STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

April 12, 2004

U.S. Army Corps of Engineers
Regulatory Field Office
Post Office Box 1890
Wilmington, NC 28402-1890

ATTN: Mr. Richard Spencer
NCDOT Coordinator

Dear Sir:

Subject: **Application for a Permit Modification for Section 404 and 401 permits for the Ellerbe Bypass and Ellerbe Connector (NC 73 Extension).**
Richmond and Montgomery Counties, US 220; TIP No. R-2231; Federal Aid No. NHF-45-1(49); State Project No. 8.T550803; TIP No. R-3303; Federal Aid No. STP –73(4); State Project No. 8.1581201.
COE Action ID 199400590; DWQ Project No. 000874.
$200 to WBS No. 34527.1.1.

The North Carolina Department of Transportation (NCDOT) proposes to construct a four-lane, full control access highway on new location extending from the existing four-lane facility on US 220 south of Ellerbe at SR 1448, Richmond County, to the existing intersection of US 220 and US 220A, just south of Candor in Montgomery County, including the NC 73 extension from the intersection of NC 73 and US 220 connecting to the proposed US 220 four-lane facility north of SR 1452 in Richmond County. Section 404 and 401 permits have already been issued (July 15, 2003 and April 3, 2003, respectively) for the above stated projects, however at the time of the application only preliminary plans and impacts were submitted for the NC 73 extension (R-3303). The NC 73 extension will be a two-lane road with two-12 foot lanes, four foot paved shoulders and four foot grassed shoulders on each side. This application addresses the final design plans and jurisdictional impacts for the NC 73 extension (R-3303).

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1548 MAIL SERVICE CENTER
RALEIGH NC 27699-1548

TELEPHONE: 919-733-3141
FAX: 919-733-9794

WEBSITE: WWW.NCDOT.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

IMPACTS TO WATERS OF THE UNITED STATES

The project impacts are located in the Yadkin-Pee Dee River Basin. The project is contained in two subbasins (03-07-10 and 03-07-16) and two Hydrologic Units (03040104 and 03040201). The preliminary impacts were fill in 1.32 acres (ac) of jurisdictional wetlands and 367 feet (ft) of jurisdictional streams.

Since the time the permit was issued, NCDOT took measures to avoid and minimize impacts to wetlands and streams. The alignment was moved slightly to completely avoid a wetland site, also no mechanized clearing will be done as originally planned. These avoidance and minimization efforts resulted in a decrease in impacts to wetlands and streams. The following table shows the amount of reduction in jurisdictional impacts. Detailed impacts at each site are listed in the enclosed wetland impact summary table.

Table 1. Preliminary Impacts vs. Final Impacts

	Preliminary Impacts	Final Impacts	Reduction Amount
Riverine Wetlands	1.32 ac	0.92 ac	0.40 ac
Streams	367 ft	315 ft	52 ft

There are five wetland sites (Sites 1-5) and two stream crossings (Sites 2 and 3). Sites 1 and 2 are located in subbasin 03-07-10 and Hydrologic Unit 03040104. Sites 3-5 are located in subbasin 03-07-16 in Hydrologic Unit 03040201. The original impacts to wetlands and streams from R-3303 have already been mitigated for using the Key Branch Mitigation Site at a 2:1 ratio. Since impacts were reduced during final design, we request for credit to the Key Branch Mitigation Site for 0.80 ac of riverine wetlands and 104 ft of streams.

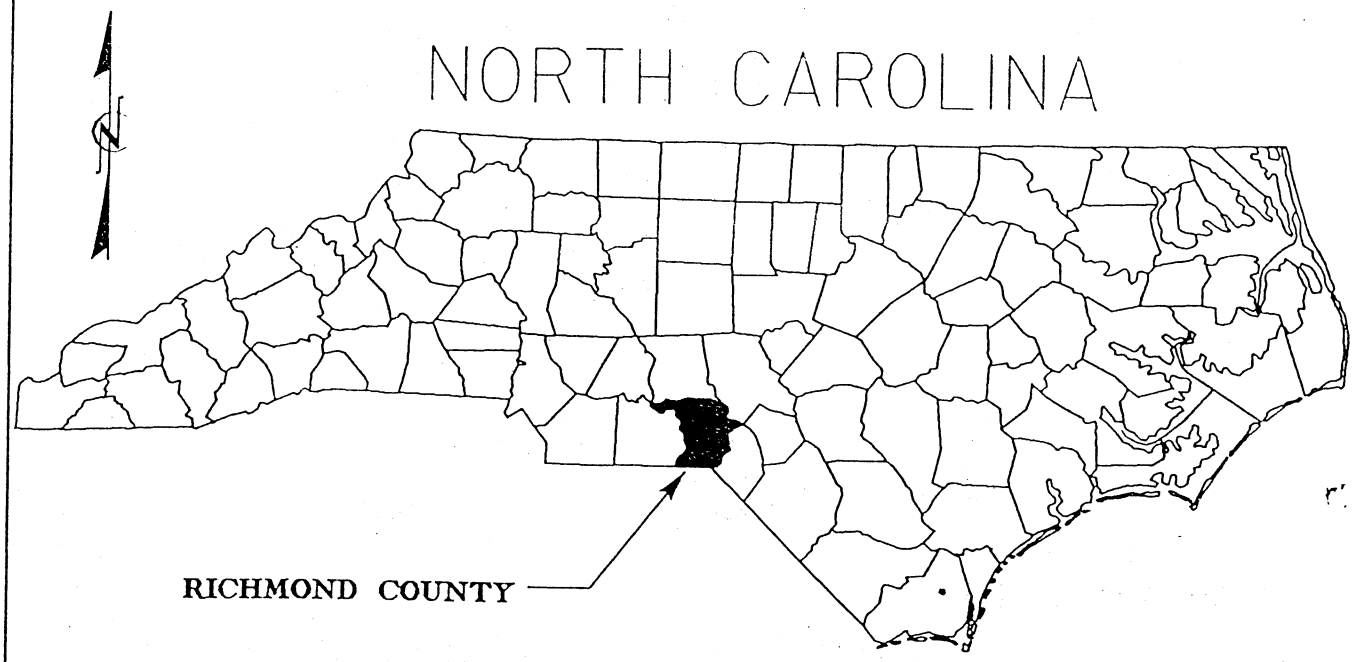
This application is hereby made for a Section 404 Individual Permit Modification as stated for the above mentioned activity. By copy of this letter, we are also requesting a Section 401 Water Quality Certification modification. In compliance with Section 143-215.3D(e) of the NCAC we will provide $200 to act as payment for processing the Section 401 permit modification as previously noted in this application (see Subject Line). Seven copies of the application are being provided to the DWQ for their review.

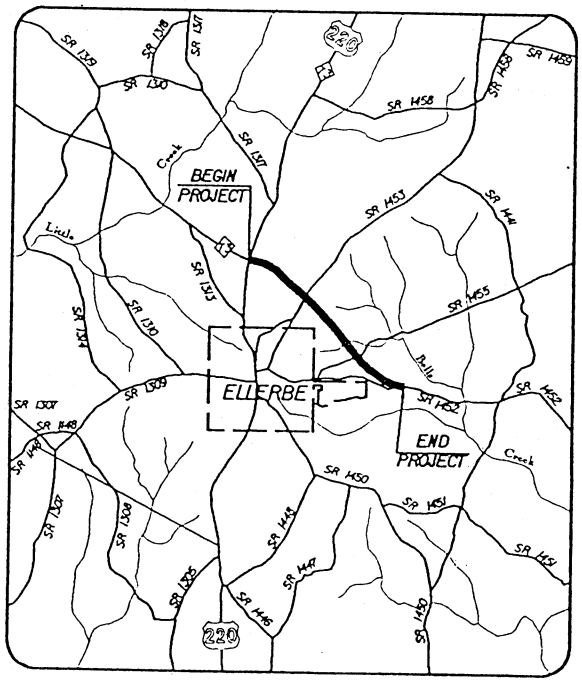
If you have any questions or need additional information please call Rachelle Beauregard at 715-1383.

Sincerely,

Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA

cc: Mr. David Franklin, USACE, Wilmington (Cover Letter Only)
Mr. John Hennsey, NCDWQ (7 copies)
Mr. Travis Wilson, NCWRC
Mr. Ron Sechler, NMFS
Ms. Kathy Matthews, USEPA
Mr. Gary Jordon, USFWS
Mr. John F. Sullivan, III, P.E., FHWA
Mr. Jay Bennett, P.E., Roadway Design
Mr. Omar Sultan, Programming and TIP
Ms. Art McMillian, P.E., Highway Design
Mr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Mr. W. F. Rosser, P.E. (Div. 8), Division Engineer
Mr. Art King (Div. 8), Division Environmental Officer





VICINITY MAP

VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS

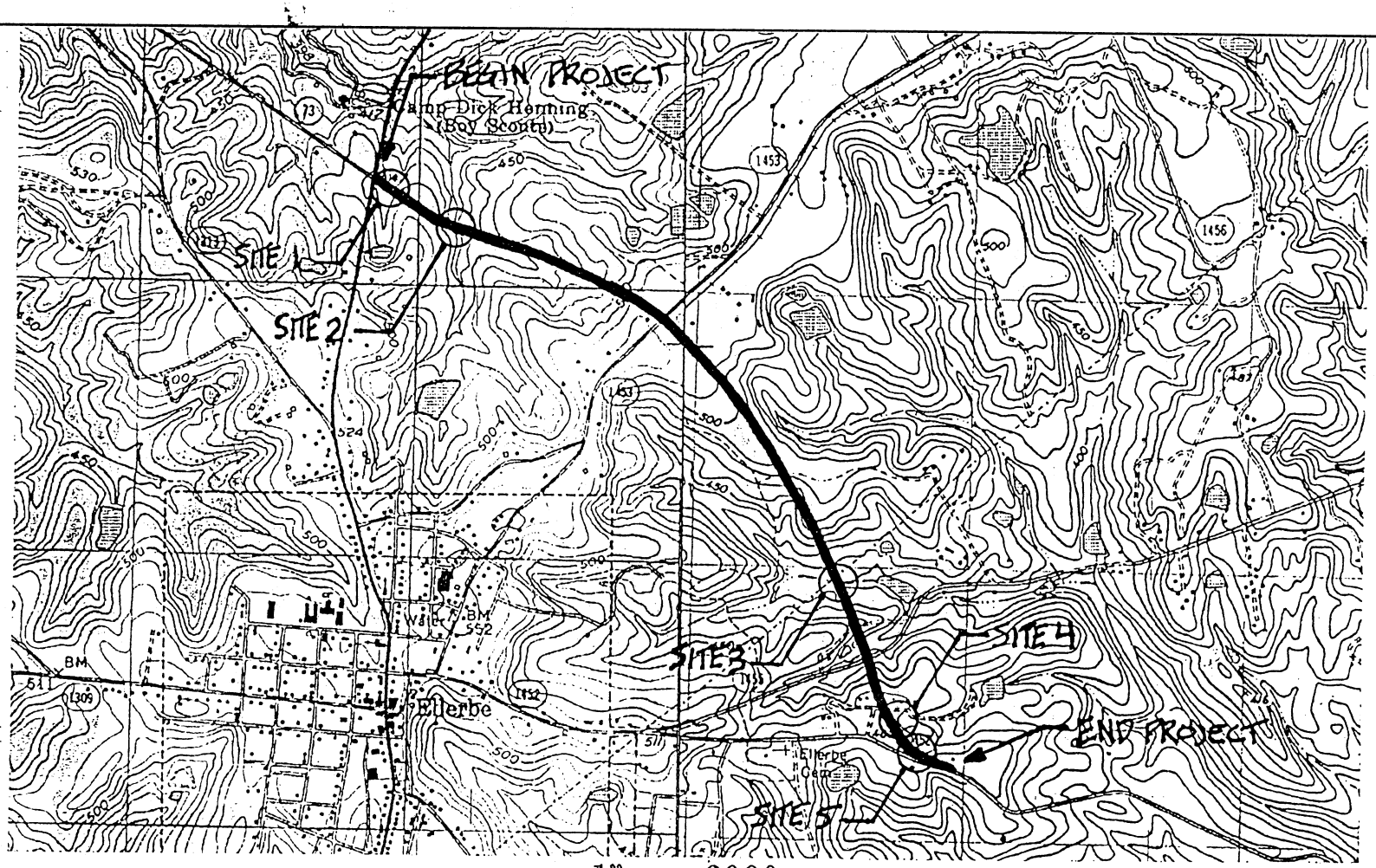
RICHMOND COUNTY

PROJECT: 8.1581201 (R-3303)

NC 73 EXTENSION FROM EXISTING NC 73 / US 220 TO SR 1452

SHEET 2 OF 5

03/31/05



1" = 2000'

SITE MAP

NCDOT

DIVISION OF HIGHWAYS

RICHMOND COUNTY

PROJECT: 8.1581201 (R-3303)

NC 73 EXTENSION FROM

EXISTING NC 73/US

220 TO SR 1452

SHEET 1 OF 5 03/31/03

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS				SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (ac)	Mechanized Clearing (Method II) (ac)	Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp. Fill In SW (ac)	Existing Channel Impacted (ft)	Natural Stream Design (ft)
1	11+50 -L-	24 " RCP	0.14								
2	14+30 to 14+80-L-	60" RCP	0.36				0.021			138.00	
3	34+40 to 35+00 -L-	66" RCP	0.22				0.035			177.00	
4	40+35 -L-	NA	0.01								
5	41+40 to 41075 -L-	30" RCP	0.20								
TOTALS:			0.92	0.00	0.00	0.00	0.055	0.00	0.00	315.00	0.00

Note: Per Division Construction Method II will be used in wetlands and streams.

Method II Clearing is clearing to the slope stake line only.

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
RICHMOND COUNTY

PROJECT:8.1581201 (R-3303)

NC73 EXT FROM NC73/US220 TO SR1452

SHEET 3 OF 5

04/08/03

Form Revised 3/22/01

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS				SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method II) (ha)	Fill In SW (Natural) (ha)	Fill In SW (Pond) (ha)	Temp. Fill In SW (ha)	Existing Channel Impacted (m)	Natural Stream Design (m)
1	11+50 -L-	600 RCP	0.056								
2	14+30 to 14+80-L-	1500 RCP	0.144				0.0084			42	
3	34+40 to 35+00 -L-	1650 RCP	0.089				0.014			54	
4	40+35 -L-	NA	0.006								
5	41+40 to 41075 -L-	750 RCP	0.079								
TOTALS:			0.374	0	0	0	0.0224	0	0	96	0

Note: Per Division Construction Method II will be used in wetlands and streams.

Method II Clearing is clearing to the slope stake line only.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RICHMOND COUNTY
PROJECT:8.1581201 (R-3303)
NC73 EXT FROM NC73/US220 TO SR1452
SHEET 4 OF 5 4/8/2003

Form Revised 3/22/01

PROPERTY OWNERS

NAMES AND ADDRESSES

NAMES	ADDRESSES
HUBERT COVINGTON	2260 NORTH US 220 ELLERBE, NC 28338
KATRINA GREEN	2370 SPRINGS RUN WAY DECATUR, GA 30032
LUCY MABE	249 FIRETOWN RD. ELLERBE, NC 28338
CAROLINA POWER AND LIGHT	PO BOX 1551 410 SOUTH WILMINGTON ST. RALEIGH, NC 27602
ROGER ALLRED	6726 LANCER DR. CHARLOTTE, NC 28226
RICHARD AND RUBY HENDERSON	PO BOX 463 ELLERBE. NC 28338

NCDOT

DIVISION OF HIGHWAYS

RICHMOND COUNTY

PROJECT: 8.1581201 (R-3303)

NC 73 EXTENSION FROM EXISTING NC 73 / US 220 TO SR 1452

SHEET 5 OF 5 03 / 31 / 03

R-3303

PROJECT: 34527.2.2

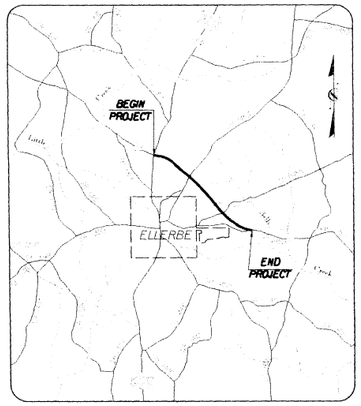
(SENT TO R/W 30 MAY 2003)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RICHMOND COUNTY

LOCATION: NC 73 EXTENSION FROM EXISTING NC 73/ US 220 TO SR 1452 (CHURCH STREET)

TYPE OF WORK: GRADING, DRAINAGE, AND PAVING.



VICINITY MAP

METRIC

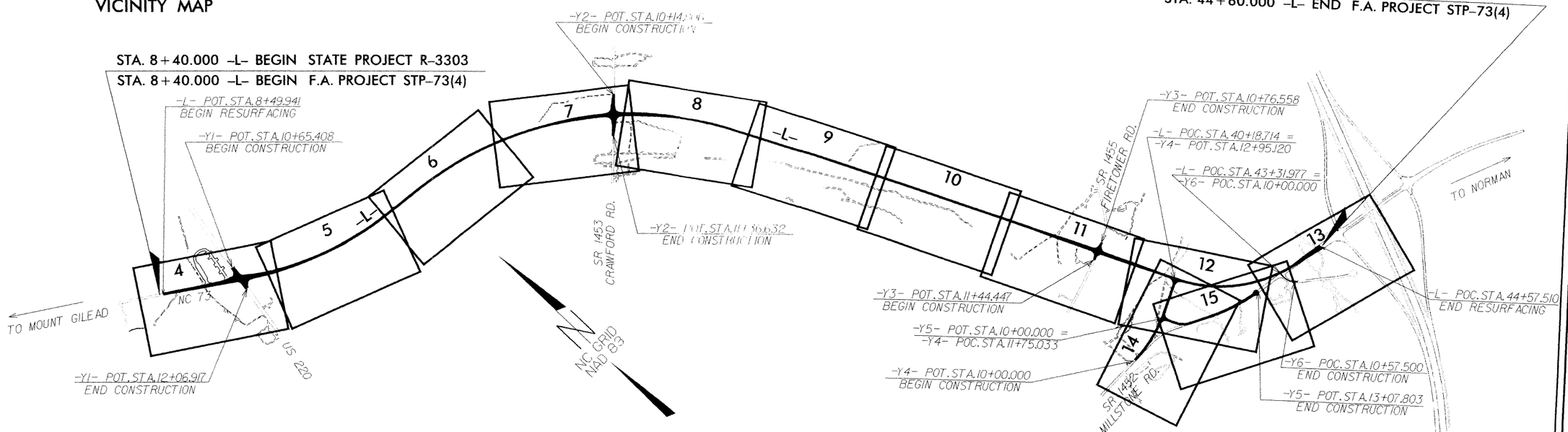
ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3303	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
8.1581201 34527.2.2	STP-73(4) STP-73(4)	P.E. R/W & UTILITIES	

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STA. 44+60.000 -L- END STATE PROJECT R-3303
STA. 44+60.000 -L- END F.A. PROJECT STP-73(4)

STA. 8+40.000 -L- BEGIN STATE PROJECT R-3303
STA. 8+40.000 -L- BEGIN F.A. PROJECT STP-73(4)



NCDOT CONTACT: TERESA BRUTON, P.E., PROJECT ENGINEER - DESIGN SERVICES

*CLEARING ON THIS PROJECT SHALL BE ESTABLISHED BY METHOD III (USE METHOD II IN WETLAND AREAS).

GRAPHIC SCALE

5m 0 10m
PLANS

5m 0 10m
PROFILE (HORIZONTAL)

1m 0 2m
PROFILE (VERTICAL)

DESIGN DATA

ADT 2004 = 3680
ADT 2024 = 6460
DHV = 12 %
D = 60 %
T = 2 % *
* TTST 1% DUAL 3%
V = 100 km/h

PROJECT LENGTH

LENGTH ROADWAY F.A. PROJECT STP-73(4) = 3.620 km

TOTAL LENGTH STATE PROJECT 34527.2.2 = 3.620 km

Prepared in the Office of:
WANG ENGINEERING COMPANY, INC.
CARY, N.C.
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY 30, 2003

LETTING DATE:
OCTOBER 19, 2004

GREG S. PURVIS, P.E.
PROJECT ENGINEER

SCOTT L. KENNEDY
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

REVISIONS

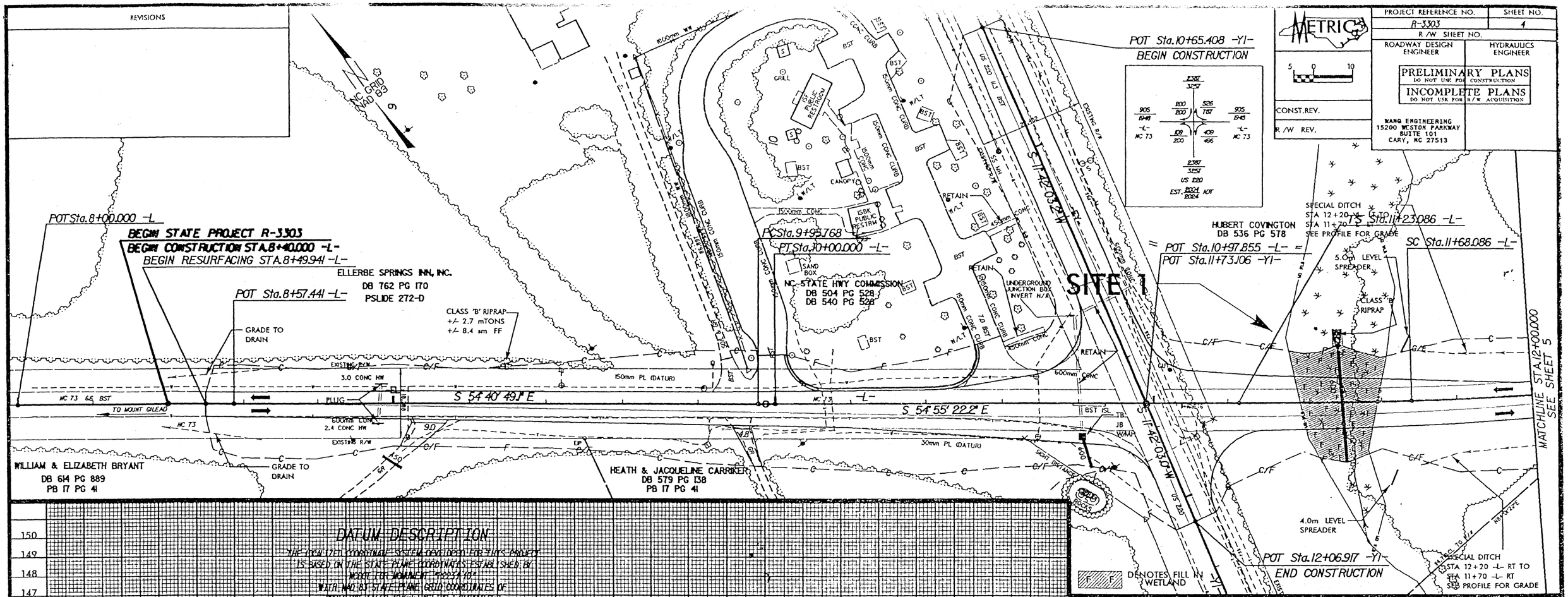
PROJECT REFERENCE NO.	SHEET NO.
R-3303	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

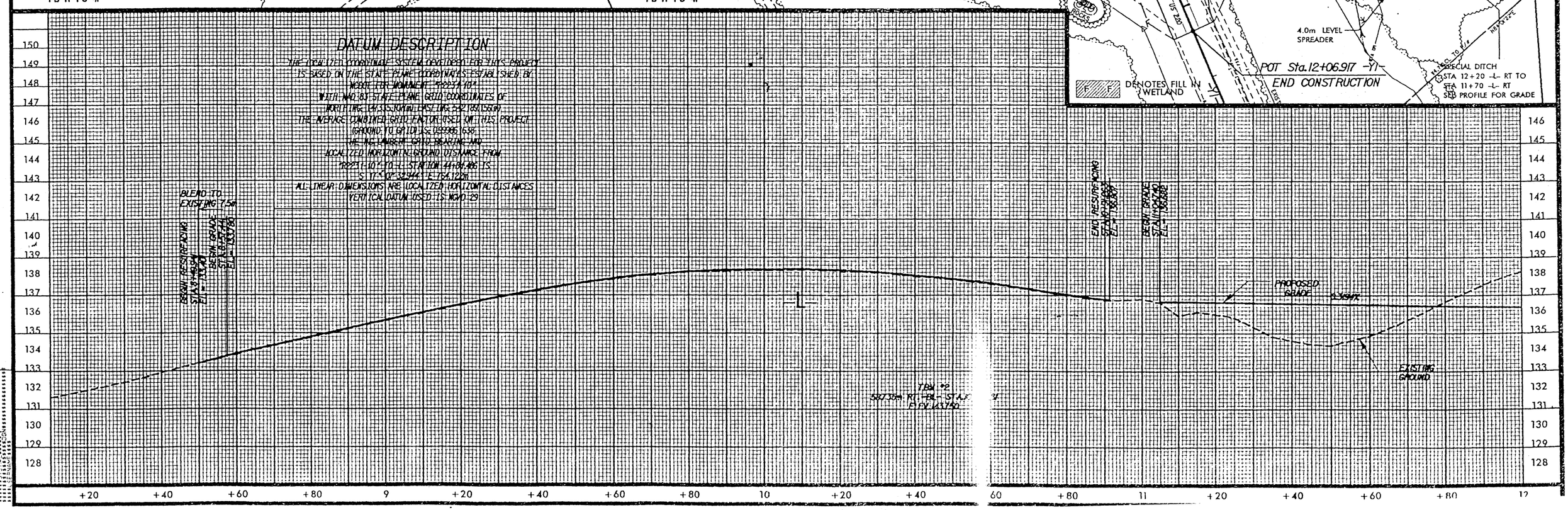
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513

CONST. REV.
R/W REV.

METRIC
5 0 10





REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3303	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

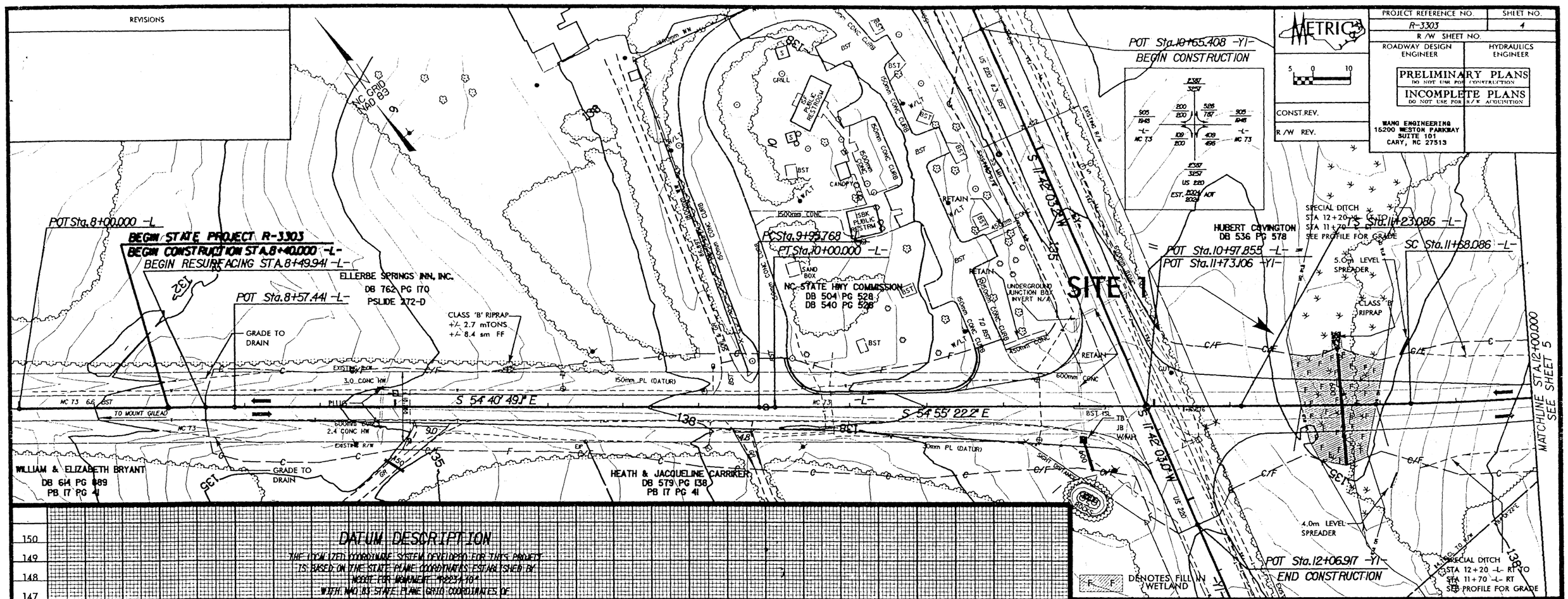
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

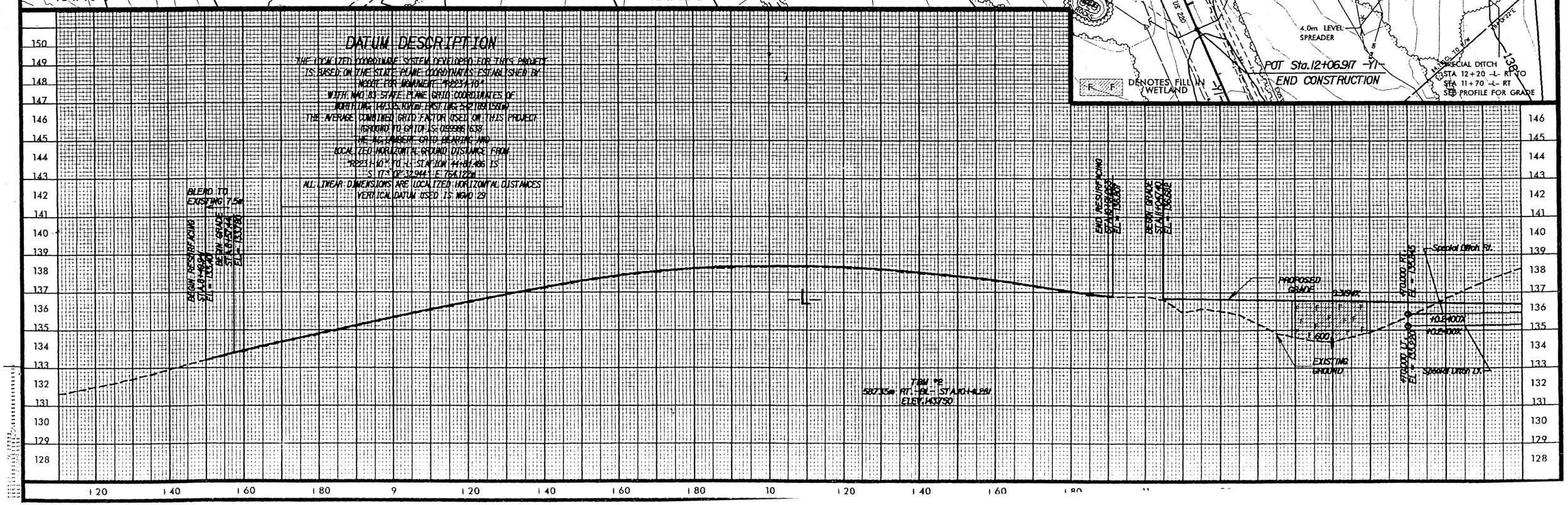
WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513

CONST. REV.

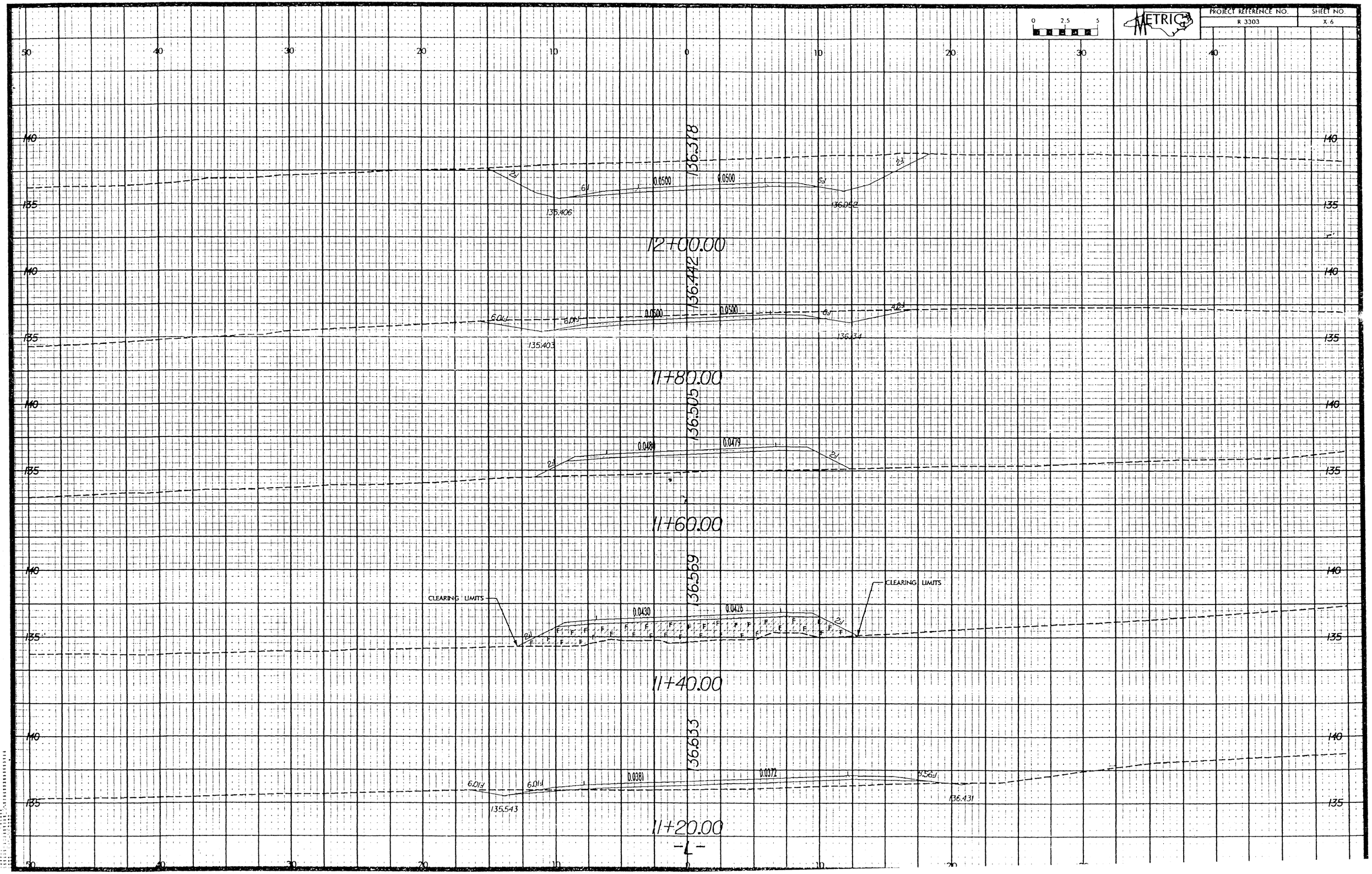
R/W REV.

METRIC





PROJECT REFERENCE NO.	SHEET NO.
R 3303	X 6



REVISIONS

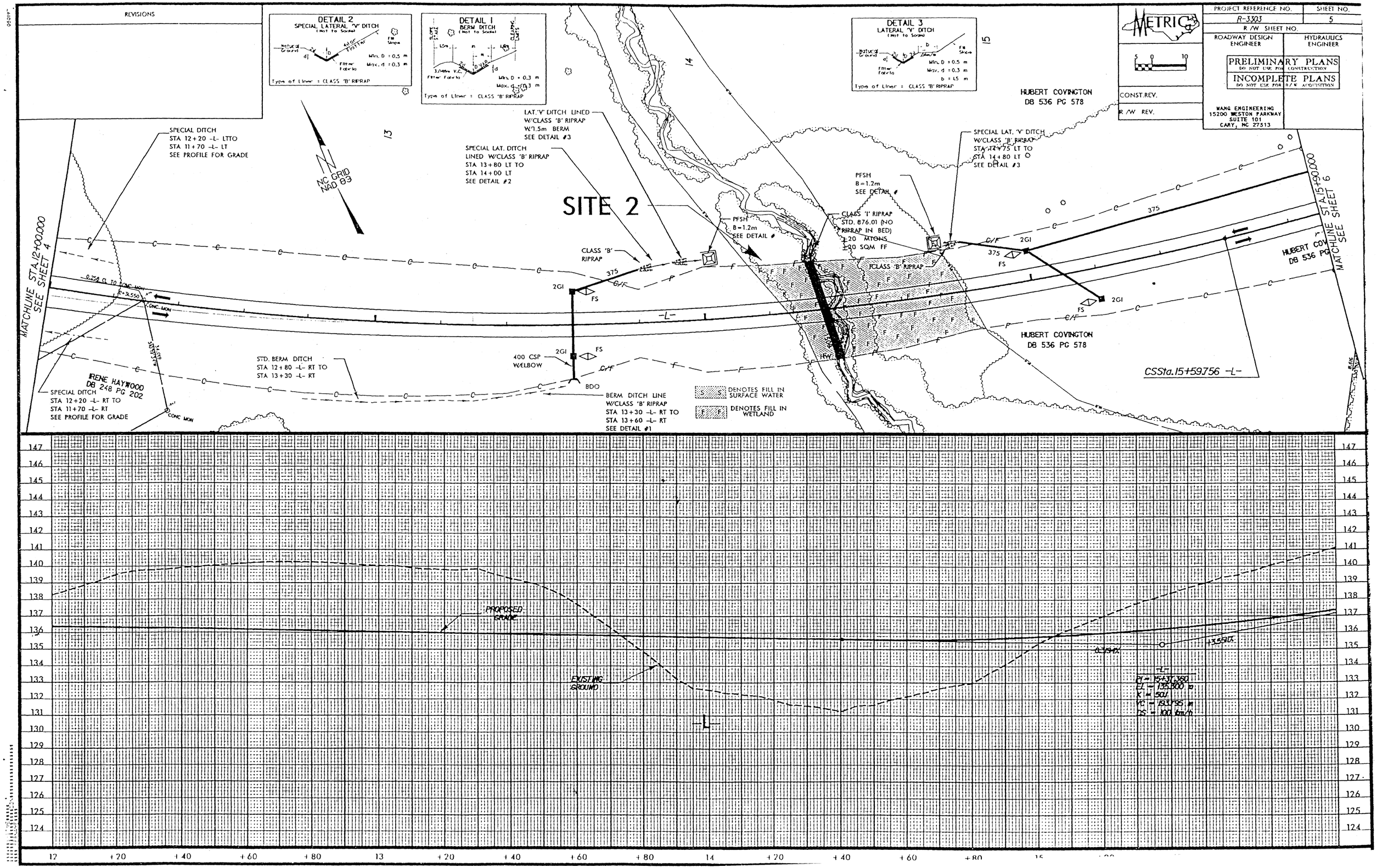
PROJECT REFERENCE NO.	SHEET NO.
R-3303	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

CONST. REV.
R/W REV.

WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513

METRIC
5 0 10



REVISIONS

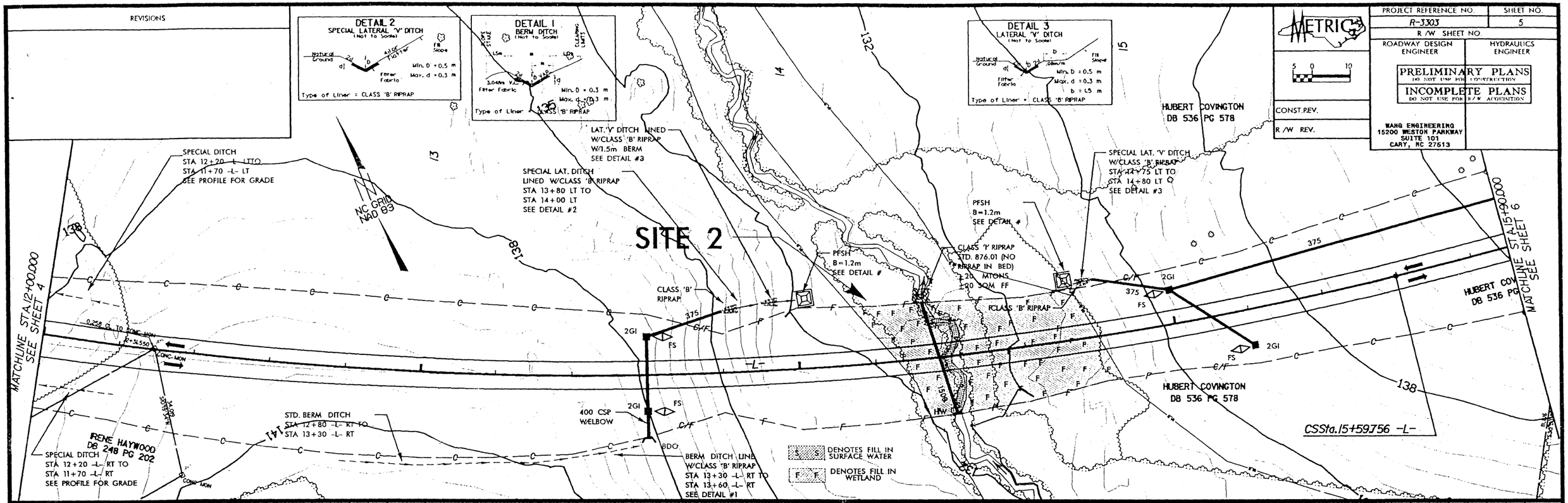
PROJECT REFERENCE NO.	SHEET NO.
R-3303	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

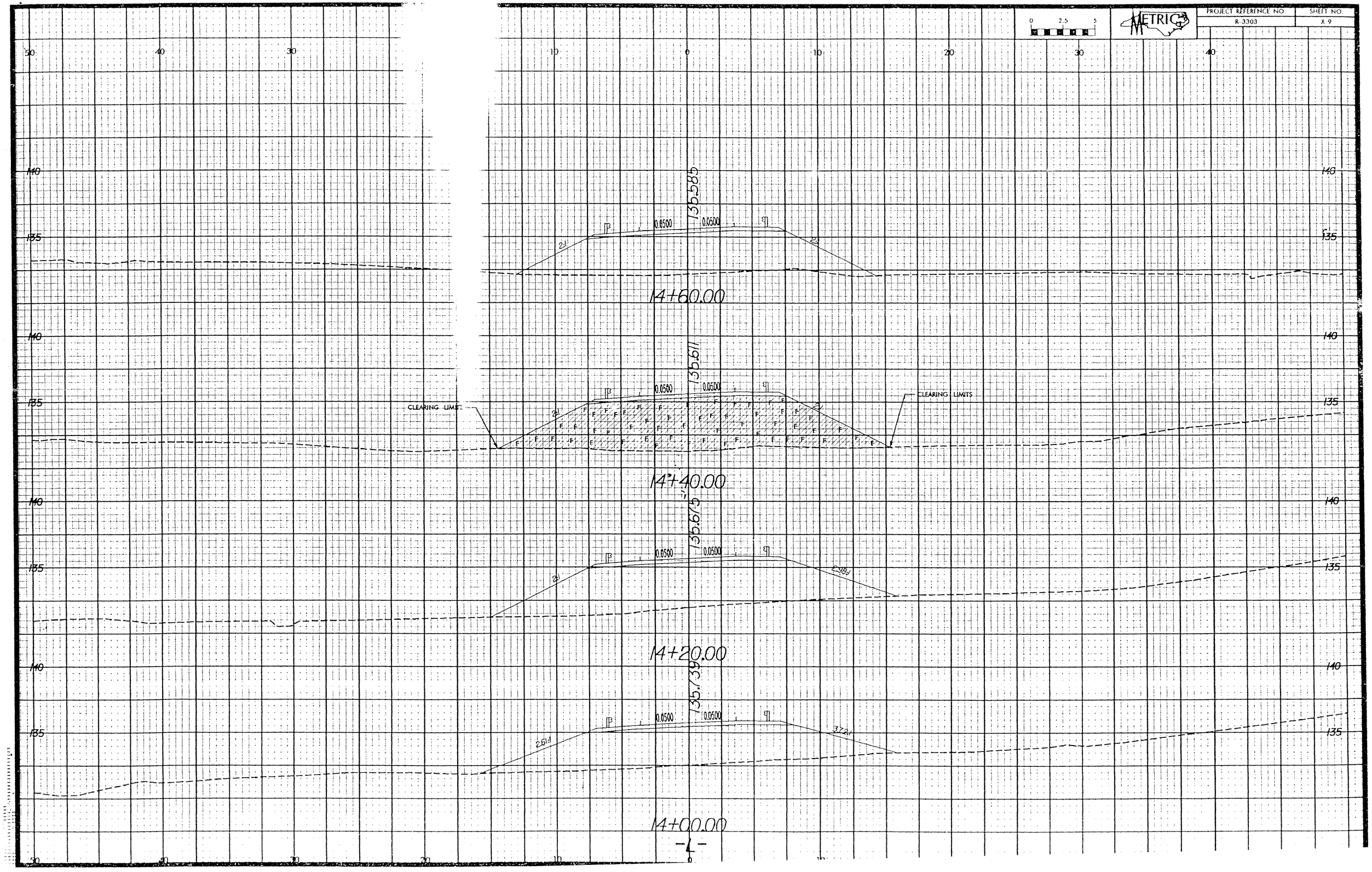
WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513

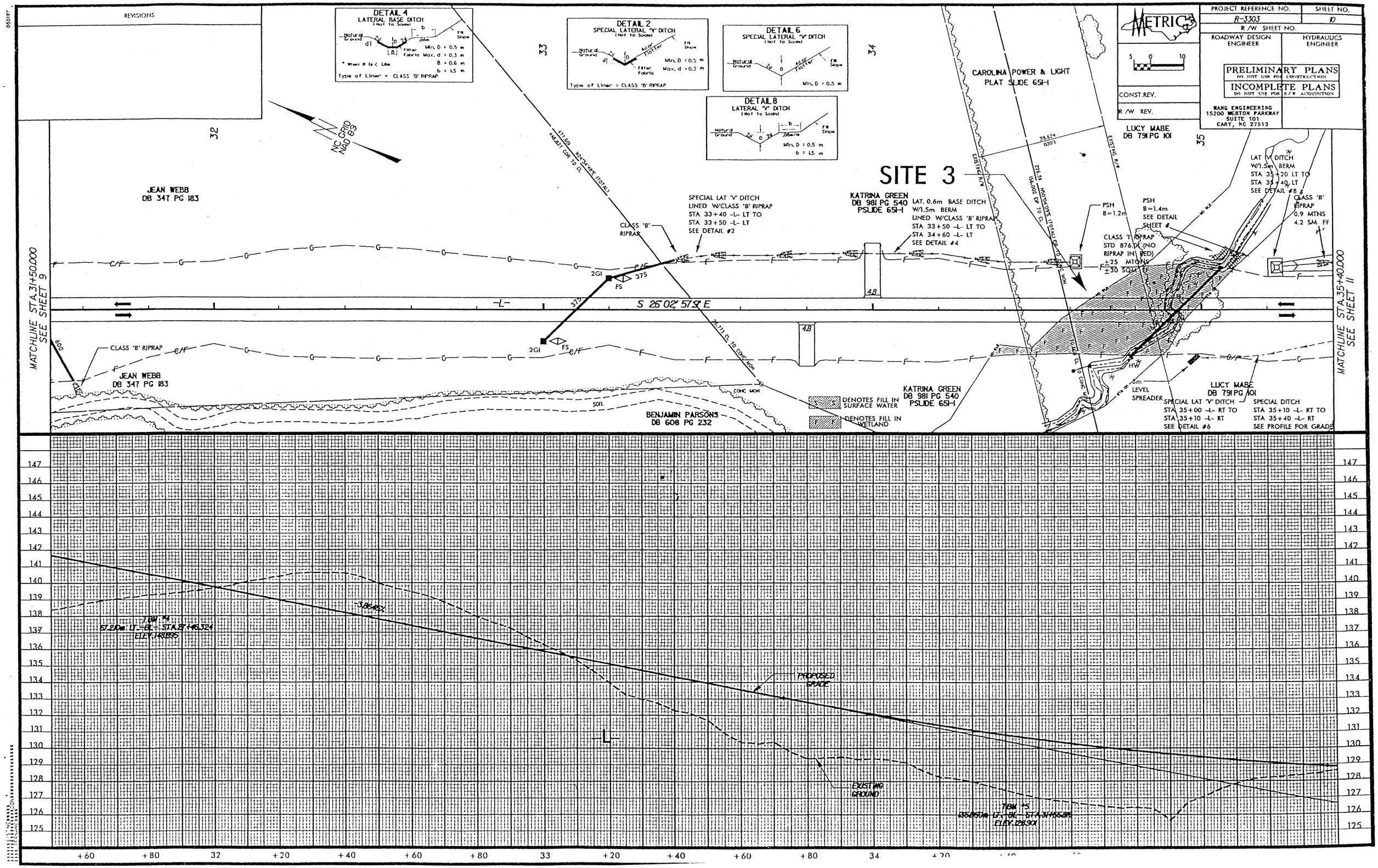
CONST.REV.
R/W REV.

METRIC 5 0 10



PROJECT REFERENCE NO.	SHEET NO.
R-3303	X 9





REVISIONS
DETAIL 4
LATERAL BASE DITCH
(Not to Scale)
Min. D = 0.5 m
Max. d = 0.3 m
B = 0.6 m
b = 1.5 m
Type of Liner = CLASS 'B' RIPRAP
DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D = 0.5 m
Max. d = 0.3 m
Type of Liner = CLASS 'B' RIPRAP
DETAIL 6
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D = 0.5 m
DETAIL 8
LATERAL 'V' DITCH
(Not to Scale)
Min. D = 0.5 m
b = 1.5 m
METRIC
PROJECT REFERENCE NO.
R-3303
SHEET NO.
10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513
CONST. REV.
R/W REV.
NC GRID NAD 83
SITE 3
CAROLINA POWER & LIGHT
PLAT SLIDE 65H
LUCY MABE
DB 791 PG 101
JEAN WEBB
DB 347 PG 183
SPECIAL LAT 'V' DITCH
LINED W/CLASS 'B' RIPRAP
STA 33+40 -L- LT TO
STA 33+50 -L- LT
SEE DETAIL #2
CLASS 'B' RIPRAP
KATRINA GREEN
DB 981 PG 540
PSLIDE 65H
LAT. 0.6m BASE DITCH
W/1.5m BERM
LINED W/CLASS 'B' RIPRAP
STA 33+50 -L- LT TO
STA 34+60 -L- LT
SEE DETAIL #4
PSH
B=1.2m
PSH
B=1.4m
SEE DETAIL
SHEET #
CLASS 'I' RIPRAP
STD 876.01 (NO
RIPRAP IN BED)
±25 MTONS
±30 SQM FF
LAT 'V' DITCH
W/1.5m BERM
STA 35+20 LT TO
STA 35+40 LT
SEE DETAIL #8
CLASS 'B'
RIPRAP
0.9 MTNS
4.2 SM FF
MATCHLINE STA 31+50.000
SEE SHEET 9
MATCHLINE STA 35+40.000
SEE SHEET 11
S 26°02'57.9" E
-L-
CLASS 'B' RIPRAP
JEAN WEBB
DB 347 PG 183
BENJAMIN PARSONS
DB 608 PG 232
KATRINA GREEN
DB 981 PG 540
PSLIDE 65H
DENOTES FILL IN SURFACE WATER
DENOTES FILL IN WETLAND
LEVEL SPREADER
LUCY MABE
DB 791 PG 101
SPECIAL LAT 'V' DITCH
STA 35+00 -L- RT TO
STA 35+10 -L- RT
SEE DETAIL #6
SPECIAL DITCH
STA 35+10 -L- RT TO
STA 35+40 -L- RT
SEE PROFILE FOR GRADE
PROPOSED GRADE
EXISTING GROUND
-L-
+60
+80
32
+20
+40
+60
+80
33
+20
+40
+60
+80
34
+20

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3303	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

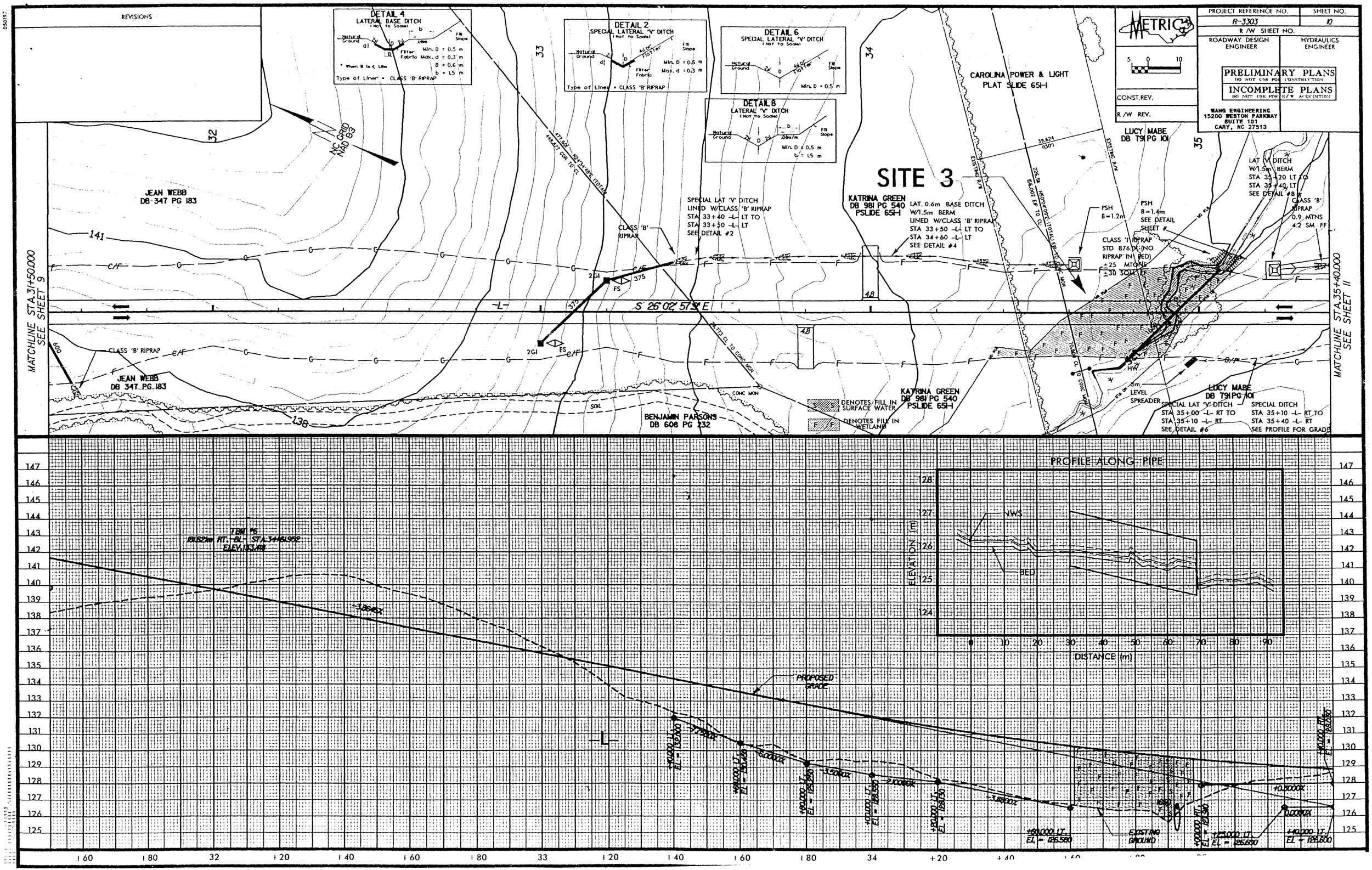
CONST. REV.

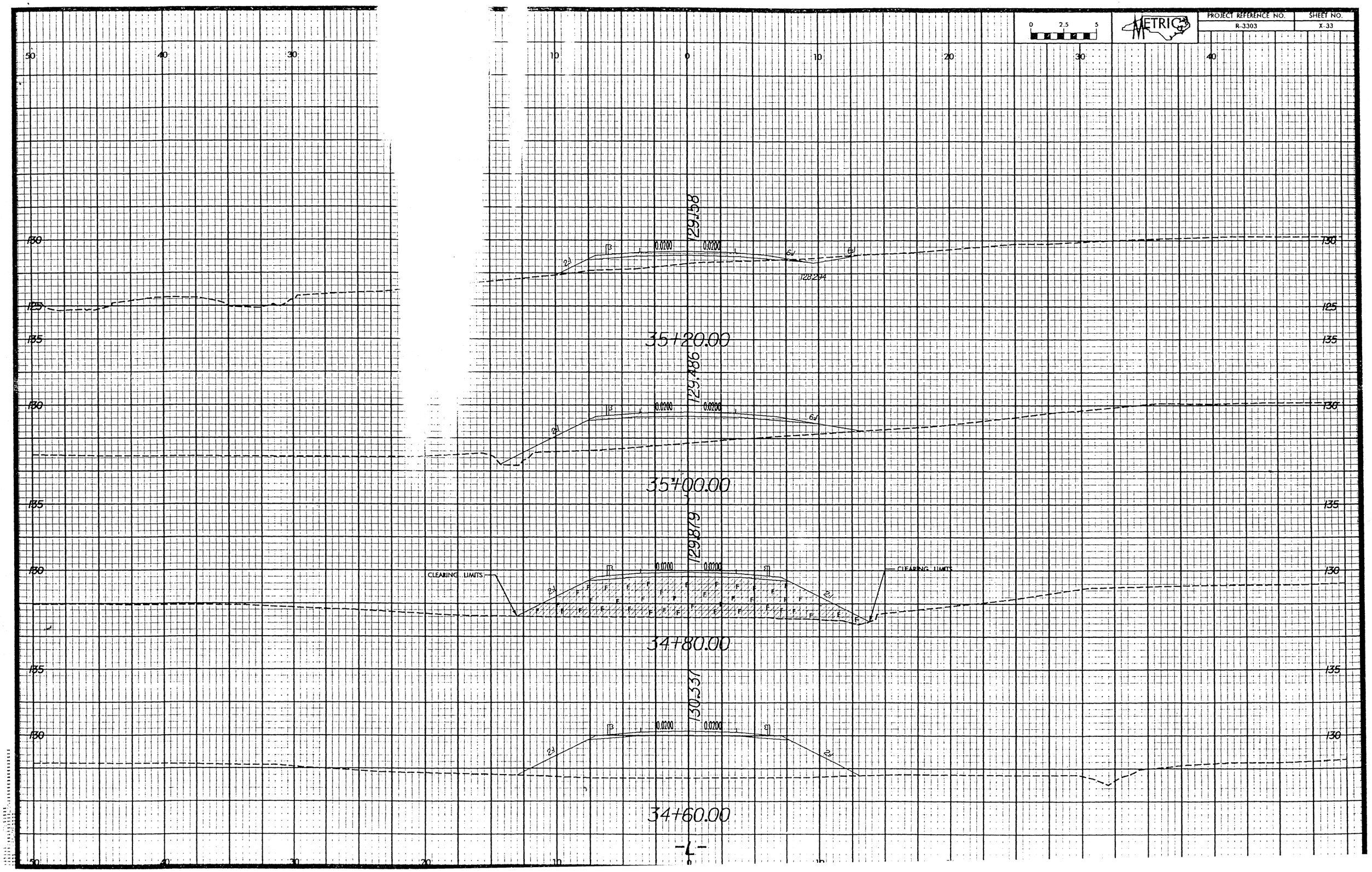
R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513




METRIC
0 2.5 5
PROJECT REFERENCE NO.
R-3303
SHEET NO.
X-33
50 40 30 10 0 10 20 30 40
130
125
135
130
129.58
0.0200
0.0200
2:1
6:1
128.294
35+20.00
129.486
35+00.00
129.879
CLEARING LIMITS
34+80.00
130.331
34+60.00
-L-

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3303	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

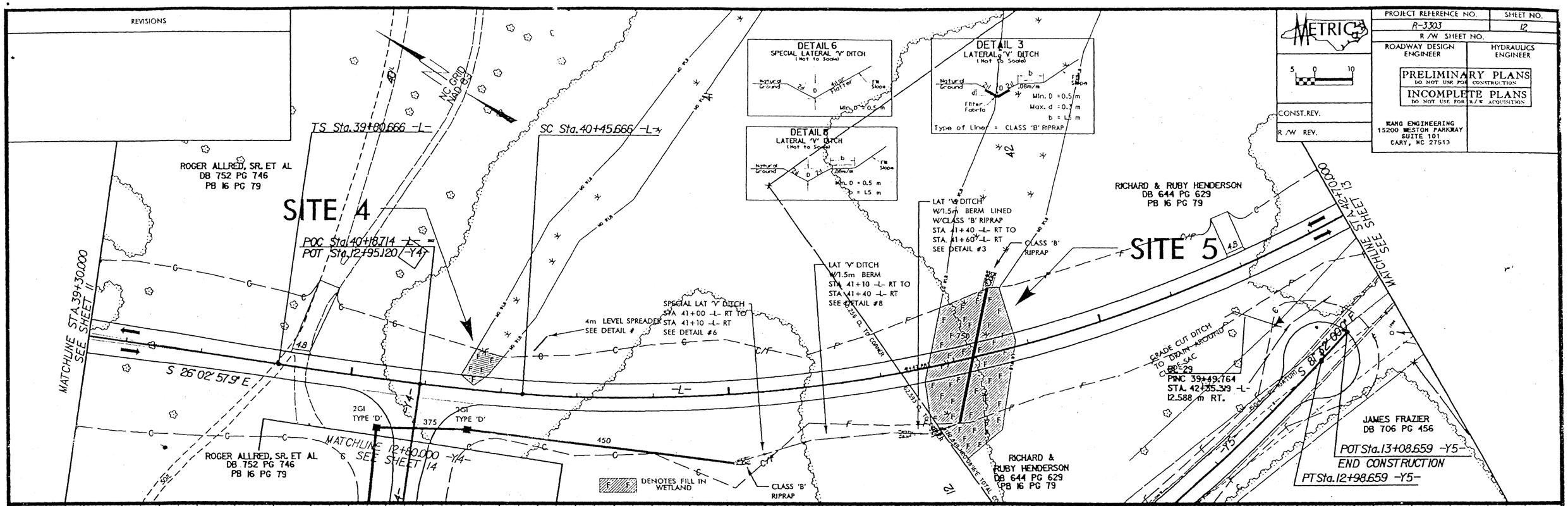
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

CONST. REV.

R/W REV.

RAMO ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513

METRIC 5 0 10



REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3303	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

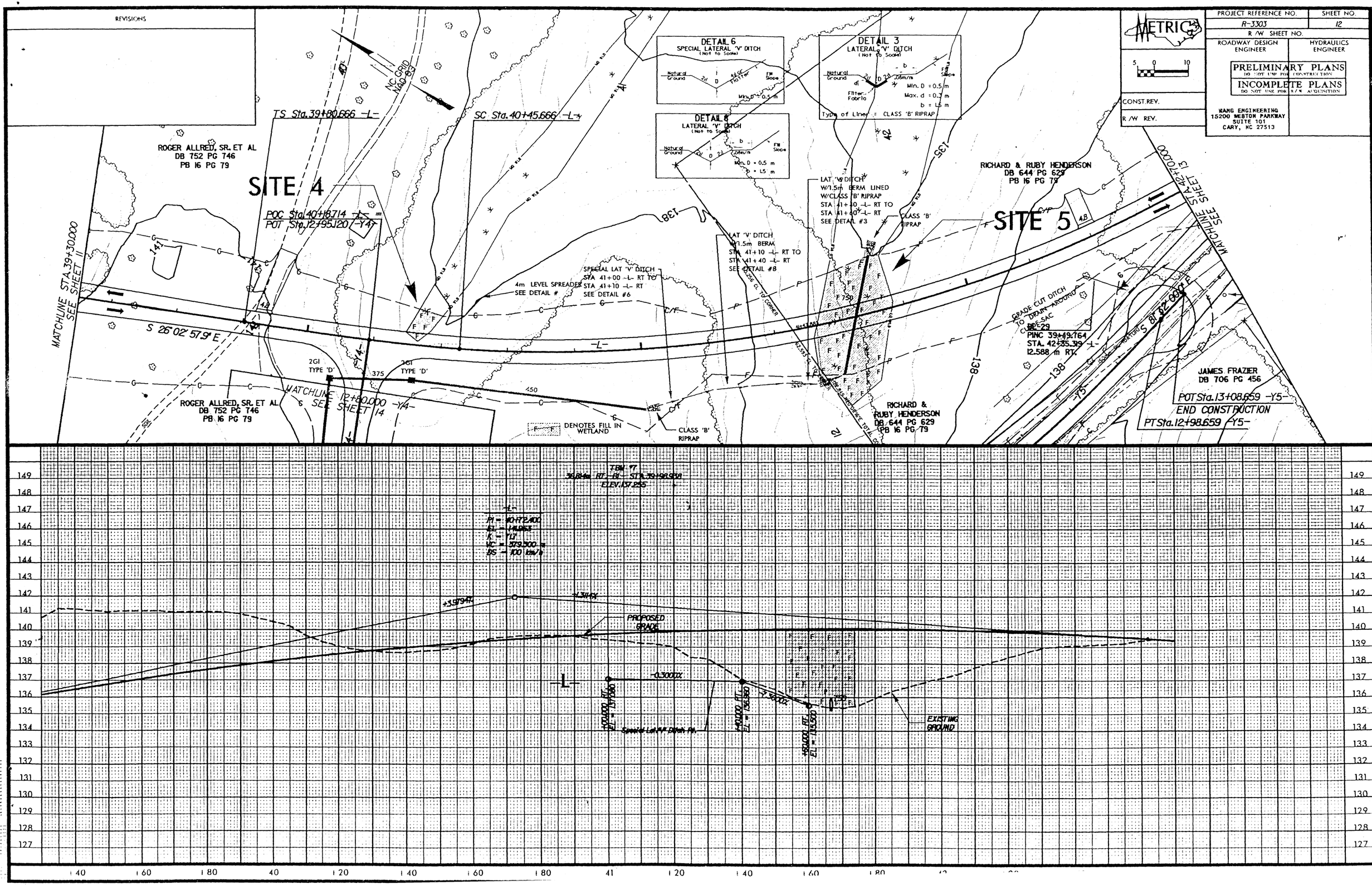
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

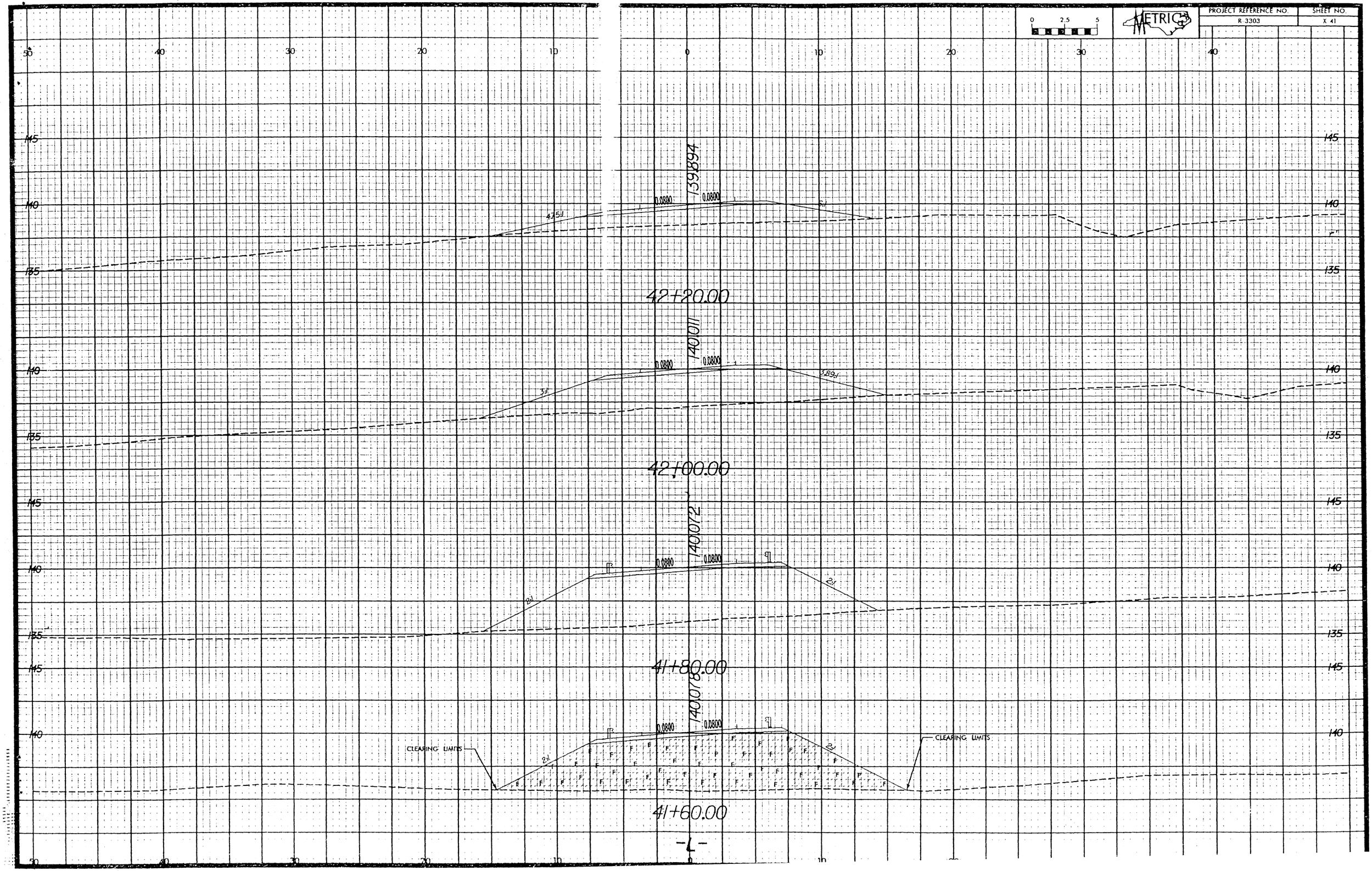
CONST. REV.

R/W REV.

WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513

METRIC
5 0 10



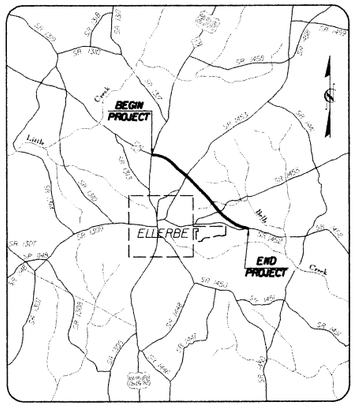

METRIC
0 2.5 5
PROJECT REFERENCE NO.
R-3303
SHEET NO.
X 41
50
40
30
20
10
0
10
20
30
40
145
140
135
139894
0.0800
0.0800
4.75:1
5:1
42+20.00
140011
0.0800
0.0800
5:1
4.89:1
42+00.00
140072
0.0800
0.0800
2:1
2:1
41+80.00
140078
0.0800
0.0800
CLEARING LIMITS
CLEARING LIMITS
41+60.00
-L-

R-3303

PROJECT: 34527.2.2

(SENT TO RA/: 30 MAY 2003)

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RICHMOND COUNTY

LOCATION: NC 73 EXTENSION FROM EXISTING NC 73/ US 220 TO SR 1452 (CHURCH STREET)

TYPE OF WORK: GRADING, DRAINAGE, AND PAVING.

METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

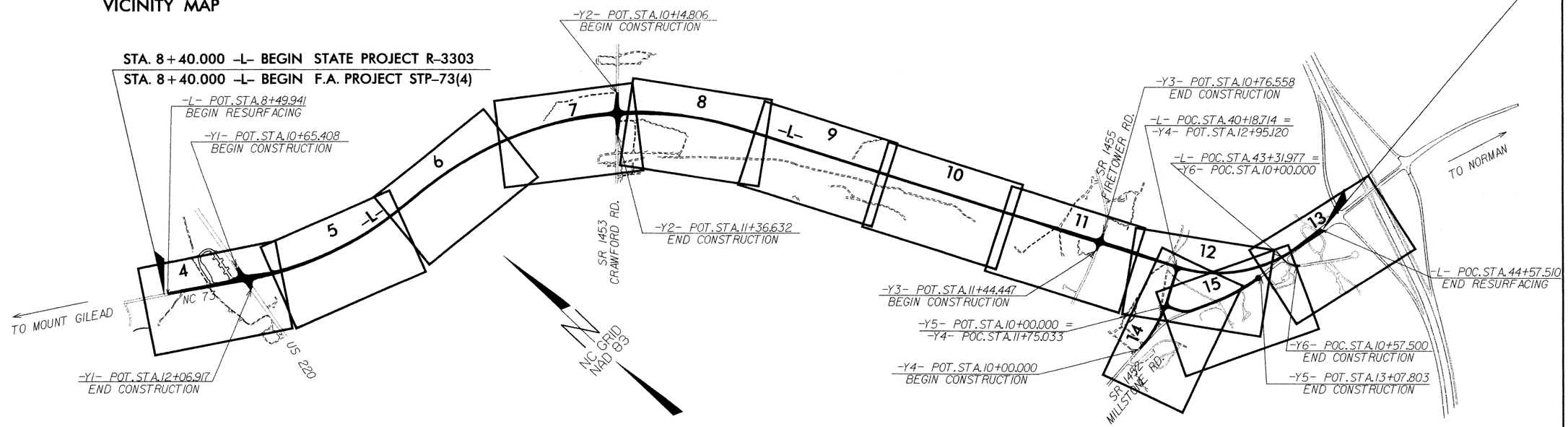
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3303	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
8.1581201	STP-73(4)	P.E.
34527.2.2	STP-73(4)	R/W & UTILITIES

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STA. 44+60.000 -L- END STATE PROJECT R-3303
STA. 44+60.000 -L- END F.A. PROJECT STP-73(4)

STA. 8+40.000 -L- BEGIN STATE PROJECT R-3303
STA. 8+40.000 -L- BEGIN F.A. PROJECT STP-73(4)



NCDOT CONTACT: TERESA BRUTON, P.E., PROJECT ENGINEER - DESIGN SERVICES

*CLEARING ON THIS PROJECT SHALL BE ESTABLISHED BY METHOD III (USE METHOD II IN WETLAND AREAS).

GRAPHIC SCALE

5m 0 10m
PLANS

5m 0 10m
PROFILE (HORIZONTAL)

1m 0 2m
PROFILE (VERTICAL)

DESIGN DATA

ADT 2004 = 3680
ADT 2024 = 6460
DHV = 12 %
D = 60 %
T = 2 % *
* TTST 1% DUAL 3%
V = 100 km/h

PROJECT LENGTH

LENGTH ROADWAY F.A. PROJECT STP-73(4) = 3.620 km

TOTAL LENGTH STATE PROJECT 34527.2.2 = 3.620 km

Prepared In the Office of:
WANG ENGINEERING COMPANY, INC.
CARY, N.C.
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY 30, 2003

LETTING DATE:
OCTOBER 19, 2004

GREG S. PURVIS, P.E.
PROJECT ENGINEER

SCOTT L. KENNEDY
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

REVISIONS

R-3303	4
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

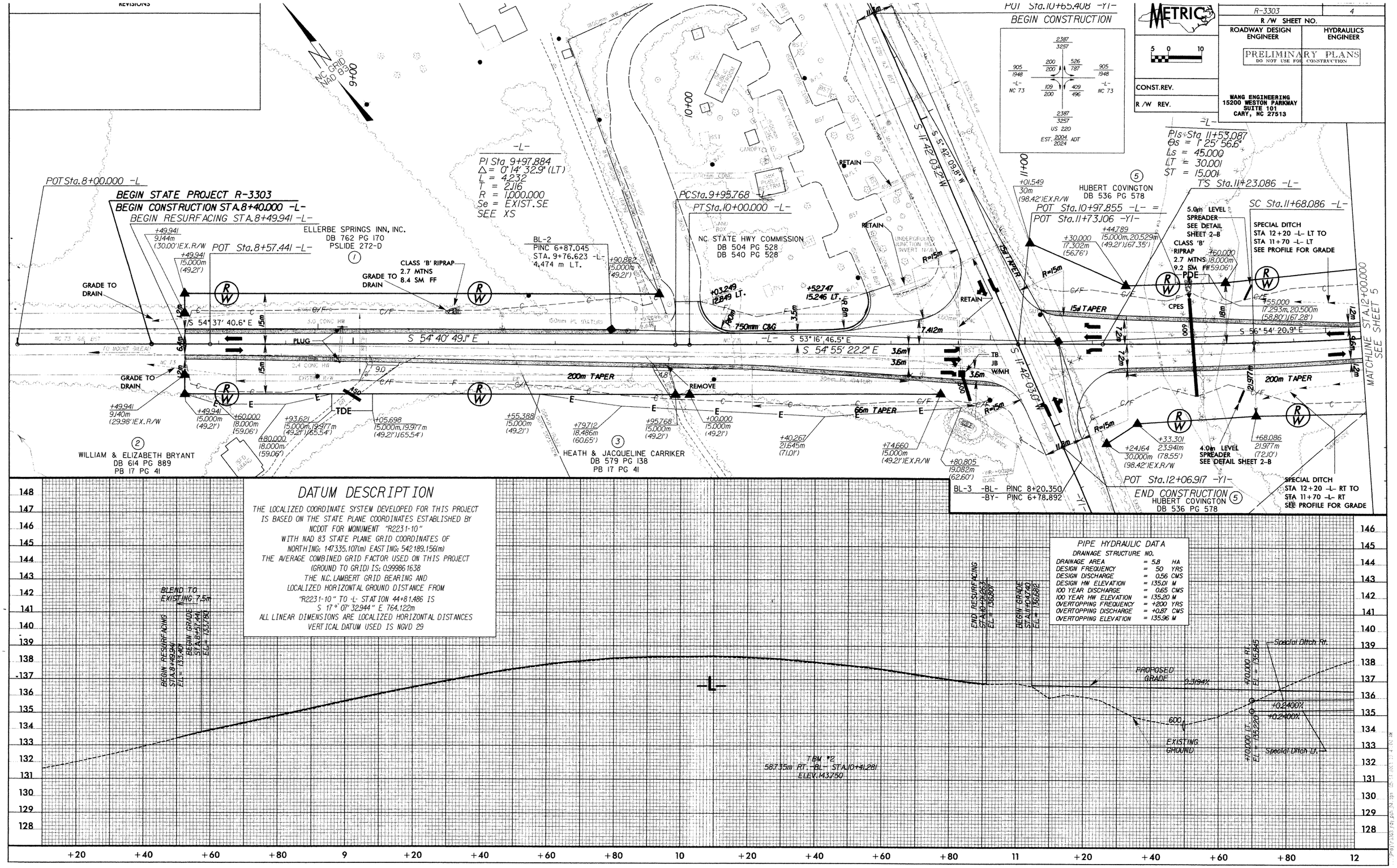
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513

CONST.REV.

R /W REV.

METRIC 5 0 10



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2231-10"
WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 147335.107(m) EASTING: 542189.156(m)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99986 1638
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2231-10" TO -L- STATION 44+81.486 IS S 17° 07' 32.944" E 764.122m
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	5.8	HA
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	0.56	CMS
DESIGN HW ELEVATION	=	135.01	M
100 YEAR DISCHARGE	=	0.65	CMS
100 YEAR HW ELEVATION	=	135.20	M
OVERTOPPING FREQUENCY	=	+200	YRS
OVERTOPPING DISCHARGE	=	+0.87	CMS
OVERTOPPING ELEVATION	=	135.96	M

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3303	5
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R /W REV.

WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not To Scale)

Type of Liner = CLASS 'B' RIPRAP
STA. 13+80.000 -L- LT. TO STA. 14+00.000 -L- LT.

DETAIL 1
BERM DITCH
(Not To Scale)

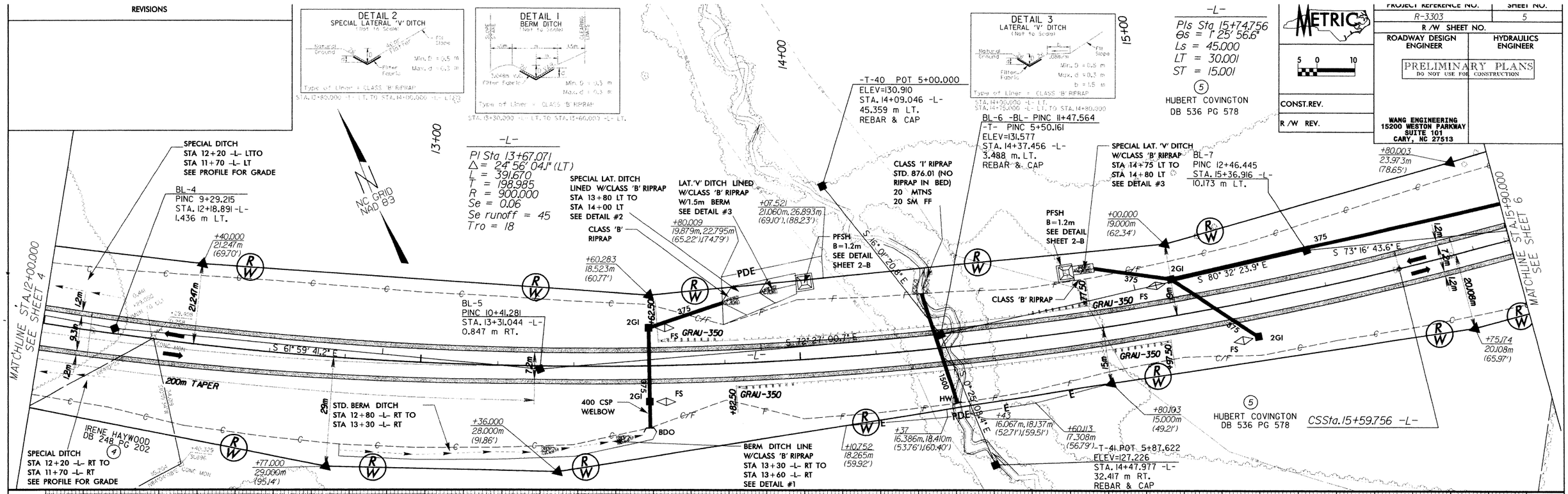
Type of Liner = CLASS 'B' RIPRAP
STA. 13+30.000 -L- LT. TO STA. 13+60.000 -L- LT.

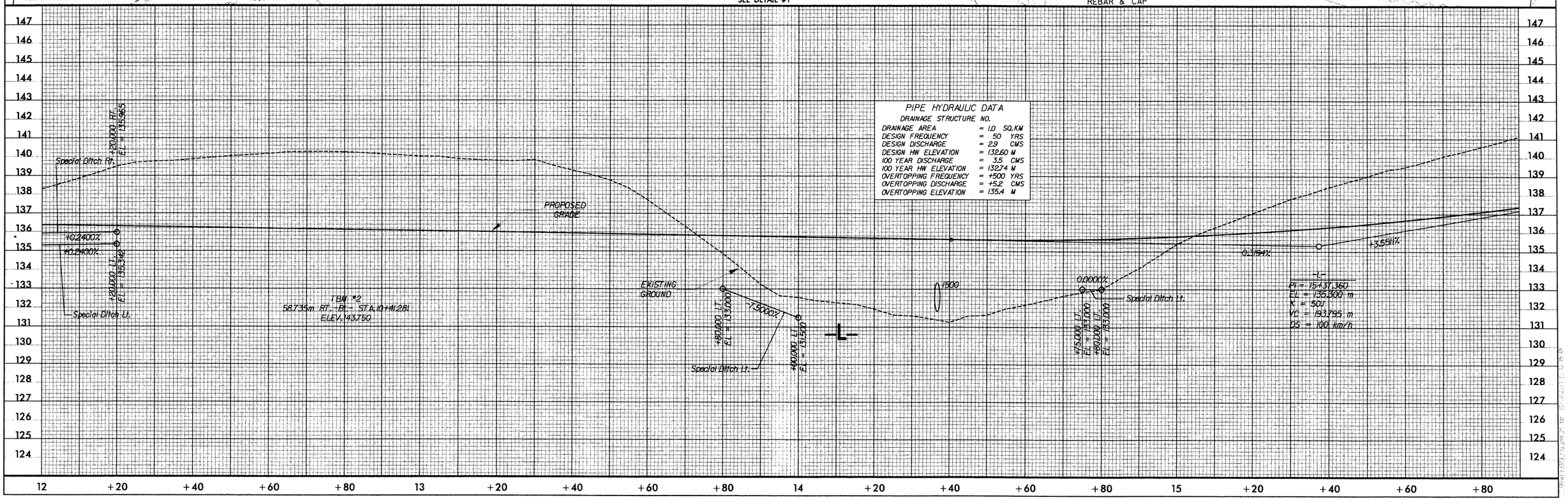
DETAIL 3
LATERAL 'V' DITCH
(Not To Scale)

Type of Liner = CLASS 'B' RIPRAP
STA. 14+00.000 -L- LT.
STA. 14+75.000 -L- LT. TO STA. 14+80.000

-L-
PIs Sta 15+74.756
Θs = 1° 25' 56.6"
Ls = 45.000
LT = 30.001
ST = 15.001

(5) HUBERT COVINGTON
DB 536 PG 578





PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 1.0	SQ.KM
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 2.9	CMS
DESIGN HW ELEVATION	= 132.60	M
100 YEAR DISCHARGE	= 3.5	CMS
100 YEAR HW ELEVATION	= 132.74	M
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= +5.2	CMS
OVERTOPPING ELEVATION	= 135.4	M

REVISIONS

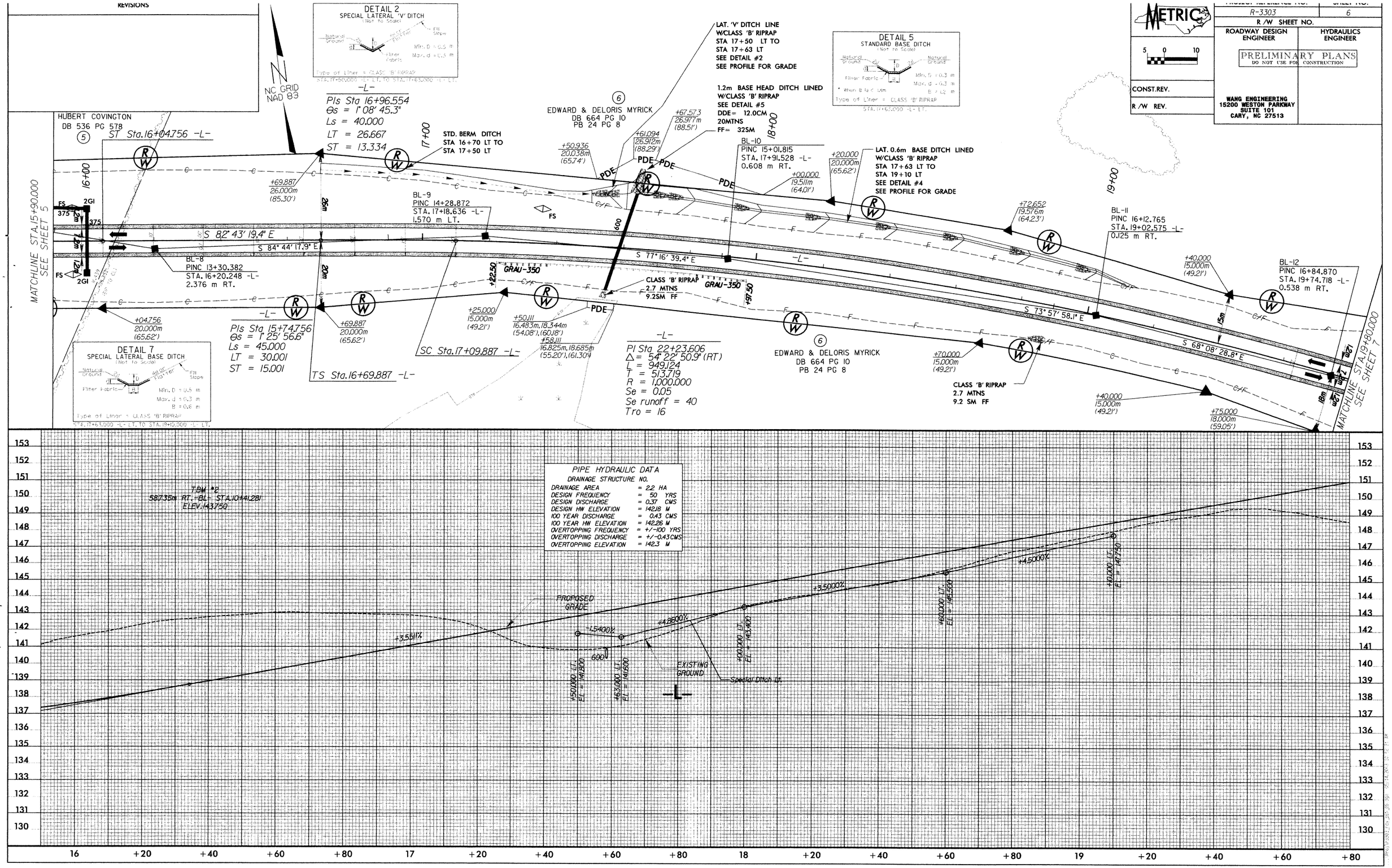
PROJECT REFERENCE NO.	SHEET NO.
R-3303	6
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R /W REV.

WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513



REVISIONS

DETAIL 7
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground — 60:1 Max. Fill Slope — Fill Slope — Filter Fabric — D — B
Min. D = 0.5 m
Max. d = 0.3 m
B = 0.6 m
Type of Liner = CLASS 'B' RIPRAP
STA. 19+97.000 -L- LT. TO STA. 21+40.000 -L- LT.

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

Natural Ground — 60:1 Max. Fill Slope — Fill Slope — D
Min. D = 0.5 m
STA. 23+20.000 -L- LT. TO STA. 24+50.000 -L- LT.

METRIC
5 0 10

R-3303	7
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R /W REV.

WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513

LYRLIE TREECE
DB 285 PG 165
PB 24 PG 8

-L-
PI Sta 22+23.606
Δ = 54° 22' 50.9" (RT)
L = 949.124
T = 513.719
R = 1,000.000
Se = 0.05
Se runoff = 40
Tro = 16

NC GRID NAD 83

LAT. 0.6m BASE DITCH
W/CLASS 'B' RIPRAP
STA 19+97 LT TO
STA 21+40 LT -L-
SEE DETAIL #7
SEE PROFILE FOR GRADE

BL-13
PINC 17+67.623
STA. 20+57.495 -L-
0.397 m LT.

+00.000
24.000m
(78.74')

+48.173
26.899m
(88.25')

+94.753
21.559m
(70.73')

20+00

21+00

22+00

23+00

CLASS 'B' RIPRAP

450 PPES

375 FS 2GI

375 FS 2GI

100.0m TAPER

67.0m TAPER

S 58° 26' 55.3" E

S 64° 40' 40.6" E

S 51° 12' 22.9" E

+40.000
15.000m
(49.21')

BL-14
PINC 18+95.062
STA. 22+84.904 -L-
1.376 m LT.

+22.000
14.865m
(48.76')

+20.000
17.381m
(57.02')

6 EDWARD & DELORIS MYRICK
DB 664 PG 10
PB 24 PG 8

BL-15 -BL- PINC 20+27.373
-BYL- PINC 6+75.750

+78.649
16.785m
(55.07')

POC Sta. 23+10.471 -L- =
POT Sta. 10+74.906 -Y2-
S 46° 50' 23.1" W

+03.692 -Y2-
13.982m
(45.87')

POT Sta. 11+36.632 -Y2-
END CONSTRUCTION

+28.619 -Y2-
9.111m
(29.89')EX.R/W

6 EDWARD & DELORIS MYRICK
DB 664 PG 10
PB 24 PG 8

POT Sta. 10+14.806 -Y2-
BEGIN CONSTRUCTION

+14.806 -Y2-
9.129m, 11.500m
EX. R/W (29.95'), (37.73')

+14.806 -Y2-
11.500m
(37.73')

+14.806 -Y2-
9.159m
(30.05')EX.R/W

+45.887 -Y2-
14.062m
(46.13')

+81.844
15.000m
(49.21')

CLASS 'B' RIPRAP
2.7 MTNS
9.2 SM FF

+44.128 -Y2-
11.322m
(37.15')

SPECIAL LAT. 'V' DITCH
STA 23+20 LT TO
STA 24+50 LT -L-
SEE DETAIL #6
SEE PROFILE FOR GRADE

7 JEAN WEBB
DB 347 PG 183

+35.048
20.083m
(65.89')

67.0m TAPER

+39.920
17.000m
(55.77')

+56.755
17.000m, 25.928m
(55.77')(85.07')

7 JEAN WEBB
DB 347 PG 183

+04.965 -Y2-
15.000m
(49.21')

+19.934
12.258m
(40.22')

POT Sta. 11+30.157 -Y2- 8
+36.632 -Y2-
9.178m
(30.11')EX.R/W
GUY L. WEBB JR.
DB 604 PG 402

MATCHLINE STA. 19+80.000
SEE SHEET 6

MATCHLINE STA. 23+70.000
SEE SHEET 8

CLASS 'B' RIPRAP
1.8 MTNS
5.9 SM FF

PDE

+97.000
25.982m, 30.000m
(85.24'), (98.43')

+88.000
26.000m, 30.000m
(85.30'), (98.43')

526/787
1322/2540 -L- NC 73
209/296 309/396
100/100 209/296
526/787
SR 1453
EST. 2004/2024 ADT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	0.84 HA
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	0.14 CMS
DESIGN HW ELEVATION	=	149.38 M
100 YEAR DISCHARGE	=	0.17 CMS
100 YEAR HW ELEVATION	=	149.43 M
OVERTOPPING FREQUENCY	=	+ 100 YRS
OVERTOPPING DISCHARGE	=	+ 0.17 CMS
OVERTOPPING ELEVATION	=	149.7 M

TBW #4
67.210m RT. -BL- STA. 27+46.324
ELEV. 148.895

PROPOSED GRADE

EXISTING GROUND

-L-
PI = 23+06.830
EL = 162.325 m
K = 9016
VC = 514.374 m
DS = 100 km/h

+3.5511%

-2.1332%

0.30000%

Special Ditch Lt.

Special Lat. 'V' Ditch Lt.

+97.000 LT.
EL = 148.000

+20.000 LT.
EL = 149.250

+40.000 LT.
EL = 149.500

+60.000 LT.
EL = 150.200

+80.000 LT.
EL = 151.200

+100.000 LT.
EL = 152.000

+120.000 LT.
EL = 153.500

+140.000 LT.
EL = 154.500

+200.000 LT.
EL = 158.190

+1.0900%

+1.2500%

+3.5000%

+5.0000%

+4.0000%

+1.5000%

+5.0000%

166 165 164 163 162 161 160 159 158 157 156 155 154 153 152 151 150 149 148 147

+80 20 +20 +40 +60 +80 21 +20 +40 +60 +80 22 +20 +40 +60 +80 23 +20 +40 +60

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3303	8
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

METRIC 5 0 10

CONST.REV.

R /W REV.

WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513

DETAIL 6
SPECIAL LATERAL 'V' DITCH
(Not To Scale)

Natural Ground — Fill Slope — Min. D = 0.5 m

STA. 23+20.000 -L- LT. TO STA. 24+50.000 -L- LT.
STA. 24+80.000 -L- RT. TO STA. 25+40.000 -L- RT.
STA. 27+00.000 -L- RT. TO STA. 28+40.000 -L- RT.

DETAIL 7
SPECIAL LATERAL BASE DITCH
(Not To Scale)

Natural Ground — Fill Slope — Filter Fabric — Min. D = 0.5 m — Max. d = 0.3 m — B = 0.6 m

Type of Liner = CLASS 'B' RIPRAP

STA. 25+40.000 -L- LT. TO STA. 26+00.000 -L- LT.

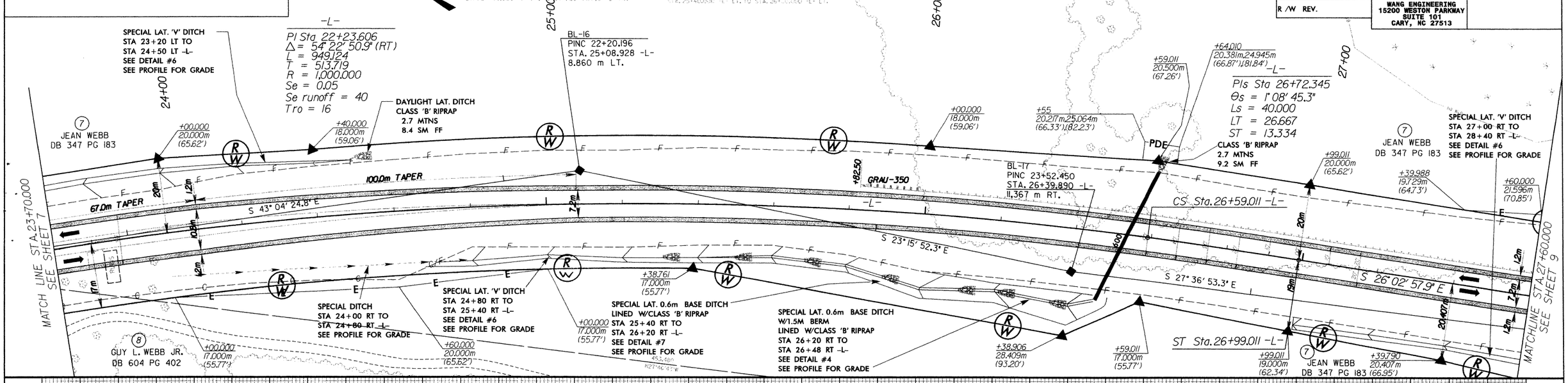
DETAIL 4
LATERAL BASE DITCH
(Not To Scale)

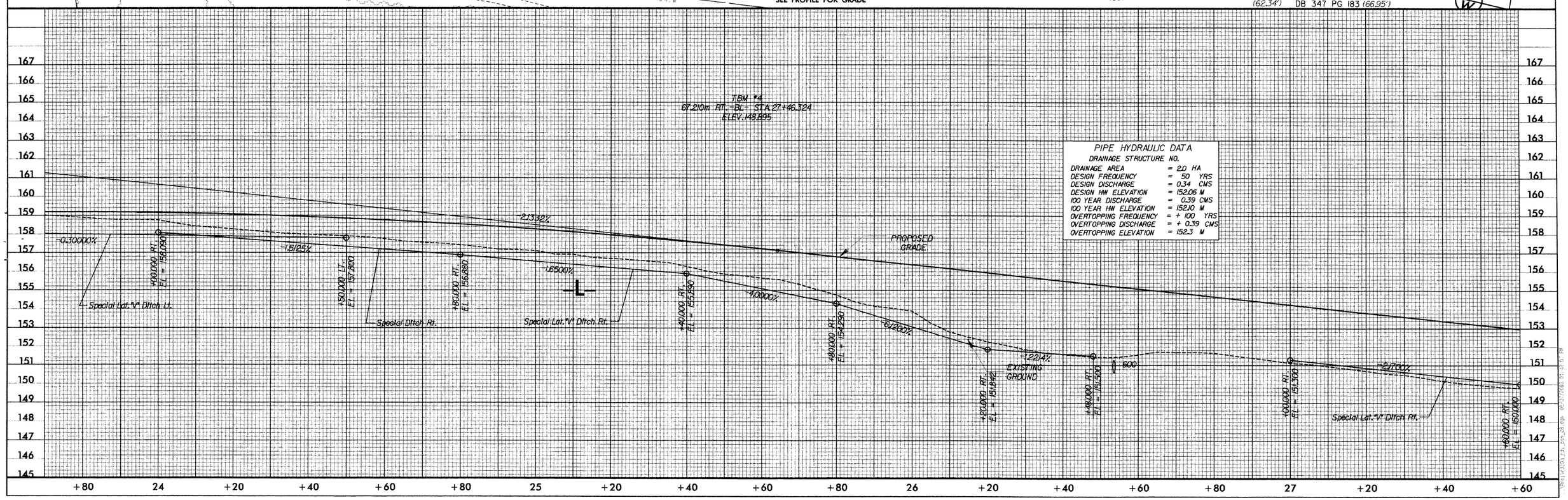
Natural Ground — Fill Slope — Filter Fabric — Min. D = 0.5 m — Max. d = 0.3 m — B = 0.6 m — b = 1.5 m

* When B is < 0.8m

Type of Liner = CLASS 'B' RIPRAP

STA. 26+20.000 -L- LT. TO STA. 26+48.000 -L- LT.





REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3303	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513

DETAIL 6
SPECIAL LATERAL 'V' DITCH
(Not To Scale)
Natural Ground, Fill Slope, Min. D = 0.5 m
STA. 27+00.000 -L- RT. TO STA. 28+40.000 -L- RT.

DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not To Scale)
Natural Ground, Fill Slope, Filter Fabric, Min. D = 0.5 m, Max. d = 0.5 m
Type of Liner = CLASS 'B' RIPRAP
STA. 30+80.000 -L- LT. TO STA. 31+50.000 -L- LT.

DETAIL 5
STANDARD BASE DITCH
(Not To Scale)
Natural Ground, Filter Fabric, Min. D = 0.3 m, Max. d = 0.3 m, B = 1.2 m
* When B is < 1.8m
Type of Liner = CLASS 'B' RIPRAP
STA. 31+36.500 -L- LT.

NC GRID NAD 83

28+00 29+00 30+00 31+00

CLASS 'B' RIPRAP
2.7 MTNS
9.2 SM FF

(7) JEAN WEBB
DB 347 PG 183

+97
19.351m, 23.000m
(63.49'), (75.46')

+03
19.311m, 23.000m
(63.36'), (75.48')

+60.000
21.596m
(70.85')

+79.987
19.464m
(63.86')

PDE

+50.000
19.000m
(62.34')

+40.000
18.000m
(59.06')

BL-18
PINC 27+24.020
STA. 30+11.776 -L-
2.039 m RT.

SPECIAL LAT. 'V' DITCH LINED
W/CLASS 'B' RIPRAP
STA 30+80 LT TO
STA 31+50 LT -L-
SEE DETAIL #2

CLASS 'B' RIPRAP

+30.000
19.158m, 27.000m
(62.85'), (88.58')

(7) JEAN WEBB
DB 347 PG 183

1.2m BASE HEAD
DITCH LINED
W/CLASS 'B' RIPRAP
SEE DETAIL #5
DDE=10.5 CM
18 MTNS
26 SM FF

+40.000
18.789m, 27.000m
(61.65'), (88.58')

PDE

+80
21m
(68.90')

BL-19
PINC 28+41.949
STA. 31+29.705 -L-
1.921 m RT.

MATCHLINE STA. 27+60.000
SEE SHEET 8

MATCHLINE STA. 31+50.000
SEE SHEET 10

GRAU-350

-L-

S 27° 36' 53.3" E

S 26° 02' 57.9" E

S 26° 06' 23.7" E

PPES

FS

2GI

SPECIAL LAT. 'V' DITCH
STA 27+00 RT TO
STA 28+40 RT -L-
SEE DETAIL #6
SEE PROFILE FOR GRADE

+03.000
26.000m
(85.30')

+50.000
19.000m
(62.34')

(7) JEAN WEBB
DB 347 PG 183

+20.000
18.000m
(59.06')

SPECIAL DITCH
STA 30+20 RT TO
STA 30+40 RT -L-

(7) JEAN WEBB
DB 347 PG 183

+00.000
18.000m
(59.06')

+40.000
25.000m
(82.02')

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	1.2 HA
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	0.20 CMS
DESIGN HW ELEVATION	=	149.47 M
100 YEAR DISCHARGE	=	0.24 CMS
100 YEAR HW ELEVATION	=	149.54 M
OVERTOPPING FREQUENCY	=	+/-100 YRS
OVERTOPPING DISCHARGE	=	+/-0.24 CMS
OVERTOPPING ELEVATION	=	149.6 M

TBM #8
135.95m LT. -BL- STA. 31+55.816
ELEV. 128.901

-L-
PI = 29+80.336
EL = 148.258 m
K = 1141
VC = 197.579 m
DS = 100 km/h

-2.5000%
+0.7500%
-2.7332%
-3.0845%
-5.0500%
-5.0000%
-6.0000%
+4.0000%

+60.000 RT.
EL = 150.000

+80.000 RT.
EL = 149.000

+40.000 RT.
EL = 149.500

Special Ditch Rt.

+20.000 RT.
EL = 145.710

+40.000 RT.
EL = 144.700

EXISTING GROUND

PROPOSED GRADE

+80.000 LT.
EL = 142.500

+00.000 LT.
EL = 141.500

+35.000 LT.
EL = 139.340

+50.000 LT.
EL = 139.500

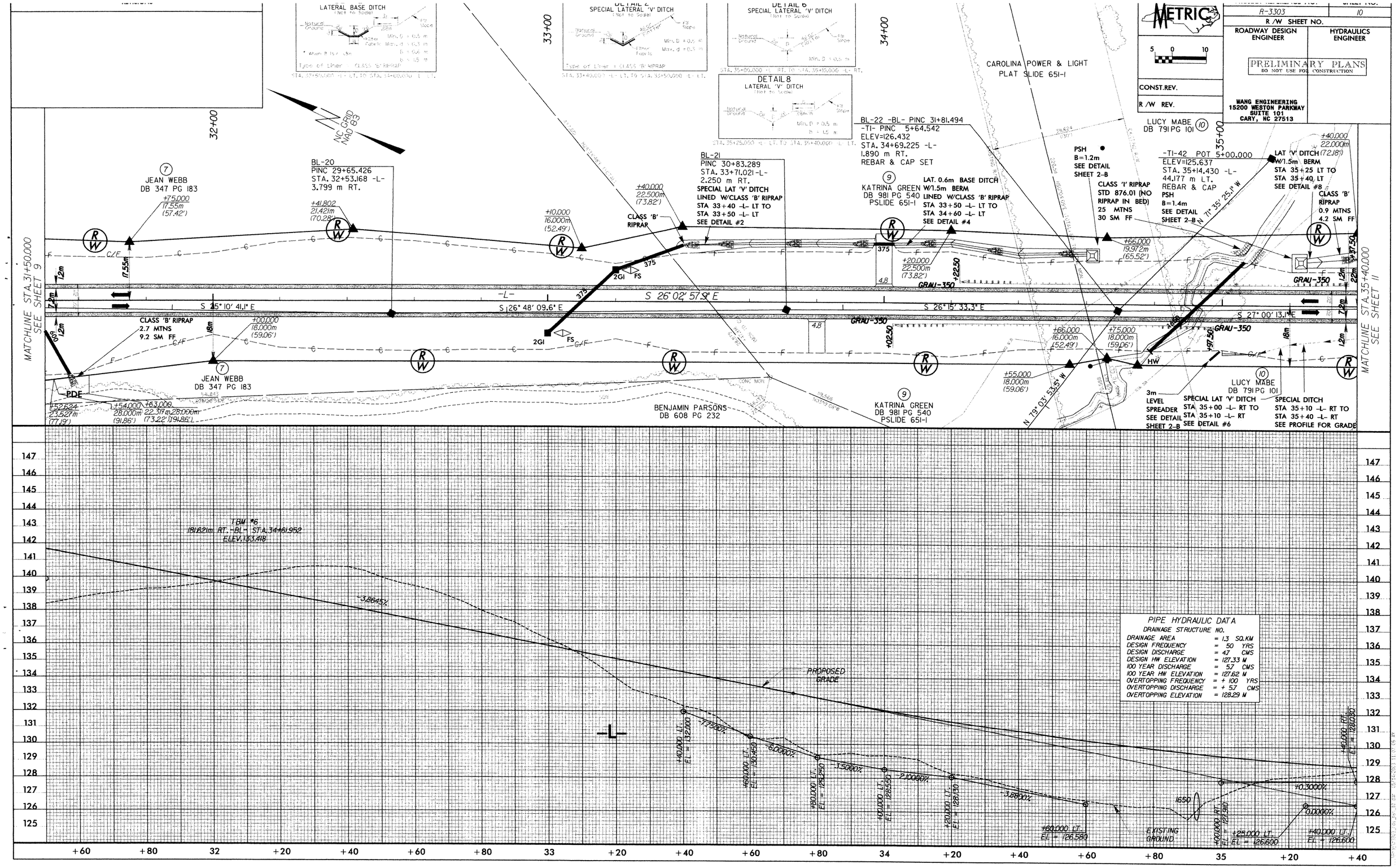
Special Lat. 'V' Ditch Lt.

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	2.2 HA
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	0.37 CMS
DESIGN HW ELEVATION	=	139.88 M
100 YEAR DISCHARGE	=	0.43 CMS
100 YEAR HW ELEVATION	=	139.96 M
OVERTOPPING FREQUENCY	=	+/-100 YRS
OVERTOPPING DISCHARGE	=	+/-0.43 CMS
OVERTOPPING ELEVATION	=	140.0 M

160 159 158 157 156 155 154 153 152 151 150 149 148 147 146 145 144 143 142 141 140 139 138 137

+60 +80 28 +20 +40 +60 +80 29 +20 +40 +60 +80 30 +20 +40 +60 +80 31 +20 +40


METRIC
R-3303
10
R /W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R /W REV.
WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513
LATERAL BASE DITCH
(Not to Scale)
DETAIL 2
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
DETAIL 6
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
DETAIL 8
LATERAL 'V' DITCH
(Not to Scale)
NC GRID NAD 83
32+00
33+00
34+00
35+00
CAROLINA POWER & LIGHT
PLAT SLIDE 651-1
BL-22 -BL- PINC 31+81.494
-TI- PINC 5+64.542
ELEV=126.432
STA. 34+69.225 -L-
1.890 m RT.
REBAR & CAP SET
LUCY MABE
DB 791 PG 101
-TI-42 POT 5+00.000
ELEV=125.637
STA. 35+14.430 -L-
44.177 m LT.
REBAR & CAP
PSH
B=1.4m
SEE DETAIL
SHEET 2-B
BL-20
PINC 29+65.426
STA. 32+53.168 -L-
3.799 m RT.
BL-21
PINC 30+83.289
STA. 33+71.021 -L-
2.250 m RT.
SPECIAL LAT 'V' DITCH
LINED W/CLASS 'B' RIPRAP
STA 33+40 -L- LT TO
STA 33+50 -L- LT
SEE DETAIL #2
CLASS 'B' RIPRAP
LAT. 0.6m BASE DITCH
W/1.5m BERM
LINED W/CLASS 'B' RIPRAP
STA 33+50 -L- LT TO
STA 34+60 -L- LT
SEE DETAIL #4
KATRINA GREEN
DB 981 PG 540
PSLIDE 651-1
JEAN WEBB
DB 347 PG 183
CLASS 'B' RIPRAP
2.7 MTNS
9.2 SM FF
CLASS 'B' RIPRAP
STD 876.01 (NO RIPRAP IN BED)
25 MTNS
30 SM FF
PSH
B=1.2m
SEE DETAIL
SHEET 2-B
LAT 'V' DITCH
W/1.5m BERM
STA 35+25 LT TO
STA 35+40 LT
SEE DETAIL #8
CLASS 'B' RIPRAP
0.9 MTNS
4.2 SM FF
3m LEVEL SPREADER
SEE DETAIL
SHEET 2-B
SPECIAL LAT 'V' DITCH
STA 35+00 -L- RT TO
STA 35+10 -L- RT
SEE DETAIL #6
SPECIAL DITCH
STA 35+10 -L- RT TO
STA 35+40 -L- RT
SEE PROFILE FOR GRADE
MATCHLINE STA.31+50.000
SEE SHEET 9
MATCHLINE STA.35+40.000
SEE SHEET 11
-L-
S 25° 10' 41.1" E
S 26° 48' 09.6" E
S 26° 02' 57.3" E
S 26° 15' 33.3" E
S 27° 00' 13.1" E
N 71° 35' 25.1" W
N 79° 03' 53.5" W
GRAU-350
BENJAMIN PARSONS
DB 608 PG 232
PDE
HW
TBM #6
18.62m RT. -BL- STA.34+61.952
ELEV.133.418
-3.8645%
PROPOSED GRADE
EXISTING GROUND
-7.1000%
-6.0000%
-1.5000%
2.1000%
-3.8800%
+0.3000%
0.0000%
1650
+40.000 LT.
EL = 132.000
+60.000 LT.
EL = 130.450
+80.000 LT.
EL = 128.250
+100.000 LT.
EL = 128.550
+120.000 LT.
EL = 128.150
+140.000 LT.
EL = 128.050
+60.000 LT.
EL = 126.580
+100.000 RT.
EL = 127.910
+25.000 LT.
EL = 126.600
+40.000 LT.
EL = 126.600
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.
DRAINAGE AREA = 1.3 SQ.KM
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 4.7 CMS
DESIGN HW ELEVATION = 127.33 M
100 YEAR DISCHARGE = 5.7 CMS
100 YEAR HW ELEVATION = 127.62 M
OVERTOPPING FREQUENCY = + 100 YRS
OVERTOPPING DISCHARGE = + 5.7 CMS
OVERTOPPING ELEVATION = 128.29 M
147
146
145
144
143
142
141
140
139
138
137
136
135
134
133
132
131
130
129
128
127
126
125
+60
+80
32
+20
+40
+60
+80
33
+20
+40
+60
+80
34
+20
+40
+60
+80
35
+20
+40

PROJECT REFERENCE NO.	SHEET NO.
R-3303	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

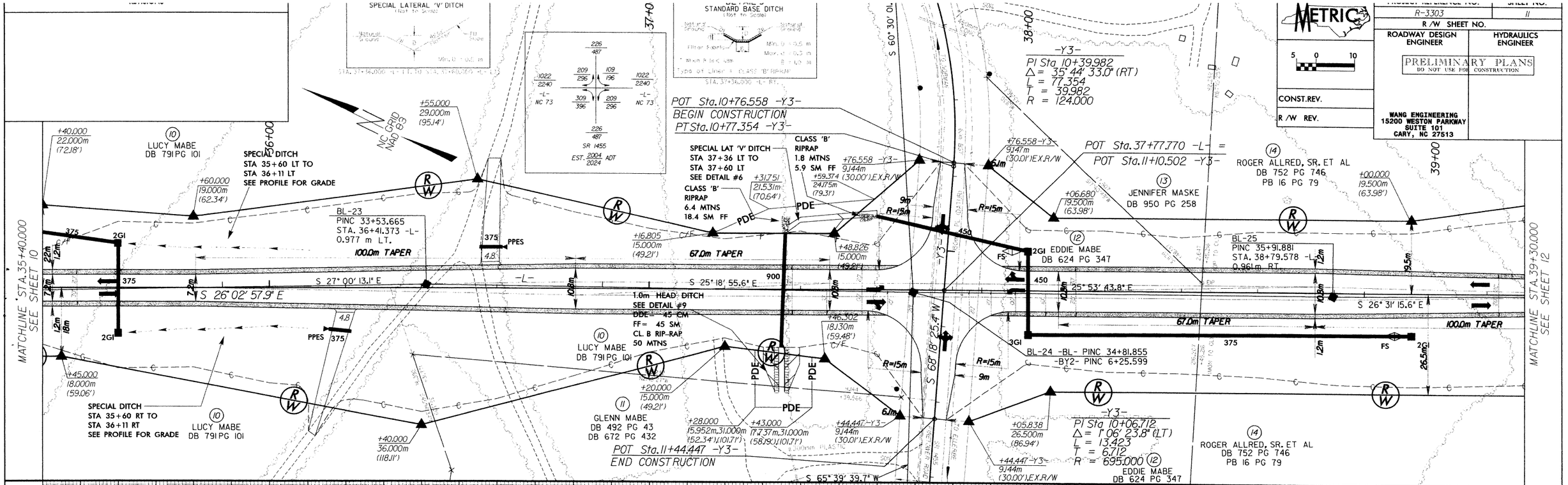
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

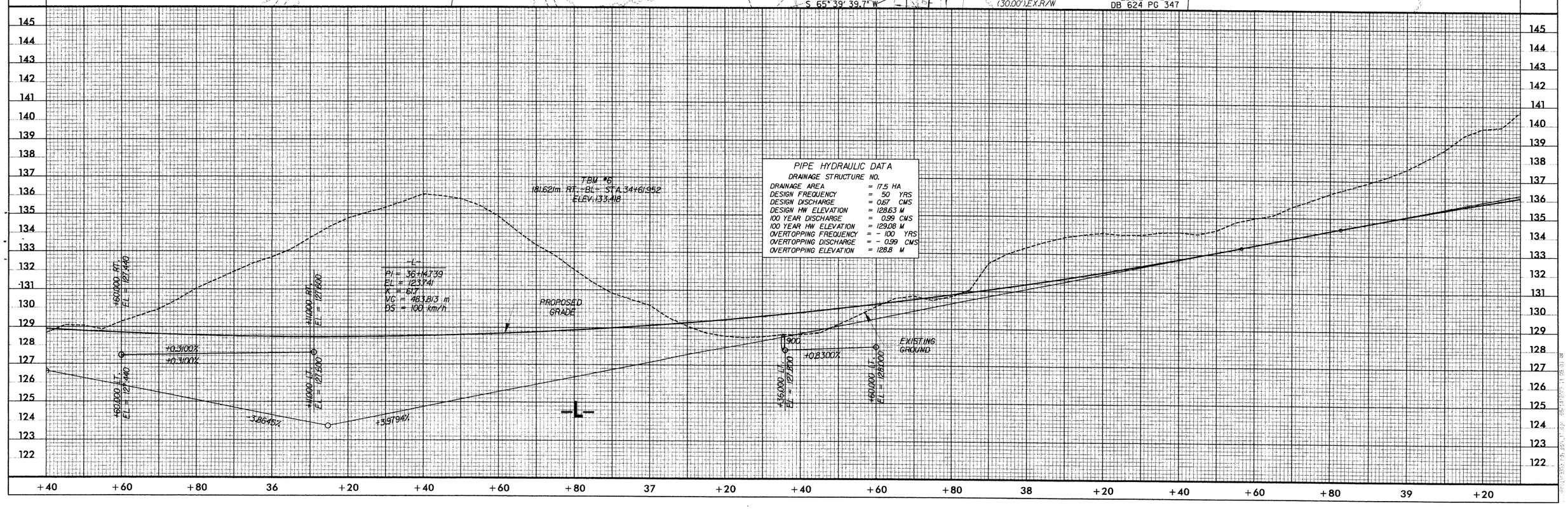
WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513

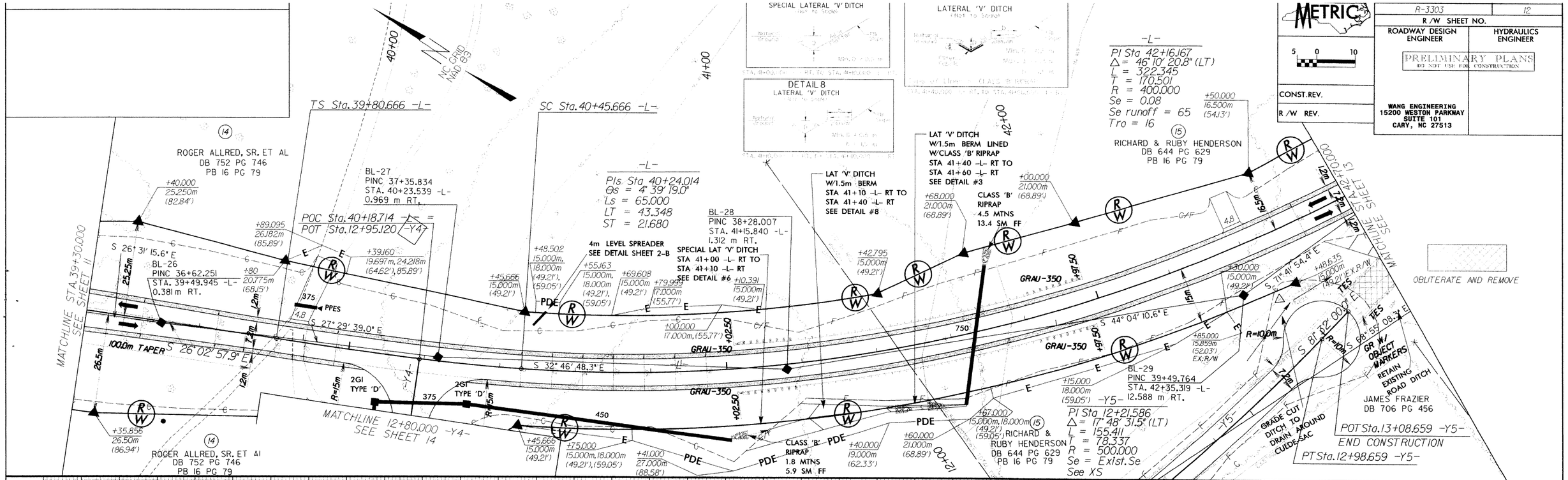
CONST.REV.

R/W REV.

METRIC 5 0 10






METRIC
5 0 10
R-3303
12
R /W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R /W REV.
WANG ENGINEERING
15200 WESTON PARKWAY
SUITE 101
CARY, NC 27513
N.C. GRID NAD 83
SPECIAL LATERAL 'V' DITCH
LATERAL 'V' DITCH
DETAIL 8
LATERAL 'V' DITCH
TS Sta.39+80.666 -L-
SC Sta.40+45.666 -L-
ROGER ALLRED, SR. ET AL
DB 752 PG 746
PB 16 PG 79
BL-27
PINC 37+35.834
STA. 40+23.539 -L-
0.969 m RT.
POC Sta.40+18.714 -L- =
POT Sta.12+95.120 -Y4-
BL-26
PINC 36+62.251
STA. 39+49.945 -L-
0.381 m RT.
PIs Sta 40+24.014
Δs = 4° 39' 19.0"
Ls = 65.000
LT = 43.348
ST = 21.680
BL-28
PINC 38+28.007
STA. 41+15.840 -L-
1.312 m RT.
4m LEVEL SPREADER
SEE DETAIL SHEET 2-B
SPECIAL LAT 'V' DITCH
STA 41+00 -L- RT TO
STA 41+10 -L- RT
SEE DETAIL #6
LAT 'V' DITCH
W/1.5m BERM LINED
W/CLASS 'B' RIPRAP
STA 41+40 -L- RT TO
STA 41+60 -L- RT
SEE DETAIL #3
LAT 'V' DITCH
W/1.5m BERM
STA 41+10 -L- RT TO
STA 41+40 -L- RT
SEE DETAIL #8
CLASS 'B' RIPRAP
4.5 MTNS
13.4 SM FF
PI Sta 42+16.167
Δ = 46° 10' 20.8" (LT)
L = 322.345
T = 170.501
R = 400.000
Se = 0.08
Se runoff = 65
Tro = 16
RICHARD & RUBY HENDERSON
DB 644 PG 629
PB 16 PG 79
MATCHLINE STA.39+30.000
SEE SHEET 11
MATCHLINE 12+80.000 -Y4-
SEE SHEET 14
MATCHLINE STA.42+73.000
SEE SHEET 13
100.0m TAPER
S 26° 02' 57.9" E
S 27° 29' 39.0" E
S 32° 46' 48.3" E
S 44° 04' 10.6" E
S 26° 31' 15.6" E
GRAU-350
2GI TYPE 'D'
CLASS 'B' RIPRAP
1.8 MTNS
5.9 SM FF
PDE
BL-29
PINC 39+49.764
STA. 42+35.319 -L-
12.588 m RT.
PI Sta 12+21.586
Δ = 17° 48' 31.5" (LT)
L = 155.411
T = 78.337
R = 500.000
Se = Exist.Se
See XS
RICHARD & RUBY HENDERSON
DB 644 PG 629
PB 16 PG 79
GRADE CUT DITCH TO DRAIN AROUND CULDE-SAC
GR W/ OBJECT MARKERS
RETAIN EXISTING ROAD DITCH
JAMES FRAZIER
DB 706 PG 456
POT Sta.13+08.659 -Y5-
END CONSTRUCTION
PT Sta.12+98.659 -Y5-
OBLITERATE AND REMOVE
T.BM #7
36.814m RT. -BL- STA.39+98.938
ELEV.137.255
PI = 40+72.400
EL = 141.953
K = 717
VC = 379.300 m
DS = 100 km/h
+3.9794%
-1.3114%
PROPOSED GRADE
-0.3000%
EXISTING GROUND
Special Lat."V" Ditch Pt.
+00.000 RT.
EL = 137.080
+40.000 RT.
EL = 136.860
+60.000 RT.
EL = 135.500
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.
DRAINAGE AREA = 3.0 HA
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 0.65 CMS
DESIGN HW ELEVATION = 136.23 M
100 YEAR DISCHARGE = 0.76 CMS
100 YEAR HW ELEVATION = 136.31 M
OVERTOPPING FREQUENCY = + 500 YRS
OVERTOPPING DISCHARGE = + 1.2 CMS
OVERTOPPING ELEVATION = 137.2 M

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3303	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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R/W REV.

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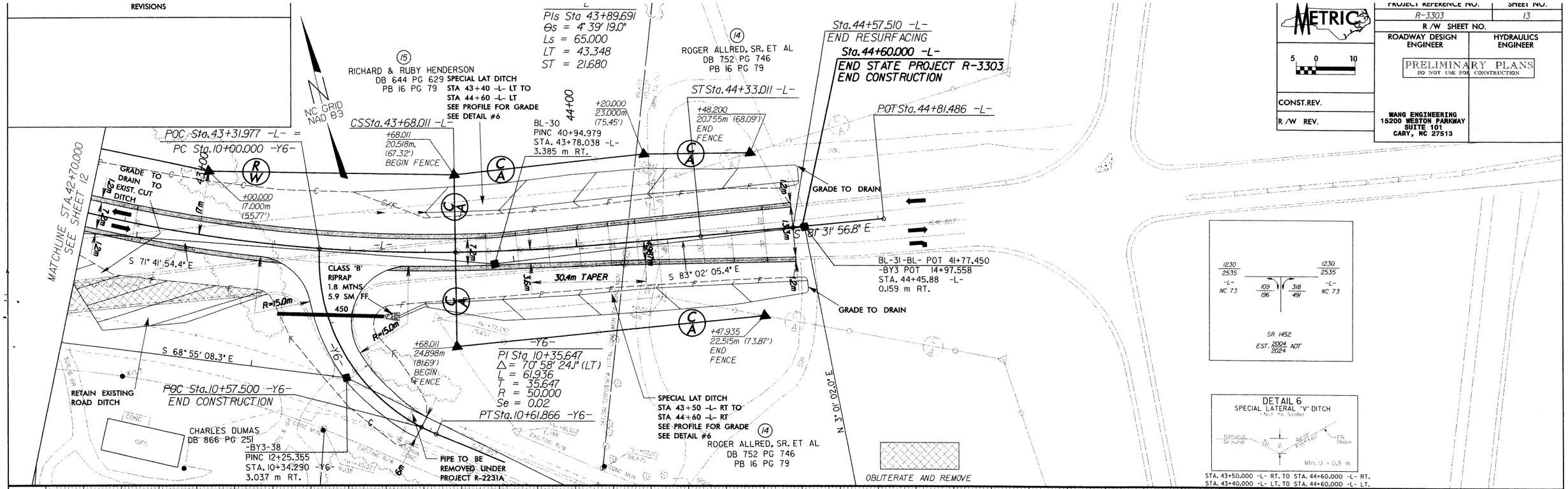
CARY, NC 27513



PARCEL'S 14 & 14A – Parcel 14 divided creating Parcel 14.

R-3303	14
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R /W REV.

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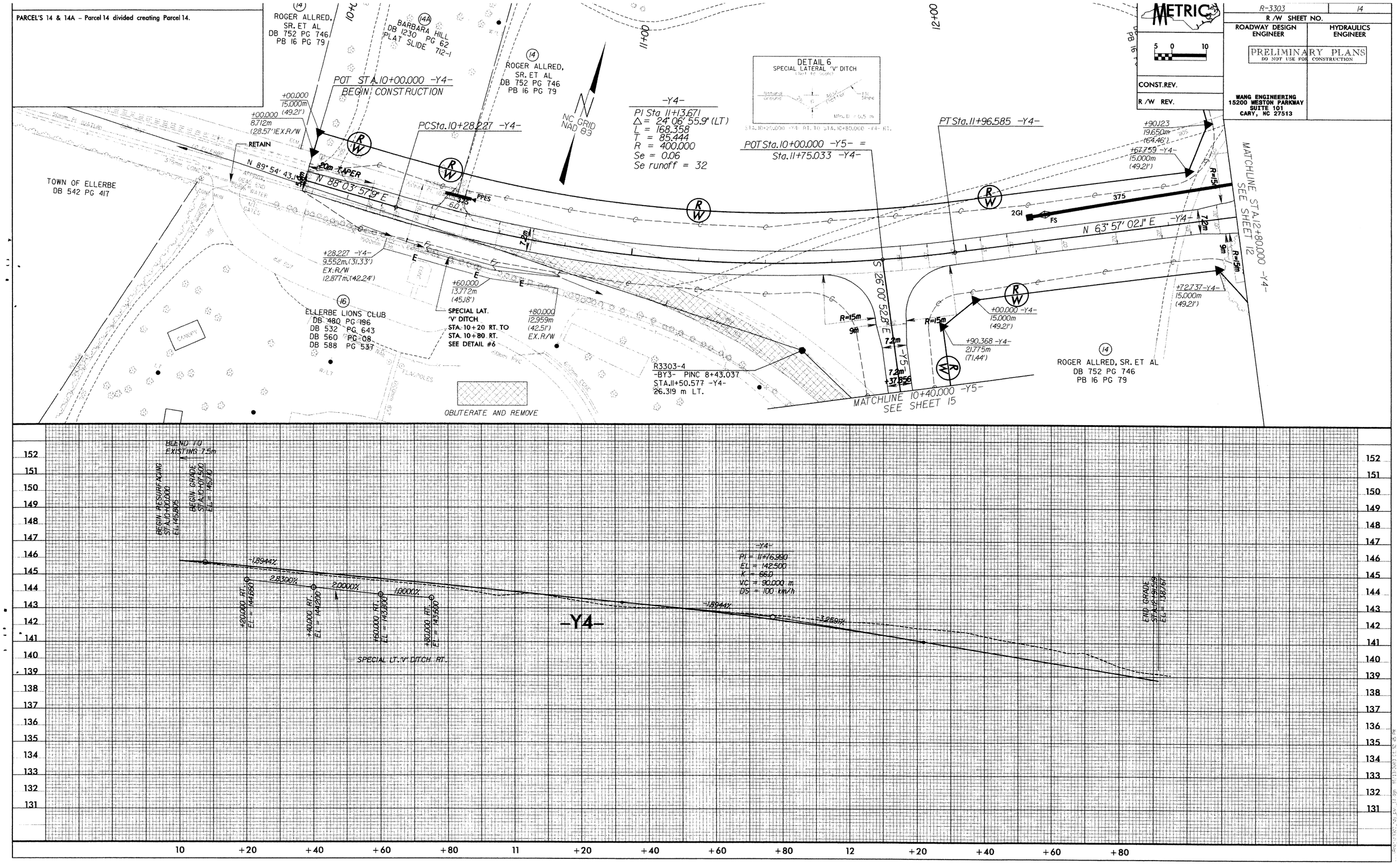
CARY, NC 27513



REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3303	15
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R /W REV.

WANG ENGINEERING
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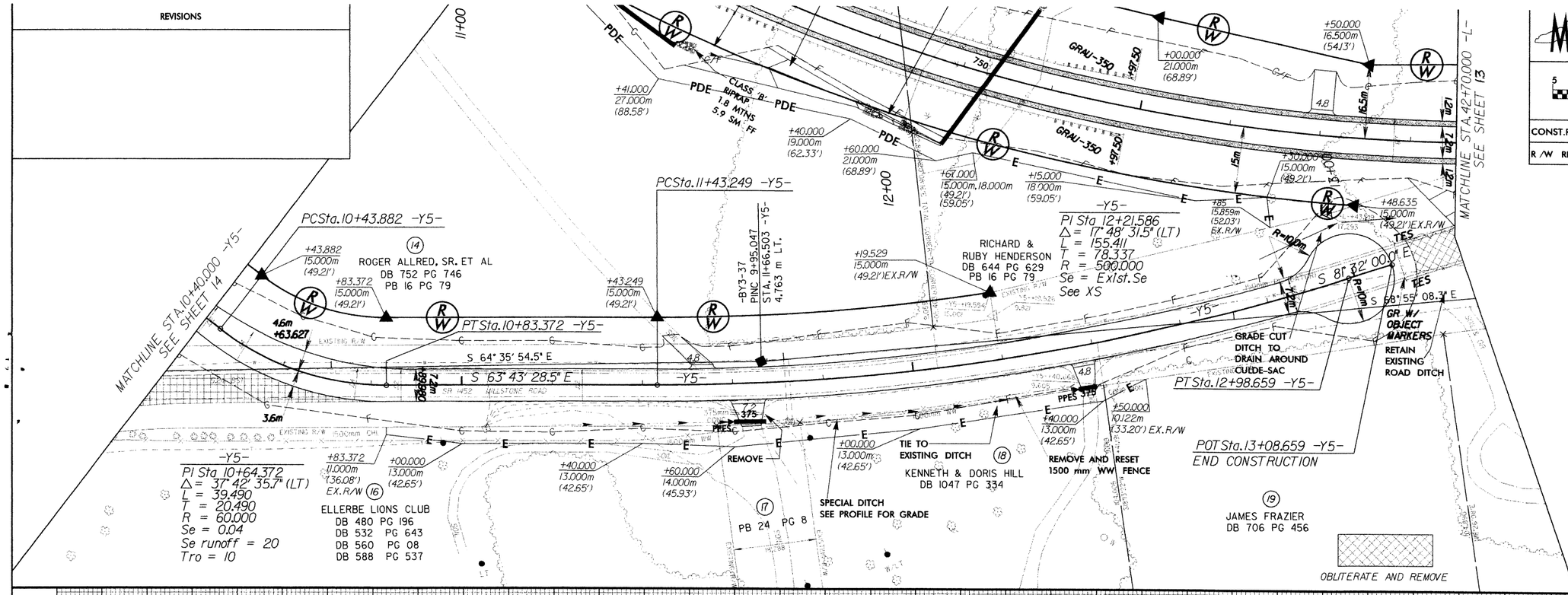
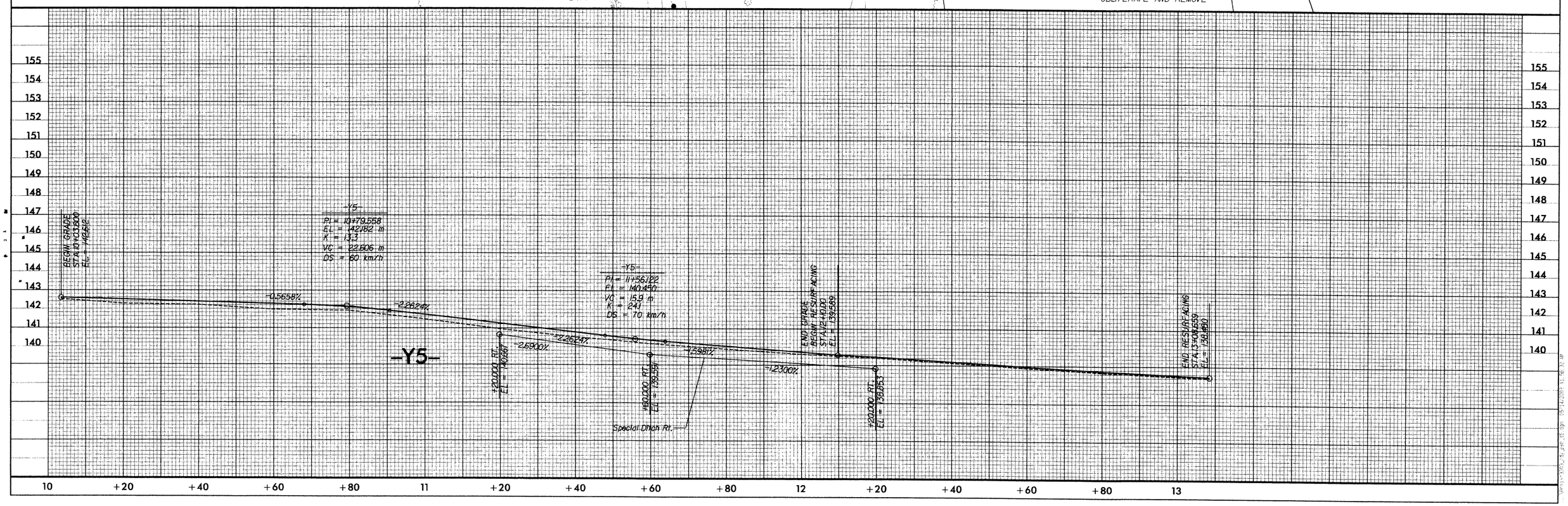
CARY, NC 27513



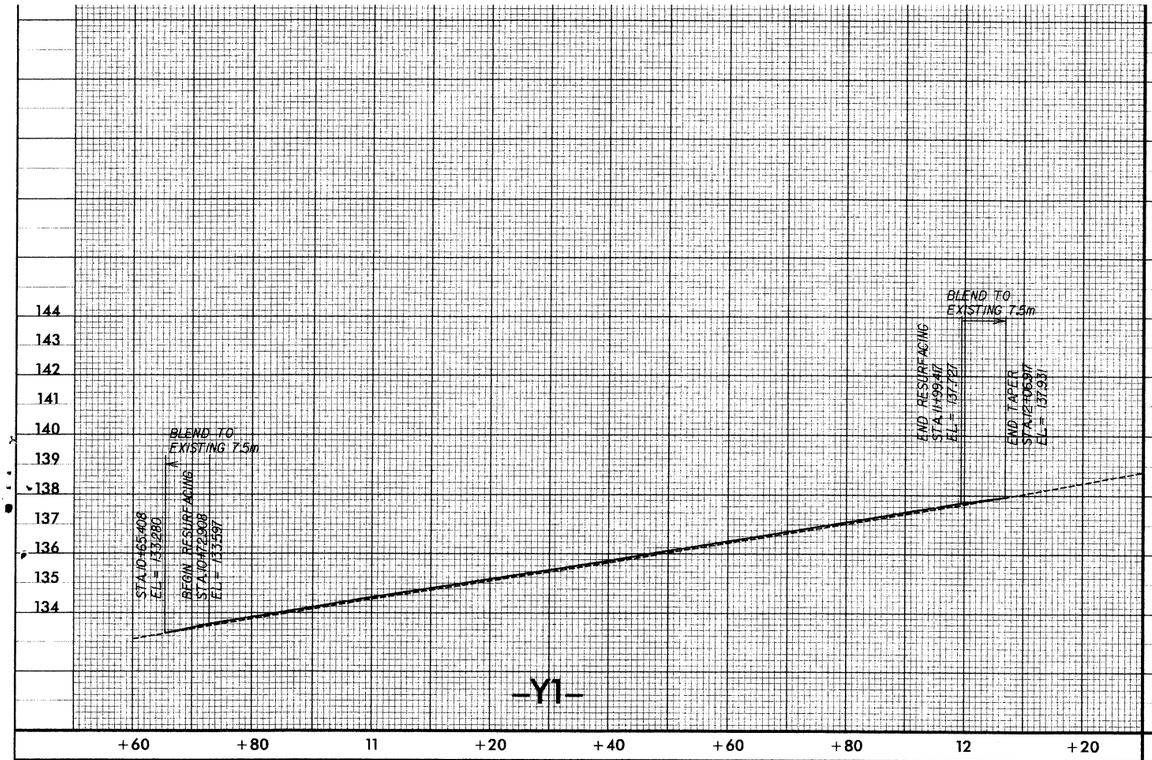
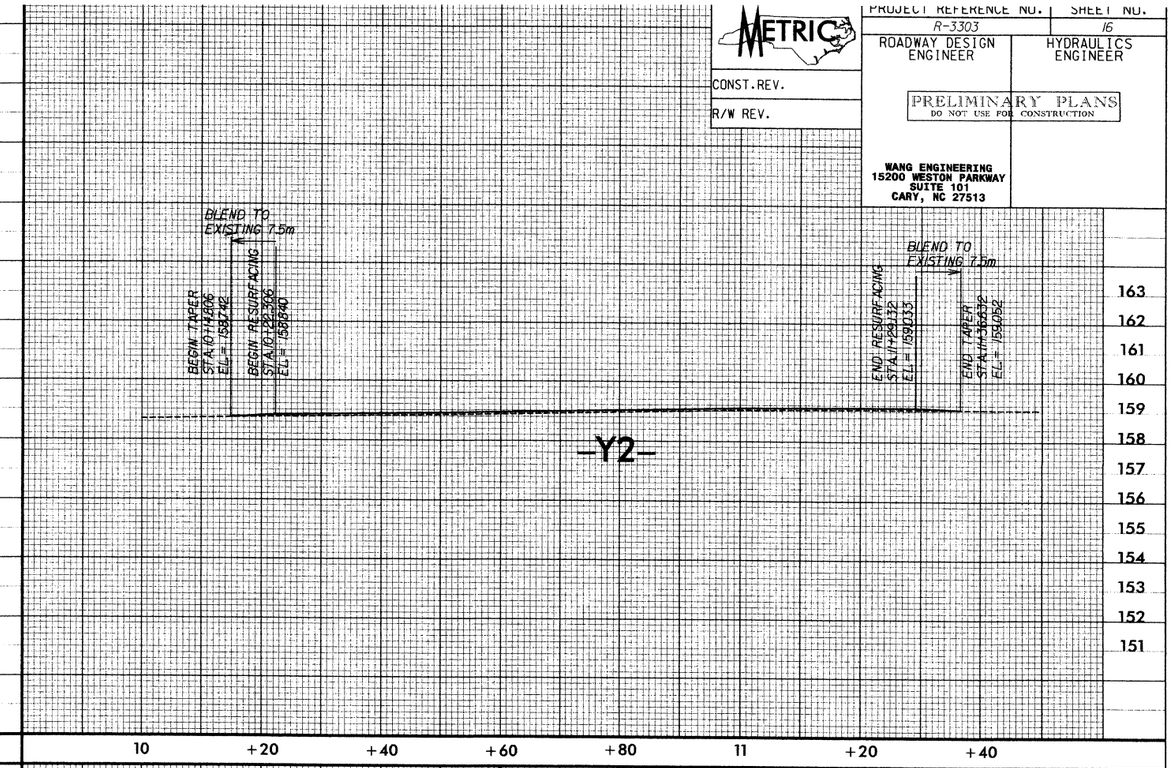
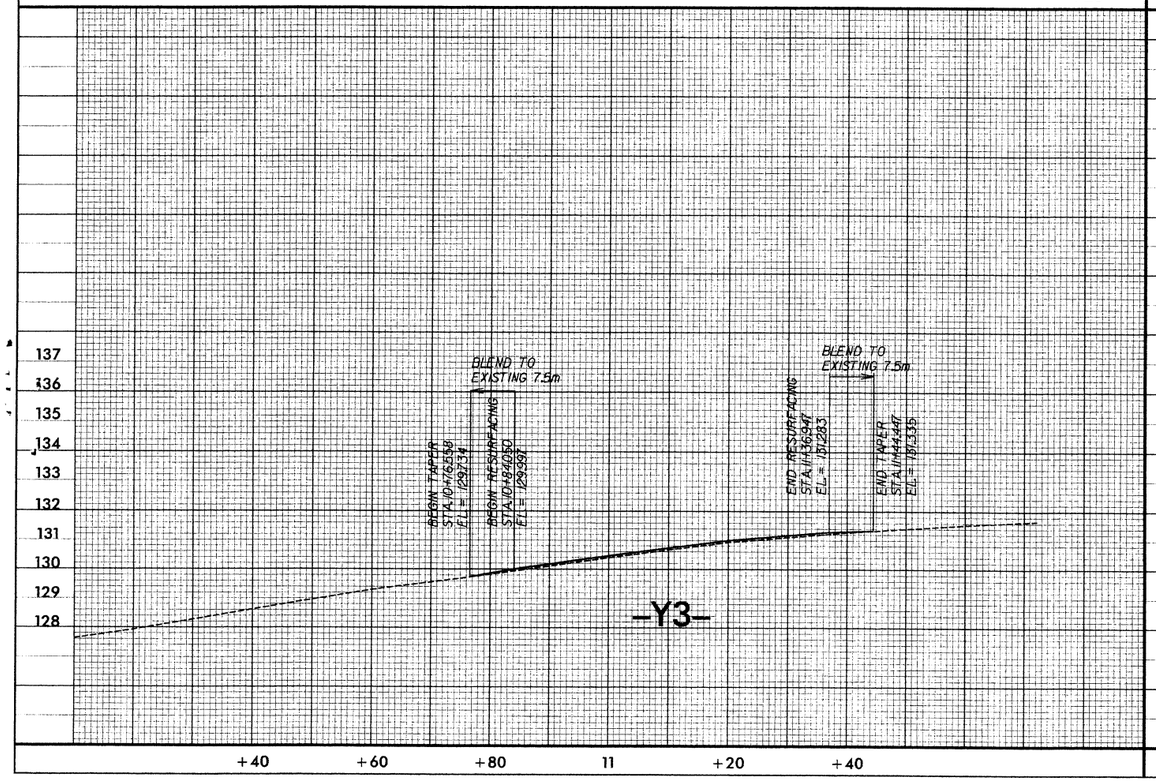
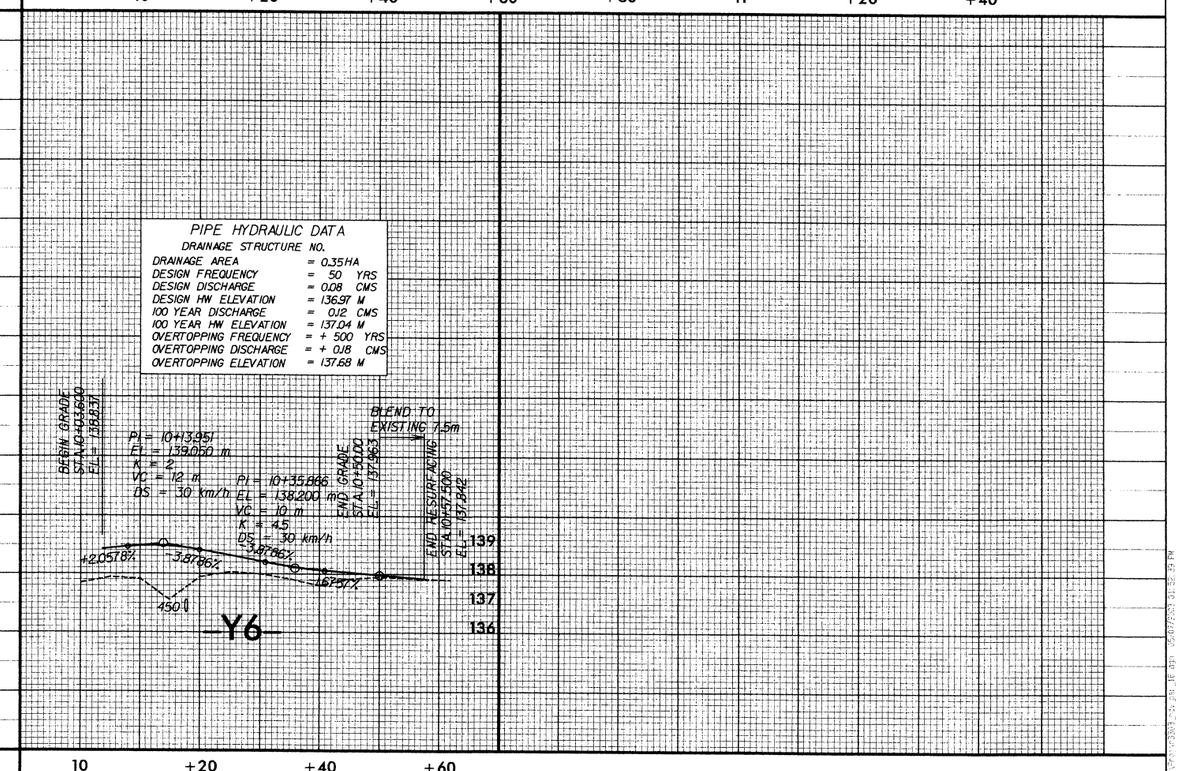


PROJECT REFERENCE NO.	SHEET NO.
R-3303	16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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CARY, NC 27513