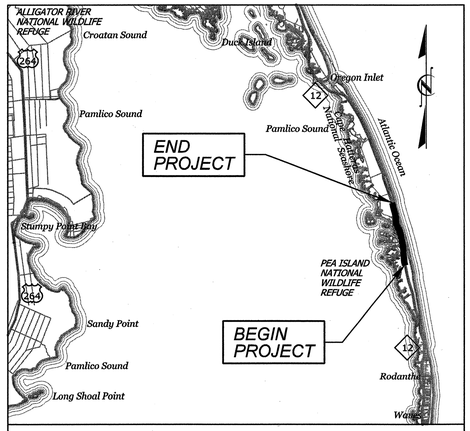
PROJECT: B-2500A

CONTRACT: C203171

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Standard Symbology Sheet



VICINITY MAP N.T.S.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

DARE COUNTY

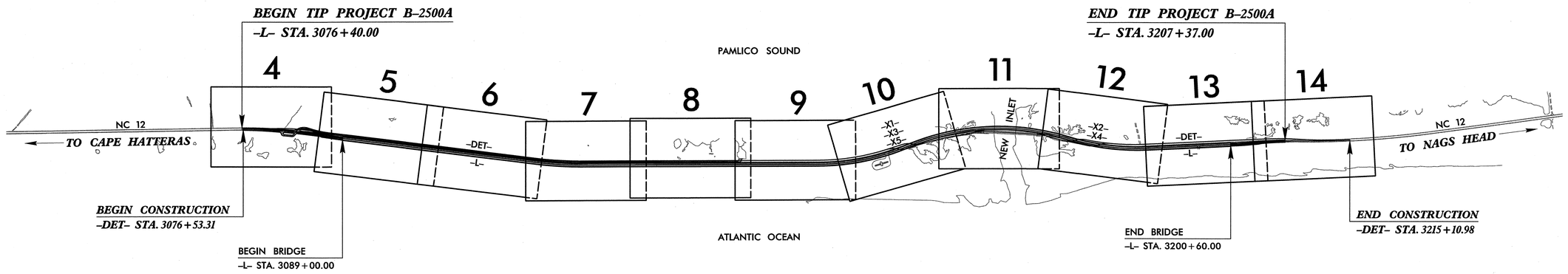
LOCATION: PHASE II, NC 12 LONG-TERM IMPROVEMENTS AT PEA ISLAND

TYPE OF WORK: GRADING, PAVING, DRAINAGE & STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-2500A	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
32635.1.6		P.E.
32635.2.2	BRNHF-0012(55)	UTIL.
32635.3.FR6	BRNHF-0012(55)	CONST.

NAD 83 CORS96



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 2012 = 7,300
ADT 2032 = 10,900
DHV = N/A
D = N/A
T = 6%
V = 60 MPH
FUNC. CLASSIFICATION: COLLECTOR
T = 1% TTST+5% DUALS REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-2500A = 0.366 MILES
LENGTH OF STRUCTURE TIP PROJECT B-2500A = 2.114 MILES
TOTAL LENGTH OF TIP PROJECT B-2500A = 2.480 MILES

NCDOT CONTACT: GARY LOVERING, PE
Project Engineer, Roadway Design

PLANS PREPARED FOR THE NCDOT BY:
STV/RALPH WHITEHEAD ASSOCIATES, INC.
1000 West Morehead St., Ste. 200, Charlotte NC, 28208
NC License Number F-0991

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: N/A

LETTING DATE: **NOVEMBER 19, 2013**

JOHN N. JOHNSON, PE
PROJECT ENGINEER

SEAN C. STEPHENS, EI
PROJECT DESIGNER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 029388 9-5-2013 ENGINEER EDWARD J. VANCE

SIGNATURE: Edward J. Vance P.E.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI 9/5/2013

SIGNATURE: Kit A. Persiani P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

952013

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI

9/5/2013

INDEX OF SHEETS

1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C	SURVEY CONTROL SHEET
2 THRU 2-C	TYPICAL SECTIONS AND DETAILS
2-D THRU 2-R	DETOUR DETAILS
2-S	BRIDGE SKETCH
2-T	DETAIL FOR TEMPORARY SHORING
2-U	BOAT ACCESS TYPICAL SECTIONS
2-V	CONCRETE FLUME DETAIL
3	SUMMARY OF QUANTITIES
3-A	DRAINAGE SUMMARY SHEET
3-B	EARTHWORK SUMMARY SHEET
3-C	COMBO SUMMARY SHEET
4 THRU 14	PLAN AND PROFILE SHEETS
TMP-1 THRU TMP-26	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-6	PAVEMENT MARKING PLANS
EC-1 THRU EC-18	EROSION CONTROL PLANS
UO-1 THRU UO-12	UTILITIES BY OTHERS
X-0 THRU X-0B	CROSS-SECTION SUMMARY SHEETS
X-1 THRU X-137	CROSS-SECTIONS
S-1 THRU S-219	STRUCTURE PLANS

GENERAL NOTES

GENERAL NOTES:

2012 SPECIFICATIONS
EFFECTIVE: 01-17-12
REVISED: 11/01/11

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

UNDERDRAINS:

UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

GENERAL NOTES CONT.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE CENTURYLINK AND CAPE HATTERAS EMC.

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

LIST OF STANDARDS

2012 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch – N. C. Department of Transportation – Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

DIVISION 2 – EARTHWORK

200.02 Method of Clearing – Method II

225.02 Guide for Grading Subgrade – Secondary and Local

225.04 Method of Obtaining Superelevation – Two Lane Pavement

DIVISION 3 – PIPE CULVERTS

300.01 Method of Pipe Installation

DIVISION 5 – SUBGRADE, BASES AND SHOULDERS

560.01 Method of Shoulder Construction – High Side of Superelevated Curve – Method I

DIVISION 6 – ASPHALT BASES AND PAVEMENTS

654.01 Pavement Repairs

DIVISION 8 – INCIDENTALS

815.02 Pipe Subsurface Drain

840.00 Concrete Base Pad for Drainage Structures

840.18 Concrete Grated Drop Inlet Type 'B' – 12" thru 36" Pipe

840.25 Anchorage for Frames – Brick or Concrete or Precast

840.27 Brick Grated Drop Inlet Type 'B' – 12" thru 36" Pipe

840.33 Angled Vane Grates and Frames

840.45 Precast Drainage Structure

846.01 Concrete Curb, Gutter and Curb & Gutter

846.04 Drop Inlet Installation in Shoulder Berm Gutter

857.01 Precast Reinforced Concrete Barrier – 41" Single Faced

862.01 Guardrail Placement

862.02 Guardrail Installation

862.03 Structure Anchor Units

876.02 Guide for Rip Rap at Pipe Outlets

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9/5/2013

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	1-B

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- 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
- Known Soil Contamination: Area or Site
- Potential Soil Contamination: Area or Site

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 Marker — RW
- 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
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

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

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (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
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?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 (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

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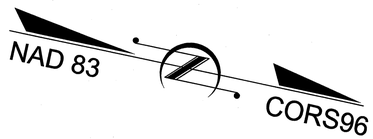
10/16/2012

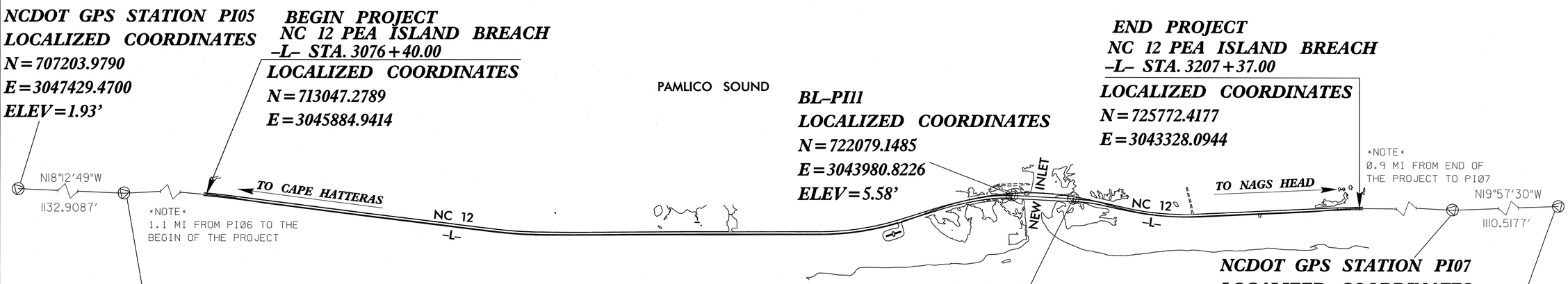
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	1-C
LOCATION AND SURVEYS	

SURVEY CONTROL SHEET NC 12 PEA ISLAND



BL

POINT	DESC.	NORTH	EAST	ELEVATION	L2 STATION	OFFSET
PI05	(GPS MON PI-05)	707203.9790	3047429.4700	1.93	OUTSIDE PROJECT LIMITS	
PI06	(GPS MON PI-06)	708280.0310	3047075.3970	2.28	OUTSIDE PROJECT LIMITS	
PI11	MAG NAIL SOUTH	722079.1485	3043980.8226	5.58	3169+58.50	18.40 RT
PI12	MAG NAIL NORTH	722733.2830	3043873.8479	5.54	3176+27.06	18.33 RT
PI07	(GPS MON PI-07)	730386.4500	3041823.4330	3.15	OUTSIDE PROJECT LIMITS	
PI08	(GPS MON PI-08)	731430.2710	3041444.3720	3.60	OUTSIDE PROJECT LIMITS	



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR "CENTROID1"
WITH NAD 83 (CORS96) STATE PLANE GRID COORDINATES OF
NORTHING: 710200.000(ft) EASTING: 3045900.000(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999025167
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "CENTROID1" TO -L- STATION 3076+40.00 IS
N 0° 18' 10.88" W 2847.32' ft
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING HTTP://WWW.NCDOT.GOV/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT

FILE: b2500ii_ls_control.txt

SITE CALIBRATION PARAMETERS HAVE NOT BEEN DETERMINED FOR THIS PROJECT.
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 UTILIZING GLOBAL POSITIONING SYSTEM.

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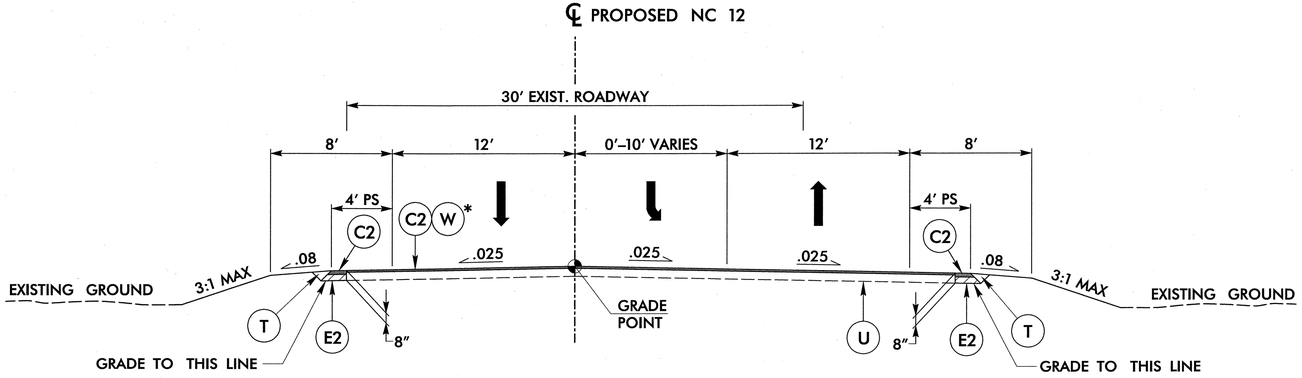
9/5/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI 9/5/2013

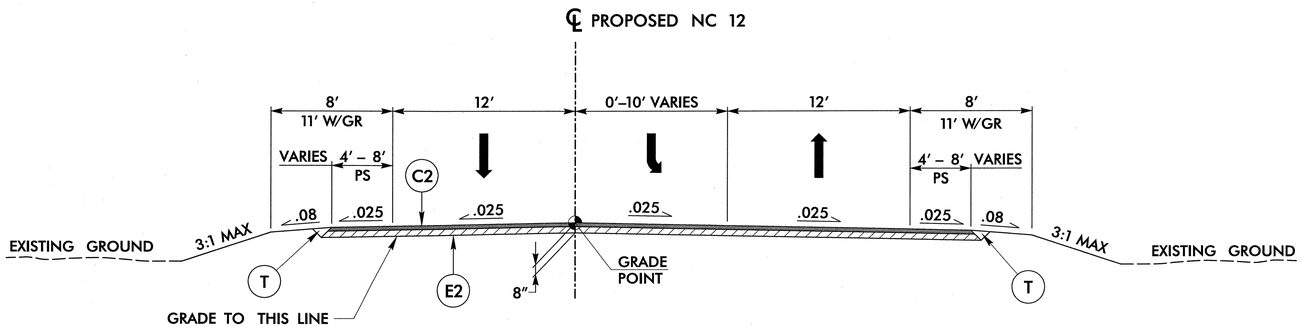
NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 9/23/13



TYPICAL SECTION #1

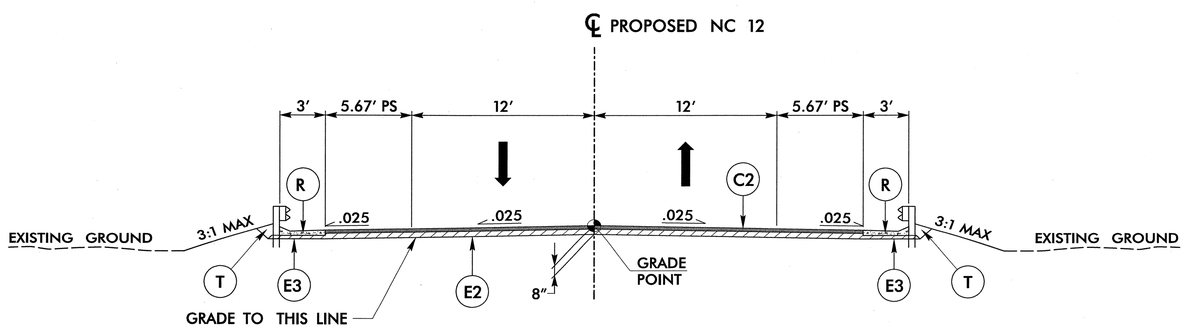
-L- STA. 3076+40.00 TO STA. 3084+60.00
-L- STA. 3204+46.89 TO STA. 3207+37.00

* NOTES:
1. USE WEDGING DETAIL #1



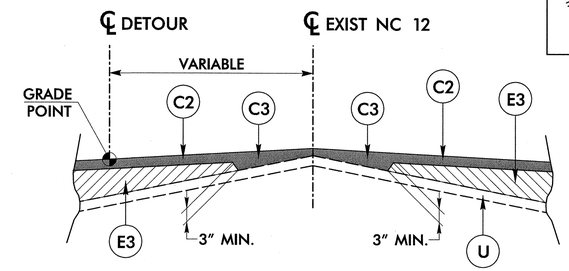
TYPICAL SECTION #2

-L- STA. 3084+60.00 TO STA. 3086+92.67
-L- STA. 3203+55.04 TO STA. 3204+46.89

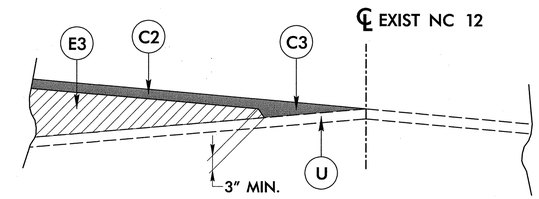


TYPICAL SECTION #3

-L- STA. 3086+92.67 TO STA. 3087+25.91
-L- STA. 3202+50.66 TO STA. 3203+55.04



WEDGING DETAIL #1



WEDGING DETAIL #2

PAVEMENT SCHEDULE

C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ.YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ.YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ.YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1.5" IN DEPTH OR GREATER THAN 2" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ.YD.
E2	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ.YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ.YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" OR GREATER THAN 5.5" IN DEPTH.
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT (SEE WEDGING DETAIL THIS SHEET)

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

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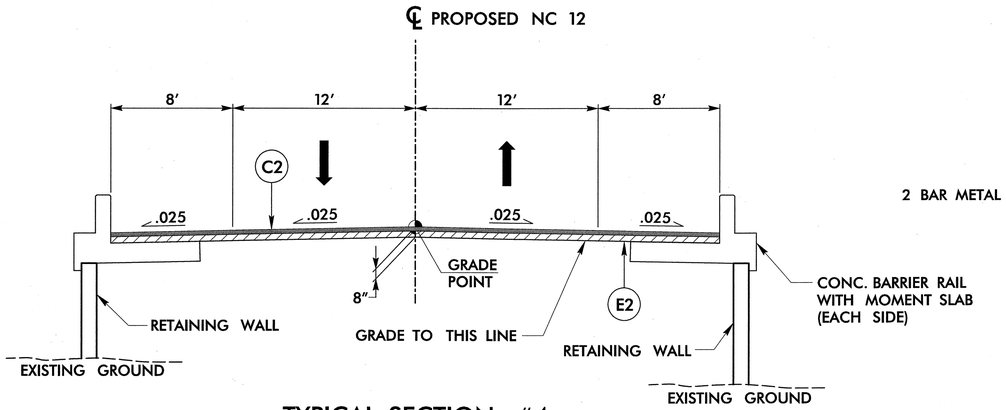
9/5/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

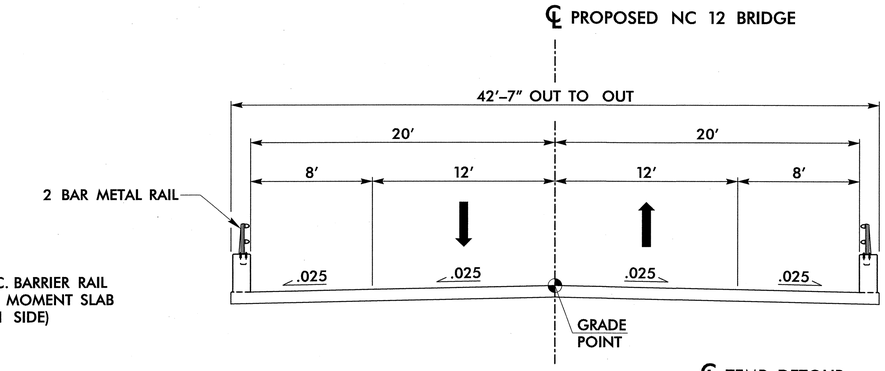
NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN 9/5/2013

NORTH CAROLINA PROFESSIONAL SEAL 22893 ENGINEER CLARK S. MORRISON 9/23/13



TYPICAL SECTION #4

–L– STA. 3087+25.91 TO STA. 3089+00.00 (BEGIN BRIDGE)
–L– STA. 3200+60.00 (END BRIDGE) TO STA. 3202+50.66

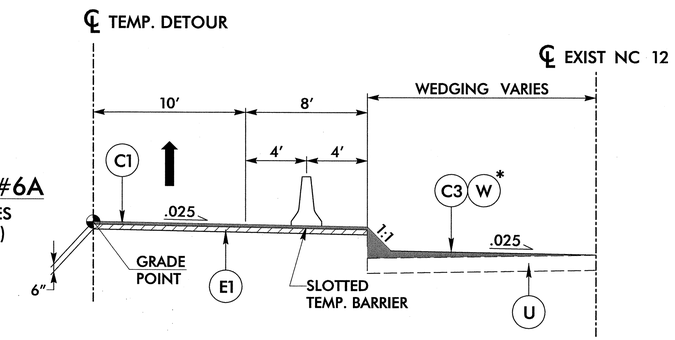


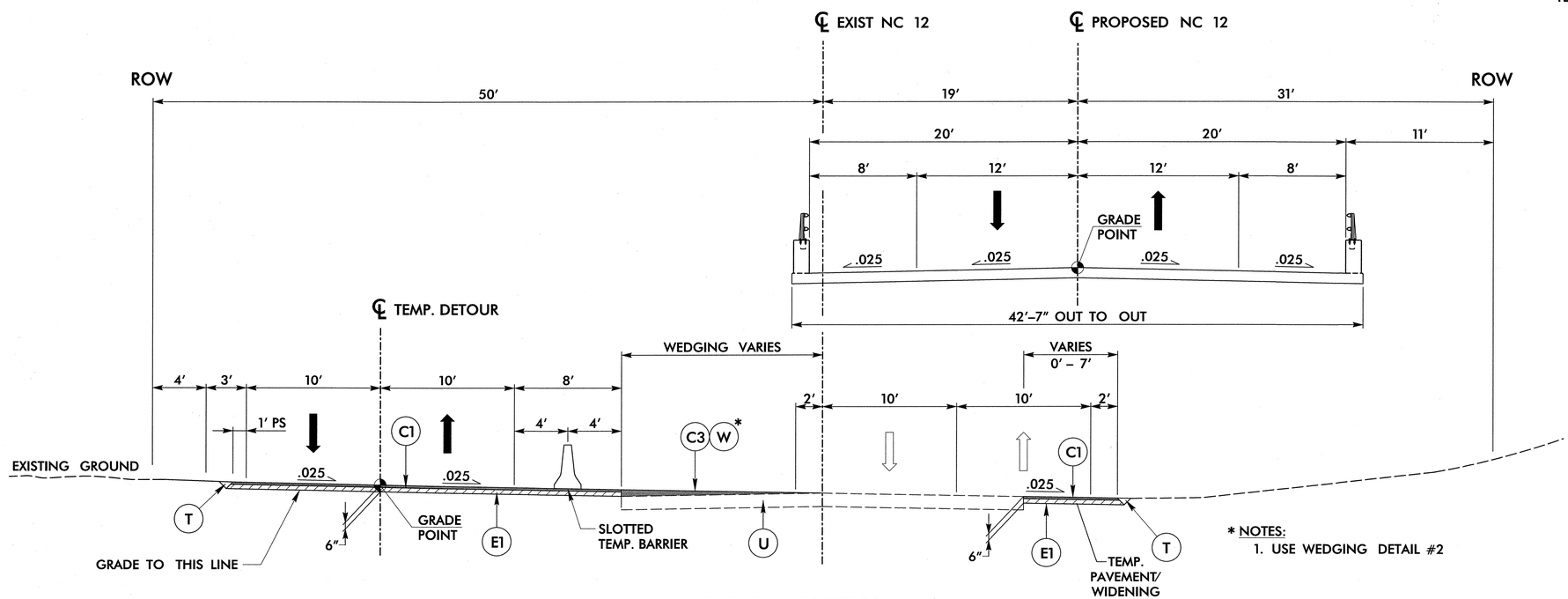
TYPICAL SECTION #5

–L– STA. 3089+00.00 (BEGIN BRIDGE)
TO STA. 3200+60.00 (END BRIDGE)

PARTIAL TYPICAL #6A

STATION RANGE VARIES
(SEE CROSS–SECTIONS)





TYPICAL SECTION #6

–DET– STA. 3078+12.67 TO STA. 3115+00.00
–DET– STA. 3119+50.00 TO STA. 3148+00.00

* NOTES:
1. USE WEDGING DETAIL #2

C1	2″ S9.5B
C2	3″ S9.5B
C3	VAR. S9.5B
E1	4″ B25.0B
E2	5″ B25.0B
E3	VAR. B25.0B
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

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9/5/2013

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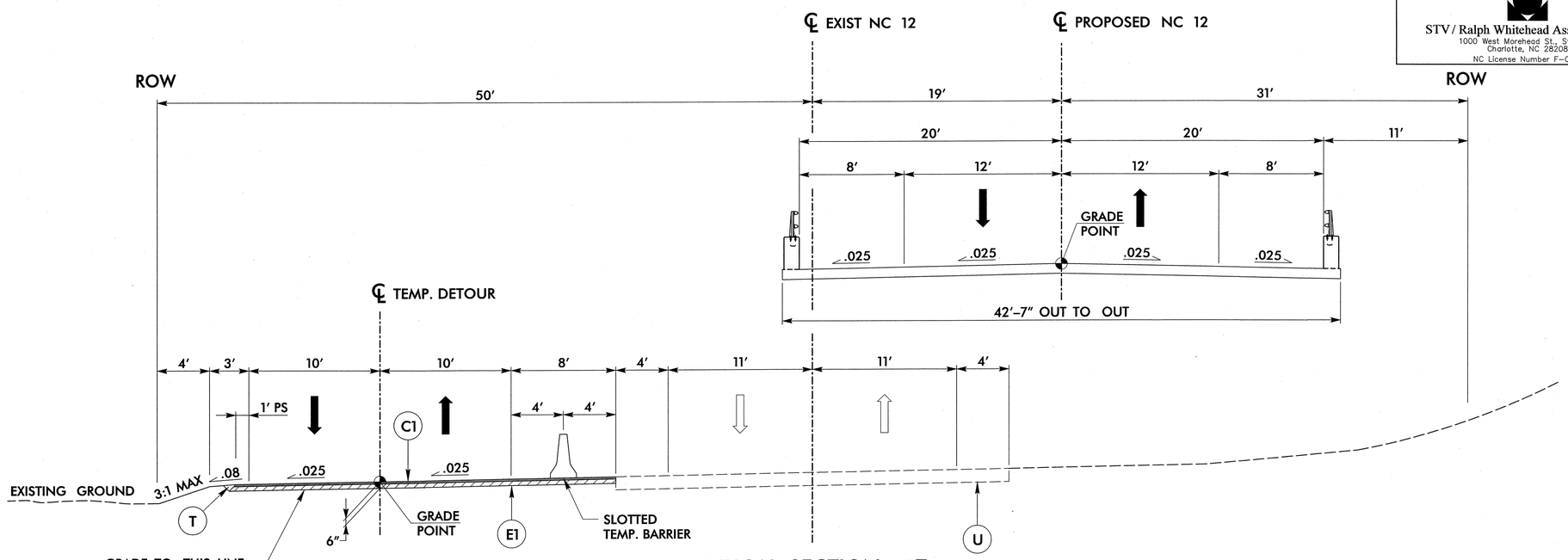
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

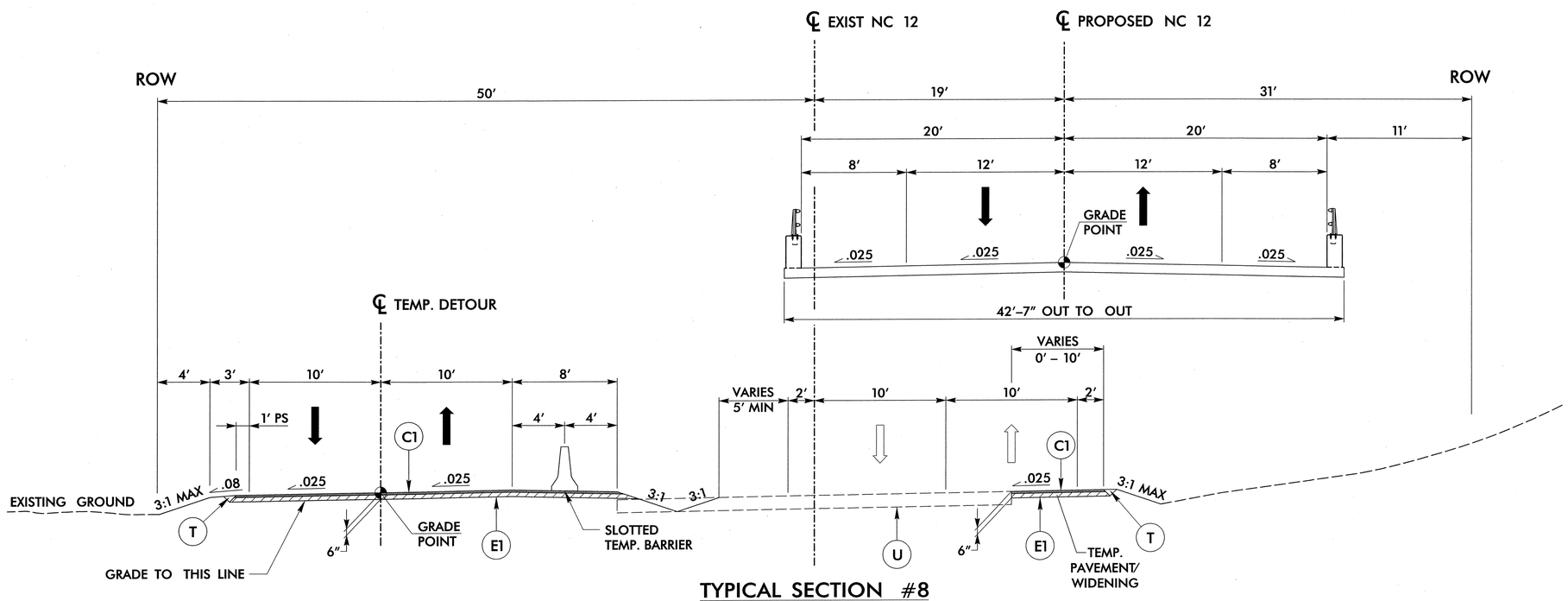
NORTH CAROLINA PROFESSIONAL SEAL 022599 ENGINEER JOSEPH A. FREEMAN 10/16/12

NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 10/24/12



TYPICAL SECTION #7

–DET– STA. 3193+00.00 TO STA. 3213+87.65



TYPICAL SECTION #8

–DET– STA. 3115+00.00 TO STA. 3119+50.00
–DET– STA. 3148+00.00 TO STA. 3157+01.57
–DET– STA. 3185+09.32 TO STA. 3193+00.00

C1	2″ S9.5B
C2	3″ S9.5B
C3	VAR. S9.5B
E1	4″ B25.0B
E2	5″ B25.0B
E3	VAR. B25.0B
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

r:\roadway\proj\stf\NC\2PEA_RDY_TYP.dgn

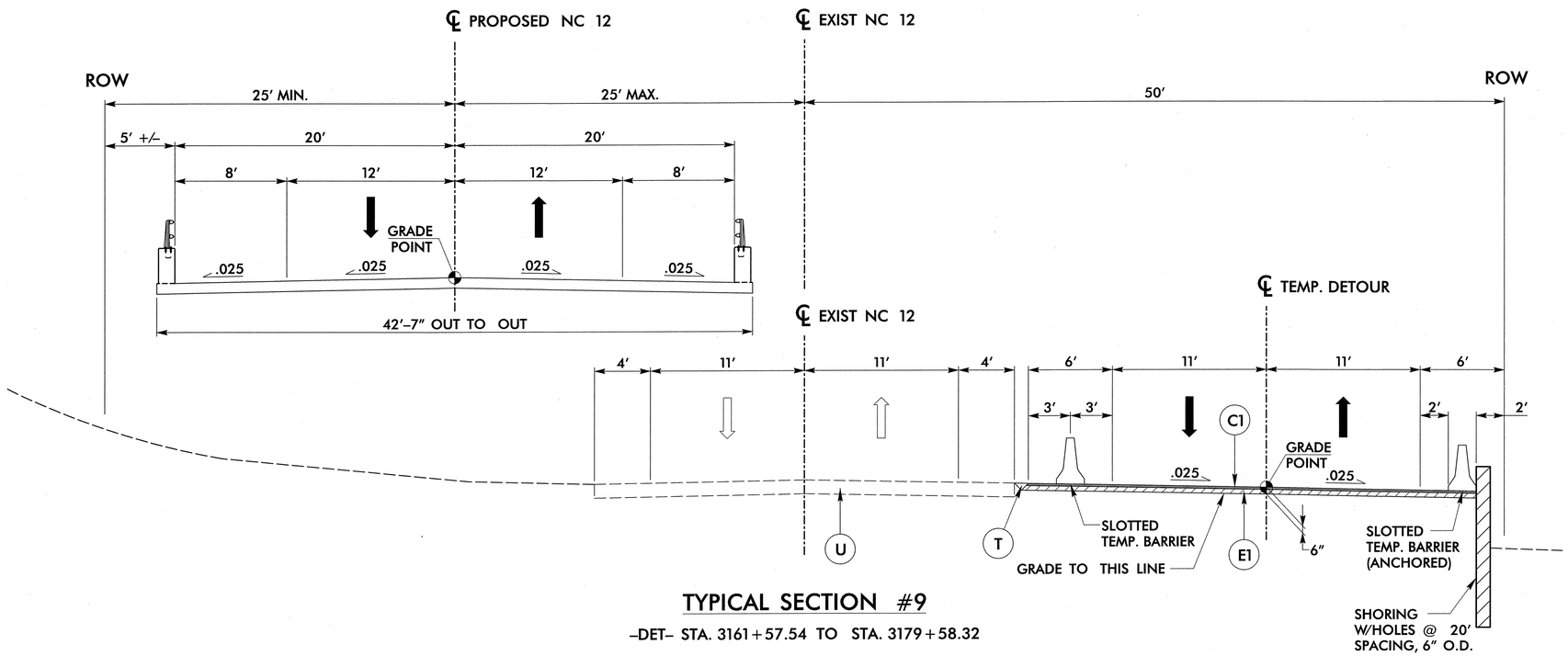
10/16/2012

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-C
R/W SHEET NO.	

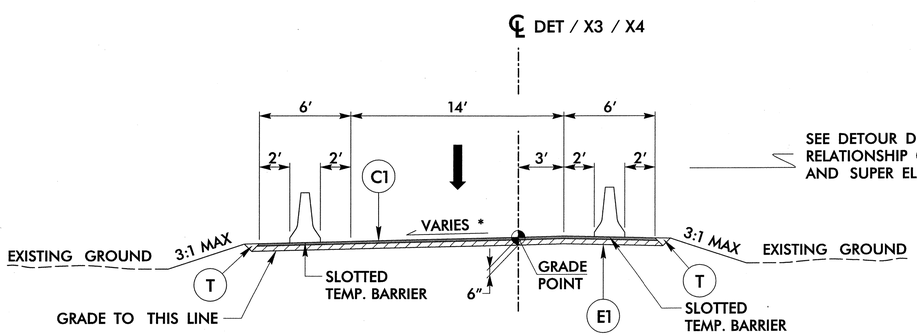
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 10/16/12

PAVEMENT DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 10/29/12



TYPICAL SECTION #9

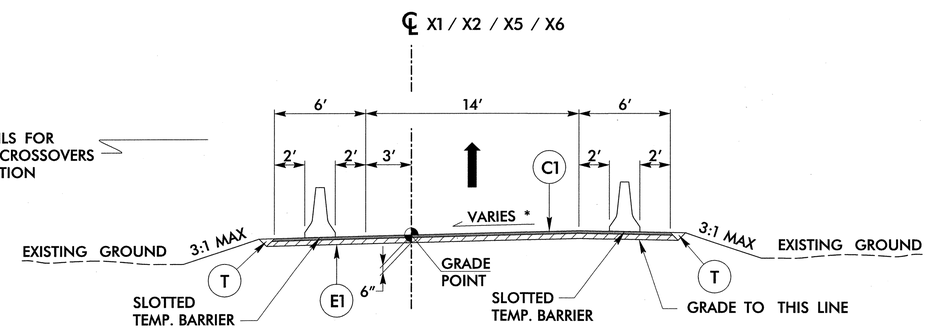
–DET– STA. 3161+57.54 TO STA. 3179+58.32



TYPICAL SECTION #10

–DET– STA. 3157+01.57 TO STA. 3161+57.54 (–X3–)
–DET– STA. 3179+58.32 TO STA. 3185+09.32 (–X4–)

SEE DETOUR DETAILS FOR RELATIONSHIP OF CROSSOVERS AND SUPER ELEVATION



TYPICAL SECTION #11

–DET– STA. 3157+01.57 TO STA. 3161+57.54 (–X1– & –X5–)
–DET– STA. 3179+58.32 TO STA. 3185+09.32 (–X2– & –X6–)

* NOTES:
1. VARIABLE SUPER ROTATES IN OPPOSITE DIRECTION FOR CURVES TO THE LEFT. SEE DETOUR PLANS FOR DETAILS.

* NOTES:
1. VARIABLE SUPER ROTATES IN OPPOSITE DIRECTION FOR CURVES TO THE RIGHT. SEE DETOUR PLANS FOR DETAILS.

C1	2″ S9.5B
C2	3″ S9.5B
C3	VAR. S9.5B
E1	4″ B25.0B
E2	5″ B25.0B
E3	VAR. B25.0B
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

r:\roadway\proj\stf\NC12PEA_RDY_TYP.dgn

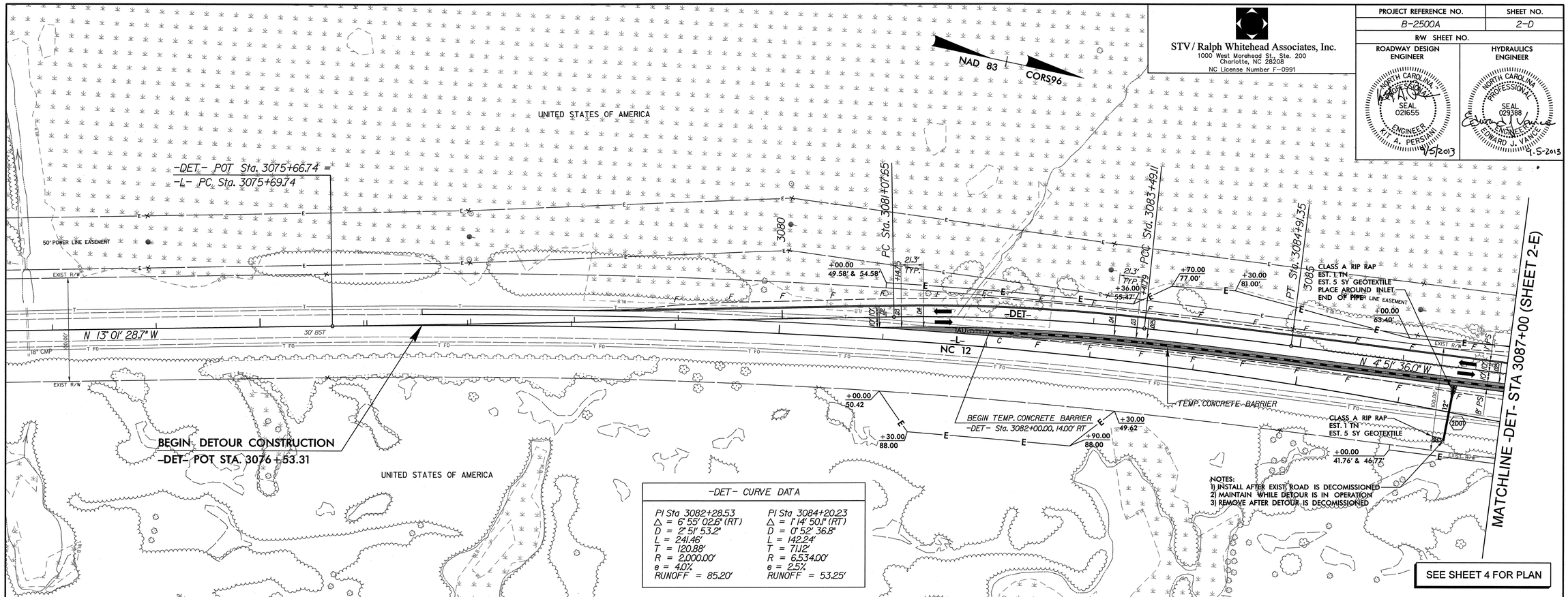
10/16/2012

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN 9/5/2013

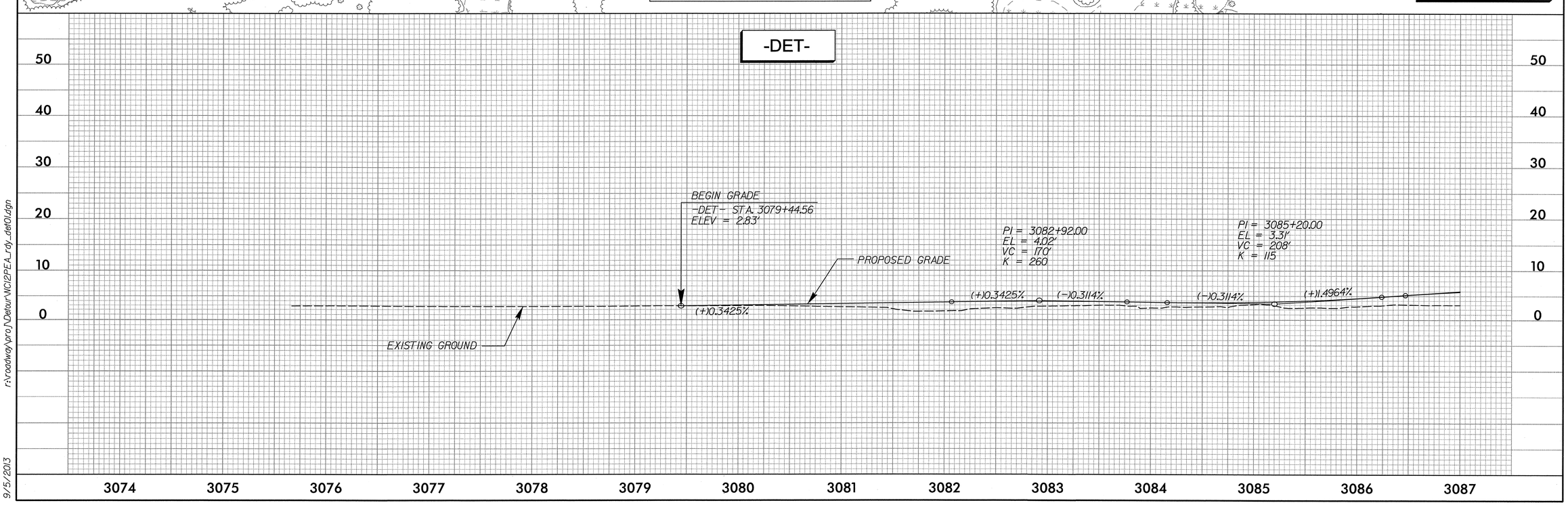
NORTH CAROLINA PROFESSIONAL SEAL 029388 ENGINEER EDWARD J. VANCE 9-5-2013



NOTES:
1) INSTALL AFTER EXIST. ROAD IS DECOMISSIONED
2) MAINTAIN WHILE DETOUR IS IN OPERATION
3) REMOVE AFTER DETOUR IS DECOMISSIONED

-DET- CURVE DATA

PI Sta 3082+28.53	PI Sta 3084+20.23
Δ = 6° 55' 02.6" (RT)	Δ = 1° 14' 50.1" (RT)
D = 2° 51' 53.2"	D = 0° 52' 36.8"
L = 241.46'	L = 142.24'
T = 120.88'	T = 71.12'
R = 2,000.00'	R = 6,534.00'
e = 4.0%	e = 2.5%
RUNOFF = 85.20'	RUNOFF = 53.25'



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9/5/2013

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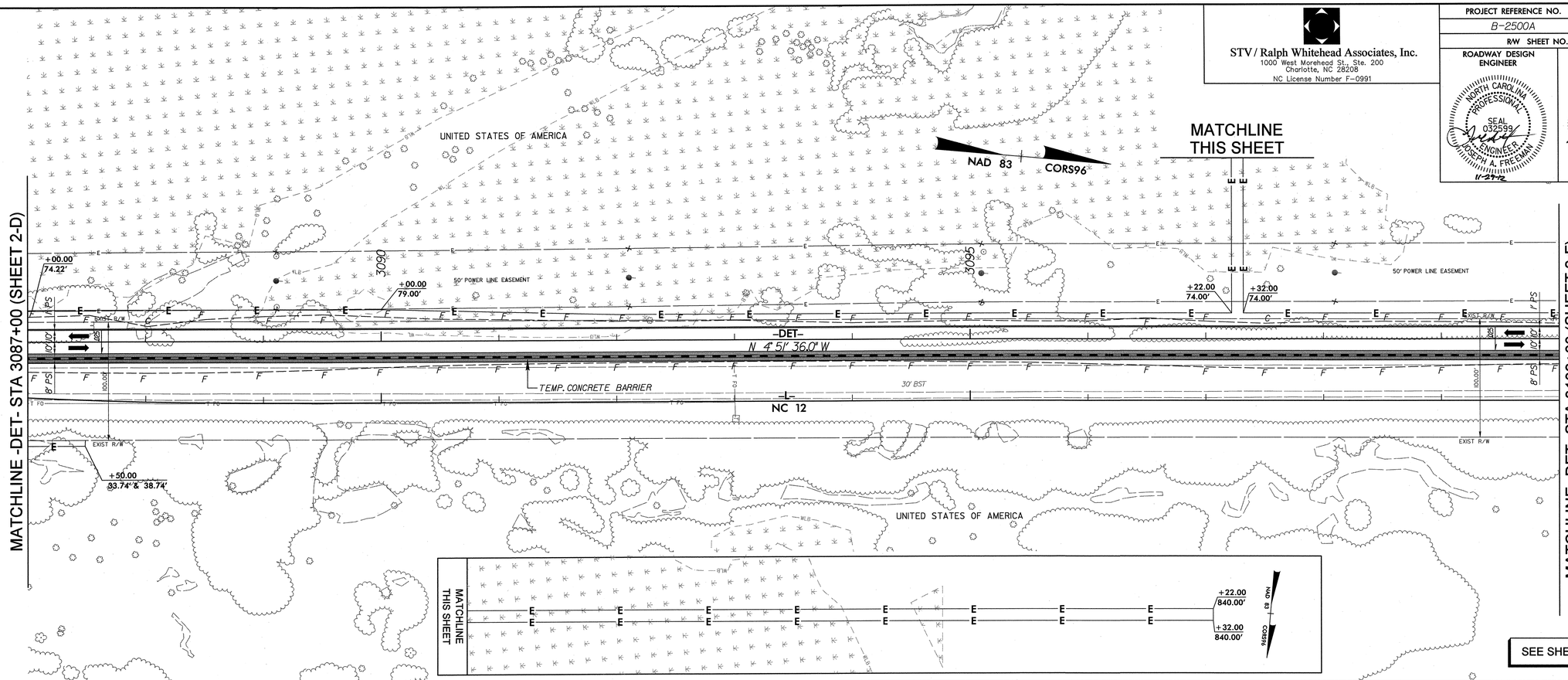
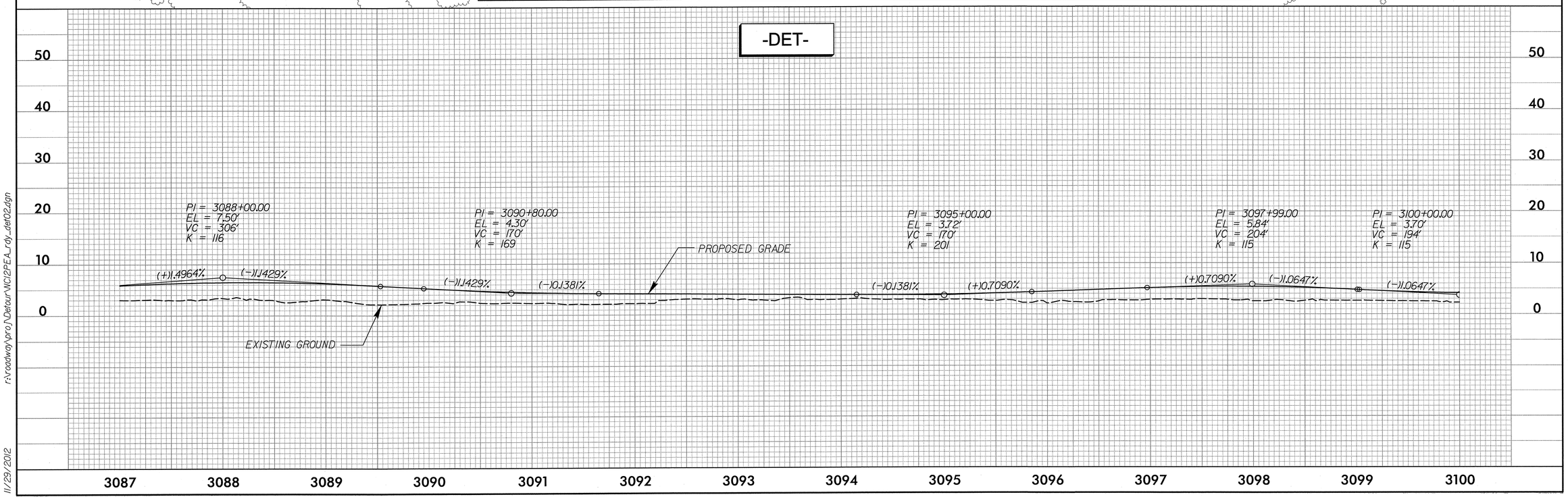
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 11-29-12

NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DARYN C. MORRISON 11/29/12





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11/29/2012

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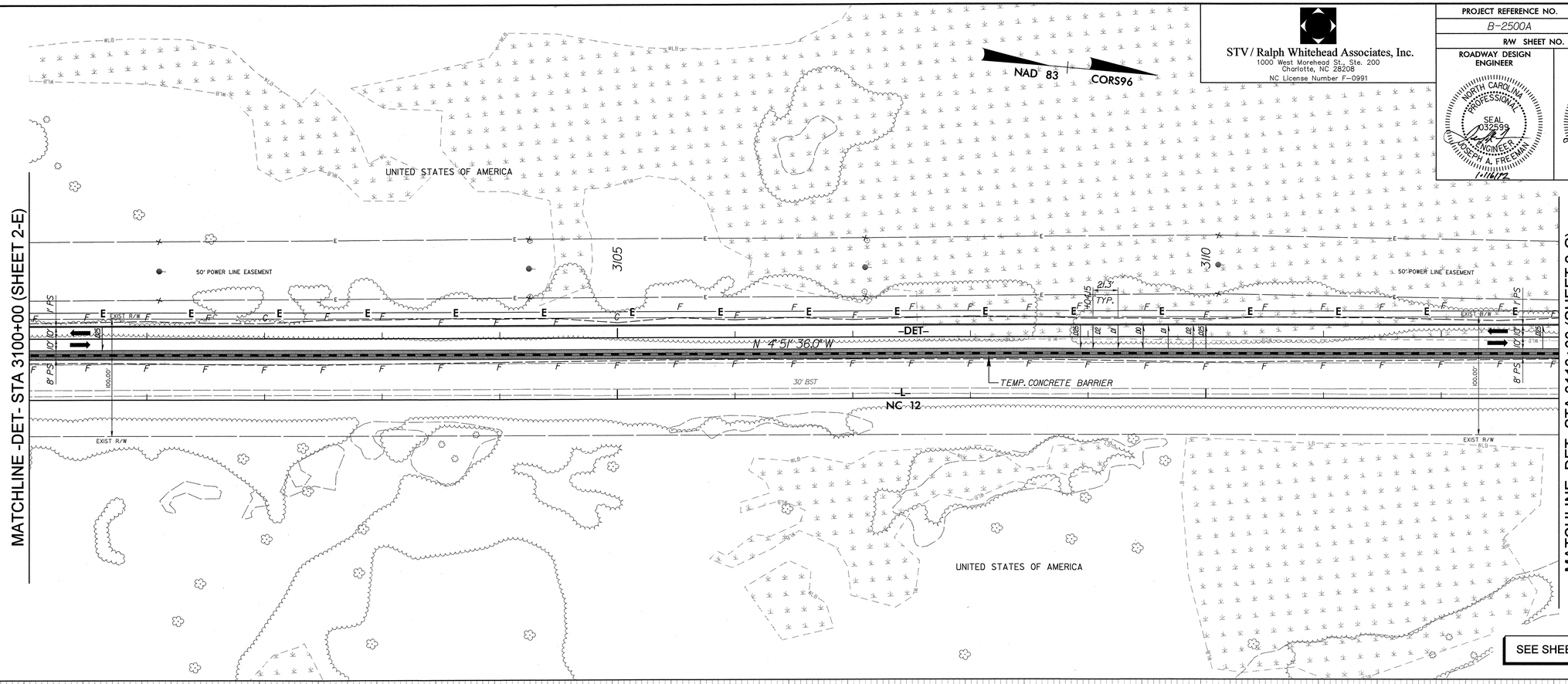
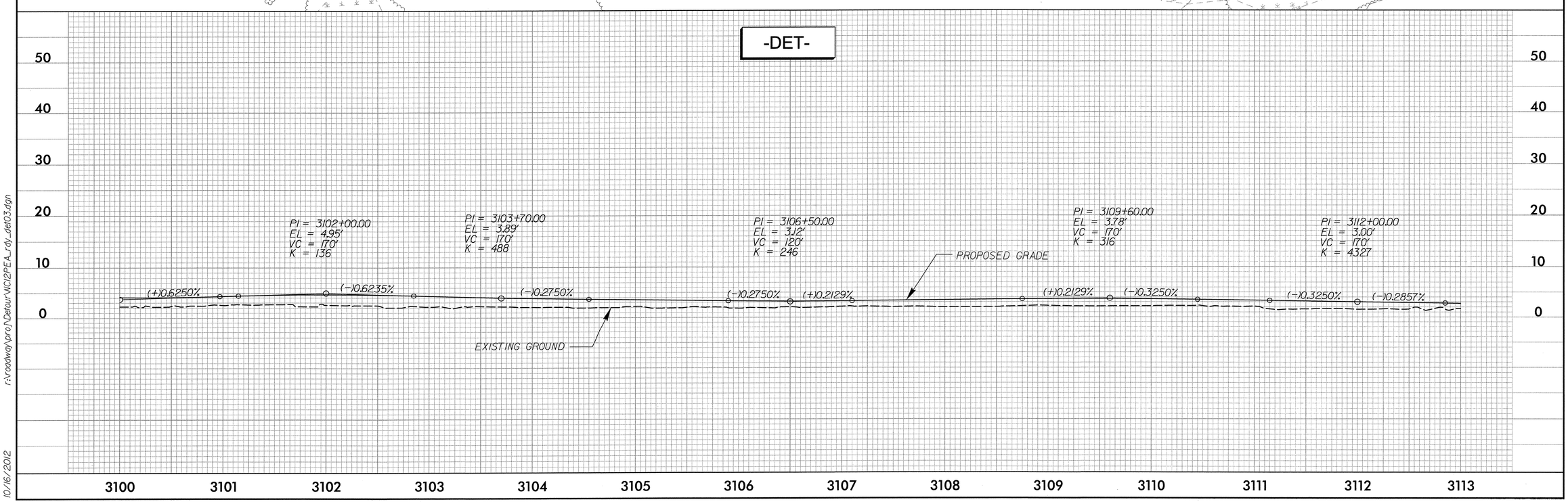
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-F
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 10/16/12

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER MARTIN C. MORRISON 10/16/12





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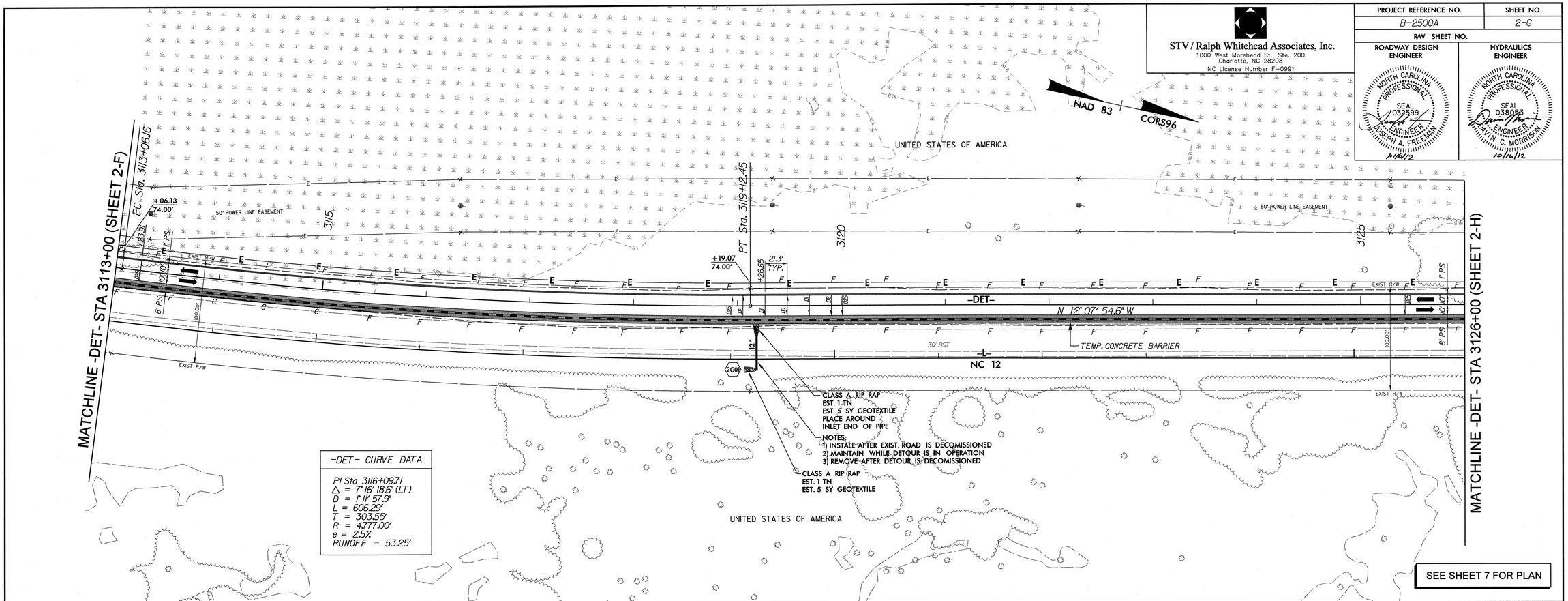
10/16/2012

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-G
R/W SHEET NO.	

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 10/16/12

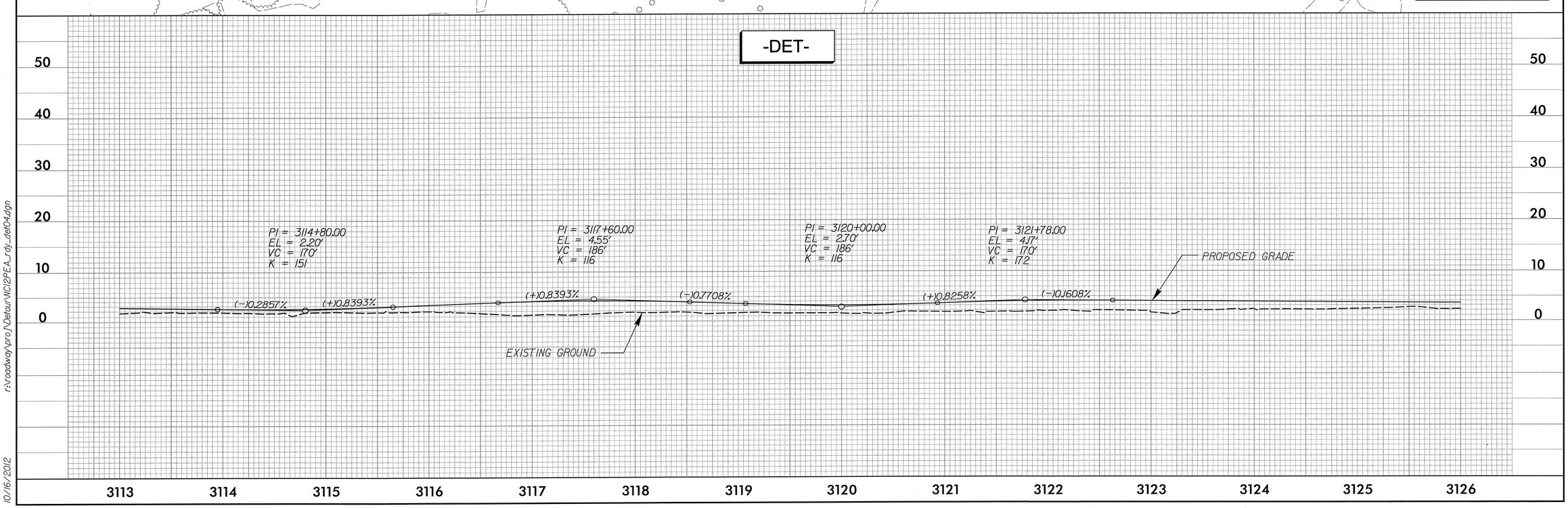
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER DAVIN C. MORRISON 10/16/12



-DET- CURVE DATA

PI Sta 3116+09.71
Δ = 7° 16' 18.6" (LT)
D = 1° 11' 57.9"
L = 606.29'
T = 303.55'
R = 4,777.00'
e = 2.5%
RUNOFF = 53.25'

SEE SHEET 7 FOR PLAN



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10/16/2012

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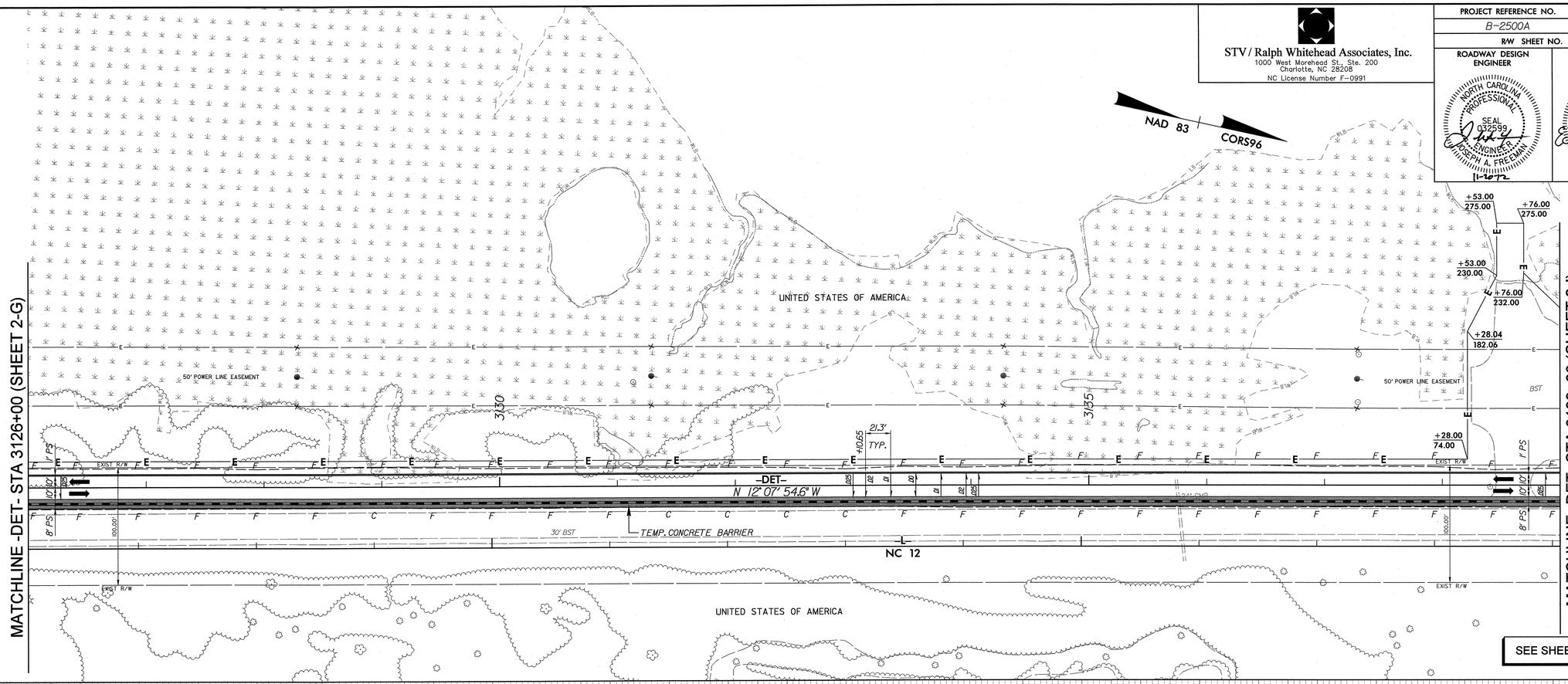
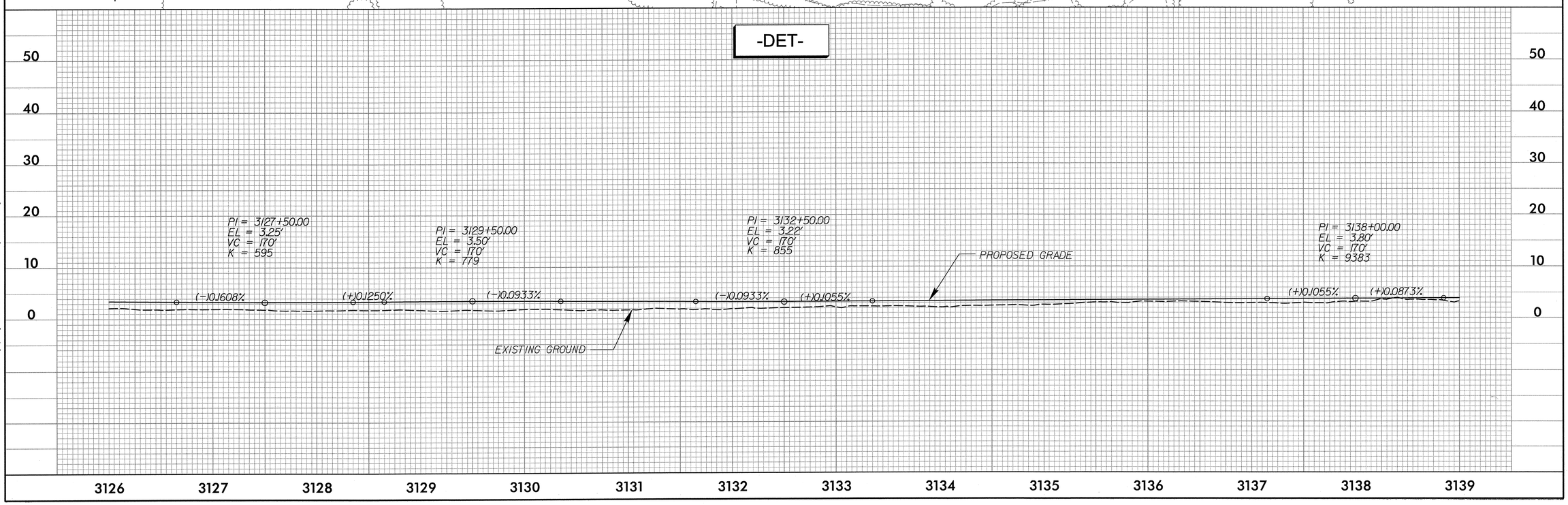
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-H
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 11-20-12

NORTH CAROLINA PROFESSIONAL SEAL 029388 ENGINEER EDWARD J. VANCE 11-20-12





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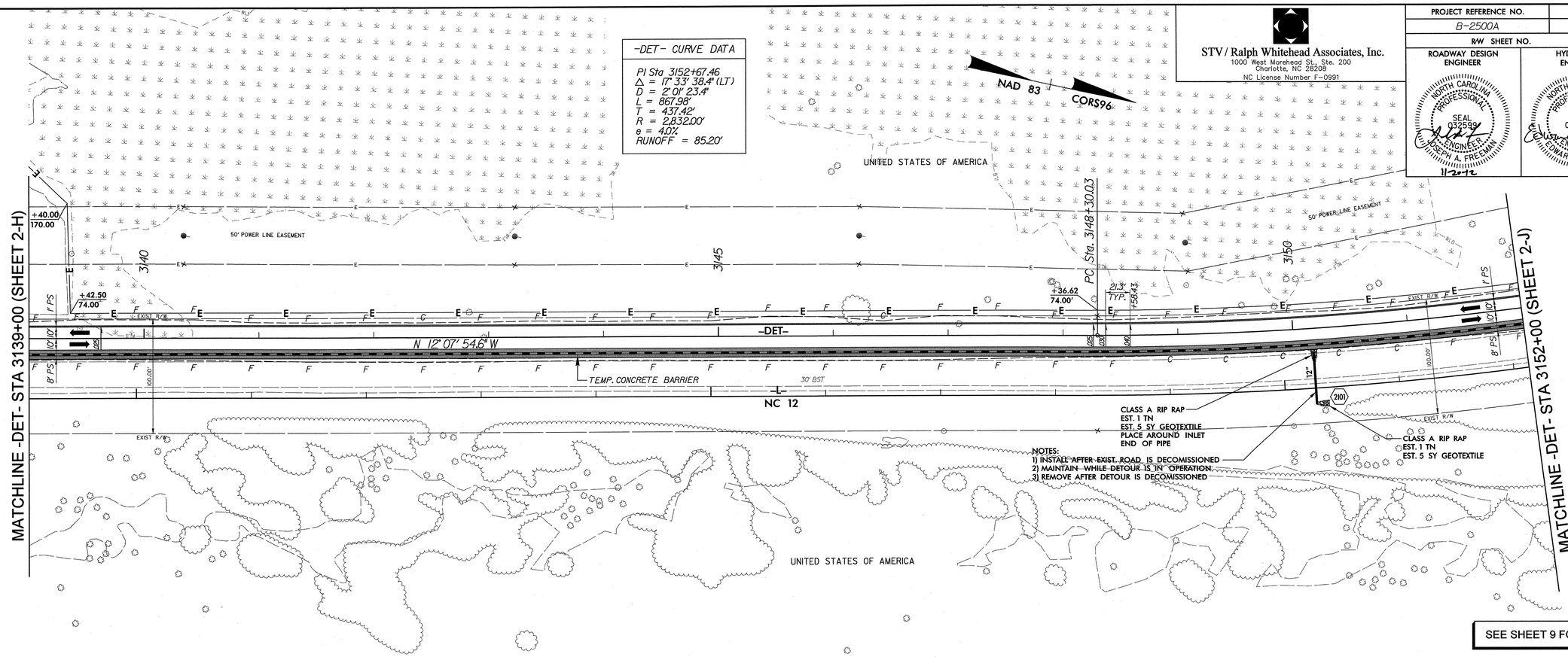
11/20/2012

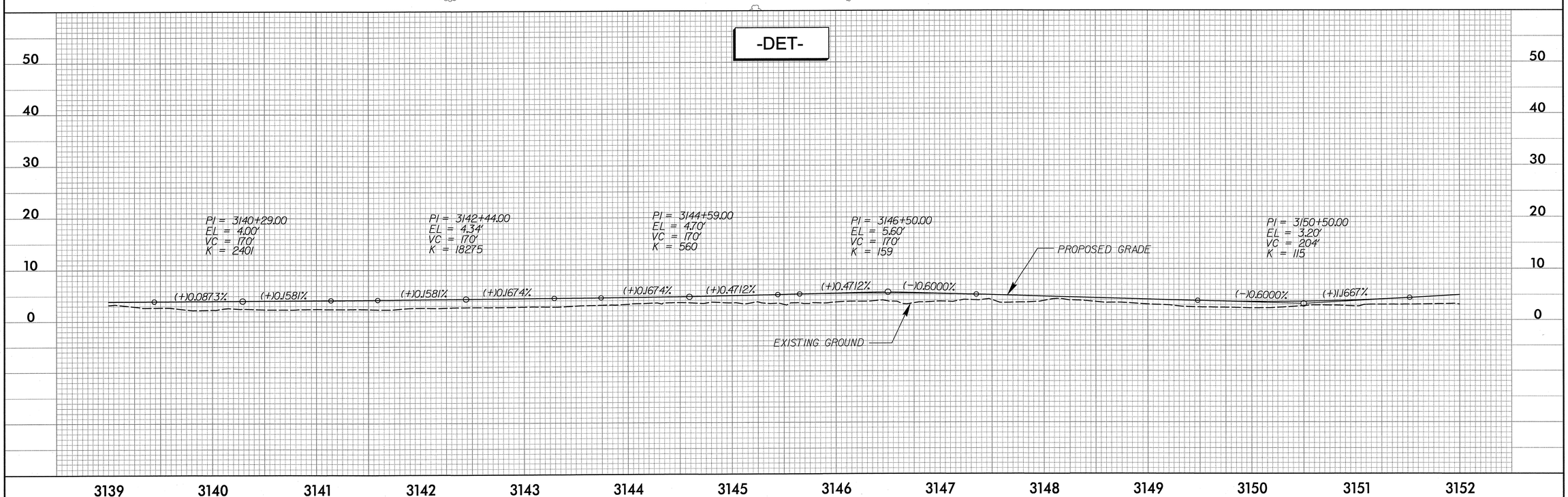
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-1
R/W SHEET NO.	

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St. Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
11-20-12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 029388 ENGINEER EDWARD J. VANCE
11-20-12





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11/20/2012

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-J
R/W SHEET NO.	

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 11-20-12

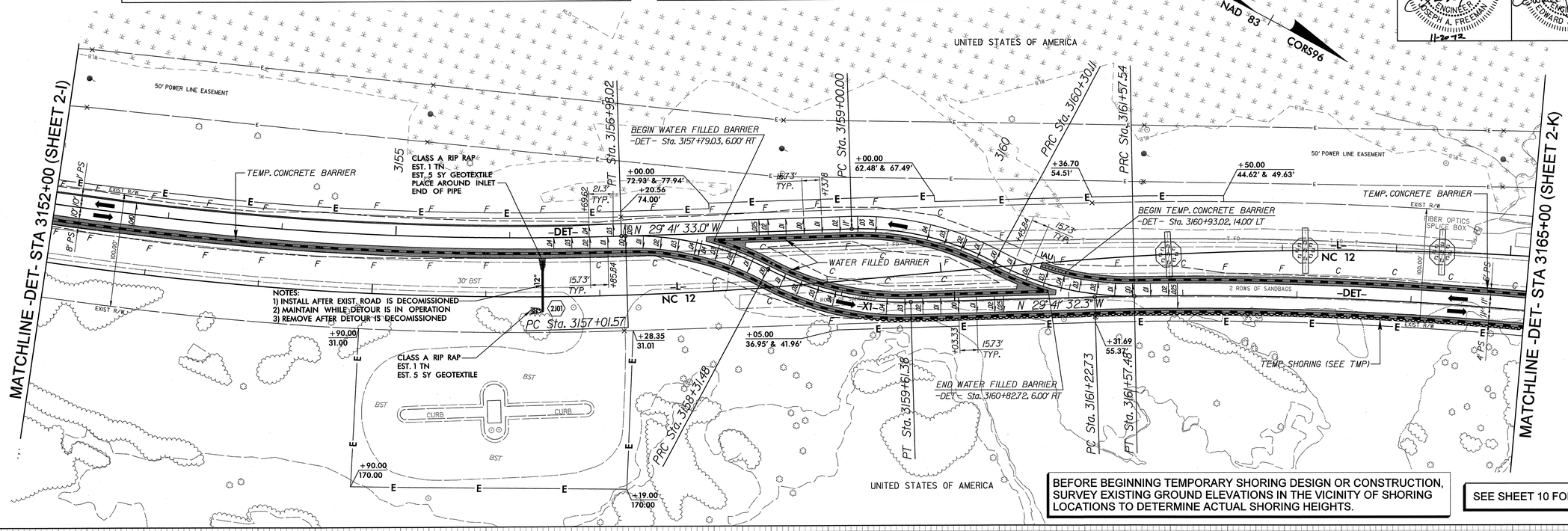
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 029388 ENGINEER EDWARD J. VANCIN 11-20-12

-DET- CURVE DATA

PI Sta 3152+67.46	PI Sta 3159+66.56	PI Sta 3160+95.24	PI Sta 3164+05.24
Δ = 17° 33' 38.4" (LT)	Δ = 29° 49' 07.6" (RT)	Δ = 29° 12' 15.4" (LT)	Δ = 8° 44' 28.2" (RT)
D = 2° 01' 23.4"	D = 22° 55' 05.9"	D = 22° 55' 05.9"	D = 1° 46' 04.2"
L = 867.98'	L = 130.11'	L = 127.43'	L = 494.45'
T = 437.42'	T = 66.56'	T = 65.13'	T = 247.71'
R = 2,832.00'	R = 250.00'	R = 250.00'	R = 3,241.00'
e = 4.0%	e = 4.0%	e = 4.0%	e = 2.5%
RUNOFF = 85.20'	RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 39.33'

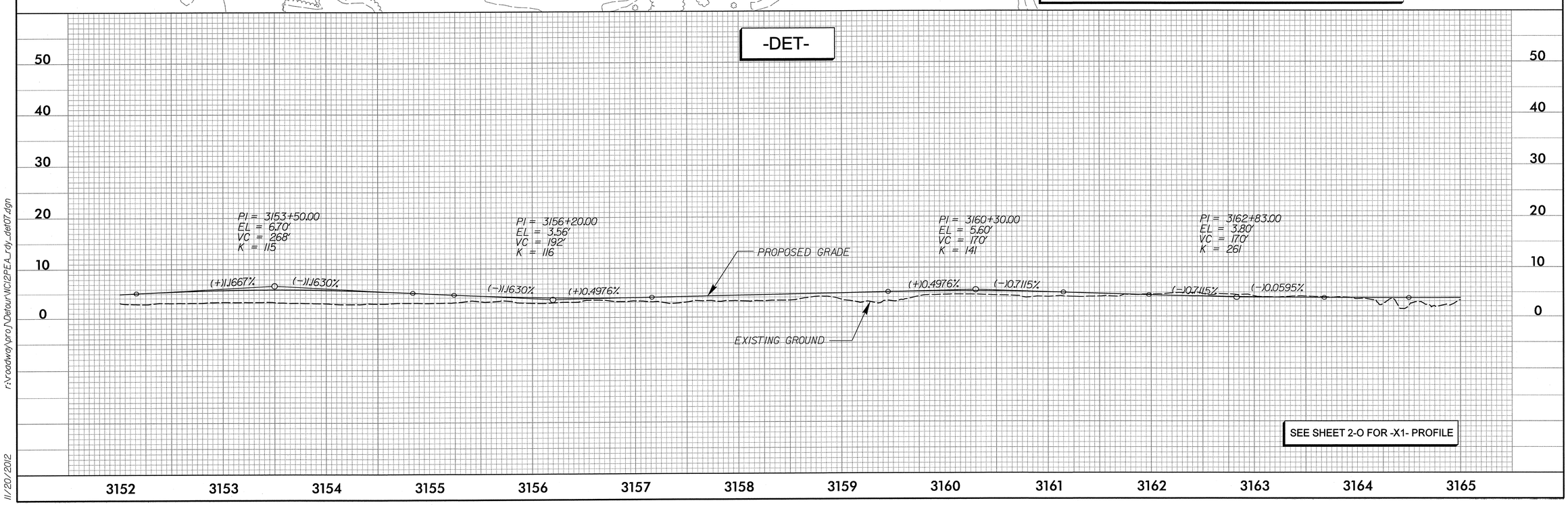
-X1- CURVE DATA

PI Sta 3157+68.03	PI Sta 3158+97.93	PI Sta 3161+40.11
Δ = 29° 46' 20.5" (RT)	Δ = 29° 46' 19.7" (LT)	Δ = 0° 36' 51.5" (RT)
D = 22° 55' 05.9"	D = 22° 55' 05.9"	D = 1° 46' 04.2"
L = 129.91'	L = 129.91'	L = 34.75'
T = 66.46'	T = 66.45'	T = 17.37'
R = 250.00'	R = 250.00'	R = 3,241.00'
e = 4.0%	e = 4.0%	e = 2.5%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 39.33'



BEFORE BEGINNING TEMPORARY SHORING DESIGN OR CONSTRUCTION, SURVEY EXISTING GROUND ELEVATIONS IN THE VICINITY OF SHORING LOCATIONS TO DETERMINE ACTUAL SHORING HEIGHTS.

SEE SHEET 10 FOR PLAN



SEE SHEET 2-O FOR -X1- PROFILE

r:\roadway\pro\Detour\NC12PEA_rdy_det07.dgn

11/20/2012

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-K
R/W SHEET NO.	

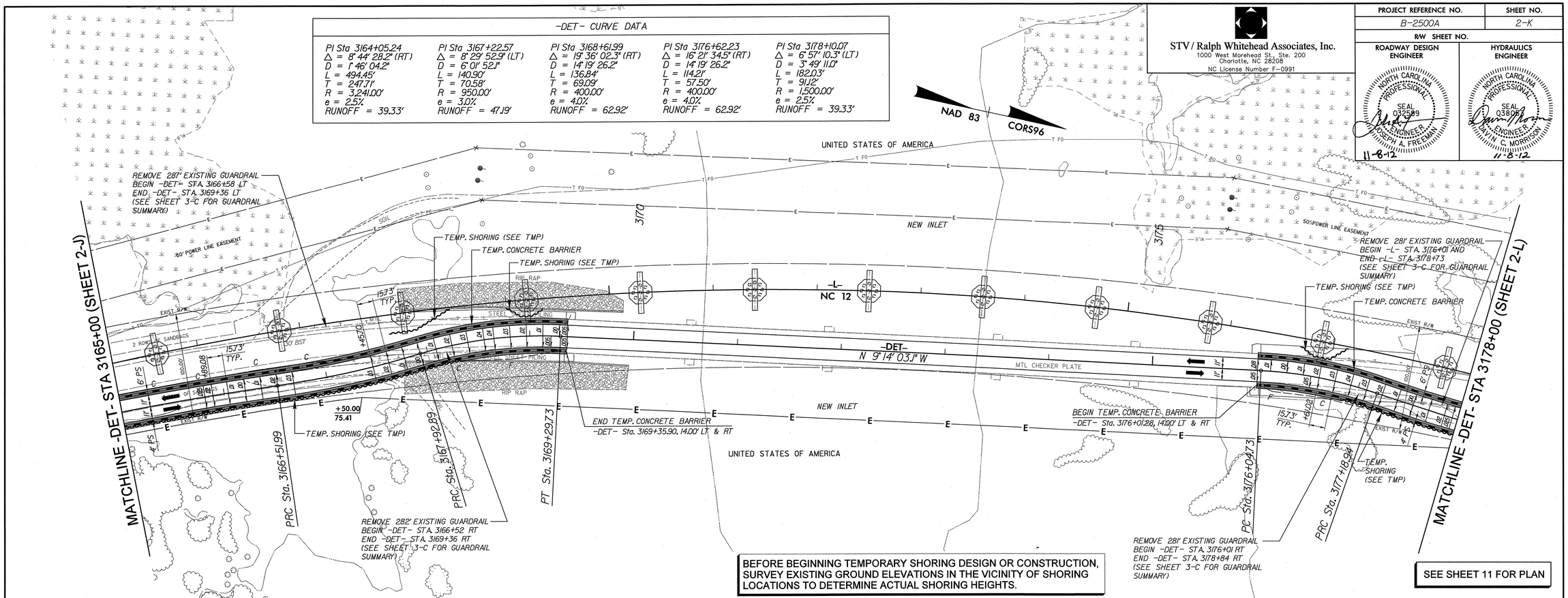
STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 032589 ENGINEER JOSEPH A. FREEMAN 11-8-12

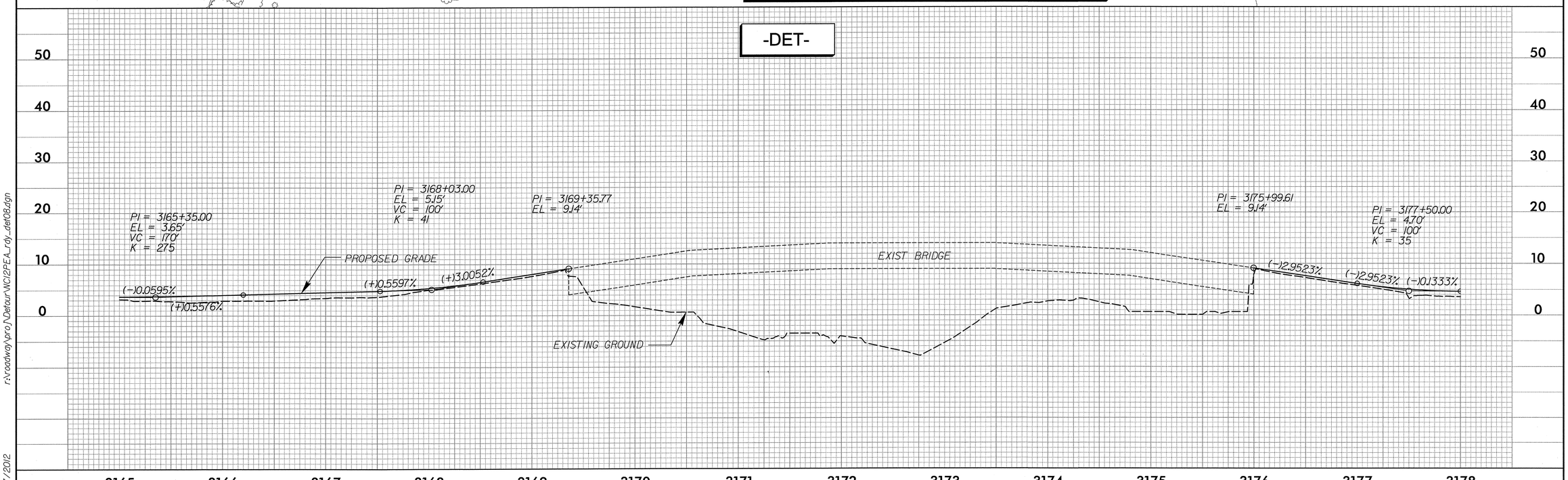
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038062 ENGINEER DAVID C. MORRISON 11-8-12

-DET- CURVE DATA

PI Sta 3164+05.24	PI Sta 3167+22.57	PI Sta 3168+61.99	PI Sta 3176+62.23	PI Sta 3178+10.07
Δ = 8° 44' 28.2" (RT)	Δ = 8° 29' 52.9" (LT)	Δ = 19° 36' 02.3" (RT)	Δ = 16° 21' 34.5" (RT)	Δ = 6° 57' 10.3" (LT)
D = 1° 46' 04.2"	D = 6° 01' 52.1"	D = 14° 19' 26.2"	D = 14° 19' 26.2"	D = 3° 49' 11.0"
L = 494.45'	L = 140.90'	L = 136.84'	L = 114.21'	L = 182.03'
T = 247.71'	T = 70.58'	T = 69.09'	T = 57.50'	T = 91.12'
R = 3,241.00'	R = 950.00'	R = 400.00'	R = 400.00'	R = 1,500.00'
e = 2.5%	e = 3.0%	e = 4.0%	e = 4.0%	e = 2.5%
RUNOFF = 39.33'	RUNOFF = 47.19'	RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 39.33'



BEFORE BEGINNING TEMPORARY SHORING DESIGN OR CONSTRUCTION, SURVEY EXISTING GROUND ELEVATIONS IN THE VICINITY OF SHORING LOCATIONS TO DETERMINE ACTUAL SHORING HEIGHTS.



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11/7/2012

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-L
R/W SHEET NO.	

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
11-8-12

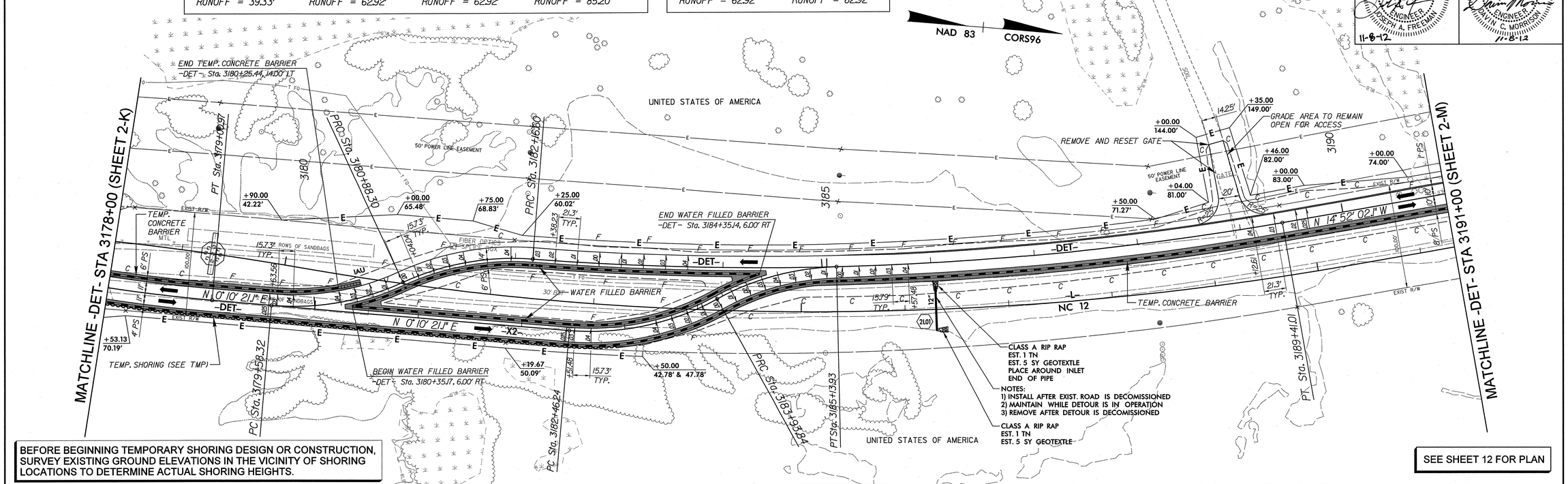
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038057 ENGINEER DAVIN C. MORRISON
11-8-12

-DET- CURVE DATA

PI Sta 3178+10.07	PI Sta 3180+24.82	PI Sta 3181+53.90	PI Sta 3185+80.79
Δ = 6° 57' 10.3" (LT)	Δ = 29° 47' 20.0" (LT)	Δ = 29° 24' 17.8" (RT)	Δ = 14° 39' 21.0" (LT)
D = 3° 49' 11.0"	D = 22° 55' 05.9"	D = 22° 55' 05.9"	D = 2° 01' 23.4"
L = 182.03'	L = 129.98'	L = 128.30'	L = 724.40'
T = 91.12'	T = 66.49'	T = 65.60'	T = 364.19'
R = 1,500.00'	R = 250.00'	R = 250.00'	R = 2,832.00'
e = 2.5%	e = 4.0%	e = 4.0%	e = 4.0%
RUNOFF = 39.33'	RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 85.20'

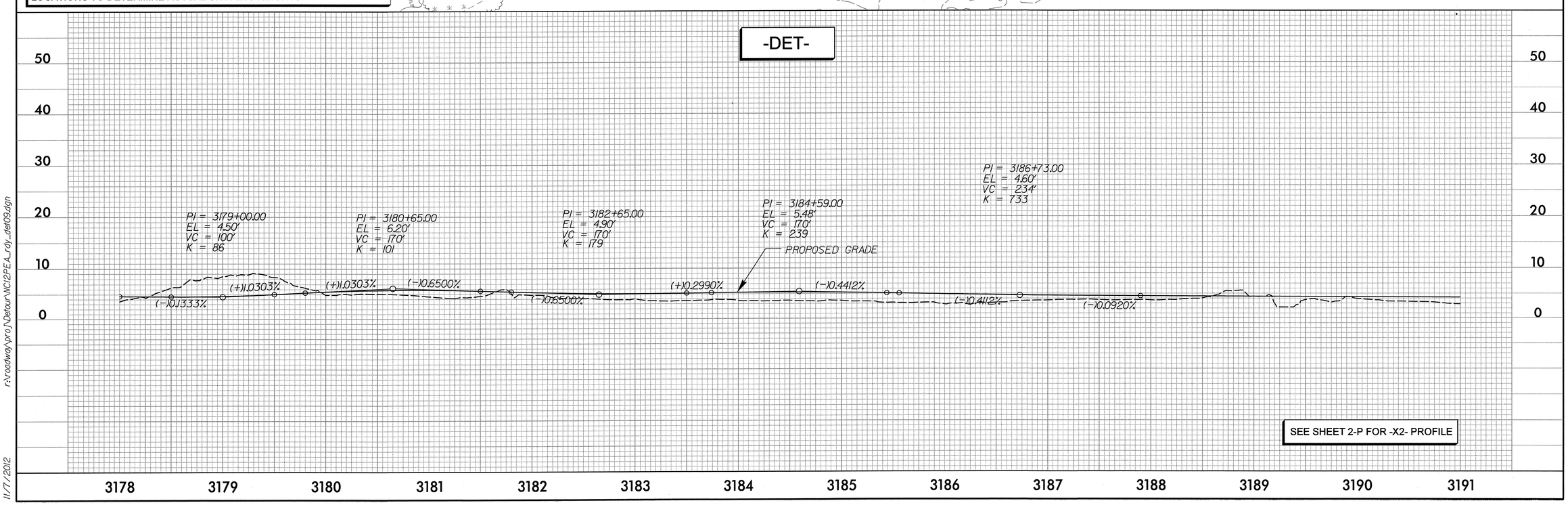
-X2- CURVE DATA

PI Sta 3183+22.26	PI Sta 3184+55.07
Δ = 33° 49' 43.7" (LT)	Δ = 27° 31' 22.1" (RT)
D = 22° 55' 05.9"	D = 22° 55' 05.9"
L = 147.61'	L = 120.09'
T = 76.02'	T = 61.23'
R = 250.00'	R = 250.00'
e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'



BEFORE BEGINNING TEMPORARY SHORING DESIGN OR CONSTRUCTION, SURVEY EXISTING GROUND ELEVATIONS IN THE VICINITY OF SHORING LOCATIONS TO DETERMINE ACTUAL SHORING HEIGHTS.

SEE SHEET 12 FOR PLAN



SEE SHEET 2-P FOR -X2- PROFILE

r:\roadway\proj\Detour\WC12PEA_rdy_det09.dgn

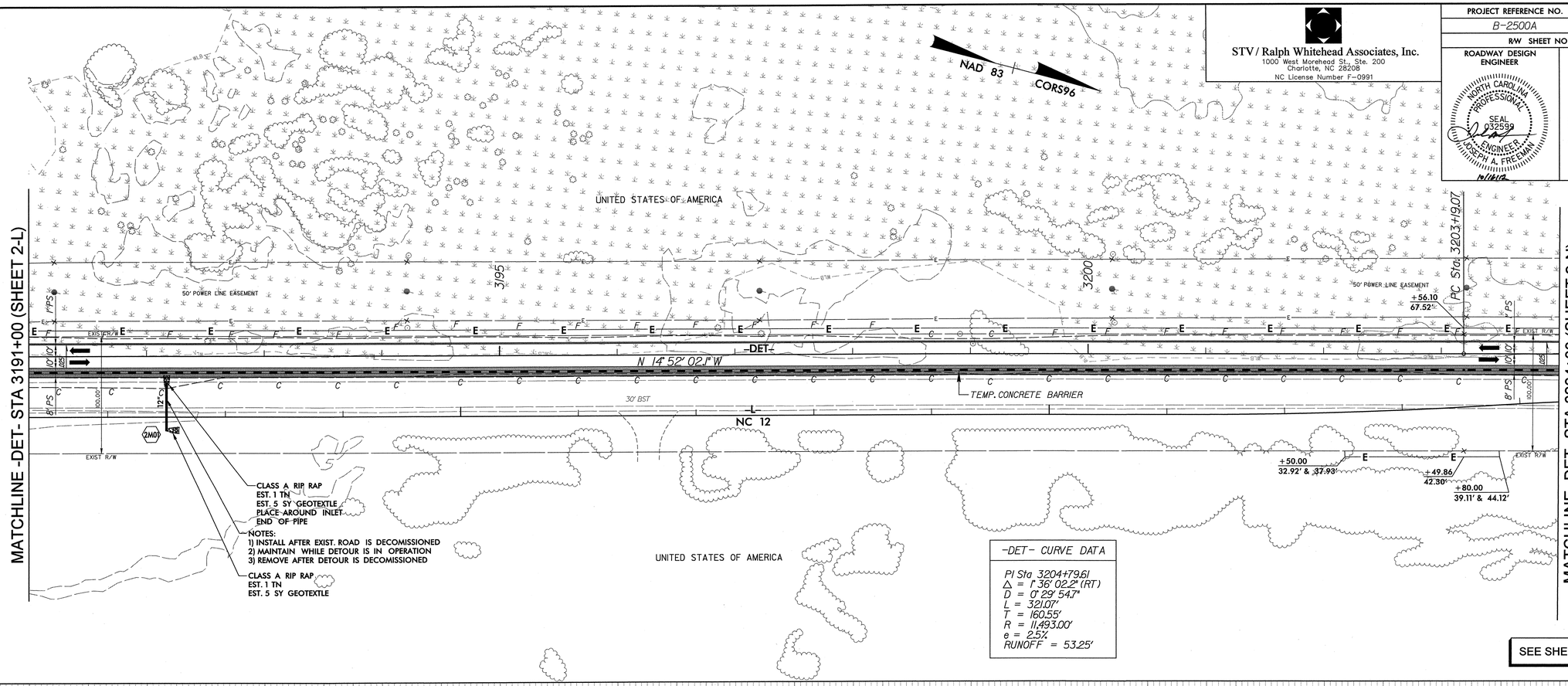
11/7/2012

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-M
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 10/16/12

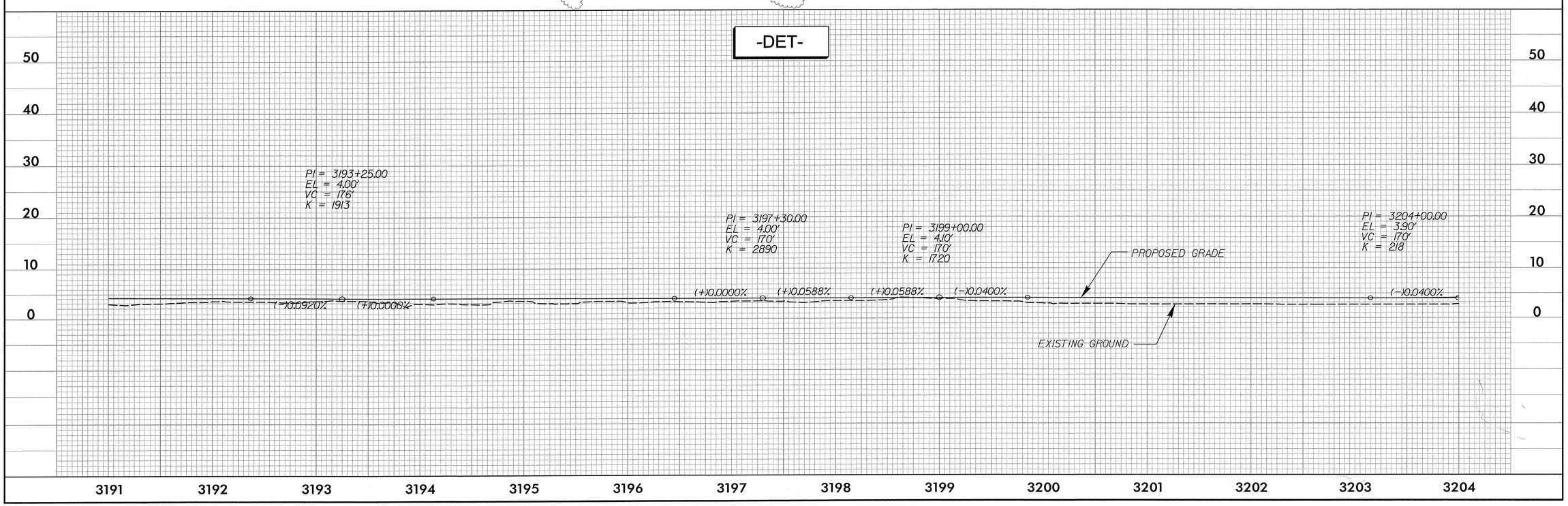
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038054 ENGINEER JONATHAN C. MORRISON 10/16/12



-DET- CURVE DATA

PI Sta 3204+79.61
Δ = 1° 36' 02.2" (RT)
D = 0° 29' 54.7"
L = 321.07'
T = 160.55'
R = 11,493.00'
e = 2.5%
RUNOFF = 53.25'

SEE SHEET 13 FOR PLAN



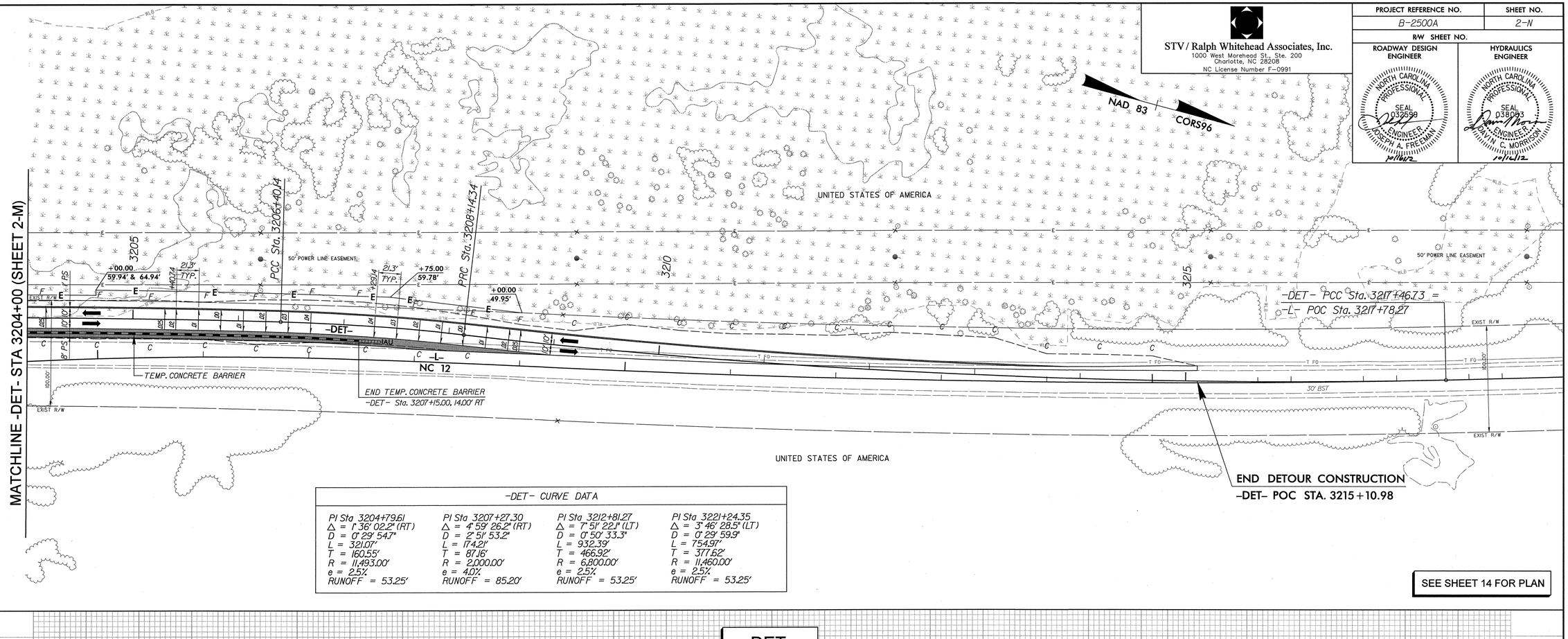
r:\roadway\proj\Detour\WC12PEA_rdy_det10.dgn
10/16/2012

STV / Ralph Whitehead Associates, Inc.
1000 West Moreheed St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-N
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

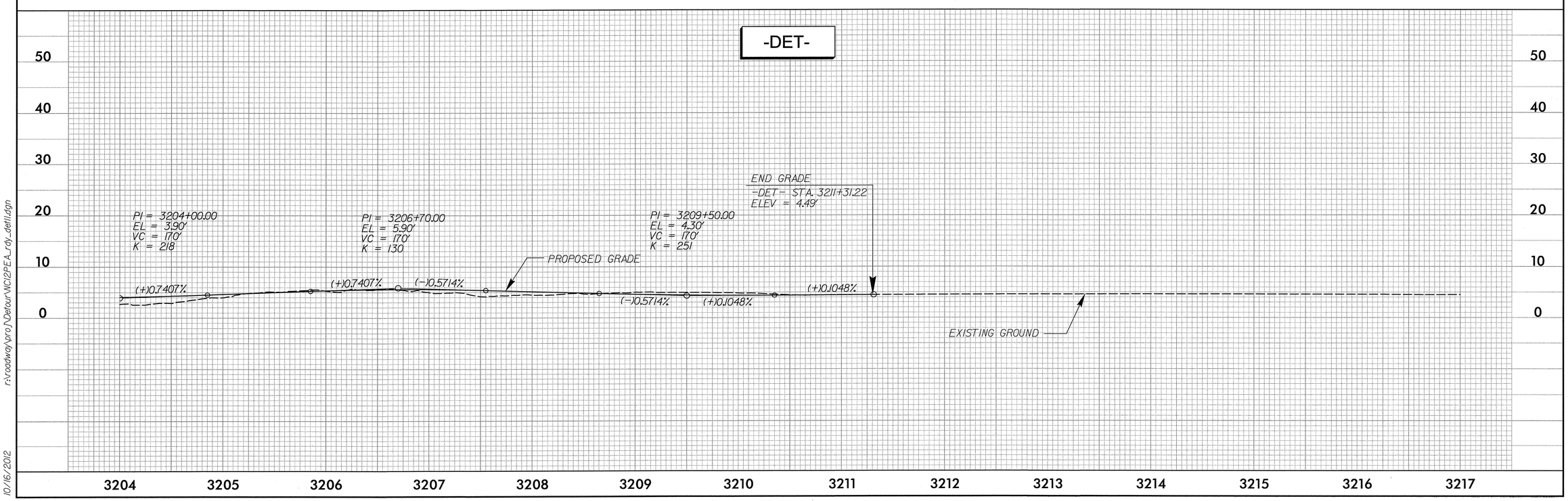
NORTH CAROLINA PROFESSIONAL SEAL 032598 ENGINEER JOSEPH A. FREEMAN 10/16/12

NORTH CAROLINA PROFESSIONAL SEAL 038073 ENGINEER DAVID W. C. MORRISON 10/16/12



SEE SHEET 14 FOR PLAN

-DET- CURVE DATA			
PI Sta 3204+79.61	PI Sta 3207+27.30	PI Sta 3212+81.27	PI Sta 3221+24.35
Δ = 1° 36' 02.2" (RT)	Δ = 4° 59' 26.2" (RT)	Δ = 1° 51' 22.1" (LT)	Δ = 3° 46' 28.5" (LT)
D = 0° 29' 54.7"	D = 2° 51' 53.2"	D = 0° 50' 33.3"	D = 0° 29' 59.9"
L = 321.07'	L = 174.21'	L = 932.39'	L = 754.97'
T = 160.55'	T = 87.16'	T = 466.92'	T = 377.62'
R = 11,493.00'	R = 2,000.00'	R = 6,800.00'	R = 11,460.00'
e = 2.5%	e = 4.0%	e = 2.5%	e = 2.5%
RUNOFF = 53.25'	RUNOFF = 85.20'	RUNOFF = 53.25'	RUNOFF = 53.25'



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10/16/2012

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-0
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 11-20-12

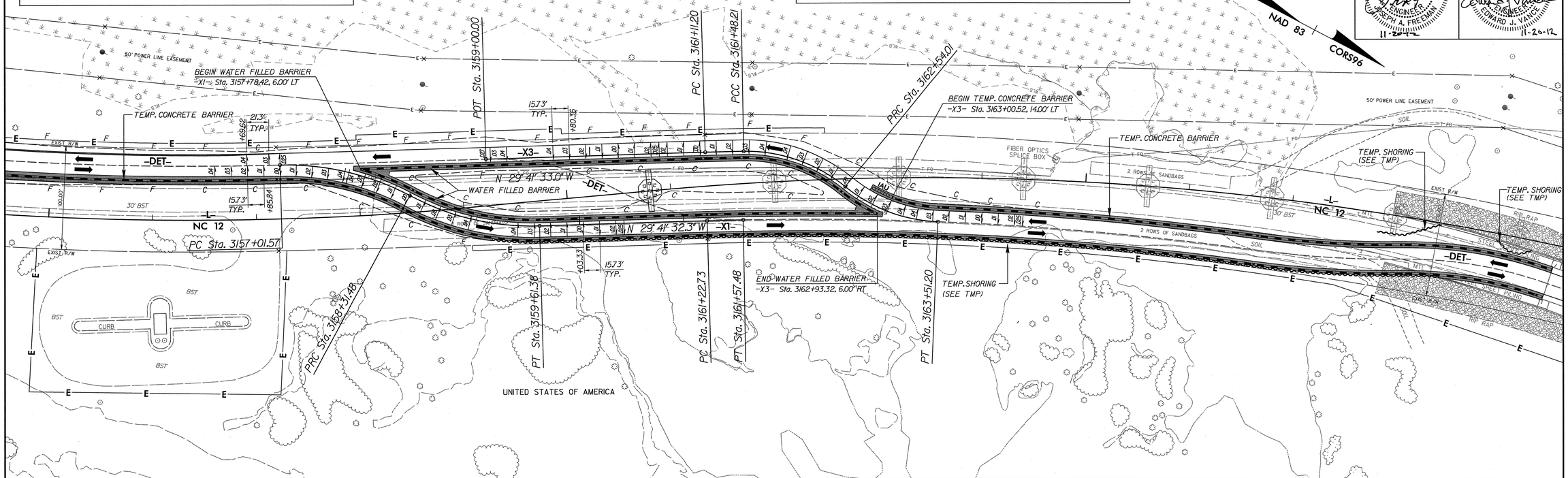
NORTH CAROLINA PROFESSIONAL SEAL 029388 ENGINEER EDWARD J. VANCE 11-20-12

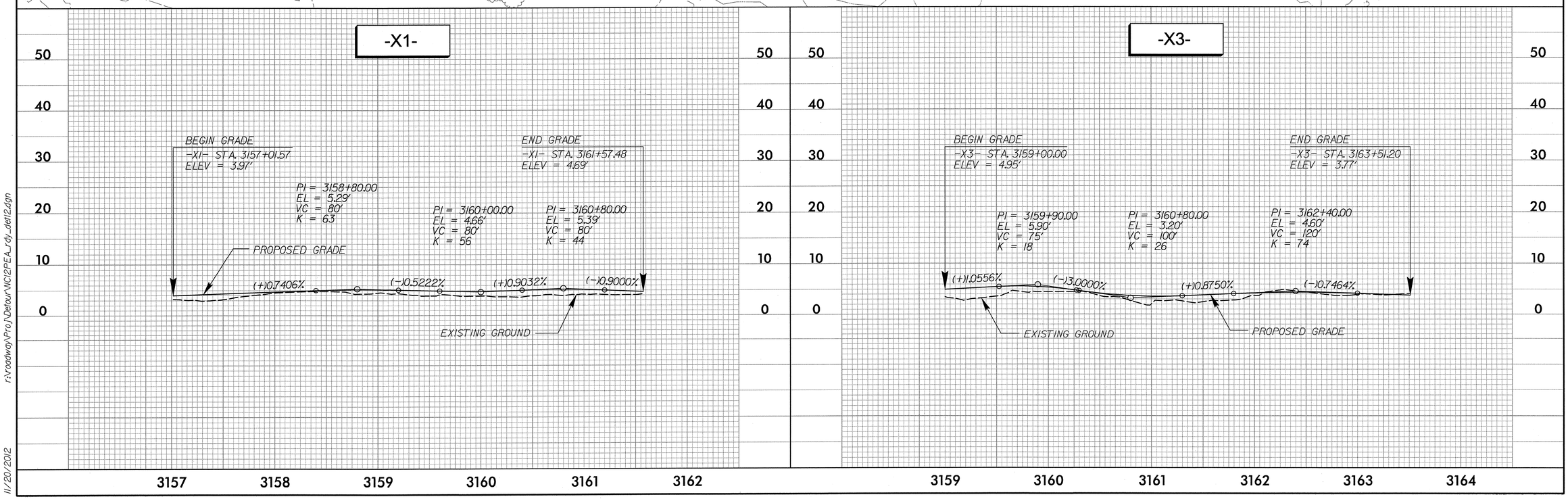
-X1- CURVE DATA

PI Sta 3157+68.03	PI Sta 3158+97.93	PI Sta 3161+40.11
Δ = 29° 46' 20.5" (RT)	Δ = 29° 46' 19.7" (LT)	Δ = 0° 36' 51.5" (RT)
D = 22° 55' 05.9"	D = 22° 55' 05.9"	D = 1° 46' 04.2"
L = 129.91'	L = 129.91'	L = 34.75'
T = 66.46'	T = 66.45'	T = 17.37'
R = 250.00'	R = 250.00'	R = 3,241.00'
e = 4.0%	e = 4.0%	e = 2.5%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 39.33'

-X3- CURVE DATA

PI Sta 3161+29.70	PI Sta 3162+03.42	PI Sta 3163+04.38
Δ = 0° 38' 28.4" (RT)	Δ = 40° 24' 44.6" (RT)	Δ = 37° 07' 27.4" (LT)
D = 1° 43' 57.2"	D = 38° 11' 49.9"	D = 38° 11' 49.9"
L = 37.01'	L = 105.80'	L = 97.19'
T = 18.51'	T = 55.21'	T = 50.37'
R = 3,307.00'	R = 150.00'	R = 150.00'
e = 4.0%	e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 62.92'





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11/20/2012

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-P
R/W SHEET NO.	

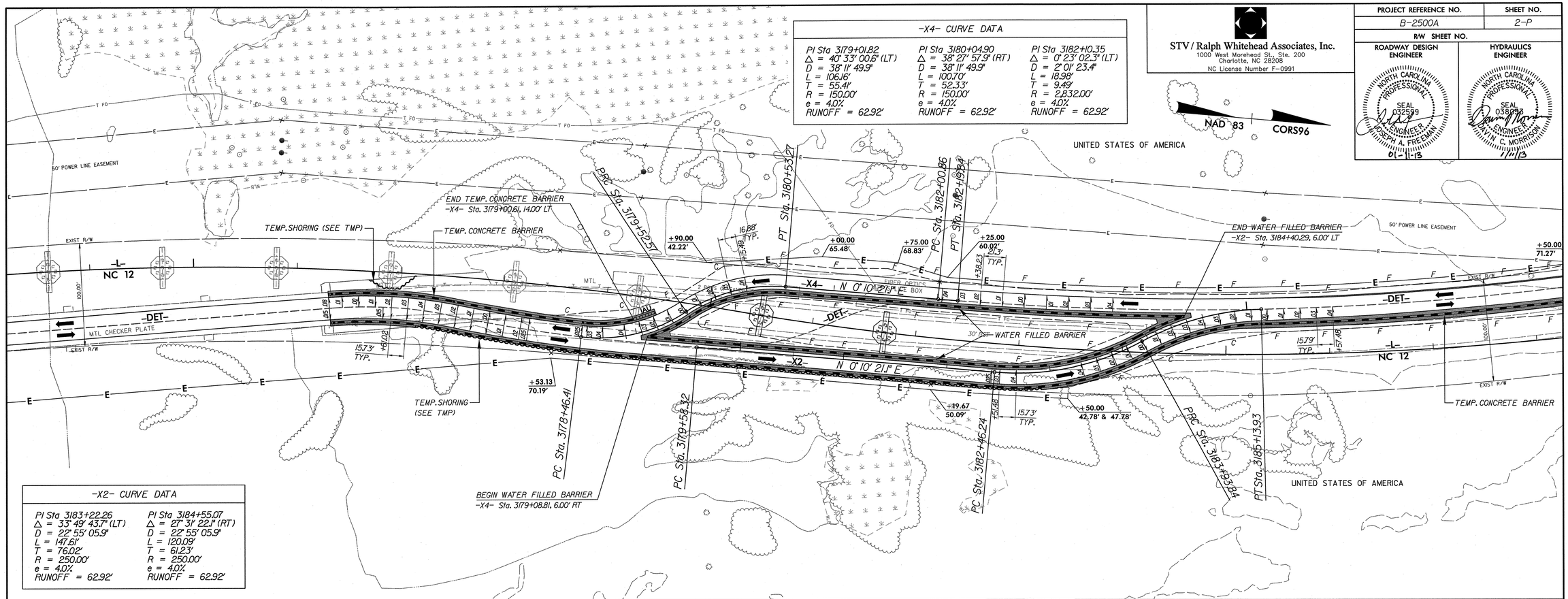
STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 01-11-13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038952 ENGINEER DAVIN C. MORRISON 1/11/13

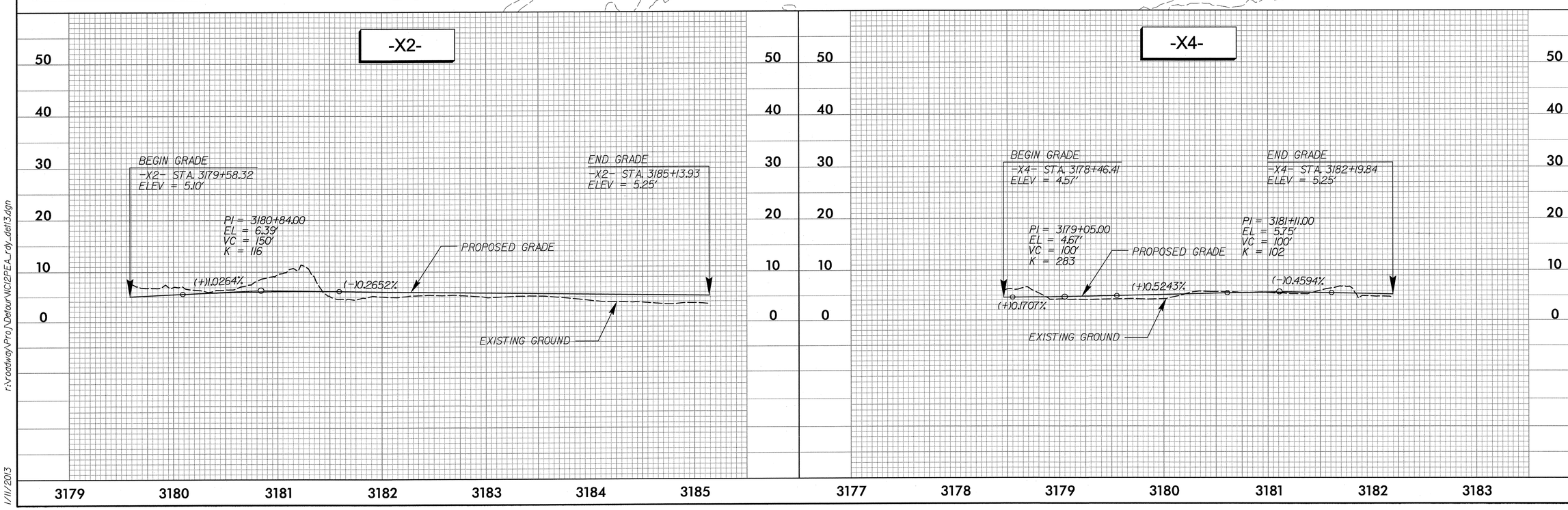
-X4- CURVE DATA

PI Sta 3179+01.82	PI Sta 3180+04.90	PI Sta 3182+10.35
Δ = 40° 33' 00.6" (LT)	Δ = 38° 27' 57.9" (RT)	Δ = 0° 23' 02.3" (LT)
D = 38° 11' 49.9"	D = 38° 11' 49.9"	D = 2° 01' 23.4"
L = 106.16'	L = 100.70'	L = 18.98'
T = 55.41'	T = 52.33'	T = 9.49'
R = 150.00'	R = 150.00'	R = 2,832.00'
e = 4.0%	e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 62.92'



-X2- CURVE DATA

PI Sta 3183+22.26	PI Sta 3184+55.07
Δ = 33° 49' 43.7" (LT)	Δ = 27° 31' 22.1" (RT)
D = 22° 55' 05.9"	D = 22° 55' 05.9"
L = 147.61'	L = 120.09'
T = 76.02'	T = 61.23'
R = 250.00'	R = 250.00'
e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'



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1/11/2013

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-Q
R/W SHEET NO.	

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 11-20-12

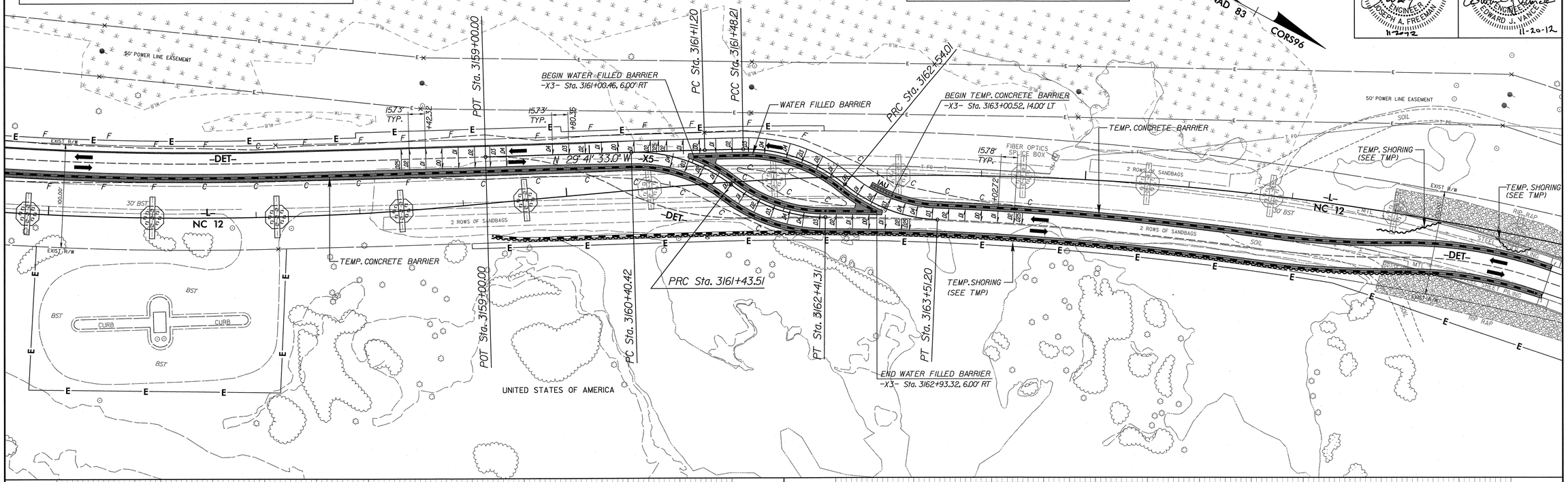
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 029388 HYDR. ENGINEER EDWARD J. VANCE 11-20-12

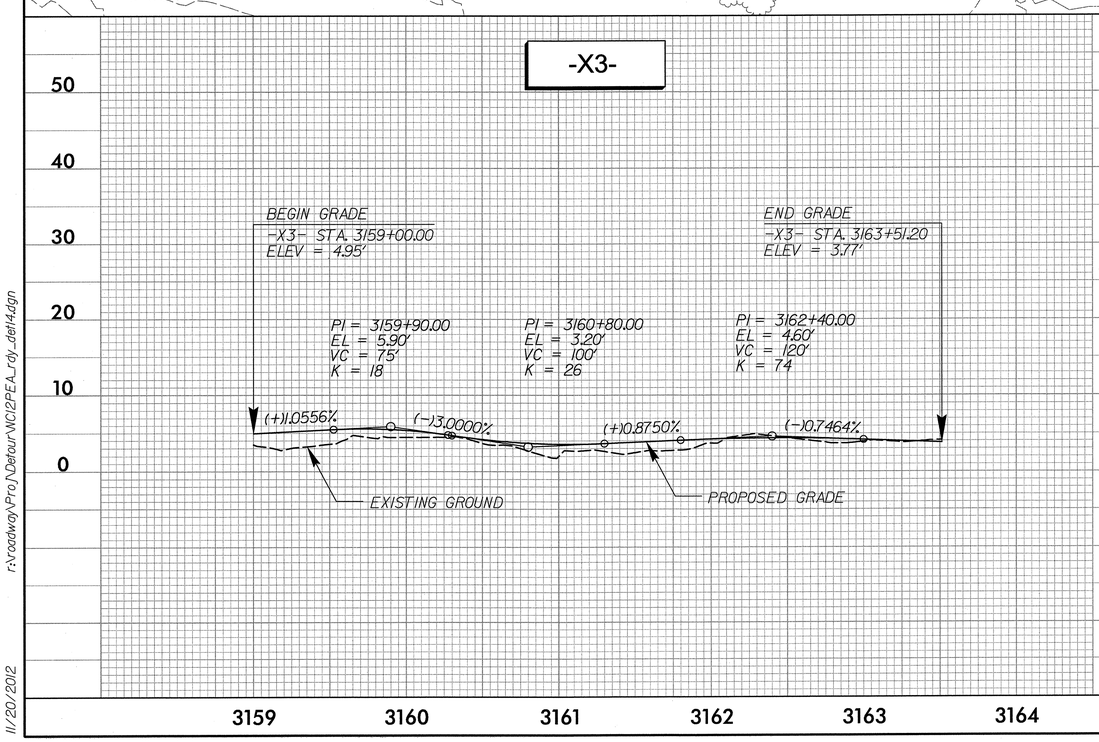
-X3- CURVE DATA

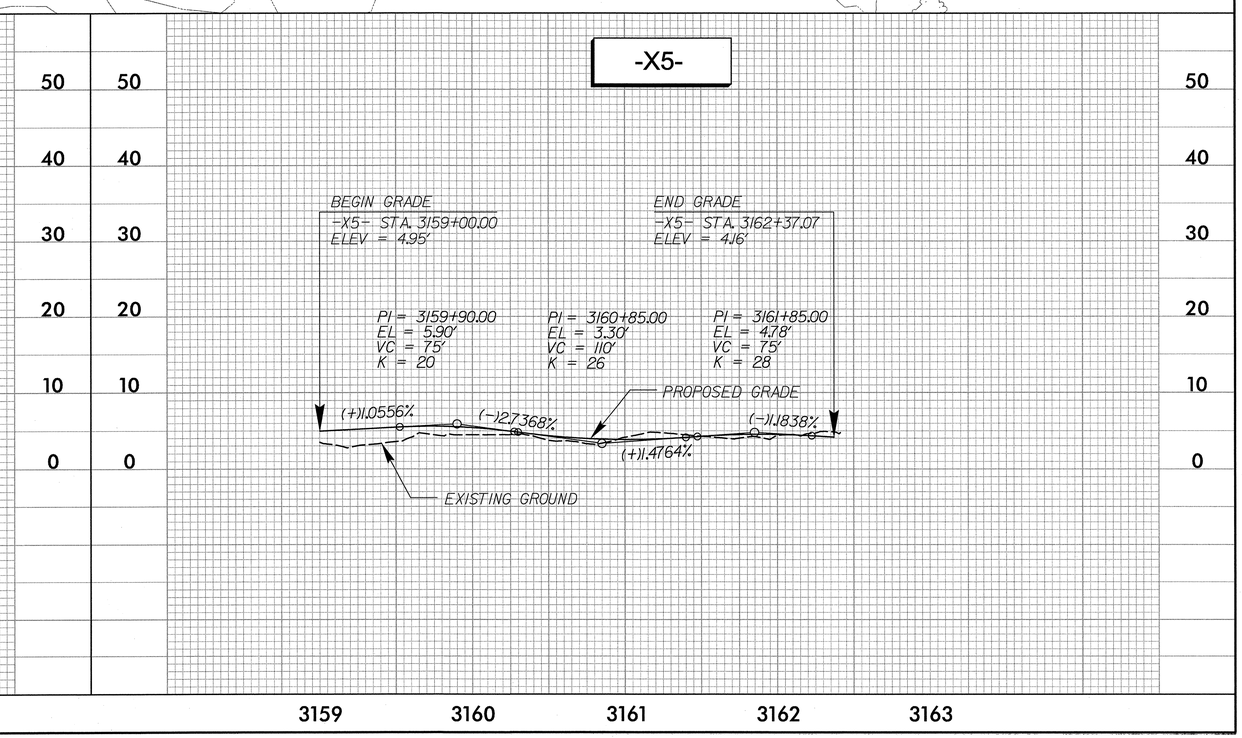
PI Sta 3161+29.70	PI Sta 3162+03.42	PI Sta 3163+04.38
Δ = 0° 38' 28.4" (RT)	Δ = 40° 24' 44.6" (RT)	Δ = 37° 07' 27.4" (LT)
D = 1° 43' 57.2"	D = 38° 11' 49.9"	D = 38° 11' 49.9"
L = 37.01'	L = 105.80'	L = 97.19'
T = 18.51'	T = 55.21'	T = 50.37'
R = 3,307.00'	R = 150.00'	R = 150.00'
e = 4.0%	e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 62.92'

-X5- CURVE DATA

PI Sta 3160+94.10	PI Sta 3161+94.22
Δ = 39° 22' 40.4" (RT)	Δ = 37° 21' 26.2" (LT)
D = 38° 11' 49.9"	D = 38° 11' 49.9"
L = 103.09'	L = 97.80'
T = 53.68'	T = 50.71'
R = 150.00'	R = 150.00'
e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'







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11/20/2012

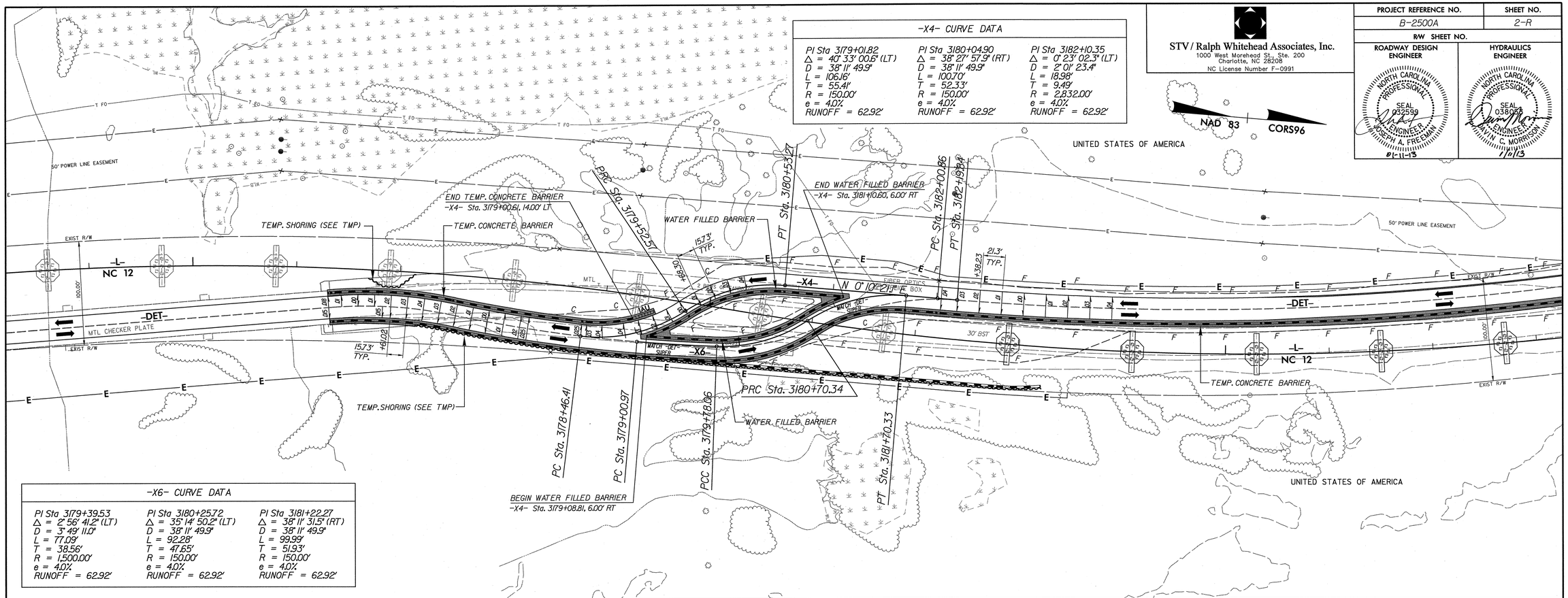
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-R
R/W SHEET NO.	

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

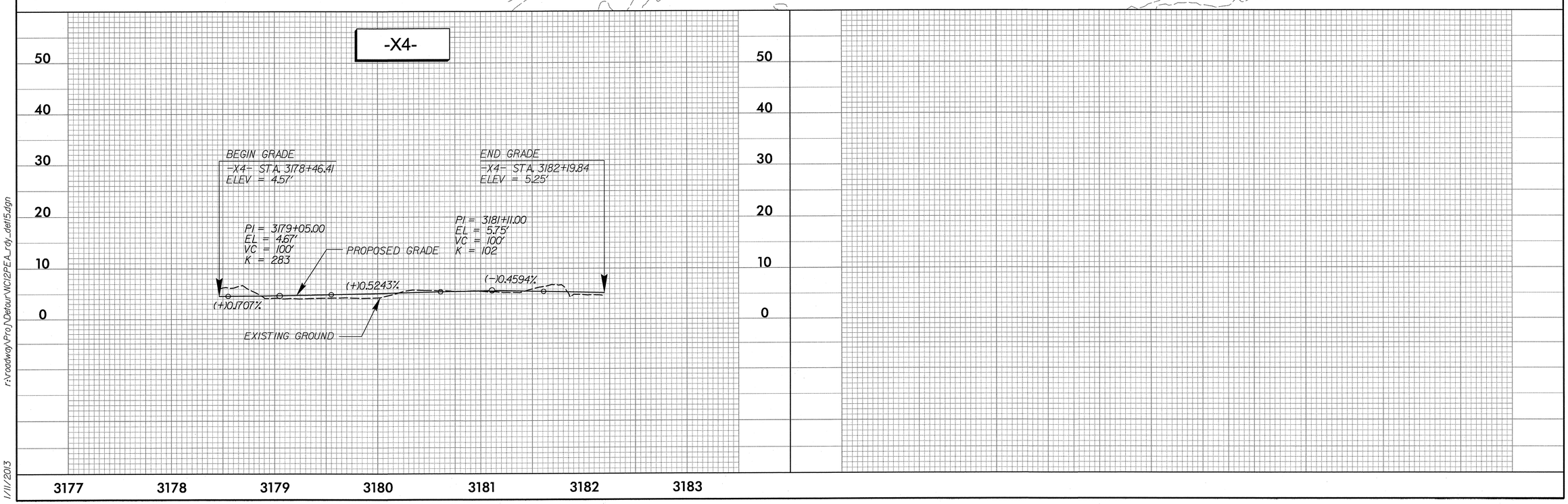
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 01-11-13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038082 ENGINEER DAVIN C. MORRISON 1/11/13

-X4- CURVE DATA		
PI Sta 3179+01.82	PI Sta 3180+04.90	PI Sta 3182+10.35
Δ = 40° 33' 00.6" (LT)	Δ = 38° 27' 57.9" (RT)	Δ = 0° 23' 02.3" (LT)
D = 38° 11' 49.9"	D = 38° 11' 49.9"	D = 2° 01' 23.4"
L = 106.16'	L = 100.70'	L = 18.98'
T = 55.41'	T = 52.33'	T = 9.49'
R = 150.00'	R = 150.00'	R = 2,832.00'
e = 4.0%	e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 62.92'



-X6- CURVE DATA		
PI Sta 3179+39.53	PI Sta 3180+25.72	PI Sta 3181+22.27
Δ = 2° 56' 41.2" (LT)	Δ = 35° 14' 50.2" (LT)	Δ = 38° 11' 31.5" (RT)
D = 3° 49' 11.0"	D = 38° 11' 49.9"	D = 38° 11' 49.9"
L = 77.09'	L = 92.28'	L = 99.99'
T = 38.56'	T = 47.65'	T = 51.93'
R = 1,500.00'	R = 150.00'	R = 150.00'
e = 4.0%	e = 4.0%	e = 4.0%
RUNOFF = 62.92'	RUNOFF = 62.92'	RUNOFF = 62.92'



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1/11/2013

BRIDGE /PAVEMENT RELATIONSHIP SKETCH

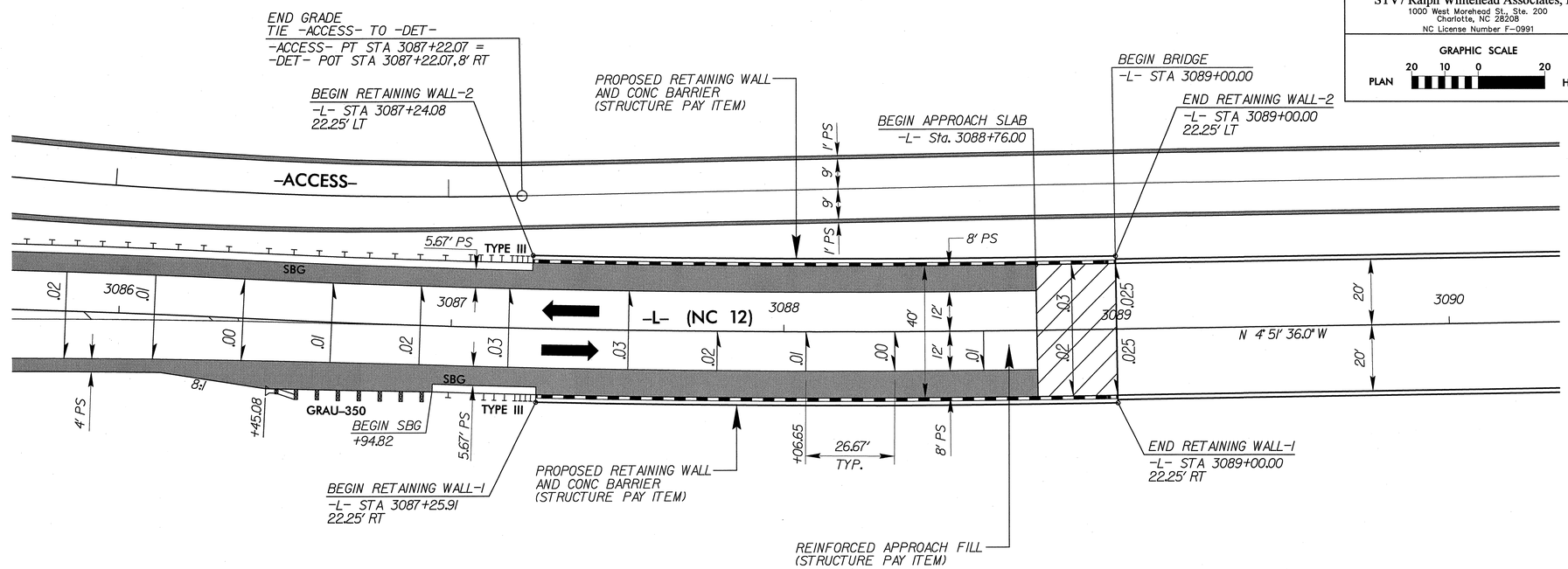
STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

GRAPHIC SCALE
PLAN 20 10 0 20 HORZ.

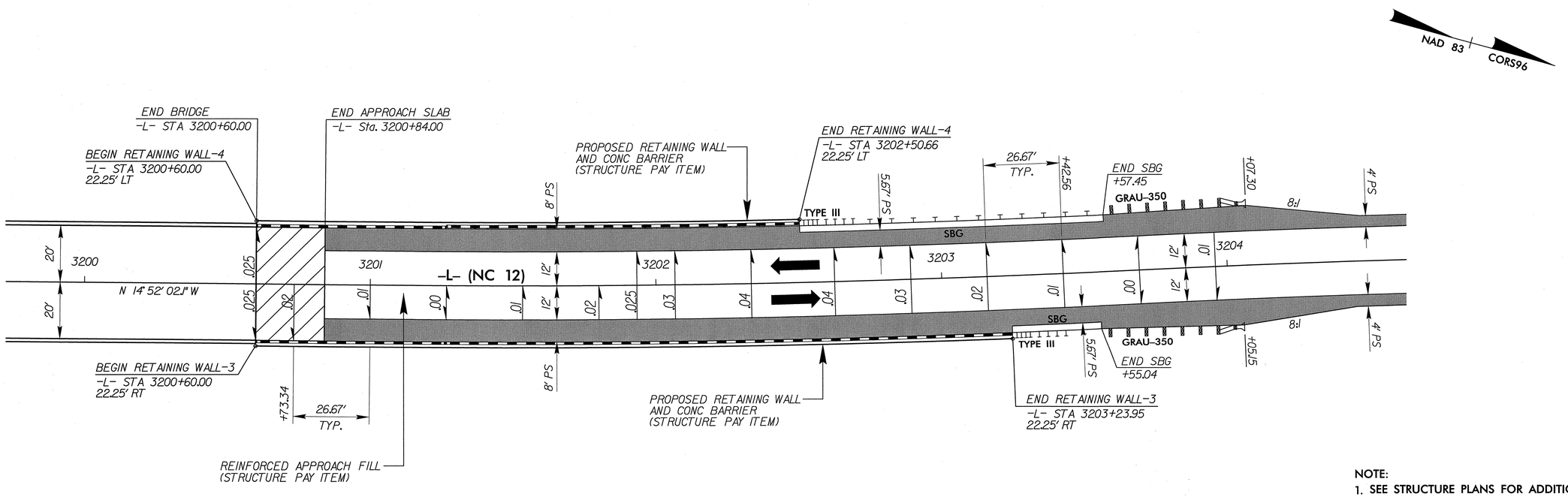
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-S
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT N. PERSIANI 9/5/2013



SEE SHEET 5 FOR PLAN



NOTE:
1. SEE STRUCTURE PLANS FOR ADDITIONAL RETAINING WALL DETAILS AND INFORMATION.

SEE SHEET 13 FOR PLAN

R:\Roadway\Proj\SHT\NC12PEA_rdy_psh02S.dgn

9/5/2013

PROJECT REFERENCE NO.	SHEET
B-2500A	2-T

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022246 ENGINEER SCOTT A. HIDDEN

Scott A. Hidden 11/18/11
SIGNATURE DATE

ENGINEER

SIGNATURE DATE

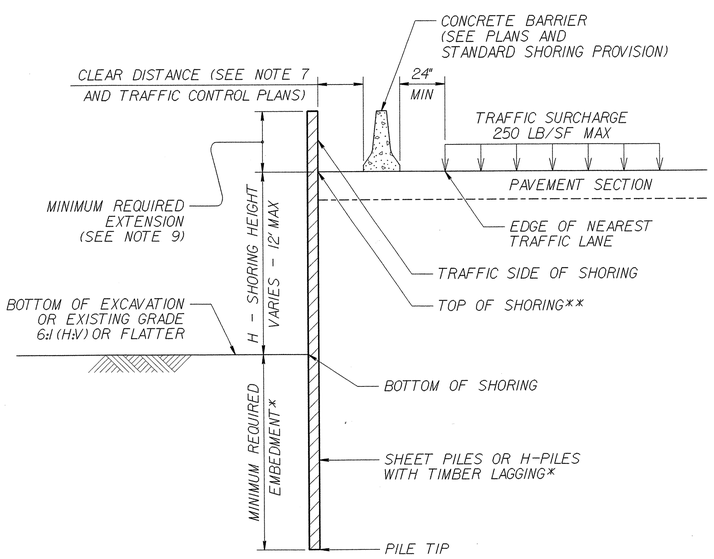
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

***DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".**

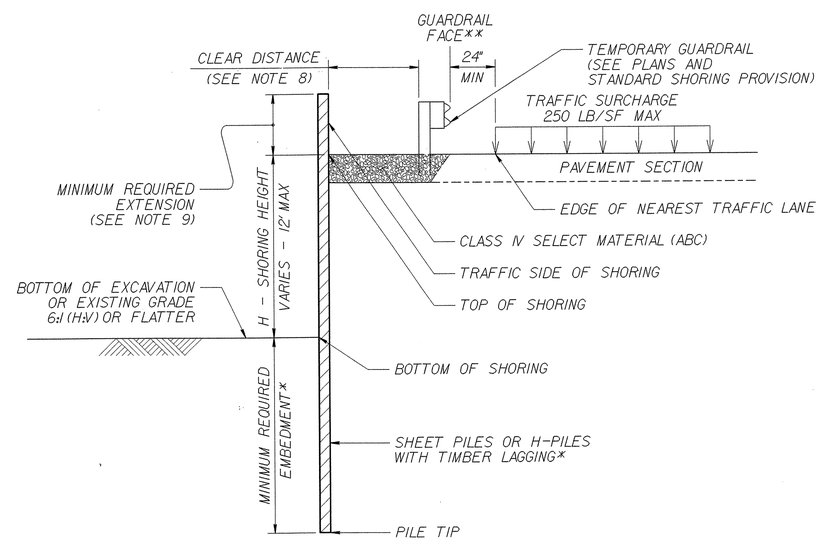
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 LB/CF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 LB/SF
4. DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
7. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
8. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
9. MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
10. MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
11. SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM.
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



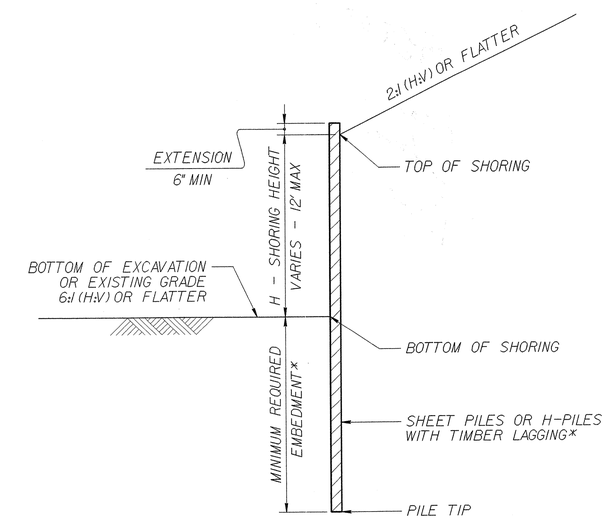
CONCRETE BARRIER

****TOP OF SHORING = EDGE OF PAVEMENT**



TEMPORARY GUARDRAIL

****GUARDRAIL FACE = EDGE OF PAVEMENT**



STANDARD TEMPORARY SHORING

(SLOPE CASE)
***SEE TABLE ABOVE.**

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)
***SEE TABLE ABOVE.**

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.01

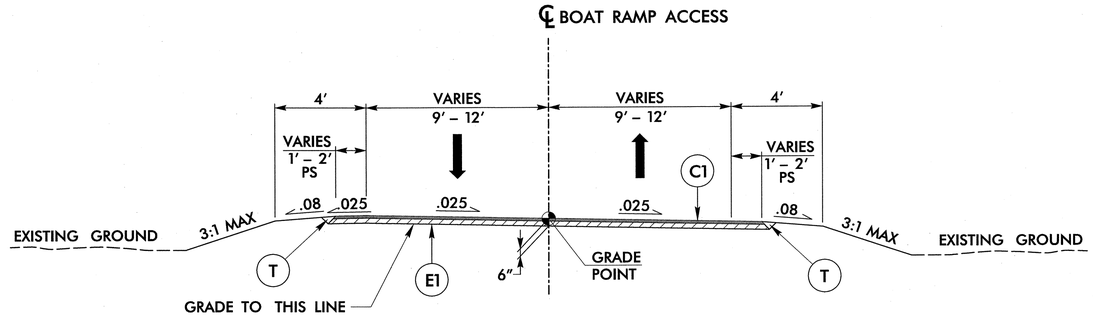
STANDARD TEMPORARY SHORING

DATE: 1-17-12

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

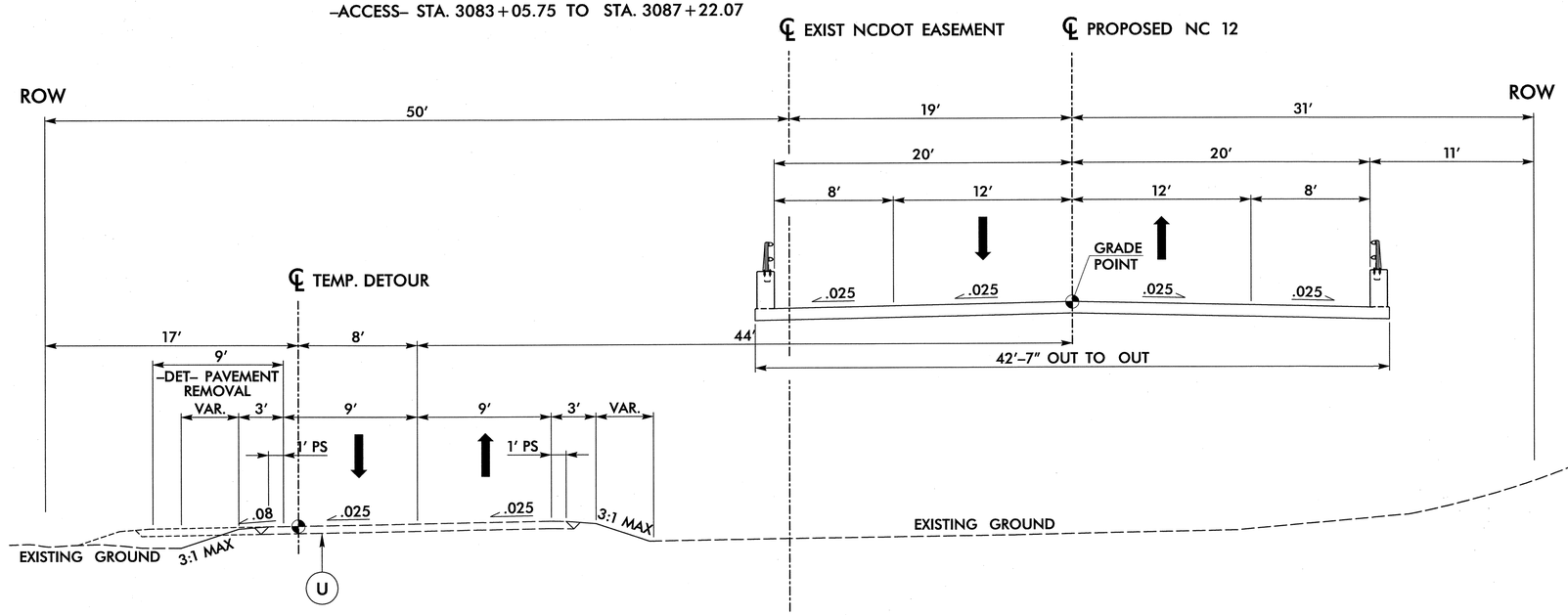
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-U
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN 9/5/2013



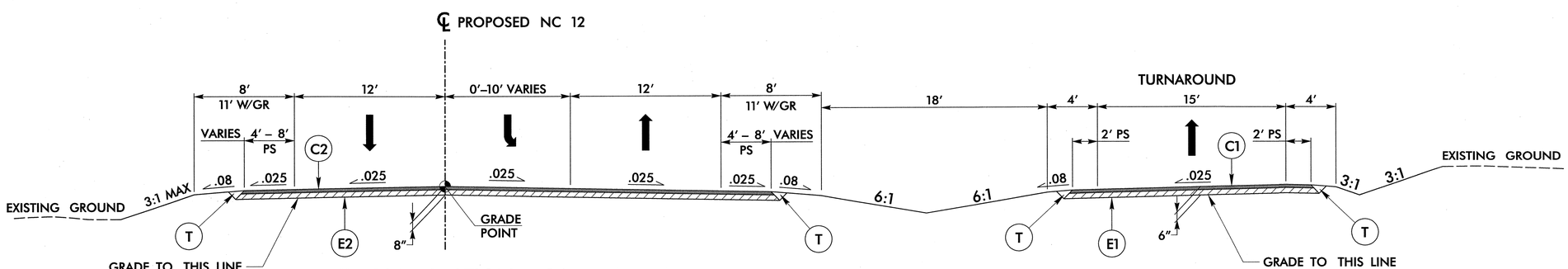
TYPICAL SECTION #12

–ACCESS– STA. 3083+05.75 TO STA. 3087+22.07



TYPICAL SECTION #13

–DET– STA. 3087+22.07 TO STA. 3139+00.00



TYPICAL SECTION #14

–L– STA. 3081+05.21 TO STA. 3083+29.84

C1	2″ S9.5B
C2	3″ S9.5B
C3	VAR. S9.5B
E1	4″ B25.0B
E2	5″ B25.0B
E3	VAR. B25.0B
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

R:\Roadway\Proj\SHT\NC\2PEA_RDY_TYP_2U.dgn

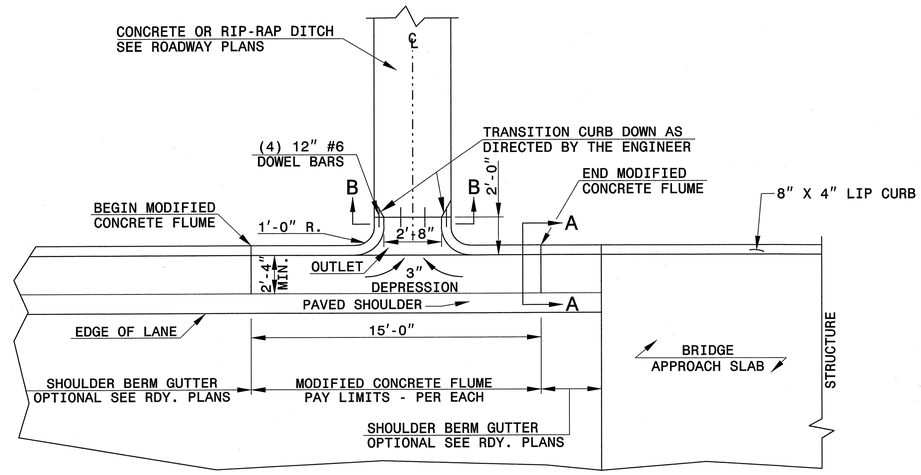
9/5/2013

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	2-V

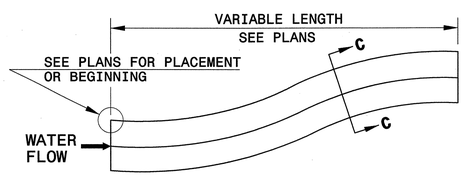
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
MODIFIED CONCRETE FLUME
WITH CONCRETE OR RIP-RAP DITCH

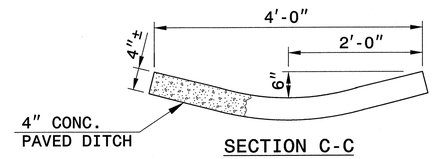
SHEET 1 OF 1
MODFLMDTCH



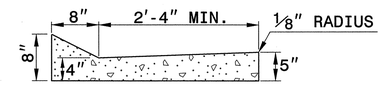
PLAN VIEW



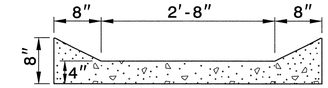
DOWNGRADE OR SAG



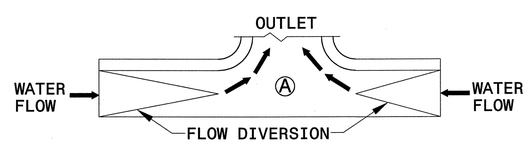
SECTION C-C



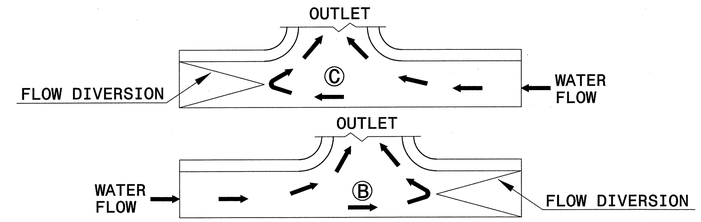
SECTION A-A



SECTION B-B

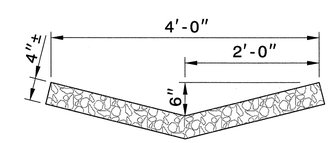


SAG



DOWN GRADE

FLOW DIVERSION EXAMPLES



RIP-RAP LINED DITCH

NOTES:

- CONSTRUCT MODIFIED CONCRETE FLUME AND SHOULDER BERM GUTTER IN ACCORDANCE WITH THIS DETAIL.
- CONSTRUCT CONCRETE DITCH IN ACCORDANCE WITH STD. DWG. NO. 850.01.
- CONSTRUCT RIP RAP LINED DITCH IN ACCORDANCE WITH THIS DETAIL, IF CALLED FOR IN PLANS.
- CONCRETE OR RIP RAP LINED DITCH SHALL BE THE TYPE AND LENGTH SPECIFIED BY THE ROADWAY PLANS. THE DITCH SHALL TERMINATE AS SHOWN ON THE PLANS. IF NO TERMINATION IS INDICATED PLACE RIP-RAP AT THE END OF THE DITCH AS INDICATED BY STD. DWG. 876.02 FOR AN 18" PIPE. TRANSITIONS FROM THE DITCH TO TERMINATION SHALL BE AS DIRECTED BY THE ENGINEER.
- MODIFICATIONS SHALL BE AS DICTATED BY SITE CONDITIONS AND DIRECTED BY THE ENGINEER.

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
MODIFIED CONCRETE FLUME
WITH CONCRETE OR RIP-RAP DITCH

SHEET 1 OF 1
MODFLMDTCH

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI
9/5/2013

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: E.E. Ward DATE: Apr. 2002
MODIFIED BY: E.E. Ward DATE: July 2004
CHECKED BY: DATE:
FILE SPEC.: w:details\stand\modifiedflume.dgn

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C203171

SUMMARY OF QUANTITIES - B-2500A

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
0043000000-N	226	Lump Sum		GRADING
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB-BING
0057000000-E	226	2,652	CY	UNDERCUT EXCAVATION
0194000000-E	SP	3,150	CY	SELECT GRANULAR MATERIAL, CLASS III
0196000000-E	270	500	SY	GEOTEXTILE FOR SOIL STABILIZA-TION
0199000000-E	SP	6,480	SF	TEMPORARY SHORING
0234000000-E	SP	1,000	CY	GENERIC GRADING ITEM SUPPLEMENTAL GRADING
0248000000-N	SP	Lump Sum		GENERIC GRADING ITEM REMOVE EXISTING SANDBAGS
0318000000-E	300	60	TON	FOUNDATION CONDITIONING MATE-RIAL, MINOR STRUCTURES
0320000000-E	300	180	SY	FOUNDATION CONDITIONING GEO-TEXTILE
0335100000-E	305	268	LF	12" DRAINAGE PIPE
0335200000-E	305	92	LF	15" DRAINAGE PIPE
0354000000-E	310	180	LF	****" RC PIPE CULVERTS, CLASS ***** (15", V)
0995000000-E	340	338	LF	PIPE REMOVAL
1220000000-E	545	50	TON	INCIDENTAL STONE BASE
1330000000-E	607	960	SY	INCIDENTAL MILLING
1489000000-E	610	11,920	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1519000000-E	610	8,160	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1575000000-E	620	1,015	TON	ASPHALT BINDER FOR PLANT MIX
1693000000-E	654	150	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
2022000000-E	815	224	CY	SUBDRAIN EXCAVATION
2026000000-E	815	1,000	SY	GEOTEXTILE FOR SUBSURFACE DRAINS
2036000000-E	815	168	CY	SUBDRAIN COARSE AGGREGATE
2044000000-E	815	1,000	LF	6" PERFORATED SUBDRAIN PIPE
2070000000-N	815	2	EA	SUBDRAIN PIPE OUTLET
2077000000-E	815	12	LF	6" OUTLET PIPE
2286000000-N	840	6	EA	MASONRY DRAINAGE STRUCTURES
2363000000-N	840	6	EA	FRAME WITH TWO GRATES, STD 840.***** (840.33)
2556000000-E	846	388	LF	SHOULDER BERM GUTTER
3030000000-E	862	312.5	LF	STEEL BM GUARDRAIL
3150000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS
3215000000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3360000000-E	863	1,121	LF	REMOVE EXISTING GUARDRAIL
3578000000-N	SP	1	EA	GENERIC FENCING ITEM REMOVE & RESET EXISTING GATE
3642000000-E	876	20	TON	RIP RAP, CLASS A
3656000000-E	876	365	SY	GEOTEXTILE FOR DRAINAGE
4025000000-E	901	39	SF	CONTRACTOR FURNISHED, TYPE *** SIGN (D)
4025000000-E	901	77	SF	CONTRACTOR FURNISHED, TYPE *** SIGN (E)
4025000000-E	901	18	SF	CONTRACTOR FURNISHED, TYPE *** SIGN (MILEMARKER)
4072000000-E	903	321	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
4078000000-E	903	6	EA	SUPPORTS, 2-LB STEEL U-CHANNEL
4096000000-N	904	5	EA	SIGN ERECTION, TYPE D
4102000000-N	904	15	EA	SIGN ERECTION, TYPE E
4114000000-N	904	6	EA	SIGN ERECTION, MILEMARKERS
4400000000-E	1110	154	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	96	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	288	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4420000000-N	1120	2	EA	PORTABLE CHANGEABLE MESSAGE SIGN
4430000000-N	1130	350	EA	DRUMS
4445000000-E	1145	400	LF	BARRICADES (TYPE III)
4455000000-N	1150	200	DAY	FLAGGER
4465000000-N	1160	8	EA	TEMPORARY CRASH CUSHIONS
4470000000-N	1160	3	EA	RESET TEMPORARY CRASH CUSHION
4480000000-N	1165	2	EA	TMA
4485000000-E	1170	15,043	LF	PORTABLE CONCRETE BARRIER
4507000000-E	1170	2,327	LF	WATER FILLED BARRIER
4508000000-E	1170	360	LF	RESET WATER FILLED BARRIER
4685000000-E	1205	15,074	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	16,318	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4695000000-E	1205	152	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)
4697000000-E	1205	103	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS)
4710000000-E	1205	27	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
4725000000-E	1205	3	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
4810000000-E	1205	113,201	LF	PAINT PAVEMENT MARKING LINES (4")
4847000000-E	1205	49,650	LF	POLYUREA PAVEMENT MARKING LINES (4", **********) (HIGHLY REFLECTIVE ELEMENTS)
4850000000-E	1205	7,131	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
4900000000-N	1251	259	EA	PERMANENT RAISED PAVEMENT MARKERS
6000000000-E	1605	20,000	LF	TEMPORARY SILT FENCE
6006000000-E	1610	200	TON	STONE FOR EROSION CONTROL, CLASS A
6012000000-E	1610	200	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	5	ACR	TEMPORARY MULCHING
6018000000-E	1620	150	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	0.5	TON	FERTILIZER FOR TEMPORARY SEED-ING
6024000000-E	1622	500	LF	TEMPORARY SLOPE DRAINS
6029000000-E	SP	1,000	LF	SAFETY FENCE
6030000000-E	1630	300	CY	SILT EXCAVATION
6036000000-E	1631	6,000	SY	MATTING FOR EROSION CONTROL
6042000000-E	1632	200	LF	1/4" HARDWARE CLOTH
6071012000-E	SP	1,200	LF	COIR FIBER WATTLE
6084000000-E	1660	5	ACR	SEEDING & MULCHING
6087000000-E	1660	2.5	ACR	MOWING
6090000000-E	1661	100	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.5	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	175	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	5	TON	FERTILIZER TOPDRESSING
6114500000-N	1667	10	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	50	EA	RESPONSE FOR EROSION CONTROL

COMPUTED BY: DCM DATE: 8/19/2013

CHECKED BY: EJV DATE: 8/13/2013

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
B-2500A	3-A

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
3087+02	LT	0501		6.30															
3087+02	LT	0501	0502		3.76	3.64	0.32												
3087+04	RT	0502		6.88															
3087+04	RT	0502	OUT		3.64	3.60	0.40		12								X	X	
3084+00	LT	0503	OUT		1.21	0.91	0.30												
3135+87	CL	0801																	
3202+89	LT	1301		7.37															
3202+89	LT	1301	1302		3.80	3.66	0.52		28								X	X	
3203+16	LT	1302		7.09															
3203+16	LT	1302	1303		3.66	3.50	0.50		36								X	X	
3203+48	LT	1303		6.79															
3203+46	LT	1303	1304		3.50	3.38	0.32												
3203+46	RT	1304		6.98															
3203+46	RT	1304	OUT		3.38	3.33	0.31		16								X	X	
3086+50	CL	2D01	OUT		3.45	3.25	0.38	56								X	X	X	
3119+25	CL	2G01	OUT		1.50	1.25	0.63	40								X	X	X	
3150+27	CL	2I01	OUT		2.80	2.50	0.68	44								X	X	X	
3156+50	CL	2J01	OUT		3.00	2.30	1.63	44								X	X	X	
3186+30	CL	2L01	OUT		2.85	2.60	0.61	44								X	X	X	
3192+50	CL	2M01	OUT		2.93	2.60	0.83	40								X	X	X	
SHEET TOTALS								268	92	0	0	0	0	0	0	0	0	0	0

	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
SHEET TOTALS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STATION	FROM	TO	15" R.C. PIPE (CLASS V)	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	*TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I. FRAME WITH TWO GRATES STD. 840.20	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	G.D.I. ANGLED VANE GRATES AND FRAMES STD. 840.33				DRAINAGE PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
3087+02	0501									1													1						1								
3087+02	0501	0502	40																																		
3087+04	0502									1												1							1								
3084+00	0503	OUT	100																																		
3135+87	0801																																			70	REMOVE EXIST. 24" CMP
3202+89	1301									1												1							1								
3203+16	1302									1												1							1								
3203+48	1303									1												1							1								
3203+46	1303	1304	40																																		
3203+46	1304									1												1							1								
3086+50	2D01	OUT																																		56	REMOVE TEMPORARY PIPE
3119+25	2G01	OUT																																		40	REMOVE TEMPORARY PIPE
3150+27	2I01	OUT																																		44	REMOVE TEMPORARY PIPE
3156+50	2J01	OUT																																		44	REMOVE TEMPORARY PIPE
3186+30	2L01	OUT																																		44	REMOVE TEMPORARY PIPE
3192+50	2M01	OUT																																		40	REMOVE TEMPORARY PIPE
SHEET TOTALS			180	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	6	0	0	0				338	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	(NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

MJTCPTV

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	3-B

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK
IN CUBIC YARDS

DETOUR & MAINLINE CONSTRUCTION

CHAIN	FROM STATION	TO STATION	SIDE	UNCL. EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
-DET-	3113+00.00	3121+93.40	RT & LT	75		60		15
-DET-	3144+93.40	3158+27.42	RT & LT	163		402	239	
-DET-	3160+34.57	3162+86.51	RT & LT	21		30	9	
-DET-	3184+25.56	3195+16.97	RT & LT	258		25		233
SUBTOTAL SUMMARY NO. 1				517		517	248	249
-DET-	3076+53.31	3106+53.31	RT & LT	27		5,206	5,178	
-DET-	3106+53.31	3136+46.71	RT & LT	133	52	3,514	3,431	102
-DET-	3136+46.71	3166+34.87	RT & LT	387		2,974	2,587	
-DET-	3166+34.87	3169+12.70 BEGIN TEMP BRIDGE	RT & LT	29		244	215	
-X1-	3157+01.57	3161+57.48	RT & LT	91		142	51	
SUBTOTAL SUMMARY NO. 2				667	52	12,080	11,463	102
-DET-	3175+74.74 END TEMP BRIDGE	3205+68.69	RT & LT	937		1,867	930	
-X2-	3179+58.32	3185+13.93	RT & LT	143		361	218	
-DET-	3205+68.69	3214+79.47	RT & LT	444		312		132
SUBTOTAL SUMMARY NO. 3				1,524		2,540	1,148	132
-X3-	3159+00.00	3163+51.20	RT & LT	225		279	54	
-X4-	3178+46.41	3182+19.84	RT & LT	245		141		104
SUBTOTAL SUMMARY NO. 4				470		420	54	104
-X5-	3159+00.00	3162+41.31	RT & LT	176		69		107
SUBTOTAL SUMMARY NO. 5				176		69		107
-L-	3076+40.00	3089+00.00	RT & LT	484		3,226	2,742	
		BEGIN PERM BRIDGE						
SUBTOTAL SUMMARY NO. 6				484		3,226	2,742	
-L-	3200+60.00	3207+37.00	RT & LT	7		3,491	3,484	
	END PERM BRIDGE							
SUBTOTAL SUMMARY NO. 7				7		3,491	3,484	
SUBTOTAL SUMMARIES NO. 1-7				3,845	52	22,343	19,139	693

NOTE: Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

NOTE: Approximate quantities only. Unclassified Excavation, Borrow Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Asphalt Pavement will be paid for at the lump sum price for "Grading".

DETOUR REMOVAL

CHAIN	FROM STATION	TO STATION	SIDE	UNCL. EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
-DET-	3113+00.00	3121+93.40	RT & LT	60		75	15	
-DET-	3144+93.40	3158+27.42	RT & LT	402		163		239
-DET-	3160+34.57	3162+86.51	RT & LT	30		21		9
-DET-	3184+25.56	3195+16.97	RT & LT	25		258	233	
SUBTOTAL SUMMARY NO. 8				517		517	248	248
-DET-	3076+53.31	3106+53.31	RT & LT	1,123		97		1,027
-DET-	3106+53.31	3136+46.71	RT & LT	732		104		628
-DET-	3136+46.71	3166+34.87	RT & LT	2,952		380		2,572
-DET-	3166+34.87	3169+12.70 BEGIN TEMP BRIDGE	RT & LT	244		29		215
-X1-	3157+01.57	3161+57.48	RT & LT	142		91		51
SUBTOTAL SUMMARY NO. 9				5,193		701		4,493
-DET-	3175+74.74 END TEMP BRIDGE	3205+68.69	RT & LT	1,867		937		930
-X2-	3179+58.32	3185+13.93	RT & LT	361		143		218
-DET-	3205+68.69	3214+79.47	RT & LT	312		444	132	
SUBTOTAL SUMMARY NO. 10				2,540		1,524	132	1,148
-X3-	3159+00.00	3163+51.20	RT & LT	279		225		54
-X4-	3178+46.41	3182+19.84	RT & LT	141		245	104	
SUBTOTAL SUMMARY NO. 11				420		470	104	54
-X5-	3159+00.00	3162+41.31	RT & LT	69		176	107	
SUBTOTAL SUMMARY NO. 12				69		176	107	
SUBTOTAL SUMMARIES NO. 8-12				8,739		3,388	591	5,943

	UNCL. EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
SUBTOTAL SUMMARIES NO. 1-7	3,845	52	22,343	19,139	693
SUBTOTAL SUMMARIES NO. 8-12	8,739		3,388	591	5,943
SUBTOTAL SUMMARIES NO. 1-12	12,584	52	25,731	19,730	6,636
LOSS DUE TO CLEARING AND GRUBBING					
ADDITIONAL UNDERCUT		2,600	3,380	3,380	2,600
ROCK WASTE TO REPLACE BORROW					
ADJUST FOR ROCK WASTE					
WASTE IN LIEU OF BORROW				-1,182	-1,182
PROJECT TOTAL	12,584	2,652	30,882	23,699	8,054
ESTIMATE 5% FOR TOPSOIL ON BORROW PITS				1,185	
GRAND TOTAL	12,584	2,652	30,882	24,884	8,054
SAY	12,600			25,000	

r:\roadway\proj\stfNCI2PEA_rdy_psh03B.dgn

9/5/2013

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	3-C

STV/ Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	BEGIN STA.	END STA.	LOCATION	YD^2
-L-	3087+35.00	3169+58.00	LT	27,885
-L-	3176+31.00	3202+62.00	LT	8,382
-DET-	3078+13.00	3169+36.00	CL	24,678
-DET-	3176+00.00	3213+88.00	CL	12,681
			TOTAL:	73,626
			SAY:	73,630

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	BEGIN STA.	END STA.	LOCATION	LENGTH
-L-	3085+05.55	3087+24.08	LT	218.53'
-L-	3086+94.82	3087+25.91	RT	31.09'
-L-	3202+50.66	3203+57.45	LT	106.79'
-L-	3203+23.95	3203+55.04	RT	31.09'
			TOTAL:	387.50'
			SAY:	388.00'

GUARDRAIL SUMMARY

SURVEY LINE	BEGIN STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350			REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	B-77	GRAU 350	M-350	TYPE III	CAT-1	VI MOD	BIC	AT-1	EA	G	NG			
-L-	3084+55.33	3087+24.08	LT	268.75				BARRIER	8.0	11.0		50		1.0			1		1								282		REM. OF EX. G/R -DET- STA. 3166+58 TO 3169+36 LT
-L-	3086+44.66	3087+25.91	RT	81.25			BARRIER		8.0	11.0	50		1.0				1		1								282		REM. OF EX. G/R -DET- STA. 3166+52 TO 3169+36 RT
-L-	3202+50.66	3204+06.91	LT	156.25			BARRIER		8.0	11.0	50		1.0				1		1								276		REM. OF EX. G/R -DET- STA. 3176+01 TO 3178+73 LT
-L-	3203+23.95	3204+05.20	RT	81.25				BARRIER	8.0	11.0		50		1.0			1		1								281		REM. OF EX. G/R -DET- STA. 3176+01 TO 3178+84 RT
			TOTAL:	587.50			ANCHOR	DEDUCTIONS		TOTAL																			
							GRAU-350	4 @ 50		200.00																			
							TYPE III	4 @ 18.75		75.00																			
			TOTAL ANCHOR LENGTH:	275.00													4		4								1,121		
			TOTAL GUARDRAIL LENGTH:	312.50				TOTAL DEDUCTIONS =		275.00																			
			SAY:	312.50																									
			ADDITIONAL GUARDRAIL POST 5 EACH					LESS DEDUCTIONS =		312.50																			

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

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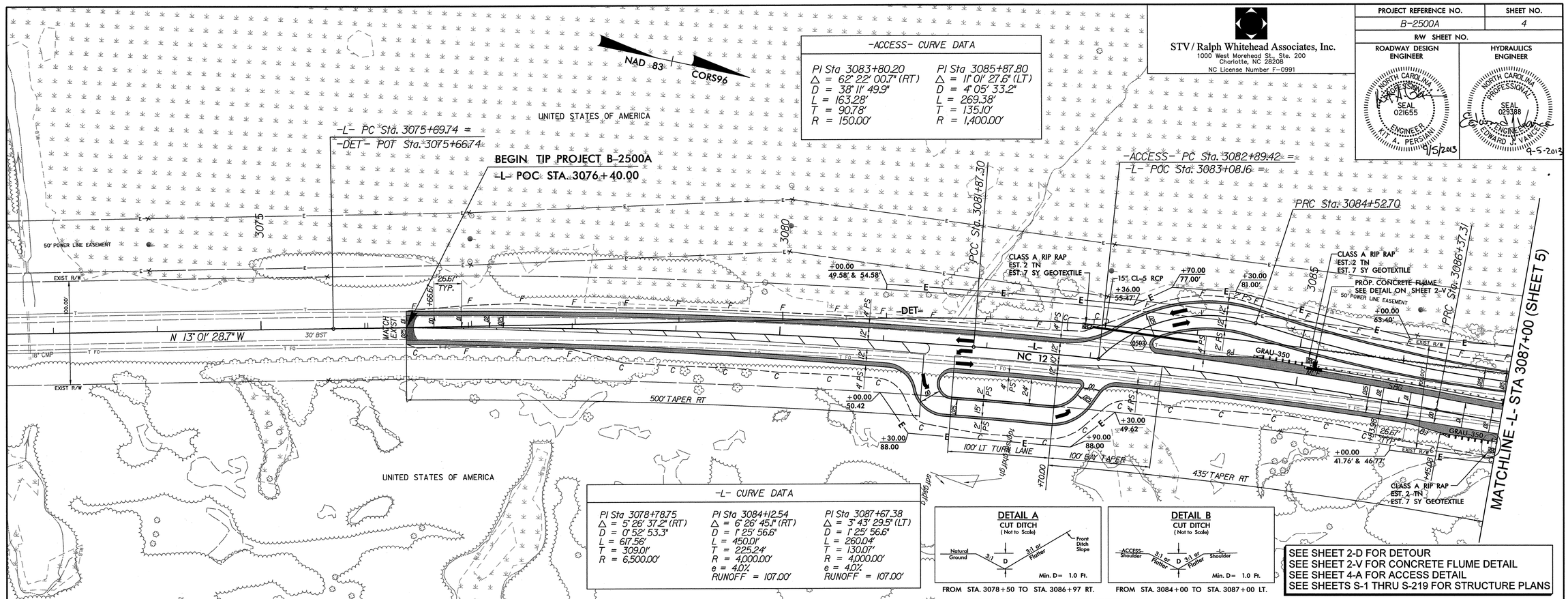
9/13/2013

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIAN 9/5/2013

NORTH CAROLINA PROFESSIONAL SEAL 029388 ENGINEER EDWARD J. VANCE 9-5-2013



-ACCESS- CURVE DATA

PI Sta 3083+80.20	PI Sta 3085+87.80
Δ = 62° 22' 00.7" (RT)	Δ = 11° 01' 27.6" (LT)
D = 38° 11' 49.9"	D = 4° 05' 33.2"
L = 163.28'	L = 269.38'
T = 90.78'	T = 135.10'
R = 150.00'	R = 1,400.00'

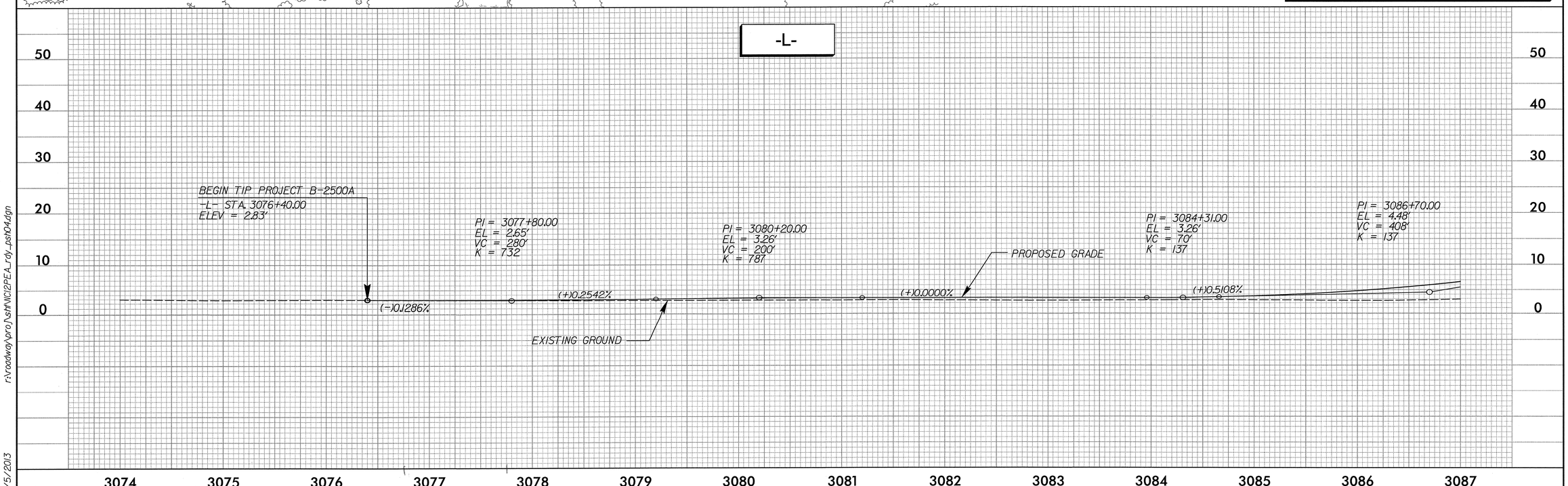
-L- CURVE DATA

PI Sta 3078+78.75	PI Sta 3084+12.54	PI Sta 3087+67.38
Δ = 5° 26' 37.2" (RT)	Δ = 6° 26' 45.1" (RT)	Δ = 3° 43' 29.5" (LT)
D = 0° 52' 53.3"	D = 1° 25' 56.6"	D = 1° 25' 56.6"
L = 617.56'	L = 450.01'	L = 260.04'
T = 309.01'	T = 225.24'	T = 130.07'
R = 6,500.00'	R = 4,000.00'	R = 4,000.00'
	e = 4.0%	e = 4.0%
	RUNOFF = 107.00'	RUNOFF = 107.00'

DETAIL A
CUT DITCH
(Not to Scale)
Natural Ground — 3:1 — D — 3:1 or Flatter — Front Ditch Slope
Min. D = 1.0 Ft.
FROM STA. 3078+50 TO STA. 3086+97 RT.

DETAIL B
CUT DITCH
(Not to Scale)
ACCESS Shoulder — 3:1 or Flatter — D — 3:1 or Flatter — L Shoulder
Min. D = 1.0 Ft.
FROM STA. 3084+00 TO STA. 3087+00 LT.

SEE SHEET 2-D FOR DETOUR
SEE SHEET 2-V FOR CONCRETE FLUME DETAIL
SEE SHEET 4-A FOR ACCESS DETAIL
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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9/5/2013

-ACCESS- (BOAT RAMP) DETAIL

STV / Ralph Whitehead Associates, Inc.
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Charlotte, NC 28208
NC License Number F-0991

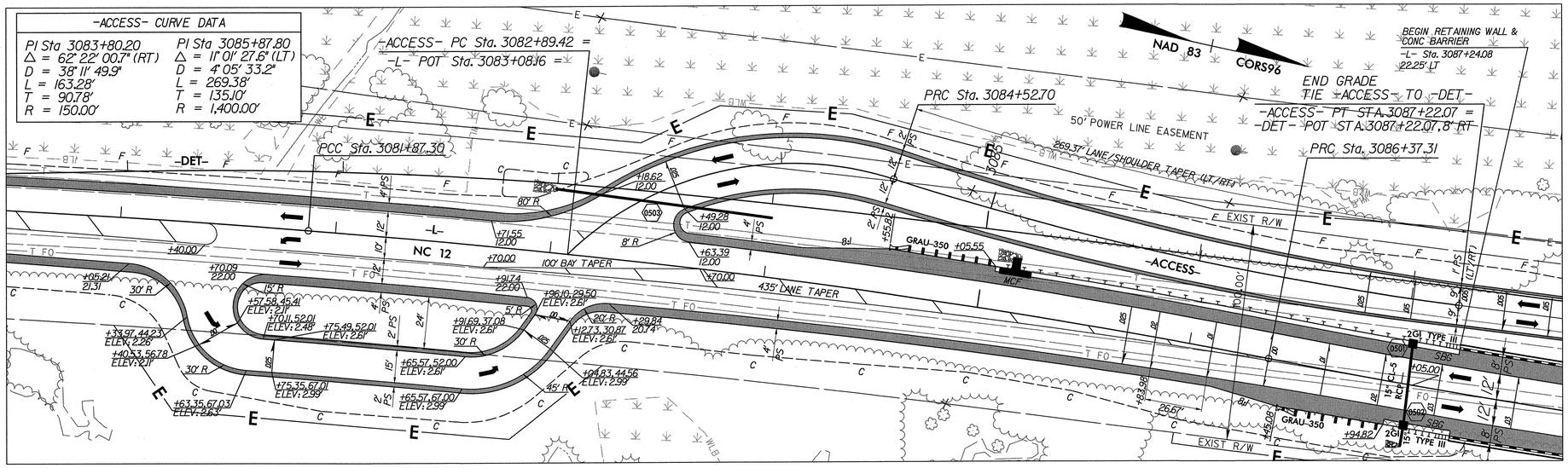
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	4A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER, KIT A. PERSIANI 9/5/2013

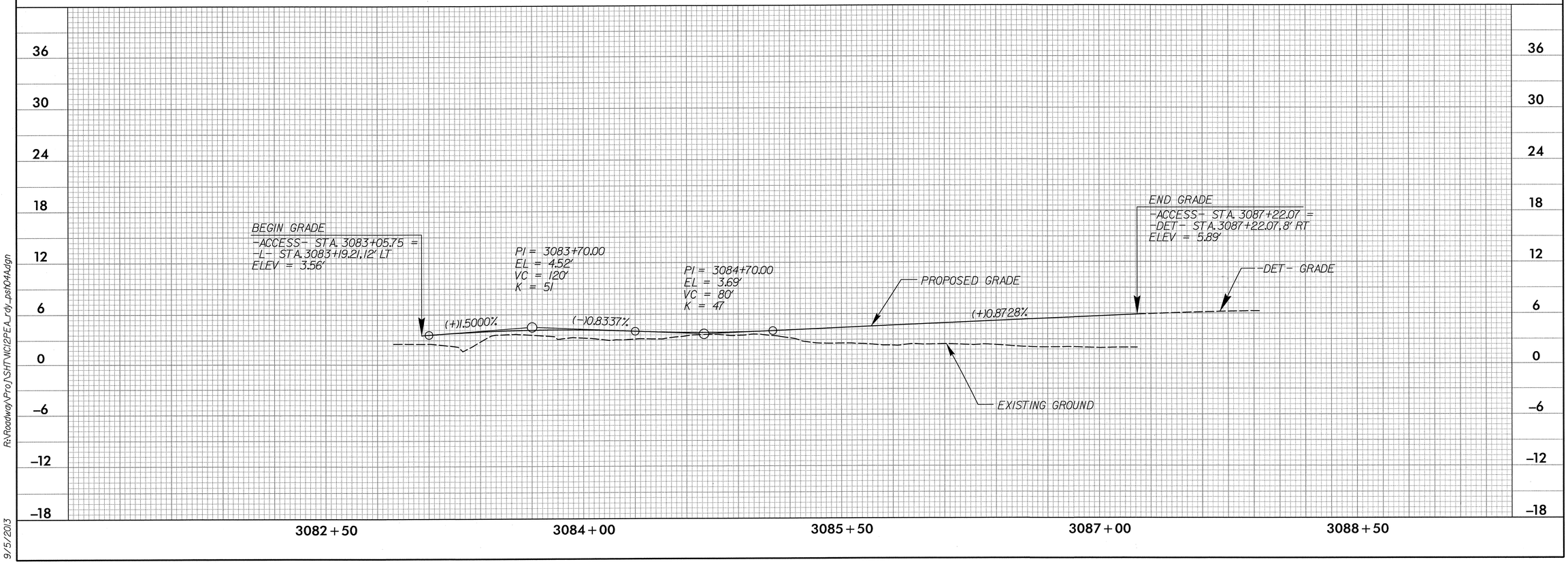
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 029388 ENGINEER, EDWARD J. VANCE 9-5-2013

GRAPHIC SCALE (PLAN): 0 30 60 HORZ.

GRAPHIC SCALE (PROFILE): HORZ. 0 30 60; VERT. 0 6 12



SEE SHEET 4 FOR FULL PLAN VIEW



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9/5/2013

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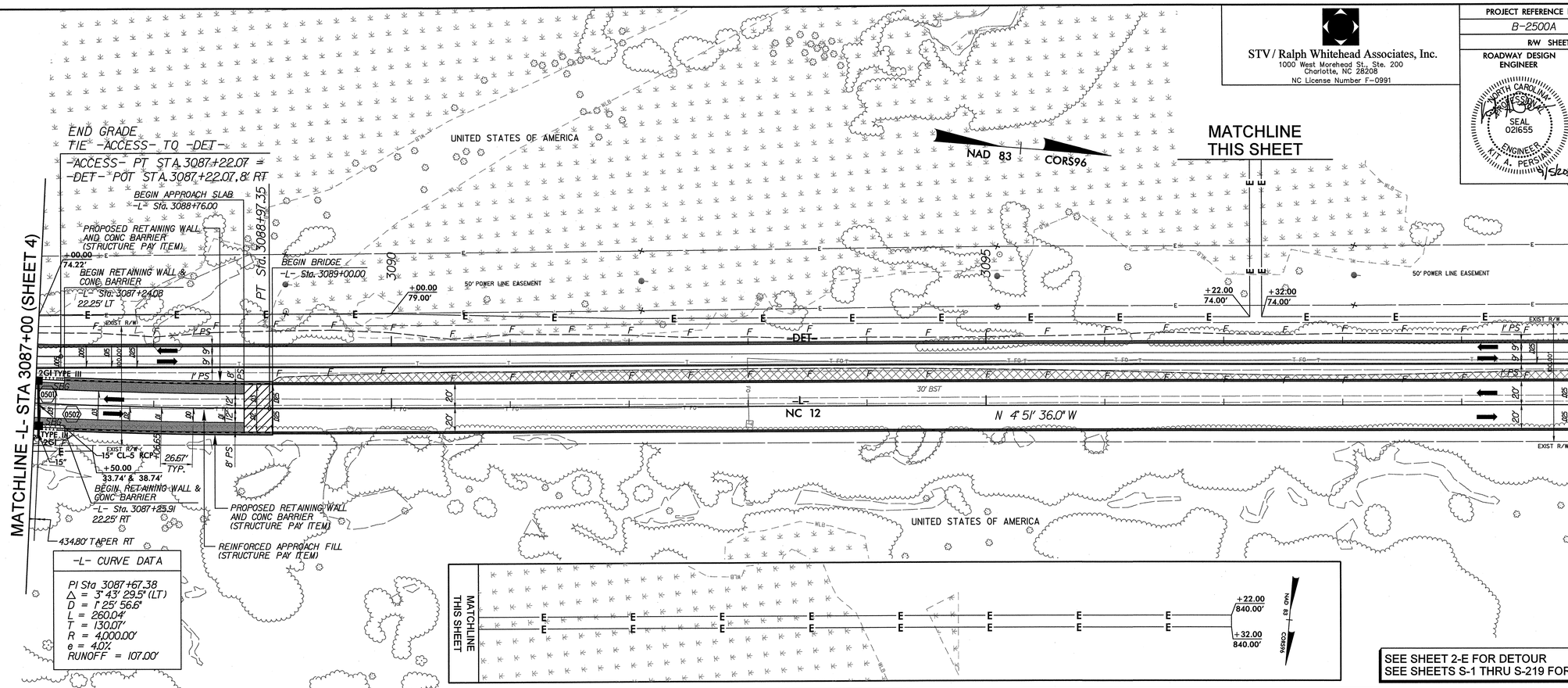
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT H. PERSIAN 9/5/2013

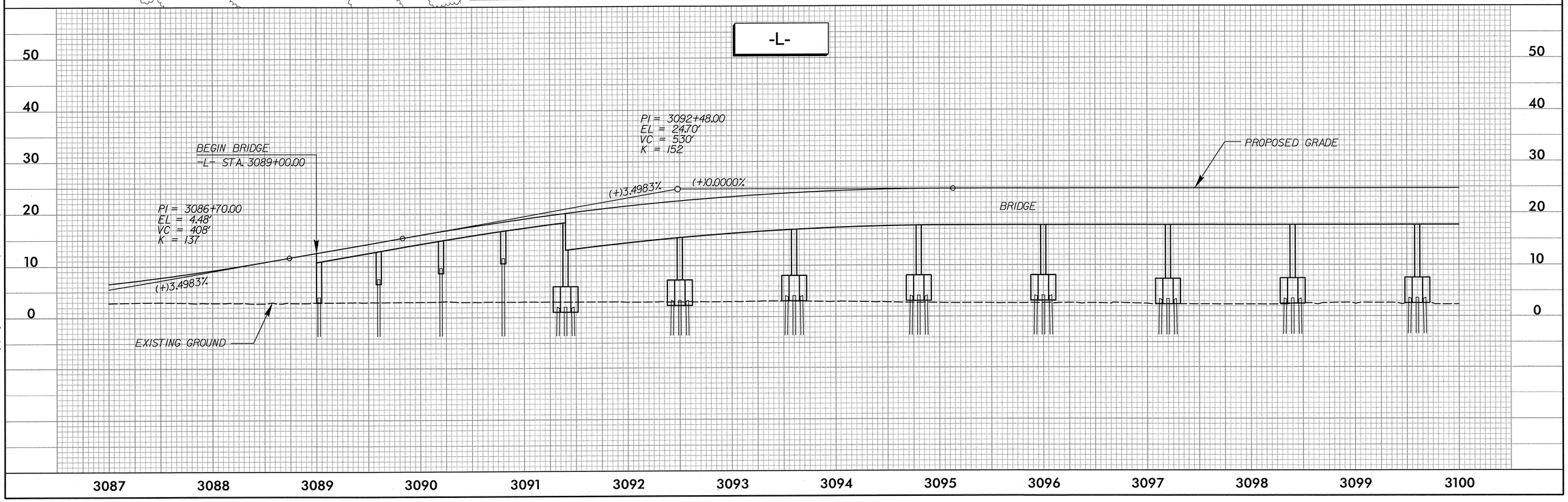
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 029388 ENGINEER EDWARD W. VANCE 9-5-2013



-L- CURVE DATA

PI Sta 3087+67.38
Δ = 3° 43' 29.5" (LT)
D = 1° 25' 56.6"
L = 260.04'
T = 130.07'
R = 4,000.00'
e = 4.0%
RUNOFF = 107.00'

SEE SHEET 2-E FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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9/5/2013

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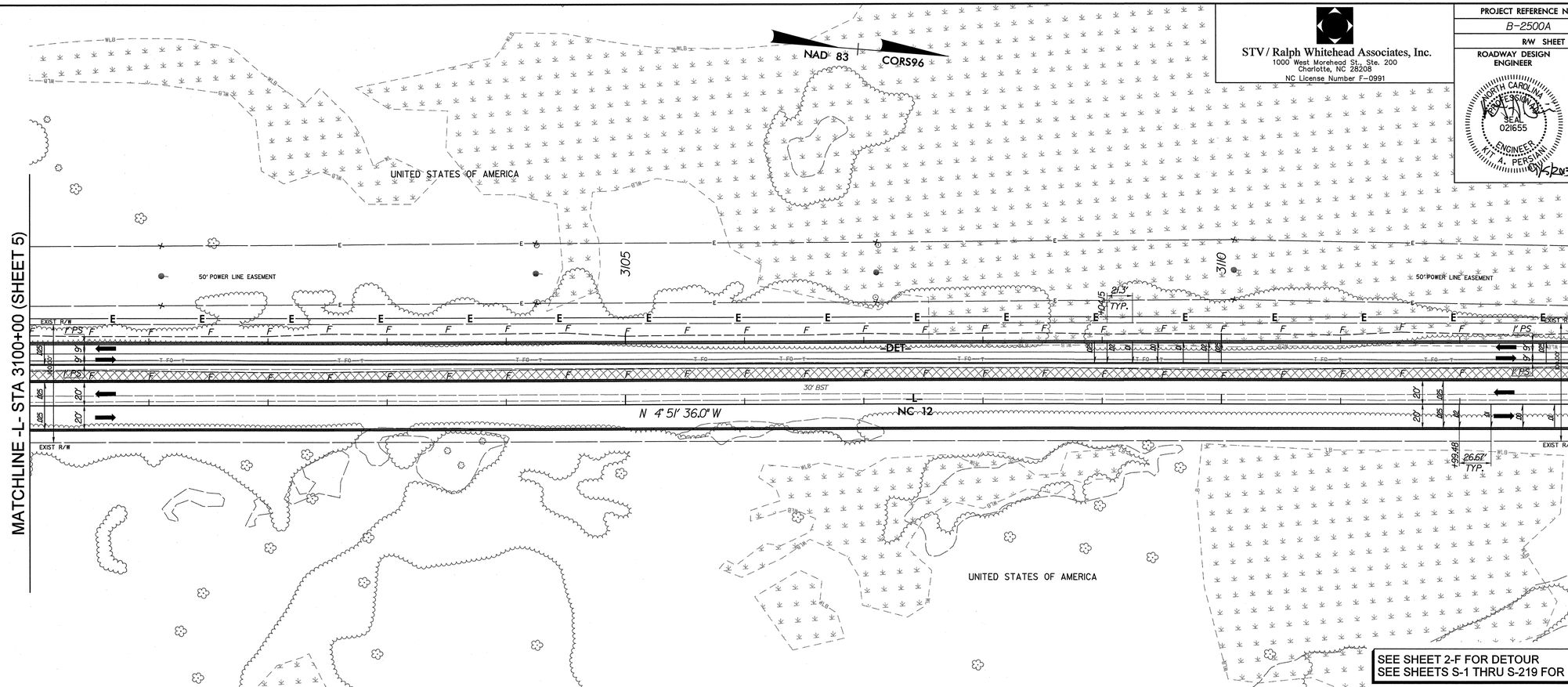
Charlotte, NC 28208
NC License Number F-0991

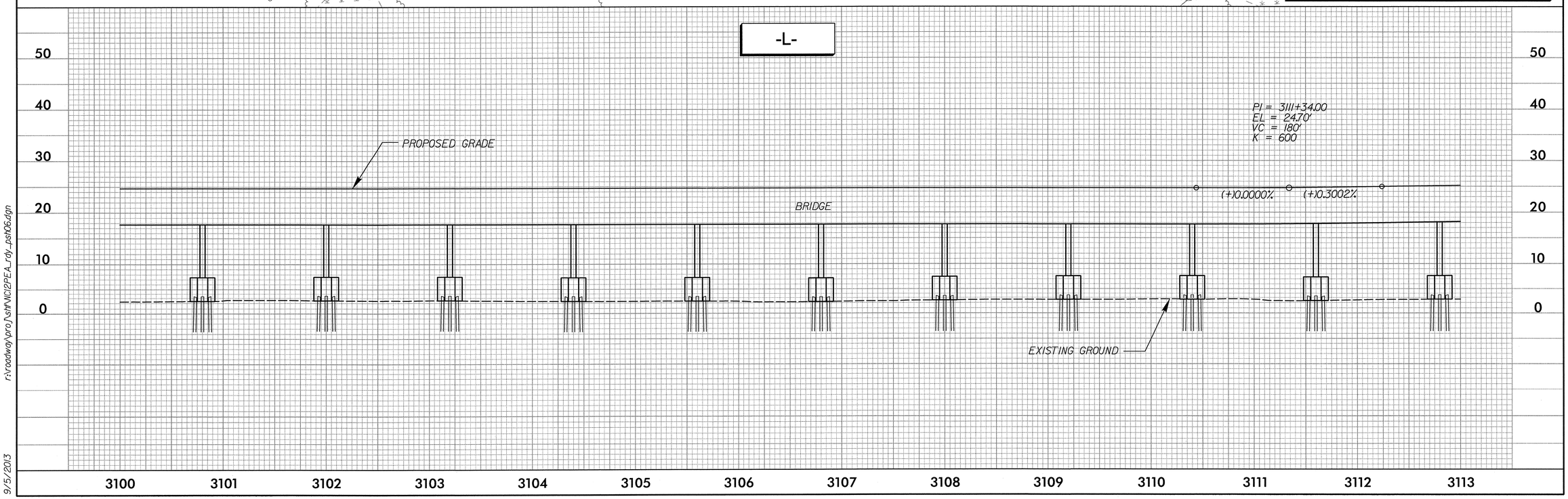
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	6
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER K.T.A. PERSIANI 9/5/2013

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 029388 ENGINEER EDWARD J. VANCURA 9-5-2013



SEE SHEET 2-F FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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9/5/2013

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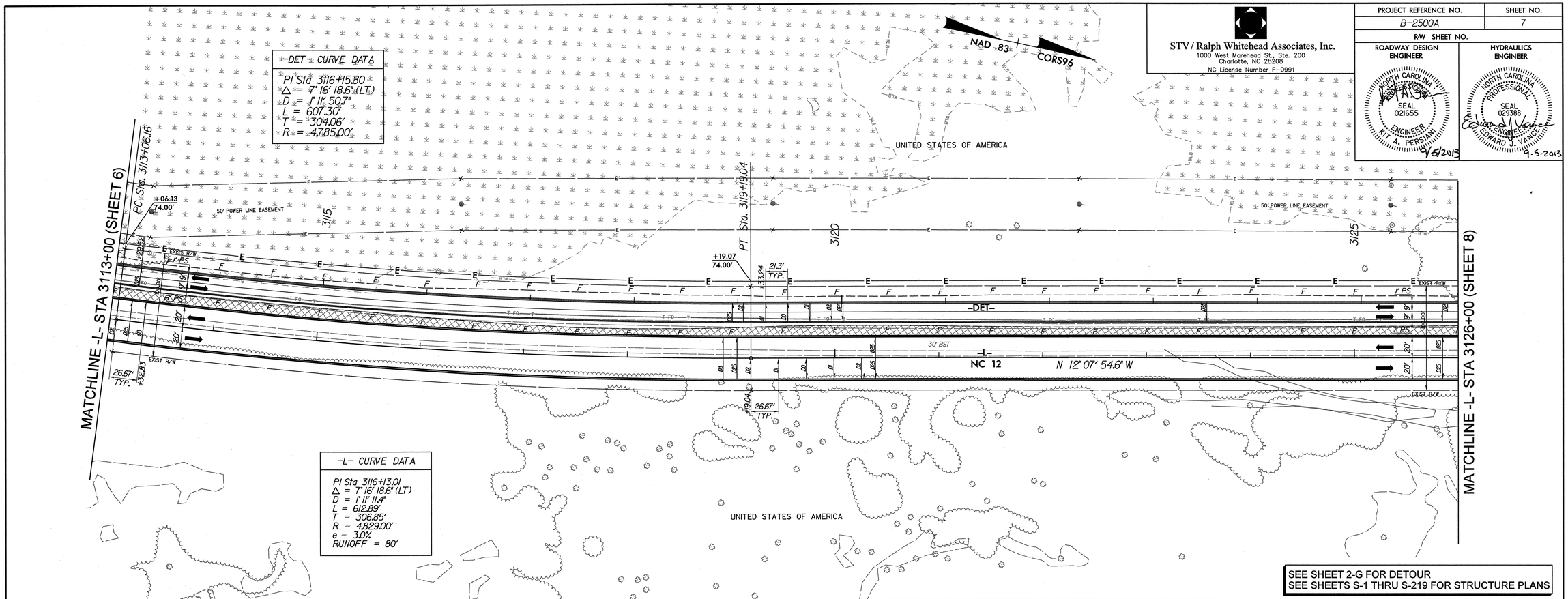
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

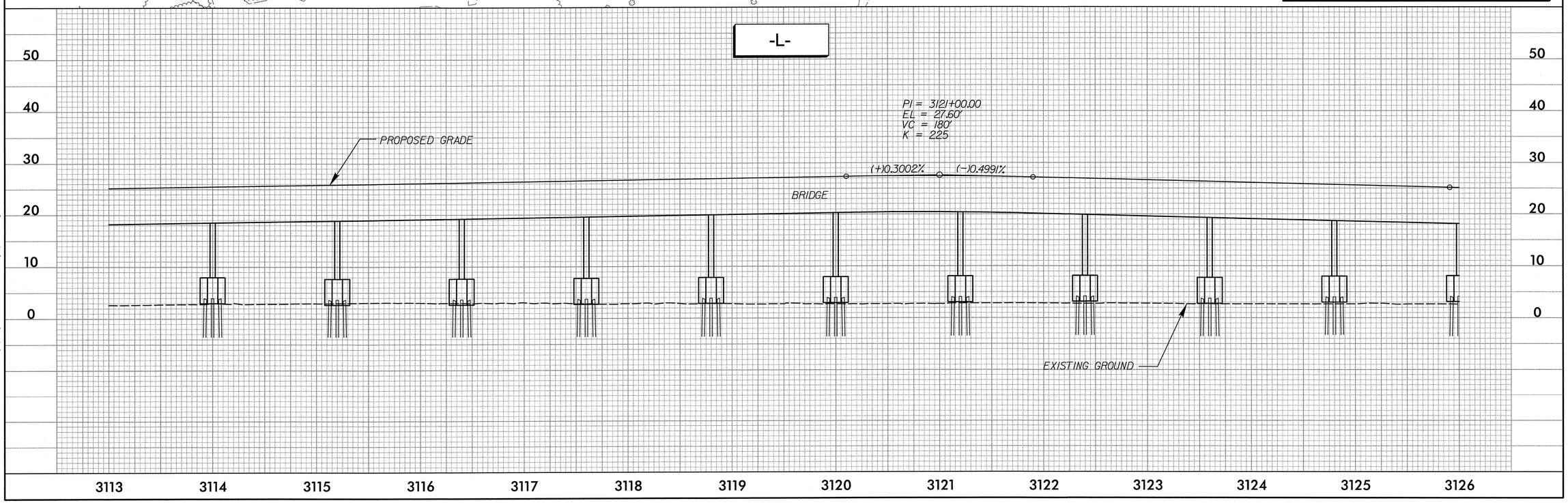
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI 9/5/2013

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 029388 HYDR. ENGINEER EDWARD J. VANCINE 9-5-2013



SEE SHEET 2-G FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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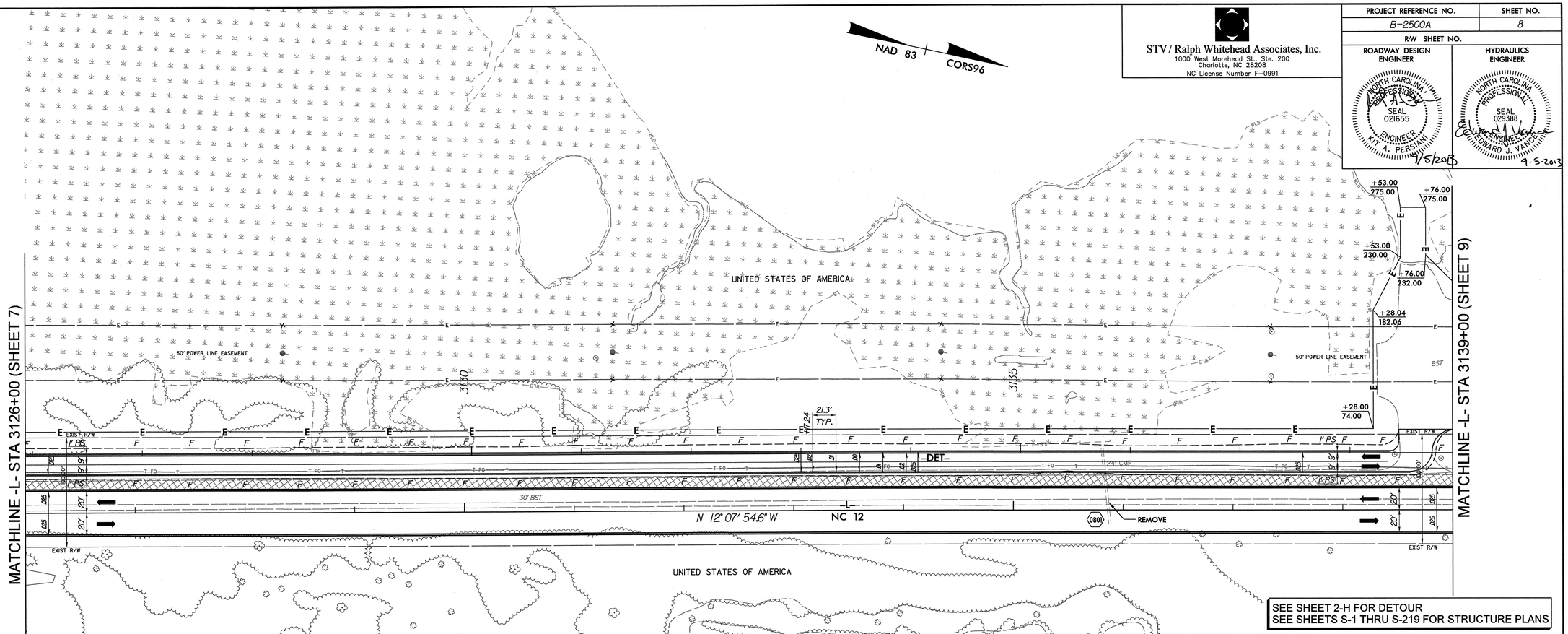
9/5/2013

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	8
R/W SHEET NO.	

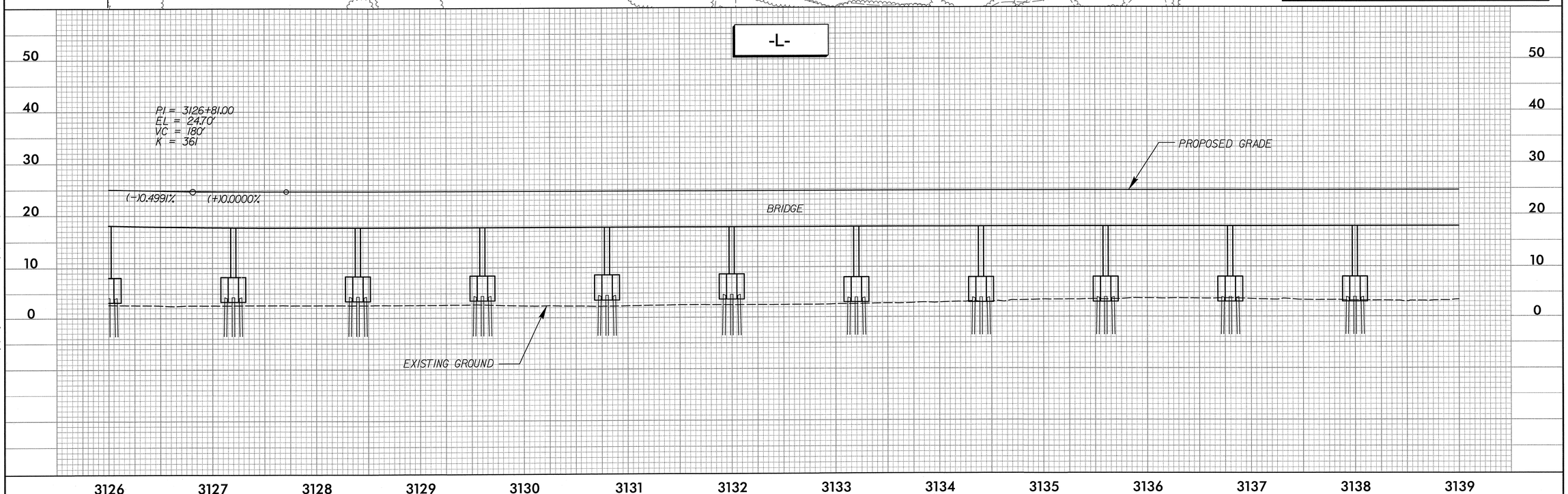
STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIT A. PERSIANI
9/5/2013

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 029388 ENGINEER EDWARD J. VANCE
9-5-2013



SEE SHEET 2-H FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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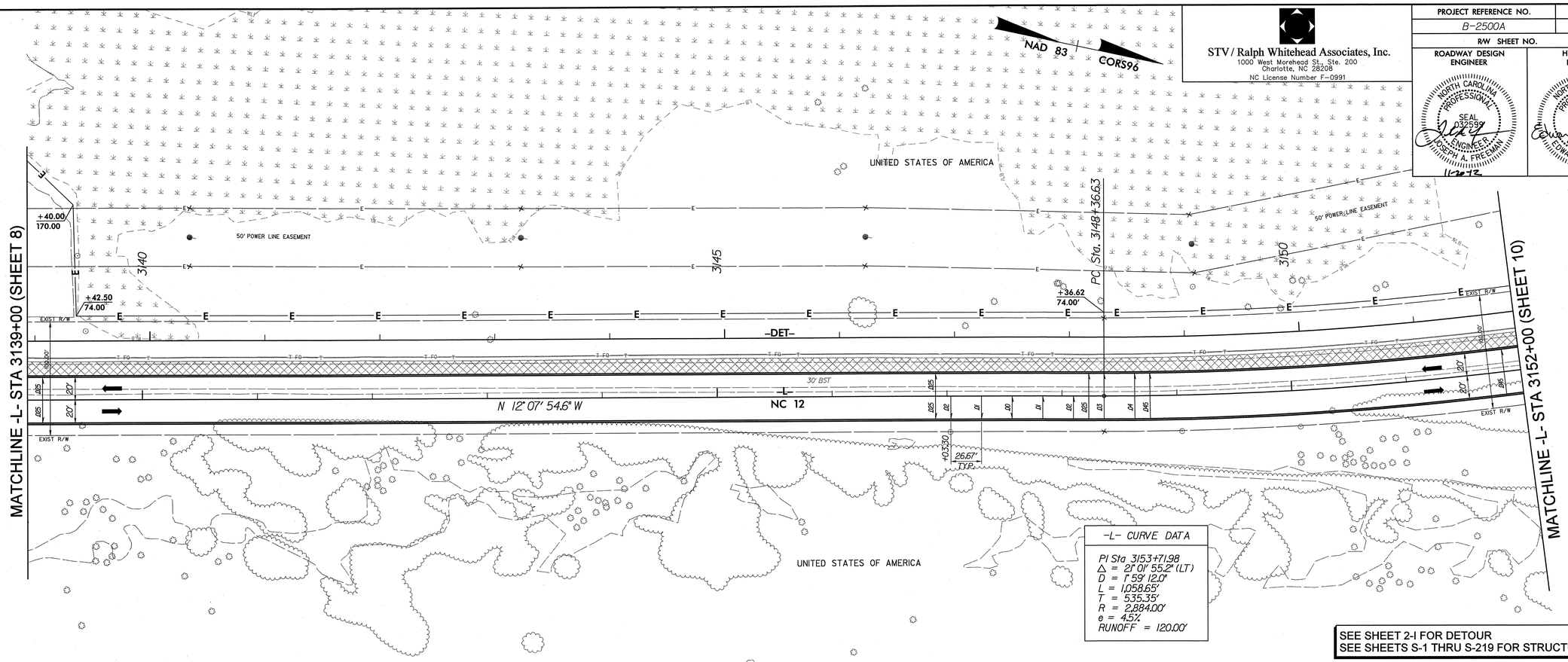
9/5/2013

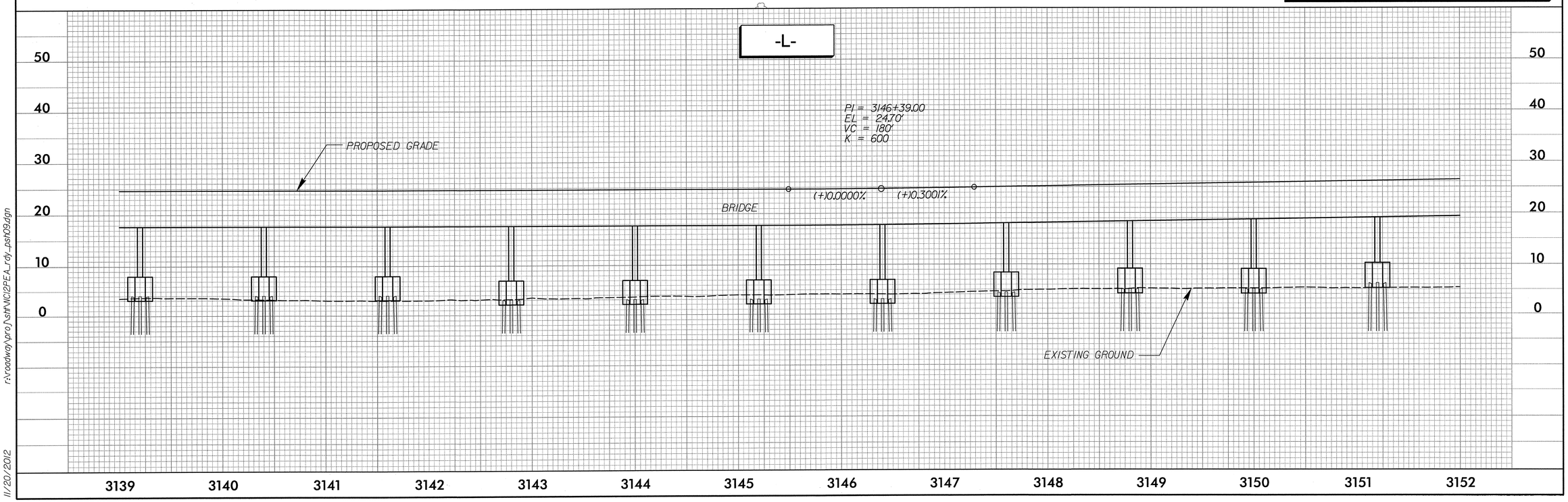
PROJECT REFERENCE NO.	SHEET NO.
B-2500A	9
R/W SHEET NO.	

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St. Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN
11-20-12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 023388 ENGINEER EDWARD J. VANCE
11-20-12





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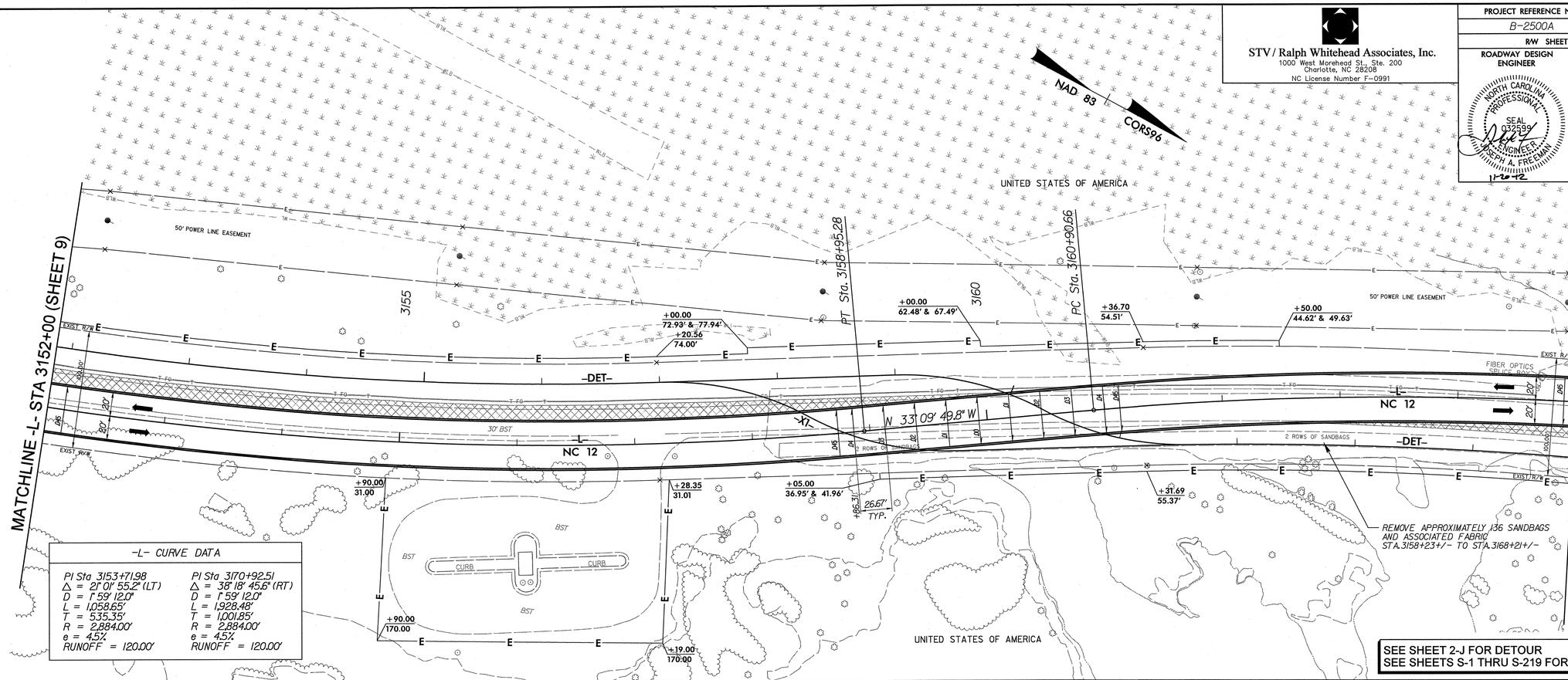
11/20/2012

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 11-20-12

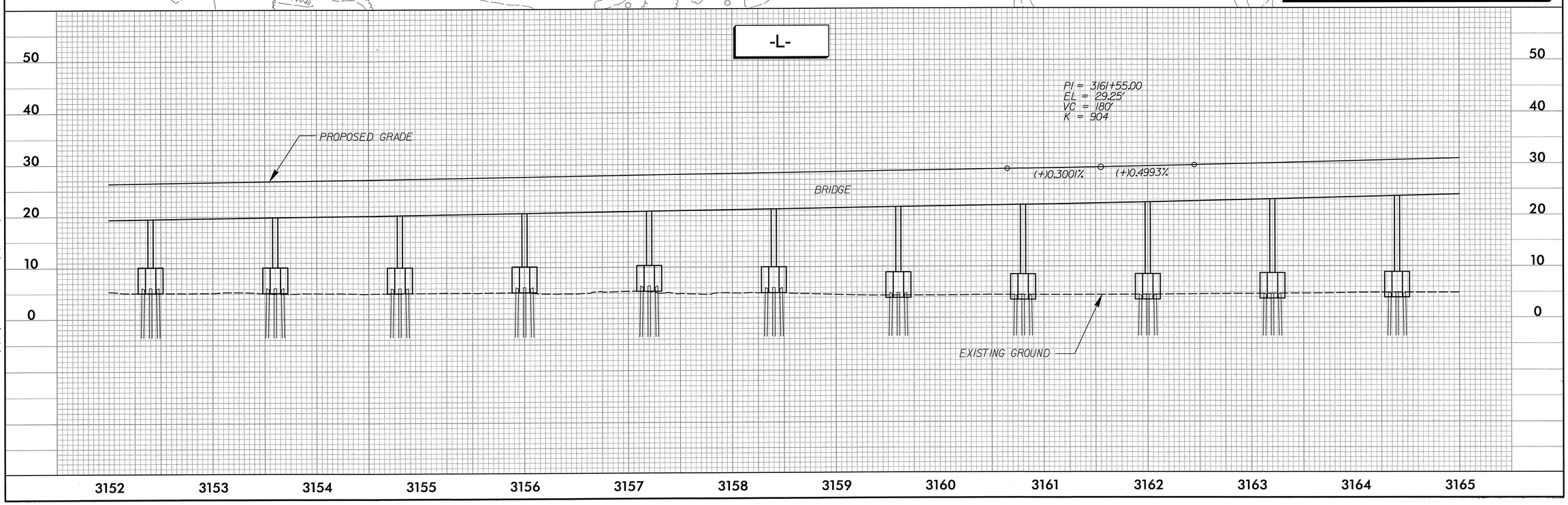
NORTH CAROLINA PROFESSIONAL SEAL 029388 ENGINEER EDWARD J. VANCE 11-20-12



-L- CURVE DATA

PI Sta 3153+71.98	PI Sta 3170+92.51
Δ = 21° 01' 55.2" (LT)	Δ = 38° 18' 45.6" (RT)
D = 1° 59' 12.0"	D = 1° 59' 12.0"
L = 1,058.65'	L = 1,928.48'
T = 535.35'	T = 1,001.85'
R = 2,884.00'	R = 2,884.00'
e = 4.5%	e = 4.5%
RUNOFF = 120.00'	RUNOFF = 120.00'

SEE SHEET 2-J FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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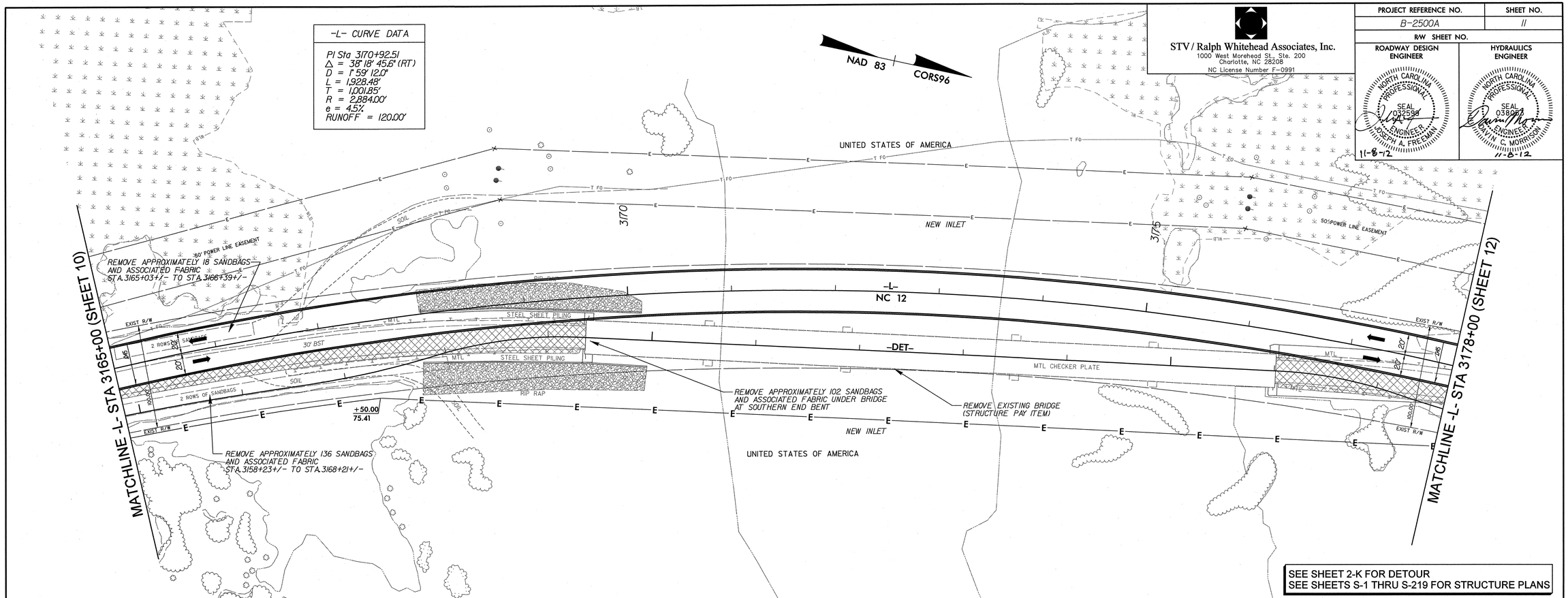
11/20/2012

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	11
R/W SHEET NO.	

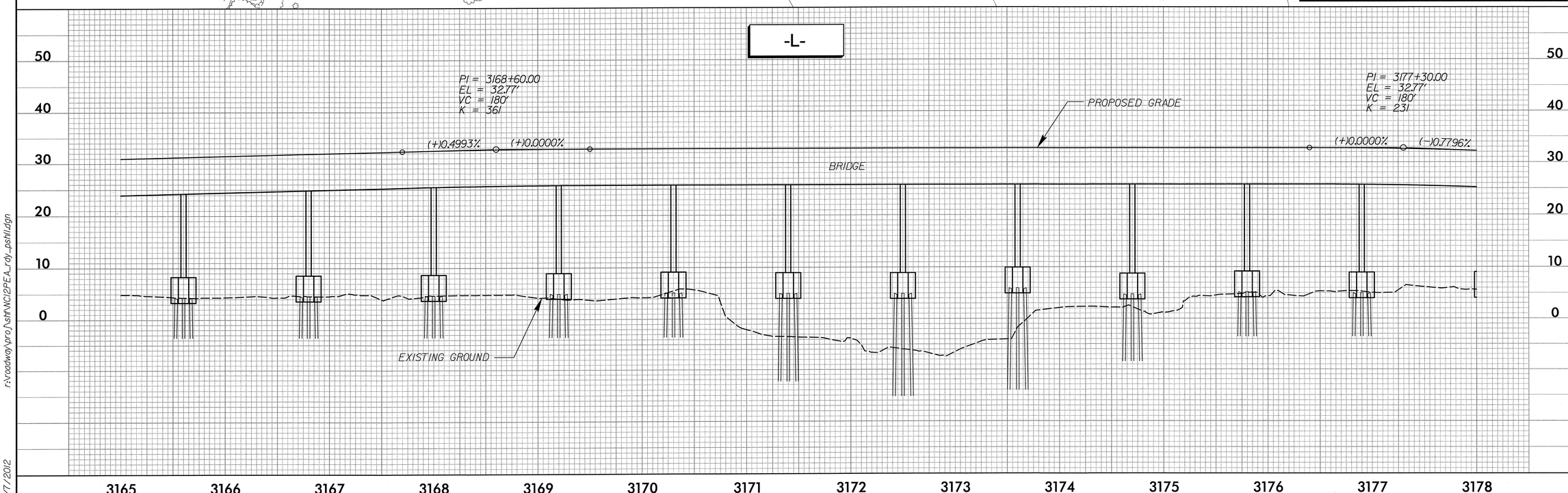
STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032598 ENGINEER JOSEPH A. FREEMAN
11-8-12

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038082 ENGINEER KEVIN C. MORRISON
11-8-12



SEE SHEET 2-K FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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11/7/2012

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	12
R/W SHEET NO.	

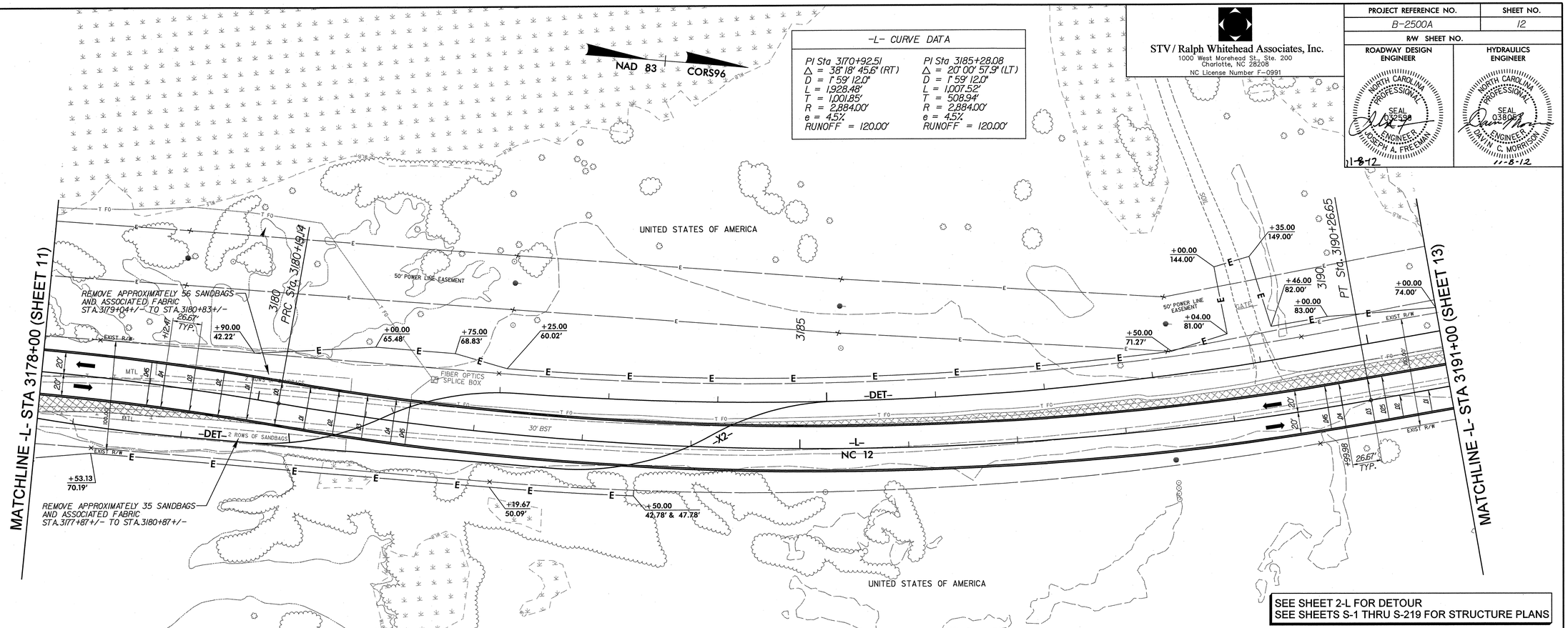
STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032558 ENGINEER JOSEPH A. FREEMAN
11-8-12

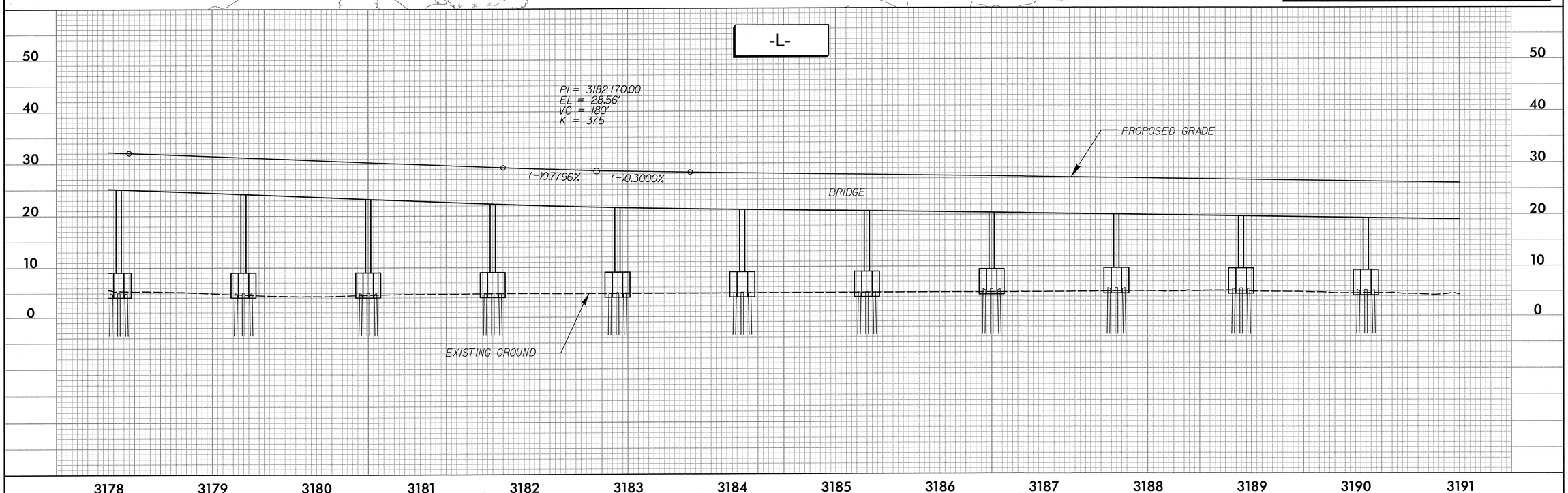
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 038063 ENGINEER DAVIN C. MORRISON
11-8-12

-L- CURVE DATA

PI Sta 3170+92.51	PI Sta 3185+28.08
Δ = 38° 18' 45.6" (RT)	Δ = 20° 00' 57.9" (LT)
D = 1° 59' 12.0"	D = 1° 59' 12.0"
L = 1,928.48'	L = 1,007.52'
T = 1,001.85'	T = 508.94'
R = 2,884.00'	R = 2,884.00'
e = 4.5%	e = 4.5%
RUNOFF = 120.00'	RUNOFF = 120.00'



SEE SHEET 2-L FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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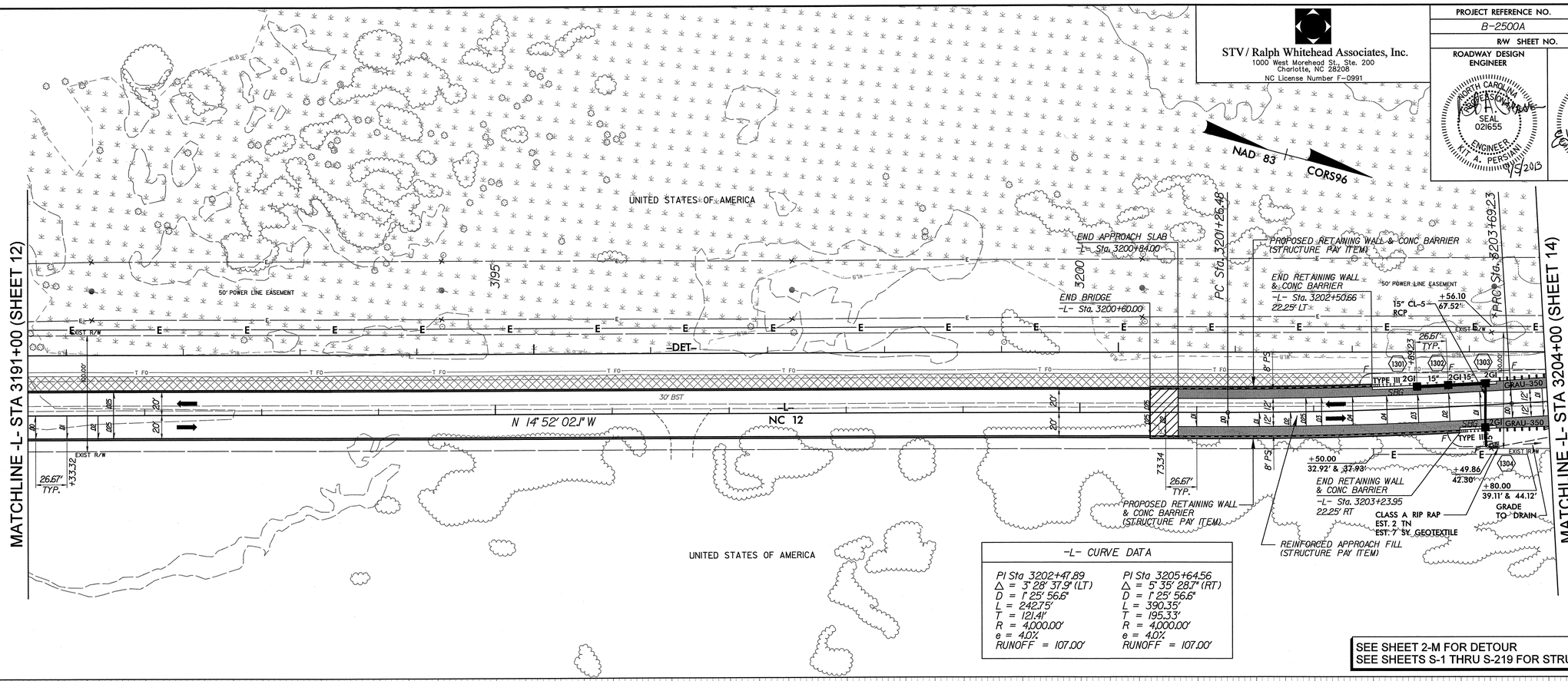
11/7/2012

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	13
R/W SHEET NO.	

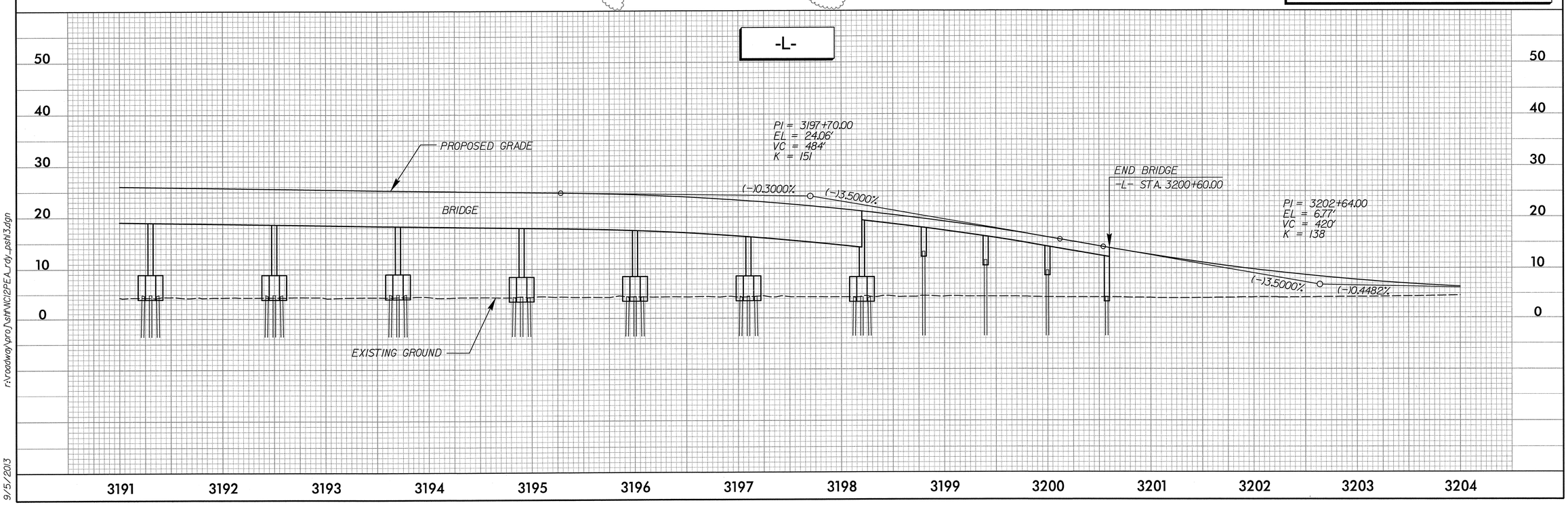
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 021655 ENGINEER KIM A. PERSIANI 9/5/2013

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 029388 ENGINEER EDWARD J. VANCE 9-5-2013



-L- CURVE DATA	
PI Sta 3202+47.89	PI Sta 3205+64.56
Δ = 3° 28' 37.9" (LT)	Δ = 5° 35' 28.7" (RT)
D = 1° 25' 56.6"	D = 1° 25' 56.6"
L = 242.75'	L = 390.35'
T = 121.41'	T = 195.33'
R = 4,000.00'	R = 4,000.00'
e = 4.0%	e = 4.0%
RUNOFF = 107.00'	RUNOFF = 107.00'

SEE SHEET 2-M FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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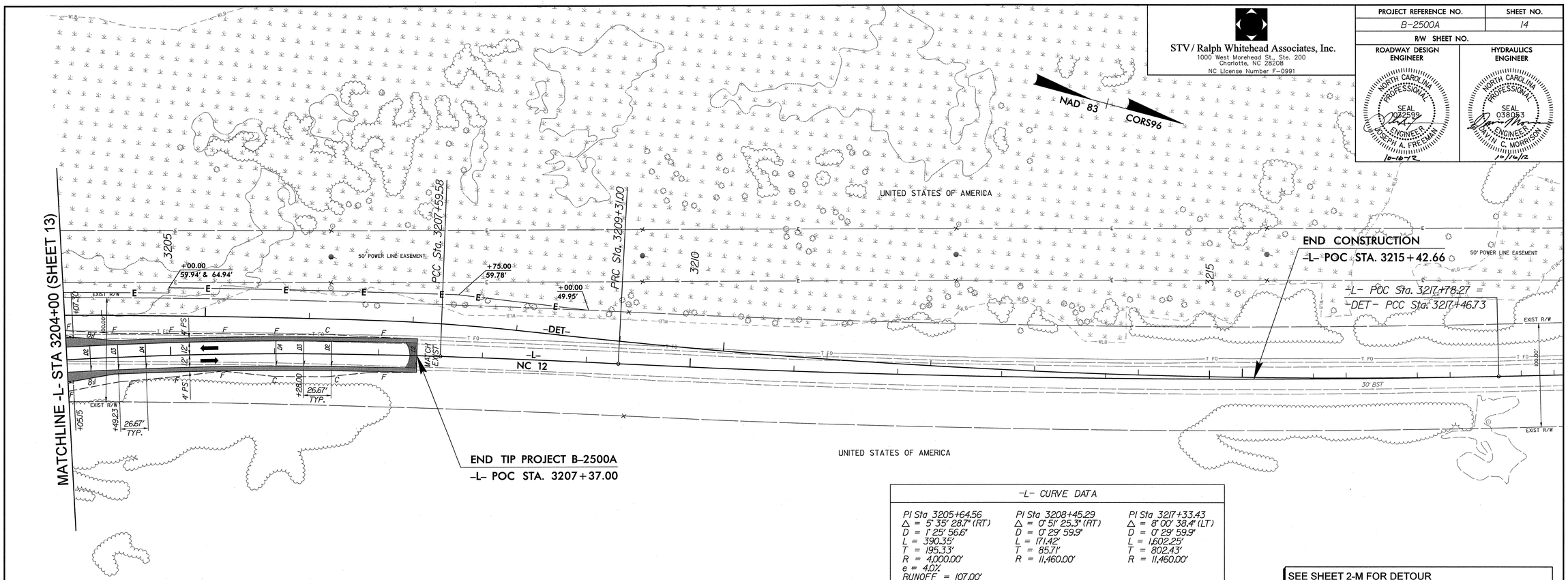
9/5/2013

STV / Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
B-2500A	14
R/W SHEET NO.	

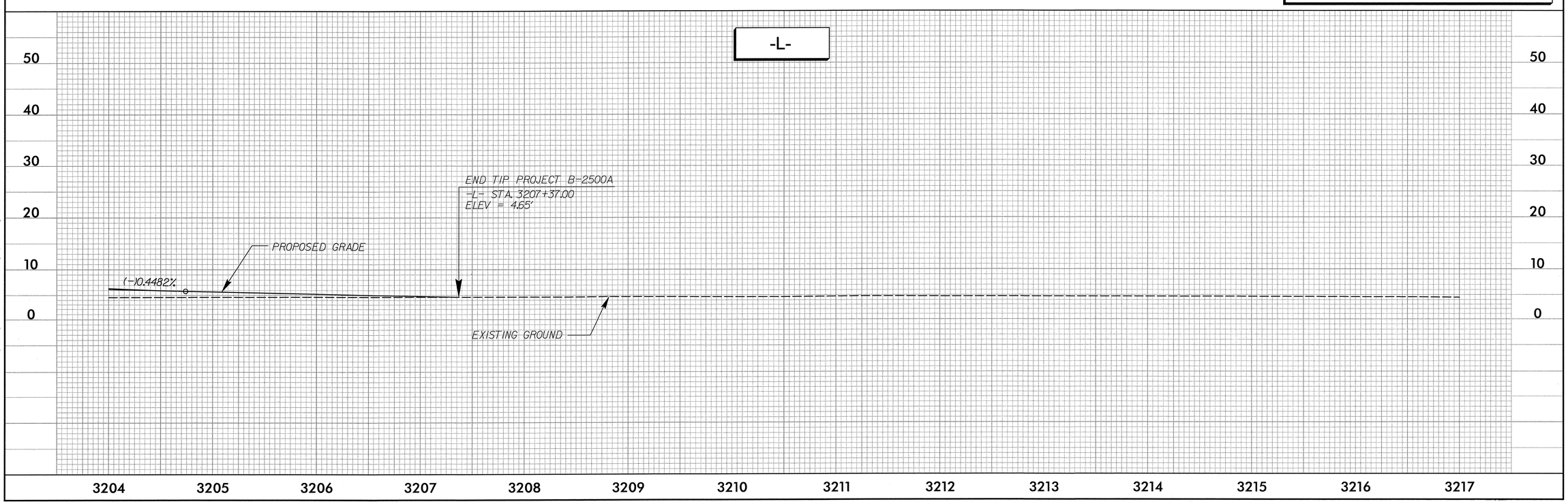
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 032599 ENGINEER JOSEPH A. FREEMAN 10-16-12

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 038053 ENGINEER JAYLIN C. MORRISON 10/16/12



-L- CURVE DATA		
PI Sta 3205+64.56	PI Sta 3208+45.29	PI Sta 3217+33.43
Δ = 5° 35' 28.7" (RT)	Δ = 0° 51' 25.3" (RT)	Δ = 8° 00' 38.4" (LT)
D = 1° 25' 56.6"	D = 0° 29' 59.9"	D = 0° 29' 59.9"
L = 390.35'	L = 171.42'	L = 1,602.25'
T = 195.33'	T = 85.71'	T = 802.43'
R = 4,000.00'	R = 11,460.00'	R = 11,460.00'
e = 4.0%		
RUNOFF = 107.00'		

SEE SHEET 2-M FOR DETOUR
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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10/16/2012