



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 1 of 4	
General Project Information							
WBS Element:		32572.1.14		TIP Number: A-0009CB		Project Type: Roadway Widening	
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-Up Area (ac.)		30.4		ac.		16.0	
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	
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. <u>Project minimization measures include:</u> >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

Page 2 of 4

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)					



Highway Stormwater Program STORMWATER MANAGEMENT PLAN FOR NCDOT PROJECTS



Page 3 of 4

[illegible]

**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	%	Existing Low Flow Channel Dimensions	5 ft. wide by 1 ft. deep
Proposed Culvert Slope (%):	3.90	%	in the Stream:	

Culvert Burial

Proposed Culvert Burial Depth (ft):	1	Proposed Low Flow Dimensions Through the Culvert:	5 ft. wide by 1 ft. deep
Existing Streambed Material:	sand, gravel and cobbles	Existing Low Flow Velocities in the Stream (ft/s):	3.8
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 conditions.	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

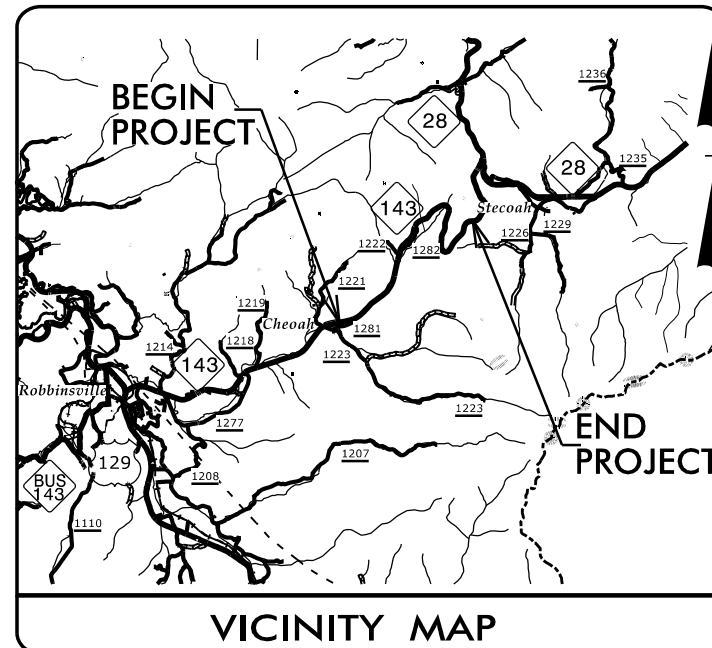
Evaluate/Describe Roadway Geometric Constraints:

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.

TIP PROJECT: A-0009CB

CONTRACT:

See Sheet 1A For Index of Sheets



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRAHAM COUNTY

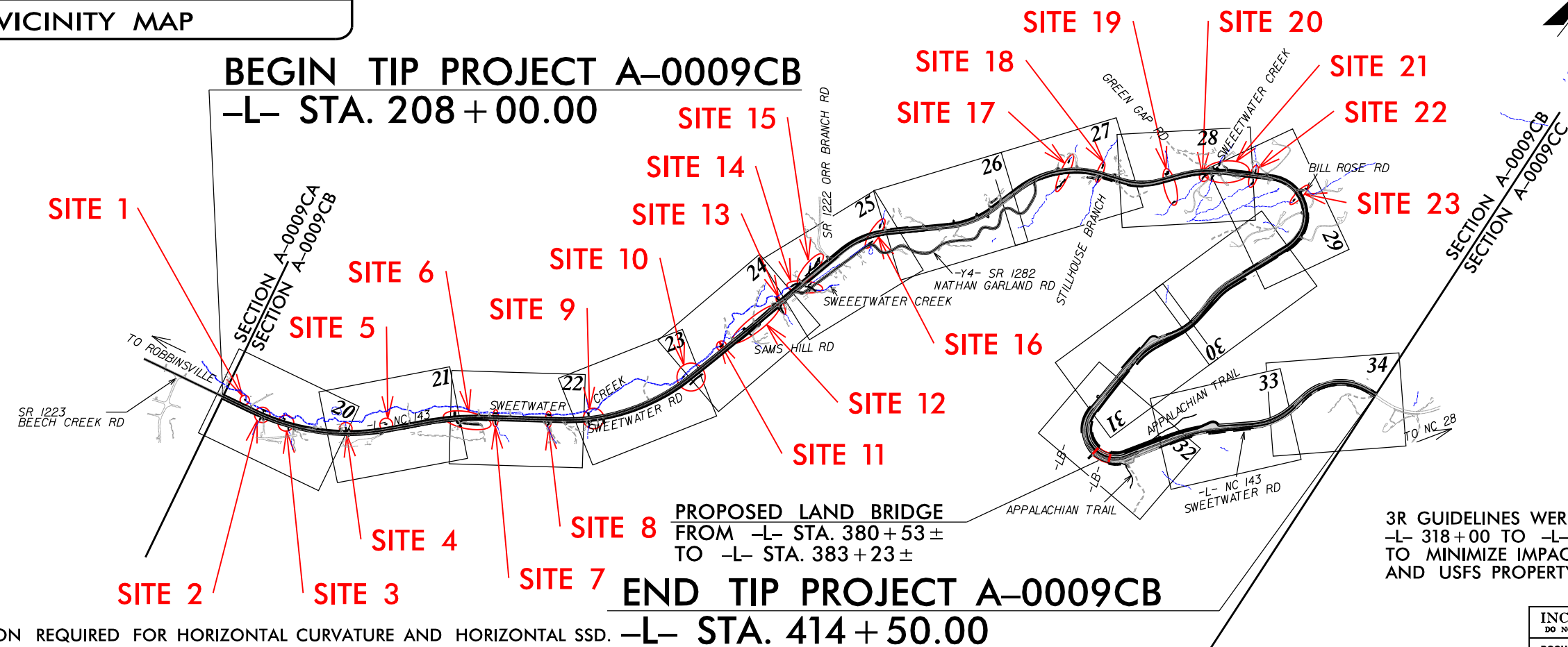
**LOCATION: UPGRADE NC 143 FROM SR 1223 (BEECH CREEK RD) TO
0.5 MILES NORTH OF APPALACHIAN TRAIL**

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

WETLAND & STREAM IMPACTS FOR 11-18-2021 4C MEETING

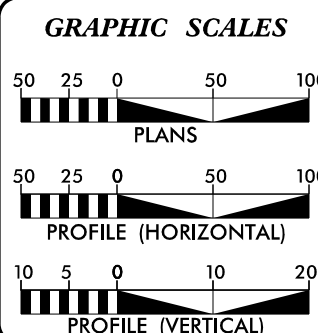
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CB	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
32572.1.14	APD-0074(178)	PE	
32572.2.14	APD-0074(178)	ROW, UTIL.	
32572.3.14	APD-0074(178)	CONST.	

PERMIT DRAWING
SHEET 1 OF 34



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

DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE AND HORIZONTAL SSD. —L— STA. 414 + 50.00
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.



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

$$\frac{\text{LENGTH ROADWAY TIP PROJECT A-0009CB}}{\text{TOTAL LENGTH TIP PROJECT A-0009CB}} = \frac{3.911 \text{ MILES}}{3.911 \text{ MILES}}$$

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

RIGHT OF WAY DATE:
SEPTEMBER 2021

LETTING DATE:
SEPTEMBER 20, 2022

2018 STANDARD SPECIFICATIONS

PLANS PREPARED FOR:

5 NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION 14
252 Webster Rd
Sylva, NC 28779

JIMMY L. TERRY, PE
PROJECT ENGINEER

AUSTIN TURNER, PE
PROJECT DESIGN ENGINEER

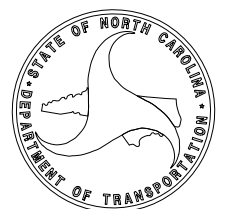
AUSTIN TURNER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ **P.E.**

**ROADWAY DESIGN
ENGINEER**

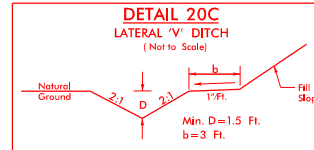
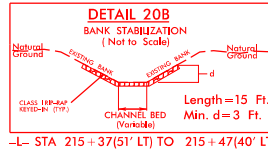
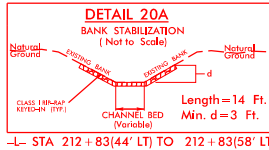
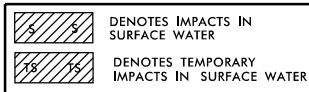
SIGNATURE: _____ *P.E.*



8/17/99

-L- CURVE DATA

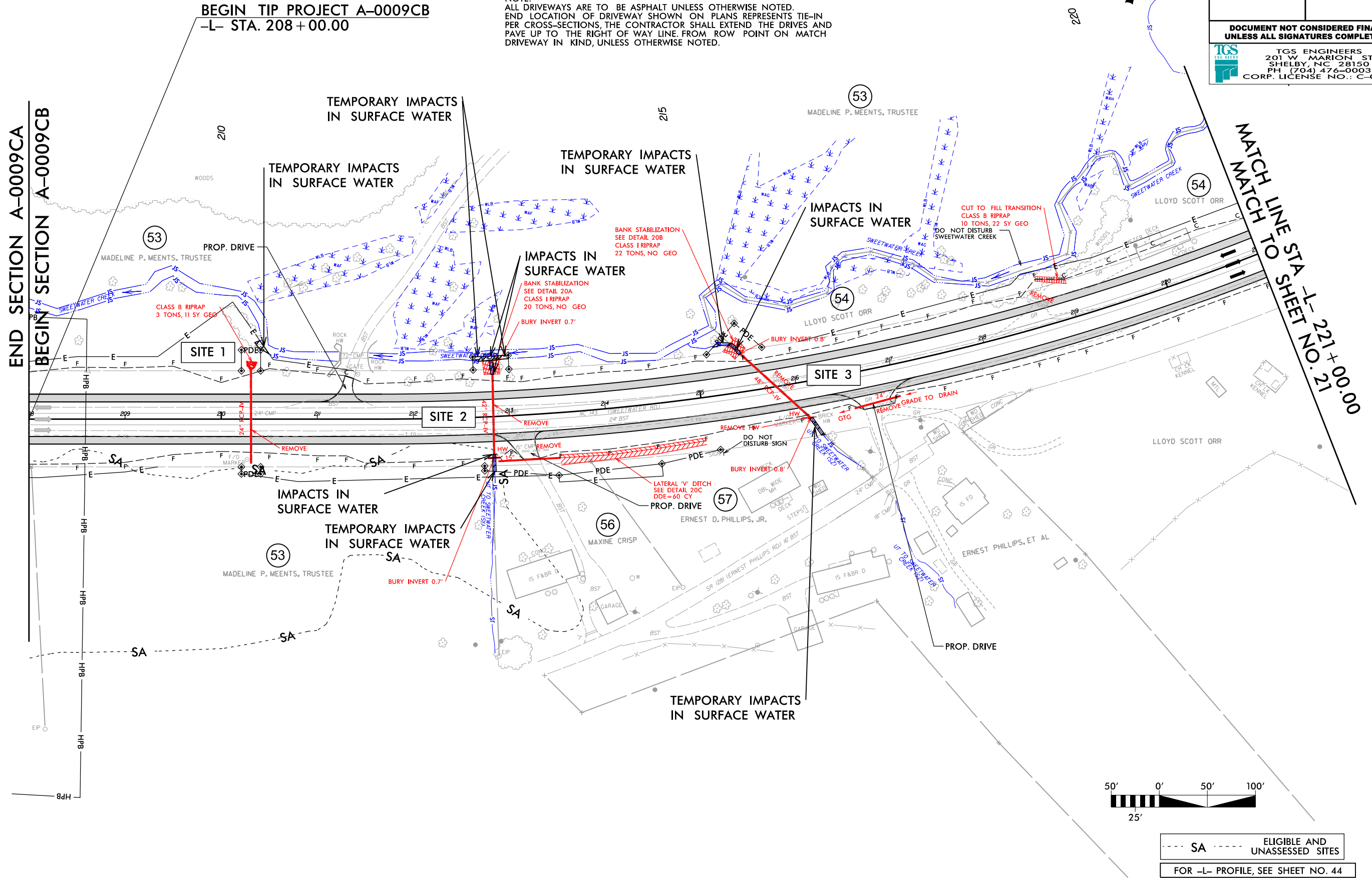
PI Sta 219+95.61
 $\Delta = 36^\circ 39' 28.8" (LT)$
 $D = 2' 17" 30.6"$
 $L = 1,599.51'$
 $T = 828.20'$
 $R = 2,500.00'$
 $SE = 0.06$
 $DS = 60 \text{ MPH}$



PERMIT DRAWING
SHEET 2 OF 34

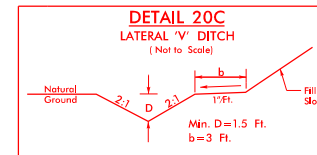
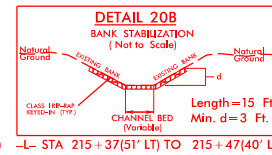
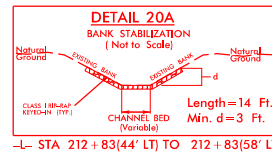
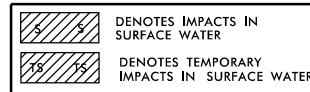
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	20
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
TGS ENGINEERS 201 W MARION ST SHELBY, NC 28150 PH: (704) 476-0003 CORP. LICENSE NO.: C-0275	

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.




--- SA --- ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 44

-L- CURVE DATA
 PI Sta 219+95.61
 $\Delta = 36^\circ 39' 28.8" (LT)$
 $D = 2' 17" 30.6"$
 $L = 1,599.51'$
 $T = 828.20'$
 $R = 2,500.00'$
 $SE = 0.06$
 $DS = 60 \text{ MPH}$

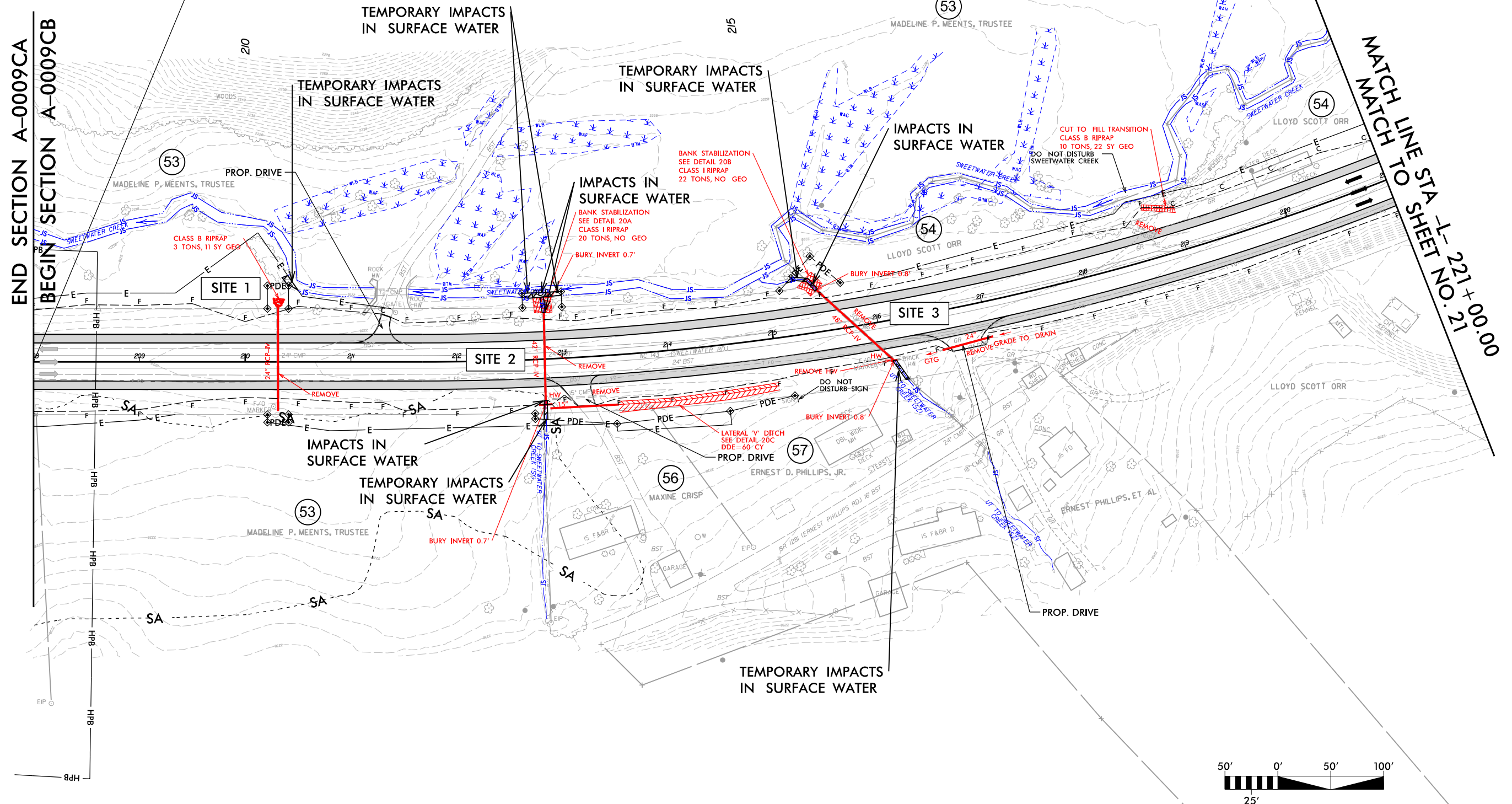


PERMIT DRAWING
SHEET 3 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	20
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<div style="border: 1px solid black; padding: 10px; text-align: center;">INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION</div>	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
<div style="display: flex; align-items: center;"><div>TGS ENGINEERS 201 W. MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. REFERENCE NO.: C-0275</div></div>	

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

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.



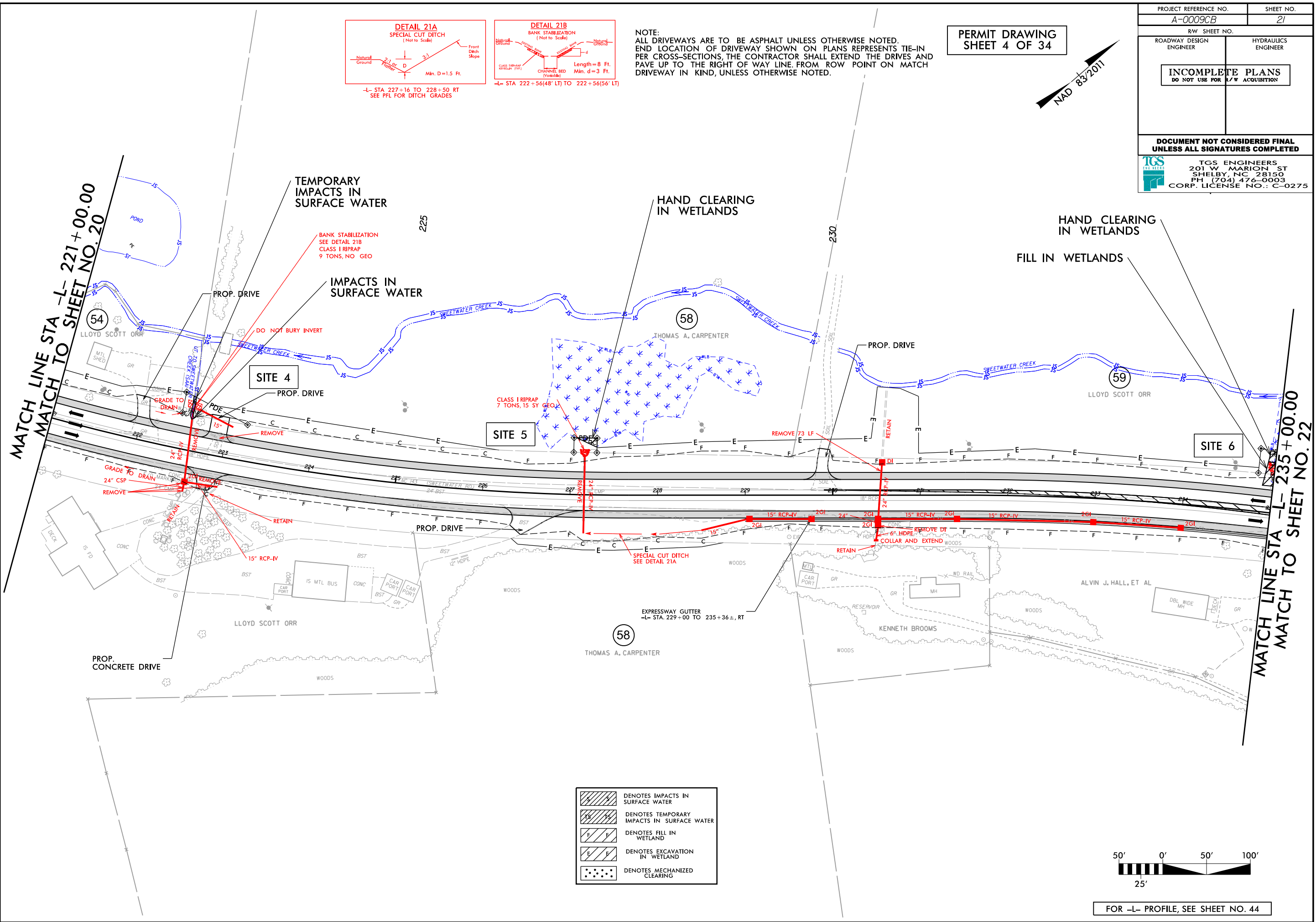
----- SA -----	ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 44	

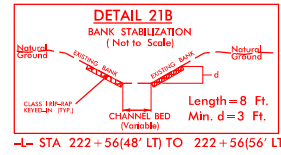
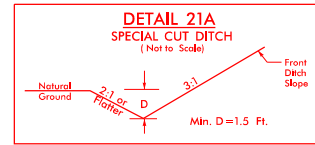
11/1/2021
X:\NC001\A-0009\Hydraulics\PERMITS.Environmental\Drawings\A-0009CB_PSH\A-0009CB_hyd_prm.psh.20.dgn
User:richard

8/17/99

REVISIONS

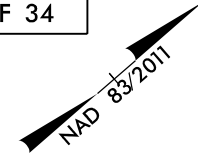
X:\PROJECTS\A-0009CB\Drawings\A-0009CB_PSH\A-0009CB_hyd.prm.psh.21.dgn
X:\PROJECTS\A-0009CB\Drawings\A-0009CB_PSH\A-0009CB_hyd.prm.psh.21.dgn
X:\PROJECTS\A-0009CB\Drawings\A-0009CB_PSH\A-0009CB_hyd.prm.psh.21.dgn




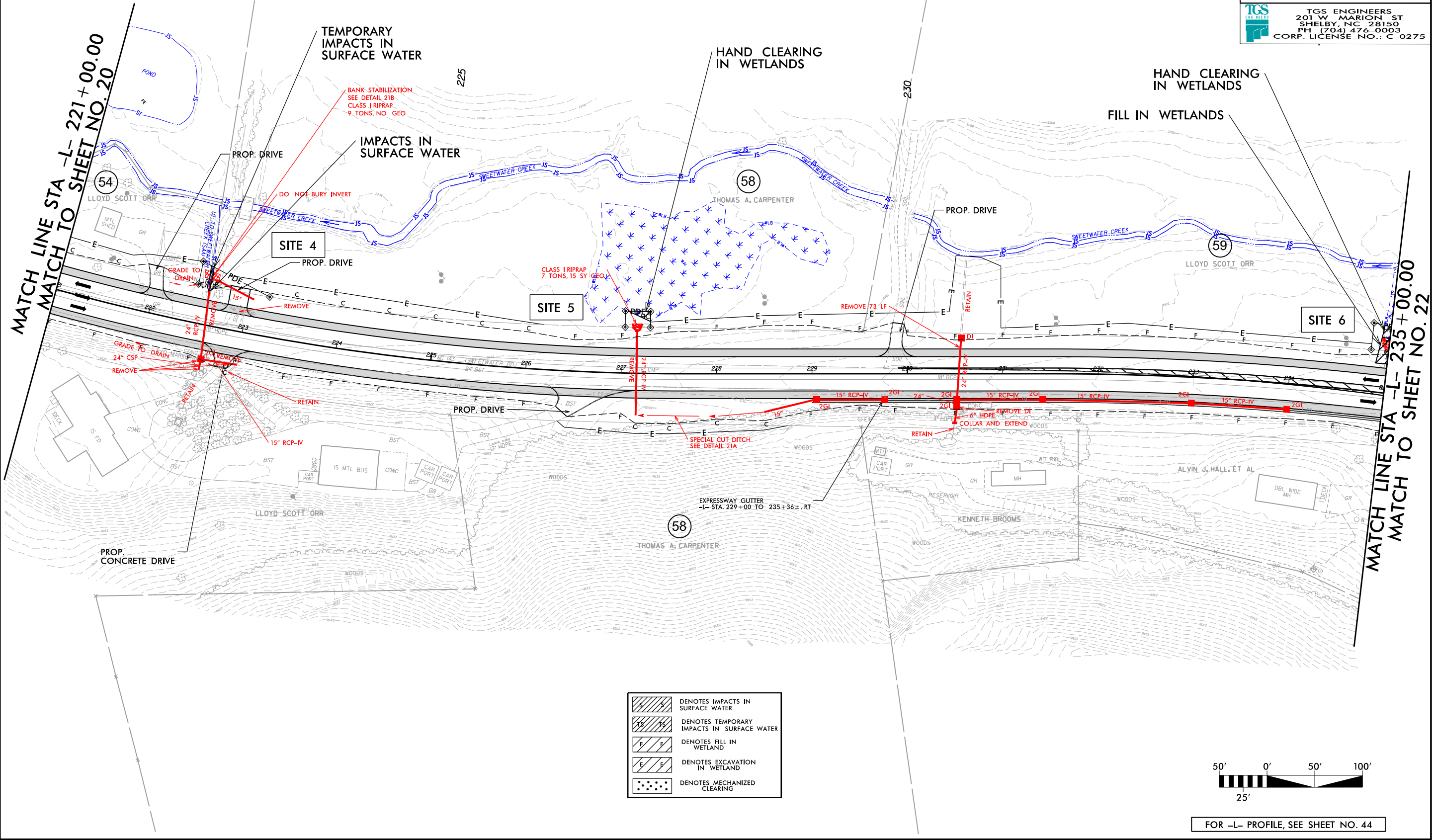


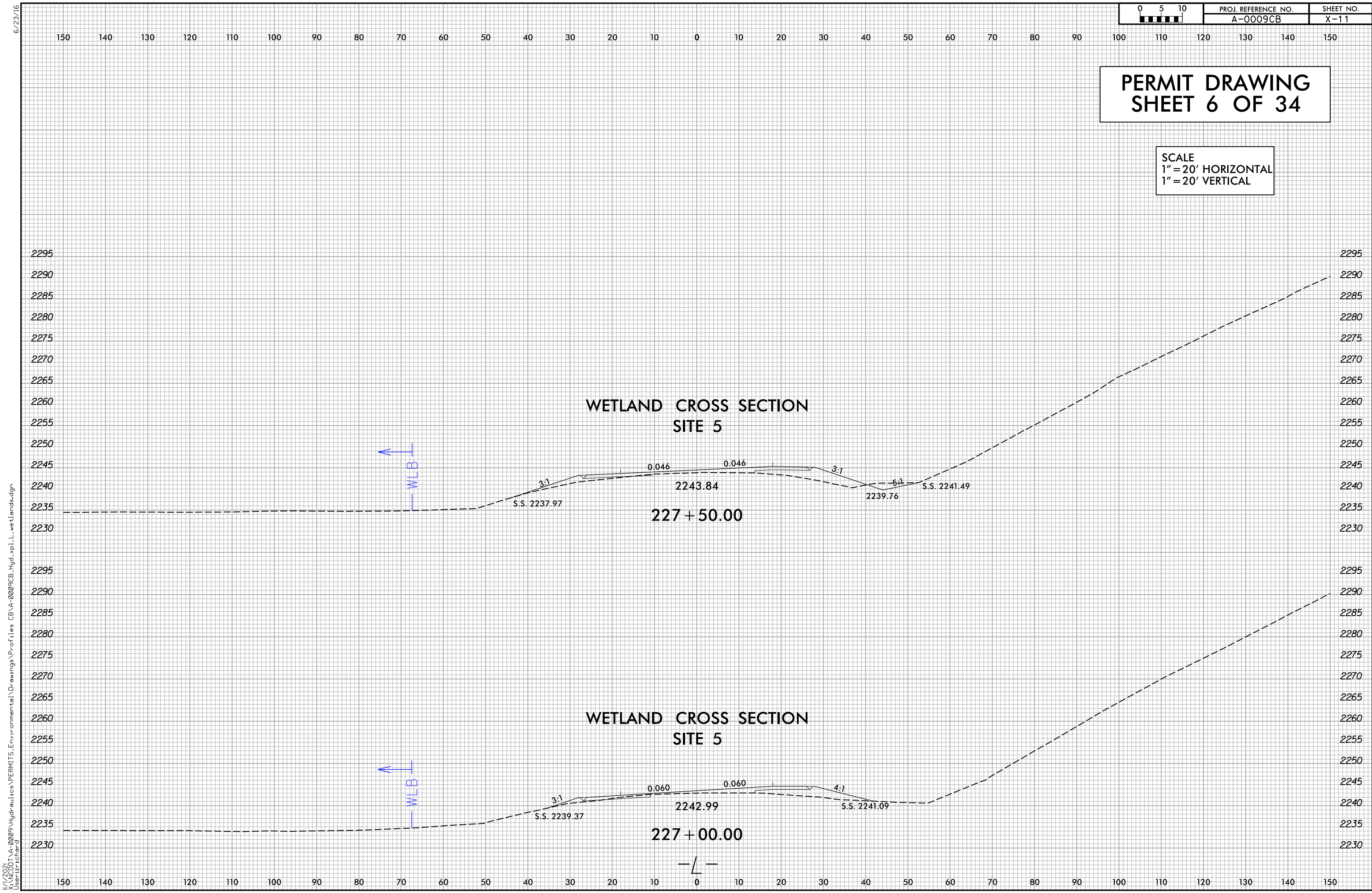
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN
PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND
PAVE UP TO THE RIGHT OF WAY LINE FROM ROW POINT ON MATCH
DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING
SHEET 5 OF 34



PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<div style="border: 1px solid black; padding: 10px; text-align: center;">INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION</div>	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
<div style="display: flex; align-items: center;"><div>TCS ENGINEERS 201 W. MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. REFERENCE NO.: C-0275</div></div>	





PERMIT DRAWING
SHEET 6 OF 34

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

<div>0510</div>	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-11

6/23/16
I:\2021\A-0009\Hydrolics\PERMITS\Environmental\Drawings\Profiles\CB\A-0009CB-Hyd-xpl-L-wetlands.dgn
User:zrichard

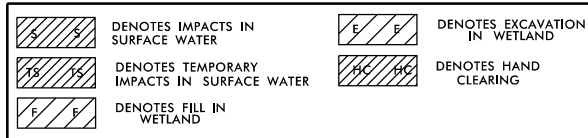
8/17/99

-L- CURVE DATA

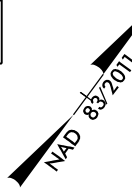
PI Sta 234+84.86
 $\Delta = 12' 40'' 17.1''$ (RT)
 $D = 1' 54' 35.5''$
 $L = 663.47'$
 $T = 333.10'$
 $R = 3,000.00'$
 $SE = 0.05$
 $DS = 60$ MPH


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

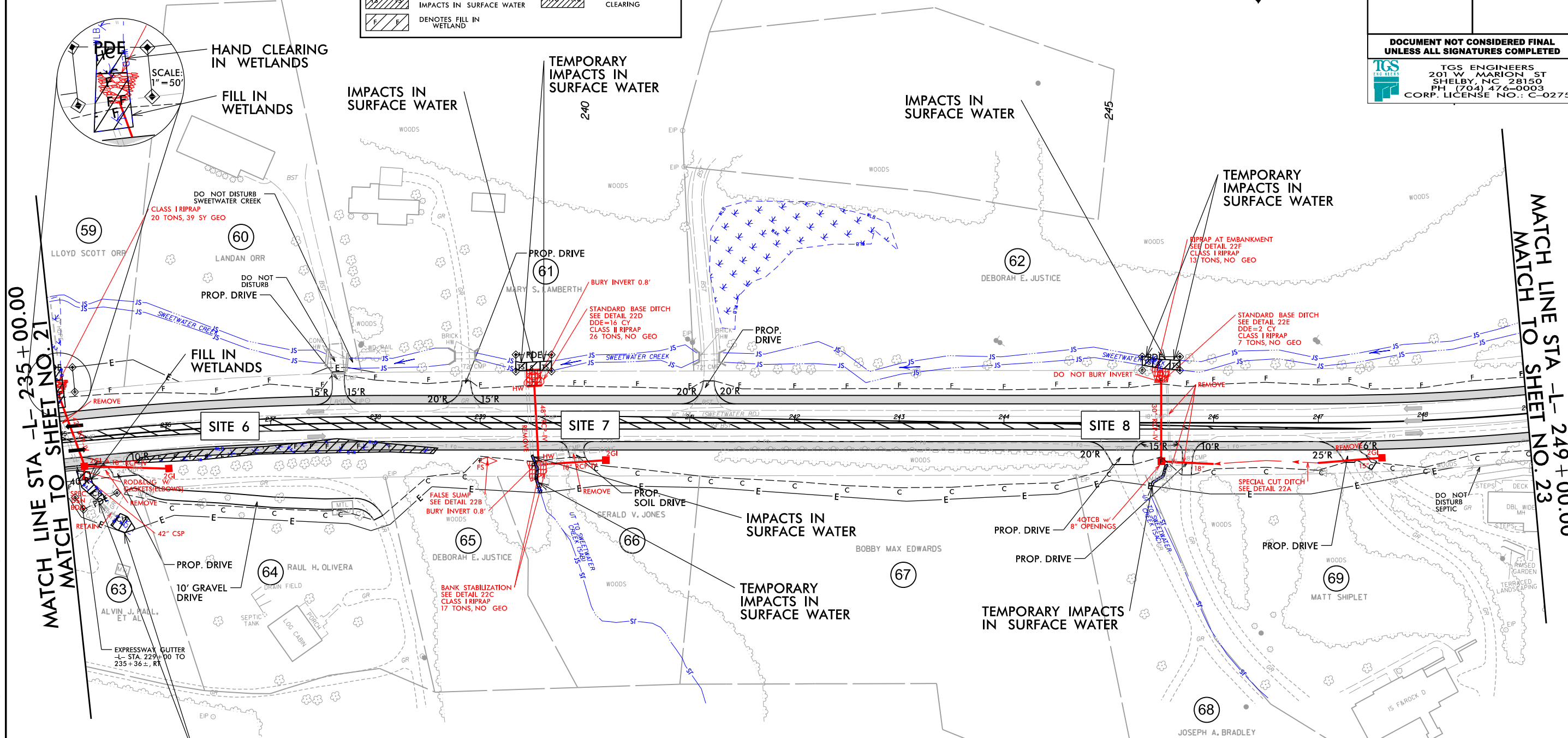
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN
PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND
PAVE UP TO THE RIGHT OF WAY LINE FROM ROW POINT ON MATCH
DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.



PERMIT DRAWING
SHEET 7 OF 34

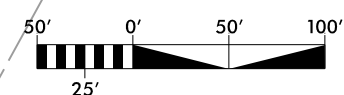
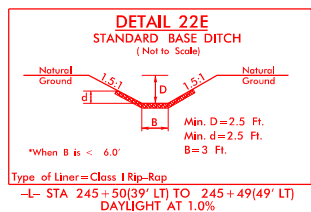
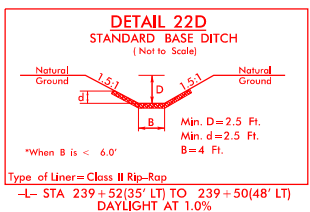
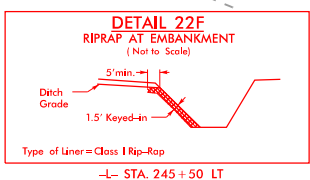
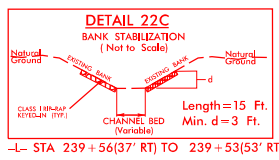
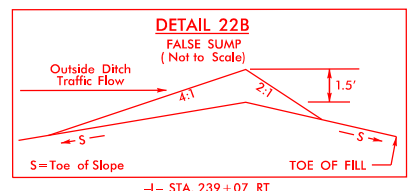
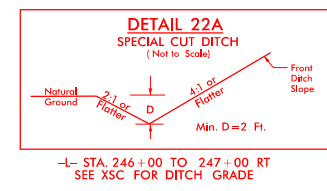


PROJECT REFERENCE NO. A-0009CB		SHEET NO. 22	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div>INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION</div>			
<div>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</div>			
<div><div>TGS ENGINEERS 201 W MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275</div></div>			



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

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



FOR -L- PROFILE, SEE SHEET NO. 45

8/17/99

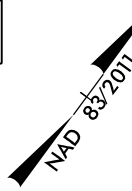
-L- CURVE DATA

PI Sta 234+84.86	PI Sta 255+20.12
$\Delta = 12^\circ 40' 17.1''$ (RT)	$\Delta = 40^\circ 44' 05.0''$ (LT)
$D = 1^\circ 54' 35.5''$	$D = 2^\circ 36' 15.7''$
$L = 663.47'$	$L = 1564.10'$
$T = 333.10'$	$T = 816.75'$
$R = 3,000.00'$	$R = 2,200.00'$
$SE = 0.05$	$SE = 0.07$
$DS = 60$ 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.

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

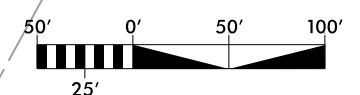
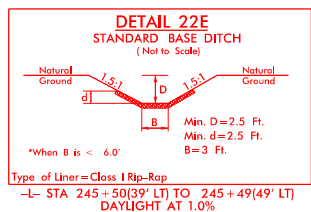
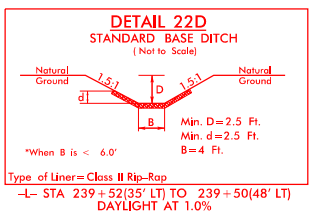
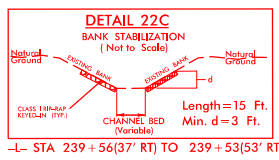
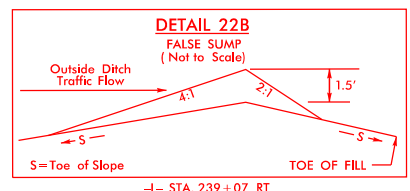
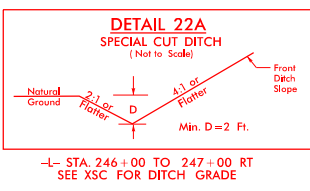
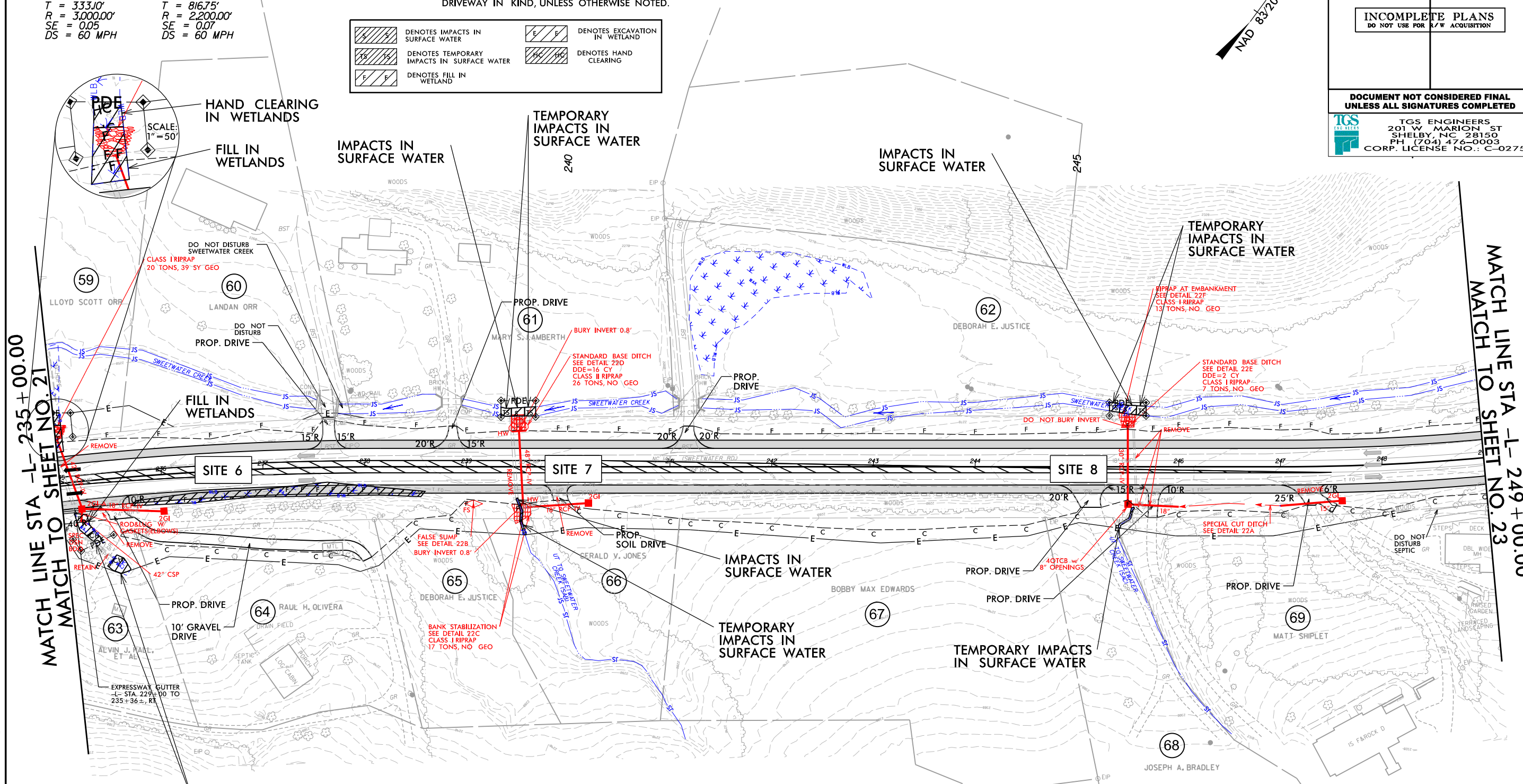
PERMIT DRAWING
SHEET 8 OF 34



PROJECT REFERENCE NO. A-0009CB		SHEET NO. 22	
RW 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			

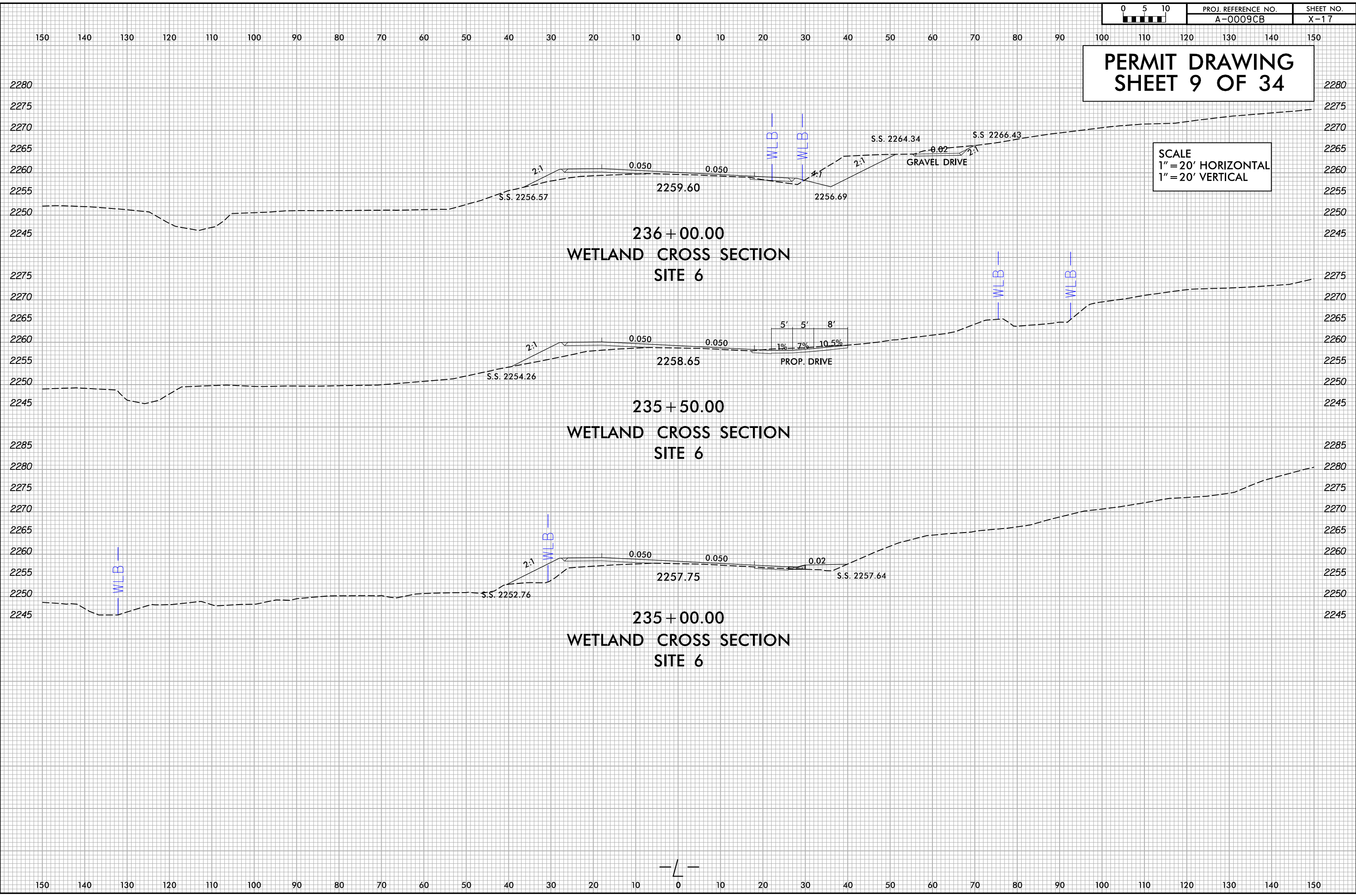
MATCH LINE STA -L- 235+00.00
MATCH TO SHEET NO. 21

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



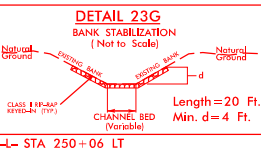
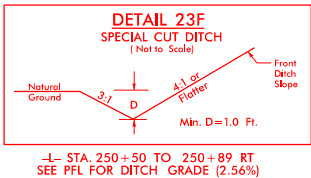
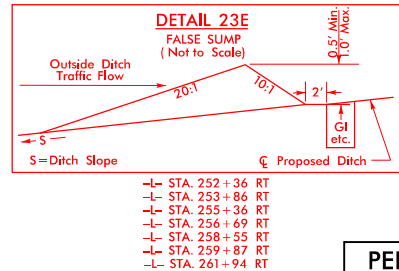
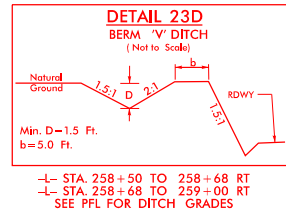
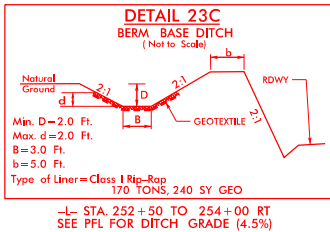
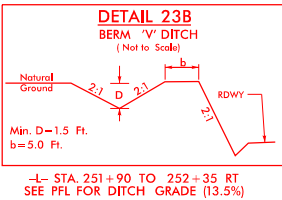
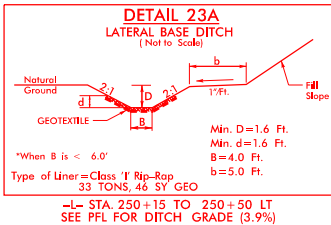
FOR -L- PROFILE, SEE SHEET NO. 45

6/23/16
I:\2021\A-0009\Hydrolics\PERMITS\Environmental\Drawings\Profiles\CB\A-0009CB-Hyd.xpl.L-wetlands.dgn
User:zrichard



8/17/99

-L- CURVE DATA
PI Sta 255+20.12
 $\Delta = 40^\circ 44' 05.0''$ (LT)
D = 2' 36" 15.7"
L = 1564.10'
T = 816.75'
R = 2200.00'
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.

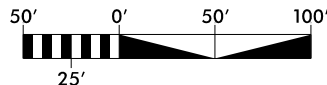
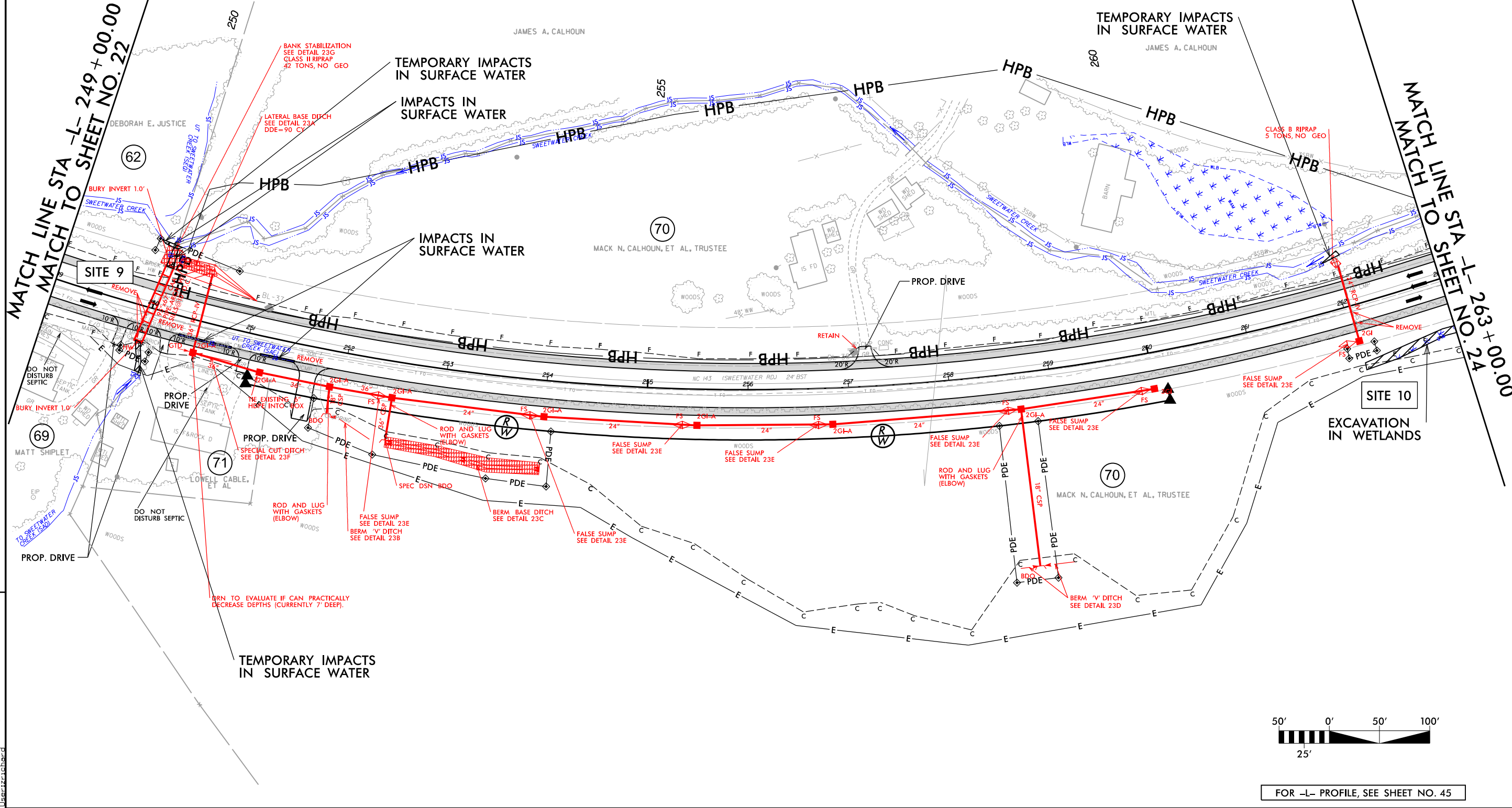
PERMIT DRAWING
SHEET 10 OF 34

- EXCAVATION IN WETLAND
- IMPACTS IN SURFACE WATER
- TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS
IN SURFACE WATER

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

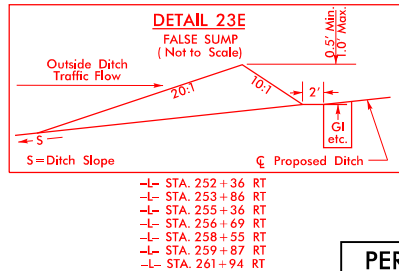
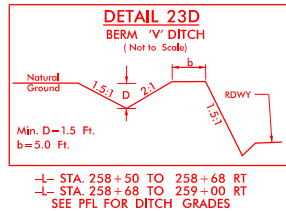
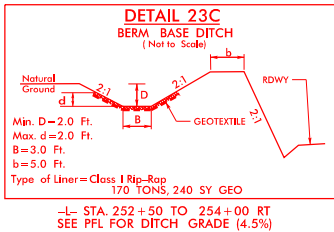
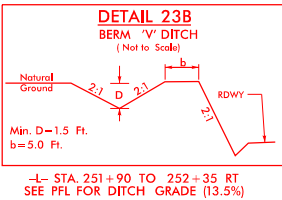
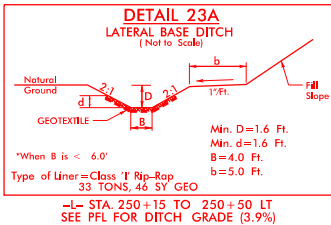
MATCH LINE STA -L- 249+00.00
MATCH LINE TO SHEET NO. 22



FOR -L- PROFILE, SEE SHEET NO. 45

8/17/99

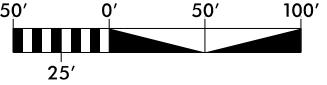
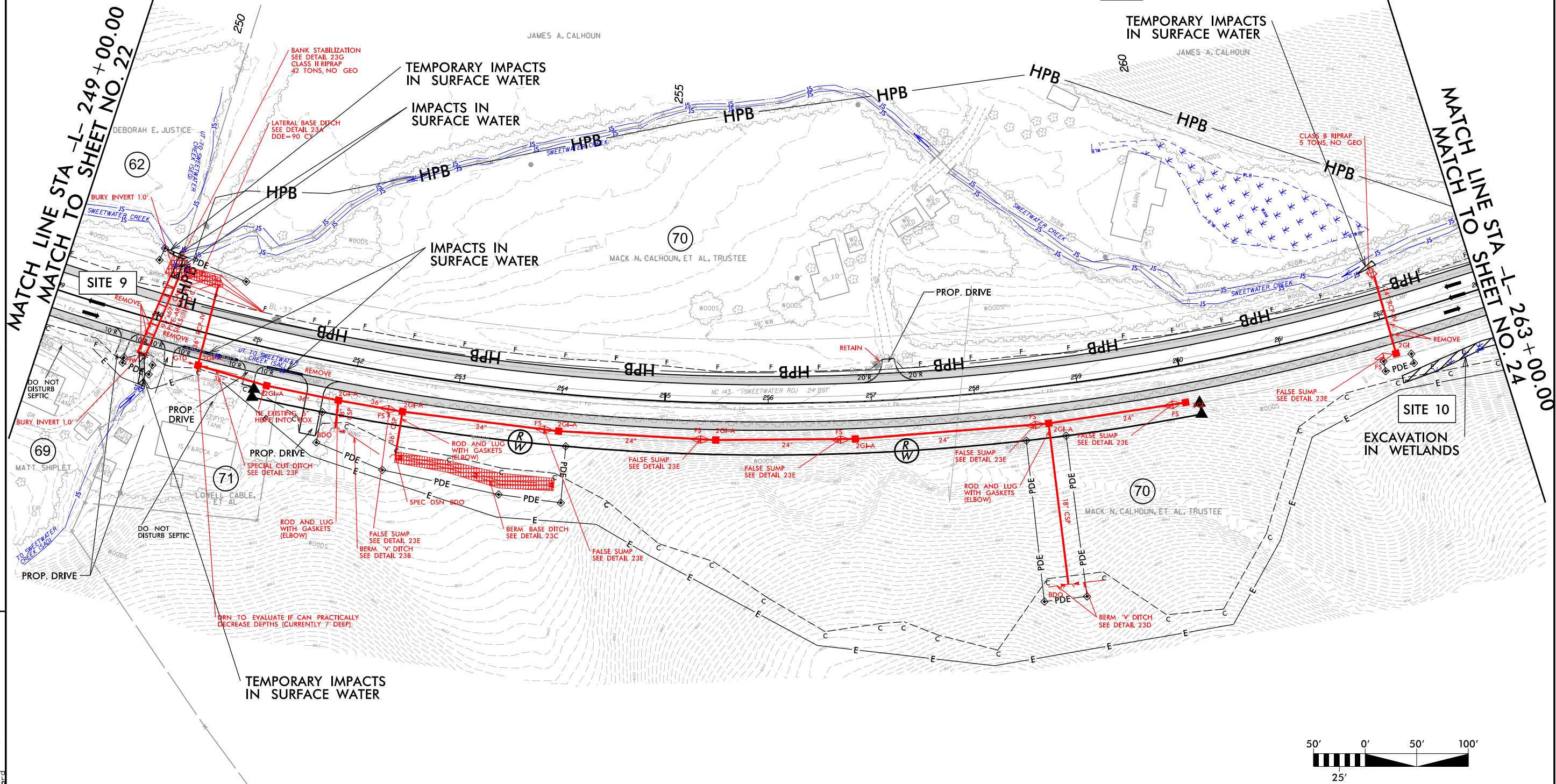
-L- CURVE DATA
PI Sta 255+20.12
 $\Delta = 40^\circ 44' 05.0''$ (LT)
D = 2' 36" 15.7"
L = 1564.10'
T = 816.75'
R = 2200.00'
SE = 0.07
DS = 60 MPH



PERMIT DRAWING
SHEET 11 OF 34

- LEGEND:
- DENOTES EXCAVATION IN WETLAND
 - DENOTES IMPACTS IN SURFACE WATER
 - DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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.

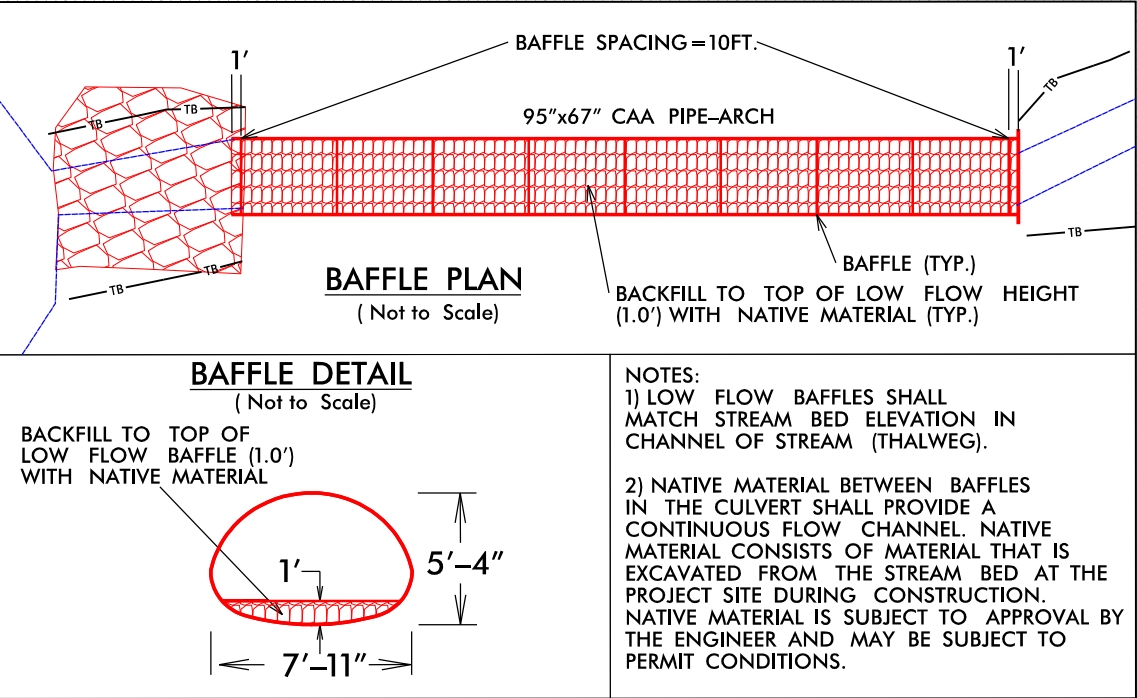


FOR -L- PROFILE, SEE SHEET NO. 45

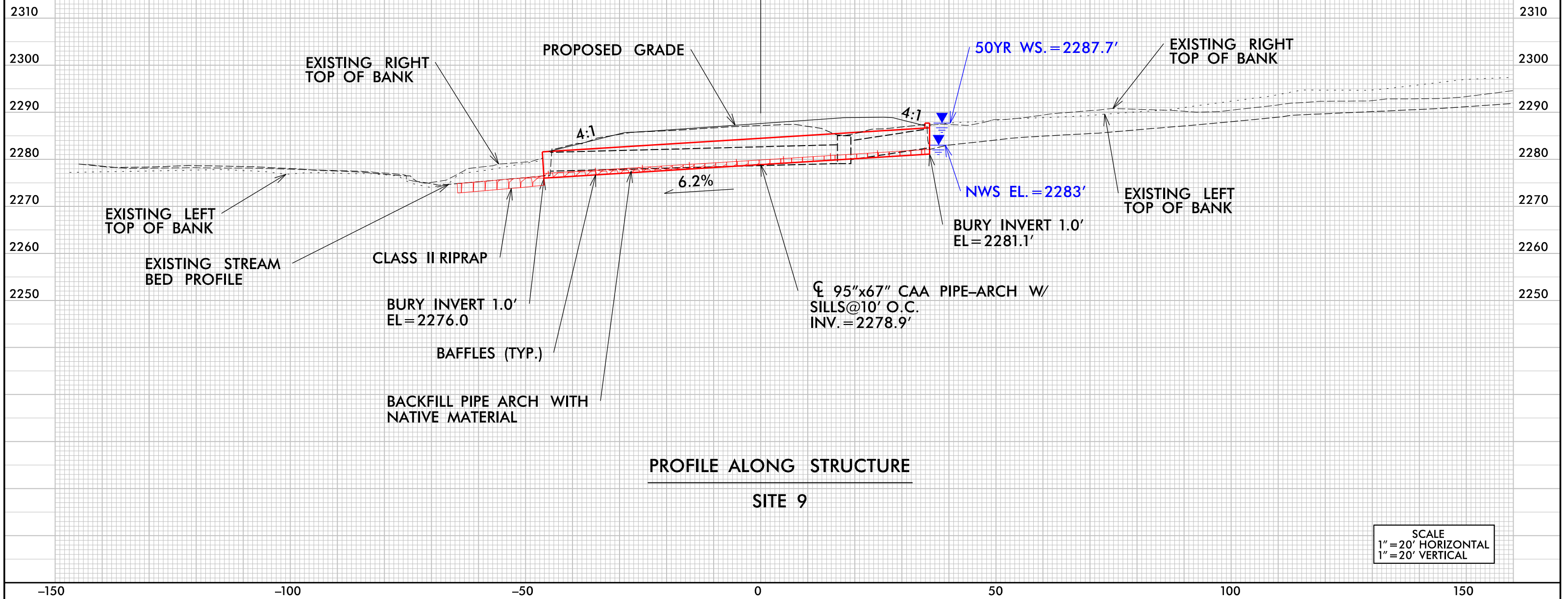
PROJECT REFERENCE NO. A-0009CB		SHEET NO. 23	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
TGS ENGINEERS 201 W. MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275			

PERMIT DRAWING
SHEET 12 OF 34

-L-
NC 143



☒ -L- STA. 250+00
95"x67" CAA PIPE-ARCH W/
SILLS@10' O.C.
PROPOSED GRADE- 2287.61'
SKEW- 98 DEG.



6/23/16

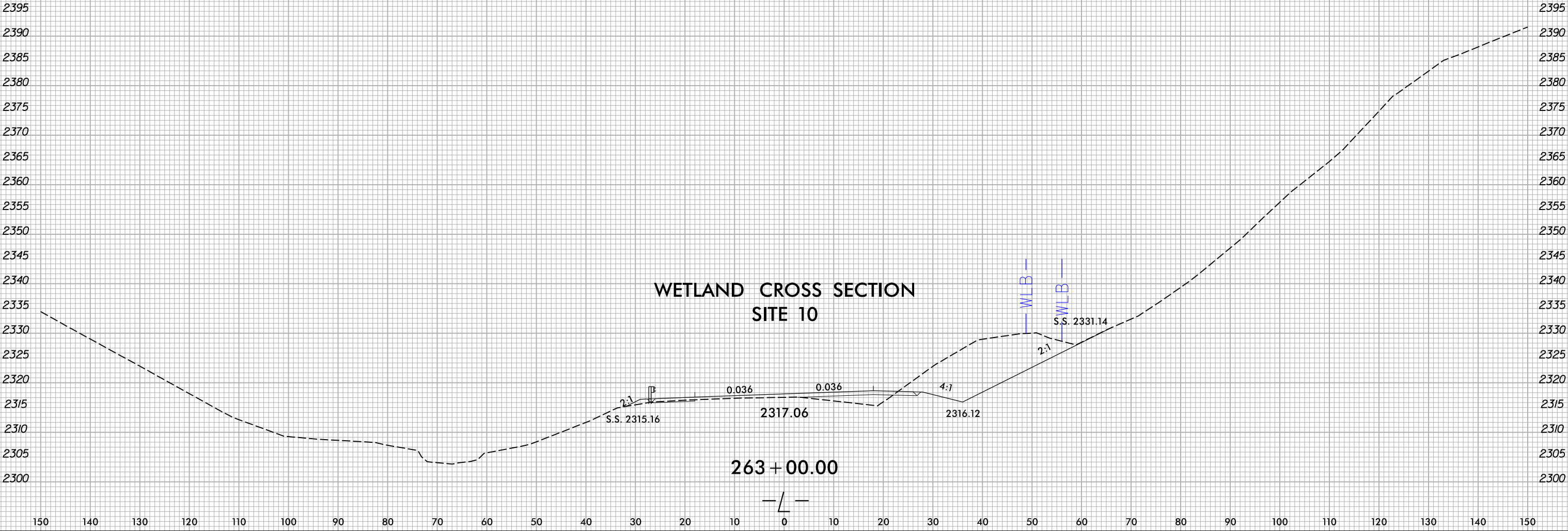
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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

PERMIT DRAWING
SHEET 13 OF 34

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

I:\1\2021\A-0009\Hydraulics\PERMITS\Environmental Drawings\Profiles CB\A-0009CB.Rdy.xpl.L-263+00.wetland.dgn
User:zrichard

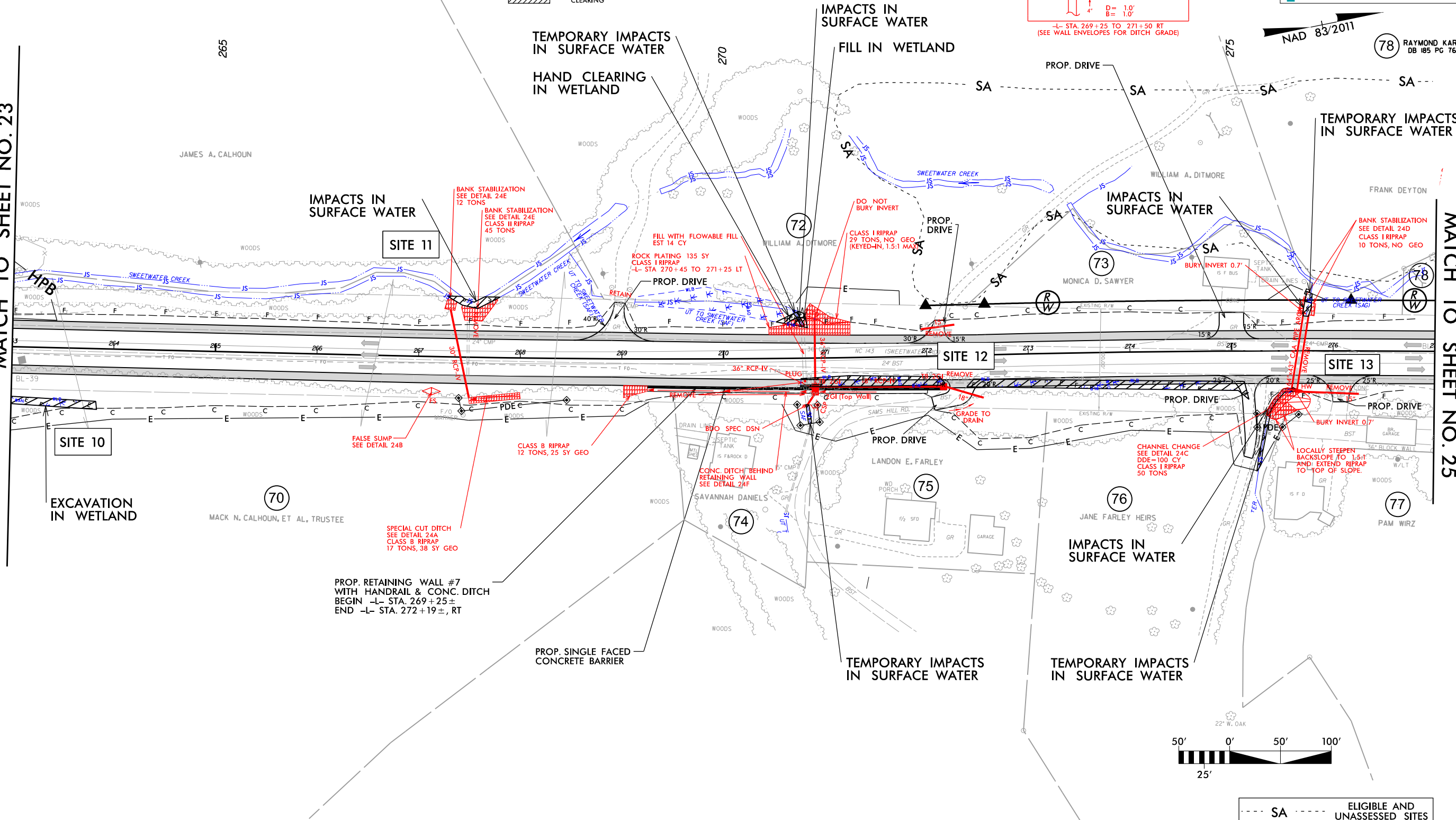


X:\NC00T\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_PSH\A-0009CB_Hyd-prm-psh_24.dgn

MATCH LINE STA -L- 277 + 00.00
MATCH TO SHEET NO. 25

----- SA ----- ELIGIBLE AND
UNASSESSED SITES

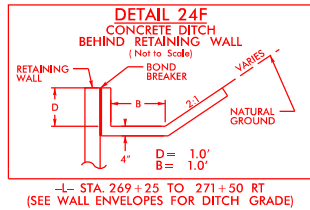
FOR -L- PROFILE, SEE SHEET NO. 46







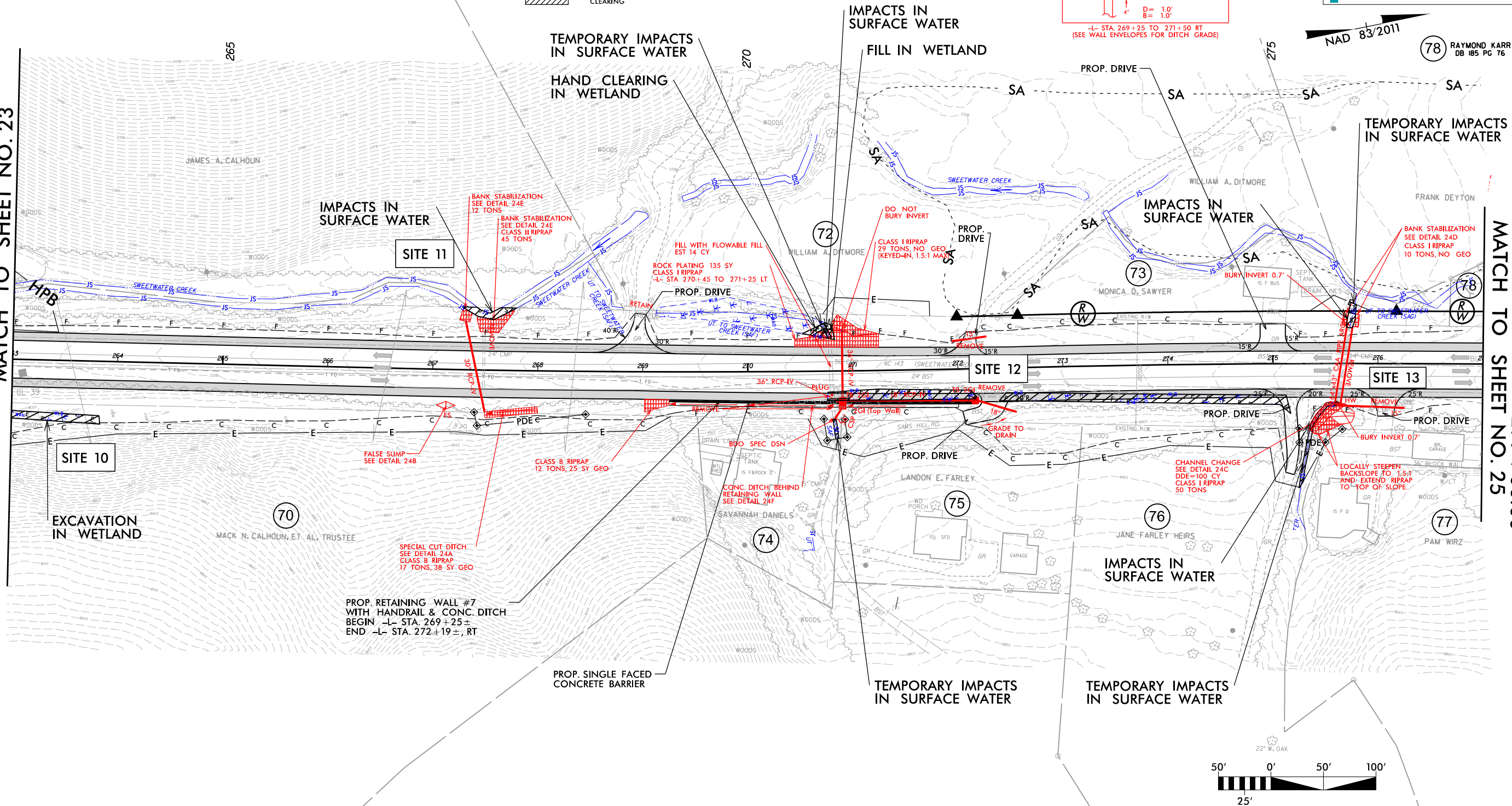
X:\NC00T\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_PSH\A-0009CB_Hyd-prm-psh_24.dgn

MATCH LINE STA -L- 277 + 00.00
MATCH TO SHEET NO. 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.

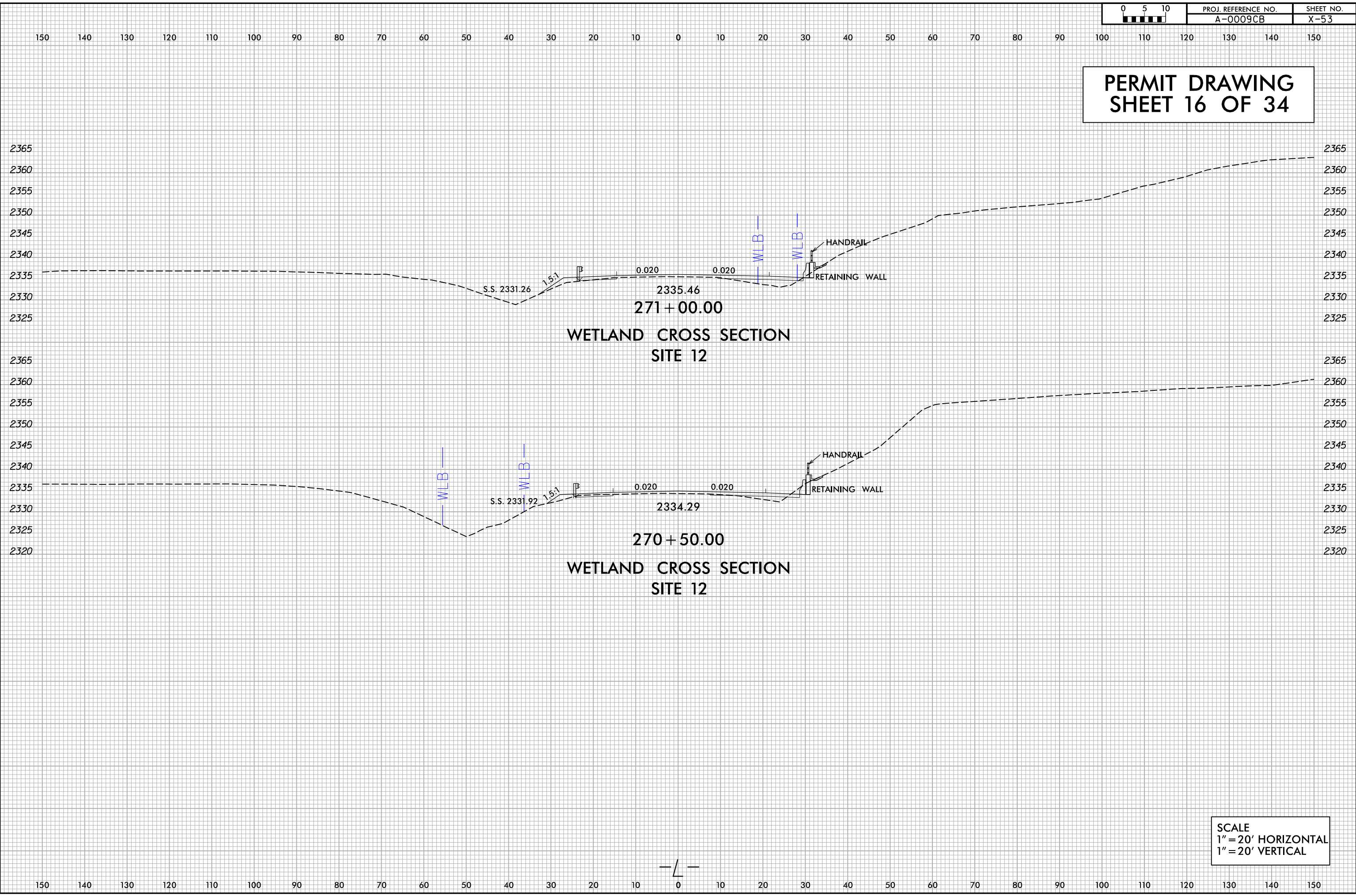


	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
	DENOTES FILL IN WETLAND
	DENOTES HAND CLEARING



SA	ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 46	

6/23/16
I:\2021\A-0009\Hydrolics\PERMITS\Environmental\Drawings\Profiles\CB\A-0009CB-Hyd.xpl.L-wetlands.dgn
User:zrichard



6/23/16

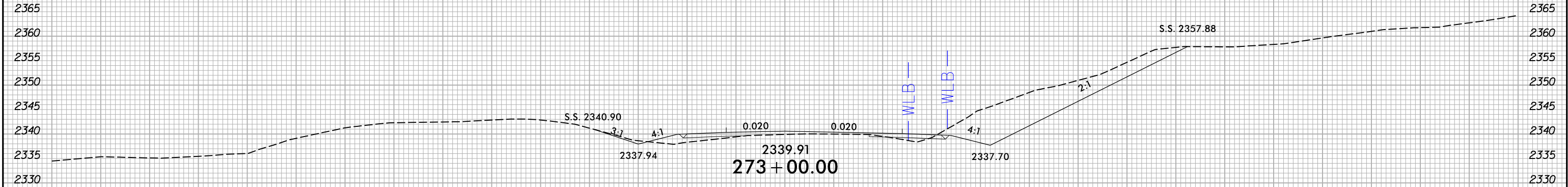
I:\2021\A-0009\Hydro\Profiles\Drawings\CB\A-0009CB-Hyd-xpl-L-wetlands.dgn
User:zrichard

0510	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-55

1501401301201101009080706050403020100102030405060708090100110120130140150

PERMIT DRAWING
SHEET 17 OF 34

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



1501401301201101009080706050403020100102030405060708090100110120130140150

8/17/19

-L- CURVE DATA

PI Sta 287+55.00
 $\Delta = 34'15''00.8''$ (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
 $\Delta = 55'08''53.6''$ (LT)
 $D = 71'37''11.0''$
 $L = 77.00'$
 $T = 41.78'$
 $R = 80.00'$

PI Sta 20+66.90
 $\Delta = 83'23''00.0''$ (RT)
 $D = 76'23''39.7''$
 $L = 109.15'$
 $T = 66.80'$
 $R = 75.00'$

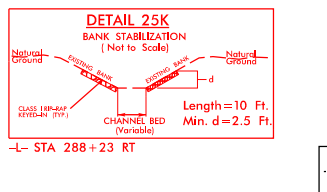
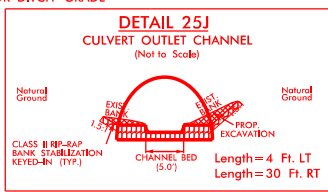
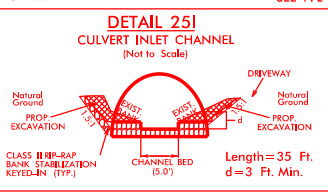
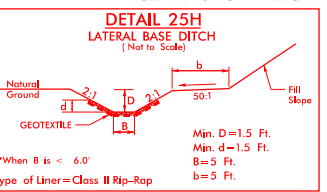
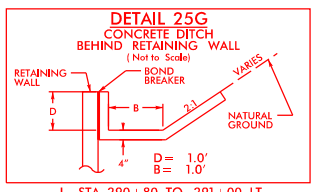
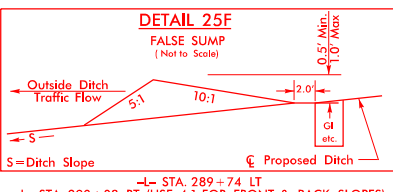
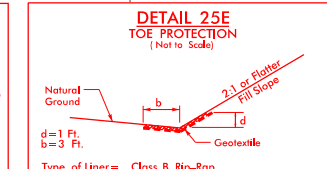
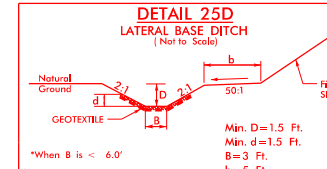
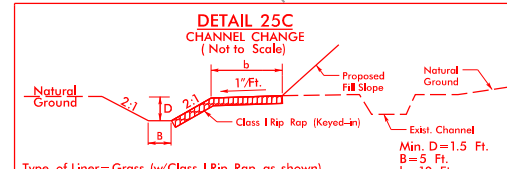
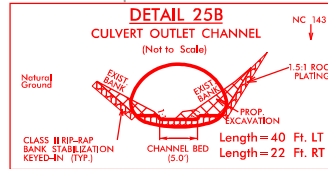
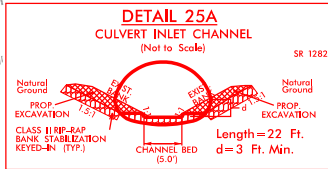
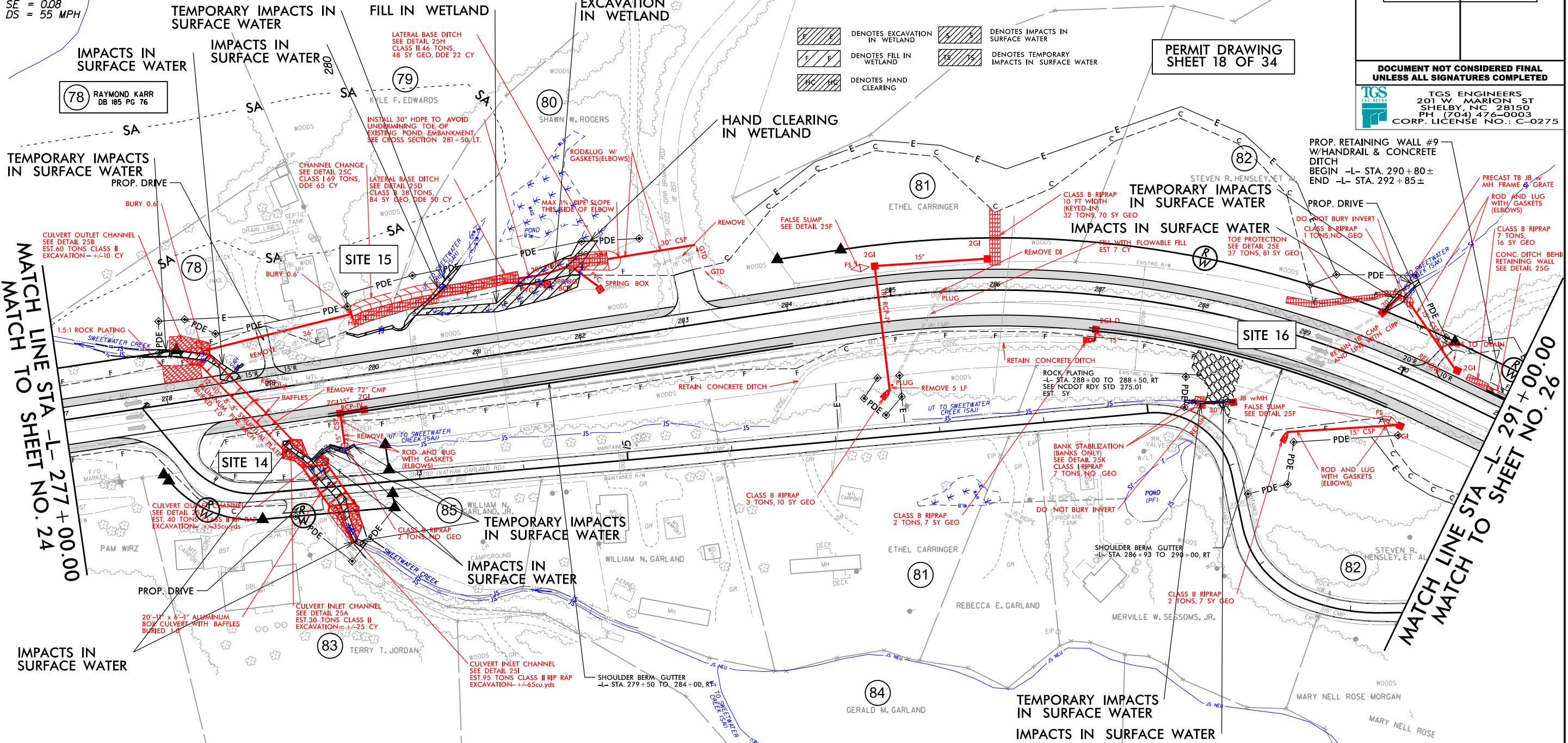
PI Sta 22+09.11
 $\Delta = 55'15''43.9''$ (LT)
 $D = 60'18''40.8''$
 $L = 91.63'$
 $T = 49.73'$
 $R = 95.00'$

PI Sta 22+91.14
 $\Delta = 23'50''55.2''$ (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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	25
RW SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/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	



SA
ELIGIBLE AND
UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 46

8/17/99

-L- CURVE DATA

PI Sta 287+55.00
 $\Delta = 34'15''00.8''$ (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
 $\Delta = 55'08''53.6''$ (LT)
 $D = 71'37''11.0''$
 $L = 77.00'$
 $T = 41.78'$
 $R = 80.00'$

PI Sta 20+66.90
 $\Delta = 83'23''00.0''$ (RT)
 $D = 76'23''39.7''$
 $L = 109.15'$
 $T = 66.80'$
 $R = 75.00'$

PI Sta 22+09.11
 $\Delta = 55'15''43.9''$ (LT)
 $D = 60'18''40.8''$
 $L = 91.63'$
 $T = 49.73'$
 $R = 95.00'$

PI Sta 22+91.14
 $\Delta = 23'50''55.2''$ (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

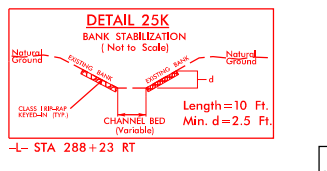
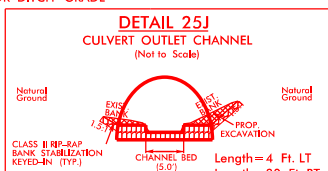
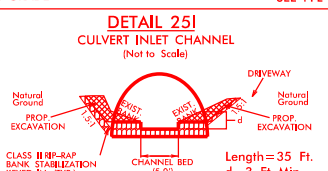
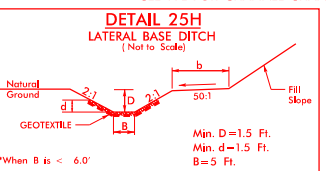
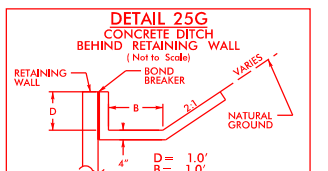
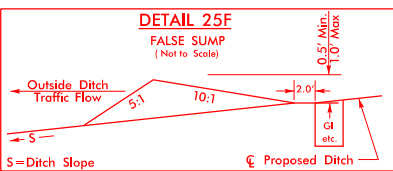
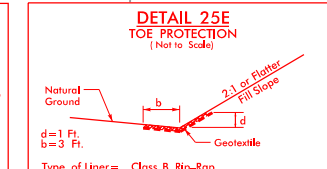
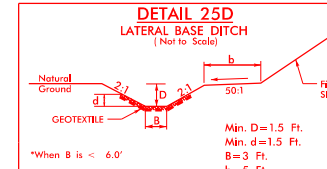
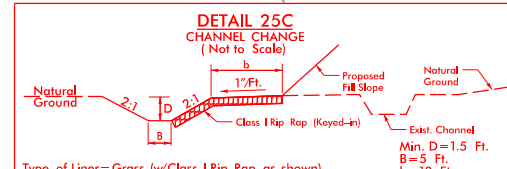
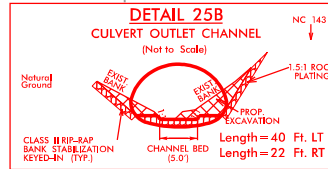
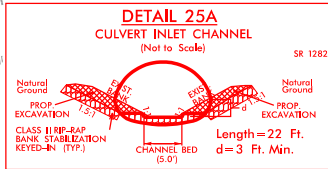
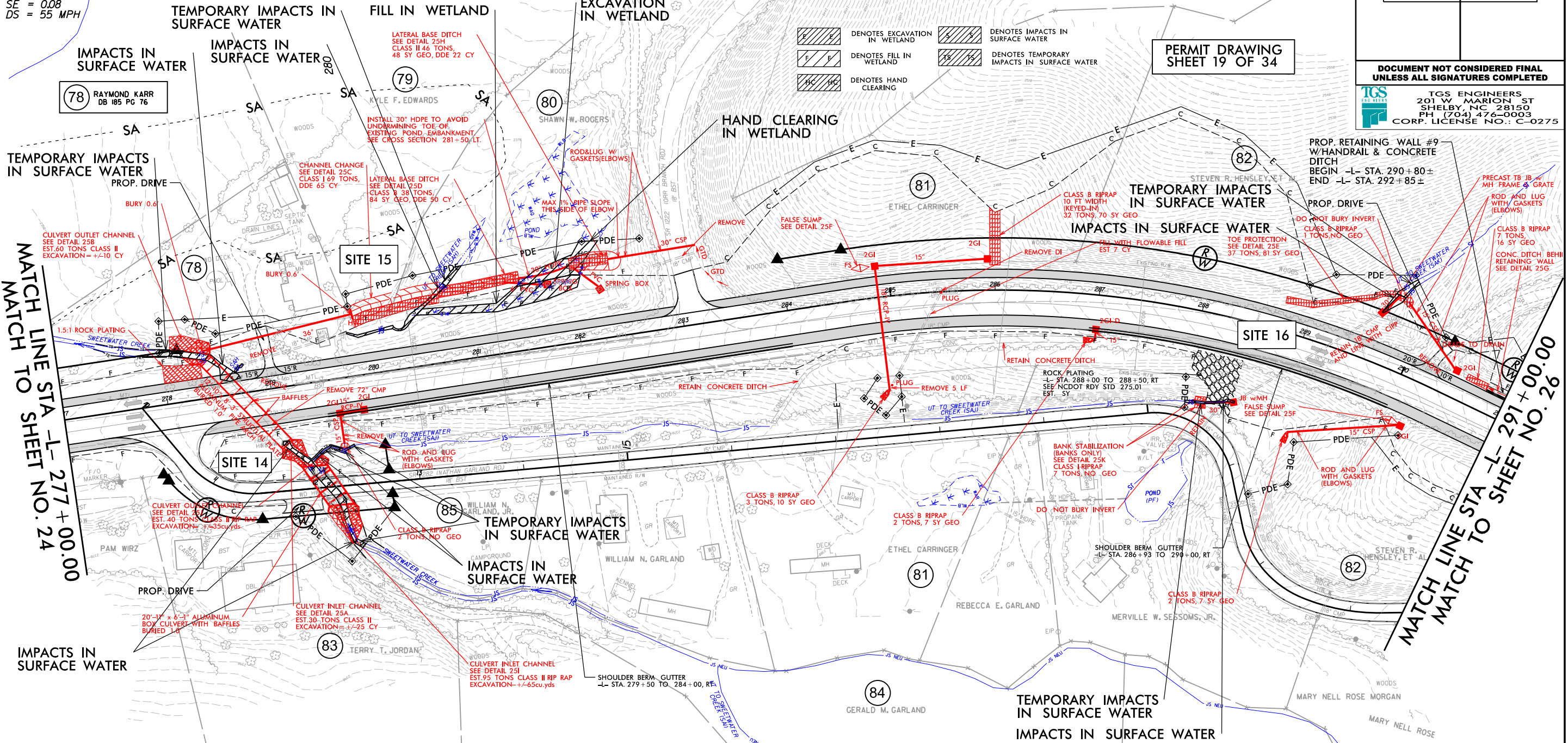
PROJECT REFERENCE NO. A-0009CB SHEET NO. 25

ROADWAY DESIGN HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR A/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

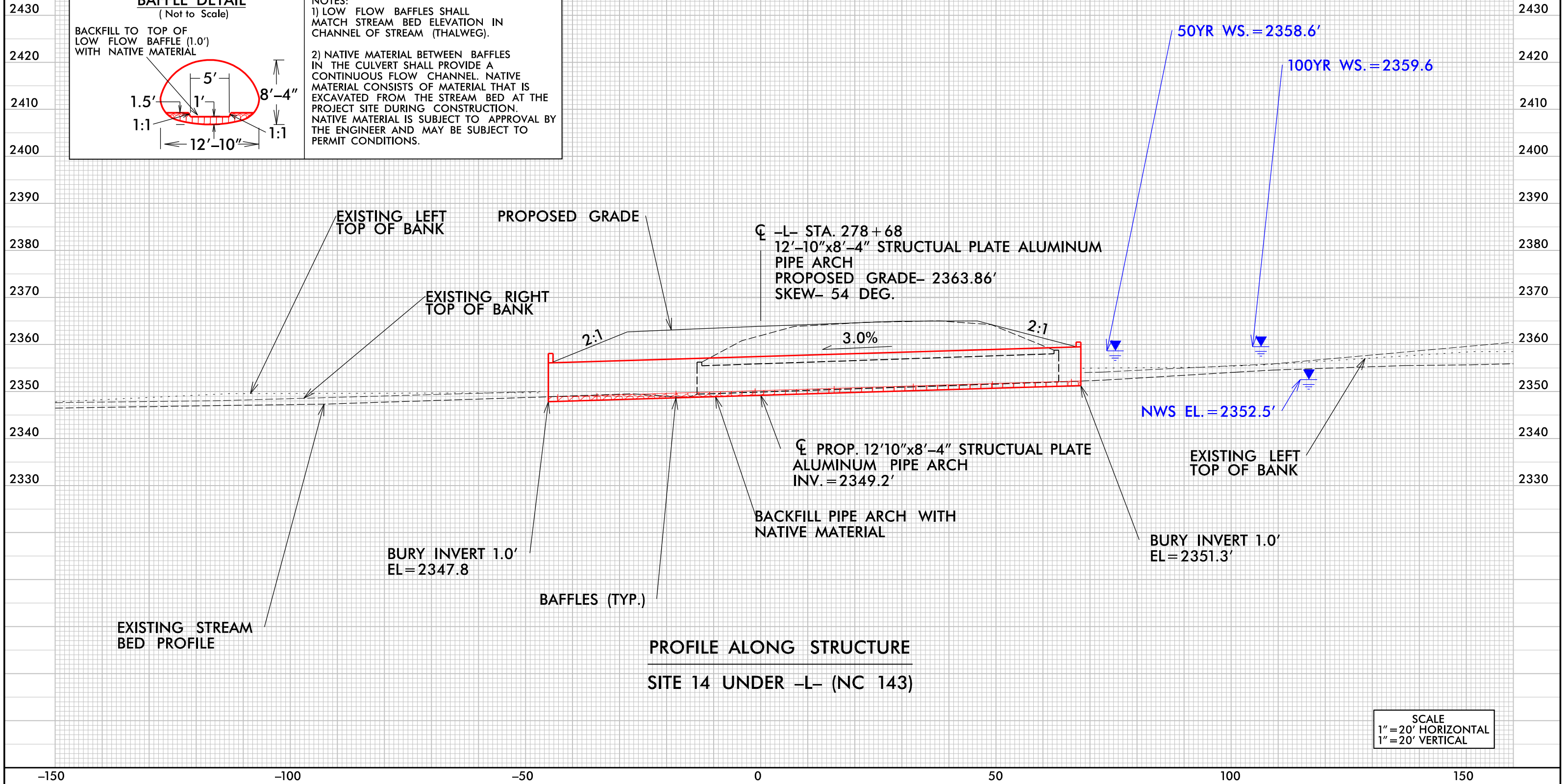
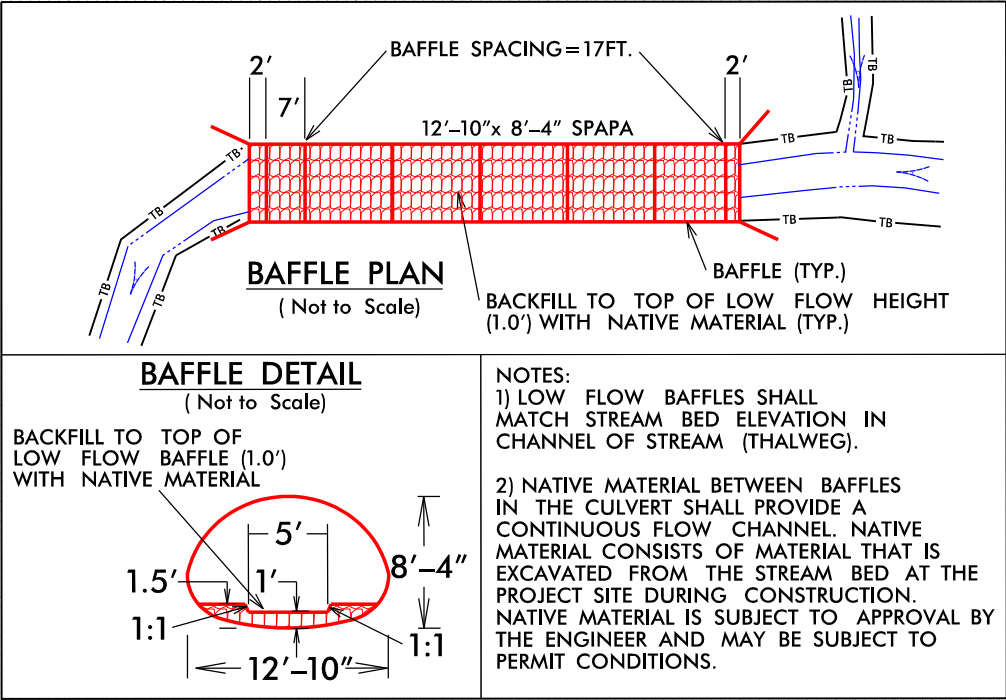


SA
ELIGIBLE AND
UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 46

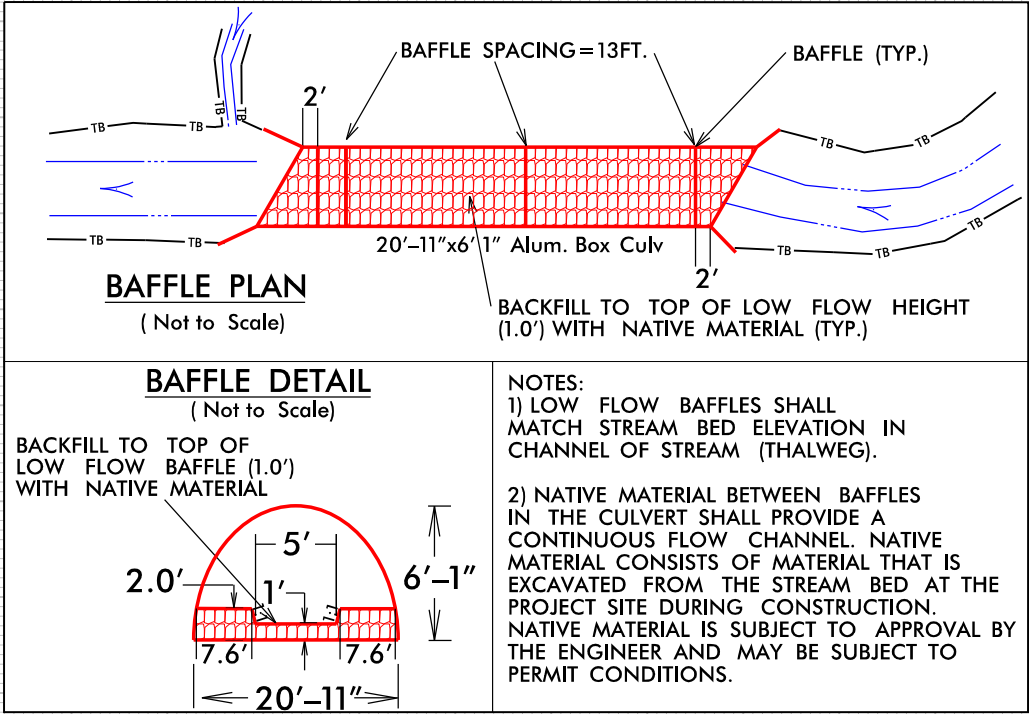
PERMIT DRAWING
SHEET 20 OF 34

-L-
NC 143



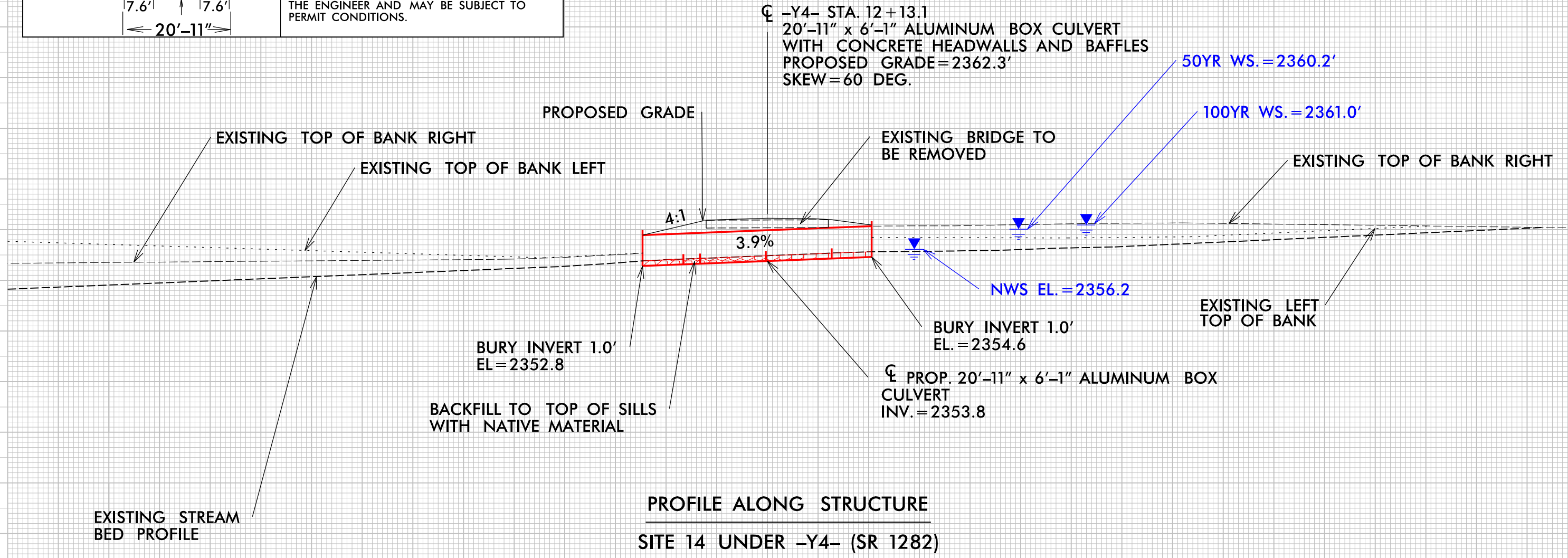
PERMIT DRAWING
SHEET 21 OF 34

-Y4-
SR 1282



2430
2420
2410
2400
2390
2380
2370
2360
2350
2340
2330

2430
2420
2410
2400
2390
2380
2370
2360
2350
2340
2330



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

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



8/17/99

-L- CURVE DATA

PI Sta 311+70.00	PI Sta 320+83.09
$\Delta = 54^{\circ} 45' 45.1''$ (RT)	$\Delta = 32^{\circ} 27' 42.9''$ (LT)
D = 5' 24' 18.9"	D = 7' 32' 20.1"
L = 1013.13'	L = 430.59'
T = 549.01'	T = 221.25'
R = 1060.00'	R = 760.00'
SE = 0.08	SE = 0.08
DS = 55 MPH	DS = 50 MPH

PI Sta 40+76.38	PI Sta 41+53.87	PI Sta 43+61.39
$\Delta = 78^{\circ} 16' 33.1''$ (LT)	$\Delta = 15^{\circ} 47' 56.9''$ (LT)	$\Delta = 41^{\circ} 05' 30.0''$ (LT)
D = 71' 37' 11.0"	D = 23' 52' 23.7"	D = 28' 38' 52.4"
L = 109.29'	L = 66.18'	L = 143.44'
T = 65.10'	T = 33.30'	T = 74.96'
R = 80.00'	R = 240.00'	R = 200.00'

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.

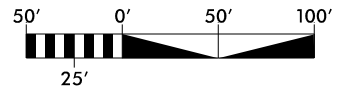
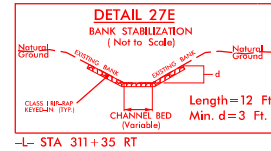
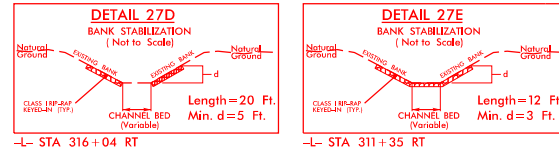
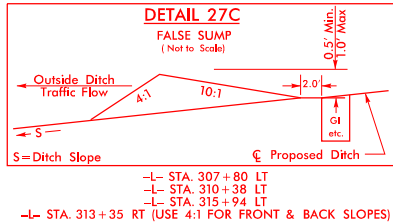
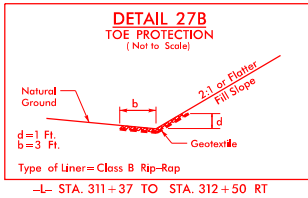
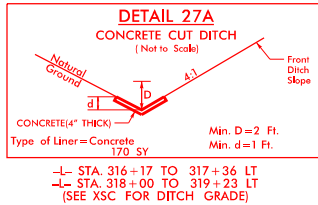
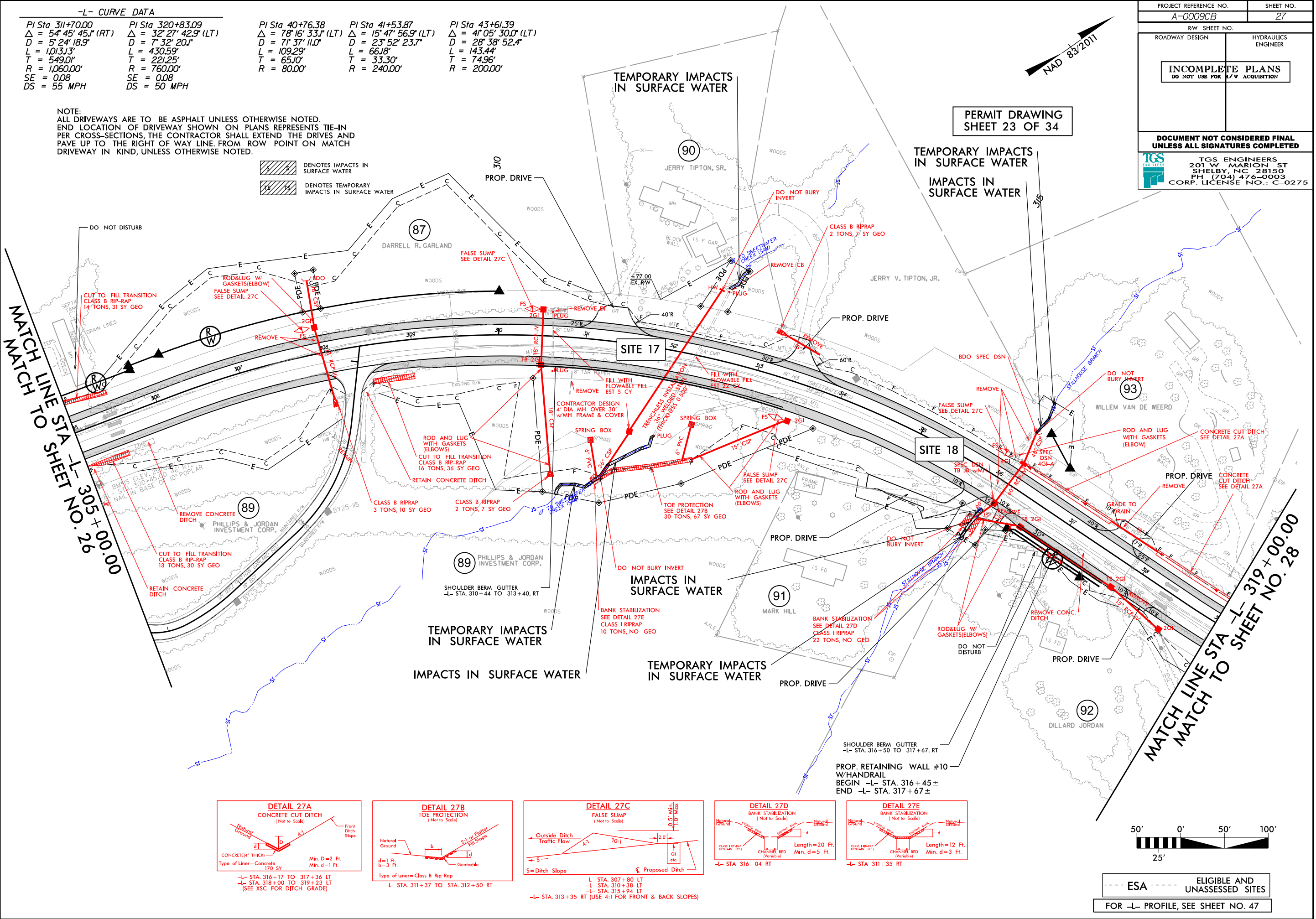
--- S --- DENOTES IMPACTS IN
SURFACE WATER
--- TS --- DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 23 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	27
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN	
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- 305+00.00
MATCH LINE STA -L- 319+00.00

X:\NORTHVA-0009\Hydraulics\PERMITS\Environmental\Drawings\A-0009CB_PSHVA-0009CB_Hyd_perm_psh_27.dgn



--- ESA --- ELIGIBLE AND
UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 47

PERMIT DRAWING
SHEET 24 OF 34

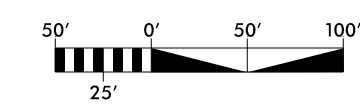
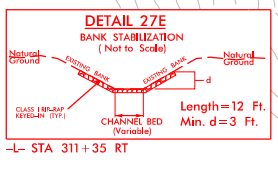
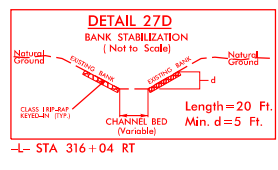
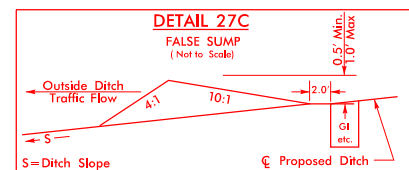
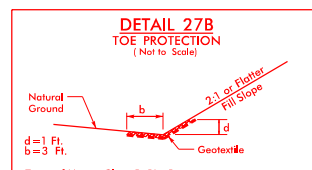
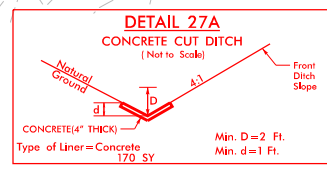
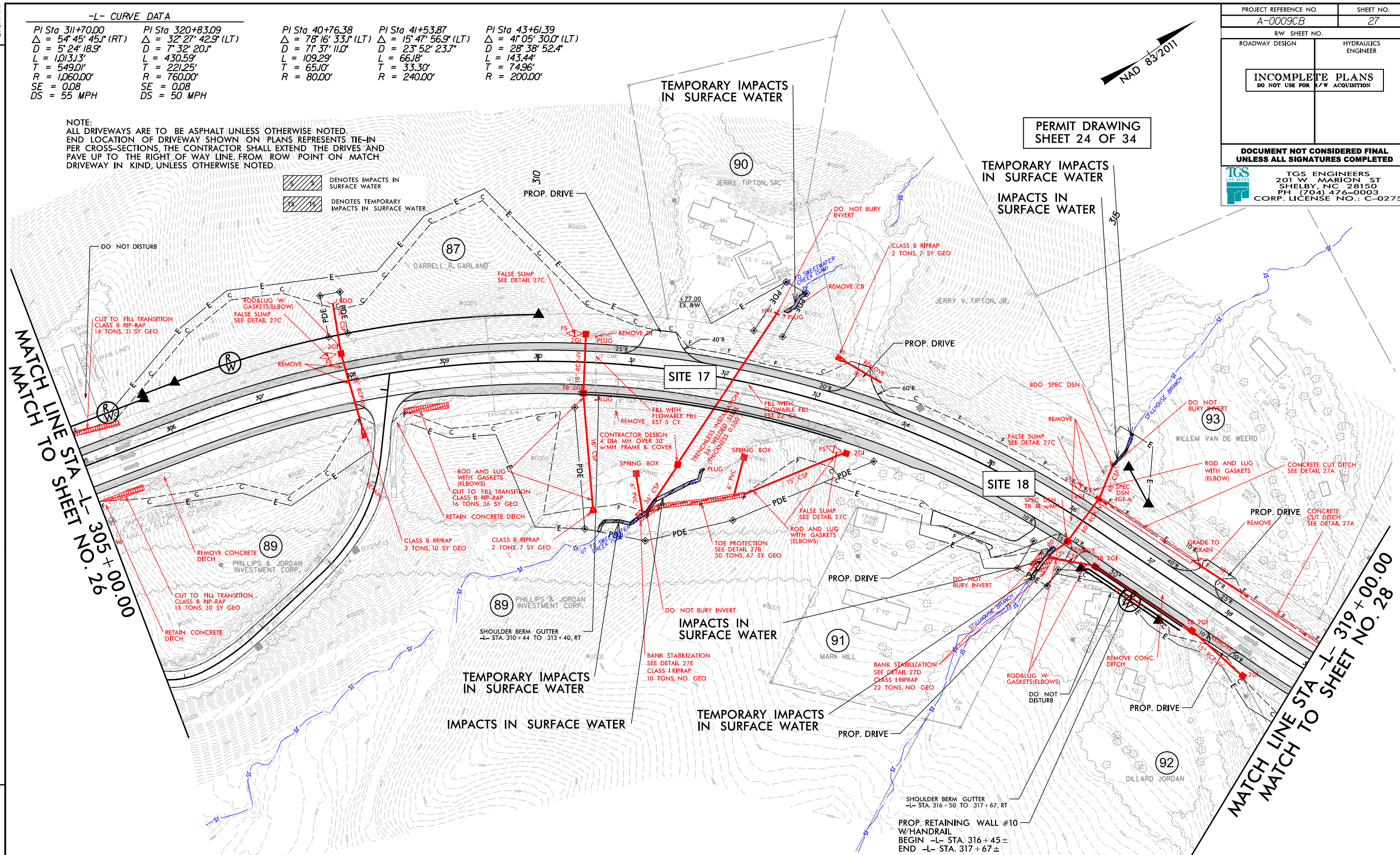
**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

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

-L- CURVE DATA

<i>PI Sta 311+70.00</i>	<i>PI Sta 320+83.09</i>	<i>PI Sta 40+76.38</i>	<i>PI Sta 41+53.87</i>	<i>PI Sta 43+61.39</i>
$\Delta = 54^{\circ} 45' 45.1''$ (RT)	$\Delta = 32^{\circ} 27' 42.9''$ (LT)	$\Delta = 78^{\circ} 16' 33.1''$ (LT)	$\Delta = 15^{\circ} 47' 56.9''$ (LT)	$\Delta = 41^{\circ} 05' 30.0''$ (LT)
<i>D = 5' 24" 18.9"</i>	<i>D = 7' 32" 20.1"</i>	<i>D = 7' 37" 11.0"</i>	<i>D = 23' 52" 23.7"</i>	<i>D = 28' 38" 52.4"</i>
<i>L = 1,013.13'</i>	<i>L = 430.59'</i>	<i>L = 109.29'</i>	<i>L = 66.18'</i>	<i>L = 143.44'</i>
<i>T = 549.01'</i>	<i>T = 221.25'</i>	<i>T = 65.10'</i>	<i>T = 33.30'</i>	<i>T = 74.96'</i>
<i>R = 1,060.00'</i>	<i>R = 760.00'</i>	<i>R = 80.00'</i>	<i>R = 240.00'</i>	<i>R = 200.00'</i>
<i>SE = 0.08</i>	<i>SE = 0.08</i>			
<i>DS = 55 MPH</i>	<i>DS = 50 MPH</i>			


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.

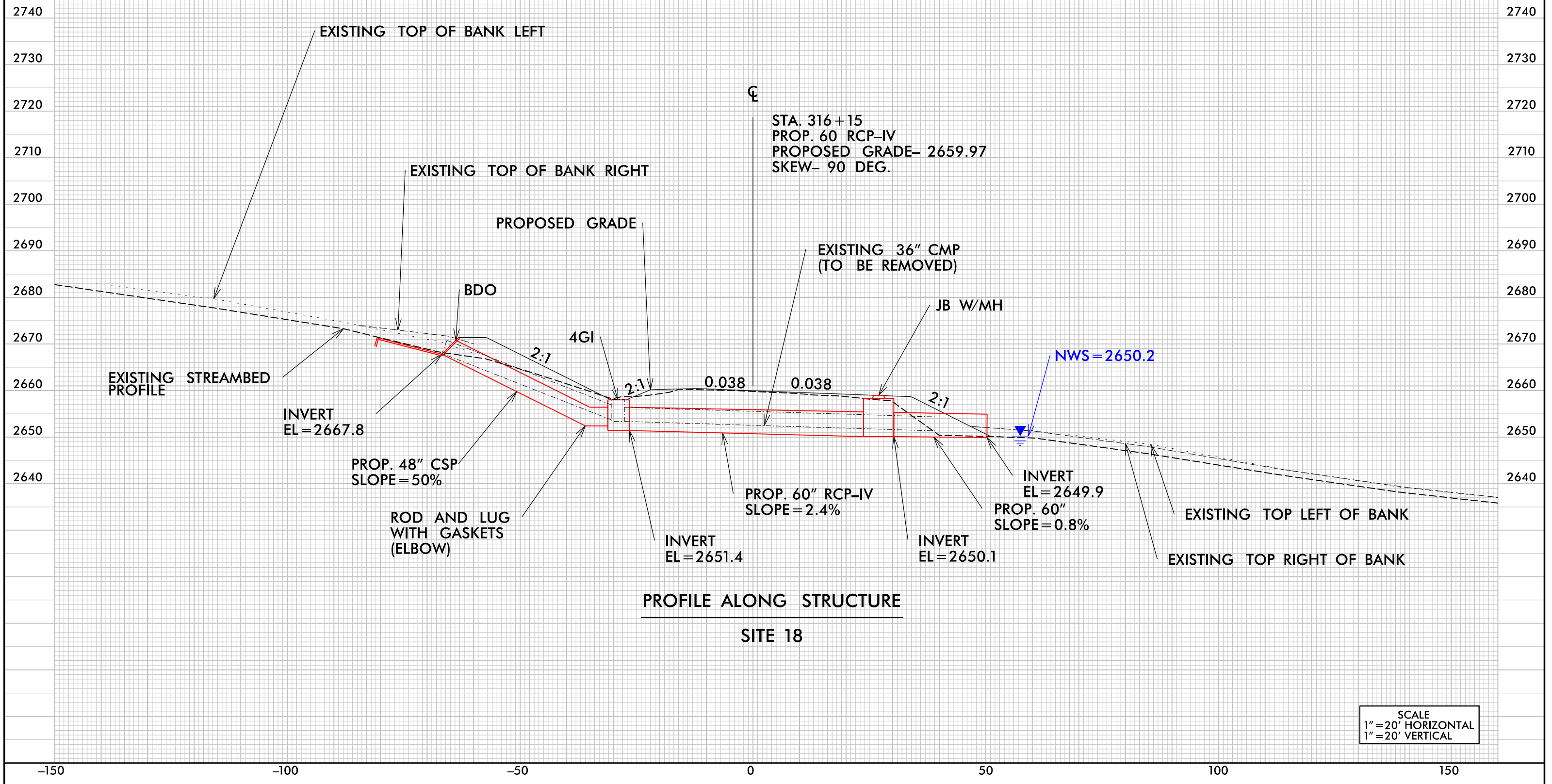


----- **ESA** ----- ELIGIBLE AND
UNASSESSED SITES


-L-
NC 143

PERMIT DRAWING
SHEET 25 OF 34

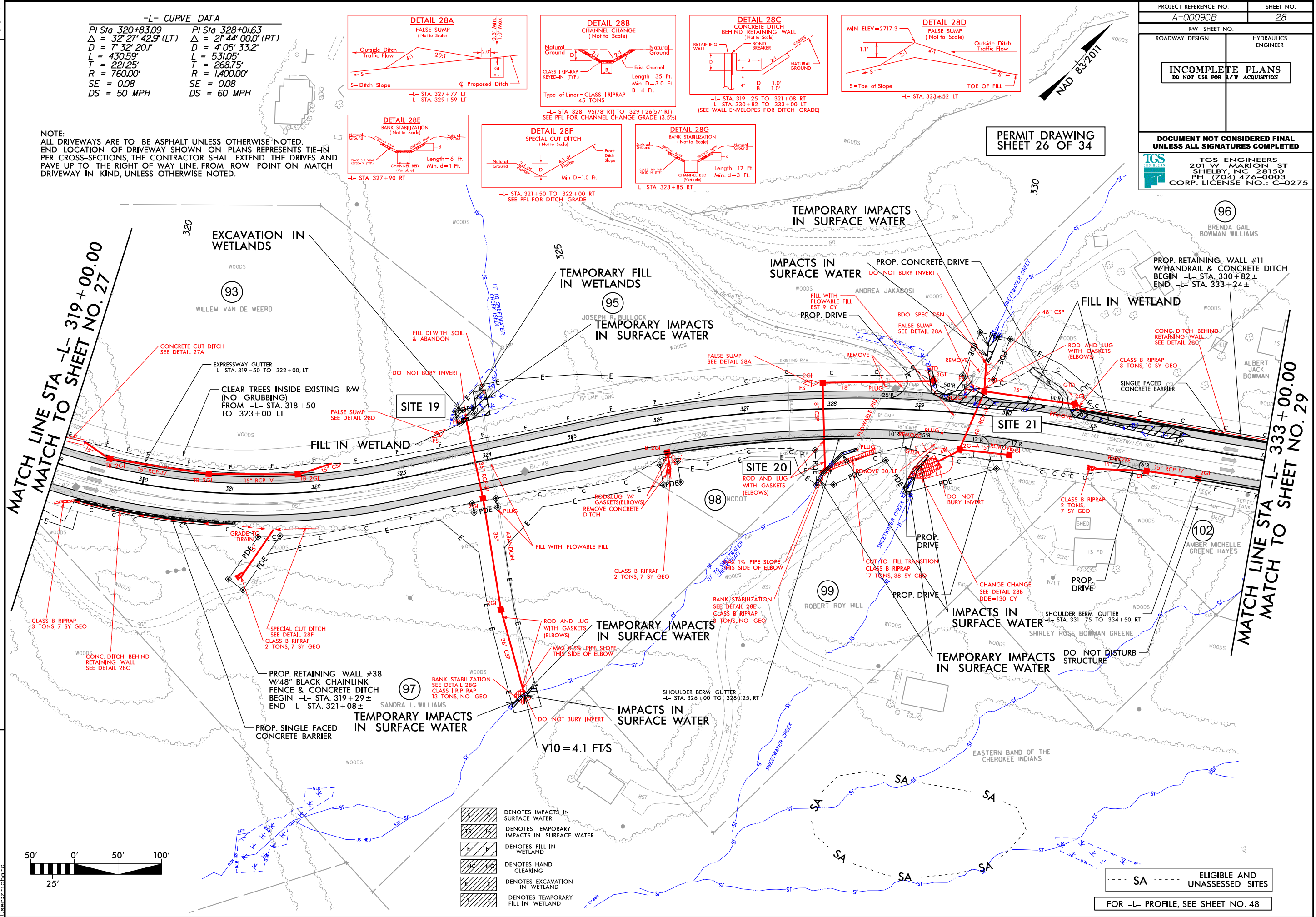
PROJECT REFERENCE NO.		SHEET NO.	
A-0009CB			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
		TGS ENGINEERS 201 W. MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275	



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

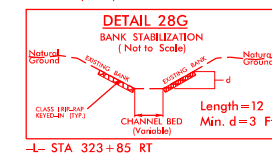
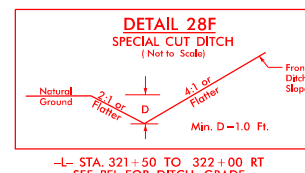
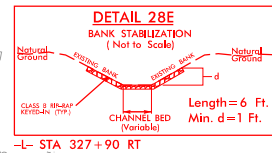
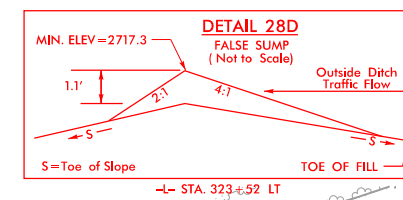
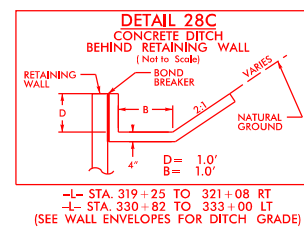
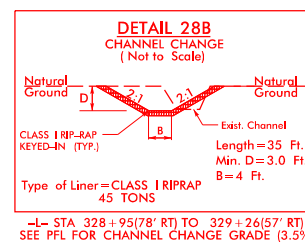
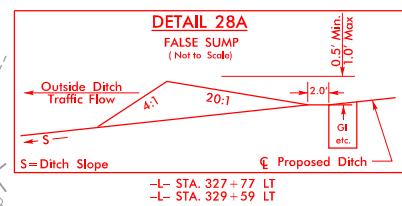
PROJECT REFERENCE NO. <i>A-0009CB</i>	SHEET NO. <i>28</i>
RW SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER
<div style="border: 1px solid black; padding: 10px; text-align: center;">INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION</div>	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
<div style="display: flex; align-items: center;"><div>TGS ENGINEERS 201 W. MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275</div></div>	

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.



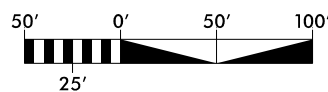
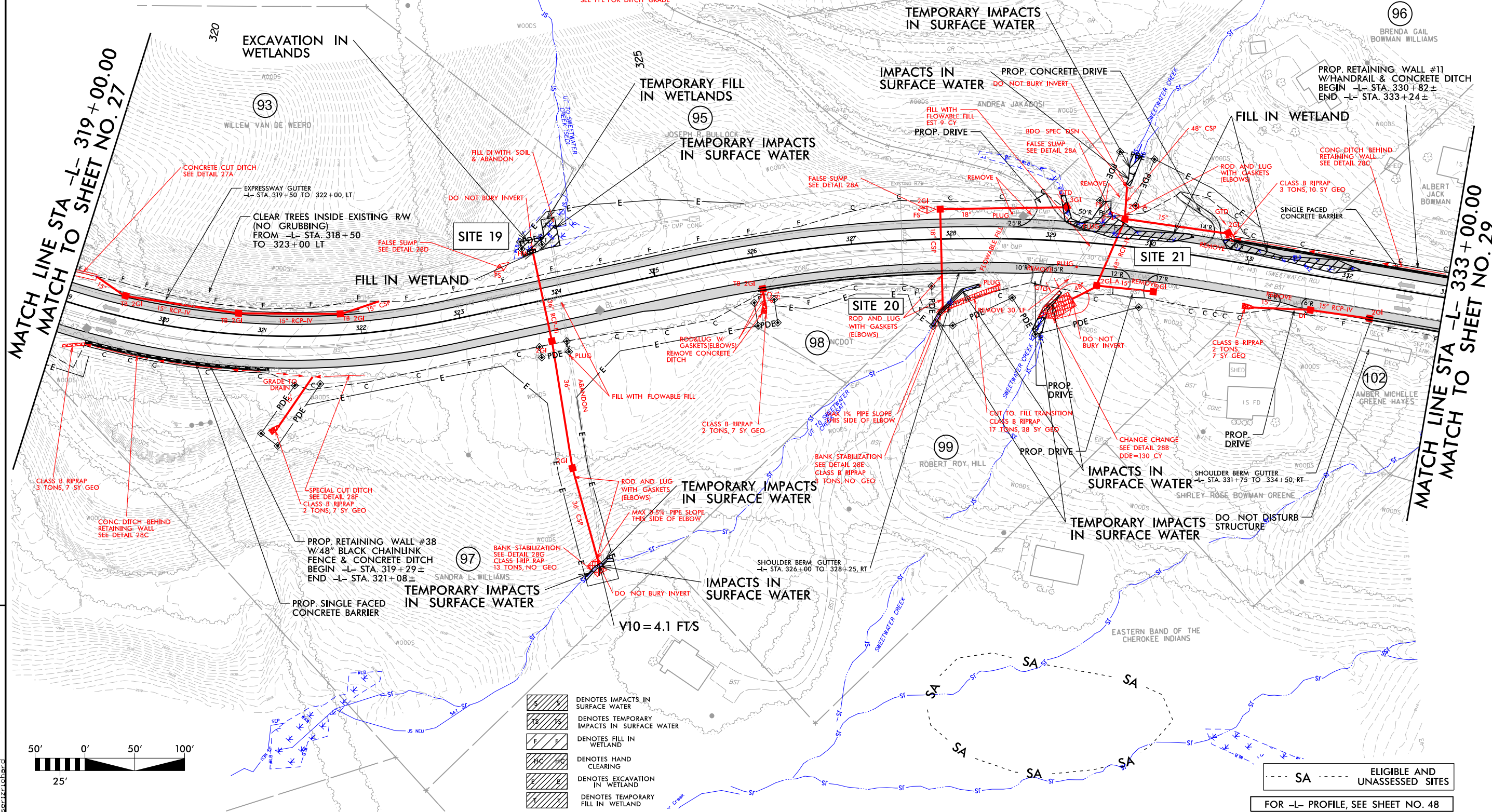
-L- CURVE DATA	
PI Sta 320+83.09	PI Sta 328+01.63
$\Delta = 32^{\circ} 27' 42.9" (LT)$	$\Delta = 21^{\circ} 44' 00.0" (RT)$
$D = 7^{\circ} 32' 20.1"$	$D = 4^{\circ} 05' 33.2"$
$L = 430.59'$	$L = 531.05'$
$T = 221.25'$	$T = 268.75'$
$R = 760.00'$	$R = 1,400.00'$
$SE = 0.08$	$SE = 0.08$
$DS = 50 \text{ MPH}$	$DS = 60 \text{ MPH}$

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.



PERMIT DRAWING
SHEET 27 OF 34

PROJECT REFERENCE NO. A-0009CB	SHEET NO. 28
ROADWAY DESIGN	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/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	



	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

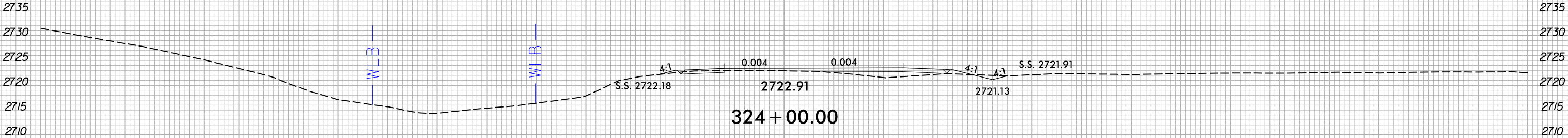
6/23/16
I:\2021\A-0009\Hydro\Hydro\PERMITS\Environmental\Drawings\Profiles\CB\A-0009CB-Hyd.xpl.L-wetlands.dgn
User:zrichard

0510 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



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

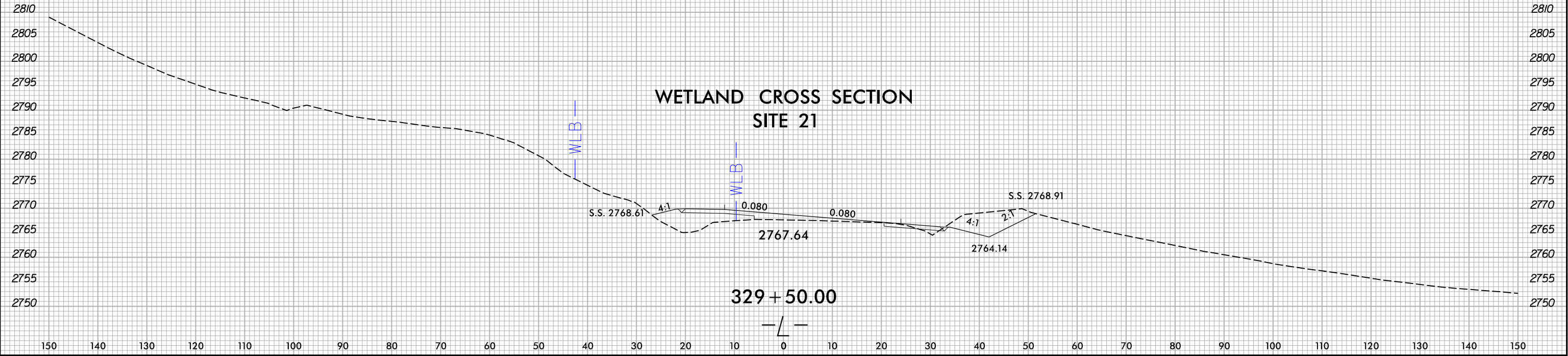
6/23/16
I:\2021\A-0009\Hydraulics\PERMITS\Environmental\Drawings\Profiles CB\A-0009CB-Hyd-xpl-L-wetlands.dgn
User:zrichard

<div>0510</div>	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-111

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

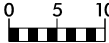
PERMIT DRAWING
SHEET 29 OF 34

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



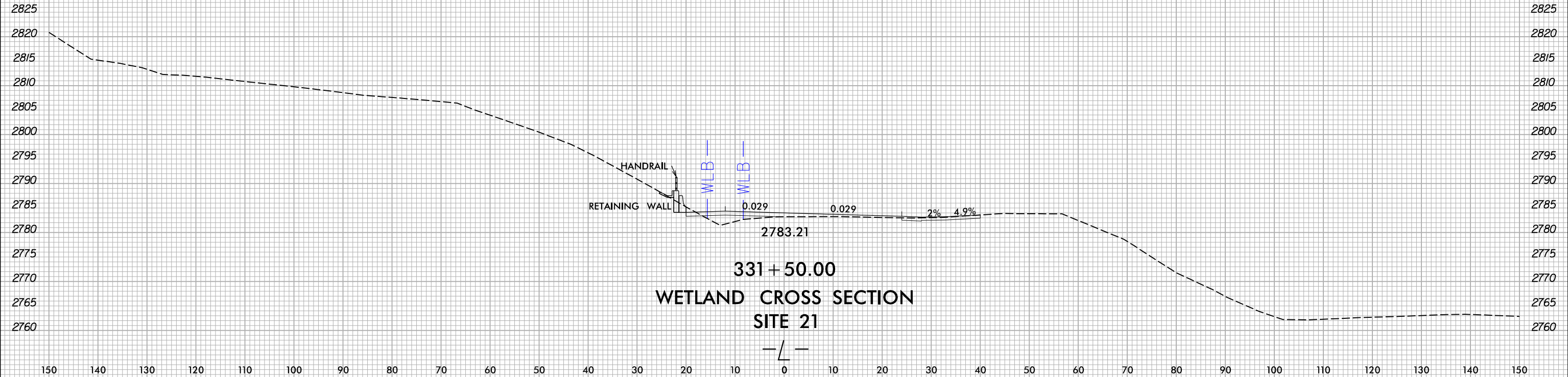
6/23/16
I:\2021\A-0009\Hydraulics\PERMITS\Environmental\Drawings\Profiles CB\A-0009CB.Hyd.xpl.L.wetlands.dgn
User:zrichard

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

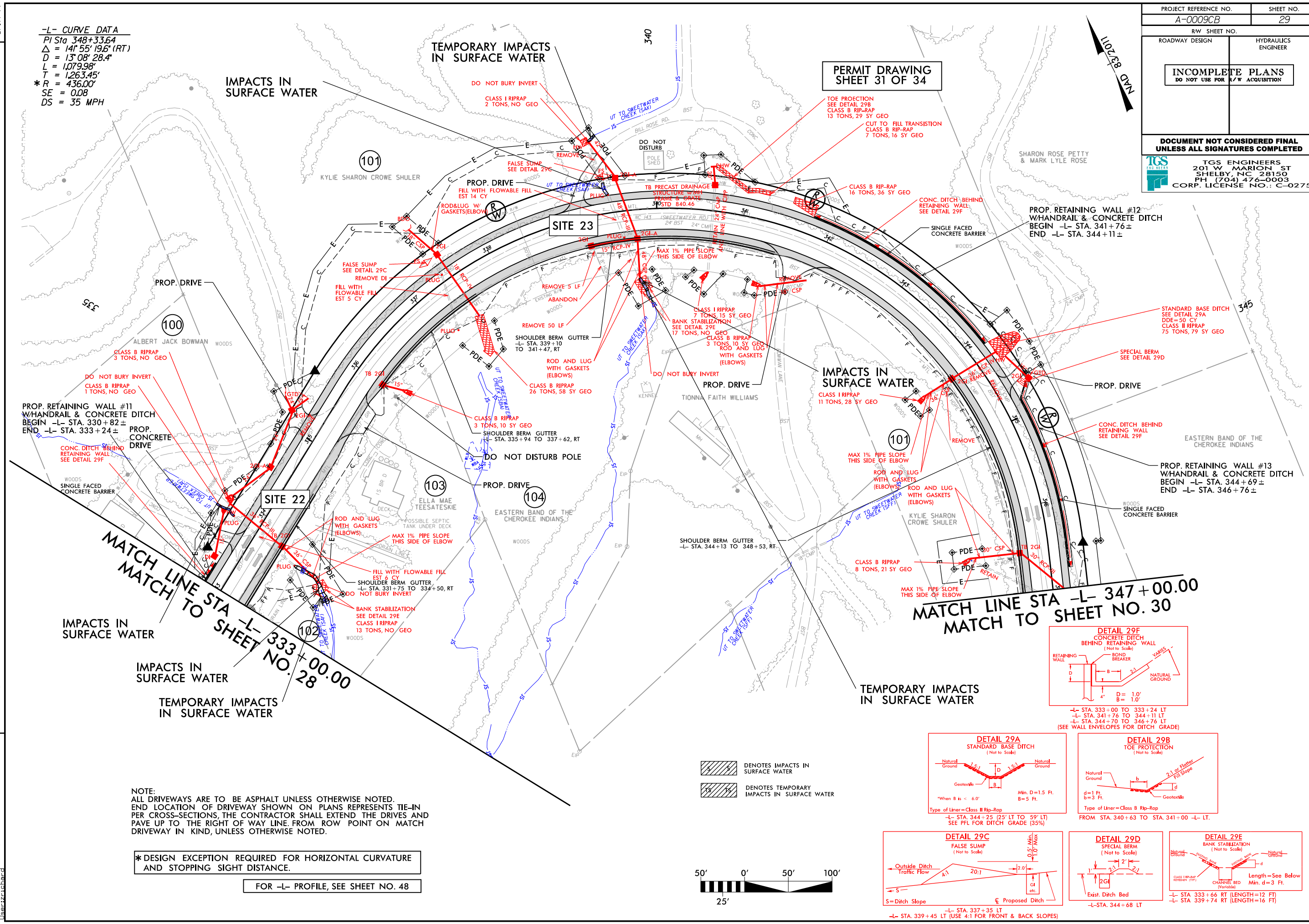
	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-115

PERMIT DRAWING
SHEET 30 OF 34

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



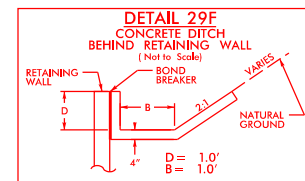
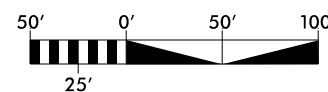
-L- CURVE DATA
 PI Sta 348+33.64
 $\Delta = 141^{\circ} 55' 19.6''$ (RT)
 $D = 13^{\circ} 08' 28.4''$
 $L = 1,079.98'$
 $T = 1,263.45'$
 $* R = 436.00'$
 $SE = 0.08$
 $DS = 35 \text{ MPH}$



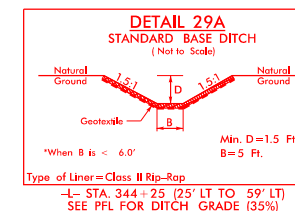
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN
PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND
PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH
DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

* DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE AND STOPPING SIGHT DISTANCE.

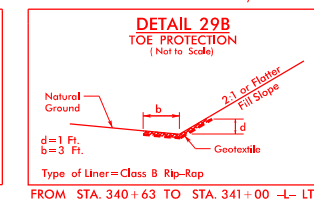
FOR -L- PROFILE, SEE SHEET NO. 48



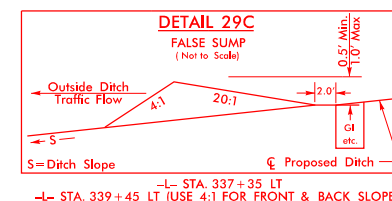
-L- STA. 333+00 TO 333+24 LT
 -L- STA. 341+76 TO 344+11 LT
 -L- STA. 344+70 TO 346+76 LT
 (SEE WALL ENVELOPES FOR DITCH GRAD



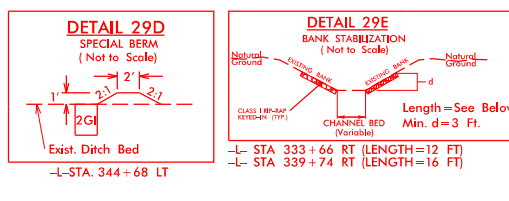
—L— STA. 344+25 (25' LT TO 59' LT)
SEE PFL FOR DITCH GRADE (35%)



FROM STA. 340+63 TO STA. 341+00 -L- LT



-L- STA. 339+45 LT (USE 4:1 FOR FRONT & BACK SLOPE)




-L STA 333+66 RT (LENGTH=12 FT)
-L STA 339+74 RT (LENGTH=16 FT)

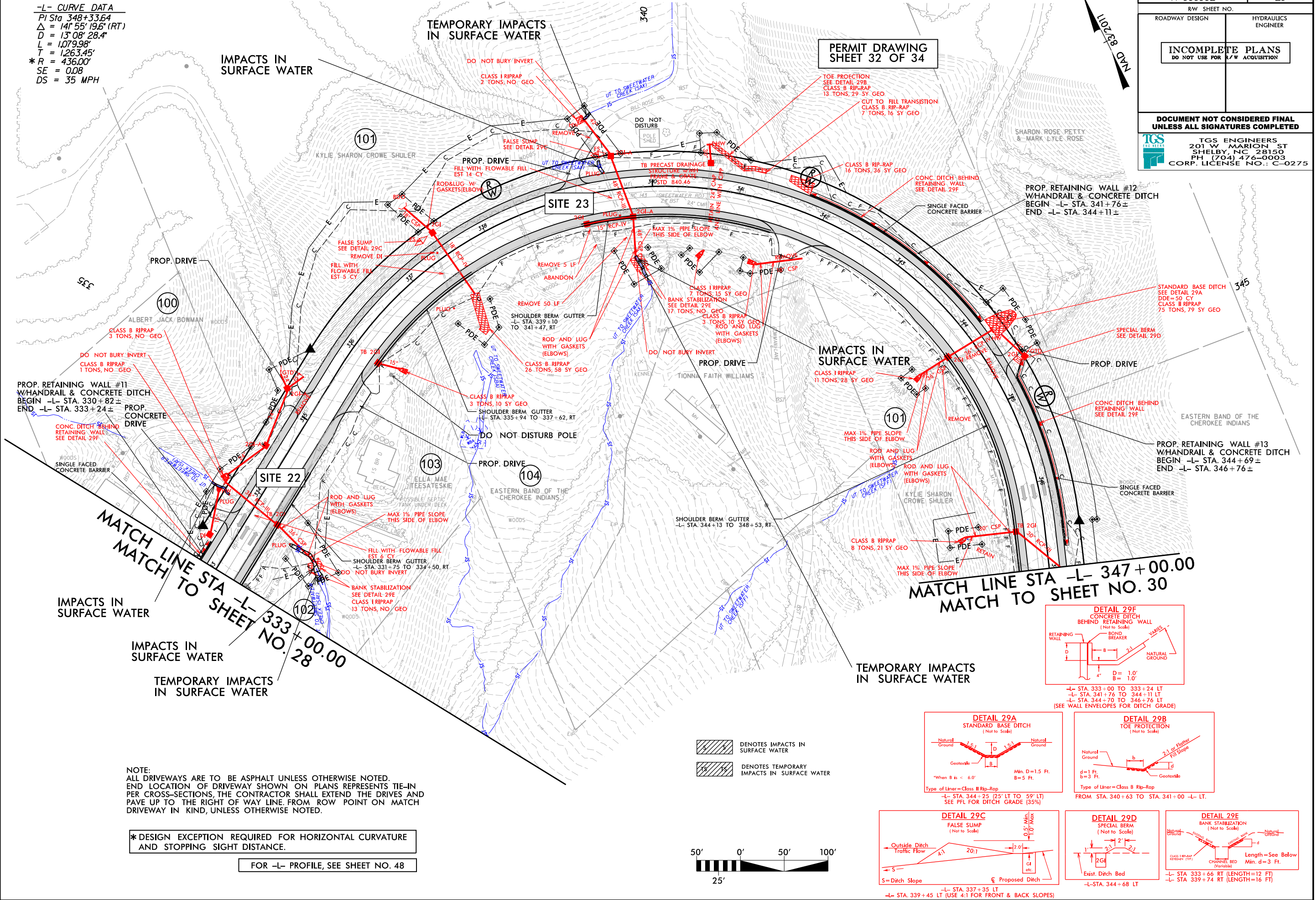
-L- CURVE DATA
 PI Sta 348+33.64
 $\Delta = 141^{\circ}55'19.6"$ (RT)
 $D = 13^{\circ}08'28.4"$
 $L = 1,079.98'$
 $T = 1,263.45'$
 $*R = 436.00'$
 $SE = 0.08$
 $DS = 35$ MPH

IMPACTS IN
SURFACE WATER

TEMPORARY IMPACTS
IN SURFACE WATER

PERMIT DRAWING
SHEET 32 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	29
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN	
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	



IMPACTS IN
SURFACE WATER

IMPACTS IN
SURFACE WATER



TEMPORARY IMPACTS
IN SURFACE WATER

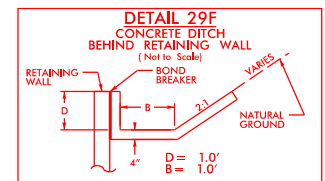
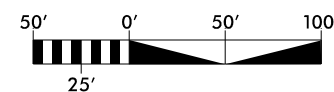
TEMPORARY IMPACTS
IN SURFACE WATER

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.

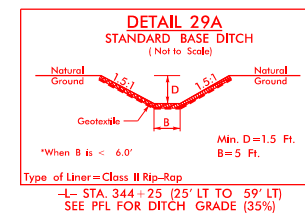
* DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE
AND STOPPING SIGHT DISTANCE.

FOR -L- PROFILE, SEE SHEET NO. 48

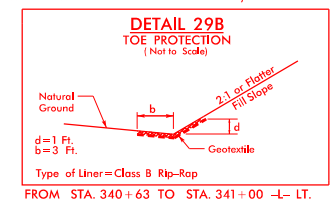
-  DENOTES IMPACTS IN SURFACE WATER
-  DENOTES TEMPORARY IMPACTS IN SURFACE WATER



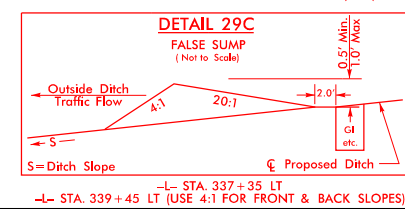
-L- STA. 333+00 TO 333+24 LT
 -L- STA. 341+76 TO 344+11 LT
 -L- STA. 344+70 TO 346+76 LT
 (SEE WALL ENVELOPES FOR DITCH GRADE)



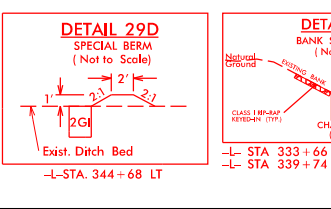
Type of Liner=Class II Rip-Rap
 -L- STA. 344+25 (25' LT TO 59' LT)
 SEE PFL FOR DITCH GRADE (35%)



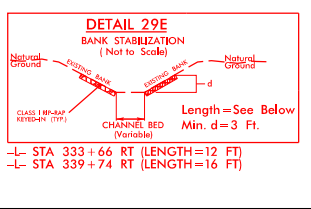
Type of Liner=Class B Rip-Rap
 FROM STA. 340+63 TO STA. 341+00 -L- LT.



-L- STA. 337+35 LT
 -L- STA. 339+45 LT (USE 4:1 FOR FRONT & BACK SLOPES)



-L- STA. 344+68 LT



-L- STA. 333+66 RT (LENGTH=12 FT)
 -L- STA. 339+74 RT (LENGTH=16 FT)

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	-L- 210+35 to 210+50 LT	Construction Easement	Sweetwater Creek								< 0.01			17	
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	304	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/1/2021
GRAHAM
A-0009CB
32572.1.14

SHEET33OF34

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	669	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/1/2021
GRAHAM
A-0009CB
32572.1.14