North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

General Project Information

WBS Element:	32572.1.13	**TIP Number:**	A-0009CA	**Project Type:**	Roadway Widening	**Date:**	11/1/2021
NCDOT Contact:	Josh Deyton, PE			**Contractor / Designer:**	TGS Engineers / Ben Henegar, PE		
Address:	253 Webster Rd Sylva, NC 28779			**Address:**	706 Hillsborough St. - Suite 200 Raleigh, NC 27603		
Phone:	828-586-2141			**Phone:**	919-773-8887 Ext. 123		
Email:	jbdeyton@ncdot.gov			**Email:**	bhenegar@tgsengineers.com		
City/Town:	Robbinsville, NC			**County(ies):**	Graham		
River Basin(s):	Little Tennessee			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	3.75 Miles	**Surrounding Land Use:**	Forested, Agriculture, Rural Residential				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	27.8	ac.		15.2	ac.		
Typical Cross Section Description:	1.) Three 12.0' paved lanes, 2.5' curb and gutter, 5.0' sidewalks (LT & RT) - 0.3 Miles 2.) Three 12.0' paved lanes, 10.0' shoulders (8.0' paved / 2.0' grassed), grassed side slopes ranging from 4:1 to 2:1 - 3.45 Miles			1.) Three 12.0' paved lanes, 2.5' curb and gutter, 5.0' sidwalk (LT) - 0.3 Miles 2.) Two 12.0 paved lanes, 8.0' grassed shoulders, grassed side slopes ranging from 4:1 to 2:1 - 3.45 Miles			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	8800	Year: 2045	Existing:	6300	Year:	2019

General Project Narrative: (Description of Minimization of Water Quality Impacts)

STIP project A-0009C is part of Corridor K of the Appalachian Development Highway System (ADHS) and improves the existing alignments of US 129, NC 143, and NC 28 between US 129 south of Robbinsville and the existing four-lane section of NC 28 in Stecoah in Graham County, NC. The project improves roadway shoulders and adding passing / climbing lanes for the length of the project. A-0009C is broken into three projects (A-0009CA, A-0009CB, & A-0009CC).

A-0009CA includes US 129 and NC 143 in Robbinsville and extends to SR 1223 (Beech Creek Rd) along NC 143.

Project minimum measures include:

>2:1 fill slopes.
>1.5:1 cut slopes where possible.
>Expressway gutter and shoulder berm gutter to reduce cross-section width.
>Alignment shifts to avoid relocations and avoid / minimize stream, wetland, and historic resource impacts.
>Alignment shifts and either symmetrical or asymmetrical widening to fit a best-fit alignment to avoid / minimize impacts and reduce earthwork.
>Maximizing shoulder section.
>Providing adequate ground cover.
>Stabilizing embankments and drainage ditches.
>Providing adequate energy dissipation.
>Utilizing natural features and drainage pathways - Existing drainage pathways were utilized to the maximum extent practicable.
>Retaining and extending existing culverts where practicable to minimize in-stream work.

Dry detention basins are proposed to the maximum extent practicable adjacent to Tulula Creek inside the Town of Robbinsville.

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WBS Element: 32572.1.13 **TIP/Proj No.:** A-0009CA **County(ies):** Graham

General Project Information

Waterbody Information

Surface Water Body (1):	Tulula Creek		**NCDWR Stream Index No.:**	2-190-2-(0.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	Trout Waters (Tr)			
Other Stream Classification:						
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Talula Creek, SE			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**		
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

Surface Water Body (2):	Tulula Creek		**NCDWR Stream Index No.:**	2-190-2-(14)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	Trout Waters (Tr)	Critical Area (CA)		
Other Stream Classification:						
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Talula Creek			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

Surface Water Body (3):	Sweetwater Creek		**NCDWR Stream Index No.:**	2-190-3-(0.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	Trout Waters (Tr)			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Sweetwater Creek, SG, SI, SJ, SK, SO, SM, SN, SR, SS, ST, SU, SV, SW, SX			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

WBS Element: 32572.1.13 **TIP No.:** A-0009CA **County(ies):** Graham

Additional Waterbody Information

Surface Water Body (4):	Slay Bacon Branch		**NCDWR Stream Index No.:**	2-190-3-7		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Slay Bacon Branch			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

Surface Water Body (5):	Pigpen Branch		**NCDWR Stream Index No.:**	2-190-3-5-1		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Pigpen Branch			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

Surface Water Body (6):	Harwood Branch		**NCDWR Stream Index No.:**	2-190-3-5		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Harwood Branch			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

Surface Water Body (7):	Beech Creek		**NCDWR Stream Index No.:**	2-190-3-3		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Beech Creek			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

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WBS Element: 32572.1.13 **TIP/Proj No.:** A-0009CA **County(ies):** Graham

Swale

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
*5	L	13+50	RT	35.32448	-83.801377	(2)Tulula Creek	0.0	2.0	8.0	2.3	230	250	1.00%	8.4	1.9	11.1	2.1	No	No
6	L	20+05	RT	35.325256	-83.799471	(2)Tulula Creek	0.0	4.0	4.0	0.7	66	195	2.00%	1.3	1.7	1.7	1.8	No	No
6	L	22+00	RT	35.325367	-83.798856	(2)Tulula Creek	0.0	4.0	4.0	0.2	23	200	2.00%	0.5	1.3	0.7	1.4	No	No
6	L	24+00	RT	35.32535	-83.798205	(2)Tulula Creek	0.0	4.0	4.0	0.4	39	200	2.35%	0.9	1.6	1.2	1.7	No	No
*6	L	27+20	LT	35.325326	-83.797108	(2)Tulula Creek	0.0	4.0	2.0	0.9	87	180	1.22%	2.4	1.7	3.2	1.9	No	No
*6	L	27+50	RT	35.325114	-83.797092	(2)Tulula Creek	0.0	4.0	2.0	0.4	40	200	1.09%	1.0	1.3	1.4	1.4	No	No
*7**	L	31+50	RT	35.324785	-83.795813	(3)Sweetwater Creek	0.0	4.0	2.0	1.3	130	100	0.57%	2.6	1.3	3.4	1.4	No	No
*7**	L	34+10	RT	35.324569	-83.794977	(3)Sweetwater Creek	0.0	4.0	2.0	2.6	260	140	0.59%	3.6	1.4	4.8	1.6	No	No
7/8	L	44+40	RT	35.323713	-83.791691	(3)Sweetwater Creek	0.0	4.0	4.0	0.8	76	140	2.29%	1.2	1.7	1.6	1.9	No	No
8**	L	46+70	LT	35.323766	-83.790863	(3)Sweetwater Creek	0.0	4.0	4.0	4.8	480	130	1.52%	3.8	2.0	5.1	2.1	No	No
8**	L	48+50	LT	35.323602	-83.790276	(3)Sweetwater Creek	0.0	4.0	4.0	4.3	430	190	1.45%	4.3	2.0	5.7	2.1	No	No
*8**	L	51+30	LT	35.323362	-83.789401	(3)Sweetwater Creek	0.0	4.0	2.0	1.8	180	70	0.43%	2.9	1.2	3.8	1.3	No	No
*11	L	83+00	LT	35.325405	-83.779683	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	39	250	0.62%	1.1	1.1	1.4	1.2	No	No
*11	L	87+50	LT	35.325285	-83.778144	(3)Sweetwater Creek	0.0	4.0	2.0	0.8	83	200	0.81%	1.9	1.4	2.5	1.5	No	No
*10/11	L	81+50	RT	35.325214	-83.780168	(3)Sweetwater Creek	0.0	4.0	2.0	0.9	86	350	2.31%	1.7	2.0	2.3	2.2	No	No
*12	L	103+50	LT	35.326326	-83.773467	(3)Sweetwater Creek	0.0	4.0	2.0	0.2	20	50	4.00%	0.6	1.9	0.7	2.0	No	No
*12	L	105+50	LT	35.326801	-83.773135	(3)Sweetwater Creek	0.0	4.0	2.0	0.3	26	100	3.66%	0.7	1.9	0.9	2.0	No	No
*12	L	107+00	LT	35.327158	-83.772884	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	37	150	2.58%	1.0	1.8	1.3	1.9	No	No
*12	L	108+00	LT	35.327418	-83.772714	(4)Slay Bacon Branch	0.0	4.0	2.0	0.4	40	100	1.73%	0.8	1.5	1.1	1.6	No	No
*12/13	L	109+00	LT	35.327648	-83.772556	(4)Slay Bacon Branch	2.0	4.0	2.0	1.1	113	150	1.78%	3.0	2.0	4.0	2.2	No	No
*13	L	120+20	LT	35.330022	-83.770150	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	39	330	1.60%	0.7	1.4	0.9	1.5	No	No
*13	L	120+50	RT	35.32988	-83.769960	(3)Sweetwater Creek	0.0	4.0	2.0	1.5	150	300	1.79%	2.4	2.0	3.2	2.1	No	No
*13/14	L	127+50	RT	35.330506	-83.767746	(3)Sweetwater Creek	0.0	4.0	2.0	4.0	400	400	0.51%	4.8	1.5	6.4	1.6	No	No
*14	L	127+00	LT	35.330669	-83.768006	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	11	100	0.68%	0.3	0.8	0.4	0.9	No	No
*14	L	128+00	LT	35.330793	-83.767699	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	11	100	0.77%	0.3	0.9	0.4	0.9	No	No
*14	L	129+50	LT	35.330936	-83.767227	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	12	120	1.03%	0.3	1.0	0.4	1.1	No	No
*14	L	132+00	LT	35.331157	-83.766432	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	13	150	2.72%	0.4	1.4	0.5	1.6	No	No
*14	L	131+00	RT	35.330883	-83.766665	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	41	200	2.71%	0.8	1.8	1.1	1.9	No	No
*15	L	143+50	RT	35.332092	-83.762742	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	8	50	1.50%	0.2	1.0	0.3	1.1	No	No
*15	L	145+00	RT	35.332227	-83.762264	(6)Harwood Branch	0.0	4.0	2.0	0.5	50	200	0.65%	0.8	1.0	1.1	1.1	No	No
*15**	L	150+50	RT	35.332764	-83.760540	(3)Sweetwater Creek	2.0	4.0	2.0	2.9	290	150	0.66%	4.9	1.6	6.5	1.7	No	No
*16	L	152+00	RT	35.332916	-83.760071	(3)Sweetwater Creek	0.0	4.0	2.0	0.2	18	100	0.70%	0.5	0.9	0.7	1.0	No	No
*16	L	153+00	RT	35.333017	-83.759760	(3)Sweetwater Creek	0.0	4.0	2.0	0.5	47	230	0.61%	1.3	1.1	1.7	1.2	No	No
*16	L	155+30	RT	35.333248	-83.759042	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	36	170	0.71%	1.0	1.1	1.3	1.2	No	No
*16	L	158+00	RT	35.333528	-83.758205	(3)Sweetwater Creek	0.0	4.0	2.0	0.5	50	200	1.32%	0.6	1.3	0.8	1.3	No	No
*16	L	160+50	RT	35.333777	-83.757430	(3)Sweetwater Creek	0.0	4.0	2.0	0.7	70	100	1.48%	0.8	1.4	1.1	1.5	No	No
16	L	162+85	RT	35.334049	-83.756688	(3)Sweetwater Creek	0.0	3.0	6.0	0.4	35	100	1.10%	0.4	1.0	0.6	1.1	No	No
*16	L	163+50	RT	35.334153	-83.756511	(3)Sweetwater Creek	0.0	4.0	2.0	1.5	146	200	2.39%	1.8	2.0	2.3	2.2	No	No

Additional Comments

Where slope (and drainage area/discharge) vary, maximum applicable velocity is entered.

*Side slopes average together to meet the minimum recommended 3:1 side slope for purposes of swale criteria.

**Provided length exceeds the recommended length for the portion of the contributing drainage area within NCDOT right of way.

North Carolina Department of Transportation

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Swales

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
*17	L	171+40	RT	35.335685	-83.754553	(3)Sweetwater Creek	0.0	4.0	2.0	1.6	160	220	0.86%	1.9	1.4	2.5	1.5	No	No
18**	L	181+05	RT	35.337919	-83.752797	(3)Sweetwater Creek	0.0	4.0	4.0	3.7	370	155	1.29%	4.4	1.9	5.9	2.1	No	No
18	L	183+15	RT	35.338415	-83.752436	(3)Sweetwater Creek	0.0	4.0	4.0	2.2	220	285	1.79%	2.6	1.9	3.5	2.1	No	No
*18/19	L	194+50	RT	35.340369	-83.749737	(3)Sweetwater Creek	0.0	4.0	2.0	0.7	70	200	0.32%	1.4	0.9	1.9	1.0	No	No
*19	L	199+50	RT	35.340803	-83.748162	(7)Beech Creek	0.0	4.0	2.0	1.5	154	200	1.26%	2.5	1.8	3.3	1.9	No	No

Additional Comments

Where slope (and drainage area/discharge) vary, maximum applicable velocity is entered.

*Side slopes average together to meet the minimum recommended 3:1 side slope for purposes of swale criteria.

**Provided length exceeds the recommended length for the portion of the contributing drainage area within NCDOT right of way.

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Other Toolbox Best Management Practices

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	BMP Type	Drainage Area (ac)	New Built-Upon Area (ac)	Volume Treated (ac-ft)	Precipitation Depth Treated over NBUA (in)	BMP Associated w/ Buffer Rules?
4	L	14+90	RT	35.32464	-83.800938	(2)Tulula Creek	Dry Detention Basin	2.0	0.1	0.2332	29.44	No
5	Y1	23+55	RT	35.321093	-83.802197	(1)Tulula Creek	Dry Detention Basin	2.0	0.3	0.076	3.20	No

Additional Comments

L 19+90 RT - Precipitation Depth Treated over Total Impervious Area = 2.10 Inches

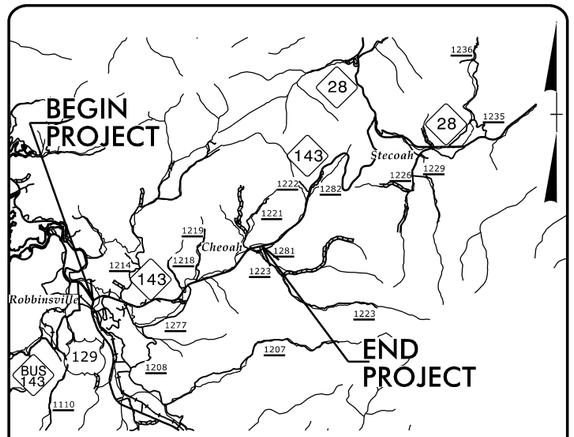
Y1 23+55 RT - Precipitation Depth Treated over Total Impervous Area = 0.69 Inches

09/08/99

CONTRACT:

TIP PROJECT: A–0009CA

See Sheet 1A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRAHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A–0009CA	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
32572.1.13	APD–0074(178)	PE
32572.2.13	APD–0074(178)	ROW,UTIL.
32572.3.13	APD–0074(178)	CONST.

PERMIT DRAWING
SHEET 1 OF 42

LOCATION: UPGRADE US 129 FROM SOUTH OF SR 1275 (FIVE POINTS ROAD) TO NC 143 AND UPGRADE NC 143 FROM US 129 TO SR 1223 (BEECH CREEK ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CULVERTS, RETAINING WALLS, AND SIGNALS

WETLAND & SURFACE WATER IMPACTS

NAD 83/2011

★ PROPOSED SIGNAL

END CONSTRUCTION
–Y1– STA. 36+70.00

BEGIN TIP PROJECT A–0009CA
–L– STA. 10+20.02

END TIP PROJECT A–0009CA
–L– STA. 208+00.00

BEGIN CULVERT –L– STA. 194+98±
END CULVERT –L– STA. 195+34±

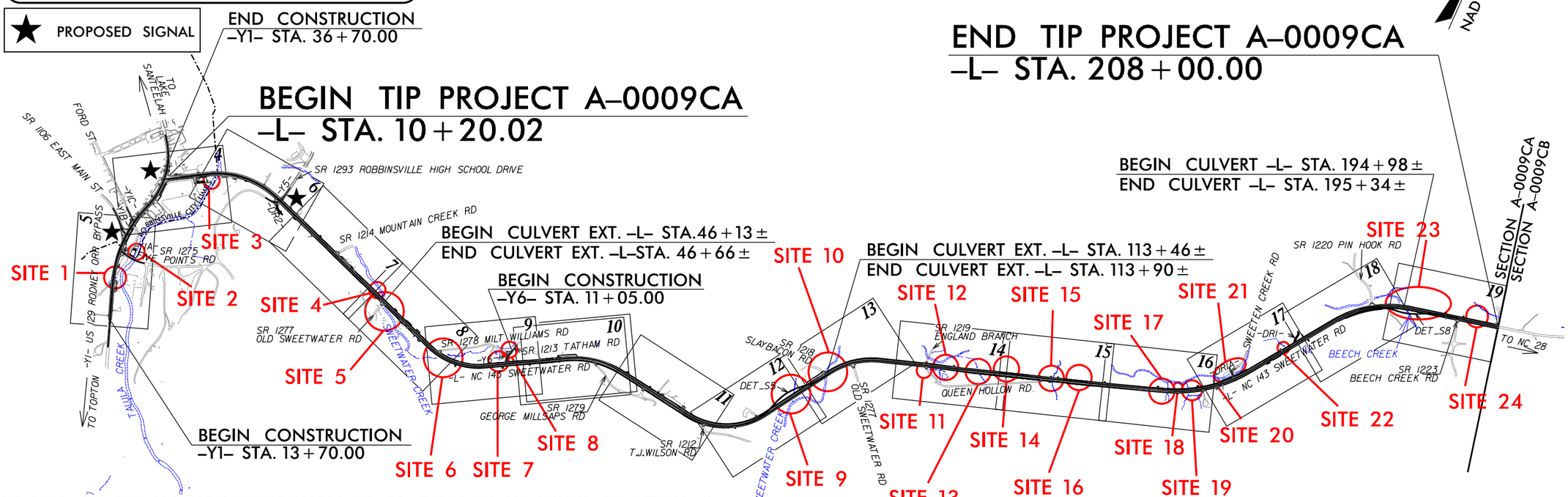
BEGIN CULVERT EXT. –L– STA.46+13±
END CULVERT EXT. –L–STA. 46+66±

BEGIN CULVERT EXT. –L– STA. 113+46±
END CULVERT EXT. –L– STA. 113+90±

BEGIN CONSTRUCTION
–Y6– STA. 11+05.00

BEGIN CONSTRUCTION
–Y1– STA. 13+70.00

SECTION A–0009CA
SECTION A–0009CB



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF ROBBINSVILLE.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS 50 25 0 50 100

PROFILE (HORIZONTAL) 50 25 0 50 100

PROFILE (VERTICAL) 10 5 0 10 20

DESIGN DATA

ADT 2019 = 6300
ADT 2045 = 8800
K = 11 %
D = 57.5%
T = 7 % *
V = 50MPH – BEGIN PROJECT TO FIVE POINTS RD
60MPH – FIVE POINTS RD TO END OF PROJECT
* TTST =2% DUAL =5%
FUNC CLASS = RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT A–0009CA	=	3.746 MILES
LENGTH STRUCTURE TIP PROJECT A–0009CA	=	0.027 MILES
TOTAL LENGTH TIP PROJECT A–0009CA	=	3.746 MILES

NCDOT CONTACT: WANDA H. AUSTIN, PE

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

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 14
252 Webster Rd
Sylva, NC 28779

RIGHT OF WAY DATE:
JULY 16, 2021

LETTING DATE:
AUGUST 16, 2022

2018 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

AUSTIN TURNER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

12/13/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_Hyd_prm_tsh.dgn
User:zrichard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

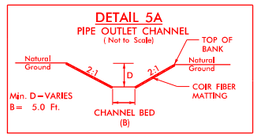
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

8/17/99

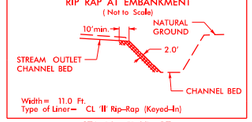
REVISIONS

DETAIL 5A
PIPE OUTLET CHANNEL
(Not to Scale)



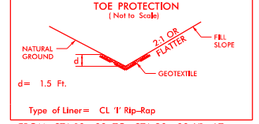
STA. 19+51–Y1– RT

DETAIL 5B
RIP RAP AT EMBANKMENT
(Not to Scale)



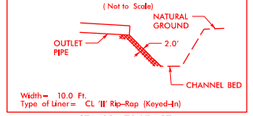
STA. 19+51–Y1– RT

DETAIL 5C
TOE PROTECTION
(Not to Scale)



FROM STA.18+80 TO STA.20+00–Y1– LT.

DETAIL 5D
RIP-RAP AT EMBANKMENT
(Not to Scale)



STA. 23+70–Y1– RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

–Y1A– CURVE DATA
PI Sta 12+48.39
Δ = 27° 40' 40.3" (LT)
D = 10° 31' 56.3"
L = 262.79'
T = 134.01'
R = 544.00'
③ –Y1A– PC 11+14.38

–Y1B– CURVE DATA
PI Sta 10+93.09
Δ = 7° 33' 51.9" (RT)
D = 7° 09' 43.1"
L = 105.62'
T = 52.89'
R = 800.00'

PI Sta 13+65.73
Δ = 40° 16' 26.4" (LT)
D = 57° 17' 44.8"
L = 70.29'
T = 36.67'
R = 100.00'
① –Y1B– PC 13+29.06
② –Y1B– PT 13+99.35

–Y1– CURVE DATA
PI Sta 24+35.36
Δ = 38° 00' 53.8" (RT)
D = 3° 10' 59.2"
L = 1,194.27'
T = 620.05'
R = 1,800.00'
SE = 0.03
DS = 45 MPH

PERMIT DRAWING
SHEET 2 OF 42

NAD 83/2011

BEGIN CONSTRUCTION
–Y1– STA. 13+70.00

BEGIN CONSTRUCTION
–Y1B– STA. 13+13.92

–Y1– PC 18+15.31

–Y1– POC 25+54.61 =
–Y1B– POT 14+16.85

–Y1– POC 23+20.33 =
–Y1A– POT 10+00.00

–Y1B– PT 11+45.83

END CONSTRUCTION
–Y1A– STA. 10+62.95

MATCH LINE STA
–Y1– 27+00.00
MATCH TO SHEET NO. 4

FOR –Y1– PROFILE, SEE SHEET NO. 27

SITE 1

SITE 2

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROP CONC MONOLITHIC ISLAND (SURFACE MOUNT)

PROP CONC SIDEWALK

PROPOSED SIGNAL

SA ELIGIBLE AND UNASSESSED SITES

AMOS ENTERPRISES, LLC
DB 328 PG 679

ROBERT COLVARD, SR., ET AL TRUSTEES
DB 362 PG 580

RITA A. SAWYER
DB 302 PG 178

ADAMS CONTRACTING CO.
DB 365 PG 673

NCDOT
DB 43 PG 599

ADAMS CONTRACTING CO.
DB 366 PG 313

HERVE CODY CONTRACTOR, LLC
DB 385 PG 80

EDDIE R. BROOMS, JR.
DB 335 PG 807

MILDRED F. HOOPER
DB 1812 PG 324

FIRST BAPTIST CHURCH OF ROBBINSVILLE, NORTH CAROLINA, INC.
DB 193 PG 472

J. & J. SOUTHLAND REALTY, INC.
DB 277 PG 7

JACKIE L. CRISP
DB 243 PG 519

TREE CLEARING SHALL BE LIMITED TO 5' PAST THE SLOPE STAKES WITHIN THE HPB. PLACE PROTECTION FENCING PRIOR TO CONSTRUCTION.

PROP. DRIVE

TEMPORARY STREAM IMPACT

BURY INVERT 1.0' BELOW STREAM BED

PERMANENT STREAM IMPACT

REMOVE HW

TOE PROECTION SEE DETAIL 5C CL 'I' RIP-RAP EST. 60 TONS GEOTEXTILE EST. 130 SY

PIPE OUTLET CHANNEL SEE DETAIL 5A S=1.0% L=45' EST. 150 CY DDE EST. 90 SY COIR FIBER MATTING

DO NOT DISTURB BILLBOARD

RIP-RAP AT EMBANKMENT SEE DETAIL 5B CL 'II' RIP-RAP EST. 25 TONS

CL 'I' RIP-RAP EST. 40 TONS (KEYED-IN IF ON BANKS ONLY)

CL 'I' RIP-RAP EST. 10 TONS GEOTEXTILE EST. 20 SY

CL 'B' RIP-RAP EST. 5 TONS GEOTEXTILE EST. 10 SY

RIP-RAP AT EMBANKMENT SEE DETAIL 5D CL 'II' RIP-RAP EST. 5 TONS

DRY DENT. BASIN #1

ROBBINSVILLE CITY LIMIT

PROP. 72" BLACK POWDER COATED CHAINLINK FENCE WITH GATE

PROP. DRIVE (GRAVEL BEHIND FENCE)

MONOLITHIC CONC. ISLAND

100' TAPER TO EXIST.

US 129 (RODNEY ORR BYPASS)

N 19° 52' 00.0" W

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User:jbenner

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

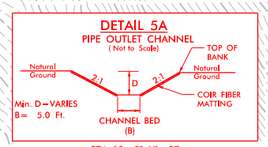
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

PERMIT DRAWING SHEET 3 OF 42

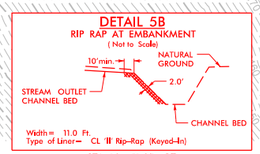
NAD 1/ 83/2011

DETAIL 5A
PIPE OUTLET CHANNEL
(Not to Scale)



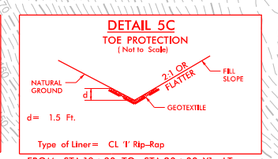
STA. 19+51-Y1- RT

DETAIL 5B
RIP RAP AT EMBANKMENT
(Not to Scale)



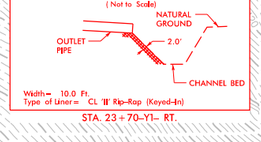
STA. 19+51-Y1- RT

DETAIL 5C
TOE PROTECTION
(Not to Scale)



FROM STA.18+80 TO STA.20+00-Y1- LT.

DETAIL 5D
RIP-RAP AT EMBANKMENT
(Not to Scale)



STA. 23+70-Y1- RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

-Y1A- CURVE DATA
PI Sta 12+48.39
Δ = 27° 40' 40.3" (LT)
D = 10° 31' 56.3"
L = 262.79'
T = 134.01'
R = 544.00'
③ -Y1A- PC 11+14.38

-Y1B- CURVE DATA
PI Sta 10+93.09
Δ = 7° 33' 51.9" (RT)
D = 7° 09' 43.1"
L = 105.62'
T = 52.89'
R = 800.00'

-Y1- CURVE DATA
PI Sta 13+65.73
Δ = 40° 16' 26.4" (LT)
D = 57° 17' 44.8"
L = 70.29'
T = 36.67'
R = 100.00'
① -Y1B- PC 13+29.06
② -Y1B- PT 13+99.35

PI Sta 24+35.36
Δ = 38° 00' 53.8" (RT)
D = 3° 10' 59.2"
L = 1,194.27'
T = 620.05'
R = 1,800.00'
SE = 0.03
DS = 45 MPH

BEGIN CONSTRUCTION
-Y1- STA. 13+70.00

BEGIN CONSTRUCTION
-Y1B- STA. 13+13.92

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-Y1- PC 18+15.31

-Y1- POC 25+54.61 = -Y1B- POT 14+16.85

-Y1- POC 23+20.33 = -Y1A- POT 10+00.00

-Y1B- PT 11+45.83

SITE 1

SITE 2

AMOS ENTERPRISES, LLC
DB 328 PG 679

PROP. DRIVE

TREE CLEARING SHALL BE LIMITED TO 5' PAST THE SLOPE STAKES WITHIN THE HPB. PLACE PROTECTION FENCING PRIOR TO CONSTRUCTION.

TEMPORARY STREAM IMPACT

BURY INVERT 1.0' BELOW STREAM BED

TOE PROTECTION SEE DETAIL 5C CL 'I' RIP-RAP EST. 60 TONS GEOTEXTILE EST. 130 SY

PERMANENT STREAM IMPACT

REMOVE HW

PLUG

15" RCP-IV

PDE

CB

HPB

SA

TULULA CREEK

PIPE OUTLET CHANNEL SEE DETAIL 5A S=1.0% L=45' EST. 150 CY DDE EST. 90 SY COIR FIBER MATTING

BURY INVERT 1.0' BELOW STREAM BED

RIP-RAP AT EMBANKMENT SEE DETAIL 5B CL 'II' RIP-RAP EST. 25 TONS

DO NOT DISTURB BILLBOARD

RIP-RAP AT EMBANKMENT SEE DETAIL 5D CL 'II' RIP-RAP EST. 5 TONS

CL 'I' RIP-RAP EST. 10 TONS GEOTEXTILE EST. 120 SY

CL 'B' RIP-RAP EST. 5 TONS GEOTEXTILE EST. 10 SY

ROBERT COLVARD, SR., ET AL TRUSTEES
DB 362 PG 580

RITA A. SAWYER
DB 302 PG 178

ADAMS CONTRACTING CO.
DB 365 PG 673

NCDOT
DB 43 PG 599

ADAMS CONTRACTING CO.
DB 366 PG 313

HERVE CODY CONTRACTOR, LLC
DB 385 PG 80

EDDIE R. BROOMS, JR.
DB 335 PG 807

MILDRED F. HOOPER
DB 130 PG 424
DB 193 PG 472

FIRST BAPTIST CHURCH OF ROBBINSVILLE, NORTH CAROLINA, INC.
DB 193 PG 472

JACKIE L. CRISP
DB 243 PG 519

J. & J. SOUTHLAND REALTY, INC.
DB 277 PG 7

MONOLITHIC CONC. ISLAND

PROP. 72" BLACK POWDER COATED CHAINLINK FENCE WITH GATE
-Y1A- PT 13+77.17

PROP. DRIVE (GRAVEL BEHIND FENCE)

ROBBINSVILLE CITY LIMIT

DRY DENT. BASIN #1

MATCH LINE STA -Y1- 27+00.00 MATCH TO SHEET NO. 4

PROP CONC MONOLITHIC ISLAND (SURFACE MOUNT)

PROP CONC SIDEWALK

PROPOSED SIGNAL

SA ELIGIBLE AND UNASSESSED SITES

FOR -Y1- PROFILE, SEE SHEET NO. 27

8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 21+39.93
△ = 51° 06' 09.7" (RT)
D = 4° 56' 21.4"
L = 1,034.62'
T = 554.57'
R = 1,160.00'
SE = 0.04
DS = 50 MPH

-Y5- CURVE DATA
PI Sta 11+51.55
△ = 9° 49' 14.7" (RT)
D = 9° 32' 57.5"
L = 102.84'
T = 51.55'
R = 600.00'

PI Sta 12+96.74
△ = 78° 27' 45.3" (RT)
D = 49° 49' 20.7"
L = 157.48'
T = 93.90'
R = 115.00'

① -Y5- PCC 12+02.84
② -Y5- PT 13+60.33

-DR2- CURVE DATA
PI Sta 11+03.23
△ = 37° 57' 56.5" (LT)
D = 55° 05' 31.5"
L = 68.91'
T = 35.78'
R = 104.00'
SE = NC
③ -DR2- PC 10+67.46
④ -DR2- PT 11+36.37
Ⓑ S 31° 49' 15.2" E

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING
SHEET 4 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

NAD 83/2011

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-Y5- POT 10+00.00
-L- POT 26+74.83 = -Y5- POC 12+26.19
-Y5- PC 11+00.00
S 9°55'00.0" W
PROP. DRIVE
TOMMY R. COLLINS, ET AL DB 195 PG 465
RELOCATE FENCE (BY OWNER)
+23.54
5' SIDEWALK
PROP. HANDRAIL -L- STA. 17+10 TO 17+90, LT
ROBBINSVILLE CITY LIMIT
CONNECT TO EXIST. BOX CULVERT
RETAIN 4@12'x14' RCBC
TEMPORARY STREAM IMPACT
PERMANENT STREAM IMPACT
RIP-RAP AT EMBANKMENT SEE DETAIL 6A CL 'II' RIP-RAP, EST. 30 TONS
HEADWALL TO BE EXTENDED SEE STRUCTURE PLANS
SITE 3
PROP. HANDRAIL -L- STA. 16+75 TO 17+60, RT
RELOCATE (BY OTHERS)
PROP. CONCRETE DRIVE
TOMMY R. COLLINS, ET AL DB 195 PG 465 DB 195 PG 468
JACK E. MILLSAPS DB 355 PG 252
OLIVER L. AMMONS DB 139 PG 127
-Y5- POT 14+50.00
-L- PT 26+19.98
N 8°48'00.0" W
-Y5- POC 12+80.00 = -DR2- POT 10+00.00
-DR2- POT 12+00.00
END CONSTRUCTION -DR2- STA. 11+60.00
S 69°47'11.7" E
150' TAPER
BM#2 ELEV. 2015.91' -BL- STA. 21+59.00 103' RT. CHISELED 'X' IN CONC PAD FOR TRAFFIC SIGNAL BOX
MATCH LINE STA -L- 16+00.00 MATCH TO SHEET NO. 4
MATCH LINE STA -L- 30+00.00 MATCH TO SHEET NO. 7

DETAIL 6A
RIP-RAP AT EMBANKMENT
(Not to Scale)
NATURAL GROUND
2.0'
OUTLET PIPE
CHANNEL BED
Width= 22.0 Ft.
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
STA. 16+35-L- RT.

DETAIL 6B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
2:1
D
2:1
Fill Slope
Min. D=1.0 Ft.
FROM STA.10+42 TO STA.11+50-DR2- LT.

DETAIL 6C
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
2:1
D
4:1 or Flatter
Fill Slope
Min. D=1.5 Ft.
FROM STA.27+00 LT TO STA.27+50-L- RT.

PROP CONC SIDEWALK
PROPOSED SIGNAL
SA ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 20
FOR -DR2- PROFILE, SEE SHEET NO. 28

8/13/2021
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User:jhenegar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

8/17/99
REVISIONS

-L- CURVE DATA
PI Sta 21+39.93
△ = 51° 06' 09.7" (RT)
D = 4° 56' 21.4"
L = 1,034.62'
T = 554.57'
R = 1,160.00'
SE = 0.04
DS = 50 MPH

-Y5- CURVE DATA
PI Sta 11+51.55
△ = 9° 49' 14.7" (RT)
D = 9° 32' 57.5"
L = 102.84'
T = 51.55'
R = 600.00'
① -Y5- PCC 12+02.84
② -Y5- PT 13+60.33

PI Sta 12+96.74
△ = 78° 27' 45.3" (RT)
D = 49° 49' 20.7"
L = 157.48'
T = 93.90'
R = 115.00'

-DR2- CURVE DATA
PI Sta 11+03.23
△ = 37° 57' 56.5" (LT)
D = 55° 05' 31.5"
L = 68.91'
T = 35.78'
R = 104.00'
SE = NC
③ -DR2- PC 10+67.46
④ -DR2- PT 11+36.37
Ⓑ S 31° 49' 15.2" E

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 5 OF 42

NAD 83/2011

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-Y5- POT 10+00.00
-L- POT 26+74.83 =
-Y5- POC 12+26.19
-Y5- PC 11+00.00
S 9° 55' 00.0" W
RELOCATE FENCE (BY OWNER)
+23.54
+79.98
30' TYP
PROP. DRIVE
PROP. DRIVE
PROP. DRIVE
PROP. DRIVE
PROP. CONCRETE DRIVE
5' SIDEWALK
5' SIDEWALK
PROP. HANDRAIL -L- STA. 17+10 TO 17+90, LT
PROP. HANDRAIL -L- STA. 16+75 TO 17+60, RT
ROBBINSVILLE CITY LIMIT
CONNECT TO EXIST. BOX CULVERT
RETAIN 4@12'x14' RCBC
TEMPORARY STREAM IMPACT
TEMPORARY STREAM IMPACT
PERMANENT STREAM IMPACT
RELOCATE (BY OTHERS)
HEADWALL TO BE EXTENDED SEE STRUCTURE PLANS
RIP-RAP AT EMBANKMENT SEE DETAIL 6A CL "II" RIP-RAP EST. 30 TONS
SITE 3
TOMMY R. COLLINS, ET AL DB 195 PG 465
TOMMY R. COLLINS, ET AL DB 195 PG 465 DB 195 PG 468
JACK E. MILLSAPS DB 355 PG 252
JACK E. MILLSAPS DB 355 PG 252
OLIVER L. AMMONS DB 139 PG 127
GREENHOUSE
WD SHED
WD BARN
IS BR D
IS MTL BUS
S BLK BUS
PASTURE
GRAHAM COUNTY BOARD OF EDUCATION
ROBBINSVILLE HS ENTRANCE
PAULA CREEK
DUKE POWER R/W
SR 1275
-Y5- POT 14+50.00
-L- PT 26+19.98
N 8° 48' 00.0" W
S 69° 47' 11.7" E
-Y5- POC 12+80.00 =
-DR2- POT 10+00.00
-DR2- POT 12+00.00
END CONSTRUCTION -DR2- STA. 11+60.00
BM#2 ELEV. 2015.91' BL - STA. 24+59.00 103' RT. CHISELED 'X' IN CONC. PAD FOR TRAFFIC SIGNAL BOX
TIE -L- TYP. CUT DITCH TO -DR2- DITCH S=4.3% SEE DETAIL 6C
SPECIAL LATERAL 'V' DITCH SEE DETAIL 6B
150' TAPER
+75
+01.81
+08
+38.84
+50
+00.00
MATCH LINE STA -L- 16+00.00 MATCH TO SHEET NO. 4
MATCH LINE STA -L- 30+00.00 MATCH TO SHEET NO. 7

DETAIL 6A
RIP-RAP AT EMBANKMENT
(Not to Scale)
NATURAL GROUND
OUTLET PIPE
2.0'
CHANNEL BED
Width= 22.0 Ft.
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
STA. 16+35-L- RT.

DETAIL 6B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
2:1
D
2:1
Fill Slope
Min. D=1.0 Ft.
FROM STA.10+42 TO STA.11+50-DR2- LT.

DETAIL 6C
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
2:1
D
4:1 or Flatter
Fill Slope
Min. D=1.5 Ft.
FROM STA.27+00 LT TO STA.27+50-L- RT.

PROP CONC SIDEWALK
PROPOSED SIGNAL
SA ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 20
FOR -DR2- PROFILE, SEE SHEET NO. 28

8/13/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_06_con.dgn
User:jbenson

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

8/17/99

REVISIONS

MATCH LINE STA -L- 44+00.00
MATCH TO SHEET NO. 7

MATCH LINE STA -L- 56+00.00
MATCH TO SHEET NO. 9

NAD 83/2011

PERMIT DRAWING SHEET 6 OF 42

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

-L- CURVE DATA
PI Sta 59+31.02
Δ = 49° 37' 23.2" (LT)
D = 5° 58' 05.9"
L = 831.44'
T = 443.82'
R = 960.00'
SE = 0.08
DS = 55 MPH

TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S/S DENOTES IMPACTS IN SURFACE WATER
F/F DENOTES FILL IN WETLAND

12 JACK MILLSAPS DB 327 PG 22

13 HILDRED E. MILLSAPS, TRUSTEE, ET AL DB 195 PG 129

14 LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 91 DB 363 PG 36 TRACT 1

15 JAMES HALL DB 253 PG 537

16 DANA J. SMITH DB 145 PG 728

17 ERIC FORD, ET AL DB 360 PG 1

18 LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 36 TRACT 2

21 BARRY L. QUEEN DB 388 PG 569

LOVIN MANAGEMENT COMPANY, LLC DB 358 PG 447

WILMA CRISP DB 120 PG 347

SITE 4

SITE 5

ROCK PLATING -L- STA. 42+00 TO 45+64, LT SEE NCDOT RDY STD 275.01 EST. SY

CULVERT OUTLET CHANNEL SEE DETAIL 8E CL 'II' RIP-RAP EST. 100 TONS EST. 90 CY DDE

PIPE OUTLET CHANNEL SEE DETAIL 8B CL 'I' RIP-RAP EST. 25 TONS EST. 25 CY DDE L=8 FT S=5.0%

15" CSP ROD AND LUG WITH GASKETS (ELBOWS)

30" CSP ROD AND LUG WITH GASKETS (ELBOWS)

CONNECTION TO PROP. RCBC EXT.

SHOULDER BERM GUTTER -L- STA. 42+00 TO 47+00, LT

CL 'I' RIP-RAP EST. 6 TONS GEOTEXTILE EST. 14 SY

DO NOT DISTURB BILLBOARD

PROP. DRIVE

PROP. DRIVE

PROP. DRIVE

SPECIAL LATERAL 'V' DITCH SEE DETAIL 8A

CL 'B' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 7 SY

EXPRESSWAY GUTTER -L- STA. 53+25 TO 55+50, LT

-L- PC 54+87.20

150 RCP-IV

127"9" TRIPLE BARREL CONC. BOX CULVERT

RETAIN AND EXTEND

3@12'x9' RCBC EXTENSION

15" RCP-IV

15" CMP REMOVE

15" RCP-IV

42" RCP-IV

S 69° 47' 11.7" E

SWEETWATER CREEK

EL 'B' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 2 SY

BM#3 ELEV. 2016.23' -BL- STA. 43+76.03 34' RT. SPIKE NAIL IN BASE OF 10" POPLAR

PROP. CONCRETE DRIVE

EXPRESSWAY GUTTER -L- STA. 49+00 TO 52+33, RT

UT TO SWEETWATER CREEK (SI)

BANK STABILIZATION SEE DETAIL 8C CL 'II' RIP-RAP EST. 350 TONS

CULVERT INLET CHANNEL SEE DETAIL 8D CL 'II' RIP-RAP EST. 140 TONS EST. 80 CY DDE

ROCK PLATING -L- STA. 44+50 TO 45+00, RT SEE NCDOT RDY STD 275.01 EST. SY

ROCK PLATING -L- STA. 47+14 TO 48+00, RT SEE NCDOT RDY STD 275.01 EST. SY

FILL IN WETLAND

DO NOT DISTURB SEPTIC

720' TAPER

DO NOT DISTURB SIGN

CL 'I' RIP-RAP EST. 25 TONS

14" CSP ROD AND LUG WITH GASKETS (ELBOWS)

3@12'x9' RCBC EXTENSION

GREU TL-2

GREU TL-3

DETAIL 8A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
FROM STA.52+00 TO STA.53+00-L- LT.

DETAIL 8B
PIPE OUTLET CHANNEL
(Not to Scale)
Min. D=4.0 Ft.
Max. d=4.0 Ft.
B=10.0 Ft.
CHANNEL BED (B)
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA.44+88-L- RT.

DETAIL 8C
BANK STABILIZATION
(Not to Scale)
TOP OF BANK
CHANNEL BED
Type of Liner= CL "II" Rip-Rap (Keyed-In)
FROM STA.47+39 TO STA.48+55-L- RT.

DETAIL 8D
CULVERT INLET CHANNEL
(LEFT TO RIGHT LOOKING DS)
(Not to Scale)
STA.47+20-L- RT.

DETAIL 8E
CULVERT OUTLET CHANNEL
(LEFT TO RIGHT LOOKING DS)
(Not to Scale)
STA.46+00-L- LT.

FOR -L- PROFILE, SEE SHEET NO. 21

V:\3\2021\A-0009\Hydraulics\PERMITS\Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_08.dgn
Hershberger

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

8/17/99

REVISIONS

MATCH LINE STA –L– 44+00.00 TO SHEET NO. 7

MATCH LINE STA –L– 56+00.00 TO SHEET NO. 9

-L- CURVE DATA
PI Sta 59+31.02
△ = 49° 37' 23.2" (LT)
D = 5° 58' 05.9"
L = 831.44'
T = 443.82'
R = 960.00'
SE = 0.08
DS = 55 MPH

PERMIT DRAWING SHEET 7 OF 42

TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F / F — DENOTES IMPACTS IN SURFACE WATER
F / F — DENOTES FILL IN WETLAND

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS. THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

NAD 83/2011

12 JACK MILLSAPS DB 327 PG 22

13 HILDRED E. MILLSAPS, TRUSTEE, ET AL DB 195 PG 129

14 LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 91 DB 363 PG 36 TRACT 1

15 JAMES HALL DB 253 PG 537

16 DANA J. SMITH DB 145 PG 728

17 ERIC FORD, ET AL DB 360 PG 1

18 LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 36 TRACT 2

21 BARRY L. QUEEN DB 388 PG 569

LOVIN MANAGEMENT COMPANY, LLC DB 358 PG 447

WILMA CRISP DB 120 PG 347

SITE 4

SITE 5

ROCK PLATING –L– STA. 42+00 TO 45+64, LT SEE NCDOT RDY STD 275.01 EST. SY

CULVERT OUTLET CHANNEL SEE DETAIL 8E CL 'II' RIP-RAP EST. 100 TONS EST. 90 CY DDE

SHOULDER BERM GUTTER –L– STA. 42+00 TO 47+00, LT

PIPE OUTLET CHANNEL SEE DETAIL 8B CL 'I' RIP-RAP EST. 25 TONS EST. 25 CY DDE L=8 FT S=5.0%

15" CSP ROD AND LUG WITH GASKETS (ELBOWS)

30" CSP ROD AND LUG WITH GASKETS (ELBOWS)

CONNECTION TO PROP. RCBC EXT.

CL 'I' RIP-RAP EST. 6 TONS GEOTEXTILE EST. 14 SY

DO NOT DISTURB BILLBOARD

PROP. DRIVE

PROP. DRIVE

PROP. DRIVE

-L- PC 54+87.20

SPECIAL LATERAL 'V' DITCH SEE DETAIL 8A

CL 'B' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 7 SY

EXPRESSWAY GUTTER –L– STA. 53+25 TO 55+50, LT

30" TYP

+87.20

60' R

S 69° 47' 11.7" E

3@12'x9' RCBC EXTENSION

12'x9' TRIPLE BARREL CONC. BOX CULVERT

RETAIN AND EXTEND

150' RCP-IV

15" RCP-IV

15" CMP REMOVE

18" RCP-IV REMOVE

15" RCP-IV

24" RCP-IV

EL 'B' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 2 SY

SWEETWATER CREEK

UT TO SWEETWATER CREEK (SH)

BM#3 ELEV. 2016.24' STA. 43+76.06 34' RT. SPIKE NAIL IN BASE OF 30" POPLAR

PROP. CONCRETE DRIVE

PROP. CONCRETE DRIVE

EXPRESSWAY GUTTER –L– STA. 49+00 TO 52+33, RT

ROCK PLATING –L– STA. 47+14 TO 48+00, RT SEE NCDOT RDY STD 275.01 EST. SY

BANK STABILIZATION SEE DETAIL 8C CL 'II' RIP-RAP EST. 350 TONS

CULVERT INLET CHANNEL SEE DETAIL 8D CL 'II' RIP-RAP EST. 140 TONS EST. 80 CY DDE

ROCK PLATING –L– STA. 48+50 TO 45+00, RT SEE NCDOT RDY STD 275.01 EST. SY

FILL IN WETLAND

DO NOT DISTURB SEPTIC

720' TAPER

DO NOT DISTURB SIGN

CL 'I' RIP-RAP EST. 25 TONS

3@12'x9' RCBC EXTENSION

GREU TL-2

GREU TL-3

GREU TL-4

52.43

78.60

50' R

40' R

25' R

20' R

16' R

10' R

6.5' R

200' R

8' FDPS

2GI

PDE

RETAIN

DETAIL 8A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 4:1 or Flatter, Fill Slope
Min. D=1.5 Ft.
FROM STA.52+00 TO STA.53+00–L– LT.

DETAIL 8B
PIPE OUTLET CHANNEL
(Not to Scale)
Natural Ground, 2:1, d, 1.5', D, CHANNEL BED (B), Min. D=4.0 Ft. Max. d=4.0 Ft. B=10.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA.44+88–L– RT.

DETAIL 8C
BANK STABILIZATION
(Not to Scale)
NATURAL GROUND, TOP OF BANK, 2.0', CHANNEL BED
Type of Liner= CL "II" Rip-Rap (Keyed-In)
FROM STA.47+39 TO STA.48+55–L– RT.

DETAIL 8D
CULVERT INLET CHANNEL
(LEFT TO RIGHT LOOKING DS)
(Not to Scale)
NWS=1999.2', 2' KEY-IN, 1.5', 1.2', VARIES 25'-0", 1.5', CLASS II RIP RAP
STA.47+20–L– RT.

DETAIL 8E
CULVERT OUTLET CHANNEL
(LEFT TO RIGHT LOOKING DS)
(Not to Scale)
NWS=1999.2', 2' KEY-IN, 12', 3' X 2' X 1' BOULDERWALL, 1.5', CLASS II RIP RAP
STA.46+00–L– LT.

FOR –L– PROFILE, SEE SHEET NO. 21

3/3/2021
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User:brenegar

5/14/99

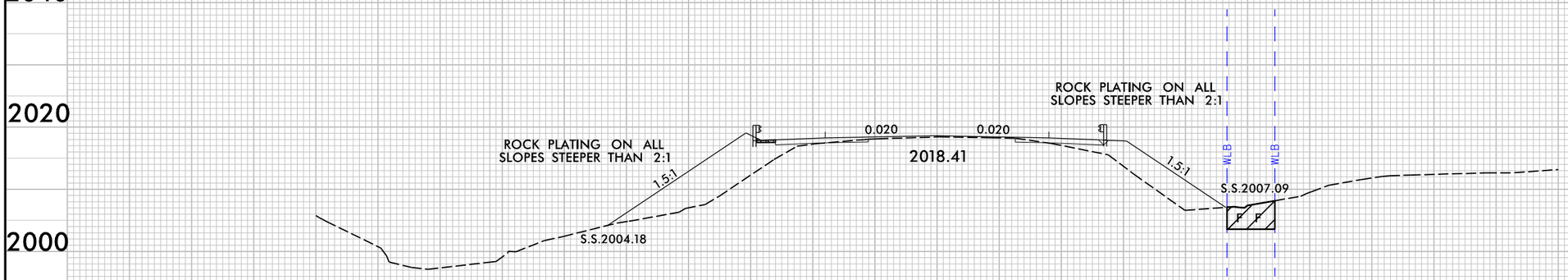
PERMIT DRAWING
SHEET 8 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F DENOTES FILL IN WETLAND

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



–L– 44+85.00

WETLAND CROSS SECTION

SITE 4

2060 2040 2020 2000 1980 1960

100' 80' 60' 40' 20' C/L 20' 40' 60' 80' 100'

8/13/2021
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User:jbenson

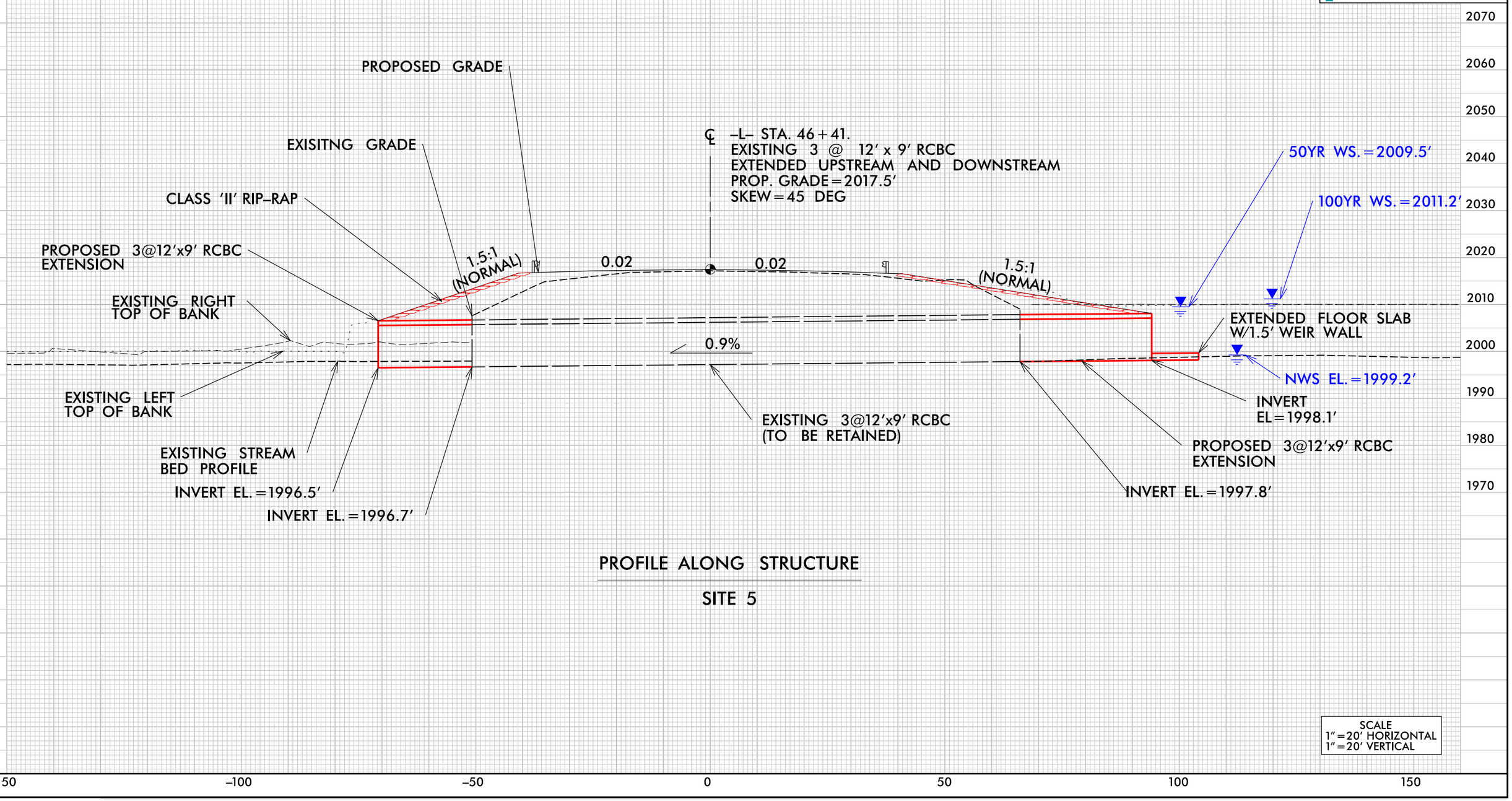
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PERMIT DRAWING SHEET 9 OF 42

–L–
NC 143



PROFILE ALONG STRUCTURE

SITE 5

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 59+31.02
Δ = 49° 37' 23.2" (LT)
D = 5° 58' 05.9"
L = 831.44'
T = 443.82'
R = 960.00'
SE = 0.08
DS = 55 MPH

-Y3- CURVE DATA
PI Sta 12+33.55
Δ = 43° 48' 04.8" (LT)
D = 57° 17' 44.8"
L = 76.45'
T = 40.20'
R = 100.00'
① -Y3- PC 12+93.35
② -Y3- PT 11+69.80
Ⓑ S 29° 24' 34.8" E

DETAIL 9G
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
4:1
2:1
1.5'
S
S=Ditch Slope
℄ Proposed Ditch
STA. 67+00-L- RT.

DETAIL 9H
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground
2:1
d
D
4:1 or Flatter
Fill Slope
Geotextile
B
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.67+00 TO STA.68+00-L- RT.

DETAIL 9I
TOE PROTECTION
(Not to Scale)
NATURAL GROUND
2:1 OR FLATTER
FILL SLOPE
d
GEOTEXTILE
d= 1.5 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.58+50 TO STA.58+96-L- RT.
FROM STA.67+20 TO STA.68+00-L- LT.

DETAIL 9J
FALSE SUMP
(Not to Scale)
0.5' Min. 1.0' Max.
Outside Ditch Traffic Flow
10:1
20:1
2.0'
GI etc.
S
S=Ditch Slope
℄ Proposed Ditch
FROM STA.59+90-L- LT.

NAD 83/2011

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 10 OF 42

-Y6- POT 10+00.00

BEGIN CONSTRUCTION
-Y6- STA. 11+05.00

NOTE:
-Y6- TO BE RESURFACED WITH 1½" S9.5B. SHOULDER SHALL BE CONSTRUCTED USING NCDOT STD. 560.01 (SHEET 1 OF 2) AND GUARDRAIL PLACED AS SHOWN ON THE PLANS. A MINIMUM OF 3' WIDENING BEHIND THE FACE OF GUARDRAIL OR EXTRA DEPTH POSTS TO BE USED.

MATCH LINE STA -L- 56+00.00
MATCH TO SHEET NO. 8

MATCH LINE STA -L- 68+00.00
MATCH TO SHEET NO. 10

SITE 6

SITE 7

SITE 8

-L- PT 63+18.65

-L- POT 66+11.28 =
-Y6-POT 13+03.70

CHRISTOPHER T. ODOM
DB 381PG 812

LOVIN MANAGEMENT COMPANY, LLC
DB 363 PG 91
DB 363 PG 36
TRACT 1

CHRISTOPHER T. ODOM
DB 381PG 812

NICHOLAS L. PHILLIPS
DB 300 PG 811

BILLY K. ANDERSON
DB 149 PG 543

BARRY L. QUEEN
DB 388 PG 569

RANCE ADAMS
DB 318 PG 227
DB 330 PG 638

SHOULDER BERM GUTTER
-L- STA. 57+00 TO 59+50, LT

ROCK PLATING
-L- STA. 57+00 TO 59+50, LT
SEE NCDOT RDY STD 275.01
EST. SY

SHOULDER BERM GUTTER
-L- STA. 64+50 TO 65+50, LT

SHOULDER BERM GUTTER
-L- STA. 66+70 TO 68+24, LT

ROCK PLATING
-L- STA. 56+00 TO 58+00, RT
SEE NCDOT RDY STD 275.01
EST. SY

PROP. DRIVE

TEMPORARY STREAM IMPACT

UT TO SWEETWATER CREEK (SI)

PIPE INLET CHANNEL
SEE DETAIL 9A
CL 'I' RIP-RAP
EST. 85 TONS
EST. 75 CY DDE

CL 'I' RIP-RAP
EST. 2 TONS
GEOTEXTILE
EST. 6 SY

15" CSP
ROD AND LUG WITH GASKETS (ELBOWS)

PIPE OUTLET CHANNEL
SEE DETAIL 9B
CL 'II' RIP-RAP
EST. 65 TONS
EST. 90 CY DDE

TOE PROJECTION
SEE DETAIL 9I
CL 'I' RIP-RAP
EST. 35 TONS
GEOTEXTILE
EST. 65 SY

FALSE SUMP
SEE DETAIL 9J

PIPE OUTLET CHANNEL
SEE DETAIL 9C
EST. 30 CY DDE
L=34 FT
S=4.1%
CL 'I' RIP-RAP
EST. 30 TONS

PIPE OUTLET CHANNEL
SEE DETAIL 9E
CL 'I' RIP-RAP
EST. 15 TONS

STANDARD BASE DITCH
SEE DETAIL 9D
EST. 15 CY DDE
L=15'
S=5.0%
CL 'I' RIP-RAP
EST. 15 TONS

RETAIN CONC. DITCH

TOE PROJECTION
SEE DETAIL 9I
CL 'I' RIP-RAP
EST. 40 TONS
GEOTEXTILE
EST. 80 SY

ROD AND LUG WITH GASKETS (ELBOWS)

FALSE SUMP
SEE DETAIL 9G

SPECIAL LATERAL BASE DITCH
SEE DETAIL 9H
CL 'I' RIP-RAP
EST. 90 TONS
GEOTEXTILE
EST. 160 SY

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 9A
PIPE INLET CHANNEL
(NOT TO SCALE)
CLASS II RIP RAP (KEYED-IN)
HT. +/-3.0'
CLASS II RIP RAP (KEYED-IN & BANKS ONLY)
STA.58+10-L- LT.

DETAIL 9B
PIPE OUTLET CHANNEL
(NOT TO SCALE)
CLASS II RIP RAP (KEYED-IN & BANKS ONLY)
(4.5')TAIL DITCH
BASE 4.5'
HT. +/-3.0'
CLASS II RIP RAP (KEYED-IN)
STA.56+60-L- RT.

DETAIL 9C
PIPE OUTLET CHANNEL
(Not to Scale)
Natural Ground
2:1
d
D
B
CHANNEL BED
Min. D=3.0 Ft.
Max. d=3.0 Ft.
B=3.0 Ft.
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA.65+06-L- LT.

DETAIL 9D
STANDARD BASE DITCH
(Not to Scale)
Natural Ground
2:1
d
D
B
Min. D=2.0 Ft.
Max. d=2.0 Ft.
B=2.0 Ft.
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA.67+10-L- LT.

DETAIL 9E
FALSE SUMP
(Not to Scale)
0.5' Min. 1.0' Max.
Outside Ditch Traffic Flow
20:1
10:1
2'
GI etc.
S
S=Ditch Slope
℄ Proposed Ditch
STA.65+70-L- RT.

DETAIL 9F
PIPE OUTLET CHANNEL
(Not to Scale)
DOWNSTREAM CHANNEL
NATURAL GROUND
30" CSP
1.5'
CLASS I RIP RAP (KEYED-IN)
STA.11+17-Y6- RT.

FOR -L- PROFILE, SEE SHEET NO. 22

8/17/2021
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PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 59+31.02
△ = 49° 37' 23.2" (LT)
D = 5° 58' 05.9"
L = 831.44'
T = 443.82'
R = 960.00'
SE = 0.08
DS = 55 MPH

-Y3- CURVE DATA
PI Sta 12+33.55
△ = 43° 48' 04.8" (LT)
D = 57° 17' 44.8"
L = 76.45'
T = 40.20'
R = 100.00'
① -Y3- PC 12+93.35
② -Y3- PT 11+69.80
Ⓑ S 29° 24' 34.8" E

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 11 OF 42

NAD 83/2011

-Y6- POT 10+00.00

BEGIN CONSTRUCTION
-Y6- STA. 11+05.00

NOTE:
-Y6- TO BE RESURFACED WITH 1½" S9.5B. SHOULDER SHALL BE CONSTRUCTED USING NCDOT STD. 560.01 (SHEET 1 OF 2) AND GUARDRAIL PLACED AS SHOWN ON THE PLANS. A MINIMUM OF 3' WIDENING BEHIND THE FACE OF GUARDRAIL OR EXTRA DEPTH POSTS TO BE USED.

MATCH LINE STA -L- 56+00.00
MATCH TO SHEET NO. 8

MATCH LINE STA -L- 68+00.00
MATCH TO SHEET NO. 10

-L- PT 63+18.65

-L- POT 66+11.28 =
-Y6-POT 13+03.70

SITE 6

SITE 7

SITE 8

14 LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 91 DB 363 PG 36 TRACT 1

19 CHRISTOPHER T. ODOM DB 381PG 812

20 NICHOLAS L. PHILLIPS DB 300 PG 811

21 BARRY L. QUEEN DB 388 PG 569

22 RANCE ADAMS DB 318 PG 227 DB 330 PG 638

23 BILLY K. ANDERSON DB 149 PG 543

CHRISTOPHER T. ODOM DB 381PG 812

SHOULDER BERM GUTTER -L- STA. 57+00 TO 59+50, LT

SHOULDER BERM GUTTER -L- STA. 64+50 TO 65+50, LT

SHOULDER BERM GUTTER -L- STA. 66+70 TO 68+24, LT

ROCK PLATING -L- STA. 56+00 TO 58+00, RT SEE NCDOT RDY STD 275.01 EST. SY

ROCK PLATING -L- STA. 57+00 TO 59+50, LT SEE NCDOT RDY STD 275.01 EST. SY

PIPE INLET CHANNEL SEE DETAIL 9A CL 'H' RIP-RAP EST. 95 TONS EST. 75 CY DDE

CL 'I' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 6 SY

15" CSP ROD AND LUG WITH GASKETS (ELBOWS)

TEMPORARY STREAM IMPACT

JB wSlab Lid 54" CSP

RETAIN 54" CSP AND LINE WITH RCP

18" CMP

UT TO SWEETWATER CREEK (SI)

FALSE SUMP SEE DETAIL 9J

PIPE OUTLET CHANNEL SEE DETAIL 9B CL 'II' RIP-RAP EST. 65 TONS EST. 90 CY DDE

TOE PROJECTION SEE DETAIL 9I CL 'I' RIP-RAP EST. 35 TONS GEOTEXTILE EST. 65 SY

PROP. DRIVE

200' TAPER

150' TAPER

360' TAPER

8'FDPS

30" TYP

PIPE OUTLET CHANNEL SEE DETAIL 9C EST. 30 CY DDE L=34 FT S=4.1% CL 'I' RIP-RAP EST. 30 TONS

RETAIN CONC. DITCH

STANDARD BASE DITCH SEE DETAIL 9D EST. 15 CY DDE L=15' S=5.0% CL 'I' RIP-RAP EST. 15 TONS

PIPE OUTLET CHANNEL SEE DETAIL 9F CL 'I' RIP-RAP EST. 15 TONS

CL 'I' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 6 SY

ROD AND LUG WITH GASKETS (ELBOWS)

TOE PROJECTION SEE DETAIL 9I CL 'I' RIP-RAP EST. 40 TONS GEOTEXTILE EST. 80 SY

FALSE SUMP SEE DETAIL 9G

REMOVE

CL 'I' RIP-RAP EST. 30 TONS

SPECIAL LATERAL BASE DITCH SEE DETAIL 9H CL 'I' RIP-RAP EST. 90 TONS GEOTEXTILE EST. 160 SY

S 14°23'30.0" W

N 60°35'25.2" E

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 9G FALSE SUMP (Not to Scale)
Outside Ditch Traffic Flow; 4:1; 2:1; 1.5'; S; S
S=Ditch Slope ℄ Proposed Ditch
STA. 67+00-L- RT.

DETAIL 9H SPECIAL LATERAL BASE DITCH (Not to Scale)
Natural Ground; 2:1; d; D; 4:1 or Flatter; Fill Slope; Geotextile; B
Min. D=1.5 Ft. Max. d=1.5 Ft. B=2.0 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.67+00 TO STA.68+00-L- RT.

DETAIL 9I TOE PROTECTION (Not to Scale)
NATURAL GROUND; d; 2:1 OR FLATTER; FILL SLOPE; GEOTEXTILE
d= 1.5 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.58+50 TO STA.58+96-L- RT.
FROM STA.67+20 TO STA.68+00-L- LT.

DETAIL 9J FALSE SUMP (Not to Scale)
Outside Ditch Traffic Flow; 10:1; 20:1; 2.0'; 0.5' Min. 1.0' Max.; GI etc.; S
S=Ditch Slope ℄ Proposed Ditch
FROM STA.59+90-L- LT.

DETAIL 9A PIPE INLET CHANNEL (NOT TO SCALE)
VAR. BASE=4.5'; CLASS II RIP RAP (KEYED-IN); HT. +/-3.0'; CLASS II RIP RAP (KEYED-IN & BANKS ONLY); 1.5'
STA.58+10-L- LT.

DETAIL 9B PIPE OUTLET CHANNEL (NOT TO SCALE)
CLASS II RIP RAP (KEYED-IN & BANKS ONLY); (4.5')TAIL DITCH; VAR.; BASE 4.5'; HT. +/-3.0'; CLASS II RIP RAP (KEYED-IN)
STA.56+60-L- RT.

DETAIL 9C PIPE OUTLET CHANNEL (Not to Scale)
Natural Ground; 2:1; d; D; 2:1; 1.5'; CHANNEL BED (B)
Min. D=3.0 Ft. Max. d=3.0 Ft. B=3.0 Ft.
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA.65+06-L- LT.

DETAIL 9D STANDARD BASE DITCH (Not to Scale)
Natural Ground; 2:1; d; D; 2:1; 1.5'; B
Min. D=2.0 Ft. Max. d=2.0 Ft. B=2.0 Ft.
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA.67+10-L- LT.

DETAIL 9E FALSE SUMP (Not to Scale)
Outside Ditch Traffic Flow; 20:1; 10:1; 0.5' Min. 1.0' Max.; 2'; GI etc.; S
S=Ditch Slope ℄ Proposed Ditch
STA.65+70-L- RT.

DETAIL 9F PIPE OUTLET CHANNEL (Not to Scale)
DOWNSTREAM CHANNEL; NATURAL GROUND; 30" CSP; 1.5'; CLASS I RIP RAP (KEYED-IN)
STA.11+17-Y6- RT.

FOR -L- PROFILE, SEE SHEET NO. 22

8/17/2021
8:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_09_con.dgn
User:bengar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

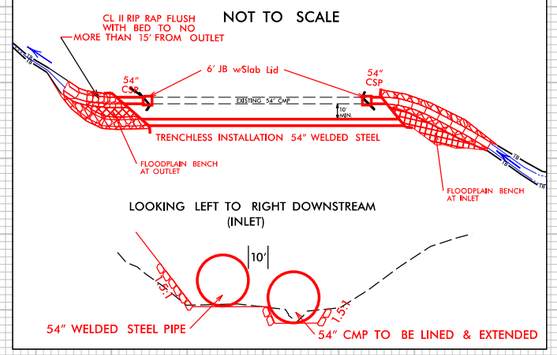
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING SHEET 12 OF 42

–L–
NC 143

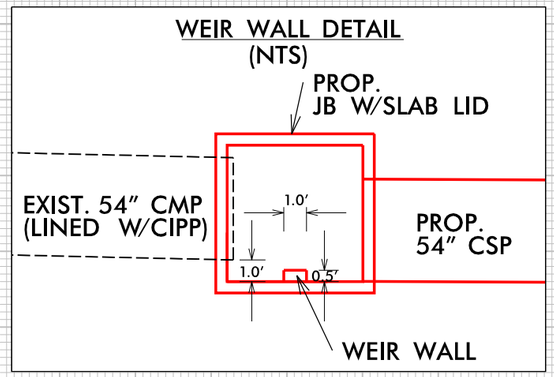
CULVERT DETAIL

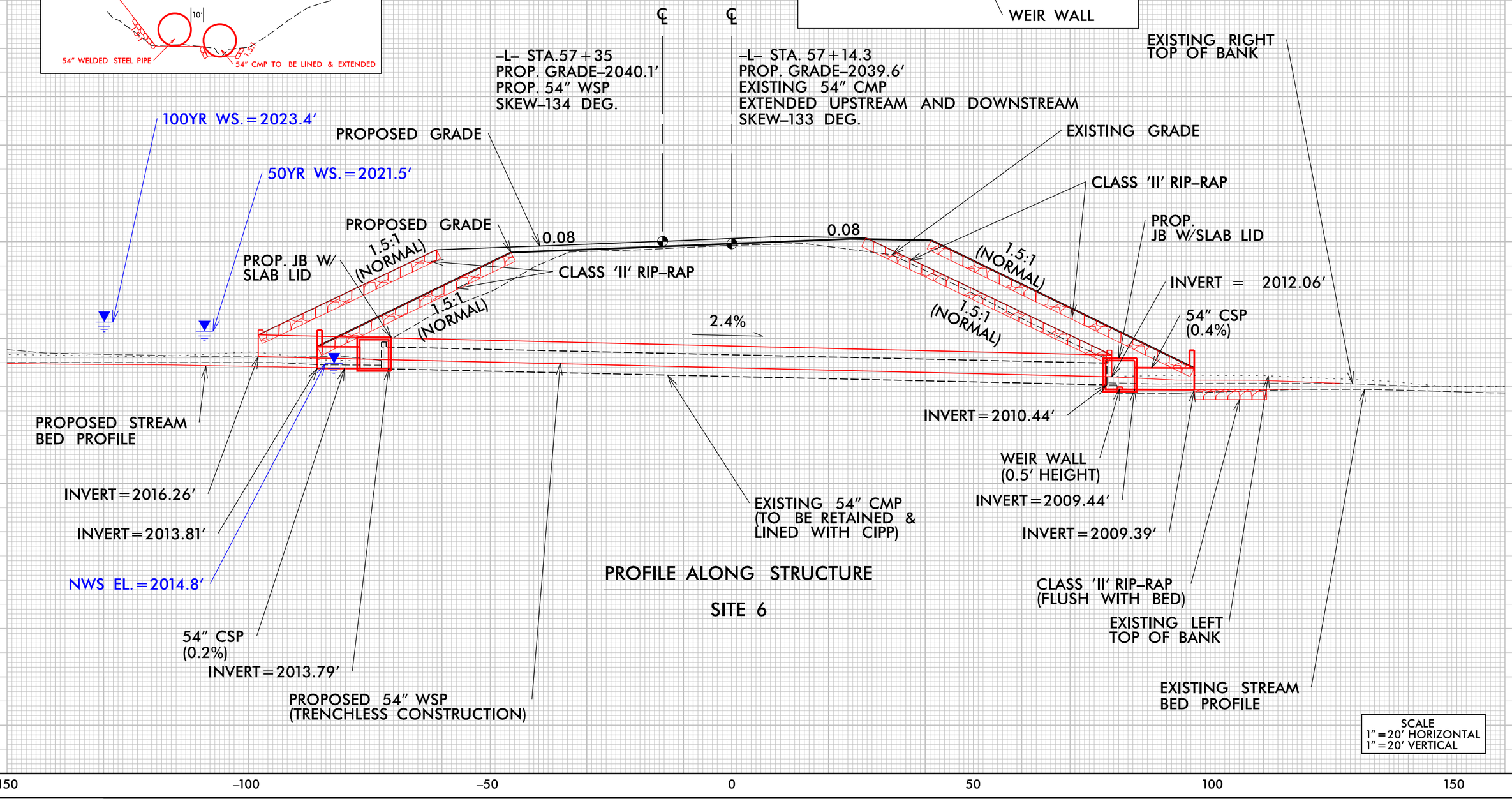
NOT TO SCALE



WEIR WALL DETAIL

(NTS)





PROFILE ALONG STRUCTURE

SITE 6

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

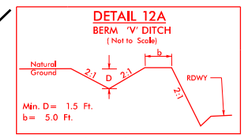
8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 98+90.11
Δ = 65° 35' 01.6" (LT)
D = 5° 58' 05.9"
L = 1,098.87'
T = 618.49'
R = 960.00'
SE = 0.08
DS = 55 MPH

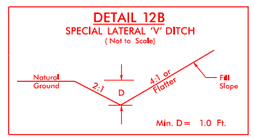
MATCH LINE STA -L- 96+00.00
MATCH TO SHEET NO. 11

DETAIL 12A
BERM 'V' DITCH
(Not to Scale)



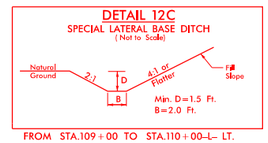
FROM STA.96+00 TO STA.96+50-L- LT
FROM STA.96+66 TO STA.99+00-L- LT

DETAIL 12B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



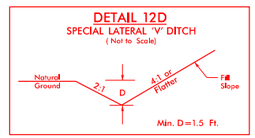
FROM STA.104+50 TO STA.108+00-L- LT.

DETAIL 12C
SPECIAL LATERAL BASE DITCH
(Not to Scale)



FROM STA.109+00 TO STA.110+00-L- LT.

DETAIL 12D
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



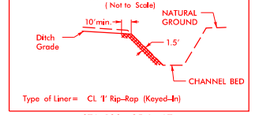
FROM STA.96+50 TO STA.99+20-L- RT.

PERMIT DRAWING SHEET 13 OF 42

5 5 DENOTES IMPACTS IN SURFACE WATER

15 15 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

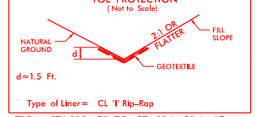
DETAIL 12E
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= CL 'I' Rip-Rap (Keyed-In)

STA. 108+95-L- LT.

DETAIL 12F
TOE PROTECTION
(Not to Scale)



Type of Liner= CL 'I' Rip-Rap

FROM STA.103+70 TO STA.104+50-L- LT.

NAD 83/2011

S 82°16'23" W
351.04'

27 LOVIN MANAGEMENT COMPANY, LLC
DB 363 PG 124
DB 363 PG 127
DB 365 PG 669

BERM 'V' DITCH SEE DETAIL 12A

BERM 'V' DITCH SEE DETAIL 12A

N 28°13'39" W
810.38'

REMOVE

18" CSP

ROD AND LUG WITH GASKETS (ELBOW)

30" RCP-III

2GI-A

8'FDPS

SR 1002 (T.A.WILSON RD)

66' BST

WOODS

EXISTING R/W

"SWEETWATER" AZ MK 15' FROM CL

32 ROBERT P. WEHR, TRUSTEE
DB 325 PG 13
DB 325 PG 17

SPECIAL LATERAL 'V' DITCH SEE DETAIL 12D

720' TAPER

SA

35 DOUGLAS E. WILSON
DB 357 PG 382

PROP. DRIVE

S 69°16'54" E
213.71'

S 37°05'05" E
1,650.05'

105

-L- PT 103+70.49

33 AVIS ANN PHILLIPS, TRUSTEE
DB 379 PG 518

36' TYP GRASS

174.49'

OTCB

15"R

2GI-A

REMOVE

FALSE SUMP SEE DETAIL 12J

GREU TL-3

15" CSP ROD AND LUG WITH GASKETS (ELBOWS)

CL 'I' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 6 SY

TIE FILL UP ON EXISTING SHOULDER FROM -L- STA 104+75 RT ON TO AVOID FILL IN FLOODPLAIN

33 AVIS ANN PHILLIPS, TRUSTEE
DB 379 PG 518

34 D. R. PHILLIPS, LLC
DB 373 PG 203

SITE 9

RIP-RAP AT EMBANKMENT SEE DETAIL 12E
CL 'I' RIP-RAP EST. 10 TONS

CL 'I' RIP-RAP EST. 40 TONS

CULVERT INLET CHANNEL SEE DETAIL 12G
CL 'II' RIP-RAP EST. 31 TONS
EST. 25 CY DDE

SPECIAL LATERAL BASE DITCH SEE DETAIL 12C

N 12°29'01" W
94.14'

SLAY BACON BRANCH

N 18°36'27" W
61.92'

TOE PROECTION SEE DETAIL 12F
CL 'I' RIP-RAP EST. 55 TONS
GEOTEXTILE EST. 110 SY

DO NOT DISTURB BILLBOARD

SEE SHEET 2B-1 FOR ONSITE DETOUR DET S5 LAYOUT.

SPECIAL LATERAL 'V' DITCH SEE DETAIL 12B

N 14°29'57" W
71.30'

FALSE SUMP SEE DETAIL 12J

34" RCP-III PLUG

36" RCP-III

GREU TL-3

8'FDPS

NC 14 (SWEETWATER RD)

24' BST

N 33°02'24" E

REMOVE

1802' AIR RELEASE BLOWBACK VALVE

STANDARD BASE DITCH SEE DETAIL 12K
L=30 FT
S=1.0%
CL 'I' RIP-RAP EST. 40 TONS
EST. 45 CY DDE

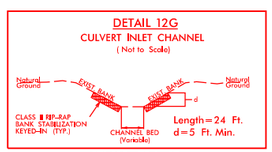
CULVERT OUTLET CHANNEL SEE DETAIL 12H
CL 'II' RIP-RAP EST. 89 TONS
EST. 50 CY DDE

SWEETWATER CREEK

PASTURE

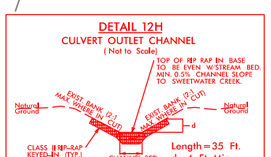
MATCH LINE STA -L- 110+00.00
MATCH TO SHEET NO. 13

DETAIL 12G
CULVERT INLET CHANNEL
(Not to Scale)



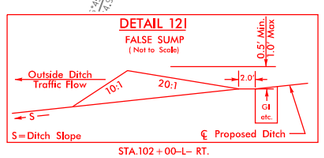
STA.108+75-L- LT.

DETAIL 12H
CULVERT OUTLET CHANNEL
(Not to Scale)



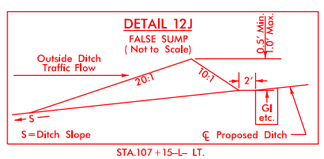
STA.107+85-L- RT.

DETAIL 12I
FALSE SUMP
(Not to Scale)



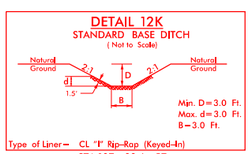
STA.102+00-L- RT.

DETAIL 12J
FALSE SUMP
(Not to Scale)



STA.107+15-L- LT.

DETAIL 12K
STANDARD BASE DITCH
(Not to Scale)



Type of Liner- CL 'I' Rip-Rap (Keyed-In)

STA.107+00-L- RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

SEE SHEET 2B-1 FOR ONSITE DETOUR DET_5S

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 23

10/6/2021
XX:XX:XX
User:hhenegar
I:\2021\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_12.dgn

-L- CURVE DATA
PI Sta 98+90.11
Δ = 65° 35' 01.6" (LT)
D = 5° 58' 05.9"
L = 1,098.87'
T = 618.49'
R = 960.00'
SE = 0.08
DS = 55 MPH

MATCH LINE STA -L- 96+00.00
MATCH TO SHEET NO. 11

MATCH LINE STA -L- 110+00.00
MATCH TO SHEET NO. 13

NAD 83/2011

PERMIT DRAWING
SHEET 14 OF 42

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 12A
BERM 'V' DITCH
(Not to Scale)
FROM STA.96+00 TO STA.96+50-L- LT
FROM STA.96+66 TO STA.99+00-L- LT

DETAIL 12B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
FROM STA.104+50 TO STA.108+00-L- LT.

DETAIL 12C
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
B=2.0 Ft.
FROM STA.109+00 TO STA.110+00-L- LT.

DETAIL 12D
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.5 Ft.
FROM STA.96+50 TO STA.99+20-L- RT.

DETAIL 12E
RIP RAP AT EMBANKMENT
(Not to Scale)
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA. 108+95-L- LT.

DETAIL 12F
TOE PROTECTION
(Not to Scale)
d=1.5 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.103+70 TO STA.104+50-L- LT.

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

REVISIONS

8/17/99

10/6/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_12_con.dgn
User:bbenege

27 LOVIN MANAGEMENT COMPANY, LLC
DB 363 PG 124
DB 363 PG 127
DB 365 PG 669

32 ROBERT P. WEHR, TRUSTEE
DB 325 PG 13
DB 325 PG 17

35 DOUGLAS E. WILSON
DB 357 PG 382

33 AVIS ANN PHILLIPS, TRUSTEE
DB 379 PG 518

34 D. R. PHILLIPS, LLC
DB 373 PG 203

SITE 9

PROP. DRIVE

-L- PT 103+70.49

BERM 'V' DITCH SEE DETAIL 12A

REMOVE

18" CSP

ROD AND LUG WITH GASKETS (ELBOW)

30" RCP-III

2GI-A

2GI-C

8'FDPS

SPECIAL LATERAL 'V' DITCH SEE DETAIL 12D

720' TAPER

SA

TOE PROECTION SEE DETAIL 12F
CL 'I' RIP-RAP EST. 55 TONS
GEOTEXTILE EST. 110 SY

DO NOT DISTURB BILLBOARD

SEE SHEET 2B-1 FOR ONSITE DETOUR DET 5S LAYOUT.

SPECIAL LATERAL 'V' DITCH SEE DETAIL 12B

FALSE SUMP SEE DETAIL 12J

RIP-RAP AT EMBANKMENT SEE DETAIL 12E
CL 'I' RIP-RAP
EST. 10 TONS

CL 'I' RIP-RAP EST. 40 TONS

CULVERT INLET CHANNEL SEE DETAIL 12G
CL 'II' RIP-RAP
EST. 31 TONS
EST. 25 CY DDE

SPECIAL LATERAL BASE DITCH SEE DETAIL 12C

36" RCP-III

GREU TL-3

STANDARD BASE DITCH SEE DETAIL 12K
L=30 FT
S=1.0%
CL 'I' RIP-RAP
EST. 40 TONS
EST. 45 CY DDE

CULVERT OUTLET CHANNEL SEE DETAIL 12H
CL 'II' RIP-RAP
EST. 89 TONS
EST. 50 CY DDE

TIE FILL UP ON EXISTING SHOULDER FROM -L- STA 104+75 RT ON TO AVOID FILL IN FLOODPLAIN

CL 'I' RIP-RAP EST. 2 TONS
GEOTEXTILE EST. 6 SY

SWEETWATER CREEK

N 33° 02' 24.1" E

DETAIL 12G
CULVERT INLET CHANNEL
(Not to Scale)
Length=24 Ft.
d=5 Ft. Min.
STA.108+75-L- LT.

DETAIL 12H
CULVERT OUTLET CHANNEL
(Not to Scale)
Length=35 Ft.
d=4 Ft. Min.
STA.107+85-L- RT.

DETAIL 12I
FALSE SUMP
(Not to Scale)
S=Ditch Slope
℄ Proposed Ditch
STA.102+00-L- RT.

DETAIL 12J
FALSE SUMP
(Not to Scale)
S=Ditch Slope
℄ Proposed Ditch
STA.107+15-L- LT.

DETAIL 12K
STANDARD BASE DITCH
(Not to Scale)
Min. D=3.0 Ft.
Max. d=3.0 Ft.
B=3.0 Ft.
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA.107+00-L- RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

SEE SHEET 2B-1 FOR ONSITE DETOUR DET_5S

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 23

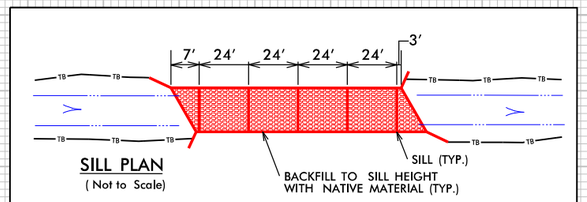
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

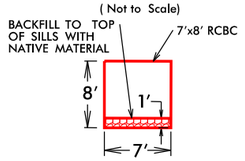
PERMIT DRAWING SHEET 15 OF 42

–L–
NC 143



SILL PLAN
(Not to Scale)

SILL DETAIL
(Not to Scale)



NOTES:
1) TOP OF SILLS SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

PROFILE ALONG STRUCTURE

SITE 9

SCALE
1″=20′ HORIZONTAL
1″=20′ VERTICAL

8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 117+87.67
Δ = 39° 02' 13.1" (RT)
D = 5° 30' 33.2"
L = 708.58'
T = 368.66'
R = 1,040.00'
SE = 0.08
DS = 55 MPH

DETAIL 13A
SPECIAL LATERAL BASE DITCH
(Not to Scale)
FROM STA.110+00 TO STA.110+50-L- LT.

DETAIL 13B
TOE PROTECTION
(Not to Scale)
Type of Liner- CL 'I' Rip-Rap
FROM STA.114+50 TO STA.116+00-L- LT.

DETAIL 13C
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Type of Liner= CL 'I' Rip-Rap
FROM STA.118+50 TO STA.119+50-L- RT.

DETAIL 13D
TOE PROTECTION
(Not to Scale)
Type of Liner= CL 'B' Rip-Rap
FROM STA.119+50 TO STA.120+50-L- RT.

DETAIL 13E
FALSE SUMP
(Not to Scale)
STA.120+10-L- LT.

PERMIT DRAWING
SHEET 16 OF 42

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

NAD 83/2011

MATCH LINE STA -L- 110+00.00
MATCH TO SHEET NO. 12

SITE 10

3@11'x9' RCBC EXTENSION

TOE PROECTION
SEE DETAIL 13B
CL 'I' RIP-RAP
EST. 75 TONS
GEOTEXTILE
EST. 165 SY

CULVERT INLET CHANNEL
SEE DETAIL 13F
CL 'II' RIP-RAP
EST. 90 TONS
EST. 15 CY DDE

SPECIAL LATERAL BASE DITCH SEE DETAIL 13A

PROP. DRIVE

RETAIN AND EXTEND 3@11'x9' RCBC AT INLET

TEMPORARY STREAM IMPACT

SWEETWATER CREEK

CULVERT OUTLET CHANNEL
SEE DETAIL 13G
CL 'II' RIP-RAP
EST. 50 TONS
EST. 90 CY DDE

-L- PC 114+19.01

RETAIN

+17.00
EX. RW

+75.00
76.00

REMOVE

24" CMP

30" RCP

+73.53

+19.06

60'R

50'R

CL 'I' RIP-RAP
EST. 11 TONS
GEOTEXTILE
EST. 21 SY

RETAIN EXIST. CONC DITCH

SPECIAL LATERAL BASE DITCH
SEE DETAIL 13C
CL 'I' RIP-RAP
EST. 80 TONS
GEOTEXTILE
EST. 120 SY

BM#6 ELEV. 2100.03'
-BL- STA. 113+70.00 17' RT.
SPIKE NAIL SET IN
BASE OF 24" WHITE OAK

TOE PROECTION
SEE DETAIL 13D
CL 'B' RIP-RAP
EST. 30 TONS
GEOTEXTILE
EST. 90 SY

CL 'B' RIP-RAP
EST. 1 TON
GEOTEXTILE
EST. 5 SY

ROD AND LUG FITTINGS AND GASKETS AS FOLLOWS: 1# CAP

FALSE SUMP SEE DETAIL 13E

FLOWABLE FILL

PLUG

-L- PT 121+27.59

34
D. R. PHILLIPS, LLC
DB 373 PG 203

33
AVIS ANN PHILLIPS, TRUSTEE
DB 379 PG 518

36
GILBERT D. LANCE, ET AL
DB 364 PG 530
(DB 57 PG 356)

36
GILBERT D. LANCE, ET AL
DB 364 PG 530
(DB 57 PG 356)

N 06°49'54" E 583.39'
S 15°51'30" W 28.13'
S 32°37'30" W 60.81'
N 54°58'30" W 51.76'
N 40°00'00" W 65.15'
N 33°02'24" E
N 72°04'37" E

WOODS
PASTURE
GR
SA
IS
BT
F
E
C
-L-
115
120

DETAIL 13F
CULVERT INLET CHANNEL
Looking Downstream (Not to Scale)
REMOVE EXISTING SILTED MATERIAL FROM EACH BARREL
3@11'x9' RCBC
Approx. Natural Ground @ Exist. Face
CLASS II RIP-RAP BANK STABILIZATION KEYED-IN (TYP.)
Length = 48 Ft.
Min. d = 4 Ft.
STA.114+10-L- LT.

DETAIL 13G
CULVERT OUTLET CHANNEL
Looking Downstream (Not to Scale)
REMOVE EXISTING SILTED MATERIAL FROM EACH BARREL
3@11'x9' RCBC
CLASS II RIP-RAP BANK STABILIZATION KEYED-IN (TYP.)
SINGLE LINE OF 3'x2'x1' BOULDERS
Length = 66 Ft.
Min. d = 4 Ft.
STA.113+45-L- RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

SEE SHEET 2B-1 FOR ONSITE DETOUR DET_5S

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 24

MATCH LINE STA -L- 124+00.00
MATCH TO SHEET NO. 14

8/17/2021
R:\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_13.dgn
User:hbenegar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

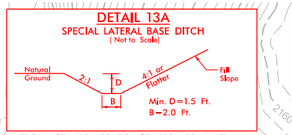
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

8/17/99

REVISIONS

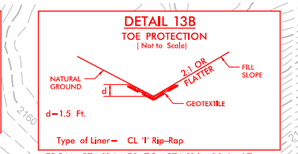
-L- CURVE DATA
PI Sta 117+87.67
Δ = 39° 02' 13" (RT)
D = 5° 30' 33.2"
L = 708.58'
T = 368.66'
R = 1,040.00'
SE = 0.08
DS = 55 MPH

DETAIL 13A
SPECIAL LATERAL BASE DITCH
(Not to Scale)



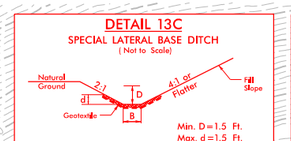
FROM STA.110+00 TO STA.110+50-L- LT.

DETAIL 13B
TOE PROTECTION
(Not to Scale)



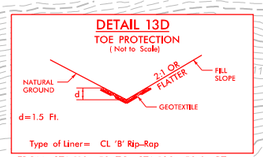
Type of Liner= CL 'I' Rip-Rap
FROM STA.114+50 TO STA.116+00-L- LT.

DETAIL 13C
SPECIAL LATERAL BASE DITCH
(Not to Scale)



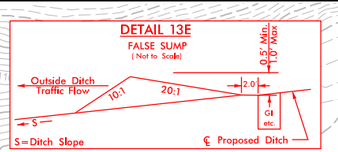
Type of Liner= CL 'I' Rip-Rap
FROM STA.118+50 TO STA.119+50-L- RT.

DETAIL 13D
TOE PROTECTION
(Not to Scale)



Type of Liner= CL 'B' Rip-Rap
FROM STA.119+50 TO STA.120+50-L- RT.

DETAIL 13E
FALSE SUMP
(Not to Scale)



STA.120+10-L- LT.

PERMIT DRAWING SHEET 17 OF 42

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/2011

MATCH LINE STA -L- 110+00.00
MATCH TO SHEET NO. 12

SITE 10

TOE PROECTION
SEE DETAIL 13B
CL 'I' RIP-RAP
EST. 75 TONS
GEOTEXTILE
EST. 165 SY

CULVERT INLET CHANNEL
SEE DETAIL 13F
CL 'II' RIP-RAP
EST. 90 TONS
EST. 15 CY DDE

3@11'x9' RCBC EXTENSION

SPECIAL LATERAL BASE DITCH SEE DETAIL 13A

RETAIN AND EXTEND 3@11'x9' RCBC AT INLET

PROP. DRIVE

TEMPORARY STREAM IMPACT

SWEETWATER CREEK

CULVERT OUTLET CHANNEL
SEE DETAIL 13G
CL 'II' RIP-RAP
EST. 50 TONS
EST. 90 CY DDE

RETAIN

REMOVE

CL 'I' RIP-RAP
EST. 11 TONS
GEOTEXTILE
EST. 21 SY

RETAIN EXIST. CONC. DITCH

SPECIAL LATERAL BASE DITCH
SEE DETAIL 13C
CL 'I' RIP-RAP
EST. 80 TONS
GEOTEXTILE
EST. 120 SY

CL 'B' RIP-RAP
EST. 1 TON
GEOTEXTILE
EST. 5 SY

ROD AND LUG INTO CONC. GUTTER FLUSH

FALSE SUMP SEE DETAIL 13E

TOE PROECTION
SEE DETAIL 13D
CL 'B' RIP-RAP
EST. 30 TONS
GEOTEXTILE
EST. 90 SY

FLOWABLE FILL

PLUG

BM=6 ELEV. 2100.03'
-BL- STA. 113+70.06 17' RT.
SPIKE NAIL SET IN
BASE OF 24" WHITE OAK

-L- PC 114+19.01

-L- PT 121+27.59

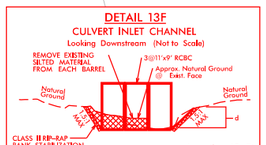
34
D. R. PHILLIPS, LLC
DB 373 PG 203

33
AVIS ANN PHILLIPS, TRUSTEE
DB 379 PG 518

36
GILBERT D. LANCE, ET AL
DB 364 PG 530
(DB 57 PG 356)

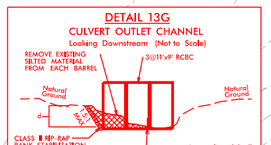
36
GILBERT D. LANCE, ET AL
DB 364 PG 530
(DB 57 PG 356)

DETAIL 13F
CULVERT INLET CHANNEL
Looking Downstream (Not to Scale)



STA.114+10-L- LT.

DETAIL 13G
CULVERT OUTLET CHANNEL
Looking Downstream (Not to Scale)



STA.113+45-L- RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

SEE SHEET 2B-1 FOR ONSITE DETOUR DET_5S

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 24

MATCH LINE STA -L- 124+00.00
MATCH TO SHEET NO. 14

8/17/2021
R:\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_13_con.dgn
User:brenegar

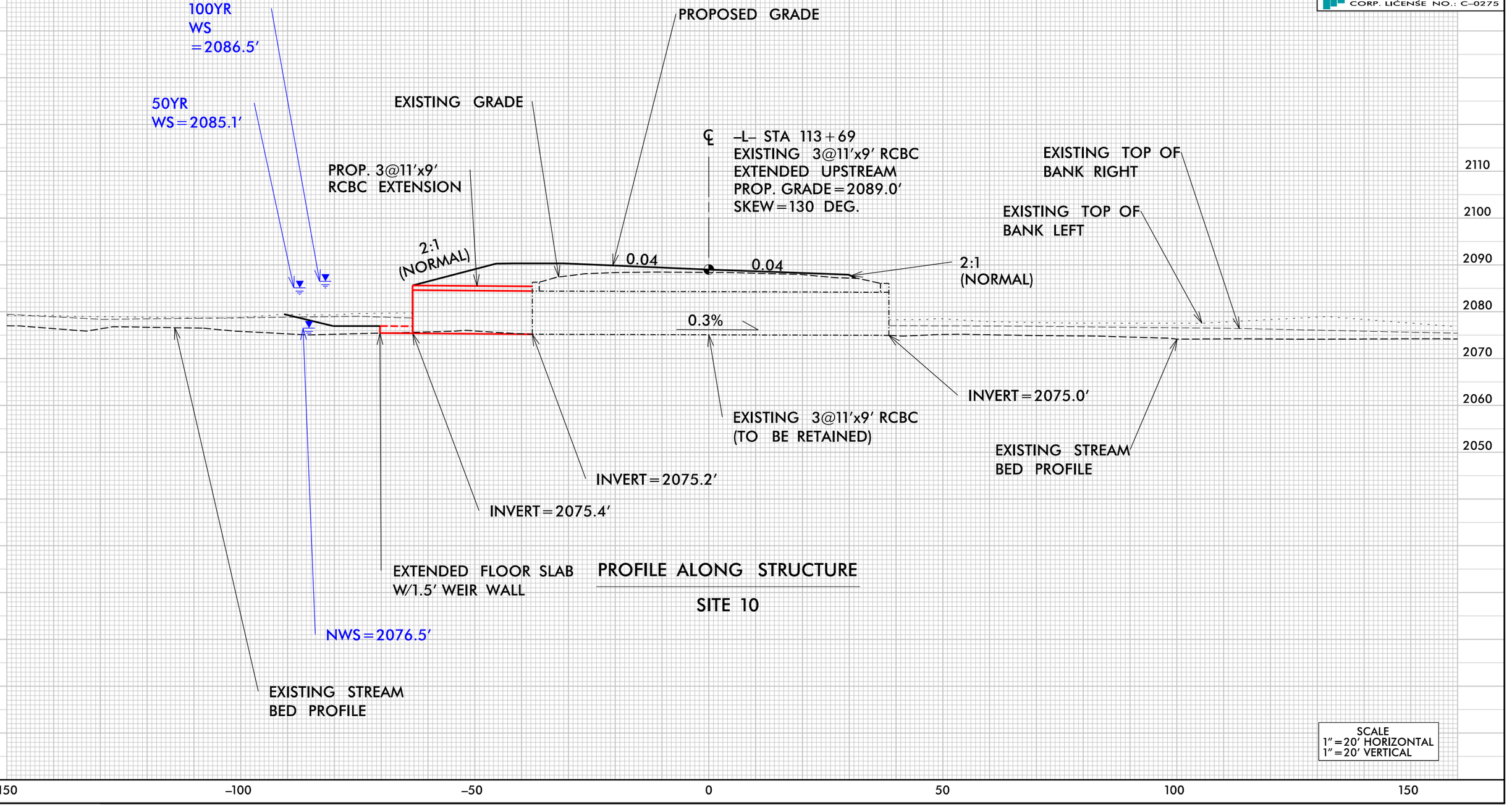
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PERMIT DRAWING SHEET 18 OF 42

–L–
NC 143



PROFILE ALONG STRUCTURE

SITE 10

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

8/17/99

REVISIONS

MATCH LINE STA –L– 124+00.00
MATCH TO SHEET NO. 13

MATCH LINE STA –L– 138+00.00
MATCH TO SHEET NO. 15

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

NAD 83/2011

NOTE:
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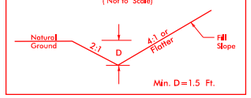
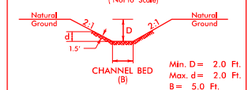
DETAIL 14A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



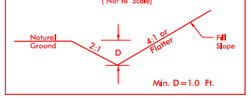
FROM STA.127+00 TO STA.127+25–L– LT.
FROM STA.127+80 TO STA.128+00–L– LT.

DETAIL 14B
PIPE OUTLET CHANNEL
(Not to Scale)



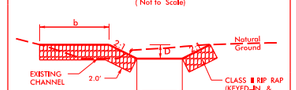
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA. 129+13–L– LT.

DETAIL 14C
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



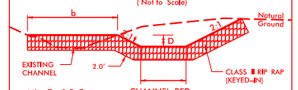
FROM STA.129+50 TO STA.130+70–L– LT.
FROM STA.131+50 TO STA.132+00–L– LT.
FROM STA.130+00 TO STA.131+00–L– RT.

DETAIL 14D
PIPE INLET CHANNEL
(Not to Scale)



STA.135+20–L– RT.

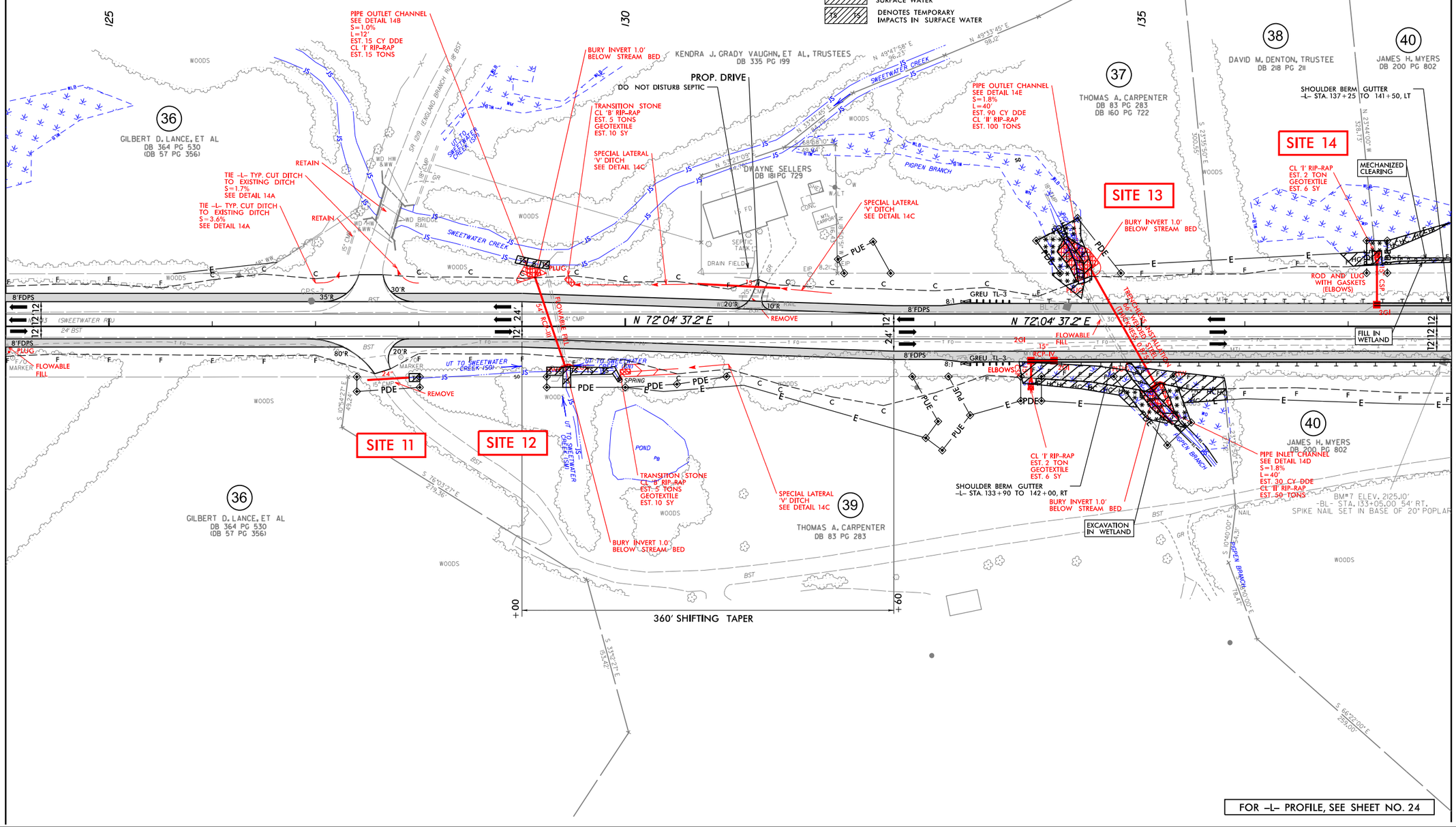
DETAIL 14E
PIPE OUTLET CHANNEL
(Not to Scale)



STA.134+40–L– LT.

PERMIT DRAWING SHEET 19 OF 42

E E	DENOTES EXCAVATION IN WETLAND
HC HC	DENOTES HAND CLEARING
	DENOTES MECHANIZED CLEARING
F F	DENOTES FILL IN WETLAND
S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER



10/6/2021
X:\6000\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_14.dgn
User:bhenegar

MATCH LINE STA –L– 124+00.00
MATCH TO SHEET NO. 13



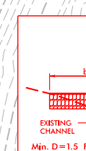
FROM STA.127+00 TO STA.127+25–L– LT.
FROM STA.127+80 TO STA.128+00–L– LT.



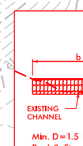
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA. 129+13–L– LT.



FROM STA.129+50 TO STA.130+70–L– LT.
FROM STA.131+50 TO STA.132+00–L– LT.
FROM STA.130+00 TO STA.131+00–L– RT.



STA.135+20–L– RT.



STA.134+40–L– LT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE–IN PER CROSS–SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PERMIT DRAWING SHEET 20 OF 42

DENOTES EXCAVATION IN WETLAND
DENOTES HAND CLEARING
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PIPE OUTLET CHANNEL SEE DETAIL 14B S=1.0% L=12' EST. 15 CY DDE CL 'I' RIP-RAP EST. 15 TONS
BURY INVERT 1.0' BELOW STREAM BED
KENDRA J. GRADY VAUGHN, ET AL, TRUSTEES DB 335 PG 199
PROP. DRIVE
DO NOT DISTURB SEPTIC
TRANSITION STONE CL 'B' RIP-RAP EST. 5 TONS GEOTEXTILE EST. 10 SY
SPECIAL LATERAL 'V' DITCH SEE DETAIL 14C
PIPE OUTLET CHANNEL SEE DETAIL 14E S=1.8% L=40' EST. 90 CY DDE CL 'II' RIP-RAP EST. 100 TONS
SHOULDER BERM GUTTER –L– STA. 137+25 TO 141+50, LT
SITE 14
CL 'I' RIP-RAP EST. 2 TON GEOTEXTILE EST. 6 SY
MECHANIZED CLEARING
TIE –L– TYP. CUT DITCH TO EXISTING DITCH S=1.7% SEE DETAIL 14A
TIE –L– TYP. CUT DITCH TO EXISTING DITCH S=3.6% SEE DETAIL 14A
RETAIN
SITE 13
SITE 11
SITE 12
SPECIAL LATERAL 'V' DITCH SEE DETAIL 14C
BURY INVERT 1.0' BELOW STREAM BED
ROD AND LUG WITH GASKETS (ELBOWS)
TEMPORARY INSTALLATION OF 24" RCP-IV (INCLUDES 2 ELBOWS)
FLOWABLE FILL
FILL IN WETLAND
REMOVE
PLUG
MARKER
POND
TRANSITION STONE CL 'B' RIP-RAP EST. 5 TONS GEOTEXTILE EST. 10 SY
SPECIAL LATERAL 'V' DITCH SEE DETAIL 14C
CL 'I' RIP-RAP EST. 2 TON GEOTEXTILE EST. 6 SY
PIPE INLET CHANNEL SEE DETAIL 14D S=1.8% L=40' EST. 30 CY DDE CL 'II' RIP-RAP EST. 50 TONS
SHOULDER BERM GUTTER –L– STA. 133+90 TO 142+00, RT
BURY INVERT 1.0' BELOW STREAM BED
EXCAVATION IN WETLAND
BM#7 ELEV. 2125.10
BL STA. 133+08.00 54' PT.
SPIKE NAIL SET IN BASE OF 20" POPLAR
360' SHIFTING TAPER
FOR –L– PROFILE, SEE SHEET NO. 24

GILBERT D. LANCE, ET AL
DB 364 PG 530
(DB 57 PG 356)

DRAYNE SELLERS
DB 181PG 729

THOMAS A. CARPENTER
DB 83 PG 283
DB 160 PG 722

DAVID M. DENTON, TRUSTEE
DB 218 PG 211

JAMES H. MYERS
DB 200 PG 802

MATCH LINE STA –L– 138+00.00
MATCH TO SHEET NO. 15

10/6/2021
X:\TGS\A-0009\Hydraulics\PERMITS\Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_14_con.dgn
User:bhenegar

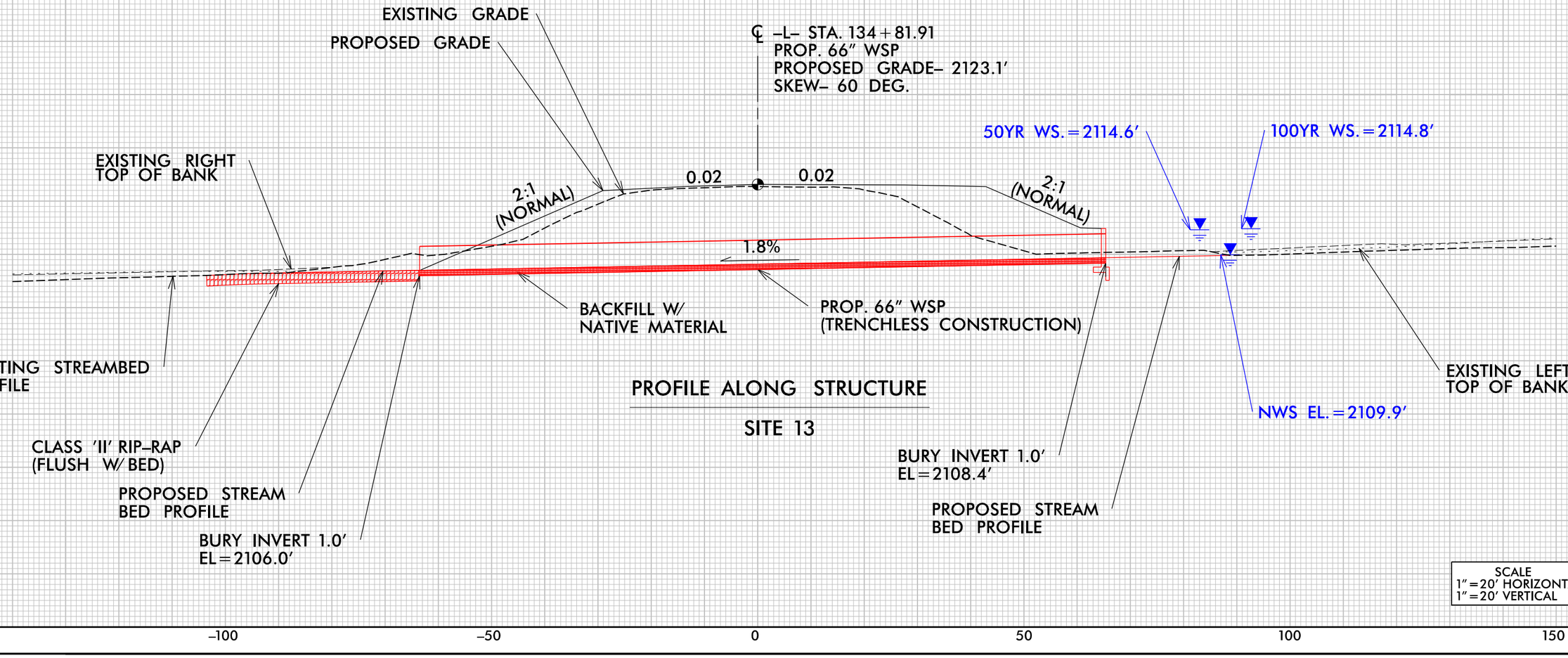
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 21 OF 42

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

–L–
NC 143



PROFILE ALONG STRUCTURE

SITE 13

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

5/14/99

PERMIT DRAWING
SHEET 22 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

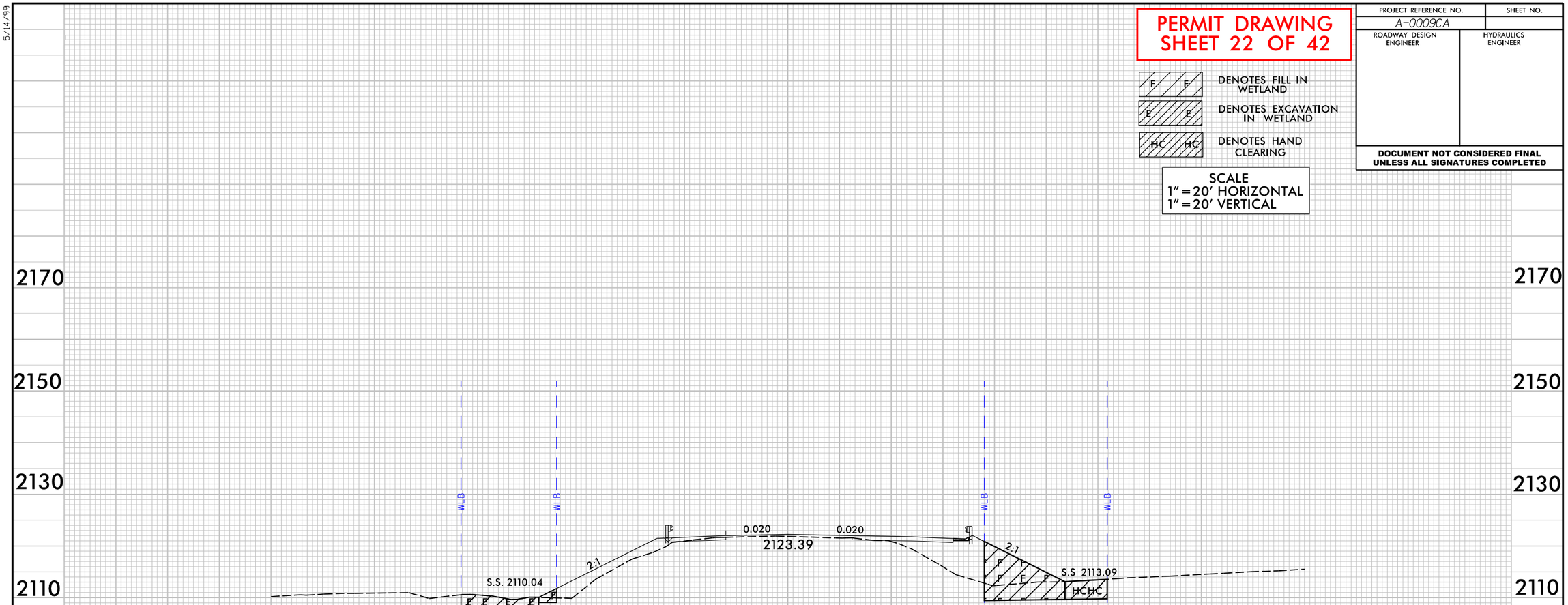
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F DENOTES FILL IN WETLAND

E E DENOTES EXCAVATION IN WETLAND

HC HC DENOTES HAND CLEARING

SCALE
1″ = 20′ HORIZONTAL
1″ = 20′ VERTICAL



–L– 134 + 50.00

WETLAND CROSS SECTION

SITE 13

100′ 80′ 60′ 40′ 20′ C/L 20′ 40′ 60′ 80′ 100′

8/13/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\XSC\A-0009CA_Hyd_xsc_site13.dgn
User:bbenson

5/14/99

PERMIT DRAWING
SHEET 23 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

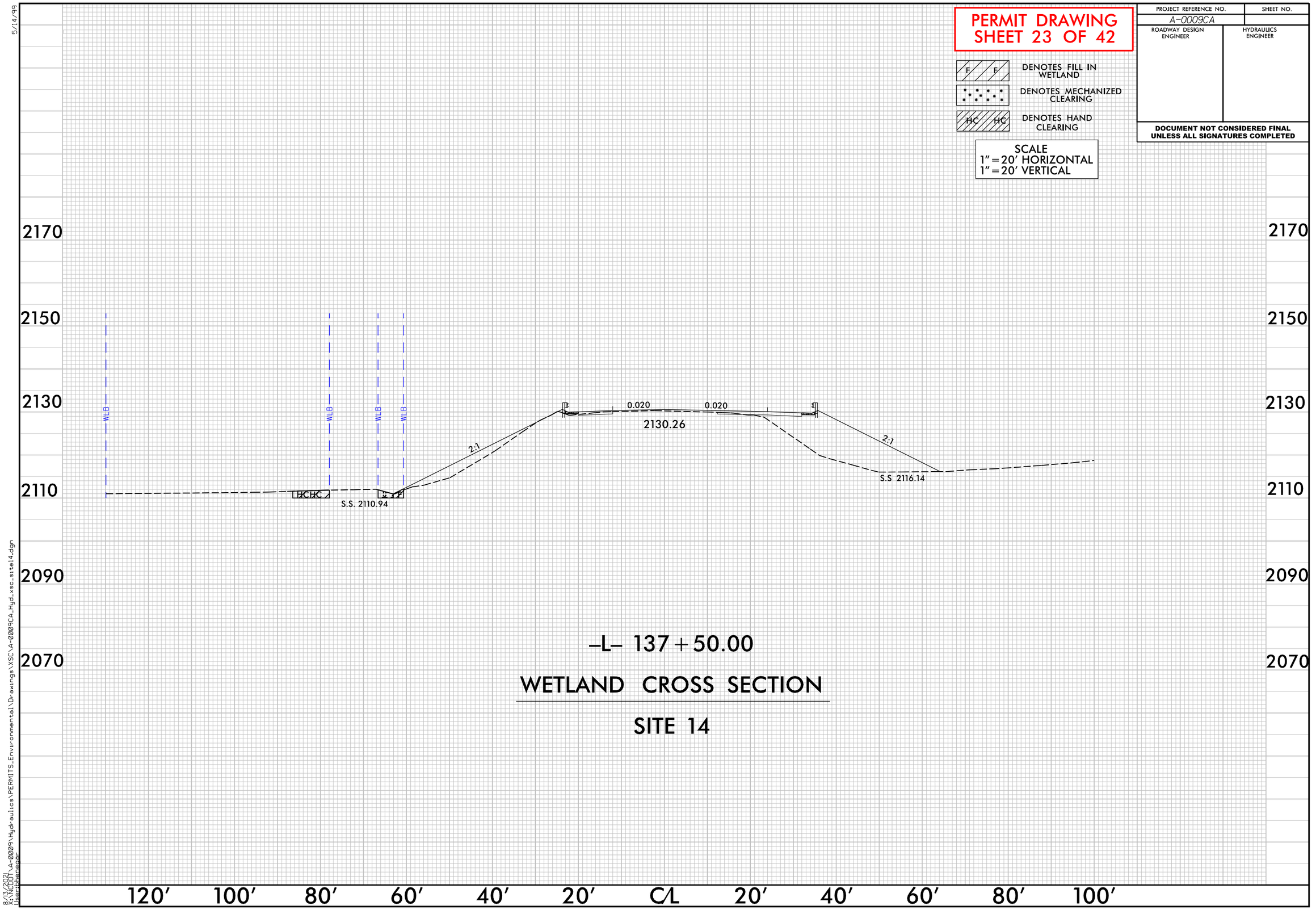
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

HC HC DENOTES HAND CLEARING

SCALE
1″ = 20′ HORIZONTAL
1″ = 20′ VERTICAL



–L– 137 + 50.00

WETLAND CROSS SECTION

SITE 14

8/13/2021
R:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\XSC\A-0009CA_Hyd_xsc_site14.dgn
User:bhenegar

8/17/99

REVISIONS

8/17/2021
\\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_15.dgn
jserbheneger

MATCH LINE STA –L– 138+00.00
MATCH TO SHEET NO. 14

MATCH LINE STA –L– 152+00.00
MATCH TO SHEET NO. 16

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

-L- CURVE DATA
PI Sta 149+87.02
Δ = 0° 52' 26.7" (LT)
D = 0° 28' 38.9"
L = 183.07'
T = 91.54'
R = 12,000.00'
SE = NC
DS = 60 MPH

DETAIL 15A
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
4:1
2:1
1.5'
S
S=Toe of Slope
TOE OF FILL
STA. 141+18–L– RT.

DETAIL 15B
TOE PROTECTION
(Not to Scale)
NATURAL GROUND
2:1 OR FLATTER
FILL SLOPE
d
GEOTEXTILE
d=2.0 Ft.
Type of Liner= CL I Rip-Rap
FROM STA.141+66 TO STA.142+15–L– RT.
FROM STA.147+50 TO STA.150+00–L– RT.

DETAIL 15C
RIP RAP AT EMBANKMENT
(Not to Scale)
10' min.
NATURAL GROUND
Ditch Grade
1.5'
CHANNEL BED
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
FROM STA.144+85 TO STA.145+00–L– RT.

DETAIL 15D
SPECIAL CUT BASE DITCH
(Not to Scale)
Natural Ground
2:1
D
B
4:1 or Flatter
Front Ditch Slope
Min. D= 1.5 Ft.
B= 2.0 Ft.
FROM STA.150+50 TO STA.152+00–L– RT.

DETAIL 15E
PIPE INLET CHANNEL
NOT TO SCALE
CLASS II RIP RAP (KEYED-IN & BANKS ONLY)
VAR
BASE=5'
3:1
HT. +/-0.5'
CLASS II RIP RAP (KEYED-IN & BANKS ONLY)
LOOKING LEFT TO RIGHT DOWNSTREAM
STA.144+76–L– RT.

DETAIL 15F
PIPE OUTLET CHANNEL
NOT TO SCALE
CLASS II RIP RAP (KEYED-IN & BANKS ONLY)
1.5:1
VAR
BASE 5'
HT. +/-1.5'
CLASS II RIP RAP (KEYED-IN & BANKS ONLY)
LOOKING LEFT TO RIGHT DOWNSTREAM
STA.144+81–L– LT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE–IN PER CROSS–SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 24 OF 42

SITE 16

SITE 15

-L- PC 148+95.48
-L- PT 150+78.55

41 JEREMY C. PHILLIPS DB 271 PG 412
42 JAMES T. KEEFER DB 340 PG 400
40 JAMES H. MYERS DB 200 PG 802
JONATHAN B. DENTON DB 330 PG 161

SHOULDER BERM GUTTER –L– STA. 137+25 TO 141+50, LT
SHOULDER BERM GUTTER –L– STA. 146+30 TO 149+50, LT
SHOULDER BERM GUTTER –L– STA. 133+90 TO 142+00, RT
SHOULDER BERM GUTTER –L– STA. 147+40 TO 149+40, RT

MECHANIZED CLEARING
FILL IN WETLAND
PROP. DRIVE
CL 'I' RIP-RAP EST. 4 TON GEOTEXTILE EST. 12 SY
PIPE OUTLET CHANNEL SEE DETAIL 15F CL 'I' RIP-RAP EST. 50 TONS EST. 60 CY DDE
BURY INVERT 1.0' BELOW STREAM BED W/1.0' SILL AT HW
1.5' SILL AT HW
CL 'I' RIP-RAP EST. 2 TON GEOTEXTILE EST. 6 SY
CL 'I' RIP-RAP EST. 5 TON GEOTEXTILE EST. 16 SY
ROD AND LUG WITH GASKETS (ELBOWS)
REMOVE
24" RCP-III
18" CMP
24" CMP
JB w/MH
FALSE SUMP SEE DETAIL 15H
FALSE SUMP SEE DETAIL 15A TOP EL=2136.2'
TOE PROECTION SEE DETAIL 15B CL 'I' RIP-RAP EST. 35 TONS GEOTEXTILE EST. 65 SY
SPECIAL CUT DITCH SEE DETAIL 15G
RIP-RAP AT EMBANKMENT SEE DETAIL 15C CL 'I' RIP-RAP EST. 10 TONS
TOE PROECTION SEE DETAIL 15B CL 'I' RIP-RAP EST. 160 TONS GEOTEXTILE EST. 310 SY
SPECIAL CUT BASE DITCH SEE DETAIL 15D
PIPE INLET CHANNEL SEE DETAIL 15E CL 'II' RIP-RAP EST. 40 TONS EST. 40 CY DDE
RETAIN
PLUG
HPB
8'FDPS
GREU TL-3
8:1
2GI
GID
FS
WOODS
GARAGE
PORCH
MH
CONC
MTL CARPORT
WD RAIL
ROCK HW
QUEEN HOLLOW
WARWOOD BRANCH
NC 143 (SWEETWATER RD)
24' BST
-EL-
N 72° 04' 37.2" E
N 71° 12' 10.5" E
N 65° 21' 00" E 1204.91'
N 05° 47' 00" E 368.70'

S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
HC HC	DENOTES HAND CLEARING

DETAIL 15G
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
2:1
D
4:1 or Flatter
Front Ditch Slope
Min. D= 1.0 Ft.
FROM STA.143+50 TO STA.144+00–L– RT.

DETAIL 15H
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
2:1
10:1
2'
0.5' Min. 1.0' Max.
GI etc.
S
S=Ditch Slope
℄ Proposed Ditch
STA.150+35–L– RT.
STA.151+85–L– RT.

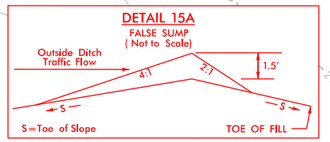
FOR –L– PROFILE, SEE SHEET NO. 25

8/17/99

REVISIONS

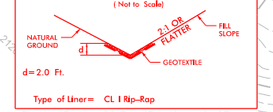
-L- CURVE DATA
PI Sta 149+87.02
Δ = 0° 52' 26.7" (LT)
D = 0° 28' 38.9"
L = 183.07'
T = 91.54'
R = 12,000.00'
SE = NC
DS = 60 MPH

DETAIL 15A
FALSE SUMP
(Not to Scale)



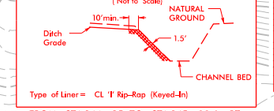
STA. 141+18-L- RT.

DETAIL 15B
TOE PROTECTION
(Not to Scale)



FROM STA.141+66 TO STA.142+15-L- RT.
FROM STA.147+50 TO STA.150+00-L- RT.

DETAIL 15C
RIP RAP AT EMBANKMENT
(Not to Scale)



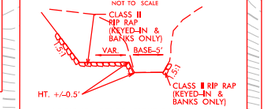
FROM STA.144+85 TO STA.145+00-L- RT.

DETAIL 15D
SPECIAL CUT BASE DITCH
(Not to Scale)



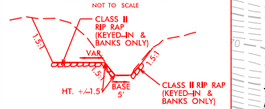
FROM STA.150+50 TO STA.152+00-L- RT.

DETAIL 15E
PIPE INLET CHANNEL
NOT TO SCALE



STA.144+76-L- RT.

DETAIL 15F
PIPE OUTLET CHANNEL
NOT TO SCALE



STA.144+81-L- LT.

NAD 83'2011

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PERMIT DRAWING SHEET 25 OF 42

MATCH LINE STA -L- 138+00.00
MATCH TO SHEET NO. 14

MATCH LINE STA -L- 152+00.00
MATCH TO SHEET NO. 16

SHOULDER BERM GUTTER -L- STA. 137+25 TO 141+50, LT

SHOULDER BERM GUTTER -L- STA. 146+30 TO 149+50, LT

SHOULDER BERM GUTTER -L- STA. 133+90 TO 142+00, RT

SHOULDER BERM GUTTER -L- STA. 147+40 TO 149+40, RT

-L- PC 148+95.48

-L- PT 150+78.55

40 JAMES H. MYERS DB 200 PG 802

41 JEREMY C. PHILLIPS DB 271 PG 412

42 JAMES T. KEEFER DB 340 PG 400

JONATHAN B. DENTON DB 330 PG 161

SITE 16

SITE 15

MECHANIZED CLEARING

FILL IN WETLAND

CL 'I' RIP-RAP EST. 4 TON GEOTEXTILE EST. 12 SY

PIPE OUTLET CHANNEL SEE DETAIL 15F
CL 'I' RIP-RAP EST. 50 TONS
EST. 60 CY DDE

BURY INVERT 1.0' BELOW STREAM BED W/1.0' SILL AT HW

1.5' SILL AT HW

CL 'I' RIP-RAP EST. 2 TON GEOTEXTILE EST. 6 SY

CL 'I' RIP-RAP EST. 5 TON GEOTEXTILE EST. 16 SY

ROD AND LUG WITH GASKETS (ELBOWS)

FALSE SUMP SEE DETAIL 15A TOP EL=2136.2'

TOE PROECTION SEE DETAIL 15B
CL 'I' RIP-RAP EST. 35 TONS
GEOTEXTILE EST. 65 SY

SPECIAL CUT DITCH SEE DETAIL 15G

RIP-RAP AT EMBANKMENT SEE DETAIL 15C
CL 'I' RIP-RAP EST. 10 TONS

TOE PROECTION SEE DETAIL 15B
CL 'I' RIP-RAP EST. 160 TONS
GEOTEXTILE EST. 310 SY

PIPE INLET CHANNEL SEE DETAIL 15E
CL 'I' RIP-RAP EST. 40 TONS
EST. 40 CY DDE

FALSE SUMP SEE DETAIL 15H

SPECIAL CUT BASE DITCH SEE DETAIL 15D

N 72° 04' 37.2" E

N 71° 12' 10.5" E

N 65° 21' 00" E 1204.9'

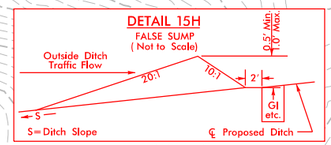
S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
HC HC	DENOTES HAND CLEARING

DETAIL 15G
SPECIAL CUT DITCH
(Not to Scale)



FROM STA.143+50 TO STA.144+00-L- RT.

DETAIL 15H
FALSE SUMP
(Not to Scale)



STA.150+35-L- RT.
STA.151+85-L- RT.

FOR -L- PROFILE, SEE SHEET NO. 25

8/17/2021
8:17:26 AM
User:hpenegar
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PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

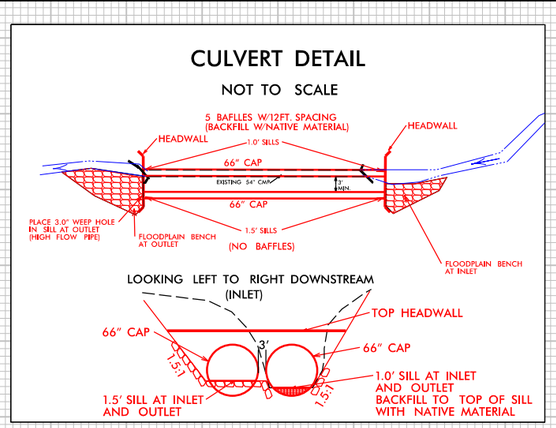
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

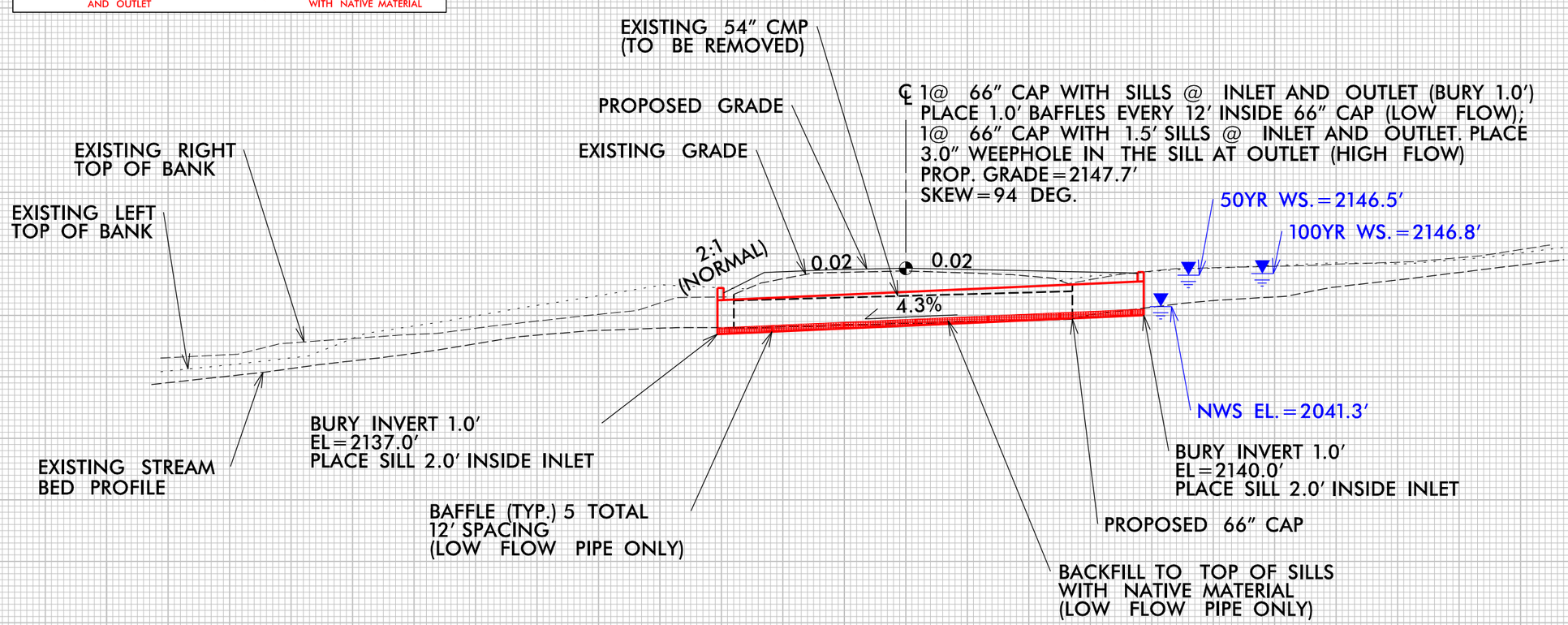
PERMIT DRAWING SHEET 26 OF 42

–L–
NC 143

CULVERT DETAIL

NOT TO SCALE





PROFILE ALONG STRUCTURE

SITE 15

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL

5/14/99

PERMIT DRAWING
SHEET 27 OF 42

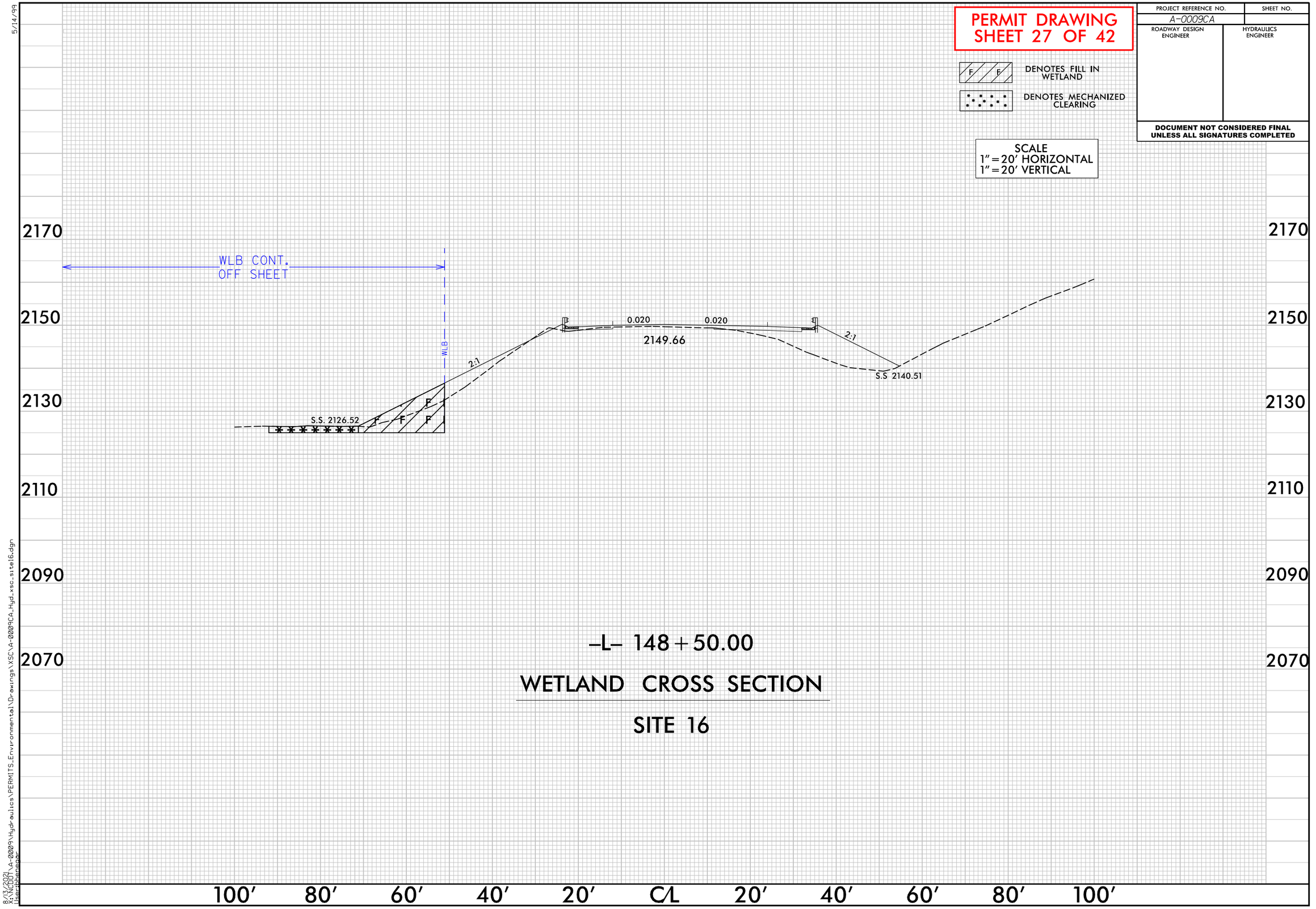
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



–L– 148 + 50.00

WETLAND CROSS SECTION

SITE 16

8/13/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\XSC\A-0009CA_Hyd_xsc_site16.dgn
User:bhenegar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

8/17/99

REVISIONS

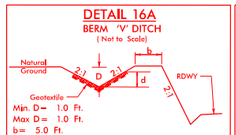
8/16/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_16.dgn
User:bhenegar

MATCH LINE STA –L– 152+00.00 SHEET NO. 15

–L– CURVE DATA

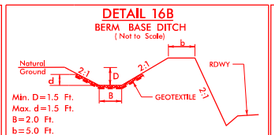
PI Sta 166+10.36
Δ = 35° 44' 58.6" (LT)
D = 3° 00' 56.0"
L = 1,185.50'
T = 612.76'
R = 1,900.00'
SE = 0.07
DS = 60 MPH

DETAIL 16A
BERM 'V' DITCH
(Not to Scale)



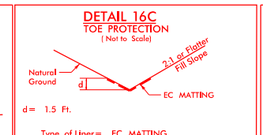
Min. D= 1.0 Ft.
Max. D= 1.0 Ft.
b= 5.0 Ft.
Type of Liner= CL 'B' Rip-Rap
FROM STA.152+50 TO STA.154+50–L– RT

DETAIL 16B
BERM BASE DITCH
(Not to Scale)



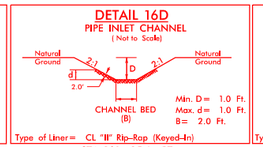
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
Type of Liner= CL 'B' Rip-Rap
FROM STA.154+50 TO STA.156+50–L– RT.

DETAIL 16C
TOE PROTECTION
(Not to Scale)



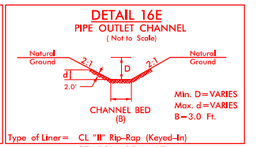
d= 1.5 Ft.
Type of Liner= EC MATTING
FROM STA.158+00 TO STA.160+00–L– RT.

DETAIL 16D
PIPE INLET CHANNEL
(Not to Scale)



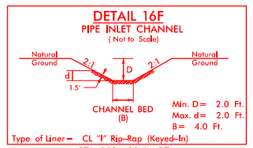
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
Type of Liner= CL "II" Rip-Rap (Keyed-In)
STA. 160+25–L– RT.
STA. 160+40–L– RT.

DETAIL 16E
PIPE OUTLET CHANNEL
(Not to Scale)



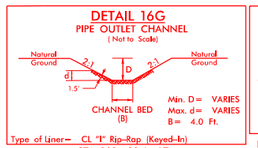
Min. D=VARIES
Max. d=VARIES
B=3.0 Ft.
Type of Liner= CL "II" Rip-Rap (Keyed-In)
STA.160+35–L– LT.

DETAIL 16F
PIPE INLET CHANNEL
(Not to Scale)



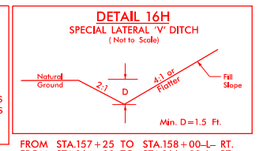
Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
B= 4.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA. 163+00–L– RT.

DETAIL 16G
PIPE OUTLET CHANNEL
(Not to Scale)



Min. D= VARIES
Max. d= VARIES
B= 4.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA. 163+00–L– LT.

DETAIL 16H
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.
FROM STA.157+25 TO STA.158+00–L– RT.
FROM STA.164+00 TO STA.166+00–L– RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE–IN PER CROSS–SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

NAD 83/2011

PERMIT DRAWING SHEET 28 OF 42

MATCH LINE STA –L– 166+00.00 SHEET NO. 17

S = DENOTES IMPACTS IN SURFACE WATER
TS = TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F = F DENOTES FILL IN WETLAND
HC = HC DENOTES HAND CLEARING

DETAIL 16I
FALSE SUMP
(Not to Scale)

STA. 157+25–L– RT.

DETAIL 16J
FALSE SUMP
(Not to Scale)

STA.160+00–L– RT.

FOR –L– PROFILE, SEE SHEET NO. 25

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

8/17/99

REVISIONS

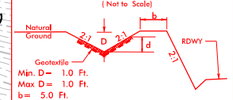
MATCH LINE STA –L– 152+00.00 SHEET NO. 15

MATCH LINE STA –L– 166+00.00 SHEET NO. 17

-L- CURVE DATA
PI Sta 166+10.36
Δ = 35° 44' 58.6" (LT)
D = 3° 00' 56.0"
L = 1,185.50'
T = 612.76'
R = 1,900.00'
SE = 0.07
DS = 60 MPH

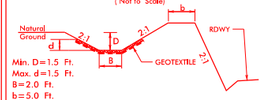
NAD 83-2011

DETAIL 16A
BERM 'V' DITCH
(Not to Scale)



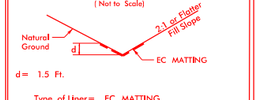
Min. D= 1.0 Ft.
Max. D= 1.0 Ft.
b= 5.0 Ft.
Type of Liner= CL 'B' Rip-Rap
FROM STA.152+50 TO STA.154+50-L- RT

DETAIL 16B
BERM BASE DITCH
(Not to Scale)



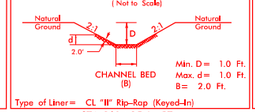
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
Type of Liner= CL 'B' Rip-Rap
FROM STA.154+50 TO STA.156+50-L- RT.

DETAIL 16C
TOE PROTECTION
(Not to Scale)



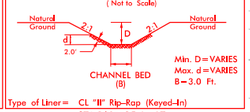
d= 1.5 Ft.
Type of Liner= EC MATTING
FROM STA.158+00 TO STA.160+00-L- RT.

DETAIL 16D
PIPE INLET CHANNEL
(Not to Scale)



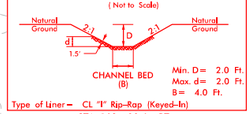
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
Type of Liner= CL "II" Rip-Rap (Keyed-In)
STA. 160+25-L- RT.
STA. 160+40-L- RT.

DETAIL 16E
PIPE OUTLET CHANNEL
(Not to Scale)



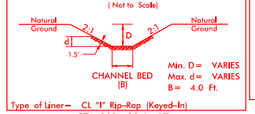
Min. D=VARIES
Max. d=VARIES
B=3.0 Ft.
Type of Liner= CL "II" Rip-Rap (Keyed-In)
STA.160+35-L- LT.

DETAIL 16F
PIPE INLET CHANNEL
(Not to Scale)



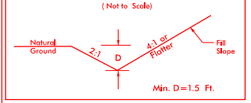
Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
B= 4.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA. 163+00-L- RT.

DETAIL 16G
PIPE OUTLET CHANNEL
(Not to Scale)



Min. D= VARIES
Max. d= VARIES
B= 4.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA. 163+00-L- LT.

DETAIL 16H
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.
FROM STA.157+25 TO STA.158+00-L- RT.
FROM STA.164+00 TO STA.166+00-L- RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 29 OF 42

43
SCOTT ANDERSON
DB 369 PG 85

42
JAMES T. KEEFER
DB 340 PG 400

44
KENNETH CODY, TRUSTEE, ET AL
DB 200 PG 641

45
KENNETH CODY, TRUSTEE, ET AL
DB 281PG 416

PROP. DRIVE

-L- PC 159+97.57

720' TAPER

150' TAPER

SHOULDER BERM GUTTER -L- STA. 159+75 TO 163+85, LT

SHOULDER BERM GUTTER -L- STA. 165+15 TO 167+50, LT

TEMPORARY STREAM IMPACT

SITE 17

SITE 18

SITE 19

SWEETWATER CREEK

BM=B ELEV. 2148.72'
BL- STA. 152+71.00 18' LT.
SPIKE NAIL SET IN BASE OF 14" POPLAR

CL 'I' RIP-RAP
EST. 7 TON
GEOTEXTILE
EST. 15 SY

REMOVE

8'FDPS

24" RCP-III

2GI-A

ROD AND LUG WITH GASKETS (ELBOW)

BDO

BERM 'V' DITCH
SEE DETAIL 16A
CL 'B' RIP-RAP
EST. 45 TONS
GEOTEXTILE
EST. 140 SY

BERM BASE DITCH
SEE DETAIL 16B
CL 'B' RIP-RAP
EST. 85 TONS
GEOTEXTILE
EST. 230 SY

FALSE SUMP
SEE DETAIL 16I

SPECIAL LATERAL 'V' DITCH
SEE DETAIL 16H

TOE PROECTION
SEE DETAIL 16C
EC MATTING
EST. 150 SY

PIPE OUTLET CHANNEL
SEE DETAIL 16E
EST. 15 CY DDE
L=25'
S=10.0%
CL 'II' RIP-RAP
EST. 25 TONS

CLASS 'I' RIP RAP
EST. 3 TONS
GEOTEXTILE
EST. 7 SY

PIPE OUTLET CHANNEL
SEE DETAIL 16G
S=1.0%
L=20'
EST. 15 CY DDE
CL 'I' RIP-RAP
EST. 20 TONS

60" CSP

ROD AND LUG WITH GASKETS (ELBOWS)

JB W/MH SPC DSN

15" RCP-IV

2GI

FILL IN WETLAND

TEMPORARY STREAM IMPACT

FALSE SUMP
SEE DETAIL 16J
TOP EL=2158.5'

PIPE INLET CHANNEL
SEE DETAIL 16D
S=23.0%
L=35'
EST. 30 CY DDE
CL 'II' RIP-RAP
EST. 20 TONS

PIPE INLET CHANNEL
SEE DETAIL 16D
S=21.0%
L=32'
EST. 20 CY DDE
CL 'II' RIP-RAP
EST. 25 TONS

PIPE INLET CHANNEL
SEE DETAIL 16F
S=5.6%
L=43'
EST. 50 CY DDE
CL 'I' RIP-RAP
EST. 90 TONS

TRANSITION STONE
CL 'B' RIP-RAP
EST. 5 TONS
GEOTEXTILE
EST. 10 SY

DO NOT DISTURB TREES IN HPB

HPB

GREU TL-3

15"R

20'R

36" CONC WALL

1½S FD

SHED

WOODS

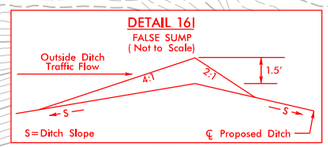
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

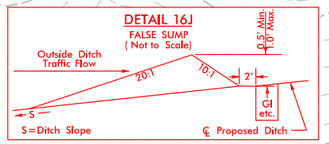
DENOTES HAND CLEARING

DETAIL 16I
FALSE SUMP
(Not to Scale)



STA. 157+25-L- RT.

DETAIL 16J
FALSE SUMP
(Not to Scale)



STA.160+00-L- RT.

FOR -L- PROFILE, SEE SHEET NO. 25

8/16/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_16_con.dgn
User:bbenear

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

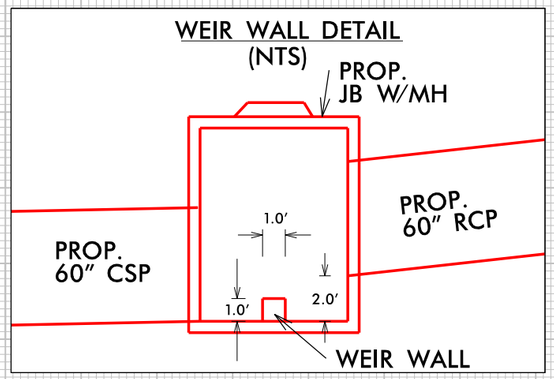
PERMIT DRAWING
SHEET 30 OF 42

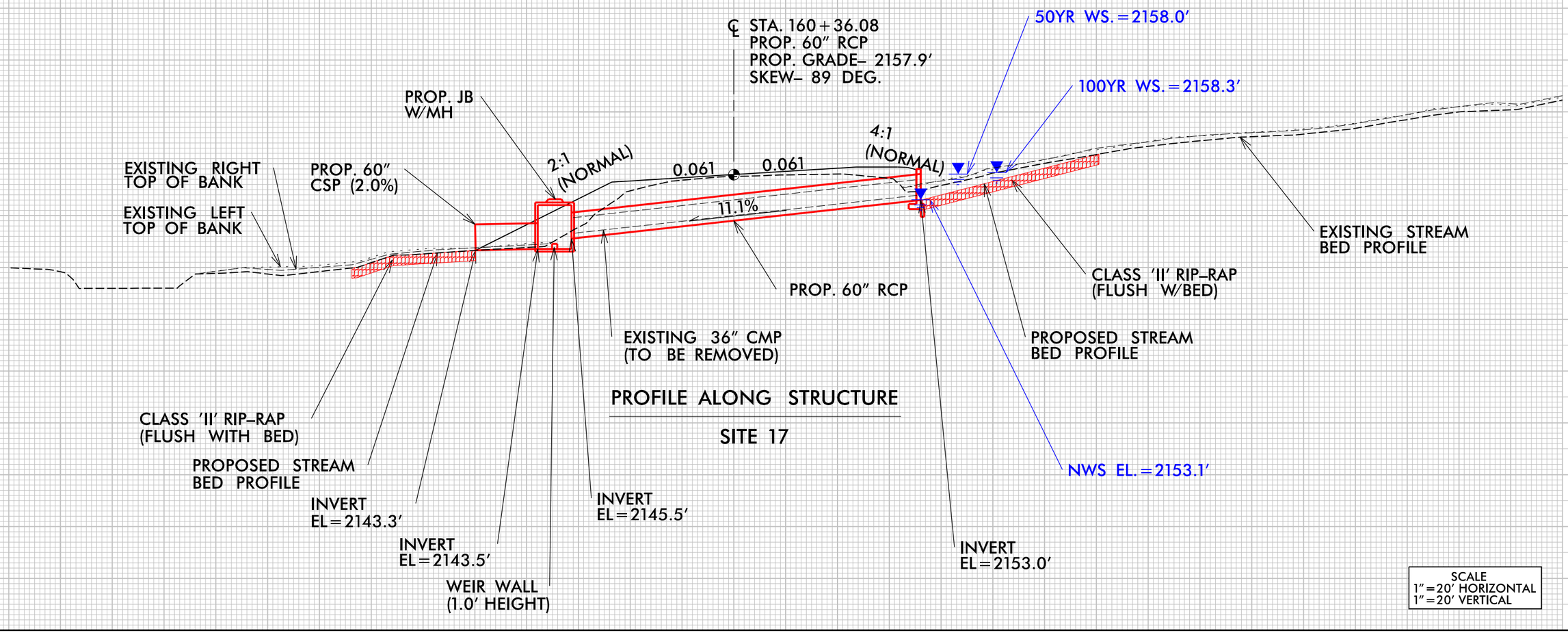
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

–L–
NC 143

WEIR WALL DETAIL
(NTS)

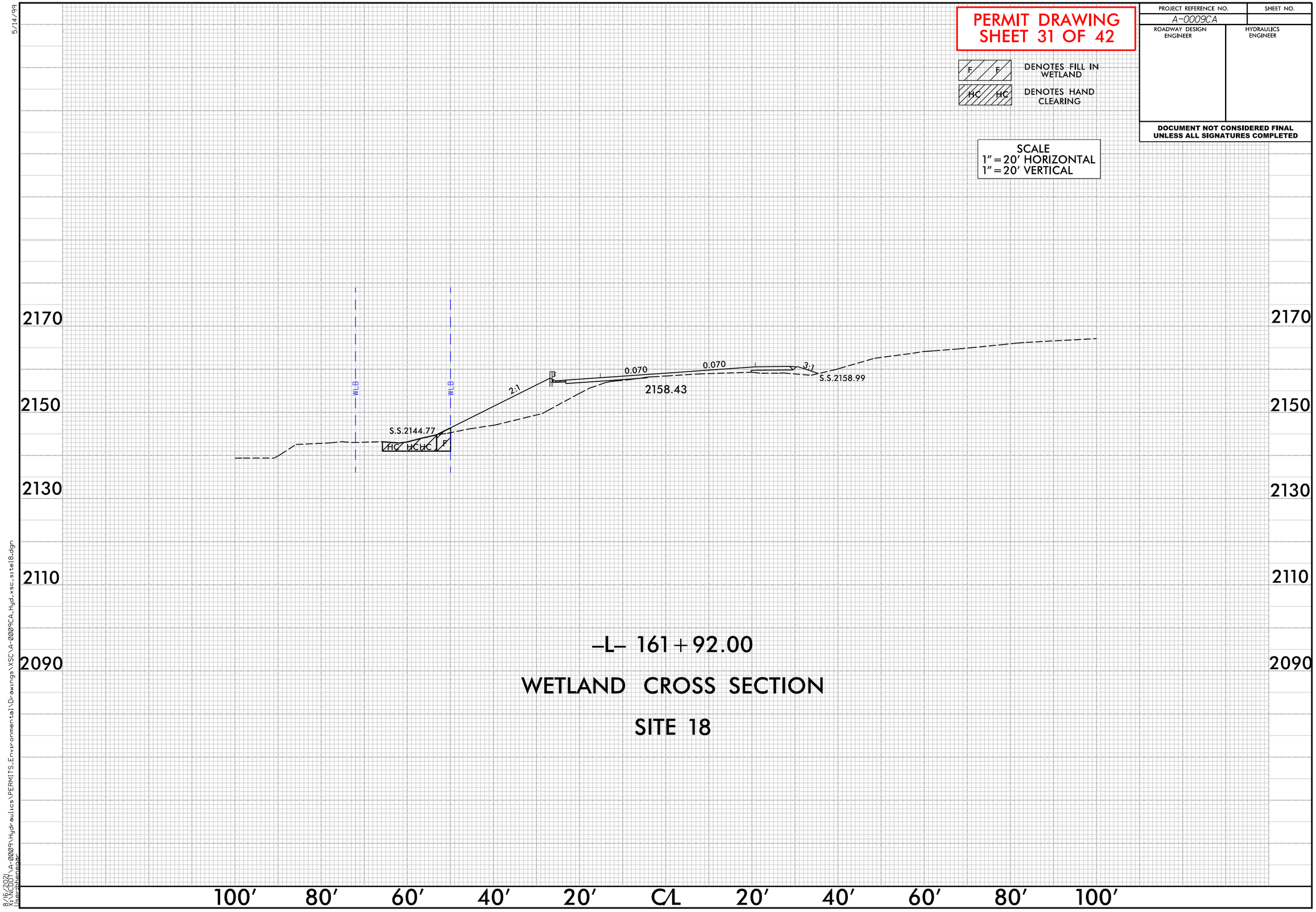




PROFILE ALONG STRUCTURE

SITE 17

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL


PERMIT DRAWING
SHEET 31 OF 42
PROJECT REFERENCE NO.
A-0009CA
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
F F DENOTES FILL IN WETLAND
HC HC DENOTES HAND CLEARING
SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL
2170
2150
2130
2110
2090
WLB
WLB
S.S.2144.77
HC HCHC
F
2:1
0.070
0.070
3:1
2158.43
S.S.2158.99
–L– 161 + 92.00
WETLAND CROSS SECTION
SITE 18
100'
80'
60'
40'
20'
C/L
20'
40'
60'
80'
100'

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PERMIT DRAWING SHEET 32 OF 42

-L- CURVE DATA
PI Sta 166+10.36
△ = 35° 44' 58.6" (LT)
D = 3° 00' 56.0"
L = 1,185.50'
T = 612.76'
R = 1,900.00'
SE = 0.07
DS = 60 MPH

-DRI- CURVE DATA
PI Sta 10+41.97
△ = 48° 49' 47.4" (RT)
D = 190° 59' 09.4"
L = 25.57'
T = 13.62'
R = 30.00'
③-DRI- PC 11+34.96
④-DRI- PT 11+67.50

PI Sta 11+53.03
△ = 62° 08' 27.9" (LT)
D = 190° 59' 09.4"
L = 32.54'
T = 18.08'
R = 30.00'

DENOTES MECHANIZED CLEARING

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

DETAIL 17A
BANK STABILIZATION
(Not to Scale)
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
FROM STA.167+15 TO STA.167+80-L- LT

DETAIL 17B
TOE PROTECTION
(Not to Scale)
FROM STA.167+75 TO STA.169+15-L- LT
FROM STA.170+10 TO STA.171+20-L- LT

DETAIL 17C
SPECIAL LATERAL BASE DITCH
(Not to Scale)
FROM STA.174+00 TO STA.174+30-L- RT.

DETAIL 17D
PIPE OUTLET CHANNEL
(Not to Scale)
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA. 177+60-L- LT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

MATCH LINE STA -L- 166+00.00
MATCH TO SHEET NO. 16

MATCH LINE STA -L- 180+00.00
MATCH TO SHEET NO. 18

NAD 83/2011

*1 PLACE GUARDRAIL END UNIT FACE ALONG FACE OF SBG (DO NOT FLARE)

BEGIN CONSTRUCTION
-DR1A- STA. 10+05.00

SITE 20

SITE 21

SITE 22

44 KENNETH CODY, TRUSTEE, ET AL DB 200 PG 641

45 KENNETH CODY, TRUSTEE, ET AL DB 281PG 416

46 GLENDA ODOM, ET AL DB 372 PG 157

47 J. C. PAYNE DB 57 PG 123

48 RICHARD C. GRINDSTAFF DB 366 PG 462

49 PAM FINCHER, ET AL DB 199 PG 293

PIPE OUTLET CHANNEL SEE DETAIL 17F S=8.0% L=22' EST. 15 CY DDE CL 'II' RIP-RAP EST. 25 TONS

-DR1A- POT 10+00.00

BANK STABILIZATION SEE DETAIL 17A CL 'II' RIP-RAP EST. 105 TONS

PROP. RETAINING WALL #3
BEGIN -L- STA. 167+75±
END -L- STA. 169+31±

CULVERT OUTLET CHANNEL SEE DETAIL 17M CL 'II' RIP-RAP EST. 165 TONS

PROP. DRIVE

REMOVE 3@84" CSP

3@14'x10' RCBC BURIED 1.0'

PROP. RETAINING WALL #4
BEGIN -L- STA. 169+92±
END -L- STA. 171+75±

CULVERT INLET CHANNEL SEE DETAIL 17L CL 'II' RIP-RAP EST. 105 TONS

-L- PT 171+83.07

720' TAPER

SHOULDER BERM GUTTER -L- STA. 168+51 TO 173+90, LT

STANDARD BASE DITCH SEE DETAIL 17I S=8.7% L=23' EST. 10 CY DDE CL 'II' RIP-RAP EST. 15 TONS GEOTEXTILE EST. 25 SY

PROP. DRIVE

PIPE OUTLET CHANNEL SEE DETAIL 17D S=1.5% L=20' EST. 15 CY DDE CL 'I' RIP-RAP EST. 25 TONS

CL 'B' RIP-RAP EST. 3 TON GEOTEXTILE EST. 7 SY

RELOCATE FENCE (BY OWNER)

48" CSP

10'R REMOVE 20 LF EXIST. 30" CMP

N 35° 27' 11.8" E

REMOVE 45 LF EXIST. 30" CMP

-L- STA 169+62.00=
-DR1A- POT 11+25.00

-L- POT 179+34.25 =
-DR1- POT 11+89.39

TEMPORARY STREAM IMPACT

PROP. DRIVE

TOE PROTECTION SEE DETAIL 17B CL 'II' RIP-RAP EST. 105 TONS

TOE PROTECTION SEE DETAIL 17B CL 'II' RIP-RAP EST. 85 TONS

LATERAL BASE DITCH SEE DETAIL 17G CL 'I' RIP-RAP EST. 100 TONS GEOTEXTILE EST. 200 SY

SPECIAL LATERAL BASE DITCH SEE DETAIL 17H CL 'I' RIP-RAP EST. 40 TONS GEOTEXTILE EST. 80 SY

SPECIAL LATERAL BASE DITCH SEE DETAIL 17C

PLACE GUARDRAIL END UNIT FACE ALONG FACE OF SBG (DO NOT FLARE)

PROP. RETAINING WALL #5 W/CONCRETE DITCH
BEGIN -L- STA. 175+35±
END -L- STA. 176+65±

SINGLE FACED CONCRETE BARRIER

SHOULDER BERM GUTTER -L- STA 174+51 TO 175+35, RT

SHOULDER BERM GUTTER -L- STA. 176+65 TO 178+00, RT

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 17K

SPECIAL LATERAL BASE DITCH SEE DETAIL 17J CL 'I' RIP-RAP EST. 260 TONS GEOTEXTILE EST. 440 SY

DO NOT DISTRURB LANDSCAPED TREES INSIDE HPB.

TEMP. PROTECTIVE FENCING REQUIRED TO PROTECT EXIST. RETAINING WALLS DURING CONSTRUCTION

TEMP. PROTECTIVE FENCING REQUIRED TO PROTECT EXIST. RETAINING WALLS DURING CONSTRUCTION

DETAIL 17E
FALSE SUMP
(Not to Scale)
S=Ditch Slope
℄ Proposed Ditch
STA.173+88-L- RT.

DETAIL 17F
PIPE OUTLET CHANNEL
(Not to Scale)
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
STA. 167+30-L- LT.

DETAIL 17G
LATERAL BASE DITCH
(Not to Scale)
*When B is < 6.0'
Type of Liner= CL 'I' Rip-Rap
FROM STA.171+50 TO STA.173+00-L- RT.

DETAIL 17L
CULVERT INLET CHANNEL
(Looking Downstream, Not to Scale)
STA.169+00-L- LT.

DETAIL 17M
CULVERT OUTLET CHANNEL
(Looking Downstream, Not to Scale)
STA.170+00-L- LT.

DETAIL 17H
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Type of Liner= CL 'I' Rip-Rap
FROM STA.173+00 TO STA.173+50-L- RT.

DETAIL 17I
STANDARD BASE DITCH
(Not to Scale)
Type of Liner= CL 'II' Rip-Rap
STA.171+50-L- LT.

DETAIL 17J
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Type of Liner= CL 'I' Rip-Rap
FROM STA.178+00 TO STA.180+00-L- RT.

DETAIL 17K
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
FROM STA.175+35 TO STA.176+65-L- RT

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 26
FOR -DR1A- PROFILE, SEE SHEET NO. 28
FOR -DR1- PROFILE, SEE SHEET NO. 28

K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_17.dgn
12/13/2021
User:richard

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PERMIT DRAWING SHEET 33 OF 42

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

-L- CURVE DATA
PI Sta 166+10.36
△ = 35°44'58.6" (LT)
D = 3°00'56.0"
L = 1,185.50'
T = 612.76'
R = 1,900.00'
SE = 0.07
DS = 60 MPH

-DRI- CURVE DATA
PI Sta 10+41.97
△ = 48°49'47.4" (RT)
D = 190°59'09.4"
L = 25.57'
T = 13.62'
R = 30.00'
③-DRI- PC 11+34.96
④-DRI- PT 11+67.50

PI Sta 11+53.03
△ = 62°08'27.9" (LT)
D = 190°59'09.4"
L = 32.54'
T = 18.08'
R = 30.00'

DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER

DETAIL 17A
BANK STABILIZATION
(Not to Scale)
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
FROM STA.167+15 TO STA.167+80-L- LT

DETAIL 17B
TOE PROTECTION
(Not to Scale)
FROM STA.167+75 TO STA.169+15-L- LT
FROM STA.170+10 TO STA.171+20-L- LT

DETAIL 17C
SPECIAL LATERAL BASE DITCH
(Not to Scale)
FROM STA.174+00 TO STA.174+30-L- RT.

DETAIL 17D
PIPE OUTLET CHANNEL
(Not to Scale)
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA. 177+60-L- LT.

MATCH LINE STA -L- 166+00.00
MATCH TO SHEET NO. 16

MATCH LINE STA -L- 180+00.00
MATCH TO SHEET NO. 18

NAD 83/2011

*1 PLACE GUARDRAIL END UNIT FACE ALONG FACE OF SBG (DO NOT FLARE)

SITE 20
SITE 21
SITE 22

BEGIN CONSTRUCTION
-DR1A- STA. 10+05.00

-L- PT 171+83.07

-DR1A- POT 10+00.00

-L- STA 169+62.00=
-DR1A- POT 11+25.00

-L- POT 179+34.25 =
-DR1- POT 11+89.39

PROP. RETAINING WALL #3
BEGIN -L- STA. 167+75±
END -L- STA. 169+31±

PROP. RETAINING WALL #4
BEGIN -L- STA. 169+92±
END -L- STA. 171+75±

PROP. RETAINING WALL #5 W/CONCRETE DITCH
BEGIN -L- STA. 175+35±
END -L- STA. 176+65±

44 KENNETH CODY, TRUSTEE, ET AL DB 200 PG 641

45 KENNETH CODY, TRUSTEE, ET AL DB 281 PG 416

46 GLENDA ODOM, ET AL DB 372 PG 157

47 J. C. PAYNE DB 57 PG 123

48 RICHARD C. GRINDSTAFF DB 366 PG 462

49 PAM FINCHER, ET AL DB 199 PG 293

PIPE OUTLET CHANNEL SEE DETAIL 17F S=8.0% L=22' EST. 15 CY DDE CL 'II' RIP-RAP EST. 25 TONS

BANK STABILIZATION SEE DETAIL 17A CL 'II' RIP-RAP EST. 105 TONS

CULVERT OUTLET CHANNEL SEE DETAIL 17M CL 'II' RIP-RAP EST. 165 TONS

CULVERT INLET CHANNEL SEE DETAIL 17L CL 'II' RIP-RAP EST. 105 TONS

STANDARD BASE DITCH SEE DETAIL 17I S=8.7% L=23' EST. 10 CY DDE CL 'II' RIP-RAP EST. 15 TONS GEOTEXTILE EST. 25 SY

PIPE OUTLET CHANNEL SEE DETAIL 17D S=1.5% L=20' EST. 15 CY DDE CL 'I' RIP-RAP EST. 25 TONS

CL 'B' RIP-RAP EST. 3 TON GEOTEXTILE EST. 7 SY

TOE PROTECTION SEE DETAIL 17B CL 'II' RIP-RAP EST. 105 TONS

LATERAL BASE DITCH SEE DETAIL 17G CL 'I' RIP-RAP EST. 100 TONS GEOTEXTILE EST. 200 SY

SPECIAL LATERAL BASE DITCH SEE DETAIL 17H CL 'I' RIP-RAP EST. 40 TONS GEOTEXTILE EST. 80 SY

SPECIAL LATERAL BASE DITCH SEE DETAIL 17C

SHOULDER BERM GUTTER -L- STA. 168+51 TO 173+90, LT

SHOULDER BERM GUTTER -L- STA. 174+51 TO 175+35, RT

SHOULDER BERM GUTTER -L- STA. 176+65 TO 178+00, RT

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 17K

SINGLE FACED CONCRETE BARRIER

SPECIAL LATERAL BASE DITCH SEE DETAIL 17J CL 'I' RIP-RAP EST. 260 TONS GEOTEXTILE EST. 440 SY

RELOCATE FENCE (BY OWNER)

REMOVE 3@84" CSP

REMOVE 20 LF EXIST. 30" CMP

REMOVE 45 LF EXIST. 30" CMP

TEMPORARY STREAM IMPACT

PROP. DRIVE

720' TAPER

TEMP. PROTECTIVE FENCING REQUIRED TO PROTECT EXIST. RETAINING WALLS DURING CONSTRUCTION

DO NOT DISTRURB LANDSCAPED TREES INSIDE HPB.

DETAIL 17E
FALSE SUMP
(Not to Scale)
STA.173+88-L- RT.

DETAIL 17F
PIPE OUTLET CHANNEL
(Not to Scale)
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
STA. 167+30-L- LT.

DETAIL 17G
LATERAL BASE DITCH
(Not to Scale)
FROM STA.171+50 TO STA.173+00-L- RT.

DETAIL 17L
CULVERT INLET CHANNEL
(Looking Downstream, Not to Scale)
STA.169+00-L- LT.

DETAIL 17M
CULVERT OUTLET CHANNEL
(Looking Downstream, Not to Scale)
STA.170+00-L- LT.

DETAIL 17H
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Type of Liner= CL 'I' Rip-Rap
FROM STA.173+00 TO STA.173+50-L- RT.

DETAIL 17I
STANDARD BASE DITCH
(Not to Scale)
Type of Liner= CL 'II' Rip-Rap
STA.171+50-L- LT.

DETAIL 17J
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Type of Liner= CL 'I' Rip-Rap
FROM STA.178+00 TO STA.180+00-L- RT.

DETAIL 17K
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
FROM STA.175+35 TO STA.176+65-L- RT

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 26
FOR -DR1A- PROFILE, SEE SHEET NO. 28
FOR -DR1- PROFILE, SEE SHEET NO. 28

12/13/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_17_con.dgn
User:richard

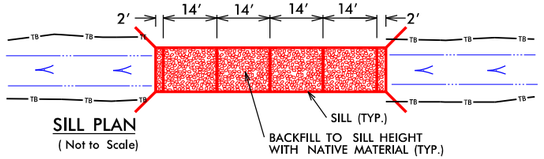
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

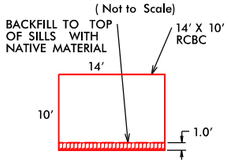
PERMIT DRAWING
SHEET 34 OF 42

–DR1A–
SWEETEN CREEK RD.



SILL PLAN
(Not to Scale)

SILL DETAIL
(Not to Scale)



NOTES:
1) TOP OF SILLS SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

PROFILE ALONG STRUCTURE

SITE 21

SCALE
1″=20′ HORIZONTAL
1″=20′ VERTICAL

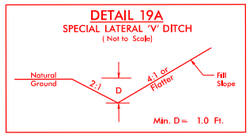
8/17/99

REVISIONS

-L- CURVE DATA

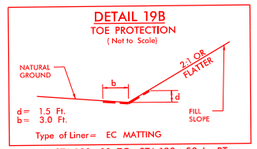
PI Sta 190+83.76
△ = 42° 18' 27.4" (RT)
D = 3° 57' 05.2"
L = 1,070.69'
T = 561.07'
R = 1,450.00'
SE = 0.08
DS = 60 MPH

DETAIL 19A
SPECIAL LATERAL "V" DITCH
(Not to Scale)



FROM STA.194+00 TO STA.194+50–L– RT.

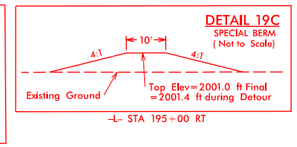
DETAIL 19B
TOE PROTECTION
(Not to Scale)



Type of Liner = EC MATTING

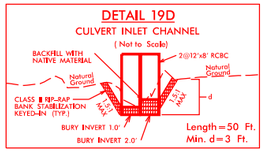
FROM STA.199+10 TO STA.199+50–L– RT.

DETAIL 19C
SPECIAL BERM
(Not to Scale)



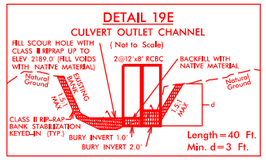
–L– STA 195+00 RT

DETAIL 19D
CULVERT INLET CHANNEL
(Not to Scale)



STA.195+50–L– RT.

DETAIL 19E
CULVERT OUTLET CHANNEL
(Not to Scale)



STA.194+75–L– LT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE–IN PER CROSS–SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 35 OF 42

- DENOTES TEMPORARY FILL IN WETLAND
- HC HC — DENOTES HAND CLEARING
- F F — DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- E E — DENOTES EXCAVATION IN WETLAND
- IS IS — DENOTES IMPACTS IN SURFACE WATER
- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

MATCH LINE STA –L– 194+00.00
MATCH TO SHEET NO. 18

BEGIN SECTION A–0009CB

END SECTION A–0009CA

END TIP PROJECT A–0009CA
–L– STA. 208+00.00

SITE 23

SITE 24

CULVERT OUTLET CHANNEL
SEE DETAIL 19E
CL "II" RIP-RAP
EST. 172 TONS
EST. 60 CY DDE

CULVERT INLET CHANNEL
SEE DETAIL 19D
CL "II" RIP-RAP
EST. 71 TONS
EST. 50 CY DDE

TOE PROTECTION
SEE DETAIL 19B
EC MATTING
EST. 50 SY

CLASS 'I' RIP RAP
EST. 11 TONS
GEOTEXTILE
EST. 22 SY

CLASS 'B' RIP RAP
EST. 2 TONS
GEOTEXTILE
EST. 7 SY

SPECIAL LATERAL 'V' DITCH
SEE DETAIL 19A

PROPOSED BERM
TOP ELEV=2201.0'
SEE DETAIL 19C

SHOULDER BERM GUTTER
–L– STA. 194+00 TO 197+83, RT

SEE SHEET 2B–2 FOR ONSITE DETOUR DET S8 LAYOUT.

BM#10 ELEV. 2201.60'
–BL– STA. 192+86.00 63' RT.
SPIKE NAIL SET IN BASE OF 14" DBL. POPLAR

–L– PT 195+93.35

51
MELANIE O. CRUSE
DB 373 PG 105

50
DELMAR HOLDER, ET AL
DB 222 PG 821

52
CAROL R. ADAMS, ET AL
DB 291PG 733

KEITH L. ROGERS
DB 141PG 409

PROP. DRIVE

200' TAPER

SR 1223 (BEECH CREEK RD) 18' BST

SR 1281

SWEETWATER CREEK

BEECH CREEK

SEE SHEET 2B–2 FOR ONSITE DETOUR DET 8S

SA — ELIGIBLE AND UNASSESSED SITES

FOR –L– PROFILE, SEE SHEET NO. 27

8/18/2021
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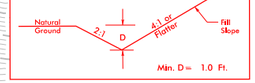
8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 190+83.76
Δ = 42° 18' 27.4" (RT)
D = 3° 57' 05.2"
L = 1,070.69'
T = 561.07'
R = 1,450.00'
SE = 0.08
DS = 60 MPH

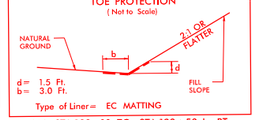
DETAIL 19A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D = 1.0 Ft.

FROM STA.194+00 TO STA.194+50-L- RT.

DETAIL 19B
TOE PROTECTION
(Not to Scale)

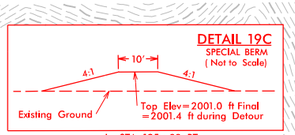


d = 1.5 Ft.
b = 3.0 Ft.

Type of Liner = EC MATTING

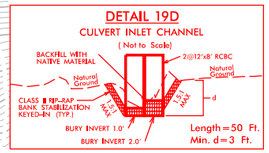
FROM STA.199+10 TO STA.199+50-L- RT.

DETAIL 19C
SPECIAL BERM
(Not to Scale)



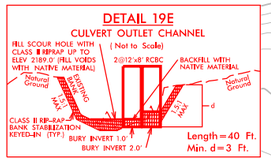
-L- STA 195+00 RT

DETAIL 19D
CULVERT INLET CHANNEL
(Not to Scale)



STA.195+50-L- RT.

DETAIL 19E
CULVERT OUTLET CHANNEL
(Not to Scale)



STA.194+75-L- LT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 36 OF 42

T T	DENOTES TEMPORARY FILL IN WETLAND
HC HC	DENOTES HAND CLEARING
F F	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
E E	DENOTES EXCAVATION IN WETLAND
S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

BEGIN SECTION A-0009CB

END SECTION A-0009CA

MATCH LINE STA -L- 194+00.00
MATCH TO SHEET NO. 18

SITE 23

SITE 24

CULVERT OUTLET CHANNEL
SEE DETAIL 19E
CL 'II' RIP-RAP
EST. 172 TONS
EST. 60 CY DDE

CULVERT INLET CHANNEL
SEE DETAIL 19D
CL 'II' RIP-RAP
EST. 71 TONS
EST. 50 CY DDE

CLASS 'B' RIP RAP
EST. 2 TONS
GEOTEXTILE
EST. 7 SY

CLASS 'I' RIP RAP
EST. 11 TONS
GEOTEXTILE
EST. 22 SY

SPECIAL LATERAL 'V' DITCH SEE DETAIL 19A

PROPOSED BERM TOP ELEV=2201.0' SEE DETAIL 19C

TOE PROTECTION SEE DETAIL 19B EC MATTING EST. 50 SY

SHOULDER BERM GUTTER -L- STA. 194+00 TO 197+83, RT

SEE SHEET 2B-2 FOR ONSITE DETOUR DET 8S LAYOUT.

-L- PT 195+93.35

BM #10 ELEV. 2204.60'
-BL- STA. 192+86.00 63' RT.
SPIKE NAIL SET IN BASE OF 14" DBL. POPLAR

51 MELANIE O. CRUSE
DB 373 PG 105

50 DELMAR HOLDER, ET AL
DB 222 PG 821

52 CAROL R. ADAMS, ET AL
DB 291 PG 733

KEITH L. ROGERS
DB 141 PG 409

PROP. DRIVE

200' TAPER

30' TYP

15" RCP-III

8'FDPS

SWEETWATER CREEK

BEECH CREEK

SR 1223 (BEECH CREEK RD) (BST)

SR 1281

END TIP PROJECT A-0009CA
-L- STA. 208+00.00

SEE SHEET 2B-2 FOR ONSITE DETOUR DET 8S

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 27

8/18/2021
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User:bhenegar

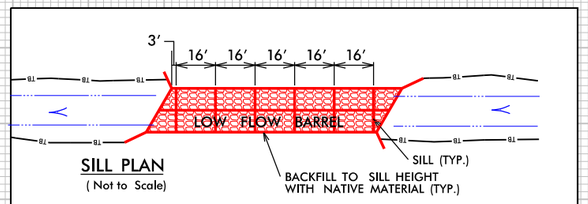
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 37 OF 42

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

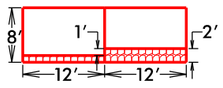
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

–L–
NC 143



SILL PLAN
(Not to Scale)

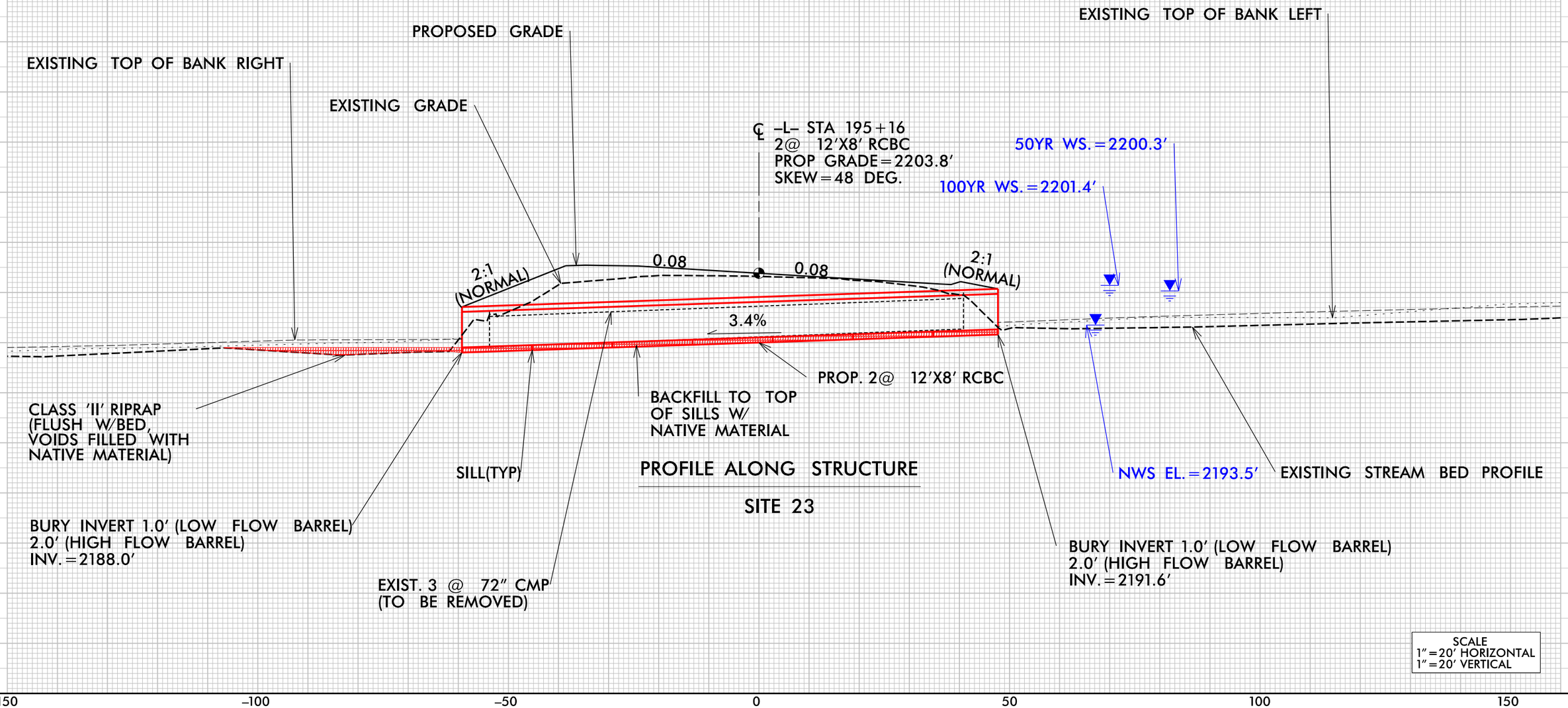
SILL DETAIL
(Not to Scale)



BACKFILL TO TOP OF SILLS /BAFFLES WITH NATIVE MATERIAL

NOTES:
1) TOP OF SILLS SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.



PROFILE ALONG STRUCTURE

SITE 23

SCALE
1″=20′ HORIZONTAL
1″=20′ VERTICAL

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

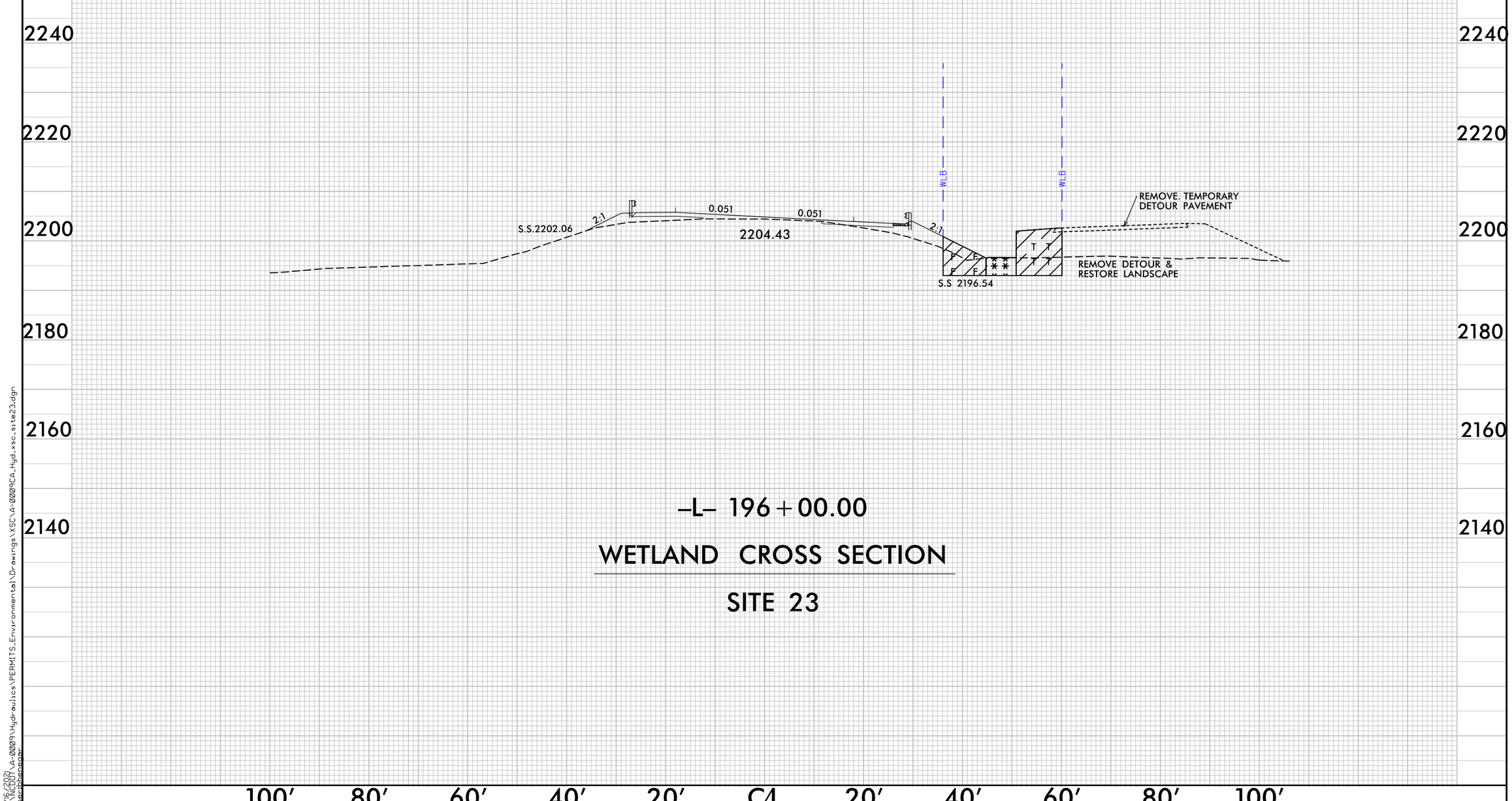
PERMIT DRAWING
SHEET 38 OF 42

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

DENOTES TEMPORARY FILL IN WETLAND

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



–L– 196+00.00

WETLAND CROSS SECTION

SITE 23

5/14/99

8/16/2021
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Userbhenegar

5/14/99

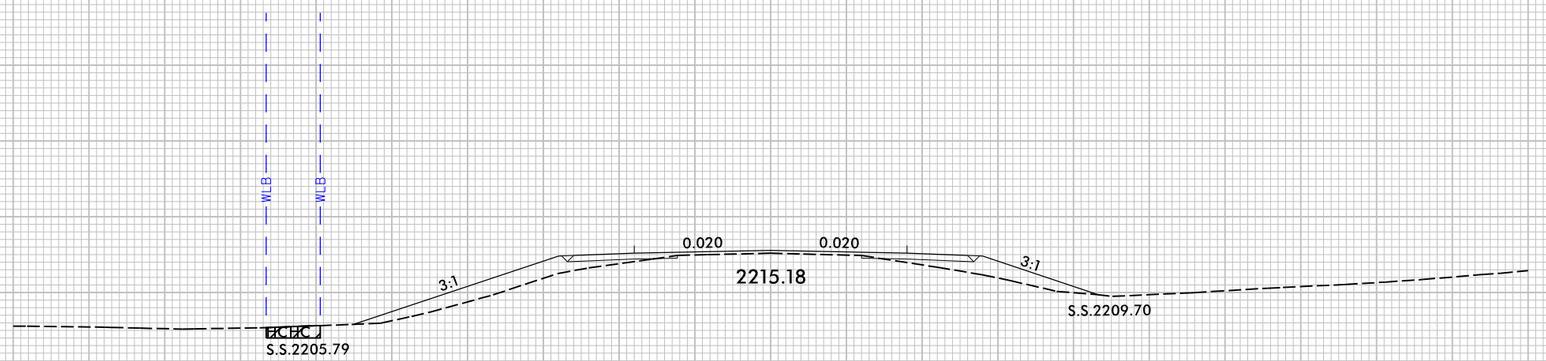
PERMIT DRAWING
SHEET 39 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HC HC DENOTES HAND CLEARING

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



2260
2240
2220
2200
2180
2160

–L– 205 + 00.00
WETLAND CROSS SECTION
SITE 24

100' 80' 60' 40' 20' C/L 20' 40' 60' 80' 100'

8/16/2021
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WETLAND AND SURACE WATER IMPACTS SUMMARY

					WETLAND IMPACTS					SURFACE WATER IMPACTS					
Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-Y1- 18+58 to 19+12 LT	60" RCP	SE	Low						< 0.01	< 0.01	39		20	
1	-Y1- 19+32 to 19+53 RT	60" RCP	SE	Low						< 0.01		24			
1	-Y1- 19+63 to 19+96 RT	Rip-rap at Embankment	Tulula Creek							< 0.01	< 0.01		12	20	
2	-Y1A- 12+01 to 12+04 LT	Rip-rap at Embankment	Tulula Creek							< 0.01	< 0.01		30		
3	-L- 16+26 to 16+57 RT	Rip-rap at Embankment	Tulula Creek							< 0.01	< 0.01		26	15	
4	-L- 44+66 to 45+04 LT	Pipe Outlet Channel	Sweetwater Creek							< 0.01	< 0.01		18	20	
4	-L- 44+91 to 44+98 LT	Pipe Outlet Channel	SG							< 0.01		18			
4	-L- 44+74 to 44+99 RT	Fill in Wetland	WG	Low	< 0.01										
5	-L- 45+71 to 45+97 LT	3@12'x9' RCBC Extension	Sweetwater Creek							< 0.01		15			
5	-L- 45+32 to 45+89 LT	Culvert Outlet Channel	Sweetwater Creek							0.02	0.01		48	10	
5	-L- 46+76 to 47+23 RT	3@12'x9' RCBC Extension	Sweetwater Creek							0.02		44			
5	-L- 47+23 to 47+72 RT	Culvert Inlet Channel	Sweetwater Creek							0.03			48		
5	-L- 47+68 to 48+71 RT	Bank Stabilization	Sweetwater Creek							0.03	< 0.01		93	10	
6	-L- 56+49 to 56+65 RT	Exist. 54" CSP (Lined) & Prop. 54" WSP	SI							< 0.01		18			
6	-L- 56+03 to 56+60 RT	Pipe Outlet Channel	SI							< 0.01	< 0.01		56	8	
6	-L- 57+64 to 57+77 LT	Exist. 54" CSP (Lined) & Prop. 54" WSP	SI							< 0.01		14			
6	-L- 57+70 to 59+23 LT	Pipe Inlet Channel	SI							0.01	< 0.01		91	50	
7	-L- 65+14 to 65+26 LT	Pipe Outlet Channel	SJ							< 0.01	< 0.01	45		11	
8	-L- 66+90 to 66+99 LT	30" CMP	SK								< 0.01			3	
8	-L- 66+27 to 66+61 LT	Pipe Outlet Channel	SI							< 0.01	< 0.01	13		20	
9	-L- 106+92 to 107+09 RT	Standard Base Ditch	Sweetwater Creek								< 0.01			20	
9	-L- 108+47 to 108+68 LT	1@7'x8' RCBC	Slay Bacon Branch							< 0.01		18			
9	-L- 108+60 to 108+82 LT	Culvert Inlet Channel	Slay Bacon Branch							< 0.01			22		
9	-L- 108+76 to 109+39 LT	Impacts to Stream	Slay Bacon Branch								0.02			91	
9	-L- 107+62 to 107+93 RT	Culvert Outlet Channel	Slay Bacon Branch							< 0.01			29		
9	-L- 107+52 to 107+89 RT	Culvert Outlet Channel	Sweetwater Creek								< 0.01			37	
SHEET TOTALS*:					< 0.01					0.17	0.06	248	473	335	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
12/7/2021
GRAHAM
A-0009CA
32572.1.13

WETLAND AND SURACE WATER IMPACTS SUMMARY

					WETLAND IMPACTS					SURFACE WATER IMPACTS					
Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
10	-L- 113+08 to 113 +30 RT	Culvert Outlet Channel	Sweetwater Creek							< 0.01	< 0.01		50	10	
10	-L- 113+76 to 114+18 LT	3@11'x9' RCBC Extension	Sweetwater Creek							0.01		35			
10	-L- 113+93 to 114+55 LT	Culvert Inlet Channel	Sweetwater Creek							< 0.01	< 0.01		32	10	
11	-L- 127+91 to 128+01 RT	24" Side Drain	SO								< 0.01			10	
12	-L- 128+93 to 129+27 LT	Pipe Outlet Channel	Sweetwater Creek							< 0.01	< 0.01		12	18	
12	-L- 129+24 to 129+40 RT	54" RCP	SO								< 0.01			16	
12	-L- 129+39 to 129+47 RT	54" RCP	SM								< 0.01			20	
12	-L- 129+47 to 129+97 RT	54" RCP	SN								< 0.01			53	
13	-L- 133+98 to 134+41 LT	Pipe Outlet Channel	WN	High	< 0.01		0.01	0.03							
13	-L- 134+18 to 134+44 LT	Pipe Outlet Channel	Pigpen Branch							< 0.01	< 0.01	39		10	
13	-L- 134+39 to 134+45 LT	66" WSP	Pigpen Branch							< 0.01		10			
13	-L- 134+85 to 135+09 RT	66" WSP	Pigpen Branch							< 0.01		32			
13	-L- 135+09 to 135+42 RT	Pipe Inlet Channel	Pigpen Branch							< 0.01	< 0.01		42	10	
13	-L- 133+81 to 135+83 RT	Pipe Inlet Channel	WO	High	0.07		< 0.01	0.02	0.03						
14	-L- 136+92 to 139+49 LT	Impacts to Wetland	WP	Low	0.02			0.01	0.01						
15	-L- 144+78 to 144+90 LT	Pipe Outlet Channel	Hardwood Branch							< 0.01	< 0.01		32	10	
15	-L- 144+78 to 144+85 LT	2 @ 66" CAP	Hardwood Branch							< 0.01		3			
15	-L- 144+74 to 144+82 RT	2 @ 66" CAP	Hardwood Branch							< 0.01		11			
15	-L- 144+74 to 144+82 RT	Pipe Inlet Channel	Hardwood Branch							< 0.01	< 0.01		27	16	
16	-L- 146+90 to 149+48 LT	Impacts to Wetland	WR	High	0.09			< 0.01	0.06						
17	-L- 160+27 to 160+38 LT	Pipe Outlet Channel	SR							< 0.01	< 0.01	24		11	
17	-L- 160+34 to 160+38 LT	60" CSP	SR							< 0.01		18			
17	-L- 160+31 to 160+38 RT	60" RCP	SR							< 0.01		6			
17	-L- 160+17 to 160+35 RT	Pipe Inlet Channel	SR							< 0.01	< 0.01	38		5	
17	-L- 160+33 to 160+56 RT	Pipe Inlet Channel	SS							< 0.01	< 0.01	24		11	
SHEET TOTALS*:					0.18		0.02	0.07	0.10	0.07	0.03	240	195	210	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
12/7/2021
GRAHAM
A-0009CA
32572.1.13

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	WETLAND IMPACTS					SURFACE WATER IMPACTS					
					Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
18	-L- 161+64 to 161+94 LT	Impacts to Wetland	WV	High	< 0.01				< 0.01						
19	-L- 163+03 to 163+17 LT	Pipe Outlet Channel	ST							< 0.01	< 0.01	18		14	
19	-L- 163+08 to 163+19 LT	36" CSP	ST							< 0.01		25			
19	-L- 162+90 to 163+13 RT	Pipe Inlet Channel	ST							< 0.01	< 0.01	41		9	
19	-L- 163+11 to 164+09 RT	Pipe Inlet Channel	SU							< 0.01	< 0.01	23		87	
20	-L- 167+07 to 167+31 LT	Pipe Outlet Channel	SV							< 0.01	< 0.01	25		13	
20	-L- 167+28 to 167+40 LT	48" CSP	SV							< 0.01		23			
20	-L- 167+66 to 167+74 RT	48" RCP	SV								< 0.01			8	
21	-L- 167+02 to 167+73 LT	Bank Stabilization	Sweetwater Creek							< 0.01			62		
21	-L- 168+52 to 169+30 LT	Culvert Outlet Channel	Sweetwater Creek							0.02	0.10		64	105	
21	-L- 169+30 to 169+40 LT	1 @ 14' x 10' RCBC	Sweetwater Creek							< 0.01		10			
21	-L- 169+82 to 169+92 LT	1 @ 14' x 10' RCBC	Sweetwater Creek							< 0.01		10			
21	-L- 169+92 to 170+73 LT	Culvet Inlet Channel	Sweetwater Creek							< 0.01	0.03		68	10	
21	-L- 169+84 to 169+99 LT	Impacts to Wetland	WY	Medium				< 0.01							
21	-L- 169+76 to 169+84 LT	Impacts to Stream	SW								< 0.01			11	
22	-L- 177+41 to 177+62 LT	Pipe Outlet Channel	SX							< 0.01	< 0.01	21		11	
22	-L- 177+54 to 177+74 LT	48" CSP	SX							< 0.01		25			
23	-L- 194+28 to 194+81 LT	Culvert Outlet Channel	Beech Creek							0.03	< 0.01		27	14	
23	-L- 194+32 to 194+82 LT	2@12'x8' RCBC	Beech Creek							< 0.01		6			
23	-L- 194+59 to 195+12 RT	Impacts to Wetland	WAB	Medium	0.02										
23	-L- 195+06 to 195+54 RT	2 @ 12'x8' RCBC	Beech Creek							< 0.01		6			
23	-L- 195+10 to 196+20 RT	Culvert Inlet Channel	Beech Creek							0.02	0.02		66	62	
23	-L- 195+59 to 199+10 RT	Impacts to Wetland	WAD	High	0.07	0.11	< 0.01	< 0.01	0.05						
24	-L- 204+48 to 205+55 LT	Impacts to Wetland	WAE	Medium					0.02						
SHEET TOTALS*:					0.09	0.11	< 0.01	< 0.01	0.07	0.13	0.16	233	287	344	
PROJECT TOTALS*:					0.28	0.11	0.03	0.07	0.17	0.36	0.26	721	955	889	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
12/7/2021
GRAHAM
A-0009CA
32572.1.13

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

General Project Information

WBS Element:	32572.1.14	**TIP Number:**	A-0009CB	**Project Type:**	Roadway Widening	**Date:**	11/1/2021
NCDOT Contact:	Josh B. Deyton, PE			**Contractor / Designer:**	TGS Engineers / David B. Petty, PE		
Address:	253 Webster Rd Sylva, NC 28779			**Address:**	706 Hillsborough St. - Suite 200 Raleigh, NC 27603		
Phone:	828-586-2141			**Phone:**	919-773-8887 Ext. 104		
Email:	jbdeyton@ncdot.gov			**Email:**	dpetty@tgsengineers.com		
City/Town:	Robbinsville, NC			**County(ies):**	Graham		
River Basin(s):	Little Tennessee			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	3.91 Miles	**Surrounding Land Use:**	Forested, Agriculture, Rural Residential				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	30.4	ac.		16.0	ac.		
Typical Cross Section Description:	1.) Three 12' paved lanes, 10' shoulders (8' paved / 2' grassed), grassed side slopes ranging from 4:1 to 2:1 - 3.4 Miles 2.) Four 12' paved lanes, 10'-12' shoulders (8'/10' paved / 2' grassed), grassed side slopes ranging from 4:1 to 2:1 - 0.5 Miles			1.) Two 12' paved lanes, 0 to 10' paved shoulders, 2' to 8' grassed shoulders, grassed side slopes ranging from 4:1 to 2:1 - 3.9 Miles			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	8800	Year: 2045	Existing:	6590	Year:	2022

General Project Narrative: (Description of Minimization of Water Quality Impacts)

STIP project A-0009C is part of Corridor K of the Appalachian Development Highway System (ADHS) and improves the existing alignments of US 129, NC 143 and NC 28 between US 129 south of Robbinsville and the existing four-lane section of NC 28 east of Stecoah in Graham County, NC. The project improves roadway shoulders and adds passing & climbing lanes for the length of the project. A-0009C is broken into three projects (A-0009CA, A-0009CB & A-0009CC).

A-0009CB improves NC 143, an urban arterial, from SR 1223 (Beech Creek Rd) to 0.5 miles north of the Appalachian Trail.

Project minimization measures include:

>2:1 fill slopes.
>1.5:1 cut slopes where possible.
>Expressway gutter and shoulder berm gutter to reduce cross-section width.
>Alignment shifts to avoid relocations and avoid / minimize stream, wetland, and historic resource impacts.
>Alignment shifts and either symmetrical or asymmetrical widening to fit a best-fit alignment to avoid / minimize impacts and reduce earthwork.
>Overall maintain existing alignment to minimize cumulative impacts to resources.
>Maximizing shoulder section.
>Providing adequate ground cover.
>Stabilizing embankments and drainage ditches.
>Minimizing culvert slopes.
>Removing existing perched outlets.
>Providing adequate energy dissipation.
>Utilizing natural features and drainage pathways - Existing drainage pathways were utilized to the maximum extent practicable.
>Retaining and extending existing culverts where practicable to minimize in-stream work.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element: 32572.1.14 **TIP/Proj No.:** A-0009CB **County(ies):** Graham

General Project Information

Waterbody Information

Surface Water Body (1):	Sweetwater Creek		**NCDWR Stream Index No.:**	2-190-3-(0.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	Trout Waters (Tr)			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Sweetwater Creek, SY, SZ, SAA, SAB, SAC, SAD, SAE, SAF, SAG, SAJ, SAH, SAK, SAM, SED, SAT, SAY, SAX			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

Surface Water Body (2):	Stillhouse Branch		**NCDWR Stream Index No.:**	2-190-3-1		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Stillhouse Branch			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element: 32572.1.14 **TIP/Proj No.:** A-0009CB **County(ies):** Graham

Swale

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
20/21*	L	219+00	LT	35.34265	-83.74207	(1)Sweetwater Creek	0.0	4.0	2.0	0.5	45	250	1.59%	1.4	1.8	1.8	1.9	No	No
21	L	223+00	LT	35.34331	-83.74099	(1)Sweetwater Creek	0.0	4.0	3.0	0.5	45	300	1.67%	1.4	1.8	1.8	1.9	No	No
21**	L	227+16	RT	35.34396	-83.73984	(1)Sweetwater Creek	0.0	3.0	5.0	2.8	280	34	0.76%	2.9	1.6	3.9	1.7	No	No
23*	L	264+00	RT	35.35176	-83.73235	(1)Sweetwater Creek	0.0	4.0	2.0	0.7	72	300	2.15%	1.2	1.9	1.5	2.0	No	No
24	L	272+50	LT	35.35408	-83.73187	(1)Sweetwater Creek	0.0	4.0	3.0	0.4	40	200	2.63%	1.0	1.7	1.4	1.8	No	No

Additional Comments

Where slope (and drainage area/discharge) vary, maximum applicable velocity is entered.

*4:1 & 2:1 side slopes average together to meet the minimum recommended 3:1 side slope for purposes of swale criteria.

**Provided length exceeds the recommended length for the portion of the contributing drainage area within NCDOT right of way.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element:	32572.1.14	TIP/Proj No.:	A-0009CB	County(ies):	Graham	Page	4	of	4

Bridge to Culvert Avoidance and Minimization

Proposed Structure Summary

Sheet No. & Station	**Sheet No.:** 17 of 33	**Station:**	-Y4- 12+13.1	**Number of Barrels:**	1
Drainage Area (ac or sq mi):	1.09	Sq. Miles		**Barrel Width/Diameter (ft):**	20'-11"
Surface Water Body:	(1)Sweetwater Creek			**Barrel Height (ft):**	6'-1"
Culvert Type:	Aluminum Box Culvert with Concrete Headwalls			**Culvert Length (ft)**	45' +/-
Avoidance and Minimization Efforts: (Bridge to Culvert)	Existing stream pattern and profile has been maintained through the culvert.				

Stream Slope

Existing Average Stream Slope (%):	3.90	%
Proposed Culvert Slope (%):	3.90	%

Culvert Burial

Proposed Culvert Burial Depth (ft):	1
Existing Streambed Material:	sand, gravel and cobbles
Proposed Sills/Baffles:	Sills are proposed at the inlet and outlet with two baffles spaced evenly every 13' along the culvert. Low flow channel will be 5' wide and 1' height to match existing condtions.

Fish and/or Aquatic Life Passage

Existing Low Flow Channel Dimensions in the Stream:	5 ft. wide by 1 ft. deep
Proposed Low Flow Dimensions Through the Culvert:	5 ft. wide by 1 ft. deep
Existing Low Flow Velocities in the Stream (ft/s):	3.8
Proposed Low Flow Velocities Through the Culvert (ft/s):	3.8
Alternating Low Flow Sills/Baffles:	There are low flow sills and baffles that do not alternate because this is a straight stretch of stream.

Culvert/Stream Alignment

Stream Patterns Upstream and Downstream of the Culvert that Could Affect Fish Passage and Bank Stability:	Culvert is in a relatively straight stretch of stream with no notable changes in slope in this vicinity.	
Bed Forms Impacted by Culvert (riffles, pools, glides, etc.):	Culvert is a riffle section of stream.	
Low Flow Floodplain Bench Required? (provide justification)	Yes	
Bends at Inlet/Outlet? (describe culvert alignment with stream)	No	
Stream Realignment Necessary? (provide justification)	No	
Bank Stabilization:	Class II riprap to be installed on banks 35' upstream and 30' downstream.	

Outlet Velocities

Natural Stream Channel 2-yr Velocity (ft/s):	7.2	**Natural Stream Channel 10-yr Velocity (ft/s):**	8.3
Proposed Culvert 2-yr Outlet Velocity (ft/s):	6.7	**Proposed Culvert 10-yr Outlet Velocity (ft/s):**	7.6

Roadway Geometric Considerations

Evaluate/Describe Roadway Geometric Constraints:

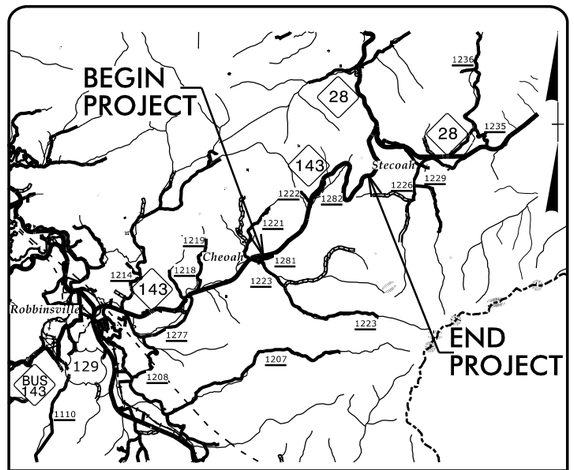
The culvert shape was selected to work with low available cover (due to low roadway grade). However, because a low flow channel with sills and native material are proposed to match existing conditions, this still provides ideal culvert design.

09/08/99

TIP PROJECT: A-0009CB

CONTRACT:

See Sheet 1A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRAHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CB	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
32572.1.14	APD-0074(178)	PE
32572.2.14	APD-0074(178)	ROW,UTIL.
32572.3.14	APD-0074(178)	CONST.

LOCATION: UPGRADE NC 143 FROM SR 1223 (BEECH CREEK RD) TO 0.5 MILES NORTH OF APPALACHIAN TRAIL

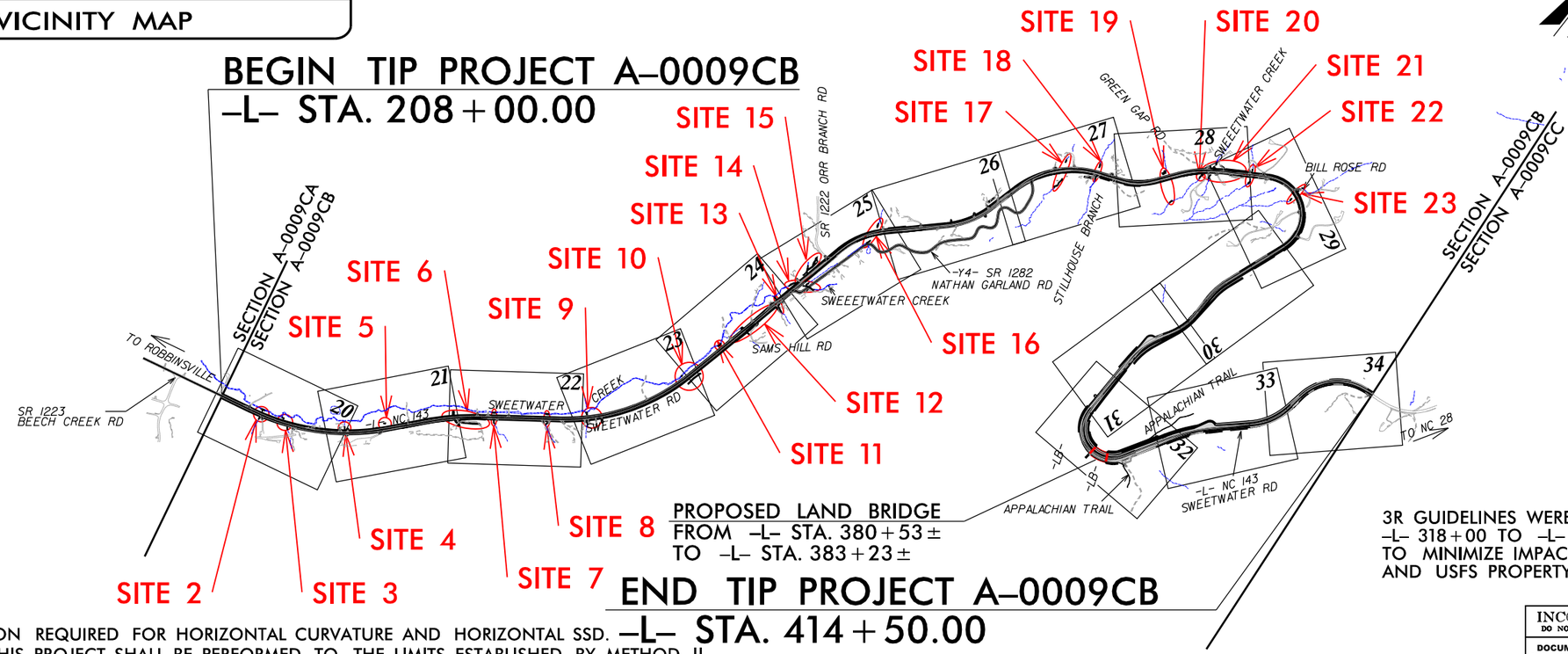
TYPE OF WORK: GRADING, PAVING, DRAINAGE, RETAINING WALLS, AND STRUCTURE

PERMIT DRAWING
SHEET 1 OF 34

WETLAND & SURFACE WATER IMPACTS

NAD 83/2011

BEGIN TIP PROJECT A-0009CB
-L- STA. 208+00.00



PROPOSED LAND BRIDGE
FROM -L- STA. 380+53±
TO -L- STA. 383+23±

END TIP PROJECT A-0009CB
-L- STA. 414+50.00

3R GUIDELINES WERE USED FROM -L- 318+00 TO -L- STA 414+50 TO MINIMIZE IMPACTS TO TRIBAL AND USFS PROPERTY.

DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE AND HORIZONTAL SSD.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2022 = 6590
ADT 2045 = 8800
K = 11 %
D = 57.5 %
T = 7 % *
V = 60 MPH
* TTST = 2% DUAL = 5%
FUNC CLASS = RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT A-0009CB = 3.911 MILES
TOTAL LENGTH TIP PROJECT A-0009CB = 3.911 MILES

NCDOT CONTACT: WANDA H. AUSTIN, PE

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

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 14
252 Webster Rd
Sylva, NC 28779

RIGHT OF WAY DATE: SEPTEMBER 2021

LETTING DATE: SEPTEMBER 20, 2022

2018 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

AUSTIN TURNER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

12/7/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB PSHA-0009CB_Hyd_tsh.dgn
User:rrichard

8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 219+95.61
△ = 36° 39' 28.8" (LT)
D = 2° 17' 30.6"
L = 1,599.51'
T = 828.20'
R = 2,500.00'
SE = 0.06
DS = 60 MPH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 20A
BANK STABILIZATION
(Not to Scale)
Length=14 Ft.
Min. d=3 Ft.
-L- STA 212+83(44' LT) TO 212+83(58' LT)

DETAIL 20B
BANK STABILIZATION
(Not to Scale)
Length=15 Ft.
Min. d=3 Ft.
-L- STA 215+37(51' LT) TO 215+47(40' LT)

DETAIL 20C
LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.5 Ft.
b=3 Ft.
-L- STA. 213+50 TO 215+00 RT
SEE PFL FOR DITCH GRADE

PERMIT DRAWING
SHEET 2 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

BEGIN TIP PROJECT A-0009CB
-L- STA. 208+00.00

END SECTION A-0009CA
BEGIN SECTION A-0009CB

MATCH LINE STA -L- 221+00.00
MATCH TO SHEET NO. 21

NAD 83/2011

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

BANK STABILIZATION
SEE DETAIL 20A
CLASS I RIPRAP
20 TONS, NO GEO

BURY INVERT 0.7'

BANK STABILIZATION
SEE DETAIL 20B
CLASS I RIPRAP
22 TONS, NO GEO

BURY INVERT 0.8'

CLASS B RIPRAP
3 TONS, 11 SY GEO

CUT TO FILL TRANSITION
CLASS B RIPRAP
10 TONS, 22 SY GEO

DO NOT DISTURB SWEETWATER CREEK

PROP. DRIVE

LATERAL 'V' DITCH
SEE DETAIL 20C
DDE=60 CY

REMOVE GRADE TO DRAIN

DO NOT DISTURB SIGN

SITE 2

SITE 3

53 MADELINE P. MEENTS, TRUSTEE

54 LLOYD SCOTT ORR

56 MAXINE CRISP

57 ERNEST D. PHILLIPS, JR.

ERNEST PHILLIPS, ET AL

SR 1281 (ERNEST PHILLIPS RD) 18' BST

SWEETWATER CREEK

WOODS

50' 0' 50' 100'
25'

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 44

12/7/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_PSH\A-0009CB_hyd_prm_psh_20.dgn
User:richard

8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 219+95.61
△ = 36° 39' 28.8" (LT)
D = 2° 17' 30.6"
L = 1,599.51'
T = 828.20'
R = 2,500.00'
SE = 0.06
DS = 60 MPH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 20A
BANK STABILIZATION
(Not to Scale)
Length=14 Ft.
Min. d=3 Ft.
-L- STA 212+83(44' LT) TO 212+83(58' LT)

DETAIL 20B
BANK STABILIZATION
(Not to Scale)
Length=15 Ft.
Min. d=3 Ft.
-L- STA 215+37(51' LT) TO 215+47(40' LT)

DETAIL 20C
LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.5 Ft.
b=3 Ft.
-L- STA. 213+50 TO 215+00 RT
SEE PFL FOR DITCH GRADE

PERMIT DRAWING
SHEET 3 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

BEGIN TIP PROJECT A-0009CB
-L- STA. 208+00.00

END SECTION A-0009CA
BEGIN SECTION A-0009CB

MATCH LINE STA -L- 221+00.00
MATCH TO SHEET NO. 21

NAD 83 2011

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

BANK STABILIZATION
SEE DETAIL 20B
CLASS I RIPRAP
22 TONS, NO GEO

IMPACTS IN SURFACE WATER

BANK STABILIZATION
SEE DETAIL 20A
CLASS I RIPRAP
20 TONS, NO GEO

BURY INVERT 0.7'

CLASS B RIPRAP
3 TONS, 11 SY GEO

DO NOT DISTURB SWEETWATER CREEK

CUT TO FILL TRANSITION
CLASS B RIPRAP
10 TONS, 22 SY GEO

DO NOT DISTURB SWEETWATER CREEK

PROP. DRIVE

BURY INVERT 0.8'

SITE 2

SITE 3

REMOVE

REMOVE GRADE TO DRAIN

DO NOT DISTURB SIGN

LATERAL 'V' DITCH
SEE DETAIL 20C
DDE=60 CY

PROP. DRIVE

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

BURY INVERT 0.7'

TEMPORARY IMPACTS IN SURFACE WATER

PROP. DRIVE

MADELINE P. MEENTS, TRUSTEE

MAXINE CRISP

ERNEST D. PHILLIPS, JR.

ERNEST PHILLIPS, ET AL

LLOYD SCOTT ORR

SWEETWATER CREEK

50' 0' 50' 100'
25'

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 44

K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_PSH\A-0009CB_hyd_prm_psh_20.dgn
12/7/2021
User:richard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

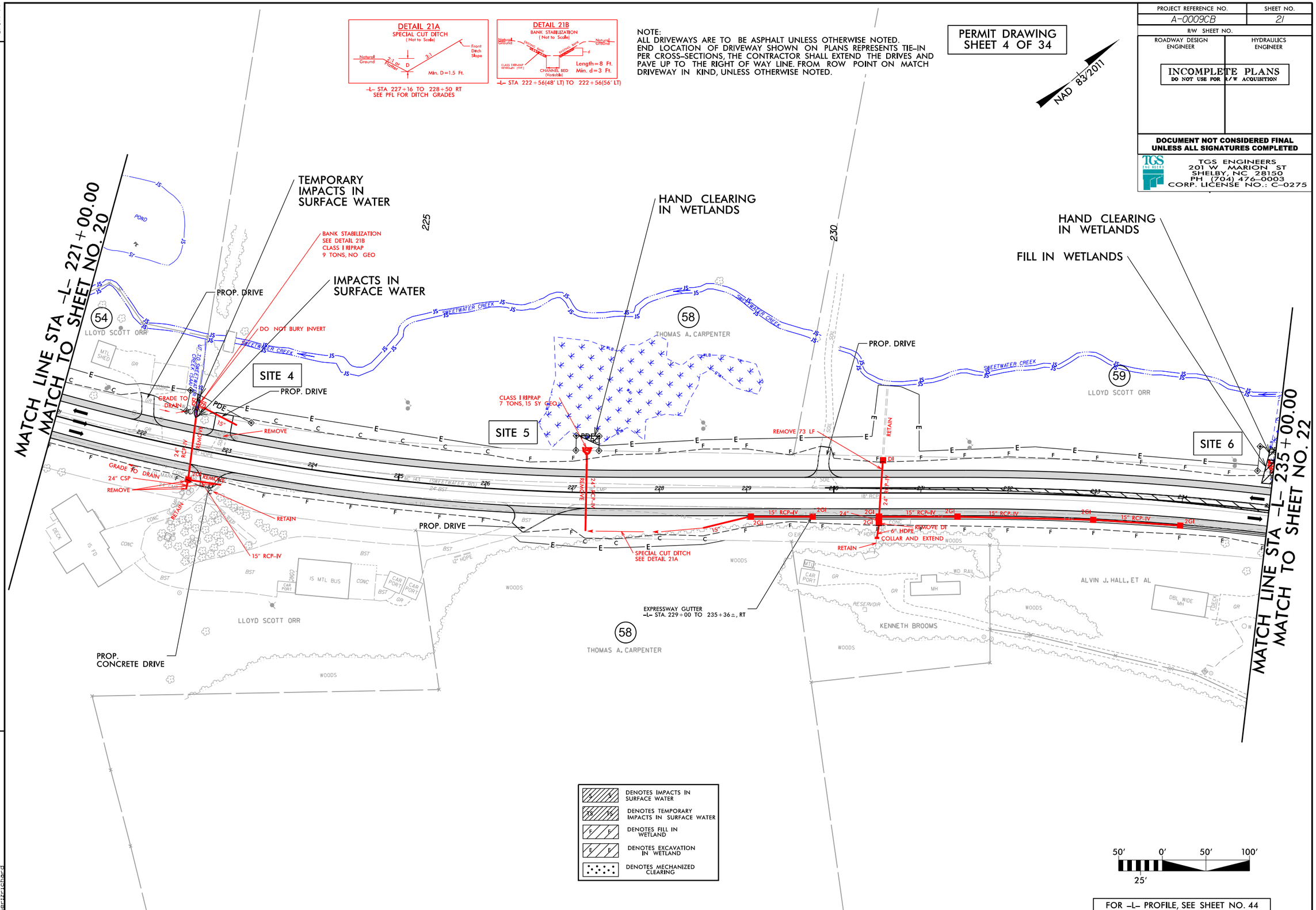
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

PERMIT DRAWING
SHEET 4 OF 34

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.



FOR -L- PROFILE, SEE SHEET NO. 44

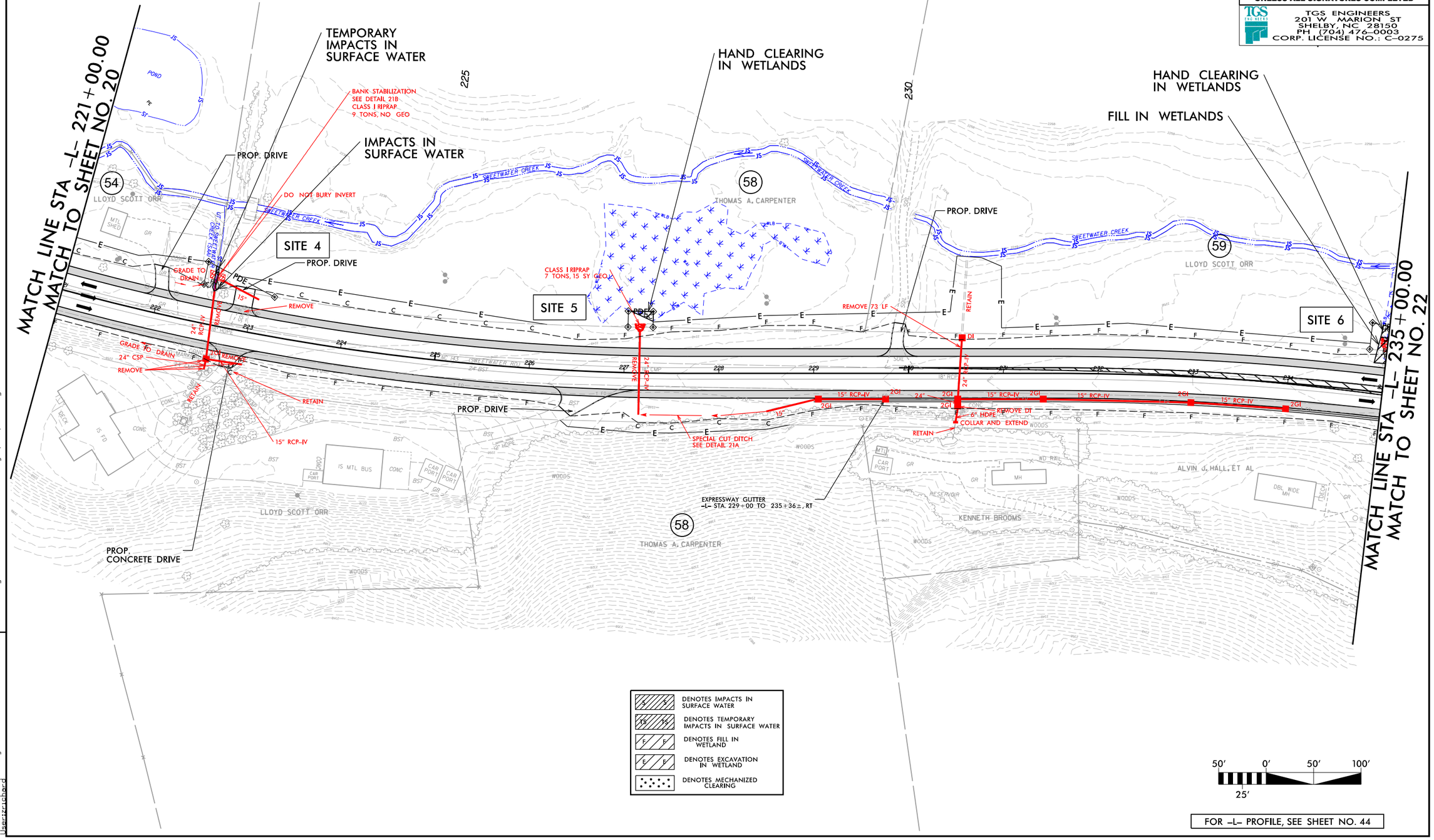
REVISIONS

8/17/99

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB PSH\A-0009CB_hyd_prm_psh_21.dgn
User:zrichard

8/17/99

REVISIONS



FOR -L- PROFILE, SEE SHEET NO. 44

11/1/2021
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User:richard

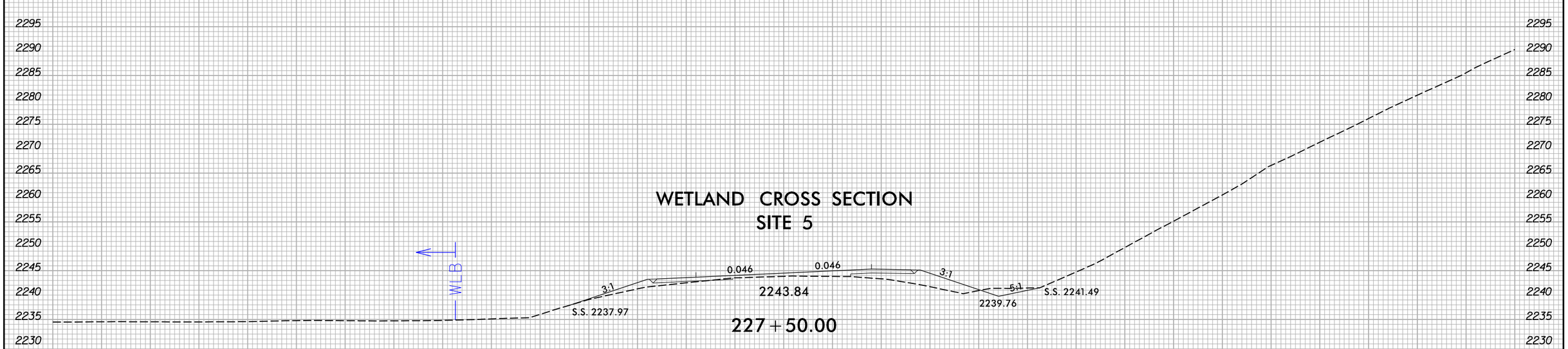
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-11

PERMIT DRAWING
SHEET 6 OF 34

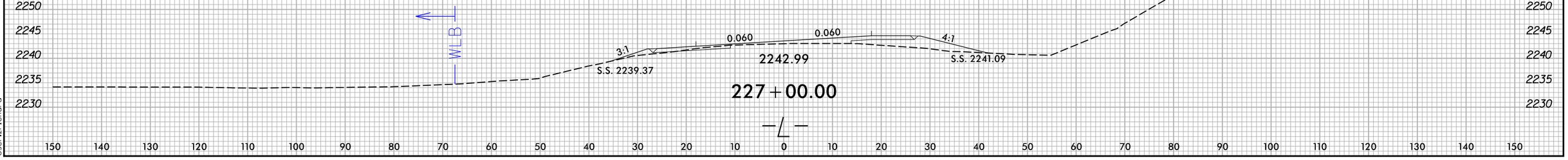
SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL

WETLAND CROSS SECTION
SITE 5



227 + 50.00

WETLAND CROSS SECTION
SITE 5



227 + 00.00

—℄—

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CB\A-0009CB_Hyd_xpLL_wetlands.dgn
User:rrichard

8/17/99

REVISIONS

-L- CURVE DATA

PI Sta 234+84.86
Δ = 12° 40' 17.1" (RT)
D = 1° 54' 35.5"
L = 663.47'
T = 333.10'
R = 3,000.00'
SE = 0.05
DS = 60 MPH

PI Sta 255+20.12
Δ = 40° 44' 05.0" (LT)
D = 2° 36' 15.7"
L = 1,564.10'
T = 816.75'
R = 2,200.00'
SE = 0.07
DS = 60 MPH

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F DENOTES FILL IN WETLAND
F F DENOTES EXCAVATION IN WETLAND
HC HC DENOTES HAND CLEARING

PERMIT DRAWING
SHEET 7 OF 34

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

MATCH LINE STA -L- 235+00.00
MATCH TO SHEET NO. 21

MATCH LINE STA -L- 249+00.00
MATCH TO SHEET NO. 23

HAND CLEARING IN WETLANDS
FILL IN WETLANDS
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
HAND CLEARING IN WETLANDS
TEMPORARY IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER

SCALE: 1"=50'

59 LLOYD SCOTT ORR
60 LANDAN ORR
61 MARY S. LAMBERTH
62 DEBORAH E. JUSTICE
63 ALVIN J. PAUL, ET AL
64 RAUL H. OLIVERA
65 DEBORAH E. JUSTICE
66 GERALD V. JONES
67 BOBBY MAX EDWARDS
68 JOSEPH A. BRADLEY
69 MATT SHIPLET

SITE 6
SITE 7
SITE 8

DO NOT DISTURB SWEETWATER CREEK
CLASS I RIPRAP 20 TONS, 39 SY GEO
DO NOT DISTURB
PROP. DRIVE
BURY INVERT 0.8'
STANDARD BASE DITCH SEE DETAIL 22D DDE=16 CY CLASS II RIPRAP 26 TONS, NO GEO
PROP. DRIVE
RIPRAP AT EMBANKMENT SEE DETAIL 22F CLASS I RIPRAP 13 TONS, NO GEO
STANDARD BASE DITCH SEE DETAIL 22E DDE=2 CY CLASS I RIPRAP 7 TONS, NO GEO
DO NOT BURY INVERT
REMOVE
RETAIN
42" CSP
PROP. DRIVE
10' GRAVEL DRIVE
EXPRESSWAY GUTTER -L- STA. 229+00 TO 235+36±, RT
FALSE SUMP SEE DETAIL 22B BURY INVERT 0.8'
BANK STABILIZATION SEE DETAIL 22C CLASS I RIPRAP 17 TONS, NO GEO
PROP. SOIL DRIVE
UT TO SWEETWATER CREEK
PROP. DRIVE
40TCB w/ 8" OPENINGS
PROP. DRIVE
SPECIAL CUT DITCH SEE DETAIL 22A
DO NOT DISTURB SEPTIC
PROP. DRIVE

SWEETWATER CREEK
NC 194 (SWEETWATER RD)
WOODS
BST
EIP
JS
Sr
F
C
E
GR
HW
RCP
CMP
SEPTIC TANK
LOG CABIN
PORCH
DRAIN FIELD
STEPS
DECK
RAISED GARDEN
TERRACED LANDSCAPING
IS FABRICK D

DETAIL 22A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
2:1 or Flatter
D
4:1 or Flatter
Front Ditch Slope
Min. D=2 Ft.
-L- STA. 246+00 TO 247+00 RT
SEE XSC FOR DITCH GRADE

DETAIL 22B
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
4:1
2:1
1.5'
S
S=Toe of Slope
TOE OF FILL
-L- STA. 239+07 RT

DETAIL 22C
BANK STABILIZATION
(Not to Scale)
Natural Ground
Bottom Width
Natural Ground
d
CLASS I RIPRAP KEYSLOPE (TYP.)
CHANNEL BED (Variable)
Length=15 Ft.
Min. d=3 Ft.
-L- STA 239+56(37' RT) TO 239+53(53' RT)

DETAIL 22F
RIPRAP AT EMBANKMENT
(Not to Scale)
5'min.
Ditch Grade
1.5' Keyed-in
Type of Liner=Class I Rip-Rap
-L- STA. 245+50 LT

DETAIL 22D
STANDARD BASE DITCH
(Not to Scale)
Natural Ground
1.5:1
1.5:1
Natural Ground
d
D
B
Min. D=2.5 Ft.
Min. d=2.5 Ft.
B=4 Ft.
*When B is < 6.0'
Type of Liner=Class II Rip-Rap
-L- STA 239+52(35' LT) TO 239+50(48' LT)
DAYLIGHT AT 1.0%

DETAIL 22E
STANDARD BASE DITCH
(Not to Scale)
Natural Ground
1.5:1
1.5:1
Natural Ground
d
D
B
Min. D=2.5 Ft.
Min. d=2.5 Ft.
B=3 Ft.
*When B is < 6.0'
Type of Liner=Class I Rip-Rap
-L- STA 245+50(39' LT) TO 245+49(49' LT)
DAYLIGHT AT 1.0%

50' 0' 50' 100'
25'

FOR -L- PROFILE, SEE SHEET NO. 45

W:\2021 XXNCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB PSH\A-0009CB_hyd_prm_psh_22.dgn
User:richard

8/17/99

REVISIONS

-L- CURVE DATA

PI Sta 234+84.86
Δ = 12° 40' 17.1" (RT)
D = 1° 54' 35.5"
L = 663.47'
T = 333.10'
R = 3,000.00'
SE = 0.05
DS = 60 MPH

PI Sta 255+20.12
Δ = 40° 44' 05.0" (LT)
D = 2° 36' 15.7"
L = 1,564.10'
T = 816.75'
R = 2,200.00'
SE = 0.07
DS = 60 MPH

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F DENOTES FILL IN WETLAND
F F DENOTES EXCAVATION IN WETLAND
HC HC DENOTES HAND CLEARING

PERMIT DRAWING
SHEET 8 OF 34

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

HAND CLEARING IN WETLANDS
FILL IN WETLANDS
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
MATCH LINE STA -L- 235+00.00 MATCH TO SHEET NO. 21
MATCH LINE STA -L- 249+00.00 MATCH TO SHEET NO. 23
SITE 6
SITE 7
SITE 8
59 LLOYD SCOTT ORR
60 LANDAN ORR
61 MARY S. LAMBERTH
62 DEBORAH E. JUSTICE
63 ALVIN J. RAUL, ET AL
64 RAUL H. OLIVERA
65 DEBORAH E. JUSTICE
66 GERALD V. JONES
67 BOBBY MAX EDWARDS
68 JOSEPH A. BRADLEY
69 MATT SHIPLET
DO NOT DISTURB SWEETWATER CREEK
CLASS I RIPRAP 20 TONS, 39 SY GEO
DO NOT DISTURB
PROP. DRIVE
BURY INVERT 0.8'
STANDARD BASE DITCH SEE DETAIL 22D DDE=16 CY CLASS II RIPRAP 26 TONS, NO GEO
PROP. DRIVE
RIPRAP AT EMBANKMENT SEE DETAIL 22F CLASS I RIPRAP 13 TONS, NO GEO
STANDARD BASE DITCH SEE DETAIL 22E DDE=2 CY CLASS I RIPRAP 7 TONS, NO GEO
DO NOT BURY INVERT
REMOVE
RETAIN
42" CSP
PROP. DRIVE
10' GRAVEL DRIVE
EXPRESSWAY GUTTER -L- STA. 229+00 TO 235+36 ±, RT
FALSE SUMP SEE DETAIL 22B BURY INVERT 0.8'
BANK STABILIZATION SEE DETAIL 22C CLASS I RIPRAP 17 TONS, NO GEO
PROP. SOIL DRIVE
PROP. DRIVE
40TCB w/ 8" OPENINGS
PROP. DRIVE
SPECIAL CUT DITCH SEE DETAIL 22A
DO NOT DISTURB SEPTIC
HAND CLEARING IN WETLANDS

DETAIL 22A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground, 2:1 or Flatter, D, 4:1 or Flatter, Front Ditch Slope
Min. D=2 Ft.
-L- STA. 246+00 TO 247+00 RT
SEE XSC FOR DITCH GRADE

DETAIL 22B
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow, 4:1, 2:1, 1.5', S
S=Toe of Slope
TOE OF FILL
-L- STA. 239+07 RT

DETAIL 22C
BANK STABILIZATION
(Not to Scale)
Natural Ground, Bottom Width, d
CLASS II RIP-RAP KEYWAY (TYP.)
CHANNEL BED (Variable)
Length = 15 Ft.
Min. d = 3 Ft.
-L- STA 239+56(37' RT) TO 239+53(53' RT)

DETAIL 22F
RIPRAP AT EMBANKMENT
(Not to Scale)
5' min., Ditch Grade, 1.5' Keyed-in
Type of Liner = Class I Rip-Rap
-L- STA. 245+50 LT

DETAIL 22D
STANDARD BASE DITCH
(Not to Scale)
Natural Ground, 1.5:1, d, D, B, Min. D=2.5 Ft., Min. d=2.5 Ft., B=4 Ft.
*When B is < 6.0'
Type of Liner = Class II Rip-Rap
-L- STA 239+52(35' LT) TO 239+50(48' LT)
DAYLIGHT AT 1.0%

DETAIL 22E
STANDARD BASE DITCH
(Not to Scale)
Natural Ground, 1.5:1, d, D, B, Min. D=2.5 Ft., Min. d=2.5 Ft., B=3 Ft.
*When B is < 6.0'
Type of Liner = Class I Rip-Rap
-L- STA 245+50(39' LT) TO 245+49(49' LT)
DAYLIGHT AT 1.0%

50' 0' 50' 100'
25'

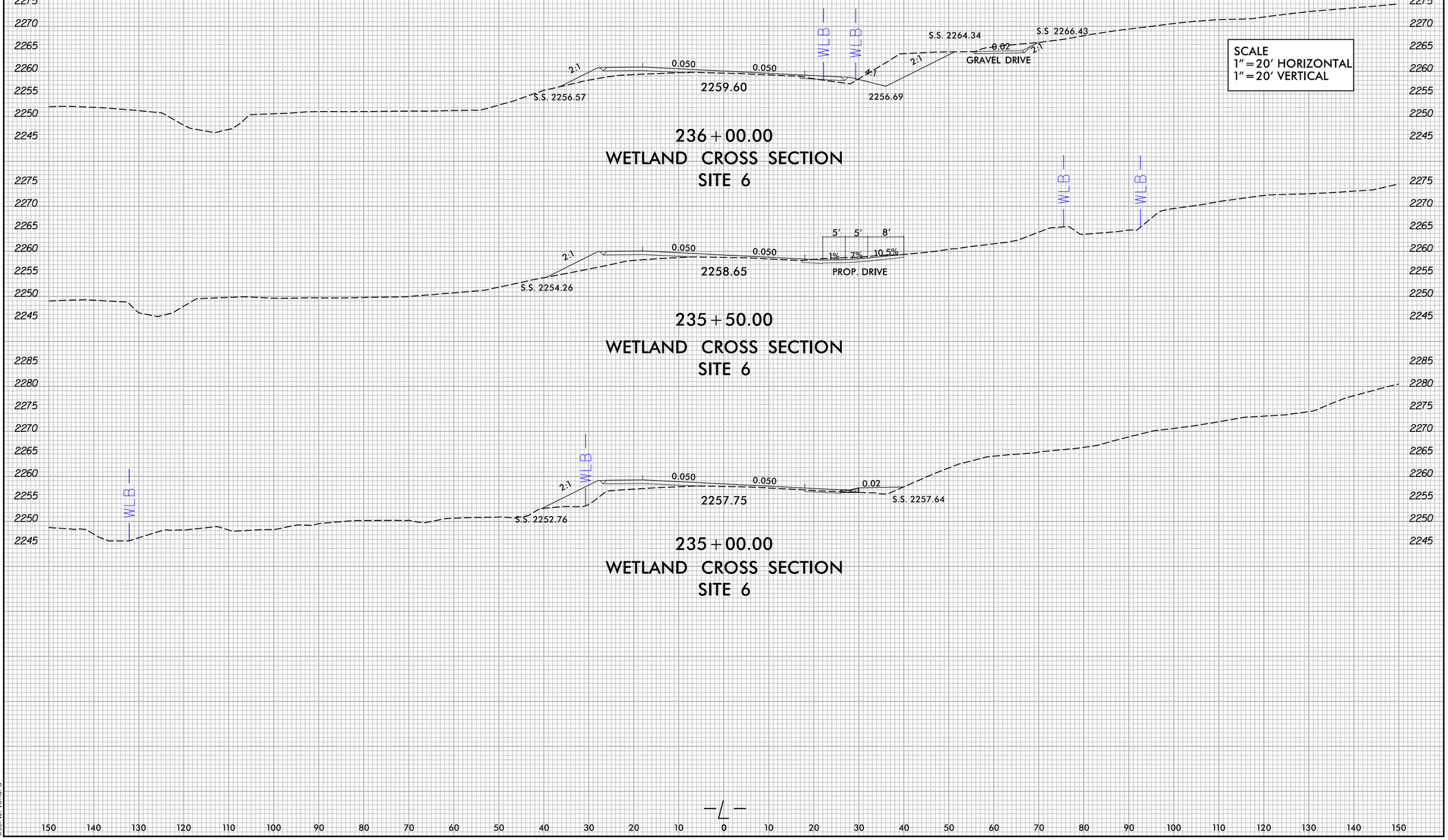
FOR -L- PROFILE, SEE SHEET NO. 45

IVK/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB PSH\A-0009CB_hyd_prm_psh_22.dgn
User:richard

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-17

PERMIT DRAWING
SHEET 9 OF 34

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



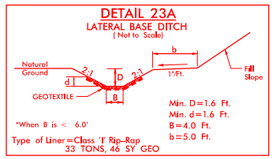
8/17/99

REVISIONS

-L- CURVE DATA

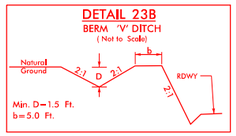
PI Sta 255+20.12
△ = 40° 44' 05.0" (LT)
D = 2° 36' 15.7"
L = 1,564.10'
T = 816.75'
R = 2,200.00'
SE = 0.07
DS = 60 MPH

DETAIL 23A
LATERAL BASE DITCH
(Not to Scale)



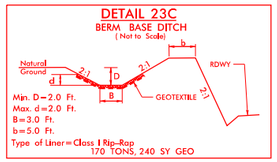
Min. D=1.6 Ft.
Min. d=1.6 Ft.
B=4.0 Ft.
b=5.0 Ft.
*When B is < 6.0'
Type of Liner=Class 'I' Rip-Rap
33 TONS, 46 SY GEO
-L- STA. 250+15 TO 250+50 LT
SEE PFL FOR DITCH GRADE (3.9%)

DETAIL 23B
BERM 'V' DITCH
(Not to Scale)



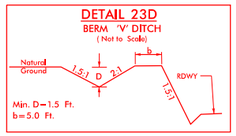
Min. D=1.5 Ft.
b=5.0 Ft.
-L- STA. 251+90 TO 252+35 RT
SEE PFL FOR DITCH GRADE (13.5%)

DETAIL 23C
BERM BASE DITCH
(Not to Scale)



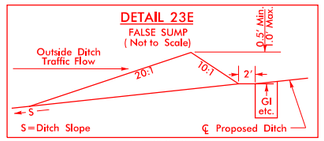
Min. D=2.0 Ft.
Max. d=2.0 Ft.
B=3.0 Ft.
b=5.0 Ft.
Type of Liner=Class I Rip-Rap
170 TONS, 240 SY GEO
-L- STA. 252+50 TO 254+00 RT
SEE PFL FOR DITCH GRADE (4.5%)

DETAIL 23D
BERM 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.
b=5.0 Ft.
-L- STA. 258+50 TO 258+68 RT
-L- STA. 258+68 TO 259+00 RT
SEE PFL FOR DITCH GRADES

DETAIL 23E
FALSE SUMP
(Not to Scale)



-L- STA. 252+36 RT
-L- STA. 253+86 RT
-L- STA. 255+36 RT
-L- STA. 256+69 RT
-L- STA. 258+55 RT
-L- STA. 259+87 RT
-L- STA. 261+94 RT

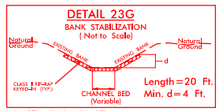
NAD 83/2011

DETAIL 23F
SPECIAL CUT DITCH
(Not to Scale)



Min. D=1.0 Ft.
-L- STA. 250+50 TO 250+89 RT
SEE PFL FOR DITCH GRADE (2.56%)

DETAIL 23G
BANK STABILIZATION
(Not to Scale)



-L- STA 250+06 LT

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

F F DENOTES EXCAVATION IN WETLAND
S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

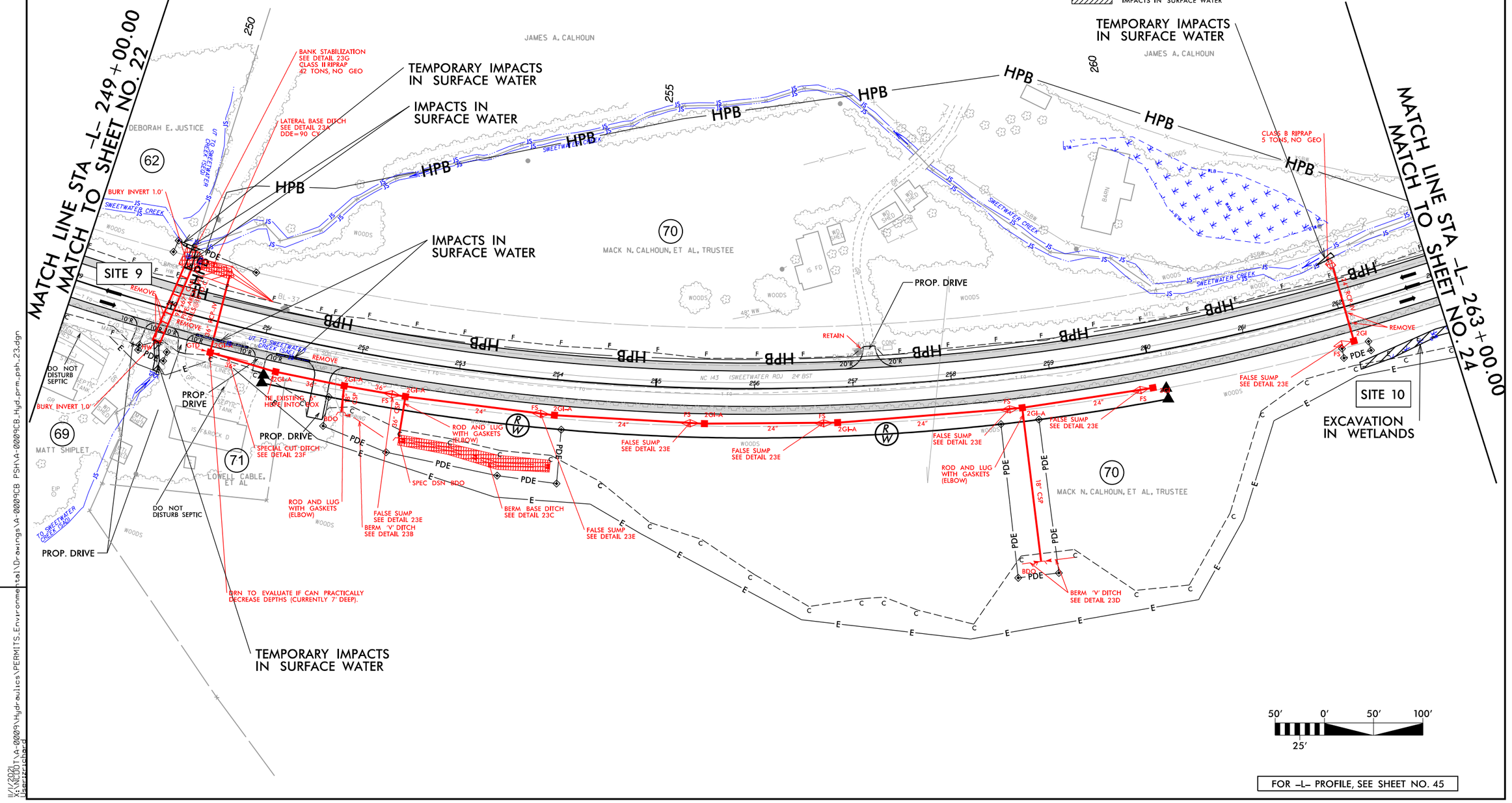
PERMIT DRAWING
SHEET 10 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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



FOR -L- PROFILE, SEE SHEET NO. 45

K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB PSH\A-0009CB_Hyd_prm_psh_23.dgn
11/1/2021
Harrelchard

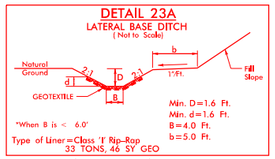
8/17/99

REVISIONS

-L- CURVE DATA

PI Sta 255+20.12
△ = 40° 44' 05.0" (LT)
D = 2° 36' 15.7"
L = 1,564.10'
T = 816.75'
R = 2,200.00'
SE = 0.07'
DS = 60 MPH

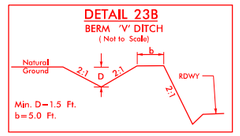
DETAIL 23A
LATERAL BASE DITCH
(Not to Scale)



Type of Liner = Class 'I' Rip-Rap
33 TONS, 46 SY GEO

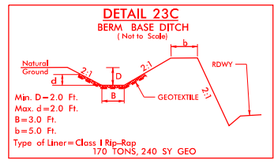
-L- STA. 250+15 TO 250+50 LT
SEE PFL FOR DITCH GRADE (3.9%)

DETAIL 23B
BERM 'V' DITCH
(Not to Scale)



-L- STA. 251+90 TO 252+35 RT
SEE PFL FOR DITCH GRADE (13.5%)

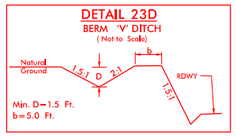
DETAIL 23C
BERM 'V' DITCH
(Not to Scale)



Type of Liner = Class I Rip-Rap
170 TONS, 240 SY GEO

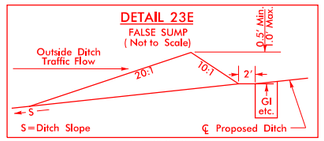
-L- STA. 252+50 TO 254+00 RT
SEE PFL FOR DITCH GRADE (4.5%)

DETAIL 23D
BERM 'V' DITCH
(Not to Scale)



-L- STA. 258+50 TO 258+68 RT
-L- STA. 258+68 TO 259+00 RT
SEE PFL FOR DITCH GRADES

DETAIL 23E
FALSE SUMP
(Not to Scale)



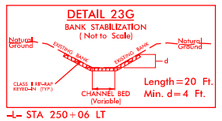
-L- STA. 252+36 RT
-L- STA. 253+86 RT
-L- STA. 255+36 RT
-L- STA. 256+69 RT
-L- STA. 258+55 RT
-L- STA. 259+87 RT
-L- STA. 261+94 RT

DETAIL 23F
SPECIAL CUT DITCH
(Not to Scale)



-L- STA. 250+50 TO 250+89 RT
SEE PFL FOR DITCH GRADE (2.56%)

DETAIL 23G
BANK STABILIZATION
(Not to Scale)



-L- STA 250+06 LT

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

F F DENOTES EXCAVATION IN WETLAND
S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PERMIT DRAWING
SHEET 11 OF 34

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

MATCH LINE STA -L- 249+00.00
MATCH TO SHEET NO. 22

MATCH LINE STA -L- 263+00.00
MATCH TO SHEET NO. 24

JAMES A. CALHOUN
DEBORAH E. JUSTICE
MACK N. CALHOUN, ET AL, TRUSTEE
MATT SHIPLET
LOWELL CABLE, ET AL

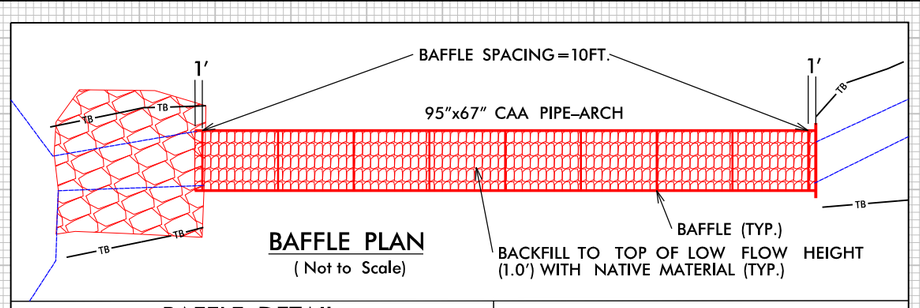
SITE 9
SITE 10

BANK STABILIZATION SEE DETAIL 23G CLASS II RIPRAP 42 TONS, NO GEO
LATERAL BASE DITCH SEE DETAIL 23A DDE=90 CY
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
CLASS B RIPRAP 5 TONS, NO GEO
EXCAVATION IN WETLANDS
BURY INVERT 1.0'
SWEETWATER CREEK
UT TO SWEETWATER CREEK
HPB
JS
PDE
RDO
REMOVE
RETAIN
PROP. DRIVE
DO NOT DISTURB SEPTIC
NE EXISTING 6" HDPE INTO CBOX
SPECIAL CUT DITCH SEE DETAIL 23F
ROD AND LUG WITH GASKETS (ELBOW)
SPEC DSN RDO
BERM 'V' DITCH SEE DETAIL 23B
BERM 'V' DITCH SEE DETAIL 23D
BERM BASE DITCH SEE DETAIL 23C
FALSE SUMP SEE DETAIL 23E
DRN TO EVALUATE IF CAN PRACTICALLY DECREASE DEPTHS (CURRENTLY 7' DEEP).
NC 143 (SWEETWATER RD) 24' BST
CONC
WOODS
BARN
SEPTIC TANK
WELL
SHED

50' 0' 50' 100'
25'

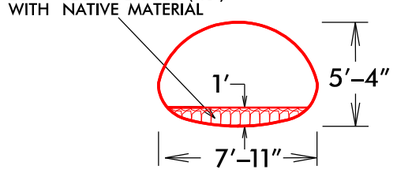
FOR -L- PROFILE, SEE SHEET NO. 45

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB PSH\A-0009CB_Hyd_prm_psh_23.dgn
User:richard



BAFFLE PLAN
(Not to Scale)

BAFFLE DETAIL
(Not to Scale)



NOTES:
1) LOW FLOW BAFFLES SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN BAFFLES IN THE CULVERT SHALL PROVIDE A CONTINUOUS FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

–L–
NC 143

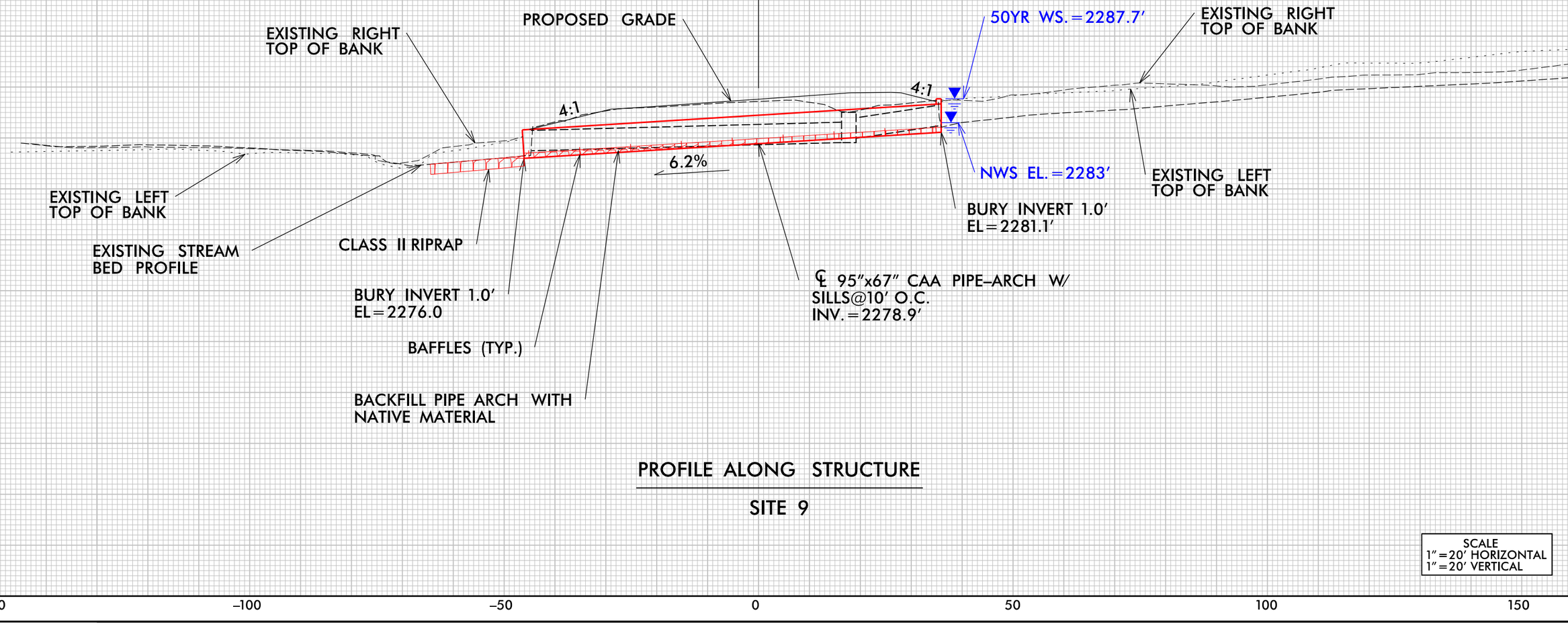
PERMIT DRAWING
SHEET 12 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A–0009CB	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

℄ –L– STA. 250+00
95″x67″ CAA PIPE–ARCH W/ SILLS@10′ O.C.
PROPOSED GRADE– 2287.61′
SKEW– 98 DEG.



PROFILE ALONG STRUCTURE

SITE 9

SCALE
1″=20′ HORIZONTAL
1″=20′ VERTICAL

6/23/16

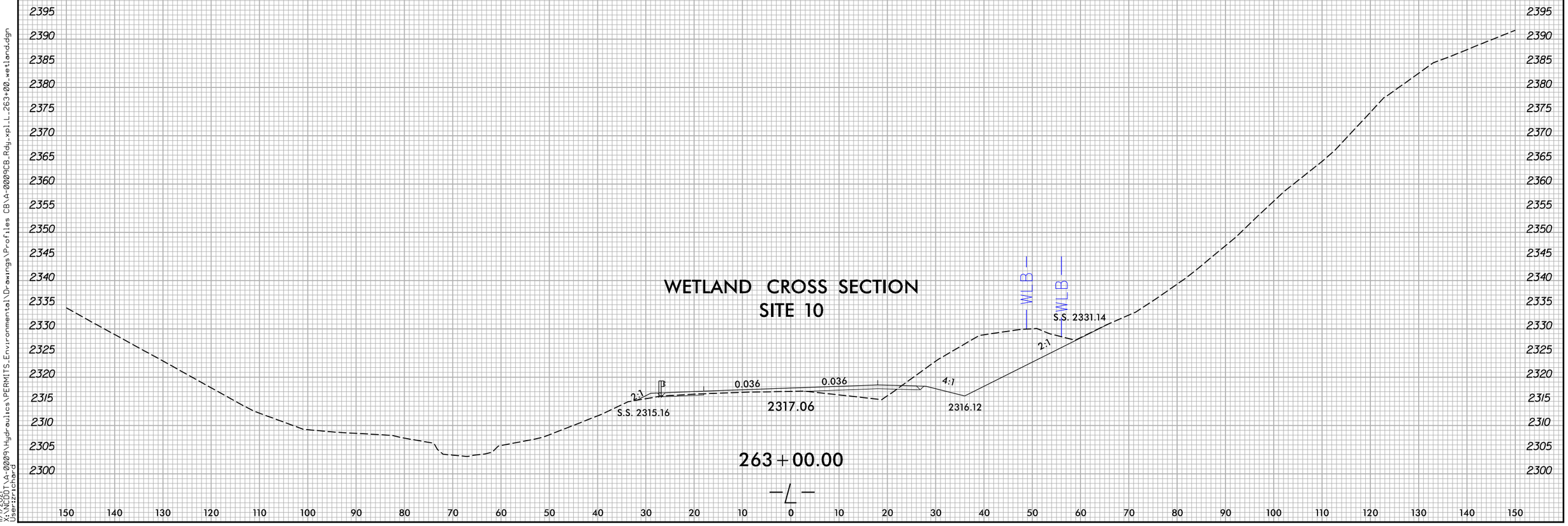
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-45

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

PERMIT DRAWING
SHEET 13 OF 34

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL

WETLAND CROSS SECTION
SITE 10



263+00.00

—℄—

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

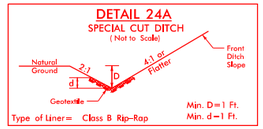
11/1/2021
X:\MCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CB\A-0009CB_Rdy_xpl_L_263+00_wetland.dgn
User:richard

8/17/99

-L- CURVE DATA

PI Sta 269+61.11	PI Sta 274+37.73
△ = 2° 50' 08.0" (LT)	△ = 1° 42' 58.4" (RT)
D = 0° 28' 38.9"	D = 0° 28' 38.9"
L = 593.88'	L = 359.44'
T = 297.00'	T = 179.74'
R = 12,000.00'	R = 12,000.00'
SE = NC	SE = NC
DS = 60 MPH	DS = 60 MPH

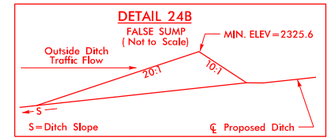
DETAIL 24A
SPECIAL CUT DITCH
(Not to Scale)



Type of Liner= Class B Rip-Rap

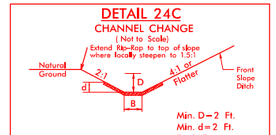
-L- STA 267+50 TO 268+00 RT
SEE PFL FOR DITCH GRADE (7.4%)

DETAIL 24B
FALSE SUMP
(Not to Scale)



-L- STA. 267+13 RT

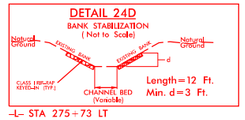
DETAIL 24C
CHANNEL CHANGE
(Not to Scale)



Type of Liner= Class I Rip-Rap

-L- STA 275+36 TO 275+62 RT
SEE PFL FOR CHANNEL CHANGE GRADE

DETAIL 24D
BANK STABILIZATION
(Not to Scale)



-L- STA 275+73 LT

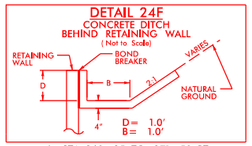
DETAIL 24E
BANK STABILIZATION
(Not to Scale)



Type of Liner= Class II Rip-Rap

-L- STA. 267+30 LT (L=10 FT)
-L- STA. 267+60 LT (L=37 FT)

DETAIL 24F
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



-L- STA. 269+25 TO 271+50 RT
(SEE WALL ENVELOPES FOR DITCH GRADE)

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

S S — DENOTES IMPACTS IN SURFACE WATER
TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F — DENOTES FILL IN WETLAND
HC HC — DENOTES HAND CLEARING

PERMIT DRAWING
SHEET 14 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	24
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NAD 83/2011

MATCH LINE STA -L- 263+00.00
MATCH TO SHEET NO. 23

MATCH LINE STA -L- 277+00.00
MATCH TO SHEET NO. 25

TEMPORARY IMPACTS IN SURFACE WATER
HAND CLEARING IN WETLAND
IMPACTS IN SURFACE WATER
FILL IN WETLAND
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
EXCAVATION IN WETLAND
PROP. RETAINING WALL #7 WITH HANDRAIL & CONC. DITCH
BEGIN -L- STA. 269+25±
END -L- STA. 272+19±, RT
PROP. SINGLE FACED CONCRETE BARRIER
TEMPORARY IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER

SITE 10 | SITE 11 | SITE 12 | SITE 13

BANK STABILIZATION SEE DETAIL 24E 12 TONS
BANK STABILIZATION SEE DETAIL 24E CLASS II RIPRAP 45 TONS
FILL WITH FLOWABLE FILL EST 14 CY
ROCK PLATING 135 SY CLASS I RIPRAP -L- STA 270+45 TO 271+25 LT
DO NOT BURY INVERT
CLASS I RIPRAP 29 TONS, NO GEO (KEYED-IN, 1.5:1 MAX)
BANK STABILIZATION SEE DETAIL 24D CLASS I RIPRAP 10 TONS, NO GEO
BURY INVERT 0.7'
FALSE SUMP SEE DETAIL 24B
CLASS B RIPRAP 12 TONS, 25 SY GEO
SPECIAL CUT DITCH SEE DETAIL 24A CLASS B RIPRAP 17 TONS, 38 SY GEO
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 24F
CHANNEL CHANGE SEE DETAIL 24C DDE=100 CY CLASS I RIPRAP 50 TONS
LOCALLY STEEPEN BACKSLOPE TO 1.5:1 AND EXTEND RIPRAP TO TOP OF SLOPE.

JAMES A. CALHOUN
MACK N. CALHOUN, ET AL, TRUSTEE
WILLIAM A. DITMORE
MONICA D. SAWYER
SAVANNAH DANIELS
LANDON E. FARLEY
JANE FARLEY HEIRS
PAM WIRZ
FRANK DEYTON
RAYMOND KARR DB 185 PG 76

SWEETWATER CREEK
UT TO SWEETWATER CREEK (SAF)
UT TO SWEETWATER CREEK (SAG)
NC 143 (SWEETWATER RD)
SAMS HILL RD.

PROP. DRIVE
GRADE TO DRAIN
36" RCP-IV
24" CMP
30" RCP-IV
42" RCP-IV
36" BLOCK WALL

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 46

50' 0' 50' 100'
25'

K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB PSH\A-0009CB_Hyd_prm_psh_24.dgn
11/1/2021
User:richard

8/17/99

-L- CURVE DATA

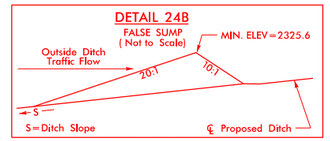
PI Sta 269+61.11	PI Sta 274+37.73
△ = 2° 50' 08.0" (LT)	△ = 1° 42' 58.4" (RT)
D = 0° 28' 38.9"	D = 0° 28' 38.9"
L = 593.88'	L = 359.44'
T = 297.00'	T = 179.74'
R = 12,000.00'	R = 12,000.00'
SE = NC	SE = NC
DS = 60 MPH	DS = 60 MPH

DETAIL 24A
SPECIAL CUT DITCH
(Not to Scale)



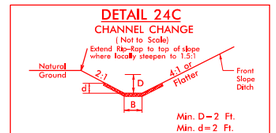
-L- STA 267+50 TO 268+00 RT
SEE PFL FOR DITCH GRADE (7.4%)

DETAIL 24B
FALSE SUMP
(Not to Scale)



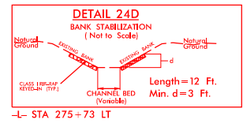
-L- STA. 267+13 RT

DETAIL 24C
CHANNEL CHANGE
(Not to Scale)



-L- STA 275+36 TO 275+62 RT
SEE PFL FOR CHANNEL CHANGE GRADE

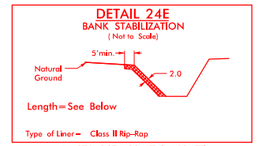
DETAIL 24D
BANK STABILIZATION
(Not to Scale)



-L- STA 275+73 LT

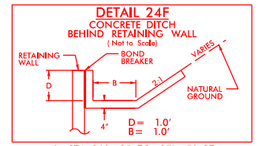
PERMIT DRAWING SHEET 15 OF 34

DETAIL 24E
BANK STABILIZATION
(Not to Scale)



-L- STA. 267+30 LT (L=10 FT)
-L- STA. 267+60 LT (L=37 FT)

DETAIL 24F
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



-L- STA. 269+25 TO 271+50 RT
(SEE WALL ENVELOPES FOR DITCH GRADE)

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	24

R/W SHEET NO.

ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F	DENOTES FILL IN WETLAND
HC HC	DENOTES HAND CLEARING

NAD 83/2011

MATCH LINE STA -L- 263+00.00
MATCH TO SHEET NO. 23

MATCH LINE STA -L- 277+00.00
MATCH TO SHEET NO. 25

78 RAYMOND KARR DB 185 PG 76

TEMPORARY IMPACTS IN SURFACE WATER
HAND CLEARING IN WETLAND
IMPACTS IN SURFACE WATER
FILL IN WETLAND
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
SITE 10
SITE 11
SITE 12
SITE 13
EXCAVATION IN WETLAND
PROP. RETAINING WALL #7 WITH HANDRAIL & CONC. DITCH
BEGIN -L- STA. 269+25±
END -L- STA. 272+19±, RT
PROP. SINGLE FACED CONCRETE BARRIER
TEMPORARY IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
BANK STABILIZATION SEE DETAIL 24E 12 TONS
BANK STABILIZATION SEE DETAIL 24E CLASS II RIPRAP 45 TONS
FILL WITH FLOWABLE FILL EST 14 CY
ROCK PLATING 135 SY CLASS I RIPRAP -L- STA 270+45 TO 271+25 LT
DO NOT BURY INVERT
CLASS I RIPRAP 29 TONS, NO GEO (KEYED-IN, 1.5:1 MAX.)
BANK STABILIZATION SEE DETAIL 24D CLASS I RIPRAP 10 TONS, NO GEO
BURY INVERT 0.7'
FALSE SUMP SEE DETAIL 24B
CLASS B RIPRAP 12 TONS, 25 SY GEO
SPECIAL CUT DITCH SEE DETAIL 24A CLASS B RIPRAP 17 TONS, 38 SY GEO
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 24F
CHANNEL CHANGE SEE DETAIL 24C DDE=100 CY CLASS I RIPRAP 50 TONS
LOCALLY STEEPEN BACKSLOPE TO 1.5:1 AND EXTEND RIPRAP TO TOP OF SLOPE.
GRADE TO DRAIN
BURY INVERT 0.7'
PROP. DRIVE
PROP. RETAINING WALL #1
36" RCP-IV
PLUG
REMOVE
30" RCP-IV
24" CMP
24" BST
18" RCP
SWEETWATER CREEK
UT TO SWEETWATER CREEK (SAF)
UT TO SWEETWATER CREEK (SAG)
NC 143 (SWEETWATER RD)
SAMS HILL RD.
JAMES A. CALHOUN
MACK N. CALHOUN, ET AL, TRUSTEE
WILLIAM A. DITMORE
MONICA D. SAWYER
FRANK DEYTON
LANDON E. FARLEY
SAVANNAH DANIELS
JANE FARLEY HEIRS
PAM WIRZ
70
72
73
74
75
76
77
78
SA
JS
HPB
WOODS
DRAIN LINE
SEPTIC TANK
WELL
WD PORCH
½ SFD
GARAGE
BR GARAGE
22" W. OAK
EXISTING R/W
50' 0' 50' 100'
25'

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 46

K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB PSH\A-0009CB_Hyd_prm_psh_24.dgn
11/1/2021
User:richard

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-53

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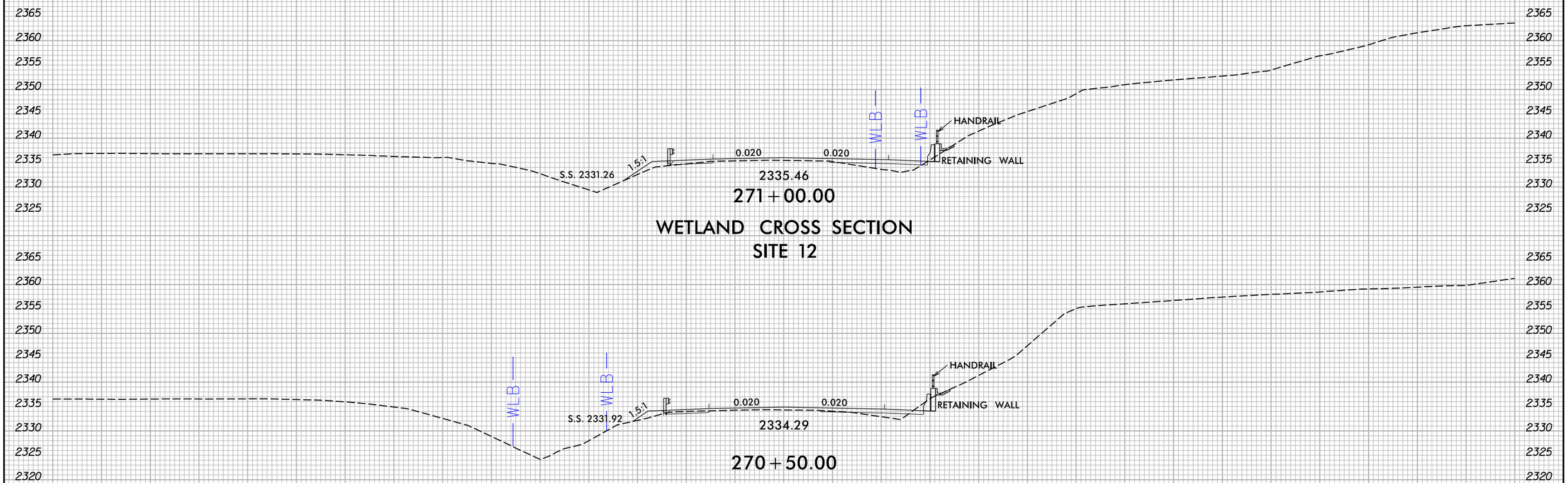
PERMIT DRAWING
SHEET 16 OF 34



SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CB\A-0009CB_Hyd_xpLL_wetlands.dgn
User:rrichard

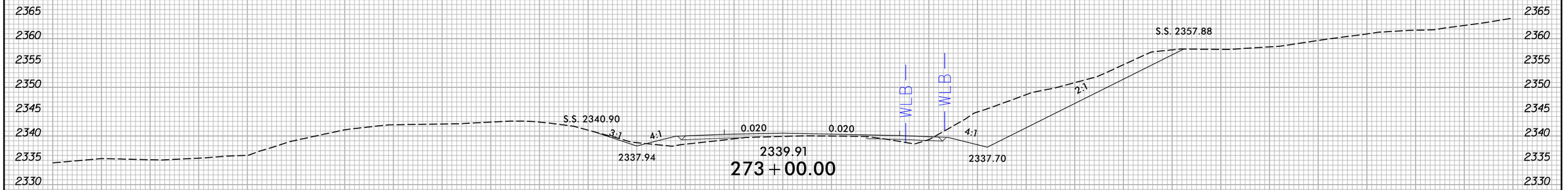
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-55

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

PERMIT DRAWING
SHEET 17 OF 34

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



273 + 00.00

WETLAND CROSS SECTION
SITE 12

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CB\A-0009CB_Hyd_xpLL_wetlands.dgn
User:rrichard

8/17/99

-L- CURVE DATA

PI Sta 287+55.00
Δ = 34° 15' 00.8" (RT)
D = 5° 58' 05.9"
L = 573.87'
T = 295.80'
R = 960.00'
SE = 0.08
DS = 55 MPH

-Y4- CURVE DATA

PI Sta 11+11.35
Δ = 55° 08' 53.6" (LT)
D = 71° 37' 11.0"
L = 77.00'
T = 41.78'
R = 80.00'

PI Sta 20+66.90
Δ = 83° 23' 00.0" (RT)
D = 76° 23' 39.7"
L = 109.15'
T = 66.80'
R = 75.00'

PI Sta 22+09.11
Δ = 55° 15' 43.9" (LT)
D = 60° 18' 40.8"
L = 91.63'
T = 49.73'
R = 95.00'

PI Sta 22+91.14
Δ = 23° 50' 55.2" (LT)
D = 30° 09' 20.4"
L = 79.09'
T = 40.12'
R = 190.00'

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

NAD 83/2011

F F DENOTES EXCAVATION IN WETLAND
F F DENOTES FILL IN WETLAND
HC HC DENOTES HAND CLEARING
S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 18 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	25
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

TEMPORARY IMPACTS IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
HAND CLEARING IN WETLAND
TEMPORARY IMPACTS IN SURFACE WATER
PROP. RETAINING WALL #9 W/HANDRAIL & CONCRETE DITCH
BEGIN -L- STA. 290+80±
END -L- STA. 292+85±

78 RAYMOND KARR DB 185 PG 76
79 KYLE F. EDWARDS
80 SHAWN W. ROGERS
81 ETHEL CARRINGER
82 STEVEN R. HENSLEY, ET AL
83 TERRY T. JORDAN
84 GERALD M. GARLAND
85 WILLIAM N. GARLAND, JR.
PAM WIRZ
REBECCA E. GARLAND
MERVILLE W. SESSOMS, JR.
MARY NELL ROSE MORGAN

SITE 14
SITE 15
SITE 16

MATCH LINE STA -L- 277+00.00 MATCH TO SHEET NO. 24

MATCH LINE STA -L- 291+00.00 MATCH TO SHEET NO. 26

PROP. DRIVE
PROP. DRIVE
PROP. DRIVE
PROP. DRIVE
DO NOT BURY INVERT
DO NOT BURY INVERT

INSTALL 30" HDPE TO AVOID UNDERMINING TOE OF EXISTING POND EMBANKMENT SEE CROSS SECTION 281+50 LT.

LATERAL BASE DITCH SEE DETAIL 25H CLASS II 46 TONS, 48 SY GEO, DDE 22 CY

CHANNEL CHANGE SEE DETAIL 25C CLASS I 69 TONS, DDE 65 CY

LATERAL BASE DITCH SEE DETAIL 25D CLASS B 38 TONS, 84 SY GEO, DDE 50 CY

ROD&LUG W/ GASKETS(ELBOWS)

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

SPRING BOX

REMOVE

FALSE SUMP SEE DETAIL 25F

CLASS B RIPRAP 10 FT WIDTH (KEYED-IN) 32 TONS, 70 SY GEO

FILL WITH FLOWABLE FILL EST 7 CY

TOE PROTECTION SEE DETAIL 25E 37 TONS, 81 SY GEO

PRECAST TB JB w/ MH FRAME & GRATE

ROD AND LUG WITH GASKETS (ELBOWS)

CLASS B RIPRAP 7 TONS, 16 SY GEO

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 25G

CULVERT OUTLET CHANNEL SEE DETAIL 25B EST.60 TONS CLASS II EXCAVATION= +/-10 CY

1.5:1 ROCK PLATING

BURY 0.6

REMOVE 72" CMP

2GI

RCP IV

BAFFLES

REMOVE UT TO SWEETWATER CREEK (SAJ)

ROD AND LUG WITH GASKETS (ELBOWS)

CULVERT OUTLET CHANNEL SEE DETAIL 25J EST.35 TONS CLASS II RIP RAP EXCAVATION= +/-35cu.yds

CLASS B RIPRAP 2 TONS, NO GEO

CULVERT INLET CHANNEL SEE DETAIL 25A EST.30 TONS CLASS II EXCAVATION= +/-25 CY

20'-0" x 6'-0" ALUMINUM BOX CULVERT WITH BAFFLES BURIED 1.0

CULVERT INLET CHANNEL SEE DETAIL 25I EST.95 TONS CLASS II RIP RAP EXCAVATION= +/-65cu.yds

IMPACTS IN SURFACE WATER

SHOULDER BERM GUTTER -L- STA. 279+50 TO 284+00, RT

SHOULDER BERM GUTTER -L- STA. 286+93 TO 290+00, RT

UT TO SWEETWATER CREEK (SAJ)

RETAIN CONCRETE DITCH

ROCK PLATING -L- STA. 288+00 TO 288+50, RT SEE NCDOT RDY STD 275.01 EST. SY

REMOVE 5 LF

BANK STABILIZATION (BANKS ONLY) SEE DETAIL 25K CLASS I RIPRAP 7 TONS, NO GEO

CLASS B RIPRAP 3 TONS, 10 SY GEO

CLASS B RIPRAP 2 TONS, 7 SY GEO

CLASS B RIPRAP 2 TONS, 7 SY GEO

JB w/MH FALSE SUMP SEE DETAIL 25F

ROD AND LUG WITH GASKETS (ELBOWS)

RETAIN TOP OF CMP AND UNDERCUT WITH CIPP

REMOVE DI

PLUG

POND (PF)

DETAIL 25A
CULVERT INLET CHANNEL
(Not to Scale)
Length = 22 Ft.
d = 3 Ft. Min.
-L- STA. 279+08 RT

DETAIL 25B
CULVERT OUTLET CHANNEL
(Not to Scale)
Length = 40 Ft. LT
Length = 22 Ft. RT
-L- STA. 278+41 LT

DETAIL 25C
CHANNEL CHANGE
(Not to Scale)
Type of Liner = Grass (w/Class I Rip-Rap as shown)
Min. D = 1.5 Ft.
B = 5 Ft.
b = 10 Ft.
-L- STA 279+87 TO 280+72 LT
SEE PFL FOR CHANNEL CHANGE GRADE

DETAIL 25D
LATERAL BASE DITCH
(Not to Scale)
*When B is < 6.0'
Type of Liner = Class B Rip-Rap
Min. D = 1.5 Ft.
Min. d = 1.5 Ft.
B = 3 Ft.
b = 5 Ft.
-L- STA 280+74 TO 281+50 LT
SEE PFL FOR DITCH GRADE

DETAIL 25E
TOE PROTECTION
(Not to Scale)
d = 1 Ft.
b = 3 Ft.
Type of Liner = Class B Rip-Rap
-L- STA 288+75 TO 289+77 LT

DETAIL 25F
FALSE SUMP
(Not to Scale)
S = Ditch Slope
℄ Proposed Ditch
-L- STA. 289+74 LT
-L- STA. 290+08 RT (USE 4:1 FOR FRONT & BACK SLOPES)

DETAIL 25G
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
D = 1.0'
B = 1.0'
-L- STA. 290+80 TO 291+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 25H
LATERAL BASE DITCH
(Not to Scale)
*When B is < 6.0'
Type of Liner = Class II Rip-Rap
Min. D = 1.5 Ft.
Min. d = 1.5 Ft.
B = 5 Ft.
b = 5 Ft.
-L- STA. 282+00 TO 282+37 LT
SEE PFL FOR DITCH GRADE

DETAIL 25I
CULVERT INLET CHANNEL
(Not to Scale)
Length = 35 Ft.
d = 3 Ft. Min.
-L- STA. 279+50 RT

DETAIL 25J
CULVERT OUTLET CHANNEL
(Not to Scale)
Length = 4 Ft. LT
Length = 30 Ft. RT
-L- STA. 279+30 RT

DETAIL 25K
BANK STABILIZATION
(Not to Scale)
Length = 10 Ft.
Min. d = 2.5 Ft.
-L- STA 288+23 RT

50' 0' 50' 100'
25'

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 46

K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_PSHA-0009CB_Hyd_prm_psh_25.dgn
12/13/2021
User:richard

8/17/99

-L- CURVE DATA

PI Sta 287+55.00
Δ = 34° 15' 00.8" (RT)
D = 5° 58' 05.9"
L = 573.87'
T = 295.80'
R = 960.00'
SE = 0.08
DS = 55 MPH

-Y4- CURVE DATA

PI Sta 11+11.35
Δ = 55° 08' 53.6" (LT)
D = 71° 37' 11.0"
L = 77.00'
T = 41.78'
R = 80.00'

PI Sta 20+66.90
Δ = 83° 23' 00.0" (RT)
D = 76° 23' 39.7"
L = 109.15'
T = 66.80'
R = 75.00'

PI Sta 22+09.11
Δ = 55° 15' 43.9" (LT)
D = 60° 18' 40.8"
L = 91.63'
T = 49.73'
R = 95.00'

PI Sta 22+91.14
Δ = 23° 50' 55.2" (LT)
D = 30° 09' 20.4"
L = 79.09'
T = 40.12'
R = 190.00'

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

NAD 83/2011

F F DENOTES EXCAVATION IN WETLAND
F F DENOTES FILL IN WETLAND
HC HC DENOTES HAND CLEARING
FS FS DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 19 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	25
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

TEMPORARY IMPACTS IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
HAND CLEARING IN WETLAND
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
PROP. RETAINING WALL #9 W/HANDRAIL & CONCRETE DITCH
BEGIN -L- STA. 290+80±
END -L- STA. 292+85±
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER

MATCH LINE STA -L- 277+00.00
MATCH TO SHEET NO. 24

MATCH LINE STA -L- 291+00.00
MATCH TO SHEET NO. 26

78 RAYMOND KARR DB 185 PG 76
79 KYLE F. EDWARDS
80 SHAWN W. ROGERS
81 ETHEL CARRINGER
82 STEVEN R. HENSLEY, ET AL
83 TERRY T. JORDAN
84 GERALD M. GARLAND
85 WILLIAM N. GARLAND, JR.

SITE 14
SITE 15
SITE 16

PROP. DRIVE
REMOVE ROCK GARDEN
CHANNEL CHANGE SEE DETAIL 25C CLASS I 69 TONS, DDE 65 CY
LATERAL BASE DITCH SEE DETAIL 25D CLASS II 46 TONS, 48 SY GEO, DDE 22 CY
LATERAL BASE DITCH SEE DETAIL 25D CLASS II 38 TONS, 84 SY GEO, DDE 50 CY
INSTALL 30" HDPE TO AVOID UNDERMINING TOE OF EXISTING POND EMBANKMENT SEE CROSS SECTION 281+50 LT.
ROD&LUG W/ GASKETS(ELBOWS)
MAX 1% PIPE SLOPE THIS SIDE OF ELBOW
CULVERT OUTLET CHANNEL SEE DETAIL 25B EST.60 TONS CLASS II EXCAVATION= +/-10 CY
1.5:1 ROCK PLATING
SWEETWATER CREEK
BURY 0.6
REMOVE 72" CMP
2GI-LD
SCP-IV
BAFFLES
REMOVE UT TO SWEETWATER CREEK (SAJ)
ROD AND LUG WITH GASKETS (ELBOWS)
CULVERT OUTLET CHANNEL SEE DETAIL 25J EST.40 TONS CLASS II/III RIP RAP EXCAVATION= +/-35cu.yds
CLASS B RIPRAP 2 TONS, NO GEO
CULVERT INLET CHANNEL SEE DETAIL 25A EST.30 TONS CLASS II EXCAVATION= +/-25 CY
20'-1" x 6'-1" ALUMINUM BOX CULVERT WITH BAFFLES BURIED 1.0
CULVERT INLET CHANNEL SEE DETAIL 25I EST.95 TONS CLASS II RIP RAP EXCAVATION= +/-65cu.yds
SHOULDER BERM GUTTER -L- STA. 279+50 TO 284+00, RT
UT TO SWEETWATER CREEK (SAJ)
REMOVE
FALSE SUMP SEE DETAIL 25F
30" CSP
SPRING BOX
CLASS B RIPRAP 10 FT WIDTH (KEYED-IN) 32 TONS, 70 SY GEO
FILL WITH FLOWABLE FILL EST 7 CY
TOE PROTECTION SEE DETAIL 25E 37 TONS, 81 SY GEO
DO NOT BURY INVERT
CLASS B RIPRAP 1 TONS, NO GEO
PRECAST TB JB w/ MH FRAME & GRATE
ROD AND LUG WITH GASKETS (ELBOWS)
CLASS B RIPRAP 7 TONS, 16 SY GEO
CONC DITCH BEHI RETAINING WALL SEE DETAIL 25G
RETAIN CONCRETE DITCH
ROCK PLATING -L- STA. 288+00 TO 288+50, RT SEE NCDOT RDY STD 275.01 EST. SY
JB w/MH FALSE SUMP SEE DETAIL 25F
BANK STABILIZATION (BANKS ONLY) SEE DETAIL 25K CLASS I RIPRAP 7 TONS, NO GEO
CLASS B RIPRAP 3 TONS, 10 SY GEO
CLASS B RIPRAP 2 TONS, 7 SY GEO
SHOULDER BERM GUTTER -L- STA. 286+93 TO 290+00, RT
CLASS B RIPRAP 2 TONS, 7 SY GEO
RETAIN TO CMP AND UNDER WITH CIPP
PROP. RETAINING WALL #10 SEE DETAIL 25G
RETAIN 10'R
RETAIN 20'R
PROP. RETAINING WALL #11 SEE DETAIL 25G
PROP. RETAINING WALL #12 SEE DETAIL 25G
PROP. RETAINING WALL #13 SEE DETAIL 25G
PROP. RETAINING WALL #14 SEE DETAIL 25G
PROP. RETAINING WALL #15 SEE DETAIL 25G
PROP. RETAINING WALL

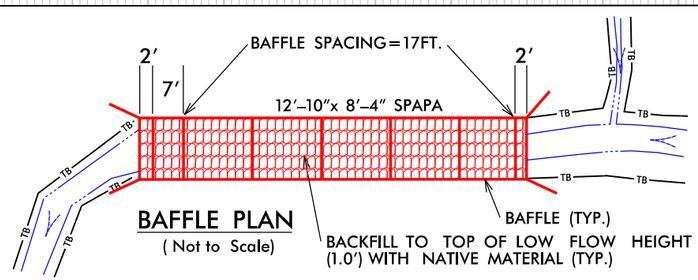
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 20 OF 34

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

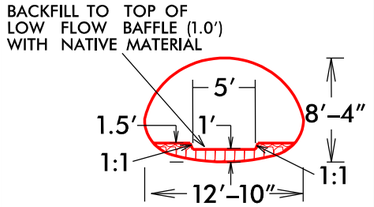
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

–L–
NC 143



BAFFLE PLAN
(Not to Scale)

BAFFLE DETAIL
(Not to Scale)



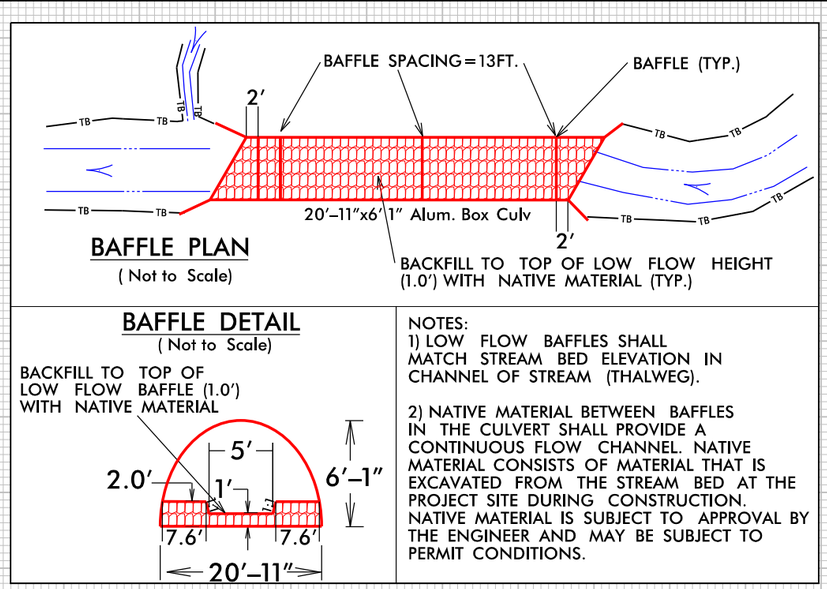
NOTES:
1) LOW FLOW BAFFLES SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN BAFFLES IN THE CULVERT SHALL PROVIDE A CONTINUOUS FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

PROFILE ALONG STRUCTURE

SITE 14 UNDER –L– (NC 143)

SCALE
1″=20′ HORIZONTAL
1″=20′ VERTICAL



BAFFLE PLAN
(Not to Scale)

BAFFLE DETAIL
(Not to Scale)

NOTES:
1) LOW FLOW BAFFLES SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN BAFFLES IN THE CULVERT SHALL PROVIDE A CONTINUOUS FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

–Y4–
SR 1282

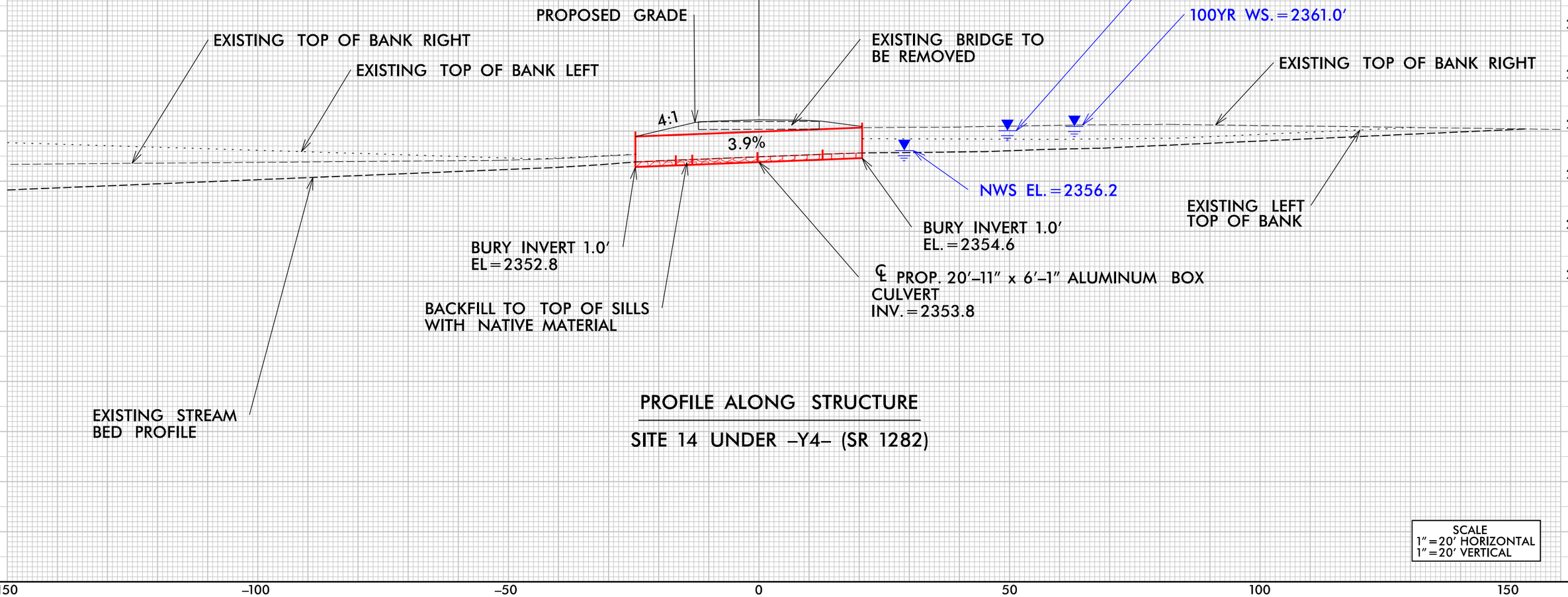
PERMIT DRAWING
SHEET 21 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

℄ –Y4– STA. 12+13.1
20′–11″ x 6′–1″ ALUMINUM BOX CULVERT
WITH CONCRETE HEADWALLS AND BAFFLES
PROPOSED GRADE=2362.3′
SKEW=60 DEG.



PROFILE ALONG STRUCTURE

SITE 14 UNDER –Y4– (SR 1282)

SCALE
1″=20′ HORIZONTAL
1″=20′ VERTICAL

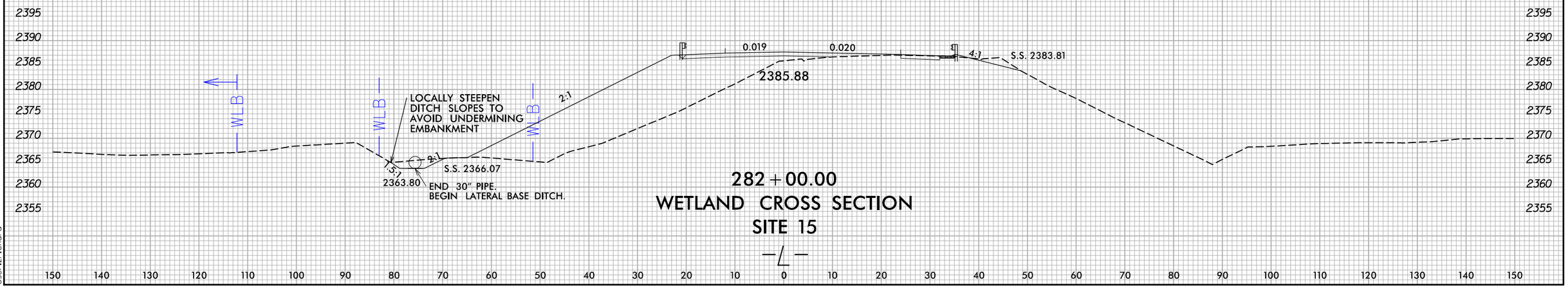
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-60

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

PERMIT DRAWING
SHEET 22 OF 34

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



282+00.00
WETLAND CROSS SECTION
SITE 15

—℄—

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CBYA-0009CB_Hyd_xpLL_wetlands.dgn
User:rrichard

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	27
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NAD 83/2011

PERMIT DRAWING
SHEET 23 OF 34

-L- CURVE DATA

PI Sta 311+70.00	PI Sta 320+83.09	PI Sta 40+76.38	PI Sta 41+53.87	PI Sta 43+61.39
Δ = 54° 45' 45.1" (RT)	Δ = 32° 27' 42.9" (LT)	Δ = 78° 16' 33.1" (LT)	Δ = 15° 47' 56.9" (LT)	Δ = 41° 05' 30.0" (LT)
D = 5° 24' 18.9"	D = 7° 32' 20.1"	D = 71° 37' 11.0"	D = 23° 52' 23.7"	D = 28° 38' 52.4"
L = 1,013.13'	L = 430.59'	L = 109.29'	L = 66.18'	L = 143.44'
T = 549.01'	T = 221.25'	T = 65.10'	T = 33.30'	T = 74.96'
R = 1,060.00'	R = 760.00'	R = 80.00'	R = 240.00'	R = 200.00'
SE = 0.08	SE = 0.08			
DS = 55 MPH	DS = 50 MPH			

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCH LINE STA -L- 305+00.00
MATCH TO SHEET NO. 26

MATCH LINE STA -L- 319+00.00
MATCH TO SHEET NO. 28

SITE 17

SITE 18

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

PROP. DRIVE

DO NOT DISTURB

CUT TO FILL TRANSITION CLASS B RIP-RAP 14 TONS, 31 SY GEO

REMOVE CONCRETE DITCH

CUT TO FILL TRANSITION CLASS B RIP-RAP 13 TONS, 30 SY GEO

RETAIN CONCRETE DITCH

ROD&LUG W/ GASKETS(ELBOW)

FALSE SUMP SEE DETAIL 27C

REMOVE

CLASS B RIPRAP 3 TONS, 10 SY GEO

CLASS B RIPRAP 2 TONS, 7 SY GEO

RETAIN CONCRETE DITCH

CUT TO FILL TRANSITION CLASS B RIP-RAP 16 TONS, 36 SY GEO

ROD AND LUG WITH GASKETS (ELBOWS)

CONTRACTOR DESIGN 4' DIA MH OVER 30' w/MH FRAME & COVER

SPRING BOX

FILL WITH FLOWABLE FILL EST 5 CY

REMOVE

TRENCHLESS INSTALLATION 36" WELDED STEEL (THICKNESS 0.360")

FILL WITH FLOWABLE FILL EST 22 CY

TOE PROTECTION SEE DETAIL 27B 30 TONS, 67 SY GEO

ROD AND LUG WITH GASKETS (ELBOWS)

FALSE SUMP SEE DETAIL 27C

SHOULDER BERM GUTTER -L- STA. 310+44 TO 313+40, RT

DO NOT BURY INVERT

BANK STABILIZATION SEE DETAIL 27E CLASS I RIPRAP 10 TONS, NO GEO

BANK STABILIZATION SEE DETAIL 27D CLASS I RIPRAP 22 TONS, NO GEO

SHOULDER BERM GUTTER -L- STA. 316+50 TO 317+67, RT

PROP. RETAINING WALL #10 W/HANDRAIL
BEGIN -L- STA. 316+45±
END -L- STA. 317+67±

DO NOT BURY INVERT

CLASS B RIPRAP 2 TONS, 7 SY GEO

REMOVE CB

TO SWEETWATER CREEK (SWC)

BDO SPEC DSN

REMOVE CONCRETE CUT DITCH SEE DETAIL 27A

GRADE TO DRAIN

CONCRETE CUT DITCH SEE DETAIL 27A

ROD AND LUG WITH GASKETS (ELBOW)

SPEC DSN TB 3B w/MH

DO NOT BURY INVERT

REMOVE CONC. DITCH

ROD&LUG W/ GASKETS(ELBOWS)

DO NOT DISTURB

STILLHOUSE BRANCH

JERRY TIPTON, SR.

JERRY V. TIPTON, JR.

WILLEM VAN DE WEERD

DARRELL R. GARLAND

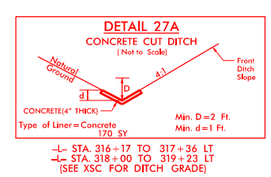
PHILLIPS & JORDAN INVESTMENT CORP.

MARK HILL

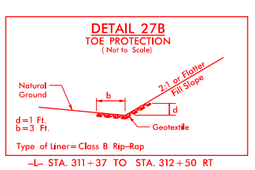
DILLARD JORDAN

BM#5 ELEV.=750.46 STA.=300+45.00 10" POPLAR

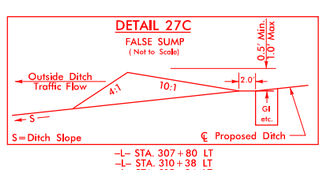
BM#6 ELEV.=750.46 STA.=300+45.00 10" POPLAR



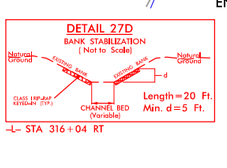
-L- STA. 316+17 TO 317+36 LT
-L- STA. 318+00 TO 319+23 LT
(SEE XSC FOR DITCH GRADE)



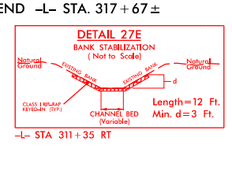
-L- STA. 311+37 TO STA. 312+50 RT



-L- STA. 307+80 LT
-L- STA. 310+38 LT
-L- STA. 315+94 LT
-L- STA. 313+35 RT (USE 4:1 FOR FRONT & BACK SLOPES)



-L- STA 316+04 RT



-L- STA 311+35 RT

50' 0' 50' 100'
25'

ESA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 47

11/1/2021
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User:richard

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	27
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NAD 83/2011

PERMIT DRAWING
SHEET 24 OF 34

-L- CURVE DATA

PI Sta 311+70.00	PI Sta 320+83.09	PI Sta 40+76.38	PI Sta 41+53.87	PI Sta 43+61.39
Δ = 54° 45' 45.1" (RT)	Δ = 32° 27' 42.9" (LT)	Δ = 78° 16' 33.1" (LT)	Δ = 15° 47' 56.9" (LT)	Δ = 41° 05' 30.0" (LT)
D = 5° 24' 18.9"	D = 7° 32' 20.1"	D = 71° 37' 11.0"	D = 23° 52' 23.7"	D = 28° 38' 52.4"
L = 1,013.13'	L = 430.59'	L = 109.29'	L = 66.18'	L = 143.44'
T = 549.01'	T = 221.25'	T = 65.10'	T = 33.30'	T = 74.96'
R = 1,060.00'	R = 760.00'	R = 80.00'	R = 240.00'	R = 200.00'
SE = 0.08	SE = 0.08			
DS = 55 MPH	DS = 50 MPH			

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCH LINE STA -L- 305+00.00
MATCH TO SHEET NO. 26

MATCH LINE STA -L- 319+00.00
MATCH TO SHEET NO. 28

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

PROP. DRIVE

SITE 17

SITE 18

DO NOT DISTURB

CUT TO FILL TRANSITION CLASS B RIP-RAP 14 TONS, 31 SY GEO

ROD&LUG W/ GASKETS(ELBOW)

FALSE SUMP SEE DETAIL 27C

REMOVE

REMOVE CB

REMOVE CONCRETE DITCH

CUT TO FILL TRANSITION CLASS B RIP-RAP 13 TONS, 30 SY GEO

RETAIN CONCRETE DITCH

CLASS B RIPRAP 3 TONS, 10 SY GEO

CLASS B RIPRAP 2 TONS, 7 SY GEO

RETAIN CONCRETE DITCH

CUT TO FILL TRANSITION CLASS B RIP-RAP 16 TONS, 36 SY GEO

ROD AND LUG WITH GASKETS (ELBOWS)

CONTRACTOR DESIGN 4' DIA MH OVER 30" w/MH FRAME & COVER

FILL WITH FLOWABLE FILL EST 5 CY

FILL WITH FLOWABLE FILL EST 22 CY

TRENCHLESS INSTALLATION 36" WELDED STEEL (THICKNESS 0.500")

SPRING BOX

PLUG

6" PVC

15" CSP

18" CSP

24" CMP

30" RCP

36" RCP

SHOULDER BERM GUTTER -L- STA. 310+44 TO 313+40, RT

SHOULDER BERM GUTTER -L- STA. 316+50 TO 317+67, RT

PROP. RETAINING WALL #10 W/HANDRAIL
BEGIN -L- STA. 316+45±
END -L- STA. 317+67±

BANK STABILIZATION SEE DETAIL 27E CLASS I RIPRAP 10 TONS, NO GEO

BANK STABILIZATION SEE DETAIL 27D CLASS I RIPRAP 22 TONS, NO GEO

TOE PROTECTION SEE DETAIL 27B 30 TONS, 67 SY GEO

DO NOT BURY INVERT

BDO SPEC DSN

SPEC DSN TB 3B w/MH

CONCRETE CUT DITCH SEE DETAIL 27A

GRADE TO DRAIN

PROP. DRIVE REMOVE

REMOVE CONC. DITCH

ROD&LUG W/ GASKETS(ELBOWS)

DO NOT DISTURB

CLASS B RIPRAP 2 TONS, 7 SY GEO

TO SWEETWATER CREEK (SMH)

UT TO SWEETWATER CREEK (SMH)

STILLHOUSE BRANCH

90 JERRY TIPTON, SR.

87 DARRELL R. GARLAND

89 PHILLIPS & JORDAN INVESTMENT CORP.

91 MARK HILL

93 WILLEM VAN DE WEERD

92 DILLARD JORDAN

JERRY V. TIPTON, JR.

DETAIL 27A
CONCRETE CUT DITCH
(Not to Scale)

Natural Ground; d; D; A:1; Front Ditch Slope; CONCRETE(4" THICK); Type of Liner=Concrete 170 SY; Min. D=2 Ft. Min. d=1 Ft.

-L- STA. 316+17 TO 317+36 LT
-L- STA. 318+00 TO 319+23 LT
(SEE XSC FOR DITCH GRADE)

DETAIL 27B
TOE PROTECTION
(Not to Scale)

Natural Ground; b; 2:1 or Flatter Fill Slope; d; Geotextile; d=1 Ft. b=3 Ft.; Type of Liner= Class B Rip-Rap

-L- STA. 311+37 TO STA. 312+50 RT

DETAIL 27C
FALSE SUMP
(Not to Scale)

Outside Ditch Traffic Flow; 4:1; 10:1; 2.0; 0.5' Min. 1.0' Max; GI etc.; S; S=Ditch Slope; ℄ Proposed Ditch

-L- STA. 307+80 LT
-L- STA. 310+38 LT
-L- STA. 315+94 LT
-L- STA. 313+35 RT (USE 4:1 FOR FRONT & BACK SLOPES)

DETAIL 27D
BANK STABILIZATION
(Not to Scale)

Natural Ground; EXISTING BANK; PROPOSED BANK; d; CLASS I RIP-RAP KEYWAY (TYP.); CHANNEL BED (Variable); Length=20 Ft. Min. d=5 Ft.

-L- STA 316+04 RT

DETAIL 27E
BANK STABILIZATION
(Not to Scale)

Natural Ground; EXISTING BANK; PROPOSED BANK; d; CLASS I RIP-RAP KEYWAY (TYP.); CHANNEL BED (Variable); Length=12 Ft. Min. d=3 Ft.

-L- STA 311+35 RT

50' 0' 50' 100'
25'

ESA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 47

IV/2021
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User:richard

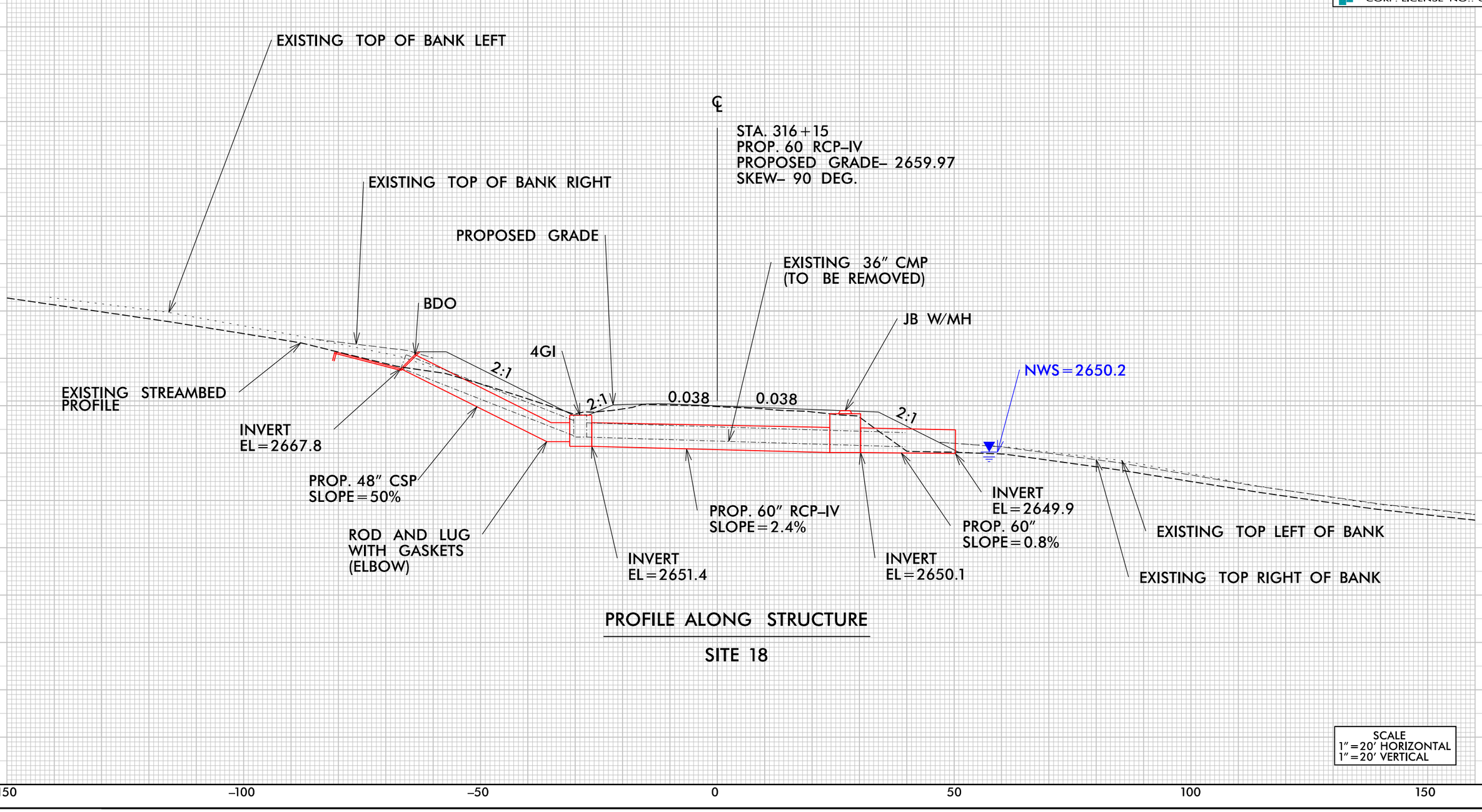
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 25 OF 34

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

–L–
NC 143



PROFILE ALONG STRUCTURE

SITE 18

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

8/17/99

-L- CURVE DATA

PI Sta 320+83.09	PI Sta 328+01.63
Δ = 32° 27' 42.9" (LT)	Δ = 21° 44' 00.0" (RT)
D = 7° 32' 20.1"	D = 4° 05' 33.2"
L = 430.59'	L = 531.05'
T = 221.25'	T = 268.75'
R = 760.00'	R = 1,400.00'
SE = 0.08	SE = 0.08
DS = 50 MPH	DS = 60 MPH

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 28A
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
A=1
20:1
2.0'
0.5' Min. 1.0' Max
G4 etc.
S=Ditch Slope
℄ Proposed Ditch
-L- STA. 327+77 LT
-L- STA. 329+59 LT

DETAIL 28B
CHANNEL CHANGE
(Not to Scale)
Natural Ground
D
2:1
2:1
Natural Ground
Exist. Channel
CLASS I RIP-RAP KEYED-IN (TYP.)
B
Length = 35 Ft.
Min. D = 3.0 Ft.
B = 4 Ft.
Type of Liner = CLASS I RIPRAP 45 TONS
-L- STA 328+95(78' RT) TO 329+26(57' RT)
SEE PFL FOR CHANNEL CHANGE GRADE (3.5%)

DETAIL 28C
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)
RETAINING WALL
BOND BREAKER
D
B
2:1
VARIES
NATURAL GROUND
4"
D= 1.0'
B= 1.0'
-L- STA. 319+25 TO 321+08 RT
-L- STA. 330+82 TO 333+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 28D
FALSE SUMP
(Not to Scale)
MIN. ELEV = 2717.3
1.1'
2:1
4:1
Outside Ditch Traffic Flow
S=Toe of Slope
TOE OF FILL
-L- STA. 323+52 LT

DETAIL 28E
BANK STABILIZATION
(Not to Scale)
Natural Ground
EXISTING BANK
EXISTING TOE
d
Natural Ground
CLASS B RIPRAP KEYED-IN (TYP.)
CHANNEL BED (Variable)
Length = 6 Ft.
Min. d = 1 Ft.
-L- STA 327+90 RT

DETAIL 28F
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
2:1 or Flatter
D
4:1 or Flatter
Front Ditch Slope
Min. D = 1.0 Ft.
-L- STA. 321+50 TO 322+00 RT
SEE PFL FOR DITCH GRADE

DETAIL 28G
BANK STABILIZATION
(Not to Scale)
Natural Ground
EXISTING BANK
EXISTING TOE
d
Natural Ground
CLASS I RIPRAP KEYED-IN (TYP.)
CHANNEL BED (Variable)
Length = 12 Ft.
Min. d = 3 Ft.
-L- STA 323+85 RT

NAD 83/2011

PERMIT DRAWING
SHEET 26 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	28

R/W SHEET NO.

ROADWAY DESIGN | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

MATCH LINE STA -L- 319+00.00
MATCH TO SHEET NO. 27

EXCAVATION IN WETLANDS

TEMPORARY FILL IN WETLANDS

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

FILL IN WETLAND

CONCRETE CUT DITCH SEE DETAIL 27A

EXPRESSWAY GUTTER -L- STA. 319+50 TO 322+00, LT

CLEAR TREES INSIDE EXISTING R/W (NO GRUBBING) FROM -L- STA. 318+50 TO 323+00 LT

FILL DI WITH SOIL & ABANDON

DO NOT BURY INVERT

FALSE SUMP SEE DETAIL 28D

SITE 19

SITE 20

SITE 21

FALSE SUMP SEE DETAIL 28A

PROP. CONCRETE DRIVE

DO NOT BURY INVERT

FILL WITH FLOWABLE FILL EST 9 CY

PROP. DRIVE

BDO SPEC DSN

FALSE SUMP SEE DETAIL 28A

PROP. RETAINING WALL #11 W/HANDRAIL & CONCRETE DITCH
BEGIN -L- STA. 330+82±
END -L- STA. 333+24±

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 28C

ROD AND LUG WITH GASKETS (ELBOWS)

CLASS B RIPRAP 3 TONS, 10 SY GEO

SINGLE FACED CONCRETE BARRIER

ROD/LUG W/ GASKETS(ELBOWS) REMOVE CONCRETE DITCH

FILL WITH FLOWABLE FILL

CLASS B RIPRAP 2 TONS, 7 SY GEO

GRADE TO DRAIN

SPECIAL CUT DITCH SEE DETAIL 28F

CLASS B RIPRAP 2 TONS, 7 SY GEO

CLASS B RIPRAP 3 TONS, 7 SY GEO

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 28C

PROP. RETAINING WALL #38 W/48" BLACK CHAINLINK FENCE & CONCRETE DITCH
BEGIN -L- STA. 319+29±
END -L- STA. 321+08±

PROP. SINGLE FACED CONCRETE BARRIER

BANK STABILIZATION SEE DETAIL 28G CLASS I RIP RAP 13 TONS, NO GEO

DO NOT BURY INVERT

V10 = 4.1 FT/S

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

MAX 8.5% PIPE SLOPE THIS SIDE OF ELBOW

CHANGE CHANGE SEE DETAIL 28B DDE=130 CY

CUT TO FILL TRANSITION CLASS B RIPRAP 17 TONS, 38 SY GEO

BANK STABILIZATION SEE DETAIL 28E CLASS B RIPRAP 8 TONS, NO GEO

SHOULDER BERM GUTTER -L- STA. 326+00 TO 328+25, RT

SHOULDER BERM GUTTER -L- STA. 331+75 TO 334+50, RT

CLASS B RIPRAP 2 TONS, 7 SY GEO

DO NOT DISTURB STRUCTURE

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

93 WILLEM VAN DE WEERD

95 JOSEPH R. BULLOCK

96 BRENDA GAIL BOWMAN WILLIAMS

97 SANDRA L. WILLIAMS

98 NCDOT

99 ROBERT ROY HILL

102 AMBER MICHELLE GREENE HAYES

ANDREA JAKABOSI

ALBERT JACK BOWMAN

SHIRLEY ROSE BOWMAN GREENE

EASTERN BAND OF THE CHEROKEE INDIANS

UT TO SWEETWATER CREEK (SEE)

SWEETWATER CREEK

NC 143 (SWEETWATER RD)

MATCH LINE STA -L- 333+00.00
MATCH TO SHEET NO. 29

FOR -L- PROFILE, SEE SHEET NO. 48

50' 0' 50' 100'
25'

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES HAND CLEARING
DENOTES EXCAVATION IN WETLAND
DENOTES TEMPORARY FILL IN WETLAND

SA ELIGIBLE AND UNASSESSED SITES

11/1/2021
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User:richard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	28

R/W SHEET NO.

ROADWAY DESIGN | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

PERMIT DRAWING SHEET 27 OF 34

NAD 83/2011

-L- CURVE DATA

PI Sta 320+83.09	PI Sta 328+01.63
Δ = 32° 27' 42.9" (LT)	Δ = 21° 44' 00.0" (RT)
D = 7° 32' 20.1"	D = 4° 05' 33.2"
L = 430.59'	L = 531.05'
T = 221.25'	T = 268.75'
R = 760.00'	R = 1,400.00'
SE = 0.08	SE = 0.08
DS = 50 MPH	DS = 60 MPH

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 28A
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
0.5' Min. 1.0' Max
2.0'
4:1 etc.
S=Ditch Slope
℄ Proposed Ditch
-L- STA. 327+77 LT
-L- STA. 329+59 LT

DETAIL 28B
CHANNEL CHANGE
(Not to Scale)
Natural Ground
Exist. Channel
CLASS I RIP-RAP KEYED-IN (TYP.)
Length = 35 Ft.
Min. D = 3.0 Ft.
B = 4 Ft.
Type of Liner = CLASS I RIPRAP 45 TONS
-L- STA 328+95(78' RT) TO 329+26(57' RT)
SEE PFL FOR CHANNEL CHANGE GRADE (3.5%)

DETAIL 28C
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)
RETAINING WALL
BOND BREAKER
VARIES
NATURAL GROUND
D= 1.0'
B= 1.0'
-L- STA. 319+25 TO 321+08 RT
-L- STA. 330+82 TO 333+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 28D
FALSE SUMP
(Not to Scale)
MIN. ELEV = 2717.3
1.1'
2:1
4:1
Outside Ditch Traffic Flow
S=Toe of Slope
TOE OF FILL
-L- STA. 323+52 LT

DETAIL 28E
BANK STABILIZATION
(Not to Scale)
CHANNEL BED (Variable)
Length = 6 Ft.
Min. d = 1 Ft.
-L- STA 327+90 RT

DETAIL 28F
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
2:1 or Flatter
4:1 or Flatter
Front Ditch Slope
Min. D = 1.0 Ft.
-L- STA. 321+50 TO 322+00 RT
SEE PFL FOR DITCH GRADE

DETAIL 28G
BANK STABILIZATION
(Not to Scale)
CLASS I RIPRAP KEYED-IN (TYP.)
CHANNEL BED (Variable)
Length = 12 Ft.
Min. d = 3 Ft.
-L- STA 323+85 RT

-L- STA. 319+00.00 MATCH LINE STA MATCH TO SHEET NO. 27

-L- STA. 333+00.00 MATCH LINE STA MATCH TO SHEET NO. 29

EXCAVATION IN WETLANDS

TEMPORARY FILL IN WETLANDS

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

FILL IN WETLAND

SITE 19

SITE 20

SITE 21

CONCRETE CUT DITCH SEE DETAIL 27A

EXPRESSWAY GUTTER -L- STA. 319+50 TO 322+00, LT

CLEAR TREES INSIDE EXISTING R/W (NO GRUBBING) FROM -L- STA. 318+50 TO 323+00 LT

FILL DI WITH SOIL & ABANDON

DO NOT BURY INVERT

FALSE SUMP SEE DETAIL 28D

FALSE SUMP SEE DETAIL 28A

PROP. CONCRETE DRIVE

DO NOT BURY INVERT

FILL WITH FLOWABLE FILL EST 9 CY

PROP. DRIVE

BDO SPEC SSN

FALSE SUMP SEE DETAIL 28A

PROP. RETAINING WALL #11 W/HANDRAIL & CONCRETE DITCH BEGIN -L- STA. 330+82± END -L- STA. 333+24±

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 28C

ROD AND LUG WITH GASKETS (ELBOWS)

CLASS B RIPRAP 3 TONS, 10 SY GEO

SINGLE FACED CONCRETE BARRIER

ROD AND LUG W/ GASKETS(ELBOWS) REMOVE CONCRETE DITCH

ROD AND LUG WITH GASKETS (ELBOWS)

REMOVE 30 LF

DO NOT BURY INVERT

CLASS B RIPRAP 2 TONS, 7 SY GEO

GRADE TO DRAIN

ABANDON

FILL WITH FLOWABLE FILL

CLASS B RIPRAP 3 TONS, 7 SY GEO

SPECIAL CUT DITCH SEE DETAIL 28F

CLASS B RIPRAP 2 TONS, 7 SY GEO

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 28C

PROP. RETAINING WALL #38 W/48" BLACK CHAINLINK FENCE & CONCRETE DITCH BEGIN -L- STA. 319+29± END -L- STA. 321+08±

PROP. SINGLE FACED CONCRETE BARRIER

BANK STABILIZATION SEE DETAIL 28G CLASS I RIP RAP 13 TONS, NO GEO

DO NOT BURY INVERT

ROD AND LUG WITH GASKETS (ELBOWS)

MAX 8.5% PIPE SLOPE THIS SIDE OF ELBOW

CUT TO FILL TRANSITION CLASS B RIPRAP 17 TONS, 38 SY GEO

CHANGE CHANGE SEE DETAIL 28B DDE=130 CY

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

BANK STABILIZATION SEE DETAIL 28E CLASS B RIPRAP 3 TONS, NO GEO

SHOULDER BERM GUTTER -L- STA. 326+00 TO 328+25, RT

SHOULDER BERM GUTTER -L- STA. 331+75 TO 334+50, RT

DO NOT DISTURB STRUCTURE

PROP. DRIVE

V10 = 4.1 FT/S

WILLEM VAN DE WEERD

JOSEPH R. BULLOCK

ANDREA JAKABOSI

BRENDA GAIL BOWMAN WILLIAMS

ALBERT JACK BOWMAN

SANDRA L. WILLIAMS

ROBERT ROY HILL

SHIRLEY ROSE BOWMAN GREENE

AMBER MICHELLE GREENE HAYES

NCDOT

EASTERN BAND OF THE CHEROKEE INDIANS

SWEETWATER CREEK

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES HAND CLEARING

DENOTES EXCAVATION IN WETLAND

DENOTES TEMPORARY FILL IN WETLAND

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 48

50' 0' 50' 100'
25'

8/17/99

11/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_PSH\A-0009CB_Hyd_prm_psh_28.dgn
User:richard

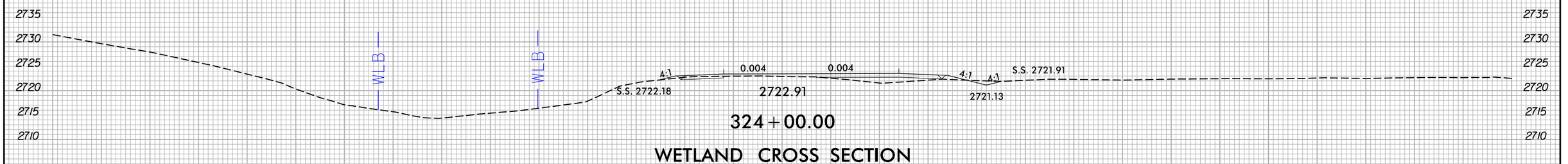
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-106

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

PERMIT DRAWING
SHEET 28 OF 34

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



324+00.00

WETLAND CROSS SECTION
SITE 19

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CB\A-0009CB_Hyd_xpLL_wetlands.dgn
User:rrichard

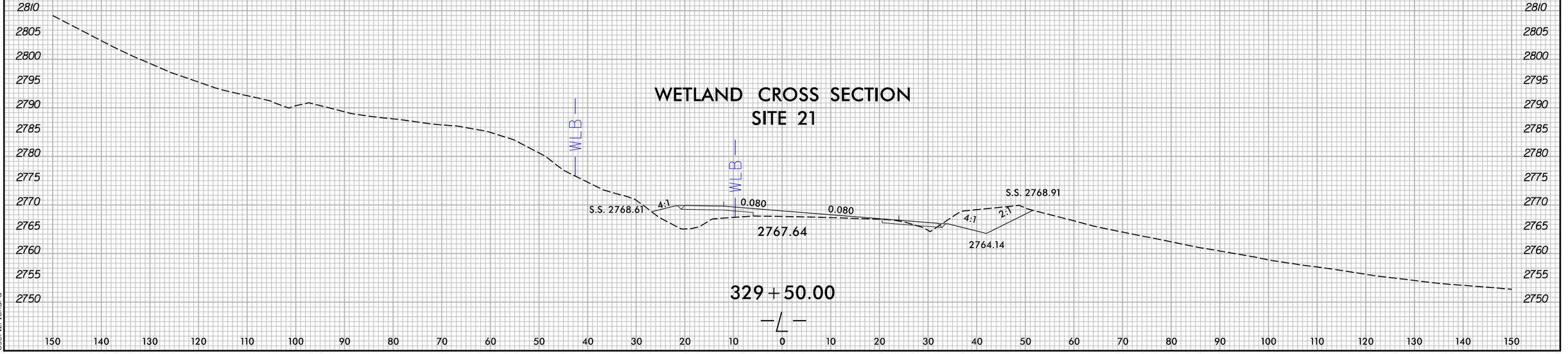
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-111

PERMIT DRAWING
SHEET 29 OF 34

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL

WETLAND CROSS SECTION
SITE 21



329+50.00

—℄—

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CB\A-0009CB_Hyd_xpLL_wetlands.dgn
User:rrichard

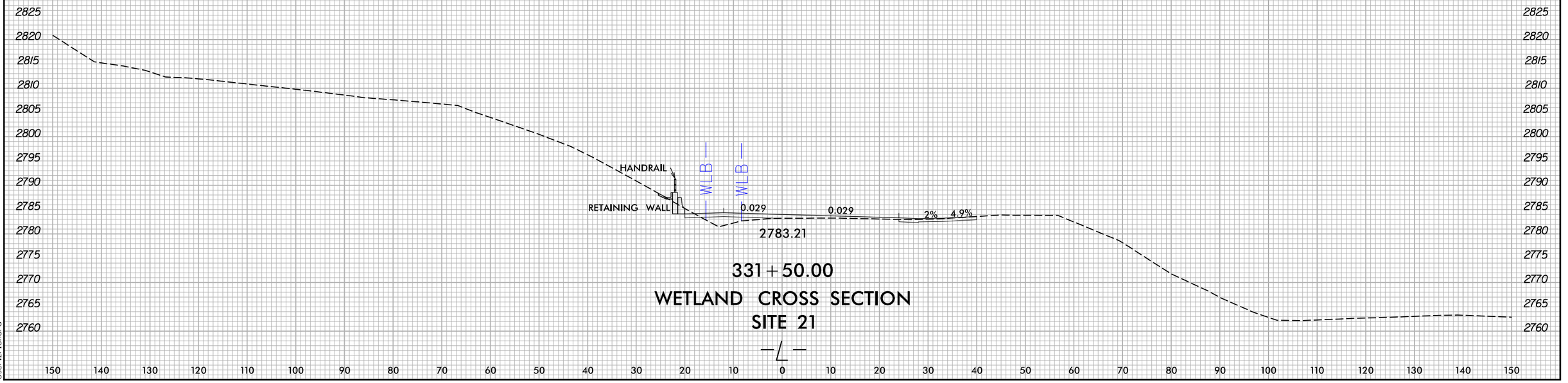
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-115

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

PERMIT DRAWING
SHEET 30 OF 34

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



331+50.00
WETLAND CROSS SECTION
SITE 21

—℄—

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CB\A-0009CB_Hyd_xpLL_wetlands.dgn
User:rrichard

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	29
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NAD 83/2011

-L- CURVE DATA
PI Sta 348+33.64
△ = 141° 55' 19.6" (RT)
D = 13° 08' 28.4"
L = 1,079.98'
T = 1,263.45'
* R = 436.00'
SE = 0.08
DS = 35 MPH

PERMIT DRAWING
SHEET 31 OF 34

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

SITE 23

SITE 22

PROP. RETAINING WALL #11 W/HANDRAIL & CONCRETE DITCH
BEGIN -L- STA. 330+82±
END -L- STA. 333+24±

PROP. RETAINING WALL #12 W/HANDRAIL & CONCRETE DITCH
BEGIN -L- STA. 341+76±
END -L- STA. 344+11±

PROP. RETAINING WALL #13 W/HANDRAIL & CONCRETE DITCH
BEGIN -L- STA. 344+69±
END -L- STA. 346+76±

PROP. CONCRETE DRIVE

PROP. DRIVE

DO NOT DISTURB POLE

DO NOT DISTURB

KYLIE SHARON CROWE SHULER

ALBERT JACK BOWMAN

ELLA MAE TEESATESKIE

EASTERN BAND OF THE CHEROKEE INDIANS

TIONNA FAITH WILLIAMS

SHARON ROSE PETTY & MARK LYLE ROSE

MATCH LINE STA -L- 333+00.00
MATCH TO SHEET NO. 28

MATCH LINE STA -L- 347+00.00
MATCH TO SHEET NO. 30

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

* DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE AND STOPPING SIGHT DISTANCE.

FOR -L- PROFILE, SEE SHEET NO. 48

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50' 100'
25'

DETAIL 29F
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
D= 1.0'
B= 1.0'
-L- STA. 333+00 TO 333+24 LT
-L- STA. 341+76 TO 344+11 LT
-L- STA. 344+70 TO 346+76 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 29A
STANDARD BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
B=5 Ft.
*When B is < 6.0'
Type of Liner=Class II Rip-Rap
-L- STA. 344+25 (25' LT TO 59' LT)
SEE PFL FOR DITCH GRADE (35%)

DETAIL 29B
TOE PROTECTION
(Not to Scale)
d=1 Ft.
b=3 Ft.
Type of Liner=Class B Rip-Rap
FROM STA. 340+63 TO STA. 341+00 -L- LT.

DETAIL 29C
FALSE SUMP
(Not to Scale)
S=Ditch Slope
-L- STA. 337+35 LT
-L- STA. 339+45 LT (USE 4:1 FOR FRONT & BACK SLOPES)

DETAIL 29D
SPECIAL BERM
(Not to Scale)
-L-STA. 344+68 LT

DETAIL 29E
BANK STABILIZATION
(Not to Scale)
Length=See Below
Min. d=3 Ft.
-L- STA 333+66 RT (LENGTH=12 FT)
-L- STA 339+74 RT (LENGTH=16 FT)

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_PSHA-0009CB_Hyd_prm_psh_29.dgn
User:rschard

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	29
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NAD 83/2011

-L- CURVE DATA
PI Sta 348+33.64
△ = 141° 55' 19.6" (RT)
D = 13° 08' 28.4"
L = 1,079.98'
T = 1,263.45'
* R = 436.00'
SE = 0.08
DS = 35 MPH

PERMIT DRAWING SHEET 32 OF 34

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

PROP. RETAINING WALL #11 W/HANDRAIL & CONCRETE DITCH
BEGIN -L- STA. 330+82±
END -L- STA. 333+24±

PROP. RETAINING WALL #12 W/HANDRAIL & CONCRETE DITCH
BEGIN -L- STA. 341+76±
END -L- STA. 344+11±

PROP. RETAINING WALL #13 W/HANDRAIL & CONCRETE DITCH
BEGIN -L- STA. 344+69±
END -L- STA. 346+76±

PROP. CONCRETE DRIVE

SITE 22

SITE 23

DO NOT DISTURB POLE

MATCH LINE STA -L- 333+00.00
MATCH TO SHEET NO. 28

MATCH LINE STA -L- 347+00.00
MATCH TO SHEET NO. 30

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

* DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE AND STOPPING SIGHT DISTANCE.

FOR -L- PROFILE, SEE SHEET NO. 48

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50' 100'
25'

DETAIL 29F
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
D= 1.0'
B= 1.0'
-L- STA. 333+00 TO 333+24 LT
-L- STA. 341+76 TO 344+11 LT
-L- STA. 344+70 TO 346+76 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 29A
STANDARD BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
B=5 Ft.
*When B is < 6.0'
Type of Liner=Class II Rip-Rap
-L- STA. 344+25 (25' LT TO 59' LT)
SEE PFL FOR DITCH GRADE (35%)

DETAIL 29B
TOE PROTECTION
(Not to Scale)
d=1 Ft.
b=3 Ft.
Type of Liner=Class B Rip-Rap
FROM STA. 340+63 TO STA. 341+00 -L- LT.

DETAIL 29C
FALSE SUMP
(Not to Scale)
S=Ditch Slope
-L- STA. 337+35 LT
-L- STA. 339+45 LT (USE 4:1 FOR FRONT & BACK SLOPES)

DETAIL 29D
SPECIAL BERM
(Not to Scale)
Exist. Ditch Bed
-L-STA. 344+68 LT

DETAIL 29E
BANK STABILIZATION
(Not to Scale)
Length=See Below
Min. d=3 Ft.
-L- STA 333+66 RT (LENGTH=12 FT)
-L- STA 339+74 RT (LENGTH=16 FT)

11/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_PSH\A-0009CB_Hyd_prm_psh_29.dgn
User:rschard

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	WETLAND IMPACTS					SURFACE WATER IMPACTS					
					Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
2	-L- 212+81 to 212+84 RT	42" RCP Inlet	SY							< 0.01	< 0.01	4		14	
2	-L- 212+82 to 212+86 LT	42" RCP Outlet	SY							< 0.01		15			
2	-L- 212+64 to 213+02 LT	Bank Stabilization	Sweetwater Creek							< 0.01	< 0.01		17	20	
3	-L- 216+08 to 216+20 RT	48" RCP Inlet	SZ								< 0.01			22	
3	-L- 215+19 to 215+48 LT	48" RCP Outlet	SZ							< 0.01	< 0.01	16		16	
4	-L- 222+54 to 222+60 LT	24" RCP Outlet	SAA							< 0.01	< 0.01	12	8	6	
5	-L- 227+06 to 227+30 LT	Impacts to Wetland	WAI	Medium					< 0.01						
6	-L- 235+11 to 238+59 RT	Impacts to Wetland	WAJ	Medium	0.06				< 0.01						
6	-L- 234+88 to 235+07 LT	Impacts to Wetland	WAJ	Medium	0.01				< 0.01						
7	-L- 239+49 to 239+59 RT	48" RCP Inlet	SAB							< 0.01	< 0.01	6	15	17	
7	-L- 239+34 to 239+68 LT	Bank Stabilization	Sweetwater Creek								< 0.01		13	21	
8	-L- 245+41 to 245+57 RT	Construction Easement	SAC	Low							< 0.01			27	
8	-L- 245+32 to 245+68 LT	Bank Stabilization	Sweetwater Creek							< 0.01	< 0.01		17	20	
9	-L- 249+92 to 250+04 RT	Culvert Inlet	SAD								< 0.01			30	
9	-L- 250+32 to 251+49 RT	Roadway	SAE							< 0.01		89			
9	-L- 250+03 to 250+10 LT	Culvert Outlet	SAD							< 0.01		20			
9	-L- 249+91 to 250+13 LT	Bank Stabilization	Sweetwater Creek							< 0.01	< 0.01		14	7	
10	-L- 262+06 to 263+84 RT	Impacts to Wetland	WAN	High			0.03								
10	-L- 261+89 to 262+10 LT	Bank Stabilization	Sweetwater Creek								< 0.01			21	
11	-L- 267+27 to 267+79 LT	Bank Stabilization	Sweetwater Creek							< 0.01			58		
12	-L- 270+76 to 275+17 RT	Impacts to Wetland	WAO	High	0.08										
12	-L- 270+81 to 270+86 RT	36" CSP BDO Inlet	SAF							< 0.01	< 0.01	14		5	
12	-L- 270+69 to 270+80 LT	Pipe Outlet	SAF							< 0.01	< 0.01	10		6	
12	-L- 270+52 to 270+83 LT	Impacts to Wetland	WAO	High	< 0.01				< 0.01						
13	-L- 275+25 to 275+63 RT	Pipe Inlet Channel	SAG							< 0.01	< 0.01	41		55	
SHEET TOTALS*:					0.15					0.03	0.03	227	142	287	

*Rounded totals are sum of actual impacts

**Notes:
Site 1 removed per 4C meeting discussion on 11/18/2021.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/23/2021
GRAHAM
A-0009CB
32572.1.14

WETLAND AND SURACE WATER IMPACTS SUMMARY

					WETLAND IMPACTS					SURFACE WATER IMPACTS					
Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
13	-L- 275+70 to 275+80 LT	Outlet Channel/Bank Stab.	SAG							< 0.01	< 0.01	2	12	10	
14	-L- 279+03 to 279+68 RT	Culverts	Sweetwater Creek							0.02	< 0.01	53	68	9	
14	-L- 279+28 to 279+71 RT	Culverts/Bank Stabilization	SAJ	Low						< 0.01	< 0.01		22	26	
14	-L- 277+76 to 278+72 LT	Culvert Outlet	Sweetwater Creek							0.01	< 0.01	34	37	33	
15	-L- 278+67 to 280+98 LT	36" / Channel Change	SAH							< 0.01	< 0.01	127		25	
15	-L- 280+46 to 282+30 LT	Impacts to Wetland	WAQ	High	0.04		0.02		< 0.01						
16	-L- 289+61 to 289+84 LT	30" Inlet	SAK							< 0.01	< 0.01	24		22	
16	-L- 288+01 to 288+52 RT	30" Outlet	SAK							< 0.01	< 0.01	29	10	10	
17	-L- 312+47 to 312+63 LT	36" WSP Inlet	SAM								< 0.01			31	
17	-L- 310+75 to 311+97 RT	36" CSP Outlet	SAM							< 0.01	< 0.01	93		50	
18	-L- 316+10 to 316+15 LT	48" CSP BDO Inlet	Stillhouse Branch							< 0.01	< 0.01	14		28	
18	-L- 316+00 to 316+07 RT	60" Outlet / Bank Stab.	Stillhouse Branch							< 0.01	< 0.01	10	20	10	
19	-L- 324+11 to 324+14 LT	36" RCP	SED							< 0.01				3	
19	-L- 323+75 to 324+14 LT	Impacts to Wetland	WAX	Low	< 0.01	0.01	< 0.01								
19	-L- 323+69 to 324+00 RT	Bank Stabilization	SAT							< 0.01	< 0.01		12	23	
20	-L- 327+77 to 328+29 RT	18" CSP Outlet	SAT							< 0.01	< 0.01	51		14	
21	-L- 329+08 to 330+42 LT	Impacts to Wetland	WAY	Medium	0.04										
21	-L- 330+71 to 332+12 LT	Impacts to Wetland	WAZ	Medium	0.02										
21	-L- 329+70 to 329+82 LT	48" CSP BDO Inlet	Sweetwater Creek							< 0.01	< 0.01	12		20	
21	-L- 328+85 to 329+14 RT	48" Outlet/Channel Change	Sweetwater Creek							< 0.01	< 0.01	32		18	
22	-L- 333+80 to 333+85 LT	36" Inlet/Channel Change	SAY							< 0.01		26			
22	-L- 333+49 to 333+72 RT	36" CSP Outlet	SAY							< 0.01	< 0.01	35	12	11	
23	-L- 339+36 to 339+44 LT	42" Inlet Stabilization	SAX								< 0.01			11	
23	-L- 339+72 to 339+89 RT	Bank Stabilization	SAX							< 0.01	< 0.01		16	11	
SHEET TOTALS*:					0.10	0.01	0.03		< 0.01	0.07	0.03	542	209	365	
PROJECT TOTALS*:					0.26	0.01	0.06	0.00	0.02	0.10	0.06	769	351	652	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/23/2021
GRAHAM
A-0009CB
32572.1.14

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

General Project Information

WBS Element:	32572.1.15	**TIP Number:**	A-0009CC	**Project Type:**	Roadway Widening	**Date:**	11/1/2021
NCDOT Contact:	Josh B. Deyton, PE			**Contractor / Designer:**	TGS Engineers / David B. Petty, PE		
Address:	253 Webster Rd Sylva, NC 28779			**Address:**	706 Hillsborough St. - Suite 200 Raleigh, NC 27603		
Phone:	828-586-2141			**Phone:**	919-773-8887 Ext. 104		
Email:	jbdeyton@ncdot.gov			**Email:**	dpetty@tgsengineers.com		
City/Town:	Robbinsville, NC			**County(ies):**	Graham		
River Basin(s):	Little Tennessee			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	4.10 Miles	**Surrounding Land Use:**	Forested, Agriculture, Rural Residential				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	29.0	ac.		15.5	ac.		
Typical Cross Section Description:	1.) -L-: Three 12' paved lanes, 10' shoulders (8' paved / 2' grassed), grassed side slopes ranging from 4:1 to 2:1 - 1.1 Miles 2.) -Y2-: Three 12' paved lanes, 10' shoulders (8' paved / 2' grassed), grassed side slopes ranging from 4:1 to 2:1 - 2.1 Miles 3.) -Y2-: Three 12' paved lanes,curb&gutter with 10' Multiuse Path, grassed side slopes ranging from 4:1 to 2:1 - 0.8 Miles			1.) -L-: Two 12' paved lanes, 0 to 12' paved shoulders, 2' to 8' grassed shoulders, grassed side slopes ranging from 4:1 to 2:1 - 1.1 Miles 2.) -Y2-: Two 12' paved lanes, 2' to 8' grassed shoulders, grassed side slopes ranging from 4:1 to 2:1 - 3.0 Miles			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	8800	Year: 2045	Existing:	6590	Year:	2022

General Project Narrative: (Description of Minimization of Water Quality Impacts)

STIP project A-0009C is part of Corridor K of the Appalachian Development Highway System (ADHS) and improves the existing alignments of US 129, NC 143 and NC 28 between US 129 south of Robbinsville and the existing four-lane section of NC 28 east of Stecoah in Graham County, NC. The project improves roadway shoulders and adds passing & climbing lanes for the length of the project. A-0009C is broken into three projects (A-0009CA, A-0009CB & A-0009CC).

A-0009CC improves NC 143 (-L-, an urban arterial) from 0.5 miles north of the Appalachian Trail to NC 28 and improves NC 28 (-Y2-, an urban arterial) from 0.2 miles west of NC 143 to 0.3 miles east of SR 1235 (Gunters Gap Rd). ADT listed above is for -L-. ADT for -Y2- is 3800 in 2022 and 5200 in 2045.

Project minimization measures include:

>2:1 fill slopes.
>1.5:1 cut slopes where possible.
>Expressway gutter and shoulder berm gutter to reduce cross-section width.
>Alignment shifts to avoid relocations and avoid / minimize stream, wetland, and historic resource impacts.
>Alignment shifts and either symmetrical or asymmetrical widening to fit a best-fit alignment to avoid / minimize impacts and reduce earthwork.
>Overall maintain existing alignment to minimize cumulative impacts to resources.
>Maximizing shoulder section.
>Providing adequate ground cover.
>Stabilizing embankments and drainage ditches.
>Minimizing culvert slopes.
>Removing existing perched outlets.
>Providing adequate energy dissipation.
>Utilizing natural features and drainage pathways - Existing drainage pathways were utilized to the maximum extent practicable.
>Retaining and extending existing culverts where practicable to minimize in-stream work.
>Site 17: As mentioned during 4B meeting, floodplain benches have been added along this stream to lower velocities and dissipate energy.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element:	32572.1.15	TIP/Proj No.:	A-0009CC	County(ies):	Graham	Page	2	of	4

General Project Information

Waterbody Information

Surface Water Body (1):	Cody Branch		**NCDWR Stream Index No.:**	2-130-1			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	SBB			**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A		
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)							

Surface Water Body (2):	Carver Branch		**NCDWR Stream Index No.:**	2-130-3-1			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	Carver Branch, SBC, SBG, SBD, SFT, SFP, SFH, SFM, SFN, SBJ, SBN, SBP, SBO			**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A		
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)							

Surface Water Body (3):	Johnson Gap Branch		**NCDWR Stream Index No.:**	2-131-2			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	Johnson Gap Branch, SEY, SEX			**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A		
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)							

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element: 32572.1.15 **TIP No.:** A-0009CC **County(ies):** Graham

Additional Waterbody Information

Surface Water Body (4):	Edwards Branch		**NCDWR Stream Index No.:**	2-130-3		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Edwards Branch, SBV			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

Surface Water Body (5):	Stecoah Creek		**NCDWR Stream Index No.:**	2-130		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	Trout Waters (Tr)			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Stecoah Creek, SCB, SCD, SDT			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element: 32572.1.15 **TIP/Proj No.:** A-0009CC **County(ies):** Graham

Swale

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
47	Y2	132+00	RT	35.37139	-83.67977	(5)Stecoah Creek	0.0	4.0	4.0	0.6	60	300	1.34%	1.0	1.2	1.3	1.3	No	No
47*	Y2	130+29	LT	35.37163	-83.68043	(5)Stecoah Creek	5.0	3.0	3.0	9.9	990	246	0.40%	15.0	1.9	20.3	2.0	No	No

Additional Comments

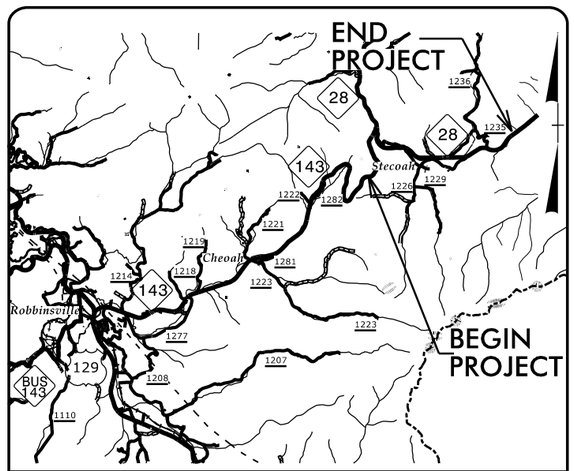
*Provided length exceeds the recommended length for the portion of the contributing drainage area within NCDOT right of way.

09/08/99

TIP PROJECT: A–0009CC

CONTRACT:

See Sheet 1A For Index of Sheets



VICINITY MAP

3R GUIDELINES WERE USED FROM –L– 414+50 TO –L– STA 474+20 AND FROM –Y2– 12+60± TO 23+00± TO MINIMIZE IMPACTS TO USFS PROPERTY AND NATURAL RESOURCES.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRAHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A–0009CC	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
32572.1.15	APD–0074(178)	PE
32572.2.15	APD–0074(178)	ROW,UTIL.
32572.3.15	APD–0074(178)	CONST.

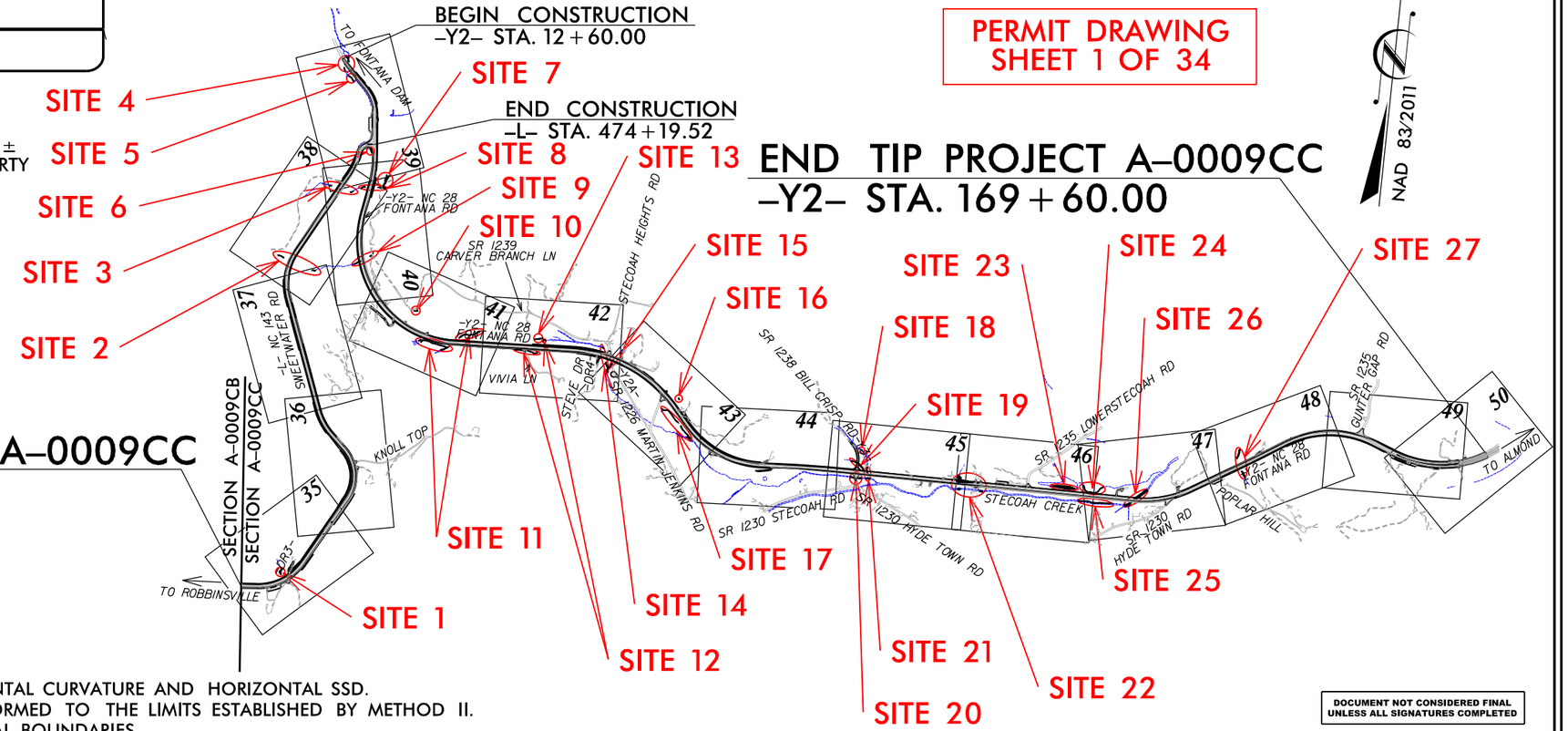
LOCATION: *UPGRADE NC 143 FROM 0.5 MILES NORTH OF APPALACHIAN TRAIL TO NC 28*
UPGRADE NC 28 FROM 0.2 MILES WEST OF NC 143 TO 0.3 MILES EAST OF SR 1235 (GUNTERS GAP RD)

TYPE OF WORK: *GRADING, PAVING, DRAINAGE, CULVERTS, & RETAINING WALLS*

WETLAND & SURFACE WATER IMPACTS

PERMIT DRAWING
SHEET 1 OF 34

NAD 83/2011



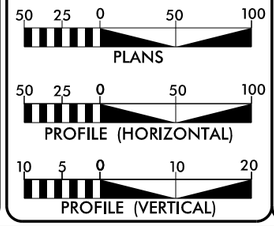
BEGIN TIP PROJECT A–0009CC
–L– STA. 414+50.00

END TIP PROJECT A–0009CC
–Y2– STA. 169+60.00

DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE AND HORIZONTAL SSD.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



–L– DESIGN DATA

ADT 2022 = 6590
ADT 2045 = 8800
K = 11 %
D = 57.5 %
T = 7 % *
V = 60 MPH
* TTST = 2% DUAL = 5%
FUNC CLASS = RURAL ARTERIAL
REGIONAL TIER

–Y2– DESIGN DATA

ADT 2022 = 3800
ADT 2045 = 5200
K = 11 %
D = 67.5 %
T = 7 % *
V = 50 MPH
* TTST = 2% DUAL = 5%
FUNC CLASS = RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT A–0009CC
–L– = 1.131 MILES
–Y2– = 2.973 MILES
TOTAL LENGTH TIP PROJECT A–0009CC = 4.104 MILES

NCDOT CONTACT: WANDA H. AUSTIN, PE

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

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 14
252 Webster Rd
Sylva, NC 28779

RIGHT OF WAY DATE: AUGUST 12, 2021

LETTING DATE: OCTOBER 18, 2022

2018 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

AUSTIN TURNER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:



12/7/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC PSH\A-0009CC_Hyd_tsh.dgn
User:zrichard

8/17/99

-L- CURVE DATA
PI Sta 419+44.60
△ = 56° 20' 44.5" (LT)
D = 9° 32' 57.5"
L = 590.05'
T = 321.35'
R = 600.00'
DS = 45 MPH
SE = 0.08

-DR3- CURVE DATA
PI Sta 10+68.68
△ = 13° 52' 12.2" (RT)
D = 22° 55' 05.9"
L = 60.52'
T = 30.41'
R = 250.00'
SE = SEE PLANS

PI Sta 11+40.26
△ = 75° 57' 23.4" (LT)
D = 114° 35' 29.6"
L = 66.28'
T = 39.03'
R = 50.00'
SE = SEE PLANS

B1 S 33° 09' 58.9" W
1 -DR3- PC 11+01.23
2 -DR3- PT 11+67.51
B2 S 42° 47' 24.5" E

PAVEMENT REMOVAL
PROP MONOLITHIC CONC ISLAND – SURFACE MOUNTED

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 35A
BERM BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
Type of Liner= Class I Rip-Rap
-L- STA. 419+00 TO STA. 419+50 LT

DETAIL 35B
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
℄ Proposed Ditch
-L- STA. 414+93 LT
-L- STA. 416+37 LT
-L- STA. 418+09 LT
-L- STA. 419+48 LT

-L-/-DR3- INTERSECTION

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	35
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

PERMIT DRAWING
SHEET 2 OF 34

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S DENOTES IMPACTS IN SURFACE WATER
E E DENOTES EXCAVATION IN WETLAND
HC HC DENOTES HAND CLEARING
F F DENOTES FILL IN WETLAND

END SECTION A-0009CB
BEGIN SECTION A-0009CC

BEGIN TIP PROJECT A-0009CC
-L- STA. 414+50.00

HAND CLEARING IN WETLANDS
EXCAVATION IN WETLANDS
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER

116 HOUSE OF PRAYER
115 U.S. FOREST SERVICE
120 MARCIA G. WILLIAMS
117 DELMAR L. HOLDER, ET AL

SITE 1

BEGIN CONSTRUCTION
-DR3 STA. 10+20.00

PROP. RETAINING WALL #21
W/CONCRETE DITCH
BEGIN -L- STA. 420+39±
END -L- STA. 436+65±

PROP. SINGLE FACED CONCRETE BARRIER

MATCH LINE STA -L- 428+00.00
MATCH TO SHEET NO. 36

PROP. RETAINING WALL #27
BEGIN -L- STA. 427+50±
END -L- STA. 431+42±

PROP. RETAINING WALL #26
BEGIN -L- STA. 421+44±
END -L- STA. 423+54±

PROP. CONCRETE DRIVE
PROP. DRIVE
REMOVE EXIST. CONCRETE DRIVE
TIE CONCRETE TO EXISTING SIGN
MONO. CONC. ISLAND

FALSE SUMP SEE DETAIL 35B
FALSE SUMP SEE DETAIL 35C
BERM BASE DITCH SEE DETAIL 35A Class I RIP-RAP 30 TONS, 60 SY GEO
SPECIAL CUT DITCH SEE DETAIL 35E CLASS I RIPRAP 65 TONS
SPECIAL CUT DITCH SEE DETAIL 35E CLASS I RIPRAP 35 TONS
CONCRETE SILL SEE DETAIL 35F
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 35D
CLASS I RIPRAP 7 TONS, 15 SY GEO
CLASS I RIPRAP (KEYED-IN) 20 TONS
CLASS I RIPRAP 1 TONS, 5 SY GEO
CLASS I RIPRAP (KEYED-IN) 11 TONS
CLASS I RIPRAP (KEYED-IN) 7 TONS
CLASS I RIPRAP (KEYED-IN) 22 TONS
CLASS B RIPRAP 2 TONS, 7 SY GEO
ROD AND LUG WITH GASKETS (ELBOWS)
MAX 1.0% PIPE SLOPE THIS SIDE OF ELBOW
FLOWABLE FILL
REMOVE CONC. DITCH
REMOVE PLUG
2GI (Top Wall)
TB 2GI

50' 0' 50' 100'
25'
FOR CONCRETE ISLAND & DRIVE LAYOUT SEE DETAIL SHT 2B-

DETAIL 35C
FALSE SUMP
(Not to Scale)
S=Ditch Slope
℄ Proposed Ditch
-L- STA. 421+00 RT
-L- STA. 426+19 RT

DETAIL 35D
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
-L- STA. 420+39 TO 428+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 35E
SPECIAL CUT DITCH
(Not to Scale)
Class I Riprap (Keyed-in)
Type of Liner= Class I Rip-Rap
-DR3- STA. 10+20 TO 12+00 RT
-DR3- STA. 10+38 TO 11+20 LT
(SEE XSCs FOR TYPICAL DITCH GRADE)

DETAIL 35F
CONCRETE SILL DETAIL
(Not to Scale)
-L- STA. 422+70 LT
-L- STA. 426+07 LT

FOR -L- PROFILE, SEE SHEET NO.69
FOR -DR3- PROFILE, SEE SHEET NO. 77

11/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC PSH\A-0009CC_Hyd_prm_psh_35.dgn
User:richard

8/17/99

-L- CURVE DATA
PI Sta 419+44.60
△ = 56° 20' 44.5" (LT)
D = 9° 32' 57.5"
L = 590.05'
T = 321.35'
R = 600.00'
DS = 45 MPH
SE = 0.08

-DR3- CURVE DATA
PI Sta 10+68.68
△ = 13° 52' 12.2" (RT)
D = 22° 55' 05.9"
L = 60.52'
T = 30.41'
R = 250.00'
SE = SEE PLANS

PI Sta 11+40.26
△ = 75° 57' 23.4" (LT)
D = 114° 35' 29.6"
L = 66.28'
T = 39.03'
R = 50.00'
SE = SEE PLANS

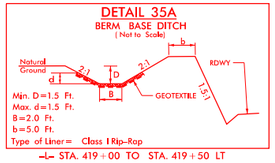
(B1) S 33° 09' 58.9" W
(1) -DR3- PC 11+01.23
(2) -DR3- PT 11+67.51
(B2) S 42° 47' 24.5" E

PAVEMENT REMOVAL

PROP MONOLITHIC CONC ISLAND – SURFACE MOUNTED

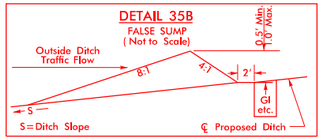
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 35A
BERM BASE DITCH
(Not to Scale)

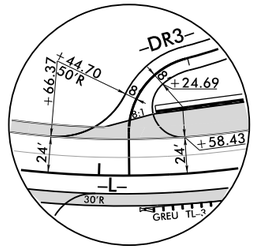


-L- STA. 419+00 TO STA. 419+50 LT

DETAIL 35B
FALSE SUMP
(Not to Scale)



-L- STA. 414+93 LT
-L- STA. 416+37 LT
-L- STA. 418+09 LT
-L- STA. 419+48 LT



-L-/-DR3- INTERSECTION

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	35
R/W SHEET NO.	

ROADWAY DESIGN | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

PERMIT DRAWING
SHEET 3 OF 34

TS / TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S / S DENOTES IMPACTS IN SURFACE WATER
E / E DENOTES EXCAVATION IN WETLAND
HC / HC DENOTES HAND CLEARING
F / F DENOTES FILL IN WETLAND

END SECTION A-0009CB
BEGIN SECTION A-0009CC

BEGIN TIP PROJECT A-0009CC
-L- STA. 414+50.00

EXCAVATION IN WETLANDS
IMPACTS IN SURFACE WATER
HAND CLEARING IN WETLANDS
TEMPORARY IMPACTS IN SURFACE WATER

MATCH LINE STA -L- 428+00.00
MATCH TO SHEET NO. 36

116 HOUSE OF PRAYER
115 U.S. FOREST SERVICE
117 DELMAR L. HOLDER, ET AL
120 MARCIA G. WILLIAMS

SITE 1

BEGIN CONSTRUCTION
-DR3 STA. 10+20.00

PROP. RETAINING WALL #21
W/CONCRETE DITCH
BEGIN -L- STA. 420+39±
END -L- STA. 436+65±

PROP. SINGLE FACED CONCRETE BARRIER

PROP. RETAINING WALL #27
BEGIN -L- STA. 427+50±
END -L- STA. 431+42±

PROP. RETAINING WALL #26
BEGIN -L- STA. 421+44±
END -L- STA. 423+54±

PROP. CONCRETE DRIVE

PROP. DRIVE

REMOVE EXIST. CONCRETE DRIVE

MONO CONC. ISLAND

TIE CONCRETE TO EXISTING SIGN

FALSE SUMP SEE DETAIL 35B

FALSE SUMP SEE DETAIL 35C

SPECIAL CUT DITCH SEE DETAIL 35E CLASS I RIPRAP 65 TONS

SPECIAL CUT DITCH SEE DETAIL 35E CLASS I RIPRAP 35 TONS

BERM BASE DITCH SEE DETAIL 35A Class I RIP-RAP 30 TONS, 60 SY GEO

CONCRETE SILL SEE DETAIL 35F

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 35D

ROD AND LUG WITH GASKETS (ELBOWS)

MAX 1.0% PIPE SLOPE THIS SIDE OF ELBOW

CLASS I RIPRAP (KEYED-IN) 7 TONS, 15 SY GEO

CLASS I RIPRAP (KEYED-IN) 20 TONS

CLASS I RIPRAP 1 TONS, 5 SY GEO

CLASS I RIPRAP (KEYED-IN) 22 TONS

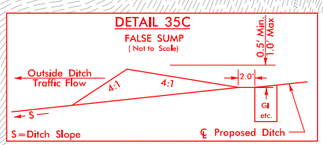
CLASS I RIPRAP (KEYED-IN) 11 TONS

CLASS I RIPRAP (KEYED-IN) 7 TONS

CLASS B RIPRAP 2 TONS, 7 SY GEO

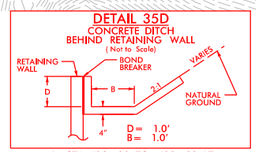
50' 0' 50' 100'
25'
FOR CONCRETE ISLAND & DRIVE LAYOUT SEE DETAIL SHT 2B-__

DETAIL 35C
FALSE SUMP
(Not to Scale)



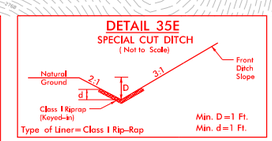
-L- STA. 421+00 RT
-L- STA. 426+19 RT

DETAIL 35D
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



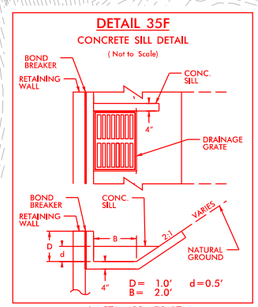
-L- STA. 420+39 TO 428+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 35E
SPECIAL CUT DITCH
(Not to Scale)



-DR3- STA. 10+20 TO 12+00 RT
-DR3- STA. 10+38 TO 11+20 LT
(SEE XSCs FOR TYPICAL DITCH GRADE)

DETAIL 35F
CONCRETE SILL DETAIL
(Not to Scale)



-L- STA. 422+70 LT
-L- STA. 426+07 LT

FOR -L- PROFILE, SEE SHEET NO.69
FOR -DR3- PROFILE, SEE SHEET NO. 77

11/1/2021
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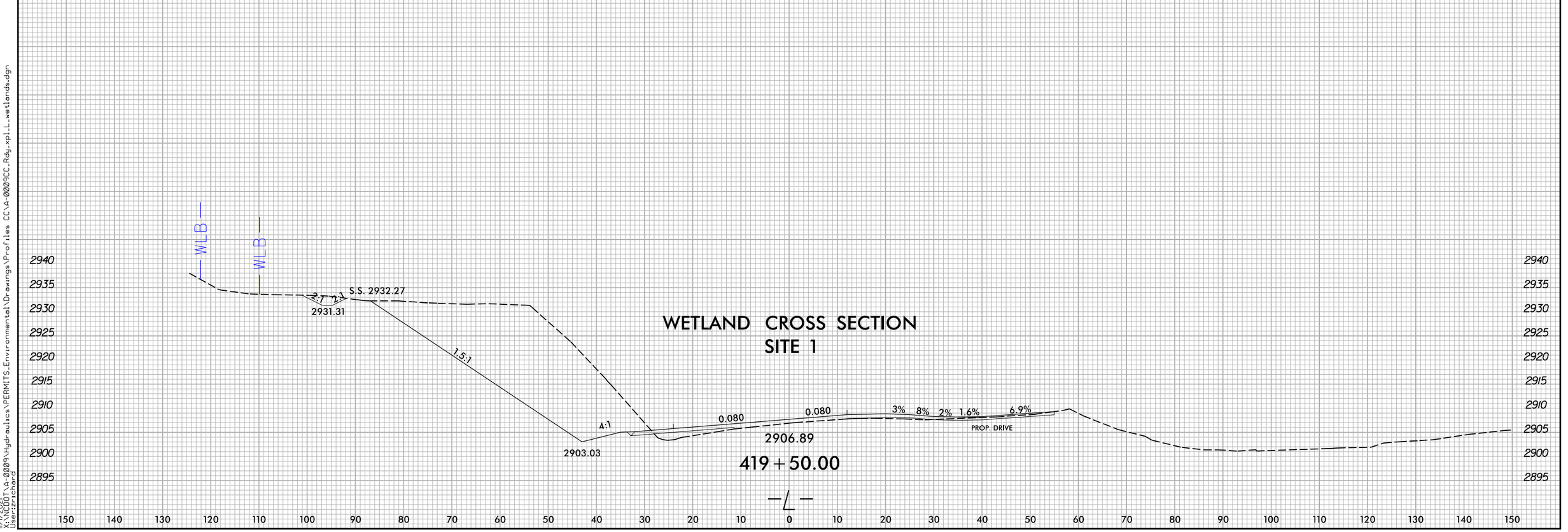
User:richard

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CC	X-7

PERMIT DRAWING
SHEET 4 OF 34

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



WETLAND CROSS SECTION
SITE 1

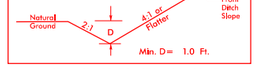
11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CC\A-0009CC_Rdy_xpLL_wetlands.dgn
User:rrichard

8/17/99

-L- CURVE DATA

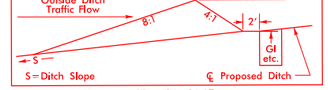
PI Sta 456+91.51	PI Sta 470+84.26
Δ = 49° 15' 00.2" (RT)	Δ = 21° 31' 55.6" (LT)
D = 9° 32' 57.5"	D = 7° 32' 20.1"
L = 515.75'	L = 285.61'
T = 275.02'	T = 144.51'
R = 600.00'	R = 760.00'
SE = 0.08	SE = 0.04
DS = 45 MPH	DS = 45 MPH

DETAIL 38A
SPECIAL CUT DITCH
(Not to Scale)



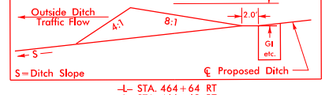
-L- STA. 461+50 TO STA. 464+00 LT
SEE PFL FOR DITCH GRADES

DETAIL 38B
FALSE SUMP
(Not to Scale)



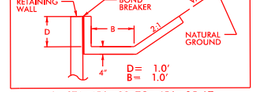
-L- STA. 464+64 LT

DETAIL 38C
FALSE SUMP
(Not to Scale)



-L- STA. 464+64 RT
-L- STA. 466+63 RT

DETAIL 38D
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



-L- STA. 456+00 TO 456+25 LT
-L- STA. 468+75 TO 470+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 38E
OUTLET CHANNEL STABILIZATION
(Not to Scale)



-L- STA 458+35 RT

DETAIL 38F
OUTLET CHANNEL STABILIZATION
(Not to Scale)



-L- STA 468+04 RT

DETAIL 38G
SPECIAL CUT DITCH
(Not to Scale)



-L- STA. 456+50 TO STA. 457+50 LT
SEE PFL FOR DITCH GRADES

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	38
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

PERMIT DRAWING
SHEET 5 OF 34

PROP. RETAINING WALL #24
W/CONCRETE DITCH
BEGIN -L- STA. 453+25±
END -L- STA. 456+25±

PROP. RETAINING WALL #25
W/CONCRETE DITCH
BEGIN -L- STA. 468+75±
END -L- STA. 471+75±

PROP. SINGLE FACED
CONCRETE BARRIER

MATCH LINE STA -L- 470+00.00
MATCH TO SHEET NO. 39

MATCH LINE STA -L- 456+00.00
MATCH TO SHEET NO. 37

TEMPORARY IMPACTS
IN SURFACE WATER

TEMPORARY IMPACTS
IN SURFACE WATER

SITE 2

SITE 2

SITE 3

SITE 3

CONC. DITCH BEHIND
RETAINING WALL
SEE DETAIL 38D

TRANSITION STONE
CLASS II RIPRAP
(KEYED-IN)
55 TONS

TIE TO EXISTING DITCH

SPECIAL CUT DITCH
SEE DETAIL 38G
CLASS II RIPRAP
(KEYED-IN)
105 TONS

2GI-D
(Top Wall)

TYPE B-77

GTD

CLASS I RIPRAP
(KEYED-IN)
25 TONS

DO NOT
DISTURB
SIGN

RETAIN 36" CMP
AND LINE WITH CIPP

RETAIN
HW

UT TO CARVER
BRANCH (PERM)

DO NOT
DISTURB SIGNS

PERMANENT EASEMENT FOR
WARBLER HABITAT ESTABLISHMENT

DO NOT
DISTURB SIGN

REMOVE
SEPARATED PIPE
(20 LF)

JB
MH

36" CSP

DO NOT BURY INVERT

OUTLET CHANNEL STABILIZATION
SEE DETAIL 38E
CLASS I RIPRAP
11 TONS, NO GEO

UT TO CARVER
BRANCH (TEMP)

SPECIAL CUT DITCH
SEE DETAIL 38A

FALSE SUMP
SEE DETAIL 38B

REMOVE
CONC. DITCH

REMOVE
PLUG

FLOWABLE FILL

18" RCP-IV

FALSE SUMP
SEE DETAIL 38C

REMOVE
CONC. DITCH

ROD AND LUG
WITH GASKETS
(ELBOWS)
REMOVE CONC DITCH

FALSE SUMP
SEE DETAIL 38C

CONC. DITCH BEHIND
RETAINING WALL
SEE DETAIL 38D

PROP. DRIVE

RETAIN
HW

15" RCP-IV

2GI
(Top Wall)

TB 2GI

PLUG

FLOWABLE FILL

CLASS I RIPRAP
(KEYED-IN)
12 TONS

RETAIN 36" CMP
AND LINE WITH CIPP

OUTLET CHANNEL STABILIZATION
SEE DETAIL 38F
CLASS II RIPRAP
14 TONS, NO GEO

CLASS I RIPRAP
4 TONS, 10 SY GEO

IMPACTS IN
SURFACE WATER

TEMPORARY IMPACTS
IN SURFACE WATER

IMPACTS IN
SURFACE WATER

TEMPORARY IMPACTS
IN SURFACE WATER

U.S. FOREST SERVICE (124)

ALLEN H. LAKEY (126)

CARVER BRANCH

UT TO CARVER BRANCH (PERM)

UT TO CARVER BRANCH (TEMP)

WOODS

50' 0' 50' 100'
25'

FOR -L- PROFILE, SEE SHEET NO. 70

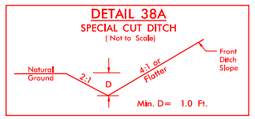
11/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSHA-0009CC_Hyd_prm_psh_38.dgn
User:rchad

8/17/99

-L- CURVE DATA

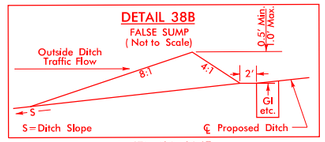
PI Sta 456+91.51	PI Sta 470+84.26
Δ = 49° 15' 00.2" (RT)	Δ = 21° 31' 55.6" (LT)
D = 9° 32' 57.5"	D = 7° 32' 20.1"
L = 515.75'	L = 285.61'
T = 275.02'	T = 144.51'
R = 600.00'	R = 760.00'
SE = 0.08	SE = 0.04
DS = 45 MPH	DS = 45 MPH

DETAIL 38A
SPECIAL CUT DITCH
(Not to Scale)



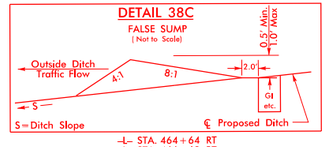
-L- STA. 461+50 TO STA. 464+00 LT
SEE PFL FOR DITCH GRADES

DETAIL 38B
FALSE SUMP
(Not to Scale)



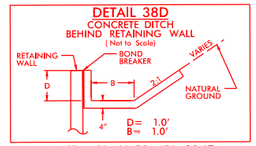
-L- STA. 464+64 LT

DETAIL 38C
FALSE SUMP
(Not to Scale)



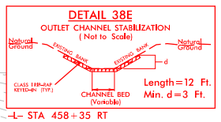
-L- STA. 464+64 RT
-L- STA. 466+63 RT

DETAIL 38D
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



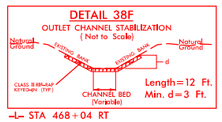
-L- STA. 456+00 TO 456+25 LT
-L- STA. 468+75 TO 470+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 38E
OUTLET CHANNEL STABILIZATION
(Not to Scale)



-L- STA 458+35 RT

DETAIL 38F
OUTLET CHANNEL STABILIZATION
(Not to Scale)



-L- STA 468+04 RT

DETAIL 38G
SPECIAL CUT DITCH
(Not to Scale)



-L- STA. 456+50 TO STA. 457+50 LT
SEE PFL FOR DITCH GRADES

15 15 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 6 OF 34

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	38
R/W SHEET NO.	

ROADWAY DESIGN | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

PROP. RETAINING WALL #24
W/CONCRETE DITCH
BEGIN -L- STA. 453+25±
END -L- STA. 456+25±

PROP. RETAINING WALL #25
W/CONCRETE DITCH
BEGIN -L- STA. 468+75±
END -L- STA. 471+75±

PROP. SINGLE FACED
CONCRETE BARRIER

MATCH LINE STA -L- 470+00.00
MATCH TO SHEET NO. 39

MATCH LINE STA -L- 456+00.00
MATCH TO SHEET NO. 37

TEMPORARY IMPACTS
IN SURFACE WATER

TEMPORARY IMPACTS
IN SURFACE WATER

SITE 2

SITE 2

SITE 3

SITE 3

CONC. DITCH BEHIND
RETAINING WALL
SEE DETAIL 38D

TRANSITION STONE
CLASS II RIPRAP
(KEYED-IN)
55 TONS

TIE TO EXISTING DITCH

SPECIAL CUT DITCH
SEE DETAIL 38G
CLASS II RIPRAP
(KEYED-IN)
105 TONS

RETAIN
HW

GTD

DO NOT
DISTURB
SIGN

CLASS I RIPRAP
(KEYED-IN)
25 TONS

RETAIN 36" CMP
AND LINE WITH CIPP

DO NOT
DISTURB SIGNS

PERMANENT EASEMENT FOR
WARBLER HABITAT ESTABLISHMENT

DO NOT
DISTURB SIGN

JB
MH

REMOVE
SEPARATED PIPE
(20 LF)

36" CSP

DO NOT BURY INVERT

OUTLET CHANNEL STABILIZATION
SEE DETAIL 38E
CLASS I RIPRAP
11 TONS, NO GEO

IMPACTS IN
SURFACE WATER

TEMPORARY IMPACTS
IN SURFACE WATER

SPECIAL CUT DITCH
SEE DETAIL 38A

FALSE SUMP
SEE DETAIL 38B

REMOVE
CONC. DITCH

PROP. DRIVE

RETAIN
HW

REMOVE

PLUG

FLOWABLE FILL

REMOVE
CONC. DITCH

FALSE SUMP
SEE DETAIL 38C

ROD AND LUG
WITH GASKETS
(ELBOWS)
REMOVE CONC. DITCH

FALSE SUMP
SEE DETAIL 38C

OUTLET CHANNEL STABILIZATION
SEE DETAIL 38F
CLASS II RIPRAP
14 TONS, NO GEO

CLASS I RIPRAP
(KEYED-IN)
12 TONS

RETAIN 36" CMP
AND LINE WITH CIPP

CLASS I RIPRAP
4 TONS, 10 SY GEO

PLUG

FLOWABLE FILL

CARVER BRANCH

UT TO CARVER BRANCH (SEE)

UT TO CARVER BRANCH (SEE)

UT TO CARVER BRANCH (SEE)

124
U.S. FOREST SERVICE

126
ALLEN H. LAKEY

50' 0' 50' 100'
25'

FOR -L- PROFILE, SEE SHEET NO. 70

11/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\D-aerial\A-0009CC_PSHA-0009CC_Hyd_prm_ash_38.dgn
User:rchad

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	39
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING
SHEET 7 OF 34

NAD 83/2011

CONTRACTOR TO LOCATE AS DIRECTED BY ENGINEER.

CONTRACTOR TO LOCATE AS DIRECTED BY ENGINEER.

CONTRACTOR TO FIELD VERIFIY UNDERGROUND STREAM ELEVATION & DIMENSIONS & COORDINATE WITH ENGINEER PRIOR TO ORDERING STRUCTURE #3904.

PROP. RETAINING WALL #40
W/CONCRETE DITCH
BEGIN -Y2- STA. 16+75±
END -Y2- STA. 18+60±

PROP. RETAINING WALL #39
W/CONCRETE DITCH
BEGIN -Y2- STA. 14+75±
END -Y2- STA. 16+25±

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

END CONSTRUCTION
-L- STA. 474+19.52

BEGIN CONSTRUCTION
-Y2- STA. 12+60.00

SITE 4

SITE 5

SITE 6

127 KATHY D. BRUCE, ET AL

128 BARBARA LAKEY

124 U.S. FOREST SERVICE

126 ALLEN H. LAKEY

STREAM GOES U/G UNABLE TO LOCATE

U/G STREAM

STREAM GOES UNDERGROUND

CLASS B RIP-RAP 3 TONS, 6 SY GEO

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 39D

SINGLE FACED CONCRETE BARRIER

CLASS B RIP-RAP 15 TONS, 32 SY GEO

STANDARD 'V' DITCH SEE DETAIL 39B DDE=5 CY

REMOVE HW

REMOVE 15 LF

SPRING BOX

30" RCP-IV

18" RCP-IV

TB JB w/MH

SPEC. DSN TB 2GI-A

CLASS B RIP-RAP 6 TONS, 12 SY GEO

SPECIAL CUT DITCH SEE DETAIL 39A

CLASS B RIPRAP 2 TONS, 7 GEO

BANK STABILIZATION SEE DETAIL 39F CLASS I RIPRAP 7 TONS, NO GEO

USE EXTRA DEPTH POSTS

PLUG

DO NOT BURY INVERT

CLASS I RIPRAP 15 TONS, NO GEO

FOR CONCRETE ISLAND & PARKING AREA LAYOUT SEE DETAIL SHT 2B-

CLASS B RIPRAP 3 TONS, 10 SY GEO

GRADE TO DRAIN

REMOVE GTD

REMOVE 12 LF

REMOVE 16 LF

TOE PROTECTION SEE DETAIL 39C CLASS B RIPRAP 190 TONS, 270 SY GEO

6" PVC

PDE

PUE

FOR CONCRETE ISLAND LAYOUT SEE DETAIL SHT 2B-

TOE PROTECTION SEE DETAIL 39C CLASS B RIPRAP 20 TONS, 43 SY GEO

BM#23 ELEV. 2523.73'
-BL- STA. 470+19.00 70' LT.
SPIKE NAIL IN BASE OF 15" POPLAR

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 39D

FALSE SUMP SEE DETAIL 39E ALLEN H. LAKEY

PROP. RETAINING WALL #25
W/CONCRETE DITCH
BEGIN -L- STA. 468+75±
END -L- STA. 471+75±

MATCH LINE STA -L- 470+00.00
MATCH TO SHEET NO. 38

MATCH LINE STA -L- 476+00.00
-Y2- 26+00.00
MATCH TO SHEET NO. 40

AVERAGE DAILY TRAFFIC

-Y2- NC 28		-NC- NC 28
1,930 / 2,900	740 / 1,000	3,790 / 5,200
	-L- NC 145	2,600 / 3,300
		3,330 / 4,300

2022 ADT
2045 ADT

FOR -L- PROFILE, SEE SHEET NO. 71
FOR -Y2- PROFILE, SEE SHEET NO. 71

50' 0' 50' 100'
25'

T1 T2	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S	DENOTES IMPACTS IN SURFACE WATER
E E	DENOTES EXCAVATION IN WETLAND
HC HC	DENOTES HAND CLEARING
F F	DENOTES FILL IN WETLAND

DETAIL 39A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground, 3:1, 3:1, Front Ditch Slope, D, Min. D=1.0 Ft.
-Y2- STA. 13+73 TO 14+50 LT
SEE PFL FOR DITCH GRADE (9.0%)

DETAIL 39B
STANDARD 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, 2:1, Natural Ground, D, Min. D=1.0 Ft.
-Y2- STA 18+80 TO 18+91 LT
SEE PFL FOR CHANNEL CHANGE GRADE (17.5%)

DETAIL 39C
TOE PROTECTION
(Not to Scale)
Natural Ground, b, 2:1 or Flatter Fill Slope, d, Geotextile
d=1 Ft.
b=3 Ft.
Type of Liner=See Below
-L- STA. 471+75 TO 472+50 LT (Class B Rip-Rap)
-Y2- STA. 22+75 TO 26+45 LT (Class I Rip-Rap)

DETAIL 39F
BANK STABILIZATION
(Not to Scale)
Natural Ground, Existing Bank Slope, Varies, Natural Ground, d, CLASS I RIPRAP STONE (TYP.), CHANNEL BED (Variable), Length=12 Ft., Min. d=3 Ft.
-Y2- STA 13+06 LT

DETAIL 39D
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
RETAINING WALL, BOND BREAKER, VARIES, D, 8", 2:1, NATURAL GROUND, 4", D= 1.0', B= 1.0'
-L- STA. 470+00 TO 471+75 LT
-Y2- STA. 14+75 TO 16+25 LT
-Y2- STA. 16+75 TO 18+60 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 39E
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow, 5:1, 10:1, 2.0', 0.5' Min., 1.0' Max., S, S=Ditch Slope, ℄ Proposed Ditch
-Y2- STA. 25+39 RT

8/17/99
REVISIONS
11/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSH\A-0009CC_Hyd_prm_psh_39.dgn
User:richard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	39
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

8/17/99

REVISIONS

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING
SHEET 8 OF 34

NAD 83/2011

CONTRACTOR TO LOCATE AS DIRECTED BY ENGINEER

CONTRACTOR TO LOCATE AS DIRECTED BY ENGINEER.

CONTRACTOR TO FIELD VERIFIY UNDERGROUND STREAM ELEVATION & DIMENSIONS & COORDINATE WITH ENGINEER PRIOR TO ORDERING STRUCTURE #3904.

PROP. RETAINING WALL #40
W/CONCRETE DITCH
BEGIN -Y2- STA. 16+75±
END -Y2- STA. 18+60±

PROP. RETAINING WALL #39
W/CONCRETE DITCH
BEGIN -Y2- STA. 14+75±
END -Y2- STA. 16+25±

END CONSTRUCTION
-L- STA. 474+19.52

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

SITE 4

SITE 5

SITE 6

BEGIN CONSTRUCTION
-Y2- STA. 12+60.00

FOR CONCRETE ISLAND & PARKING AREA LAYOUT SEE DETAIL SHT 2B-__

FOR CONCRETE ISLAND LAYOUT SEE DETAIL SHT 2B-__

MATCH LINE STA -L- 470+00.00
MATCH TO SHEET NO. 38

MATCH LINE STA -L- 476+00.00
-Y2- 26+00.00
MATCH TO SHEET NO. 40

127 KATHY D. BRUCE, ET AL

128 BARBARA LAKEY

124 U.S. FOREST SERVICE

126 ALLEN H. LAKEY

BM#23 ELEV. 2523.73'
-BL- STA. 470+19.00 TO LT.
SPIKE NAIL IN BASE OF 15" POPLAR

50' 0' 50' 100'
25'

T/S T/S	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S	DENOTES IMPACTS IN SURFACE WATER
E E	DENOTES EXCAVATION IN WETLAND
HC HC	DENOTES HAND CLEARING
F F	DENOTES FILL IN WETLAND

DETAIL 39A
SPECIAL CUT DITCH
(Not to Scale)
Min. D=1.0 Ft.
-Y2- STA. 13+73 TO 14+50 LT
SEE PFL FOR DITCH GRADE (9.0%)

DETAIL 39B
STANDARD 'V' DITCH
(Not to Scale)
Min. D=1.0 Ft.
-Y2- STA 18+80 TO 18+91 LT
SEE PFL FOR CHANNEL CHANGE GRADE (17.5%)

DETAIL 39C
TOE PROTECTION
(Not to Scale)
d=1 Ft.
b=3 Ft.
Type of Liner=See Below
-L- STA. 471+75 TO 472+50 LT (Class B Rip-Rap)
-Y2- STA. 22+75 TO 26+45 LT (Class I Rip-Rap)

DETAIL 39F
BANK STABILIZATION
(Not to Scale)
Length=12 Ft.
Min. d=3 Ft.
-Y2- STA 13+06 LT

DETAIL 39D
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
D= 1.0'
B= 1.0'
-L- STA. 470+00 TO 471+75 LT
-Y2- STA. 14+75 TO 16+25 LT
-Y2- STA. 16+75 TO 18+60 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 39E
FALSE SUMP
(Not to Scale)
S=Ditch Slope
-Y2- STA. 25+39 RT

PROP. RETAINING WALL #25
W/CONCRETE DITCH
BEGIN -L- STA. 468+75±
END -L- STA. 471+75±

AVERAGE DAILY TRAFFIC

-Y2- NC 28		-NC- NC 28
1,930 / 2,900	740 / 1,000	2,600 / 3,300
-L- NC 161		3,330 / 4,300

2022 ADT
2045 ADT

FOR -L- PROFILE, SEE SHEET NO. 71
FOR -Y2- PROFILE, SEE SHEET NO. 71

K:\NCDOT\A-0009\Hydraulics\PERMITS\Environmental\Drawings\A-0009CC_PSHA-0009CC_Hyd_prm_esh_39.dgn
11/1/2021
User:richard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	40
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

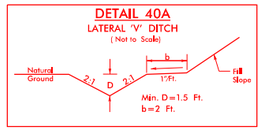
NAD 83/2011

8/17/99

REVISIONS

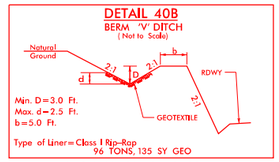
PAVEMENT REMOVAL

DETAIL 40A
LATERAL 'V' DITCH
(Not to Scale)



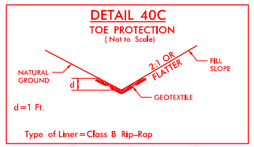
–Y2– STA. 32+40 TO 32+63 RT
SEE PFL FOR DITCH GRADE (1.4%)

DETAIL 40B
BERM 'V' DITCH
(Not to Scale)



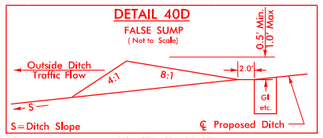
–Y2– STA. 39+00 TO 40+00 RT
SEE PFL FOR DITCH GRADES

DETAIL 40C
TOE PROTECTION
(Not to Scale)



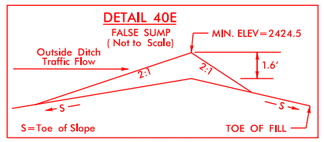
–Y2– STA. 29+75 TO 30+45 LT
–Y2– STA. 32+70 TO 33+00 RT

DETAIL 40D
FALSE SUMP
(Not to Scale)



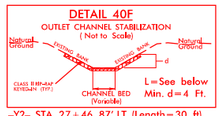
–Y2– STA. 31+85 RT
–Y2– STA. 34+12 RT
–Y2– STA. 35+62 RT
–Y2– STA. 39+63 RT

DETAIL 40E
FALSE SUMP
(Not to Scale)



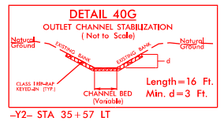
–L– STA. 36+50 RT

DETAIL 40F
OUTLET CHANNEL STABILIZATION
(Not to Scale)



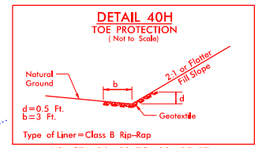
–Y2– STA 27+46 87' LT (Length=30 ft)
–Y2– STA 27+38 140' LT (Length=18 ft)

DETAIL 40G
OUTLET CHANNEL STABILIZATION
(Not to Scale)



–Y2– STA 35+57 LT

DETAIL 40H
TOE PROTECTION
(Not to Scale)



–Y2– STA. 36+50 TO 38+25 RT

MECHANIZED CLEARING IN WETLANDS

HAND CLEARING IN WETLANDS

FILL IN WETLANDS

MATCH LINE STA –Y2– 26+00.00
MATCH TO SHEET NO. 39

MATCH LINE STA –Y2– 40+00.00
MATCH TO SHEET NO. 41

PERMIT DRAWING
SHEET 9 OF 34

SITE 7

SITE 8

SITE 9

TOE PROTECTION SEE DETAIL 39C CLASS I RIPRAP

DO NOT DISTURB

OUTLET CHANNEL STABILIZATION SEE DETAIL 40F CLASS II RIPRAP 20 TONS, NO GEO

MAX 0.5% PIPE SLOPE THIS SIDE OF ELBOW

TEMPORARY IMPACTS IN SURFACE WATER

OUTLET CHANNEL STABILIZATION SEE DETAIL 40F CLASS II RIPRAP 30 TONS, NO GEO

PROP. RETAINING WALL #30
BEGIN –Y2– STA. 26+60±
END –Y2– STA. 28+75±

IMPACTS IN SURFACE WATER

ROD AND LUG WITH GASKETS (ELBOWS)

24" CSP

TB JB w/MH

24" RCP IV

TB PRECAST DRAINAGE STRUCTURE w/ MH FRAME & GRATE STD 840.46

48" CSP

ELBOWS

DO NOT BURY INVERT

CLASS B RIPRAP 2 TONS, 7 SY GEO

SHOULDER BERM GUTTER –Y2– STA. 27+00 TO 28+25, RT

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

CLASS B RIPRAP 2 TONS, 7 SY GEO

CLASS I RIPRAP 4 TONS, 10 SY GEO

TOE PROTECTION SEE DETAIL 40C CLASS B RIPRAP 14 TONS, 31 SY GEO

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

ROD AND LUG WITH GASKETS (ELBOWS)

PLUG

FLOWABLE FILL

18" CSP

REMOVE HW

2GI

FALSE SUMP SEE DETAIL 40D

LATERAL 'V' DITCH SEE DETAIL 40A DDE=10 CY

TOE PROTECTION SEE DETAIL 40C CLASS B RIPRAP 7 TONS, 15 SY GEO

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

OUTLET CHANNEL STABILIZATION SEE DETAIL 40G CLASS I RIPRAP 20 TONS, NO GEO

DO NOT BURY INVERT

PROP. DRIVE

FALSE SUMP SEE DETAIL 40D

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

ROD AND LUG WITH GASKETS (ELBOWS)

48" CSP

FLOWABLE FILL

JB w/MH

48" RCP IV

FALSE SUMP SEE DETAIL 40E

DO NOT BURY INVERT

CLASS I RIPRAP 4 TONS, NO GEO

FALSE SUMP SEE DETAIL 40D

TOE PROTECTION SEE DETAIL 40H CLASS B RIPRAP 45 TONS, 100 SY GEO

BERM 'V' DITCH SEE DETAIL 40B

ROD AND LUG WITH GASKETS (ELBOW)

BDO SPEC DSN

BERM 'V' DITCH SEE DETAIL 40B

ROBERT K. NORCROSS

ROBERT K. NORCROSS

CARVER BRANCH

UTD CARVER BRANCH (SBC)

ALLEN H. LAKEY

BARBARA LAKEY

2 S F BARN

ROCK D

BBQ

DECK

SEPTIC TANK

DRAIN LINES

WD STEPS

ROCK WALL

EXISTING R/W

RETAIN 40' FROM R/W AND LINE WITH CIPP

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES HAND CLEARING

DENOTES FILL IN WETLAND

50′ 0′ 50′ 100′
25′

FOR –Y2– PROFILE, SEE SHEET NO. 72

11/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSH\A-0009CC_Hyd_prm_psh_40.dgn
User:richard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	40
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NAD 83/2011

8/17/99
REVISIONS

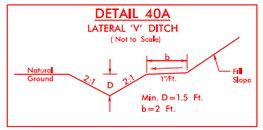
PAVEMENT REMOVAL

MECHANIZED CLEARING IN WETLANDS

HAND CLEARING IN WETLANDS

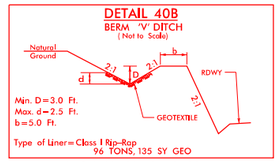
FILL IN WETLANDS

DETAIL 40A
LATERAL 'V' DITCH
(Not to Scale)



–Y2– STA. 32+40 TO 32+63 RT
SEE PFL FOR DITCH GRADE (1.4%)

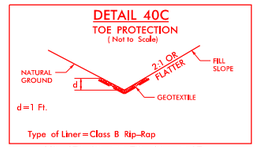
DETAIL 40B
BERM 'V' DITCH
(Not to Scale)



Type of Liner = Class I Rip-Rap
96 TONS, 135 SY GEO

–Y2– STA. 39+00 TO 40+00 RT
SEE PFL FOR DITCH GRADES

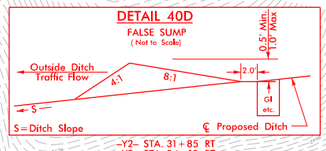
DETAIL 40C
TOE PROTECTION
(Not to Scale)



Type of Liner = Class B Rip-Rap

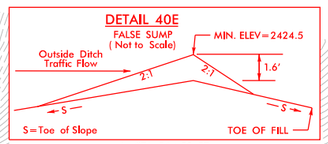
–Y2– STA. 29+75 TO 30+45 LT
–Y2– STA. 32+70 TO 33+00 RT

DETAIL 40D
FALSE SUMP
(Not to Scale)



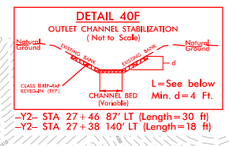
–Y2– STA. 31+85 RT
–Y2– STA. 34+12 RT
–Y2– STA. 35+62 RT
–Y2– STA. 39+63 RT

DETAIL 40E
FALSE SUMP
(Not to Scale)



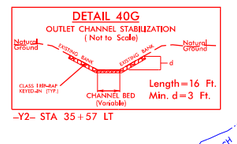
–L– STA. 36+50 RT

DETAIL 40F
OUTLET CHANNEL STABILIZATION
(Not to Scale)



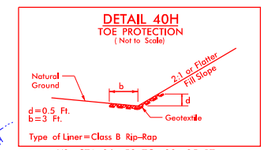
–Y2– STA 27+46 87' LT (Length=30 ft)
–Y2– STA 27+38 140' LT (Length=18 ft)

DETAIL 40G
OUTLET CHANNEL STABILIZATION
(Not to Scale)



–Y2– STA 35+57 LT

DETAIL 40H
TOE PROTECTION
(Not to Scale)



Type of Liner = Class B Rip-Rap

–Y2– STA. 36+50 TO 38+25 RT

PERMIT DRAWING
SHEET 10 OF 34

MATCH LINE STA –Y2– 26+00.00
MATCH TO SHEET NO. 39

MATCH LINE STA –Y2– 40+00.00
MATCH TO SHEET NO. 41

SITE 7

SITE 8

SITE 9

TOE PROTECTION SEE DETAIL 39C CLASS I RIPRAP

DO NOT DISTURB

OUTLET CHANNEL STABILIZATION SEE DETAIL 40F CLASS II RIPRAP 20 TONS, NO GEO

MAX 0.5% PIPE SLOPE THIS SIDE OF ELBOW

TEMPORARY IMPACTS IN SURFACE WATER

OUTLET CHANNEL STABILIZATION SEE DETAIL 40F CLASS II RIPRAP 30 TONS, NO GEO

PROP. RETAINING WALL #30
BEGIN –Y2– STA. 26+60±
END –Y2– STA. 28+75±

IMPACTS IN SURFACE WATER

ROD AND LUG WITH GASKETS (ELBOWS)

24" CSP

TB JB w/MH

24" RCP-IV

REMOVE HW

CLASS B RIPRAP 2 TONS, 7 SY GEO

TOE PROTECTION SEE DETAIL 40C CLASS B RIPRAP 14 TONS, 31 SY GEO

CLASS I RIPRAP 4 TONS, 10 SY GEO

TB PRECAST DRAINAGE STRUCTURE W/ MH FRAME & GRATE STD. 840.36

48" CSP

TB 2GI

ELBOWS

DO NOT BURY INVERT

CLASS B RIPRAP 2 TONS, 7 SY GEO

SHOULDER BERM GUTTER –Y2– STA. 27+00 TO 28+25, RT

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

ROD AND LUG WITH GASKETS (ELBOWS)

PLUG

FLOWABLE FILL

48" CSP

REMOVE HW

2GI

FALSE SUMP SEE DETAIL 40D

LATERAL 'V' DITCH SEE DETAIL 40A DDE=10 CY

TOE PROTECTION SEE DETAIL 40C CLASS B RIPRAP 7 TONS, 15 SY GEO

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

OUTLET CHANNEL STABILIZATION SEE DETAIL 40G CLASS I RIPRAP 20 TONS, NO GEO

DO NOT BURY INVERT

PROP. DRIVE

FALSE SUMP SEE DETAIL 40D

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

ROD AND LUG WITH GASKETS (ELBOWS)

48" CSP

JB w/MH

48" RCP-IV

REMOVE HW

2GI

18"

FALSE SUMP SEE DETAIL 40E

DO NOT BURY INVERT

CLASS I RIPRAP 4 TONS, NO GEO

FALSE SUMP SEE DETAIL 40D

TOE PROTECTION SEE DETAIL 40H CLASS B RIPRAP 45 TONS, 100 SY GEO

BERM 'V' DITCH SEE DETAIL 40B

BDO SPEC DSN

BERM 'V' DITCH SEE DETAIL 40B

ROD AND LUG WITH GASKETS (ELBOW)

ROBERT K. NORCROSS

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

ROBERT K. NORCROSS

BARBARA LAKEY

ALLEN H. LAKEY

CARVER BRANCH

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES HAND CLEARING

DENOTES FILL IN WETLAND

50' 0' 50' 100'
25'

FOR –Y2– PROFILE, SEE SHEET NO. 72

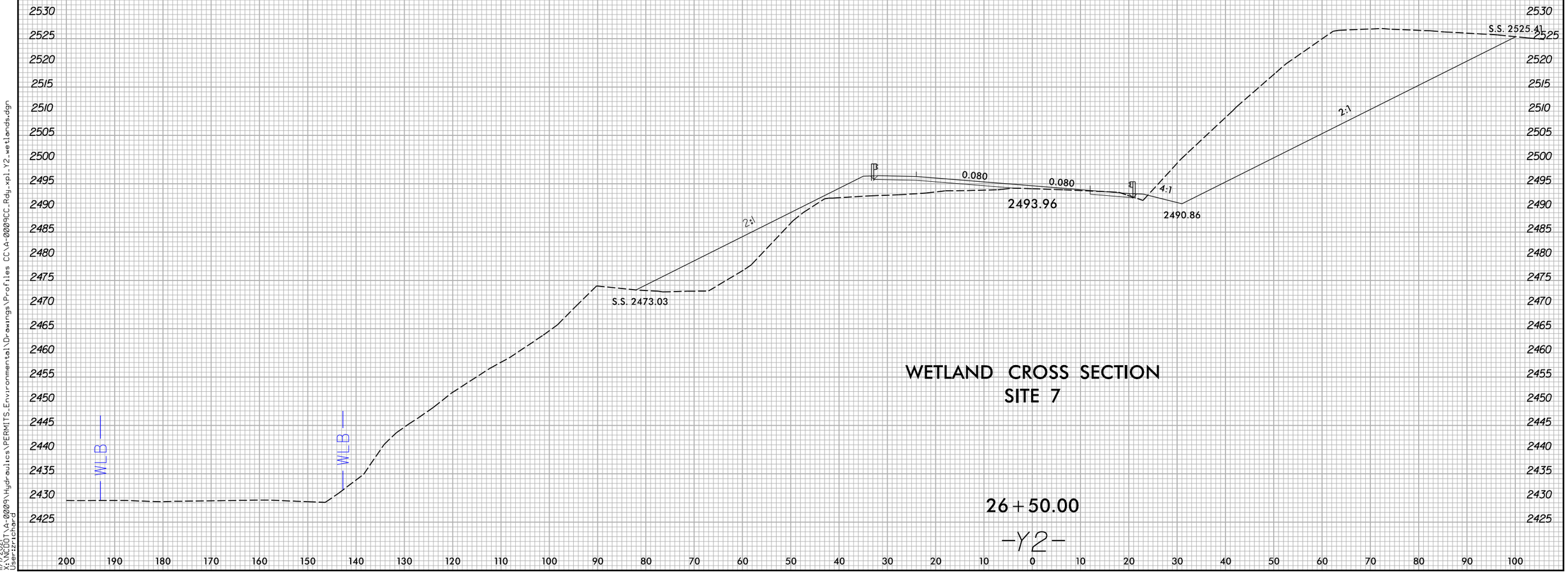
11/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\0-drings\A-0009CC_PSHA-0009CC_Hyd_prm_sh_40.dgn
User:richard

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CC	X-119

PERMIT DRAWING
SHEET 11 OF 34

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



WETLAND CROSS SECTION
SITE 7

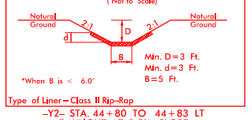
26+50.00

-Y2-

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CC\A-0009CC_Rdy_xpl_Y2_wetlands.dgn
User:rrichard

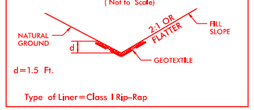
METES & BOUNDS OLD NC 28			
From	To	Direction	Distance
A	B	S 41° 15' 05" E	90.11'
B	C	S 50° 40' 15" E	37.42'
C	D	S 85° 45' 59" E	39.64'
D	E	N 58° 32' 14" E	42.05'
E	F	N 25° 05' 07" E	37.05'
F	G	N 2° 03' 42" E	39.94'
G	H	N 2° 07' 51" W	84.63'
H	J	N 3° 00' 57" E	66.88'

DETAIL 41A
STANDARD BASE DITCH
(Not to Scale)



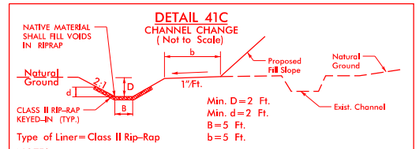
Min. D=3 Ft.
Min. d=3 Ft.
B=5 Ft.
*When B is < 6.0'
Type of Liner=Class II Rip-Rap
–Y2– STA. 44+80 TO 44+83 LT
DAYLIGHT AT 3.5% SLOPE

DETAIL 41B
TOE PROTECTION
(Not to Scale)



d=1.5 Ft.
Type of Liner=Class I Rip-Rap
–Y2– STA. 48+00 TO 50+50 LT

DETAIL 41C
CHANNEL CHANGE
(Not to Scale)

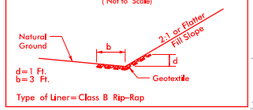


Min. D=2 Ft.
Min. d=2 Ft.
B=5 Ft.
b=5 Ft.
Type of Liner=Class II Rip-Rap

NOTES:
1) CLASS II RIP-RAP SHALL BE EMBEDDED IN ORDER TO NOT IMPEDE AQUATIC ORGANISM PASSAGE. NATIVE MATERIAL SHALL BE PLACED ON TOP OF CLASS II RIP-RAP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT PROJECT SITE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER.

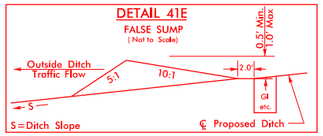
–Y2– STA. 46+95 TO 49+50 RT
–Y2– STA. 52+00 TO 53+00 LT
SEE PFL FOR CHANNEL CHANGE GRADE

DETAIL 41D
TOE PROTECTION
(Not to Scale)



d=1 Ft.
b=3 Ft.
Type of Liner=Class B Rip-Rap
–Y2– STA. 49+50 TO 51+00 RT

DETAIL 41E
FALSE SUMP
(Not to Scale)



S=Ditch Slope
–Y2– STA. 41+38 RT
–Y2– STA. 44+00 RT

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 12 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	41
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

8/17/99

REVISIONS

NAD 83/2011

MATCH LINE STA –Y2– 40+00.00
MATCH TO SHEET NO. 40

MATCH LINE STA –Y2– 54+00.00
MATCH TO SHEET NO. 42

JOHN M. STUART, III

SHED

I S F D

DECK

I S ROCK D

CONC WALL

POSSIBLE DRAIN FIELD
COULD N'T FIND TANK

DANNY K. JORDAN

130
DAVID M. HOLDER

131
JAMES P. EWING, TRUSTEE, ET AL

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

CHANNEL CHANGE
SEE DETAIL 41C
CLASS II RIPRAP
153 TONS, NO GEO
DDE=185 CY

CLASS I RIPRAP
3 TONS, 7 SY GEO

SITE 11

STANDARD BASE DITCH
SEE DETAIL 41A
CLASS II RIPRAP
38 TONS, NO GEO

DO NOT BURY INVERT

SITE 10

TOE PROTECTION
SEE DETAIL 41B
CLASS I RIPRAP
115 TONS, 160 SY GEO

SHOULDER BERM GUTTER
–Y2– STA. 47+50 TO 52+57, LT

BARBARA LAKEY

121

ROD AND LUG WITH GASKETS (ELBOWS)

MAX 1.0% PIPE SLOPE THIS SIDE OF ELBOW

MIN 1.5% PIPE SLOPE THIS SIDE OF ELBOW

SPRING BOX

JB wSlab Lid

CUT TO FILL TRANSITION
CLASS I RIPRAP
25 TONS, 35 SY GEO

PROP. DRIVE

GRADE TO DRAIN

REMOVE DI

FLOWABLE FILL

REMOVE HW

FALSE SUMP
SEE DETAIL 41E

ELBOW

BDO SPEC DSN

BDO REMOVE HW

REALIGN SOIL DRIVE

RELOCATE GATE BY OWNER

CUT TO FILL TRANSITION
CLASS B RIPRAP
8 TONS, 18 SY GEO

FILL EXISTING CHANNEL W/ COMPACTED BACKFILL

CHANNEL CHANGE
SEE DETAIL 41C
CLASS II RIPRAP
420 TONS, NO GEO
DDE=835 CY

125
ROBERT K. NORCROSS

DO NOT BURY INVERT

TOE PROTECTION
SEE DETAIL 41D
CLASS B RIPRAP
44 TONS, 98 SY GEO

EXPRESSWAY GUTTER
–Y2– STA. 51+25 TO 57+76±, RT

CREWS BROTHERS, LLC

UT TO CARVER BRANCH (SP5)

CARVER BRANCH

WOODS

SOIL

NC 28 (FONTANA RD)

50' 0' 50' 100'
25'

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

FOR –Y2– PROFILE, SEE SHEET NO. 72

11/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSH\A-0009CC_Hyd_prm_psh_41.dgn
User:richard

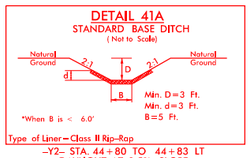
METES & BOUNDS OLD NC 28			
From	To	Direction	Distance
A	B	S 41° 15' 05" E	90.11'
B	C	S 50° 40' 15" E	37.42'
C	D	S 85° 45' 59" E	39.64'
D	E	N 58° 32' 14" E	42.05'
E	F	N 25° 05' 07" E	37.05'
F	G	N 2° 03' 42" E	39.94'
G	H	N 2° 07' 51" W	84.63'
H	J	N 3° 00' 57" E	66.88'

8/17/99

REVISIONS

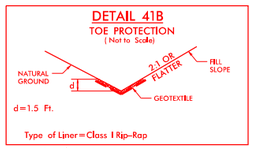
MATCH LINE STA –Y2– 40+00.00
MATCH TO SHEET NO. 40

DETAIL 41A
STANDARD BASE DITCH
(Not to Scale)



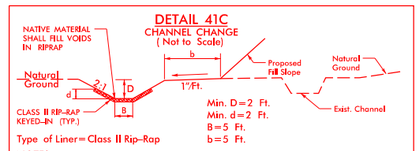
Type of Liner=Class II Rip-Rap
–Y2– STA. 44+80 TO 44+83 LT
DAYLIGHT AT 3.5% SLOPE

DETAIL 41B
TOE PROTECTION
(Not to Scale)



Type of Liner=Class I Rip-Rap
–Y2– STA. 48+00 TO 50+50 LT

DETAIL 41C
CHANNEL CHANGE
(Not to Scale)

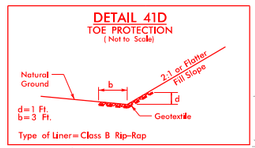


Type of Liner=Class II Rip-Rap

NOTES:
1) CLASS II RIP-RAP SHALL BE EMBEDDED IN ORDER TO NOT IMPEDE AQUATIC ORGANISM PASSAGE. NATIVE MATERIAL SHALL BE PLACED ON TOP OF CLASS II RIP-RAP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT PROJECT SITE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER.

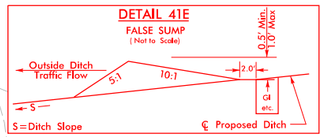
–Y2– STA. 46+95 TO 49+50 RT
–Y2– STA. 52+00 TO 53+00 LT
SEE PFL FOR CHANNEL CHANGE GRADE

DETAIL 41D
TOE PROTECTION
(Not to Scale)



Type of Liner=Class B Rip-Rap
–Y2– STA. 49+50 TO 51+00 RT

DETAIL 41E
FALSE SUMP
(Not to Scale)



–Y2– STA. 41+38 RT
–Y2– STA. 44+00 RT

JS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

JS DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 13 OF 34

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	41
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
JOHN M. STUART, III
SHED
POSSIBLE DRAIN FIELD
COULD BE SEPTIC TANK
DECK
TS ROCK R
STONE WALL
DANNY K. JORDAN
GRADE TO DRAIN
PROP. DRIVE
GRADE TO DRAIN
42"
2GI-A
FS
FALSE SUMP SEE DETAIL 41E
REALIGN SOIL DRIVE
RELOCATE GATE BY OWNER
PROP. DRIVE
130
DAVID M. HOLDER
STANDARD BASE DITCH SEE DETAIL 41A CLASS II RIPRAP 38 TONS, NO GEO
DO NOT BURY INVERT
UT TO CARVER BRANCH (SPDI)
JS
ST
SITE 10
MAX 1.0% PIPE SLOPE THIS SIDE OF ELBOW
ROD AND LUG WITH GASKETS (ELBOWS)
MIN 1.5% PIPE SLOPE THIS SIDE OF ELBOW
54" CMP
ABANDON
REMOVE DI
FLOWABLE FILL
PLUG
REMOVE HW
FALSE SUMP SEE DETAIL 41E
GRADE TO DRAIN
ELBOW
BDO SPEC DSN
PROP. DRIVE
PROP. DRIVE
SHOULDER BERM GUTTER
–Y2– STA. 47+50 TO 52+57, LT
TOE PROTECTION SEE DETAIL 41B CLASS I RIPRAP 115 TONS, 160 SY GEO
CUT TO FILL TRANSITION CLASS B RIPRAP 8 TONS, 18 SY GEO
CUT TO FILL TRANSITION CLASS I RIPRAP 25 TONS, 35 SY GEO
CHANNEL CHANGE SEE DETAIL 41C CLASS II RIPRAP 420 TONS, NO GEO DDE=835 CY
FILL EXISTING CHANNEL W/ COMPACTED BACKFILL
125
ROBERT K. NORCROSS
121
BARBARA LAKEY
CHANNEL CHANGE SEE DETAIL 41C CLASS II RIPRAP 153 TONS, NO GEO DDE=185 CY
CLASS I RIPRAP 3 TONS, 7 SY GEO
SITE 11
131
JAMES P. EWING, TRUSTEE, ET AL
DO NOT BURY INVERT
MAX 1.0% PIPE SLOPE THIS SIDE OF ELBOW
ROD AND LUG WITH GASKETS (ELBOWS)
SPRING BOX
15" CSP
JB wSlab Lid
JB SGI
PLUG
ELBOW
BDO
REMOVE HW
GRADE TO DRAIN
JB wMH
EXPRESSWAY GUTTER
–Y2– STA. 51+25 TO 57+76±, RT
DO NOT BURY INVERT
TOE PROTECTION SEE DETAIL 41D CLASS B RIPRAP 44 TONS, 98 SY GEO
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
CREWS BROTHERS, LLC
WOODS
SPRING
SOIL
EXISTING R/W
NC 28 (FONTANA RD.)

MATCH LINE STA –Y2– 54+00.00
MATCH TO SHEET NO. 42

50' 0' 50' 100'
25'

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

FOR –Y2– PROFILE, SEE SHEET NO. 72

W:\2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSH\A-0009CC_Hyd_prm_psh_41.dgn
User:rrichard

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	42
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

PERMIT DRAWING SHEET 14 OF 34

NAD 83/2011

-Y2- 54+00.00 MATCH LINE STA -Y2- SHEET NO. 41

-Y2- 68+00.00 MATCH LINE STA -Y2- SHEET NO. 43

-Y2- CURVE DATA

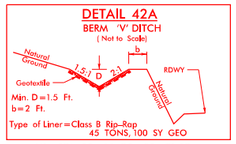
PI Sta 70+28.18
△ = 50°56'38.0" (RT)
D = 3°53'51.6"
L = 1,307.03'
T = 700.27'
R = 1,470.00'
SE = 0.08
DS = 60 MPH

-DR4- CURVE DATA

PI Sta 10+77.95	PI Sta 11+22.09
△ = 24°42'06.2" (LT)	△ = 10°28'29.8" (RT)
D = 57°17'44.8"	D = 22°55'05.9"
L = 43.11'	L = 45.71'
T = 21.90'	T = 22.92'
R = 100.00'	R = 250.00'

① ② ③

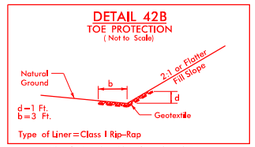
DETAIL 42A
BERM 'V' DITCH
(Not to Scale)



Type of Liner=Class B Rip-Rap
45 TONS, 100 SY GEO

-Y2- STA. 55+00 TO 55+71 RT
SEE PFL FOR DITCH GRADES

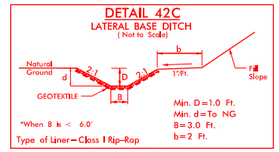
DETAIL 42B
TOE PROTECTION
(Not to Scale)



Type of Liner=Class I Rip-Rap

-Y2- STA. 58+49 TO 59+18 RT

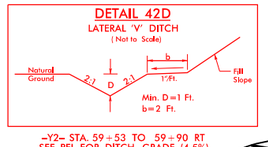
DETAIL 42C
LATERAL BASE DITCH
(Not to Scale)



Type of Liner=Class I Rip-Rap

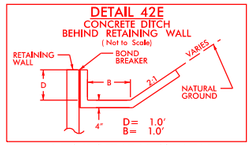
-Y2- STA. 59+18 TO 59+53 RT
SEE PFL FOR DITCH GRADE (18.6%)

DETAIL 42D
LATERAL 'V' DITCH
(Not to Scale)



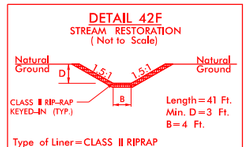
-Y2- STA. 59+53 TO 59+90 RT
SEE PFL FOR DITCH GRADE (4.5%)

DETAIL 42E
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



-Y2- STA. 63+75 TO 66+02 RT
(SEE WALL ENVELOPES FOR DITCH GRADE)

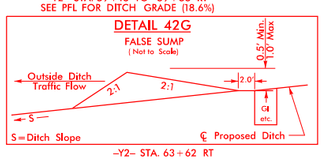
DETAIL 42F
STREAM RESTORATION
(Not to Scale)



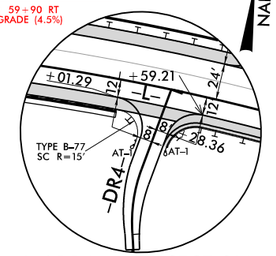
Type of Liner=CLASS II RIPRAP
120 TONS

-Y2- STA 67+96(68' LT) TO 68+26(90' LT)
SEE PFL FOR CHANNEL GRADE (4.9%)

DETAIL 42G
FALSE SUMP
(Not to Scale)



-Y2- STA. 63+62 RT



-L-/-DR4- INTERSECTION

PROP. RETAINING WALL #32
BEGIN -Y2- STA. 58+90±
END -Y2- STA. 66+83±

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

END CONSTRUCTION
-DR4- STA. 11+10.00

TEMPORARY IMPACTS IN SURFACE WATER

JAMES P. EWING, TRUSTEE, ET AL (131)

CREWS BROTHERS, LLC (134)

EUGENE R. WIECZOREK

DEAN A. HORNING (134A)

ROBERT K. NORCROSS (135)

ROBERT PEASE

JOHN B. NORCROSS (133)

CREWS BROTHERS, LLC

CARVER BRANCH

UT TO CARVER BRANCH (SFM)

SITE 12

SITE 13

SITE 14

SITE 15

CLASS I RIPRAP
4 TONS, 12 SY GEO

DO NOT BURY INVERT

PDE 6" PVC

SPRING BOX

SHOULDER BERM GUTTER
-Y2- STA. 58+90 TO 63+22, LT

ROD AND LUG WITH GASKETS (ELBOWS)

24" CSP

PLUG

BDO

REMOVE HW

EXPRESSWAY GUTTER
-Y2- STA. 51+25 TO 57+76±, RT

100' R

20' R

15" RCP-IV

2GI

REMOVE

PROP. DRIVE

CONSIDER ADDING AGGREGATE SHOULDER DRAIN OR SPRING BOX BEFORE FINAL PLANS.

BERM 'V' DITCH
SEE DETAIL 42A

CLASS I RIPRAP
3 TONS, 7 SY GEO

TOE PROTECTION
SEE DETAIL 42B
CLASS I RIPRAP
35 TONS, 50 SY GEO

LATERAL BASE DITCH
SEE DETAIL 42C
CLASS I RIPRAP
55 TONS, 77 SY GEO
DDE=40 CY

OUTLET CHANNEL STABILIZATION
SEE DETAIL 42H
CLASS II RIPRAP
8 TONS, NO GEO

24" RCP-IV WITH FLARE END SECTION

24" COLLAR AND EXTEND

LATERAL 'V' DITCH
SEE DETAIL 42D
DDE=35 CY

TOE PROTECTION
SEE DETAIL 42J
CLASS I RIPRAP
68 TONS, 95 SY GEO

FALSE SUMP
SEE DETAIL 42G

SINGLE FACED CONCRETE BARRIER

CONC. DITCH BEHIND RETAINING WALL
SEE DETAIL 42E

PROP. RETAINING WALL #33
W/CONCRETE DITCH
BEGIN -Y2- STA. 63+75±
END -Y2- STA. 66+02±

ROCK EMBANKMENT -DR4- 10+35 TO 11+30 LT
SEE DETAIL SHEET 24-X TRANSITION FROM TYPICAL AT 10+35 TO 1.5:1 AT 10+60.
MAINTAIN 1.5:1 FROM 10+60 TO 11+30.

CULVERT OUTLET CHANNEL
SEE DETAIL 42I
35 TONS CLASS II

DO NOT BURY INVERT

CLASS I RIPRAP
2 TON, 8 SY GEO

SHOULDER BERM GUTTER
-DR4- STA. 10+36 LT
TO -Y2- STA 70+50, RT

STREAM RESTORATION
SEE DETAIL 42F
DDE=160 CY

CLASS B RIPRAP
2 TONS, 7 CY GEO

RETAIN AND EXTEND 1@6'x6' RCBC AT OUTLET

REMOVE

JB w/Slab Lid

TB 2GI

RCP-IV

FES

SR 1239 CARVER BRANCH LN

SFN

SFM

SFS

SPRING

SPRING BOX

ROCK WALL

STEEL PANTS

WOODS

BST

GR

MTL

EIP

EIPO

ROCK HW

CONC HW

STOCKPILE

HOUSE

BARN

SILO

GAZEBO

GO ROCK WALL

NC 280 FRONTANA RD

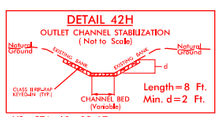
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100'
25'

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 42H
OUTLET CHANNEL STABILIZATION
(Not to Scale)



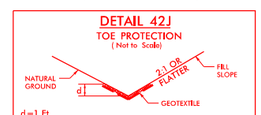
-Y2- STA 60+03 LT

DETAIL 42I
OUTLET CHANNEL DETAIL
(Not to Scale)



-Y2- STA 67+56 RT

DETAIL 42J
TOE PROTECTION
(Not to Scale)



Type of Liner=Class I Rip-Rap

-Y2- STA. 61+50 TO 63+50 RT

FOR -Y2- PROFILE, SEE SHEET NO. 73
FOR -DR4- PROFILE, SEE SHEET NO. 77

W:\2021 Projects\A-0009A\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSH\A-0009CC_Hyd_prm_psh_42.dgn
11/4/2021
User:richard

8/17/99

REVISIONS

–Y2– 54+00.00 SHEET NO. 41

–Y2– CURVE DATA

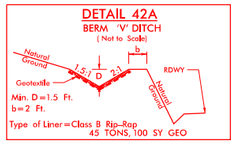
PI Sta 70+28.18
△ = 50° 56' 38.0" (RT)
D = 3° 53' 51.6"
L = 1,307.03'
T = 700.27'
R = 1,470.00'
SE = 0.08
DS = 60 MPH

–DR4– CURVE DATA

PI Sta 10+77.95	PI Sta 11+22.09
△ = 24° 42' 06.2" (LT)	△ = 10° 28' 29.8" (RT)
D = 57° 17' 44.8"	D = 22° 55' 05.9"
L = 43.11'	L = 45.71'
T = 21.90'	T = 22.92'
R = 100.00'	R = 250.00'

① ② ③

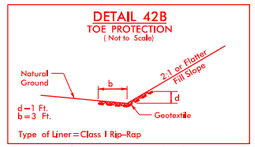
DETAIL 42A
BERM 'V' DITCH
(Not to Scale)



Type of Liner=Class B Rip-Rap
45 TONS, 100 SY GEO

–Y2– STA. 55+00 TO 55+71 RT
SEE PFL FOR DITCH GRADES

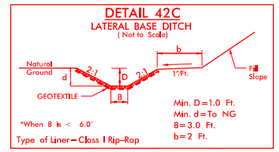
DETAIL 42B
TOE PROTECTION
(Not to Scale)



Type of Liner=Class I Rip-Rap

–Y2– STA. 58+49 TO 59+18 RT

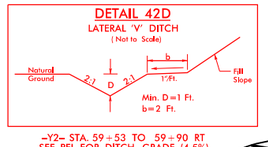
DETAIL 42C
LATERAL BASE DITCH
(Not to Scale)



*When B is < 6.0'
Type of Liner=Class I Rip-Rap

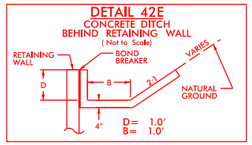
–Y2– STA. 59+18 TO 59+53 RT
SEE PFL FOR DITCH GRADE (18.6%)

DETAIL 42D
LATERAL 'V' DITCH
(Not to Scale)



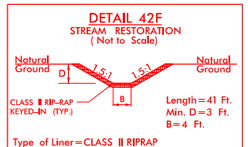
–Y2– STA. 59+53 TO 59+90 RT
SEE PFL FOR DITCH GRADE (4.5%)

DETAIL 42E
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



–Y2– STA. 63+75 TO 66+02 RT
(SEE WALL ENVELOPES FOR DITCH GRADE)

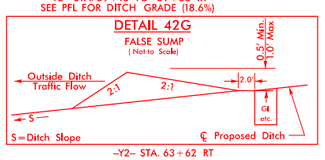
DETAIL 42F
STREAM RESTORATION
(Not to Scale)



Type of Liner=CLASS II RIPRAP
120 TONS

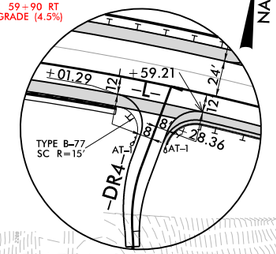
–Y2– STA. 67+96(68' LT) TO 68+26(90' LT)
SEE PFL FOR CHANNEL GRADE (4.9%)

DETAIL 42G
FALSE SUMP
(Not to Scale)



–Y2– STA. 63+62 RT

NAD 83/2011



PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	42
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

PERMIT DRAWING
SHEET 15 OF 34

–L–/–DR4– INTERSECTION

PROP. RETAINING WALL #32
BEGIN –Y2– STA. 58+90±
END –Y2– STA. 66+83±

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

END CONSTRUCTION
–DR4– STA. 11+10.00

TEMPORARY IMPACTS IN SURFACE WATER

MATCH LINE STA –Y2– 54+00.00
MATCH TO SHEET NO. 41

MATCH LINE STA –Y2– 68+00.00
MATCH TO SHEET NO. 43

JAMES P. EWING, TRUSTEE, ET AL (131)
CREWS BROTHERS, LLC (134)
EUGENE R. WIECZOREK (134A)
DEAN A. HORNING
ROBERT K. NORCROSS (135)
ROBERT PEASE
JOHN B. NORCROSS (133)

SITE 12 | SITE 13 | SITE 14 | SITE 15

CARVER BRANCH
UT TO CARVER BRANCH
UT TO CARVER BRANCH (SFM)
SR 1239 CARVER BRANCH LN

CLASS I RIPRAP
4 TONS, 12 SY GEO

DO NOT BURY INVERT

SHOULDER BERM GUTTER
–Y2– STA. 58+90 TO 63+22, LT

ROD AND LUG WITH GASKETS (ELBOWS)

*PLUG

EXPRESSWAY GUTTER
–Y2– STA. 51+25 TO 57+76±, RT

BERM 'V' DITCH
SEE DETAIL 42A

PROP. DRIVE

CONSIDER ADDING AGGREGATE SHOULDER DRAIN OR SPRING BOX BEFORE FINAL PLANS

CLASS I RIPRAP
3 TONS, 7 SY GEO

TOE PROTECTION
SEE DETAIL 42B
CLASS I RIPRAP
35 TONS, 50 SY GEO

LATERAL BASE DITCH
SEE DETAIL 42C
CLASS I RIPRAP
55 TONS, 77 SY GEO
DDE=40 CY

OUTLET CHANNEL STABILIZATION
SEE DETAIL 42H
CLASS II RIPRAP
8 TONS, NO GEO

COLLAR AND EXTEND

LATERAL 'V' DITCH
SEE DETAIL 42D
DDE=35 CY

TOE PROTECTION
SEE DETAIL 42J
CLASS I RIPRAP
68 TONS, 95 SY GEO

FALSE SUMP
SEE DETAIL 42G

SINGLE FACED CONCRETE BARRIER

CONC. DITCH BEHIND RETAINING WALL
SEE DETAIL 42E

PROP. RETAINING WALL #33
W/CONCRETE DITCH
BEGIN –Y2– STA. 63+75±
END –Y2– STA. 66+02±

CLASS B RIPRAP
2 TONS, 7 CY GEO

RETAIN AND EXTEND
1@6'x6' RCBC
AT OUTLET

STREAM RESTORATION
SEE DETAIL 42F
DDE=160 CY

CULVERT OUTLET CHANNEL
SEE DETAIL 42I
35 TONS CLASS II

ROCK EMBANKMENT –DR4– 10+35 TO 11+30 LT
SEE DETAIL SHEET 24-X TRANSITION FROM
TYPICAL AT 10+35 TO 1.5:1 AT 10+60
MAINTAIN 1.5:1 FROM 10+60 TO 11+30

SHOULDER BERM GUTTER
–DR4– STA. 10+36 LT
TO –Y2– STA. 70+50, RT

DO NOT BURY INVERT
CLASS I RIPRAP
2 TON, 8 SY GEO

24" CMP
24" CSP
24" RCP
15" RCP-IV
18" RCP-IV
2GI
TB 2GI
JB w/Slab Lid
REMOVE
REMOVE HW
PLUG
BDO
PDE
SPRING BOX
SFN
SFM
SFI
SFK
SFL
SFT
JS
SF
SS
E
F
C
Sf
MTL
WOODS
BST
GR
ROCK
HW
BARN
GO ROCK WALL

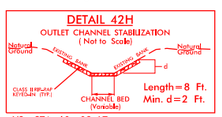
TS = DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S = DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100'
25'

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE–IN PER CROSS–SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 42H
OUTLET CHANNEL STABILIZATION
(Not to Scale)



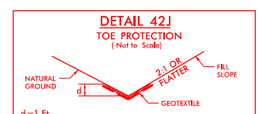
–Y2– STA 60+03 LT

DETAIL 42I
OUTLET CHANNEL DETAIL
(Not to Scale)



–Y2– STA 67+56 RT

DETAIL 42J
TOE PROTECTION
(Not to Scale)



Type of Liner=Class I Rip-Rap

–Y2– STA. 61+50 TO 63+50 RT

FOR –Y2– PROFILE, SEE SHEET NO. 73

FOR –DR4– PROFILE, SEE SHEET NO. 77

W:\2021 A-0009CC\TVA-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSHA-0009CC_Hyd_prm_pth_42.dgn
11/4/2021
User:richard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

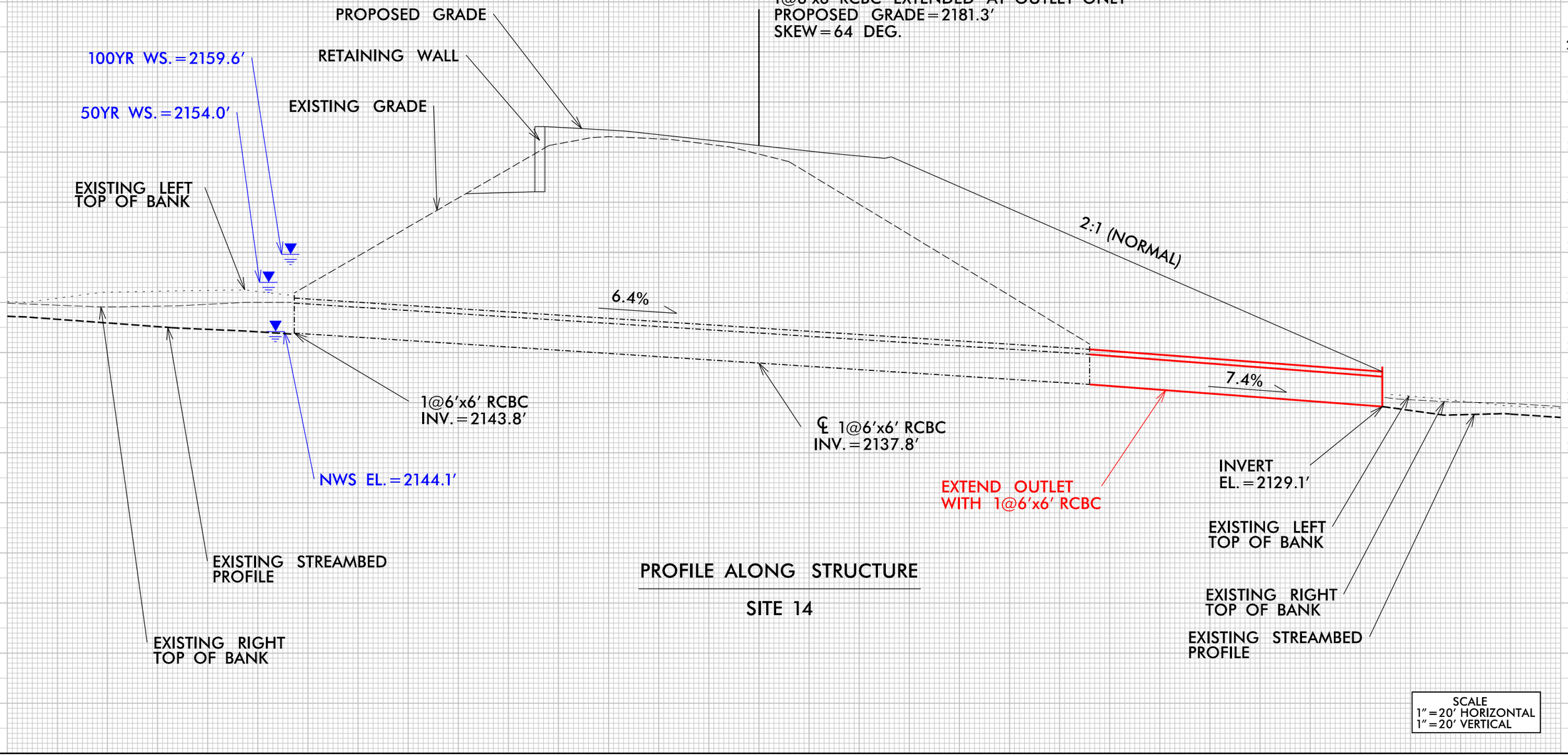
PERMIT DRAWING
SHEET 16 OF 34

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

–Y2–
NC 28

℄ –Y2– STA. 66+85
1@6'x6' RCBC EXTENDED AT OUTLET ONLY
PROPOSED GRADE=2181.3'
SKEW=64 DEG.



PROFILE ALONG STRUCTURE

SITE 14

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PERMIT DRAWING
SHEET 17 OF 34

–Y2–
NC 28

℄ –Y2– STA 67+82
66" WSP
PROP. GRADE=2172.9'
SKEW=102 DEG.

100YR WSEL=2157.6'

50YR WSEL=2156.0'

PROPOSED GRADE

EXISTING GRADE

2:1 NORMAL

2:1 NORMAL

JB W/ SLAB LID

TB RT

TB LT

TB RT

TB LT

13.7%

10.6%

NWS=2152.8'

INV=2152.4'

INV=2150.4'

INV=2134.8'

INV=2129.2'

66" CAAP

RESTORED CHANNEL
LINED WITH CLASS II
RIPRAP AT 4.9%

EXISTING 42" CMP
TO BE REMOVED

FLOWABLE FILL
EXISTING 48" CMP

66" WSP
(TRECHLESS CONSTRUCTION)

CLASS II RIPRAP

EXISTING STREAM
BED PROFILE

2020
2010
2200
2190
2180
2170
2160
2150
2140
2130
2120
2110
2100

–150 –100 –50 0 50 100 150

PROFILE ALONG STRUCTURE

SITE 15

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

8/17/99

REVISIONS

-Y2- CURVE DATA

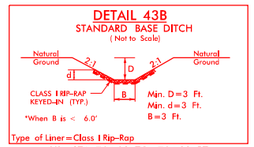
PI Sta 70+28.18	PI Sta 83+84.46
Δ = 50° 56' 38.0" (RT)	Δ = 52° 00' 01.9" (LT)
D = 3° 53' 51.6"	D = 5° 24' 18.9"
L = 1,307.03'	L = 962.04'
T = 700.27'	T = 517.00'
R = 1,470.00'	R = 1,060.00'
SE = 0.08	SE = 0.08
DS = 60 MPH	DS = 55 MPH

DETAIL 43A
LATERAL BASE DITCH
(Not to Scale)



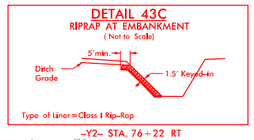
-Y2- STA. 71+00 TO 74+00 RT
SEE PFL FOR DITCH GRADES

DETAIL 43B
STANDARD BASE DITCH
(Not to Scale)



Type of Liner=Class I Rip-Rap
-Y2- STA. 76+08 TO 76+22 RT
SEE PFL FOR DITCH GRADE (0.3%)

DETAIL 43C
RIPRAP AT EMBANKMENT
(Not to Scale)



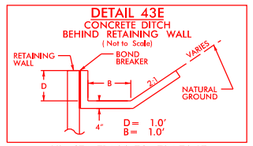
Type of Liner=Class I Rip-Rap
-Y2- STA. 76+22 RT

DETAIL 43D
STREAM RESTORATION
(Not to Scale)



Type of Liner=Class II Rip-Rap
-Y2- STA 78+00 TO 78+46 RT

DETAIL 43E
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



-Y2- STA. 71+26 TO 72+76 LT
-Y2- STA. 77+92 TO 82+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	43
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

PERMIT DRAWING SHEET 18 OF 34

MATCH LINE STA -Y2- 68+00.00
MATCH TO SHEET NO. 42

MATCH LINE STA -Y2- 82+00.00
MATCH TO SHEET NO. 44

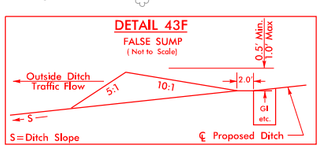
133 JOHN B. NORCROSS
136 JAMES M. JENKINS
137 RICKEY D. McCRACKEN
138 ROBERT K. NORCROSS
139 THOMAS E. SCHIESSLE
140 GLEN McCOY
141 LESTER A. JENKINS, ET AL
135 ROBERT K. NORCROSS
138 ROBERT K. NORCROSS
FLOYD J. CODY
ARNOLD D. CODY

TEMPORARY IMPACTS IN SURFACE WATER
PROP. RETAINING WALL #34 W/CONCRETE DITCH
BEGIN -Y2- STA. 71+25±
END -Y2- STA. 72+75±
PROP. RETAINING WALL #35 W/CONCRETE DITCH
BEGIN -Y2- STA. 77+94±
END -Y2- STA. 88+25±
STREAM RESTORATION SEE DETAIL 42F
FILL 42" CMP AFTER PROPOSED SYSTEM IS IN SERVICE
REMOVE 42" CMP & DI AFTER PROPOSED SYSTEM IS IN SERVICE
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 43E
SITE 15
SITE 16
SITE 17
PROP. DRIVE
DO NOT DISTURB
CLASS B RIP-RAP 5 TONS, 12 SY GEO
CLASS I RIPRAP 2 TONS, NO GEO
FALSE SUMP SEE DETAIL 43F
BURY INVERT 0.7'
REMOVE HW
REMOVE DI
REMOVE 5 LF
SINGLE FACED CONCRETE BARRIER
GRADE TO DRAIN
FLOWABLE FILL
PLUG
ELBOWS
CLASS I RIPRAP 4 TONS, 10 SY GEO
SHOULDER BERM GUTTER -DR4- STA. 10+36, LT TO 70+50, RT
LATERAL BASE DITCH SEE DETEIL 43A DDE=200 CY
REMOVE 11 LF
END CONSTRUCTION -Y2A- STA. 11+25.00
ROD AND LUG WITH GASKETS (ELBOWS)
MAX 1.0% PIPE SLOPE THIS SIDE OF ELBOW
CLASS B RIPRAP 3 TONS, 11 SY GEO
RIPRAP AT EMBANKMENT SEE DETAIL 43C CLASS I RIPRAP 6 TONS, NO GEO
STANDARD BASE DITCH SEE DETAIL 43B CLASS I RIPRAP 18 TONS, NO GEO DDE=50 CY
FLOODPLAIN BENCH SEE DETAIL 43G 570 SY COIR FIBER MATTING DDE=210 CY
STREAM RESTORATION SEE DETAIL 43D CLASS II RIPRAP 60 TONS DDE=30 CY
TB PRECAST DRAINAGE STRUCTURE w/2GI STD 840.46
SPEC DSN TB 2GI-A
NOTE: MATCH PAVEMENT SLOPE TO EXISTING SLOPE
UT TO CARVER BRANCH (TSIP)
CARVER BRANCH
SR 1226 MARTIN JENKINS RD.
SR 1226 STEDMAN RD.
ABANDON
DO NOT DISTURB ROCK WALL OR STEPS
ROD AND LUG WITH GASKETS (ELBOWS)

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

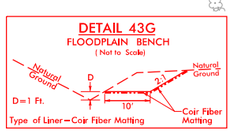
50' 0' 50' 100'
25'

DETAIL 43F
FALSE SUMP
(Not to Scale)



-Y2- STA. 74+13 LT
-Y2- STA. 74+15 RT

DETAIL 43G
FLOODPLAIN BENCH
(Not to Scale)



-Y2- STA. 76+25 TO 80+10 RT

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

FOR -Y2- PROFILE, SEE SHEET NO. 73

12/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSH\A-0009CC_Hyd_prm_psh_43.dgn
User:richard

8/17/99

REVISIONS

-Y2- CURVE DATA

PI Sta 70+28.18	PI Sta 83+84.46
Δ = 50° 56' 38.0" (RT)	Δ = 52° 00' 01.9" (LT)
D = 3° 53' 51.6"	D = 5° 24' 18.9"
L = 1,307.03'	L = 962.04'
T = 700.27'	T = 517.00'
R = 1,470.00'	R = 1,060.00'
SE = 0.08	SE = 0.08
DS = 60 MPH	DS = 55 MPH

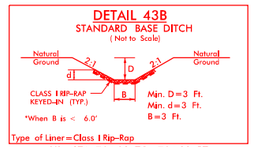
DETAIL 43A
LATERAL BASE DITCH
(Not to Scale)



Min. D=1.0 Ft.
B=5 Ft.
b=5 Ft.

-Y2- STA. 71+00 TO 74+00 RT
SEE PFL FOR DITCH GRADES

DETAIL 43B
STANDARD BASE DITCH
(Not to Scale)



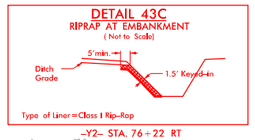
Min. D=3 Ft.
Min. d=3 Ft.
B=3 Ft.

*When B is < 6.0'

Type of Liner=Class I Rip-Rap

-Y2- STA. 76+08 TO 76+22 RT
SEE PFL FOR DITCH GRADE (0.3%)

DETAIL 43C
RIPRAP AT EMBANKMENT
(Not to Scale)



Type of Liner=Class I Rip-Rap

-Y2- STA. 76+22 RT

DETAIL 43D
STREAM RESTORATION
(Not to Scale)



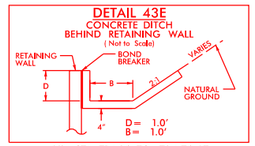
*When B is < 6.0'

B=MatchExisting(2to4Ft)

Type of Liner=Class II Rip-Rap

-Y2- STA 78+00 TO 78+46 RT

DETAIL 43E
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



D= 1.0'
B= 1.0'

-Y2- STA. 71+26 TO 72+76 LT
-Y2- STA. 77+92 TO 82+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	43
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

PERMIT DRAWING SHEET 19 OF 34

MATCH LINE STA -Y2- 68+00.00
MATCH TO SHEET NO. 42

MATCH LINE STA -Y2- 82+00.00
MATCH TO SHEET NO. 44

133 JOHN B. NORCROSS
136 JAMES M. JENKINS
137 RICKEY D. McCRACKEN
138 ROBERT K. NORCROSS
139 THOMAS E. SCHIESSLE
140 GLEN McCOY
141 LESTER A. JENKINS, ET AL
135 ROBERT K. NORCROSS
138 ROBERT K. NORCROSS
FLOYD J. CODY
ARNOLD D. CODY

TEMPORARY IMPACTS IN SURFACE WATER

PROP. RETAINING WALL #34 W/CONCRETE DITCH
BEGIN -Y2- STA. 71+25±
END -Y2- STA. 72+75±

PROP. RETAINING WALL #35 W/CONCRETE DITCH
BEGIN -Y2- STA. 77+94±
END -Y2- STA. 88+25±

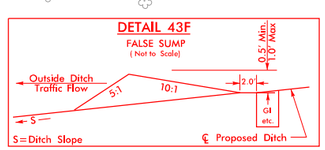
SITE 15
SITE 16
SITE 17

STREAM RESTORATION SEE DETAIL 42F
FILL 42" CMP AFTER PROPOSED SYSTEM IS IN SERVICE
REMOVE 42" CMP & DI AFTER PROPOSED SYSTEM IS IN SERVICE
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 43E
CLASS B RIP-RAP 5 TONS, 12 SY GEO
CLASS I RIPRAP 2 TONS, NO GEO
FALSE SUMP SEE DETAIL 43F
DO NOT DISTURB
PROP. DRIVE
BURY INVERT 0.7'
SINGLE FACED CONCRETE BARRIER
GRADE TO DRAIN
CLASS I RIPRAP 4 TONS, 10 SY GEO
SHOULDER BERM GUTTER -DR4- STA. 10+36, LT TO 70+50, RT
LATERAL BASE DITCH SEE DETEIL 43A DDE=200 CY
REMOVE 11 LF
ROD AND LUG WITH GASKETS (ELBOWS)
MAX 1.0% PIPE SLOPE THIS SIDE OF ELBOW
CLASS B RIPRAP 3 TONS, 11 SY GEO
RIPRAP AT EMBANKMENT SEE DETAIL 43C CLASS I RIPRAP 6 TONS, NO GEO
STANDARD BASE DITCH SEE DETAIL 43B CLASS I RIPRAP 18 TONS, NO GEO DDE=50 CY
FLOODPLAIN BENCH SEE DETAIL 43G 570 SY COIR FIBER MATTING DDE=270 CY
STREAM RESTORATION SEE DETAIL 43D CLASS II RIPRAP 60 TONS DDE=30 CY
TB PRECAST DRAINAGE STRUCTURE w/2GI STD 840.46
SPEC. DSK TB 2GI-A
ABANDON
DO NOT DISTURB ROCK WALL OR STEPS
NOTE: MATCH PAVEMENT SLOPE TO EXISTING SLOPE
END CONSTRUCTION -Y2A- STA. 11+25.00

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50' 100'
25'

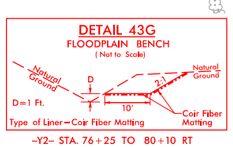
DETAIL 43F
FALSE SUMP
(Not to Scale)



S=Ditch Slope

-Y2- STA. 74+13 LT
-Y2- STA. 74+15 RT

DETAIL 43G
FLOODPLAIN BENCH
(Not to Scale)



Type of Liner=Coir Fiber Matting

-Y2- STA. 76+25 TO 80+10 RT

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

FOR -Y2- PROFILE, SEE SHEET NO. 73

12/1/2021
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User:richard

8/17/99

REVISIONS

MATCH LINE STA –Y2– 96+00.00
MATCH TO SHEET NO. 44

MATCH LINE STA –Y2– 110+00.00
MATCH TO SHEET NO. 46

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

DENOTES EXCAVATION IN WETLAND

DENOTES HAND CLEARING

DENOTES FILL IN WETLAND

HAND CLEARING IN WETLANDS

EXCAVATION IN WETLANDS

FILL IN WETLANDS

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE–IN PER CROSS–SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

METES & BOUNDS

From	To	Direction	Dist.
A	B	N 07°53'20" E	17.13'
B	C	N 10°35'28" E	23.71'
C	D	N 32°56'27" E	21.45'
D	E	S 21°07'17" W	24.54'

PERMIT DRAWING
SHEET 20 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	45
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NAD 83/2011

SCALE: 1"=50'

BEGIN CONSTRUCTION
–Y3– STA. 10+50.00

–L–/–Y3– INTERSECTION

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

SITE 18

SITE 19

SITE 20

SITE 21

SITE 22

PROP. DRIVE

PROP. CONCRETE DRIVE

10' MULTIUSE PATH W/ TIMBER RAIL FENCE

SHOT ROCK
–Y2– STA. 102+70 TO 103+95, RT
SEE DETAIL SHT 2_–

SHOT ROCK
–Y2– STA. 108+45 TO 110+05, RT
SEE DETAIL SHT 2_–

RIPRAP AT EMBANKMENT
SEE DETAIL 45H
CLASS II RIPRAP
35 TONS, NO GEO

FOLLOWING CULVERT INSTALLATION, CONTRACTOR SHALL RESTORE STECOAH RD. TO EXISTING GRADE WHILE UTILIZING 3' TURF SHOULDERS AND 3:1 MAX FILL SLOPES

JOSEPH L. EDWARDS (146)

GREGORY D. BURCHFIELD (147)

WILLIAM CARR (148)

AARON E. FARLEY (150)
DB 288 PG 202

ROANNE GORDON (149)

JEFFERY HYDE, ET AL

ODELL LOVIN

LEONARD BRIDGES

JAIME J. HOOPER

UT TO STECOAH CREEK (SCB)

STECOAH CREEK

CARVER BRANCH

UT TO EDWARDS BRANCH (SBV)

STECOAH BAPTIST CHURCH

50' 0' 50' 100'
25'

DETAIL 45G
UP AND DOWNSTREAM FLOODPLAIN BENCH
(Not to Scale)
EST. 24 CY DDE
EST. 54 TONS CLASS I RIP RAP
–Y2– STA. 99+76 LT (U/S LENGTH=24 FT)
–Y2– STA. 99+90 RT (D/S LENGTH=12 FT)

DETAIL 45A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
2:1
D
4:1 or Flatter
Front Ditch Slope
Min. D=2 Ft.
–Y3– STA. 11+50 TO 12+00 RT
SEE PFL FOR DITCH GRADE (7.6%)

DETAIL 45B
STANDARD 'V' DITCH
(Not to Scale)
Natural Ground
2:1
D
2:1
Natural Ground
Min. D=1.5 Ft.
–Y3– STA. 12+00(29' LT) TO 12+00(54' LT)
DAYLIGHT AT 1.0% SLOPE

DETAIL 45C
FALSE SUMP
(Not to Scale)
1.5' Min.
Outside Ditch Traffic Flow
4:1
4:1
PIPE
S
S=Ditch Slope
℄ Proposed Ditch
–Y3– STA. 12+10 RT

DETAIL 45D
CHANNEL CHANGE
(Not to Scale)
Natural Ground
D
2:1
2:1
Natural Ground
CLASS I RIP-RAP KEYED-IN (TYP.)
Exist. Channel
B
Length=22 Ft.
Min. D=3.0 Ft.
B=5 Ft.
Type of Liner=CLASS II RIPRAP 25 TONS
–Y2– STA 109+73(57' LT) TO 109+81(37' LT)
SEE PFL FOR CHANNEL CHANGE GRADE (15%)

DETAIL 45E
SPECIAL BERM
(Not to Scale)
10'
2:1
2:1
ELEV=2002 ft
Pipe Inlet
Exist. Ground
–Y2– STA. 109+98 LT

DETAIL 45F
CHANNEL CHANGE
(Not to Scale)
b
Natural Ground
2:1
D
2:1
Proposed Fill Slope
Natural Ground
1'/Ft.
B
Exist. Channel
Min. D=2 Ft.
B=3 Ft.
Min. b=3 Ft.
Type of Liner=Grass
–Y2– STA 99+04 TO 99+74 LT
SEE PFL FOR CHANNEL CHANGE GRADE (0.5%)

DETAIL 45H
RIPRAP AT EMBANKMENT
(Not to Scale)
L
Pipe Outlet
2' Keyed-in
Length=18 ft
Type of Liner=Class II Rip-Rap
–Y2– STA. 109+81 RT

DETAIL 45I
UP AND DOWNSTREAM FLOODPLAIN BENCH
(Looking Downstream, Not to Scale)
EST. 20 CY DDE
EST. 42 TONS CLASS II RIP RAP
–Y2– STA. 98+12 TO 98+39 RT (U/S L=27 FT)
–Y2– STA. 98+89 TO 99+12 RT (D/S L=23 FT)

SA ELIGIBLE AND UNASSESSED SITES

FOR –Y2– PROFILE, SEE SHEET NO. 74

FOR –Y3– PROFILE, SEE SHEET NO. 77

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User:richard

8/17/99

REVISIONS

MATCH LINE STA –Y2– 96+00.00
MATCH TO SHEET NO. 44

MATCH LINE STA –Y2– 110+00.00
MATCH TO SHEET NO. 46

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

DENOTES EXCAVATION IN WETLAND

DENOTES HAND CLEARING

DENOTES FILL IN WETLAND

HAND CLEARING IN WETLANDS

EXCAVATION IN WETLANDS

FILL IN WETLANDS

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE–IN PER CROSS–SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

METES & BOUNDS

From	To	Direction	Dist.
A	B	N 07°53'20" E	17.13'
B	C	N 10°35'28" E	23.71'
C	D	N 32°56'27" E	21.45'
D	E	S 21°07'17" W	24.54'

PERMIT DRAWING
SHEET 21 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A–0009CC	45
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NAD 83/2011

BEGIN CONSTRUCTION
–Y3– STA. 10+50.00

–L–/–Y3– INTERSECTION

SCALE: 1"=50'

PROP. DRIVE

TEMPORARY IMPACTS IN SURFACE WATER

SITE 18

SITE 19

SITE 20

SITE 21

SITE 22

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

CLASS B RIPRAP 3 TONS, 10 SY GEO

SPECIAL CUT DITCH SEE DETAIL 45A

STANDARD "V" DITCH SEE DETAIL 45B DDE=15 CY

FALSE SUMP SEE DETAIL 45C

CHANNEL CHANGE SEE DETAIL 45F DDE=125 CY

CLASS I RIPRAP (KEYED–IN) BANK STABILIZATION 14 TONS

BURY INVERT 0.5'

RETAIN

FLOODPLAIN BENCH SEE DETAIL 45G

CHANNEL CHANGE SEE DETAIL 45D DDE=15 CY

SPECIAL BERM SEE DETAIL 45E

DO NOT BURY INVERT

RETAIN TO HERE

REMOVE 22 LF

10' MULTIUSE PATH W/ TIMBER RAIL FENCE

SILLS & BAFFLES (TYP.)

FOLLOWING CULVERT INSTALLATION, CONTRACTOR SHALL RESTORE STECOAH RD. TO EXISTING GRADE WHILE UTILIZING 3' TURF SHOULDERS AND 3:1 MAX FILL SLOPES

SHOT ROCK –Y2– STA. 102+70 TO 103+95, RT SEE DETAIL SHT 2_–

SHOT ROCK –Y2– STA. 108+45 TO 110+05, RT SEE DETAIL SHT 2_–

RIPRAP AT EMBANKMENT SEE DETAIL 45H CLASS II RIPRAP 35 TONS, NO GEO

PROP. CONCRETE DRIVE

PROP. DRIVE

FLOWABLE FILL

CB–G REMOVE

PLUG

CB–F

CB–G

15" RCP–IV

18" RCP–IV

ELBOW 15" RCP–IV

42"

18"

GTD 15" RCP–IV

UT TO STECOAH CREEK (SCB)

STECOAH CREEK

UT TO EDWARDS BRANCH (SBV)

CARVER BRANCH

10' MULTIUSE PATH W/TIMBER RAIL FENCE

JOSEPH L. EDWARDS

GREGORY D. BURCHFIELD

WILLIAM CARR

AARON E. FARLEY
DB 288 PG 202

ROANNE GORDON (BY WILL)

LEONARD BRIDGES

ODELL LOVIN

JEFFERY HYDE, ET AL

STECOAH BAPTIST CHURCH

JAIME J. HOOPER

50' 0' 50' 100'
25'

DETAIL 45G
UP AND DOWNSTREAM FLOODPLAIN BENCH
(Not to Scale)

EST. 24 CY DDE
EST. 54 TONS CLASS I RIP RAP

–Y2– STA. 99+76 LT (U/S LENGTH=24 FT)
–Y2– STA. 99+90 RT (D/S LENGTH=12 FT)

DETAIL 45A
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground, 2:1, D, 4:1 or Flatter, Front Ditch Slope
Min. D=2 Ft.

–Y3– STA. 11+50 TO 12+00 RT
SEE PFL FOR DITCH GRADE (7.6%)

DETAIL 45B
STANDARD "V" DITCH
(Not to Scale)

Natural Ground, 2:1, D, 2:1, Natural Ground
Min. D=1.5 Ft.

–Y3– STA. 12+00(29' LT) TO 12+00(54' LT)
DAYLIGHT AT 1.0% SLOPE

DETAIL 45C
FALSE SUMP
(Not to Scale)

1.5' Min., Outside Ditch Traffic Flow, 4:1, 4:1, PIPE, S, S=Ditch Slope, ℄ Proposed Ditch

–Y3– STA. 12+10 RT

DETAIL 45D
CHANNEL CHANGE
(Not to Scale)

Natural Ground, D, 2:1, 2:1, Natural Ground, B, Exist. Channel
CLASS I RIP–RAP KEYED–IN (TYP.)
Length=22 Ft.
Min. D=3.0 Ft.
B=5 Ft.
Type of Liner=CLASS II RIPRAP 25 TONS

–Y2– STA 109+73(57' LT) TO 109+81(37' LT)
SEE PFL FOR CHANNEL CHANGE GRADE (15%)

DETAIL 45E
SPECIAL BERM
(Not to Scale)

10', 2:1, 2:1, ELEV=2002 ft, Pipe Inlet, Exist. Ground

–Y2– STA. 109+98 LT

DETAIL 45F
CHANNEL CHANGE
(Not to Scale)

Natural Ground, 2:1, D, 2:1, b, Proposed Fill Slope, Natural Ground, B, Exist. Channel
1'/Ft.
Min. D=2 Ft.
B=3 Ft.
Min. b=3 Ft.
Type of Liner=Grass

–Y2– STA 99+04 TO 99+74 LT
SEE PFL FOR CHANNEL CHANGE GRADE (0.5%)

DETAIL 45H
RIPRAP AT EMBANKMENT
(Not to Scale)

L, Pipe Outlet, 2' Keyed–in
Length=18 ft
Type of Liner=Class II Rip–Rap

–Y2– STA. 109+81 RT

DETAIL 45I
UP AND DOWNSTREAM FLOODPLAIN BENCH
(Looking Downstream, Not to Scale)

EST. 20 CY DDE
EST. 42 TONS CLASS II RIP RAP

–Y2– STA. 98+12 TO 98+39 RT (U/S L=27 FT)
–Y2– STA. 98+89 TO 99+12 RT (D/S L=23 FT)

SA ELIGIBLE AND UNASSESSED SITES

FOR –Y2– PROFILE, SEE SHEET NO. 74

FOR –Y3– PROFILE, SEE SHEET NO. 77

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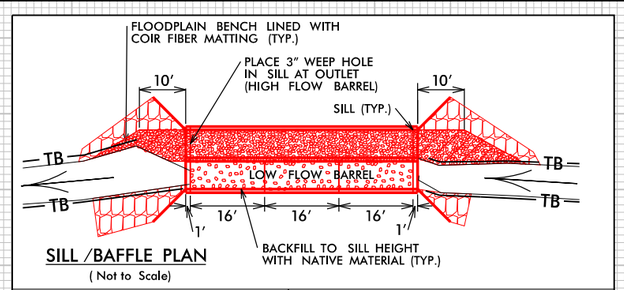
User:richard

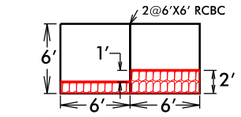


SILL /BAFFLE PLAN

(Not to Scale)

SILL DETAIL

(Not to Scale)



NOTES:

1) TOP OF SILLS AT EACH END OF LOW FLOW BARREL SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL. IF RIP RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL, NATIVE MATERIAL SHALL BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

–Y3A–
NC 28

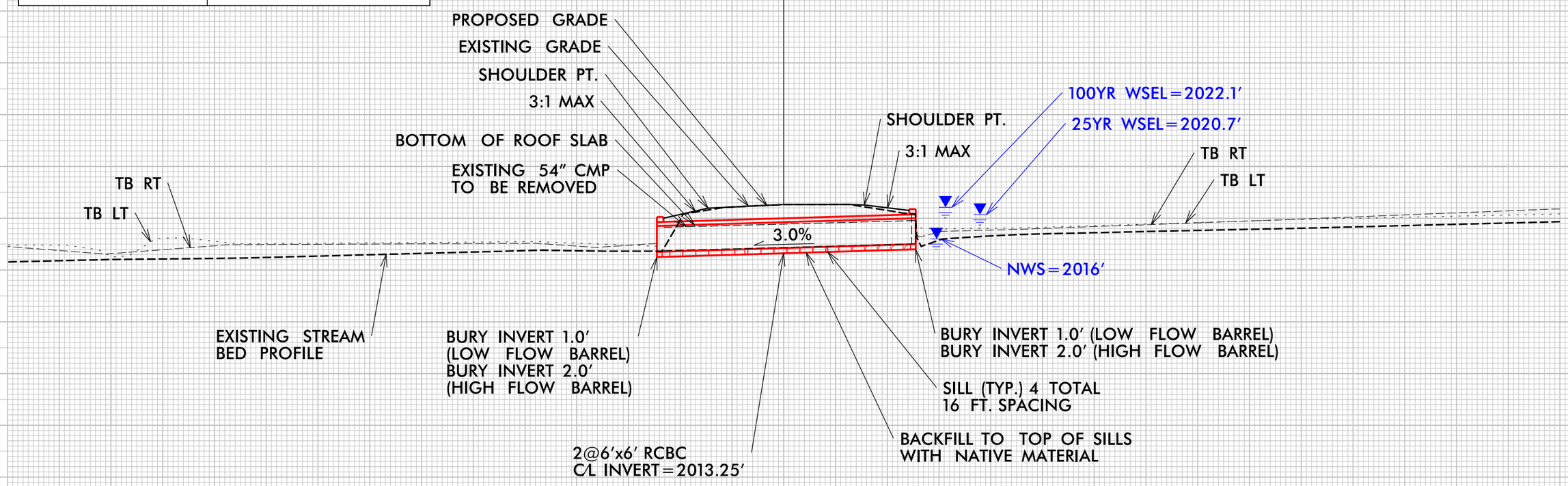
PERMIT DRAWING
SHEET 22 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

℄ –Y3A– STA 10+67
2@ 6'x6' RCBC
BURIED 1.0' & 2.0'
PROP. GRADE=2022.6'
SKEW=90 DEG.



PROFILE ALONG STRUCTURE

SITE 20

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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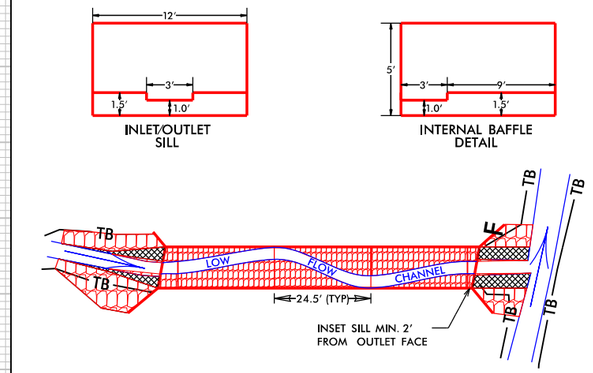
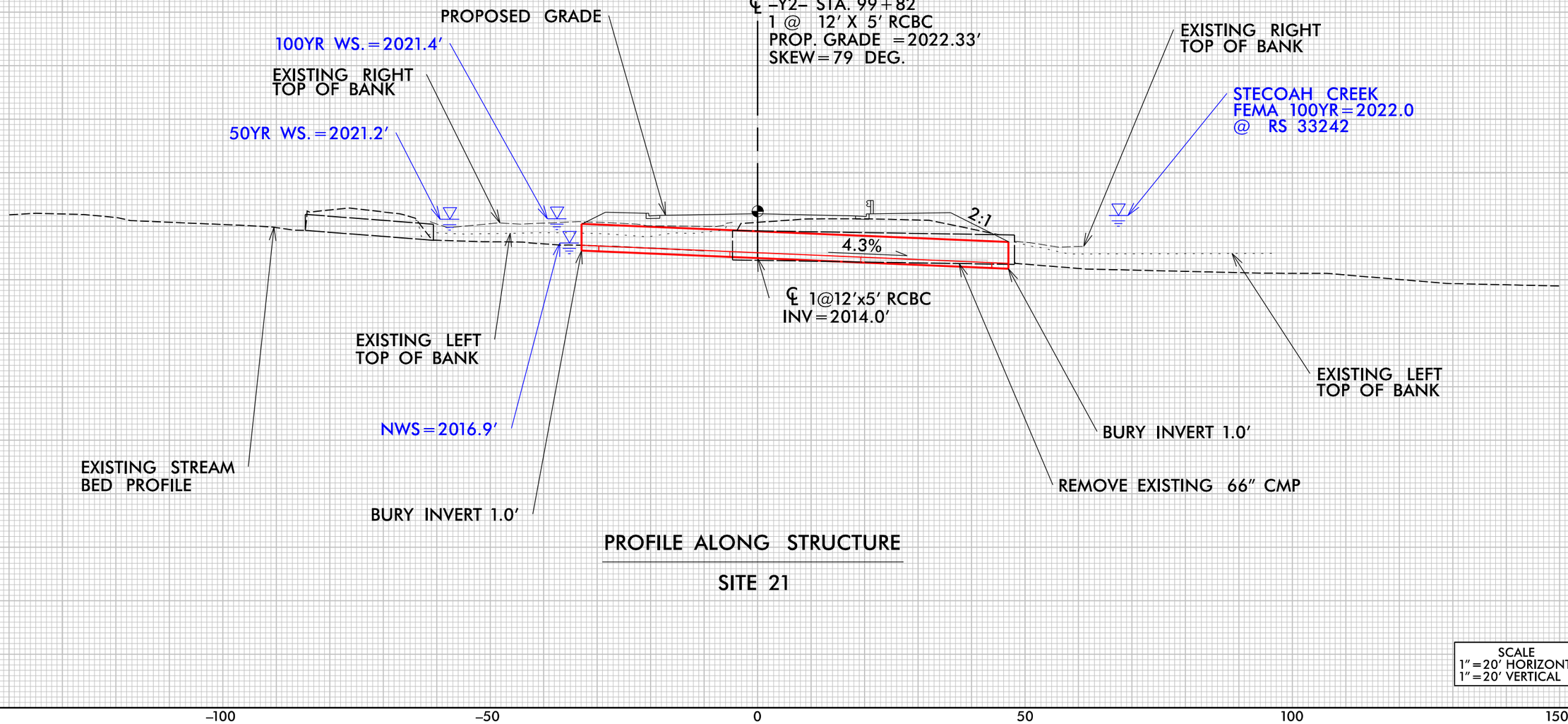
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 23 OF 34

–Y2–
NC 28

CULVERT SILL DETAIL
NOT TO SCALE





PROFILE ALONG STRUCTURE

SITE 21

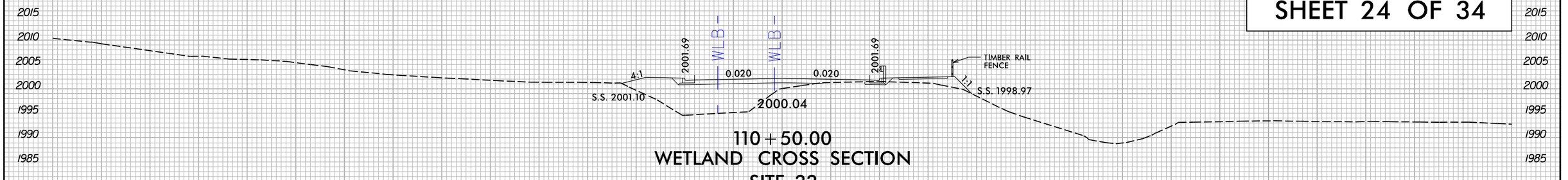
SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

6/23/16

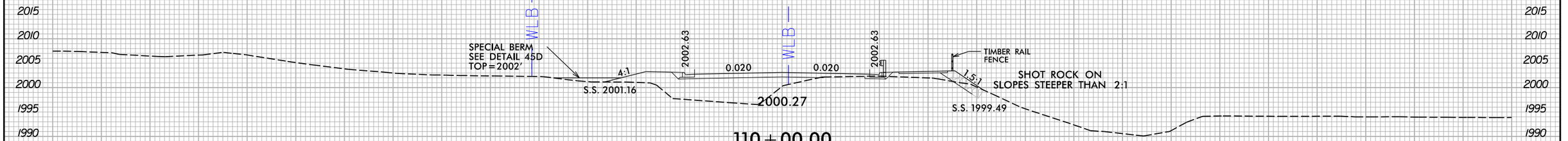
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CC	X-221

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

PERMIT DRAWING
SHEET 24 OF 34



110+50.00
WETLAND CROSS SECTION
SITE 22



110+00.00
WETLAND CROSS SECTION
SITE 22

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

-Y2-

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

11/1/2021
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User:rrichard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	46
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NAD 83/2011

REVISIONS 8/17/99

PERMIT DRAWING SHEET 25 OF 34

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S DENOTES IMPACTS IN SURFACE WATER
E E DENOTES EXCAVATION IN WETLAND
HC HC DENOTES HAND CLEARING
F F DENOTES FILL IN WETLAND

MATCH LINE STA -Y2- 110+00.00
MATCH TO SHEET NO. 45

MATCH LINE STA -Y2- 124+00.00
MATCH TO SHEET NO. 47

FILL IN WETLANDS

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

SITE 22

SITE 23

SITE 24

SITE 25

150 AARON E. HARLEY

151 DANA KILBY

152 RANDALL WILSON, ET AL DB 343 PG 632

DANNY JENKINS

LEONDUS McCRACKEN

JAIME J. HOOPER

BILLY HOLDER

JAMES R. HYDE, TRUSTEE

DAVID R. HYDE

PROP. DRIVE

REMOVE HW

TOE PROTECTION SEE DETAIL 46E CLASS B RIPRAP 68 TONS, 150 SY GEO

ROD AND LUG WITH GASKETS (ELBOWS)

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

ROCK FILL IN POND SEE DETAIL 46A NATURAL RIPRAP 385 TONS

FILL EXISTING CHANNEL W/ COMPACTED BACKFILL

CHANNEL CHANGE SEE DETAIL 46B DDE=135 CY

CLASS B RIPRAP 3 TONS, 11 SY GEO

CLASS B RIPRAP 1 TONS, 5 SY GEO

CLASS B RIPRAP 1 TON, 5 SY GEO

24" RCP-IV

15" RCP-IV

18" RCP-IV

SPEC DSN TB 2GI-A

TB 2GI

GRADE TO DRAIN

DI

CB-E

CB-G

CB-F

24" CS

PLUG

FLOWABLE FILL

ELBOWS

DO NOT BURY INVERT

RIPRAP AT EMBANKMENT SEE DETAIL 46C CLASS II RIPRAP 20 TONS, NO GEO

REMOVE R/R

SHOT ROCK -Y2- STA. 115+25 TO 116+75, RT SEE DETAIL SHT. 2_--

SHOT ROCK -Y2- STA. 117+75 TO 128+25, RT SEE DETAIL SHT. 2 --

10' MULTIUSE PATH W/ TIMBER RAIL FENCE

FLOODPLAIN BENCH SEE DETAIL 46D 470 SY COIR FIBER MATTING DDE=345 CY

CLASS I RIPRAP 2 TON, 6 SY GEO

UT TO STECOAH CREEK (SCU)

STECOAH CREEK

SR 1235 (LOWER STECOAH RD)

NC 28 (FONTANA RD)

24" BST

24" CMP

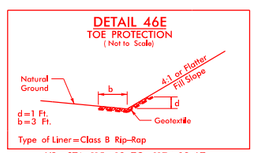
24" ROCK WALL

48" CROSS TIE WALL

POND (PL)

POND (PH)

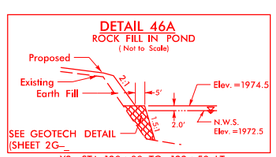
DETAIL 46E
TOE PROTECTION
(Not to Scale)



Type of Liner=Class B Rip-Rap

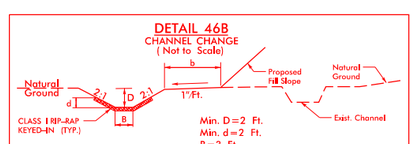
-Y2- STA 115+18 TO 117+08 LT

DETAIL 46A
ROCK FILL IN POND
(Not to Scale)



-Y2- STA. 120+00 TO 122+50 LT

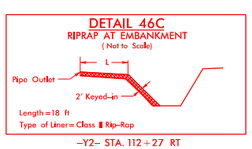
DETAIL 46B
CHANNEL CHANGE
(Not to Scale)



Type of Liner=Class I Riprap 175 TONS

-Y2- STA. 123+47 TO 125+20 LT
SEE PFL FOR CHANNEL CHANGE GRADE (3.56%)

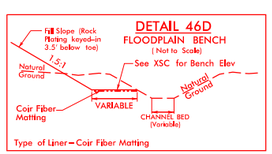
DETAIL 46C
RIPRAP AT EMBANKMENT
(Not to Scale)



Type of Liner=Class II Rip-Rap

-Y2- STA. 112+27 RT

DETAIL 46D
FLOODPLAIN BENCH
(Not to Scale)



Type of Liner=Coir Fiber Matting

-Y2- STA. 123+25 TO 126+25 RT

50' 0' 50' 100'
25'

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PROP MONOLITHIC CONC ISLAND - SURFACE MOUNTED

FOR -Y2- PROFILE, SEE SHEET NO. 46

11/1/2021
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User:richard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	46
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

NAD 83/2011

PERMIT DRAWING
SHEET 26 OF 34

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S DENOTES IMPACTS IN SURFACE WATER
E E DENOTES EXCAVATION IN WETLAND
HC HC DENOTES HAND CLEARING
F F DENOTES FILL IN WETLAND

FILL IN WETLANDS

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

MATCH LINE STA -Y2- 110+00.00
MATCH TO SHEET NO. 45

MATCH LINE STA -Y2- 124+00.00
MATCH TO SHEET NO. 47

REVISIONS 8/17/99

150 AARON E. PARLEY

151 DANA KILBY

152 RANDALL WILSON, ET AL DB 343 PG 632

DANNY JENKINS

LEONDUS McCRACKEN

JAMES R. HYDE, TRUSTEE

DAVID R. HYDE

JAIME J. HOOPER

BILLY HOLDER

SITE 22

SITE 23

SITE 24

SITE 25

PROP. DRIVE

REMOVE HW

REMOVE & RE-SET

TOE PROTECTION
SEE DETAIL 46E
CLASS B RIPRAP
68 TONS, 150 SY GEO

ROD AND LUG WITH GASKETS (ELBOWS)

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

CLASS B RIPRAP
3 TONS, 11 SY GEO

CLASS B RIPRAP
1 TONS, 5 SY GEO

ROCK FILL IN POND
SEE DETAIL 46A
NATURAL RIPRAP
385 TONS

FILL EXISTING CHANNEL W/ COMPACTED BACKFILL

CHANNEL CHANGE
SEE DETAIL 46B
DDE=135 CY

GRADE TO DRAIN

15" RCP-IV

18" RCP-IV

24" RCP-IV

24" CS

TB 2GI

SPEC DSN TB 2GI-A

CB-E

CB-G

CB-F

PLUG

FLOWABLE FILL

ELBOWS

DO NOT BURY INVERT

RIPRAP AT EMBANKMENT
SEE DETAIL 46C
CLASS II RIPRAP
20 TONS, NO GEO

CLASS B RIPRAP
1 TON, 5 SY GEO

SHOT ROCK
-Y2- STA. 115+25 TO 116+75, RT
SEE DETAIL SHT. 2_-_

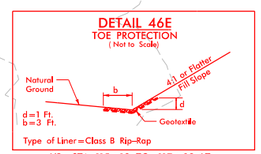
SHOT ROCK
-Y2- STA. 117+75 TO 128+25, RT
SEE DETAIL SHT. 2_-_

CLASS I RIPRAP
2 TON, 6 SY GEO

FLOODPLAIN BENCH
SEE DETAIL 46D
470 SY COIR FIBER MATTING
DDE=345 CY

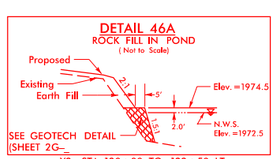
10' MULTIUSE PATH W/ TIMBER RAIL FENCE

DETAIL 46E
TOE PROTECTION
(Not to Scale)



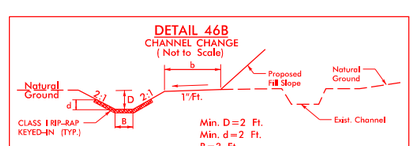
Type of Liner=Class B Rip-Rap
-Y2- STA 115+18 TO 117+08 LT

DETAIL 46A
ROCK FILL IN POND
(Not to Scale)



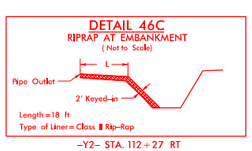
-Y2- STA. 120+00 TO 122+50 LT

DETAIL 46B
CHANNEL CHANGE
(Not to Scale)



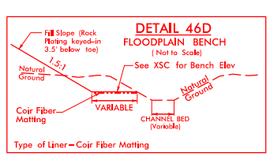
Type of Liner=Class I Riprap
175 TONS
Min. D=2 Ft.
Min. d=2 Ft.
B=3 Ft.
b=5 Ft.
-Y2- STA. 123+47 TO 125+20 LT
SEE PFL FOR CHANNEL CHANGE GRADE (3.56%)

DETAIL 46C
RIPRAP AT EMBANKMENT
(Not to Scale)



Type of Liner=Class II Rip-Rap
-Y2- STA. 112+27 RT

DETAIL 46D
FLOODPLAIN BENCH
(Not to Scale)



Type of Liner=Coir Fiber Matting
-Y2- STA. 123+25 TO 126+25 RT

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

50' 0' 50' 100'
25'

PROP MONOLITHIC CONC ISLAND - SURFACE MOUNTED

FOR -Y2- PROFILE, SEE SHEET NO. 46

11/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSH\A-0009CC_Hyd_prm_psh_46.dgn
User:richard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	47
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

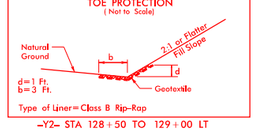
PERMIT DRAWING
SHEET 27 OF 34

8/17/99

REVISIONS

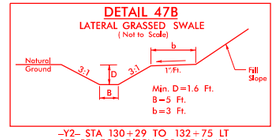
-Y2- CURVE DATA
PI Sta 132+08.73
Δ = 30° 56' 09.8" (LT)
D = 4° 48' 53.2"
L = 642.52'
T = 329.30'
R = 1190.00'
SE = 0.04
DS = 55 MPH

DETAIL 47A
TOE PROTECTION
(Not to Scale)



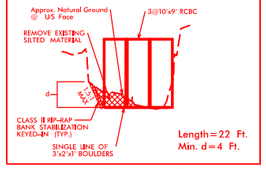
Type of Liner= Class B Rip-Rap
-Y2- STA 128+50 TO 129+00 LT

DETAIL 47B
LATERAL GRASSED SWALE
(Not to Scale)



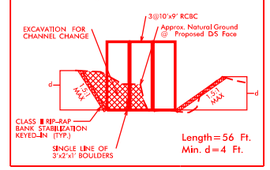
-Y2- STA 130+29 TO 132+75 LT
SEE PFL FOR DITCH GRADE (0.4%)

DETAIL 47C
CULVERT INLET CHANNEL DETAIL
Looking Downstream (Not to Scale)



-Y2- STA. 128+47 RT

DETAIL 47D
CULVERT OUTLET CHANNEL DETAIL
Looking Downstream (Not to Scale)



-Y2- STA. 129+26 LT

DETAIL 47E
SPECIAL CUT DITCH
(Not to Scale)



-Y2- STA 129+00 TO 132+06 RT
SEE PFL FOR DITCH GRADE (1.34%)

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

NAD 83/2011

MATCH LINE STA -Y2- 124+00.00
MATCH TO SHEET NO. 46

MATCH LINE STA -Y2- 138+00.00
MATCH TO SHEET NO. 48

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

SITE 24

SITE 25

SITE 26

SITE 26

CHANNEL CHANGE SEE DETAIL 46B

PROP. DRIVE

CLASS B RIPRAP 1 TONS, 5 SY GEO

BANK STABILIZATION SEE CULVERT OUTLET CHANNEL DETAIL 47D 85 TONS CLASS II

CHANNEL CHANGE/ BENCH ELEV=1951.4'

SINGLE LINE OF 3'x2'x1' BOULDERS TO MAINTAIN LOW FLOW IN EASTERNMOST BARRELS 10 TONS

TOE PROTECTION SEE DETAIL 47A CLASS B RIPRAP 13 TONS, 28 SY GEO

LATERAL GRASSED SWALE SEE DETAIL 47B DDE=320 CY

EXCAVATION DDE 77 CY

CLASS B RIPRAP 3 TONS, 7 SY GEO

CLASS B RIPRAP 3 TONS, 7 SY GEO

REMOVE 30 LF

ROD AND LUG WITH GASKETS (ELBOWS)

CLASS I RIPRAP 11 TONS,22 SY GEO

PROP. DRIVE

DO NOT DISTURB SIGN

FLOODPLAIN BENCH SEE DETAIL 46D

SHOT ROCK -Y2- STA. 117+75 TO 128+25, RT SEE DETAIL SHT. 2_-_

10' MULTIUSE PATH W/TIMBER RAIL FENCE

CLASS I RIPRAP 2 TON, 6 SY GEO

BANK STABILIZATION SEE CULVERT INLET CHANNEL DETAIL 47C 15 TONS CLASS II

SINGLE LINE OF 3'x2'x1' BOULDERS TO MAINTAIN LOW FLOW IN EASTERNMOST BARRELS 5 TONS

EXCAVATION DDE 17 CY

GRADE TO DRAIN

RETAIN AND EXTEND D'S WITH 3@10'x9' RCBC

REMOVE EXISTING SILTED MATERIAL FROM ALL BARRELS DDE 157 CY

SPECIAL CUT DITCH SEE DETAIL 47E

REMOVE

TB 2GI

SHOULDER BERM GUTTER -Y2- STA. 133+32 TO 133+60, RT

DOUBLE FACED CONCRETE BARRIER TYPE T-2

PROP. DRIVE

10' MULTIUSE PATH W/TIMBER RAIL FENCE

CLASS B RIPRAP 3 TONS, 10 SY GEO

CLASS B RIPRAP 2 TONS, 7 SY GEO

JAMES R. HYDE, TRUSTEE

DAVID R. HYDE

WILLIAM D. IVEY

WILLIAM M. HYDE

JAMES R. HYDE, TRUSTEE

GRAHAM WELL DRILLING, LLC

KICKSTAND LODGE, LTD.

CIRCLE G MANAGEMENT, LLC

MICHAEL CABLE, ET AL

RANDALL WILSON, ET AL

UT TO STECOAH CREEK (SCD)

STECOAH CREEK

POND (PG)

NC 28 (FONTANA RD)

SR 1230 (HYDE TOWN RD)

WOODS

50' 0' 50' 100'
25'

FOR -Y2- PROFILE, SEE SHEET NO. 75

11/1/2021
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User:richard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	47
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

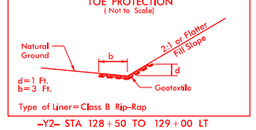
PERMIT DRAWING SHEET 28 OF 34

8/17/99

REVISIONS

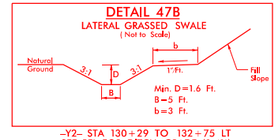
-Y2- CURVE DATA
PI Sta 132+08.73
Δ = 30° 56' 09.8" (LT)
D = 4° 48' 53.2"
L = 642.52'
T = 329.30'
R = 1,190.00'
SE = 0.04
DS = 55 MPH

DETAIL 47A
TOE PROTECTION
(Not to Scale)



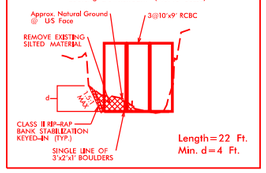
-Y2- STA 128+50 TO 129+00 LT

DETAIL 47B
LATERAL GRASSED SWALE
(Not to Scale)



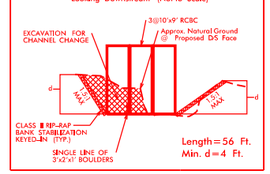
-Y2- STA 130+29 TO 132+75 LT
SEE PFL FOR DITCH GRADE (0.4%)

DETAIL 47C
CULVERT INLET CHANNEL DETAIL
Looking Downstream (Not to Scale)



-Y2- STA. 128+47 RT

DETAIL 47D
CULVERT OUTLET CHANNEL DETAIL
Looking Downstream (Not to Scale)



-Y2- STA. 129+26 LT

DETAIL 47E
SPECIAL CUT DITCH
(Not to Scale)



-Y2- STA 129+00 TO 132+06 RT
SEE PFL FOR DITCH GRADE (1.34%)

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

MATCH LINE STA -Y2- 124+00.00
MATCH TO SHEET NO. 46

MATCH LINE STA -Y2- 138+00.00
MATCH TO SHEET NO. 48

NAD 83/2011

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

SITE 24

SITE 25
10' MULTIUSE PATH W/TIMBER RAIL FENCE

SITE 26

SITE 26

CHANNEL CHANGE SEE DETAIL 46B

PROP. DRIVE

CLASS B RIPRAP 1 TONS, 5 SY GEO

BANK STABILIZATION SEE CULVERT OUTLET CHANNEL DETAIL 47D 85 TONS CLASS II

CHANNEL CHANGE/ BENCH ELEV=1951.4'

SINGLE LINE OF 3'x2'x1' BOULDERS TO MAINTAIN LOW FLOW IN EASTERNMOST BARRELS 10 TONS

TOE PROTECTION SEE DETAIL 47A CLASS B RIPRAP 13 TONS, 28 SY GEO

LATERAL GRASSED SWALE SEE DETAIL 47B DDE=320 CY

EXCAVATION DDE 77 CY

CLASS B RIPRAP 3 TONS, 7 SY GEO

CLASS B RIPRAP 3 TONS, 7 SY GEO

CLASS I RIPRAP 11 TONS,22 SY GEO

PROP. DRIVE

DO NOT DISTURB SIGN

REMOVE 30 LF

ROD AND LUG WITH GASKETS (ELBOWS)

ELBOWS

ELBOWS

ELBOWS

GRADE TO DRAIN

GRADE TO DRAIN

GRADE TO DRAIN

RETAIN AND EXTEND D/S WITH 3@10'x9' RCBC

SPECIAL CUT DITCH SEE DETAIL 47E

REMOVE

REMOVE

REMOVE

REMOVE EXISTING SILTED MATERIAL FROM ALL BARRELS DDE EST 10 CY

BANK STABILIZATION SEE CULVERT INLET CHANNEL DETAIL 47C 15 TONS CLASS II

SINGLE LINE OF 3'x2'x1' BOULDERS TO MAINTAIN LOW FLOW IN EASTERNMOST BARRELS 5 TONS

CLASS I RIPRAP 2 TON, 6 SY GEO

EXCAVATION DDE 17 CY

SHOT ROCK -Y2- STA. 117+75 TO 128+25, RT SEE DETAIL SHT. 2_-_

FLOODPLAIN BENCH SEE DETAIL 46D

CLASS B RIPRAP 3 TONS, 10 SY GEO

CLASS B RIPRAP 2 TONS, 7 SY GEO

DOUBLE FACED CONCRETE BARRIER TYPE T-2

SHOULDER BERM GUTTER -Y2- STA. 133+32 TO 133+60, RT

10' MULTIUSE PATH W/TIMBER RAIL FENCE

JAMES R. HYDE, TRUSTEE

DAVID R. HYDE

WILLIAM D. IVEY

WILLIAM M. HYDE

JAMES R. HYDE, TRUSTEE

GRAHAM WELL DRILLING, LLC

KICKSTAND LODGE, LTD.

CIRCLE G MANAGEMENT, LLC

MICHAEL CABLE, ET AL

RANDALL WILSON, ET AL

UT TO STECOAH CREEK (SCD)

STECOAH CREEK

POND (PG)

NC 28 (FONTANA RD)

SR 1230 (HYDE TOWN RD)

50' 0' 50' 100'
25'

FOR -Y2- PROFILE, SEE SHEET NO. 75

11/1/2021
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User:richard

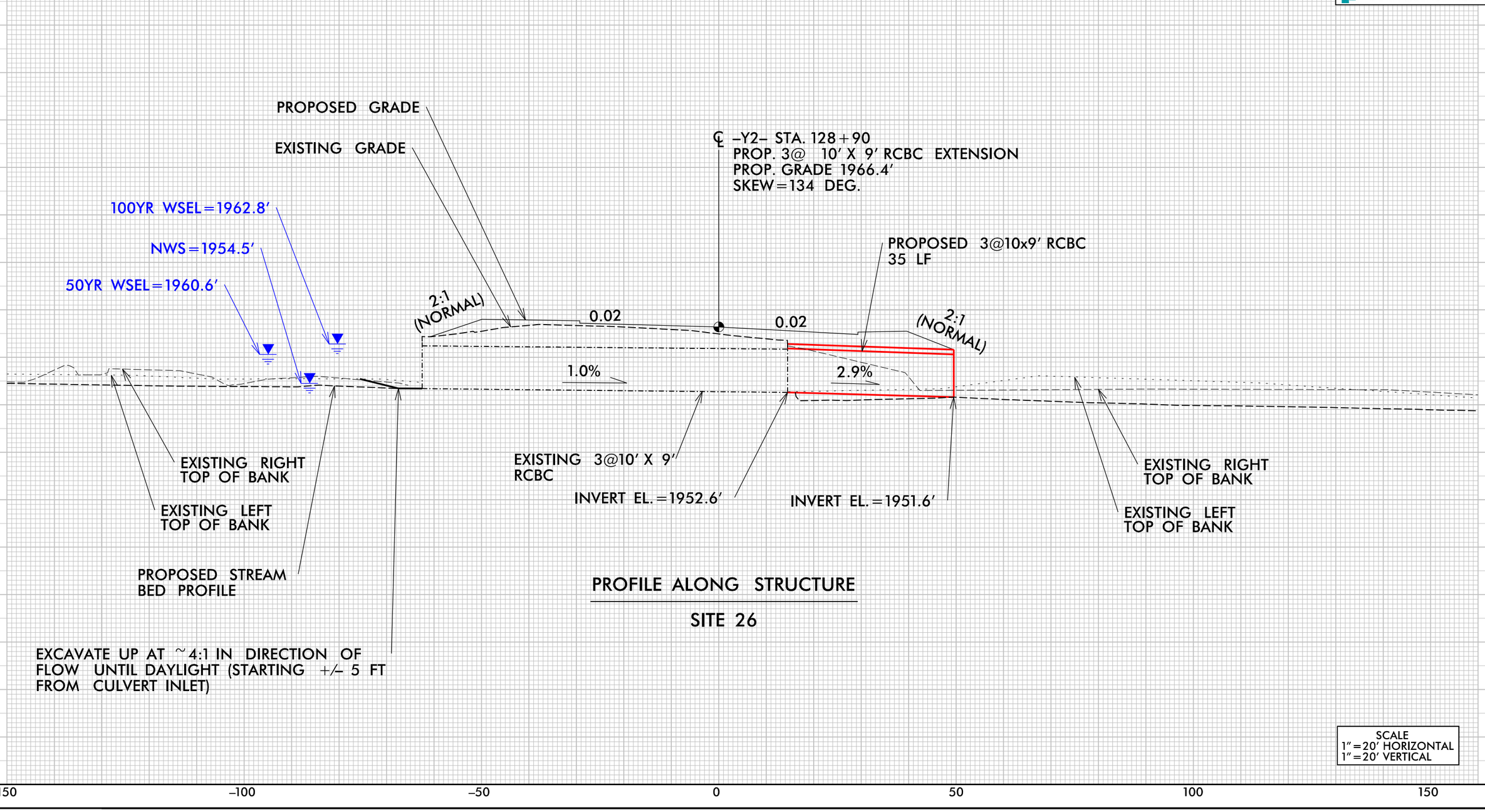
PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PERMIT DRAWING
SHEET 29 OF 34

–Y2–
NC 28



EXCAVATE UP AT ~4:1 IN DIRECTION OF FLOW UNTIL DAYLIGHT (STARTING +/– 5 FT FROM CULVERT INLET)

PROFILE ALONG STRUCTURE

SITE 26

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	48
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

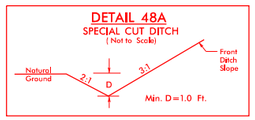
8/17/99

REVISIONS

-Y2- CURVE DATA

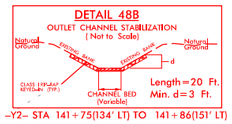
PI Sta 142+30.76	PI Sta 152+17.13
Δ = 1°24'23.1" (LT)	Δ = 5°4'14.50" (RT)
D = 0°28'38.9"	D = 5°21'17.1"
L = 294.56'	L = 1,013.07'
T = 147.29'	T = 548.10'
R = 12,000.00'	R = 1,070.00'
SE = NC	SE = 0.08
DS = 60 MPH	DS = 55 MPH

DETAIL 48A
SPECIAL CUT DITCH
(Not to Scale)



-Y2- STA. 139+00 TO 139+34 RT
SEE PFL FOR DITCH GRADE (0.5%)

DETAIL 48B
OUTLET CHANNEL STABILIZATION
(Not to Scale)



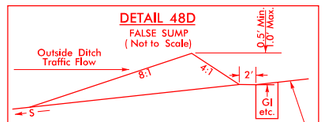
-Y2- STA 141+75(134' LT) TO 141+86(151' LT)

DETAIL 48C
SPECIAL CUT DITCH
(Not to Scale)



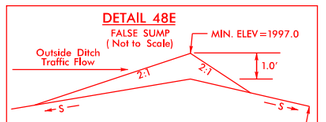
-Y2- STA. 143+50 TO 144+50 RT
SEE XSC FOR DITCH GRADE

DETAIL 48D
FALSE SUMP
(Not to Scale)



-Y2- STA. 145+87 RT
-Y2- STA. 151+10 RT

DETAIL 48E
FALSE SUMP
(Not to Scale)



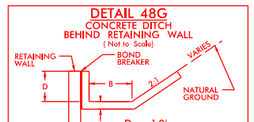
-L- STA. 142+67 RT

DETAIL 48F
TOE PROTECTION
(Not to Scale)



-Y2- STA 139+34 TO 141+09 RT
-Y2- STA 141+20 TO 142+25 RT

DETAIL 48G
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



-Y2- STA. 146+60 TO 148+80 RT
(SEE WALL ENVELOPES FOR DITCH GRADE)

NAD 83/2011

PERMIT DRAWING
SHEET 30 OF 34

MATCH LINE STA -Y2- 138+00.00
MATCH TO SHEET NO. 47

MATCH LINE STA -Y2- 152+00.00
MATCH TO SHEET NO. 49

TEMPORARY IMPACTS IN SURFACE WATER

SITE 27

IMPACTS IN SURFACE WATER

154 KICKSTAND LODGE, LTD.

156 T. J. EDWARDS

155 CIRCLE G MANAGEMENT, LLC

157 MICHAEL HOLDER

MICHAEL HOLDER

DO NOT DISTURB

PROP. DRIVE

DO NOT BURY INVERT

OUTLET CHANNEL STABILIZATION
SEE DETAIL 48B
CLASS I RIPRAP
30 TONS, NO GEO

CLASS B RIPRAP
3 TONS, 11 GEOTECH

MAX 1.0% PIPE SLOPE
THIS SIDE OF ELBOW

ROD AND LUG W/ GASKETS (ELBOWS)

CLASS B RIPRAP
3 TONS, 10 SY GEO

CLASS I RIPRAP
4 TONS, 10 GEOTECH

REMOVE 20 LF

REMOVE HW

REMOVE 18" RCP-W

JB w/Slab Lid

JB w/MH

SPECIAL CUT DITCH
SEE DETAIL 48A

FALSE SUMP
SEE DETAIL 48E

FALSE SUMP
SEE DETAIL 48D

CUT TO FILL TRANSISTION
CLASS II RIPRAP
40 TONS, 42 SY GEO

CONC. DITCH
BEHIND
RETAINING WALL
SEE DETAIL 48G

CLASS B RIP-RAP
3 TONS, 7 SY GEO

TOE PROTECTION
SEE DETAIL 48F
CLASS I RIPRAP
57 TONS, 80 SY GEO

TOE PROTECTION
SEE DETAIL 48F
CLASS I RIPRAP
80 TONS, 112 SY GEO

SPECIAL CUT DITCH
SEE DETAIL 48C
CLASS B RIPRAP
45 TONS, 100 CY GEO

PROP. RETAINING WALL #41
W/CONCRETE DITCH
BEGIN -Y2- STA. 146+60±
END -Y2- STA. 148+80±

DO NOT DISTURB PUMPS

DO NOT DISTURB SHED

CONTRACTOR TO REPAVE POPLAR HILL DRIVE IF DAMAGED DURING CONSTRUCTION

SHOULDER BERM GUTTER
-Y2- STA. 139+50 TO 142+00, RT

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

15 15 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100'
25'

FOR -Y2- PROFILE, SEE SHEET NO. 76

11/1/2021
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User:richard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	48
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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

PERMIT DRAWING
SHEET 31 OF 34

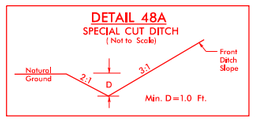
NAD 83/2011

REVISIONS 8/17/99

-Y2- CURVE DATA

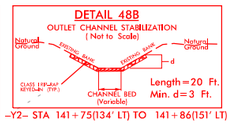
PI Sta 142+30.76	PI Sta 152+17.13
Δ = 1° 24' 23.1" (LT)	Δ = 5° 14' 50.1" (RT)
D = 0° 28' 38.9"	D = 5° 21' 17.1"
L = 294.56'	L = 1,013.07'
T = 147.29'	T = 548.10'
R = 12,000.00'	R = 1,070.00'
SE = NC	SE = 0.08
DS = 60 MPH	DS = 55 MPH

DETAIL 48A
SPECIAL CUT DITCH
(Not to Scale)



-Y2- STA. 139+00 TO 139+34 RT
SEE PFL FOR DITCH GRADE (0.5%)

DETAIL 48B
OUTLET CHANNEL STABILIZATION
(Not to Scale)



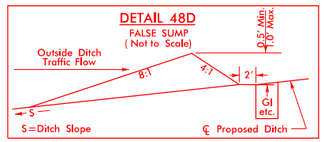
-Y2- STA 141+75(134' LT) TO 141+86(151' LT)

DETAIL 48C
SPECIAL CUT DITCH
(Not to Scale)



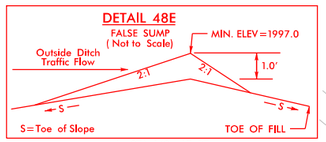
-Y2- STA. 143+50 TO 144+50 RT
SEE XSC FOR DITCH GRADE

DETAIL 48D
FALSE SUMP
(Not to Scale)



-Y2- STA. 145+87 RT
-Y2- STA. 151+10 RT

DETAIL 48E
FALSE SUMP
(Not to Scale)



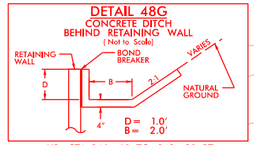
-L- STA. 142+67 RT

DETAIL 48F
TOE PROTECTION
(Not to Scale)



-Y2- STA 139+34 TO 141+09 RT
-Y2- STA 141+20 TO 142+25 RT

DETAIL 48G
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



-Y2- STA. 146+60 TO 148+80 RT
(SEE WALL ENVELOPES FOR DITCH GRADE)

MATCH LINE STA -Y2- 138+00.00
MATCH TO SHEET NO. 47

MATCH LINE STA -Y2- 152+00.00
MATCH TO SHEET NO. 49

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

SITE 27

154 KICKSTAND LODGE, LTD.

156 T. J. EDWARDS

155 CIRCLE G MANAGEMENT, LLC

157 MICHAEL HOLDER

DO NOT DISTURB

DO NOT BURY INVERT

OUTLET CHANNEL STABILIZATION
SEE DETAIL 48B
CLASS I RIPRAP
30 TONS, NO GEO

CLASS B RIPRAP
3 TONS, 11 GEOTECH

MAX 1.0% PIPE SLOPE THIS SIDE OF ELBOW

ROD AND LUG WITH GASKETS (ELBOWS)

PROP. DRIVE

REMOVE 20 LF

CLASS B RIPRAP
3 TONS, 10 SY GEO

CLASS I RIPRAP
4 TONS, 10 GEOTECH

REMOVE HW

REMOVE 16" RCP-IV

JB w/Slab Lid

JB w/MH

FALSE SUMP
SEE DETAIL 48E

FALSE SUMP
SEE DETAIL 48D

CUT TO FILL TRANSITION
CLASS II RIPRAP
40 TONS, 42 SY GEO

TOE PROTECTION
SEE DETAIL 48F
CLASS I RIPRAP
57 TONS, 80 SY GEO

CLASS B RIP-RAP
3 TONS, 7 SY GEO

SPECIAL CUT DITCH
SEE DETAIL 48A

SPECIAL CUT DITCH
SEE DETAIL 48C
CLASS B RIPRAP
45 TONS, 100 CY GEO

CONC. DITCH
BEHIND
RETAINING WALL
SEE DETAIL 48G

PROP. RETAINING WALL #41
W/CONCRETE DITCH
BEGIN -Y2- STA. 146+60±
END -Y2- STA. 148+80±

DO NOT DISTURB PUMPS

DO NOT DISTURB SHED

TOE PROTECTION
SEE DETAIL 48F
CLASS I RIPRAP
80 TONS, 112 SY GEO

SHOULDER BERM GUTTER
-Y2- STA. 139+50 TO
142+00, RT

CONTRACTOR TO REPAVE POPLAR HILL DRIVE IF DAMAGED DURING CONSTRUCTION

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100'
25'

FOR -Y2- PROFILE, SEE SHEET NO. 76

11/1/2021
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User:richard

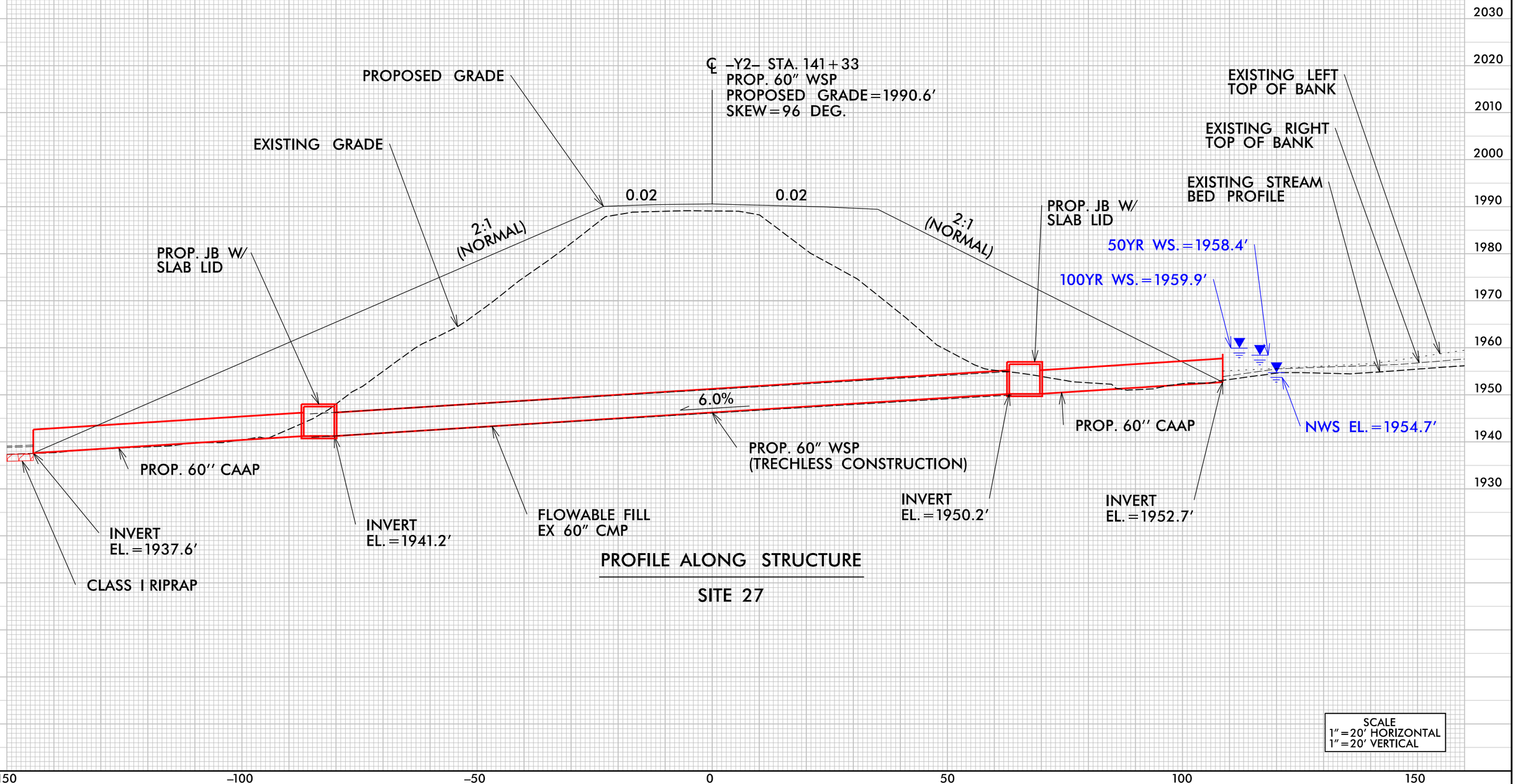
PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PERMIT DRAWING
SHEET 32 OF 34

–Y2–
NC 28



PROFILE ALONG STRUCTURE

SITE 27

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	WETLAND IMPACTS					SURFACE WATER IMPACTS					
					Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 419+21 to 419+65 LT	24" CSP/Berm Ditch	SBB							< 0.01	< 0.01	38		54	
1	-L- 419+21 to 419+44 LT	Impacts to Wetland	WBB	Medium			< 0.01		< 0.01						
2	-L- 458+23 to 458+31 LT	36" CMP Inlet	SBC								< 0.01			69	
2	-L- 458+27 to 458+53 RT	36" CMP Outlet	SBC							< 0.01	< 0.01	18		17	
3	-L- 467+36 to 467+47 LT	36" CMP Inlet	Carver Branch	Low							< 0.01			16	
3	-L- 468+02 to 468+28 RT	36" CMP Outlet	Carver Branch	Low						< 0.01	< 0.01	12		20	
4	-Y2- 13+50 to 13+73 RT	36" CMP Inlet	Johnson Gap Branch								< 0.01			27	
4	-Y2- 12+79 to 13+07 LT	36" CMP Outlet	Johnson Gap Branch							< 0.01	< 0.01		12	24	
4	-Y2- 13+06 to 13+24 LT	36" CMP Outlet	SEY								< 0.01			18	
4	-Y2- 12+60 to 12+84 LT	36" CMP Outlet	SEZ								< 0.01			24	
5	-Y2- 14+46 to 15+25 RT	36" RCP Outlet	Johnson Gap Branch								< 0.01			83	
6	-Y2- 23+52 to 23+92 RT	Roadway	SBG							< 0.01		43			
7	-Y2- 26+08 to 27+35 LT	Roadway	WBV	Low	< 0.01			< 0.01	0.02						
8	-Y2- 27+79 to 28+01 RT	48" CSP Inlet	Carver Branch	Low						< 0.01	< 0.01	22		21	
8	-Y2- 27+32 to 27+47 LT	42" & 54" Outlet Channel	Carver Branch	Low						< 0.01	< 0.01	47		11	
9	-Y2- 35+91 to 36+06 RT	48" RCP Inlet	SBC							< 0.01	< 0.01	50	8	19	
9	-Y2- 35+16 to 35+53 LT	48" CSP Outlet	SBC							< 0.01	< 0.01	14		14	
10	-Y2- 44+52 to 45+01 LT	54" CAAP Outlet Channel	SBD							< 0.01	< 0.01		23	26	
11	-Y2- 46+92 to 47+00 RT	Channel Change	SFT							< 0.01	< 0.01	4		16	
11	-Y2- 46+67 to 49+75 RT	Channel Change	SFP	Medium						0.04	< 0.01	288		29	
11	-Y2- 49+06 to 49+87 RT	48" CSP Inlet	SFH							< 0.01	< 0.01	37	20	38	
11	-Y2- 50+88 to 53+14 LT	42" CSP / Channel Change	SFH							0.03	< 0.01	240		16	
12	-Y2- 57+08 to 59+56 RT	Roadway/Toe Protection	SFM							< 0.01		191			
12	-Y2- 60+02 to 60+23 LT	24" CMP Outlet	SFM							< 0.01	< 0.01	16		8	
13	-Y2- 59+10 to 59+95 LT	Roadway Fill	SFN							< 0.01	< 0.01	72		15	
14	-Y2- 66+30 to 66+49 LT	6'x6'x RCBC Inlet	Carver Branch	Low							< 0.01			19	
SHEET TOTALS*:					< 0.01					0.11	0.05	1092	63	584	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/1/2021
GRAHAM
A-0009CC
32572.1.15

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	WETLAND IMPACTS					SURFACE WATER IMPACTS					
					Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
14	-Y2- 67+12 to 67+69 RT	6'x6' RCBC Outlet	Carver Branch	Low						0.01	< 0.01	84		20	
15	-Y2- 68+25 to 68+35 LT	Stream Restoration	SBJ								< 0.01			20	
15	-Y2- 67+66 to 67+91 RT	66" CAAP	SBJ							< 0.01		67			
16	-Y2- 75+85 to 76+04 LT	42" RCP Inlet	SBN								< 0.01			22	
17	-Y2- 75+67 to 75+89 RT	Construction Easement	SBP								< 0.01			21	
17	-Y2- 75+89 to 80+17 RT	Floodplain Bench	SBO							< 0.01	0.02		6	419	
17	-Y2- 79+70 to 80+15 RT	Floodplain Bench	Carver Branch	Low							< 0.01			50	
18	-Y3- 11+91 to 12+04 LT	18" RCP Outlet Ditch	Edwards Branch								< 0.01			16	
19	-Y2- 97+95 to 99+45 LT	30" RCP & Channel Change	SBV							< 0.01	< 0.01	67	77	42	
20	-Y2- 98+02 to 99+22 RT	2@6'x6' RCBC	Carver Branch	Low						< 0.01	< 0.01		50	20	
21	-Y2- 99+73 to 99+85 LT	1@12'x5' RCBC Inlet	Edwards Branch							< 0.01	< 0.01	30	24	3	
21	-Y2- 99+89 to 99+94 RT	1@12'x5' RCBC Outlet	Edwards Branch							< 0.01			10		
21	-Y2- 99+71 to 100+13 RT	Floodplain Bench Const.	Carver Branch	Low						< 0.01	< 0.01		23	20	
22	-Y2- 109+70 to 112+01 LT&RT	Roadway/Channel Change	SCB							0.01	< 0.01	209		12	
22	-Y2- 109+60 to 111+38 LT	Roadway/Channel Change	WBR	Medium	0.07		< 0.01		0.01						
22	-Y2- 109+73 to 112+43 RT	Bank Stabilization	Stecoah Creek							< 0.01	< 0.01		31	20	
23	-Y2- 119+92 to 122+49 LT	Rock Fill in Pond	PH							0.06	0.06				
24	-Y2- 123+32 to 125+51 LT	Channel Change	SCD							0.02	< 0.01	226		66	
25	-Y2- 122+95 to 126+55 RT	Floodplain Bench Const.	Stecoah Creek								0.04			361	
26	-Y2- 128+02 to 128+66 RT	Bank Stabilization	Stecoah Creek							0.01	0.01		31	31	
26	-Y2- 128+93 to 130+43 LT	3@10'x9' RCBC Outlet	Stecoah Creek							0.04	0.03	35	54	65	
27	-Y2- 141+09 to 141+21 RT	60" CAAP Inlet	SDT							0.01	< 0.01	43	9	16	
27	-Y2- 141+25 to 141+97 LT	60" CAAP Outlet	SDT							0.02	< 0.01	91		11	
SHEET TOTALS*:					0.07		< 0.01		0.01	0.22	0.20	852	315	1235	
PROJECT TOTALS*:					0.07	0.00	0.01	0.01	0.04	0.33	0.25	1944	378	1819	

*Rounded totals are sum of actual impacts

**Notes:

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