North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element:	42346.3.1	**TIP No.:**	I-5111	**County(ies):**	Wake	**Page**	1	**of**	9

General Project Information

WBS Element:	42346.3.1	**TIP Number:**	I-5111	**Project Type:**	Roadway Widening	**Date:**	2/6/2019
NCDOT Contact:	Paul Atkinson, P.E.			**Contractor / Designer:**	Richard Bollinger, P.E. (RS&H)		
Address:	1000 Birch Ridge Drive Raleigh, NC 27610			**Address:**	8521 Six Forks Road Suite 400 Raleigh, NC 27615		
Phone:	(919) 707-6707			**Phone:**	(919) 926-4105		
Email:	patkinson@ncdot.gov			**Email:**	Richard.bollinger@rsandh.com		
City/Town:	Raleigh			**County(ies):**	Wake		
River Basin(s):	Neuse			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	2.823 MI.	**Surrounding Land Use:**	Woods, Residential

	Proposed Project	**Existing Site**
Project Built-Upon Area (ac.)	77.8 ac.	49.9 ac.
Typical Cross Section Description:	A 170-foot wide typical section will be used, providing ten 12-foot travel lanes, two 14-foot exterior shoulder sections, 12-feet of the shoulder is paved, as well as two 11' interior paved shoulder sections. Accomodations for a future managed lane and six foot buffer will be provided at all bridge locations.	The existing 165-foot wide typical section features six 12-foot travel lanes, two 10-foot exterioir shoulder sections, as well as two 4-foot interior paved shoulder sections and a grass median.
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 166,400 Year: 2040	Existing: 103,200 Year: 2015

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

I-5111 (Section 1) involves widening Interstate 40, including the construction of multiple new alignments and bridges in Wake County. The majority of the widening will occur in the existing median. Aquatic habitats within the study area consist of wetlands, as well as perennial and intermittent streams. Water quality treament will be provided via treatment swales that will be utlized throughout the project to the greatest extent practicable upstream of all riparian buffer zones. There will be no direct discharge to the buffer zones via deck drains from the proposed bridges.

Waterbody Information

Surface Water Body (1):	UT to Swift Creek		**NCDWR Stream Index No.:**	27-43-(8)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel		
NRTR Stream ID:	SY			**Buffer Rules in Effect:**	Neuse
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	No	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

WBS Element: 42346.3.1 **TIP No.:** I-5111 **County(ies):** Wake

Additional Waterbody Information

Surface Water Body (2):	UT to Swift Creek		**NCDWR Stream Index No.:**	27-43-(8)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel		
NRTR Stream ID:	SZ			**Buffer Rules in Effect:**	Neuse
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 Swift Creek		**NCDWR Stream Index No.:**	27-43-(8)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel		
NRTR Stream ID:	SBB			**Buffer Rules in Effect:**	Neuse
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 (4):	UT to Swift Creek		**NCDWR Stream Index No.:**	27-43-(8)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel		
NRTR Stream ID:	SAA			**Buffer Rules in Effect:**	Neuse
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 Little Arm Branch		**NCDWR Stream Index No.:**	27-34-11-2	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel		
NRTR Stream ID:	SB			**Buffer Rules in Effect:**	Neuse
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

WBS Element:	42346.3.1	TIP No.:	I-5111	County(ies):	Wake	Page	3	of	9

Additional Waterbody Information

Surface Water Body (6):	UT to Little Arm Branch		**NCDWR Stream Index No.:**	27-34-11-2		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel			
NRTR Stream ID:	SC			**Buffer Rules in Effect:**	Neuse	
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 Little Arm Branch		**NCDWR Stream Index No.:**	27-34-11-2		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel			
NRTR Stream ID:	SD			**Buffer Rules in Effect:**	Neuse	
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 (8):	UT to Little Arm Branch		**NCDWR Stream Index No.:**	27-34-11-2		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel			
NRTR Stream ID:	SF			**Buffer Rules in Effect:**	Neuse	
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 (9):	Little Arm Branch		**NCDWR Stream Index No.:**	27-34-11-2		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel			
NRTR Stream ID:	SE			**Buffer Rules in Effect:**	Neuse	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

WBS Element: 42346.3.1 **TIP No.:** I-5111 **County(ies):** Wake

Additional Waterbody Information

Surface Water Body (10):	UT to White Oak Creek		**NCDWR Stream Index No.:**	27-43-11	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel		
NRTR Stream ID:	SNN			**Buffer Rules in Effect:**	Neuse
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 (11):	UT to White Oak Creek		**NCDWR Stream Index No.:**	27-43-11	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel		
NRTR Stream ID:	SOO			**Buffer Rules in Effect:**	Neuse
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 (12):	UT to Poplar Branch		**NCDWR Stream Index No.:**	27-34-11-1	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel		
NRTR Stream ID:	SI			**Buffer Rules in Effect:**	Neuse
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 (13):	UT to Poplar Branch		**NCDWR Stream Index No.:**	27-34-11-1	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel		
NRTR Stream ID:	SH			**Buffer Rules in Effect:**	Neuse
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

WBS Element:	42346.3.1	TIP No.:	I-5111	County(ies):	Wake	Page	5	of	9

Additional Waterbody Information

Surface Water Body (14):	UT to Poplar Branch		**NCDWR Stream Index No.:**	27-34-11-1	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel		
NRTR Stream ID:	SJ			**Buffer Rules in Effect:**	Neuse
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 (15):	Poplar Branch		**NCDWR Stream Index No.:**	27-34-11-1	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Wedgemussel, Tar River spinymussel		
NRTR Stream ID:	SG			**Buffer Rules in Effect:**	Neuse
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 (16):			**NCDWR Stream Index No.:**		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**			
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:				**Buffer Rules in Effect:**	
Project Includes Bridge Spanning Water Body?		**Deck Drains Discharge Over Buffer?**		**Dissipator Pads Provided in Buffer?**	
Deck Drains Discharge Over Water Body?		(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 (17):			**NCDWR Stream Index No.:**		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**			
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:				**Buffer Rules in Effect:**	
Project Includes Bridge Spanning Water Body?		**Deck Drains Discharge Over Buffer?**		**Dissipator Pads Provided in Buffer?**	
Deck Drains Discharge Over Water Body?		(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)					

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
4	-Y1RPWB- 14+50 - 15+00 RT 35°45'21" / -78°35'59"	(2)UT to Swift Creek	4.0	6.0	6.0	0.2	24	50	0.30%	1.0	0.8	1.3	0.8	No	Yes
4	-Y1RPWB- 15+00 - 18+00 RT 35°45'21" / -78°35'59"	(2)UT to Swift Creek	0.0	6.0	6.0	0.2	24	300	1.72%	1.0	1.6	1.3	1.7	No	Yes
4	-Y1RPWB- 19+00 - 20+50 RT 35°45'18" / -78°35'54"	(2)UT to Swift Creek	0.0	4.0	3.0	0.2	24	150	3.02%	1.0	1.8	1.3	1.9	No	Yes
5	-Y1RPEB- 19+00 - 19+50 RT 35°45'16" / -78°35'55"	(2)UT to Swift Creek	0.0	8.0	6.0	0.4	38	50	0.52%	1.9	1.2	2.4	1.3	No	Yes
5	-Y1RPA- 19+80 - 21+94 RT 35°45'7" / -78°35'36"	(3)UT to Swift Creek	0.0	6.0	6.0	0.2	15	214	3.68%	0.6	1.9	0.8	2.1	No	Yes
5	-Y1RPA- 21+94 - 24+30 RT 35°45'7" / -78°35'36"	(3)UT to Swift Creek	0.0	6.0	6.0	0.2	17	236	3.24%	0.7	1.9	0.9	2.0	No	Yes
5	-Y1RPA- 25+00 - 28+50 RT 35°45'8" / -78°35'34"	(3)UT to Swift Creek	0.0	6.0	6.0	0.3	32	350	2.28%	1.3	1.9	1.7	2.0	No	Yes
5	-Y1RPA- 29+00 - 32+50 RT 35°45'6" / -78°35'37"	(3)UT to Swift Creek	0.0	6.0	6.0	0.3	26	350	2.14%	1.1	1.8	1.4	1.9	No	Yes
5	-Y1RPWB- 34+80 - 37+00 RT 35°45'7" / -78°35'45"	(2)UT to Swift Creek	4.0	6.0	4.0	0.4	37	220	1.66%	1.9	1.7	2.4	1.9	No	Yes
5	-L2RT- 472+65 - 474+75 LT 35°45'14" / -78°35'32"	(3)UT to Swift Creek	6.0	3.0	3.0	1.0	97	210	1.00%	5.1	2.0	5.1	2.0	No	Yes
5	-Y1RPBD- 40+00 - 41+00 LT 35°45'15" / -78°35'35"	(3)UT to Swift Creek	6.0	4.0	4.0	0.2	24	100	4.00%	1.3	1.9	1.3	1.9	No	Yes
6	-L- 16+50 - 18+00 RT 35°45'3" / -78°35'43"	(3)UT to Swift Creek	0.0	6.0	6.0	0.3	25	150	1.84%	1.1	1.7	1.4	1.6	No	Yes
6	-L- 20+00 - 22+00 RT 35°44'59" / -78°35'42"	(3)UT to Swift Creek	0.0	12.0	5.0	0.6	58	200	1.20%	5.1	2.0	5.8	2.0	No	Yes
6	-L- 22+50 - 23+00 RT 35°44'58" / -78°35'41"	(3)UT to Swift Creek	0.0	8.0	16.0	0.6	58	50	0.62%	5.1	1.4	5.8	1.5	No	Yes
6	-L- 23+00 - 25+00 RT 35°44'58" / -78°35'41"	(3)UT to Swift Creek	0.0	8.0	8.0	0.7	65	200	1.52%	2.7	1.9	3.5	2.0	No	Yes
6	-L- 24+50 - 28+00 LT 35°44'55" / -78°35'38"	(3)UT to Swift Creek	0.0	6.0	3.0	0.8	76	350	0.64%	3.1	1.6	4.0	1.7	No	Yes
6	-L- 21+50 - 22+00 LT 35°44'58" / -78°35'38"	(3)UT to Swift Creek	0.0	6.0	6.0	0.4	41	50	1.94%	1.7	1.9	2.2	2.1	No	Yes
7	-L- 31+00 - 33+00 LT 35°44'48" / -78°35'35"	(5)UT to Swift Creek	0.0	6.0	4.0	2.0	202	200	0.50%	8.3	1.8	10.7	1.9	No	Yes
7	-L- 33+50 - 34+50 LT 35°44'46" / -78°35'34"	(5)UT to Swift Creek	0.0	6.0	4.0	2.0	202	100	0.58%	8.3	1.9	10.7	2.1	No	Yes

Additional Comments

Surface Water Bodies (2), (3), and (5) are buffered.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 42346.3.1 **TIP No.:** I-5111 **County(ies):** Wake

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
7	-L- 37+00 - 37+50 LT 35°44'44" / -78°35'33"	(5)UT to Swift Creek	0.0	6.0	6.0	2.0	202	50	0.70%	8.3	2.0	10.7	2.1	No	Yes
7	-L- 30+00 - 35+00 RT 35°44'46" / -78°35'37"	(5)UT to Swift Creek	0.0	3.0	3.0	2.5	245	500	0.50%	10.1	2.0	13.0	2.1	No	Yes
8	-L- 38+00 - 39+00 RT 35°44'41" / -78°35'35"	(6)UT to Little Arm Branch	0.0	8.0	4.0	1.3	132	100	0.71%	5.4	1.8	7.0	1.9	No	Yes
8	-L- 41+00 - 43+00 RT 35°44'38" / -78°35'33"	(6)UT to Little Arm Branch	0.0	12.0	3.0	1.3	132	200	0.93%	5.4	1.9	7.0	2.0	No	Yes
8	-L- 48+00 - 49+00 RT 35°44'32" / -78°35'31"	(6)UT to Little Arm Branch	4.0	6.0	4.0	0.9	85	100	1.36%	3.5	2.0	4.5	2.1	No	Yes
8	-L- 48+00 - 49+00 LT 35°44'33" / -78°35'29"	(6)UT to Little Arm Branch	0.0	6.0	6.0	0.9	88	100	1.01%	3.6	1.8	4.7	2.0	No	Yes
8	-L- 50+00 - 51+00 LT 35°44'32" / -78°35'28"	(6)UT to Little Arm Branch	6.0	6.0	4.0	0.9	88	100	1.68%	3.6	2.0	4.7	2.2	No	Yes
8	-L- 51+00 - 53+00 LT 35°44'29" / -78°35'27"	(6)UT to Little Arm Branch	0.0	8.0	4.0	0.7	74	200	1.51%	3.0	2.0	3.9	2.1	No	Yes
9	-L- 55+00 - 56+00 LT 35°44'26" / -78°35'26"	(6)UT to Little Arm Branch	0.0	6.0	6.0	0.2	18	100	1.56%	0.7	1.5	1.0	1.6	No	Yes
9	-L- 56+00 - 57+00 LT 35°44'25" / -78°35'25"	(6)UT to Little Arm Branch	0.0	6.0	6.0	0.4	41	100	1.14%	1.7	1.6	2.2	1.7	No	Yes
10	-L- 67+00 - 70+00 RT 35°44'15" / -78°35'24"	(7)UT to Little Arm Branch	4.0	5.0	4.0	2.1	208	300	0.60%	8.6	1.9	11.0	2.1	No	Yes
10	-L- 74+00 - 75+00 RT 35°44'08" / -78°35'22"	(7)UT to Little Arm Branch	0.0	6.0	6.0	2.1	208	100	0.49%	8.6	1.7	11.0	1.9	No	Yes
10	-L- 70+00 - 71+00 LT 35°44'13" / -78°35'20"	(7)UT to Little Arm Branch	0.0	4.0	4.0	1.0	101	100	0.60%	4.2	1.7	5.4	1.8	No	Yes
10	-L- 72+50 - 73+50 LT 35°44'11" / -78°35'20"	(7)UT to Little Arm Branch	0.0	4.0	3.0	1.1	107	100	0.50%	4.4	1.7	5.7	1.8	No	Yes
10	-L- 78+00 - 80+50 RT 35°44'05" / -78°35'20"	(7)UT to Little Arm Branch	0.0	6.0	4.0	0.4	44	250	1.32%	1.8	1.8	2.3	1.9	No	Yes
11	-L- 82+00 - 83+00 RT 35°44'01" / -78°35'19"	(8)UT to Little Arm Branch	0.0	8.0	12.0	0.9	85	100	1.52%	3.5	1.9	4.5	2.0	No	Yes
13	-L- 107+60 - 110+85 RT 35°43'38" / -78°35'09"	(8)UT to Little Arm Branch	0.0	6.0	4.0	0.2	17	325	0.74%	0.7	1.1	0.9	1.2	No	Yes
13	-L- 111+00 - 112+50 RT 35°43'35" / -78°35'08"	(8)UT to Little Arm Branch	0.0	6.0	6.0	0.1	8	150	1.78%	1.0	1.7	1.3	1.8	No	Yes
13	-L- 113+50 - 122+00 RT 35°43'33" / -78°35'07"	(8)UT to Little Arm Branch	0.0	4.0	4.0	1.7	174	850	0.40%	7.2	1.7	9.2	1.8	No	Yes

Additional Comments

Surface Water Bodies (5), (6), (7), and (8) are buffered.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 42346.3.1 **TIP No.:** I-5111 **County(ies):** Wake

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
13	-L- 113+50 - 122+00 LT 35°43'33" / -78°35'05"	(8)UT to Little Arm Branch	0.0	6.0	4.0	0.3	25	850	1.70%	1.0	1.5	1.3	1.6	No	Yes
13	-Y3RPC- 17+50 - 18+50 RT 35°43'32" / -78°35'09"	(8)UT to Little Arm Branch	0.0	6.0	6.0	0.3	26	100	2.74%	1.1	2.0	1.4	2.1	No	Yes
13	-Y3RPB- 13+29 - 15+84 LT 35°43'35" / -78°35'05"	(8)UT to Little Arm Branch	0.0	6.0	6.0	0.6	60	255	1.35%	2.5	1.9	3.2	2.0	No	Yes
14	-L- 125+50 - 127+00 RT 35°43'19" / -78°35'04"	(10)UT to White Oak	0.0	6.0	4.0	0.3	32	150	0.88%	1.3	1.4	1.7	1.5	No	Yes
14	-L- 127+00 - 135+00 RT 35°43'11" / -78°35'04"	(11)UT to White Oak	0.0	6.0	4.0	1.5	151	800	0.58%	6.2	1.8	8.0	1.9	No	Yes
14	-Y3RPC- 23+00 - 26+00 LT 35°43'27" / -78°35'09"	(8)UT to Little Arm Branch	0.0	6.0	6.0	0.3	25	300	1.44%	1.0	1.6	1.3	1.7	No	Yes
14	-Y3RPA- 16+03 - 21+00 RT 35°43'16" / -78°34'59"	(11)UT to White Oak	0.0	6.0	5.0	0.2	18	497	1.74%	0.7	1.5	1.0	1.6	No	Yes
14	-Y3RPA- 16+03 - 22+00 LT 35°43'17" / -78°34'58"	(11)UT to White Oak	0.0	6.0	4.0	0.5	49	597	1.85%	1.0	1.7	1.3	1.8	No	Yes
14	-Y3RPD- 14+73 - 16+25 LT 35°43'10" / -78°35'04"	(11)UT to White Oak	0.0	6.0	4.0	0.3	29	152	2.10%	1.2	1.9	1.5	2.0	No	Yes
14	-Y3RPD- 17+79 - 18+00 LT 35°43'12" / -78°35'05"	(11)UT to White Oak	0.0	6.0	4.0	0.3	29	21	1.95%	1.2	1.9	1.5	2.0	No	Yes
15	-L- 137+50 - 144+50 RT 35°43'03" / -78°35'03"	(15)Poplar Branch	0.0	6.0	3.0	1.7	174	700	0.52%	7.2	1.8	9.2	1.9	No	Yes
15	-L- 148+00 - 148+50 RT 35°43'00" / -78°35'04"	(15)Poplar Branch	0.0	6.0	5.0	0.5	51	50	1.32%	2.1	1.8	2.7	1.9	No	Yes
15	-L- 148+50 - 150+50 RT 35°42'59" / -78°35'04"	(12)UT to Poplar	4.0	3.0	3.0	1.7	174	200	3.46%	6.3	1.9	8.3	2.0	No	Yes
15	--L- 152+00 - 152+50 LT 35°42'56" / -78°35'01"	(15)Poplar Branch	0.0	6.0	8.0	0.5	45	50	1.70%	1.9	1.8	2.4	1.9	No	Yes

Additional Comments

Surface Water Bodies (8), (10), (11), (12), and (15) are buffered.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: **TIP No.:** I-5111 **County(ies):** Wake

Preformed Scour Holes and Energy Dissipators

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)	BMP Associated w/ Buffer Rules?
15	-L- 149+00 LT 35°42'58" / -78°35'00"	(15)Poplar Branch	Riprap Energy Dissipator Basin	Class I	134.4	Pipe	72	270.0	3.8	Yes

Additional Comments

Surface Water Body (15) is buffered.

* Refer to the NCDOT Best Management Practices Toolbox (2014), NCDOT Standards, the Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 14 (HEC-14), Third Edition, Hydraulic Design of Energy Dissipators for Culverts and Channels (July 2006), as applicable, for design guidance and criteria.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

General Project Information

WBS Element:	42346.3.1	**TIP Number:**	I-5111/I-4739 (SEC 2)	**Project Type:** Roadway Widening	**Date:** 2/6/2019
NCDOT Contact:	Paul Atkinson, PE	**Contractor / Designer:**	RK&K: Matthew Cook, PE		
Address:	NC Department of Transportation 1020 Birch Ridge Dr Raleigh, NC 27610	**Address:**	900 Ridgefield Drive Suite 350 Raleigh, NC 27609		
Phone:	919-707-6707	**Phone:**	919-878-9560		
Email:	patkinson@ncdot.gov	**Email:**	mcook@rkk.com		
City/Town:	Raleigh	**County(ies):**	Wake	Johnston	
River Basin(s):	Neuse	**CAMA County?**	No	No	
Wetlands within Project Limits?	Yes				

Project Description

Project Length (lin. miles or feet):	13.04	**Surrounding Land Use:**	Commercial / Industrial / Residential
	Proposed Project		**Existing Site**
Project Built-Upon Area (ac.)	372.3 ac.		353.3 ac.
Typical Cross Section Description:	The proposed typical cross section for I-40 will be will have four to five 12' lanes in each direction, 12' outside shoulders and 11' inside shoulders. For most of the project there will be median barrier running the length of the roadway facility.		The existing typical cross section for I-40 is two to three lanes in each direction with 12' lanes, 10' outside shoulders and 4' inside shoulders.
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 137,200	Year: 2040	Existing: 106,200 Year: 2018
General Project Narrative: (Description of Minimization of Water Quality Impacts)	The widening of I-40 from I-440 to Cornwallis Road (SR 1525) will involve grading, drainage improvements, paving, widening, resurfacing and structures work. There are 10 major crossings on the entire project providing adequate cross sectional openings to allow water to travel under I-40 or other alignments on the project without impacting any structures adjacent to the project. The 10 major crossings consist of a bridge over Swift creek two RCBCs with supplemented pipes and crossings with maintained pipes with supplemented pipes. Drainage outfalls along the project have been analyzed to verify stability and outlet protection has been incorporated into the design for all proposed drainage improvements. Areas of the project around jurisdictional features have incorporated steeper side slopes to minimize impacts. The project is located in the Neuse river basin so this area adheres to buffer rules. Buffer swales have been designed through out the entire project providing filtration before water inters jurisdictional streams. Due to the proximity to Swift Creek, two permanent filtration basins have been designed to treat water entering the stream. These two permanent filtration basins will also serve as hazardous spill basins. There has also been two basins designed that solely serve as hazardous spill basins with one of them already being in the roadway facility that will handle any kind of chemical spills that happen on I-40 near Swift Creek.		

Waterbody Information

Surface Water Body (1):	Poplar Branch	**NCDWR Stream Index No.:**	27-34-11-1		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:					
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SRM		**Buffer Rules in Effect:**	Neuse	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element:	42346.3.1	**TIP No.:**	I-5111/I-4739 (SEC 2)	**County(ies):**	Wake Johnston	**Page** 2	**of** 8

Additional Waterbody Information

Surface Water Body (2):	White Oak Creek		**NCDWR Stream Index No.:**	24-43-11		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)			
Other Stream Classification:						
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	SOE			**Buffer Rules in Effect:**	Neuse	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	No	**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 (3):	Swift Creek		**NCDWR Stream Index No.:**	27-43-(8)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)			
Other Stream Classification:						
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	SDG			**Buffer Rules in Effect:**	Neuse	
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	No	**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)						

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 42346.3.1 **TIP No.:** I-5111/I-4739 (SEC 2) **County(ies):** Wake Johnston

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
17	-L- 170+00 TO -L- 172+00 LT	(1)Poplar Branch	0.0	4.0	3.0	0.4	44	200	1.68%	1.6	2.0	2.1	2.1	No	Yes
17-18	-L- 177+50 TO -L- 179+50 LT	(1)Poplar Branch	0.0	4.0	4.0	1.7	168	200	0.94%	4.6	2.0	5.9	2.1	No	Yes
18	-L- 181+50 TO -L- 184+50 LT	(1)Poplar Branch	0.0	4.0	4.0	1.5	147	300	0.53%	4.0	1.6	5.2	1.7	No	Yes
19	-L- 200+00 TO -L- 203+50 LT	(1)Poplar Branch	0.0	4.0	4.0	1.8	175	102	0.42%	5.7	1.6	7.3	1.7	No	Yes
19-20	-L- 203+50 TO -L- 207+00 LT	(1)Poplar Branch	0.0	4.0	4.0	1.2	121	350	0.42%	3.9	1.5	5.0	1.6	No	Yes
20	-L- 216+00 TO -L- 218+00 LT	(1)Poplar Branch	0.0	4.0	4.0	1.2	124	200	0.90%	4.0	2.0	5.1	2.1	No	Yes
19	-L- 193+00 TO -L- 193+50 LT	(1)Poplar Branch	0.0	6.0	6.0	0.1	14	50	0.48%	0.5	0.8	0.6	0.9	No	Yes
19	-L- 193+50 TO -L- 195+50 LT	(1)Poplar Branch	0.0	6.0	6.0	0.6	64	200	0.45%	1.9	1.3	2.6	1.4	No	Yes
19	-L- 195+50 TO -L- 197+50 LT	(1)Poplar Branch	0.0	6.0	3.0	0.9	87	200	0.93%	2.6	1.8	3.3	1.9	No	Yes
61	-Y5RPB- 45+00 TO -Y5RPB- 46+50 LT	(2)White Oak Creek	0.0	4.0	2.0	0.5	51	150	0.71%	1.4	1.4	1.8	1.5	No	Yes
23	-L- 256+00 TO -L- 257+28 RT	(2)White Oak Creek	4.0	3.0	3.0	1.5	153	128	0.30%	2.5	1.3	3.2	1.4	No	Yes
23	-L- 262+00 TO -L- 264+85 LT	(2)White Oak Creek	0.0	6.0	6.0	0.7	72	285	0.45%	2.3	1.2	3.0	1.3	No	Yes
23-24	-L- 264+85 TO -L- 273+00 LT	(2)White Oak Creek	0.0	6.0	6.0	2.0	198	815	0.45%	6.3	1.6	8.1	1.7	No	Yes
23-24	-L- 262+50 TO -L- 271+50 RT	(2)White Oak Creek	0.0	6.0	6.0	1.6	157	900	0.45%	5.0	1.5	6.4	1.6	No	Yes
27	-L- 312+50 TO -L- 314+50 LT	(2)White Oak Creek	0.0	6.0	6.0	0.2	16	200	1.40%	0.5	1.3	0.6	1.3	No	Yes
27	-L- 310+00 TO -L- 311+50 RT	(2)White Oak Creek	0.0	6.0	6.0	1.2	116	150	1.30%	3.5	2.0	4.4	2.1	No	Yes
28	-L- 322+00 TO -L- 323+32 RT	(2)White Oak Creek	4.0	4.0	4.0	5.6	557	132	0.60%	17.0	2.0	21.0	2.1	No	Yes
28	-L- 322+68 TO -L- 323+75 LT	(2)White Oak Creek	4.0	3.0	3.0	10.1	1008	107	0.40%	27.1	2.0	34.9	2.1	No	Yes
29	-L- 338+00 TO -L- 341+50 RT	(2)White Oak Creek	0.0	6.0	6.0	0.8	81	350	1.40%	2.6	1.9	3.3	2.0	No	Yes

Additional Comments

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 42346.3.1 **TIP No.:** I-5111/I-4739 (SEC 2) **County(ies):** Wake Johnston

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
29	-L- 341+50 TO -L- 346+46 RT	(2)White Oak Creek	0.0	6.0	6.0	1.4	136	496	0.90%	4.4	1.9	5.6	2.0	No	Yes
29	-L- 338+50 TO -L- 341+50 LT	(2)White Oak Creek	0.0	6.0	6.0	0.8	75	350	1.40%	2.4	1.9	3.1	2.0	No	Yes
29	-L- 341+50 TO -L- 346+46 LT	(2)White Oak Creek	0.0	6.0	6.0	1.1	112	496	0.90%	3.6	1.8	4.6	1.9	No	Yes
31	-L- 360+37 TO -L- 363+00 RT	(2)White Oak Creek	0.0	6.0	6.0	0.6	55	263	2.00%	1.8	2.0	2.2	2.1	No	Yes
33	-L- 387+50 TO -L- 389+50 RT	(2)White Oak Creek	0.0	4.0	3.0	0.8	77	200	0.30%	2.5	1.3	3.2	1.4	No	Yes
33	-L- 390+93 TO -L- 395+00 RT	(2)White Oak Creek	0.0	6.0	6.0	0.8	81	407	0.70%	2.6	1.4	3.3	1.5	No	Yes
34	-L- 396+50 TO -L- 399+00 RT	(2)White Oak Creek	0.0	3.0	3.0	0.8	81	250	0.40%	2.2	1.1	2.9	1.2	No	Yes
34	-L- 403+00 TO -L- 405+93 RT	(2)White Oak Creek	0.0	3.0	3.0	2.5	250	293	0.80%	8.0	2.0	10.0	2.1	No	Yes
35	-L- 411+00 TO -L- 415+50 LT	(2)White Oak Creek	0.0	4.0	3.0	1.1	108	450	0.30%	3.7	1.3	4.8	1.4	No	Yes
35	-L- 417+50 TO -L- 420+50 LT	(2)White Oak Creek	0.0	4.0	3.0	2.5	252	300	0.50%	8.1	2.0	10.0	2.1	No	Yes
35	-L- 418+00 TO -L- 419+35 RT	(2)White Oak Creek	0.0	4.0	3.0	0.7	66	135	0.40%	2.1	1.2	2.7	1.3	No	Yes
35-36	-L- 419+35 TO -L- 422+50 RT	(2)White Oak Creek	0.0	4.0	3.0	1.1	112	315	0.30%	3.6	1.3	4.6	1.4	No	Yes
35	-L- 410+00 TO -L- 414+16 RT	(2)White Oak Creek	0.0	4.0	3.0	1.4	144	414	0.70%	4.6	1.6	5.9	1.7	No	Yes
35	-L- 414+16 TO -L- 417+50 RT	(2)White Oak Creek	0.0	4.0	3.0	1.5	151	336	0.70%	4.9	1.7	6.2	1.8	No	Yes
36	-L- 424+50 TO -L- 429+00 LT	(3)Swift Creek	0.0	4.0	3.0	1.3	134	450	0.30%	4.3	1.3	5.5	1.4	No	Yes
37	-L- 450+00 TO -L- 452+00 LT	(3)Swift Creek	0.0	4.0	3.0	0.5	47	200	0.40%	1.5	1.2	1.9	1.2	No	Yes
37	-L- 446+00 TO -L- 447+40 RT	(3)Swift Creek	4.0	3.0	3.0	0.4	37	140	2.00%	1.3	1.4	1.7	1.6	No	Yes
38	-L- 462+50 TO -L- 464+00 RT	(3)Swift Creek	0.0	3.0	3.0	0.7	72	150	0.30%	2.6	1.0	3.4	1.1	No	Yes
38	-L- 467+50 TO -L- 473+50 RT	(3)Swift Creek	0.0	4.0	3.0	2.6	260	600	1.10%	6.0	2.0	7.6	2.1	No	Yes

Additional Comments

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 42346.3.1 **TIP No.:** I-5111/I-4739 (SEC 2) **County(ies):** Wake Johnston

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
21	-Y5LPB- 17+50 TO -Y5LPB- 20+98 RT	(2)White Oak Creek	0.0	3.0	3.0	1.1	113	348	0.30%	3.6	1.1	4.6	1.2	No	Yes
21	-Y5LPB- 12+25 TO -Y5LPB- 13+82 RT	(2)White Oak Creek	0.0	4.0	3.0	0.4	39	157	2.50%	1.1	2.0	1.4	2.1	No	Yes
21	-Y5LPB- 25+00 TO -Y5LPB- 26+85 RT	(2)White Oak Creek	0.0	3.0	3.0	0.8	75	185	1.40%	3.4	2.0	4.3	2.2	No	Yes
21	-Y5LPB- 26+85 TO -Y5LPB- 29+45 RT	(2)White Oak Creek	0.0	3.0	3.0	3.8	379	260	0.60%	12.0	2.0	16.0	2.1	No	Yes
21	-Y5RPB- 30+50 TO -Y5RPB- 34+00 RT	(2)White Oak Creek	0.0	4.0	3.0	2.7	273	350	0.70%	7.5	2.0	9.6	2.1	No	Yes
21	-Y5RPBSPUR- 13+73 TO -Y5RPBSPUR- 17+20 RT	(2)White Oak Creek	4.0	4.0	3.0	4.2	418	347	0.90%	11.5	2.0	14.7	2.1	No	Yes
21-61	-Y5RPB- 40+50 TO -Y5RPB- 43+50 LT	(2)White Oak Creek	0.0	4.0	3.0	1.8	181	300	0.80%	5.0	2.0	6.4	2.1	No	Yes
22	-Y5RPA- 17+50 TO -Y5RPA- 20+50 RT	(2)White Oak Creek	0.0	4.0	4.0	0.5	53	300	2.00%	1.5	2.0	1.9	2.1	No	Yes
61	-Y5RPA- 27+00 TO -Y5RPA- 29+00 RT	(2)White Oak Creek	0.0	4.0	3.0	0.4	38	200	0.90%	1.1	1.2	1.4	1.3	No	Yes
22	-L- 249+50 TO -L- 250+53 LT	(2)White Oak Creek	0.0	3.0	3.0	1.6	156	103	1.20%	4.6	2.0	5.9	2.1	No	Yes
22	-Y5RPC- 52+00 TO -Y5RPC- 53+28 LT	(2)White Oak Creek	0.0	4.0	3.0	0.2	24	128	2.30%	0.9	1.9	1.1	2.1	No	Yes
22	-Y5RPC- 53+28 TO -Y5RPC- 54+50 LT	(2)White Oak Creek	0.0	4.0	3.0	0.2	23	122	0.30%	0.8	0.9	1.1	1.0	No	Yes
22	-L- 249+00 TO -L- 251+00 RT	(2)White Oak Creek	4.0	3.0	3.0	2.8	278	200	0.90%	8.3	2.0	11.0	2.2	No	Yes
22	-L- 251+50 TO -L- 253+00 RT	(2)White Oak Creek	0.0	4.0	3.0	1.0	100	150	2.10%	2.5	2.0	3.2	2.1	No	Yes
22	-L- 253+00 TO -L- 256+00 RT	(2)White Oak Creek	0.0	4.0	4.0	1.3	133	300	1.30%	3.7	2.0	4.7	2.1	No	Yes
22	-L- 252+00 TO -L- 254+50 LT	(2)White Oak Creek	0.0	4.0	3.0	1.0	98	250	0.50%	3.1	1.3	4.0	1.4	No	Yes
63	-Y8RPA- 24+50 TO -Y8RPA- 26+00 LT	(3)Swift Creek	0.0	4.0	3.0	0.2	18	150	0.30%	0.4	0.6	0.5	0.7	No	Yes
63	-Y8RPA- 26+00 TO -Y8RPA- 28+50 LT	(3)Swift Creek	0.0	4.0	3.0	0.4	36	250	3.50%	0.7	1.9	1.0	2.0	No	Yes
38	-L- 474+00 TO -L- 476+00 RT	(3)Swift Creek	0.0	4.0	3.0	0.7	68	200	1.10%	2.2	1.6	2.8	1.7	No	Yes

Additional Comments

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 42346.3.1 **TIP No.:** I-5111/I-4739 (SEC 2) **County(ies):** Wake Johnston

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
37	-L- 437+00 TO -L- 444+00 LT	(3)Swift Creek	4.0	3.0	3.0	9.3	926	700	0.40%	25.0	1.9	33.0	2.1	No	Yes
37	-L- 444+00 TO -L- 446+90 LT	(3)Swift Creek	4.0	3.0	3.0	10.0	1000	290	0.30%	28.0	1.9	35.0	2.0	No	Yes
63	-Y8RPA- 26+00 TO -Y8RPA- 27+01 RT	(3)Swift Creek	0.0	3.0	3.0	1.0	103	101	1.40%	3.5	2.0	4.5	2.1	No	Yes
63	-Y8RPA- 27+48 TO -Y8RPA- 29+60 RT	(3)Swift Creek	0.0	3.0	3.0	3.3	331	212	0.60%	11.0	2.0	15.0	2.2	No	Yes
25	-L- 282+11 TO -L- 282+50 RT	(2)White Oak Creek	4.0	3.0	3.0	4.0	396	39	0.50%	10.0	1.7	13.0	1.8	No	Yes
25	-L- 284+00 TO -L- 290+00 RT	(2)White Oak Creek	0.0	6.0	6.0	1.9	189	600	0.80%	5.6	1.9	7.2	2.0	No	Yes

Additional Comments

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: **TIP No.:** I-5111/I-4739 (SEC **County(ies):** Wake Johnston

Preformed Scour Holes and Energy Dissipators

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)	BMP Associated w/ Buffer Rules?
19	-L- 192+73 LT	(1)Poplar Branch	Riprap Energy Dissipator Basin	Class I	67.7	Pipe	72" RCP & 42" RCP	230.0	0.9	Yes
23	-L- 256+65 LT	(2)White Oak Creek	Riprap Energy Dissipator Basin	Class I	44.2	Pipe	66" RCP	160.0	1.6	Yes

Additional Comments

* Refer to the NCDOT Best Management Practices Toolbox (2014), NCDOT Standards, the Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 14 (HEC-14), Third Edition, Hydraulic Design of Energy Dissipators for Culverts and Channels (July 2006), as applicable, for design guidance and criteria.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 42346.3.1 **TIP No.:** I-5111/I-4739 (S **County(ies):** Wake Johnston

Level Spreaders, Hazardous Spill Basins, and Forebays

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Level Spreader, Hazardous Spill Basin, or Forebay?	Drainage Area (ac)	New Built-Upon Area (ac)	Required / Minimum Treatment			Treatment Achieved		BMP Associated w/ Buffer Rules?
38	-L- 468+25 LT Improving Existing Basin	(3)Swift Creek	Hazardous Spill Basin	6.71	0.00	2yr, tc=10 min, td= 5 min storm runoff + 1,550 cf (cf)	N/A	cf	N/A	cf	Yes
63	-Y8RPA- 23+00 RT	(3)Swift Creek	Hazardous Spill Basin	14.55	0.50	2yr, tc=10 min, td= 5 min storm runoff + 1,550 cf (cf)	17779.1	cf	18036.0	cf	Yes

*Hazardous spill basins are pollution prevention measures designed for spill containment rather than stormwater treatment. Under Required / Minimum Treatment and Treatment Achieved, provide the minimum required volume and the actual HSB volume, respectively. Refer to the NCDOT Stormwater Best Management Practices Toolbox (2014) for design guidance.

Additional Comments

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 42346.3.1 **TIP No.:** I-5111/I-4739 (SEC 3) **County(ies):** Johnston

General Project Information

WBS Element:	42346.3.1	**TIP Number:**	I-5111/I-4739 (SEC 3)	**Project Type:** Roadway Widening	**Date:** 2/6/2019
NCDOT Contact:	Paul Atkinson, PE	**Contractor / Designer:**	RK&K: Matthew Cook, PE		
Address:	NC Department of Transportation 1020 Birch Ridge Dr Raleigh, NC 27610	**Address:**	900 Ridgefield Drive Suite 350 Raleigh, NC 27609		
Phone:	919-707-6707	**Phone:**	919-878-9560		
Email:	patkinson@ncdot.gov	**Email:**	mcook@rkk.com		
City/Town:	Raleigh	**County(ies):**	Johnston		
River Basin(s):	Neuse	**CAMA County?**	No		
Wetlands within Project Limits?	Yes				

Project Description

Project Length (lin. miles or feet):	13.04	**Surrounding Land Use:**	Commercial / Industrial / Residential
	Proposed Project		**Existing Site**
Project Built-Upon Area (ac.)	362.5 ac.		270.5 ac.
Typical Cross Section Description:	The proposed typical cross section for I-40 will be will have four to five 12' lanes in each direction, 12' outside shoulders and 11' inside shoulders. For most of the project there will be median barrier running the length of the roadway facility.		The existing typical cross section for I-40 is two to three lanes in each direction with 12' lanes, 10' outside shoulders and 4' inside shoulders.
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 137,200	Year: 2040	Existing: 106,200 Year: 2018
General Project Narrative: (Description of Minimization of Water Quality Impacts)	The widening of I-40 from I-440 to Cornwallis Road (SR 1525) will involve grading, drainage improvements, paving, widening, resurfacing and structures work. There are 10 major crossings on the entire project providing adequate cross sectional openings to allow water to travel under I-40 or other alignments on the project without impacting any structures adjacent to the project. The 10 major crossings consist of a bridge over Swift creek two RCBCs with supplemented pipes and crossings with maintained pipes with supplemented pipes. Drainage outfalls along the project have been analyzed to verify stability and outlet protection has been incorporated into the design for all proposed drainage improvements. Areas of the project around jurisdictional features have incorporated steeper side slopes to minimize impacts. The project is located in the Neuse river basin so this area adheres to buffer rules. Buffer swales have been designed through out the entire project providing filtration before water inters jurisdictional streams. Due to the proximity to Swift Creek, two permanent filtration basins have been designed to treat water entering the stream. These two permanent filtration basins will also serve as hazardous spill basins. There has also been two basins designed that solely serve as hazardous spill basins with one of them already being in the roadway facility that will handle any kind of chemical spills that happen on I-40 near Swift Creek.		

Waterbody Information

Surface Water Body (1):	Swift Creek	**NCDWR Stream Index No.:**	27-43-(8)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:					
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SDG			**Buffer Rules in Effect:**	
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	No	**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)					

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element:	42346.3.1	**TIP No.:**	I-5111/I-4739 (SEC 3)	**County(ies):**	Johnston	**Page**	**2** **of** **6**

Additional Waterbody Information

Surface Water Body (2):	Mill Branch		**NCDWR Stream Index No.:**	27-43-15-12	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:					
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Mill Branch			**Buffer Rules in Effect:**	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 42346.3.1 **TIP No.:** I-5111/I-4739 (SEC 3) **County(ies):** Johnston

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
40	-L- 117+00 TO -L- 118+17 RT	(1)Swift Creek	0.0	4.0	3.0	4.5	451	117	0.30%	11.0	1.5	15.0	1.6	No	Yes
42	-L- 111+09 LT	(1)Swift Creek	4.0	3.0	3.0	1.9	189	70	0.90%	6.9	1.8	8.9	2.0	No	Yes
45	-L- 163+70 TO -L- 166+64 LT	(1)Swift Creek	0.0	3.0	3.0	1.2	120	294	0.40%	3.8	1.2	4.9	1.3	No	Yes
45	-L- 146+15 TO -L- 147+00 RT	(1)Swift Creek	4.0	3.0	3.0	8.5	850	85	0.30%	27.0	1.9	35.0	2.0	No	Yes
45	-Y1RPA- 18+05 TO -Y1RPA- 22+50 LT	(1)Swift Creek	0.0	3.0	3.0	3.1	309	445	0.70%	9.9	2.0	13.0	2.1	No	Yes
45	-Y1RPD- 14+21 TO -Y1RPD- 15+75 LT	(1)Swift Creek	4.0	3.0	3.0	4.0	400	154	0.50%	13.0	1.8	16.0	1.9	No	Yes
45	-Y1RPD- 15+75 TO -Y1RPD- 16+53 LT	(1)Swift Creek	4.0	3.0	3.0	4.0	400	75	0.60%	13.0	2.0	16.0	2.1	No	Yes
45	-L- 173+25 TO -L- 175+50 LT	(1)Swift Creek	4.0	3.0	3.0	2.5	247	225	0.70%	8.5	1.8	11.0	1.9	No	Yes
45	-Y1RPD- 20+28 TO -Y1RPD- 21+50 LT	(1)Swift Creek	0.0	4.0	4.0	0.8	78	122	1.30%	2.5	2.0	3.2	2.1	No	Yes
45	-Y1RPA- 19+50 TO -Y1RPA- 22+00 RT	(1)Swift Creek	0.0	6.0	6.0	1.0	95	250	2.20%	3.1	2.0	3.9	2.1	No	Yes
45-46	-LCDEB- 54+64.54 TO -LCDEB- 59+01.14 RT	(1)Swift Creek	0.0	6.0	6.0	1.7	165	436	0.50%	4.6	1.2	5.9	1.3	No	Yes
45	-Y1RPA- 15+74.66 TO -Y1RPA- 16+33.93 RT	(1)Swift Creek	0.0	3.0	3.0	0.8	80	59	3.20%	1.0	2.0	1.3	2.1	No	Yes
46	-L- 186+00 TO -L- 189+50 RT	(1)Swift Creek	0.0	4.0	3.0	0.9	87	350	0.30%	2.8	1.3	3.6	1.3	No	Yes
46	-L- 184+00 TO -L- 185+50 RT	(1)Swift Creek	0.0	3.0	3.0	2.4	241	150	0.70%	8.3	1.9	9.9	2.0	No	Yes
46	-L- 191+00 TO -L- 193+50 LT	(2)Mill Branch	0.0	4.0	3.0	0.9	89	250	0.30%	2.0	1.1	2.6	1.2	No	Yes
46	-L- 209+00 TO -L- 207+78 RT	(2)Mill Branch	4.0	3.0	3.0	14.1	1410	78	0.30%	45.0	1.9	58.0	2.0	No	Yes
46	-Y2- 59+26 TO -Y2- 61+00 LT	(2)Mill Branch	0.0	3.0	3.0	3.1	309	174	0.30%	8.5	1.4	11.0	1.5	No	Yes
46	-Y2RPB- 24+00 TO -Y2RPB- 26+60 LT	(2)Mill Branch	4.0	3.0	3.0	4.4	435	260	0.80%	12.0	2.0	15.0	2.1	No	Yes
46	-Y2- 57+50 TO -Y2- 58+00 LT	(2)Mill Branch	4.0	3.0	3.0	8.5	848	50	0.30%	27.0	1.8	35.0	2.0	No	Yes

Additional Comments

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 42346.3.1 **TIP No.:** I-5111/I-4739 (SEC 3) **County(ies):** Johnston

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
46	-Y2RPA- 18+30 TO -Y2RPA- 22+75 LT	(2)Mill Branch	4.0	3.0	3.0	13.2	1320	445	0.30%	42.0	2.0	54.0	2.1	No	Yes
46	-Y2RPA- 19+50 TO -Y2RPA- 20+50 RT	(2)Mill Branch	4.0	3.0	3.0	2.9	285	100	0.70%	9.1	2.0	12.0	2.1	No	Yes
46	-Y2RPA- 20+50 TO -Y2RPA- 23+50 RT	(2)Mill Branch	4.0	3.0	3.0	3.3	328	300	0.60%	11.0	2.0	13.0	2.1	No	Yes
46	-Y2RPA- 13+62 TO -Y2RPA- 17+40 RT	(2)Mill Branch	0.0	4.0	3.0	2.0	199	378	0.30%	5.9	1.4	7.6	1.5	No	Yes
46	-Y2RPB- 15+64.89 TO -Y2RPB- 18+50 LT	(1)Swift Creek	0.0	6.0	6.0	1.2	117	285	0.90%	3.5	1.4	4.5	1.5	No	Yes
46	-LCDEB- 68+22.85 TO -LCDEB- 70+94.51 LT	(2)Mill Branch	0.0	6.0	6.0	1.0	101	272	0.50%	3.0	1.1	3.8	1.2	No	Yes
46	-L- 200+00 TO -L- 203+50 RT	(2)Mill Branch	0.0	6.0	6.0	0.8	82	350	0.50%	2.4	1.1	3.1	1.2	No	Yes
46	-L- 198+50 TO -L- 202+75 LT	(2)Mill Branch	0.0	6.0	6.0	1.1	112	425	1.20%	3.3	1.7	4.3	1.8	No	Yes
46	-L- 202+75 TO -L- 204+50 LT	(2)Mill Branch	0.0	6.0	6.0	0.6	55	175	1.40%	1.6	1.4	2.1	1.5	No	Yes
46	-L- 204+00 TO -L- 205+00 RT	(2)Mill Branch	0.0	6.0	6.0	0.8	83	100	2.50%	2.5	2.0	3.2	2.1	No	Yes
46	-Y2RPD3- 17+50 TO -Y2RPD3- 24+00 RT	(2)Mill Branch	0.0	6.0	6.0	1.7	169	650	1.70%	4.3	2.0	5.4	2.1	No	Yes
46	-Y2RPD3- 16+70 TO -Y2RPD3- 23+00 LT	(2)Mill Branch	0.0	6.0	6.0	1.1	114	630	1.90%	3.4	1.9	4.3	2.0	No	Yes
47	-Y2RPD3- 12+21.20 TO -Y2RPD3- 15+51.99 LT	(2)Mill Branch	0.0	6.0	6.0	0.6	58	331	0.40%	1.9	0.9	2.4	1.0	No	Yes
47	-LCDWB- 102+08 TO -LCDWB- 103+27 LT	(2)Mill Branch	4.0	3.0	3.0	1.6	161	119	1.30%	5.5	2.0	7.1	2.1	No	Yes
47	-LCDEB- 88+99 TO -LCDEB- 91+52 RT	(2)Mill Branch	4.0	3.0	3.0	3.9	391	253	0.70%	11.0	2.0	14.0	2.1	No	Yes
48	-L- 227+50 TO -L- 229+50 LT	(2)Mill Branch	0.0	4.0	3.0	0.5	53	200	2.40%	1.0	2.0	1.2	2.1	No	Yes
48-49	-L- 231+50 TO -L- 232+65 LT	(2)Mill Branch	4.0	3.0	3.0	3.6	358	115	0.50%	11.0	1.7	15.0	1.9	No	Yes
49	-L- 243+00 TO -L- 243+50 RT	(2)Mill Branch	4.0	3.0	3.0	0.7	71	50	3.20%	2.0	2.0	2.5	2.1	No	Yes
49	-L- 237+00 TO -L- 241+50 LT	(2)Mill Branch	4.0	4.0	3.0	1.2	119	450	1.10%	4.0	2.0	5.2	2.1	No	Yes

Additional Comments

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 42346.3.1 **TIP No.:** I-5111/I-4739 (SEC 3) **County(ies):** Johnston

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
49	-L- 234+28 TO -L- 235+50 LT	(2)Mill Branch	4.0	3.0	3.0	3.8	379	122	0.70%	12.0	2.0	16.0	2.1	No	Yes
50	-L- 245+50 TO -L- 247+66 LT	(2)Mill Branch	4.0	3.0	3.0	4.3	431	216	0.70%	12.0	2.0	15.0	2.1	No	Yes
50	-L- 250+18 TO -L- 253+50 LT	(2)Mill Branch	0.0	6.0	6.0	0.8	83	332	0.40%	2.7	1.0	3.4	1.1	No	Yes
50	-L- 249+00 TO -L- 250+00 LT	(2)Mill Branch	4.0	3.0	3.0	4.4	437	100	0.50%	15.0	1.9	19.0	2.0	No	Yes
50-51	-L- 250+50 TO -L- 260+19 RT	(2)Mill Branch	0.0	6.0	6.0	1.8	175	969	0.30%	4.0	1.0	5.1	1.1	No	Yes
50-51	-L- 253+50 TO -L- 260+13 LT	(2)Mill Branch	0.0	6.0	6.0	1.7	170	663	0.30%	5.5	1.1	7.0	1.2	No	Yes
51	-L- 269+00 TO -L- 270+71 LT	(2)Mill Branch	4.0	3.0	3.0	3.5	345	171	0.70%	11.0	2.0	14.0	2.1	No	Yes
71	-Y2- 61+50 TO -Y2- 63+50 LT	(2)Mill Branch	0.0	4.0	3.0	0.9	94	200	0.30%	2.4	1.2	3.0	1.3	No	Yes

Additional Comments

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 42346.3.1 **TIP No.:** I-5111/I-4739 (SEC 3) **County(ies):** Johnston

Other Best Management Practices

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	BMP Type	Drainage Area (ac)	New Built-Upon Area (ac)	Volume Treated (ac-ft)	Precipitation Depth Treated over NBUA (in)	BMP Associated w/ Buffer Rules?
40	-L- 95+00 LT	(1)Swift Creek	HSB/Bioretention Basin	11.7	2.3	11481	63301.36	Yes
40	-L- 95+00 RT	(1)Swift Creek	HSB/Bioretention Basin	15.6	3.3	19966	76623.85	Yes

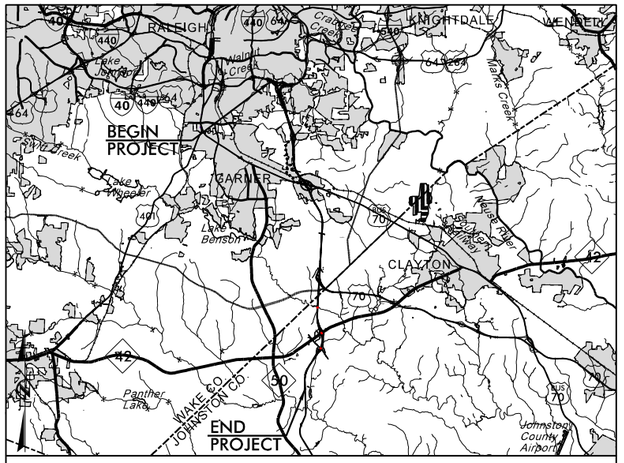
Additional Comments

09/08/99

TIP PROJECT: I-5111 /I-4739

CONTRACT: C204134

See Sheet 1-B For Plan Sheet Symbols



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

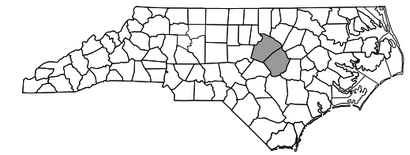
WAKE & JOHNSTON COUNTIES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5111 /I-4739	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
42346.3.1	IMNHF-040-4(139)301	PE

LOCATION: I-40 FROM I-440 /US 64 (EXIT 301) TO JUST NORTH OF SR 1525 (CORNWALLIS ROAD), INCLUDING IMPROVEMENTS TO NC 42 AND SR 1010 (CLEVELAND ROAD).

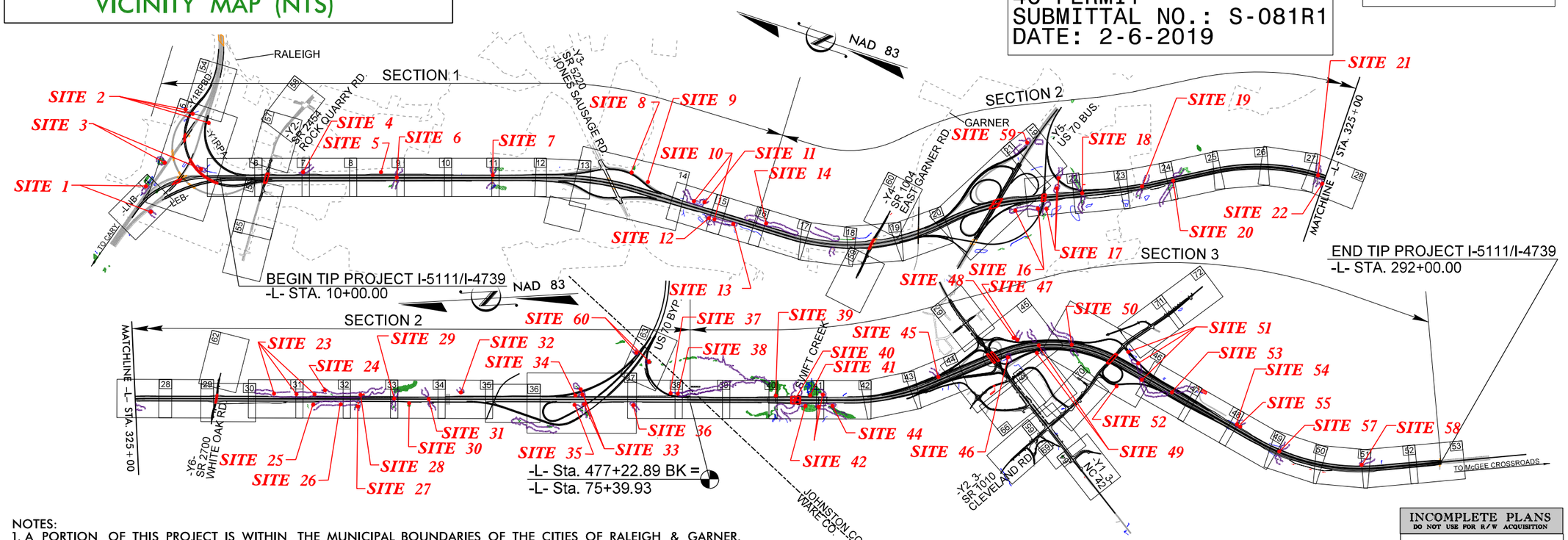
TYPE OF WORK: GRADING, DRAINAGE, PAVING, WIDENING, RESURFACING & STRUCTURES



WETLAND AND STREAM IMPACTS

PERMIT DRAWING
SHEET 1 OF 125

4C PERMIT
SUBMITTAL NO.: S-081R1
DATE: 2-6-2019



NOTES:
1. A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITIES OF RALEIGH & GARNER.
2. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III MODIFIED.
3. THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

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

GRAPHIC SCALES

50 25 0 50 100 — PLANS

50 25 0 50 100 — PROFILE (HORIZONTAL)

10 5 0 10 20 — PROFILE (VERTICAL)

DESIGN DATA

ADT 2018 = 106,200
ADT 2040 = 137,200
DHV = 65%
D = 9%
T = 9% *
V = 70 MPH & 75 MPH **
FUNC CLASS: URBAN INTERSTATE
* (TTST 5% + DUAL 4%)
** DESIGN SPEED CHANGES AT US 70 BUS

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT I-5111 /I-4739 ..... 12.950 miles
LENGTH STRUCTURE TIP PROJECT I-5111 /I-4739 ..... 0.094 miles
TOTAL LENGTH OF PROJECT I-5111 /I-4739 ..... 13.044 miles

NCDOT CONTACT

K. Zak Hamidi, P.E.
PROJECT ENGINEER – DESIGN-BUILD UNIT

PLANS PREPARED BY:

RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
NC LICENSE NO. F-0112
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

S.T. WOOTEN

2018 STANDARD SPECIFICATIONS

LETTING DATE:
JUNE 19, 2018

Brandon J. McInnis, P.E.
PROJECT ENGINEER

Mary E. Yahl, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2/6/2019
R:\Hydraulics\PERMITS_Environmental\Drawings\4C\I5111_I4739_Hyd_wet_tsh.dgn
aburke

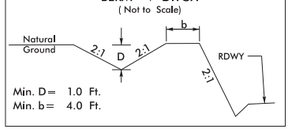
DITCH DETAILS: SECTION 1

PERMIT DRAWING
SHEET 2 OF 125

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	2D-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

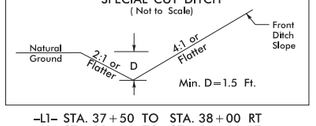
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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



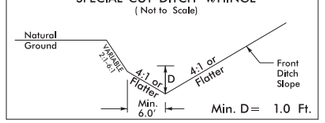
–L– STA. 55+00 TO STA. 56+50 LT

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



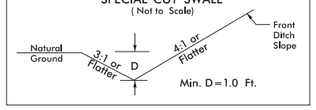
–L1– STA. 37+50 TO STA. 38+00 RT
–L1– STA. 33+50 TO STA. 34+00 LT
–L1– STA. 37+00 TO STA. 37+50 LT
–L1– STA. 152+00 to STA. 152+50 LT
–Y3RPA– STA. 15+02 TO STA. 15+52 RT
–Y1RPC– STA. 24+00 TO STA. 25+39 RT
–Y1RPA– STA. 22+00 TO STA. 24+50 RT
–Y1RPA– STA. 27+50 TO STA. 32+25 LT

DETAIL D
SPECIAL CUT DITCH wHINGE
(Not to Scale)



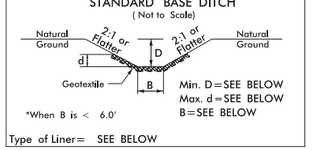
–L1– STA. 120+00 TO STA. 123+00 RT
–L1– STA. 121+50 TO STA. 122+50 LT
–L1– STA. 130+00 TO STA. 132+50 LT
–L1– STA. 124+00 TO STA. 128+00 LT
–L1– STA. 125+50 TO STA. 127+00 RT
–L1– STA. 130+00 TO STA. 131+50 RT
–L1– STA. 138+50 TO STA. 142+00 LT
–L1– STA. 146+00 TO STA. 148+00 RT
–Y1RPEB– STA. 17+50 TO STA. 19+00 RT
–Y3RPA– STA. 17+59 TO STA. 22+00 LT

DETAIL E
SPECIAL CUT SWALE
(Not to Scale)



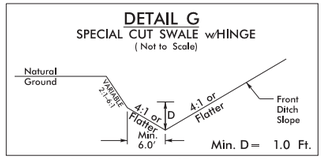
–Y1RPBD– STA. 21+00 TO STA. 23+00 LT

DETAIL F
STANDARD BASE DITCH
(Not to Scale)



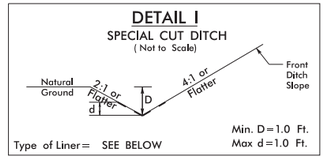
–L1– STA. 103+00 RT, B=6', CL B RIPRAP, MIN D=2.0' L=100', BEG. EL=253.00', END EL=261.50', S=3.0%
–L1– STA. 104+00 RT, B=6', CL B RIPRAP, MIN D=6.0' L=300', BEG. EL=256.00', END EL=261.50', S=1.5%

DETAIL G
SPECIAL CUT SWALE wHINGE
(Not to Scale)



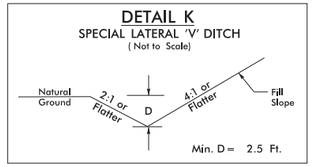
–L1– STA. 25+00 TO STA. 28+50 LT
–L1– STA. 31+00 TO STA. 32+00 RT
–L1– STA. 30+50 TO STA. 33+50 LT
–L1– STA. 72+50 TO STA. 73+50 LT
–Y1RPBD– STA. 28+50 TO STA. 29+50 LT
–Y1RPWB– STA. 14+60 TO STA. 16+50 RT

DETAIL I
SPECIAL CUT DITCH
(Not to Scale)



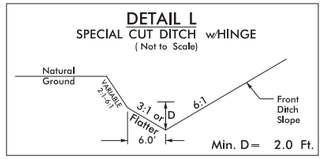
–Y1RPA– STA. 24+00 TO STA. 25+00 LT, CL B RIPRAP

DETAIL K
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



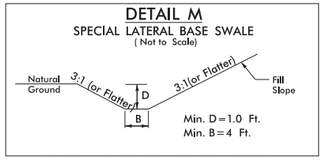
–L1– STA. 37+00 TO STA. 37+63 LT
–L1– STA. 41+00 TO STA. 42+50 LT
–L1– STA. 41+50 TO STA. 42+00 RT
–L1– STA. 58+00 TO STA. 58+50 LT
–L1– STA. 67+00 TO STA. 72+50 LT
–L1– STA. 70+00 TO STA. 70+50 RT
–L1– STA. 73+50 TO STA. 74+50 LT
–L1– STA. 107+60 TO STA. 109+00 RT
–L1– STA. 113+00 TO STA. 121+50 LT
–L1– STA. 113+50 TO STA. 120+00 RT
–L1– STA. 116+00 TO STA. 121+50 LT
–L1– STA. 128+50 TO STA. 130+00 LT
–L1– STA. 132+50 TO STA. 133+00 LT
–L1– STA. 136+50 TO STA. 140+00 RT
–L1– STA. 137+00 TO STA. 138+00 LT
–L1– STA. 137+50 TO STA. 139+00 RT
–L1– STA. 138+50 TO STA. 139+00 LT
–L1– STA. 140+50 TO STA. 142+50 RT
–L1– STA. 142+00 TO STA. 143+00 RT
–L1– STA. 145+50 TO STA. 146+00 RT
–Y1RPEB– STA. 31+00 TO STA. 32+64 RT
–Y1RPWB– STA. 18+00 TO STA. 19+00 LT
–Y1RPBD– STA. 30+00 TO STA. 30+50 LT

DETAIL L
SPECIAL CUT DITCH wHINGE
(Not to Scale)



–L1– STA. 42+50 TO STA. 45+50 LT
–L1– STA. 109+00 TO STA. 110+85 RT
–L1– STA. 139+00 TO STA. 142+00 RT
–L1– STA. 143+00 TO STA. 144+50 RT
–L1– STA. 121+50 TO STA. 122+50 LT
–L1– STA. 137+00 TO STA. 137+50 LT
–L1– STA. 139+00 TO STA. 142+00 LT
–L1– STA. 140+00 TO STA. 140+50 RT
–L1– STA. 142+50 TO STA. 144+50 RT
–L1– STA. 158+50 TO STA. 160+00 LT
–Y1RPBD– STA. 21+50 TO STA. 22+00 RT
–Y1RPBD– STA. 25+00 TO STA. 27+00 RT
–Y1RPBD– STA. 23+00 TO STA. 28+50 LT

DETAIL M
SPECIAL LATERAL BASE SWALE
(Not to Scale)



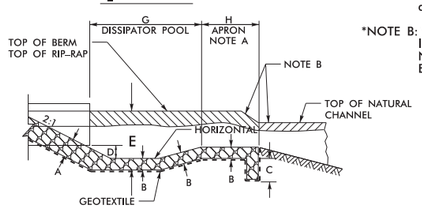
–L1– STA. 67+00 TO STA. 70+00 RT
–L1– STA. 149+00 TO STA. 150+50 RT
–Y1RPWB– STA. 33+50 TO STA. 37+00 RT

DETAIL X
RIP–RAPPED ENERGY DISSIPATOR BASIN

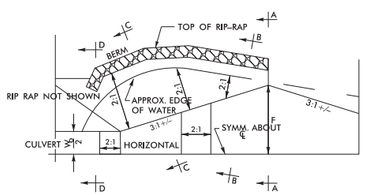
*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A–A SUCH THAT Q des/(CROSS SECTION AREA AT SEC. A–A)= SPECIFIED VELOCITY.

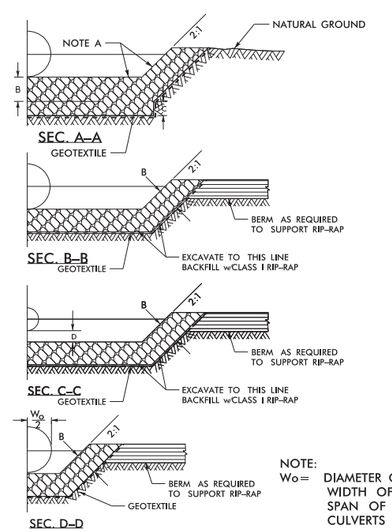
*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIP–RAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A–A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.

℄ SECTION



HALF PLAN





DIM.	RIP RAP BASIN # 1	2	3	4	5	6	7	8
A	2.5							
B	1.67							
C	2.0							
D	2.3							
E	10.0							
F	10.0							
G	22.4							
H	11.2							

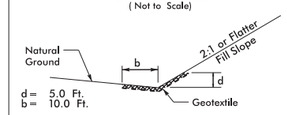
*ALL DIMENSIONS APPROXIMATE IN FT

BASIN #	LOCATION (AT OUTLET)
1	–L1– 149+03 LT
2	
3	
4	
5	
6	
7	
8	

NOTE:
Wo= DIAMETER OF PIPE, WIDTH OF BOX OR SPAN OF PIPE–ARCH CULVERTS

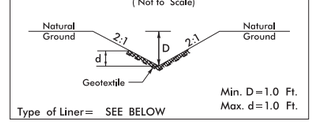
5/05

DETAIL O
TOE PROTECTION
(Not to Scale)



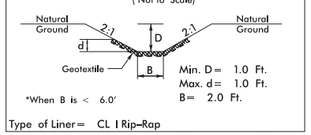
–L1– STA. 143+11 TO STA. 144+21 LT, CL I RIPRAP

DETAIL P
STANDARD 'V' DITCH
(Not to Scale)



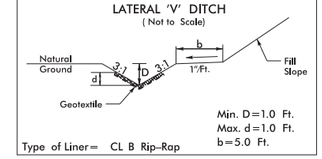
–L1– STA. 118+88 TO STA. 118+94 RT, CL B RIPRAP

DETAIL Q
STANDARD BASE DITCH
(Not to Scale)



–L1– STA. 144+80 TO STA. 144+98 RT

DETAIL W
LATERAL 'V' DITCH
(Not to Scale)



–Y1RPA– STA. 22+50 TO STA. 24+00 LT

PLANS PREPARED BY:
RS&H
RS&H Architects–Engineers–Planners, Inc.
8521 SIX FORKS ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27615
NC LICENSE NO. F–0493 (919) 926–4100

2/6/2019
C:\pw_work\rsh_pw\pw_user\d0202309\I-5111_I-4739_Hyd_Ditch Detail.dgn
Fullerwb

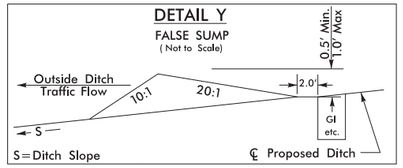
DITCH DETAILS: SECTION 1

PERMIT DRAWING
SHEET 3 OF 125

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	2D-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

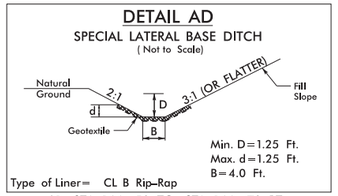
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DETAIL Y
FALSE SUMP
(Not to Scale)



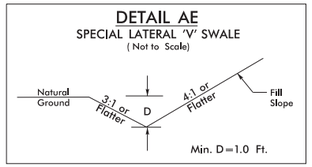
-L1- STA. 37+78 LT
-L1- STA. 37+78 RT
-L1- STA. 45+08 RT
-L1- STA. 50+65 LT
-L1- STA. 66+85 LT
-L1- STA. 127+27 RT
-L1- STA. 110+84 RT
-L1- STA. 111+84 RT
-L1- STA. 113+22 RT
-L1- STA. 128+25 LT
-L1- STA. 133+14 LT
-L1- STA. 134+63 RT
-L1- STA. 136+71 LT
-L1- STA. 142+14 LT
-L1- STA. 151+58 LT
-L1- STA. 154+80 LT
-Y1RPWB- STA. 19+37 RT
-Y1RPWB- STA. 19+86 RT
-Y1RPEB- STA. 34+56 RT
-Y3RPA- STA. 18+82 LT
-Y3RPA- STA. 18+85 RT
-Y3PRC- STA. 11+99 RT
-Y3RPC- STA. 15+30 RT
-Y3RPD- STA. 14+62 LT
-Y3RPD- STA. 17+74 LT

DETAIL AD
SPECIAL LATERAL BASE DITCH
(Not to Scale)



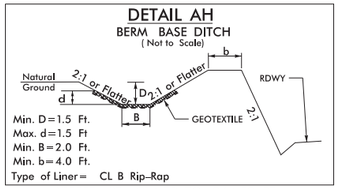
-L1- STA. 144+50 TO STA. 144+79 RT
-L1- STA. 145+00 TO STA. 146+00 RT

DETAIL AE
SPECIAL LATERAL 'V' SWALE
(Not to Scale)



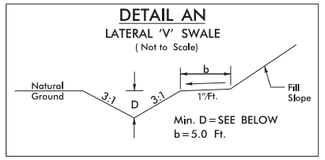
-L1- STA. 56+50 TO STA. 57+30 LT

DETAIL AH
BERM BASE DITCH
(Not to Scale)



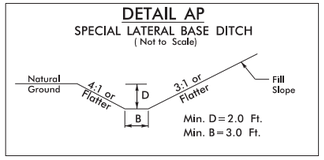
-Y1RPEB- STA. 21+50 TO 24+50 RT

DETAIL AN
LATERAL 'V' SWALE
(Not to Scale)



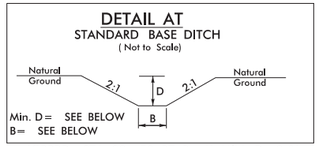
-Y1RPA- STA. 18+05 TO STA. 22+50 LT, D=1.5'

DETAIL AP
SPECIAL LATERAL BASE DITCH
(Not to Scale)



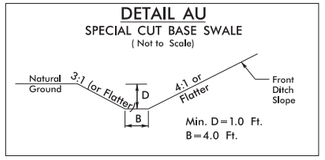
-L1- STA. 113+34 TO STA. 113+50 RT
-L1- STA. 59+50 TO STA. 63+00 LT
-Y1RPWB- STA. 33+50 TO STA. 34+80 RT
-Y1RPBD- STA. 54+00 TO STA. 54+50 LT

DETAIL AT
STANDARD BASE DITCH
(Not to Scale)



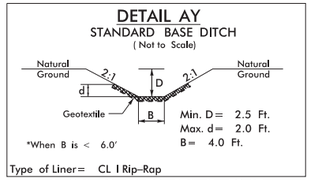
-Y1RPBD- STA. 32+50 RT, B=4', MIN D=2.0'
L=175', BEG. EL=231.15', END EL=224.00', S=4.1%

DETAIL AU
SPECIAL CUT BASE SWALE
(Not to Scale)



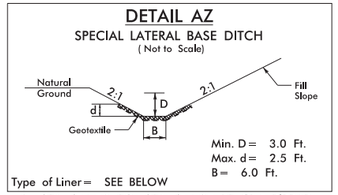
-L1- STA. 32+00 TO STA. 37+50 RT
-Y1RPEB- STA. 17+50 TO STA. 19+95 LT
-Y1RPWB- STA. 33+50 TO STA. 37+00 RT

DETAIL AY
STANDARD BASE DITCH
(Not to Scale)



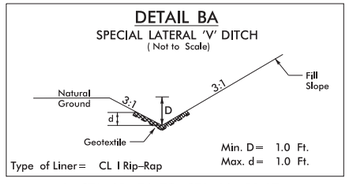
-L- STA. 59+12 TO STA. 61+50 LT

DETAIL AZ
SPECIAL LATERAL BASE DITCH
(Not to Scale)



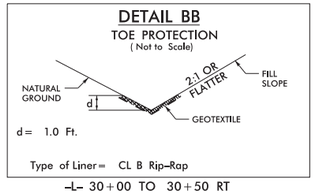
-L- STA. 61+50 TO STA. 61+85 LT, CL 1 RIPRAP
-L- STA. 61+85 TO STA. 63+00 LT, CL B RIPRAP

DETAIL BA
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



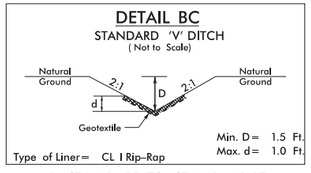
-L- STA. 65+76 TO STA. 66+50 LT

DETAIL BB
TOE PROTECTION
(Not to Scale)



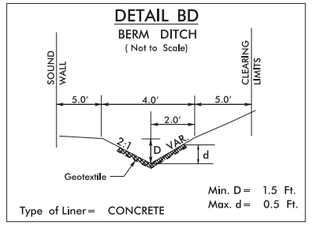
-L- 30+00 TO 30+50 RT

DETAIL BC
STANDARD 'V' DITCH
(Not to Scale)



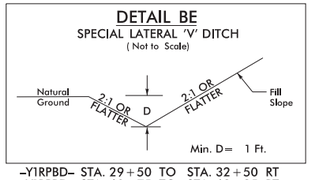
-L- STA. 40+25 TO STA. 40+40 LT

DETAIL BD
BERM DITCH
(Not to Scale)



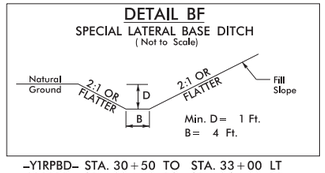
-Y1RPA- STA. 14+00 TO STA. 21+00 RT
-Y1RPA- STA. 21+00 TO STA. 25+50 RT
-Y1RPA- STA. 25+50 TO STA. 35+25 RT
-Y1RPA- STA. 35+25 TO -L2RT- STA. 490+50 RT
-L2RT- STA. 492+25 TO STA. 494+00 RT
-L2RT- STA. 494+80 TO STA. 499+25 RT
-L2RT- STA. 499+25 TO STA. 501+00 RT
-L2RT- STA. 447+50 TO STA. 448+25 RT
-L2RT- STA. 449+50 TO STA. 453+00 RT
-L2RT- STA. 454+00 TO STA. 454+75 RT
-L2RT- STA. 454+75 -Y1RPEB- STA. 12+25 RT
-L2RT- STA. 450+50 STA. STA. 459+00 LT

DETAIL BE
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



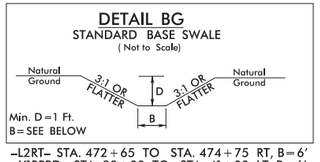
-Y1RPBD- STA. 29+50 TO STA. 32+50 RT
-Y1RPBD- STA. 60+75 TO STA. 63+85 RT

DETAIL BF
SPECIAL LATERAL BASE DITCH
(Not to Scale)



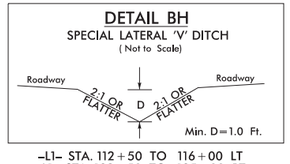
-Y1RPBD- STA. 30+50 TO STA. 33+00 LT
-Y1RPBD- STA. 32+50 TO STA. 36+00 RT
-Y1RPWB- STA. 19+00 TO STA. 24+50 LT
-Y1RPWB- STA. 19+50 TO STA. 22+00 RT

DETAIL BG
STANDARD BASE SWALE
(Not to Scale)



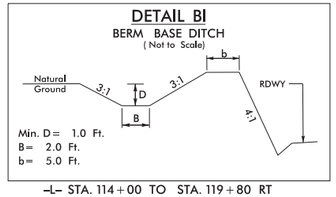
-L2RT- STA. 472+65 TO STA. 474+75 RT, B=6'
-Y1RPBD- STA. 38+00 TO STA. 41+00 LT, B=6'

DETAIL BH
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



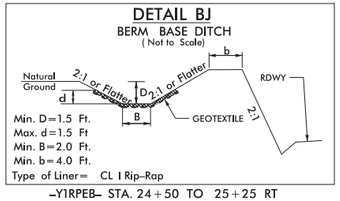
-L1- STA. 112+50 TO 116+00 LT
-L1- STA. 132+50 TO 135+00 RT
-Y3RPA- STA. 15+02 TO 17+59 LT

DETAIL BI
BERM BASE DITCH
(Not to Scale)



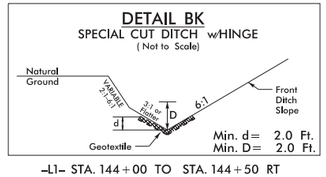
-L- STA. 114+00 TO STA. 119+80 RT

DETAIL BJ
BERM BASE DITCH
(Not to Scale)



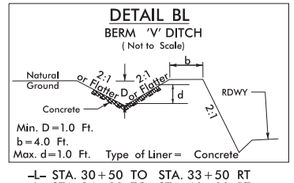
-Y1RPEB- STA. 24+50 TO 25+25 RT

DETAIL BK
SPECIAL CUT DITCH w/HINGE
(Not to Scale)



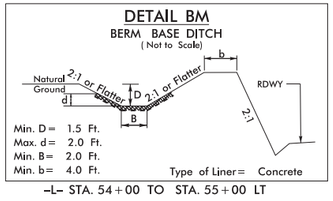
-L1- STA. 144+00 TO STA. 144+50 RT

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



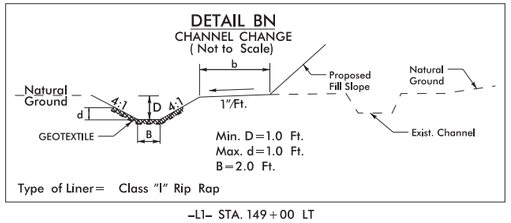
-L- STA. 30+50 TO STA. 33+50 RT
-L- STA. 34+00 TO STA. 46+00 RT

DETAIL BM
BERM BASE DITCH
(Not to Scale)



-L- STA. 54+00 TO STA. 55+00 LT

DETAIL BN
CHANNEL CHANGE
(Not to Scale)



-L1- STA. 149+00 LT

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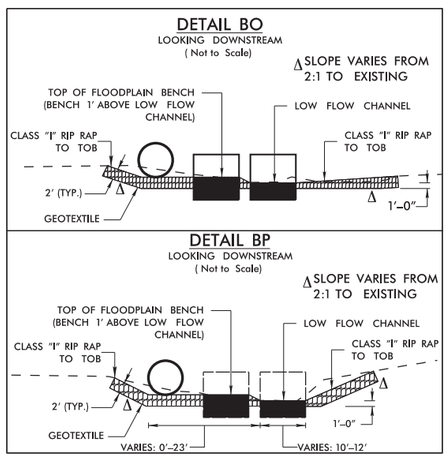
DITCH DETAILS: SECTION 1

PERMIT DRAWING
SHEET 4 OF 125

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	2D-3
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

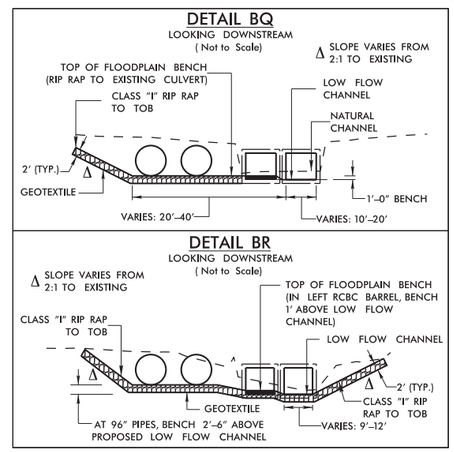
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SITE 1



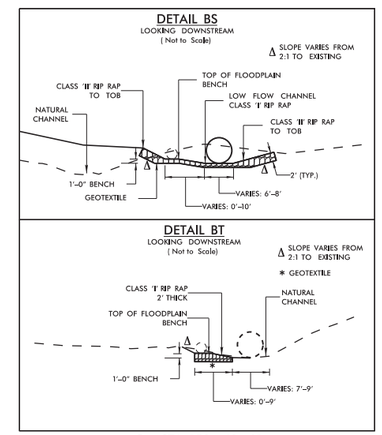
℄ STA. 64+93 -L1-

SITE 2



℄ STA. 91+25 -L1-

SITE 3



℄ STA. 150+49 -L1-

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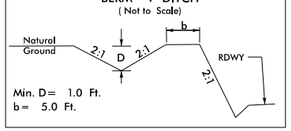
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	2D-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

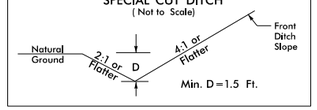
PERMIT DRAWING SHEET 5 OF 125

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



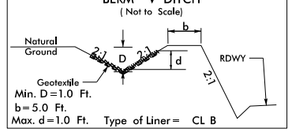
–L2– STA. 170+50 TO STA. 175+50 RT
–L2– STA. 198+50 TO STA. 204+00 RT
–L2– STA. 295+16 TO STA. 310+00 RT
–L2– STA. 388+75 TO STA. 394+00 RT

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



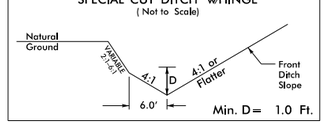
–L1– STA. 121+50 TO STA. 123+00 RT
–L2– STA. 198+50 TO STA. 199+30 RT
–L2– STA. 204+95 TO STA. 209+00 RT
–L2– STA. 209+00 TO STA. 209+50 LT
–L2– STA. 212+00 TO STA. 214+50 LT
–L2– STA. 212+50 TO STA. 214+00 RT
–L2– STA. 258+50 TO STA. 260+50 LT
–L2– STA. 258+50 TO STA. 262+50 RT
–L2– STA. 303+50 TO STA. 304+35 RT
–L2– STA. 309+00 TO STA. 310+00 RT
–L2– STA. 420+50 TO STA. 423+50 LT
–L3– STA. 155+00 TO STA. 157+50 RT
–L3– STA. 155+00 TO STA. 157+50 LT
–L3– STA. 276+50 TO STA. 278+50 RT
–LCDEB– STA. 91+51.57 TO STA. 99+29.50 RT
–Y1RPA_3– STA. 22+00 TO STA. 24+50 RT
–Y1RPB_3– STA. 20+50 TO STA. 22+00 LT
–Y1RPC_3– STA. 12+97 TO STA. 15+49 RT
–Y1RPC_3– STA. 24+00 TO STA. 25+39 RT
–Y2_3– STA. 13+00 TO STA. 14+50 RT
–Y2_3– STA. 13+50 TO STA. 14+50 LT
–Y2_3– STA. 17+50 TO STA. 19+15 RT
–Y2_3– STA. 71+50 TO STA. 74+50 RT
–Y2RPA– STA. 17+40 TO STA. 19+00 RT
–Y3RPC– STA. 24+00 TO STA. 26+00 LT
–Y3RPC– STA. 27+00 TO STA. 30+00 LT
–Y3RPC– STA. 31+00 TO STA. 32+00 LT
–Y8RPA– STA. 16+25 TO STA. 15+25 LT
–Y5– STA. 43+50 TO STA. 44+00 RT
–Y5RPA– STA. 18+00 TO STA. 23+50 LT
–Y5LPC– STA. 17+00 TO STA. 19+50 RT
–Y5RPB– STA. 37+00 TO STA. 38+50 LT
–Y5RPB_TEMP– STA. 37+00 TO STA. 38+50 LT
–Y5RPB_TEMP– STA. 39+90 TO STA. 42+50 LT
–Y5RPB– STA. 42+00 TO STA. 43+50 RT
–Y5RPC– STA. 15+99.13 TO STA. 18+09.64 RT
–Y5RPC– STA. 58+50 TO STA. 59+60 LT
BEG. EL=312.27', END EL=311.94', S=0.30%
–Y5RPBSPUR– STA. 14+50 TO STA. 16+50 LT
–Y5RPBSPUR– STA. 17+20 TO STA. 17+50 RT
–Y5RPD– STA. 18+00 TO STA. 18+59 RT
–Y6– STA. 10+50 TO STA. 15+58 LT
–Y6– STA. 11+16 TO STA. 14+00 RT
–Y6– STA. 18+50 TO STA. 23+00 LT
–Y6– STA. 20+79 TO STA. 23+00 RT
–Y8RPC– STA. 18+61 TO STA. 21+13 RT

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



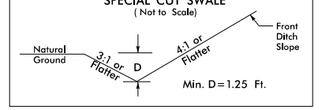
–L2– STA. 167+50 TO STA. 170+50 RT
–L2– STA. 204+00 TO STA. 204+95 RT

DETAIL D
SPECIAL CUT DITCH w/HINGE
(Not to Scale)



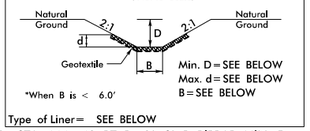
–L2– STA. 172+50 TO STA. 176+50 RT
–L2– STA. 177+00 TO STA. 181+00 RT
–L2– STA. 179+50 TO STA. 181+50 LT
–L2– STA. 190+50 TO STA. 195+50 RT
–L2– STA. 199+30 TO STA. 204+95 RT
–L2– STA. 207+00 TO STA. 209+00 LT
–L2– STA. 214+50 TO STA. 216+00 LT
–L2– STA. 218+00 TO STA. 219+50 LT
–L3– STA. 21+50 TO STA. 23+50 LT
–Y5RPB– STA. 38+50 TO STA. 39+00 LT
–Y5RPC– STA. 18+09.64 TO STA. 20+00 RT

DETAIL E
SPECIAL CUT SWALE
(Not to Scale)



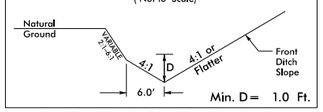
–L2– STA. 170+00 TO STA. 172+00 LT
–L2– STA. 195+50 TO STA. 197+00 LT
–L2– STA. 251+50 TO STA. 253+00 RT
–L2– STA. 252+00 TO STA. 254+50 LT
–L2– STA. 387+50 TO STA. 389+50 RT
–L2– STA. 411+00 TO STA. 415+50 LT
–L2– STA. 417+50 TO STA. 420+50 LT
–L2– STA. 418+00 TO STA. 422+50 RT
–L2– STA. 424+50 TO STA. 429+00 LT
–L2– STA. 450+00 TO STA. 452+00 LT
–L3– STA. 186+00 TO STA. 189+50 RT
–L3– STA. 191+00 TO STA. 193+50 LT
–L3– STA. 227+50 TO STA. 229+50 LT
–Y2RPA_3– STA. 13+62 TO STA. 17+40 RT
–Y5LPB– STA. 12+25 TO STA. 13+82 RT
–Y5RPB– STA. 30+50 TO STA. 34+00 RT
–Y5RPB– STA. 40+50 TO STA. 43+50 LT
–Y5RPB– STA. 45+00 TO STA. 46+50 LT
–Y5RPC– STA. 52+00 TO STA. 53+28 LT
BEG. EL=314.91', END EL=311.93', S=2.33%
–Y5RPC– STA. 53+28 TO STA. 54+50 LT
BEG. EL=311.93', END EL=312.30', S=0.30%
–Y8RPA– STA. 24+50 TO STA. 28+50 LT
–Y2_3– STA. 61+50 TO STA. 63+50 LT

DETAIL F
STANDARD BASE DITCH
(Not to Scale)



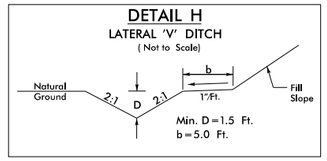
–L2– STA. 444+43 RT, B=2', CL B RIPRAP, MIN D=1.0'
L=98', BEG. EL=271.77', END EL=266.15', S=5.76%
–L2– STA. 473+44 LT, B=2', CL B RIPRAP, MIN D=1.0'
L=39', BEG. EL=237.23, END EL=235.29, S=5.0%
–Y5LPB– STA. 26+85 RT, B=4', CL I RIPRAP, MIN. D=2.25'
L=485', BEG. EL=338.00', END EL=325.00', S=2.68%
–Y5LPB– STA. 27+33 LT, B=4', CL I RIPRAP, MIN D=3.5'
L=445', BEG. EL=323.00', END EL=315.25', S=1.74%
–Y5RPBSPUR– STA. 17+30 LT, B=4', CL I RIPRAP, MIN D=3.5'
L=286', BEG. EL=311.25', END EL=306.50', S=1.66%
–Y5RPB– STA. 43+35 LT, B=4', CL II RIPRAP, MIN D=3.5'
L=133', BEG. EL=305.80', END EL=302.95', S=2.14%

DETAIL G
SPECIAL CUT SWALE w/HINGE
(Not to Scale)



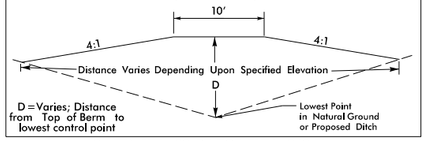
–L2– STA. 177+50 TO STA. 179+50 LT
–L2– STA. 181+50 TO STA. 184+50 LT
–L2– STA. 200+00 TO STA. 207+00 LT
–L2– STA. 216+00 TO STA. 218+00 LT
–L2– STA. 253+00 TO STA. 256+00 RT
–L3– STA. 20+28 TO STA. 21+50 LT
–Y5RPA– STA. 17+50 TO STA. 20+50 RT

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



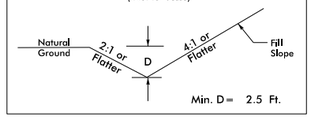
–L2– STA. 257+28 TO STA. 258+50 RT
–L2– STA. 275+65 TO STA. 276+50 LT
–L2– STA. 386+27 TO STA. 387+50 RT
–L2– STA. 395+74 TO STA. 396+50 RT
–Y5LPC– STA. 14+50 TO STA. 17+00 RT
–Y5LPB– STA. 15+40 TO STA. 17+50 LT
–Y5RPB– STA. 35+00 TO STA. 37+00 LT
–Y5RPB_TEMP– STA. 35+00 TO STA. 37+00 LT
–Y5RPBSPUR– STA. 16+50 TO STA. 17+29 LT

DETAIL J
10' WIDE BERM
(Not to Scale)



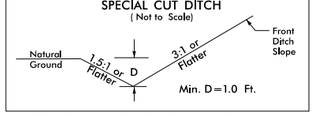
–L2– STA. 177+00 RT, TOP ELEV=349.5'
–L2– STA. 305+00 RT, TOP ELEV=314.5'
–L2– STA. 324+25 LT, TOP ELV=277.5'
–L2– STA. 436+50 LT, TOP ELEV=280.0'
–L3– STA. 114+00 LT, TOP ELEV=228.0'
–L3– STA. 278+50 RT, TOP ELEV=260.0'
–Y5RPB– STA. 43+74 LT, TOP ELEV=314.0'
–Y2RPA_3– STA. 19+26 LT, TOP ELEV=298.0'
–Y2– STA. 70+00 LT, TOP ELEV=304.8'

DETAIL K
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



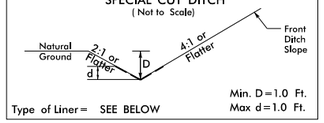
–L1– STA. 37+00 TO STA. 38+00 LT
–L1– STA. 41+00 TO STA. 42+50 LT
–L1– STA. 56+50 TO STA. 57+50 LT
–L1– STA. 58+00 TO STA. 58+50 LT
–L1– STA. 67+00 TO STA. 73+50 LT
–L1– STA. 107+60 TO STA. 109+00 RT
–L1– STA. 113+00 TO STA. 121+50 LT
–L1– STA. 113+34 TO STA. 121+50 RT
–L1– STA. 137+50 TO STA. 139+00 RT
–L1– STA. 142+00 TO STA. 143+00 RT
–L1– STA. 145+50 TO STA. 146+00 RT
–L1– STA. 129+00 TO STA. 133+00 LT
–Y3RPC– STA. 21+00 TO STA. 24+00 LT
–Y3RPC– STA. 26+00 TO STA. 27+00 LT
–Y3RPC– STA. 30+00 TO STA. 31+00 LT
–Y3RPD– STA. 18+00 TO STA. 19+00 LT
–Y5LPB– STA. 13+82.47 TO STA. 17+50 RT

DETAIL BI
SPECIAL CUT DITCH
(Not to Scale)



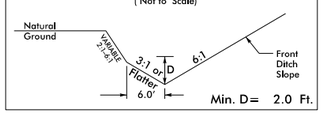
–Y4– STA. 10+80 TO STA. 14+30 LT

DETAIL I
SPECIAL CUT DITCH
(Not to Scale)



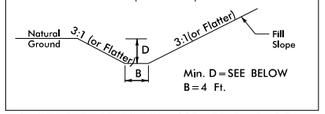
–L3– STA. 122+50 TO STA. 123+50 LT, CL B RIPRAP
–Y1RPA_3– STA. 24+00 TO STA. 25+00 LT, CL B RIPRAP
–Y5RPB– STA. 34+00 TO STA. 37+50 RT, PSRM
–Y5RPB– STA. 38+50 TO STA. 40+50 LT, CL I RIPRAP
–Y5RPB_TEMP– STA. 38+50 TO STA. 39+90 LT, CL I RIPRAP
–Y5RPBSPUR– STA. 10+20 TO STA. 13+73 RT, CL II RIPRAP

DETAIL L
SPECIAL CUT DITCH w/HINGE
(Not to Scale)



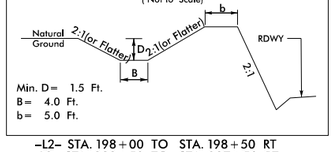
–L1– STA. 42+50 TO STA. 45+50 LT
–L1– STA. 109+00 TO STA. 110+85 RT
–L1– STA. 121+50 TO STA. 122+50 LT
–L1– STA. 137+00 TO STA. 137+50 LT
–L1– STA. 139+00 TO STA. 142+00 RT
–L1– STA. 140+00 TO STA. 142+00 LT
–L1– STA. 143+00 TO STA. 144+50 RT

DETAIL M
SPECIAL LATERAL BASE SWALE
(Not to Scale)



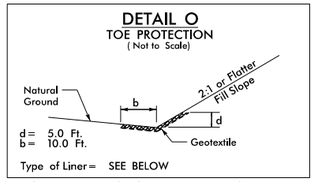
–L1– STA. 149+00 TO STA. 150+50 RT, D=1.0'
–Y2RPB_3– STA. 24+00 TO STA. 26+60 LT, D=1.0'

DETAIL N
BERM BASE DITCH
(Not to Scale)



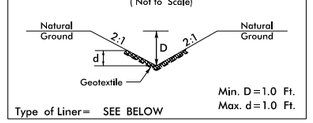
–L2– STA. 198+00 TO STA. 198+50 RT
–L2– STA. 283+50 TO STA. 287+50 RT
–L2– STA. 289+50 TO STA. 290+50 RT
–LCDEB– STA. 95+00 TO STA. 104+50 RT

DETAIL O
TOE PROTECTION
(Not to Scale)



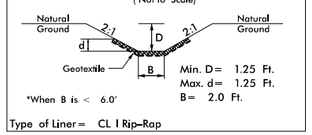
–L1– STA. 143+11 TO STA. 144+21 LT, CL I RIPRAP
–L2– STA. 399+00 TO STA. 401+00 RT, CL B RIPRAP
–L2– STA. 427+00 TO STA. 429+25 RT, CL I RIPRAP
–L3– STA. 77+77 TO STA. 78+38 LT, CL B RIPRAP
–L3– STA. 98+40 TO STA. 99+60 LT, CL I RIPRAP
–L3– STA. 111+87 TO STA. 118+19 LT, CL I RIPRAP
–L3– STA. 144+14 TO STA. 145+50 LT, CL I RIPRAP
–L3– STA. 171+60 TO STA. 173+25 LT, CL I RIPRAP
–L3– STA. 181+65 TO STA. 183+00 LT, CL I RIPRAP
–L3– STA. 181+80 TO STA. 183+71 RT, CL I RIPRAP
–L3– STA. 211+00 TO STA. 212+50 LT, CL I RIPRAP
–L3– STA. 243+50 TO STA. 246+60 RT, CL I RIPRAP
–L3– STA. 247+42 TO STA. 250+00 RT, CL I RIPRAP
–Y8LPC– STA. 10+62 TO STA. 12+40 LT, CL I RIPRAP
–LCDWB– STA. 97+73.62 TO STA. 99+23.62 LT, CL B RIPRAP
–Y2RPA_3– STA. 18+31 TO STA. 19+12 LT, CL B RIPRAP
–Y1_3– STA. 32+90 TO STA. 33+40 RT, CL B RIPRAP
–Y1_3– STA. 68+00 TO STA. 68+60 RT, CL B RIPRAP

DETAIL P
STANDARD 'V' DITCH
(Not to Scale)



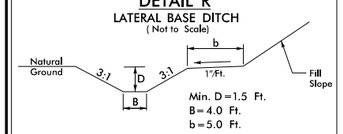
–L1– STA. 118+88 TO STA. 118+94 RT, CL B RIPRAP
–Y5RPA– STA. 20+50 RT, L=100', CL I RIPRAP
BEG. EL=311.09', END EL=302.04', S=9.05%
–Y5RPA– STA. 21+50 RT, L=100', CL I RIPRAP
BEG. EL=302.04', END EL=293.48', S=8.56%
–Y6– STA. 21+00 LT, CL B RIPRAP

DETAIL Q
STANDARD BASE DITCH
(Not to Scale)



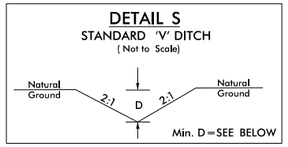
–L1– STA. 144+80 TO STA. 144+98 RT
–Y5– STA. 25+00 LT, L=103', CL B RIPRAP,
BEG. EL=355.50' END EL=352.00', S=3.4%

DETAIL R
LATERAL BASE DITCH
(Not to Scale)



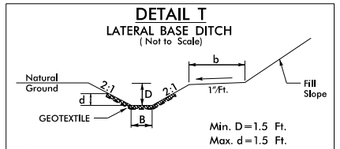
–L3– STA. 92+50 TO STA. 94+50 LT
–L3– STA. 265+00 TO STA. 276+50 RT

DETAIL S
STANDARD 'V' DITCH
(Not to Scale)



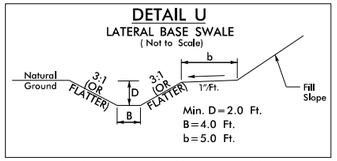
–Y5RPD– STA. 20+17 RT, MIN. D=2.0',
L=149, S=1.34%
BEG. EL=336.00', END EL=334.00'
–Y8RPA– STA. 16+00 RT, MIN. D=2.25'
L=99', S=0.3%
BEG. EL=237.80', END EL=237.54'

DETAIL T
LATERAL BASE DITCH
(Not to Scale)



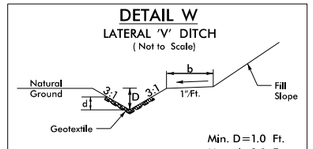
–L2– STA. 251+00 TO STA. 251+50 RT, CL B
–L2– STA. 272+00 TO STA. 273+00 RT, CL B
–L2– STA. 273+30 TO STA. 275+50 RT, CL B
–L2– STA. 274+00 TO STA. 275+05 LT, CL B
–L2– STA. 320+00 TO STA. 322+68 LT, CL B
–L2– STA. 320+50 TO STA. 322+00 RT, CL I
–L2– STA. 324+50 TO STA. 325+50 RT, CL B
–L2– STA. 405+93 TO STA. 406+50 RT, CL B

DETAIL U
LATERAL BASE SWALE
(Not to Scale)



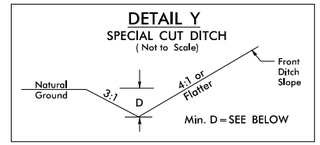
–L2– STA. 249+00 TO STA. 251+00 RT
–L2– STA. 256+00 TO STA. 257+28 RT
–L2– STA. 282+11 TO STA. 282+50 RT
–L2– STA. 322+00 TO STA. 323+32 RT
–L2– STA. 322+68 TO STA. 323+75 LT
–L2– STA. 437+00 TO STA. 446+90 LT
–L3– STA. 86+50 TO STA. 92+80 RT
–L3– STA. 146+15 TO STA. 147+00 RT
–L3– STA. 173+25 TO STA. 175+50 LT
–L3– STA. 249+00 TO STA. 250+00 LT
–Y2_3– STA. 57+50 TO STA. 58+00 LT
–Y2RPA_3– STA. 19+63 TO STA. 22+75 LT
–Y2RPA_3– STA. 19+50 TO STA. 23+50 RT

DETAIL W
LATERAL 'V' DITCH
(Not to Scale)



–Y1RPA– STA. 22+50 TO STA. 24+00 LT

DETAIL Y
SPECIAL CUT DITCH
(Not to Scale)



–Y2_3– STA. 77+50 TO STA. 85+50 LT, MIN D=3.25'
–Y2_3– STA. 82+50 TO STA. 85+00 RT, MIN D=2.25'

PLANS PREPARED BY :
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aburke

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	2D-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 6 OF 125

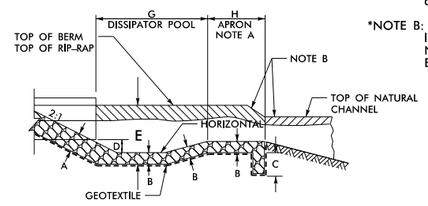
DETAIL X

RIP-RAPPED ENERGY DISSIPATOR BASIN

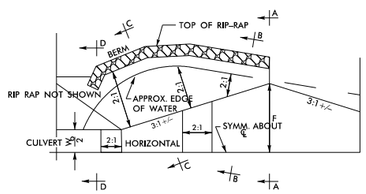
*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT Q des/(CROSS SECTION AREA AT SEC. A-A) = SPECIFIED VELOCITY.

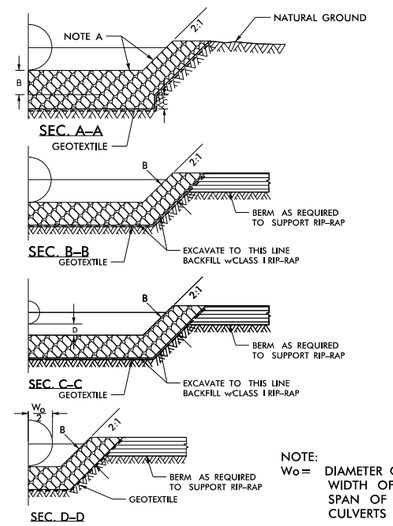
*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIP-RAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.

℄ SECTION



HALF PLAN





DIM.	RIP RAP BASIN #							
	1	2	3	4	5	6	7	8
A	4.0	4.0						
B	3.0	3.0						
C	2.0	2.0						
D	1.9	1.3						
E	10.5	8.5						
F	12.6	12.6						
G	28.7	21.3						
H	9.6	6.3						

*ALL DIMENSIONS APPROXIMATE IN FT

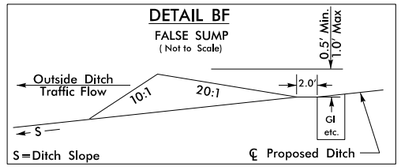
BASIN #	LOCATION (AT OUTLET)
1	-L2- 192+73 LT
2	-L2- 256+65 LT
3	
4	
5	
6	
7	
8	

NOTE:
Wo = DIAMETER OF PIPE, WIDTH OF BOX OR SPAN OF PIPE-ARCH CULVERTS

5/05

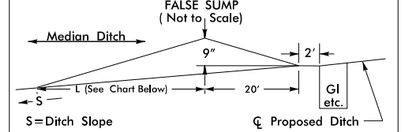
DETAIL BF

FALSE SUMP
(Not to Scale)



DETAIL BG

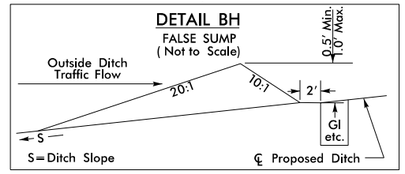
FALSE SUMP
(Not to Scale)



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'

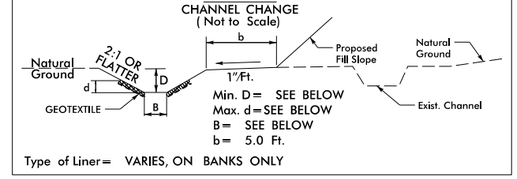
DETAIL BH

FALSE SUMP
(Not to Scale)



DETAIL V

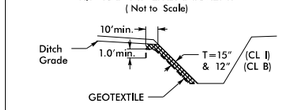
CHANNEL CHANGE
(Not to Scale)



-Y5RPC- STA. 53+28 LT, B=3', CL I RIPRAP, MIN D=2.25'
BEG. EL=308.85', END EL=307.37', L=48', S=3.1%
-L2- STA. 257+28 RT, B=8', CL I RIPRAP, MIN D=4.0'
L=31', BEG. EL=314.75', END EL=314.84', S=0.3%
-L2- STA. 273+00 TO STA. 273+30 RT, B=4', D=4', d=4', CL I RIPRAP
-L2- STA. 275+00 LT, B=4', CL I RIPRAP, MIN D=3.5'
L=42', BEG. EL=290.72', END EL=290.12', S=1.42%
-L2- STA. 281+89 RT, B=1.5', CL I RIPRAP, MIN D=3.25'
BEG. EL=306.78', END EL=306.28', L=25', S=2.0%
-L2- STA. 283+47 LT, B=4', CL I RIPRAP, MIN D=4.75'
L=66', BEG. EL=302.98', END EL=302.67', S=0.5%
-L2- STA. 323+32 TO STA. 324+50 RT, B=4', D=4.75', d=4.75', CL I RIPRAP
-L2- STA. 395+91 RT, B=3', D=1.5', d=1.5', CL I RIPRAP, S=4.4%
BEG. EL=259.53', END EL=257.50'
-L3- STA. 178+50 TO STA. 181+75 LT, B=4', D=2.5', CL I RIPRAP
-L3- STA. 246+42 TO STA. 247+34 RT, B=4', D=3.25', d=3.25', CL I RIPRAP

DETAIL BA

RIP RAP AT EMBANKMENT
(Not to Scale)

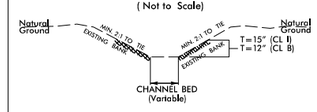


Type of Liner= SEE BELOW

-L2- STA. 257+25 RT, CL I RIPRAP
-L2- STA. 272+87 RT, CL B RIPRAP
-L2- STA. 273+27 RT, CL B RIPRAP
-L2- STA. 275+06 LT, CL B RIPRAP
-L2- STA. 322+48 LT, CL B RIPRAP
-L2- STA. 322+88 LT, CL B RIPRAP
-L2- STA. 323+13 RT, CL I RIPRAP
-L2- STA. 386+30 RT, CL I RIPRAP
-L2- STA. 395+82 RT, CL I RIPRAP
-L2- STA. 405+84 RT, CL I RIPRAP
-L2- STA. 406+05 RT, CL B RIPRAP
-L2- STA. 447+72 LT, CL I RIPRAP
-L2- STA. 447+93 LT, CL I RIPRAP
-L3- STA. 174+80 RT, CL B RIPRAP
-L3- STA. 210+62 RT, CL I RIPRAP
-L3- STA. 215+34 LT, CL I RIPRAP
-L3- STA. 215+52 LT, CL I RIPRAP
-L3- STA. 247+67 LT, CL I RIPRAP
-L3- STA. 270+63 LT, CL I RIPRAP

DETAIL BB

PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)

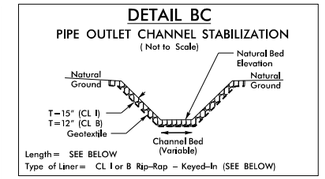


Length= SEE BELOW
Type of Liner= CL I or B Rip-Rap - Keyed-In (SEE BELOW)

-L2- STA. 169+12 LT, L=5', CL B RIPRAP
-L2- STA. 172+65 LT, L=8', CL B RIPRAP
-L2- STA. 176+20 LT, L=36', CL I RIPRAP
-L2- STA. 284+50 LT, L=5', CL I RIPRAP
-L2- STA. 396+41 LT, L=45', CL I RIPRAP
-L2- STA. 369+00 LT, L=5', CL B RIPRAP
-L2- STA. 381+90 RT, L=5', CL B RIPRAP
-L2- STA. 416+93 LT, L=10', CL B RIPRAP
-L2- STA. 447+84 LT, L=64', CL I RIPRAP
-L2- STA. 461+38 RT, L=30', CL I RIPRAP
-Y8RPA- STA. 27+36 RT, L=22', CL I RIPRAP
-L3- STA. 111+82 LT, L=16', CL I RIPRAP (INLET)
-L3- STA. 144+04 LT, L=40', CL I RIPRAP
-L3- STA. 168+43 LT, L=45', CL I RIPRAP
-L3- STA. 171+49 LT, L=55', CL I RIPRAP
-L3- STA. 205+30 RT, L=55', CL I RIPRAP
-L3- STA. 233+34 LT, L=45', CL I RIPRAP
-L3- STA. 234+09 LT, L=40', CL I RIPRAP
-L3- STA. 247+67 LT, L=50', CL I RIPRAP
-L3- STA. 270+61 LT, L=12', CL I RIPRAP

DETAIL BC

PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)

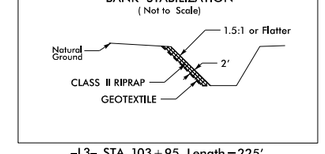


Length= SEE BELOW
Type of Liner= CL I or B Rip-Rap - Keyed-In (SEE BELOW)

-L2- STA. 245+56 RT, L=20', CL I RIPRAP
-L2- STA. 290+70 LT, L=35', CL I RIPRAP
-L3- STA. 121+50 RT, L=20', CL B RIPRAP
-L3- STA. 124+36 RT, L=30', CL I RIPRAP
-L3- STA. 126+90 RT, L=30', CL I RIPRAP
-L3- STA. 275+43 LT, L=25', CL I RIPRAP

DETAIL BF

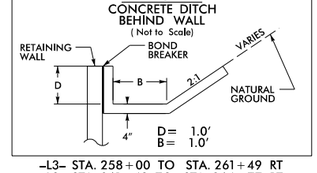
BANK STABILIZATION
(Not to Scale)



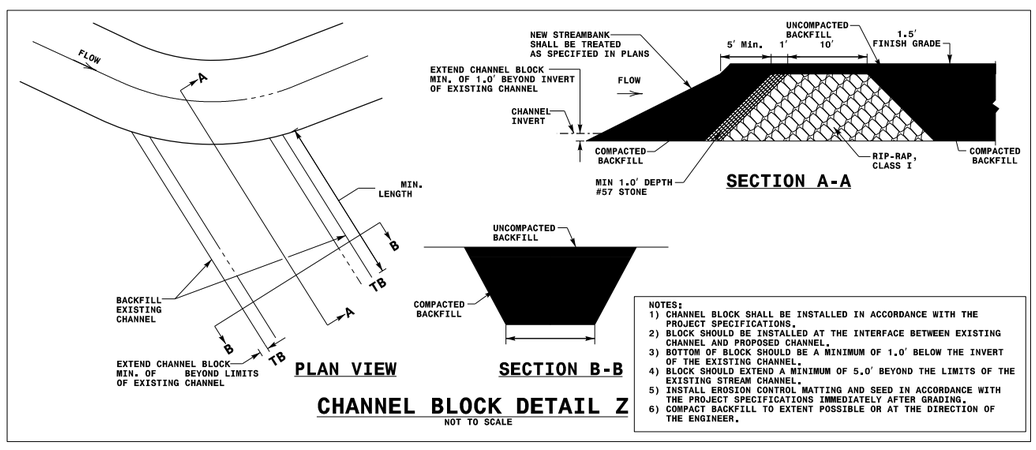
-L3- STA. 103+95, Length=225'
-L3- STA. 104+40, Length=250'

DETAIL BE

CONCRETE DITCH BEHIND WALL
(Not to Scale)



-L3- STA. 258+00 TO STA. 261+49 RT
-L3- STA. 261+49 TO STA. 264+77 RT
-L3- STA. 264+77 TO STA. 266+90 RT
-L3- STA. 266+90 TO STA. 271+00 RT
-L3- STA. 276+00 TO STA. 277+50 RT
-L3- STA. 277+50 TO STA. 280+20 RT
-L3- STA. 347+48 TO STA. 366+50 RT



NOTES:
1) CHANNEL BLOCK SHALL BE INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
2) BLOCK SHOULD BE INSTALLED AT THE INTERFACE BETWEEN EXISTING CHANNEL AND PROPOSED CHANNEL.
3) BOTTOM OF BLOCK SHOULD BE A MINIMUM OF 1.0' BELOW THE INVERT OF THE EXISTING CHANNEL.
4) BLOCK SHOULD EXTEND A MINIMUM OF 5.0' BEYOND THE LIMITS OF THE EXISTING STREAM CHANNEL.
5) INSTALL EROSION CONTROL MATTING AND SEED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS IMMEDIATELY AFTER GRADING.
6) COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.

CHANNEL BLOCK DETAIL Z

NOT TO SCALE

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
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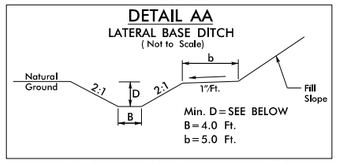
abourke

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	2D-3
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

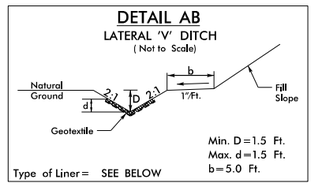
PERMIT DRAWING
SHEET 7 OF 125

DETAIL AA
LATERAL BASE DITCH
(Not to Scale)



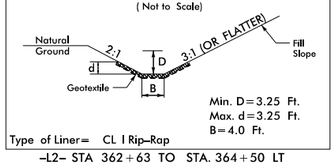
–L2– STA. 282+50 TO STA. 283+50 RT, D=1.0'
–L2– STA. 290+50 TO STA. 292+50 RT, D=1.0'
–Y4– STA. 22+76 TO STA. 23+75 LT, D=1.75'

DETAIL AB
LATERAL 'V' DITCH
(Not to Scale)



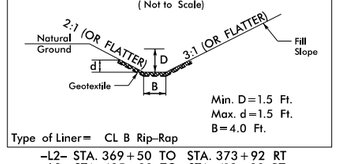
–L2– STA. 248+00 TO STA. 249+50 LT, CL B RIPRAP
–L2– STA. 316+50 TO STA. 317+50 RT, CL I RIPRAP
–L2– STA. 401+00 TO STA. 403+00 RT, CL I RIPRAP

DETAIL AC
SPECIAL LATERAL BASE DITCH
(Not to Scale)



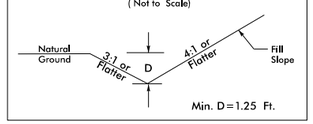
–L2– STA 362+63 TO STA. 364+50 LT
–L2– STA. 374+50 TO STA. 379+00 LT

DETAIL AD
SPECIAL LATERAL BASE DITCH
(Not to Scale)



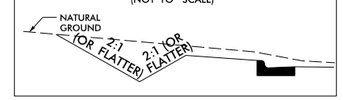
–L2– STA. 369+50 TO STA. 373+92 RT
–L2– STA. 405+93 TO STA. 410+00 RT
–L2– STA. 434+50 TO STA. 436+27 LT

DETAIL AE
SPECIAL LATERAL 'V' SWALE
(Not to Scale)



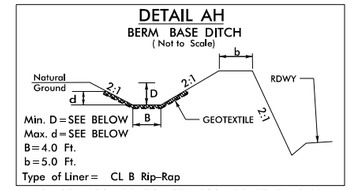
–L2– STA. 410+00 TO STA. 417+50 RT
–L2– STA. 467+50 TO STA. 473+50 RT
–L2– STA. 474+00 TO STA. 476+00 RT
–Y5RPA– STA. 27+00 TO STA. 29+00 RT

DETAIL AG
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



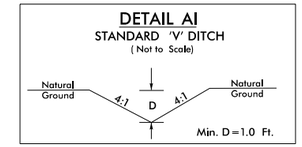
–Y2_3– STA. 20+50 TO STA. 24+25 RT
–Y2_3– STA. 30+00 TO STA. 42+49 RT
–Y5LPC– STA. 18+50 TO STA. 21+20 LT
–Y1_3– STA. 25+50 TO STA. 30+10 RT
–Y1E– STA. 12+25 TO STA. 16+00 LT

DETAIL AH
BERM BASE DITCH
(Not to Scale)



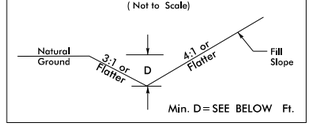
–L2– STA. 198+00 TO STA. 198+50 RT, D=2.0'
–L2– STA. 418+50 TO STA. 420+50 RT, D=1.5'
–L2– STA. 424+80 TO STA. 435+00 LT, D=1.5'

DETAIL AI
STANDARD 'V' DITCH
(Not to Scale)



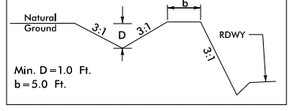
–L2– STA. 223+19 LT, L=75', S=1.08%
BEG. EL=364.81', END EL=364.00'

DETAIL AJ
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



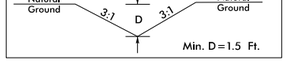
–L2– STA. 444+50 TO STA. 447+84 LT, D=1.25'
–L2– STA. 473+50 TO STA. 474+00 RT, D=1.0'
–LCDEB– STA. 22+55.28 TO STA. 25+05.29 RT, D=1.0'
–Y1RPB_3– STA. 22+00 TO STA. 25+00 RT, D=1.5'
–Y1RPB_3– STA. 22+00 TO STA. 23+50 LT, D=2.00'
–Y2_3– STA. 69+00 TO STA. 70+52 RT, D=1.0'
–Y5RPD– STA. 17+50 TO STA. 19+75 LT, D=2.00'
–SR1– STA. 11+85 TO STA. 14+50 RT, D=1.25'
–SR1– STA. 12+34 TO STA. 14+75 LT, D=1.0'
–PIERCE– STA. 13+63 TO STA. 14+50 RT, D=1.0'

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



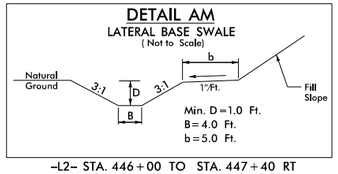
–L3– STA. 121+00 TO STA. 122+50 LT
–L3– STA. 126+50 TO STA. 138+00 LT
–L3– STA. 156+00 TO STA. 157+75 RT
–L3– STA. 238+00 TO STA. 243+00 RT
–L3– STA. 276+50 TO STA. 290+00 RT
–LCDEB– STA. 90+01.57 TO STA. 95+00 RT
–Y2RPA_3– STA. 18+00 TO STA. 19+50 RT

DETAIL AL
STANDARD 'V' DITCH
(Not to Scale)



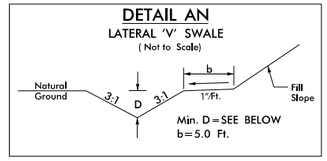
–L3– STA. 157+75 TO STA. 159+58 RT
–SR1– STA. 18+50 RT, BEG. ELEV=316.80, END ELEV=315.00, S=1.24%, L=145'
–SR1– STA. 18+50 LT, BEG. ELEV=317.56, END ELEV=317.02, S=0.48%, L=112'
–Y1_3– STA. 19+77 TO STA. 20+50 LT, BEG. ELEV=312.00, END ELEV=313.00, S=1.4%
–Y1_3– STA. 21+71 TO STA. 22+50 RT, BEG. ELEV=316.00, END ELEV=317.50, S=1.7%
–Y1E– STA. 16+00 TO STA. 17+00 LT, S=1.3%
BEG. ELEV=314.00, END ELEV=312.72'
–PIERCE– STA. 13+63 RT, L=118', S=1.8%
BEG. ELEV=320.48, END ELEV=318.40

DETAIL AM
LATERAL BASE SWALE
(Not to Scale)



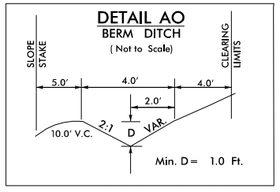
–L2– STA. 446+00 TO STA. 447+40 RT
–L3– STA. 111+09 LT; L=70'; S=0.9%
–L3– STA. 231+50 TO STA. 232+79 LT
–L3– STA. 234+28 TO STA. 235+50 LT
–L3– STA. 243+00 TO STA. 243+50 RT
–L3– STA. 245+50 TO STA. 247+66 LT
–L3– STA. 269+00 TO STA. 270+71 LT
–LCDEB– STA. 88+98.93 TO STA. 91+51.57 RT
–LCDWB– STA. 102+08.23 TO STA. 103+26.82 LT
–Y1RPD_3– STA. 14+21 TO STA. 16+53 LT

DETAIL AN
LATERAL 'V' SWALE
(Not to Scale)



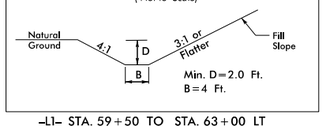
–L2– STA. 249+50 TO STA. 250+53 LT, D=1.0'
–L2– STA. 462+50 TO STA. 464+00 RT, D=1.25'
–L2– STA. 396+50 TO STA. 399+00 RT, D=1.0'
–L2– STA. 403+00 TO STA. 405+93 RT, D=1.5'
–L3– STA. 163+70 TO STA. 166+64 LT, D=1.25'
–L3– STA. 184+00 TO STA. 185+50 RT, D=1.5'
–Y1RPA_3– STA. 15+74.66 TO STA. 16+33.93 RT, D=1.0'
–Y1RPA_3– STA. 18+05 TO STA. 22+50 LT, D=1.5'
–Y2_3– STA. 59+26 TO STA. 61+00 LT, D=1.75'
–Y5LPB– STA. 17+50 TO STA. 20+98 RT, D=1.25'
–Y5LPB– STA. 25+00 TO STA. 26+85 RT, D=1.0'
–Y5LPB– STA. 26+85 TO STA. 29+45 RT, D=1.75'
–Y8RPA– STA. 26+00 TO STA. 27+01 RT, D=1.0'
–Y8RPA– STA. 27+48 TO STA. 29+60 RT, D=1.75'

DETAIL AO
BERM DITCH
(Not to Scale)



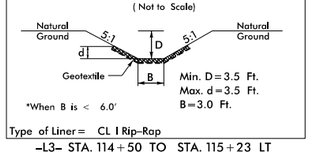
–L1– STA. 30+50 TO STA. 33+50 RT
–L1– STA. 34+00 TO STA. 46+00 RT
–L1– STA. 54+00 TO STA. 56+50 LT

DETAIL AP
SPECIAL LATERAL BASE DITCH
(Not to Scale)



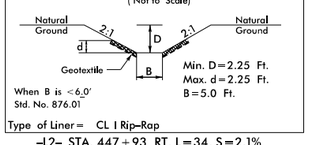
–L1– STA. 59+50 TO STA. 63+00 LT

DETAIL AQ
STANDARD BASE DITCH
(Not to Scale)



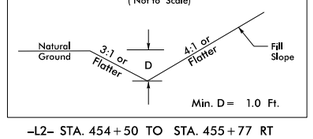
Type of Liner= CL I Rip-Rap
–L3– STA. 114+50 TO STA. 115+23 LT

DETAIL AR
STANDARD BASE DITCH
(Not to Scale)



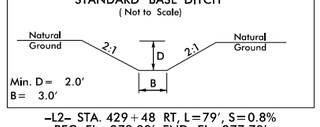
Type of Liner= CL I Rip-Rap
–L2– STA. 447+93 RT, L=34, S=2.1%
BEG. EL=257.30'; END EL=256.60'

DETAIL AS
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



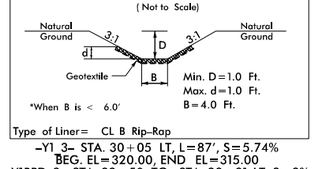
–L2– STA. 454+50 TO STA. 455+77 RT
–Y5LPB– STA. 13+82.47 TO STA. 17+50 RT

DETAIL AT
STANDARD BASE DITCH
(Not to Scale)



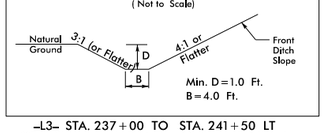
–L2– STA. 429+48 RT, L=79', S=0.8%
BEG. EL=278.30', END EL=277.70'

DETAIL BD
STANDARD BASE DITCH
(Not to Scale)



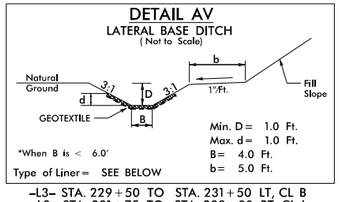
Type of Liner= CL B Rip-Rap
–Y1_3– STA. 30+05 LT, L=87', S=5.74%
BEG. EL=320.00, END EL=315.00
–Y1RPD_3– STA. 22+50 TO STA. 23+31 LT, S=9%
BEG. EL= 307.33, END ELEV=300.0
–Y1RPD_3– STA. 23+31 TO STA. 23+96 LT, S=9.2%
BEG. ELEV=300.00, END ELEV=305.96

DETAIL AU
SPECIAL CUT BASE SWALE
(Not to Scale)



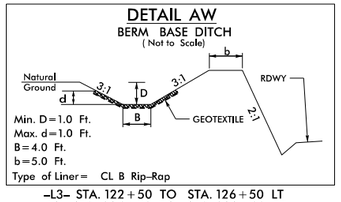
–L3– STA. 237+00 TO STA. 241+50 LT
–Y5RPBSPUR– STA. 13+73 TO STA. 17+20 RT

DETAIL AV
LATERAL BASE DITCH
(Not to Scale)



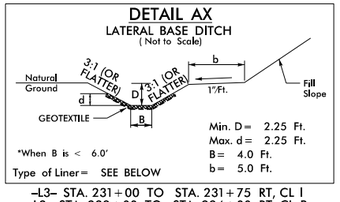
Type of Liner= SEE BELOW
–L3– STA. 229+50 TO STA. 231+50 LT, CL B
–L3– STA. 231+75 TO STA. 233+00 RT, CL I
–L3– STA. 234+00 TO STA. 235+00 RT, CL B
–L3– STA. 235+50 TO STA. 237+00 LT, CL B
–L3– STA. 243+00 TO STA. 245+50 LT, CL B
–L3– STA. 263+00 TO STA. 269+00 LT, CL B
–L3– STA. 263+50 TO STA. 265+00 RT, CL B

DETAIL AW
BERM BASE DITCH
(Not to Scale)



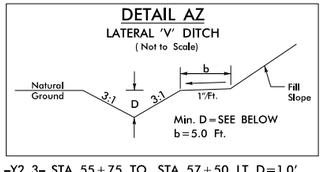
Type of Liner= CL B Rip-Rap
–L3– STA. 122+50 TO STA. 126+50 LT
–L3– STA. 234+50 TO STA. 238+00 RT
–LCDEB– STA. 104+50 TO STA. 109+50 RT

DETAIL AX
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= SEE BELOW
–L3– STA. 231+00 TO STA. 231+75 RT, CL I
–L3– STA. 233+00 TO STA. 234+00 RT, CL B
–LCDWB– STA. 99+23.62 TO STA. 103+26.82 LT, CL I
–Y2RPA_3– STA. 22+75 TO STA. 23+40 LT, CL I

DETAIL AZ
LATERAL 'V' DITCH
(Not to Scale)



–Y2_3– STA. 55+75 TO STA. 57+50 LT, D=1.0'
–Y2LPD_3– STA. 16+20 TO STA. 18+81 RT, D=1.0'
–Y2RPD_3– STA. 24+43 TO STA. 25+27 LT, D=2.25'
–Y1_3– STA. 30+88 TO STA. 32+00 RT, D=1.0'

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2/6/2019
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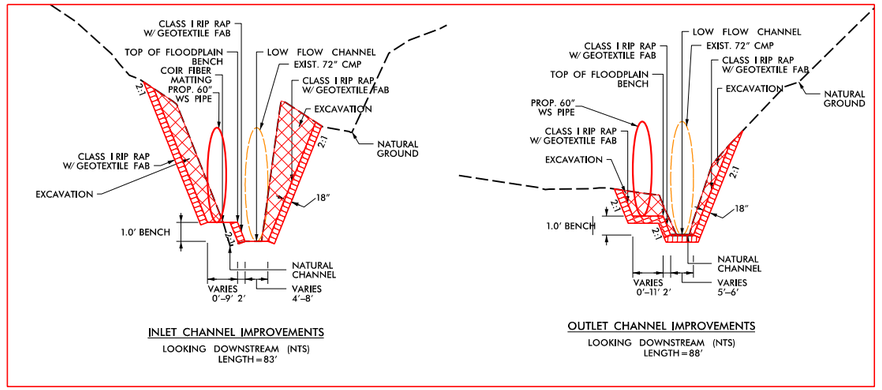
aburke

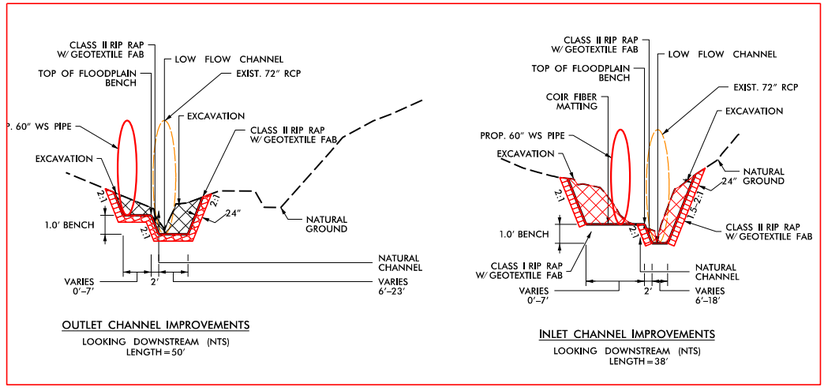
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	2D-4
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

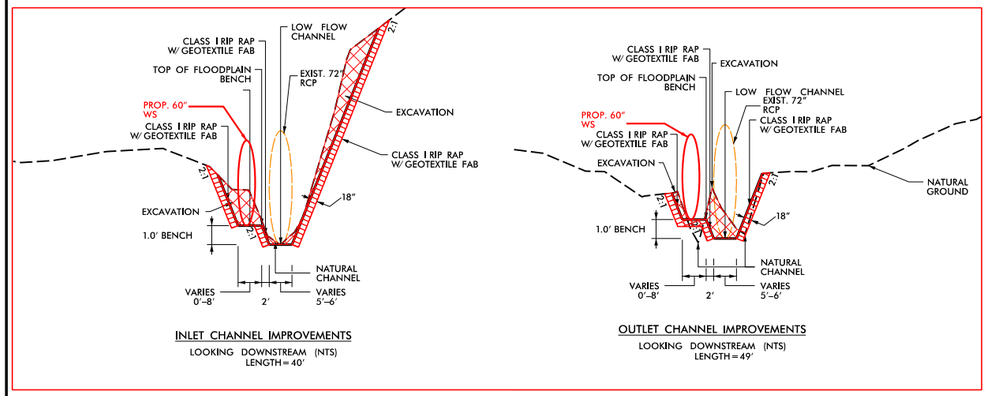
PERMIT DRAWING
SHEET 8 OF 125



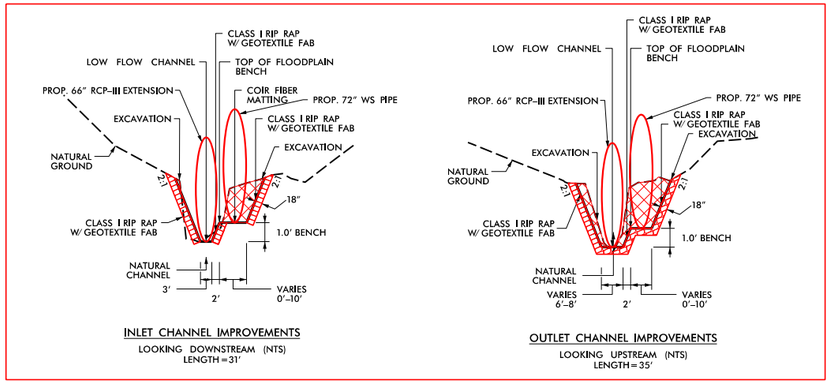
CULVERT INLET/OUTLET DETAILS
C400
-L2- 249 + 09



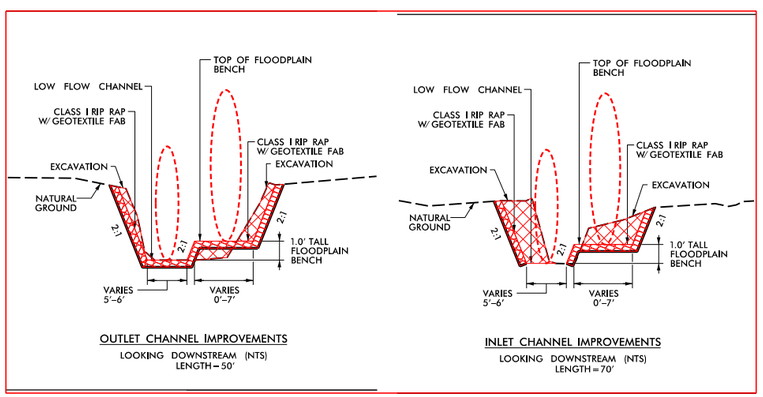
CULVERT INLET/OUTLET DETAILS
C700
-L2- 386 + 82



CULVERT INLET/OUTLET DETAILS
C500
-Y5RPA- 21 + 98



CULVERT INLET/OUTLET DETAILS
C800
-L2- 405 + 38



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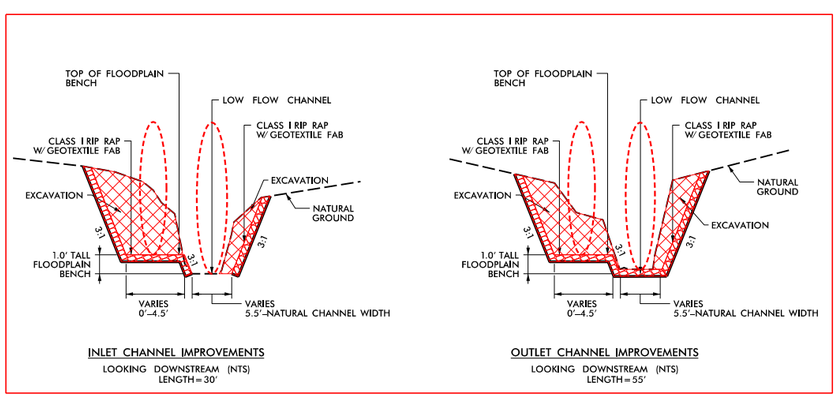
C600
-L2- 322 + 93



CULVERT INLET/OUTLET DETAILS
C900
-L3- 212 + 70

PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

2/6/2019
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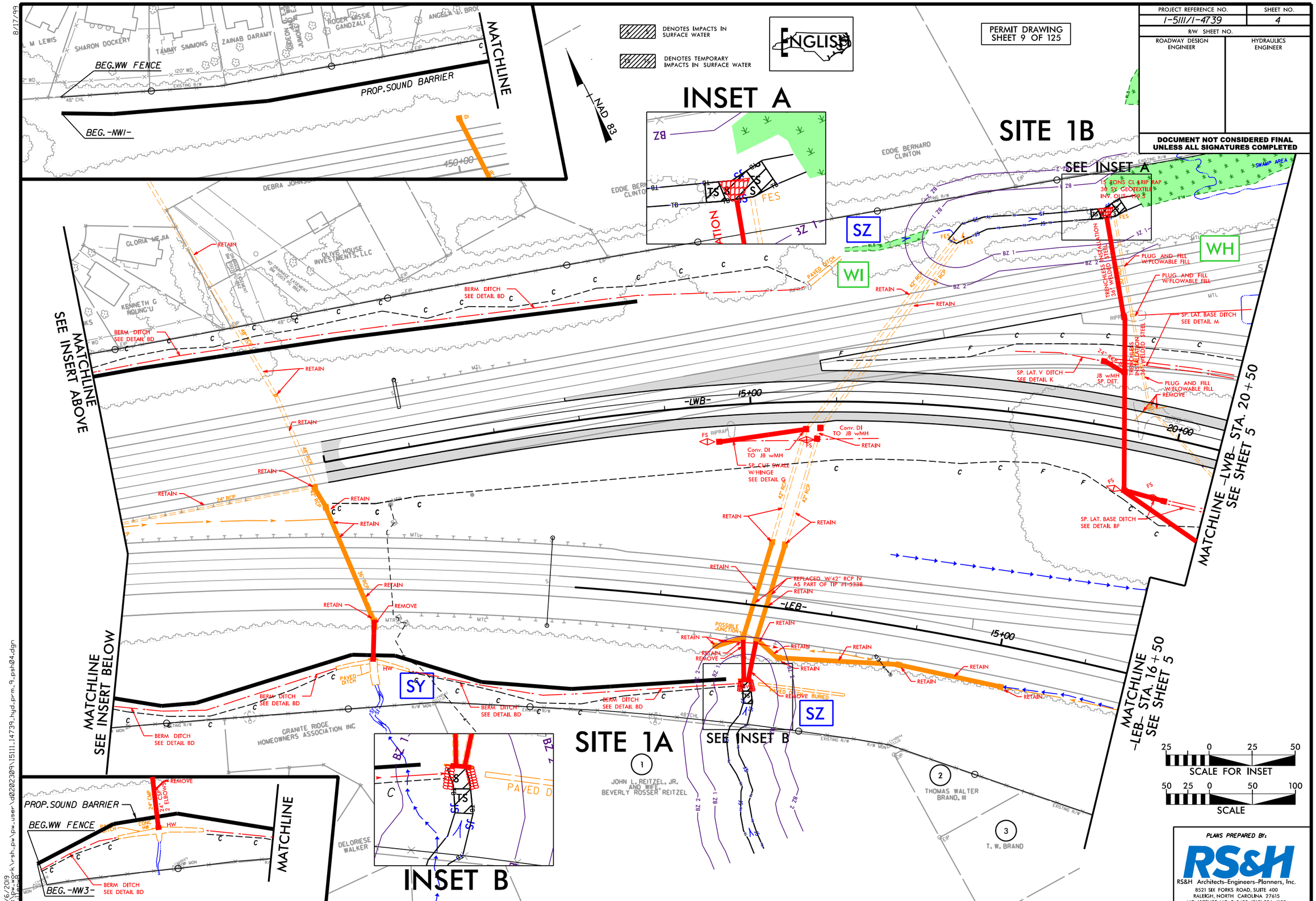
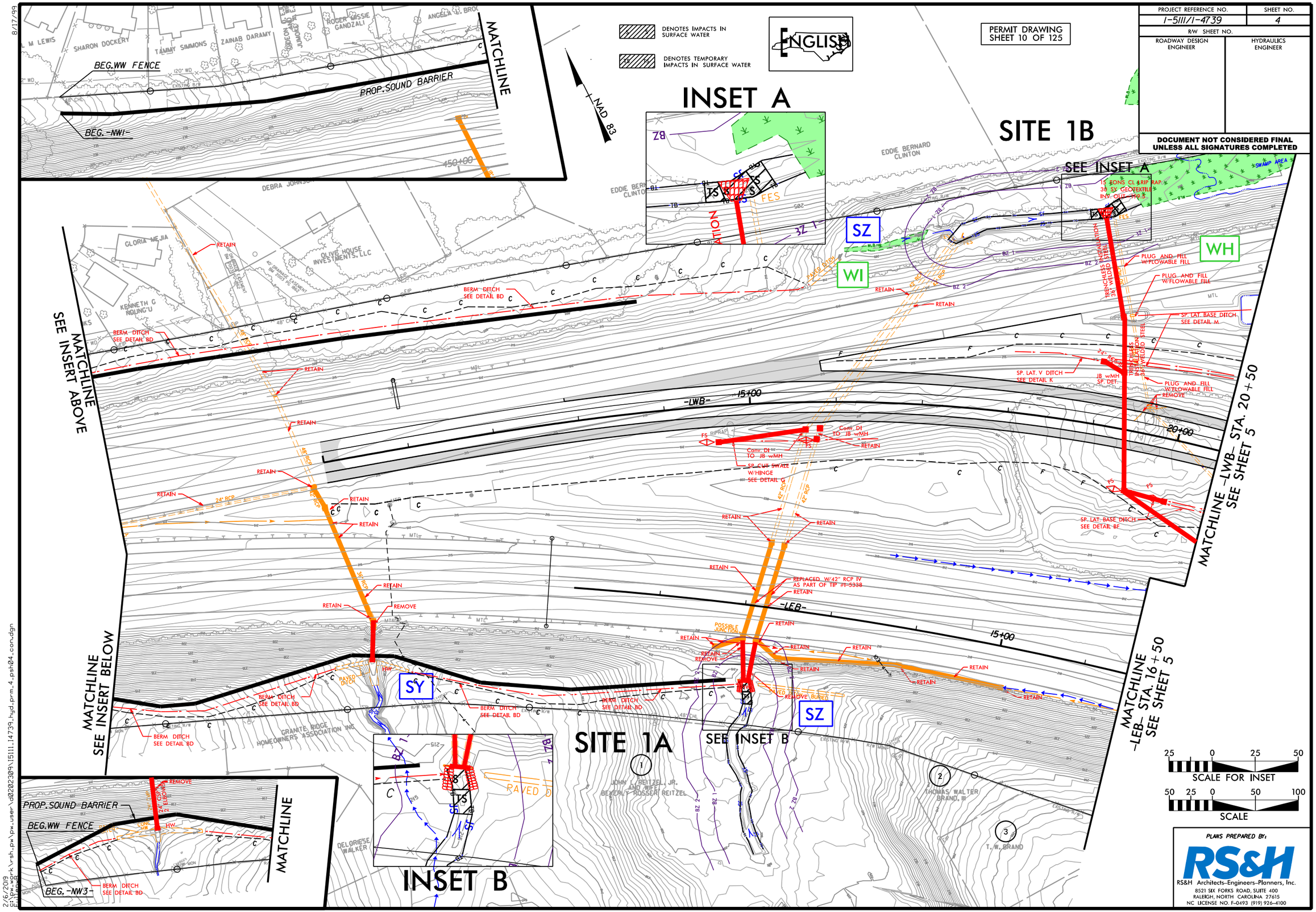
aburke



PROJECT REFERENCE NO.
I-5111/I-4739
SHEET NO.
4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
ENGLISH
PERMIT DRAWING SHEET 9 OF 125
NAD 83
INSET A
SITE 1B
SEE INSET A
SITE 1A
SEE INSET B
INSET B
MATCHLINE
SEE INSERT ABOVE
MATCHLINE SEE INSERT BELOW
MATCHLINE -LWB- STA. 20+50 SEE SHEET 5
MATCHLINE -LEB- STA. 16+50 SEE SHEET 5
BEG.WW FENCE
PROP.SOUND BARRIER
BEG.-NW1-
BEG.-NW3-
SZ
WI
WH
SY
-LWB-
-LEB-
15+00
20+00
BERM DITCH SEE DETAIL BD
RETAIN
REMOVE
PAVED DITCH
PLUG AND FILL W/FLOWABLE FILL
SP. LAT. BASE DITCH SEE DETAIL M
SP. LAT. V DITCH SEE DETAIL K
SP. LAT. BASE DITCH SEE DETAIL BF
Conv. DI TO JB w/MH
SP. CUT SWALE W/HINGE SEE DETAIL G
REPLACED W/42" RCP IV AS PART OF TIP #I-5338
POSSIBLE JUNCTION
GRANITE RIDGE HOMEOWNERS ASSOCIATION INC
JOHN L. REITZEL, JR. AND WIFE, BEVERLY ROSSER REITZEL
THOMAS WALTER BRAND, III
T. W. BRAND
DELORIESE WALKER
EDDIE BERNARD CLINTON
OLIVE HOUSE INVESTMENTS, LLC
SCALE FOR INSET
SCALE
PLANS PREPARED BY:
RS&H
RS&H Architects-Engineers-Planners, Inc.
8521 SIX FORKS ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27615
NC LICENSE NO. F-0493 (919) 926-4100



PROJECT REFERENCE NO.
I-5111/I-4739
SHEET NO.
4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
ENGLISH
PERMIT DRAWING SHEET 10 OF 125
NAD 83
INSET A
SITE 1B
SEE INSET A
SITE 1A
SEE INSET B
INSET B
MATCHLINE
SEE INSERT ABOVE
MATCHLINE SEE INSERT BELOW
MATCHLINE -LWB- STA. 20+50 SEE SHEET 5
MATCHLINE -LEB- STA. 16+50 SEE SHEET 5
BEG.WW FENCE
PROP.SOUND BARRIER
BEG.-NW1-
BEG.-NW3-
SZ
WI
WH
SY
-LWB-
-LEB-
15+00
20+00
BERM DITCH SEE DETAIL BD
RETAIN
REMOVE
PLUG AND FILL W/FLOWABLE FILL
SP. LAT. BASE DITCH SEE DETAIL M
SP. LAT. V DITCH SEE DETAIL K
SP. LAT. BASE DITCH SEE DETAIL BE
SP. CUT SWALE W/HINGE SEE DETAIL G
REPLACED W/42" RCP IV AS PART OF TIP #I-5338
POSSIBLE JUNCTION
GRANITE RIDGE HOMEOWNERS ASSOCIATION INC
EDDIE BERNARD CLINTON
OLIVE HOUSE INVESTMENTS, LLC
GLORIA MEJIA
KENNETH G NOUNG'U
SHARON DOCKERY
TAMMY SIMMONS
ZAINAB DARAMY
ROGER MISSIE GANDZALI
ANGELA L. BROC
DEBRA JOHNSON
JOHN L. REITZEL, JR. AND WIFE BEVERLY ROSSER REITZEL
THOMAS WALTER BRAND, III
T. W. BRAND
DELORIESE WALKER
SCALE FOR INSET
SCALE
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8521 SIX FORKS ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27615
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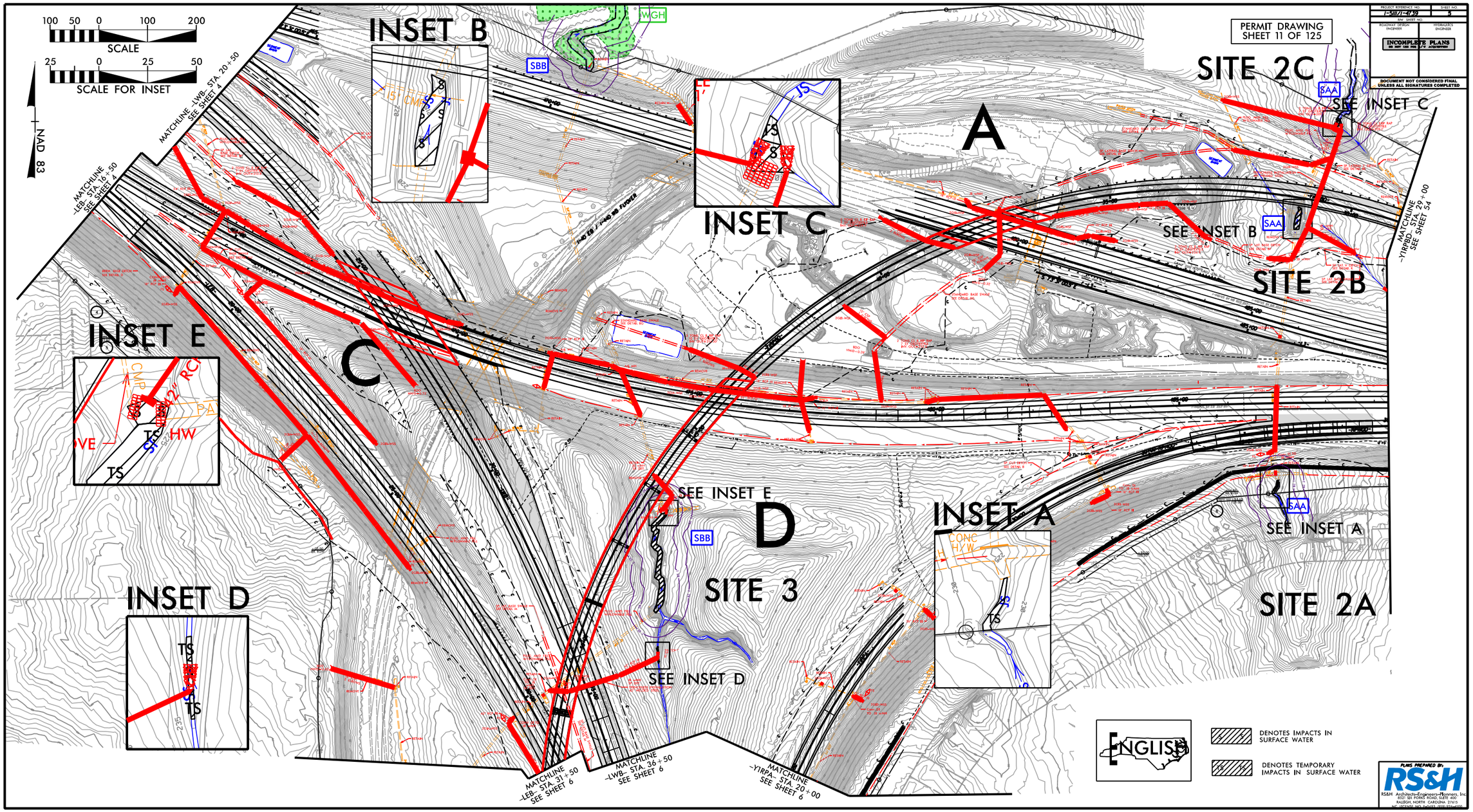
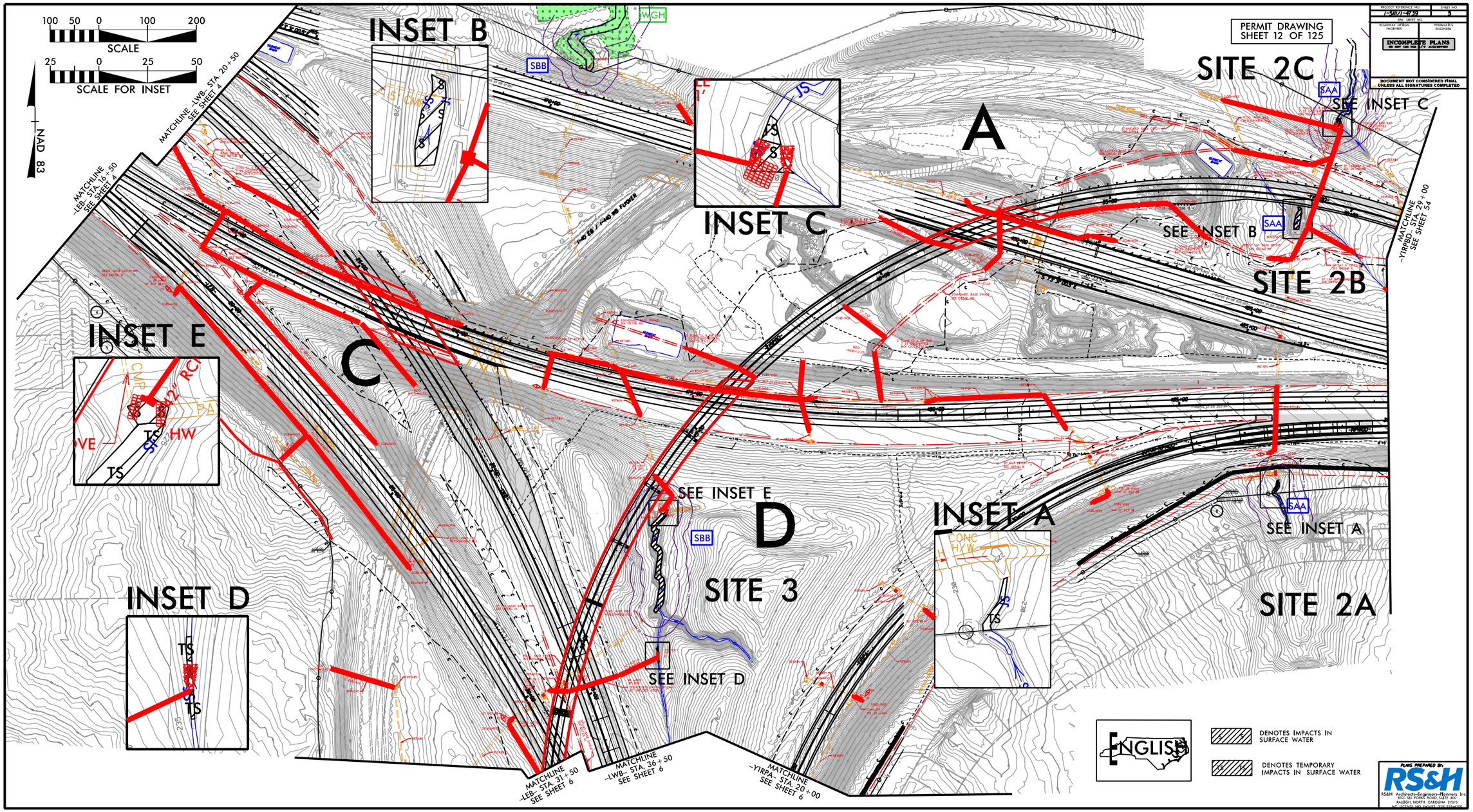


PERMIT DRAWING
SHEET 11 OF 125
INCOMPLETE PLANS
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SCALE
SCALE FOR INSET
NAD 83
INSET B
INSET C
INSET E
INSET D
INSET A
SITE 2C
SITE 2B
SITE 2A
SITE 3
A
C
D
SEE INSET C
SEE INSET B
SEE INSET E
SEE INSET D
SEE INSET A
MATCHLINE -LWB- STA. 20+50 SEE SHEET 4
MATCHLINE -LEB- STA. 16+50 SEE SHEET 4
MATCHLINE -YIRPBD- STA. 29+00 SEE SHEET 54
MATCHLINE -LEB- STA. 31+50 SEE SHEET 6
MATCHLINE -LWB- STA. 36+50 SEE SHEET 6
MATCHLINE -YIRPA- STA. 20+00 SEE SHEET 6
ENGLISH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PLANS PREPARED BY:
RS&H



PERMIT DRAWING
SHEET 12 OF 125
INCOMPLETE PLANS
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SCALE
SCALE FOR INSET
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INSET B
INSET C
INSET E
INSET D
INSET A
SITE 2C
SITE 2B
SITE 2A
SITE 3
A
C
D
SEE INSET C
SEE INSET B
SEE INSET E
SEE INSET D
SEE INSET A
MATCHLINE -LWB- STA. 20+50 SEE SHEET 4
MATCHLINE -LEB- STA. 16+50 SEE SHEET 4
MATCHLINE -YIRPBD- STA. 29+00 SEE SHEET 54
MATCHLINE -LEB- STA. 31+50 SEE SHEET 6
MATCHLINE -LWB- STA. 36+50 SEE SHEET 6
MATCHLINE -YIRPA- STA. 20+00 SEE SHEET 6
ENGLISH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PLANS PREPARED BY:
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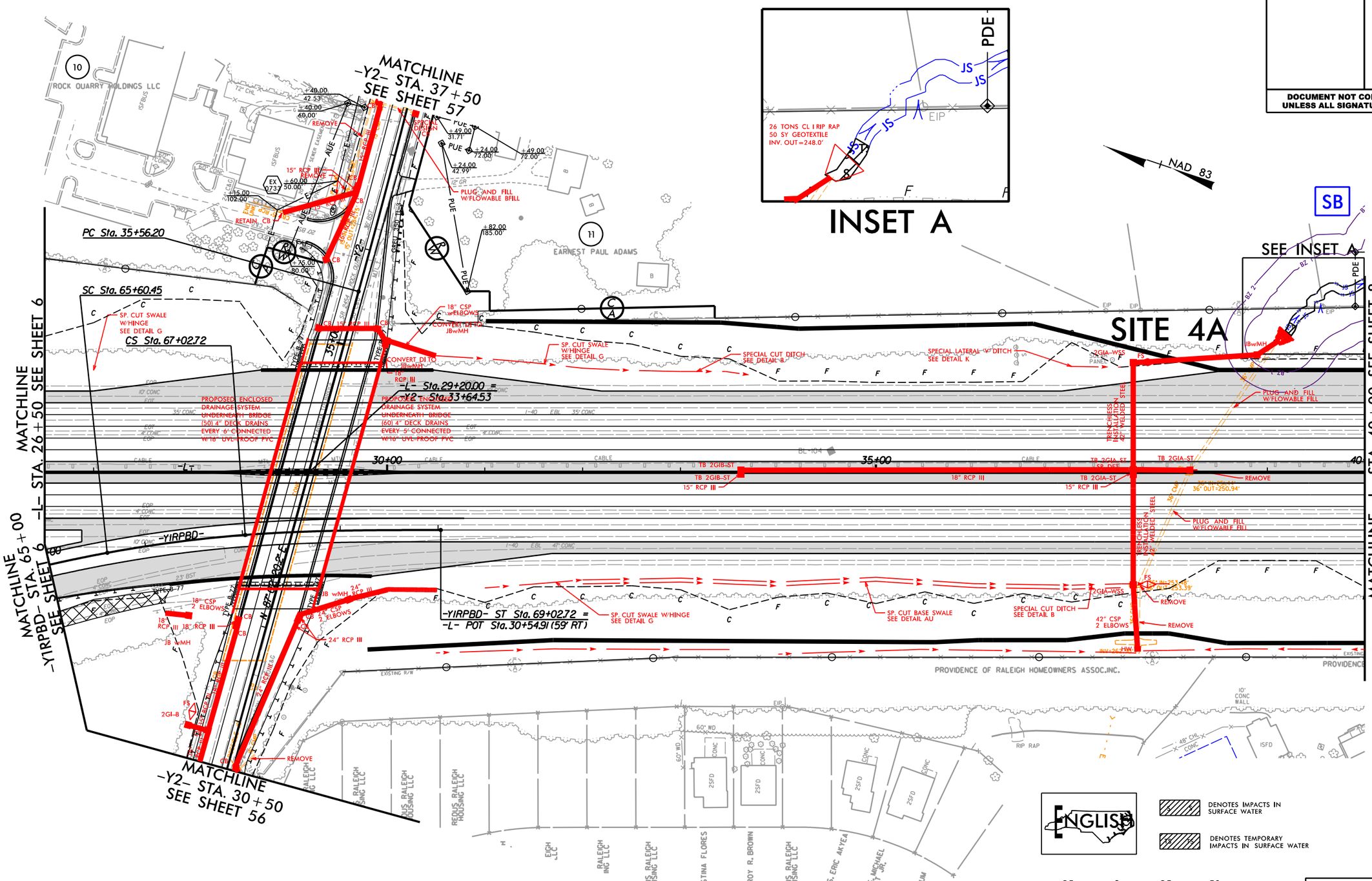
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 13 OF 125



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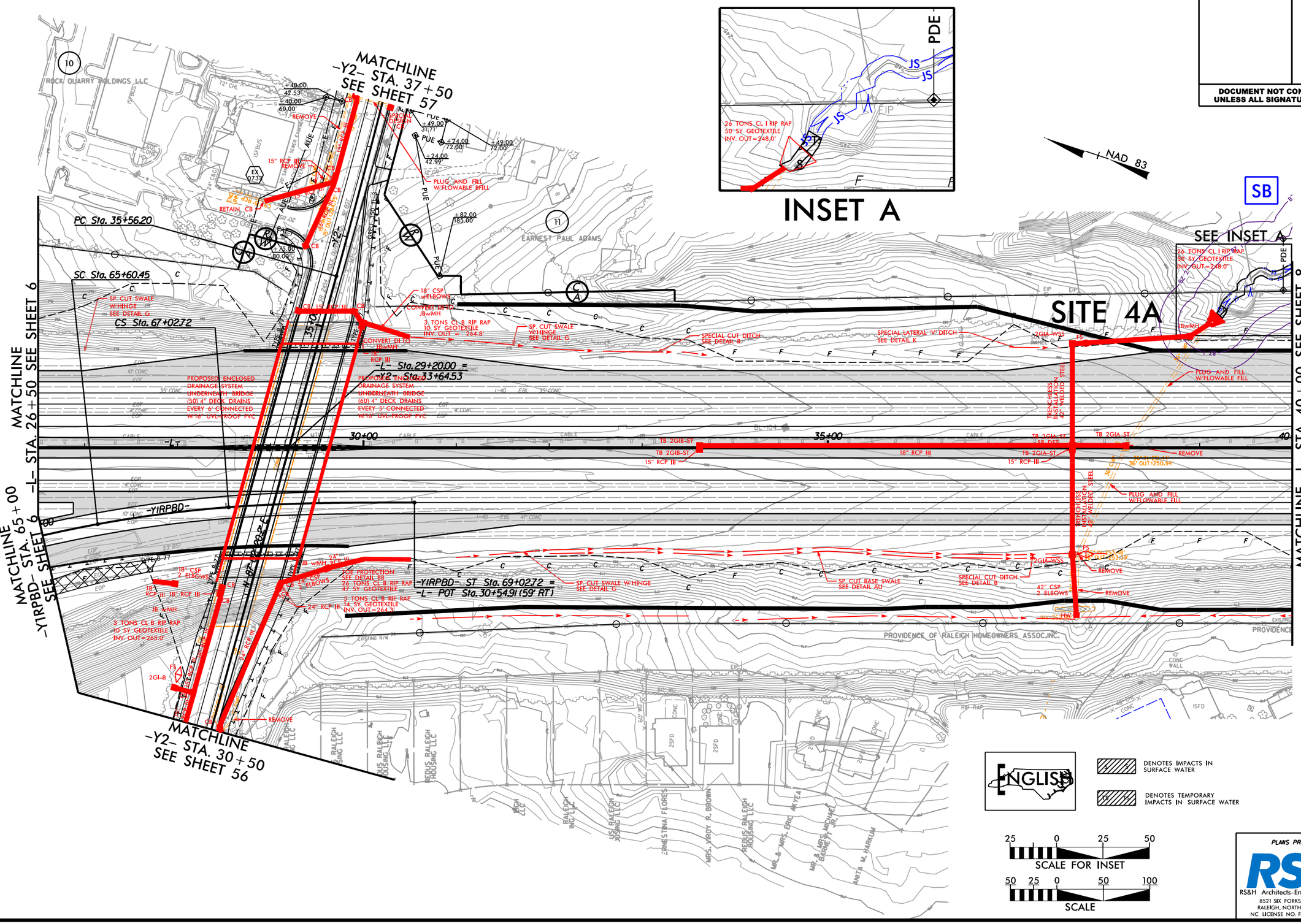
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 14 OF 125



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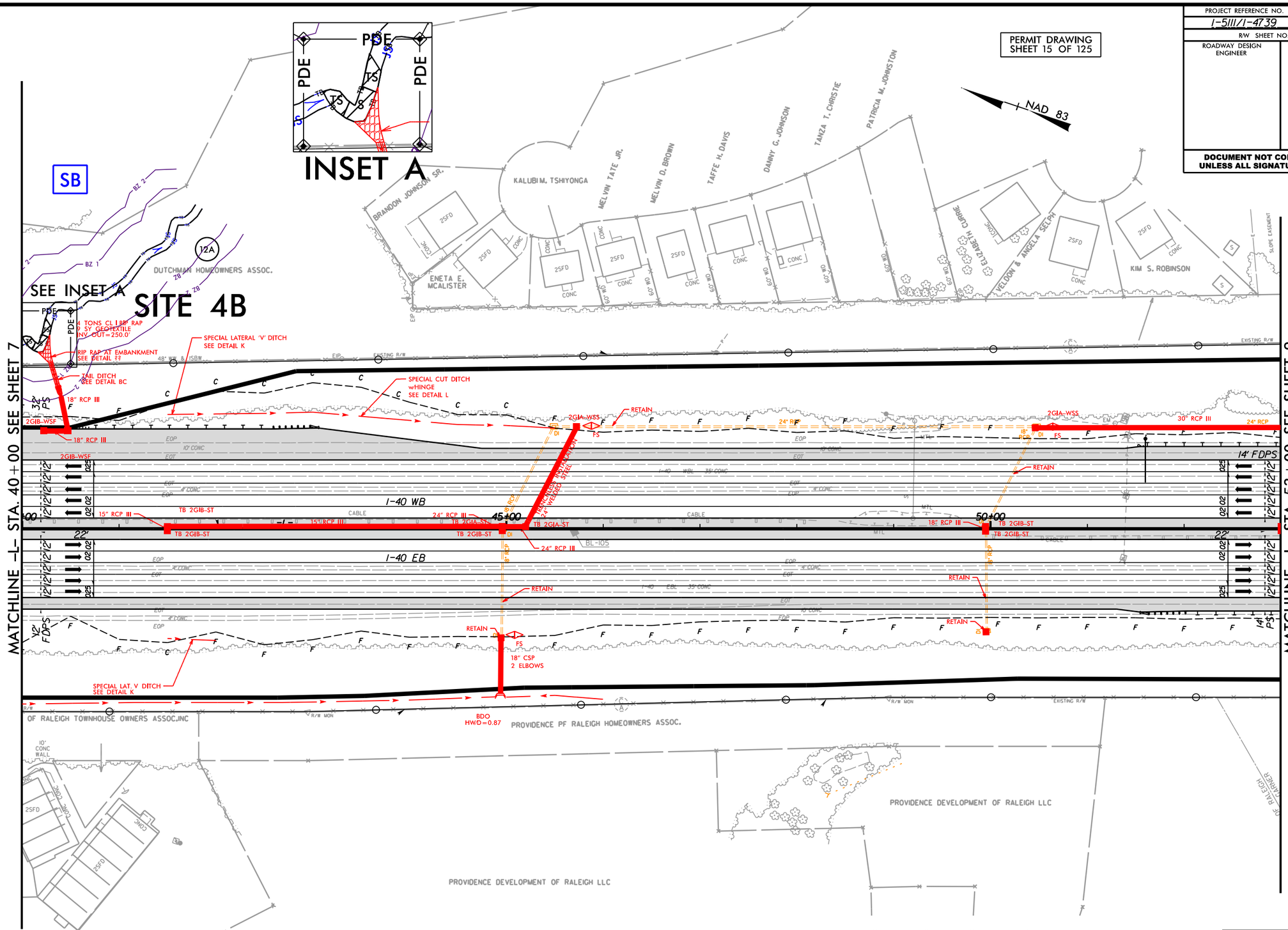
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 15 OF 125



ENGLISH

SCALE FOR INSET: 25 0 25 50

SCALE: 50 25 0 50 100

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

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2/5/2019
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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
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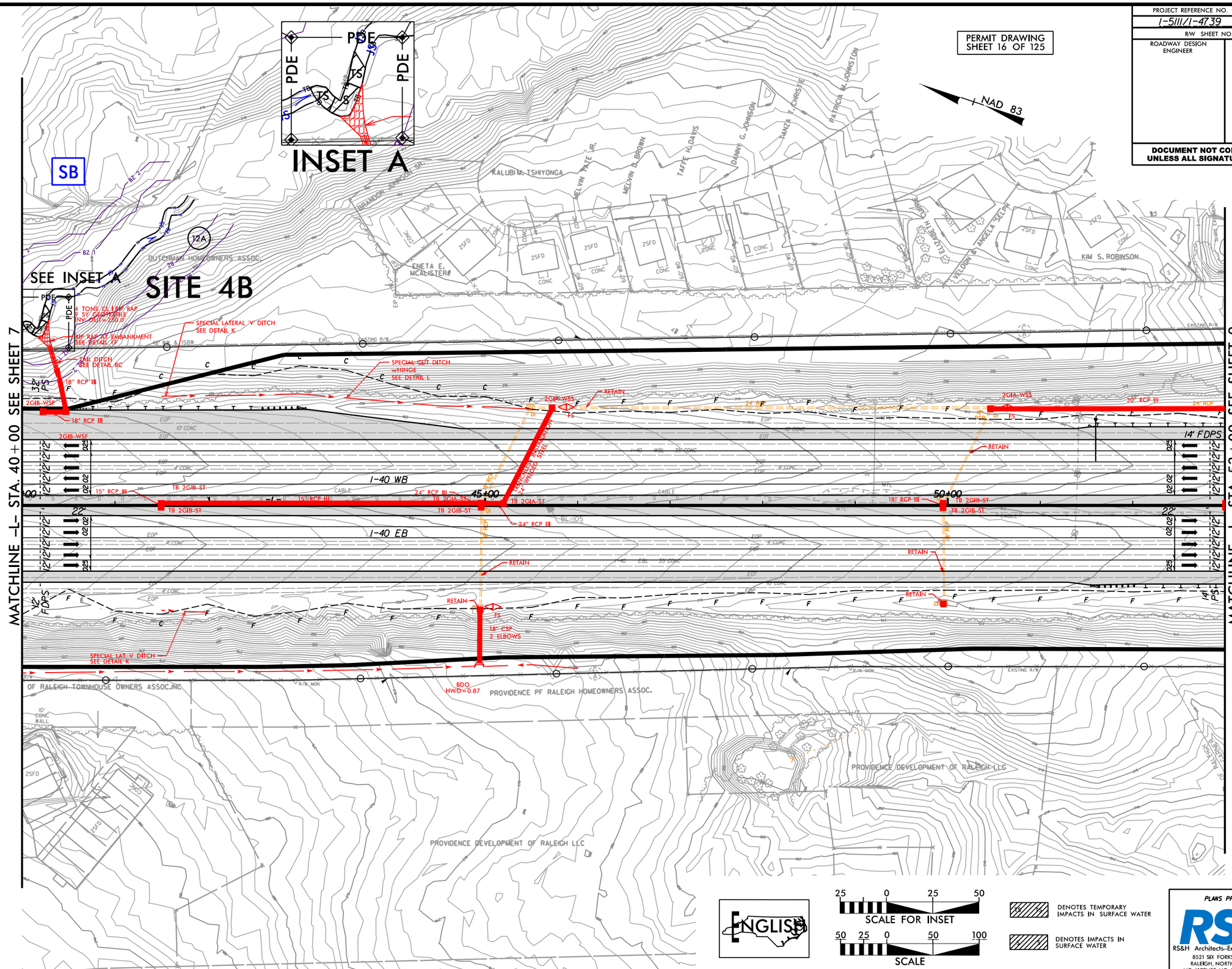

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2/5/2019
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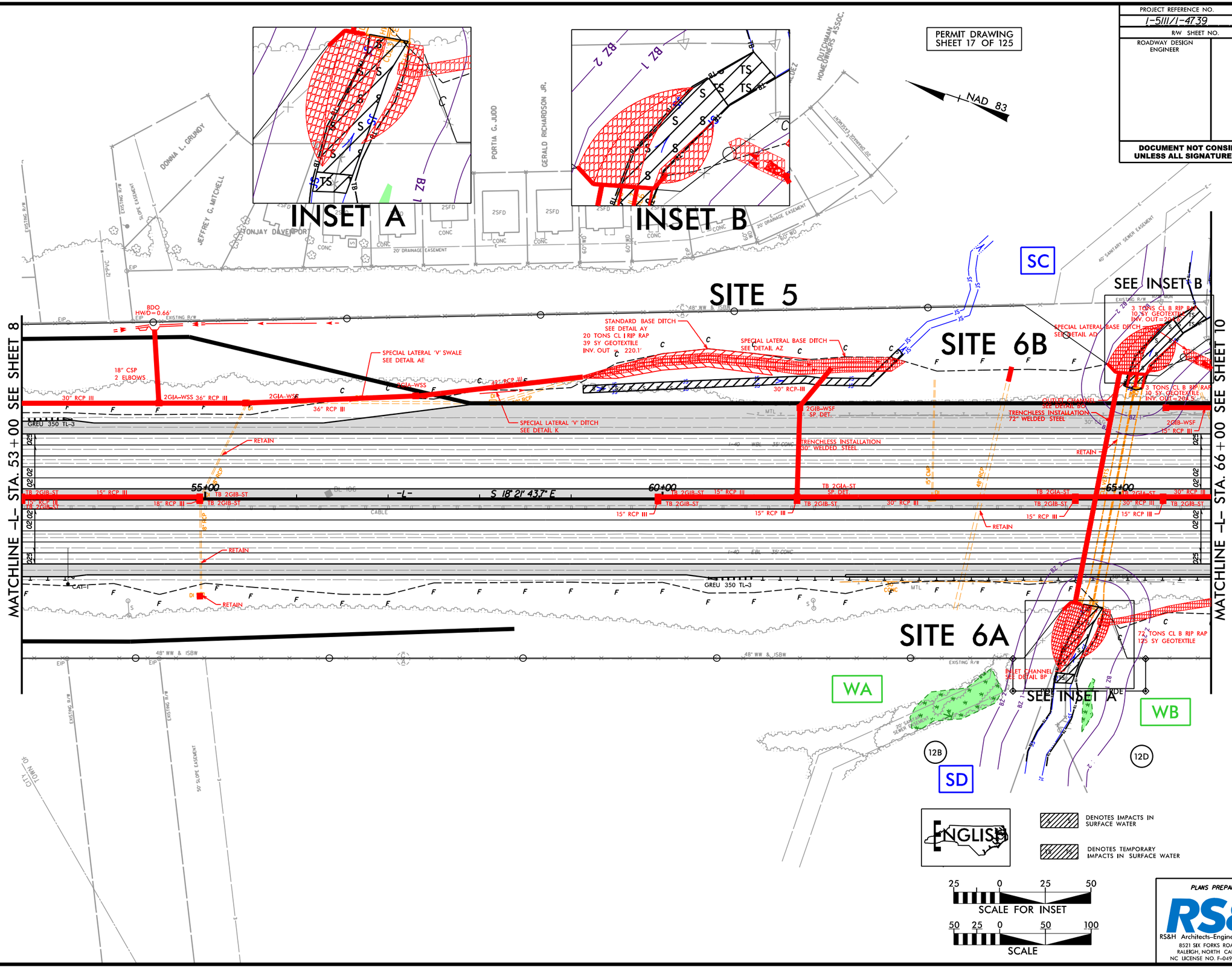
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 17 OF 125



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2/5/2019
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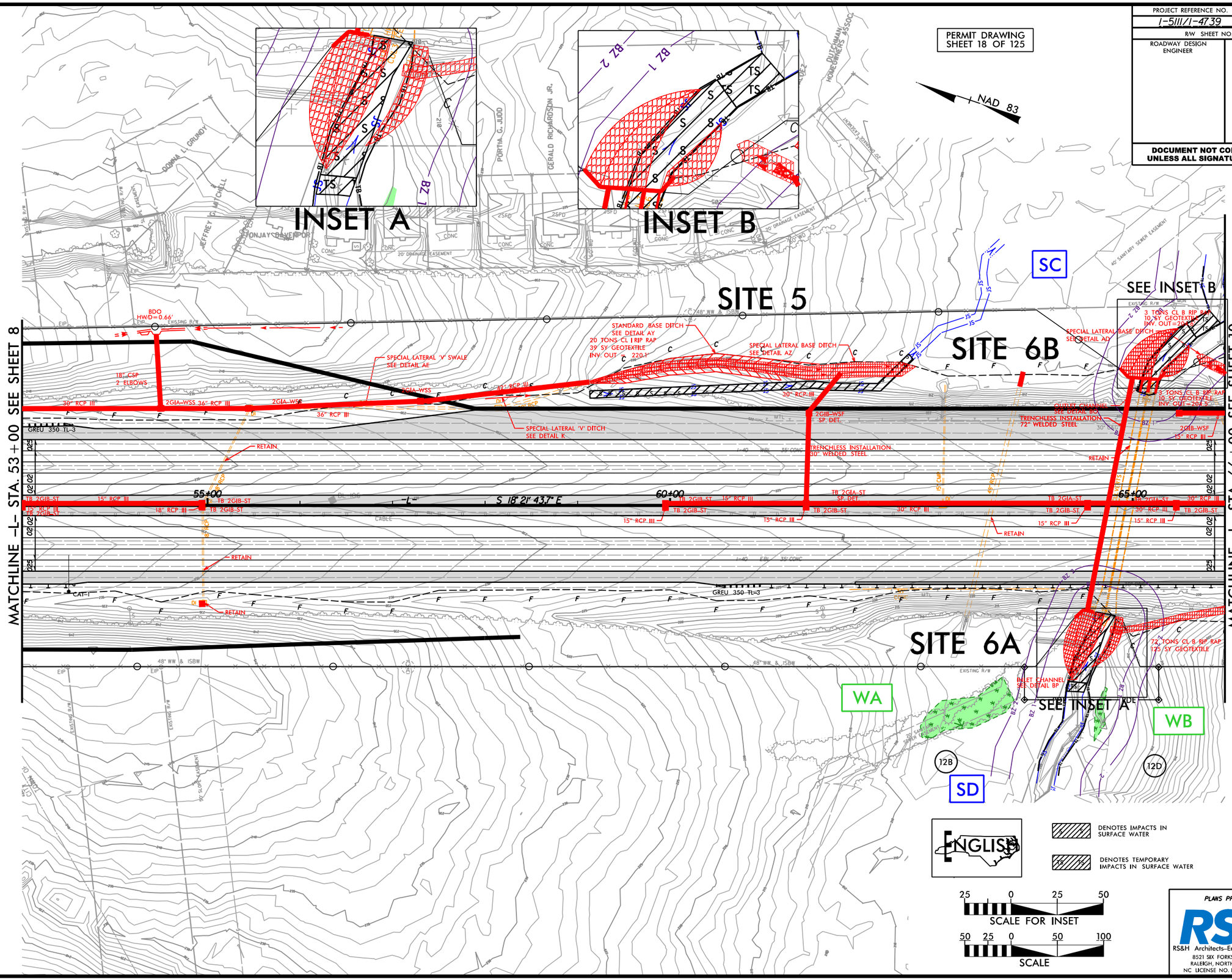
ENGLISH

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 18 OF 125



ENGLISH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PLANS PREPARED BY:

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RALEIGH, NORTH CAROLINA 27615
NC LICENSE NO. F-0493 (919) 926-4100

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2/5/2019
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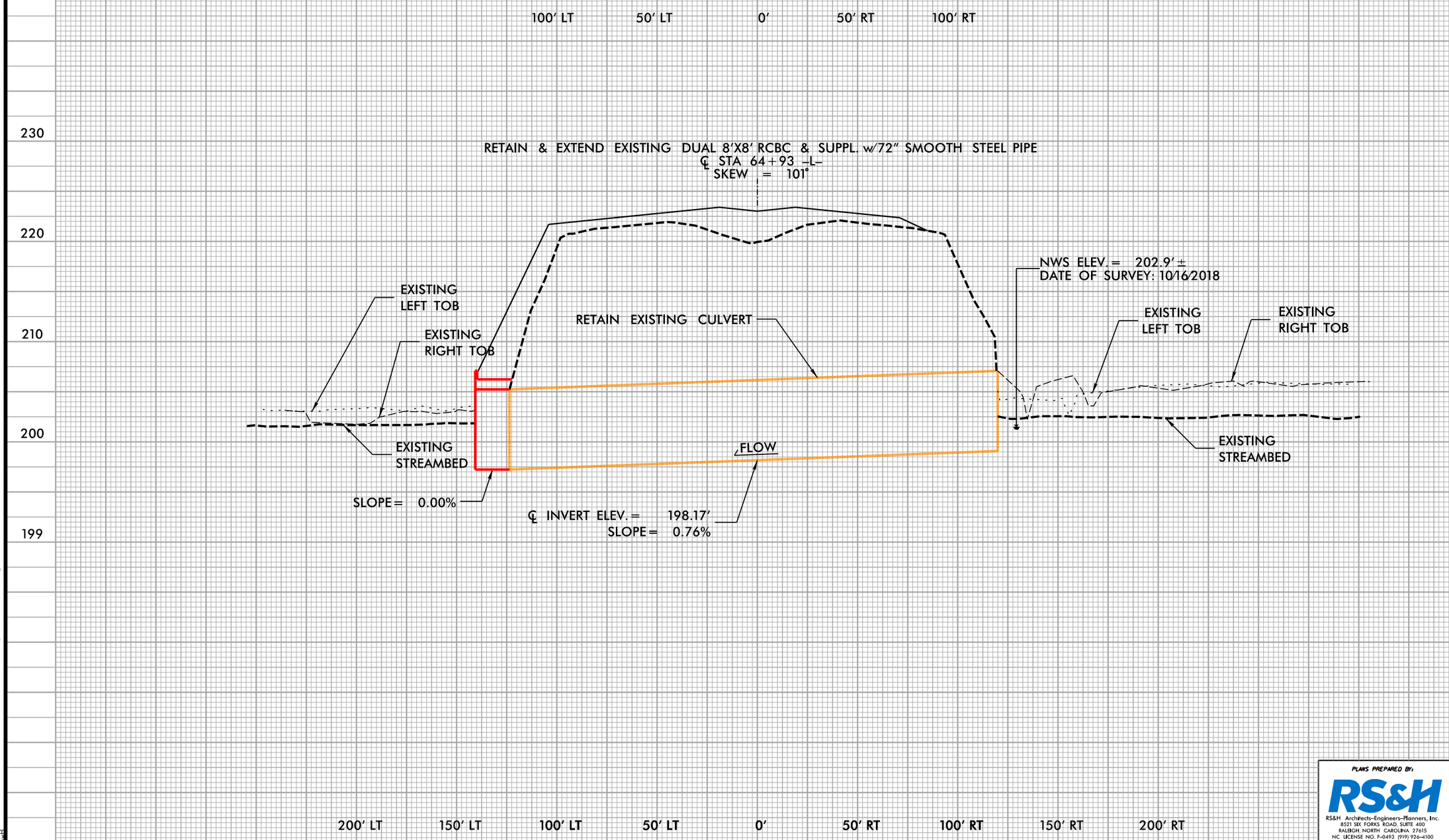
PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 19 OF 125

SITE 6



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5/14/99

2/5/2019
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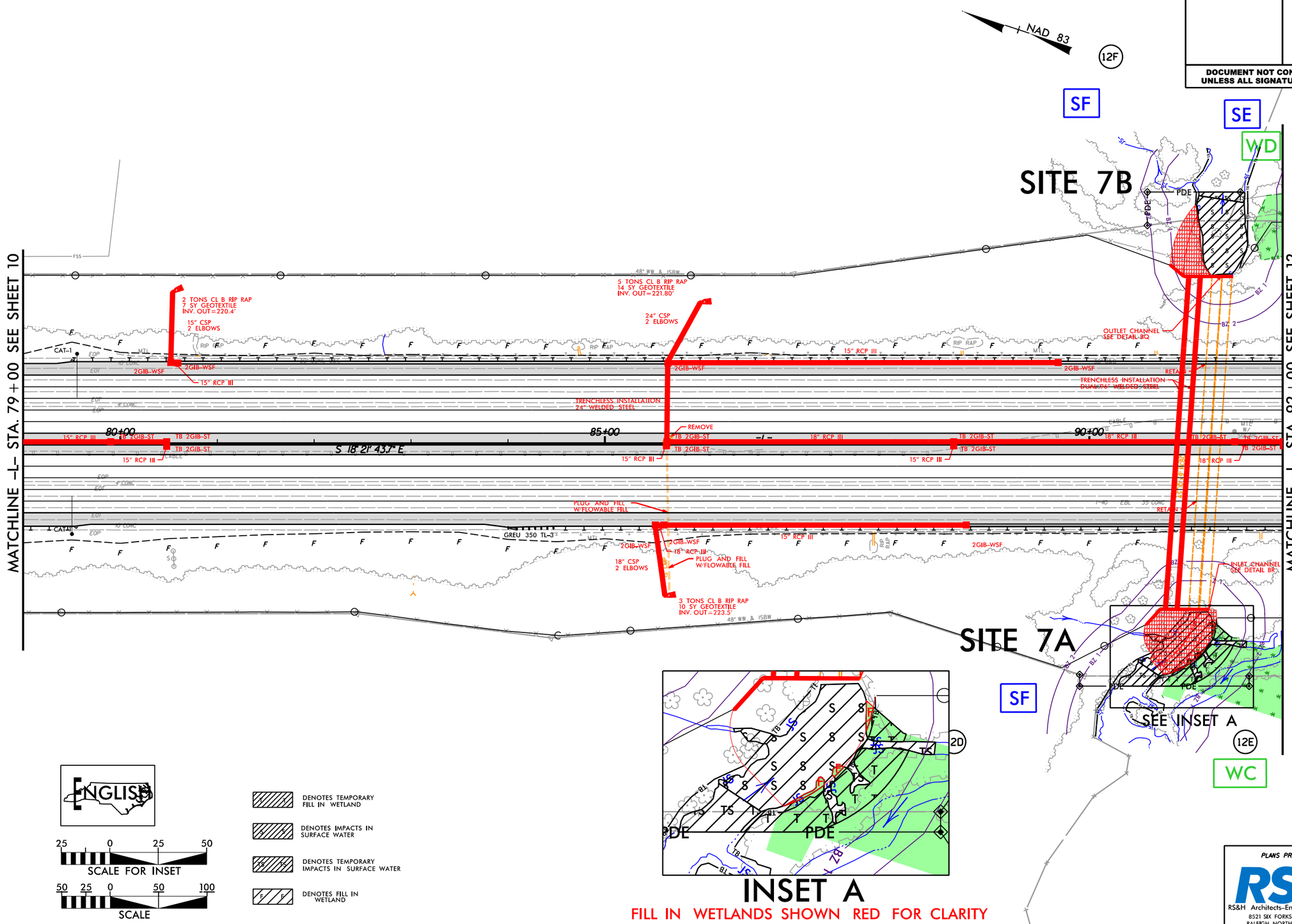
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 20 OF 125



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8/17/99

2/5/2019
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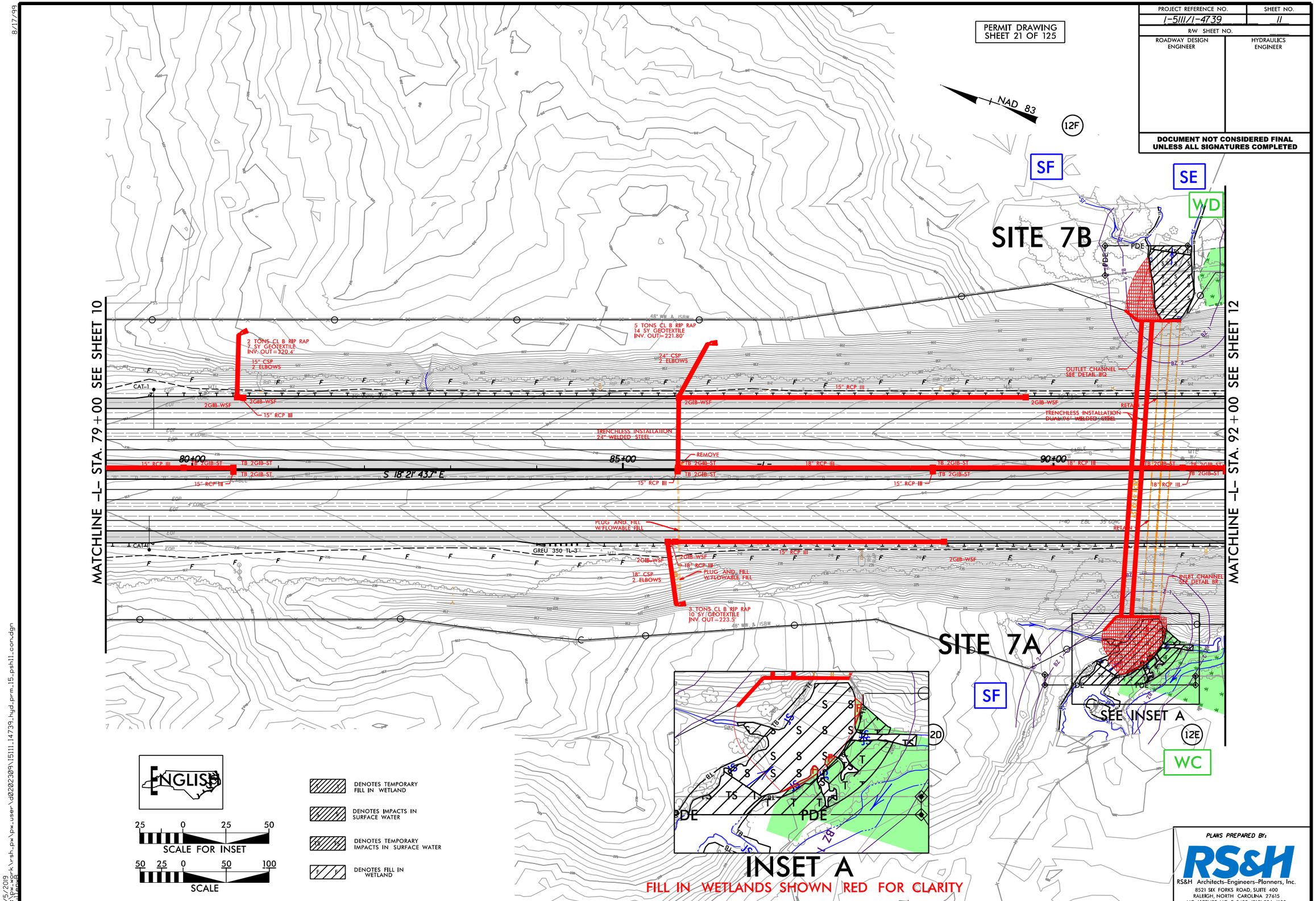
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 21 OF 125



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8/17/99

2/5/2019
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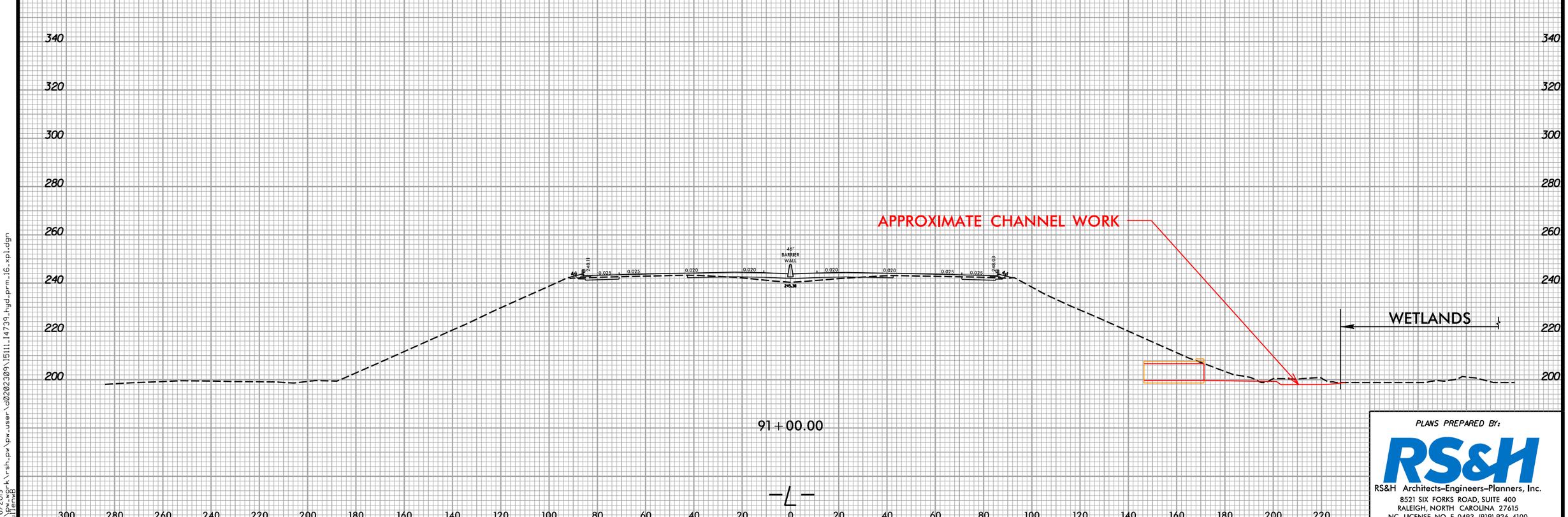
PROJ. REFERENCE NO.	SHEET NO.
I-5111/I-4739	S1

PERMIT DRAWING
SHEET 22 OF 125

SITE 7



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6/23/16

2/6/2019
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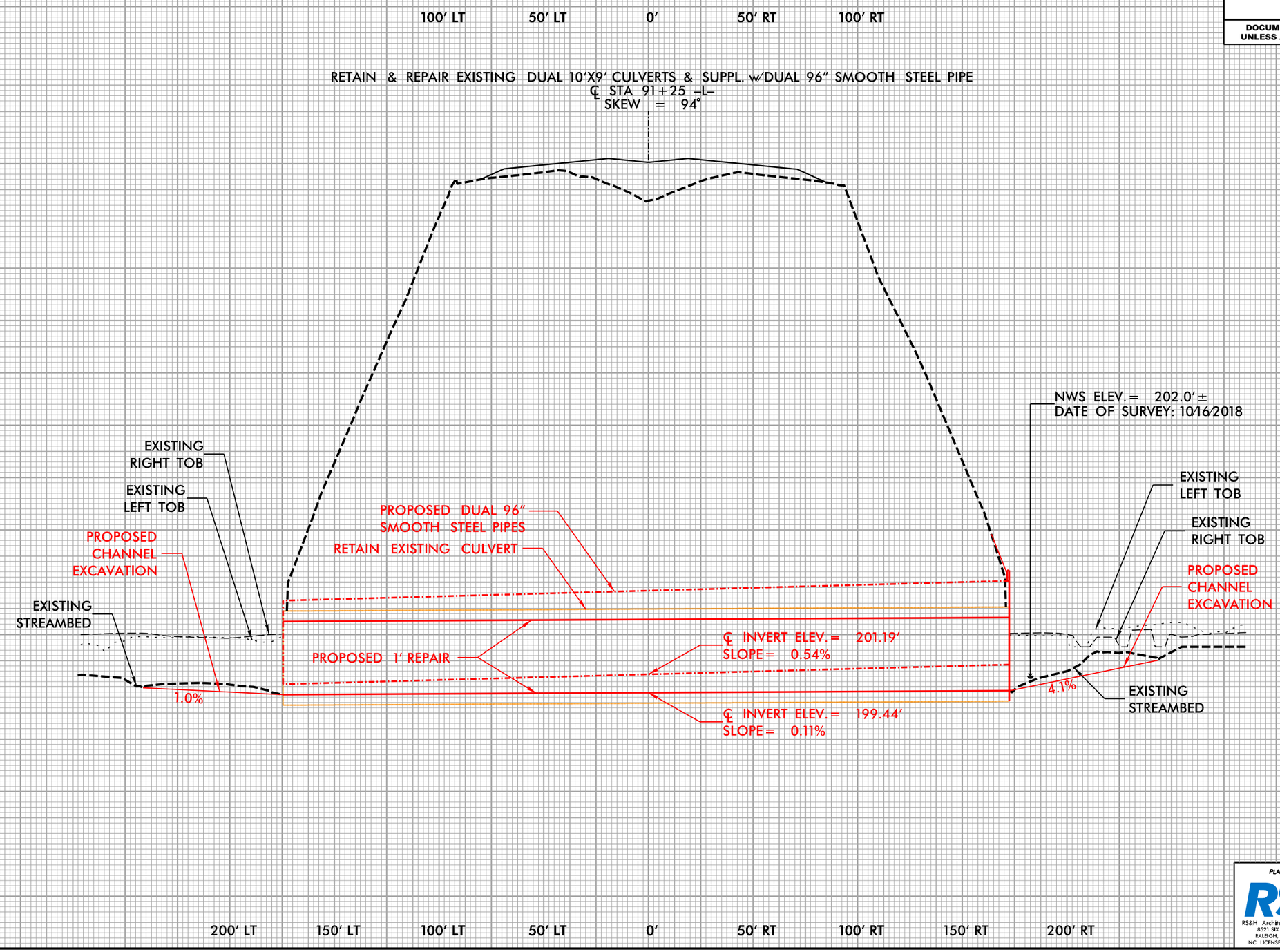
FullenwB

PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 23 OF 125

SITE 7



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5/14/99

2/5/2019
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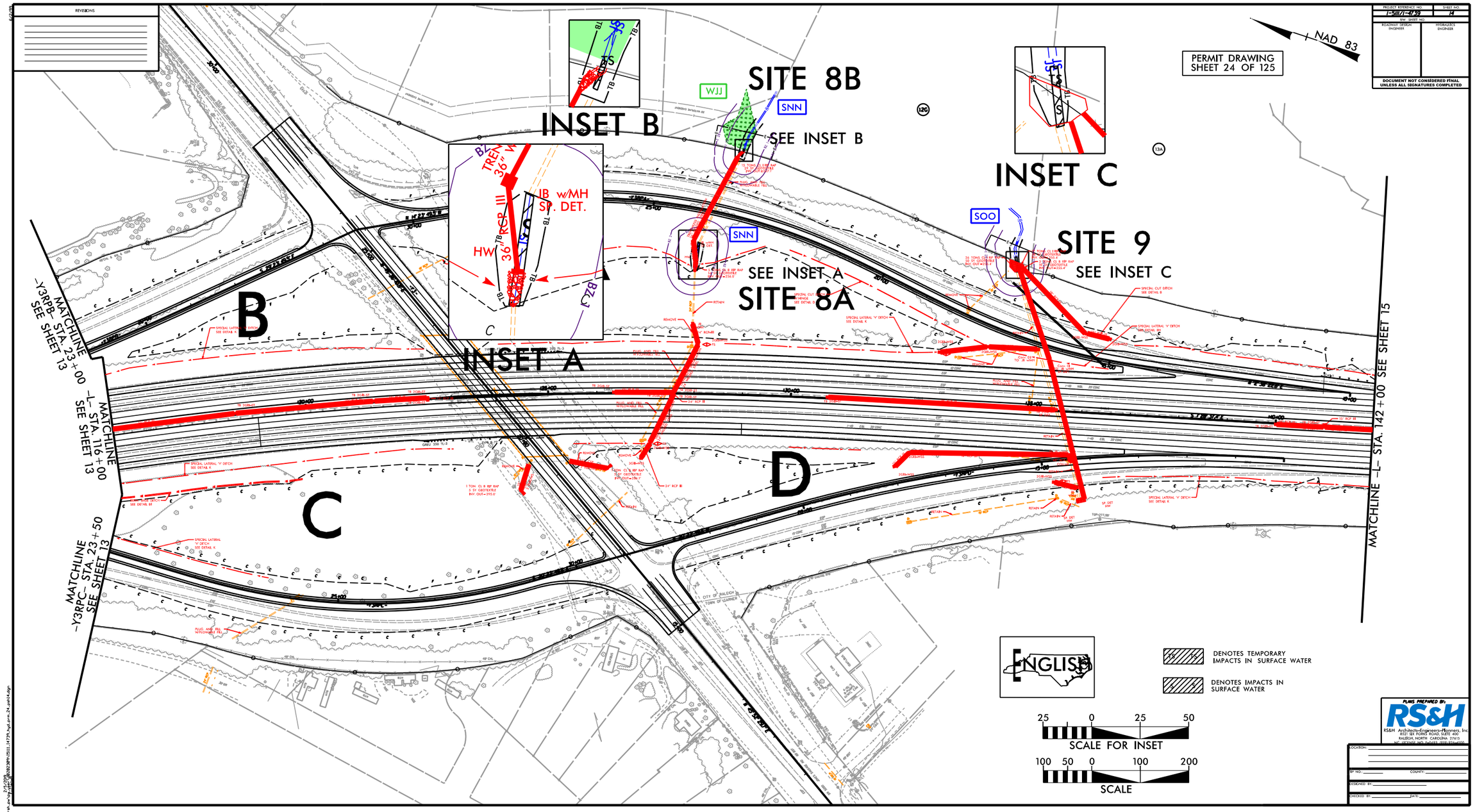

PERMIT DRAWING
SHEET 24 OF 125
NAD 83
SITE 8B
SEE INSET B
INSET B
INSET C
SITE 9
SEE INSET C
SEE INSET A
SITE 8A
INSET A
B
C
D
WJJ
SNN
SOO
IB w/MH
SP. DET.
MATCHLINE
-Y3RPB- STA. 23+00
SEE SHEET 13
MATCHLINE
-L- STA. 116+00
SEE SHEET 13
MATCHLINE
-Y3RPC- STA. 23+50
SEE SHEET 13
MATCHLINE -L- STA. 142+00 SEE SHEET 15
ENGLISH
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
25 0 25 50
SCALE FOR INSET
100 50 0 100 200
SCALE
PLANS PREPARED BY:
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RS&H Architects-Engineers-Planners, Inc.
8521 SEA FORKS ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27615
NC LICENSE NO. 60423 (919) 878-4500
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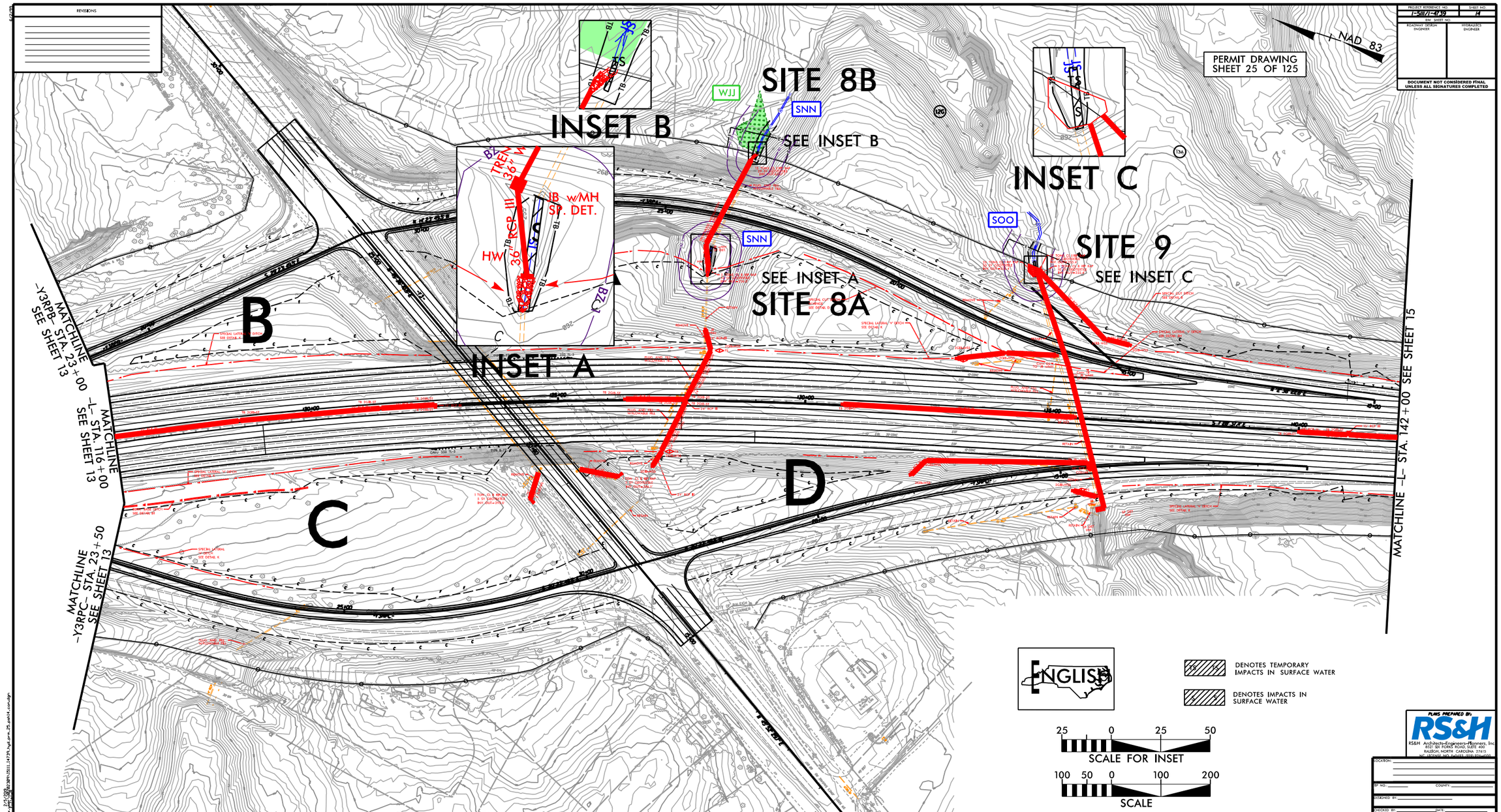
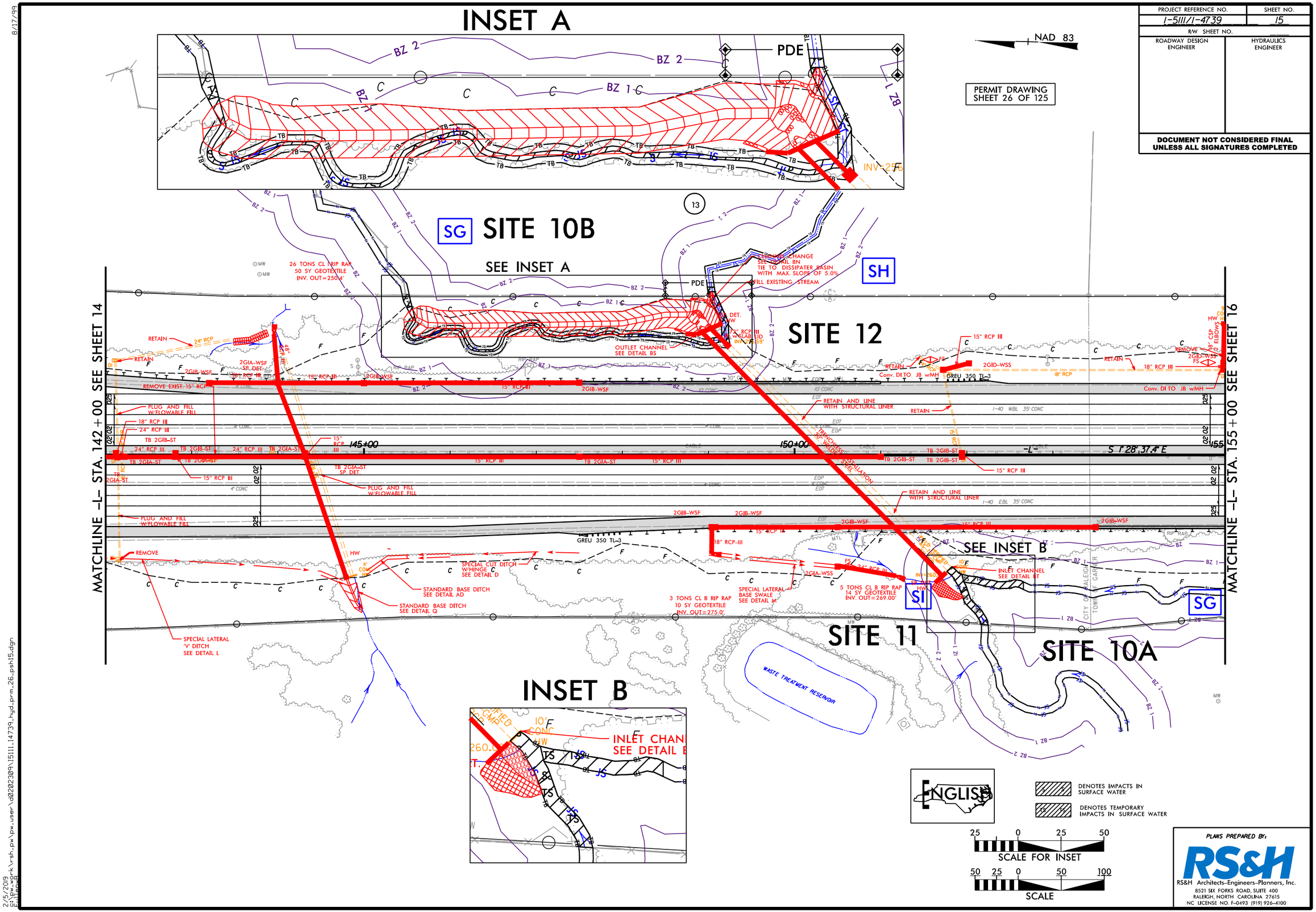


REVISIONS
PERMIT DRAWING
SHEET 25 OF 125
NAD 83
SITE 8B
SEE INSET B
INSET B
INSET C
SITE 9
SEE INSET C
SEE INSET A
SITE 8A
INSET A
WJJ
SNN
SOO
IB w/MH
SP. DET.
B
C
D
MATCHLINE
-Y3RPB- STA. 23+00
SEE SHEET 13
MATCHLINE
-L- STA. 116+00
SEE SHEET 13
MATCHLINE
-Y3RPC- STA. 23+50
SEE SHEET 13
MATCHLINE -L- STA. 142+00 SEE SHEET 15
ENGLISH
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
25 0 25 50
SCALE FOR INSET
100 50 0 100 200
SCALE
PLANS PREPARED BY:
RS&H
RS&H Architects-Engineers-Planners, Inc.
8521 SEE FORKS ROAD, SUITE 400
RALEIGH, NORTH CAROLINA 27615
NC LICENSE NO. (AO-1) 0329-0224-0000
LOCATION:
SP NO.:
COUNTY:
DESIGNED BY:
CHECKED BY:
DATE:



PROJECT REFERENCE NO.	SHEET NO.
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R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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2/5/2019
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PROJECT REFERENCE NO.	SHEET NO.
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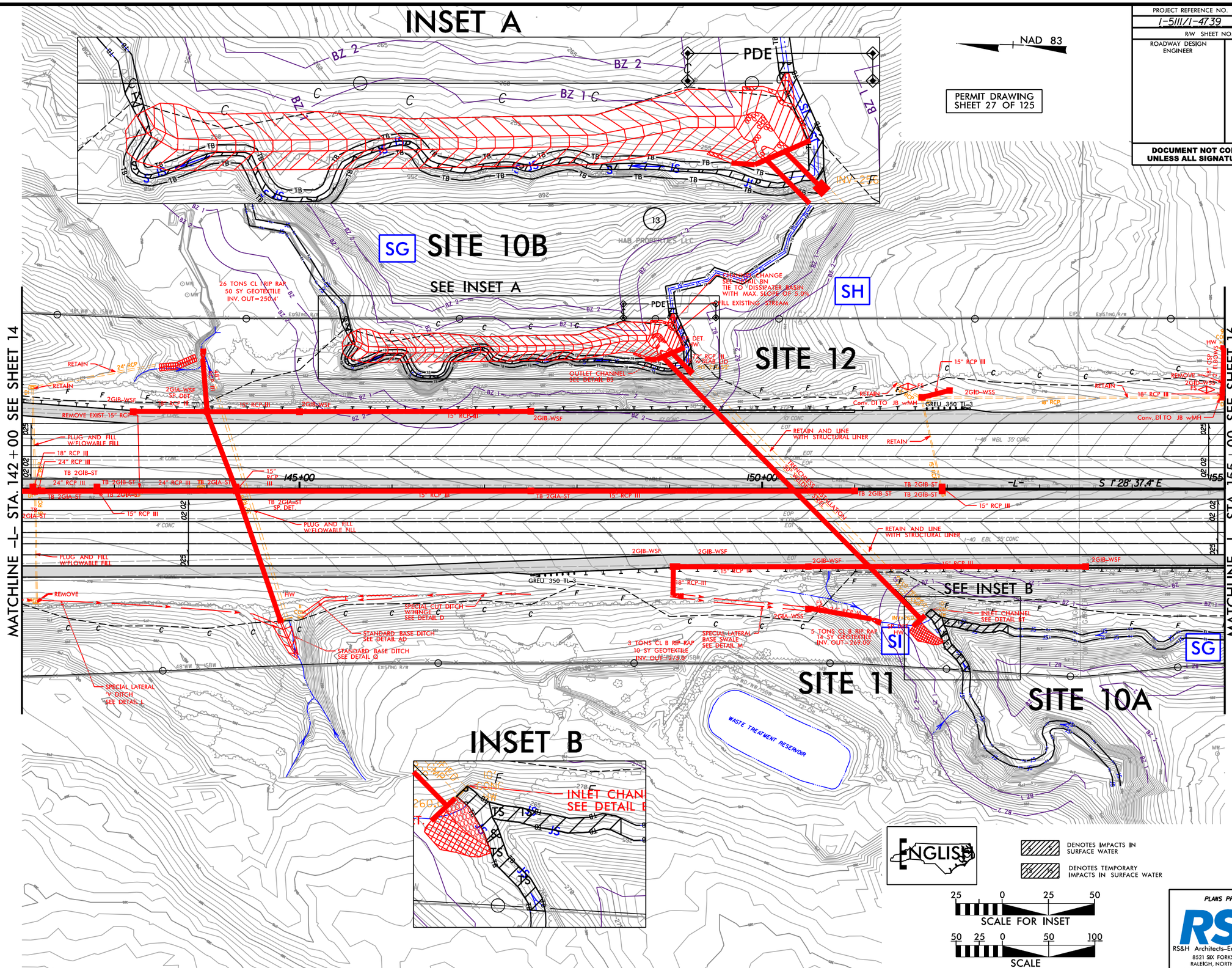
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83

PERMIT DRAWING
SHEET 27 OF 125



PLANS PREPARED BY:

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8521 SIX FORKS ROAD, SUITE 400
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NC LICENSE NO. F-0493 (919) 926-4100

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PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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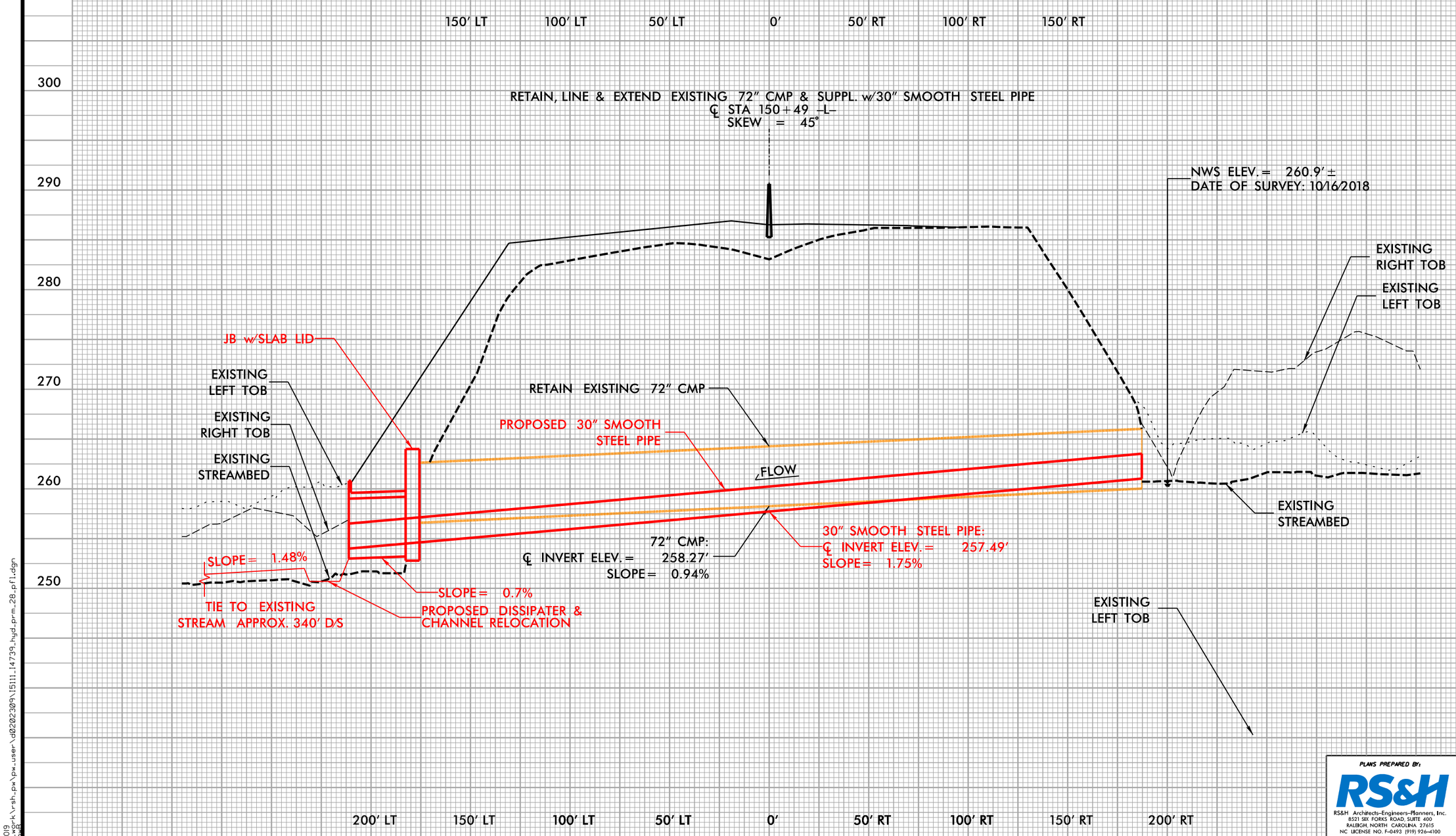
PERMIT DRAWING
SHEET 28 OF 125

SITE 10



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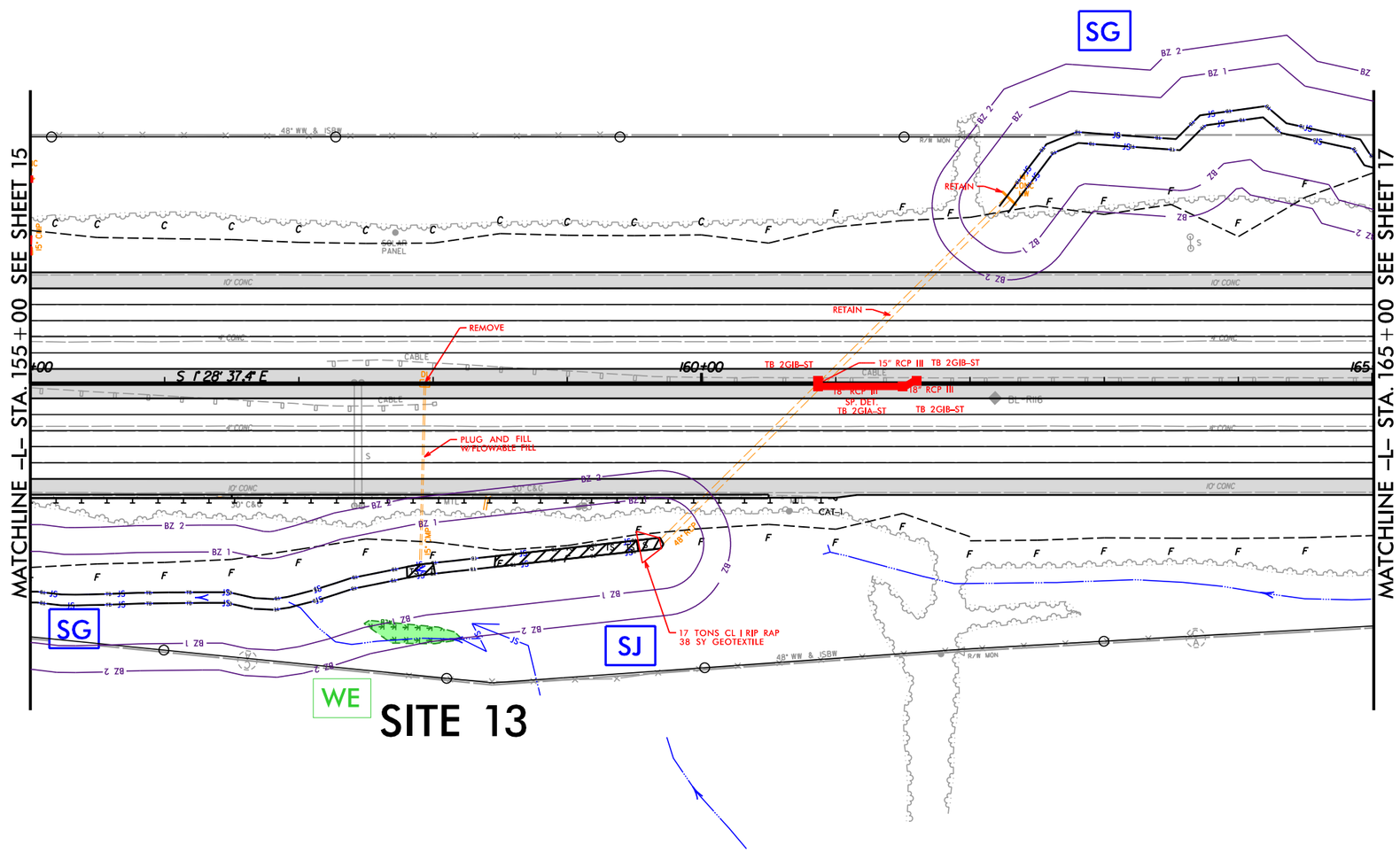
2/5/2019
c:\pw_work\rsh_pw\pw_user\d0202309\15111_14739_hyd_prm_28_pfl.dgn

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83

PERMIT DRAWING
SHEET 29 OF 125



ENGLISH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50 25 0 50 100
SCALE

PLANS PREPARED BY:

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2/5/2019
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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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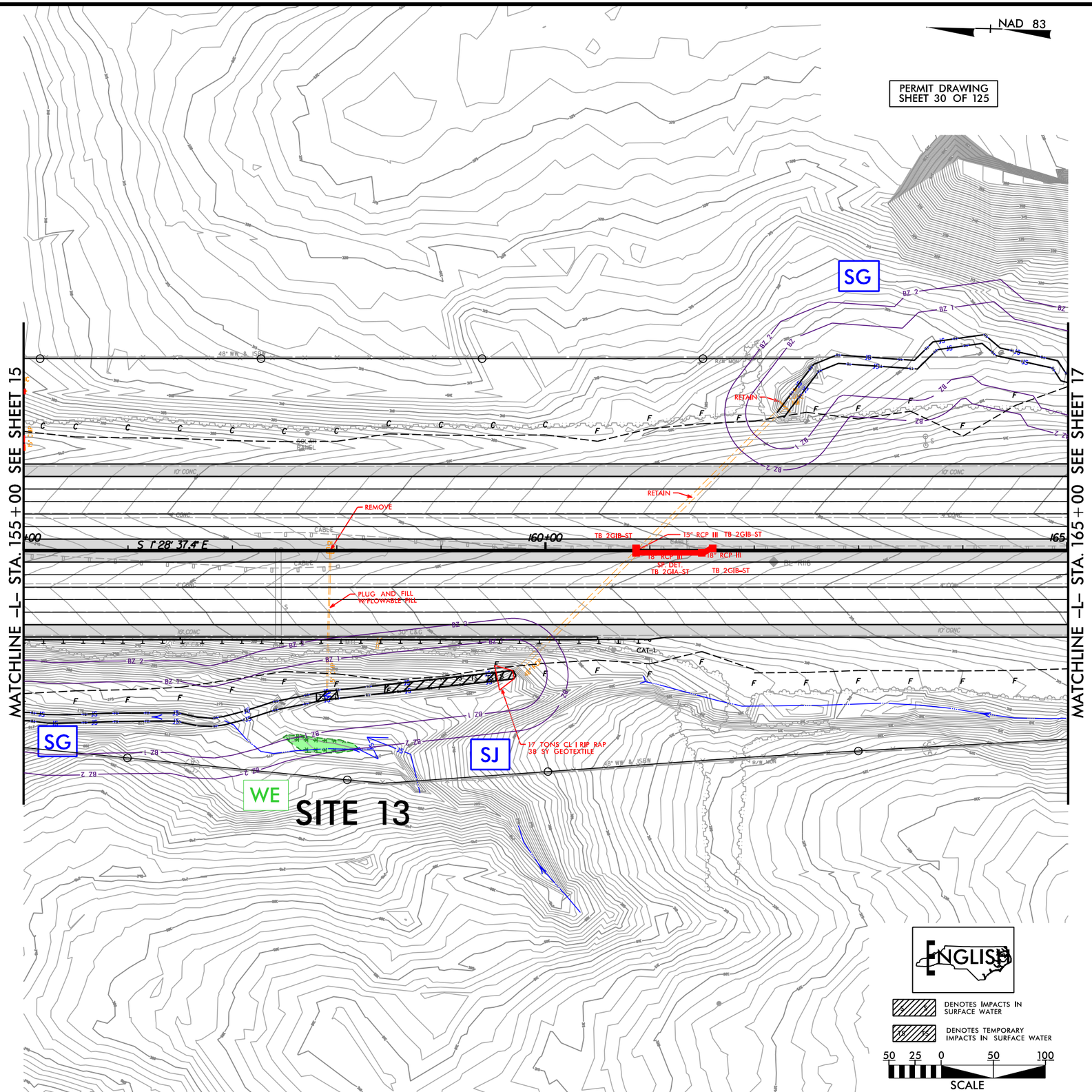

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2/5/2019
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8/17/99

25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 31 OF 125

ENGLISH

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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NAD 83

MARTIN MARIETTA MATERIAL INC.
MAPPED PER WAKE CO. G.I.S.

14

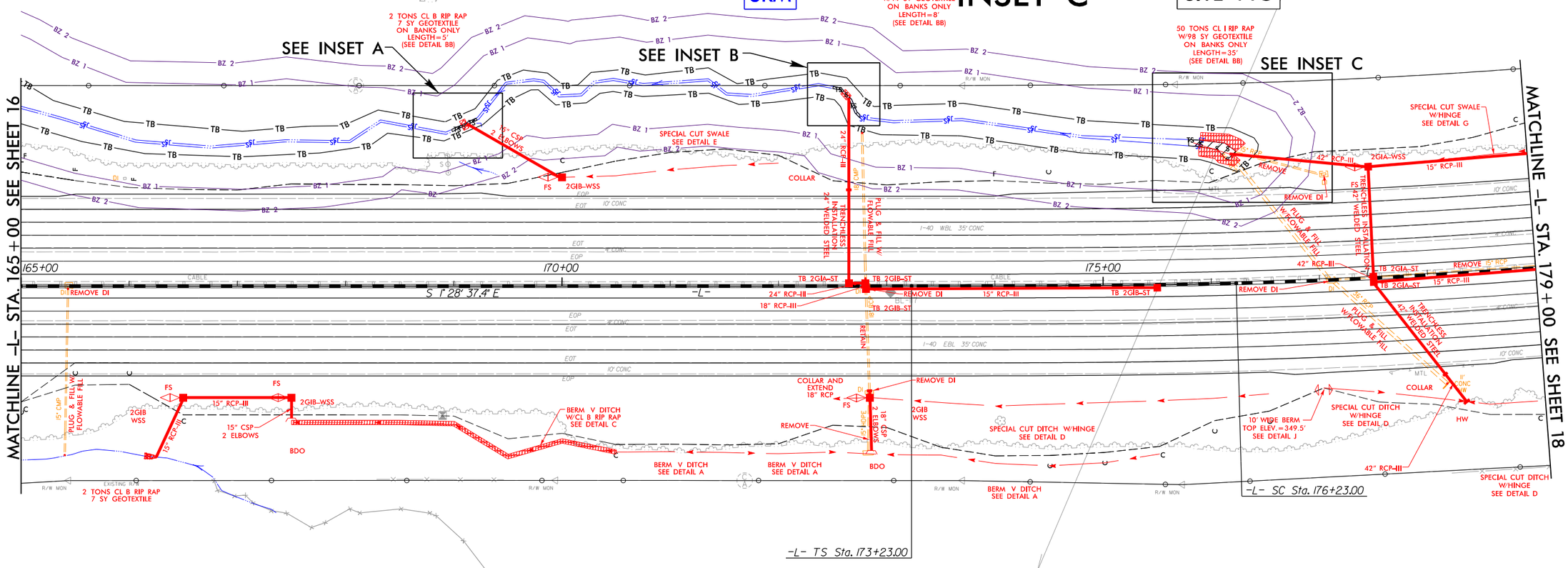
SITE 14B

SITE 14A

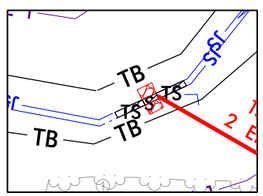
SRM

INSET C

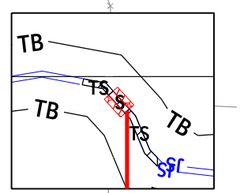
SITE 14C



GARNER ECONOMIC DEVELOPMENT CORP.



INSET A



INSET B

MARTIN MARIETTA MATERIAL INC.
MAPPED PER WAKE CO. G.I.S.

FOR -L- PROFILE SEE SHT. 85

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2/6/2019
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abburge

8/17/99

25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 32 OF 125

ENGLISH

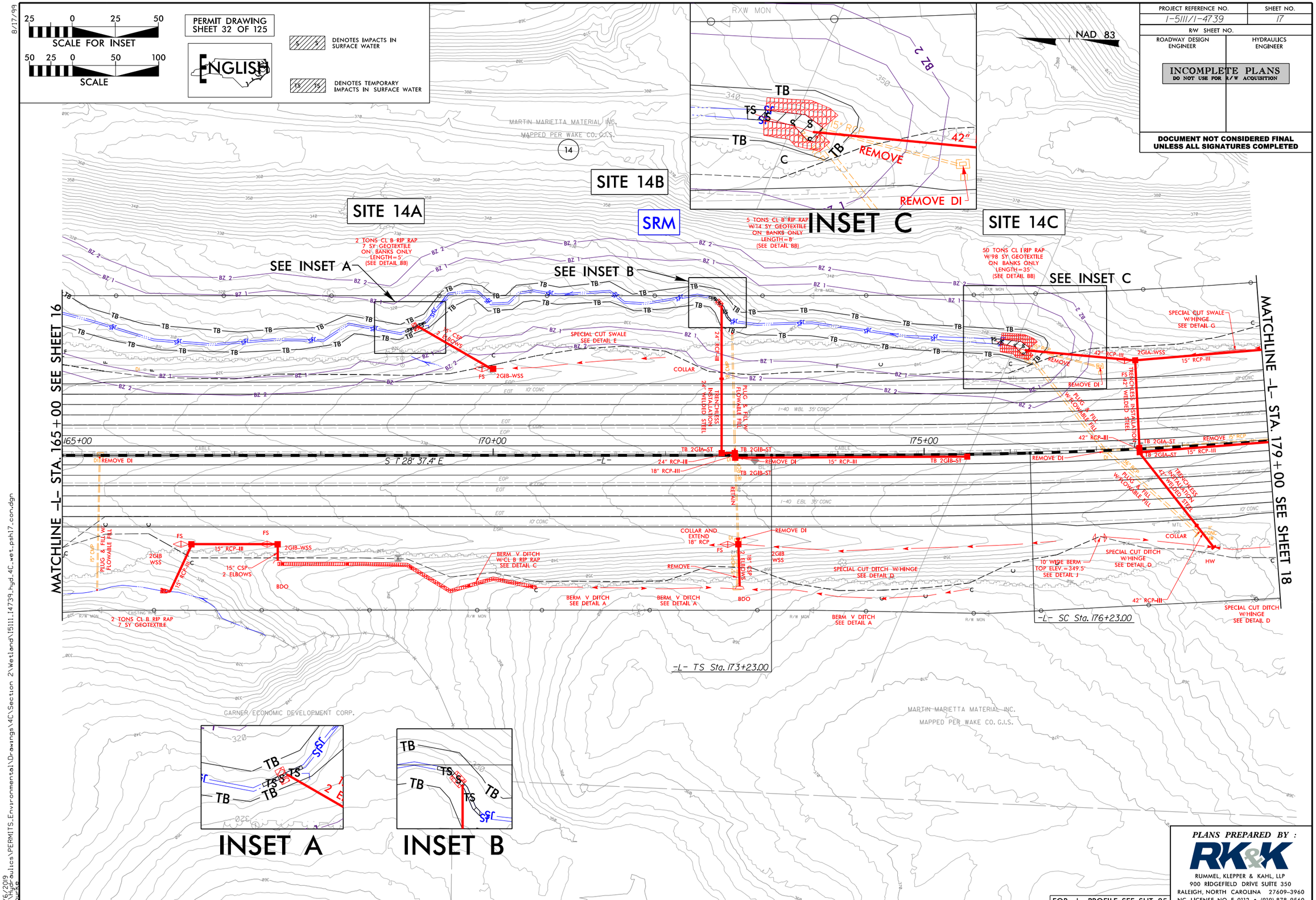
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	17
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



FOR -L- PROFILE SEE SHT. 85

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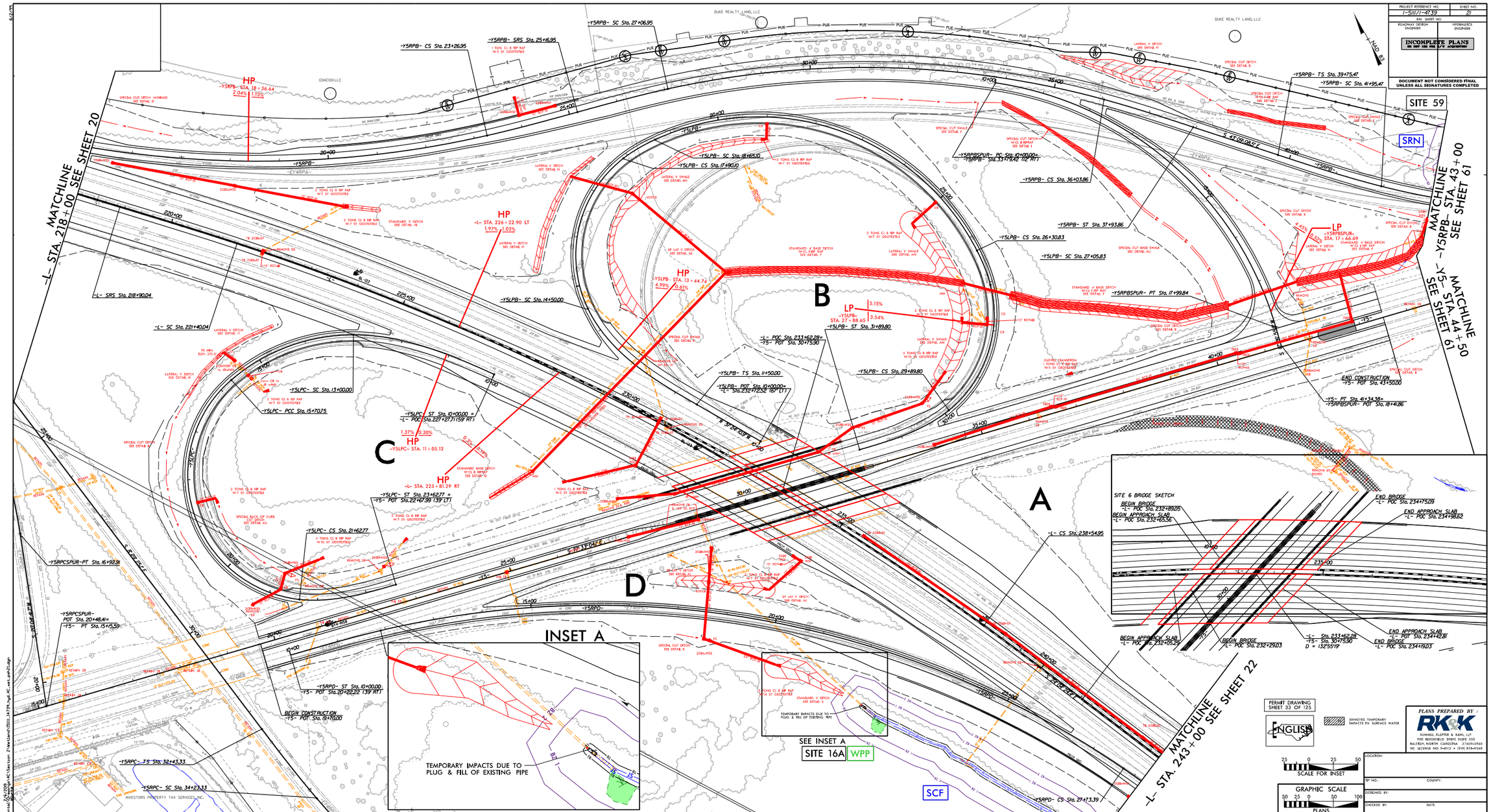
abruce



PROJECT REFERENCE NO.
I-5111/I-4739
SHEET NO.
21
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SITE 59
SRN
MATCHLINE -L- STA. 218+00 SEE SHEET 20
MATCHLINE -Y5RPB- STA. 43+00 SEE SHEET 61
MATCHLINE -Y5- STA. 44+50 SEE SHEET 61
MATCHLINE -L- STA. 243+00 SEE SHEET 22
A
B
C
D
INSET A
SITE 6 BRIDGE SKETCH
TEMPORARY IMPACTS DUE TO PLUG & FILL OF EXISTING PIPE
SEE INSET A
SITE 16A
WPP
SCF
PERMIT DRAWING SHEET 33 OF 125
ENGLISH
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
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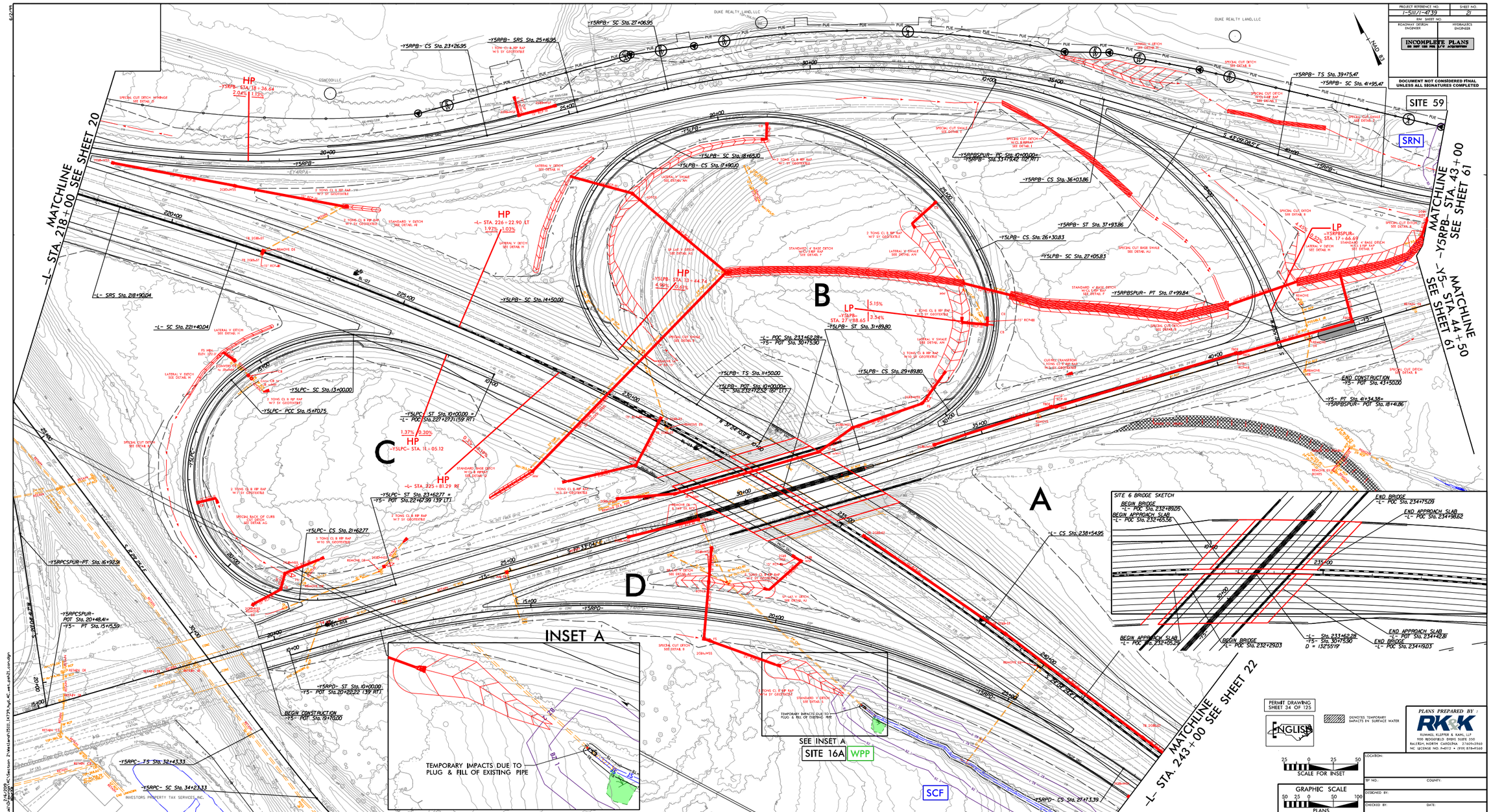
SCALE FOR INSET
GRAPHIC SCALE
PLANS
LOCATION:
TIP NO.:
COUNTY:
DESIGNED BY:
CHECKED BY:
DATE:



PROJECT REFERENCE NO.
I-5111/I-4739
SHEET NO.
21
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SITE 59
SRN
MATCHLINE -L- STA. 218+00 SEE SHEET 20
MATCHLINE -Y5RPB- STA. 43+00 SEE SHEET 61
MATCHLINE -Y5- STA. 44+50 SEE SHEET 61
MATCHLINE -L- STA. 243+00 SEE SHEET 22
A
B
C
D
INSET A
SITE 6 BRIDGE SKETCH
SEE INSET A
SITE 16A
WPP
SCF
TEMPORARY IMPACTS DUE TO PLUG & FILL OF EXISTING PIPE
PERMIT DRAWING SHEET 34 OF 125
ENGLISH
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PLANS PREPARED BY :
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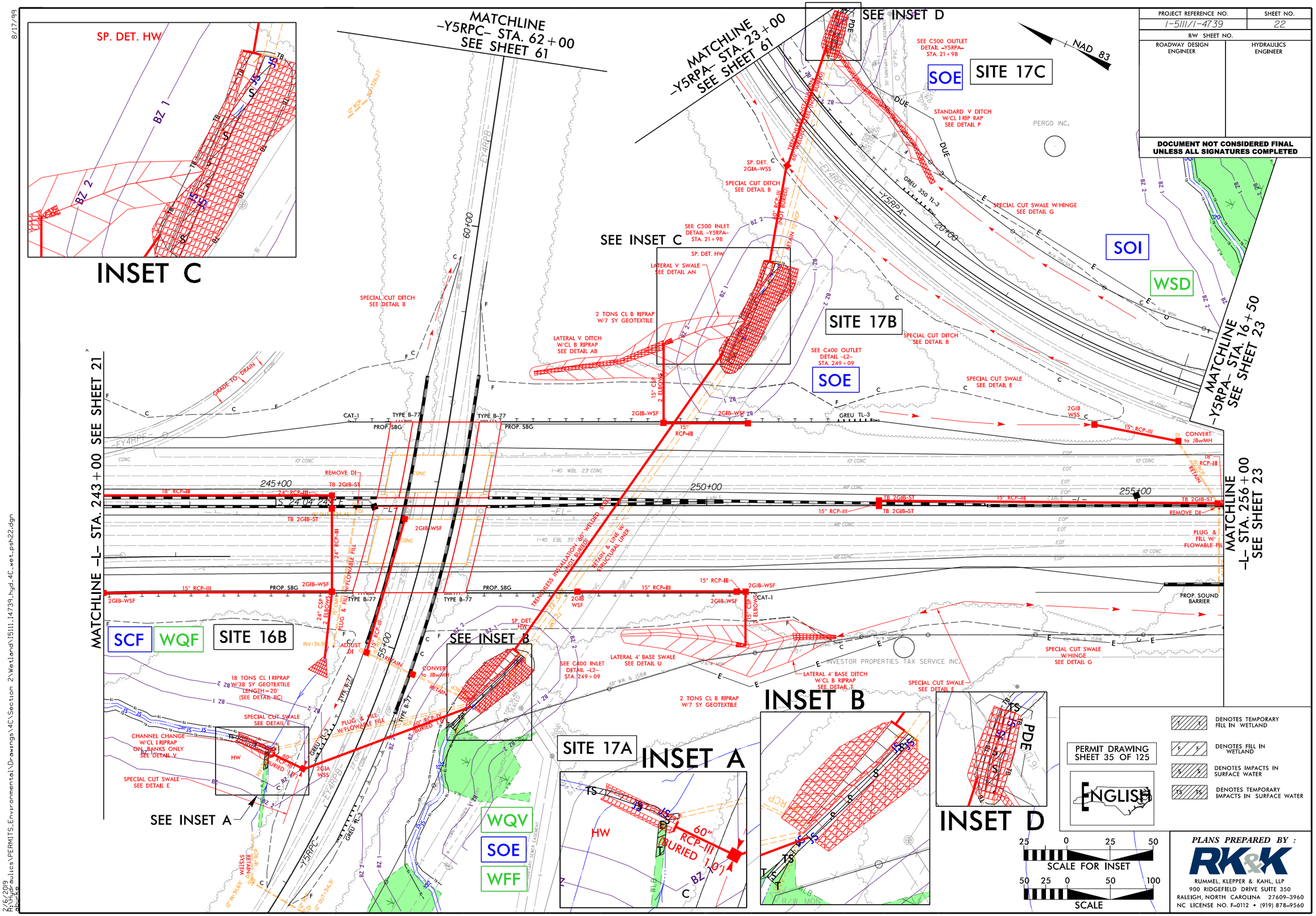
SCALE FOR INSET
GRAPHIC SCALE
PLANS
LOCATION:
TIP NO.:
COUNTY:
DESIGNED BY:
CHECKED BY:
DATE:

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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2/5/2019
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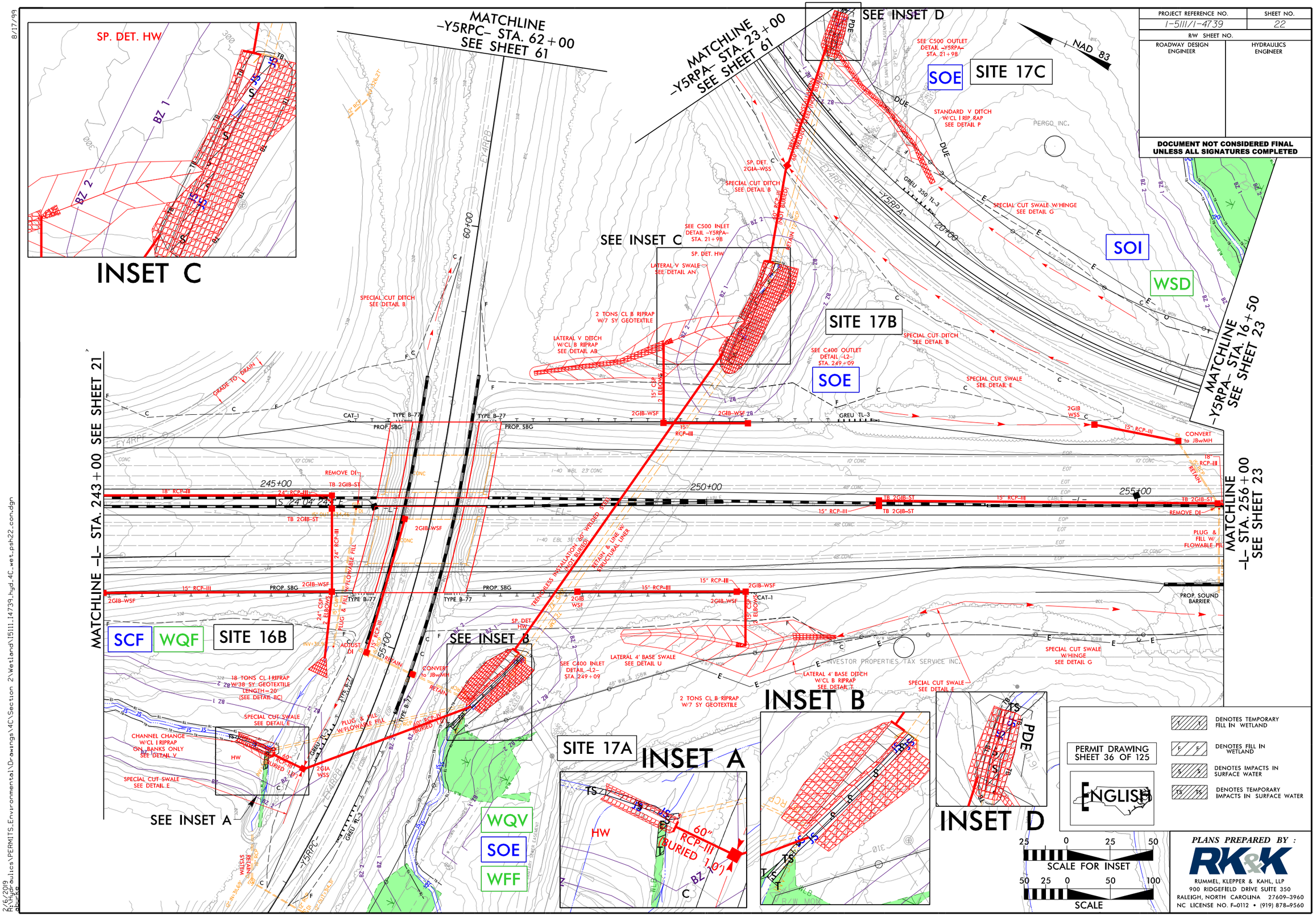
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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2/6/2019
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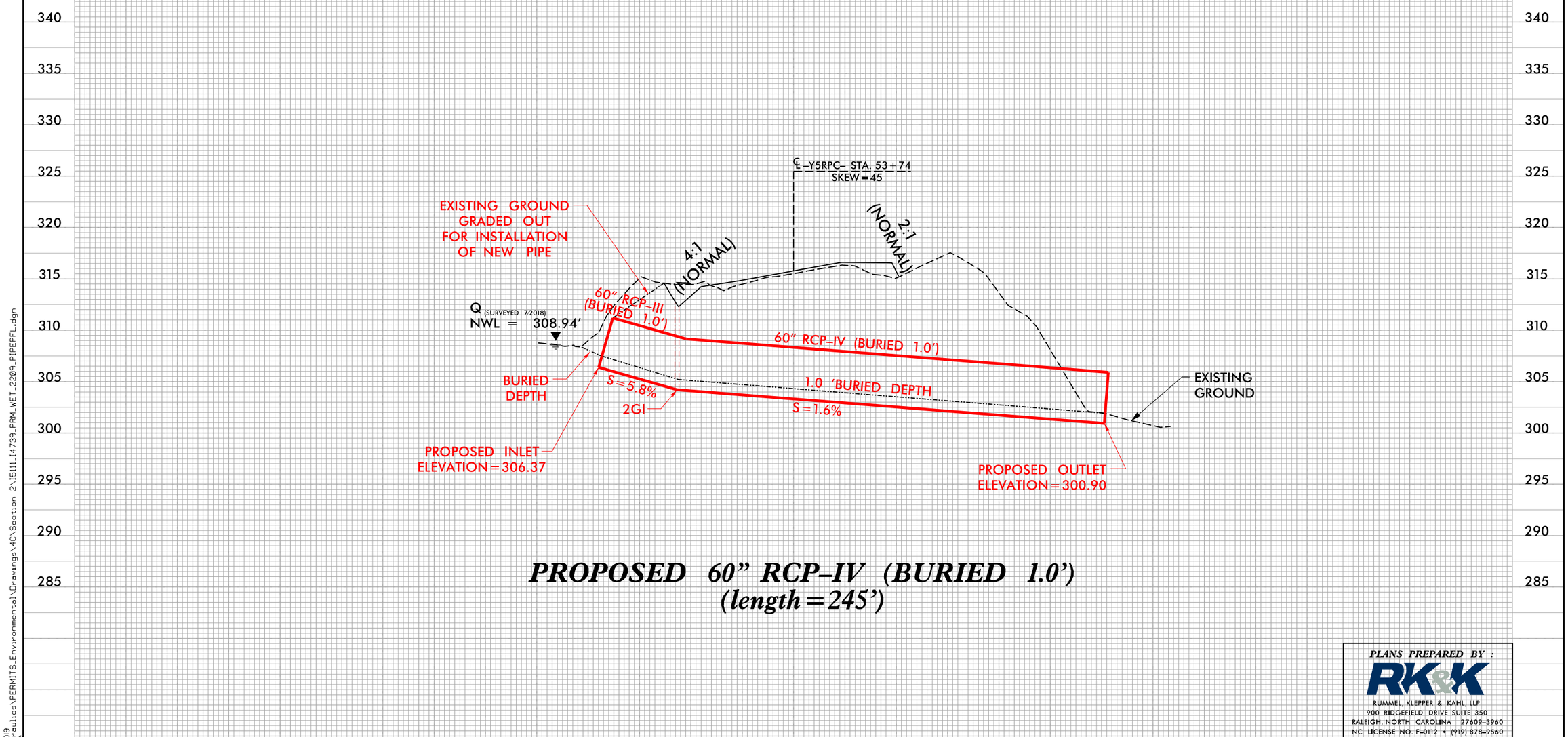
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 37 OF 125

SITE 16B & 17A
–Y5RPC– 53+74



PROPOSED 60" RCP–IV (BURIED 1.0')
(length=245')

PLANS PREPARED BY :

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5/14/99

2/6/2019
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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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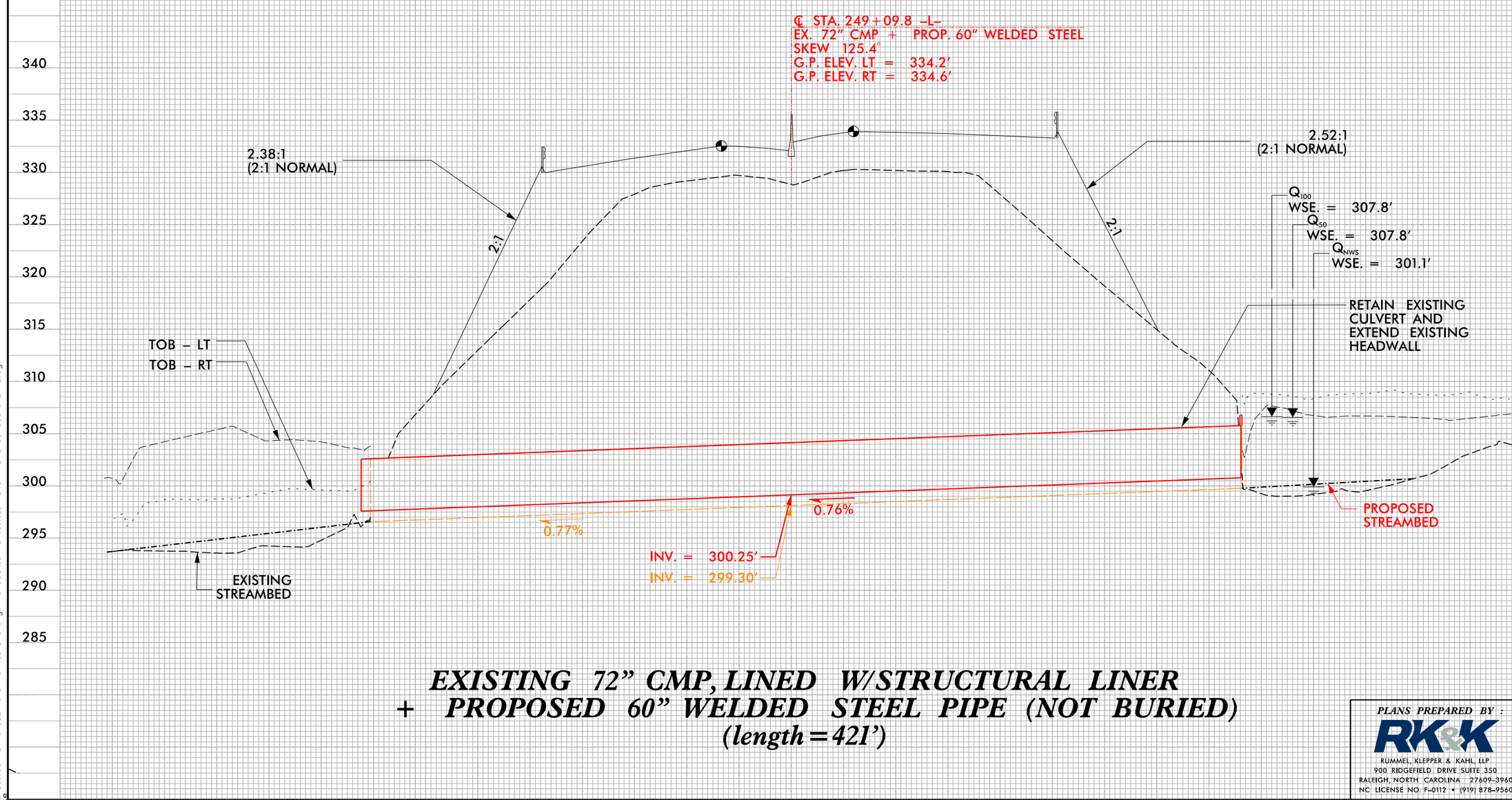
PERMIT DRAWING
SHEET 38 OF 125

SITE 17A & 17B
-L- 249+09.8



EXISTING 72" CMP, LINED W/STRUCTURAL LINER + PROPOSED 60" WELDED STEEL PIPE (NOT BURIED)
(length = 421')

PLANS PREPARED BY :

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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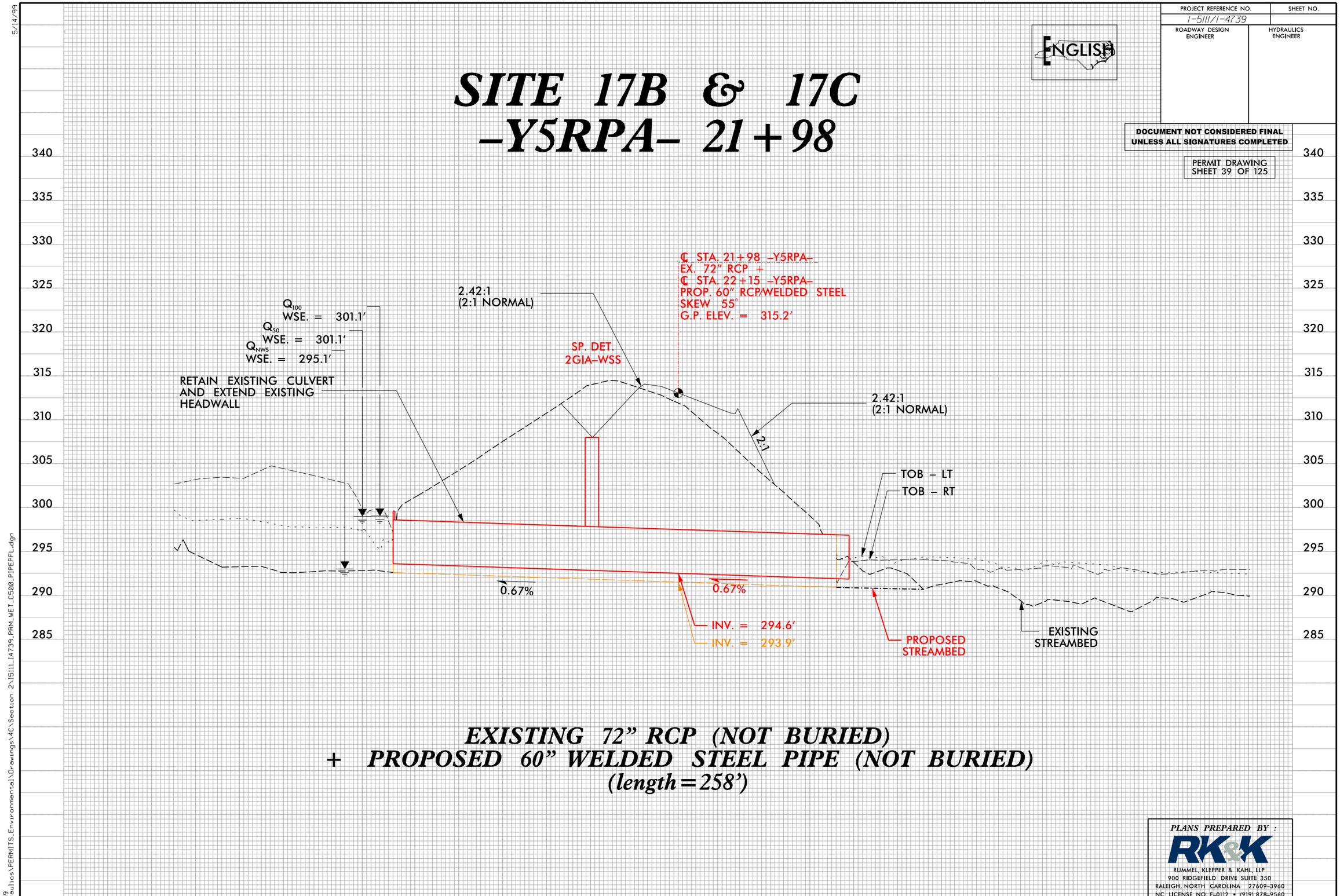
PERMIT DRAWING
SHEET 39 OF 125

SITE 17B & 17C
–Y5RPA– 21+98



EXISTING 72" RCP (NOT BURIED)
+ PROPOSED 60" WELDED STEEL PIPE (NOT BURIED)
(length = 258')

PLANS PREPARED BY :

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2/6/2019
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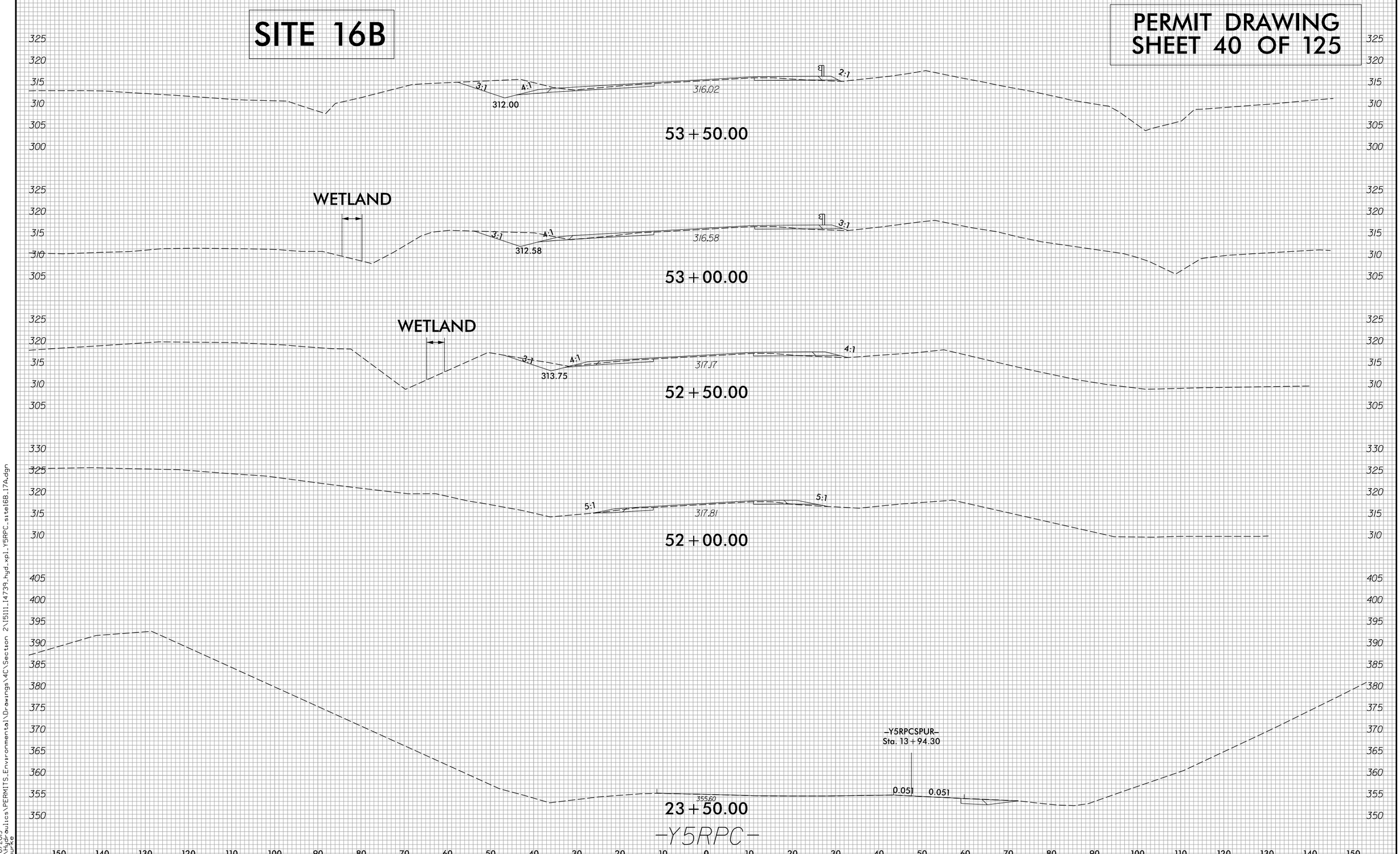
dburke



6/23/16

2/6/2019
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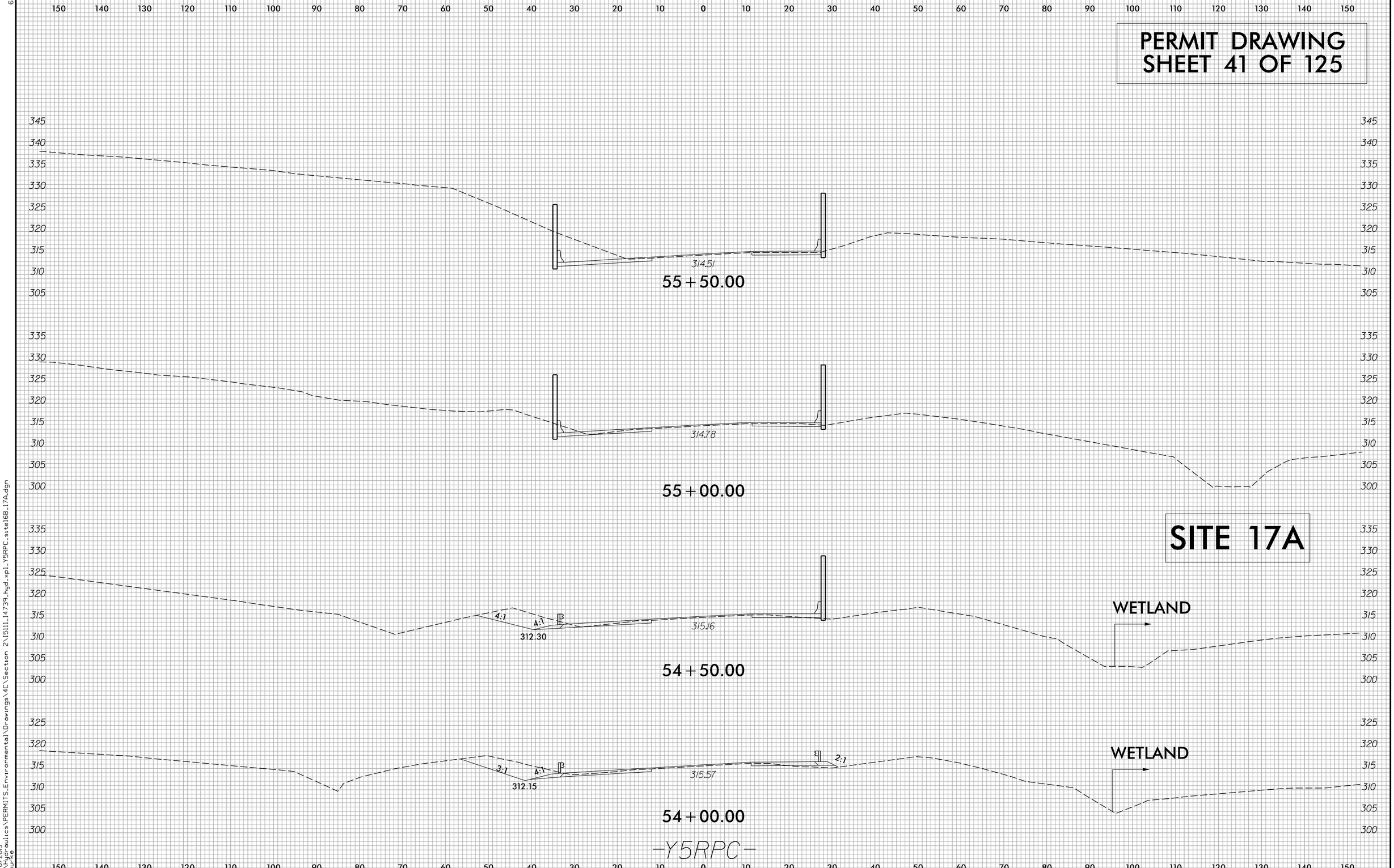
aburke

PROJ. REFERENCE NO.	SHEET NO.
I-5111/I-4739	X-207

PERMIT DRAWING
SHEET 41 OF 125



6/23/16

2/6/2019
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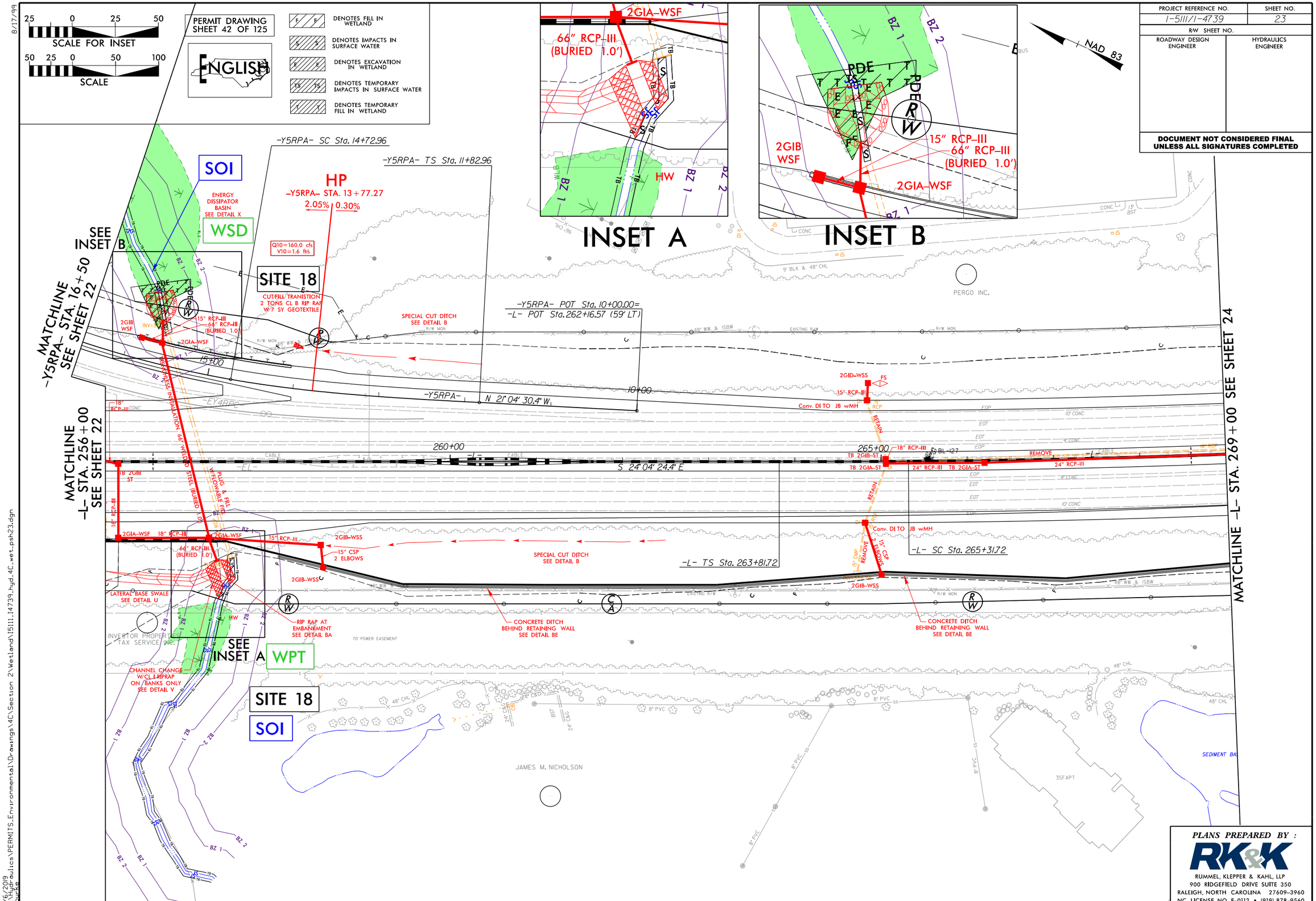
obourke



PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	23
R/W SHEET NO.	
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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 43 OF 125

ENGLISH

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

NAD 83

INSET A

INSET B

SOI

WSD

WPT

SITE 18

HP
-Y5RPA- STA. 13+77.27
2.05% 0.30%

Q10=160.0 cfs
V10=1.6 fps

ENERGY DISSIPATOR BASIN SEE DETAIL X

CUT/FILL TRANISTION 2 TONS CL B RIP RAP W/7 SY GEOTEXTILE

SPECIAL CUT DITCH SEE DETAIL B

-Y5RPA- SC Sta. 14+72.96

-Y5RPA- TS Sta. 11+82.96

-Y5RPA- POT Sta. 10+00.00=
-L- POT Sta. 262+16.57 (59' LT)

-Y5RPA- N 21° 04' 30.4" W

-L- S 24° 04' 24.4" E

-L- TS Sta. 263+81.72

-L- SC Sta. 265+31.72

MATCHLINE -Y5RPA- STA. 16+50 SEE SHEET 22

MATCHLINE -L- STA. 256+00 SEE SHEET 22

MATCHLINE -L- STA. 269+00 SEE SHEET 24

SEE INSET B

SEE INSET A

2GIA-WSF
66" RCP-III (BURIED 1.0')
HW
BZ 1
BZ 2

2GIB WSF
15" RCP-III
66" RCP-III (BURIED 1.0')
2GIA-WSF
PDE
RW

2GID-WSS
15" RCP-III
Conv. DI TO JB w/MH
RETAIN

18" RCP-III
TB 2GIB-ST
TB 2GIA-ST
24" RCP-III
REMOVE
BL-127

2GIB-WSS
15" CSP 2 ELBOWS

PLUG & FILL W/FLOWABLE FILL

INSTALLATION 66" WELDED STEEL (BURIED 1.0')

LATERAL BASE SWALE SEE DETAIL U

RIP RAP AT EMBANKMENT SEE DETAIL BA

CONCRETE DITCH BEHIND RETAINING WALL SEE DETAIL BE

CHANNEL CHANGE W/CL B RIPRAP ON BANKS ONLY SEE DETAIL V

INVESTOR PROPERTIES TAX SERVICE INC

70' POWER EASEMENT

JAMES M. NICHOLSON

PERGO INC.

SEDIMENT BA

3SF APT

8" PVC

48" CMP

24" CMP

EXISTING R/W

R/W MON

CABLE

CONC

EOT

EOP

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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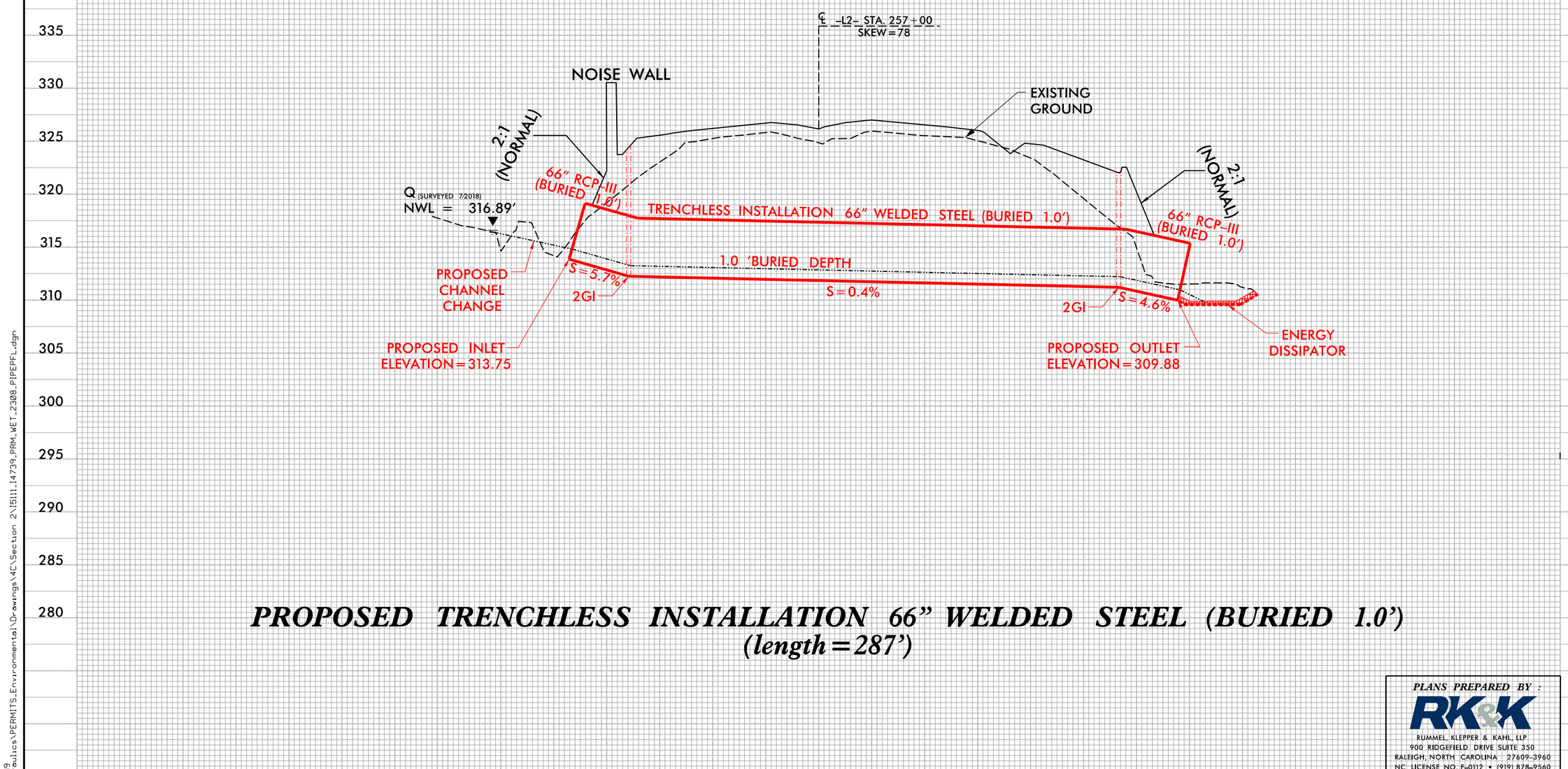
PERMIT DRAWING
SHEET 44 OF 125

SITE 18
-L2- 257+00



PROPOSED TRENCHLESS INSTALLATION 66" WELDED STEEL (BURIED 1.0')
(length=287')

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2/6/2019
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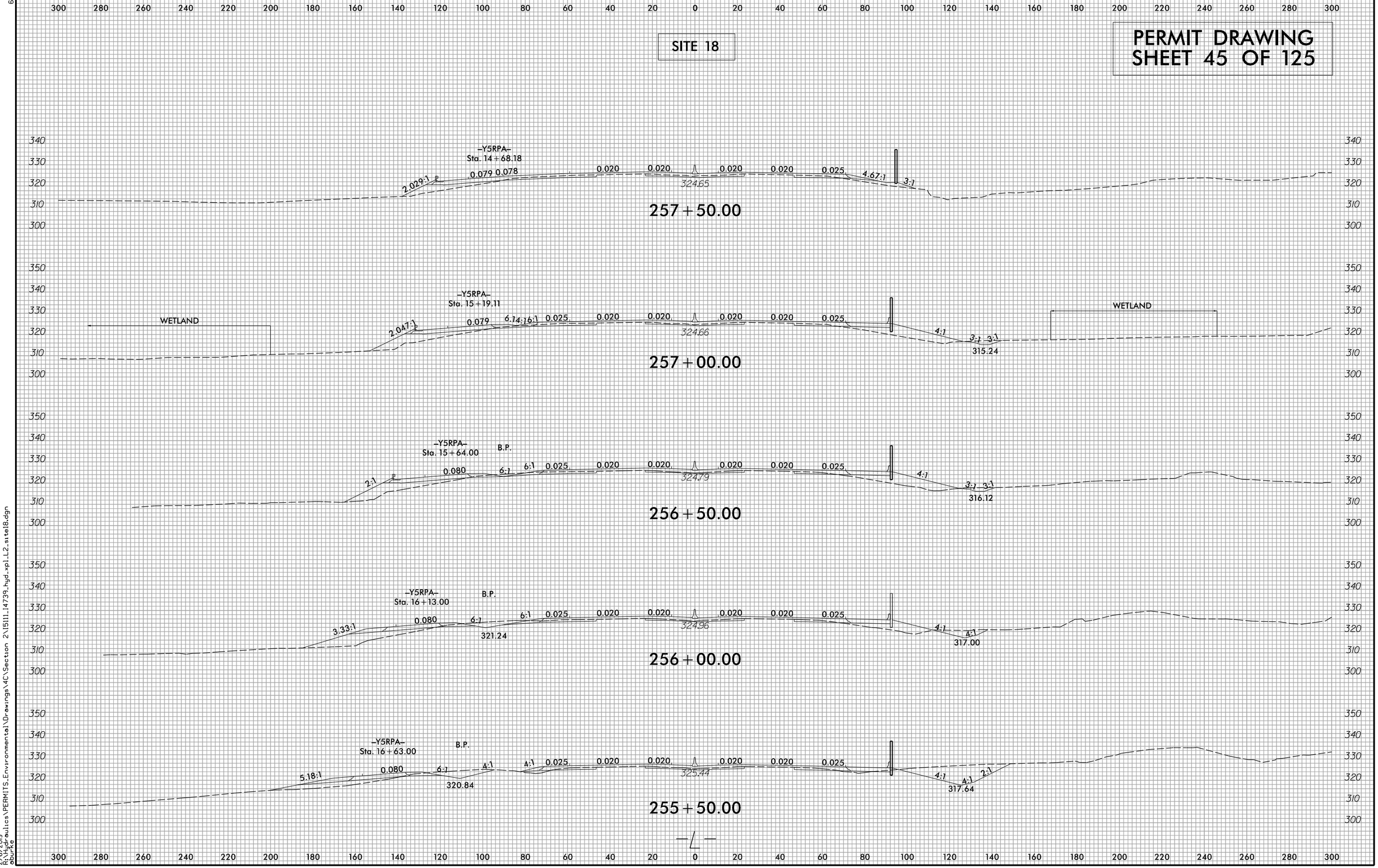
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-50

PERMIT DRAWING
SHEET 45 OF 125

SITE 18



6/23/16

2/6/2019
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oburke

8/17/99

25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 46 OF 125

ENGLISH

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

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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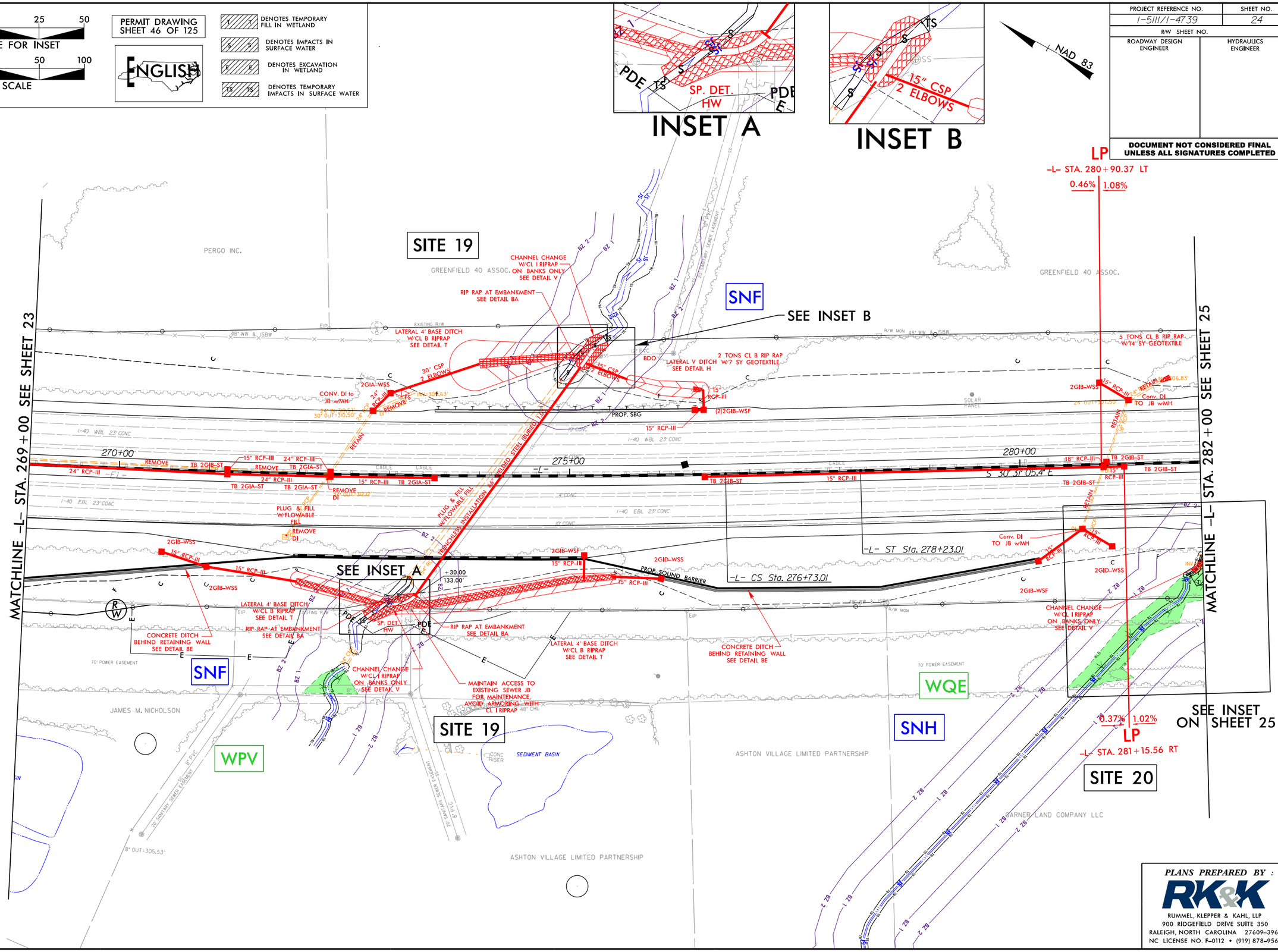

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abburke

8/17/99

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SCALE FOR INSET

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SCALE

PERMIT DRAWING
SHEET 47 OF 125

ENGLISH

T T	DENOTES TEMPORARY FILL IN WETLAND
S S	DENOTES IMPACTS IN SURFACE WATER
E E	DENOTES EXCAVATION IN WETLAND
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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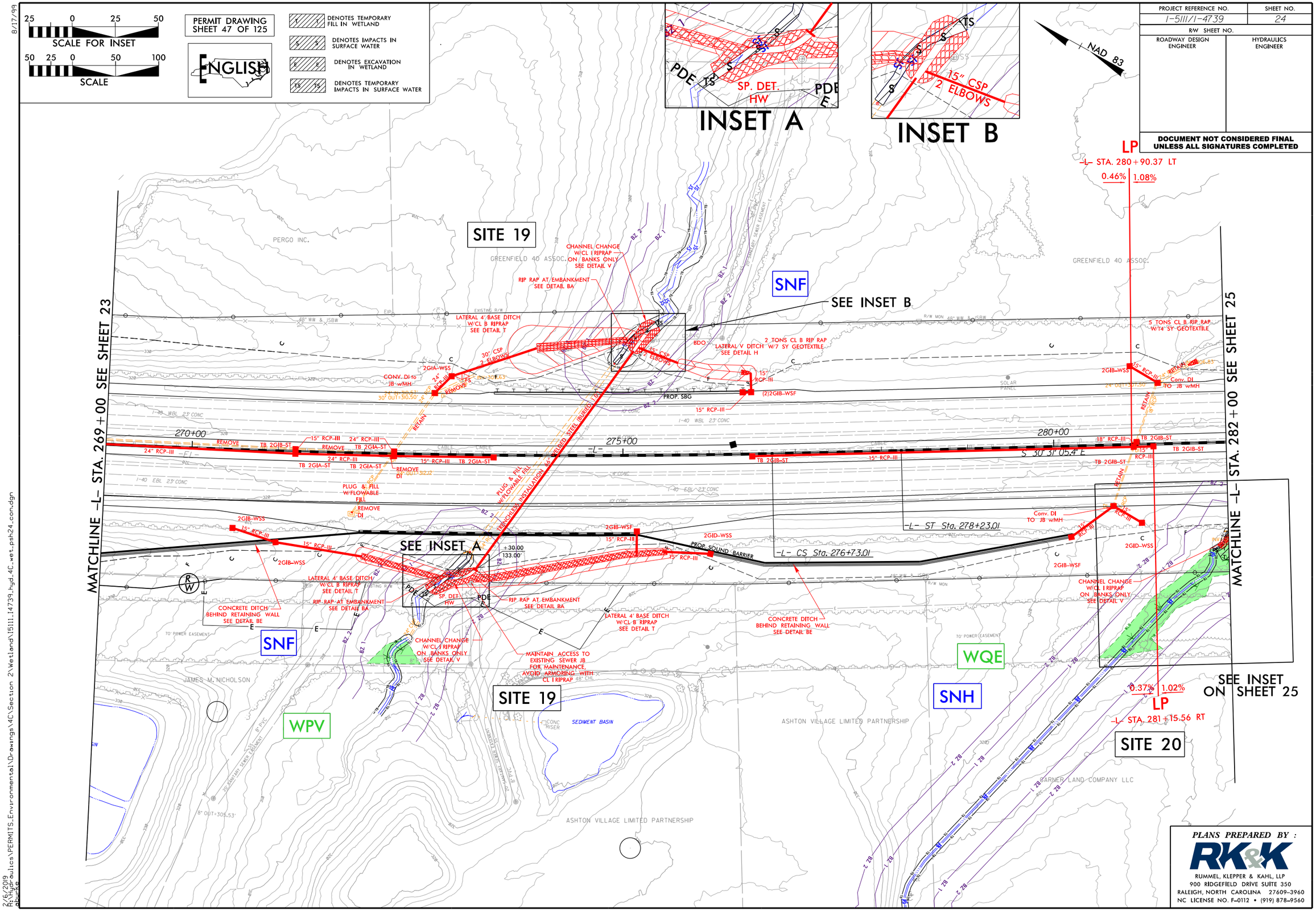

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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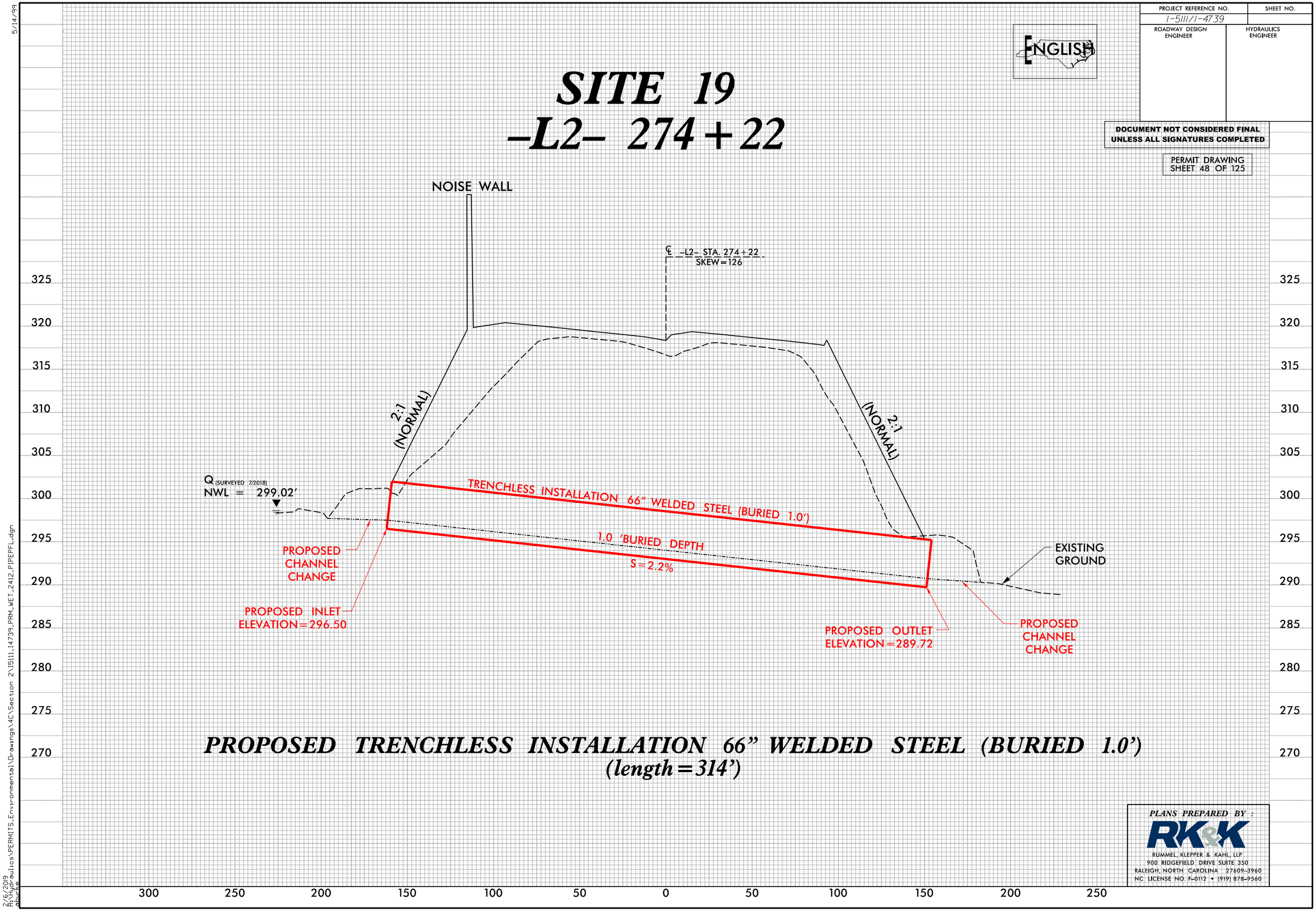
PERMIT DRAWING
SHEET 48 OF 125

SITE 19
–L2– 274+22



PROPOSED TRENCHLESS INSTALLATION 66" WELDED STEEL (BURIED 1.0')
(length=314')

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SCALE

PERMIT DRAWING
SHEET 49 OF 125

ENGLISH

S S	DENOTES IMPACTS IN SURFACE WATER
E E	DENOTES EXCAVATION IN WETLAND
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
T T	DENOTES TEMPORARY FILL IN WETLAND

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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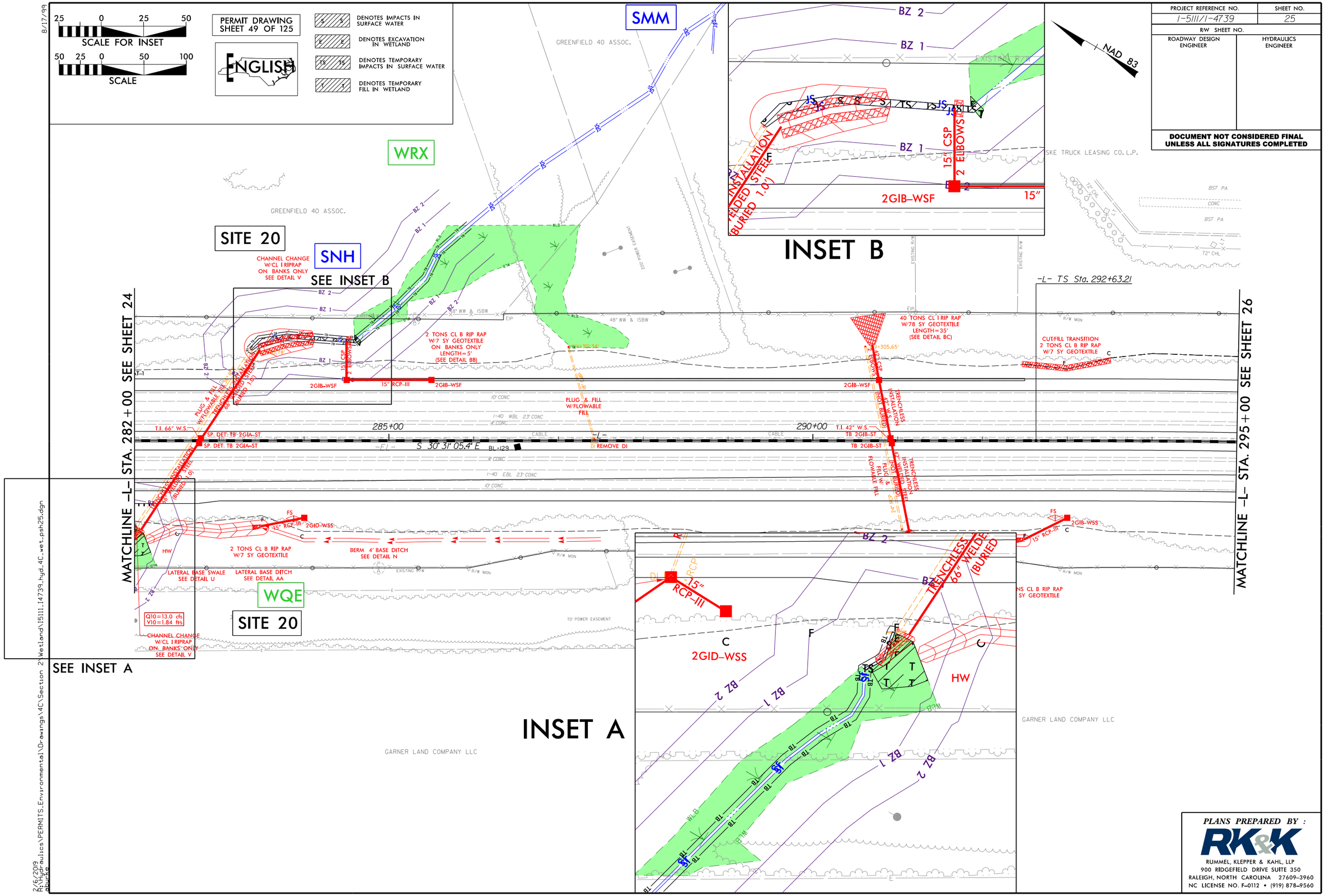

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PERMIT DRAWING
SHEET 50 OF 125

ENGLISH

S S	DENOTES IMPACTS IN SURFACE WATER
E E	DENOTES EXCAVATION IN WETLAND
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
T T	DENOTES TEMPORARY FILL IN WETLAND

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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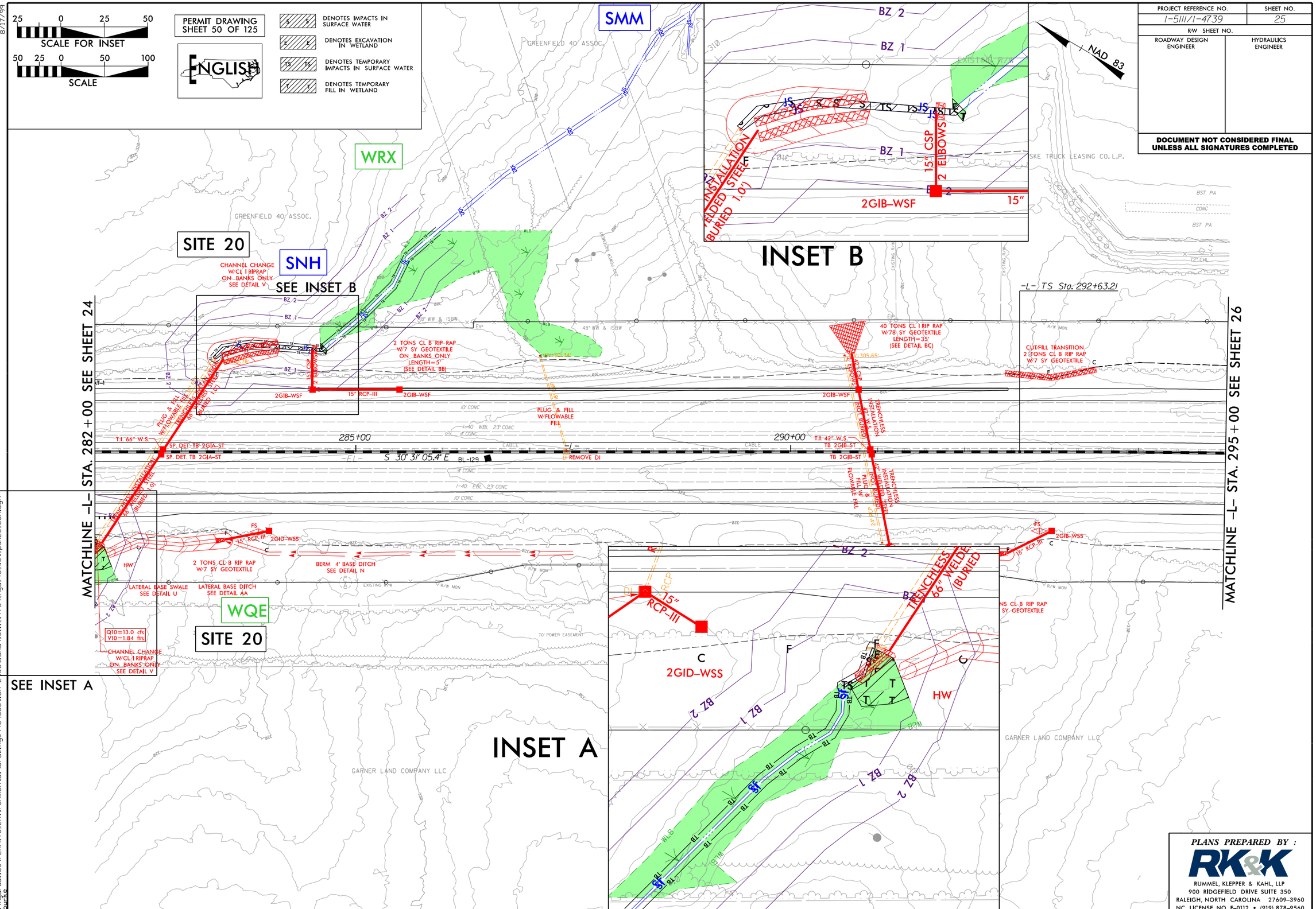

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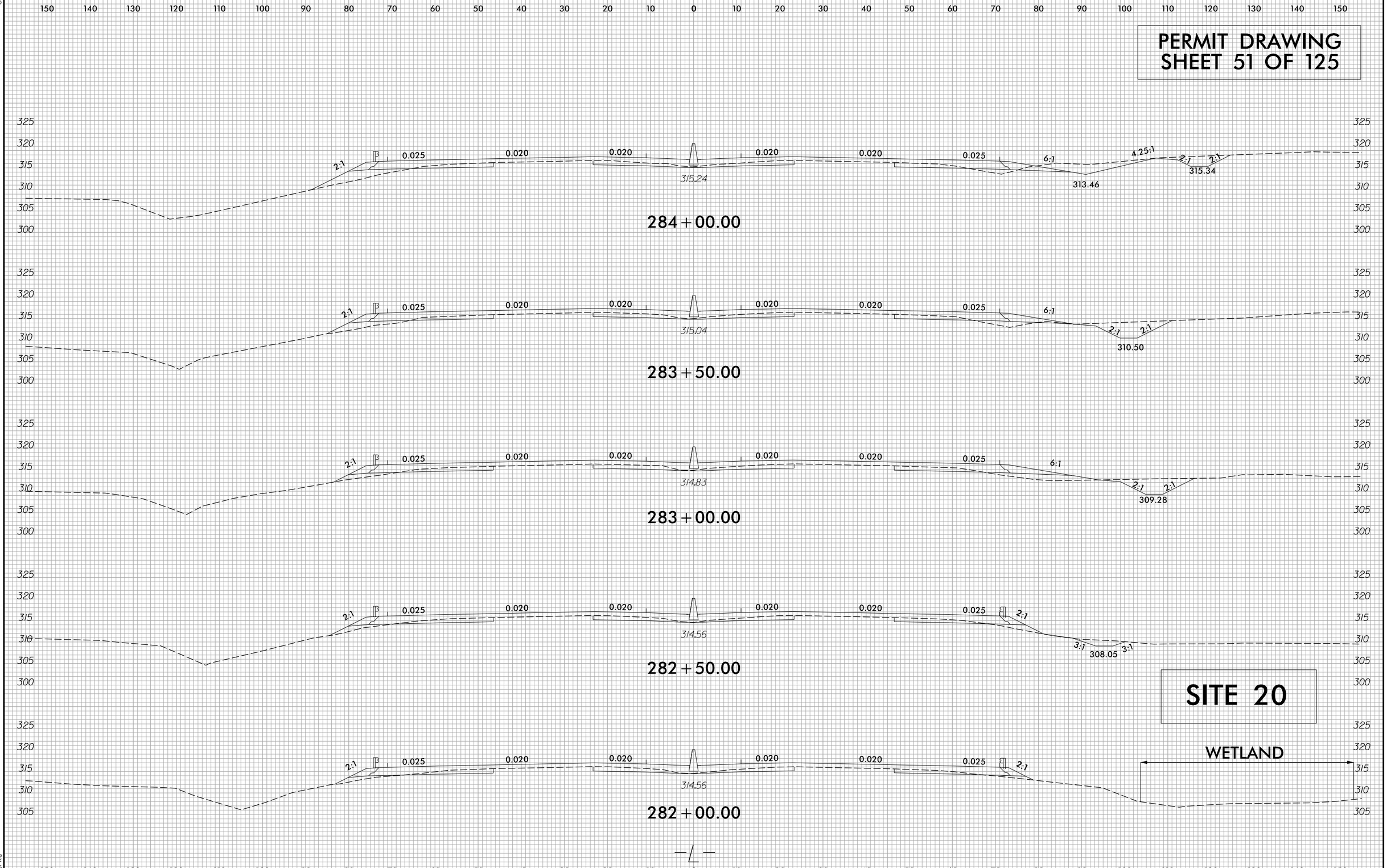

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PERMIT DRAWING
SHEET 52 OF 125

ENGLISH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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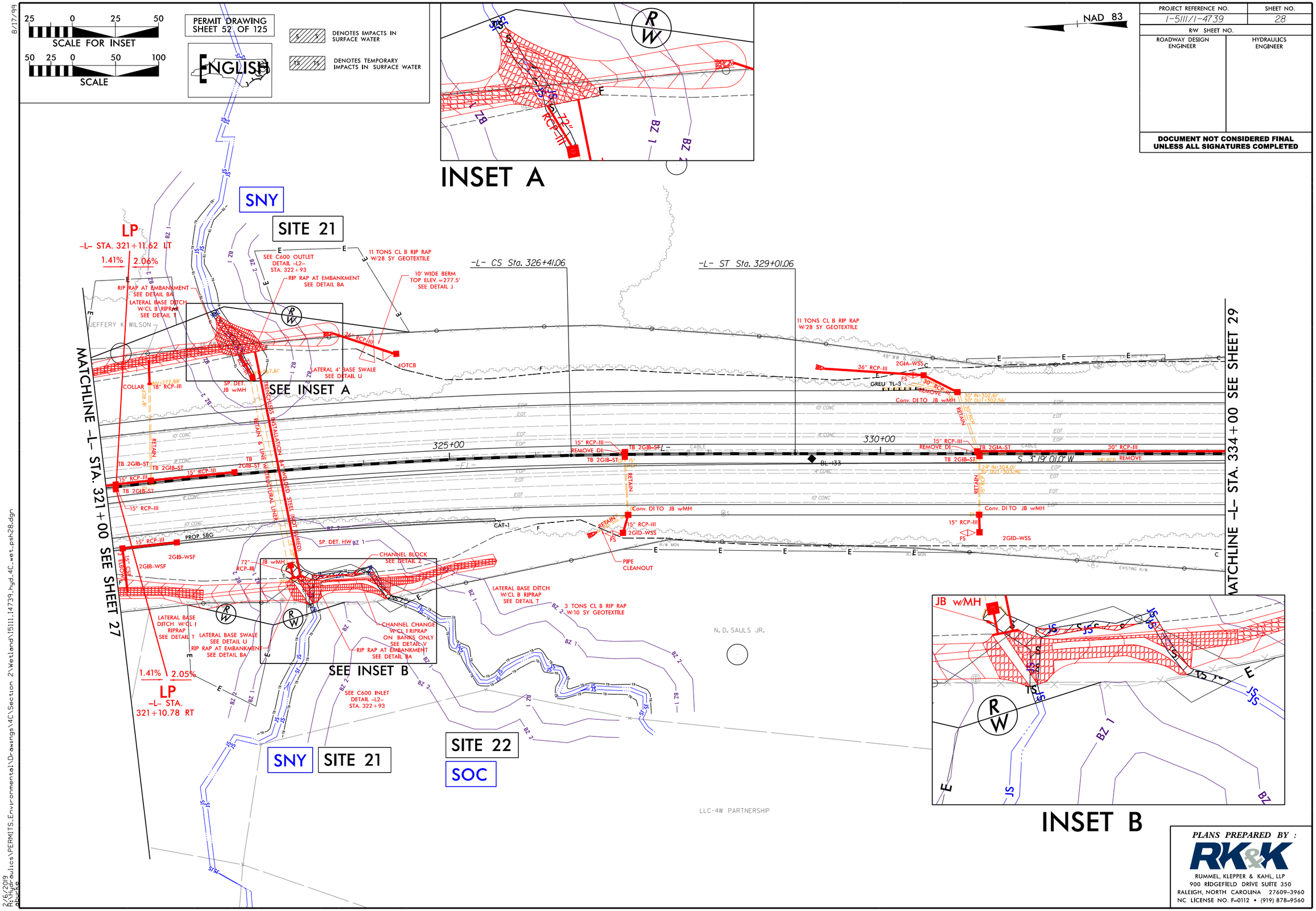

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SCALE FOR INSET

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PERMIT DRAWING
SHEET 53 OF 125

ENGLISH

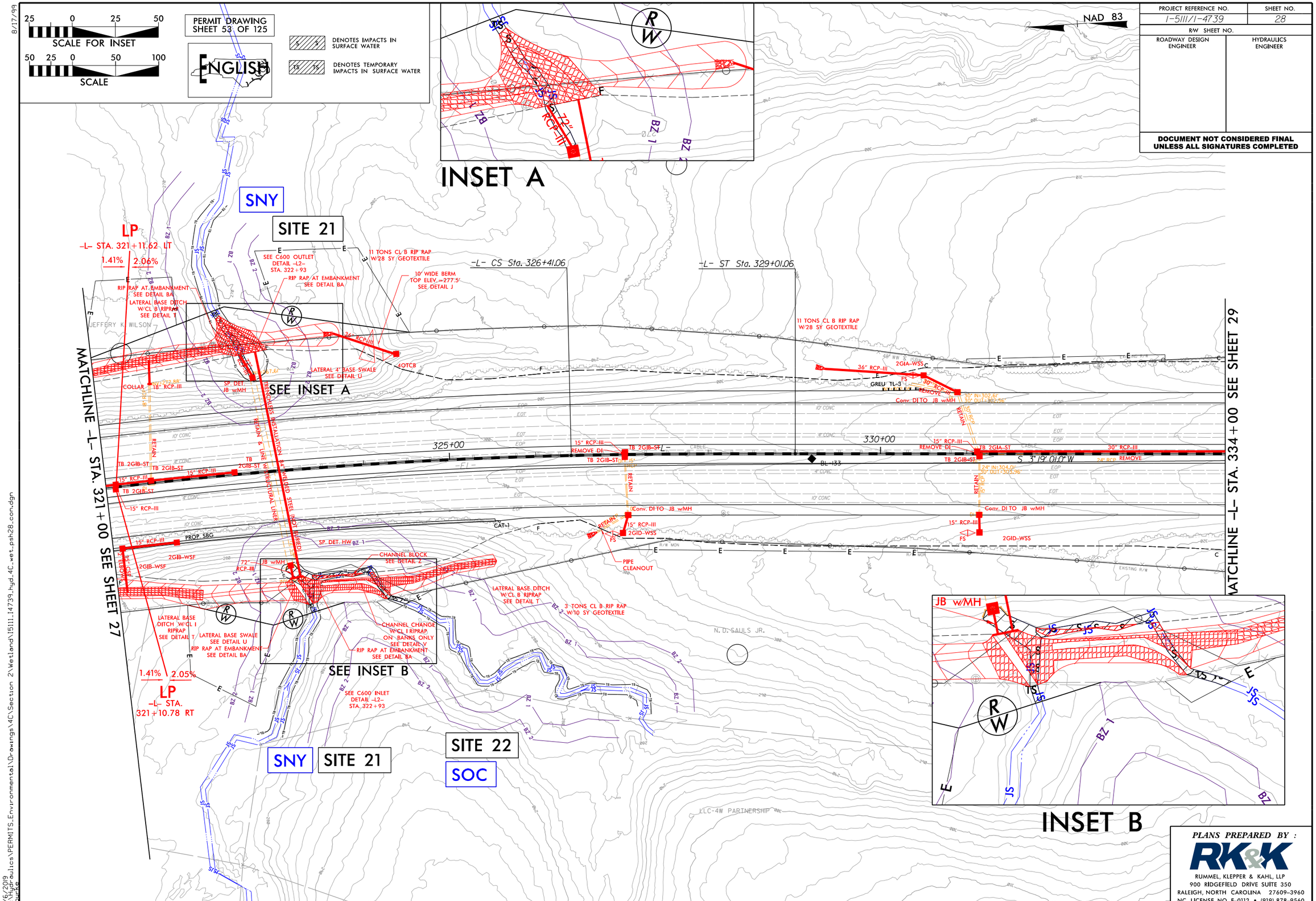
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83



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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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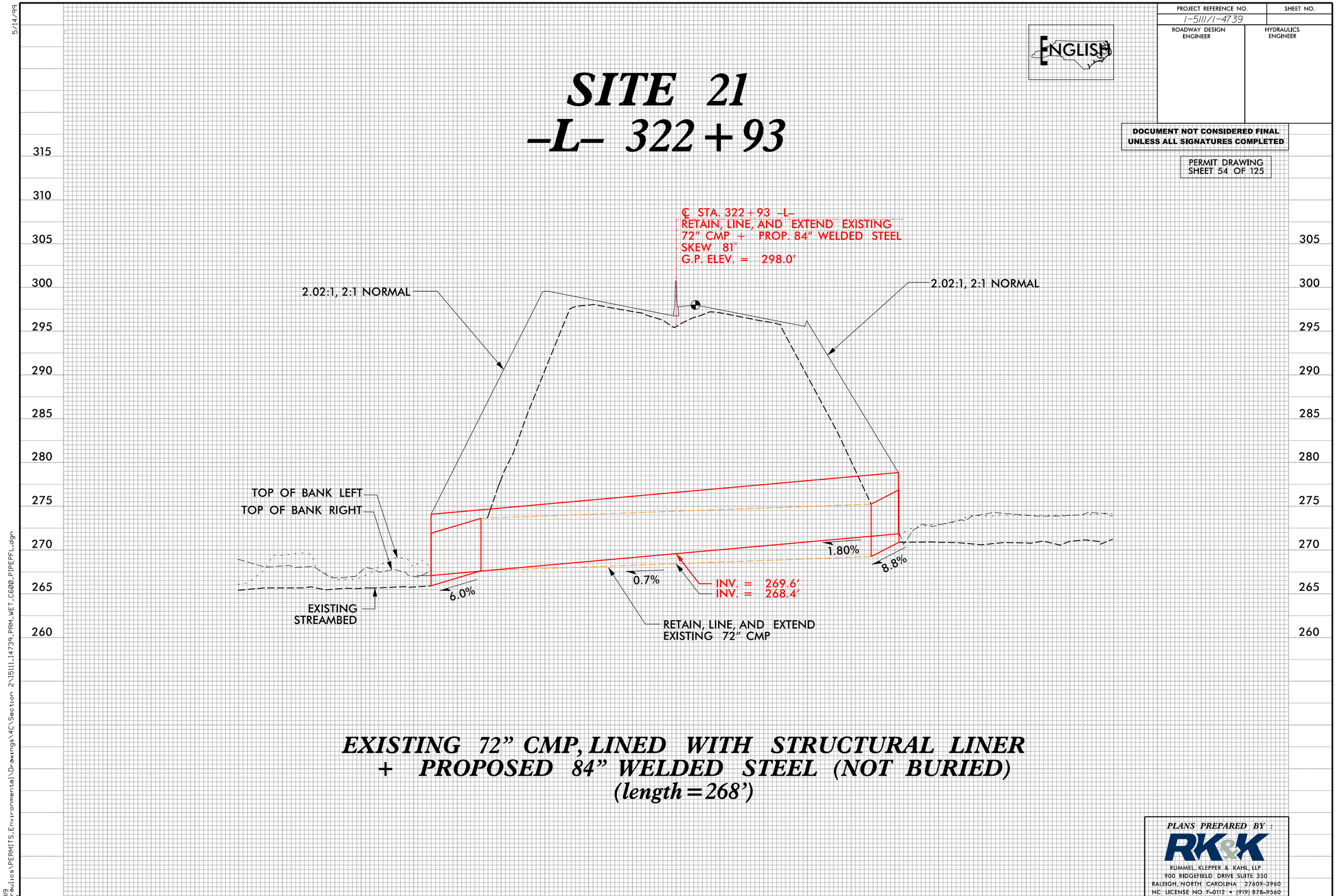
PERMIT DRAWING
SHEET 54 OF 125

SITE 21
-L- 322+93



EXISTING 72" CMP, LINED WITH STRUCTURAL LINER + PROPOSED 84" WELDED STEEL (NOT BURIED)
(length = 268')

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PERMIT DRAWING
SHEET 55 OF 125

ENGLISH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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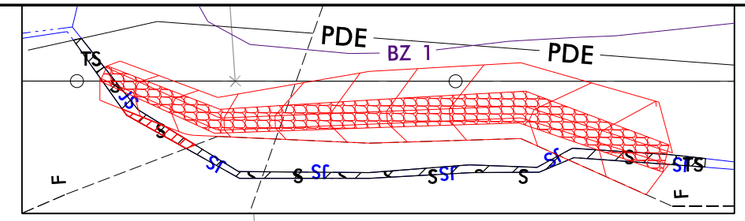
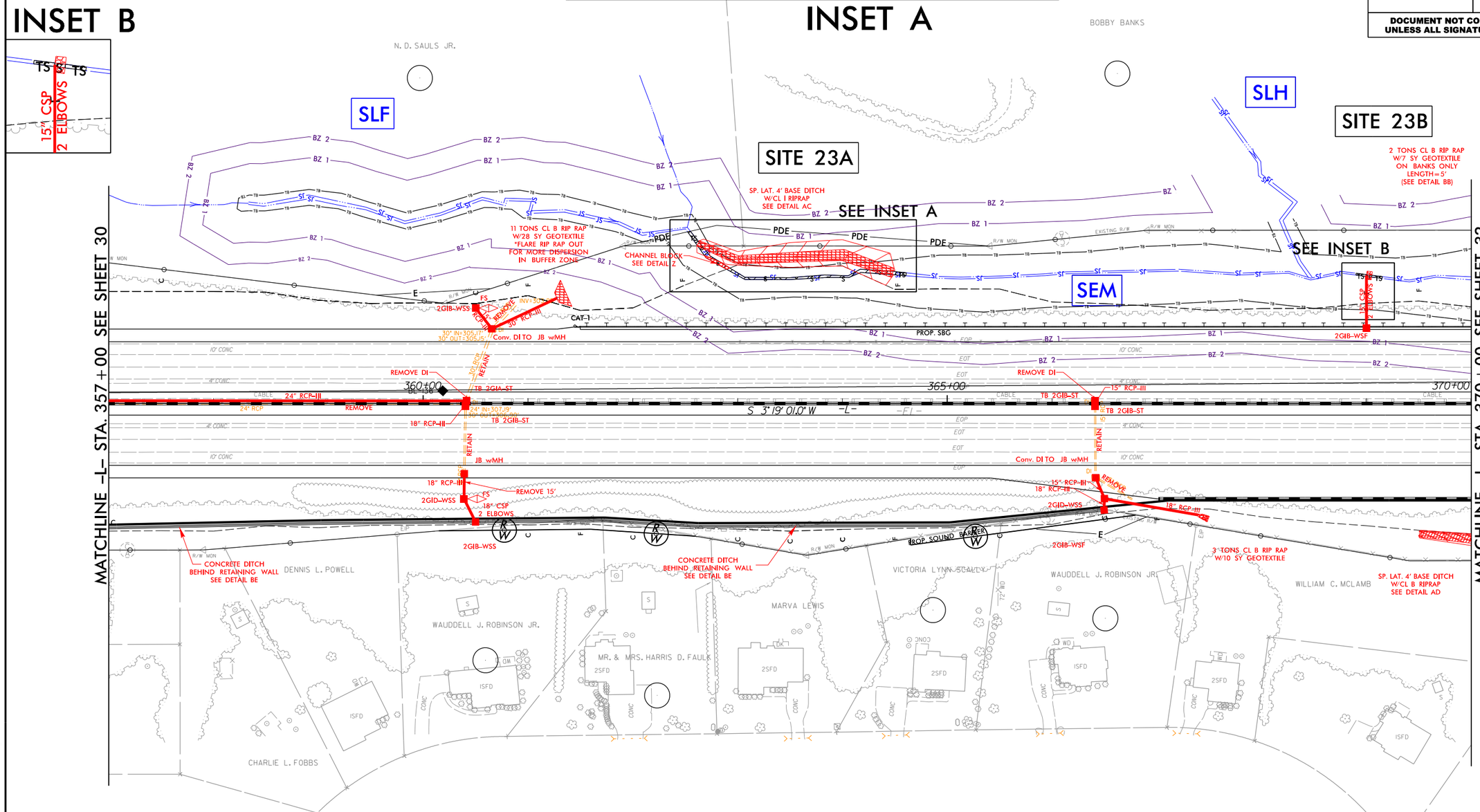
NAD 83

INSET B

INSET A





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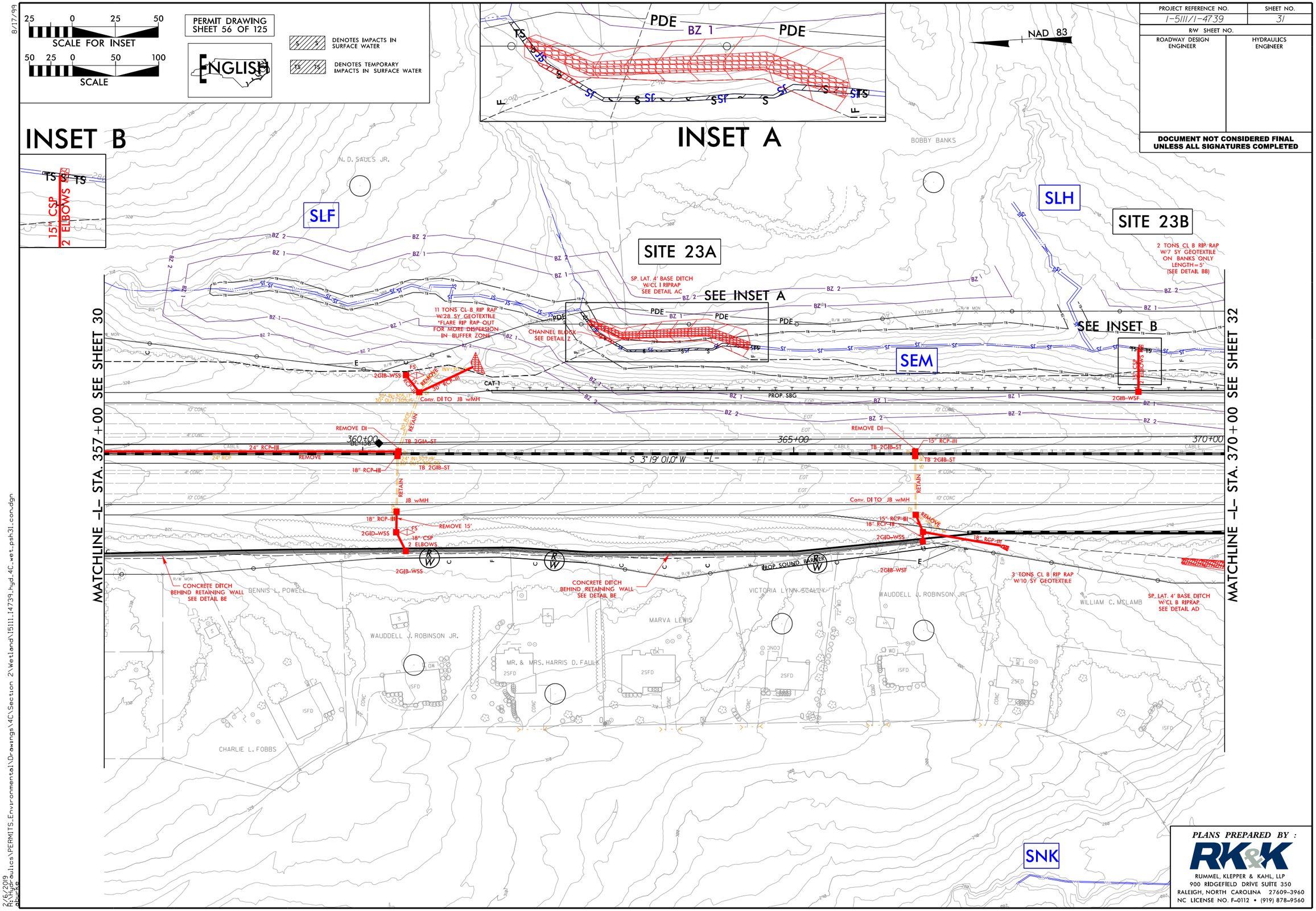

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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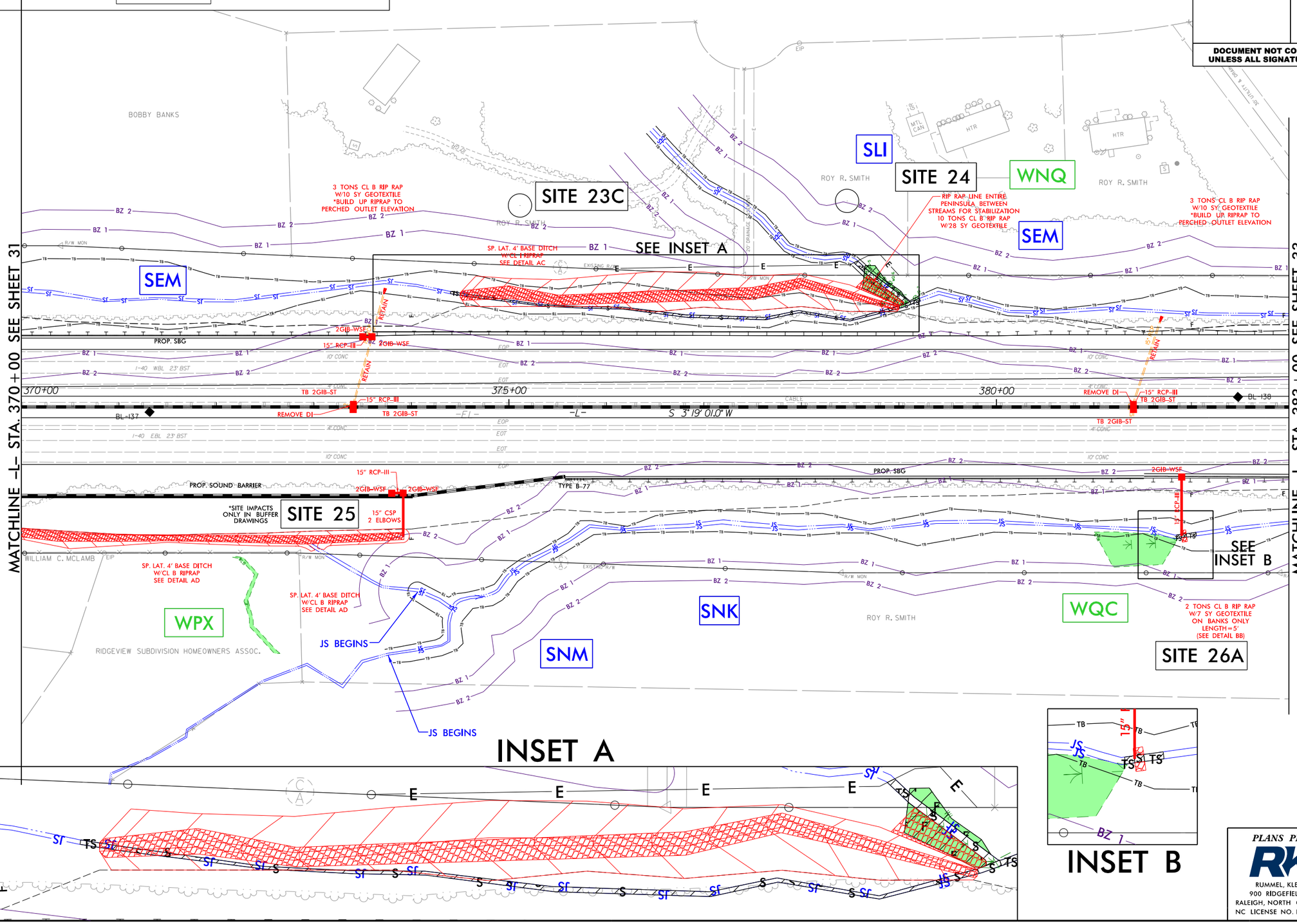
PERMIT DRAWING
SHEET 57 OF 125

ENGLISH

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

NAD 83



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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING
SHEET 58 OF 125

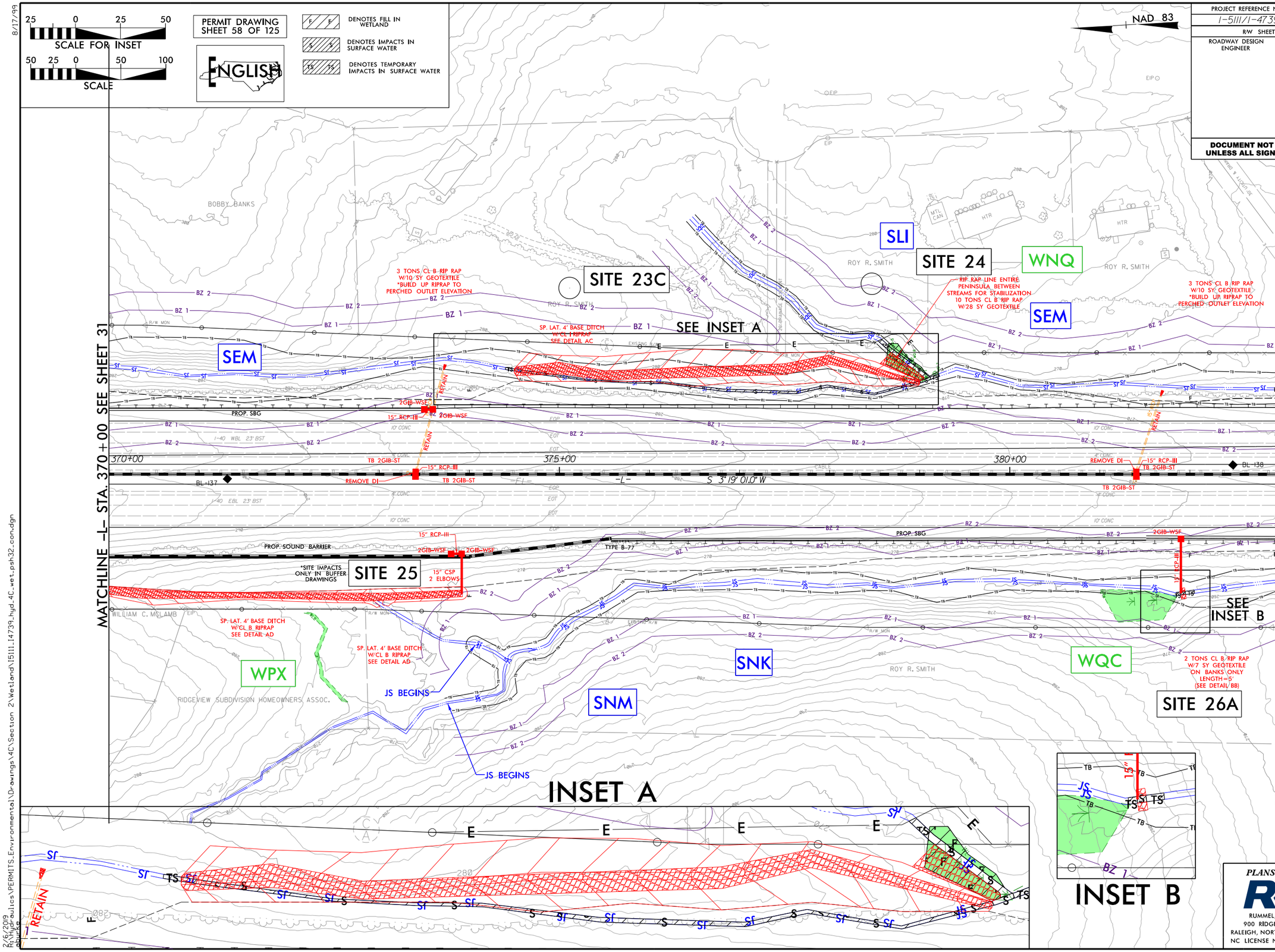
ENGLISH

F/F DENOTES FILL IN WETLAND

S/S DENOTES IMPACTS IN SURFACE WATER

TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83



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PERMIT DRAWING
SHEET 59 OF 125

ENGLISH

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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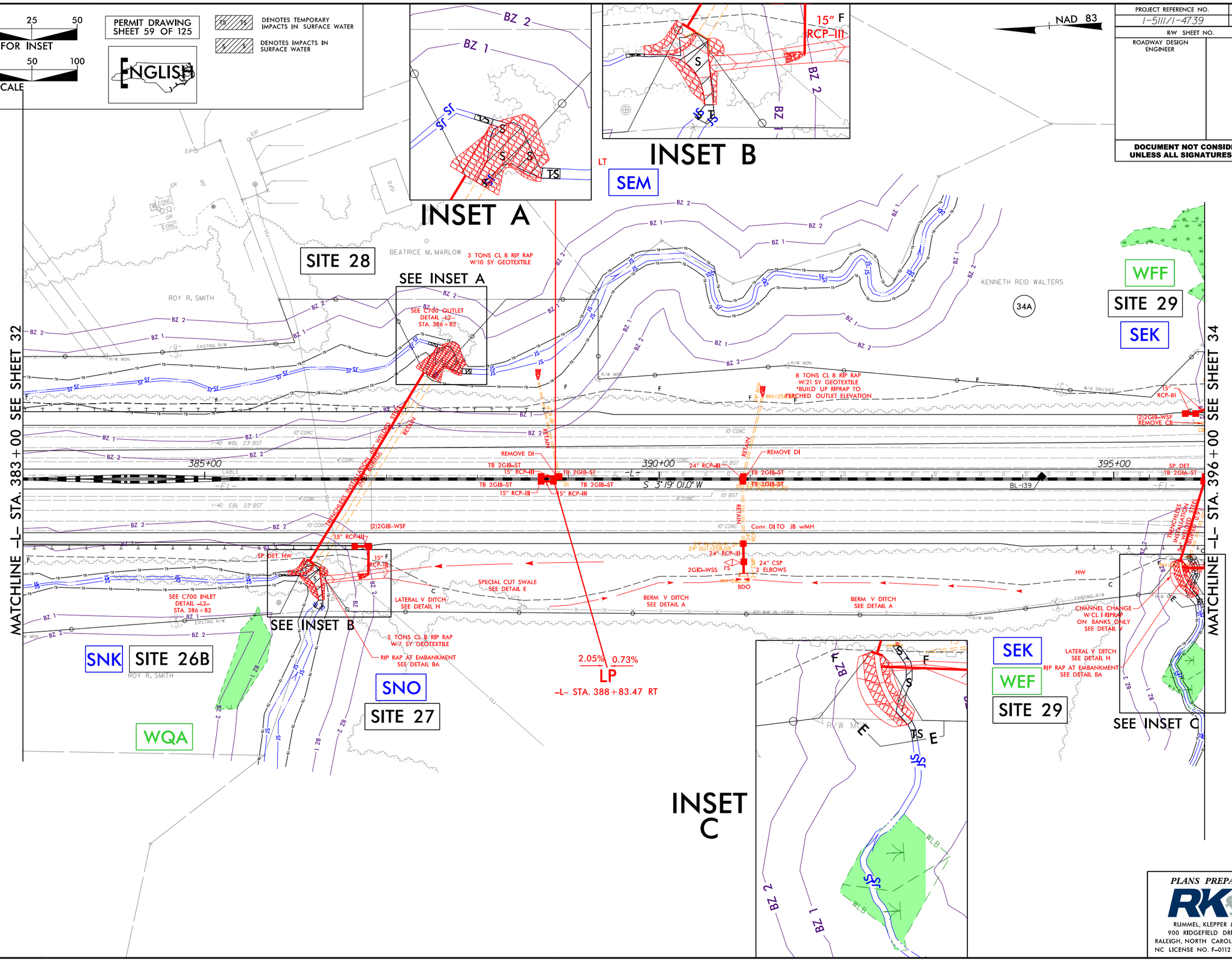

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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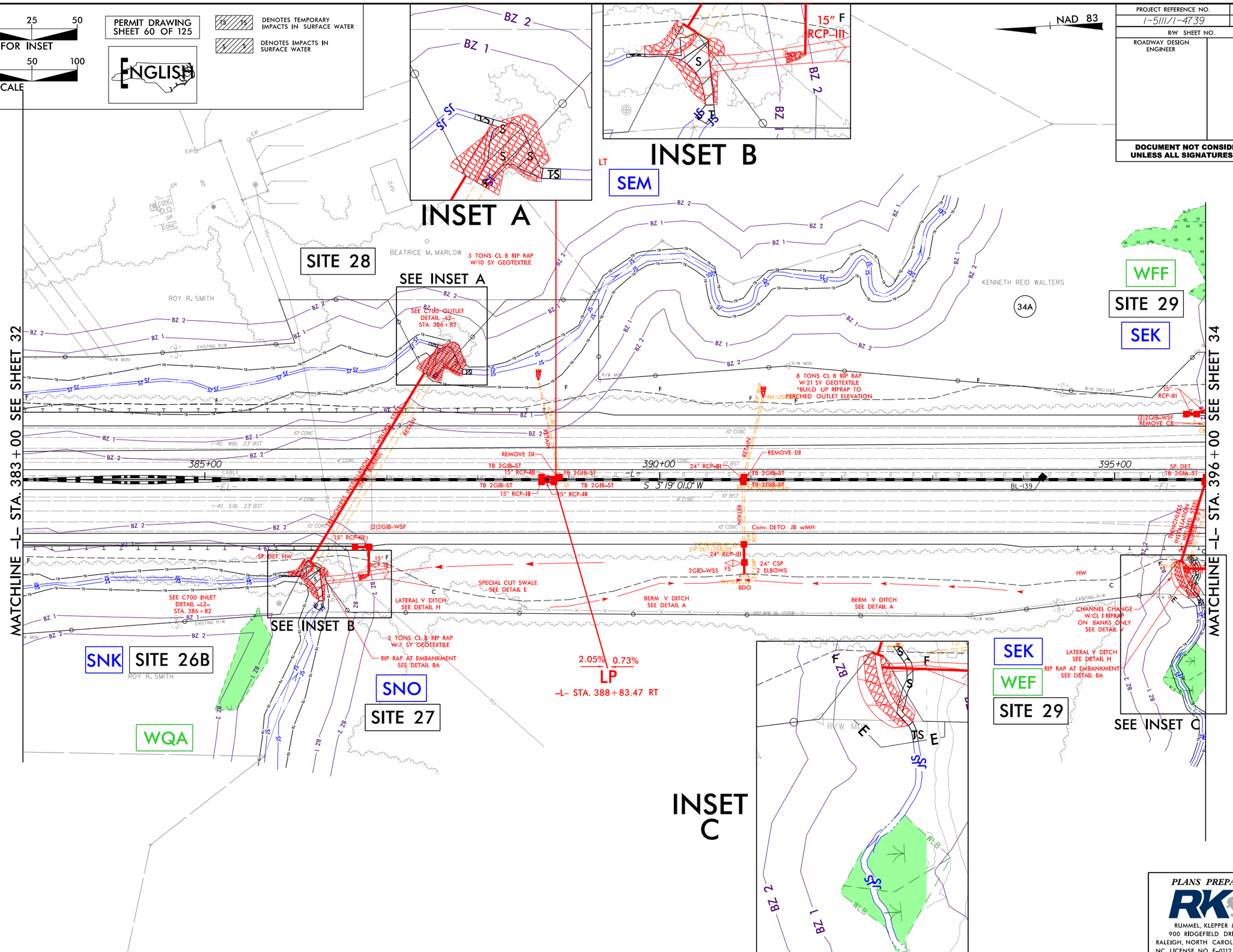
PERMIT DRAWING
SHEET 60 OF 125

ENGLISH

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

NAD 83



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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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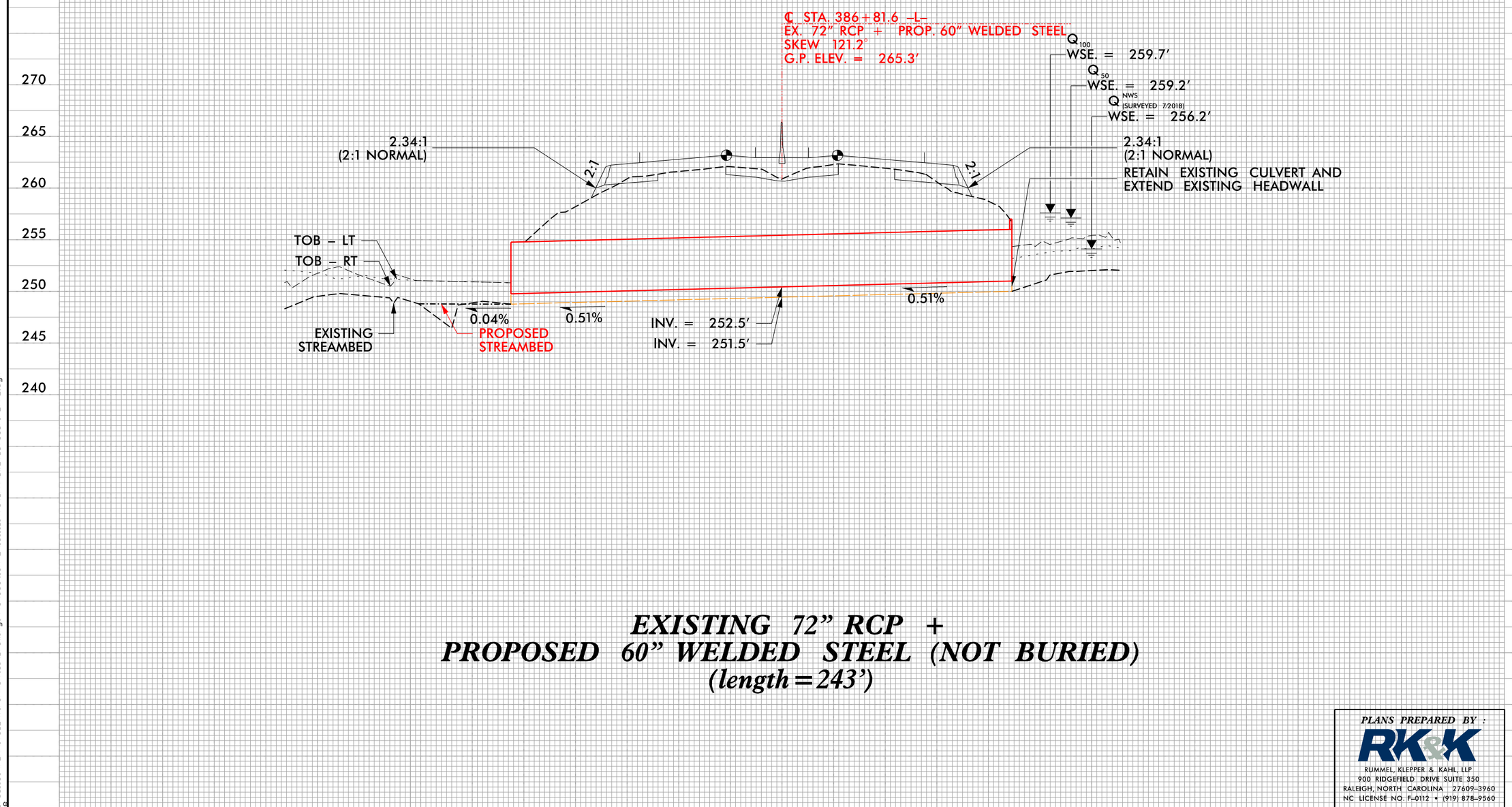
PERMIT DRAWING
SHEET 61 OF 125

SITE 26B, 27, & 28
-L- 386+81.6



EXISTING 72" RCP +
PROPOSED 60" WELDED STEEL (NOT BURIED)
(length=243')

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SCALE

PERMIT DRAWING
SHEET 62 OF 125

ENGLISH

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

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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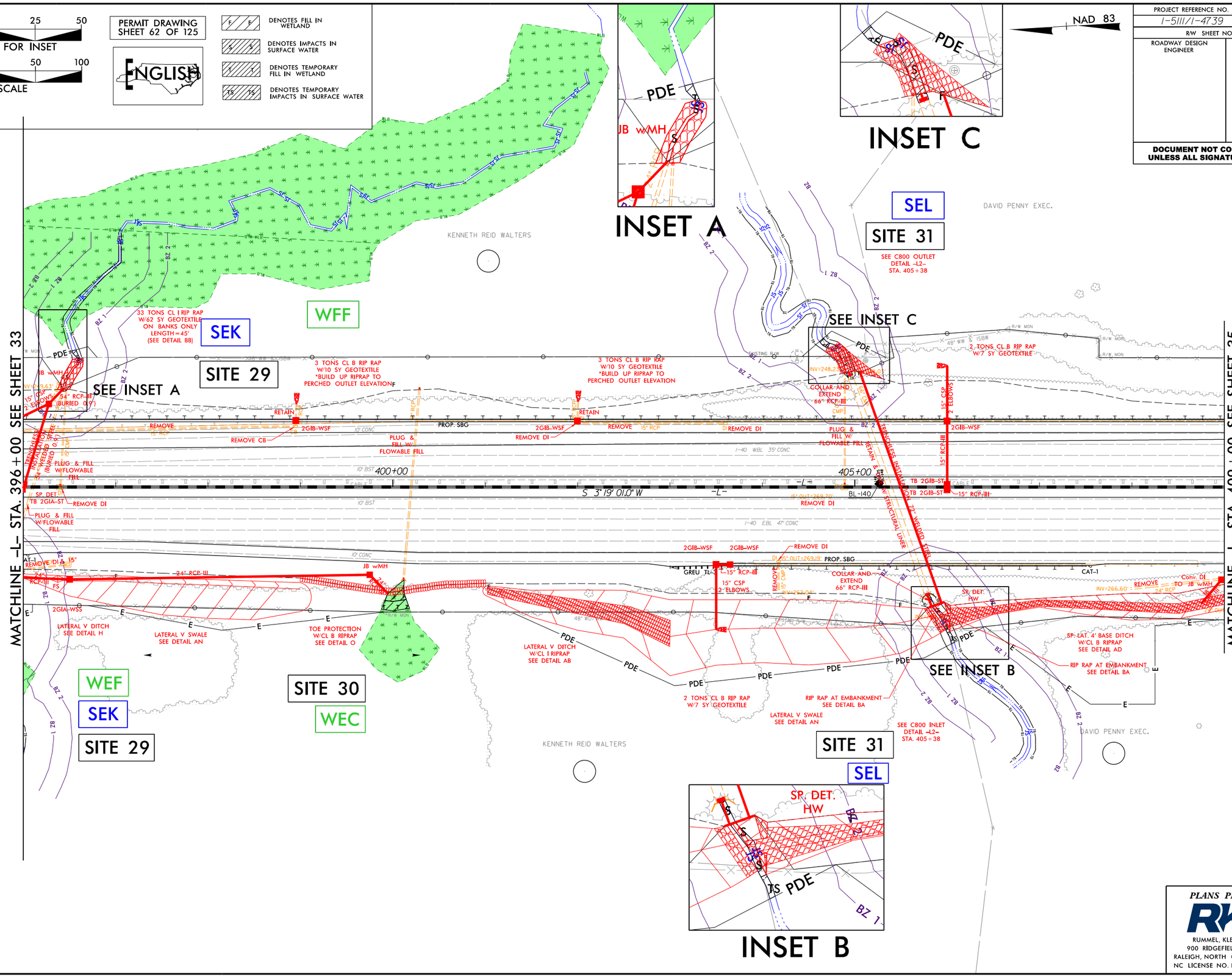

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PERMIT DRAWING
SHEET 63 OF 125

ENGLISH

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

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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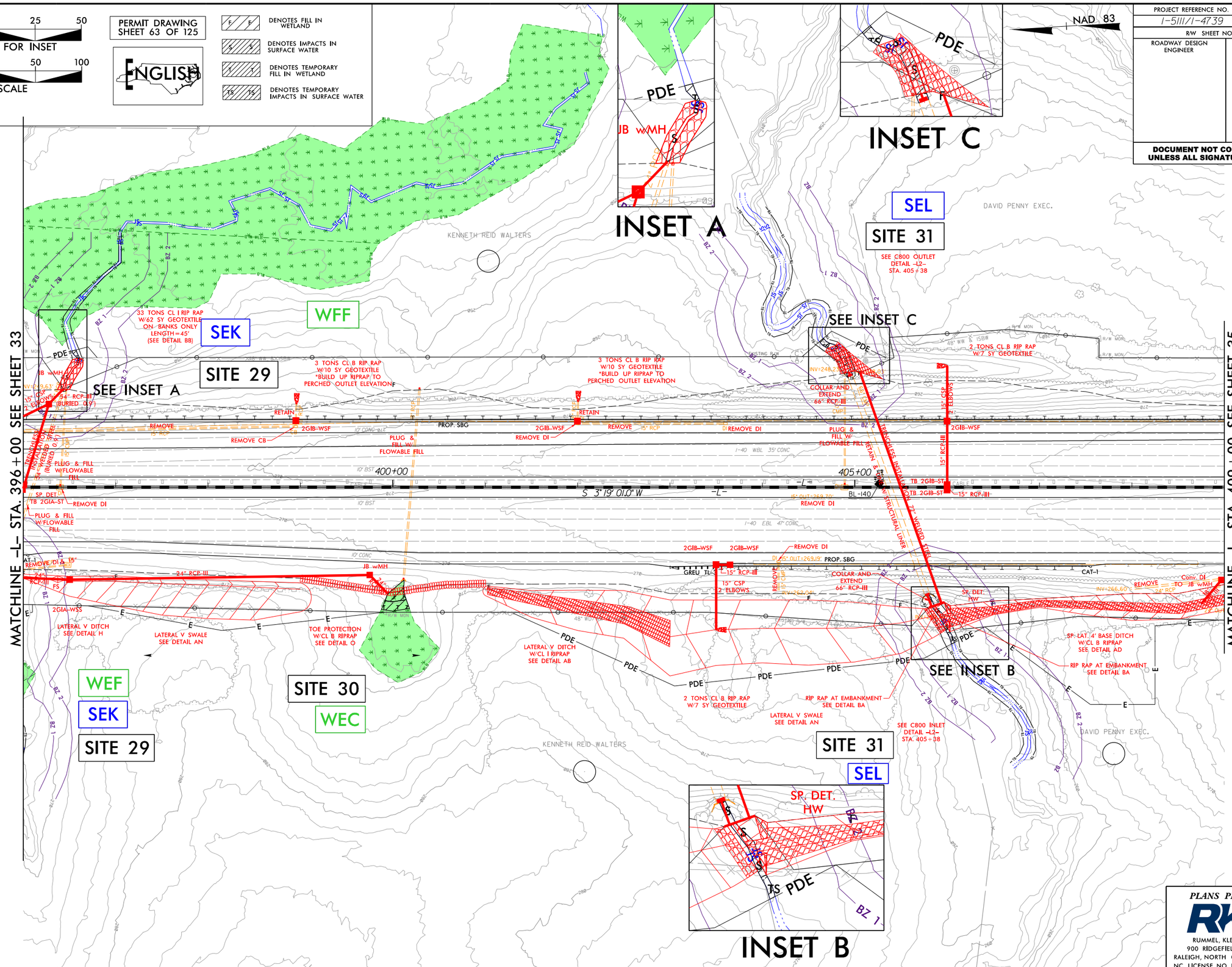

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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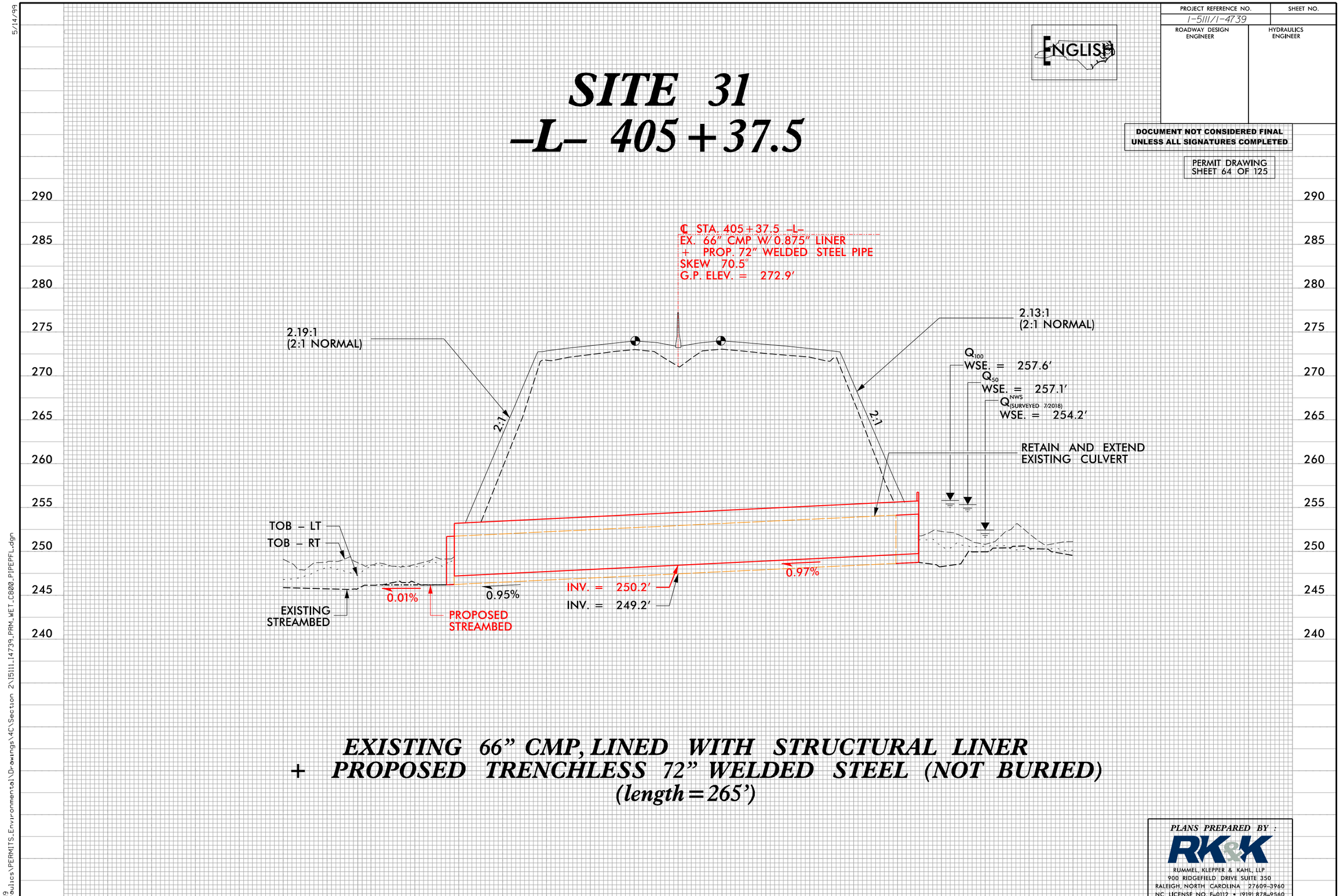
SHEET 64 OF 125

SITE 31
–L– 405+37.5



EXISTING 66" CMP, LINED WITH STRUCTURAL LINER + PROPOSED TRENCHLESS 72" WELDED STEEL (NOT BURIED)
(length = 265')

PLANS PREPARED BY :

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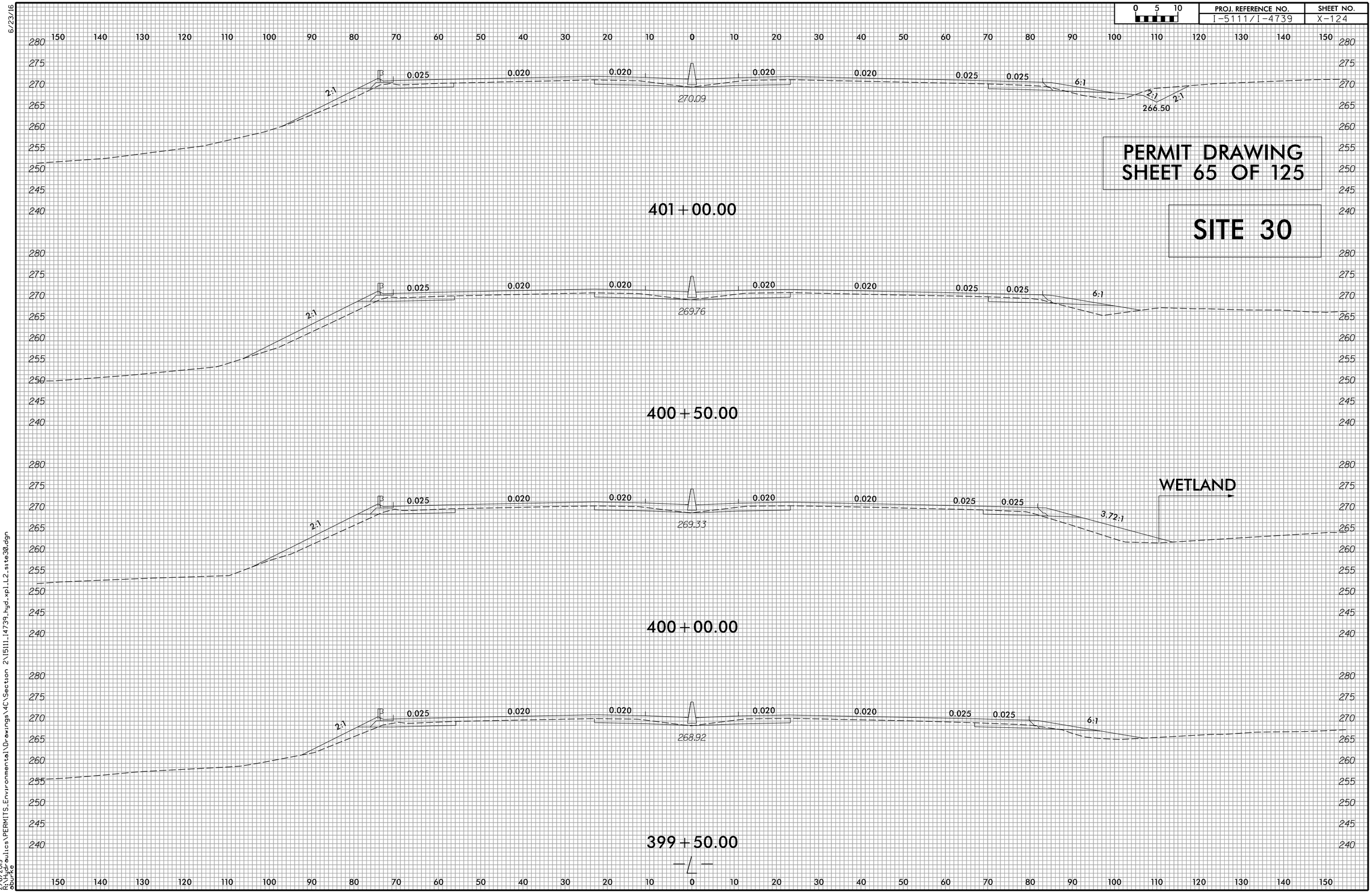
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-124



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dburke

8/17/99

25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 66 OF 125

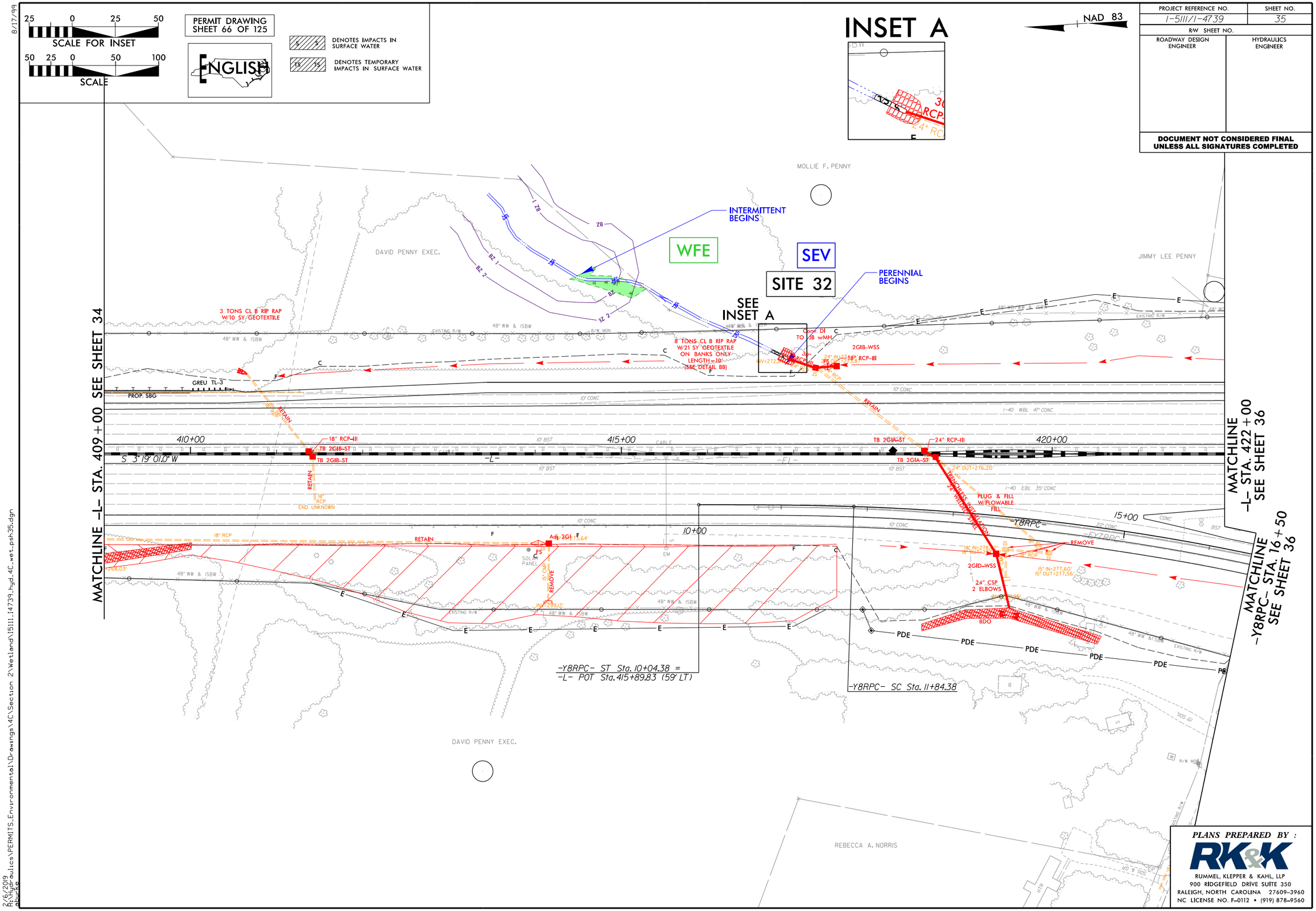
ENGLISH

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 67 OF 125

ENGLISH

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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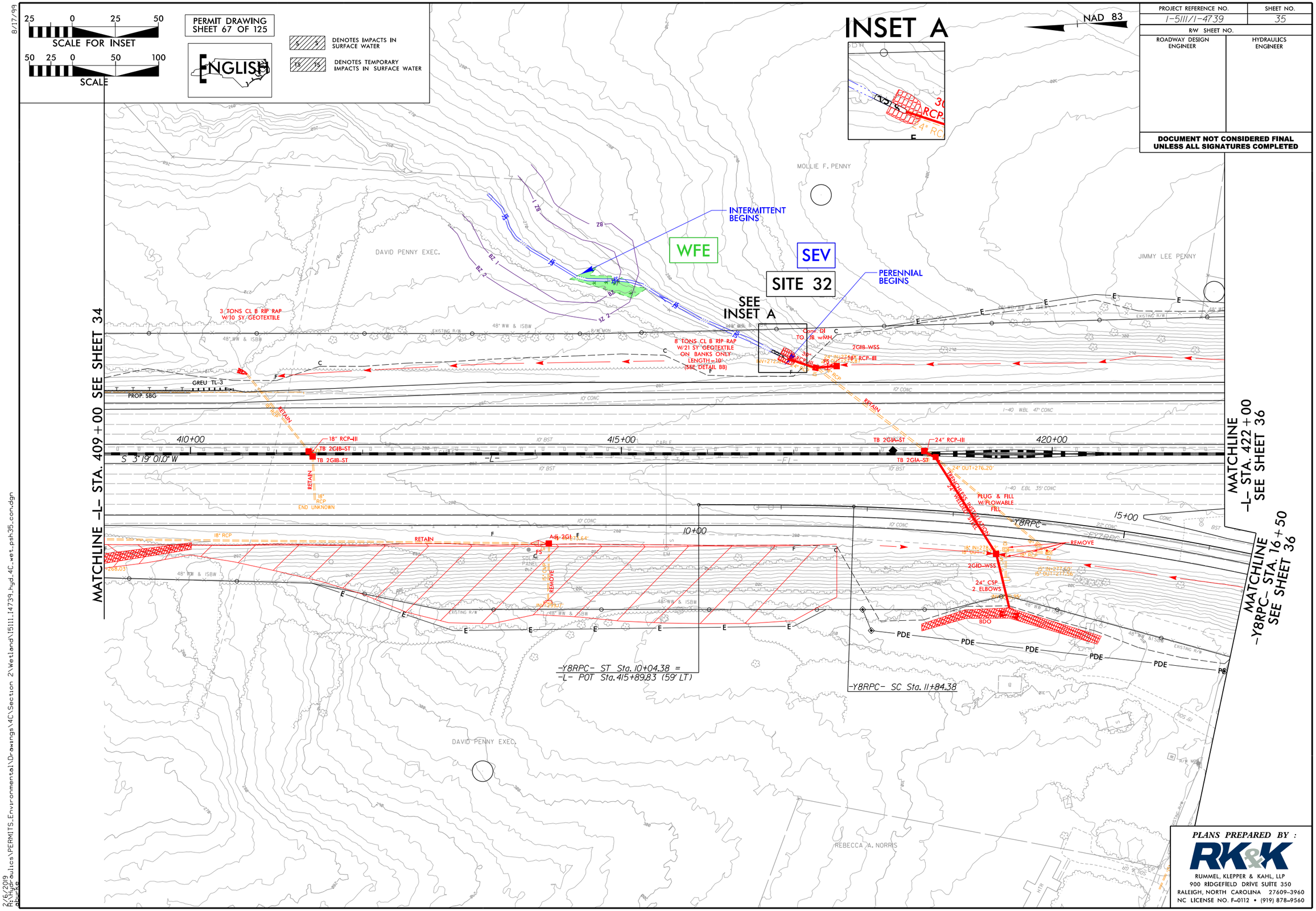

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REVISIONS

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

SCALE FOR INSET 25 0 25 50

SCALE 50 25 0 50 100

PERMIT DRAWING SHEET 68 OF 125

ENGLISH

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	37
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS

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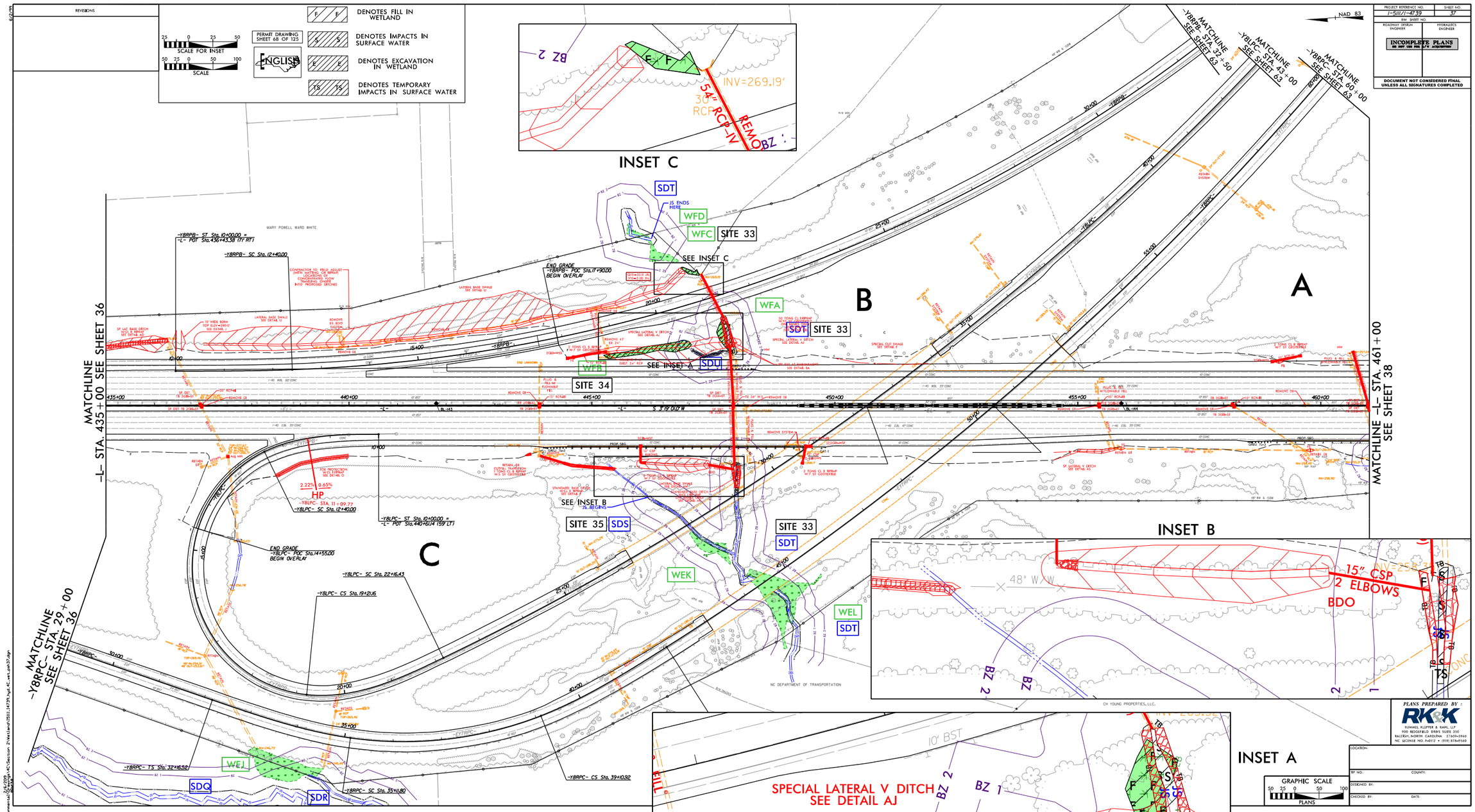
NAD 83



GRAPHIC SCALE 50 25 0 50 100 PLANS

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LOCATION:	
TIP NO.:	COUNTY:
DESIGNED BY:	
CHECKED BY:	DATE:

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5/4/2018

REVISIONS

SCALE FOR INSET 25 0 25 50

SCALE 50 25 0 50 100

PERMIT DRAWING SHEET 69 OF 125

ENGLISH

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

E E DENOTES EXCAVATION IN WETLAND

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	37
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS

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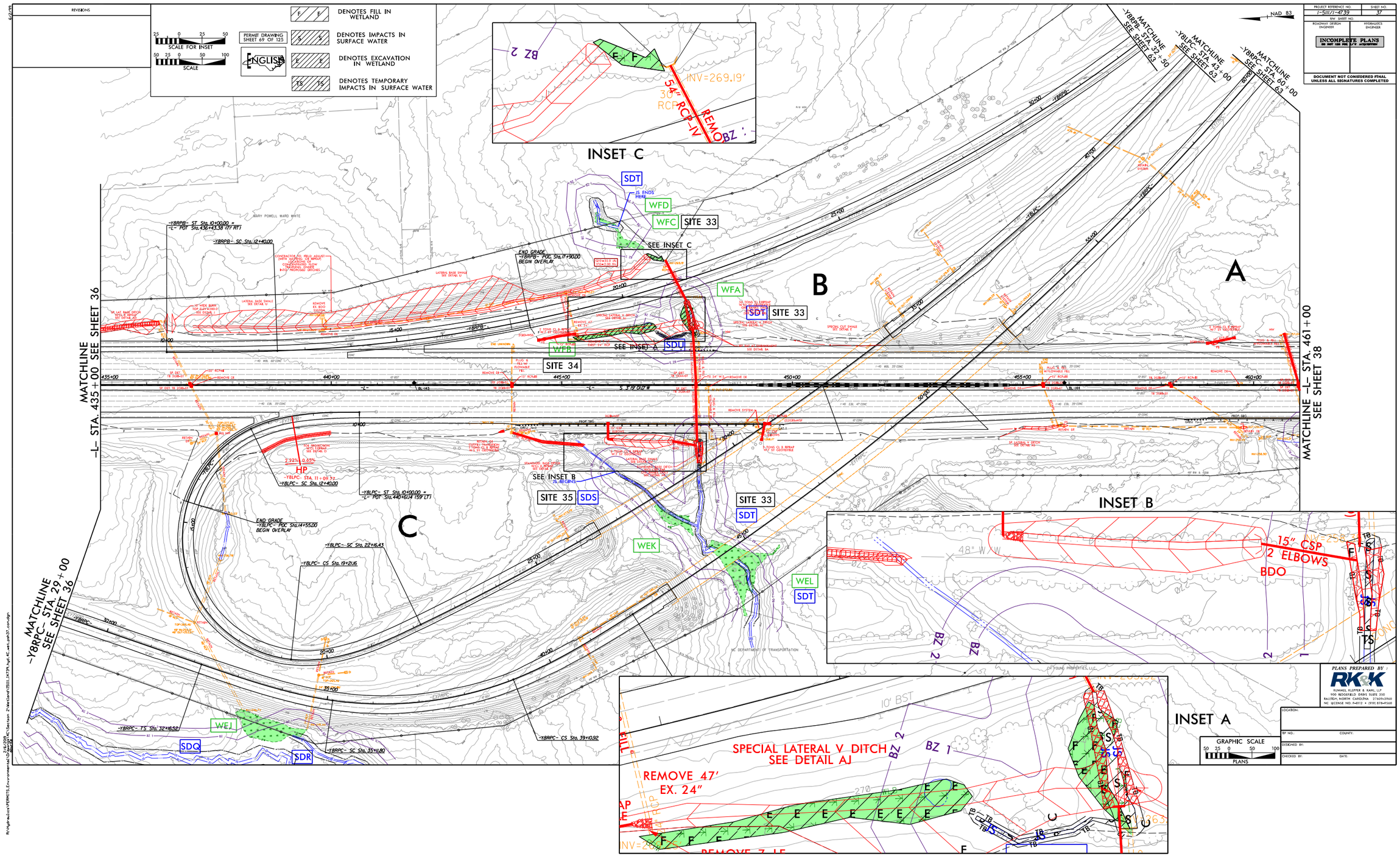

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LOCATION:	
TIP NO.:	COUNTY:
DESIGNED BY:	
CHECKED BY:	DATE:

2/6/2009
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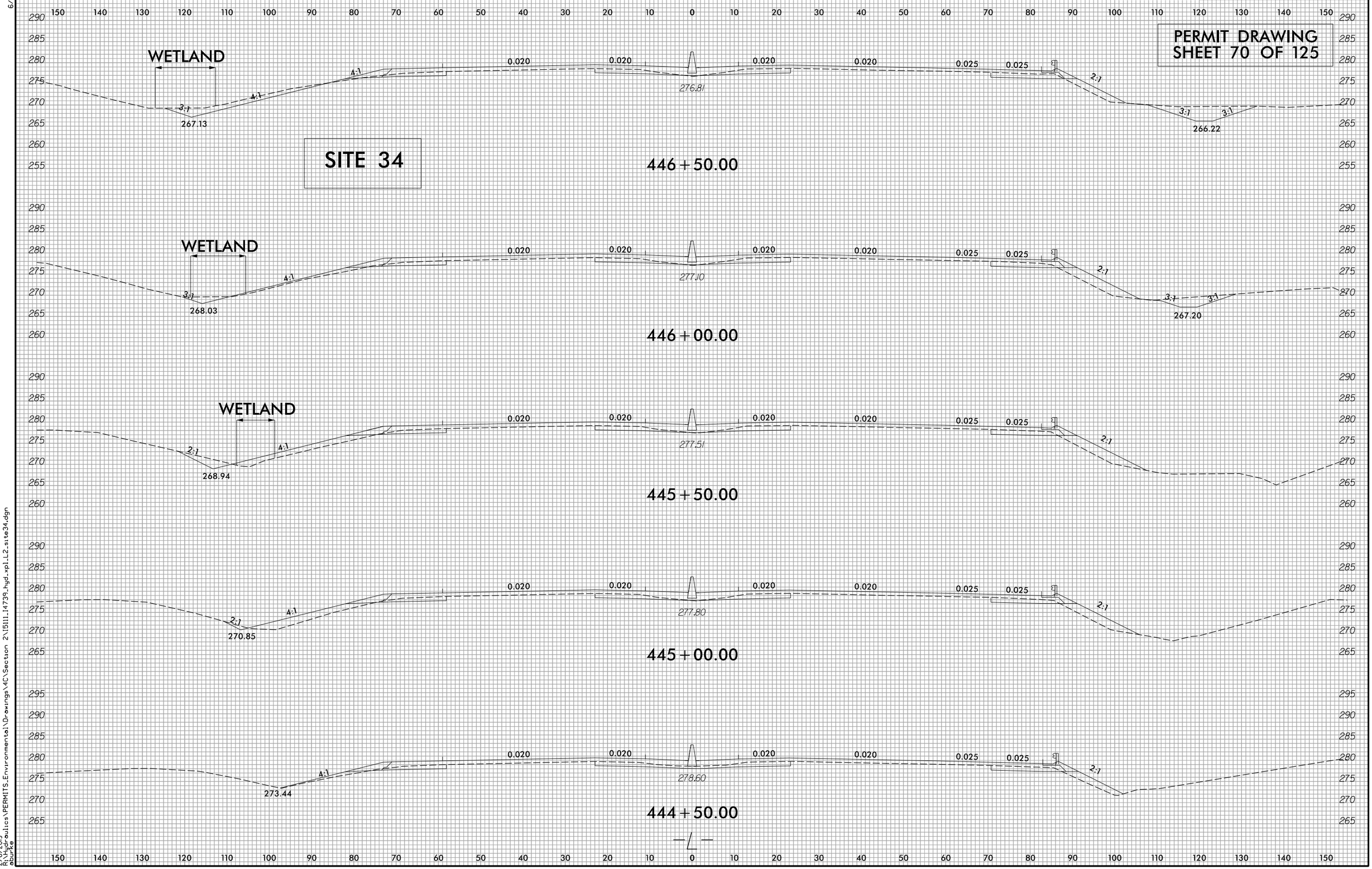
dbarnes

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-146

PERMIT DRAWING
SHEET 70 OF 125



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obunke

8/17/99

25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 71 OF 125

ENGLISH

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

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	38
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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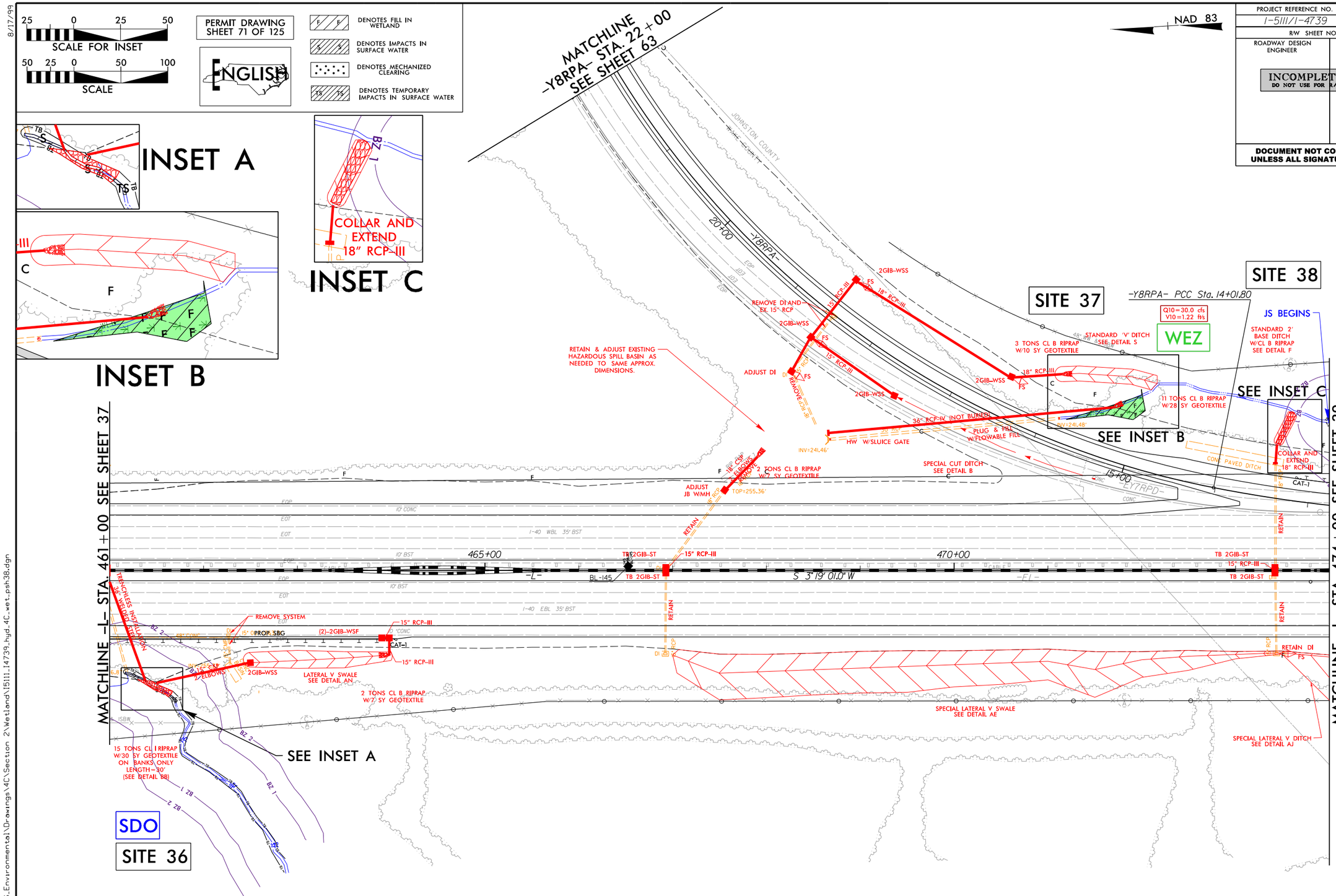
NAD 83



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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	38
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 72 OF 125

ENGLISH

DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

MATCHLINE -Y8RPA- STA. 22+00 SEE SHEET 63

INSET A

INSET B

INSET C

COLLAR AND EXTEND 18" RCP-III

SITE 37

SITE 38

-Y8RPA- PCC Sta. 14+01.80

Q10=30.0 cfs
V10=1.22 fps

WEZ

JS BEGINS

STANDARD 'V' DITCH SEE DETAIL 5

3 TONS CL B RIPRAP W/10 SY GEOTEXTILE

STANDARD 2' BASE DITCH W/CL B RIPRAP SEE DETAIL F

11 TONS CL B RIPRAP W/28 SY GEOTEXTILE

SEE INSET B

SEE INSET C

REMOVE DI AND EX. 15" RCP

RETAIN & ADJUST EXISTING HAZARDOUS SPILL BASIN AS NEEDED TO SAME APPROX. DIMENSIONS.

ADJUST DI

36" RCP-V (NOT BURIED)

PLUG & FILL W/FLOWABLE FILL

HW W/SLUICE GATE

SPECIAL CUT DITCH SEE DETAIL B

2 TONS CL B RIPRAP W/7 SY GEOTEXTILE

ADJUST JB W/MH

MATCHLINE -L- STA. 461+00 SEE SHEET 37

MATCHLINE -L- STA. 474+00 SEE SHEET 39

465+00

470+00

S 3°19' 01.0" W

TRENCHLESS INSTALLATION 36" HDPE CULVERT

REMOVE SYSTEM

15" DPROP. SBG

(2)-2GIB-WSF

15" RCP-III

LATERAL V SWALE SEE DETAIL AN

2 TONS CL B RIPRAP W/7 SY GEOTEXTILE

SPECIAL LATERAL V SWALE SEE DETAIL AE

SPECIAL LATERAL V DITCH SEE DETAIL AJ

15 TONS CL I RIPRAP W/30 SY GEOTEXTILE ON BANKS ONLY LENGTH=20' (SEE DETAIL BB)

SEE INSET A

SDO

SITE 36

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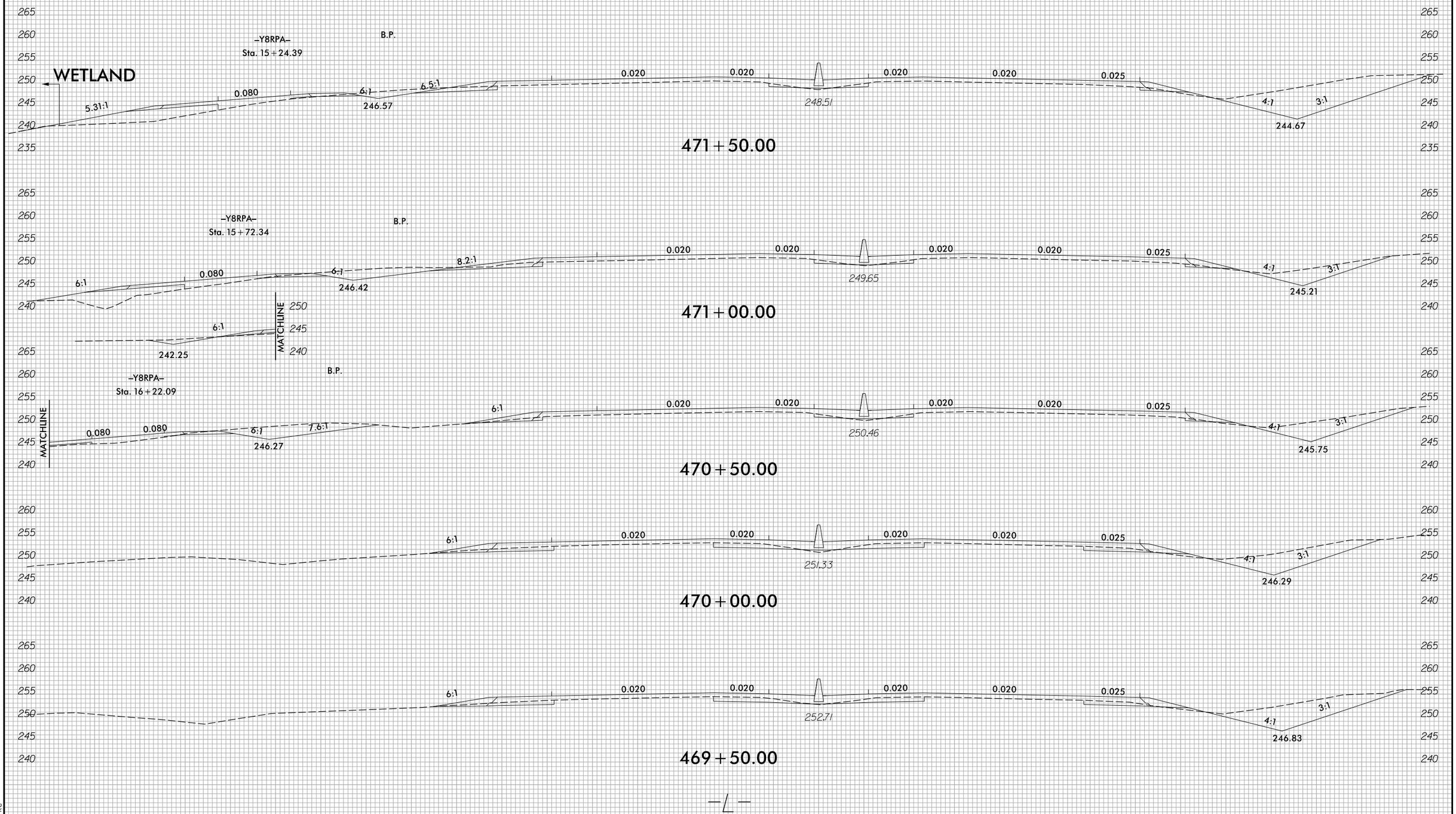
abburke

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-157

PERMIT DRAWING
SHEET 73 OF 125

SITE 37



6/23/16

2/6/2019
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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	61
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

25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

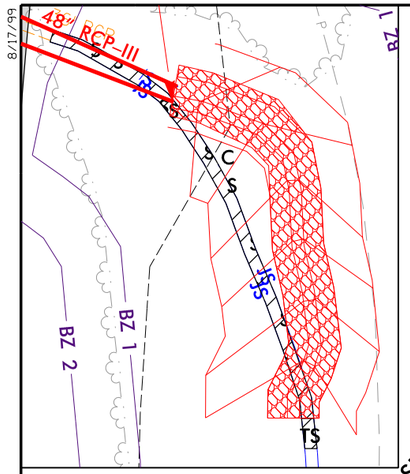
PERMIT DRAWING
SHEET 74 OF 125

ENGLISH

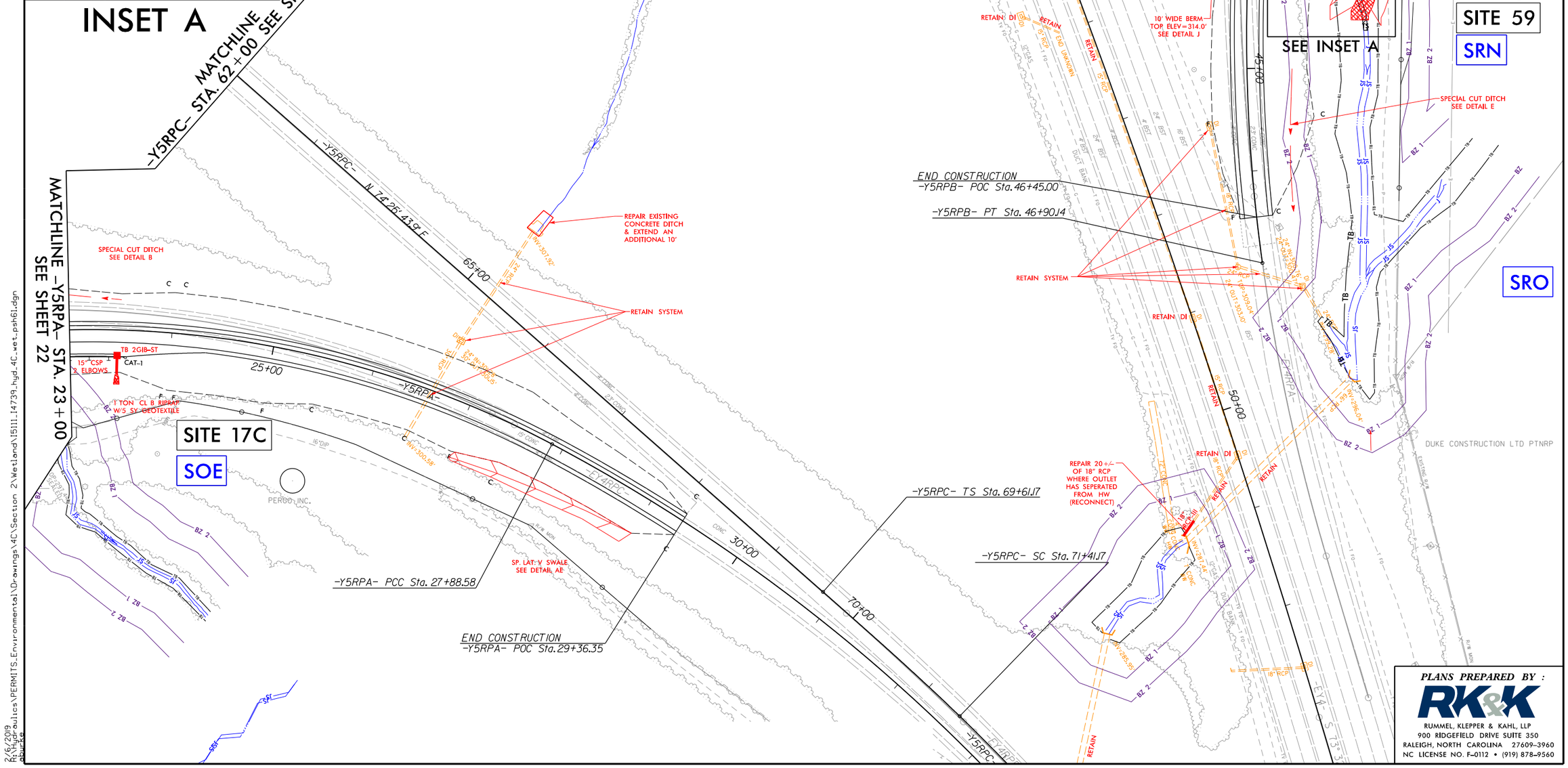
S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83



INSET A



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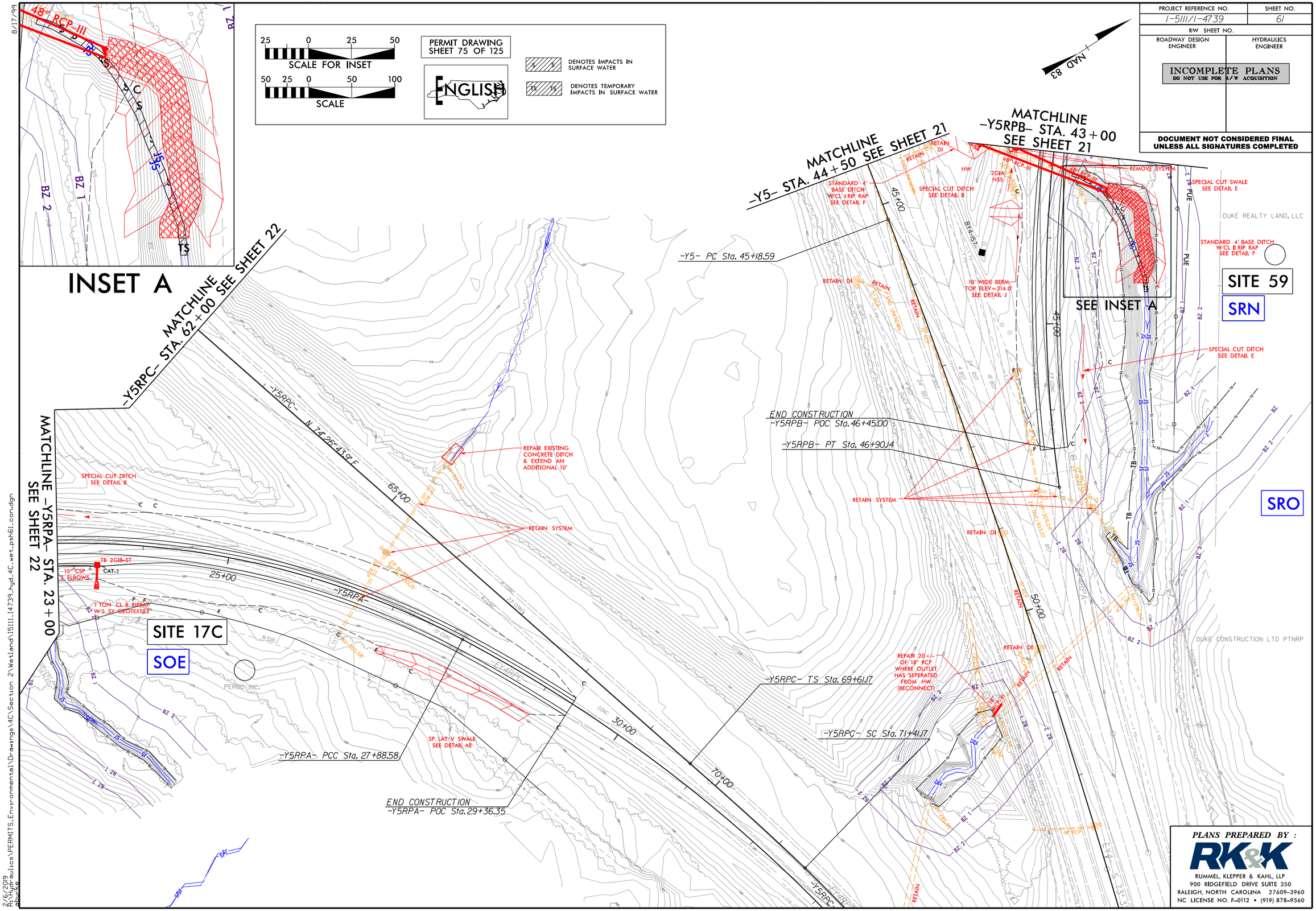

PROJECT REFERENCE NO.
I-5111/I-4739
SHEET NO.
61
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 75 OF 125
SCALE FOR INSET
SCALE
ENGLISH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83
INSET A
48" RCP-III
MATCHLINE -Y5RPC- STA. 62+00 SEE SHEET 22
MATCHLINE -Y5RPA- STA. 23+00 SEE SHEET 22
MATCHLINE -Y5- STA. 44+50 SEE SHEET 21
MATCHLINE -Y5RPB- STA. 43+00 SEE SHEET 21
SITE 59
SRN
SRO
SITE 17C
SOE
SEE INSET A
-Y5- PC Sta. 45+18.59
END CONSTRUCTION -Y5RPB- POC Sta. 46+45.00
-Y5RPB- PT Sta. 46+90.14
-Y5RPC- TS Sta. 69+61.17
-Y5RPC- SC Sta. 71+41.17
-Y5RPA- PCC Sta. 27+88.58
END CONSTRUCTION -Y5RPA- POC Sta. 29+36.35
-Y5RPC- N 74°26'43.9" E
REPAIR EXISTING CONCRETE DITCH & EXTEND AN ADDITIONAL 10'
SPECIAL CUT DITCH SEE DETAIL B
SPECIAL CUT DITCH SEE DETAIL E
SPECIAL CUT SWALE SEE DETAIL E
STANDARD 4' BASE DITCH W/CL I RIP RAP SEE DETAIL F
STANDARD 4' BASE DITCH W/CL II RIP RAP SEE DETAIL F
10' WIDE BERM TOP ELEV=314.0' SEE DETAIL J
REMOVE SYSTEM
RETAIN SYSTEM
REPAIR 20+/- OF 18" RCP WHERE OUTLET HAS SEPERATED FROM HW (RECONNECT)
SP. LAT. V SWALE SEE DETAIL AE
1 TON CL B RIPRAP W/5 SY GEOTEXTILE
15" CSP 2 ELBOWS
TB 2GIB-ST
CAT-1
DUKE REALTY LAND, LLC
DUKE CONSTRUCTION LTD PTNRP
PERGO INC.
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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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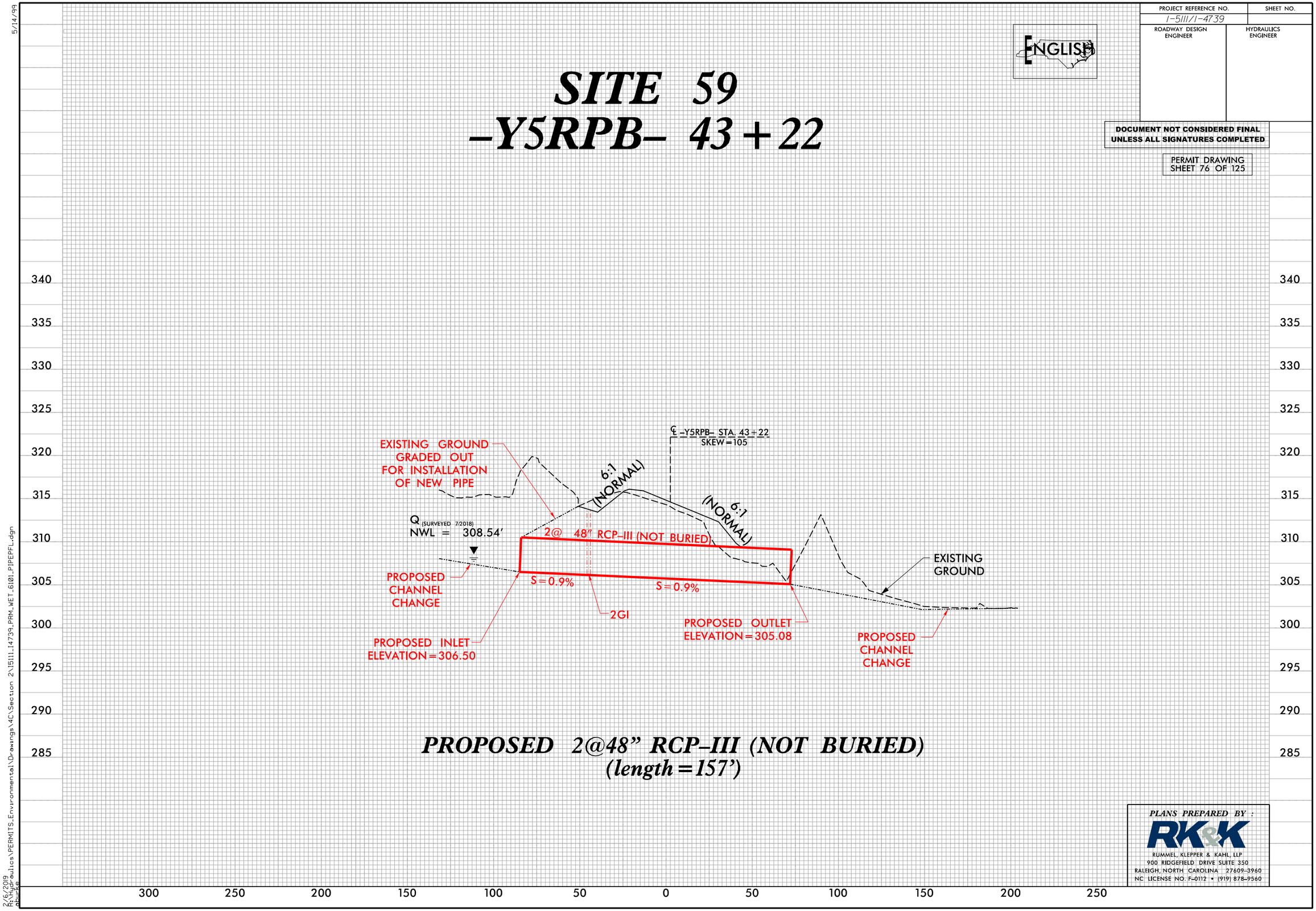
PERMIT DRAWING
SHEET 76 OF 125

SITE 59
–Y5RPB– 43+22



PROPOSED 2@48" RCP–III (NOT BURIED)
(length=157')

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	63
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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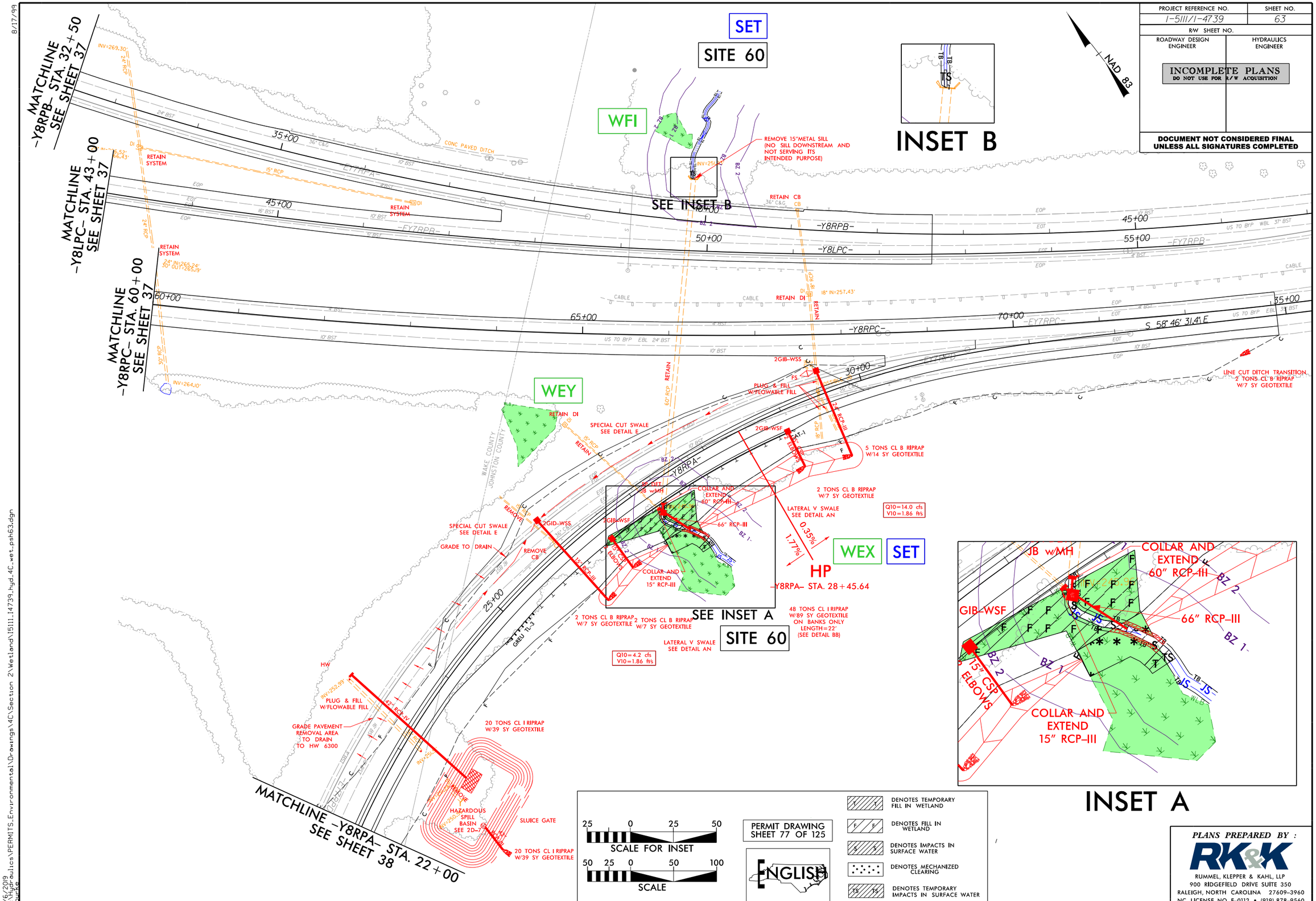

25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 77 OF 125

ENGLISH

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

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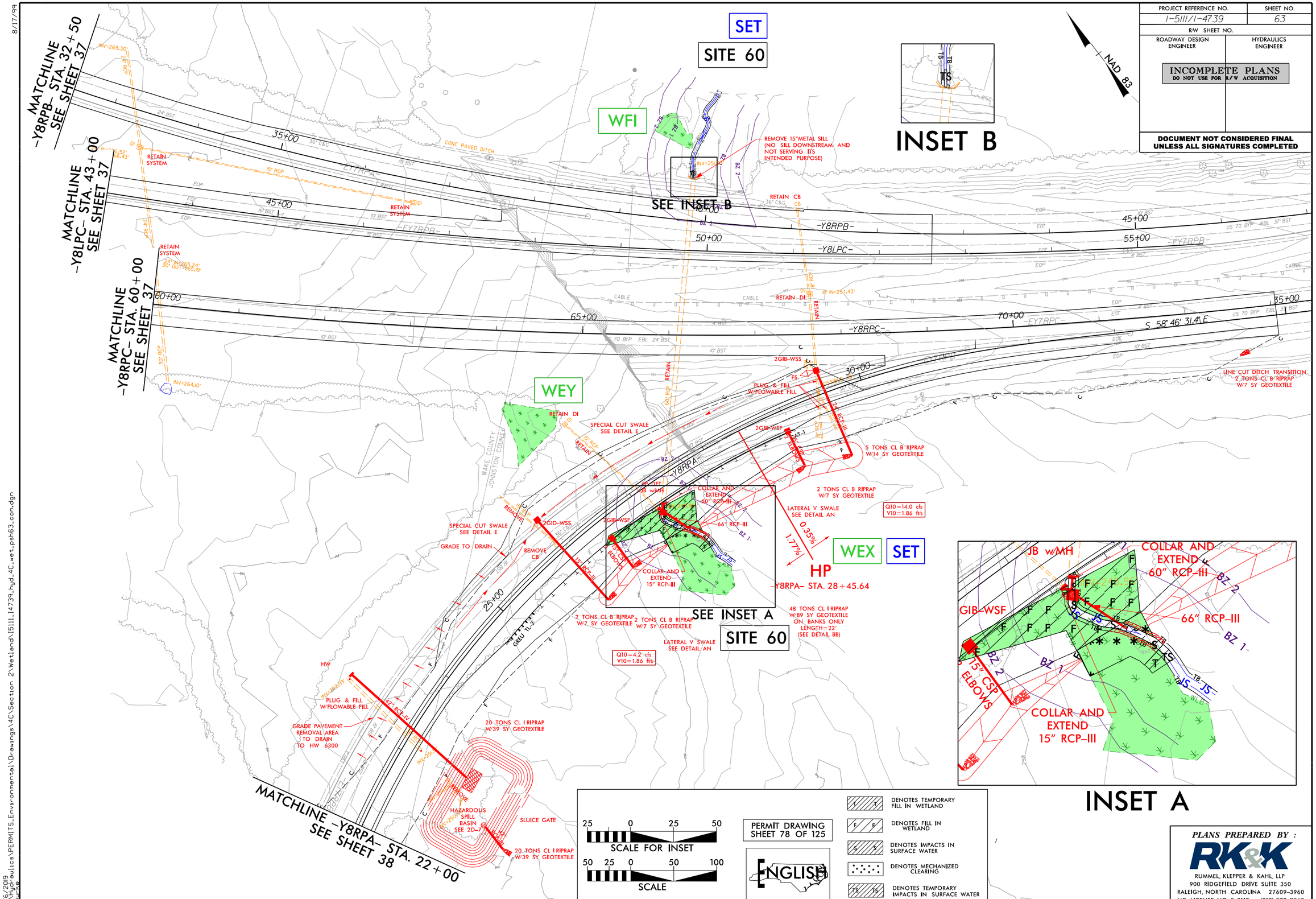

PROJECT REFERENCE NO.
I-5111/I-4739
SHEET NO.
63
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
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NAD 83
SET
SITE 60
WFI
WEY
WEX
SET
INSET B
SEE INSET B
SEE INSET A
SITE 60
HP
-Y8RPA- STA. 28+45.64
MATCHLINE -Y8RPB- STA. 32+50 SEE SHEET 37
MATCHLINE -Y8LPC- STA. 43+00 SEE SHEET 37
MATCHLINE -Y8RPC- STA. 60+00 SEE SHEET 37
MATCHLINE -Y8RPA- STA. 22+00 SEE SHEET 38
REMOVE 15" METAL SILL (NO SILL DOWNSTREAM AND NOT SERVING ITS INTENDED PURPOSE)
RETAIN SYSTEM
RETAIN CB
RETAIN DI
CONC PAVED DITCH
-Y8RPB-
-Y8LPC-
-Y8RPC-
-Y8RPA-
S 58° 46' 31.4" E
LINE CUT DITCH TRANSITION 2 TONS CL B RIPRAP W/7 SY GEOTEXTILE
5 TONS CL B RIPRAP W/14 SY GEOTEXTILE
2 TONS CL B RIPRAP W/7 SY GEOTEXTILE
LATERAL V SWALE SEE DETAIL AN
Q10=14.0 cfs V10=1.86 ft/s
Q10=4.2 cfs V10=1.86 ft/s
48 TONS CL I RIPRAP W/89 SY GEOTEXTILE ON BANKS ONLY LENGTH=22' (SEE DETAIL BB)
SPECIAL CUT SWALE SEE DETAIL E
GRADE TO DRAIN
REMOVE CB
COLLAR AND EXTEND 60" RCP-III
COLLAR AND EXTEND 15" RCP-III
66" RCP-III
PLUG & FILL W/FLOWABLE FILL
GRADE PAVEMENT REMOVAL AREA TO DRAIN TO HW 6300
20 TONS CL I RIPRAP W/39 SY GEOTEXTILE
HAZARDOUS SPILL BASIN SEE 2D-7
SLUICE GATE
WAKE COUNTY
JOHNSTON COUNTY
JB w/MH
GIB-WSF
15" CSP ELBOWS
INSET A
SCALE FOR INSET
SCALE
PERMIT DRAWING SHEET 78 OF 125
ENGLISH
DENOTES TEMPORARY FILL IN WETLAND
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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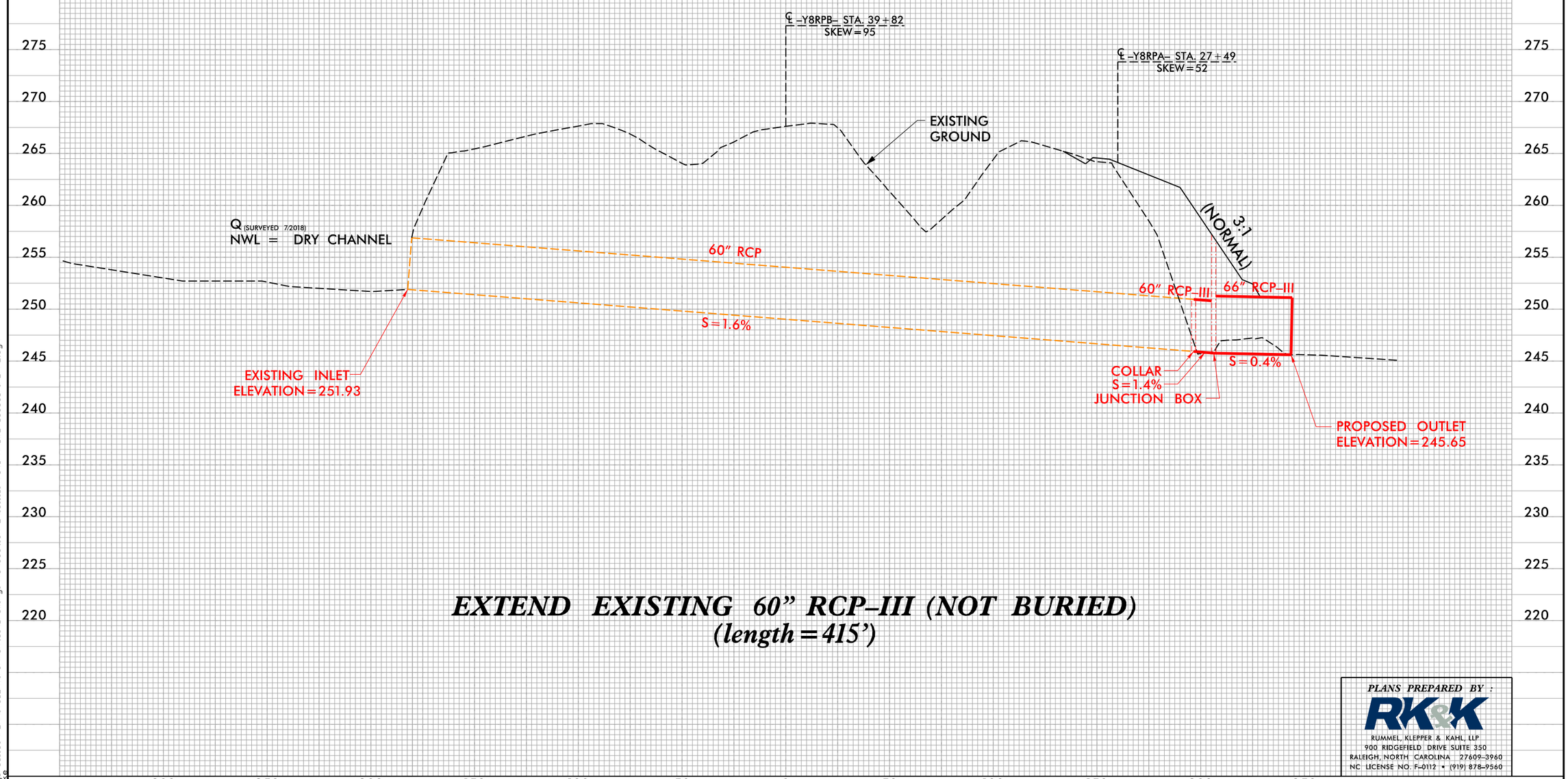
PERMIT DRAWING
SHEET 79 OF 125

SITE 60
–Y8RPB 39+82



EXTEND EXISTING 60" RCP–III (NOT BURIED)
(length=415')

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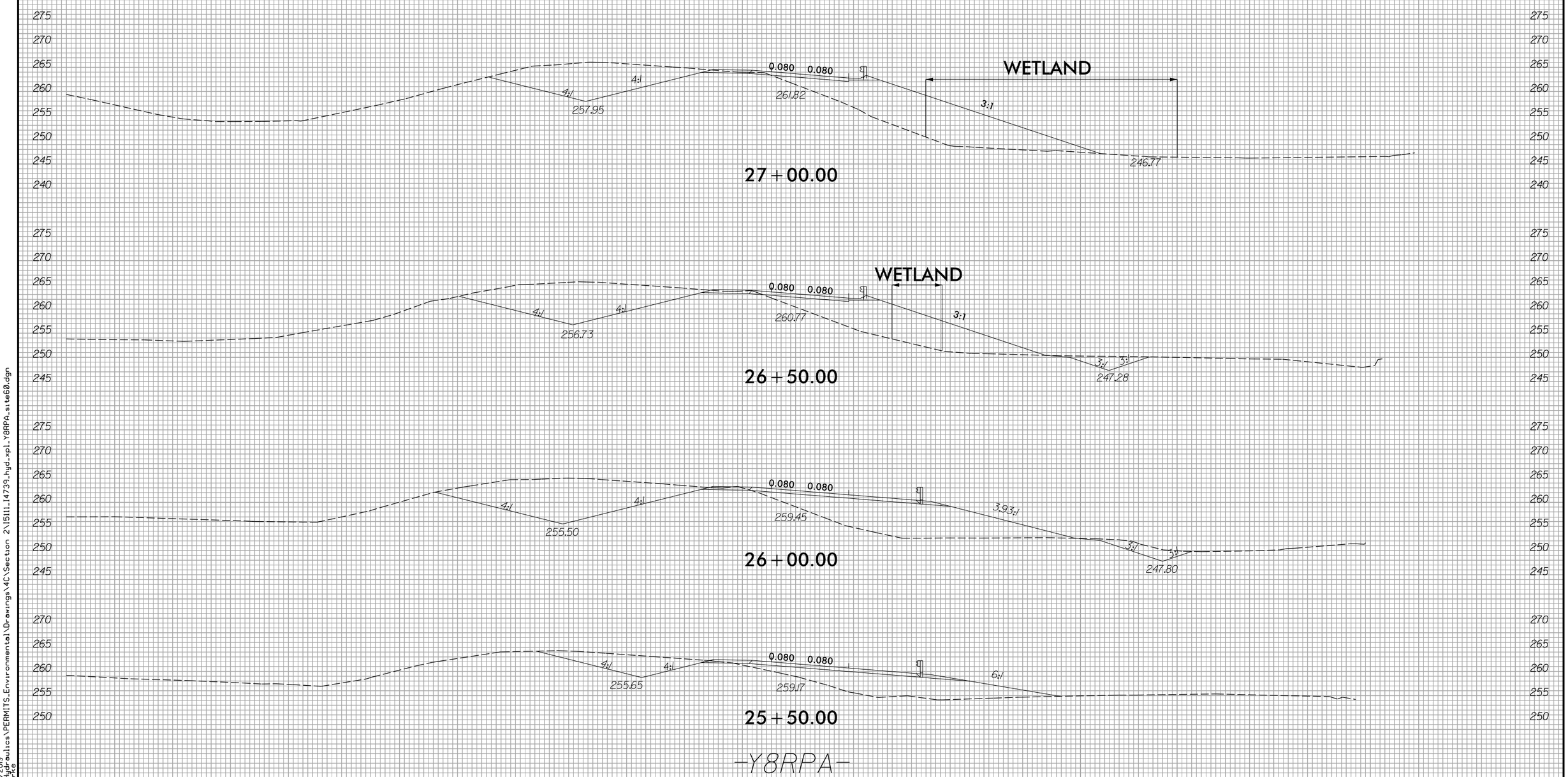
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-224

PERMIT DRAWING
SHEET 80 OF 125

SITE 60



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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	40
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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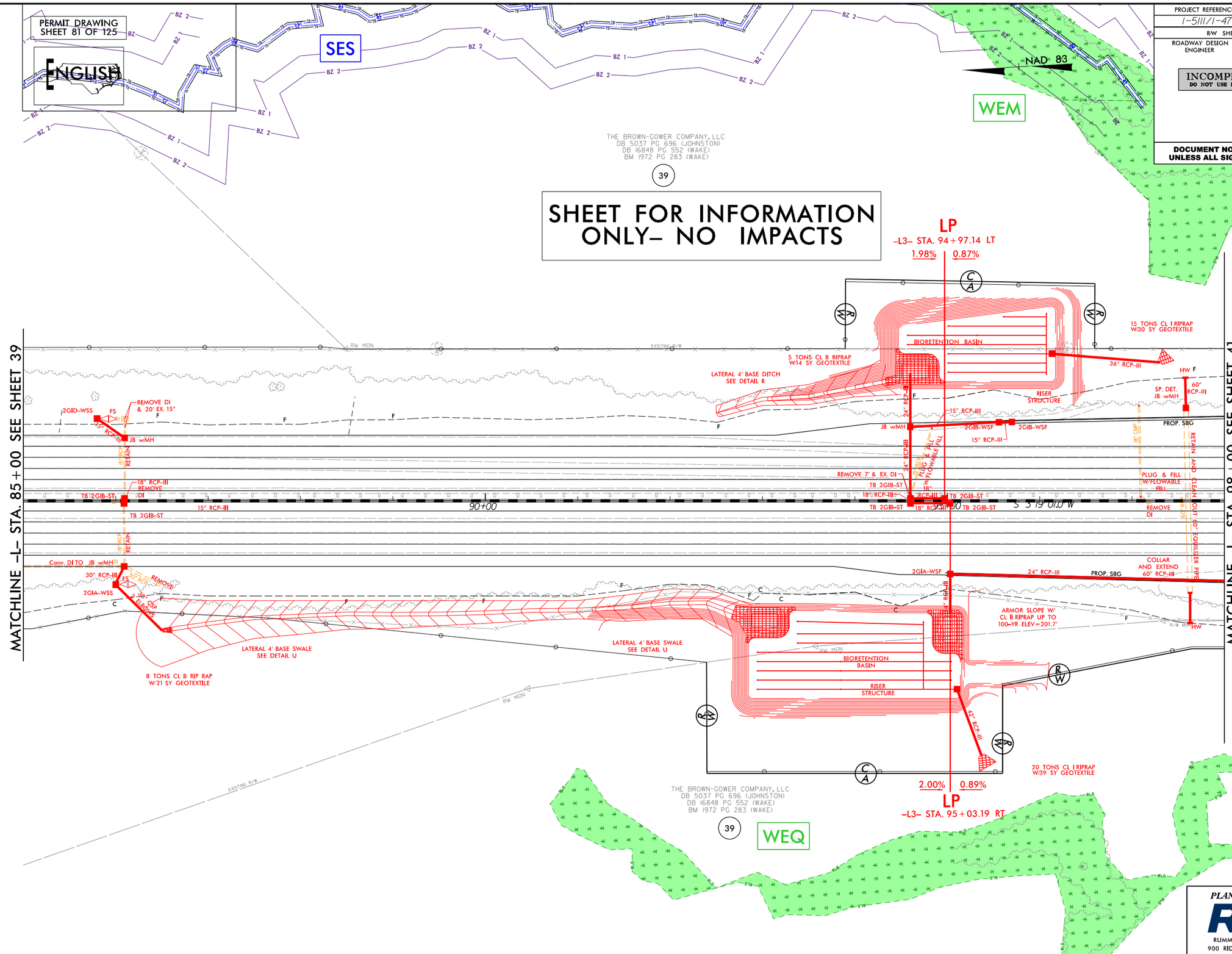

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	40
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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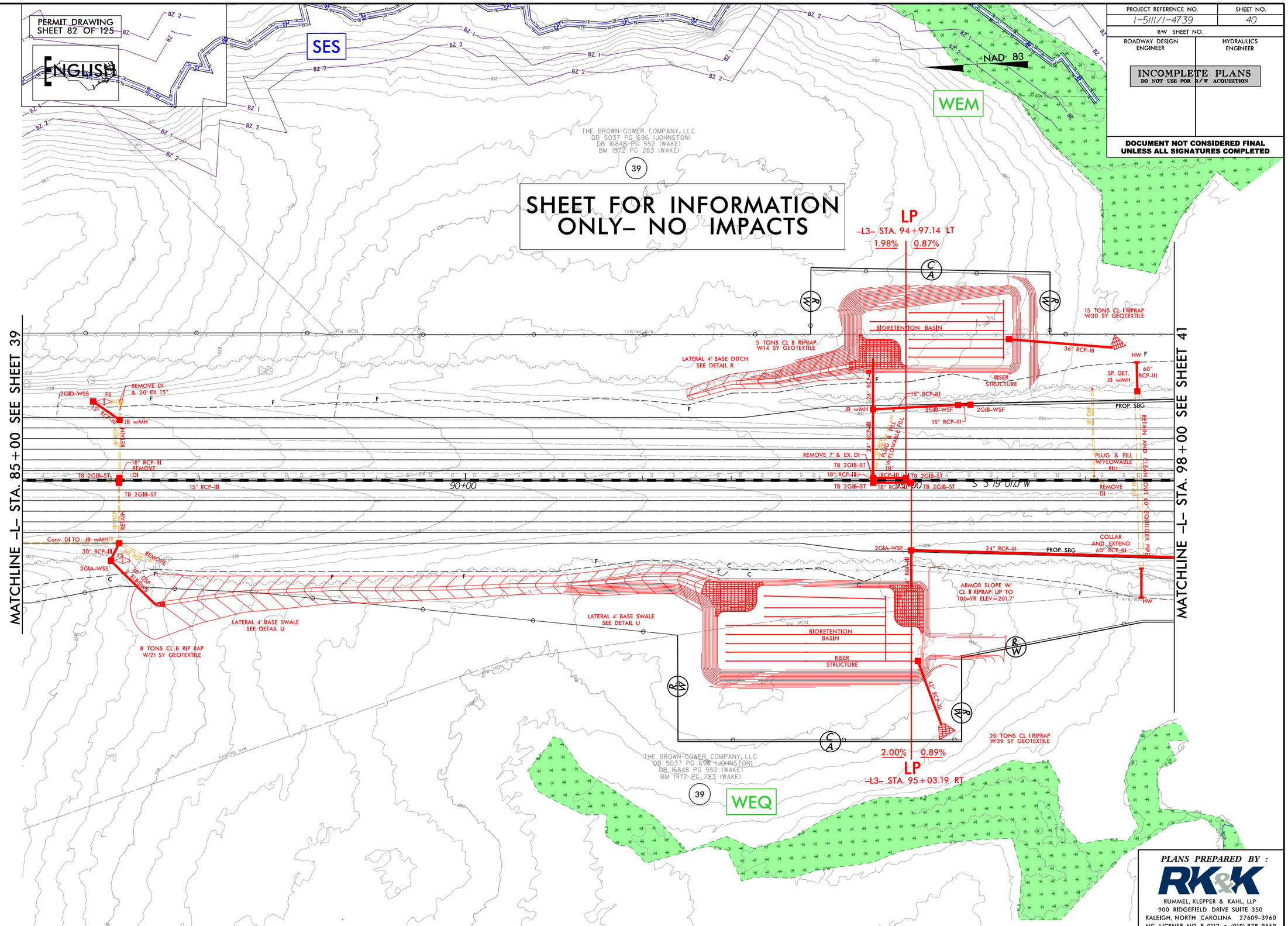

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	41
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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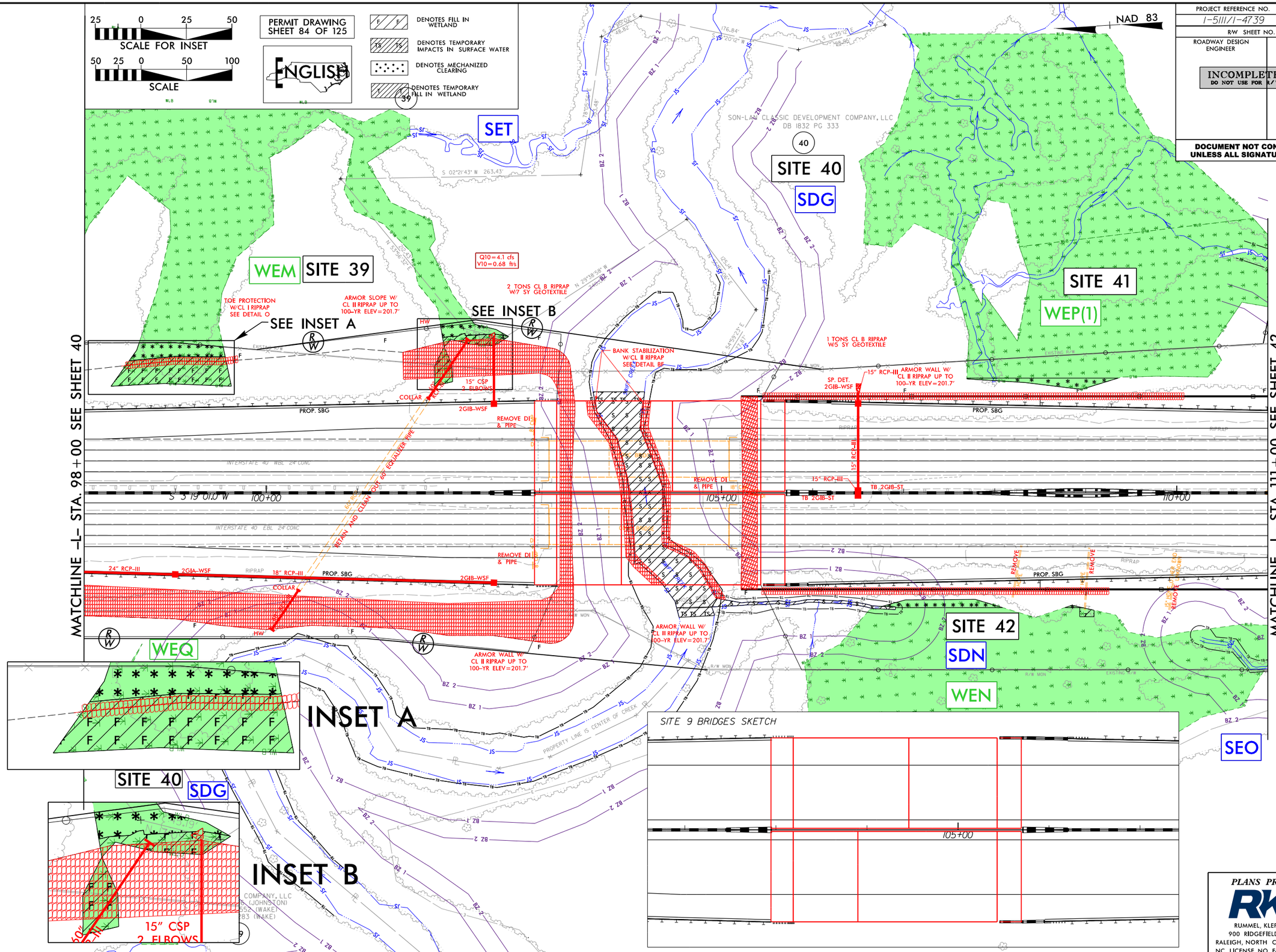

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	41
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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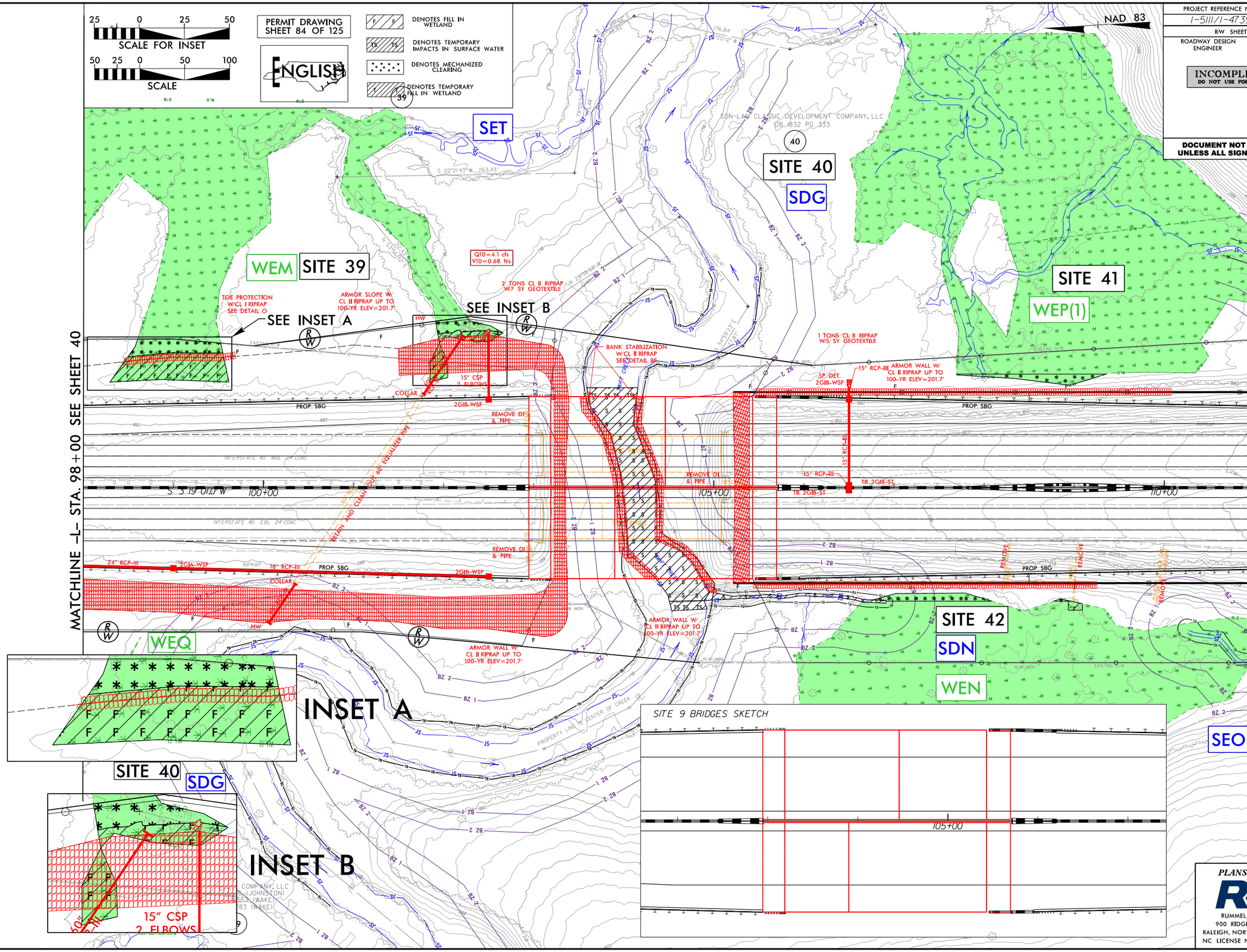

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PERMIT DRAWING
SHEET 85 OF 125

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	109
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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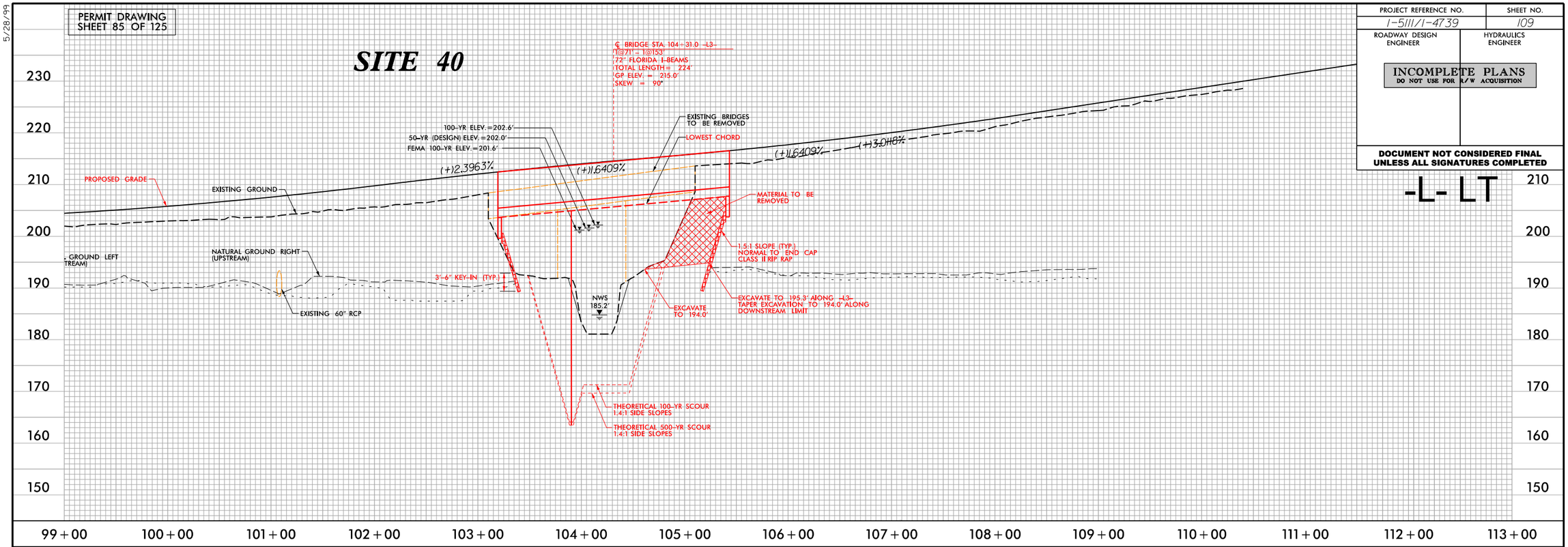
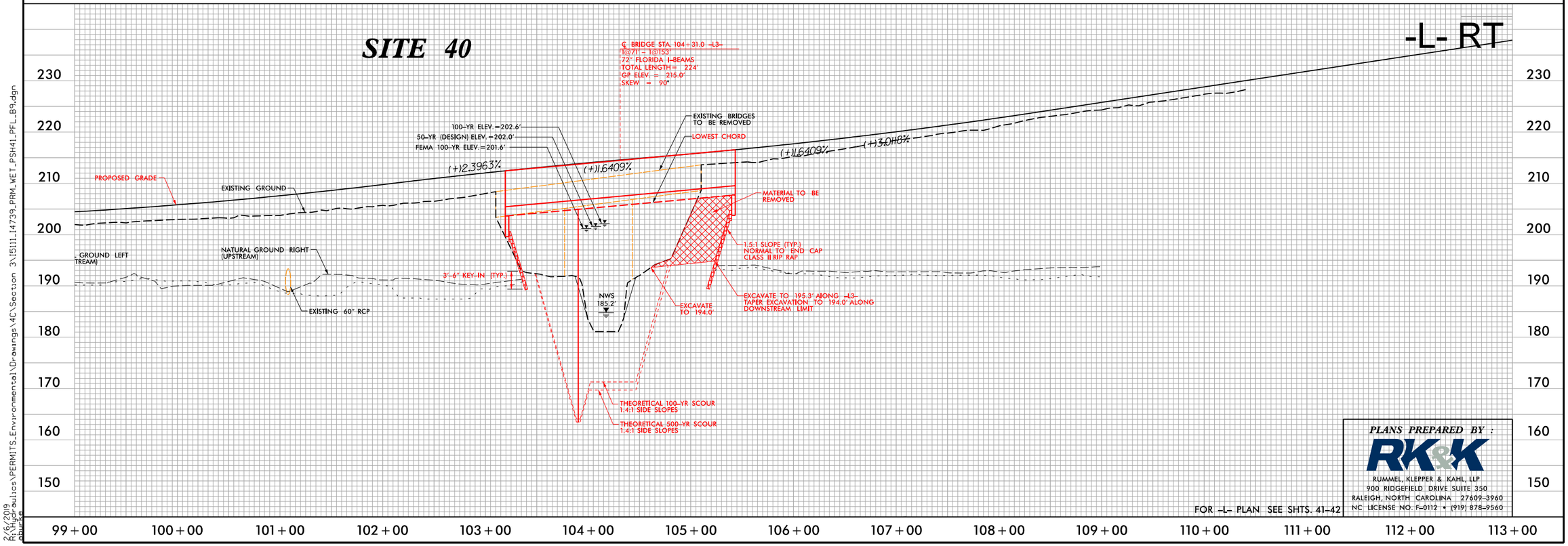
-L- LT



-L- RT



FOR -L- PLAN SEE SHTS. 41-42

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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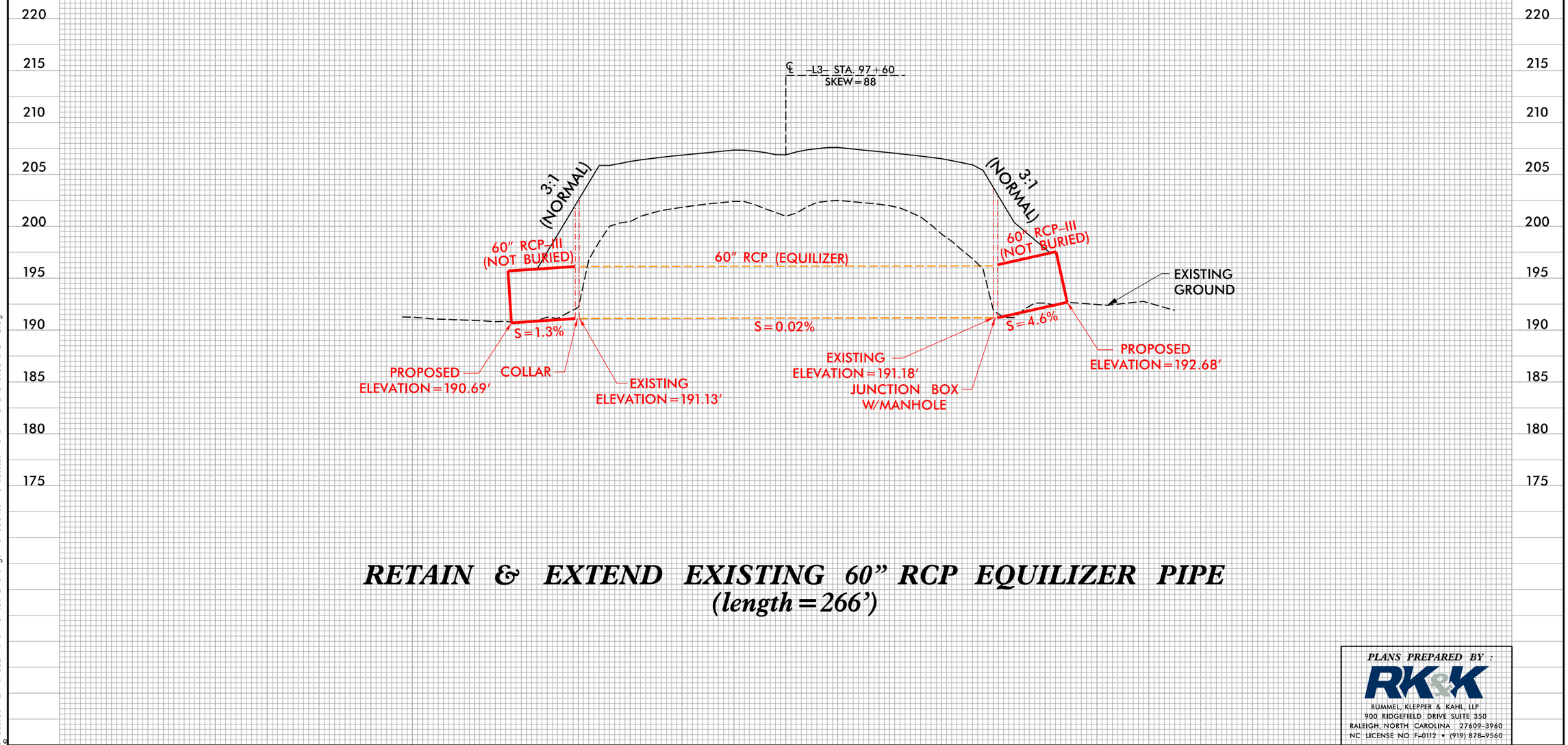
SHEET 86 OF 125

SITE 39
-L3- 97+60



RETAIN & EXTEND EXISTING 60" RCP EQUILIZER PIPE
(length=266')

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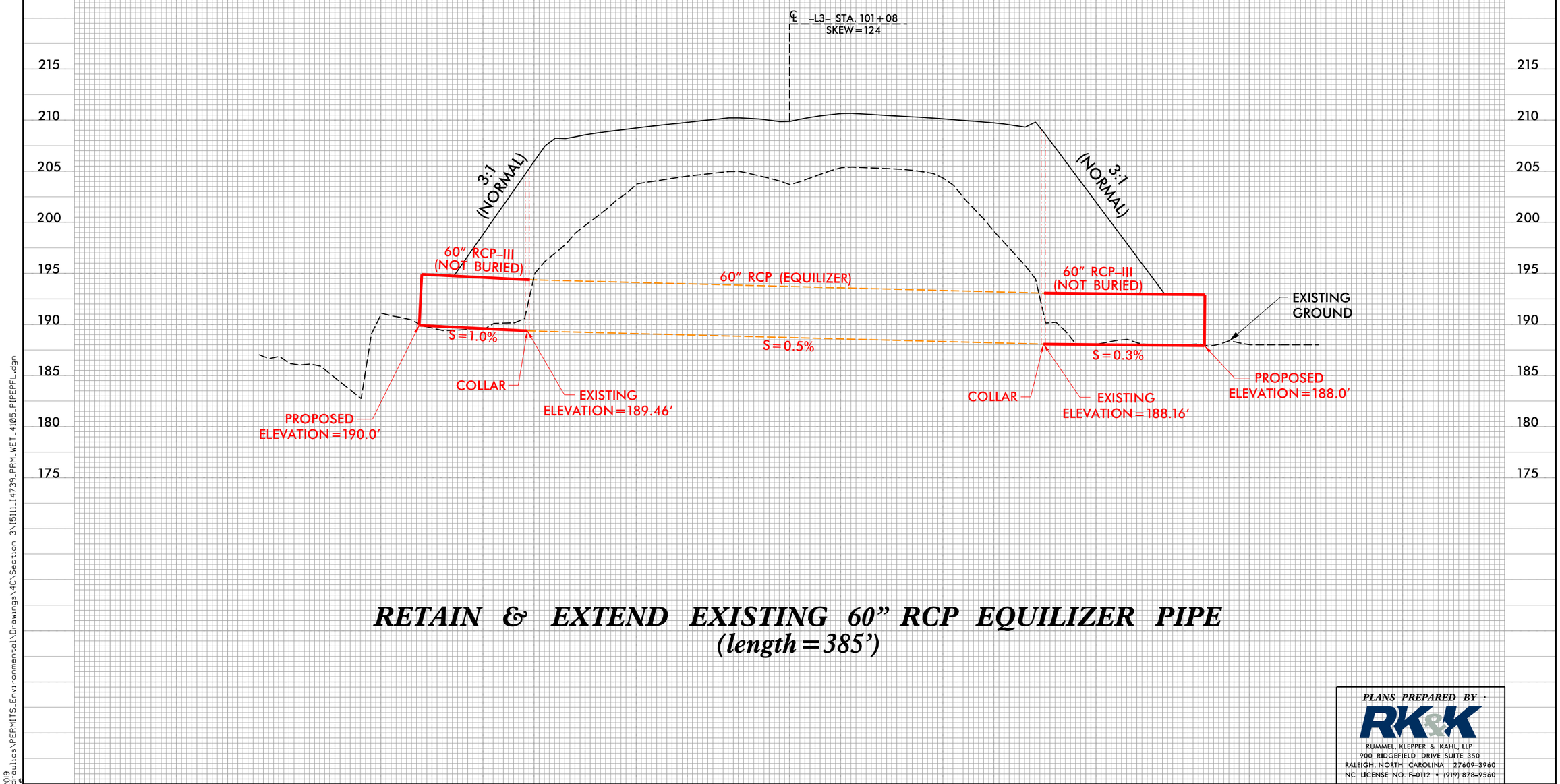
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 87 OF 125

SITE 40
-L3- 101+08



RETAIN & EXTEND EXISTING 60" RCP EQUILIZER PIPE
(length=385')

PLANS PREPARED BY :

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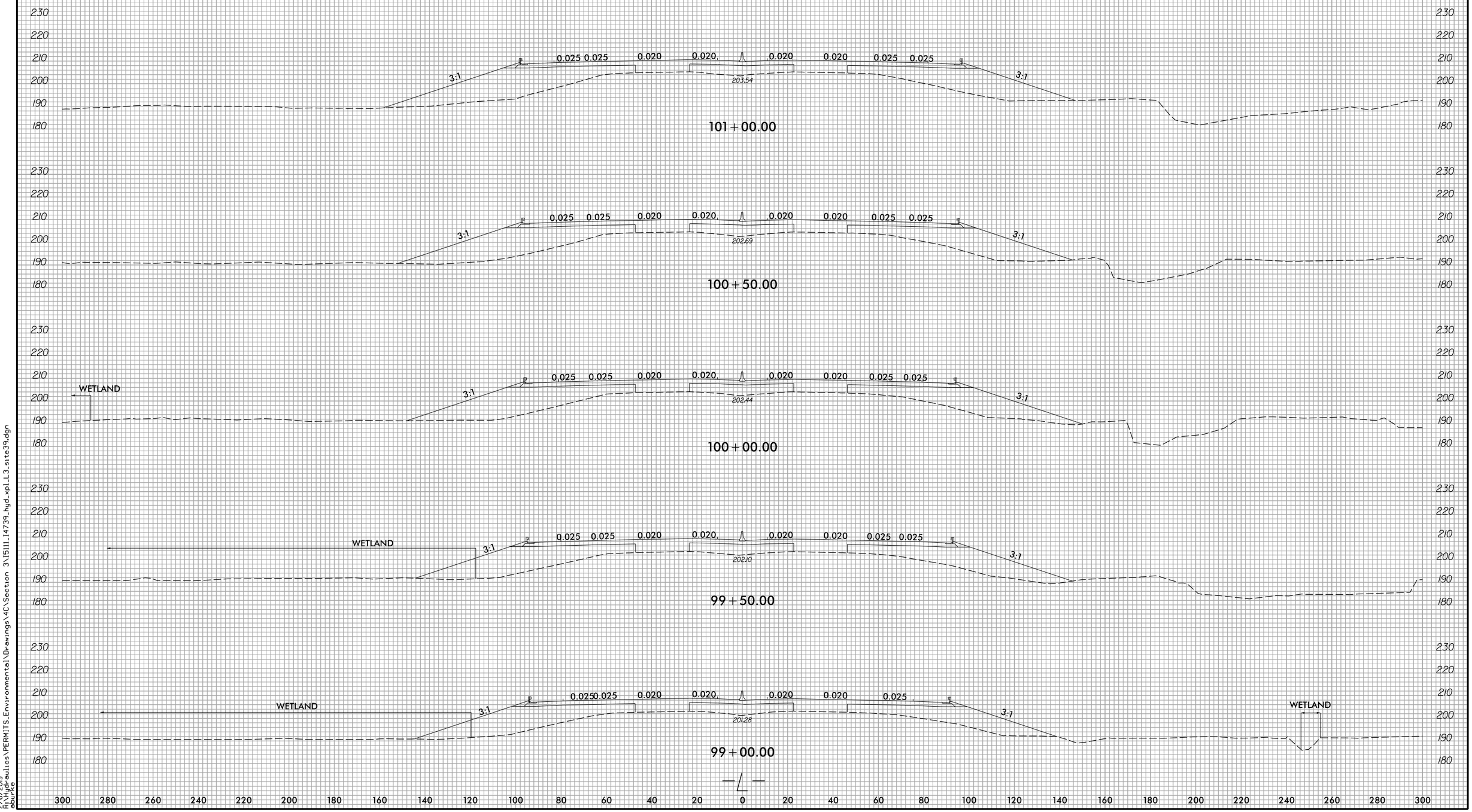
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-7

PERMIT DRAWING
SHEET 88 OF 125

SITE 39



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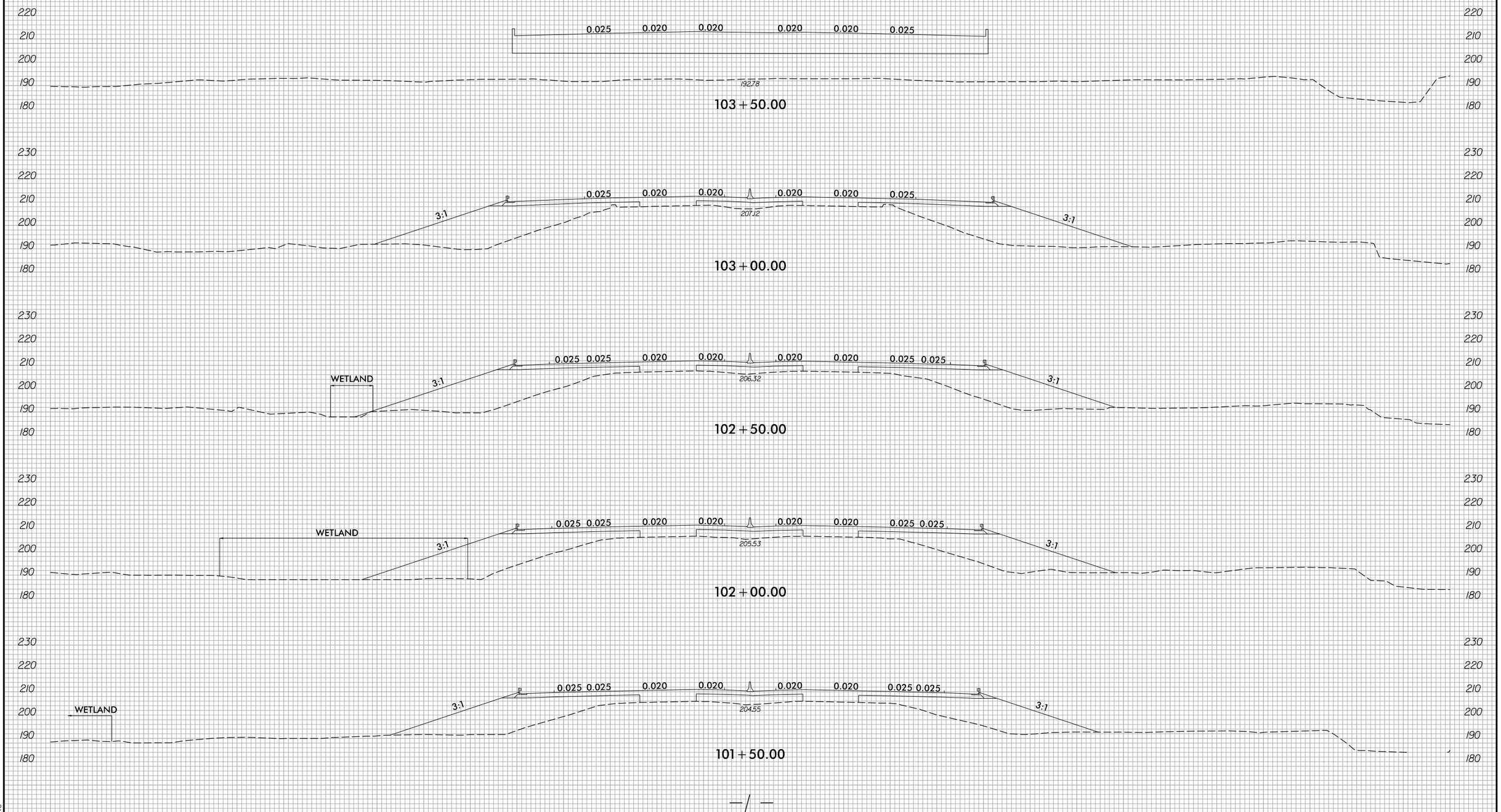
dburke

6/23/16

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-8

PERMIT DRAWING
SHEET 89 OF 125

SITE 40



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aburke

6/23/16

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-10

PERMIT DRAWING
SHEET 90 OF 125

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8/17/99

25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 92 OF 125

ENGLISH

DENOTES TEMPORARY FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	42
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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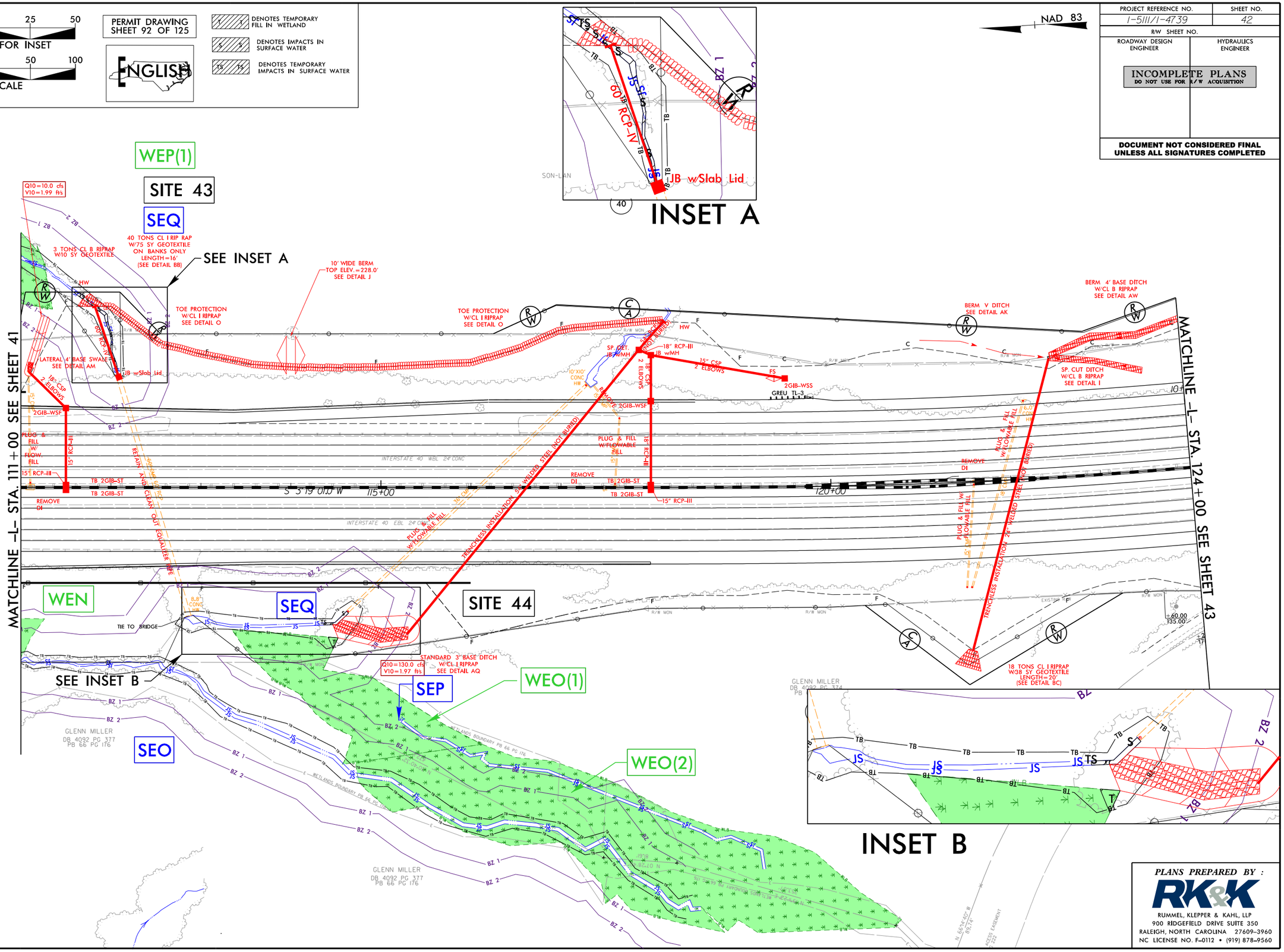

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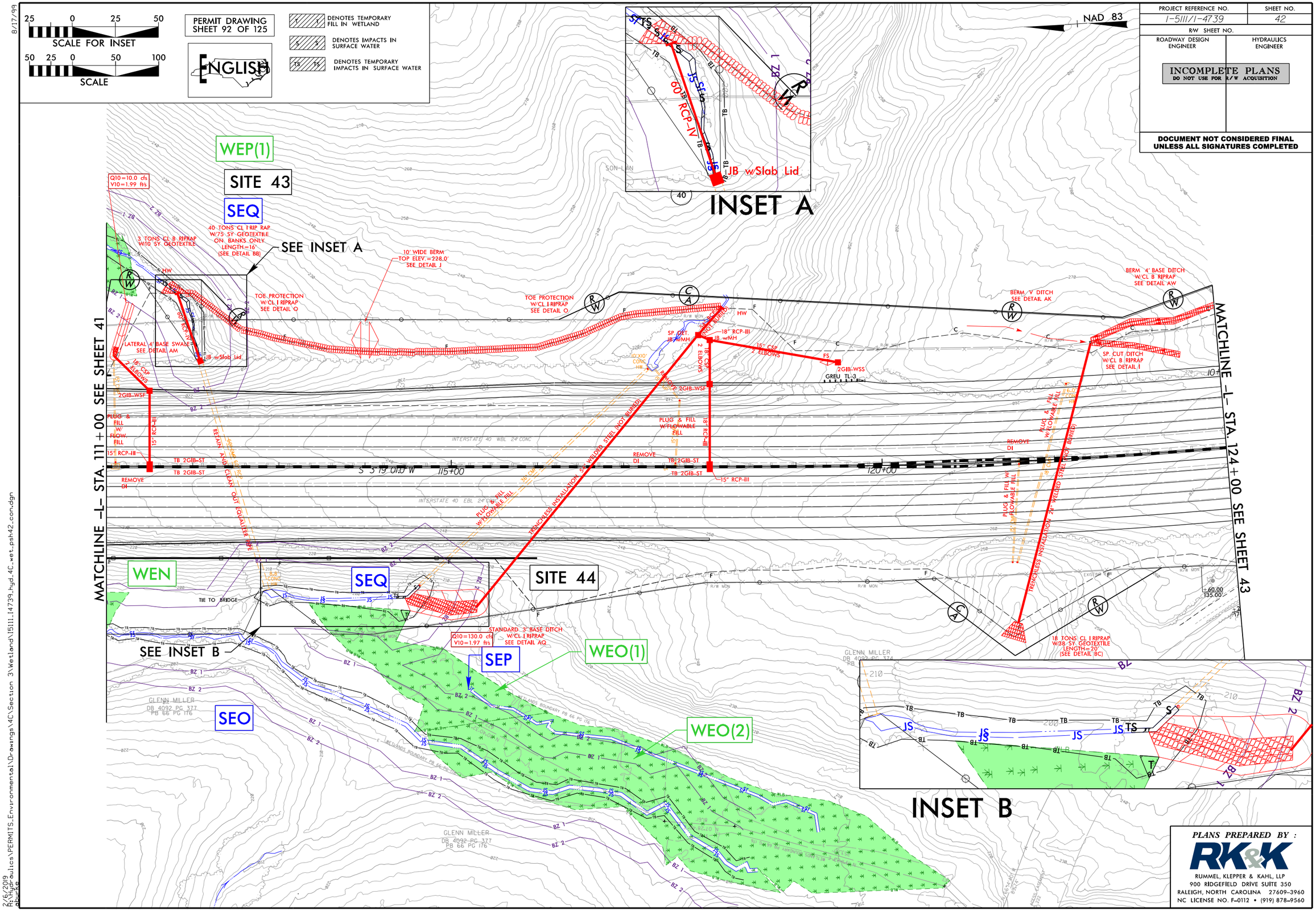

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	42
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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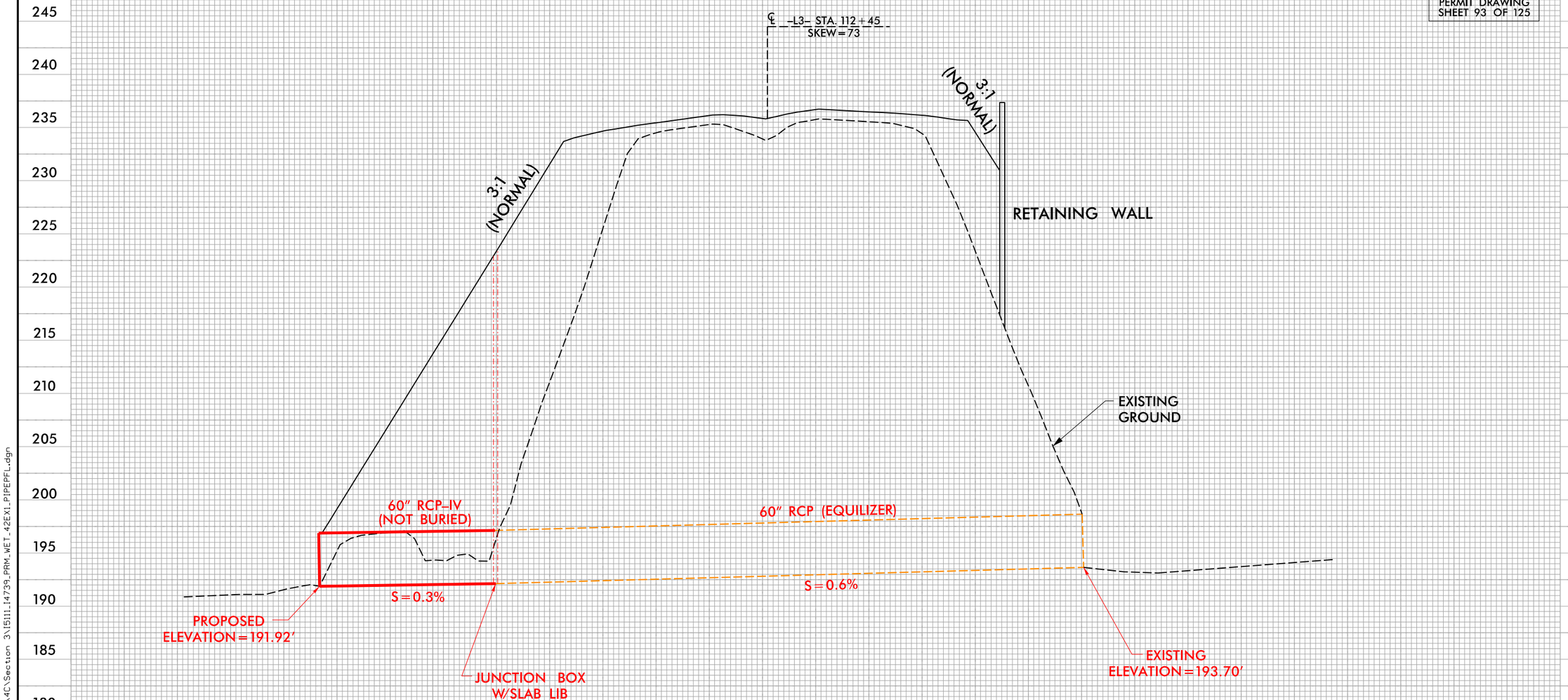
SHEET 93 OF 125

SITE 43 & 44
-L3- 112+45



RETAIN & EXTEND EXISTING 60" RCP EQUILIZER PIPE
(length=360')

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25 0 25 50
SCALE FOR INSET

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SCALE

PERMIT DRAWING
SHEET 94 OF 125

ENGLISH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	44
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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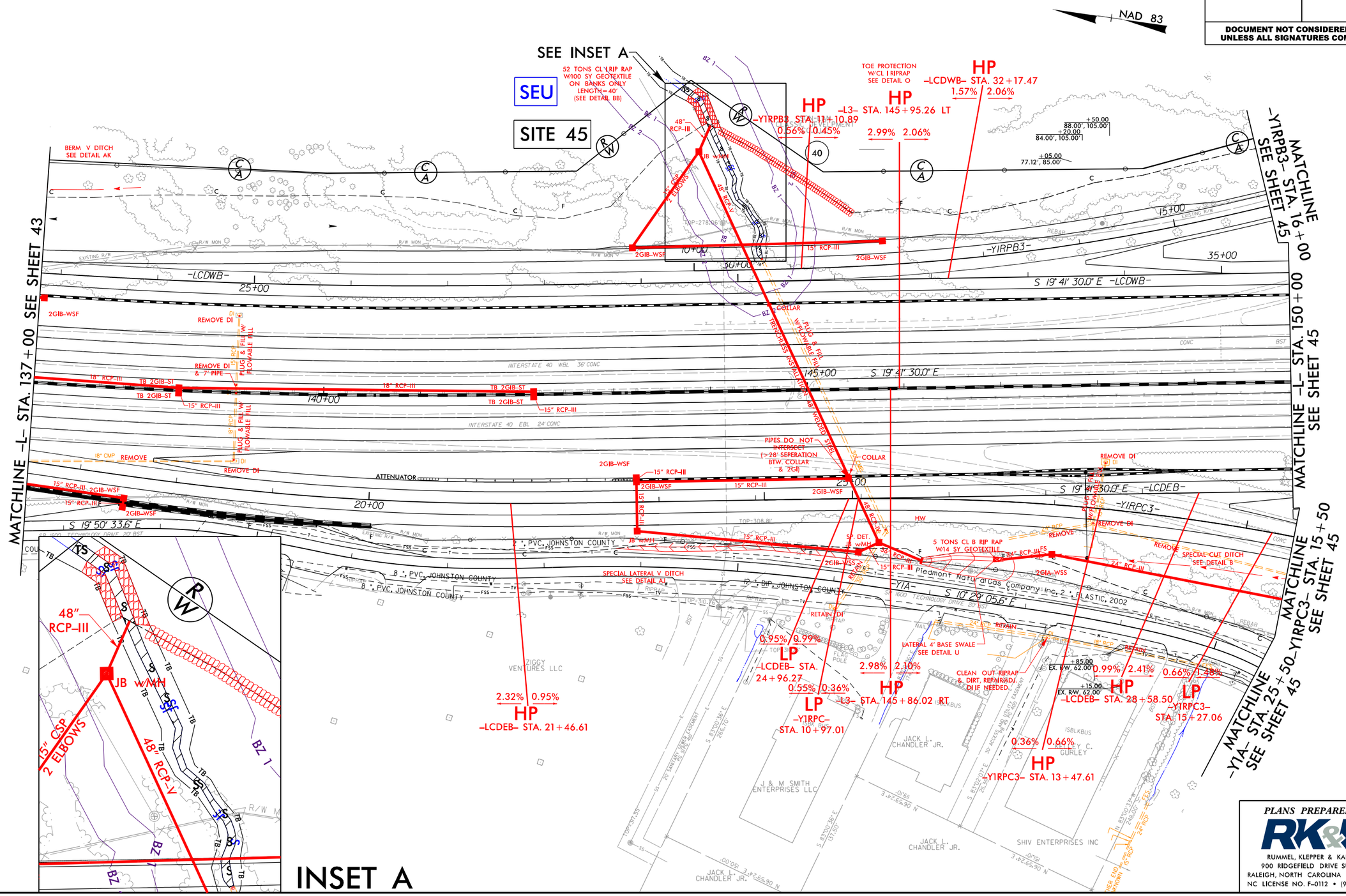

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	44
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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SCALE FOR INSET

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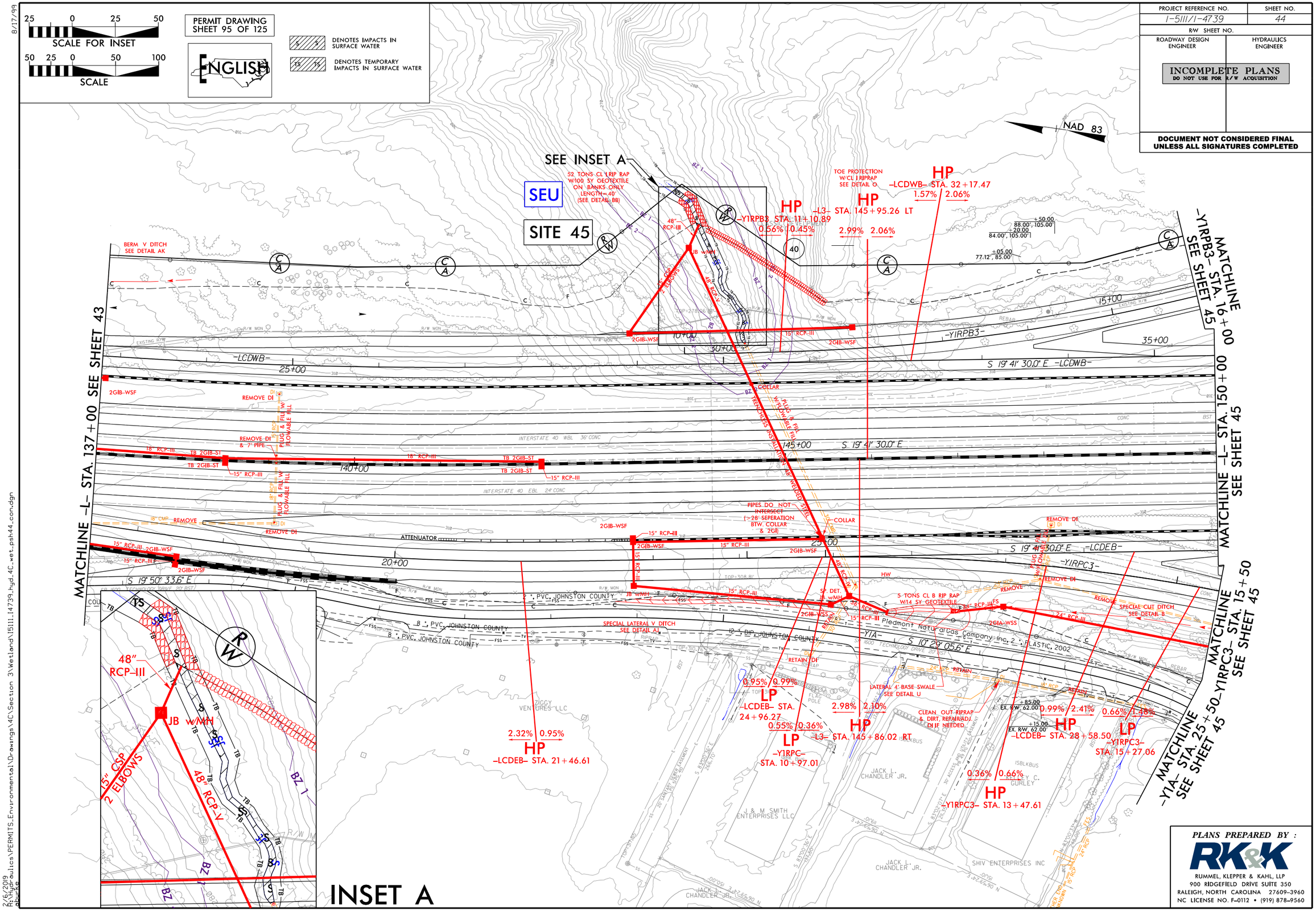
SCALE

PERMIT DRAWING
SHEET 95 OF 125

ENGLISH

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER



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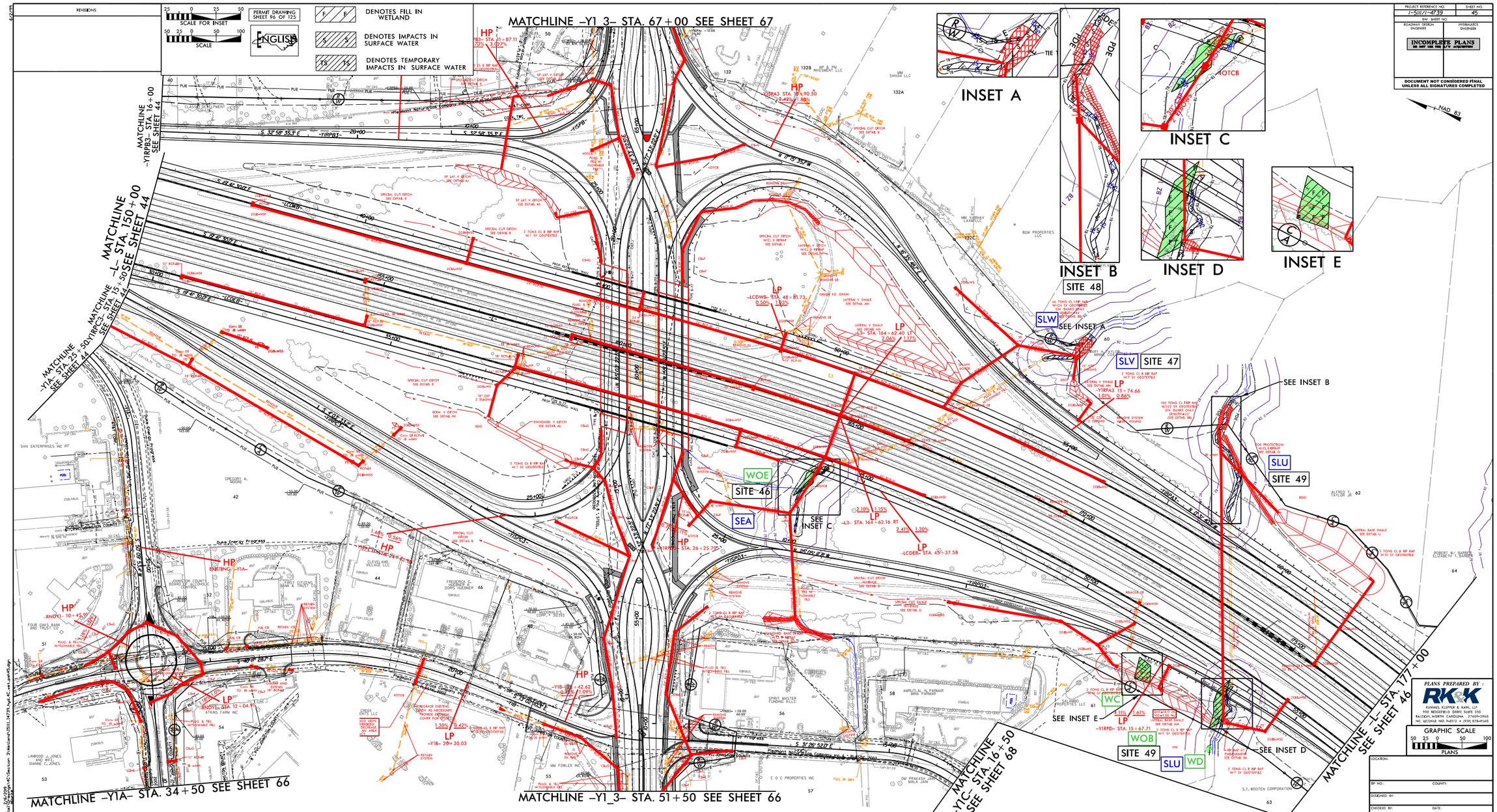

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SCALE FOR INSET
SCALE
PERMIT DRAWING SHEET 96 OF 125
ENGLISH
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
MATCHLINE -Y1_3- STA. 67+00 SEE SHEET 67
MATCHLINE -Y1RPB3- STA. 16+00 SEE SHEET 44
MATCHLINE -L- STA. 150+00 SEE SHEET 44
MATCHLINE -Y1A- STA. 25+50 SEE SHEET 44
MATCHLINE -Y1RPC3- STA. 15+50 SEE SHEET 44
MATCHLINE -Y1A- STA. 34+50 SEE SHEET 66
MATCHLINE -Y1_3- STA. 51+50 SEE SHEET 66
MATCHLINE -Y1C- STA. 16+50 SEE SHEET 68
MATCHLINE -L- STA. 177+00 SEE SHEET 46
INSET A
INSET B
INSET C
INSET D
INSET E
SITE 48
SITE 47
SITE 46
SITE 49
SEE INSET A
SEE INSET B
SEE INSET C
SEE INSET D
SEE INSET E
SLW
SLV
SLU
WOE
SEA
WC
WOB
WD
HP
LP
NAD 83
PROJECT REFERENCE NO.
I-5111/I-4739
SHEET NO.
45
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
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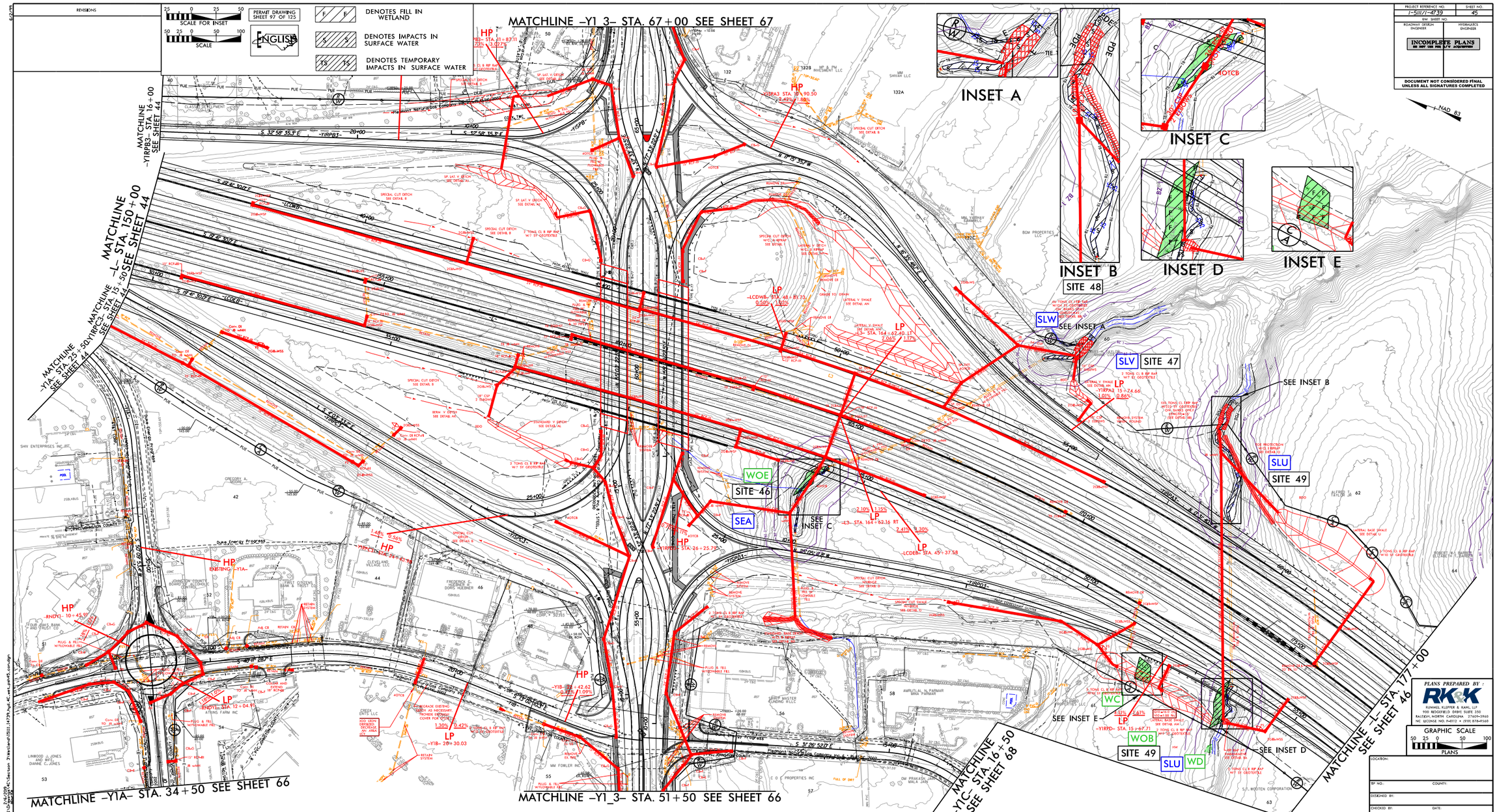
NC LICENSE NO. F-0112 • (919) 878-9560
GRAPHIC SCALE
50 25 0 50 100
PLANS
LOCATION:
TIP NO.:
COUNTY:
DESIGNED BY:
CHECKED BY:
DATE:



REVISIONS
SCALE FOR INSET
SCALE
PERMIT DRAWING SHEET 97 OF 125
ENGLISH
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
MATCHLINE -Y1_3- STA. 67+00 SEE SHEET 67
MATCHLINE -Y1RPB3- STA. 16+00 SEE SHEET 44
MATCHLINE -L- STA. 150+00 SEE SHEET 44
MATCHLINE -Y1A- STA. 25+50 SEE SHEET 44
MATCHLINE -Y1RPC3- STA. 15+50 SEE SHEET 44
MATCHLINE -Y1A- STA. 34+50 SEE SHEET 66
MATCHLINE -Y1_3- STA. 51+50 SEE SHEET 66
MATCHLINE -Y1C- STA. 16+50 SEE SHEET 68
MATCHLINE -L- STA. 177+00 SEE SHEET 46
INSET A
INSET B
INSET C
INSET D
INSET E
SITE 48
SITE 47
SITE 46
SITE 49
SEE INSET A
SEE INSET B
SEE INSET C
SEE INSET D
SEE INSET E
SLW
SLV
SLU
WOE
SEA
WC
WOB
WD
HP
LP
NAD 83
PROJECT REFERENCE NO.
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
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GRAPHIC SCALE
PLANS
LOCATION:
TIP NO.:
COUNTY:
DESIGNED BY:
CHECKED BY:
DATE:

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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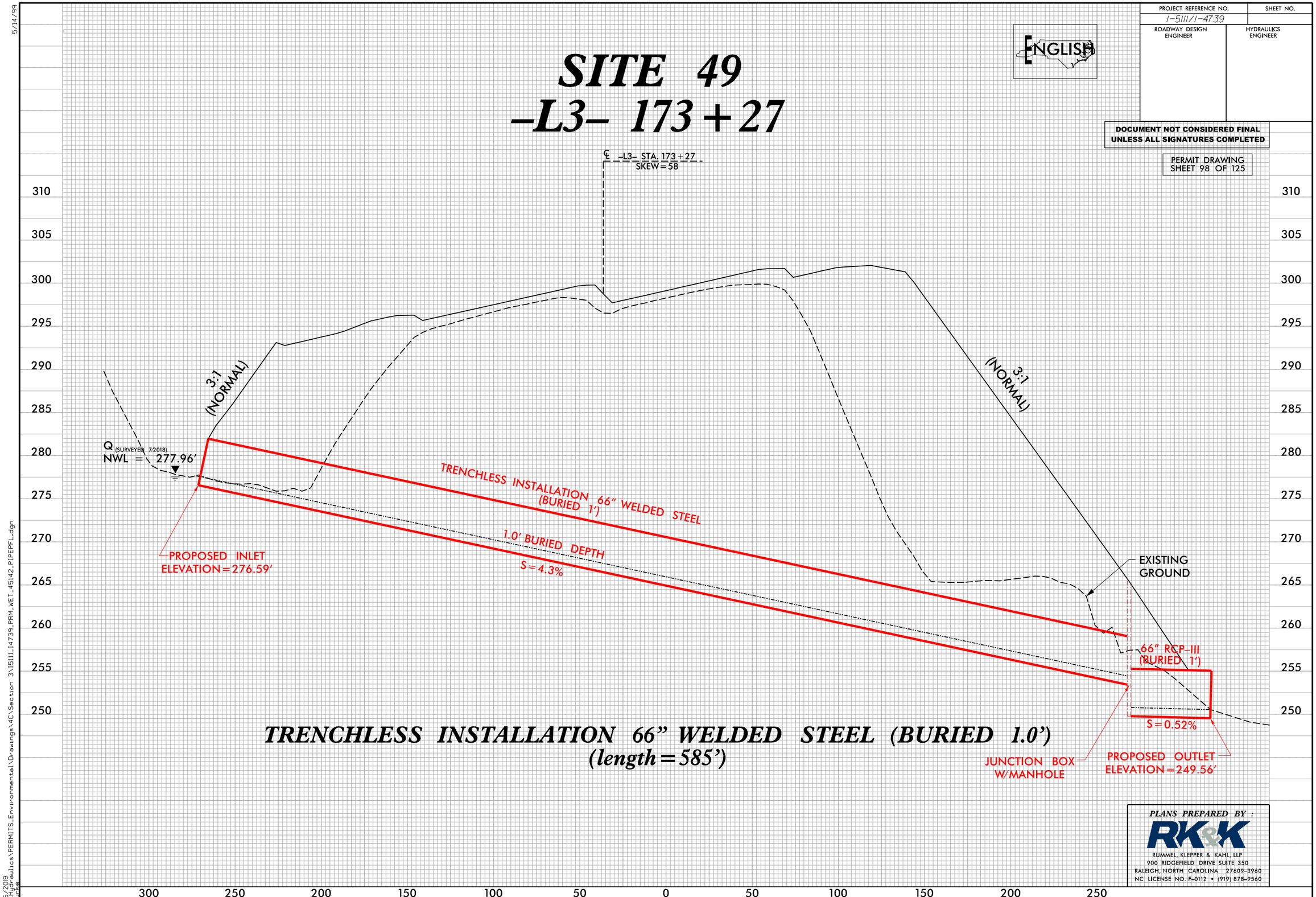
SHEET 98 OF 125

SITE 49
-L3- 173+27



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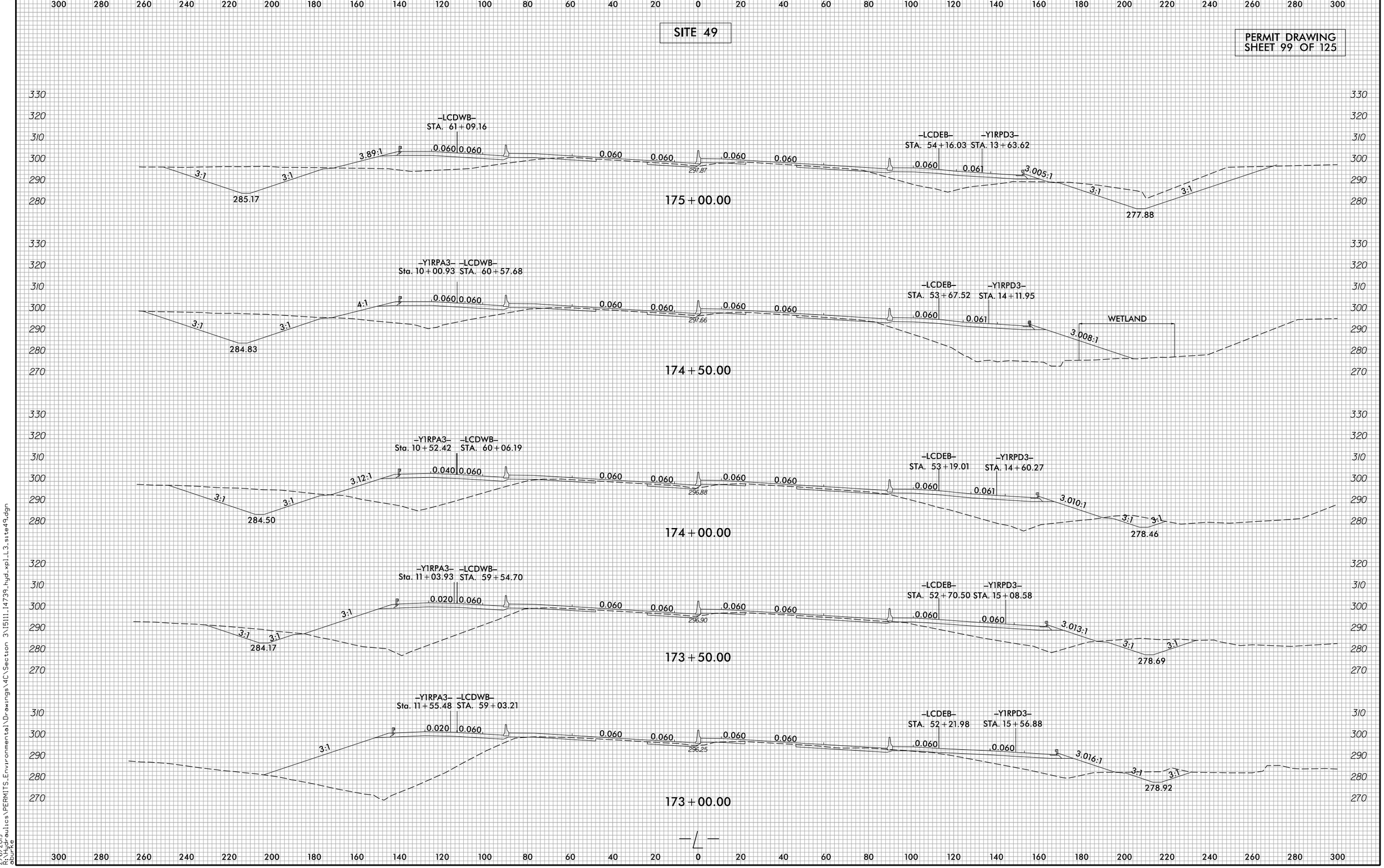
	I-5111/I-4739	X-33

SITE 49

PERMIT DRAWING
SHEET 99 OF 125



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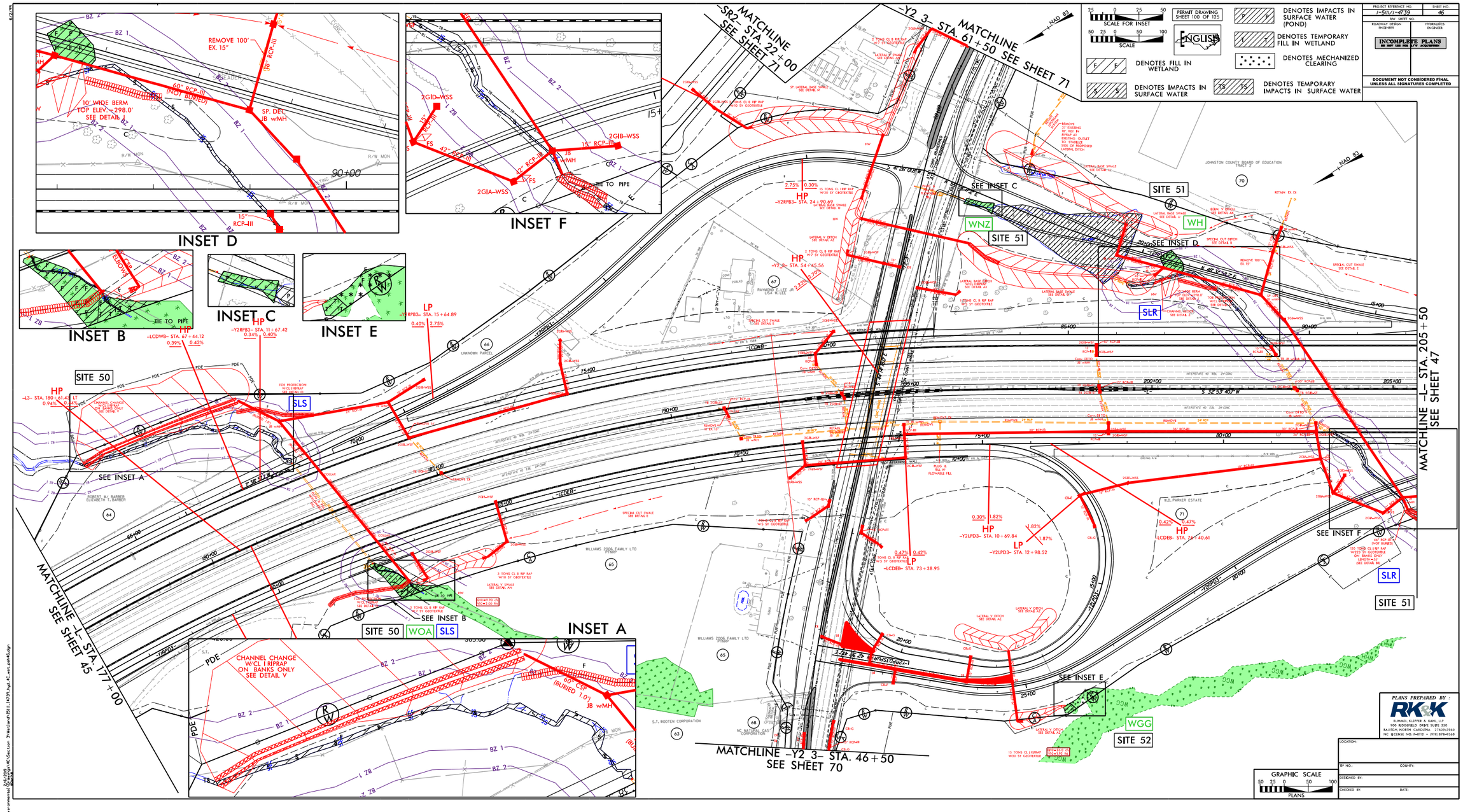
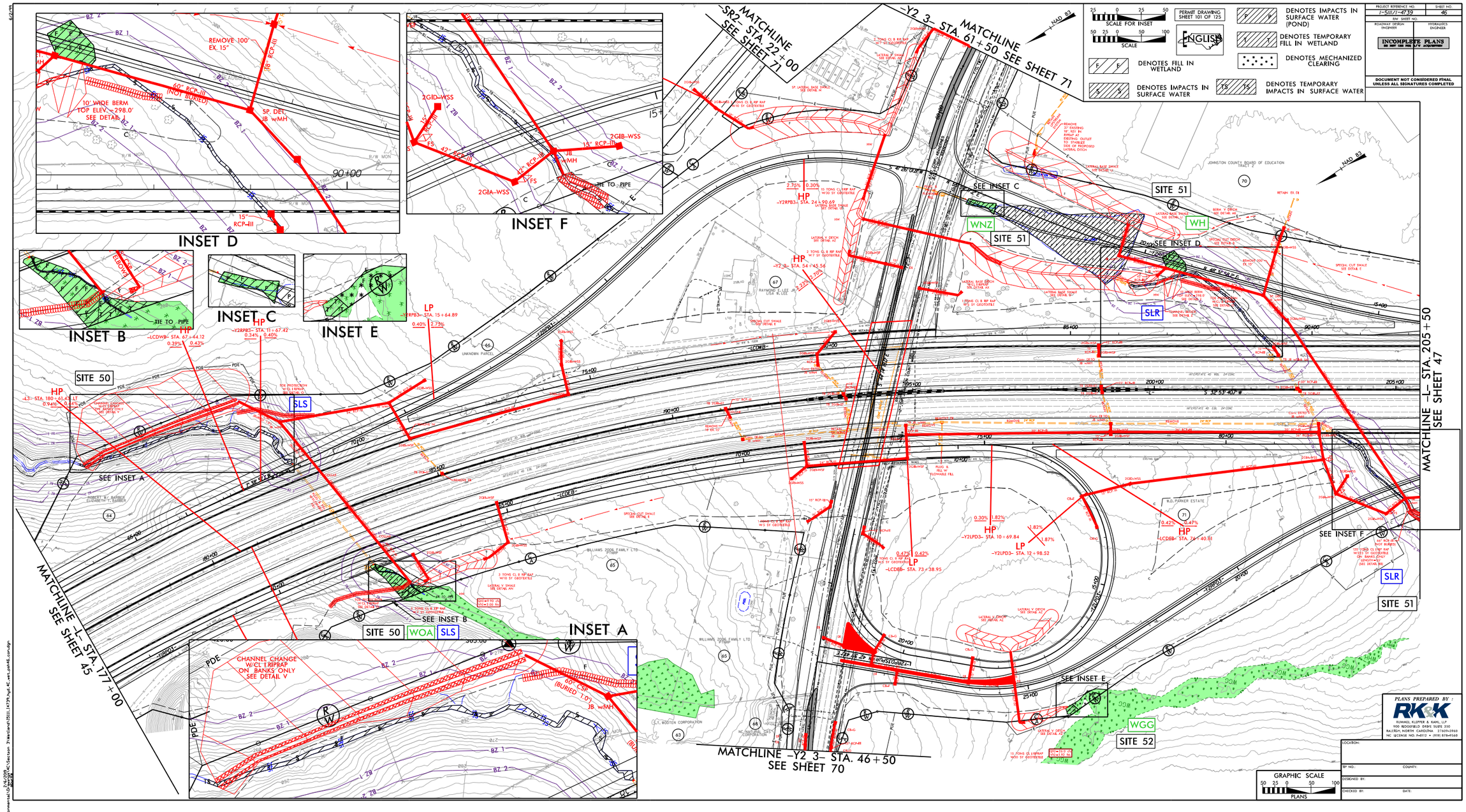

MATCHLINE -SR2- STA. 22+00 SEE SHEET 71
MATCHLINE -Y2_3- STA. 61+50 SEE SHEET 71
MATCHLINE -L- STA. 205+50 SEE SHEET 47
MATCHLINE -L- STA. 177+00 SEE SHEET 45
MATCHLINE -Y2_3- STA. 46+50 SEE SHEET 70
INSET A
INSET B
INSET C
INSET D
INSET E
INSET F
SEE INSET A
SEE INSET B
SEE INSET C
SEE INSET D
SEE INSET E
SEE INSET F
SITE 50
SITE 51
SITE 52
SLS
SLR
WOA
WNZ
WH
WGG
REMOVE 100' EX. 15"
60" RCP-III (NOT BURIED)
10' WIDE BERM TOP ELEV. 298.0' SEE DETAIL J
SP. DEL. JB w/MH
2GID-WSS
2GIB-WSS
2GIA-WSS
TIE TO PIPE
CHANNEL CHANGE W/CL I RIPRAP ON BANKS ONLY SEE DETAIL V
60" CSP (BURIED 1.0')
JB w/MH
-LCDWB-
-LCDEB-
-Y2LPD3-
-Y2RPB3-
-L3-
-Y2_3-
-Y2_4-
-LCDWB- STA. 67+44.12
-Y2RPB3- STA. 11+67.42
-Y2RPB3- STA. 15+64.89
-L3- STA. 180+61.46
-Y2_3- STA. 24+00.69
-Y2_4- STA. 54+45.56
-Y2LPD3- STA. 10+69.84
-Y2LPD3- STA. 12+98.52
-LCDEB- STA. 73+38.95
-LCDEB- STA. 76+40.61
HP
LP
NAD 83
SCALE FOR INSET
SCALE
ENGLISH
PERMIT DRAWING SHEET 100 OF 125
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES TEMPORARY FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PROJECT REFERENCE NO. I-5111/I-4739
SHEET NO. 46
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 ROBERT FULTON DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
LOCATION:
TIP NO.:
COUNTY:
DESIGNED BY:
CHECKED BY:
DATE:
GRAPHIC SCALE
PLANS



INSET A
INSET B
INSET C
INSET D
INSET E
INSET F
MATCHLINE -SR2- STA. 22+00 SEE SHEET 71
MATCHLINE -Y2 3- STA. 61+50 SEE SHEET 71
MATCHLINE -L- STA. 177+00 SEE SHEET 45
MATCHLINE -L- STA. 205+50 SEE SHEET 47
MATCHLINE -Y2 3- STA. 46+50 SEE SHEET 70
SITE 50
SITE 51
SITE 52
SEE INSET A
SEE INSET B
SEE INSET C
SEE INSET D
SEE INSET E
SEE INSET F
REMOVE 100' EX. 15"
10' WIDE BERM TOP ELEV. 298.0' SEE DETAIL
60" RCP-III (NOT BURIED)
SP. DET. JB wMH
2GID-WSS
2GIB-WSS
2GIA-WSS
CHANNEL CHANGE W/CL I RIPRAP ON BANKS ONLY SEE DETAIL V
60" CSP (BURIED 1.0')
JB wMH
PERMIT DRAWING SHEET 101 OF 125
SCALE FOR INSET
SCALE
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES TEMPORARY FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PROJECT REFERENCE NO. I-5111/I-4739
SHEET NO. 46
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PLANS PREPARED BY :
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GRAPHIC SCALE
PLANS
LOCATION:
TIP NO.:
COUNTY:
DESIGNED BY:
CHECKED BY:
DATE:

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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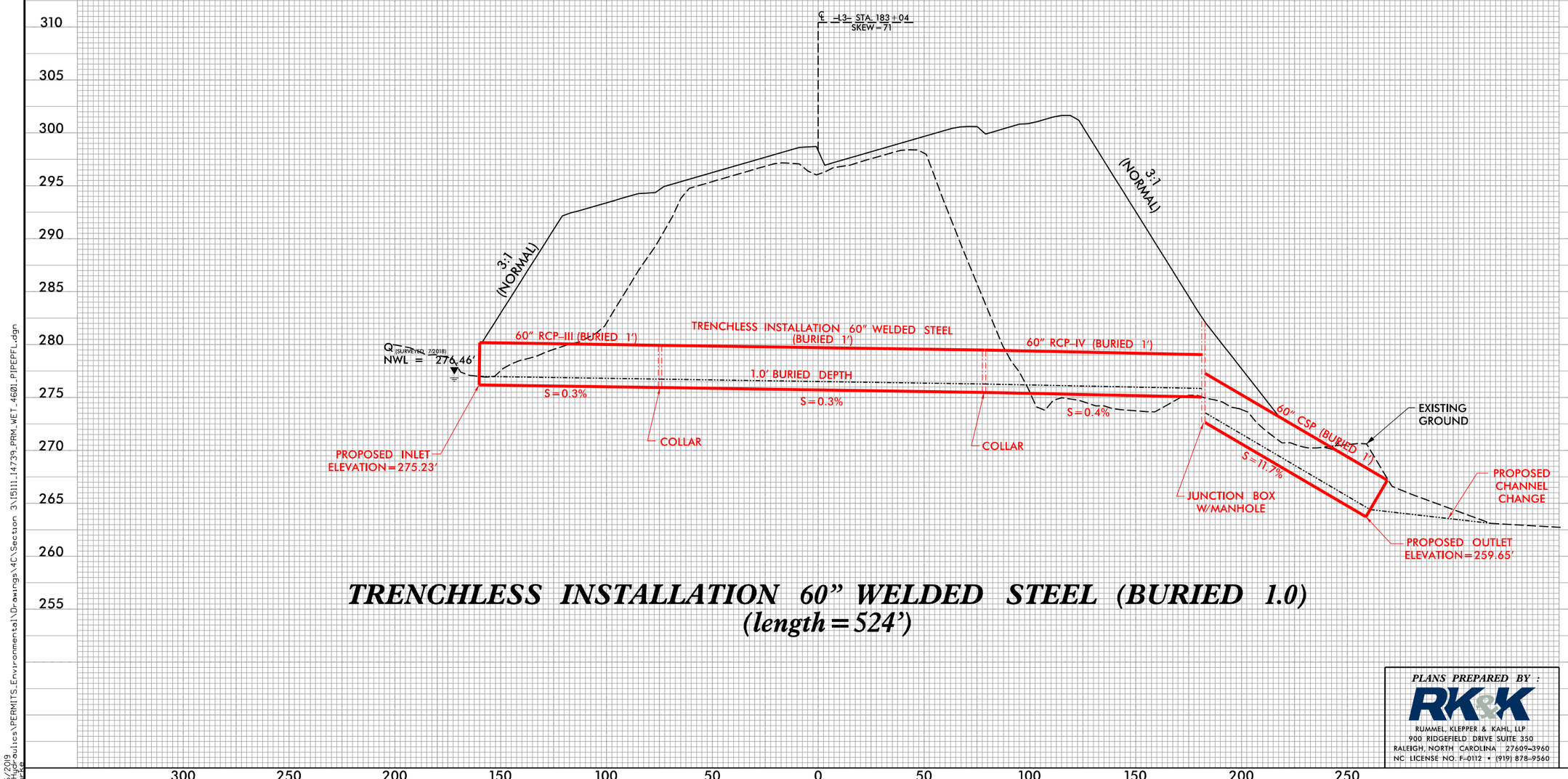
PERMIT DRAWING
SHEET 102 OF 125

SITE 50
-L3- 183+04



TRENCHLESS INSTALLATION 60" WELDED STEEL (BURIED 1.0)
(length=524')

PLANS PREPARED BY :

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aburkes

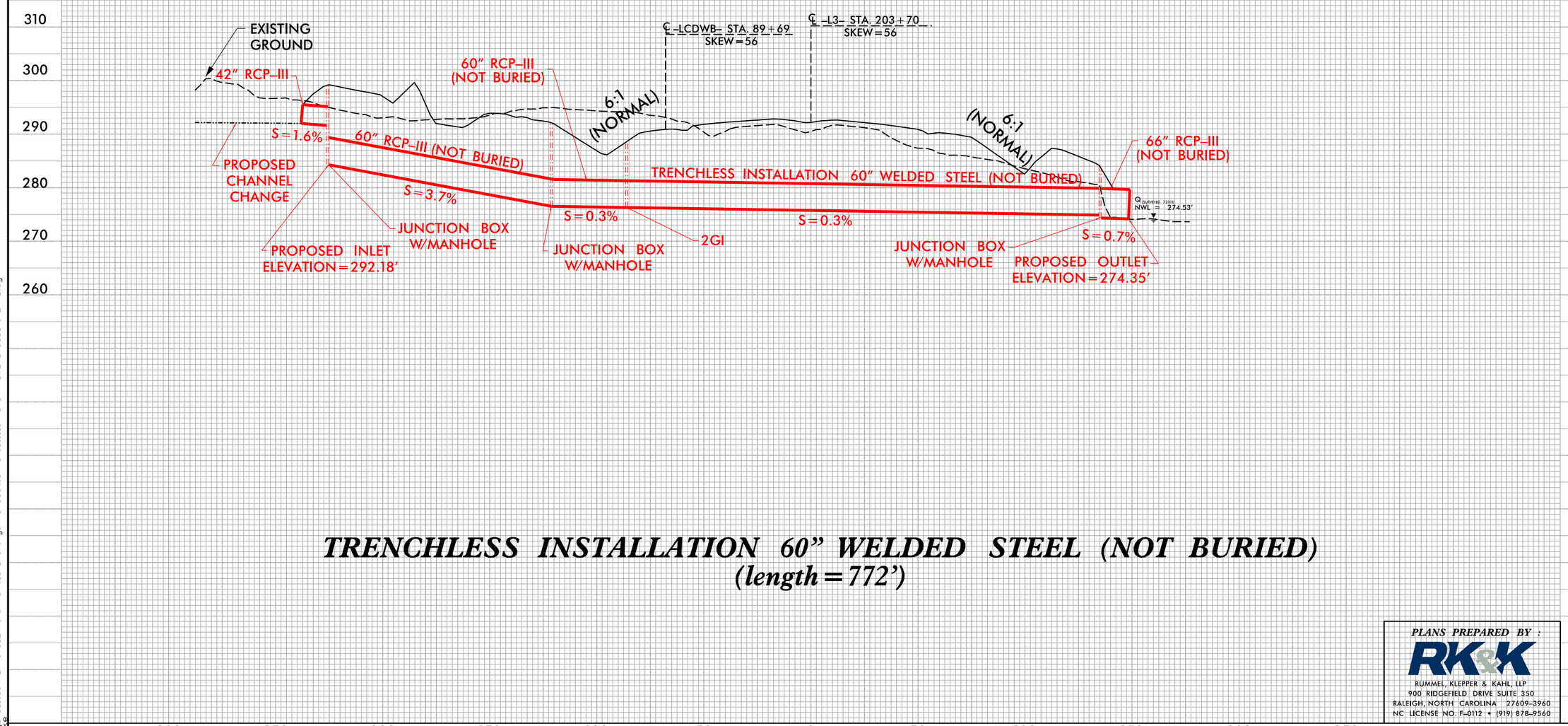
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 103 OF 125

SITE 51
–L3– 203 + 70



TRENCHLESS INSTALLATION 60" WELDED STEEL (NOT BURIED)
(length = 772')

PLANS PREPARED BY :
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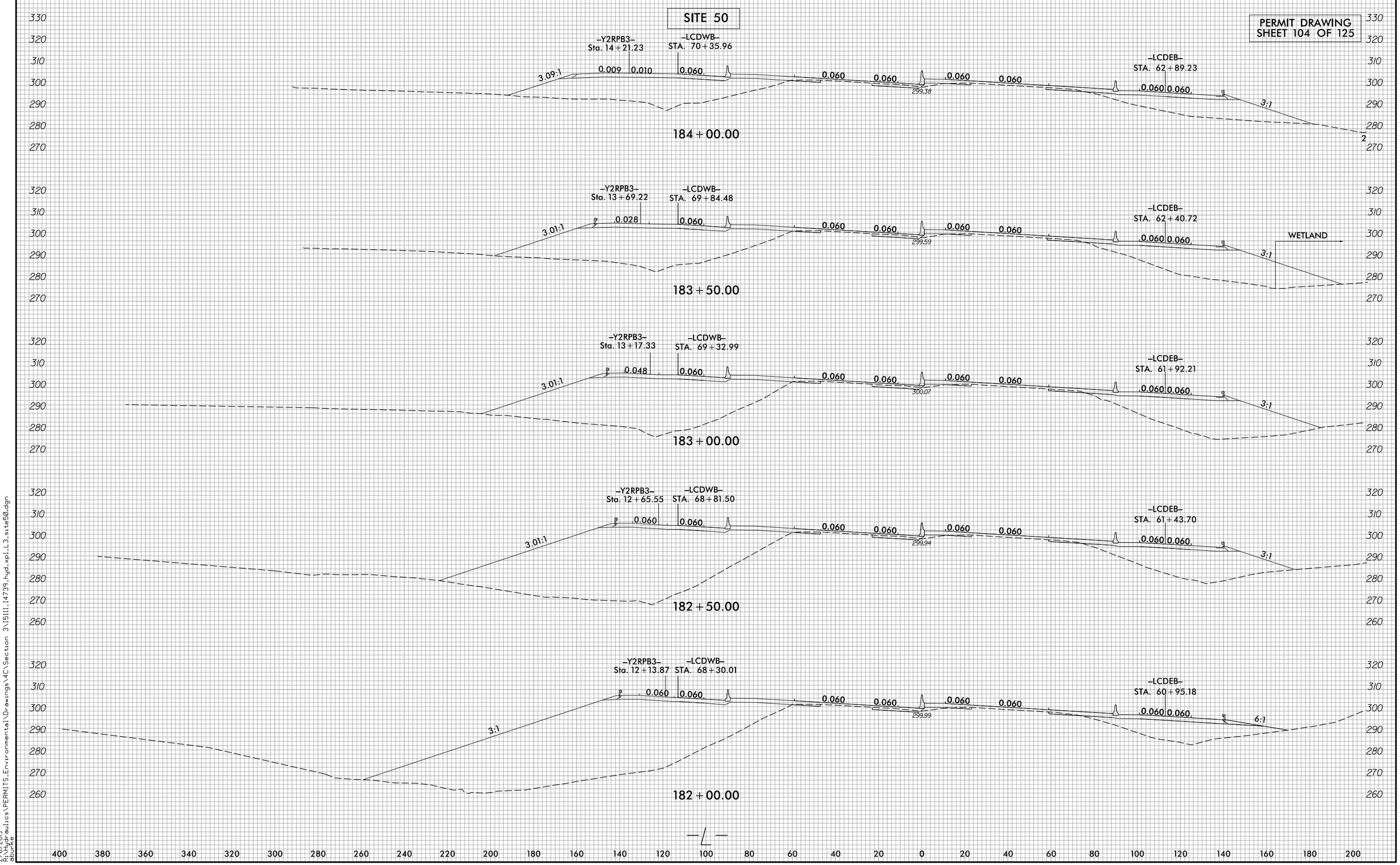
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-37

SITE 50

PERMIT DRAWING
SHEET 104 OF 125



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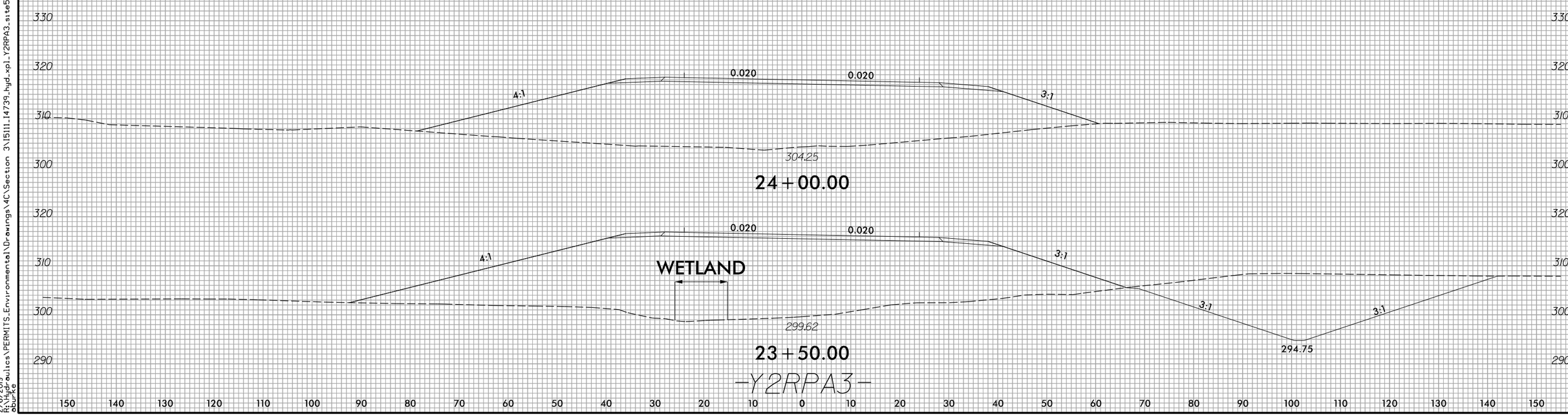
aburke

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-161

PERMIT DRAWING
SHEET 105 OF 125

SITE 51



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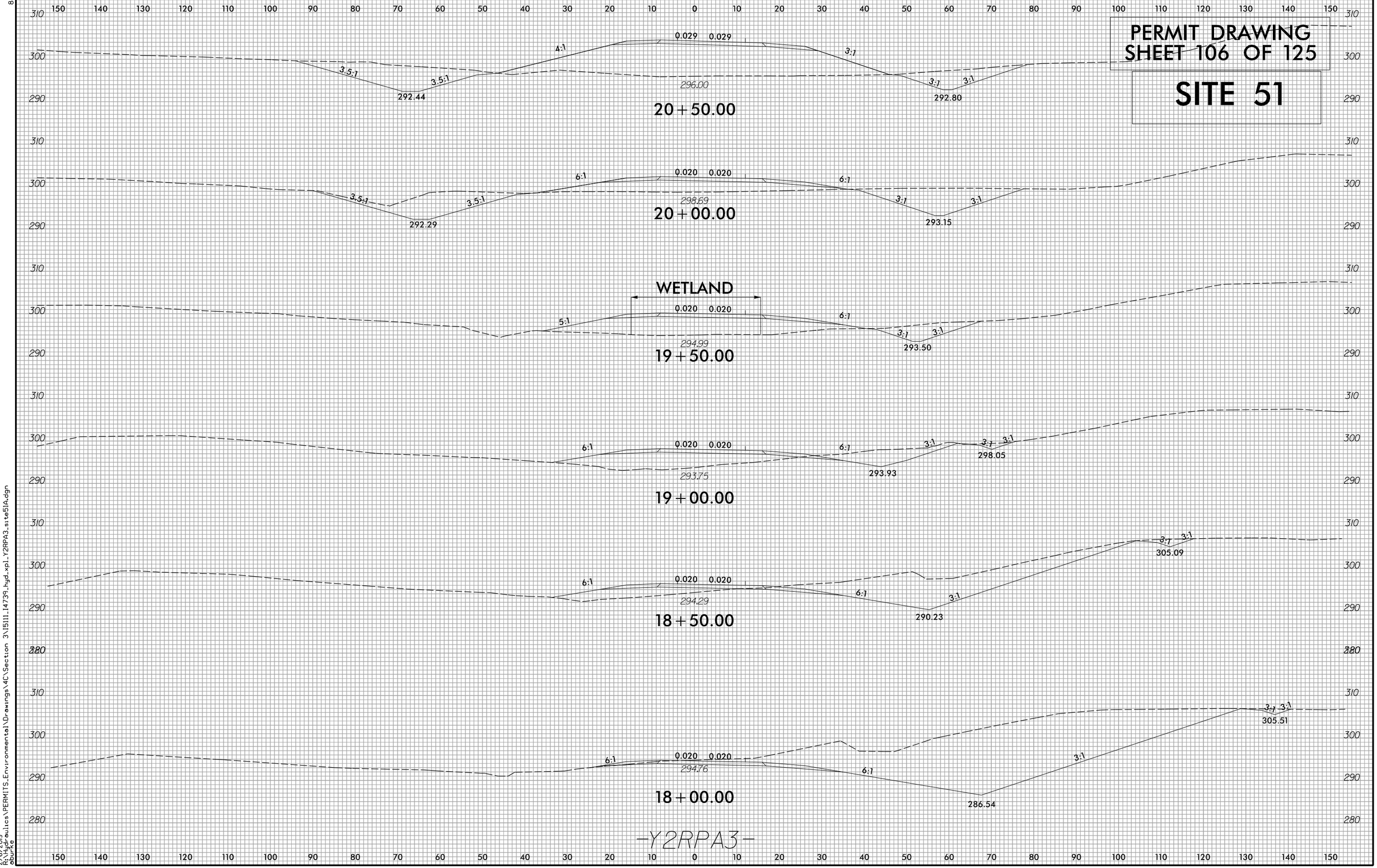
obunke

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-159

PERMIT DRAWING
SHEET 106 OF 125

SITE 51



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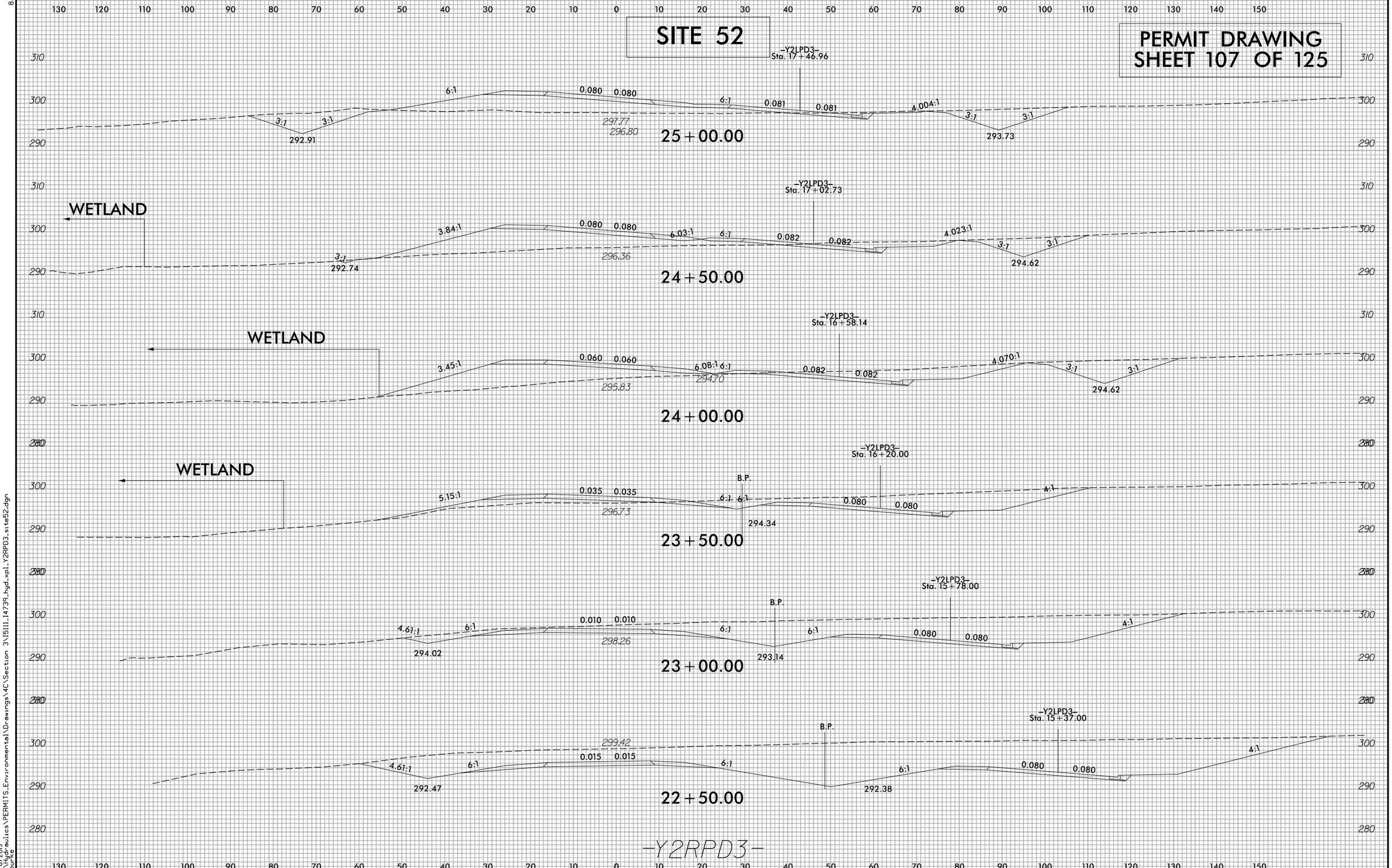
oburke

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-167

SITE 52

PERMIT DRAWING
SHEET 107 OF 125



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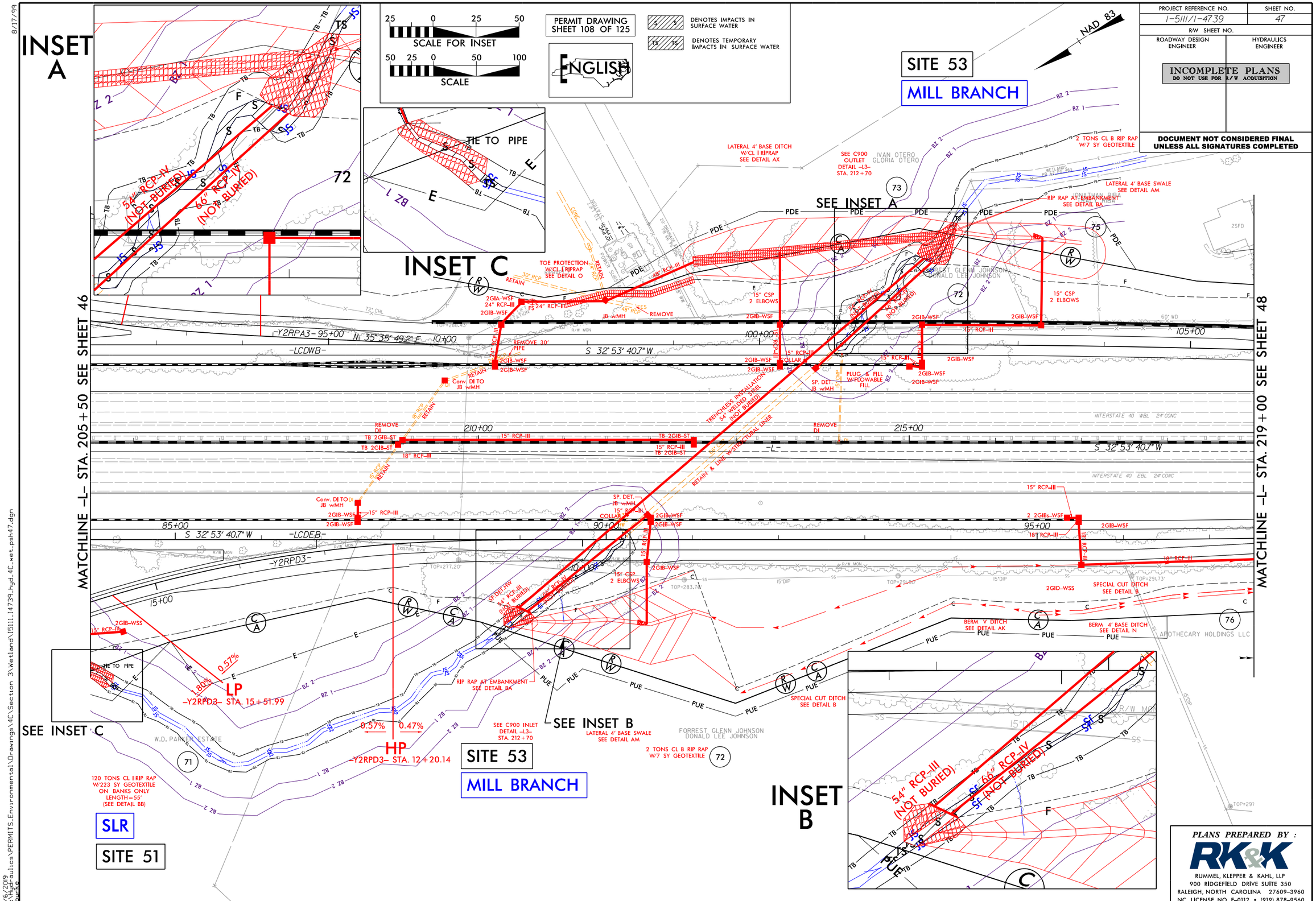
obunke



PROJECT REFERENCE NO.
I-5111/I-4739
SHEET NO.
47
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 108 OF 125
SCALE FOR INSET
SCALE
ENGLISH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83
SITE 53
MILL BRANCH
INSET A
INSET B
INSET C
SEE INSET A
SEE INSET B
SEE INSET C
MATCHLINE -L- STA. 205+50 SEE SHEET 46
MATCHLINE -L- STA. 219+00 SEE SHEET 48
LP
-Y2RPD3- STA. 15+51.99
HP
-Y2RPD3- STA. 12+20.14
SLR
SITE 51
54" RCP-IV (NOT BURIED)
66" RCP-IV (NOT BURIED)
54" RCP-III (NOT BURIED)
66" RCP-IV (NOT BURIED)
TIE TO PIPE
TRENCHLESS INSTALLATION 54" WELDED STEEL (NOT BURIED)
RETAIN & LINE W/STRUCTURAL LINER
LATERAL 4' BASE DITCH W/CL I RIPRAP SEE DETAIL AX
SEE C900 OUTLET DETAIL -L3- STA. 212+70
2 TONS CL B RIP RAP W/7 SY GEOTEXTILE
LATERAL 4' BASE SWALE SEE DETAIL AM
RIP RAP AT EMBANKMENT SEE DETAIL BA
TOE PROTECTION W/CL I RIPRAP SEE DETAIL O
15" CSP 2 ELBOWS
PLUG & FILL W/FLOWABLE FILL
SPECIAL CUT DITCH SEE DETAIL B
BERM V DITCH SEE DETAIL AK
BERM 4' BASE DITCH SEE DETAIL N
120 TONS CL I RIP RAP W/223 SY GEOTEXTILE ON BANKS ONLY LENGTH=55' (SEE DETAIL BB)
SEE C900 INLET DETAIL -L3- STA. 212+70
0.57%
1.80%
0.47%
-Y2RPA3- 95+00
N 35° 35' 49.2" E
10+00
100+00
105+00
-LCDWB-
S 32° 53' 40.7" W
210+00
215+00
-L-
85+00
90+00
95+00
15+00
-LCDEB-
-Y2RPD3-
INTERSTATE 40 WBL 24' CONC
INTERSTATE 40 EBL 24' CONC
FORREST GLENN JOHNSON
DONALD LEE JOHNSON
APOTHECARY HOLDINGS LLC
W.D. PARKER ESTATE
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	47
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 109 OF 125

ENGLISH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

SITE 53
MILL BRANCH

INSET A

INSET C

INSET B

SEE INSET A

SEE INSET B

SEE INSET C

MATCHLINE -L- STA. 205+50 SEE SHEET 46

MATCHLINE -L- STA. 219+00 SEE SHEET 48

-Y2RPA3- 95+00 N 35° 35' 49.2" E 10+00

-LCDWB- S 32° 53' 40.7" W

100+00 105+00

210+00 215+00

-L- S 32° 53' 40.7" W

85+00 90+00 95+00

-LCDEB- S 32° 53' 40.7" W

-Y2RPD3- 15+00

LP -Y2RPD3- STA. 15+51.99

HP -Y2RPD3- STA. 12+20.14

0.57% 0.80% 0.47%

54" RCP-IV (NOT BURIED)

66" RCP-IV (NOT BURIED)

54" RCP-III (NOT BURIED)

TRENCHLESS INSTALLATION 54" WELDED STEEL (NOT BURIED)

RETAIN & LINE W/STRUCTURAL LINER

LATERAL 4' BASE DITCH W/CL I RIPRAP SEE DETAIL AX

SEE C900 OUTLET DETAIL -L3- STA. 212+70

LATERAL 4' BASE SWALE SEE DETAIL AM

RIP RAP AT EMBANKMENT SEE DETAIL BA

2 TONS CL B RIP RAP W/7 SY GEOTEXTILE

TOE PROTECTION W/CL I RIPRAP SEE DETAIL O

15" CSP 2 ELBOWS

SPECIAL CUT DITCH SEE DETAIL B

BERM V DITCH SEE DETAIL AK

BERM 4' BASE DITCH SEE DETAIL N

120 TONS CL I RIP RAP W/223 SY GEOTEXTILE ON BANKS ONLY LENGTH=55' (SEE DETAIL BB)

SLR

SITE 51

SITE 53

MILL BRANCH

IVAN OTERO
GLORIA OTERO
JONATHAN GIRL
FORREST GLENN JOHNSON
DONALD LEE JOHNSON
W.D. PARKER ESTATE
APOTHECARY HOLDINGS LLC
INTERSTATE 40 WBL 24" CONC
INTERSTATE 40 EBL 24" CONC

PLANS PREPARED BY :

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2/6/2019
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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

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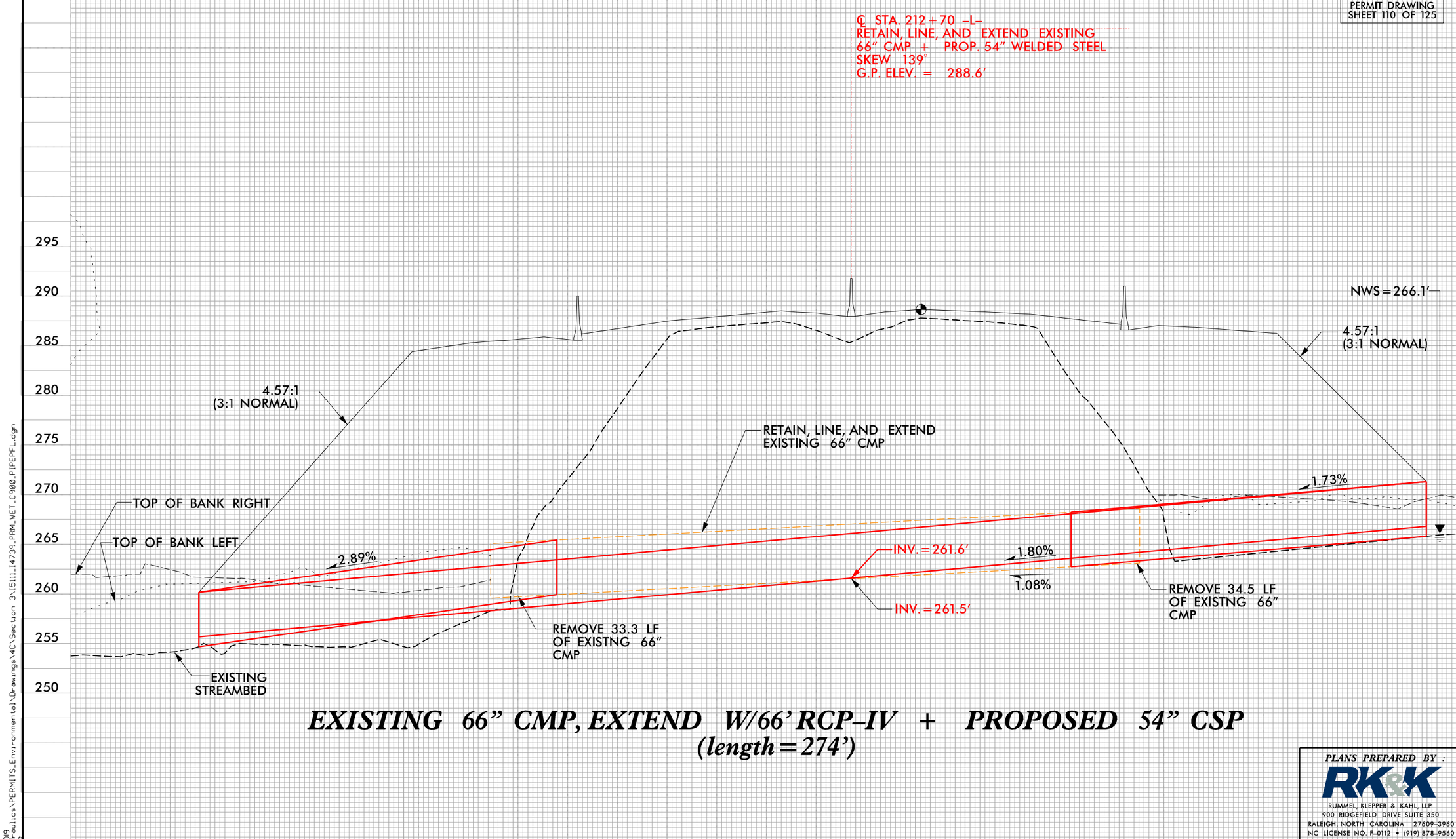
PERMIT DRAWING
SHEET 110 OF 125

SITE 53
–L– 212+70



EXISTING 66" CMP, EXTEND W/66' RCP–IV + PROPOSED 54" CSP
(length=274')

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PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	49
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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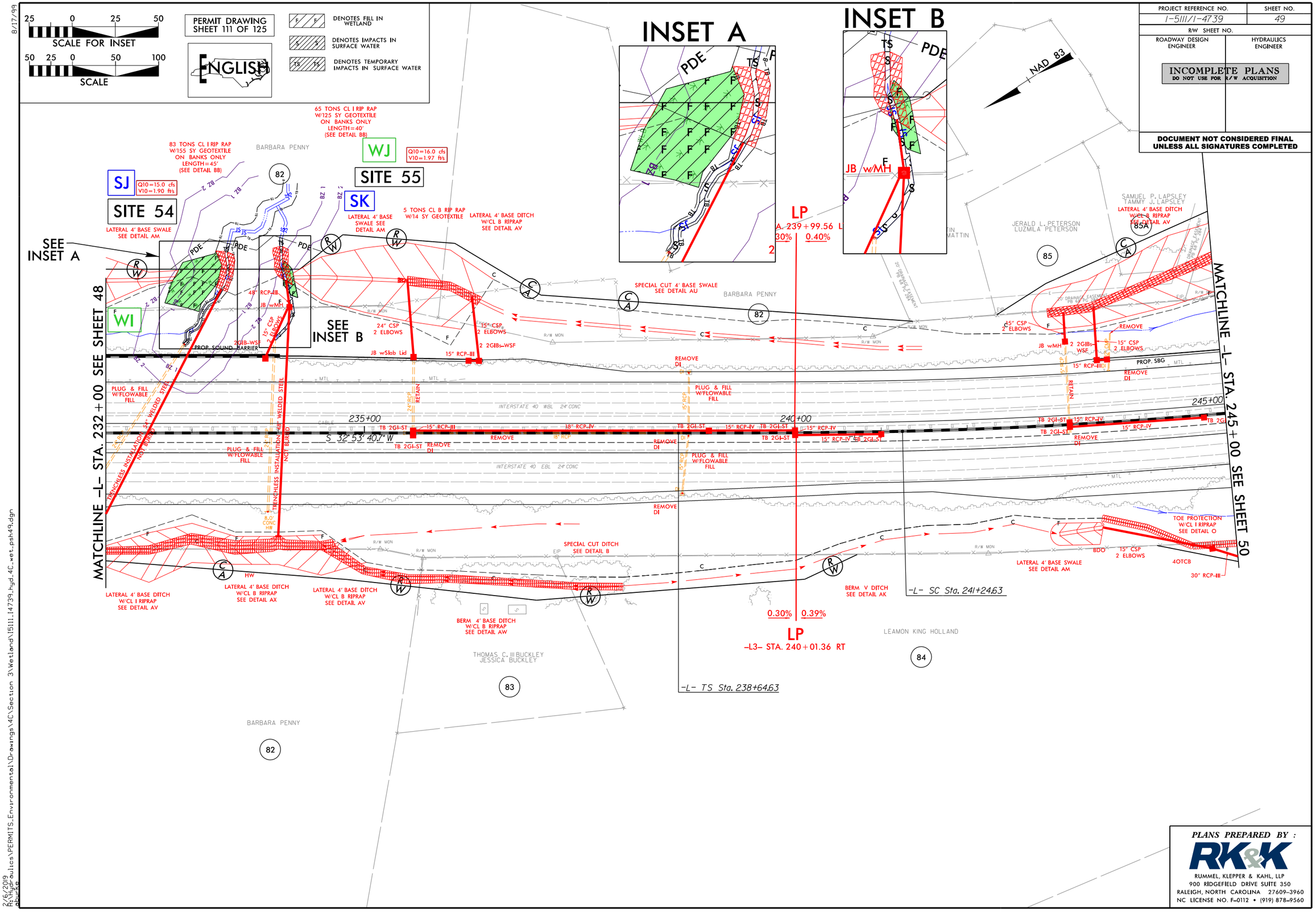
25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 111 OF 125

ENGLISH

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



PLANS PREPARED BY :
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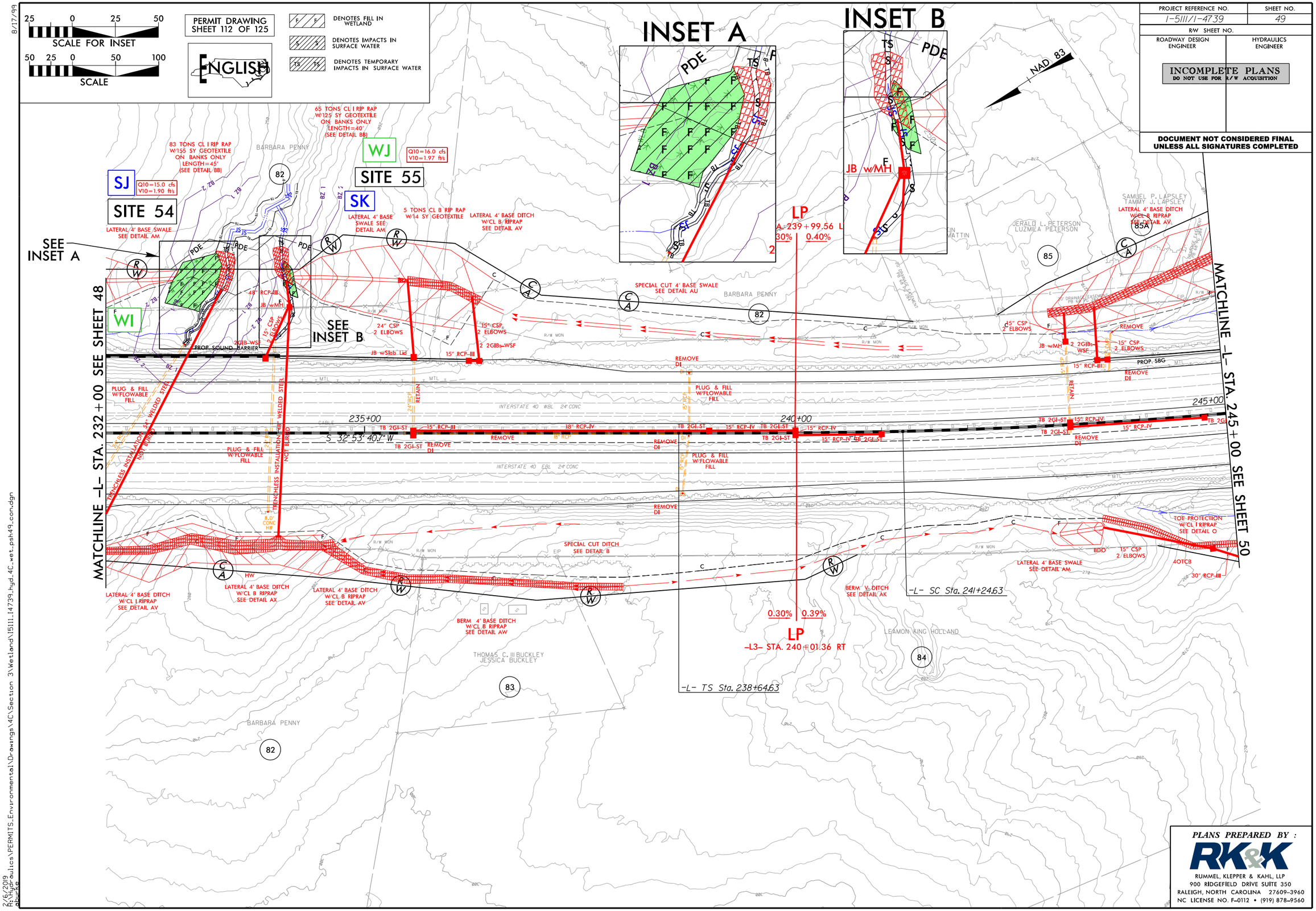
dburke



PROJECT REFERENCE NO.
I-5111/I-4739
SHEET NO.
49
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
PERMIT DRAWING SHEET 112 OF 125
ENGLISH
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SCALE FOR INSET
SCALE
INSET A
INSET B
SITE 54
SITE 55
SJ
SK
WI
WJ
SEE INSET A
SEE INSET B
MATCHLINE -L- STA. 232+00 SEE SHEET 48
MATCHLINE -L- STA. 245+00 SEE SHEET 50
LP
-L3- STA. 240+01.36 RT
-L- TS Sta. 238+64.63
-L- SC Sta. 241+24.63
0.30%
0.39%
0.40%
S 32°53' 40.7" W
235+00
240+00
245+00
NAD 83
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
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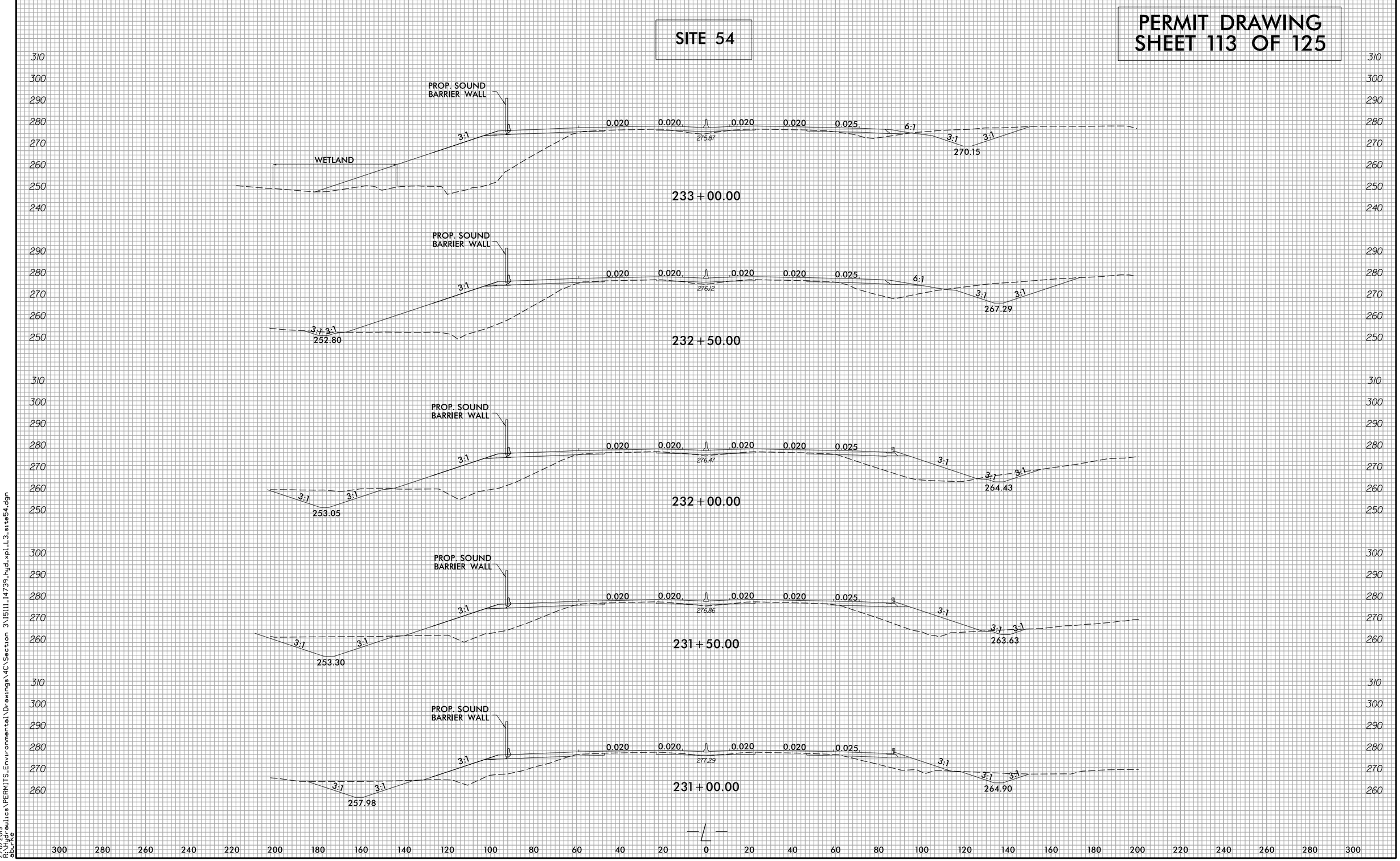
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-54

PERMIT DRAWING
SHEET 113 OF 125

SITE 54



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aburke

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	50
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

25 0 25 50
SCALE FOR INSET

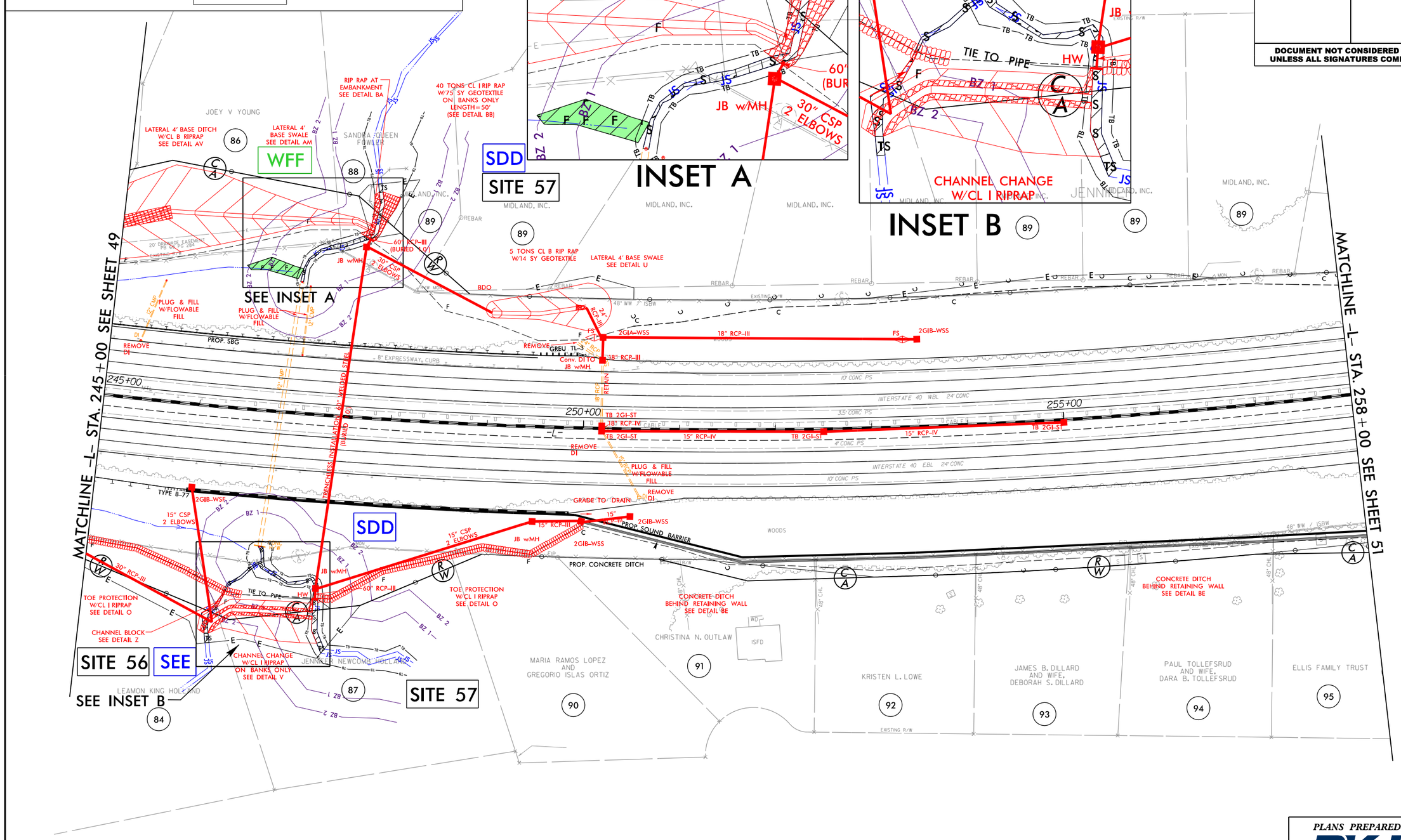
50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 114 OF 125

ENGLISH

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

NAD 83



PLANS PREPARED BY :

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dburke

8/17/99

25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 115 OF 125

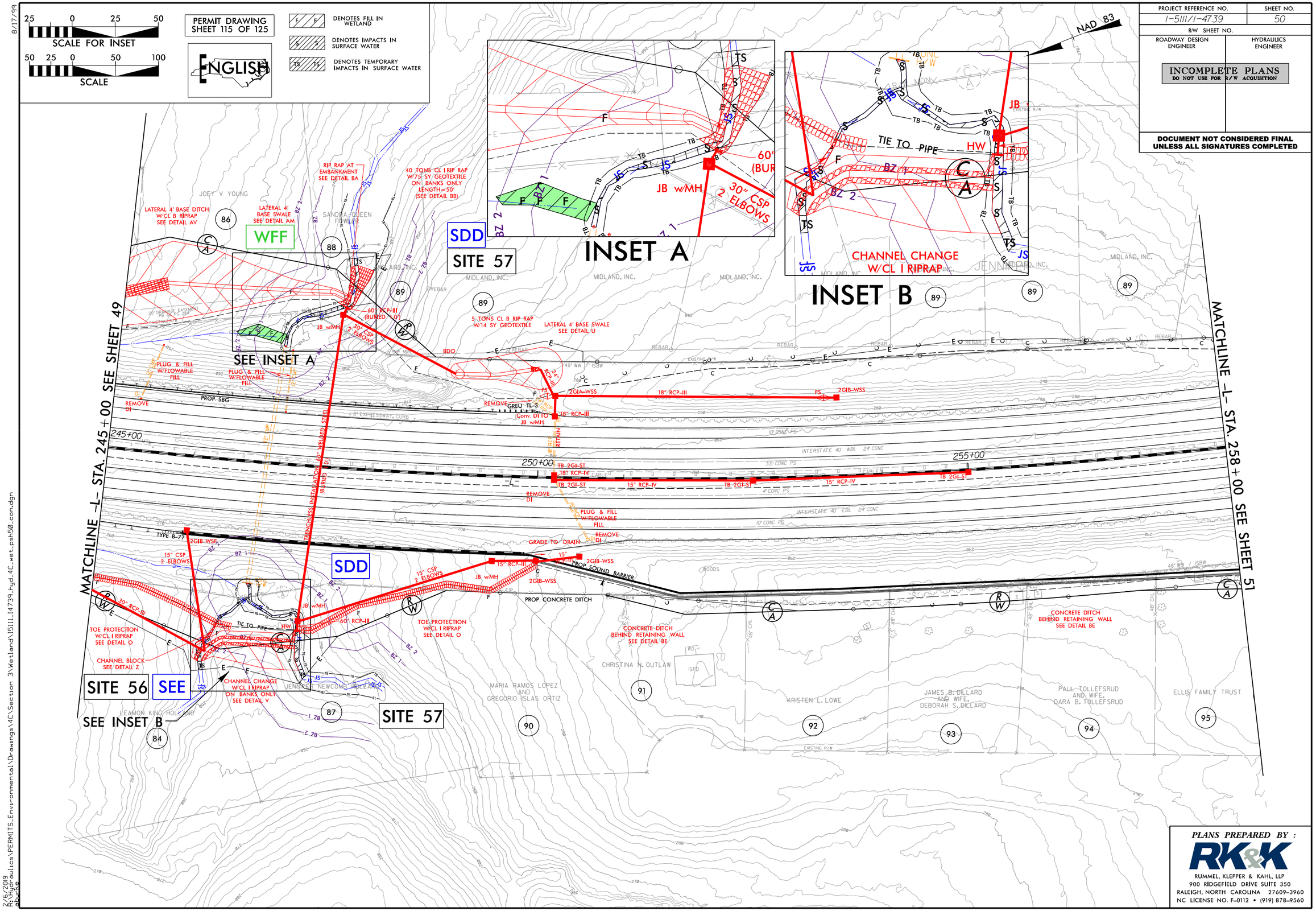
ENGLISH

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

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	50
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



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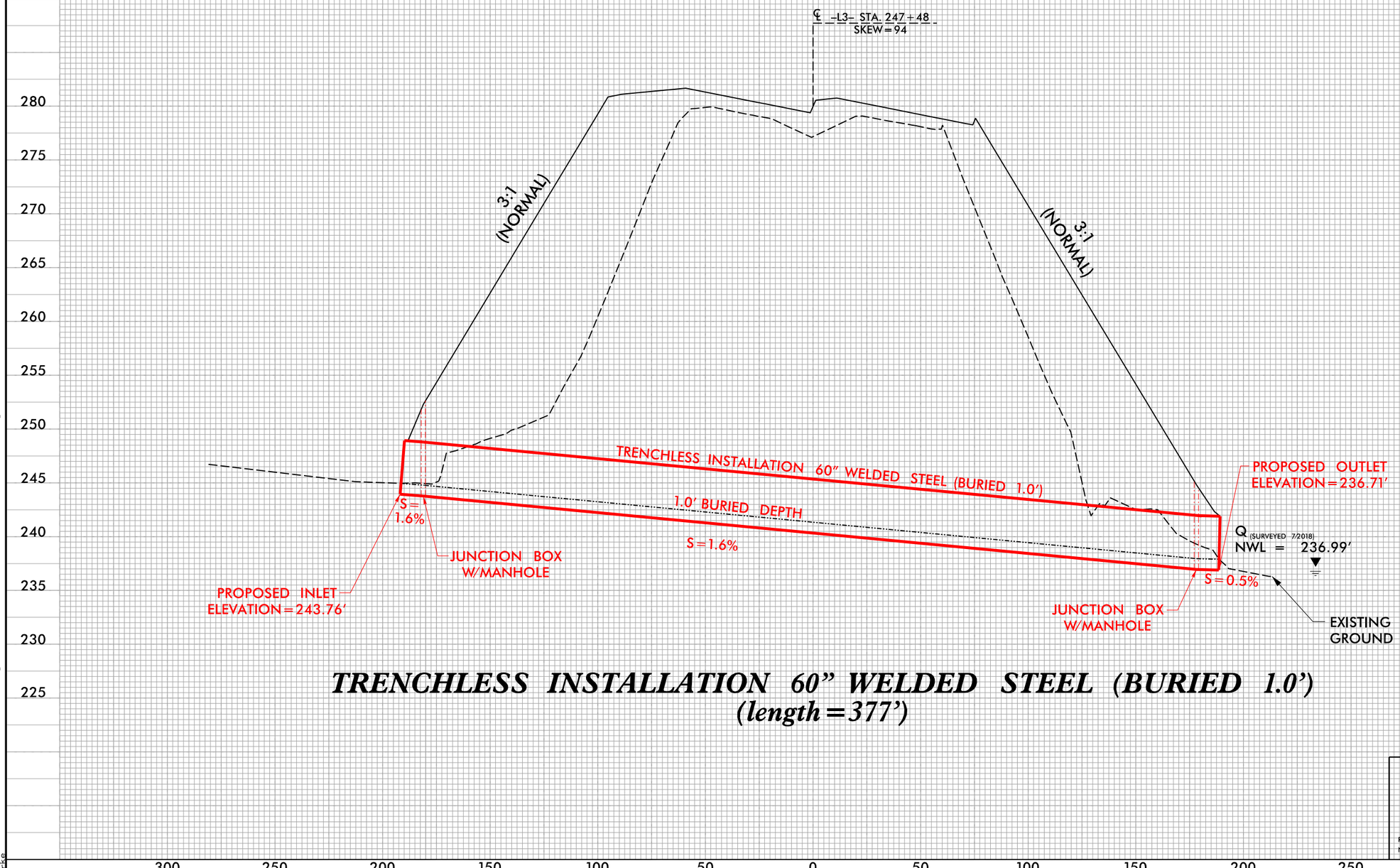
PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 116 OF 125

SITE 57
-L3- 247+48



TRENCHLESS INSTALLATION 60" WELDED STEEL (BURIED 1.0')
(length=377')

PLANS PREPARED BY :
RK&K
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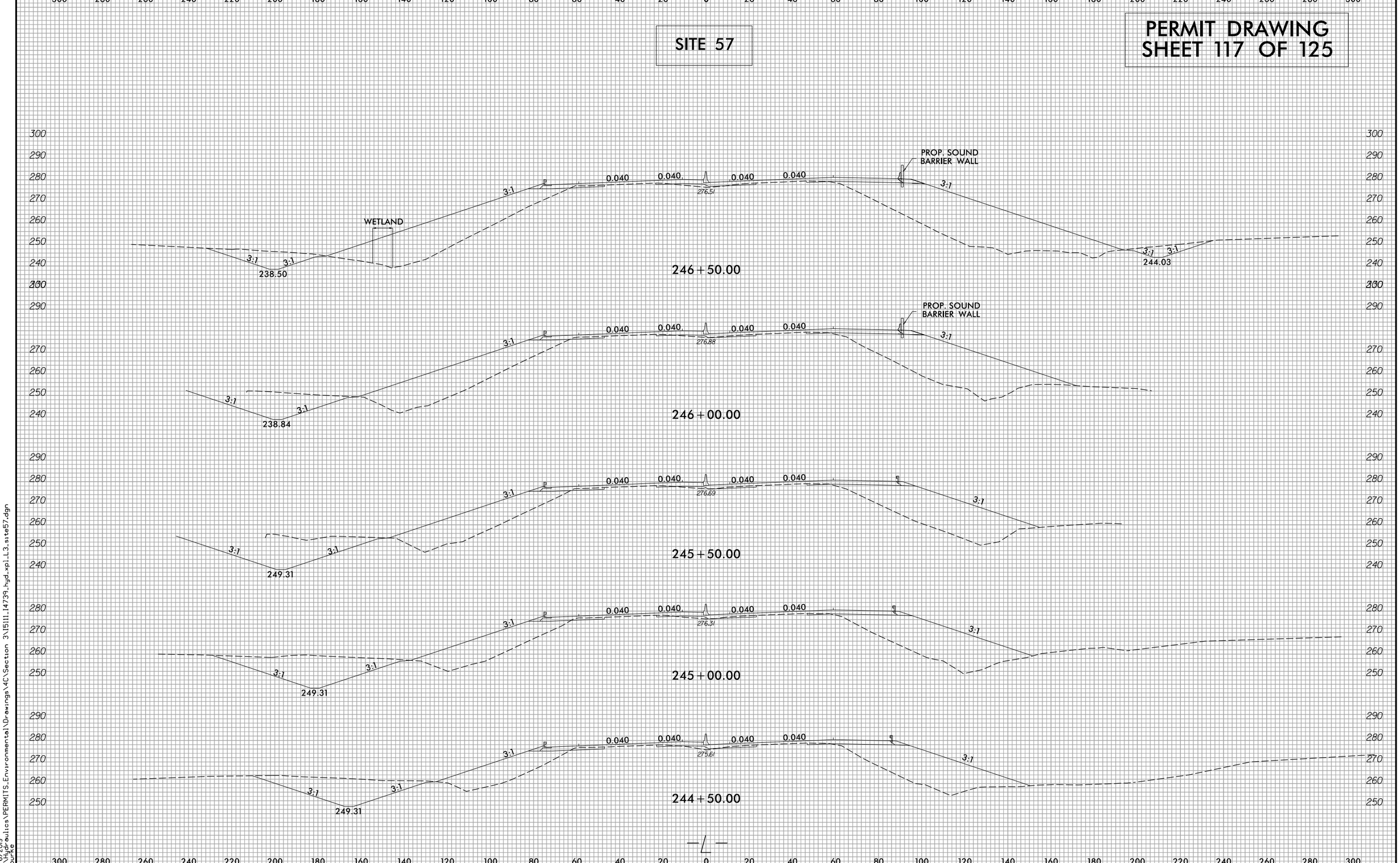
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	I-5111/I-4739	X-58

PERMIT DRAWING
SHEET 117 OF 125

SITE 57



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obourke

8/17/99

25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

PERMIT DRAWING
SHEET 118 OF 125

ENGLISH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
I-5111/I-4739	51
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

NAD 83

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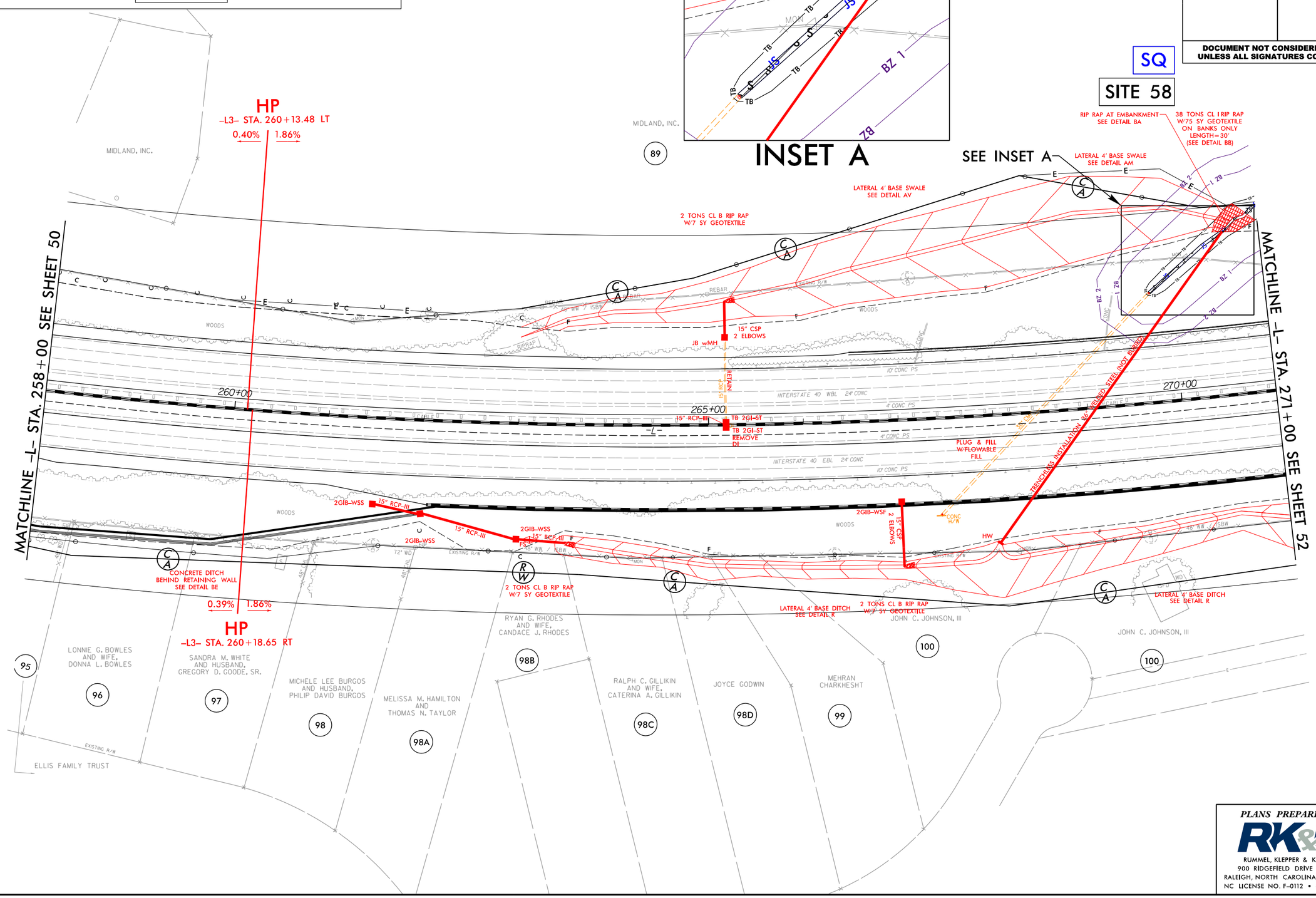
SITE 58



PLANS PREPARED BY :

RK&K

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2/6/2019
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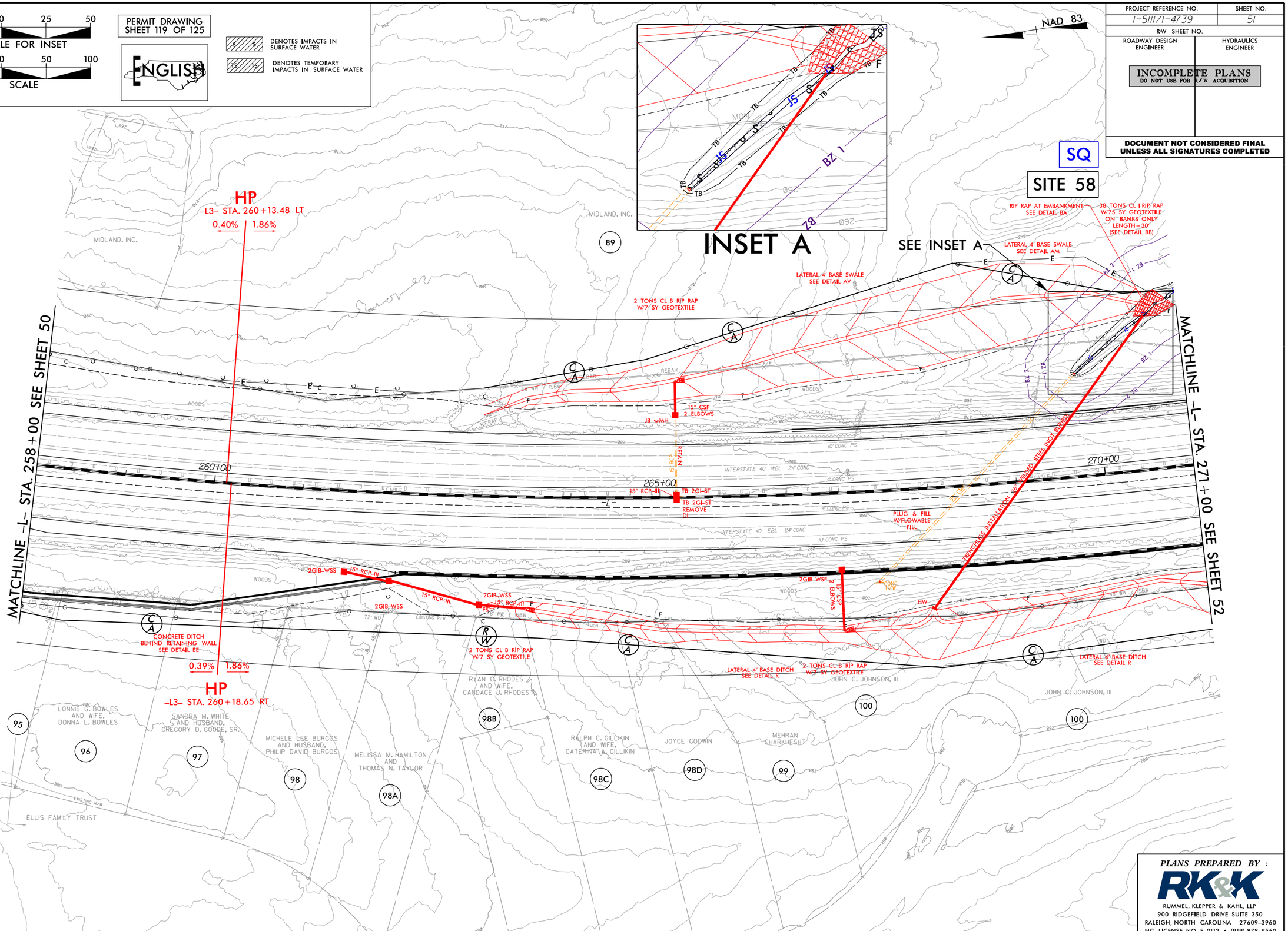

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WETLAND AND SURACE WATER IMPACTS SUMMARY

			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	-LEB- 12+14 RT	HW Replacement						< 0.01	< 0.01	12	12	
1B	-LWB- 18+77 LT	Rip Rap Outlet Pad						< 0.01	< 0.01	20	20	
2A	-Y1RPA- 32+52 RT	Concr. Ditch Replacement							< 0.01		29	
2B	-Y1RPBD- 31+06 RT	Prop Rdwy Fill						0.01		46		
2C	-Y1RPBD- 30+62 LT	Rip Rap Outlet Pads						< 0.01	< 0.01	7	11	
3	-Y1RPBD- 46+74 to 48+93 LT	Prop Pipes & Bridge Construction						< 0.01	0.05	25	240	
4A	-L- 39+21 LT	Rip Rap Outlet Pad						< 0.01	< 0.01	15	10	
4B	-L- 40+19 LT	Ditch Outfall						< 0.01	< 0.01	21	27	
5	-L- 59+13 to 62+63 LT	Channel Change						0.06	< 0.01	349	11	
6A	-L- 64+53 RT	Channel work at 8'x8' RCBC inlet						0.03	< 0.01	82	10	
6B	-L- 65+38 LT	Channel work at 8'x8' RCBC outlet						0.04	0.01	86	29	
7A	-L- 90+96 RT	Channel work at 10'x9' RCBC inlet	< 0.01	0.04				0.06	0.02	86	86	
7B	-L- 91+39 LT	Channel work at 10'x9' RCBC outlet						0.08	0.01	79	10	
8A	-Y3RPA- 23+91 LT	Prop Rdwy Fill and Rip Rap Pad						< 0.01		58		
8B	-Y3RPA- 23+45 RT	Channel Change						< 0.01	< 0.01	12	4	
9	-Y3RPA- 17+58 RT	Rip Rap at pipe outfalls						< 0.01	< 0.01	21	10	
TOTALS*:			< 0.01	0.04				0.31	0.13	919	509	0

*Rounded totals are sum of actual impacts

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
02/05/2019
Wake County
I-5111 / I-4739
42346.3.1

Revised 2016 09 09

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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)
10A/11	-L- 151+95 RT	Perm & Temp Channel Work						< 0.01	0.02	31	119	
10B/12	-L- 145+45 to 149+23 LT	Channel Change and stabilization						0.04	< 0.01	502	18	
13	-L- 157+90 RT	Plug and Fill of Existing Outlet							< 0.01		20	
13	-L- 158+46 to 159+72 RT	Roadway Fill Slope						< 0.01	0.02	20	106	
TOTALS*:								0.05	0.05	553	263	0

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Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
14A	-L- 168+98-169+22 LT	BANK STABILIZATION - SRM						< 0.01	< 0.01	5	20	
14B	-L- 172+50-172+75 LT	BANK STABILIZATION - SRM						< 0.01	< 0.01	8	30	
14C	-L- 175+91-176+26 LT	BANK STABILIZATION - SRM						< 0.01	< 0.01	34	10	
15	ONLY IN BUFFER SET											
16A	-Y5RPD- 22+19-22+29 RT	EXIST. 24" CMP PLUG							< 0.01		10	
16B	-Y5RPC- 53+31 LT	60" RCP - SCF, WQF		< 0.01	< 0.01			< 0.01	< 0.01	46	10	
17A	-Y5RCP- 54+38-54+68 RT	60" RCP - SOE, WQV		< 0.01				< 0.01	< 0.01	12	21	
	-Y5RCP- 54+68-55+37 RT	BANK STABILIZATION - SOE						< 0.01		84		
17B	-L- 250+27 LT	BANK STABILIZATION - SOE						0.02		128		
17C	-Y5RPA- 22+51-22+93 RT	BANK STABILIZATION - SOE						< 0.01	< 0.01	49	5	
18	-L- 256+39-257+51 LT & RT	DITCH, 66" WSP- SOI, WSD	< 0.01					< 0.01		62		
	-L- 256+70 LT	BANK STABILIZATION - SOI		0.02	0.02			< 0.01	< 0.01	34	11	
19	-L- 272+67-275+51 LT & RT	DITCH, 66" WSP - SNF						0.02	< 0.01	134	14	
20	-L- 281+93-284+50 LT & RT	CHANNEL CHANGE - SNH, WQE		0.01	< 0.01			< 0.01	< 0.01	99	46	
	-L- 284+50 LT	BANK STABILIZATION - SNH						< 0.01	< 0.01	5	10	
21	-L- 322+40-323+33 LT & RT	CHANNEL CHANGE, 72" RCP, SNY						0.02	< 0.01	138	19	
22	-L- 323+33-324+31 RT	CHANNEL CHANGE - SOC						0.01	< 0.01	108	22	
23A	-L- 362+54-364+61 LT	CHANNEL CHANGE - SLF / SEM						0.01	< 0.01	204	23	
23B	-L- 368+90-369+15 LT	BANK STABILIZATION - SEM						< 0.01	< 0.01	5	20	
23C	-L- 374+40-379+01 LT	CHANNEL CHANGE - SEM						0.02	< 0.01	455	10	
	-L- 379+01-379+22 LT	BANK STABILIZATION - SEM						< 0.01	< 0.01	12	10	
24	-L- 378+63-379+12 LT	BANK STABILIZATION - SLI	0.02					< 0.01	< 0.01	56	13	
25	ONLY IN BUFFER SET											
TOTALS*:			0.02	0.03	0.02			0.15	0.02	1678	303	0

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NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
FEBRUARY 2019
WAKE AND JOHNSTON
I-5111_I-4739

WETLAND AND SURACE WATER IMPACTS SUMMARY

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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)
26A	-L- 381+90 RT	BANK STABILIZATION - SNK						< 0.01	< 0.01	5	10	
26B	-L- 385+85-386+27 RT	BANK STABILIZATION - SNK						< 0.01	< 0.01	42	10	
27	-L- 386+25 RT	BANK STABILIZATION - SNO						< 0.01	< 0.01	26	10	
28A	-L- 387+46-387+93	BANK STABILIZATION - SEM						0.01	< 0.01	41	20	
28B	ONLY IN BUFFER SET											
29	-L- 395+85 RT	CHANNEL CHANGE - SEK						< 0.01	< 0.01	48	10	
	-L- 396+45 LT	BANK STABILIZATION - SEK						< 0.01	< 0.01	37	10	
30	-L- 400+05 RT	ROADWAY FILL - WEC	< 0.01	< 0.01								
31	-L- 405+95 LT & RT	66" RCP - SEL						< 0.01		18		
	-L- 405+95 LT & RT	BANK STABILIZATION - SEL						< 0.01	< 0.01	72	23	
32	-L- 416+74-416+93 LT	BANK STABILIZATION - SEV						< 0.01	< 0.01	10	10	
33	-L- 447+90 LT & RT	54" RCP & 54" WSP - SDT, WFA, WFC	0.02		< 0.01			0.01	< 0.01	127	10	
34	-L- 445+24-447+90 LT	ROADWAY FILL - SDU, WFB	0.01		0.04			< 0.01		90		
35	ONLY IN BUFFER SET											
36	-L- 461+16-461+39 RT	36" WSP - SDO						< 0.01		23		
	-L- 461+37-431+65 RT	BANK STABILIZATION - SDO						< 0.01	< 0.01	31	10	
37	-Y8RPA- 14+95-15+75 RT	36" RCP - WEZ	0.02									
38	ONLY IN BUFFER SET											
59	-Y5RPB- 43+22-44+62 LT	2 @ 48" RCP, CHANNEL CHANGE - SRN						0.01	< 0.01	159	10	
60	-Y8RPB- 39+80 LT	CHANNEL WORK - SET, WEX	0.06			0.02		< 0.01	< 0.01	51	10	
	-Y8RPA- 27+35 RT	BANK STABILIZATION - SET, WEX		< 0.01				< 0.01	< 0.01	23	10	
TOTALS*:			0.12	< 0.01	0.05	0.02		0.09	0.01	804	153	0

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NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
FEBRUARY 2019
WAKE AND JOHNSTON
I-5111_I-4739

Revised 2016 09 09

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Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
39A	-L- 98+30-99+62 LT	ROADWAY FILL - WEM	0.08			0.03						
39B	-L- 101+93-102+66 LT	ROADWAY FILL - WEM	0.03			0.02						
40	-L- 103+59-104+95 LT & RT	BANK STABILIZATION - SDG						0.22	0.02	254	20	
41	-L- 107+69-109+35 LT	ROADWAY FILL - WEP(1)				0.02						
42	-L- 104+95-108+09 RT	ROADWAY FILL - SDN, WEN		< 0.01		0.02		0.02			200	
43	-L- 111+80-112+09 LT	ROADWAY FILL - SEQ						< 0.01		86		
	-L- 111+61-111+80 LT	BANK STABILIZATION-SEQ						< 0.01	< 0.01	16	10	
44	-L- 114+37-114+64 RT	DITCH - SEQ, WEO(1)		< 0.01				< 0.01	< 0.01	22	10	
45	-L- 144+01-144+56 LT	48" CSP - SEU						0.01		154		
	-L- 143+75-144+08 LT	BANK STABILIZATION - SEU						< 0.01	< 0.01	40	10	
46	-L- 164+25-164+78 RT	30" CSP / 36" RCP - SEA, WOE	0.02					0.01		168		
47	-Y1RPA- 16+63-17+14 RT	54" CSP - SLV						< 0.01		62		
	-Y1RPA- 16+58-16+65 RT	BANK STABILIZATION - SLV						< 0.01	< 0.01	45	10	
48	-Y1RPA- 16+66-17+11 RT	ROADWAY FILL, RIPRAP - SLW						< 0.01	< 0.01	4	48	
49	-L- 171+49-174+67 LT & RT	66" WSP / 66" RCP - SLU, WC, WOB	0.06					0.03		284		
	-L- 171+40-174+63 LT & RT	BANK STABILIZATION - SLU						< 0.01	< 0.01	64	20	
50	-LCDWB- 64+67-68+61 LT & RT	60" CSP, CHANNEL CHANGE - SLS,WOA	0.05	0.02				0.06	< 0.01	588	43	
51	-Y2RPA3- 23+20-23+82 LT	ROADWAY FILL - WNZ	0.02									
	-Y2RPA3- 20+23-23+20	ROADWAY FILL - POND 2						0.58				
	-L- 199+51-205+31	ROADWAY FILL, 66" RCP - SLR, WH	0.03					0.04		612		
	-Y2RPD3- 15+76-16+19 LT	BANK STABILIZATION- SLR						< 0.01	< 0.01	55	15	
52	-Y2RPD3- 23+65-24+43 LT	DITCH, ROADWAY FILL - WGG	< 0.01	< 0.01		0.03						
53	-L- 210+53-215+65	54" RCP / 66" RCP - MILL BRANCH						0.06	< 0.01	380	16	
	-L- 210+21-210+61 RT	BANK STABILIZATION - MILL BRANCH						< 0.01	< 0.01	29	16	
TOTALS*:			0.29	0.03		0.12		1.07	0.04	2864	418	0

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NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
FEBRUARY 2019
WAKE AND JOHNSTON
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Revised 2016 09 09

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54	-L- 232+69-233+35 LT	54" WSP - SJ, WI						< 0.01		82		
	-L- 233+33-233+44 LT	BANK STABILIZATION - SJ						< 0.01	< 0.01	45	10	
55	-L- 233+94-234+19 LT	48" RCP - SK, WJ	< 0.01					< 0.01		78		
	-L- 234+02-234+11 LT	BANK STABILIZATION - SK						< 0.01	< 0.01	40	10	
56	-L- 246+22-246+77 RT	CHANNEL CHANGE - SEE						< 0.01	< 0.01	102	10	
57	-L- 246+73-247+65	60" WSP - SDD, WFF	0.01					0.02	< 0.01	238	10	
	-L- 247+59-247+78 LT	BANK STABILIZATION - SDD						< 0.01	< 0.01	55	9	
58	-L- 269+75-270+63 LT	36" WSP - SQ						< 0.01		100		
	-L- 270+58-270+85 LT	BANK STABILIZATION - SQ						< 0.01	< 0.01	33	9	
TOTALS*:			0.02					0.06	< 0.01	773	58	0

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FEBRUARY 2019
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