

Permit Drawings



North Carolina Department of Transportation
Highway Stormwater Program STORMWATER
MANAGEMENT PLAN
FOR NCDOT PROJECTS



(Version 3.00; Released August 2021)

WBS Element: 41890.1 TIP/Proj No: R-5100A County(ies): Iredell Page 1 of 1

General Project Information

WBS Element:	41890.1	TIP Number:	R-5100A	Project Type:	Roadway Widening	Date:	10/11/2023
NCDOT Contact:	Brook Anderson, PE			Contractor / Designer:	VHB		
Address:	1000 Birch Ridge Drive Raleigh, NC 27610			Address:	Venture 1 940 Main Campus Drive, Suite 500 Raleigh, NC 27606		
	Phone: 919-706-6706				Phone: 919-741-5779		
	Email: beanderson@ncdot.gov				Email: bbarham@vhb.com		
City/Town:	Mooresville			County(ies):	Iredell		
River Basin(s):	Catawba			CAMA County?	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	2.40	Surrounding Land Use:	Residential, Urban
Proposed Project		Existing Site	
Project Built-Up Area (ac.)	25.9 ac.	16.0 ac.	
Typical Cross Section Description:	4@ 12' lanes with 8.5' median, 10' sidewalk and variable shoulder width		
		2@ 12' lanes with a bi-directional continuous left turn lane and variable shoulder width	
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 34700	Year: 2040	Existing: 27100
		Year: 2015	

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

This project proposes the widening of Williamson Rd (SR 1109) from I-77 to Brawley School Rd (SR 1100) in Iredell County. The existing roadway will be widened with proposed C&G with sidewalk behind the curb. All proposed outfalls within the project limits will utilize Rip Rap Outlet pads to provide energy dissipation and lessen erosive velocities. The existing bridge over I-77 will be widened to accommodate the additional lanes and proposed C&G. The existing bridge over Lake Norman (5@45' reinforced concrete decking, on I beams with concrete caps) will be replaced with a 3@ 80' 45" prestressed girder bridge with 4'-0" Caps. To minimize surface water impacts to Lake Norman, the fill slopes on the causeway were steepened to 1.75:1 from 1 foot above the full pond elevation. This project requires ditches through the buffers on the RT and LT of -L- at each end of the causeway that crosses Lake Norman. For the begin bridge LT ditch outlet, treatment was able to be achieved for approximately 90' by flattening the grass-lined ditch to a 0.003 ft/ft slope. Likewise, treatment was achieved at the end bridge LT ditch outlet for approximately 20' in BZ 2 with the same approach. It was not practicable to meet treatment requirements in the other quadrants due to required ditch grades and the necessary addition of rip rap to achieve non-erosive velocities.

Waterbody Information

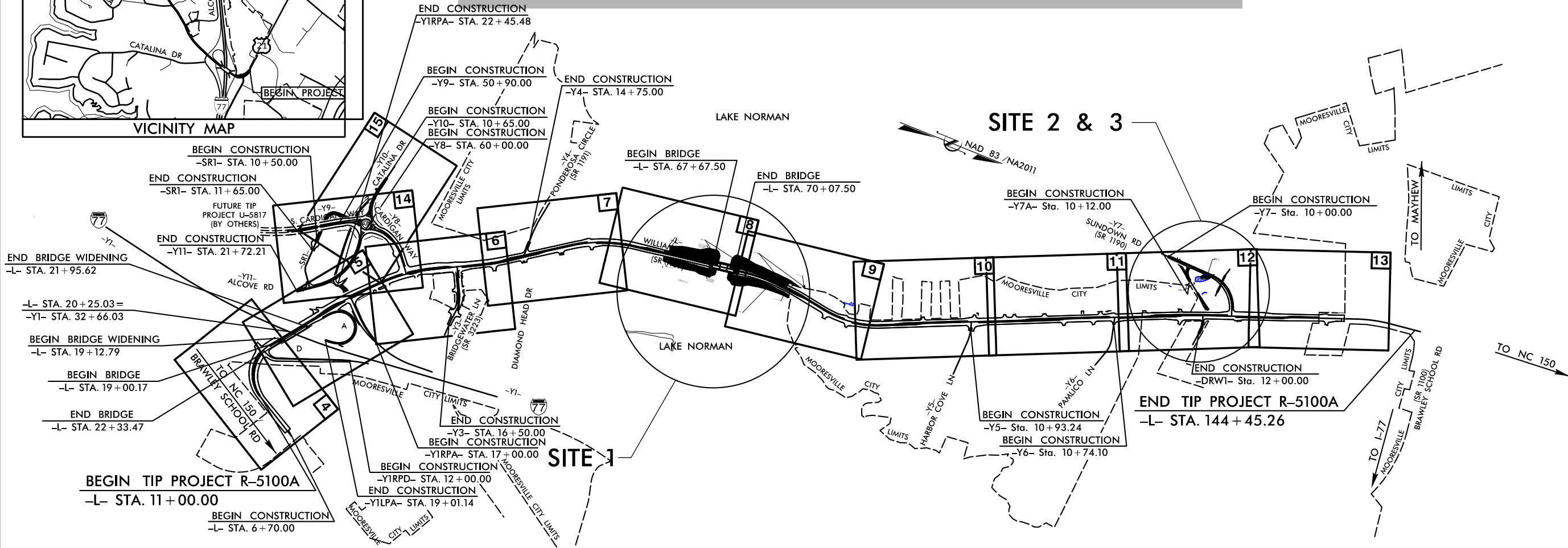
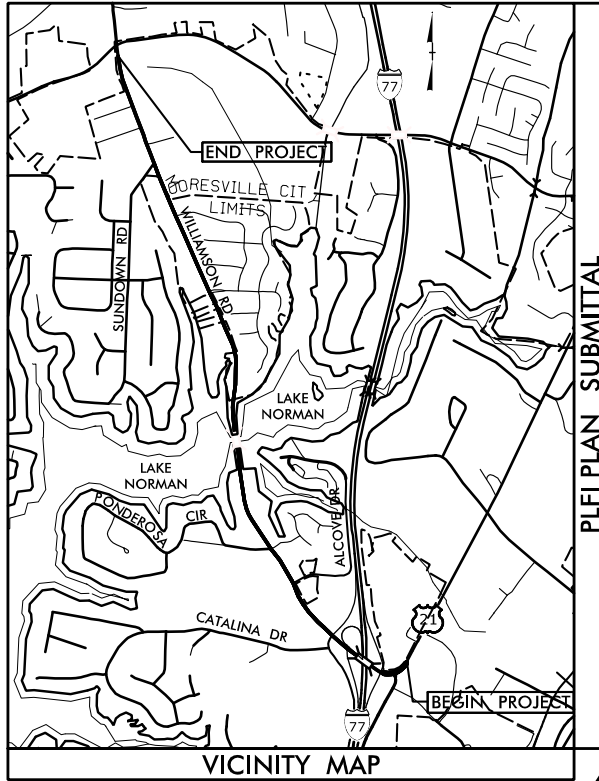
Surface Water Body (1):	Catawba River (Lake Norman below elevation 760)	NCDWR Stream Index No.:	11-104-(02)		
NCDWR Surface Water Classification for Water Body	Primary Classification:	Water Supply IV (WS-IV)	Class B	Critical Area (CA)	
	Supplemental Classification:				
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Lake Norman/Reeds Creek	Buffer Rules in Effect:	Catawba		
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)					

09/28/24 10:41:15 AM R:\Hydraulics\PERMITS-Environmental\Drawings\Surface Water Impacts\R5100A_PRM_TSH_SW.dgn bdeveau

TIP PROJECT: R-5100A

CONTRACT:

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



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

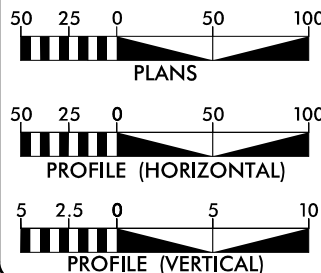
LOCATION: WILLIAMSON RD (SR 1109) FROM I-77
TO BRAWLEY SCHOOL ROAD (SR 1100).

TYPE OF WORK: WIDENING, GRADING, DRAINAGE, PAVING, STRUCTURES,
SIGNALS AND PAVEMENT MARKINGS

PERMIT DRAWING
SHEET 1 OF 10

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5100A	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
41890.1.2	N/A	P.E.	
41890.2.3	N/A	R / W	
41890.2.6	N/A	UTILITIES	

GRAPHIC SCALES



DESIGN DATA

ADT 2024 = 27,100
ADT 2044 = 34,700
K = 10
D = 55
T = 4 % *
V = 50 MPH
* TTST = 1% DUAL = 3%
FUNC CLASS =
MAJOR COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT - 2.429 mi
LENGTH BRIDGE PROJECT - 0.099 mi
TOTAL LENGTH PROJECT - 2.528 mi

NCDOT CONTACT: **VERROL McLEARY**
PROJECT MANAGER - PMU DIVISIONS 11-14

LOCHNER

H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111

Prepared in the Office of:



VHB Engineering, Inc. P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 20, 2019

LETTING DATE:
JULY 16, 2024

CHRISTINA YOKELEY, PE
PROJECT ENGINEER

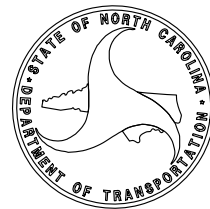
REID CROSSER
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN
ENGINEER

SIGNATURE: _____ P.E.



5/14/99

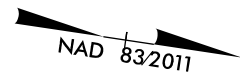
LOCHNER

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NC License
Number F-0159



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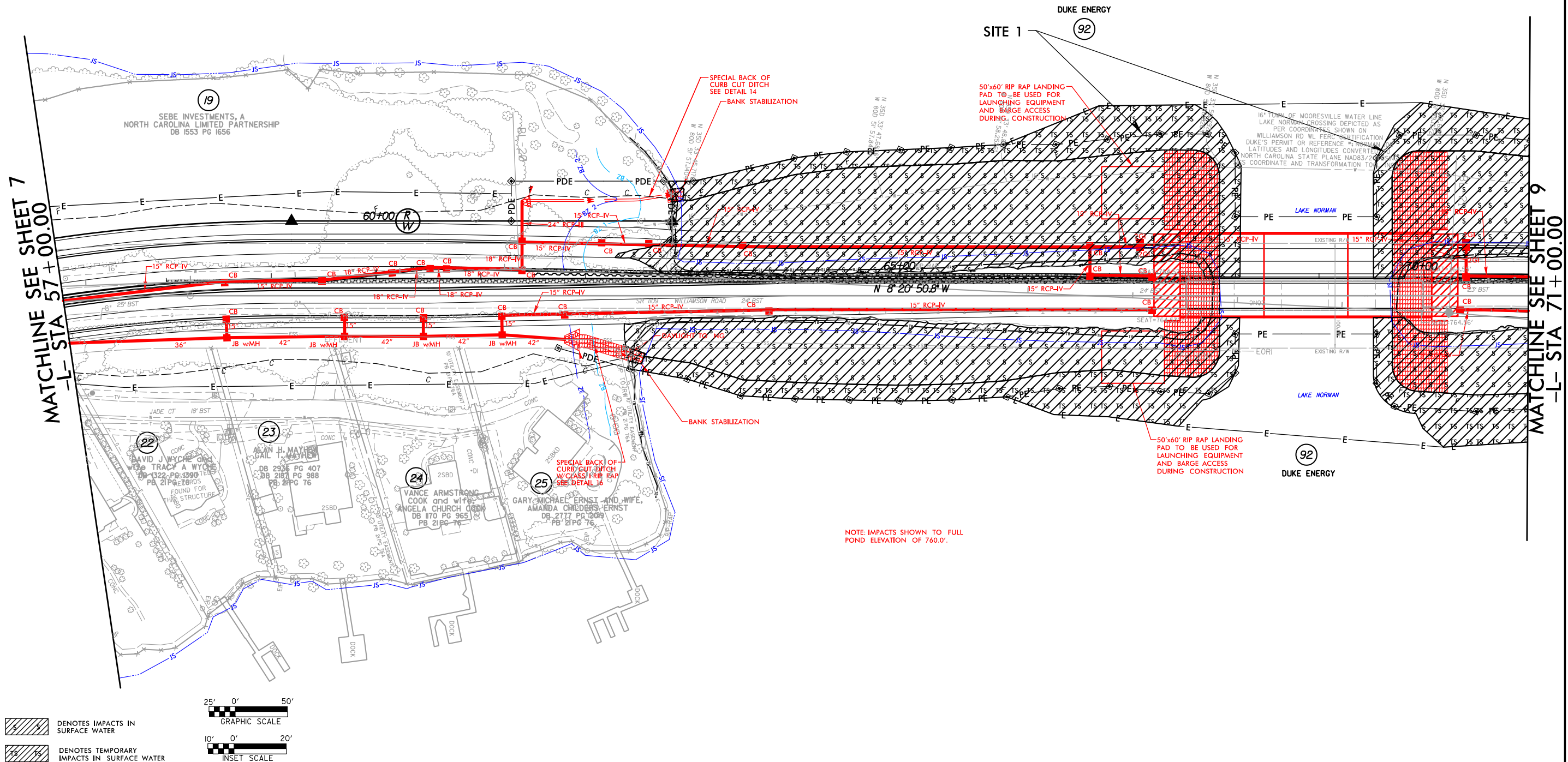


PROJECT REFERENCE NO.		SHEET NO.
R-5100A		8
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER

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

NOTE: TIE ALL PROPOSED CURB & GUTTER
AND SIDEWALK TO EXISTING UNLESS
OTHERWISE SHOWN.

**PERMIT DRAWING
SHEET 2 OF 10**



5/14/99

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Raleigh, NC 27606

PROJECT REFERENCE NO.
R-5100A

SHEET NO.
8

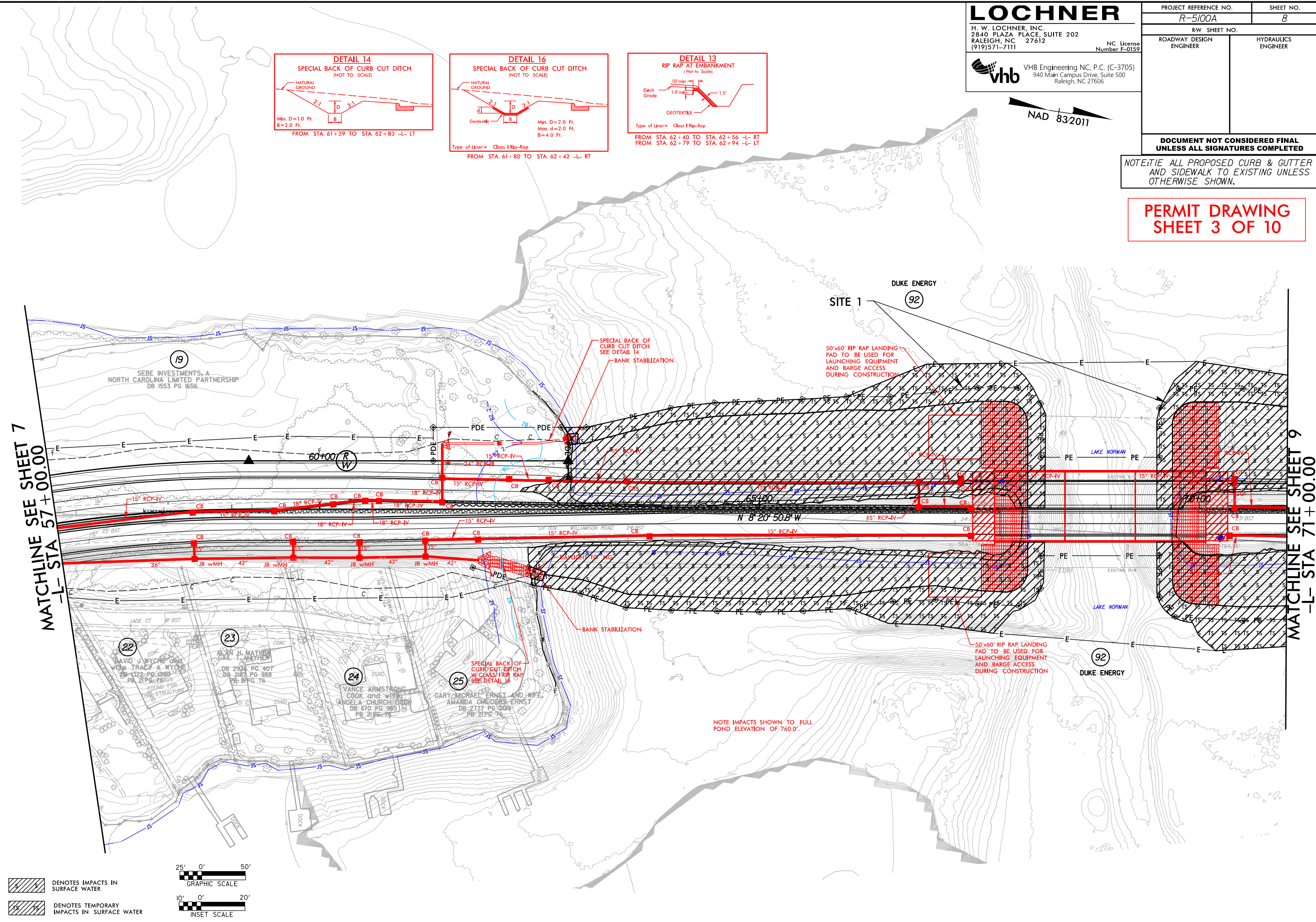
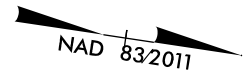
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ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

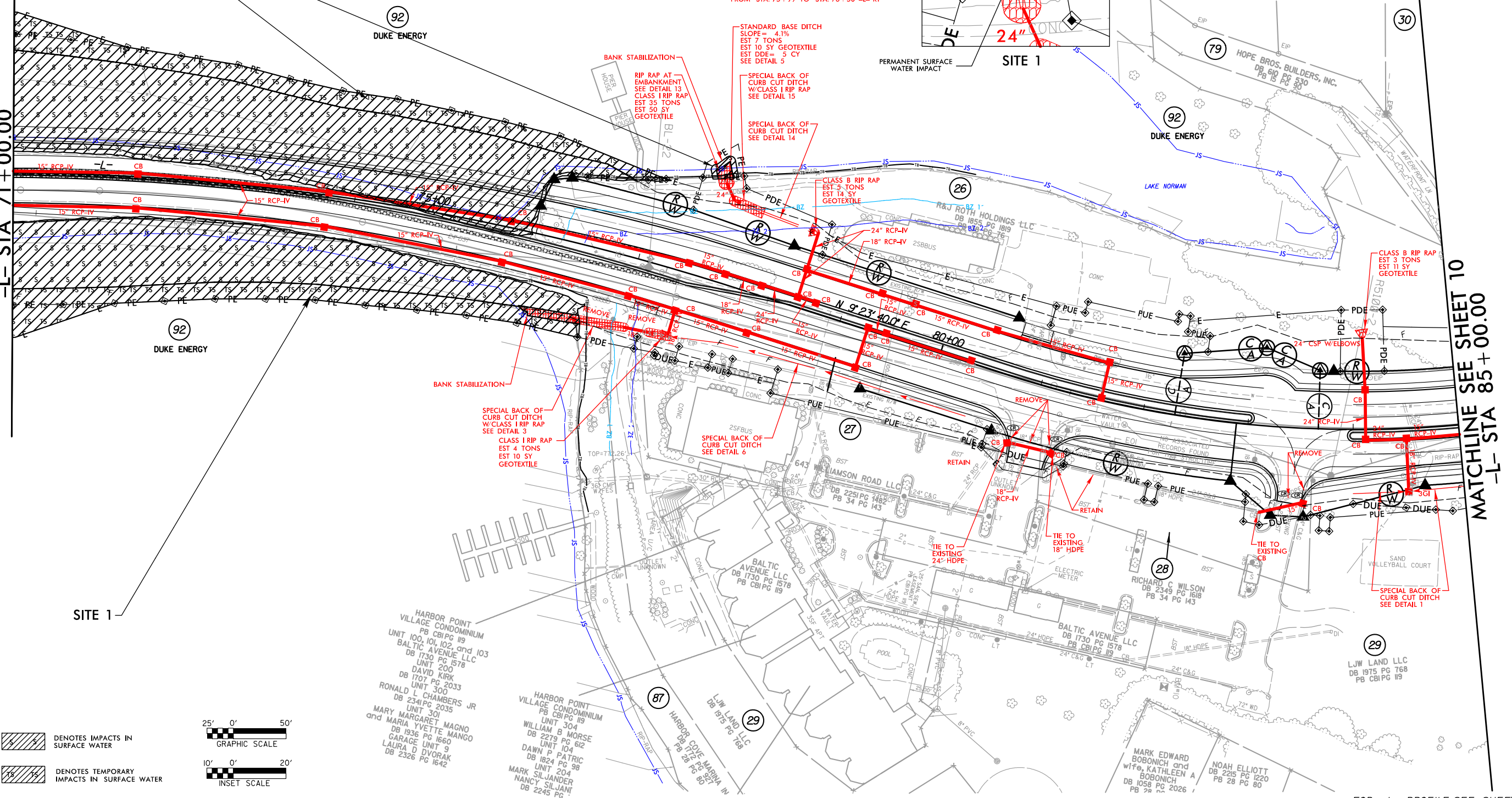
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**PERMIT DRAWING
SHEET 3 OF 10**



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FOR -L- PROFILE, SEE SHEET 17

5/14/99

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LOCHNER

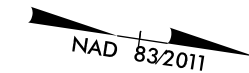
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Number F-0159



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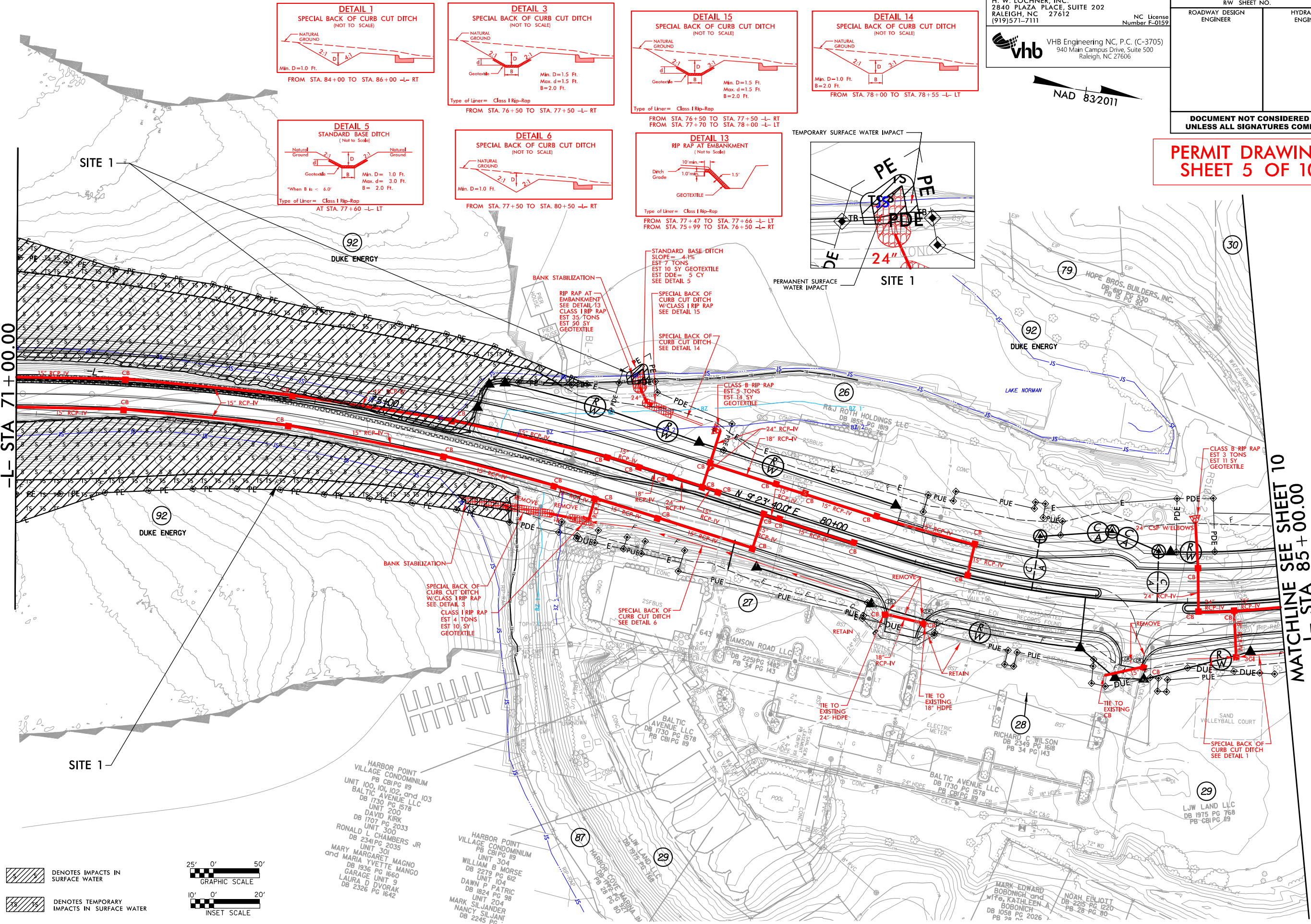
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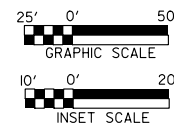
PERMIT DRAWING
SHEET 5 OF 10

MATCHLINE SEE SHEET 8
-L- STA 71+00.00

MATCHLINE SEE SHEET 10
-L- STA 85+00.00



1/8" = 10' DENOTES IMPACTS IN SURFACE WATER
1/8" = 10' DENOTES TEMPORARY IMPACTS IN SURFACE WATER



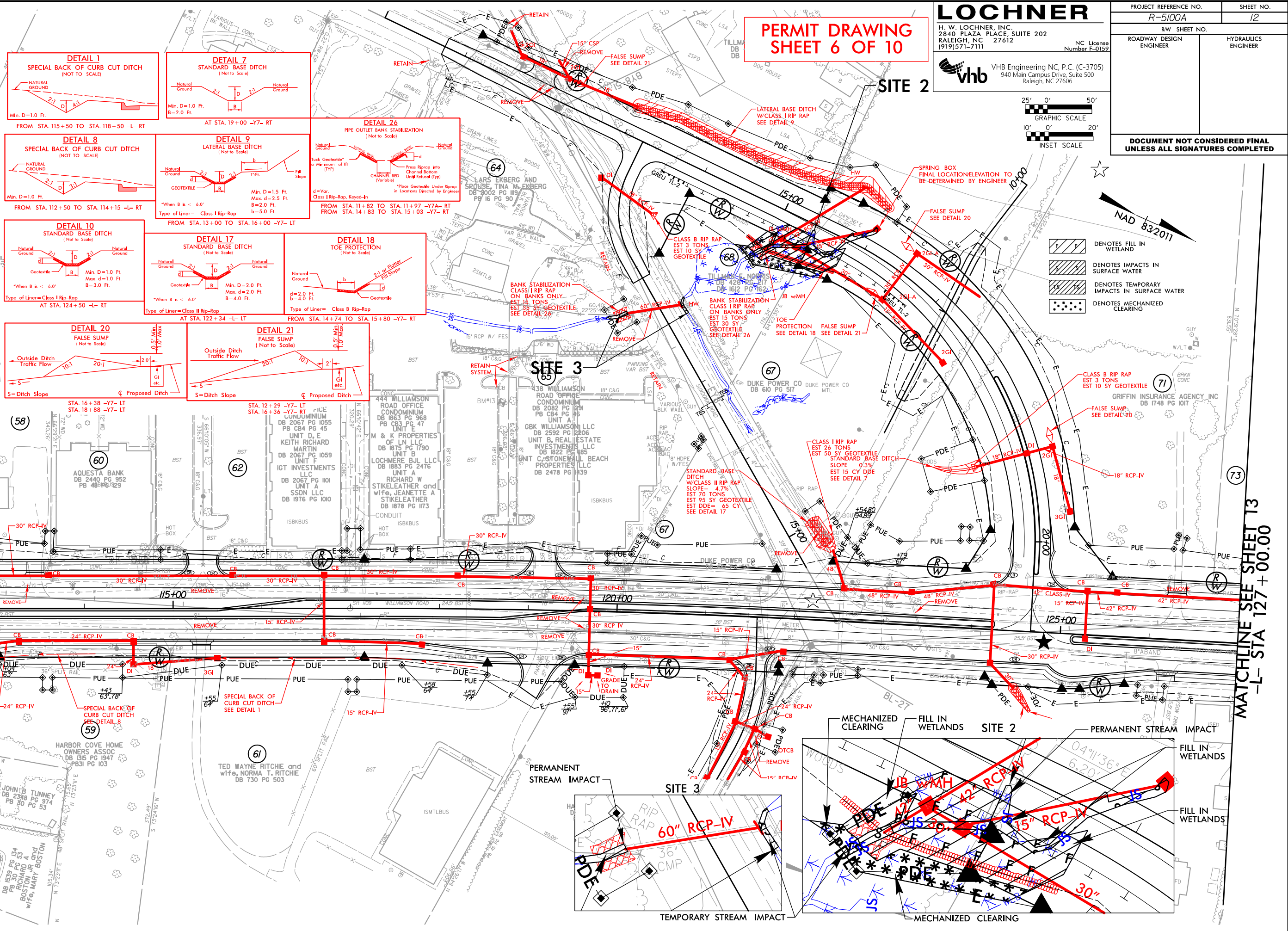
FOR -L- PROFILE, SEE SHEET 17

5/14/99

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MATCHLINE SEE SHEET 11
-L- STA 113+00.00

MATCHLINE SEE SHEET 13
-L- STA 127+00.00



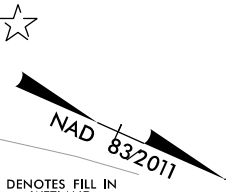
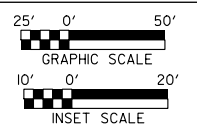
PERMIT DRAWING SHEET 6 OF 10

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NC License
Number F-0159

vhb
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Raleigh, NC 27606

PROJECT REFERENCE NO.		SHEET NO.
R-5100A		12
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



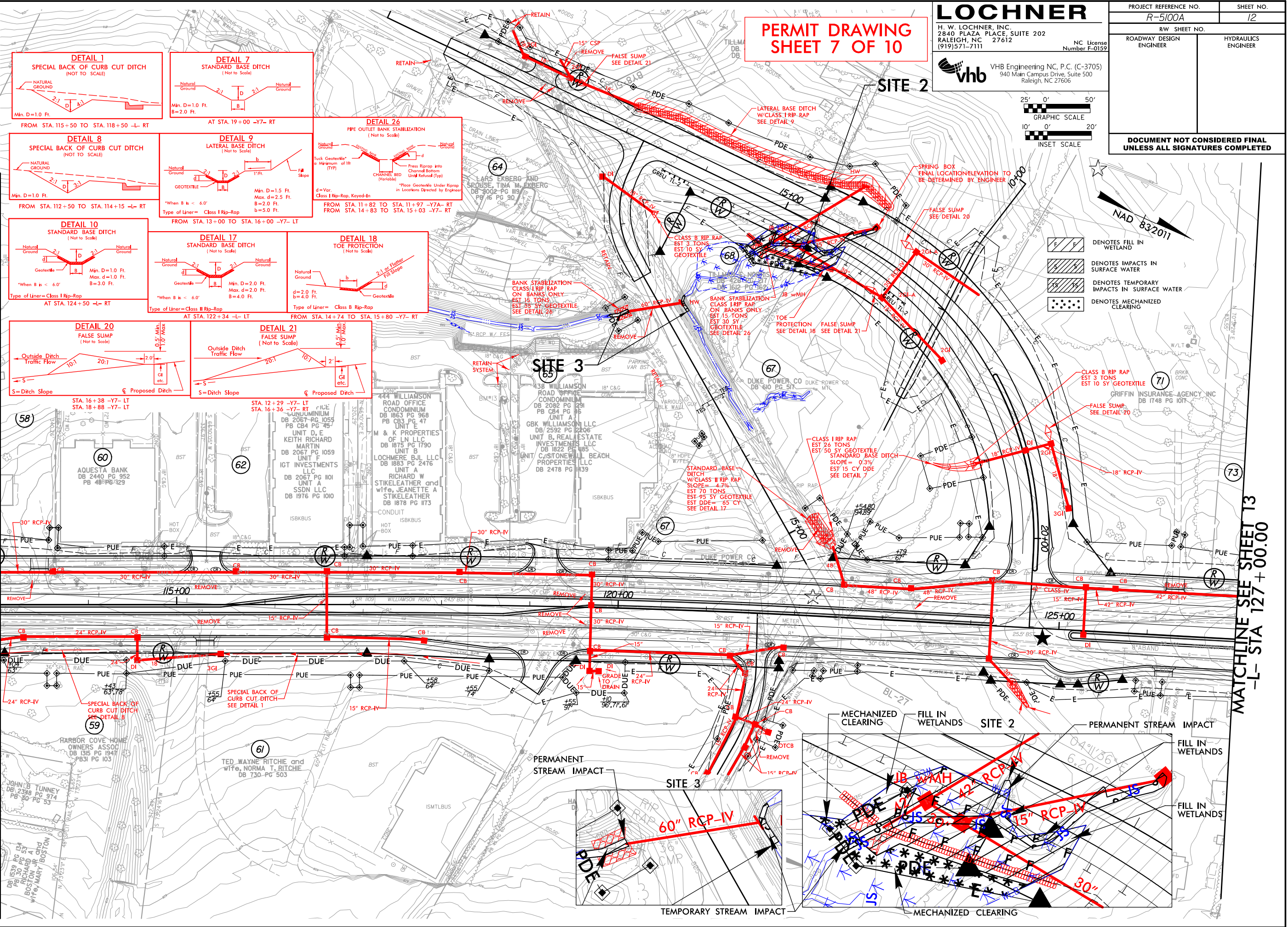
- Denotes Fill in Wetland
- Denotes Impacts in Surface Water
- Denotes Temporary Impacts in Surface Water
- Denotes Mechanized Clearing

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

NAD 83/2011

- | | |
|---|--|
|  | <p> DENOTES FILL IN
 WETLAND </p> |
|  | <p> DENOTES IMPACTS IN
 SURFACE WATER </p> |
|  | <p> DENOTES TEMPORARY
 IMPACTS IN SURFACE WATER </p> |
|  | <p> DENOTES MECHANIZED
 CLEARING </p> |

WATCHLINE SEE SHEET 13
-L- STA 127+00.00



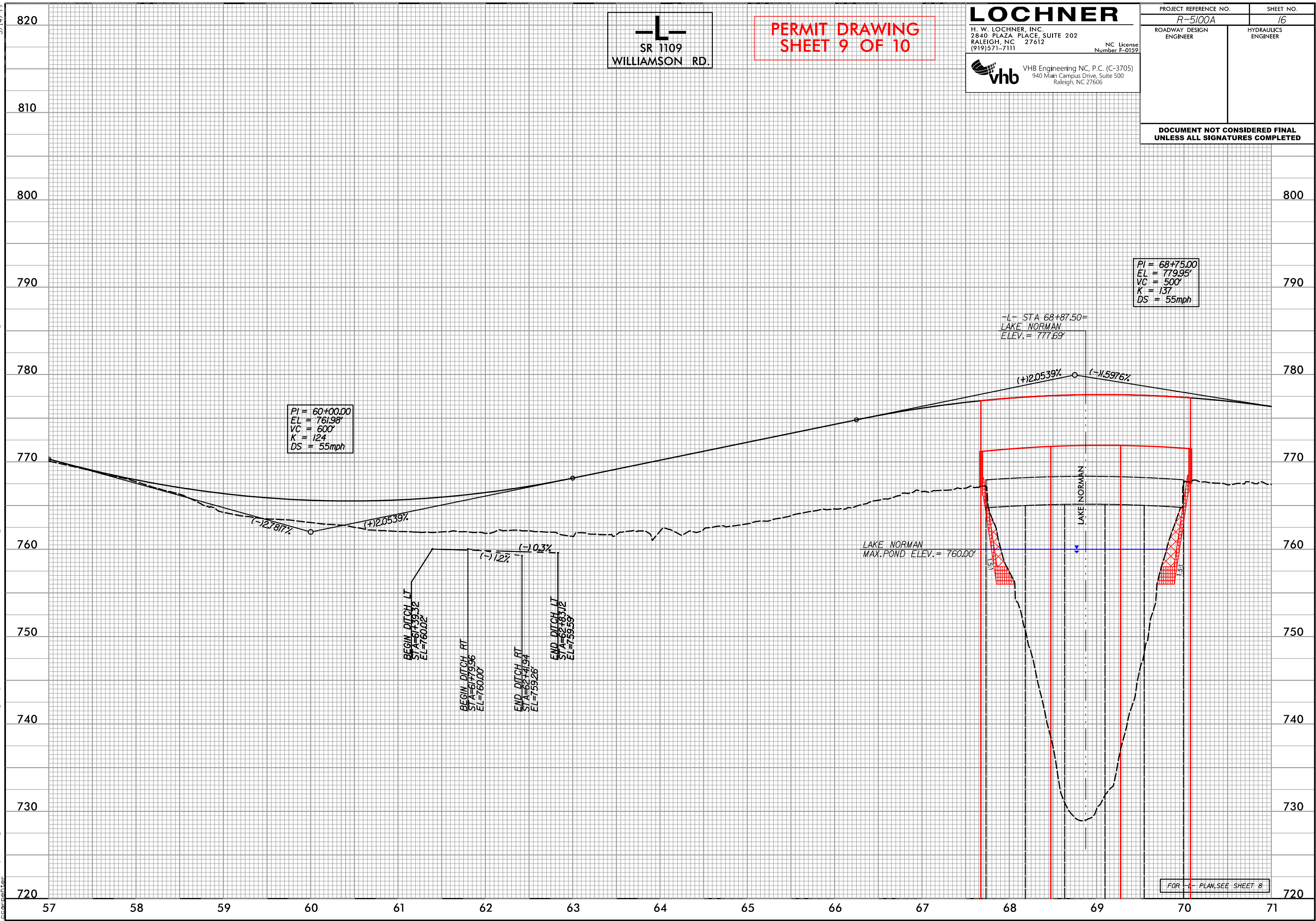
6/23/16

PERMIT DRAWING
SHEET 8 OF 10

SYSTEMS
DRAINAGE
SULPHUR
AVENUE



350556 AM
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ccarcenter



FOR -L- PLAN, SEE SHEET 8

WETLAND AND SURFACE WATER IMPACTS SUMMARY												
			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	62+28/77+68 -L-	Roadway Fill						3.95	1.47			
1	62+28/77+68 -L-	Bank Stabilization						0.02	< 0.01			
2	14+71 to 16+02 -Y7-	42"/15" RCPs, Roadway Fill	0.06			0.02		0.01		167		
2	14+71 to 16+02 -Y7-	42"/15" RCPs Bank Stabilization						< 0.01	< 0.01	16	9	
3	11+84 to 12+18 -Y7A-	60" RCP							< 0.01		20	
3	11+84 to 12+18 -Y7A-	60" RCP Bank Stabilization						< 0.01		22		
TOTALS*:			0.06			0.02		3.99	1.48	205	29	0

NOTES:

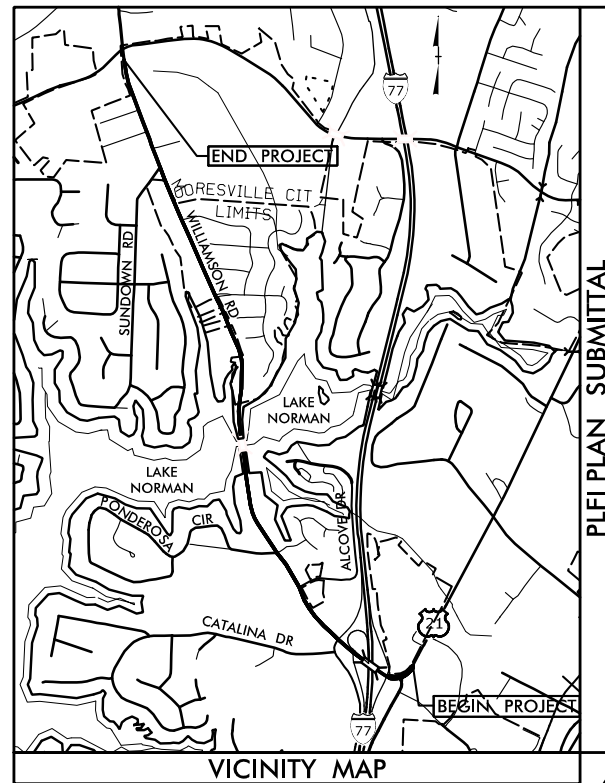
- NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
4/22/2024
IREDELL
5100A
41890.1.2
SHEET 10 OF 10

Utility Drawings

TIP PROJECT: R-5100A

CONTRACT:

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



PIEPIAN SURMITAI

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

IREDELL COUNTY

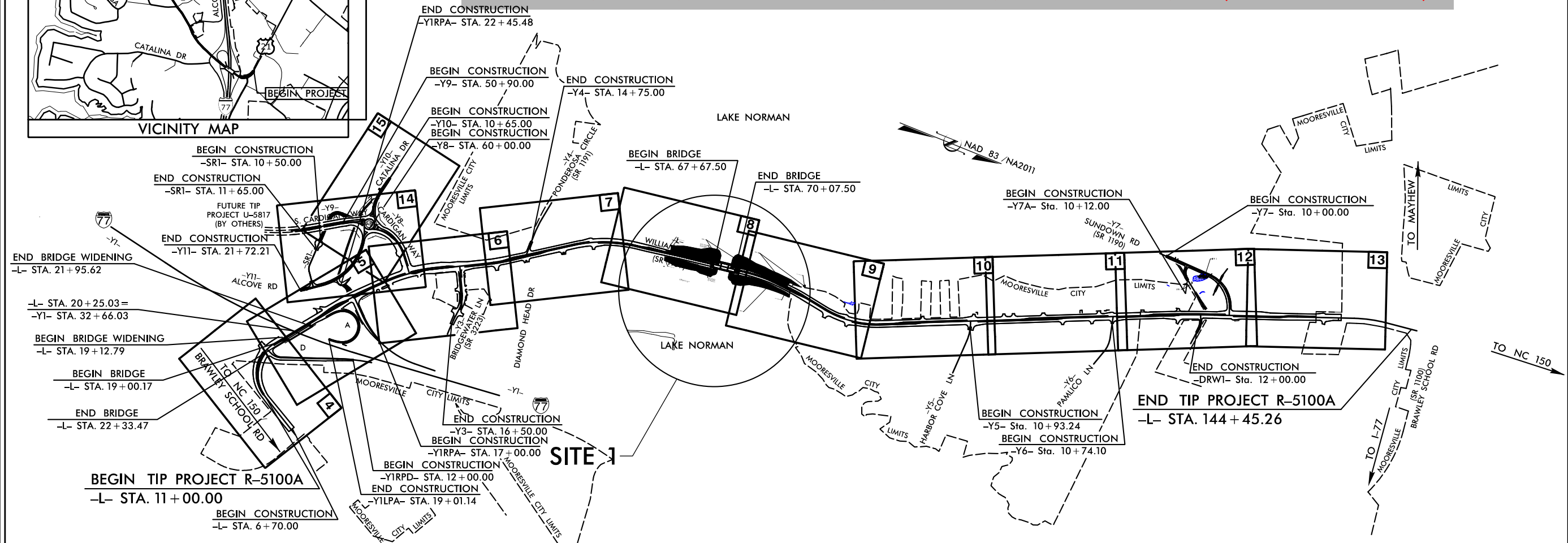
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***TYPE OF WORK: WIDENING, GRADING, DRAINAGE, PAVING, STRUCTURES,
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PERMIT DRAWING
SHEET 1 OF 4

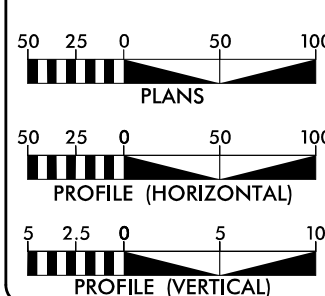
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N.C.	R-5100A	1	
STATE PROJ.NO.	F.A.PROJ.NO.	DESCRIPTION	
41890.1.2	N/A	P.E.	
41890.2.3	N/A	R / W	
41890.2.6	N/A	UTILITIES	

WETLAND AND SURFACE WATER IMPACTS PERMIT (WET UTILITY)



**DOCUMENT NOT CONSIDERED FINAL
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GRAPHIC SCALES



DESIGN DATA

ADT 2024 = 27,100
ADT 2044 = 34,700
K = 10
D = 55
T = 4 % *
V = 50 MPH
* TTST = 1% DUAL = 3%
FUNC CLASS =
MAJOR COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT	-	2.429 mi
LENGTH BRIDGE PROJECT	-	0.099 mi
TOTAL LENGTH PROJECT	-	2.528 mi

NCDOT CONTACT: VERROL McLEARY
PROJECT MANAGER - PMU DIVISIONS 11-14

Prepared in the Office of:

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111



VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 20, 2019

LETTING DATE:
JULY 16, 2024

CHRISTINA YOKELEY, PE
PROJECT ENGINEER

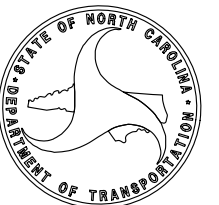
REID CROSSER
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ **P.E.**

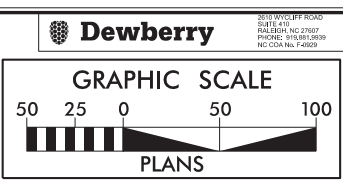
**ROADWAY DESIGN
ENGINEER**

SIGNATURE: _____ *P.E.*



NOTE:
THE ESTIMATED QUANTITY OF DUCTILE IRON
WATER PIPE FITTINGS ON THIS PLAN SHEET
IS 2400 POUNDS. THE ACTUAL QUANTITY AND
TYPE OF FITTINGS WILL VARY BASED ON
FIELD CONDITIONS.

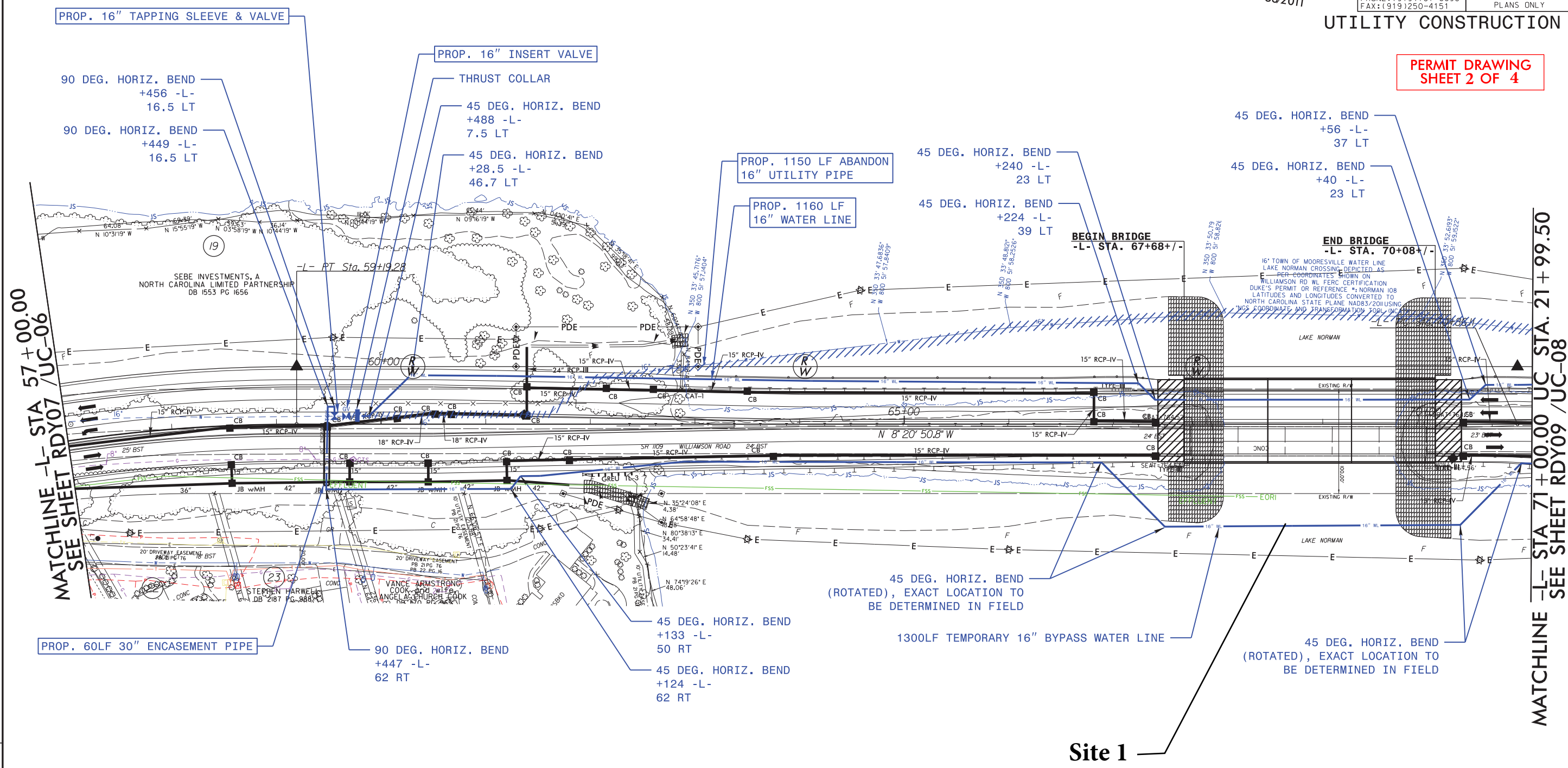
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PROJECT REFERENCE NO.		SHEET NO.	
R-5100A		UC-07	
DESIGNED BY:			
DRAWN BY:			
CHECKED BY:			
APPROVED BY:			
REVISED:			
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION			
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151		UTILITY CONSTRUCTION PLANS ONLY	

UTILITY CONSTRUCTION

PERMIT DRAWING
SHEET 2 OF 4



REVISIONS

MATCHLINE -L- STA 57 + 00.00
SEE SHEET RDY07 / UC-06

MATCHLINE
-L- STA 71 + 00.00 UC STA. 21 + 99.50
SEE SHEET RDY09 / UC-08

8/17/99

REVISIONS

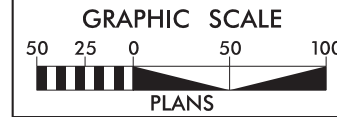
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SEE SHEET RDY08 /UC-07

NOTE:
THE ESTIMATED QUANTITY OF DUCTILE IRON
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IS 4500 POUNDS. THE ACTUAL QUANTITY AND
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NAD 83/2011

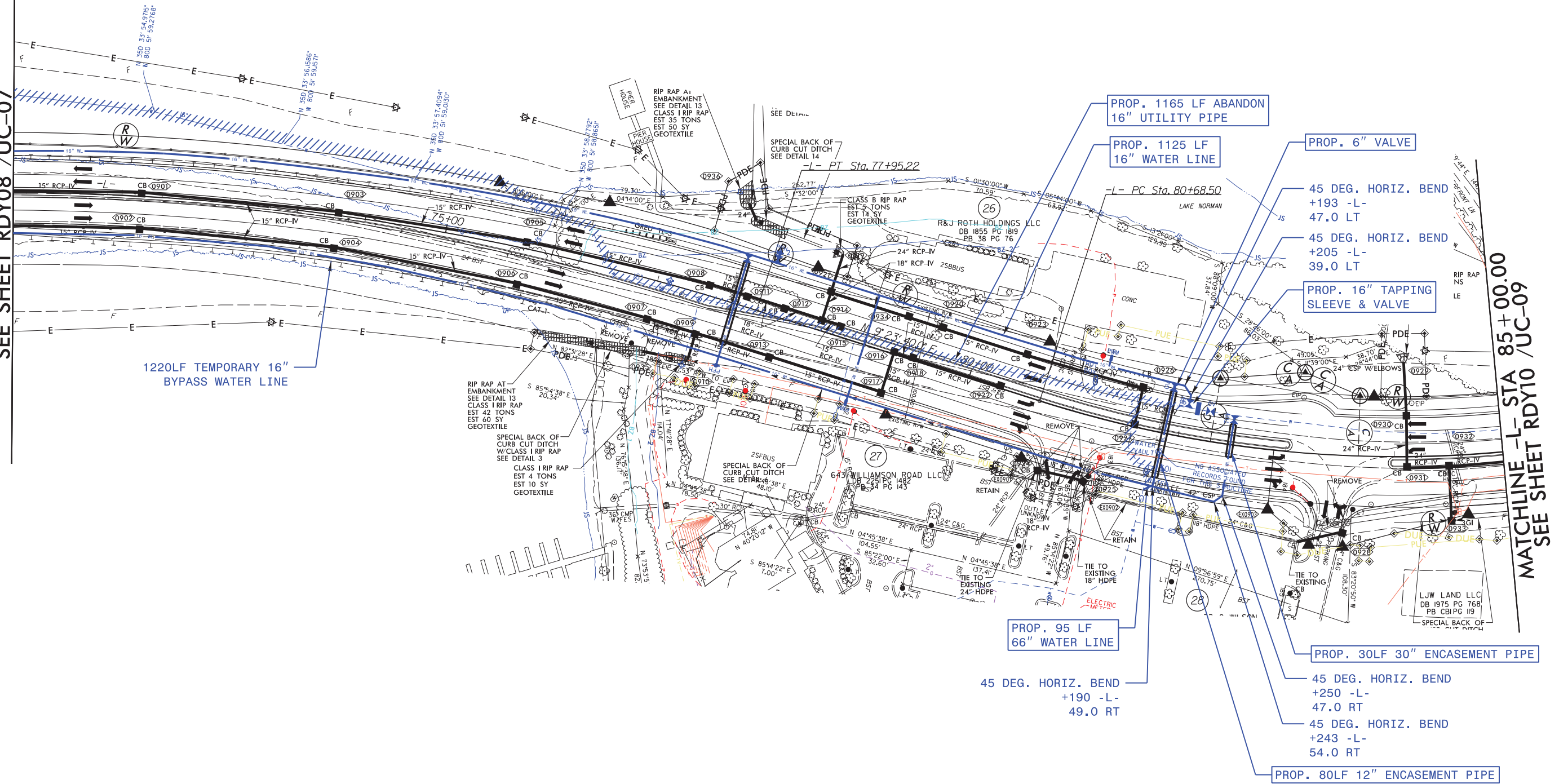
Dewberry



PROJECT REFERENCE NO.		SHEET NO.
R-5100A		UC-08
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DRAWN BY:		
CHECKED BY:		
APPROVED BY:		
REVISED:		
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION		
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151		UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

PERMIT DRAWING
SHEET 3 OF 4



WETLAND AND SURFACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
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1	66+85/70+90 -L- RT	Temporary 16" Bypass							< 0.01			
		Water Line										
TOTALS*:									< 0.01	0	0	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

10/11/2023

IREDELL

5100A

41890.1.D1

SHEET

4

OF

4

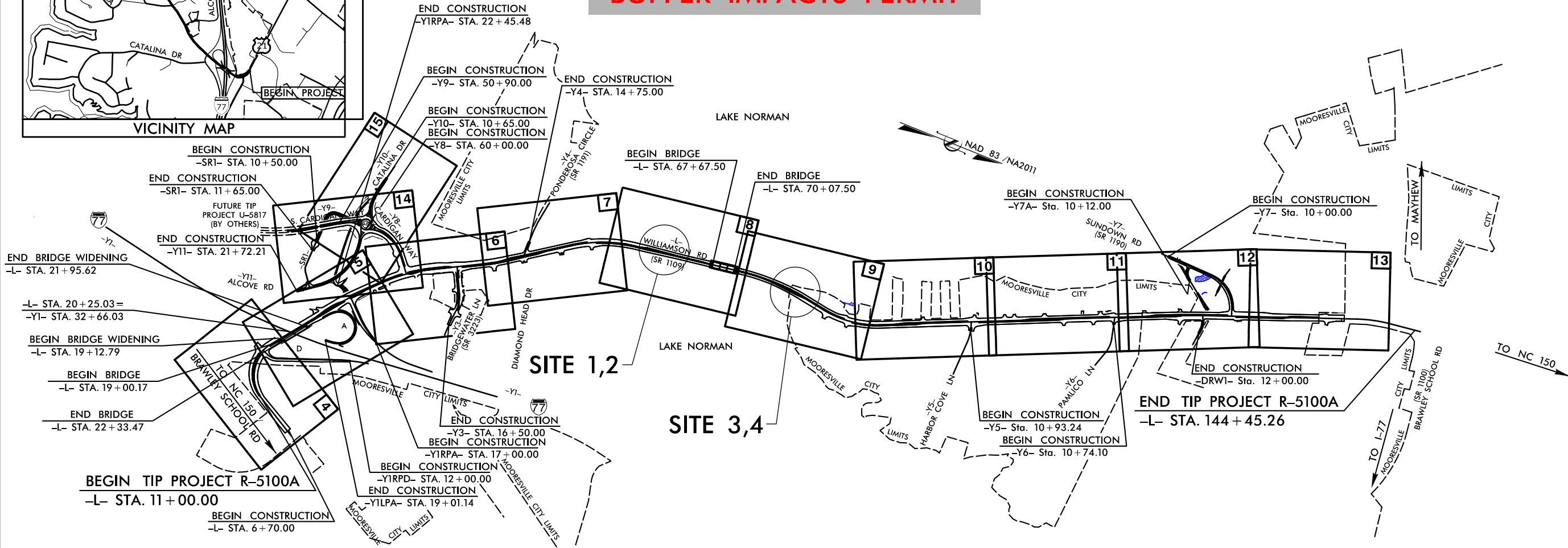
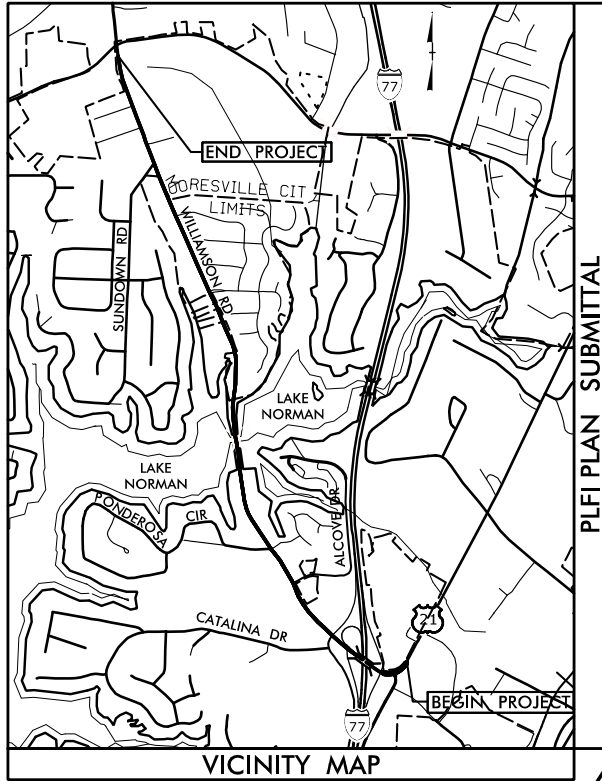
Buffer Drawings

09/28/24
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bdeveau

TIP PROJECT: R-5100A

CONTRACT:

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



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

LOCATION: WILLIAMSON RD (SR 1109) FROM I-77
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TYPE OF WORK: WIDENING, GRADING, DRAINAGE, PAVING, STRUCTURES,
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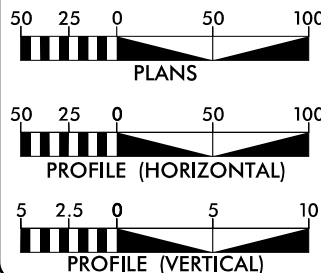
BUFFER IMPACTS PERMIT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5100A	1	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
41890.1.2	N/A	P.E.	
41890.2.3	N/A	R / W	
41890.2.6	N/A	UTILITIES	

BUFFER DRAWING
SHEET 1 OF 4

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GRAPHIC SCALES



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ADT 2044 = 34,700
K = 10
D = 55
T = 4 % *
V = 50 MPH
* TTST = 1% DUAL = 3%
FUNC CLASS =
MAJOR COLLECTOR
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT - 2.429 mi
LENGTH BRIDGE PROJECT - 0.099 mi
TOTAL LENGTH PROJECT - 2.528 mi

NCDOT CONTACT: **VERROL McLEARY**
PROJECT MANAGER - PMU DIVISIONS 11-14

LOCHNER

H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111

Prepared in the Office of:



VHB Engineering, Inc. (VHB)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 20, 2019

LETTING DATE:
JULY 16, 2024

CHRISTINA YOKEYLEY, PE
PROJECT ENGINEER

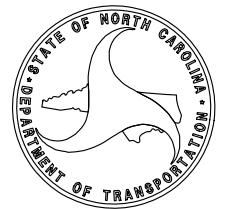
REID CROSSER
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

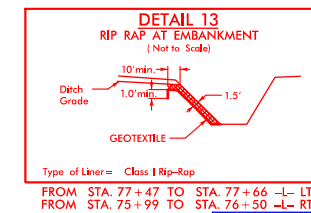
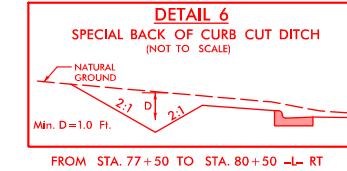
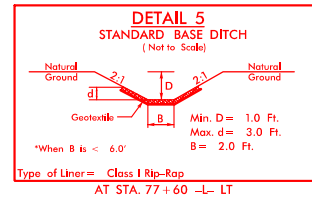
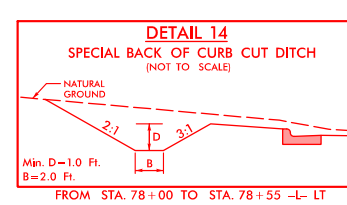
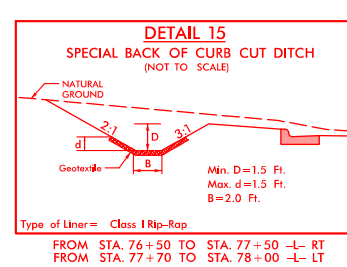
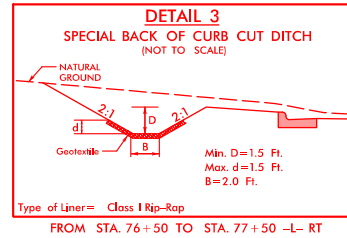
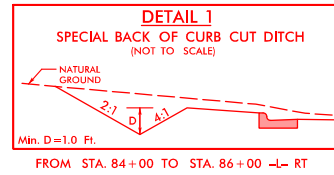
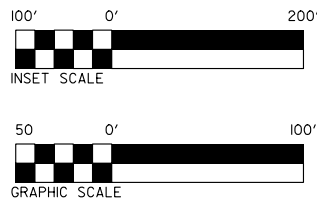
SIGNATURE: _____ P.E.

ROADWAY DESIGN
ENGINEER

SIGNATURE: _____ P.E.



5/14/99



Sta. = 77+56 -L- RT.
DA=2.2 AC
C=0.8 Tc=10 min
H10=5.5 INHR I2=4.2 INHR
Q10=9.9 CFS Q2=7.4 CFS
V10=3.1 FPS V2=2.8 FPS
d10=0.9 FT d2=0.7 FT
s=0.045 FT/FT
n=0.065
Liner=CLASS I RIP RAP

DUKE EN

92

DUKE ENERGY

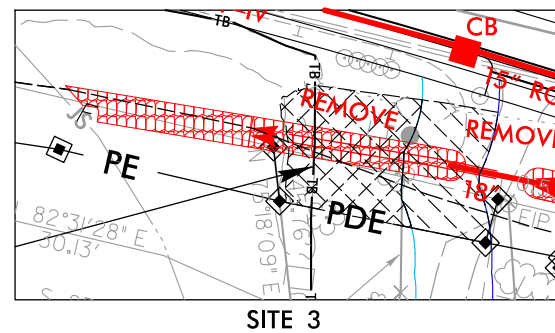
STANDARD BASE DITCH
SLOPE = 4.1%
EST 7 TONS
EST 10 SY GEOTEXTILE
EST DDE = 5 CY
SEE DETAIL 5

SPECIAL BACK OF CURB CUT DITCH
W/CLASS I RIP RAP
SEE DETAIL 15

SPECIAL BACK OF CURB CUT DITCH
SEE DETAIL 14

TREATMENT HAS BEEN
ACHIEVED FOR +/- 20'
BEFORE B22 BY FLATTENING
THE SLOPE OF THIS DITCH
TO 0.003 FT/FT.

MATCHLINE SEE SHEET 8
-L- STA 71+00.00



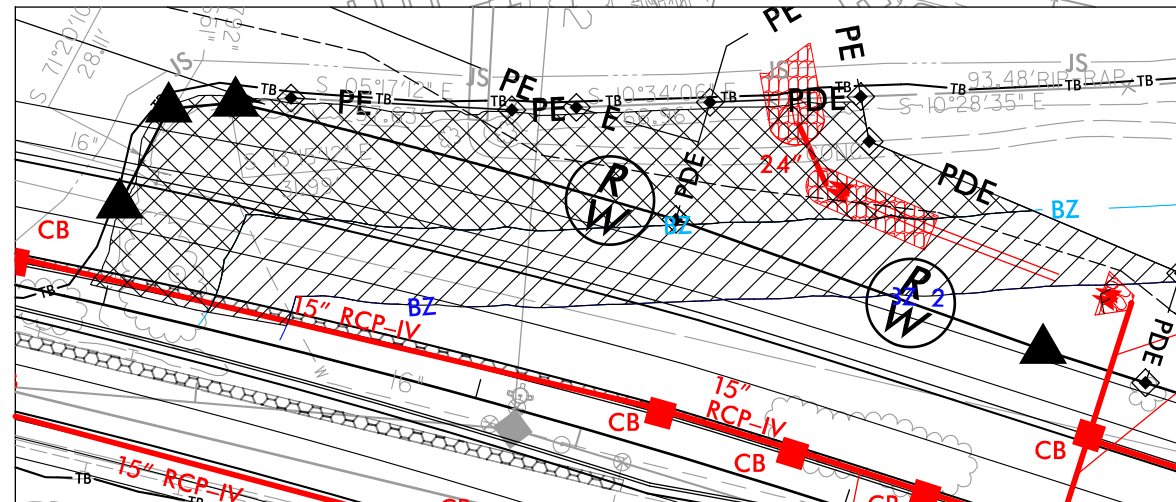
DUKE EN

92

DUKE ENERGY

Sta. = 76+50 -L- RT.
DA=2.0 AC
C=0.7 Tc=10 min
H10=5.5 INHR I2=4.2 INHR
Q10=8.3 CFS Q2=5.9 CFS
V10=2.4 FPS V2=2.2 FPS
d10=0.8 FT d2=0.7 FT
s=0.025 FT/FT
n=0.065
Liner=CLASS I RIP RAP

SPECIAL BACK OF CURB CUT DITCH
W/CLASS I RIP RAP
SEE DETAIL 3



- ALLOWABLE IMPACTS ZONE 2
- ALLOWABLE IMPACTS ZONE 1
- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1

LOCHNER

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NC License
Number F-0159

vhb VHB Engineering NC, P.C. (C-3705)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

NAD 832011

PROJECT REFERENCE NO.		SHEET NO.
R-5100A		9
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

BUFFER DRAWING
SHEET 3 OF 4

MATCHLINE SEE SHEET 10
-L- STA 85+00.00

FOR -L- PROFILE, SEE SHEET 17

\\b0042 PM
S:\Enviroment\Drawings\Buffer Impacts\R5100A_PRM_BUFFER_PSH_09.dgn

RIPARIAN BUFFER IMPACTS SUMMARY													
			IMPACTS									BUFFER REPLACEMENT	
Site No.	Station (From/to)	Structure Size / Type	TYPE			ALLOWABLE			MITIGABLE				
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft²)	ZONE 2 (ft²)	TOTAL (ft²)	ZONE 1 (ft²)	ZONE 2 (ft²)	TOTAL (ft²)	ZONE 1 (ft²)	ZONE 2 (ft²)
1	61+78 to 62+83 -L- LT	Roadway Fill			X				3630	2592	6222		
2	61+85 to 62+41 -L- RT	Roadway Fill	X			1091	622	1713					
3	76+56 to 77+21 -L- RT	Roadway Fill	X			1035	705	1740					
4	75+96 to 78+65 -L- LT	Roadway Fill			X				6879	4768	11647		
TOTALS*:						2126	1327	3453	10509	7360	17869	0	0

Impacts at Lake Norman were calculated based on a normal pool elevation of 760'.

SHEET 4 OF 4