



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY  
GOVERNOR

ANTHONY J. TATA  
SECRETARY

February 13, 2013

U.S. Fish and Wildlife Service  
Pea Island National Wildlife Refuge  
PO Box 1969  
Manteo, NC 27954

ATTN: Mr. Mike Bryant  
Refuge Manager

SUBJECT: **Request for Necessary Permits for Construction and Demolition Activities** for the Pea Island Long-Term Improvements on NC 12 in Dare County, Division 1; TIP No. B-2500 A.

Dear Mr. Bryant:

The North Carolina Department of Transportation (NCDOT) proposes to replace the existing three span temporary bridge over "New Inlet," which was reopened by Hurricane Irene in September 2011, with a 2.1 mile bridge.

As portions of the Pea Island National Wildlife Refuge (PINWR) will be utilized (either temporarily during construction or permanently) during this work, notification to your office is required. This letter is to request the following:

- A permit (Special Use or otherwise) for the construction of the project and any associated temporary impacts, including temporary construction easements. A completed Special Use Permit Application (and appropriate site drawings) for the construction of the project is attached for your review and approval.

Project Description

The project consists of constructing a new 2.1 mile long bridge on NC 12. This project was necessitated by the formation of an inlet at Pea Island, which resulted from Hurricane Irene. The total project length, which includes the temporary roadway alignment, is 2.7 miles. The proposed bridge will be a two-lane section (12' travel lanes with 8' shoulders), and will have 98 spans. The drainage system will consist of open scuppers on the main bridge spans, grate inlets and pipe systems for the ramps and end spans, and roadside ditches for the approach pavement.

Attachments that are enclosed include: Stormwater Management Plan, PCN form, permit drawings, roadway drawings and utility drawings.

#### NEPA Document Status

In December 2010, following extensive environmental study and coordination with other agencies, a Record of Decision (ROD) was issued for TIP Project No. B-2500 (NC 12 Replacement of the Herbert C. Bonner Bridge). The environmental documents studied several detailed alternatives for maintaining the NC 12 corridor between Bodie Island and the village of Rodanthe. The Record of Decision authorized an initial phase consisting of a parallel bridge replacement for Bonner Bridge and established a Transportation Management Plan (TMP) for the study and selection of future project phases along the NC 12 corridor. Although the ROD deferred final decisions for future phases, the various Parallel Bridge Corridor alternatives (Nourishment, Road North/Bridge South, All Bridge, and Phased Approach) were encompassed within the environmental study as potential phases beyond Phase I and were representative of the range of potential impacts under the ROD's selected alternative.

As a result of coastal conditions following Hurricane Irene (August 2011), NCDOT initiated Phases IIA (New Inlet/Pea Island) and IIB (Rodanthe) of TIP Project No. B-2500 in order to implement long-term improvements at two roadway sections breached by the hurricane. In accordance with the TMP, NCDOT has performed environmental monitoring, hosted a Peer Exchange panel of coastal experts, held informational public workshops, convened the Merger Team and obtained concurrence from agency partners on key points.

FHWA and NCDOT anticipate the issuance of a new Environmental Assessment in February 2013. This EA explains the screening of alternatives for Phase IIA, a process that identified the "Bridge within Existing NC 12 Easement Alternative" as the sole detailed-study alternative, the Preferred Alternative, and the Least Environmentally Damaging Practicable Alternative (LEDPA). The EA updated the previous environmental analyses with respect to this alternative.

Based on the EA and on coordination with state and federal environmental resource and regulatory agencies, FHWA has expressed the belief that the changes identified and assessed in the EA would not result in any new, significant impacts not previously identified in the 2008 Final Environmental Impact Statement, 2010 Environmental Assessment, or 2010 ROD.

#### Jetting

Jetting will be necessary for the installation of new bridge bents and the removal the temporary bridge at New Inlet. All jetting that occurs within New Inlet will occur at ebb tide. This jetting operation will require the use of pumping and water intakes at three designated locations shown on the attached drawings. Jetting spoils will be confined to the 100' Transportation Easement within the Pea Island National Wildlife Refuge, unless the Refuge accepts the material for Refuge use.

#### Utilities

A single existing utility pole as well as its associated guy pole and guy wires will be replaced with a single, self-supporting transmission pole. The existing pole need not be replaced but for road alignment.

All existing underground telephone fiber optic and copper cables inside the project construction limits will be abandoned and new underground fiber optic and copper cables will be installed inside the Cape Hatteras EMC power easement. A portion of the utilities between Stations 3168+00 to 3181+00 will remain in place. All of the cables to be relocated will be directionally bored to avoid impacts to wetlands.

### **Proposed Schedule**

#### Proposed Let Date

This project calls for a letting date of July 16, 2013, with a review date of May 28, 2013.

### **Easement Minimization**

At every step of the design process, the NCDOT has minimized impacts to PINWR and lessen the easement requirements for the project. The primary goal was to align the bridge as close to the existing NC 12 as feasible while generally adhering to NCDOT and FHWA design standards.

#### Temporary Construction Easement

Temporary easements will be necessary for construction of the detour road, as the new bridge will be built in the existing location of the current NC 12. Due to the tight alignment, constructability issues, and morphology, "slivers" of PINWR property may be temporarily impacted. The total amount of Pea Island National Wildlife Refuge that may be temporarily impacted is 3.84 acres.

Part of this easement includes a temporary construction easement at the existing New Inlet boat ramp to accommodate a staging area for construction, as well as a pumping intake site for the use of jetting piles into the substrate. Once complete, the area will be returned to a natural area, per the discretion of the PINWR.

NCDOT employs many strategies to avoid and minimize impacts to sensitive areas in all of its designs. Many of these strategies have been incorporated into Best Management Practice (BMP) documents that have been reviewed and approved by state and federal resource agencies, and which will be followed throughout construction. All wetland areas and environmentally sensitive areas not affected by the project will be protected from unnecessary encroachment using tree protection fencing or an equivalent measure. The project will be consistent with those measures outlined in the Project Commitments of the ROD. Individual avoidance and minimization measures that affect the PINWR include the following:

#### Design Measures

- The roadway alignment was shifted to overlap with the current NC 12 alignment to the greatest extent practical, allowing for fewer wetland impacts as well as less easement acquisition from the PINWR.
- At the ends of the bridge the stormwater runoff will be collected and piped to a rip rap apron, and then drain to the roadside swales which will promote infiltration.

### Protected Species Measures

A number of conservation measures for protected species are being implemented for this project. As the mission of your agency and PINWR includes wildlife conservation, we hereby reference these measures, which are further documented in the attached USFWS Biological and Conference Opinions. In addition:

- An educational night lighting meeting on-site will be scheduled with USFWS and all contractors in order to minimize disturbance to sea turtles and other protected species. Night lighting will meet the requirements specified in the attached USFWS Biological and Conference Opinions, unless otherwise specified by USFWS.
- No permanent light fixtures will be mounted on the proposed bridge and approaches except for navigational lighting.
- No permanent lighting will be installed on the portion of the existing bridge to be retained as a fishing pier.
- To the maximum extent practical, while ensuring safe travel, NCDOT will limit or avoid the use of road signs or other potential predator perches adjacent to plover nesting and foraging areas. Large cantilever signs will be avoided in favor of smaller and shorter signs.

### Construction Staging Measures

- All areas of Temporary Construction Easement will be returned to the conditions present before construction started or better, and where applicable, areas to be returned to PINWR will be restored to natural habitat conditions to the satisfaction of the Refuge Manager. This is to include the portion of the New Inlet Boat Ramp parking lot and the adjacent grassy area to be temporarily used for staging.
- No staging of construction equipment or storage of construction supplies will be allowed in wetlands.
- Lighting required at the staging area will be coordinated along with other construction lighting to ensure no adverse effects to sea turtles and other aquatic species.
- Fueling stations will be contained to avoid inadvertent spills reaching surface waters. Any spills will be controlled and reported as applicable.

### General Construction Measures

- NCDOT has elected to use more hand clearing rather than mechanized clearing where feasible to minimize impacts to wetlands.
- Special Sediment Control Fence and Environmentally-Sensitive Area fencing will be used where applicable.

**Regulatory Approvals**

The NCDOT anticipates that these activities will also be authorized under the following permits:

- USACE General 404 Permit
- NC Division of Water Quality 401 Individual Water Quality Certification
- NC Division of Coastal Management CAMA Major Development Permit (Modification)
- US Coast Guard Advanced Approval

If you have any questions or would like additional information, please contact Michael Turchy at [maturchy@ncdot.gov](mailto:maturchy@ncdot.gov) or (919) 707-6157. A copy of this application will also be posted at <http://www.doh.dot.state.nc.us/preconstruct/pe/>.

Sincerely,



Gregory J. Thorpe, Ph.D., Manager  
Project Development and Environmental Analysis Unit

cc:

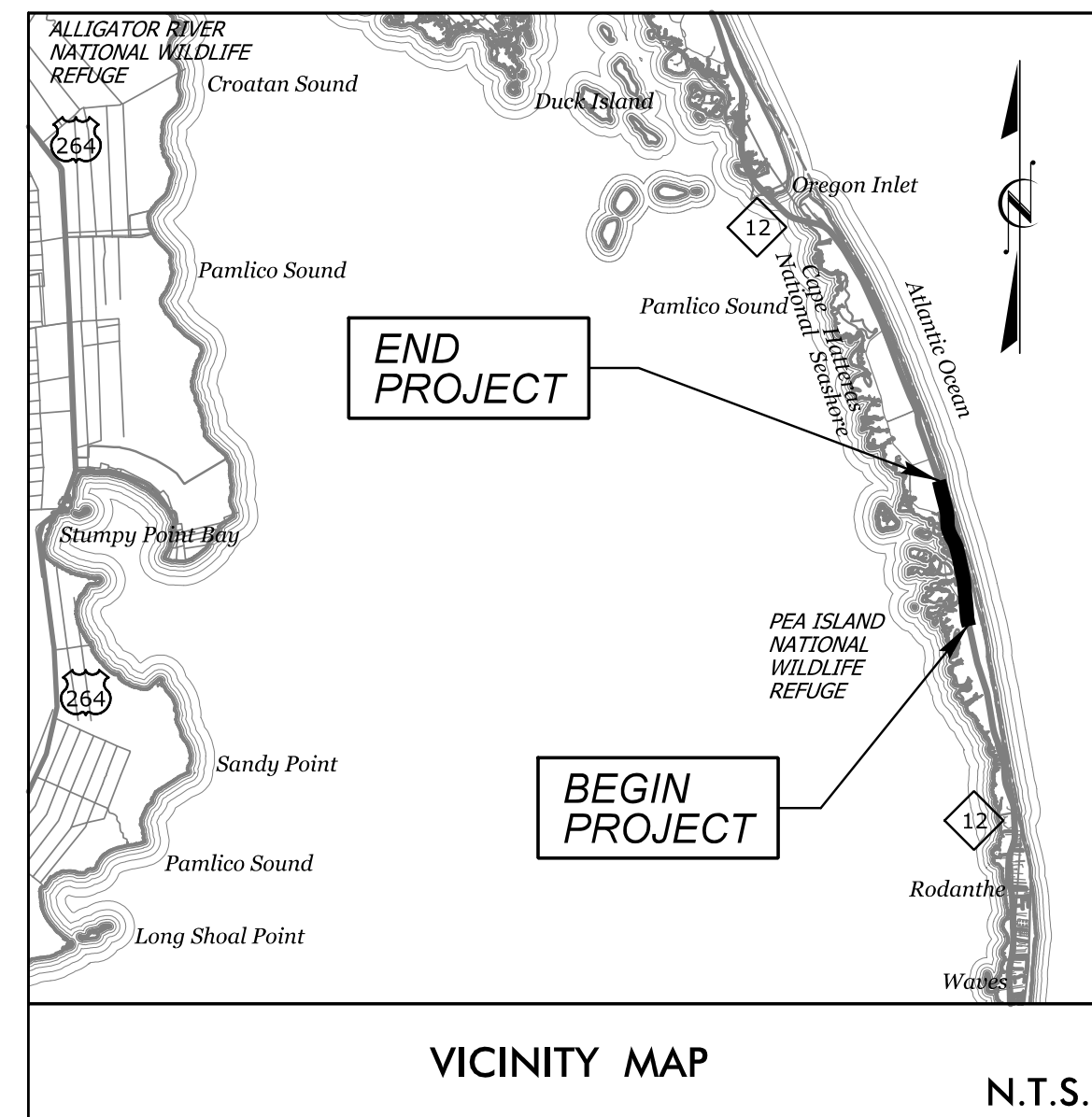
Mr. Bill Biddlecome, Washington Field Office, USACE

Ms. Cynthia Dohner, Southeast Regional Director, USFWS

**PROJECT: B-2500A**

**CONTRACT: C203171**

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

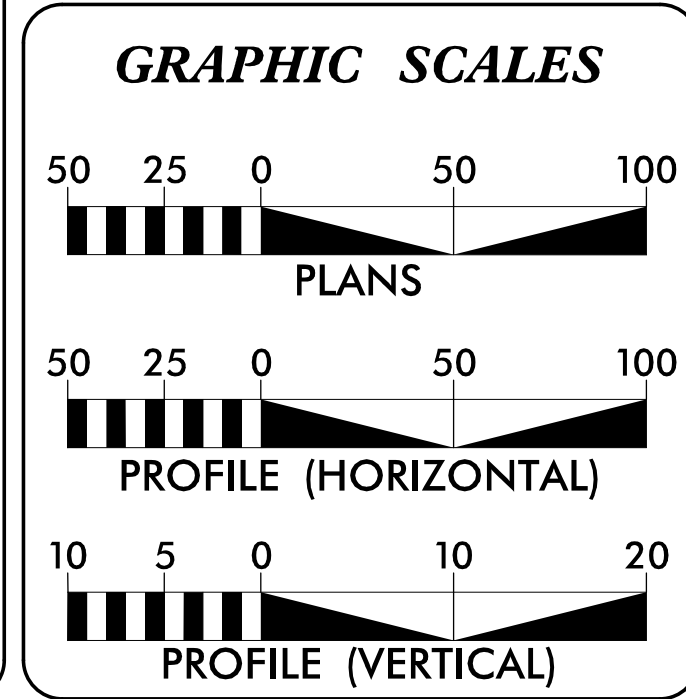
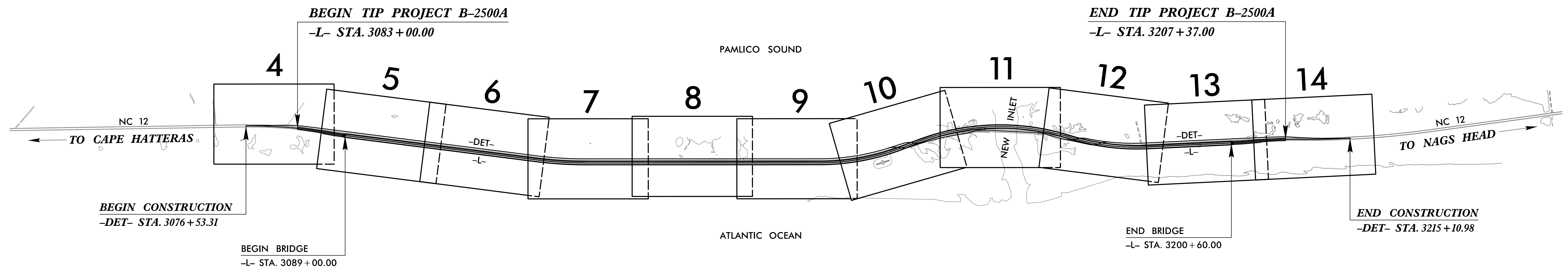
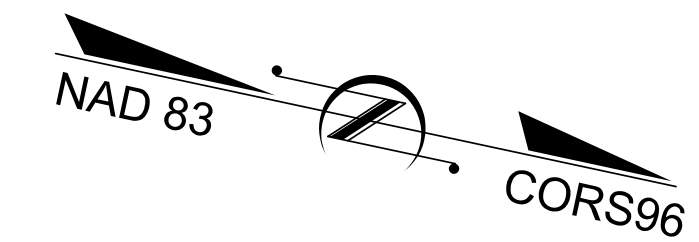


STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**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>B-2500A</b>	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
32635.1.6		P.E.	
32635.2.2	BRNH-0012(55)	UTIL.	
32635.3.6	BRNH-0012(55)	CONST.	



**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 = 0.241 MILES  
LENGTH OF STRUCTURE TIP PROJECT B-2500A = 2.114 MILES  
TOTAL LENGTH OF TIP PROJECT B-2500A = 2.355 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: DECEMBER 18, 2012

JOHN N. JOHNSON, PE  
PROJECT ENGINEER

JOSEPH A. FREEMAN, PE  
PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

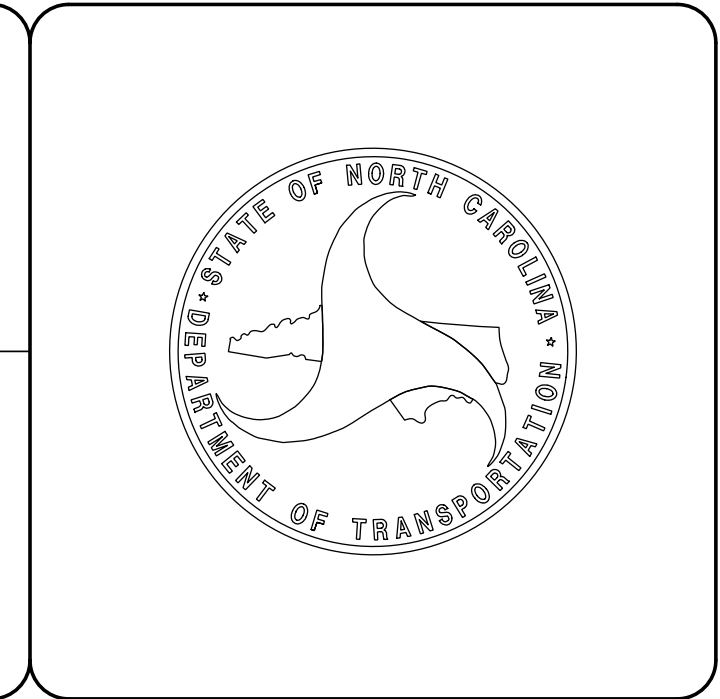
PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

SIGNATURE: \_\_\_\_\_ P.E.

**ROADWAY DESIGN ENGINEER**

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

SIGNATURE: \_\_\_\_\_ P.E.



Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

Table listing symbols for boundaries and property: State Line, County Line, Township Line, City Line, Reservation Line, Property Line, Existing Iron Pin, Property Corner, Property Monument, Parcel/Sequence Number, Existing Fence Line, Proposed Woven Wire Fence, Proposed Chain Link Fence, Proposed Barbed Wire Fence, Existing Wetland Boundary, Proposed Wetland Boundary, Existing Endangered Animal Boundary, Existing Endangered Plant Boundary, Known Soil Contamination: Area or Site, Potential Soil Contamination: Area or Site.

BUILDINGS AND OTHER CULTURE:

Table listing symbols for buildings and other culture: Gas Pump Vent or U/G Tank Cap, Sign, Well, Small Mine, Foundation, Area Outline, Cemetery, Building, School, Church, Dam.

HYDROLOGY:

Table listing symbols for hydrology: Stream or Body of Water, Hydro, Pool or Reservoir, Jurisdictional Stream, Buffer Zone 1, Buffer Zone 2, Flow Arrow, Disappearing Stream, Spring, Wetland, Proposed Lateral, Tail, Head Ditch, False Sump.

RAILROADS:

Table listing symbols for railroads: Standard Gauge, RR Signal Milepost, Switch, RR Abandoned, RR Dismantled.

RIGHT OF WAY:

Table listing symbols for right of way: Baseline Control Point, Existing Right of Way Marker, Existing Right of Way Line, Proposed Right of Way Line, Proposed Right of Way Line with Iron Pin and Cap Marker, Proposed Right of Way Line with Concrete or Granite Marker, Existing Control of Access, Proposed Control of Access, Existing Easement Line, Proposed Temporary Construction Easement, Proposed Temporary Drainage Easement, Proposed Permanent Drainage Easement, Proposed Permanent Drainage / Utility Easement, Proposed Permanent Utility Easement, Proposed Temporary Utility Easement, Proposed Aerial Utility Easement, Proposed Permanent Easement with Iron Pin and Cap Marker.

ROADS AND RELATED FEATURES:

Table listing symbols for roads and related features: Existing Edge of Pavement, Existing Curb, Proposed Slope Stakes Cut, Proposed Slope Stakes Fill, Proposed Curb Ramp, Existing Metal Guardrail, Proposed Guardrail, Existing Cable Guiderail, Proposed Cable Guiderail, Equality Symbol, Pavement Removal.

VEGETATION:

Table listing symbols for vegetation: Single Tree, Single Shrub, Hedge, Woods Line.

Table listing symbols for orchard and vineyard.

EXISTING STRUCTURES:

Table listing symbols for existing structures: MAJOR: Bridge, Tunnel or Box Culvert, Bridge Wing Wall, Head Wall and End Wall; MINOR: Head and End Wall, Pipe Culvert, Footbridge, Drainage Box: Catch Basin, DI or JB, Paved Ditch Gutter, Storm Sewer Manhole, Storm Sewer.

UTILITIES:

Table listing symbols for utilities: POWER: Existing Power Pole, Proposed Power Pole, Existing Joint Use Pole, Proposed Joint Use Pole, Power Manhole, Power Line Tower, Power Transformer, U/G Power Cable Hand Hole, H-Frame Pole, Recorded U/G Power Line, Designated U/G Power Line (S.U.E.\*).

TELEPHONE:

Table listing symbols for telephone: Existing Telephone Pole, Proposed Telephone Pole, Telephone Manhole, Telephone Booth, Telephone Pedestal, Telephone Cell Tower, U/G Telephone Cable Hand Hole, Recorded U/G Telephone Cable, Designated U/G Telephone Cable (S.U.E.\*), Recorded U/G Telephone Conduit, Designated U/G Telephone Conduit (S.U.E.\*), Recorded U/G Fiber Optics Cable, Designated U/G Fiber Optics Cable (S.U.E.\*).

WATER:

Table listing symbols for water: Water Manhole, Water Meter, Water Valve, Water Hydrant, Recorded U/G Water Line, Designated U/G Water Line (S.U.E.\*), Above Ground Water Line.

TV:

Table listing symbols for TV: TV Satellite Dish, TV Pedestal, TV Tower, U/G TV Cable Hand Hole, Recorded U/G TV Cable, Designated U/G TV Cable (S.U.E.\*), Recorded U/G Fiber Optic Cable, Designated U/G Fiber Optic Cable (S.U.E.\*).

GAS:

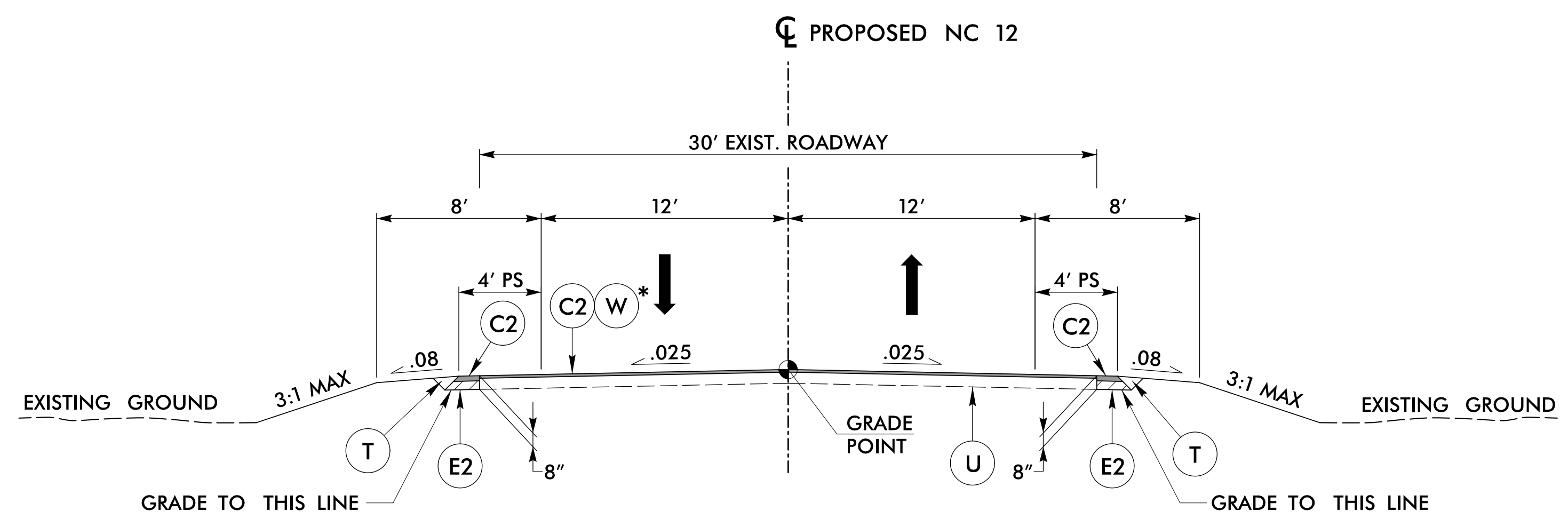
Table listing symbols for gas: Gas Valve, Gas Meter, Recorded U/G Gas Line, Designated U/G Gas Line (S.U.E.\*), Above Ground Gas Line.

SANITARY SEWER:

Table listing symbols for sanitary sewer: Sanitary Sewer Manhole, Sanitary Sewer Cleanout, U/G Sanitary Sewer Line, Above Ground Sanitary Sewer, Recorded SS Forced Main Line, Designated SS Forced Main Line (S.U.E.\*).

MISCELLANEOUS:

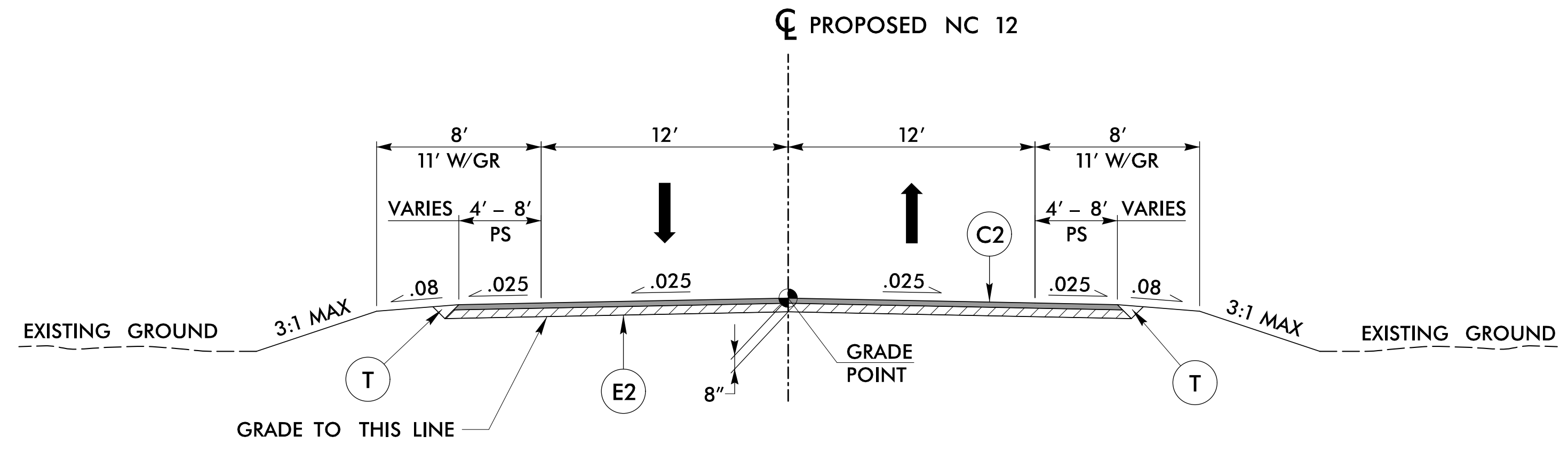
Table listing symbols for miscellaneous: Utility Pole, Utility Pole with Base, Utility Located Object, Utility Traffic Signal Box, Utility Unknown U/G Line, U/G Tank; Water, Gas, Oil, Underground Storage Tank, Approx. Loc., A/G Tank; Water, Gas, Oil, Geoenvironmental Boring, U/G Test Hole (S.U.E.\*), Abandoned According to Utility Records, End of Information.



**TYPICAL SECTION #1**

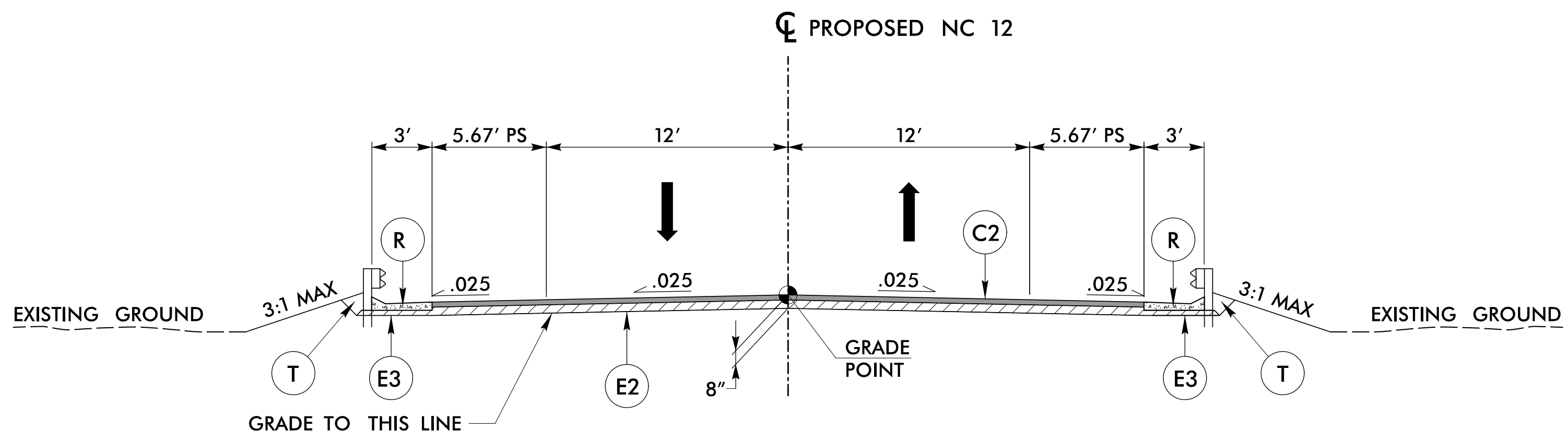
-L- STA. 3083+00.00 TO STA. 3086+92.67  
 -L- STA. 3204+46.89 TO STA. 3207+37.00

\* NOTES:  
 1. USE WEDGING DETAIL #1



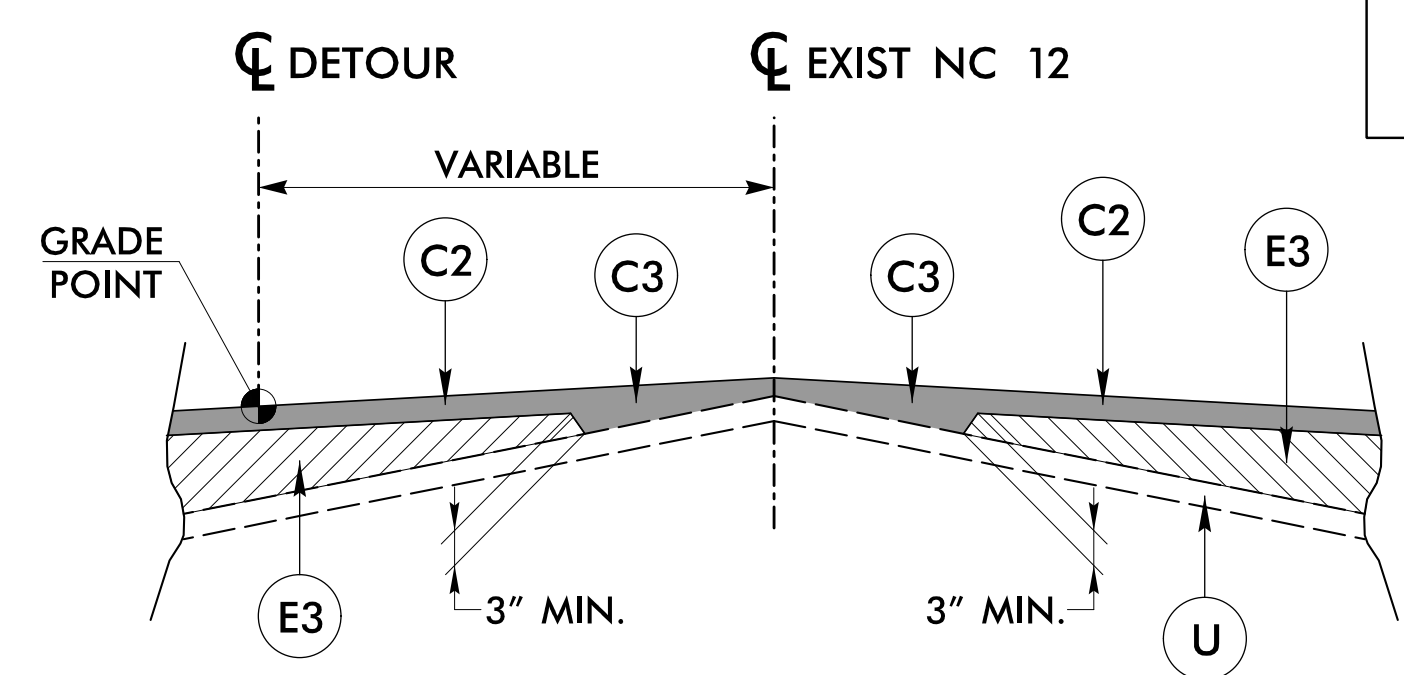
**TYPICAL SECTION #2**

-L- STA. 3086+02.91 TO STA. 3086+92.67  
 -L- STA. 3203+55.04 TO STA. 3204+46.89

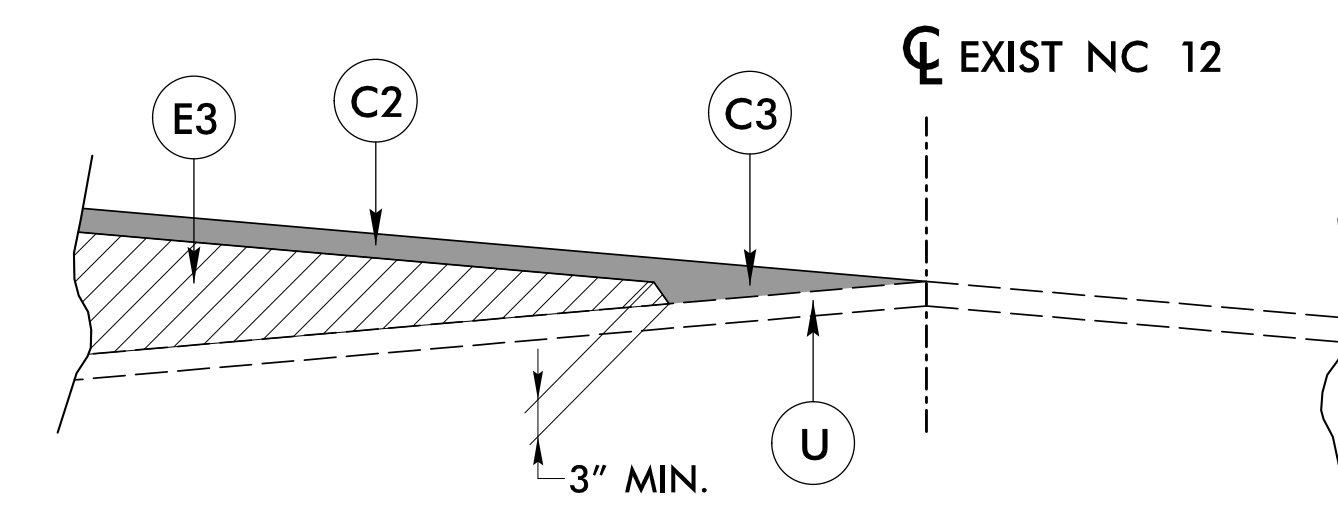


**TYPICAL SECTION #3**

-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**

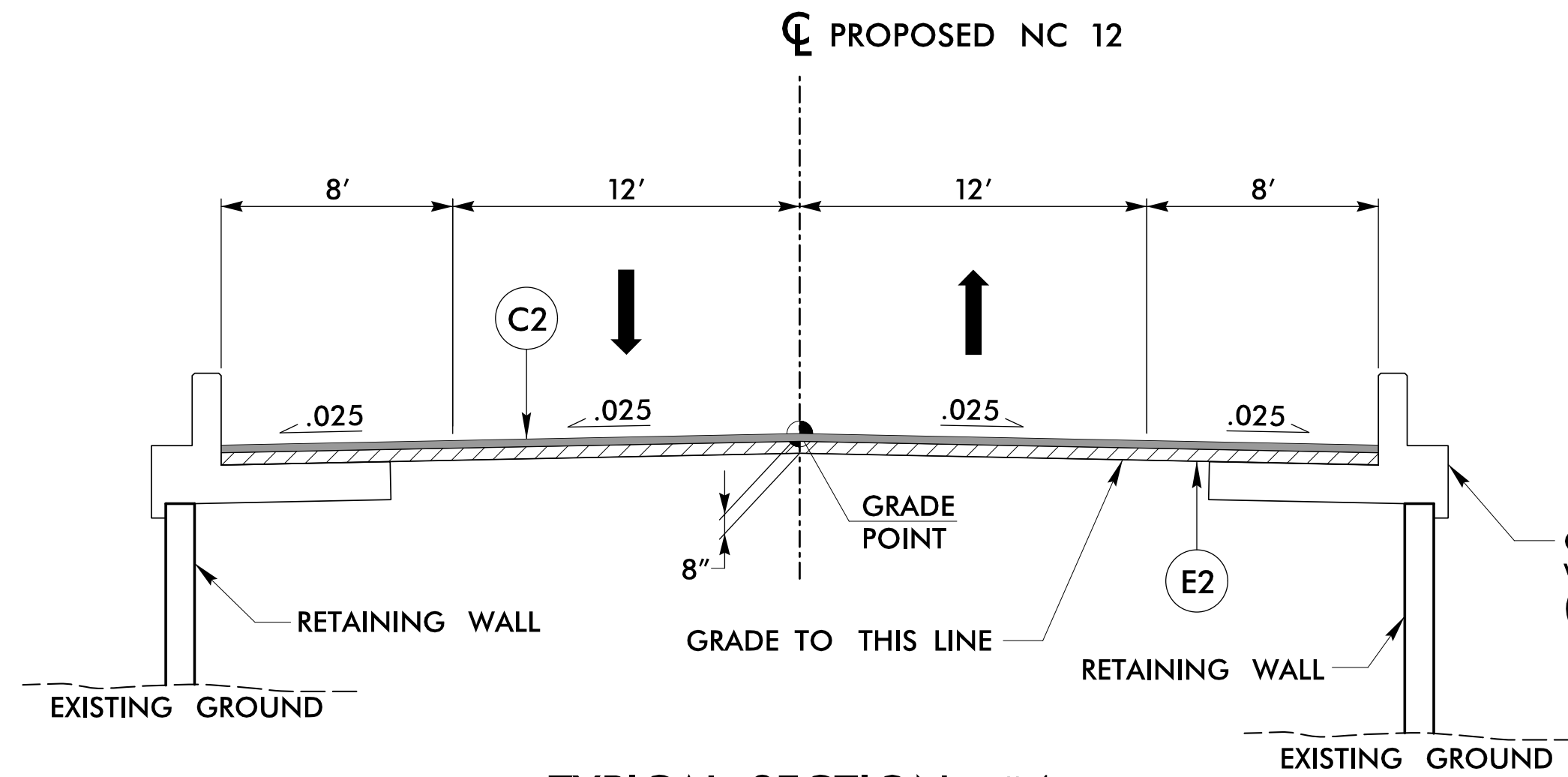
**PAVEMENT SCHEDULE**

<b>C1</b>	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ.YD.
<b>C2</b>	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.
<b>C3</b>	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.
<b>E1</b>	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ.YD.
<b>E2</b>	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ.YD.
<b>E3</b>	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.
<b>R</b>	SHOULDER BERM GUTTER
<b>T</b>	EARTH MATERIAL
<b>U</b>	EXISTING PAVEMENT
<b>W</b>	VARIABLE DEPTH ASPHALT (SEE WEDGING DETAIL THIS SHEET)

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

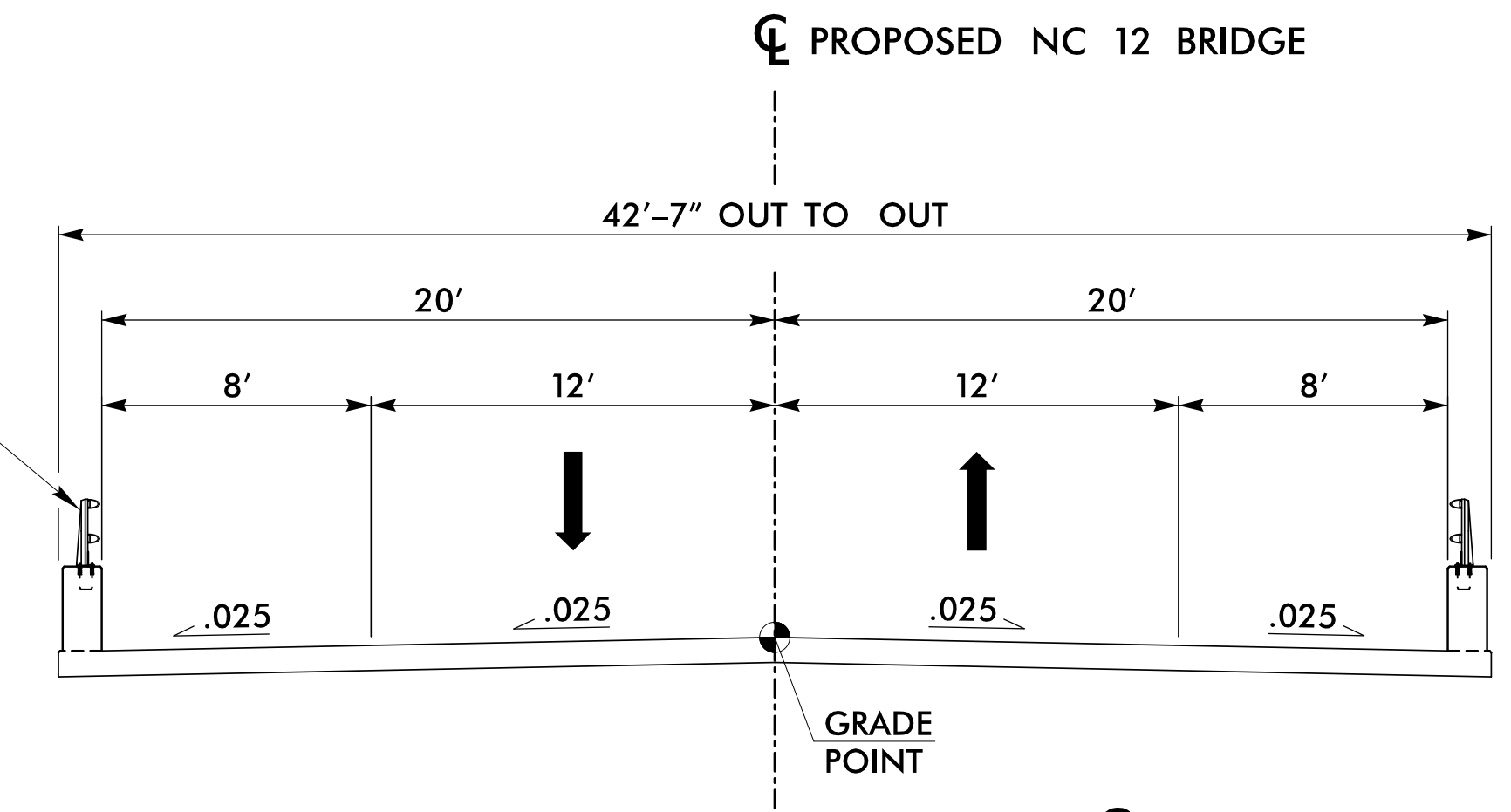
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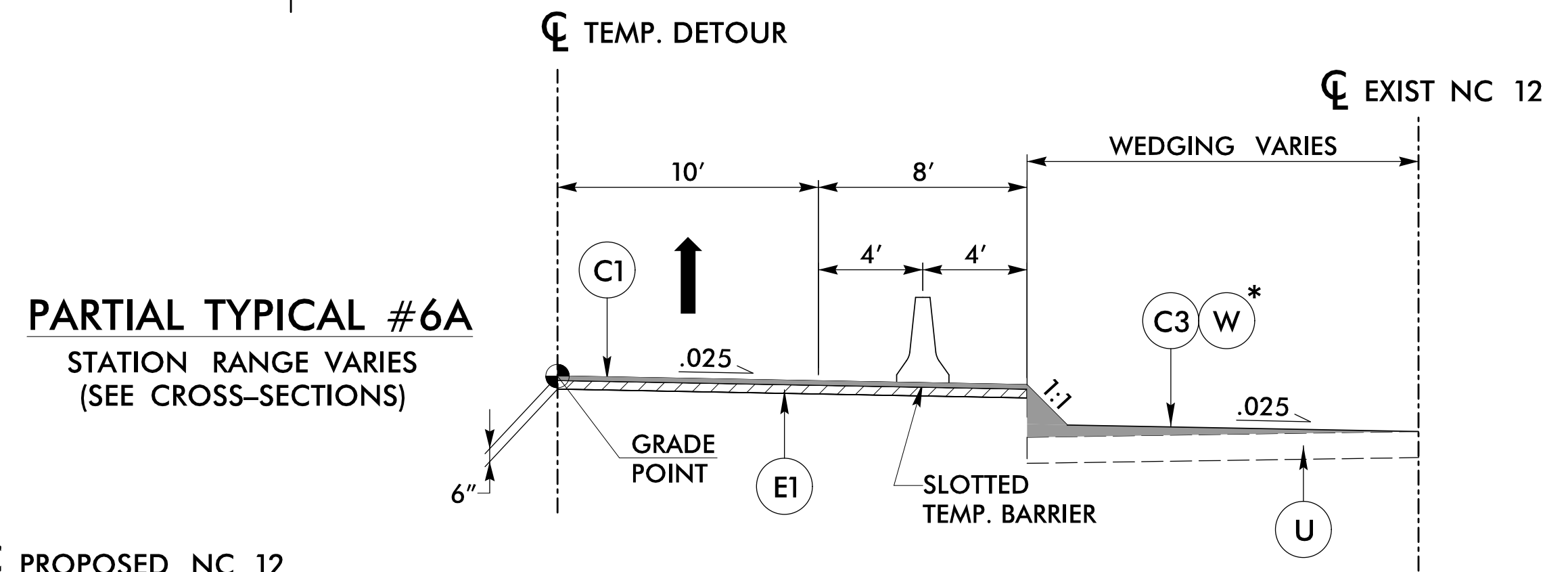
**TYPICAL SECTION #4**

-L- STA. 3087+50.00 TO STA. 3089+00.00 (BEGIN BRIDGE)  
 -L- STA. 3200+60.00 (END BRIDGE) TO STA. 3202+50.00

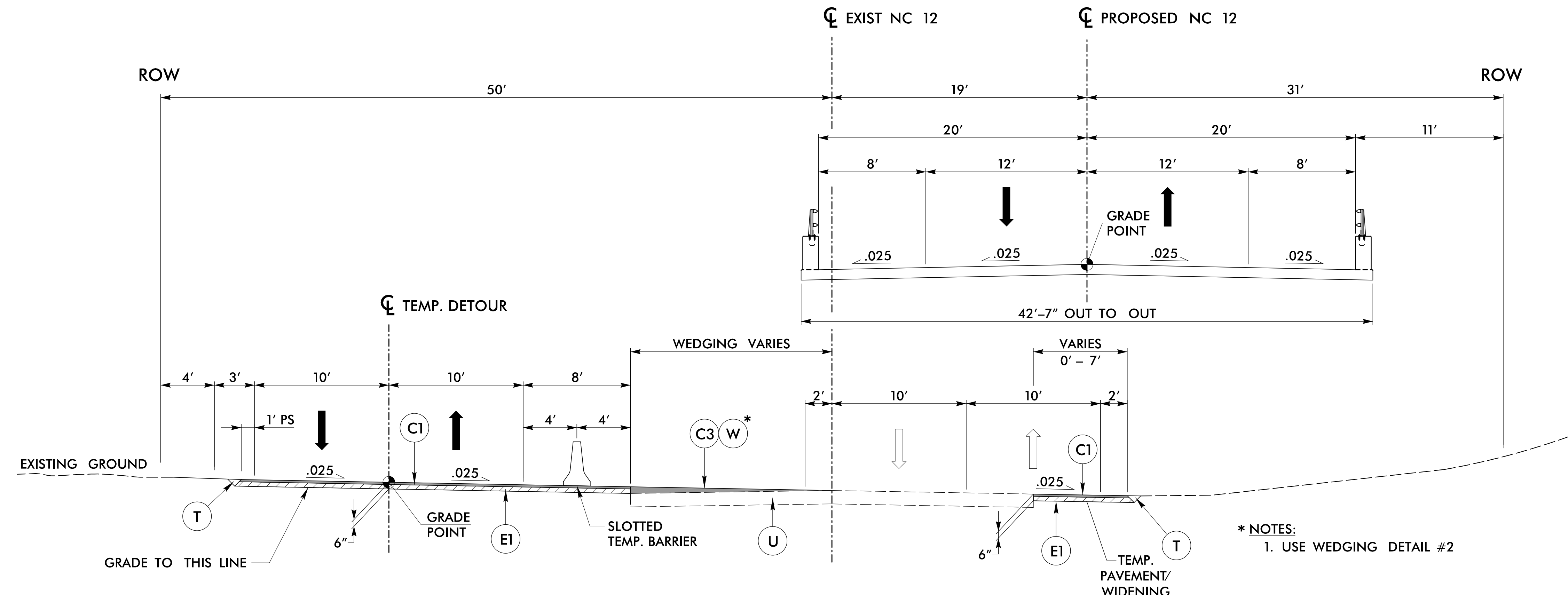


**TYPICAL SECTION #5**

-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**

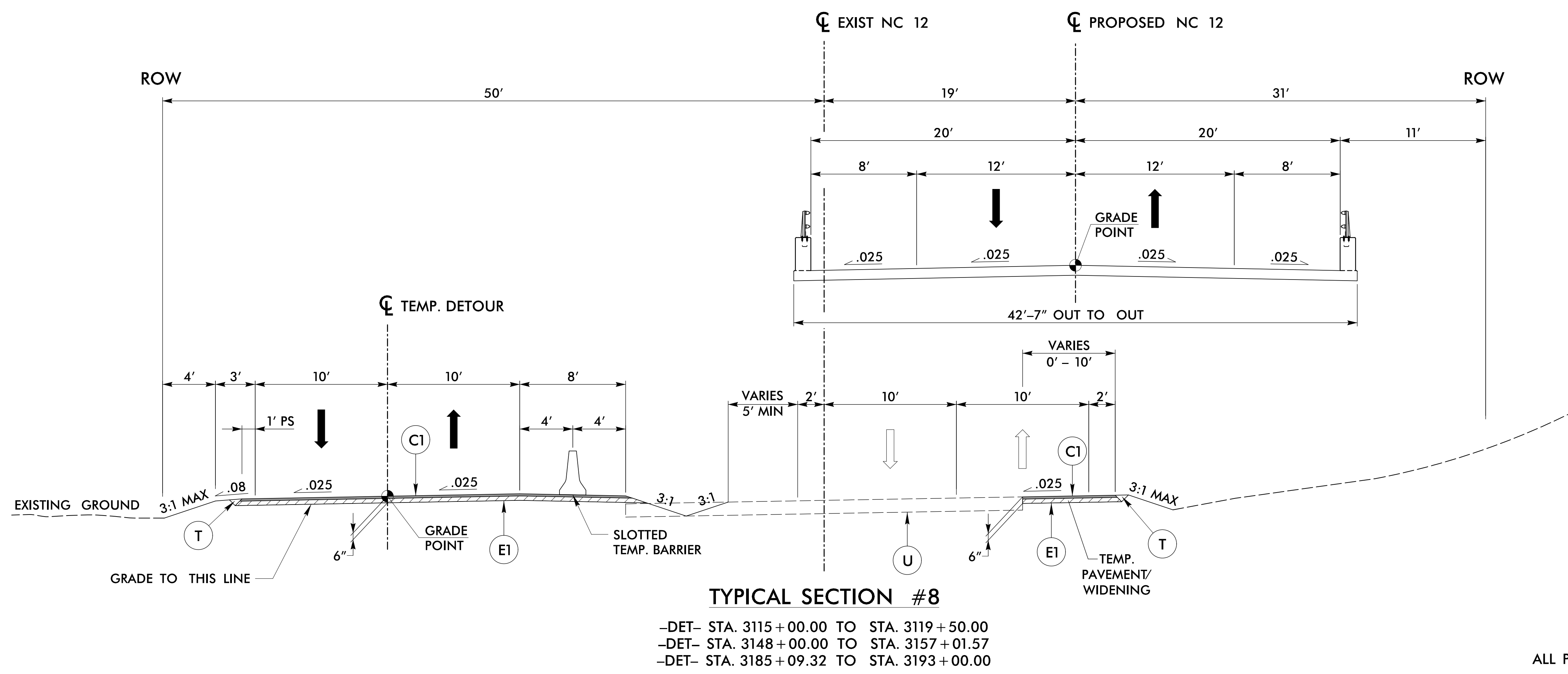
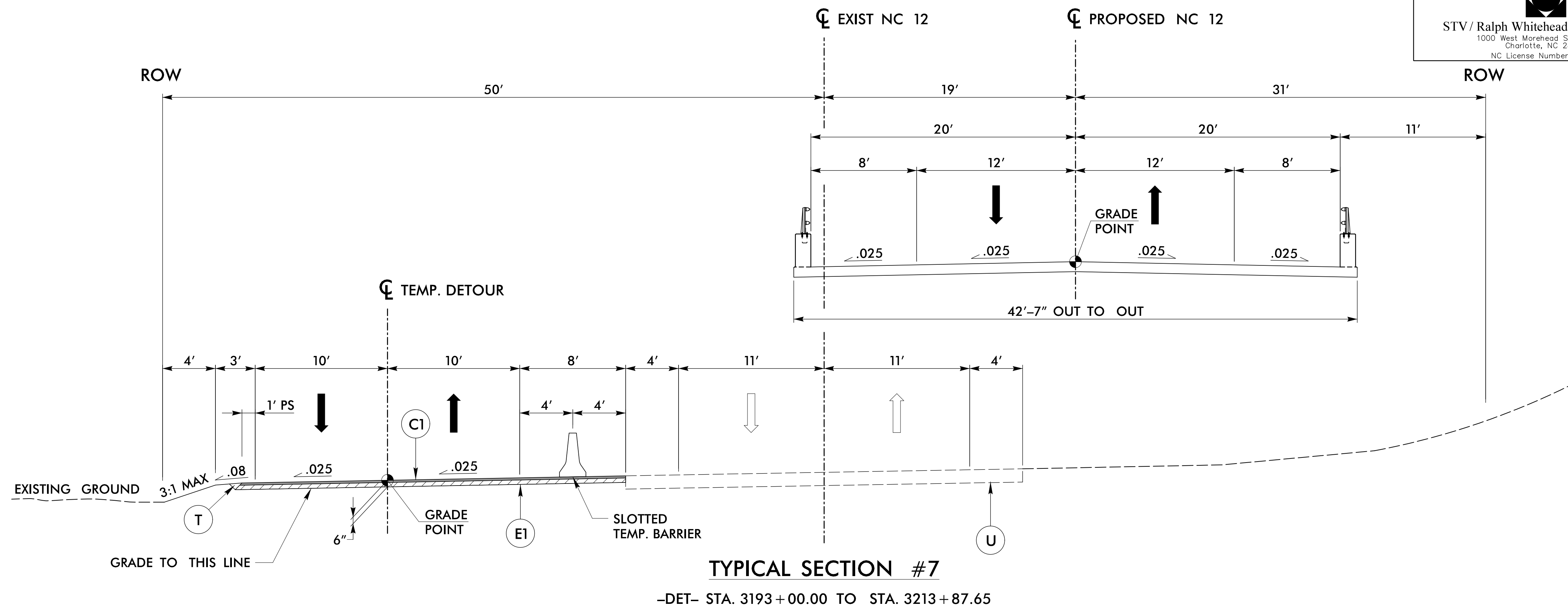
-DET- STA. 3078+12.67 TO STA. 3115+00.00  
 -DET- STA. 3119+50.00 TO STA. 3148+00.00

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

\* NOTES:  
 1. USE WEDGING DETAIL #2

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

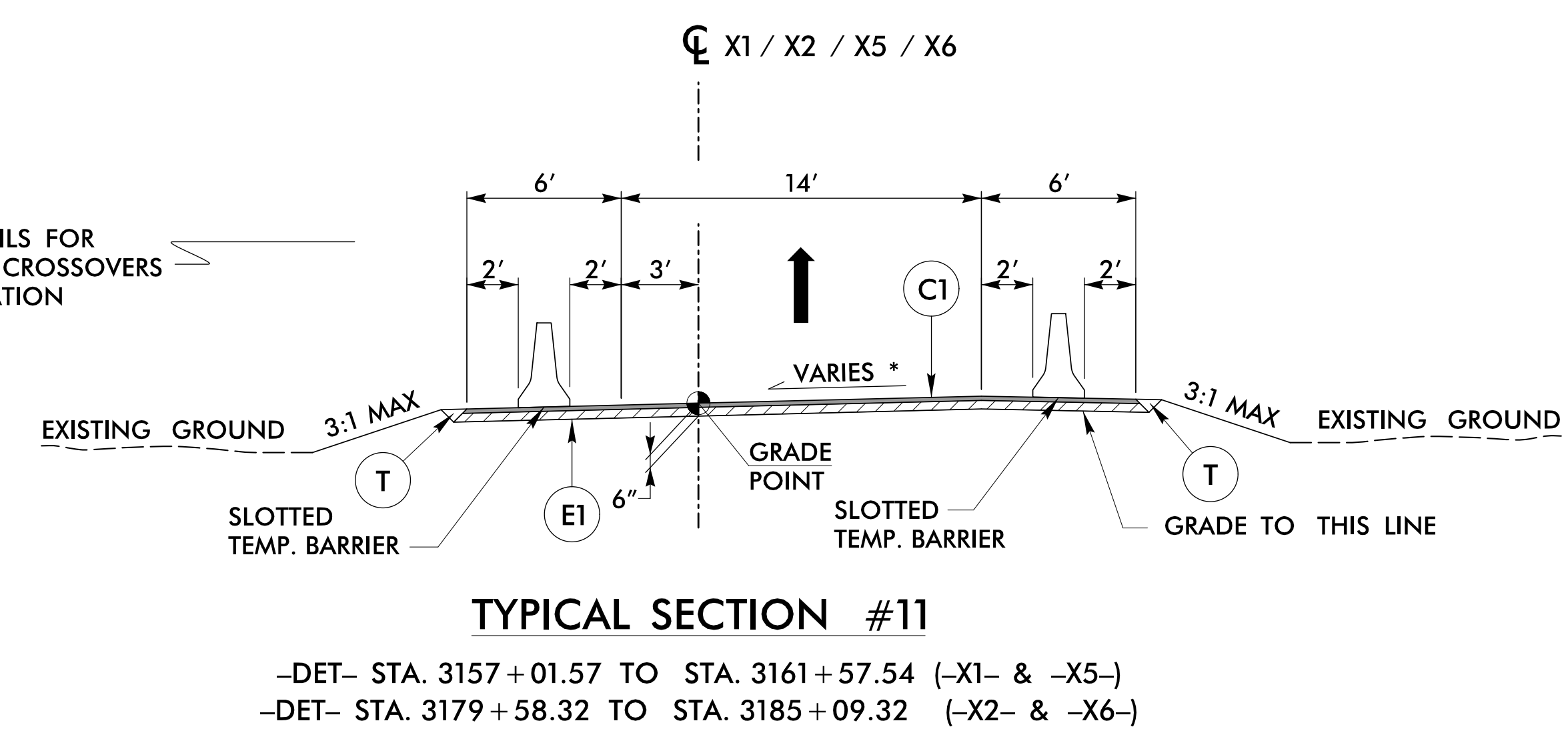
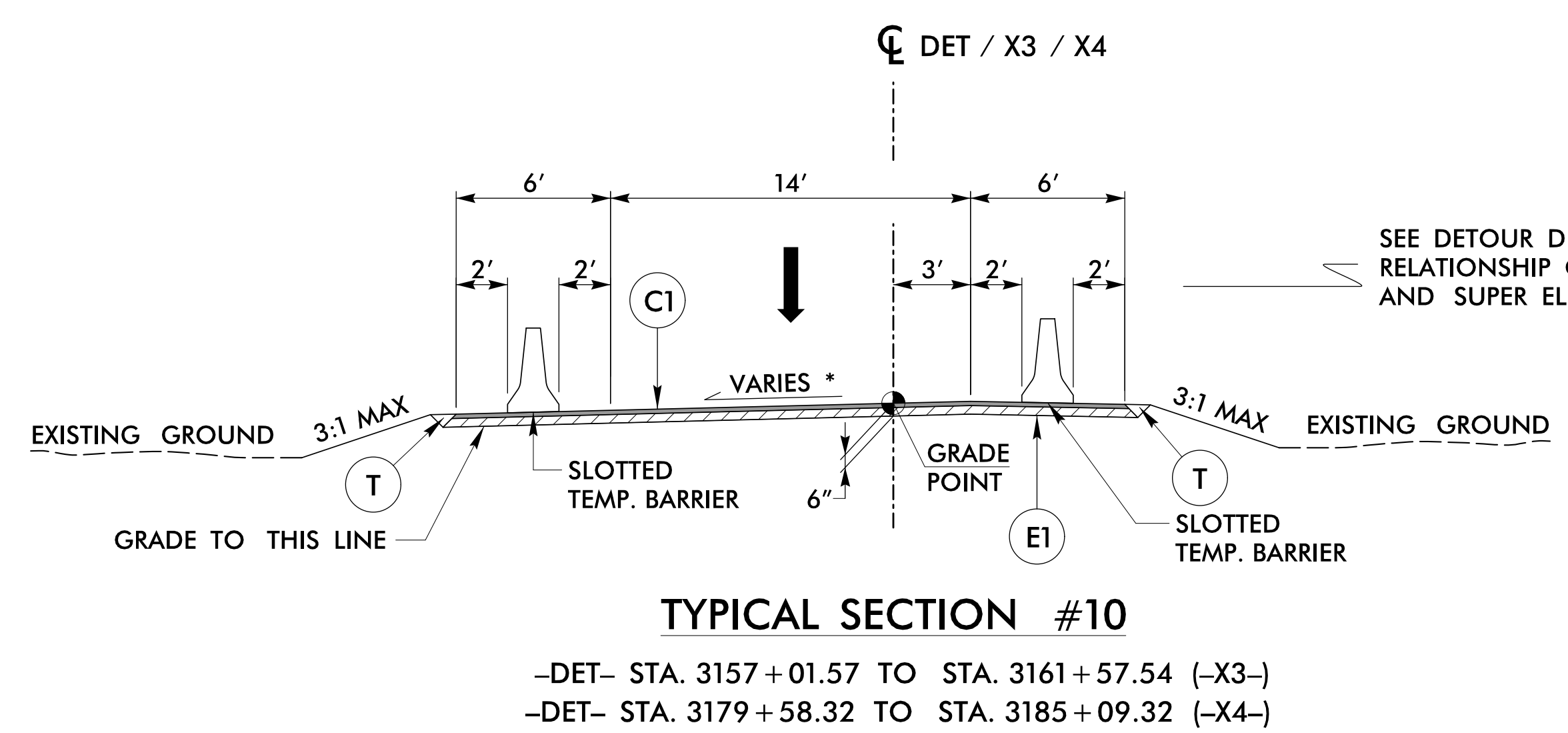
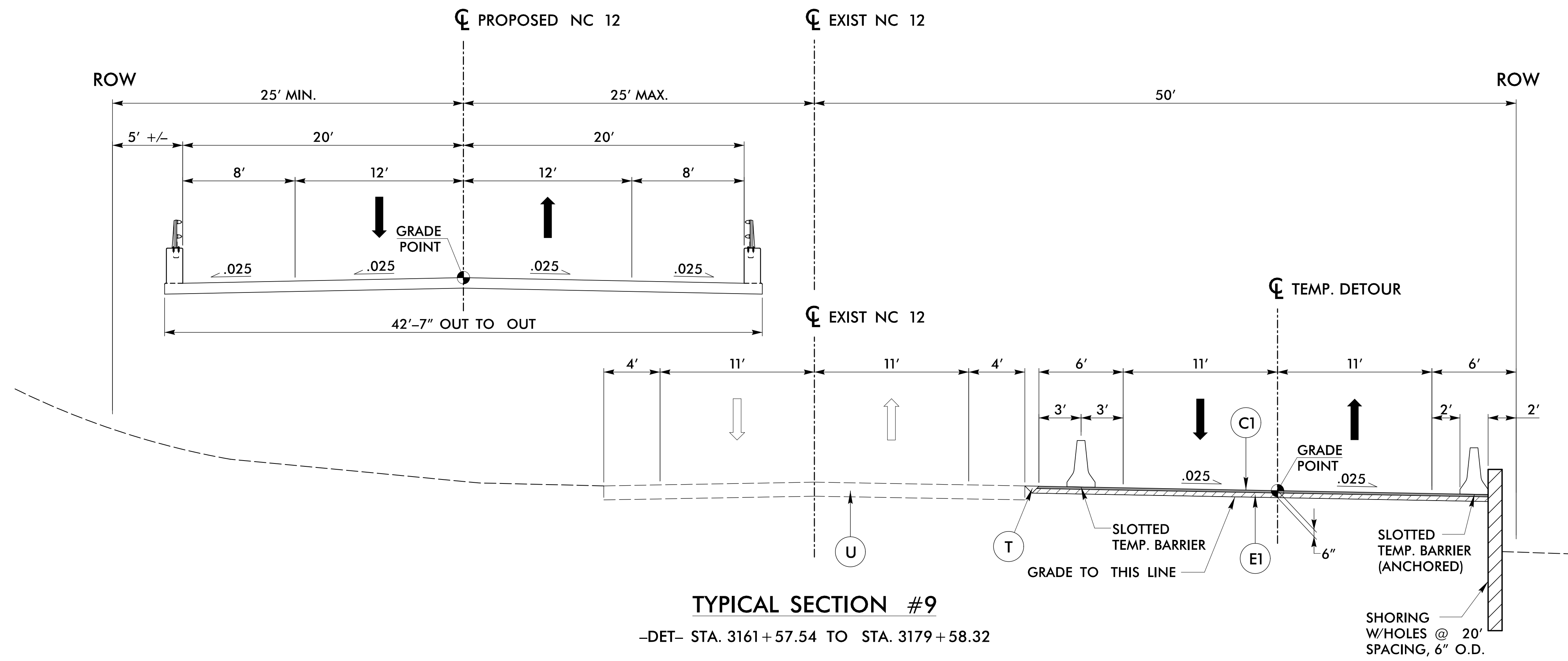
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 10/16/2012



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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 10/16/2012



**\* 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.

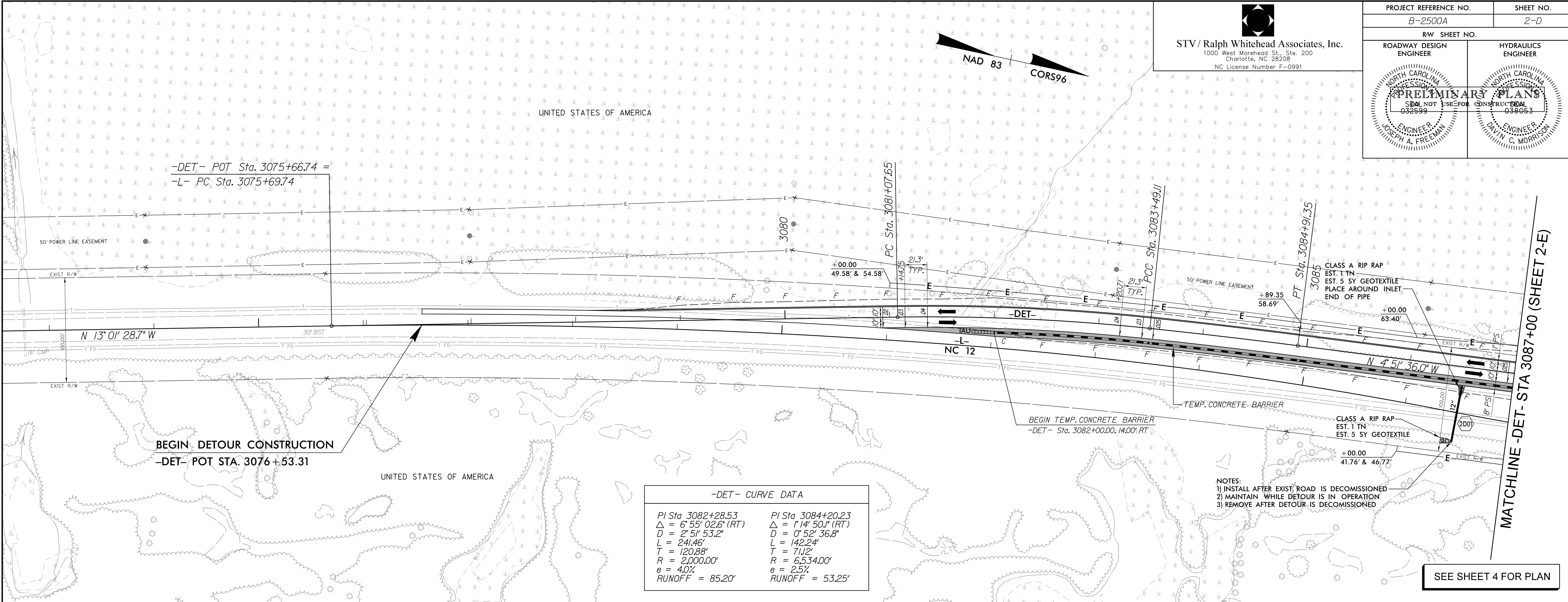
C1	2" S9.5B
C2	3" S9.5B
C3	VAR. S9.5B
E1	4" B25.0B
E2	5" B25.0B
E3	VAR. B25.0B
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

ALL PAVEMENT SLOPES 1:1 UNLESS NOTED OTHERWISE

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 10/16/2012

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

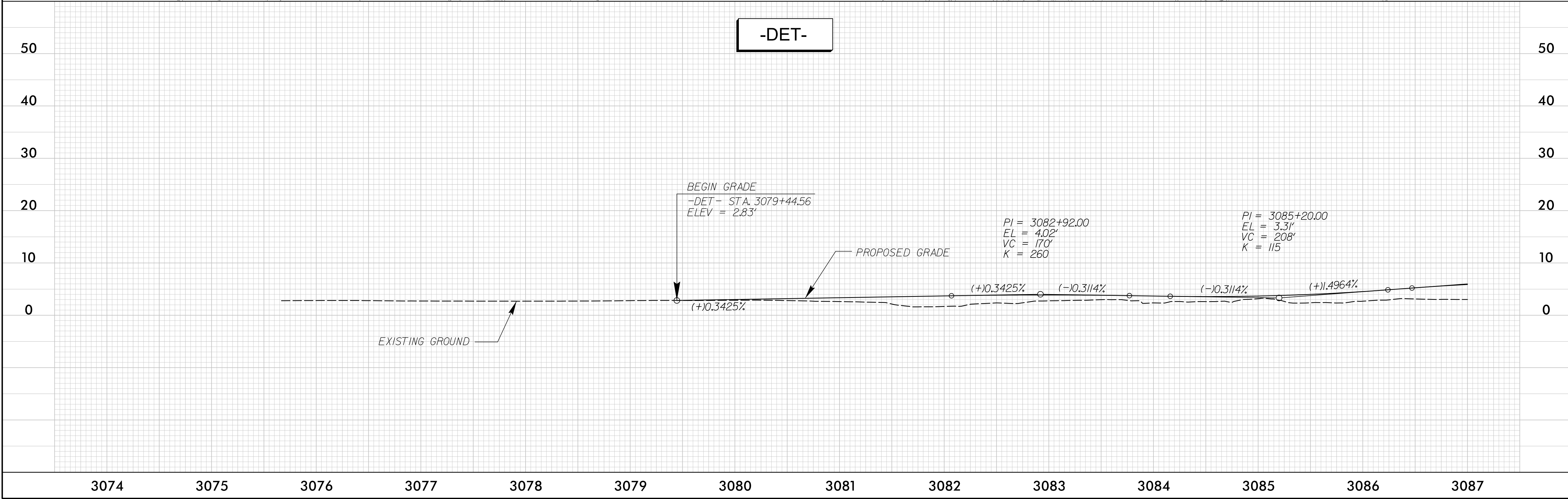
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RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



-DET- CURVE DATA

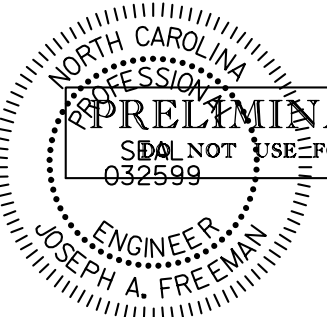
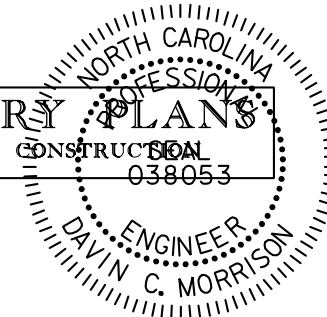
PI Sta 3082+28.53	PI Sta 3084+20.23
$\Delta = 6^{\circ}55'02.6''$ (RT)	$\Delta = 1^{\circ}14'50.1''$ (RT)
$D = 2^{\circ}51'53.2''$	$D = 0^{\circ}52'36.8''$
$L = 241.46'$	$L = 142.24'$
$T = 120.88'$	$T = 71.12'$
$R = 2,000.00'$	$R = 6,534.00'$
$e = 4.0\%$	$e = 2.5\%$
$RUNOFF = 85.20'$	$RUNOFF = 53.25'$

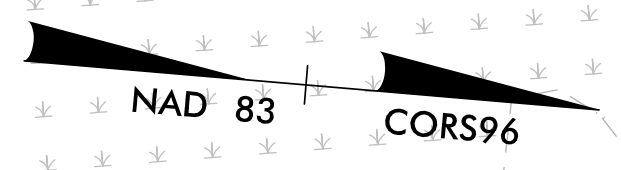
- NOTES:
- 1) INSTALL AFTER EXIST. ROAD IS DECOMMISSIONED
  - 2) MAINTAIN WHILE DETOUR IS IN OPERATION
  - 3) REMOVE AFTER DETOUR IS DECOMMISSIONED



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 10/16/2012

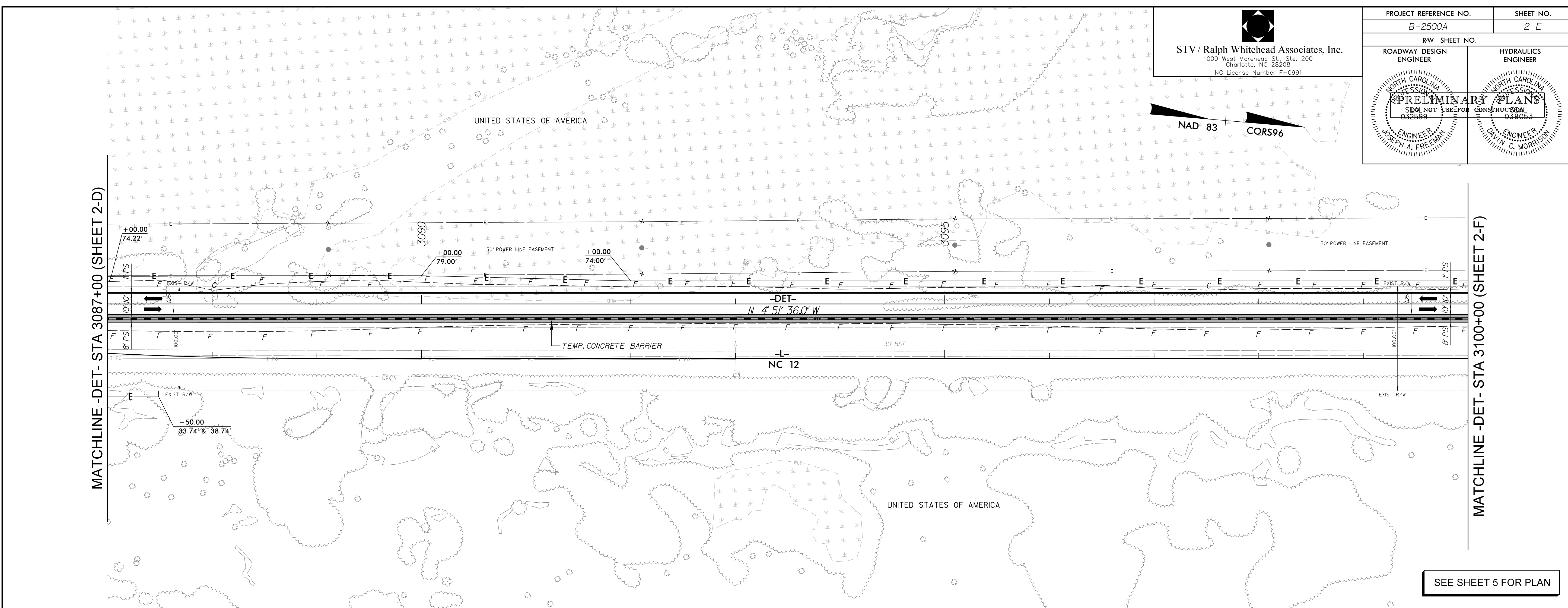
STV / Ralph Whitehead Associates, Inc.  
 1000 West Morehead St., Ste. 200  
 Charlotte, NC 28208  
 NC License Number F-0991

PROJECT REFERENCE NO. B-2500A	SHEET NO. 2-E
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
 PRELIMINARY PLANS NOT FOR CONSTRUCTION	 PRELIMINARY PLANS NOT FOR CONSTRUCTION

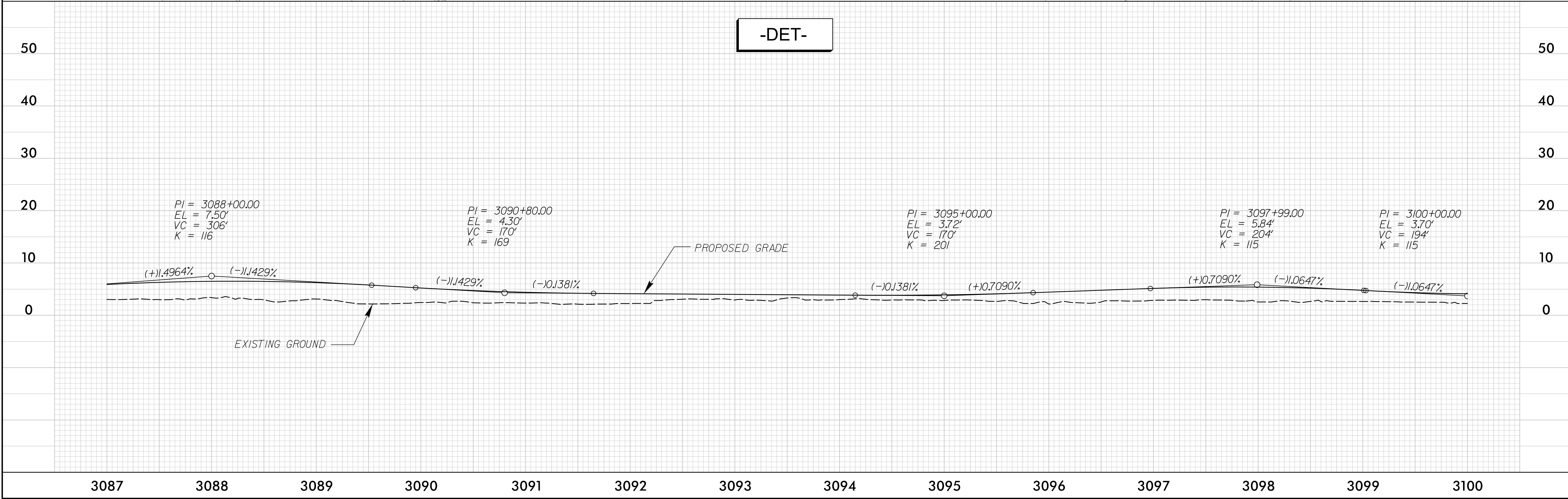


MATCHLINE -DET- STA 3087+00 (SHEET 2-D)

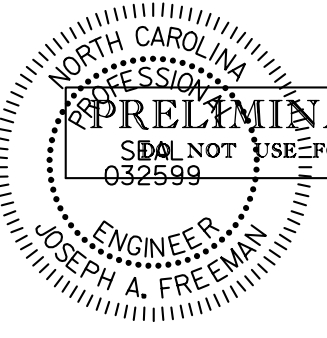
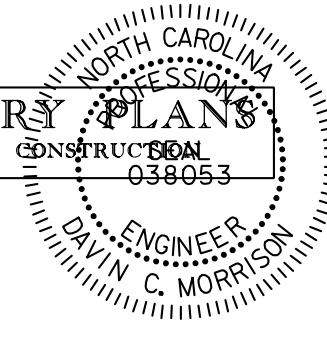
MATCHLINE -DET- STA 3100+00 (SHEET 2-F)



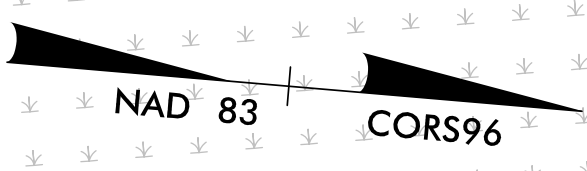
SEE SHEET 5 FOR PLAN



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10/16/2012

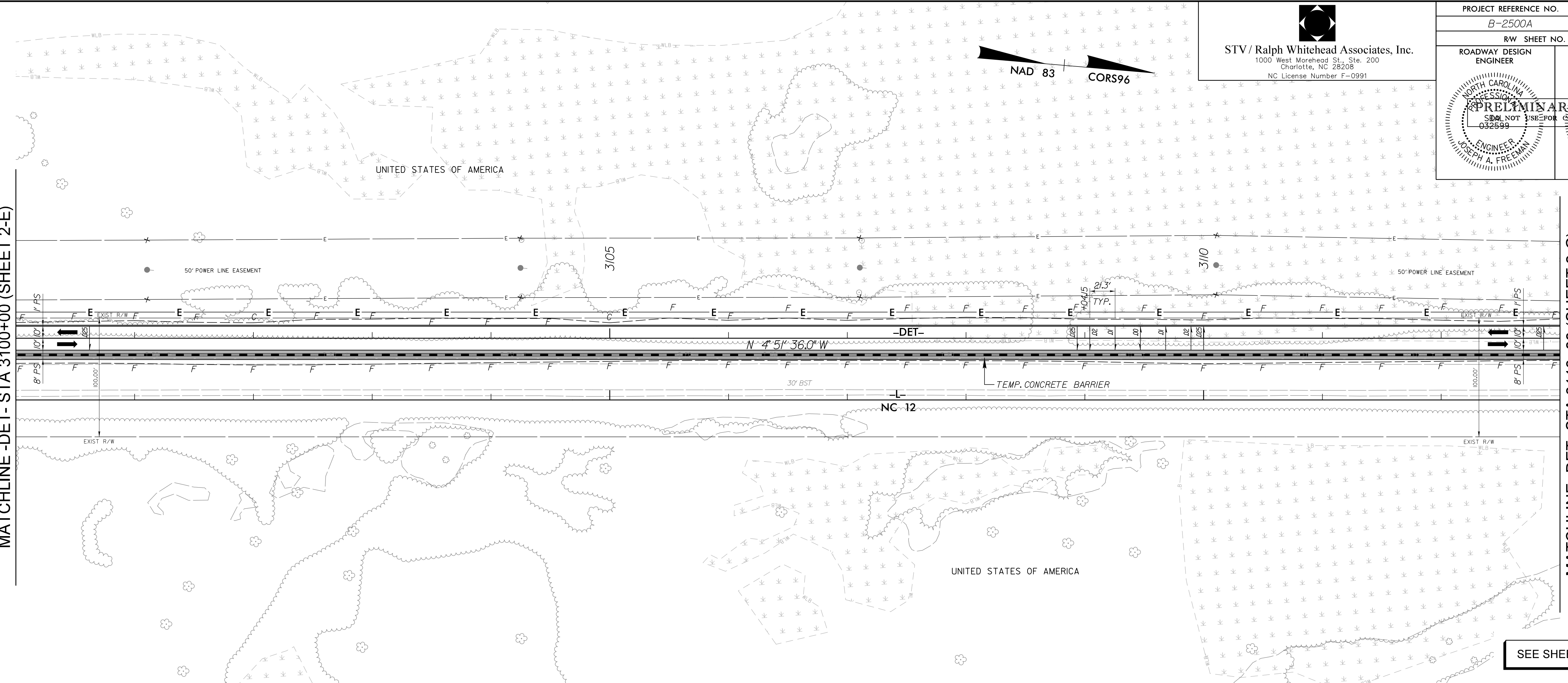
PROJECT REFERENCE NO. B-2500A	SHEET NO. 2-F
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
 PRELIMINARY PLANS SHALL NOT BE USED FOR CONSTRUCTION ENGINEER JOSEPH A. FREEMAN	 PRELIMINARY PLANS SHALL NOT BE USED FOR CONSTRUCTION ENGINEER DR. N. C. MORRISON

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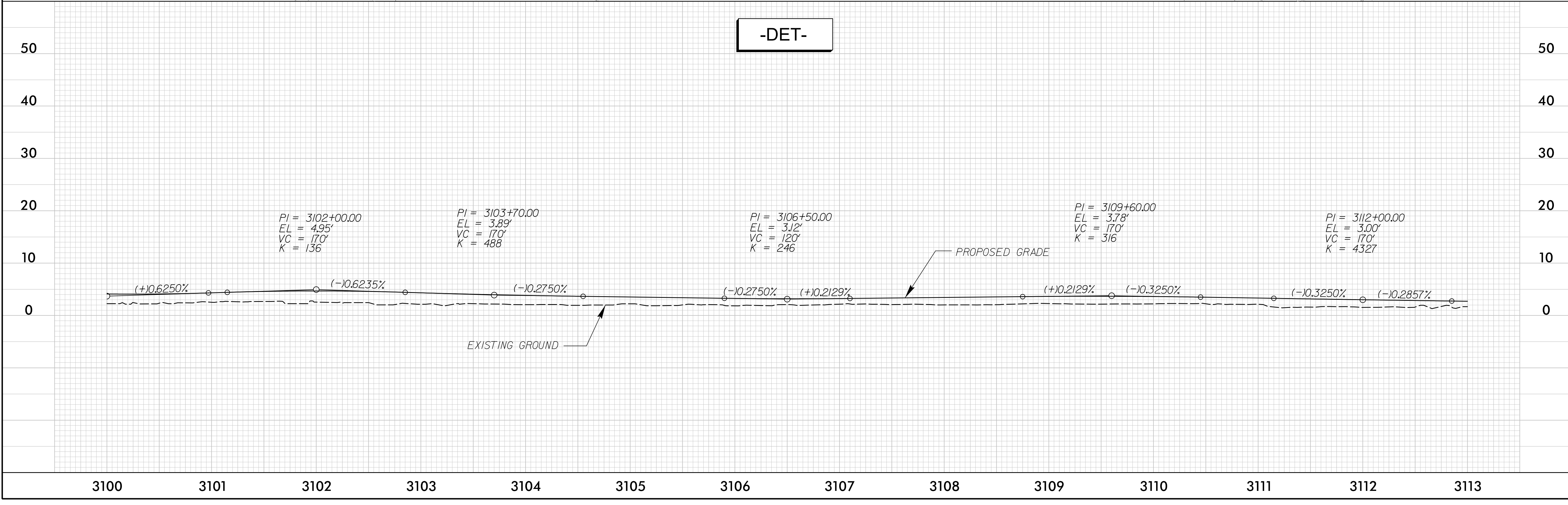


MATCHLINE -DET- STA 3100+00 (SHEET 2-E)

MATCHLINE -DET- STA 3113+00 (SHEET 2-G)

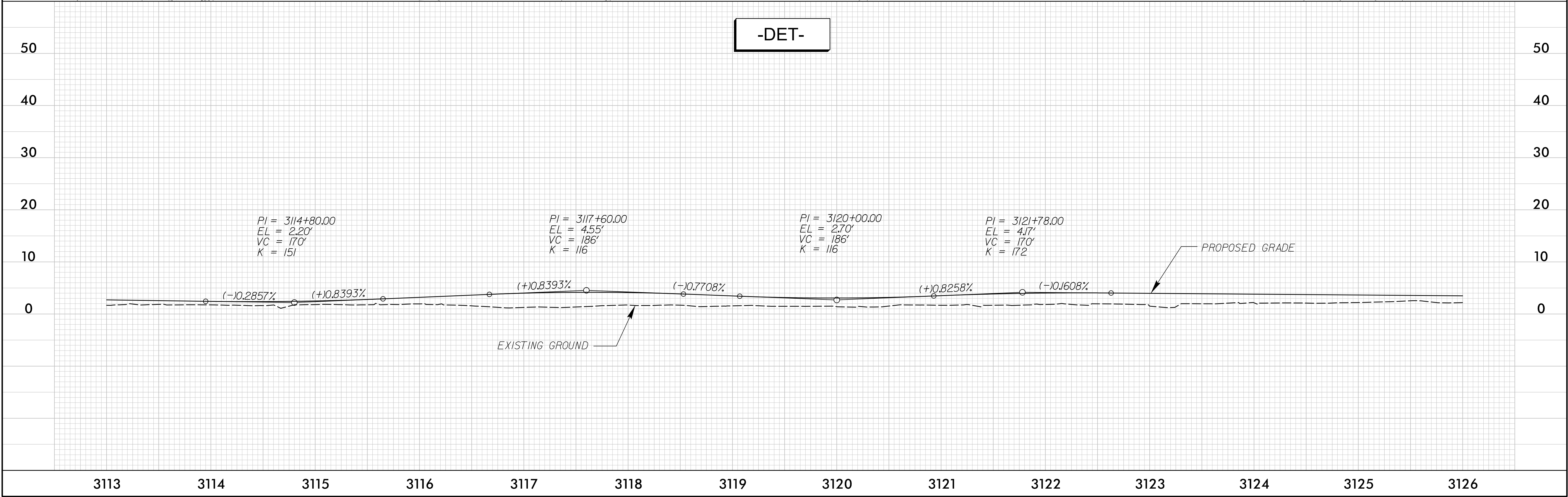
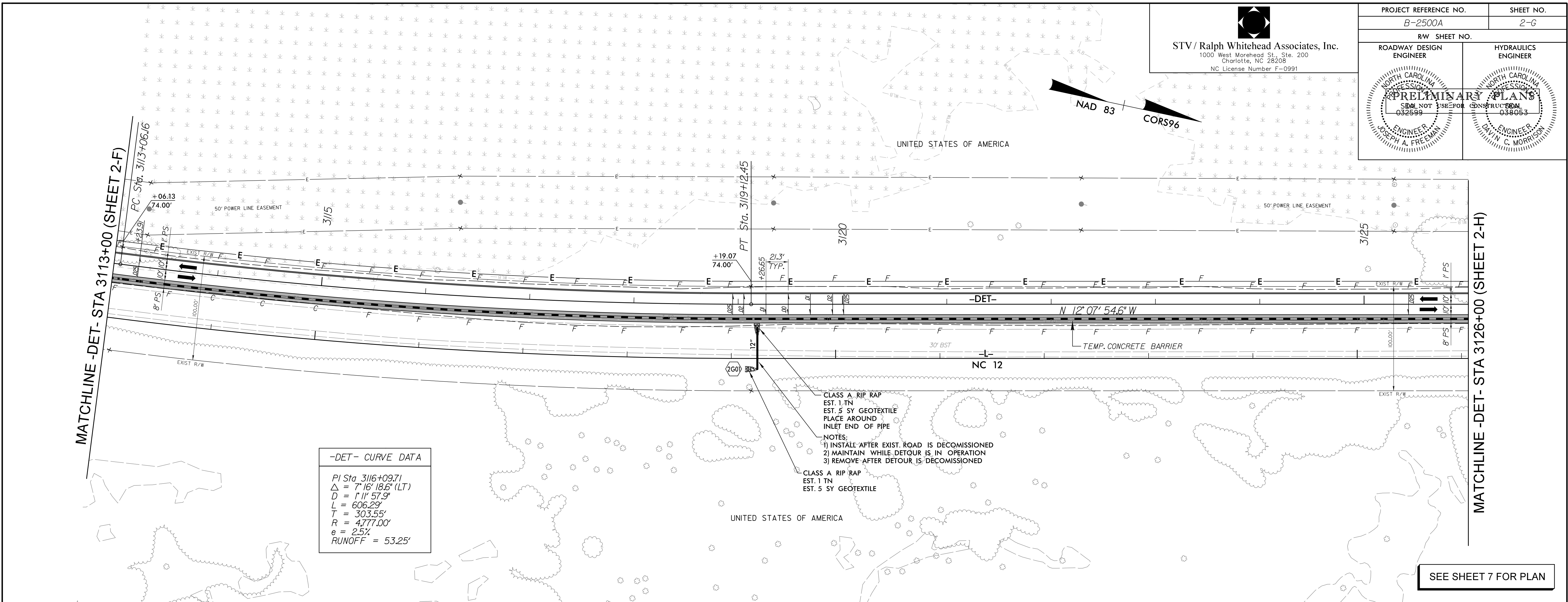


SEE SHEET 6 FOR PLAN



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 10/16/2012

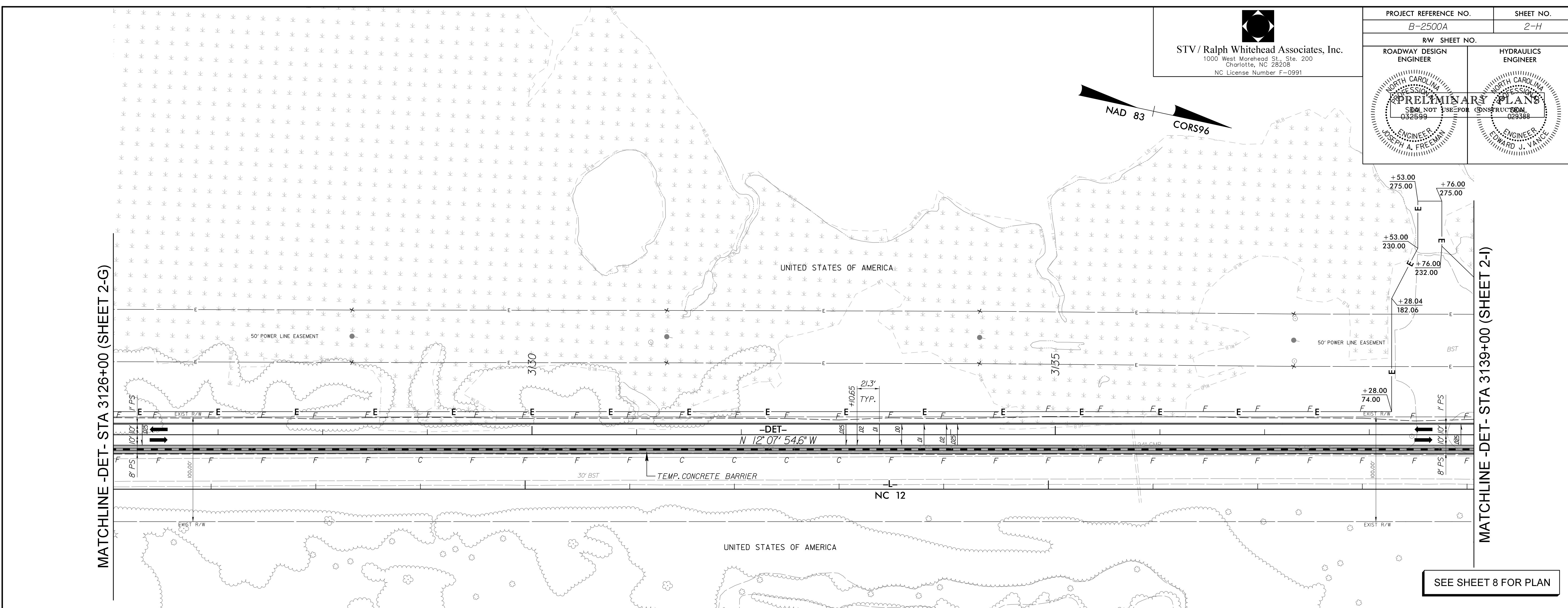
SEE SHEET 7 FOR PLAN

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 NC License Number F-0991

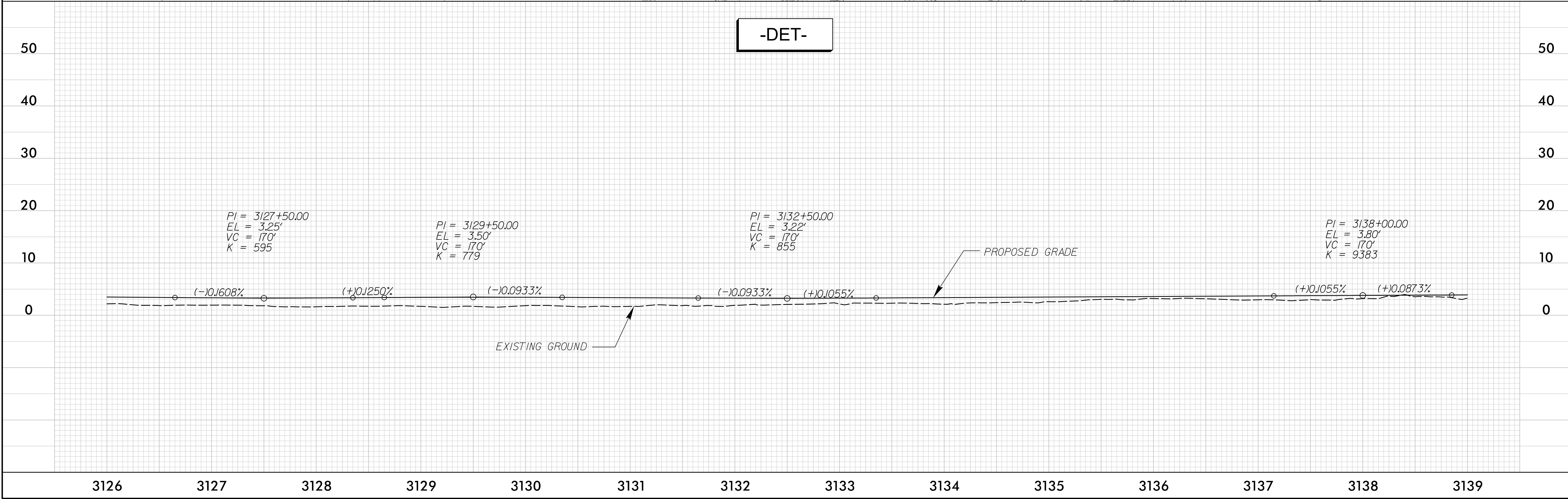
PROJECT REFERENCE NO. B-2500A	SHEET NO. 2-H
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS SHEET NOT FOR CONSTRUCTION 032599	PRELIMINARY PLANS SHEET NOT FOR CONSTRUCTION 029388
ENGINEER JOSEPH A. FREEMAN	ENGINEER EDWARD J. VANCE

MATCHLINE -DET- STA 3126+00 (SHEET 2-G)

MATCHLINE -DET- STA 3139+00 (SHEET 2-I)



SEE SHEET 8 FOR PLAN



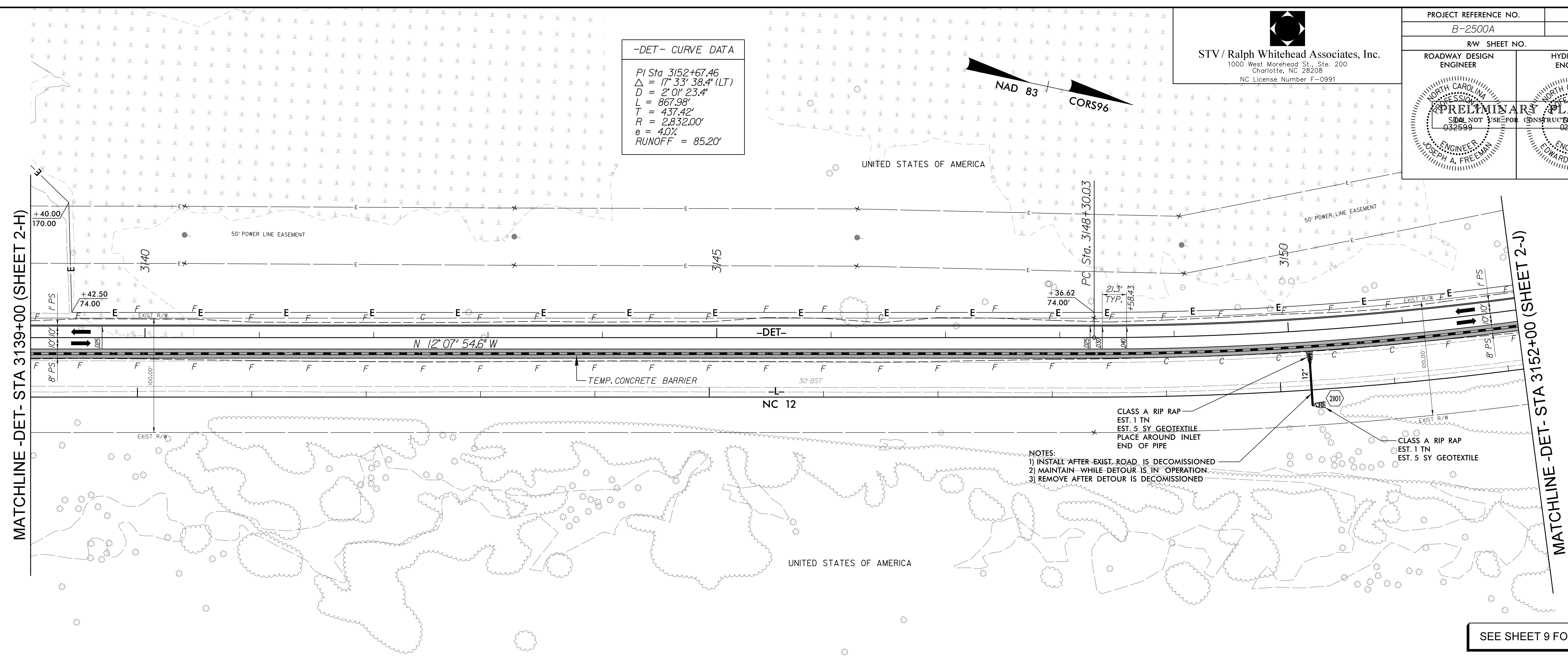
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 11/20/2012



PROJECT REFERENCE NO. B-2500A	SHEET NO. 2-1
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

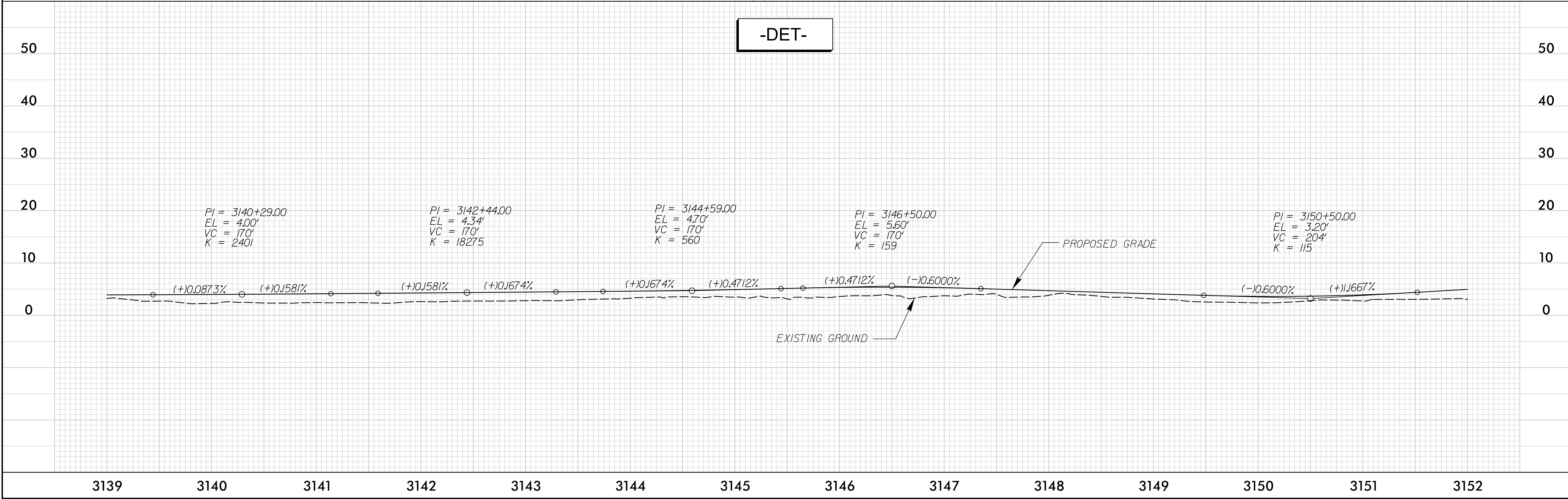
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Charlotte, NC 28208  
NC License Number F-0991

**-DET- CURVE DATA**  
 PI Sta 3152+67.46  
 $\Delta = 17^{\circ} 53' 38.4" (LT)$   
 $D = 2101.234'$   
 $L = 867.98'$   
 $T = 437.42'$   
 $R = 2,832.00'$   
 $e = 4.0\%$   
 RUNOFF = 85.20'



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

SEE SHEET 9 FOR PLAN



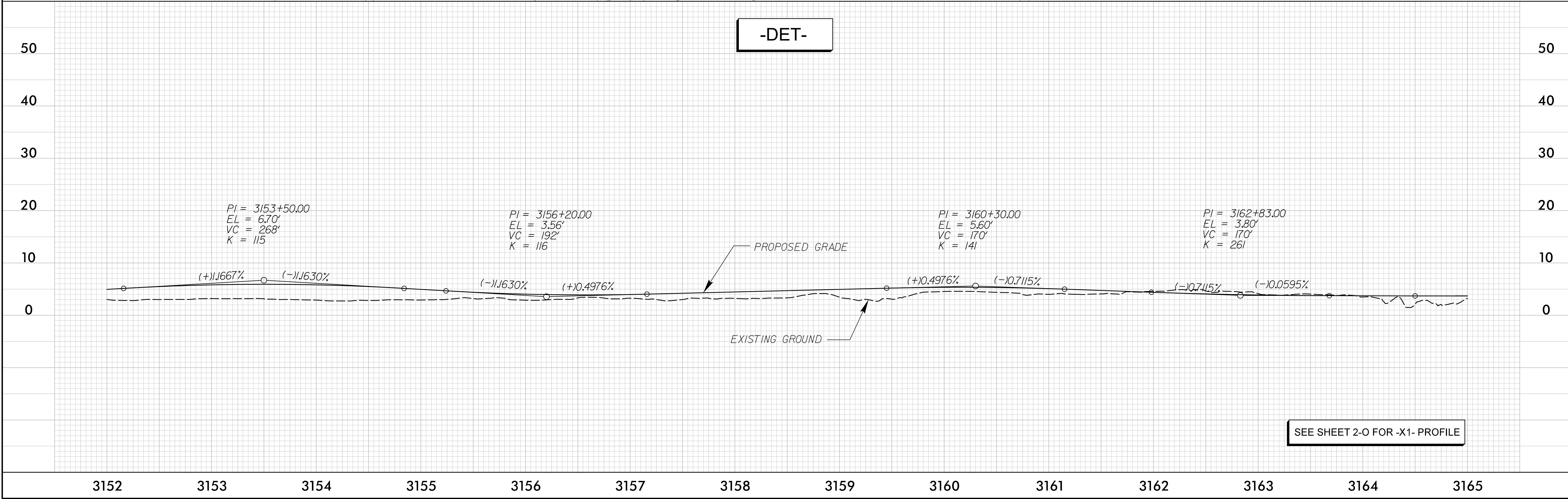
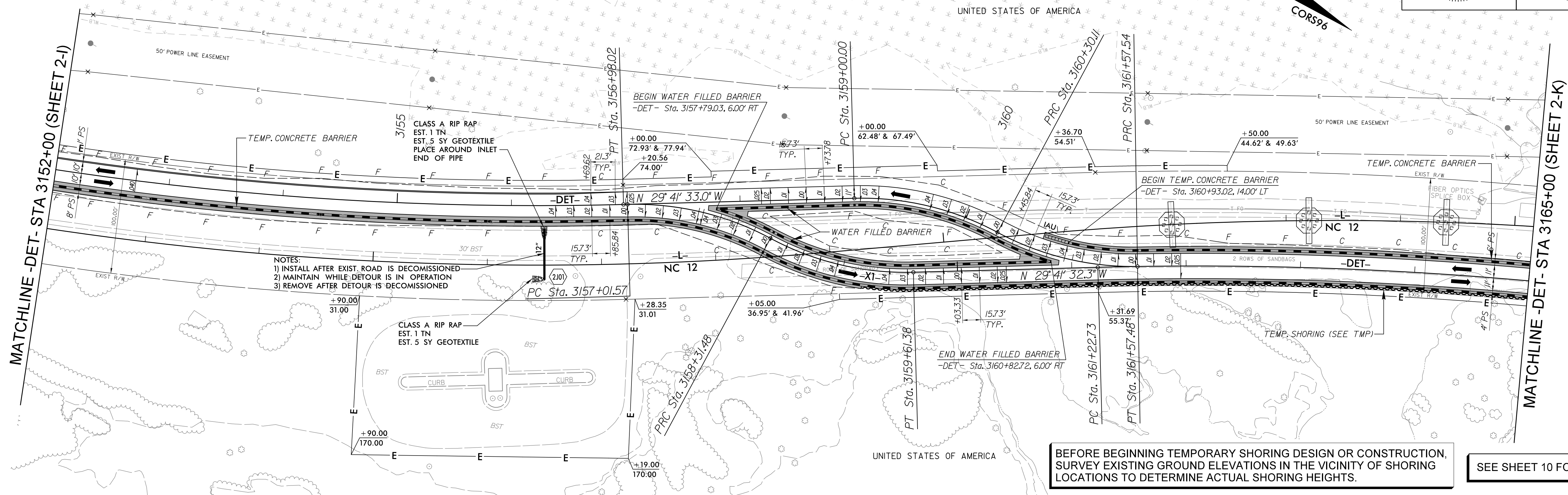
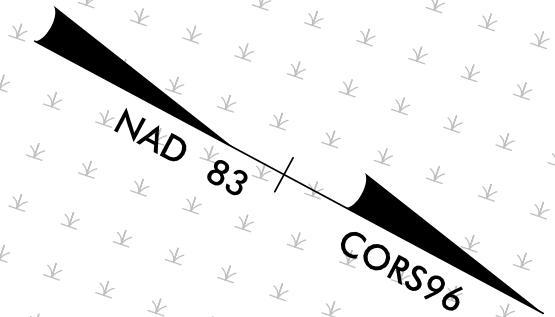
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 11/20/2012

-DET- CURVE DATA			
PI Sta 3152+67.46	PI Sta 3159+66.56	PI Sta 3160+95.24	PI Sta 3164+05.24
$\Delta = 17^{\circ} 33' 38.4"$ (LT)	$\Delta = 29^{\circ} 49' 07.6"$ (RT)	$\Delta = 29^{\circ} 12' 15.4"$ (LT)	$\Delta = 8^{\circ} 44' 28.2"$ (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'

-XI- CURVE DATA		
PI Sta 3157+68.03	PI Sta 3158+97.93	PI Sta 3161+40.11
$\Delta = 29^{\circ} 46' 20.5"$ (RT)	$\Delta = 29^{\circ} 46' 19.7"$ (LT)	$\Delta = 0^{\circ} 36' 51.5"$ (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'

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PROJECT REFERENCE NO. B-2500A	SHEET NO. 2-J
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
SOLID NOT TO BE FOR CONSTRUCTION	
ENGINEER JOSEPH A. FREEMAN 032599	ENGINEER EDWARD J. YANCEY 029388



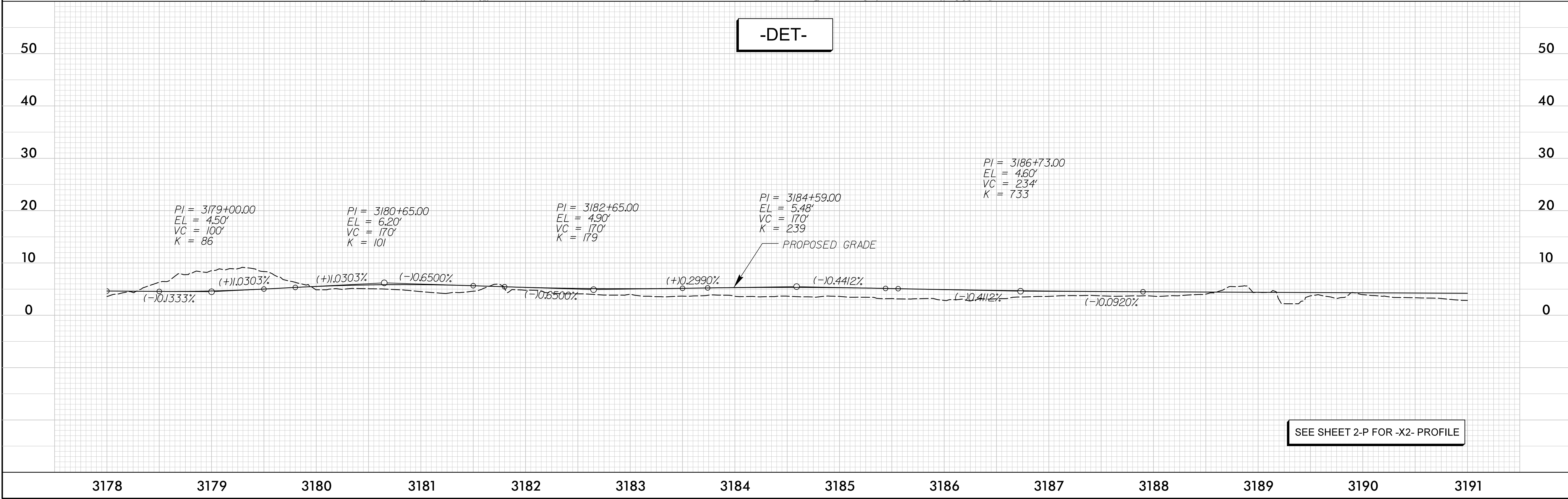
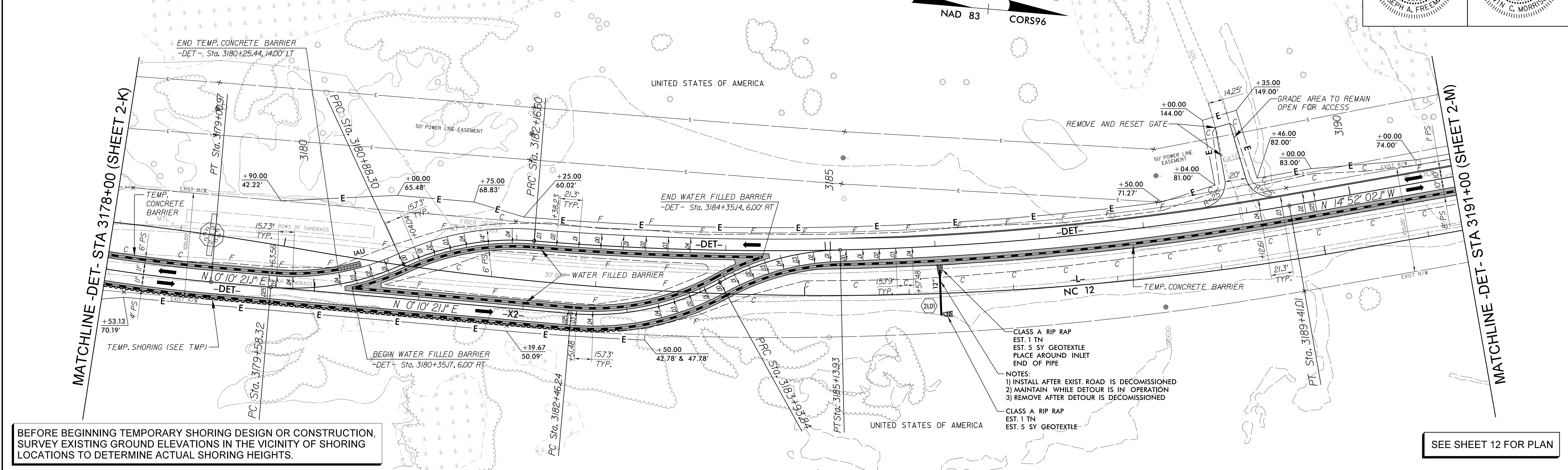
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 11/20/2012



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Charlotte, NC 28208  
NC License Number F-0991

-DET- CURVE DATA			
PI Sta 3178+10.07 Δ = 6° 57' 10.3" (LT) D = 3° 49' 11.0" L = 182.03' T = 91.12' R = 1,500.00' e = 2.5% RUNOFF = 39.33'	PI Sta 3180+24.82 Δ = 29° 47' 20.0" (LT) D = 22° 55' 05.9" L = 129.98' T = 66.49' R = 250.00' e = 4.0% RUNOFF = 62.92'	PI Sta 3181+53.90 Δ = 29° 24' 17.8" (RT) D = 22° 55' 05.9" L = 128.30' T = 65.60' R = 250.00' e = 4.0% RUNOFF = 62.92'	PI Sta 3185+80.79 Δ = 14° 39' 21.0" (LT) D = 2° 01' 23.4" L = 72.40' T = 36.419' R = 2,832.00' e = 4.0% RUNOFF = 85.20'

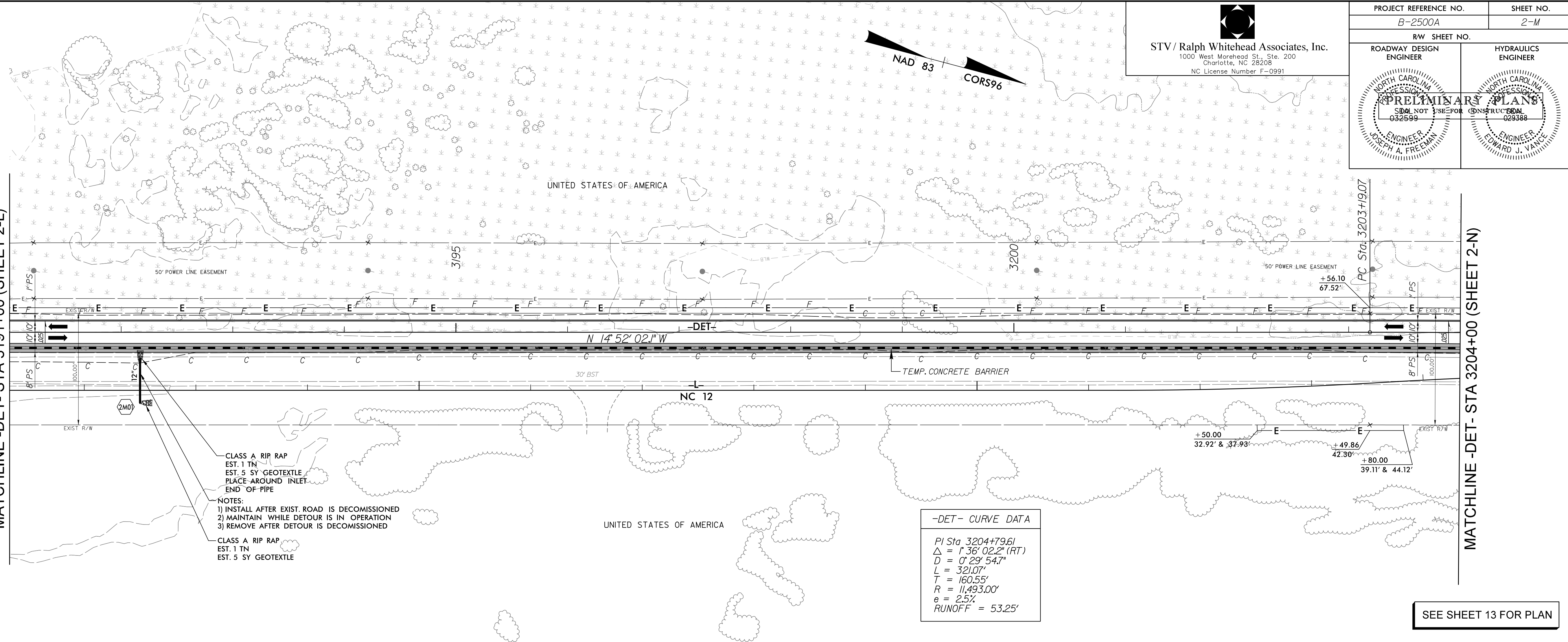
-X2- CURVE DATA	
PI Sta 3183+22.26 Δ = 33° 49' 43.7" (LT) D = 22° 55' 05.9" L = 147.61' T = 76.02' R = 250.00' e = 4.0% RUNOFF = 62.92'	PI Sta 3184+55.07 Δ = 27° 31' 22.1" (RT) D = 22° 55' 05.9" L = 120.09' T = 61.23' R = 250.00' e = 4.0% RUNOFF = 62.92'



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 11/8/2012

MATCHLINE -DET- STA 3191+00 (SHEET 2-L)

MATCHLINE -DET- STA 3204+00 (SHEET 2-N)



CLASS A RIP RAP  
 EST. 1 TN  
 EST. 5 SY GEOTEXTILE  
 PLACE AROUND INLET  
 END OF PIPE

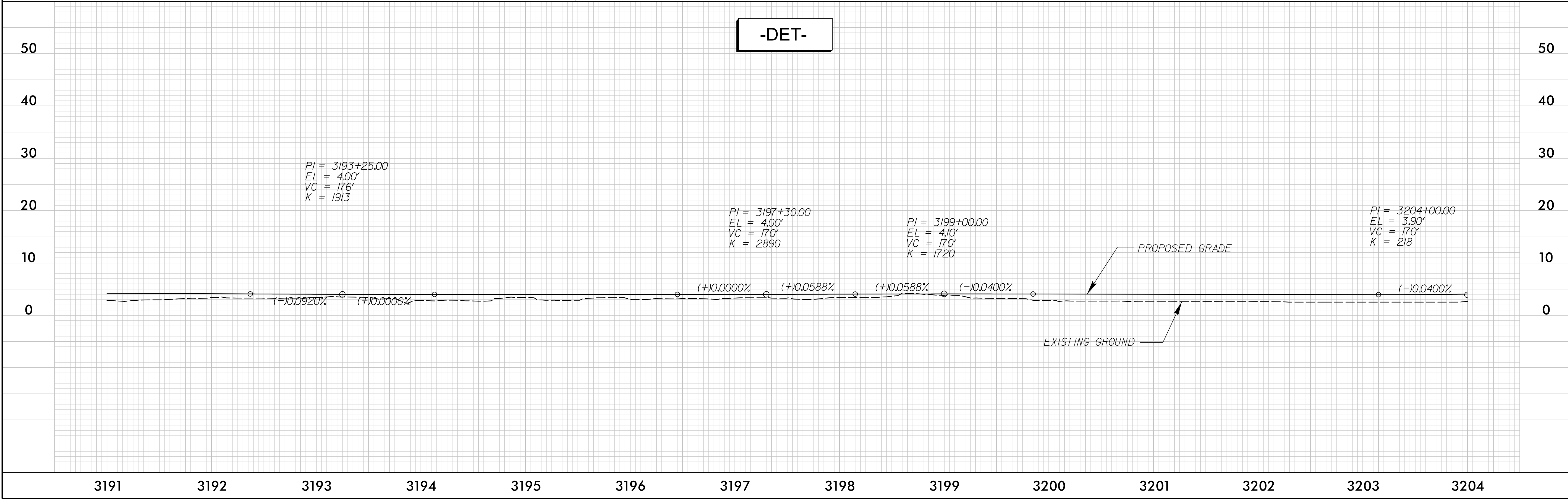
NOTES:  
 1) INSTALL AFTER EXIST. ROAD IS DECOMMISSIONED  
 2) MAINTAIN WHILE DETOUR IS IN OPERATION  
 3) REMOVE AFTER DETOUR IS DECOMMISSIONED

CLASS A RIP RAP  
 EST. 1 TN  
 EST. 5 SY GEOTEXTILE

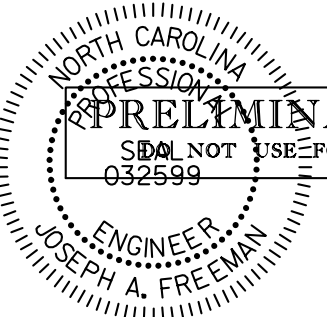
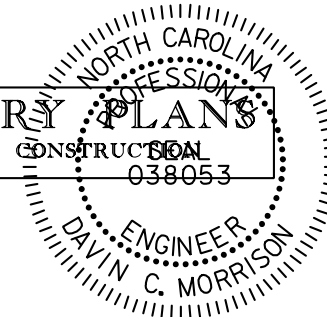
**-DET- CURVE DATA**

PI Sta 3204+79.61  
 $\Delta = 136^{\circ} 02.2' (RT)$   
 $D = 0^{\circ} 29' 54.7''$   
 $L = 321.07'$   
 $T = 160.55'$   
 $R = 11,493.00'$   
 $e = 2.5\%$   
 $RUNOFF = 53.25'$

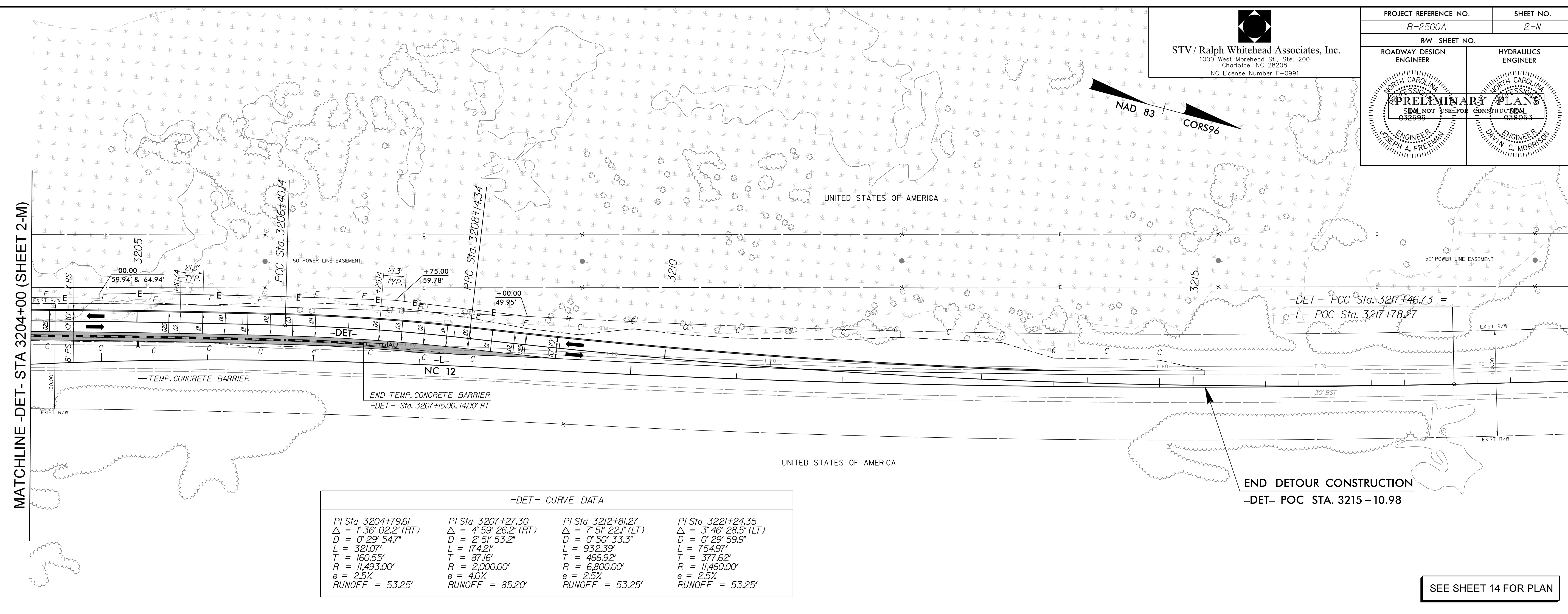
SEE SHEET 13 FOR PLAN



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 Charlotte, NC 28208  
 NC License Number F-0991

PROJECT REFERENCE NO. B-2500A	SHEET NO. 2-N
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
	

MATCHLINE -DET- STA 3204+00 (SHEET 2-M)

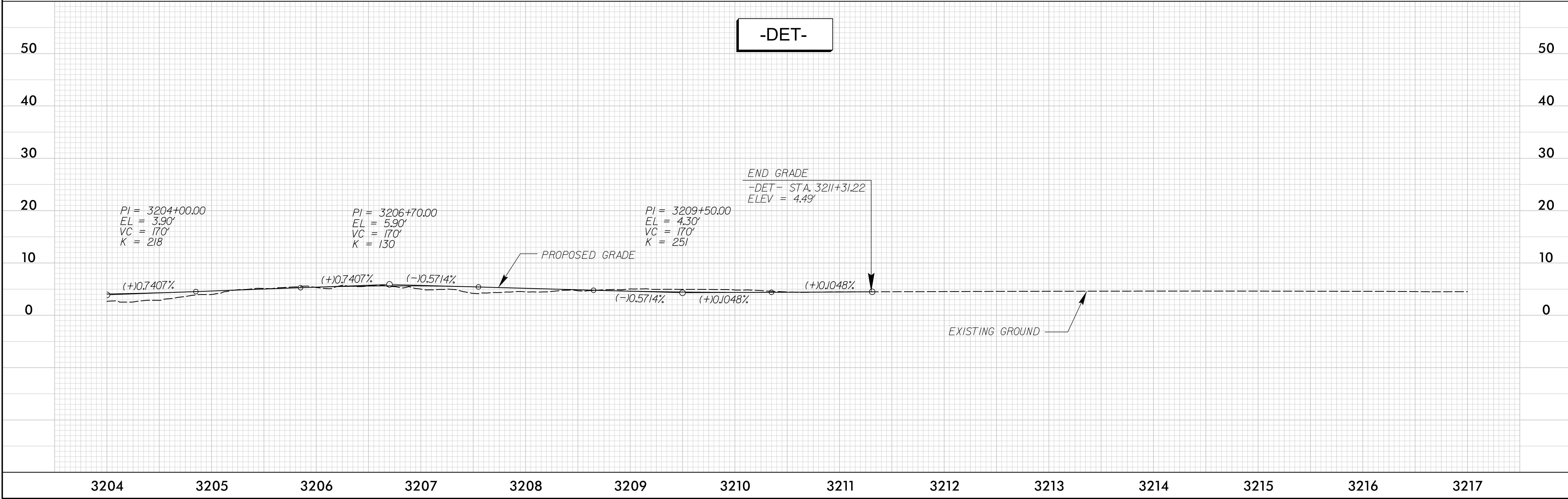


-DET- CURVE DATA

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'	PI Sta 3207+27.30 Δ = 4° 59' 26.2" (RT) D = 2' 51' 53.2" L = 174.21' T = 87.16' R = 2,000.00' e = 4.0% RUNOFF = 85.20'	PI Sta 3212+81.27 Δ = 7° 51' 22.1" (LT) D = 0' 50' 33.3" L = 932.39' T = 466.92' R = 6,800.00' e = 2.5% RUNOFF = 53.25'	PI Sta 3221+24.35 Δ = 3° 46' 28.5" (LT) D = 0' 29' 59.9" L = 754.97' T = 377.62' R = 11,460.00' e = 2.5% RUNOFF = 53.25'
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SEE SHEET 14 FOR PLAN

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10/16/2012



**-X1- CURVE DATA**

PI Sta 3157+68.03 Δ = 29° 46' 20.5" (RT) D = 22' 55" 05.9" L = 129.91' T = 66.46' R = 250.00' e = 4.0% RUNOFF = 62.92%	PI Sta 3158+97.93 Δ = 29° 46' 19.7" (LT) D = 22' 55" 05.9" L = 129.91' T = 66.45' R = 250.00' e = 4.0% RUNOFF = 62.92%	PI Sta 3161+40.11 Δ = 0° 36' 51.5" (RT) D = 1' 46" 04.2" L = 34.75' T = 17.37' R = 3,241.00' e = 2.5% RUNOFF = 39.33%
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**-X3- CURVE DATA**

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

PROJECT REFERENCE NO. B-2500A SHEET NO. 2-0

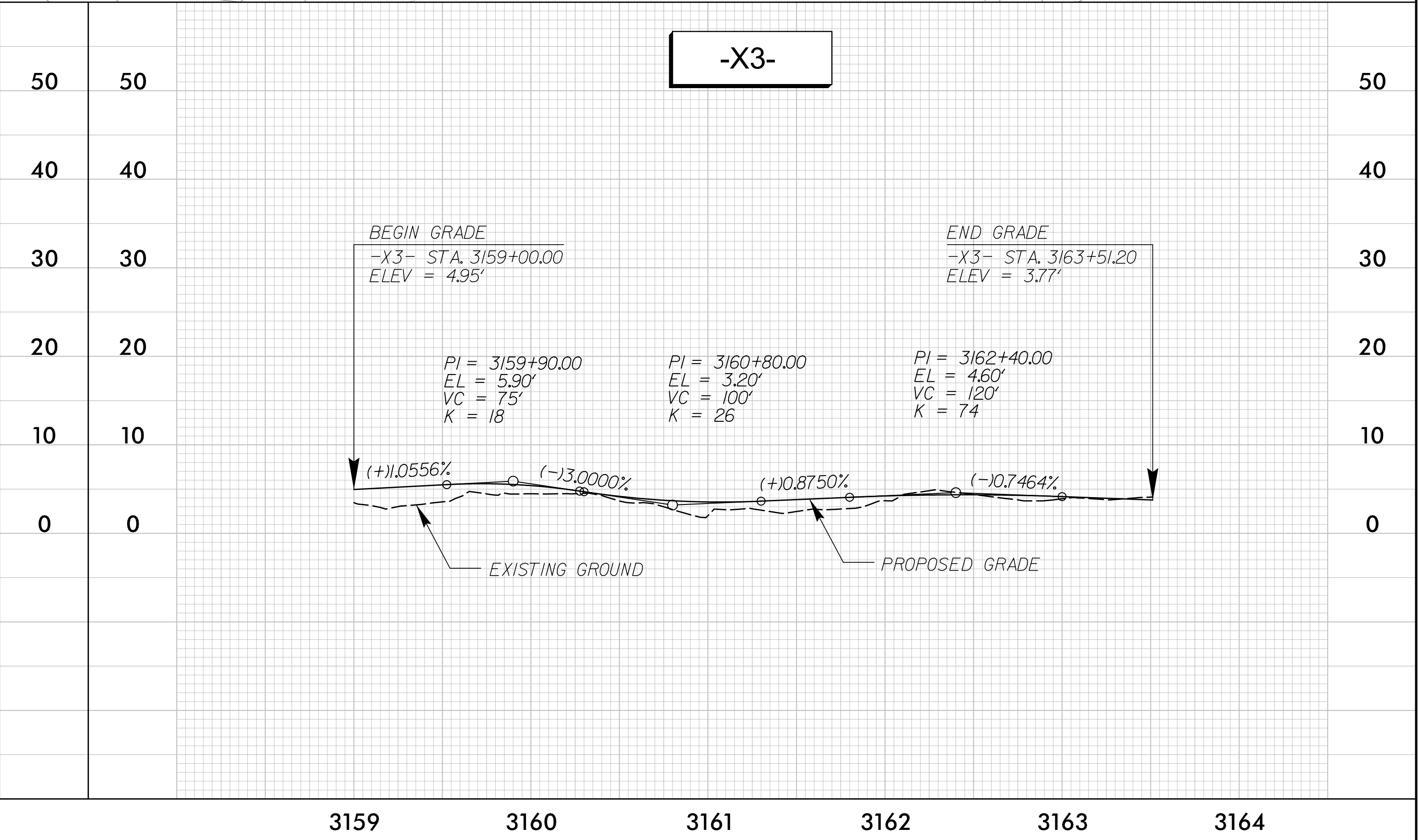
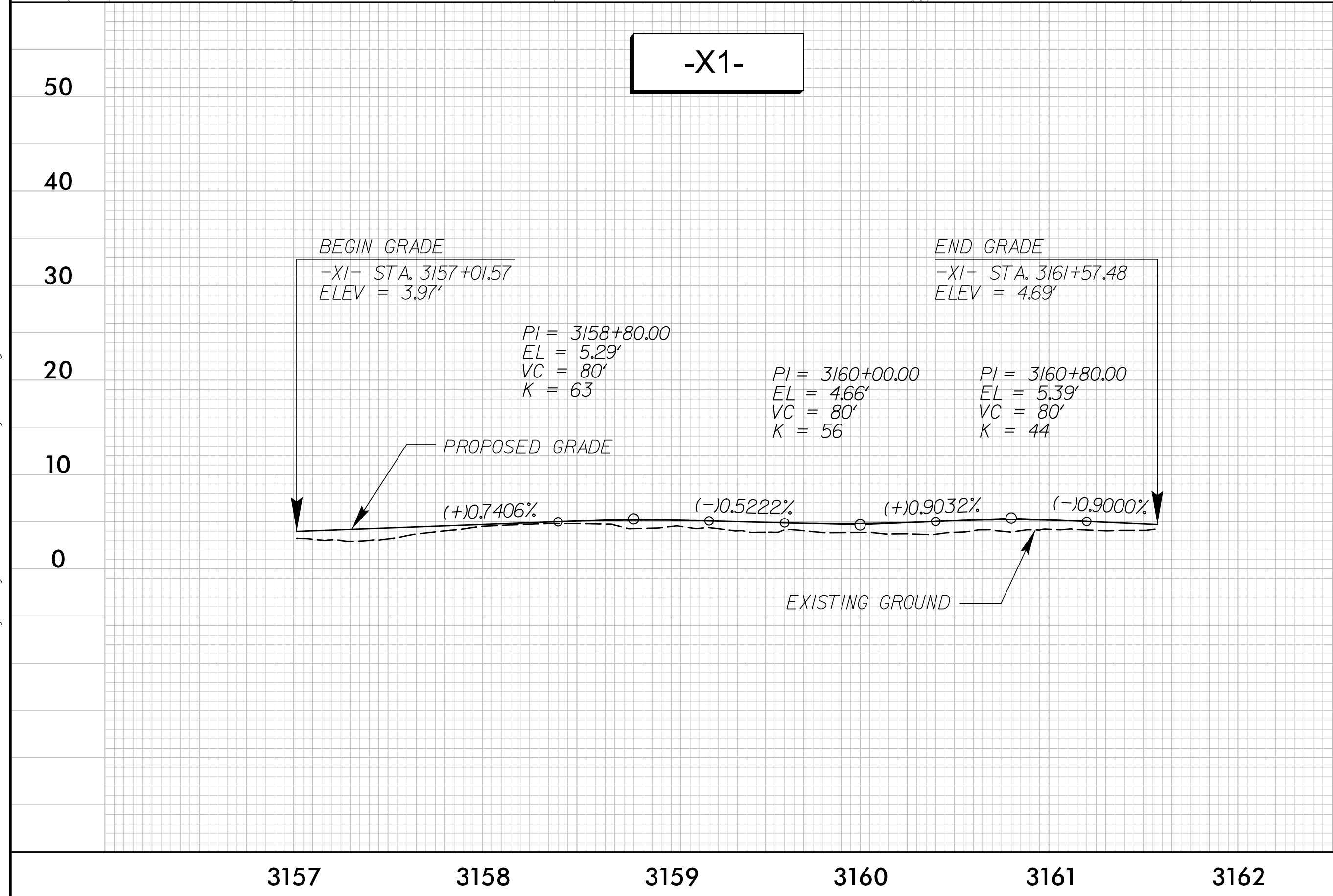
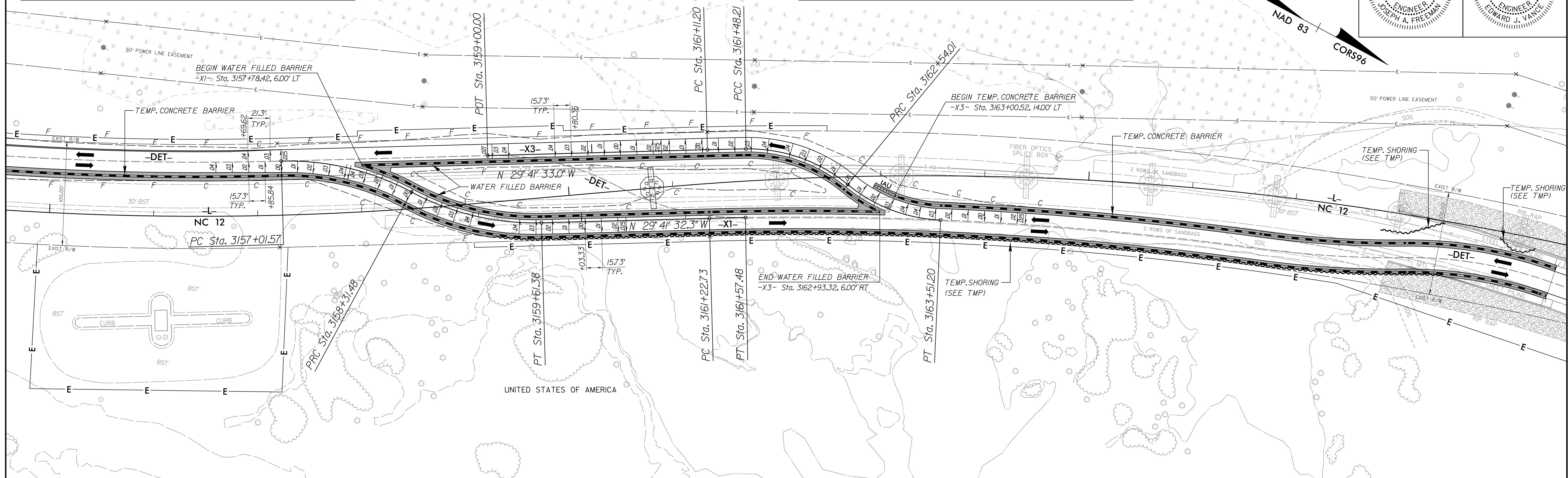
RW SHEET NO.

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Charlotte, NC 28208  
NC License Number F-0991

ROADWAY DESIGN ENGINEER  
HYDRAULICS ENGINEER

PRELIMINARY PLANS  
SEAL NOT FOR CONSTRUCTION  
032599 029388

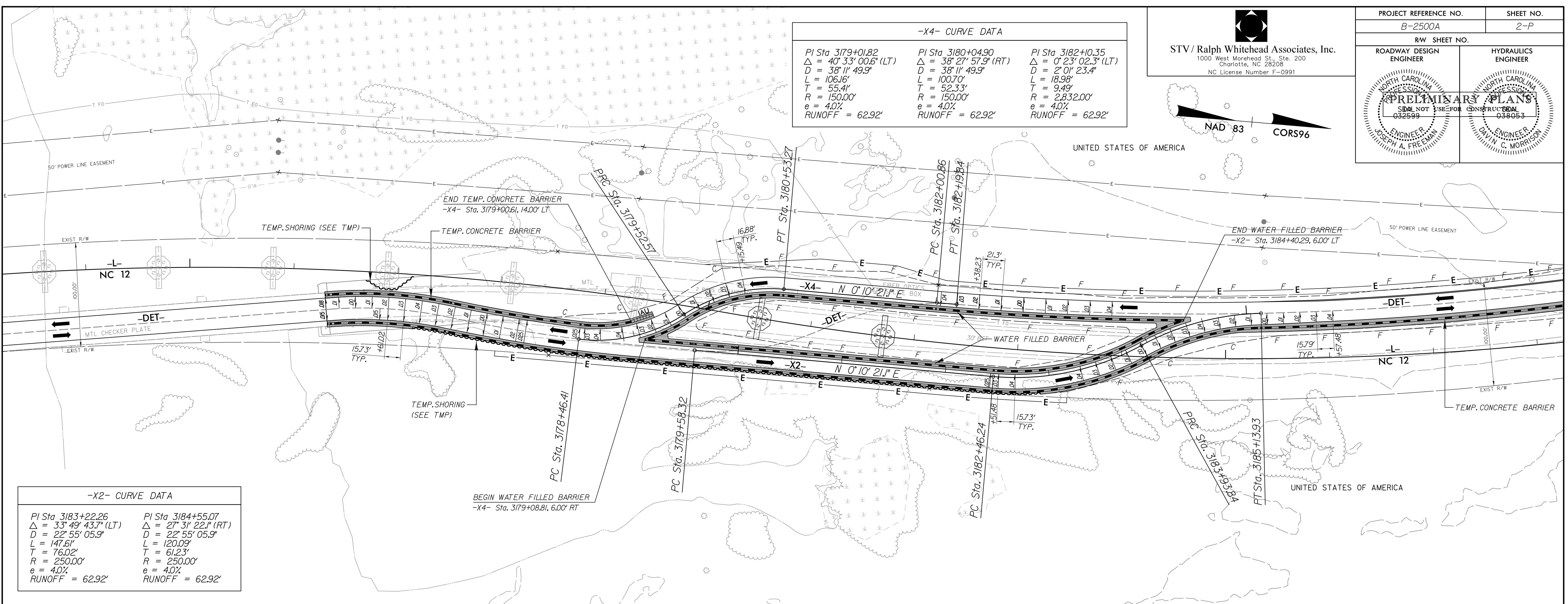
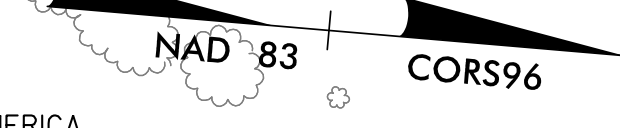
ENGINEER JOSEPH A. FREEMAN  
ENGINEER EDWARD J. VAN...



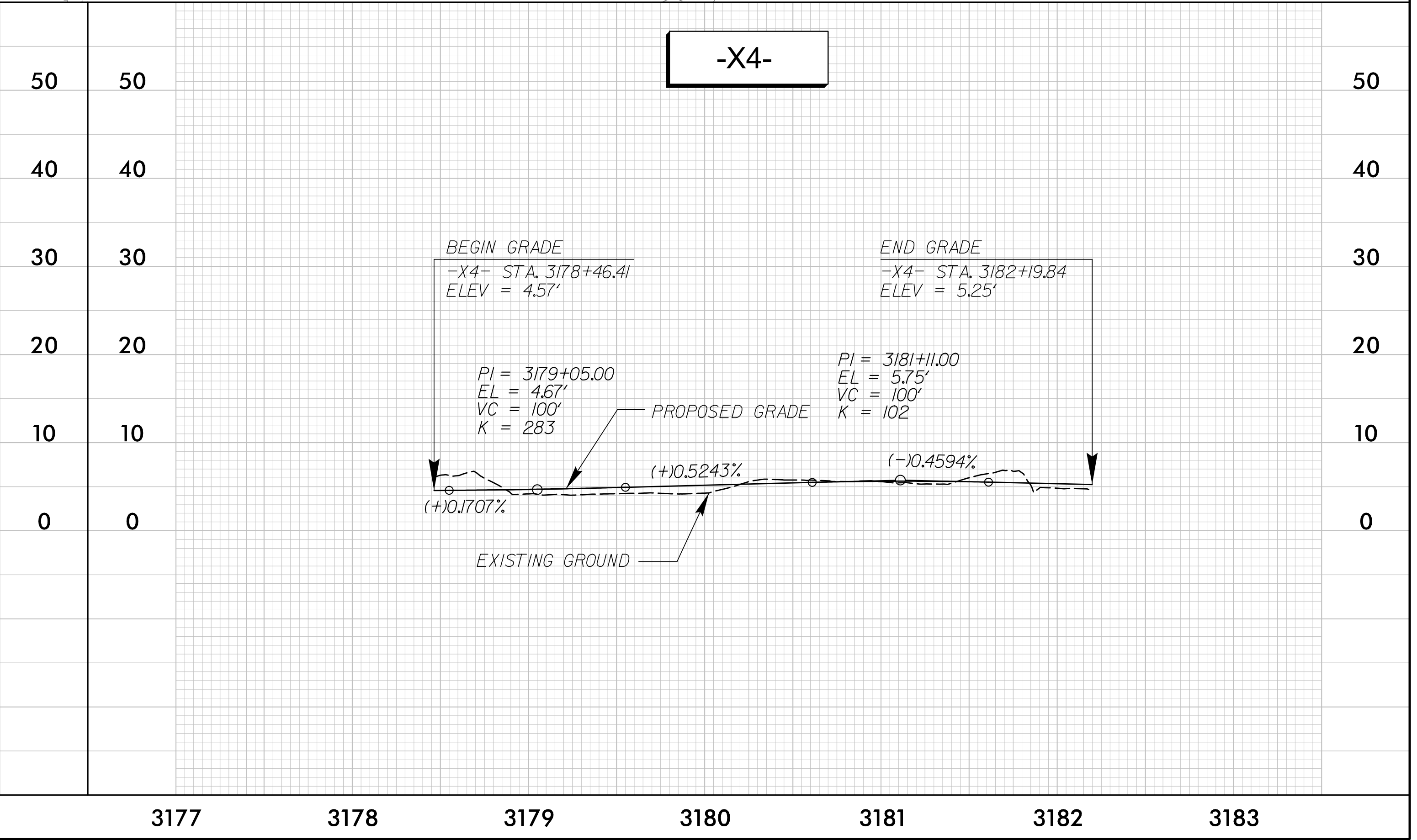
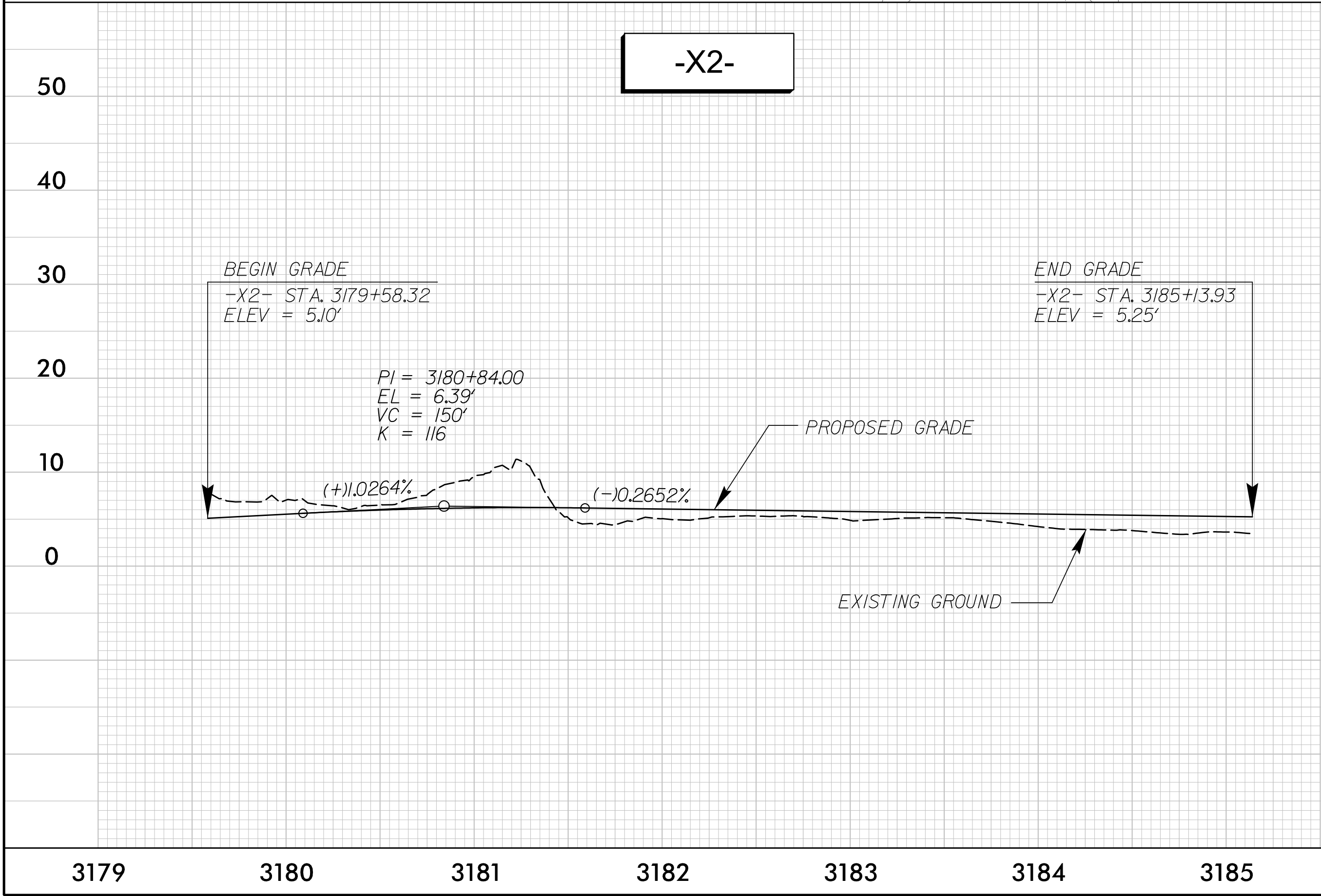
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11/20/2012

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 NC License Number F-0991

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



-X2- CURVE DATA	
PI Sta 3183+22.26 Δ = 33° 49' 43.7" (LT) D = 22° 55' 05.9" L = 147.61' T = 76.02' R = 250.00' e = 4.0% RUNOFF = 62.92'	PI Sta 3184+55.07 Δ = 27° 31' 22.1" (RT) D = 22° 55' 05.9" L = 120.09' T = 61.23' R = 250.00' e = 4.0% RUNOFF = 62.92'



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 10/16/2012



**-X3- CURVE DATA**

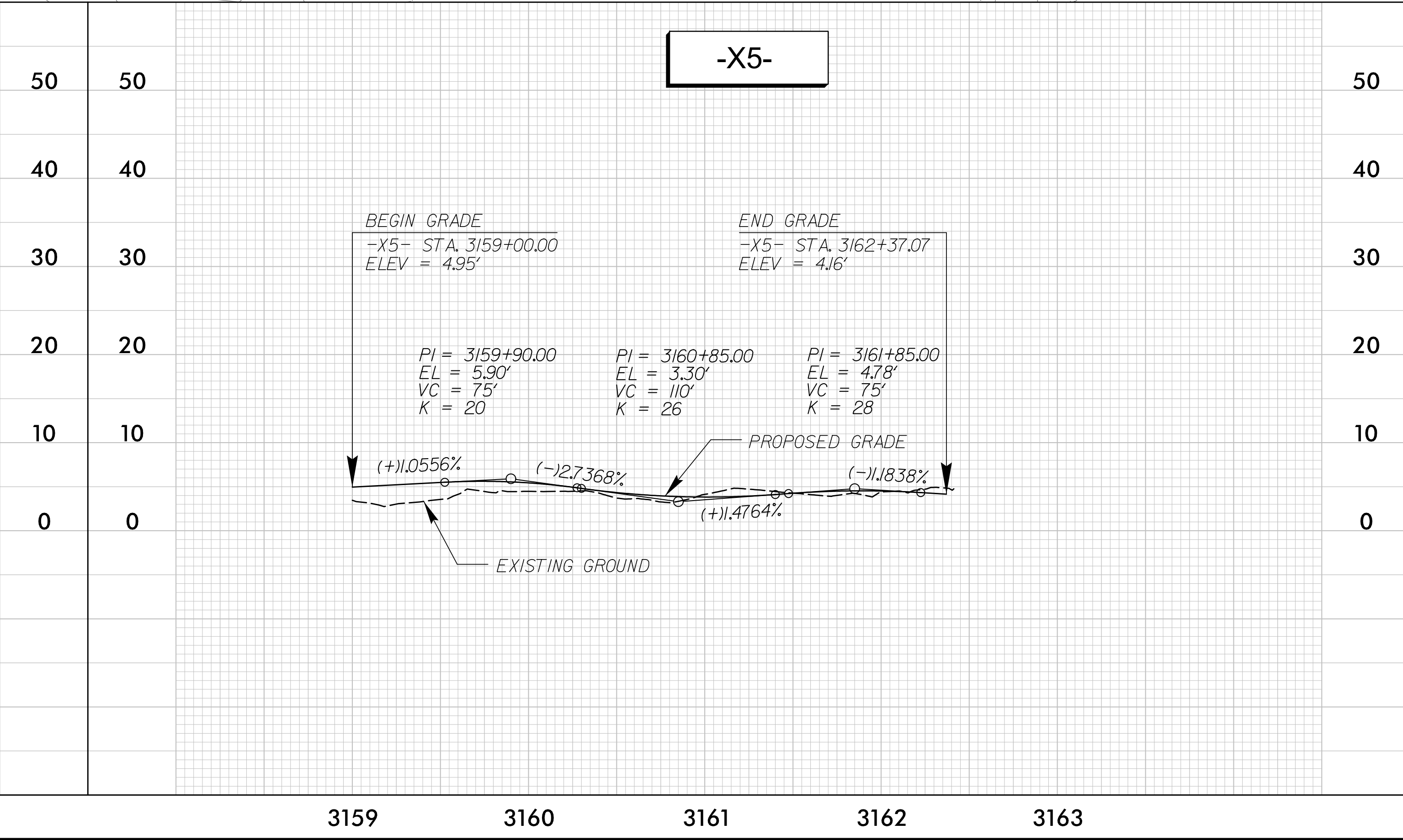
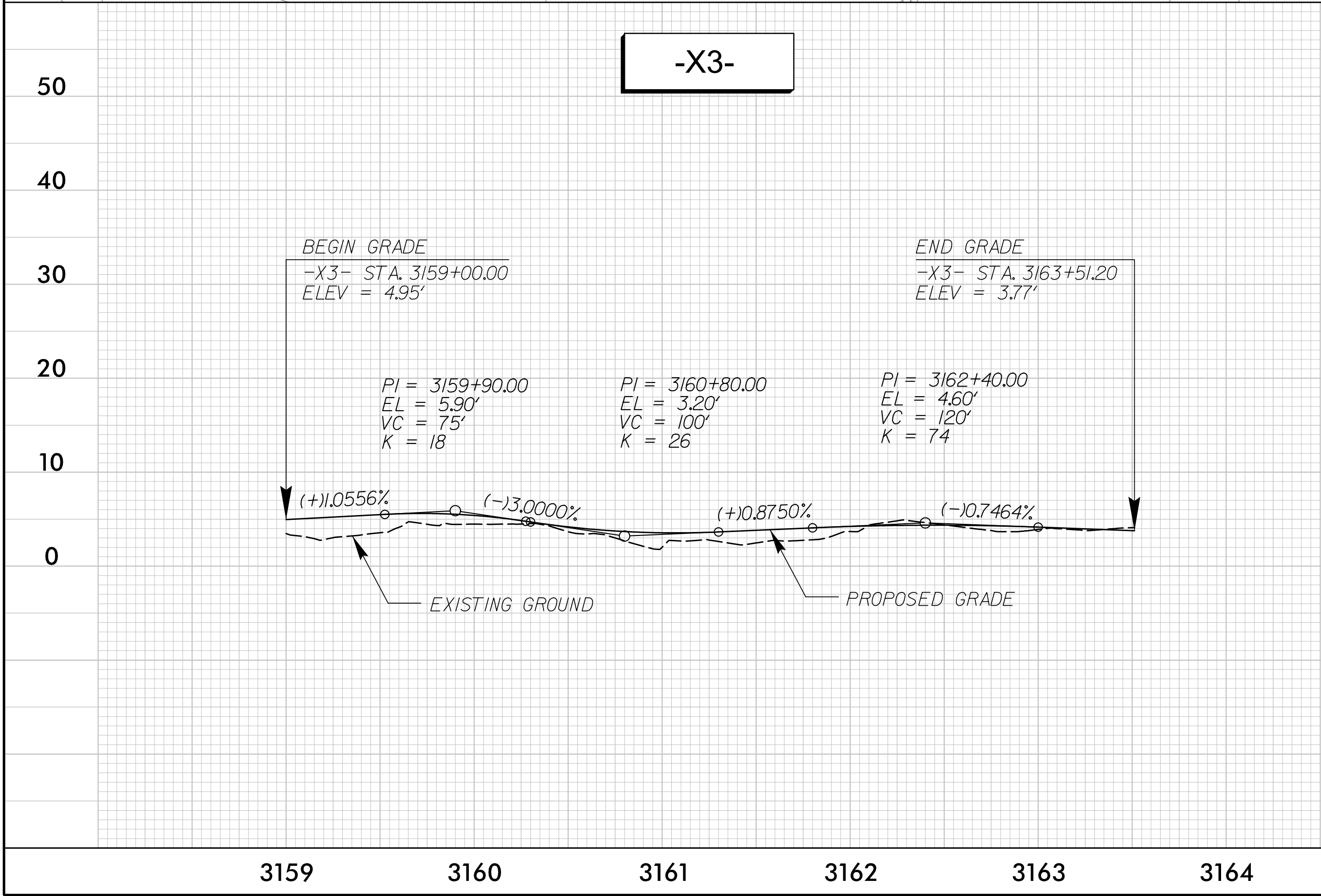
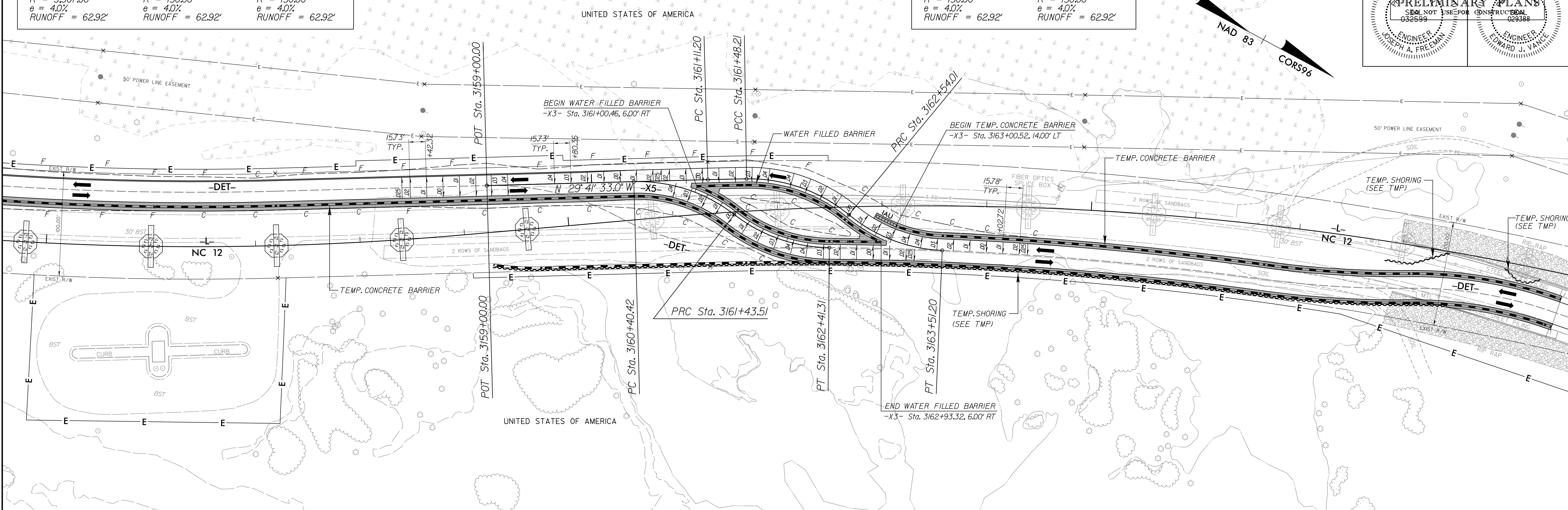
PI Sta 3161+29.70 Δ = 0° 38' 28.4" (RT) D = 1' 43' 57.2" L = 37.0' T = 18.5' R = 3,307.00' e = 4.0% RUNOFF = 62.92'	PI Sta 3162+03.42 Δ = 40° 24' 44.6" (RT) D = 38' 11' 49.9" L = 105.80' T = 55.2' R = 150.00' e = 4.0% RUNOFF = 62.92'	PI Sta 3163+04.38 Δ = 37° 07' 27.4" (LT) D = 38' 11' 49.9" L = 97.19' T = 50.37' R = 150.00' e = 4.0% RUNOFF = 62.92'
--	--	--

**-X5- CURVE DATA**

PI Sta 3160+94.10 Δ = 39° 22' 40.4" (RT) D = 38' 11' 49.9" L = 103.09' T = 53.68' R = 150.00' e = 4.0% RUNOFF = 62.92'	PI Sta 3161+94.22 Δ = 37° 21' 26.2" (LT) D = 38' 11' 49.9" L = 97.80' T = 50.71' R = 150.00' e = 4.0% RUNOFF = 62.92'
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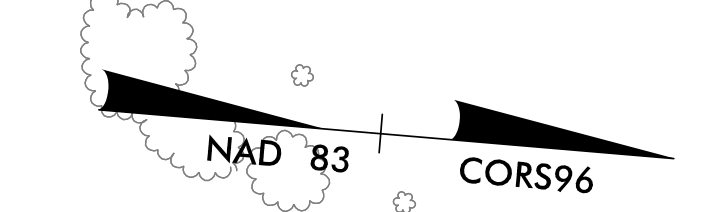
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1000 West Morehead St., Ste. 200  
Charlotte, NC 28208  
NC License Number F-0991

PROJECT REFERENCE NO. B-2500A	SHEET NO. 2-0
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b>	
SEAL NOT FOR CONSTRUCTION	SEAL NOT FOR CONSTRUCTION
ENGINEER JOSEPH A. FREEMAN 032599	ENGINEER EDWARD J. VAN... 029388

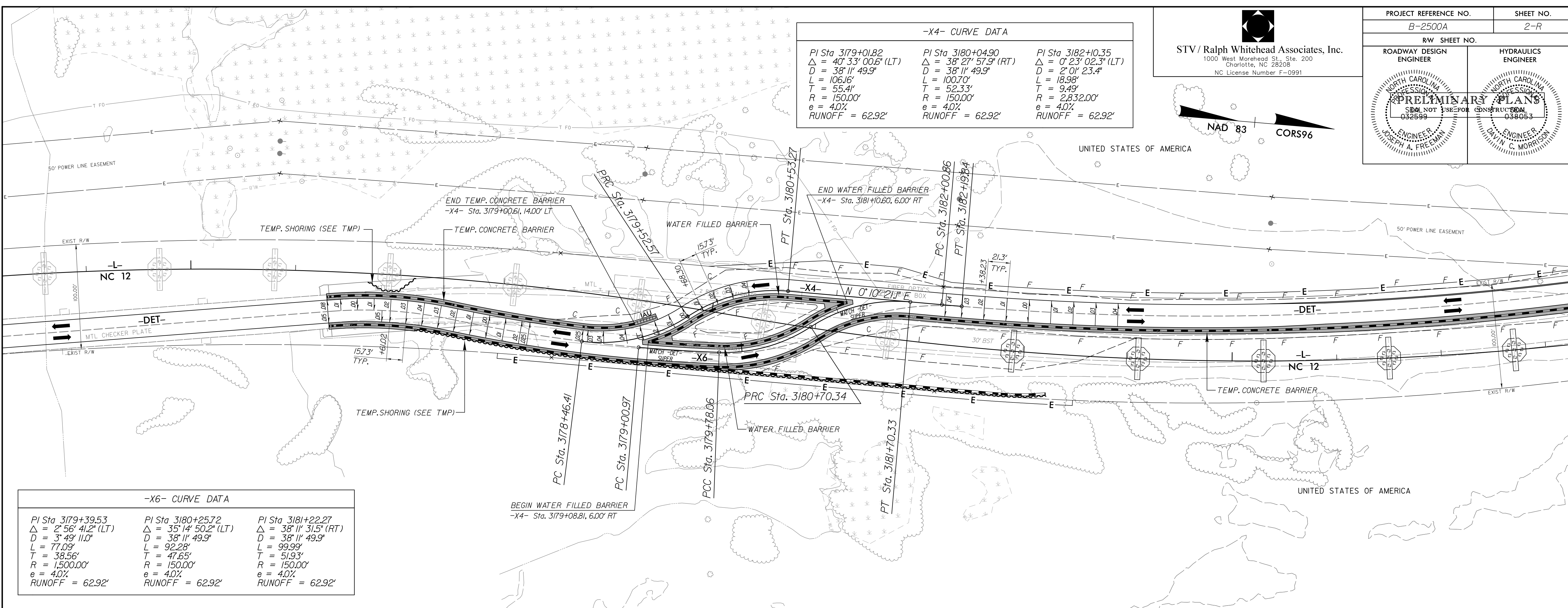


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 11/20/2012

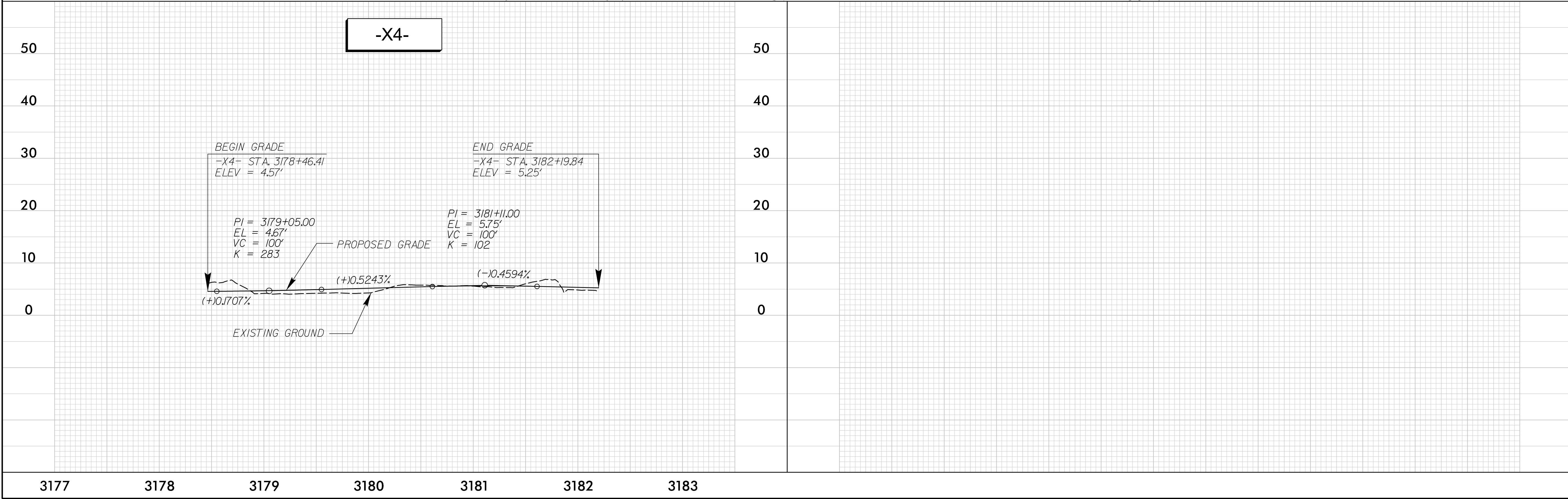
STV / Ralph Whitehead Associates, Inc.  
 1000 West Morehead St., Ste. 200  
 Charlotte, NC 28208  
 NC License Number F-0991



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



-X6- CURVE DATA		
PI Sta 3179+39.53 Δ = 2° 56' 41.2" (LT) D = 3' 49' 11.0" L = 77.09' T = 38.56' R = 1500.00' e = 4.0% RUNOFF = 62.92'	PI Sta 3180+25.72 Δ = 35° 14' 50.2" (LT) D = 38' 11" 49.9" L = 92.28' T = 47.65' R = 150.00' e = 4.0% RUNOFF = 62.92'	PI Sta 3181+22.27 Δ = 38° 11' 31.5" (RT) D = 38' 11" 49.9" L = 99.93' T = 51.93' R = 150.00' e = 4.0% RUNOFF = 62.92'



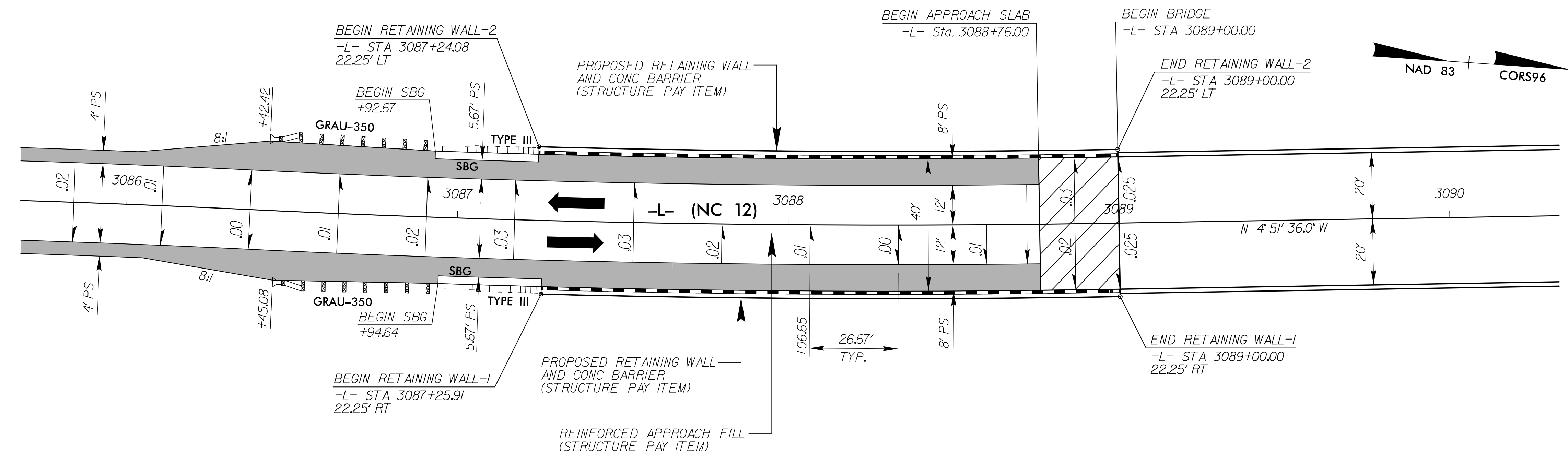
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 10/16/2012

# BRIDGE / PAVEMENT RELATIONSHIP SKETCH

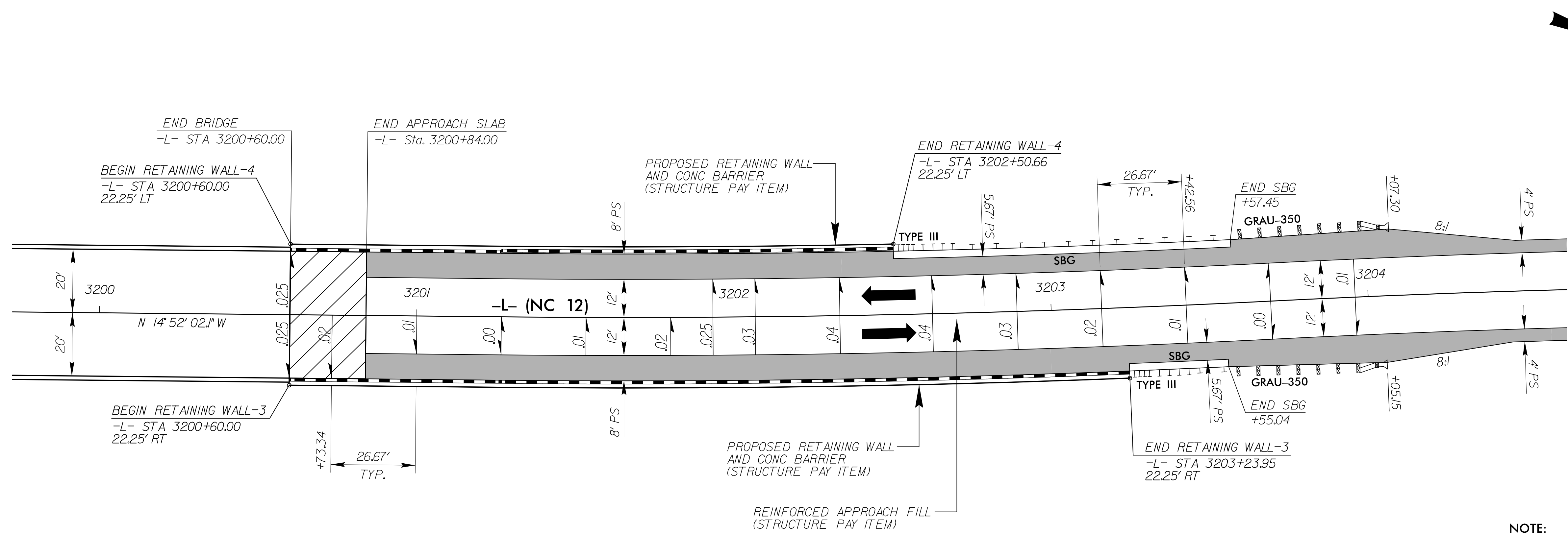
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GRAPHIC SCALE  
 20 10 0 20  
 PLAN HORZ.

PROJECT REFERENCE NO. B-2500A	SHEET NO. 2-S
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION 032599 ENGINEER JOSEPH A. FREEMAN	



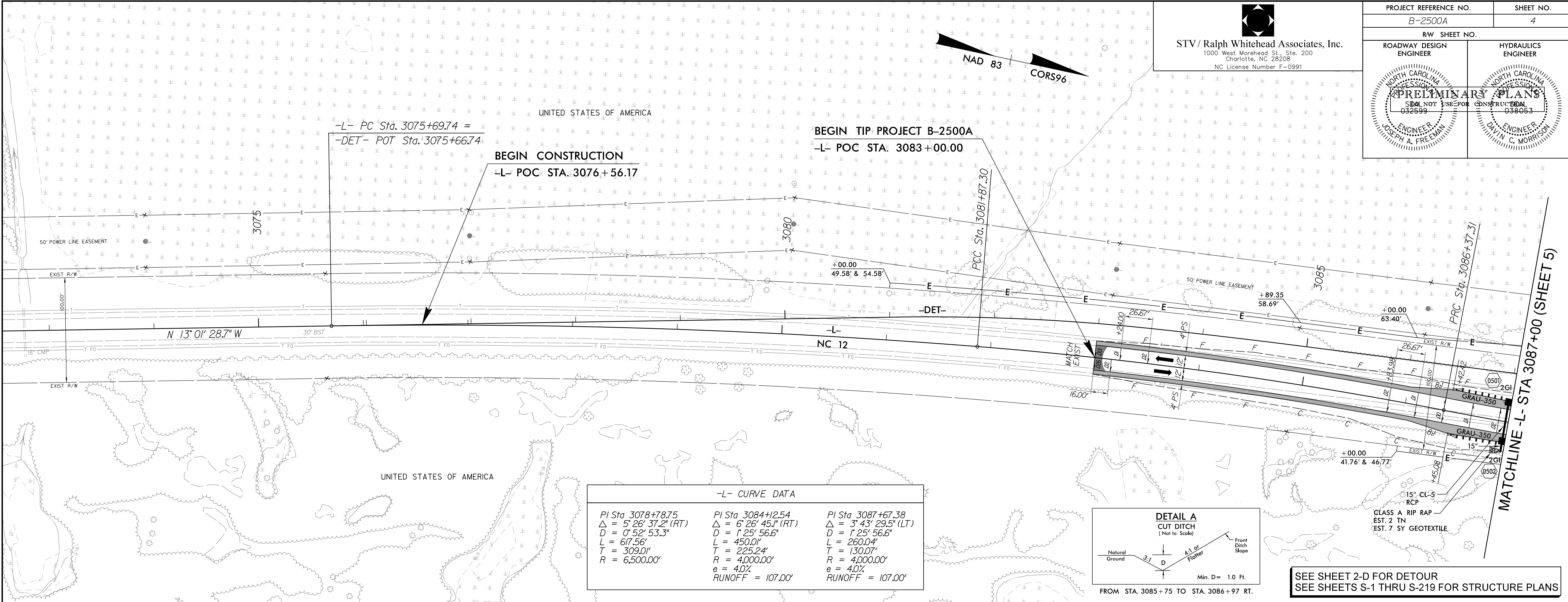
SEE SHEET 5 FOR PLAN



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

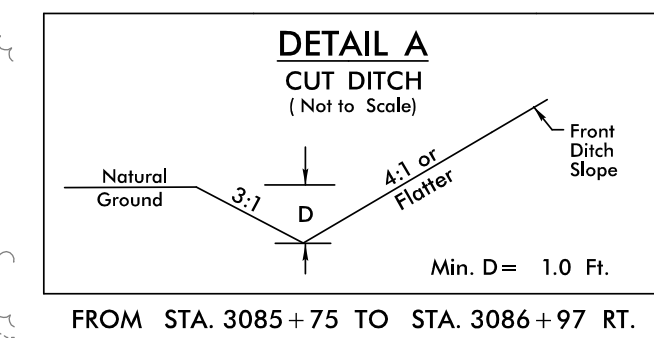
SEE SHEET 13 FOR PLAN

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 10/16/2012

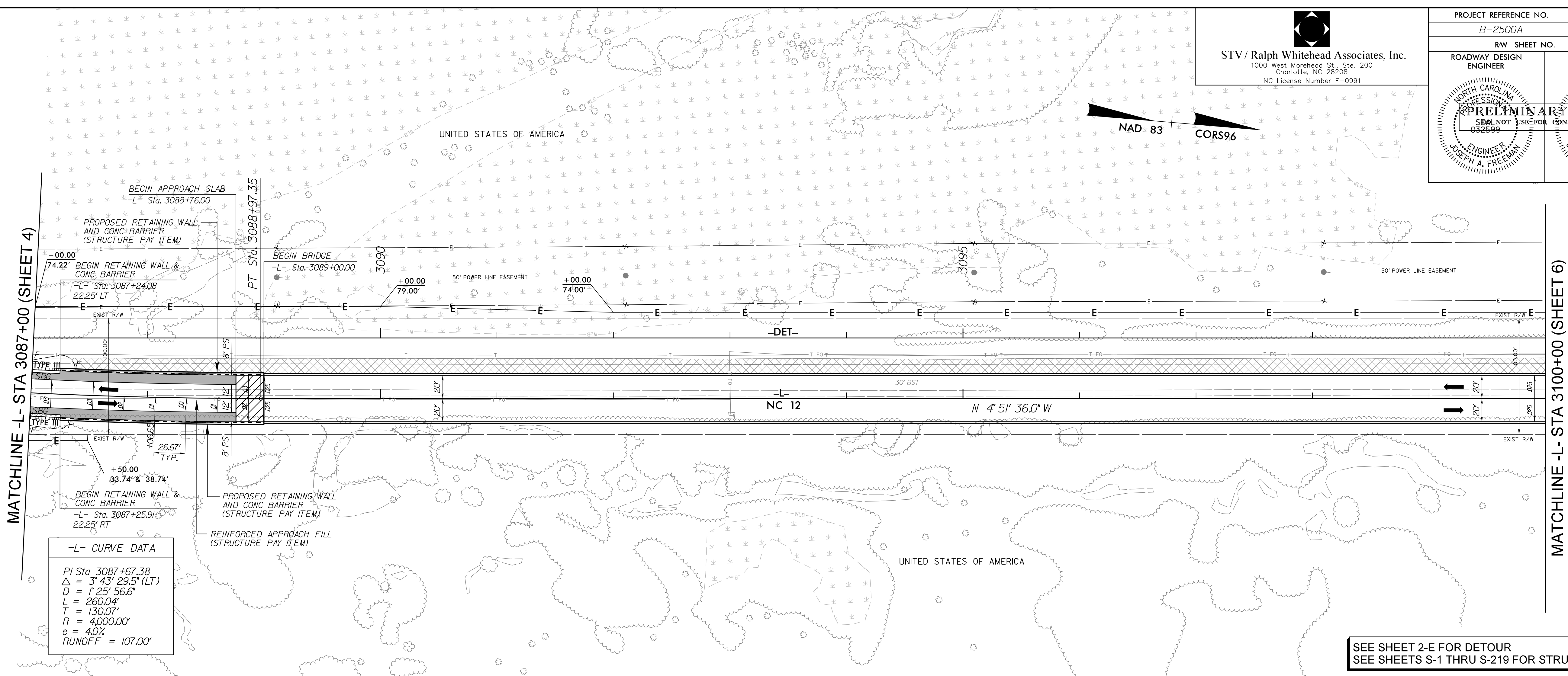


-L- CURVE DATA

<i>PI Sta. 3078+78.75</i> $\Delta = 5^{\circ} 28' 37.2"$ (RT) $D = 0^{\circ} 52' 53.3"$ $L = 617.56'$ $T = 309.01'$ $R = 6,500.00'$	<i>PI Sta. 3084+12.54</i> $\Delta = 6^{\circ} 26' 45.1"$ (RT) $D = 1^{\circ} 25' 56.6"$ $L = 450.01'$ $T = 225.24'$ $R = 4,000.00'$ $e = 4.0\%$ $RUNOFF = 107.00'$	<i>PI Sta. 3087+67.38</i> $\Delta = 3^{\circ} 43' 29.5"$ (LT) $D = 1^{\circ} 25' 56.6"$ $L = 260.04'$ $T = 130.07'$ $R = 4,000.00'$ $e = 4.0\%$ $RUNOFF = 107.00'$
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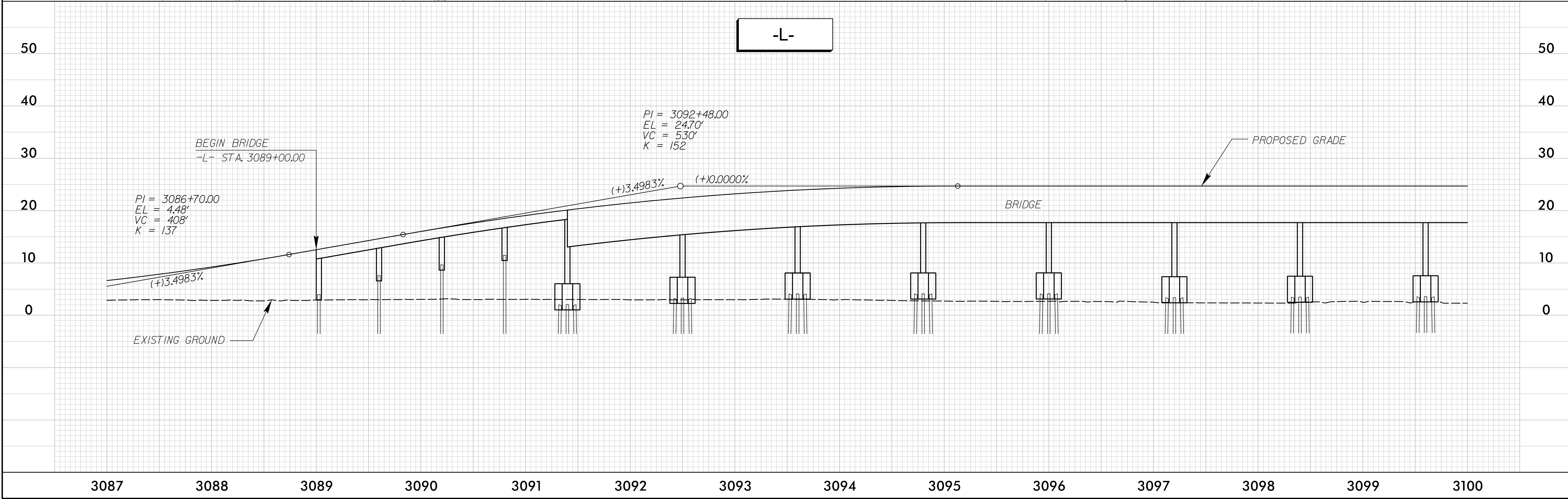
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 10/16/2012



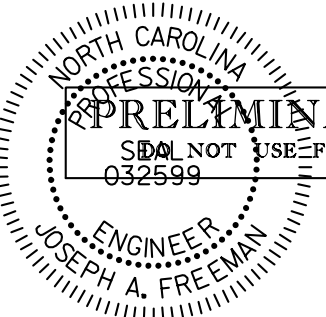
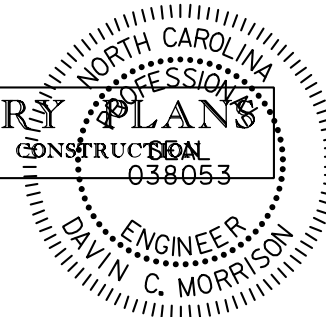
**-L- CURVE DATA**

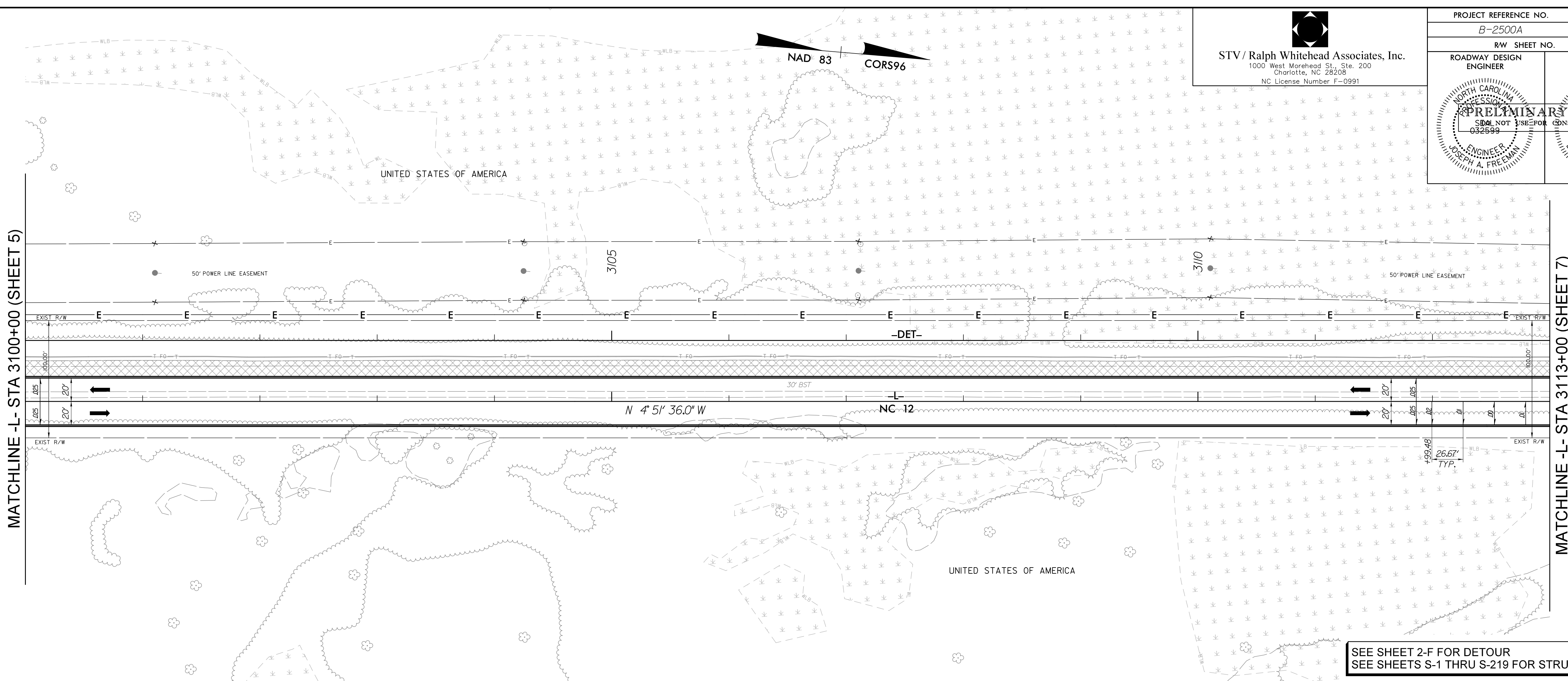
PI Sta. 3087+67.38  
 $\Delta = 3^\circ 43' 29.5" (LT)$   
 $D = 1^\circ 25' 56.6"$   
 $L = 260.04'$   
 $T = 130.07'$   
 $R = 4000.00'$   
 $e = 4.0\%$   
 $RUNOFF = 107.00'$

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



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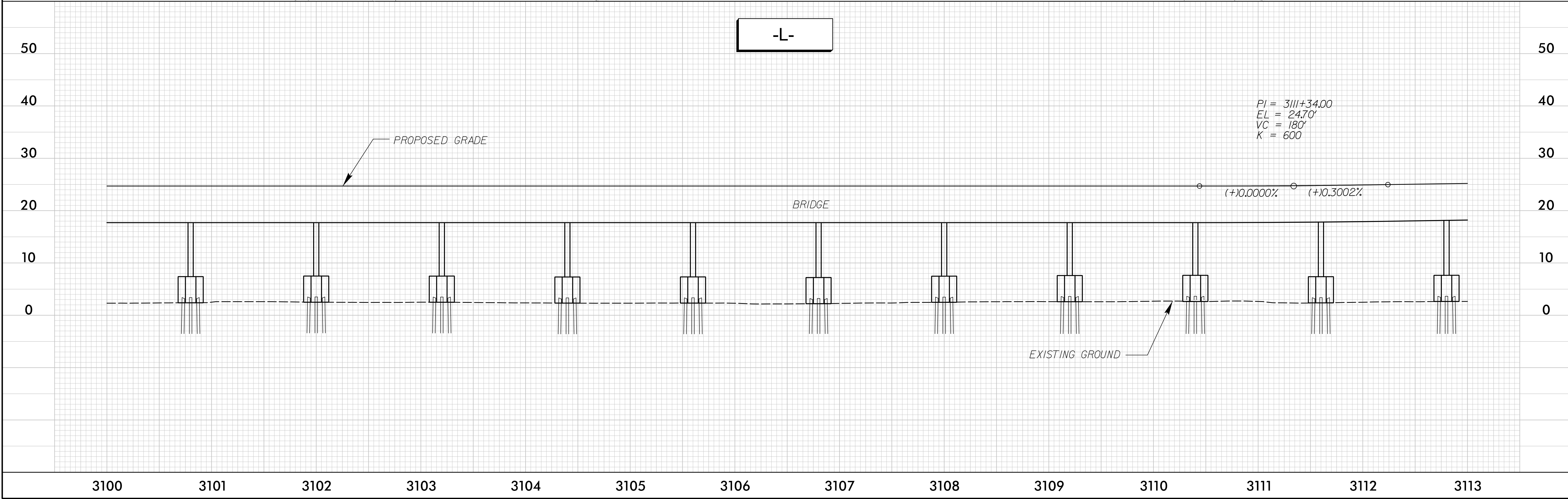
PROJECT REFERENCE NO. B-2500A	SHEET NO. 6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
	



MATCHLINE -L- STA 3100+00 (SHEET 5)

MATCHLINE -L- STA 3113+00 (SHEET 7)

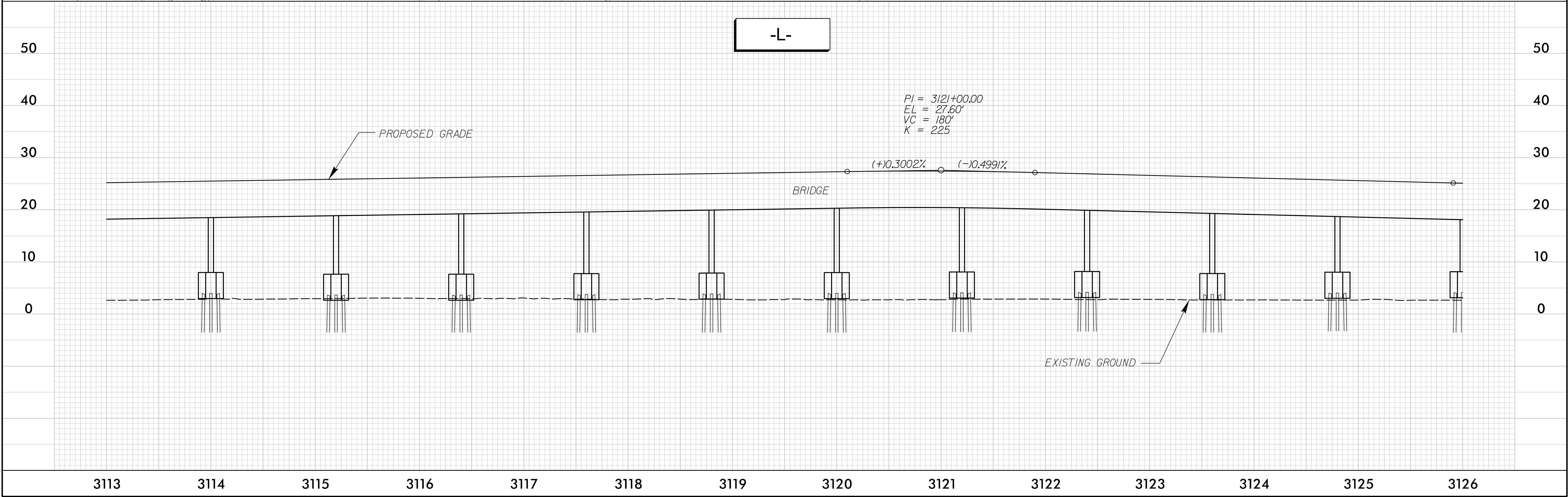
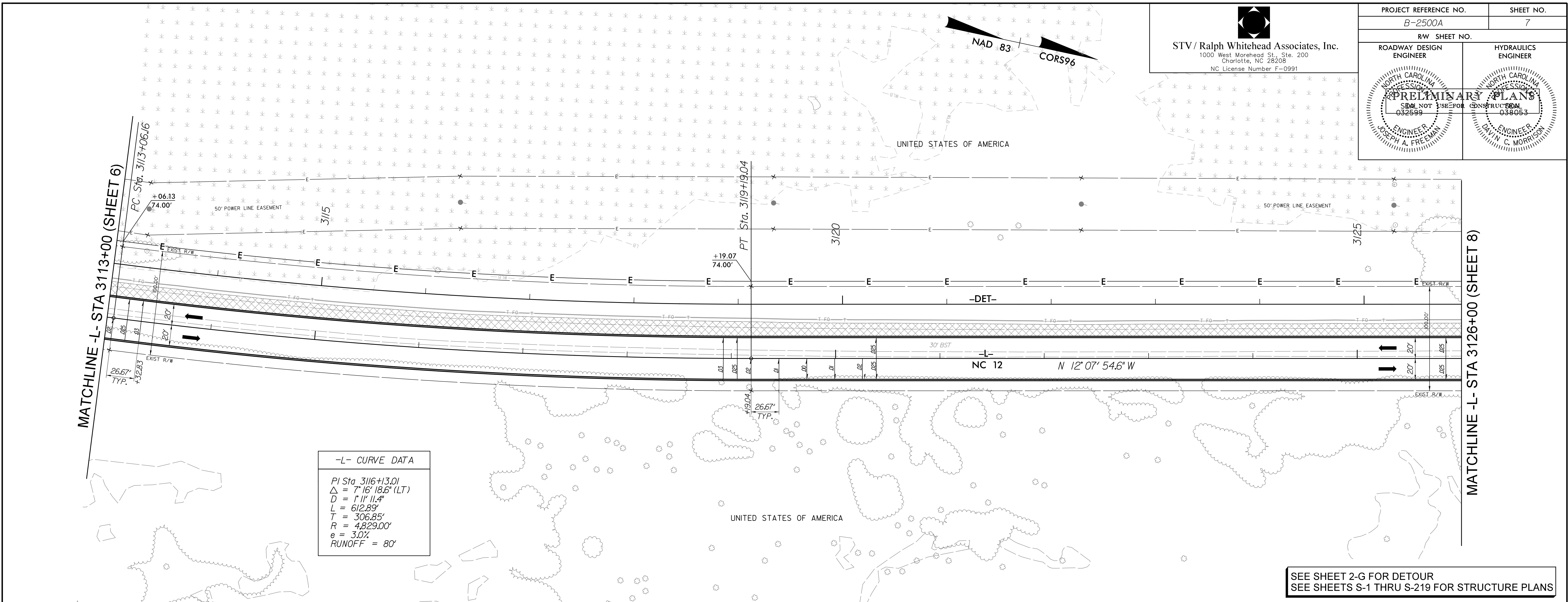
SEE SHEET 2-F FOR DETOUR  
 SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



-L-

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10/16/2012

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NC License Number F-0991

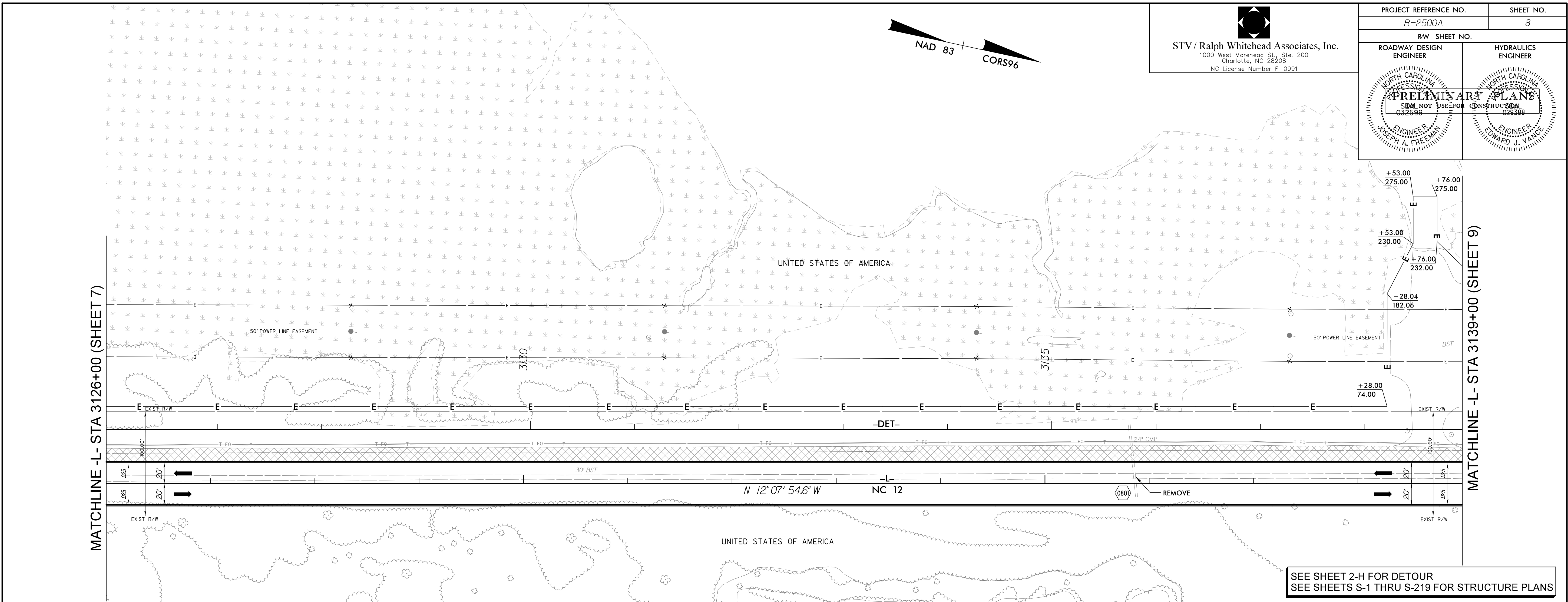
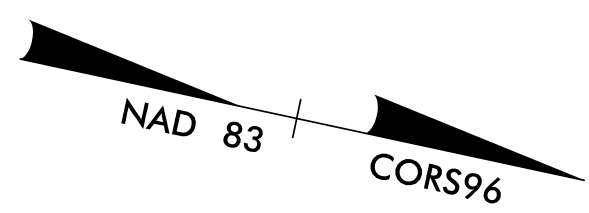


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 10/16/2012

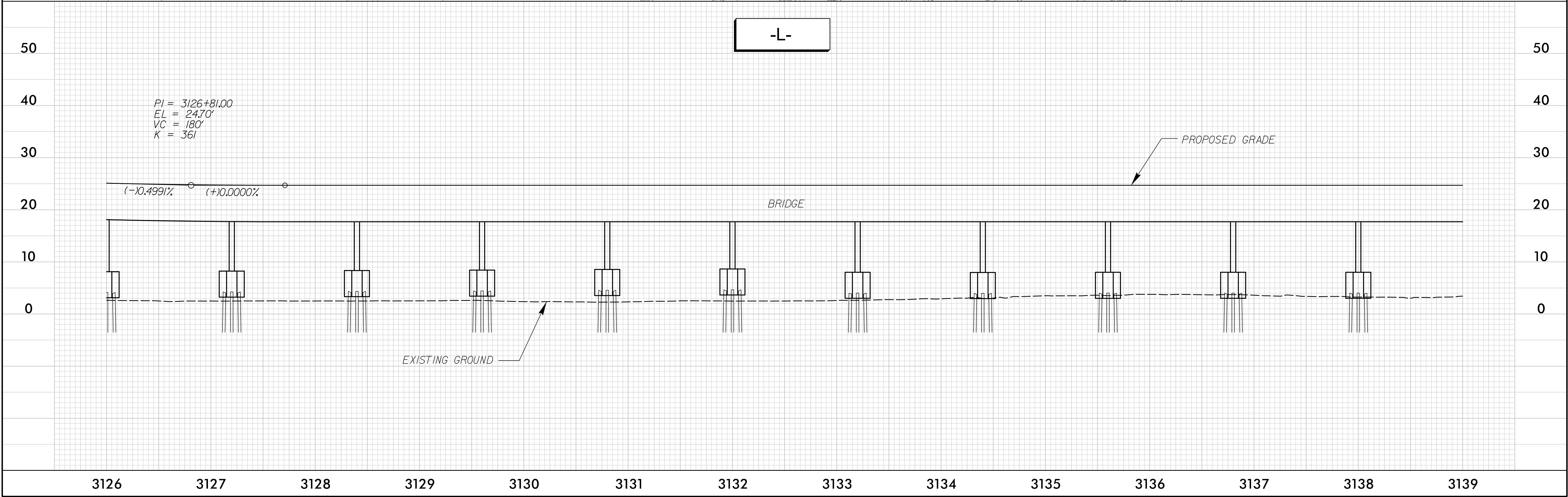
SEE SHEET 2-G FOR DETOUR  
SEE SHEETS S-1 THRU S-19 FOR STRUCTURE PLANS

PROJECT REFERENCE NO. B-2500A	SHEET NO. 8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER JOSEPH A. FREEMAN 032589	HYDRAULICS ENGINEER EDWARD J. YANGL 029388

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Charlotte, NC 28208  
NC License Number F-0991



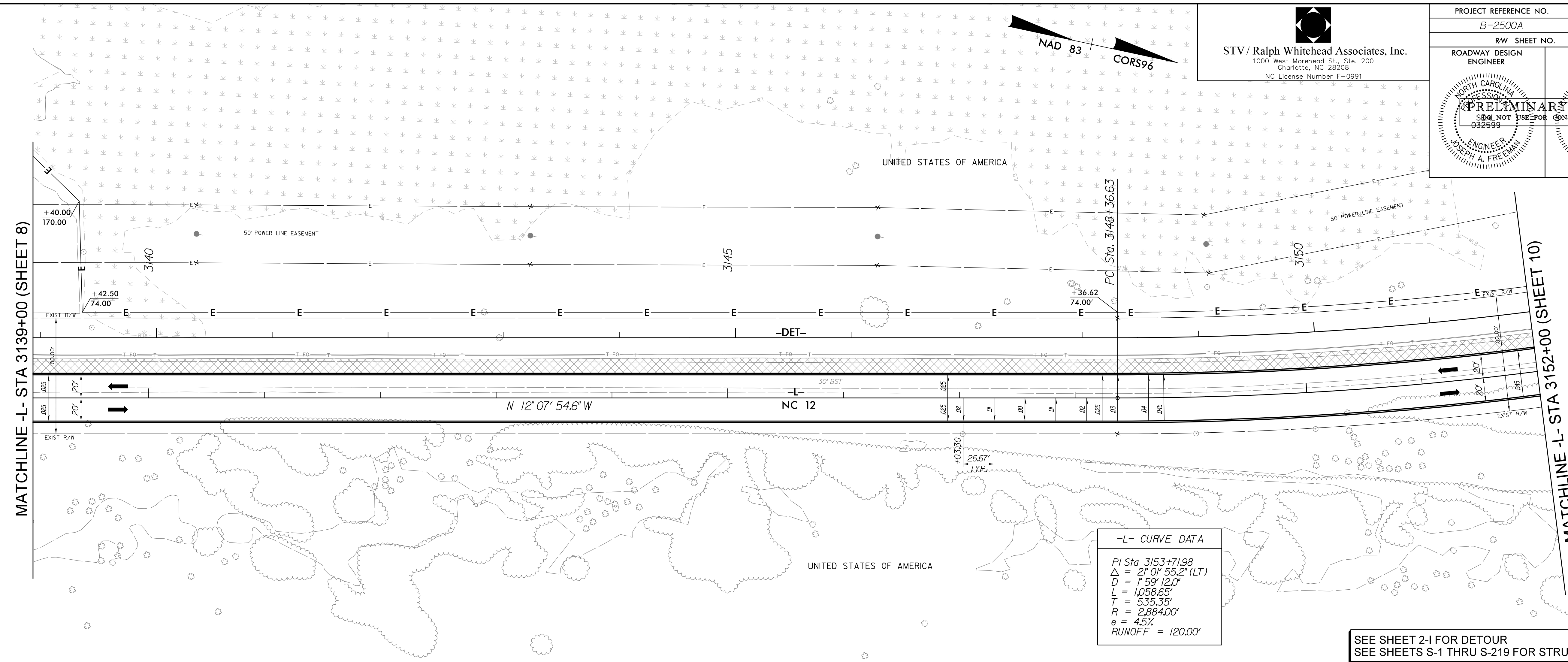
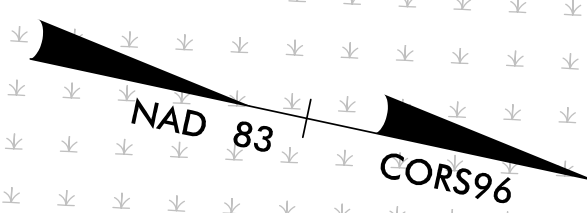
SEE SHEET 2-H FOR DETOUR  
SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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11/20/2012

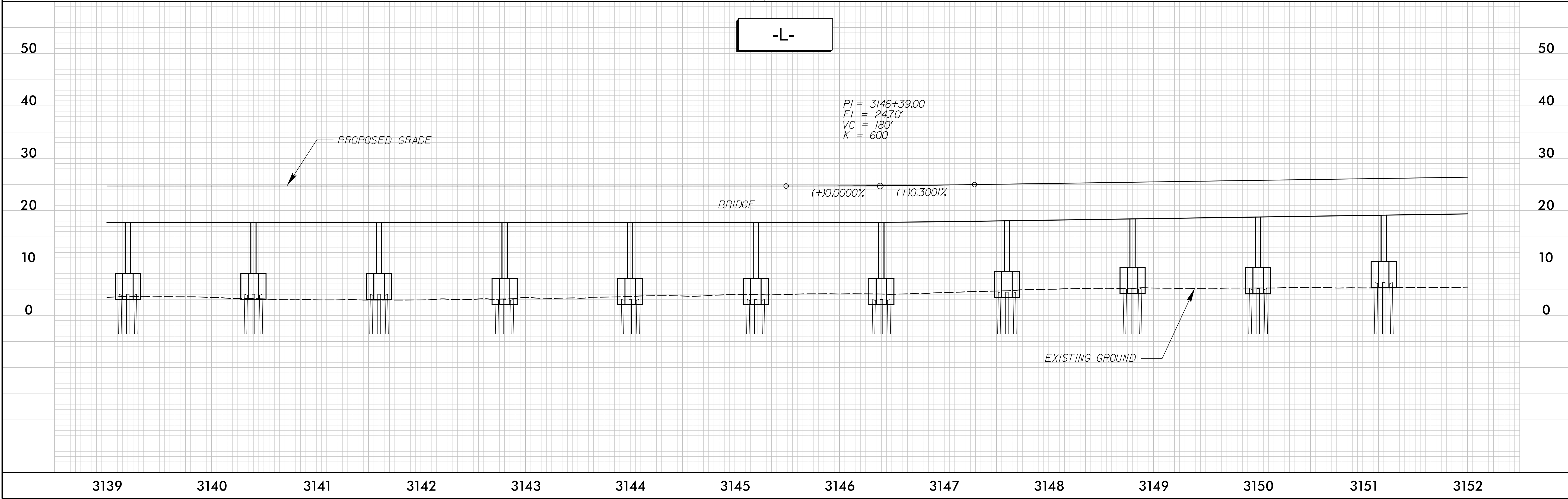


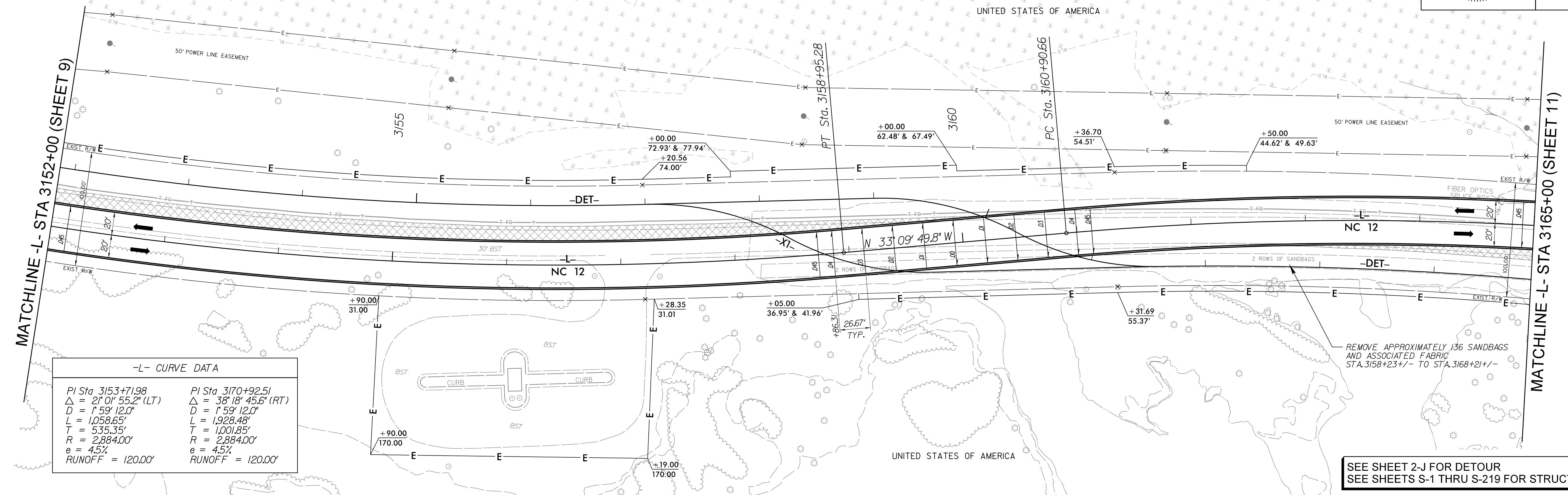
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 Charlotte, NC 28208  
 NC License Number F-0991



**-L- CURVE DATA**  
 PI Sta 3153+71.98  
 $\Delta = 21^{\circ} 01' 55.2\"$  (LT)  
 $D = 1,591.20'$   
 $L = 1,058.65'$   
 $T = 535.35'$   
 $R = 2,684.00'$   
 $e = 4.5\%$   
 RUNOFF = 120.00'

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

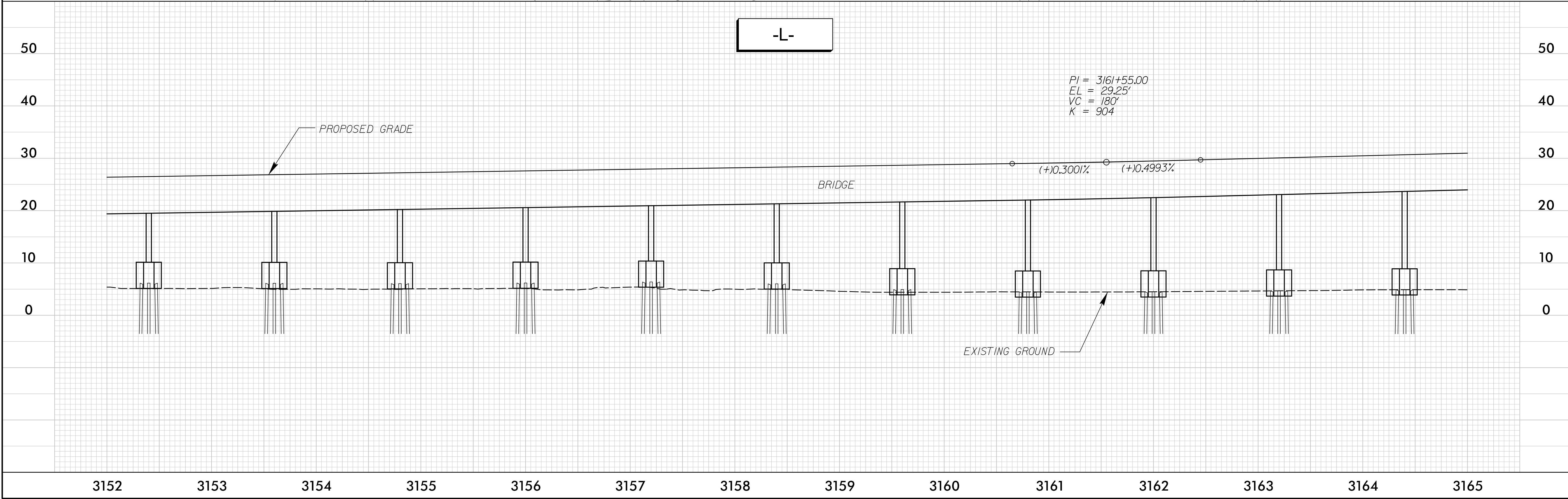




**-L- CURVE DATA**

PI Sta 3153+71.98	PI Sta 3170+92.51
$\Delta = 21^{\circ} 01' 55.2''$ (LT)	$\Delta = 38^{\circ} 18' 45.6''$ (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'

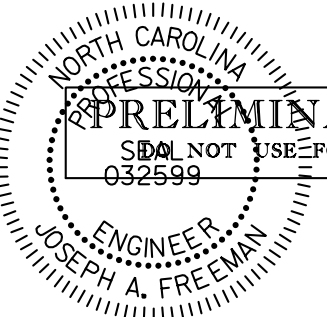
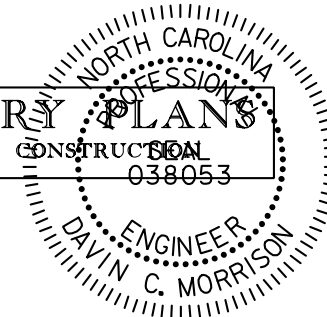
SEE SHEET 2-J FOR DETOUR  
 SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS

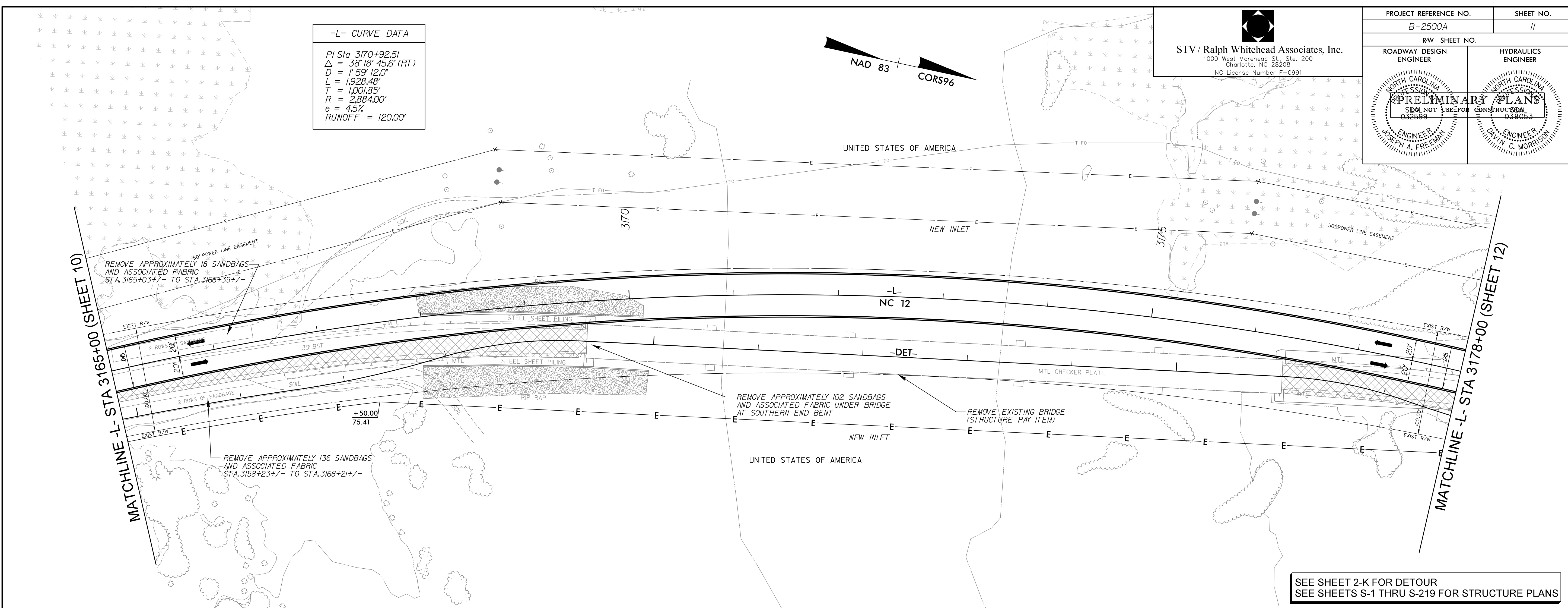


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 11/20/2012

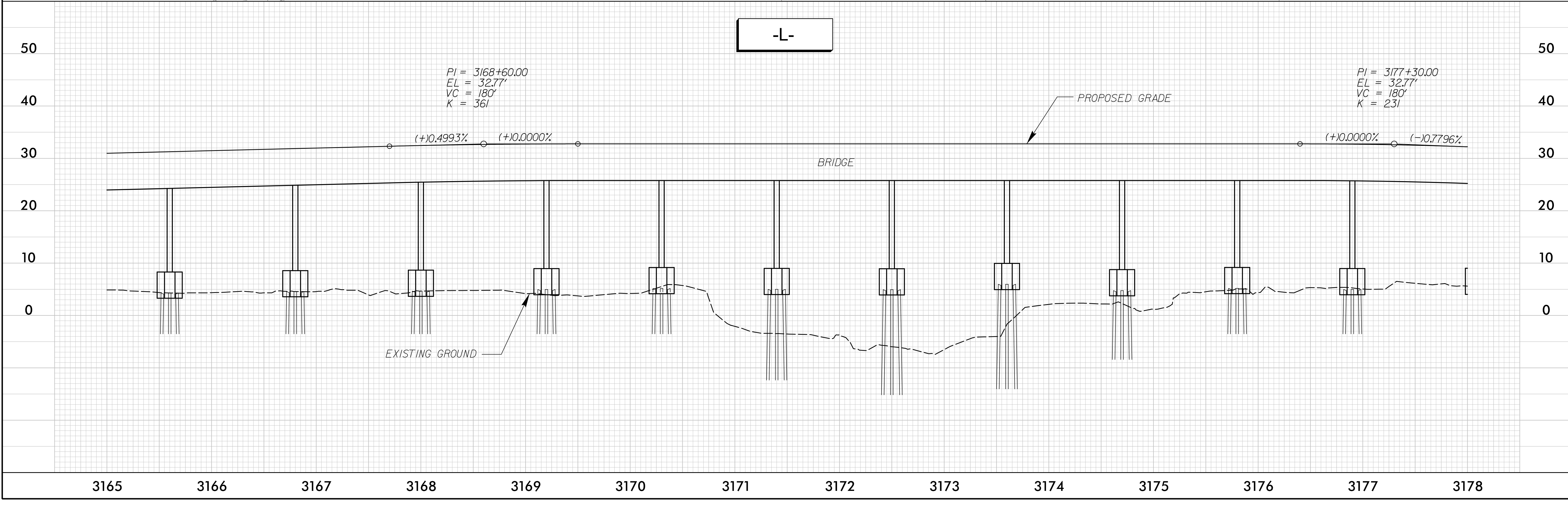
**-L- CURVE DATA**  
 PI Sta 3170+92.51  
 $\Delta = 38^{\circ} 18' 45.6" (RT)$   
 $D = 1,591.20'$   
 $L = 1,928.48'$   
 $T = 1,001.85'$   
 $R = 2,884.00'$   
 $e = 4.5\%$   
 RUNOFF = 120.00'

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PROJECT REFERENCE NO. B-2500A	SHEET NO. II
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
 JOSEPH A. FREEMAN ENGINEER NO. 032599	 DR. N. C. MORRISON ENGINEER NO. 034053



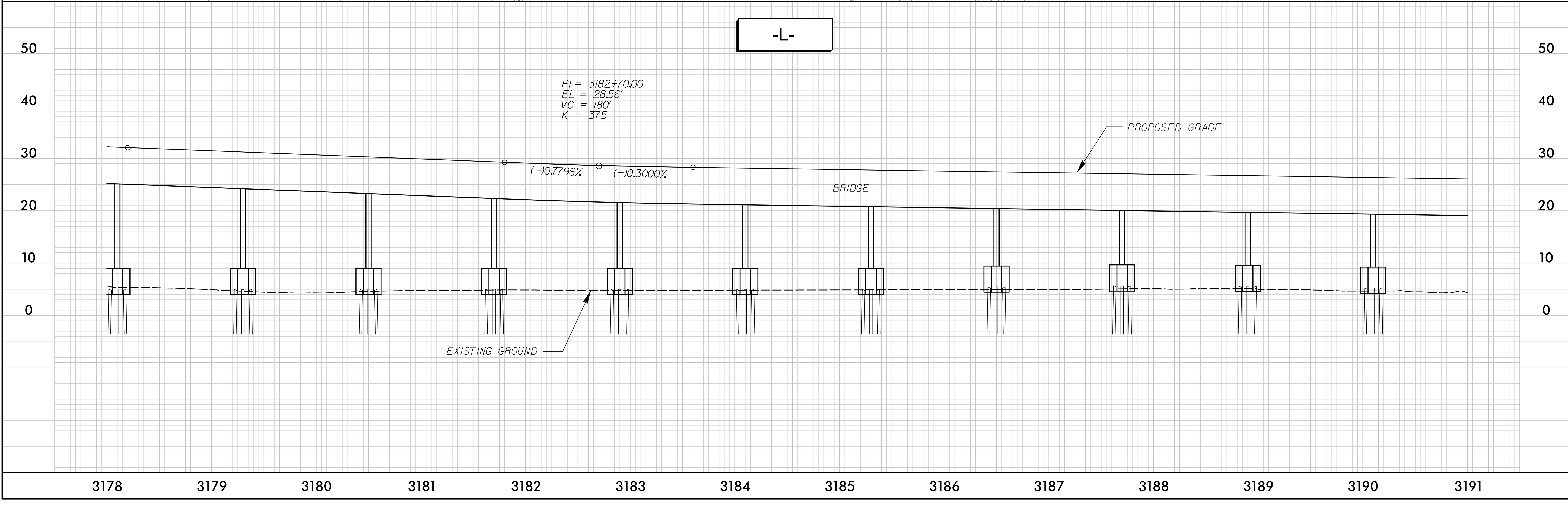
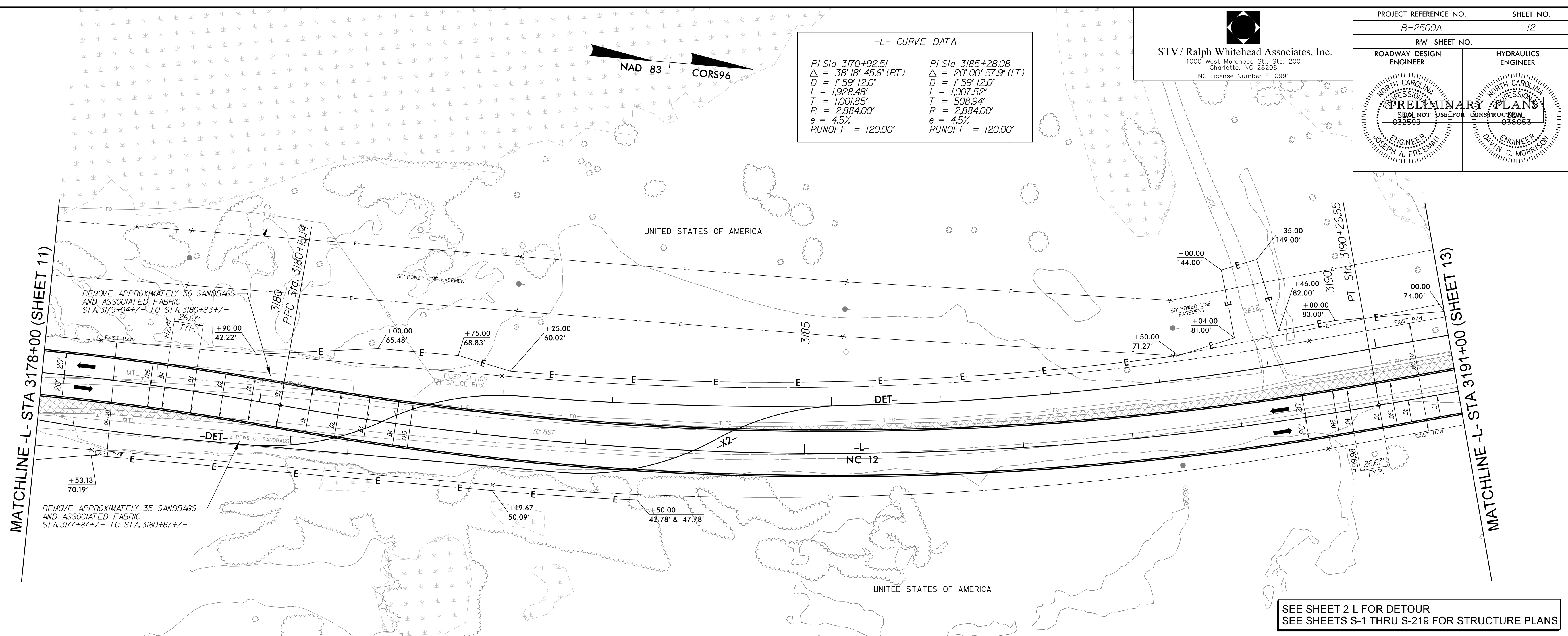
SEE SHEET 2-K FOR DETOUR  
 SEE SHEETS S-1 THRU S-219 FOR STRUCTURE PLANS



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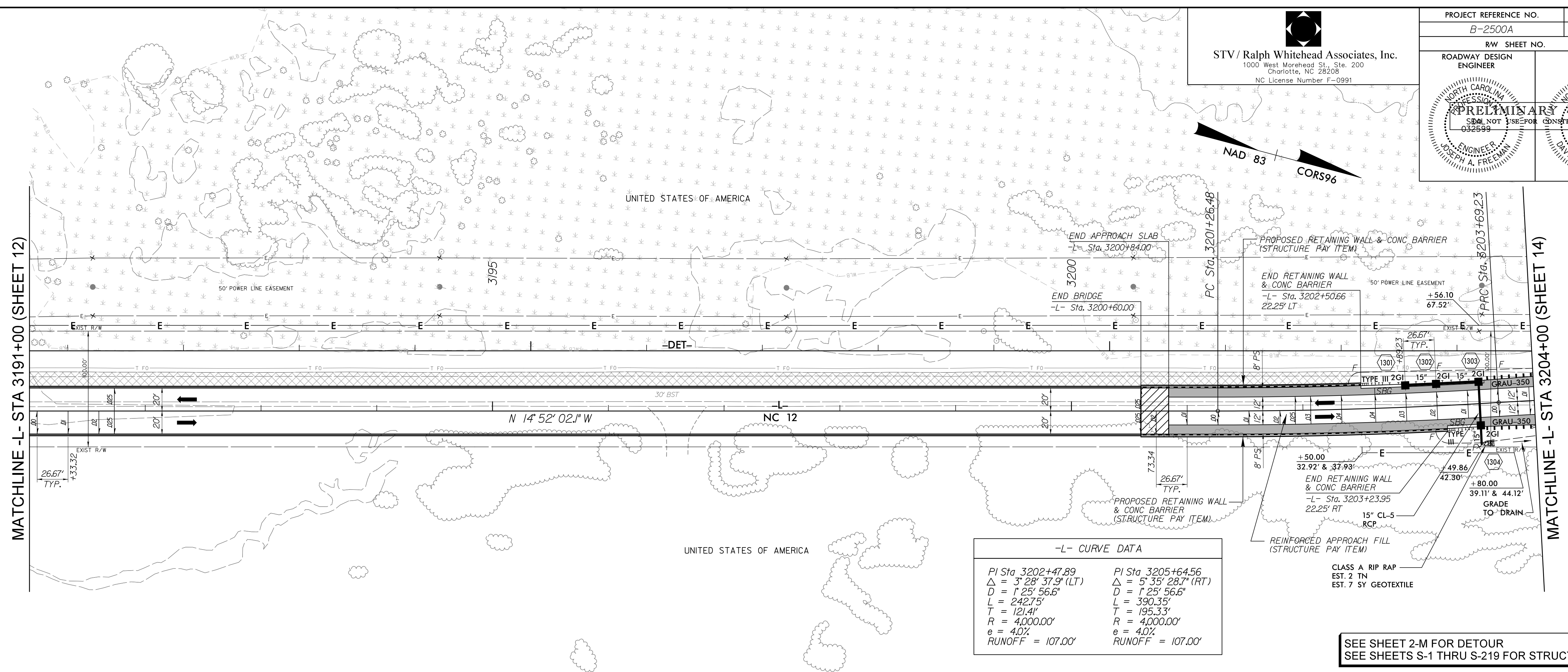
-L- CURVE DATA	
PI Sta 3170+92.51	PI Sta 3185+28.08
$\Delta = 38^\circ 18' 45.6"$ (RT)	$\Delta = 20^\circ 00' 57.9"$ (LT)
D = 1' 59" 12.0"	D = 1' 59" 12.0"
L = 1,928.48'	L = 1,007.52'
T = 1,001.85'	T = 508.94'
R = 2,884.00'	R = 2,884.00'
e = 4.5%	e = 4.5%
RUNOFF = 120.00'	RUNOFF = 120.00'



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 11/8/2012

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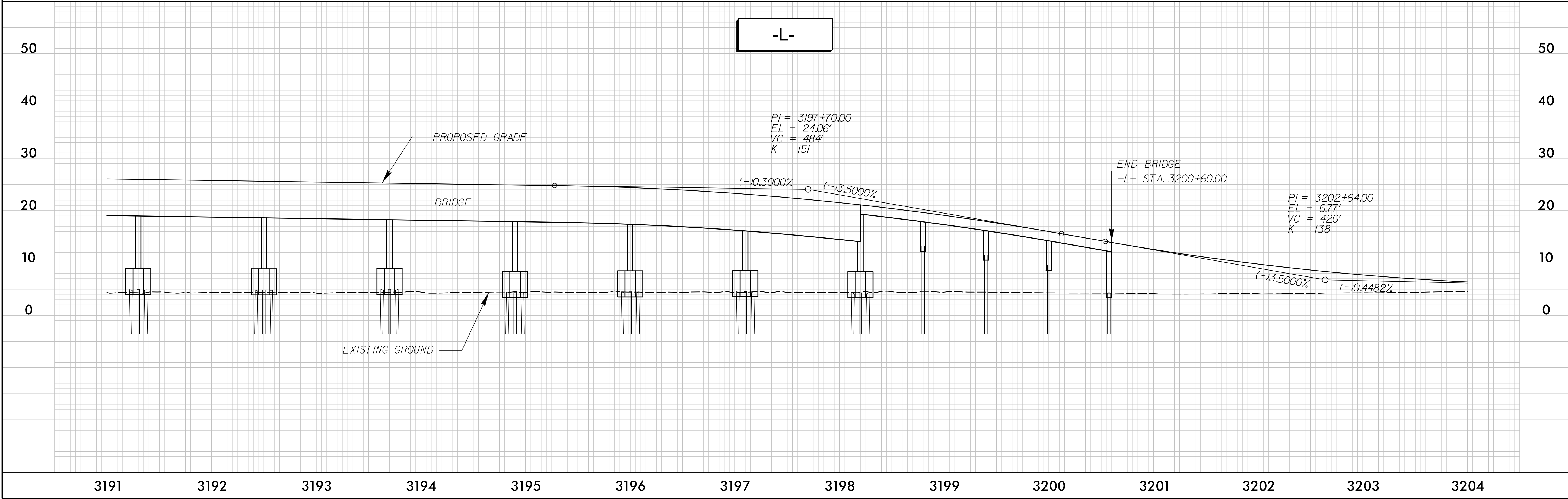
PROJECT REFERENCE NO. B-2500A	SHEET NO. 13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b>	
SHEET NOT TO BE USED FOR CONSTRUCTION	
ENGINEER JOSEPH A. FREEMAN	ENGINEER DAVID G. MORRISON



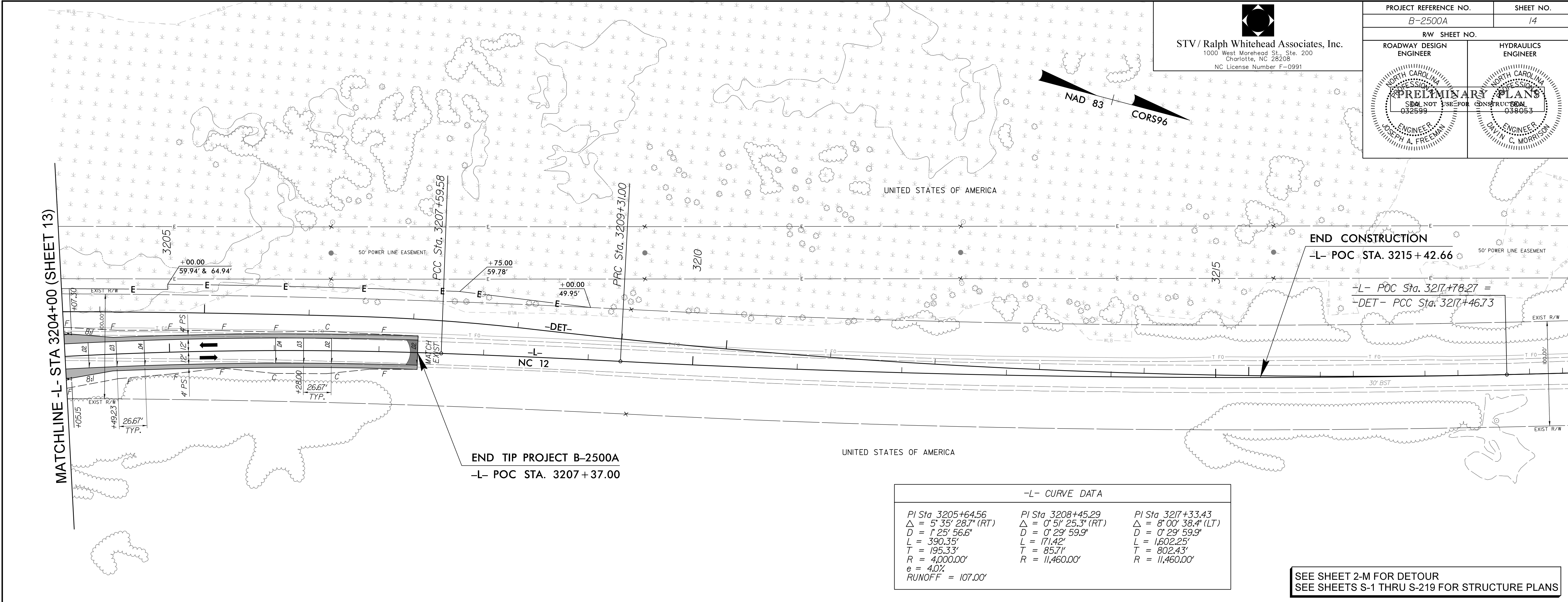
-L- CURVE DATA

PI Sta 3202+47.89	PI Sta 3205+64.56
$\Delta = 3^{\circ} 28' 37.9"$ (LT)	$\Delta = 5^{\circ} 35' 28.7"$ (RT)
$D = 1^{\circ} 25' 56.6"$	$D = 1^{\circ} 25' 56.6"$
$L = 242.75'$	$L = 390.35'$
$T = 121.4'$	$T = 195.33'$
$R = 4,000.00'$	$R = 4,000.00'$
$e = 4.0\%$	$e = 4.0\%$
$RUNOFF = 107.00'$	$RUNOFF = 107.00'$

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



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 10/16/2012



-L- CURVE DATA

PI Sta 3205+64.56 Δ = 5° 35' 28.7" (RT) D = 1' 25" 56.6" L = 390.35' T = 195.33' R = 4,000.00' e = 4.0% RUNOFF = 107.00'	PI Sta 3208+45.29 Δ = 0° 51' 25.3" (RT) D = 0' 29" 59.9" L = 171.42' T = 85.71' R = 11,460.00'	PI Sta 3217+33.43 Δ = 8° 00' 38.4" (LT) D = 0' 29" 59.9" L = 1602.25' T = 802.43' R = 11,460.00'
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SEE SHEET 2-M FOR DETOUR  
 SEE SHEETS S-1 THRU S-19 FOR STRUCTURE PLANS

