

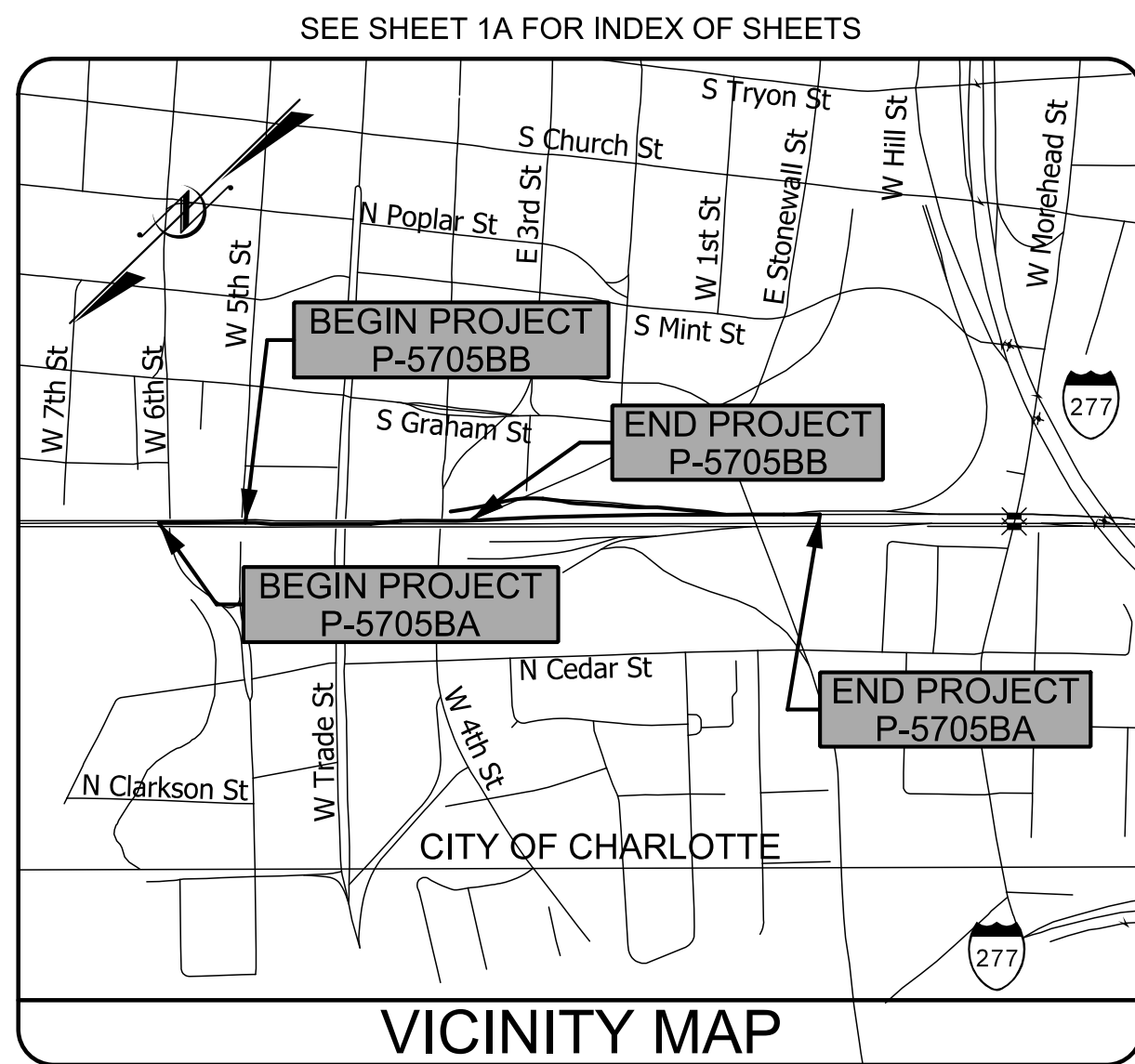
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**CONTRACT: C204058 TIP PROJECT: P-5705BA & P-5705BB**

REV #1: REVISE LETTING DATE



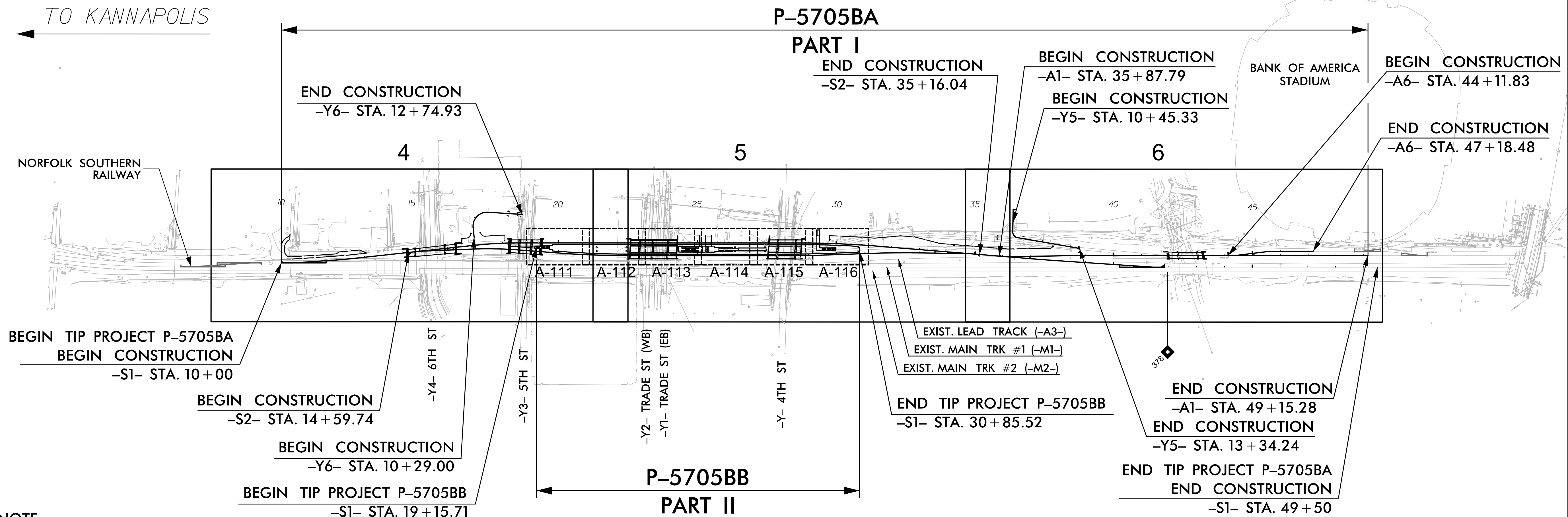
STATE OF NORTH CAROLINA  
RAIL DIVISION

**MECKLENBURG COUNTY**

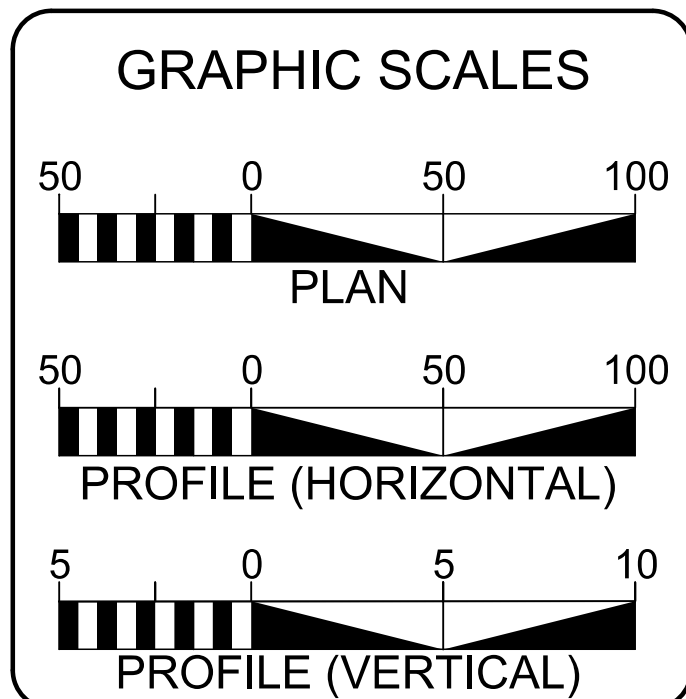
**LOCATION: CHARLOTTE GATEWAY STATION - TRACK, STRUCTURES AND SIGNALS**  
**CHARLOTTE GATEWAY STATION - PLATFORM AND CANOPY**  
**TYPE OF WORK: DRAINAGE, PAVING, GRADING, STRUCTURES, ARCHITECTURE**

**CHARLOTTE PROJ. NO.: TK1715009**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5705BA & P-5705BB	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
32213		R/W(P-5705BA/P-5705BB)	
44475.1.2		PE,UTIL (P-5705BA/P-5705BB)	
44475.3.6	FR-TII-0047-17	UTIL.CONST. (P-5705BA/P-5705BB)	
44475FHWA.3.1	STBGDA-1001(079)	CONST. (P-5705BA/P-5705BB)	



**NOTE:**  
PROPOSED STRUCTURE BEGIN/END STATIONS NOT SHOWN FOR CLARITY.  
SEE P-5705BA AND P-5705BB TITLE SHEETS FOR STRUCTURE BEGIN/END STATIONS.



PROJECT LENGTH	
LENGTH OF RAIL TIP PROJECT P-5705BA	0.612 MILES
LENGTH OF STRUCTURES TIP PROJECT P-5705BA	0.136 MILES
TOTAL LENGTH OF RAIL TIP PROJECT P-5705BA	0.748 MILES
LENGTH OF STRUCTURES TIP PROJECT P-5705BB	0.220 MILES
TOTAL LENGTH OF RAIL TIP PROJECT P-5705BB	0.220 MILES
LENGTH OF RAIL TIP PROJECT P-5705BA & P-5705BB	0.612 MILES
LENGTH OF STRUCTURES TIP PROJECT P-5705BA & P-5705BB	0.356 MILES
TOTAL LENGTH OF RAIL TIP PROJECT P-5705BA & P-5705BB	0.968 MILES

LENGTH MEASURED ALONG -S1-

2018 STANDARD SPECIFICATIONS

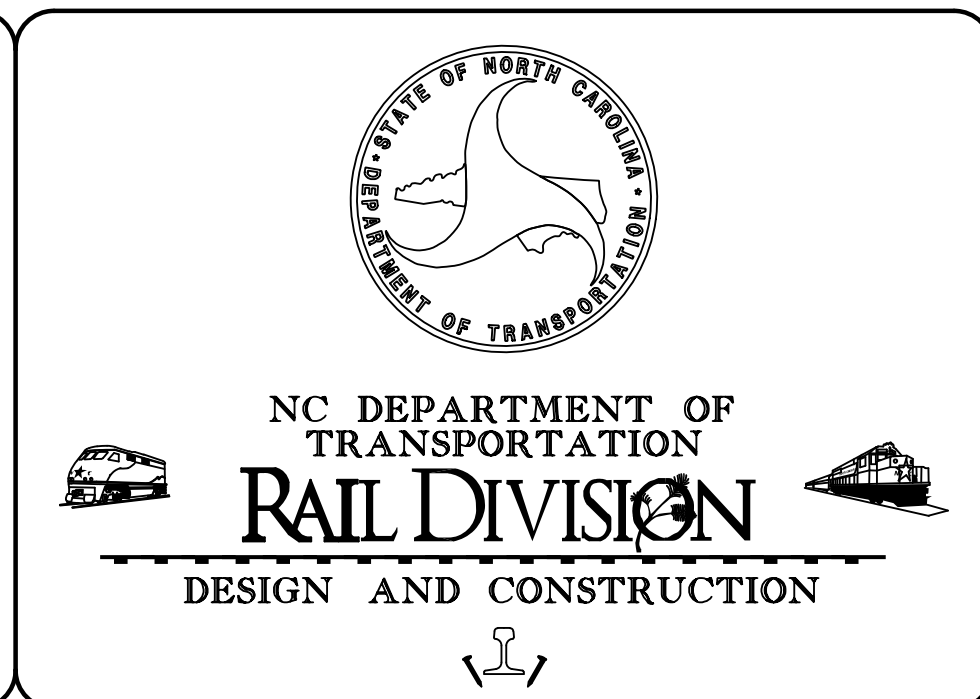
RIGHT OF WAY DATE: N/A

LETTING DATE: MAY 29, 2018

PREPARED IN THE OFFICE OF:


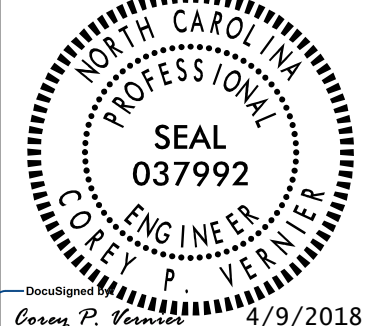
**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609  
NC License No: C-1554

- COREY VERNIER, P.E.  
RAIL PROJECT ENGINEER
- DAVID HAWKINS, P.E.  
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- JAMES BYRD, P.E.  
HYDRAULICS PROJECT ENGINEER
- ERIC SECKINGER, P.E.  
ROADWAY PROJECT ENGINEER
- CHRISTOPHER PARK, P.E.  
STRUCTURE PROJECT ENGINEER
- BLAIR WAGENBLAST, R.A.  
PROJECT ARCHITECT
- MATTHEW SIMMONS, P.E.  
NCDOT PROJECT MANAGER



INDEX OF SHEETS

SHEET NUMBER	DESCRIPTION
1	COVER SHEET
1A	INDEX OF DRAWINGS, GENERAL NOTES AND STANDARDS
1B-1 THRU 1B-2	CONVENTIONAL PLAN SHEET SYMBOLS AND ABBREVIATIONS
1C-1 THRU 1C-17	SURVEY CONTROL SHEETS
1D-1	PROPOSED ALIGNMENT CONTROL SHEET
<b>PART I</b>	
1	TITLE SHEET (P-5705BA)
2 THRU 2F	PROPOSED TRACK TYPICAL SECTIONS (-S1-, -S2-, -A1-, -A6-)
2G	PROPOSED ROADWAY TYPICAL SECTIONS (-Y-, -Y1-, -Y2-, -Y3-, -Y4-)
2H THRU 2L	TRACK HORIZONTAL ALIGNMENT GEOMETRY(-S1-, -S2-, -A1-, -A6-)
2M	PLATFORM ENVELOPE SHEET
2N	GATE DETAIL
2O THRU 2R	UNDERDRAIN AND LATERAL PIPE DETAILS
2S	EXCAVATION ADJACENT TO ACTIVE TRACK AND BENCHING DETAILS
2T	ROADBED TRANSITION DETAIL
2U	EARTH MOUND DETAIL
2V	ROCK PLATING DETAIL
2W	PAVEMENT REPAIR DETAIL
2X	MOREHEAD ST ACCESS EASEMENT DETAIL
2Y	DETAIL OF SPECIAL OFFSET CATCH BASIN
2Z	STANDARD TEMPORARY SHORING
2AA	STRUCTURE DETAIL SHEET
2BB	DETAIL TO CONVERT EXISTING DI, CB, OTCB OR GI TO JUNCTION BOX
2CC	ROADWAY DETAIL DRAWING FOR GUARDRAIL INSTALLATION
3A	DRAINAGE SUMMARY
3B	EARTHWORK SUMMARY
3C	PARCEL INDEX AND SUMMARY OF QUANTITIES
3D	GEOTECHNICAL SUMMARY
4 THRU 6	PROPOSED TRACK PLAN AND PROFILE SHEETS (-S1-)
7 THRU 10	PROPOSED TRACK PROFILE SHEETS (-S2-, -M1-, -A1-, -A6-)
11	PROPOSED ROADWAY PLAN AND PROFILE SHEET (ACCESS ROAD) (-Y5-)
12	PROPOSED ROADWAY PLAN AND PROFILE SHEET (ACCESS ROAD) (-Y6-)
13 THRU 16	PROPOSED ROADWAY PLAN SHEETS (-Y-, -Y1-, -Y2-, -Y3-, -Y4-)
17 THRU 19	PROPOSED ROADWAY PROFILE SHEETS (-Y-, -Y1-, -Y2-, -Y3-, -Y4-)
CP-01 THRU CP-03	CONSTRUCTION PHASING SHEETS (FOR REFERENCE ONLY)
TMP-1 THRU TMP-11	TRANSPORTATION MANAGEMENT PLANS
EC-1 THRU EC-9	EROSION CONTROL
SIGN-1 THRU SIGN-4	SIGNING AND PAVEMENT MARKING PLANS
UC-1 THRU UC-8	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-3	UTILITIES BY OTHERS
X-0	CROSS SECTION INDEX
X-0A	CROSS SECTION SUMMARY
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S1-1 THRU S1-39	STRUCTURE PLANS (6TH ST BRIDGE)
S2-1 THRU S2-20	STRUCTURE PLANS (5TH ST TRACK 1 BRIDGE)
S3-1 THRU S3-42	STRUCTURE PLANS (5TH ST TRACK 2 BRIDGE)
S4-1 THRU S4-21	STRUCTURE PLANS (TRADE ST TRACK 1 BRIDGE)
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S6-1 THRU S6-19	STRUCTURE PLANS (4TH ST TRACK 1 BRIDGE)
S7-1 THRU S7-51	STRUCTURE PLANS (4TH ST TRACK 2 BRIDGE)
S8-1 THRU S8-39	STRUCTURE PLANS (P&N BRIDGE)
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C1-1 THRU C1-2	CULVERT PLANS
W-01 THRU W-17	RETAINING WALL PLANS
ET-01 THRU ET-09	ELECTRIC TRACTION PLANS
<b>PART II</b>	
1	TITLE SHEET (P-5705BB)
A-001 THRU A-608	ARCHITECTURE PLANS
PL-000 THRU PL-502	PLUMBING PLANS
S-001 THRU S-811	STRUCTURE PLANS (PLATFORM, CONCOURSE AND BAGGAGE RAMP)
S10-1 THRU S10-4	STRUCTURE PLANS (5TH ST EGRESS STAIRS)
S11-1 THRU S11-7	STRUCTURE PLANS (PEDESTRIAN/BAGGAGE TUNNEL)
S12-1 THRU S12-5	STRUCTURE PLANS (4TH ST EGRESS TUNNEL)
S13-1 THRU S13-18	STRUCTURE PLANS (CANOPY FOUNDATIONS)

 <b>HNTB</b> NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554	PROJECT REFERENCE NO.	SHEET NO.
	P-5705BA & P-5705BB	1A
DATE: MARCH 16, 2018		
RAILROAD DESIGN ENGINEER		R/W SHEET NO.
		

2018 ROADWAY ENGLISH STANDARD DRAWINGS: EFFECTIVE: 01-16-2018  
 REVISED:

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2018 are applicable to this project and by reference hereby are considered a part of these plans:

STD. NO. TITLE  
 DIVISION 2 - EARTHWORK  
 200.03 Method of Clearing - Method III

DIVISION 3 - PIPE CULVERTS  
 300.01 Method of Pipe Installation

DIVISION 8 - INCIDENTALS

815.02 Subsurface Drain  
 840.00 Concrete Base Pad for Drainage Structures  
 840.01 Brick Catch Basin - 12" thru 54" Pipe  
 840.02 Concrete Catch Basin - 12" thru 54" Pipe  
 840.03 Frame, Grates and Hood - for Use on Standard Catch Basin  
 840.18 Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe  
 840.22 Frames and Wide Slot Sag Grates  
 840.25 Anchorage for Frames  
 840.27 Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe  
 840.31 Concrete Junction Box - 12" thru 66" Pipe  
 840.32 Brick Junction Box - 12" thru 66" Pipe  
 840.34 Traffic Bearing Junction Box  
 840.45 Precast Drainage Structure  
 840.46 Traffic Bearing Precast Drainage Structure  
 840.54 Manhole Frame and Cover  
 840.66 Drainage Structure Steps  
 840.72 Pipe Collar  
 846.01 Concrete Curb, Gutter and Curb & Gutter  
 848.01 Concrete Sidewalk  
 848.03 Driveway Turnout - Drop Curb Type  
 862.01 Guardrail Placement  
 862.02 Guardrail Installation  
 866.01 Chain Link Fence - 4', 5' and 6' High Fence  
 876.01 Rip Rap in Channels  
 876.02 Guide for Rip Rap at Pipe Outlets

GENERAL NOTES: 2018 SPECIFICATIONS  
 EFFECTIVE: 01-16-2018  
 REVISED:

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 III.

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.

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

DRIVEWAYS:  
 DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.03 AT LOCATIONS SHOWN ON PLANS OR AS 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.

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 Duke Energy, PNG, AT&T Distribution  
 Zayo Group, Dukenet/Windstream Communications, CenturyLink, Time Warner Cable/Charter,  
 Verizon Business, Level 3 Communications, City of Charlotte  
 ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

GENERAL NOTES FOR RAILROAD GRADING:  
 THIS CONTRACT INCLUDES ALL WORK REQUIRED TO CONSTRUCT THE RAILROAD ROADBED UP TO AND INCLUDING THE SUBBALLAST LAYER. CONSTRUCTION OF TRACK, INCLUDING BALLAST AND SIGNALS, WILL BE DONE BY NORFOLK SOUTHERN RAILWAY AND IS DEPICTED FOR REFERENCE ONLY.

THE PROPOSED GRADE LINES SHOWN DENOTE THE FINAL ELEVATION OF THE PROPOSED TOP OF LOW RAIL AT THE CENTERLINE OF TRACK AS SHOWN ON THE TYPICAL SECTIONS. WHERE NO PROPOSED GRADE LINES ARE SHOWN, THE PROFILES SHOWN DEPICT THE EXISTING TOP OF LOW RAIL.

UNDERGROUND STORAGE TANKS (UST) SHOWN ON THE PLANS WILL BE REMOVED BY OTHERS

RAILROAD SAFETY:  
 THE CONTRACTOR THAT WILL ENTER NORFOLK SOUTHERN RIGHT-OF-WAY, PERFORM WORK WITHIN 25' OF AN ACTIVE TRACK, OR OTHERWISE HAVE THE POTENTIAL TO FOUL AN ACTIVE TRACK SHALL OBTAIN A RIGHT-OF-ENTRY AGREEMENT FROM NORFOLK SOUTHERN RAILWAY IN ADVANCE.

INFORMATION AVAILABLE:  
<http://www.nscorp.com/content/nscorp/en/real-estate/norfolk-southern-services/access-norfolk-southern-property.html>

ALL CONTRACTOR AND SUBCONTRACTOR EMPLOYEES THAT WILL ENTER NORFOLK SOUTHERN RIGHT-OF-WAY, PERFORM WORK WITHIN 25' OF AN ACTIVE TRACK, OR OTHERWISE HAVE THE POTENTIAL TO FOUL AN ACTIVE TRACK SHALL OBTAIN THE FOLLOWING SAFETY CREDENTIALS IN ADVANCE.

- NORFOLK SOUTHERN ROADWAY WORKER PROTECTION TRAINING (NS RWP)- INFORMATION AVAILABLE: [www.rtrainers.com](http://www.rtrainers.com)
- E-RAILSAFE CERTIFICATION - INFORMATION AVAILABLE: [http://www.e-railsafe.com/index\\_narrow.html](http://www.e-railsafe.com/index_narrow.html)

ONLY AFTER RECEIPT OF A FULLY EXECUTED RIGHT-OF-ENTRY AGREEMENT FROM NORFOLK SOUTHERN RAILWAY CAN CONTRACTOR OR SUBCONTRACTOR EMPLOYEES ENTER NORFOLK SOUTHERN RAILWAY RIGHT-OF-WAY. EVERY EMPLOYEE SHALL DISPLAY BOTH NS RWP AND E-RAILSAFE BADGES AT ALL TIMES.

ALL CONSTRUCTION ACTIVITIES ON NORFOLK SOUTHERN RIGHT-OF-WAY, WITHIN 25' OF AN ACTIVE TRACK, OR OTHERWISE HAVE THE POTENTIAL TO FOUL AN ACTIVE TRACK SHALL BE COORDINATED WITH THE NORFOLK SOUTHERN FLAGMAN. SUCH ACTIVITIES ARE SUBJECT TO STOPPAGE TO ENSURE SAFETY OF PASSING TRAINS.

Note: Not To Scale

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

STATE OF NORTH CAROLINA RAIL DIVISION

HNTB HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554

Table with project reference numbers, sheet numbers, and engineer names.

DATE: MARCH 16, 2018

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

Table listing symbols for boundaries and property such as 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 Contamination Area: Soil, Potential Contamination Area: Soil, Known Contamination Area: Water, Potential Contamination Area: Water, Contaminated Site: Known or Potential.

BUILDINGS AND OTHER CULTURE:

Table listing symbols for buildings and other culture such as 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 such as Stream or Body of Water, Hydro, Pool or Reservoir, Jurisdictional Stream, Buffer Zone 1, Buffer Zone 2.

HYDROLOGY (CONTINUED):

Table listing symbols for hydrology (continued) such as Flow Arrow, Disappearing Stream, Spring, Wetland, Proposed Lateral, Tail, Head Ditch, False Sump.

RIGHT OF WAY:

Table listing symbols for right of way such as 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 Permanent Easement with Iron Pin and Cap Marker.

ROADS AND RELATED FEATURES:

Table listing symbols for roads and related features such as Existing Edge of Pavement, Existing Curb, Proposed Slope Stakes Cut, Proposed Slope Stakes Fill, Proposed Wheel Chair Ramp, Existing Metal Guardrail, Proposed Guardrail, Existing Cable Guiderail, Proposed Cable Guiderail, Pavement Removal.

VEGETATION:

Table listing symbols for vegetation such as Single Tree, Single Shrub, Hedge, Woods Line, Orchard, Vineyard.

EXISTING STRUCTURES:

Table listing symbols for existing structures such as 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 such as 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: 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 such as 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 such as 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 such as 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 such as 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 such as Utility Pole, Utility Pole with Base, Utility Located Object, Utility Traffic Signal Box, Utility Unknown U/G Line, U/G Tank; Water, Gas, Oil, A/G Tank; Water, Gas, Oil, U/G Test Hole (S.U.E.\*), Abandoned According to Utility Records, End of Information, Proposed Retaining Wall, Temporary Shoring.

# STATE OF NORTH CAROLINA RAIL DIVISION

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609  
NC License No: C-1554

DATE: MARCH 16, 2018

PROJECT REFERENCE NO. P-5705BA & P-5705BB	SHEET NO. 1B-2
R/W SHEET NO.	
RAILROAD DESIGN ENGINEER	HYDRAULIC ENGINEER

## CONVENTIONAL PLAN SHEET SYMBOLS AND ABBREVIATIONS

### RAILROADS:

Curve Information .....	$D_c = \frac{x^2}{xx'}$ $E_a = x \cdot x'$ $L_s = xxx'$
Curve Label .....	○
Existing Track to be Removed .....	▤▤▤▤▤▤▤▤▤▤
Existing Track to be Retained .....	▤▤▤▤▤▤▤▤▤▤
Existing Track to be Shifted .....	- - - - -
Milepost .....	
Point of Inflection No Curve (PINC) .....	△
Proposed Track .....	▬
Proposed Power Operated Turnout .....	
Proposed Hand Throw Turnout .....	
Profile Grade Line .....	◐
Turnout Label .....	□

### ABBREVIATIONS:

#### TRACK ALIGNMENT - HORIZONTAL:

CD .....	Cant Deficiency
CS .....	Curve to Spiral
Dc .....	Degree of Curvature
Ea .....	Actual Superelevation (Inches)
Eu .....	Unbalance Elevation (Inches)
I .....	Curve Intersection Angle
L .....	Length of Curve
Ls .....	Length of Spiral
PI .....	Point of Intersection
PI/TO .....	Point of Intersection / Turnout
POL .....	Point on Line
PS .....	Point of Switch
PT .....	Point on Tangent
R .....	Radius
SC .....	Spiral to Curve
ST .....	Spiral to Tangent
TO .....	Turnout
TS .....	Tangent to Spiral
X .....	Spiral Tangent Length to Offset
Y .....	Spiral Tangent Offset

#### TRACK ALIGNMENT - VERTICAL:

EL .....	Elevation
L .....	Vertical Curve Length
R .....	Rate of Change
T/R .....	Top of Rail
VPC .....	Vertical Point of Curve
VPI .....	Vertical Point of Intersection
VPT .....	Vertical Point of Tangent

#### DRAINAGE:

BCCMP .....	Bituminous Coated Corrugated Metal Pipe
CIP .....	Cast Iron Pipe
HDPE .....	High Density Polyethylene Pipe
INV. ....	Invert
NWSEL .....	Normal Water Surface Elevation
PSRM .....	Permanent Soil Reinforcement Matting
RCB .....	Reinforced Concrete Box Culvert
RCP .....	Reinforced Concrete Pipe
STB .....	Stone Box Culvert
SYGF .....	Square Yards Geotextile Fabric
WSP .....	Welded Steel Pipe

#### MISCELLANEOUS:

ABS .....	Absolute
AEI .....	Automatic Equipment Identification
AVE .....	Avenue
AH .....	Ahead
BK .....	Back
B .....	Baseline
BLDG .....	Building
BLVD .....	Boulevard
CB .....	Catch Basin
C .....	Centerline
CLR .....	Clear
CONC .....	Concrete
CONST. ....	Construction
DWG .....	Drawing
E .....	East
EL .....	Elevation
ESMT .....	Easement
EXIST. ....	Existing
EB .....	East Bound
FT .....	Feet
FND .....	Foundation
GRD .....	Ground
HW .....	Headwall
HORIZ. ....	Horizontal
HTTO .....	Hand Throw Turnout
LT .....	Left
LH .....	Left hand
MIN .....	Minimum
MP .....	Milepost
MPH .....	Miles Per Hour
N .....	North
N/A .....	Not Applicable
NB .....	North Bound
NO. ....	Number
NCDOT .....	North Carolina Department of Transportation
NCRR .....	North Carolina Railroad
NSR .....	Norfolk Southern Railway
OTM .....	Other Track Material
PAVT .....	Pavement
PGL .....	Profile Grade Line
POTO .....	Power Operated Turnout
PROP. ....	Proposed
RD .....	Road
RT .....	Right
RR .....	Railroad
RH .....	Right hand
R/W .....	Right-of-Way
REQ'D .....	Required
S .....	South
SEG .....	Segment
STA .....	Station
SR .....	State Route
SHLDR .....	Shoulder
SHT .....	Sheet
SWM .....	Storm Water Management
TRK .....	Track
V .....	Velocity (MPH)
VERT .....	Vertical
W .....	West
W/ .....	With
WB .....	West Bound

PROJECT REFERENCE NO. P-5705BA & P-5705BB	SHEET NO. 1C-1
Location and Surveys	

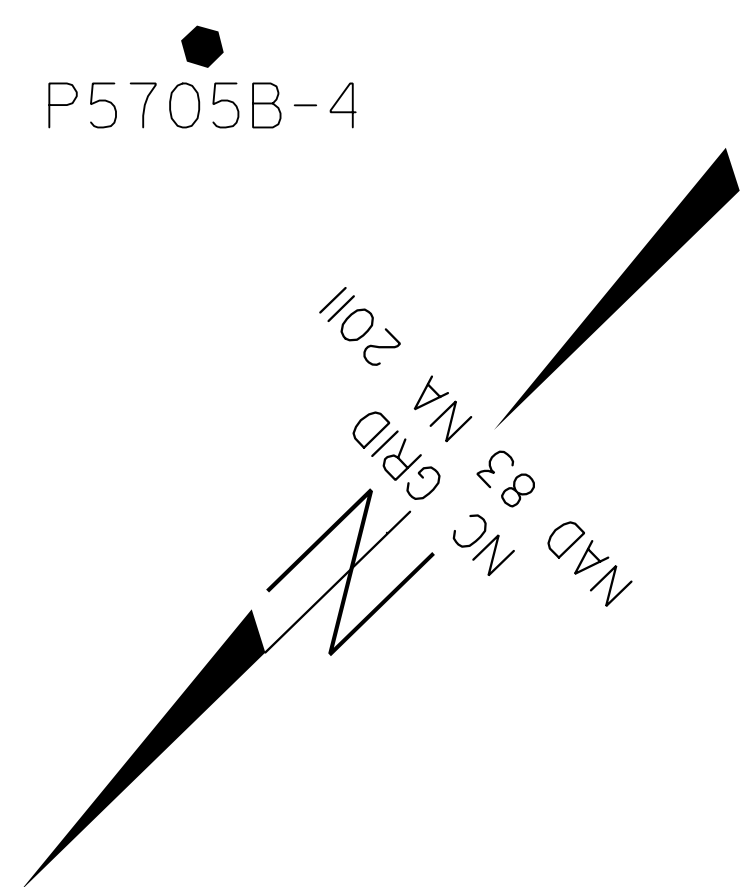
# SURVEY CONTROL SHEET

## W/EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

TO KANNAPOLIS ←

TO 109  
(336.72')

TO GASTONIA →



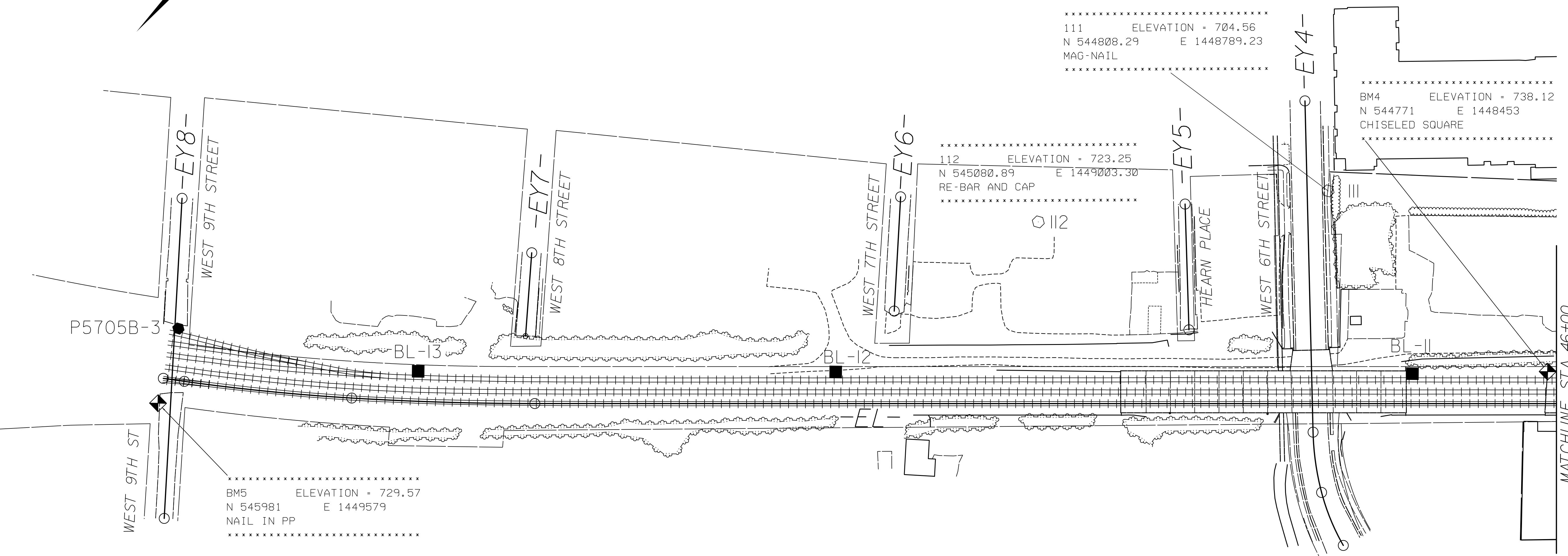
110 ELEVATION = 715.23  
 N 544533.50 E 1449079.17  
 MAG-NAIL

111 ELEVATION = 704.56  
 N 544808.29 E 1448789.23  
 MAG-NAIL

112 ELEVATION = 723.25  
 N 545080.89 E 1449003.30  
 RE-BAR AND CAP

BM4 ELEVATION = 738.12  
 N 544771 E 1448453  
 CHISELED SQUARE

BM5 ELEVATION = 729.57  
 N 545981 E 1449579  
 NAIL IN PP



**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "P5705B-2"

WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF  
 NORTHING: 542629.390(ft) EASTING: 1445444.637(ft)  
 ELEVATION: 683.308(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9998447800

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "P5705B-2" TO -S1- STATION 10+00.00 IS  
 N 52°33'53.8" E 4499.67'

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
 VERTICAL DATUM USED IS NAVD 88

- NOTES:**
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  - PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

NOTE: DRAWING NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
P-5705BA & P-5705BB	1C-2
Location and Surveys	

# SURVEY CONTROL SHEET

← TO KANNAPOLIS

TO GASTONIA →

↑ TO 108  
(360.34')

↑ TO 103  
(402.57')

↑ TO 102  
(358.23')

107

\*\*\*\*\*  
 107 ELEVATION = 736.04  
 N 544284.04 E 1448783.47  
 MAG-NAIL  
 \*\*\*\*\*

104

\*\*\*\*\*  
 104 ELEVATION = 741.72  
 N 543915.17 E 1448485.41  
 MAG-NAIL  
 \*\*\*\*\*

101

\*\*\*\*\*  
 101 ELEVATION = 733.37  
 N 543614.99 E 1448111.27  
 MAG-NAIL  
 \*\*\*\*\*

\*\*\*\*\*  
 106 ELEVATION = 727.87  
 N 544545.62 E 1448547.63  
 MAG-NAIL  
 \*\*\*\*\*

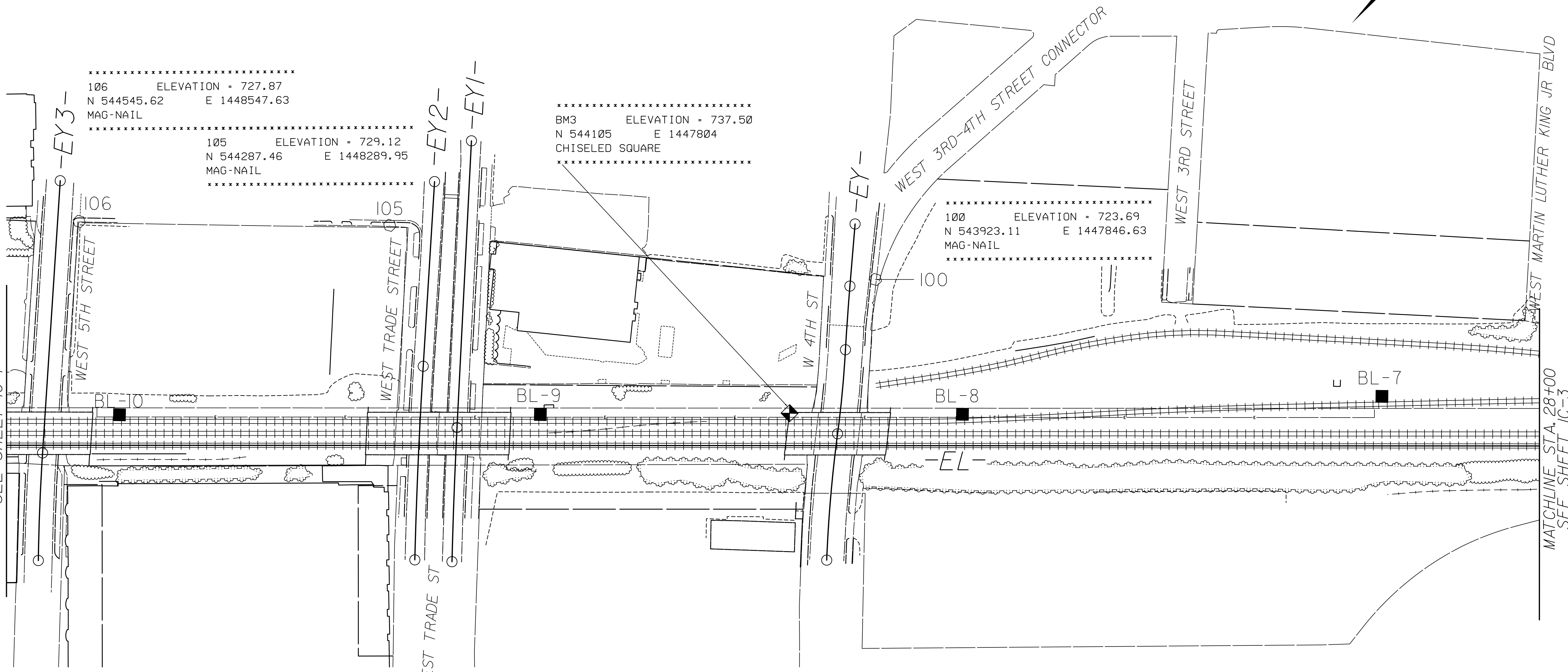
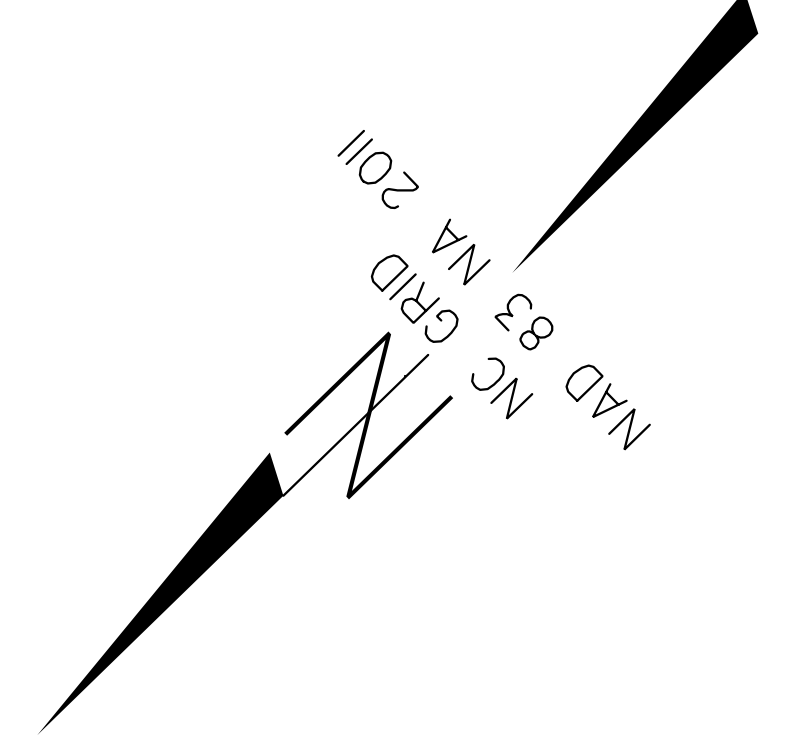
\*\*\*\*\*  
 105 ELEVATION = 729.12  
 N 544287.46 E 1448289.95  
 MAG-NAIL  
 \*\*\*\*\*

\*\*\*\*\*  
 BM3 ELEVATION = 737.50  
 N 544105 E 1447804  
 CHISELED SQUARE  
 \*\*\*\*\*

\*\*\*\*\*  
 100 ELEVATION = 723.69  
 N 543923.11 E 1447846.63  
 MAG-NAIL  
 \*\*\*\*\*

MATCHLINE STA. 46+00  
SEE SHEET 1C-1

MATCHLINE STA. 28+00  
SEE SHEET 1C-3



### NOTES:

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NOTE: DRAWING NOT TO SCALE

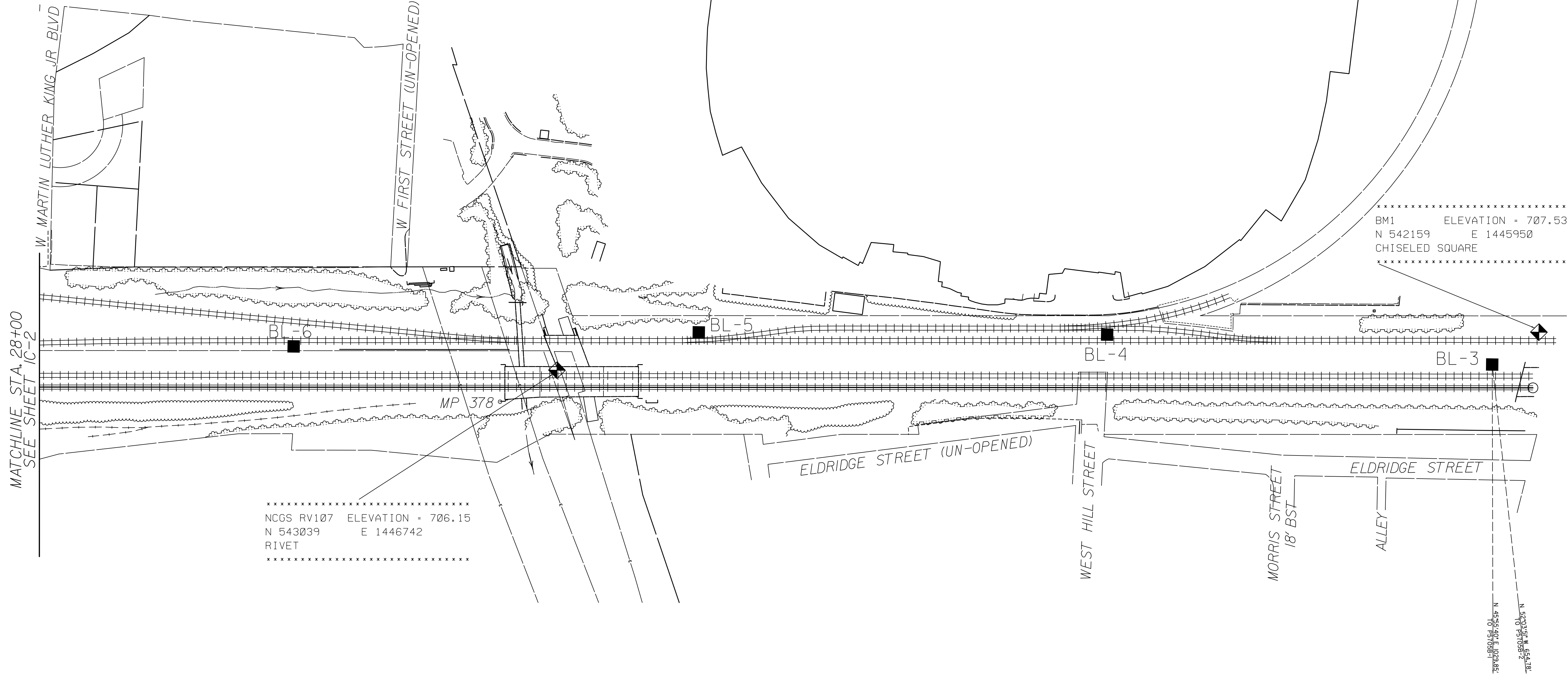
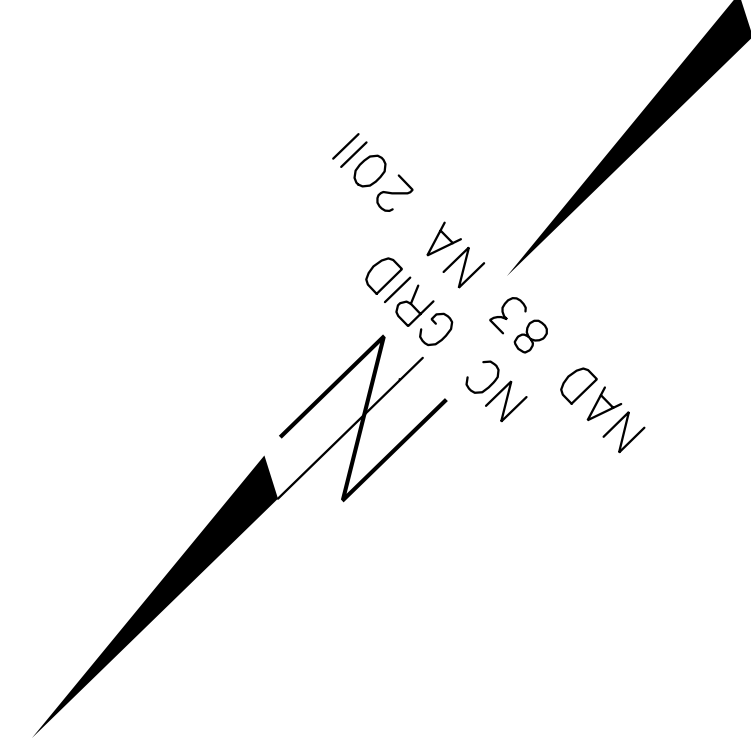
PROJECT REFERENCE NO.	SHEET NO.
P-5705BA & P-5705BB	1C-3
Location and Surveys	

# SURVEY CONTROL SHEET

W/EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

← TO KANNAPOLIS

→ TO GASTONIA



MATCHLINE STA. 28+00  
SEE SHEET 1C-2

\*\*\*\*\*  
 NCGS RV107 ELEVATION = 706.15  
 N 543039 E 1446742  
 RIVET  
 \*\*\*\*\*

\*\*\*\*\*  
 BM1 ELEVATION = 707.53  
 N 542159 E 1445950  
 CHISELED SQUARE  
 \*\*\*\*\*

N 520250 E 654187  
 TO P-5705BB  
 N 455540 E 1029482  
 TO P-5705BA

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NOTE: DRAWING NOT TO SCALE



# SURVEY CONTROL SHEET

## BASELINE

BL POINT	DESC.	NORTH	EAST	ELEVATION
1	GPS P5705B-1	542943.1696	1445221.1543	670.09
2	GPS P5705B-2	542629.3900	1445444.6370	683.31
3	BL-3	542226.8456	1445961.0633	711.07
4	BL-4	542534.2325	1446310.5454	706.62
5	BL-5	542885.1262	1446655.7118	706.95
6	BL-6	543246.8513	1446984.0832	713.51
7	BL-7	543592.5959	1447333.3859	724.54
8	BL-8	543960.2705	1447661.8381	735.08
9	BL-9	544315.6877	1448007.2578	737.60
10	BL-10	544670.0759	1448351.7409	737.03
11	BL-11	544887.9468	1448563.5695	735.72
12	BL-12	545377.9010	1449043.5256	730.95
13	BL-13	545733.0461	1449390.5540	728.48
14	GPS P5705B-3	545901.9120	1449625.9940	728.32
15	GPS P5705B-4	545446.5087	1450075.8714	737.50

## ADDITIONAL CONTROL POINTS

***** 100 ELEVATION = 723.69 N 543923.11 E 1447846.63 MAG-NAIL *****	***** 107 ELEVATION = 736.04 N 544284.04 E 1448783.47 MAG-NAIL *****
***** 101 ELEVATION = 733.37 N 543614.99 E 1448111.27 MAG-NAIL *****	***** 108 ELEVATION = 746.31 N 543938.33 E 1449104.12 MAG-NAIL *****
***** 102 ELEVATION = 740.85 N 543258.01 E 1448474.07 MAG-NAIL *****	***** 109 ELEVATION = 723.43 N 544241.04 E 1449400.60 MAG-NAIL *****
***** 103 ELEVATION = 752.49 N 543541.19 E 1448819.56 MAG-NAIL *****	***** 110 ELEVATION = 715.23 N 544533.50 E 1449079.17 MAG-NAIL *****
***** 104 ELEVATION = 741.72 N 543915.17 E 1448485.41 MAG-NAIL *****	***** 111 ELEVATION = 704.56 N 544808.29 E 1448789.23 MAG-NAIL *****
***** 105 ELEVATION = 729.12 N 544287.46 E 1448289.95 MAG-NAIL *****	***** 112 ELEVATION = 723.25 N 545080.89 E 1449003.30 RE-BAR AND CAP *****
***** 106 ELEVATION = 727.87 N 544545.62 E 1448547.63 MAG-NAIL *****	

## BENCHMARKS

***** BM1 ELEVATION = 707.53 N 542159 E 1445950 CHISELED SQUARE *****	***** BM4 ELEVATION = 738.12 N 544771 E 1448453 CHISELED SQUARE *****
***** BM2 ELEVATION = 706.15 N 543039 E 1446742 RIVET *****	***** BM5 ELEVATION = 729.57 N 545981 E 1449579 NAIL IN PP *****
***** BM3 ELEVATION = 737.50 N 544105 E 1447804 CHISELED SQUARE *****	***** NCGS RV107 ELEVATION = 706.15 N 543039 E 1446742 RIVET *****

EL POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	542211.253	1445906.755							
LINE			N 44°14'46.1" E	4814.93					
PC	545660.421	1449266.331							
CURVE			N 45°57'35.6" E	217.82	03°25'39.1"(RT)	01°34'24.0"	217.85	108.96	3641.71
PCC	545811.842	1449422.912							
CURVE			N 49°55'18.7" E	200.11	04°29'47.0"(RT)	02°14'47.1"	200.16	100.13	2550.55
PCC	545940.677	1449576.028							
CURVE			N 52°24'58.5" E	25.23	00°29'32.7"(RT)	01°57'06.5"	25.23	12.61	2935.53
PT	545940.677	1449576.028							

EY POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	543894.750	1447910.079							
LINE			N 41°01'12.8" W	73.23					
PC	543949.998	1447862.018							
CURVE			N 41°48'53.5" W	74.95	01°35'21.4"(LT)	02°07'12.9"	74.96	37.48	2702.32
PCC	544005.862	1447812.044							
CURVE			N 40°25'12.6" W	99.17	04°22'43.2"(RT)	04°24'50.5"	99.20	49.62	1298.04
PCC	544081.365	1447747.740							
CURVE			N 40°52'55.1" W	148.99	05°18'08.1"(LT)	03°33'27.5"	149.04	74.57	1610.51
PT	544081.365	1447747.740							

EY1 POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	544149.466	1448294.217							
LINE			N 42°54'13.0" W	337.21					
PC	544396.472	1448064.655							
CURVE			N 43°37'33.0" W	157.78	01°26'40.0"(LT)	00°54'55.6"	157.79	78.90	6258.87
PT	544396.472	1448064.655							

EY2 POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	544213.920	1448290.108							
LINE			N 42°16'05.4" W	217.32					
PC	544374.735	1448143.941							
CURVE			N 43°18'11.5" W	227.69	02°04'12.2"(LT)	00°54'32.7"	227.70	113.86	6302.54
PT	544374.735	1448143.941							

EY3 POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	544528.238	1448597.381							
LINE			N 42°04'21.4" W	320.44					
PC	544766.096	1448382.666							
CURVE			N 43°32'07.4" W	126.52	02°55'32.0"(LT)	02°18'43.3"	126.54	63.28	2478.15
PT	544766.096	1448382.666							

EY4 POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	544753.376	1448885.088							
LINE			N 47°09'58.1" W	393.81					
PC	545021.115	1448596.298							
CURVE			N 53°48'34.0" W	72.36	13°17'11.8"(LT)	18°19'15.9"	72.52	36.42	312.73
PCC	545063.841	1448537.901							
CURVE			N 68°03'15.8" W	68.06	15°12'11.7"(LT)	22°16'15.9"	68.26	34.33	257.27
PT	545063.841	1448537.901							

EY5 POINT	N	E	BEARING	DIST
POT	544941.038	1448896.711		
LINE			N 47°31'55.9" W	149.53
POT	545042.000	1448786.406		

EY6 POINT	N	E	BEARING	DIST
POT	545177.393	1449138.838		
LINE			N 42°32'40.2" W	136.00
POT	545277.592	1449046.880		

EY7 POINT	N	E	BEARING	DIST
POT	545538.047	1449397.267		
LINE			N 41°29'52.3" W	99.23
POT	545612.365	1449331.521		

EY8 POINT	N	E	BEARING	DIST
POT	545790.830	1449733.737		
LINE			N 42°33'48.3" W	380.99
POT	546071.439	1449476.035		

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# SURVEY CONTROL SHEET

A3 POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	545977.969	1449672.731							
LINE			S 53°43'24.2" W	24.75					
POT	545963.323	1449652.777							
LINE			S 53°19'14.4" W	25.02					
POT	545948.381	1449632.715							
LINE			S 52°35'46.4" W	24.45					
POT	545933.530	1449613.294							
LINE			S 52°10'41.6" W	25.79					
POT	545917.717	1449592.924							
LINE			S 51°38'52.3" W	24.56					
POT	545902.478	1449573.663							
LINE			S 51°17'35.9" W	25.85					
POT	545886.310	1449553.488							
LINE			S 50°29'43.9" W	22.83					
POT	545871.787	1449535.873							
LINE			S 50°13'33.8" W	26.08					
POT	545855.100	1449515.825							
LINE			S 49°33'07.4" W	22.45					
POT	545840.534	1449498.739							
LINE			S 49°05'46.6" W	25.74					
POT	545823.681	1449479.287							
LINE			S 48°07'25.6" W	23.83					
POT	545807.774	1449461.543							
LINE			S 48°45'32.9" W	13.98					
POT	545798.556	1449451.028							
LINE			S 47°54'25.5" W	50.46					
POT	545764.728	1449413.581							
LINE			S 46°44'17.5" W	34.62					
POT	545741.003	1449388.371							
LINE			S 47°14'04.7" W	10.71					
PC	545733.732	1449380.510							
CURVE			S 45°39'48.2" W	54.32	01°08'09.9(LT)	02°05'29.9"	54.32	27.16	2739.43
PCC	545695.771	1449341.659							
CURVE			S 44°48'18.6" W	112.94	01°07'45.9(LT)	01°00'00.0"	112.94	56.47	5729.66
PT	545615.639	1449262.071							
LINE			S 44°14'25.6" W	594.53					
POT	545189.706	1448847.283							
LINE			S 44°20'33.3" W	48.14					
POT	545155.279	1448813.637							
LINE			S 44°02'19.0" W	50.11					
POT	545119.257	1448778.805							
LINE			S 44°13'53.0" W	49.49					
POT	545083.799	1448744.285							
LINE			S 44°18'08.8" W	48.10					
POT	545049.377	1448710.691							
LINE			S 44°15'48.3" W	50.00					
POT	545013.571	1448675.794							
LINE			S 44°20'53.5" W	49.54					
POT	544978.144	1448641.164							
LINE			S 44°14'17.9" W	49.79					
POT	544942.475	1448606.431							
LINE			S 44°06'26.5" W	49.97					
POT	544906.592	1448571.649							
LINE			S 44°26'40.0" W	49.88					
POT	544870.979	1448536.720							
LINE			S 44°15'08.5" W	50.13					
POT	544835.074	1448501.740							
LINE			N 42°33'57.9" E	0.63					
POT	544835.540	1448502.168							
LINE			S 44°13'24.5" W	50.61					
POT	544799.272	1448466.870							
LINE			S 44°23'04.2" W	48.97					
POT	544764.272	1448432.614							
LINE			S 44°12'46.0" W	50.13					
POT	544728.342	1448397.658							
LINE			S 44°15'47.3" W	50.31					
POT	544692.313	1448362.544							
LINE			S 44°13'41.6" W	48.93					
POT	544657.254	1448328.417							
LINE			S 44°16'13.9" W	49.87					
POT	544621.541	1448293.602							
LINE			S 44°04'49.2" W	50.40					
POT	544585.336	1448258.541							
LINE			S 44°24'18.4" W	48.29					
POT	544550.840	1448224.754							
LINE			S 44°17'14.9" W	50.21					
POT	544514.899	1448189.696							
LINE			S 44°16'28.9" W	49.72					
POT	544479.303	1448154.990							

NOTES:

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# SURVEY CONTROL SHEET

A3 (CONT.)		N	E	BEARING	DIST	DELTA	D	L	T	R
LINE	POT	544443.765	1448120.523	S 44°07'24.6" W	49.51					
LINE	POT	544407.509	1448085.216	S 44°14'24.9" W	50.61					
LINE	POT	544372.296	1448051.076	S 44°06'49.0" W	49.05					
LINE	POT	544336.438	1448016.204	S 44°12'04.8" W	50.02					
LINE	POT	544300.412	1447981.354	S 44°02'57.9" W	50.12					
LINE	POT	544264.893	1447946.685	S 44°18'22.2" W	49.63					
LINE	POT	544228.746	1447911.332	S 44°21'49.5" W	50.56					
LINE	POT	544193.407	1447876.875	S 44°16'33.6" W	49.36					
LINE	POT	544181.563	1447865.393	S 44°06'39.2" W	16.50					
LINE	POT	544157.418	1447841.772	S 44°22'17.3" W	33.78					
LINE	POT	544122.580	1447807.661	S 44°23'45.2" W	48.76					
LINE	POT	544086.677	1447772.617	S 44°18'22.7" W	50.17					
LINE	POT	544050.558	1447737.373	S 44°17'51.1" W	50.47					
LINE	POT	544015.167	1447703.257	S 43°56'56.8" W	49.16					
LINE	POT	543997.339	1447686.149	S 43°49'09.7" W	24.71					
LINE	POT	543978.614	1447668.618	S 43°06'49.6" W	25.65					
LINE	POT	543960.399	1447651.878	S 42°35'01.4" W	24.74					
LINE	POT	543923.359	1447618.789	S 41°46'31.5" W	49.67					
LINE	POT	543886.075	1447586.111	S 41°14'00.0" W	49.58					
LINE	POT	543848.644	1447553.481	S 41°04'47.6" W	49.66					
LINE	POT	543810.944	1447520.598	S 41°05'45.1" W	50.03					
LINE	POT	543773.884	1447487.723	S 41°34'31.6" W	49.54					
LINE	POT	543736.761	1447454.205	S 42°04'42.9" W	50.02					
LINE	POT	543700.363	1447420.928	S 42°26'06.8" W	49.32					
LINE	POT	543663.868	1447387.107	S 42°49'19.9" W	49.76					
LINE	POT	543627.276	1447353.214	S 42°48'25.6" W	49.88					
LINE	POT	543590.615	1447319.106	S 42°56'02.2" W	50.07					
LINE	POT	543553.939	1447285.036	S 42°53'25.5" W	50.06					
LINE	POT	543517.390	1447250.979	S 42°58'43.0" W	49.96					
LINE	POT	543481.058	1447217.155	S 42°57'09.4" W	49.64					
LINE	POT	543481.024	1447217.073	S 67°28'46.0" W	0.09					
LINE	POT	543444.292	1447182.853	S 42°58'20.4" W	50.20					
LINE	POT	543408.192	1447149.196	S 42°59'39.2" W	49.36					
LINE	POT	543371.768	1447114.611	S 43°30'59.3" W	50.23					
LINE	POT	543335.944	1447080.174	S 43°52'08.7" W	49.69					
LINE	POT	543300.593	1447046.004	S 44°01'36.4" W	49.17					
LINE	POT	543264.637	1447011.125	S 44°07'44.1" W	50.09					
LINE	POT	543228.739	1446976.409	S 44°02'27.7" W	49.94					
LINE	POT	543193.447	1446941.901	S 44°21'23.3" W	49.36					
LINE	POT			S 44°09'36.2" W	50.41					

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# SURVEY CONTROL SHEET

A3 (CONT.)		N	E	BEARING	DIST	DELTA	D	L	T	R
POT	POINT	543157.285	1446906.784							
LINE				S 43°59'03.4" W	49.70					
POT		543121.523	1446872.268							
LINE				S 44°17'42.8" W	22.42					
POT		543105.476	1446856.611							
LINE				S 43°57'27.9" W	11.62					
POT		543097.109	1446848.543							
LINE				S 44°14'45.1" W	25.68					
POT		543078.713	1446830.625							
LINE				S 44°29'46.7" W	25.42					
POT		543060.583	1446812.811							
LINE				S 44°19'18.0" W	16.90					
POT		543048.490	1446801.001							
LINE				S 43°51'41.6" W	7.87					
POT		543042.819	1446795.551							
LINE				S 44°25'48.1" W	48.76					
POT		543007.997	1446761.415							
LINE				S 44°11'04.4" W	49.39					
POT		542972.582	1446726.994							
LINE				S 44°11'49.9" W	50.16					
POT		542936.617	1446692.023							
LINE				S 44°10'52.2" W	43.59					
POT		542905.356	1446661.643							
LINE				S 44°52'25.9" W	6.42					
POT		542900.804	1446657.111							
LINE				S 43°54'47.2" W	26.17					
POT		542881.952	1446638.961							
LINE				S 44°16'47.4" W	23.18					
POT		542865.358	1446622.779							
LINE				S 44°14'25.3" W	50.24					
POT		542829.364	1446587.727							
LINE				S 44°12'58.7" W	49.84					
POT		542793.645	1446552.972							
LINE				S 44°13'25.1" W	49.79					
POT		542757.967	1446518.248							
LINE				S 44°11'38.8" W	49.72					
POT		542722.318	1446483.588							
LINE				S 44°09'31.2" W	49.94					
POT		542686.492	1446448.799							
LINE				S 44°15'03.5" W	49.87					
POT		542650.769	1446413.998							
LINE				S 44°17'29.8" W	49.76					
POT		542615.152	1446379.251							
LINE				S 44°09'42.8" W	49.79					
POT		542579.432	1446344.561							
LINE				S 44°15'11.9" W	49.70					
POT		542543.832	1446309.877							
LINE				S 44°05'52.4" W	49.99					
POT		542507.933	1446275.091							
LINE				S 44°10'01.3" W	49.71					
POT		542472.275	1446240.455							
LINE				S 44°13'24.5" W	49.67					
POT		542436.680	1446205.812							
LINE				S 44°12'37.1" W	49.51					
POT		542401.192	1446171.289							
LINE				S 43°58'37.3" W	14.22					
POT		542390.960	1446161.416							
LINE				S 44°11'52.9" W	35.41					
POT		542365.570	1446136.727							
LINE				S 44°06'49.1" W	49.91					
POT		542329.733	1446101.982							
LINE				S 44°16'55.5" W	49.78					
POT		542294.098	1446067.229							
LINE				S 44°12'46.8" W	50.30					
POT		542258.048	1446032.156							
LINE				S 44°18'16.3" W	49.34					
POT		542222.737	1445997.692							
LINE				S 44°22'51.5" W	50.20					
POT		542186.859	1445962.581							
LINE				S 44°23'41.6" W	49.14					
POT		542151.744	1445928.200							
LINE				S 44°23'41.6" W	69.26					
POT		542102.254	1445879.744							
LINE				S 44°33'05.2" W	131.48					
PC		542008.557	1445787.503							
CURVE				S 46°21'23.0" W	248.54	03°36'35.5"(RT)	01°27'08.0"	248.58	124.33	3945.49
PCC		541837.021	1445607.647							
CURVE				S 51°56'07.7" W	234.10	07°32'53.9"(RT)	03°13'21.0"	234.24	117.30	1778.23
PT		541692.688	1445423.337							

NOTES:

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# SURVEY CONTROL SHEET

A3 (CONT.)		N	E	BEARING	DIST	DELTA	D	L	T	R
LINE	POT	541621.343	1445318.711	S 55°42'34.7" W	126.64					
LINE	POT	541597.320	1445287.356	S 52°32'33.6" W	39.50					

A4		N	E	BEARING	DIST
POT	POINT	544009.409	1447757.002		
LINE				S 35°48'56.7" W	27.69
POT		543986.956	1447740.799		
LINE				S 36°12'41.0" W	25.11
POT		543966.695	1447725.964		
LINE				S 35°28'48.4" W	24.88
POT		543946.436	1447711.524		
LINE				S 34°34'19.2" W	25.16
POT		543925.723	1447697.250		
LINE				S 33°39'29.1" W	24.84
POT		543905.049	1447683.484		
LINE				S 32°40'12.1" W	24.71
POT		543884.249	1447670.146		
LINE				S 31°04'41.3" W	24.74
POT		543863.060	1447657.375		
LINE				S 29°55'54.5" W	25.24
POT		543841.183	1447644.779		
LINE				S 30°56'45.9" W	25.01
POT		543819.733	1447631.918		
LINE				S 32°16'41.7" W	24.55
POT		543798.976	1447618.807		
LINE				S 34°01'38.9" W	24.96
POT		543778.289	1447604.839		
LINE				S 35°04'07.9" W	25.10
POT		543757.742	1447590.415		
LINE				S 37°07'14.3" W	25.09
POT		543737.737	1447575.274		
LINE				S 39°37'46.7" W	24.35
POT		543718.983	1447559.743		
LINE				S 42°05'39.2" W	24.87
POT		543700.528	1447543.071		
LINE				S 44°59'54.1" W	24.87
POT		543682.943	1447525.487		
LINE				S 47°13'09.2" W	74.30
POT		543632.477	1447470.952		
LINE				S 47°23'40.2" W	49.88
POT		543598.713	1447434.241		
LINE				S 47°19'10.5" W	49.76
POT		543564.982	1447397.662		
LINE				S 47°30'02.2" W	49.92
POT		543531.259	1447360.859		
LINE				S 47°27'24.2" W	49.62
POT		543497.708	1447324.300		
LINE				S 48°12'17.8" W	50.00
POT		543464.387	1447287.026		
LINE				S 49°05'36.1" W	24.57
POT		543448.300	1447268.459		
LINE				S 49°34'40.0" W	49.80
POT		543416.009	1447230.547		
LINE				S 49°52'55.4" W	49.86
POT		543383.881	1447192.418		
LINE				S 49°54'08.0" W	49.94
POT		543351.717	1447154.219		
LINE				S 49°51'13.5" W	49.59
POT		543319.744	1447116.312		
LINE				S 49°51'28.2" W	50.15
POT		543287.413	1447077.975		
LINE				S 49°35'18.6" W	49.77
POT		543255.147	1447040.078		
LINE				S 49°33'03.1" W	49.54
POT		543223.006	1447002.378		
LINE				S 49°28'35.3" W	49.86
POT		543190.606	1446964.474		
LINE				S 49°30'58.9" W	49.97
POT		543158.162	1446926.465		
LINE				S 49°43'43.2" W	49.93
POT		543125.887	1446888.369		
LINE				S 49°59'47.8" W	37.35
POT		543101.880	1446859.762		
LINE				S 49°28'40.8" W	12.23
POT		543093.936	1446850.468		
LINE				S 48°48'35.7" W	24.58
POT		543077.747	1446831.969		
LINE				S 47°04'25.7" W	25.50
POT		543060.380	1446813.297		
LINE				S 45°57'42.2" W	17.10
POT		543048.490	1446801.001		

A5		N	E	BEARING	DIST
POT	POINT	542905.356	1446661.643		
LINE				S 40°06'57.1" W	6.48
POT		542900.402	1446657.469		
LINE				S 42°25'13.8" W	25.36
POT		542881.682	1446640.363		
LINE				S 39°09'00.5" W	24.75
POT		542862.491	1446624.739		
LINE				S 37°15'53.0" W	25.34
POT		542842.326	1446609.397		
LINE				S 36°36'45.4" W	24.90
POT		542822.341	1446594.548		
LINE				S 36°46'51.9" W	25.16
POT		542802.192	1446579.485		
LINE				S 40°16'44.7" W	24.65
POT		542783.387	1446563.549		
LINE				S 43°36'51.0" W	25.23
POT		542765.119	1446546.144		
LINE				S 44°16'07.5" W	24.54
POT		542747.543	1446529.011		
LINE				S 44°13'54.9" W	49.74
POT		542711.902	1446494.313		
LINE				S 44°15'39.6" W	50.00
POT		542676.094	1446459.417		
LINE				S 44°14'09.6" W	49.80
POT		542640.417	1446424.679		
LINE				S 44°08'38.8" W	49.75
POT		542604.715	1446390.028		
LINE				S 44°17'06.0" W	49.69
POT		542569.140	1446355.330		
LINE				S 44°14'55.9" W	25.30
POT		542551.019	1446337.678		
LINE				S 44°21'08.3" W	24.90
POT		542533.217	1446320.274		
LINE				S 44°25'52.1" W	24.71
POT		542515.569	1446302.973		
LINE				S 44°41'47.5" W	24.83
POT		542497.917	1446285.507		
LINE				S 47°43'14.9" W	25.22
POT		542480.951	1446266.848		
LINE				S 49°48'13.5" W	24.75
POT		542464.978	1446247.944		
LINE				S 50°54'08.0" W	24.74
POT		542449.375	1446228.743		
LINE				S 51°44'36.2" W	25.03
POT		542433.875	1446209.086		
LINE				S 50°11'39.9" W	24.59
POT		542418.130	1446190.192		
LINE				S 46°59'16.8" W	25.01
POT		542401.069	1446171.904		
LINE				S 46°03'15.0" W	14.57
POT		542390.960	1446161.416		

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# SURVEY CONTROL SHEET

M1 POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	545989.141	1449663.644							
LINE			S 54°16'53.5" W	23.87					
POT	545975.204	1449644.263							
LINE			S 53°12'31.9" W	25.10					
POT	545960.174	1449624.165							
LINE			S 52°45'19.0" W	24.99					
POT	545945.048	1449604.270							
LINE			S 52°17'25.0" W	25.47					
POT	545929.470	1449584.121							
LINE			S 52°02'48.2" W	25.70					
POT	545913.662	1449563.853							
LINE			S 51°10'53.9" W	24.38					
POT	545898.380	1449544.859							
LINE			S 50°38'02.5" W	7.42					
PC	545893.675	1449539.125							
CURVE			S 47°51'51.0" W	293.70	06°06'44.0*(LT)	02°04'48.9"	293.82	147.06	2754.43
PT	545696.636	1449321.330							
LINE			S 44°48'29.0" W	4.06					
POT	545693.755	1449318.469							
LINE			S 44°40'01.1" W	7.75					
POT	545688.244	1449313.021							
LINE			S 44°32'45.9" W	7.75					
POT	545682.720	1449307.585							
LINE			S 44°26'43.2" W	7.75					
POT	545677.187	1449302.158							
LINE			S 44°21'53.0" W	7.75					
POT	545671.647	1449296.739							
LINE			S 44°18'15.3" W	7.75					
POT	545666.101	1449291.326							
LINE			S 44°15'50.3" W	7.75					
POT	545660.551	1449285.917							
LINE			S 44°14'37.7" W	7.75					
POT	545654.999	1449280.509							
LINE			S 44°14'25.6" W	189.05					
POT	545519.560	1449148.615							
LINE			S 44°25'45.9" W	47.70					
POT	545485.494	1449115.221							
LINE			S 44°16'16.4" W	49.06					
POT	545450.364	1449080.973							
LINE			S 44°11'55.3" W	50.11					
POT	545414.440	1449046.040							
LINE			S 44°09'50.2" W	49.48					
POT	545378.947	1449011.569							
LINE			S 44°10'23.5" W	49.66					
POT	545343.326	1448976.961							
LINE			S 44°15'56.4" W	50.43					
POT	545307.214	1448941.762							
LINE			S 44°14'33.4" W	49.08					
POT	545272.053	1448907.519							
LINE			S 44°17'21.1" W	49.87					
POT	545236.352	1448872.694							
LINE			S 44°20'18.7" W	50.50					
POT	545200.233	1448837.399							
LINE			S 44°14'41.2" W	49.27					
POT	545164.935	1448803.019							
LINE			S 44°17'51.6" W	49.52					
POT	545129.489	1448768.432							
LINE			S 44°10'25.1" W	49.15					
POT	545094.240	1448734.185							
LINE			S 44°18'37.3" W	48.70					
POT	545059.390	1448700.164							
LINE			S 44°15'27.5" W	50.43					
POT	545023.272	1448664.970							
LINE			S 44°14'15.3" W	49.53					
POT	544987.788	1448630.418							
LINE			S 44°15'14.7" W	49.48					
POT	544952.346	1448595.887							
LINE			S 44°15'30.0" W	50.15					
POT	544916.430	1448560.889							
LINE			S 44°12'57.0" W	49.96					
POT	544880.621	1448526.047							
LINE			S 44°07'56.2" W	49.40					
POT	544845.165	1448491.649							
LINE			S 44°21'45.9" W	50.04					
POT	544809.393	1448456.664							
LINE			S 44°07'17.9" W	50.09					
POT	544773.433	1448421.790							
LINE			S 44°17'15.7" W	49.83					
POT	544737.766	1448386.999							

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# SURVEY CONTROL SHEET

M1 (CONT.)		N	E	BEARING	DIST	DELTA	D	L	T	R
LINE	POT	544702.016	1448352.254	S 44°10'59.6" W	49.85					
LINE	POT	544666.748	1448317.955	S 44°12'07.1" W	49.20					
LINE	POT	544630.957	1448283.123	S 44°13'19.3" W	49.94					
LINE	POT	544595.247	1448248.405	S 44°11'34.9" W	49.81					
LINE	POT	544560.128	1448214.140	S 44°17'41.4" W	49.07					
LINE	POT	544524.554	1448179.569	S 44°10'50.8" W	49.61					
LINE	POT	544488.839	1448144.801	S 44°13'48.8" W	49.84					
LINE	POT	544452.860	1448109.892	S 44°08'06.8" W	50.13					
LINE	POT	544417.569	1448075.537	S 44°13'48.1" W	49.25					
LINE	POT	544382.220	1448041.044	S 44°17'52.1" W	49.39					
LINE	POT	544346.141	1448006.048	S 44°07'37.3" W	50.26					
LINE	POT	544335.878	1447996.029	S 44°18'38.7" W	14.34					
LINE	POT	544324.123	1447984.642	S 44°05'20.3" W	16.37					
LINE	POT	544309.782	1447970.538	S 44°31'21.5" W	20.11					
LINE	POT	544274.621	1447936.380	S 44°10'15.7" W	49.02					
LINE	POT	544238.187	1447900.796	S 44°19'25.7" W	50.93					
LINE	POT	544202.674	1447866.246	S 44°12'45.1" W	49.55					
LINE	POT	544167.237	1447831.649	S 44°18'46.1" W	49.53					
LINE	POT	544132.374	1447797.661	S 44°16'18.8" W	48.69					
LINE	POT	544096.862	1447762.994	S 44°18'36.6" W	49.63					
LINE	POT	544060.465	1447727.567	S 44°13'34.5" W	50.79					
LINE	POT	544024.900	1447692.888	S 44°16'38.5" W	49.67					
LINE	POT	543988.490	1447657.488	S 44°11'39.1" W	50.78					
LINE	POT	543951.074	1447620.988	S 44°17'24.0" W	52.27					
LINE	POT	543914.142	1447585.108	S 44°10'20.1" W	51.49					
LINE	POT	543878.766	1447550.586	S 44°18'00.0" W	49.43					
LINE	POT	543842.831	1447515.715	S 44°08'20.7" W	50.07					
LINE	POT	543808.650	1447482.326	S 44°19'42.4" W	47.78					
LINE	POT	543772.770	1447447.331	S 44°17'04.6" W	50.12					
LINE	POT	543737.340	1447412.807	S 44°15'28.7" W	49.47					
LINE	POT	543702.100	1447378.549	S 44°11'25.7" W	49.15					
LINE	POT	543666.447	1447343.746	S 44°18'31.7" W	49.82					
LINE	POT	543631.391	1447309.633	S 44°13'08.1" W	48.91					
LINE	POT	543595.062	1447274.226	S 44°15'49.1" W	50.73					
LINE	POT	543559.973	1447240.069	S 44°13'44.0" W	48.97					
LINE	POT	543525.263	1447206.355	S 44°09'57.8" W	48.39					
LINE	POT	543490.284	1447172.337	S 44°12'07.3" W	48.79					
LINE	POT	543455.182	1447138.121	S 44°16'03.7" W	49.02					
LINE	POT	543420.449	1447104.337	S 44°12'23.6" W	48.45					
LINE	POT			S 44°12'14.5" W	48.92					

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# SURVEY CONTROL SHEET

M1 (CONT.)		N	E	BEARING	DIST	DELTA	D	L	T	R
POT	POINT	543385.379	1447070.228							
LINE				S 44°13'41.9" W	47.93					
POT		543351.031	1447036.793							
LINE				S 44°12'03.4" W	49.28					
POT		543315.699	1447002.433							
LINE				S 44°13'37.9" W	51.12					
POT		543279.070	1446966.779							
LINE				S 44°17'29.8" W	49.24					
POT		543243.821	1446932.391							
LINE				S 44°15'24.7" W	48.09					
POT		543209.381	1446898.833							
LINE				S 44°23'20.2" W	49.26					
POT		543174.177	1446864.372							
LINE				S 44°10'02.6" W	47.54					
POT		543140.075	1446831.247							
LINE				S 44°15'23.4" W	48.23					
POT		543105.534	1446797.591							
LINE				S 44°16'24.5" W	49.80					
POT		543069.877	1446762.827							
LINE				S 44°19'31.4" W	49.31					
POT		543034.603	1446728.374							
LINE				S 44°09'36.4" W	47.47					
POT		543000.550	1446695.305							
LINE				S 44°13'53.4" W	48.08					
POT		542966.099	1446661.766							
LINE				S 44°15'33.7" W	47.87					
POT		542931.818	1446628.360							
LINE				S 44°18'02.1" W	48.54					
POT		542897.077	1446594.457							
LINE				S 44°12'39.4" W	47.39					
POT		542863.107	1446561.410							
LINE				S 44°17'07.0" W	45.07					
POT		542830.845	1446529.943							
LINE				S 44°07'38.6" W	47.22					
POT		542796.951	1446497.066							
LINE				S 44°20'34.8" W	51.12					
POT		542760.391	1446461.335							
LINE				S 44°13'11.9" W	49.19					
POT		542725.139	1446427.030							
LINE				S 44°21'56.1" W	48.41					
POT		542690.533	1446393.182							
LINE				S 44°12'35.4" W	49.12					
POT		542655.324	1446358.931							
LINE				S 44°16'00.5" W	48.57					
POT		542620.541	1446325.027							
LINE				S 44°15'31.6" W	49.19					
POT		542585.308	1446290.694							
LINE				S 44°15'51.0" W	50.16					
POT		542549.387	1446255.684							
LINE				S 44°13'24.4" W	48.99					
POT		542514.279	1446221.515							
LINE				S 44°17'42.5" W	49.32					
POT		542478.980	1446187.074							
LINE				S 44°09'44.7" W	49.05					
POT		542443.794	1446152.902							
LINE				S 44°20'28.1" W	48.95					
POT		542408.787	1446118.691							
LINE				S 44°15'13.5" W	48.27					
POT		542374.216	1446085.009							
LINE				S 44°07'38.7" W	48.38					
POT		542339.488	1446051.323							
LINE				S 44°13'48.3" W	47.83					
POT		542305.213	1446017.957							
LINE				S 44°17'16.1" W	47.84					
POT		542270.965	1445984.550							
LINE				S 44°14'57.8" W	48.31					
POT		542236.361	1445950.841							
LINE				S 44°07'12.2" W	48.58					
POT		542201.489	1445917.024							
LINE				S 44°10'39.5" W	100.00					
POT		542129.769	1445847.334							
LINE				S 44°08'34.6" W	73.41					
POT		542077.093	1445796.210							
LINE				S 44°23'35.5" W	51.54					
POT		542040.262	1445760.151							
LINE				S 44°18'42.4" W	50.39					
POT		542004.204	1445724.949							
LINE				S 44°14'56.7" W	49.69					
POT		541968.609	1445690.275							

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# SURVEY CONTROL SHEET

M1 (CONT.)		N	E	BEARING	DIST	DELTA	D	L	T	R
LINE	POINT									
POT		541933.070	1445655.655	S 44°14'58.3" W	49.61					
LINE				S 44°23'02.6" W	49.99					
POT		541897.343	1445620.688							
LINE				S 44°34'29.7" W	49.08					
POT		541862.379	1445586.239							
LINE				S 45°04'09.9" W	51.36					
POT		541826.104	1445549.876							
LINE				S 45°28'56.1" W	49.57					
POT		541791.352	1445514.534							
LINE				S 46°29'13.6" W	49.94					
POT		541756.965	1445478.314							
LINE				S 47°35'19.1" W	50.62					
POT		541722.827	1445440.943							
LINE				S 48°39'49.3" W	49.79					
POT		541689.945	1445403.562							
LINE				S 50°13'05.1" W	49.64					
POT		541658.180	1445365.412							
LINE				S 51°23'26.2" W	49.53					
POT		541627.275	1445326.711							
LINE				S 52°43'26.1" W	50.47					
POT		541596.707	1445286.550							
LINE				S 53°51'43.6" W	50.96					
POT		541566.656	1445245.397							
LINE				S 55°01'01.6" W	49.80					
POT		541538.105	1445204.596							
LINE				S 55°55'47.4" W	49.21					
POT		541510.538	1445163.834							
LINE				S 57°04'31.4" W	50.41					
POT		541483.140	1445121.523							
LINE				S 58°11'01.3" W	49.47					
POT		541457.060	1445079.487							
LINE				S 59°09'06.1" W	50.56					
POT		541431.137	1445036.084							
LINE				S 60°11'20.2" W	48.54					
POT		541407.005	1444993.966							
LINE				S 61°07'38.2" W	51.39					
POT		541382.191	1444948.965							
LINE				S 62°09'58.6" W	49.61					
POT		541359.028	1444905.095							
LINE				S 63°11'09.1" W	49.89					
POT		541336.521	1444860.566							
LINE				S 64°03'15.0" W	49.82					
POT		541314.722	1444815.764							
LINE				S 65°14'34.7" W	50.38					
POT		541293.626	1444770.018							
LINE				S 66°01'36.2" W	50.16					
POT		541273.245	1444724.184							
LINE				S 66°45'30.1" W	49.97					
POT		541253.525	1444678.266							
LINE				S 67°36'07.9" W	50.42					
POT		541234.315	1444631.654							
LINE				S 68°22'52.7" W	50.14					
POT		541215.842	1444585.041							
LINE				S 69°11'33.9" W	49.84					
POT		541198.137	1444538.450							
LINE				S 70°03'26.0" W	49.99					
POT		541181.085	1444491.454							
LINE				S 70°39'13.6" W	49.87					
POT		541164.565	1444444.402							
LINE				S 71°21'47.2" W	50.60					
POT		541148.394	1444396.453							
LINE				S 72°21'59.8" W	49.87					
POT		541133.288	1444348.929							
LINE				S 73°09'06.8" W	49.40					
POT		541118.970	1444301.649							
LINE				S 73°57'19.8" W	49.96					
POT		541105.163	1444253.639							
LINE				S 74°51'23.6" W	50.58					
POT		541091.949	1444204.813							
LINE				S 75°44'12.2" W	50.43					
POT		541079.523	1444155.933							
LINE				S 76°24'45.5" W	49.66					
POT		541067.857	1444107.665							
LINE				S 77°21'17.5" W	50.21					
POT		541056.865	1444058.671							
LINE				S 78°09'45.5" W	49.75					
POT		541046.660	1444009.981							
LINE				S 79°00'29.6" W	50.33					

NOTES:

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2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

# SURVEY CONTROL SHEET

M1 (CONT.)		N	E	BEARING	DIST	DELTA	D	L	T	R
POT	POINT	541037.064	1443960.576							
LINE				S 79°55'47.5" W	50.68					
POT		541028.203	1443910.680							
LINE				S 80°36'35.8" W	49.28					
POT		541020.163	1443862.062							
LINE				S 81°18'32.1" W	49.59					
POT		541012.670	1443813.044							
LINE				S 82°13'33.2" W	51.05					
POT		541005.764	1443762.459							
LINE				S 82°59'12.4" W	50.03					
POT		540999.656	1443712.808							
LINE				S 83°46'24.1" W	49.54					
POT		540994.283	1443663.562							
LINE				S 84°45'33.4" W	49.98					
POT		540989.718	1443613.793							
LINE				S 85°43'43.6" W	49.53					
POT		540986.029	1443564.399							
LINE				S 86°29'34.8" W	51.23					
POT		540982.895	1443513.261							
LINE				S 87°26'34.2" W	49.13					
POT		540980.703	1443464.180							
LINE				S 88°25'41.9" W	50.31					
POT		540979.323	1443413.885							
LINE				S 89°17'29.9" W	49.26					
POT		540978.714	1443364.629							
LINE				N 89°56'53.9" W	50.98					
POT		540978.760	1443313.648							
LINE				N 89°20'09.7" W	49.36					
POT		540979.332	1443264.290							
LINE				N 88°48'11.6" W	50.99					
POT		540980.397	1443213.310							
LINE				N 88°26'24.0" W	49.41					
POT		540981.742	1443163.923							
LINE				N 88°19'29.4" W	49.98					
POT		540983.203	1443113.967							
LINE				N 88°19'18.3" W	49.68					
POT		540984.658	1443064.307							
LINE				N 88°15'37.5" W	49.77					
POT		540986.169	1443014.555							
LINE				N 88°09'08.2" W	50.49					
POT		540987.797	1442964.090							
LINE				N 88°10'54.7" W	49.64					
POT		540989.372	1442914.473							
LINE				N 88°08'12.2" W	50.13					
POT		540991.002	1442864.368							
LINE				N 88°14'41.5" W	50.12					
POT		540992.537	1442814.274							
LINE				N 88°07'57.9" W	50.15					
POT		540994.171	1442764.153							
LINE				N 88°11'55.6" W	49.57					
POT		540995.729	1442714.610							
LINE				N 88°11'00.3" W	50.03					
POT		540997.315	1442664.604							
LINE				N 88°10'36.4" W	50.16					
POT		540998.911	1442614.466							
LINE				N 88°08'09.9" W	50.61					
POT		541000.557	1442563.887							
LINE				N 88°07'00.7" W	48.93					
POT		541002.165	1442514.980							
LINE				N 88°15'12.2" W	49.90					
POT		541003.686	1442465.101							
LINE				N 88°04'47.3" W	50.53					
POT		541005.379	1442414.603							
LINE				N 88°07'10.7" W	49.98					
POT		541007.019	1442364.649							
LINE				N 88°11'07.2" W	50.02					
POT		541008.603	1442314.653							
LINE				N 88°02'47.4" W	28.97					
POT		541009.591	1442285.698							

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# SURVEY CONTROL SHEET

M2 POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	546000.795	1449655.895							
LINE			S 53°18'07.9" W	4.42					
PC	545998.156	1449652.354							
CURVE			S 49°27'17.2" W	448.83	09°17'57.1"(LT)	02°04'11.0"	449.30	225.15	2768.43
PT	545706.397	1449311.293							
LINE			S 44°48'18.6" W	4.05					
POT	545703.522	1449308.438							
LINE			S 44°39'53.4" W	7.75					
POT	545698.010	1449302.990							
LINE			S 44°32'40.3" W	7.75					
POT	545692.487	1449297.554							
LINE			S 44°26'39.4" W	7.75					
POT	545686.954	1449292.127							
LINE			S 44°21'50.7" W	7.75					
POT	545681.413	1449286.708							
LINE			S 44°18'14.2" W	7.75					
POT	545675.867	1449281.295							
LINE			S 44°15'49.8" W	7.75					
POT	545670.317	1449275.886							
LINE			S 44°14'37.6" W	7.75					
POT	545664.765	1449270.478							
LINE			S 44°14'25.6" W	140.84					
POT	545563.863	1449172.217							
LINE			S 44°20'08.7" W	46.34					
POT	545530.716	1449139.830							
LINE			S 44°19'50.3" W	49.57					
POT	545495.257	1449105.190							
LINE			S 44°17'44.1" W	49.58					
POT	545459.770	1449070.565							
LINE			S 44°14'19.7" W	49.50					
POT	545424.307	1449036.032							
LINE			S 44°07'19.9" W	50.01					
POT	545388.407	1449001.215							
LINE			S 44°14'15.4" W	49.08					
POT	545353.245	1448966.977							
LINE			S 44°12'39.7" W	50.71					
POT	545316.897	1448931.617							
LINE			S 44°15'51.3" W	48.95					
POT	545281.840	1448897.448							
LINE			S 44°12'15.1" W	49.87					
POT	545246.092	1448862.680							
LINE			S 44°11'44.1" W	49.46					
POT	545210.631	1448828.201							
LINE			S 44°15'16.9" W	50.53					
POT	545174.441	1448792.940							
LINE			S 44°17'01.4" W	51.98					
POT	545137.228	1448756.646							
LINE			S 44°07'32.0" W	46.51					
POT	545103.839	1448724.261							
LINE			S 44°14'00.4" W	48.78					
POT	545068.885	1448690.230							
LINE			S 44°13'05.6" W	50.12					
POT	545032.968	1448655.280							
LINE			S 44°13'35.6" W	49.76					
POT	544997.308	1448620.570							
LINE			S 44°14'26.5" W	49.09					
POT	544962.139	1448586.321							
LINE			S 44°20'10.6" W	50.60					
POT	544925.944	1448550.955							
LINE			S 44°10'28.5" W	49.67					
POT	544890.317	1448516.340							
LINE			S 44°14'42.9" W	49.87					
POT	544854.593	1448481.545							
LINE			S 44°14'54.0" W	49.16					
POT	544819.380	1448447.244							
LINE			S 44°15'39.1" W	50.98					
POT	544782.872	1448411.666							
LINE			S 44°14'14.8" W	49.47					
POT	544747.432	1448377.157							
LINE			S 44°21'37.0" W	49.21					
POT	544712.249	1448342.751							
LINE			S 44°07'18.2" W	49.45					
POT	544676.749	1448308.323							
LINE			S 44°16'32.6" W	50.29					
POT	544640.743	1448273.216							
LINE			S 44°14'29.4" W	50.16					
POT	544604.810	1448238.222							
LINE			S 44°14'58.4" W	48.70					
POT	544569.928	1448204.242							

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# SURVEY CONTROL SHEET

M2 (CONT.) POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
LINE			S 44°13'01.2" W	50.19					
POT	544533.956	1448169.240							
LINE			S 44°15'48.7" W	49.62					
POT	544498.420	1448134.606							
LINE			S 44°14'15.8" W	50.39					
POT	544462.320	1448099.454							
LINE			S 44°10'33.2" W	48.03					
POT	544427.871	1448065.982							
LINE			S 44°16'02.6" W	50.77					
POT	544391.516	1448030.545							
LINE			S 44°12'57.2" W	50.17					
POT	544355.557	1447995.557							
LINE			S 44°15'37.2" W	49.02					
POT	544320.448	1447961.343							
LINE			S 44°06'43.6" W	50.29					
POT	544284.344	1447926.341							
LINE			S 44°17'44.4" W	50.56					
POT	544248.154	1447891.030							
LINE			S 44°14'30.3" W	49.42					
POT	544212.746	1447856.547							
LINE			S 44°15'50.4" W	49.76					
POT	544177.109	1447821.814							
LINE			S 44°14'51.4" W	48.89					
POT	544142.084	1447787.697							
LINE			S 44°14'44.6" W	49.09					
POT	544106.915	1447753.442							
LINE			S 44°14'39.1" W	52.10					
POT	544069.589	1447717.088							
LINE			S 44°11'18.4" W	48.23					
POT	544035.008	1447683.473							
LINE			S 44°16'20.4" W	51.56					
POT	543998.091	1447647.482							
LINE			S 44°11'47.5" W	52.34					
POT	543960.565	1447610.994							
LINE			S 44°15'19.2" W	51.90					
POT	543923.389	1447574.772							
LINE			S 44°17'03.9" W	48.58					
POT	543888.613	1447540.854							
LINE			S 44°14'27.6" W	50.50					
POT	543852.436	1447505.623							
LINE			S 44°18'06.7" W	48.28					
POT	543817.881	1447471.900							
LINE			S 44°16'16.5" W	48.81					
POT	543782.929	1447437.826							
LINE			S 44°15'59.9" W	49.78					
POT	543747.284	1447403.082							
LINE			S 44°15'13.2" W	49.62					
POT	543711.745	1447368.457							
LINE			S 44°19'17.5" W	49.27					
POT	543676.499	1447334.036							
LINE			S 44°14'29.8" W	49.68					
POT	543640.906	1447299.373							
LINE			S 44°17'11.4" W	50.20					
POT	543604.972	1447264.323							
LINE			S 44°15'04.5" W	49.46					
POT	543569.546	1447229.811							
LINE			S 44°14'52.0" W	48.15					
POT	543535.054	1447196.213							
LINE			S 44°14'31.8" W	49.35					
POT	543499.703	1447161.785							
LINE			S 44°11'26.2" W	47.70					
POT	543465.498	1447128.533							
LINE			S 44°14'04.7" W	49.12					
POT	543430.304	1447094.267							
LINE			S 44°13'05.1" W	49.18					
POT	543395.059	1447059.971							
LINE			S 44°14'38.9" W	47.71					
POT	543360.884	1447026.686							
LINE			S 44°15'10.7" W	49.19					
POT	543325.650	1446992.359							
LINE			S 44°15'39.5" W	51.31					
POT	543288.900	1446956.545							
LINE			S 44°17'39.4" W	49.09					
POT	543253.766	1446922.266							
LINE			S 44°17'30.8" W	48.35					
POT	543219.159	1446888.504							
LINE			S 44°12'41.1" W	48.60					
POT	543184.321	1446854.612							
LINE			S 44°20'05.2" W	48.36					

NOTES:

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# SURVEY CONTROL SHEET

M2 (CONT.)		N	E	BEARING	DIST	DELTA	D	L	T	R
POT	POINT	543149.732	1446820.817							
LINE				S 44°15'59.1" W	48.05					
POT		543115.324	1446787.279							
LINE				S 44°16'17.9" W	46.28					
POT		543082.186	1446754.973							
LINE				S 44°14'56.7" W	49.91					
POT		543046.436	1446720.148							
LINE				S 44°09'31.8" W	51.54					
POT		543009.462	1446684.244							
LINE				S 44°21'29.9" W	46.60					
POT		542976.147	1446651.667							
LINE				S 44°11'11.9" W	48.32					
POT		542941.499	1446617.989							
LINE				S 44°11'43.3" W	48.19					
POT		542906.950	1446584.397							
LINE				S 44°16'26.7" W	47.33					
POT		542873.062	1446551.357							
LINE				S 44°17'43.2" W	44.27					
POT		542841.375	1446520.440							
LINE				S 44°09'51.0" W	49.01					
POT		542806.220	1446486.296							
LINE				S 44°13'56.8" W	50.04					
POT		542770.366	1446451.390							
LINE				S 44°14'17.7" W	48.83					
POT		542735.385	1446417.327							
LINE				S 44°15'05.1" W	48.98					
POT		542700.301	1446383.148							
LINE				S 44°12'43.1" W	49.00					
POT		542665.181	1446348.981							
LINE				S 44°15'06.6" W	49.06					
POT		542630.038	1446314.744							
LINE				S 44°20'04.4" W	48.53					
POT		542595.329	1446280.832							
LINE				S 44°16'17.1" W	50.60					
POT		542559.095	1446245.508							
LINE				S 44°16'16.6" W	48.15					
POT		542524.619	1446211.898							
LINE				S 44°12'14.4" W	50.34					
POT		542488.533	1446176.801							
LINE				S 44°17'47.5" W	48.21					
POT		542454.030	1446143.135							
LINE				S 44°18'22.5" W	49.00					
POT		542418.967	1446108.911							
LINE				S 44°12'34.1" W	48.95					
POT		542383.883	1446074.782							
LINE				S 44°09'00.4" W	48.72					
POT		542348.925	1446040.846							
LINE				S 44°13'52.5" W	47.33					
POT		542315.014	1446007.833							
LINE				S 44°14'05.5" W	48.56					
POT		542280.224	1445973.960							
LINE				S 44°14'33.6" W	47.77					
POT		542246.000	1445940.629							
LINE				S 44°13'48.6" W	48.47					
POT		542211.268	1445906.818							
LINE				S 44°16'07.7" W	100.00					
POT		542139.658	1445837.013							
LINE				S 44°16'02.3" W	62.37					
POT		542094.995	1445793.478							
LINE				S 44°12'36.7" W	11.12					
POT		542087.023	1445785.722							
LINE				S 44°11'16.7" W	50.84					
POT		542050.566	1445750.284							
LINE				S 44°16'30.4" W	50.64					
POT		542014.310	1445714.934							
LINE				S 44°19'53.1" W	49.87					
POT		541978.636	1445680.083							
LINE				S 44°22'27.6" W	50.57					
POT		541942.486	1445644.714							
LINE				S 44°20'59.7" W	48.92					
POT		541907.502	1445610.515							
LINE				S 44°27'02.0" W	51.03					
POT		541871.076	1445574.781							
LINE				S 44°46'54.1" W	48.99					
POT		541836.300	1445540.269							
LINE				S 45°29'20.8" W	49.29					
POT		541801.749	1445505.123							
LINE				S 46°25'27.8" W	49.10					
POT		541767.905	1445469.553							

NOTES:

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# SURVEY CONTROL SHEET

M2 (CONT.)		N	E	BEARING	DIST	DELTA	D	L	T	R
LINE	POINT									
POT		541733.790	1445432.202	S 47°35'33.4" W	50.59					
LINE				S 48°52'45.3" W	49.46					
POT		541701.264	1445394.944							
LINE				S 50°03'54.4" W	28.43					
PC		541683.015	1445373.146							
CURVE				S 53°52'36.6" W	309.92	06°38'33.1"(RT)	02°08'32.1"	310.07	155.22	2674.71
PCC		541500.313	1445122.811							
CURVE				S 59°04'49.5" W	159.09	03°45'52.7"(RT)	02°21'58.2"	159.10	79.59	2421.63
PCC		541418.569	1444986.333							
CURVE				S 61°23'44.9" W	45.85	00°51'58.1"(RT)	01°53'20.7"	45.85	22.93	3033.12
PCC		541396.618	1444946.078							
CURVE				S 63°05'50.1" W	143.55	02°32'12.3"(RT)	01°46'01.4"	143.56	71.79	3242.59
PT		541331.663	1444818.061							
LINE				S 64°41'42.0" W	53.89					
PC		541308.627	1444769.340							
CURVE				S 67°46'39.8" W	303.90	05°03'34.4"(RT)	01°39'51.9"	303.99	152.10	3442.54
PCC		541193.693	1444488.015							
CURVE				S 75°33'56.5" W	640.87	10°30'59.0"(RT)	01°38'19.3"	641.75	321.79	3496.53
PCC		541033.943	1443867.373							
CURVE				S 81°42'39.1" W	104.81	01°46'26.4"(RT)	01°41'33.5"	104.81	52.41	3385.10
PCC		541018.833	1443763.662							
CURVE				S 83°36'16.9" W	114.26	02°00'49.0"(RT)	01°45'44.0"	114.27	57.14	3251.46
PT		541006.106	1443650.109							
LINE				S 85°23'10.2" W	66.22					
PC		541000.779	1443584.102							
CURVE				S 88°56'25.6" W	377.57	06°21'57.8"(RT)	01°41'06.8"	377.76	189.08	3400.00
PT		540993.797	1443206.592							
LINE				N 88°07'10.2" W	616.55					
POT		541014.029	1442590.376							
LINE				N 87°06'01.3" W	3.75					
POT		541014.219	1442586.631							
LINE				N 88°06'15.3" W	321.31					
POT		541024.848	1442265.496							

NOTES:

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.

# PROPOSED ALIGNMENT CONTROL SHEET

A1			
TYPE	STATION	NORTH	EAST
POT	35+87.79	543496.7714	1447233.8636
POT	36+19.04	543476.2284	1447210.3148
PC	38+47.19	543309.8433	1447054.2047
PT	39+53.72	543232.8411	1446980.5999
POT	48+42.17	542596.3343	1446360.7516
POT	49+15.28	542543.8320	1446309.8770

A6			
TYPE	STATION	NORTH	EAST
POT	44+11.83	542904.6403	1446660.9888
POT	44+41.83	542883.1477	1446640.0587
PC	45+32.64	542810.7032	1446585.2941
PT	45+92.21	542765.4617	1446546.4327
POT	47+18.47	542674.9999	1446458.3519

PLATFORM			
TYPE	STATION	NORTH	EAST
POT	19+68.93	544638.5594	1448379.2632
POT	30+83.93	543839.7519	1447601.3620

S1			
TYPE	STATION	NORTH	EAST
POT	10+00.00	545364.5649	1449017.5662
POT	10+39.98	545335.9225	1448989.6733
TS	11+56.77	545247.0124	1448913.9457
SC	11+96.77	545216.4857	1448888.0979
CS	12+53.24	545172.7295	1448852.3906
ST	12+93.24	545141.2854	1448827.6669
POT	12+98.24	545137.3459	1448824.5879
POT	13+38.22	545105.8457	1448799.9681
POT	14+59.74	545010.1003	1448725.1357
POT	14+99.72	544978.6001	1448700.5159
TS	16+73.33	544841.8174	1448593.6098
SC	17+35.33	544793.2629	1448555.0575
CS	18+19.93	544729.5302	1448499.4104
ST	18+81.93	544684.7830	1448456.4976
TS	28+53.03	543989.0635	1447778.9861
SC	28+84.03	543966.8870	1447757.3250
CS	31+32.61	543796.0340	1447576.8418
ST	31+63.61	543775.6202	1447553.5121
POT	33+11.81	543678.1944	1447441.8315
POT	33+51.79	543651.9125	1447411.7041
POT	34+77.81	543569.0698	1447316.7403
POT	35+17.79	543542.7879	1447286.6129
POT	35+87.79	543496.7714	1447233.8636
POT	36+19.04	543476.2284	1447210.3148
TS	36+98.79	543423.8025	1447150.2182
SC	37+29.79	543403.4028	1447126.8762
CS	37+81.55	543369.0985	1447088.1213
ST	38+12.55	543348.4054	1447065.0390
POT	41+44.04	543126.9013	1446818.4088
POT	41+84.02	543098.2655	1446790.5091
POT	49+50.00	542549.6314	1446255.9797

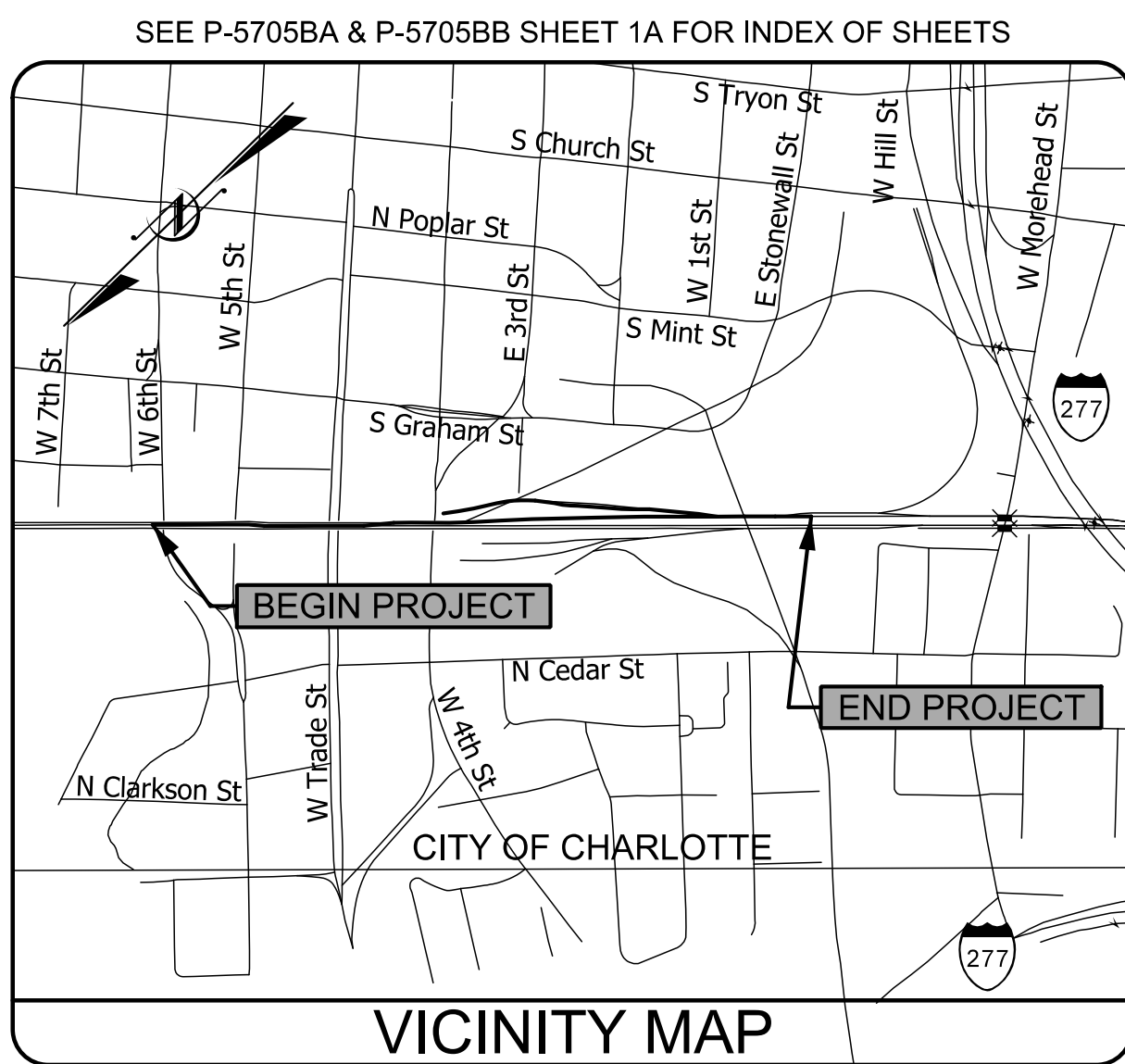
S2			
TYPE	STATION	NORTH	EAST
POT	14+59.74	545010.1003	1448725.1357
POT	14+99.72	544978.6001	1448700.5159
TS	16+58.94	544859.9602	1448594.3327
SC	17+20.94	544814.0808	1448552.6326
CS	18+17.49	544746.0421	1448484.1231
ST	18+79.49	544704.6596	1448437.9570
TS	19+86.23	544634.0276	1448357.9348
SC	20+17.23	544613.4785	1448334.7241
CS	22+45.81	544455.8812	1448169.2106
ST	22+76.81	544433.7047	1448147.5495
TS	28+04.14	544055.9098	1447779.6421
SC	28+35.14	544033.6683	1447758.0478
CS	29+27.51	543966.3466	1447694.8013
ST	29+58.51	543943.4072	1447673.9498
TS	31+09.22	543831.7313	1447572.7444
SC	31+71.22	543785.9406	1447530.9451
CS	32+54.09	543725.9611	1447473.7618
ST	33+16.09	543682.0250	1447430.0173
POT	34+76.06	543569.0698	1447316.7403
POT	35+16.04	543542.7879	1447286.6129

Y5			
TYPE	STATION	NORTH	EAST
POT	10+00.00	543344.1813	1447318.1107
PC	10+80.08	543401.0694	1447261.7529
PT	11+08.41	543403.1978	1447235.8219
POT	13+34.24	543270.8262	1447052.8461

Y6			
TYPE	STATION	NORTH	EAST
POT	10+29.00	544802.8691	1448599.9271
PC	10+64.06	544781.1647	1448627.4549
PT	11+50.97	544704.8336	1448630.0532
POT	12+74.93	544621.6394	1448538.1527

**TIP PROJECT: P-5705BA**

**CONTRACT: C204058**



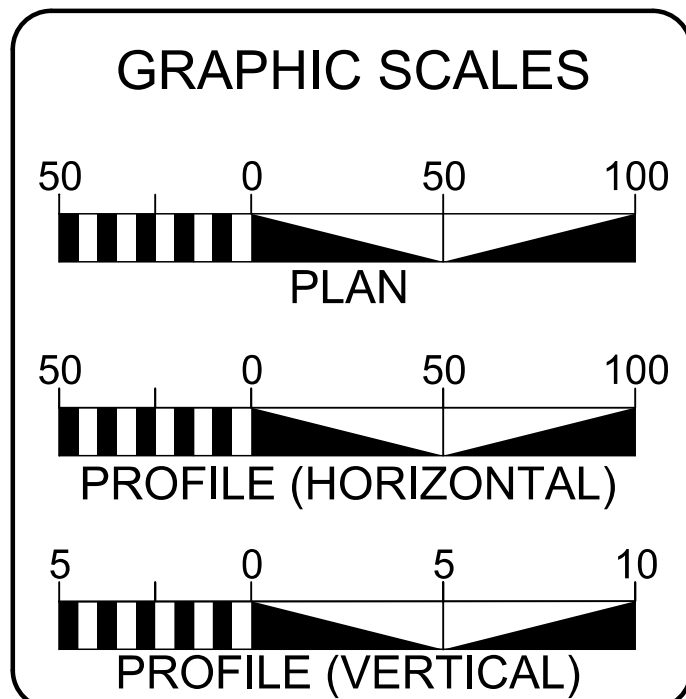
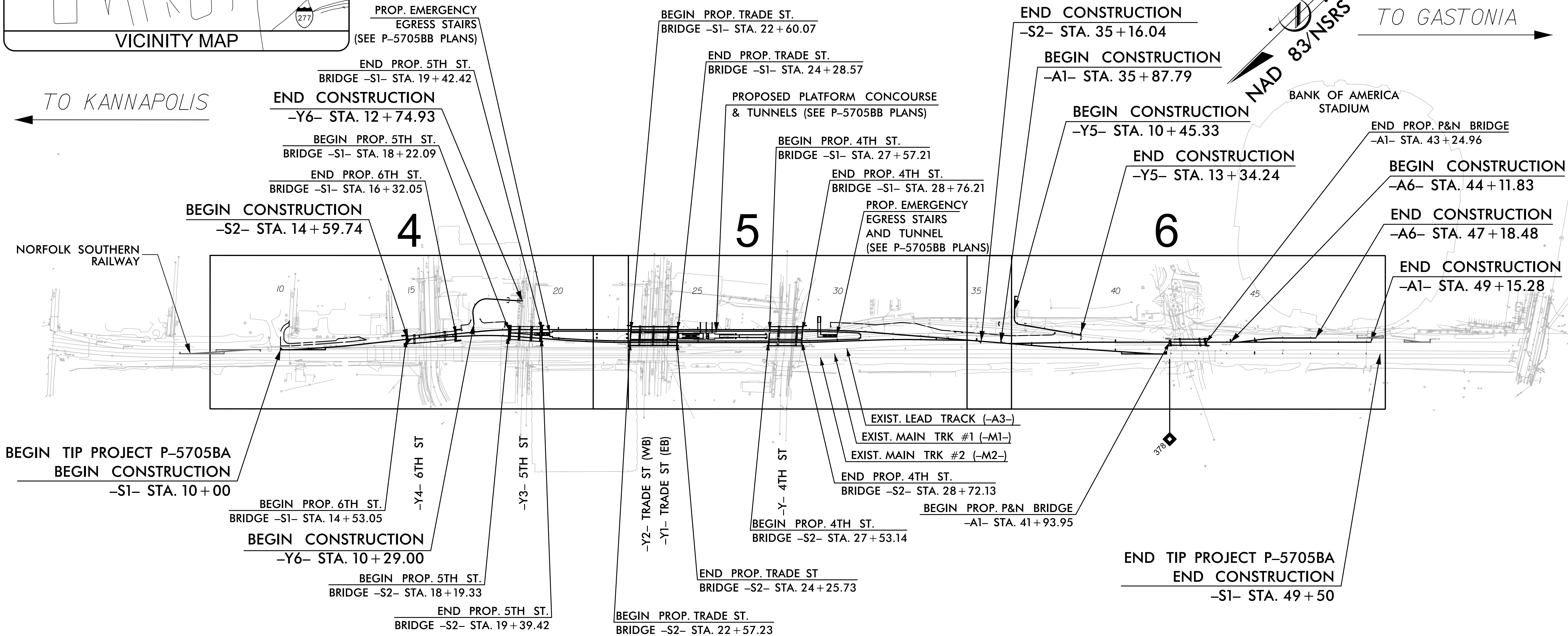
STATE OF NORTH CAROLINA  
RAIL DIVISION

**MECKLENBURG COUNTY**

**LOCATION: CHARLOTTE GATEWAY STATION - TRACK, STRUCTURES AND SIGNALS**  
**TYPE OF WORK: DRAINAGE, PAVING, GRADING, STRUCTURES**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5705BA	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
32213		ROW	
44475.1.2		P.E. / UTIL P.E.	
44475.3.6	FR-TII-0047-17	CONST./UTIL CONST.	
44475FHWA.3.1	STBGDA-1001(079)	CONST.	

**CHARLOTTE PROJ. NO.: TK1715009**  
**PART 1 OF 2**



PROJECT LENGTH	
LENGTH OF RAIL TIP PROJECT	0.612 MILES
LENGTH OF STRUCTURES TIP PROJECT	0.136 MILES
TOTAL LENGTH OF RAIL TIP PROJECT	0.748 MILES
LENGTH MEASURED ALONG -S1-	
NCDOT CONTACT:	MATTHEW SIMMONS, P.E. NCDOT PROJECT MANAGER

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609  
NC License No: C-1554

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: N/A

LETTING DATE: MAY 15, 2018

COREY VERNIER, P.E.  
RAIL PROJECT ENGINEER

DAVID HAWKINS, P.E.  
STRUCTURE PROJECT ENGINEER

JAMES BYRD, P.E.  
HYDRAULICS PROJECT ENGINEER

ERIC SECKINGER, P.E.  
ROADWAY PROJECT ENGINEER

MATTHEW SIMMONS, P.E.  
NCDOT PROJECT MANAGER

RAIL ENGINEER

HYDRAULICS ENGINEER

DocuSigned by: Corey P. Vernier  
SIGNATURE: P.E.

DocuSigned by: James A. Byrd  
SIGNATURE: P.E.

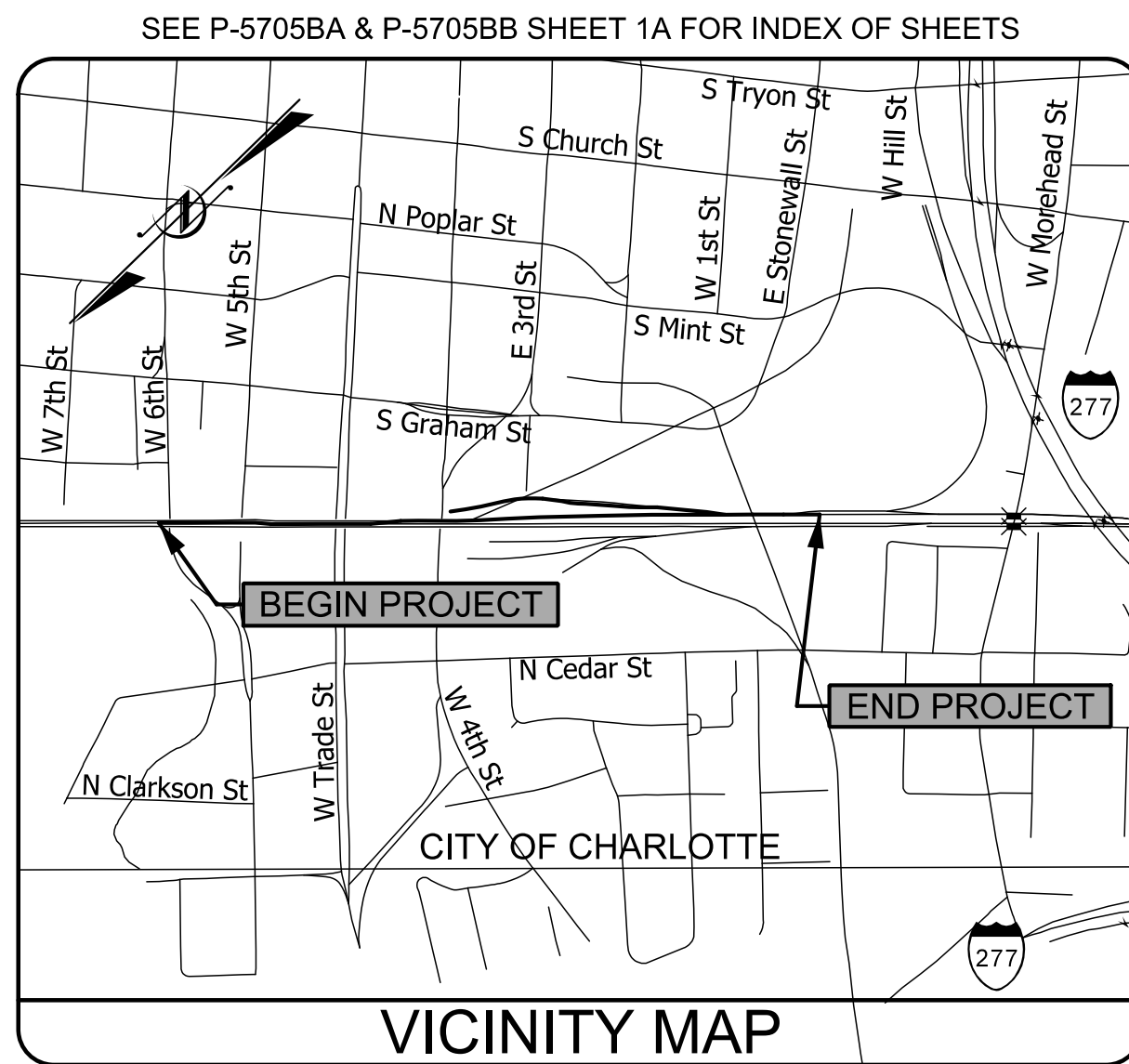
NC DEPARTMENT OF TRANSPORTATION  
**RAIL DIVISION**  
DESIGN AND CONSTRUCTION



**TIP PROJECT: P-5705BA**

**CONTRACT: C204058**

REV #1: REVISE LETTING DATE



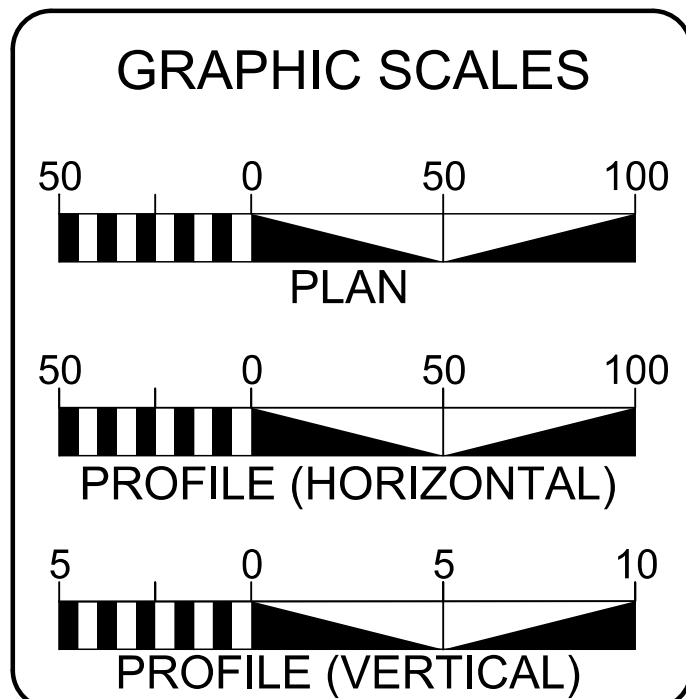
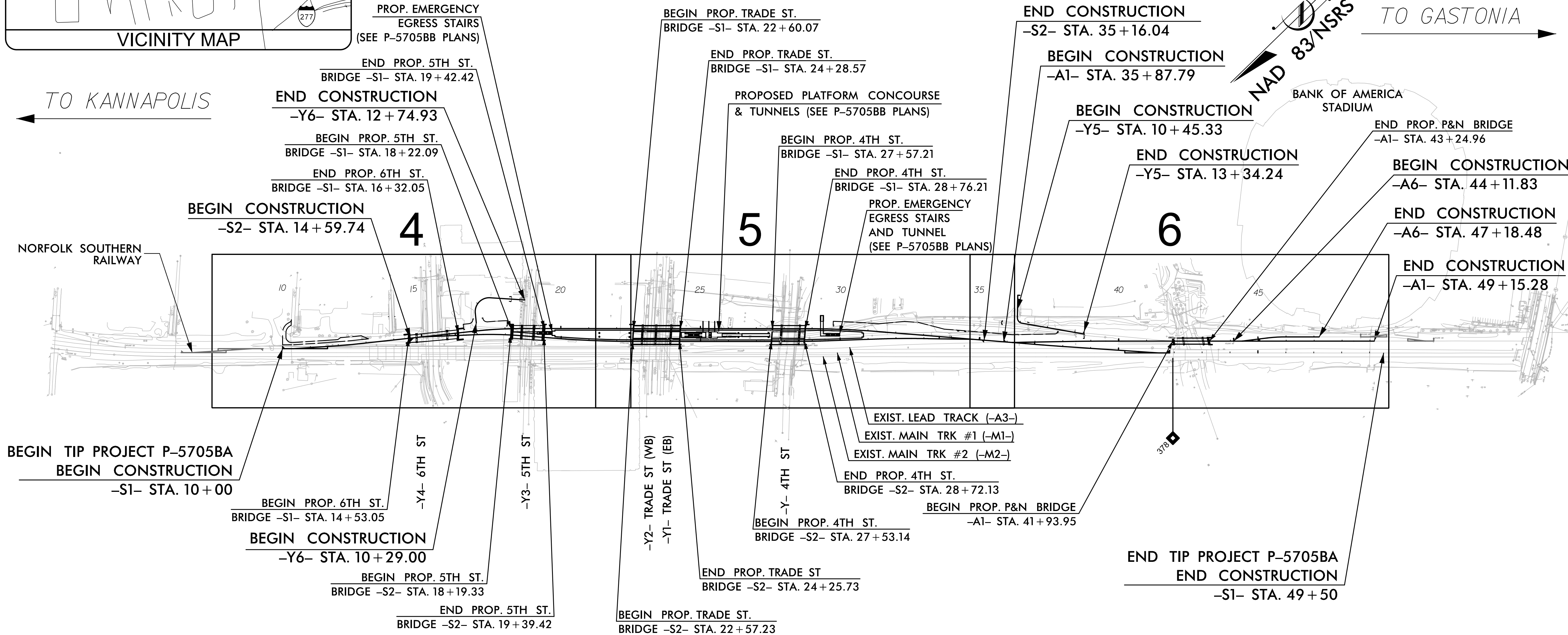
STATE OF NORTH CAROLINA  
RAIL DIVISION

**MECKLENBURG COUNTY**

**LOCATION: CHARLOTTE GATEWAY STATION - TRACK, STRUCTURES AND SIGNALS**  
**TYPE OF WORK: DRAINAGE, PAVING, GRADING, STRUCTURES**

**CHARLOTTE PROJ. NO.: TK1715009**  
**PART 1 OF 2**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5705BA	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
32213		ROW	
44475.1.2		P.E. / UTIL P.E.	
44475.3.6	FR-TII-0047-17	CONST./UTIL CONST.	
44475FHWA.3.1	STBGDA-1001(079)	CONST.	



PROJECT LENGTH	
LENGTH OF RAIL TIP PROJECT	0.612 MILES
LENGTH OF STRUCTURES TIP PROJECT	0.136 MILES
TOTAL LENGTH OF RAIL TIP PROJECT	0.748 MILES
LENGTH MEASURED ALONG -S1-	
NCDOT CONTACT:	MATTHEW SIMMONS, P.E. NCDOT PROJECT MANAGER

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609  
NC License No: C-1554

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: N/A

LETTING DATE: MAY 29, 2018

COREY VERNIER, P.E.  
RAIL PROJECT ENGINEER

DAVID HAWKINS, P.E.  
STRUCTURE PROJECT ENGINEER

JAMES BYRD, P.E.  
HYDRAULICS PROJECT ENGINEER

ERIC SECKINGER, P.E.  
ROADWAY PROJECT ENGINEER

MATTHEW SIMMONS, P.E.  
NCDOT PROJECT MANAGER

RAIL ENGINEER

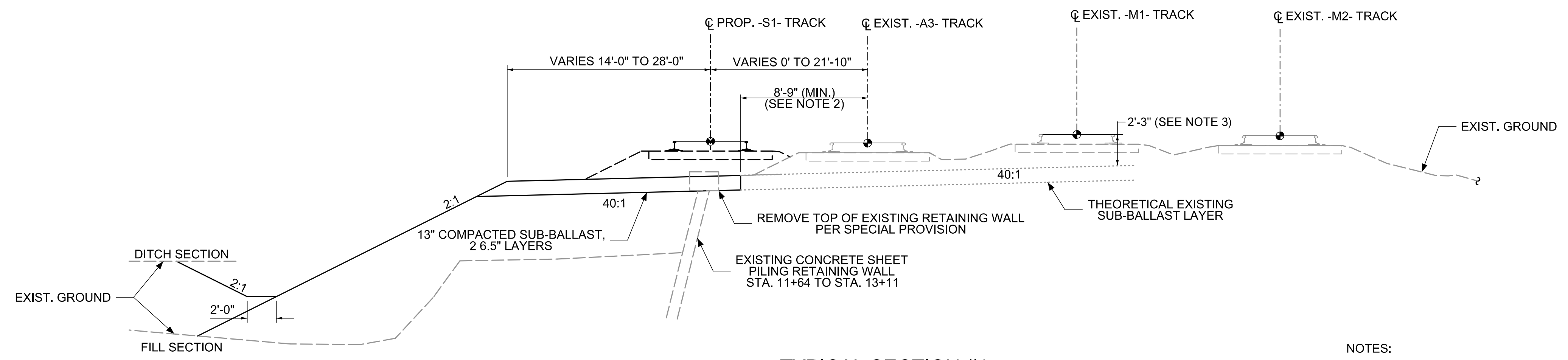
HYDRAULICS ENGINEER

DocuSigned by: Corey P. Vernier  
SIGNATURE: [Stamp: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037992]

DocuSigned by: James A. Byrd  
SIGNATURE: [Stamp: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15764]

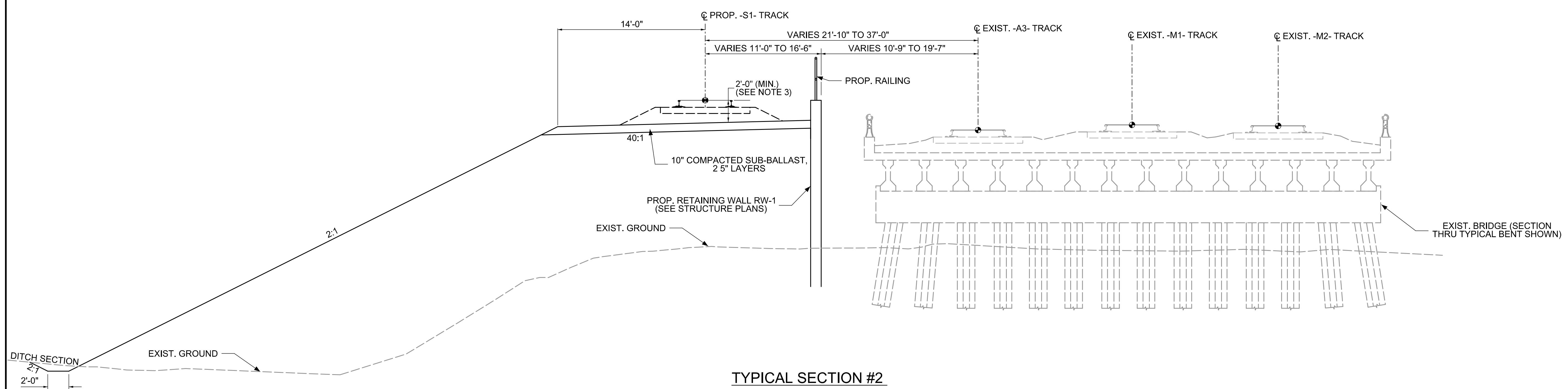
NC DEPARTMENT OF TRANSPORTATION  
**RAIL DIVISION**  
DESIGN AND CONSTRUCTION

PROJECT REFERENCE NO. P-5705BA		SHEET NO. 2	
RW SHEET NO.			
RAILROAD DESIGN ENGINEER			



**TYPICAL SECTION #1**  
 -S1- STA. 10+00 TO STA. 13+11

- NOTES:
1. THE TYPICAL SECTIONS TAKE PRECEDENCE OVER THE CROSS SECTIONS. CROSS SECTIONS ARE PROVIDED FOR REFERENCE ONLY.
  2. DIMENSION SHOWN IS FOR BIDDING PURPOSES ONLY AND MUST BE COORDINATED WITH THE NORFOLK SOUTHERN REPRESENTATIVE PRIOR TO CONSTRUCTION. SEE 'EXCAVATION ADJACENT TO ACTIVE TRACK DETAIL' FOR REQUIREMENTS.
  3. ANY CHANGES IN THE DISTANCE BETWEEN THE PROPOSED TOP OF RAIL AND THE PROPOSED TOP OF SUB-BALLAST SHALL BE MADE OVER A DISTANCE OF 50 TRACK FEET OR AS DIRECTED BY THE RAILROAD ENGINEER IN THE FIELD. POSITIVE DRAINAGE AWAY FROM THE MAINLINE TRACKS SHALL BE MAINTAINED AT ALL TIMES WHILE MAINTAINING A CONSTANT 40:1 CROSS SLOPE WITHIN 5' OF PROPOSED TRACK CENTERLINE.



**TYPICAL SECTION #2**  
 -S1- STA. 13+11 TO STA. 14+53 (+/- BEGIN BRIDGE)

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.

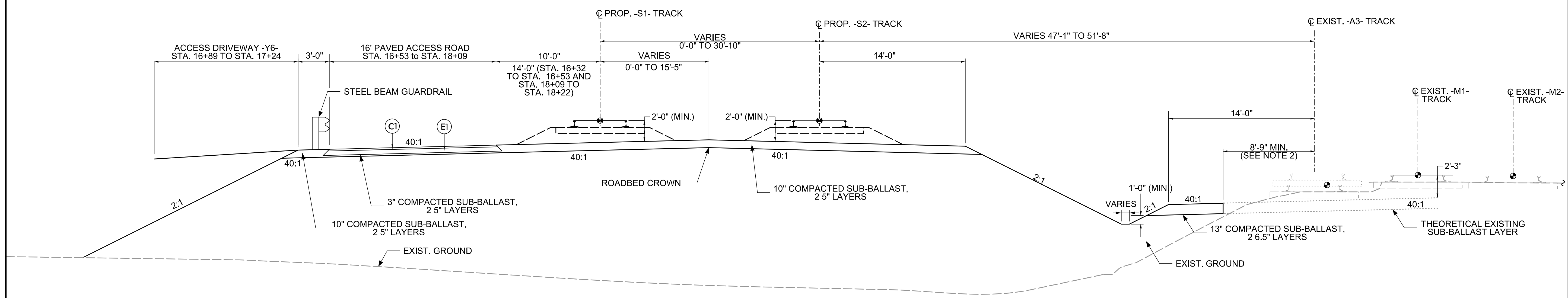
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343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609  
NC License No: C-1554

PROJECT REFERENCE NO. P-5705BA SHEET NO. 2A

DATE: MARCH 16, 2018

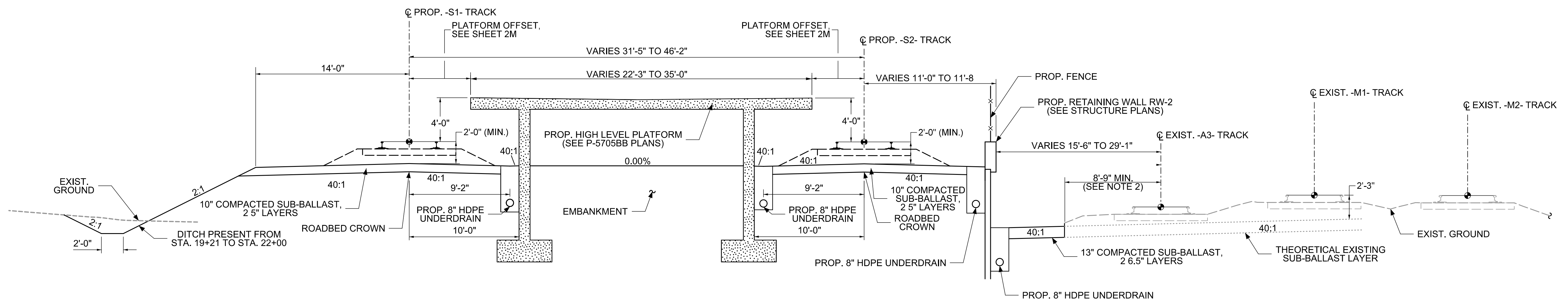
R/W SHEET NO.

RAILROAD DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER



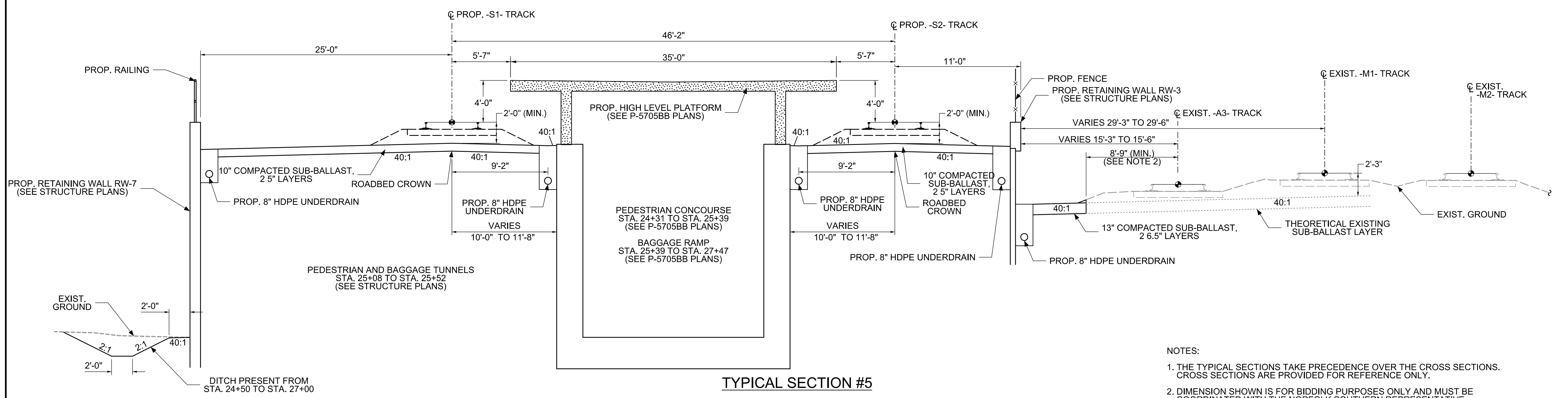
**TYPICAL SECTION #3**  
-S1- STA. 16+32 (+/- END BRIDGE) TO STA. 18+22 (+/- BEGIN BRIDGE)

- NOTES:
1. THE TYPICAL SECTIONS TAKE PRECEDENCE OVER THE CROSS SECTIONS. CROSS SECTIONS ARE PROVIDED FOR REFERENCE ONLY.
  2. DIMENSION SHOWN IS FOR BIDDING PURPOSES ONLY AND MUST BE COORDINATED WITH THE NORFOLK SOUTHERN REPRESENTATIVE PRIOR TO CONSTRUCTION. SEE 'EXCAVATION ADJACENT TO ACTIVE TRACK DETAIL' FOR REQUIREMENTS.



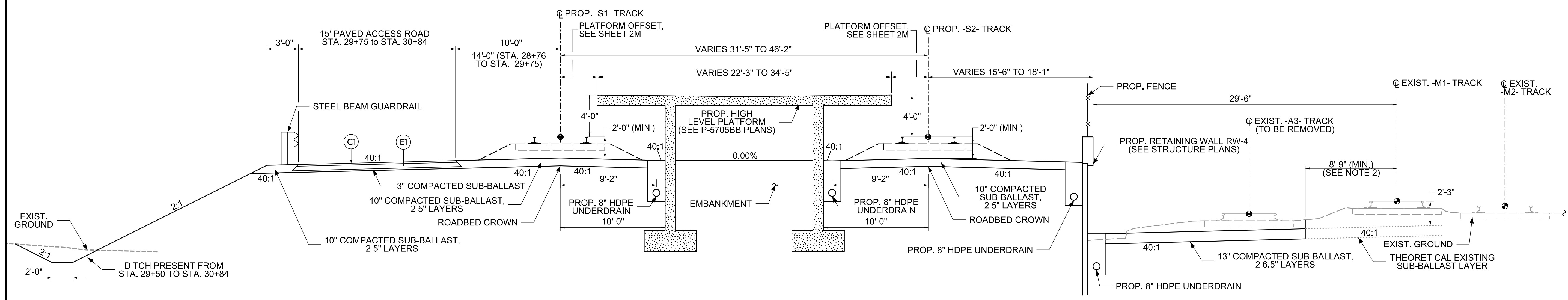
**TYPICAL SECTION #4**  
-S1- STA. 19+42 (+/- END BRIDGE) TO STA. 22+60 (+/- BEGIN BRIDGE)

PROJECT REFERENCE NO. P-5705BA		SHEET NO. 2B	
RW SHEET NO.			
RAILROAD DESIGN ENGINEER		PAVEMENT DESIGN ENGINEER	



**TYPICAL SECTION #5**  
-S1- STA. 24+28 (+/- END BRIDGE) TO STA. 27+57 (+/- BEGIN BRIDGE)

- NOTES:
1. THE TYPICAL SECTIONS TAKE PRECEDENCE OVER THE CROSS SECTIONS. CROSS SECTIONS ARE PROVIDED FOR REFERENCE ONLY.
  2. DIMENSION SHOWN IS FOR BIDDING PURPOSES ONLY AND MUST BE COORDINATED WITH THE NORFOLK SOUTHERN REPRESENTATIVE PRIOR TO CONSTRUCTION. SEE 'EXCAVATION ADJACENT TO ACTIVE TRACK DETAIL' FOR REQUIREMENTS.



**TYPICAL SECTION #6**  
-S1- STA. 28+76 (+/- END BRIDGE) TO STA. 30+84

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.

3/19/2018  
h\_02B.dgn

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.

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Raleigh, North Carolina 27609  
NC License No: C-1554

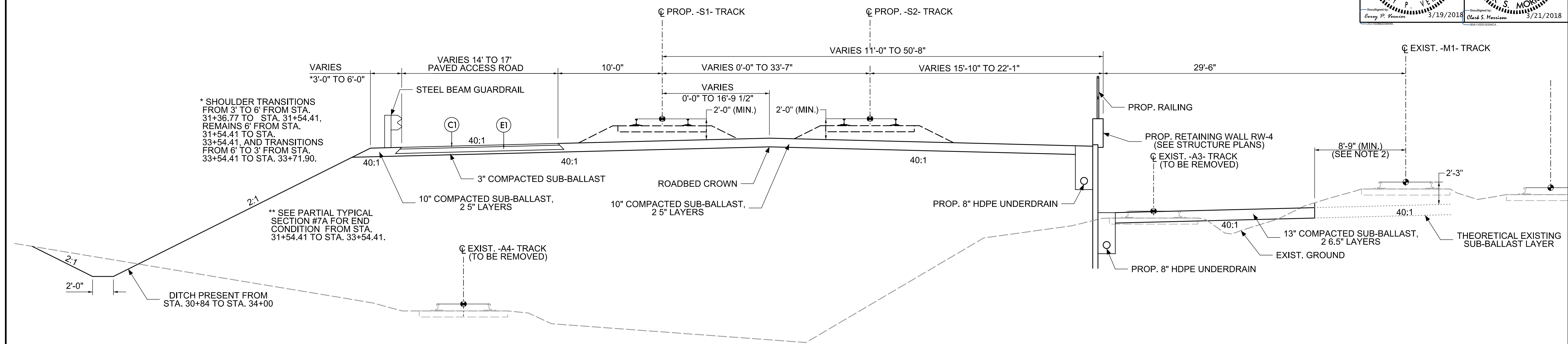
PROJECT REFERENCE NO. P-5705BA SHEET NO. 2C

R/W SHEET NO.

DATE: MARCH 16, 2018

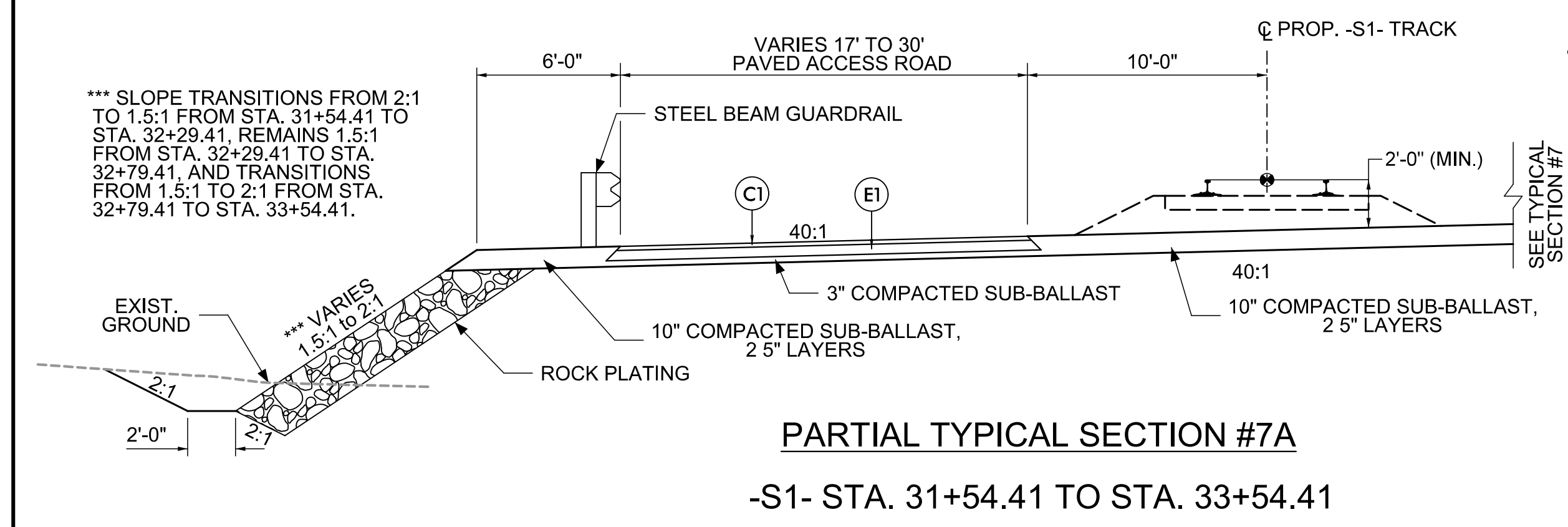
RAILROAD DESIGN ENGINEER SEAL 037992  
PAVEMENT DESIGN ENGINEER SEAL 022896

Designed by: Corey P. Francis 3/19/2018  
Checked by: Clark S. Morrison 3/21/2018

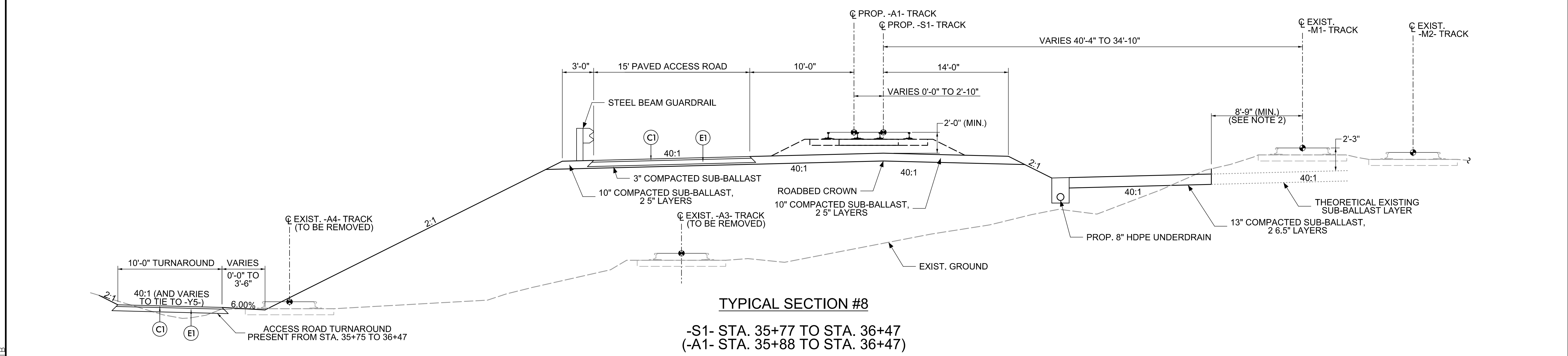


TYPICAL SECTION #7  
-S1- STA. 30+84 TO STA. 35+77

- NOTES:
1. THE TYPICAL SECTIONS TAKE PRECEDENCE OVER THE CROSS SECTIONS. CROSS SECTIONS ARE PROVIDED FOR REFERENCE ONLY.
  2. DIMENSION SHOWN IS FOR BIDDING PURPOSES ONLY AND MUST BE COORDINATED WITH THE NORFOLK SOUTHERN REPRESENTATIVE PRIOR TO CONSTRUCTION. SEE 'EXCAVATION ADJACENT TO ACTIVE TRACK DETAIL' FOR REQUIREMENTS.




PARTIAL TYPICAL SECTION #7A  
-S1- STA. 31+54.41 TO STA. 33+54.41



TYPICAL SECTION #8  
-S1- STA. 35+77 TO STA. 36+47  
(-A1- STA. 35+88 TO STA. 36+47)

3/19/2018 sh\_02C.dgn



PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.

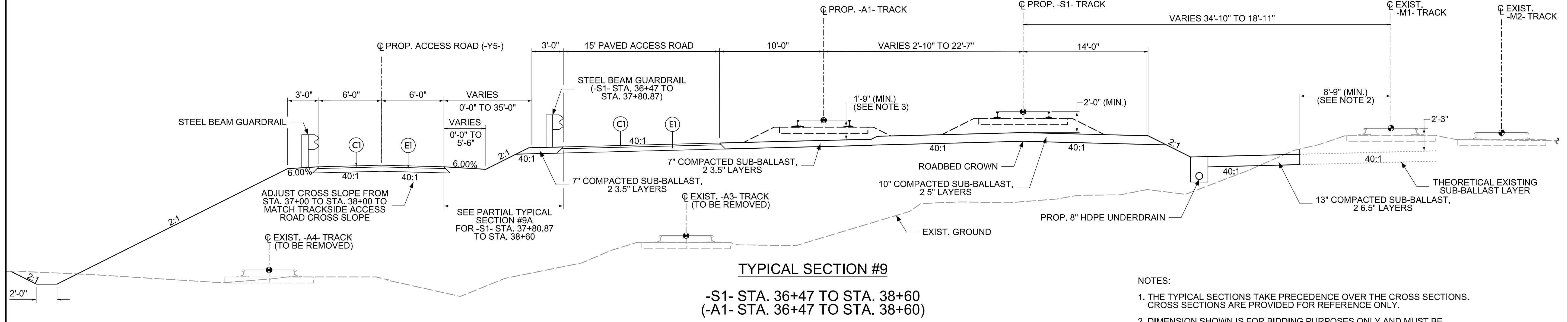


**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609  
NC License No: C-1554

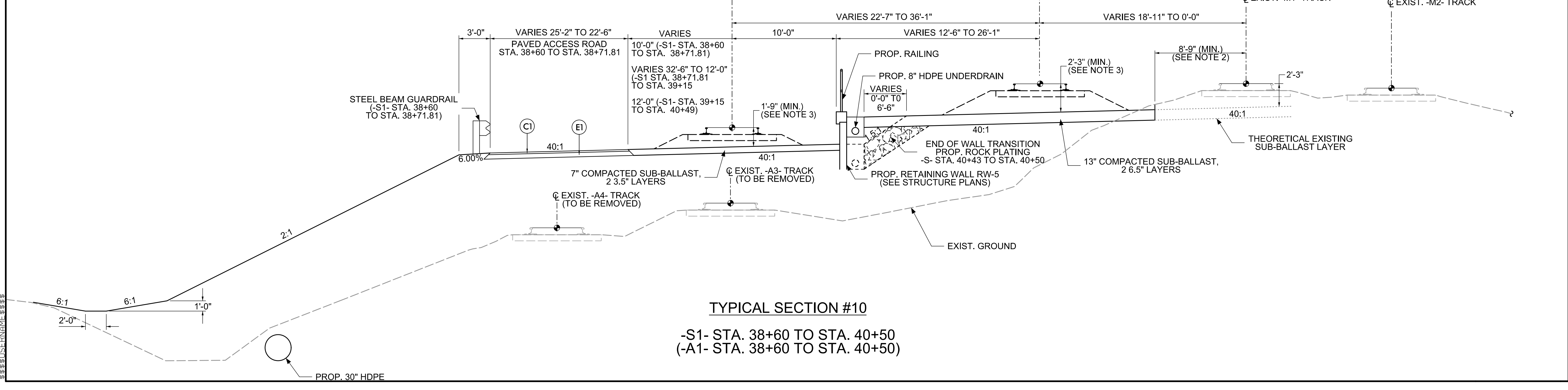
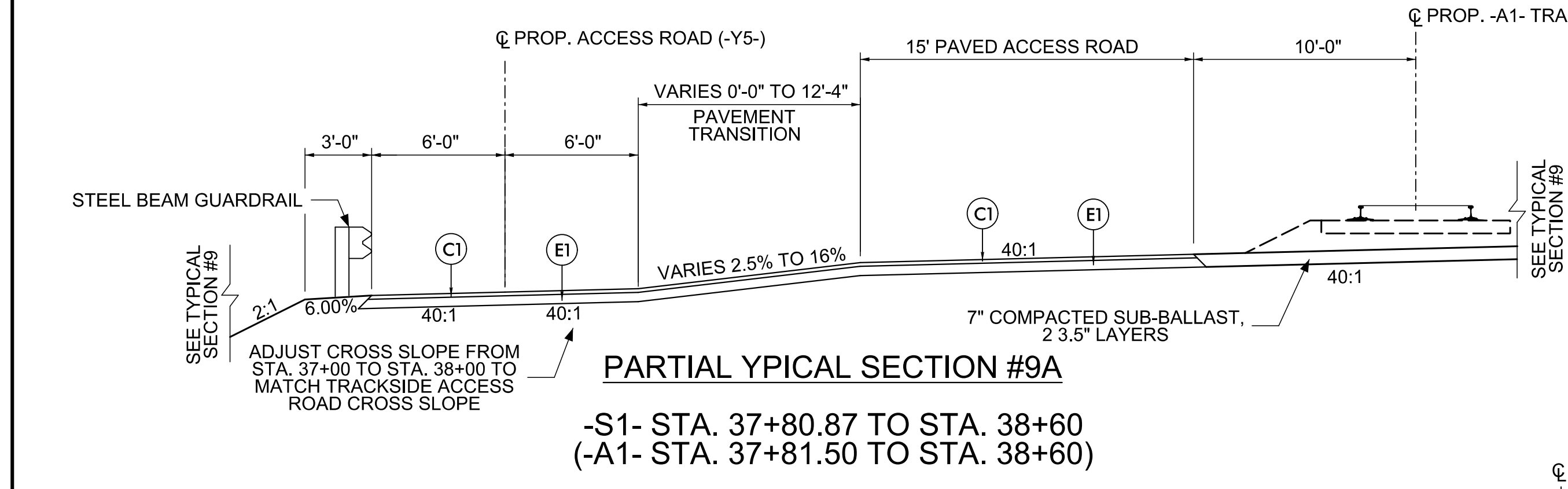
PROJECT REFERENCE NO. P-5705BA	SHEET NO. 2D
RW/SHEET NO.	
RAILROAD DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DATE: MARCH 16, 2018

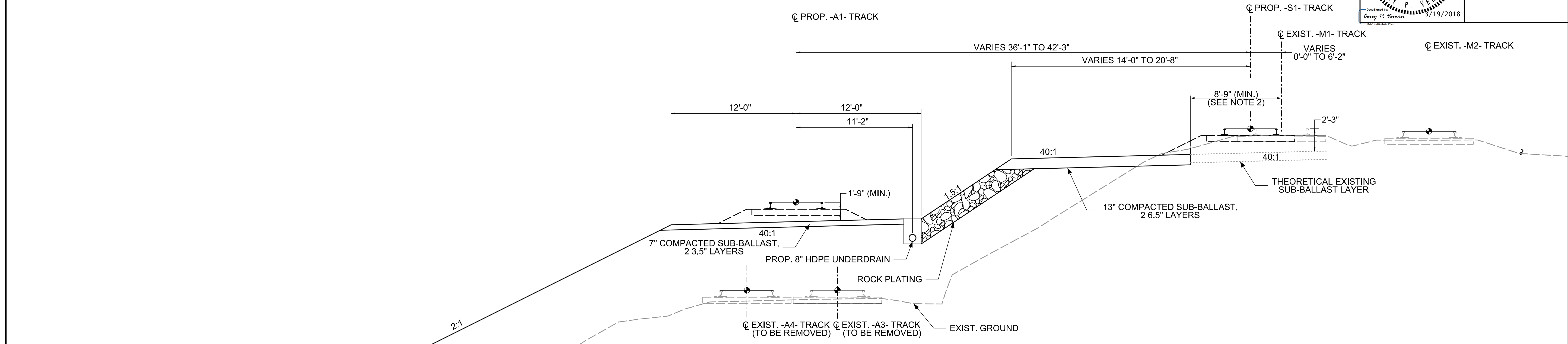
 COREY P. VANNICE ENGINEER SEAL 037992 3/19/2018	 CLARK S. MORRISON ENGINEER SEAL 022896 3/21/2018
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- NOTES:
1. THE TYPICAL SECTIONS TAKE PRECEDENCE OVER THE CROSS SECTIONS. CROSS SECTIONS ARE PROVIDED FOR REFERENCE ONLY.
  2. DIMENSION SHOWN IS FOR BIDDING PURPOSES ONLY AND MUST BE COORDINATED WITH THE NORFOLK SOUTHERN REPRESENTATIVE PRIOR TO CONSTRUCTION. SEE 'EXCAVATION ADJACENT TO ACTIVE TRACK DETAIL' FOR REQUIREMENTS.
  3. ANY CHANGES IN THE DISTANCE BETWEEN THE PROPOSED TOP OF RAIL AND THE PROPOSED TOP OF SUB-BALLAST SHALL BE MADE OVER A DISTANCE OF 50 TRACK FEET OR AS DIRECTED BY THE RAILROAD ENGINEER IN THE FIELD. POSITIVE DRAINAGE AWAY FROM THE -S1- TRACK SHALL BE MAINTAINED AT ALL TIMES WHILE MAINTAINING A CONSTANT 40:1 CROSS SLOPE WITHIN 5' OF PROPOSED TRACK CENTERLINE.



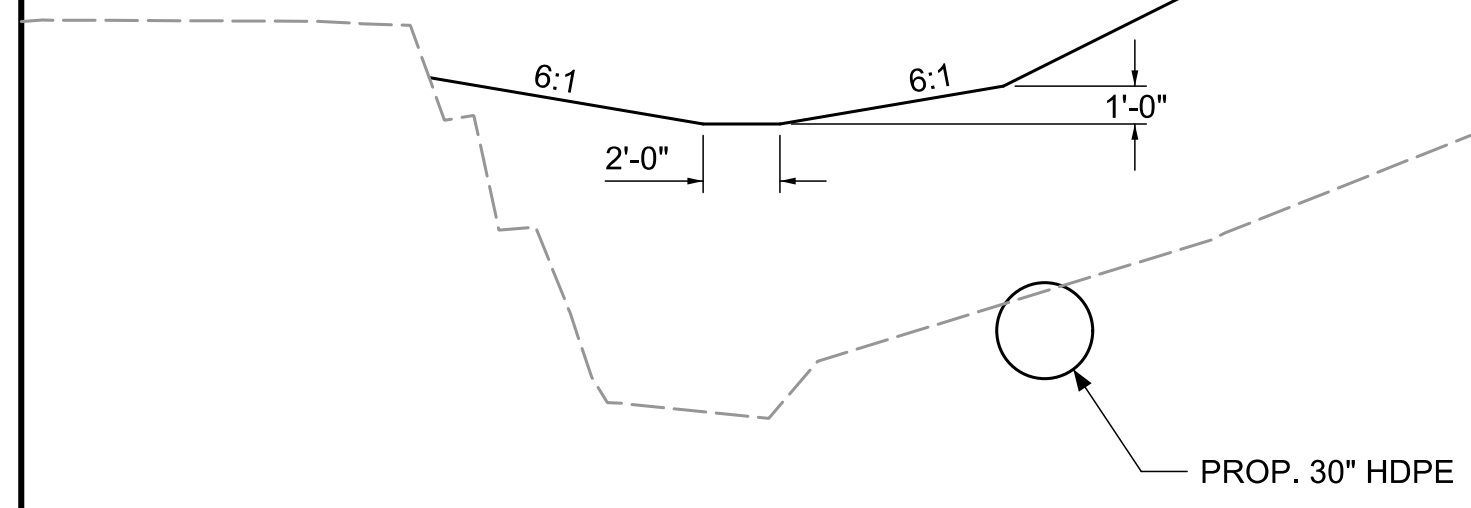
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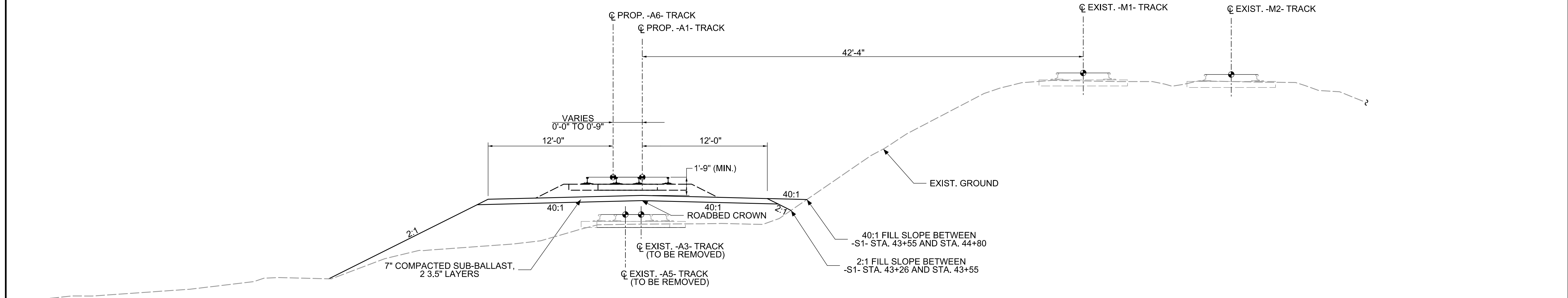
**TYPICAL SECTION #11**

-S1- STA. 40+50 TO STA. 41+95 (+/- BEGIN BRIDGE)  
(-A1- STA. 40+50 TO STA. 41+93 (+/- BEGIN BRIDGE))

- NOTES:
1. THE TYPICAL SECTIONS TAKE PRECEDENCE OVER THE CROSS SECTIONS. CROSS SECTIONS ARE PROVIDED FOR REFERENCE ONLY.
  2. DIMENSION SHOWN IS FOR BIDDING PURPOSES ONLY AND MUST BE COORDINATED WITH THE NORFOLK SOUTHERN REPRESENTATIVE PRIOR TO CONSTRUCTION. SEE 'EXCAVATION ADJACENT TO ACTIVE TRACK DETAIL' FOR REQUIREMENTS.



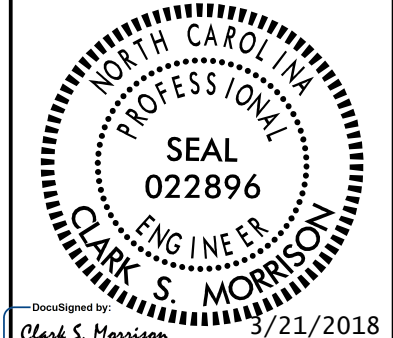


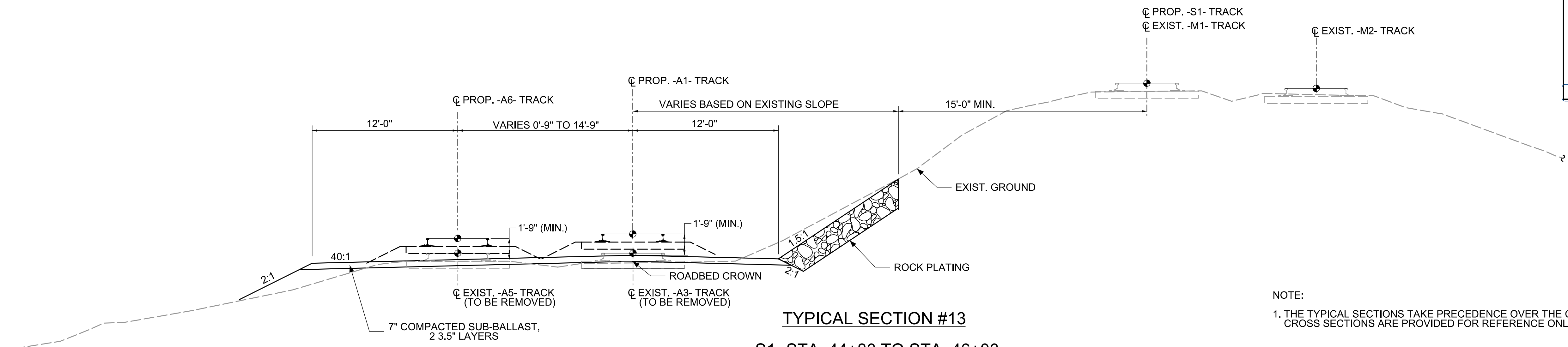
PROP. 30" HDPE



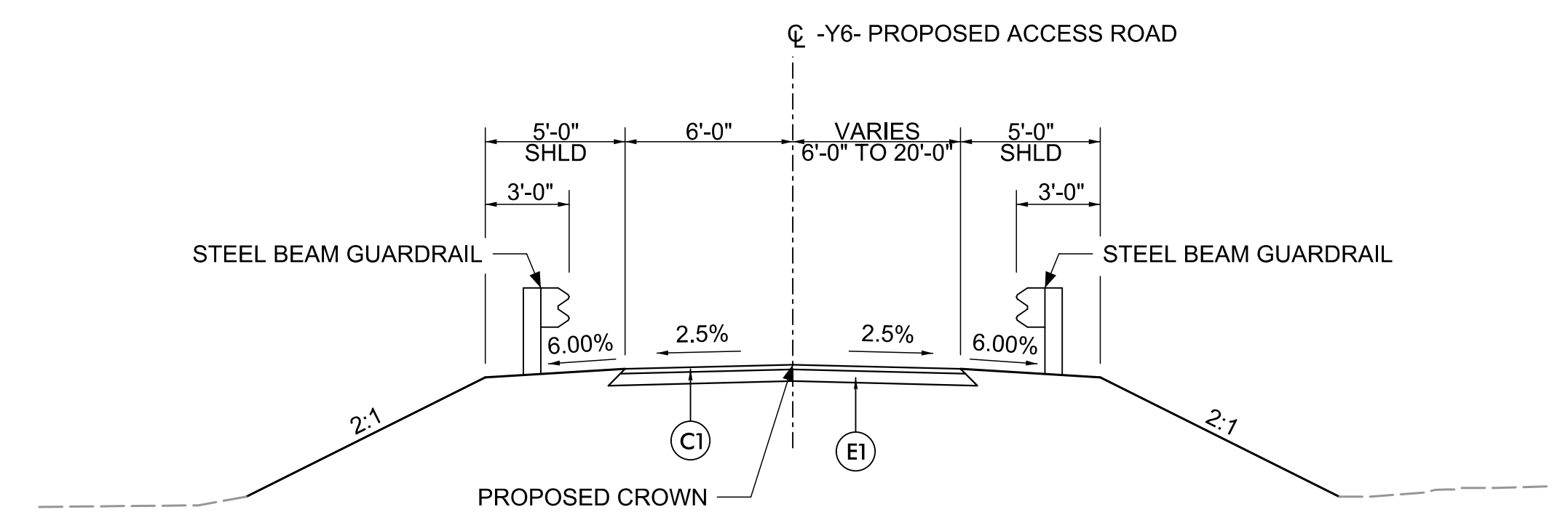
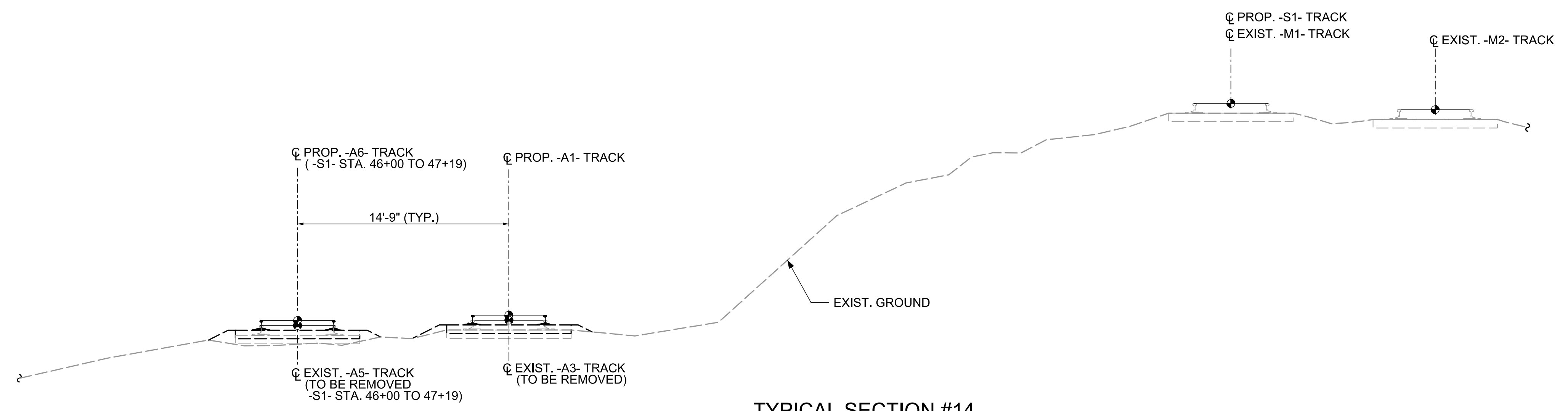
**TYPICAL SECTION #12**

-S1- STA. 43+26 (+/- END BRIDGE) TO STA. 44+80  
(-A1- STA. 43+24 (+/- END BRIDGE) TO STA. 44+79)

 HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554	PROJECT REFERENCE NO.	SHEET NO.
	P-5705BA	2F
DATE: MARCH 16, 2018		
RW SHEET NO.		
RAILROAD DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER	
 COREY P. VANNICE SEAL 037992 ENGINEER NORTH CAROLINA 3/19/2018	 CLARK S. MORRISON SEAL 022896 ENGINEER NORTH CAROLINA 3/21/2018	



NOTE:  
 1. THE TYPICAL SECTIONS TAKE PRECEDENCE OVER THE CROSS SECTIONS. CROSS SECTIONS ARE PROVIDED FOR REFERENCE ONLY.




PAVEMENT SCHEDULE	
C1	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.

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PAVEMENT SCHEDULE	
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. PLACED IN TWO LAYERS.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
R1	2'-6" CURB AND GUTTER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	MILLING BITUMINOUS PAVEMENT 3"

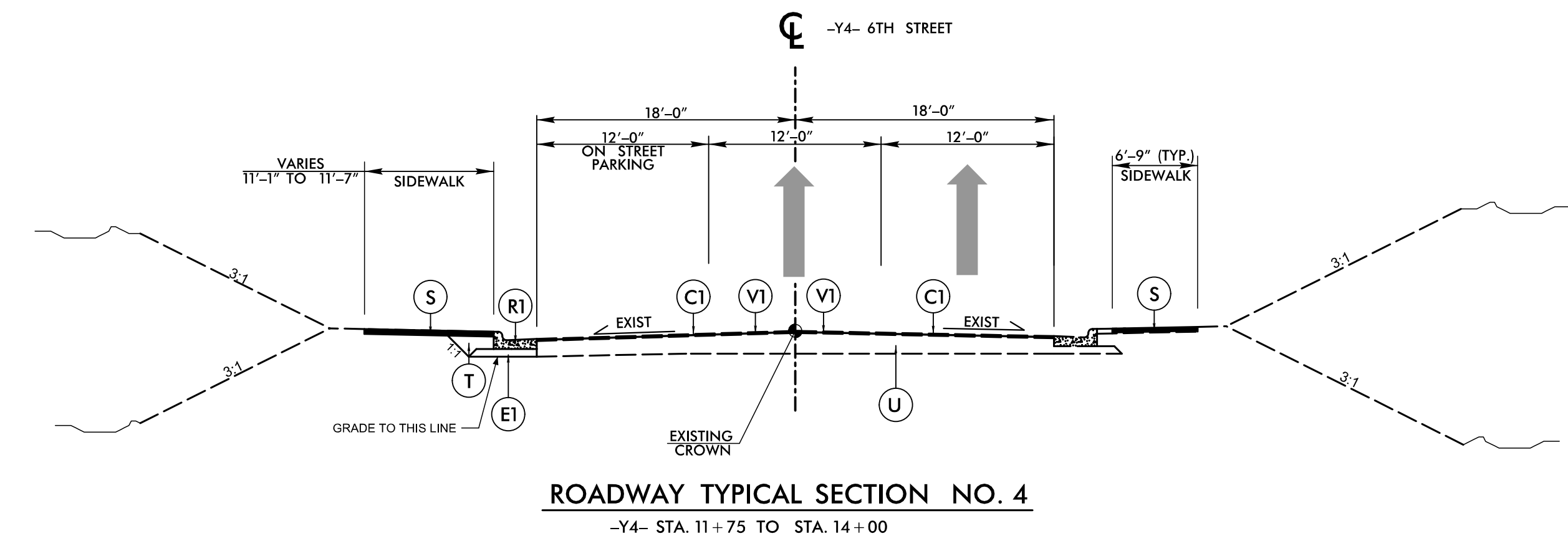
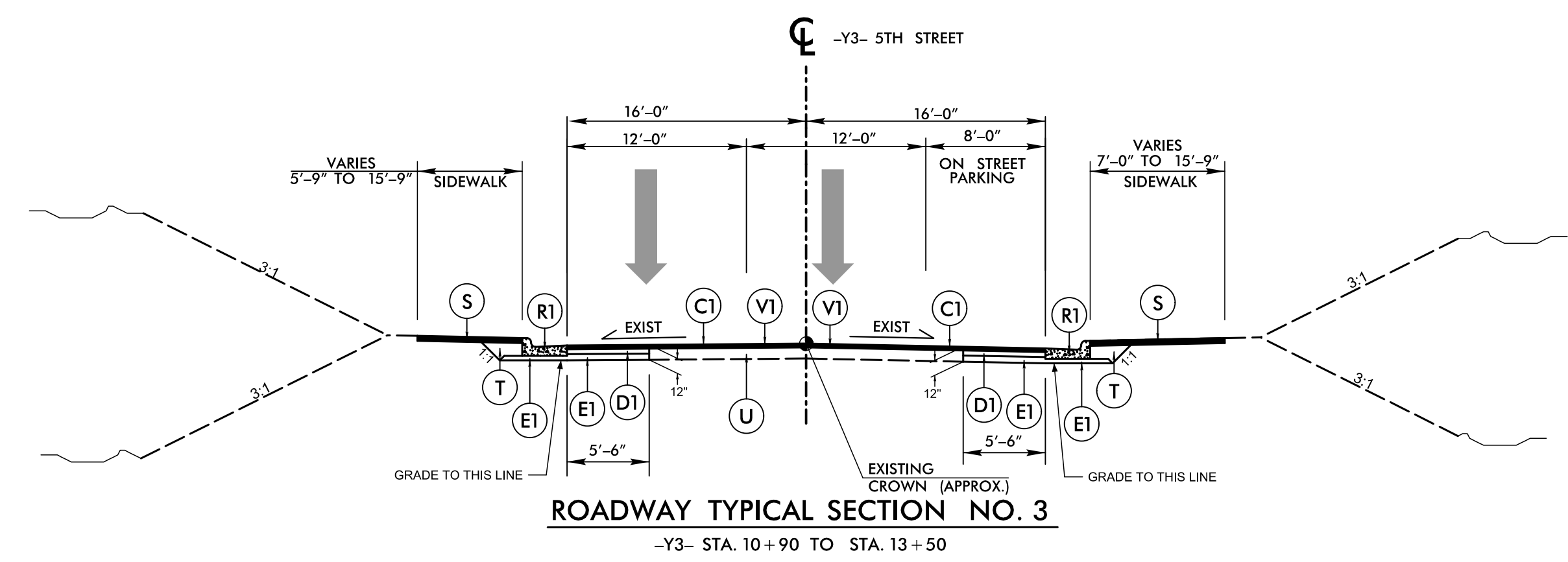
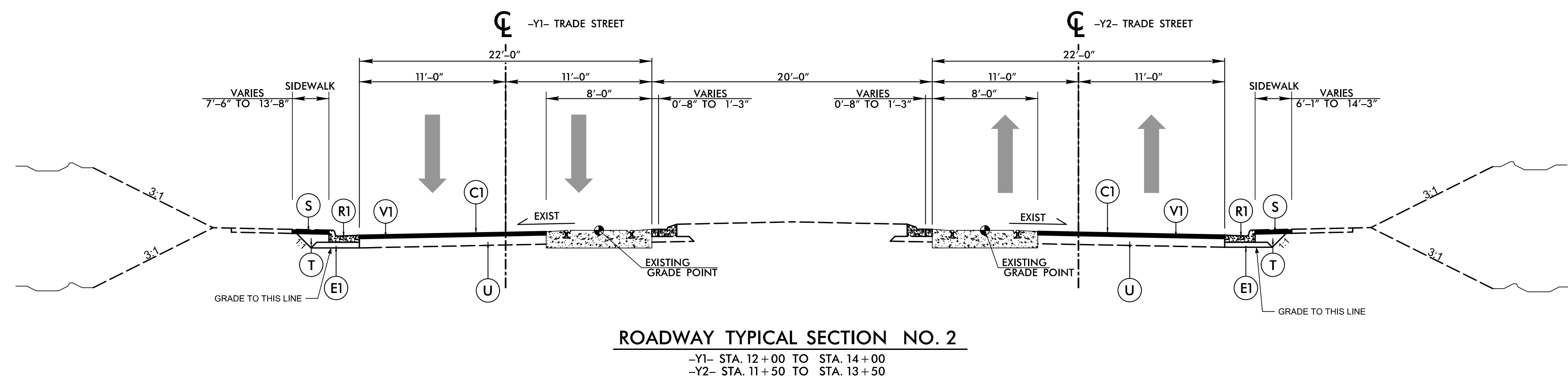
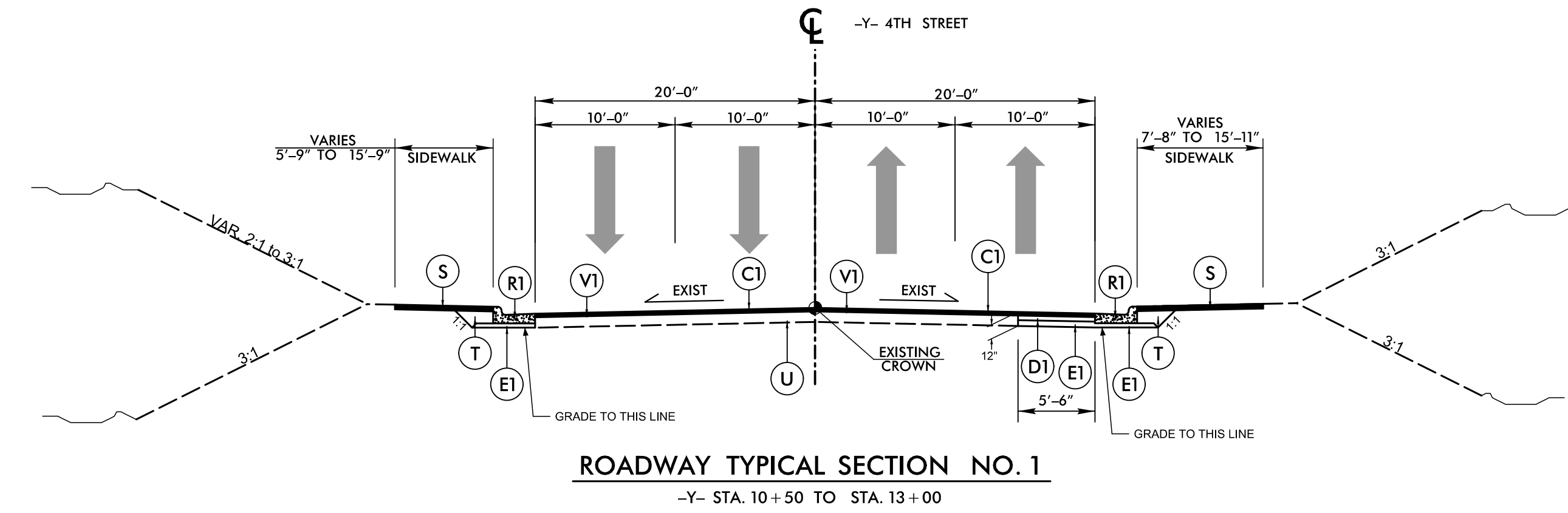


**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609  
NC License No: C-1554

PROJECT REFERENCE NO. P-5705BA	SHEET NO. 2G
RW SHEET NO.	
DATE: MARCH 16, 2018	



ROADWAY DESIGN ENGINEER  
Eric W. Seckinger 3/15/2018

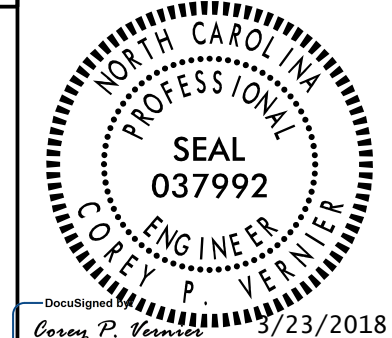


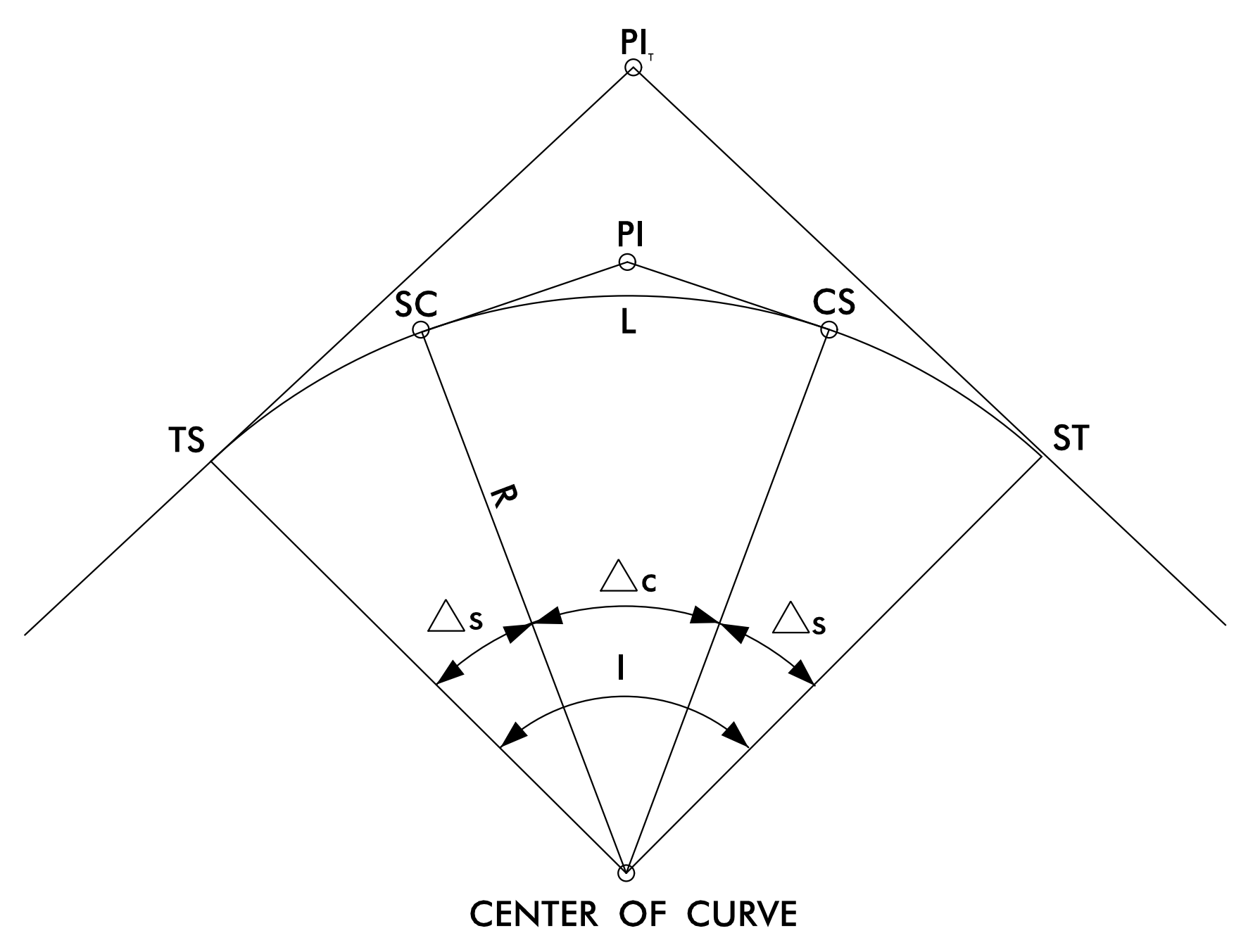
- NOTES:**
- SEE PLAN SHEETS FOR SIDEWALK AND CURB & GUTTER LIMITS OF CONSTRUCTION
  - FINAL SURFACE OF -Y1- AND -Y2- TRADE ST SHALL NOT BE PERFORMED PRIOR TO THE COMPLETION OF THE CHARLOTTE AREA TRANSIT SYSTEM (CATS) GOLD LINE STREET CAR EXTENSION PROJECT.

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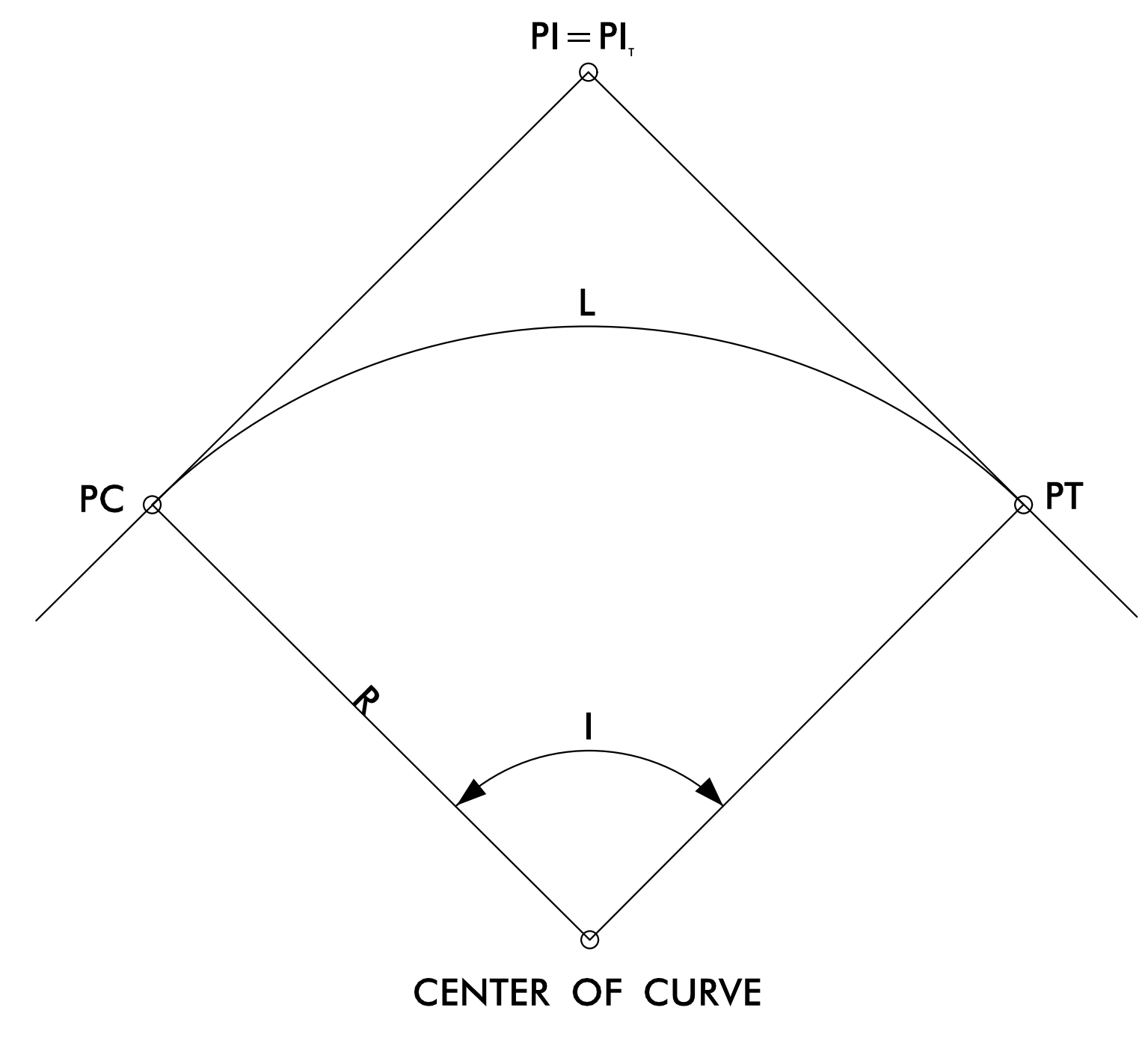
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# HORIZONTAL CURVE GEOMETRY SHEET

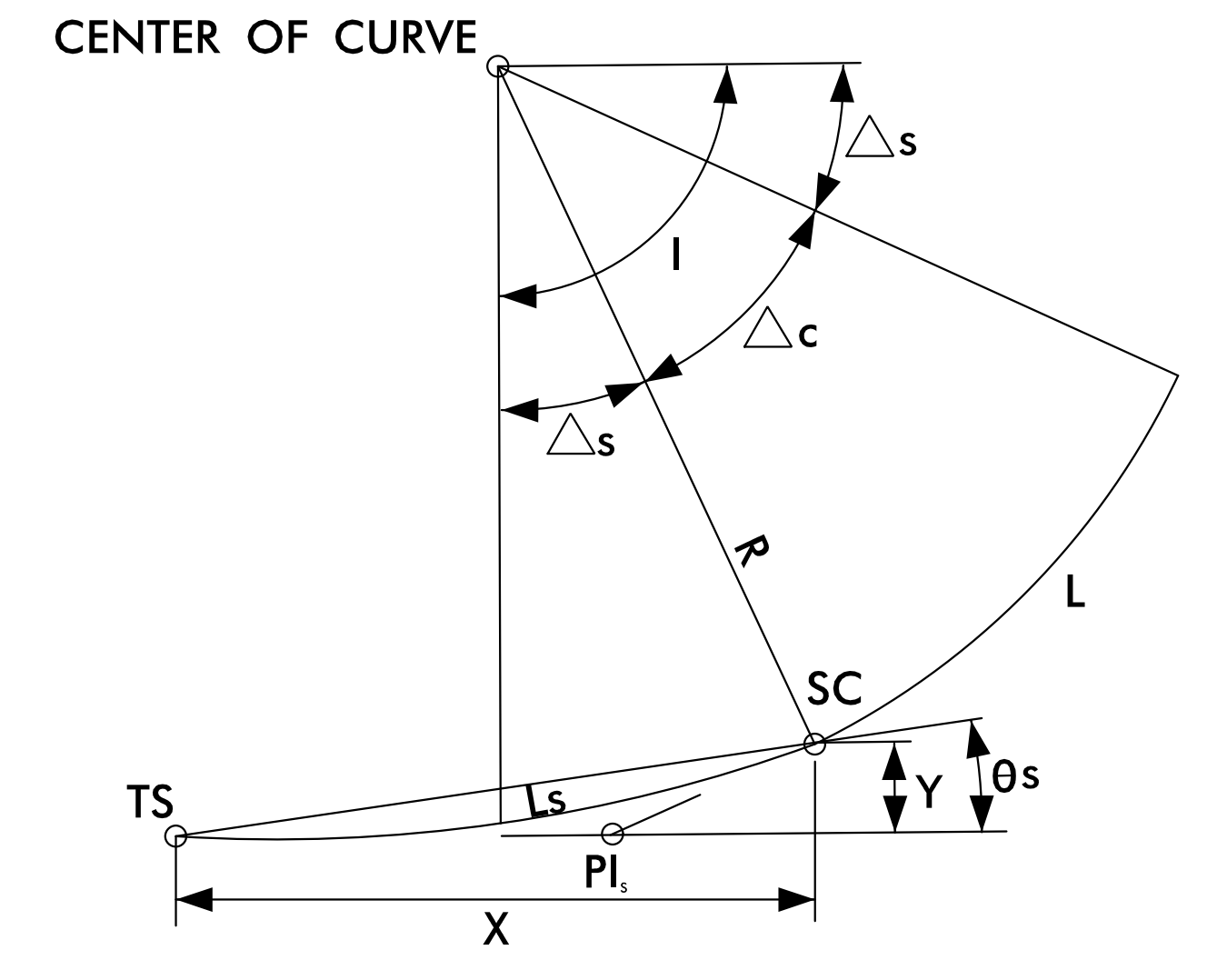
<b>HNTB</b> HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554	PROJECT REFERENCE NO. P-5705BA	SHEET NO. 2H
	RW SHEET NO.	
DATE: MARCH 16, 2018		
RAILROAD DESIGN ENGINEER		
		
Design by: Corey P. Verrier 5/23/2018		



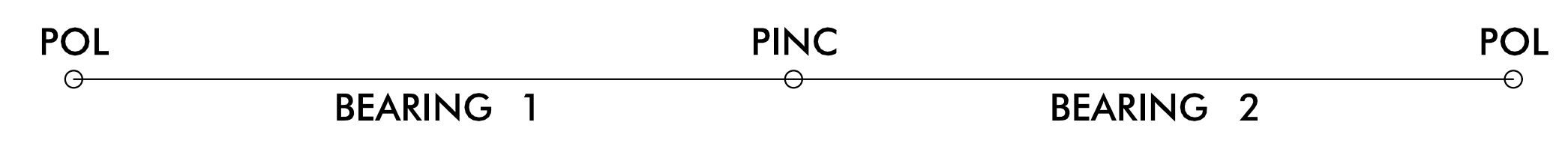
**FIGURE A**  
CIRCULAR CURVE WITH SPIRAL TRANSITION CURVES



**FIGURE B**  
SIMPLE CIRCULAR CURVE



**FIGURE C**  
SPIRAL TRANSITION CURVE



**FIGURE D**  
DEFLECTION BETWEEN TANGENTS

R	RADIUS OF CURVATURE	PI <sub>c</sub>	POINT OF INTERSECTION (CIRCULAR CURVE)
D <sub>c</sub>	DEGREE OF CURVATURE (CHORD DEFINED)	PI <sub>t</sub>	POINT OF INTERSECTION (TANGENT)
L	LENGTH OF CURVE (CHORD DEFINED)	PI <sub>s</sub>	POINT OF INTERSECTION (SPIRAL)
I	TOTAL INTERSECTION ANGLE	PC	TANGENT TO CIRCULAR CURVE
Δ <sub>c</sub>	CURVE ANGLE	PT	CIRCULAR CURVE TO TANGENT
Δ <sub>s</sub>	SPIRAL ANGLE	TS	TANGENT TO SPIRAL
θ <sub>s</sub>	SPIRAL DEFLECTION	SC	SPIRAL TO CIRCULAR CURVE
L <sub>s</sub>	LENGTH OF SPIRAL	CS	CIRCULAR CURVE TO SPIRAL
X	SPIRAL TANGENT LENGTH TO OFFSET	ST	SPIRAL TO TANGENT
Y	SPIRAL TANGENT OFFSET	PINC	POINT OF INTERSECTION NO CURVE

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<b>HNTB</b> HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554	PROJECT REFERENCE NO.	SHEET NO.
	P-5705BA	21
RWV SHEET NO.		
DATE: MARCH 16, 2018		
RAILROAD DESIGN ENGINEER		

**PROPOSED S1 TRACK ALIGNMENT**

Point 15901 (PS #15 LH TO)  
N 545,364.5649 E 1,449,017.5662 Sta 10+00.00

Course from 15901 to 15902  
S 44° 14' 25.62" W Dist 39.9800

Point 15902 (PI TO #15 LH TO)  
N 545,335.9225 E 1,448,989.6733 Sta 10+39.98

Course from 15902 to TS S1-1B  
S 40° 25' 19.62" W Dist 116.7890

Curve 101 Ea = 0.50", V(Passenger) = 30 mph

PISCS S1-1 N 545,195.0570 E 1,448,869.6936 STA 12+25.02

Total Tangent = 68.2468  
Total Length = 136.4737  
Total Delta = 2° 24' 42.35" (LT)  
Back Tangent = S 40° 25' 19.62" W  
Ahead Tangent = S 38° 00' 37.27" W

Spiral S1-1B

Chord Definition

Angle 0° 29' 59.86" (LT) P 0.0291  
LS 40.0000 K 19.9999  
R 2,292.0130 LT 26.6668  
YS 0.1163 ST 13.3334  
XS 39.9997 LC 39.9999  
BK S 40° 25' 19.62" W  
AH S 39° 55' 19.76" W  
CB S 40° 15' 19.67" W  
Defl 0° 09' 59.95"  
Deg 2° 30' 00.00"

Spiral Coordinates

Point	North	East	Station
TS	545,247.0124	1,448,913.9457	11+56.77
PI	545,226.7113	1,448,896.6546	11+83.44
SC	545,216.4857	1,448,888.0979	11+96.77
CC	543,745.5949	1,450,645.8818	

Curve S1-1

Chord Definition

P.I. Station 12+25.01 N 545,194.8276 E 1,448,869.9747  
Delta = 1° 24' 42.63" (LT)  
Degree = 2° 30' 00.00"  
Tangent = 28.2405  
Length = 56.4737  
Radius = 2,292.0130  
External = 0.1740  
Long Chord = 57.4767  
Mid. Ord. = 0.1740  
P.C. Station 11+96.77 N 545,216.4857 E 1,448,888.0979  
P.T. Station 12+53.24 N 545,172.7295 E 1,448,852.3906  
C.C. N 543,745.5949 E 1,450,645.8818  
Back S 39° 55' 19.76" W  
Ahead S 38° 30' 37.13" W  
Chord Bear S 39° 12' 58.45" W

Spiral S1-1A

Chord Definition

Angle 0° 29' 59.86" (LT) P 0.0291  
LS 40.0000 K 19.9999  
R 2,292.0130 LT 26.6668  
YS 0.1163 ST 13.3334  
XS 39.9997 LC 39.9999  
BK S 38° 30' 37.13" W  
AH S 38° 00' 37.27" W  
CB S 38° 10' 37.23" W  
Defl 0° 09' 59.95"  
Deg 2° 30' 00.00"

Spiral Coordinates

Point	North	East	Station
CS	545,172.7295	1,448,852.3906	12+53.24
PI	545,162.2961	1,448,844.0884	12+66.58
ST	545,141.2854	1,448,827.6669	12+93.24
CC	543,745.5949	1,450,645.8818	

Course from ST S1-1A to 15903  
S 38° 00' 37.27" W Dist 5.0000

Point 15903 (PS #15 LH TO - FUTURE)  
N 545,137.3459 E 1,448,824.5879 Sta 12+98.24

Course from 15903 to 15904  
S 38° 00' 37.27" W Dist 39.9800

Point 15904 (PI TO #15 LH TO - FUTURE)  
N 545,105.8457 E 1,448,799.9681 Sta 13+38.22

Course from 15904 to 15905  
S 38° 00' 37.27" W Dist 121.5198

Point 15905 (PS #15 RH TO)  
N 545,010.1003 E 1,448,725.1357 Sta 14+59.74

Course from 15905 to 15906  
S 38° 00' 37.27" W Dist 39.9800

Point 15906 (PI TO #15 RH TO)  
N 544,978.6001 E 1,448,700.5159 Sta 14+99.72

Course from 15906 to TS S1-2B  
S 38° 00' 37.27" W Dist 173.6042

Curve 102 Ea = 1.00", V(Passenger) = 30 mph

PISCS S1-2 N 544,759.5694 E 1,448,529.3266 STA 17+77.72

Total Tangent = 104.3890  
Total Length = 208.6021  
Total Delta = 6° 13' 47.95" (RT)  
Back Tangent = S 38° 00' 37.27" W  
Ahead Tangent = S 44° 14' 25.23" W

Spiral S1-2B

Chord Definition

Angle 1° 19' 01.91" (RT) P 0.1188  
LS 62.0000 K 30.9995  
R 1,348.4451 LT 41.3345  
YS 0.4751 ST 20.6677  
XS 61.9967 LC 61.9985  
BK S 38° 00' 37.27" W  
AH S 39° 19' 39.19" W  
CB S 38° 26' 57.90" W  
Defl 0° 26' 20.63"  
Deg 4° 15' 00.00"

Spiral Coordinates

Point	North	East	Station
TS	544,841.8174	1,448,593.6098	16+73.33
PI	544,809.2500	1,448,568.1558	17+14.66
SC	544,793.2628	1,448,555.0576	17+35.33
CC	545,647.8438	1,447,511.9874	

Curve S1-2

Chord Definition

P.I. Station 17+77.65 N 544,760.5232 E 1,448,528.2342  
Delta = 3° 35' 44.13" (RT)  
Degree = 4° 15' 00.00"  
Tangent = 42.3247  
Length = 84.6021  
Radius = 1,348.4451  
External = 0.6641  
Long Chord = 84.6077  
Mid. Ord. = 0.6637  
P.C. Station 17+35.33 N 544,793.2628 E 1,448,555.0576  
P.T. Station 18+19.93 N 544,729.5302 E 1,448,499.4104  
C.C. N 545,647.8438 E 1,447,511.9874  
Back S 39° 19' 39.19" W  
Ahead S 42° 55' 23.31" W  
Chord Bear S 41° 07' 31.25" W

Spiral S1-2A

Chord Definition

Angle 1° 19' 01.91" (RT) P 0.1188  
LS 62.0000 K 30.9995  
R 1,348.4451 LT 41.3345  
YS 0.4751 ST 20.6677  
XS 61.9967 LC 61.9985  
BK S 42° 55' 23.31" W  
AH S 44° 14' 25.23" W  
CB S 43° 48' 04.60" W  
Defl 0° 26' 20.63"  
Deg 4° 15' 00.00"

Spiral Coordinates

Point	North	East	Station
CS	544,729.5302	1,448,499.4104	18+19.93
PI	544,714.3959	1,448,485.3354	18+40.60
ST	544,684.7830	1,448,456.4976	18+81.93
CC	545,647.8438	1,447,511.9874	

Course from ST S1-2A to TS S1-3B  
S 44° 14' 25.23" W Dist 971.1063

Curve 103 Ea = 0.50", V(Passenger) = 30 mph

PISCS S1-3 N 543,877.7552 E 1,447,670.5910 STA 30+08.40

Total Tangent = 155.3674  
Total Length = 310.5709  
Total Delta = 4° 39' 34.19" (RT)  
Back Tangent = S 44° 14' 25.23" W  
Ahead Tangent = S 48° 53' 59.42" W

Spiral S1-3B

Chord Definition

Angle 0° 15' 29.97" (RT) P 0.0116  
LS 31.0000 K 15.5000  
R 3,437.8680 LT 20.6667  
YS 0.0466 ST 10.3334  
XS 30.9999 LC 31.0000  
BK S 44° 14' 25.23" W  
AH S 44° 29' 55.19" W  
CB S 44° 19' 35.22" W  
Defl 0° 05' 09.99"  
Deg 1° 40' 00.00"

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<b>HNTB</b> HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554	PROJECT REFERENCE NO.	SHEET NO.
	P-5705BA	2J
RW SHEET NO.		
DATE: MARCH 16, 2018		

### PROPOSED S1 TRACK ALIGNMENT (CONTINUED)

#### Curve 103 (CONTINUED)

Spiral Coordinates

Point	North	East	Station
TS	543,989.0635	1,447,778.9861	28+53.03
PI	543,974.2575	1,447,764.5676	28+73.70
SC	543,966.8870	1,447,757.3250	28+84.03
CC	546,376.4634	1,445,305.2080	

Curve S1-3

Chord Definition

P.I. Station	30+08.38	N	543,878.1966	E	1,447,670.1732
Delta =	4° 08' 34.26" (RT)				
Degree =	1° 40' 00.00"				
Tangent =	124.3440				
Length =	248.5709				
Radius =	3,437.8680				
External =	2.2480				
Long Chord =	248.5255				
Mid. Ord. =	2.2465				
P.C. Station	28+84.03	N	543,966.8870	E	1,447,757.3250
P.T. Station	31+32.61	N	543,796.0340	E	1,447,576.8418
C.C.		N	546,376.4634	E	1,445,305.2080
Back	S 44° 29' 55.19" W				
Ahead	S 48° 38' 29.45" W				
Chord Bear	S 46° 34' 12.32" W				

Spiral S1-3A

Chord Definition

Angle	0° 15' 29.97" (RT)	P	0.0116
LS	31.0000	K	15.5000
R	3,437.8680	LT	20.6667
YS	0.0466	ST	10.3334
XS	30.9999	LC	31.0000
BK	S 48° 38' 29.45" W		
AH	S 48° 53' 59.42" W		
CB	S 48° 48' 49.43" W		
Defl	0° 05' 09.99"		
Deg	1° 40' 00.00"		

Spiral Coordinates

Point	North	East	Station
CS	543,796.0340	1,447,576.8418	31+32.61
PI	543,789.2060	1,447,569.0857	31+42.94
ST	543,775.6202	1,447,553.5121	31+63.61
CC	546,376.4634	1,445,305.2080	

Course from ST S1-3A to 15907  
S 48° 53' 59.42" W Dist 148.2037

Point 15907 (PI TO #15 RH TO - FUTURE)  
N 543,678.1944 E 1,447,441.8315 Sta 33+11.81

Course from 15907 to 15908  
S 48° 53' 59.42" W Dist 39.9800

Point 15908 (PS #15 RH TO - FUTURE)  
N 543,651.9125 E 1,447,411.7041 Sta 33+51.79

Course from 15908 to 15909  
S 48° 53' 59.42" W Dist 126.0200

Point 15909 (PI TO #15 LH TO)  
N 543,569.0698 E 1,447,316.7403 Sta 34+77.81

Course from 15909 to 15910  
S 48° 53' 59.42" W Dist 39.9800

Point 15910 (PS #15 LH TO)  
N 543,542.7879 E 1,447,286.6129 Sta 35+17.79

Course from 15910 to 15911  
S 48° 53' 59.42" W Dist 70.0000

Point 15911 (PS #10 LH TO)  
N 543,496.7714 E 1,447,233.8636 Sta 35+87.79

Course from 15911 to 15912  
S 48° 53' 59.42" W Dist 31.2500

Point 15912 (PI TO #10 LH TO)  
N 543,476.2284 E 1,447,210.3148 Sta 36+19.04

Course from 15912 to TS S1-4B  
S 48° 53' 59.42" W Dist 79.7500

Curve 104 Ea = 0.50', V(Passenger) = 30 mph

PISCS S1-4 N 543,386.4115 E 1,447,107.3564 STA 37+55.67

Total Tangent = 56.8790  
Total Length = 113.7559  
Total Delta = 0° 49' 39.20" (LT)  
Back Tangent = S 48° 53' 59.42" W  
Ahead Tangent = S 48° 04' 20.22" W

Spiral S1-4B

Chord Definition

Angle	0° 09' 17.99" (LT)	P	0.0070
LS	31.0000	K	15.5000
R	5,729.6507	LT	20.6667
YS	0.0280	ST	10.3333
XS	31.0000	LC	31.0000
BK	S 48° 53' 59.42" W		
AH	S 48° 44' 41.42" W		
CB	S 48° 50' 53.42" W		
Defl	0° 03' 06.00"		
Deg	1° 00' 00.00"		

Spiral Coordinates

Point	North	East	Station
TS	543,423.8025	1,447,150.2182	36+98.79
PI	543,410.2167	1,447,134.6446	37+19.46
SC	543,403.4028	1,447,126.8762	37+29.79
CC	539,095.9636	1,450,905.0853	

Curve S1-4

Chord Definition

P.I. Station	37+55.67	N	543,386.3382	E	1,447,107.4213
Delta =	0° 31' 03.21" (LT)				
Degree =	1° 00' 00.00"				
Tangent =	25.8785				
Length =	51.7559				
Radius =	5,729.6507				
External =	0.0584				
Long Chord =	51.7564				
Mid. Ord. =	0.0584				
P.C. Station	37+29.79	N	543,403.4028	E	1,447,126.8762
P.T. Station	37+81.55	N	543,369.0985	E	1,447,088.1213
C.C.		N	539,095.9636	E	1,450,905.0853
Back	S 48° 44' 41.42" W				
Ahead	S 48° 13' 38.21" W				
Chord Bear	S 48° 29' 09.82" W				

Spiral S1-4A

Chord Definition

Angle	0° 09' 17.99" (LT)	P	0.0070
LS	31.0000	K	15.5000
R	5,729.6507	LT	20.6667
YS	0.0280	ST	10.3333
XS	31.0000	LC	31.0000
BK	S 48° 13' 38.21" W		
AH	S 48° 04' 20.22" W		
CB	S 48° 07' 26.22" W		
Defl	0° 03' 06.00"		
Deg	1° 00' 00.00"		

Spiral Coordinates

Point	North	East	Station
CS	543,369.0985	1,447,088.1213	37+81.55
PI	543,362.2147	1,447,080.4148	37+91.88
ST	543,348.4054	1,447,065.0390	38+12.55
CC	539,095.9636	1,450,905.0853	

Course from ST S1-4A to 15913  
S 48° 04' 20.22" W Dist 331.4974

Point 15913 (PI TO #15 RH TO)  
N 543,126.9013 E 1,446,818.4088 Sta 41+44.04

Course from 15913 to 15914  
S 44° 15' 14.22" W Dist 39.9800

Point 15914 (PS #15 RH TO)  
N 543,098.2655 E 1,446,790.5091 Sta 41+84.02

Course from 15914 to 15915  
S 44° 15' 14.22" W Dist 765.9772

Point 15915 (POT - FOR STATIONING ONLY)  
N 542,549.6314 E 1,446,255.9797 Sta 49+50.00

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	RW SHEET NO.	
DATE: MARCH 16, 2018		

**PROPOSED S2 TRACK ALIGNMENT**

Point 15921 (PS #15 RH TO)  
N 545,010.1003 E 1,448,725.1357 Sta 14+59.74

Course from 15921 to 15922  
S 38° 00' 37.27" W Dist 39.9800

Point 15922 (PI TO #15 RH TO)  
N 544,978.6001 E 1,448,700.5159 Sta 14+99.72

Course from 15922 to TS S2-1B  
S 41° 49' 43.27" W Dist 159.2177

Curve 201 Ea = 1.00", V(Passenger) = 30 mph

PISCS S2-1 N 544,777.7072 E 1,448,520.7159 STA 17+69.33

Total Tangent = 110.3857  
Total Length = 220.5533  
Total Delta = 6° 44' 16.48" (RT)  
Back Tangent = S 41° 49' 43.27" W  
Ahead Tangent = S 48° 33' 59.75" W

Spiral S2-1B

Chord Definition

Angle 1°19' 01.91" (RT) P 0.1188  
LS 62.0000 K 30.9995  
R 1,348.4451 LT 41.3345  
YS 0.4751 ST 20.6677  
XS 61.9967 LC 61.9985  
BK S 41°49' 43.27" W  
AH S 43°08' 45.19" W  
CB S 42°16' 03.90" W  
Defl 0°26' 20.63"  
Deg 4°15' 00.00"

Spiral Coordinates

Point North East Station  
TS 544,859.9602 1,448,594.3327 16+58.94  
PI 544,829.1602 1,448,566.7665 17+00.27  
SC 544,814.0807 1,448,552.6327 17+20.94  
CC 545,736.2261 1,447,568.7872

Curve S2-1

Chord Definition

P.I. Station 17+69.25 N 544,778.8342 E 1,448,519.5966  
Delta = 4° 06' 12.65" (RT)  
Degree = 4° 15' 00.00"  
Tangent = 48.3084  
Length = 96.5533  
Radius = 1,348.4451  
External = 0.8651  
Long Chord = 96.5548  
Mid. Ord. = 0.8645  
P.C. Station 17+20.94 N 544,814.0807 E 1,448,552.6327  
P.T. Station 18+17.49 N 544,746.0421 E 1,448,484.1231  
C.C. N 545,736.2261 E 1,447,568.7872  
Back S 43° 08' 45.19" W  
Ahead S 47° 14' 57.84" W  
Chord Bear S 45° 11' 51.51" W

Spiral S2-1A

Chord Definition

Angle 1°19' 01.91" (RT) P 0.1188  
LS 62.0000 K 30.9995  
R 1,348.4451 LT 41.3345  
YS 0.4751 ST 20.6677  
XS 61.9967 LC 61.9985  
BK S 47°14' 57.84" W  
AH S 48°33' 59.75" W  
CB S 48°07' 39.12" W  
Defl 0°26' 20.63"  
Deg 4° 15' 00.00"

Spiral Coordinates

Point North East Station  
CS 544,746.0421 1,448,484.1231 18+17.49  
PI 544,732.0127 1,448,468.9465 18+38.16  
ST 544,704.6596 1,448,437.9570 18+79.49  
CC 545,736.2261 1,447,568.7872

Course from ST S2-1A to TS S2-2B  
S 48° 33' 59.75" W Dist 106.7354

Curve 202 Ea = 0.50", V(Passenger) = 30 mph

PISCS S2-2 N 544,537.8395 E 1,448,248.9589 STA 21+31.58

Total Tangent = 145.3544  
Total Length = 290.5765  
Total Delta = 4° 19' 34.52" (LT)  
Back Tangent = S 48° 33' 59.75" W  
Ahead Tangent = S 44° 14' 25.23" W

Spiral S2-2B

Chord Definition

Angle 0°15' 29.97" (LT) P 0.0116  
LS 31.0000 K 15.5000  
R 3,437.8680 LT 20.6667  
YS 0.0466 ST 10.3334  
XS 30.9999 LC 31.0000  
BK S 48° 33' 59.75" W  
AH S 48° 18' 29.78" W  
CB S 48° 28' 49.76" W  
Defl 0° 05' 09.99"  
Deg 1° 40' 00.00"

Spiral Coordinates

Point North East Station  
TS 544,634.0276 1,448,357.9348 19+86.23  
PI 544,620.3514 1,448,342.4404 20+06.90  
SC 544,613.4785 1,448,334.7241 20+17.23  
CC 542,046.3048 1,450,621.3276

Curve S2-2

Chord Definition

P.I. Station 21+31.56 N 544,537.4321 E 1,448,249.3467  
Delta = 3° 48' 34.59" (LT)  
Degree = 1° 40' 00.00"  
Tangent = 114.3344  
Length = 228.5765  
Radius = 3,437.8680  
External = 1.9007  
Long Chord = 228.5424  
Mid. Ord. = 1.8997  
P.C. Station 20+17.23 N 544,613.4785 E 1,448,334.7241  
P.T. Station 22+45.81 N 544,455.8812 E 1,448,169.2106  
C.C. N 542,046.3048 E 1,450,621.3276  
Back S 48° 18' 29.78" W  
Ahead S 44° 29' 55.19" W  
Chord Bear S 46° 24' 12.49" W

Spiral S2-2A

Chord Definition

Angle 0°15' 29.97" (LT) P 0.0116  
LS 31.0000 K 15.5000  
R 3,437.8680 LT 20.6667  
YS 0.0466 ST 10.3334  
XS 30.9999 LC 31.0000  
BK S 44°29' 55.19" W  
AH S 44°14' 25.23" W  
CB S 44°19' 35.22" W  
Defl 0° 05' 09.99"  
Deg 1° 40' 00.00"

Spiral Coordinates

Point North East Station  
CS 544,455.8812 1,448,169.2106 22+45.81  
PI 544,448.5108 1,448,161.9680 22+56.14  
ST 544,433.7047 1,448,147.5495 22+76.81  
CC 542,046.3048 1,450,621.3276

Course from ST S2-2A to TS S2-3B  
S 44°14' 25.23" W Dist 527.3375

Curve 203 Ea = 0.50", V(Passenger) = 30 mph

PISCS S2-3 N 544,000.6069 E 1,447,725.7865 STA 28+81.34

Total Tangent = 77.1935  
Total Length = 154.3701  
Total Delta = 2° 03' 22.14" (LT)  
Back Tangent = S 44° 14' 25.23" W  
Ahead Tangent = S 42° 11' 03.08" W

Spiral S2-3B

Chord Definition

Angle 0°15' 29.97" (LT) P 0.0116  
LS 31.0000 K 15.5000  
R 3,437.8680 LT 20.6667  
YS 0.0466 ST 10.3334  
XS 30.9999 LC 31.0000  
BK S 44° 14' 25.23" W  
AH S 43° 58' 55.26" W  
CB S 44° 09' 15.24" W  
Defl 0° 05' 09.99"  
Deg 1° 40' 00.00"

Spiral Coordinates


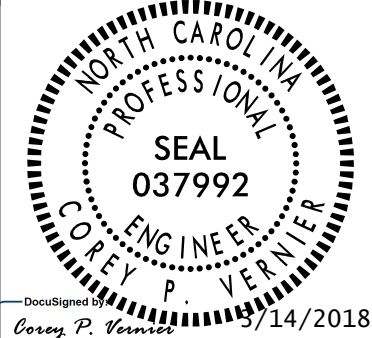
Point North East Station  
TS 544,055.9098 1,447,779.6421 28+04.14  
PI 544,041.1038 1,447,765.2236 28+24.81  
SC 544,033.6683 1,447,758.0478 28+35.14  
CC 541,646.3009 1,450,231.7925

Curve S2-3

Chord Definition

P.I. Station 28+81.33 N 544,000.4323 E 1,447,725.9723  
Delta = 1° 32' 22.21" (LT)  
Degree = 1° 40' 00.00"  
Tangent = 46.1895  
Length = 92.3701  
Radius = 3,437.8680  
External = 0.3103  
Long Chord = 92.3706  
Mid. Ord. = 0.3102  
P.C. Station 28+35.14 N 544,033.6683 E 1,447,758.0478  
P.T. Station 29+27.51 N 543,966.3466 E 1,447,694.8013  
C.C. N 541,646.3009 E 1,450,231.7925  
Back S 43°58' 55.26" W  
Ahead S 42°26' 33.05" W  
Chord Bear S 43°12' 44.16" W

Vertical curve data and notes on the left margin.

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	R/W SHEET NO.	
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**PROPOSED S2 TRACK ALIGNMENT (CONTINUED)**

**Curve 203 (CONTINUED)**

Spiral S2-3A

Chord Definition

Angle	0°15' 29.97" (LT)	P	0.0116
LS	31.0000	K	15.5000
R	3,437.8680	LT	20.6667
YS	0.0466	ST	10.3334
XS	30.9999	LC	31.0000
BK	S 42°26' 33.05" W		
AH	S 42°11' 03.08" W		
CB	S 42°16' 13.07" W		
Defl	0° 05' 09.99"		
Deg	1° 40' 00.00"		

Spiral Coordinates

Point	North	East	Station
CS	543,966.3466	1,447,694.8013	29+27.51
PI	543,958.7210	1,447,687.8278	29+37.85
ST	543,943.4072	1,447,673.9498	29+58.51
CC	541,646.3009	1,450,231.7925	

Course from ST S2-3A to TS S2-4B  
S 42°11' 03.08" W Dist 150.7119

**Curve 204** Ea = 1.00", V(Passenger) = 30 mph

PISCS S2-4 N 543,755.0734 E 1,447,503.2738 STA 32+12.68

Total Tangent =	103.4533
Total Length =	206.8689
Total Delta =	2° 53' 50.33" (RT)
Back Tangent =	S 42° 11' 03.08" W
Ahead Tangent =	S 45° 04' 53.42" W

Spiral S2-4B

Chord Definition

Angle	0° 37' 11.89" (RT)	P	0.0559
LS	62.0000	K	30.9999
R	2,864.9344	LT	41.3336
YS	0.2236	ST	20.6669
XS	61.9993	LC	61.9997
BK	S 42° 11' 03.08" W		
AH	S 42° 48' 14.97" W		
CB	S 42° 23' 27.05" W		
Defl	0° 12' 23.96"		
Deg	2° 00' 00.00"		

Spiral Coordinates

Point	North	East	Station
TS	543,831.7313	1,447,572.7444	31+09.22
PI	543,801.1035	1,447,544.9882	31+50.56
SC	543,785.9406	1,447,530.9451	31+71.22
CC	545,732.6479	1,445,428.9985	

Curve S2-4

Chord Definition

P.I. Station	32+12.66	N	543,755.5373	E	1,447,502.7873
Delta =	1°39' 26.56" (RT)				
Degree =	2° 00' 00.00"				
Tangent =	41.4394				
Length =	82.8689				
Radius =	2,864.9344				
External =	0.2997				
Long Chord =	82.8702				
Mid. Ord. =	0.2997				
P.C. Station	31+71.22	N	543,785.9406	E	1,447,530.9451
P.T. Station	32+54.09	N	543,725.9611	E	1,447,473.7618
C.C.		N	545,732.6479	E	1,445,428.9985

Back	S 42°48' 14.97" W
Ahead	S 44°27' 41.53" W
Chord Bear	S 43°37' 58.25" W

Spiral S2-4A

Chord Definition

Angle	0° 37' 11.89" (RT)	P	0.0559
LS	62.0000	K	30.9999
R	2,864.9344	LT	41.3336
YS	0.2236	ST	20.6669
XS	61.9993	LC	61.9997
BK	S 44°27' 41.53" W		
AH	S 45°04' 53.42" W		
CB	S 44°52' 29.46" W		
Defl	0° 12' 23.96"		
Deg	2° 00' 00.00"		

Spiral Coordinates

Point	North	East	Station
CS	543,725.9611	1,447,473.7618	32+54.09
PI	543,711.2107	1,447,459.2861	32+74.76
ST	543,682.0250	1,447,430.0173	33+16.09
CC	545,732.6479	1,445,428.9985	

Course from ST S2-4A to 15923  
S 45°04' 53.42" W Dist 159.9706

Point 15923 (PI TO #15 LH TO)  
N 543,569.0698 E 1,447,316.7403 Sta 34+76.06

Course from 15923 to 15924  
S 48°53' 59.42" W Dist 39.9800

Point 15924 (PS #15 LH TO)  
N 543,542.7879 E 1,447,286.6129 Sta 35+16.04

**PROPOSED A1 TRACK ALIGNMENT**

Point 15941 (PS #10 LH TO)  
N 543,496.7714 E 1,447,233.8636 Sta 35+87.79

Course from 15941 to 15942  
S 48° 53' 59.42" W Dist 31.2500

Point 15942 (PI TO #10 LH TO)  
N 543,476.2284 E 1,447,210.3148 Sta 36+19.04

Course from 15942 to PC A1-1  
S 43° 10' 30.42" W Dist 228.1542

**Curve 401** Ea = 0.00", V(Passenger) = 15 mph

Curve A1-1

Chord Definition

P.I. Station	39+00.46	N	543,271.0001	E	1,447,017.7602
Delta =	1° 03' 54.81" (RT)				
Degree =	1° 00' 00.00"				
Tangent =	53.2635				
Length =	106.5225				
Radius =	5,729.6507				
External =	0.2476				
Long Chord =	106.5223				
Mid. Ord. =	0.2476				
P.C. Station	38+47.19	N	543,309.8433	E	1,447,054.2047
P.T. Station	39+53.72	N	543,232.8411	E	1,446,980.5999
C.C.		N	547,230.2447	E	1,442,875.7660
Back	S 43° 10' 30.42" W				
Ahead	S 44° 14' 25.23" W				
Chord Bear	S 43° 42' 27.82" W				

Course from PT A1-1 to 15943  
S 44°14' 25.23" Dist 888.4553

Point 15943 (PINC)  
N 542,596.3343 E 1,446,360.7516 Sta 48+42.17

Course from 15943 to 15944  
S 44° 05' 52.44" Dist 73.1076

Point 15944 (POT)  
N 542,543.8320 E 1,446,309.8770 Sta 49+15.28

**PROPOSED A6 TRACK ALIGNMENT**

Point 15981 (PS #8 LH TO)  
N 542,904.6403 E 1,446,660.9888 Sta 44+11.83

Course from 15981 to 15982  
S 44° 14' 25.23" W Dist 30.0000

Point 15982 (PI TO #8 LH TO)  
N 542,883.1477 E 1,446,640.0587 Sta 44+41.83

Course from 15982 to PC A6-1  
S 37° 05' 15.23" W Dist 90.8151

**Curve 601** Ea = 0.00", V(Passenger) = 15 mph

Curve A6-1

Chord Definition

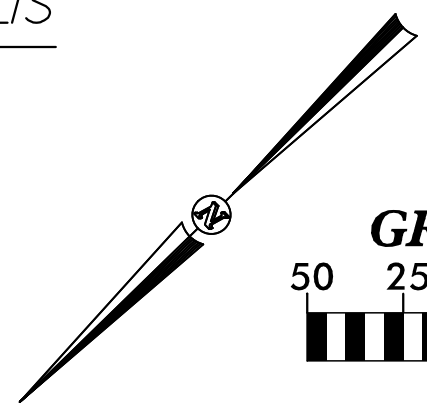
P.I. Station	45+62.52	N	542,786.8687	E	1,446,567.2763
Delta =	7° 08' 54.35" (RT)				
Degree =	12° 00' 00.00"				
Tangent =	29.8784				
Length =	59.5702				
Radius =	478.3386				
External =	0.9322				
Long Chord =	59.6406				
Mid. Ord. =	0.9304				
P.C. Station	45+32.64	N	542,810.7032	E	1,446,585.2941
P.T. Station	45+92.21	N	542,765.4617	E	1,446,546.4327
C.C.		N	543,099.1580	E	1,446,203.7163
Back	S 37° 05' 15.23" W				
Ahead	S 44° 14' 09.58" W				
Chord Bear	S 40° 39' 42.40" W				

Course from PT A6-1 to 15983  
S 44° 14' 09.58" W Dist 126.2599

Point 15983 (POT)  
N 542,674.9999 E 1,446,458.3519 Sta 47+18.47

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TO KANNAPOLIS

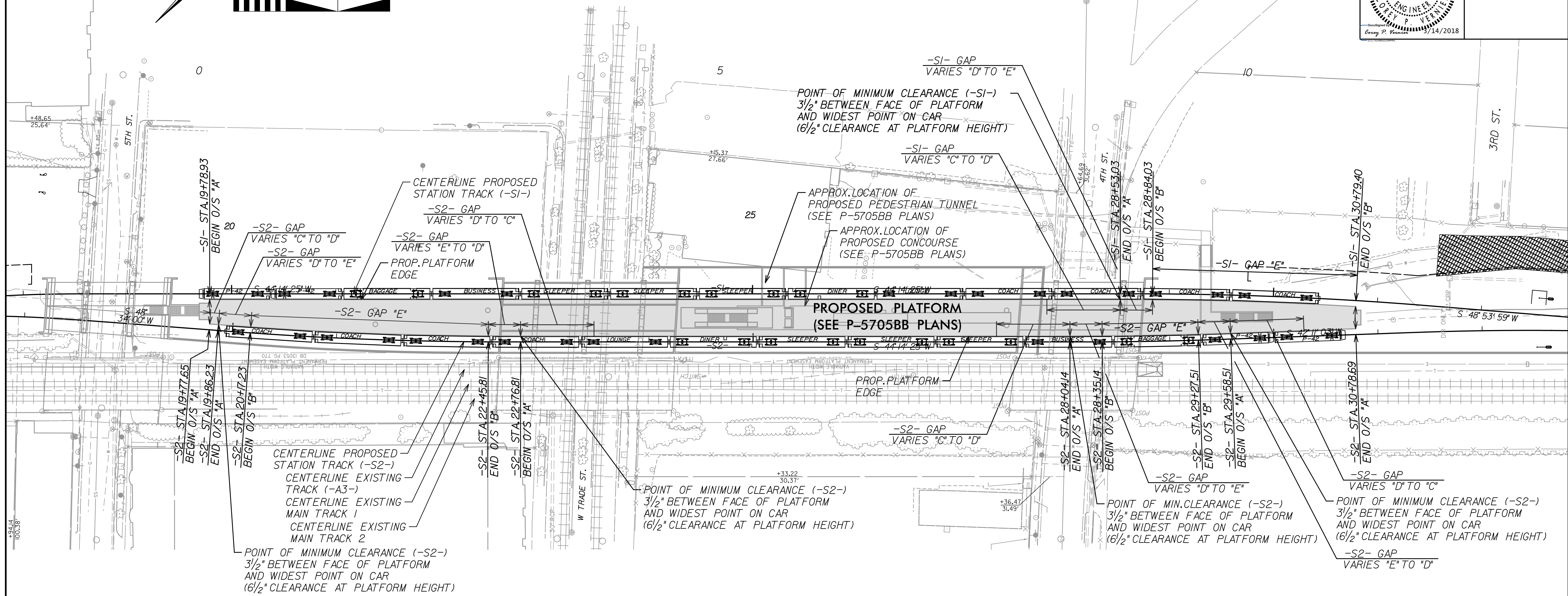


# PLATFORM ENVELOPE SHEET

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609  
NC License No: C-1554

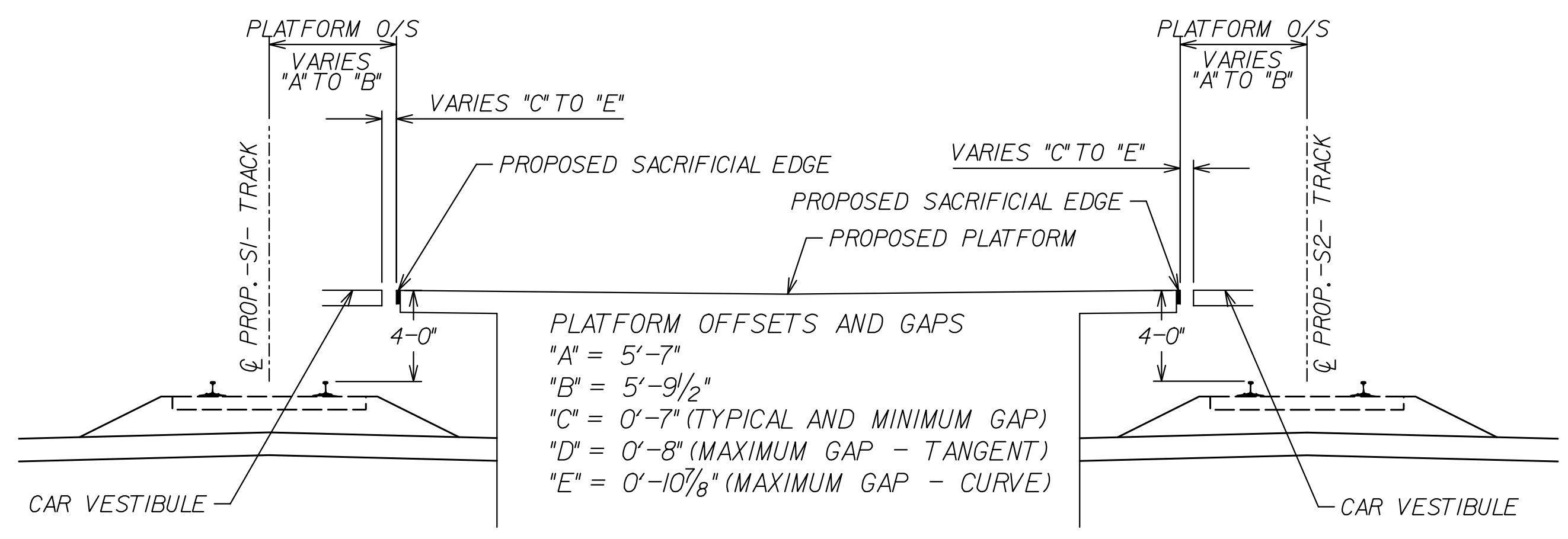
PROJECT REFERENCE NO. P-5705BA	SHEET NO. 2M
RW SHEET NO.	
RAILROAD DESIGN ENGINEER	
DATE: MARCH 16, 2018	

TO GASTONIA



### NOTES:

- 1) THE CONSIST OF THE CRESCENT (\*19/\*20) ANALYZED ON THIS SHEET REPRESENTS A HOLIDAY OR FUTURE CONSIST AND INCLUDES AN EXTRA COACH AND AN EXTRA SLEEPING CAR AS COMPARED TO THE TYPICAL EXISTING CRESCENT CONSIST.
- 2) THE CONSIST ANALYZED INCLUDES THE FOLLOWING EQUIPMENT:  
 2 - P-42 LOCOMOTIVES  
 1 - VIEWLINER BAGGAGE CAR  
 1 - AMFLEET II BUSINESS CLASS CAR  
 3 - VIEWLINER SLEEPING CARS  
 1 - HERITAGE DINING CAR  
 1 - AMFLEET II LOUNGE CAR  
 4 - AMFLEET II COACH CARS
- 3) THE GAPS MEASURED ARE FROM THE EDGE OF THE CAR THRESHOLD TO THE FACE OF THE SACRIFICIAL EDGE OF THE PROPOSED PLATFORM. THE GAPS VARY DEPENDING ON THE ORIENTATION OF THE CAR.
- 4) THE TYPICAL GAP IS 7" AND VARIES BETWEEN 7" AND 10 7/8" WHICH EXCEEDS ADA REQUIREMENTS. THEREFORE, PASSENGERS WITH LIMITED MOBILITY WILL BE ACCOMMODATED USING BRIDGE PLATES.

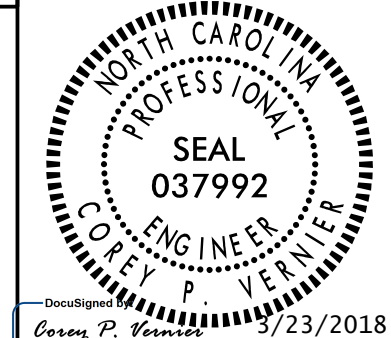


PLATFORM OFFSETS AND GAPS  
 "A" = 5'-7"  
 "B" = 5'-9 1/2"  
 "C" = 0'-7" (TYPICAL AND MINIMUM GAP)  
 "D" = 0'-8" (MAXIMUM GAP - TANGENT)  
 "E" = 0'-10 7/8" (MAXIMUM GAP - CURVE)

### PLATFORM OFFSET DETAIL

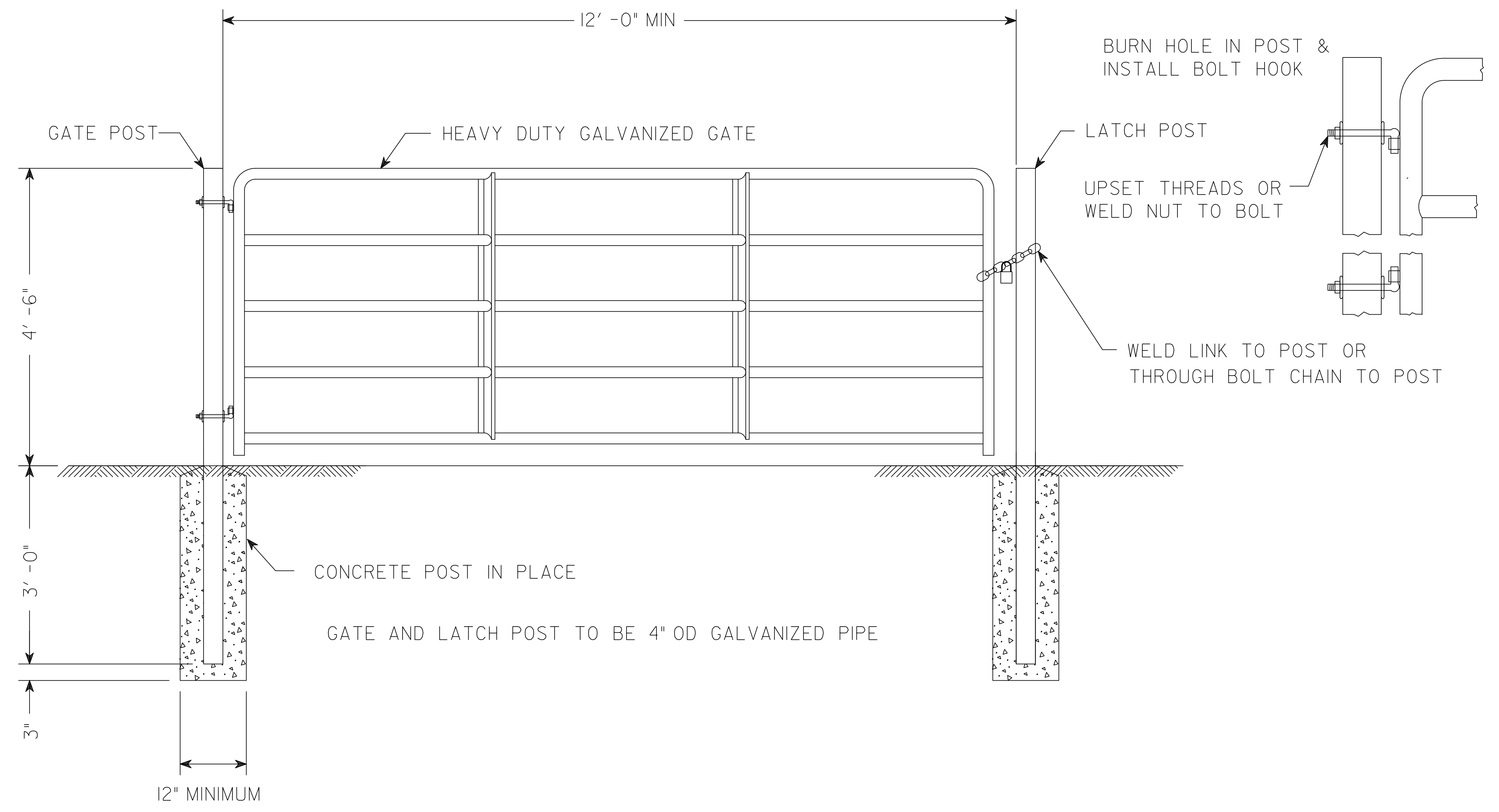
NOT TO SCALE

0012DEL\_P28

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554	PROJECT REFERENCE NO. P-5705BA	SHEET NO. 2N
	RW SHEET NO.	
DATE: MARCH 16, 2018	RAILROAD DESIGN ENGINEER  Cory P. Venner 3/23/2018	

# GATE DETAIL

N.T.S.





# TRACK DRAINAGE DETAILS

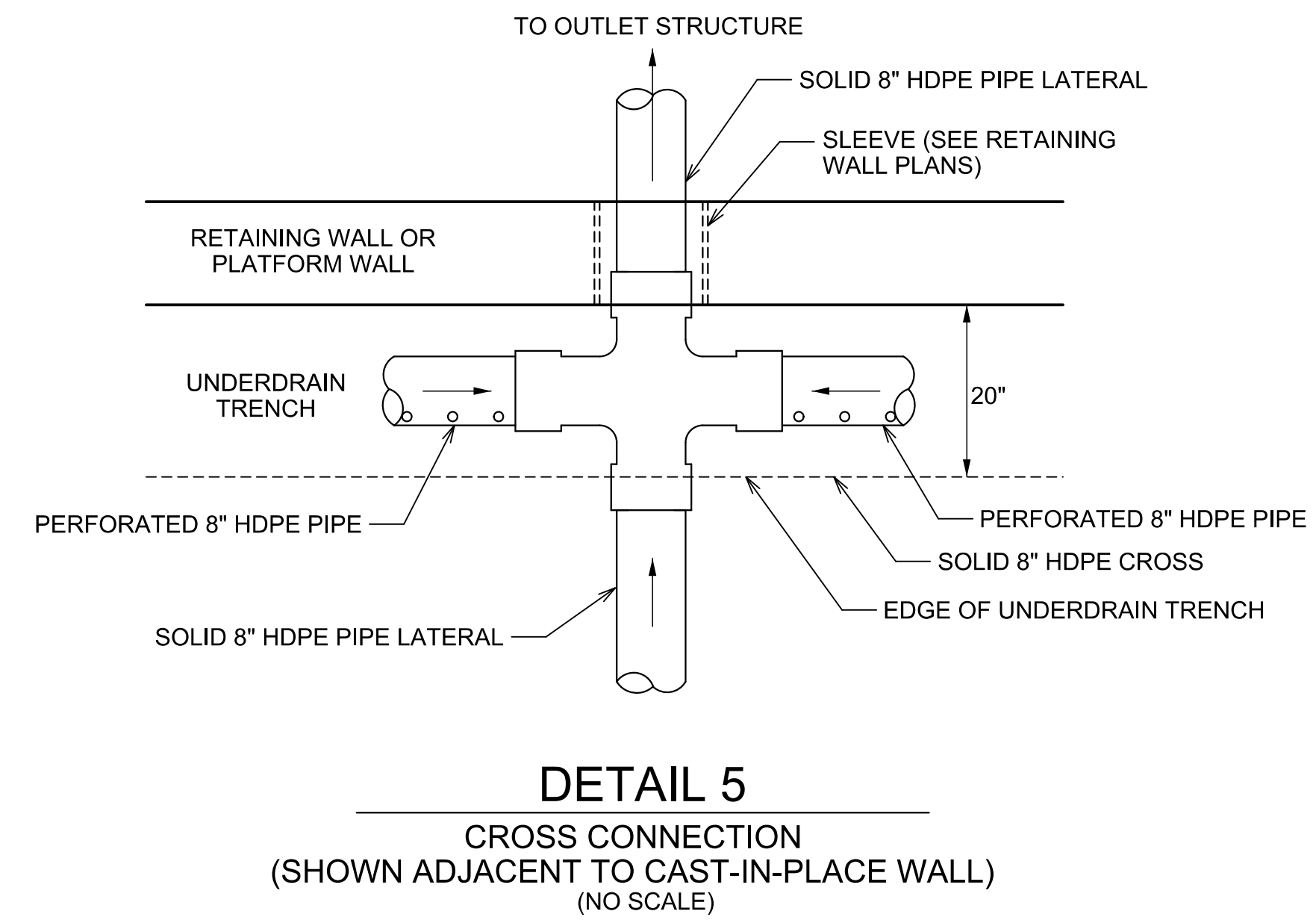
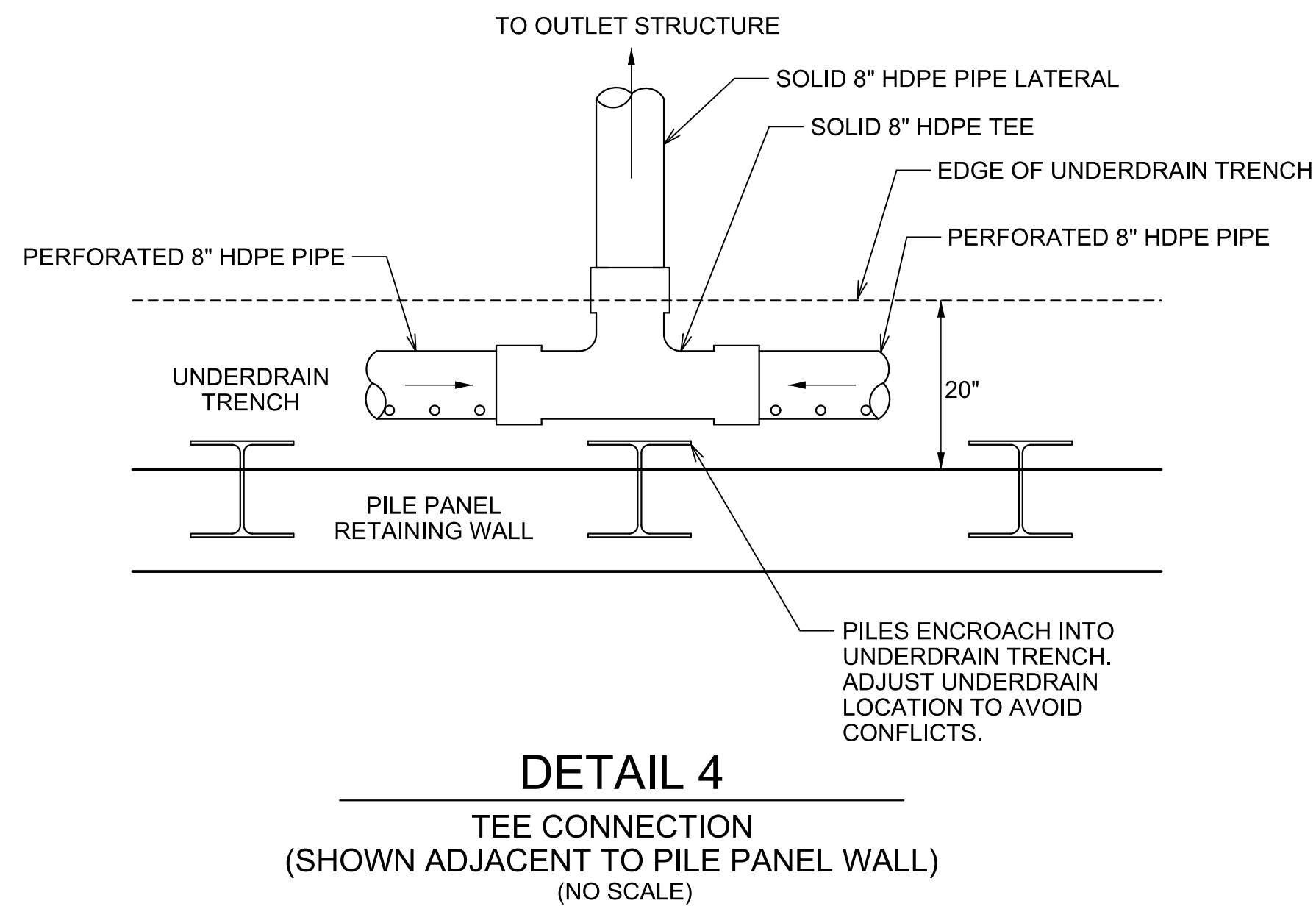
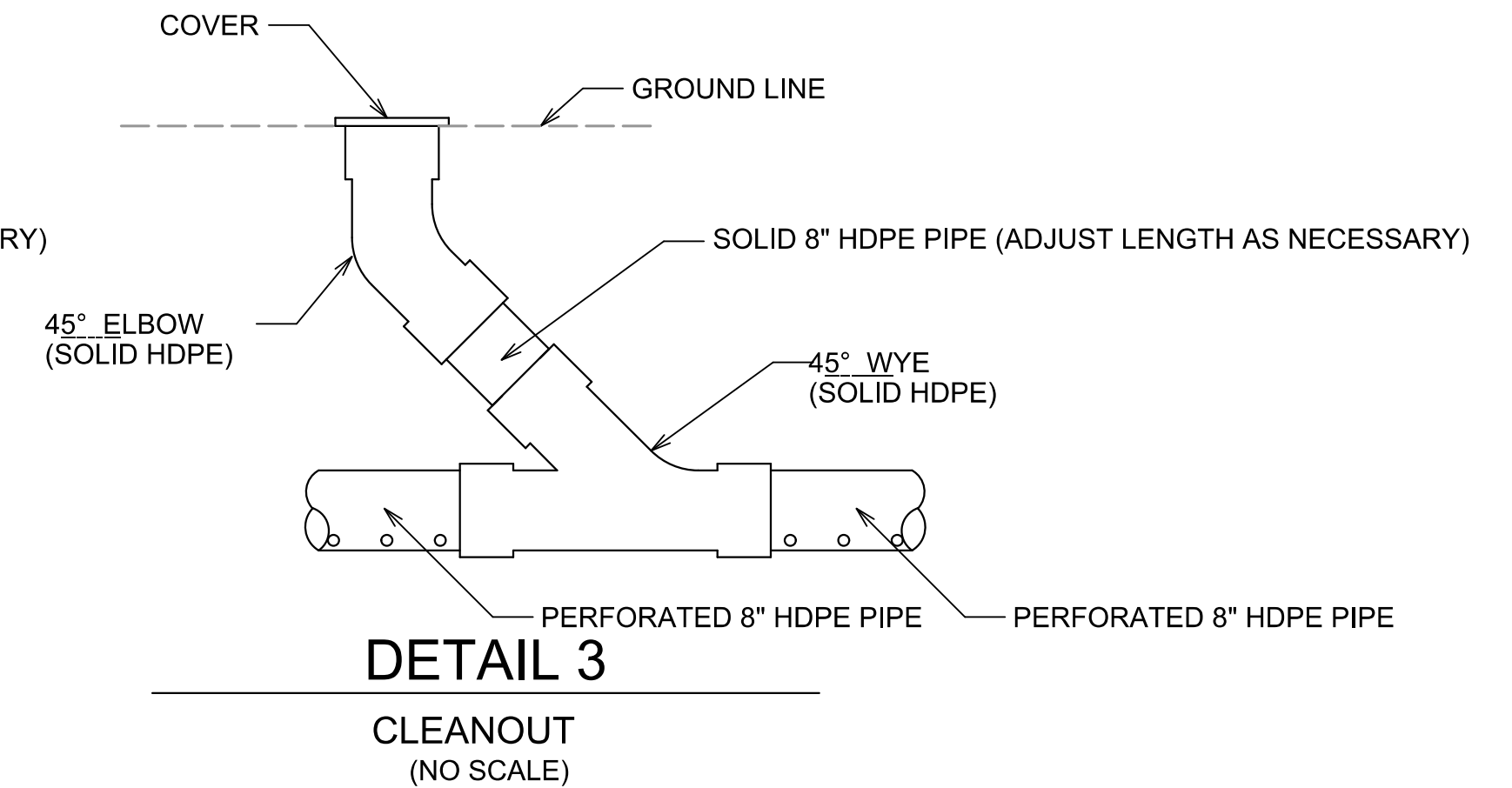
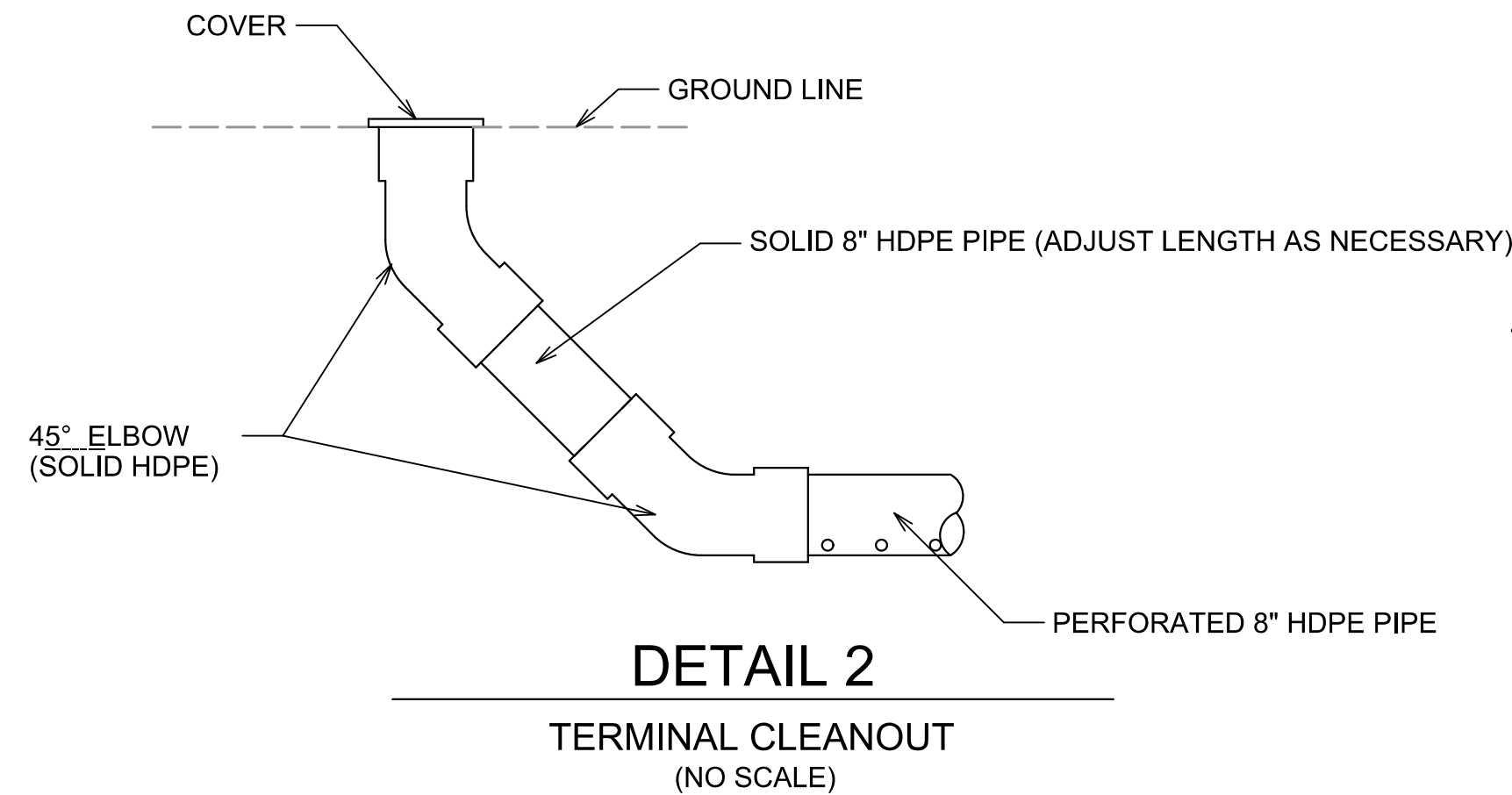
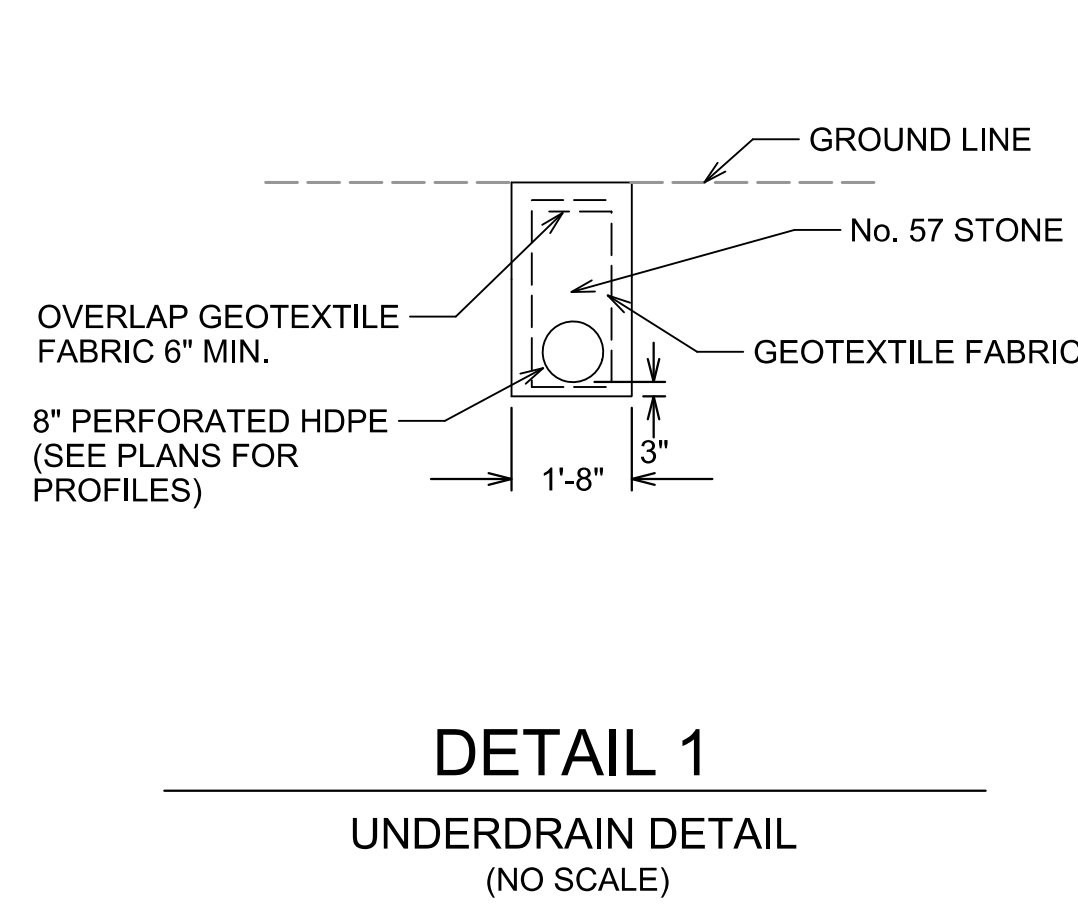
**HNTB** HNTB NORTH CAROLINA, P.C.  
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Raleigh, North Carolina 27609  
NC License No: C-1554

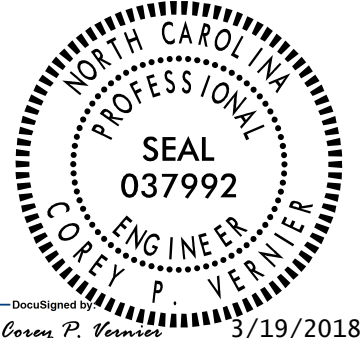
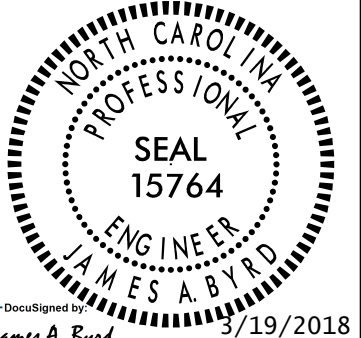
PROJECT REFERENCE NO.	SHEET NO.
P-5705BA	20

DATE: MARCH 16, 2018

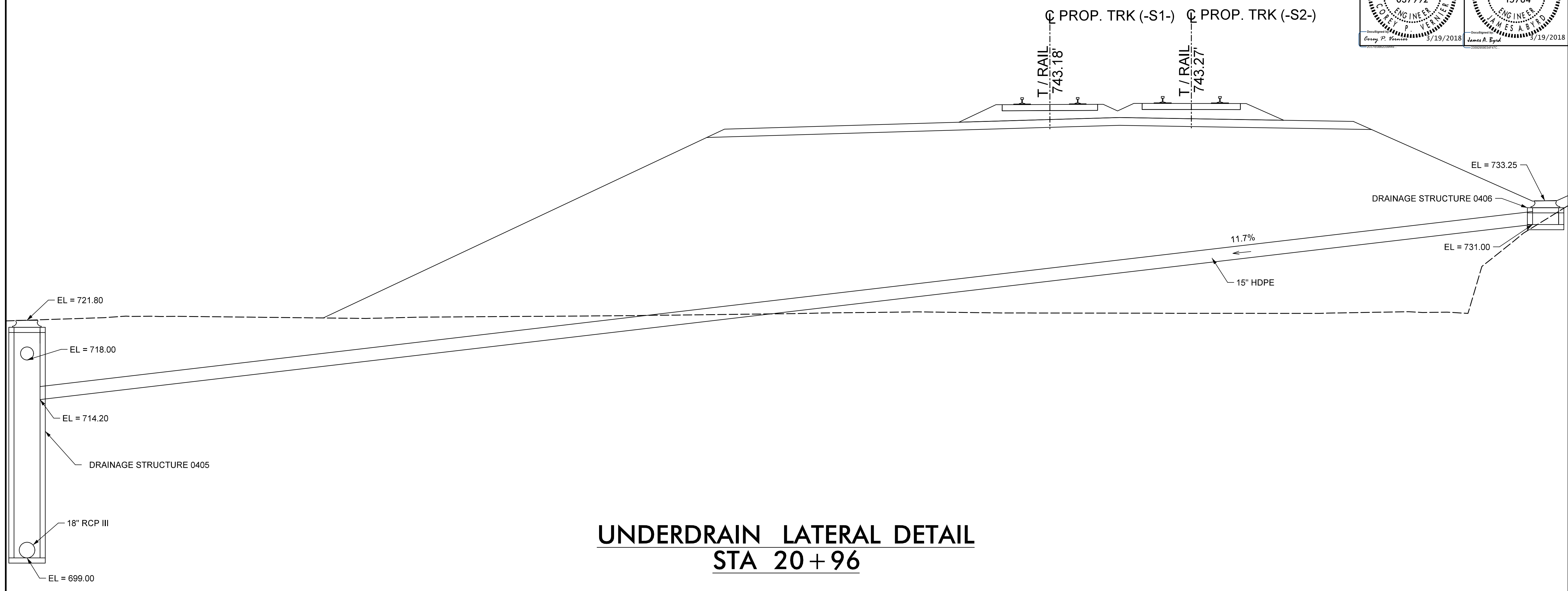
RW SHEET NO.	
RAILROAD DESIGN ENGINEER	HYDRAULIC ENGINEER
3/14/2018	3/14/2018

## 8" UNDERDRAIN DETAIL

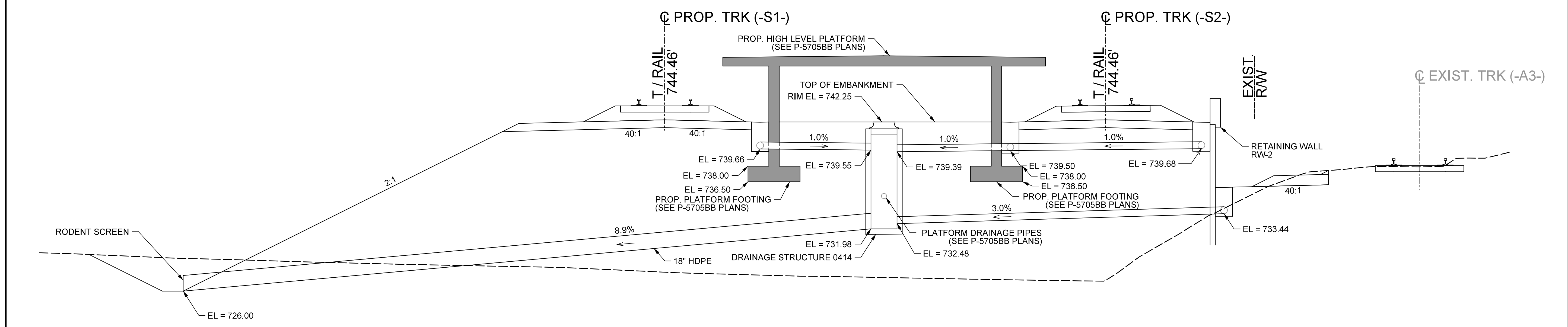


PROJECT REFERENCE NO. P-5705BA		SHEET NO. 2P	
RW SHEET NO.			
RAILROAD DESIGN ENGINEER		HYDRAULIC ENGINEER	
			
Designed by Gregory P. Vannoy 3/19/2018		Designed by James A. Byrd 3/19/2018	

## LATERAL PIPE DETAIL STA 16+82.73 (SKEWED)



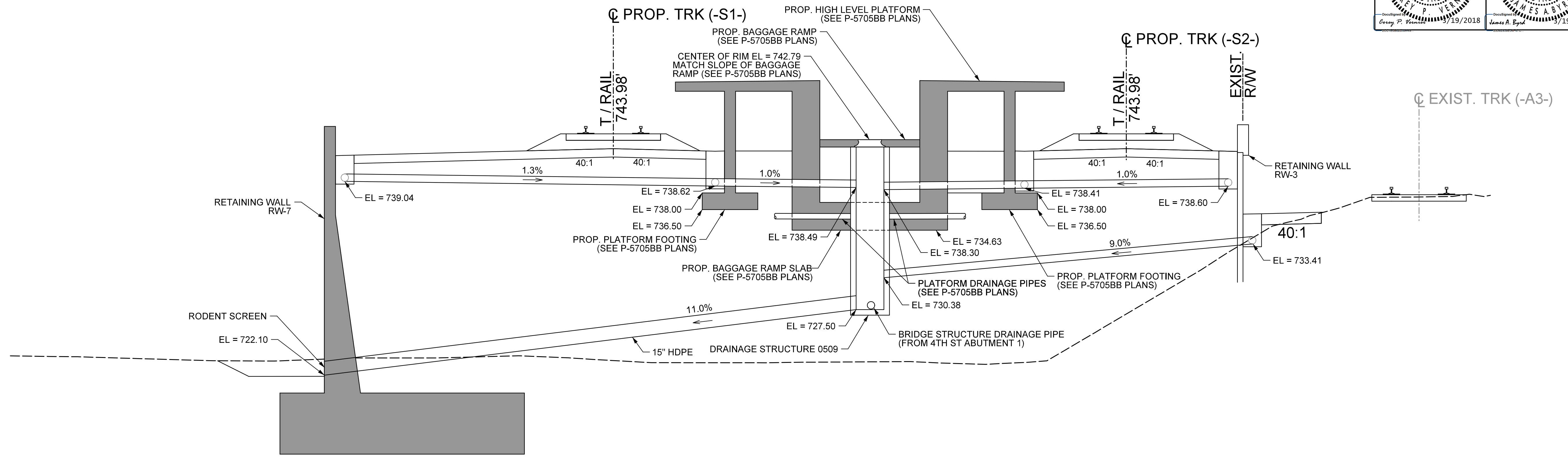
## UNDERDRAIN LATERAL DETAIL STA 20+96



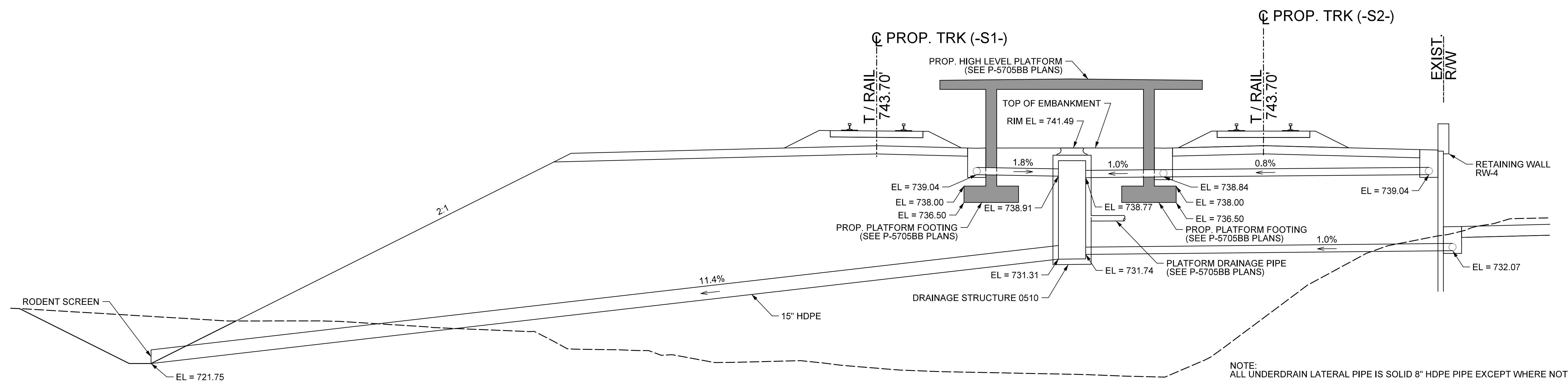
NOTE:  
 ALL UNDERDRAIN LATERAL PIPE IS SOLID 8" HDPE PIPE EXCEPT WHERE NOTED.

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554	PROJECT REFERENCE NO. P-5705BA	SHEET NO. 2Q
	RW SHEET NO.	
DATE: MARCH 16, 2018	RAILROAD DESIGN ENGINEER COLEBY P. VERMEER	HYDRAULIC ENGINEER JAMES A. BYRD
	SEAL 037992 ENGINEER	SEAL 15764 ENGINEER
	Designed by: Coleby P. Vermeer 3/19/2018	Designed by: James A. Byrd 3/19/2018

## UNDERDRAIN LATERAL DETAIL STA 27 + 00



## UNDERDRAIN LATERAL DETAIL STA 30 + 50

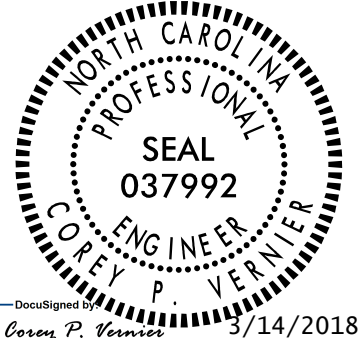



NOTE:  
ALL UNDERDRAIN LATERAL PIPE IS SOLID 8" HDPE PIPE EXCEPT WHERE NOTED.

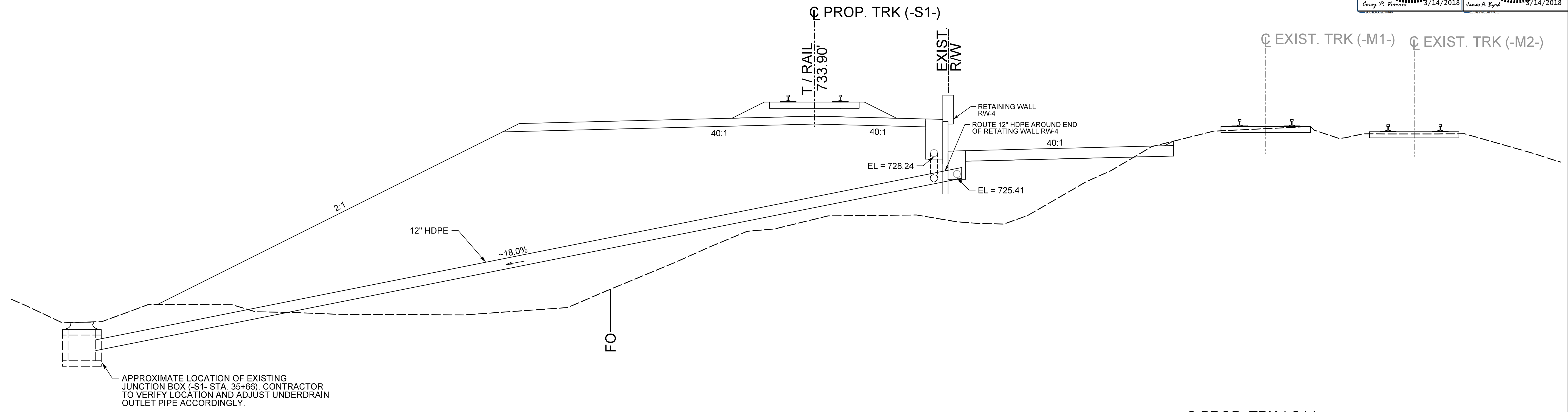
**HNTB** HNTB NORTH CAROLINA, P.C.  
 343 E. Six Forks Road, Suite 200  
 Raleigh, North Carolina 27609  
 NC License No: C-1554

PROJECT REFERENCE NO. P-5705BA  
 SHEET NO. 2R

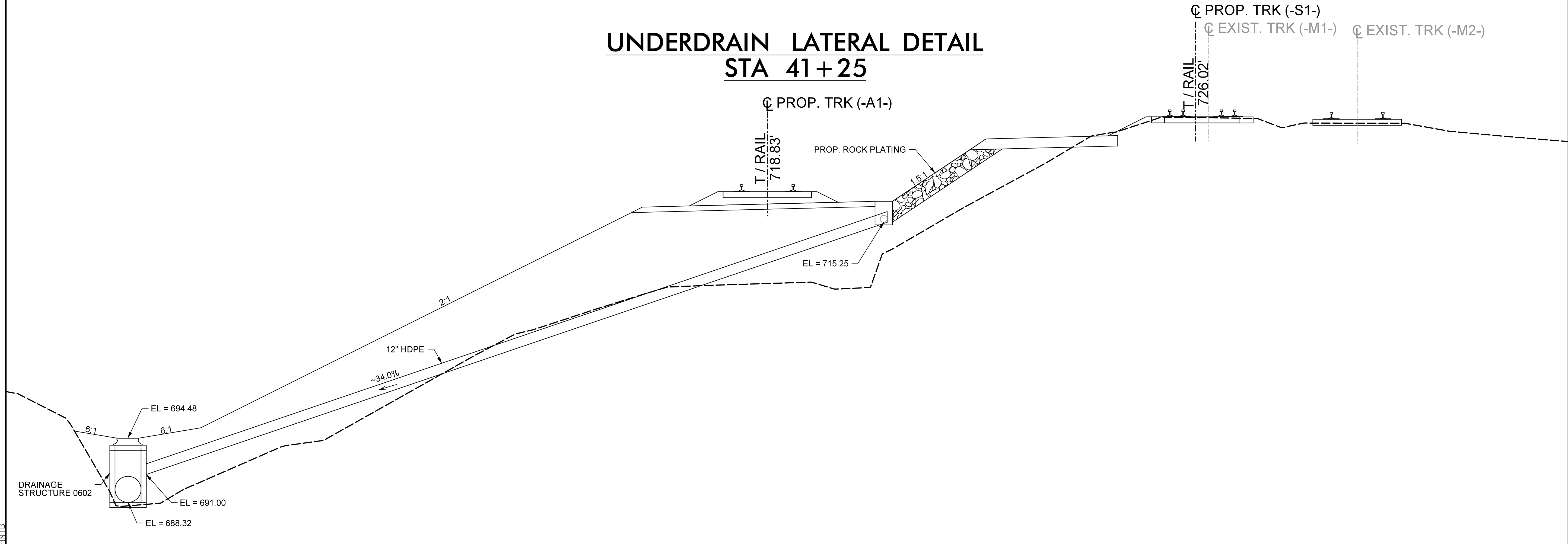
DATE: MARCH 16, 2018

RW SHEET NO.	
RAILROAD DESIGN ENGINEER	HYDRAULIC ENGINEER
 COREY P. KERN SEAL 037992 ENGINEER 3/14/2018	 JAMES A. BYRD SEAL 15764 ENGINEER 3/14/2018

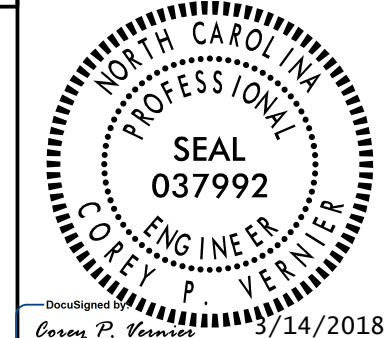
### UNDERDRAIN LATERAL DETAIL STA 35 + 77



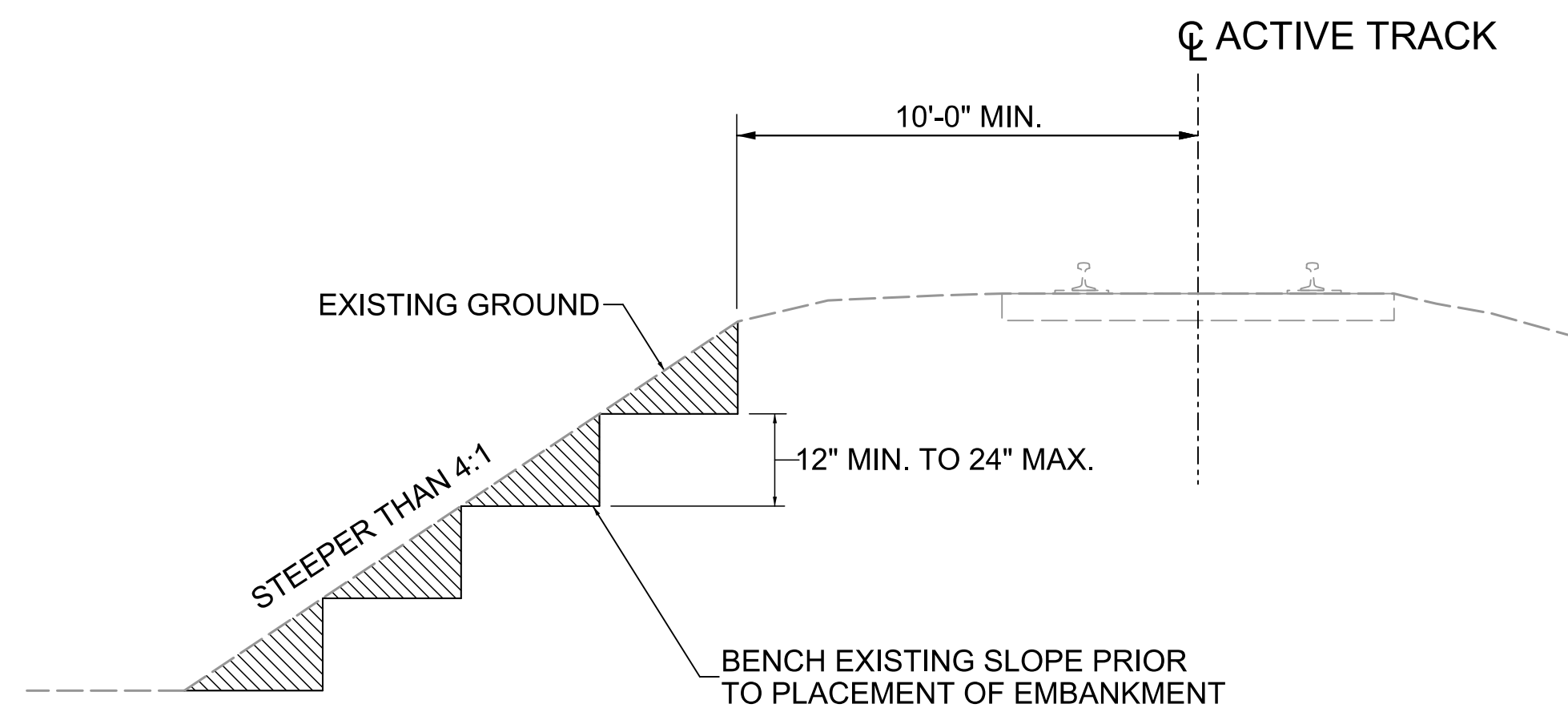
### UNDERDRAIN LATERAL DETAIL STA 41 + 25



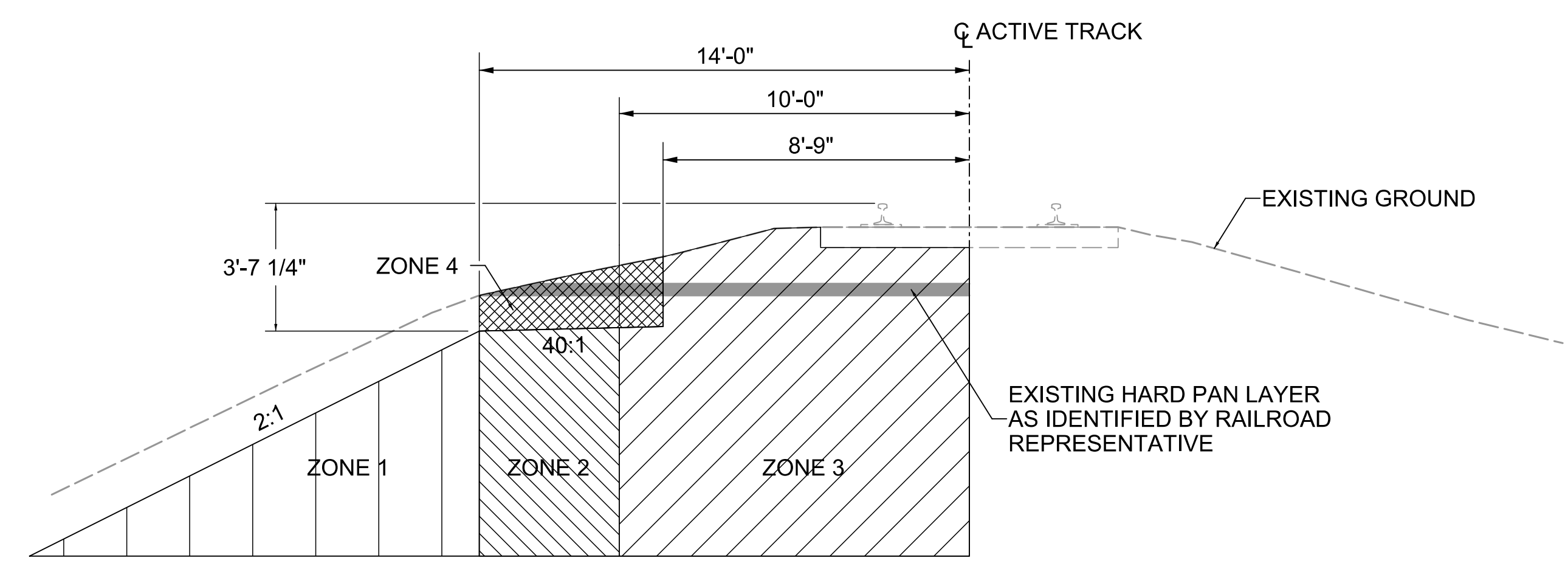
3/14/2018  
 C:\p\h\h\02R.dgn  
 HNTB

<b>HNTB</b> HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554	PROJECT REFERENCE NO. P-5705BA	SHEET NO. 2S
	RW SHEET NO.	
DATE: MARCH 16, 2018		
		

# PARTIAL SECTION BENCHING DETAIL



# EXCAVATION ADJACENT TO ACTIVE TRACK

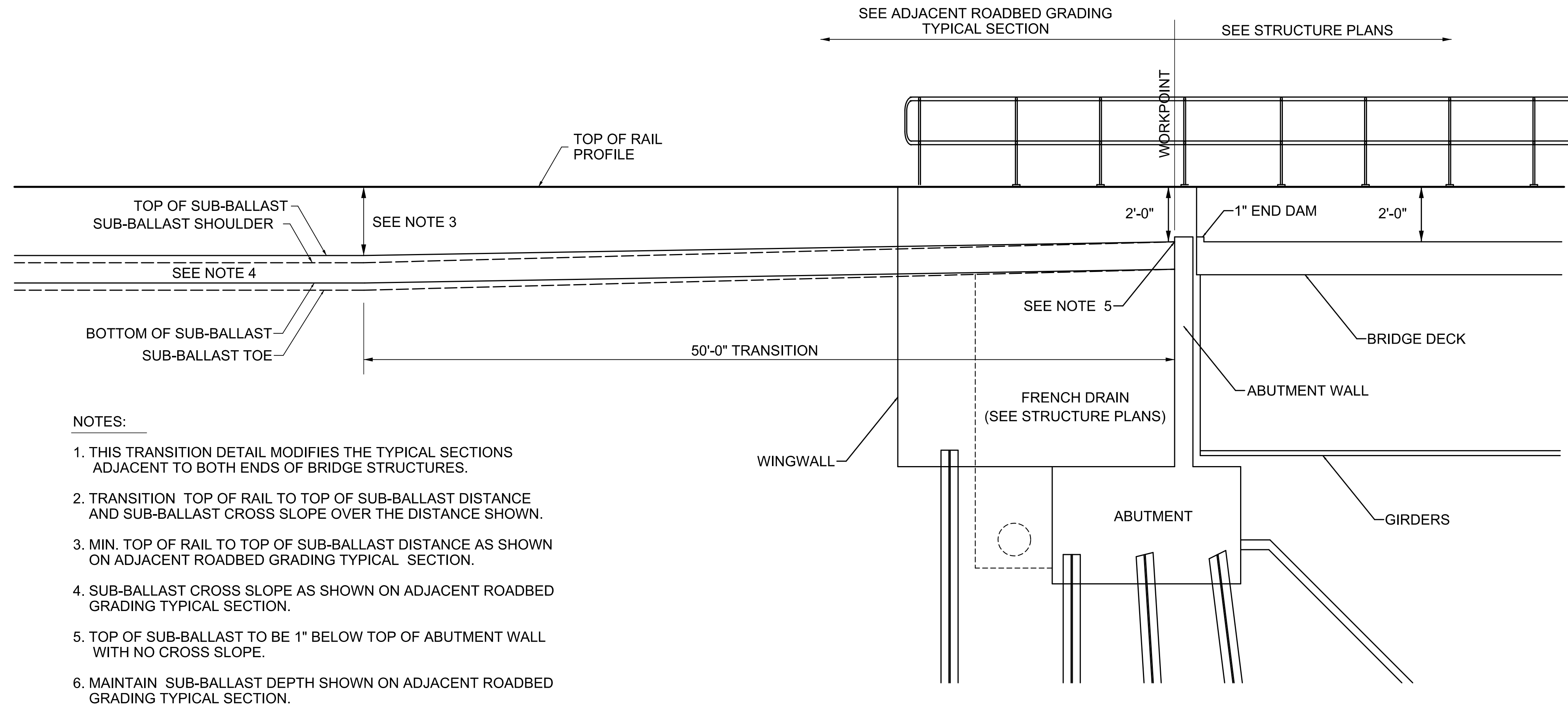


## EXCAVATION AND SHORING REQUIREMENTS

- ALL EXCAVATION ADJACENT TO ACTIVE TRACK MUST BE COORDINATED WITH THE RAILROAD REPRESENTATIVE PRIOR TO EXCAVATION. IF THE CONTRACTOR PROPOSES TO INSTALL SHORING WITHIN ZONE 1 OR ZONE 2 AS NOTED BELOW THAT IS NOT DETAILED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL SUBMIT THE PROPOSED SHORING SYSTEM TO THE RAILROAD FOR APPROVAL PRIOR TO INSTALLATION.
- ZONE 1 - EXCAVATION WITHIN ZONE 1 WILL REQUIRE SHORING FOR THE PROTECTION OF THE RAILROAD EXCEPT WHEN LIMITS OF EXCAVATION COMPLY WITH THE SPECIAL PROVISIONS OR WHEN BENCHING AN EXISTING SLOPE THAT FALLS WITHIN ZONE 1.
  - ZONE 2 - EXCAVATION WITHIN ZONE 2 WILL REQUIRE SHORING FOR THE PROTECTION OF THE RAILROAD EXCEPT WHEN LIMITS OF EXCAVATION COMPLY WITH THE SPECIAL PROVISIONS OR BENCHING AN EXISTING SLOPE THAT FALLS WITHIN ZONE 2. CONTRACTOR DESIGNED SHORING SHALL CONSIST OF INTERLOCKING SHEETING.
  - ZONE 3 - NO EXCAVATIONS WILL BE ALLOWED IN ZONE 3 EXCEPT FOR WHERE SPECIFICALLY DETAILED IN THE PLANS.
  - ZONE 4 - EXCAVATION WITHIN ZONE 4 ABOVE THE HARD PAN LAYER IS PERMITTED. EXCAVATION THROUGH AND BELOW THE HARD PAN LAYER IS PERMITTED ONLY AFTER THE RAILROAD REPRESENTATIVE DETERMINES IT NECESSARY TO PENETRATE THE HARD PAN LAYER. EXCAVATION THROUGH AND BELOW THE HARD PAN LAYER SHALL BE PERFORMED PER SPECIAL PROVISION.

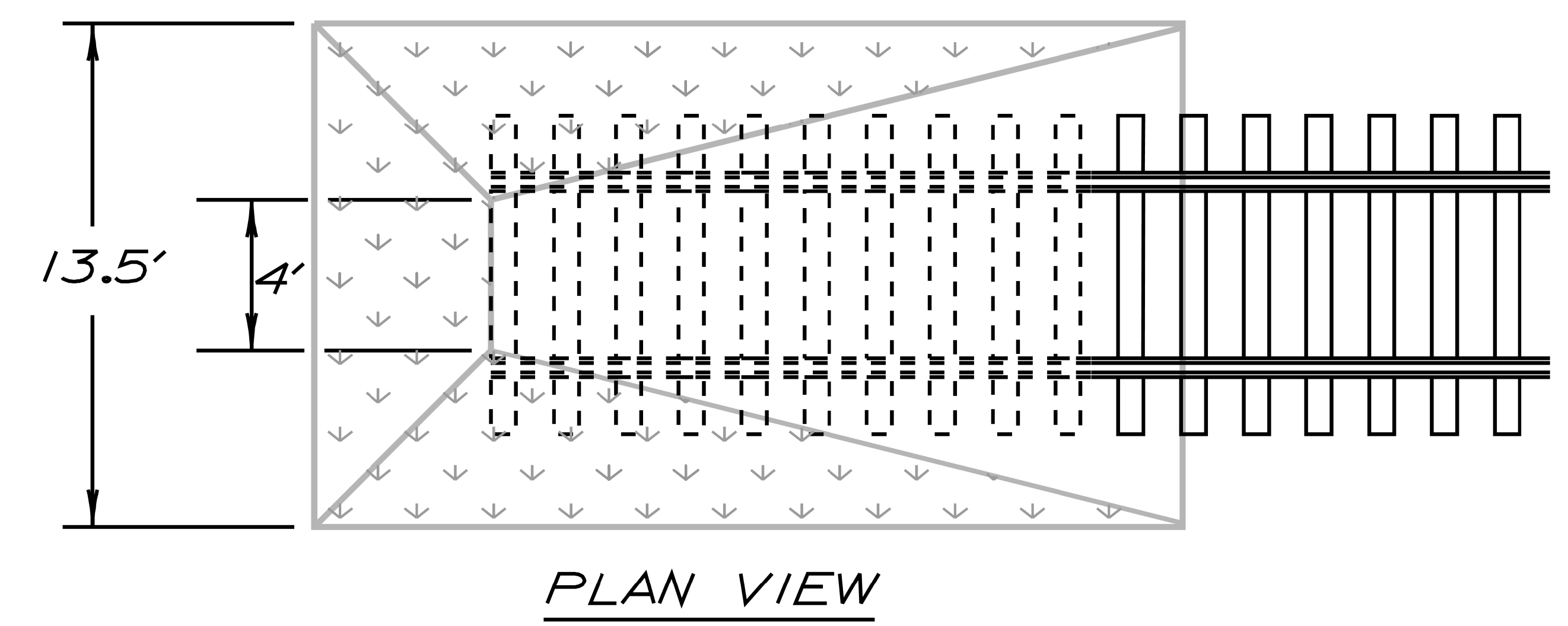
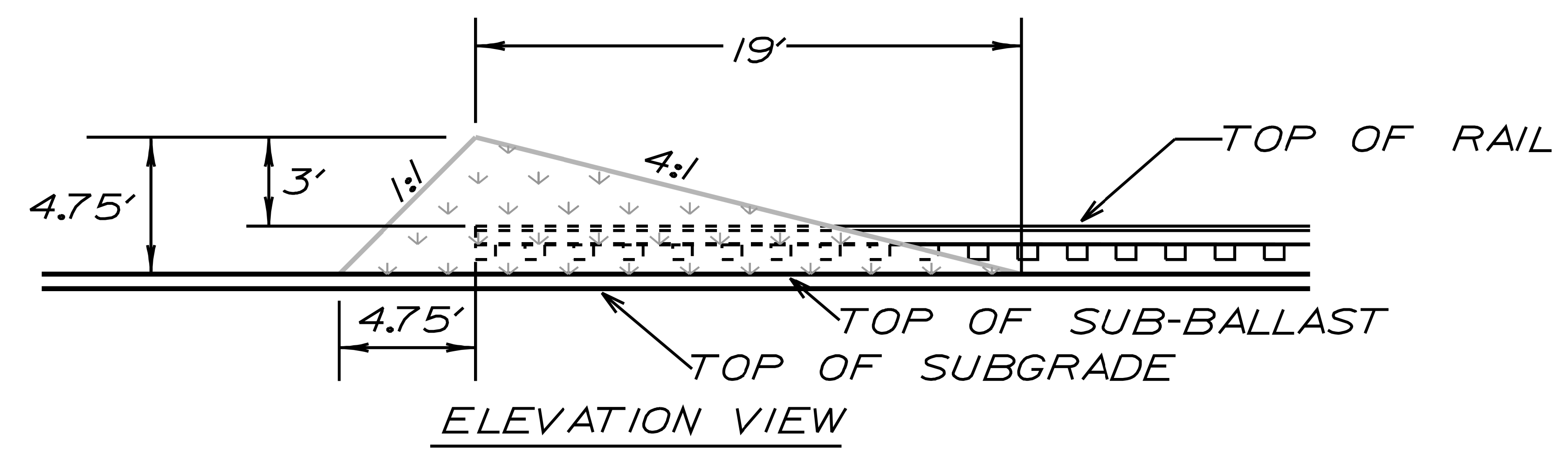
# ROADBED TRANSITION DETAIL

(NOT TO SCALE)



- NOTES:
1. THIS TRANSITION DETAIL MODIFIES THE TYPICAL SECTIONS ADJACENT TO BOTH ENDS OF BRIDGE STRUCTURES.
  2. TRANSITION TOP OF RAIL TO TOP OF SUB-BALLAST DISTANCE AND SUB-BALLAST CROSS SLOPE OVER THE DISTANCE SHOWN.
  3. MIN. TOP OF RAIL TO TOP OF SUB-BALLAST DISTANCE AS SHOWN ON ADJACENT ROADBED GRADING TYPICAL SECTION.
  4. SUB-BALLAST CROSS SLOPE AS SHOWN ON ADJACENT ROADBED GRADING TYPICAL SECTION.
  5. TOP OF SUB-BALLAST TO BE 1" BELOW TOP OF ABUTMENT WALL WITH NO CROSS SLOPE.
  6. MAINTAIN SUB-BALLAST DEPTH SHOWN ON ADJACENT ROADBED GRADING TYPICAL SECTION.

DETAIL



NORFOLK SOUTHERN RAILWAY COMPANY

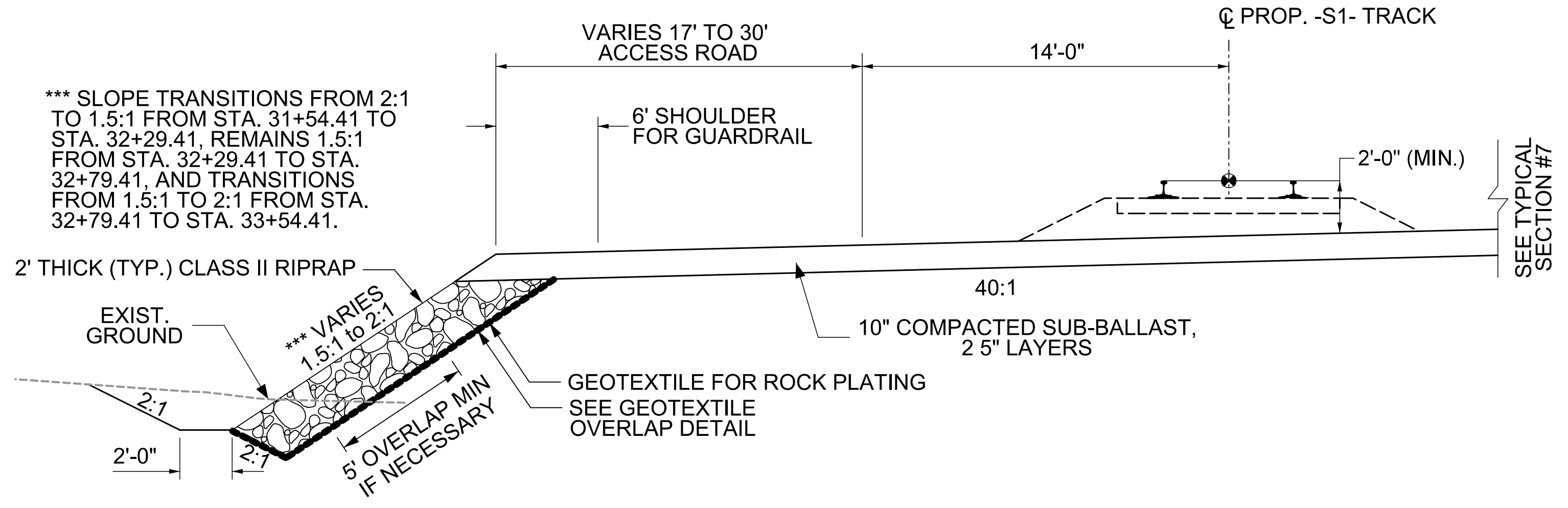
**EARTH MOUND  
DETAIL**

AUGUST 2000  
Atlanta, Georgia

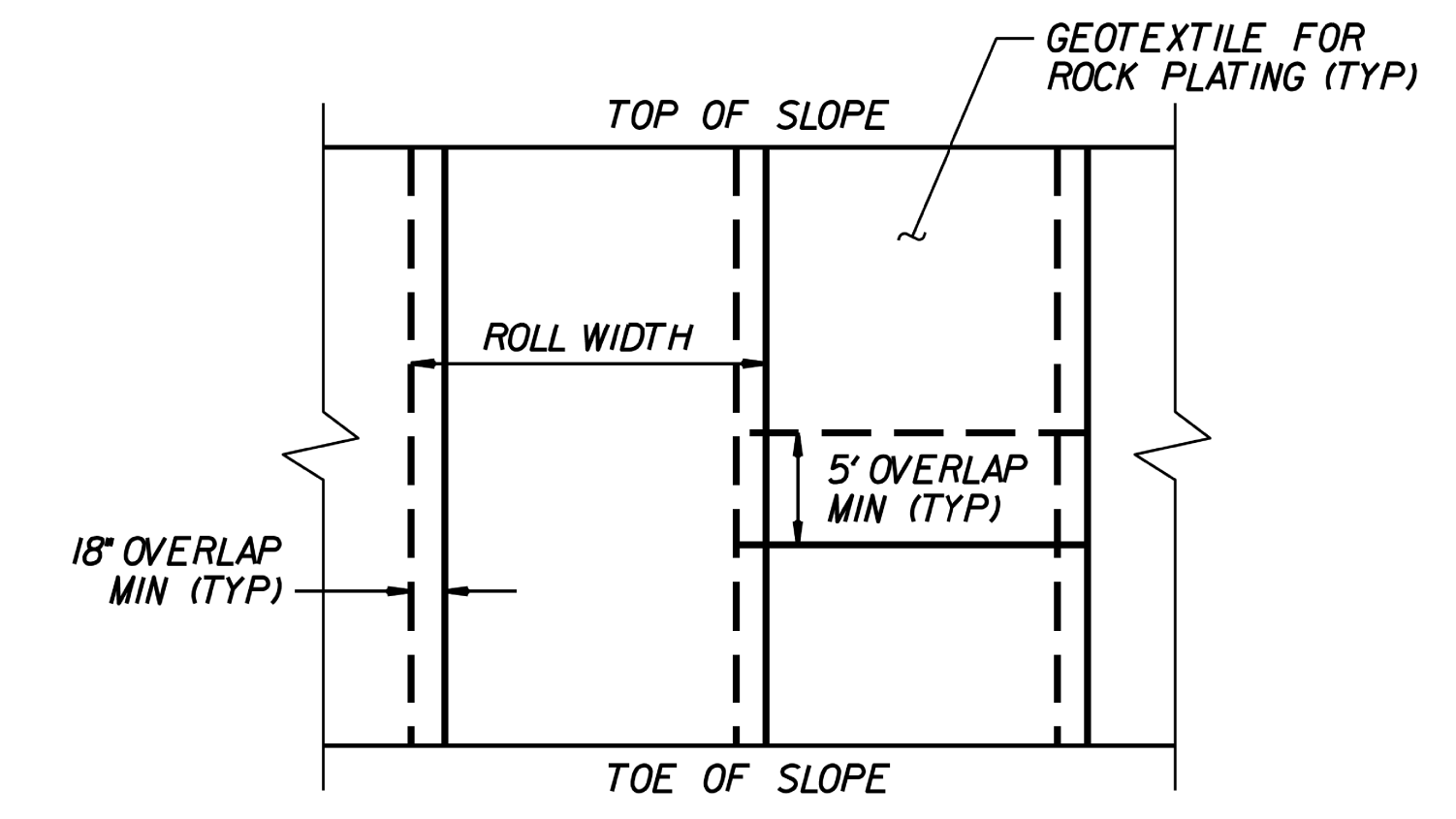
# ROCK PLATING DETAILS

(NOT TO SCALE)

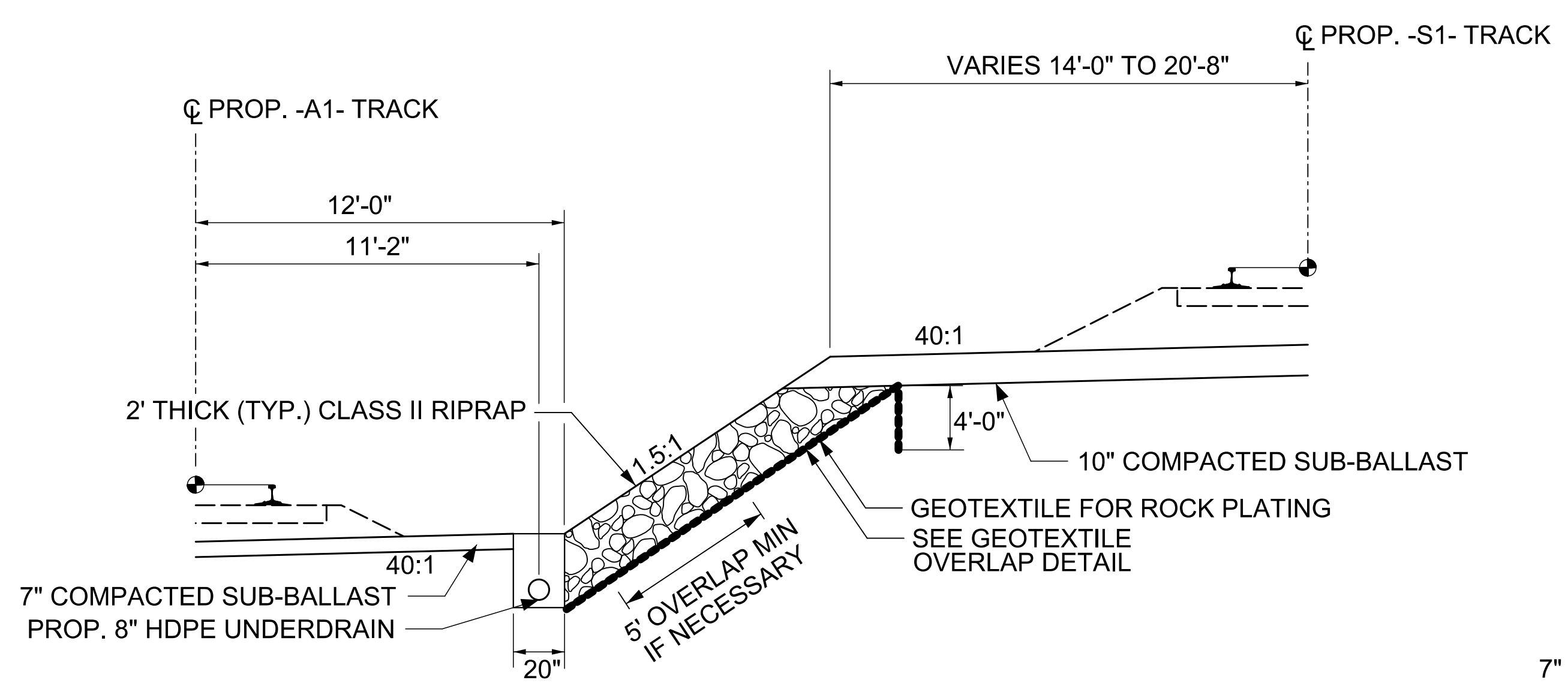
<b>HNTB</b> HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554	PROJECT REFERENCE NO. P-5705BA	SHEET NO. 2V
	RW SHEET NO.	
DATE: MARCH 16, 2018		



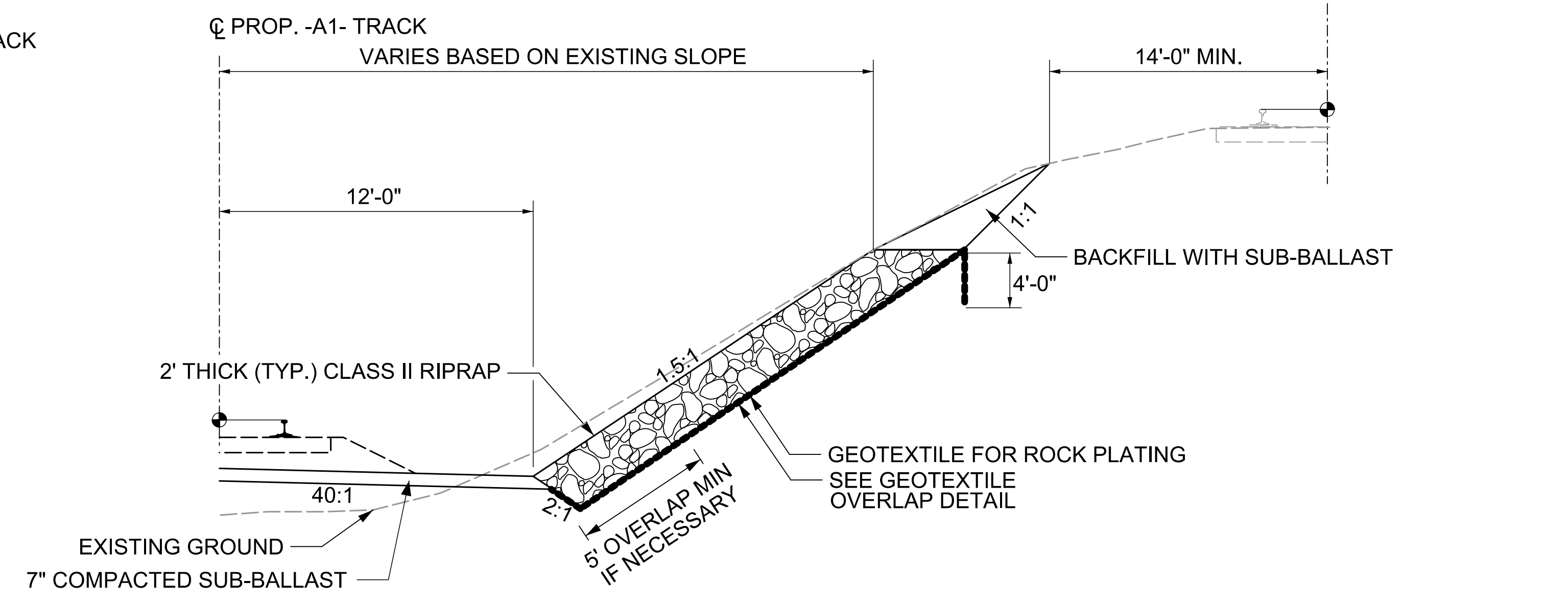
**-S1- STA. 31+54.41 THRU 33+54.41**



**GEOTEXTILE OVERLAP DETAIL  
(PLAN VIEW)**



**-S1- STA. 40+43.92 THRU 41+90.37  
(-A1- STA. 40+43.92 THRU 41+89.10)**



**-S1- STA. 44+90.00 THRU 46+00.00  
(-A1- STA. 44+88.73 THRU 45+98.74)**




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Raleigh, North Carolina 27609  
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
P-5705BA	2W

DATE: MARCH 16, 2018

R/W SHEET NO.

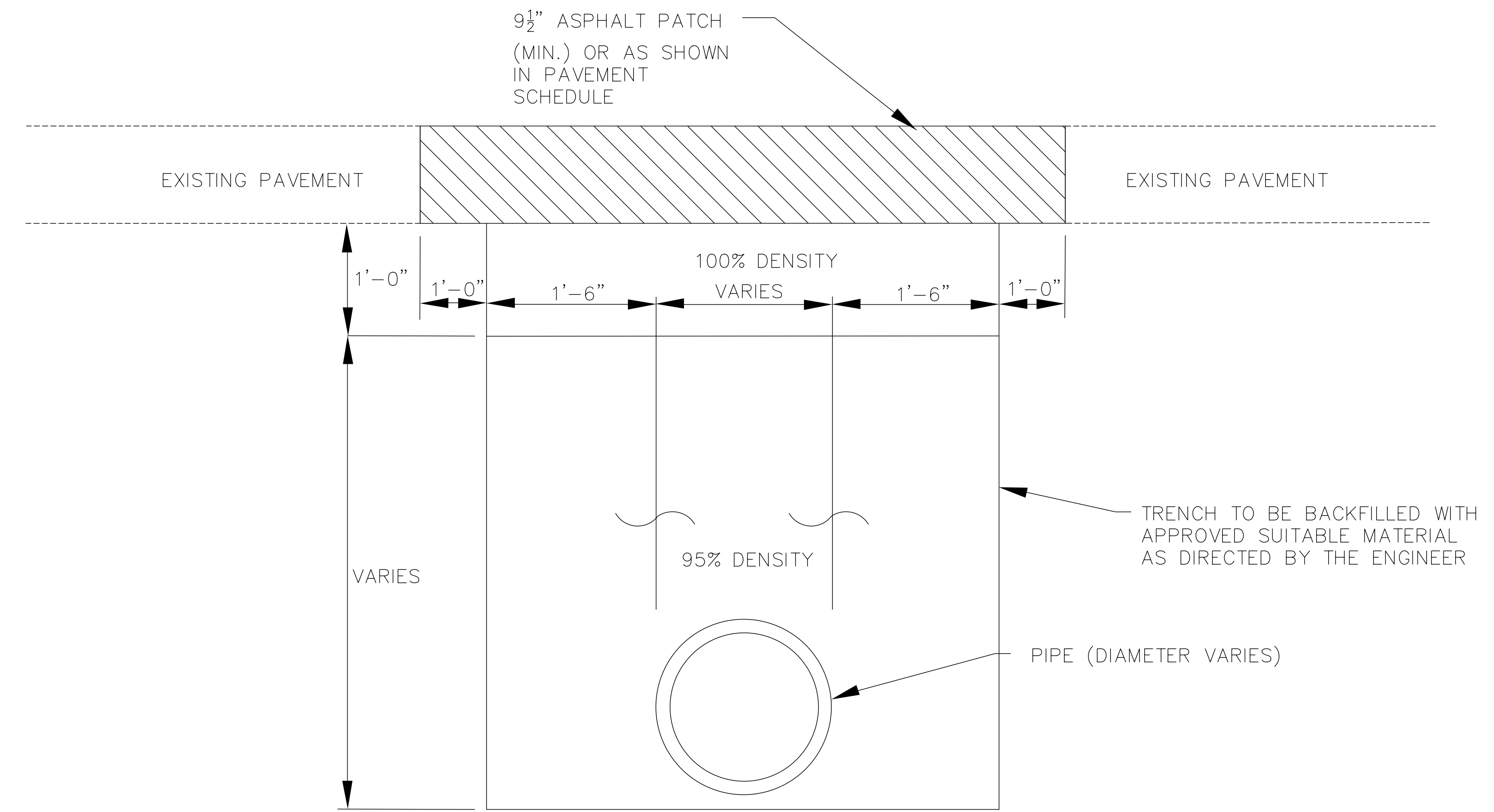
ROADWAY DESIGN ENGINEER



Eric W. Seckinger 3/15/2018

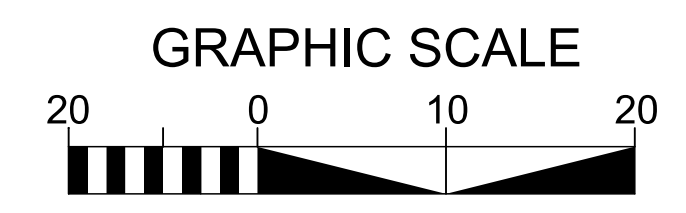
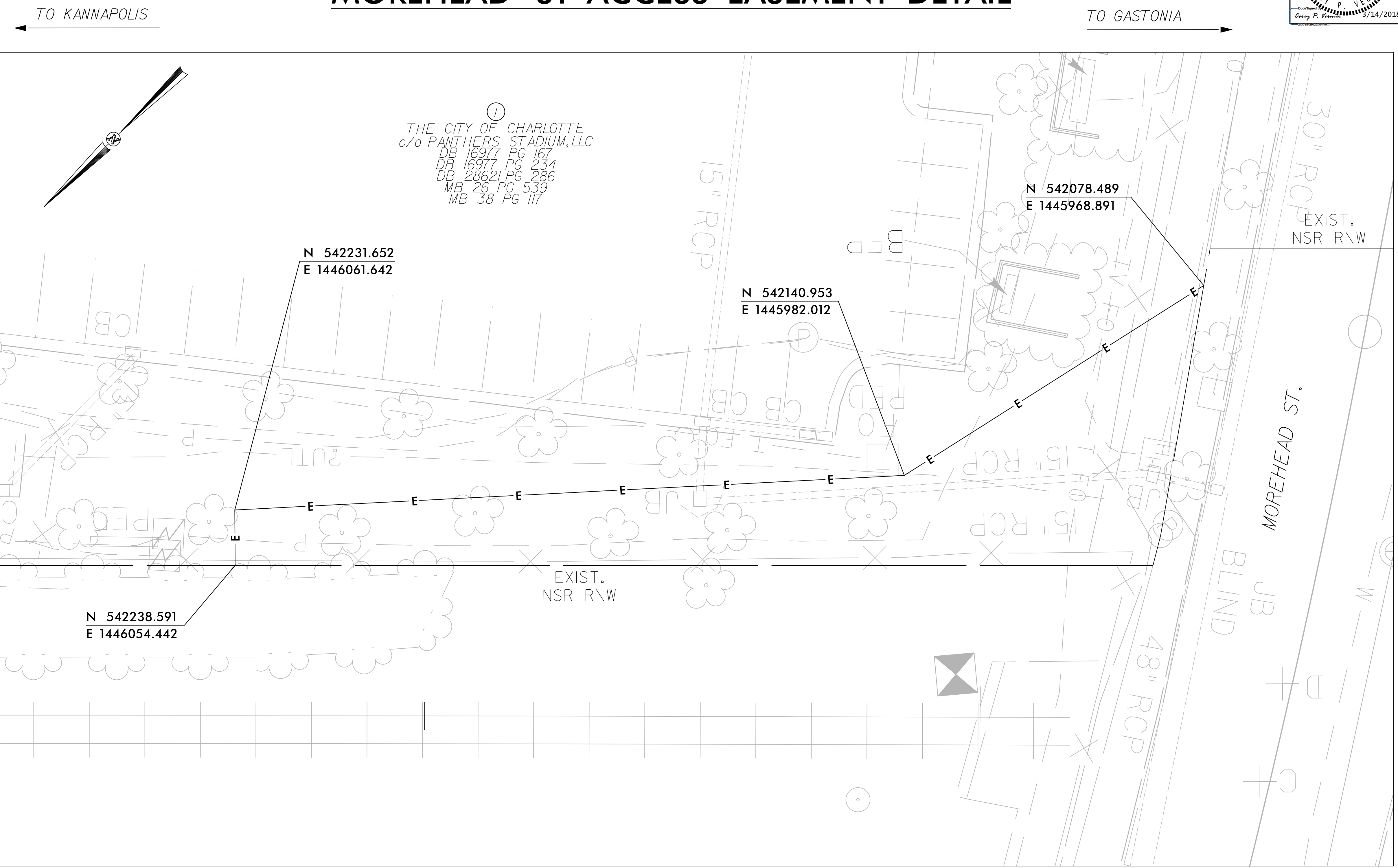
# PAVEMENT REPAIR DETAIL

(NOT TO SCALE)



<b>HNTB</b> HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554	PROJECT REFERENCE NO. P-5705BA	SHEET NO. 2X
	RW SHEET NO.	
DATE: MARCH 16, 2018		

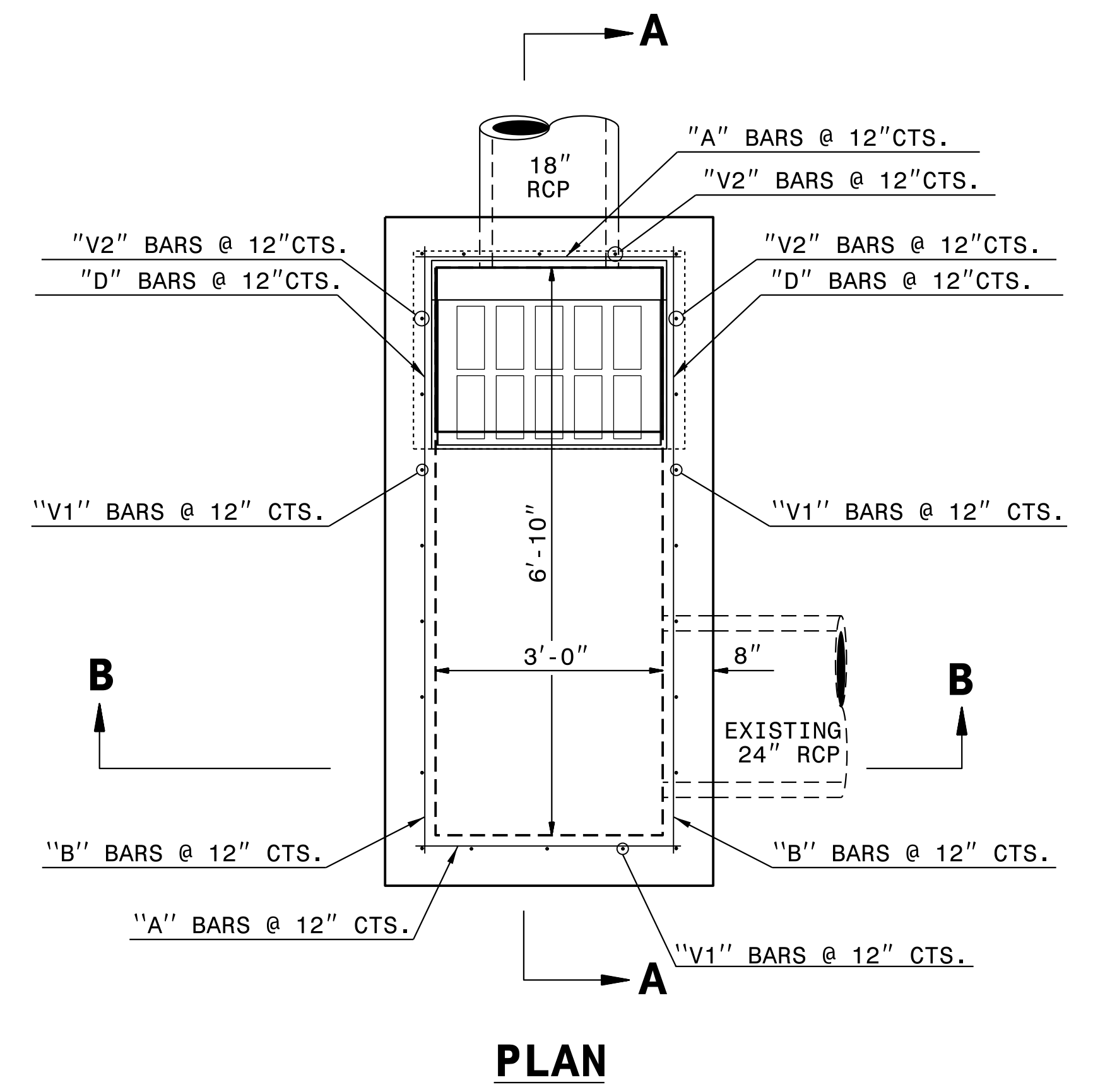
# MOREHEAD ST ACCESS EASEMENT DETAIL



PROJECT REFERENCE NO. P-5705BA	SHEET NO. 2Y
-----------------------------------	-----------------

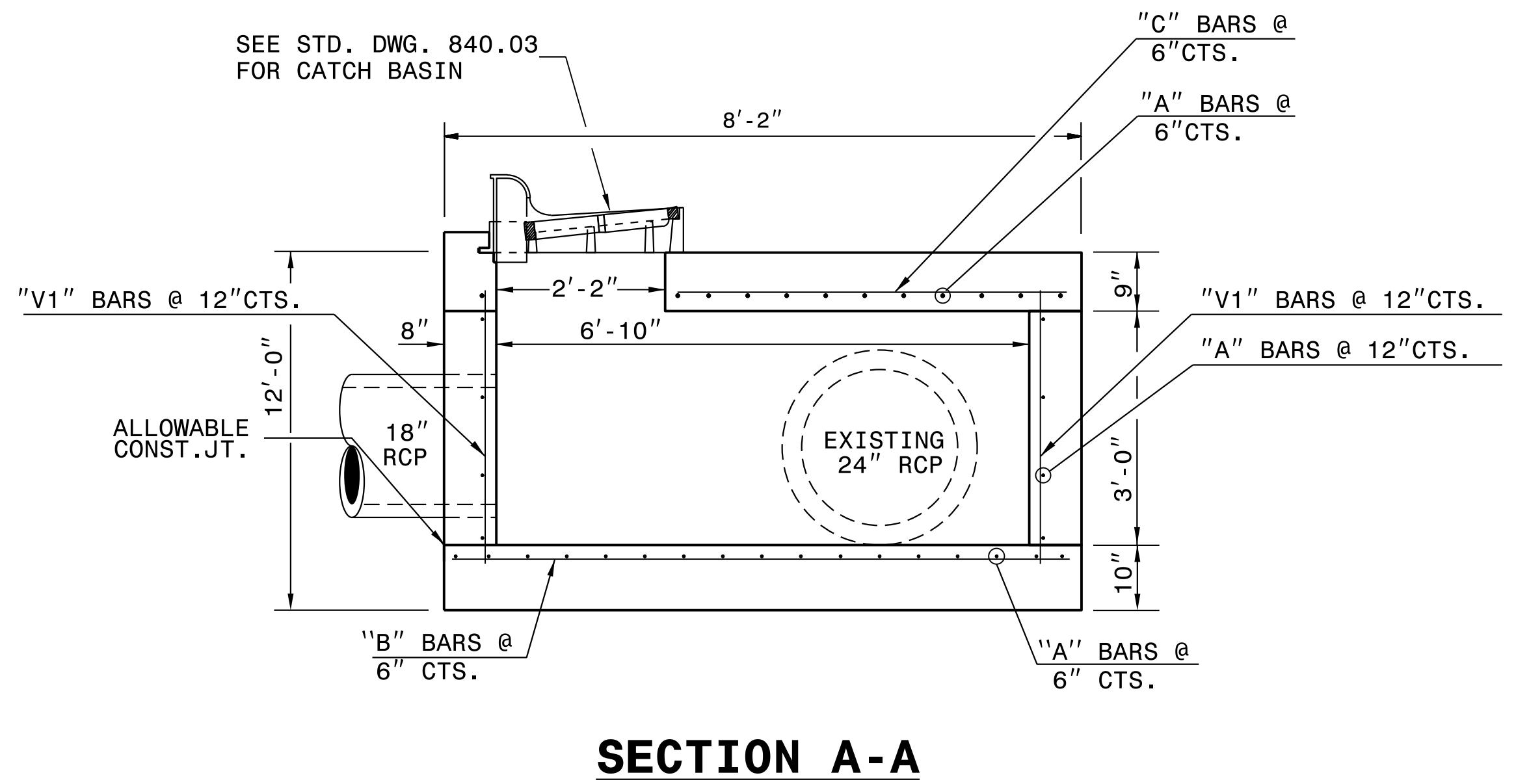
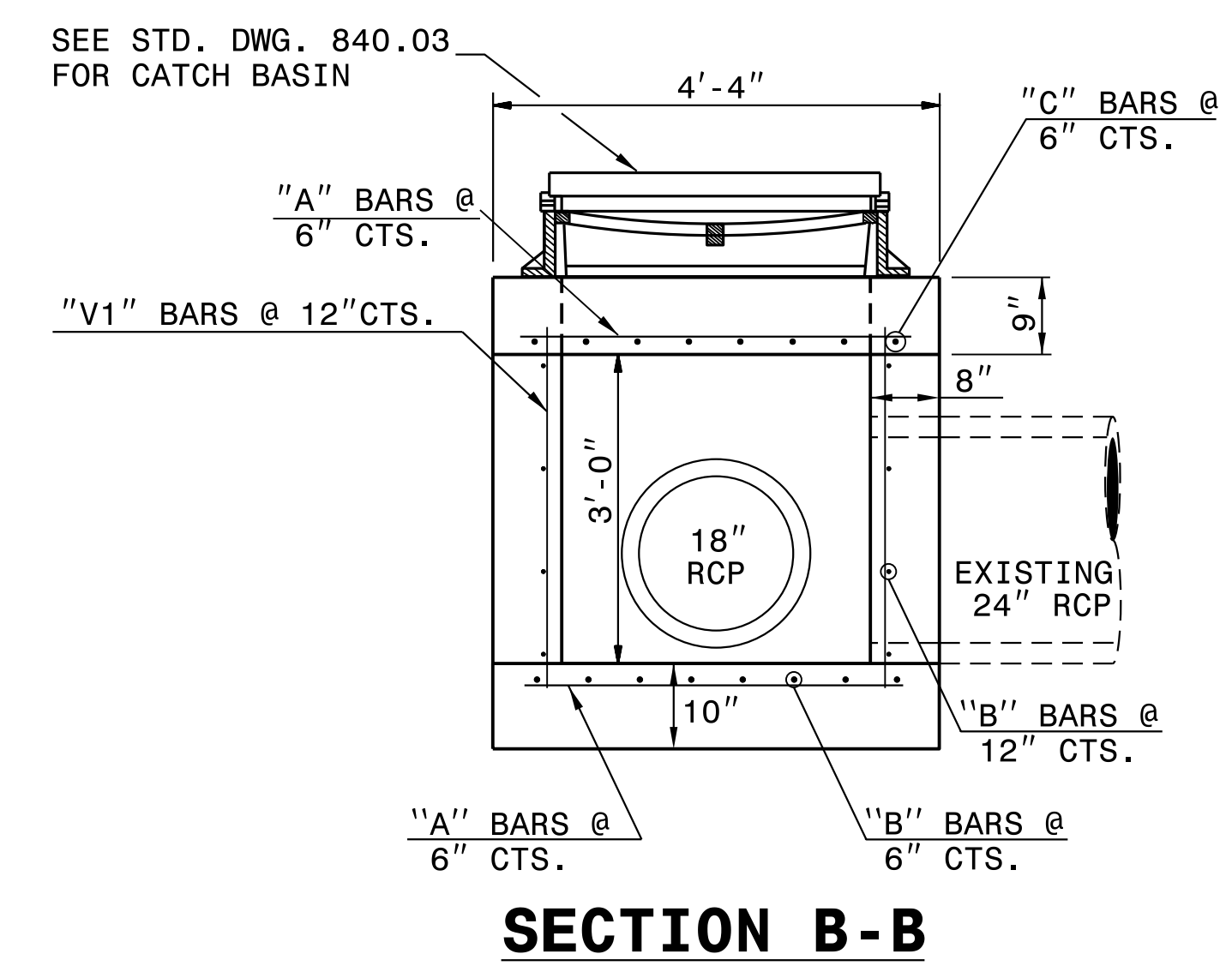
SEAL  
022966  
3/14/2018

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



**GENERAL NOTES:**

1. USE CLASS "AA" CONCRETE THROUGHOUT.
2. CONSTRUCT CONCRETE BOX IN ACCORDANCE WITH SECTION 825 OF THE STANDARD SPECIFICATIONS.
3. USE FORMS TOR CONSTRUCT THE BOTTOM SLAB.
4. ADJUST LENGTH OF STEEL BARS AS NEEDED TO COMPENSATE FOR PIPES AND FRAME AND GRATE OPENINGS.
5. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60.
6. CUT OR BEND STEEL BARS AS NEEDED TO PROVIDE 2" CLEARANCE.
7. LOCATE FRAME AND GRATE AS FIELD CONDITIONS DICTATE AND AS DIRECTED BY THE ENGINEER.
8. DIMENSIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.



**BILL OF MATERIALS**

BAR	QTY	SIZE	LENGTH	WEIGHT
A	37	#5	4'-0"	154
B	16	#5	7'-10"	131
C	8	#5	5'-0"	42
V1	24	#5	3'-6"	88
TOTAL REINF. STEEL (lbs.)				415
TOTAL CONC. CU. YDS.			3.5	

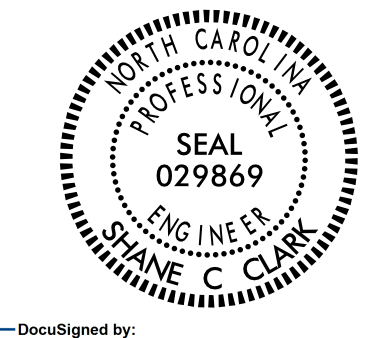
NO DEDUCTIONS HAVE BEEN MADE TO ACCOMMODATE PIPES OR CATCH BASIN OPENING.

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

**DETAIL OF SPECIAL  
OFFSET CATCH BASIN**

ORIGINAL BY: K.A.KEMPF DATE: JAN 10, 2018  
 MODIFIED BY: DATE:   
 CHECKED BY: DATE:   
 FILE SPEC.: s:details/kkempf/english/P5705B\_tb\_cb\_offset.dgn

I:\AN-2018\1342\5\Contracts\Special Details\kempf\english\P5705B\_tb\_cb\_offset.dgn  
Jhowerton AT\_CSD-292595

<b>PROJECT REFERENCE NO.</b> P-5705BA		<b>SHEET NO.</b> 2Z
GEOTECHNICAL ENGINEER  SEAL 029869 SHANE C. CLARK ENGINEER		ENGINEER
DocuSigned by: Shane C. Clark 1F4E8FE9E9A6E4A SIGNATURE		3/16/2018 DATE SIGNATURE DATE
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>		

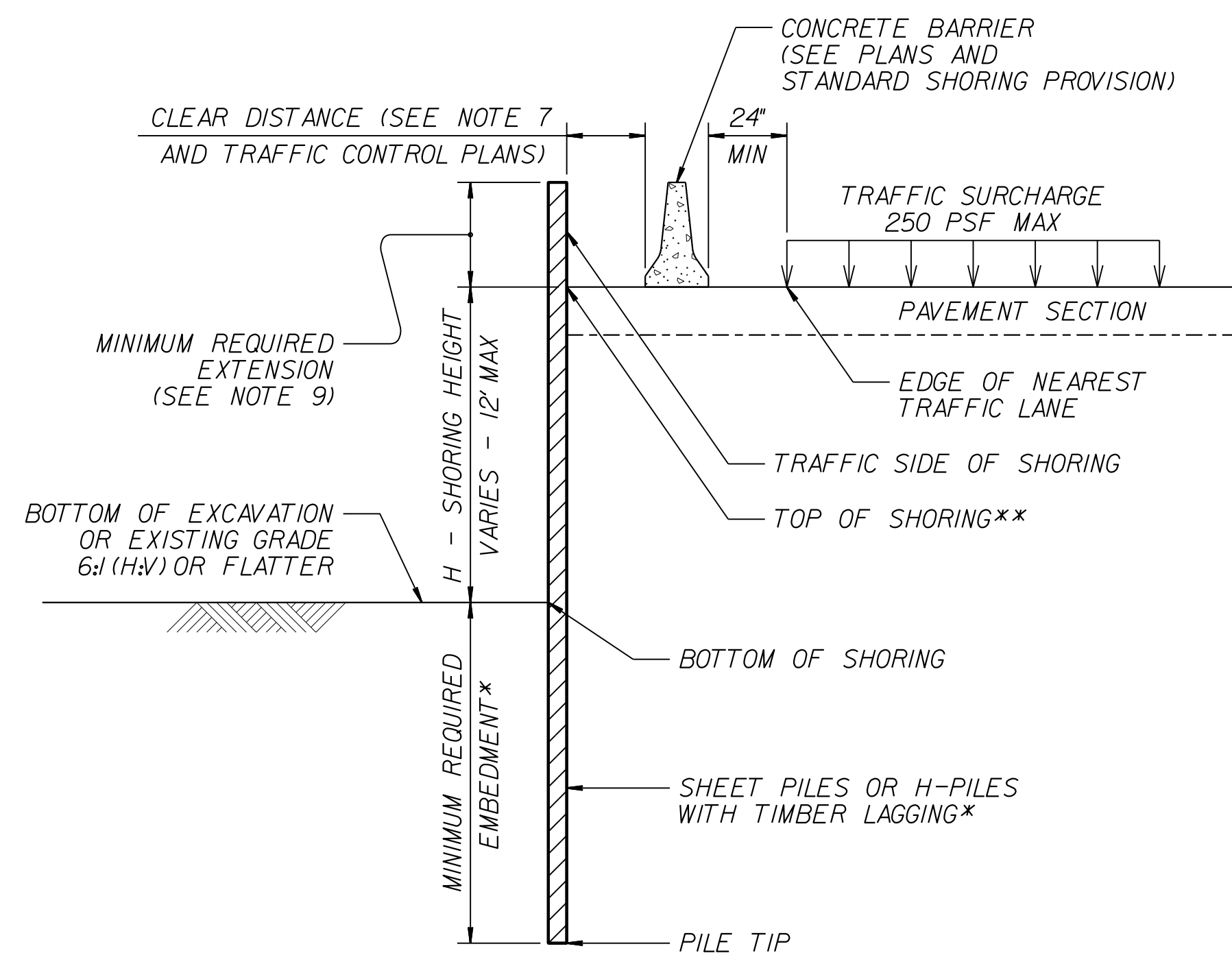
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT						SURCHARGE CASE WITH TRAFFIC IMPACT									
		SHEET PILES		H-PILES WITH TIMBER LAGGING				SHEET PILES		H-PILES WITH TIMBER LAGGING							
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)				MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /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	13.0	13.0	13.0	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	14.5	14.5	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	15.5	15.5	15.5	15.5	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	--	18.5	18.5	18.5	18.5	18.5	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	--	21.0	21.0	21.0	21.0	21.0	21.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	--	22.0	22.0	22.0	22.0	22.0	22.0
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	9.5	9.5	9.5	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	10.5	10.5	10.5	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	11.5	11.5	11.5	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	--	14.5	14.5	14.5	14.5	14.5	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	--	16.0	16.0	16.0	16.0	16.0	16.0

**NOTES:**

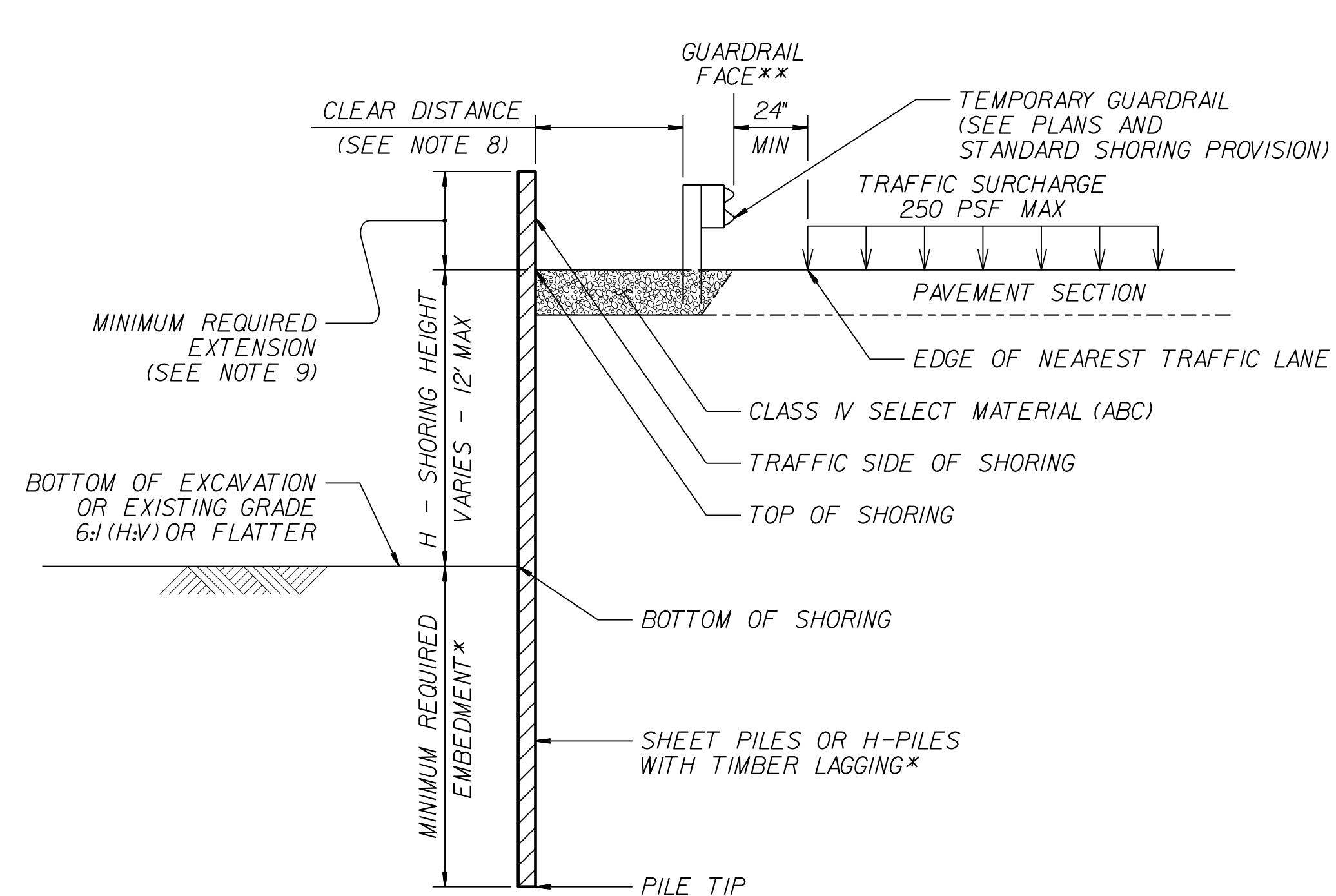
1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
UNIT WEIGHT,  $\gamma = 120$  PCF  
FRICTION ANGLE,  $\phi = 30$  DEGREES  
COHESION,  $c = 0$  PSF
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. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:  
[connect.ncdot.gov/resources/Geological/Pages/Geotech\\_Forms\\_Details.aspx](http://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx)
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.

**MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS**

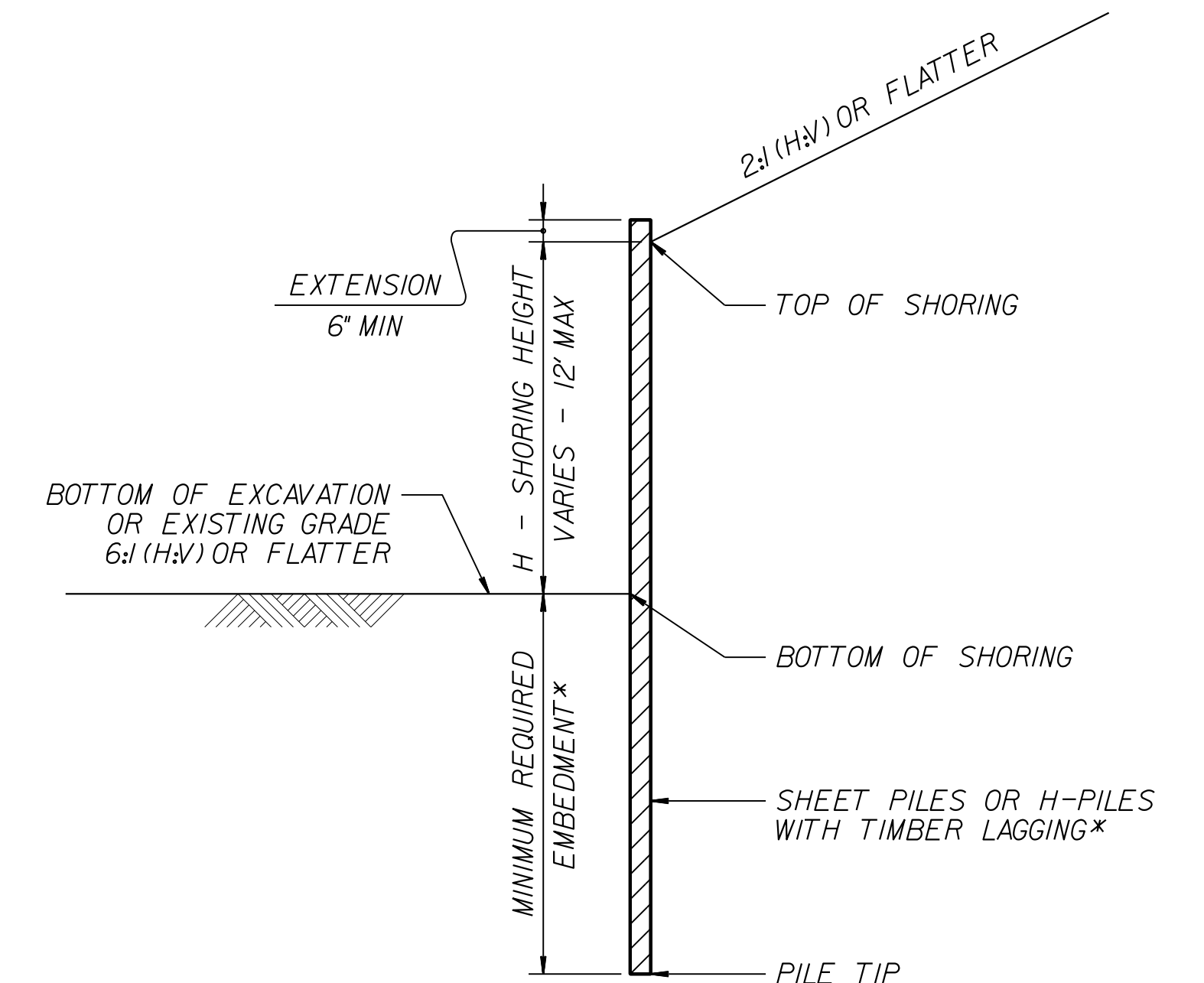
**\*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".**



**CONCRETE BARRIER**  
\*\*TOP OF SHORING =  
EDGE OF PAVEMENT

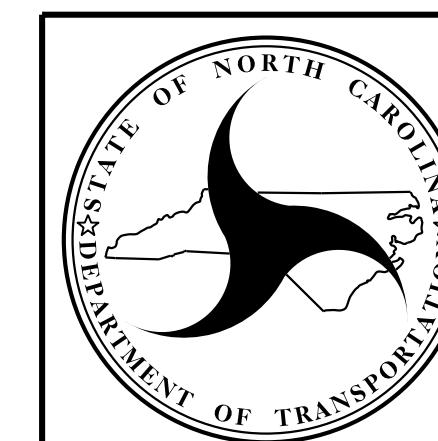


**TEMPORARY GUARDRAIL**  
\*\*GUARDRAIL FACE =  
EDGE OF PAVEMENT



**STANDARD TEMPORARY SHORING**  
(SLOPE CASE)  
\*SEE TABLE ABOVE.

**STANDARD TEMPORARY SHORING**  
(SURCHARGE CASE)  
\*SEE TABLE ABOVE.



NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
  
**GEOTECHNICAL  
ENGINEERING UNIT**

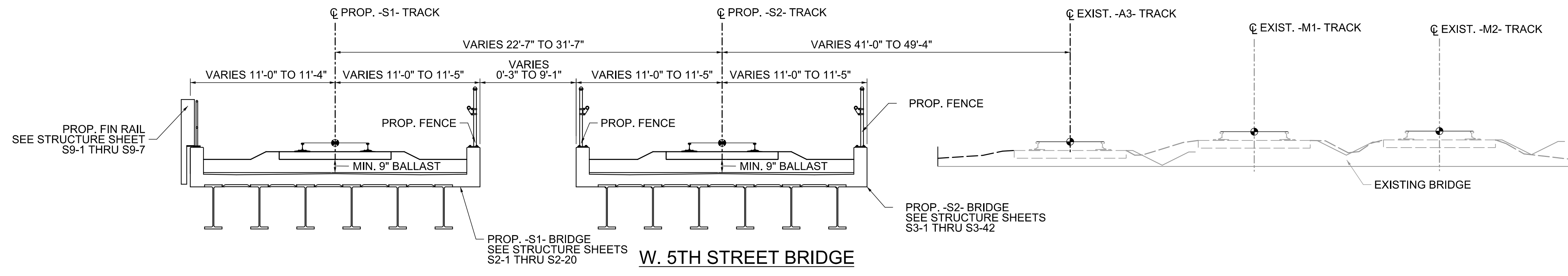
STANDARD DETAIL NO. 1801.01

STANDARD  
TEMPORARY SHORING

R/W SHEET NO.

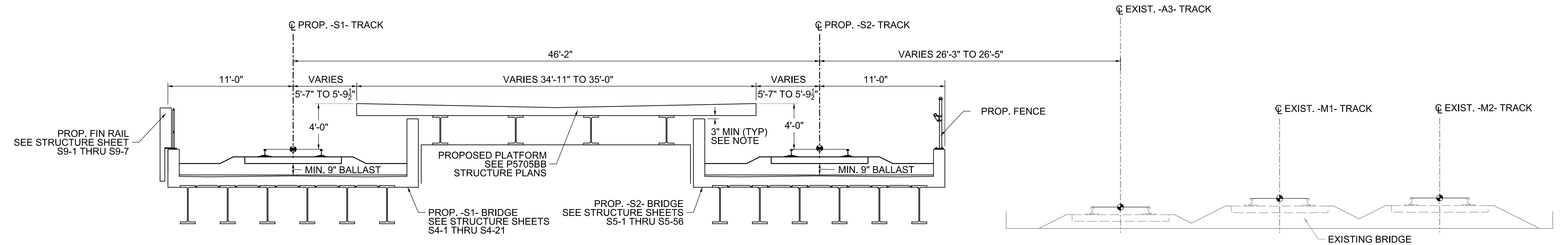
RAILROAD DESIGN ENGINEER

4/3/2018

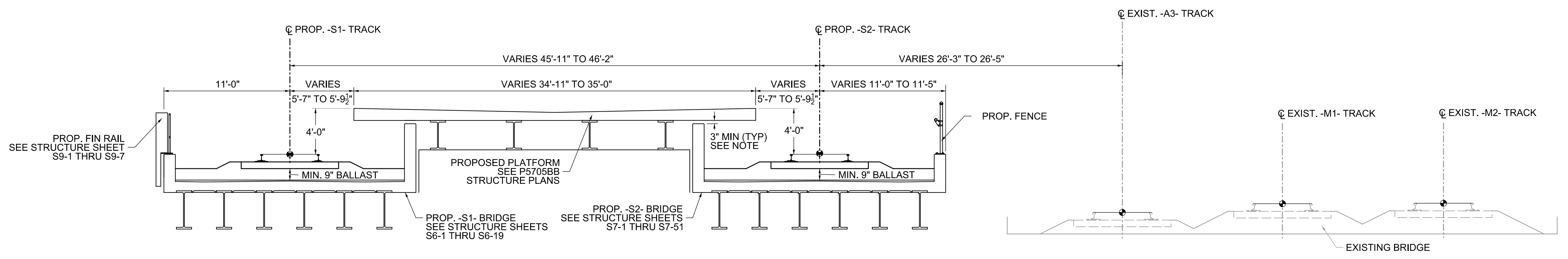


**W. 5TH STREET BRIDGE**  
-S1- STA. 18+22.09 TO STA. 19+42.42

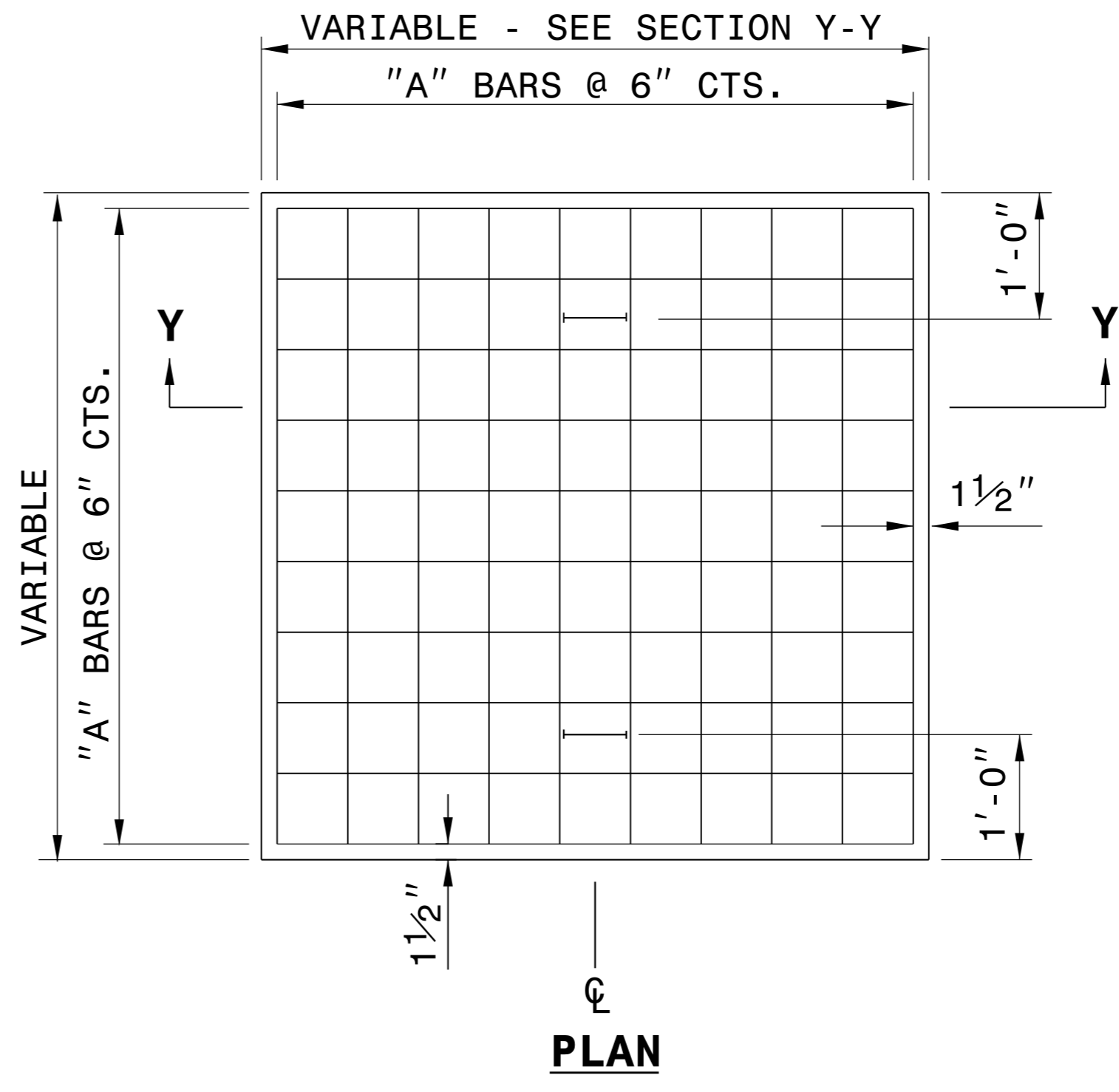
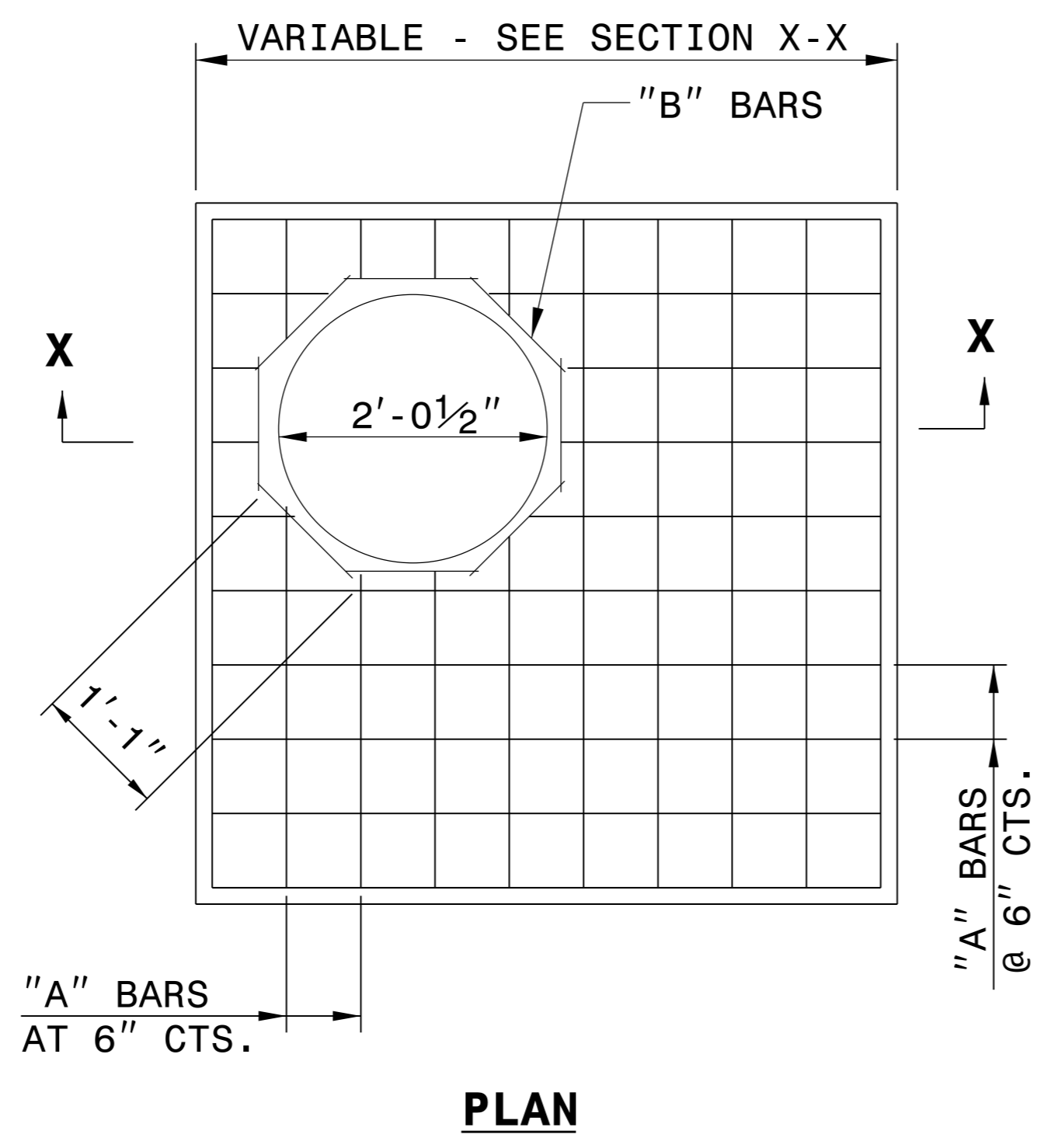
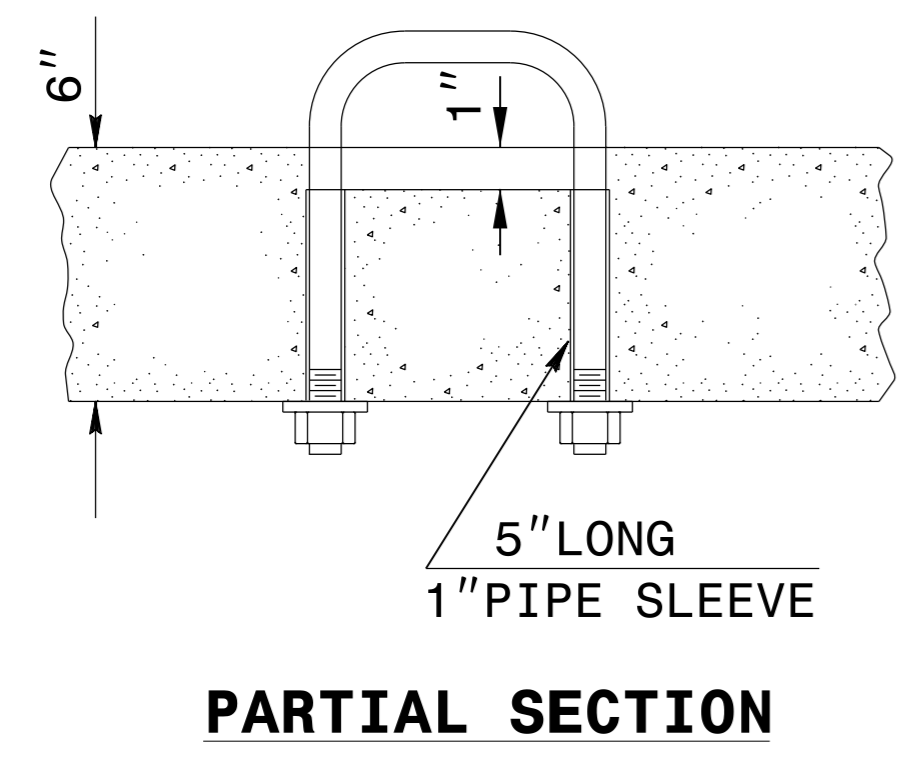
NOTE:  
1. MINIMUM GAP REMAINING AFTER CONSIDERING ALL PLATFORM DEFLECTIONS. SEE P-5705BA STRUCTURE PLANS AND P-5705BB PLATFORM PLANS



**W. TRADE ST BRIDGE**  
-S1- STA. 22+60.07 TO STA. 24+28.57



**W. 4TH STREET BRIDGE**  
-S1- STA. 27+57.21 TO 28+76.21



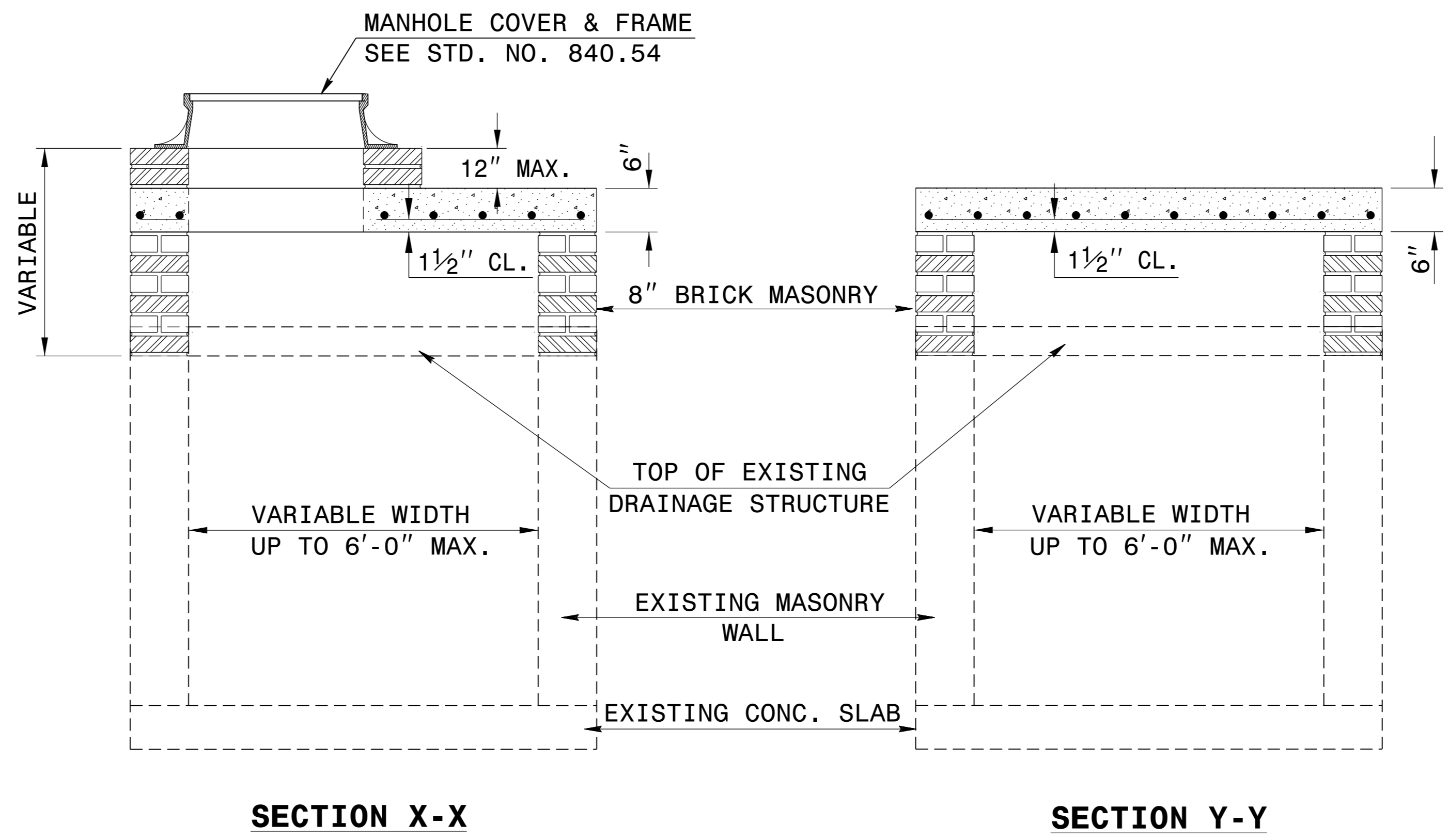
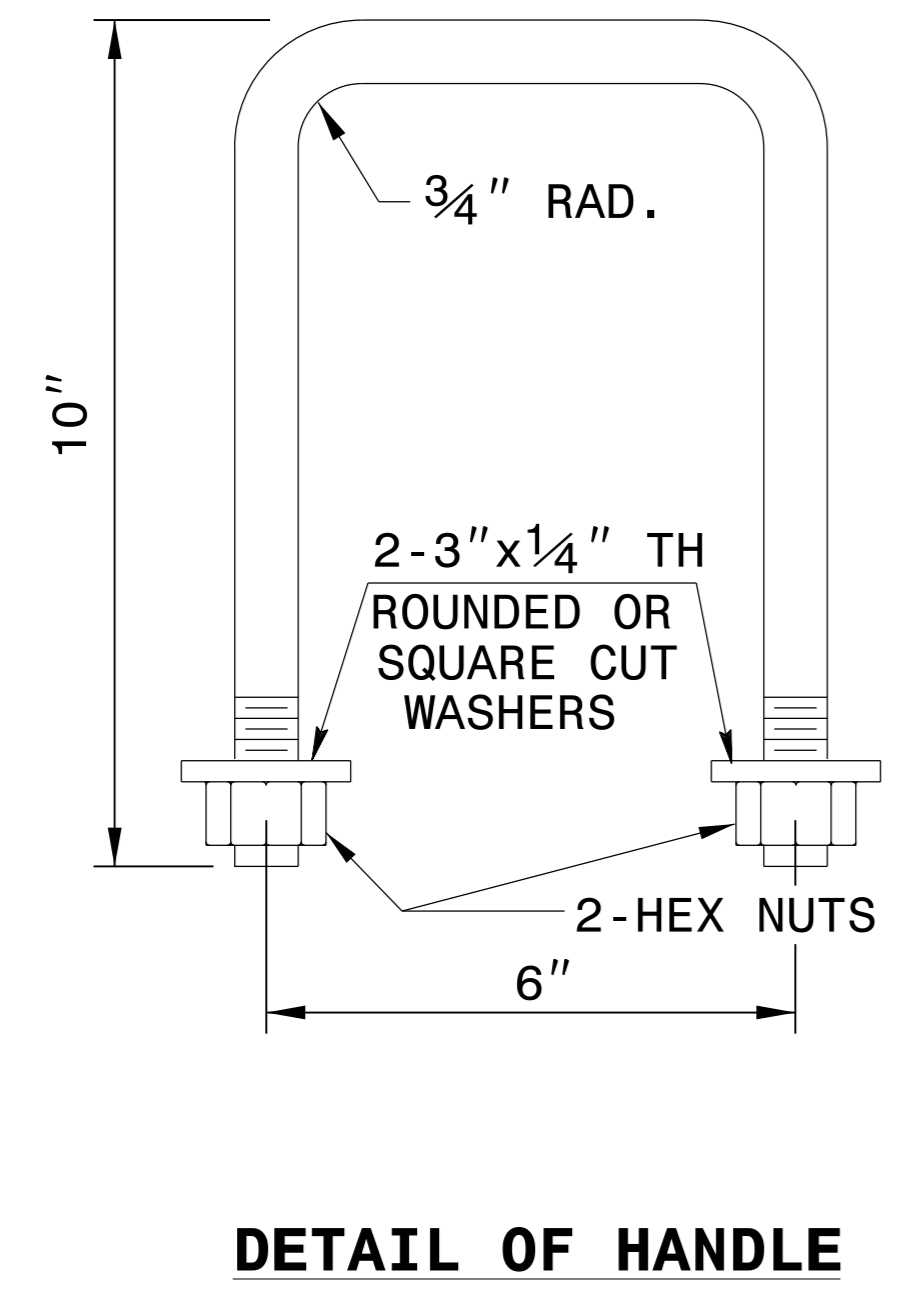
**GENERAL NOTES:**

CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

THE DIMENSIONS FOR THE EXISTING BOXES ARE APPROXIMATE AND MAY VARY SLIGHTLY.

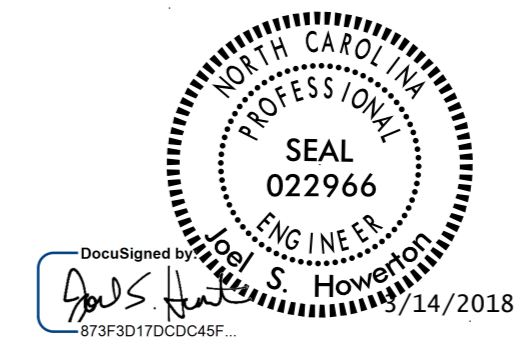
DETAIL INTENDED FOR NON-TRAFFIC BEARING DRAINAGE STRUCTURES.

<b>BILL OF MATERIALS</b>				
<b>REINFORCING STEEL</b>				
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
A	#4	20	4'-6"	60.12
B	#4	8	1'-1"	5.79
<b>TOTAL</b>				<b>65.91 *</b>
<b>MASONRY</b>				<b>CU YDS</b>
TOP SLAB CONCRETE CLASS "B"				.4326 *
BRICK MASONRY PER FT HT (MIN)				.4111



**\* NOTE:**  
QUANTITIES BASED ON 3'-6" X 3'-6" DRAINAGE STRUCTURE. ADJUST QUANTITIES FOR LARGER STRUCTURES AND MANHOLE CONSTRUCTION.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



<b>CONTRACT STANDARDS AND DEVELOPMENT UNIT</b>	
Office 919-707-6950	FAX 919-250-4119
<b>DETAIL TO CONVERT EXISTING DI, CB, OTCB or GI TO JUNCTION BOX (MANHOLE OPTIONAL)</b>	
ORIGINAL BY: T.S.S.	DATE: NOV. 1997
MODIFIED BY: T.S.S.	DATE: FEB. 2000
CHECKED BY:	DATE:
FILE SPEC.: ds174:/usr/details/stand/boxtojbe.dgn	

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

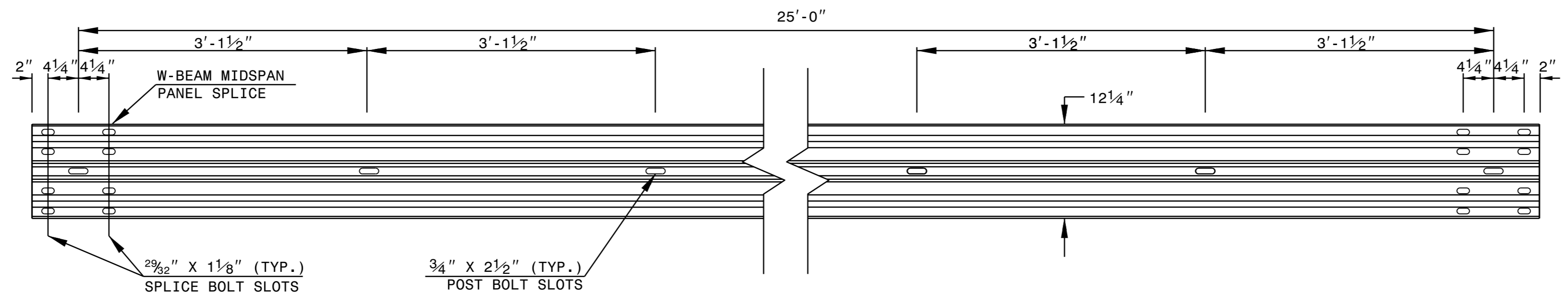
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 6 OF 8  
**862D02**

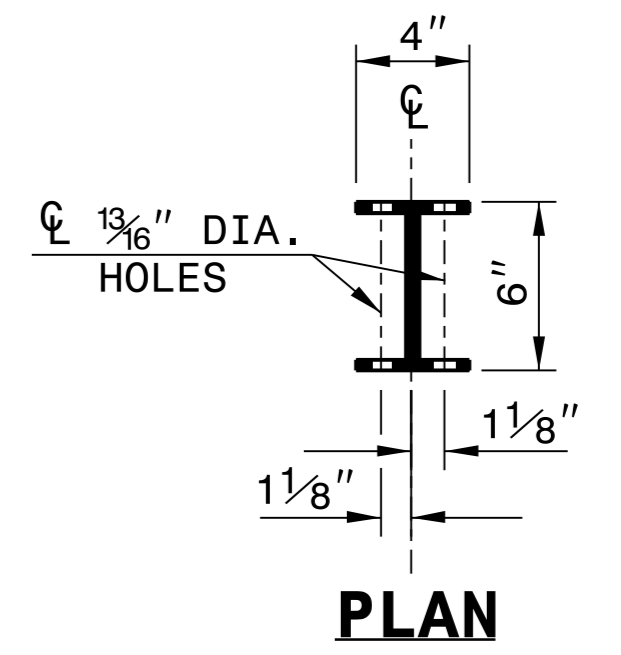
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

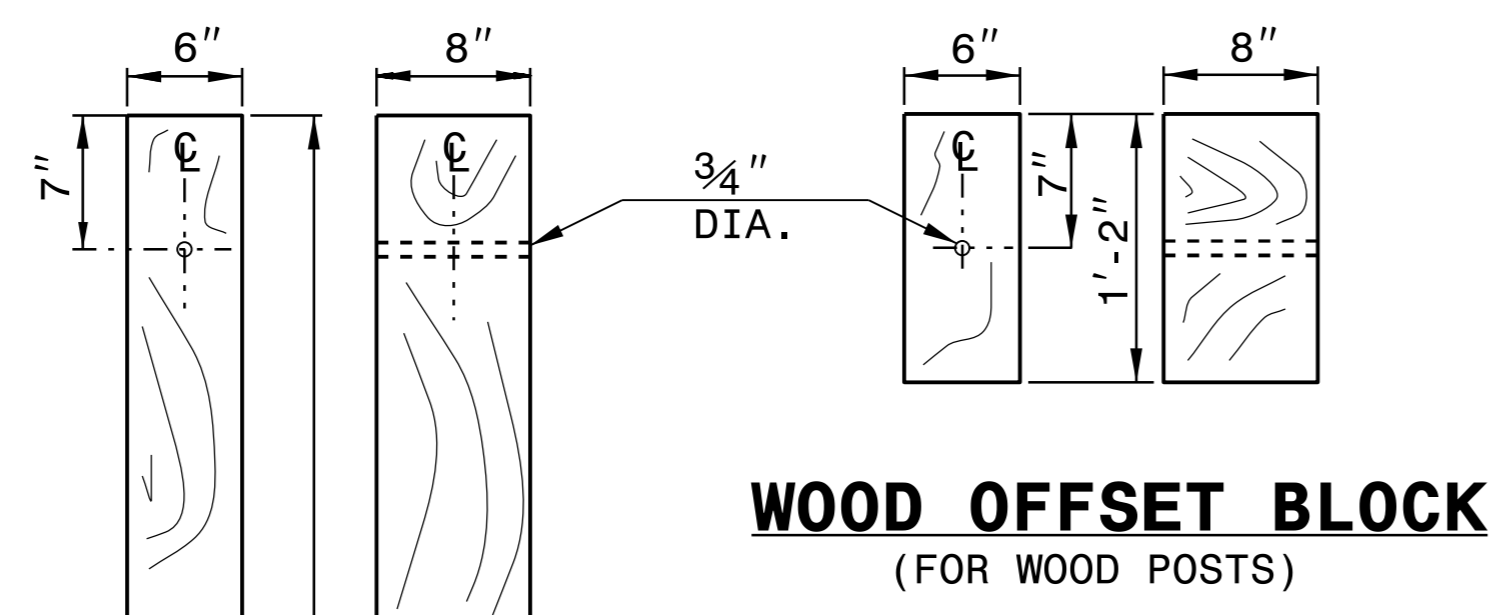
SHEET 6 OF 8  
**862D02**



**STANDARD W-BEAM GUARDRAIL**



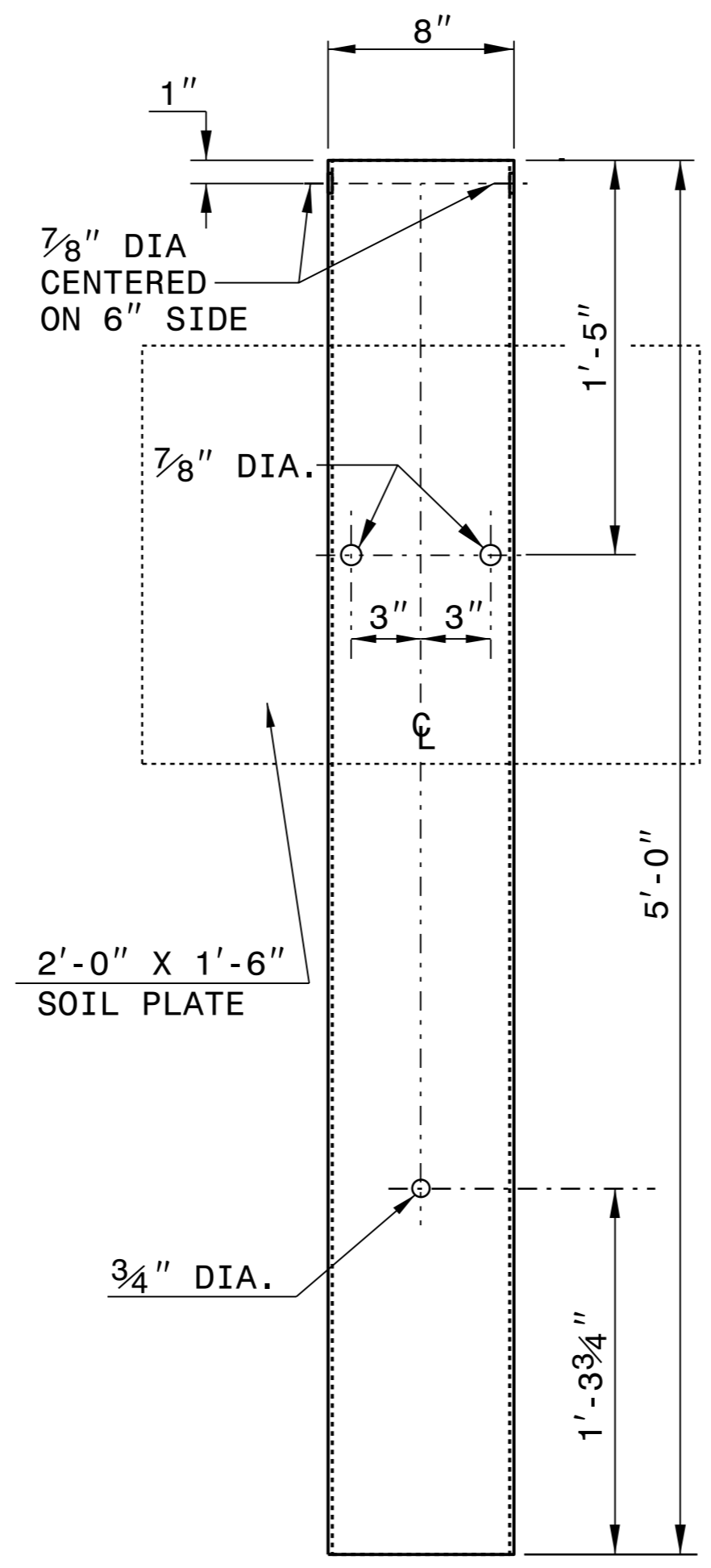
**PLAN**



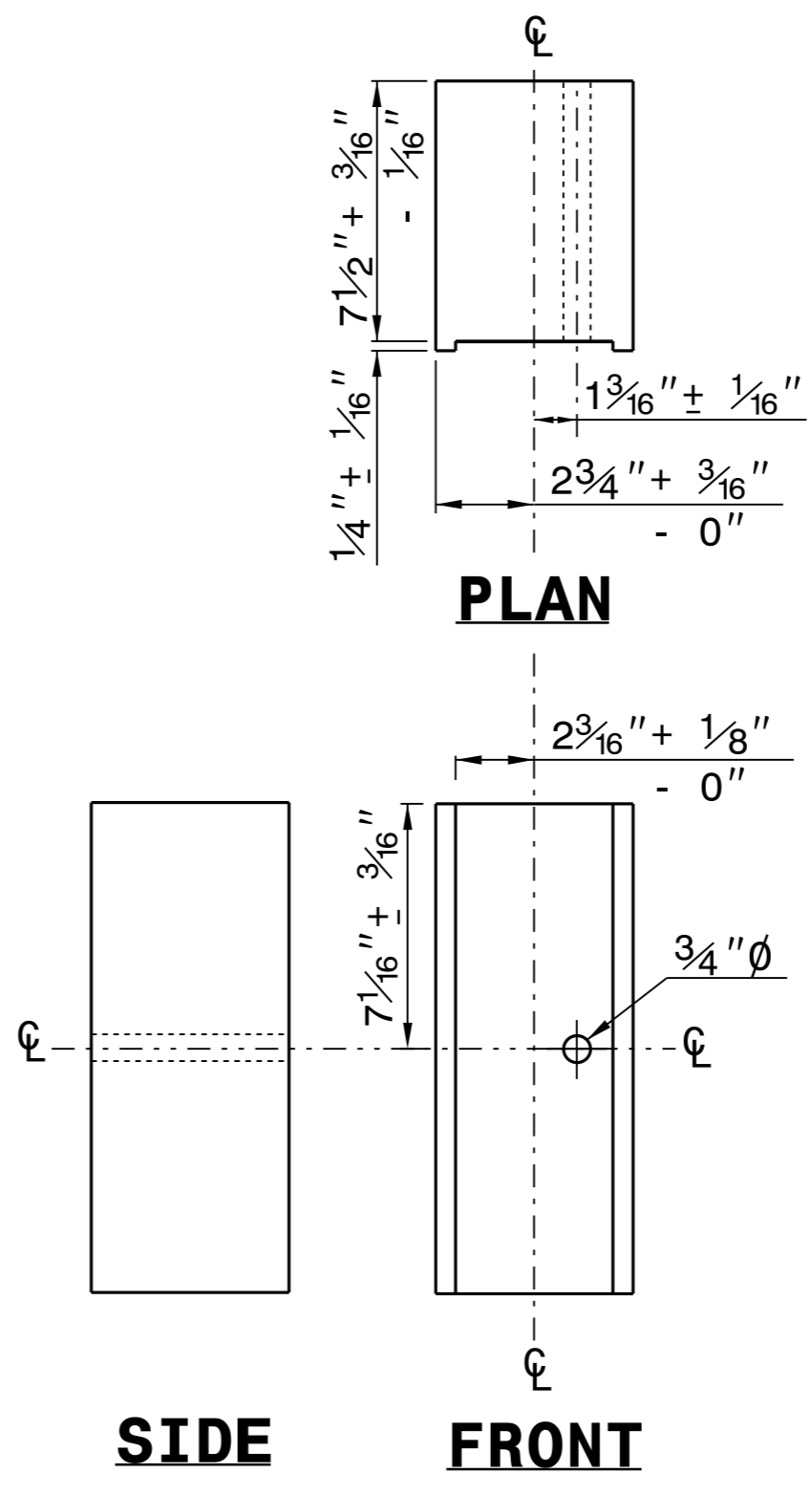
**WOOD OFFSET BLOCK  
(FOR WOOD POSTS)**

**STANDARD  
LINE POST**

**SHORT WOOD  
BREAKAWAY POST**



**STEEL TUBE  
TS 6"x8"x0.1875"**

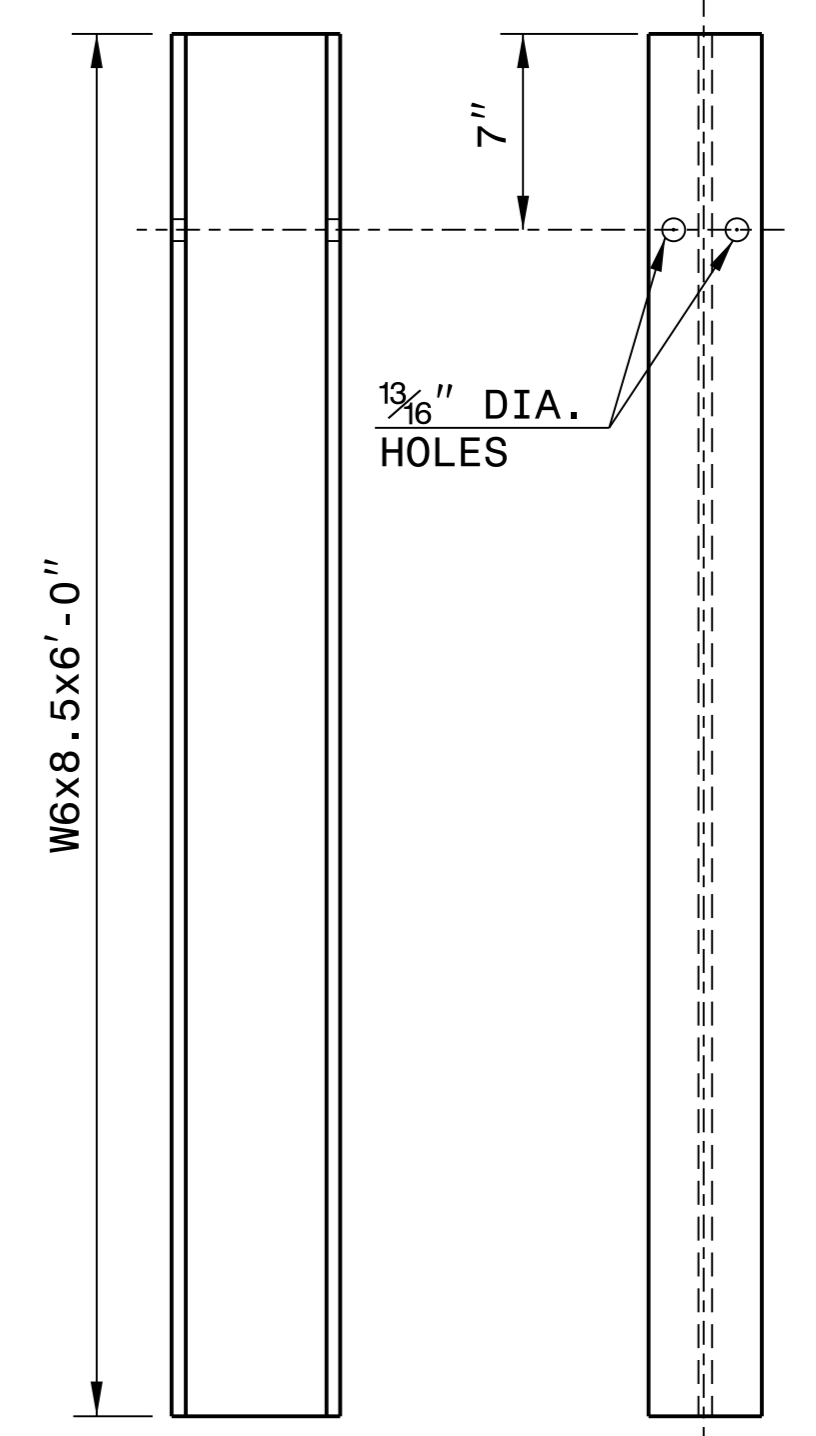


**PLAN**

**SIDE**

**FRONT**

**ROUTED  
OFFSET BLOCK**

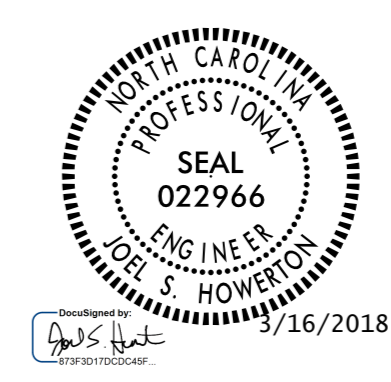


**SIDE**

**FRONT**

**"W6" STEEL POST**

**SYSTEM PARTS**



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

**SEE TITLE BLOCK**

ORIGINAL BY: J. HOWERTON DATE: 3-7-2018  
MODIFIED BY: DATE: \_\_\_\_\_  
CHECKED BY: DATE: \_\_\_\_\_  
FILE SPEC.: \_\_\_\_\_

RALD084

COMPUTED BY: Allen T. Hodges E.I. DATE: 3/08/18  
CHECKED BY: DATE:

PROJECT NO. SHEET NO.  
P-5705BA 3A

DIVISION OF HIGHWAYS

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)

Table with columns: LINE & STATION, OFFSET, STRUCTURE NUMBER, TOP ELEVATION, INVERT ELEVATION, MINIMUM REQUIRED SLOPE, Side Drain Pipe (RCP, CSP, CAAP, or HDPE), R. C. PIPE CLASS III, R. C. PIPE CLASS IV, FRAME, GRATES, AND HOOD, and REMARKS. Includes a SHEET TOTALS row at the bottom.

ABBREVIATIONS table listing materials like C.A.A. CORRUGATED ALUMINIUM ALLOY, C.B. CATCH BASIN, C.S. CORRUGATED STEEL, etc.

SHEET TOTALS



**SUMMARY OF EARTHWORK  
(IN CUBIC YARDS)**

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
<b>SUMMARY #1</b>					
-S1- STA 10+00 TO STA 14+53.05	251	0	7,687	7,436	0
<b>#1 TOTAL</b>	<b>251</b>	<b>0</b>	<b>7,687</b>	<b>7,436</b>	<b>0</b>
<b>SUMMARY #2</b>					
-S1- STA 16+32.05 TO STA 18+22.09	25	0	16,307	16,282	0
<b>#2 TOTAL</b>	<b>25</b>	<b>0</b>	<b>16,307</b>	<b>16,282</b>	<b>0</b>
<b>SUMMARY #3</b>					
-S1- STA 19+42.42 TO STA 22+60.07	303	0	15,500	15,197	0
<b>#3 TOTAL</b>	<b>303</b>	<b>0</b>	<b>15,500</b>	<b>15,197</b>	<b>0</b>
<b>SUMMARY #4</b>					
-S1- STA 24+28.57.05 TO STA 27+57.21	501	0	14,535	14,034	0
<b>#4 TOTAL</b>	<b>501</b>	<b>0</b>	<b>14,535</b>	<b>14,034</b>	<b>0</b>
<b>SUMMARY #5</b>					
-S1- STA 28+76.21 TO STA 41+95.22	1,082	0	58,473	57,391	0
<b>#5 TOTAL</b>	<b>1,082</b>	<b>0</b>	<b>58,473</b>	<b>57,391</b>	<b>0</b>
<b>SUMMARY #6</b>					
-S1- STA 43+26.22 TO STA 46+00.00	195	0	572	377	0
<b>#6 TOTAL</b>	<b>195</b>	<b>0</b>	<b>572</b>	<b>377</b>	<b>0</b>
<b>SUMMARIES 1-6 TOTAL</b>	<b>2,357</b>	<b>0</b>	<b>113,074</b>	<b>110,717</b>	<b>0</b>
ADJUSTMENT DUE TO OFFSITE DISPOSAL	570		656	656	570
BORROW REDUCTION DUE TO SELECT MATERIAL			-83,400	-83,400	
<b>PROJECT TOTAL</b>	<b>2,927</b>	<b>0</b>	<b>30,330</b>	<b>27,973</b>	<b>570</b>
ESTIMATE 5% FOR TOPSOIL ON BORROW PITS				1,399	
<b>GRAND TOTAL</b>	<b>2,927</b>	<b>0</b>	<b>30,330</b>	<b>29,372</b>	<b>570</b>
SAY	2,950	0		29,400	

EST. 200 TN CLASS IV SUBGRADE STABILIZATION

\* THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.



COMPUTED BY: SCC DATE: 3/5/18  
 CHECKED BY: SCC DATE: 3/5/18

(1-16-18)

PROJECT NO.  
P5705BA

SHEET NO.  
3D

**STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS**

**SUMMARY OF SUBSURFACE DRAINAGE**

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	1000
				<b>TOTAL LF:</b>	1000

\*UD = Underdrain  
 \*BD = Blind Drain  
 \*SD = Subsurface Drain

**SUMMARY OF ROCK PLATING**

LINE	Beginning Slope (H:V)	Approx. Station	Ending Slope (H:V)	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* 1/2/B	Rock Plating SY
-S1-	1.5:1	31+54.41	1.5:1	33+54.41	LT	N/A **	2	763
-A1-	1.5:1	40+43.92	1.5:1	41+89.10	RT	N/A **	2	139
-A1-	1.5:1	44+88.73	1.5:1	45+98.74	RT	N/A **	2	113
<b>TOTAL SY:</b>								1015

\*Use Class 1, 2 or B riprap if riprap class is not shown for rock plating location.  
 \*\* See Project Specific Rock Plating Details on Sheet 2V

**SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION**

LINE	Station	Station	Aggregate Type* ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU		100	200	400		
<b>TOTAL CY/TONS/SY:</b>					100	200**	400**	0	0

\*ASU = Aggregate Subgrade  
 \*AST = Aggregate Stabilization  
 \*\*Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Soil Stabilization" are only the estimated quantities for ASU/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609  
NC License No: C-1554

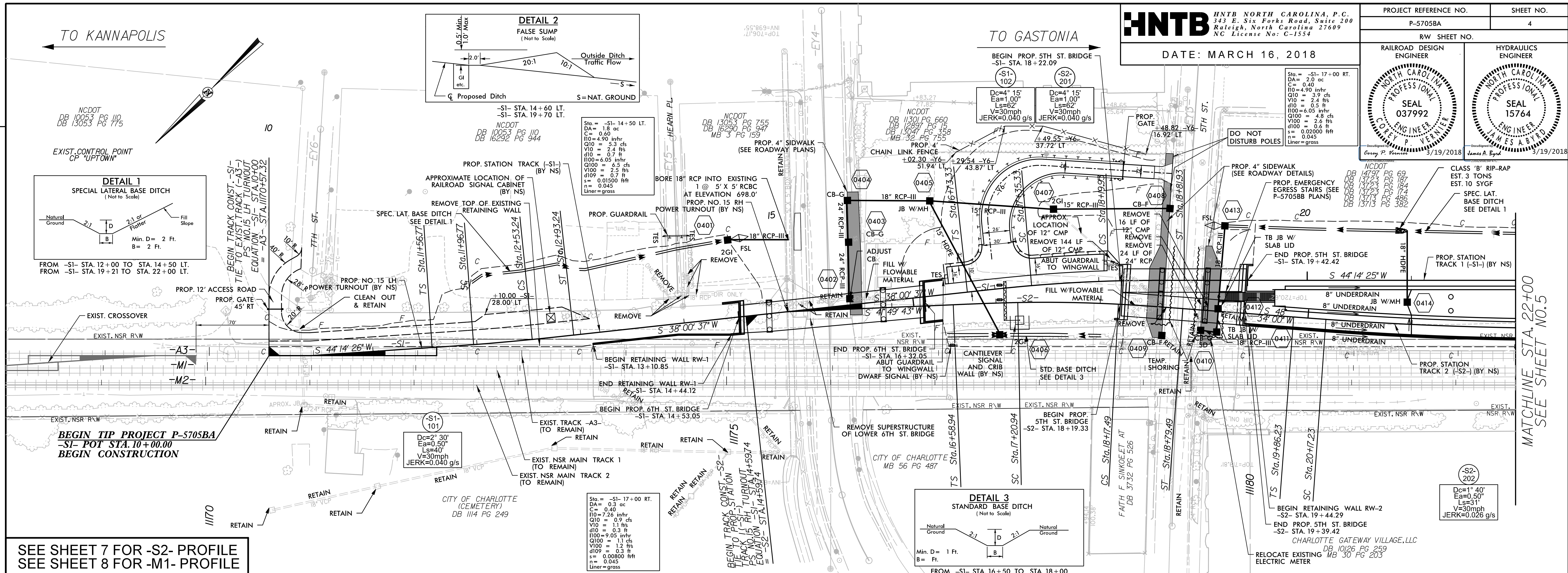
PROJECT REFERENCE NO. P-5705BA  
RW SHEET NO. 4

DATE: MARCH 16, 2018

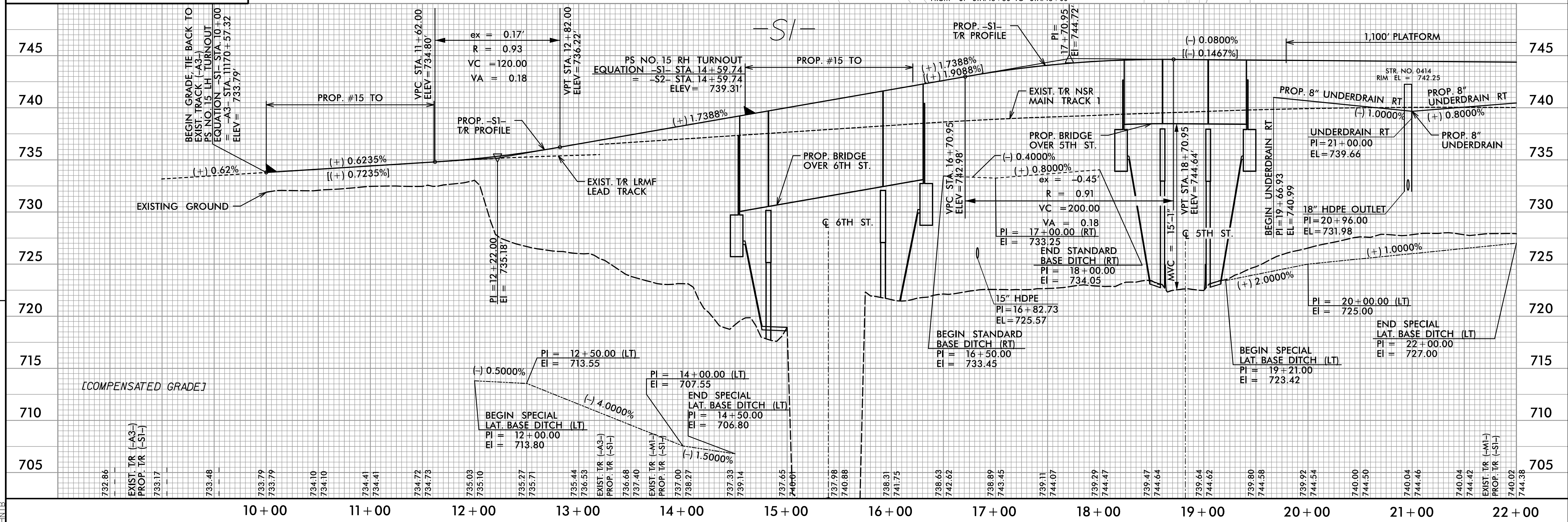
RAILROAD DESIGN ENGINEER  
HYDRAULICS ENGINEER

PROFESSIONAL SEAL  
037992  
COLEY P. VENNIER  
3/19/2018

PROFESSIONAL SEAL  
15764  
JAMES A. BYRD  
3/19/2018



SEE SHEET 7 FOR -S2- PROFILE  
SEE SHEET 8 FOR -M1- PROFILE



REVISIONS

3/19/2018  
R-esh\_04.dgn  
HNTB

TO KANNAPOLIS

TO GASTONIA

**HNTB** HNTB NORTH CAROLINA, P.C.  
343 E. Six Forks Road, Suite 200  
Raleigh, North Carolina 27609  
NC License No: C-1554

PROJECT REFERENCE NO. P-5705BA SHEET NO. 5

RW SHEET NO.

RAILROAD DESIGN ENGINEER

HYDRAULICS ENGINEER

DATE: MARCH 16, 2018

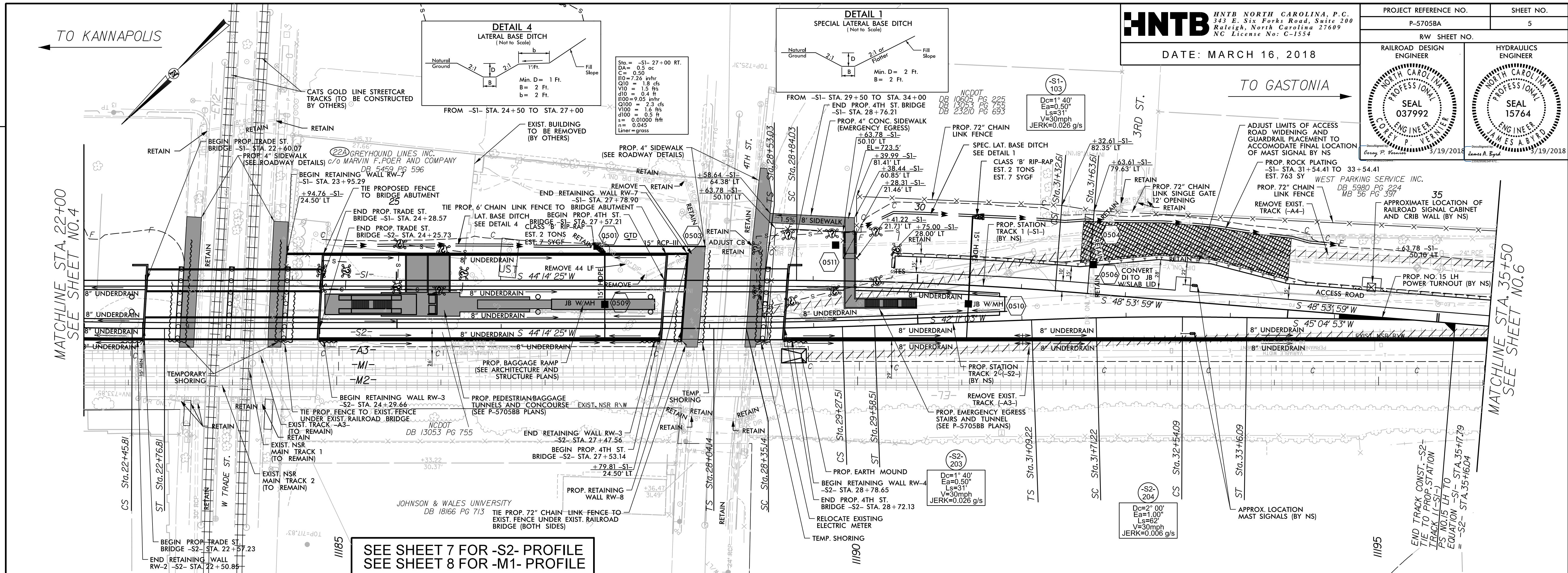
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SEAL 15764

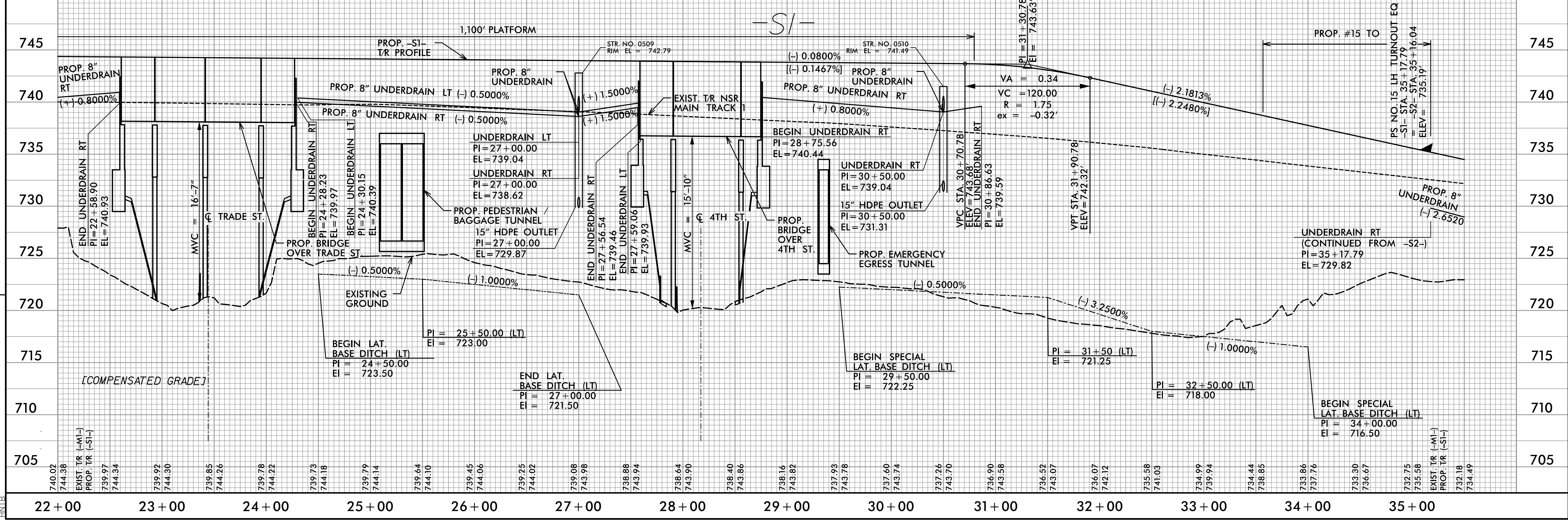
3/19/2018

MATCHLINE STA. 22+00  
SEE SHEET NO.4

MATCHLINE STA. 35+50  
SEE SHEET NO.6



SEE SHEET 7 FOR -S2- PROFILE  
SEE SHEET 8 FOR -M1- PROFILE



3/16/2018  
hntb-esh\_05.dgn  
HNTB