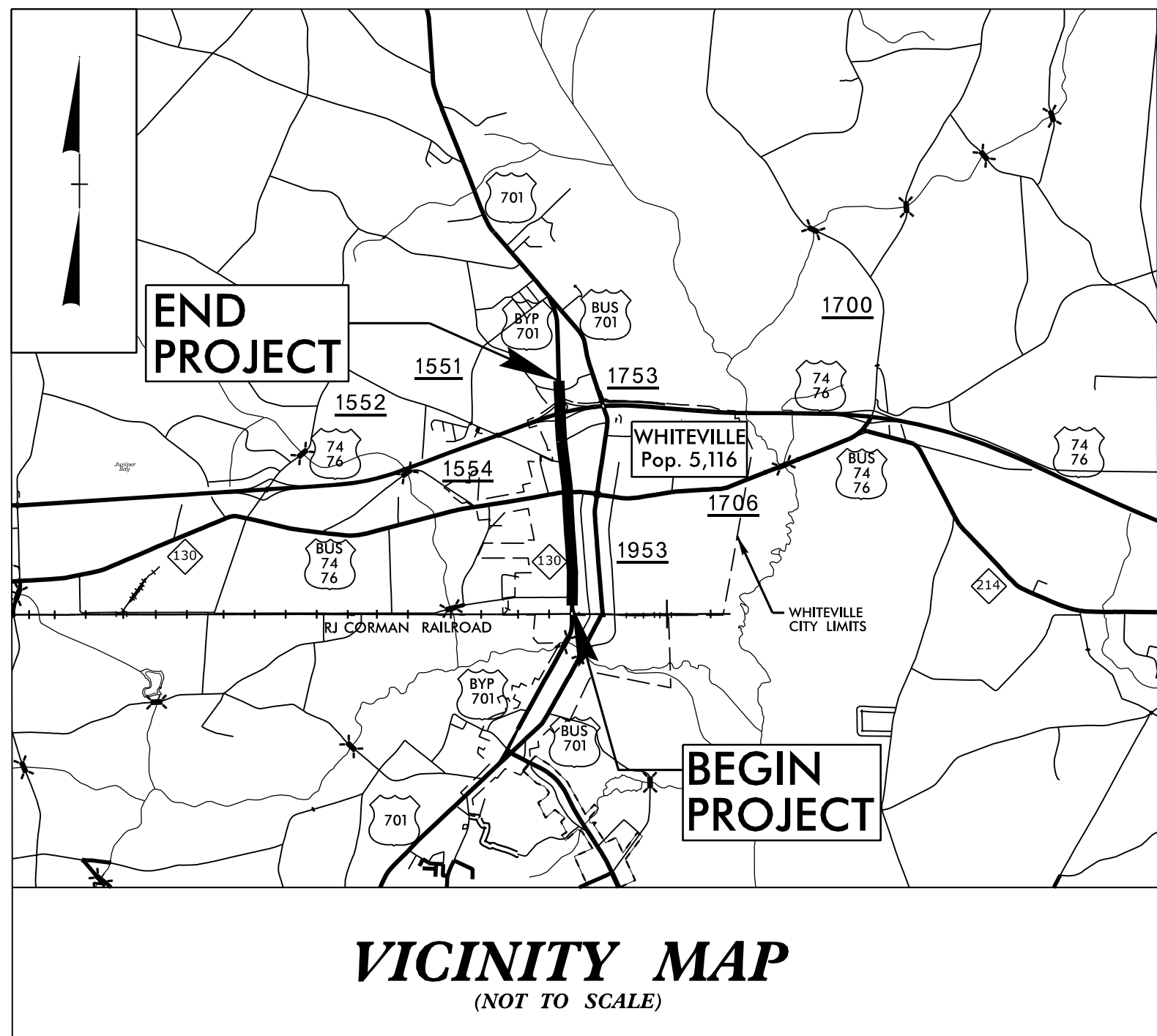


TIP PROJECT: R-5020B

CONTRACT: C204649

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

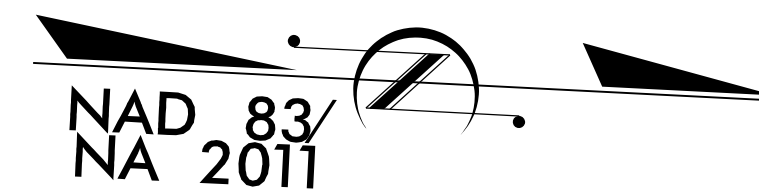


STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS COLUMBUS COUNTY

LOCATION: US 701 BYPASS (MADISON STREET - JK POWELL BOULEVARD)
FROM SR 1437 (VIRGIL AVENUE) TO US 7476

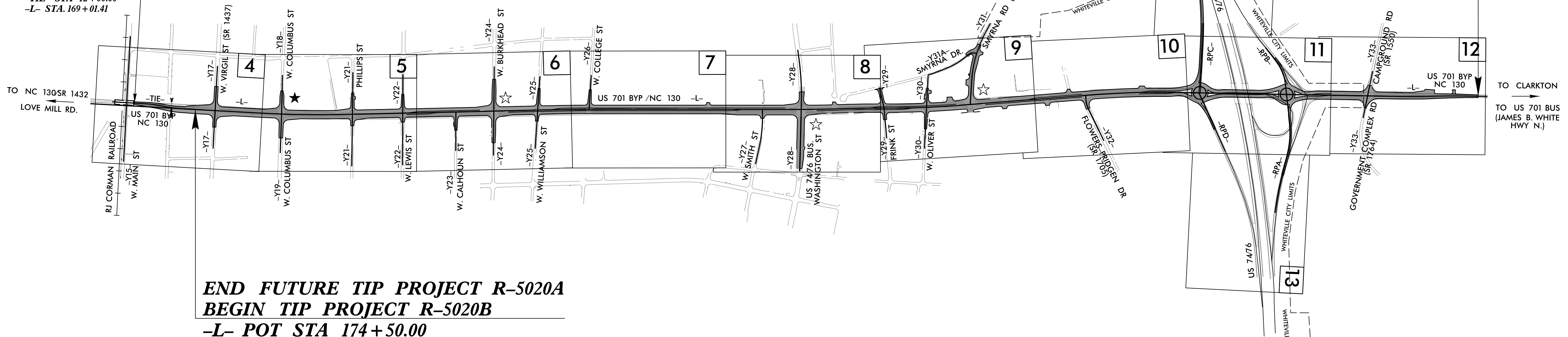
TYPE OF WORK: GRADING, DRAINAGE, PAVING, CULVERT, AND SIGNALS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5020B	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
41499.1.3	NHP-0701(033)	P.E.	
41499.2.3	N.A.	R/W	
41499.2.5	N.A.	UTIL.	
41499.3.3	N.A.	CONST.	



END TIP PROJECT R-5020B
-L- POT STA 289+75.00

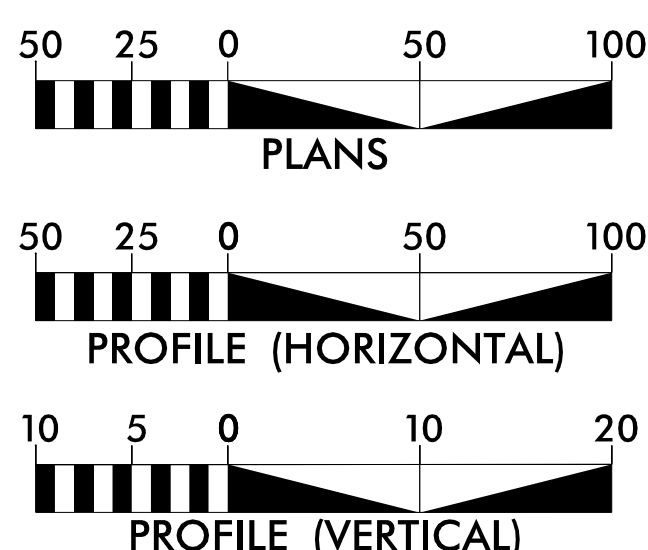
BEGIN CONSTRUCTION
-TIE- STA 12+00.00 =
-L- STA. 169+01.41



END FUTURE TIP PROJECT R-5020A
BEGIN TIP PROJECT R-5020B
-L- POT STA 174+50.00

NOTE:
1. THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.

GRAPHIC SCALES



DESIGN DATA

ADT 2020 = 21,417
ADT 2040 = 26,000
K = 8 %
D = 55 %
T = 6 % *
V = 50 MPH
*(TTST = 3% + DUAL 3%)
FUNC CLASS = URBAN ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT R-5020B = 2.183 MILES
TOTAL LENGTH OF TIP PROJECT R-5020B = 2.183 MILES

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

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 16, 2018

LETTING DATE:
AUGUST 17, 2021

NCDOT CONTACT: CRAIG A. FREEMAN, P.E.
PROJECT ENGINEER - DIVISION 6

Plans Prepared For:
DIVISION OF HIGHWAYS
558 Gillespie St.
Fayetteville NC, 28301

CHARLES L. FLOWE, P.E.
PROJECT ENGINEER

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

HYDRAULICS ENGINEER

DocuSigned by:
Selma G Dalton
SIGNATURE: 5/5/2021

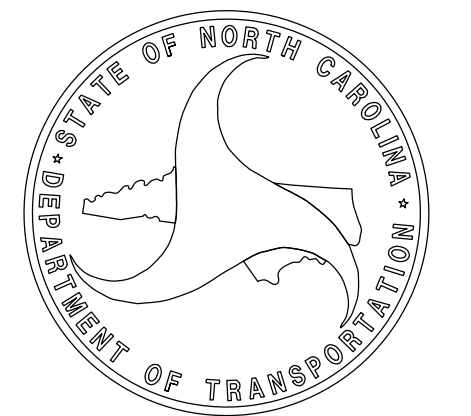
ROADWAY DESIGN ENGINEER

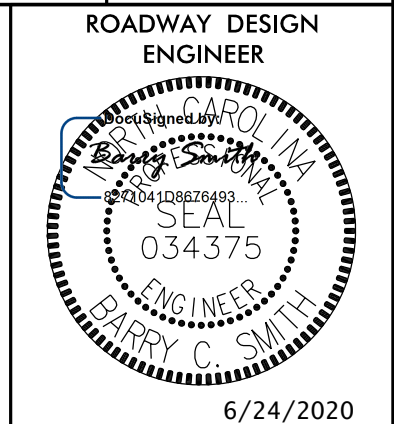
DocuSigned by:
Barry Smith
SIGNATURE: 5/5/2021

★ REVISED SIGNAL
★ PROPOSED SIGNAL

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27608
TEL: (919) 885-2247 FAX: (919) 885-2258
ENG FIRM LICENSE NO. CB99

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED





SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
2A-1 TO 2A-8	TYPICAL SECTIONS AND PAVEMENT SCHEDULE
2B-1 TO 2B-6	ROUNDBOUT AND INTERSECTION DETAIL SHEETS
2C-1	DETAIL OF TRANSITION FROM 2'-6" CURB AND GUTTER TO VALLEY GUTTER
2C-2	DETAIL TO CONVERT EXISTING DI, CB, DTCB OR GI TO JUNCTION BOX
2C-3	DETAIL OF CONCRETE JUNCTION BOX WITH 6"-12" PIPE PASSING THRU
2C-4	PEDESTRIAN SAFETY RAIL DETAIL
2C-5	DETAIL OF TRANSITION FROM SHOULDER BERM GUTTER TO 2'-6" CURB AND GUTTER
2C-6	DETAIL OF MINIMUM DEPTH CONCRETE CATCH BASIN - 12" THRU 84" PIPE
2C-7	DETAIL OF CONCRETE GRATED DROP INLET TYPE 'A' MINIMUM DEPTH - 12" THRU 72" PIPE
2C-8	DETAIL OF 2" ROLLED CURB
2C-9	CURB RAMP DETAIL- DIRECTIONAL RAMPS
2C-10	CURB RAMP DETAIL- PARALLEL RAMPS
2C-11	CURB RAMP DETAIL- SHARED LANDING
2C-12	W BEAM GUARDRAIL SECTION INSTALLATION DETAIL
2C-13	METHOD OF CLEARING - MODIFIED METHOD II DETAIL
2C-14	2-GI IN VALLEY GUTTER DETAIL
2D-1 TO 2D-2	DRAINAGE STRUCTURE DETAIL SHEETS
2G-1 TO 2G-2	STANDARD REINFORCED SOIL SLOPE WITH HIGH GROUNDWATER STANDARD
2G-3	STANDARD TEMPORARY SHORING
2G-4 TO 2G-6	STANDARD TEMPORARY WALL
3B-1	SUMMARIES OF GUARDRAIL, PAVEMENT REMOVAL, VALLEY GUTTER, AND CONCRETE CURB
3B-2	EARTHWORK SUMMARY
3D-1 TO 3D-16	DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
3P-1	PARCEL INDEX SHEET
4 TO 14	PLAN SHEETS
15 TO 24	PROFILE SHEETS
RW01	RIGHT-OF-WAY TITLE SHEET
RW02C-1 TO RW02C-11	SURVEY CONTROL SHEETS
RW02D-1 TO RW02D-2	PROPOSED ALIGNMENT CONTROL SHEETS
RW03E-1 TO RW03E-3	RIGHT-OF-WAY AND PERMANENT EASEMENT CONTROL SHEETS
RW-04 TO RW-14	RIGHT OF WAY SHEETS
TMP-1 TO TMP-61	TRANSPORTATION MANAGEMENT PLANS
PMP-1 TO PMP-14	PAVEMENT MARKING PLANS
EC-1 TO EC-25	EROSION CONTROL PLANS
SIGN-1 TO SIGN-25	SIGNING PLANS
SIG-1.0 TO SIG-29.0	SIGNAL PLANS
SIG-M1 TO SIG-M8	METAL POLE DESIGN PLANS
SCP-1 TO SCP-33	COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS
ITS-1 TO ITS-3	ITS PLANS
UC-1 TO UC-39	UTILITIES CONSTRUCTION PLANS
UD-1 TO UD-10	UTILITIES BY OTHERS PLANS
X-1A	INDEX OF CROSS-SECTIONS
X-1B TO X-1C	CROSS-SECTION SUMMARY SHEETS
X-1 TO X-97	CROSS-SECTIONS
C-1 TO C-4	CULVERT PLANS
W-1 TO W-3	RETAINING WALL DETAILS

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 II MODIFIED.

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

SHOULDER CONSTRUCTION: ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01 & STD. NO. 560.02

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.

SHOULDER DRAINS: SHOULDER DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 816.02 AND DETAILS IN PLANS AT LOCATIONS DIRECTED BY THE ENGINEER.

DRIVEWAYS: DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.02 USING 3 FOOT RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

STREET TURNOUT: STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADII NOTED ON PLANS.

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".

UTILITIES: UTILITY OWNERS ON THIS PROJECT ARE PIEDMONT NATURAL GAS COMPANY, DUKE POWER, CENTURY LINK, SPECTRUM, MCNC, AND CITY OF WHITEVILLE. ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT-OF-WAY MARKERS: ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

CURB RAMPS: CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS CONSTRUCT ALL CURB RAMPS IN ACCORDANCE WITH STD 848.05 AND/OR 848.06

2018 ROADWAY ENGLISH STANDARD DRAWINGS

EFF. 01-16-2018 REV.

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

225.01 Guide for Grading Subgrade - Interstate and Freeway

225.02 Guide for Grading Subgrade - Secondary and Local

225.04 Method of Obtaining Super-elevation - Two Lane Pavement

225.06 Method of Grading Sight Distance at Intersections

DIVISION 3 - PIPE CULVERTS

300.01 Method of Pipe Installation

310.10 Driveway Pipe Construction

DIVISION 5 - SUBGRADE, BASES AND SHOULDERS

560.01 Method of Shoulder Construction - High Side of Super-elevated Curve - Method I

560.02 Method of Shoulder Construction - High Side of Super-elevated Curve - Method II

DIVISION 6 - ASPHALT BASES AND PAVEMENTS

654.01 Pavement Repairs

DIVISION 8 - INCIDENTALS

815.02 Subsurface Drain

816.01 Concrete Pads - for Shoulder Drain Installation

816.02 Aggregate Shoulder Drain

816.04 Markers for Drainage Structure and Concrete Pad

838.01 Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew

838.11 Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew

838.80 Precast Endwalls - 12" thru 72" Pipe 90 Skew

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

840.14 Concrete Drop Inlet - 12" thru 30" Pipe

840.15 Brick Drop Inlet - 12" thru 30" Pipe

840.16 Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15

840.17 Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe

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

840.19 Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe

840.20 Frames and Wide Slot Flat Grates

840.22 Frames and Wide Slot Sag Grates

840.24 Frames and Narrow Slot Sag Grates

840.25 Anchorage for Frames - Brick or Concrete or Precast

840.26 Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe

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

840.28 Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe

840.29 Frames and Narrow Slot Flat Grates

840.31 Concrete Junction Box - 12" thru 66" Pipe

840.32 Brick Junction Box - 12" thru 66" Pipe

840.34 Traffic Bearing Junction Box - for Use with Pipes 42" and Under

840.35 Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates

840.45 Precast Drainage Structure

840.46 Traffic Bearing Precast Drainage Structure

840.54 Manhole Frame and Cover

840.66 Drainage Structure Steps

840.71 Concrete and Brick Pipe Plug

840.72 Pipe Collar

846.01 Concrete Curb, Gutter and Curb & Gutter

846.04 Drop Inlet Installation in Shoulder Berm Gutter

848.01 Concrete Sidewalk

848.02 Driveway Turnout - Radius Type

848.04 Street Turnout

848.05 Curb Ramp - Proposed Curb & Gutter

848.06 Curb Ramp - Existing Curb & Gutter

852.01 Concrete Islands

852.04 Method for Placement of Drop Inlets in Grass Median - Using 1'-6" Curb and Gutter

852.06 Method for Placement of Drop Inlets in Concrete Islands

852.10 Median Construction - with Curb and Gutter

862.01 Guardrail Placement

862.02 Guardrail Installation

862.03 Structure Anchor Units

876.01 Rip Rap in Channels

876.02 Guide for Rip Rap at Pipe Outlets

876.04 Drainage Ditches with Class 'B' Rip Rap

I:\JUN-2020-10-31-15-20-2018\2020-10-31-15-20-2018\Roadway\Proc\Proc\Roadway\Proc\R-5020B-Rdy_tsh_1A.dgn

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

12/2/2016

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EIP
Computed Property Corner	-----
Property Monument	□ ECM
Parcel/Sequence Number	①23
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	--- WLB ---
Proposed Wetland Boundary	--- WLB ---
Existing Endangered Animal Boundary	--- EAB ---
Existing Endangered Plant Boundary	--- EPB ---
Existing Historic Property Boundary	--- HPB ---
Known Contamination Area: Soil	☠-s-☠
Potential Contamination Area: Soil	☠-s-☠
Known Contamination Area: Water	☠-w-☠
Potential Contamination Area: Water	☠-w-☠
Contaminated Site: Known or Potential	☠ ?

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○ S
Well	○ W
Small Mine	⌵
Foundation	□
Area Outline	□
Cemetery	□
Building	□
School	□
Church	□
Dam	▬

HYDROLOGY:

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

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○ MILEPOST 35
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

RIGHT OF WAY & PROJECT CONTROL:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

Single Tree	☼
Single Shrub	☼

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

Hedge	-----
Woods Line	-----
Orchard	☼ ☼ ☼ ☼
Vineyard	□ Vineyard

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	--- CONC ---
Bridge Wing Wall, Head Wall and End Wall	--- CONC WW ---
MINOR:	
Head and End Wall	--- CONC HW ---
Pipe Culvert	-----
Footbridge	--- ---
Drainage Box: Catch Basin, DI or JB	□ CB
Paved Ditch Gutter	-----
Storm Sewer Manhole	○ S
Storm Sewer	--- S ---

UTILITIES:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:


Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	□
Utility Unknown U/G Line LOS B (S.U.E.*)	--- 7UTL ---
U/G Tank; Water, Gas, Oil	□
Underground Storage Tank, Approx. Loc.	□ UST
A/G Tank; Water, Gas, Oil	□
Geoenvironmental Boring	⊕
U/G Test Hole LOS A (S.U.E.*)	○
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

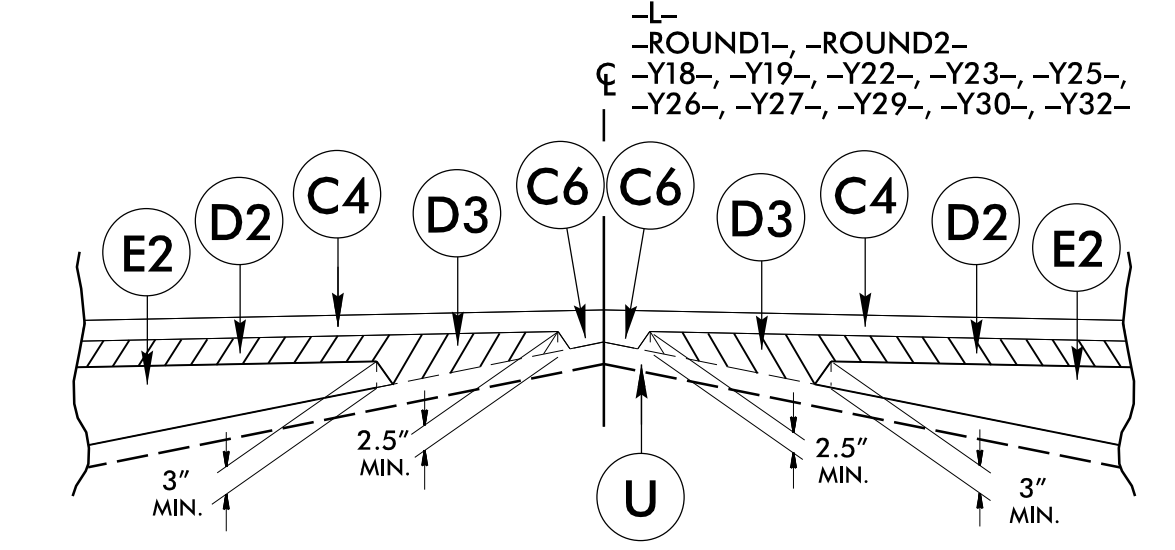
6/22/20

PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)

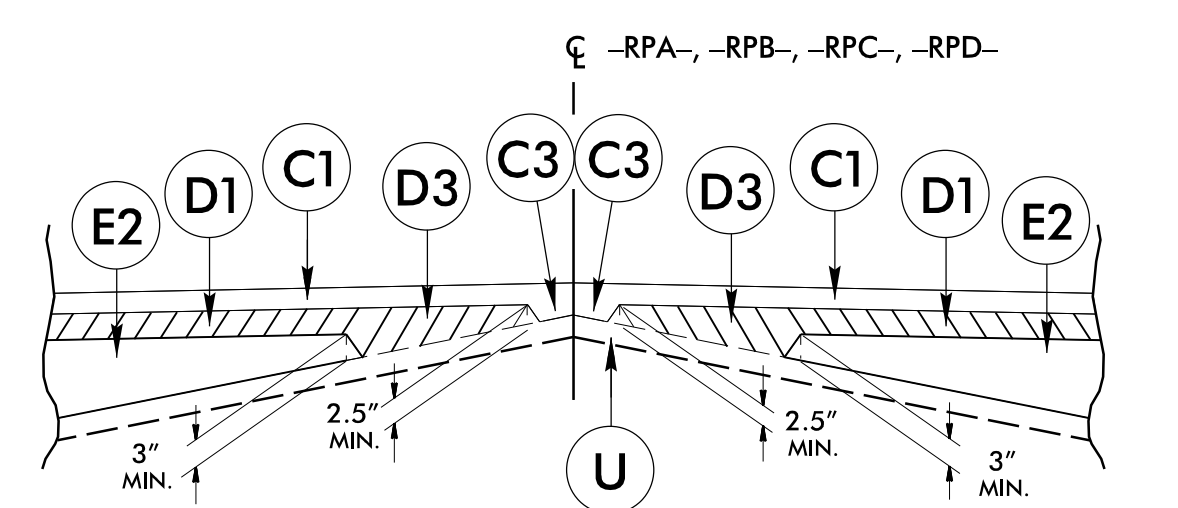
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.	R5	2' CONCRETE VALLEY GUTTER
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	R6	5" MONOLITHIC ISLAND (SURFACE MOUNTED)
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1.5" IN DEPTH.	R7	8"x12" CONCRETE CURB
C4	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	R8	2" ROLLED CONCRETE CURB
C5	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	R9	SHOULDER BERM GUTTER
C6	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1.5" IN DEPTH OR GREATER THAN 2" IN DEPTH.	S	4" CONC. SIDEWALK
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	T	EARTH MATERIAL
D2	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	U	EXISTING PAVEMENT
D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.5" IN DEPTH OR GREATER THAN 4" IN DEPTH.	V1	INCIDENTAL MILLING
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	V2	MILLING ASPHALT PAVEMENT (1.5" DEPTH)
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT GREATER THAN 5.5" IN DEPTH OR LESS THAN 3" IN DEPTH	W1	WEDGING DETAIL #1
R1	1'-6" CONC. CURB AND GUTTER	W2	WEDGING DETAIL #2
R2	2'-6" CONC. CURB AND GUTTER	W3	WEDGING DETAIL #3
R3	8"x18" CONCRETE CURB	W4	WEDGING DETAIL #4
R4	9" JOINTED CONCRETE TRUCK APRON WITH WIRE MESH REINFORCEMENT		

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

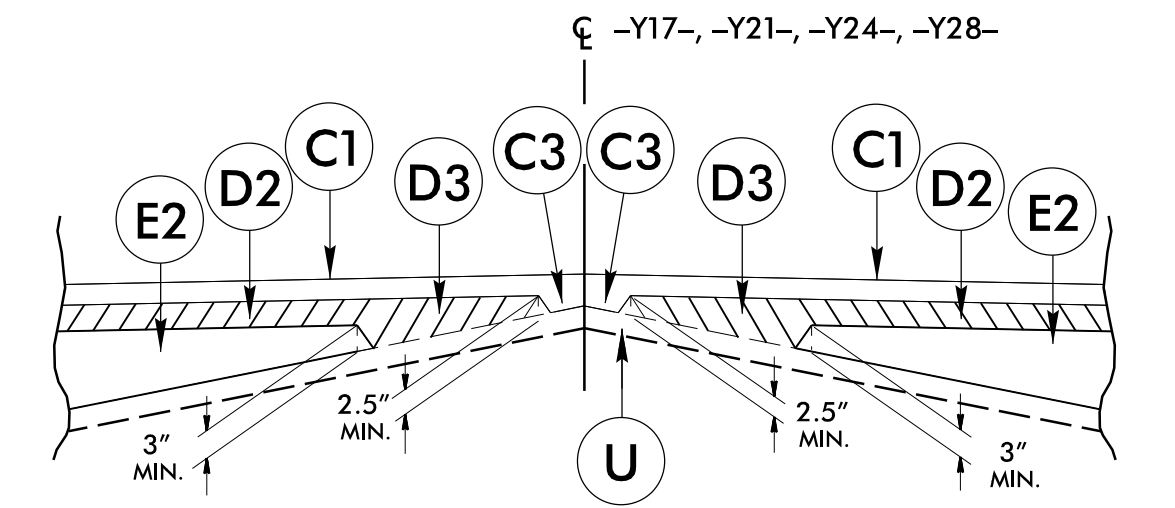
PROJECT REFERENCE NO. <i>R-5020B</i>	SHEET NO. <i>2A-1</i>
ROADWAY DESIGN ENGINEER <i>Charles S. Plummer</i> SEAL 034375 ENGINEER BARRY C. SMITH	PAVEMENT DESIGN ENGINEER <i>Charles S. Plummer</i> SEAL 022896 ENGINEER S. MORRISON
6/24/2020	6/30/2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609 Phone (919) 783-9214 • Fax (919) 783-9266	



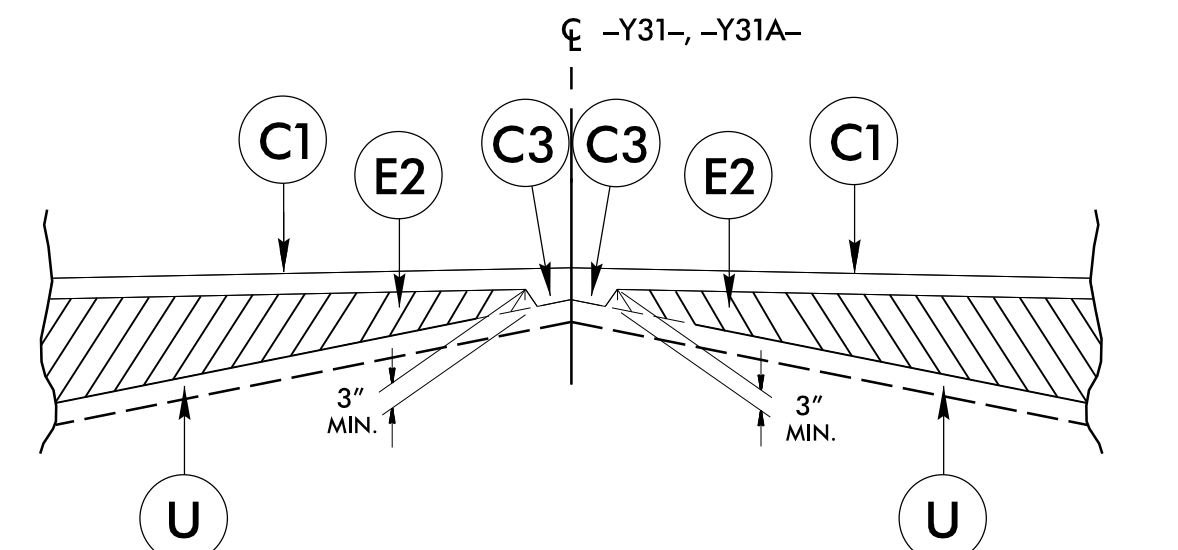
DETAIL SHOWING METHOD OF WEDGING (W1)



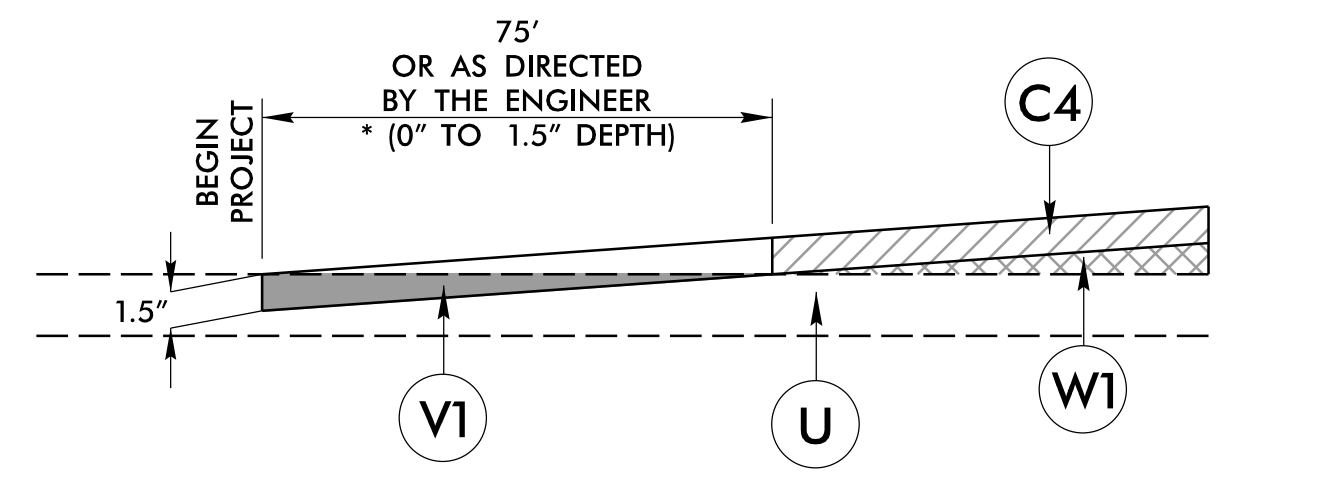
DETAIL SHOWING METHOD OF WEDGING (W2)



DETAIL SHOWING METHOD OF WEDGING (W3)



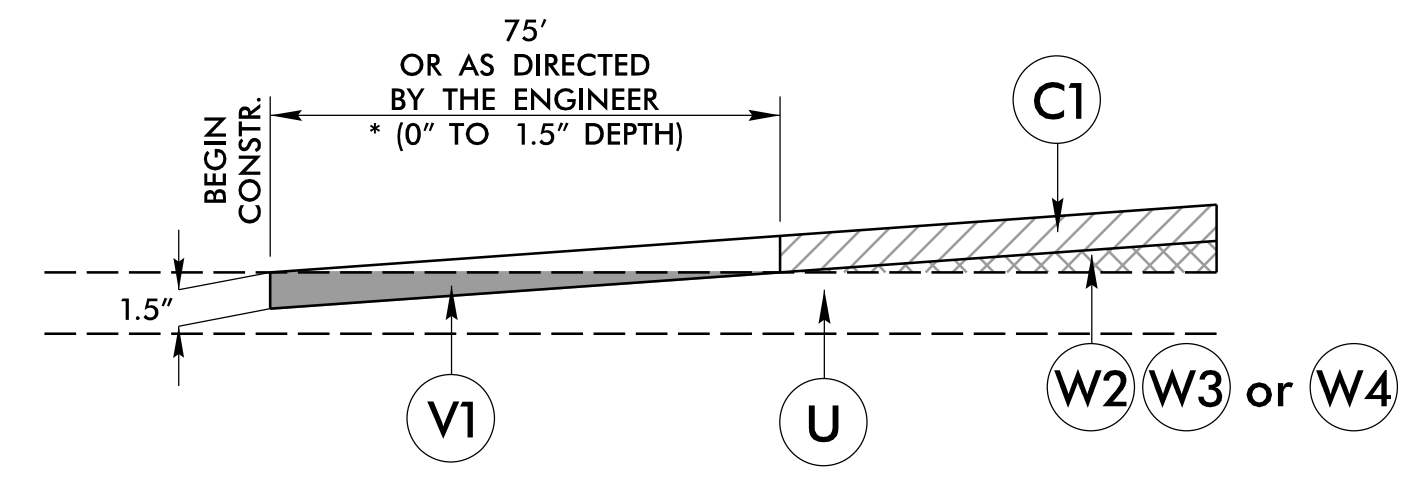
DETAIL SHOWING METHOD OF WEDGING (W4)



NOTE: MIRROR FOR END PROJECT CONSTR. * MILL DEPTH AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER

PAVEMENT MILLING DETAIL KEY-IN (TIE-IN) #1

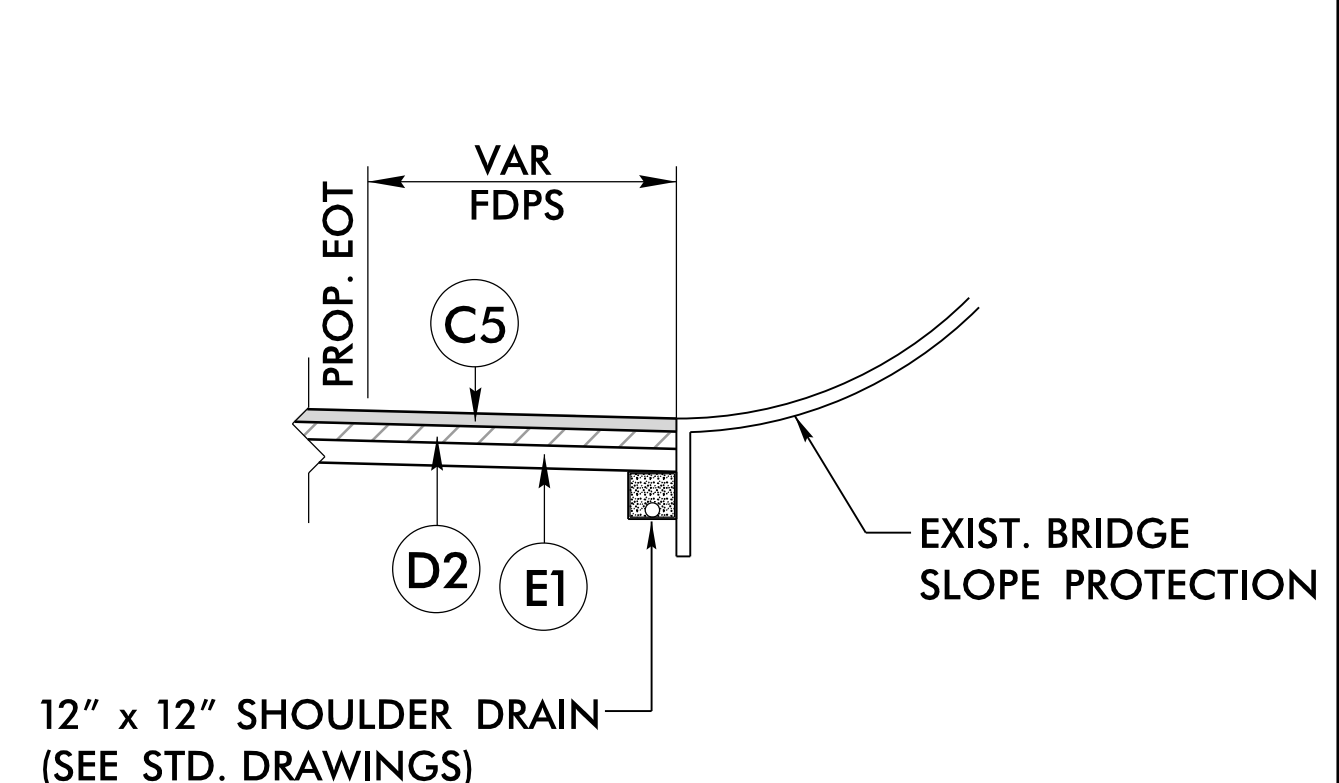
- L- STA. 289+00.00 TO STA. 289+75.00
- Y18- STA. 11+40.00 TO STA. 12+15.00
- Y19- STA. 11+40.00 TO STA. 12+15.00
- Y22- STA. 11+80.00 TO STA. 12+10.00
- Y22- STA. 14+20.00 TO STA. 14+30.00
- Y23- STA. 11+25.00 TO STA. 11+65.00
- Y25- STA. 11+10.00 TO STA. 11+85.00
- Y25- STA. 13+43.66 TO STA. 14+05.00
- Y26- STA. 11+30.00 TO STA. 12+05.00
- Y29- STA. 10+09.71 TO STA. 10+20.00
- Y29- STA. 12+75.00 TO STA. 12+95.00
- Y30- STA. 11+20.00 TO STA. 11+95.00
- Y30- STA. 14+10.00 TO STA. 14+85.00
- Y32- STA. 10+70.00 TO STA. 11+22.00



NOTE: MIRROR FOR END CONSTR. * MILL DEPTH AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER

PAVEMENT MILLING DETAIL KEY-IN (TIE-IN) #2

- Y17- STA. 11+85.00 TO STA. 12+05.00
- Y17- STA. 15+30.00 TO STA. 15+50.00
- Y21- STA. 11+85.00 TO STA. 12+15.00
- Y21- STA. 14+55.00 TO STA. 14+80.00
- Y24- STA. 11+15.00 TO STA. 11+90.00
- Y24- STA. 16+20.00 TO STA. 16+85.00
- Y28- STA. 14+37.00 TO STA. 14+99.45
- Y28- STA. 19+93.00 TO STA. 20+68.00
- Y31- STA. 12+25.00 TO STA. 13+00.00
- Y31A- STA. 11+12.00 TO STA. 11+30.00
- RPA- STA. 13+47.27 TO STA. 13+80.00
- RPB- STA. 11+30.00 TO STA. 12+05.00
- RPC- STA. 15+00.00 TO STA. 15+60.00
- RPD- STA. 12+20.00 TO STA. 12+95.00

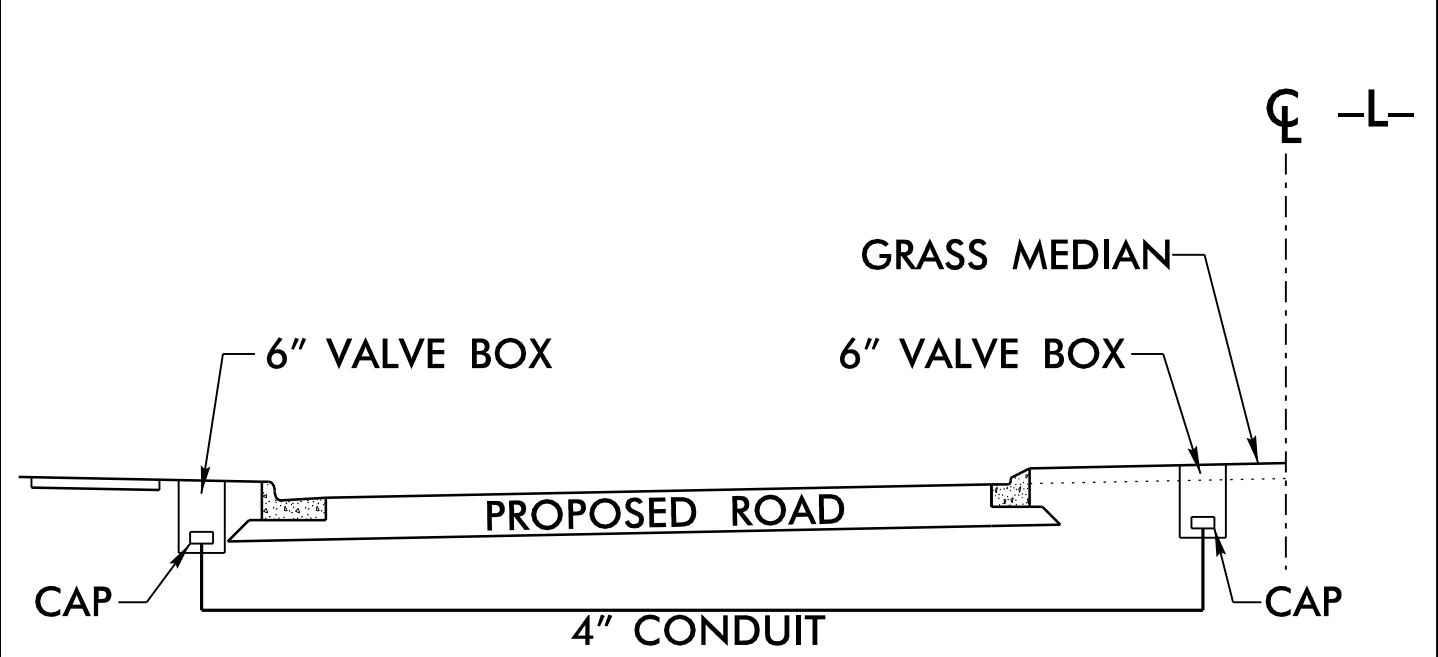


12" x 12" SHOULDER DRAIN (SEE STD. DRAWINGS)

DETAIL OF SHOULDER DRAINS

- (USE IN CONJUNCTION WITH TYP. SECT. NO. 4)
- L- STA. 266+00.00 TO STA. 271+80.00 LT. (OUTFALLS = DRAINAGE STR. 1115 & STR. 1151)
 - L- STA. 265+50.00 TO STA. 271+80.00 RT. (OUTFALL = DRAINAGE STR. 1113)

NOTE: ADJUST DEPTH OF DRAIN AS NECESSARY TO PROPERLY DRAIN OR AS DIRECTED BY ENGINEER



4" PVC IRRIGATION CONDUIT DETAIL
(SEE SPECIAL PROVISIONS)

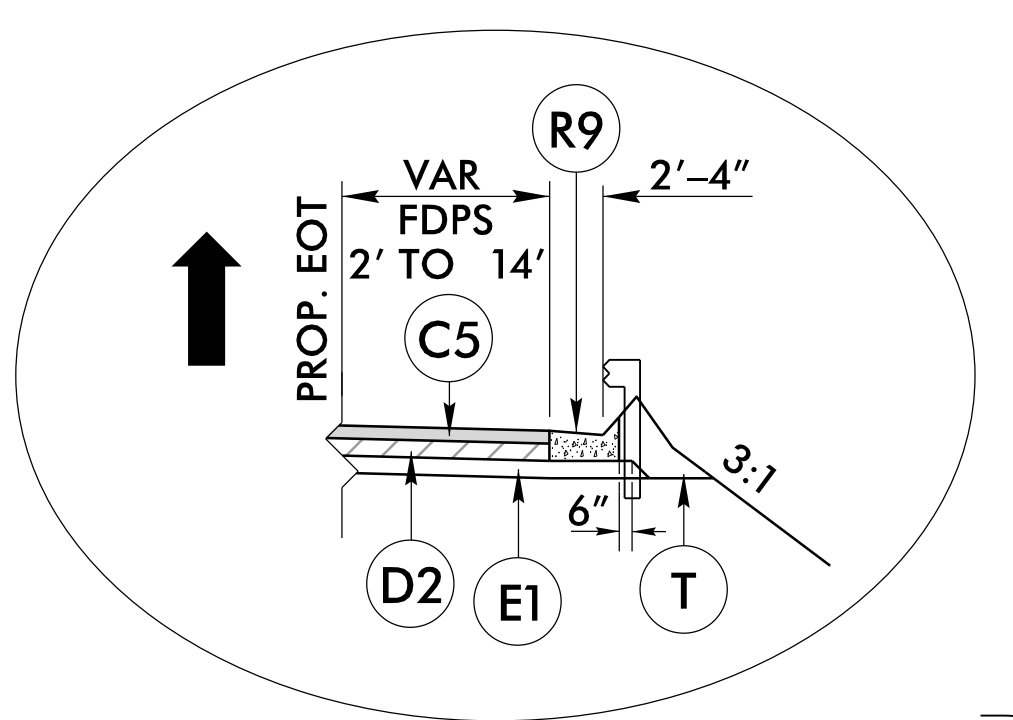
- NOTES:
- 1) USE 4" SDR21 PVC CONDUIT OR AS DIRECTED BY RESIDENT ENGINEER
 - 2) FOR VALVE BOX DETAILS SEE UTILITY CONSTRUCTION PLANS
 - 3) CONTRACTOR WILL DRILL/BORE 4" CONDUIT SLEEVE TO ACCOMMODATE IRRIGATION TO ISLANDS PER RESIDENT ENGINEER DIRECTION.

R-5020B.dwg, I:1289, NCDDOT, R-5020B, US, 7/01, W:\dmtmg\Roadway\Proj\R-5020B_Rdy_tup.dgn
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 11/15/2016 10:53:27 AM
 11/15/2016 10:53:27 AM

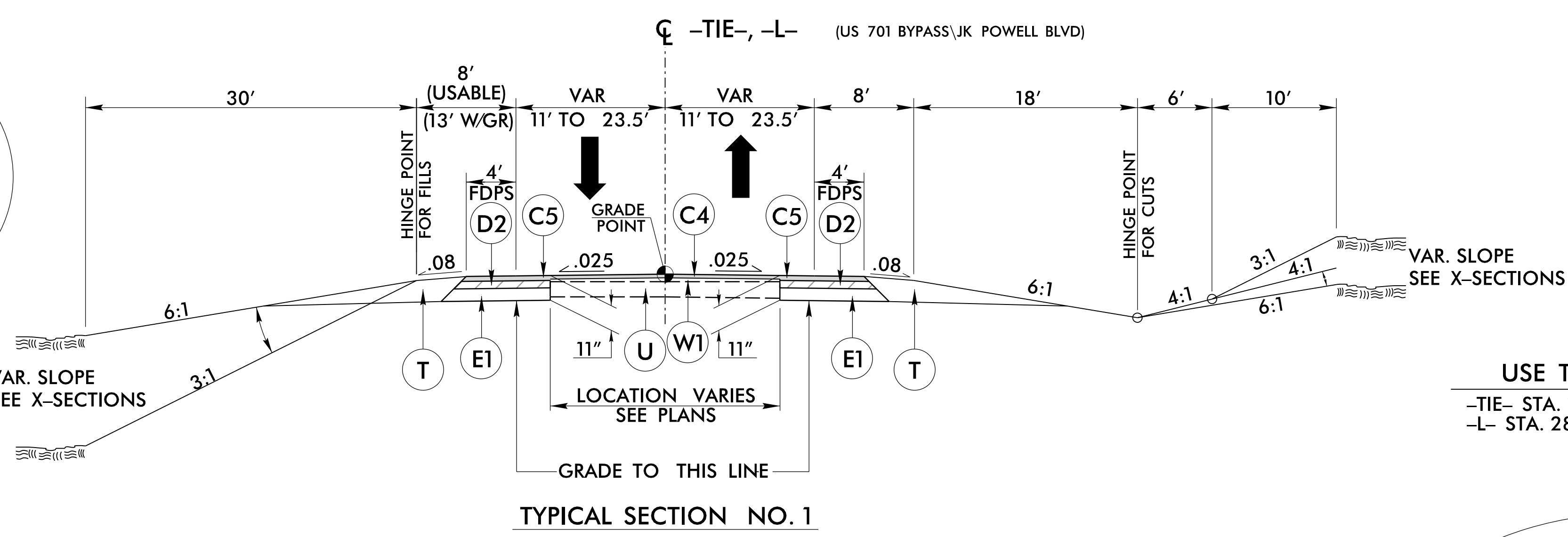
6/22/2020

PAVEMENT SCHEDULE	
<i>(FINAL PAVEMENT DESIGN)</i>	
C1	1.5" TYPE S9.5B
C2	3" TYPE S9.5B
C3	VAR. TYPE S9.5B
C4	1.5" TYPE S9.5C
C5	3" TYPE S9.5C
C6	VAR. TYPE S9.5C
D1	2.5" TYPE I19.0C
D2	4" TYPE I19.0C
D3	VAR. TYPE I19.0C
E1	4" TYPE B25.0C
E2	VAR. TYPE B25.0C
R1	1'-6" C&G
R2	2'-6" C&G
R3	8"x18" CONC. CURB
R4	9" CONC. TRUCK APRON
R5	CONC. VALLEY GUTTER
R6	5" MONO. ISLAND
R7	8"x12" CONC. CURB
R9	SHOULDER BERM GUTTER
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	INCIDENTAL MILLING
V2	1.5" MILLING
W1	WEDGING DETAIL #1

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



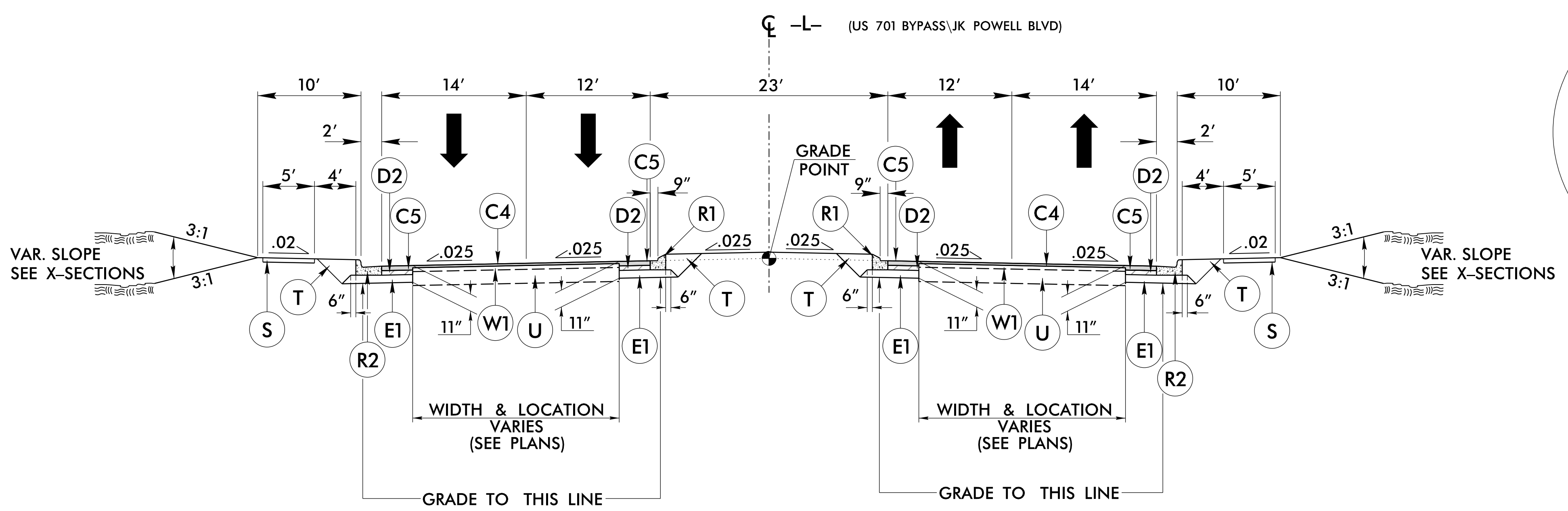
INSET A
SHOULDER BERM GUTTER DETAIL
USE WITH TYPICAL SECTION NO. 1
-TIE- STA. 12+00.00 TO STA. 17+50.00 RT



TYPICAL SECTION NO. 1

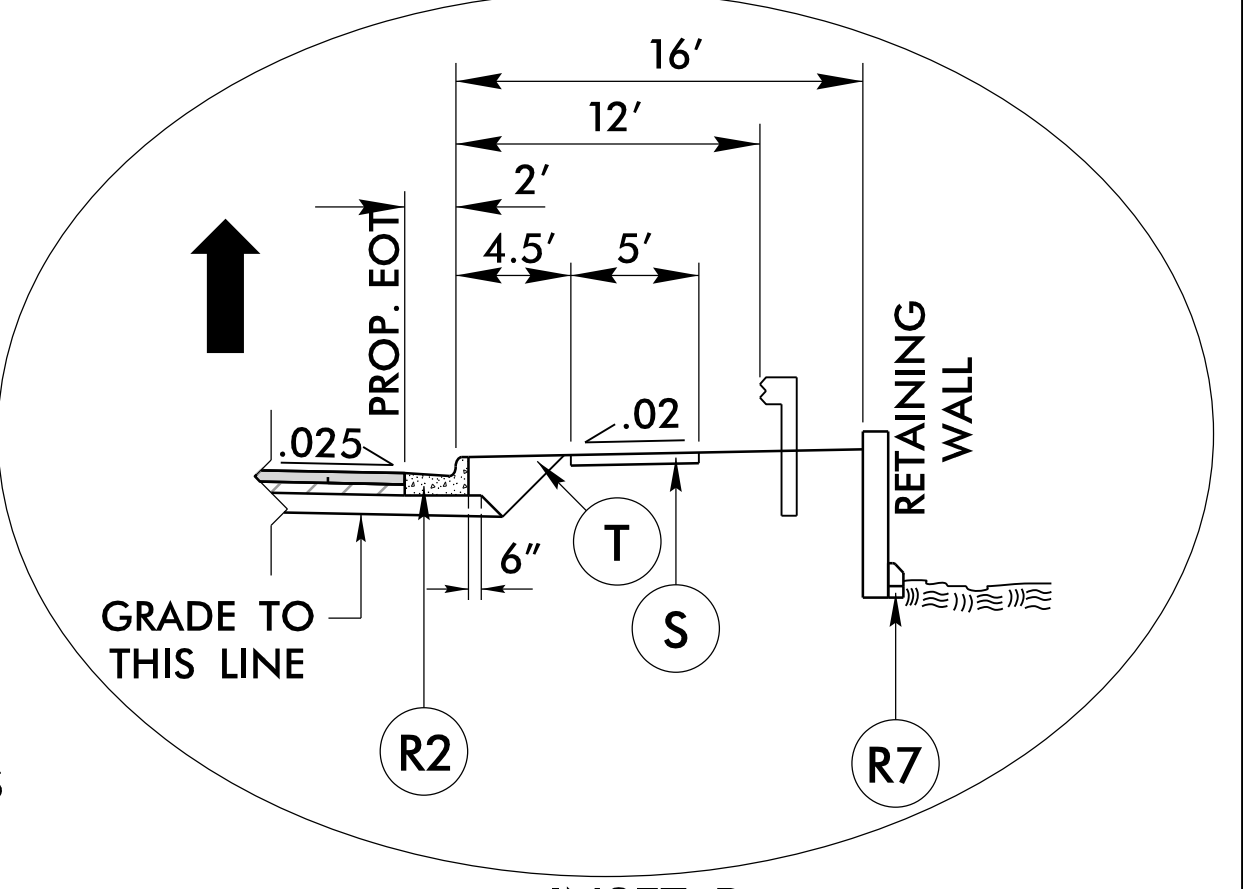
PROJECT REFERENCE NO. <i>R-5020B</i>	SHEET NO. <i>2A-2</i>
ROADWAY DESIGN ENGINEER <i>[Signature]</i>	PAVEMENT DESIGN ENGINEER <i>[Signature]</i>
Professional Seal: 034375 <i>[Signature]</i>	Professional Seal: 022896 <i>[Signature]</i>
6/24/2020	6/30/2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

USE TYPICAL SECTION NO. 1
-TIE- STA. 12+00.00 TO STA. 17+50.00
-L- STA. 285+00.00 TO STA. 289+75.00



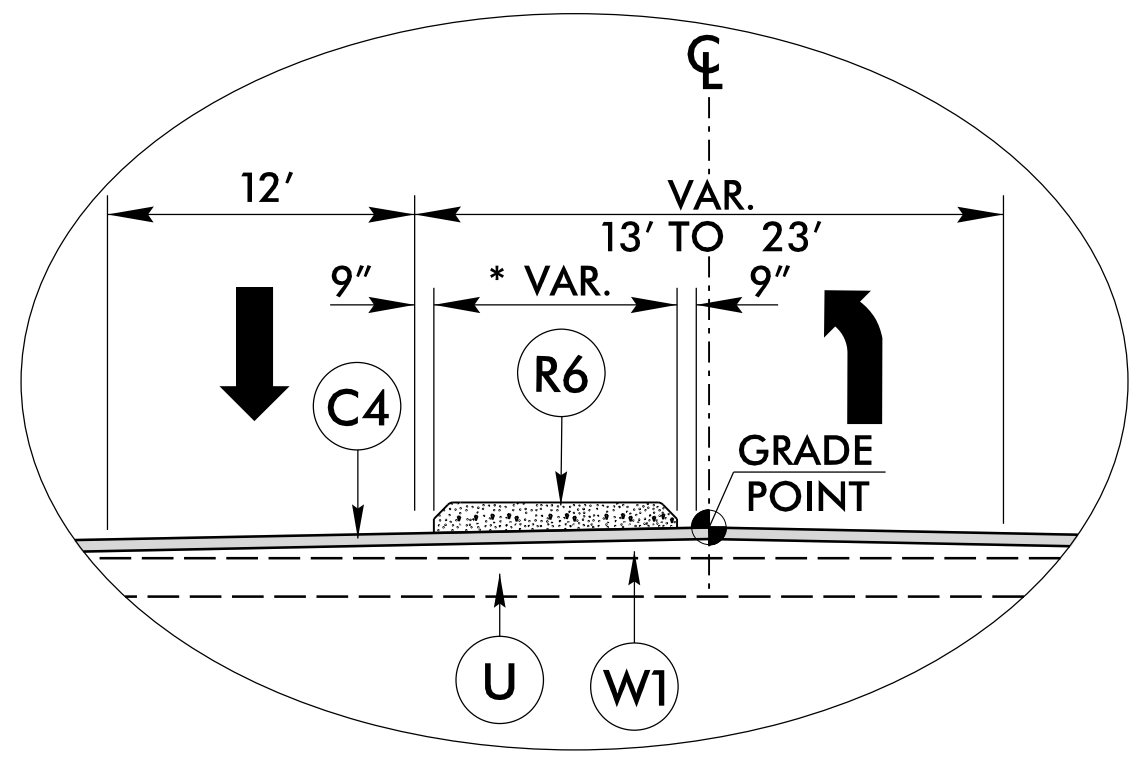
TYPICAL SECTION NO. 2

(V2) NOTE: MILL EXISTING PAVEMENT AT LEAST 1.5" AND PLACE AT LEAST 3" S9.5C AT THE FOLLOWING LOCATIONS:
-L- STA. 200+00.00 TO STA. 205+50.00
-L- STA. 226+00.00 TO STA. 233+00.00

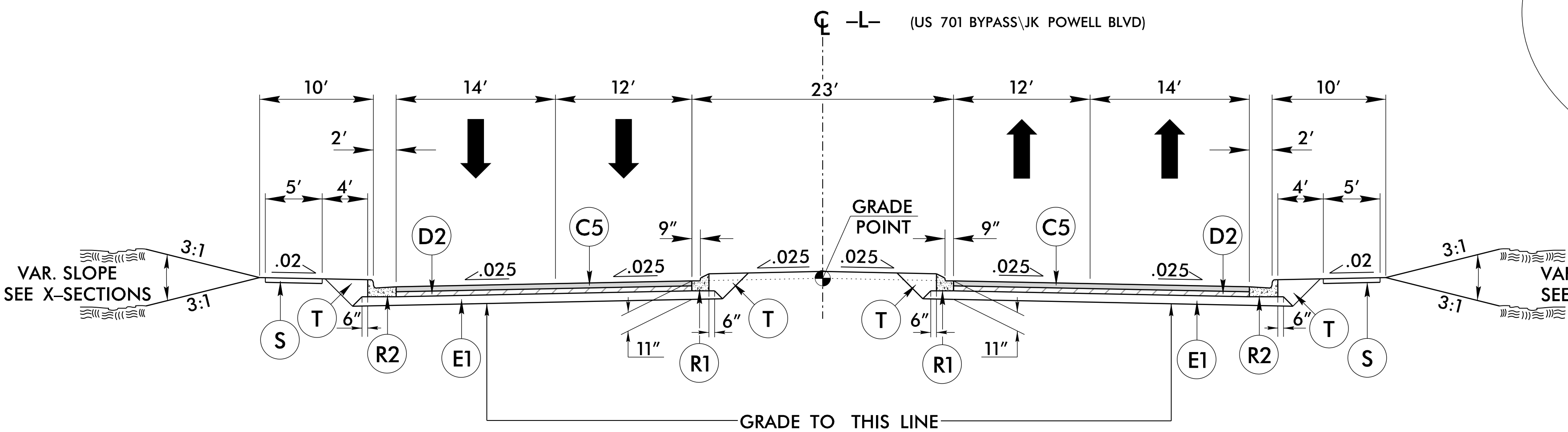


INSET B
USE WITH TYPICAL SECTION NO. 2
-L- STA. 247+41.55 TO STA. 250+75.85 RT

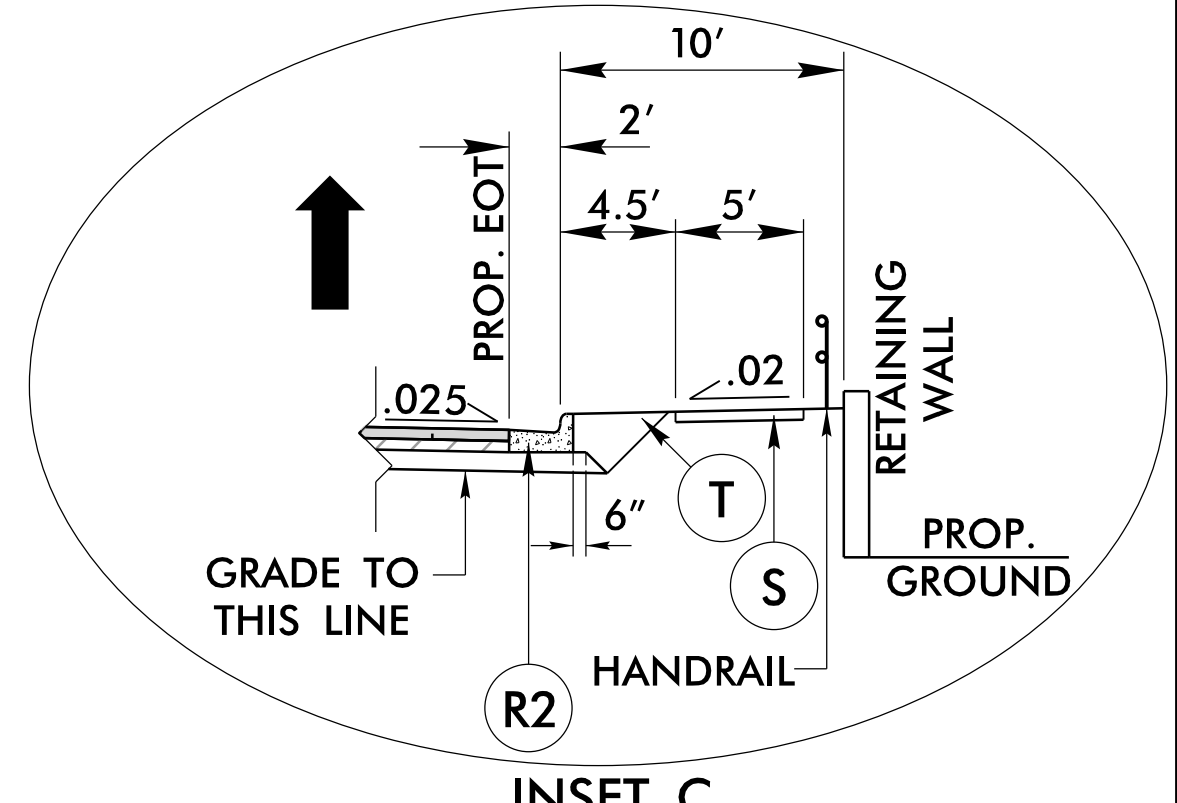
USE TYPICAL SECTION NO. 2
-L- STA. 174+50.00 TO STA. 205+50.00
-L- STA. 210+50.00 TO STA. 263+99.70



INSET D
USE WITH TYPICAL SECTION NO. 1 & NO. 2
*SEE PLANS FOR WIDTH AND LOCATION
-L- STA. 174+50.00 TO STA. 193+50.14
-L- STA. 200+07.50 TO STA. 202+61.50
-L- STA. 227+48.50 TO STA. 230+30.00
-L- STA. 242+85.00 TO STA. 245+44.50
-L- STA. 254+15.00 TO STA. 259+26.89



TYPICAL SECTION NO. 3



INSET C
USE WITH TYPICAL SECTION NO. 2
-L- STA. 251+32 TO STA. 251+82 RT

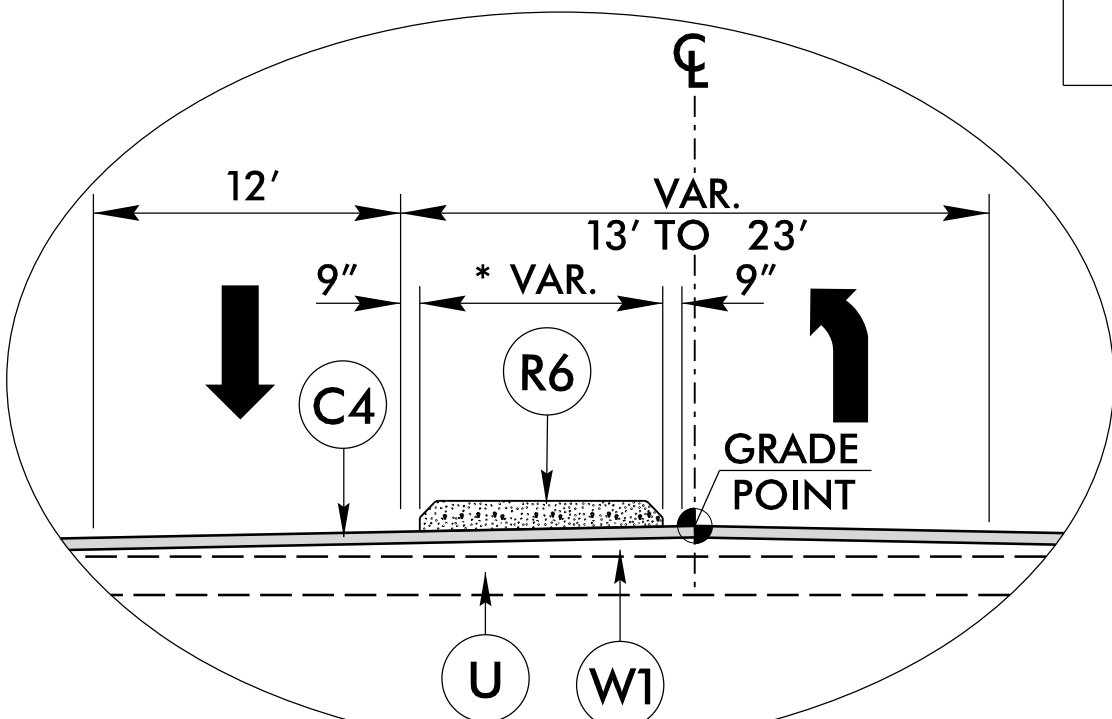
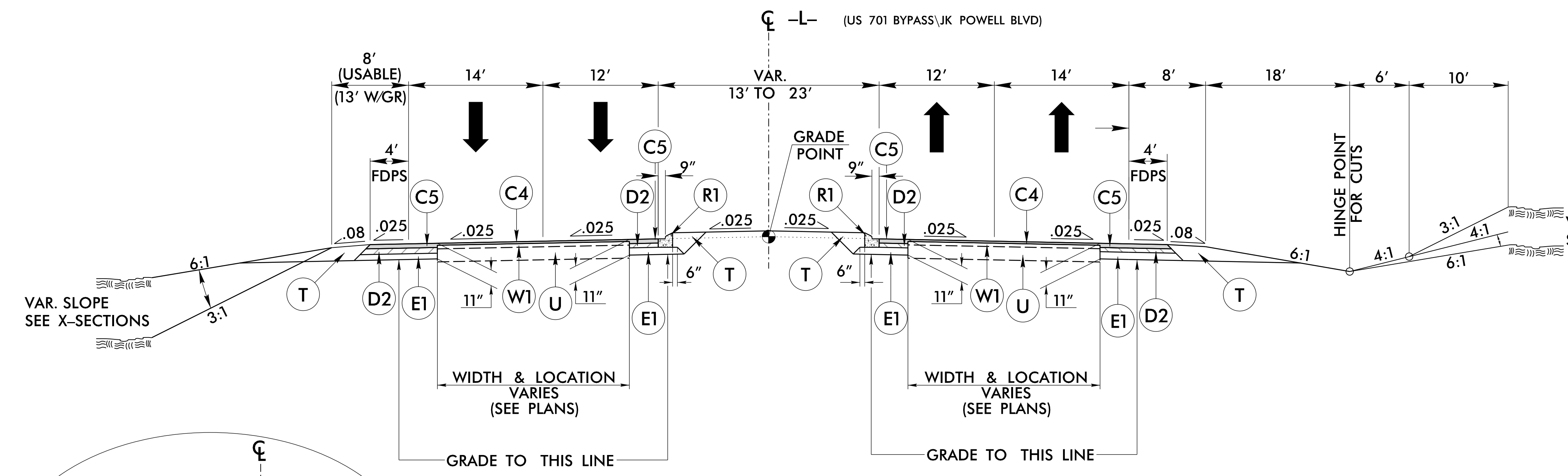
USE TYPICAL SECTION NO. 3
-L- STA. 205+50.00 TO STA. 210+50.00

R: APR 2020, P: 25, NCDOT R-5020B US 701 Widening Roadway Proje R-5020B_Rdy_typ.dgn

6/22/20

PAVEMENT SCHEDULE <i>(FINAL PAVEMENT DESIGN)</i>	
C1	1.5" TYPE S9.5B
C2	3" TYPE S9.5B
C3	VAR. TYPE S9.5B
C4	1.5" TYPE S9.5C
C5	3" TYPE S9.5C
C6	VAR. TYPE S9.5C
D1	2.5" TYPE I19.0C
D2	4" TYPE I19.0C
D3	VAR. TYPE I19.0C
E1	4" TYPE B25.0C
E2	VAR. TYPE B25.0C
R1	1'-6" C&G
R2	2'-6" C&G
R3	8"x18" CONC. CURB
R4	9" CONC. TRUCK APRON
R5	CONC. VALLEY GUTTER
R6	5" MONO. ISLAND
R7	8"x12" CONC. CURB
R8	2" ROLLED CURB
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	INCIDENTAL MILLING
V2	1.5" MILLING
W1	WEDGING DETAIL #1

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

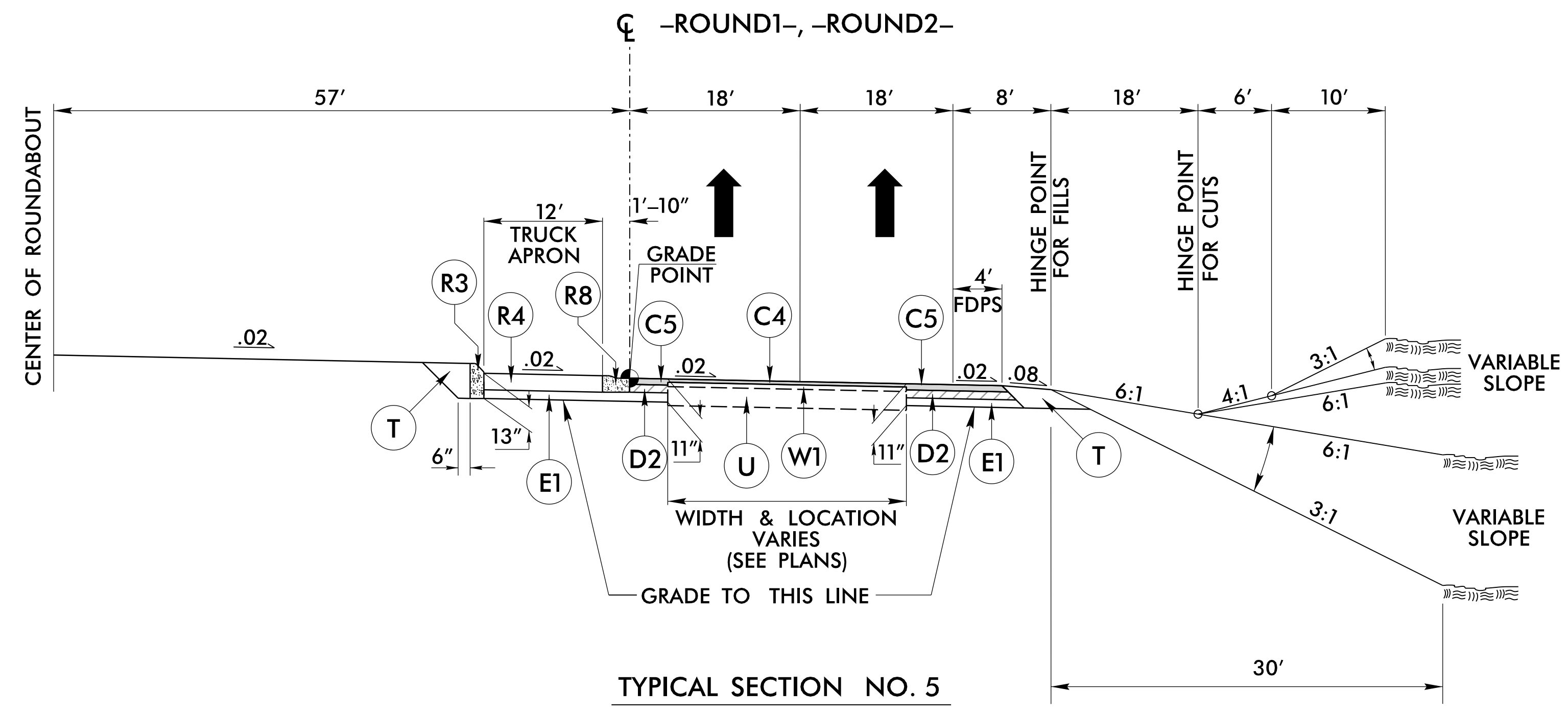


INSET D
 USE WITH TYPICAL SECTION NO. 4
 *SEE PLANS FOR WIDTH AND LOCATION
 -L- STA. 265+49.70 TO STA. 271+79.70
 -L- STA. 276+54.36 TO STA. 285+02.00

TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4
 -L- STA. 265+49.70 TO STA. 271+79.70
 -L- STA. 273+29.70 TO STA. 285+00.00

NOTE: FOR SHOULDER DRAIN LOCATIONS, SEE DETAIL ON SHEET 2A-1



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5
 -ROUND1- STA. 10+00.00 TO STA. 13+58.14
 -ROUND2- STA. 10+00.00 TO STA. 13+58.14

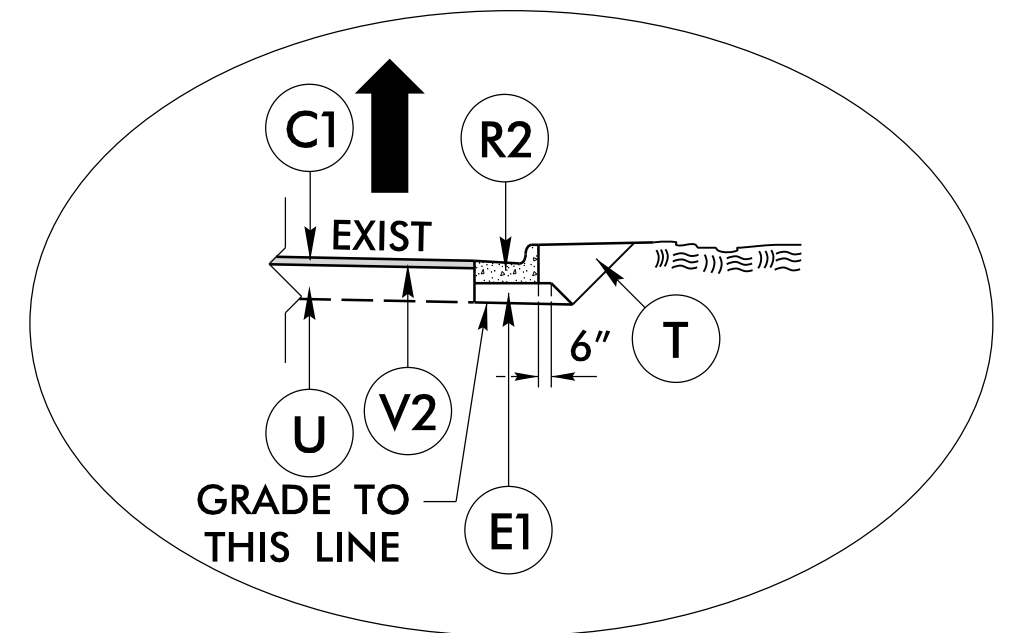
PROJECT REFERENCE NO. R-5020B	SHEET NO. 2A-3
ROADWAY DESIGN ENGINEER <i>[Signature]</i> SEAL 034375 6/24/2020	PAVEMENT DESIGN ENGINEER <i>[Signature]</i> SEAL 022896 6/30/2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609 Phone (919) 783-9214 • Fax (919) 783-9266	

P:\APR-2020\11289 NCDDOT R-5020B US 701 Widening\Roadway\Proc\1R-5020B_Rdy_tup.dgn
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 USER: JG

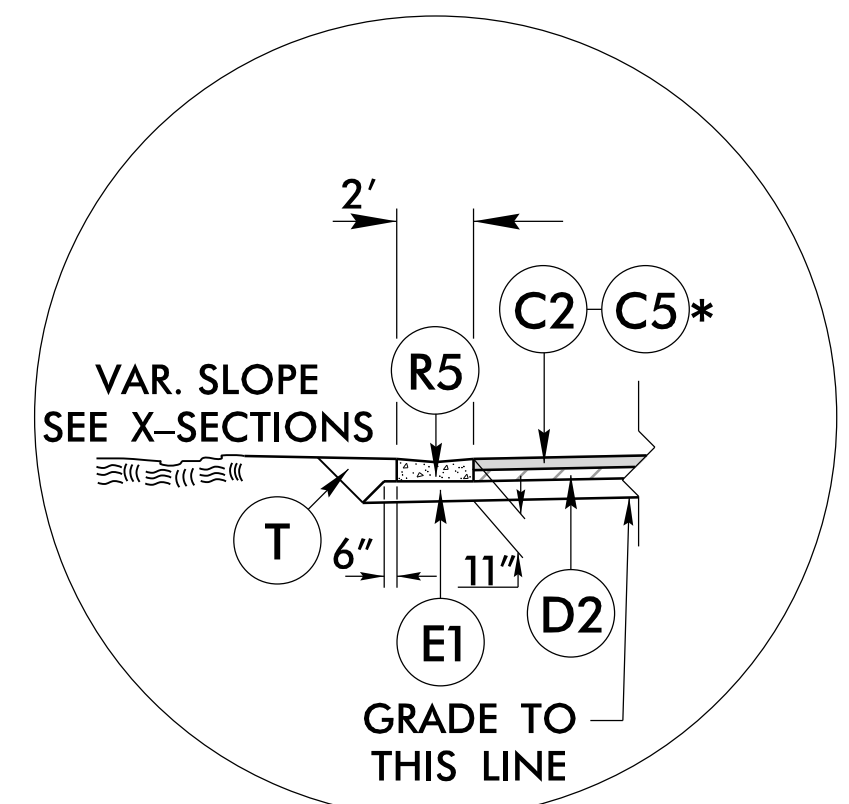
6/22/20

PAVEMENT SCHEDULE <small>(FINAL PAVEMENT DESIGN)</small>	
C1	1.5" TYPE S9.5B
C2	3" TYPE S9.5B
C3	VAR. TYPE S9.5B
C4	1.5" TYPE S9.5C
C5	3" TYPE S9.5C
C6	VAR. TYPE S9.5C
D1	2.5" TYPE I19.0C
D2	4" TYPE I19.0C
D3	VAR. TYPE I19.0C
E1	4" TYPE B25.0C
E2	VAR. TYPE B25.0C
R1	1'-6" C&G
R2	2'-6" C&G
R3	8"x18" CONC. CURB
R4	9" CONC. TRUCK APRON
R5	CONC. VALLEY GUTTER
R6	5" MONO. ISLAND
R7	8"x12" CONC. CURB
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	INCIDENTAL MILLING
V2	1.5" MILLING
W1	WEDGING DETAIL #1
W3	WEDGING DETAIL #3

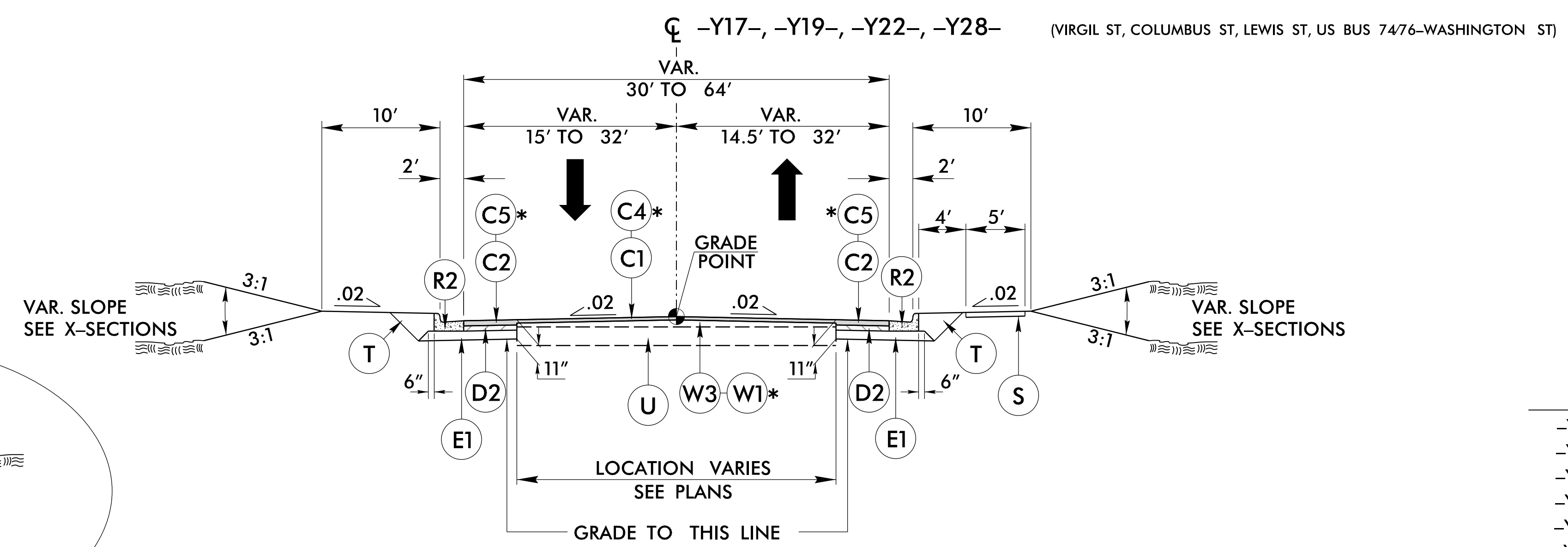
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



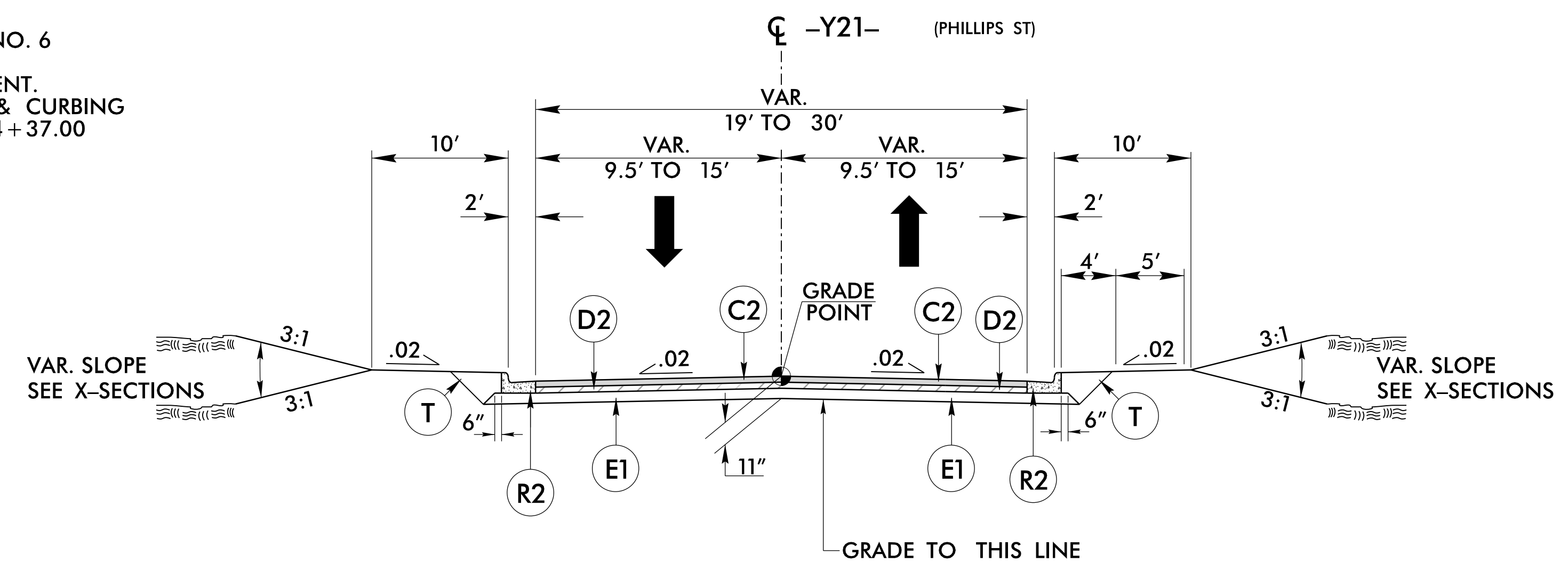
INSET E
USE WITH TYPICAL SECTION NO. 6
MILL 1.5" OF EXISTING PAVEMENT.
REPLACE EXISTING PAVEMENT & CURBING FROM -Y28- 13+80.00 TO 14+37.00 (MIRROR FOR LEFT SIDE)



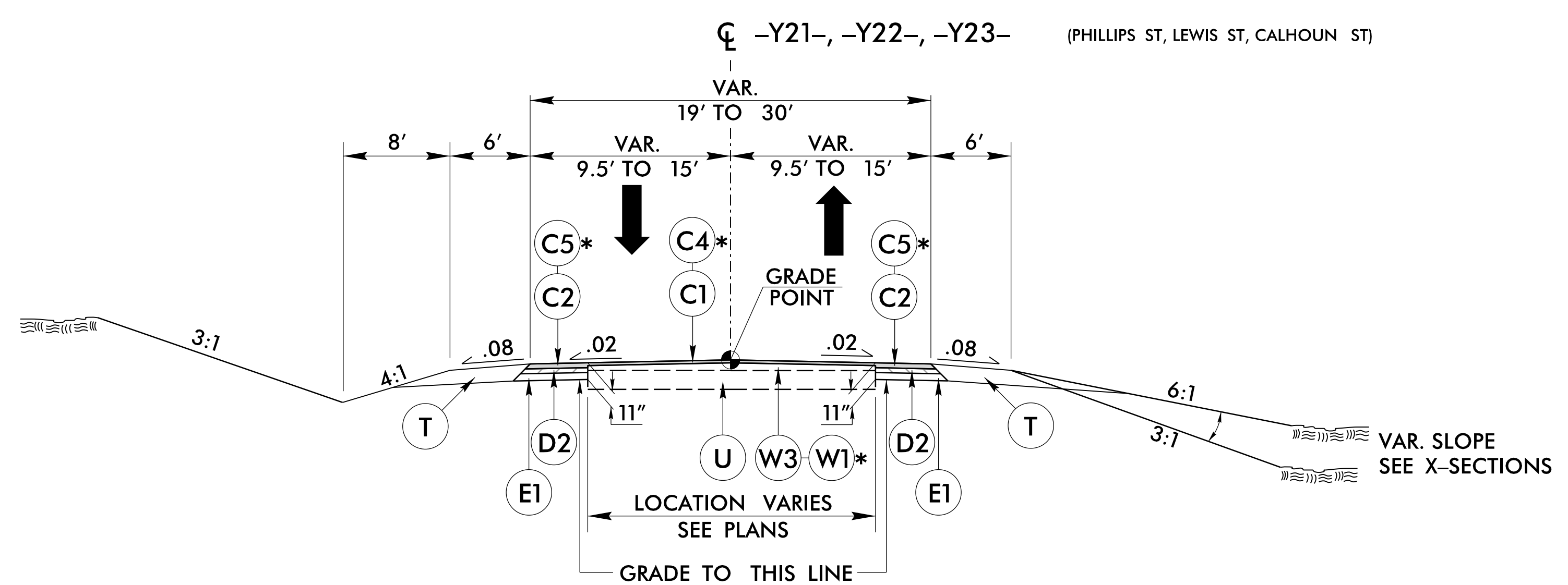
INSET F
USE WITH TYPICAL SECTION NO. 7, 8 & 9
-Y18- STA. 11+40.00 TO STA. 12+49.36 RT
-Y18- STA. 11+40.00 TO STA. 12+57.89 LT
-Y21- STA. 11+85.00 TO STA. 12+99.32 RT
-Y21- STA. 11+85.00 TO STA. 13+08.61 LT
-Y22- STA. 11+80.00 TO STA. 12+81.38 LT
-Y24- STA. 15+55.00 TO STA. 16+85.00 LT



TYPICAL SECTION NO. 6



TYPICAL SECTION NO. 7



TYPICAL SECTION NO. 8

PROJECT REFERENCE NO. R-5020B	SHEET NO. 2A-4
ROADWAY DESIGN ENGINEER SHERRY C. SMITH 034375 6/24/2020	PAVEMENT DESIGN ENGINEER DAVID S. MORRISON 022896 6/30/2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

USE TYPICAL SECTION NO. 6
-Y17- STA. 11+85.00 TO STA. 13+64.13
-Y17- STA. 14+39.13 TO STA. 15+50.00
-Y19- STA. 10+37.50 TO STA. 12+15.00
-Y22- STA. 13+87.64 TO STA. 14+30.00
-Y28- STA. 14+37.00 TO STA. 14+99.45
-Y28- STA. 15+86.48 TO STA. 18+96.00

* USE C4, C5, & W1 ON -Y19- AND -Y22-

USE TYPICAL SECTION NO. 7
-Y21- STA. 12+80.00 TO STA. 13+40.18

USE TYPICAL SECTION NO. 8
-Y21- STA. 11+85.00 TO STA. 12+80.00
-Y21- STA. 14+15.22 TO STA. 14+80.00
-Y22- STA. 11+80.00 TO STA. 13+12.62
-Y23- STA. 10+90.00 TO STA. 11+65.00

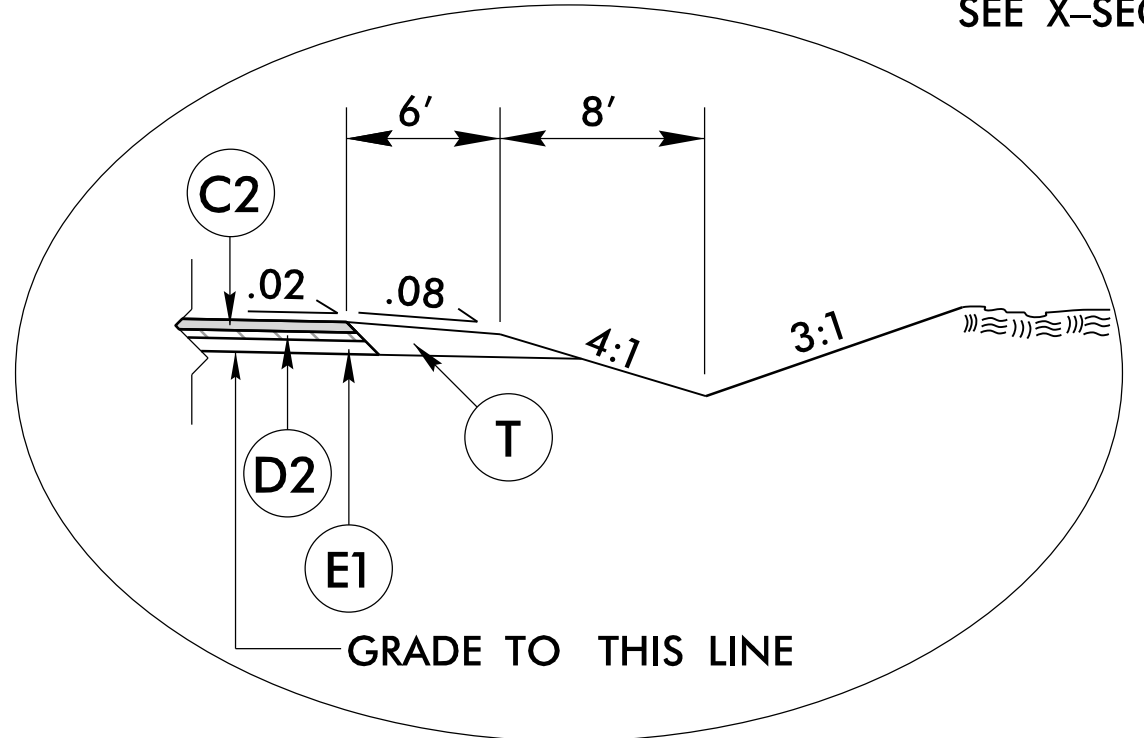
* USE C4, C5, & W1 ON -Y22- AND -Y23-

R-5020B.dwg, 6/22/20, 11:28 AM, NCDOT, R-5020B, US, 701, W:\dmr\p\Roadway\Proj\R-5020B_Rdy_tjy.dgn

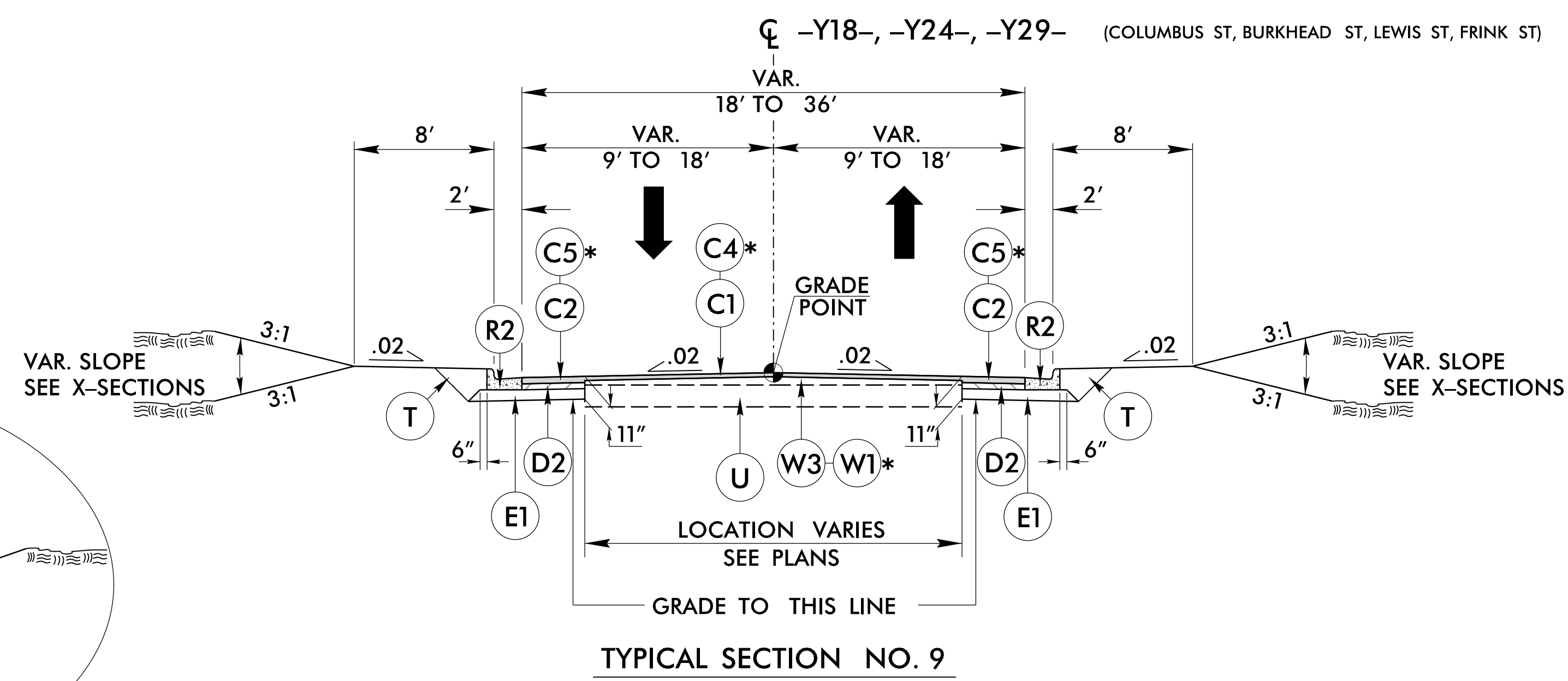
6/22/2019 2:00:11 PM C:\Users\jmorrisson\OneDrive\Documents\Projects\Roadway\Proj\R-5020B_Rdy_tjpl.dgn

PAVEMENT SCHEDULE	
(FINAL PAVEMENT DESIGN)	
C1	1.5" TYPE S9.5B
C2	3" TYPE S9.5B
C3	VAR. TYPE S9.5B
C4	1.5" TYPE S9.5C
C5	3" TYPE S9.5C
C6	VAR. TYPE S9.5C
D1	2.5" TYPE I19.0C
D2	4" TYPE I19.0C
D3	VAR. TYPE I19.0C
E1	4" TYPE B25.0C
E2	VAR. TYPE B25.0C
R1	1'-6" C&G
R2	2'-6" C&G
R3	8"x18" CONC. CURB
R4	9" CONC. TRUCK APRON
R5	CONC. VALLEY GUTTER
R6	5" MONO. ISLAND
R7	8"x12" CONC. CURB
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	INCIDENTAL MILLING
V2	1.5" MILLING
W1	WEDGING DETAIL #1
W3	WEDGING DETAIL #3

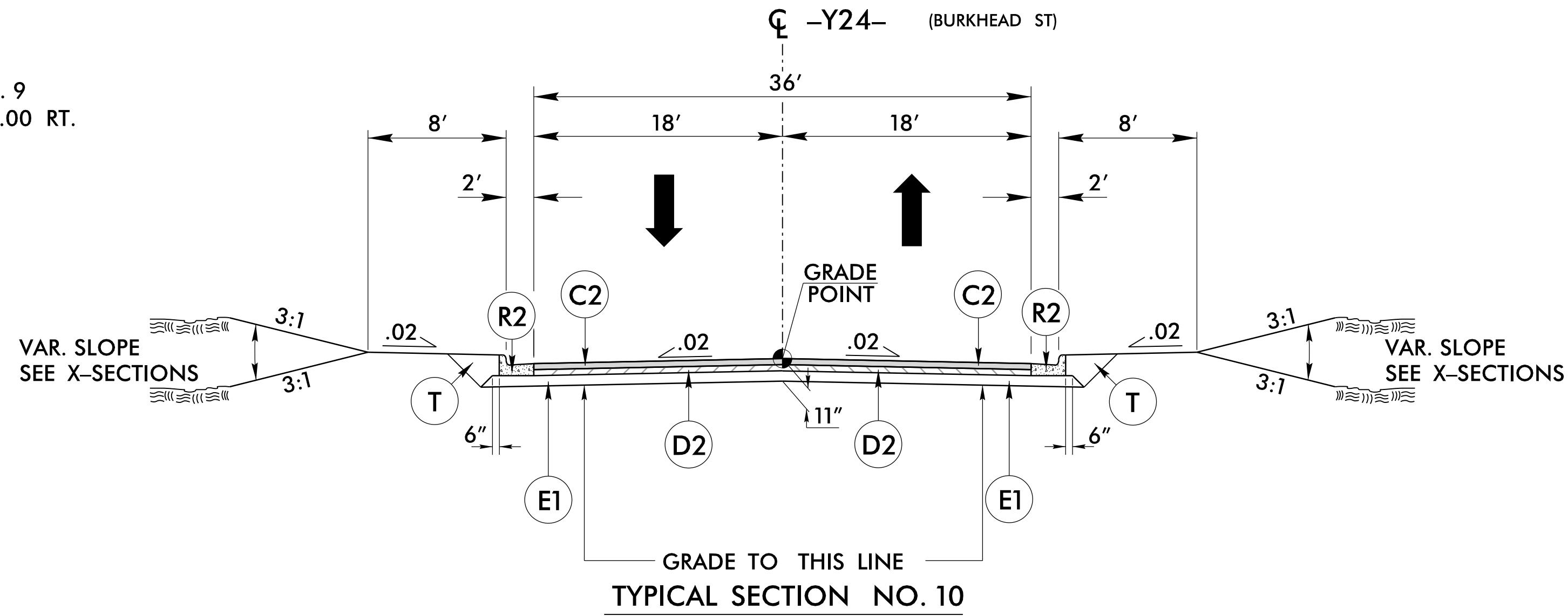
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



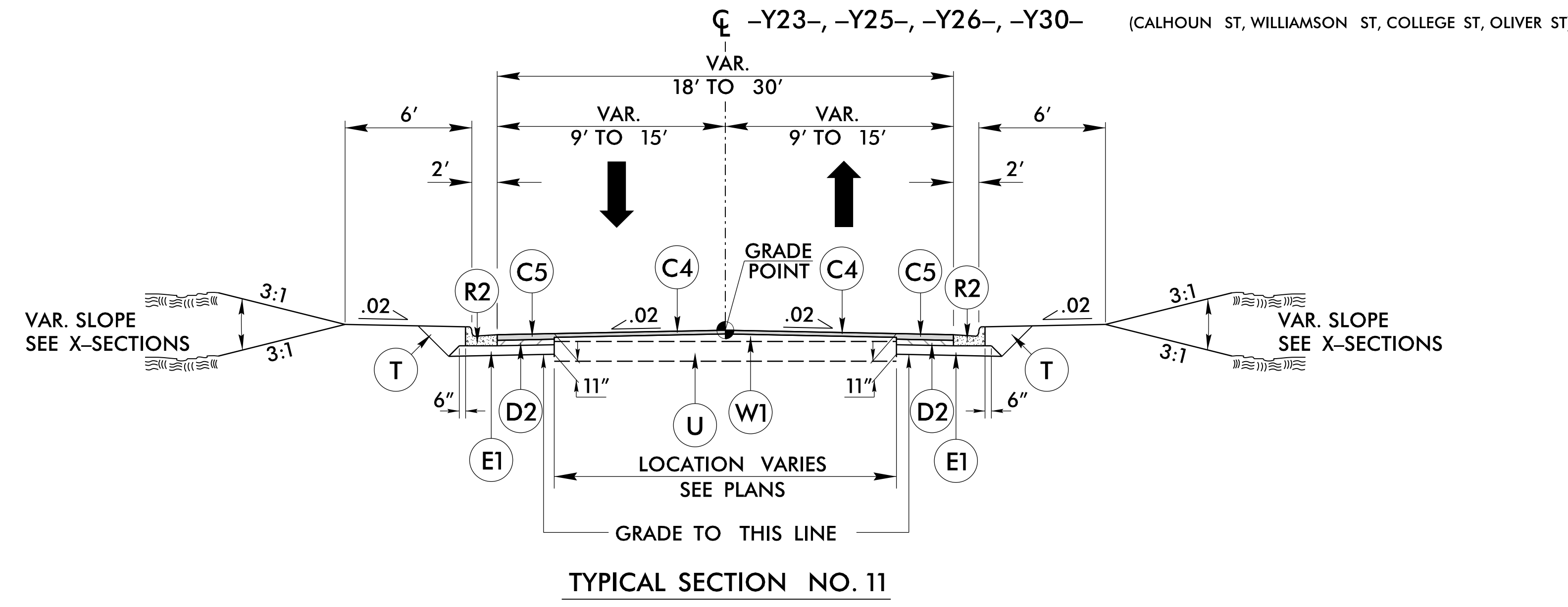
INSET G
USE WITH TYPICAL SECTION NO. 9
-Y24- STA. 16+00.00 TO STA. 16+85.00 RT.



TYPICAL SECTION NO. 9



TYPICAL SECTION NO. 10



TYPICAL SECTION NO. 11

PROJECT REFERENCE NO. R-5020B	SHEET NO. 2A-5
ROADWAY DESIGN ENGINEER <i>Barry C. Smith</i> SEAL 034375 ENGINEER BARRY C. SMITH 6/24/2020	PAVEMENT DESIGN ENGINEER <i>Clayton S. Morrison</i> SEAL 022896 ENGINEER CLAYTON S. MORRISON 6/30/2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 <small>Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609 Phone (919) 783-9214 • Fax (919) 783-9266</small>	

USE TYPICAL SECTION NO. 9
 -Y18- STA. 11+40.00 TO STA. 13+12.53
 -Y24- STA. 11+15.00 TO STA. 13+05.00
 -Y24- STA. 14+37.73 TO STA. 16+85.00
 -Y29- STA. 10+09.71 TO STA. 11+52.54
 -Y29- STA. 12+28.66 TO STA. 12+95.00

* USE C4, C5, & W1 ON -Y18- AND -Y29-

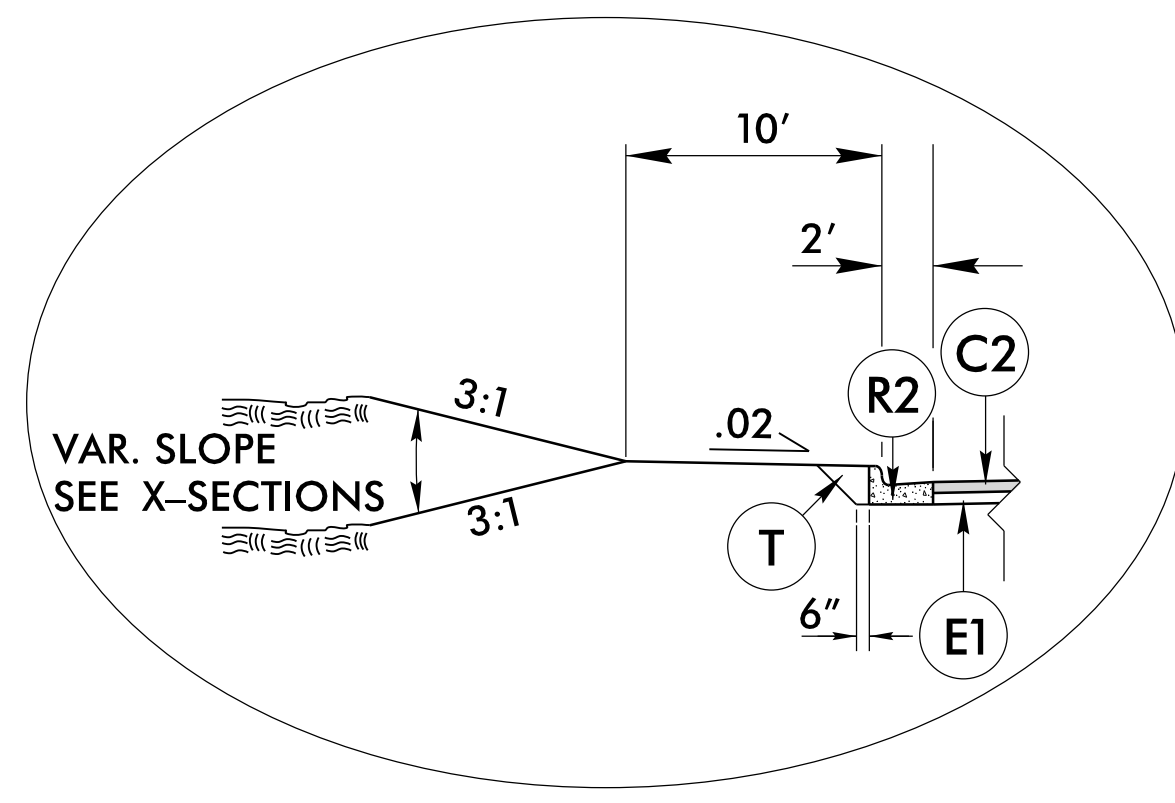
USE TYPICAL SECTION NO. 10
 -Y24- STA. 13+05.00 TO STA. 13+62.69

USE TYPICAL SECTION NO. 11
 -Y23- STA. 10+37.52 TO STA. 10+90.00
 -Y25- STA. 11+10.00 TO STA. 12+68.38
 -Y25- STA. 13+43.66 TO STA. 14+05.00
 -Y26- STA. 11+30.00 TO STA. 12+70.86
 -Y30- STA. 11+20.00 TO STA. 12+53.00
 -Y30- STA. 13+50.00 TO STA. 14+85.00

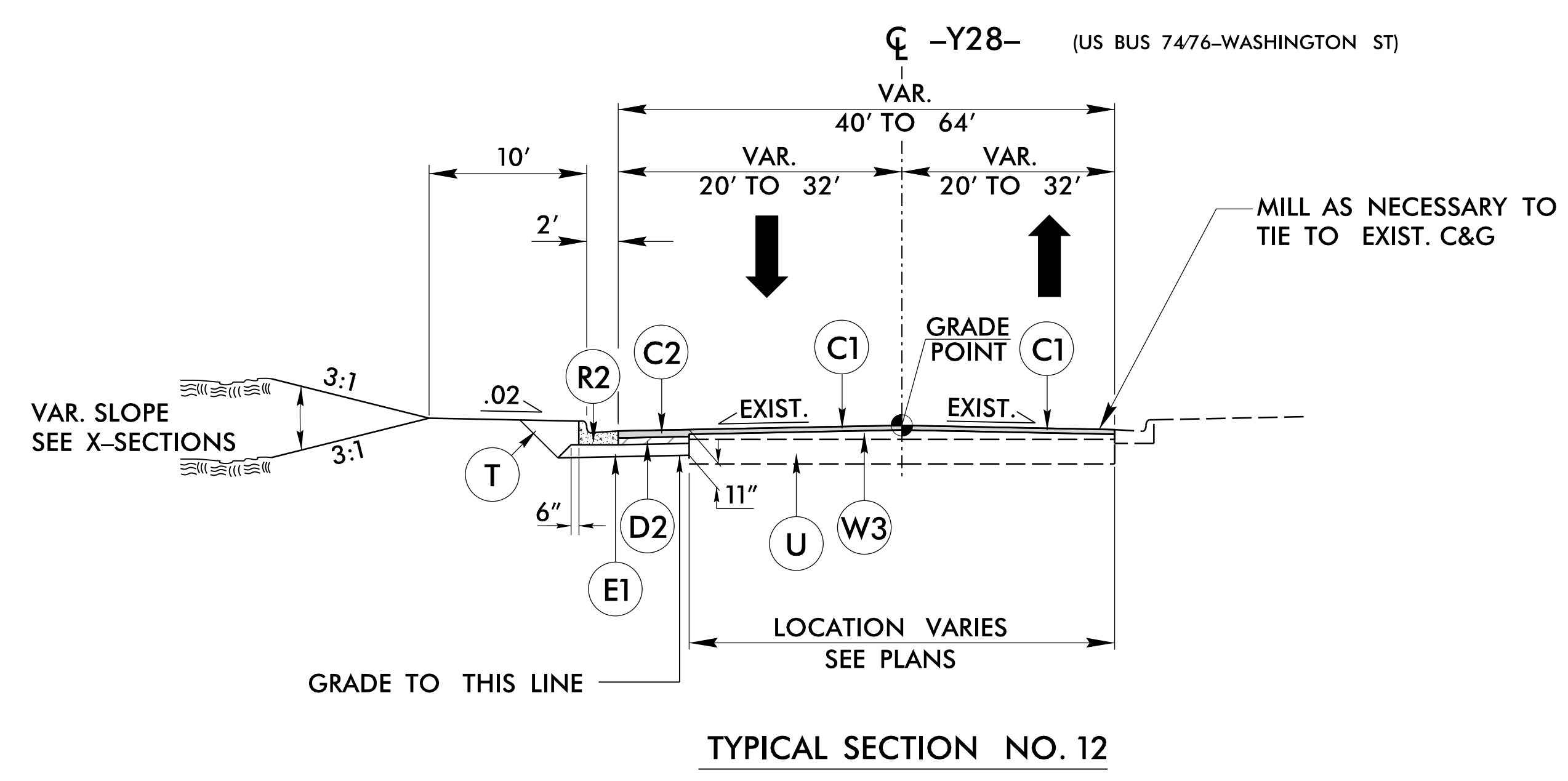
6/2/2020

PAVEMENT SCHEDULE <small>(FINAL PAVEMENT DESIGN)</small>	
C1	1.5" TYPE S9.5B
C2	3" TYPE S9.5B
C3	VAR. TYPE S9.5B
C4	1.5" TYPE S9.5C
C5	3" TYPE S9.5C
C6	VAR. TYPE S9.5C
D1	2.5" TYPE I19.0C
D2	4" TYPE I19.0C
D3	VAR. TYPE I19.0C
E1	4" TYPE B25.0C
E2	VAR. TYPE B25.0C
R1	1'-6" C&G
R2	2'-6" C&G
R3	8"x18" CONC. CURB
R4	9" CONC. TRUCK APRON
R5	CONC. VALLEY GUTTER
R6	5" MONO. ISLAND
R7	8"x12" CONC. CURB
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	INCIDENTAL MILLING
V2	1.5" MILLING
W3	WEDGING DETAIL #3
W4	WEDGING DETAIL #4

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

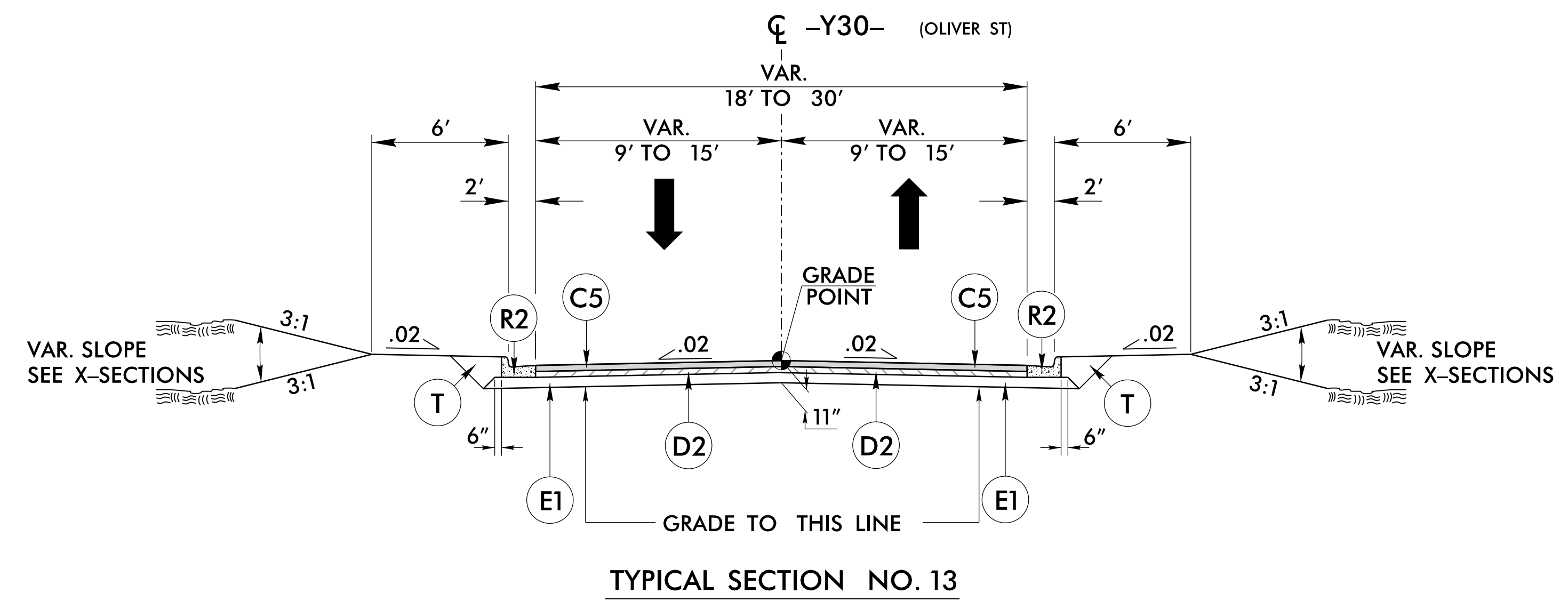


INSET H
USE WITH TYPICAL SECTION NO. 14
-Y31- STA. 14+88.00 TO STA. 17+35.10 LT.



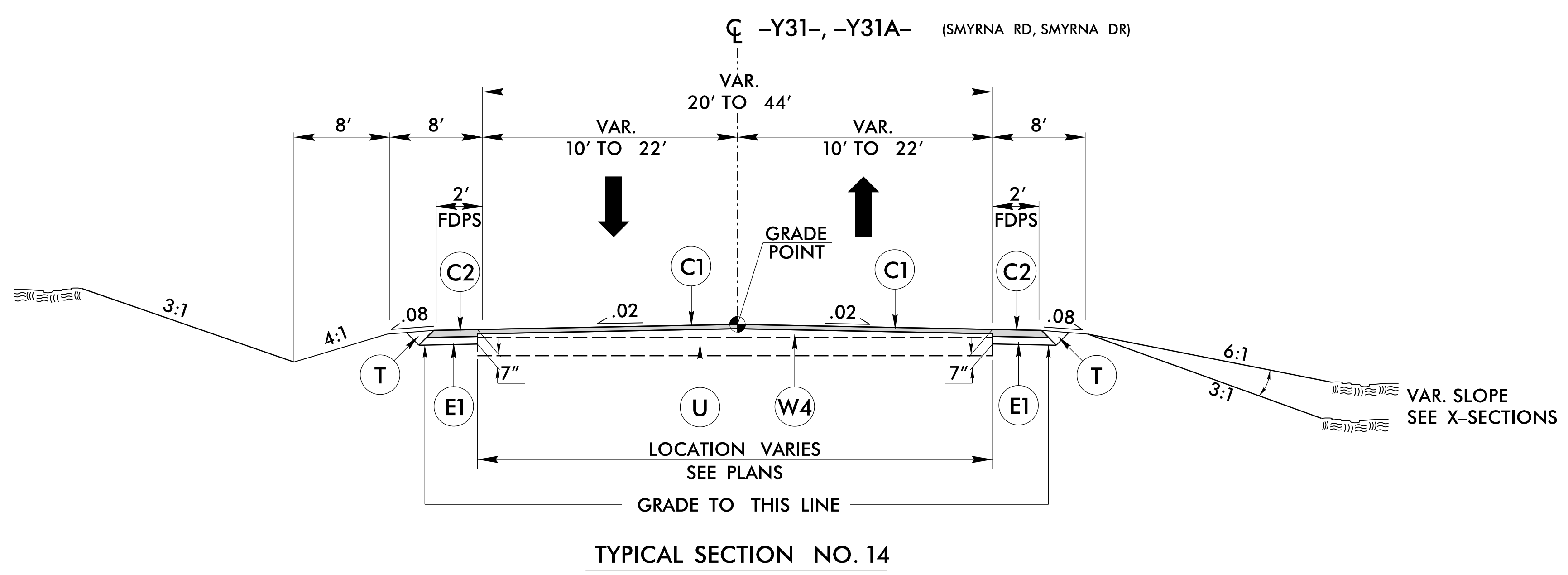
TYPICAL SECTION NO. 12

USE TYPICAL SECTION NO. 12
-Y28- STA. 18+96.00 TO STA. 20+68.00



TYPICAL SECTION NO. 13

USE TYPICAL SECTION NO. 13
-Y30- STA. 13+28.32 TO STA. 13+50.00



TYPICAL SECTION NO. 14

USE TYPICAL SECTION NO. 14
-Y31- STA. 12+25.00 TO STA. 17+35.10
-Y31A- STA. 10+22.53 TO STA. 11+30.00


PROJECT REFERENCE NO. R-5020B	SHEET NO. 2A-6
ROADWAY DESIGN ENGINEER Barry C. Smith SEAL 034375 ENGINEER Barry C. Smith	PAVEMENT DESIGN ENGINEER Clark S. Morrison SEAL 022896 ENGINEER Clark S. Morrison
6/24/2020	6/30/2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609 Phone (919) 783-9214 • Fax (919) 783-9266	

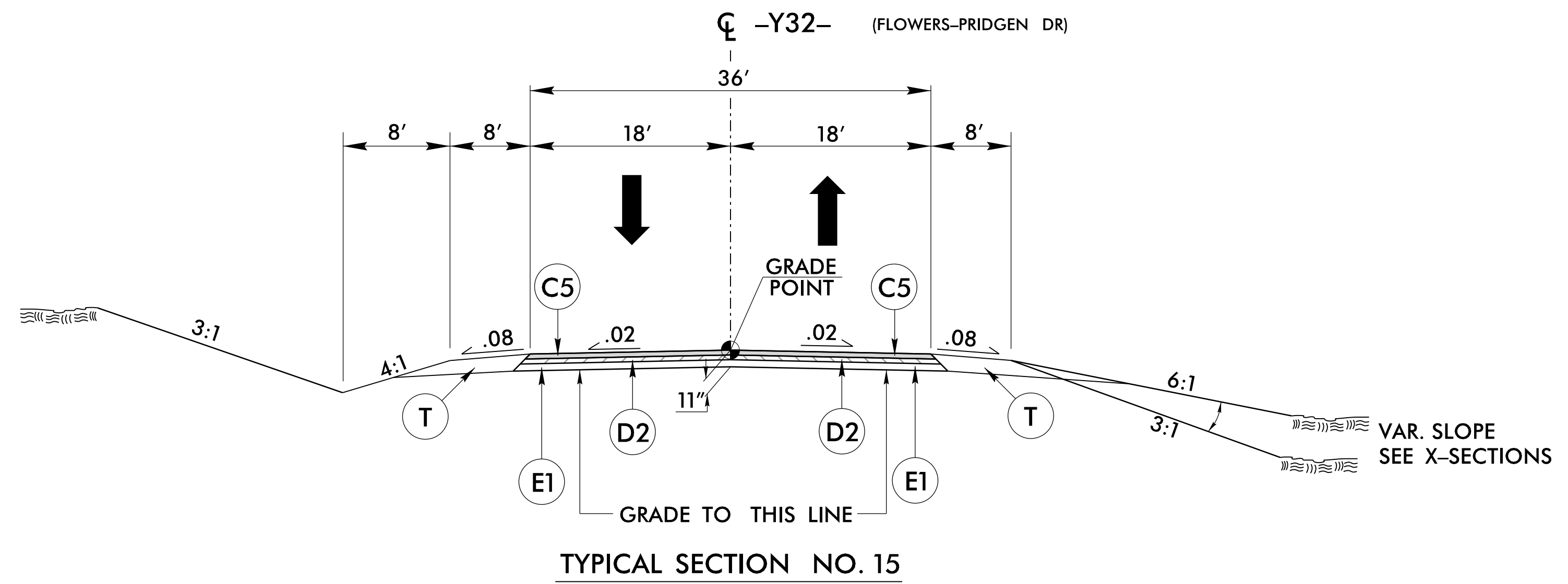
6/22/20

PAVEMENT SCHEDULE <i>(FINAL PAVEMENT DESIGN)</i>	
C1	1.5" TYPE S9.5B
C2	3" TYPE S9.5B
C3	VAR. TYPE S9.5B
C4	1.5" TYPE S9.5C
C5	3" TYPE S9.5C
C6	VAR. TYPE S9.5C
D1	2.5" TYPE I19.0C
D2	4" TYPE I19.0C
D3	VAR. TYPE I19.0C
E1	4" TYPE B25.0C
E2	VAR. TYPE B25.0C
R1	1'-6" C&G
R2	2'-6" C&G
R3	8"x18" CONC. CURB
R4	9" CONC. TRUCK APRON
R5	CONC. VALLEY GUTTER
R6	5" MONO. ISLAND
R7	8"x12" CONC. CURB
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	INCIDENTAL MILLING
V2	1.5" MILLING
W1	WEDGING DETAIL #1
W2	WEDGING DETAIL #2

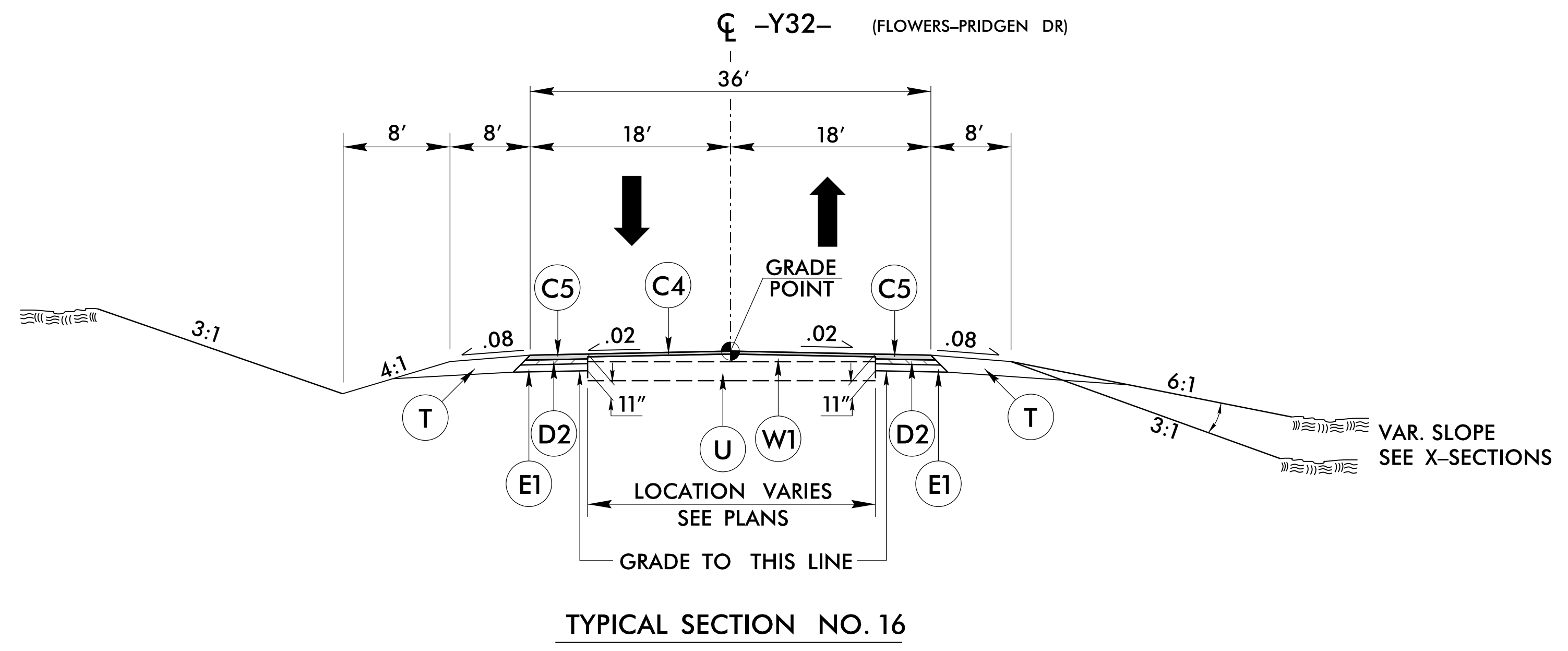
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

USE 4:1 MAX SLOPES INSIDE INTERCHANGE

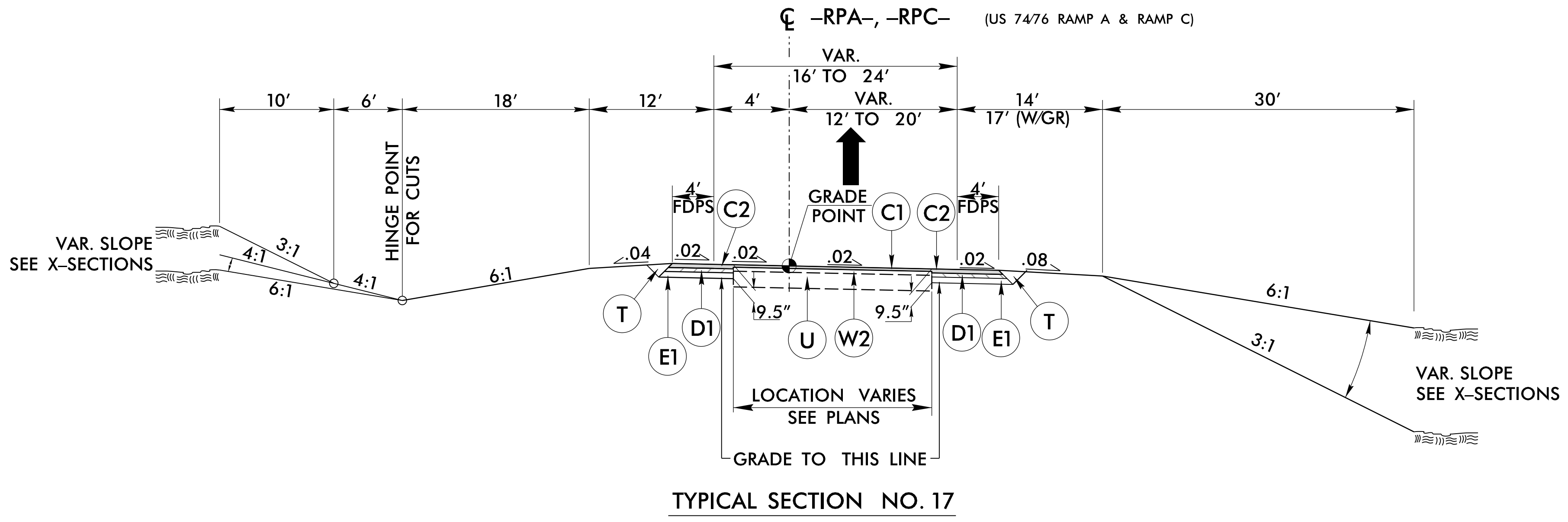
PROJECT REFERENCE NO. <i>R-5020B</i>	SHEET NO. <i>2A-7</i>
ROADWAY DESIGN ENGINEER <i>SEAL 034375</i> BARRY C. SMITH	PAVEMENT DESIGN ENGINEER <i>SEAL 022896</i> CLAY S. MORRISON
6/24/2020	6/30/2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609 Phone (919) 783-9214 • Fax (919) 783-9266	



USE TYPICAL SECTION NO. 15
-Y32- STA. 10+37.50 TO STA. 10+70.00



USE TYPICAL SECTION NO. 16
-Y32- STA. 10+70.00 TO STA. 11+22.00



USE TYPICAL SECTION NO. 17
-RPA- STA. 13+47.27 TO STA. 16+37.92
-RPC- STA. 15+00.00 TO STA. 23+29.58

P:\APR-2020\11289 NCDDOT R-5020B US 701 Widening\Roadway\Proj\R-5020B_Rdy_tup.dgn
 6/22/2020 10:16:53 AM USER:KCI

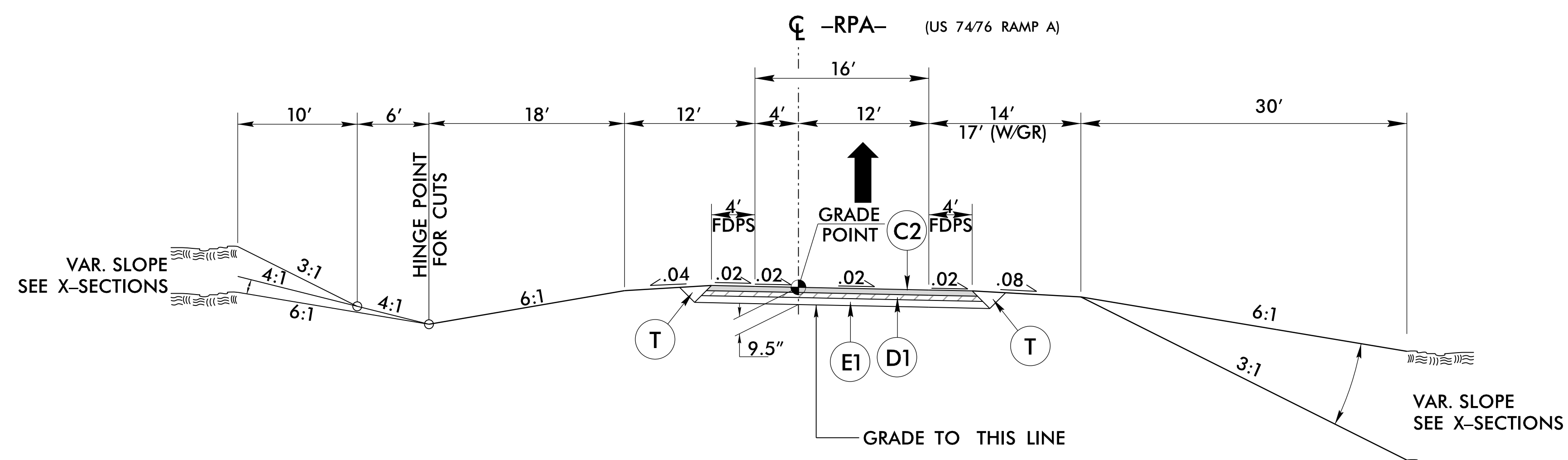
6/2/2019

PAVEMENT SCHEDULE <small>(FINAL PAVEMENT DESIGN)</small>	
C1	1.5" TYPE S9.5B
C2	3" TYPE S9.5B
C3	VAR. TYPE S9.5B
C4	1.5" TYPE S9.5C
C5	3" TYPE S9.5C
C6	VAR. TYPE S9.5C
D1	2.5" TYPE I19.0C
D2	4" TYPE I19.0C
D3	VAR. TYPE I19.0C
E1	4" TYPE B25.0C
E2	VAR. TYPE B25.0C
R1	1'-6" C&G
R2	2'-6" C&G
R3	8"x18" CONC. CURB
R4	9" CONC. TRUCK APRON
R5	CONC. VALLEY GUTTER
R6	5" MONO. ISLAND
R7	8"x12" CONC. CURB
S	4" CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	INCIDENTAL MILLING
W2	WEDGING DETAIL #2

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

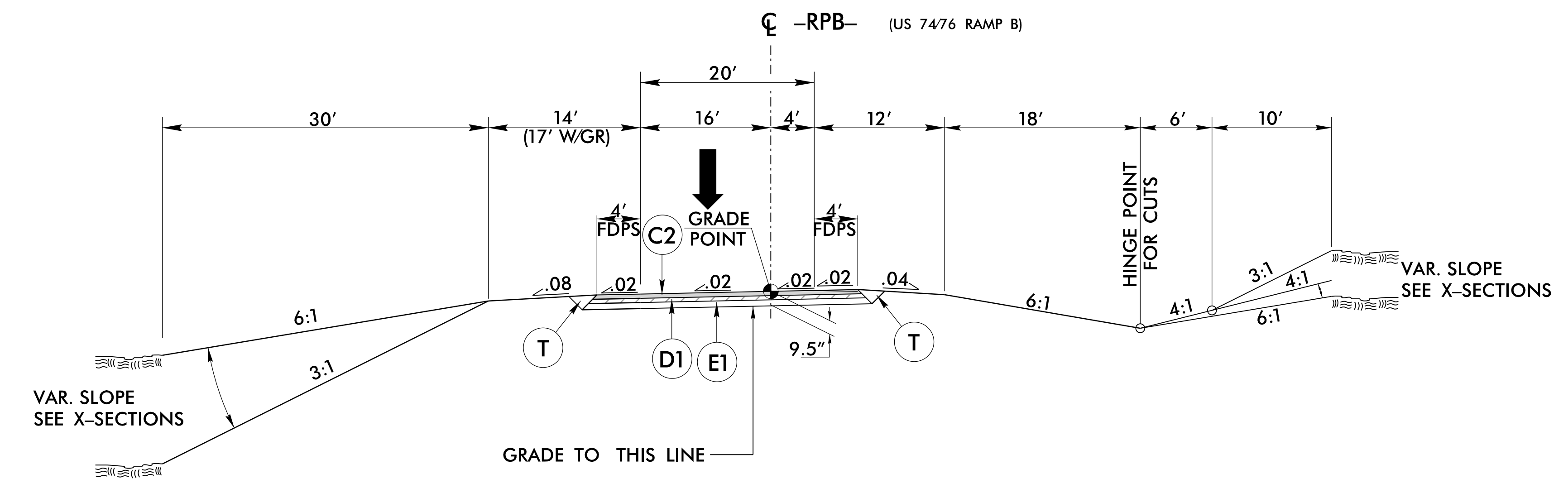
USE 4:1 MAX SLOPES INSIDE INTERCHANGE

R:\APR-2020\11289 NCDDOT R-5020B US 701 Widening\Roadway\Proj\R-5020B_Rdy_tjw.dgn
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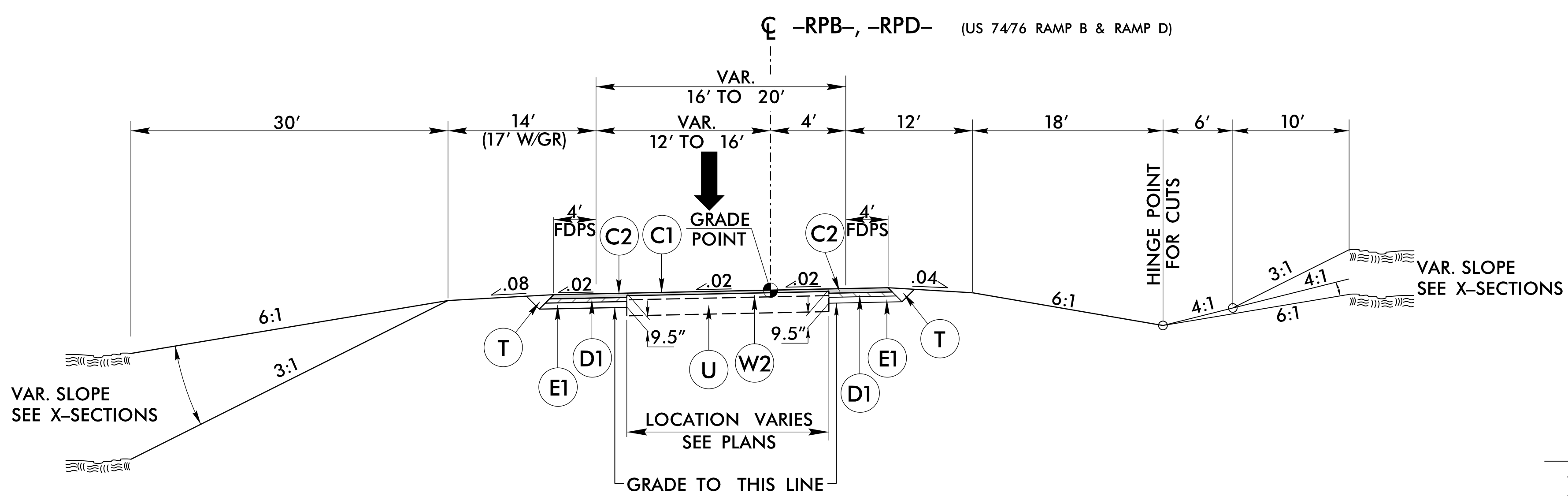
TYPICAL SECTION NO. 18

USE TYPICAL SECTION NO. 18
-RPA- STA. 16+37.92 TO STA. 19+87.33



TYPICAL SECTION NO. 19

USE TYPICAL SECTION NO. 19
-RPB- STA. 12+82.00 TO STA. 13+82.18



TYPICAL SECTION NO. 20

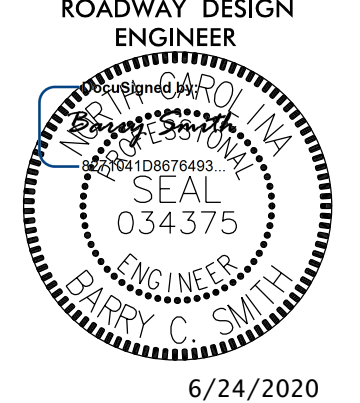

USE TYPICAL SECTION NO. 20
-RPB- STA. 11+30.00 TO STA. 12+82.00
-RPD- STA. 12+20.00 TO STA. 14+80.17

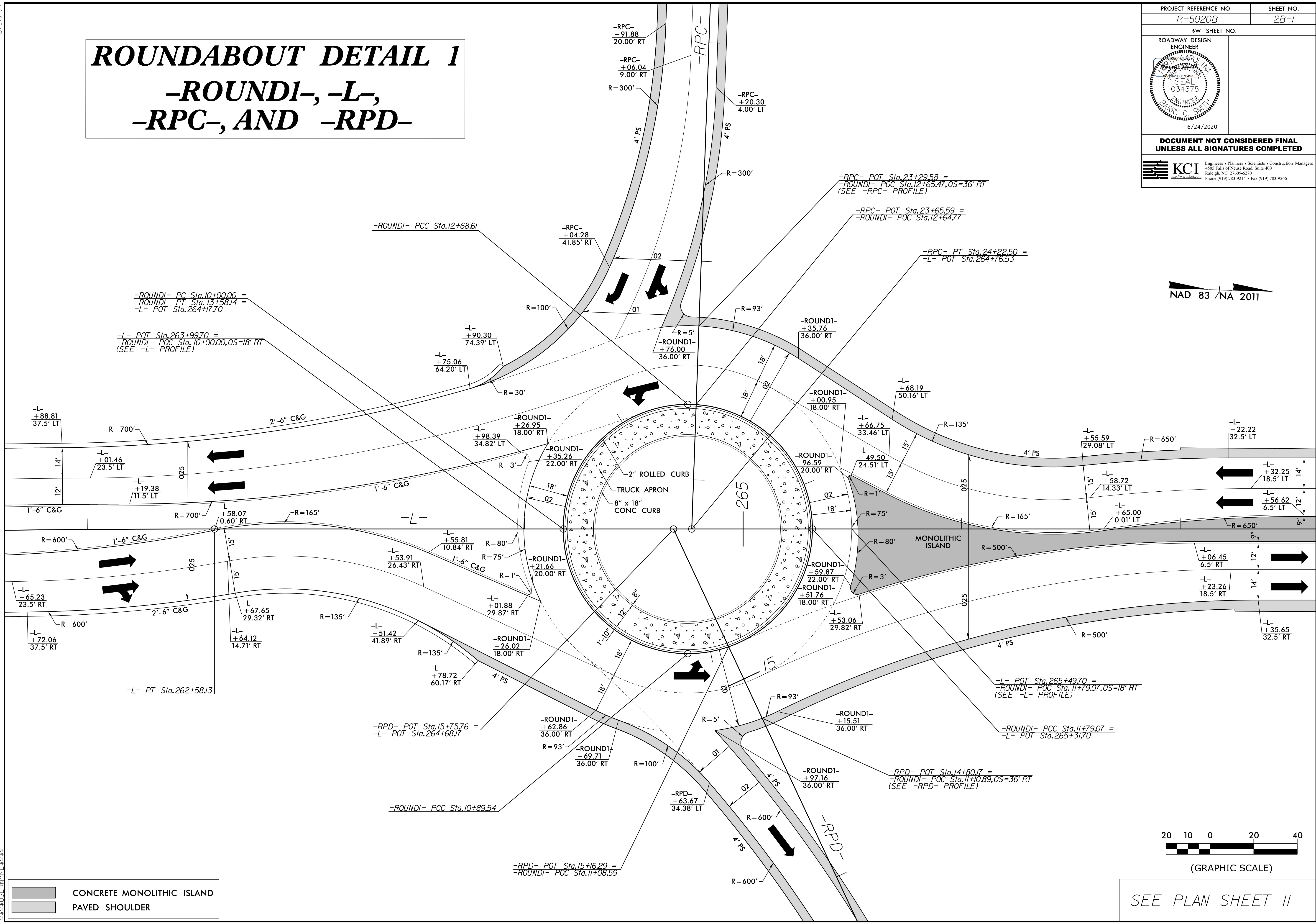
PROJECT REFERENCE NO. R-5020B	SHEET NO. 2A-8
ROADWAY DESIGN ENGINEER <i>Barry C. Smith</i> 034375 6/24/2020	PAVEMENT DESIGN ENGINEER <i>Clark S. Morrison</i> 022896 6/30/2020
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609 Phone (919) 783-9214 • Fax (919) 783-9266	

8/17/19
20-MAR-2020 10:27
K:\2016\201606089\201606089\Roadway\Proc\N-5020B_Rdy_2B_1.dgn
NCDDOT R-5020B US 701 Widening\Roadway\Proc\N-5020B_Rdy_2B_1.dgn

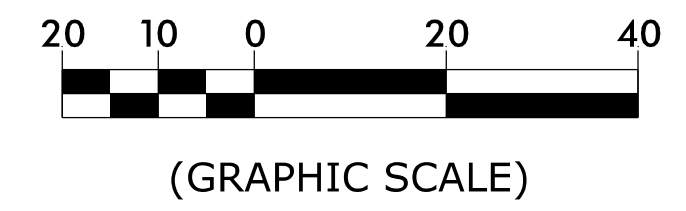
ROUNDBABOUT DETAIL 1

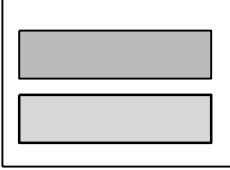
-ROUND1-, -L-, -RPC-, AND -RPD-

PROJECT REFERENCE NO. <i>R-5020B</i>	SHEET NO. <i>2B-1</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
	
6/24/2020	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 KCI <small>Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 783-9214 • Fax (919) 783-9266</small>	



NAD 83 / NA 2011



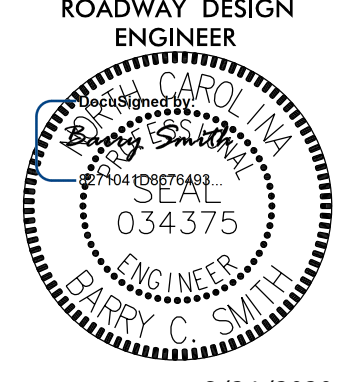


 CONCRETE MONOLITHIC ISLAND
 PAVED SHOULDER

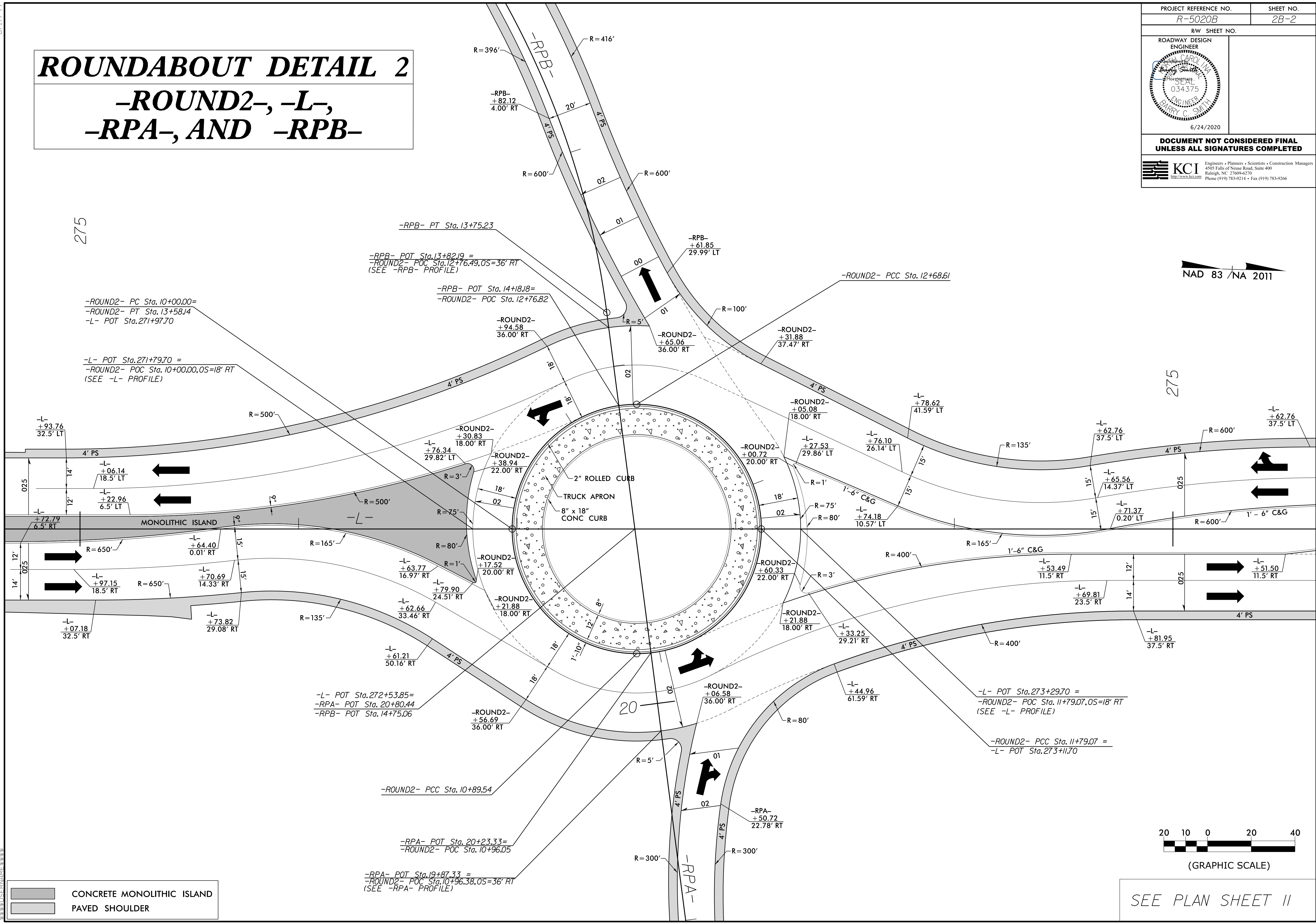
SEE PLAN SHEET II

8/17/99
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NCDDT R-5020B US 701 Widening\Roadway\Pro\1\5020B\RDY_2B_2.dgn

ROUNDAABOUT DETAIL 2

-ROUND2-, -L-, -RPA-, AND -RPB-

PROJECT REFERENCE NO.	SHEET NO.
R-5020B	2B-2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
	
6/24/2020	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-4270 Phone (919) 783-9214 • Fax (919) 783-9266	




CONCRETE MONOLITHIC ISLAND

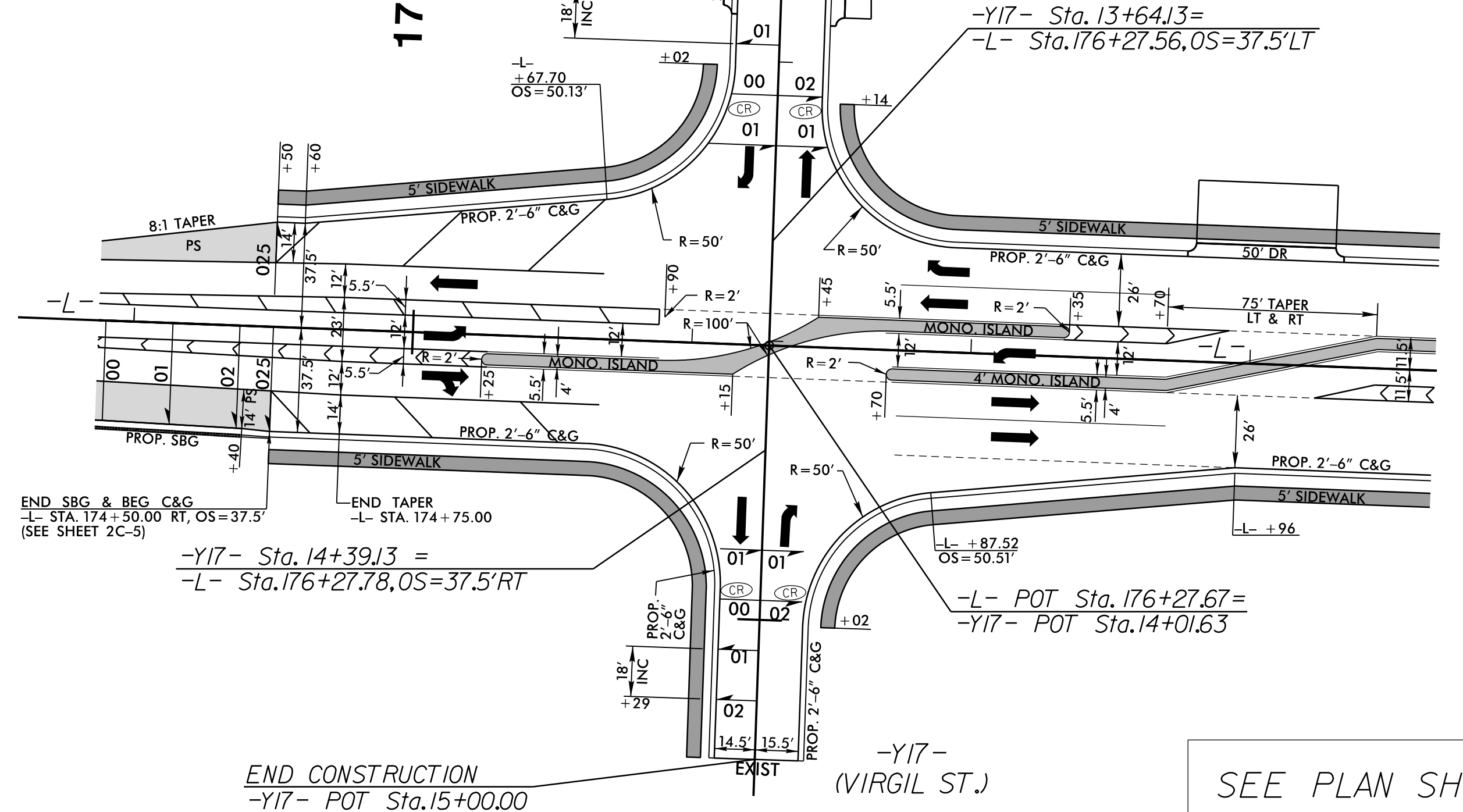
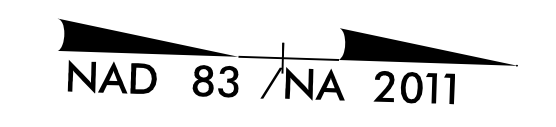
PAVED SHOULDER

SEE PLAN SHEET 11

6/2/2019

INTERSECTION DETAIL 1

-L- AND -Y17- (VIRGIL ST.)



SEE PLAN SHEET 4

INTERSECTION DETAIL 2

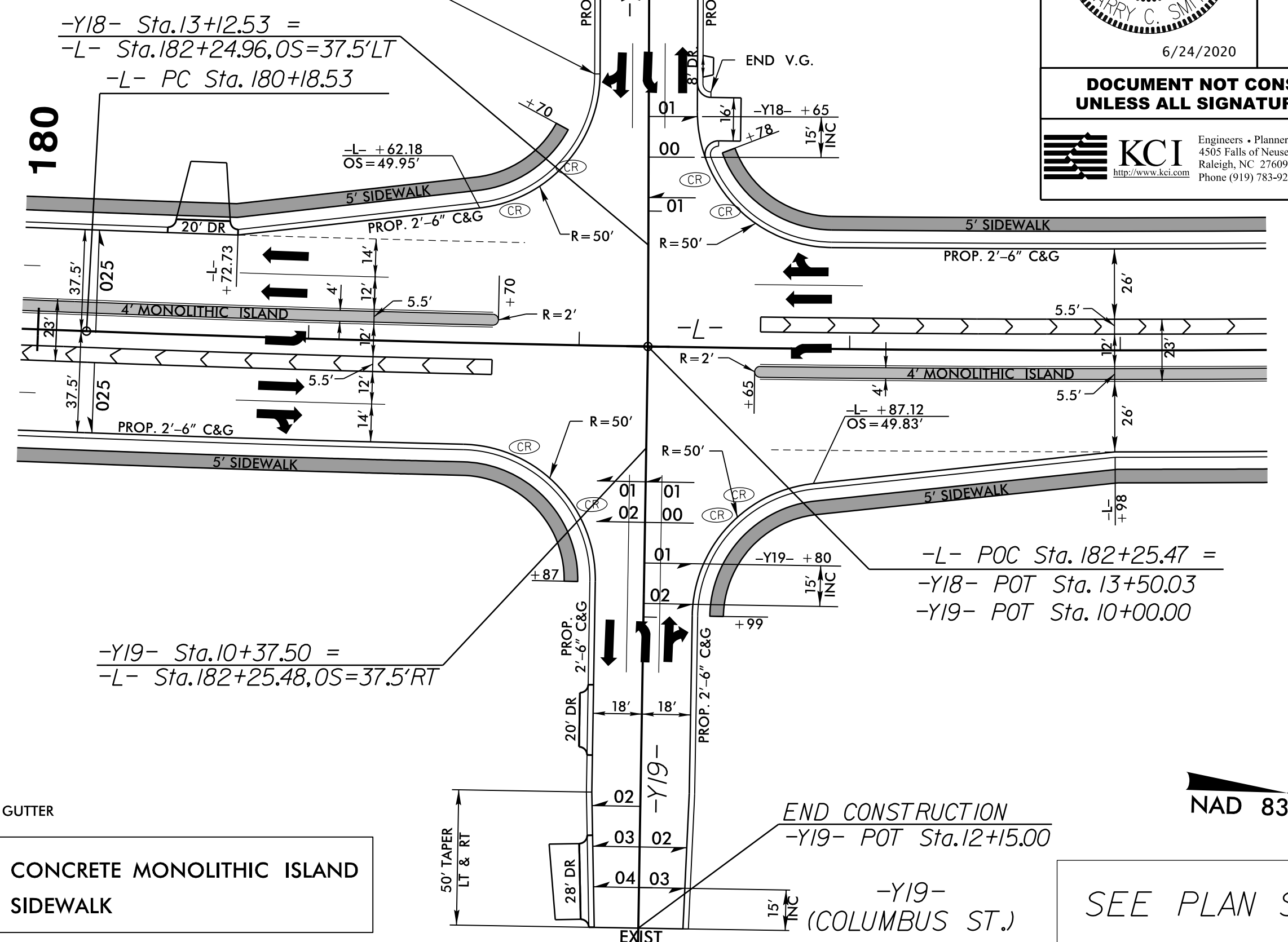
-L-, -Y18-, AND -Y19- (COLUMBUS ST.)

BEGIN CONSTRUCTION
-Y18- POT Sta.11+40.00

180

NOTE:
V.G. = VALLEY GUTTER

- CONCRETE MONOLITHIC ISLAND
- SIDEWALK

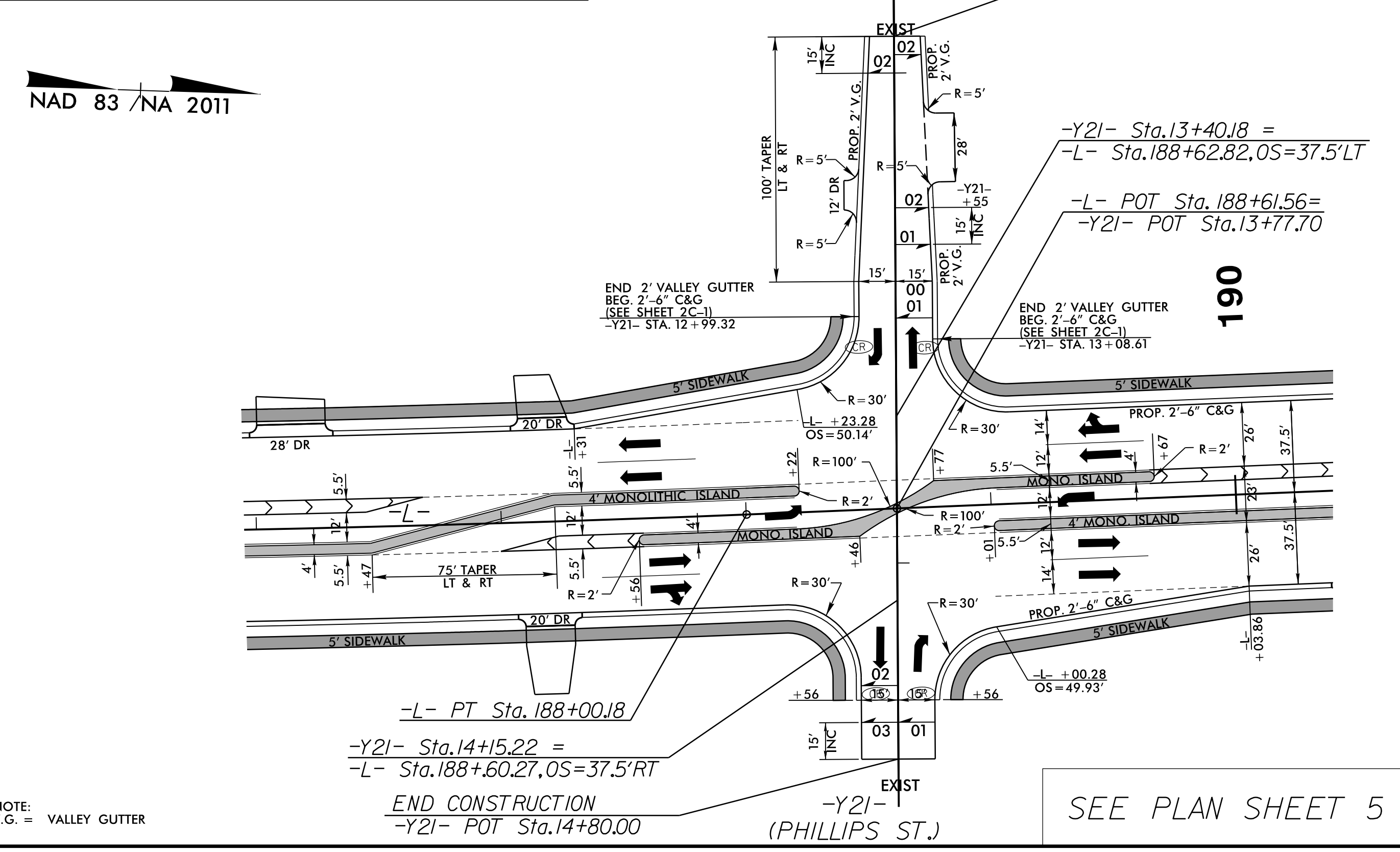


SEE PLAN SHEET 5

PROJECT REFERENCE NO. R-5020B	SHEET NO. 2B-3
ROADWAY DESIGN ENGINEER 	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
KCI <small>Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 783-9214 • Fax (919) 783-9266</small>	

INTERSECTION DETAIL 3

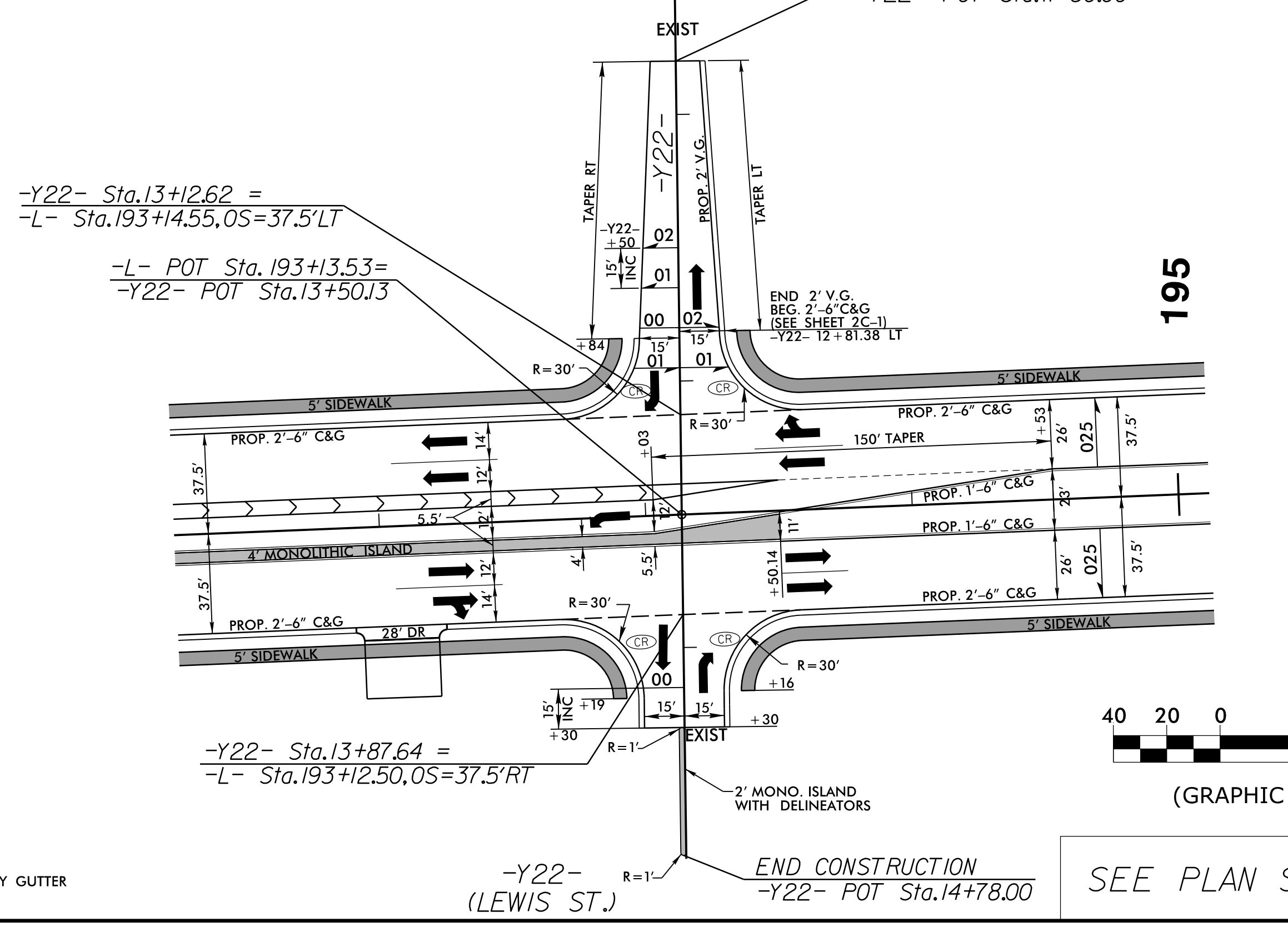
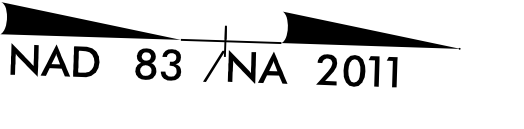
-L- AND -Y21- (PHILLIPS ST.)



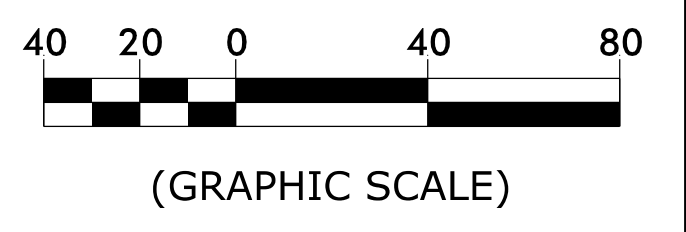
SEE PLAN SHEET 5

INTERSECTION DETAIL 4

-L- AND -Y22- (LEWIS ST.)



SEE PLAN SHEET 5



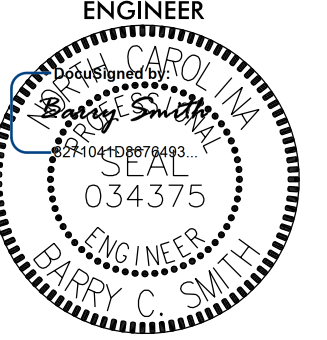

NOTE:
V.G. = VALLEY GUTTER

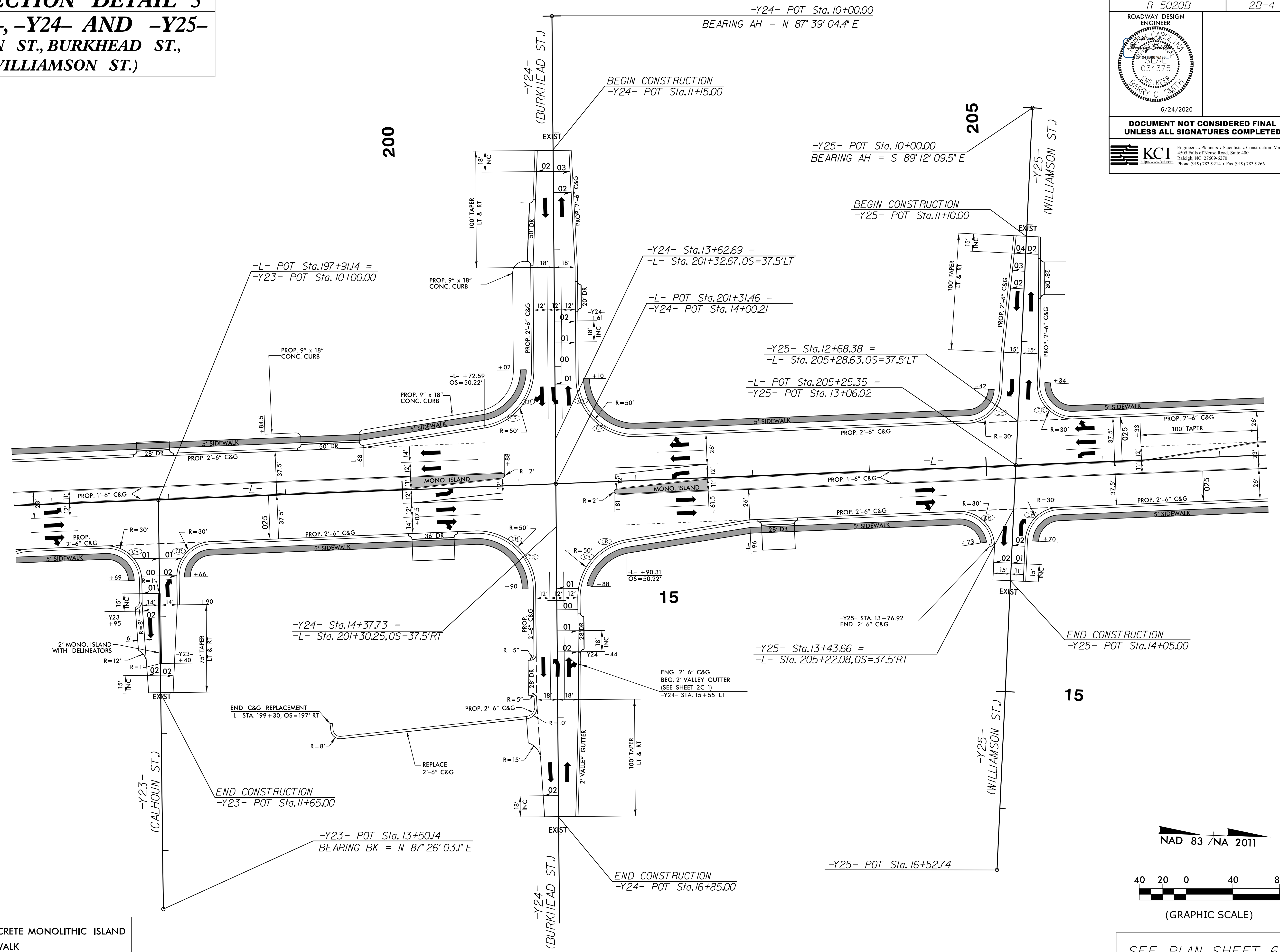
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6/2/20

INTERSECTION DETAIL 5

-L-, -Y23-, -Y24- AND -Y25- (CALHOUN ST., BURKHEAD ST., & WILLIAMSON ST.)

PROJECT REFERENCE NO. R-5020B	SHEET NO. 2B-4
ROADWAY DESIGN ENGINEER  6/24/2020	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 783-9214 • Fax (919) 783-9266	



	CONCRETE MONOLITHIC ISLAND
	SIDEWALK

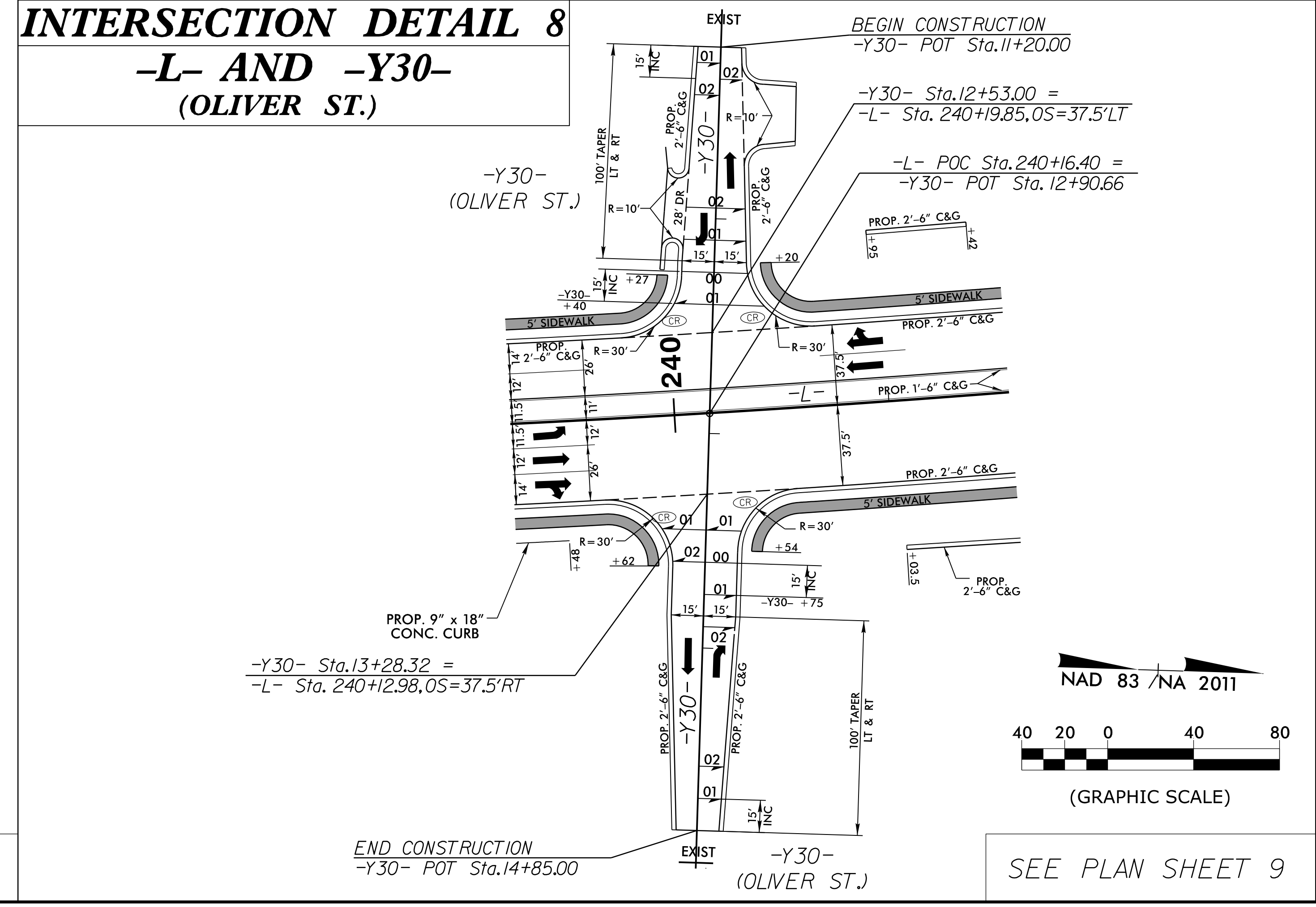
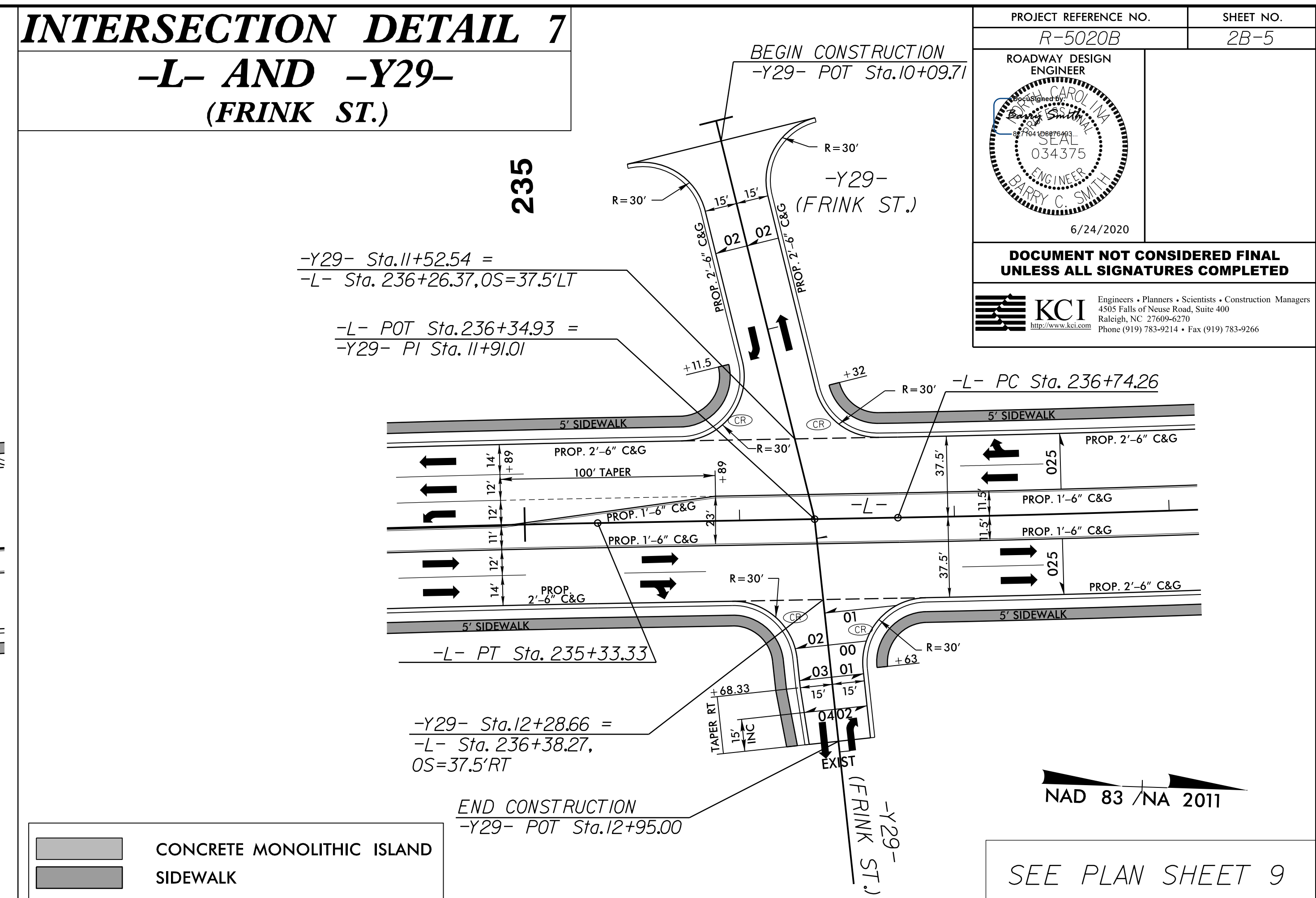
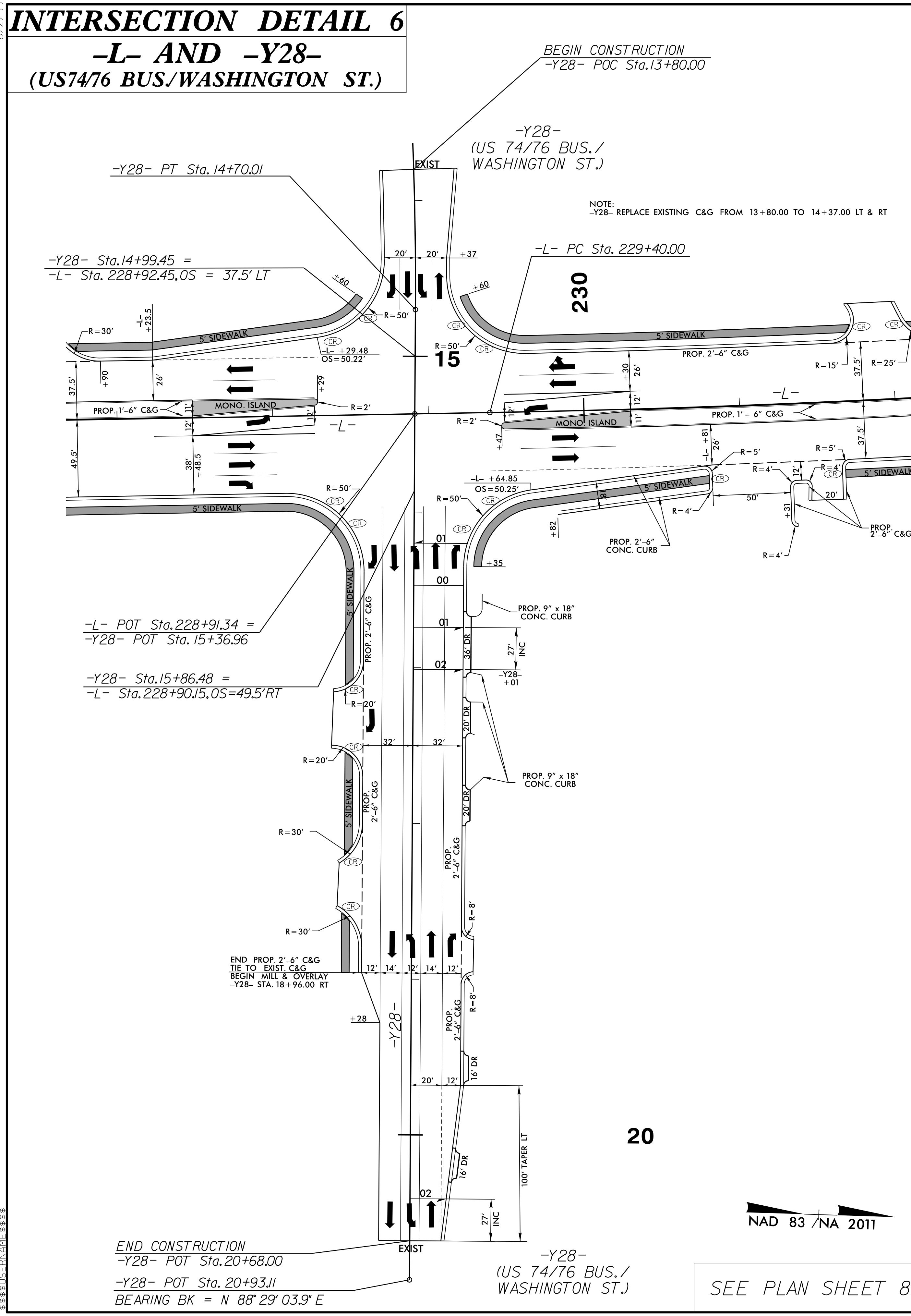


(GRAPHIC SCALE)

SEE PLAN SHEET 6

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6/22/19
R-5020B US 701 Widening\Roadway\Prop\R-5020B_Rdy.dtl\Intersections.dgn
6/22/20 10:36 AM
R-5020B US 701 Widening\Roadway\Prop\R-5020B_Rdy.dtl\Intersections.dgn
6/22/20 10:36 AM
R-5020B US 701 Widening\Roadway\Prop\R-5020B_Rdy.dtl\Intersections.dgn
6/22/20 10:36 AM



PROJECT REFERENCE NO. R-5020B	SHEET NO. 2B-5
ROADWAY DESIGN ENGINEER ENGINEER BARRY C. SMITH	
6/24/2020	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27604-6270 Phone (919) 783-0214 • Fax (919) 783-9266	

6/22/20
C:\MAR2020\1036\K0_2016\20160608\502020B\NCDDOT R-502020B US 701 Widening\Roadway\Proj\R-502020B_Rdy.dtl\Intersections.dgn

INTERSECTION DETAIL 9

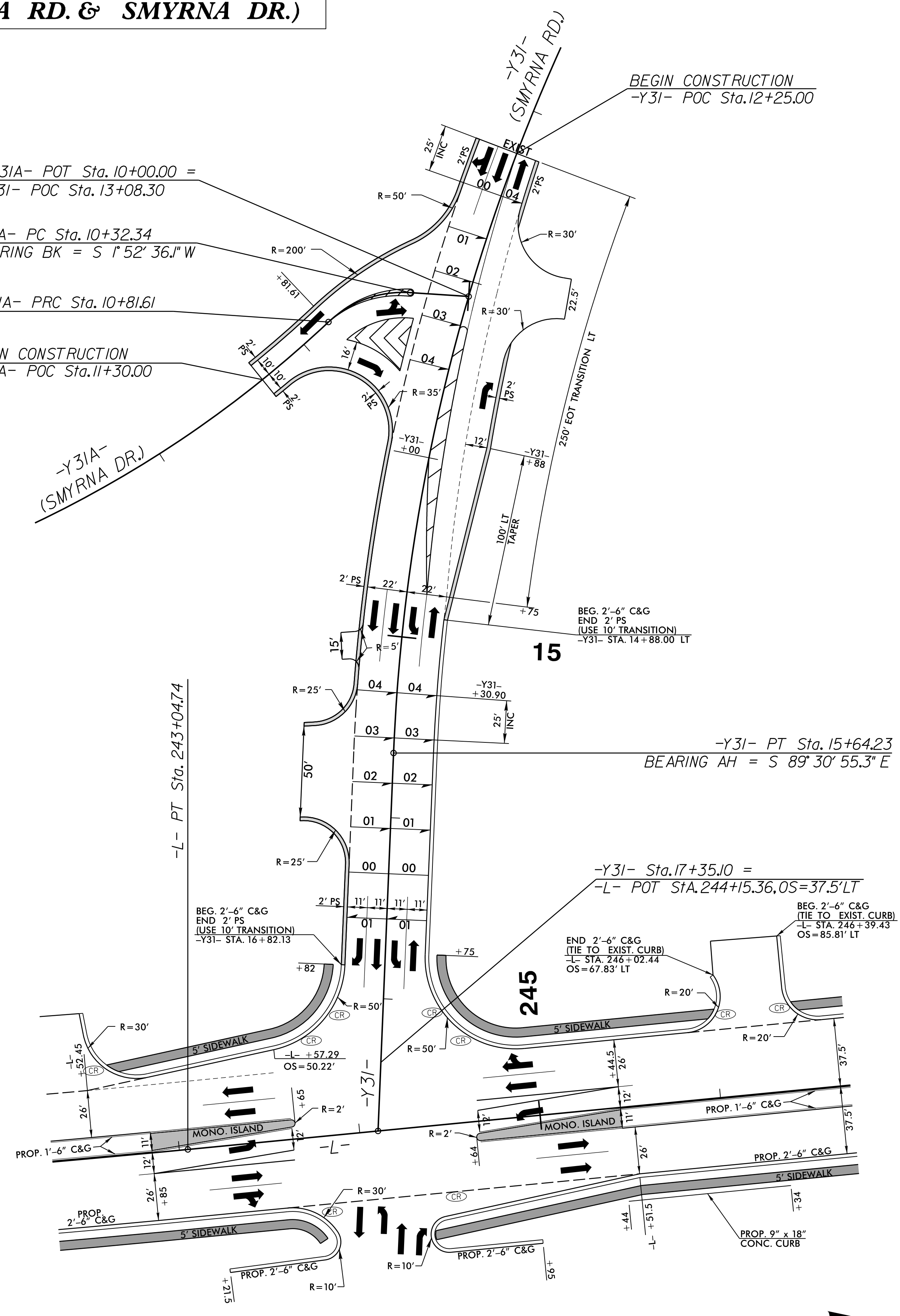
-L-, -Y31-, AND -Y31A- (SMYRNA RD. & SMYRNA DR.)

-Y31A- POT Sta. 10+00.00 =
-Y31- POC Sta. 13+08.30

-Y31A- PC Sta. 10+32.34
BEARING BK = S 7° 52' 36.1" W

-Y31A- PRC Sta. 10+81.61

BEGIN CONSTRUCTION
-Y31A- POC Sta. 11+30.00

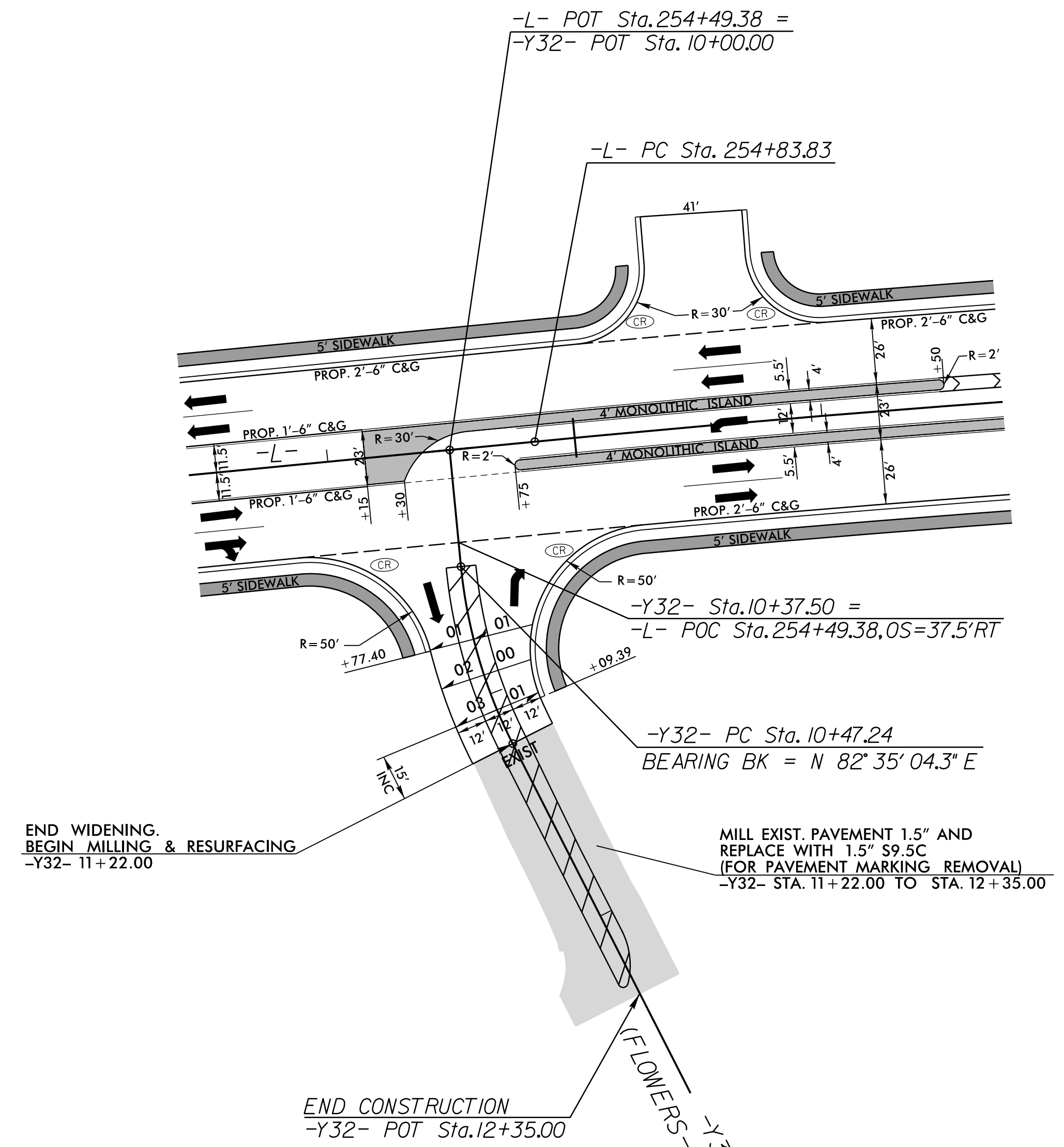


NAD 83 / NA 2011

SEE PLAN SHEET 9

INTERSECTION DETAIL 10

-L- AND -Y32- (FLOWERS-PRIDGEN DR.)



NAD 83 / NA 2011

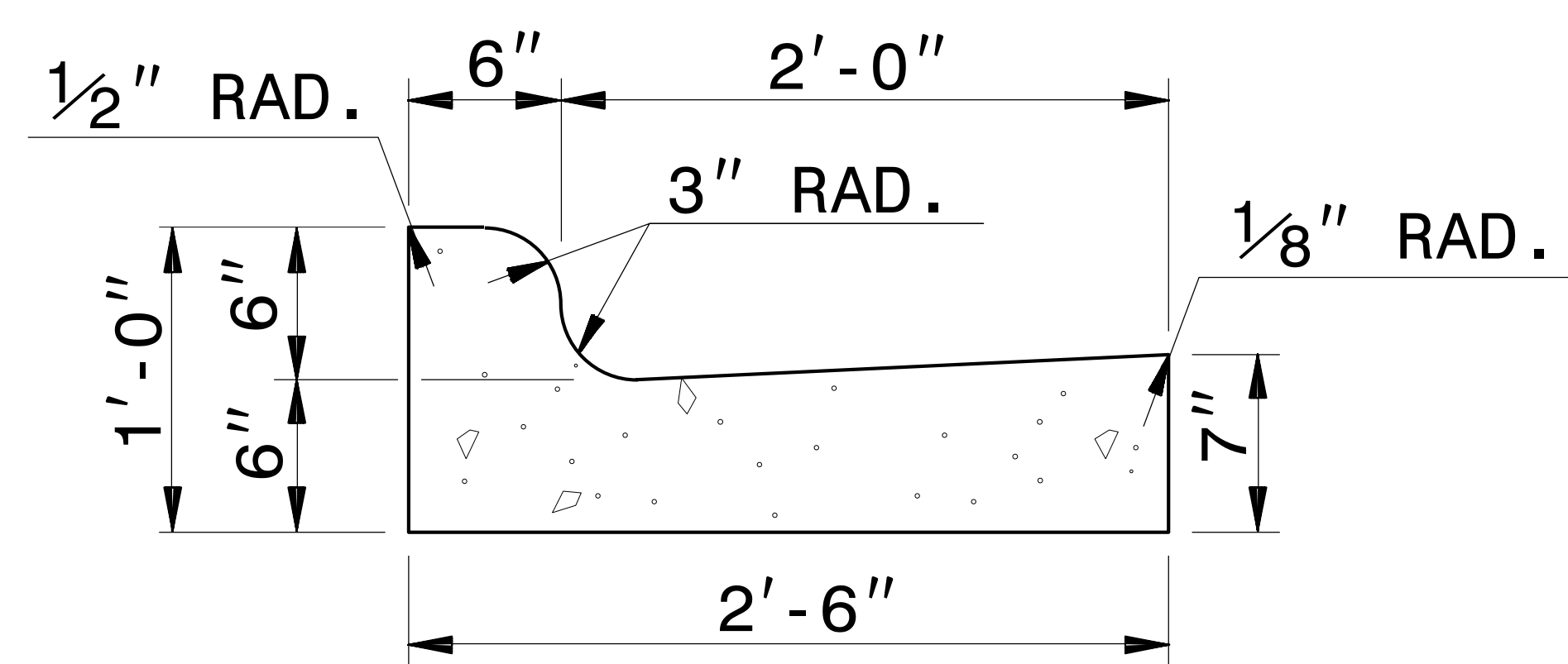
(GRAPHIC SCALE)

SEE PLAN SHEET 10

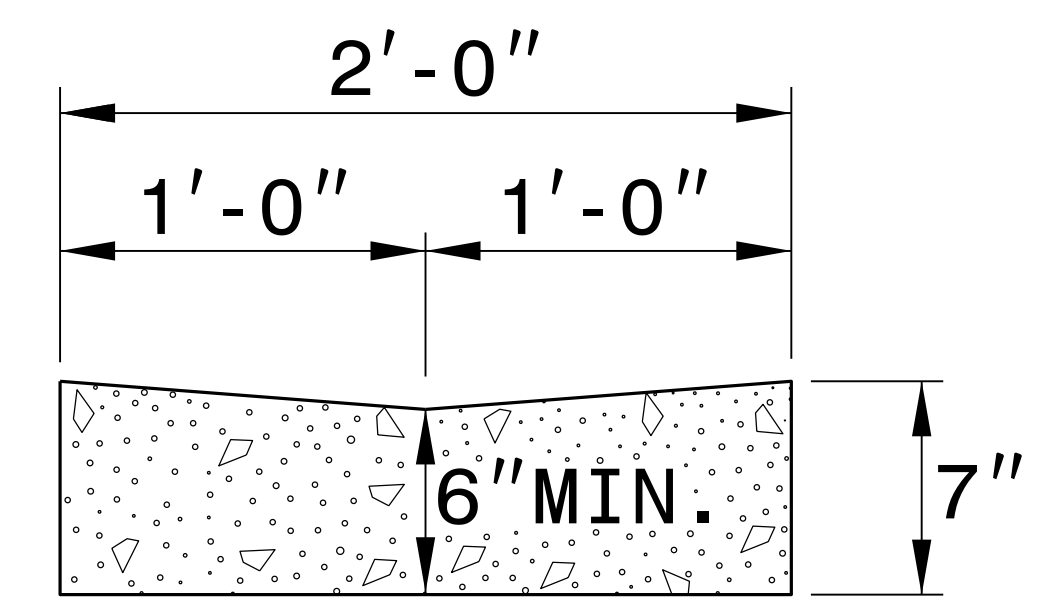
PROJECT REFERENCE NO. R-5020B	SHEET NO. 2B-6
ROADWAY DESIGN ENGINEER 6/24/2020	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 783-9214 • Fax (919) 783-9266	

	CONCRETE MONOLITHIC ISLAND
	SIDEWALK

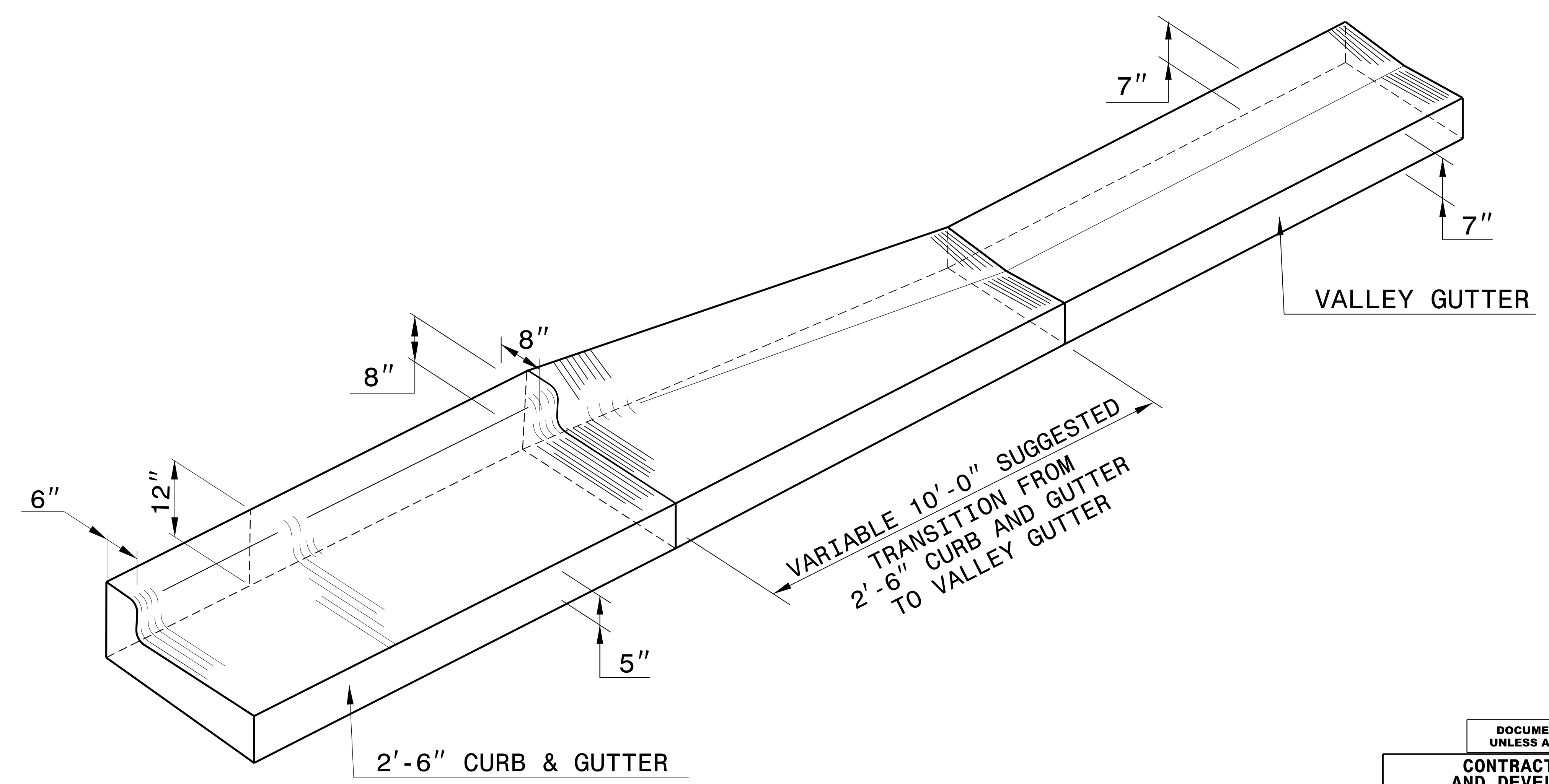
*NOTE: SEE STD. DWG. 846.01 FOR GENERAL NOTES



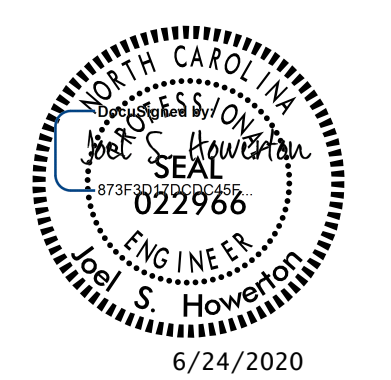
2'-6" CURB AND GUTTER



VALLEY GUTTER



ISOMETRIC VIEW OF TRANSITION



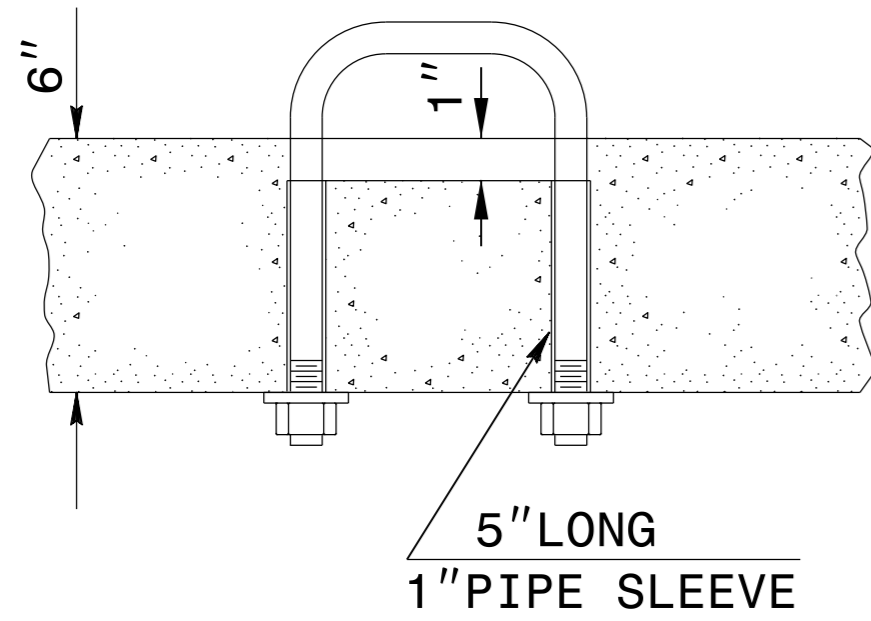
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

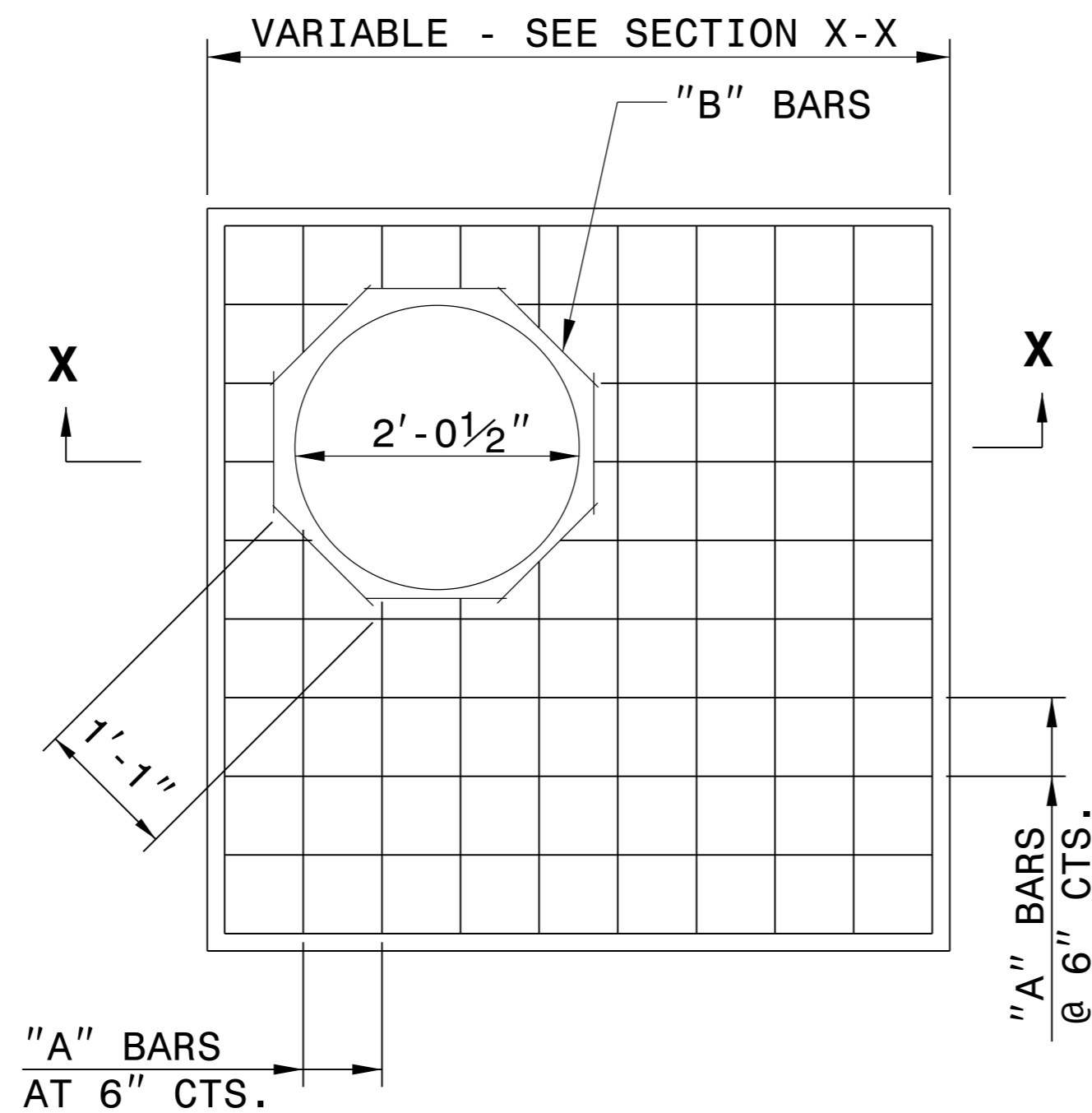
TRANSITION FROM 2'-6" CURB AND GUTTER TO VALLEY GUTTER

ORIGINAL BY: T.S. SPELL DATE: FEB. 4, 2009
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: w:\usr\details\stand\cgtransit.dgn

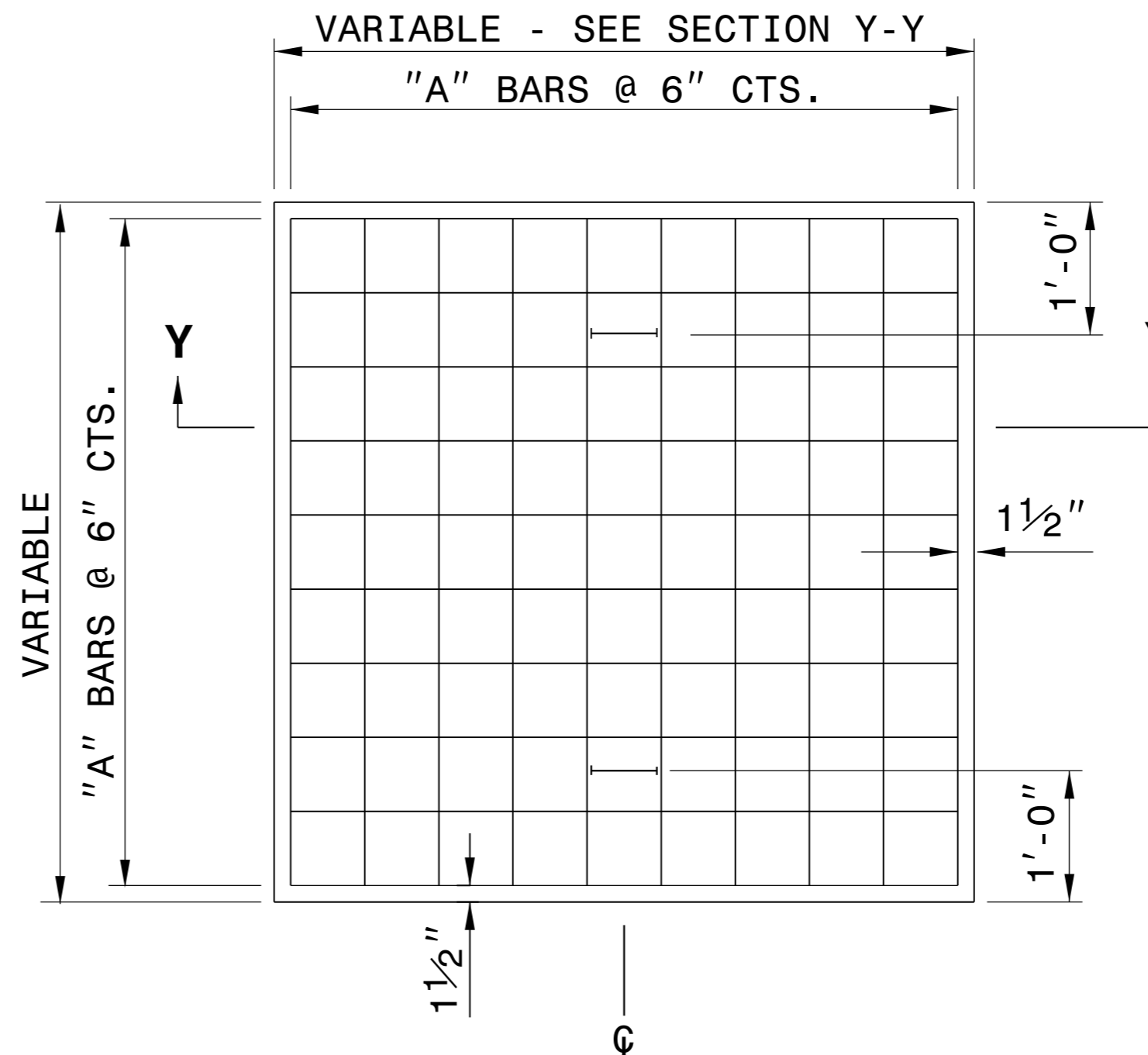
07-SEP-2017 08:20 S:\Contracts\Contractors\Special Details\vericward\usr\details\stand\c&g transition sections.dgn JHowerton AT USD-292595



PARTIAL SECTION



PLAN



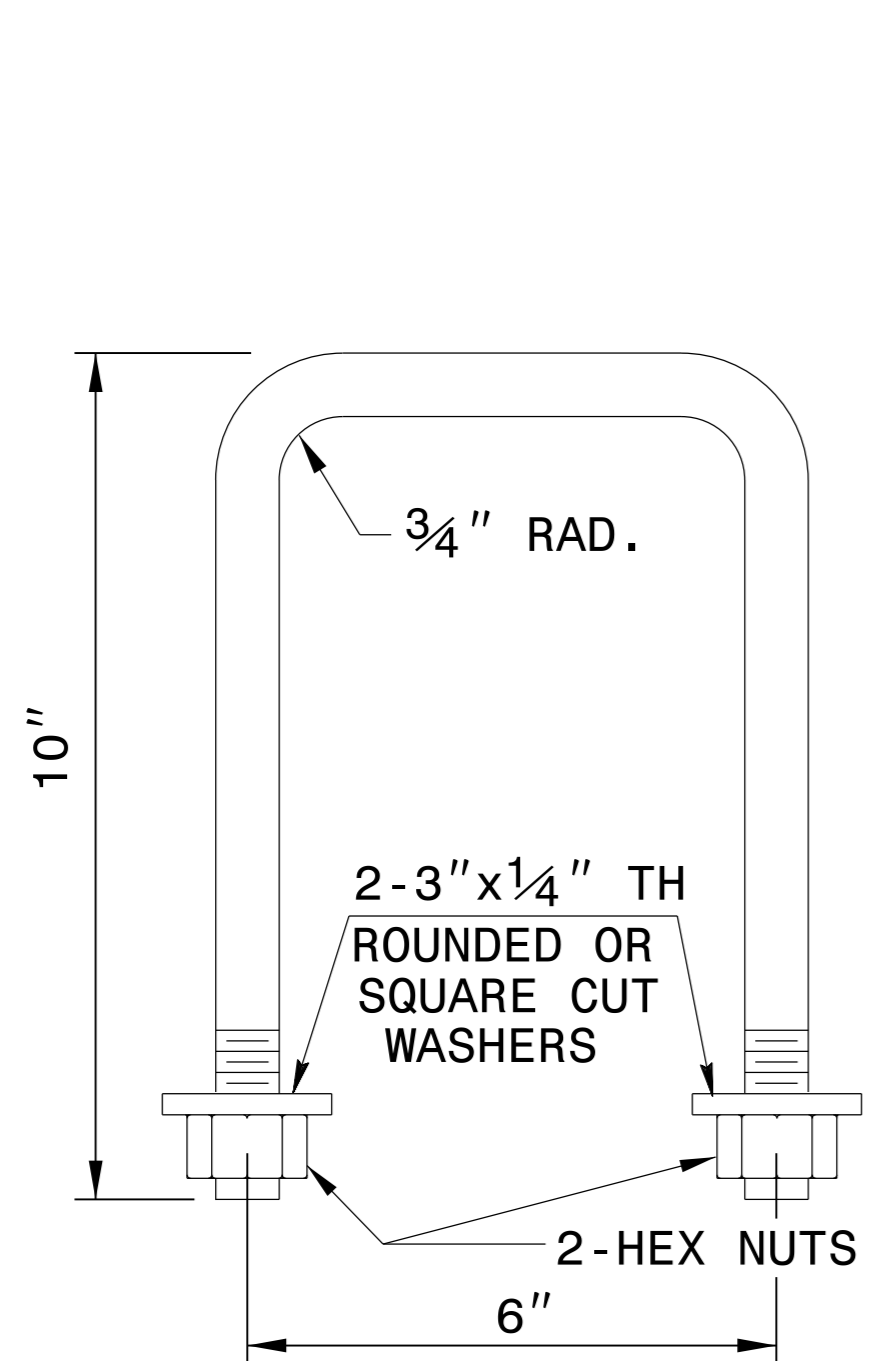
PLAN

GENERAL NOTES:

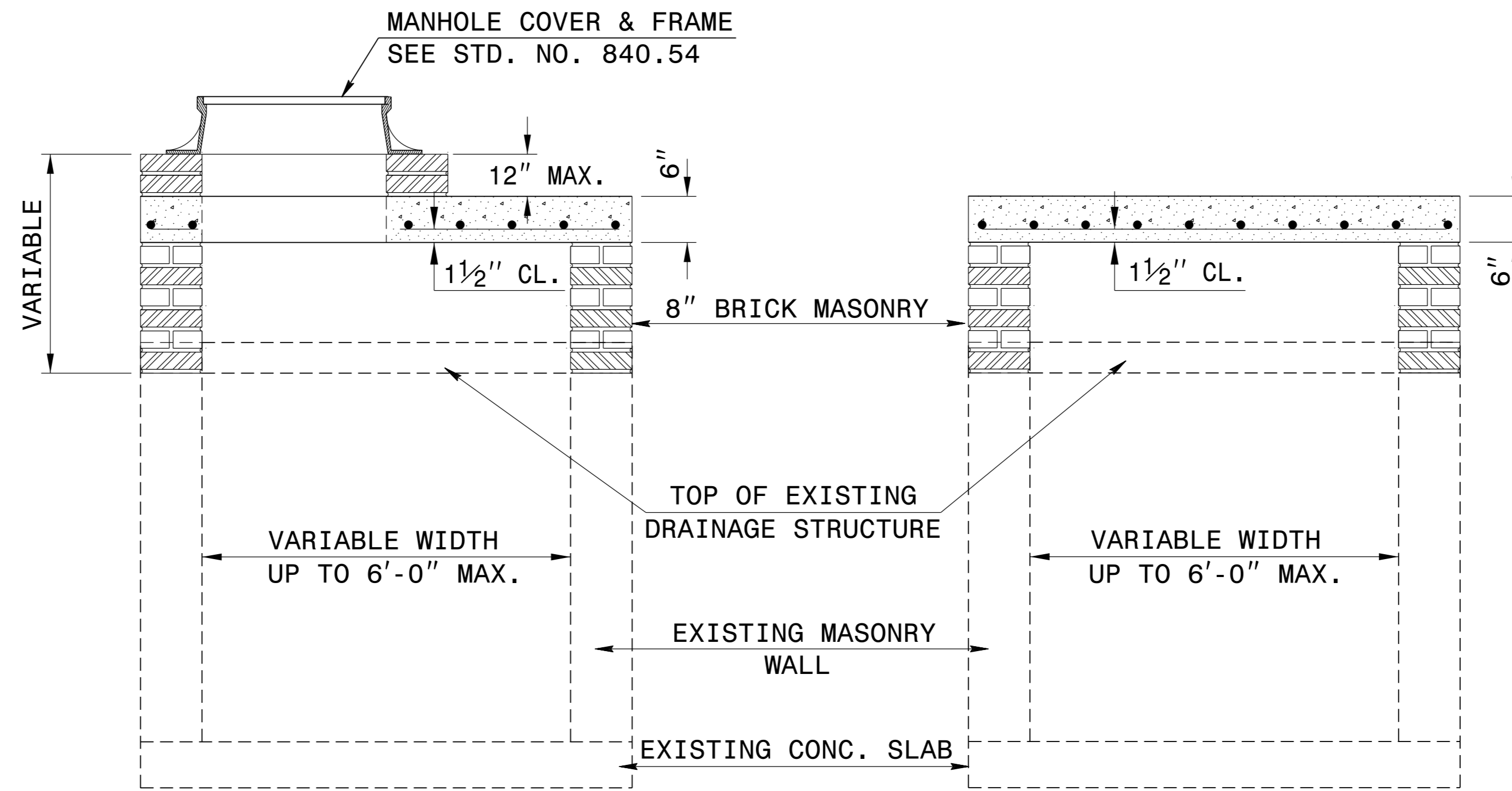
CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

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

DETAIL INTENDED FOR NON-TRAFFIC BEARING DRAINAGE STRUCTURES.



DETAIL OF HANDLE



SECTION X-X

SECTION Y-Y

BILL OF MATERIALS

REINFORCING STEEL				
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
A	#4	20	4'-6"	60.12
B	#4	8	1'-1"	5.79
TOTAL				65.91 *
MASONRY				CU YDS
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



CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119
DETAIL TO CONVERT EXISTING DI, CB, OTCB or GI TO JUNCTION BOX (MANHOLE OPTIONAL)

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/boxtojb.dgn

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

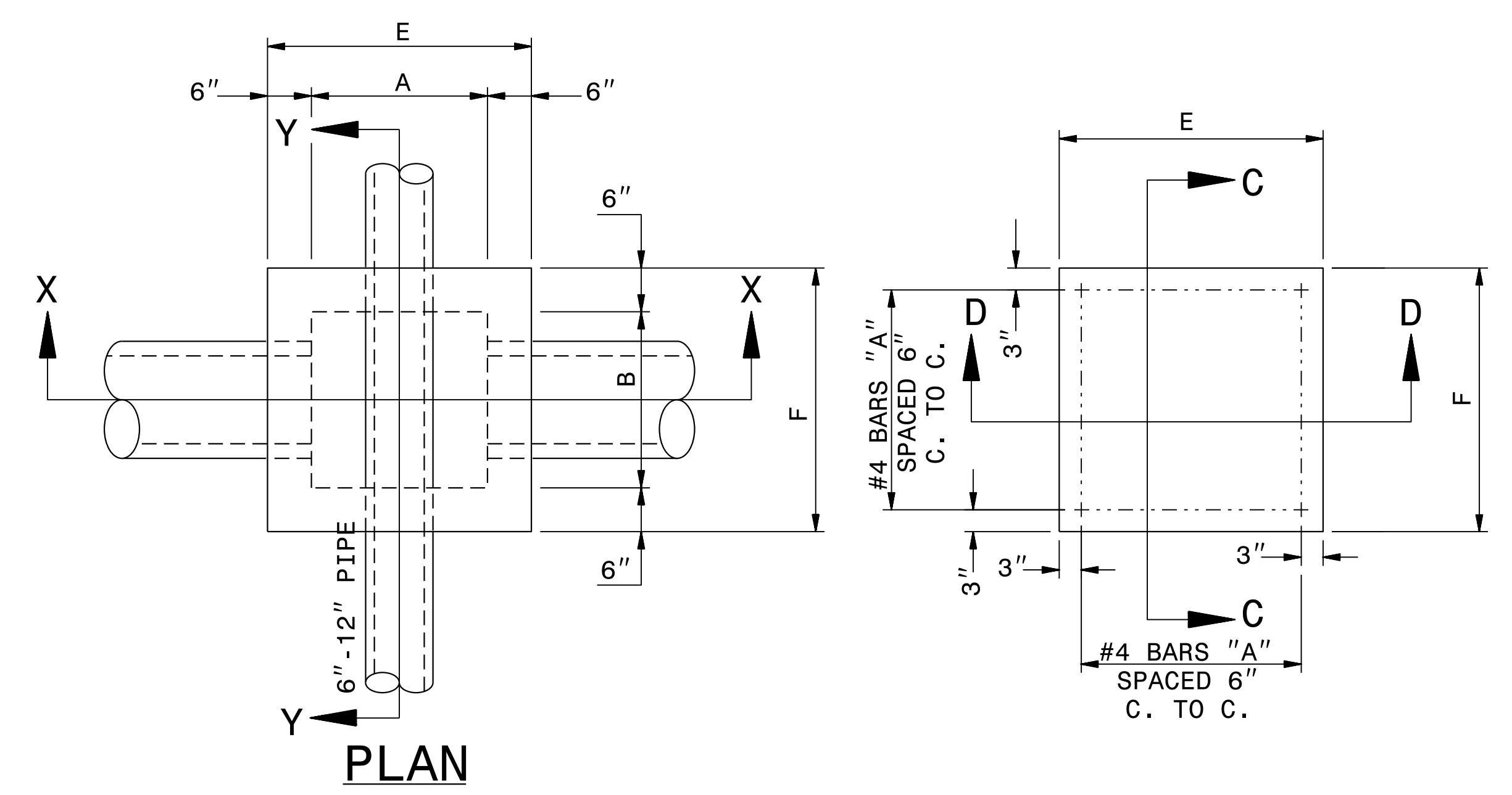
ENGLISH DETAIL DRAWING FOR
**CONCRETE JUNCTION BOX WITH
6"-12" UTILITY PIPE PASSING THRU
12" THRU 66" PIPE**

SHEET 1 OF 1
840D31

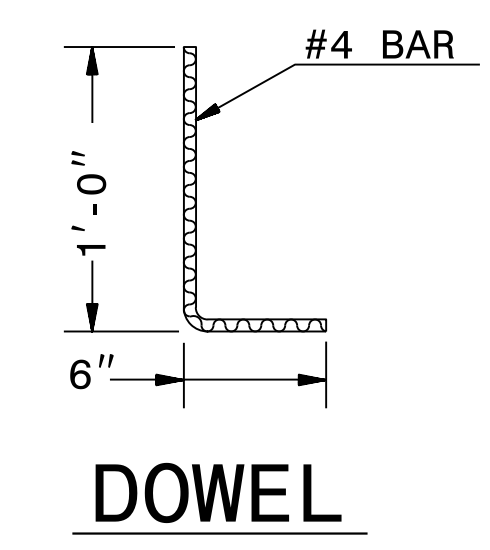
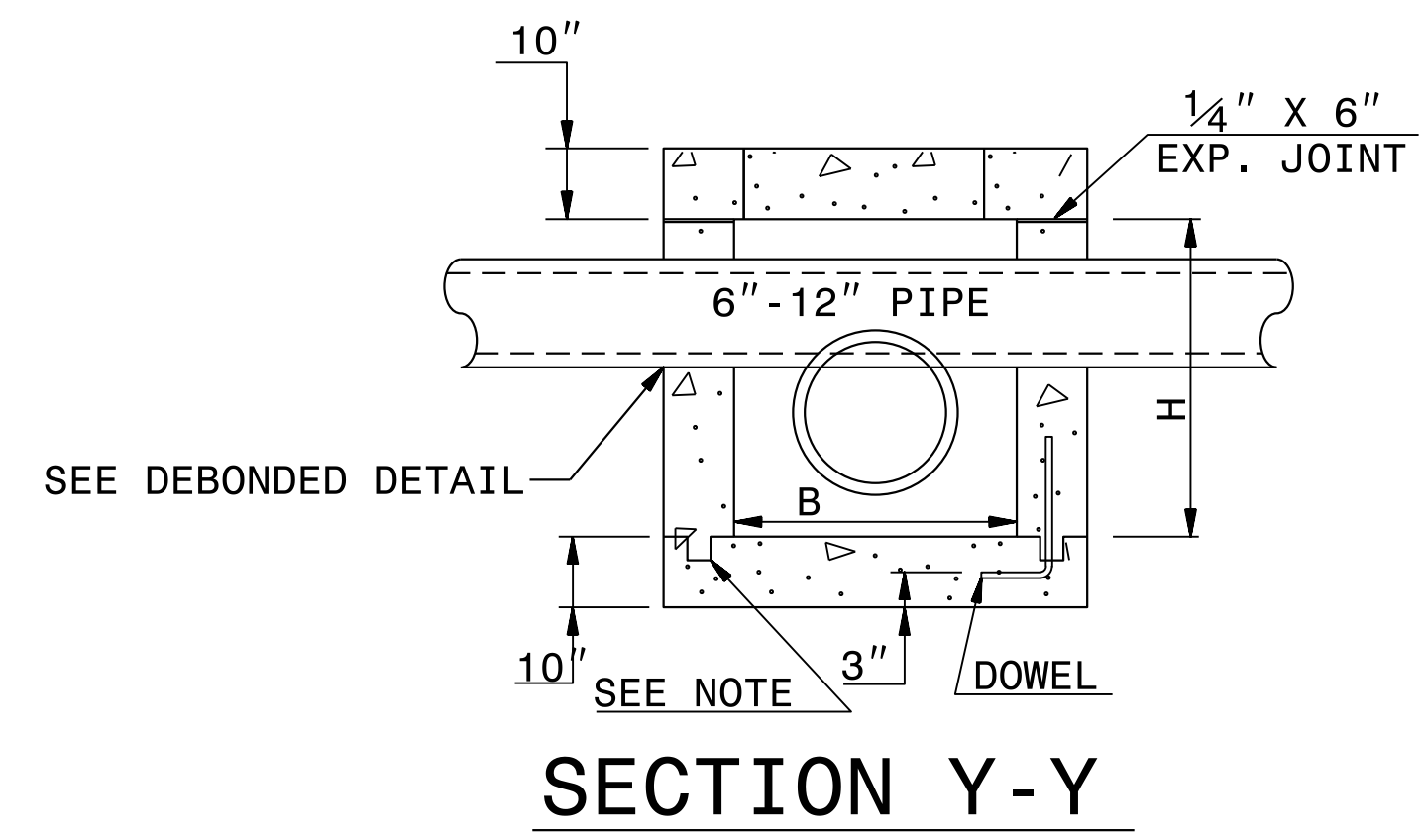
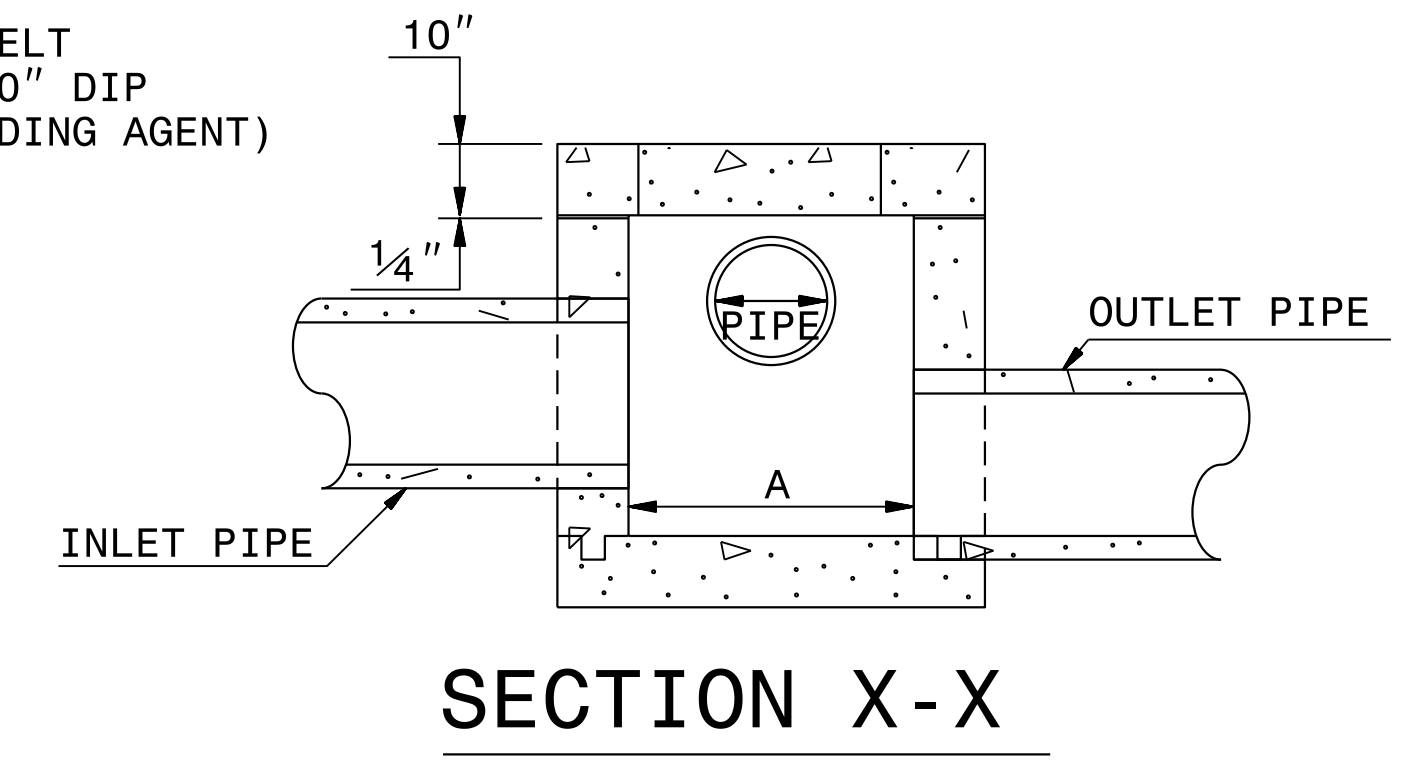
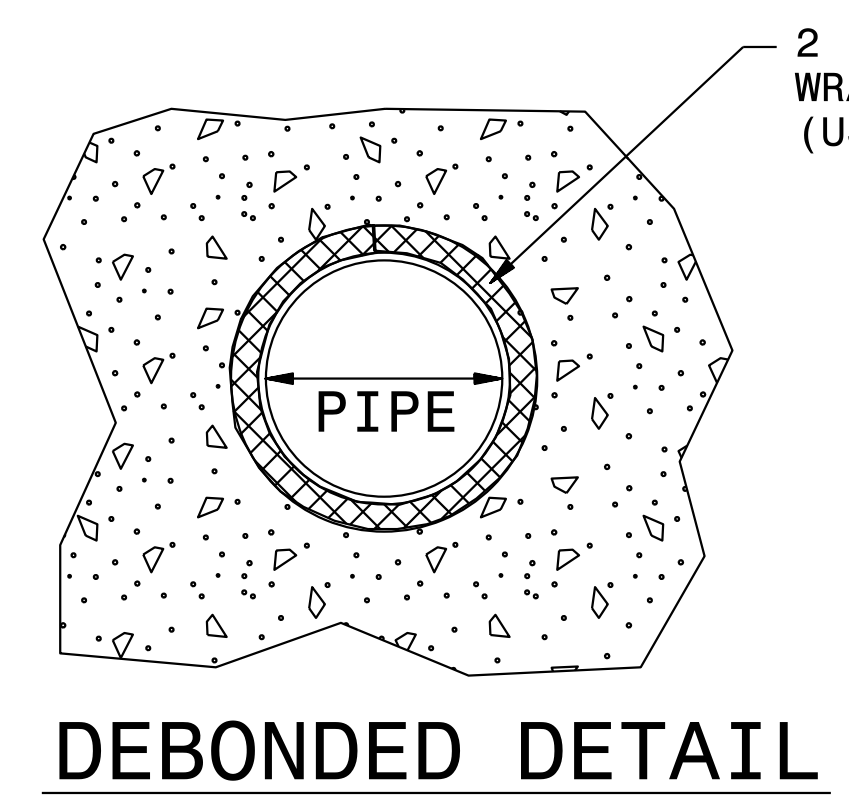
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
**CONCRETE JUNCTION BOX WITH
6"-12" UTILITY PIPE PASSING THRU
12" THRU 66" PIPE**

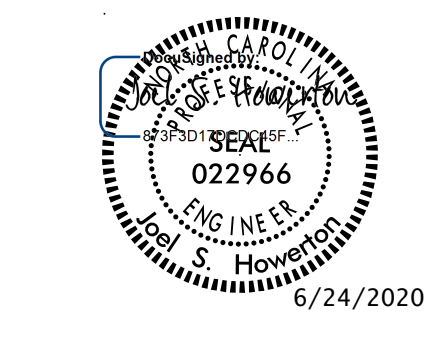
SHEET 1 OF 1
840D31



GENERAL NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
USE FORMS TO CONSTRUCT THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD NO. 840.00.
REFER TO R.S.D.N. 840.31 FOR PLACEMENT OF MANHOLE COVER IN JUNCTION BOX.



DIMENSIONS AND QUANTITIES FOR CONCRETE JUNCTION BOXES														
DIMENSIONS OF BOX AND PIPE				REINFORCEMENT BARS "A"		COVER DIMENSIONS		CUBIC YARDS IN BOX			TOTAL QUANTITIES BOX AND COVER		DEDUCTIONS FOR ONE PIPE CU.YDS.	
PIPE	SPAN	WIDTH	HEIGHT	NO.	LENGTH	E	F	COVER	FLOOR	WALL/ FT. OF HT.	LBS. REINF.	CU. YDS. MIN. "H"	C.S.	R.C.
12"	2'-0"	2'-0"	2'-3"	12	2'-9"	3'-0"	3'-0"	0.222	0.222	0.185	22	0.750	0.015	0.024
15"	2'-3"	2'-3"	2'-6"	12	3'-0"	3'-3"	3'-3"	0.261	0.261	0.204	24	0.902	0.023	0.036
18"	2'-6"	2'-6"	2'-9"	14	3'-3"	3'-6"	3'-6"	0.302	0.302	0.222	30	1.065	0.033	0.049
24"	3'-0"	3'-0"	3'-3"	16	3'-9"	4'-0"	4'-0"	0.395	0.395	0.259	40	1.434	0.059	0.091
30"	3'-6"	3'-6"	3'-9"	18	4'-3"	4'-6"	4'-6"	0.500	0.500	0.296	51	1.860	0.092	0.138
36"	4'-0"	4'-0"	4'-3"	20	4'-9"	5'-0"	5'-0"	0.617	0.617	0.333	64	2.341	0.132	0.196
42"	4'-6"	4'-6"	4'-9"	22	5'-3"	5'-6"	5'-6"	0.747	0.747	0.370	77	2.878	0.180	0.284
48"	5'-0"	5'-0"	5'-3"	24	5'-9"	6'-0"	6'-0"	0.889	0.889	0.407	92	3.471	0.235	0.364
54"	5'-6"	5'-6"	5'-9"	26	6'-3"	6'-6"	6'-6"	1.043	1.043	0.444	109	4.283	0.297	0.440
60"	6'-0"	6'-0"	6'-3"	28	6'-9"	7'-0"	7'-0"	1.210	1.210	0.481	127	5.090	0.367	0.546
66"	6'-6"	6'-6"	6'-9"	30	7'-3"	7'-6"	7'-6"	1.389	1.389	0.518	146	5.917	0.444	0.655



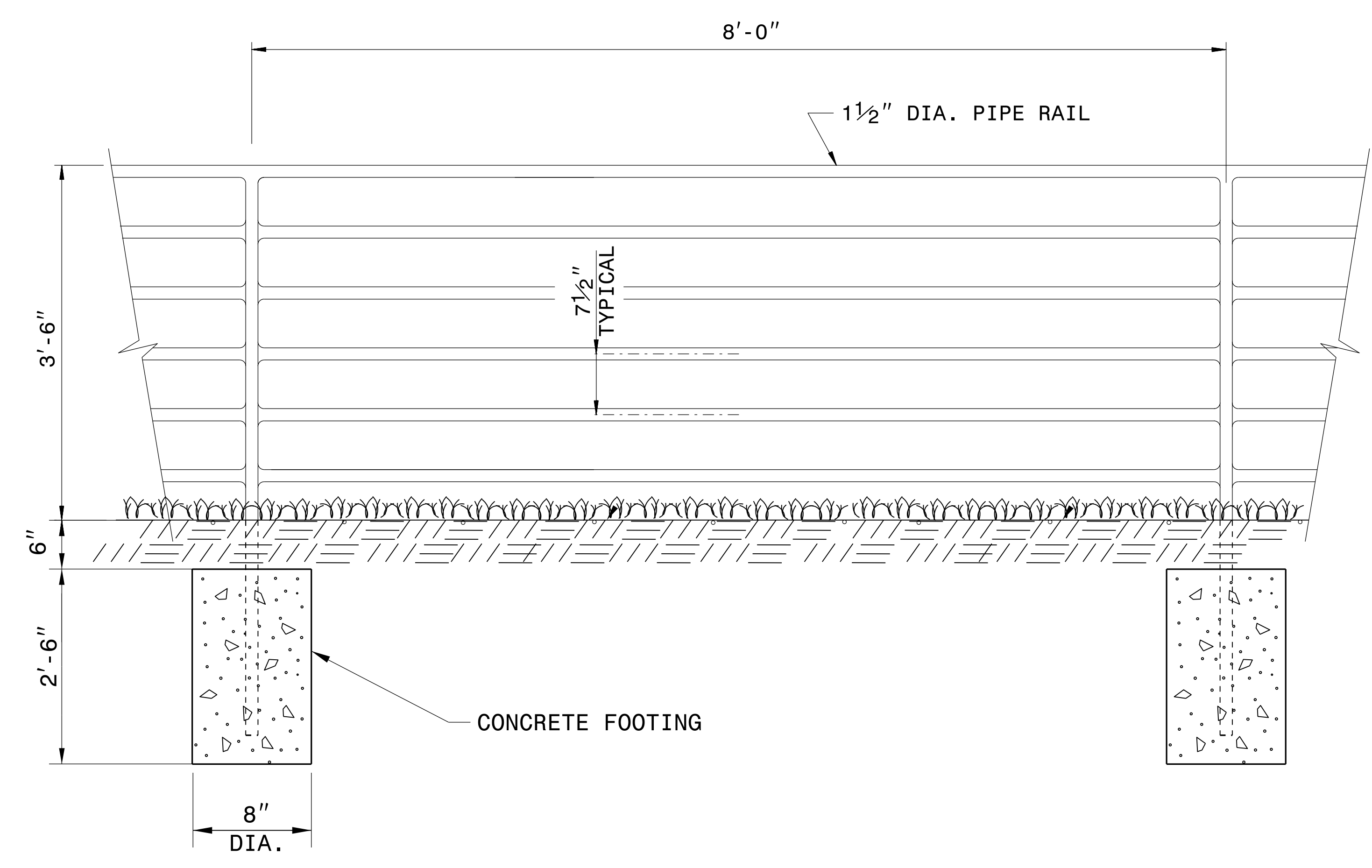
CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: E.E. WARD DATE: 3-12-98
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: usr/details/stand/conflict_box.dgn

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

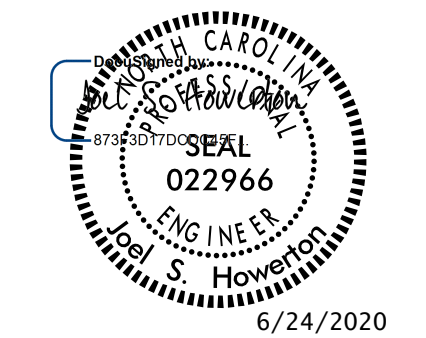
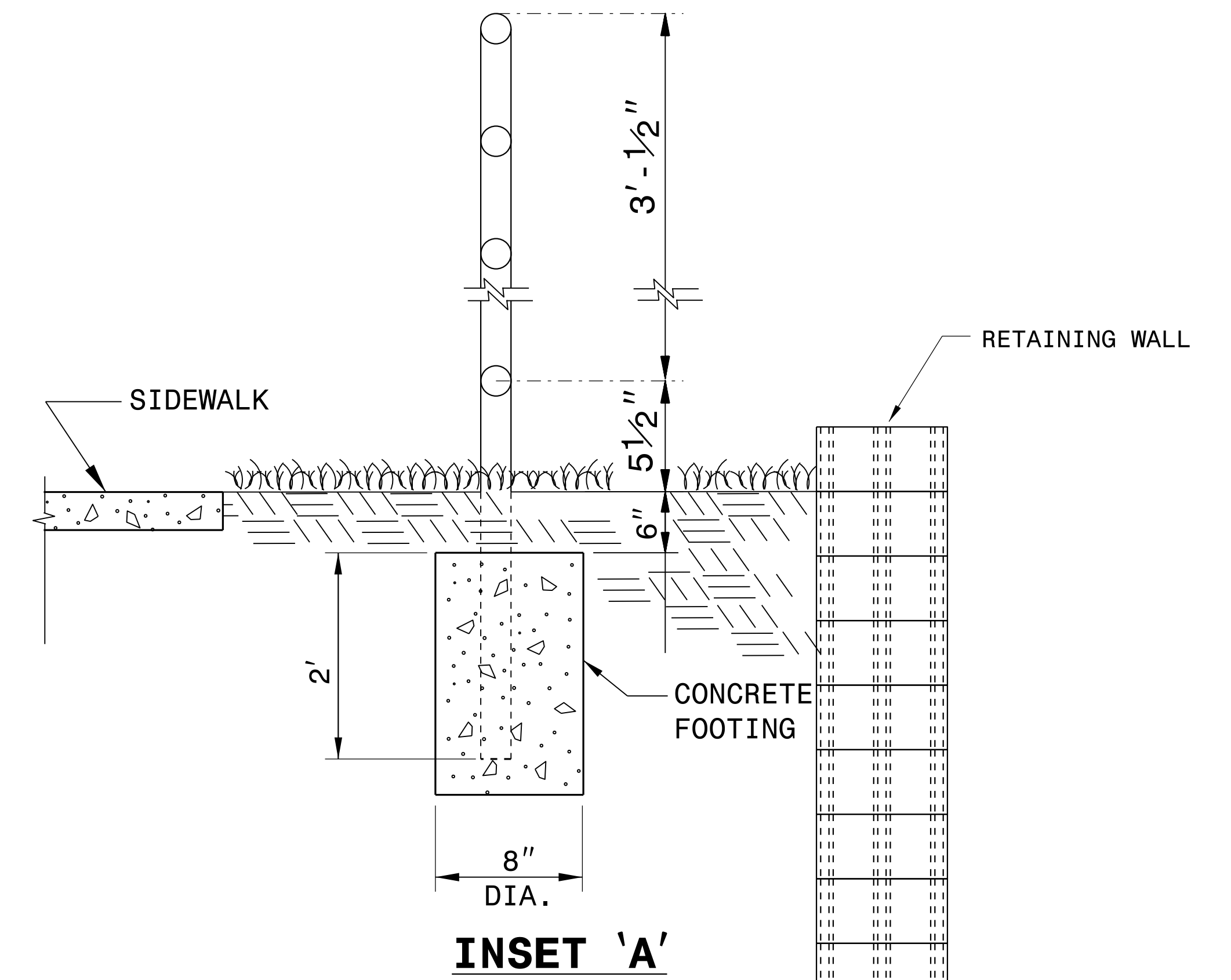
27-JAN-2020 07:57 S:\Contracts\Special Details\Howerton\Conflict Box.dgn .Howerton AT USD-320965



ELEVATION OF HANDRAIL

NOTES:

- CONSTRUCT PROPOSED STEEL PIPE RAIL OF 1 1/2" DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.
- REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.
- PAINT, IF REQUIRED BY THE ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE STANDARD SPECIFICATIONS.
- WELD IN ACCORDANCE WITH ARTICLE 1072-18 OF THE STANDARD SPECIFICATIONS.
- USE CLASS 'B' CONCRETE FOR HANDRAIL FOOTINGS.
- PLACEMENT OF HANDRAIL IN RELATION TO RETAINING WALL AND SIDEWALK MAY BE MODIFIED AS DIRECTED BY THE ENGINEER.



6/24/2020

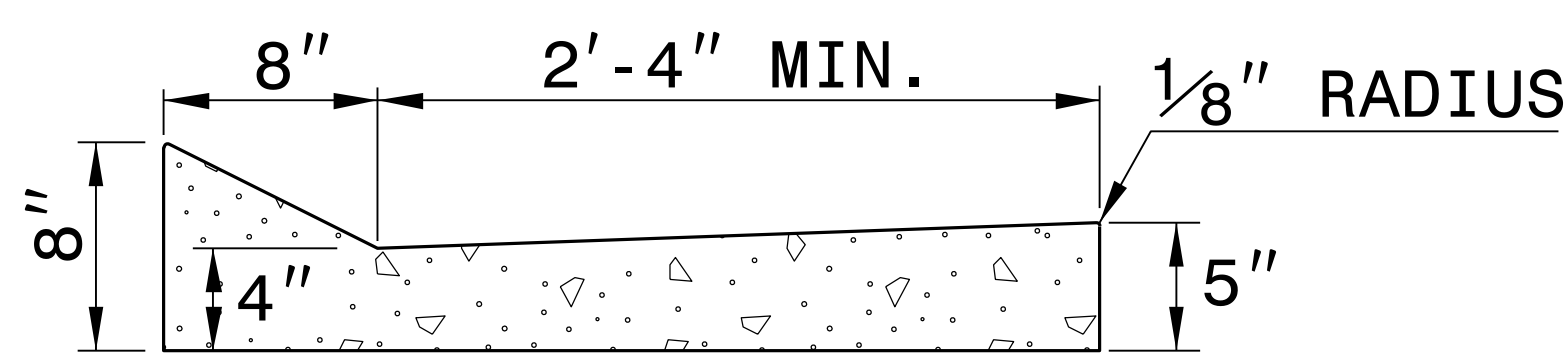
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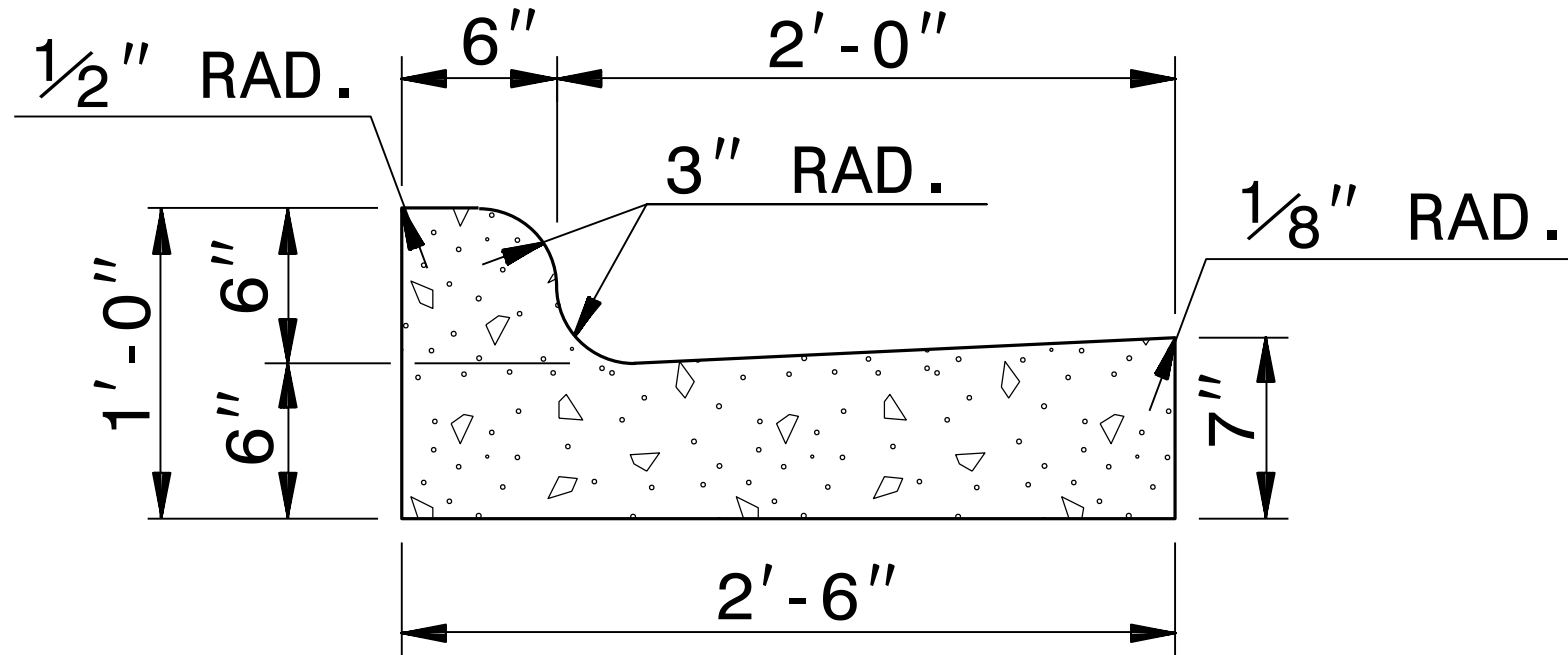
PROPOSED PEDESTRIAN SAFETY RAIL

ORIGINAL BY: E.E. WARD DATE: 12-99
 MODIFIED BY: DATE:
 CHECKED BY: DATE:
 FILE SPEC.: jhowerton/handrail adjacent to sidewalk.dgn

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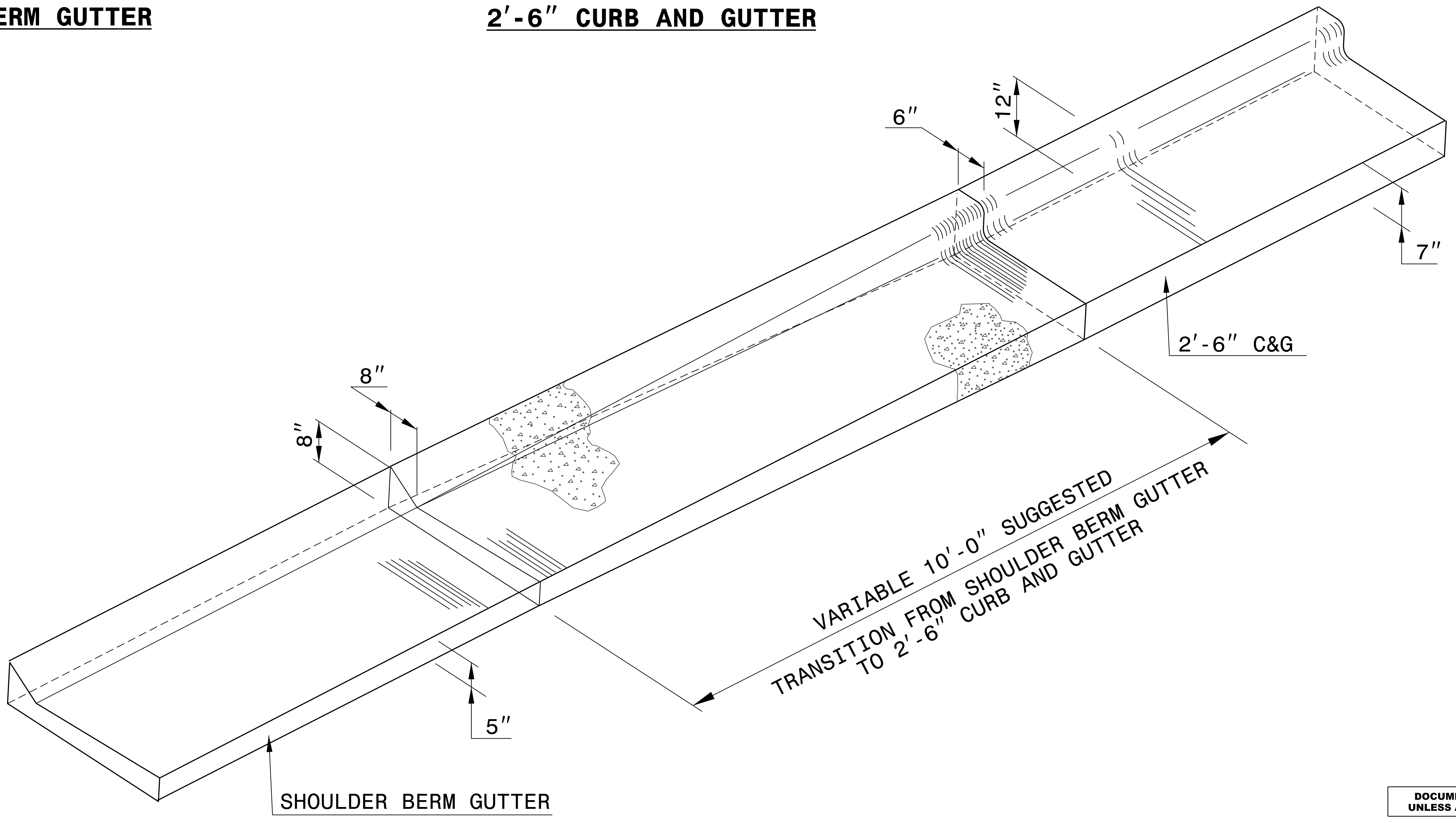


SHOULDER BERM GUTTER



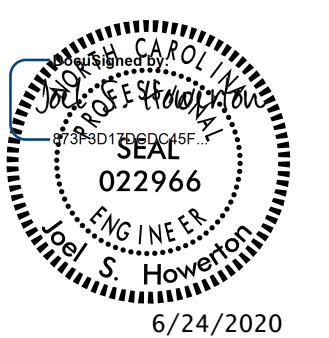
2'-6" CURB AND GUTTER

*NOTE: SEE STD. DWG. 846.01 FOR GENERAL NOTES



ISOMETRIC VIEW OF TRANSITION

VARIABLE 10'-0" SUGGESTED
TRANSITION FROM SHOULDER BERM GUTTER
TO 2'-6" CURB AND GUTTER



6/24/2020

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**DETAIL OF SHOULDER BERM GUTTER
TO 2'-6" CURB & GUTTER
TRANSITION SECTION**

ORIGINAL BY: E.E. WARD DATE: 5-29-02
 MODIFIED BY: DATE: _____
 CHECKED BY: DATE: _____
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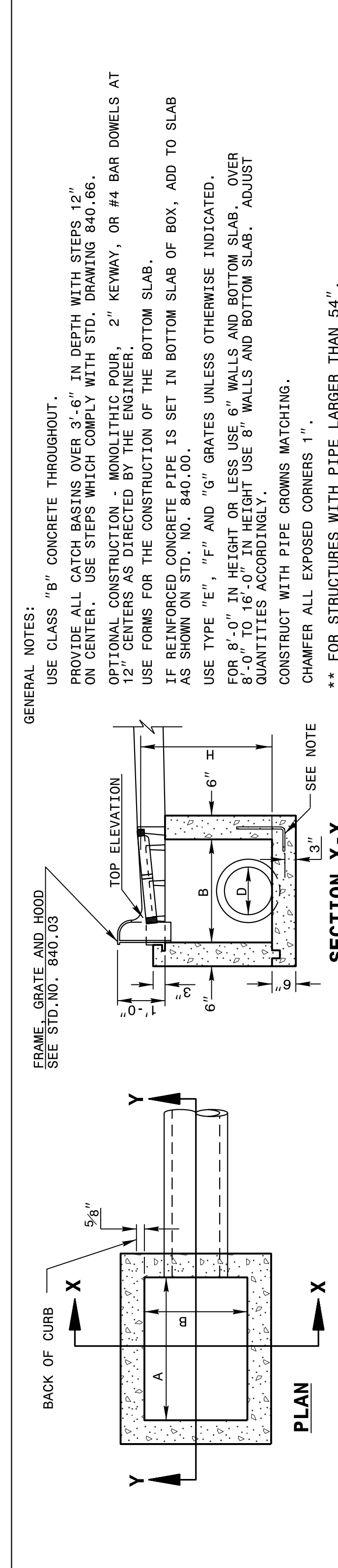
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5/14/99

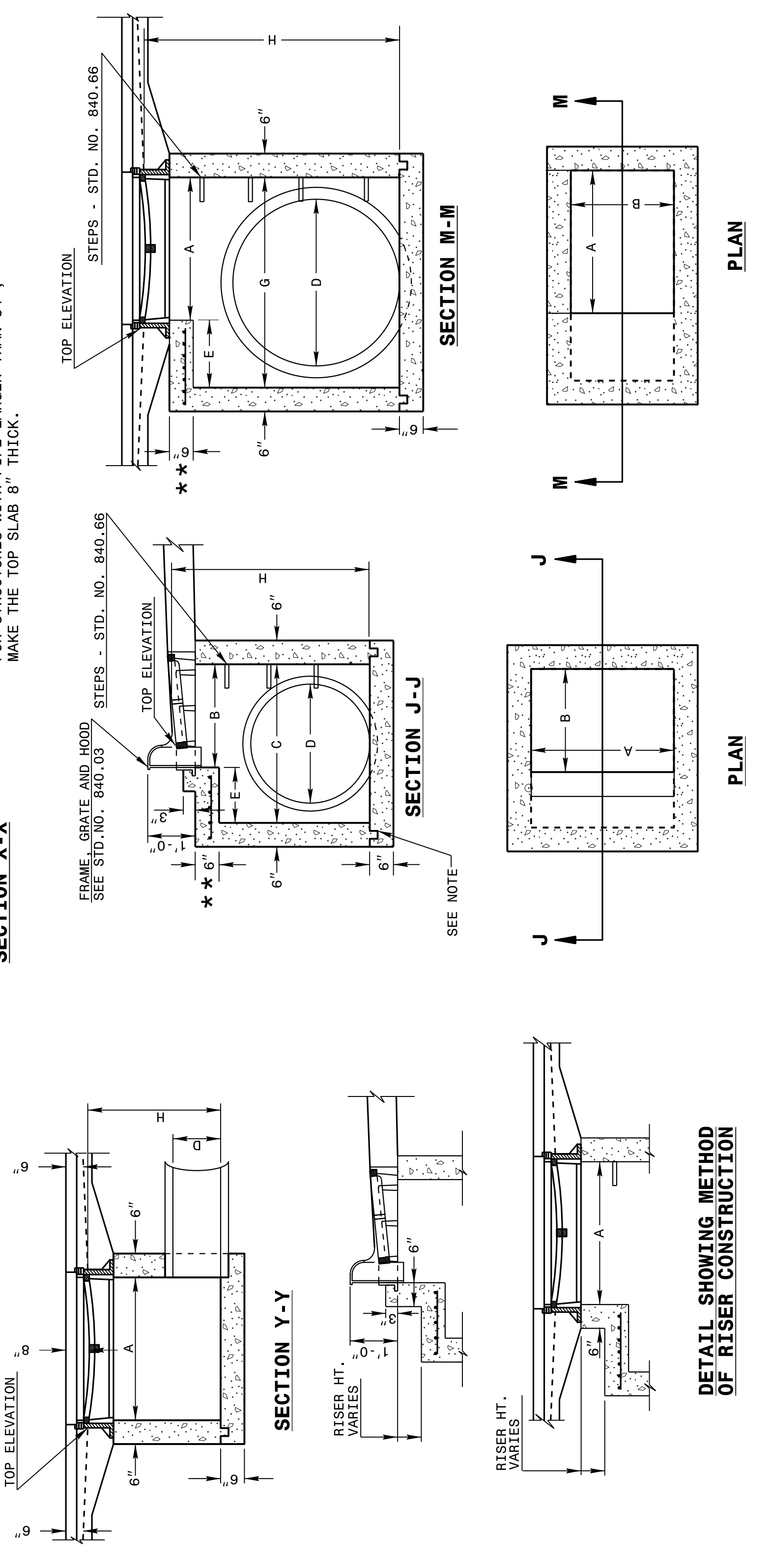
STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

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



ENGLISH DETAIL DRAWING FOR
MINIMUM DEPTH
CONCRETE CATCH BASIN
 12" THRU 84" PIPE

ENGLISH DETAIL DRAWING FOR
MINIMUM DEPTH
CONCRETE CATCH BASIN
 12" THRU 84" PIPE

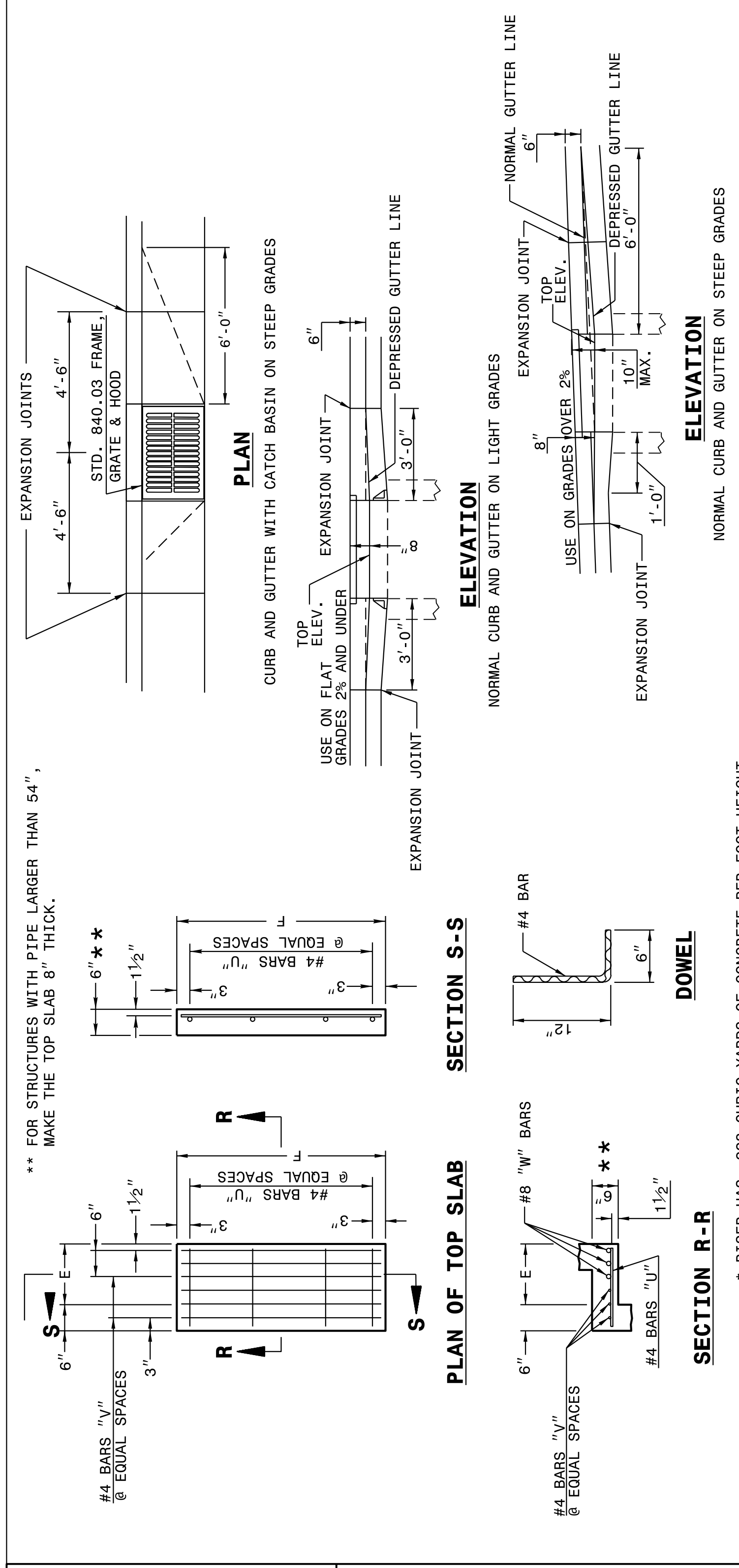


SHEET 1 OF 2
840D02

SHEET 1 OF 2
840D02

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STATE OF NORTH CAROLINA
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 RALEIGH, N.C.



ENGLISH DETAIL DRAWING FOR
MINIMUM DEPTH
CONCRETE CATCH BASIN
 12" THRU 84" PIPE

ENGLISH DETAIL DRAWING FOR
MINIMUM DEPTH
CONCRETE CATCH BASIN
 12" THRU 84" PIPE

* RISER HAS .228 CUBIC YARDS OF CONCRETE PER FOOT HEIGHT

PIPE D.	DIMENSIONS OF BOX AND PIPE			COVER DIMENSION			BARS-U			BARS-V			BARS-W			TOTAL LBS.	CU. YDS. CONC. IN BOX	DEDUCTIONS		
	SPAN	WIDTH	HEIGHT	E	F	H	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	TOP SLAB			BOTTOM SLAB	TOT. CONC. HEIGHT, H.	C. M.	R. C.
12"	3'-0"	2'-2"	2'-0"	..	..	2'-0"	..	..	..	..	..	..	..	..	0.235	0.772	0.015	0.026	0.026	0.026
15"	3'-0"	2'-2"	2'-3"	..	..	2'-3"	..	..	..	..	..	..	..	..	0.235	0.829	0.023	0.036	0.036	0.036
18"	3'-0"	2'-2"	3'-1"	..	..	3'-1"	..	..	..	..	..	..	..	..	0.235	0.887	0.033	0.049	0.049	0.049
24"	3'-0"	2'-2"	3'-10"	..	..	3'-10"	..	..	..	..	..	..	..	..	0.235	1.001	0.059	0.085	0.085	0.085
30"	3'-0"	2'-2"	3'-4"	1'-2"	4'-4"	4'-4"	4	1'-5"	2	4'-1"	3	4'-1"	3	4'-7"	0.123	0.347	1.433	0.092	0.127	0.127
36"	3'-0"	2'-2"	3'-10"	1'-8"	4'-10"	4'-10"	4	1'-11"	3	4'-7"	3	4'-7"	3	4'-7"	0.161	0.432	1.714	0.132	0.178	0.178
42"	3'-0"	2'-2"	4'-5"	2'-2"	5'-5"	5'-5"	5	2'-5"	4	5'-2"	4	5'-2"	4	5'-2"	0.200	0.543	1.738	0.180	0.243	0.243
48"	3'-0"	2'-2"	5'-0"	2'-10"	6'-0"	6'-0"	5	3'-1"	4	5'-9"	3	5'-9"	3	5'-9"	0.235	0.667	2.052	0.235	0.317	0.317
54"	3'-0"	2'-2"	5'-7"	3'-5"	6'-7"	6'-7"	6	3'-8"	5	6'-4"	3	6'-4"	3	6'-4"	0.289	0.802	2.387	0.287	0.401	0.401
60"	3'-0"	2'-2"	6'-3"	4'-1"	7'-3"	7'-3"	6	4'-4"	5	7'-0"	3	7'-0"	3	7'-0"	0.340	0.973	2.722	0.363	0.546	0.546
66"	3'-0"	2'-2"	6'-11"	4'-9"	7'-11"	7'-11"	7	5'-0"	6	7'-8"	3	7'-8"	3	7'-8"	0.391	1.160	3.057	0.440	0.655	0.655
72"	3'-0"	2'-2"	7'-6"	5'-3"	8'-6"	8'-6"	7	5'-6"	6	8'-3"	3	8'-3"	3	8'-3"	0.442	1.340	3.392	0.524	0.774	0.774
78"	3'-0"	2'-2"	8'-1"	5'-11"	9'-1"	9'-1"	8	6'-2"	7	8'-10"	3	8'-10"	3	8'-10"	0.493	1.530	3.727	0.615	0.893	0.893
84"	3'-0"	2'-2"	8'-9"	6'-7"	9'-9"	9'-9"	8	6'-10"	7	9'-6"	3	9'-6"	3	9'-6"	0.544	1.760	4.062	0.713	1.010	1.010

SHEET 2 OF 2
840D02

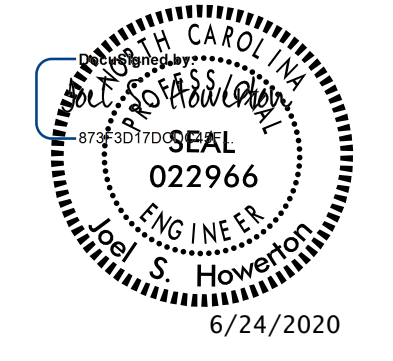
SHEET 2 OF 2
840D02

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SEE PLATE FOR TITLE

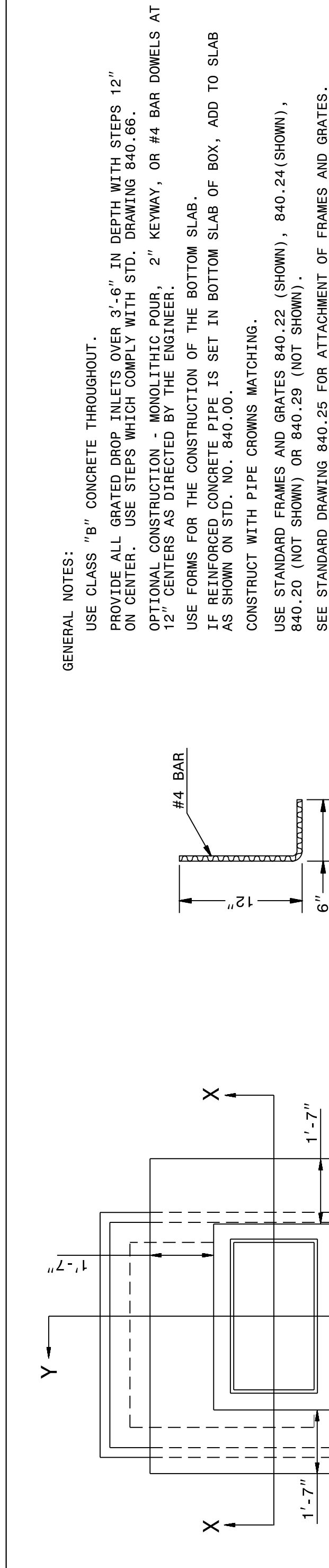
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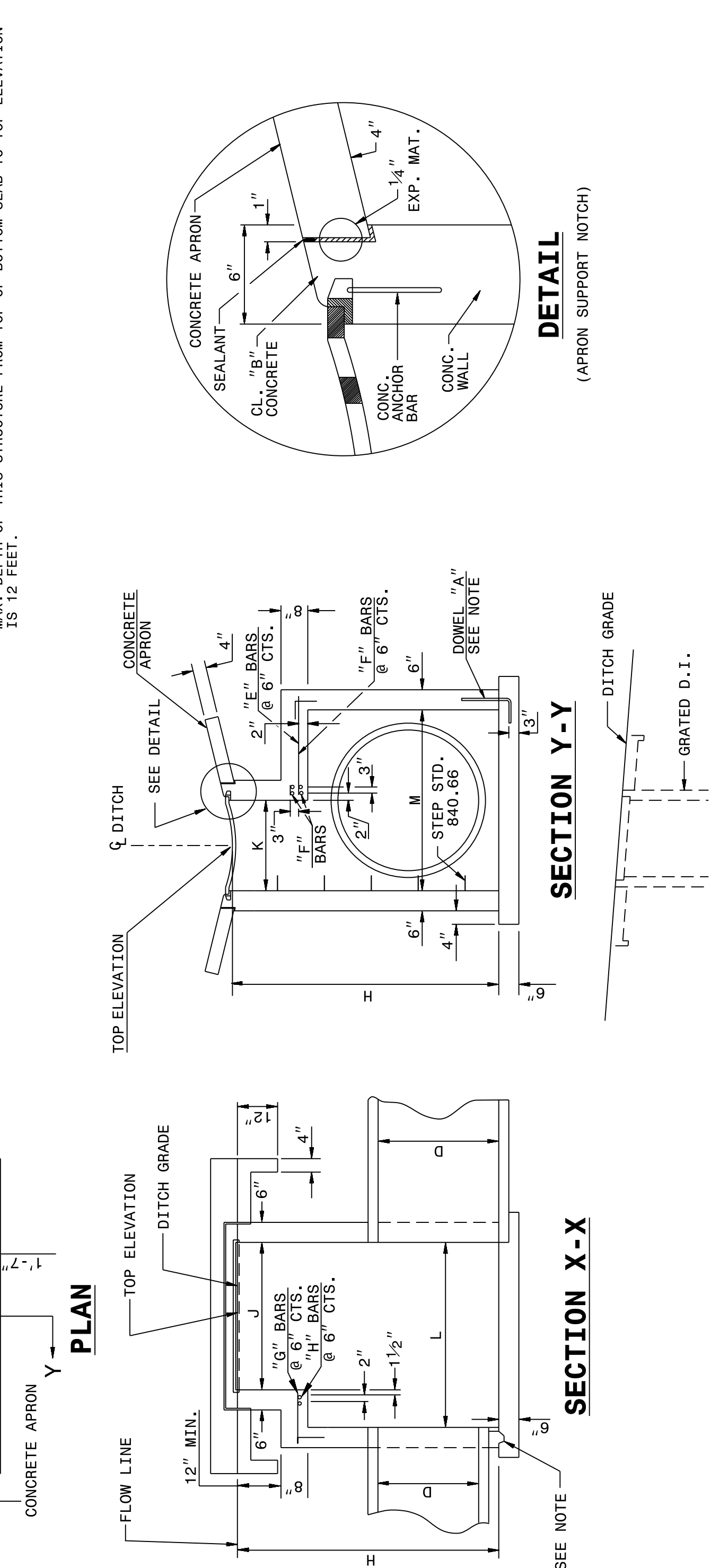
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
12" THRU 72" PIPE

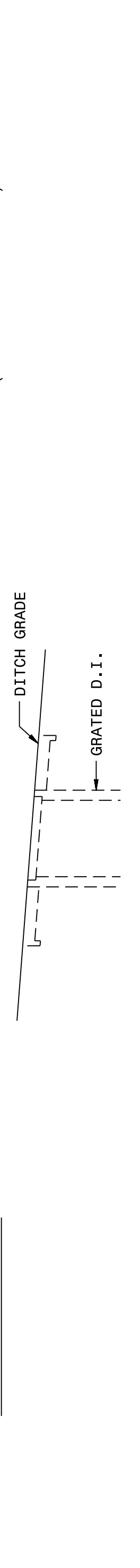
SHEET 1 OF 2
840d17



SECTION X-X



SECTION Y-Y



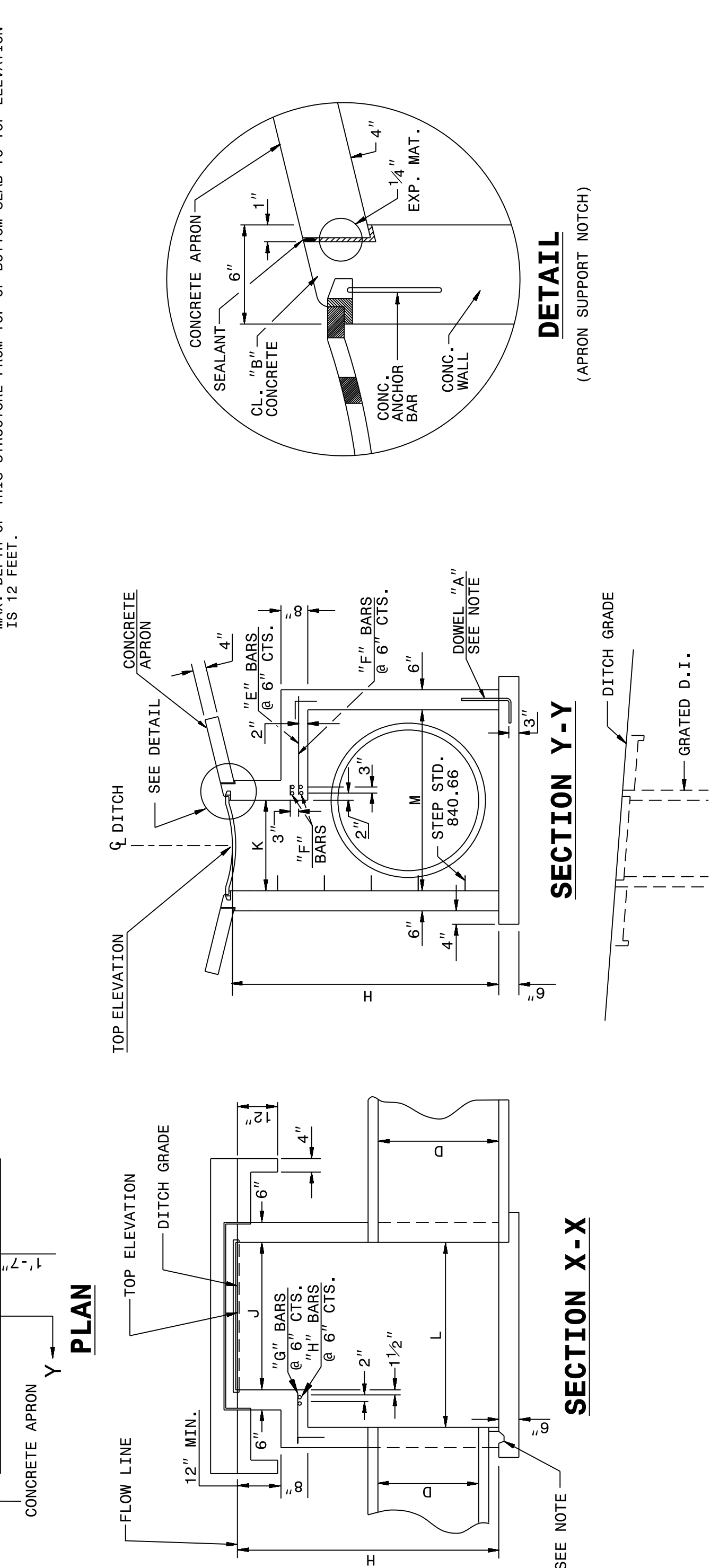
STATE OF
NORTH CAROLINA
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE

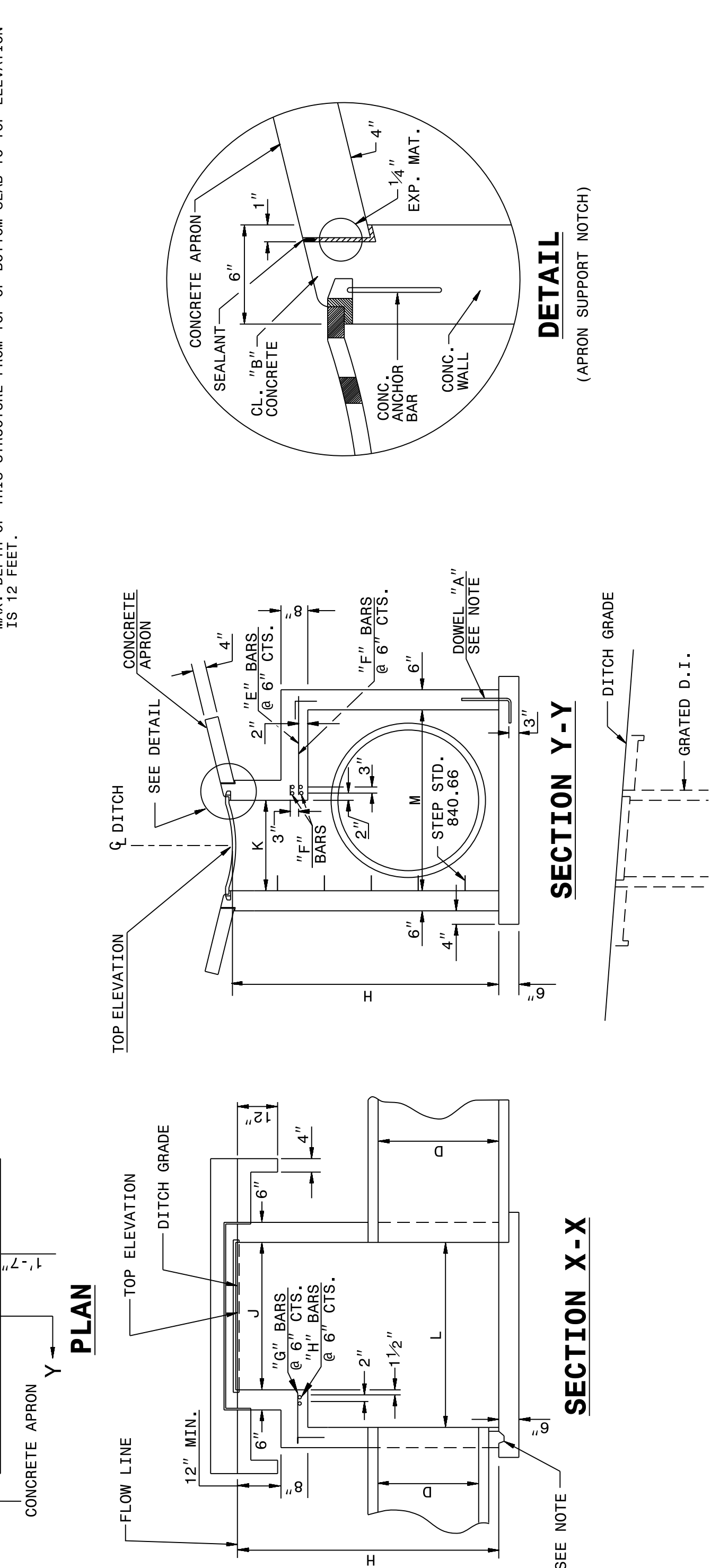
SHEET 1 OF 2
840d17

GENERAL NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.
PROVIDE ALL GRATED DROP INLETS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.
USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
CONSTRUCT WITH PIPE CROWNS MATCHING.
USE STANDARD FRAMES AND GRATES 840.22 (SHOWN), 840.24 (SHOWN), 840.20 (NOT SHOWN) OR 840.29 (NOT SHOWN).
SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.
MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 12 FEET.

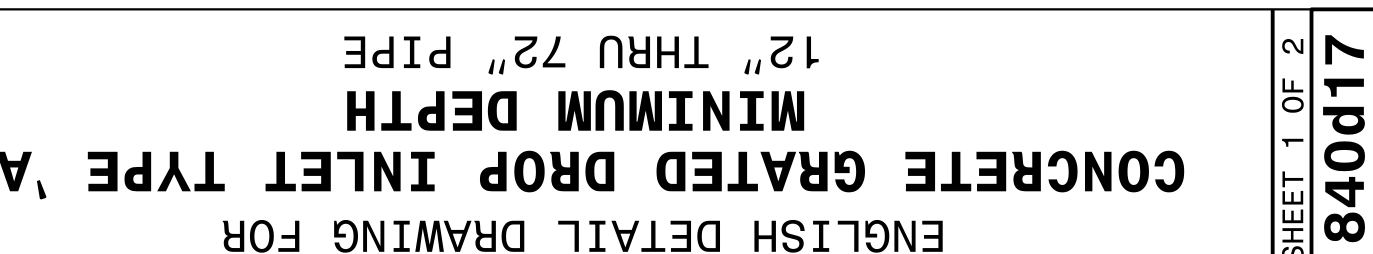
DOWEL - A



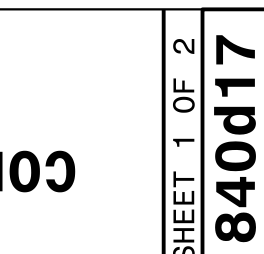
DOWEL - B



DETAIL



DETAIL

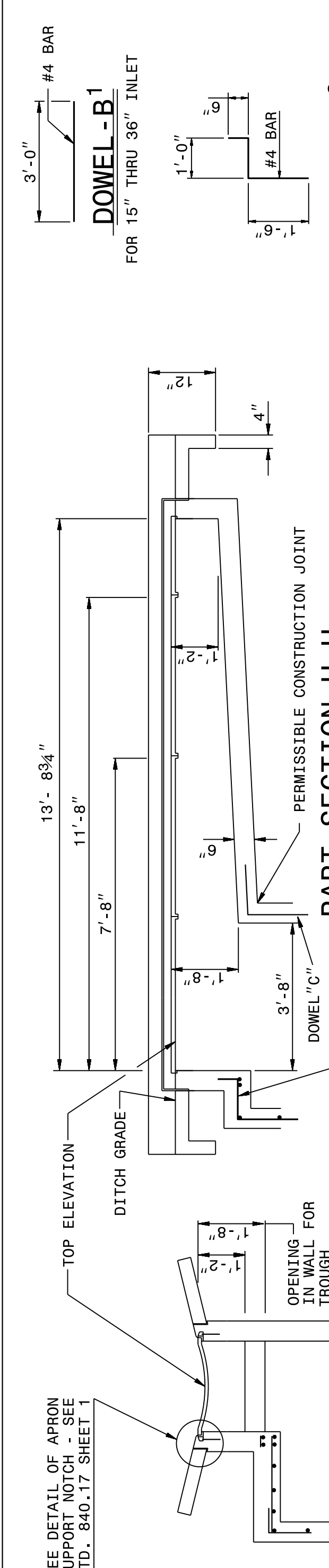


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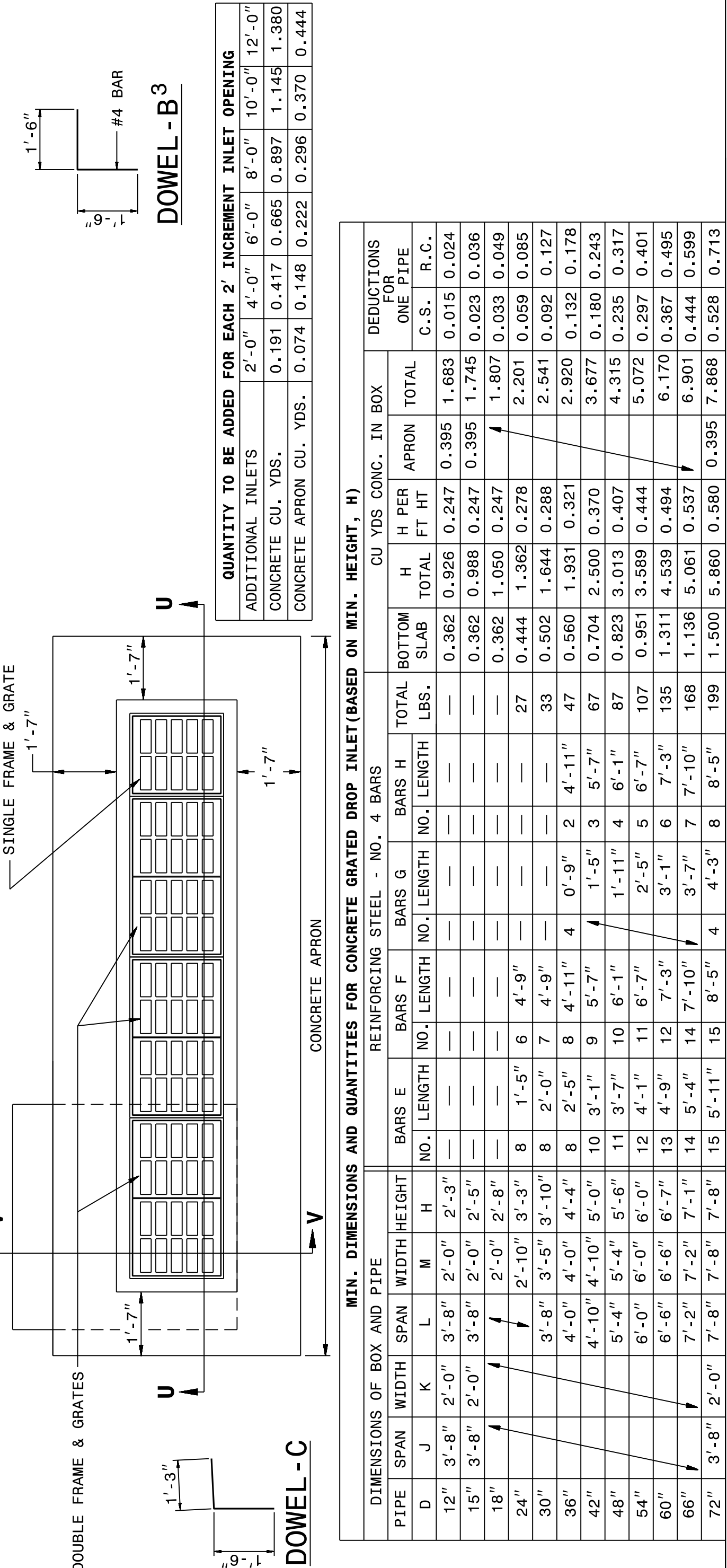
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
12" THRU 72" PIPE

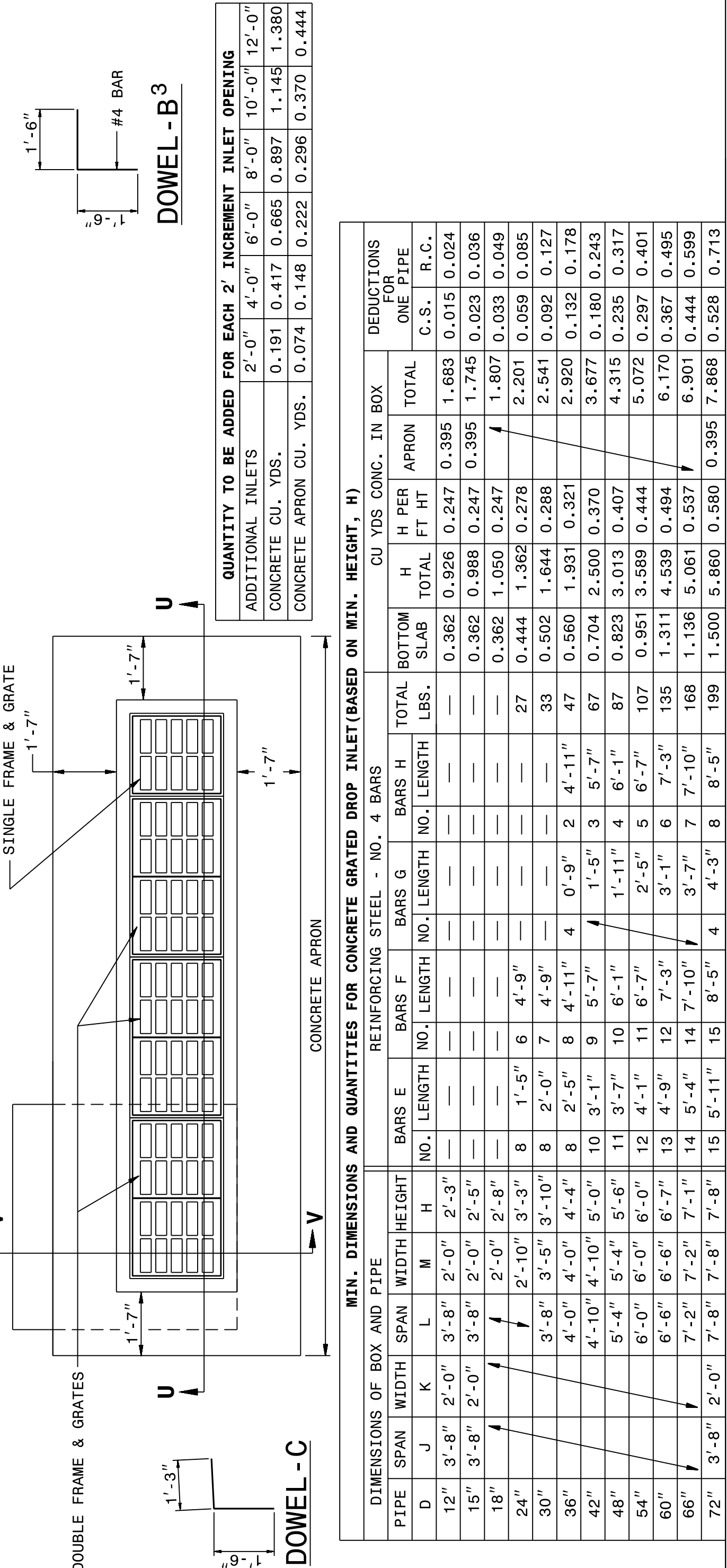
SHEET 2 OF 2
840d17



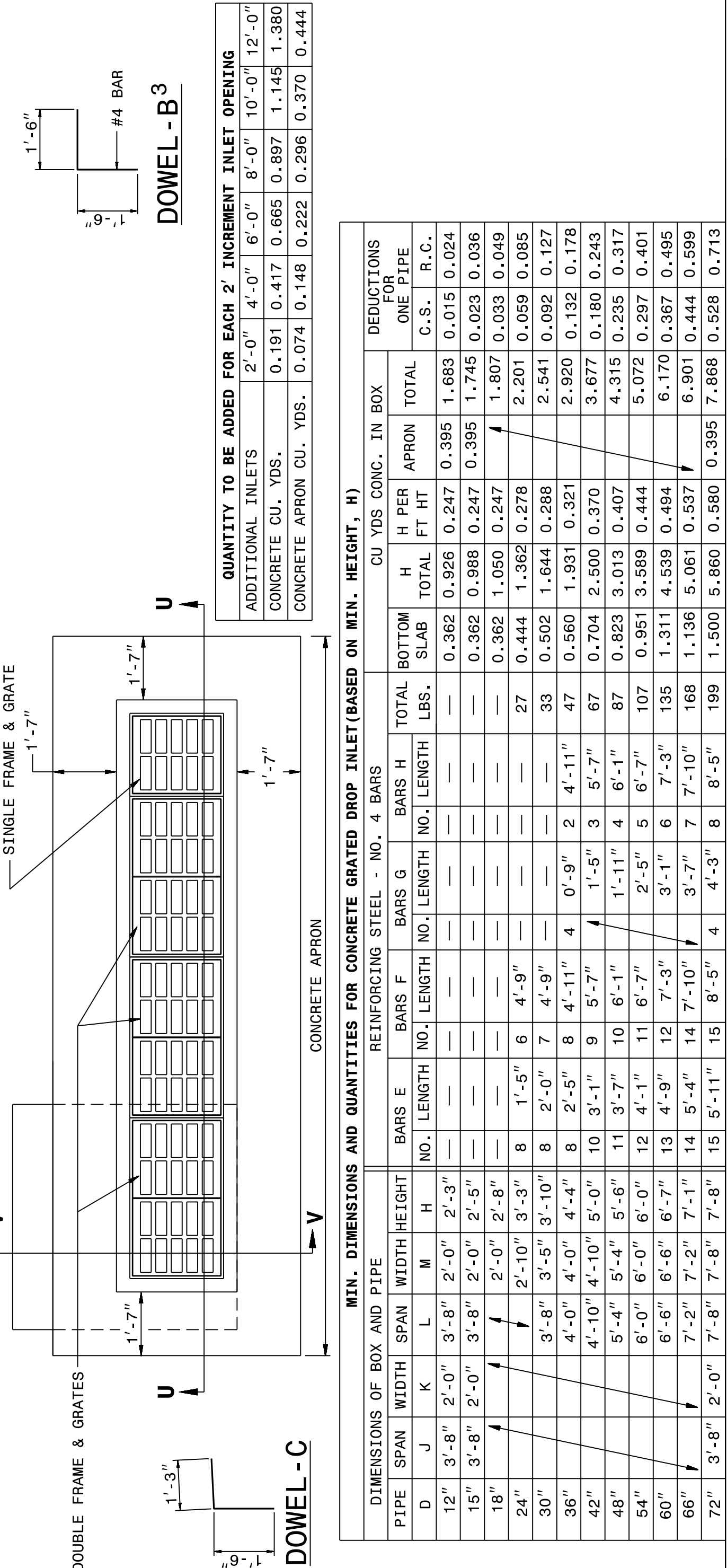
DOWEL - B1



DOWEL - B2



DOWEL - B3



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ENGLISH DETAIL DRAWING FOR
CONCRETE GRATED DROP INLET TYPE 'A'
MINIMUM DEPTH
12" THRU 72" PIPE

SHEET 2 OF 2
840d17

MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE GRATED DROP INLET (BASED ON MIN. HEIGHT, H)

PIPE	DIMENSIONS OF BOX AND PIPE		REINFORCING STEEL - NO. 4 BARS										CU YDS CONC. IN BOX		DEDUCTIONS FOR ONE PIPE			
	SPAN	WIDTH	SPAN	WIDTH	HEIGHT	BARS E	BARS F	BARS G	BARS H	TOTAL BOTTOM SLAB	H PER FT	APRON TOTAL	C.S.	R.C.				
12"	3'-8"	2'-0"	3'-8"	2'-0"	2'-3"	—	—	—	—	—	—	0.362	0.926	0.247	0.395	1.683	0.015	0.024
15"	3'-8"	2'-0"	3'-8"	2'-0"	2'-5"	—	—	—	—	—	—	0.362	0.988	0.247	0.395	1.745	0.023	0.036
18"	—	—	—	—	2'-0"	2'-8"	—	—	—	—	—	0.362	1.050	0.247	1.807	0.033	0.049	
24"	—	—	—	—	2'-10"	3'-3"	8	1'-5"	6	4'-9"	—	0.444	1.362	0.278	2.201	0.059	0.085	
30"	—	—	—	—	3'-8"	3'-10"	8	2'-0"	7	4'-9"	—	0.502	1.644	0.288	2.541	0.082	0.127	
36"	—	—	—	—	4'-0"	4'-4"	8	2'-5"	8	4'-11"	4	0'-9"	1.931	0.321	2.920	0.132	0.178	
42"	—	—	—	—	4'-10"	5'-0"	10	3'-1"	9	5'-7"	3	0'-7"	2.500	0.370	3.677	0.180	0.243	
48"	—	—	—	—	5'-4"	5'-6"	11	3'-7"	10	6'-1"	4	0'-8"	3.013	0.407	4.315	0.235	0.317	
54"	—	—	—	—	6'-0"	6'-0"	12	4'-1"	11	6'-7"	5	0'-7"	3.589	0.444	5.072	0.287	0.401	
60"	—	—	—	—	6'-6"	6'-7"	13	4'-9"	12	7'-3"	6	0'-9"	4.539	0.494	6.170	0.367	0.495	
66"	—	—	—	—	7'-2"	7'-1"	14	5'-4"	14	7'-10"	7	0'-10"	5.061	0.537	6.901	0.444	0.599	
72"	—	—	—	—	7'-8"	7'-8"	15	5'-11"	15	8'-5"	8	0'-5"	5.860	0.580	7.868	0.528	0.713	

QUANTITY TO BE ADDED FOR EACH 2' INCREMENT INLET OPENING

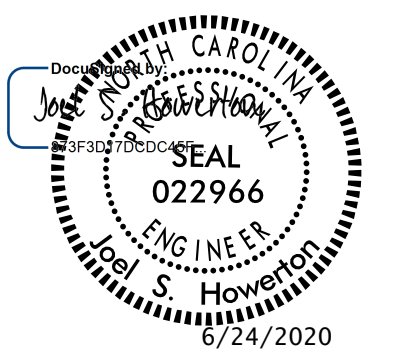
ADDITIONAL INLETS	2'-0"	4'-0"	6'-0"	8'-0"	10'-0"	12'-0"
CONCRETE CU. YDS.	0.191	0.417	0.665	0.897	1.145	1.380
CONCRETE APRON CU. YDS.	0.074	0.148	0.222	0.296	0.370	0.444

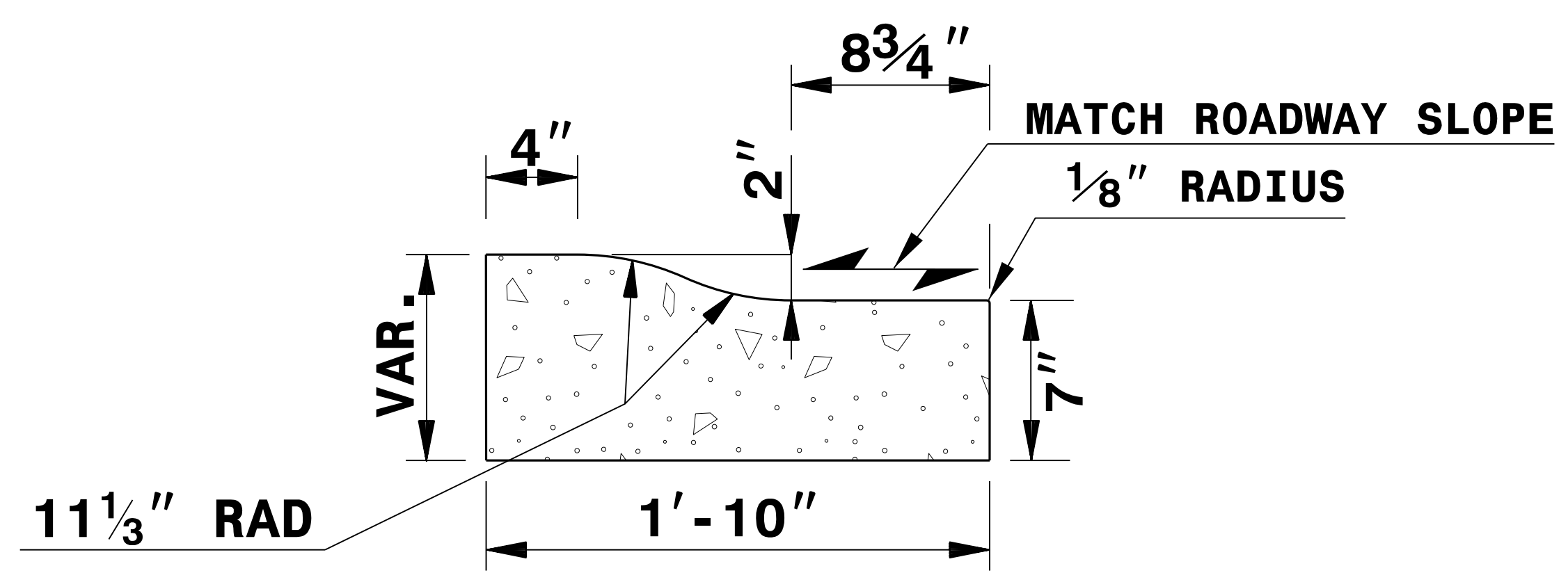
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SEE TITLE BLOCK

ORIGINAL BY: J. Howerton DATE: 1/22/14
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: jhowerton\minimum depth type A.dgn

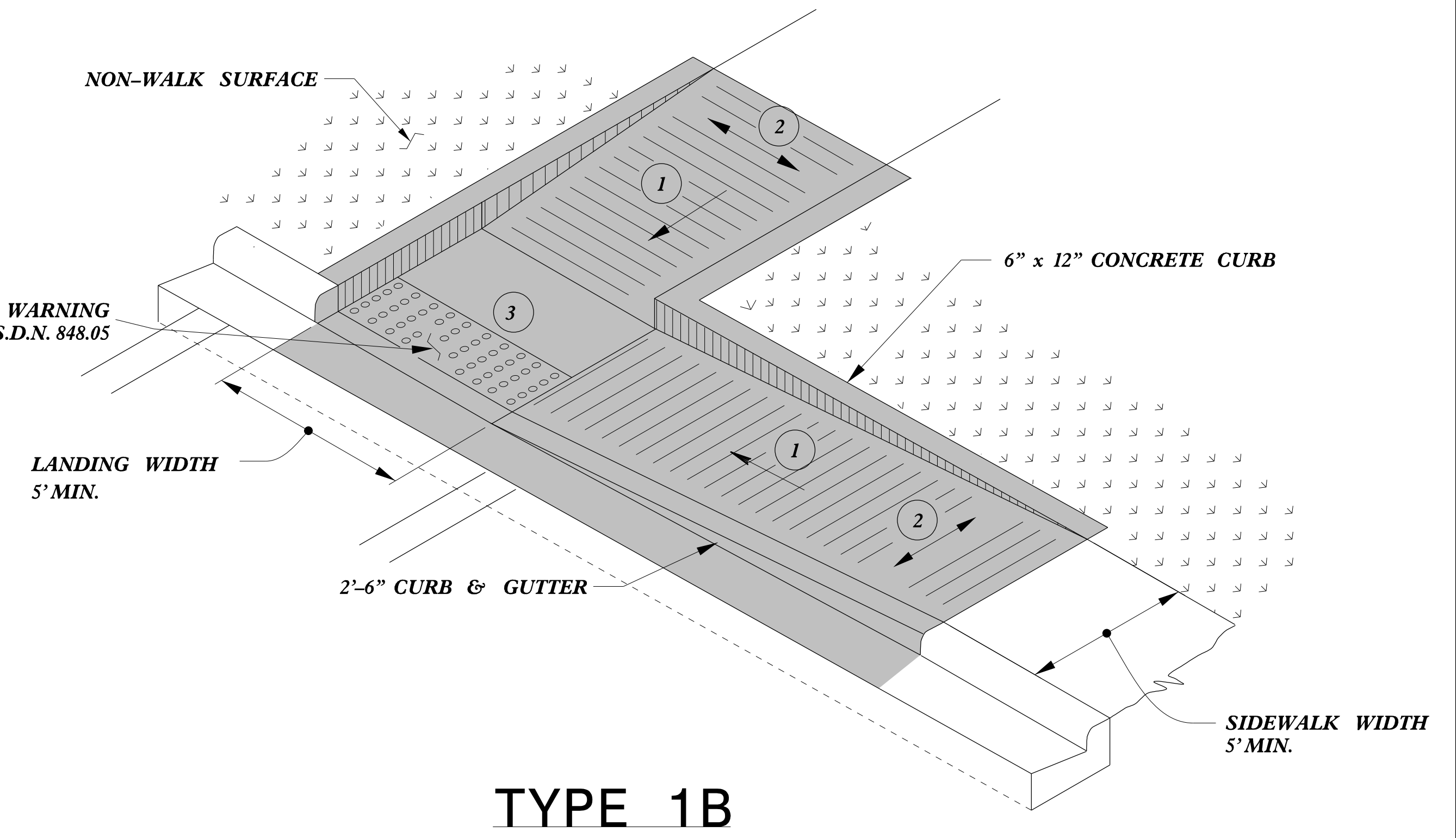
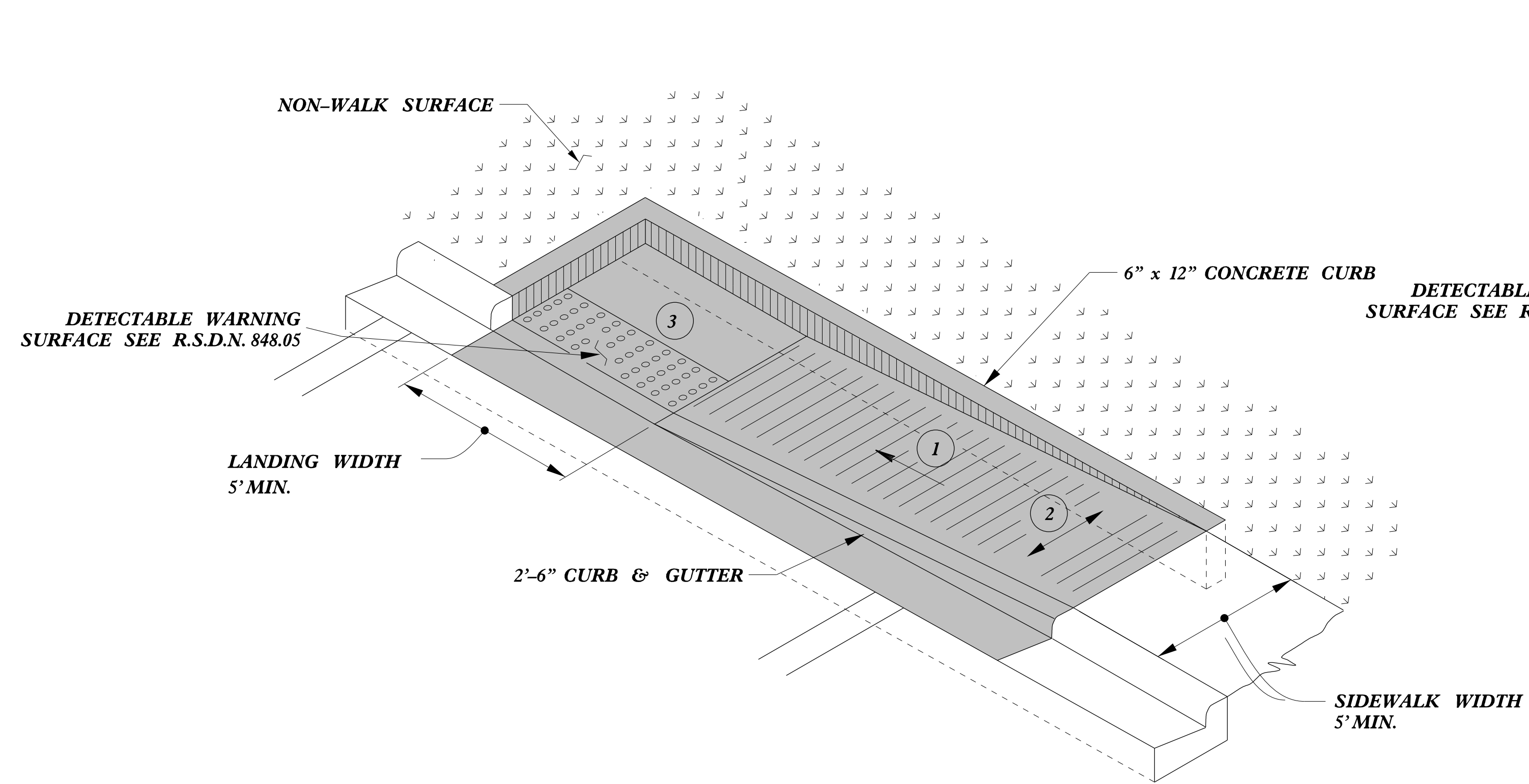




**ROUNDABOUT TRUCK APRON CURB AND GUTTER
(2" ROLLED CURB)**

	CONTRACT STANDARDS AND DEVELOPMENT UNIT Office 919-707-6950 FAX 919-250-4119
	DETAIL OF 2" ROLLED CURB
ORIGINAL BY: <u>R. KLUCKMAN</u> DATE: <u>11/30/17</u> MODIFIED BY: _____ DATE: _____ CHECKED BY: _____ DATE: _____ FILE SPEC.: _____	

Paul S. Howerton
P.E.
6/24/2020

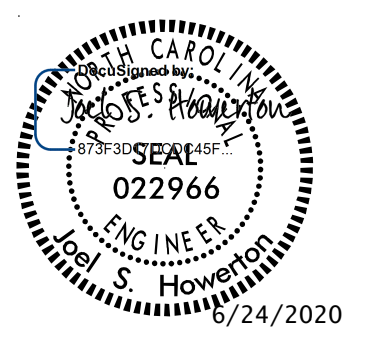
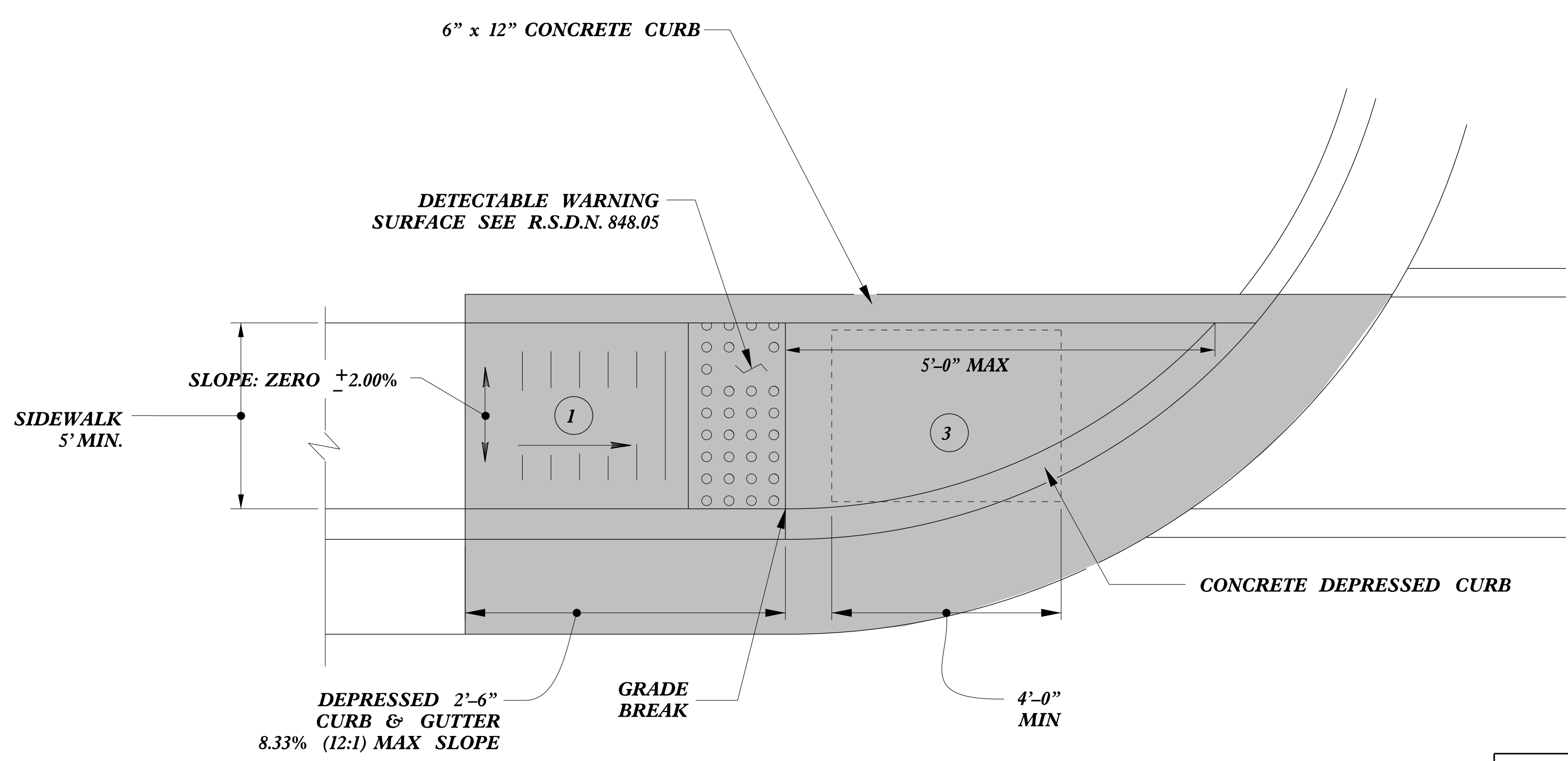


TYPE 1A

TYPE 1B

 PAY LIMITS FOR 1 CURB RAMP

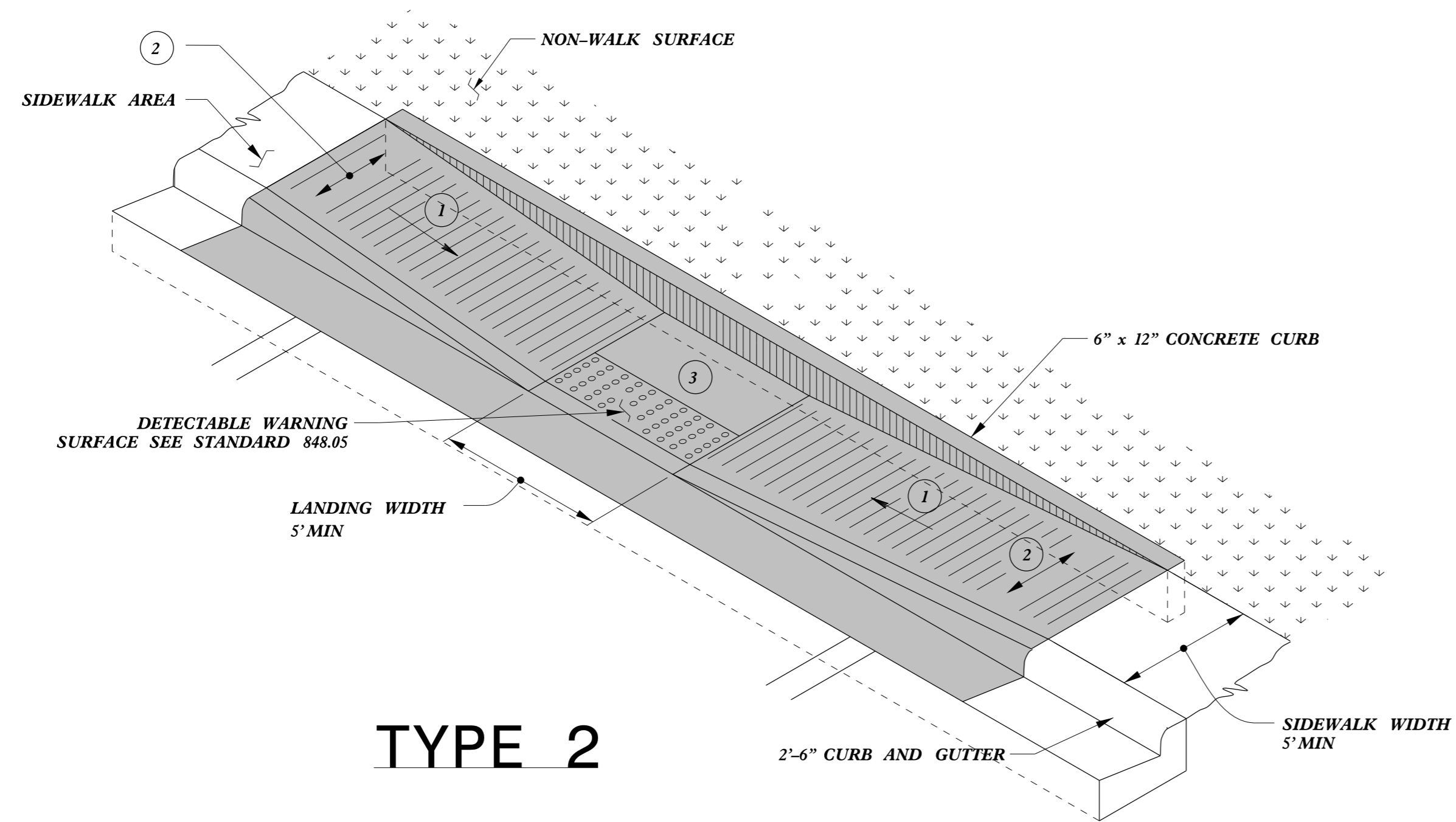
- 1 8.33% (12:1) MAX RAMP SLOPE
- 2 CROSS SLOPE: 2.00%
- 3 CURB RAMPS REQUIRE A (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS AND DEVELOPMENT UNIT	
Office 919-707-6950	FAX 919-250-4119
CURB RAMPS	
Directional Ramps	
ORIGINAL BY: J.S. HOWERTON	DATE: 7/7/11
MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC. :stds/2012CurbRamp/CurbRampDetails.dgn	

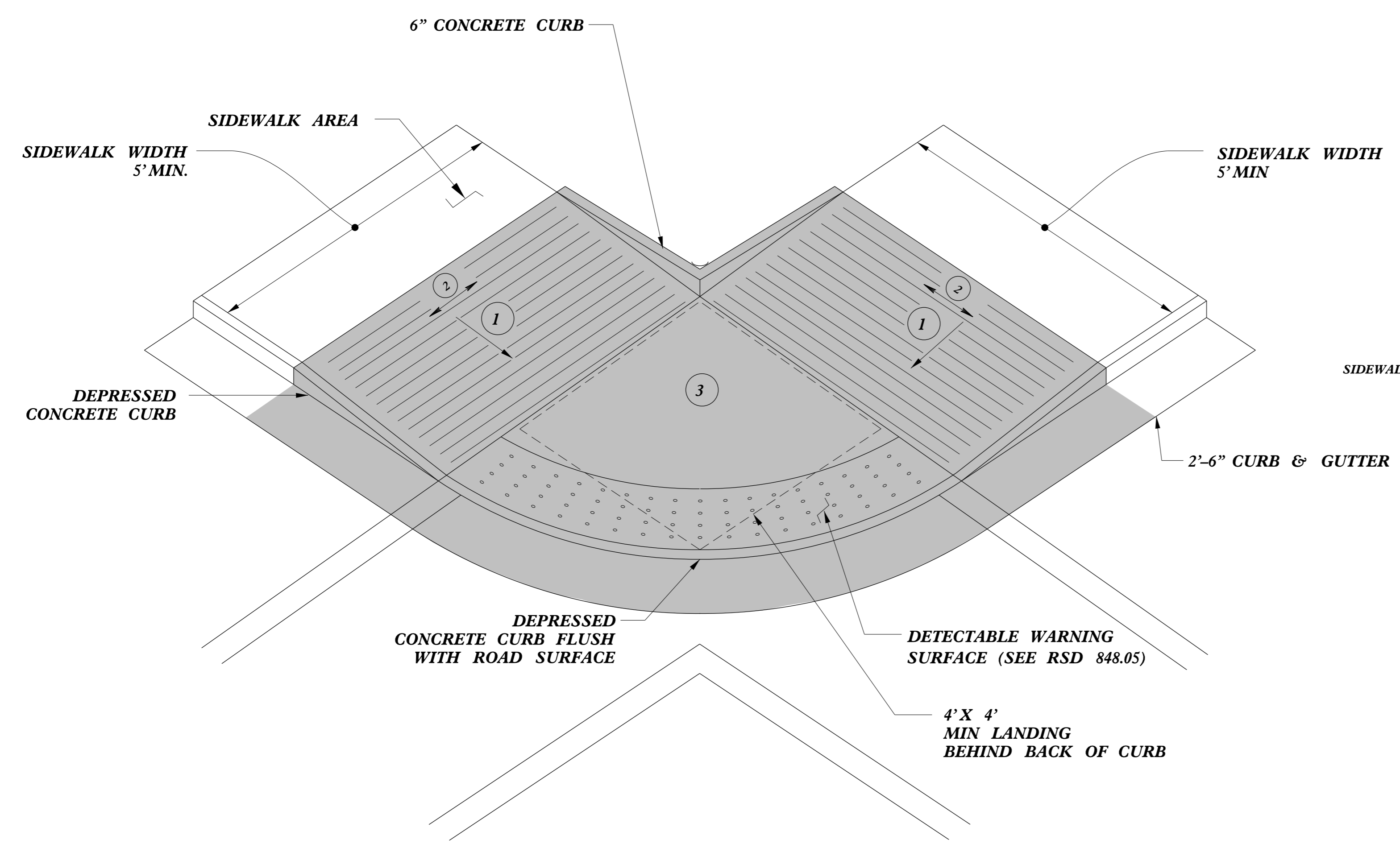
REFER TO ROADWAY STANDARD DRAWING NUMBER 848.05 SHEET 3 OF 3 FOR ALL RAMP NOTES



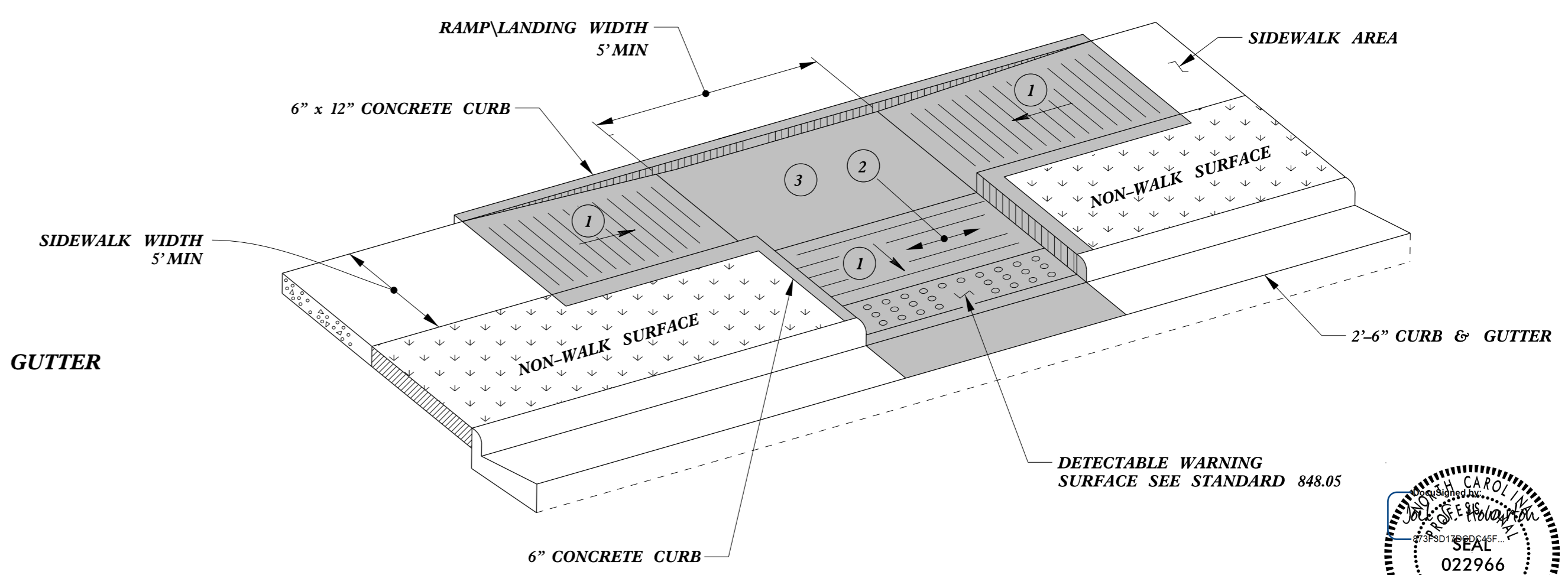
TYPE 2

PAY LIMITS FOR 1 CURB RAMP

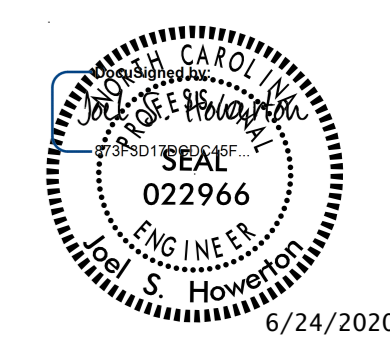
- 1 8.33% (12:1) MAX RAMP SLOPE
- 2 CROSS SLOPE: 2.00%
- 3 CURB RAMPS REQUIRE A (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.



TYPE 2A



TYPE 3



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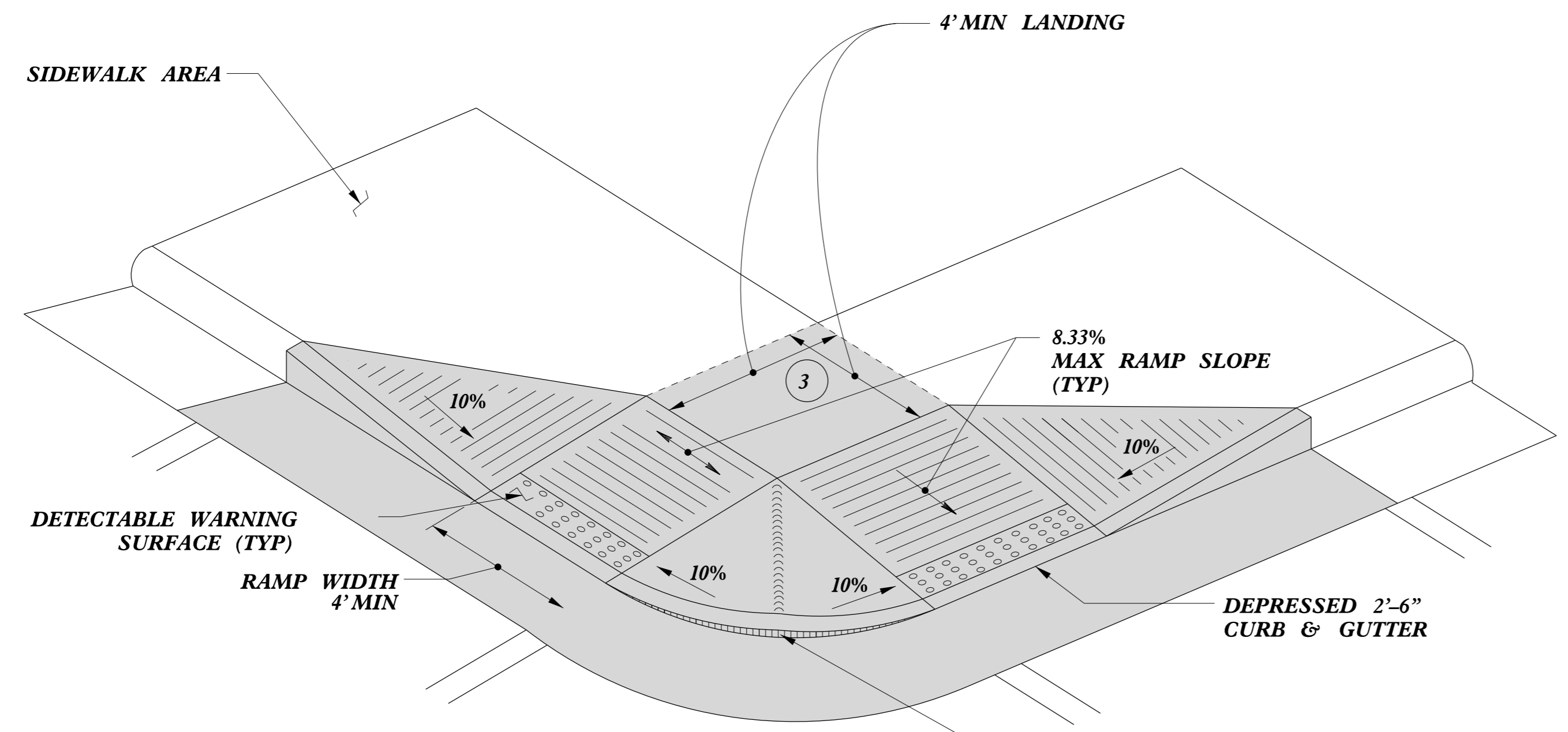
CONTRACT STANDARDS AND DEVELOPMENT UNIT
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CURB RAMPS
 Parallel Ramps

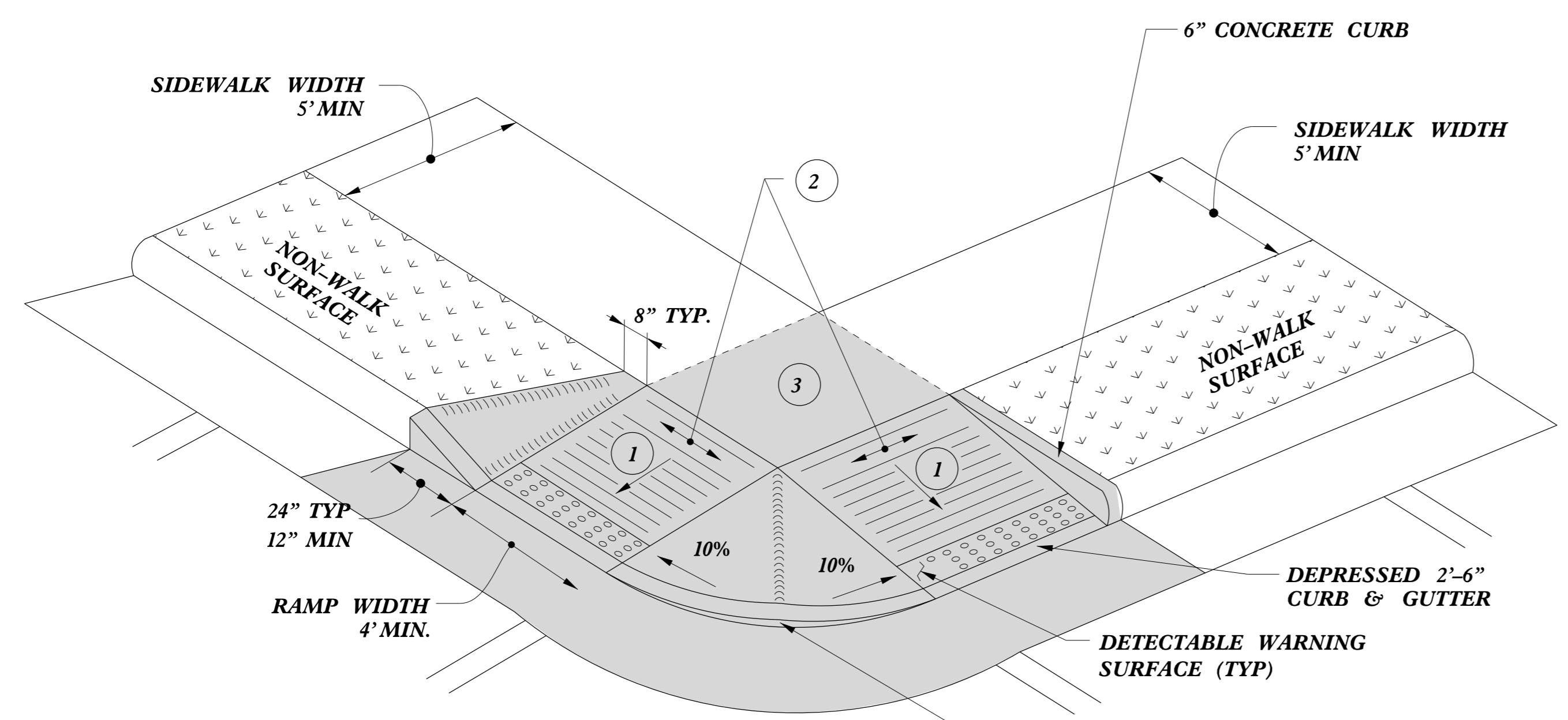
ORIGINAL BY: J.S. HOWERTON DATE: 7/7/11
 MODIFIED BY: DATE:
 CHECKED BY: DATE:
 FILE SPEC.: stds/2012CurbRamp/CurbRampDetails.dgn

REFER TO ROADWAY STANDARD DRAWING NUMBER 848.05 SHEET 3 OF 3 FOR ALL RAMP NOTES

5/14/99
C:\ME\CON\CON\USER\NAME

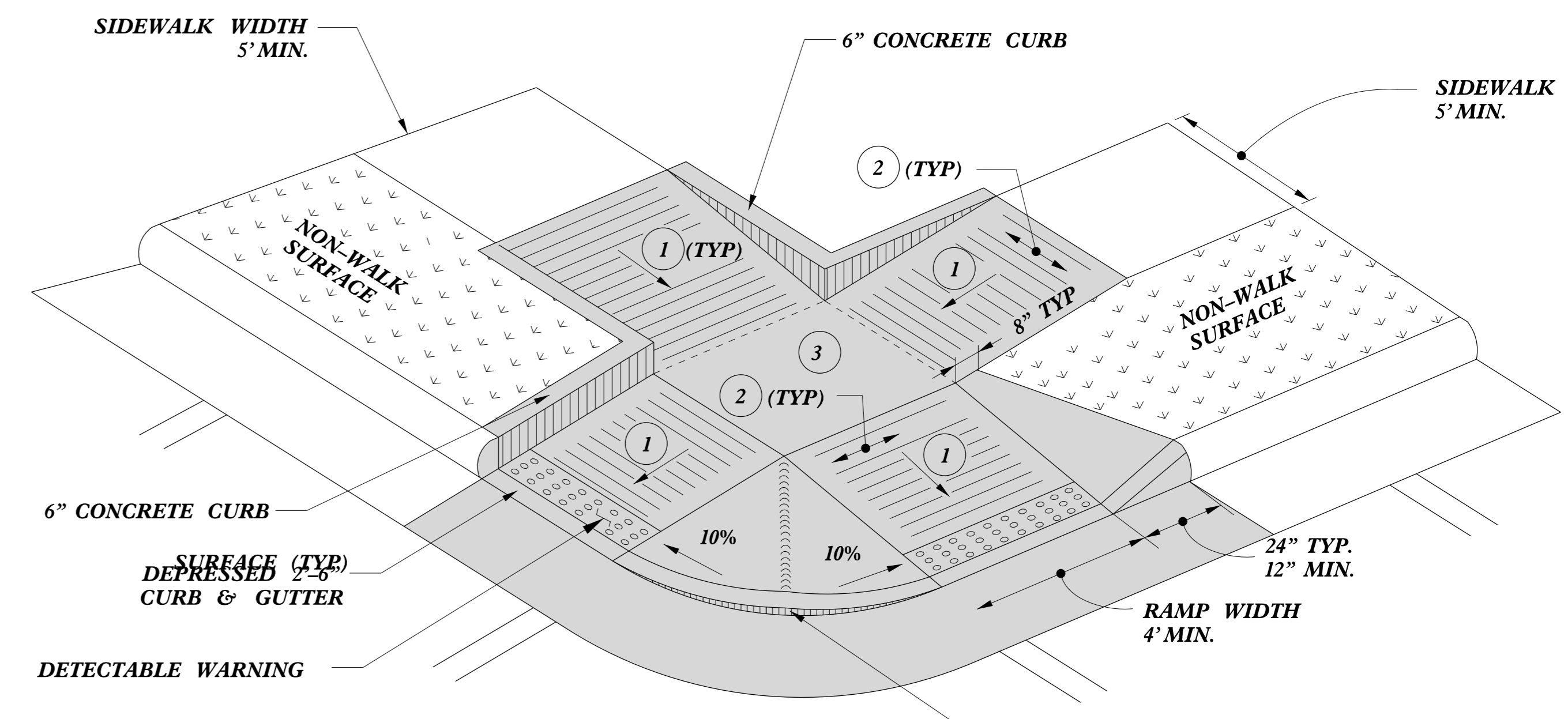


TYPE 4



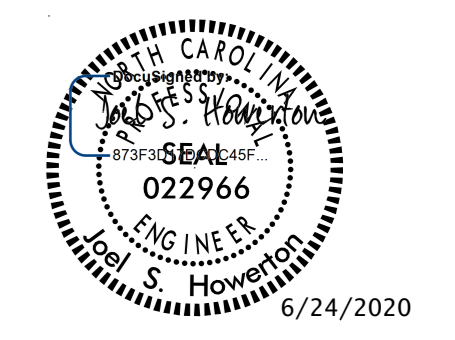
TYPE 4A

PAY LIMITS FOR 2 CURB RAMPS



TYPE 5

- 1 8.33% (12:1) MAX RAMP SLOPE
- 2 CROSS SLOPE: 2.00%
- 3 CURB RAMPS REQUIRE A (4'-0") MINIMUM LANDING WITH A MAXIMUM CROSS SLOPE AND LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING MANEUVERS. SLOPE TO DRAIN TO CURB.



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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CURB RAMPS
Shared Landing

ORIGINAL BY: J.S. HOWERTON DATE: 7/7/11
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: stds/2012CurbRamp/CurbRampDetails.dgn

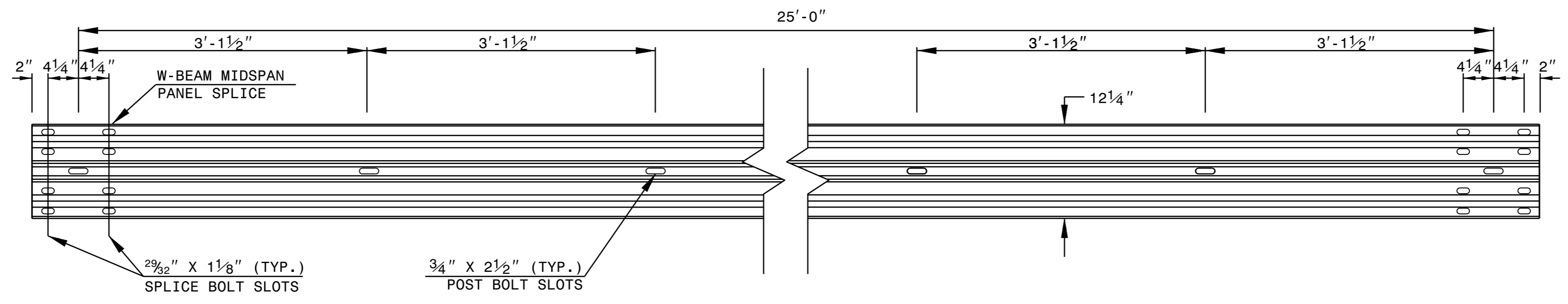
REFER TO ROADWAY STANDARD DRAWING NUMBER 848.05 SHEET 3 OF 3 FOR ALL RAMP NOTES

5/14/99
\$\$\$\$\$ TIME\$\$\$\$\$
\$\$\$\$\$ C:\TME\$\$\$\$\$
\$\$\$\$\$ USER\$\$\$\$\$

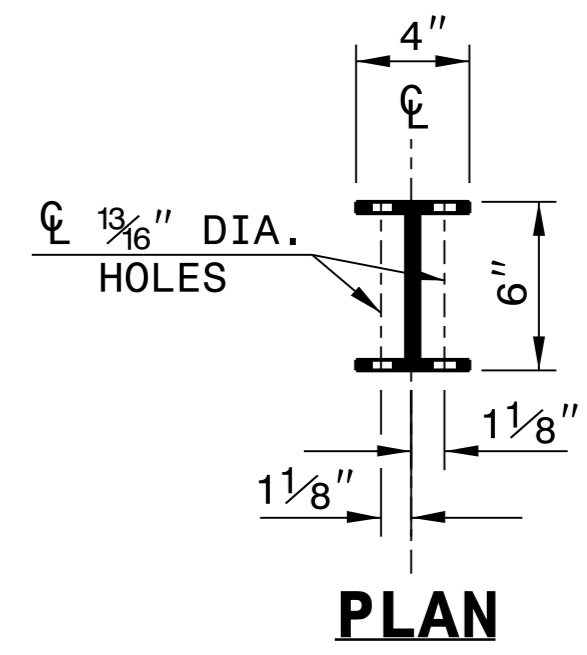
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

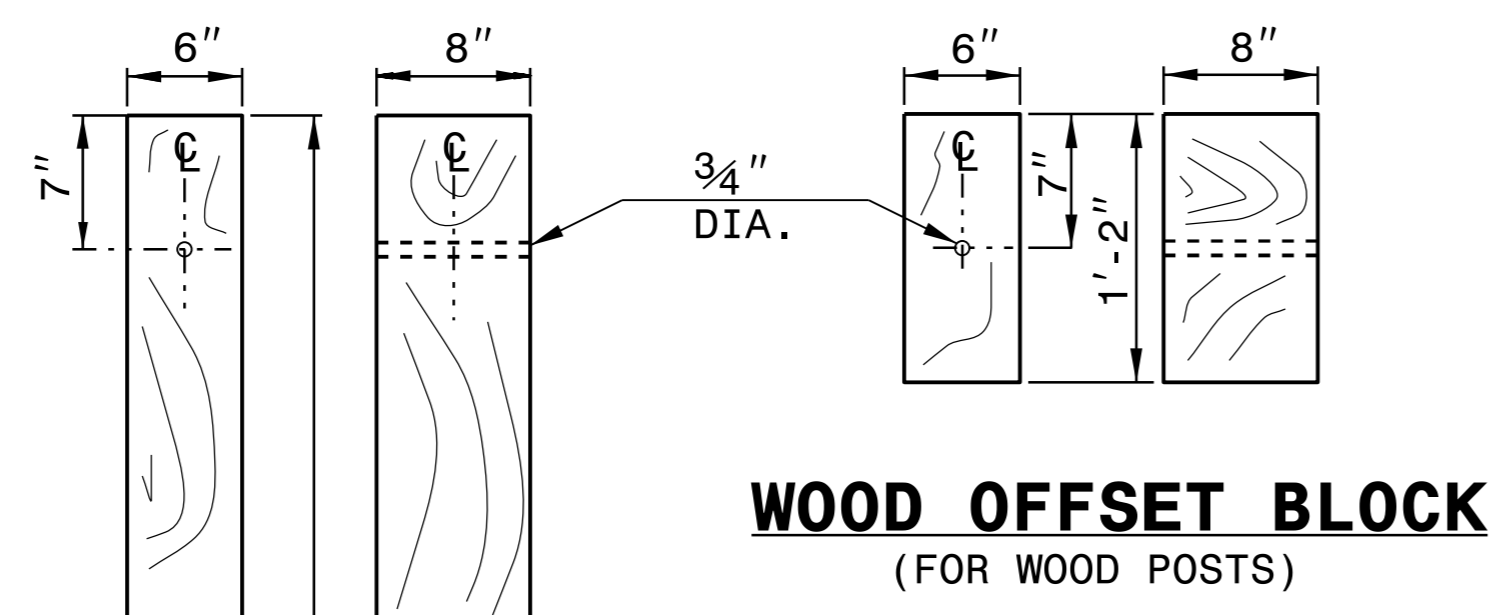
SHEET 6 OF 8
862D02



STANDARD W-BEAM GUARDRAIL



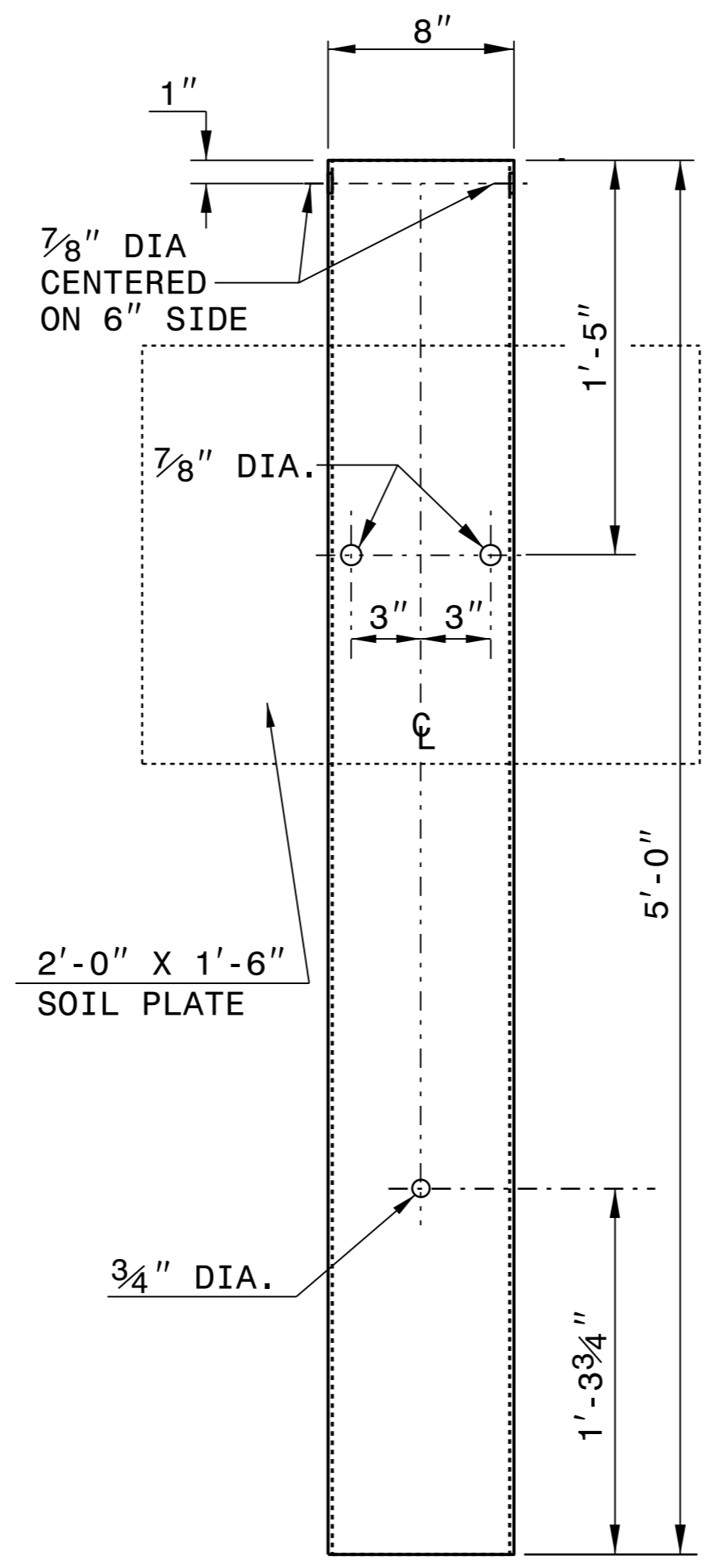
PLAN



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

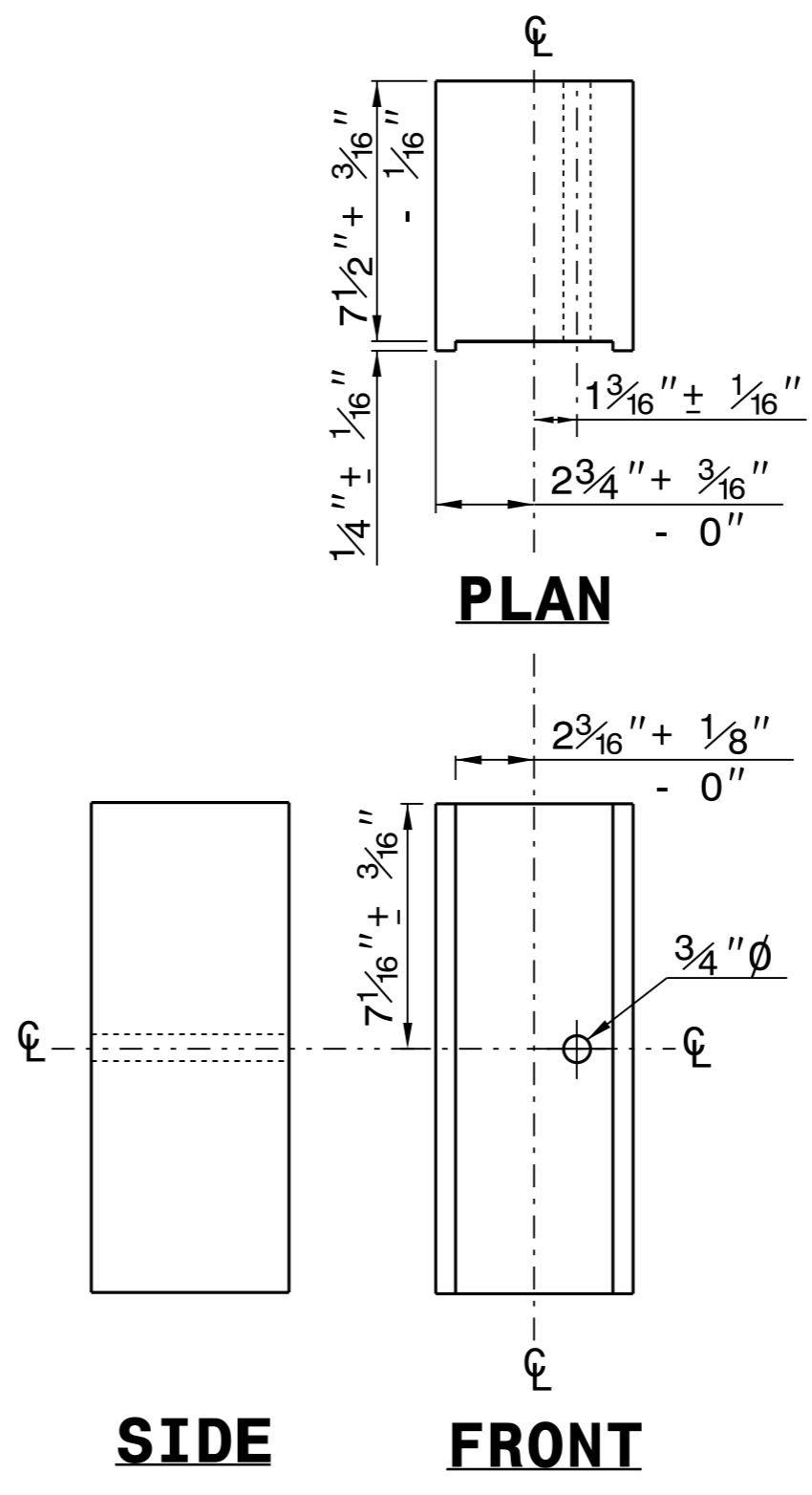
**STANDARD
LINE POST**

**SHORT WOOD
BREAKAWAY POST**



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

SYSTEM PARTS

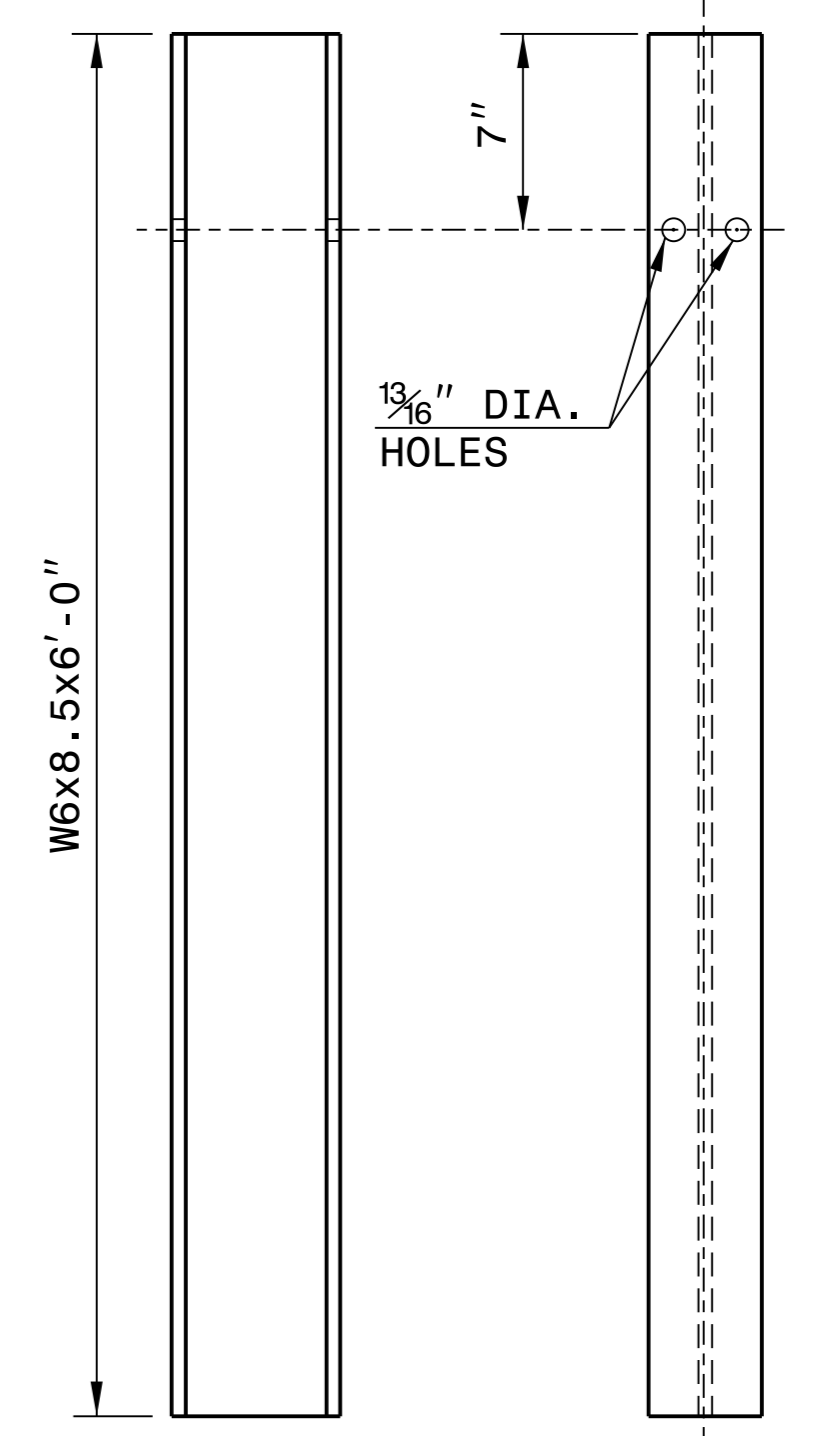


PLAN

SIDE

FRONT

**ROUTED
OFFSET BLOCK**



SIDE

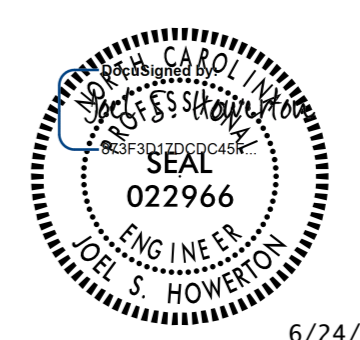
FRONT

"W6" STEEL POST

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

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 8
862D02



6/24/2020

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AND DEVELOPMENT UNIT**
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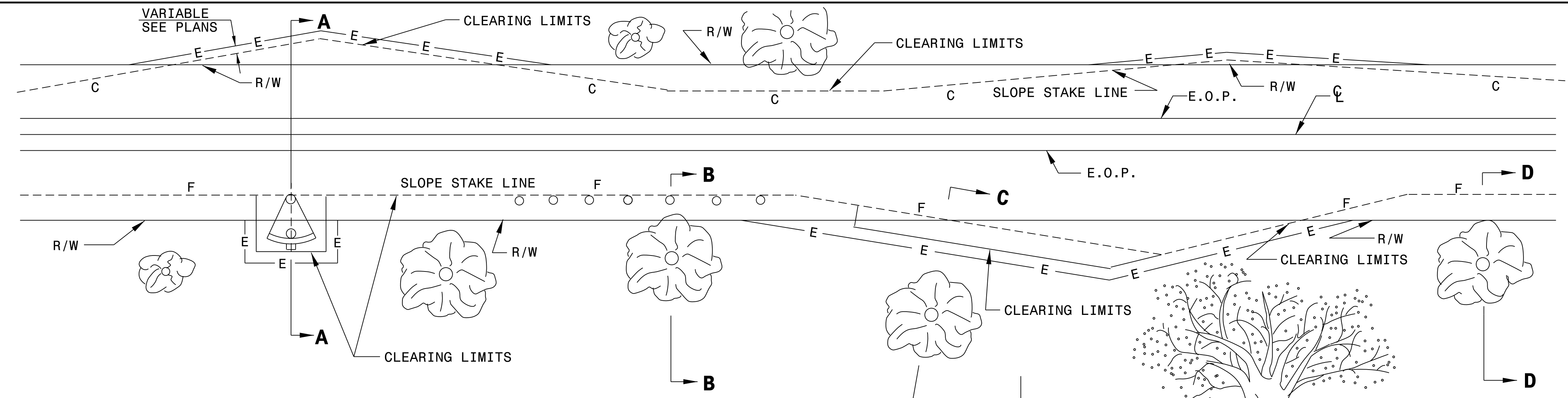
SEE TITLE BLOCK

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

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

ENGLISH DETAIL DRAWING FOR
METHOD OF CLEARING
 MODIFIED METHOD - II
 HAND CLEARING ONLY

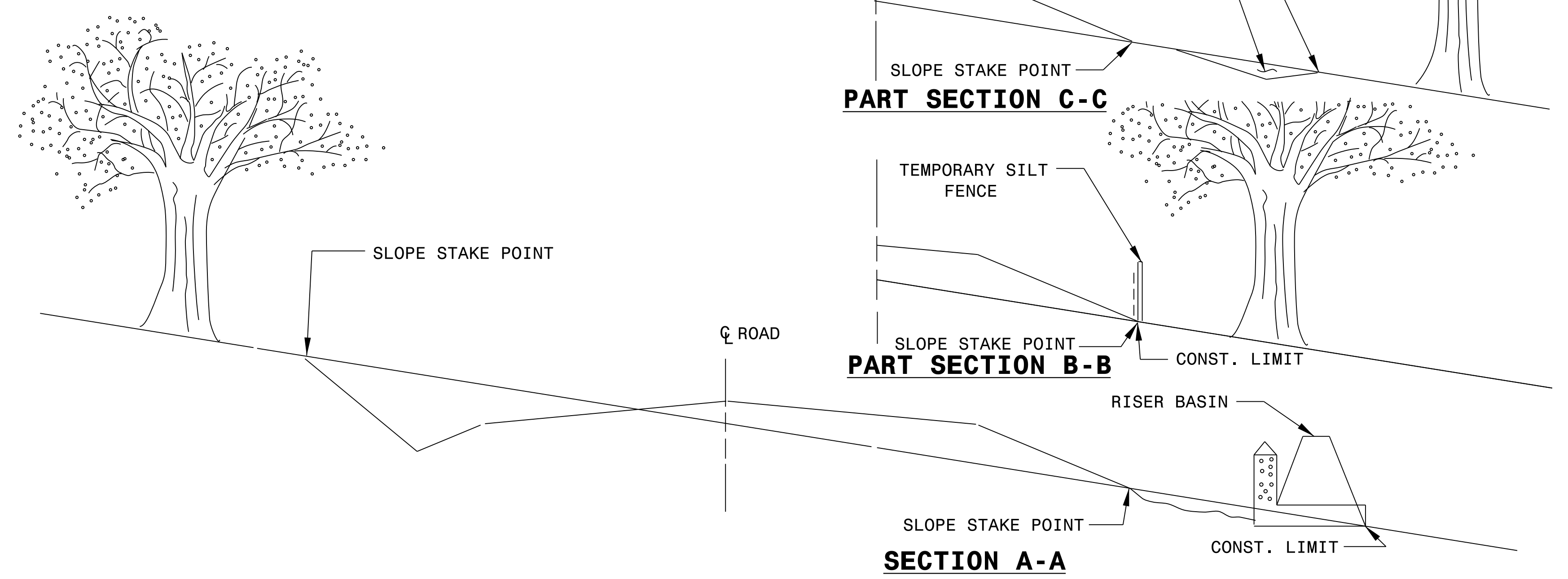
SHEET 1 OF 1
200d02



GENERAL NOTES:

1. REMOVE TREES OUTSIDE THE CLEARING LIMIT WHEN, IN THE OPINION OF THE ENGINEER, THE UTILITY OF A TREE WILL BE DESTROYED BY THE CONSTRUCTION OR THE CLEARING OPERATION.
2. CLEAR IN ACCORDANCE WITH THIS STANDARD EXCEPT WHERE ADDITIONAL CLEARING IS REQUIRED FOR SAFETY AS SHOWN ON THE PLANS.
3. FOR SECTIONS WITH WIDE MEDIANS WHERE TREES ARE TO REMAIN, CLEAR THE MEDIUM SIDE IN THE SAME MANNER AS ON THE OUTSIDE.
4. ONLY HAND CLEARING WILL BE ALLOWED WITHIN THE PROJECT LIMITS.

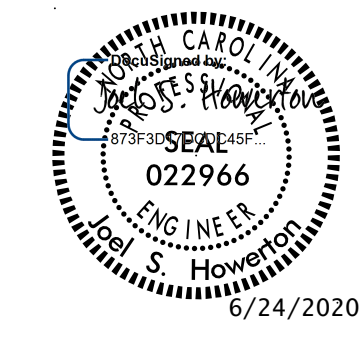
CLEAR TO SLOPE STAKE LINE OR CONSTRUCTION LIMITS



STATE OF NORTH CAROLINA
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 RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
METHOD OF CLEARING
 MODIFIED METHOD - II
 HAND CLEARING ONLY

SHEET 1 OF 1
200d02



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STANDARDS AND SPECIAL DESIGN
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SEE TITLE BLOCK

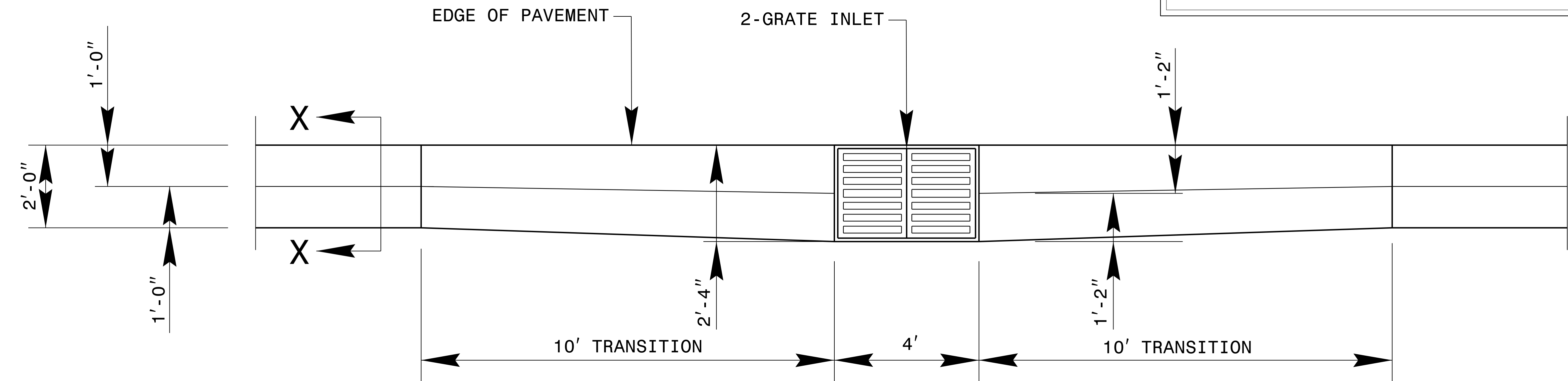
ORIGINAL BY: rnbritt DATE: 05-02-11
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 CHECKED BY: DATE:
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DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

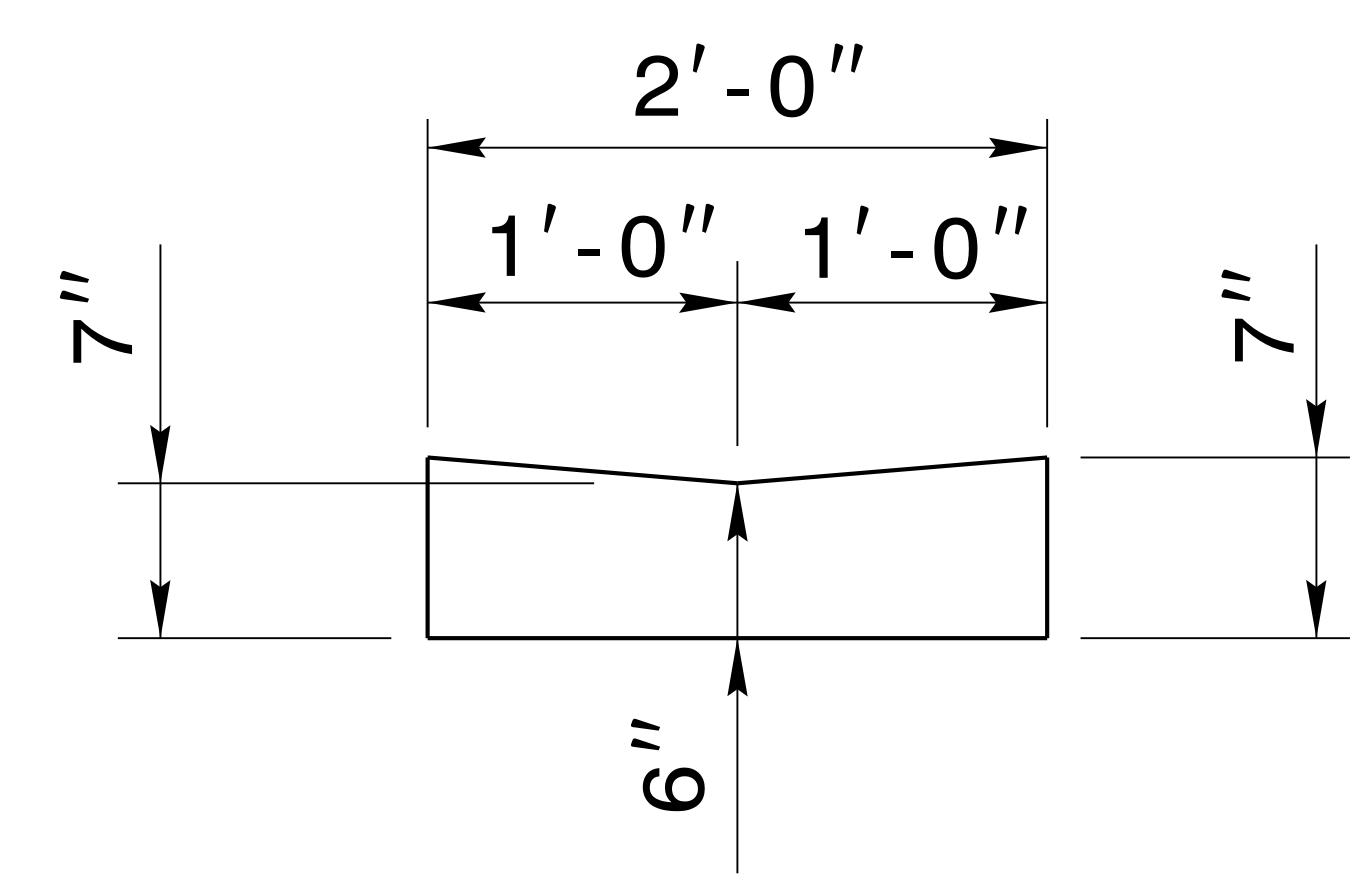
5/14/99

GENERAL NOTES:

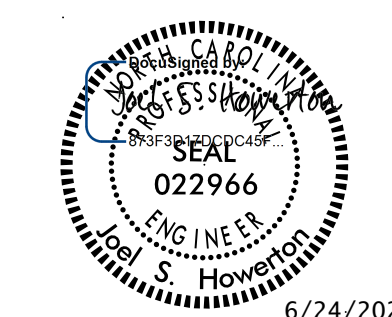
- PLACE CONTRACTION JOINTS AT 10' INTERVALS, EXCEPT THAT A 15' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
- JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
- CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS.
- CONSTRUCT NON-TEMPLATE FORMED JOINTS A MIN. OF 1½" DEEP.
- FILL ALL CONSTRUCTION JOINTS WITH JOINT FILLER AND SEALER.
- SPACE EXPANSION JOINTS AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.



2-GI IN VALLELY GUTTER PLAN VIEW



VALLEY GUTTER SECTION X-X



6/24/2020

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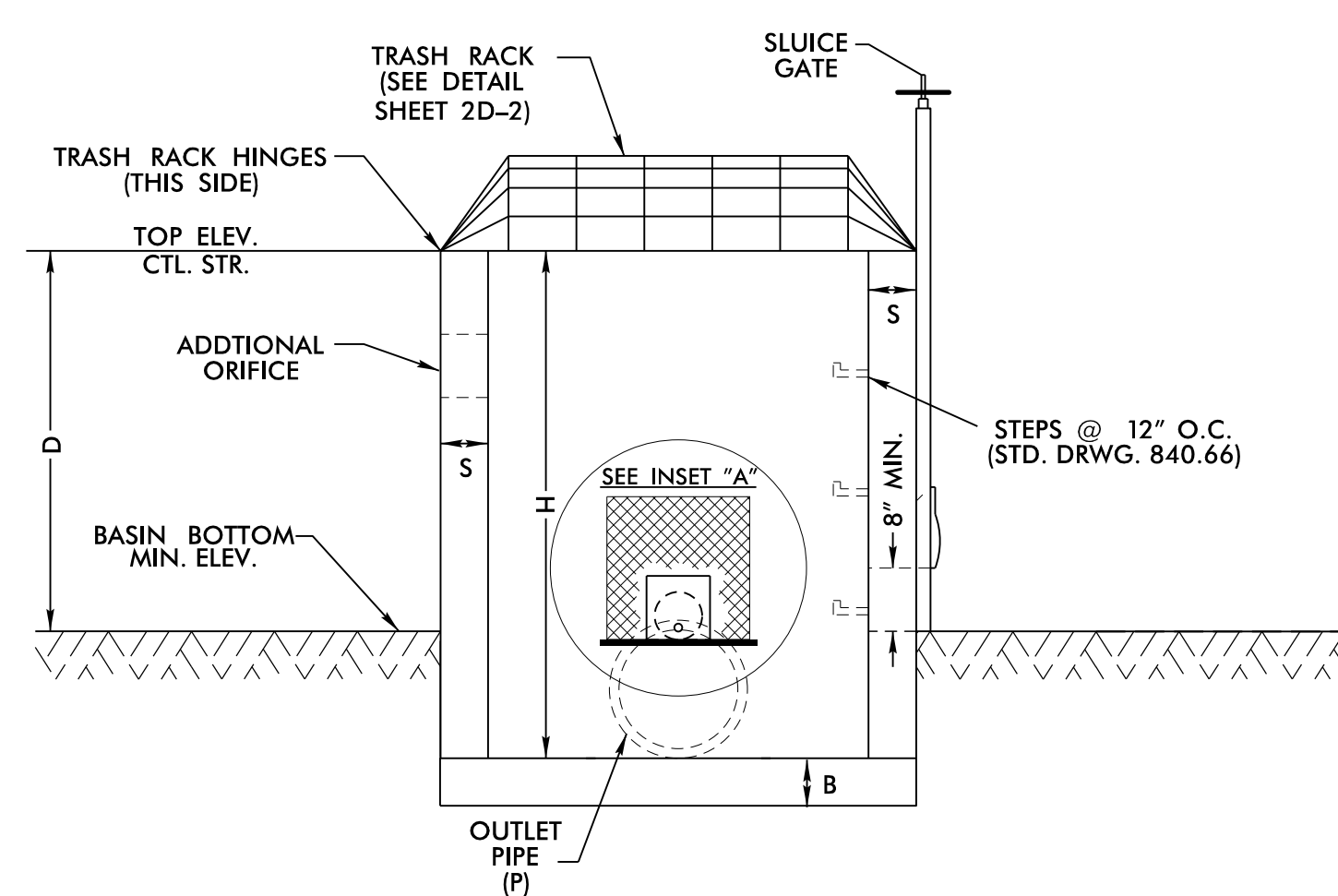
2-GI IN VALLEY GUTTER

ORIGINAL BY: _____ DATE: _____
 MODIFIED BY: rnbritt DATE: 02-20-12
 CHECKED BY: _____ DATE: _____
 FILE SPEC.: details/english/misc/2gi in valley gutter.dgn

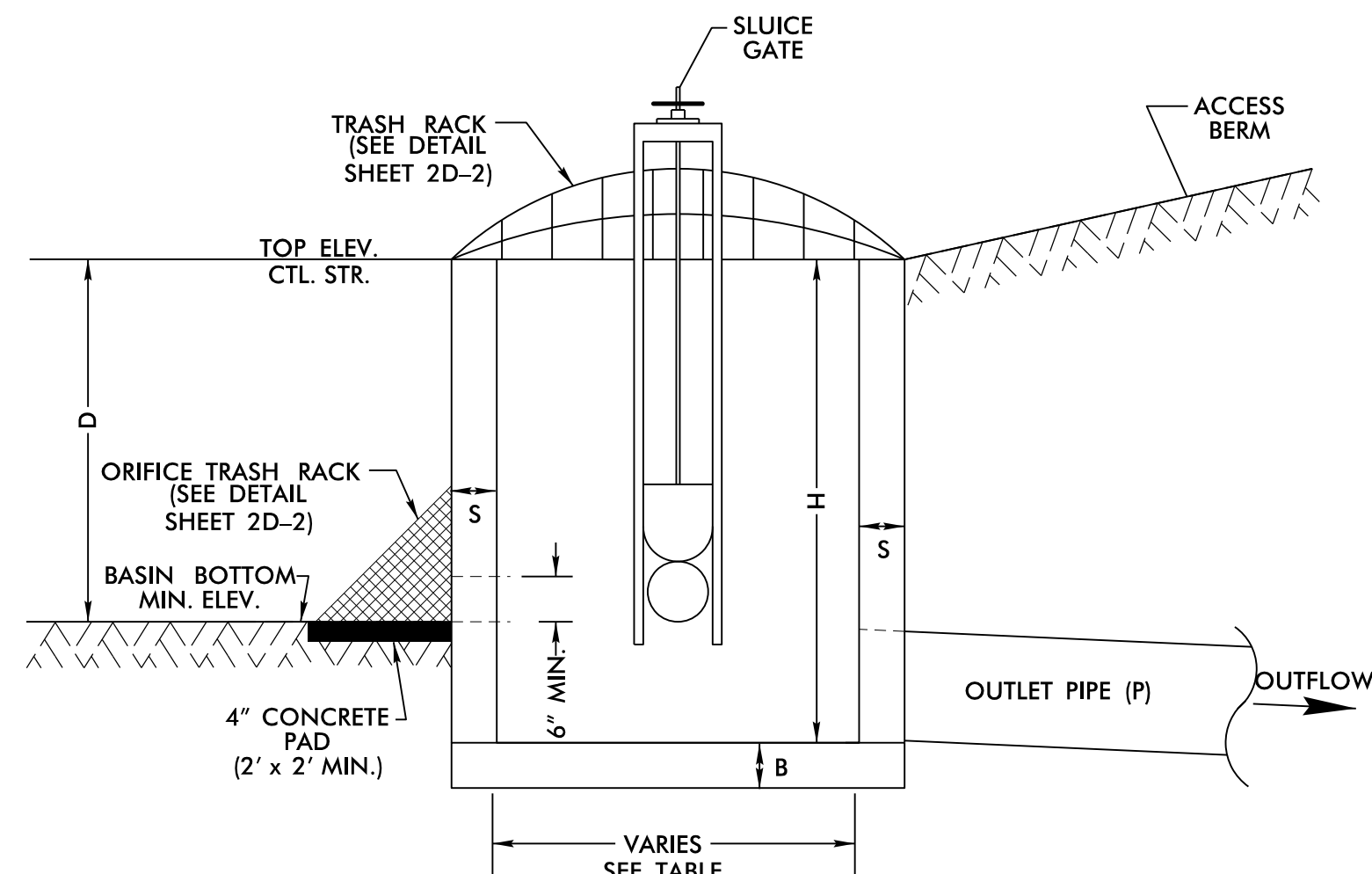
I5-JAN-2020 07:51
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 .jhowerton AT USD-320965

DETAIL 12 DRY DETENTION BASIN DRAWDOWN STRUCTURE

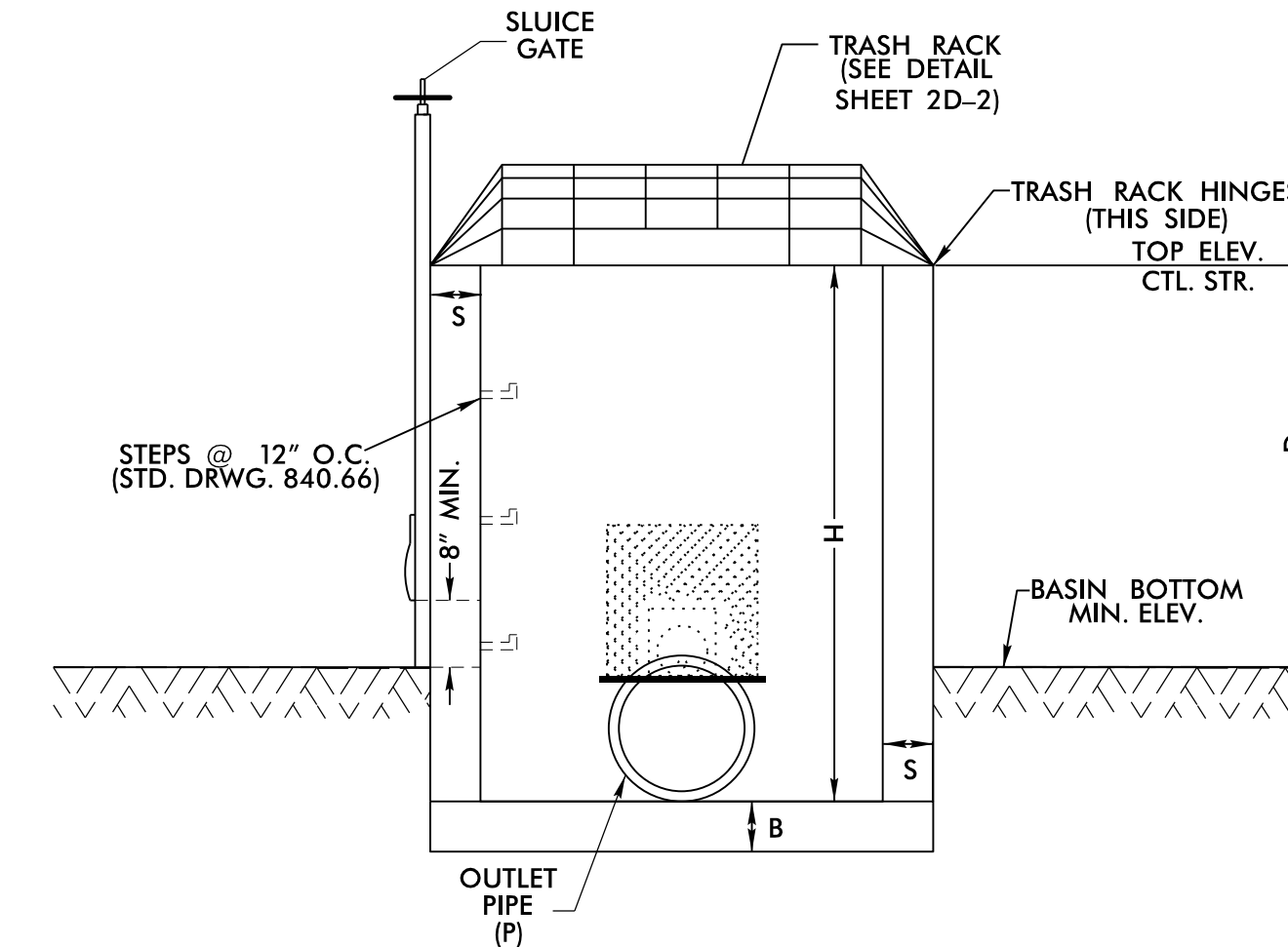
NOT TO SCALE



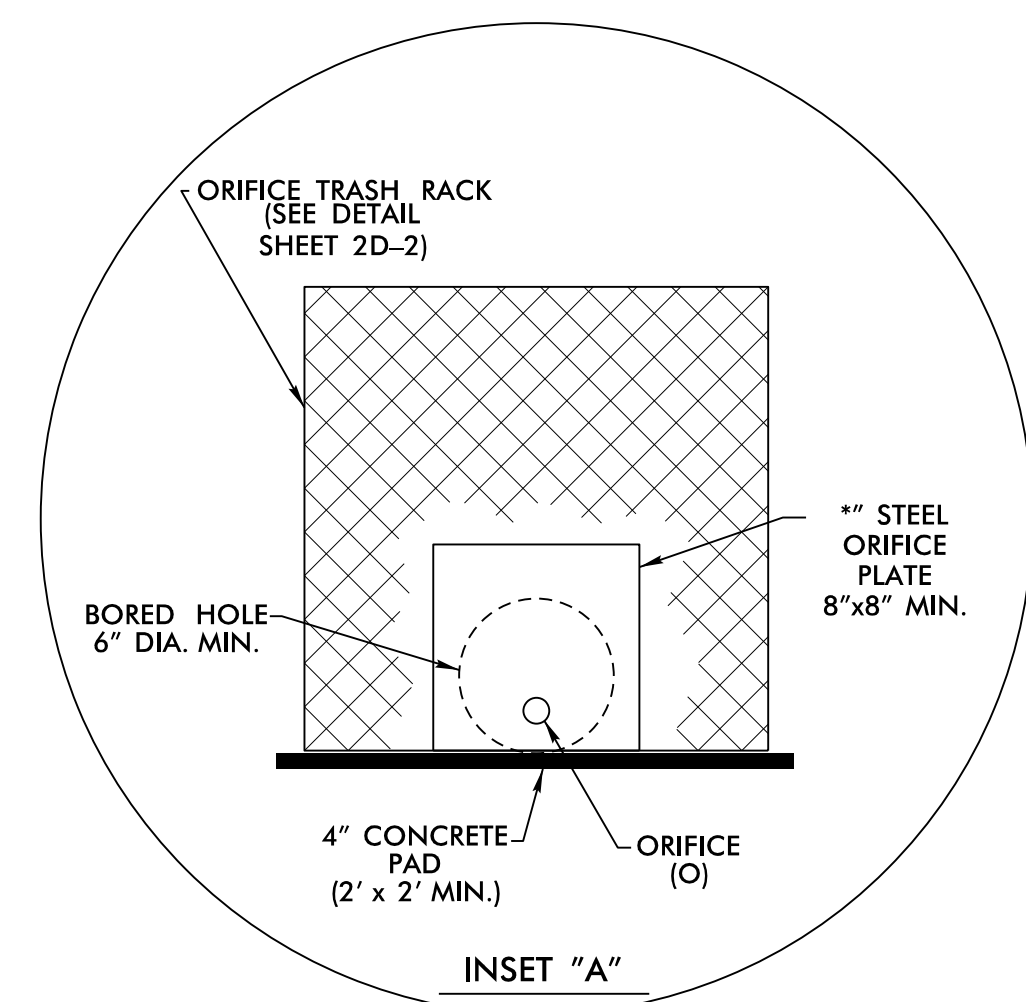
SIDE 1



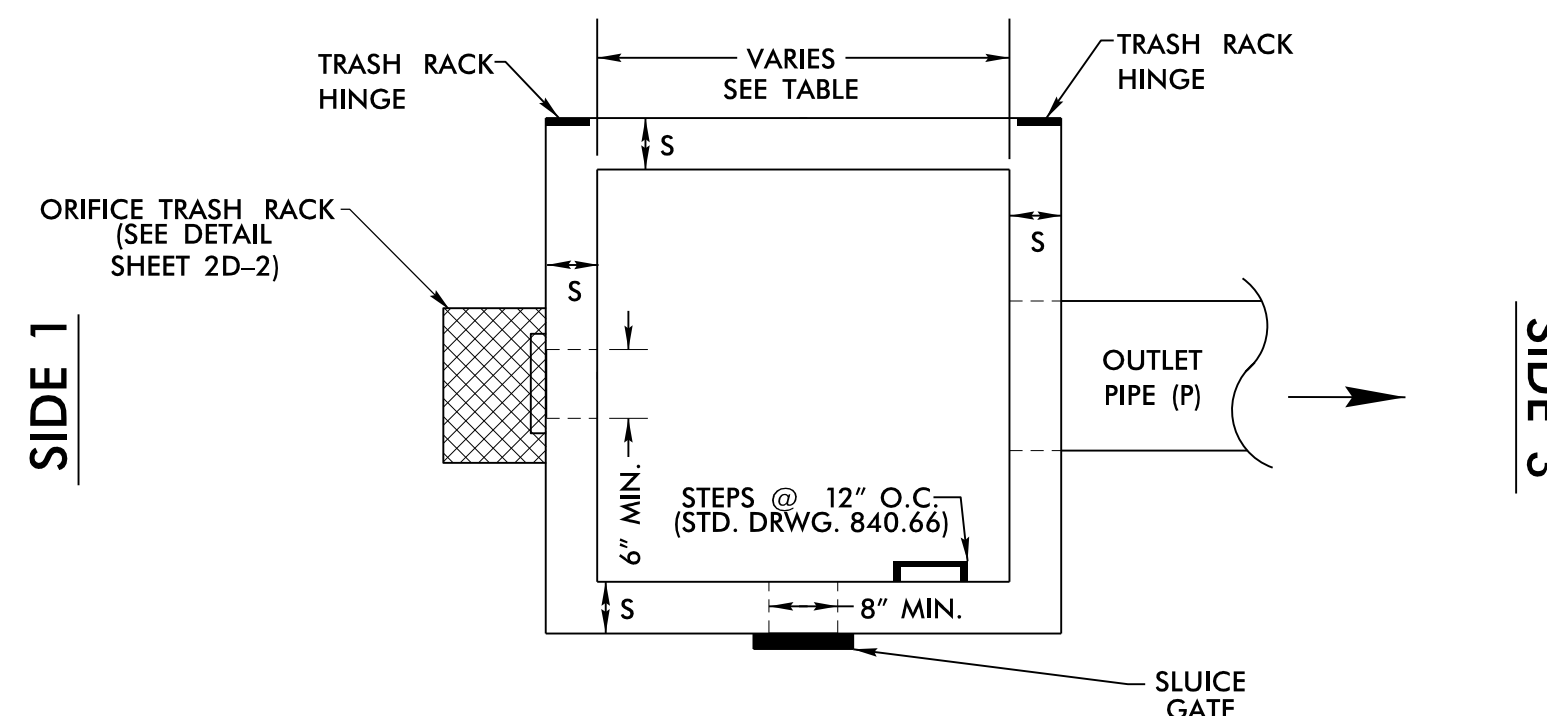
SIDE 2



SIDE 3



INSET "A"



SIDE 2

PLAN VIEW

TRASH RACK NOT SHOWN FOR CLARITY

NOTES:

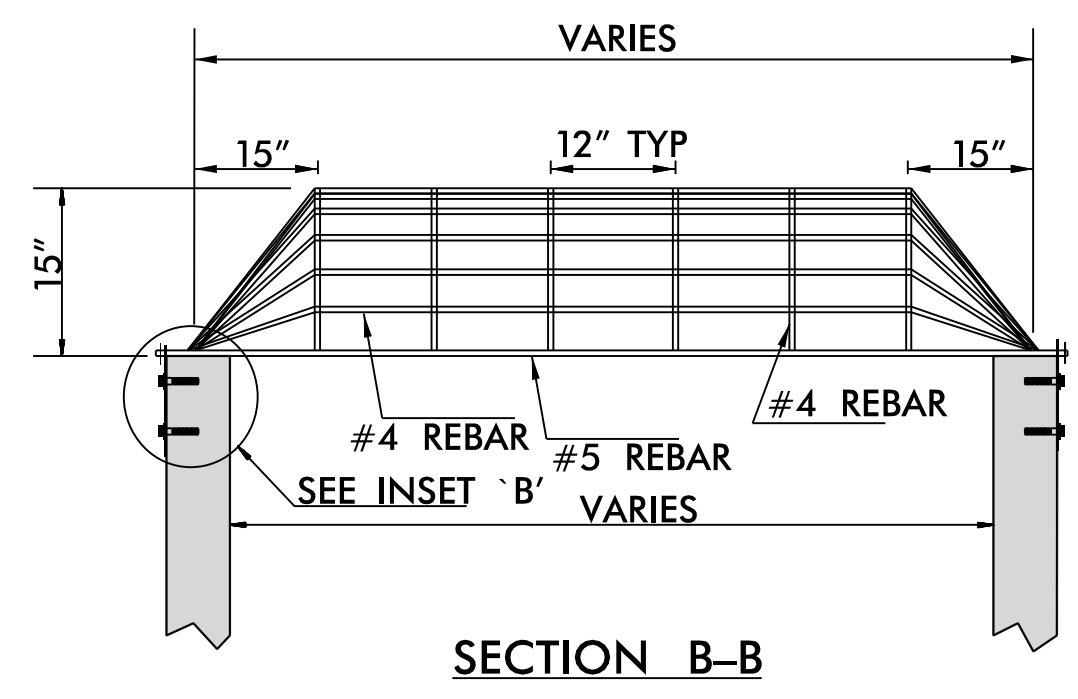
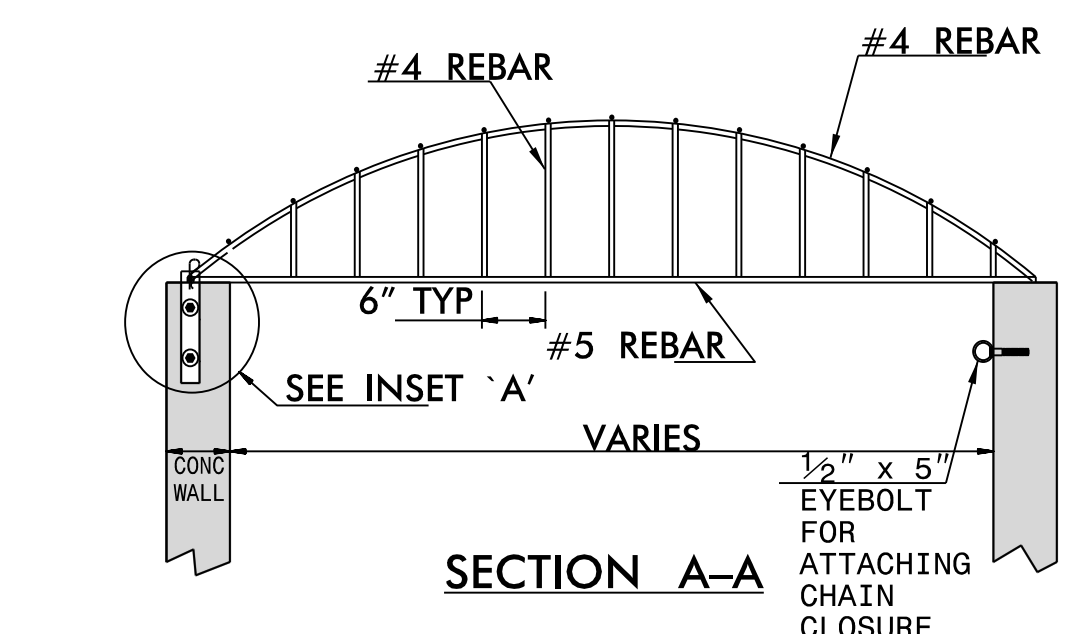
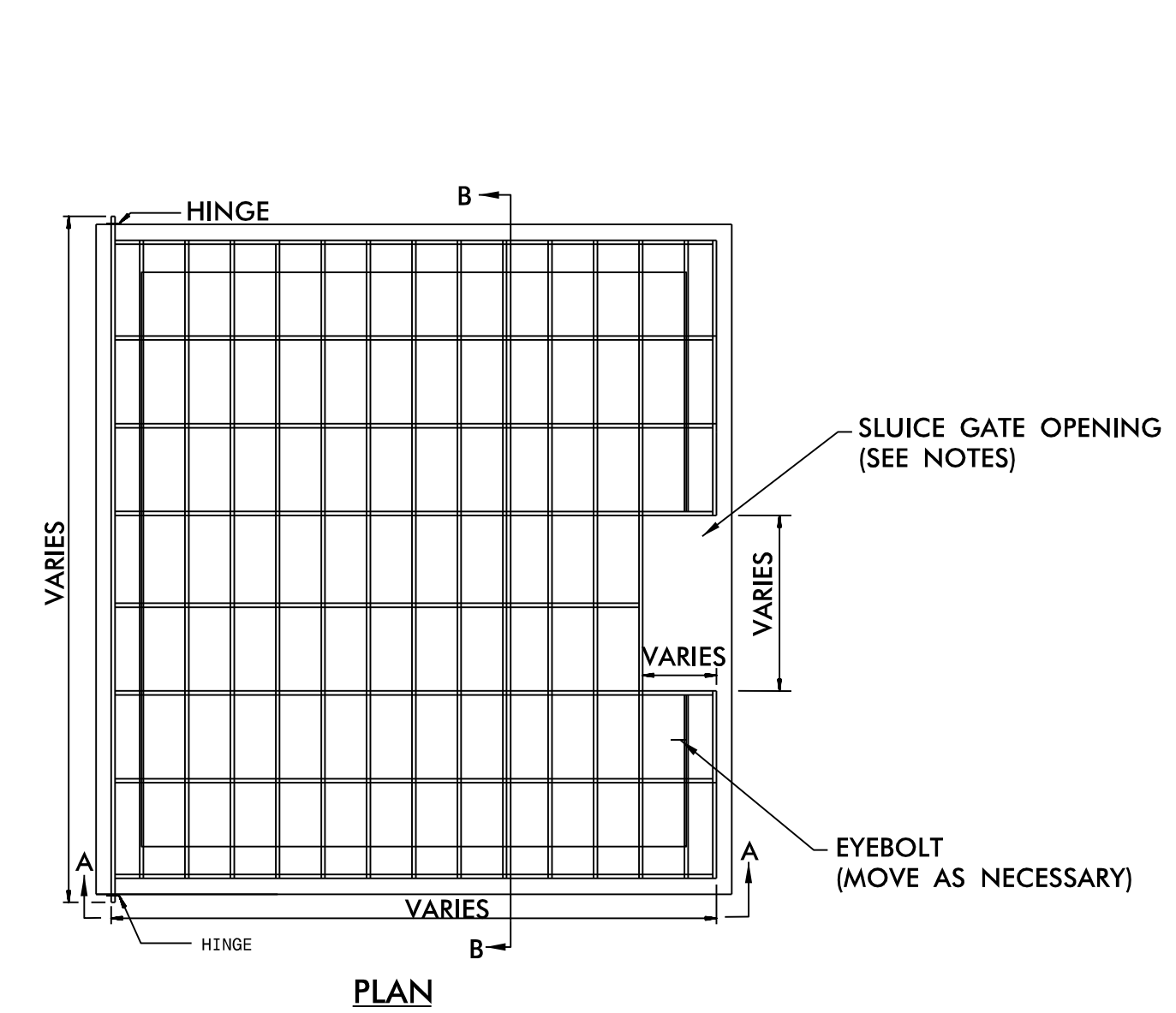
1. TOP ELEVATION OF CONTROL STRUCTURE (WEIR ELEVATION) SHOULD BE SET AT THE W_{QV} ELEVATION.
2. 15" MINIMUM DIAMETER FOR OUTLET PIPE.
3. 2" MINIMUM DIAMETER ORIFICE. IF ORIFICE IS GREATER THAN 6", A STEEL PLATE IS NOT REQUIRED.
4. NO BEDDING MATERIAL TO BE USED. THEREFORE, DO NOT FOLLOW STANDARD DRAWINGS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

MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE

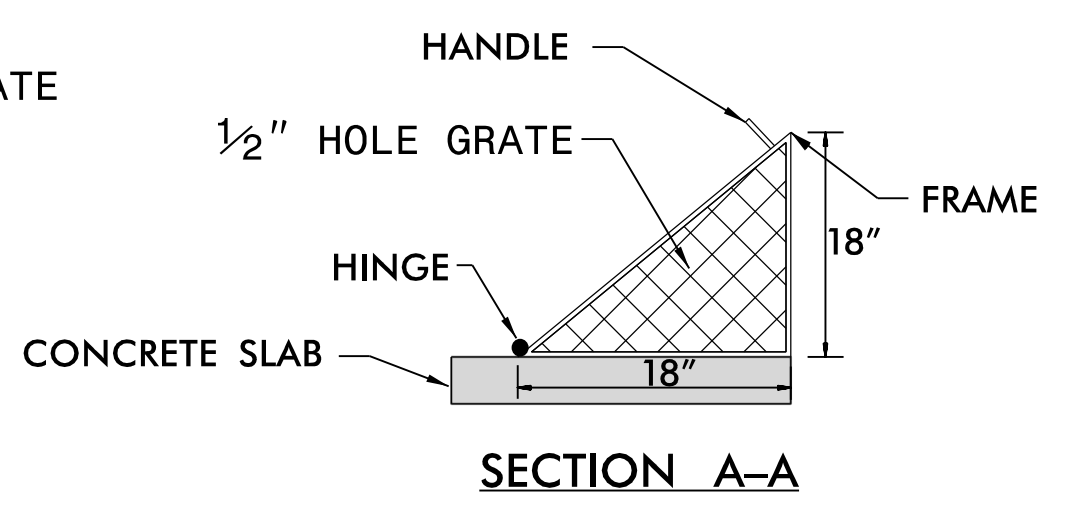
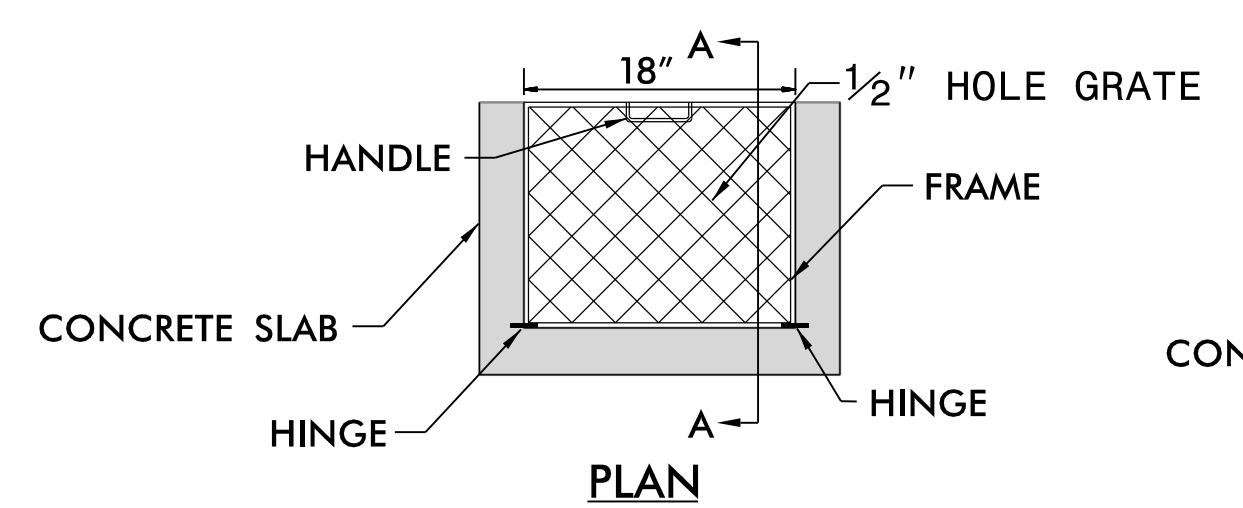
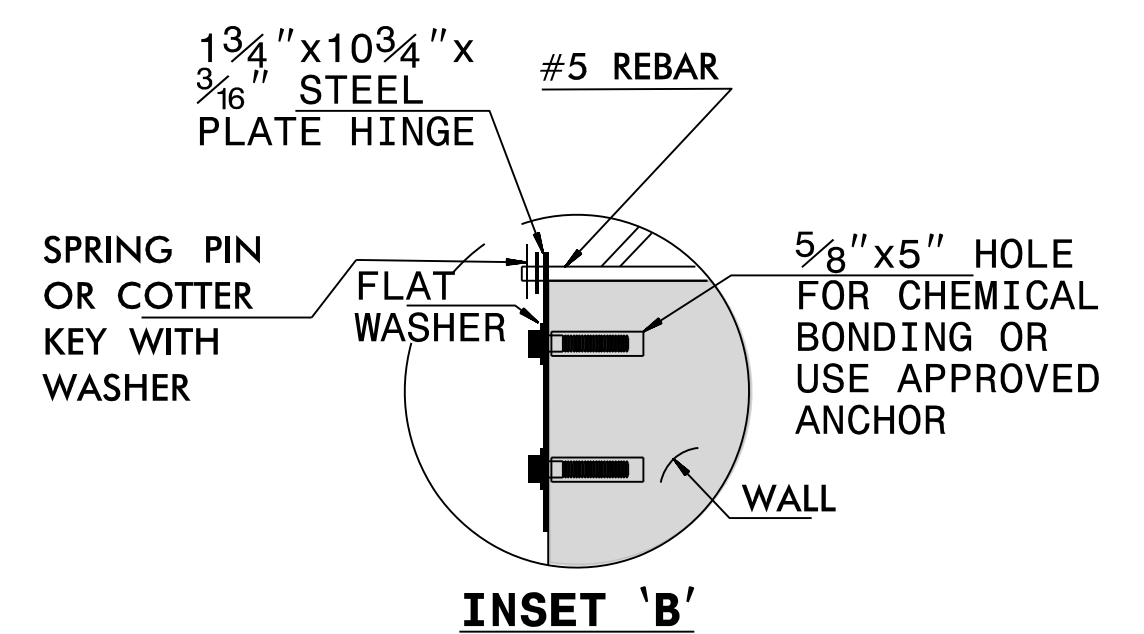
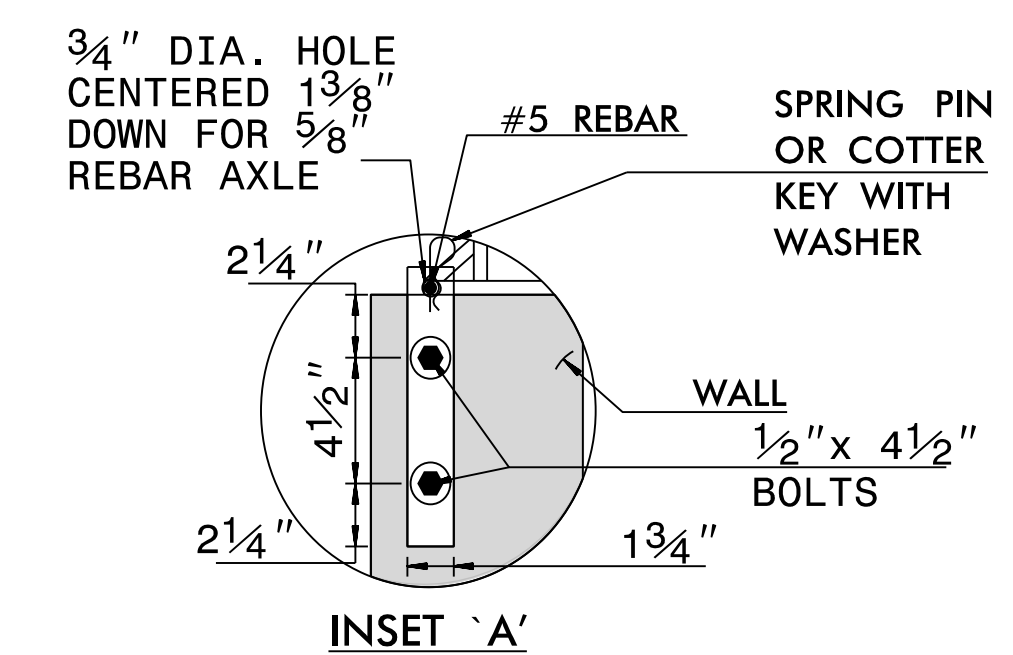
STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	BASIN BOTTOM MINIMUM ELEV.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	INV. ELEV. CTL. STR.	CTL. STR. DIMENSIONS (W x L x H)	ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE DIAMETER(P) INCHES	ADDT'L ORIFICE(S) DIAMETER(O) INCHES	ORIFICE INV. ELEV.
242+48 -L- RT	0933	6	6	84.9	86.8	1.9	84.9	2.3'x3.0'x1.9'	9.5"	84.9	15"	N/A	N/A
243+05 -L- RT	0937	6	6	83.6	88.9	5.3	83.6	4.0'x4.0'x5.3'	6.0"	83.6	15"	N/A	N/A

DETAIL 12A REBAR & ORIFICE TRASH RACKS (N.T.S.)

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



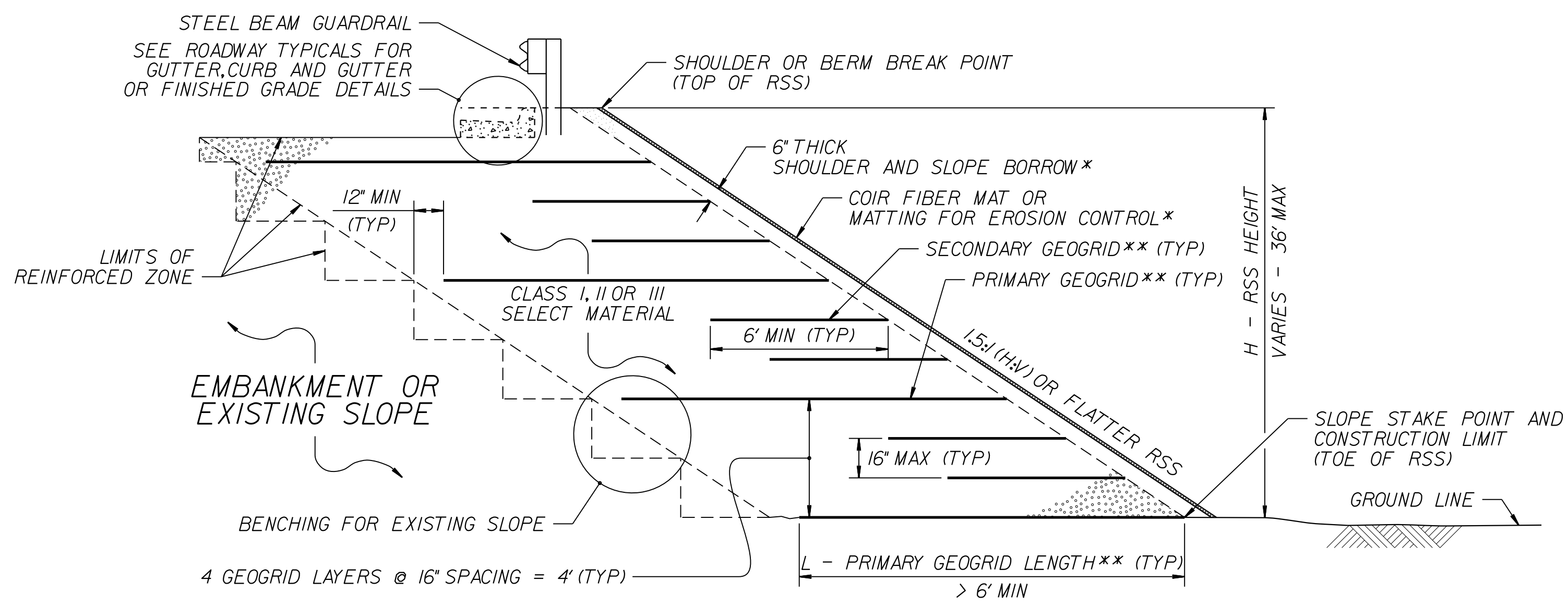
**REBAR TRASH RACK
NOT TO SCALE**



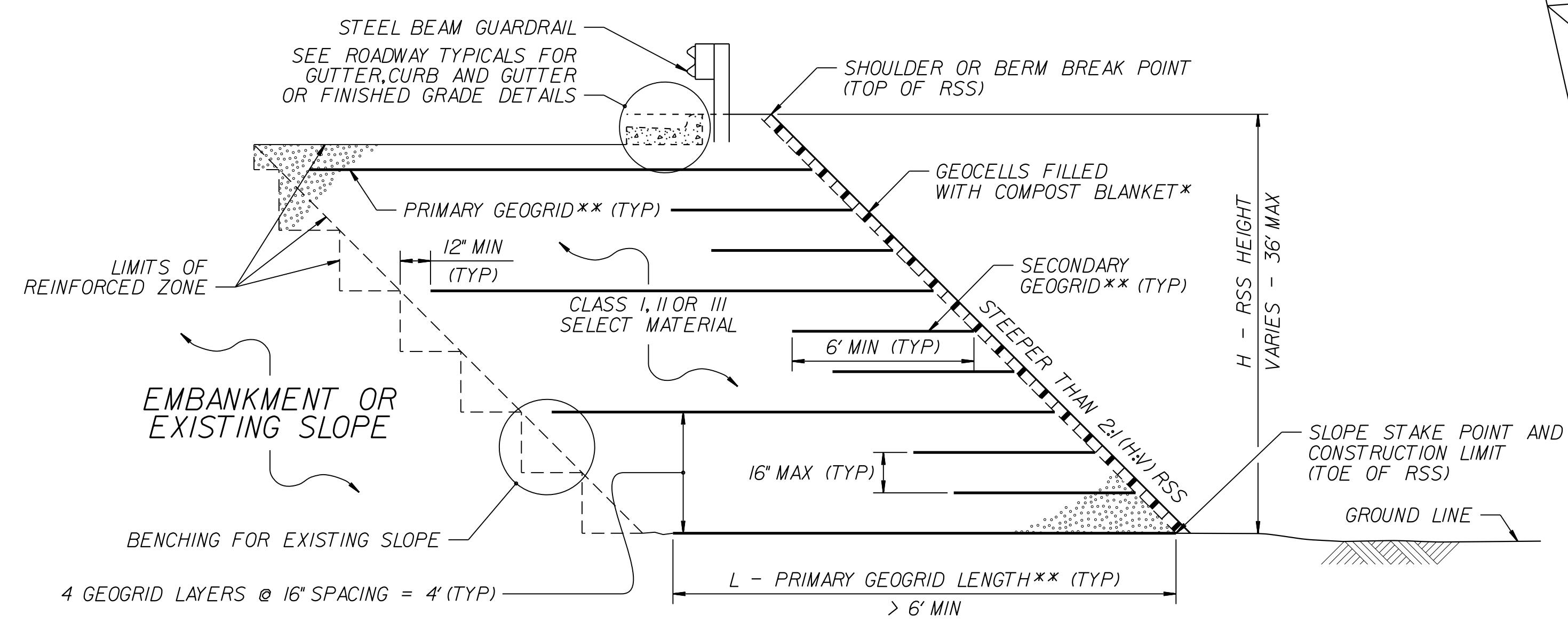
**ORIFICE TRASH RACK
NOT TO SCALE**

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

28-APR-2020 10:24
 R:\2016\221601889\NICDOT R-5020B US 701 Widening\Roadway\Proj\F-5020B_Rdy_pah_2D-2.dgn
 \$\$\$\$SYTIME\$\$\$\$

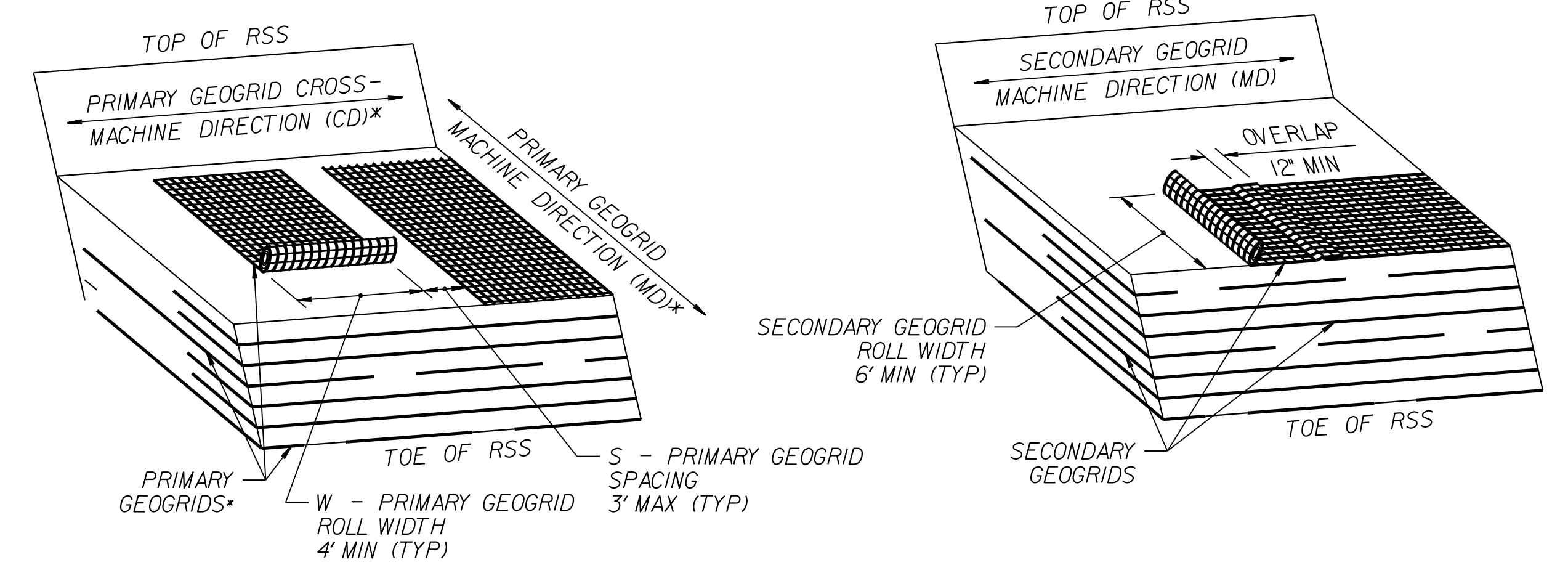


MATTING WITH SHOULDER AND SLOPE BORROW
*SEE NOTES 3 AND 10 ON SHEET 2.




GEOCELLS WITH COMPOST BLANKET
*SEE NOTES 3 AND 10 ON SHEET 2.

STANDARD REINFORCED SOIL SLOPE (RSS)
**SEE TABLES ON SHEET 2 AND GEOGRID PLACEMENT DETAILS.
IF RSS ANGLE IS 2:1 (H:V) OR FLATTER, REPLACE PRIMARY GEOGRID WITH SECONDARY GEOGRID PLACED AS SHOWN IN THE GEOGRID PLACEMENT DETAILS.



GEOGRID PLACEMENT DETAILS
(% COVERAGE = $\frac{W}{W+S} \times 100 \geq 75\%$)
*SEE NOTE 8 ON SHEET 2. DO NOT OVERLAP PRIMARY GEOGRIDS IN ANY DIRECTION.

PROJECT REFERENCE NO. R-5020B	SHEET NO. 2G-2
GEOTECHNICAL ENGINEER  DocuSigned by: Scott A. Holden 3/20/2020 <small>780CA2995C403 SIGNATURE DATE</small>	ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

H (FT)	0 - < 12		12 - 24		> 24 - 36	
	I	II OR III	I	II OR III	I	II OR III
1:1 TO < 1.5:1 (H:V) RSS	900	500	1200	900	1800	1200
1.5:1 TO 1.75:1 (H:V) RSS	500	500	900	500	1400	1000
> 1.75:1 TO < 2:1 (H:V) RSS	500	500	600	500	1000	800

**MINIMUM REQUIRED PRIMARY GEOGRID
LONG-TERM DESIGN STRENGTH (LTDS, LB/FT) IN MACHINE DIRECTION (MD)**
(LTDS IS BASED ON 100% COVERAGE FOR PRIMARY GEOGRID.
SEE NOTE 8 FOR LESS THAN 100% COVERAGE.)

NOTES:

- SEE EROSION CONTROL AND ROADWAY PLANS AND SUMMARY SHEETS FOR REINFORCED SOIL SLOPE (RSS) AND SLOPE EROSION CONTROL LOCATIONS.
- FOR STANDARD REINFORCED SOIL SLOPES, SEE REINFORCED SOIL SLOPES PROVISION. FOR STEEL BEAM GUARDRAIL, SEE SECTION 862 OF THE STANDARD SPECIFICATIONS.
- FOR SHOULDER AND SLOPE BORROW, SEE ARTICLE 1019-2 OF THE STANDARD SPECIFICATIONS. FOR GEOCELLS, SEE CELLULAR CONFINEMENT SYSTEMS PROVISION. FOR COIR FIBER MAT MATTING FOR EROSION CONTROL AND COMPOST BLANKET, SEE EROSION CONTROL PROVISIONS, SECTION 1631 OF THE STANDARD SPECIFICATIONS AND ROADWAY STANDARD DRAWING NO. 1631.01.
- STANDARD RSS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF
- DO NOT USE STANDARD RSS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER OR FLOOD ELEVATION IS ABOVE TOE OF RSS.
- DO NOT USE STANDARD RSS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW RSS.
- PRIMARY GEOGRIDS ARE APPROVED FOR LTDS FOR A 75-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM: connect.ncdot.gov/resources/Geological/Pages/Products.aspx
DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SELECT MATERIAL AS FOLLOWS:

MATERIAL TYPE	SELECT MATERIAL
BORROW	CLASS I SELECT MATERIAL
FINE AGGREGATE	CLASS II OR III SELECT MATERIAL

- FOR PRIMARY GEOGRIDS WITH 100% COVERAGE, PLACE PRIMARY GEOGRIDS SO GEOGRIDS ARE ADJACENT TO EACH OTHER IN THE CD. FOR PRIMARY GEOGRIDS WITH 75% TO LESS THAN 100% COVERAGE,

$$\text{MINIMUM REQUIRED PRIMARY GEOGRID LTDS} = \text{LTDS BASED ON 100\% COVERAGE} \times (W + S) / W$$

SEE TABLE FOR LTDS BASED ON 100% COVERAGE AND GEOGRID PLACEMENT DETAILS FOR PRIMARY GEOGRID ROLL WIDTH (W) AND SPACING (S). FOR PRIMARY GEOGRIDS WITH LESS THAN 100% COVERAGE, STAGGER PRIMARY GEOGRIDS SO GEOGRIDS ARE CENTERED OVER GAPS IN THE PRIMARY GEOGRID LAYER BELOW. DO NOT USE LESS THAN 75% COVERAGE FOR PRIMARY GEOGRIDS.

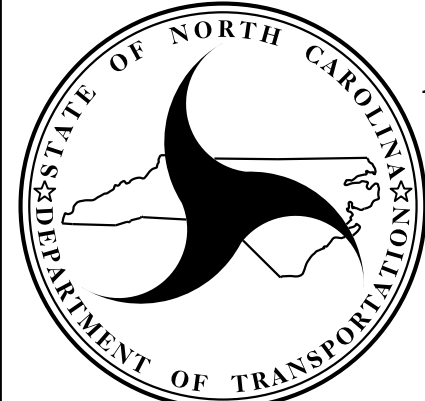
- DO NOT PLACE ANY GEOGRIDS UNTIL EXCAVATION DIMENSIONS AND IN-SITU MATERIAL ARE APPROVED.
- FOR SLOPE EROSION CONTROL, USE GEOCELLS OR MATTING ON SLOPE FACES OF RSS AS FOLLOWS:

RSS ANGLE	SLOPE EROSION CONTROL
1:1 TO < 1.5:1 (H:V)	GEOCELLS WITH COMPOST BLANKET
1.5:1 TO < 2:1 (H:V)	GEOCELLS WITH COMPOST BLANKET OR COIR FIBER MAT WITH SHOULDER AND SLOPE BORROW*
2:1 (H:V) OR FLATTER	MATTING FOR EROSION CONTROL WITH SHOULDER AND SLOPE BORROW

*SEE REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL SUMMARY TABLE IN THE ROADWAY SUMMARY SHEETS FOR SLOPE EROSION CONTROL ON SLOPE FACES OF RSS 1.5:1 (H:V) TO STEEPER THAN 2:1.

H (FT)	0 - < 12		12 - 24		> 24 - 36	
SELECT MATERIAL CLASS	I	II OR III	I	II OR III	I	II OR III
1:1 TO < 1.5:1 (H:V) RSS	1.25	1.20	1.15	1.10	1.10	1.00
1.5:1 TO 1.75:1 (H:V) RSS	1.10	1.00	0.95	0.90	0.90	0.85
> 1.75:1 TO < 2:1 (H:V) RSS	1.00	0.85	0.80	0.75	0.75	0.70

PRIMARY GEOGRID LENGTH / RSS HEIGHT (L / H) RATIO (L > 6' MIN)
(IF L ≤ 6', USE SECONDARY GEOGRID INSTEAD OF PRIMARY GEOGRID.)

 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT	STANDARD DETAIL NO. 1802.01
	STANDARD REINFORCED SOIL SLOPE (RSS) WITH HIGH GROUNDWATER SHEET 2 OF 2 DATE: 12-17-19

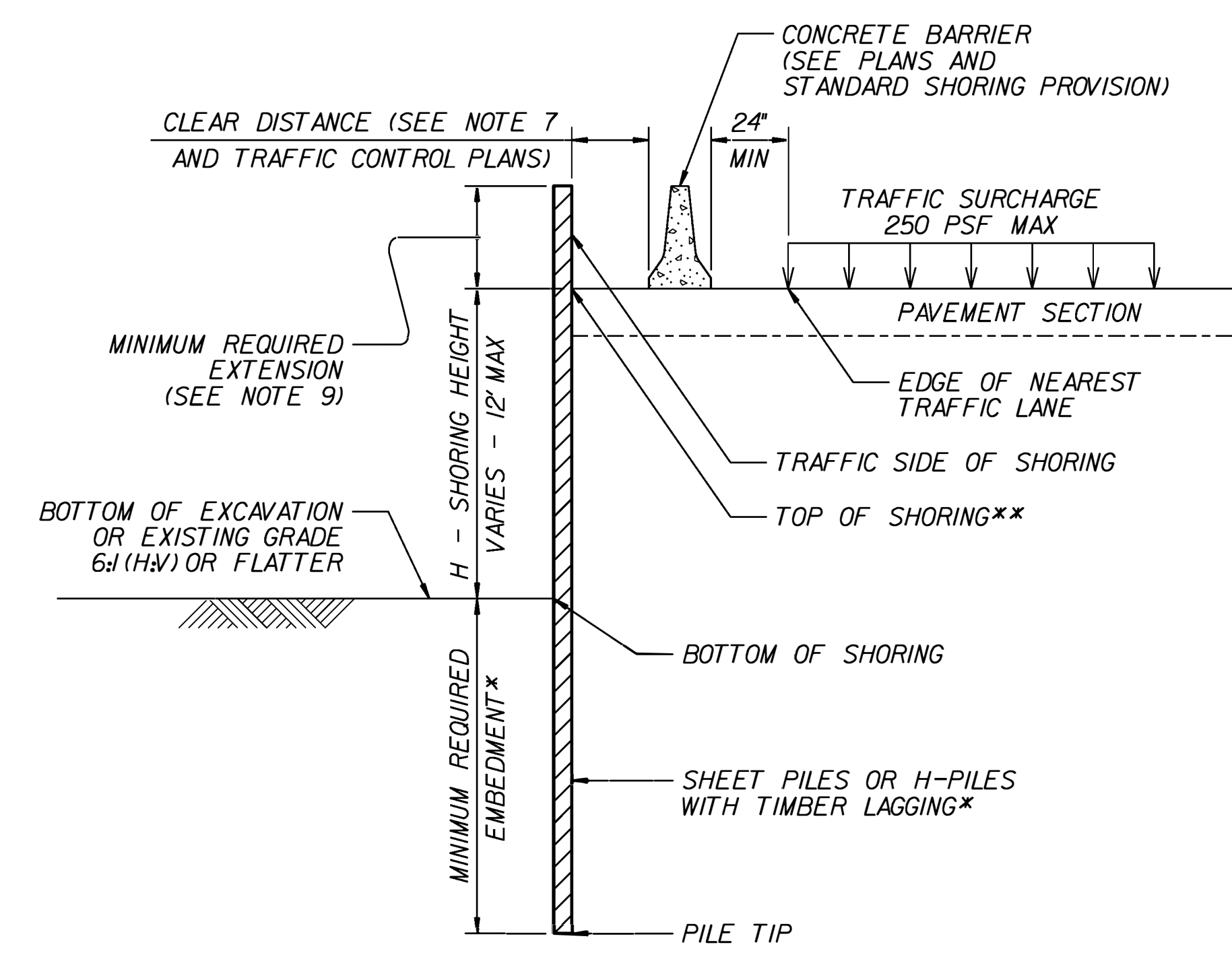
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS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

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

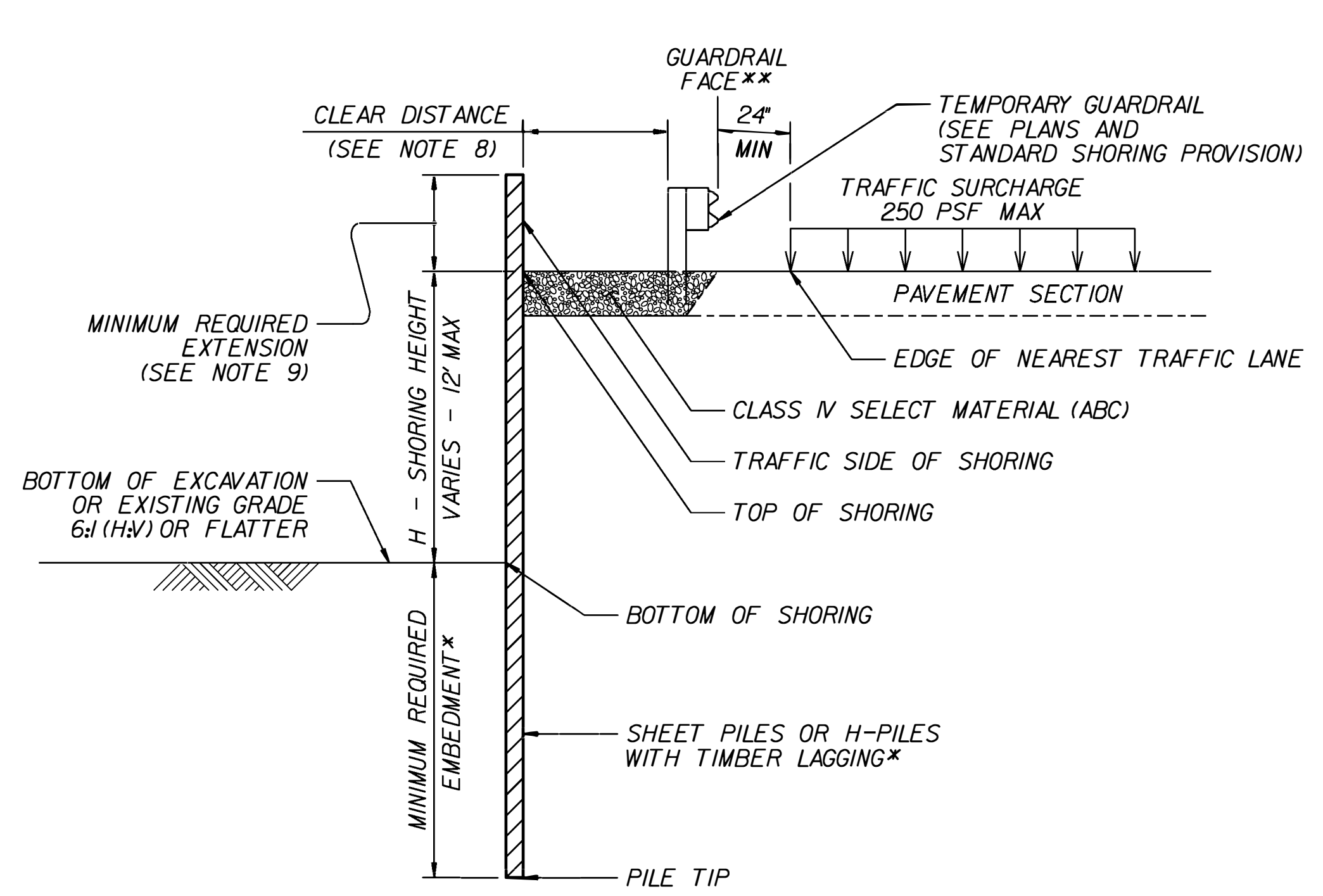
*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

NOTES:

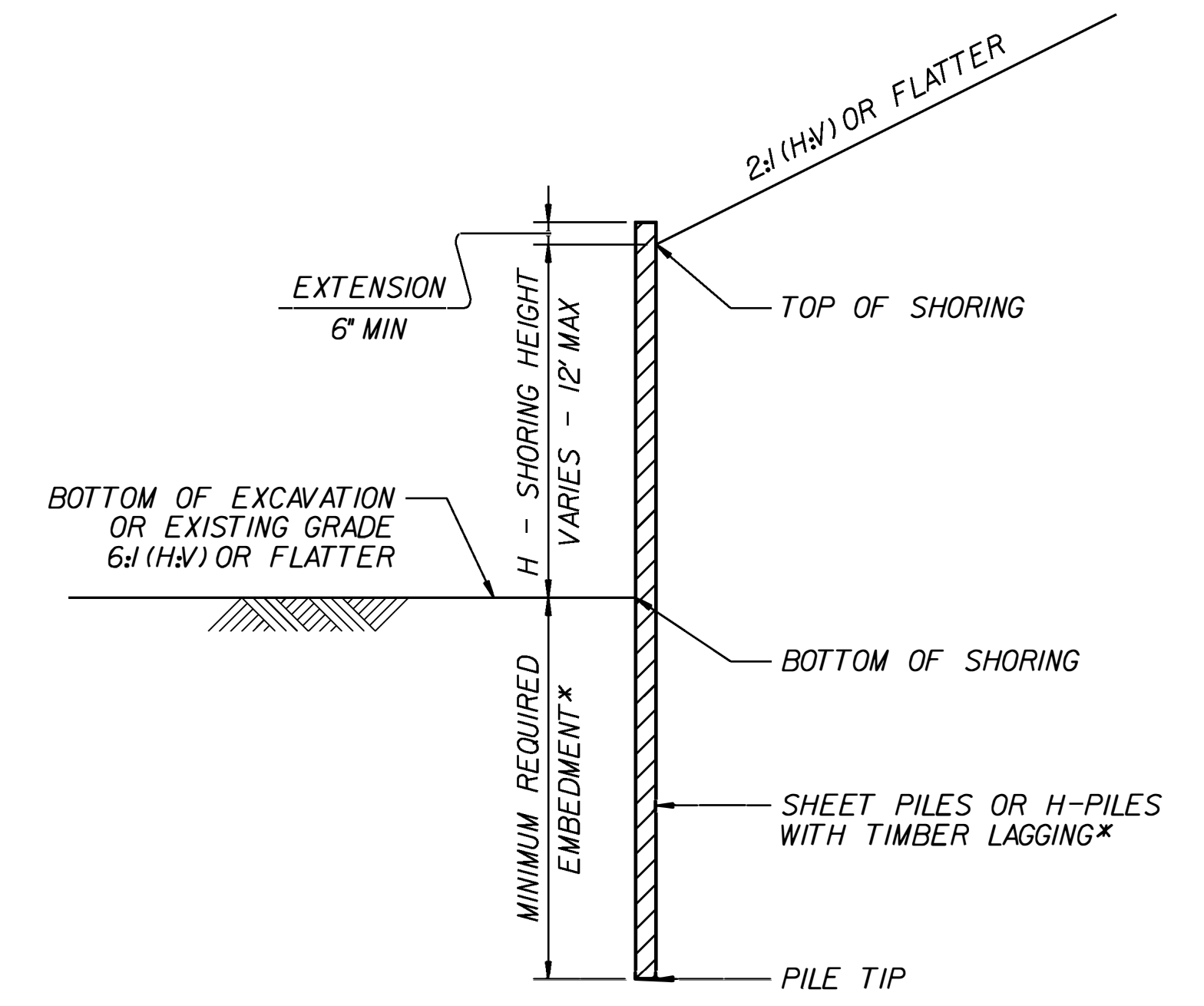
- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF
- DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
- 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.
- 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".
- 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".
- MINIMUM REQUIRED EXTENSION IS 6' FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32' FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
- 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.
- 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
- CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



CONCRETE BARRIER
**TOP OF SHORING =
EDGE OF PAVEMENT



TEMPORARY GUARDRAIL
**GUARDRAIL FACE =
EDGE OF PAVEMENT



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

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

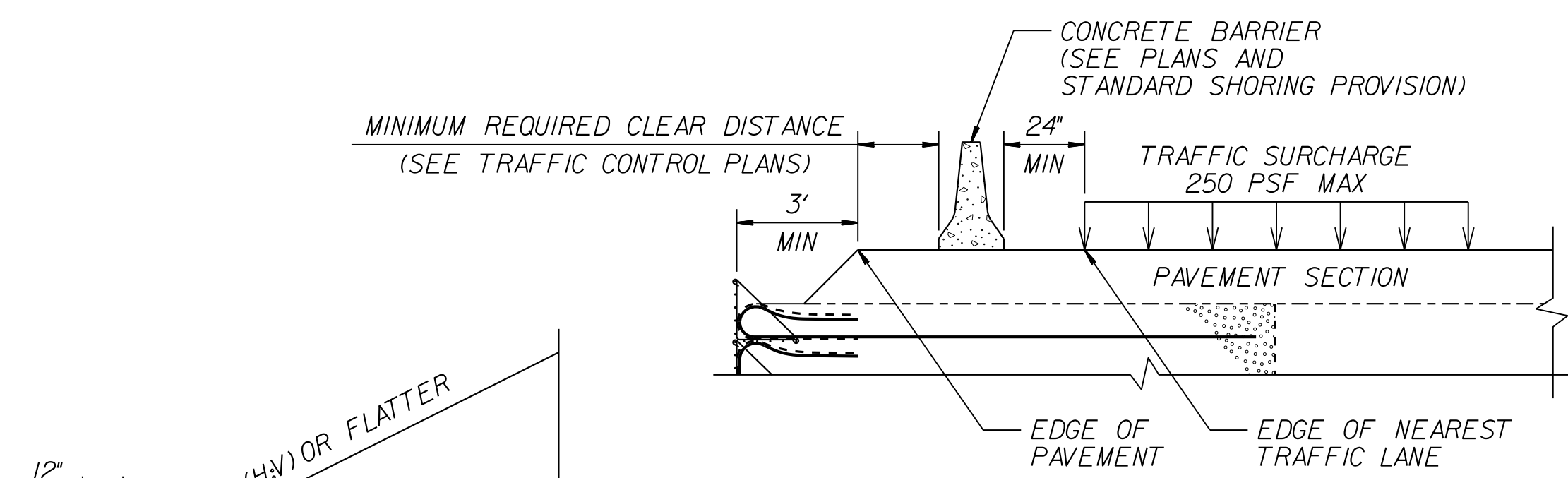


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DIVISION OF HIGHWAYS

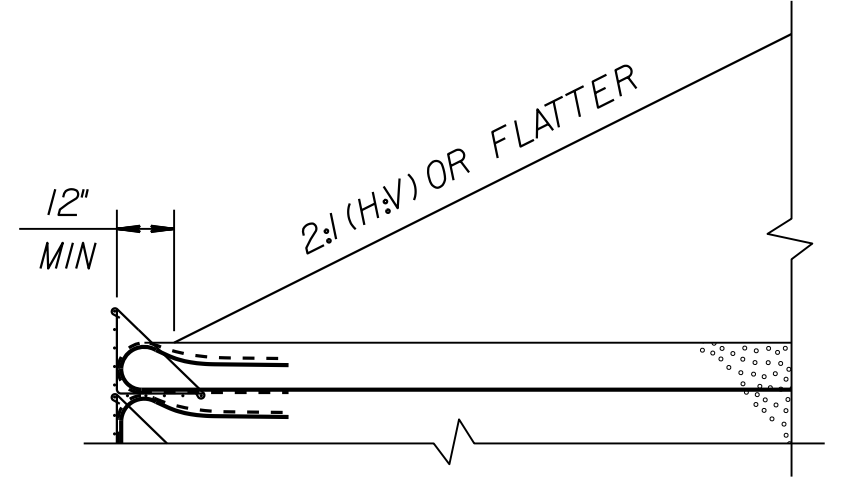
**GEOTECHNICAL
ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.01

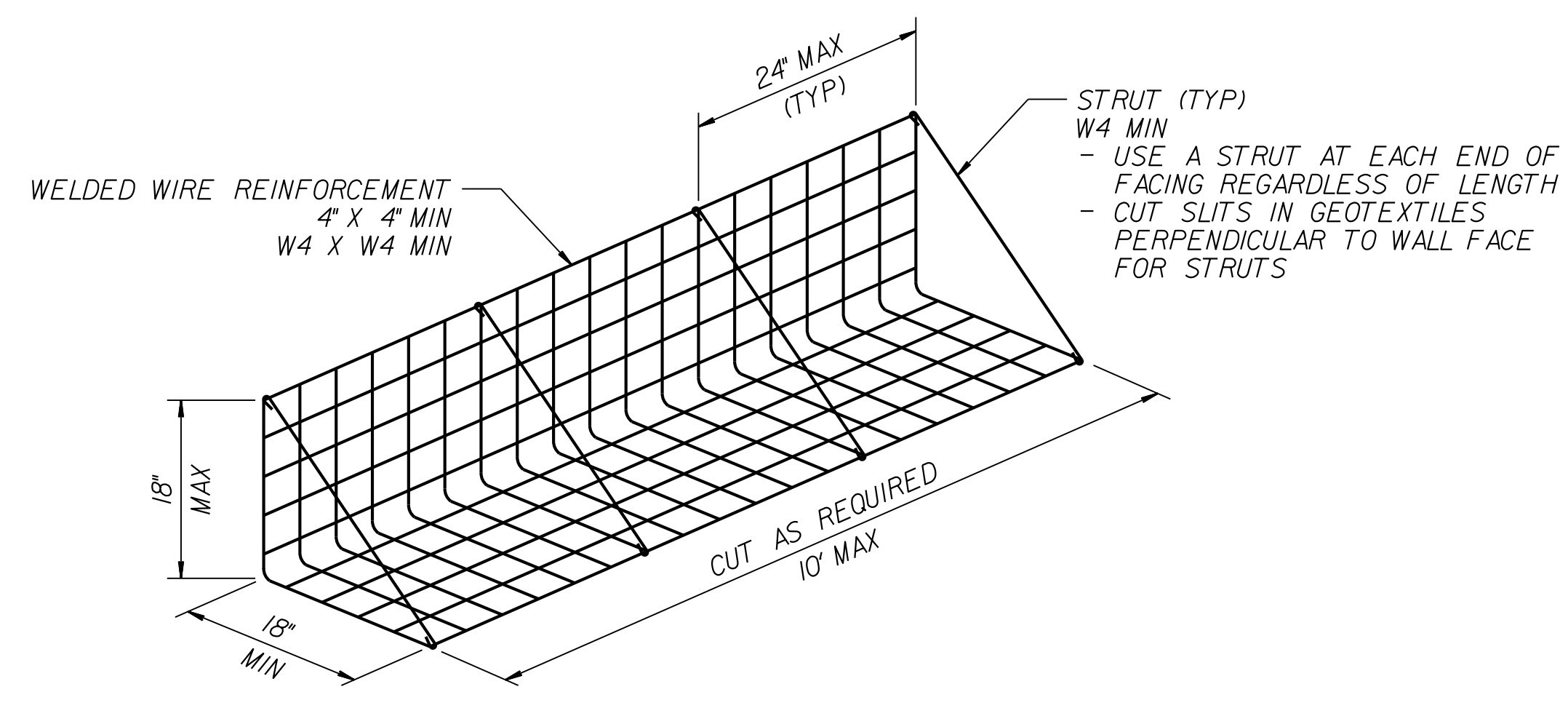
**STANDARD
TEMPORARY SHORING**



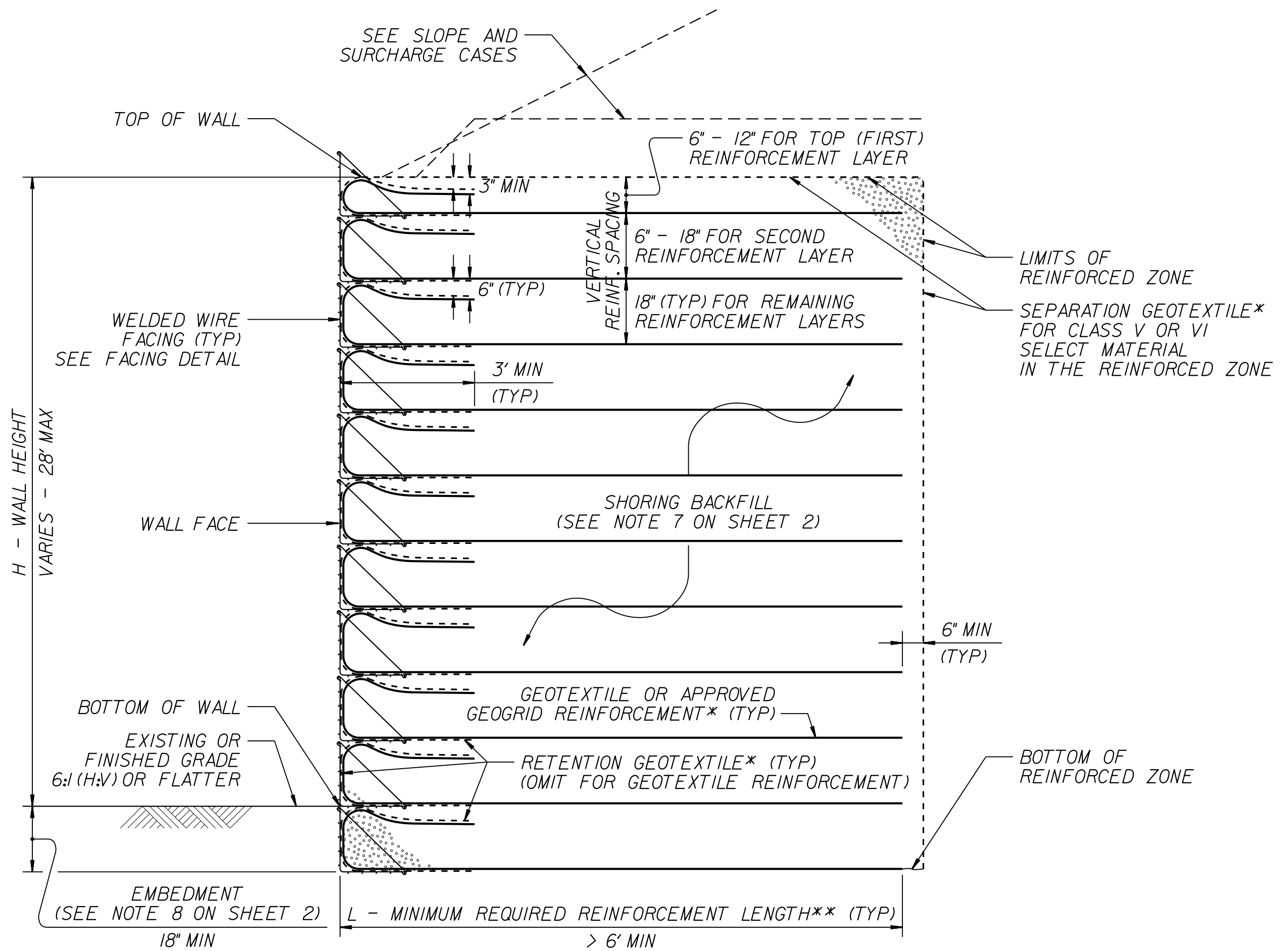
SURCHARGE CASE



SLOPE CASE

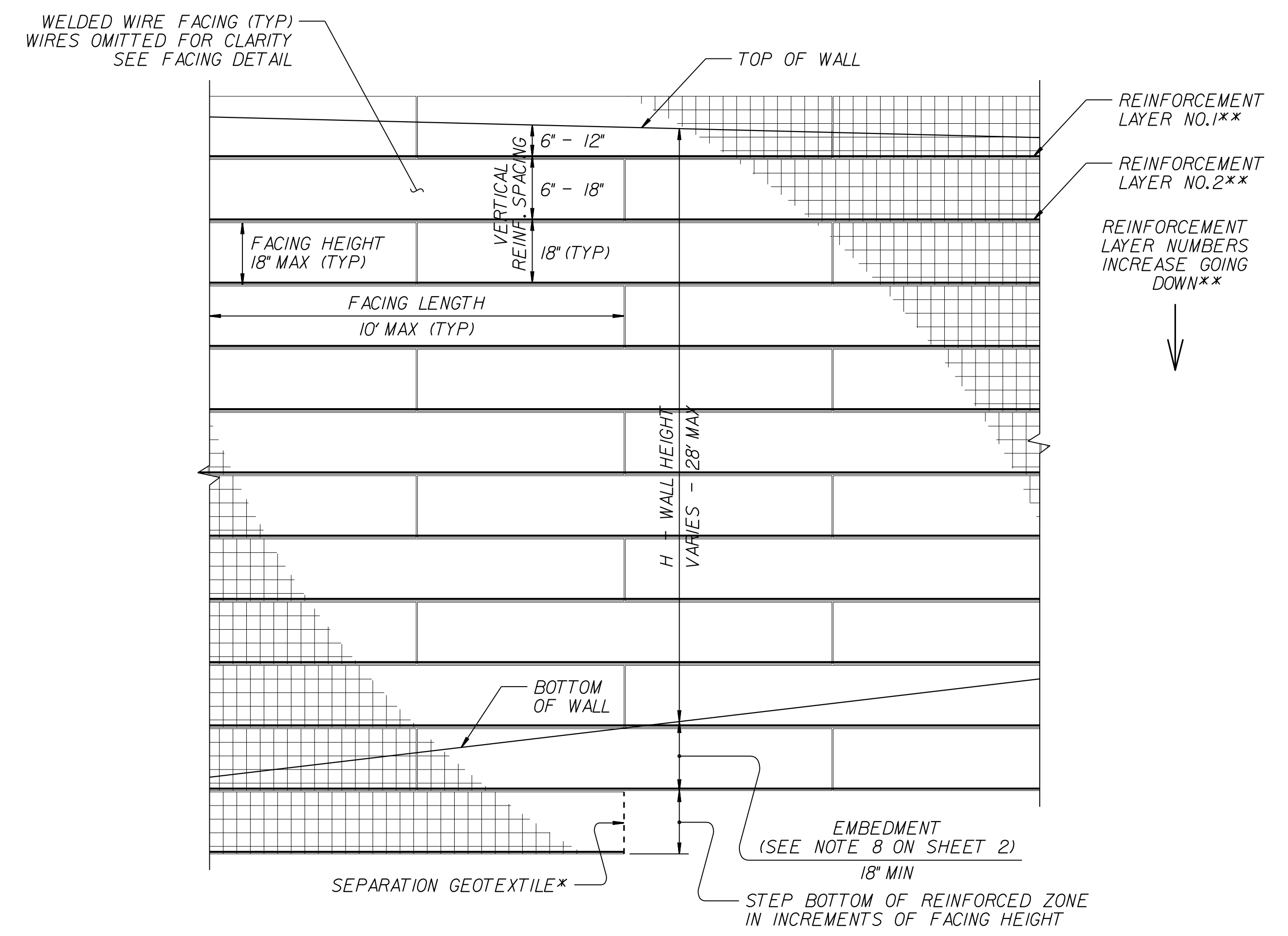


FACING DETAIL



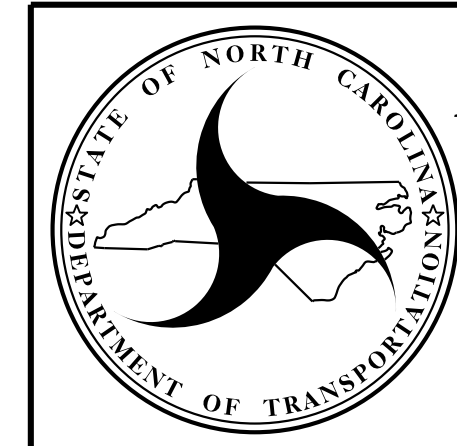
STANDARD TEMPORARY WALL

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)
 *SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
 **SEE REINFORCEMENT TABLES ON SHEET 3.



STANDARD TEMPORARY WALL - PARTIAL ELEVATION

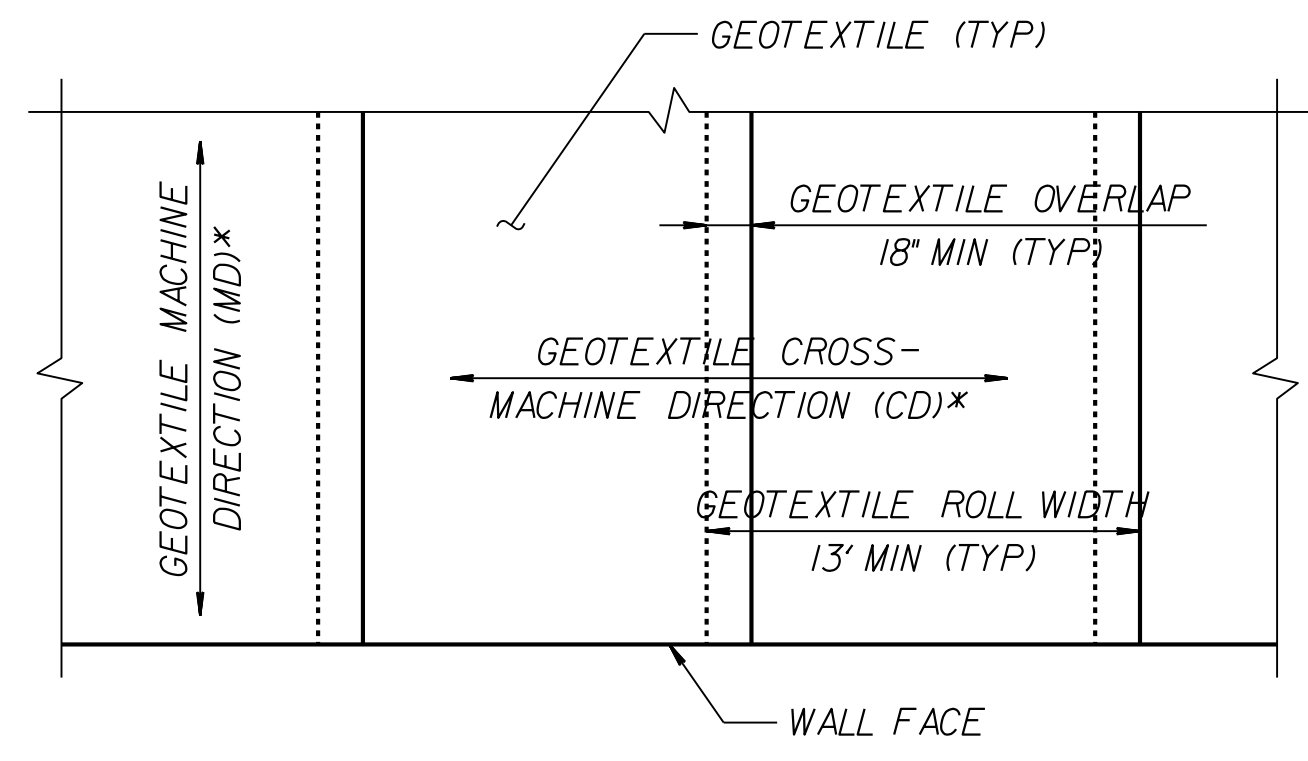
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
 **SEE REINFORCEMENT TABLES ON SHEET 3.



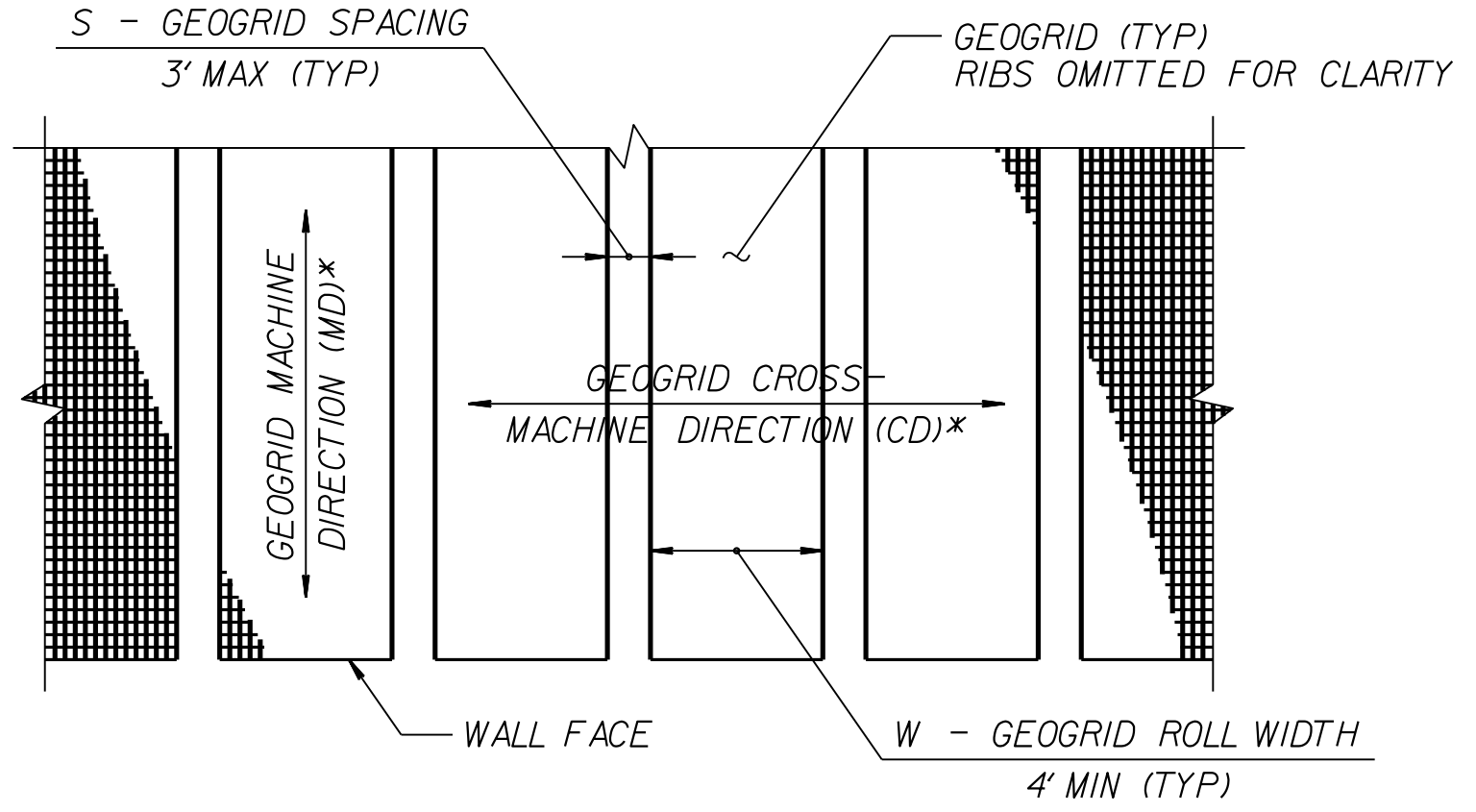
NORTH CAROLINA
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 DIVISION OF HIGHWAYS
**GEOTECHNICAL
 ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.02

STANDARD
 TEMPORARY WALL
 SHEET 1 OF 3

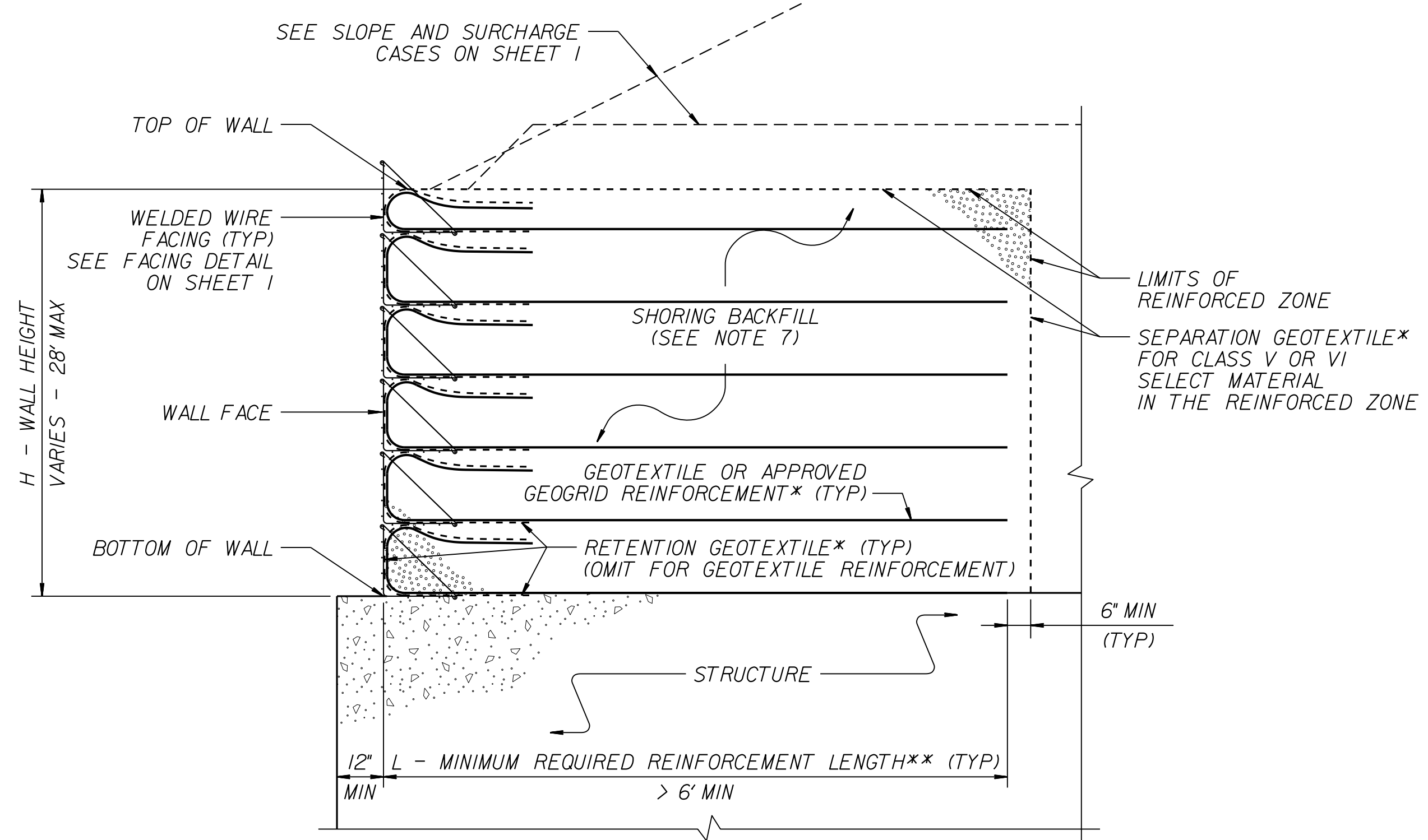


GEOTEXTILE PLACEMENT
(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)



GEOGRID PLACEMENT
(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT - $\frac{W}{W+S} \times 100 \geq 80\%$, SEE NOTE 11)

GEOSYNTHETIC PLACEMENT DETAILS
(PLAN VIEW)
*SEE NOTE 12.



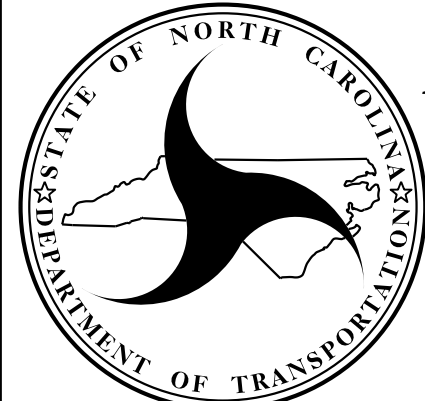
TEMPORARY WALL ON STRUCTURE DETAIL
*SEE GEOSYNTHETIC PLACEMENT DETAILS.
**SEE REINFORCEMENT TABLES ON SHEET 3.

NOTES:

- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ PCF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ PSF
- DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
- USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER IS ABOVE BOTTOM OF REINFORCED ZONE.
- DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
- EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
- DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
- GEOGRIDS ARE TYPICALLY APPROVED FOR ULTIMATE TENSILE STRENGTHS IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) OR SHORT-TERM DESIGN STRENGTHS FOR A 3-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM:
connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Manual.aspx
DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

- IF THE WEBSITE DOES NOT LIST A SHORT-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID, USE A SHORT-TERM DESIGN STRENGTH EQUAL TO THE ULTIMATE TENSILE STRENGTH DIVIDED BY 3.5 FOR THE GEOGRID REINFORCEMENT.
- FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
 - AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:
- W (REINFORCEMENT ROLL WIDTH) \geq (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
- REINFORCEMENT STRENGTH IN CD \geq MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
 - SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:
connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
 - DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
 - FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
 - DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
 - CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
 - FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
 - FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.



**NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

**GEOTECHNICAL
ENGINEERING UNIT**

Professional Engineer Seal for Scott A. Hadden, No. 022246, State of North Carolina. Includes signature line and date 3/20/2020.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Table with columns: SLOPE OR SURCHARGE CASE, GROUNDWATER DEPTH, SHORING BACKFILL TYPE, H - WALL HEIGHT (FT) [4-28]. Rows for Slope Case (>0) and Surcharge Case (>0 to 7, >0 to 10, >7 for H < 20', >10 for H ≥ 20').

L - MINIMUM REQUIRED REINFORCEMENT LENGTH (FT) (FOR ALL REINFORCEMENT TYPES)

Table with columns: WALL HEIGHT (H) + EMBEDMENT (FT), NUMBER OF REINFORCEMENT LAYERS*. Rows range from 2.5-4 to 28-29.5 ft.

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

Table: GEOTEXTILE REINFORCEMENT ULTIMATE TENSILE STRENGTH (LB/FT). Columns: REINFORCEMENT LAYER NUMBER*, SLOPE CASE (CLASS II, III, V), SURCHARGE CASE (A-2-4 SOIL, CLASS II, III, V).

GEOTEXTILE REINFORCEMENT ULTIMATE TENSILE STRENGTH (LB/FT)

Table: GEOGRID REINFORCEMENT SHORT-TERM DESIGN STRENGTH (LB/FT). Columns: REINFORCEMENT LAYER NUMBER*, SLOPE CASE (CLASS II, III, V), SURCHARGE CASE (A-2-4 SOIL, CLASS II, III, V).

GEOGRID REINFORCEMENT SHORT-TERM DESIGN STRENGTH (LB/FT) (SEE NOTE 10 ON SHEET 2.)

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD (SEE NOTE 9 ON SHEET 2.) *SEE PARTIAL ELEVATION ON SHEET 1 FOR REINFORCEMENT LAYER NUMBERING.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD TEMPORARY WALL SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK
 IN CUBIC YARDS

STATION	STATION	UNCL. EXCAV. (CY)	UNDERCUT (CY)	EMBANK. +% (CY)	BORROW (CY)	WASTE (CY)
-TIE- 12+00.00	17+50.00	394		14,274	13,880	
SUBTOTALS:		394		14,274	13,880	
-L- 174+50.00	180+00.00	249		2,762	2,513	
-Y17- 11+85.00	13+64.13	26		190	164	
-Y17- 14+39.13	15+50.00	22		256	234	
SUBTOTALS:		297		3,208	2,911	
-L- 180+00.00	204+00.00	2,484		1,981	87	590
-Y18- 11+40.00	13+12.53	102		20		82
-Y19- 10+37.50	12+15.00	69		119	50	
-Y21- 11+85.00	13+40.18	152				152
-Y21- 14+15.22	14+80.00	18		33	15	
-Y22- 11+80.00	13+12.62	57		51		6
-Y22- 13+87.64	14+30.00	10		23	13	
-Y23- 10+37.52	11+65.00	25		18		8
-Y24- 11+15.00	13+62.69	251		5		246
-Y24- 14+37.73	16+85.00	109		33		76
SUBTOTALS:		3,277		2,283	165	1,160
-L- 204+00.00	234+00.00	3,290		5,121	2,380	549
-Y25- 11+10.00	12+68.38	69		49		20
-Y25- 13+43.66	14+05.00	12		14	2	
-Y26- 11+30.00	12+70.86	80		8		72
-Y28- 15+86.48	20+68.00	461		200		261
SUBTOTALS:		3,912		5,392	2,382	902
-L- 234+00.00	263+99.70	2,273		10,072	7,799	
-Y29- 10+09.71	11+52.52	81		93	12	
-Y29- 12+28.66	12+95.00	23		16		6
-Y30- 11+20.00	12+53.00	52		44		8
-Y30- 13+28.32	14+85.00	107		58		50
-Y31- 12+25.00	17+35.10	461		1,067	606	
-Y31A- 10+22.53	11+30.00	3		259	256	
-Y32- 10+37.50	11+22.00	98		102	4	
SUBTOTALS:		3,098		11,711	8,677	64
-L- 265+49.70	271+79.70	493		121		372
-ROUND1- 10+00.00	13+58.14	221		2,404	2,183	
-ROUND2- 10+00.00	13+58.14	3		2,978	2,975	
-RPA- 13+47.27	19+91.33	1,020		1,773	753	
-RPB- 11+30.00	13+82.18	575		188		386
-RPC- 15+00.00	23+29.58	306		1,214	908	
-RPD- 12+20.00	14+80.17	179		85		94
SUBTOTALS:		2,797		8,763	6,819	852
-L- 273+29.70	289+75.00	2,758		2,460	1,353	1,651
SUBTOTALS:		2,758		2,460	1,353	1,651
TOTALS:		16,533		48,091	36,187	4,629
MATERIAL FOR SHOULDER CONSTRUCTION:				1,250	1,250	
WASTE IN LIEU OF BORROW:					-1,839	-1,839
PROJECT TOTALS:		16,533		49,341	35,598	2,790
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT					1,780	
GRAND TOTALS:		16,533		49,341	37,378	2,790
SAY:		16,600			37,400	

EST. UNDERCUT EXCAVATION (CONTINGENCY) = 1,400 CY TO BE USED AT THE DISCRETION OF THE RESIDENT ENGINEER (PER GEOTECH RECS LETTER - FEBRUARY 14, 2018)
 EST. SHALLOW UNDERCUT BY STATIONS = 6,500 CY (PER GEOTECH RECS LETTER - FEBR. 14, 2018: -L- STA. 182+90 TO 227+25 LT RT = 6380 CY; -RPB- STA. 11+30 TO 13+75 LT & RT = 120 CY)
 EST. SELECT GRANULAR MATERIAL (CONTINGENCY) = 400 CY (PER GEOTECH RECS LETTER - FEBRUARY 14, 2018)
 EST. DDE = 1,780 CY

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

KC02M663X2

COMPUTED BY: Will Hines, Jr., PE DATE: 4/12/2018
CHECKED BY: Joshua G. Dalton, PE DATE: 4/12/2018

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO. R-5020B SHEET NO. 3D-2

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 for LINE & STATION, OFFSET, STRUCTURE NUMBER, TOP ELEVATION, INVERT ELEVATION, MINIMUM REQUIRED SLOPE, Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC), R. C. PIPE CLASS III, R. C. PIPE CLASS IV, DUCTILE IRON PIPE TYPE 3 SEALED PIPE SYSTEM, QUANTITIES FOR SEALED DRAINAGE STRUCTURES, ENDWALLS, REINFORCED ENDWALLS, MASONRY, DRAINAGE STRUCTURE, QUANTITIES FOR DRAINAGE STRUCTURES, FRAME, GRATES, AND HOOD, CONCRETE TRANSITIONAL SECTION, OPEN THROAT C.B. STD., D.I. STD., G.D.I. TYPE, G.D.I. (W.S. SAG) FRAME, G.D.I. (W.S. SAG) FRAME W/ 2 GRATES, G.D.I. (N.S. SAG) FRAME W/ 2 GRATES, G.D.I. (N.S. SAG) FRAME W/ GRATE, G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES, J.B. STD., T.B.D.I. STD., M.H. STD., M.H. FRAME AND COVER, CONVERT EXISTING C.B. TO J.B., CONVERT EXISTING C.B. TO D.I., SLUICE GATE (DRY DETENTION BASIN), ADJUST D.I., 15" DRAINAGE PIPE ELBOW, C FLOWABLE FILL, C CONCRETE COLLARS, CONCRETE AND BRICK PIPE PLUG, PIPE REMOVAL, ABBREVIATIONS, and REMARKS.

SHEET TOTALS

120 36 24

828 164 384 20

25 2.1

11 1 5 5

3

7 7

1

6 2

5 2

2

KC12M663X2

COMPUTED BY: Will Hines, Jr., PE DATE: 4/12/2018
CHECKED BY: Joshua G. Dalton, PE DATE: 4/12/2018

PROJECT NO. R-5020B SHEET NO. 3D-3

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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 for LINE & STATION, OFFSET, STRUCTURE NUMBER, TOP ELEVATION, INVERT ELEVATION, MINIMUM REQUIRED SLOPE, Drainage Pipe, R. C. PIPE CLASS III/IV, DUCTILE IRON PIPE, QUANTITIES FOR SEALED DRAINAGE STRUCTURES, ENDWALLS, REINFORCED ENDWALLS, DRAINAGE STRUCTURE, QUANTITIES FOR DRAINAGE STRUCTURES, FRAME, GRATES, AND HOOD, CONCRETE TRANSITIONAL SECTION, OPEN THROAT C.B., D.I. FRAME AND GRATES, G.D.I. TYPE, G.D.I. TYPE, G.D.I. (W.S. FLAT) FRAME WITH GRATE, G.D.I. (W.S. SAG) FRAME W/ 2 GRATES, G.D.I. (W.S. SAG) FRAME W/ 2 GRATES, G.D.I. (N.S. SAG) FRAME W/ 2 GRATES, G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES, J.B. STD., T.B.D.I. STD., M.H. STD., M.H. FRAME AND COVER, CONVERT EXISTING C.B. TO J.B., CONVERT EXISTING D.I. TO J.B., SLUICE GATE (DRY DETENTION BASIN), ADJUST D.I., 15" DRAINAGE PIPE ELBOW, CY FLOWABLE FILL, CY CONCRETE COLLARS CL. "B" STD., CY CONCRETE AND BRICK PIPE PLUG, PIPE REMOVAL, ABBREVIATIONS, and REMARKS.

KCP-20663X2

COMPUTED BY: Will Hines, Jr., PE DATE: 4/12/2018
CHECKED BY: Joshua G. Dalton, PE DATE: 4/12/2018

PROJECT NO. R-5020B SHEET NO. 3D-7

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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 for Line & Station, Offset, Structure Number, Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC), R.C. Pipe Class III/IV, Ductile Iron Pipe, Quantities for Sealed Drainage Structures, Endwalls, Reinforced Endwalls, Drainage Structure, Quantities for Drainage Structures, Frame, Grates, and Hood, Concrete Transitional Section, Open Throat C.B., D.I. Frame and Grates, G.D.I. Type A/B, G.D.I. Type D, G.D.I. (W.S. Flat) Frame with Grate, G.D.I. (W.S. Sag) Frame w/ 2 Grates, G.D.I. (N.S. Sag) Frame w/ Grate, G.D.I. (N.S. Flat) Frame w/ Grate, J.B. STD., T.B.D.I. STD., M.H. STD., M.H. Frame and Cover, Convert Existing C.B. to J.B., Convert Existing D.I. to J.B., Sluice Gate (Dry Detention Basin), Adjust D.I., 15" Drainage Pipe Elbow, Flowable Fill, Concrete Collars, Concrete and Brick Pipe Plug, Pipe Removal, and Remarks. Includes a SHEET TOTALS row at the bottom.

