Winston-Salem Northern Beltway

Project R-2247, Project U-2579, and Project U-2579A

Legend

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Railroad
- County Line

Preferred Alternatives

- Project U-2579
- Project R-2247

2 1 0 2 Miles

Schedule

Project U-2579

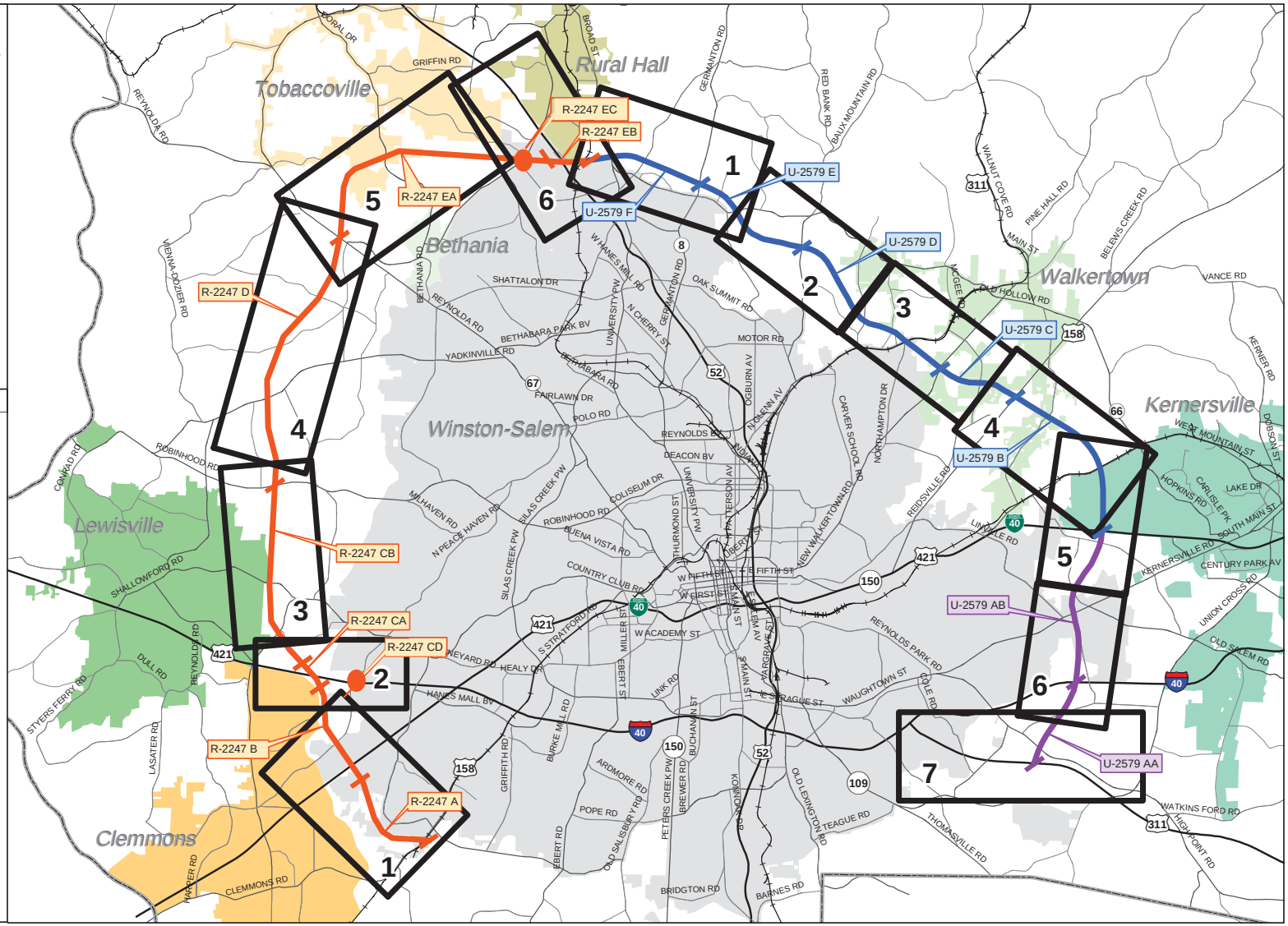
AA, AB – Right of way: 2018, Construction: 2020
B – Under Construction
C – Right of Way: In Progress
Construction: 2018
D, E, F – Right of Way and Construction:
February 2018
G – (Replacement of Hastings Hill Road Bridge over US 421) – Complete

Project R-2247

EB – Right of Way and Construction: July 2018
CD, EC – Under Construction
EA – Right of Way and Construction: 2021
D – Right of Way and Construction: 2023
CB – Right of Way and Construction: 2025
CA – Right of Way and Construction: 2027
B – Right of Way and Construction: 2027
A – Right of way and Construction: Post Year*
F – (Intelligent Transportation Systems for R-2247B, CA, CB, D, EA, and EB)
– Post Year*

*Unfunded in 2018-2027 State Transportation Improvement Program

Map last updated August 2017



North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element:	34839.1.9	TIP No.:	U-2579C	County(ies):	Forsyth	Page	1	of	4

General Project Information

WBS Element:	34839.1.9	**TIP Number:**	U-2579C	**Project Type:**	New Location	**Date:**	1/14/2017
NCDOT Contact:	Stephen Morgan, PE	**Contractor / Designer:**	Sungate Design Group				
Address:	Hydraulics Unit 1590 Mail Service Center Raleigh, NC 27699-1590	**Address:**	905 Jones Franklin Rd Raleigh, NC 27606				
Phone:	(919) 707-6739	**Phone:**	(919) 859-2243				
Email:	smorgan@ncdot.gov	**Email:**	belam@sungatedesign.com				
City/Town:	Winston Salem	**County(ies):**	Forsyth				
River Basin(s):	Yadkin-Pee Dee	**CAMA County?**	No				
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	1.99	**Surrounding Land Use:**	Residential, Agricultural, Rural

	Proposed Project	Existing Site
Project Built-Upon Area (ac.)	43.6 ac.	5.8 ac.
Typical Cross Section Description:	Three 12ft lanes with 14ft outside shoulders (12ft paved) and 12ft paved inside shoulders in each direction with a 22ft grassed median.	N/A
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 81,670 Year: 2037	Existing: 65,592 Year: 2017

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

I-74 Winston-Salem Northern Beltway from East of US 311 to US 158: Measures have been taken throughout the project to limit impacts to wetlands and surface waters. Two Dry Detention basins will be utilized in the gore areas between the -L- line and Ramps B and C. These basins will serve to attenuate peak stormwater flows, promote settlement of suspended solids and reduce erosive velocities downstream. Further, no deck drains will be used on the Lowery Mill Creek bridge, eliminating potential for direct roadway runoff into surface waters. A rip rap energy dissipator basin will be used at storm drain system outlet, in the Lowery Mill Creek floodplain, to reduce peak flow velocities to Lowery Mill Creek. 2:1 slopes will be used in fill areas to reduce impacts to surrounding wetlands and jurisdictional streams.

Waterbody Information

Surface Water Body (1):	Lowery Mill Creek	**NCDWR Stream Index No.:**	12-94-12-3-(0.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:				**Buffer Rules in Effect:**	N/A
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 2.07; Released October 2016)

WBS Element:	34839.1.9	TIP No.:	U-2579C	County(ies):	Forsyth	Page	2	of	4

Additional Waterbody Information

Surface Water Body (2):	Frazier Creek		**NCDWR Stream Index No.:**	12-94-12-6-1		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:				
Other Stream Classification:						
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:				**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body? (If yes, provide justification in the General Project Narrative)	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)		

Surface Water Body (3):			**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, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		

Surface Water Body (4):			**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, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		

Surface Water Body (5):			**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, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element: **TIP No.:** U-2579C **County(ies):** Forsyth

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?
11	473+00 -L- RT 36.146976, -78.578803	(1)Lowery Mill Creek	Riprap Energy Dissipator Basin	Class I	20.7	Pipe	36	56.1	23.9	N/A

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 2.07; Released October 2016)

WBS Element: 34839.1.9 **TIP No.:** U-2579C **County(ies):** Forsyth

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?
6	400+00 -L- RT 36.153435, -80.182593	(2)Frazier Creek	Dry Detention Basin	13.4	3.9	1.37	4.44	No
6	400+00 -L- LT 36.154528, -80.181637	(2)Frazier Creek	Dry Detention Basin	7.4	2.0	0.63	3.98	No

Additional Comments

TIP PROJECT: U-2579C PHASE II

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheets 1C-1 Thru 1C-7 For Survey Control Sheets

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

FORSYTH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579C	1	

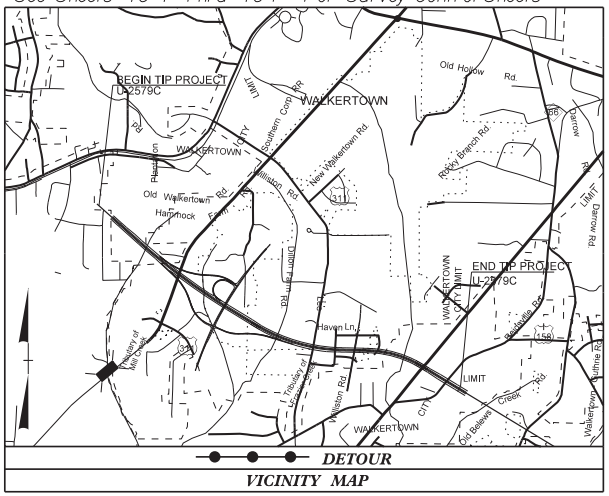
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34839.1.9	N/A	PE
34839.2.6	N/A	R/W
34839.2.GV18	NHP-0918(062)	R/W
34839.2.16	N/A	UTIL
34839.3.GV6	NHP-0918(062)	CONSTR.

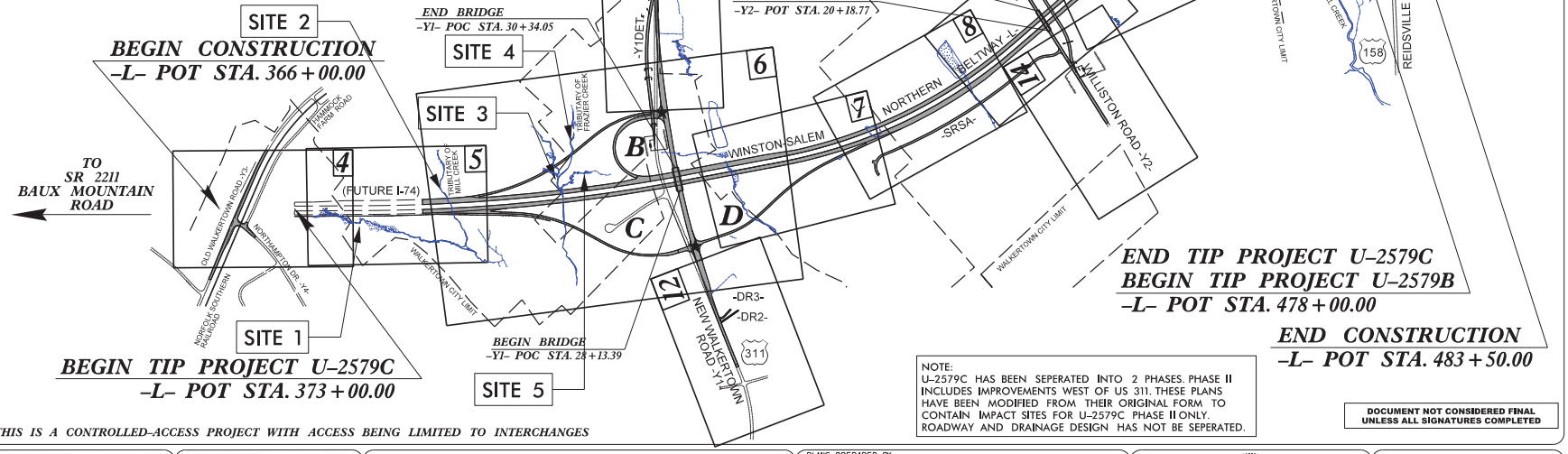
PERMIT DRAWING
SHEET 1 OF 23

LOCATION: WINSTON – SALEM NORTHERN BELTWAY (EASTERN SECTION) FROM US 311 TO US 158 (FUTURE I-74)

TYPE OF WORK: WIDENING, GRADING, PAVING, DRAINAGE, SIGNING, SIGNALS, ITS, CULVERTS AND STRUCTURES.

WETLAND AND SURFACE WATER IMPACTS PERMIT





THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES

NOTE:
U-2579C HAS BEEN SEPERATED INTO 2 PHASES. PHASE II INCLUDES IMPROVEMENTS WEST OF US 311. THESE PLANS HAVE BEEN MODIFIED FROM THEIR ORIGINAL FORM TO CONTAIN IMPACT SITES FOR U-2579C PHASE II ONLY. ROADWAY AND DRAINAGE DESIGN HAS NOT BE SEPERATED.

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 2017 = 65,592
ADT 2037 = 93,112
K = 10 %
D = 60 %
T = 18 % *
V = 70 MPH
*(TTST=12% + DUAL=6%)
FUNC CLASS=INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT U-2579C	=	1.941 Miles
LENGTH OF STRUCTURE PROJECT U-2579C	=	0.048 Mile
TOTAL LENGTH OF TIP PROJECT U-2579C	=	1.989 Miles

PLANS PREPARED BY:
&
8601 SIX FORKS RD, SUITE 260
RALEIGH, NC 27615
919-926-4100

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
AUGUST 28, 2015

LETTING DATE:
OCTOBER 17, 2017

JASON TALLEY, PE
PROJECT ENGINEER

JARED BOND, PE
PROJECT DESIGN ENGINEER

TATIA L. WHITE, PE, PLS
NCDOT CONTACT

HYDRAULICS ENGINEER
SIGNATURE:

ROADWAY DESIGN ENGINEER
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

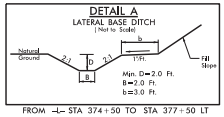
$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	2D-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

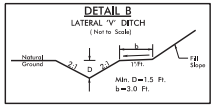
PERMIT DRAWING SHEET 2 OF 23

DETAIL A
LATERAL BASE DITCH
(Not to Scale)



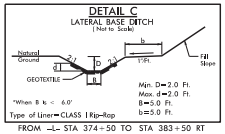
FROM –L– STA 374+50 TO STA 377+50 LT

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



FROM –L– STA 373+00 TO STA 374+50 LT
FROM –Y1DET– STA 24+00 TO STA 29+00 LT

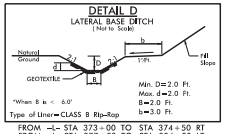
DETAIL C
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= CLASS I Rip-Rap

FROM –L– STA 374+50 TO STA 383+50 RT

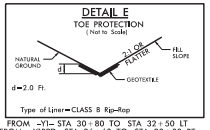
DETAIL D
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= CLASS B Rip-Rap

FROM –L– STA 373+00 TO STA 374+50 RT
FROM –L– STA 377+50 TO STA 384+00 LT
FROM –L– STA 385+50 TO STA 386+50 LT
FROM –L– STA 387+00 TO STA 392+00 LT
FROM –L– STA 438+15 TO STA 442+50 RT
FROM –Y1RPB– STA 16+00 TO STA 21+60 LT
FROM –Y1RPC– STA 20+85 TO STA 21+40 RT

DETAIL E
TOE PROTECTION
(Not to Scale)

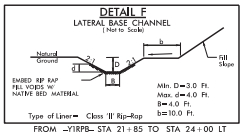


d=2.0 Ft.

Type of Liner= CLASS B Rip-Rap

FROM –Y1RPD– STA 30+80 TO STA 32+50 LT
FROM –Y1RPD– STA 26+60 TO STA 28+00 RT
FROM –Y1RPD– STA 26+90 TO STA 30+00 LT
FROM –Y1RPC– STA 17+85 TO STA 20+50 RT
FROM –Y1RPC– STA 21+17 TO STA 24+00 LT
FROM –Y1RPB– STA 22+50 TO STA 24+25 RT
FROM –L– STA 399+50 TO STA 401+00 LT
FROM –L– STA 399+50 TO STA 401+00 RT
FROM –L– STA 413+78 TO STA 414+50 LT
FROM –L– STA 474+86 TO STA 475+80 LT
FROM –Y3– STA 17+00 TO STA 18+70 RT
FROM –SRSA– STA 13+00 TO STA 13+80 LT

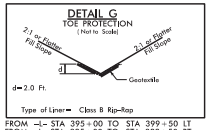
DETAIL F
LATERAL BASE CHANNEL
(Not to Scale)



Type of Liner= Class 'II' Rip-Rap

FROM –Y1RPB– STA 21+85 TO STA 24+00 LT

DETAIL G
TOE PROTECTION
(Not to Scale)

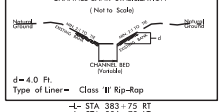


d=2.0 Ft.

Type of Liner= Class B Rip-Rap

FROM –L– STA 395+00 TO STA 399+50 LT
FROM –L– STA 395+00 TO STA 399+50 RT

DETAIL H
CHANNEL BANK STABILIZATION
(Not to Scale)

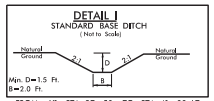


d=4.0 Ft.

Type of Liner= Class 'II' Rip-Rap

–L– STA 383+75 RT
–L– STA 386+78 LT
–L– STA 388+85 RT
–L– STA 414+19 RT
–Y1RPB– STA 21+75 LT
–SRSA– STA 22+65 RT

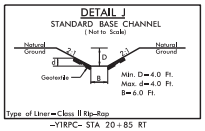
DETAIL J
STANDARD BASE DITCH
(Not to Scale)



Min. D=1.5 Ft.
B=2.0 Ft.

FROM –Y1– STA 37+50 TO STA 41+00 LT
–Y1LPB– STA 14+00 LT
–Y2DET– STA 23+50 LT

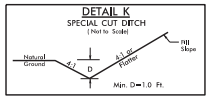
DETAIL J
STANDARD BASE CHANNEL
(Not to Scale)



Type of Liner= Class II Rip-Rap

–Y1RPC– STA 20+85 RT

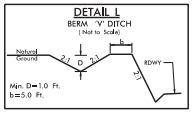
DETAIL K
SPECIAL CUT DITCH
(Not to Scale)



Min. D=1.0 Ft.

FROM –Y1– STA 12+50 TO STA 14+00 LT
FROM –Y1– STA 26+00 TO STA 27+50 LT
FROM –Y1DET– STA 16+00 TO STA 21+50 LT
FROM –Y1DET– STA 19+50 TO STA 21+50 RT
FROM –Y1LPB– STA 14+00 TO STA 15+00 LT
FROM –Y1RPC– STA 26+00 TO STA 28+50 LT
FROM –Y1RPC– STA 29+75 TO STA 31+00 LT
FROM –L– STA 430+00 TO STA 434+00 LT
FROM –L– STA 469+00 TO STA 470+00 LT
FROM –Y2– STA 14+13 TO STA 17+50 RT
FROM –Y2– STA 15+50 TO STA 16+00 LT
FROM –Y2DET– STA 23+00 TO STA 24+50 RT

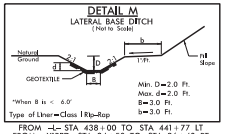
DETAIL L
BERM 'V' DITCH
(Not to Scale)



Min. D=1.0 Ft.
b=5.0 Ft.

FROM –L– STA 417+00 TO STA 418+50 LT
FROM –L– STA 444+00 TO STA 444+50 RT
FROM –L– STA 451+00 TO STA 454+50 LT
FROM –Y1LPB– STA 13+00 TO STA 14+50 RT

DETAIL M
LATERAL BASE DITCH
(Not to Scale)

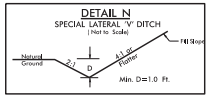


Min. D=2.0 Ft.
Max. d=2.0 Ft.
B=3.0 Ft.
b=3.0 Ft.

Type of Liner= Class I Rip-Rap

FROM –L– STA 438+00 TO STA 441+77 LT
FROM –Y1RPD– STA 24+50 TO STA 26+40 RT

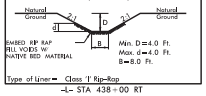
DETAIL N
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D=1.0 Ft.

FROM –Y1– STA 39+50 TO STA 42+03 RT
FROM –Y1– STA 43+00 TO STA 46+50 RT
FROM –Y1DET– STA 29+00 TO STA 30+50 LT
FROM –Y2– STA 22+50 TO STA 26+00 LT
FROM –Y2DET– STA 17+50 TO STA 19+50 LT
FROM –Y3– STA 13+30 TO STA 16+00 LT
FROM –Y3– STA 13+25 TO STA 17+00 RT
FROM –Y3– STA 19+60 TO STA 21+40 RT
FROM –Y3– STA 25+30 TO STA 26+50 LT
FROM –Y4– STA 10+10 TO STA 11+20 RT

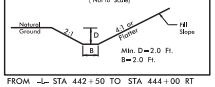
DETAIL O
STANDARD BASE CHANNEL
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap

–L– STA 438+00 RT

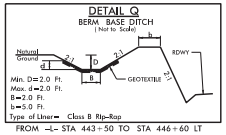
DETAIL P
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D=2.0 Ft.
B=2.0 Ft.

FROM –L– STA 442+50 TO STA 444+00 RT

DETAIL Q
BERM BASE DITCH
(Not to Scale)

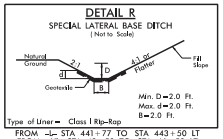


Min. D=2.0 Ft.
Max. d=2.0 Ft.
B=2.0 Ft.
b=5.0 Ft.

Type of Liner= Class B Rip-Rap

FROM –L– STA 443+50 TO STA 446+60 LT

DETAIL R
SPECIAL LATERAL BASE DITCH
(Not to Scale)

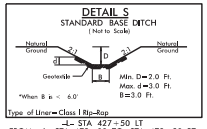


Min. D=2.0 Ft.
Max. d=2.0 Ft.
B=2.0 Ft.

Type of Liner= Class I Rip-Rap

FROM –L– STA 441+77 TO STA 443+50 LT
FROM –Y1– STA 43+50 TO STA 46+50 LT

DETAIL S
STANDARD BASE DITCH
(Not to Scale)

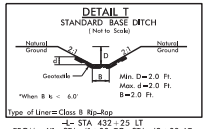


Min. D=2.0 Ft.
Max. d=3.0 Ft.
B=3.0 Ft.

Type of Liner= Class I Rip-Rap

–L– STA 427+50 LT
FROM –L– STA 473+00 TO STA 473+90 RT

DETAIL T
STANDARD BASE DITCH
(Not to Scale)

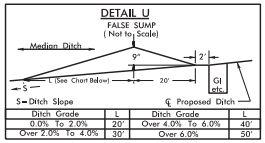


Min. D=2.0 Ft.
Max. d=2.0 Ft.
B=2.0 Ft.

Type of Liner= Class B Rip-Rap

–L– STA 432+25 LT
FROM –Y1– STA 41+00 TO STA 42+08 LT
–Y1RPD– STA 28+30 RT

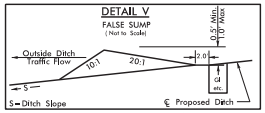
DETAIL U
FALSE SUMP
(Not to Scale)



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'

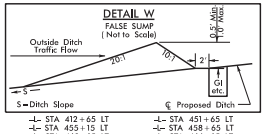
–L– STA 376+15 –L– STA 380+15 –L– STA 384+15
–L– STA 388+15 –L– STA 391+90 –L– STA 396+15
–L– STA 400+15 –L– STA 403+65 –L– STA 413+15
–L– STA 416+85 –L– STA 421+85 –L– STA 427+85
–L– STA 433+00 –L– STA 441+95 –L– STA 451+65
–L– STA 455+15 –L– STA 458+65 –L– STA 462+15
–L– STA 466+15 –L– STA 470+65 –L– STA 471+95

DETAIL V
FALSE SUMP
(Not to Scale)



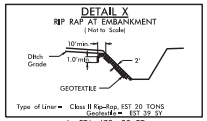
–L– STA 413+15 RT
–L– STA 418+35 LT
–L– STA 427+90 RT
–L– STA 455+15 RT
–L– STA 462+15 RT
–L– STA 470+65 RT
–L– STA 414+85 LT
–L– STA 425+00 LT
–L– STA 451+65 RT
–L– STA 458+65 RT
–L– STA 466+15 RT
–Y1– STA 17+80 LT

DETAIL W
FALSE SUMP
(Not to Scale)



–L– STA 412+65 LT
–L– STA 455+15 LT
–L– STA 462+15 LT
–L– STA 470+15 LT
–L– STA 451+65 LT
–L– STA 458+65 LT
–L– STA 466+15 LT
–Y2– STA 22+85 RT
–SRSA– STA 19+20 LT

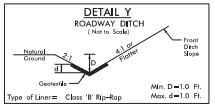
DETAIL X
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= Class III Rip-Rap, EST. 20 TONS
Geotextile= EST. 39 SY

–L– STA 473+90 RT

DETAIL Y
ROADWAY DITCH
(Not to Scale)

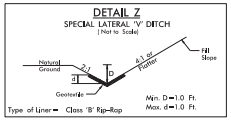


Min. D=1.0 Ft.
Max. d=1.0 Ft.

Type of Liner= Class 'B' Rip-Rap

FROM –SRSA– STA 19+50 TO STA 21+50 RT
FROM –SRSA– STA 19+50 TO STA 21+50 LT
FROM –SRSA– STA 24+50 TO STA 29+00 RT
FROM –SRSA– STA 24+50 TO STA 29+00 LT

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

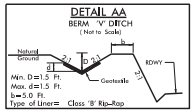


Min. D=1.0 Ft.
Max. d=1.0 Ft.

Type of Liner= Class 'B' Rip-Rap

FROM –SRSA– STA 21+50 TO STA 22+55 RT
FROM –SRSA– STA 21+50 TO STA 22+55 LT
FROM –SRSA– STA 22+75 TO STA 24+50 RT
FROM –SRSA– STA 22+80 TO STA 24+50 LT

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

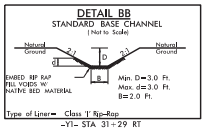


Min. D=1.5 Ft.
Max. d=1.5 Ft.
b=5.0 Ft.

Type of Liner= Class 'B' Rip-Rap

FROM –L– STA 454+50 TO STA 455+50 LT

DETAIL BB
STANDARD BASE CHANNEL
(Not to Scale)

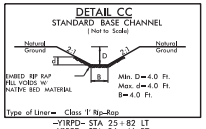


Min. D=3.0 Ft.
Max. d=3.0 Ft.
B=2.0 Ft.

Type of Liner= Class 'I' Rip-Rap

–Y1– STA 31+29 RT

DETAIL CC
STANDARD BASE CHANNEL
(Not to Scale)

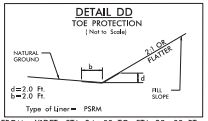


Min. D=4.0 Ft.
Max. d=4.0 Ft.
B=4.0 Ft.

Type of Liner= Class 'I' Rip-Rap

–Y1RPD– STA 25+82 LT
–Y1RPD– STA 26+46 RT

DETAIL DD
TOE PROTECTION
(Not to Scale)



d=2.0 Ft.
b=2.0 Ft.

Type of Liner= PSRM

FROM –Y1DET– STA 24+50 TO STA 28+00 RT

5/14/99
9/27/2017
U2579C_Hyd_prm_wet_psh_03.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	2D-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

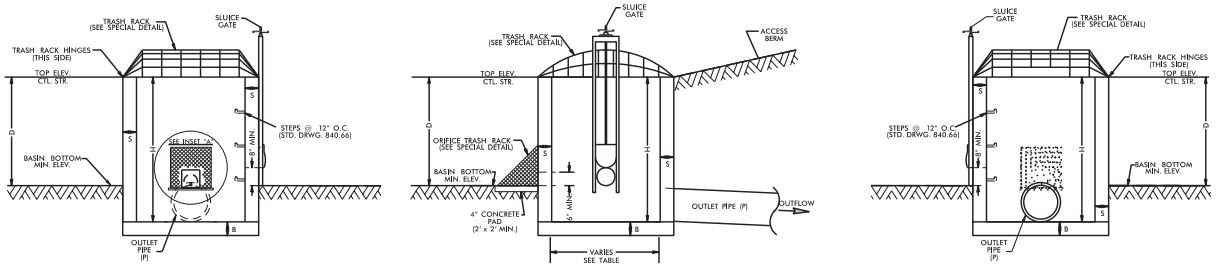
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

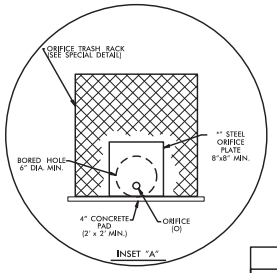
PERMIT DRAWING SHEET 3 OF 23

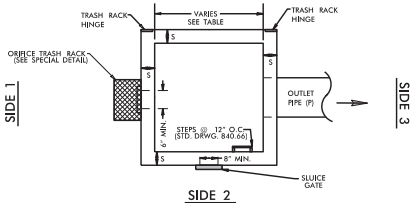
DETAIL EE

DRY DETENTION BASIN DRAWDOWN STRUCTURE

NOT TO SCALE







PLAN VIEW

TRASH RACK NOT SHOWN FOR CLARITY

NOTES:

1. TOP ELEVATION OF CONTROL STRUCTURE (WEIR ELEVATION) SHOULD BE SET AT THE WQv ELEVATION.
2. 15" MINIMUM DIAMETER FOR OUTLET PIPE.
3. 2" MINIMUM DIAMETER ORIFICE. IF ORIFICE IS GREATER THAN 6", A STEEL PLATE IS NOT REQUIRED.
4. NO BEDDING MATERIAL TO BE USED. THEREFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.
5. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION. A GATE VALVE MAY BE USED IN LIEU OF THE 8" SLUICE GATE.
6. SLUICE GATE SHALL PROVIDE WATERTIGHT SEAL. PROVIDE ADEQUATE CLEARANCE FOR GATE OPERATION AND FOR PROPER SEATING OF GATE OVER PIPE.
7. SELECT BOX STANDARD AS REQUIRED TO ACCOMMODATE SLUICE GATE AND ORIFICE TRASH RACK WIDTH.
8. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATE.
9. ADJUST FOOTER DIMENSIONS AS NEEDED FOR ANTI-FLOTATION.
10. PAYMENT OF TRASH RACKS ARE INCIDENTAL TO BASIN DRAWDOWN STRUCTURE.

MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE

STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	BASIN BOTTOM MINIMUM ELEV.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	INV. ELEV. CTL. STR.	CTL. STR. DIMENSIONS (W x L x H)	ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE DIAMETER(P) INCHES
400+00 -L- LT	0623	6"	18"	940.0	944.0	4.0	938.0	5' X 5' X 6'	6"	940.0	24
400+08 -L- RT	0609	6"	15"	947.0	950.0	3.0	945.0	5' x 5' x 5'	6"	947.0	24

5/14/99

8/27/2007
U2579C_Hyd_prm_wet_psh_03a.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	2D-3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

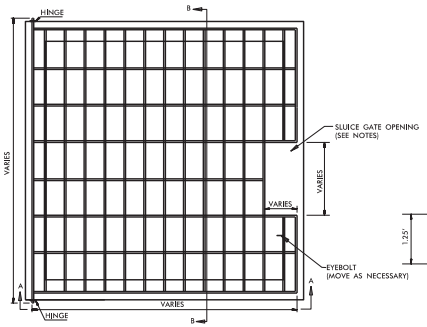
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 4 OF 23

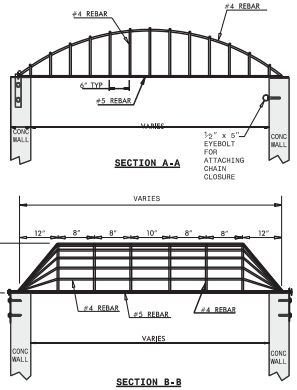
DETAIL FF

REMOVABLE ORIFICE TRASH RACK

NOT TO SCALE



PLAN

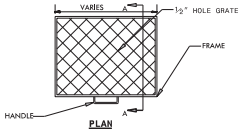


SECTION A-A

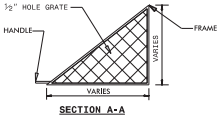
SECTION B-B

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.
5. PROVIDE OPENING IN TRASH RACK TO ACCOMODATE SLUICE GATE ON THE OUTLET PIPE. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATES.

REBAR TRASH RACK
NOT TO SCALE

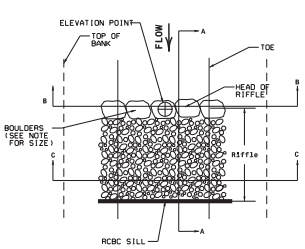


PLAN

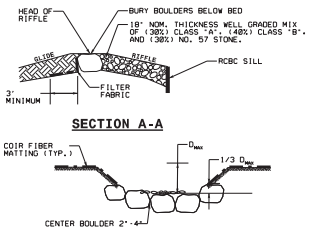


SECTION A-A

ORIFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. REMOVEABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM A-153.



PLAN VIEW



SECTION A-A

SECTION B-B

SECTION C-C

NOTE:
BOULDER SHOULD BE NATIVE STONES OR SHOT ROCK, ANGULAR AND OBLONG, WITH AN AXIS APPROXIMATELY 3.0 L_1, 2.5' W_1, 2.0' D

BOULDERS EST. 15 TONS
CLASS 'B' RIP RAP EST. 25 TONS
CLASS 'A' RIP RAP EST. 20 TONS
NO. 57 STONE EST. 20 TONS
EST. 50 SY GEOTEXTILE FABRIC

REACH	1
Mbkf (ft)	8.0'
Dmax (ft)	2.0'

CONSTRUCTED RIFFLE DETAIL GG

NOT TO SCALE

5/14/99

8/27/2007
U2579C_Rtd_prm_wet_psh_03b.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	2D-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 5 OF 23

DETAIL HH

(NOT TO SCALE)

SINGLE BARREL CULVERT W/SILLS AND BAFFLES

*NOTES:

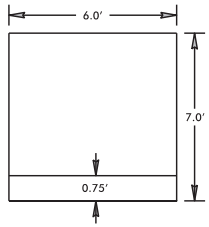
1) NATIVE BED MATERIAL SHALL BE PLACED BETWEEN THE SILLS IN THE CULVERT. NATIVE MATERIALS CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL. IF RIP RAP IS USED, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FACILITATE ANIMAL PASSAGE. THE TOP SURFACE OF THE NATURAL STREAM BED MATERIAL SHALL BE PLACED AND LEVELED TO A FLAT SURFACE TO ALLOW FOR ANIMAL PASSAGE. NATIVE MATERIAL AND RIP RAP ARE SUBJECT TO APPOVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

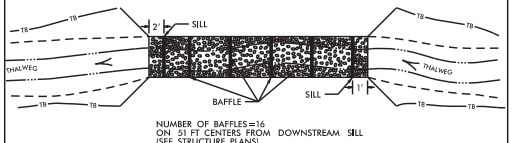
2) SILLS/BAFFLES ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

3) TOP OF SILLS/BAFFLES SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (THALWEG)

4) DO NOT SET ELEVATION OF SILL/BAFFLES ABOVE BANK FULL.

5) NUMBER OF SILL/BAFFLES DETERMINED BY THE ENGINEER.





NUMBER OF BAFFLES=16
ON 51 FT CENTERS FROM DOWNSTREAM SILL
(SEE STRUCTURE PLANS)

PLAN VIEW

913

6' X 7' RCBC AT -L- STA 397+73

DETAIL II

(NOT TO SCALE)

SINGLE BARREL CULVERT W/SILLS

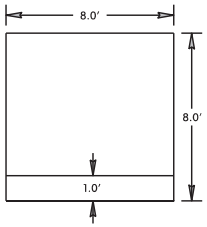
*NOTES:

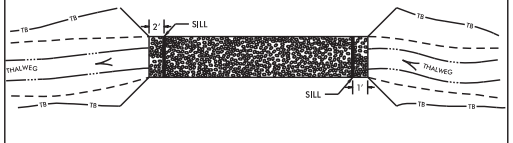
1) NATIVE BED MATERIAL SHALL BE PLACED BETWEEN THE SILLS IN THE CULVERT. NATIVE MATERIALS CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL. IF RIP RAP IS USED, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FACILITATE ANIMAL PASSAGE. THE TOP SURFACE OF THE NATURAL STREAM BED MATERIAL SHALL BE PLACED AND LEVELED TO A FLAT SURFACE TO ALLOW FOR ANIMAL PASSAGE. NATIVE MATERIAL AND RIP RAP ARE SUBJECT TO APPOVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

2) SILLS/BAFFLES ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

3) TOP OF SILLS/BAFFLES SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (THALWEG)

4) DO NOT SET ELEVATION OF SILL/BAFFLES ABOVE BANK FULL.





PLAN VIEW

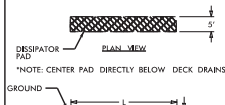
913

8' X 8' RCBC AT -L- STA 437+97

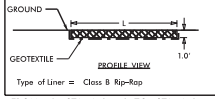
DETAIL JJ

DECK DRAIN DISSIPATOR PAD

(Not to Scale)



*NOTE: CENTER PAD DIRECTLY BELOW DECK DRAINS



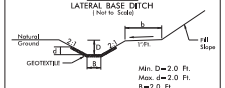
Type of Liner = Class B Rip-Rap

FROM -L- STA 472+52 TO STA 472+74 LT
FROM -L- STA 472+96 TO STA 473+08 RT
FROM -L- STA 473+85 TO STA 474+43 LT
FROM -L- STA 474+29 TO STA 474+90 RT

DETAIL LL

LATERAL BASE DITCH

(Not to Scale)



Min. D=2.0 Ft.
Max. d=2.0 Ft.
B=2.0 Ft.
b=5.0 Ft.

Type of Liner= Class 'I' Rip-Rap

FROM -Y1- STA. 41+00 TO STA. 43+50 LT

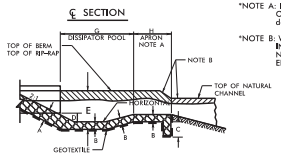
DETAIL KK

RIP-RAPPED ENERGY DISSIPATOR BASIN

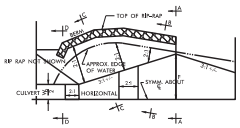
*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT Q des/CROSS SECTION AREA AT SEC. A-A)= SPECIFIED VELOCITY.

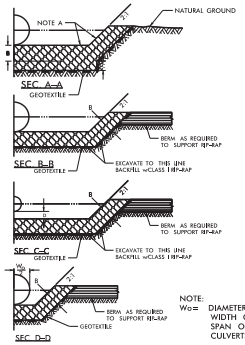
*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL TOP OF RIP-RAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.

℄ SECTION



HALF PLAN





DIM	RIP RAP BASIN #							
	1	2	3	4	5	6	7	8
A	2'							
B	2'							
C	2'							
D	2'							
E	7'							
F	12'							
G	20'							
H	10'							

*ALL DIMENSIONS APPROXIMATE IN FEET

CLASS 'I' RIP RAP
EST. 105 TONS
EST. 190 SY GEOTEXTILE FABRIC
EST. 100 CY DDE

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

5/05

-L- STA 472+75 RT

5/14/99

9/27/2007
U2579C_2D_Hyd_prm_wet_psh_03c.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE: 1" = 100'

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 6 OF 23

BEGIN TIP PROJECT U-2579C
BEGIN GRADING
-L- POT STA. 373+00.00

-L- POT Sta. 367+89.88
-Y3- POT Sta. 20+43.69

-Y4- PT Sta. 12+43.35
N 25° 29' 38.5" W
-Y4- POT Sta. 12+53.12
-Y4- POT Sta. 19+10.68

-Y4- PC Sta. 11+19.74

-Y4- POT Sta. 10+00.00

-Y3- PC Sta. 24+14.77

S 48° 08' 54.4" E

N 53° 46' 56.4" E

MATCHLINE INSERT -Y3- STA. 15+50.00

MATCHLINE -L- STA. 377+00.00 SHEET 5

SITE 1

NOTE:
FOR -L- PROFILE, SEE SHEETS 15 & 16
FOR -Y3- PROFILE, SEE SHEET 32
FOR -Y4- PROFILE, SEE SHEET 32
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE: 1" = 100'

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 7 OF 23

BEGIN TIP PROJECT U-2579C
BEGIN GRADING
-L- POT STA. 373+00.00

-L- POT Sta.367+89.88
-Y3- POT Sta.20+43.69

-Y4- RT Sta.12+43.35
N 25° 39' 38.5" W
-Y4- POT Sta.12+53.12
-Y4- POT Sta.19+10.68

-Y4- PC Sta.11+19.74

-Y4- POT Sta.10+00.00

-Y3- PC Sta.24+14.77

S 48° 08' 54.4" E

N 53° 46' 56.4" E

MATCHLINE INSERT -Y3- STA. 15+50.00

MATCHLINE -L- STA. 377+00.00 SHEET 5

SITE 1

NOTE:
FOR -L- PROFILE, SEE SHEETS 15 & 16
FOR -Y3- PROFILE, SEE SHEET 32
FOR -Y4- PROFILE, SEE SHEET 32
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4

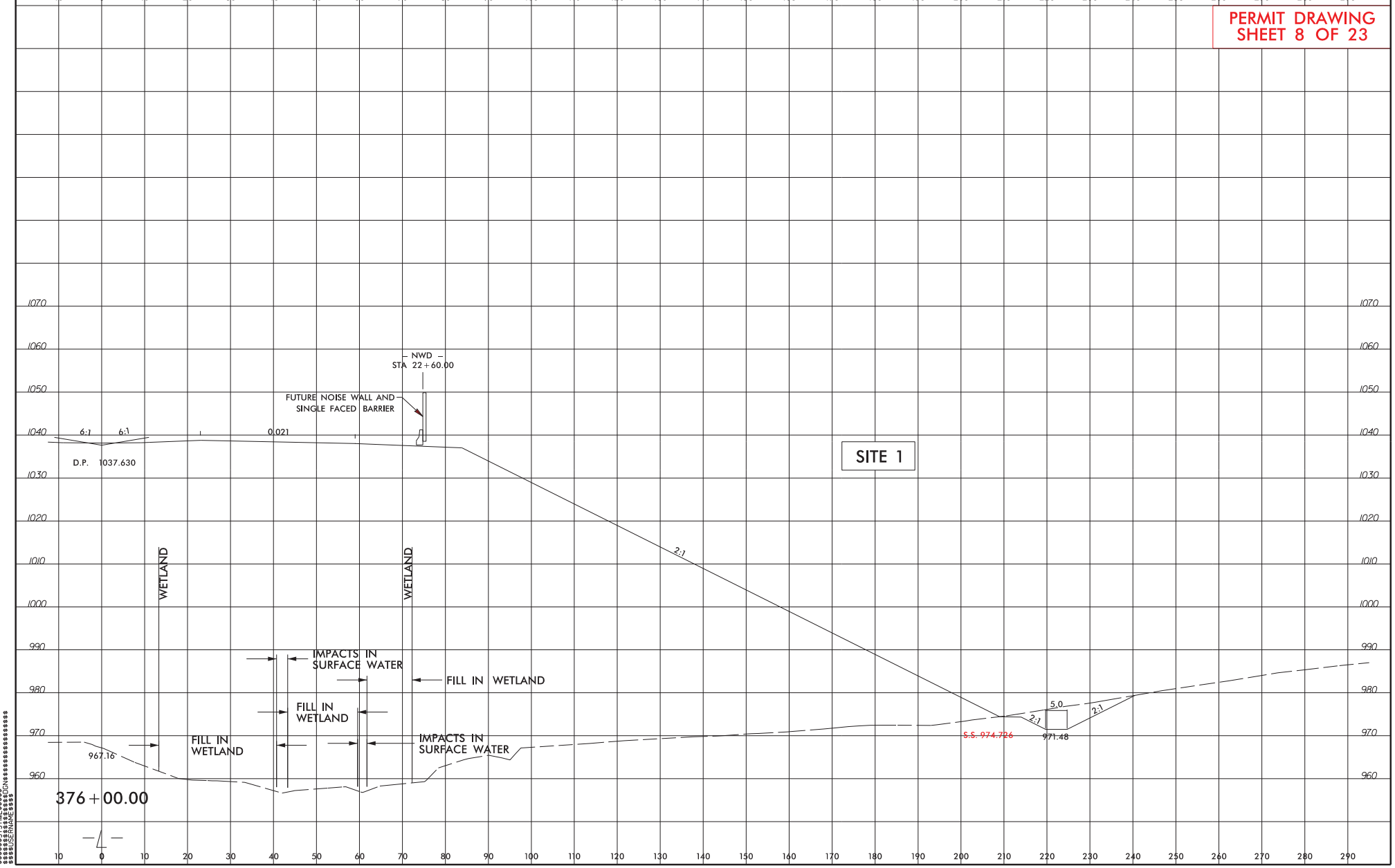
8/17/99

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2579C	X-8

0 5 10

PERMIT DRAWING
SHEET 8 OF 23



$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 9 OF 23

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SCALE: 1" = 100'

OAK GROVE MORAVIAN CHURCH TRUSTEES

WINSTON-SALEM CITY LIMITS

FORSYTH COUNTY

MARGARET H. HOERNER & MARY E. HAMMOCK

SEE DETAIL H
CL II RIP RAP
ON BANKS ONLY
EST 48 TONS
LENGTH = 20'

DO NOT BURY INVERT

60" CSP

SEE DETAIL D
LATERAL 2' BASE DITCH
W/CL B RIP RAP
EST 336 TONS
EST 883 SY GEO
EST 1,083 CY DDE

SEE DETAIL D
LATERAL 2' BASE DITCH
W/CL B RIP RAP
EST 68 TONS
EST 177 SY GEO
EST 32 CY DDE

SEE DETAIL D
LATERAL 2' BASE DITCH
W/CL B RIP RAP
EST 141 TONS
EST 371 SY GEO
EST 288 CY DDE

SEE DETAIL D
LATERAL 2' BASE DITCH
W/CL B RIP RAP
EST 296 TONS
EST 777 SY GEO
EST 280 CY DDE

-L- PC Sta. 380+26.43

-YIRPB- TS Sta. 10+00.00 =
-L- POC Sta. 386+77.67
(59.00' LT.)

-YIRPB- SC Sta. 12+40.00

END FUTURE SHOULDER BERM GUTTER
BEGIN SHOULDER BERM GUTTER
-L- STA. 385+00.00 LT.

SITE 2

SITE 1

-YIRPB-

-L-

S 48° 08' 54.4" E

-YIRPC- S 46° 53' 22.0" E

-YIRPC- POT Sta. 10+00.00 =
-L- POC Sta. 388+11.00
(59.00' RT.)

-YIRPC-

MATCHLINE -L- STA. 377+00.00 SHEET 4

MATCHLINE -L- STA. 390+00.00 SHEET 6

47" W.W. FENCE

15" RCP-IV

18" RCP-IV

15" RCP-III

24" W/ELBOWS

15" W/ELBOWS

60" CSP

BURY INVERT 1.0'

SEE DETAIL H
CL II RIP RAP
ON BANKS ONLY
EST 59 TONS
LENGTH = 40'

SEE DETAIL H
CL II RIP RAP
ON BANKS ONLY
EST 48 TONS
LENGTH = 25'

JB w/ SLAB LID

JB w/MH

SEE DETAIL C
LATERAL 5' BASE DITCH
W/CL I RIP RAP

EXISTING CHANNEL A-A (Not to Scale)

EXISTING CHANNEL B-B (Not to Scale)

EXISTING CHANNEL C-C (Not to Scale)

EXISTING CHANNEL D-D (Not to Scale)

Q(10yr) = 65 cfs
S = 1.5%
V(10yr) = 8.9 fps

PAVED SHOULDER

+50.00 -L-
289.64'
300.00'

+55.00 -L-
266.40'

STEPHEN N. & DEBRA H. RIERSON

ROGER R. & BARBARA BAILEY

NOTE:
FOR -L- PROFILE SEE SHEETS 16 & 17
FOR -YIRPB- PROFILE SEE SHEET 24
FOR -YIRPC- PROFILE SEE SHEET 25
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4

8/17/99

SYSTEM
DGN
USERNAME

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 10 OF 23

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SCALE: 1" = 100'

SITE 1

SITE 2

MATCHLINE -L- STA. 377+00.00 SHEET 4

MATCHLINE -L- STA. 390+00.00 SHEET 6

-L- PC Sta. 380+26.43

-YIRPB- TS Sta. 10+00.00 = -L- POC Sta. 386+77.67 (59.00' LT.)

-YIRPB- SC Sta. 12+40.00

-YIRPC- POT Sta. 10+00.00 = -L- POC Sta. 388+111.00 (59.00' RT.)

S 48° 08' 54.4" E

-YIRPC- S 46° 53' 22.0" E

OAK GROVE MORAVIAN CHURCH TRUSTEES

WINSTON-SALEM CITY LIMITS

FORSYTH COUNTY

MARGARET H. HOERNER & MARY E. HAMMOCK

STEPHEN N. & DEBRA H. RIERSON

ROGER R. & BARBARA BAILEY

EXISTING CHANNEL A-A (Not to Scale)

EXISTING CHANNEL B-B (Not to Scale)

EXISTING CHANNEL C-C (Not to Scale)

EXISTING CHANNEL D-D (Not to Scale)

PAVED SHOULDER

NOTE:
FOR -L- PROFILE SEE SHEETS 16 & 17
FOR -YIRPB- PROFILE SEE SHEET 24
FOR -YIRPC- PROFILE SEE SHEET 25
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4

8/17/99

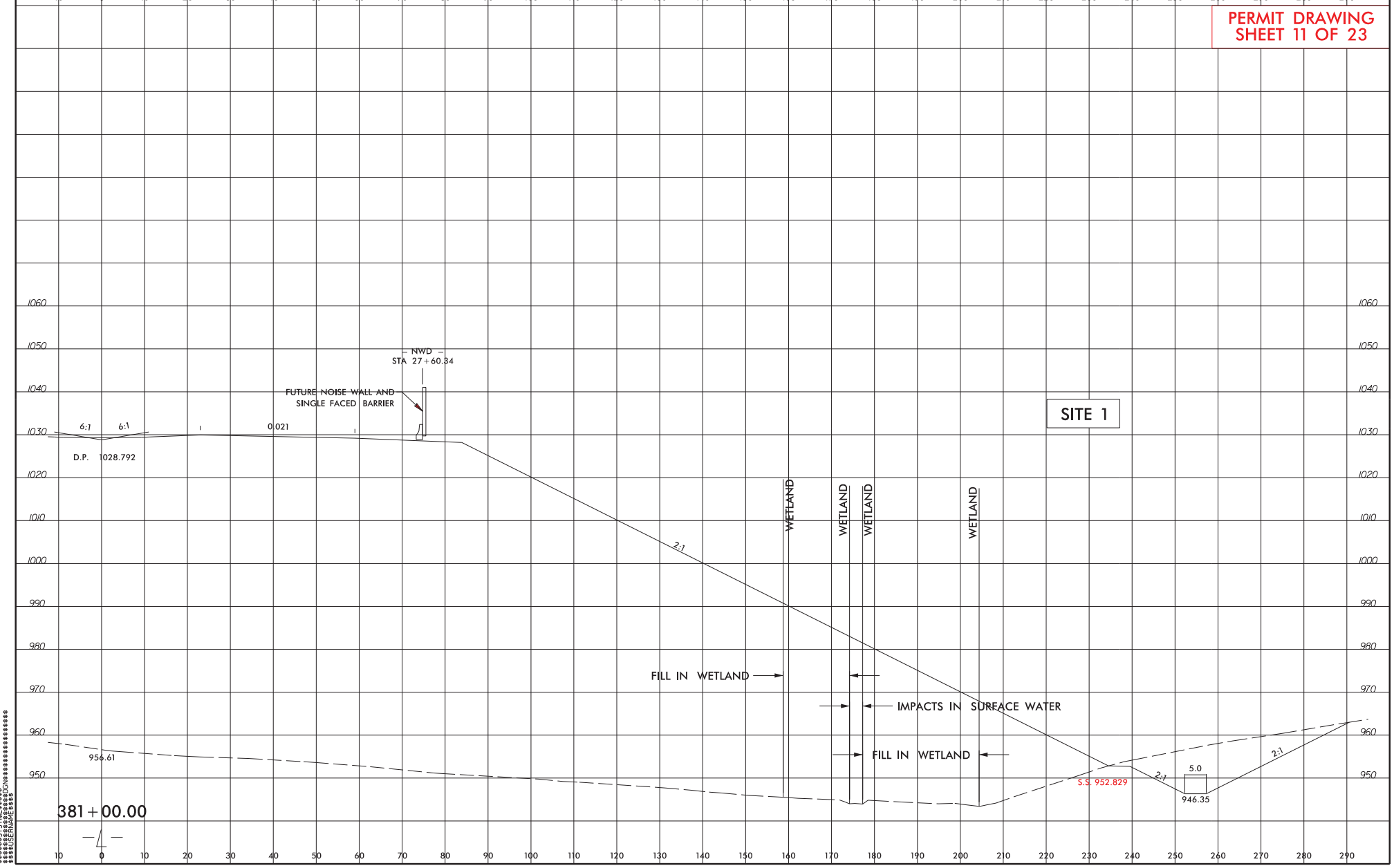
SYSTEM
USERNAME

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2579C	X-20

0 5 10

PERMIT DRAWING
SHEET 11 OF 23



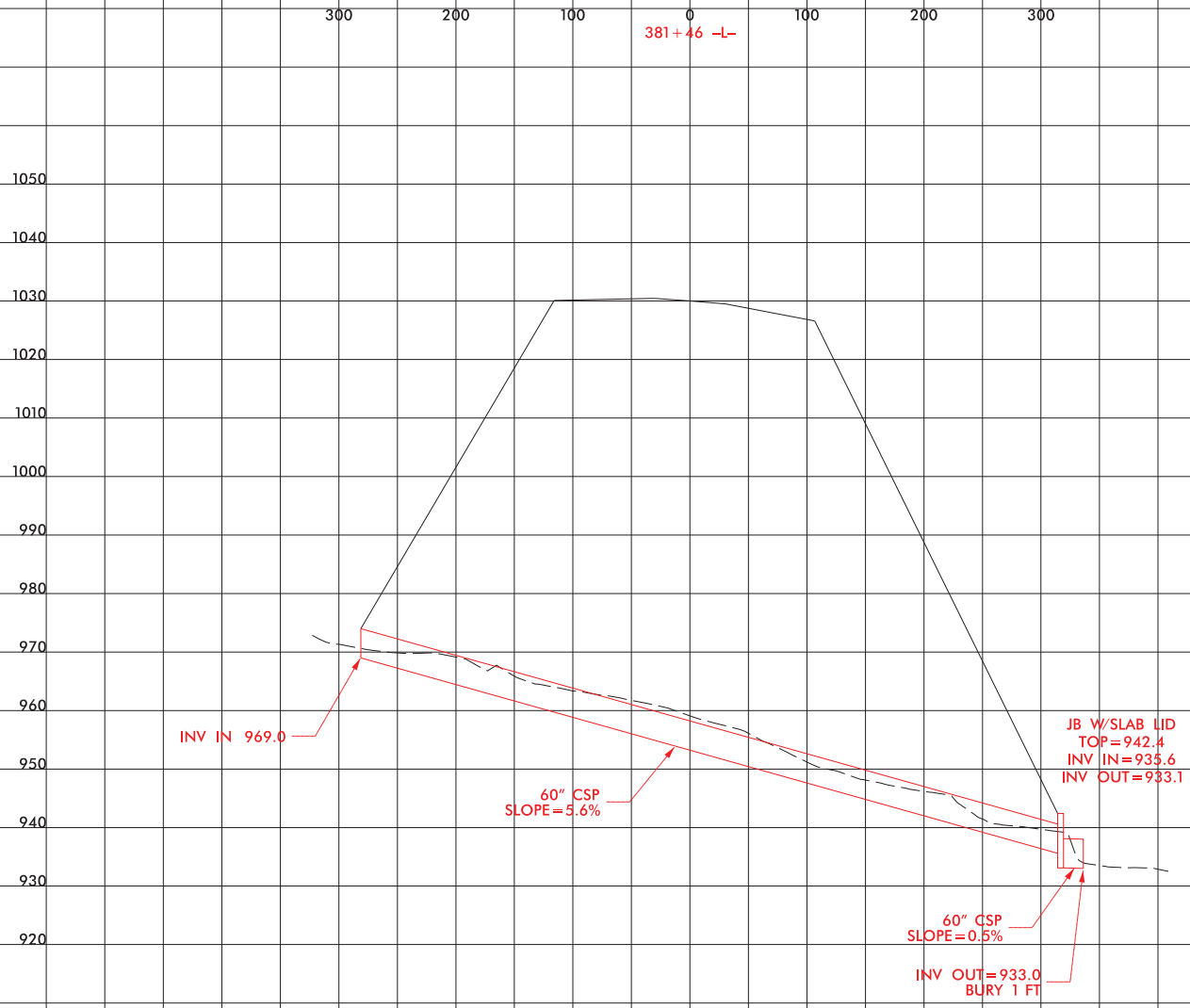
$$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$$$USERNAME$$$$

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2579C	5C

0 50

PERMIT DRAWING
SHEET 12 OF 23



SITE 1

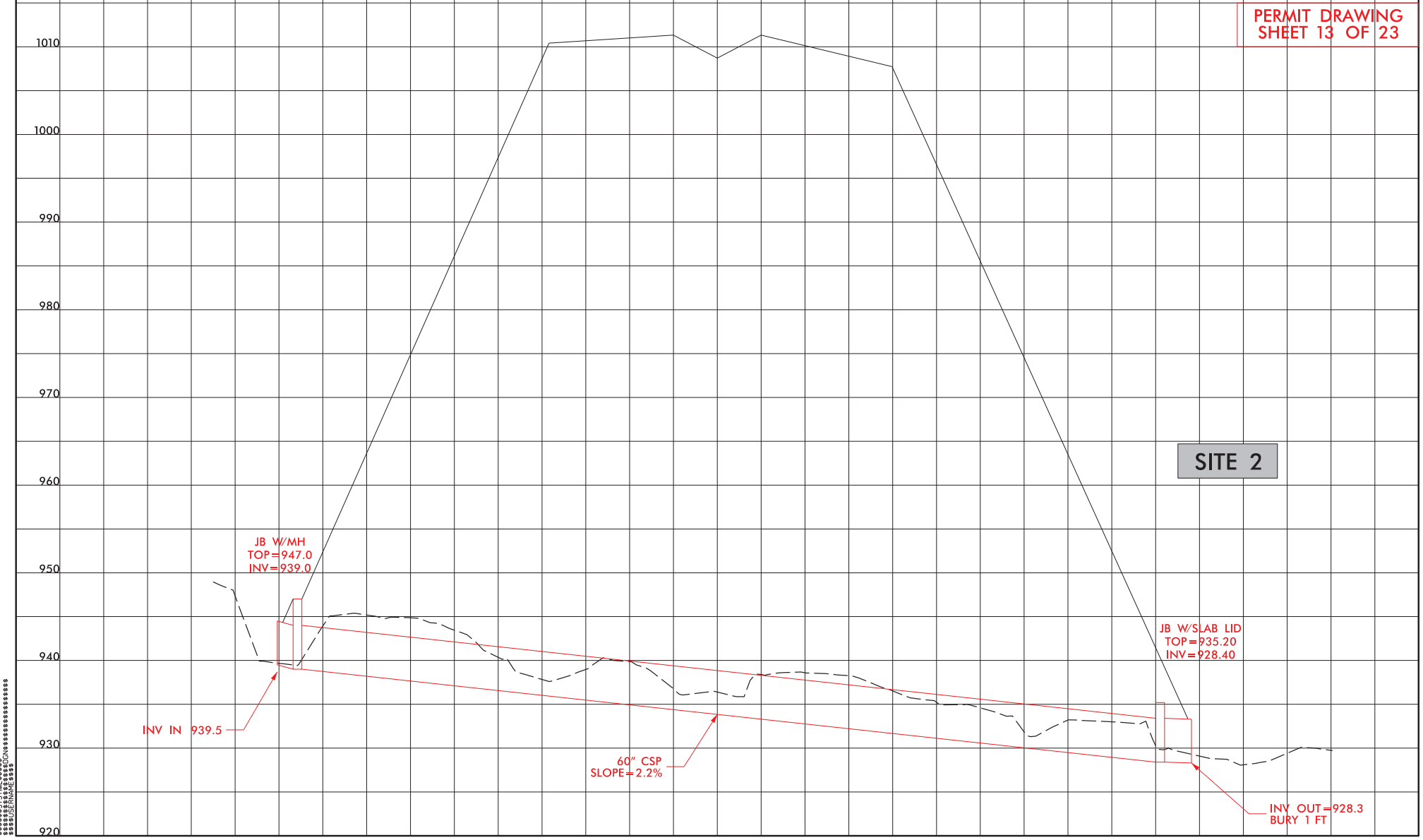
$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2579C	5D

0 25

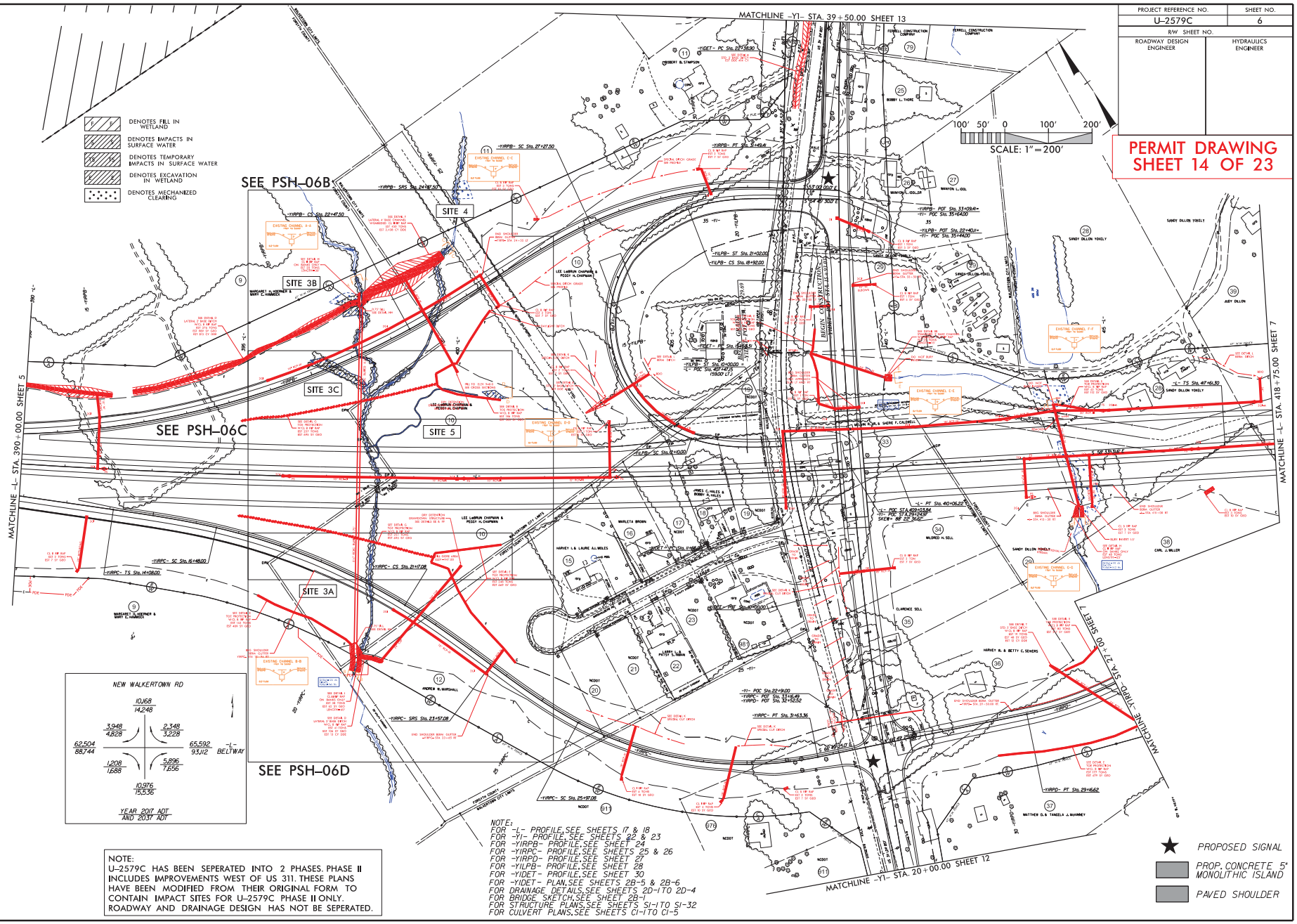
PERMIT DRAWING
SHEET 13 OF 23



$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 14 OF 23



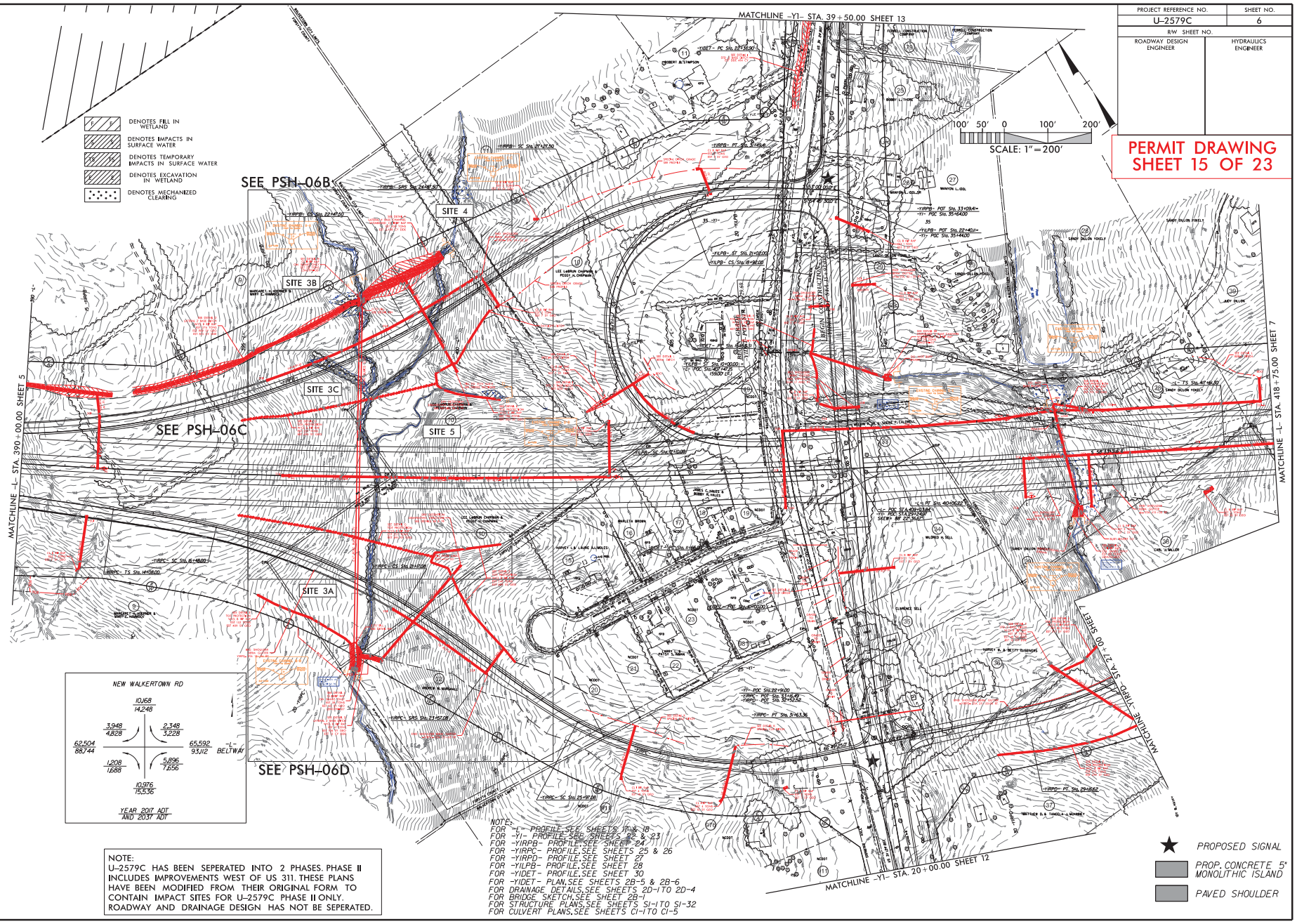
NOTE:
U-2579C HAS BEEN SEPERATED INTO 2 PHASES. PHASE II INCLUDES IMPROVEMENTS WEST OF US 311. THESE PLANS HAVE BEEN MODIFIED FROM THEIR ORIGINAL FORM TO CONTAIN IMPACT SITES FOR U-2579C PHASE II ONLY. ROADWAY AND DRAINAGE DESIGN HAS NOT BE SEPERATED.

NOTE:
FOR -L- PROFILE, SEE SHEETS 17 & 18
FOR -Y1- PROFILE, SEE SHEETS 22 & 23
FOR -YIRPB- PROFILE, SEE SHEET 24
FOR -YIRPC- PROFILE, SEE SHEETS 25 & 26
FOR -YIRPD- PROFILE, SEE SHEET 27
FOR -YILPB- PROFILE, SEE SHEET 28
FOR -YIDET- PROFILE, SEE SHEET 30
FOR -YIDET- PLAN, SEE SHEETS 2B-5 & 2B-6
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4
FOR BRIDGE SKETCH, SEE SHEET 2B-1
FOR STRUCTURE PLANS, SEE SHEETS S1-1 TO S1-32
FOR CULVERT PLANS, SEE SHEETS C1-1 TO C1-5

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

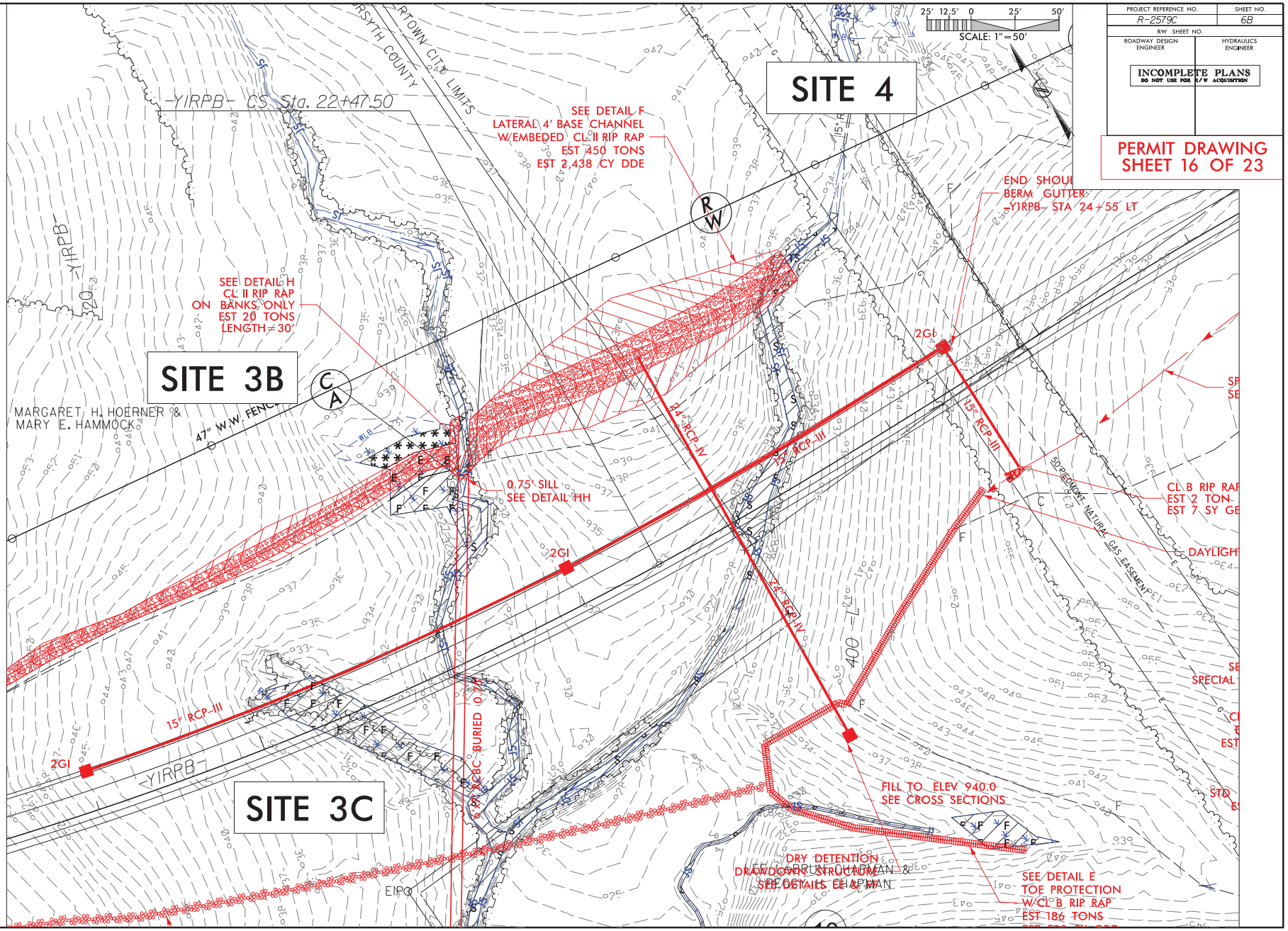
PERMIT DRAWING SHEET 15 OF 23

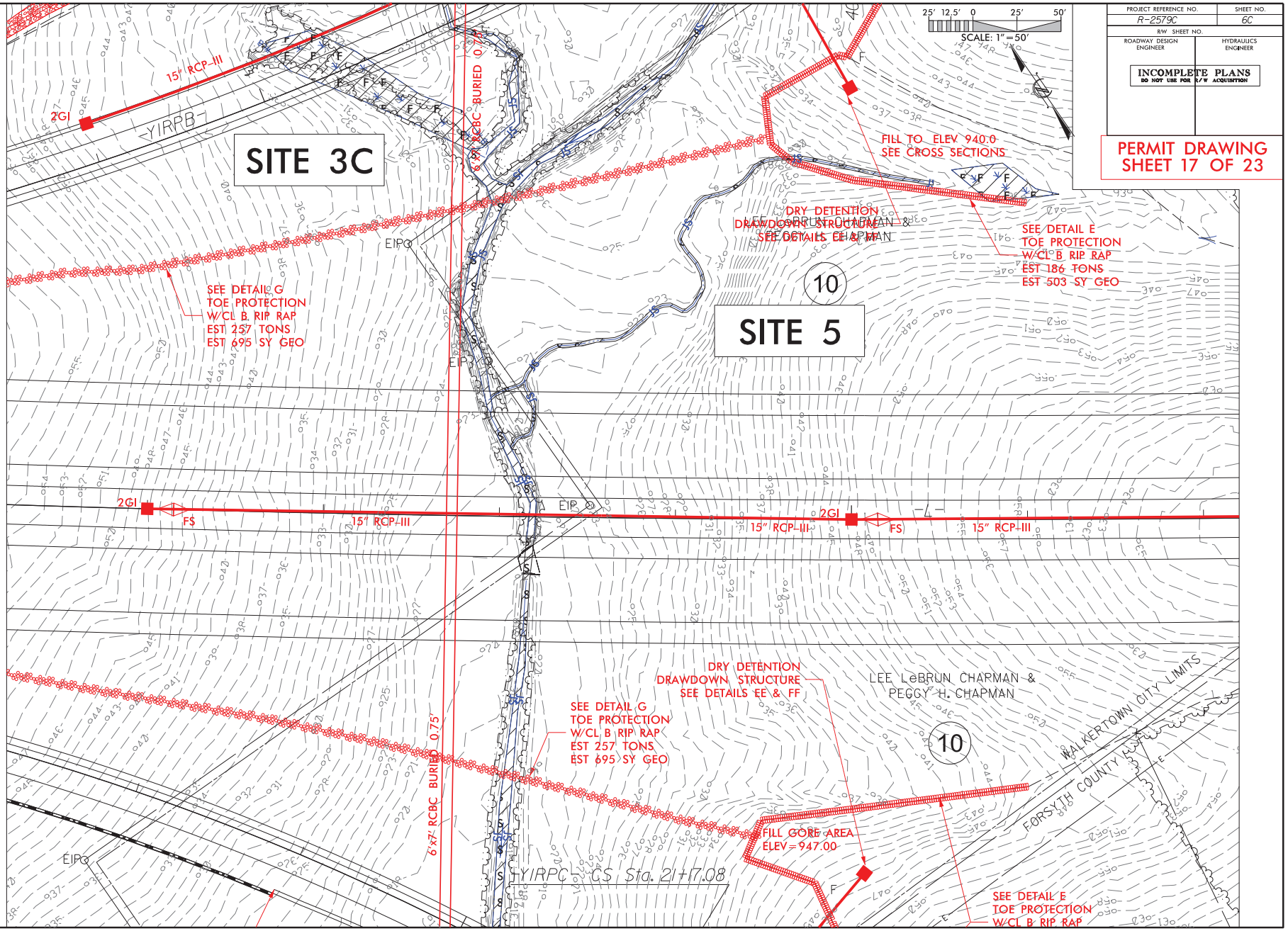


NOTE:
U-2579C HAS BEEN SEPERATED INTO 2 PHASES. PHASE II INCLUDES IMPROVEMENTS WEST OF US 311. THESE PLANS HAVE BEEN MODIFIED FROM THEIR ORIGINAL FORM TO CONTAIN IMPACT SITES FOR U-2579C PHASE II ONLY. ROADWAY AND DRAINAGE DESIGN HAS NOT BE SEPERATED.

NOTE:
FOR -L- PROFILE, SEE SHEETS 17 & 18
FOR -Y1- PROFILE, SEE SHEETS 22 & 23
FOR -YIRPB- PROFILE, SEE SHEET 24
FOR -YIRPC- PROFILE, SEE SHEETS 25 & 26
FOR -YIRPD- PROFILE, SEE SHEET 27
FOR -YILPB- PROFILE, SEE SHEET 28
FOR -YIDET- PROFILE, SEE SHEET 30
FOR -YIDET- PLAN, SEE SHEETS 2B-5 & 2B-6
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4
FOR BRIDGE SKETCH, SEE SHEET 2B-1
FOR STRUCTURE PLANS, SEE SHEETS S1-1 TO S1-32
FOR CULVERT PLANS, SEE SHEETS C1-1 TO C1-5

8/17/99


SCALE: 1" = 50'
25' 12.5' 0 25' 50'
SITE 4
SITE 3B
SITE 3C
-YIRPB- CS Sta. 22+47.50
TOWN CITY LIMITS
FORSYTH COUNTY
SEE DETAIL F
LATERAL 4' BASE CHANNEL
W/EMBEDED CL II RIP RAP
EST 450 TONS
EST 2,438 CY DDE
END SHOULDER BERM GUTTER
-YIRPB- STA 24+55 LT
SEE DETAIL H
CL II RIP RAP
ON BANKS ONLY
EST 20 TONS
LENGTH=30'
MARGARET H. HOERNER &
MARY E. HAMMOCK
47" W.W. FENCE
0.75' SILL
SEE DETAIL HH
2GI
2GJ
24" RCP-IV
15" RCP-III
24" RCP-IV
15" RCP-III
15" RCP-III
2GI
-YIRPB-
SD PIEDMONT NATURAL GAS EASEMENT
CL B RIP RAP
EST 2 TON
EST 7 SY GE
DAYLIGHT
SPECIAL
FILL TO ELEV 940.0
SEE CROSS SECTIONS
DRY DETENTION
DRAWDOWN STRUCTURE
SEE DETAILS EE & PLAN
SEE DETAIL E
TOE PROTECTION
W/CL B RIP RAP
EST 186 TONS
EIPO
400
R/W
PROJECT REFERENCE NO.
R-2579C
SHEET NO.
6B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PERMIT DRAWING
SHEET 16 OF 23
8/17/99
REVISIONS



PROJECT REFERENCE NO.	SHEET NO.
R-2579C	6C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

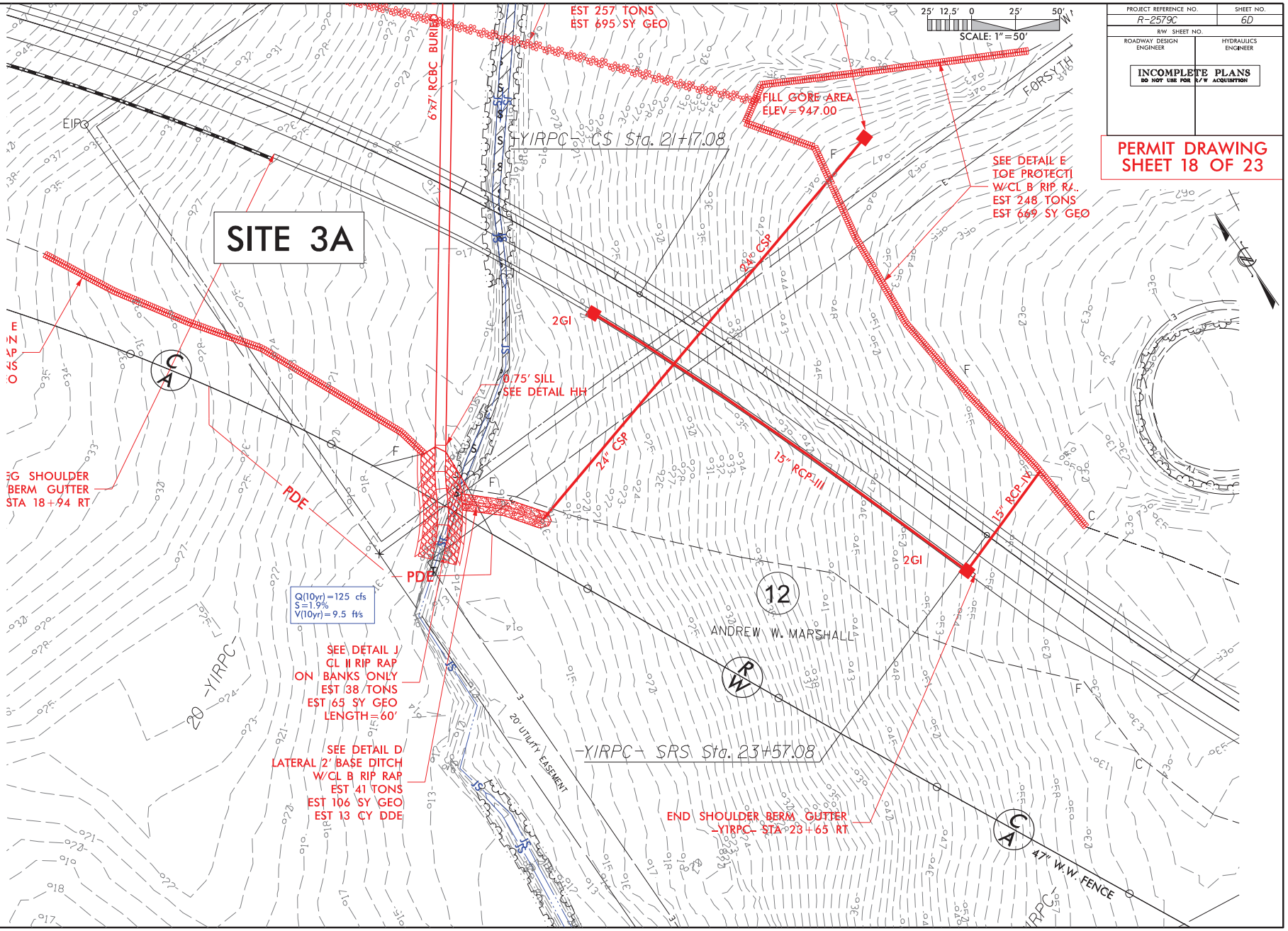
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PERMIT DRAWING
SHEET 17 OF 23

REVISIONS

8/17/99

$$$$$$SYSTIME$$$$$$
$$$$$$DGNSPACE$$$$$$
$$$$$$USERNAME$$$$$$



PROJECT REFERENCE NO.	SHEET NO.
R-2579C	6D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PERMIT DRAWING
SHEET 18 OF 23

REVISIONS

8/17/99

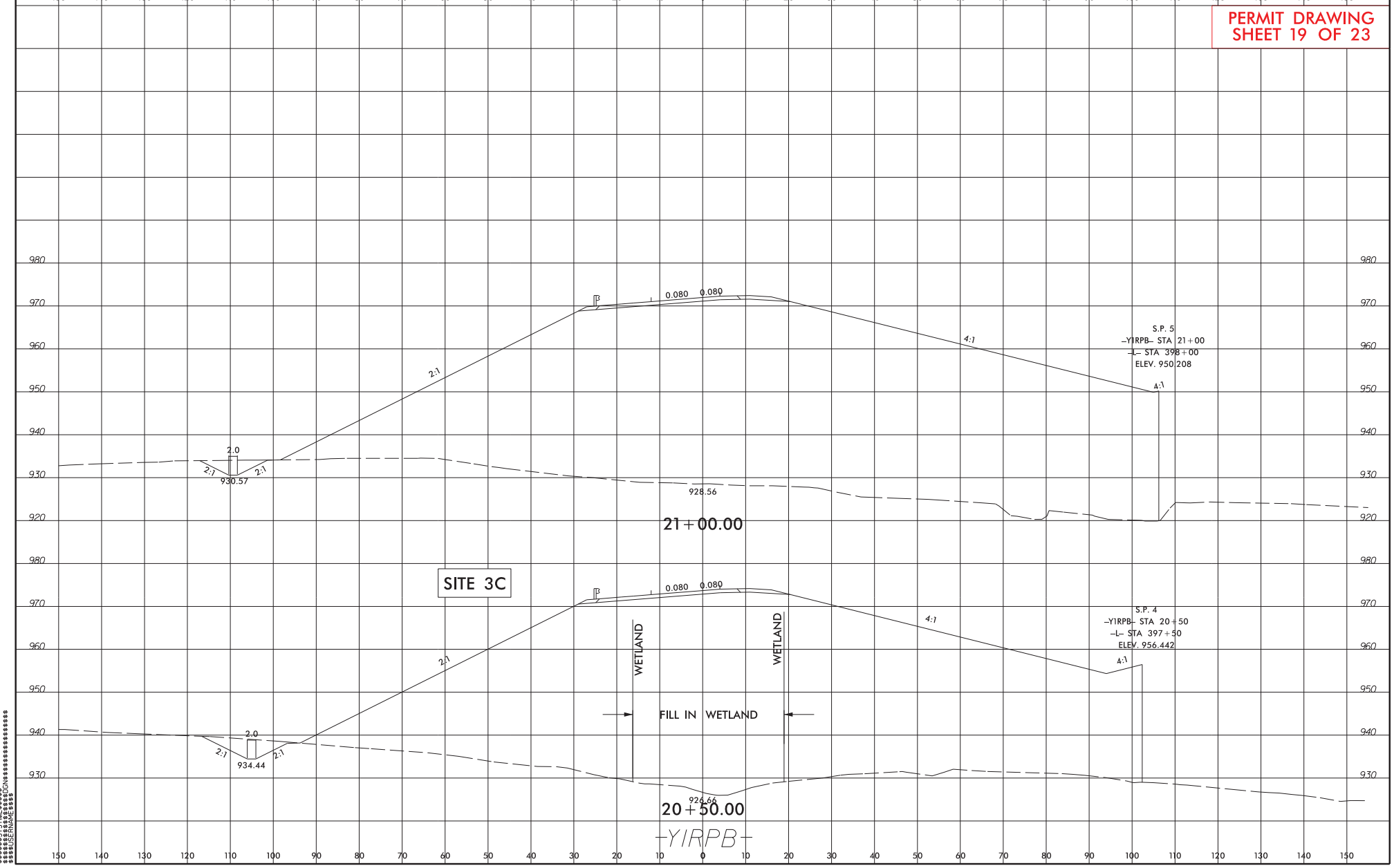
$$$$$$$SYSTIME$$$$$$
$$$$$$$

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2579C	X-197

0 5 10

PERMIT DRAWING
SHEET 19 OF 23

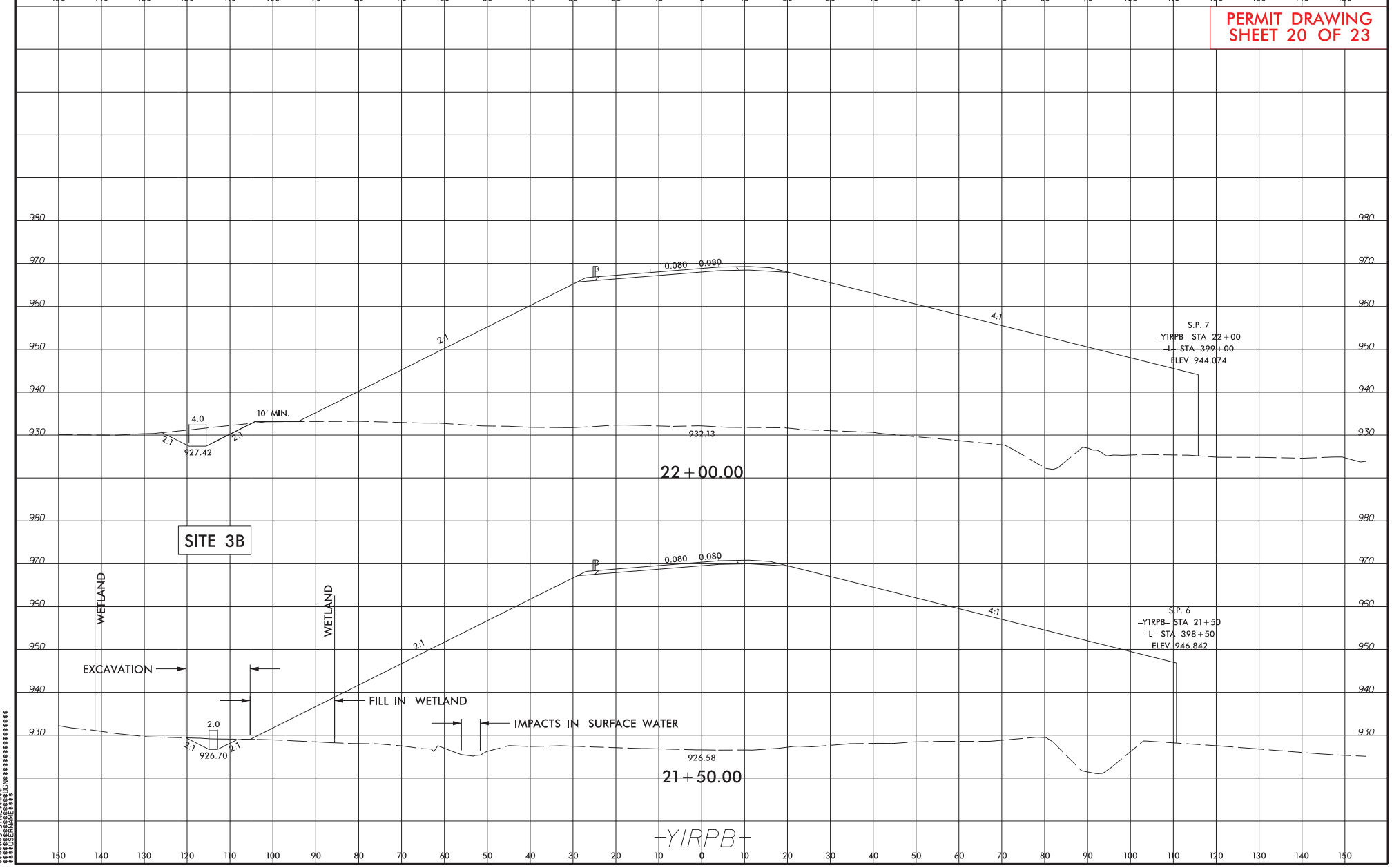


$$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$$$USERNAME$$$$

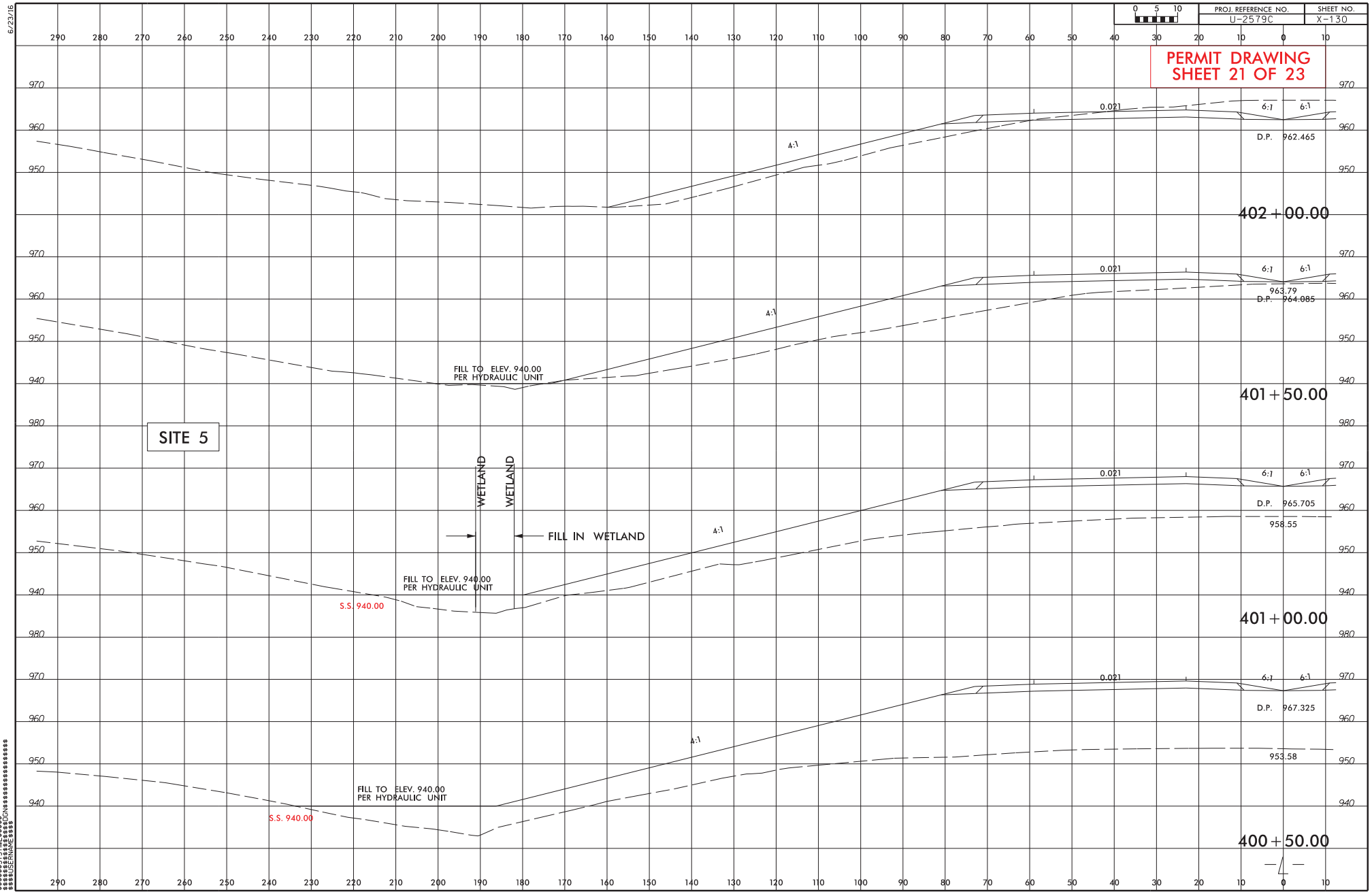
PROJ. REFERENCE NO.	SHEET NO.
U-2579C	X-198

0 5 10

PERMIT DRAWING
SHEET 20 OF 23



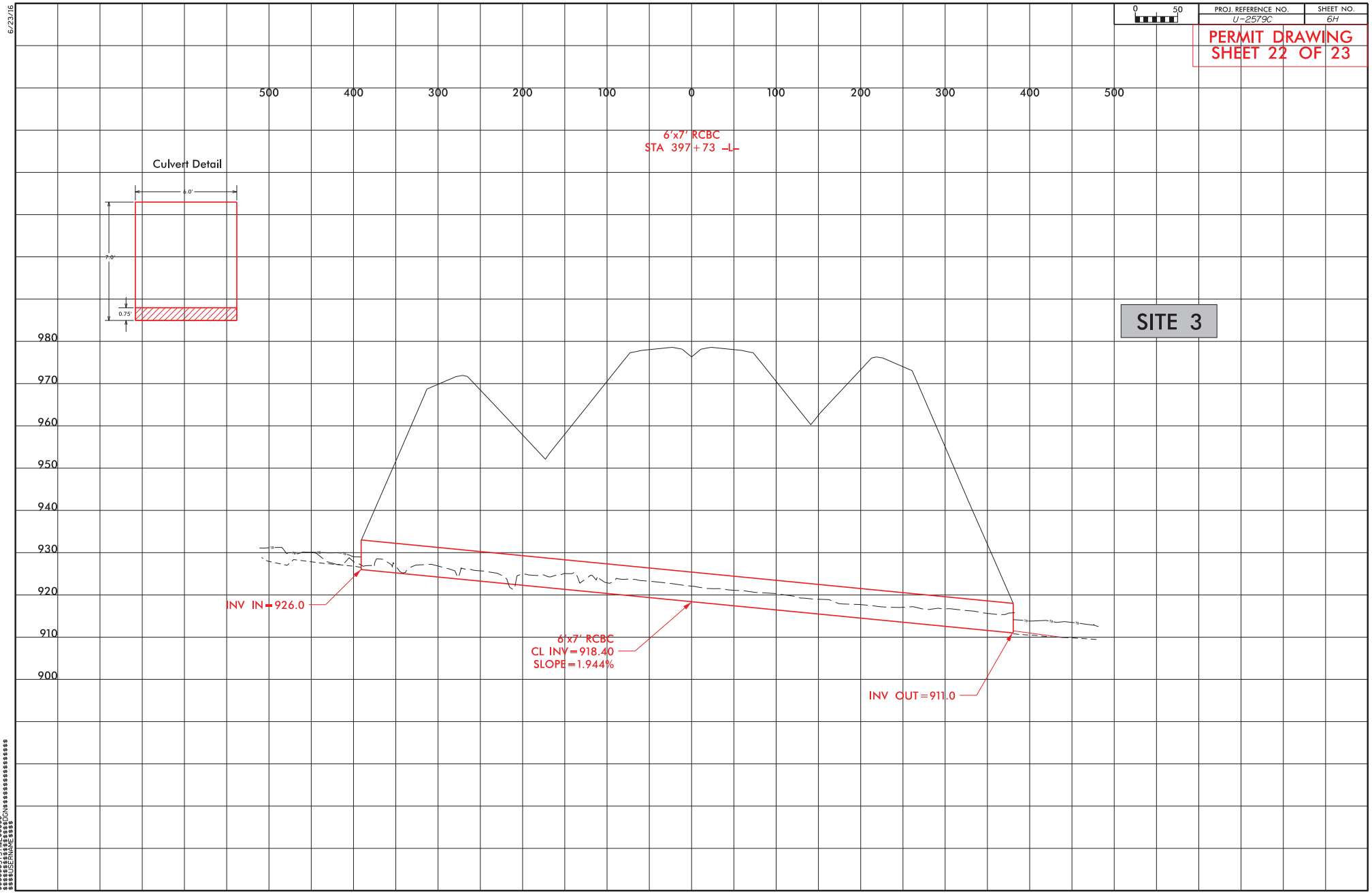
$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$


PROJ. REFERENCE NO.
U-2579C
SHEET NO.
X-130
PERMIT DRAWING
SHEET 21 OF 23
402+00.00
401+50.00
401+00.00
400+50.00
D.P. 962.465
D.P. 964.085
963.79
D.P. 965.705
958.55
D.P. 967.325
953.58
0.021
6:1
4:1
FILL TO ELEV. 940.00
PER HYDRAULIC UNIT
S.S. 940.00
SITE 5
WETLAND
WETLAND
FILL IN WETLAND

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
U-2579C	6H

PERMIT DRAWING
SHEET 22 OF 23



$$$$$$$$SYSTIME$$$$$
$$$$$$$$USERNAME$$$$

WETLAND PERMIT IMPACT 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	374+59-384+06 -L- RT	ROADWAY FILL	0.57					0.07	< 0.01	1148	31	
		BANK STABILIZATION (Downstream)						< 0.01		40		
2	386+73-388+95 -L-	60" CSP						0.03	< 0.01	552	35	
		BANK STABILIZATION						< 0.01		45		
3A	396+56-398+20 -L-	6'x7' RCBC						0.09	< 0.01	914	55	
		BANK STABILIZATION (Upstream)						< 0.01		33		
3B	21+17-21+80 -Y1RPB- LT	ROADWAY FILL	0.02		0.01	0.01						
3C	20+10-21+05 -Y1RPB-	ROADWAY FILL	0.06									
4	21+05-24+11 -Y1RPB-	ROADWAY FILL						0.05	< 0.01	405	40	
5	398+07-401+19 -L- LT	ROADWAY FILL	0.02					0.02		390		
TOTALS*:			0.66		0.01	0.01		0.26	0.02	3527	161	0

*Rounded totals are sum of actual impacts

NOTES:
Site 1: Perm Fill = 0.5674 ac
Site 2: Upstream Bank Stabilization = 0.001 AC / 20 LF, Downstream Bank Stabilization = 0.002 AC / 25 LF
Site 3B: Perm Fill = 0.0169 ac / Excav. = 0.0147 ac / Mech. Clearing = 0.0118 ac
Site 3C: Perm Fill = 0.0582 ac
Site 5: Perm Fill = 0.0150 ac

Revised September 2014

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
September 27, 2017
FORSYTH
U-2579C Phase II
34839.3.6

09/08/99

TIP PROJECT: U-2579C

CONTRACT:

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

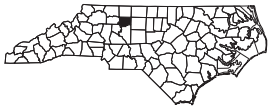
FORSYTH COUNTY

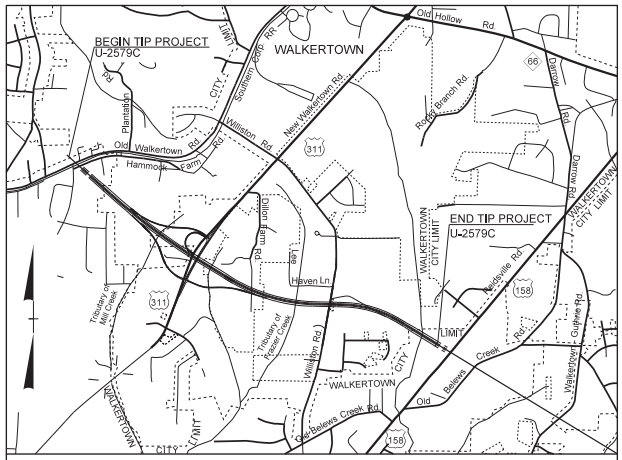
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579C	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34839.1.9	N/A	PE
34839.2.6	N/A	R/W
34839.2.GV18	N/A	R/W
34839.2.16	N/A	UTIL
34839.3.GV6	NHP-0918(062)	CONSTR.

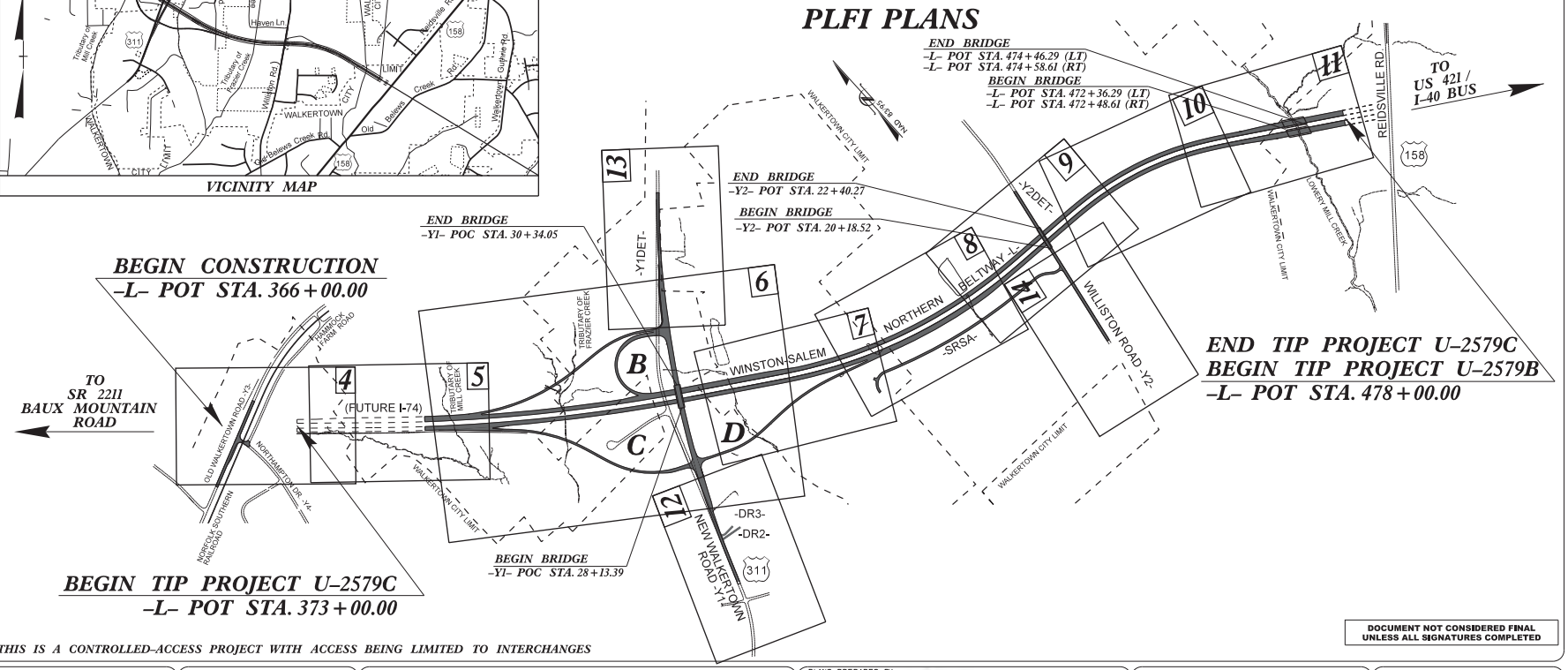
LOCATION: WINSTON – SALEM NORTHERN BELTWAY (EASTERN SECTION) FROM US 311 TO US 158 (FUTURE I-74)

TYPE OF WORK: WIDENING, GRADING, PAVING, DRAINAGE, SIGNING, SIGNALS, ITS, CULVERTS AND STRUCTURES.





VICINITY MAP



THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

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

DESIGN DATA

ADT 2017 = 65,592
ADT 2037 = 93,112
DHV = 10 %
D = 60 %
T = 18 % *
V = 70 MPH

* TTST 12 % DUAL 6 %

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT U-2579C = 1.989 Miles
LENGTH OF STRUCTURE PROJECT U-2579C = 0.040 Mile
TOTAL LENGTH OF TIP PROJECT U-2579C = 1.949 Miles

PLANS PREPARED BY:
RS&H & SUNGATE DESIGN GROUP, P.A.
8601 SIX FORKS RD. SUITE 260
RALEIGH, NC 27615
919-926-4100

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: OCTOBER 28, 2015

LETTING DATE: OCTOBER 17, 2017

JASON TALLEY, PE
PROJECT ENGINEER

JARED BOND, PE
PROJECT DESIGN ENGINEER

TATIA L. WHITE, PE, PLS
NCDOT CONTACT

HYDRAULICS ENGINEER
SIGNATURE:

ROADWAY DESIGN ENGINEER
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

13-MAR-2017 18:40
R:\Roadway\Proj\U2579C_rdy_tsh.dgn
$$$$USERNAME$$$$

04/06/15

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — PCM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil
- Potential Contamination Area: Soil
- Known Contamination Area: Water
- Potential Contamination Area: Water
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- U/G Telephone Cable LOS B (S.U.E.*) — T
- U/G Telephone Cable LOS C (S.U.E.*) — T
- U/G Telephone Cable LOS D (S.U.E.*) — T
- U/G Telephone Conduit LOS B (S.U.E.*) — TC
- U/G Telephone Conduit LOS C (S.U.E.*) — TC
- U/G Telephone Conduit LOS D (S.U.E.*) — TC
- U/G Fiber Optics Cable LOS B (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS C (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS D (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

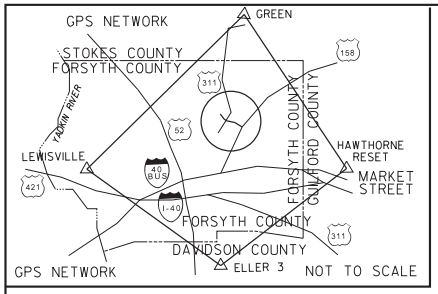
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

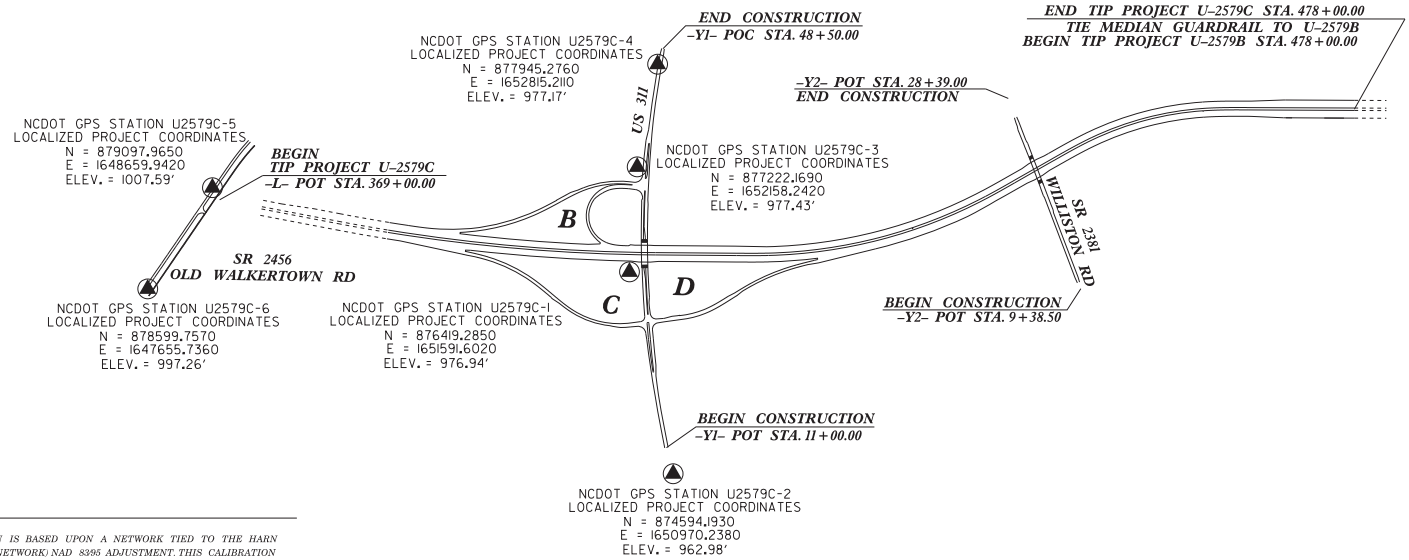
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line LOS B (S.U.E.*) — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole LOS A (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	1C-1
Location and Surveys	

SURVEY CONTROL SHEET U-2579C





NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORKWITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

2. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
   HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   U2579C_LS_GPSCALIB.HTML
   U2579C_LS_WGS84.TXT
   U2579C_LS_LOCAL.TXT
   U2579C_LS_CONTROL.TXT

   THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

DATUM DESCRIPTION

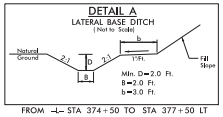
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "U2579C-1"
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 876419.285(ft) EASTING: 1651591.602(ft)
ELEVATION: 976.94(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99995453
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "U2579C-1" TO -L- STATION 390+00.00 IS
N 49°00'53.54" 3884.0262'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

13-MAR-2017 19:40
R:\Roadway\Proj\U2579C_Ls_lc-1.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	2D-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

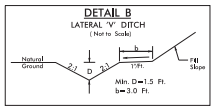
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DETAIL A
LATERAL BASE DITCH
(Not to Scale)



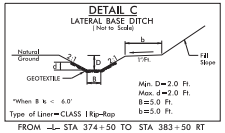
FROM –L– STA 374+50 TO STA 377+50 LT

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



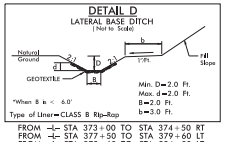
FROM –L– STA 373+00 TO STA 374+50 LT
FROM –Y1DET– STA 24+00 TO STA 29+00 LT

DETAIL C
LATERAL BASE DITCH
(Not to Scale)



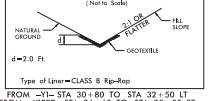
FROM –L– STA 374+50 TO STA 383+50 RT

DETAIL D
LATERAL BASE DITCH
(Not to Scale)



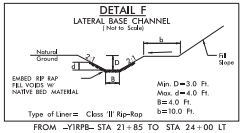
FROM –L– STA 373+00 TO STA 374+50 RT
FROM –L– STA 377+50 TO STA 379+60 LT
FROM –L– STA 379+60 TO STA 384+00 LT
FROM –L– STA 385+50 TO STA 386+50 LT
FROM –L– STA 387+00 TO STA 392+00 LT
FROM –L– STA 393+00 TO STA 394+50 LT
FROM –L– STA 438+15 TO STA 442+50 RT
FROM –Y1RPB– STA 16+00 TO STA 21+60 LT
FROM –Y1RPC– STA 20+75 TO STA 21+35 RT

DETAIL E
TOE PROTECTION
(Not to Scale)



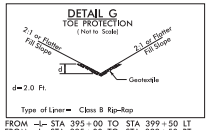
FROM –Y1– STA 30+80 TO STA 32+50 LT
FROM –Y1RPD– STA 26+60 TO STA 28+00 RT
FROM –Y1RPD– STA 26+90 TO STA 30+00 LT
FROM –Y1RPC– STA 17+85 TO STA 20+50 RT
FROM –Y1RPC– STA 21+17 TO STA 23+60 LT
FROM –Y1RPB– STA 22+50 TO STA 24+25 RT
FROM –L– STA 399+50 TO STA 401+00 LT
FROM –L– STA 399+50 TO STA 401+00 RT
FROM –L– STA 413+78 TO STA 414+50 LT
FROM –Y3– STA 17+00 TO STA 18+90 RT
FROM –SRSA– STA 13+00 TO STA 13+80 LT

DETAIL F
LATERAL BASE CHANNEL
(Not to Scale)



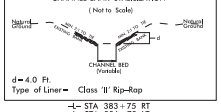
FROM –Y1RPB– STA 21+85 TO STA 24+00 LT

DETAIL G
TOE PROTECTION
(Not to Scale)



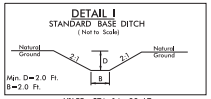
FROM –L– STA 395+00 TO STA 399+50 LT
FROM –L– STA 395+00 TO STA 399+50 RT

DETAIL H
CHANNEL BANK STABILIZATION
(Not to Scale)



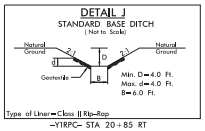
–L– STA 383+75 RT
–L– STA 386+78 LT
–L– STA 389+85 RT
–L– STA 414+19 RT
–Y1RPB– STA 21+75 LT
–SRSA– STA 22+65 RT

DETAIL I
STANDARD BASE DITCH
(Not to Scale)



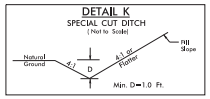
–Y1LPB– STA 14+00 LT
–Y2DET– STA 23+50 LT

DETAIL J
STANDARD BASE DITCH
(Not to Scale)



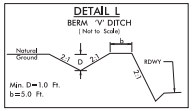
–Y1RPC– STA 20+85 RT

DETAIL K
SPECIAL CUT DITCH
(Not to Scale)



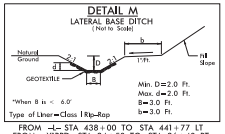
FROM –Y1– STA 12+50 TO STA 14+00 LT
FROM –Y1– STA 26+00 TO STA 27+50 LT
FROM –Y1DET– STA 16+00 TO STA 21+50 LT
FROM –Y1DET– STA 19+50 TO STA 21+50 RT
FROM –Y1LPB– STA 14+00 TO STA 15+00 LT
FROM –Y1RPC– STA 26+00 TO STA 28+50 LT
FROM –Y1RPC– STA 29+75 TO STA 31+00 LT
FROM –L– STA 430+00 TO STA 432+25 LT
FROM –L– STA 432+25 TO STA 434+00 LT
FROM –L– STA 469+00 TO STA 470+00 LT
FROM –Y2– STA 14+13 TO STA 17+50 RT
FROM –Y2– STA 15+50 TO STA 16+00 LT
FROM –Y2DET– STA 23+00 TO STA 24+50 RT

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



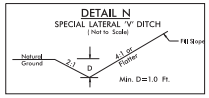
FROM –L– STA 417+00 TO STA 418+50 LT
FROM –L– STA 444+00 TO STA 444+50 RT
FROM –L– STA 451+00 TO STA 545+50 LT
FROM –Y1LPB– STA 13+00 TO STA 14+50 RT

DETAIL M
LATERAL BASE DITCH
(Not to Scale)



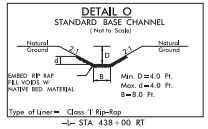
FROM –L– STA 438+00 TO STA 441+77 LT
FROM –Y1RPD– STA 24+50 TO STA 26+40 RT

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



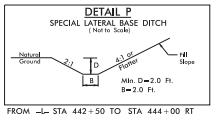
FROM –Y1– STA 39+50 TO STA 42+03 RT
FROM –Y1– STA 43+00 TO STA 46+50 RT
FROM –Y1DET– STA 29+00 TO STA 30+50 LT
FROM –Y2– STA 22+50 TO STA 26+00 LT
FROM –Y2DET– STA 17+50 TO STA 19+50 LT
FROM –Y3– STA 14+00 TO STA 16+50 LT
FROM –Y3– STA 14+00 TO STA 17+00 RT
FROM –Y3– STA 19+50 TO STA 23+00 RT

DETAIL O
STANDARD BASE CHANNEL
(Not to Scale)



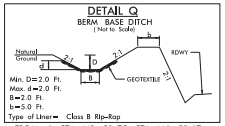
–L– STA 438+00 RT

DETAIL P
SPECIAL LATERAL BASE DITCH
(Not to Scale)



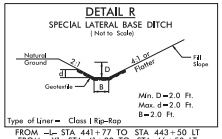
FROM –L– STA 442+50 TO STA 444+00 RT

DETAIL Q
BERM BASE DITCH
(Not to Scale)



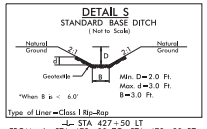
FROM –L– STA 443+50 TO STA 446+50 LT

DETAIL R
SPECIAL LATERAL BASE DITCH
(Not to Scale)



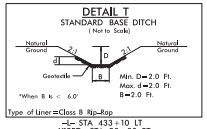
FROM –L– STA 441+77 TO STA 443+50 LT
FROM –Y1– STA 41+00 TO STA 46+50 LT

DETAIL S
STANDARD BASE DITCH
(Not to Scale)



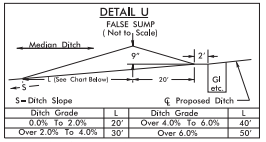
–L– STA 427+50 LT
FROM –L– STA 473+00 TO STA 473+90 RT

DETAIL T
STANDARD BASE DITCH
(Not to Scale)



–L– STA 433+10 LT
–Y1RPD– STA 28+30 RT

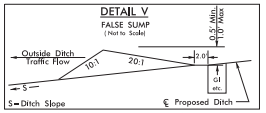
DETAIL U
FALSE SUMP
(Not to Scale)



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'

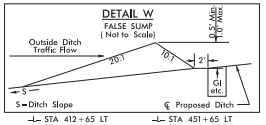
–L– STA 376+15
–L– STA 388+15
–L– STA 400+15
–L– STA 416+85
–L– STA 433+00
–L– STA 455+15
–L– STA 466+15
–L– STA 380+15
–L– STA 391+90
–L– STA 403+65
–L– STA 421+85
–L– STA 441+95
–L– STA 448+65
–L– STA 470+65
–L– STA 384+15
–L– STA 396+15
–L– STA 413+15
–L– STA 427+85
–L– STA 451+65
–L– STA 462+15
–L– STA 471+95

DETAIL V
FALSE SUMP
(Not to Scale)



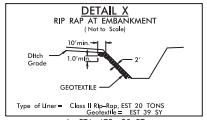
–L– STA 413+15 RT
–L– STA 418+35 LT
–L– STA 427+90 RT
–L– STA 455+15 RT
–L– STA 462+15 RT
–L– STA 470+65 RT
–L– STA 414+85 LT
–L– STA 425+00 LT
–L– STA 451+65 RT
–L– STA 458+65 RT
–L– STA 466+15 RT
–Y1– STA 17+80 LT

DETAIL W
FALSE SUMP
(Not to Scale)



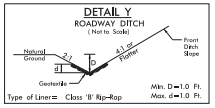
–L– STA 412+65 LT
–L– STA 455+15 LT
–L– STA 462+15 LT
–L– STA 470+15 LT
–L– STA 451+65 LT
–L– STA 458+65 LT
–L– STA 466+15 LT
–Y2– STA 22+85 RT
–SRSA– STA 19+20 LT

DETAIL X
RIP RAP AT EMBANKMENT
(Not to Scale)



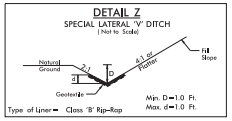
–L– STA 473+90 RT

DETAIL Y
ROADWAY DITCH
(Not to Scale)



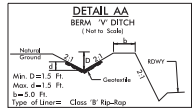
FROM –SRSA– STA 19+50 TO STA 21+50 RT
FROM –SRSA– STA 19+50 TO STA 21+50 LT
FROM –SRSA– STA 24+50 TO STA 29+00 RT
FROM –SRSA– STA 24+50 TO STA 29+00 LT

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



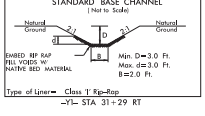
FROM –SRSA– STA 21+50 TO STA 22+55 RT
FROM –SRSA– STA 21+50 TO STA 22+55 LT
FROM –SRSA– STA 22+75 TO STA 24+50 RT
FROM –SRSA– STA 22+80 TO STA 24+50 LT

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



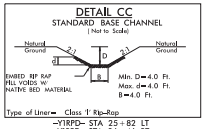
FROM –L– STA 454+50 TO STA 455+50 LT
FROM –Y1– STA 37+50 TO STA 41+00 LT

DETAIL BB
STANDARD BASE CHANNEL
(Not to Scale)



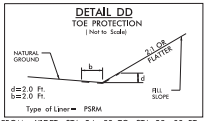
–Y1– STA 31+29 RT

DETAIL CC
STANDARD BASE CHANNEL
(Not to Scale)



–Y1RPD– STA 25+82 LT
–Y1RPD– STA 26+46 RT

DETAIL DD
TOE PROTECTION
(Not to Scale)



FROM –Y1DET– STA 24+50 TO STA 28+00 RT

5/14/99

13 MAR 2003 10:04
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PROJECT REFERENCE NO.	SHEET NO.
U-2579C	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

RIGHT OF WAY REVISION 7/26/16 - COMBINED PARCELS 5,6,7 & 8 AS ONE PARCEL 5 AND CHANGED PROPERTY OWNER NAMES TO TRUSTEES OF OAK GROVE MORAVIAN CHURCH DB 1131 PG 1486 AND THE BOARD OF PROVINCIAL ELDERS OF THE SOUTHERN PROVINCE OF THE MORAVIAN CHURCH DB 146 PG 211, RLC
RIGHT OF WAY REVISION 5/31/17 - ADDED PARCELS 94,95,96,97,98 AND 99; ADDED C/A ON PARCELS 94,95,AND 96; ADDED TCE ON PARCELS 95,96,97,98,AND 99, JMB

8/17/99

-Y3-
PI Sta 29+34.40
Δ = 30° 12' 45.2" (RT)
D = 2° 58' 35.1"
L = 1,015.07'
T = 519.63'
R = 1,925.00'
SE = 05
RO = SEE PLANS

-Y4-
PI Sta 11+82.16
Δ = 19° 40' 26.4" (LT)
D = 15° 54' 55.8"
L = 123.62'
T = 62.42'
R = 360.00'

BEGIN CONSTRUCTION
-Y3- POT STA. 13+25.00

END CONSTRUCTION
-Y3- POT STA. 26+50.00

BEGIN TIP PROJECT U-2579C
BEGIN GRADING
-L- POT STA. 373+00.00

BEGIN CONSTRUCTION
-L- POT STA. 366+00.00

BEGIN CONSTRUCTION
-Y4- POT STA. 10+10.00

-L- POT Sta. 367+89.88
-Y3- POT Sta. 20+43.69

-Y4- PT Sta. 12+43.35
N 25° 29' 38.5" W
-Y4- POT Sta. 12+53.12
-Y4- POT Sta. 19+10.68

-Y4- PC Sta. 11+19.74

-Y4- POT Sta. 10+00.00

-Y3- PC Sta. 23+14.77

S 48° 08' 54.4" E

N 65° 25' 55.4" E

N 65° 49' 12.7" W

MATCHLINE -L- STA. 377+00.00 SHEET 5

MATCHLINE INSERT -Y3- STA. 15+50.00

TIMOTHY W. & SHANNON M. MALONEY DB 1851 PG 2888

WALTER & MARILYN SAWYERS DB 3204 PG 1784

DARLYNN & GODOFREDO SORIANO DB 1875 PG 1455

ELMER C. LAWSON PB 17 PG 117

JULIA S. ELLIS

LUTHERAN HOME W S PROP INC DB 2718 PG 2834

JOHN & PAULINE STYERS DB 1891 PG 791

MT. PLEASANT HOLINESS CHURCH DB 1747 PG 778

MARYANN B. SWEAT DB 1197 PG 1273

OAK GROVE MORAVIAN CHURCH TRUSTEES DB 146 PG 211

OAK GROVE MORAVIAN CHURCH TRUSTEES DB 1131 PG 1486 (TRACT 2)

OAK GROVE MORAVIAN CHURCH TRUSTEES DB 1131 PG 1486 (TRACT 1)

OAK GROVE MORAVIAN CHURCH TRUSTEES DB 382 PG 66

MDC INVESTMENTS LLC DB 3927 PG 2185

JOHN H. MAYFIELD, JR. DB 1448 PG 141

CLARENCE E. & LILLIE M. FARABEE DB 1228 PG 1234

SIGIFREDO & ROSALBA ALFARO DB 2800 PG 3451

LINDA R. SHAW DB 2627 PG 4197

DB 1705 PG 443 FRANCES G. TUCKER

SEE DETAIL A LATERAL 2' BASE DITCH EST. 1,818 CY DDE

SEE DETAIL B LATERAL V DITCH EST. 139 CY DDE

SEE DETAIL D LATERAL 2' BASE DITCH W/CL B RIP RAP EST 101 TONS EST 265 SY GEO EST 443 CY DDE

SEE DETAIL E TOE PROTECTION W/CL B RIP RAP EST 173 TONS EST 472 SY GEO

SEE DETAIL D2 PSRM TOE PROTECTION EST 130 SY

BEGIN FUTURE SHOULDER BERM GUTTER -L- STA. 373+00 LT.

BEGIN FUTURE NOISE WALL D -NWD- STA.19+60.00 -L- STA.373+00.00 74.75' RT.

FUTURE NOISE WALL & SINGLE FACED BARRIER

300' TAPER

GRADE ONLY

14' P.S.

12' P.S.

14'-3" P.S.

47" W.W. FENCE

15" W. ELBOWS

REMOVE

WALKERTOWN CITY LIMITS

FORSYTH COUNTY

WINSTON-SALEM CITY LIMITS

PAVED SHOULDER

NOTE:
FOR -L- PROFILE, SEE SHEETS 15 & 16
FOR -Y3- PROFILE, SEE SHEET 32
FOR -Y4- PROFILE, SEE SHEET 32
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4

24-MAY-2017 10:28
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PROJECT REFERENCE NO.	SHEET NO.
U-2579C	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

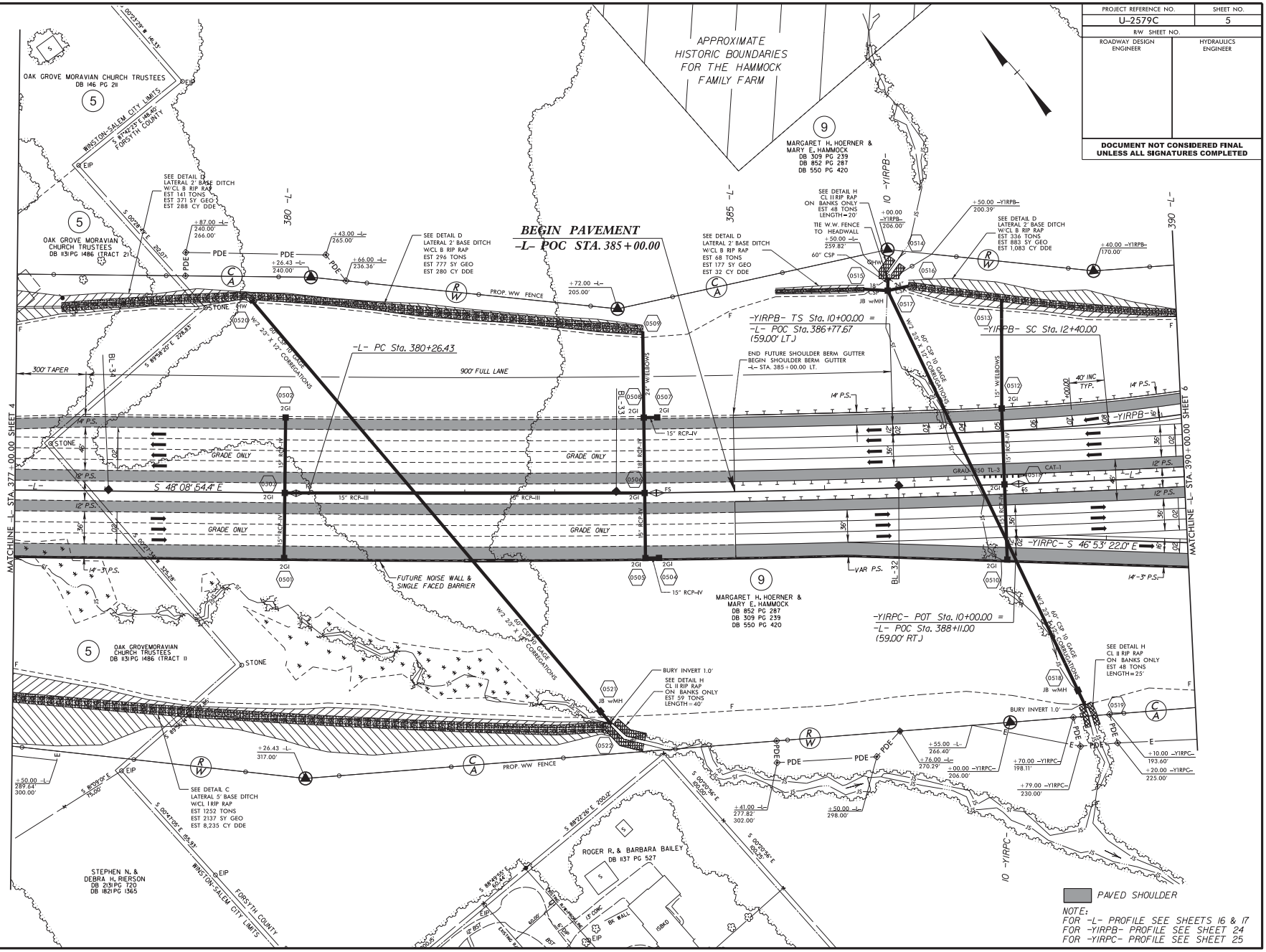
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

RIGHT OF WAY REVISION 7/26/16 - COMBINED PARCELS 5,6,7 & 8 AS ONE PARCEL 5 AND CHANGED PROPERTY OWNER NAMES TO TRUSTEES OF OAK GROVE MORAVIAN CHURCH DB 1131 PG 1486 AND THE BOARD OF PROVINCIAL ELDERS OF THE SOUTHERN PROVINCE OF THE MORAVIAN CHURCH DB 146 PG 211.RLC

RIGHT OF WAY REVISION 5/3/17 - ADDED TCE ON PARCEL 9.JMB

8/17/99



NOTE:
FOR -L- PROFILE SEE SHEETS 16 & 17
FOR -YIRPB- PROFILE SEE SHEET 24
FOR -YIRPC- PROFILE SEE SHEET 25

03-MAY-2017 09:38
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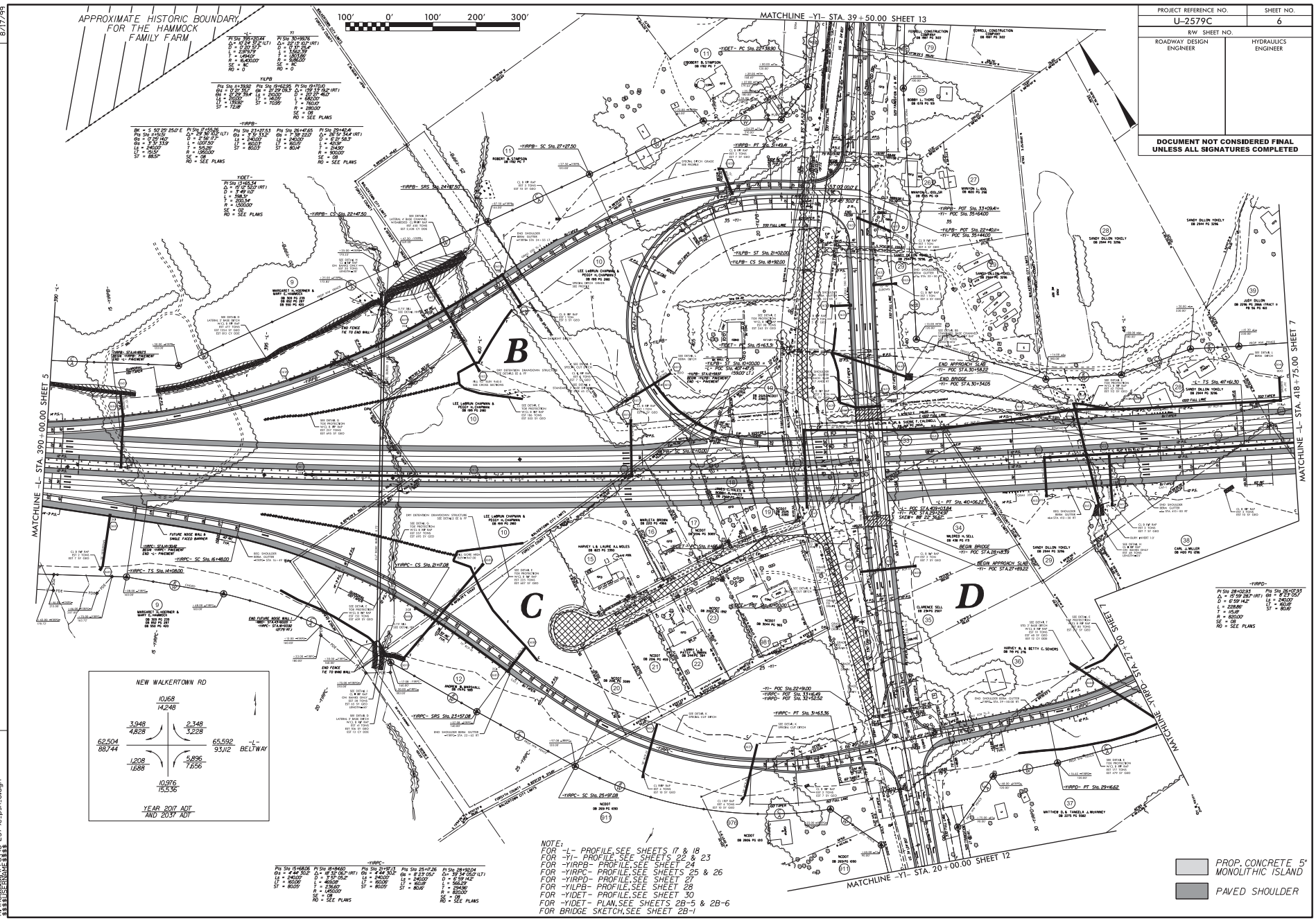
PROJECT REFERENCE NO.	SHEET NO.
U-2579C	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

RIGHT OF WAY REVISION 3/7/17 - UPDATED PROPERTY LINE ON PARCEL 39, JMB
RIGHT OF WAY REVISION 3/29/17 - ADDED PUE ON PARCEL 11, JMB
RIGHT OF WAY REVISION 5/31/17 - ADDED TCE ON PARCEL 9, JMB

8/17/99



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North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element:	34409.3.23	TIP No.:	R-2247CD	County(ies):	Forsyth	Page	1	of	4

General Project Information

WBS Element:	34409.3.23	**TIP Number:**	R-2247CD	**Project Type:**	Roadway Widening	**Date:**	9/25/2017
NCDOT Contact:	Michael J. Shumsky, PE			**Contractor / Designer:**	Randal C. Howard, PE		
Address:	NCDOT Design Build Unit 1595 Mail Service Center Raleigh, NC 27699-1595			**Address:**	Sungate Design Group, PA 905 Jones Franklin Road Raleigh, NC 27606		
Phone:	(919) 707-6627			**Phone:**	(919) 859-2243		
Email:	mshumsky@ncdot.gov			**Email:**	rhoward@sungatedesign.com		
City/Town:	Winston-Salem			**County(ies):**	Forsyth		
River Basin(s):	Yadkin-Pee Dee			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	.867 miles	**Surrounding Land Use:**	Medium density residential

	Proposed Project	Existing Site
Project Built-Upon Area (ac.)	23.6 ac.	15.9 ac.
Typical Cross Section Description:	Y17 (US 421): Three (3) 12' travel lanes each direction, concrete barrier rail median with 18' paved median shoulders, and 12' paved ouside shoulders with grass roadway ditches, both sides.	Y17 (US 421): Two 12' travel lanes with paved shoulders, grass median, and grass roadway ditches, both sides.
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 77,735 Year: 2036	Existing: 57,065 Year: 2016

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

The R-2247CD project involves US 421 and Peace Haven Road Interchange improvements for future Winston-Salem Northern Beltway along with other improvements to adjacent roadways including realignments. Grass swales have been incorporated in roadside ditches, where possible, to reduce velocities and promote infiltarion of runoff. A dry detension basin is proposed to treat runoff and attenuate peak flows for portions on the roadway runoff. Riprap at pipe outlets, ditches, and streambanks has been incorporated to minimize erosion on slopes where vegetation will not be adequate. Storm drainage discharging directly to wetlands has been design to meet non-erosive velocity requirements. Bridge deck drainage for the Kester Mill Road bridge will be collected and discharged outside the limits of the surface-water. NCDOT standards for ground cover, vegetation, and slope stabilization will be adhered to during the life of this project, as spcified in the approved NCDOT Erosion and Sediment Control Plan for the project.

Waterbody Information

Surface Water Body (1):	Muddy Creek		**NCDWR Stream Index No.:**	12-94-(0.5)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:				**Buffer Rules in Effect:**	N/A
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)					

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element:	34409.3.23	**TIP No.:**	R-2247CD	**County(ies):**	Forsyth	**Page**	2	**of** 4

Additional Waterbody Information

Surface Water Body (2):	Silas Creek		**NCDWR Stream Index No.:**	12-94-10		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:				**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element: 34409.3.23 **TIP No.:** R-2247CD **County(ies):** Forsyth

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?
6	Y17 43+70 to 46+70 RT & ALPD 12+00 to 14+25 RT	Silas Creek	0.0	4.0	4.0	2.6	260	525	0.50%	8.3	1.9	10.8	2.0	No	No
6	Y17 48+50 LT	Silas Creek	0.0	6.0	4.0	1.8	180	510	0.92%	4.8	2.0	6.2	2.1	No	No
6	Y17 68+20 LT	Silas Creek	0.0	6.0	4.0	1.3	130	180	0.30%	5.5	1.4	7.2	1.4	No	No

Additional Comments

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element: 34409.3.23 **TIP No.:** R-2247CD **County(ies):** Forsyth

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?
6	Y17 50+00 RT	Silas Creek	Dry Detention Basin	15.1	6.4	0.32	0.63	No

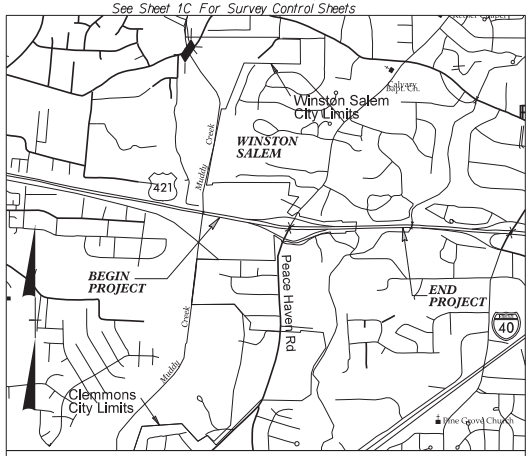
Additional Comments

09/28/99

TIP PROJECT: R-2247CD

CONTRACT: C203840

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheet 1C For Survey Control Sheets



VICINITY MAP

60% ROADWAY PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

FORSYTH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2247CD	1	

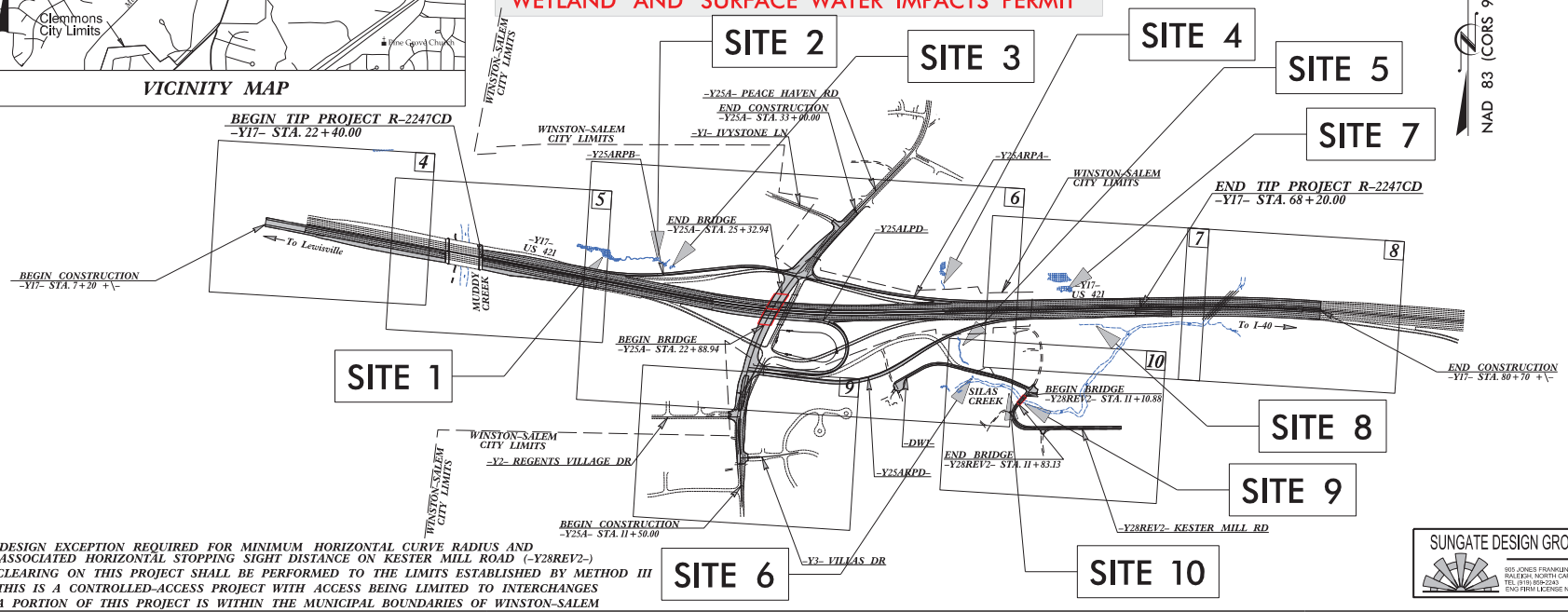
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34409.3.23	NHP-0421(088)	P.E.
34409.3.23	NHP-0421(088)	R/W & UTIL.
34409.3.23	NHP-0421(088)	CONST.

PERMIT DRAWING
SHEET 1 OF 23

LOCATION: WINSTON-SALEM NORTHERN BELTWAY – MODIFICATION OF THE US 421/SR 1891 (PEACE HAVEN ROAD) INTERCHANGE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, GUARDRAIL, STRUCTURES, SIGNING, SIGNALS, NOISE WALLS AND RETAINING WALL

WETLAND AND SURFACE WATER IMPACTS PERMIT



- DESIGN EXCEPTION REQUIRED FOR MINIMUM HORIZONTAL CURVE RADIUS AND ASSOCIATED HORIZONTAL STOPPING SIGHT DISTANCE ON KESTER MILL ROAD (-Y28REV2-)
- CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
- THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES
- A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF WINSTON-SALEM

SUNGATE DESIGN GROUP, P.A.
805 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

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 2016 = 57,065
ADT 2036 = 77,735
DHV = 10 %
D = 65 %
T = 7 % *
V = 70 MPH
* (TTST = 4% + DUAL 3%)
FUNC CLASS = FREEWAY

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2247CD = .867 MI.

TOTAL LENGTH TIP PROJECT R-2247CD = .867 MI.

Prepared In the Office of:
KCI Associates of N.C., P.A.
4505 Falls of Neuse Road, Suite 400
Raleigh, NC 27609
Phone (919) 783-9214
Fax (919) 783-9266

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 15, 2016

LETTING DATE:
NOVEMBER 15, 2016

NCDOT CONTACT: K. ZAK HAMIDI, PE
PROJECT ENGINEER – DESIGN BUILD UNIT

Plans Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.
Raleigh NC, 27610

CHARLES L. FLOWE, P.E.
PROJECT ENGINEER

BARRY C. SMITH, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

9/6/2017
R2247CD_Hyd_prm_wet_01.dgn
rhoward

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	2D-1

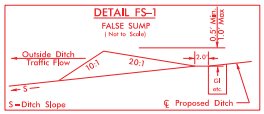
HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG / ARCHITECTURE LICENSE NO. C-0910

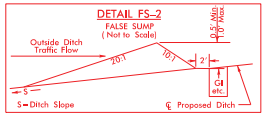
PERMIT DRAWING SHEET 2 OF 23

DETAIL FS-1
FALSE SUMP
(Not to Scale)



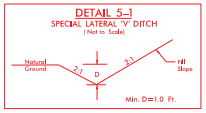
STA. 34+35 -Y17- LT
STA. 35+45 -Y17- LT
STA. 36+90 -Y17- LT
STA. 76+30 -Y17- LT
STA. 13+90 -DW1- RT

DETAIL FS-2
FALSE SUMP
(Not to Scale)



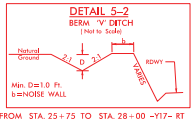
STA. 17+36 -Y25ARPA- RT, STA. 16+40 -Y25ARPA- RT
STA. 24+50 -Y17- RT, STA. 25+25 -Y17- RT
STA. 31+15 -Y17- RT, STA. 60+64 -Y17- LT
STA. 61+15 -Y17- LT, STA. 76+15 -Y17- RT
STA. 79+20 -Y17- RT, STA. 14+15 -DW1- LT

DETAIL 5-1
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



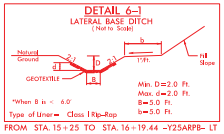
FROM STA. 28+50 TO STA. 30+00 -Y17- LT

DETAIL 5-2
BERM 'V' DITCH
(Not to Scale)



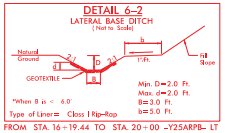
FROM STA. 25+75 TO STA. 28+00 -Y17- RT

DETAIL 6-1
LATERAL BASE DITCH
(Not to Scale)



FROM STA. 15+25 TO STA. 16+19.44 -Y25ARPB- LT

DETAIL 6-2
LATERAL BASE DITCH
(Not to Scale)

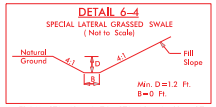


FROM STA. 16+19.44 TO STA. 20+00 -Y25ARPB- LT

DETAIL 6-3
SPECIAL CUT DITCH
(Not to Scale)

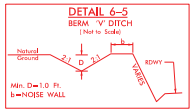
FROM STA. 44+50 TO STA. 46+50 -Y17- LT
FROM STA. 14+25 TO STA. 15+50 -Y25ALPD- RT
FROM STA. 26+50 TO STA. 29+85 -Y25ARPD- RT

DETAIL 6-4
SPECIAL LATERAL GRASSED SWALE
(Not to Scale)



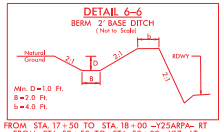
FROM STA. 43+70 TO STA. 46+70 -Y17- RT
FROM STA. 12+00 TO STA. 14+25 -Y25ALPD- RT

DETAIL 6-5
BERM 'V' DITCH
(Not to Scale)



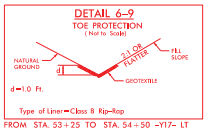
FROM STA. 38+36 TO STA. 40+00 -Y17- RT
FROM STA. 18+00 TO STA. 22+50 -Y25ARPA- RT
FROM STA. 57+50 TO STA. 59+00 -Y17- LT

DETAIL 6-6
BERM '2' BASE DITCH
(Not to Scale)



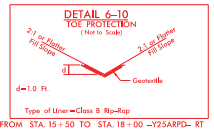
FROM STA. 17+50 TO STA. 18+00 -Y25ARPA- RT
FROM STA. 52+50 TO STA. 53+00 -Y17- LT

DETAIL 6-9
TOE PROTECTION
(Not to Scale)



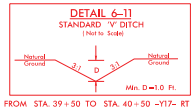
FROM STA. 53+25 TO STA. 54+50 -Y17- LT

DETAIL 6-10
TOE PROTECTION
(Not to Scale)



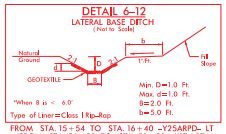
FROM STA. 15+50 TO STA. 18+00 -Y25ARPD- RT

DETAIL 6-11
STANDARD 'V' DITCH
(Not to Scale)



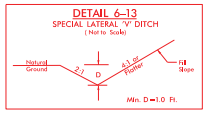
FROM STA. 39+50 TO STA. 40+50 -Y17- RT

DETAIL 6-12
LATERAL BASE DITCH
(Not to Scale)



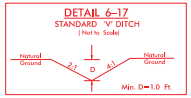
FROM STA. 15+54 TO STA. 16+40 -Y25ARPD- LT
FROM STA. 56+50 TO STA. 59+30 -Y17- RT

DETAIL 6-13
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



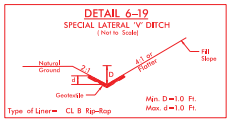
FROM STA. 10+00 TO STA. 12+00 -DW1- LT
FROM STA. 10+00 AROUND CUL-DE-SAC 45 L.F.

DETAIL 6-17
STANDARD 'V' DITCH
(Not to Scale)



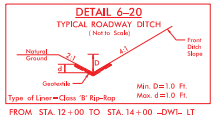
FROM STA. 09+78.5 TO 09+83.7 -DW1- RT

DETAIL 6-19
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



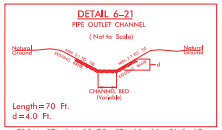
FROM STA. 16+33 TO STA. 20+00 -Y25ARPB- RT

DETAIL 6-20
TYPICAL ROADWAY DITCH
(Not to Scale)



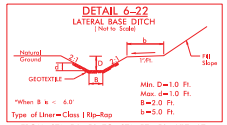
FROM STA. 12+00 TO STA. 14+00 -DW1- LT

DETAIL 6-21
PIPE OUTLET CHANNEL
(Not to Scale)



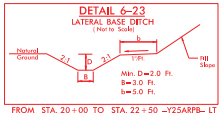
FROM STA. 14+55 TO STA. 15+00 -DW1- LT

DETAIL 6-22
LATERAL BASE DITCH
(Not to Scale)



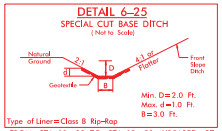
FROM STA. 54+50 TO STA. 57+50 -Y17- LT

DETAIL 6-23
LATERAL BASE DITCH
(Not to Scale)



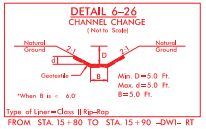
FROM STA. 20+00 TO STA. 22+50 -Y25ARPB- LT

DETAIL 6-25
SPECIAL CUT BASE DITCH
(Not to Scale)



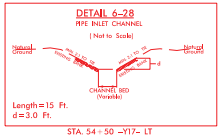
FROM STA 18+00 TO STA. 19+50 -Y25ARPD- RT

DETAIL 6-26
CHANNEL CHANGE
(Not to Scale)



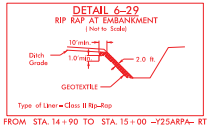
FROM STA. 15+80 TO STA. 15+90 -DW1- RT

DETAIL 6-28
PIPE INLET CHANNEL
(Not to Scale)



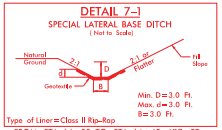
STA. 54+50 -Y17- LT

DETAIL 6-29
RIP RAP AT EMBANKMENT
(Not to Scale)



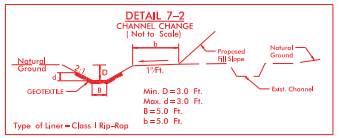
FROM STA. 14+90 TO STA. 15+00 -Y25ARPA- RT

DETAIL 7-1
SPECIAL LATERAL BASE DITCH
(Not to Scale)



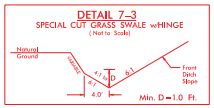
FROM STA. 64+00 TO STA. 64+45 -Y17- RT

DETAIL 7-2
CHANNEL CHANGE
(Not to Scale)



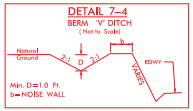
FROM STA. 63+90 TO STA. 66+00 -Y17- RT

DETAIL 7-3
SPECIAL CUT GRASS SWALE w/HINGE
(Not to Scale)



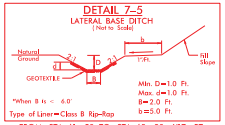
FROM STA. 65+00 TO STA. 65+50 -Y17- LT
FROM STA. 66+50 TO STA. 68+20 -Y17- LT

DETAIL 7-4
BERM 'V' DITCH
(Not to Scale)



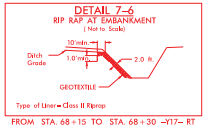
FROM STA. 59+00 TO STA. 60+50 -Y17- LT
FROM STA. 65+00 TO STA. 71+50 -Y17- LT

DETAIL 7-5
LATERAL BASE DITCH
(Not to Scale)



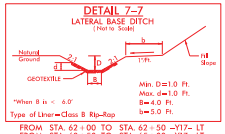
FROM STA. 61+50 TO STA. 63+90 -Y17- RT

DETAIL 7-6
RIP RAP AT EMBANKMENT
(Not to Scale)



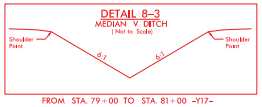
FROM STA. 68+15 TO STA. 68+30 -Y17- RT

DETAIL 7-7
LATERAL BASE DITCH
(Not to Scale)



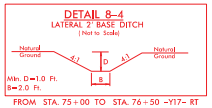
FROM STA. 62+00 TO STA. 62+50 -Y17- LT
FROM STA. 63+50 TO STA. 65+00 -Y17- LT

DETAIL 8-3
MEDIAN 'V' DITCH
(Not to Scale)



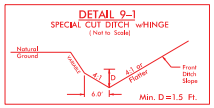
FROM STA. 79+00 TO STA. 81+00 -Y17-

DETAIL 8-4
LATERAL 2' BASE DITCH
(Not to Scale)



FROM STA. 75+00 TO STA. 76+50 -Y17- RT

DETAIL 9-1
SPECIAL CUT DITCH w/HINGE
(Not to Scale)

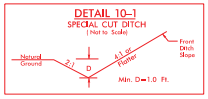


FROM STA. 13+16 TO STA. 15+00 -Y25A- LT

DETAIL 9-2
SPECIAL CUT DITCH
(Not to Scale)

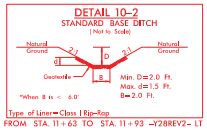
FROM STA. 11+63 TO STA. 12+56 -Y25A- LT
FROM STA. 17+50 TO STA. 19+00 -Y25A- RT

DETAIL 10-1
SPECIAL CUT DITCH
(Not to Scale)



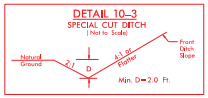
FROM STA. 17+50 TO STA. 20+00 -DW1- LT

DETAIL 10-2
STANDARD BASE DITCH
(Not to Scale)



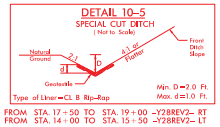
FROM STA. 11+63 TO STA. 11+93 -Y28REV2- LT

DETAIL 10-3
SPECIAL CUT DITCH
(Not to Scale)



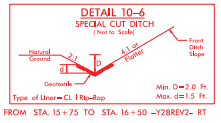
FROM STA. 11+93 TO STA. 15+25 -Y28REV2- LT
FROM STA. 18+50 TO STA. 19+50 -Y28REV2- LT

DETAIL 10-5
SPECIAL CUT DITCH
(Not to Scale)



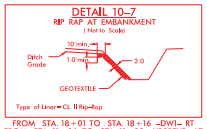
FROM STA. 17+50 TO STA. 19+00 -Y28REV2- RT
FROM STA. 14+00 TO STA. 15+50 -Y28REV2- LT

DETAIL 10-6
SPECIAL CUT DITCH
(Not to Scale)



FROM STA. 15+75 TO STA. 16+50 -Y28REV2- RT

DETAIL 10-7
RIP RAP AT EMBANKMENT
(Not to Scale)



FROM STA. 18+01 TO STA. 18+16 -DW1- RT
FROM STA. 11+06 TO STA. 11+29 -Y28REV2- LT
FROM STA. 11+51 TO STA. 11+74 -Y28REV2- LT

$$$$SYSTIME$$$$
$$$$PROJECT$$$$
$$$$DGN$$$$
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	2D-2

HYDRAULICS ENGINEER

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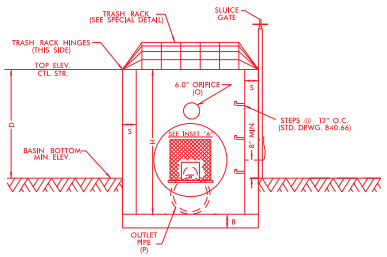
SUNGATE DESIGN GROUP, P.A.
909 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-490

PERMIT DRAWING
SHEET 3 OF 23

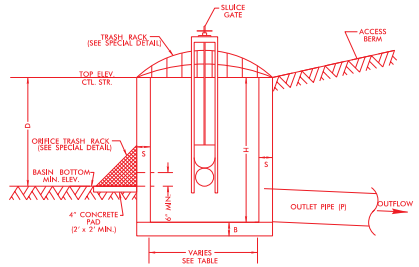
DETAIL 6-14

DRY DETENTION BASIN DRAWDOWN STRUCTURE

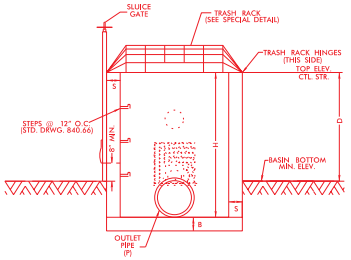
NOT TO SCALE



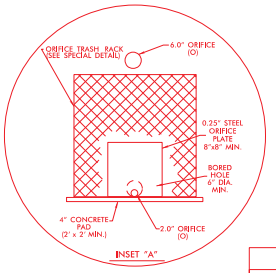
SIDE 1



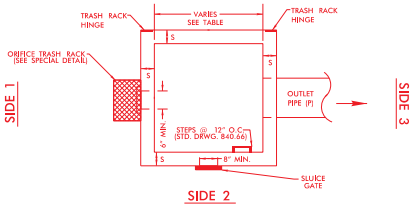
SIDE 2



SIDE 3



INSET "A"



SIDE 2

PLAN VIEW

TRASH RACK NOT SHOWN FOR CLARITY

NOTES:

1. TOP ELEVATION OF CONTROL STRUCTURE (WEIR ELEVATION) SHOULD BE SET AT 792.5'.
2. NO BEDDING MATERIAL TO BE USED, THEREFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.
3. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION. A GATE VALVE MAY BE USED IN LIEU OF THE 8" SLUICE GATE.
4. SLUICE GATE SHALL PROVIDE WATERTIGHT SEAL. PROVIDE ADEQUATE CLEARANCE FOR GATE OPERATION AND FOR PROPER SEATING OF GATE OVER PIPE.
5. SELECT BOX STANDARD AS REQUIRED TO ACCOMMODATE SLUICE GATE AND ORIFICE TRASH RACK WIDTH.
6. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATE.
7. ADJUST FOOTER DIMENSIONS AS NEEDED FOR ANTI-FLOTATION.

MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE

STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	BASIN BOTTOM MINIMUM ELEV.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	INV. ELEV. CTL. STR.	CTL. STR. DIMENSIONS (W x L x H)	ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE DIAMETER(P) INCHES
-Y25ARPD- 20+25 RT	0668	6"	15"	790.0'	792.5'	2.5'	786.0'	4.5'x4.5'x6.5'	2.0"	790.0'	36"
									6.0"	791.0'	

6/2/99

8/6/2017
R2247CD_Hyd_prm_wet_0202.dgn
jboward

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	2D-3

HYDRAULICS ENGINEER

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SUNGATE DESIGN GROUP, P.A.
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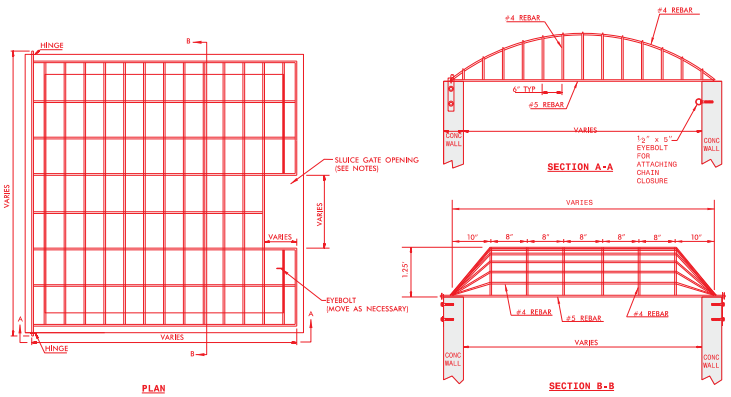
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-490

PERMIT DRAWING SHEET 4 OF 23

DETAIL 6-15
REMOVABLE ORIFICE TRASH RACK
NOT TO SCALE

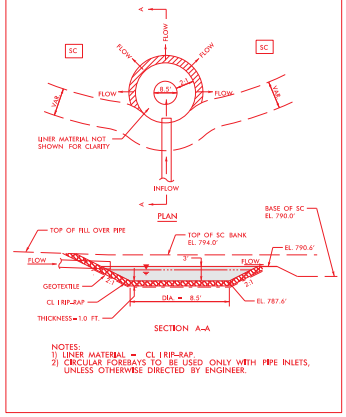


REBAR TRASH RACK
NOT TO SCALE

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.
5. PROVIDE OPENING IN TRASH RACK TO ACCOMODATE SLUICE GATE ON THE OUTLET PIPE. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATES.

ORIFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A "" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. REMOVEABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM A-153.

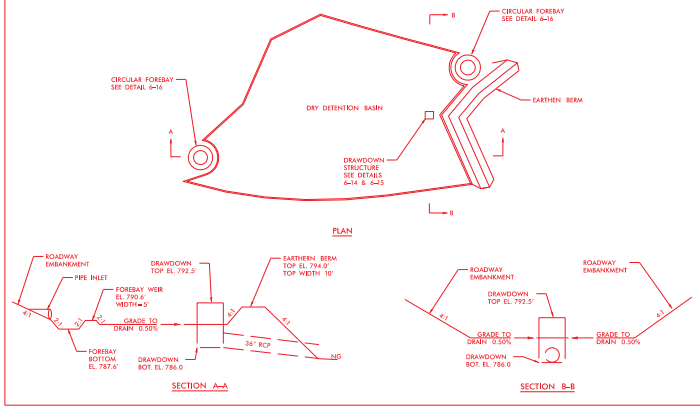
DETAIL 6-16
CIRCULAR FOREBAY



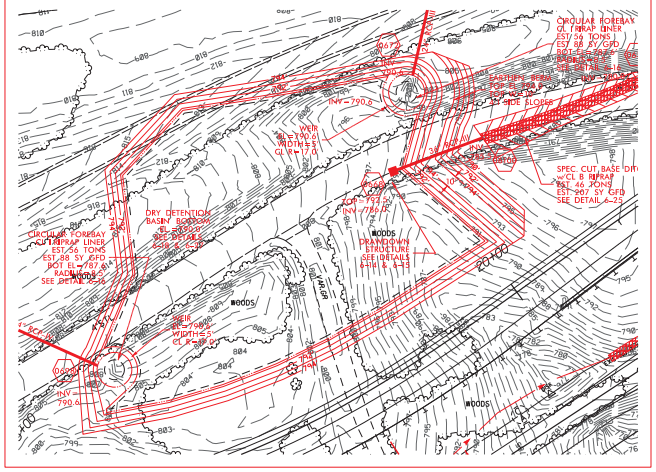
NOTES:
1) LINER MATERIAL = CL I RIP-RAP
2) CIRCULAR FOREBAYS TO BE USED ONLY WITH PIPE INLETS, UNLESS OTHERWISE DIRECTED BY ENGINEER.

STA. 51+25 -L- RT
STA. 23+25 -Y25ARPD- RT

DETAIL 6-18
DRY DETENTION BASIN PROFILES



DETAIL 6-27
DRY DETENTION BASIN GRADING PLAN



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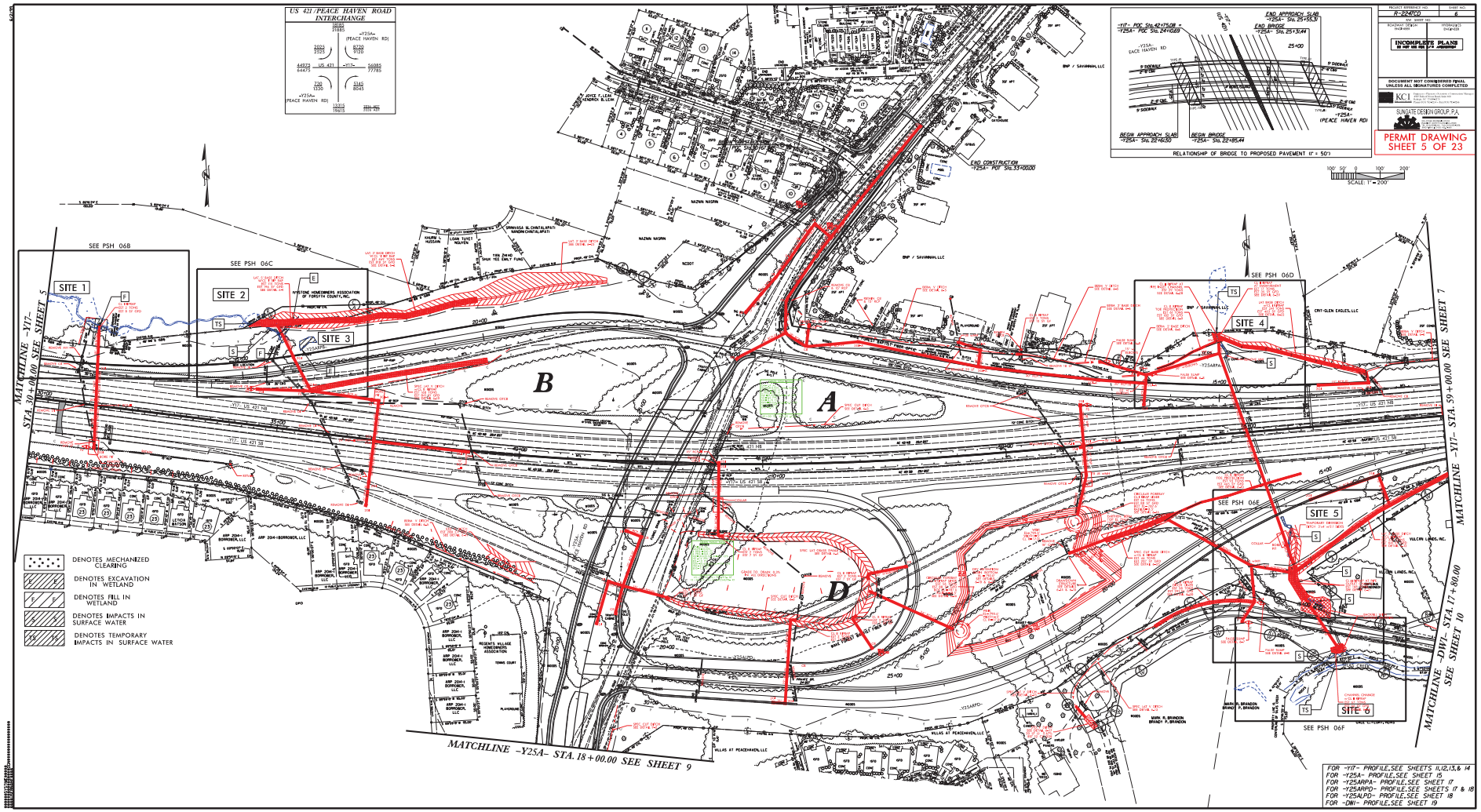
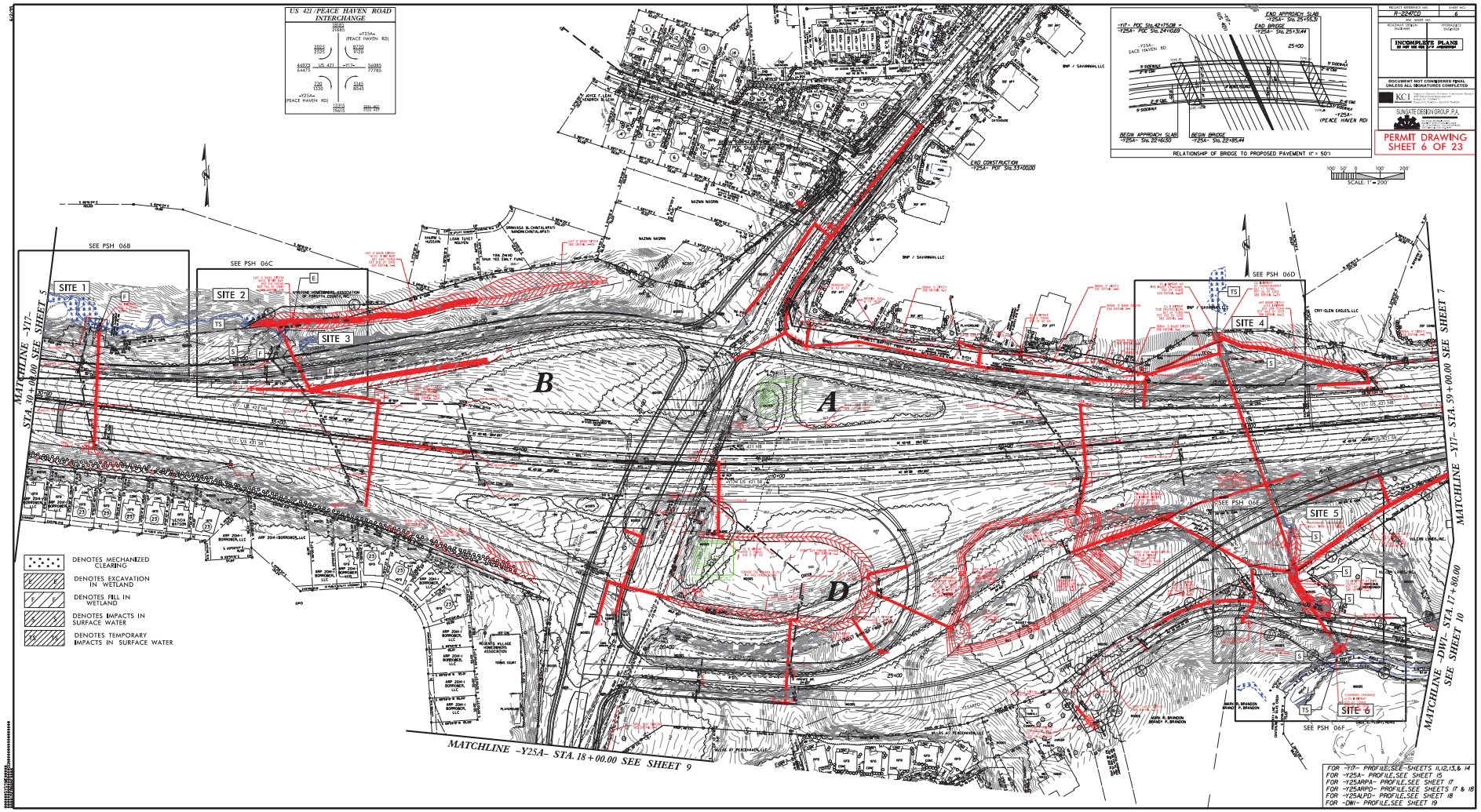
Phoebe.d


US 421/PEACE HAVEN ROAD INTERCHANGE
-Y25A- (PEACE HAVEN RD)
US 421
-Y17-
-Y25A- (PEACE HAVEN RD)
SEE PSH 06B
SEE PSH 06C
SEE PSH 06D
SEE PSH 06E
SEE PSH 06F
SITE 1
SITE 2
SITE 3
SITE 4
SITE 5
SITE 6
A
B
D
MATCHLINE -Y17- STA. 30+00.00 SEE SHEET 5
MATCHLINE -Y17- STA. 59+00.00 SEE SHEET 7
MATCHLINE -DW1- STA. 17+80.00 SEE SHEET 10
MATCHLINE -Y25A- STA. 18+00.00 SEE SHEET 9
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
END APPROACH SLAB -Y25A- Sta. 25+55.31
END BRIDGE -Y25A- Sta. 25+33.44
BEGIN APPROACH SLAB -Y25A- Sta. 22+65.50
BEGIN BRIDGE -Y25A- Sta. 22+85.44
END CONSTRUCTION -Y25A- POT Sta. 33+00.00
RELATIONSHIP OF BRIDGE TO PROPOSED PAVEMENT (1" = 50')
SCALE: 1" = 200'
PROJECT REFERENCE NO. R-2248CD
SHEET NO. 6
TOTAL SHEETS 23
INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
KCI
SUNGATE DESIGN GROUP, P.A.
PERMIT DRAWING
SHEET 5 OF 23
FOR -Y17- PROFILE, SEE SHEETS 11,12,13, & 14
FOR -Y25A- PROFILE, SEE SHEET 15
FOR -Y25ARPA- PROFILE, SEE SHEET 17
FOR -Y25ARPO- PROFILE, SEE SHEETS 17 & 18
FOR -Y25AUPO- PROFILE, SEE SHEET 18
FOR -DW1- PROFILE, SEE SHEET 19


US 421/PEACE HAVEN ROAD INTERCHANGE
SITE 1
SITE 2
SITE 3
SITE 4
SITE 5
SITE 6
A
B
D
SEE PSH 06B
SEE PSH 06C
SEE PSH 06D
SEE PSH 06E
SEE PSH 06F
MATCHLINE -Y17- STA. 30+00.00 SEE SHEET 5
MATCHLINE -Y17- STA. 59+00.00 SEE SHEET 7
MATCHLINE -DW1- STA. 17+80.00 SEE SHEET 10
MATCHLINE -Y25A- STA. 18+00.00 SEE SHEET 9
END CONSTRUCTION -Y25A- POT Sta.33+00.00
END APPROACH SLAB -Y25A- Sta. 25+55.31
END BRIDGE -Y25A- Sta. 25+33.44
BEGIN APPROACH SLAB -Y25A- Sta. 22+65.50
BEGIN BRIDGE -Y25A- Sta. 22+85.44
RELATIONSHIP OF BRIDGE TO PROPOSED PAVEMENT (1" = 50')
SCALE: 1" = 200'
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
FOR -Y17- PROFILE,SEE SHEETS 11,12,13,& 14
FOR -Y25A- PROFILE,SEE SHEET 15
FOR -Y25ARPA- PROFILE,SEE SHEET 17
FOR -Y25ARPO- PROFILE,SEE SHEETS 17 & 18
FOR -Y25AUPO- PROFILE,SEE SHEET 18
FOR -DW1- PROFILE,SEE SHEET 19
PROJECT REFERENCE NO. R-2248CD
SHEET NO. 6
TOTAL SHEETS 23
INCOMPLETE PLANS
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KCI
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PERMIT DRAWING
SHEET 6 OF 23

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

20 10 0 20 40

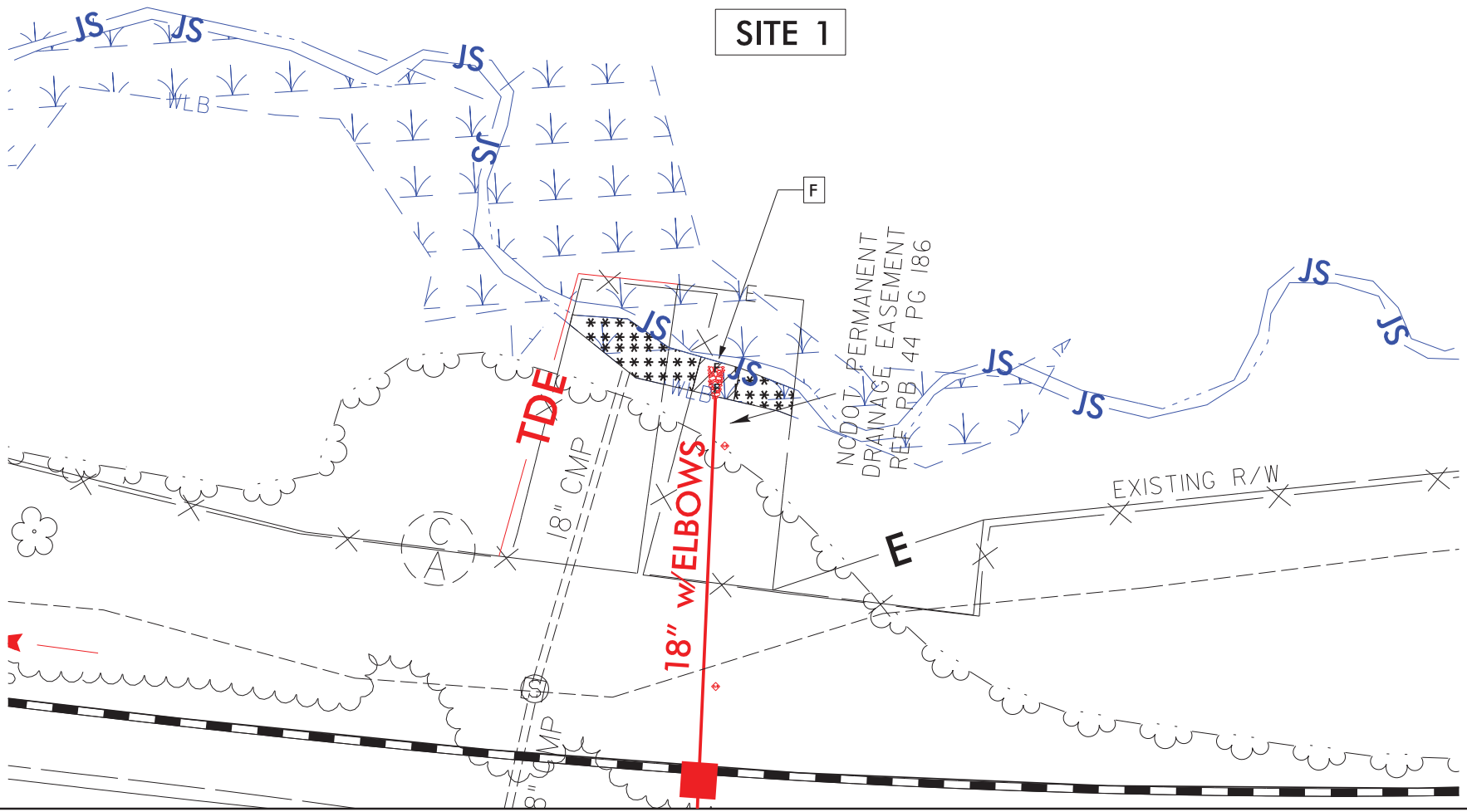
SCALE: 1" = 20'

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	6B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PERMIT DRAWING
SHEET 7 OF 23

SITE 1



8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	6C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PERMIT DRAWING
SHEET 8 OF 23

F — DENOTES FILL IN WETLAND

E — DENOTES EXCAVATION IN WETLAND

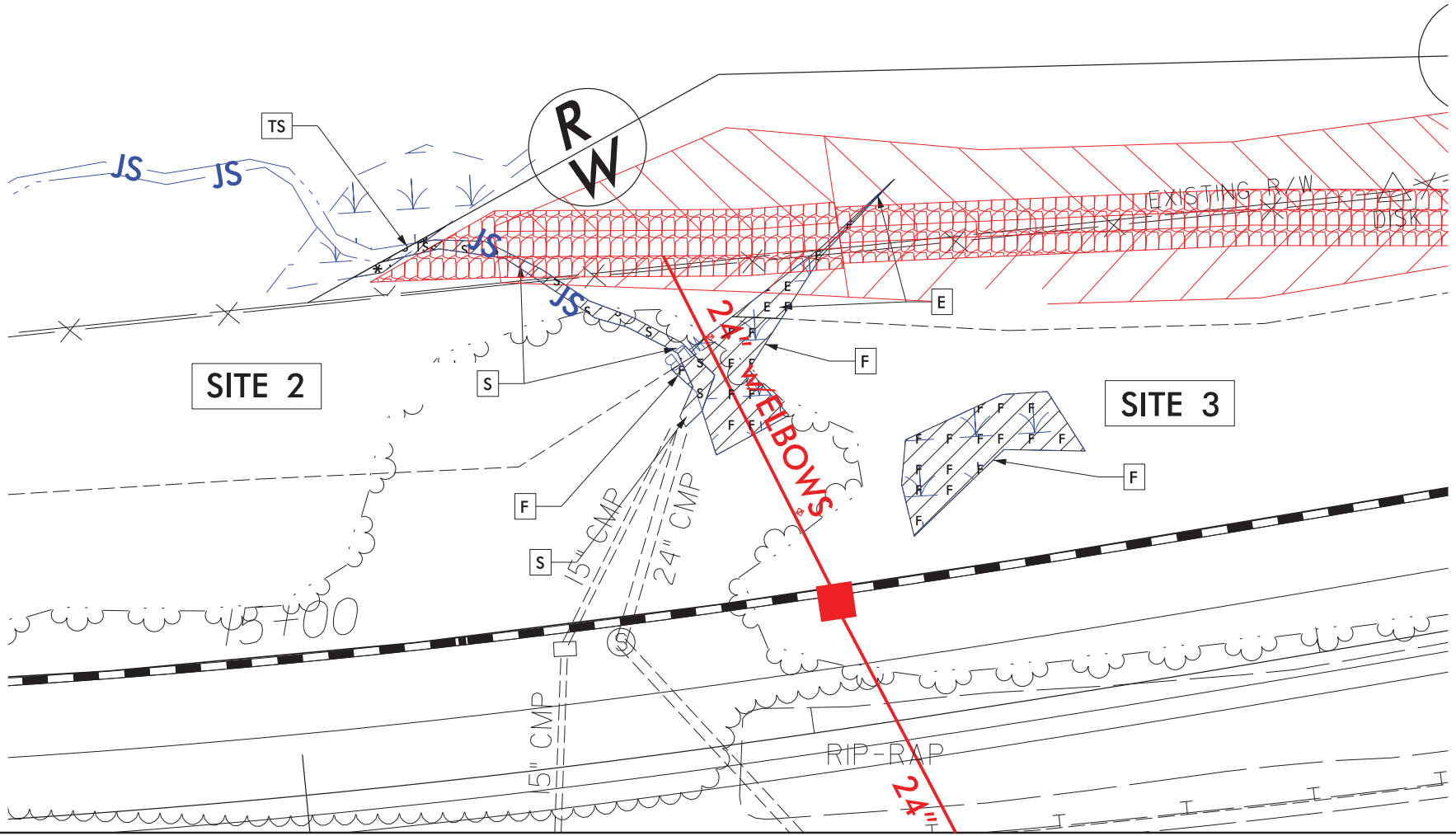
S — DENOTES IMPACTS IN SURFACE WATER

TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

20 10 0 20 40

SCALE: 1" = 20'



REVISIONS

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	6D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PERMIT DRAWING
SHEET 9 OF 23

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

20 10 0 20 40
SCALE: 1" = 20'

N

SITE 4

TS

EXISTING R/W

NAIL

C A

INVERT NOT BURIED HW

S

JS

48"

72" CHL

NAIL

11' CONC HW

WOODS

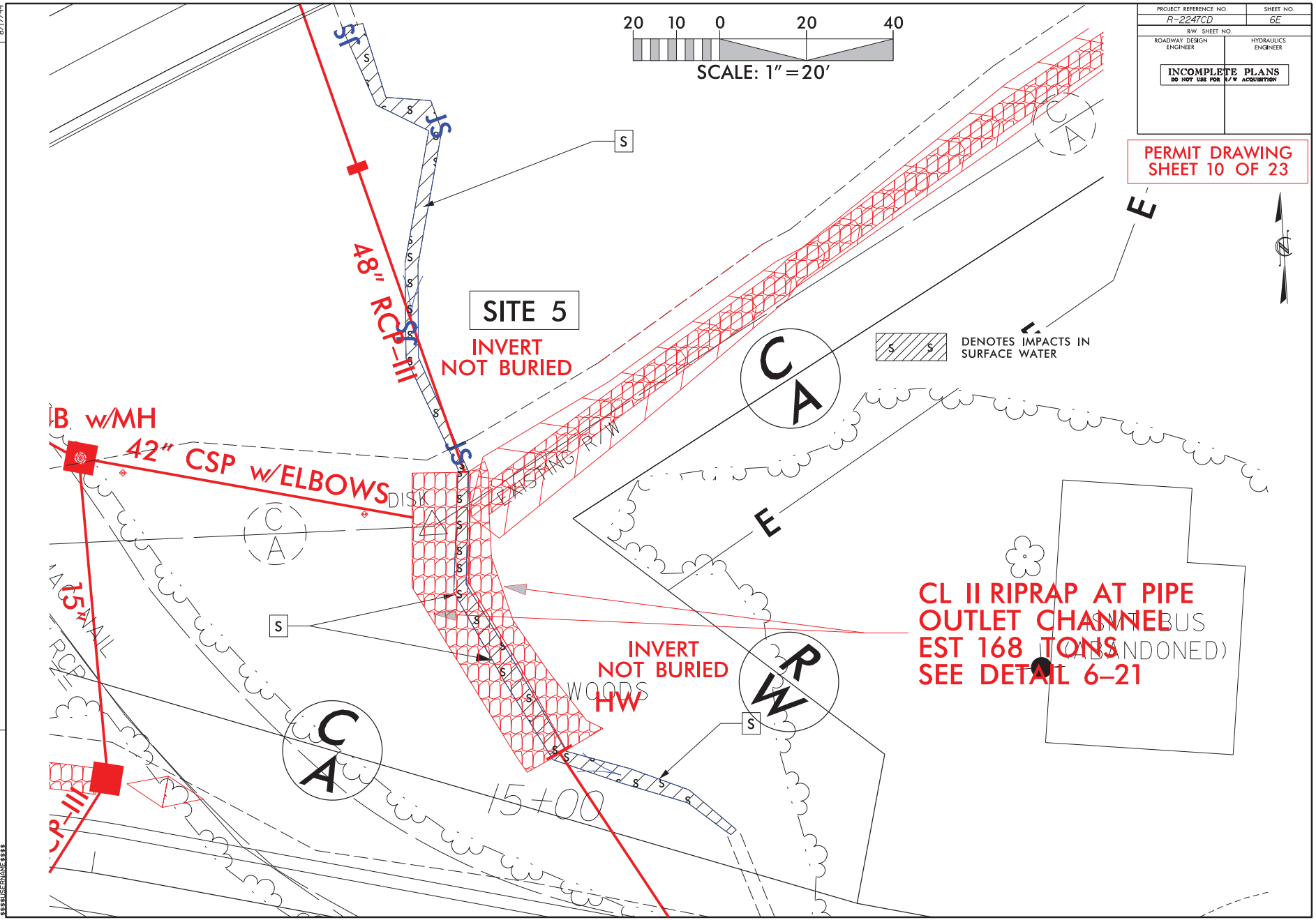
30" w/ELBOWS

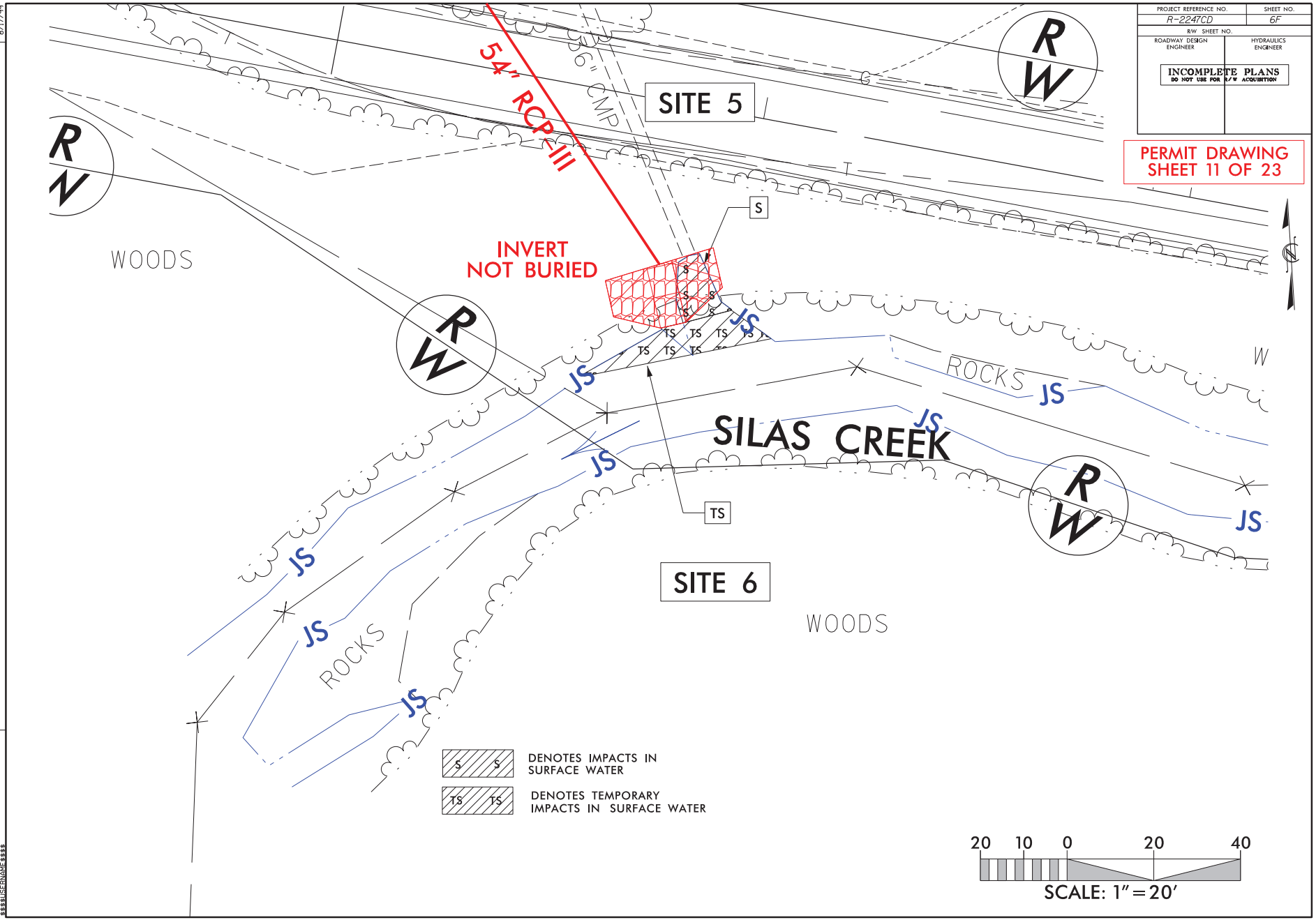
15+00

REVISIONS

8/17/99

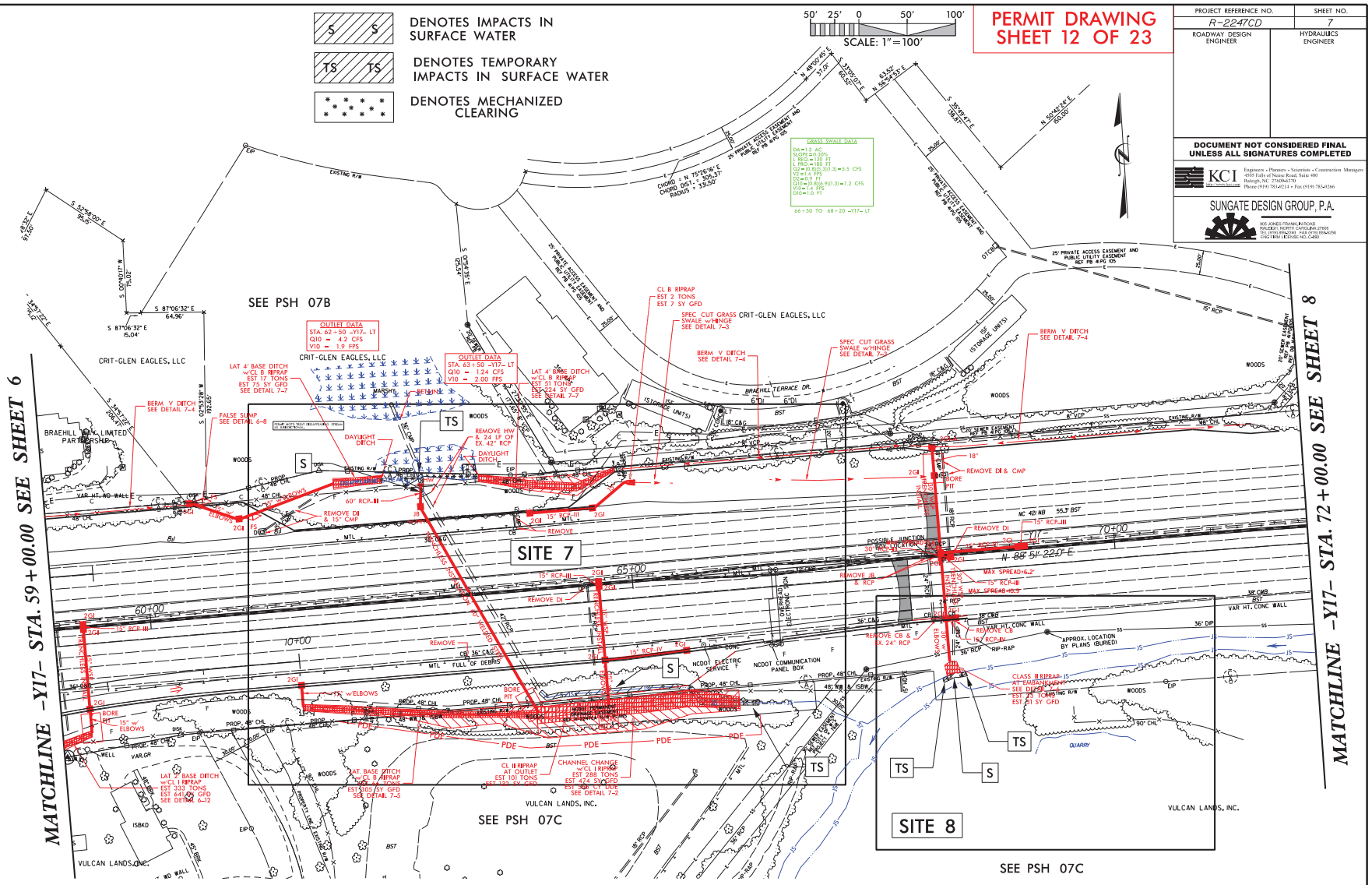
$$$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$


PROJECT REFERENCE NO.
R-2247CD
SHEET NO.
6E
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PERMIT DRAWING
SHEET 10 OF 23
20 10 0 20 40
SCALE: 1" = 20'
SITE 5
INVERT
NOT BURIED
48" RCP-III
42" CSP w/ELBOWS
B w/MH
15" WAL
RCP
DENOTES IMPACTS IN SURFACE WATER
EXISTING R/W
DISK
WOODS
INVERT
NOT BURIED
HW
CL II RIPRAP AT PIPE
OUTLET CHANNEL
EST 168 TONS
SEE DETAIL 6-21
(ABANDONED)
15+00
CA
RW
E
JS
S
REVISIONS
8/17/99



8/17/99

REVISIONS



FOR -Y17- PROFILE, SEE SHEETS 12 & 14
FOR -Y25ARPA- PROFILE, SEE SHEET 17
FOR -Y25ARPD- PROFILE, SEE SHEET 17

6/2/99

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

50' 25' 0 50' 100'
SCALE: 1"=100'

PERMIT DRAWING SHEET 13 OF 23

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	7A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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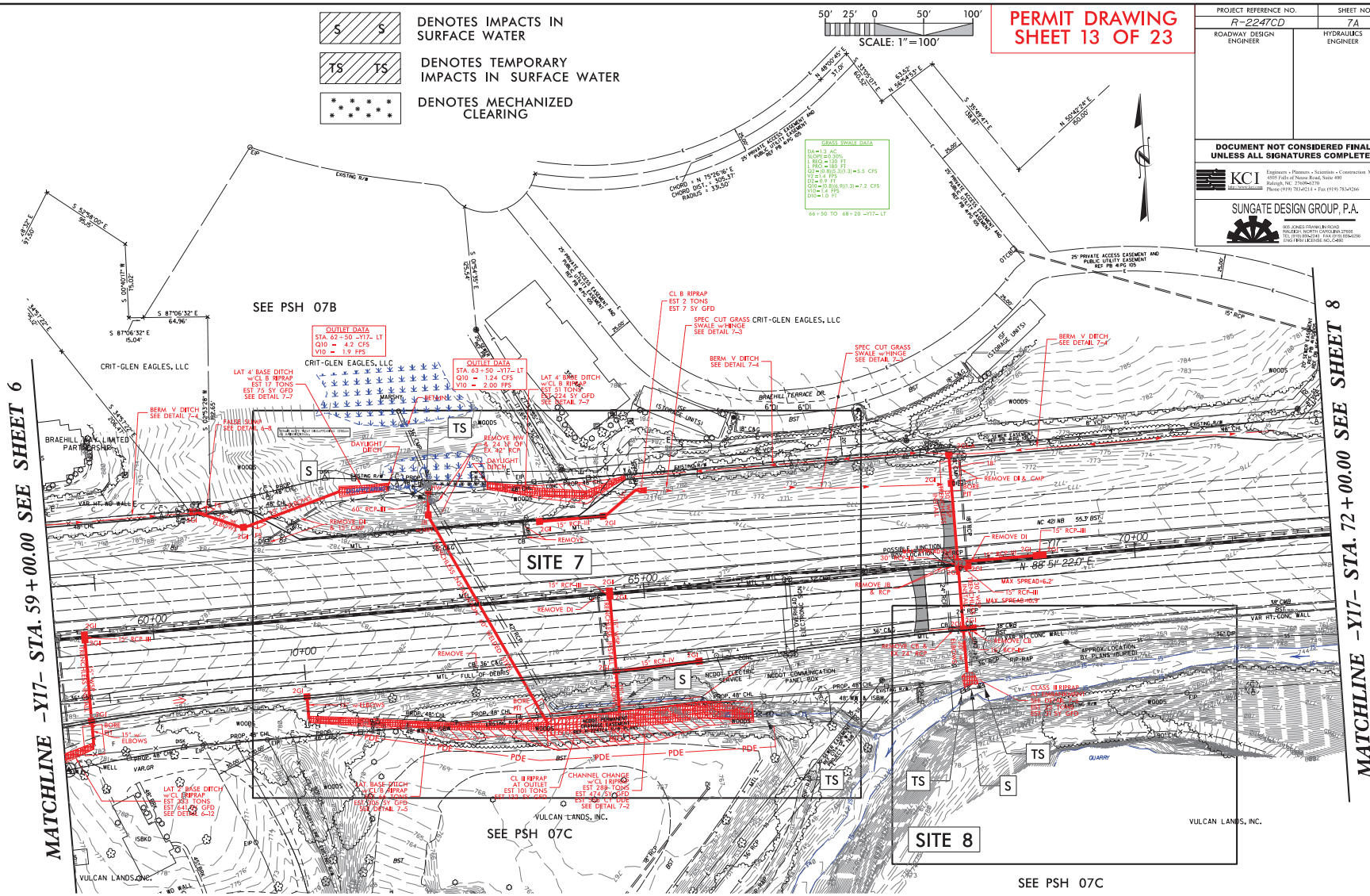
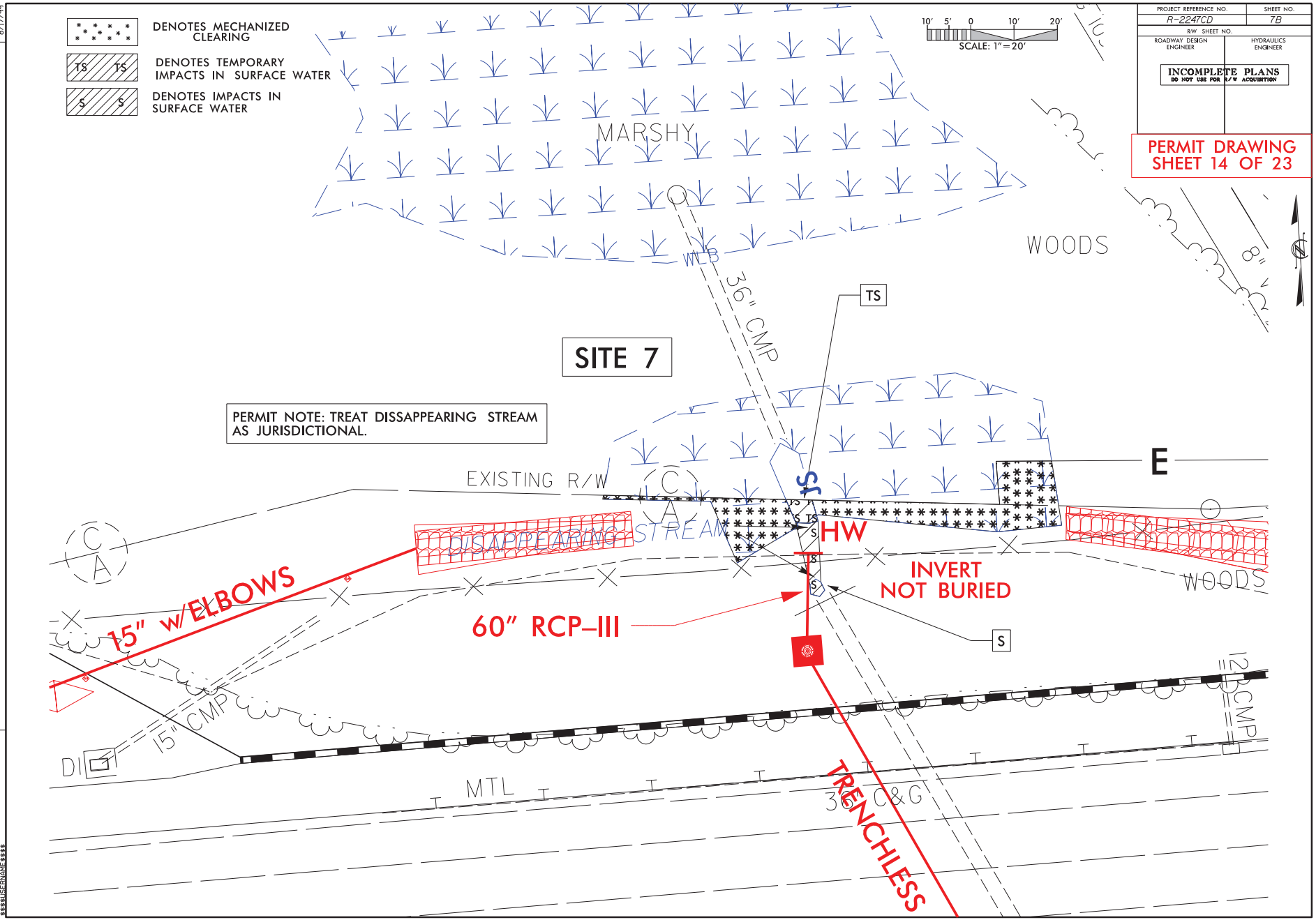



DENOTES MECHANIZED CLEARING
TS TS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S
DENOTES IMPACTS IN SURFACE WATER
10' 5' 0 10' 20'
SCALE: 1" = 20'
PROJECT REFERENCE NO.
R-2247CD
SHEET NO.
7B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PERMIT DRAWING
SHEET 14 OF 23
MARSHY
WOODS
WLB
36" CMP
TS
SITE 7
PERMIT NOTE: TREAT DISSAPPEARING STREAM AS JURISDICTIONAL.
E
EXISTING R/W
(C)
(A)
DISAPPEARING STREAM
HW
INVERT NOT BURIED
WOODS
75" w/ELBOWS
60" RCP-III
S
15" CMP
DI
MTL
36" C&G
TRENCHLESS
12" CMP
8/17/99
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	7C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PERMIT DRAWING
SHEET 15 OF 23

SITE 7

BORE PIT

15" w/ ELBOWS

S

JS

NCDOT PERMANENT DRAINAGE EASEMENT REF. R-2247CA R/W PLANS

WOODS

BORE PIT

TS

PDE

BST

SITE 8

36" C&G

MTL

CB

2GI

38" CMB

BST

VAR HT. CONC WALL

SS

APPROX. LOCATION

30" w/ ELBOWS

24" CMP

15" RCP-IV

36" RCP

RIP-RAP

INVERT NOT BURIED

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

EXISTING R/W

15" HDPE

CLASS II RIPRAP
AT EMBANKMENT
SEE DETAIL 7-6
EST. 23 TONS
EST. 31 SY GFD

20 10 0 20 40

SCALE: 1" = 20'

REVISIONS

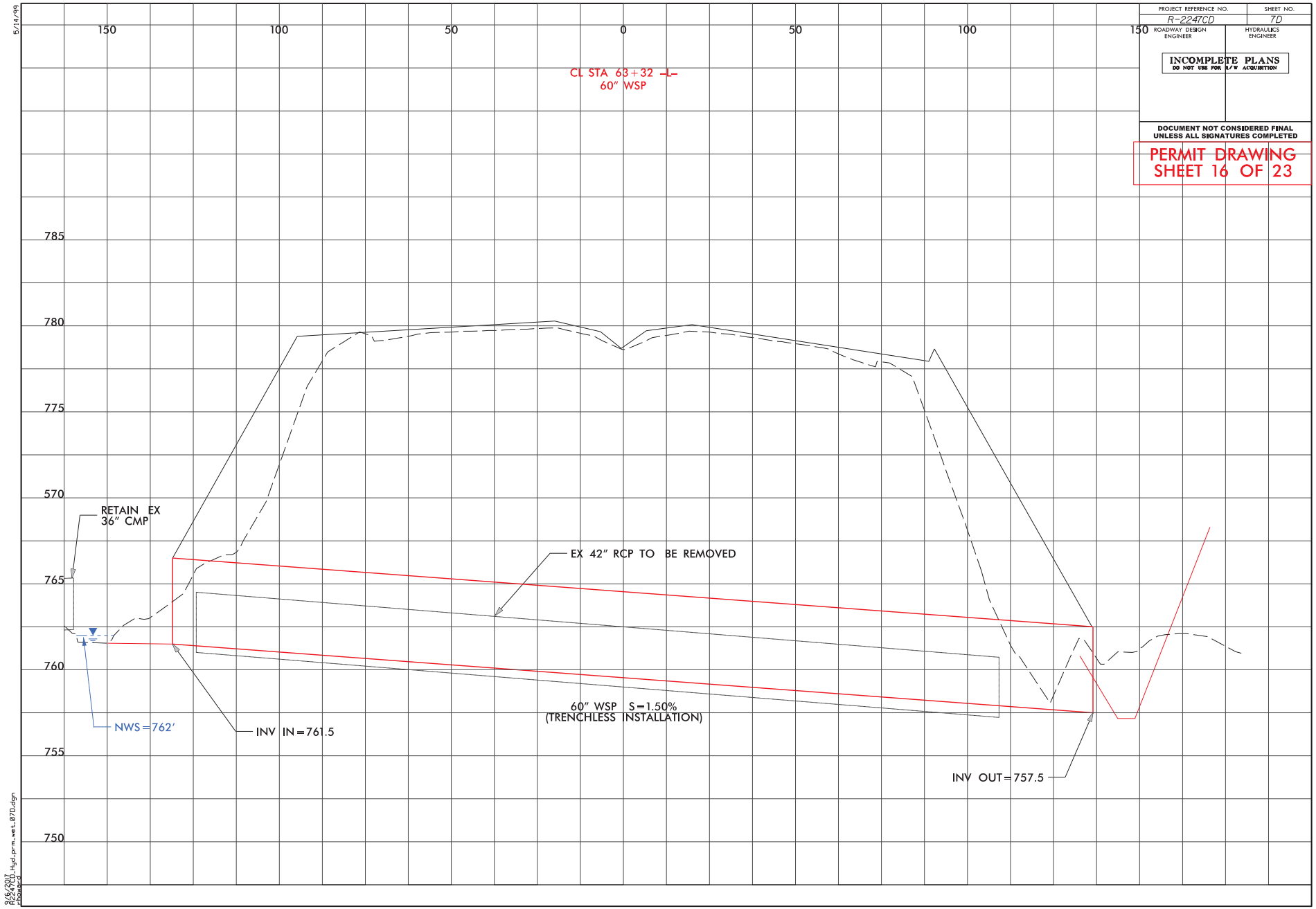
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	7D
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 16 OF 23



5/14/99

8/6/2017
R2247CD_Hyd_prm_wet_070.dgn
pboward

6/2/99

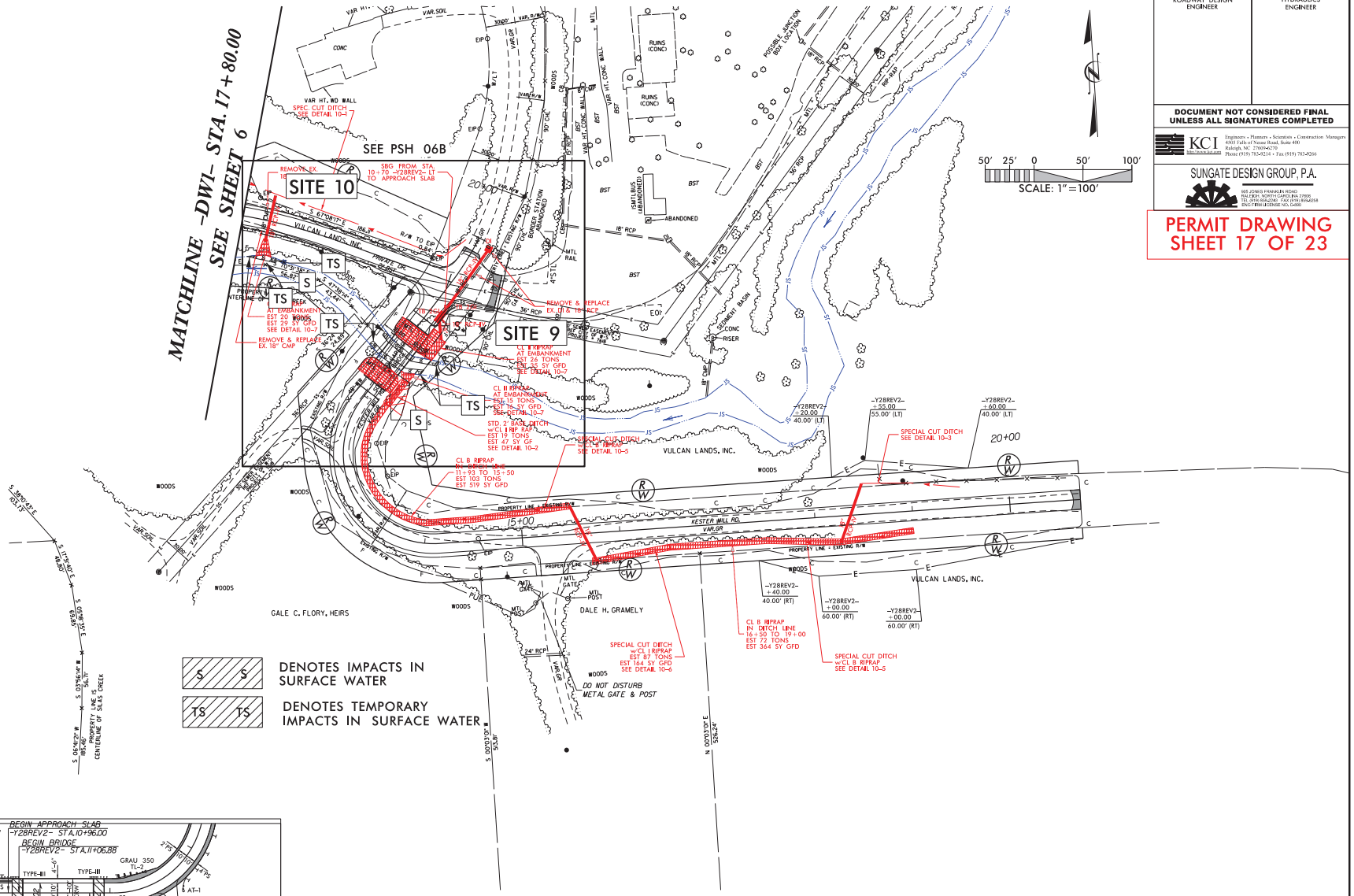
PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

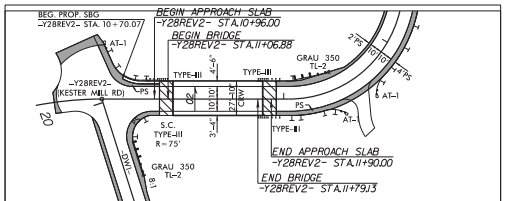
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

KCI Technologies, Inc.
Engineers • Planners • Scientists • Construction Managers
4303 Falls of Neuse Road, Suite 400
Raleigh, NC 27609-6270
Phone (919) 783-9214 • Fax (919) 783-0266

SUNGATE DESIGN GROUP, P.A.
605 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2200 FAX (919) 859-2268
ENG FIRM LICENSE NO. C-0180

PERMIT DRAWING
SHEET 17 OF 23





RELATIONSHIP OF BRIDGE TO PROPOSED PAVEMENT (1" = 50')

NOTE:
** DESIGN EXCEPTION FOR MIN. HORIZONTAL RADIUS AND ASSOCIATED HORIZONTAL STOPPING SIGHT DISTANCE.

FOR -DW1- PROFILE, SEE SHEET 19
FOR -Y28REV2- PROFILE, SEE SHEET 19

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	10A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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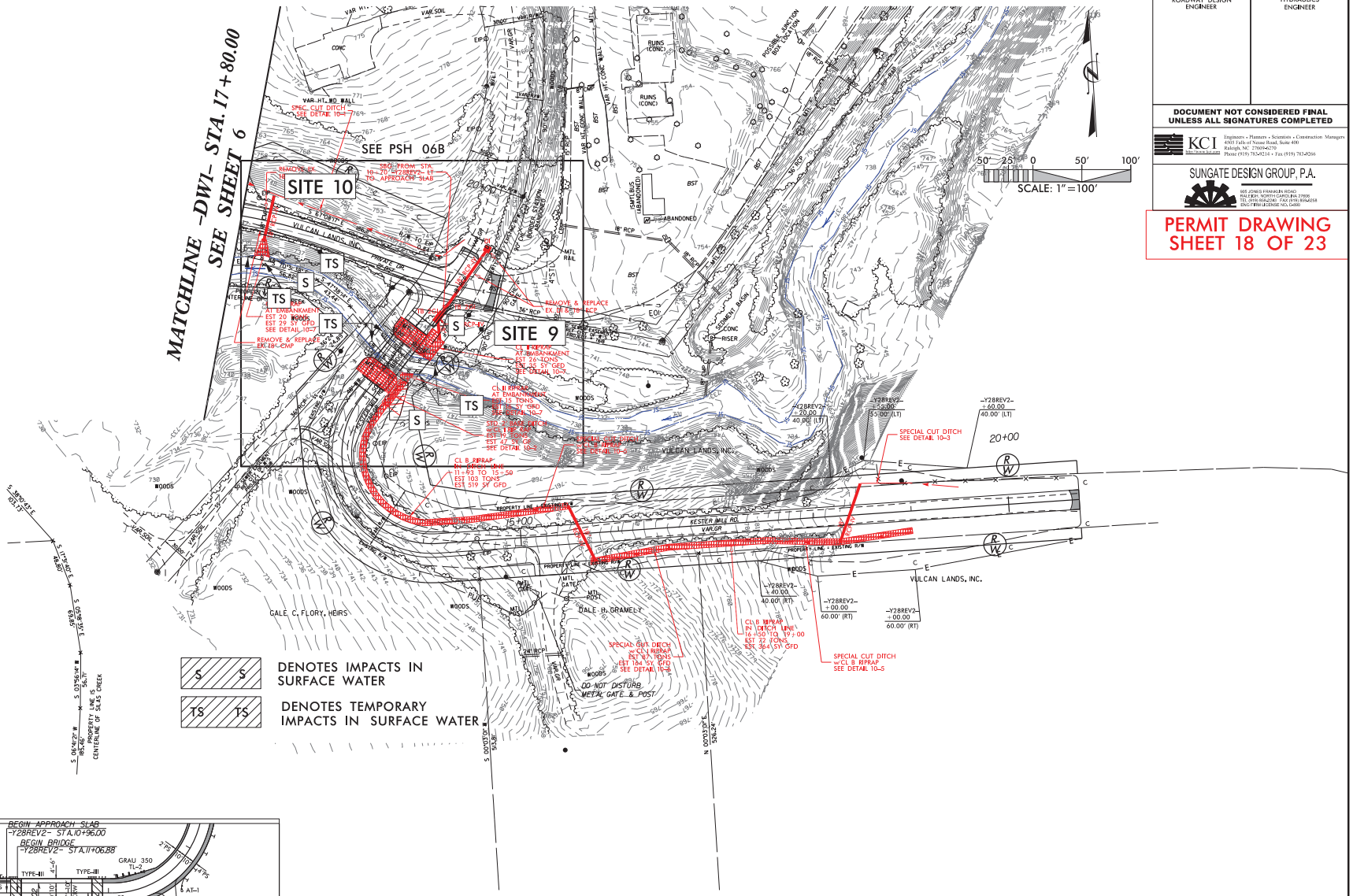
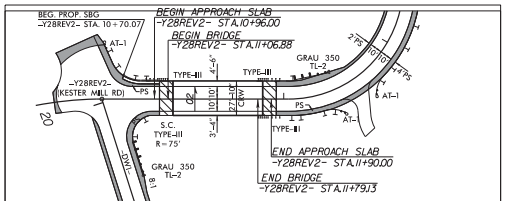
ENG FIRM LICENSE NO. C-0180

PERMIT DRAWING
SHEET 18 OF 23

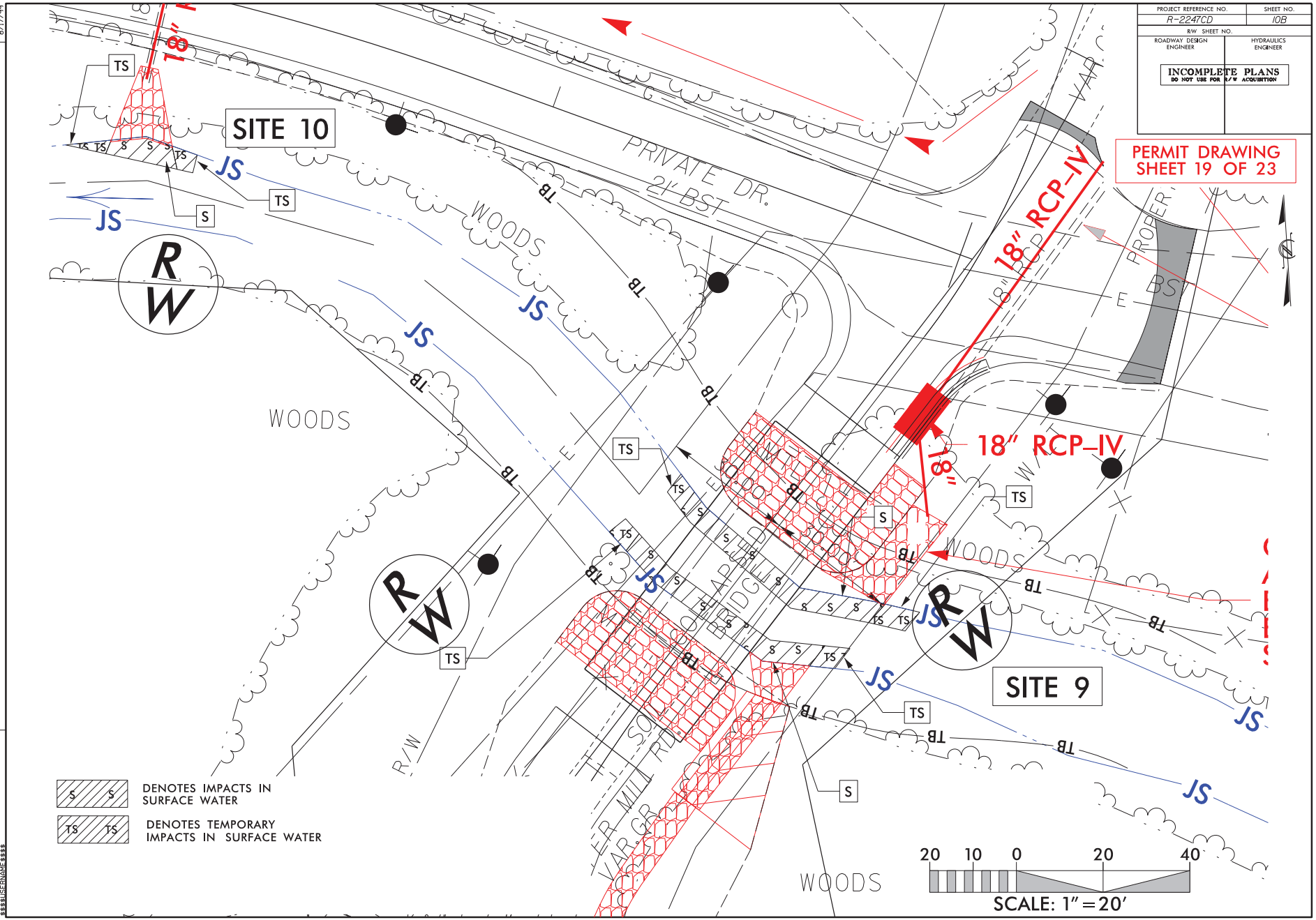




RELATIONSHIP OF BRIDGE TO PROPOSED PAVEMENT (1" = 50')

NOTE:
** DESIGN EXCEPTION FOR MIN. HORIZONTAL RADIUS AND ASSOCIATED HORIZONTAL STOPPING SIGHT DISTANCE.

FOR -DW1- PROFILE, SEE SHEET 19
FOR -Y28REV2- PROFILE, SEE SHEET 19



REVISIONS

8/17/99

5/28/99

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www.kci.com

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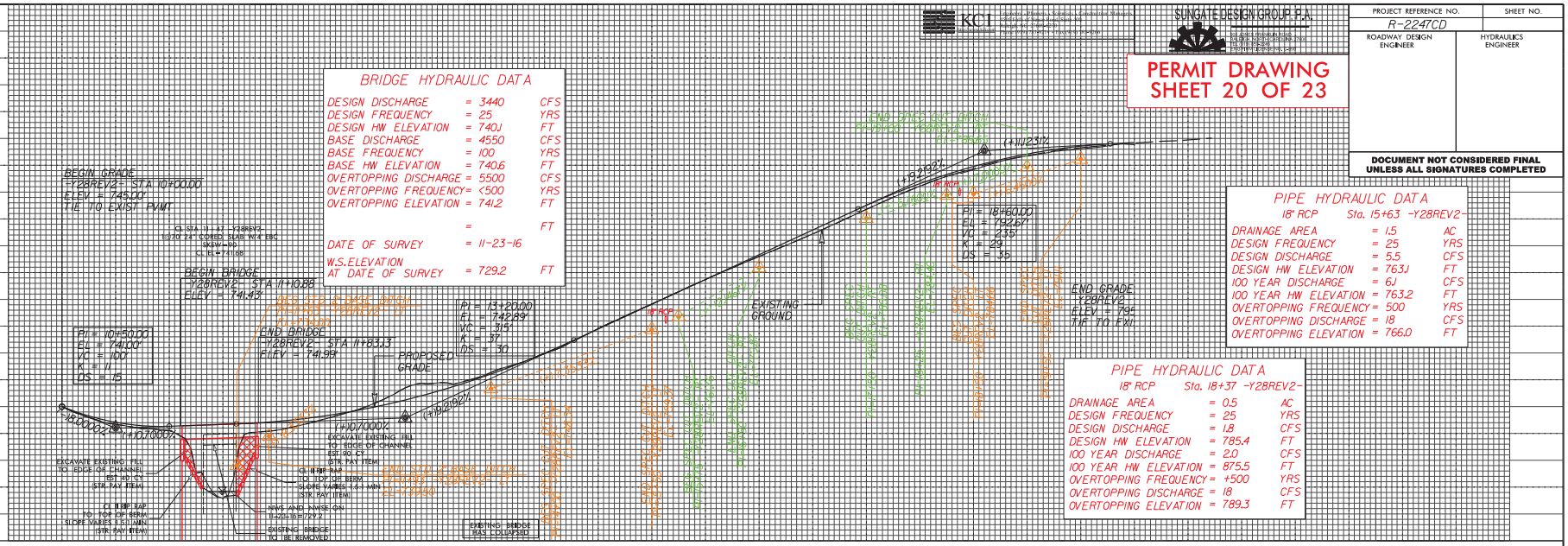
(410) 742-3115
FAX (410) 742-3117
E-MAIL: SDG@DELMARVA.COM

PERMIT DRAWING
SHEET 20 OF 23

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 3440	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 740.1	FT
BASE DISCHARGE	= 4550	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 740.6	FT
OVERTOPPING DISCHARGE	= 5500	CFS
OVERTOPPING FREQUENCY	= <500	YRS
OVERTOPPING ELEVATION	= 741.2	FT
	=	FT
DATE OF SURVEY	= 11-23-16	
W.S.ELEVATION AT DATE OF SURVEY	= 729.2	FT

PIPE HYDRAULIC DATA

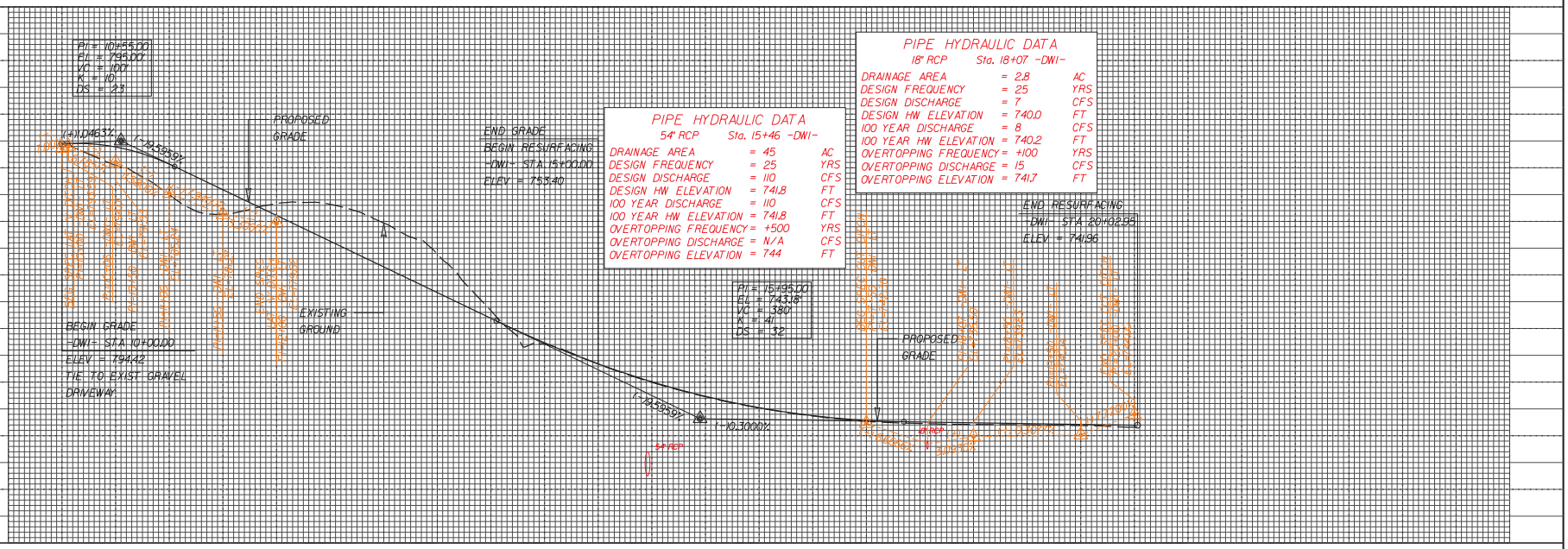
18" RCP Sta. 15+63 -Y28REV2-

DRAINAGE AREA	= 1.5	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 5.5	CFS
DESIGN HW ELEVATION	= 763.1	FT
100 YEAR DISCHARGE	= 6.1	CFS
100 YEAR HW ELEVATION	= 763.2	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 18	CFS
OVERTOPPING ELEVATION	= 766.0	FT

PIPE HYDRAULIC DATA

18" RCP Sta. 18+37 -Y28REV2-

DRAINAGE AREA	= 0.5	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 1.8	CFS
DESIGN HW ELEVATION	= 785.4	FT
100 YEAR DISCHARGE	= 2.0	CFS
100 YEAR HW ELEVATION	= 875.5	FT
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= 18	CFS
OVERTOPPING ELEVATION	= 789.3	FT



PIPE HYDRAULIC DATA

54" RCP Sta. 15+46 -DW1-

DRAINAGE AREA	= 45	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 110	CFS
DESIGN HW ELEVATION	= 741.8	FT
100 YEAR DISCHARGE	= 110	CFS
100 YEAR HW ELEVATION	= 741.8	FT
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING ELEVATION	= 744	FT

PIPE HYDRAULIC DATA

18" RCP Sta. 18+07 -DW1-

DRAINAGE AREA	= 2.8	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 7	CFS
DESIGN HW ELEVATION	= 740.0	FT
100 YEAR DISCHARGE	= 8	CFS
100 YEAR HW ELEVATION	= 740.2	FT
OVERTOPPING FREQUENCY	= +100	YRS
OVERTOPPING DISCHARGE	= 15	CFS
OVERTOPPING ELEVATION	= 741.7	FT

8262207
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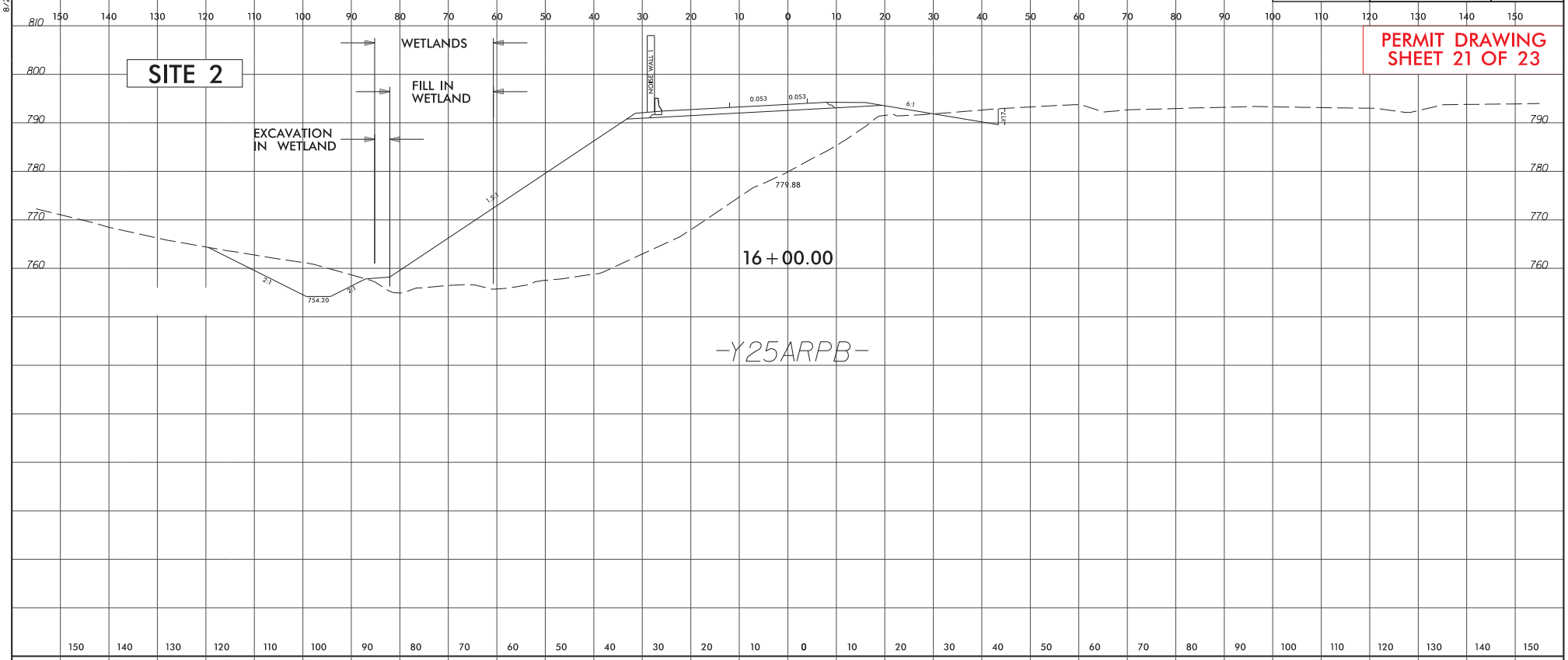
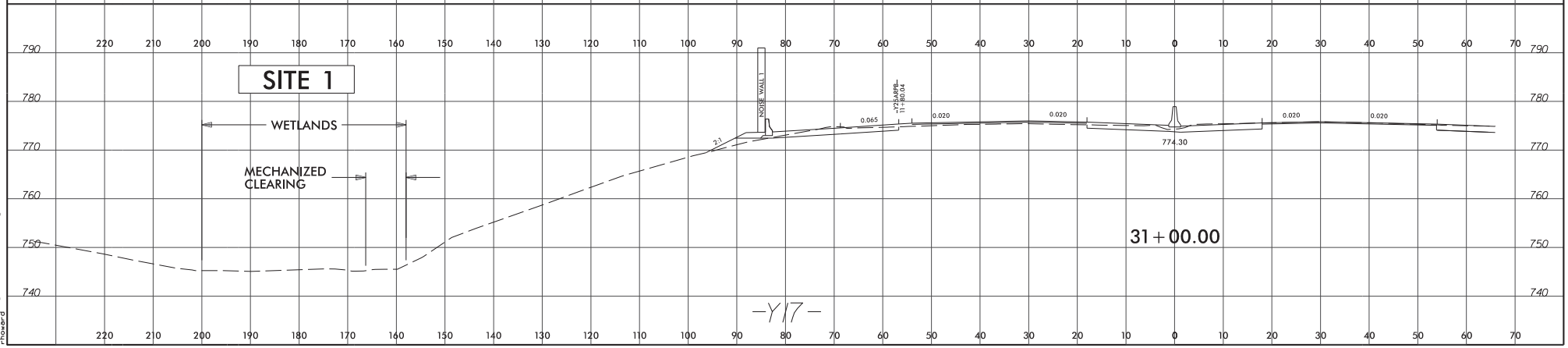
Phoward

PERMIT DRAWING
SHEET 21 OF 23





8/23/99

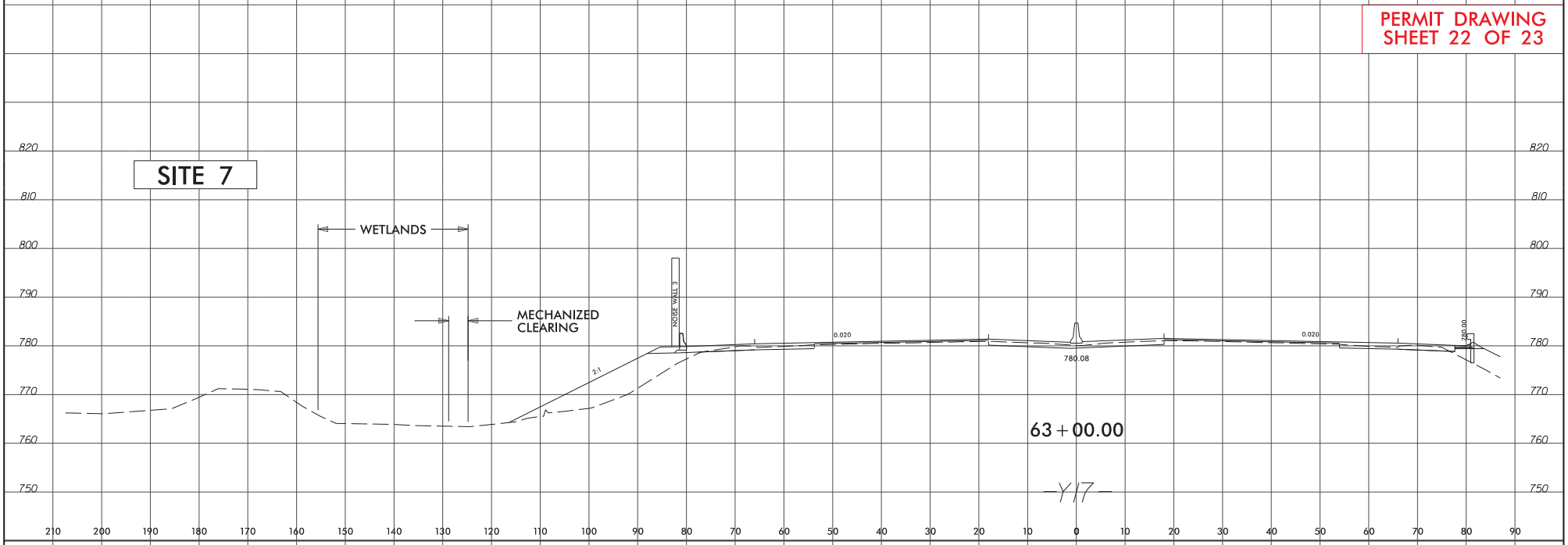
9/6/2017
R2247CD_Hgd_prm_wet_xpl_01.dgn
rbowen

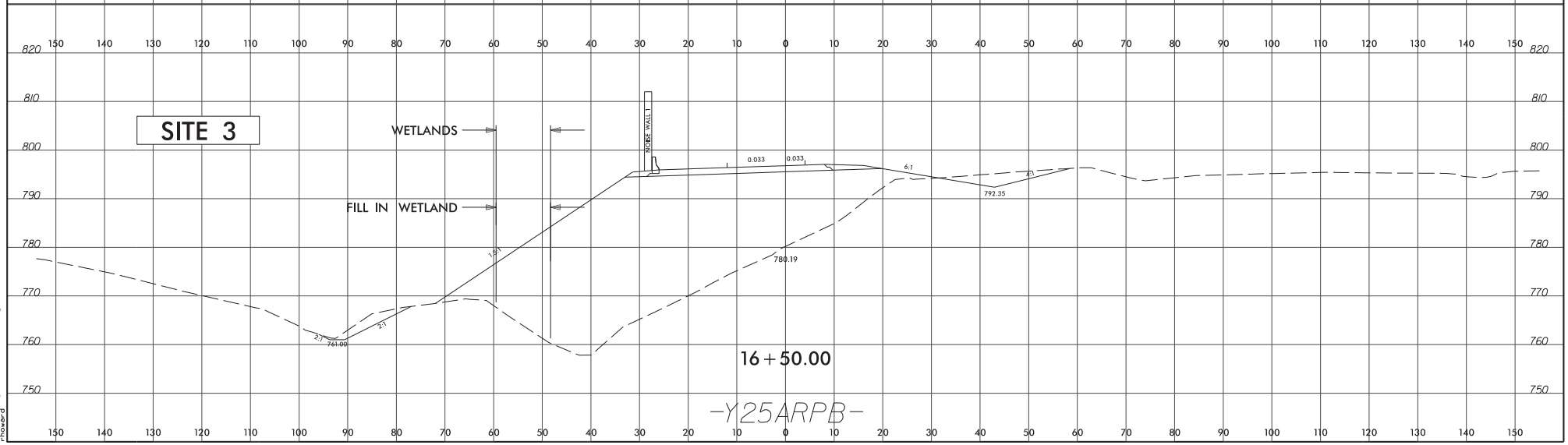
8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-2247CD	X-54

0 5 10

PERMIT DRAWING
SHEET 22 OF 23





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R2247CD_Hyd_prm_wet_xpl_02.dgn
rbowen

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)
1	11+67 to 12+14 -Y25ARPB- LT	RIPRAP PAD & TEMP. E&SC	< 0.01			< 0.01						
2	15+25 to 16+32 -Y25ARPB- LT	ROADWAY FILL & DITCH EXCAV.	< 0.01		< 0.01	< 0.01		< 0.01	< 0.01	75	7	
3	16+24 to 16+61 -Y25ARPB- LT	ROADWAY FILL	0.01									
4	14+88 to 15+17 -Y25ARPA- RT	ROADWAY FILL & CHANNEL CHANGE						< 0.01	< 0.01	56	4	
5	14+21 to 15+45 -DW1- LT	ROADWAY FILL & CHANNEL CHANGE						0.01		160		
"	14+66 to 15+02 -DW1- LT	RIPRAP LINED CHANNEL						< 0.01		72		
"	15+87 to 16+01 -DWI- RT	CHANNEL CHANGE						< 0.01		15		
6	15+70 to 16+11 -DWI- RT	CHANNEL CHANGE							< 0.01		45	
7	62+44 to 63+49 -Y17- LT	ROADWAY FILL & TEMP. E&SC				0.01		< 0.01	< 0.01	17	6	
"	63+94 to 66+20 -Y17- RT	CHANNEL CHANGE						0.02	< 0.01	216	20	
8	68+11 to 68+36 -Y17- RT	BANK STABILIZATION						< 0.01	< 0.01	16	10	
9	11+27 to 11+57 -Y28REV2- LT & RT	BANK STABILIZATION						0.01	< 0.01	55	15	
10	18+96 to 19+22 -DW1- RT	BANK STABILIZATION						< 0.01	< 0.01	17	14	
TOTALS*:			0.02		< 0.01	0.02		0.07	0.01	699	121	0

*Rounded totals are sum of actual impacts

Fill in Wetlands:
Site 1: Perm. Fill in Wetlands = 0.0012 ac. / Mech. Clearing in Wetlands = 0.0056 ac.
Site 2: Perm. Fill in Wetlands = 0.0068 ac. / Excavation in Wetlands = 0.0020 ac. / Mech. Clearing in Wetlands = 0.0003 ac.
Site 3: Perm. Fill in Wetlands = 0.0100 ac.
Site 7: Mech. Clearing in Wetlands = 0.0144 ac.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
9-28-2017
FORSYTH COUNTY
R-2247CD
34409.3.23

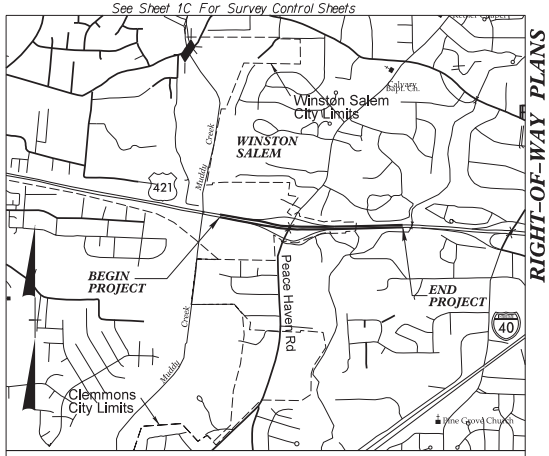
Revised 2016 09 09

09/08/99

TIP PROJECT: R-2247CD

CONTRACT: C203840

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheet 1C For Survey Control Sheets



VICINITY MAP

RIGHT-OF-WAY PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

FORSYTH COUNTY

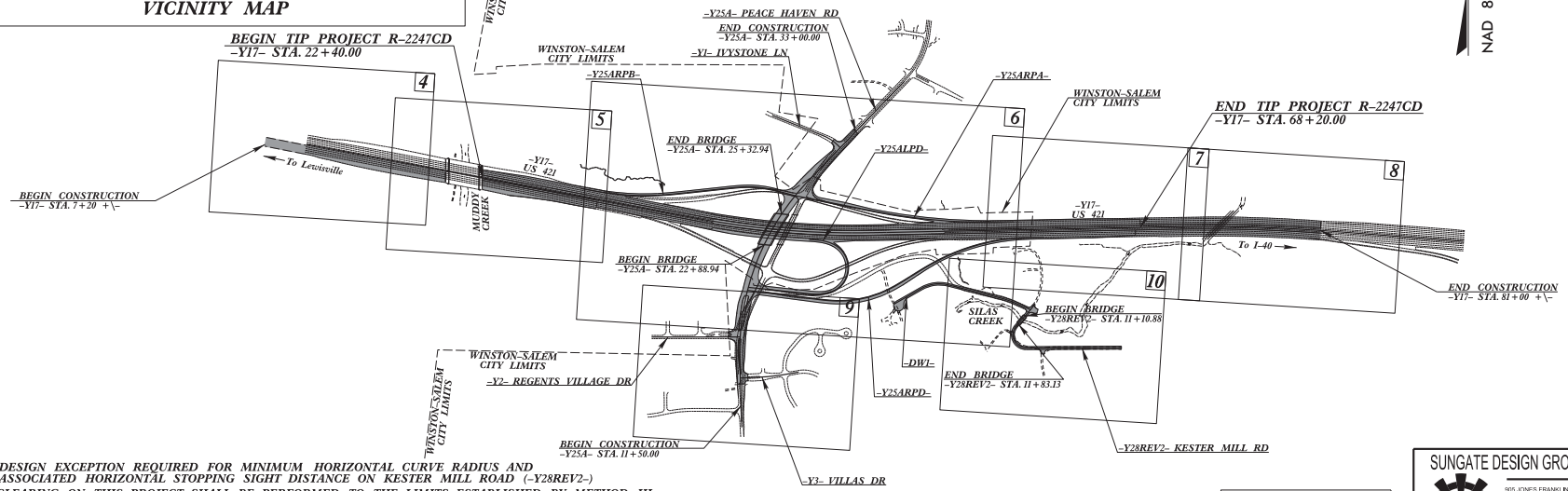
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2247CD	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34409.3.23	NHP-0421(088)	P.E.
34409.3.23	NHP-0421(088)	R/W & UTIL.
34409.3.23	NHP-0421(088)	CONST.

LOCATION: WINSTON-SALEM NORTHERN BELTWAY – MODIFICATION OF THE US 421/SR 1891 (PEACE HAVEN ROAD) INTERCHANGE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, GUARDRAIL, STRUCTURES, SIGNING, SIGNALS, NOISE WALLS AND RETAINING WALL

NAD 83 (CORS 96)



- DESIGN EXCEPTION REQUIRED FOR MINIMUM HORIZONTAL CURVE RADIUS AND ASSOCIATED HORIZONTAL STOPPING SIGHT DISTANCE ON KESTER MILL ROAD (-Y28REV2-)
- CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
- THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES
- A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF WINSTON-SALEM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

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 2016 = 57,065
ADT 2036 = 77,735
DHV = 10 %
D = 65 %
T = 7 % *
V = 70 MPH
* (TTST = 4% + DUAL 3%)
FUNC CLASS = FREEWAY

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2247CD = .867 MI.

TOTAL LENGTH TIP PROJECT R-2247CD = .867 MI.

Prepared In the Office of:
KCI Associates of N.C., P.A.
4505 Falls of Neuse Road, Suite 400
Raleigh, NC 27609
Phone (919) 783-9214
Fax (919) 783-9266

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 15, 2016

LETTING DATE:
NOVEMBER 15, 2016

NCDOT CONTACT: K. ZAK HAMIDI, PE
PROJECT ENGINEER – DESIGN BUILD UNIT

Plans Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.
Raleigh NC, 27610

CHARLES L. FLOWE, P.E.
PROJECT ENGINEER

BARRY C. SMITH, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

28-SEP-2017 13:42
MS 2016 (16.00.22)
$$$$USERNAME$$$$
R2247 WS\R-2247CD\Roadway\Proj\R2247CD_Rdy_tsh.dgn

12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	1B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Computed Property Corner
- Property Monument — PCM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil — S
- Potential Contamination Area: Soil — S
- Known Contamination Area: Water — W
- Potential Contamination Area: Water — W
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY & PROJECT CONTROL:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Exist Permanent Easment Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line — R/W
- New Right of Way Line with Pin and Cap — R/W
- New Right of Way Line with Concrete or Granite R/W Marker — R/W
- New Control of Access Line with Concrete C/A Marker — C/A
- Existing Control of Access — C/A
- New Control of Access — C/A
- Existing Easement Line — E
- New Temporary Construction Easement — E
- New Temporary Drainage Easement — TDE
- New Permanent Drainage Easement — PDE
- New Permanent Drainage / Utility Easement — DUE
- New Permanent Utility Easement — PUE
- New Temporary Utility Easement — TUE
- New Aerial Utility Easement — AUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) — P
- U/G Power Line LOS C (S.U.E.*) — P
- U/G Power Line LOS D (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- U/G Telephone Cable LOS B (S.U.E.*) — T
- U/G Telephone Cable LOS C (S.U.E.*) — T
- U/G Telephone Cable LOS D (S.U.E.*) — T
- U/G Telephone Conduit LOS B (S.U.E.*) — TC
- U/G Telephone Conduit LOS C (S.U.E.*) — TC
- U/G Telephone Conduit LOS D (S.U.E.*) — TC
- U/G Fiber Optics Cable LOS B (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS C (S.U.E.*) — T FO
- U/G Fiber Optics Cable LOS D (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) — W
- U/G Water Line LOS C (S.U.E*) — W
- U/G Water Line LOS D (S.U.E*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- U/G TV Cable LOS B (S.U.E.*) — TV
- U/G TV Cable LOS C (S.U.E.*) — TV
- U/G TV Cable LOS D (S.U.E.*) — TV
- U/G Fiber Optic Cable LOS B (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS C (S.U.E.*) — TV FO
- U/G Fiber Optic Cable LOS D (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) — G
- U/G Gas Line LOS C (S.U.E.*) — G
- U/G Gas Line LOS D (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- SS Forced Main Line LOS B (S.U.E.*) — FSS
- SS Forced Main Line LOS C (S.U.E.*) — FSS
- SS Forced Main Line LOS D (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line LOS B (S.U.E.*) — ?U/L
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole LOS A (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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KCI
Engineers • Planners • Scientists • Construction Managers
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Raleigh, NC 27609-6270
http://www.kci.com Phone (919) 783-9214 • Fax (919) 783-9266

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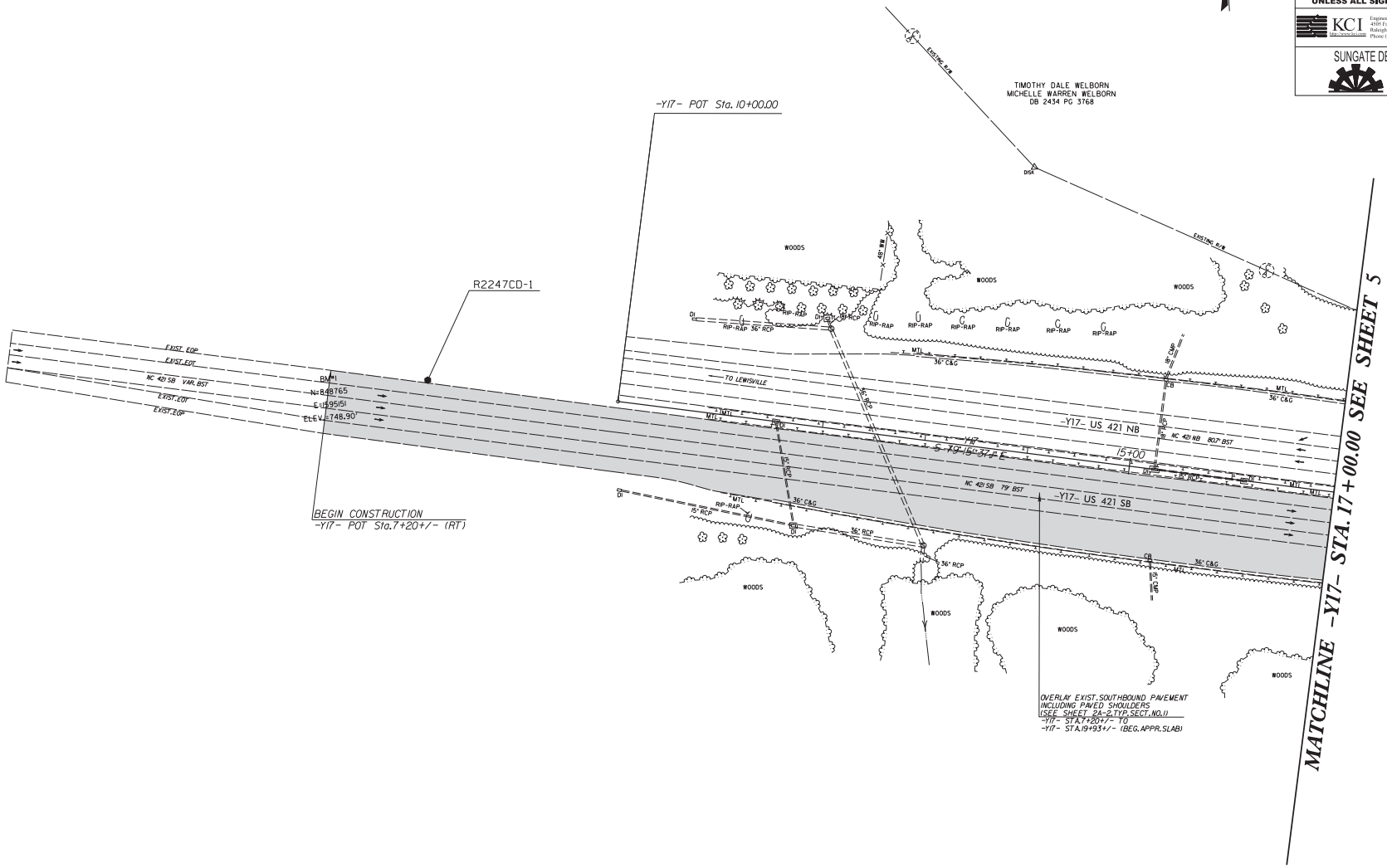
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-0341
ENG FIRM LICENSE NO.C-0660



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PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SUNGATE DESIGN GROUP, P.A.
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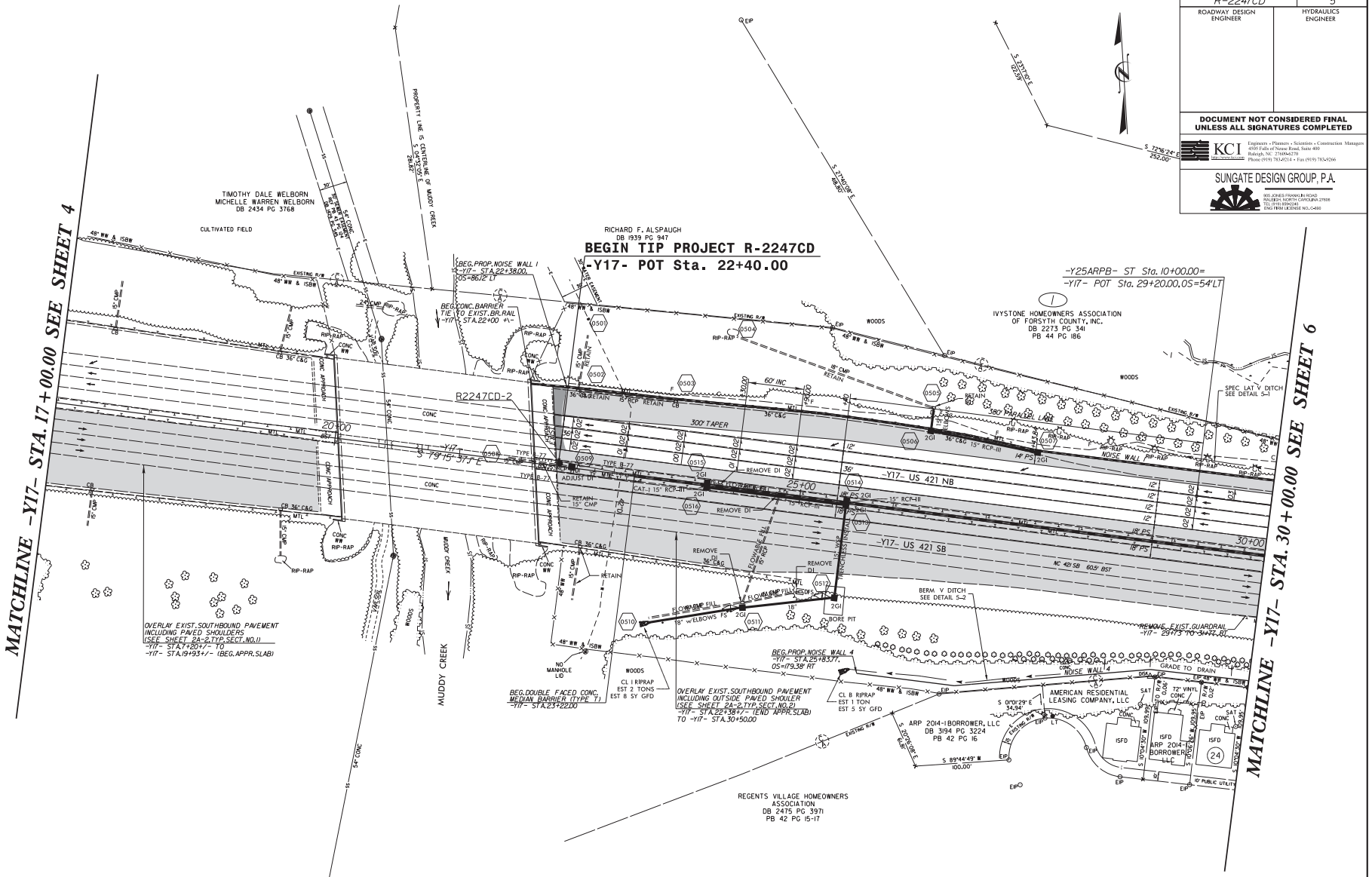
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-0361
ENG FIRM LICENSE NO. C-1466



FOR -Y17- PROFILE, SEE SHEETS 11 & 13
FOR -Y25ARPB- PROFILE, SEE SHEET 17
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-3
FOR NOISE WALL DETAILS, SEE SHEETS 2N-1 TO 2N-2 AND 2N-6 TO 2N-7

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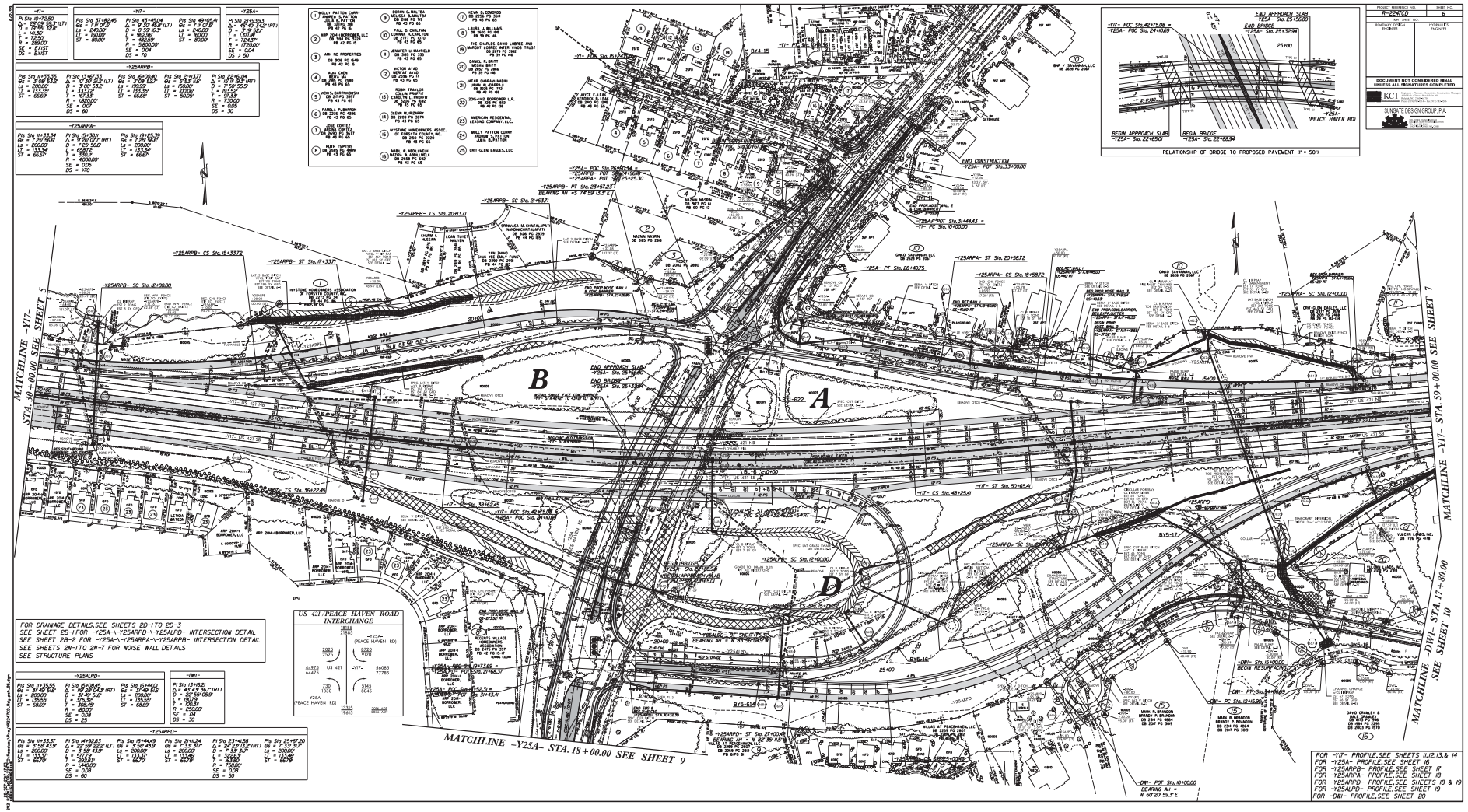
PROJECT REFERENCE NO. SHEET NO.
R-2247CD 6
F.A. PROJ. STATE PROJ. NO. DESCRIPTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
KCI
SUNGATE DESIGN GROUP, P.A.
RELATIONSHIP OF BRIDGE TO PROPOSED PAVEMENT (1" = 50')
END APPROACH SLAB -Y25A- Sta. 25+56.80
END BRIDGE -Y25A- Sta. 25+32.94
BEGIN APPROACH SLAB -Y25A- Sta. 22+65.01
BEGIN BRIDGE -Y25A- Sta. 22+88.94
-Y25A- (PEACE HAVEN RD)
MATCHLINE -Y17- STA. 30+00.00 SEE SHEET 5
MATCHLINE -Y17- STA. 59+00.00 SEE SHEET 7
MATCHLINE -DW1- STA. 17+80.00 SEE SHEET 10
MATCHLINE -Y25A- STA. 18+00.00 SEE SHEET 9
A
B
D
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-3
SEE SHEET 2B-1 FOR -Y25A-\-Y25ARPD-\-Y25ALPD- INTERSECTION DETAIL
SEE SHEET 2B-2 FOR -Y25A-\-Y25ARPA-\-Y25ARPB- INTERSECTION DETAIL
SEE SHEETS 2H-1 TO 2H-7 FOR NOISE WALL DETAILS
SEE STRUCTURE PLANS
US 421 / PEACE HAVEN ROAD INTERCHANGE
FOR -Y17- PROFILE, SEE SHEETS 11, 12, 13, & 14
FOR -Y25A- PROFILE, SEE SHEET 16
FOR -Y25ARPB- PROFILE, SEE SHEET 17
FOR -Y25ARPA- PROFILE, SEE SHEET 18
FOR -Y25ARPD- PROFILE, SEE SHEETS 18 & 19
FOR -Y25ALPD- PROFILE, SEE SHEET 19
FOR -DW1- PROFILE, SEE SHEET 20

-Y25ARPA-
PIs Sta 11+33.34
Θs = 1° 25' 56.6"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

-Y25ARPD-	
PIs Sta 11+33.37	PI Sta 14+92.83
Θs = 3° 58' 43.9"	Δ = 22° 59' 22.2" (LT)
Ls = 200.00'	D = 3° 58' 43.9"
LT = 133.37'	L = 577.79'
ST = 66.70'	T = 292.83'
	R = 1,440.00'
	SE = 0.08
	DS = 60

-Y17-	
PI Sta 75+15.85	PIs Sta 80+95.26
Δ = 4° 47' 48.8" (RT)	Θs = 0° 44' 59.8"
D = 0° 30' 00.0"	Ls = 299.98'
L = 959.38'	LT = 199.99'
T = 479.97'	ST = 99.99'
R = 11,459.16'	
SE = EXIST	
DS = EXIST	

PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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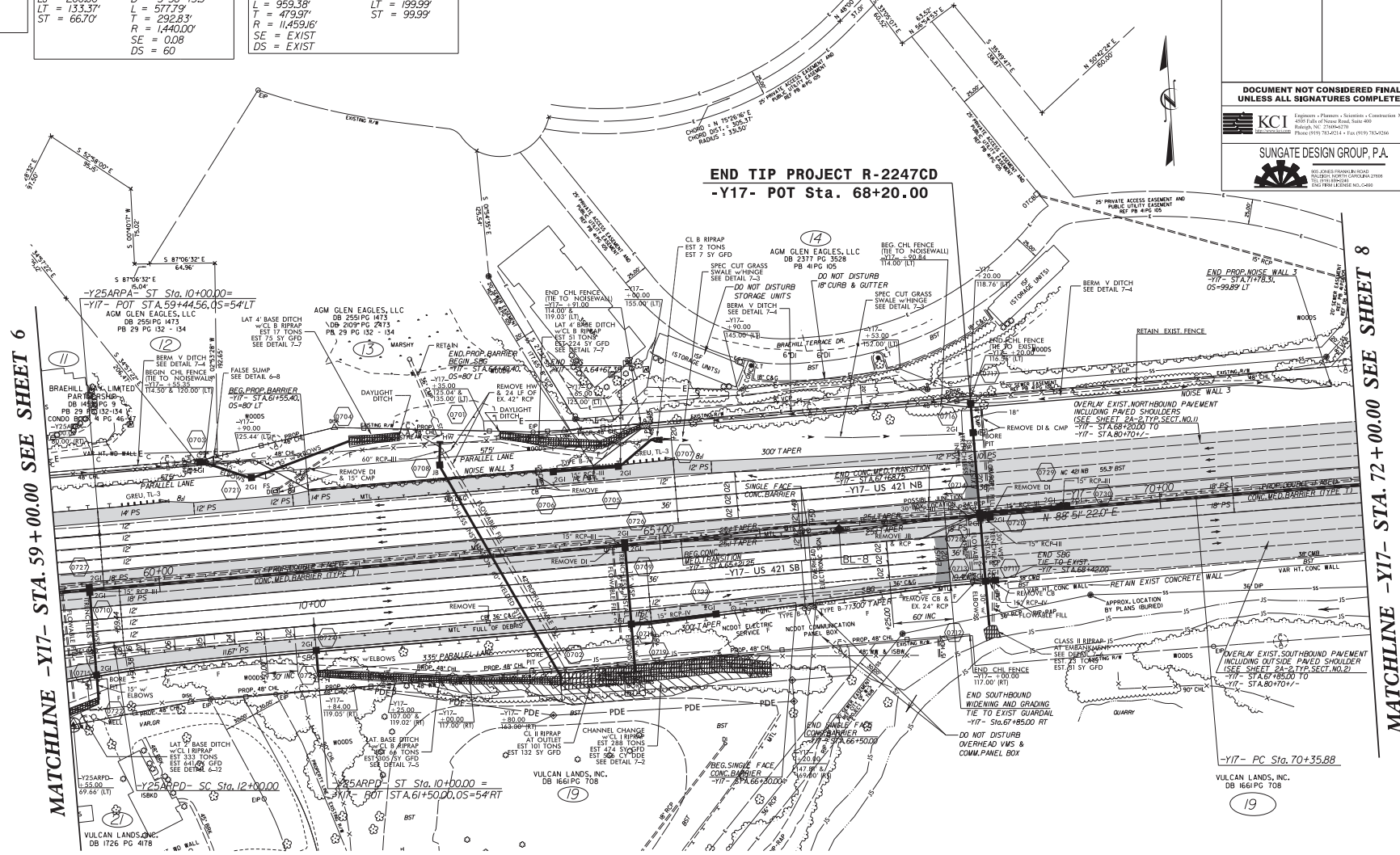
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-9240
ENG FIRM LICENSE NO. C-0466



FOR -Y17- PROFILE, SEE SHEETS 12, 14, & 15
FOR -Y25ARPA- PROFILE, SEE SHEET 18
FOR -Y25ARPD- PROFILE, SEE SHEET 18
FOR NOISE WALL DETAILS, SEE SHEETS 2N-4 TO 2N-5
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-3

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PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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905 JONES FRANKLIN ROAD
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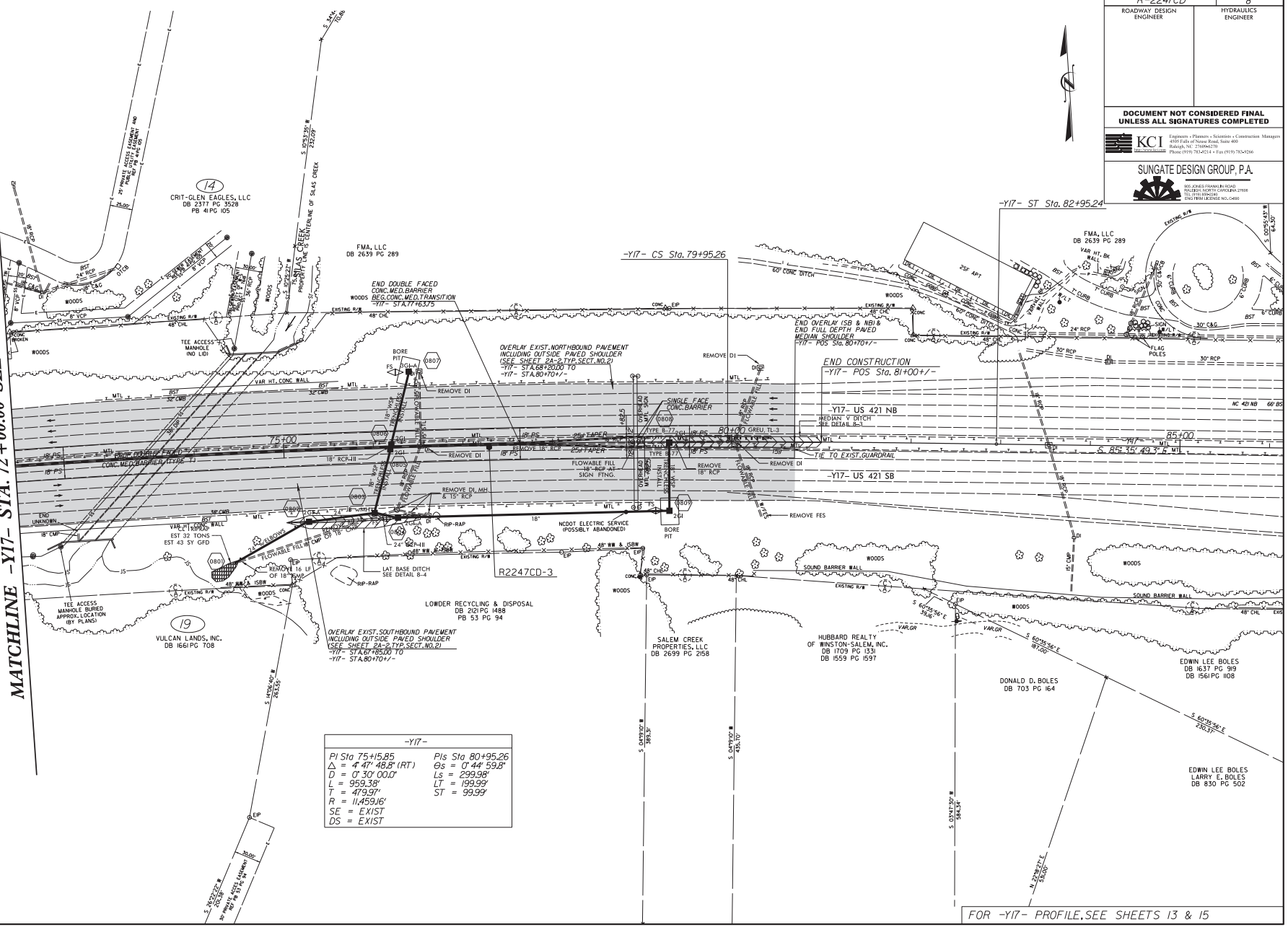
TEL (919) 859-0341
ENG FIRM LICENSE NO. C-0460



-Y17-	
PI Sta 75+15.85	PIs Sta 80+95.26
Δ = 4° 47' 48.8" (RT)	Θs = 0° 44' 59.8"
D = 0° 30' 00.0"	Ls = 299.98'
L = 959.38'	LT = 199.99'
T = 479.97'	ST = 99.99'
R = 11,459.16'	
SE = EXIST	
DS = EXIST	

6/2/99

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