North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.02; Released April 23, 2024)

General Project Information

WBS Element:	34598.2.2	**TIP Number:**	R-4045/BR-0012	**Project Type:**	Roadway Widening	**Date:**	6/3/2024
NCDOT Contact:	Andy Hussey			**Contractor / Designer:**	Brandon Johnson, PE		
Address:	1020 Birch Ridge Drive Room #16 Raleigh, NC 27610			**Address:**	3301 Benson Dr Suite 400 Raleigh, NC 27609		
Phone:	(919) 707-6641			**Phone:**	(919) 322-0115		
Email:	lahussey@ncdot.gov			**Email:**	brandon.johnson@summitde.com		
City/Town:	Mooresboro			**County(ies):**	Cleveland		
River Basin(s):	Broad			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	1.59	**Surrounding Land Use:**	Rural Area with Residential and Agricultural Land Use				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	19.2	ac.		15.6	ac.		
Typical Cross Section Description:	2 12' lane divided highway with 12' total shoulder (10' paved)			2 12' lane divided highway with 4' paved shoulder			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	30300	Year: 2043	Existing:	22600	Year:	2023

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

State Project involves an upgrade of US 74 at SR 1168 insterection to an interchange and replacement of NCDOT Bridge 220048 and 220049 over Sandy Run Creek on US 74 in Cleveland County. An addition of 2 ramps that will fill over two jurisdictional streams, and one of the ramps will be a new crossing over UT to Sandy Run Creek. An addition of 1 ramp, 1 loop and a major collector that will be new crossings over UT to Sandy Run Creek. Minimization measures such as utilizing 1.5:1 fill slopes are used near wetlands and streams to reduce permanent stream impact. Grass lined ditches are used to help promote infiltration in proposed ditches and ditches with rip rap are used to reduce erosions. Bank stabilization and rip rap at embankment are utilized to reduce erosion at streams.

Stream SA is outside the project limits, so there are no surface water impacts to this stream.

Stream SB is crossed by four alignments (-Y1RPA-, -Y1LPA-, -Y1-, and -Y2-). The proposed -Y1RPA- crossing is a single span bridge. Proposed fill slopes of 2:1 and 1.5:1 ensure all fill is at least 10 feet outside top of bank. The existing topography around the stream is very steep, so ditches are lined with rip rap to reduce velocity and rip rap at embankment is used at the ties to the stream. The proposed -Y1LPA- crossing is an 8’ x 7’ box culvert. The culvert is aligned with the upstream and downstream channels to the greatest extent possible with minimal channel work. The culvert is embedded 1.0' and rip rap channels/protection at the inlet and outlet are embedded to align with the stream. 1.5:1 fill slopes are utilized to minimize culvert length, minimize impacts to Wetland WF, and ensure the fill slope does not impact the stream south of the culvert. Streambank stabilization is proposed to protect the banks during and after culvert phasing. The proposed -Y1- crossing is a 78” pipe. The pipe is aligned the upstream and downstream channels to the greatest extent possible with minimal channel work. The pipe is embedded 1.0' and rip rap channels/protection at the inlet and outlet are embedded to align with the stream. 1.5:1 fill slopes are utilized to minimize pipe length and minimize impacts to Wetland WE. Additionally, the alignment of -Y1- is shifted west of the existing which reduces the impact to Wetland WE with the grade increase required for the -Y1- bridge. The ditch tie in is located at the proposed rip rap channel at the pipe inlet. The proposed -Y2- crossing is a 60” pipe. The pipe is aligned the upstream and downstream channels to the greatest extent possible with minimal channel work. The pipe is embedded 1.0' and rip rap channels/protection at the inlet and outlet are embedded to align with the stream. 1.5:1 fill slopes is utilized to minimize pipe length. The drainage areas of the ditches in the northwest and southeast quadrants are large, so the ditches are lined with rip rap and the last ditch section has a slope of 0.005 ft/ft to reduce the velocity at the tie to the stream. Similarly, the ditch in the southwest quadrant utilizes rip rap to reduce velocity, and all ditches tie to the pipe inlet/outlet stabilization. With the large ditch in the southeast quadrant tying to Stream SB, adding additional drainage area to Stream SD is minimized.

Stream SE has a temporary impact due to a clean water diversion being used to divert clean water around the construction site tying to the stream.

Stream SC is crossed by alignment -SR1-. A proposed 60” pipe buried 1.0’ will be used as the crossing. Fill slopes are 2:1 on both sides of the alignment near the stream to minimize stream impacts. Outlet channel stabilization will be used to reduce erosion at the downstream end. Rip rap will be extended downstream to include the outlet of a closed drainage system that discharges into the stream. Due to the steepness of the existing topography, the storm drain system will also utilize elbows to reduce the velocity of the discharge going into the stream. Wetland WB and WC are directly downstream of the crossing. WB will not be impacted. The impacts to WC will be minimized with the use of 2:1 fill slopes. Existing topography near the stream is steep and stream bank stabilization will be installed at the inlet to reduce runoff velocity from the proposed ditches and minimize erosion.

WBS Element:	34598.2.2	TIP No.:	R-4045/BR-0012	County(ies):	Cleveland	Page	2	of	5

Additional General Project Information

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

Per the CE document, a new 54" pipe will be placed parallel to the existing 48" pipe on Stream SC under US 74, ensuring a more stable stream with less susceptibility to stream blockages, minimizing impacts to dwarf-flowered heartleaf plants located upstream from the existing inlet. The -L- alignment has been shifted north to avoid any impacts to the upstream stream section and the dwarf flowered heartleaf boundary. NCDOT Hydraulics design guidelines were followed to minimize impacts to aquatic passage. A jurisdictional stream rip rap protection pad is proposed at the outlet of retain existing 48" RCP extension. The proposed new 54" steel pipe will be trenchless installation parallel to the existing 48" RCP with sufficient clearance to avoid and minimize impacts to stream SC. During installation, temporary dikes will be utilized to separate pushing and receiving pits from stream SC. Due to the requirement to construct parallel to existing 48" RCP upstream and downstream, 54" pipe ends will not align with stream SC. A bench excavation upstream within the existing roadway slope limits is proposed as an overflow in accordance with RFP requirements. Downstream will require a proposed channel lined with rip rap from the 54" pipe to the existing stream SC tie in where pipe outlet channel stabilization is proposed. 1.5:1 roadway fill slopes will be utilized to minimize pipe length and stream impacts.

A new 60" pipe buried 1.0' will cross alignment -RPD-. Channel stabilization will be placed at outlet to reduce velocity and prevent erosion. Stream SG will be realigned downstream of the 60" -RPD- pipe and upstream of a new 66" pipe as a 47 ft long, 8 ft wide riprap-lined tail ditch with 2:1 side slopes. A proposed 66" pipe buried 1.0' will replace the existing 48" RCP under US 74. The proposed 66" steel pipe will be trenchless installation with sufficient clearance to minimize impacts to stream SG. The proposed 66" pipe will discharge to the same outlet as the existing 48" RCP with pipe outlet stabilization. During installation, temporary dikes will be utilized to separate pushing and receiving pits from stream SG. A temporary diversion channel will be utilized downstream of the 66" pipe in order to stabilize the existing channel before restoring flow to the existing condition. 1.5:1 roadway fill slopes will be utilized to minimize pipe length and stream impacts.

Alignment -SR1- does not cross stream SG but discharges directly downstream to SG. Pipe outlet channel stabilization will be installed at the cross pipe upstream of SG to reduce velocity and prevent erosion.

Streams SD and SF south of -L- interchange Quadrant C are fully impacted by the preliminary and final proposed design/construction, so Stream SD and SF flows will be directed into a single 60" steel trenchless installed pipe. The outlet will be aligned with an existing ditch outside of stream SD north of -L- and pipe outlet channel is proposed to connect the outfall ditch with Stream SD. During trenchless installation, a temporary dike will be utilized to separate receiving pit from existing stream SD at the pipe outlet, and a temporary diversion channel will also be utilized. The proposed drainage will direct existing stream SD drainage north and south of -L- directly to Stream SB to minimize the effects of adding the existing SF drainage to SD.

Sandy Run Creek is crossed by one alignment (-L-/US 74). The proposed crossing are two-span dual bridges that are taller and longer than the existing bridges. Proposed spill through abutment slopes of 1.5:1 will ensure all fill is at least 10 feet outside top of bank. The single interior drill shaft bents are outside the stream. The proposed bents are located to avoid conflicts with the existing bents. A stormdrain system is proposed right of -L- near the eastbound lane to outfall the proposed 10-ft base ditch minimizing erosion to Sandy Run Creek. Extending the ditch to Sandy Run Creek will require a steep grade that would create undesired erosive velocity.

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FOR NCDOT PROJECTS

(Version 3.02; Released April 23, 2024)

WBS Element:	34598.2.2	TIP/Proj No.:	R-4045/BR-0012	County(ies):	Cleveland	Page	3	of	5

General Project Information

Waterbody Information

Surface Water Body (1):	Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	Sandy Run Creek			**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A		
Deck Drains Discharge Over Water Body?	No	(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):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	SA			**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):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	SB			**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A		
Deck Drains Discharge Over Water Body?	No	(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: 34598.2.2 **TIP No.:** R-4045/BR-0012 **County(ies):** Cleveland

Additional Waterbody Information

Surface Water Body (4):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Flowered Heartleaf		
NRTR Stream ID:	SC			**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):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SD			**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):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	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?**	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):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SF			**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: 34598.2.2	**TIP No.:** R-4045/BR-0012	**County(ies):** Cleveland	**Page** 5 **of** 5

Additional Waterbody Information

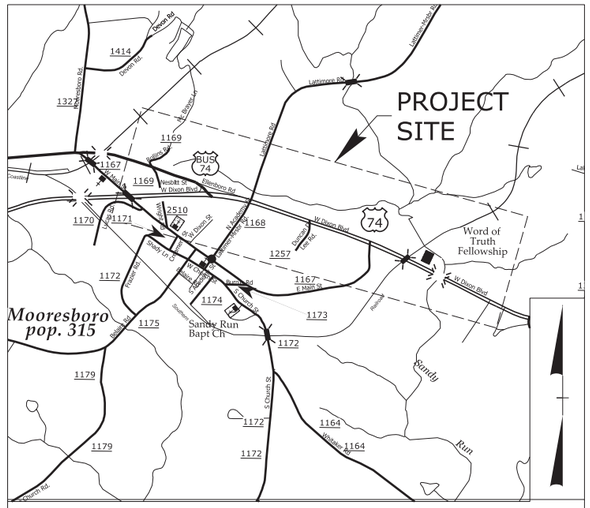
Surface Water Body (8):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	SG			**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)						

09/08/99

TIP PROJECT: R-4045/BR-0012

CONTRACT: C204860

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



VICINITY MAP

NOTE: THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES FOR THE TOWN OF MOORESBORO.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CLEVELAND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4045/BR-0012	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34598.2.2 & 67012.3.1	NHF-74 (4) (R-4045)	CONST.

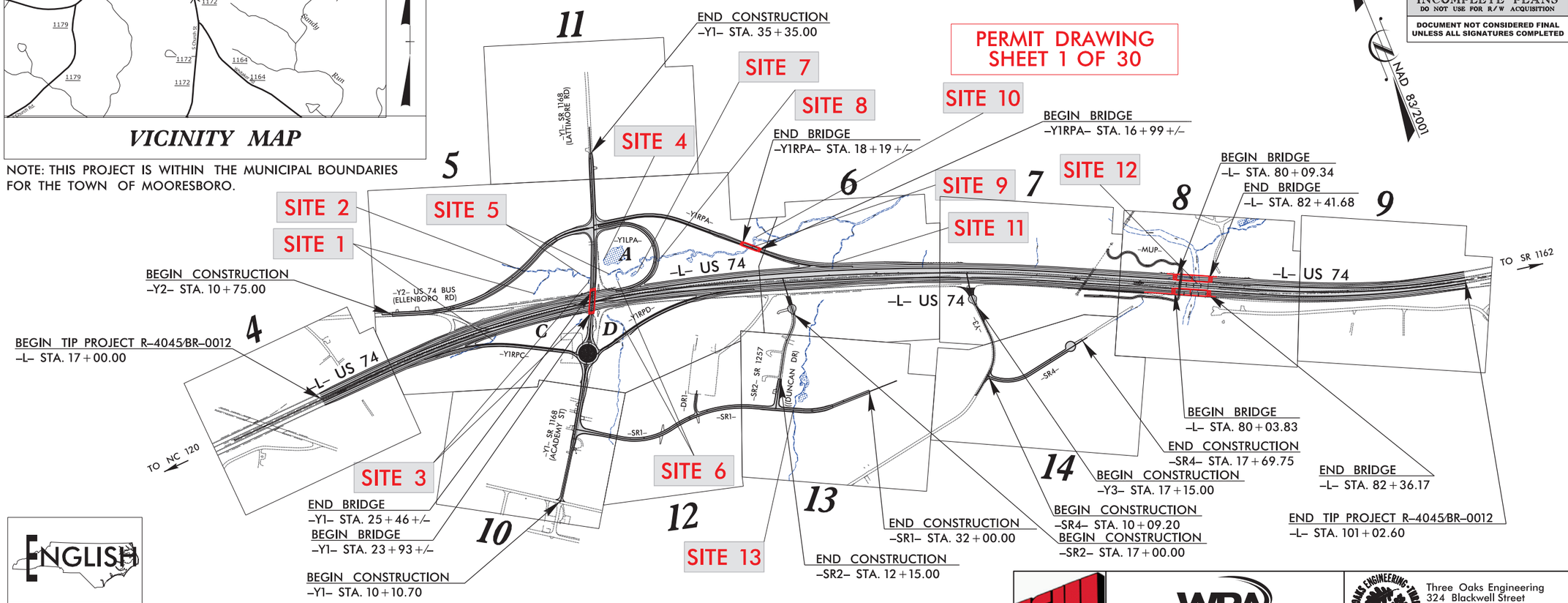
LOCATION: UPGRADE OF US 74 AT SR 1168 (N. ACADEMY ST/LATTIMORE RD) INTERSECTION TO AN INTERCHANGE AND REPLACEMENT OF BRIDGE NOS. 220048 AND 220049 ON US 74 OVER SANDY RUN CREEK

TYPE OF WORK: DESIGN-BUILD AS SPECIFIED IN THE SCOPE OF WORK CONTAINED IN THE REQUEST FOR PROPOSALS

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

PERMIT DRAWING SHEET 1 OF 30

NAD 83/2001



ENGLISH

THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS LIMITED BEING LIMITED TO INTERCHANGE. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

E.S. WAGNER CO., LLC

WRA
Whitman, Requardt & Associates, LLP
1201 Edwards Mill Road, Suite 320, Raleigh, North Carolina 27606

THREE OAKS ENGINEERING
Three Oaks Engineering
324 Blackwell Street
Suite 1200
Durham, NC 27701
919.732.1300

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 2.5 0 5 10

DESIGN DATA

ADT 2023 = 22,600
ADT 2043 = 30,300
K = 8 %
D = 55 %
T = 15 % *
V = 70 MPH
* TTST = 10% DUAL 5%
FUNC CLASS = FREEWAY/INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT R-4045/BR-0012 = 1.591 MILES

LENGTH STRUCTURE T.I.P. PROJECT R-4045/BR-0012 = 0.044 MILES

TOTAL LENGTH OF T.I.P. PROJECT R-4045/BR-0012 = 1.547 MILES

NCDOT CONTACT: ANDY HUSSEY, PE
PROJECT MANAGER, ALTERNATIVE DELIVERY UNIT

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
FIRM NO. P-0339
320 Executive Ct.
Hillsborough, NC 27278-8551
Voice: (919) 732-3883
Fax: (919) 732-6776
www.summitde.com

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JULY 20, 2023

LETTING DATE: JULY 20, 2023

BRANDON JOHNSON, PE
PROJECT ENGINEER

DOUGLAS SAUNDERS, PE
DEPUTY PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

03-JUN-2024 11:14
R-4045_Hyd_prm_psh_I(TSH).dgn
he.yang

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	2D-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: SUMMIT — NC FIRM LICENSE No. P-0339, 320 Executive Ct., Hillsborough, NC 27278, (919) 732-3883, (919) 732-6676 (FAX)

Prepared in the Office of: WRA — 1201 Edwards Mill Road, Suite 320, Raleigh, NC 27606, (919) 859-0808

DETAIL 1
SPECIAL CUT DITCH w/HINGE (Not to Scale)
VARIES 0' TO 6' — Min. D= 1.0 Ft.
FROM STA. 22+00 TO STA. 23+50 -L- RT
FROM STA. 20+50 TO STA. 26+50 -Y1RPA- RT

DETAIL 2
FALSE SUMP (Not to Scale)
Outside Ditch Traffic Flow; 10:1; 20:1; 2.0'; 0.5' Min. 1.0' Max.; GI etc.; S = Ditch Slope; ℄ Proposed Ditch
STA. 21+89 -L- RT
STA. 50+39 -L- RT
STA. 61+21 -L- RT
STA. 83+62 -L- LT
STA. 85+24 -L- LT
STA. 92+15 -L- LT

DETAIL 3
FALSE SUMP (Not to Scale)
Median Ditch; 9"; 2'; L (See Chart Below); 20'; GI etc.; S = Ditch Slope; ℄ Proposed Ditch

Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 27+50 -Y1_RPA- LT
STA. 21+89 -L- CL
STA. 28+88 -L- CL
STA. 35+63 -L- CL
STA. 45+13 -L- CL
STA. 48+06 -L- CL
STA. 50+41 -L- CL
STA. 61+61 -L- CL
STA. 69+98 -L- CL
STA. 75+13 -L- CL
STA. 79+78 -L- CL
STA. 82+61 -L- CL
STA. 85+26 -L- CL
STA. 91+94 -L- CL

DETAIL 4
FALSE SUMP (Not to Scale)
Outside Ditch Traffic Flow; 20:1; 10:1; 2'; 0.5' Min. 1.0' Max.; GI etc.; S = Ditch Slope; ℄ Proposed Ditch
STA. 27+50 -Y1_RPA- RT
STA. 21+88 -L- LT
STA. 68+90 -L- LT
STA. 75+13 -L- LT
STA. 78+96 -L- LT
STA. 92+20 -L- RT
STA. 20+50 -Y1RPA- RT
STA. 18+50 -Y2- LT

DETAIL 5
SPECIAL 'V' DITCH (Not to Scale)
Min. D= 1.0 Ft.
FROM STA. 34+00 TO STA. 35+50 -L- LT
FROM STA. 51+00 TO STA. 52+00 -L- RT
FROM STA. 74+00 TO STA. 77+00 -L- RT
FROM STA. 13+50 TO STA. 15+00 -Y1- RT
FROM STA. 11+00 TO STA. 12+40.41 -SR1- LT
FROM STA. 12+65 TO STA. 14+50 -SR1- LT
FROM STA. 11+00 TO STA. 12+00 -SR1- RT

DETAIL 6
SPECIAL BASE DITCH (Not to Scale)
Min. D=1.5Ft.; d= 1.5 Ft.; B= 2.0 Ft.
Type of Liner= CL B Rip-Rap, Keyed-In
FROM STA. 26+00 TO STA. 28+50 -L- RT

DETAIL 7
CUT DITCH (Not to Scale)
Min. D=1.0Ft.; d= 1.0 Ft.
Type of Liner= CL B Rip-Rap, Keyed-In
FROM STA. 25+50 TO STA. 29+00 -L- LT

DETAIL 8
LATERAL BASE DITCH (Not to Scale)
Min. D=1.0Ft.; d= 1.0 Ft.; B= 4 Ft.; b= 5 Ft.
Type of Liner= CL B Rip-Rap, Keyed-In
FROM STA. 36+00 TO STA. 37+00 -L- LT

DETAIL 9
STANDARD BASE DITCH (Not to Scale)
Min. D=1.5Ft.; d= 1.5 Ft.; B= 10.0 Ft.
Type of Liner= CL I Rip-Rap, Keyed-In
FROM STA. 33+10 TO STA. 33+35 -L- RT
67 FT @ 0.037 FT/FT

DETAIL 10
SPECIAL 'V' DITCH (Not to Scale)
Min. D= 1.0 Ft.
FROM STA. 23+50 TO STA. 26+00 -L- RT
FROM STA. 59+00 TO STA. 60+50 -L- RT
FROM STA. 20+00 TO STA. 23+50 -Y1RPA- LT
FROM STA. 26+50 TO STA. 28+50 -Y1RPA- RT
FROM STA. 30+62 TO STA. 32+50 -Y1- LT
FROM STA. 30+88 TO STA. 32+50 -Y1- RT
FROM STA. 10+50 TO STA. 12+50 -Y2- LT
FROM STA. 11+00 TO STA. 12+50 -Y2- RT
FROM STA. 25+00 TO STA. 26+50 -Y2- LT
FROM STA. 10+50 TO STA. 11+00 -SR1- LT
FROM STA. 14+00 TO STA. 19+00 -SR1- LT
FROM STA. 19+50 TO STA. 22+50 -SR1- LT
FROM STA. 28+50 TO STA. 31+00 -SR1- LT
FROM STA. 10+43.44 TO STA. 11+00 -SR1- RT
FROM STA. 17+00 TO STA. 18+50 -SR1- RT
FROM STA. 19+50 TO STA. 23+00 -SR1- RT
FROM STA. 14+50 TO STA. 15+50 -SR4- LT
FROM STA. 16+50 TO STA. 17+00 -SR4- LT
FROM STA. 10+22.65 TO STA. 11+00 -DR1- LT
FROM STA. 10+22.65 TO STA. 11+00 -DR1- RT

DETAIL 11
SPECIAL BASE DITCH (Not to Scale)
Min. D= 1.0 Ft.; B= 2.0 Ft.
FROM STA. 52+00 TO STA. 59+00 -L- RT
FROM STA. 19+00 TO STA. 19+66.67 -Y1- LT
FROM STA. 19+83 TO STA. 20+50 -Y1RPC- RT
FROM STA. 28+50 TO STA. 32+00 -SR1- RT
FROM STA. 10+50 TO STA. 11+50 -SR2- LT

DETAIL 12
LATERAL BASE DITCH (Not to Scale)
Min. D=1.5Ft.; d= 1.5 Ft.; B= 2.0 Ft.; b= 5.0 Ft.
Type of Liner= CL B Rip-Rap, Keyed-In
FROM STA. 61+85 TO STA. 63+85 -L- LT

DETAIL 13
SPECIAL BASE DITCH (Not to Scale)
Min. D=1.5Ft.; d= 1.5 Ft.; B= 6.0 Ft.
Type of Liner= CL I Rip-Rap, Keyed-In
FROM STA. 77+48 TO STA. 78+50 -L- RT

DETAIL 14
LATERAL BASE DITCH (Not to Scale)
Min. D=1.0Ft.; d= 1.0 Ft.; B= 2.0 Ft.; b= 5.0 Ft.
Type of Liner= CL B Rip-Rap, Keyed-In
FROM STA. 82+65 TO STA. 83+20 -L- LT

DETAIL 15
SPECIAL 'V' DITCH (Not to Scale)
Min. D= 2.0 Ft.
Type of Liner= CL 'B' Rip-Rap, Keyed-In d= 2.0 Ft.
FROM STA. 12+00 TO STA. 12+55 -SR1- RT

DETAIL 16
SPECIAL 'V' DITCH (Not to Scale)
Min. D= 2.5 Ft.
Type of Liner= CL 'B' Rip-Rap, Keyed-In d= 2.5 Ft.
FROM STA. 12+55 TO STA. 13+00 -SR1- RT

DETAIL 17
SPECIAL 'V' DITCH (Not to Scale)
Min. D= 1.5 Ft.
Type of Liner= CL 'B' Rip-Rap, Keyed-In d= 1.5 Ft.
FROM STA. 13+00 TO STA. 14+50 -SR1- RT
FROM STA. 20+00 TO STA. 20+69 -Y1RPD- LT

DETAIL 18
SPECIAL 'V' DITCH (Not to Scale)
Min. D= 1.0 Ft.
Type of Liner= CL 'B' Rip-Rap, Keyed-In d= 1.0 Ft.
FROM STA. 12+50 TO STA. 15+81 -Y2- RT
FROM STA. 14+50 TO STA. 17+00 -SR1- RT
FROM STA. 10+50 TO STA. 14+50 -SR4- LT

DETAIL 19
SPECIAL 'V' DITCH (Not to Scale)
Min. D= 1.5 Ft.
FROM STA. 18+50 TO STA. 19+50 -SR1- RT

DETAIL 20
SPECIAL BASE DITCH (Not to Scale)
Min. D=1.0Ft.; d= 1.0 Ft.; B= 4.0 Ft.
Type of Liner= CL 'B' Rip-Rap, Keyed-In
FROM STA. 23+00 TO STA. 26+00 -SR1- RT
FROM STA. 18+50 TO STA. 19+57.71 -Y1- RT

DETAIL 21
SPECIAL BASE DITCH (Not to Scale)
Min. D=1.0Ft.; d= 1.0 Ft.; B= 2.0 Ft.
Type of Liner= CL 'B' Rip-Rap, Keyed-In
FROM STA. 19+00 TO STA. 20+45 -Y2- LT
FROM STA. 27+00 TO STA. 28+50 -SR1- RT

DETAIL 22
SPECIAL 'V' DITCH (Not to Scale)
Min. D= 1.0 Ft.
FROM STA. 15+50 TO STA. 16+50 -SR4- LT

DETAIL 23
SPECIAL BASE DITCH (Not to Scale)
Min. D=1.5Ft.; d= 1.5 Ft.; B= 4.0 Ft.
Type of Liner= CL 'B' Rip-Rap, Keyed-In
FROM STA. 12+00 TO STA. 17+50 -SR4- RT

DETAIL 24
SPECIAL 'V' DITCH (Not to Scale)
Min. D= 0.5 Ft.
FROM STA. 16+50 TO STA. 18+50 -Y1- RT

DETAIL 25
SPECIAL BASE DITCH (Not to Scale)
Min. D=1.8Ft.; d= 1.8 Ft.; B= 2.0 Ft.
Type of Liner= CL I Rip-Rap, Keyed-In
FROM STA. 18+06 TO STA. 19+83 -Y1RPC- RT

DETAIL 27
SPECIAL BASE DITCH (Not to Scale)
Min. D=1.6Ft.; d= 1.6 Ft.; B= 2.0 Ft.
Type of Liner= CL 'I' Rip-Rap, Keyed-In
FROM STA. 13+62.12 TO STA. 18+06 -Y1RPC- RT

DETAIL 28
PIPE OUTLET CHANNEL STABILIZATION (Not to Scale)
Length= 20 Ft.
Type of Liner= 47 TONS CL 'I' Rip-Rap - Keyed-In
*Place Geotextile Under Riprap in Locations Directed by Engineer
STA. 26+34 -SR1- LT

DETAIL 29
BANK STABILIZATION (Not to Scale)
Place Geotextile Under Riprap in Locations Directed by Engineer; Press Riprap into Channel Bottom Until Refusal
Type of Liner= 3 TONS,CL 'I' Rip-Rap, Keyed-In
FROM STA. 26+28 TO STA. 26+33.38 -SR1- RT

DETAIL 30
BANK STABILIZATION (Not to Scale)
Place Geotextile Under Riprap in Locations Directed by Engineer; Press Riprap into Channel Bottom Until Refusal
Type of Liner= 4 TONS,CL 'I' Rip-Rap, Keyed-In
FROM STA. 26+35 TO STA. 26+44 -SR1- RT

DETAIL 31
LATERAL BASE DITCH (Not to Scale)
Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D= 2 Ft.; d= 2 Ft.; B= 6 Ft.; b= 30 Ft.
Type of Liner= CL B Rip-Rap, Keyed-In
FROM STA. 20+55 TO STA. 21+50 -Y2- LT

DETAIL 32
SPECIAL BASE DITCH (Not to Scale)
Min. D= 1.5 Ft.; B= 6.0 Ft.
FROM STA. 21+50 TO STA. 24+50 -Y2- LT

DETAIL 33
SPECIAL BASE DITCH (Not to Scale)
Min. D= 1.5 Ft.; B= 2 Ft.
FROM STA. 24+50 TO STA. 25+00 -Y2- LT

DETAIL 34
TAIL DITCH (Not to Scale)
Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D= 1.5 Ft.; d= 1.5 Ft.; B= 2.0 Ft.
Type of Liner= ? Rip-Rap, Keyed-In
FROM STA. 17+65 TO STA. 18+12 -Y1RPA- RT
49 FT @ 0.005 FT/FT

DETAIL 35
SPECIAL 'V' DITCH (Not to Scale)
Min. D= 0.6 Ft.
FROM STA. 10+50 TO STA. 11+00 -Y2- RT

DETAIL 36
SPECIAL BASE DITCH (Not to Scale)
Min. D= 1.5 Ft.; d= 1.5 Ft.; B= 6 Ft.
Type of Liner= CL B Rip-Rap, Keyed-In
FROM STA. 15+81 TO STA. 19+00 -Y2- RT

DETAIL 37
LATERAL BASE DITCH (Not to Scale)
Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D= 2 Ft.; d= 2 Ft.; B= 6 Ft.; b= 5 Ft.
Type of Liner= CL B Rip-Rap, Keyed-In
FROM STA. 19+50 TO STA. 21+35 -Y2- RT

DETAIL 38
LATERAL BASE DITCH (Not to Scale)
Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D= 1 Ft; d= 1 Ft.; B= 2.0 Ft.; b= 5.0 Ft.
Type of Liner= CL I Rip-Rap, Keyed-In
FROM STA. 18+12 TO STA. 20+00 -Y1RPA- RT

DETAIL 39
LATERAL BASE DITCH (Not to Scale)
Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D=1.0Ft.; d= 1.0 Ft.; B= 2.0 Ft.; b= 5.0 Ft.
Type of Liner= 'B' Rip-Rap, Keyed-In
FROM STA. 26+44 TO STA. 27+00 -SR1- RT

DETAIL 40
PIPE OUTLET CHANNEL STABILIZATION (Not to Scale)
Length= 25 Ft.
Type of Liner= 70 TON CL II Rip-Rap - Keyed-In
*Place Geotextile Under Riprap in Locations Directed by Engineer
STA. 21+32 -Y2- RT

DETAIL 41
LATERAL BASE DITCH (Not to Scale)
Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Min. D= 1 Ft; d= 1 Ft.; B= 4 Ft.; b= 15 Ft.
Type of Liner= CL B Rip-Rap, Keyed-In
FROM STA. 26+04 TO STA. 26+57 -Y1- LT

DETAIL 42
PIPE OUTLET CHANNEL (Not to Scale)
Length= 35 Ft.
Type of Liner= 65 TON CL II Rip-Rap - Keyed-In
*Place Geotextile Under Riprap in Locations Directed by Engineer
STA. 26+78 -Y1- RT

DETAIL 43
PIPE INLET STABILIZATION (Not to Scale)
Press Riprap into Channel Bottom Until Refusal (Typ)
Length= 45 Ft.; d= 3.0 Ft.; Est.= 45 Tons of Class II Rip-Rap, Keyed-In
Place Geotextile Under Riprap in Locations Directed by Engineer
STA. 20+65 -Y2- LT

DETAIL 44
PIPE INLET CHANNEL (Not to Scale)
Length= 26 Ft.
Type of Liner= 50 TON CL II Rip-Rap - Keyed-In
*Place Geotextile Under Riprap in Locations Directed by Engineer
STA. 26+72 -Y1- LT

DETAIL 45
BANK STABILIZATION (Not to Scale)
Place Geotextile Under Riprap in Locations Directed by Engineer; Press Riprap into Channel Bottom Until Refusal
Type of Liner= CL II Rip-Rap, Keyed-In
FROM STA. 12+72 TO STA. 13+98 -Y1LPA- LT
FROM STA. 14+11 TO STA. 14+75 -Y1LPA- RT
FROM STA. 16+84 TO STA. 17+10 -Y1RPA- RT
FROM STA. 17+19 TO STA. 17+36 -Y1RPA- RT

DETAIL 46
RIP RAP AT EMBANKMENT (Not to Scale)
Place Geotextile Under Riprap in Locations Directed by Engineer; Press Riprap into Channel Bottom Until Refusal
Type of Liner= 12 TONS,CL I Rip-Rap, Keyed-In
STA. 17+61 -Y1RPA- RT

DETAIL 47
TOE PROTECTION (Not to Scale)
d= 1.0 Ft.; b= 5.0 Ft.
Type of Liner= CL B Rip-Rap
FROM STA. 14+00 TO STA. 16+94.69 -Y1RPA- LT
FROM STA. 10+75 TO STA. 11+11 -Y1RPA- RT
FROM STA. 11+42 TO STA. 13+40 -Y1RPA- RT
FROM STA. 17+50 TO STA. 19+00 -Y1- LT

DETAIL 48
RIP RAP AT EMBANKMENT (Not to Scale)
Place Geotextile Under Riprap in Locations Directed by Engineer; Press Riprap into Channel Bottom Until Refusal
Type of Liner= 8 TONS,CL I Rip-Rap, Keyed-In
STA. 19+77 -Y1RPA- LT

DETAIL 49
TAIL DITCH (Not to Scale)
Min. D= 1.0 Ft.
FROM STA. 19+77 TO STA. 20+00 -Y1RPA- LT
43 FT @ 0.062 FT/FT

DETAIL 50
SPECIAL BASE DITCH (Not to Scale)
Min. D= 0.8 Ft.; B= 4.0 Ft.
FROM STA. 20+69 TO STA. 22+00 -Y1RPD- LT

DETAIL 51
SPECIAL 'V' DITCH (Not to Scale)
Min. D= 1.0 Ft.; d= 1.0 Ft.
Type of Liner= CL I Rip-Rap, Keyed-In
FROM STA. 19+50 TO STA. 20+00 -Y1RPD- LT

ENGLISH

PERMIT DRAWING
SHEET 2 OF 30

6/2/99
03-JUN-2024 11:14
R-4045_Hyd_prm_psh_2 (Detail Sheet 1).dgn

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	2D-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
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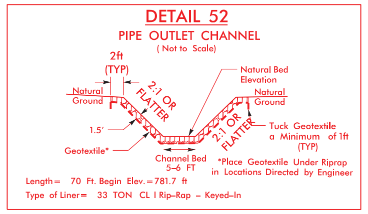
Prepared in the Office of: SUMMIT DESIGN AND ENGINEERING SERVICES — NC FIRM LICENSE No: P-0339, 320 Executive Ct., Hillsborough, NC 27278, (919) 732-3883, (919) 732-6676 (FAX)

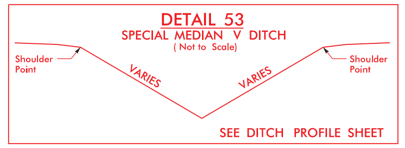
Prepared in the Office of: WRA Whitman, Requardt & Associates, LLP — 120 Edwards Mill Road, Suite 320, Raleigh, NC 27606, (919) 859-0806

DETAIL 52
PIPE OUTLET CHANNEL (Not to Scale)



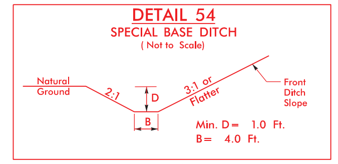
STA. 54+44 -L- LT

DETAIL 53
SPECIAL MEDIAN V DITCH (Not to Scale)



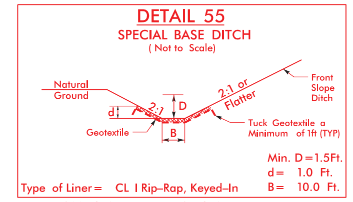
FROM STA. 36+50 TO STA. 37+50 -L- CL
FROM STA. 49+50 TO STA. 50+50 -L- CL

DETAIL 54
SPECIAL BASE DITCH (Not to Scale)



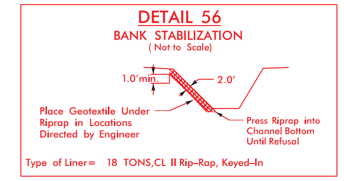
FROM STA. 11+00 TO STA. 11+45.18 -RAB- RT

DETAIL 55
SPECIAL BASE DITCH (Not to Scale)



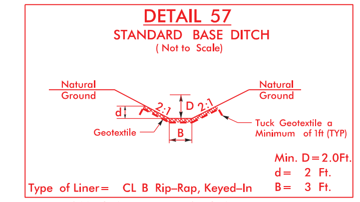
FROM STA. 78+50 TO STA. 80+45 -L- RT

DETAIL 56
BANK STABILIZATION (Not to Scale)



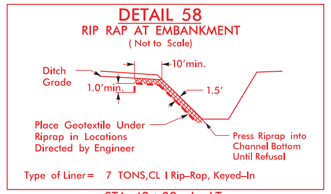
FROM STA. 80+87 TO STA. 80+96 -L- RT

DETAIL 57
STANDARD BASE DITCH (Not to Scale)



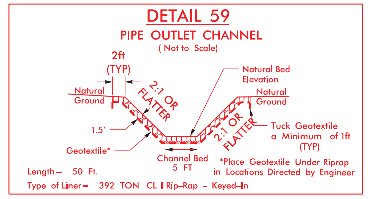
FROM STA. 48+05 TO STA. 48+08 -L- LT
27 FT @0.019 FT/FT

DETAIL 58
RIP RAP AT EMBANKMENT (Not to Scale)



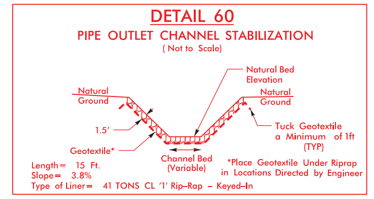
STA. 48+08 -L- LT

DETAIL 59
PIPE OUTLET CHANNEL (Not to Scale)



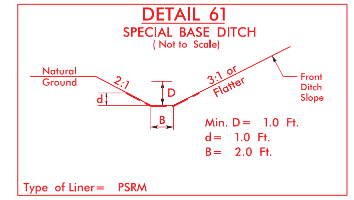
STA. 33+93 -L- LT

DETAIL 60
PIPE OUTLET CHANNEL STABILIZATION (Not to Scale)



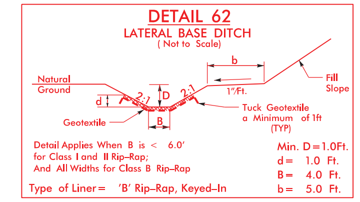
STA. 12+65 -SR1- LT

DETAIL 61
SPECIAL BASE DITCH (Not to Scale)



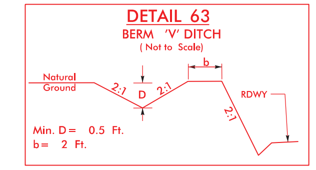
FROM STA. 22+50 TO STA. 24+66.93 -SR1- LT

DETAIL 62
LATERAL BASE DITCH (Not to Scale)



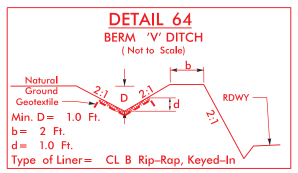
FROM STA. 26+00 TO STA. 26+28 -SR1- RT

DETAIL 63
BERM 'V' DITCH (Not to Scale)



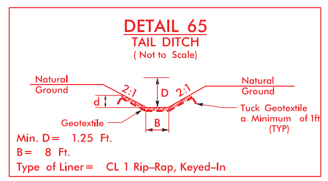
FROM STA. 13+00 TO STA. 14+50 -Y1RPD- LT

DETAIL 64
BERM 'V' DITCH (Not to Scale)



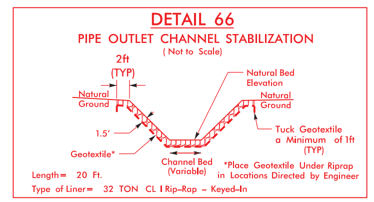
FROM STA. 14+50 TO STA. 19+50 -Y1RPD- LT

DETAIL 65
TAIL DITCH (Not to Scale)



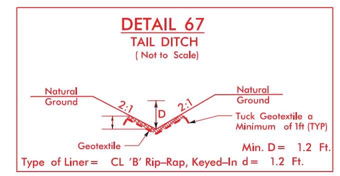
FROM STA. 18+91 TO STA. 19+13 -Y1RPD- RT
47 FT @0.058 FT/FT

DETAIL 66
PIPE OUTLET CHANNEL STABILIZATION (Not to Scale)



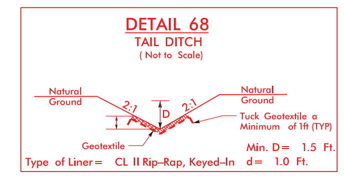
STA. 55+51 -L- LT

DETAIL 67
TAIL DITCH (Not to Scale)



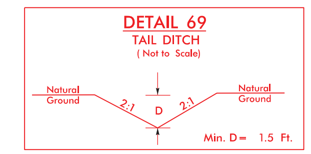
FROM STA. 46+58.86 TO STA. 47+50 -L- RT
91 FT @ 0.11 FT/FT
FROM STA. 47+50 TO STA. 48+50 -L- RT
100 FT @ 0.10 FT/FT
FROM STA. 48+50 TO STA. 49+50 -L- RT
100 FT @ 0.075 FT/FT
100 FT @ 0.10 FT/FT
FROM STA. 49+50 TO STA. 50+30 -L- RT
80 FT @ 0.035 FT/FT

DETAIL 68
TAIL DITCH (Not to Scale)



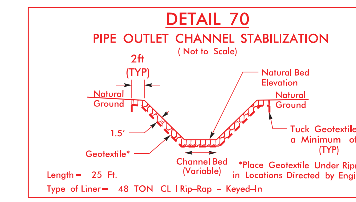
FROM STA. 17+39 TO STA. 17+80 -Y3- LT
46 FT @ 0.087 FT/FT

DETAIL 69
TAIL DITCH (Not to Scale)



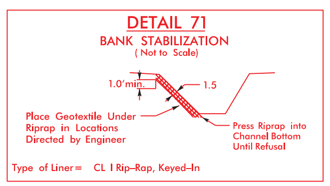
FROM STA. 17+24 TO STA. 17+83 -Y3- RT
58 FT @ 0.069 FT/FT

DETAIL 70
PIPE OUTLET CHANNEL STABILIZATION (Not to Scale)



STA. 39+92 -L- LT

DETAIL 71
BANK STABILIZATION (Not to Scale)



FROM STA. 34+37 TO STA. 34+63 -L- LT
FROM STA. 39+75 TO STA. 39+86 -L- LT

ENGLISH

PERMIT DRAWING
SHEET 3 OF 30

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	5

ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
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Prepared in the Office of:
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Prepared in the Office of:
WRA Whitman, Requardt & Associates, LLP
1201 Edwards Mill Road,
Suite 320,
Raleigh, NC 27606
(919) 859-0808

CURVE DATA FOR -L-

PI Sta 32+15.65
Δ = 15° 59' 57.8" (RT)
D = 0° 49' 32.1"
L = 1,937.94'
T = 975.32'
R = 6,940.00'
DS = 70 MPH
SE = 0.03

PIs Sta 42+68.08
Θs = 0° 23' 15.5"
Θs = 0° 50' 46.4"
Ls = 205.00'
LT = 115.20'
ST = 89.81'

PI Sta 58+01.11
Δ = 10° 41' 35.2" (RT)
D = 0° 22' 41.5"
L = 2,827.44'
T = 1,417.84'
R = 15,150.00'
DS = 70 MPH
SE = NC

-YIRPA- CURVE DATA

PIs Sta 11+33.38
Θs = 4° 46' 28.7"
Ls = 200.00'
LT = 133.38'
ST = 66.71'

PI Sta 13+41.97
Δ = 13° 29' 39.5" (RT)
D = 4° 46' 28.7"
L = 282.62'
T = 141.97'
R = 1,200.00'
SE = 0.08
DS = 60 MPH

PIs Sta 15+42.66
Θs = 4° 17' 49.9"
Ls = 180.00'
LT = 120.04'
ST = 60.03'

PIs Sta 23+44.38
Θs = 9° 32' 57.5"
Ls = 200.00'
LT = 133.53'
ST = 66.84'

PI Sta 25+29.57
Δ = 22° 23' 01.0" (LT)
D = 9° 32' 57.5"
L = 234.40'
T = 118.71'
R = 600.00'
SE = 0.08
RO = 200'
DS = 45 MPH

-YILPA- CURVE DATA

PIs Sta 11+38.12
Θs = 25° 32' 02.4"
Ls = 205.00'
LT = 138.12'
ST = 69.65'

PI Sta 22+84.18
Δ = 155° 56' 15.8" (LT)
D = 24° 54' 40.4"
L = 625.97'
T = 1,079.18'
R = 230.00'
SE = 0.08
RO = 200'
DS = 30 MPH

-Y2- CURVE DATA

PI Sta 17+89.03
Δ = 47° 03' 52.7" (LT)
D = 4° 46' 28.7"
L = 985.72'
T = 522.58'
R = 1,200.00'
SE = 0.08
RO = 192'
DS = 60 mph

PI Sta 24+26.30
Δ = 38° 24' 03.0" (RT)
D = 11° 27' 33.0"
L = 335.11'
T = 174.12'
R = 500.00'
SE = 0.06
RO = SEE PLANS
DS = 30 mph

-YIRPC- CURVE DATA

PIs Sta 11+98.34
Θs = 4° 17' 49.9"
Ls = 180.00'
LT = 120.04'
ST = 60.03'

PI Sta 14+26.79
Δ = 15° 59' 06.3" (RT)
D = 4° 46' 28.7"
L = 334.79'
T = 168.49'
R = 1,200.00'
SE = 0.08
DS = 60 MPH

PIs Sta 16+53.12
Θs = 4° 17' 49.9"
Ls = 180.00'
LT = 120.04'
ST = 60.03'

PI Sta 20+71.59
Δ = 24° 36' 57.4" (RT)
D = 44° 04' 25.2"
L = 55.85'
T = 28.36'
R = 130.00'

PI Sta 21+20.74
Δ = 24° 26' 36.8" (LT)
D = 57° 17' 44.8"
L = 42.66'
T = 21.66'
R = 100.00'

-Y1- CURVE DATA

PI Sta 23+30.77
Δ = 15° 03' 06.8" (LT)
D = 0° 49' 06.6"
L = 1,838.94'
T = 924.79'
R = 7,000.00'
SE = NC
DS = 45 mph

-YIRPD- CURVE DATA

PIs Sta 11+60.05
Θs = 4° 26' 08.9"
Ls = 240.00'
LT = 160.05'
ST = 80.05'

PI Sta 15+63.12
Δ = 23° 33' 03.6" (LT)
D = 3° 41' 47.4"
L = 637.12'
T = 323.12'
R = 1,550.00'
SE = 0.08
DS = 65 mph

PIs Sta 19+37.14
Θs = 3° 19' 36.7"
Ls = 180.00'
LT = 120.02'
ST = 60.02'

PI Sta 21+46.39
Δ = 9° 08' 00.9" (RT)
D = 14° 19' 26.2"
L = 63.76'
T = 31.95'
R = 400.00'
SE = NC
DS = 15 MPH

PI Sta 22+03.48
Δ = 22° 00' 20.9" (LT)
D = 44° 04' 25.2"
L = 49.93'
T = 25.28'
R = 130.00'

PI Sta 22+54.16
Δ = 40° 47' 18.6" (RT)
D = 81° 51' 04.0"
L = 49.83'
T = 26.02'
R = 70.00'

-RAB- CURVE DATA

PI Sta 12+18.08
Δ = 70° 40' 24.1" (LT)
D = 89° 31' 28.8"
L = 78.94'
T = 45.38'
R = 64.00'

PI Sta 12+84.18
Δ = 154° 36' 58.6" (LT)
D = 89° 31' 28.8"
L = 172.71'
T = 284.18'
R = 64.00'

PI Sta 13+15.36
Δ = 89° 44' 17.1" (LT)
D = 89° 31' 28.8"
L = 100.24'
T = 63.71'
R = 64.00'

PI Sta 13+78.38
Δ = 44° 58' 20.3" (LT)
D = 89° 31' 28.8"
L = 50.23'
T = 26.49'
R = 64.00'

PERMIT DRAWING
SHEET 4 OF 30

TS TS	TEMPORARY SURFACE WATER IMPACTS	F F	FILL IN WETLAND
S S	SURFACE WATER IMPACTS	* * *	MECHANIZED CLEARING (GRUBBING)

FOR -L- PROFILE, SEE SHEET 16 AND 17
FOR -Y1- PROFILE, SEE SHEET 22
FOR -Y1LPA- PROFILE, SEE SHEET 23
FOR -Y1RPA- PROFILE, SEE SHEET 23 AND 24
FOR -Y1RPC- PROFILE, SEE SHEET 24
FOR -Y1RPD- PROFILE, SEE SHEET 25
FOR -Y2- PROFILE SEE SHEET 25 AND 26

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	5

ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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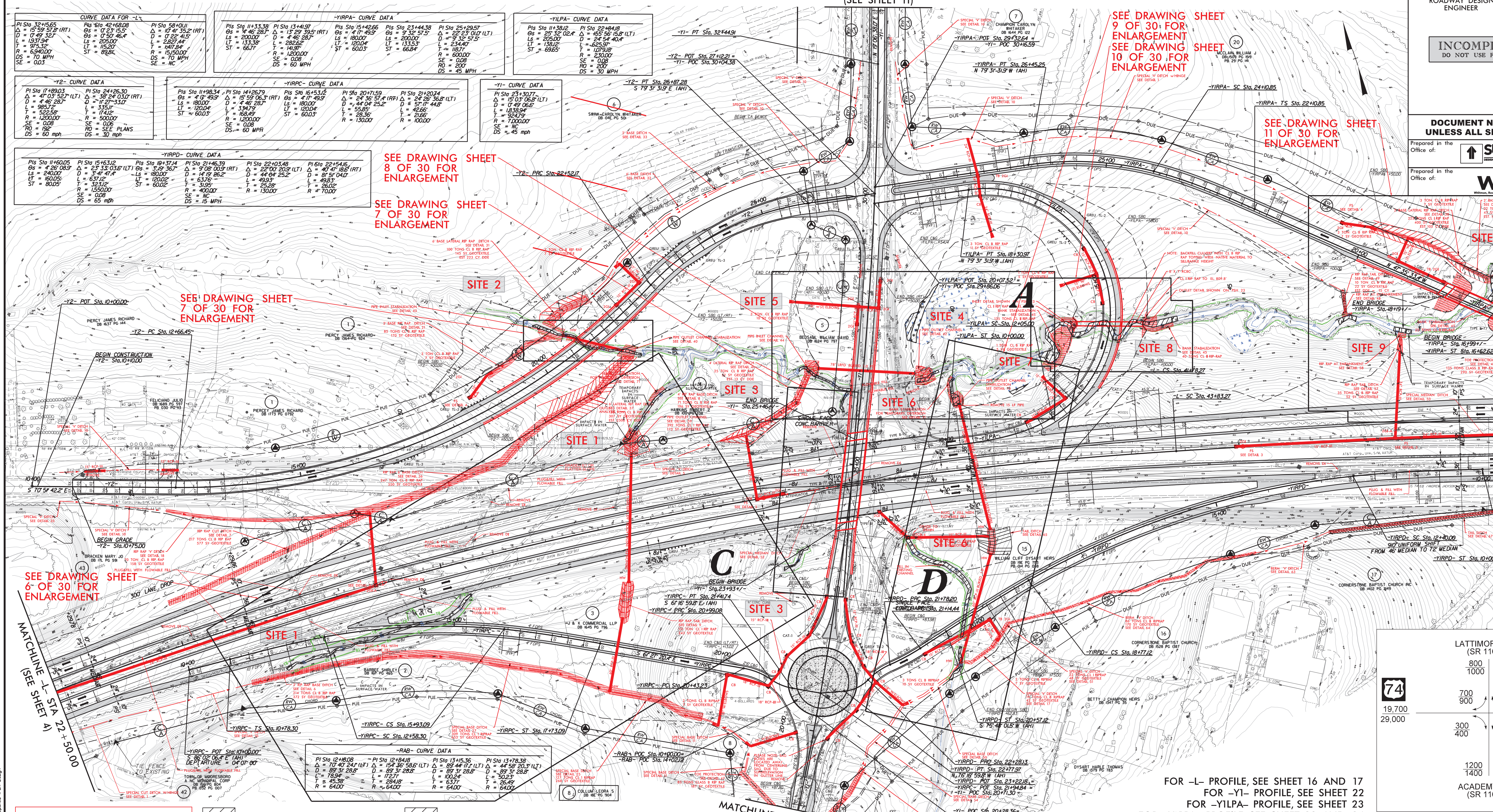
(919) 732-6676 (FAX)

Prepared in the Office of: WRA Withers Ravenel & Associates, LLP
1201 Edwards Mill Road, Suite 320
Raleigh, NC 27606
(919) 859-0808



LATTIMORE RD (SR 1168)

ACADEMY RD (SR 1168)

74 (west)	19,700 / 29,000
74 (east)	21,400 / 31,100
Lattimore Rd	800 / 1000
	700 / 900
	1500 / 1900
	300 / 400
	1200 / 1500
Academy Rd	1200 / 1400

2020 AADT
2045 AADT

FOR -L- PROFILE, SEE SHEET 16 AND 17
FOR -Y1- PROFILE, SEE SHEET 22
FOR -Y1LPA- PROFILE, SEE SHEET 23
FOR -Y1RPA- PROFILE, SEE SHEET 23 AND 24
FOR -Y1RPC- PROFILE, SEE SHEET 24
FOR -Y1RPD- PROFILE, SEE SHEET 25
FOR -Y2- PROFILE SEE SHEET 25 AND 26

GRAPHIC SCALE
50 25 0 50 100

PERMIT DRAWING SHEET 5 OF 30

Symbol	Description
TS TS	TEMPORARY SURFACE WATER IMPACTS
S S	SURFACE WATER IMPACTS
F F	FILL IN WETLAND
* * *	MECHANIZED CLEARING (GRUBBING)

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING
SHEET 6 OF 30

S S SURFACE WATER IMPACTS

TS TS TEMPORARY SURFACE WATER IMPACTS

ENGLISH

SITE 1

IMPACTS IN SURFACE WATER

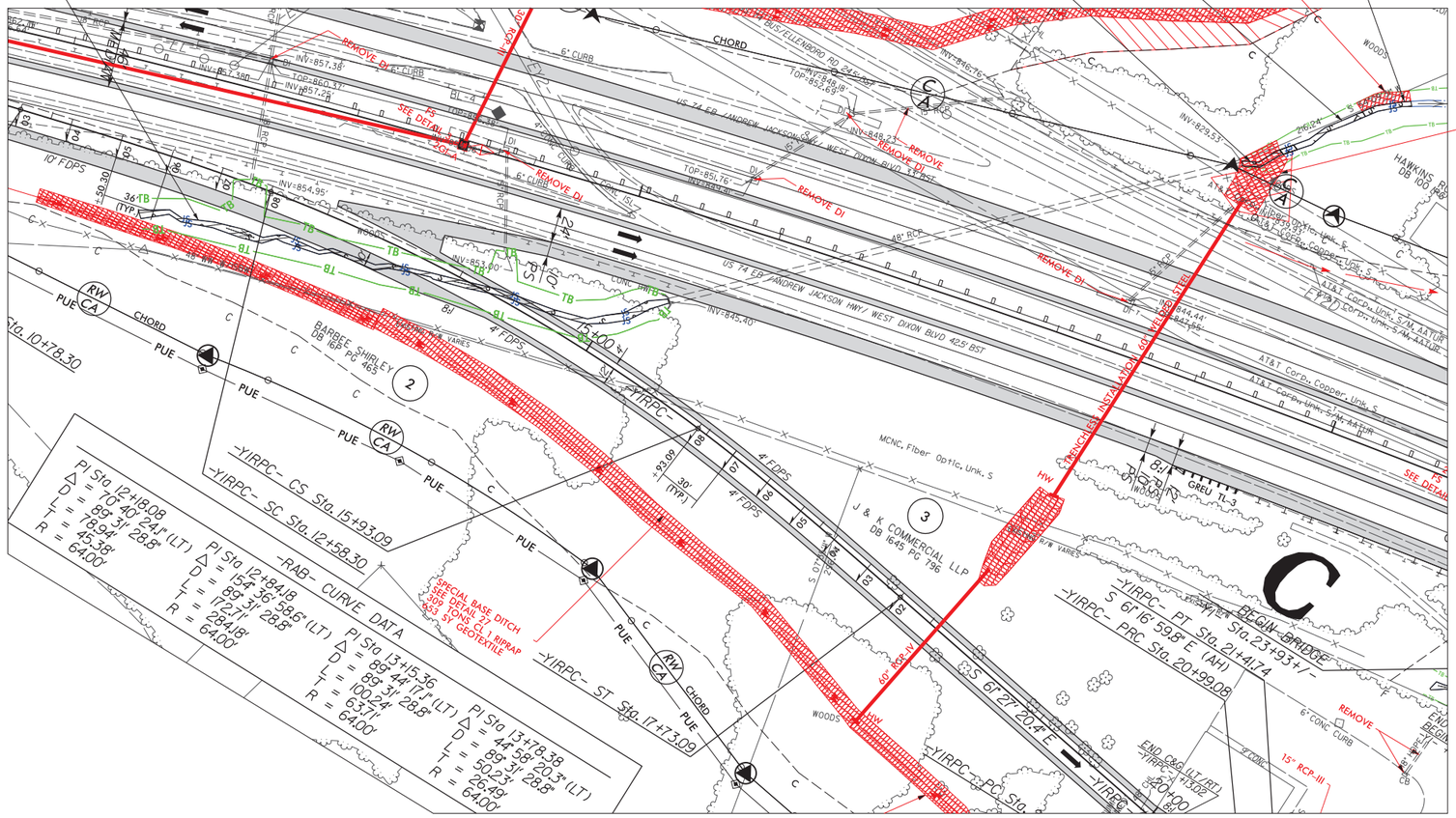
IMPACTS IN SURFACE WATER

BANK STABILIZATION FOR TEMPORARY DIVERSION SEE DETAIL 71

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

PIPE OUTLET CHANNEL
SEE DETAIL 59
392 TONS CL 1 RIP RAP
173 SY GEOTEXTILE



50 25 0 50 100
PLANS

03-JUN-2024 11:15
R-4045_Fig1.prn_psh_5_Inset1 (Site 1).dgn
REVISIONS
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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SHEET 7 OF 30

S S SURFACE WATER IMPACTS

TS TS TEMPORARY SURFACE WATER IMPACTS

ENGLISH

8/17/99

REVISIONS

NAD 83/2011

6' BASE LATERAL RIP RAP DITCH
SEE DETAIL 31
100 TONS CL B RIP RAP
145 SY GEOTEXTILE
EST 223 CY DDE

HW

60" RCP-HI BURIED 135 FT

IMPACTS IN SURFACE WATER

PIPE OUTLET CHANNEL STABALIZATION
SEE DETAIL 40

PIPE INLET STABALIZATION
SEE DETAIL 43

TEMPORARY IMPACTS IN SURFACE WATER

2' BASE RIP RAP DITCH
SEE DETAIL 21
85 TONS CL B RIP RAP
170 SY GEOTEXTILE

IMPACTS IN SURFACE WATER

SITE 2

6' LATERAL RIP RAP DITCH
SEE DETAIL 37
138 TON CL B RIP RAP
307 SY GEOTEXTILE
EST. 2500 CY DDE

TEMPORARY IMPACTS IN SURFACE WATER

10 5 0 10 20
PLANS

IMPACTS IN SURFACE WATER

NAD 83/2011

PLUG & FILL WITH FLOWABLE FILL

SINGLE FACE CONC BARRIER REMOVE

IMPACTS IN SURFACE WATER

SITE 3

25 12.5 0 25 50
PLANS

03-JUN-2024 11:15
R-4045_fgd-prm_psh_5_Inset2 (Site 2 and 3).dgn
hewong

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8
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

Prepared in the Office of: SUMMIT

PERMIT DRAWING
SHEET 8 OF 30

Symbol	Legend
S	SURFACE WATER IMPACTS
TS	TEMPORARY SURFACE WATER IMPACTS
F	FILL IN WETLAND
*	MECHANIZED CLEARING (GRUBBING)

ENGLISH

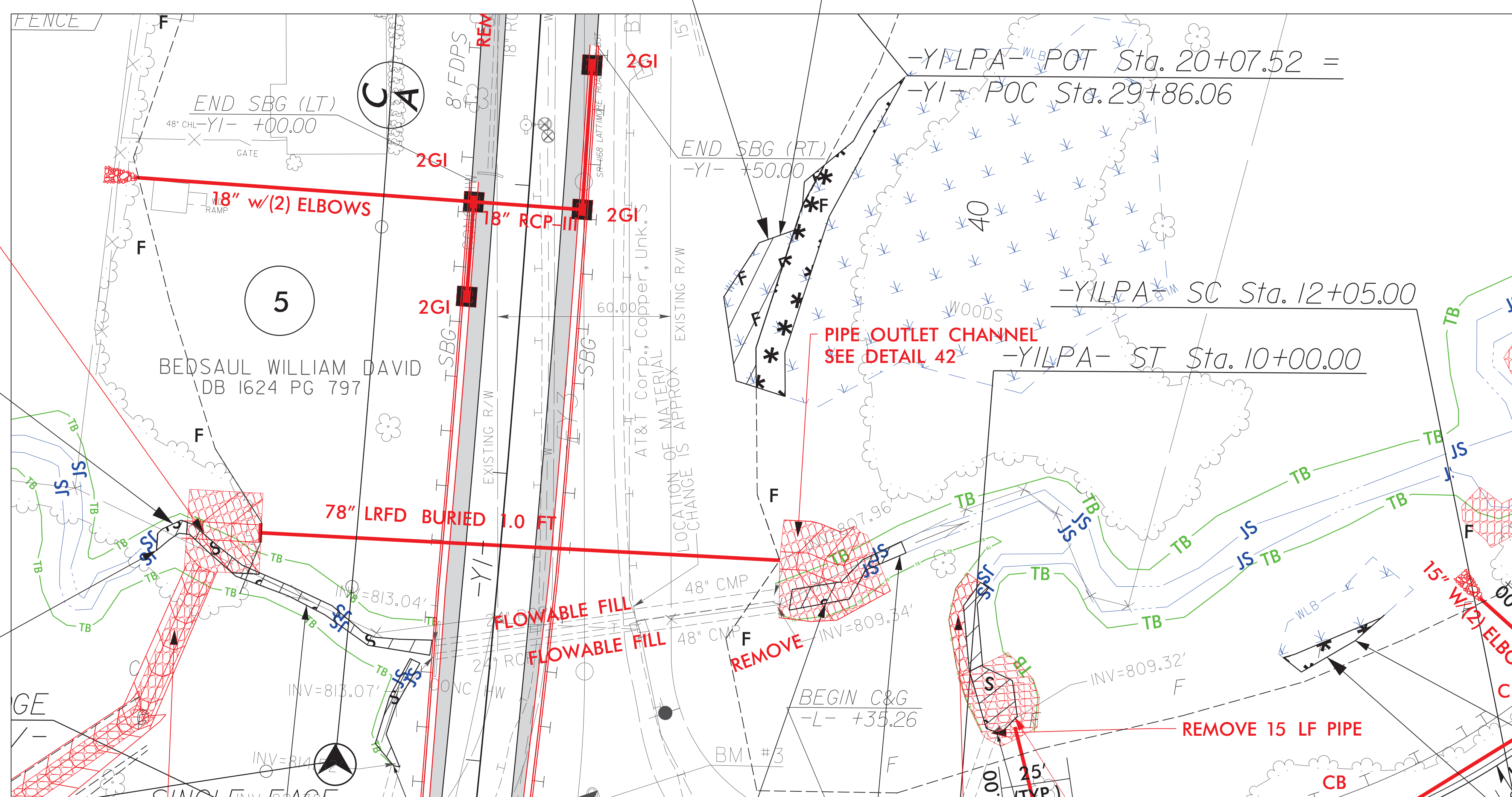
NAD 83/2011

SITE 4

FILL IN WETLAND

PIPE INLET CHANNEL
SEE DETAIL 44

SITE 5



TEMPORARY IMPACTS
IN SURFACE WATER

MECHANIZED CLEARING

SITE 7

4' LATERAL RIP RAP DITCH
SEE DETAIL 41
25 TON CL B RIP RAP
52 SY GEOTEXTILE
EST. 13 CY DDE

SEE SHEET 7 OF 30
FOR SITE 3

PIPE OUTLET CHANNEL STABILIZATION
SEE DETAIL 70

IMPACTS IN
SURFACE WATER

SEE SHEET 9 OF 30
FOR SITE 6

TEMPORARY IMPACTS
IN SURFACE WATER

BANK STABILIZATION
FOR TEMPORARY DIVERSION
SEE DETAIL 71

IMPACTS IN
SURFACE WATER

25 12.5 0 25 50
PLANS

REVISIONS

8/17/99

03-JUN-2024 11:15
R-4045_Hyd_prm_psh_5_Inset3 (Site 4 5 7).dgn

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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PERMIT DRAWING
SHEET 9 OF 30

S S SURFACE WATER IMPACTS

TS TS TEMPORARY SURFACE WATER IMPACTS

ENGLISH

NAD 83/2011

REVISIONS

8/17/99

IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

SITE 6

SEE SHEET 8 OF 30 FOR SITE 7

25 12.5 0 25 50
PLANS

03-JUN-2024 11:15
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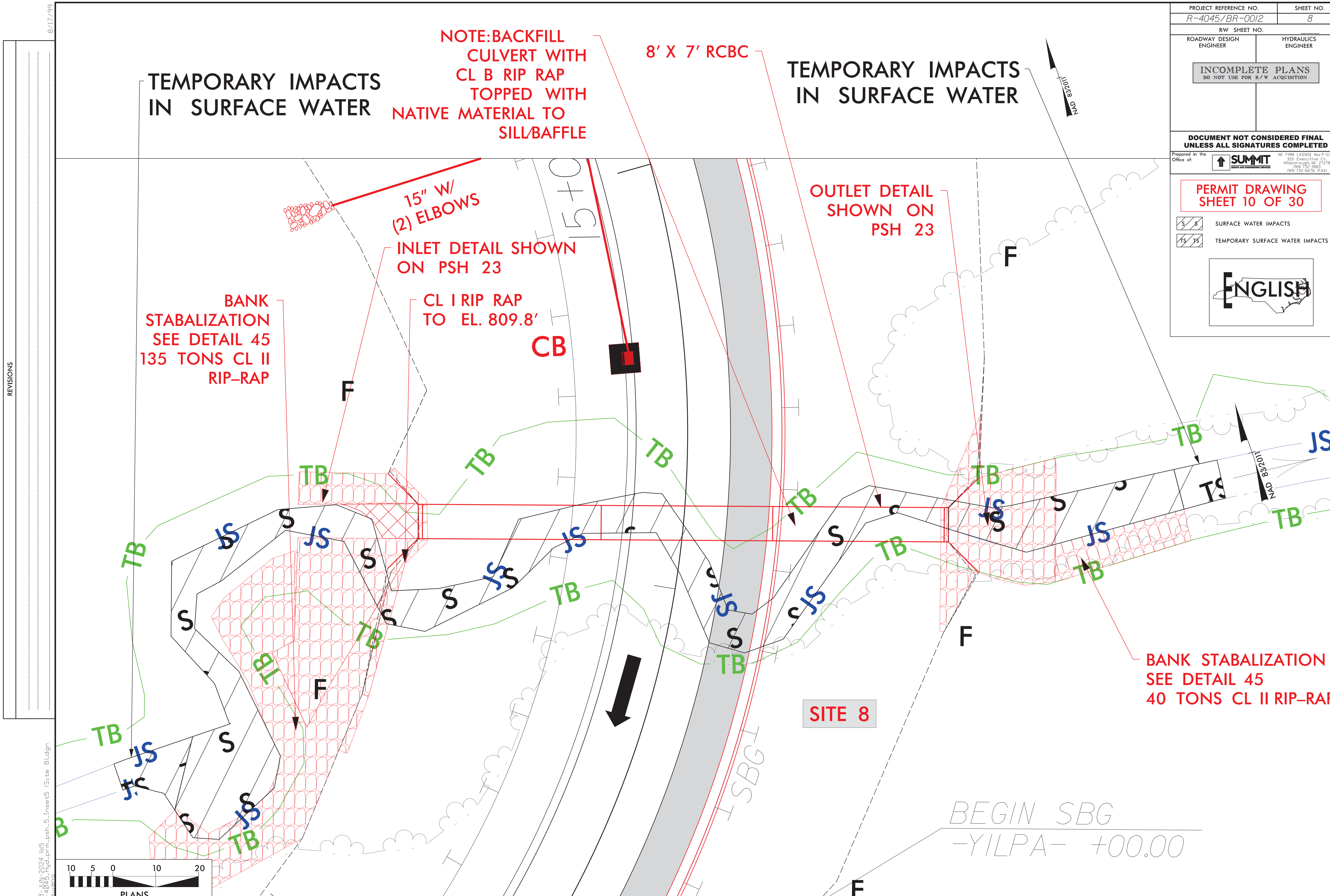
PROJECT REFERENCE NO.
R-4045/BR-0012
SHEET NO.
8
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
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PERMIT DRAWING
SHEET 10 OF 30
SURFACE WATER IMPACTS
TEMPORARY SURFACE WATER IMPACTS
ENGLISH
REVISIONS
TEMPORARY IMPACTS IN SURFACE WATER
NOTE: BACKFILL CULVERT WITH CL B RIP RAP TOPPED WITH NATIVE MATERIAL TO SILL/BAFFLE
8′ X 7′ RCBC
TEMPORARY IMPACTS IN SURFACE WATER
NAD 83/2011
15″ W/ (2) ELBOWS
INLET DETAIL SHOWN ON PSH 23
OUTLET DETAIL SHOWN ON PSH 23
BANK STABALIZATION SEE DETAIL 45 135 TONS CL II RIP-RAP
CL I RIP RAP TO EL. 809.8′
CB
BANK STABALIZATION SEE DETAIL 45 40 TONS CL II RIP-RAP
SITE 8
BEGIN SBG
-YILPA- +00.00
SBG
PLANS

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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PERMIT DRAWING
SHEET 11 OF 30

S/S SURFACE WATER IMPACTS

TS/TS TEMPORARY SURFACE WATER IMPACTS

ENGLISH

NAD 83/2011

RW CA

FS
SEE DETAIL 4

2GI
3 TON CL B RIP RAP
7 SY GEOTEXTILE

3 TON CL B RIP RAP
7 SY GEOTEXTILE
2' BASE LATERAL RIP RAP DITCH
SEE DETAIL 38
225 TONS CL I RIP RAP
400 SY GEOTEXTILE
EST 105 CY DDE

2' BASE RIP RAP TAIL DITCH
SEE DETAIL 34
22 TONS CL I RIP RAP
47 SY GEOTEXTILE
EST. 130 CY DDE

RIP RAP AT EMBANKEMENT
SEE DETAIL 46
BANK STABALIZATION
SEE DETAIL 45
12 TONS CL II RIP-RAP

SITE 10

2 TON CL I RIP RAP
6 SY GEOTEXTILE

CL II RIP RAP
TO EL. 794.1'

15" RCP-III

15" W/ (2) ELBOWS

TB 2GI

N 47° 35' 33.4" W

END SBG
-YIRPA- +00.00

RIP RAP TAIL DITCH
SEE DETAIL 49
10 TON CL B RIP RAP
22 SY GEOTEXTILE
EST. DDE = 15 CY

RIP RAP AT EMBANKEMENT
SEE DETAIL 48

END BRIDGE
-YIRPA- Sta. 18+19+/-

SITE 9

BANK STABALIZATION
SEE DETAIL 45
25 TONS CL II RIP-RAP

BEGIN BRIDGE
-YIRPA- Sta. 16+99+/-
-YIRPA- ST Sta. 16+62.62

TOE PROTECTION
SEE DETAIL 47
135 TONS CLASS B RIP RAP
290 SY GEOTEXTILE

RIP RAP TAIL DITCH
SEE DETAIL 57
35 TONS CL B RIP RAP
52 SY GEOTEXTILE

24" RCP-III

SPECIAL MEDIAN DITCH
SEE DETAIL 53

10' PS

24'

4' PS

BM #4

WOODS

TYPE B-77

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

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

RIP RAP AT EMBANKMENT
SEE DETAIL 58

20 10 0 20 40
PLANS

REVISIONS 8/17/99

03-JUN-2024 11:15
R-4045_fig5-prm_psh_5_inset6 (Site 9 and 10).dgn
default

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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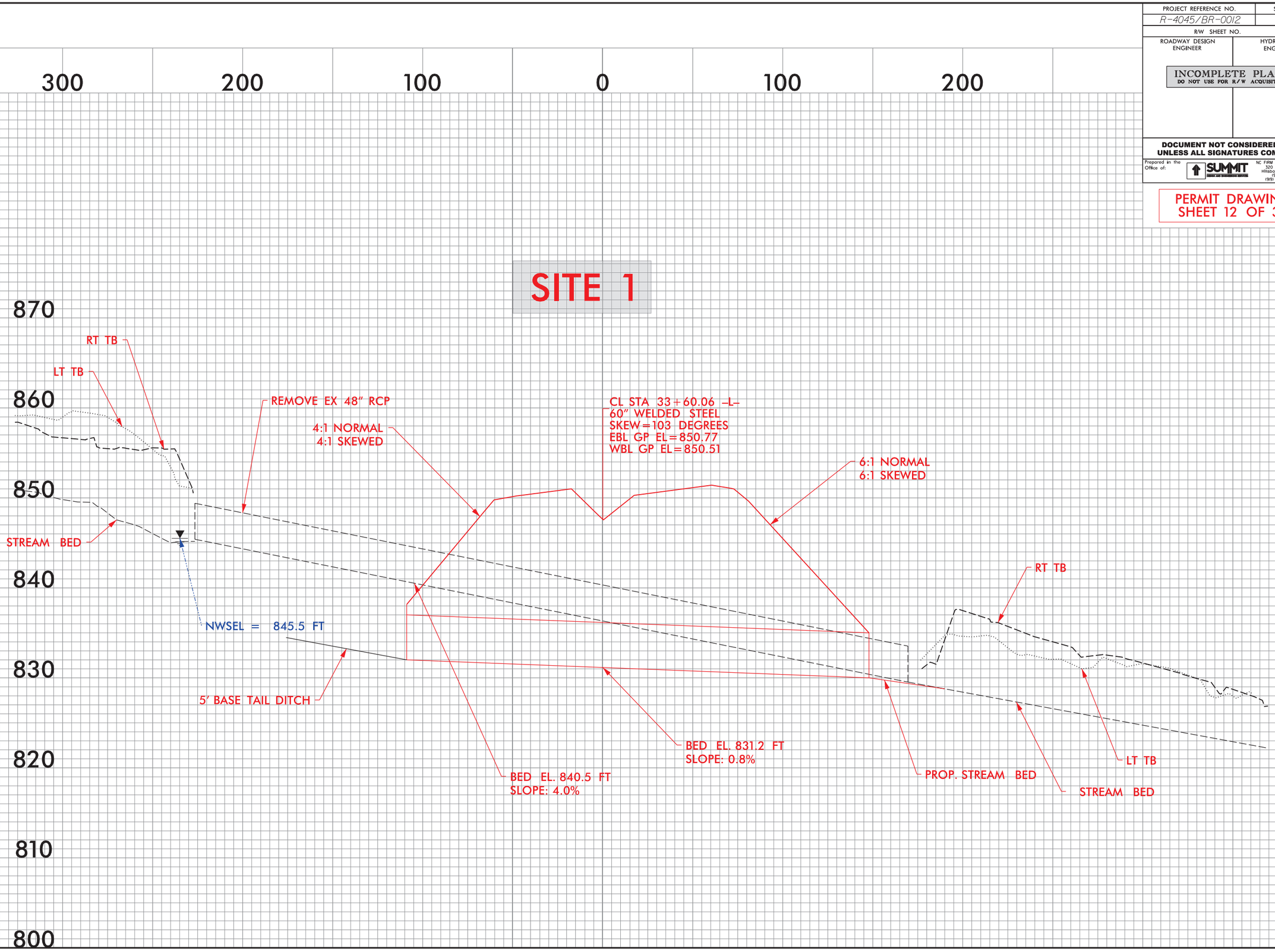
SHEET 12 OF 30

SITE 1



8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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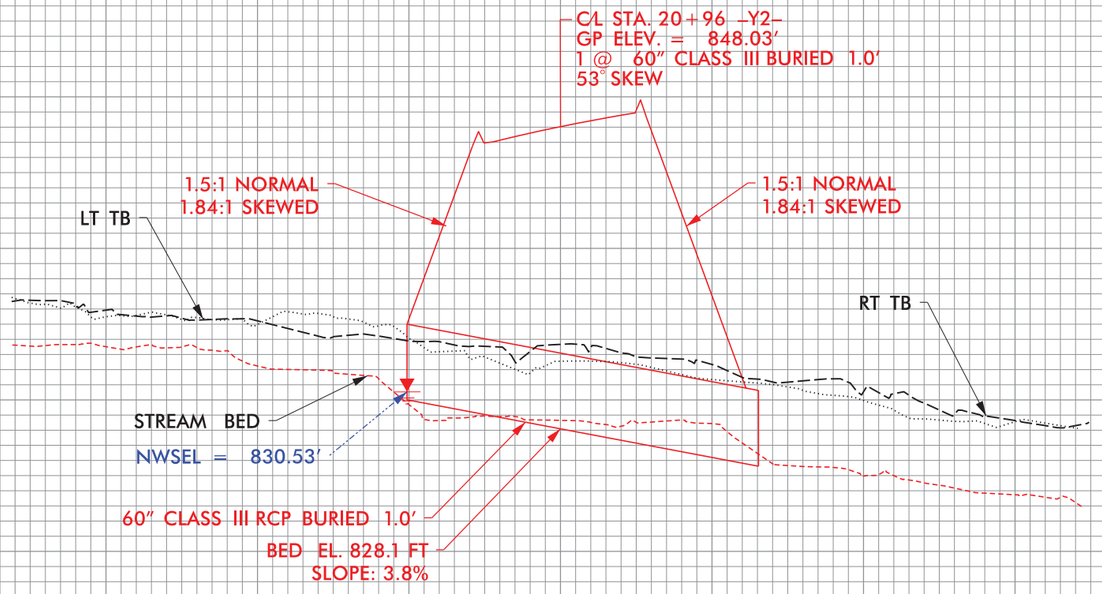
PERMIT DRAWING
SHEET 13 OF 30

200 100 0 100 200

870 860 850 840 830 820 810 800 790

SITE 2



ENGLISH

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R4045_BR0012_PERMIT-Y2 Cross Pipe.dgn
hguang

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-4045	X-64

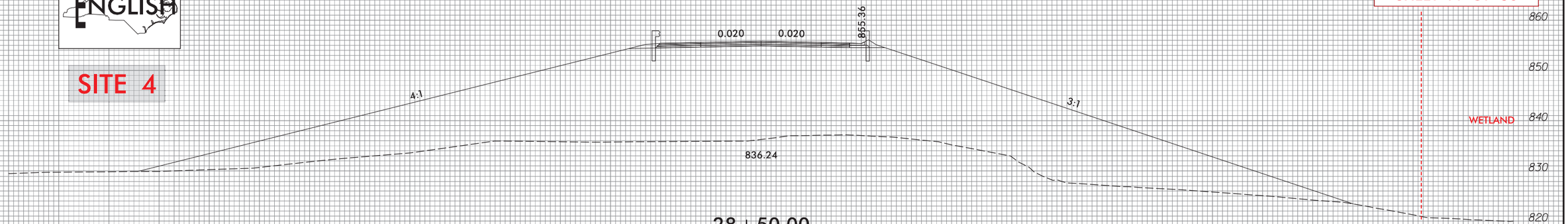
PERMIT DRAWING
SHEET 14 OF 30

ENGLISH

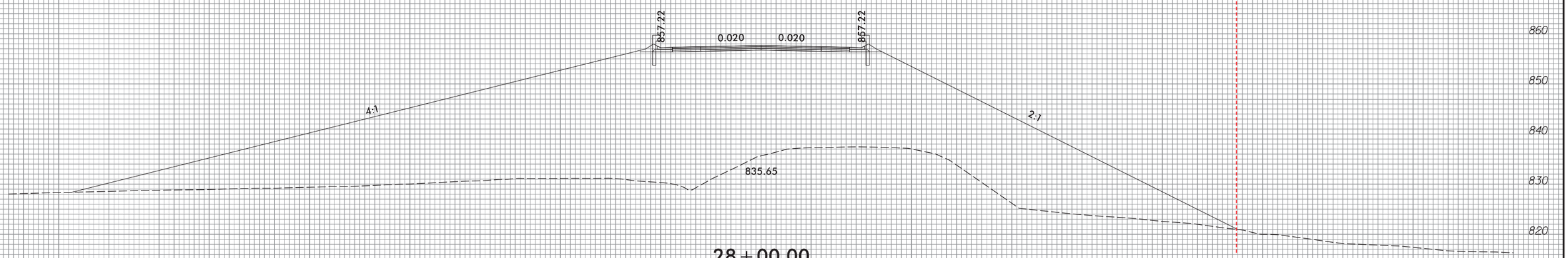
SITE 4

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

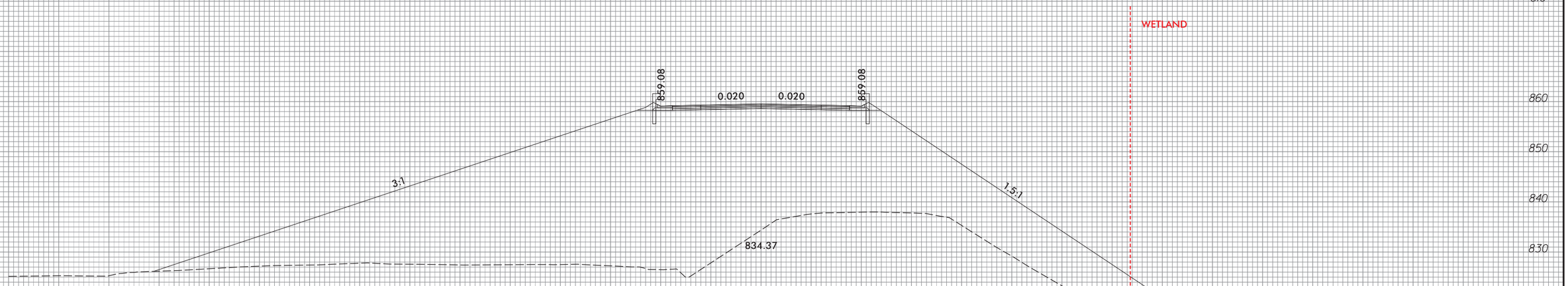
860 850 840 830 820 810



28+50.00



28+00.00



27+50.00

—Y1—

03-JUN-2024 11:15
R-4045_Hyd_prm_XPL_Y1.dgn
he.jang

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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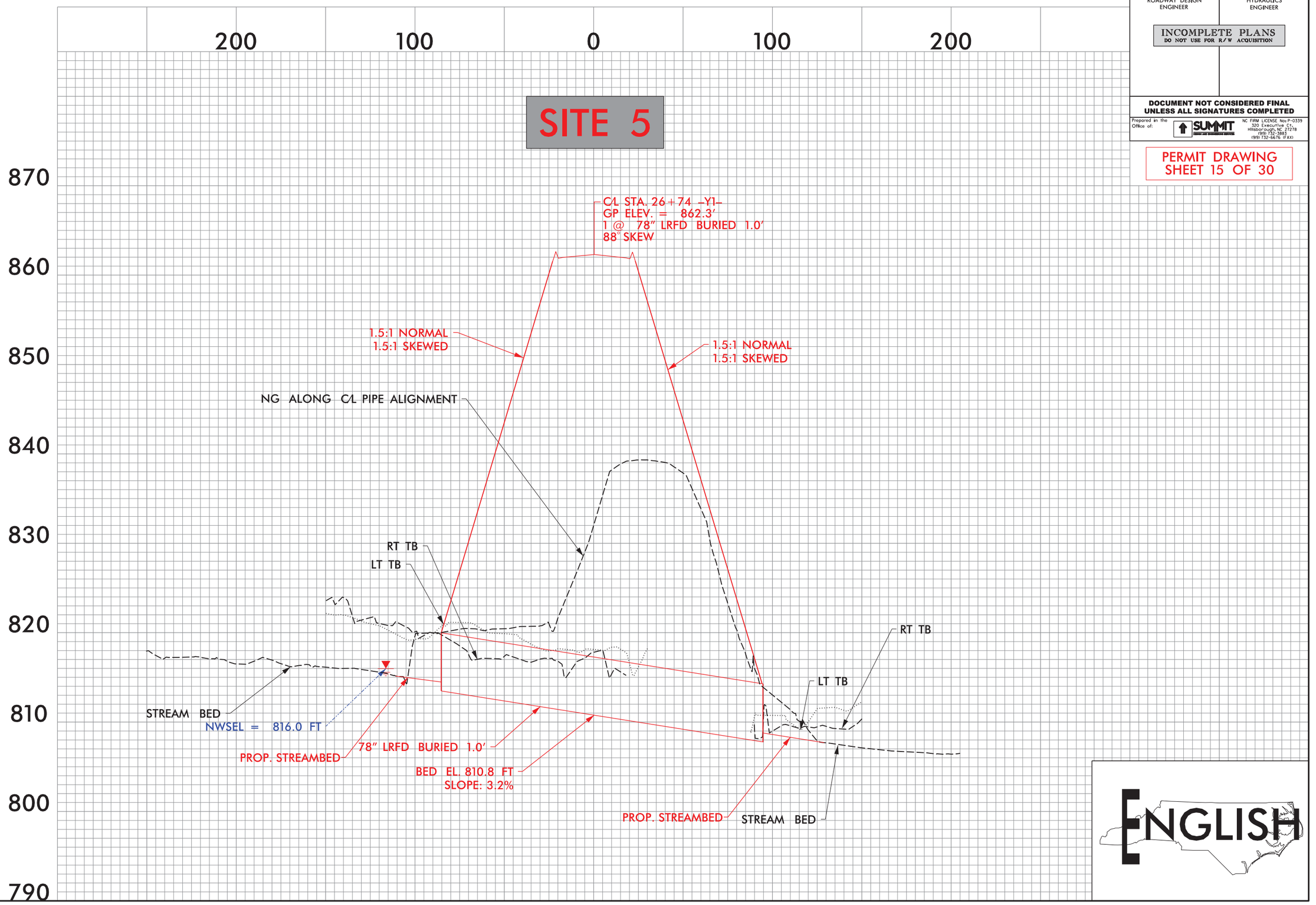
PERMIT DRAWING
SHEET 15 OF 30

SITE 5



ENGLISH

REVISIONS

8/17/99

03-JUN-2024 14:15
R4045_R10_PERMIT-Y1 Cross Pipe.dgn
hsuang

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING
SHEET 16 OF 30

REVISIONS
8/17/99

03-JUN-2024 11:15
R-4045_hyd_prm_psh_X (RPD_Cul_PFL).dgn
hewang

300 200 100 0 100 200

–L– –Y1RPD–

870 860 850 840 830 820 810 800 790

SITE 6

℄ STA. 40+05 –L–
1@66" RCP–IV BURIED 1.0'
SKEW = 80°
ELEV. = 841.7'

℄ STA. 19+95 –Y1RPD–
1@60" RCP–IV BURIED 1.0'
SKEW = 135°
ELEV. = 852.4'

NG ALONG C/L PIPE ALIGNMENT
NG ALONG C/L PIPE ALIGNMENT

1.5:1 NORMAL
1.51:1 SKEWED

4:1 NORMAL
7.9:1 SKEWED

RT TB
LT TB
RT TB
LT TB
RT TB
LT TB

STREAM BED
STREAM BED

60" RCP–IV BURIED 1.0'

BED EL. 831.2 FT
SLOPE: 6.1%

8' BASE TAIL DITCH

66" RCP–IV BURIED 1.0'

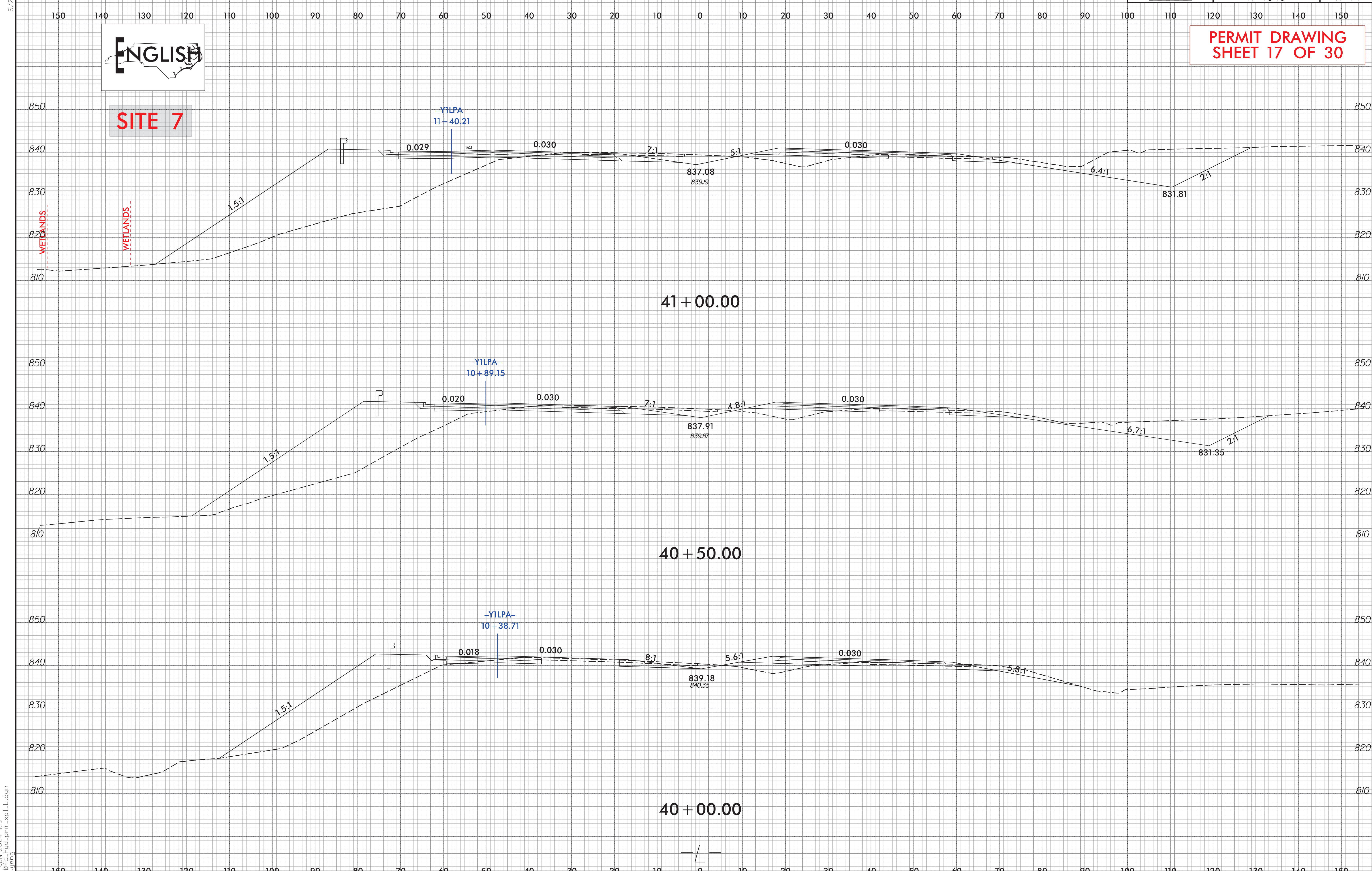
BED EL. 815.5 FT
SLOPE: 5.8%

ENGLISH

PROJ. REFERENCE NO.	SHEET NO.
R-4045	X-14

PERMIT DRAWING
SHEET 17 OF 30

SITE 7



6/23/16

03-JUN-2024 11:15
R4045_Hyd_prm_xpl_L.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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PERMIT DRAWING
SHEET 18 OF 30

REVISIONS
8/17/99

200 100 0 100 200

SITE 8

860
850
840
830
820
810
800
790
780

C/L STA. 14+15.46 -Y1LPA-
GP ELEV. = 832.48'
1 @ 8' X 7' RCBC BURIED 1.0'
85° SKEW

1.5:1 NORMAL AND SKEWED

1.5:1 NORMAL AND SKEWED

NG ALONG CULVERT

CL I RIP RAP TO ELEV. 809.8'

CL I RIP RAP TO ELEV. 809.8'

RT TB

LT TB

CL I RIP RAP SEE OUTLET TYPICAL

C/L STREAM

LT TB
RT TB

NWSEL = 803.3'
DATE 12.06.23

1' SILL
1' BAFFLE

1' BAFFLE

1' SILL

PROP. STREAMBED

C/L INVERT = 800.7'
SLOPE = 1.0%

The Engineer, in consultation with DEO staff, shall review all material to be used as backfill prior to conducting the backfill activity. Backfill shall consist of native material only unless the Engineer, in consultation with DEO staff, determines that (1) the native material is unsuitable, or (2) additional material is required to supplement the native material. The chosen backfill material shall not have adverse effects to aquatic life, aquatic life passage, or water quality. Native material consists of material that is excavated from the stream bed or floodplain at the project site during culvert construction.

ENGLISH

03-JUN-2024 11:15
R4045_BR0012_PERMIT-Y1rpa culvert.dgn
bewang

PROJECT REFERENCE NO.	SHEET NO.
R-4045	23

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

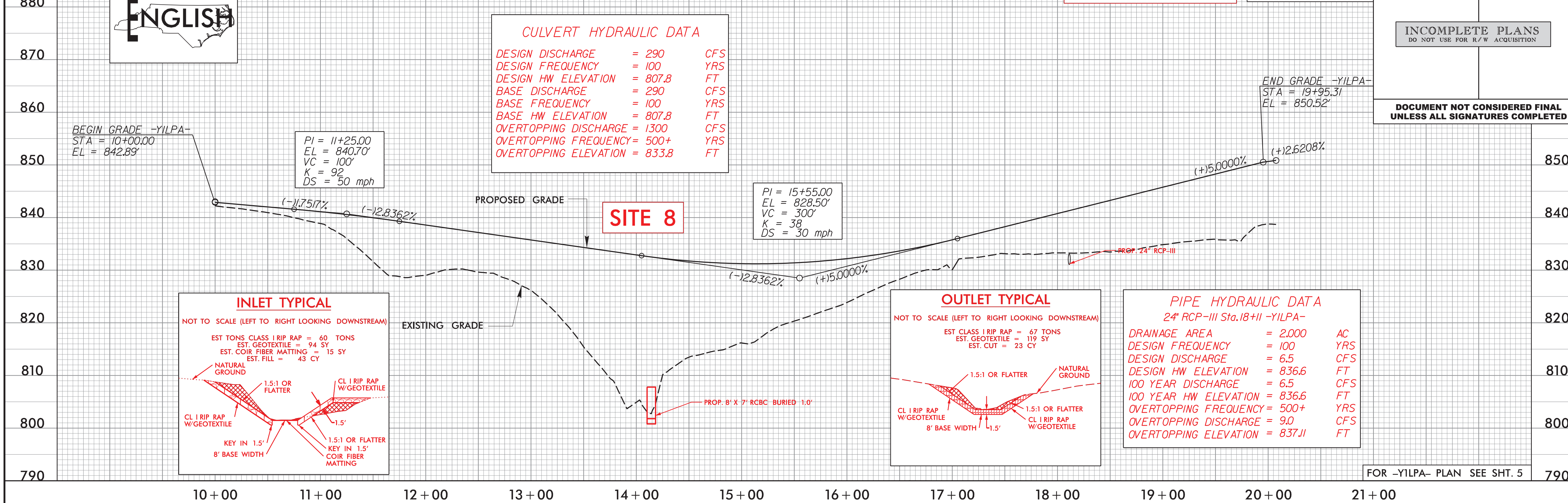
PERMIT DRAWING
SHEET 19 OF 30

ENGLISH

-Y1LPA-

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	290	CFS
DESIGN FREQUENCY	=	100	YRS
DESIGN HW ELEVATION	=	807.8	FT
BASE DISCHARGE	=	290	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	807.8	FT
OVERTOPPING DISCHARGE	=	1300	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	833.8	FT



SITE 8
BEGIN GRADE -Y1LPA-
STA = 10+00.00
EL = 842.89'
PI = 11+25.00
EL = 840.70'
VC = 100'
K = 92
DS = 50 mph
(-)1.7517%
(-)2.8362%
PROPOSED GRADE
PI = 15+55.00
EL = 828.50'
VC = 300'
K = 38
DS = 30 mph
(-)2.8362%
(+)5.0000%
(+)5.0000%
(+)2.6208%
END GRADE -Y1LPA-
STA = 19+95.31
EL = 850.52'
PROP. 24" RCP-III
EXISTING GRADE
PROP. 8' X 7' RCBC BURIED 1.0'
INLET TYPICAL
NOT TO SCALE (LEFT TO RIGHT LOOKING DOWNSTREAM)
EST TONS CLASS I RIP RAP = 60 TONS
EST. GEOTEXTILE = 94 SY
EST. COIR FIBER MATTING = 15 SY
EST. FILL = 43 CY
NATURAL GROUND
1.5:1 OR FLATTER
CL I RIP RAP W/GEOTEXTILE
CL I RIP RAP W/GEOTEXTILE
1.5'
KEY IN 1.5'
8' BASE WIDTH
1.5:1 OR FLATTER
KEY IN 1.5'
COIR FIBER MATTING
OUTLET TYPICAL
NOT TO SCALE (LEFT TO RIGHT LOOKING DOWNSTREAM)
EST CLASS I RIP RAP = 67 TONS
EST. GEOTEXTILE = 119 SY
EST. CUT = 23 CY
1.5:1 OR FLATTER
NATURAL GROUND
CL I RIP RAP W/GEOTEXTILE
1.5:1 OR FLATTER
CL I RIP RAP W/GEOTEXTILE
8' BASE WIDTH
1.5'
FOR -Y1LPA- PLAN SEE SHT. 5
880
870
860
850
840
830
820
810
800
790
10+00
11+00
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
20+00
21+00

PIPE HYDRAULIC DATA

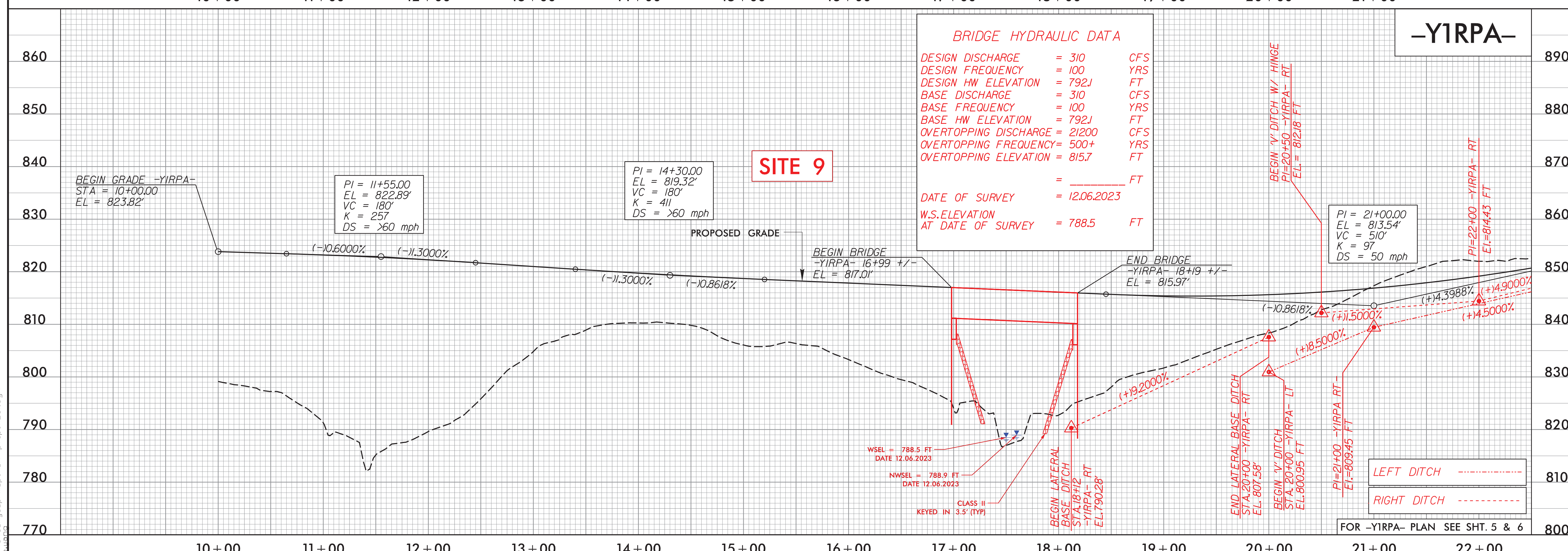
24" RCP-III Sta.18+11 -Y1LPA-

DRAINAGE AREA	=	2.000	AC
DESIGN FREQUENCY	=	100	YRS
DESIGN DISCHARGE	=	6.5	CFS
DESIGN HW ELEVATION	=	836.6	FT
100 YEAR DISCHARGE	=	6.5	CFS
100 YEAR HW ELEVATION	=	836.6	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	9.0	CFS
OVERTOPPING ELEVATION	=	837.11	FT

-Y1RPA-

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	310	CFS
DESIGN FREQUENCY	=	100	YRS
DESIGN HW ELEVATION	=	792.1	FT
BASE DISCHARGE	=	310	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	792.1	FT
OVERTOPPING DISCHARGE	=	21200	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	815.7	FT
	=	________	FT
DATE OF SURVEY	=	12.06.2023	
W.S.ELEVATION AT DATE OF SURVEY	=	788.5	FT



SITE 9
BEGIN GRADE -Y1RPA-
STA = 10+00.00
EL = 823.82'
PI = 11+55.00
EL = 822.89'
VC = 180'
K = 257
DS = >60 mph
(-)0.6000%
(-)1.3000%
PI = 14+30.00
EL = 819.32'
VC = 180'
K = 411
DS = >60 mph
(-)1.3000%
(-)0.8618%
PROPOSED GRADE
BEGIN BRIDGE
-Y1RPA- 16+99 +/-
EL = 817.01'
END BRIDGE
-Y1RPA- 18+19 +/-
EL = 815.97'
PI = 21+00.00
EL = 813.54'
VC = 510'
K = 97
DS = 50 mph
(-)0.8618%
(+)1.5000%
(+)4.3988%
(+)4.9000%
(+)4.5000%
(+)18.5000%
(+)9.2000%
BEGIN 'V' DITCH W/ HINGE
PI=20+50 -Y1RPA- RT
EL= 812.18 FT
PI=22+00 -Y1RPA- RT
El=814.43 FT
WSEL = 788.5 FT
DATE 12.06.2023
NWSEL = 788.9 FT
DATE 12.06.2023
CLASS II
KEYED IN 3.5' (TYP)
BEGIN LATERAL BASE DITCH
STA.18+12 -Y1RPA- RT
EL.790.28'
END LATERAL BASE DITCH
STA.20+00 -Y1RPA- RT
EL. 807.58'
BEGIN 'V' DITCH
STA.20+00 -Y1RPA- LT
EL. 800.95 FT
PI=21+00 -Y1RPA- RT
El=809.45 FT
LEFT DITCH
RIGHT DITCH
FOR -Y1RPA- PLAN SEE SHT. 5 & 6
860
850
840
830
820
810
800
790
780
770
890
880
870
860
850
840
830
820
810
800
10+00
11+00
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
20+00
21+00
22+00

5/28/99

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PERMIT DRAWING
SHEET 20 OF 30

TS TS — TEMPORARY SURFACE WATER IMPACTS
S S — SURFACE WATER IMPACTS

50 25 0 50 100
PLANS

ENGLISH

-YIRPA- CURVE DATA

PIs Sta 11+33.38	PI Sta 13+41.97	PIs Sta 15+42.66
Θs = 4° 46' 28.7"	Δ = 13° 29' 39.5" (RT)	Θs = 4° 17' 49.9"
Ls = 200.00'	D = 4° 46' 28.7"	Ls = 180.00'
LT = 133.38'	L = 282.62'	LT = 120.04'
ST = 66.71'	T = 141.97'	ST = 60.03'
	R = 1,200.00'	
	SE = 0.08	
	DS = 60 MPH	

CURVE DATA FOR -L-

PI Sta 58+01.11
Δ = 10° 41' 35.2" (RT)
D = 0° 22' 41.5"
L = 2,827.44'
T = 1,417.84'
R = 15,150.00'
DS = 70 MPH
SE = NC

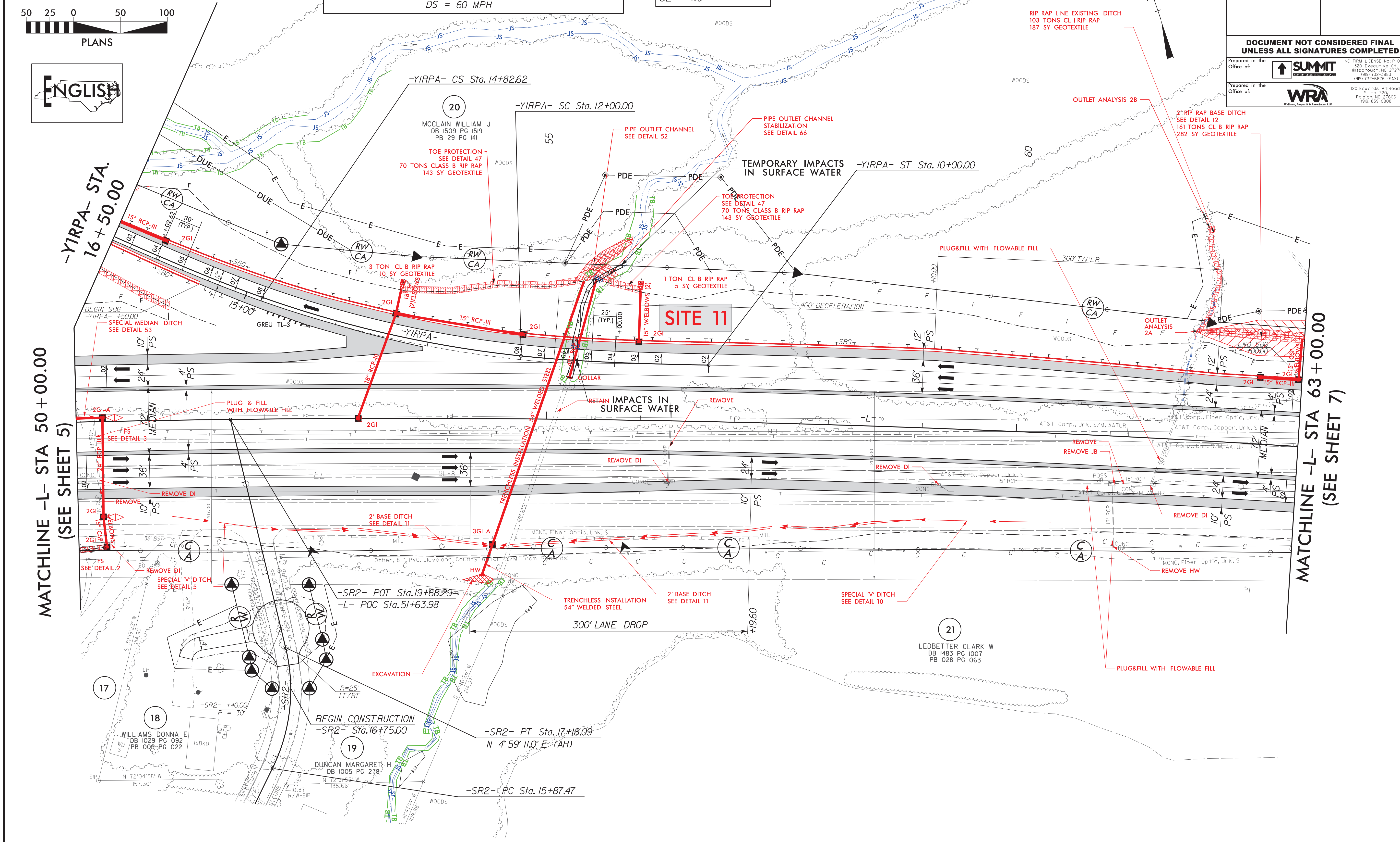
PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	6
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: SUMMIT — NC FIRM LICENSE No: P-0339, 320 Executive Ct., Hillsborough, NC 27278, (919) 732-3883, (919) 732-6676 (FAX)

Prepared in the Office of: WRA — 1201 Edwards Mill Road, Suite 320, Raleigh, NC 27606, (919) 859-0808



SITE 11
-YIRPA- STA. 16+50.00
MATCHLINE -L- STA 50+00.00 (SEE SHEET 5)
MATCHLINE -L- STA 63+00.00 (SEE SHEET 7)
-YIRPA- CS Sta. 14+82.62
-YIRPA- SC Sta. 12+00.00
-YIRPA- ST Sta. 10+00.00
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
PIPE OUTLET CHANNEL SEE DETAIL 52
PIPE OUTLET CHANNEL STABILIZATION SEE DETAIL 66
TOE PROTECTION SEE DETAIL 47 70 TONS CLASS B RIP RAP 143 SY GEOTEXTILE
3 TON CL B RIP RAP 10 SY GEOTEXTILE
1 TON CL B RIP RAP 5 SY GEOTEXTILE
RIP RAP LINE EXISTING DITCH 103 TONS CL I RIP RAP 187 SY GEOTEXTILE
OUTLET ANALYSIS 2B
OUTLET ANALYSIS 2A
2' RIP RAP BASE DITCH SEE DETAIL 12 161 TONS CL B RIP RAP 282 SY GEOTEXTILE
PLUG&FILL WITH FLOWABLE FILL
300' TAPER
400' DECELERATION
SPECIAL MEDIAN DITCH SEE DETAIL 53
BEGIN SBG
END SBG
GREU TL-3
PLUG & FILL WITH FLOWABLE FILL
TRENCHLESS INSTALLATION 54" WELDED STEEL
2' BASE DITCH SEE DETAIL 11
SPECIAL 'V' DITCH SEE DETAIL 5
SPECIAL 'V' DITCH SEE DETAIL 10
FS SEE DETAIL 3
FS SEE DETAIL 2
REMOVE DI
REMOVE JB
REMOVE HW
REMOVE
RETAIN
COLLAR
EXCAVATION
-SR2- POT Sta.19+68.29= -L- POC Sta.51+63.98
300' LANE DROP
BEGIN CONSTRUCTION -SR2- Sta.16+75.00
-SR2- PT Sta. 17+18.09 N 4° 59' 11.0" E (AH)
-SR2- PC Sta. 15+87.47
20 MCCLAIN WILLIAM J DB 1509 PG 1519 PB 29 PG 141
21 LEDBETTER CLARK W DB 1483 PG 1007 PB 028 PG 063
18 WILLIAMS DONNA E DB 1029 PG 092 PB 008 PG 022
19 DUNCAN MARGARET H DB 1005 PG 278
17
WOODS

FOR -L- PROFILE, SEE SHEET 18
FOR -YIRPA- PROFILE, SEE SHEET 23
FOR -SR2- PROFILE, SEE SHEET 27

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TS TEMPORARY SURFACE WATER IMPACTS

S SURFACE WATER IMPACTS

50 25 0 50 100
PLANS

ENGLISH

-YIRPA- CURVE DATA

PIs Sta 11+33.38	PI Sta 13+41.97	PIs Sta 15+42.66
Θs = 4° 46' 28.7"	Δ = 13° 29' 39.5" (RT)	Θs = 4° 17' 49.9"
Ls = 200.00'	D = 4° 46' 28.7"	Ls = 180.00'
LT = 133.38'	L = 282.62'	LT = 120.04'
ST = 66.71'	T = 141.97'	ST = 60.03'
	R = 1,200.00'	
	SE = 0.08	
	DS = 60 MPH	

CURVE DATA FOR -L-

PI Sta 58+01.11
Δ = 10° 41' 35.2" (RT)
D = 0° 22' 41.5"
L = 2,827.44'
T = 1,417.84'
R = 15,150.00'
DS = 70 MPH
SE = NC

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	6
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
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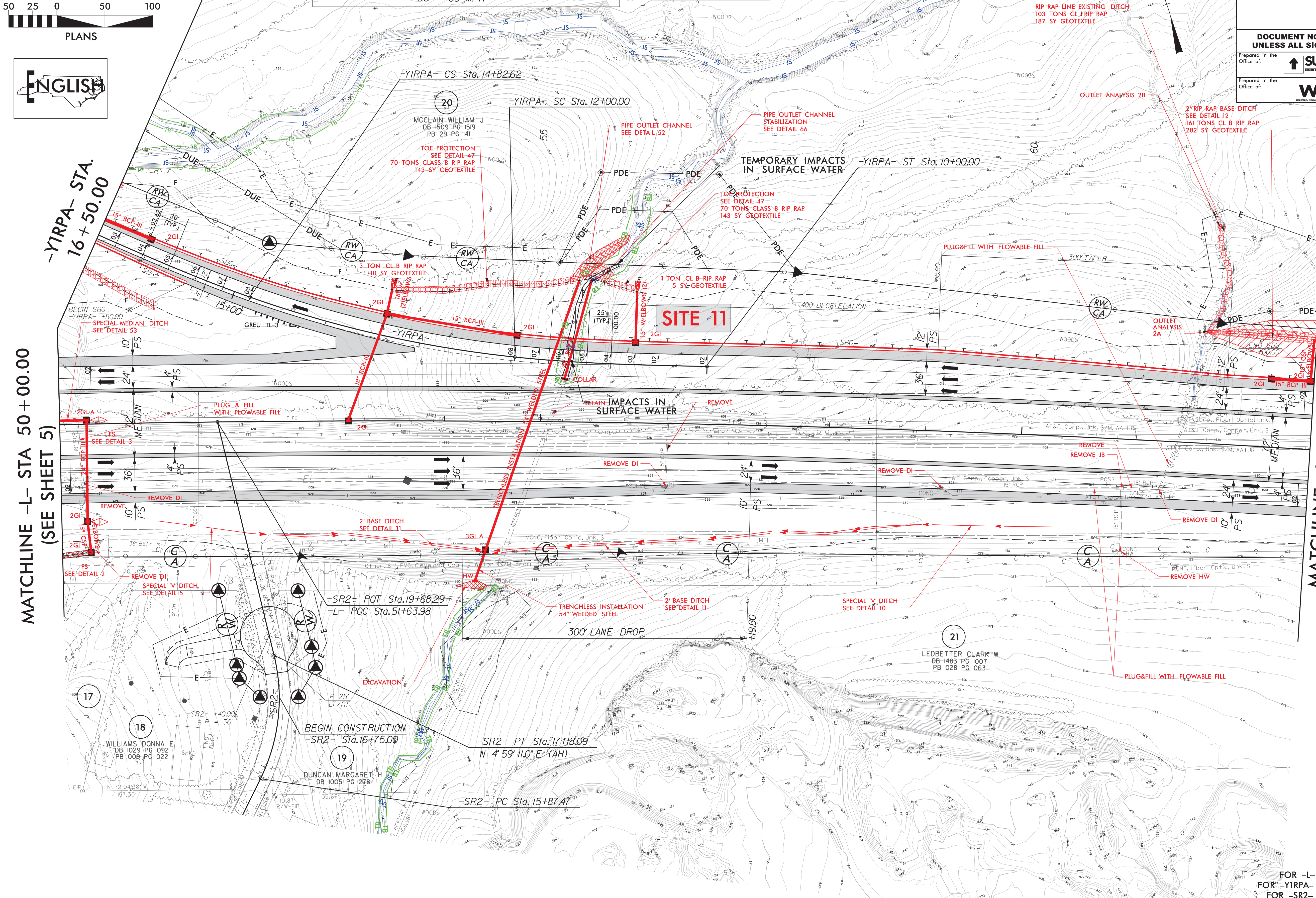
-YIRPA- STA. 16+50.00
-YIRPA- CS Sta. 14+82.62
-YIRPA- SC Sta. 12+00.00
-YIRPA- ST Sta. 10+00.00
MCCLAIN WILLIAM J
DB 1509 PG 1519
PB 29 PG 141
TOE PROTECTION
SEE DETAIL 47
70 TONS CLASS B RIP RAP
143 SY GEOTEXTILE
PIPE OUTLET CHANNEL
SEE DETAIL 52
PIPE OUTLET CHANNEL STABILIZATION
SEE DETAIL 66
TEMPORARY IMPACTS IN SURFACE WATER
3 TON CL B RIP RAP
10 SY GEOTEXTILE
1 TON CL B RIP RAP
5 SY GEOTEXTILE
SITE 11
RIP RAP LINE EXISTING DITCH
103 TONS CL I RIP RAP
187 SY GEOTEXTILE
OUTLET ANALYSIS 2B
2' RIP RAP BASE DITCH
SEE DETAIL 12
161 TONS CL B RIP RAP
282 SY GEOTEXTILE
PLUG&FILL WITH FLOWABLE FILL
300' TAPER
400' DECELERATION
OUTLET ANALYSIS 2A
BEGIN SBG
SPECIAL MEDIAN DITCH
SEE DETAIL 53
PLUG & FILL WITH FLOWABLE FILL
IMPACTS IN SURFACE WATER
COLLAR
RETAIN
REMOVE
REMOVE DI
REMOVE JB
TRENCHLESS INSTALLATION 54" WELDED STEEL
2' BASE DITCH
SEE DETAIL 11
SPECIAL 'V' DITCH
SEE DETAIL 5
SPECIAL 'V' DITCH
SEE DETAIL 10
REMOVE HW
EXCAVATION
MATCHLINE -L- STA 50+00.00 (SEE SHEET 5)
MATCHLINE -L- STA 63+00.00 (SEE SHEET 7)
-SR2- POT Sta.19+68.29=
-L- POC Sta.51+63.98
300' LANE DROP
LEDBETTER CLARK W
DB 1483 PG 1007
PB 028 PG 063
BEGIN CONSTRUCTION
-SR2- Sta.16+75.00
-SR2- PT Sta.17+18.09
N 4° 59' 11.0" E (AH)
-SR2- PC Sta.15+87.47
WILLIAMS DONNA E
DB 1029 PG 092
PB 008 PG 022
DUNCAN MARGARET H
DB 1005 PG 278

FOR -L- PROFILE, SEE SHEET 18
FOR -YIRPA- PROFILE, SEE SHEET 23
FOR -SR2- PROFILE, SEE SHEET 27

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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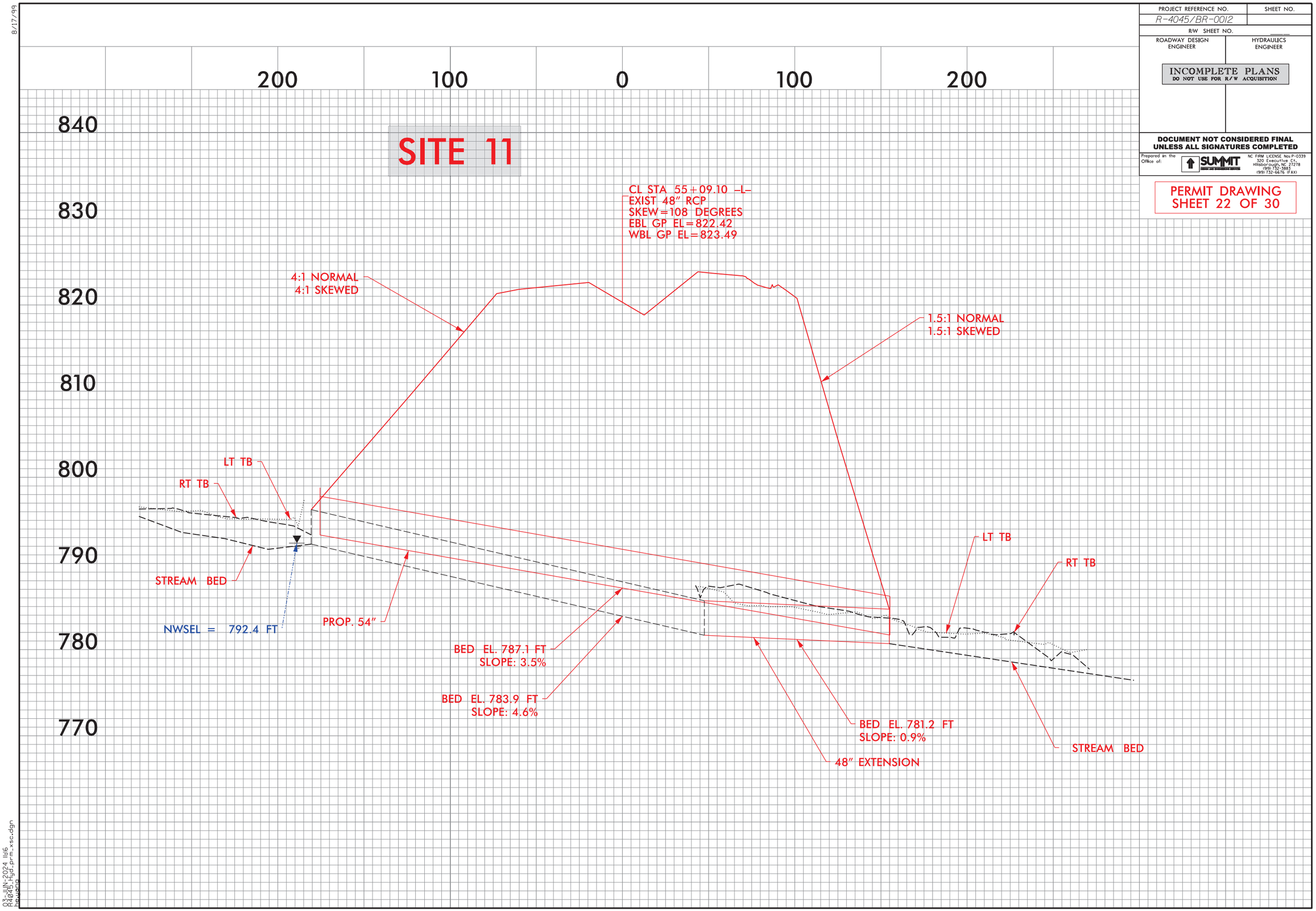
PERMIT DRAWING
SHEET 22 OF 30

SITE 11



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PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
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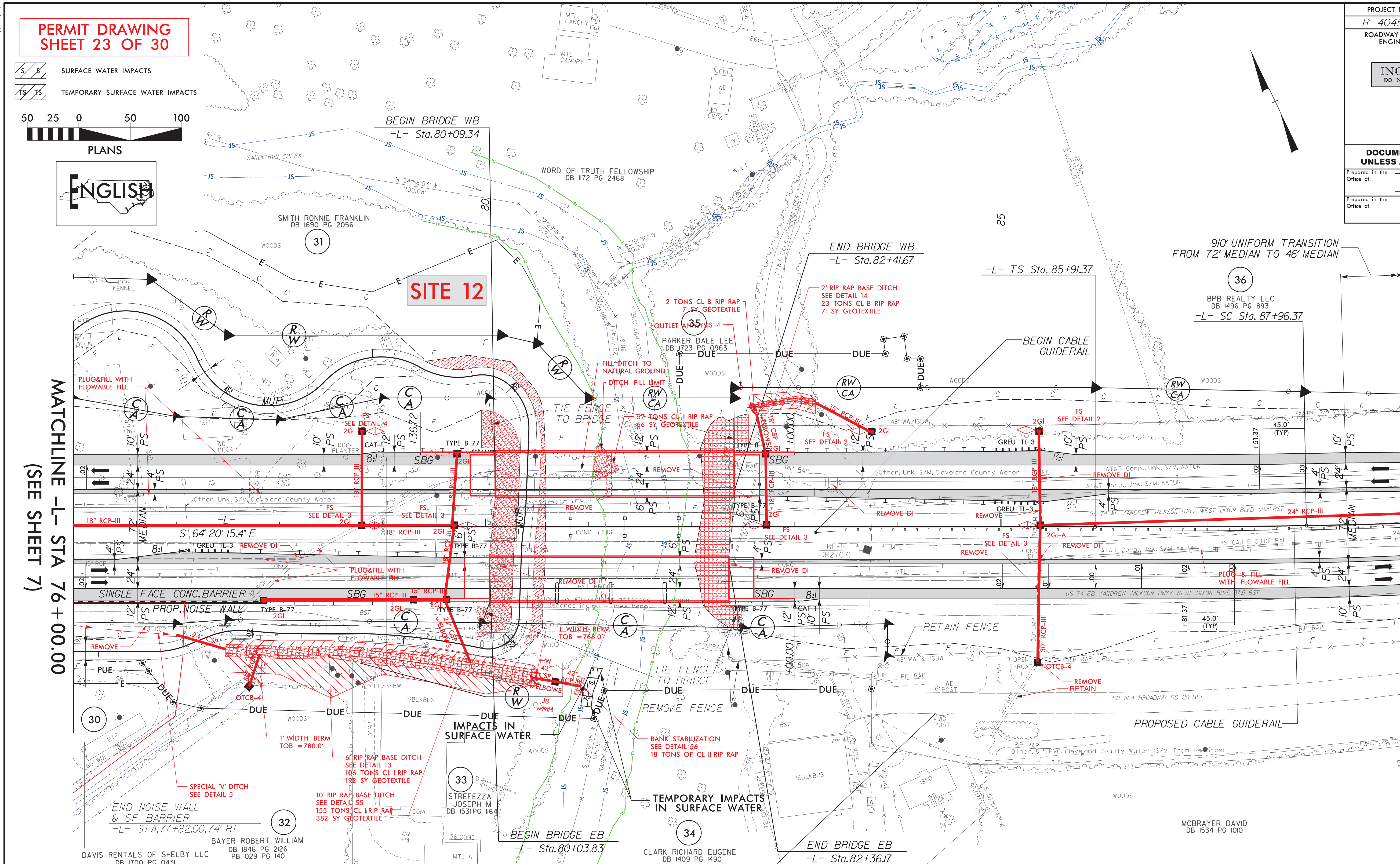

PERMIT DRAWING
SHEET 23 OF 30
SURFACE WATER IMPACTS
TEMPORARY SURFACE WATER IMPACTS
50 25 0 50 100
PLANS
ENGLISH
SITE 12
BEGIN BRIDGE WB
-L- Sta.80+09.34
END BRIDGE WB
-L- Sta.82+41.67
BEGIN BRIDGE EB
-L- Sta.80+03.83
END BRIDGE EB
-L- Sta.82+36.17
-L- TS Sta. 85+91.37
-L- SC Sta. 87+96.37
910' UNIFORM TRANSITION
FROM 72' MEDIAN TO 46' MEDIAN
BEGIN CABLE GUIDERAIL
PROPOSED CABLE GUIDERAIL
MATCHLINE -L- STA 76+00.00
(SEE SHEET 7)
MATCHLINE -L- STA 89+00.00
(SEE SHEET 9)
SMITH RONNIE FRANKLIN
DB 1690 PG 2056
WORD OF TRUTH FELLOWSHIP
DB 1172 PG 2468
PARKER DALE LEE
DB 1723 PG 0963
BPB REALTY LLC
DB 1496 PG 893
STREFEZZA JOSEPH M
DB 1531 PG 1164
CLARK RICHARD EUGENE
DB 1409 PG 1490
BAYER ROBERT WILLIAM
DB 1846 PG 2126
PB 029 PG 140
DAVIS RENTALS OF SHELBY LLC
DB 1700 PG 0431
MCBRAYER DAVID
DB 1534 PG 1010
IMPACTS IN
SURFACE WATER
TEMPORARY IMPACTS
IN SURFACE WATER
TIE FENCE TO BRIDGE
RETAIN FENCE
REMOVE FENCE
END NOISE WALL
& SF BARRIER
-L- STA.77+82.00,74' RT
SINGLE FACE CONC. BARRIER
PROP. NOISE WALL
S 64° 20' 15.4" E
US 74 WB /ANDREW JACKSON HWY / WEST DIXON BLVD
US 74 EB /ANDREW JACKSON HWY / WEST DIXON BLVD
SANDY RUN CREEK
2 TONS CL B RIP RAP
7 SY GEOTEXTILE
2' RIP RAP BASE DITCH
SEE DETAIL 14
23 TONS CL B RIP RAP
71 SY GEOTEXTILE
FILL DITCH TO NATURAL GROUND
DITCH FILL LIMIT
57 TONS CL II RIP RAP
66 SY GEOTEXTILE
PLUG&FILL WITH FLOWABLE FILL
1' WIDTH BERM
TOB =766.0'
1' WIDTH BERM
TOB =780.0'
6' RIP RAP BASE DITCH
SEE DETAIL 13
106 TONS CL I RIP RAP
192 SY GEOTEXTILE
10' RIP RAP BASE DITCH
SEE DETAIL 55
155 TONS CL I RIP RAP
382 SY GEOTEXTILE
BANK STABILIZATION
SEE DETAIL 56
18 TONS OF CL II RIP RAP
SPECIAL 'V' DITCH
SEE DETAIL 5

CURVE DATA FOR -MUP-							
PI Sta 12+72.20	PI Sta 12+71.37	PI Sta 14+13.23	PI Sta 15+06.06	PI Sta 15+75.51	PI Sta 16+20.74	PI Sta 16+64.47	PI Sta 17+68.07
Δ = 159° 10' 58.7" (LT)	Δ = 120° 57' 43.3" (RT)	Δ = 114° 13' 06.4" (LT)	Δ = 76° 39' 29.3" (RT)	Δ = 41° 29' 15.5" (LT)	Δ = 51° 34' 08.2" (RT)	Δ = 52° 22' 55.9" (RT)	Δ = 5° 53' 34.8" (RT)
D = 114° 35' 29.6"	D = 76° 23' 39.7"	D = 76° 23' 39.7"	D = 76° 23' 39.7"	D = 76° 23' 39.7"	D = 143° 14' 22.0"	D = 104° 10' 26.9"	D = 22° 55' 05.9"
L = 138.91'	L = 158.34'	L = 149.51'	L = 100.35'	L = 54.31'	L = 36.00'	L = 50.28'	L = 25.71'
T = 272.20'	T = 132.46'	T = 115.97'	T = 59.29'	T = 28.41'	T = 19.32'	T = 27.05'	T = 12.87'
R = 50.00'	R = 75.00'	R = 75.00'	R = 75.00'	R = 75.00'	R = 40.00'	R = 55.00'	R = 250.00'

CURVE DATA FOR -L-	
PIs Sta 87+28.04	PI Sta 94+51.96
Θs = 0° 57' 23.3"	Δ = 12° 11' 21.0" (LT)
Ls = 205.00'	D = 0° 55' 59.4"
LT = 136.67'	L = 1,306.23'
ST = 68.34'	T = 655.59'
	R = 6,140.00'
	DS = 65 MPH
	SE = 0.03

CURVE DATA FOR -MUP-							
PI Sta 17+94.31	PI Sta 19+07.39	PI Sta 19+92.93	PI Sta 21+20.86	PI Sta 21+72.46	PI Sta 22+29.53	PI Sta 23+24.21	PI Sta 23+71.18
Δ = 6° 07' 53.1" (LT)	Δ = 100° 18' 24.7" (RT)	Δ = 12° 23' 53.0" (LT)	Δ = 4° 34' 47.6" (RT)	Δ = 26° 26' 45.5" (LT)	Δ = 21° 58' 07.1" (RT)	Δ = 3° 26' 01.1" (RT)	Δ = 5° 15' 54.1" (LT)
D = 22° 55' 05.9"	D = 190° 59' 09.4"	D = 9° 01' 22.6"	D = 28° 38' 52.4"	D = 71° 37' 11.0"	D = 71° 37' 11.0"	D = 14° 19' 26.2"	D = 19° 05' 54.9"
L = 26.75'	L = 52.52'	L = 137.41'	L = 15.99'	L = 36.93'	L = 30.67'	L = 23.97'	L = 27.57'
T = 13.39'	T = 35.95'	T = 68.97'	T = 8.00'	T = 18.80'	T = 15.53'	T = 11.99'	T = 13.79'
R = 250.00'	R = 30.00'	R = 635.00'	R = 200.00'	R = 80.00'	R = 80.00'	R = 400.00'	R = 300.00'

FOR -L- PROFILE, SEE SHEET 20
FOR -MUP- PROFILE, SEE SHEET 29

6/2/99

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PERMIT DRAWING
SHEET 24 OF 30

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8

ROADWAY DESIGN ENGINEER | PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
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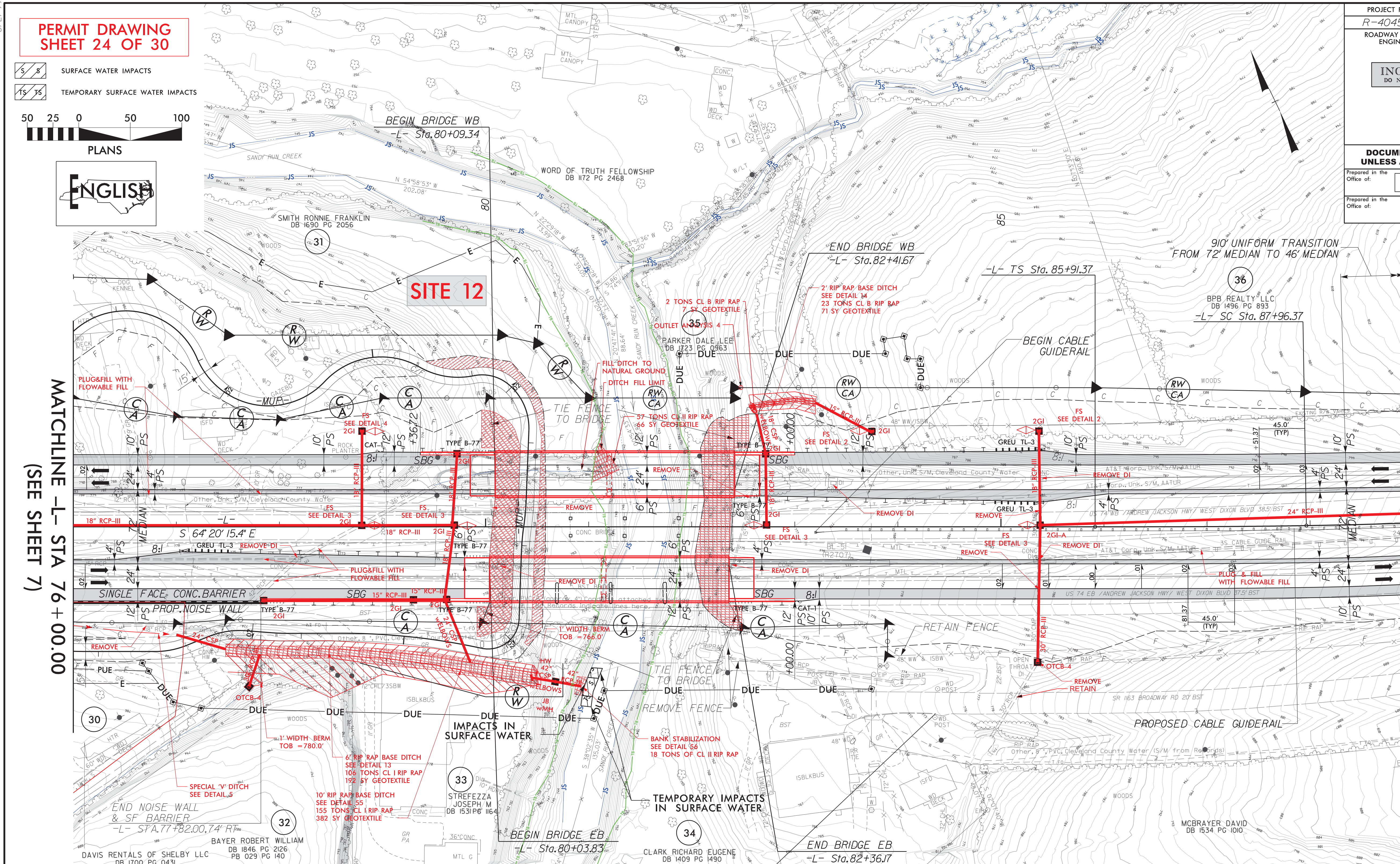

S S SURFACE WATER IMPACTS
TS TS TEMPORARY SURFACE WATER IMPACTS
50 25 0 50 100
PLANS
ENGLISH
SITE 12
BEGIN BRIDGE WB
-L- Sta.80+09.34
END BRIDGE WB
-L- Sta.82+41.67
BEGIN BRIDGE EB
-L- Sta.80+03.83
END BRIDGE EB
-L- Sta.82+36.17
-L- TS Sta. 85+91.37
-L- SC Sta. 87+96.37
910' UNIFORM TRANSITION
FROM 72' MEDIAN TO 46' MEDIAN
WORD OF TRUTH FELLOWSHIP
DB 1172 PG 2468
SMITH RONNIE FRANKLIN
DB 1690 PG 2056
PARKER DALE LEE
BPB REALTY LLC
DB 1496 PG 893
STREFEZZA JOSEPH M
DB 1531 PG 1164
CLARK RICHARD EUGENE
DB 1409 PG 1490
MCBRAYER DAVID
DB 1534 PG 1010
BAYER ROBERT WILLIAM
DB 1846 PG 2126
PB 029 PG 140
DAVIS RENTALS OF SHELBY LLC
DB 1700 PG 0431
END NOISE WALL
& SF BARRIER
-L- STA.77+82.00,74' RT
BEGIN CABLE GUIDERAIL
PROPOSED CABLE GUIDERAIL
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
SINGLE FACE CONC. BARRIER
PROP. NOISE WALL
S 64° 20' 15.4" E
TIE FENCE TO BRIDGE
RETAIN FENCE
REMOVE FENCE
2 TONS CL B RIP RAP
7 SY GEOTEXTILE
2' RIP RAP BASE DITCH
SEE DETAIL 14
23 TONS CL B RIP RAP
71 SY GEOTEXTILE
FILL DITCH TO NATURAL GROUND
DITCH FILL LIMIT
57 TONS CL II RIP RAP
66 SY GEOTEXTILE
BANK STABILIZATION
SEE DETAIL 56
18 TONS OF CL II RIP RAP
6' RIP RAP BASE DITCH
SEE DETAIL 13
106 TONS CL I RIP RAP
192 SY GEOTEXTILE
10' RIP RAP BASE DITCH
SEE DETAIL 55
155 TONS CL I RIP RAP
382 SY GEOTEXTILE
SPECIAL 'V' DITCH
SEE DETAIL 5
1' WIDTH BERM
TOB =780.0'
1' WIDTH BERM
TOB =766.0'
PLUG&FILL WITH FLOWABLE FILL
MATCHLINE -L- STA 76+00.00
(SEE SHEET 7)
MATCHLINE -L- STA 89+00.00
(SEE SHEET 9)

CURVE DATA FOR -MUP-							
PI Sta 12+72.20	PI Sta 12+71.37	PI Sta 14+13.23	PI Sta 15+06.06	PI Sta 15+75.51	PI Sta 16+20.74	PI Sta 16+64.47	PI Sta 17+68.07
△ = 159° 10' 58.7" (LT)	△ = 120° 57' 43.3" (RT)	△ = 114° 13' 06.4" (LT)	△ = 76° 39' 29.3" (RT)	△ = 41° 29' 15.5" (LT)	△ = 51° 34' 08.2" (RT)	△ = 52° 22' 55.9" (RT)	△ = 5° 53' 34.8" (RT)
D = 114° 35' 29.6"	D = 76° 23' 39.7"	D = 76° 23' 39.7"	D = 76° 23' 39.7"	D = 76° 23' 39.7"	D = 143° 14' 22.0"	D = 104° 10' 26.9"	D = 22° 55' 05.9"
L = 138.91'	L = 158.34'	L = 149.51'	L = 100.35'	L = 54.31'	L = 36.00'	L = 50.28'	L = 25.71'
T = 272.20'	T = 132.46'	T = 115.97'	T = 59.29'	T = 28.41'	T = 19.32'	T = 27.05'	T = 12.87'
R = 50.00'	R = 75.00'	R = 75.00'	R = 75.00'	R = 75.00'	R = 40.00'	R = 55.00'	R = 250.00'

CURVE DATA FOR -MUP-							
PI Sta 17+94.31	PI Sta 19+07.39	PI Sta 19+92.93	PI Sta 21+20.86	PI Sta 21+72.46	PI Sta 22+29.53	PI Sta 23+24.21	PI Sta 23+71.18
△ = 6° 07' 53.1" (LT)	△ = 100° 18' 24.7" (RT)	△ = 12° 23' 53.0" (LT)	△ = 4° 34' 47.6" (RT)	△ = 26° 26' 45.5" (LT)	△ = 21° 58' 07.1" (RT)	△ = 3° 26' 01.1" (RT)	△ = 5° 15' 54.1" (LT)
D = 22° 55' 05.9"	D = 190° 59' 09.4"	D = 9° 01' 22.6"	D = 28° 38' 52.4"	D = 71° 37' 11.0"	D = 71° 37' 11.0"	D = 14° 19' 26.2"	D = 19° 05' 54.9"
L = 26.75'	L = 52.52'	L = 137.41'	L = 15.99'	L = 36.93'	L = 30.67'	L = 23.97'	L = 27.57'
T = 13.39'	T = 35.95'	T = 68.97'	T = 8.00'	T = 18.80'	T = 15.53'	T = 11.99'	T = 13.79'
R = 250.00'	R = 30.00'	R = 635.00'	R = 200.00'	R = 80.00'	R = 80.00'	R = 400.00'	R = 300.00'

CURVE DATA FOR -L-	
PIs Sta 87+28.04	PI Sta 94+51.96
Θs = 0° 57' 23.3"	△ = 12° 11' 21.0" (LT)
Ls = 205.00'	D = 0° 55' 59.4"
LT = 136.67'	L = 1,306.23'
ST = 68.34'	T = 655.59'
	R = 6,140.00'
	DS = 65 MPH
	SE = 0.03

FOR -L- PROFILE, SEE SHEET 20
FOR -MUP- PROFILE, SEE SHEET 29

5/28/99

PERMIT DRAWING
SHEET 25 OF 30

–L– (EB)

PROJECT REFERENCE NO.	SHEET NO.
R-4045	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SITE 12

PI = 80+35.00
EL = 765.15'
VC = 1600'
K = 182
DS = 70 MPH

PROPOSED GRADE

(–)3.42627%

(–)4.87702%

(–)14.00000%

(+)14.80000%

(–)0.50000%

EXISTING GRADE

END DITCH GRADE
STA.77+00.00 –L– RT
EL.774.06 FT
BEGIN 24" CSP

BEGIN DITCH GRADE
STA.77+48.00 –L– RT
EL.773.29 FT
END 24" CSP

TRANSITION FROM 6' BASE DITCH TO 10' BASE DITCH STA. 79+00 TO STA. 80+00 –L– RT

PI =80+00.00 –L– RT
EL = 761.00 FT

–MUP–

END DITCH GRADE
STA.80+50.00 –L– RT
EL.760.75 FT

NWSEL = 742.54 FT
DATE 11.16.2023

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 8,790	CFS
DESIGN FREQUENCY	= 100	YRS
DESIGN HW ELEVATION	= 760.8	FT
BASE DISCHARGE	= 8,790	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 760.8	FT
OVERTOPPING DISCHARGE	= 51,600	CFS
OVERTOPPING FREQUENCY	= > 500	YRS
OVERTOPPING ELEVATION	= 782.6	FT
500 YEAR DISCHARGE	= 12,490	CFS
500 YEAR HW ELEVATION	= 763.5	FT
DATE OF SURVEY	= 11.16.2023	
W.S.ELEVATION AT DATE OF SURVEY	= 742.54	FT

FOR –L– PLAN SEE SHT. 8

730 740 750 760 770 780 790 800 810 820 830

76+00 77+00 78+00 79+00 80+00 81+00 82+00 83+00 84+00 85+00 86+00 87+00 88+00 89+00

–L– (WB)

SITE 12

PI = 81+00.00
EL = 760.81'
VC = 1710'
K = 182
DS = 70 MPH

PROPOSED GRADE

(–)4.00000%

EXISTING GRADE

(–)4.00000%

(+)5.40507%

(+)9.09091%

–MUP–

BEGIN DITCH GRADE
STA.82+65.00 –L– LT
EL.767.00 FT

END DITCH GRADE
STA.81+20.00 –L– LT
EL.772.00 FT

NWSEL = 742.75 FT
DATE 11.16.2023

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 8,790	CFS
DESIGN FREQUENCY	= 100	YRS
DESIGN HW ELEVATION	= 761.2	FT
BASE DISCHARGE	= 8,790	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 761.2	FT
OVERTOPPING DISCHARGE	= 41,800	CFS
OVERTOPPING FREQUENCY	= > 500	YRS
OVERTOPPING ELEVATION	= 780.5	FT
500 YEAR DISCHARGE	= 12,490	CFS
500 YEAR HW ELEVATION	= 763.9	FT
DATE OF SURVEY	= 11.16.2023	
W.S.ELEVATION AT DATE OF SURVEY	= 742.75	FT

LEFT DITCH

RIGHT DITCH

FOR –L– PLAN SEE SHT. 8

730 740 750 760 770 780 790 800 810

76+00 77+00 78+00 79+00 80+00 81+00 82+00 83+00 84+00 85+00 86+00 87+00 88+00 89+00

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6/2/99

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: SUMMIT Design and Engineering Services — NC FIRM LICENSE Nos P-0339, 320 Executive Ct, Hillsborough, NC 27278, (919) 732-3883, (919) 732-6676 (FAX)

Prepared in the Office of: WRA Wetland, Research & Associates, LLP — 1201 Edwards Mill Road, Suite 320, Raleigh, NC 27606, (919) 859-0808

MATCHLINE -SR1- STA 22+50.00 (SEE SHEET 12)

-SR2- PT Sta. 15+13.12
N 44° 47' 41.0" E (AH)

-SR2- PC Sta. 13+98.22

-SR2- CURVE DATA
PI Sta 14+55.98
Δ = 14° 31' 57.1" (RT)
D = 12° 38' 53.1"
L = 114.90'
T = 57.76'
R = 453.00'

END CONSTRUCTION
-SR2- Sta. 12+15.00

-SR1- POT Sta. 34+13.20

END CONSTRUCTION
-SR1- Sta. 32+20.00

END GRADE
-SR1- Sta. 32+00.00

-SR1- PT Sta. 23+31.03

-SR2- POT Sta. 10+00.00 =
-SR1- POT Sta. 24+97.66

-SR1- PC Sta. 26+92.35

-SR1- PT Sta. 29+13.11
END PVMT./BEGIN ABC

-SR1- CURVE DATA

PI Sta 20+36.18	PI Sta 28+04.67
Δ = 38° 26' 03.9" (RT)	Δ = 26° 04' 45.5" (LT)
D = 6° 15' 42.6"	D = 11° 48' 48.8"
L = 613.79'	L = 220.76'
T = 318.94'	T = 112.32'
R = 915.00'	R = 485.00'
SE = 0.05	SE = 0.06
RO = 105'	RO = 126'
DS = 40 MPH	DS = 40 MPH

SITE 13

17 CORNERSTONE BAPTIST CHURCH INC DB 1402 PG 2149

22 DODSON JENNA L DB 1716 PG 1466

ROBBINS NICHOLAS A DB 1861 PG 2891

CAMPBELL MARJORIE DB 1269 PG 1799

DUNCAN MARGARET H DB 1005 PG 276

DUNCAN MARGARET H DB 1005 PG 278

21 LEDBETTER CLARK W DB 1483 PG 1007 PB 028 PG 063

23 DUNCAN MARGARET H DB 1005 PG 276

24 WILLIAMS DONNA E DB 1474 PG 15

BALDWIN GINGER ATKINS DB 1427 PG 281

SPECIAL BASE DITCH SEE DETAIL 61 192 SY PSRM

SPECIAL BASE DITCH SEE DETAIL 11

SPECIAL 'V' DITCH SEE DETAIL 10

3 TONS CL B RIP RAP 10 SY GEOTEXTILE OUTLET ANALYSIS 1310 & 1314

PIPE OUTLET CHANNEL STABILIZATION SEE DETAIL 28

TEMPORARY STREAM IMPACT

PERMANENT STREAM IMPACT

SPECIAL BASE DITCH 147 TONS CL B RIP RAP 325 SY GEOTEXTILE SEE DETAIL 20

LATERAL BASE DITCH 12 TONS CL B RIP RAP 25 SY GEOTEXTILE SEE DETAIL 62 EST 40 CY DDE

BANK STABILIZATION SEE DETAIL 29

LATERAL BASE DITCH 39 TONS CL B RIP RAP 156 SY GEOTEXTILE SEE DETAIL 39 EST 105 CY DDE

BANK STABILIZATION SEE DETAIL 30

SPECIAL BASE DITCH 62 TONS CL B RIP RAP 137 SY GEOTEXTILE SEE DETAIL 21

50 25 0 50 100

PLANS

- TS TS — TEMPORARY SURFACE WATER IMPACTS
- S S — SURFACE WATER IMPACTS
- F F — FILL IN WETLAND
- * * * — MECHANIZED CLEARING (GRUBBING)

PERMIT DRAWING SHEET 26 OF 30

FOR -SR1- PROFILE, SEE SHEET 26
FOR -SR2- PROFILE, SEE SHEET 27

ENGLISH

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BRUNSON

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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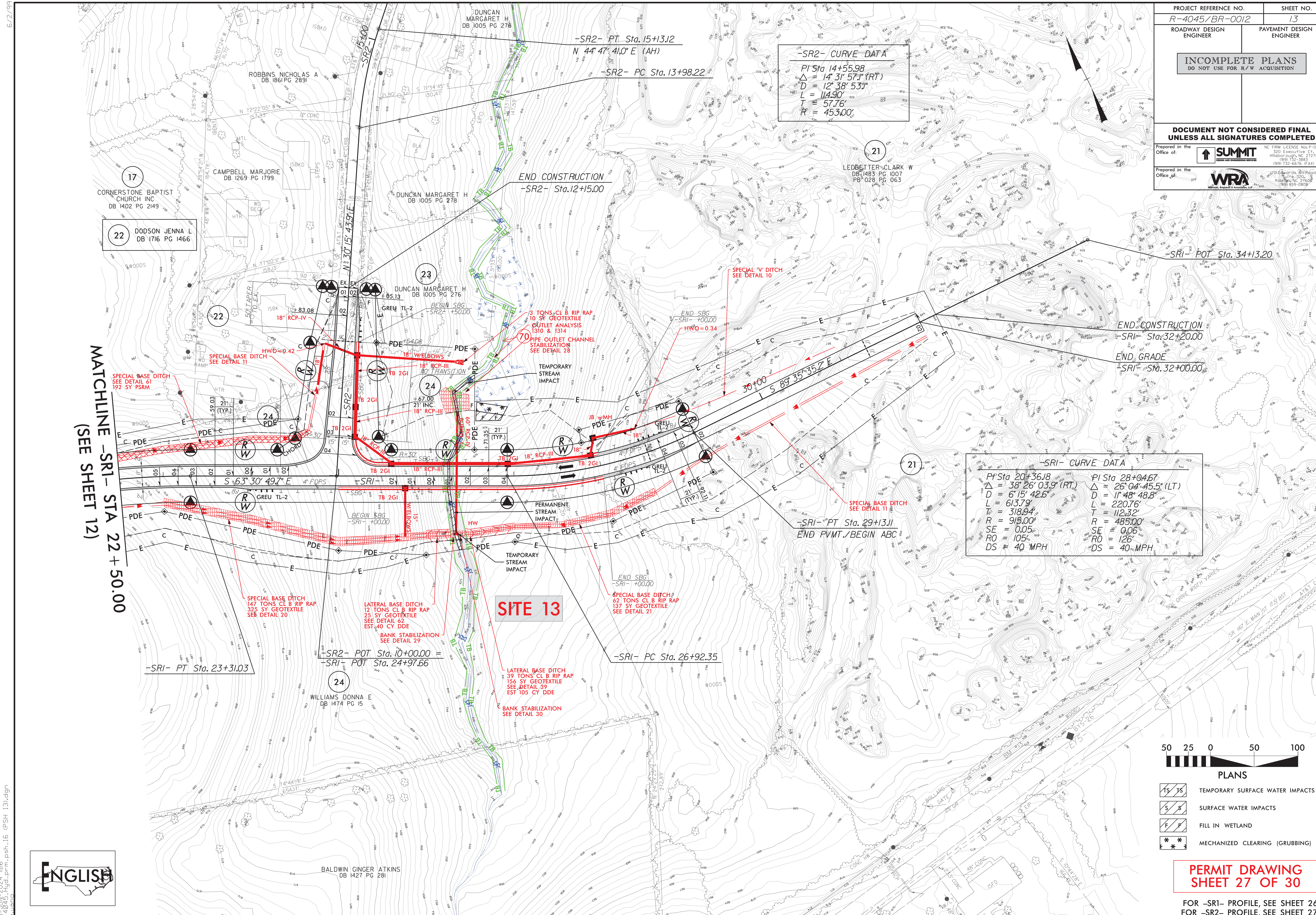
Prepared in the Office of: WRA — 2016 Edwards Mill Road, Suite 320, Raleigh, NC 27606, (919) 859-0800



-SR2- CURVE DATA
PI Sta 14+55.98
Δ = 14° 31' 57.1" (RT)
D = 12° 38' 53.1"
L = 114.90'
T = 57.76'
R = 453.00'
-SR1- CURVE DATA
PI Sta 20+36.18
Δ = 38° 26' 03.9" (RT)
D = 6° 15' 42.6"
L = 613.79'
T = 318.94'
R = 915.00'
SE = 0.05
RO = 105'
DS = 40 MPH
PI Sta 28+04.67
Δ = 26° 04' 45.5" (LT)
D = 11° 48' 48.8"
L = 220.76'
T = 112.32'
R = 485.00'
SE = 0.06
RO = 126'
DS = 40 MPH
-SR2- PT Sta. 15+13.12
N 44° 47' 41.0" E (AH)
-SR2- PC Sta. 13+98.22
END CONSTRUCTION
-SR2- Sta. 12+15.00
-SR1- POT Sta. 34+13.20
END CONSTRUCTION
-SR1- Sta. 32+20.00
END GRADE
-SR1- Sta. 32+00.00
-SR1- PT Sta. 29+13.11
END PVMT./BEGIN ABC
-SR1- PC Sta. 26+92.35
-SR2- POT Sta. 10+00.00 =
-SR1- POT Sta. 24+97.66
-SR1- PT Sta. 23+31.03
MATCHLINE -SR1- STA 22+50.00
(SEE SHEET 12)
S 63° 30' 49.7" E
S 89° 35' 35.2" E
N 13° 15' 43.9" E
SITE 13
TEMPORARY STREAM IMPACT
PERMANENT STREAM IMPACT
SPECIAL 'V' DITCH SEE DETAIL 10
SPECIAL BASE DITCH SEE DETAIL 61 192 SY PSRM
SPECIAL BASE DITCH SEE DETAIL 11
SPECIAL BASE DITCH 147 TONS CL B RIP RAP 325 SY GEOTEXTILE SEE DETAIL 20
LATERAL BASE DITCH 12 TONS CL B RIP RAP 25 SY GEOTEXTILE SEE DETAIL 62 EST 40 CY DDE
BANK STABILIZATION SEE DETAIL 29
LATERAL BASE DITCH 39 TONS CL B RIP RAP 156 SY GEOTEXTILE SEE DETAIL 39 EST 105 CY DDE
BANK STABILIZATION SEE DETAIL 30
SPECIAL BASE DITCH 62 TONS CL B RIP RAP 137 SY GEOTEXTILE SEE DETAIL 21
3 TONS CL B RIP RAP 10 SY GEOTEXTILE OUTLET ANALYSIS 1310 & 1314 PIPE OUTLET CHANNEL STABILIZATION SEE DETAIL 28
CORNERSTONE BAPTIST CHURCH INC DB 1402 PG 2149
DODSON JENNA L DB 1716 PG 1466
ROBBINS NICHOLAS A DB 1861 PG 2891
CAMPBELL MARJORIE DB 1269 PG 1799
DUNCAN MARGARET H DB 1005 PG 278
LEDBETTER CLARK W DB 1483 PG 1007 PB 028 PG 063
WILLIAMS DONNA E DB 1474 PG 15
BALDWIN GINGER ATKINS DB 1427 PG 281
50 25 0 50 100
PLANS
TEMPORARY SURFACE WATER IMPACTS
SURFACE WATER IMPACTS
FILL IN WETLAND
MECHANIZED CLEARING (GRUBBING)

PERMIT DRAWING
SHEET 27 OF 30

FOR -SR1- PROFILE, SEE SHEET 26
FOR -SR2- PROFILE, SEE SHEET 27

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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NC FIRM LICENSE No: P-0339
320 Executive Ct.
Hillsborough, NC 27278
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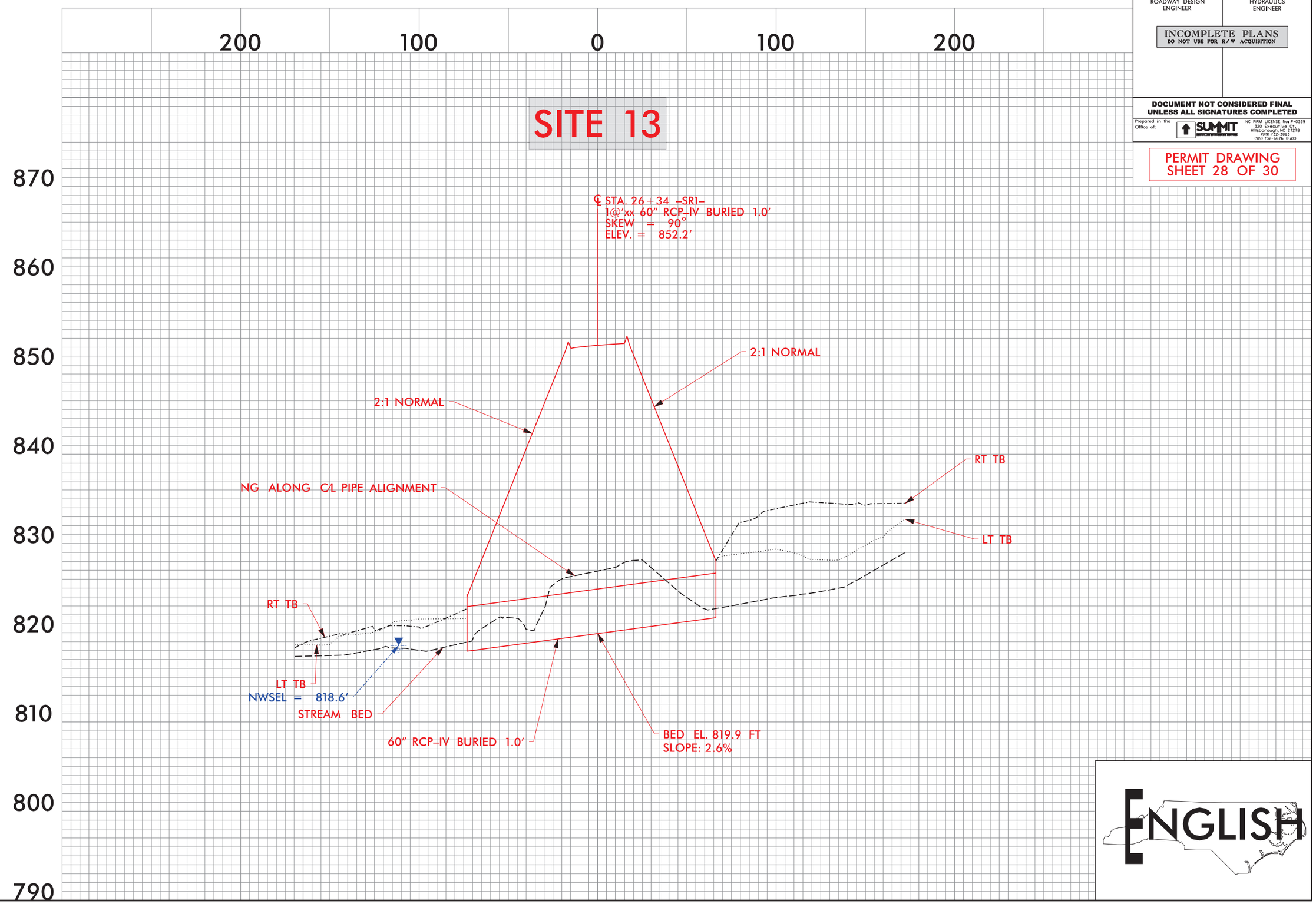
(919) 732-6676 (FAX)

PERMIT DRAWING
SHEET 28 OF 30

SITE 13



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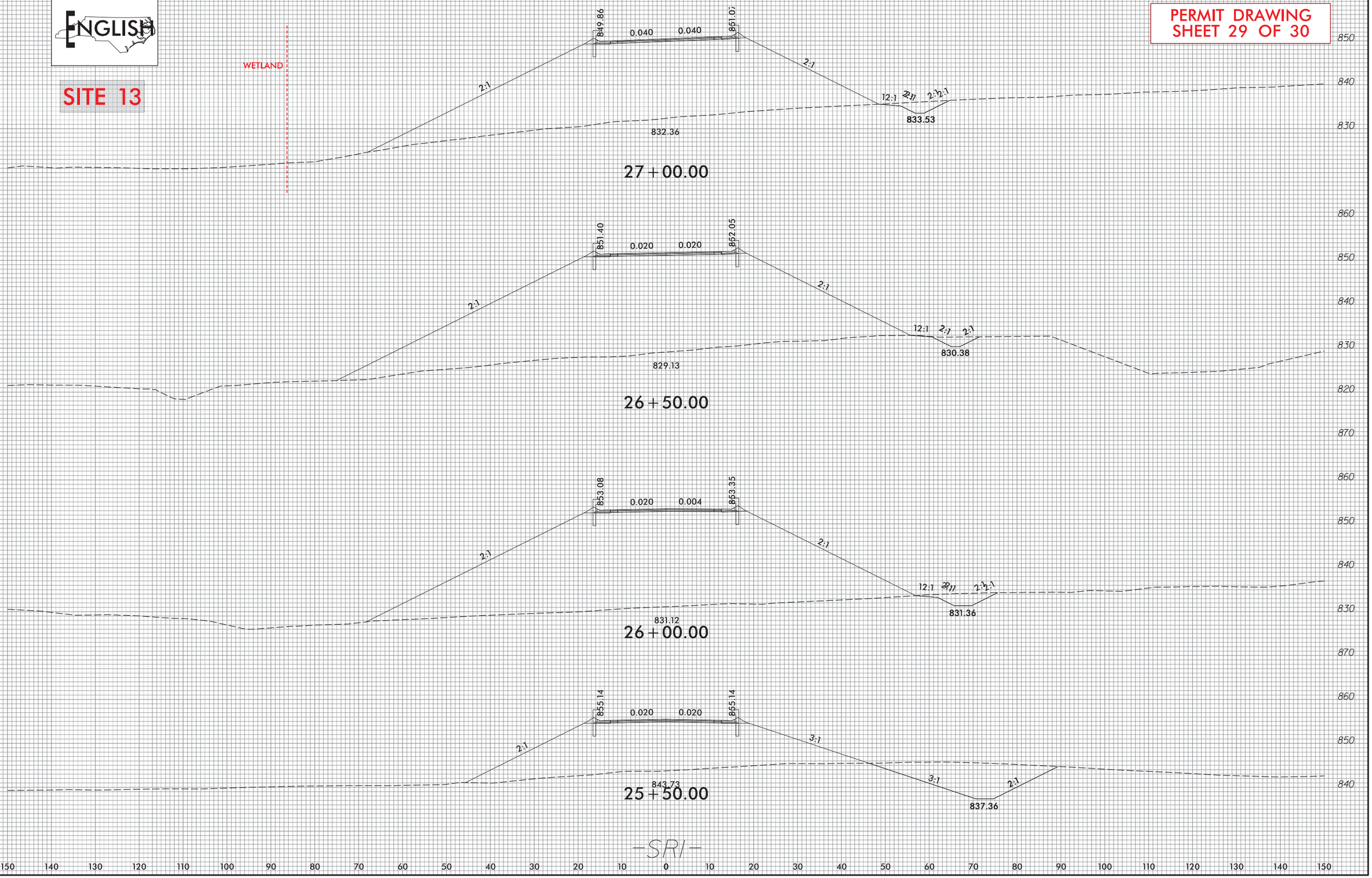
	R-4045	X-101

PERMIT DRAWING
SHEET 29 OF 30

ENGLISH

SITE 13

WETLAND



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WETLAND AND SURFACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	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 (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1a	26+70 to 30+41 -L- RT	Roadway Fill Slope/Rip Rap Channel						0.03		378		
1b	26+70 to 30+41 -L- LT	Proposed 60" Pipe Outlet						< 0.01	< 0.01	30	63	
1c	26+70 to 30+41 -L- LT	Bank Stabilization						< 0.01		33		
2a	20+65 to 21+32 Y2	60" Pipe						< 0.01	< 0.01	122	27	
2b	20+65 to 21+32 Y2	Pipe Outlet						< 0.01		22		
2c	20+65 to 21+32 Y2	Bank Stabalization						< 0.01		47		
3	25+95 to 26+35 Y1	Roadway Fill Slope						< 0.01		110		
4	27+32 to 28+56 Y1	Roadway Fill Slope	0.01			0.02						
5	26+72 to 26+79 Y1	78" Pipe and Channel						0.01	< 0.01	130	23	
6a	-L- 40+05 LT	66" Pipe Outlet						< 0.01		32		
6b	-L- 40+05 LT	Bank Stabilization						< 0.01		31		
6c	19+76 to 20+28 Y1RPD RT	60" Pipe / Stream Re-alignment						0.04		320		
7	11+44 to 11+96 Y1LPA	Roadway Fill Slope				< 0.01						
8a	14+08 to 14+20 Y1LPA	8' x 7' RCBC						0.03	< 0.01	184	25	
8b	14+08 to 14+20 Y1LPA	Culvert Outlet						< 0.01		24		
8c	14+08 to 14+20 Y1LPA	Bank Stabalization						0.03		161		
9a	19+65 to 19+82 Y1RPA	Rip Rap at Embankment						< 0.01	< 0.01	17	19	
9b	-L- 48+00 LT	Bank Stabilization						< 0.01	< 0.01	13	20	
9c	17+49 to 17+61 Y1RPA	Rip Rap at Embankment						< 0.01	< 0.01	21	33	
10	16+92 to 17+11 Y1RPA	Rip Rap at Embankment						< 0.01		34		
11	-L- 55+09 LT	Extend EX 48" Pipe						0.01	< 0.01	132	10	
12	-L- 81+20 RT	Bank Stabilization						< 0.01	< 0.01	19	20	
13a	26+25 to 26+55 SR1	60" Pipe						< 0.01	< 0.01	147	23	
13b	26+25 to 26+55 SR1	60" Pipe Outlet						< 0.01	< 0.01	26	27	
13c	26+56 to 26+88 SR1 LT	Roadway Fill Slope	< 0.01			< 0.01						
TOTALS*:			0.02			0.03		0.23	0.04	2033	290	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
6/3/2024
CLEVELAND COUNTY
R-4045/BR-0012
NG AND BRIDGE REPLACEMENT ON US-74 OVER S
SHEET 30 OF 30

Revised 2018 Feb