

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

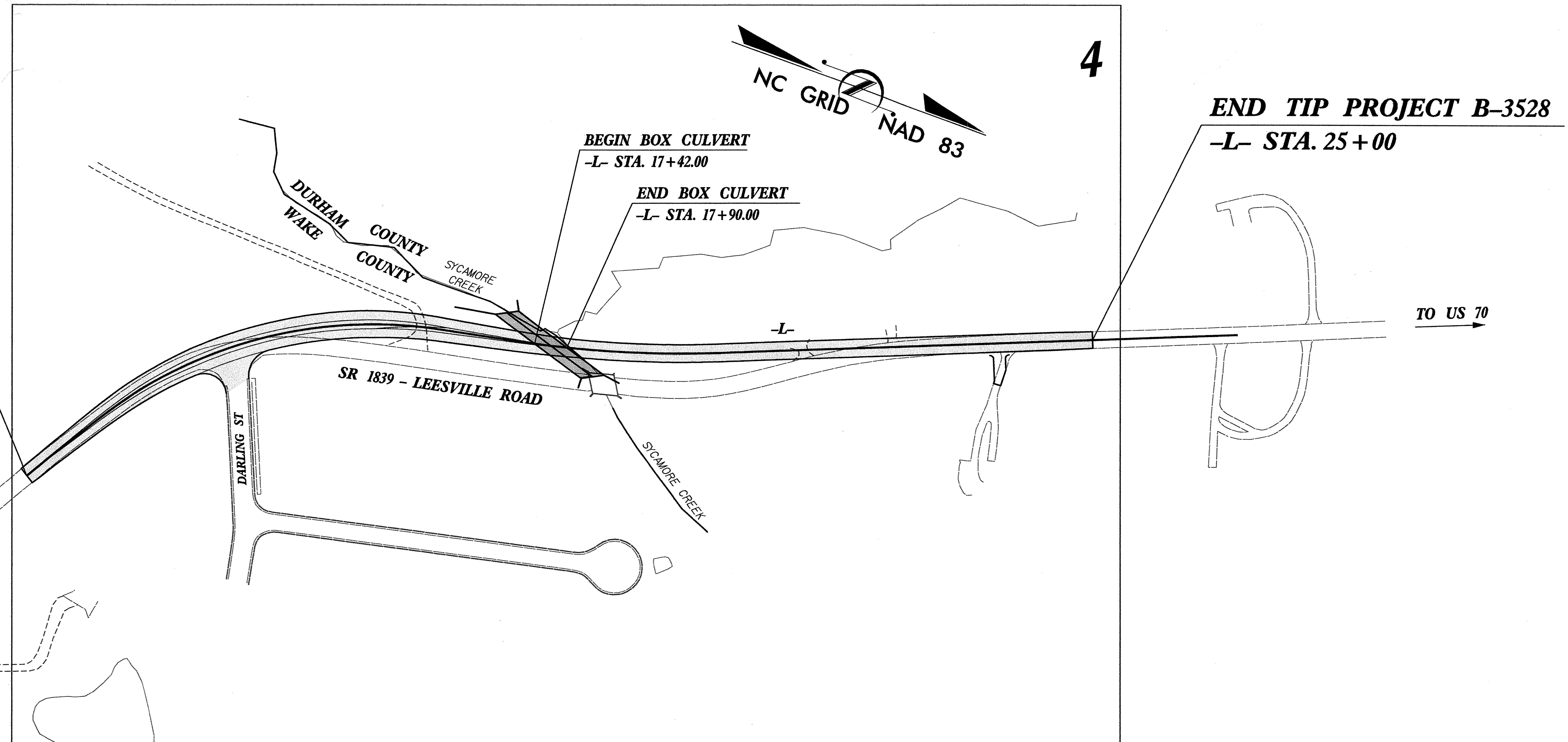
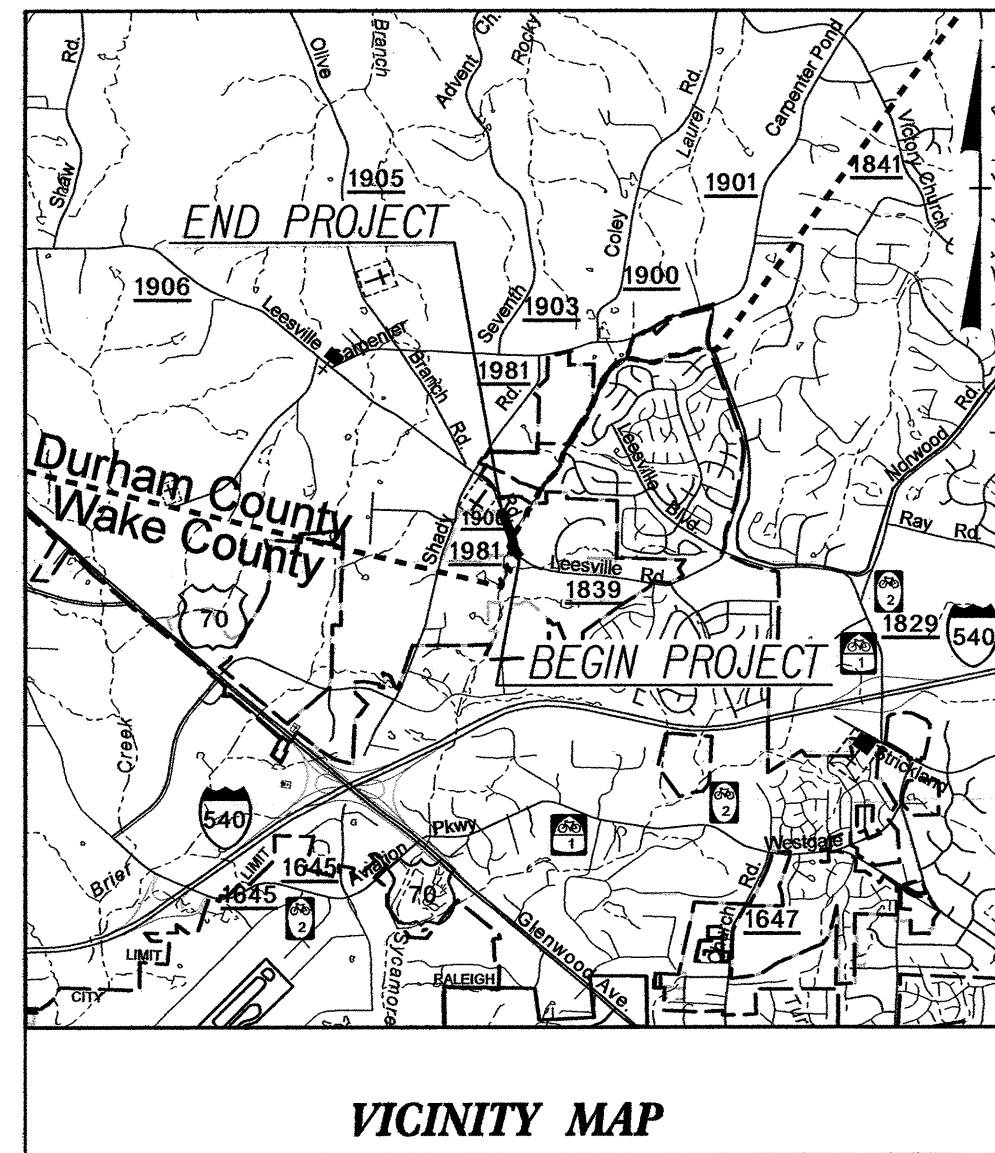
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3528	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33136.1.1	BRZ-1839(1)	P.E.	
33136.2.2	BRZ-1839(1)	RW & UTIL.	
33136.3.1	BRZ-1839(1)	CONST.	

TIP PROJECT: B-3528

WAKE AND DURHAM COUNTIES

LOCATION: Bridge 429 over Sycamore Creek on SR 1839 and Approaches

TYPE OF WORK: Grading, Drainage, Paving and Structure



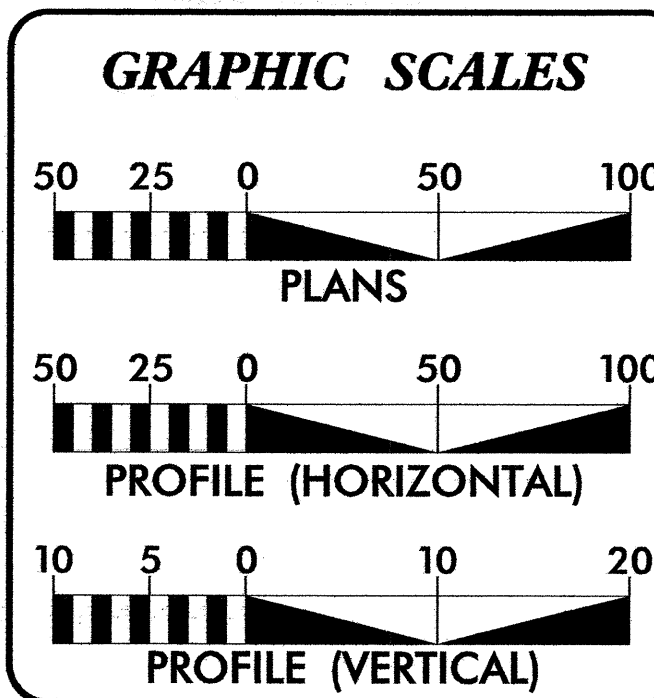
BEGIN TIP PROJECT B-3528
-L- STA. 10+00

END TIP PROJECT B-3528
-L- STA. 25+00

** DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVE AND HORIZONTAL SSD.

NCDOT CONTACT: CATHY HOUSER, P.E.
ROADWAY DESIGN - ENGINEERING COORDINATION

CONTRACT: C201783



DESIGN DATA

ADT 2008 =	12,350
ADT 2030 =	28,600
DHV =	12 %
D =	70 %
T =	3 % *
** V =	50 MPH
* TTST 1%	DUAL 2%

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-3528	=	0.275 mi.
LENGTH OF STRUCTURE TIP PROJECT B-3528	=	0.009 mi.
TOTAL LENGTH OF TIP PROJECT B-3528	=	0.284 mi.

Prepared In the Office of:
KO & ASSOCIATES, P.C.
Consulting Engineers
5121 KINGDOM WAY, SUITE 100, RALEIGH, N.C. 27607
(919) 551-6966

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
October 20, 2006

LETTING DATE:
March 18, 2008

Brian A. Wiles, P.E.
PROJECT ENGINEER

HYDRAULICS ENGINEER

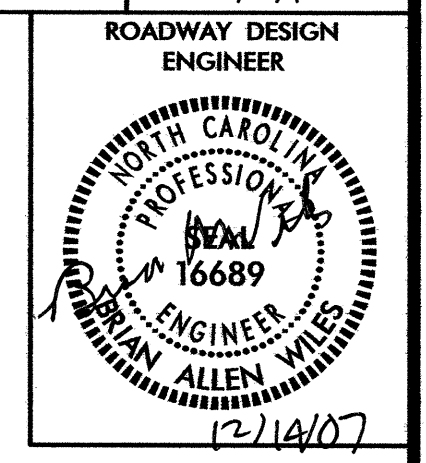
W. Herbert Turner
SIGNATURE: W. Herbert Turner
SEAL 021162

ROADWAY DESIGN ENGINEER

Brian A. Wiles
SIGNATURE: Brian A. Wiles
SEAL 16689

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

Paul W. Miller
STATE HIGHWAY DESIGN ENGINEER



INDEX OF SHEETS

SHEET NUMBER	DESCRIPTION
1	Title Sheet
1-A	Index of Sheets, General Notes and List of Standards
1-B	Conventional Symbols
1-C	Survey Control Sheet
1-D	Centerline Coordinate List
2	Typical Sections, Wedging Detail and Pavement Schedule
2-A	Retaining Wall Detail
2-B	Detail of Lateral Swale/Ditch w/Rock Checks
2-C	Detail for Anchorage for Frames
2-D	Standard Temporary Shoring
2-E	Standard Temporary Mechanically Stabilized Earth (MSE) Walls
2-F	Standard Temporary MSE Walls Reinforcement Tables-English Units
2-G	Temporary Fabric Wall
2-H	Hilfiker Temporary Wall
2-I	Sierrascape Temporary Wall
2-J thru 2-L	Retained Earth Temporary Wall
2-M thru 2-O	Terratrel Temporary Wall
3	Summary of Quantities
3-A	List of Pipes, Endwalls, Etc. (for Pipes 48" and Under) and Guardrail Summary
3-B	Summary of Earthwork and Summary of Existing Pavement Removal
4	Plan Sheet
5	Profile Sheet
TCP-1 thru TCP-8	Traffic Control Plans
PM-1	Pavement Marking Plan
SIGN-1 thru SIGN-4	Signing Plans
EC-1 thru EC-6	Erosion Control Plans
RF-1	Reforestation Plans
UC-1 thru UC-4	Utility Construction Plans
UO-1 thru UO-2	Utility by Others
XSUM-1	Cross Section Summary Sheet
X-1 thru X-9	Cross Sections
C-1 thru C-10	Culvert Plans

GENERAL NOTES:

GENERAL NOTES: 2006 SPECIFICATIONS
EFFECTIVE: 07-18-06
REVISED: 07-18-06

GRADING AND SURFACING OR RESURFACING AND WIDENING:

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

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

SIDE ROADS:

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

UNDERDRAINS:

UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 AT LOCATIONS DIRECTED BY THE ENGINEER.

STREET TURNOUT:

STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 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" OR "TEMPORARY SHORING-BARRIER SUPPORTED" DEPENDING UPON THE LOCATION OF THE SHORING.

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE Duke Energy, Verizon, Level 3 and PSNC Energy.

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 CONTRACT.

2006 ROADWAY STANDARD DRAWINGS

EFF. 07-18-06
REV. 01-02-07

2006 ROADWAY STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

STD. NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superlevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation - Method 'A'
310.10	Driveway Pipe Construction
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENT	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.03	Pipe Underdrain and Blind Drain
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
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
862.01	Guardrail Placement
862.02	Guardrail Installation
876.01	Rip Rap in Channels
876.04	Drainage Ditches with Class 'B' Rip Rap

Note: Not to Scale

*S.U.E. = Subsurface Utility Engineering

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

State Line	_____
County Line	_____
Township Line	_____
City Line	_____
Reservation Line	_____
Property Line	_____
Existing Iron Pin	○
Property Corner	→
Property Monument	□
Parcel/Sequence Number	②③
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-

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

Standard Gauge	_____
RR Signal Milepost	○
Switch	□
RR Abandoned	_____
RR Dismantled	_____

RIGHT OF WAY:

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	_____
Proposed Right of Way Line	_____
Proposed Right of Way Line with Iron Pin and Cap Marker	_____
Proposed Right of Way Line with Concrete or Granite Marker	_____
Existing Control of Access	○
Proposed Control of Access	○
Existing Easement Line	-E-
Proposed Temporary Construction Easement	-E-
Proposed Temporary Drainage Easement	-TDE-
Proposed Permanent Drainage Easement	-PDE-
Proposed Permanent Utility Easement	-PUE-

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	_____
Existing Curb	_____
Proposed Slope Stakes Cut	-C-
Proposed Slope Stakes Fill	-F-
Proposed Wheel Chair Ramp	○
Proposed Wheel Chair Ramp Curb Cut	○
Curb Cut for Future Wheel Chair Ramp	○
Existing Metal Guardrail	_____
Proposed Guardrail	_____
Existing Cable Guiderail	_____
Proposed Cable Guiderail	_____
Equality Symbol	○
Pavement Removal	_____

VEGETATION:

Single Tree	○
Single Shrub	○
Hedge	_____
Woods Line	_____
Orchard	_____
Vineyard	_____

EXISTING STRUCTURES:

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

UTILITIES:

POWER:	
Existing Power Pole	○
Proposed Power Pole	○
Existing Joint Use Pole	○
Proposed Joint Use Pole	○
Power Manhole	○
Power Line Tower	□
Power Transformer	□
U/G Power Cable Hand Hole	□
H-Frame Pole	○
Recorded U/G Power Line	_____
Designated U/G Power Line (S.U.E.*)	_____

TELEPHONE:

Existing Telephone Pole	○
Proposed Telephone Pole	○
Telephone Manhole	○
Telephone Booth	□
Telephone Pedestal	□
Telephone Cell Tower	○
U/G Telephone Cable Hand Hole	□
Recorded U/G Telephone Cable	_____
Designated U/G Telephone Cable (S.U.E.*)	_____
Recorded U/G Telephone Conduit	_____
Designated U/G Telephone Conduit (S.U.E.*)	_____
Recorded U/G Fiber Optics Cable	_____
Designated U/G Fiber Optics Cable (S.U.E.*)	_____

WATER:

Water Manhole	○
Water Meter	○
Water Valve	○
Water Hydrant	○
Recorded U/G Water Line	_____
Designated U/G Water Line (S.U.E.*)	_____
Above Ground Water Line	_____

TV:

TV Satellite Dish	○
TV Pedestal	□
TV Tower	○
U/G TV Cable Hand Hole	□
Recorded U/G TV Cable	_____
Designated U/G TV Cable (S.U.E.*)	_____
Recorded U/G Fiber Optic Cable	_____
Designated U/G Fiber Optic Cable (S.U.E.*)	_____

GAS:

Gas Valve	○
Gas Meter	○
Recorded U/G Gas Line	_____
Designated U/G Gas Line (S.U.E.*)	_____
Above Ground Gas Line	_____

SANITARY SEWER:

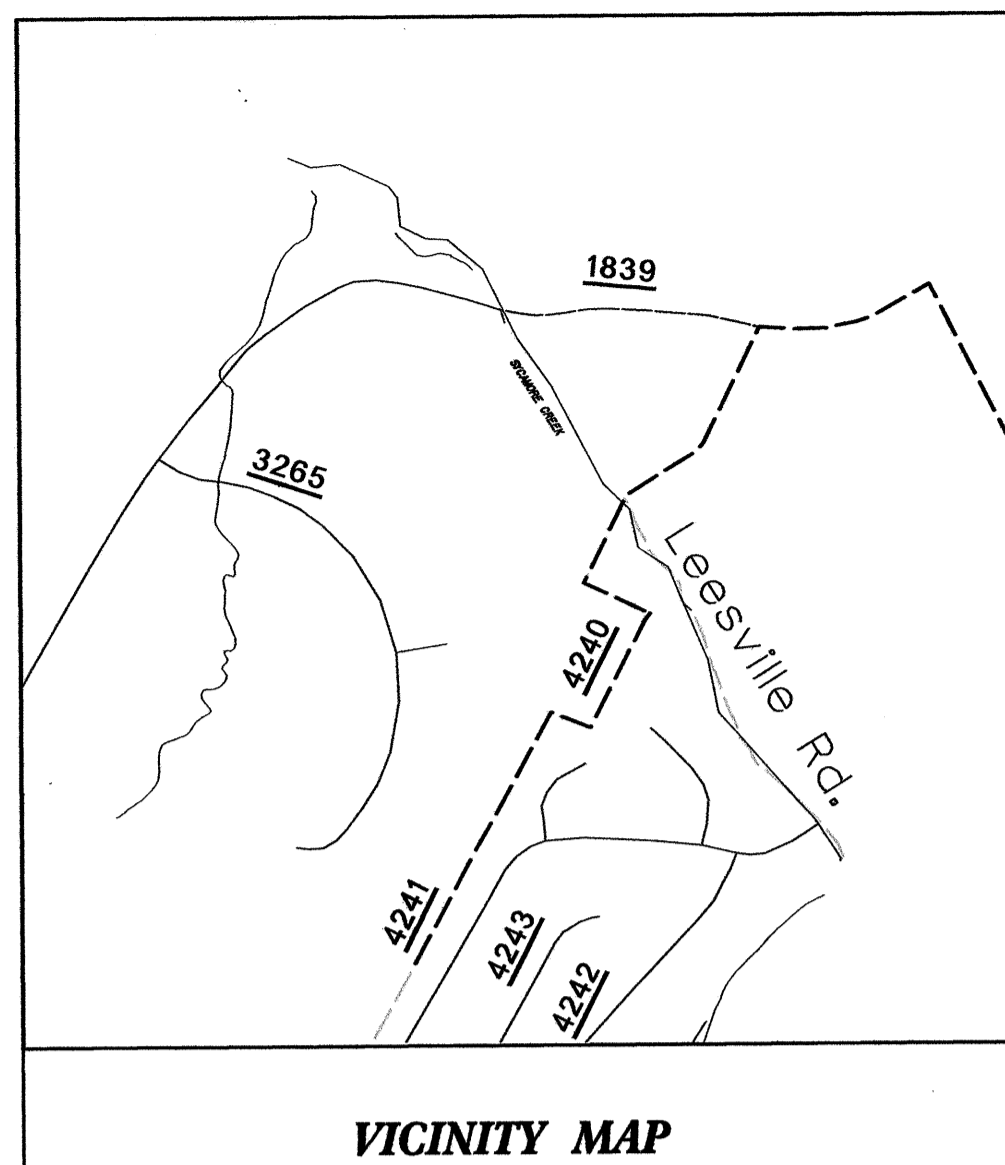
Sanitary Sewer Manhole	○
Sanitary Sewer Cleanout	○
U/G Sanitary Sewer Line	_____
Above Ground Sanitary Sewer	_____
Recorded SS Forced Main Line	_____
Designated SS Forced Main Line (S.U.E.*)	_____

MISCELLANEOUS:

Utility Pole	○
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	□
Utility Unknown U/G Line	_____
U/G Tank; Water, Gas, Oil	□
A/G Tank; Water, Gas, Oil	□
U/G Test Hole (S.U.E.*)	○
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

03/14/06

B-3528

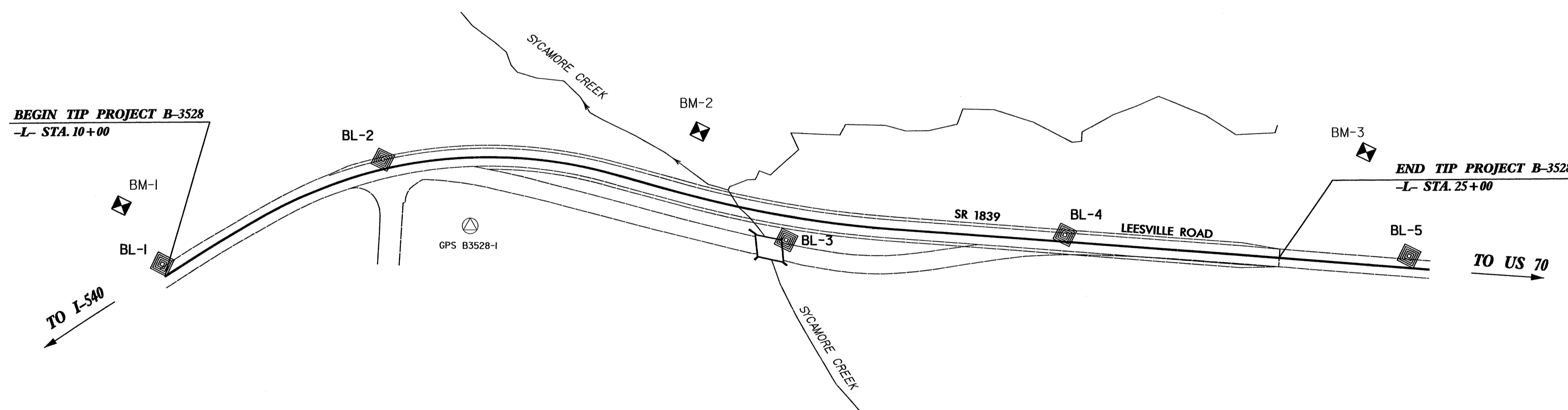
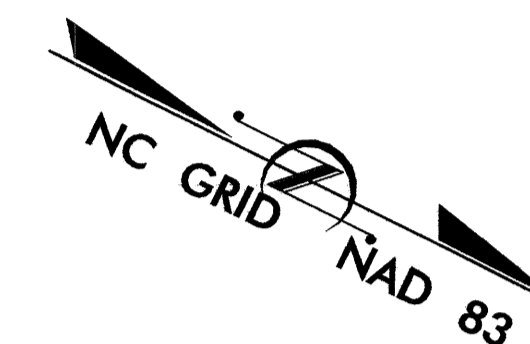


SURVEY CONTROL SHEET B-3528

WAKE COUNTY

**LOCATION: BRIDGE 429 OVER SYCAMORE CREEK
ON SR 1839 (LEESVILLE RD)**

PROJECT REFERENCE NO.	SHEET NO.
B-3528	1C
Location and Surveys	



CONTROL DATA

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	789833.5215	2071974.6411	411.64	10+05.33	15.07 LT
2	BL-2	790031.2172	2071724.8394	415.78	13+21.35	12.51 LT
3	BL-3	790549.0102	2071585.5563	407.26	18+59.30	30.92 RT
4	BL-4	790872.1284	2071418.4770	427.71	22+18.86	9.25 LT
5	BL-5	791286.9366	2071244.2592	443.12	26+68.73	15.30 LT

BENCHMARK DATA

 BM1 ELEVATION = 404.98
 N 789752 E 2071930
 L STATION 10+00 108 LEFT
 RR SPIKE SET IN 14" OAK

 BM3 ELEVATION = 434.13
 N 791177 E 2071148
 L STATION 26+03 146 LEFT
 RR SPIKE SET IN TWIN POPLAR 17" & 8"

 BM2 ELEVATION = 404.58
 N 790385 E 2071508
 L STATION 17+17 84 LEFT
 RR SPIKE SET IN 13" CHERRY

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "GPS B3528-1" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 790171.3552(±) EASTING: 2071751.6221(±) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999922770 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS B3528-1" TO -L- STATION 10+00.00 IS S 35°41'26.0" E 403.65' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD 29

NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTP://WWW.NCDOT.ORG/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.ncdot.org/preconstruct/highway/location/project/)
 THE FILES TO BE FOUND ARE AS FOLLOWS:

B3528_ls_control_060314.txt

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

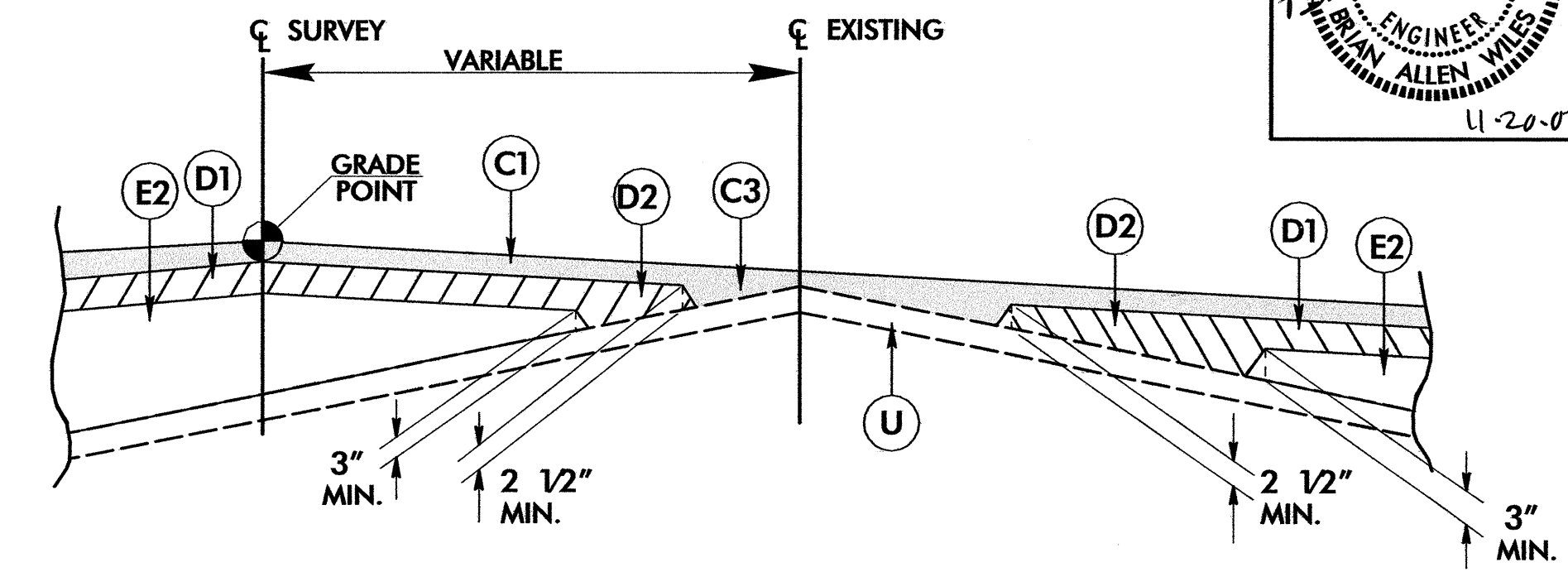
- ⊙ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
- PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
 NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)
 SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

6/2/09

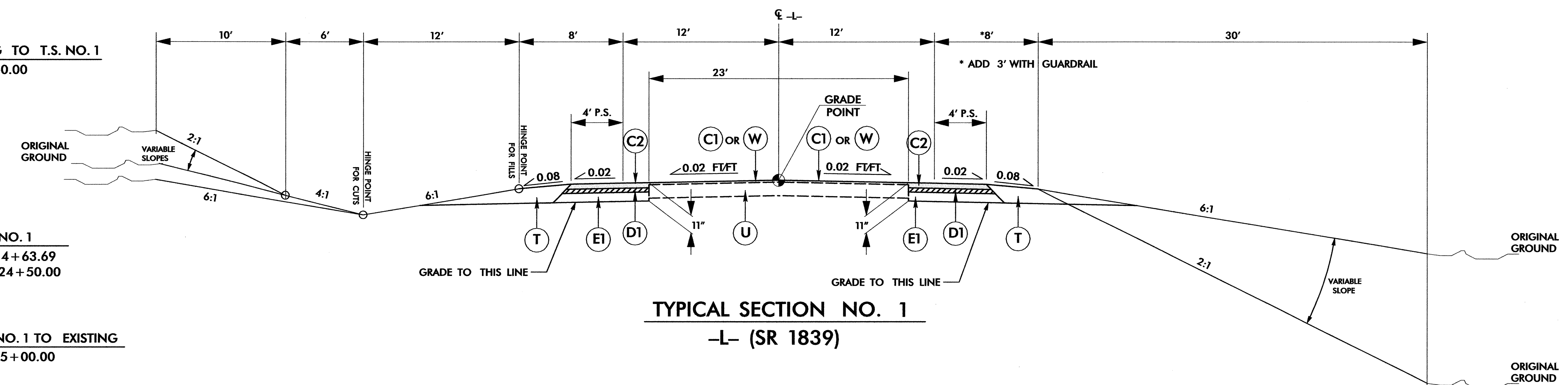
PAVEMENT SCHEDULE			
C1	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	E1	PROP. APPROX. 5 1/2" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1 1/2" IN DEPTH OR GREATER THAN 2" IN DEPTH.	U	EXISTING PAVEMENT.
D1	PROP. APPROX. 2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL SHEET No. 2)
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" IN DEPTH OR GREATER THAN 4" IN DEPTH.	T	EARTH MATERIAL.

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



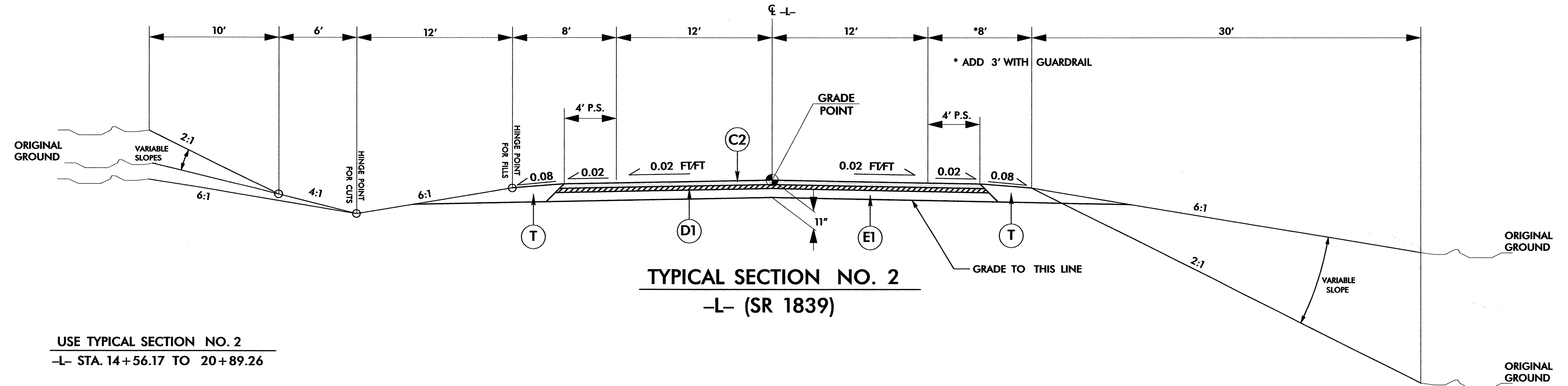
Detail Showing Method Of Wedging

TRANSITION FROM EXISTING TO T.S. NO. 1
 -L- STA. 10+00.00 TO 10+50.00



USE TYPICAL SECTION NO. 1
 -L- STA. 10+50.00 TO 14+63.69
 -L- STA. 20+89.26 TO 24+50.00

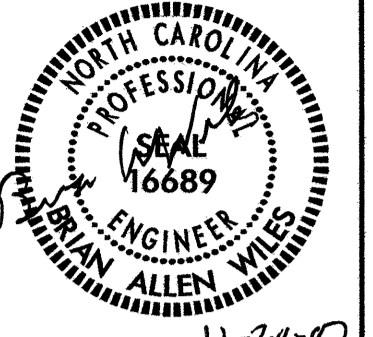
TRANSITION FROM T.S. NO. 1 TO EXISTING
 -L- STA. 24+50.00 TO 25+00.00



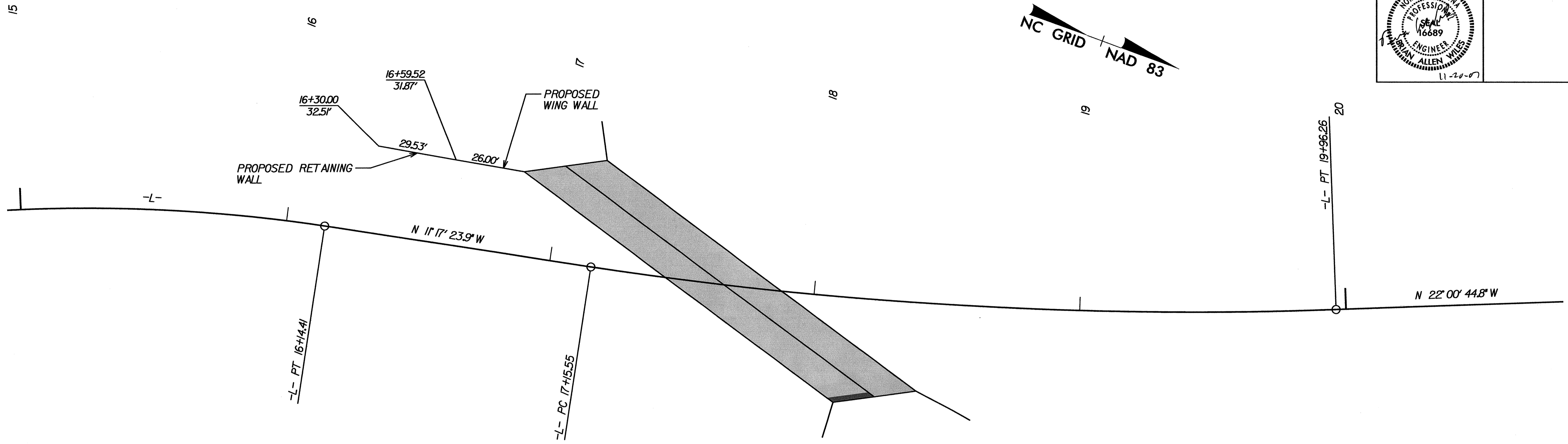
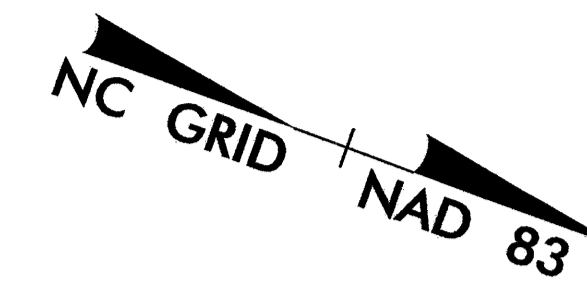
USE TYPICAL SECTION NO. 2
 -L- STA. 14+56.17 TO 20+89.26

11/19/2007
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 KO & Associates, P.C.

8/17/99

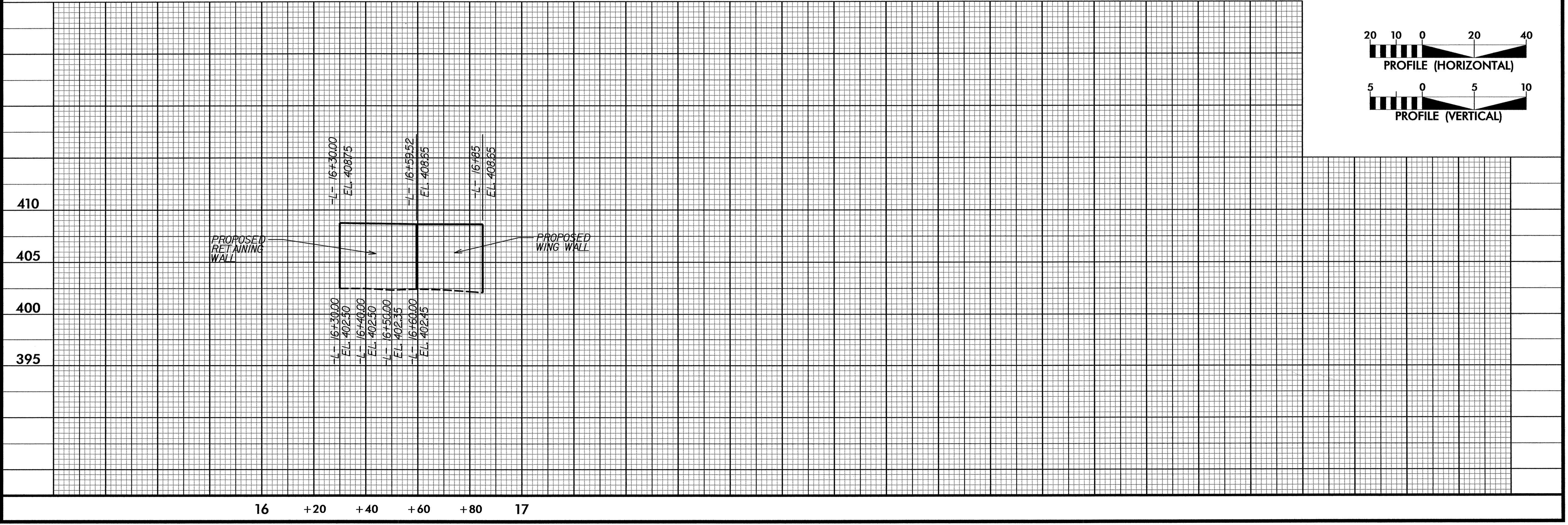
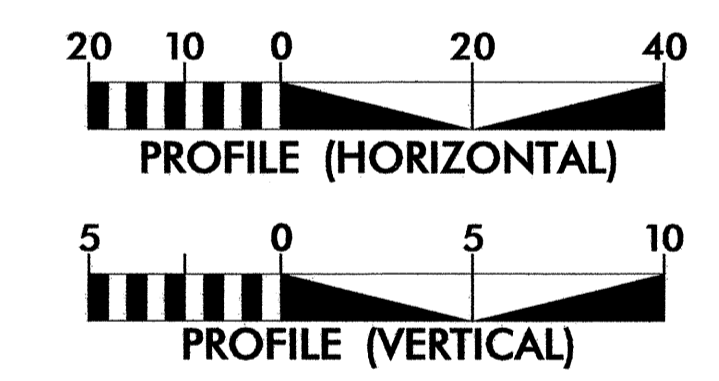
PROJECT REFERENCE NO. B-3528	SHEET NO. 2-A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
	

RETAINING WALL DETAIL



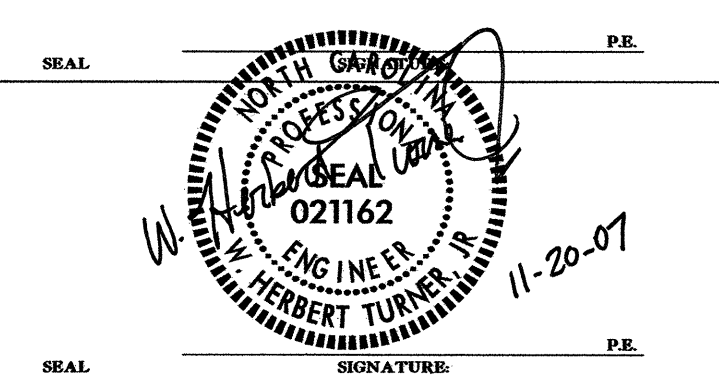
REVISIONS

FOR PLAN, SEE SHEET NO. 4

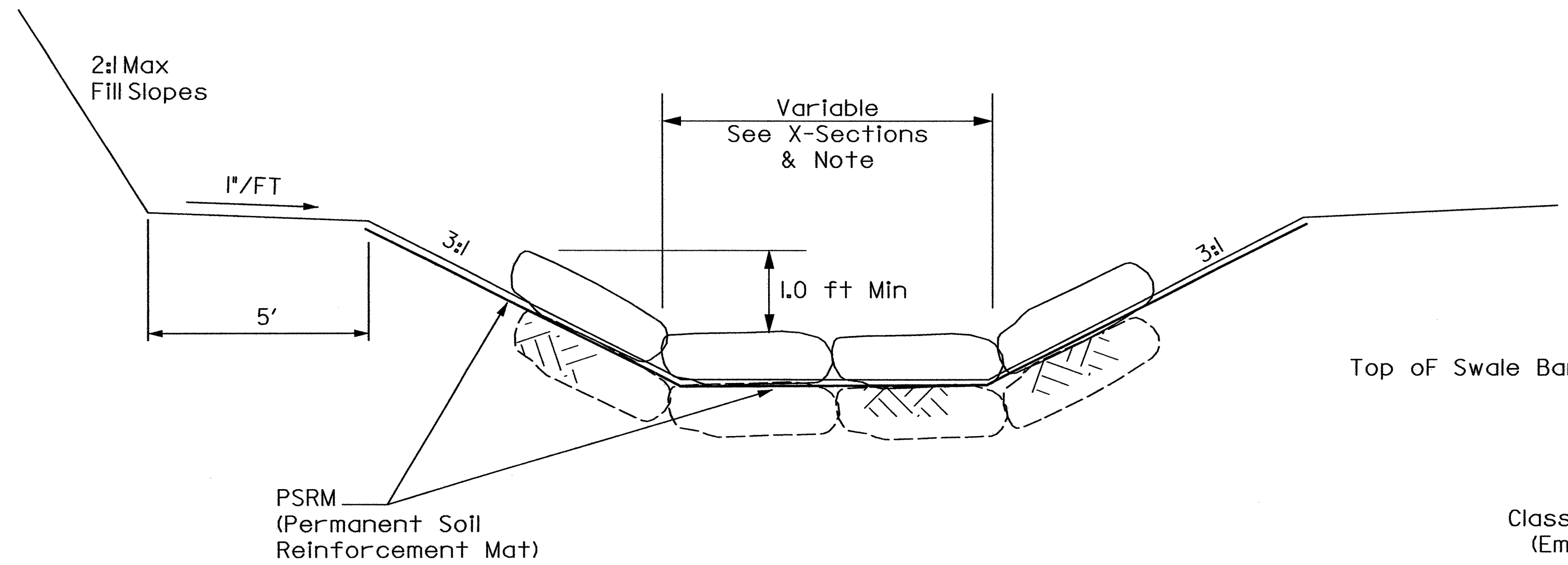


11/9/2007
R:\Roadway\Proj\B3528_Rdy-psh-retain_well.dgn
KO & Associates, P.C.

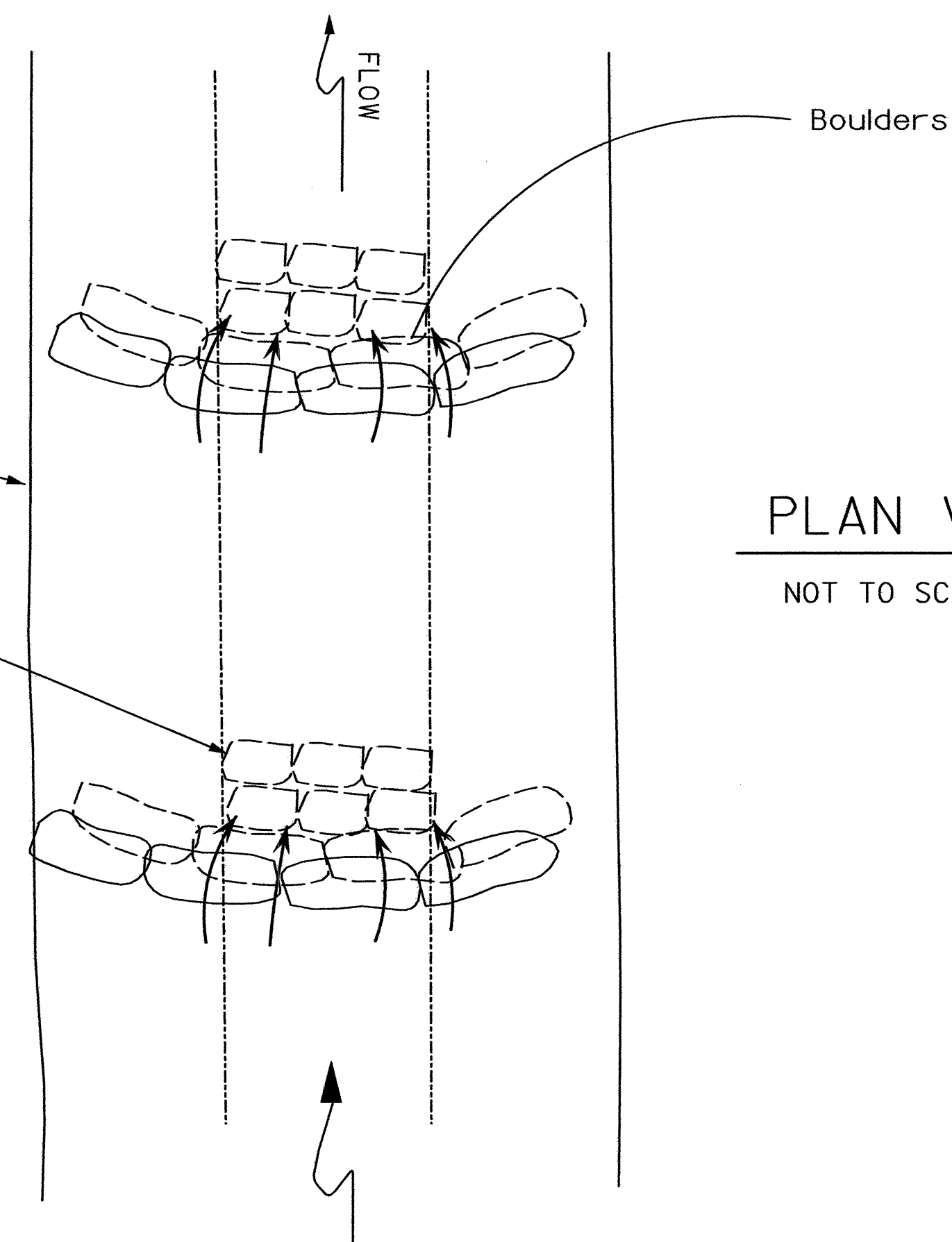
LATERAL SWALE/DITCH W/ROCK CHECKS



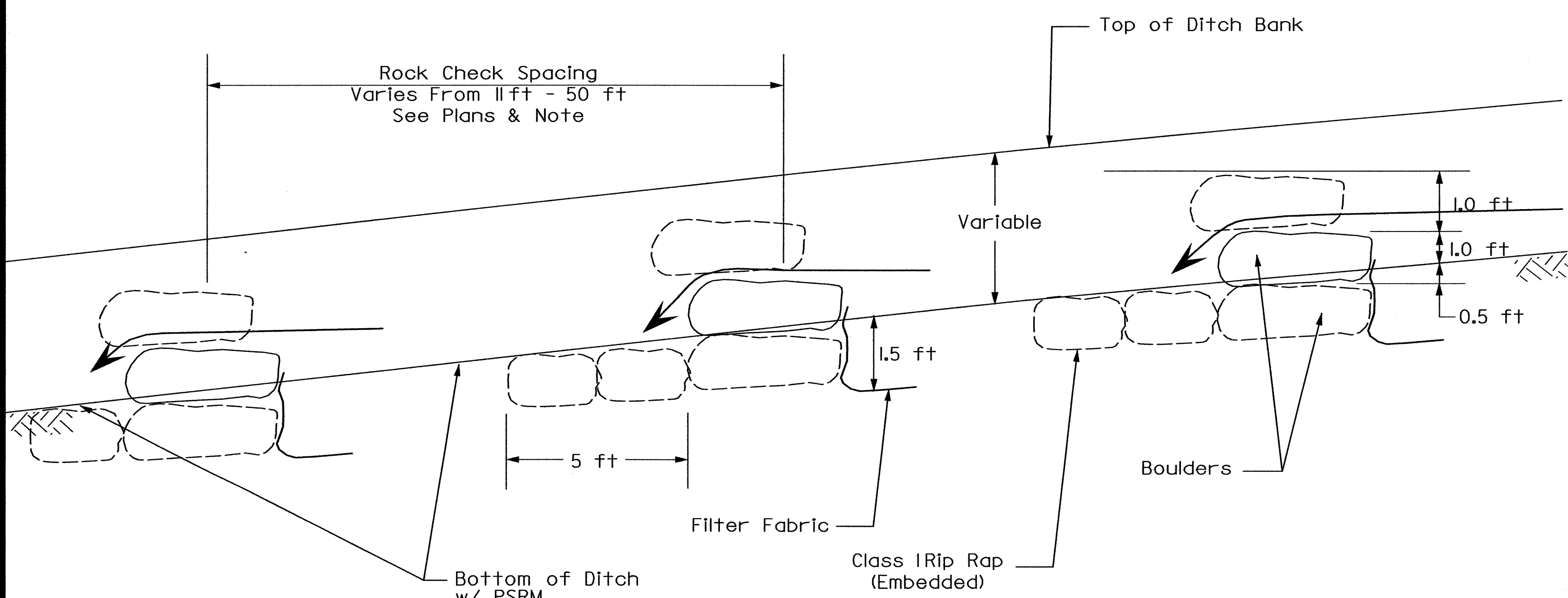
LOCATIONS				
SHEET	ALIGN	STATION - STATION	SIDE	REMARKS
4	-L-	18+26 - 20+00	LT	11' SPACING



TYPICAL CROSS SECTION
 NOT TO SCALE



PLAN VIEW
 NOT TO SCALE



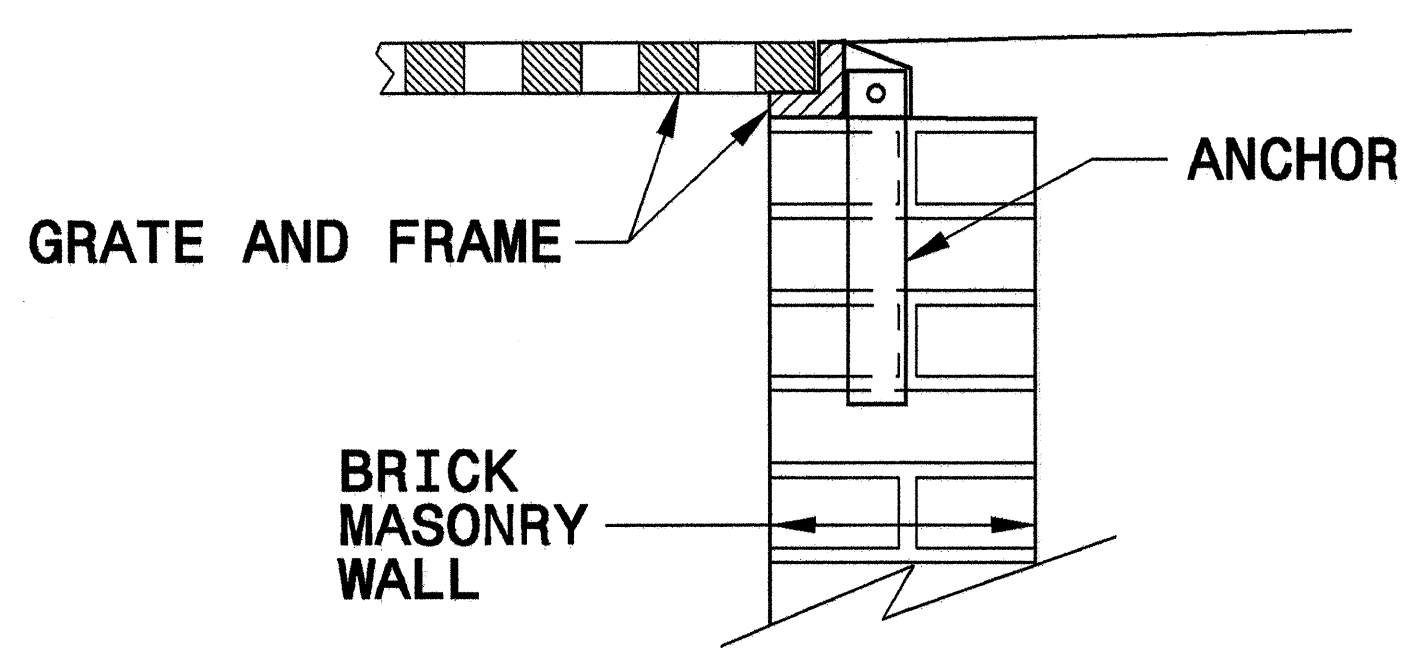
PROFILE
 NOT TO SCALE

NOTE:
 BOULDERS SHOULD BE ANGULAR AND OBLONG WITH APPROXIMATE DIMENSIONS OF 0.6m x 0.45m x 0.45m (2' x 1.5' x 1.5'). ROCK SHOULD FIT TIGHTLY TOGETHER WITH MINIMAL VOIDS. STAGGER BOULDER JOINTS.
 ROCK CHECK SPACING IS DEPENDENT ON DITCH GRADES AT 1' DROP INTERVALS OR SLOPE CONTROL.
 DITCH WIDTHS VARY. WIDEN TO EXTENT PRACTICAL WITHIN R/W LIMITS. SEE X-SECTIONS.

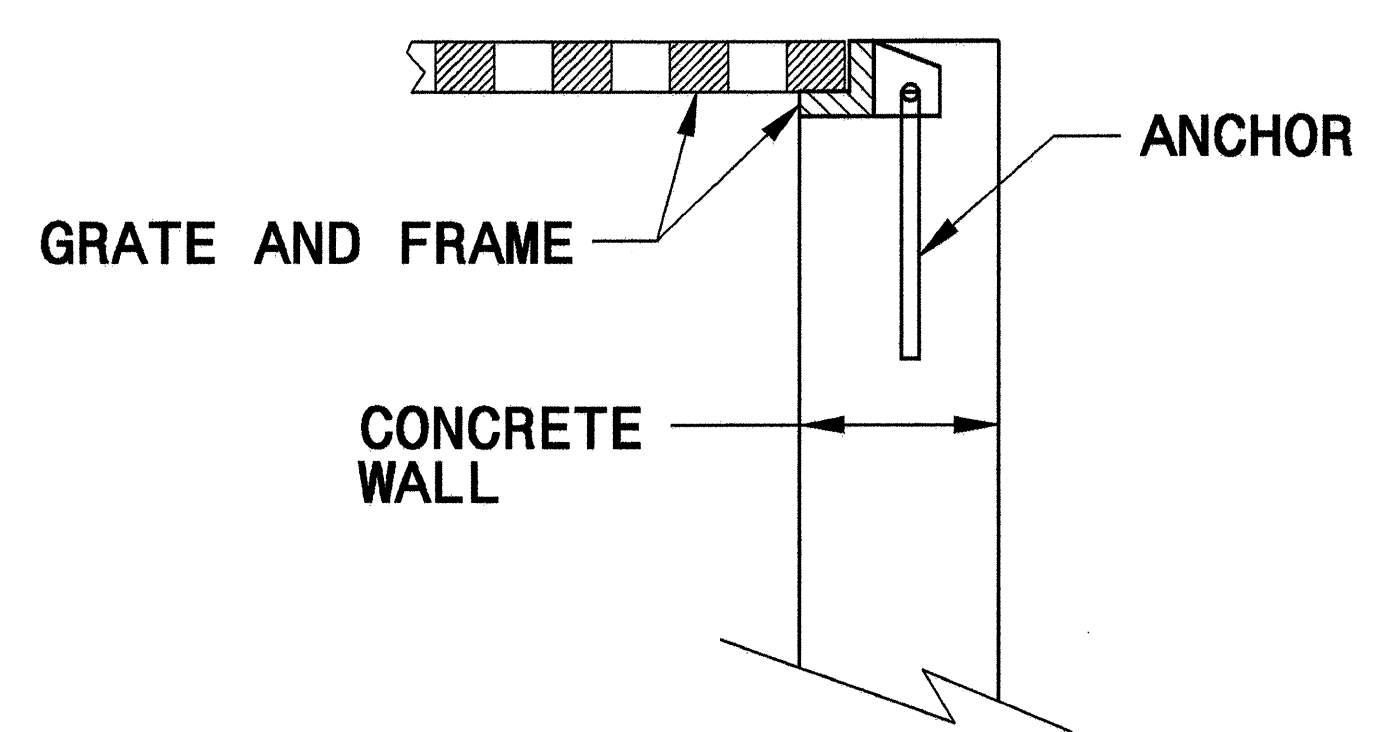
STATE OF NORTH CAROLINA
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ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE

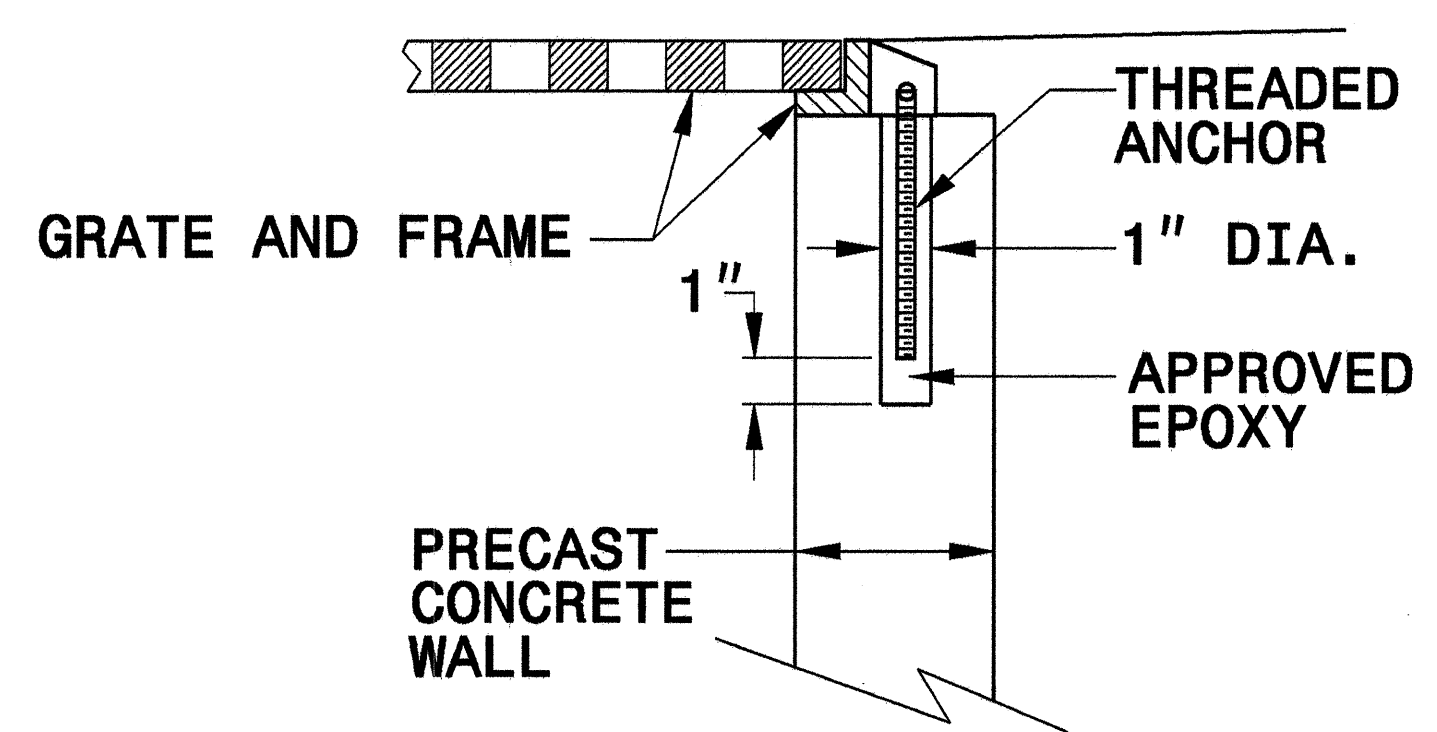
SHEET 1 OF 1
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BRICK MASONRY CONSTRUCTION



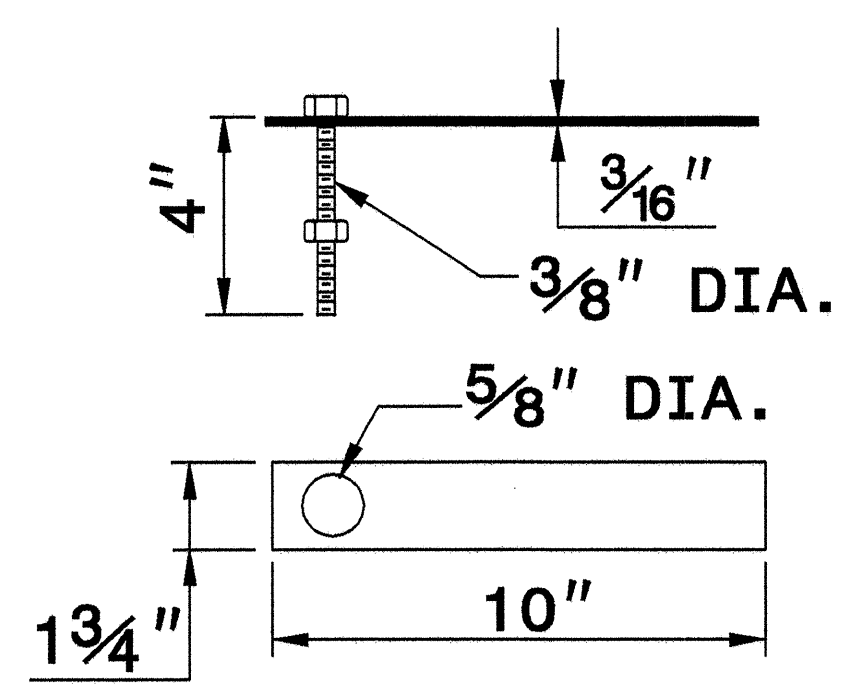
CONCRETE CONSTRUCTION



PRECAST CONCRETE CONSTRUCTION

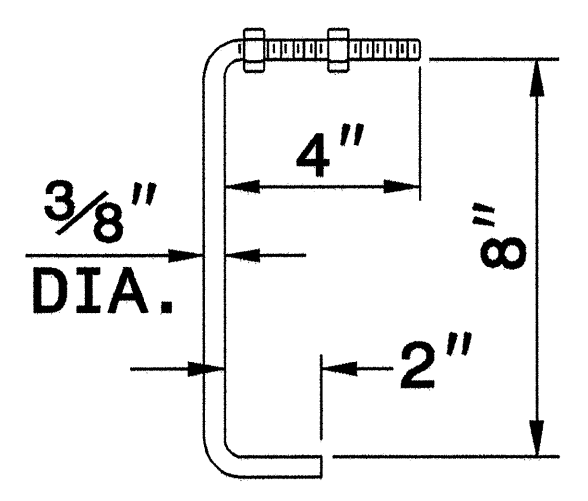
DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET

NOTE:
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



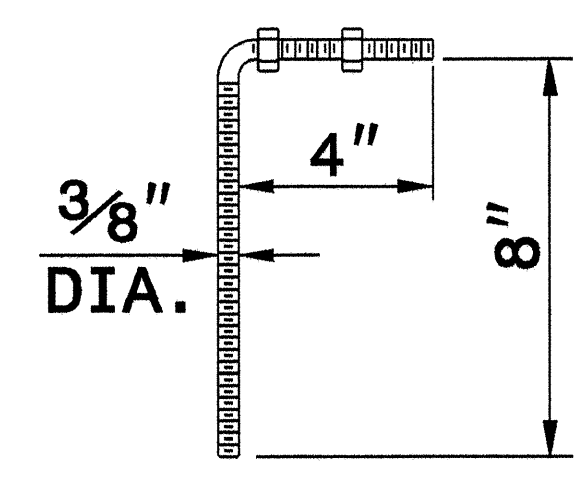
MASONRY ANCHOR

3/8" DIA. BOLT WITH PLATE



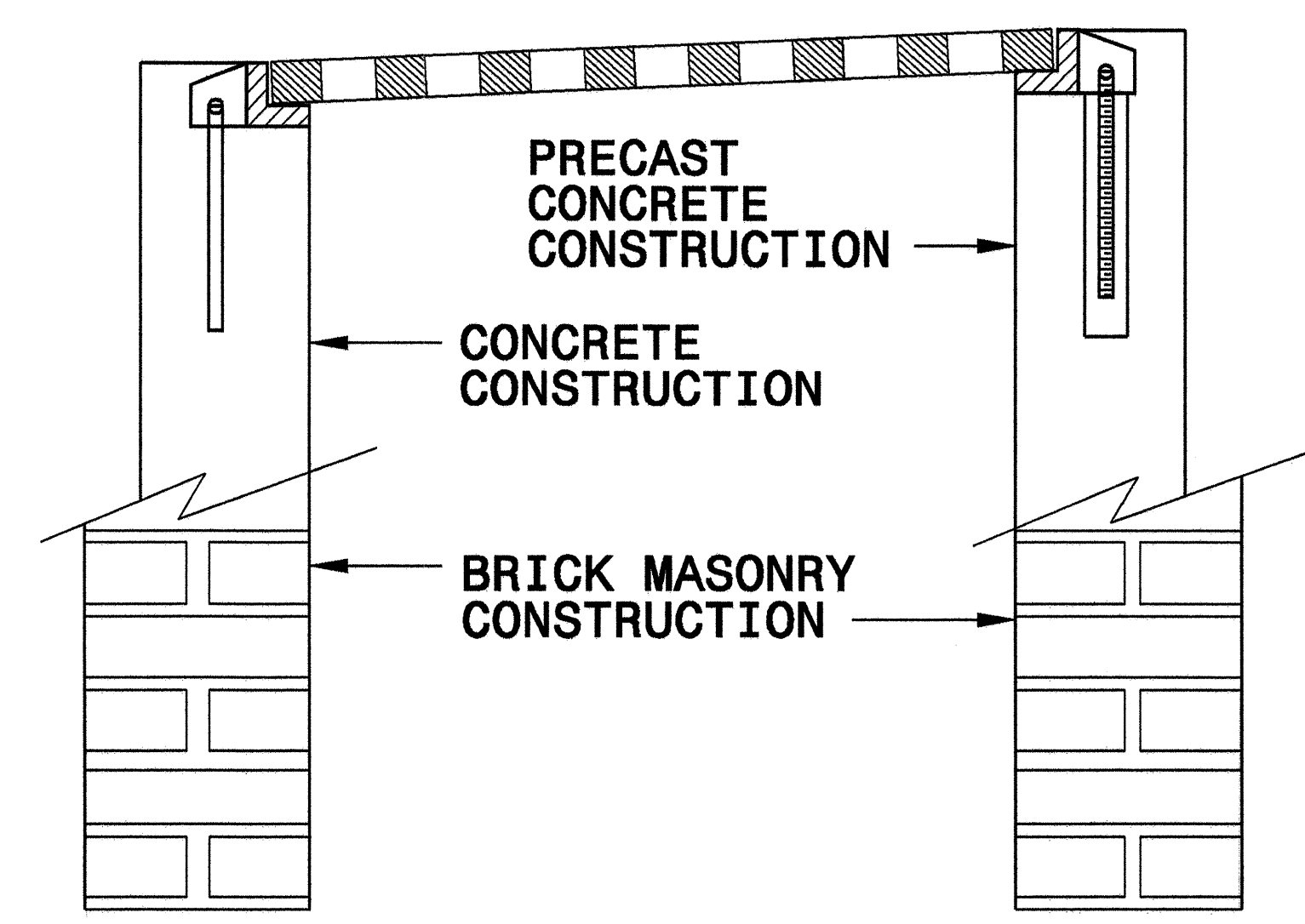
CONCRETE ANCHOR

3/8" DIA. BENT BAR



PRECAST CONCRETE ANCHOR

3/8" DIA. BENT BAR



FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS

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

ENGLISH DETAIL DRAWING FOR
ANCHORAGE FOR FRAMES
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1
840D25

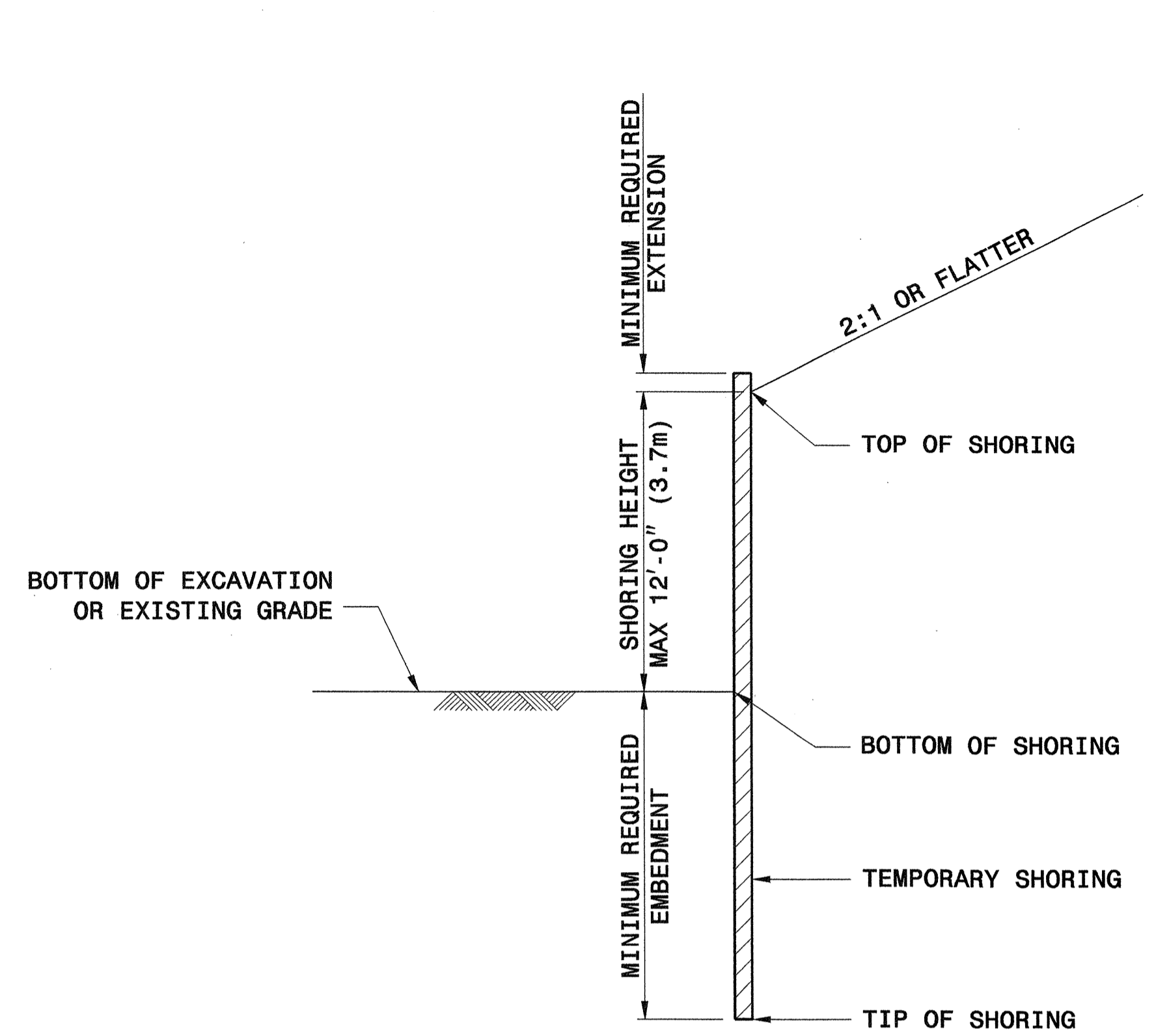
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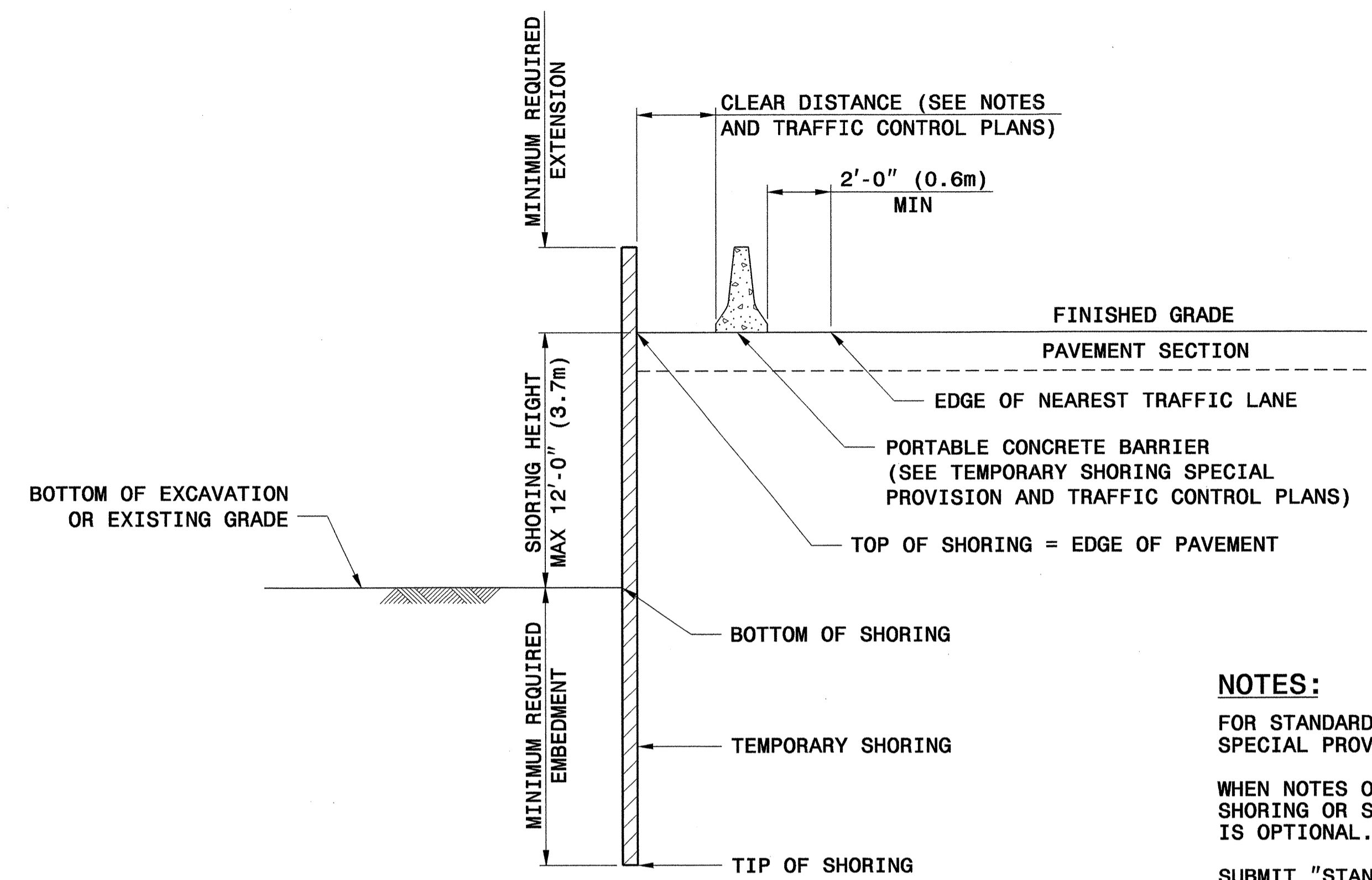
**PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN**
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: 2006 STD 840.25 DATE: 07/18/06
MODIFIED BY: E.E. WARD DATE: 9/25/06
CHECKED BY: DATE:
FILE SPEC.:



SLOPE CASE



SURCHARGE CASE

NOTES:

FOR STANDARD TEMPORARY SHORING, SEE TEMPORARY SHORING SPECIAL PROVISION.
 WHEN NOTES ON PLANS DO NOT PROHIBIT STANDARD TEMPORARY SHORING OR STANDARD SHORING, STANDARD TEMPORARY SHORING IS OPTIONAL.
 SUBMIT "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 14 DAYS BEFORE BEGINNING SHORING CONSTRUCTION. UP TO THREE LOCATIONS MAY BE INCLUDED ON EACH SELECTION FORM.

- STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING CONDITIONS:
- 1) MAXIMUM SHORING HEIGHT IS 12'-0" (3.7m).
 - 2) TRAFFIC SURCHARGE IS 240 PSF (11.5 KPA) MAXIMUM OR BACKSLOPE IS 2:1 (H:V) OR FLATTER.
 - 3) BOTTOM OF EXCAVATION OR EXISTING GRADE IN FRONT OF SHORING IS 6:1 (H:V) SLOPE OR FLATTER.
 - 4) H PILE SPACING IS 6'-0" (1.8m).
 - 5) H PILE EMBEDMENT DEPTHS ARE FOR DRIVEN PILES.
 - 6) TIMBER LAGGING IS A MINIMUM OF 3" (75mm) THICK.

STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
 TOTAL UNIT WEIGHT = 120 PCF (18.8 KN/M³)
 FRICTION ANGLE = 30 DEGREES
 COHESION = 0 PSF (0 KPA)
 GROUNDWATER IS ASSUMED TO BE BELOW BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF SHORING.

DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT WITHIN THE EMBEDMENT DEPTH.

VERIFY GROUNDWATER ELEVATION BEFORE BEGINNING SHORING CONSTRUCTION.

IF THE CLEAR DISTANCE AVAILABLE IS LESS THAN THE MINIMUM REQUIRED IN ACCORDANCE WITH THE TRAFFIC CONTROL PLANS, SET THE BARRIER AGAINST THE TRAFFIC SIDE OF THE SHORING AND USE THE "SURCHARGE CASE WITH TRAFFIC IMPACT".

AT THE CONTRACTOR'S OPTION, H PILE EMBEDMENT DEPTHS FOR PILES SET IN DRILLED HOLES MAY BE REDUCED BY 25%. FOR PILE EXCAVATION, SEE TEMPORARY SHORING SPECIAL PROVISION.

CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF THE SHORING. COLLECT AND DIRECT RUNOFF AWAY FROM SHORING.

CONTACT THE ENGINEER IF MINIMUM REQUIRED EMBEDMENT IS NOT ACHIEVED.

GROUNDWATER CONDITION	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT						SURCHARGE CASE WITH TRAFFIC IMPACT				
	SHORING HEIGHT FT (m)	SHEET PILES		H PILES WITH TIMBER LAGGING			MINIMUM REQUIRED EMBEDMENT FT (m)	MINIMUM REQUIRED SECTION MODULUS IN ³ /FT (cm ³ /m)	H PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT FT (m)	MINIMUM REQUIRED SECTION MODULUS IN ³ /FT (cm ³ /m)	HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)			HP 10x42 (HP 250x62)	HP 12x53 (HP 310x79)	HP 14x73 (HP 360x108)
GROUNDWATER ELEVATION BETWEEN TIP OF SHORING AND BELOW TIP OF SHORING	< 6 (1.8)	7.5 (2.3)	3.0 (161)	8.0 (2.4)	8.0 (2.4)	8.0 (2.4)	11.0 (3.4)	10.0 (538)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)
	7 (2.1)	8.5 (2.6)	4.5 (242)	9.5 (2.9)	9.5 (2.9)	9.5 (2.9)	12.0 (3.7)	12.0 (645)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)
	8 (2.4)	10.0 (3.0)	6.5 (349)	10.5 (3.2)	10.5 (3.2)	10.5 (3.2)	12.5 (3.8)	14.0 (753)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)
	9 (2.7)	11.0 (3.4)	9.5 (511)	--	12.0 (3.7)	12.0 (3.7)	13.5 (4.1)	16.5 (887)	--	12.5 (3.8)	12.5 (3.8)
	10 (3.0)	12.5 (3.8)	13.0 (699)	--	--	13.5 (4.1)	14.0 (4.3)	19.5 (1048)	--	13.5 (4.1)	13.5 (4.1)
	11 (3.4)	13.5 (4.1)	17.0 (914)	--	--	14.5 (4.4)	15.0 (4.6)	22.5 (1210)	--	--	14.5 (4.4)
GROUNDWATER ELEVATION ABOVE TIP OF SHORING	12 (3.7)	15.0 (4.6)	21.5 (1156)	--	--	16.0 (4.9)	16.0 (4.9)	25.5 (1371)	--	--	15.5 (4.7)
	< 6 (1.8)	11.5 (3.5)	4.5 (242)	11.5 (3.5)	11.5 (3.5)	11.5 (3.5)	16.0 (4.9)	12.0 (645)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)
	7 (2.1)	13.0 (4.0)	7.0 (376)	13.0 (4.0)	13.0 (4.0)	13.0 (4.0)	17.0 (5.2)	14.5 (780)	14.5 (4.4)	14.5 (4.4)	14.5 (4.4)
	8 (2.4)	15.0 (4.6)	10.0 (538)	--	15.0 (4.6)	15.0 (4.6)	18.0 (5.5)	17.0 (914)	--	15.5 (4.7)	15.5 (4.7)
	9 (2.7)	17.0 (5.2)	14.0 (753)	--	17.0 (5.2)	17.0 (5.2)	19.0 (5.8)	20.0 (1075)	--	17.0 (5.2)	17.0 (5.2)
	10 (3.0)	18.5 (5.6)	19.5 (1048)	--	--	18.5 (5.6)	20.0 (6.1)	23.5 (1263)	--	--	18.5 (5.6)
	11 (3.4)	20.5 (6.3)	26.0 (1398)	--	--	--	21.0 (6.4)	28.0 (1505)	--	--	20.0 (6.1)
12 (3.7)	22.5 (6.9)	33.0 (1774)	--	--	--	22.0 (6.7)	33.0 (1774)	--	--	21.5 (6.6)	

NOTE: MINIMUM REQUIRED EXTENSION IS 6" (150mm) FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" (800 mm) FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".

STANDARD TEMPORARY MSE WALL OPTIONS



Scott A. Hildner 2/29/07
SIGNATURE DATE

TEMPORARY MSE WALL OPTION	VENDOR	CONTACT INFORMATION	REINFORCEMENT TYPE	SHEETS
TEMPORARY FABRIC WALL	N/A	N/A	POLYESTER OR POLYPROPYLENE FABRIC	3
HILFIKER TEMPORARY WALL	HILFIKER RETAINING WALLS	1902 HILFIKER LANE, EUREKA, CA 95503-5711 707-443-5093 WWW.HILFIKER.COM	WELDED WIRE MAT	4
SIERRASCAPE TEMPORARY WALL	TENSAR EARTH TECHNOLOGIES, INC	5883 GLENRIDGE DRIVE, SUITE 200 ATLANTA, GA 30328-5363 404-250-1290 WWW.TENSARCORP.COM	GEOGRID	5
RETAINED EARTH TEMPORARY WALL	THE REINFORCED EARTH COMPANY	8614 WESTWOOD CENTER DRIVE, SUITE 1100 VIENNA, VA 22182-2233 703-749-4325 WWW.REINFORCEDEARTH.COM	WELDED WIRE MESH	6-8
TERRATREL TEMPORARY WALL	THE REINFORCED EARTH COMPANY	8614 WESTWOOD CENTER DRIVE, SUITE 1100 VIENNA, VA 22182-2233 703-749-4325 WWW.REINFORCEDEARTH.COM	RIBBED STEEL STRIPS	9-11

FOR STANDARD TEMPORARY MSE WALLS, SEE TEMPORARY SHORING SPECIAL PROVISION.

WHEN NOTES ON PLANS DO NOT PROHIBIT TEMPORARY MSE WALLS OR STANDARD SHORING, STANDARD TEMPORARY MSE WALLS ARE OPTIONAL.

WHEN NOTES ON PLANS REQUIRE TEMPORARY MSE WALLS, USE STANDARD TEMPORARY MSE WALLS OR CONTRACTOR DESIGNED TEMPORARY MSE WALLS.

WHEN THE ALIGNMENT OF STANDARD TEMPORARY MSE WALLS RESULTS IN AN INTERIOR ANGLE LESS THAN 90 DEGREES, SUBMIT AN ACUTE CORNER DETAIL FOR THE SPECIFIC SITUATION IN ACCORDANCE WITH THE WALL VENDOR RECOMMENDATIONS. ALSO, SUBMIT A "STANDARD TEMPORARY MSE WALL SELECTION FORM" FOR EACH TEMPORARY MSE WALL LOCATION. SUBMIT THESE ITEMS AT LEAST 14 DAYS BEFORE BEGINNING WALL CONSTRUCTION.

STANDARD TEMPORARY MSE WALLS ARE BASED ON THE FOLLOWING CONDITIONS:

- 1) MAXIMUM WALL HEIGHT IS 28'-0" (8.5m).
- 2) TRAFFIC SURCHARGE IS 240 PSF (11.5 KPA) MAXIMUM OR BACKSLOPE IS 2:1 (H:V) OR FLATTER.
- 3) EXISTING OR FINISHED GRADE IN FRONT OF WALL IS 6:1 (H:V) SLOPE OR FLATTER.
- 4) THE GRADE OF THE TOP OF WALL IS LESS THAN 4% FOR RETAINED EARTH AND TERRATREL TEMPORARY WALLS.
- 5) DESIGN SERVICE LIFE IS 3 YEARS.
- 6) MATERIAL IN REINFORCED ZONE IS SHORING BACKFILL.
- 7) MAXIMUM APPLIED BEARING PRESSURE IS 1 TSF (100 KPA) FOR WALL HEIGHTS UP TO 8'-0" (2.4m), 2 TSF (195 KPA) FOR WALL HEIGHTS BETWEEN 8'-0" AND 18'-0" (2.4m AND 5.5m) AND 3 TSF (290 KPA) FOR WALL HEIGHTS OVER 18'-0" (5.5m).

STANDARD TEMPORARY MSE WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:

- TOTAL UNIT WEIGHT = 120 PCF (18.8 KN/M³)
- FRICTION ANGLE = 30 DEGREES
- COHESION = 0 PSF (0 KPA)
- GROUNDWATER IS ASSUMED TO BE BELOW BOTTOM OF REINFORCED ZONE.

DO NOT USE STANDARD TEMPORARY MSE WALLS WHEN THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE BOTTOM OF REINFORCED ZONE.

CONTROL DRAINAGE DURING CONSTRUCTION IN THE VICINITY OF STANDARD TEMPORARY MSE WALLS. COLLECT AND DIRECT RUNOFF AWAY FROM WALLS AND SHORING BACKFILL.

EXCAVATE AS NECESSARY FOR STANDARD TEMPORARY MSE WALLS IN ACCORDANCE WITH THE FOLLOWING FOR THE WALL OPTION CHOSEN:

- 1) MINIMUM EMBEDMENT OF 18" (450mm) UNLESS WALL BEARS ON ROCK, CONCRETE OR PAVEMENT AS DETERMINED BY THE ENGINEER
- 2) VERTICAL STEPS IN INCREMENT EQUAL TO THE VERTICAL REINFORCEMENT SPACING
- 3) WITH THE EXCEPTION OF EITHER THE FIRST OR LAST SECTION OF WALL, HORIZONTAL SECTION LENGTHS IN INCREMENTS EQUAL TO THE FOLLOWING:

STANDARD TEMPORARY MSE WALL OPTION	INCREMENT
TEMPORARY FABRIC WALL	9'-0" (2.7m) MIN (VARIES)
HILFIKER TEMPORARY WALL	10'-0" (3.0m) MIN (VARIES)
SIERRASCAPE TEMPORARY WALL	18'-7 1/4" (5.7m)
RETAINED EARTH TEMPORARY WALL	24'-0" (7.3m)
TERRATREL TEMPORARY WALL	19'-8" (6.0m)

DO NOT PLACE SHORING BACKFILL OR FIRST REINFORCEMENT LAYER UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND FOUNDATION MATERIAL.

IF APPLICABLE, INSTALL FOUNDATIONS LOCATED WITHIN THE REINFORCED ZONE BEFORE BEGINNING WALL CONSTRUCTION UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

ERECT AND MAINTAIN FACINGS AND FORMS AS SHOWN ON THE STANDARD TEMPORARY MSE WALL DETAILS. STAGGER VERTICAL JOINTS OF FACINGS AND FORMS TO CREATE A RUNNING BOND WHEN POSSIBLE UNLESS SHOWN OTHERWISE ON THESE DETAILS.

PLACE FACINGS AND FORMS AS NEAR TO VERTICAL AS POSSIBLE WITH NO NEGATIVE BATTER. CONSTRUCT STANDARD TEMPORARY MSE WALLS WITH A VERTICAL AND HORIZONTAL TOLERANCE OF 3" (75mm) WHEN MEASURED WITH A 10'-0" (3m) STRAIGHT EDGE AND AN OVERALL VERTICAL PLUMBNESS (BATTER) AND HORIZONTAL ALIGNMENT OF LESS THAN 6" (150mm).

PLACE REINFORCEMENT AT LOCATIONS AND ELEVATIONS SHOWN ON THE STANDARD TEMPORARY MSE WALL DETAILS AND IN SLIGHT TENSION FREE OF KINKS, FOLDS, WRINKLES OR CREASES.

DO NOT SPLICE REINFORCEMENT IN THE REINFORCEMENT DIRECTION (RD), i.e., PARALLEL TO THE WALL FACE. SEAMS ARE ALLOWED IN THE CROSS-REINFORCEMENT DIRECTION (CRD).

CONTACT THE ENGINEER WHEN EXISTING OR FUTURE STRUCTURES SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT. TO AVOID STRUCTURES, DELFECT, SKEW AND MODIFY REINFORCEMENT.

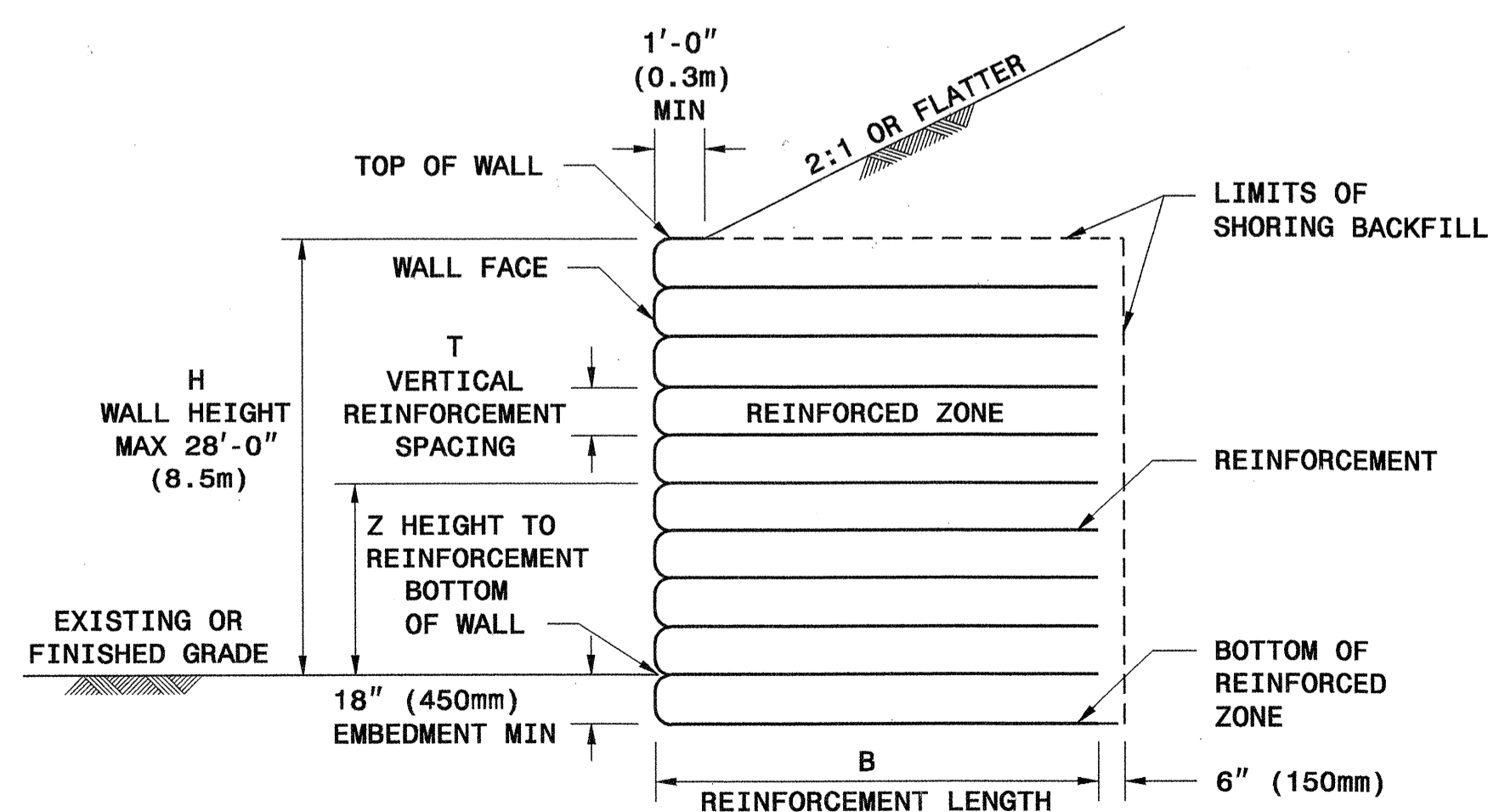
PLACE SHORING BACKFILL IN 8" TO 10" (200mm to 250mm) THICK LIFTS AND COMPACT IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. USE ONLY HAND OPERATED COMPACTION EQUIPMENT WITHIN 3'-0" (1m) OF THE WALL FACE.

DO NOT DAMAGE REINFORCEMENT WHEN PLACING AND COMPACTING SHORING BACKFILL. DO NOT OPERATE HEAVY EQUIPMENT ON REINFORCEMENT UNTIL IT IS COVERED WITH AT LEAST 10" (250mm) OF SHORING BACKFILL. DO NOT USE SHEEPSFOOT, GRID ROLLERS OR OTHER TYPES OF COMPACTION EQUIPMENT WITH FEET.

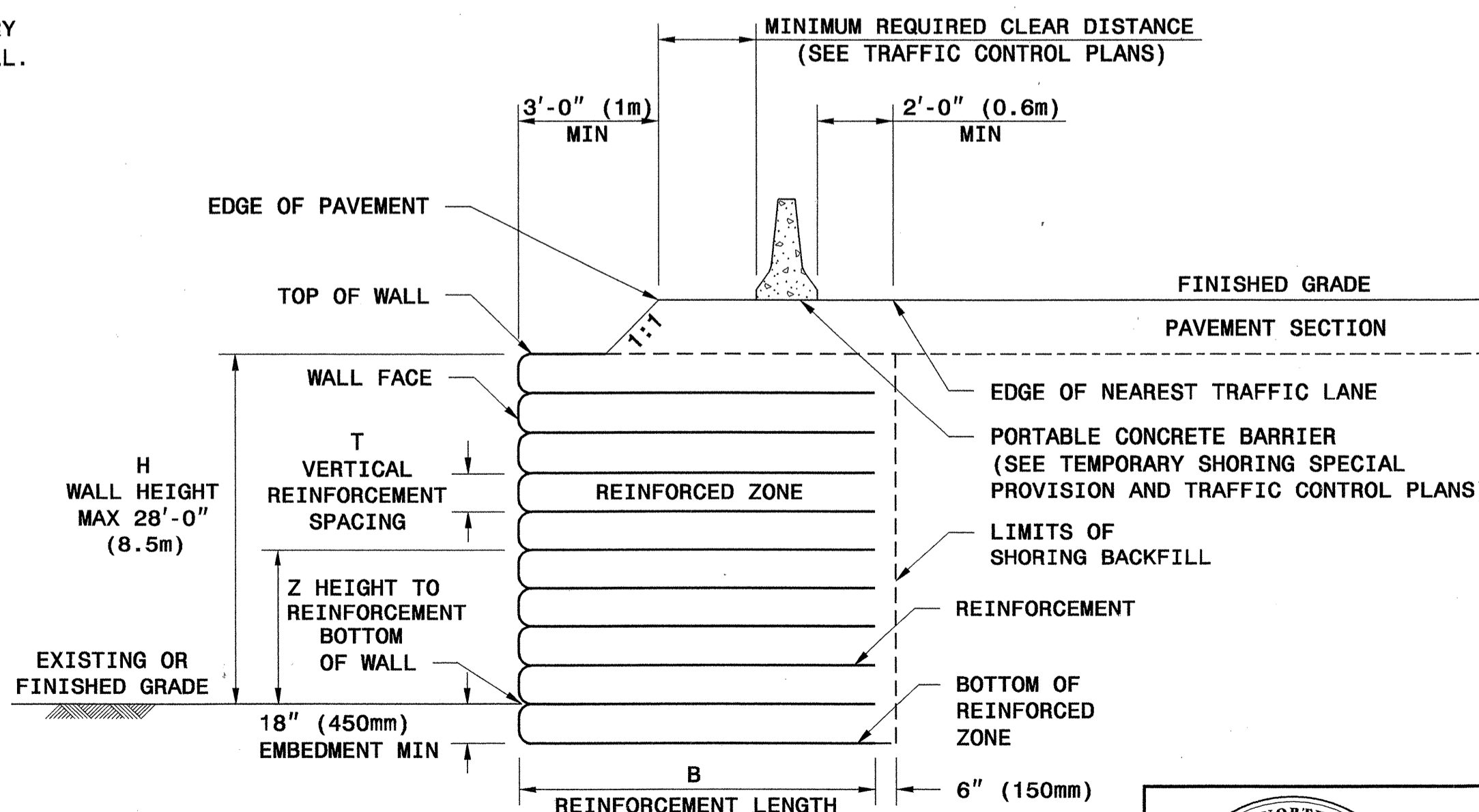
COVER REINFORCING AND RETENTION FABRIC WITH AT LEAST 3" (75mm) OF SHORING BACKFILL. PLACE TOP REINFORCEMENT LAYER BETWEEN 4" AND 24" (100mm and 600mm) BELOW TOP OF WALL DEPENDING ON WALL OPTION.

BENCH STANDARD TEMPORARY MSE WALLS INTO THE SIDES OF EXCAVATIONS WHERE APPLICABLE.

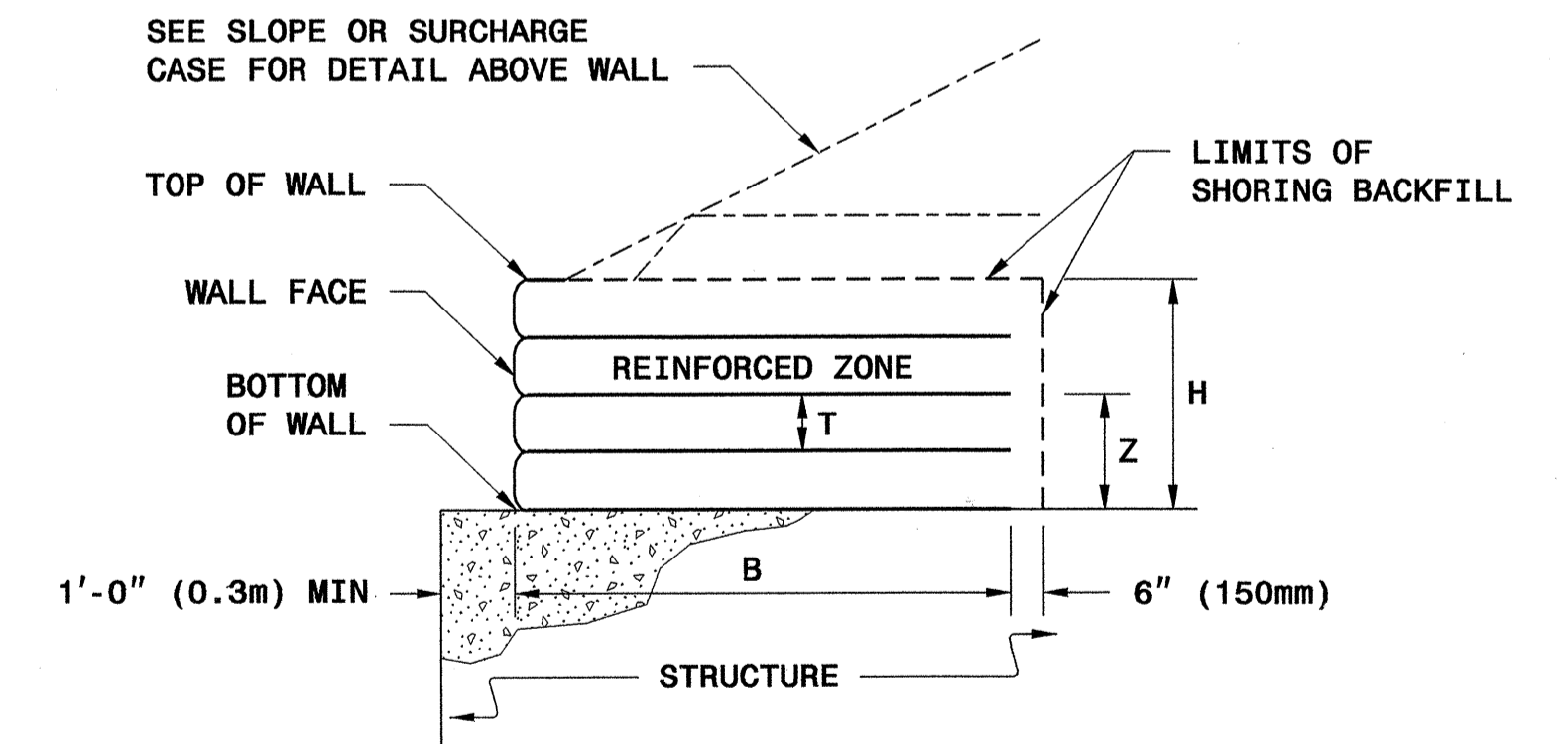
IF THE TOP OF WALL IS WITHIN 5'-0" (1.5m) OF FINISHED GRADE, REMOVE TOP FORM OR FACING AND INCORPORATE THE TOP REINFORCEMENT LAYER INTO THE FILL WHEN PLACING FILL IN FRONT OF THE WALL. STANDARD TEMPORARY MSE WALLS REMAIN IN PLACE PERMANENTLY UNLESS REQUIRED OTHERWISE.



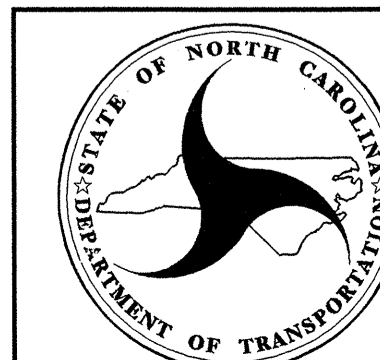
SLOPE CASE



SURCHARGE CASE



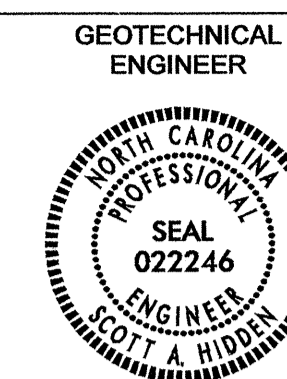
TEMPORARY MSE WALL ON STRUCTURE



GEOTECHNICAL ENGINEERING UNIT
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY MECHANICALLY STABILIZED EARTH (MSE) WALLS



ENGINEER

Signature and Date of Engineer

HOW TO USE THIS SHEET:

- FOR ALL WALL OPTIONS, DETERMINE MINIMUM REQUIRED REINFORCEMENT LENGTH (B) FROM TABLE AT RIGHT BASED ON WALL HEIGHT (H) AND SLOPE OR SURCHARGE CASE
- FOR STANDARD TEMPORARY FABRIC WALL, SEE SHEET 3 FOR FABRIC STRENGTH REQUIREMENTS BASED ON WALL HEIGHT (H)
- FOR ALL OTHER WALL OPTIONS, DETERMINE REINFORCEMENT TYPE FROM TABLES BELOW FOR EACH HEIGHT TO REINFORCEMENT (Z) BASED ON WALL HEIGHT (H) AND SLOPE OR SURCHARGE CASE

MINIMUM REQUIRED REINFORCEMENT LENGTH B (FT)

(FOR ALL WALL OPTIONS)

Table with columns for WALL HEIGHT H (FT) and SURCHARGE CASE, and rows for SLOPE CASE and SURCHARGE CASE with values ranging from 8 to 28.

TERRATREL TEMPORARY WALL (STRIPS PER LEVEL PER PANEL)

Table for Terratrel Temporary Wall showing H (FT) vs Z (FT-INCHES) with reinforcement strip counts.

SIERRASCAPE TEMPORARY WALL (GEOGRID TYPE)

11 = UX1100MSE 16 = UX1600MSE
14 = UX1400MSE 17 = UX1700MSE
15 = UX1500MSE

Table for Sierrascape Temporary Wall showing H (FT) vs Z (FT) with reinforcement grid types.

Table for Sierrascape Temporary Wall showing H (FT) vs Z (FT) with reinforcement grid types.

HILFIKER TEMPORARY WALL (WELDED WIRE MAT TYPE)

4.5 = W4.5 x W3.5
7.0 = W7.0 x W3.5
9.5 = W9.5 x W4.0

Table for HilfiKER Temporary Wall showing H (FT) vs Z (FT) for Slope Case with reinforcement mat types.

Table for HilfiKER Temporary Wall showing H (FT) vs Z (FT) for Surcharge Case with reinforcement mat types.

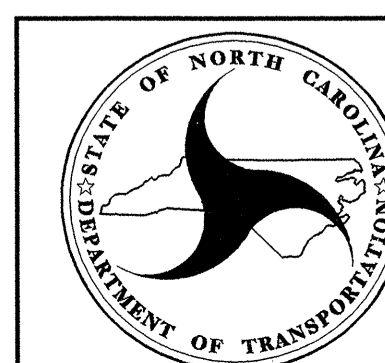
RETAINED EARTH TEMPORARY WALL (WELDED WIRE MESH TYPE)

3X1 = 3W8 x W8 x 1.0'
3X2 = 3W8 x W8 x 2.0'

Table for Retained Earth Temporary Wall showing H (FT) vs Z (FT) for Slope and Surcharge Cases with reinforcement mesh types.

NOTES FOR HILFIKER TEMPORARY WALL

- 1) CAP MAT AT TOP OF WALL IS NOT INCLUDED IN TABLES.
2) REINFORCEMENT IS NOT REQUIRED AT 1' LEVEL FOR SLOPE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 24'.
3) REINFORCEMENT IS NOT REQUIRED AT 3' LEVEL FOR SLOPE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 26'.
4) REINFORCEMENT IS NOT REQUIRED AT 1' LEVEL FOR SURCHARGE CASE UNTIL WALL HEIGHT (H) IS GREATER THAN 26'.



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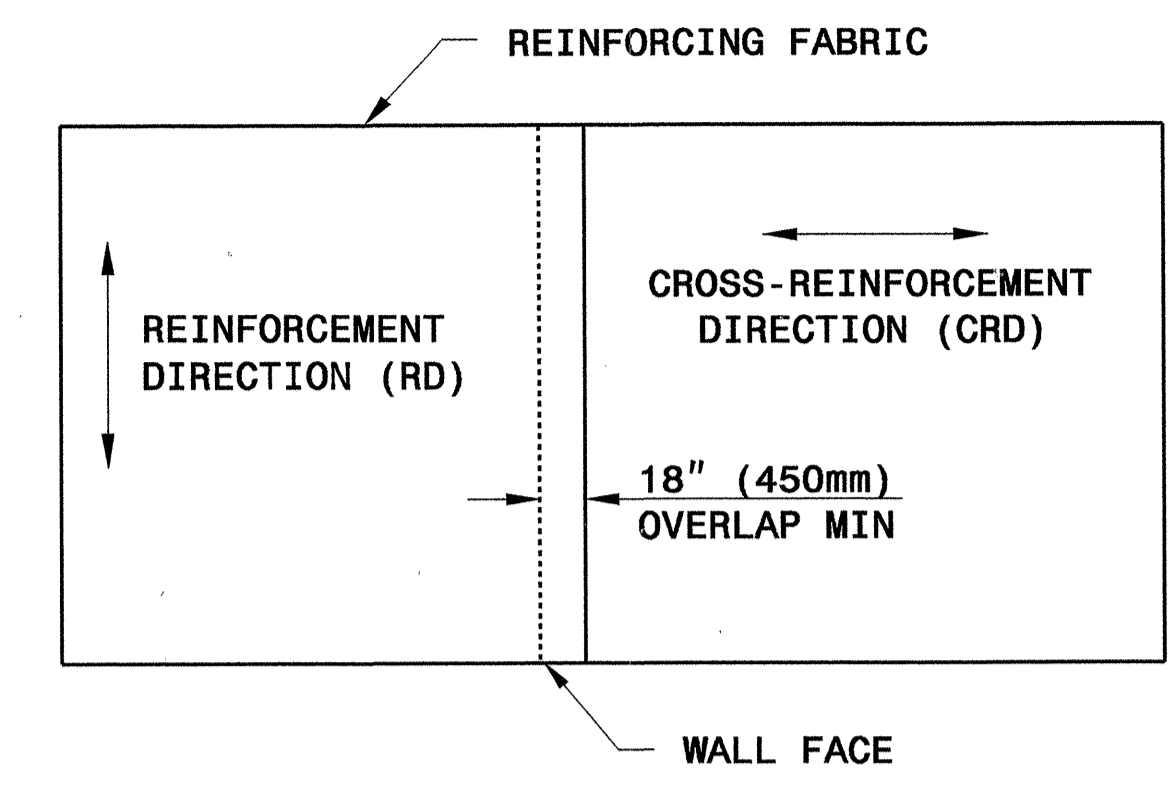
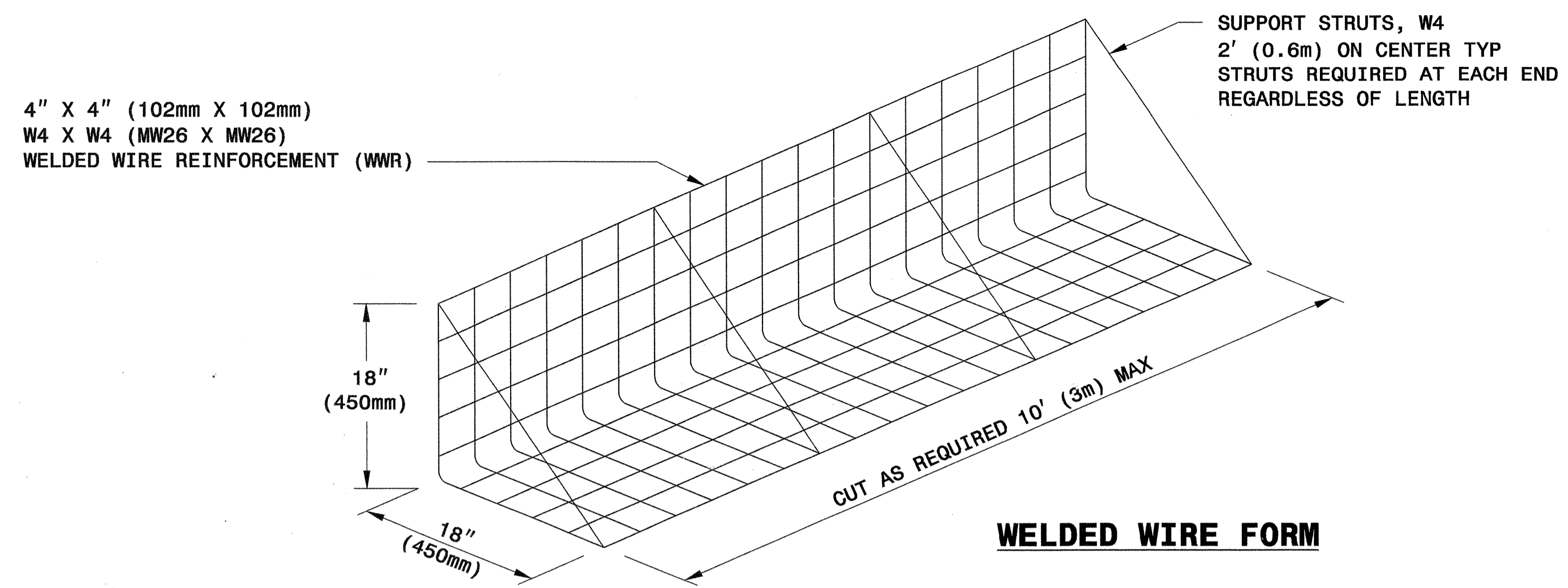
STANDARD TEMPORARY MSE WALL REINFORCEMENT TABLES - ENGLISH UNITS

GEOTECHNICAL ENGINEER

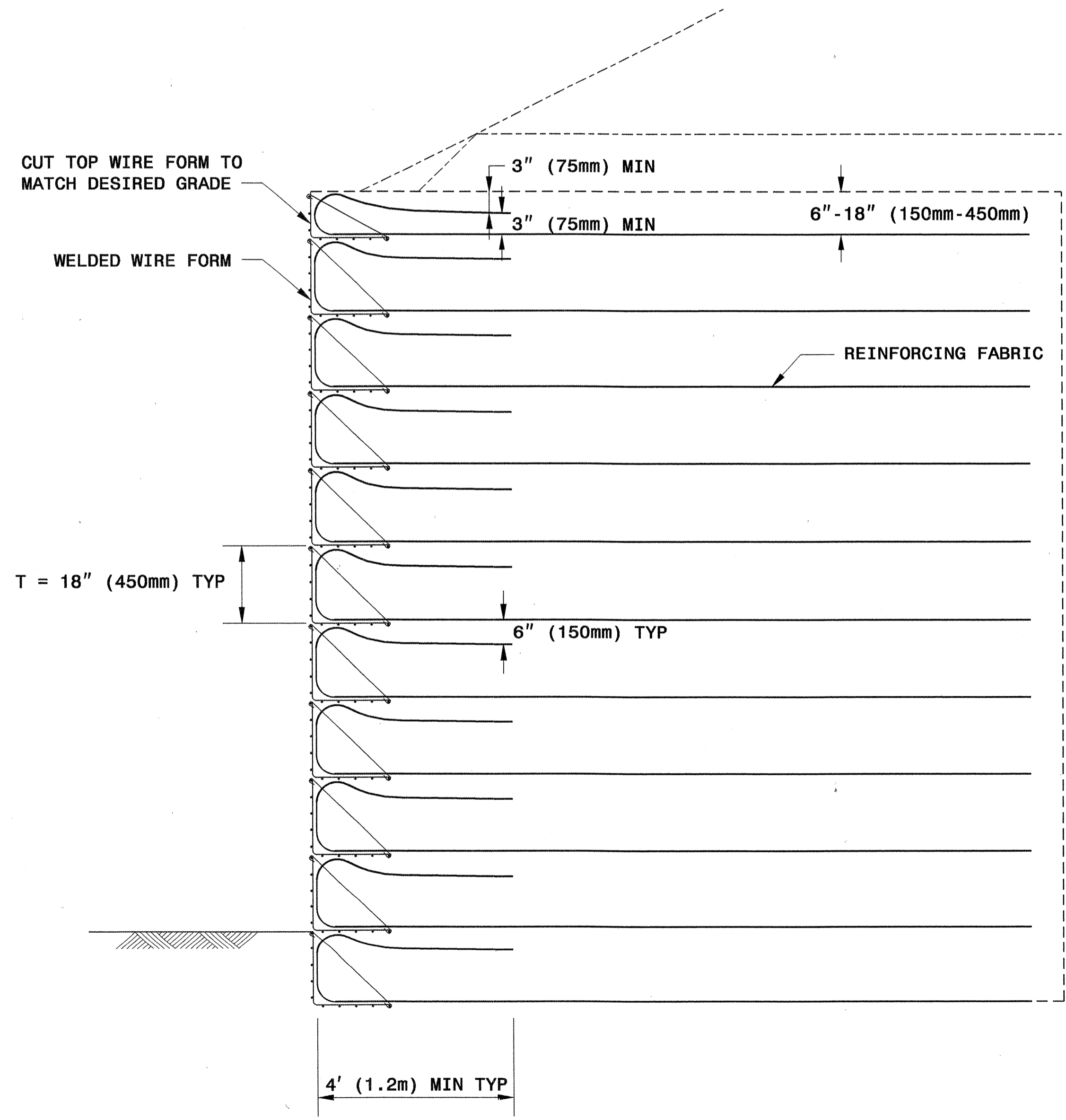
ENGINEER

SEAL
022246
NORTH CAROLINA PROFESSIONAL ENGINEERS
SCOTT A. HEDDER

Scott A. Hedder 3/29/07
SIGNATURE DATE



PLAN VIEW OF FABRIC OVERLAP



TYPICAL SECTION

**MINIMUM REQUIRED REINFORCING FABRIC STRENGTH FOR RD*
(SLOPE AND SURCHARGE CASES)**

WALL HEIGHT H FEET (M)	POLYESTER WIDE WIDTH TENSILE STRENGTH @ ULTIMATE LB/INCH (KN/M)	POLYPROPYLENE WIDE WIDTH TENSILE STRENGTH @ ULTIMATE LB/INCH (KN/M)
4 (1.2)	200 (35)	200 (35)
6 (1.8)	200 (35)	200 (35)
8 (2.4)	200 (35)	200 (35)
10 (3.0)	200 (35)	230 (40)
12 (3.7)	220 (39)	264 (46)
14 (4.3)	248 (43)	297 (52)
16 (4.9)	276 (48)	330 (58)
18 (5.5)	304 (53)	364 (64)
20 (6.1)	332 (58)	397 (70)
22 (6.7)	359 (63)	431 (76)
24 (7.3)	387 (68)	464 (81)
26 (7.9)	415 (73)	497 (87)
28 (8.5)	443 (78)	531 (93)

*RD = REINFORCEMENT DIRECTION

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DEPARTMENT OF TRANSPORTATION
RALEIGH

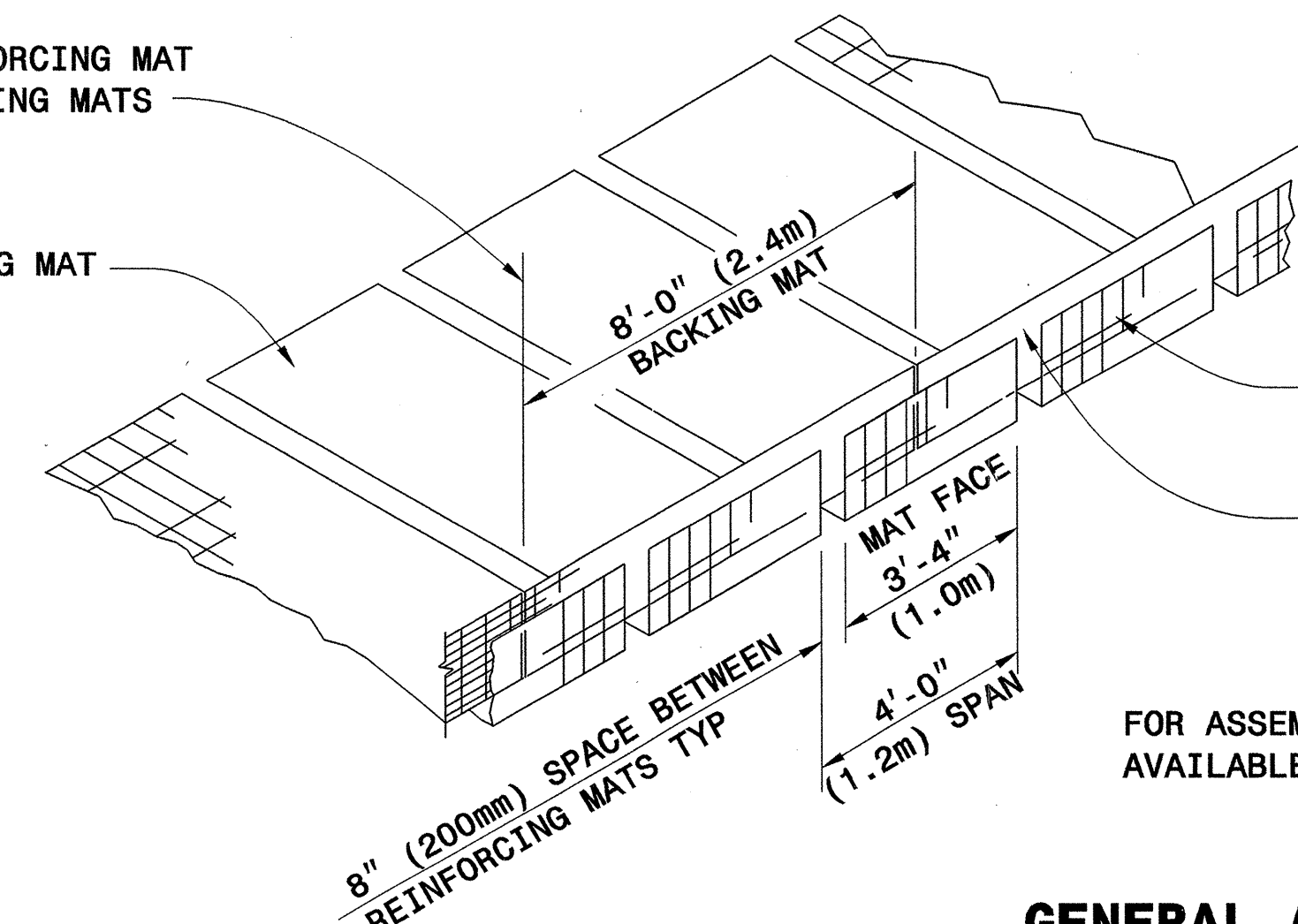
STANDARD DRAWING NO. 1801.02

TEMPORARY FABRIC WALL

SHEET 3 OF 11 DATE: 12-19-06

CENTERLINE OF REINFORCING MAT
FACE = EDGE OF BACKING MATS

REINFORCING MAT

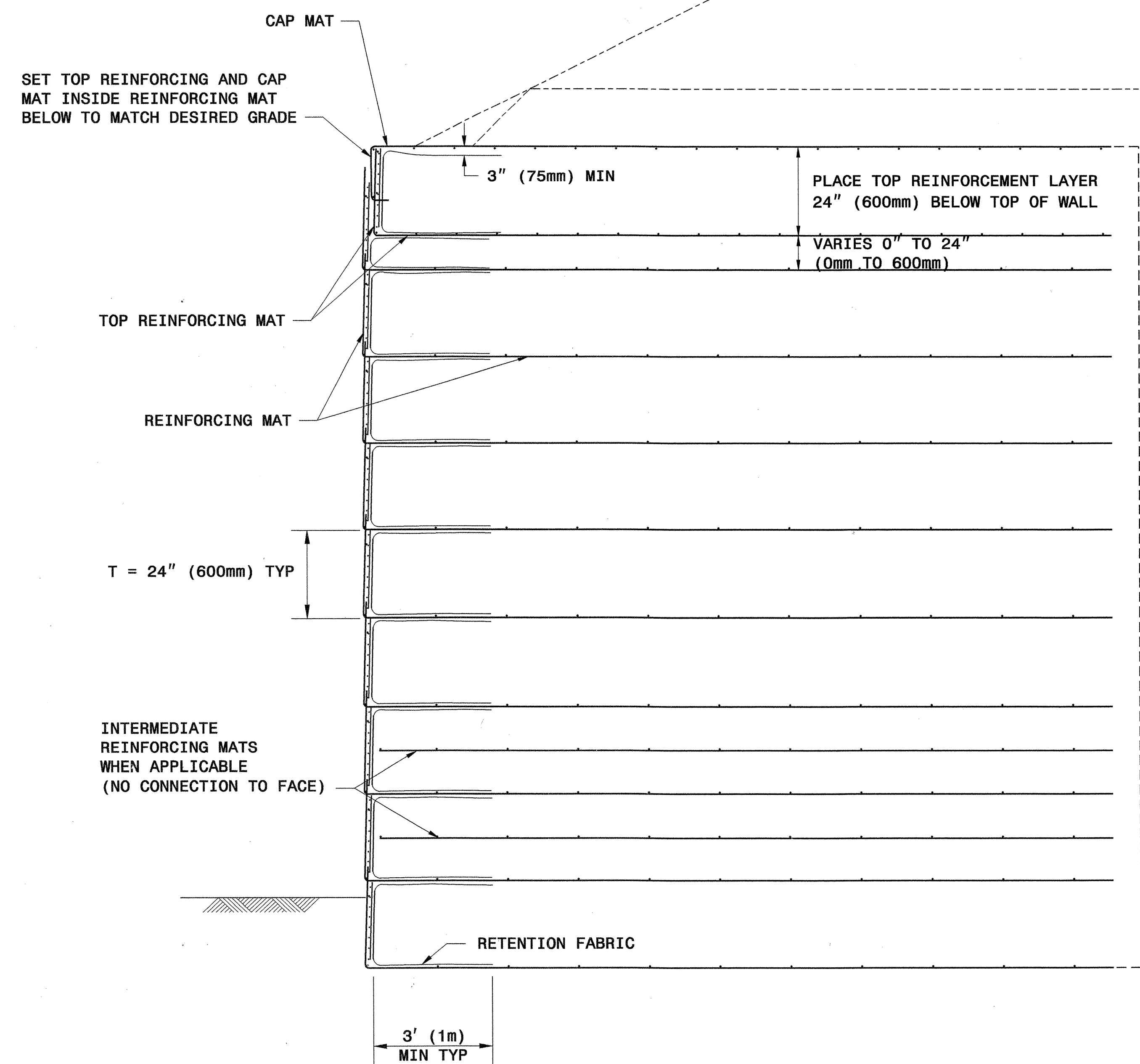


WALL FACE

BACKING MAT

FOR ASSEMBLY INSTRUCTIONS, SEE WELDED WIRE WALL CONSTRUCTION GUIDE AVAILABLE FROM HILFIKER WEBSITE AT WWW.HILFIKER.COM/WWW

GENERAL ASSEMBLY DETAIL



SET TOP REINFORCING AND CAP MAT INSIDE REINFORCING MAT BELOW TO MATCH DESIRED GRADE

3" (75mm) MIN

PLACE TOP REINFORCEMENT LAYER 24" (600mm) BELOW TOP OF WALL

VARIABLES 0" TO 24" (0mm TO 600mm)

TOP REINFORCING MAT

REINFORCING MAT

T = 24" (600mm) TYP

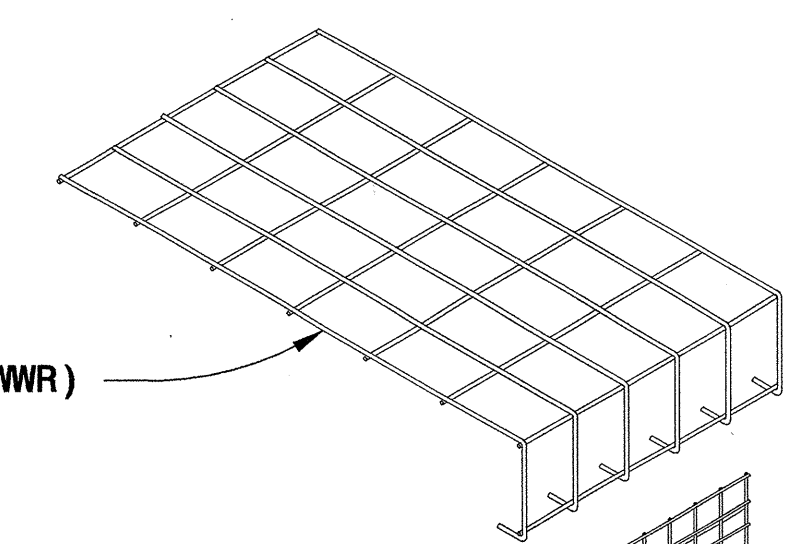
INTERMEDIATE REINFORCING MATS WHEN APPLICABLE (NO CONNECTION TO FACE)

RETENTION FABRIC

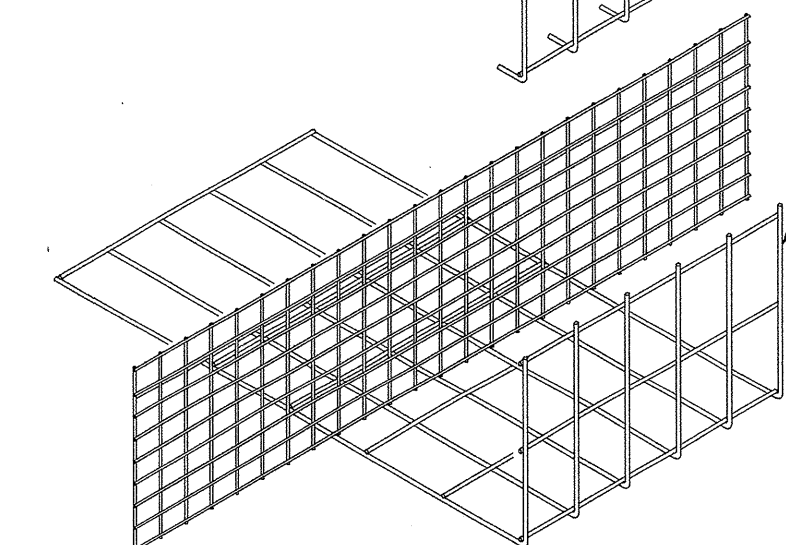
3' (1m) MIN TYP

TYPICAL SECTION

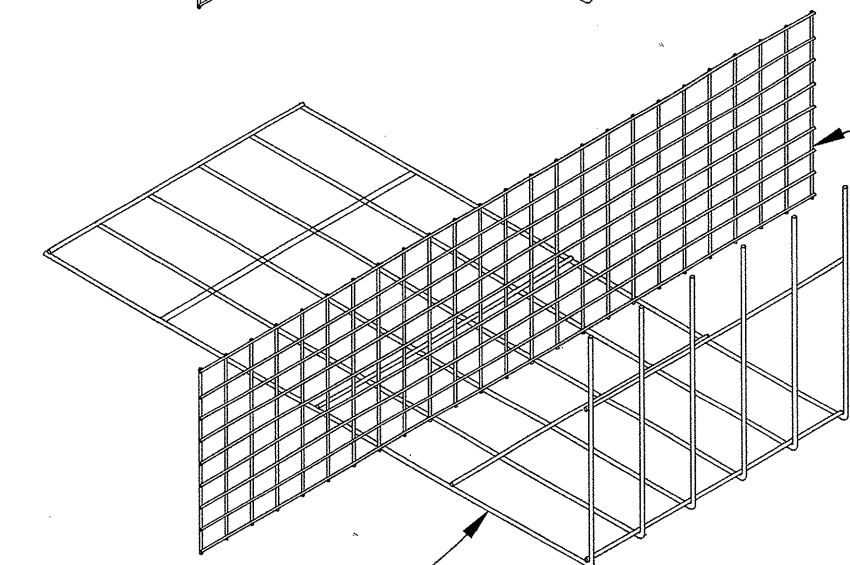
8" X 12" (203mm X 305mm)
W4.5 X W3.5 (MW29 X MW23)
CAP MAT
WELDED WIRE REINFORCEMENT (WWR)



8" X 12" (203mm X 305mm)
W4.5 X W3.5 (MW29 X MW23) WWR
TOP REINFORCING MAT (NO PRONGS)



4" X 3" (102mm X 76mm)
W5 X W2.5 (MW32 X MW16) WWR
BACKING MAT
8' (2.4m) WIDE



8" X 21" (203mm X 533mm)
REINFORCING MAT
SEE SHEETS 2 AND 3 FOR GAUGE SIZES

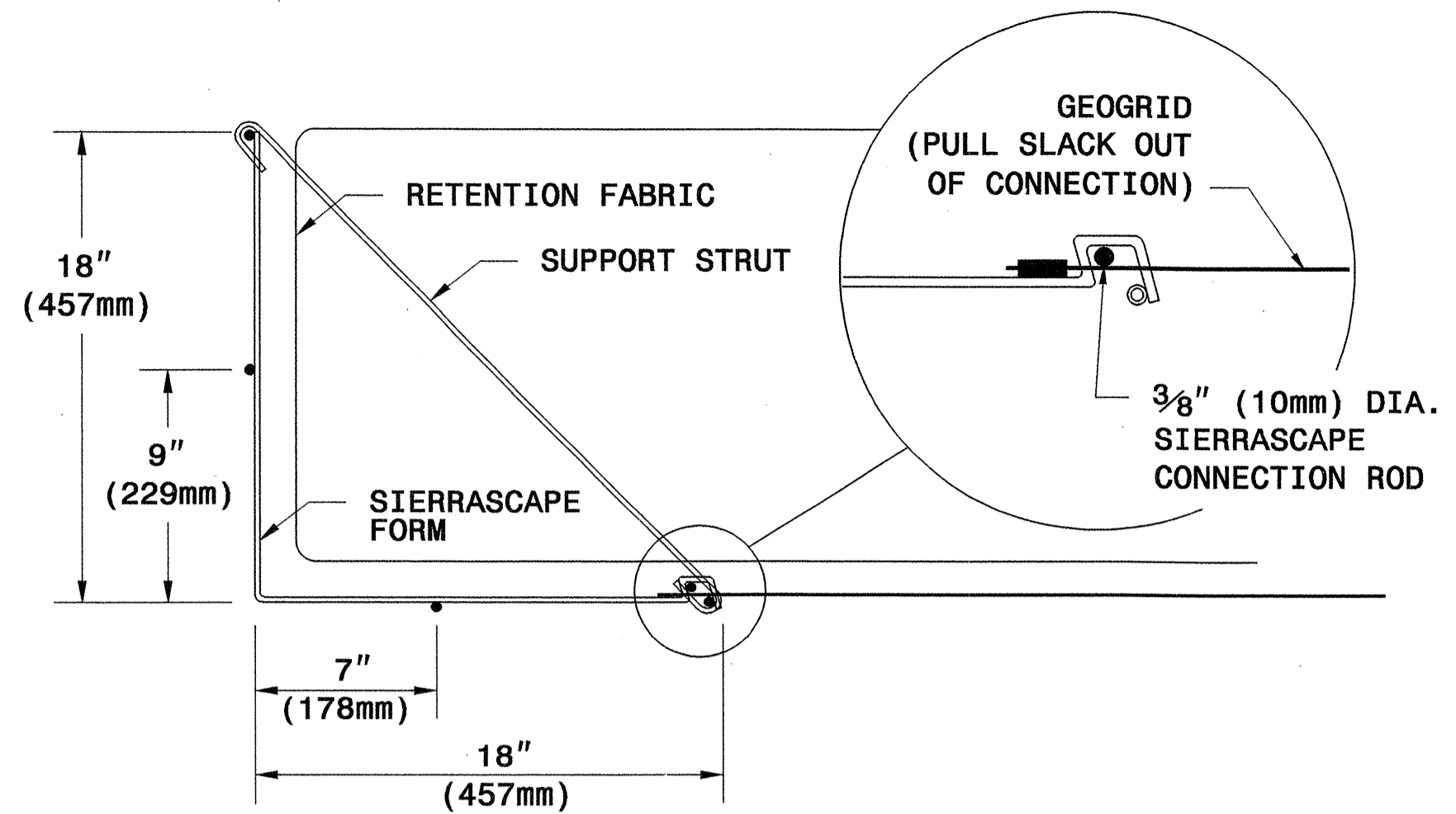
WALL COMPONENTS

GEOTECHNICAL ENGINEER

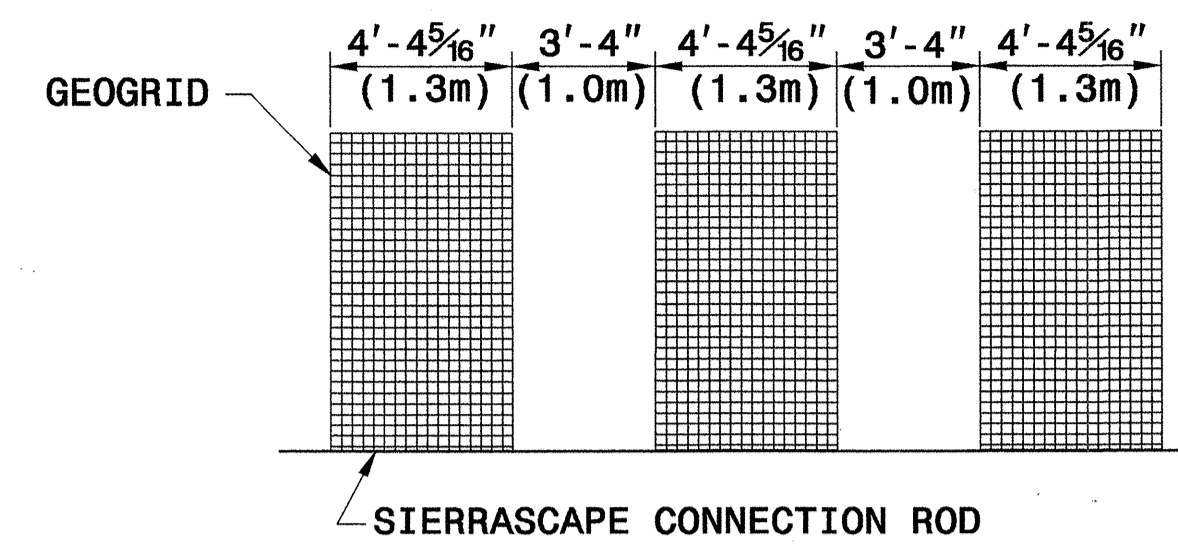
ENGINEER



Scott A. Hilder 5/29/07
SIGNATURE DATE

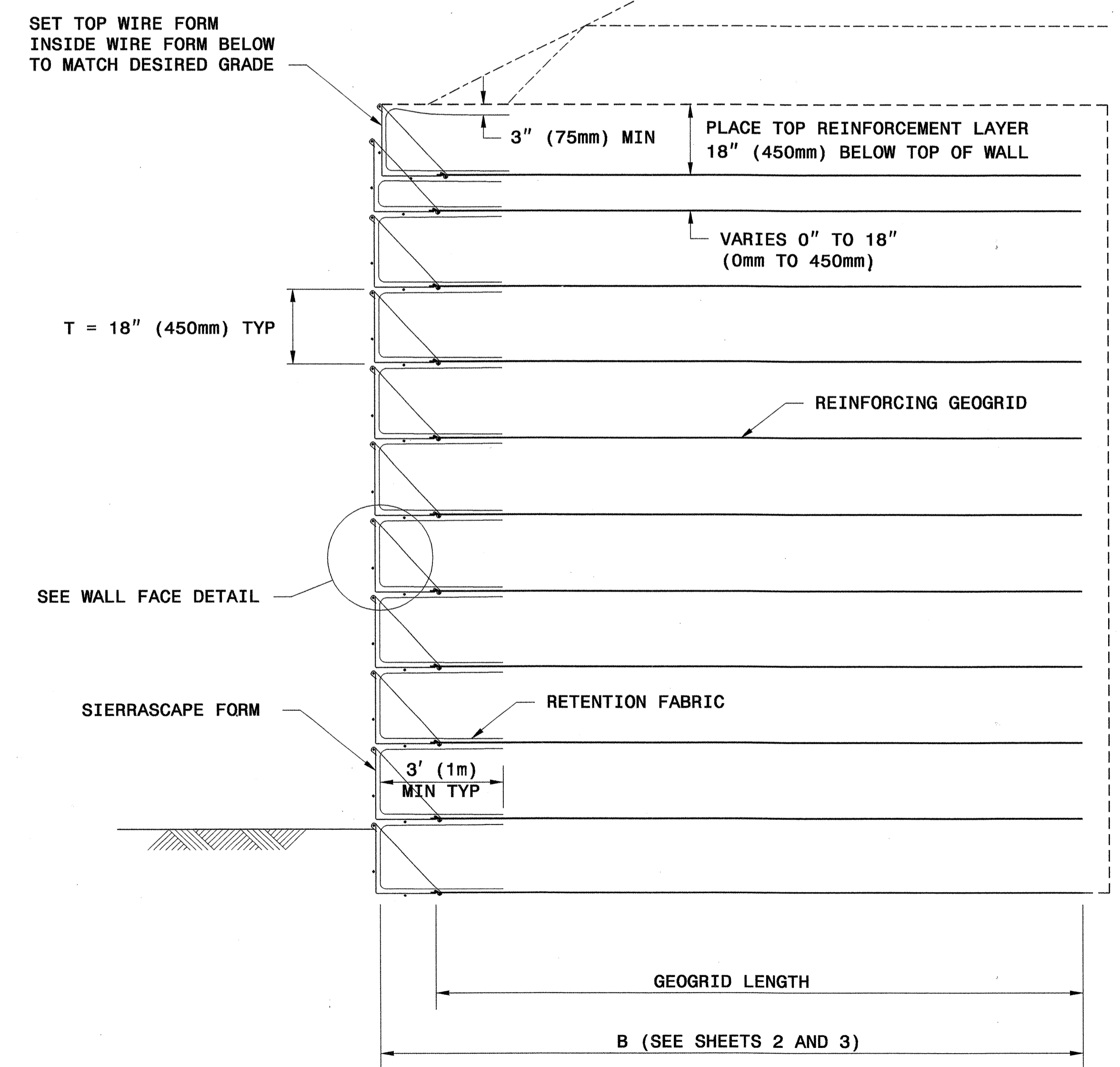


WALL FACE DETAIL

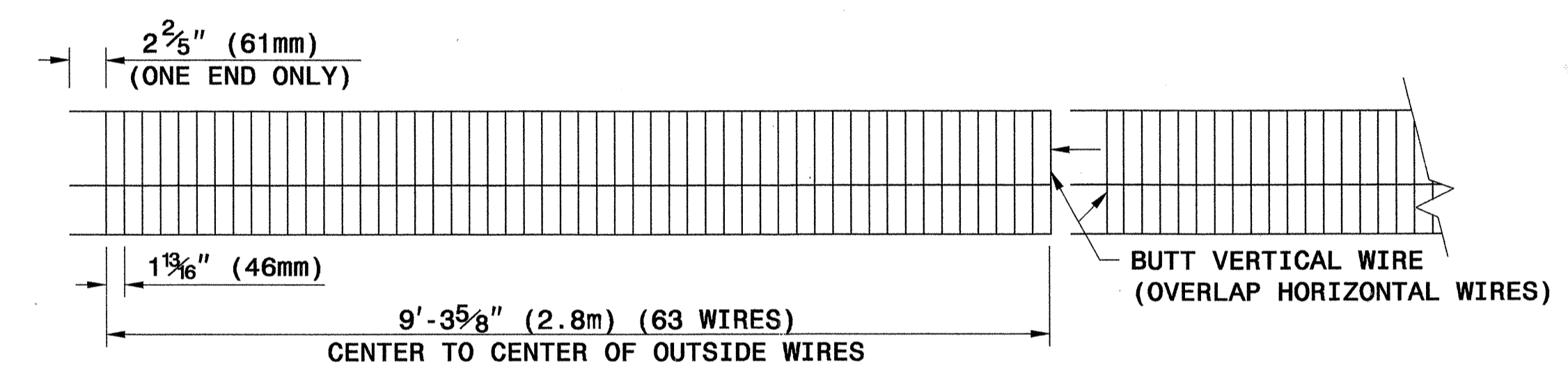


PLACE ALTERNATE LAYERS OF GEOGRID IN STAGGERED PATTERN SUCH THAT THE LAYER ABOVE IS CENTERED OVER SPACE BELOW

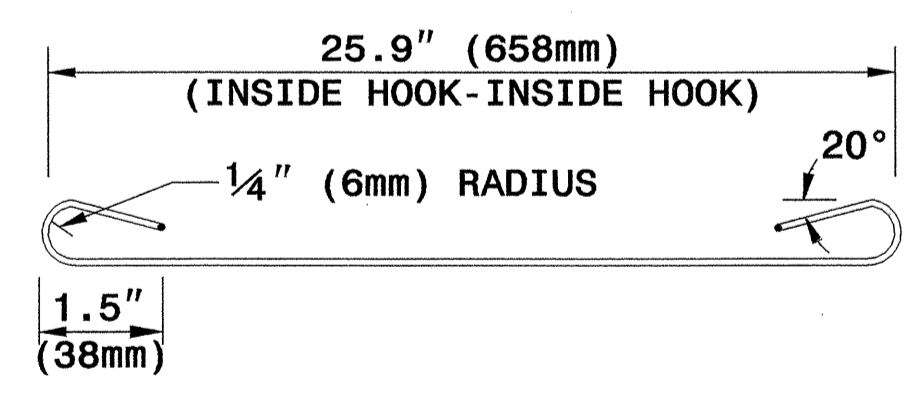
TYPICAL GEOGRID COVERAGE



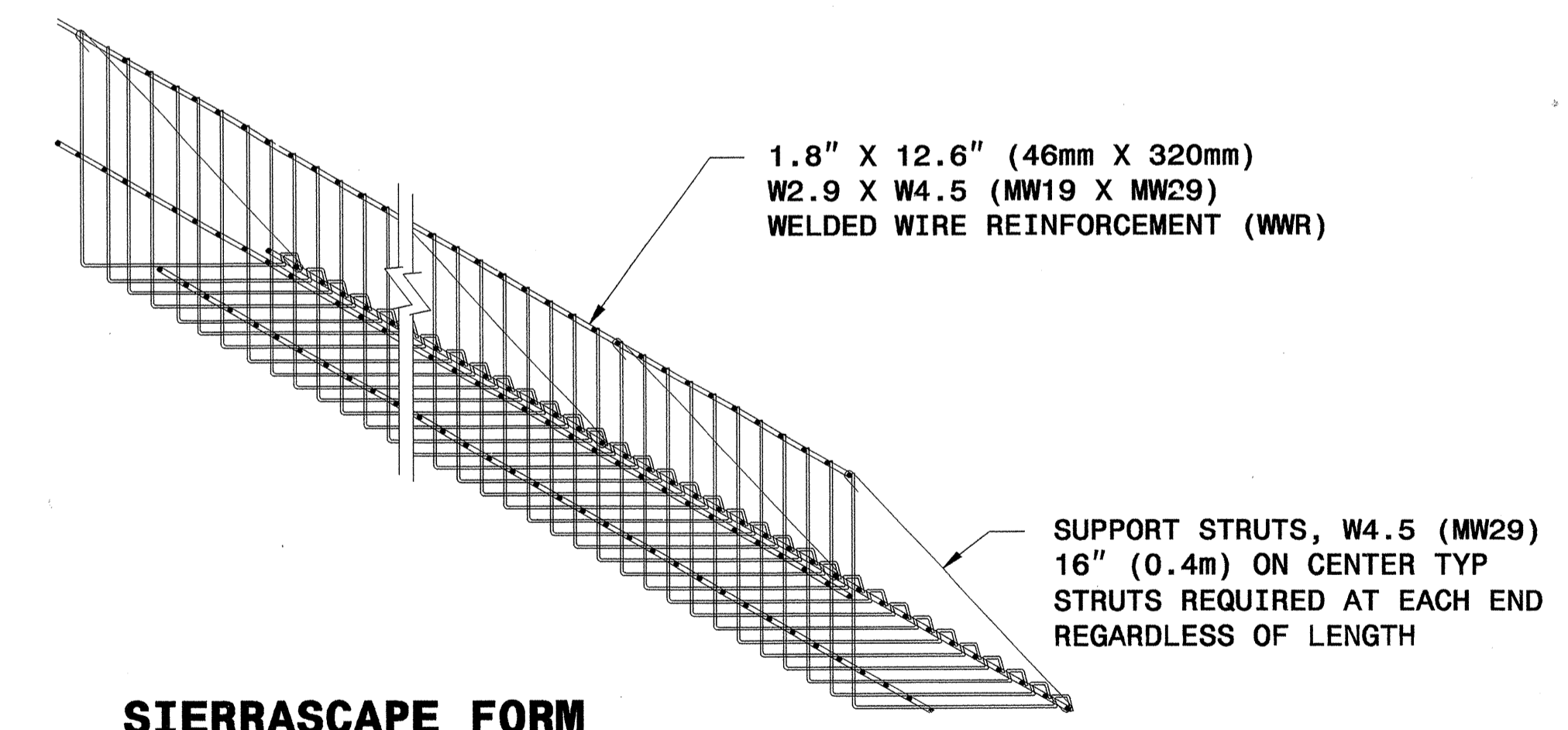
TYPICAL SECTION



ELEVATION VIEW

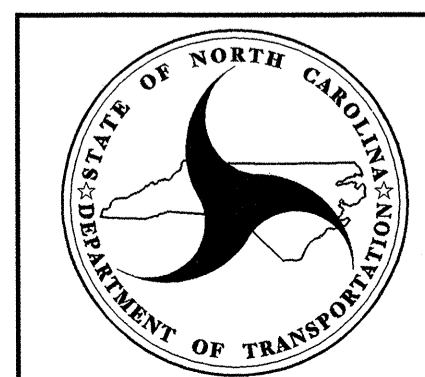
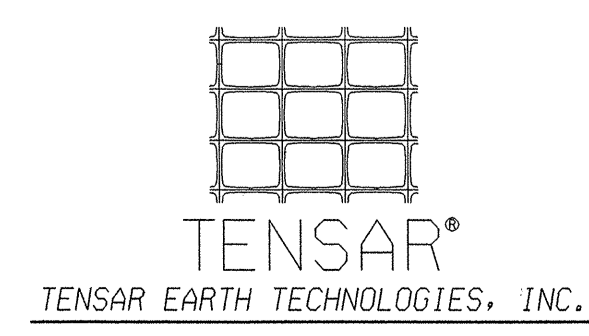


SUPPORT STRUT



SIERRASCAPE FORM

WALL COMPONENTS




GEOTECHNICAL ENGINEERING UNIT
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD DRAWING NO. 1801.02

SIERRASCAPE TEMPORARY WALL

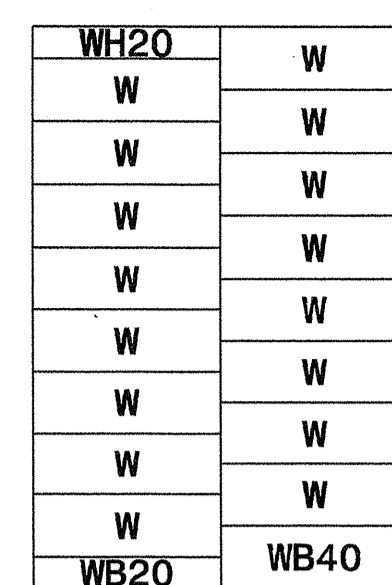
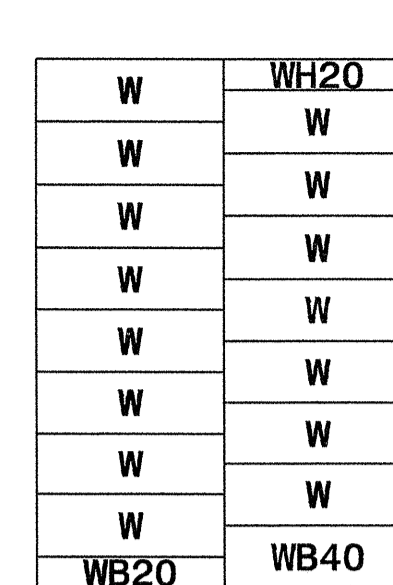
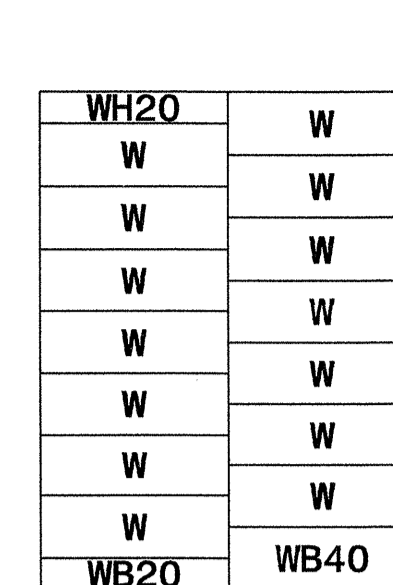
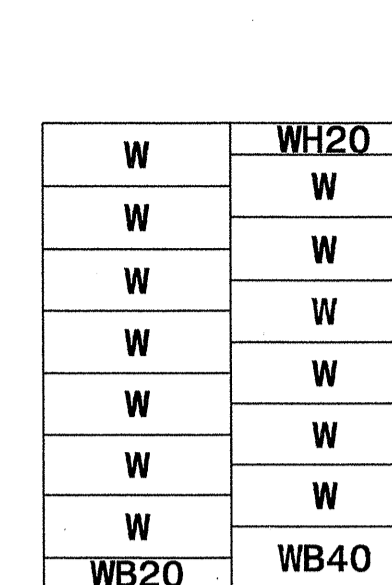
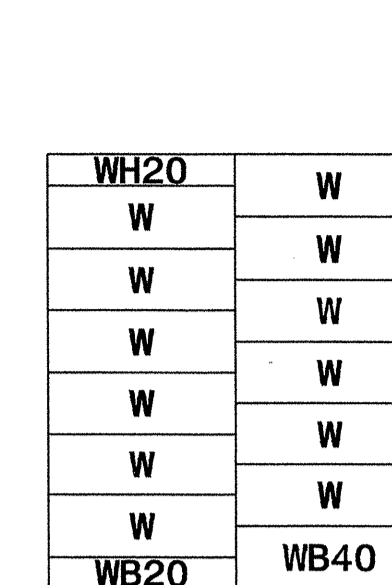
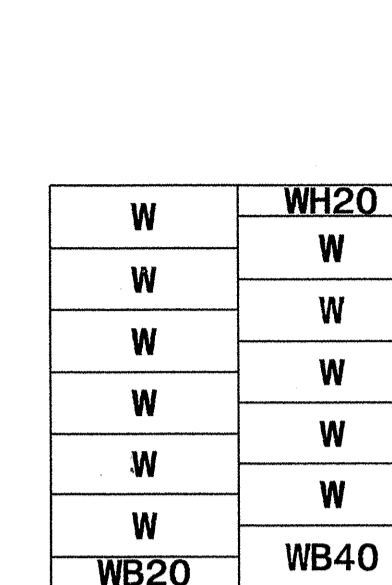
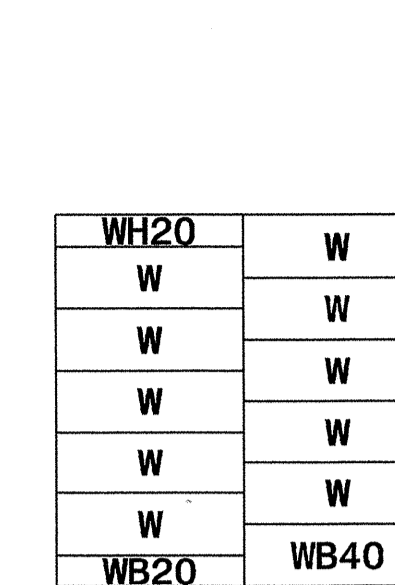
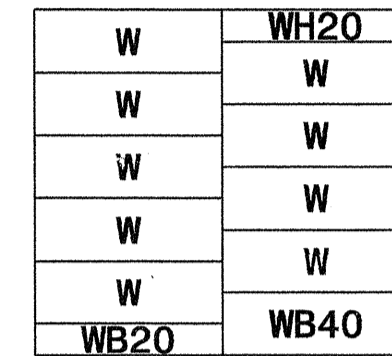
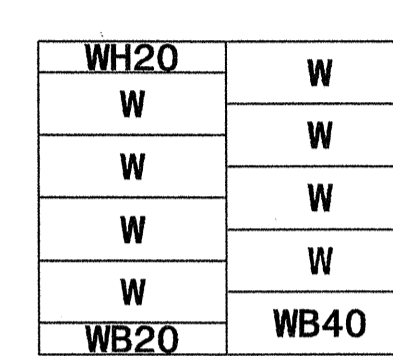
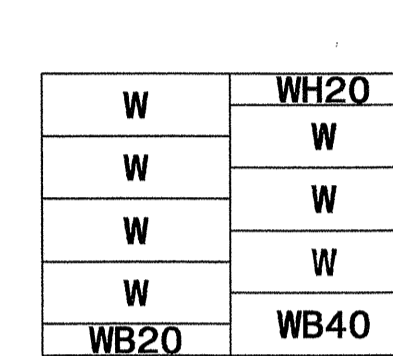
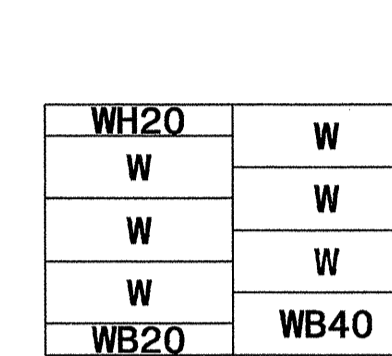
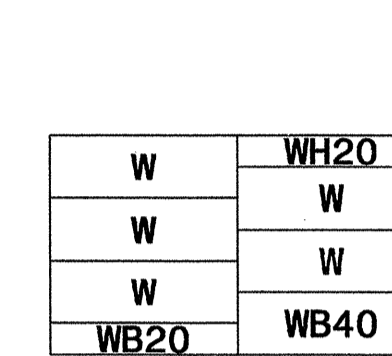
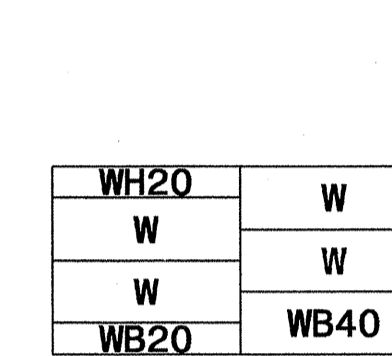
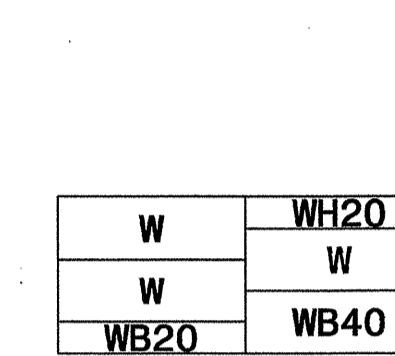
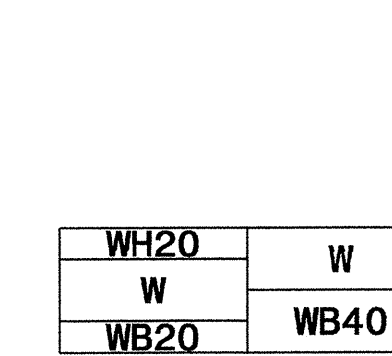
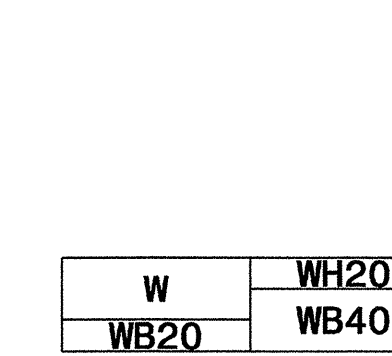
GEOTECHNICAL ENGINEER ENGINEER

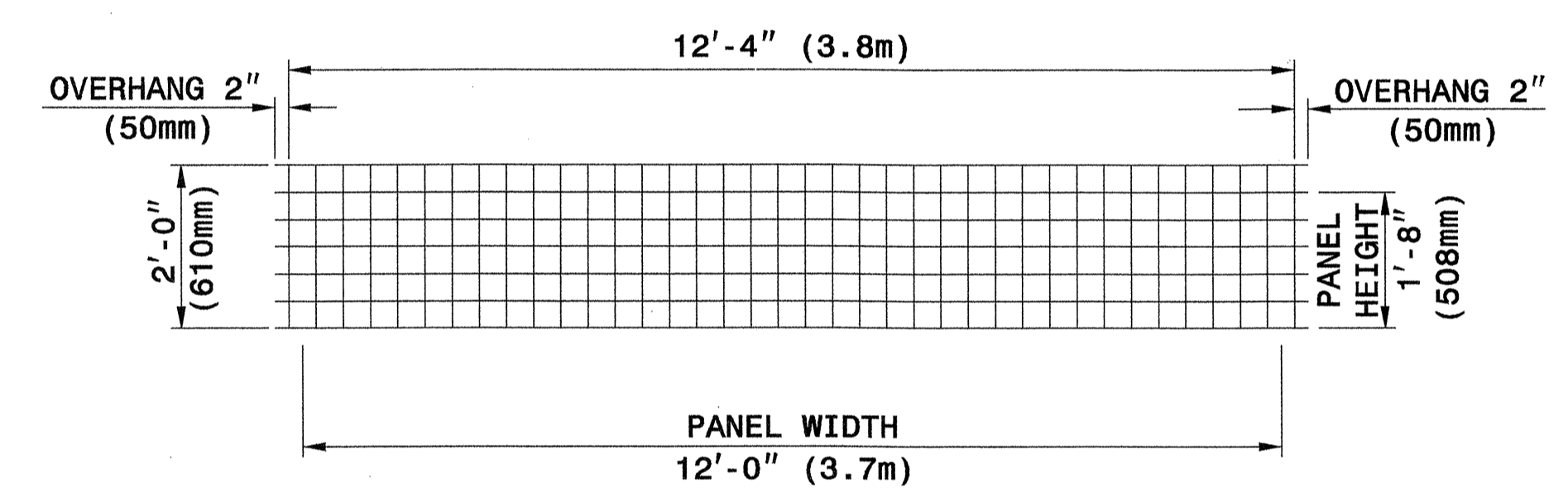


Scott A. Hidden 3/29/07

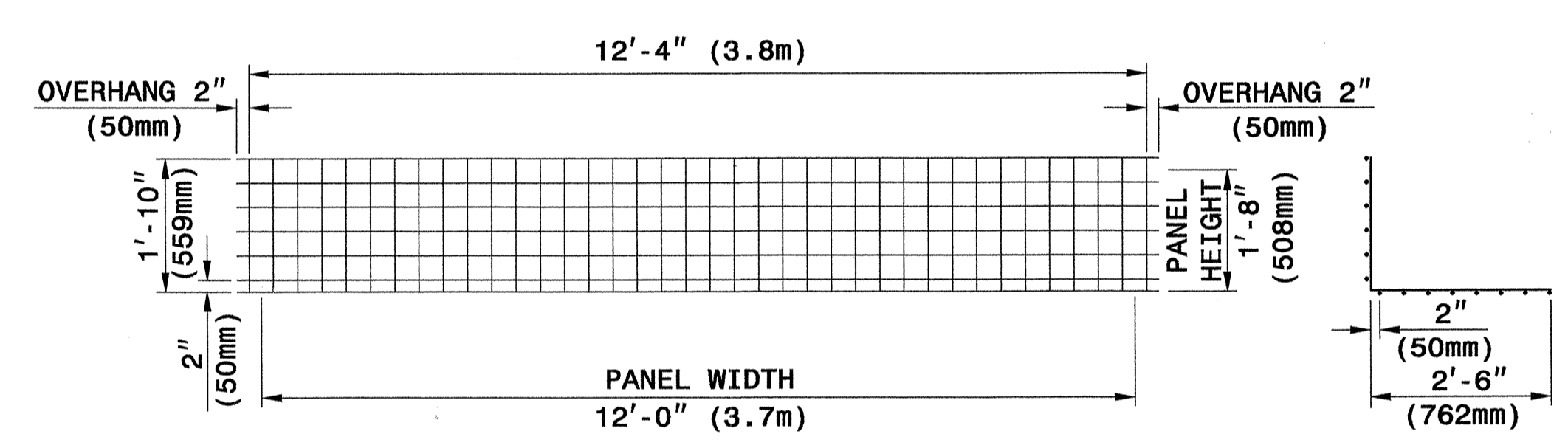
PANEL LAYOUTS

H - WALL HEIGHT
(FEET-INCHES)
(METER)

								
< 28 - 0 < 8.5	< 27 - 0 < 8.2	< 25 - 4 < 7.7	< 23 - 8 < 7.2	< 22 - 0 < 6.7	< 20 - 4 < 6.2	< 18 - 8 < 5.7		
								
< 17 - 0 < 5.2	< 15 - 4 < 4.7	< 13 - 8 < 4.2	< 12 - 0 < 3.7	< 10 - 4 < 3.2	< 8 - 8 < 2.6	< 7 - 0 < 2.1	< 5 - 4 < 1.6	< 3 - 8 < 1.1

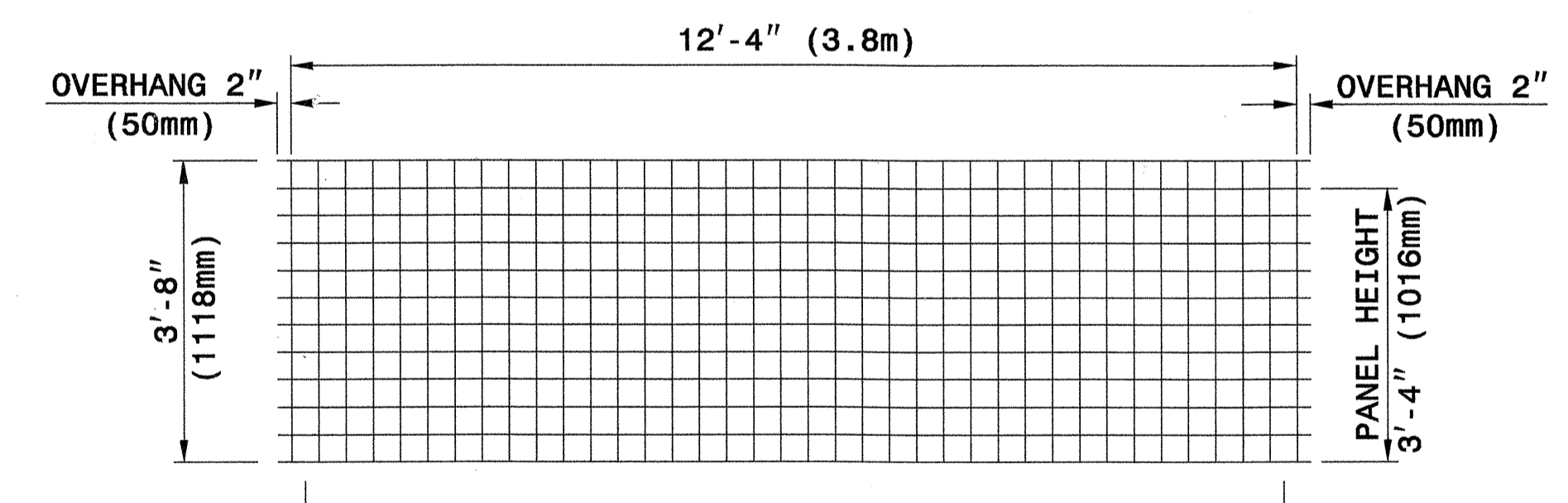


TYPE WH20

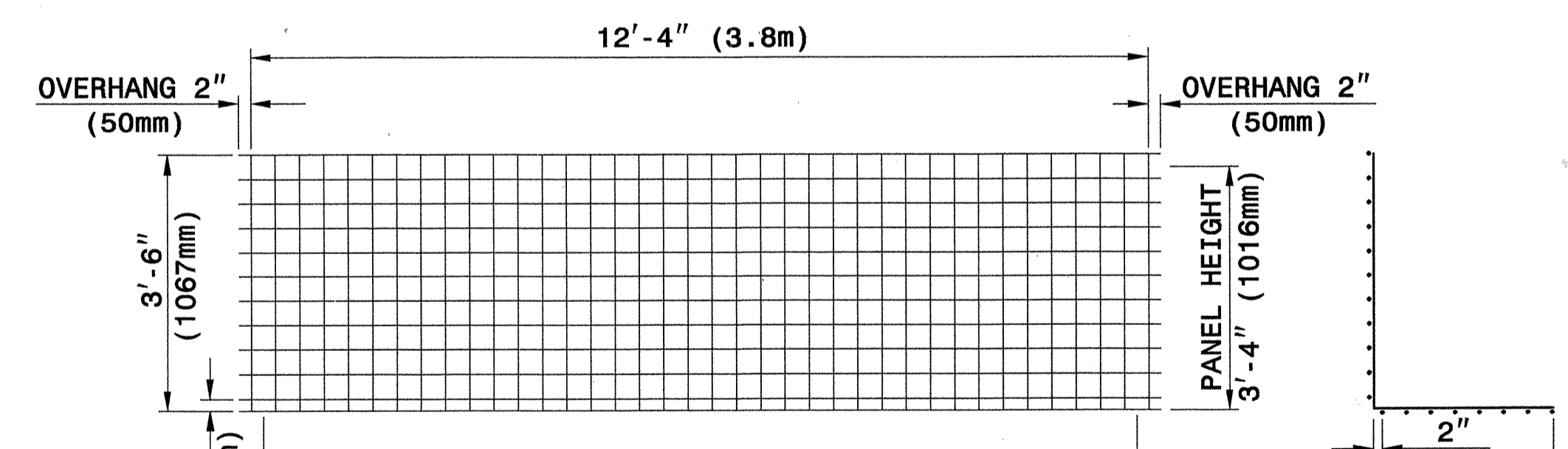


TYPE WB20

SECTION



TYPE W



TYPE WB40

SECTION

WELDED WIRE FACINGS

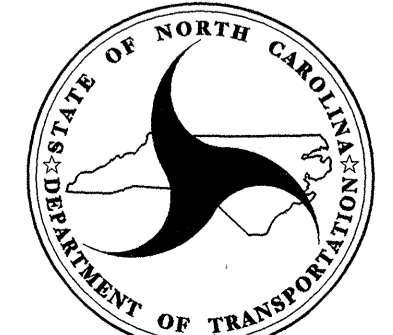
WELDED WIRE FORMS

PANEL TYPES (WELDED WIRE FACINGS AND FORMS)

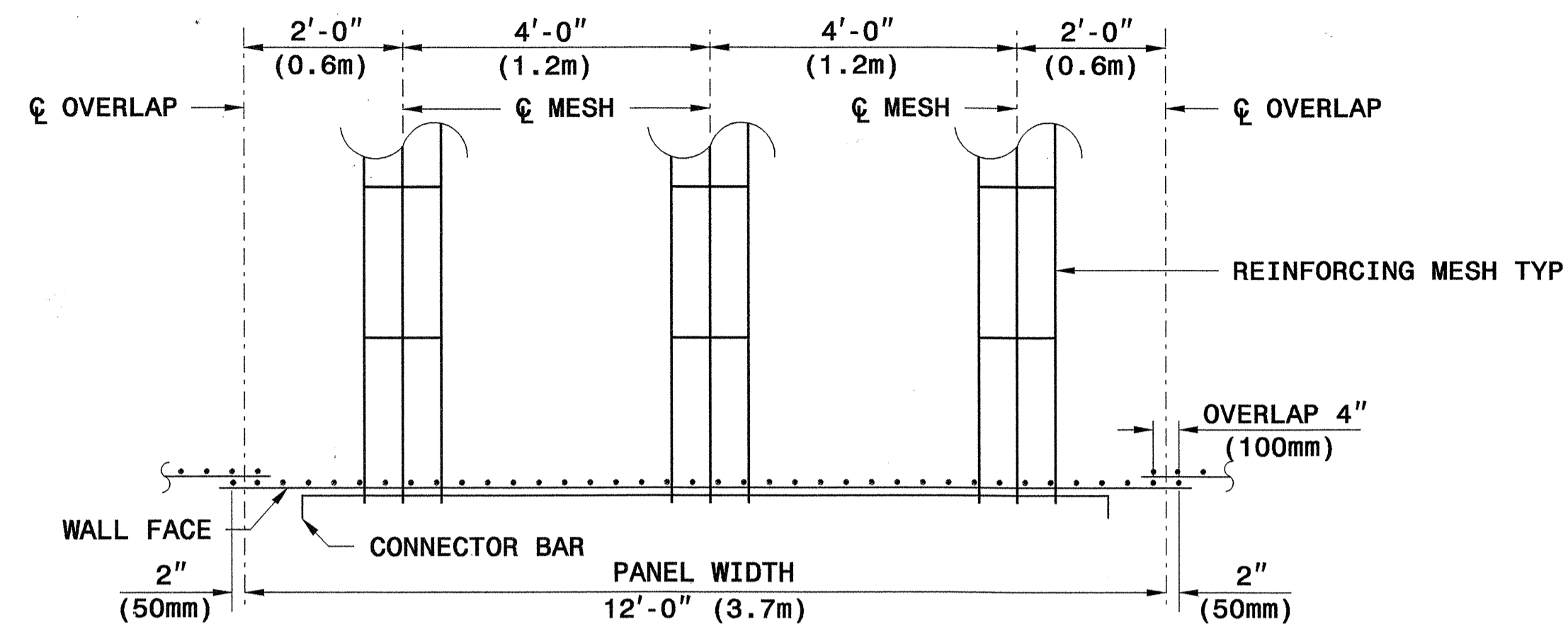
4" X 4" (100mm X 100mm), W8 X W8 (MW52 X MW52) WELDED WIRE REINFORCEMENT (WWR)



GEOTECHNICAL ENGINEERING UNIT
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH



STANDARD DRAWING NO. 1801.02
RETAINED EARTH TEMPORARY WALL
SHEET 6 OF 11 DATE: 12-19-06



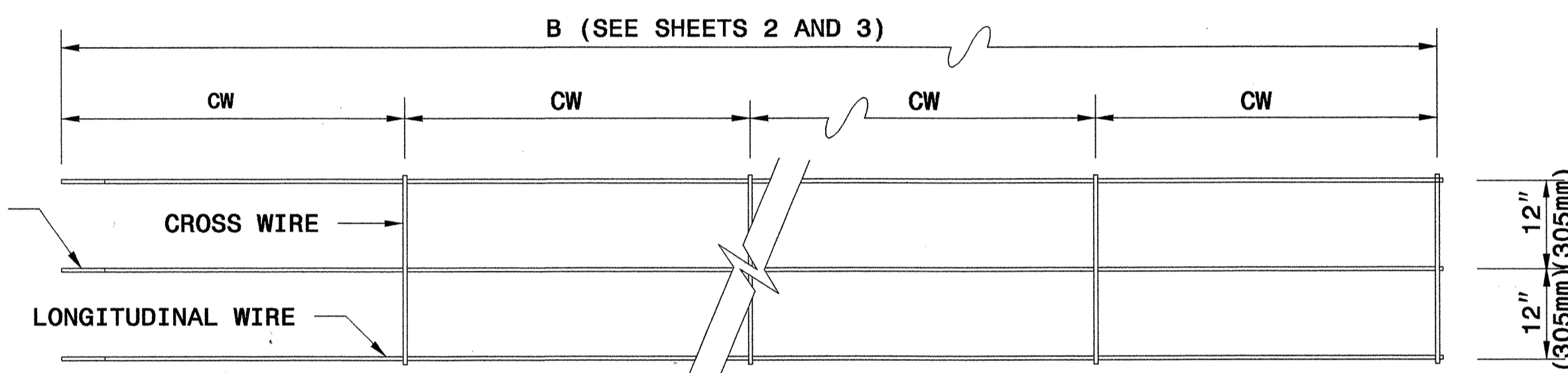
**REINFORCING MESH PLACEMENT DETAIL
(PLAN VIEW)**



1/2" (13mm) DIA. BAR

CONNECTOR BAR

LOOPEd END OF MESH
(SEE REINFORCING MESH LOOP DETAIL)

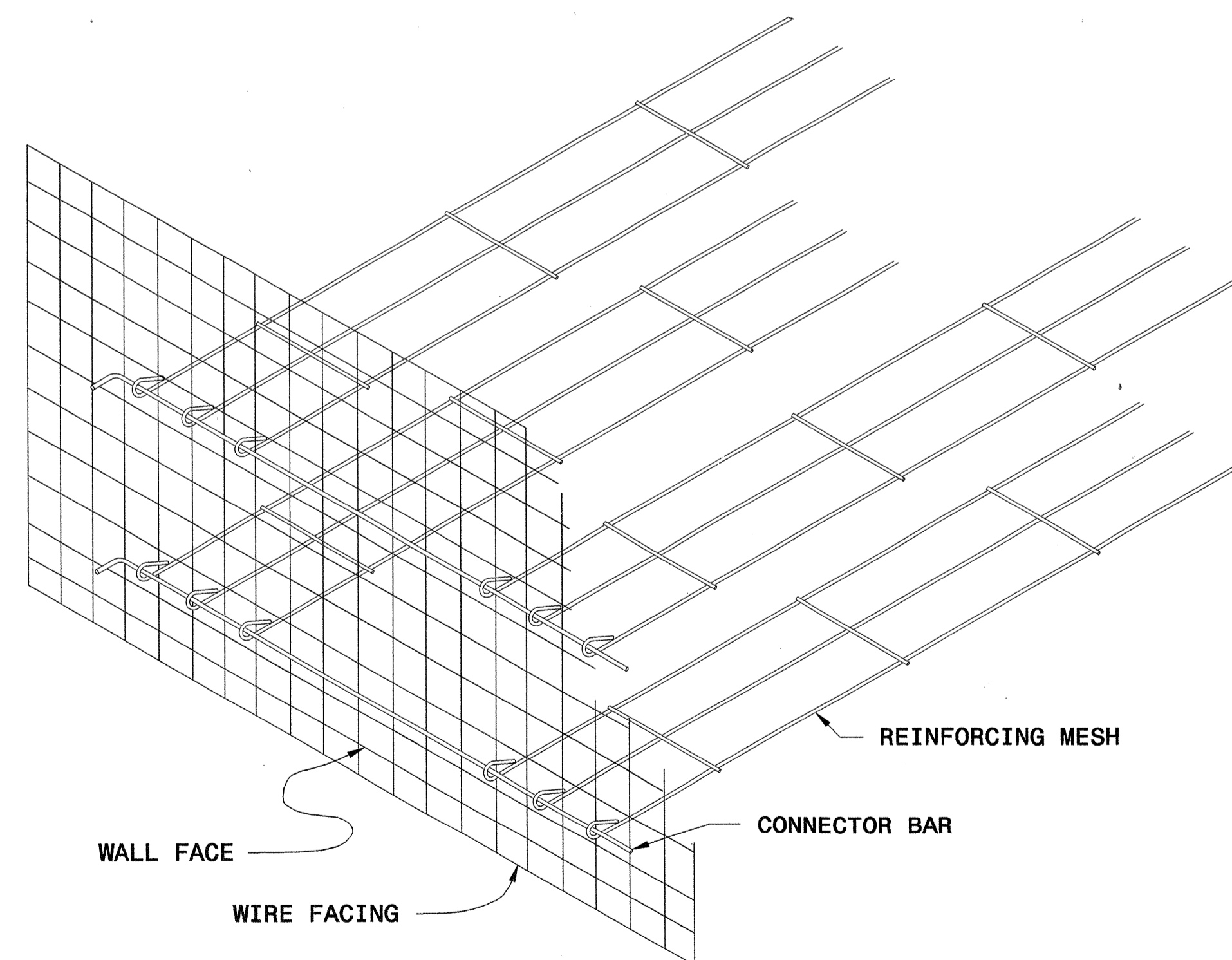


IF REINFORCEMENT LENGTH IS NOT AN INCREMENT OF 2'-0" (610mm) MAKE CW EQUAL TO 12" (305mm) AT THE END OF THE REINFORCING MESH OPPOSITE THE LOOPEd END

3W8 X W8 x 2.0' (3MW52 X MW52 X 610mm)

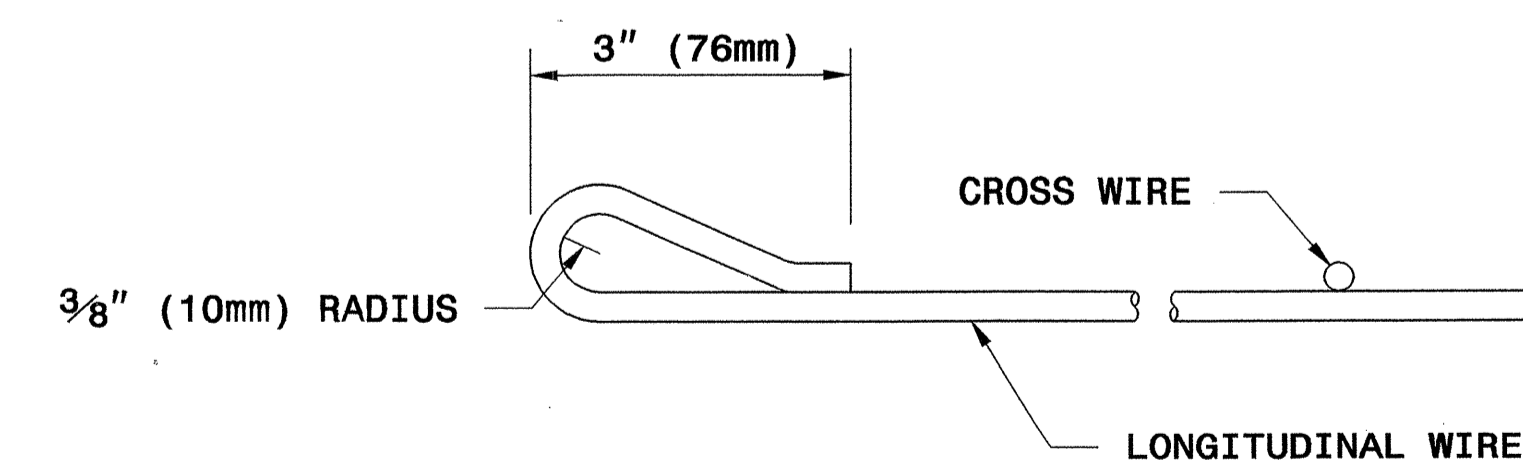
NO. OF LONGITUDINAL WIRES
GAUGE OF LONGITUDINAL WIRES
GAUGE OF CROSS WIRES
SPACING OF CROSS WIRES IN FT (mm), CW

REINFORCING MESH DESIGNATION

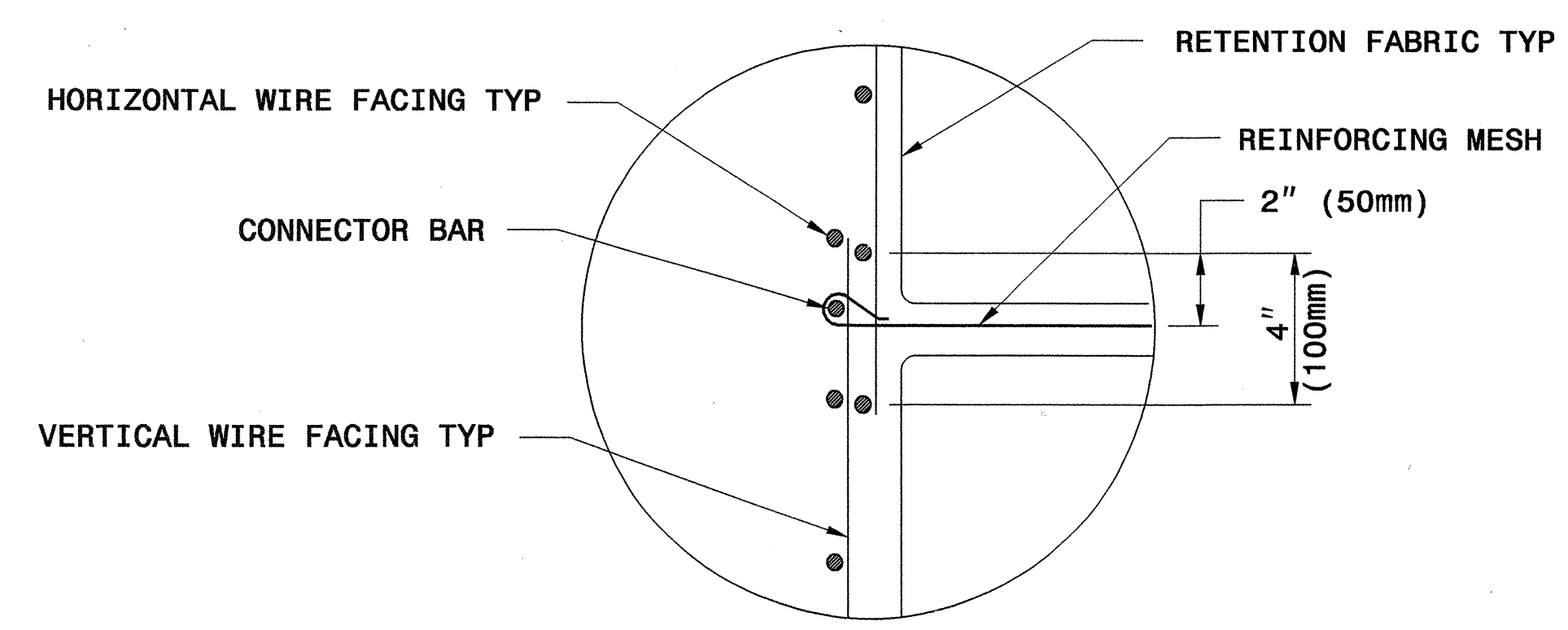


GENERAL ASSEMBLY DETAIL

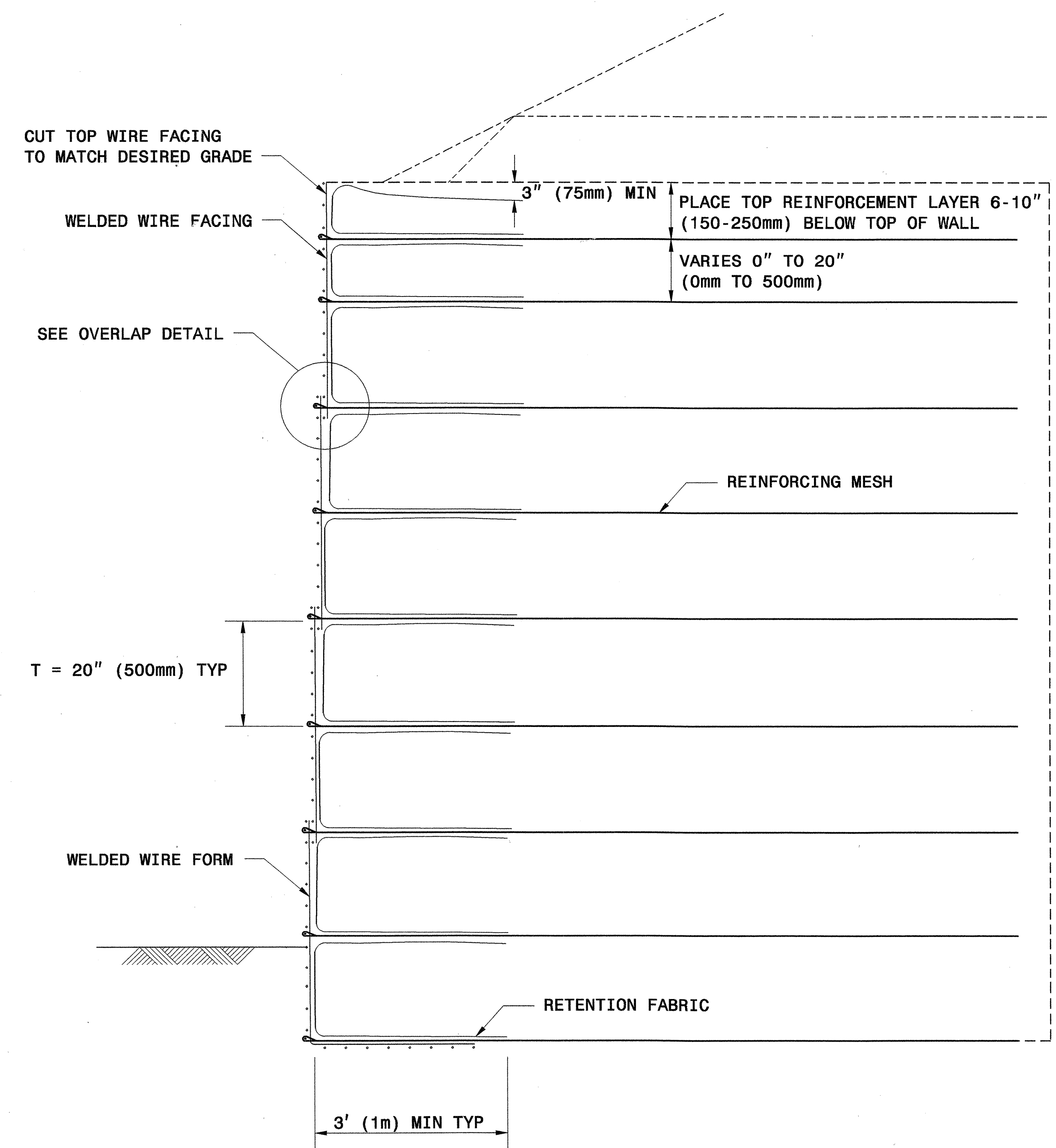
REINFORCING MESH



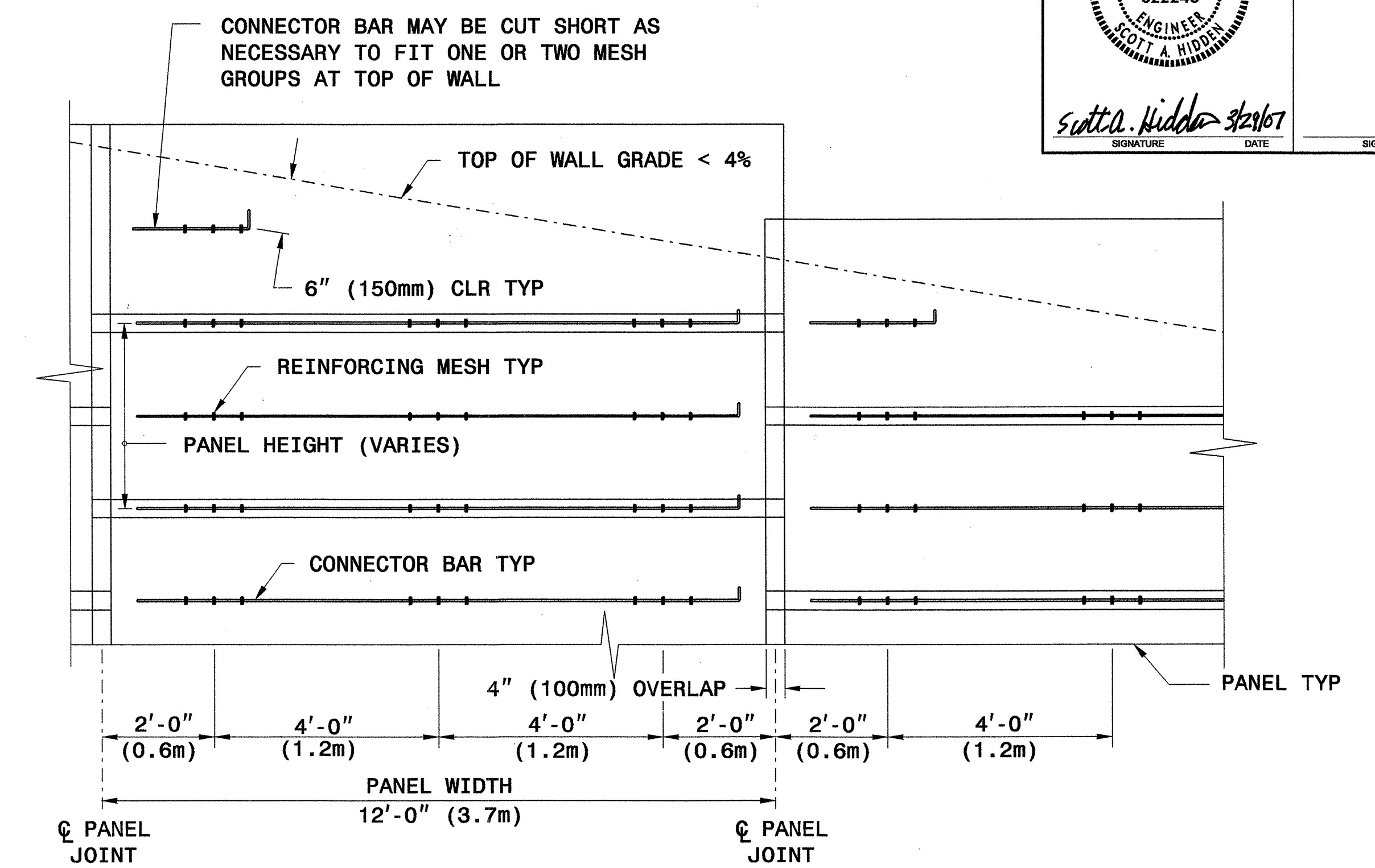
REINFORCING MESH LOOP DETAIL



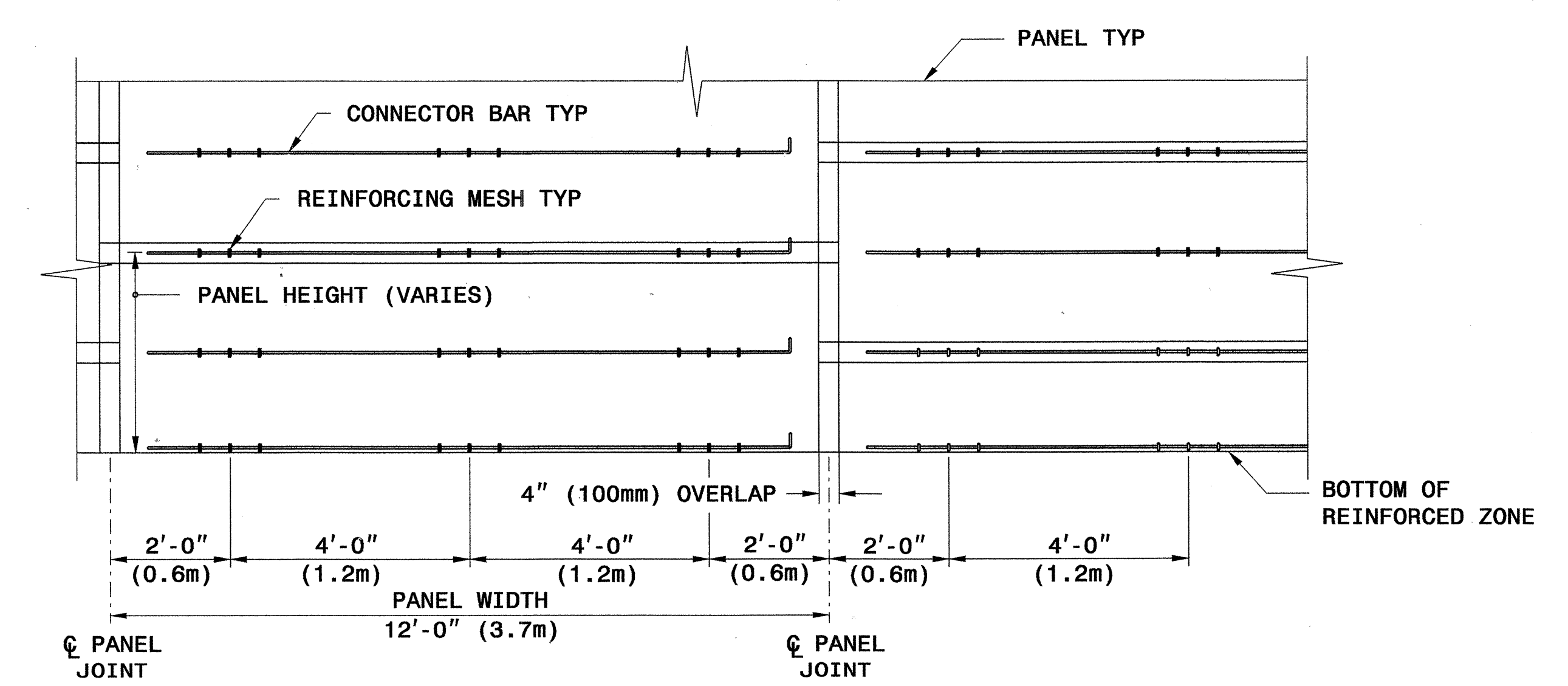
OVERLAP DETAIL



TYPICAL SECTION



**TYPICAL ELEVATION @ TOP OF WALL
(WIRES NOT SHOWN FOR CLARITY)**



**TYPICAL ELEVATION @ BOTTOM OF WALL
(WIRES NOT SHOWN FOR CLARITY)**

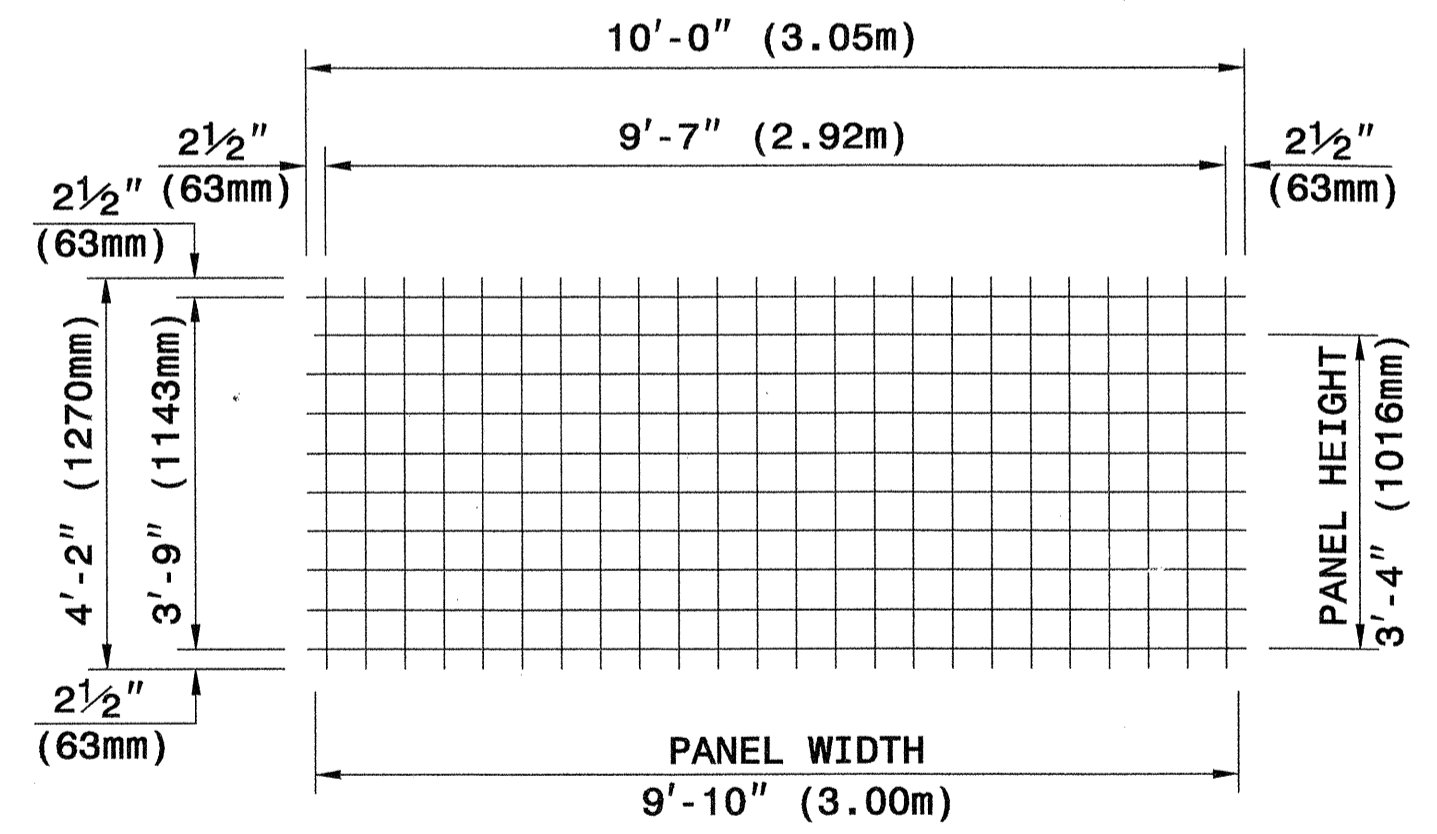
PANEL LAYOUTS

H - WALL HEIGHT
(FEET - INCHES)
(METER)

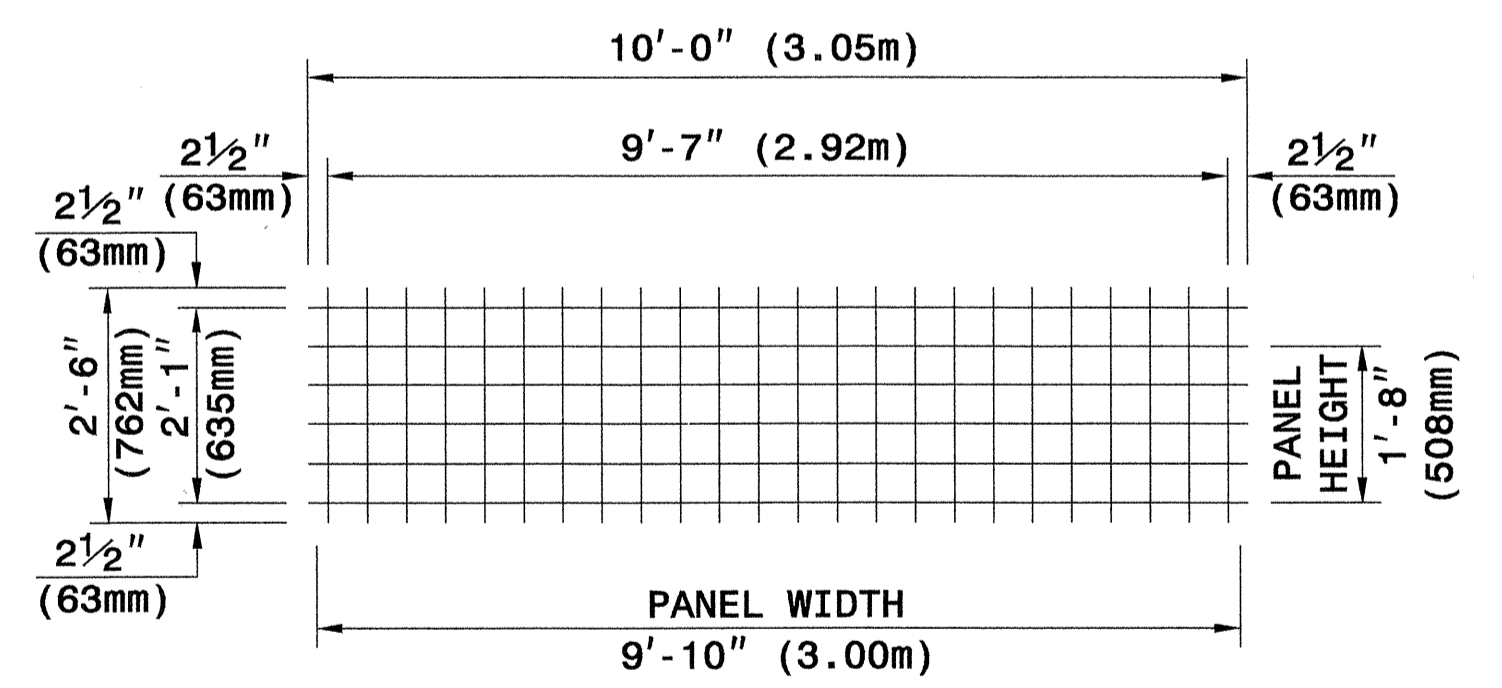
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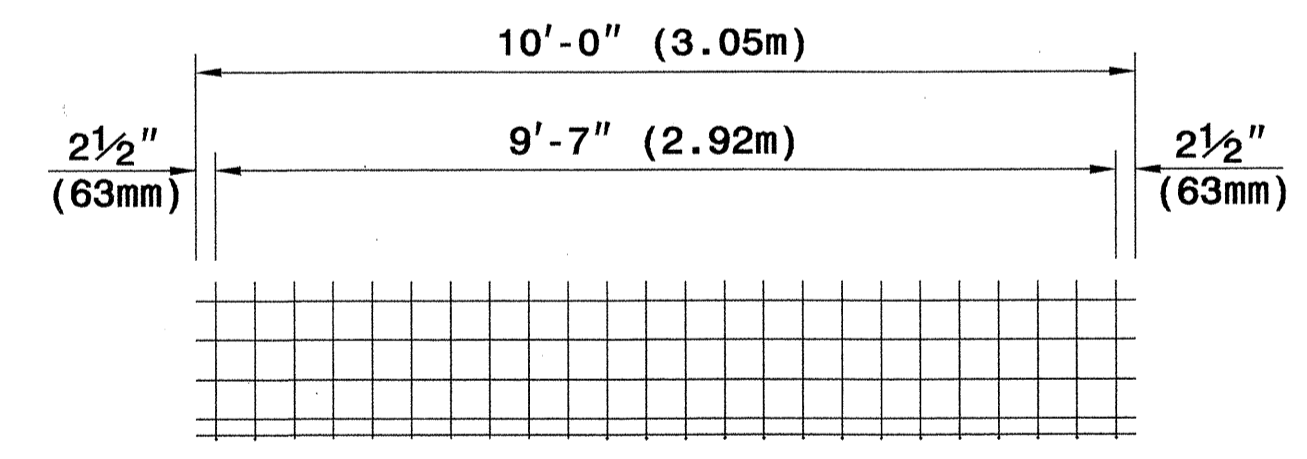
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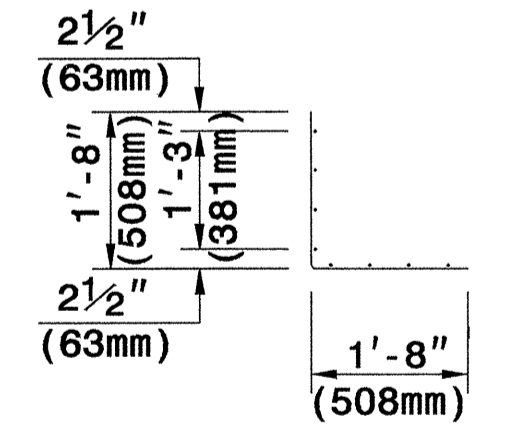
TYPE A



TYPE B



WELDED WIRE FORM



SECTION


WELDED WIRE FACINGS

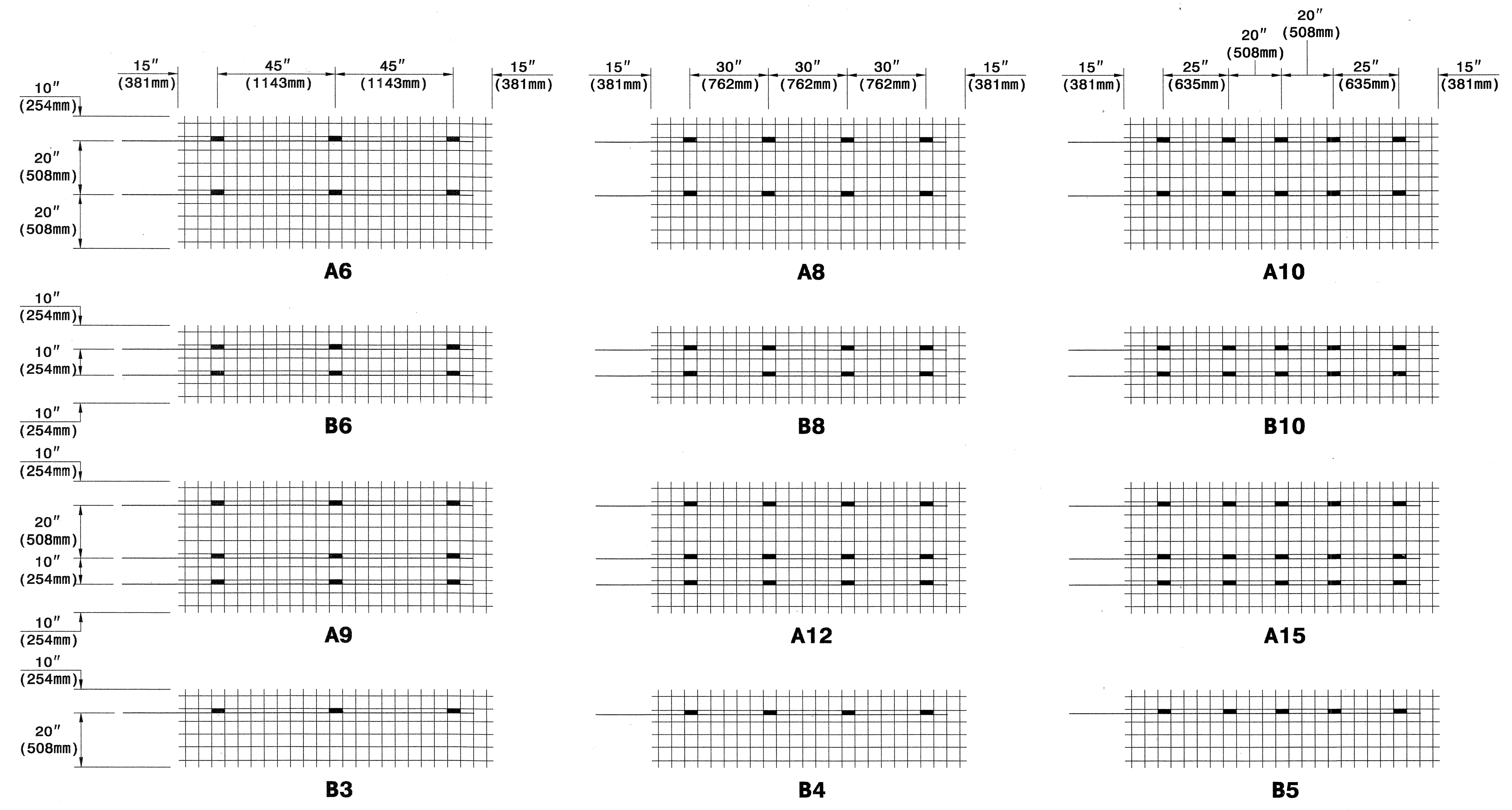
PANEL TYPES (WELDED WIRE FACINGS AND FORM)

5" X 5" (125mm X 125mm), W5 X W5 (MW32 X MW32) WELDED WIRE REINFORCEMENT (WWR)



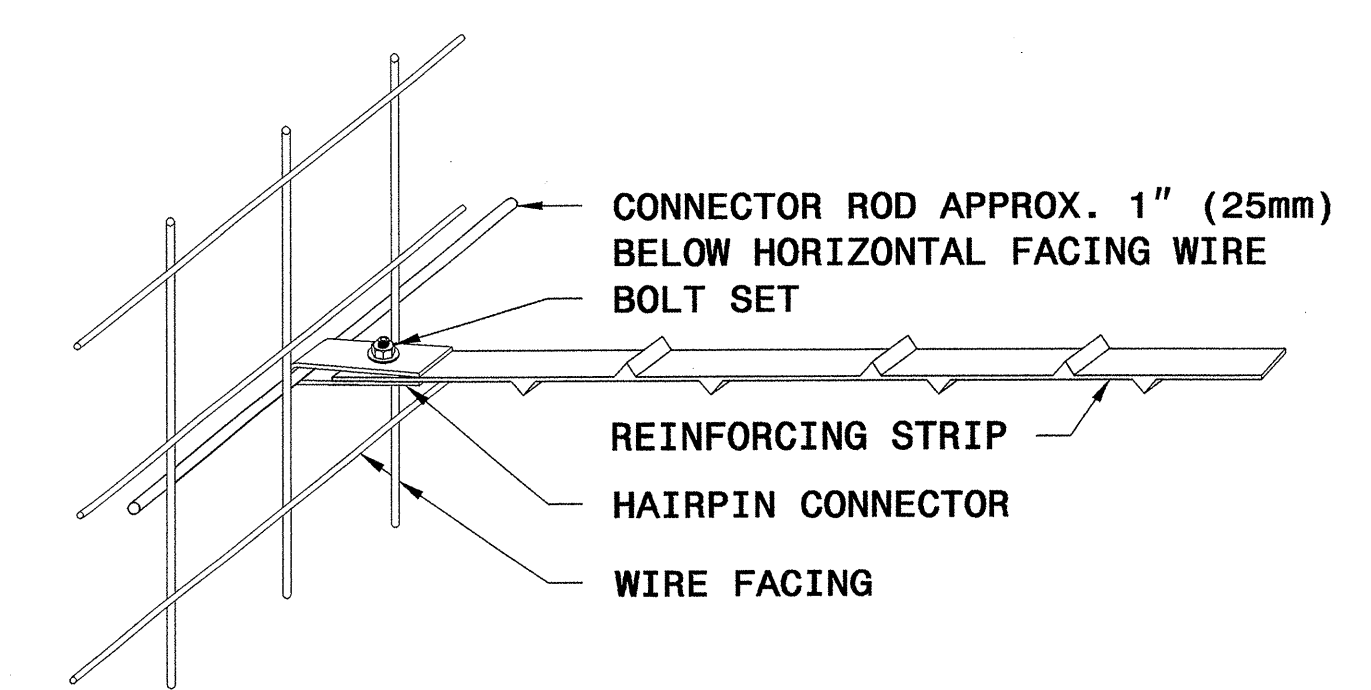
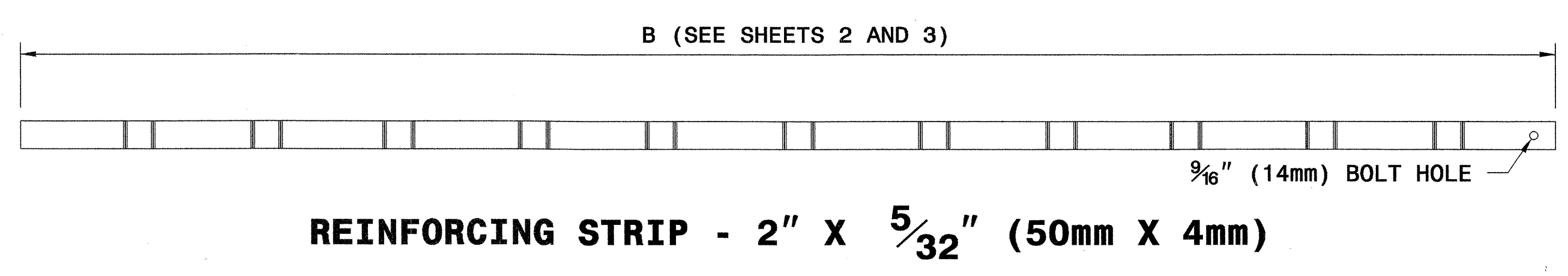
GEOTECHNICAL ENGINEERING UNIT
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GEOTECHNICAL ENGINEER  Scott A. Hadden 3/27/07 SIGNATURE DATE	ENGINEER SIGNATURE DATE
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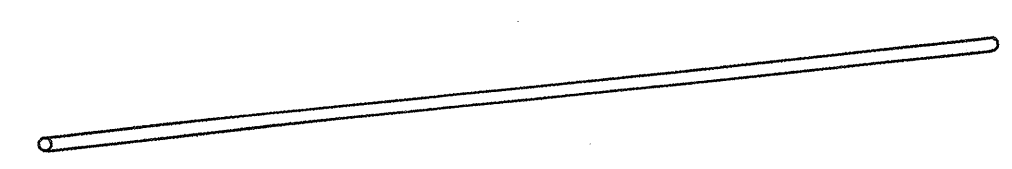


KEY: A8
 NUMBER OF REINFORCING STRIPS
 PANEL TYPE

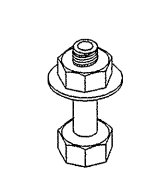
CONNECTOR ROD AND REINFORCING STRIP PLACEMENT DIAGRAMS



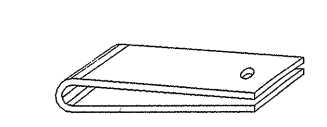
STRIP TO FACING CONNECTION



1/2" (13mm) DIA. ROD
CONNECTOR ROD



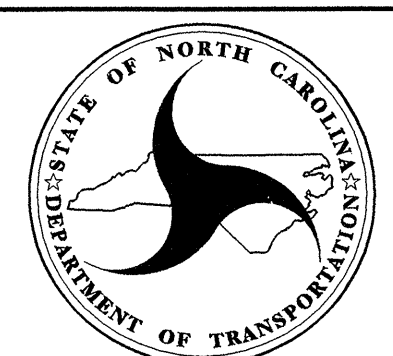
1/2" (13mm) BOLT WITH NUT AND WASHER
BOLT SET



HAIRPIN CONNECTOR

WALL COMPONENTS



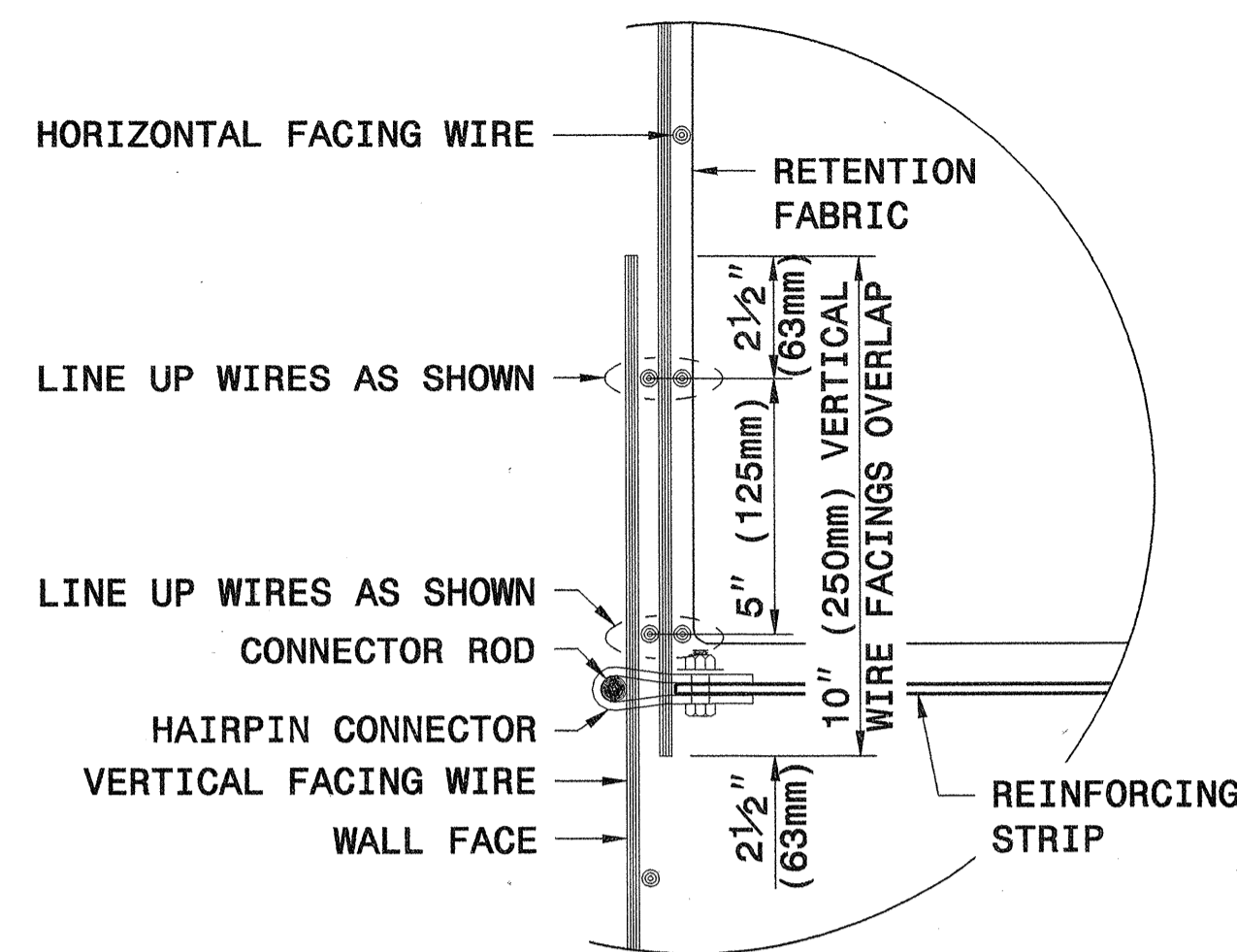

GEOTECHNICAL ENGINEERING UNIT
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD DRAWING NO. 1801.02
TERRATREL TEMPORARY WALL
 SHEET 10 OF 11 DATE: 12-19-06

GEOTECHNICAL ENGINEER ENGINEER

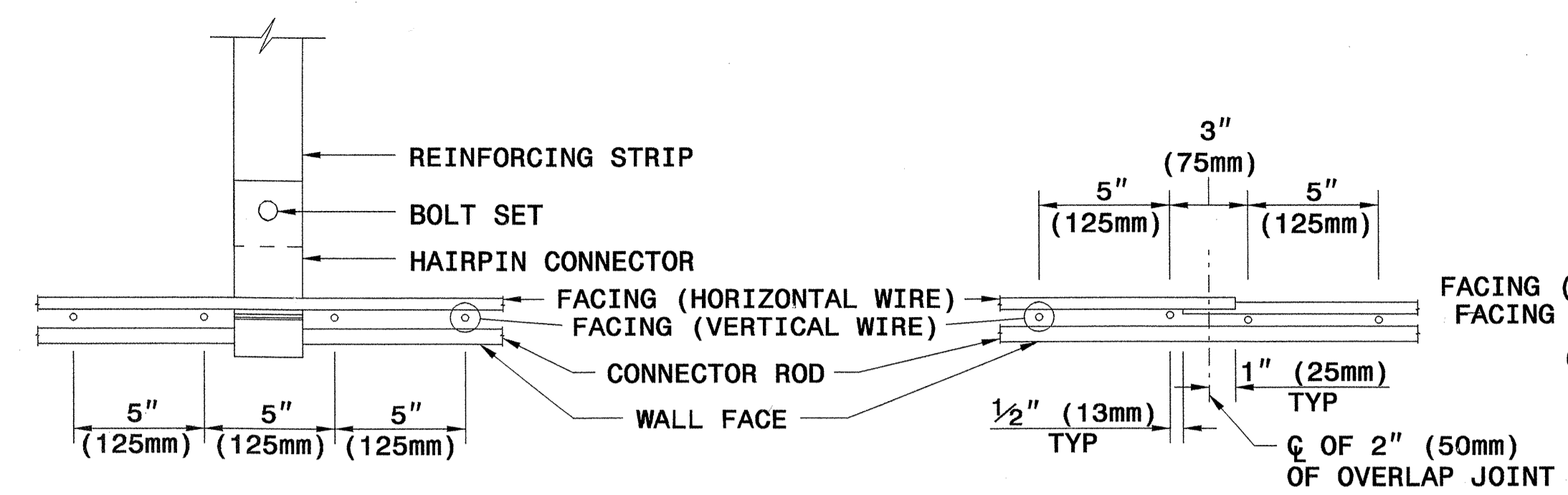
SEAL 022246
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SCOTT A. HEDDEN

Signature: *Scott A. Hedden* / 12/19/06
 DATE

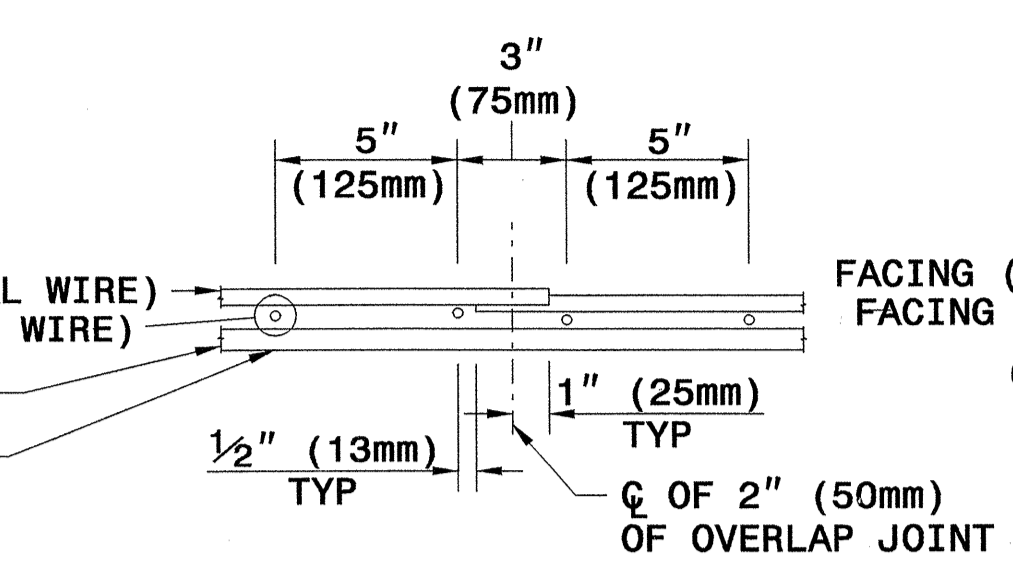


OVERLAP FACINGS VERTICALLY ONE FULL 5" (125mm) WIRE SQUARE DISREGARDING HALF SQUARES AT EDGES

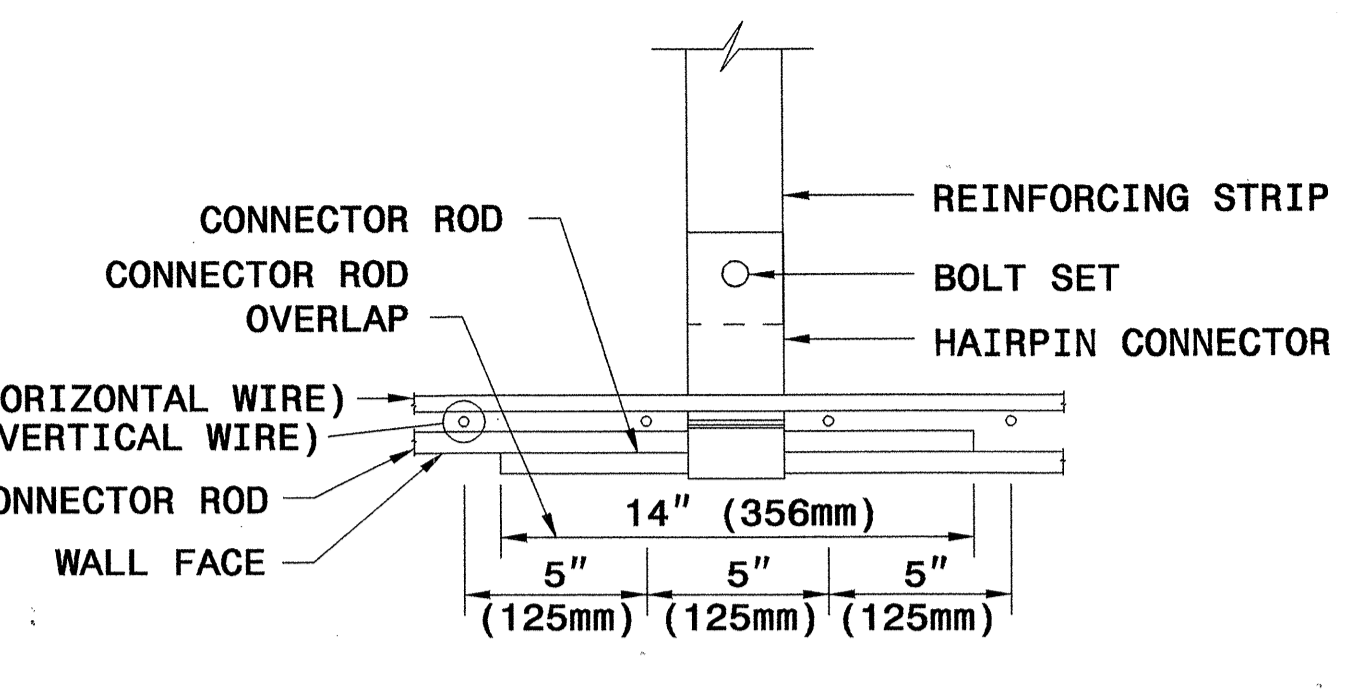
VERTICAL OVERLAP DETAIL



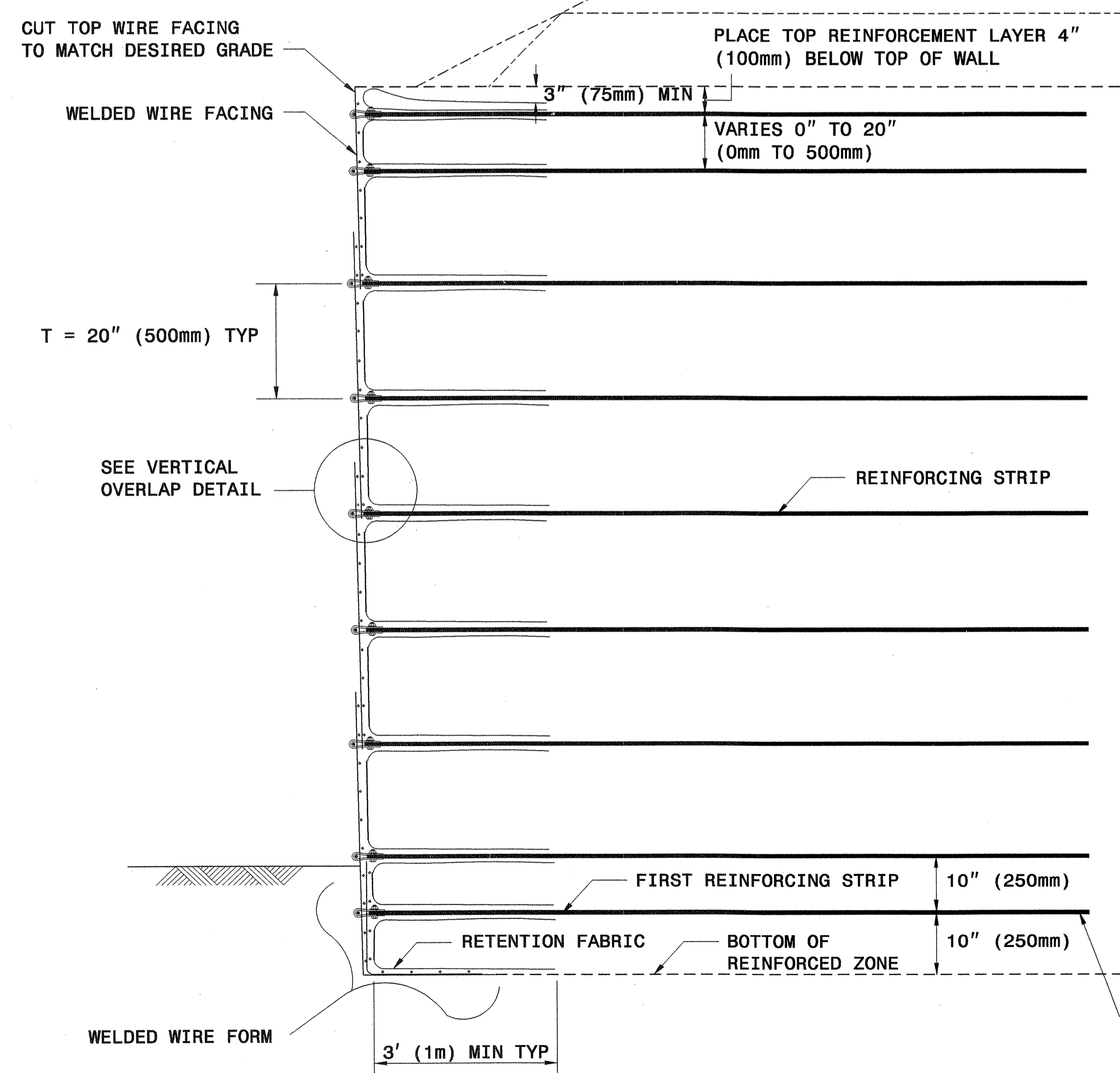
**PLAN DETAIL 'A'
STRIP CONNECTION**



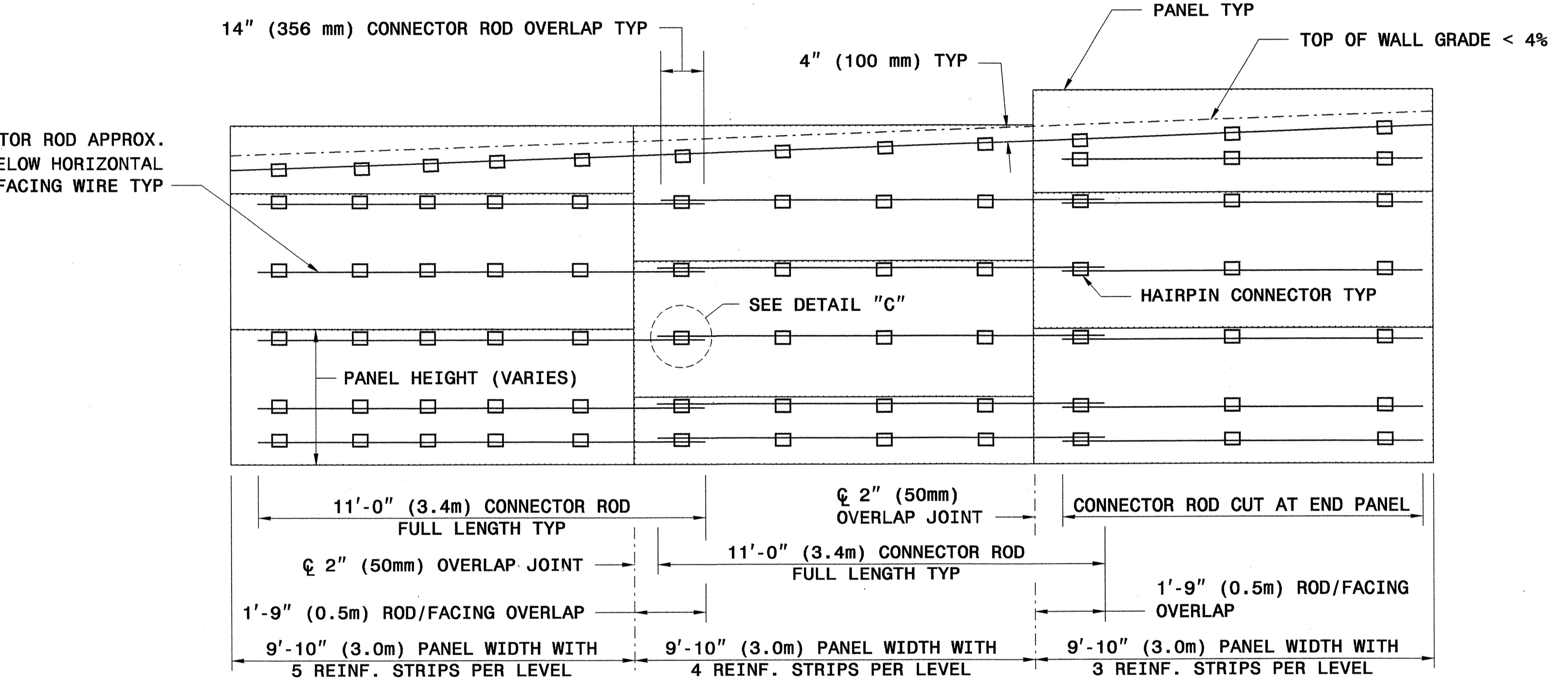
**PLAN DETAIL 'B'
HORIZONTAL OVERLAP DETAIL**



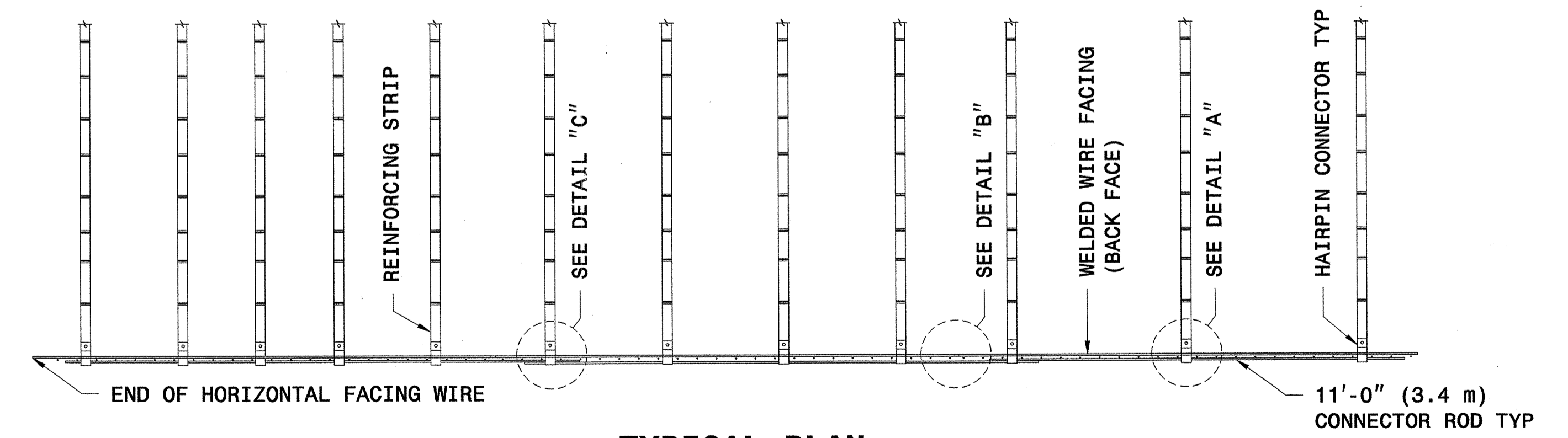
**PLAN DETAIL 'C'
STRIP CONNECTION WITH
HORIZONTAL OVERLAP DETAIL**



TYPICAL SECTION



**TYPICAL ELEVATION
(WIRES NOT SHOWN FOR CLARITY)**



TYPICAL PLAN

PLACE LOWEST REINFORCING STRIP 10" (250mm) FROM BOTTOM OF REINFORCED ZONE



GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.02

TERRATREL TEMPORARY WALL

SHEET 11 OF 11 DATE: 12-19-06

6/4/99

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C201783

ItemNumber	Sec #	Quantity	Unit	Description
000010000-N	800	Lump Sum		MOBILIZATION
005000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB-BING
005700000-E	226	500	CY	UNDERCUT EXCAVATION
006300000-N	SP	Lump Sum		GRADING
008000000-E	SP	100	TON	CLASS IV SUBGRADE STABILIZATION
010600000-E	230	10,900	CY	BORROW EXCAVATION
013400000-E	240	470	CY	DRAINAGE DITCH EXCAVATION
019500000-E	265	400	CY	SELECT GRANULAR MATERIAL
019600000-E	270	400	SY	FABRIC FOR SOIL STABILIZATION
019900000-E	SP	1,050	SF	TEMPORARY SHORING
031800000-E	300	42	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS
034300000-E	310	28	LF	15" SIDE DRAIN PIPE
037200000-E	310	24	LF	18" RC PIPE CULVERTS, CLASS III
040200000-E	310	92	LF	48" RC PIPE CULVERTS, CLASS III
099500000-E	340	57	LF	PIPE REMOVAL
122000000-E	545	30	TON	INCIDENTAL STONE BASE
148900000-E	610	1,450	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
149800000-E	610	750	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE 119.0B
151900000-E	610	1,050	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
156000000-E	620	165	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
169300000-E	654	20	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
200000000-N	806	18	EA	RIGHT OF WAY MARKERS
202200000-E	815	45	CY	SUBDRAIN EXCAVATION
203300000-E	815	35	CY	SUBDRAIN FINE AGGREGATE
204400000-E	815	200	LF	6" PERFORATED SUBDRAIN PIPE
205500000-E	815	6	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS
206600000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET
207700000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)
220900000-E	838	6	CY	ENDWALLS
228600000-N	840	2	EA	MASONRY DRAINAGE STRUCTURES
230800000-E	840	2	LF	MASONRY DRAINAGE STRUCTURES
236700000-N	840	1	EA	FRAME WITH TWO GRATES, STD 840.29
239600000-N	840	1	EA	FRAME WITH COVER, STD 840.54
283000000-N	858	1	EA	ADJUSTMENT OF MANHOLES
303000000-E	862	725	LF	STEEL BM GUARDRAIL
315000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS
327000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
362800000-E	876	150	TON	RIP RAP, CLASS I
364900000-E	876	105	TON	RIP RAP, CLASS B
365600000-E	876	965	SY	FILTER FABRIC FOR DRAINAGE
402500000-E	901	19.5	SF	CONTRACTOR FURNISHED, TYPE *** SIGN (D)
402500000-E	901	22.5	SF	CONTRACTOR FURNISHED, TYPE *** SIGN (E)
407200000-E	903	127	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
409600000-N	904	2	EA	SIGN ERECTION, TYPE D
410200000-N	904	4	EA	SIGN ERECTION, TYPE E
415500000-N	907	18	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL
440000000-E	1110	48	SF	WORK ZONE SIGNS (STATIONARY)
440500000-E	1110	96	SF	WORK ZONE SIGNS (PORTABLE)
441000000-E	1110	32	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
443000000-N	1130	39	EA	DRUMS

ItemNumber	Sec #	Quantity	Unit	Description
444500000-E	1145	48	LF	BARRICADES (TYPE III)
445500000-N	1150	240	MD	FLAGGER
446500000-N	1160	2	EA	TEMPORARY CRASH CUSHIONS
447000000-N	1160	2	EA	RESET TEMPORARY CRASH CUSHIONS
449000000-E	1170	530	LF	PORTABLE CONCRETE BARRIER (ANCHORED)
450500000-E	1170	520	LF	RESET PORTABLE CONCRETE BARRIER (ANCHORED)
465000000-N	1251	43	EA	TEMPORARY RAISED PAVEMENT MARKERS
468500000-E	1205	2,998	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
468600000-E	1205	3,817	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
469500000-E	1205	78	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)
471000000-E	1205	29	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
472500000-E	1205	6	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
481000000-E	1205	9,175	LF	PAINT PAVEMENT MARKING LINES (4")
482000000-E	1205	73	LF	PAINT PAVEMENT MARKING LINES (8")
483500000-E	1205	34	LF	PAINT PAVEMENT MARKING LINES (24")
484500000-N	1205	6	EA	PAINT PAVEMENT MARKING SYMBOL
485000000-E	1205	4,009	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
490000000-N	1251	42	EA	PERMANENT RAISED PAVEMENT MARKERS
569140000-E	1520	187	LF	10" SANITARY GRAVITY SEWER
569150000-E	1520	173	LF	12" SANITARY GRAVITY SEWER
577500000-E	1525	2	EA	4" DIA UTILITY MANHOLE
578100000-E	1525	6	LF	UTILITY MANHOLE WALL, 4" DIA
600000000-E	1605	1,400	LF	TEMPORARY SILT FENCE
600600000-E	1610	150	TON	STONE FOR EROSION CONTROL, CLASS A
600900000-E	1610	590	TON	STONE FOR EROSION CONTROL, CLASS B
601200000-E	1610	205	TON	SEDIMENT CONTROL STONE
601500000-E	1615	4.5	ACR	TEMPORARY MULCHING
601800000-E	1620	150	LB	SEED FOR TEMPORARY SEEDING
602100000-E	1620	0.75	TON	FERTILIZER FOR TEMPORARY SEEDING
602400000-E	1622	75	LF	TEMPORARY SLOPE DRAINS
602700000-N	1622	2	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
602900000-E	SP	450	LF	SAFETY FENCE
603000000-E	1630	1,935	CY	SILT EXCAVATION
603600000-E	1631	1,910	SY	MATTING FOR EROSION CONTROL
603700000-E	SP	255	SY	COIR FIBER MAT
603800000-E	SP	575	SY	PERMANENT SOIL REINFORCEMENT MAT
604200000-E	1632	20	LF	1/4" HARDWARE CLOTH
604500000-E	SP	225	LF	*** TEMPORARY PIPE (18")
606900000-E	1638	90	CY	STILLING BASINS
607000000-N	SP	2	EA	SPECIAL STILLING BASINS
607103000-E	SP	350	LF	COIR FIBER BAFFLES
608400000-E	1660	5	ACR	SEEDING & MULCHING
608700000-E	1660	2.5	ACR	MOWING
609000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
609300000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
609600000-E	1662	100	LB	SEED FOR SUPPLEMENTAL SEEDING
610800000-E	1665	3.75	TON	FERTILIZER TOPDRESSING
611100000-E	SP	215	LF	IMPERVIOUS DIKE
611400000-N	SP	2.5	HR	SPECIALIZED HAND MOWING
611700000-N	SP	27	EA	RESPONSE FOR EROSION CONTROL
612000000-E	SP	120	CY	CULVERT DIVERSION CHANNEL

ItemNumber	Sec #	Quantity	Unit	Description
612300000-E	1670	0.1	ACR	REFORESTATION
615000000-E	SP	25	TON	GENERIC EROSION CONTROL ITEM HEADER/FOOTER ROCK

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STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

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

STATION	LOCATION (L,R,T, OR C)	STRUCTURE NO.	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE)							BITUMINOUS COATED C.S. PIPE TYPE B (UNLESS NOTED OTHERWISE)							CLASS III R.C. PIPE OR C.S. PIPE OR TYPE IR ALUMINIZED OR HDPE PIPE, TYPE S OR D							15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	24" SIDE DRAIN PIPE	ENDWALLS		QUANTITIES FOR DRAINAGE STRUCTURES * TOTAL LF FOR PAV. QUANTITY SHALL BE COL. "A" + (1/2 X COL. "B")	FRAME, GRATES AND HOOD STANDARD 840.03	M.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	T.B.J.B. STD. 840.34	M.H. FRAME & COVER STD. 840.54	PIPE REMOVAL LINFT.	REMARKS											
							12"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"	30"	36"	42"	48"	12"	15"	18"	24"	30"				36"	42"									48"	CU. YDS.		PER EACH (0' THRU 5.0')	5.0' THRU 10.0'	10.0' AND ABOVE	TYPE OF GRATE				
																																										R.C.P.	C.S.P.				A	B	E	F	G
																																																	E	F	G
-L- 12 + 70	RT	1	413.5	413.5																							1					1																			
-L- 12 + 82	RT	1	2	413.5	409.8		24																																												
-L- 12 + 93	RT	2	409.8	409.8																								1								1		1													
-L- 18 + 25	LT	3		400.0																							6																								
-L- 17 + 75	LT	3	RCBC	400.0	398.0						92																																								
-L- 21 + 08	CL																																																		
-L- 22 + 30	LT																																																		
-L- 23 + 74	RT	4																																																	
TOTALS							24				92															28	6	2							1			1	1	1							57				

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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		TEMPORARY ANCHORS								IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS																							
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	XI MOD	B-77	GRAU 350	M-350	XIII	CAT-1	VI MOD	BIC	AT-1	EA	G	NG																												
																									ANCHOR DEDUCTIONS:																											
-L-	14+00.00	19+75.00	LT	475.00			15+00	18+75	8	11	50	50	1	1																																						
-L-	15+75.00	20+25.00	RT	450.00			16+75	19+25	8	11	50	50	1	1																																						
			SUB TOTALS	925.00																																																
			ANCHOR DEDUCTIONS	200.00																																																
			TOTALS	725.00																																																
												GRAU-350 4 x 50' =				200'																																				
																TOTAL =		200'																																		
												5 ADDITIONAL GUARDRAIL POSTS																																								

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK
 IN CUBIC YARDS

SUMMARY OF PAVEMENT REMOVAL
 IN SQUARE YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
SUMMARY NO. 1					
-L- 10+00 TO 25+00	2245		11550	9305	
TOTAL SUMMARY NO. 1	2245		11550	9305	
SUB-TOTAL SUMMARY NO. 1	2245		11550	9305	
LOSS DUE TO CLEARING & GRUBBING	-150			150	
EST. BORROW FOR SHOULDER CONST.			915	915	
EST. 5% REPLACE TOPSOIL ON BORROW PITS				519	
PROJECT TOTALS	2095		12465	10889	
GRAND TOTALS	2095		12465	10889	
SAY	2100			10900	

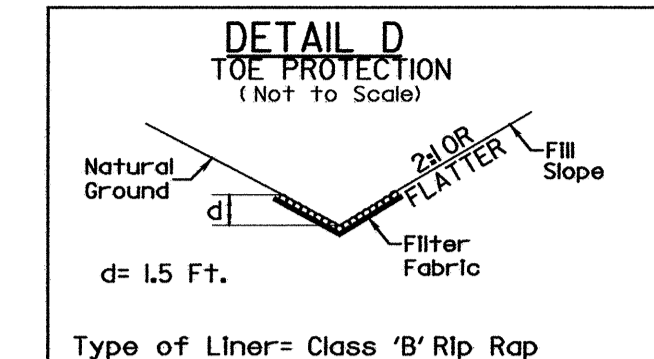
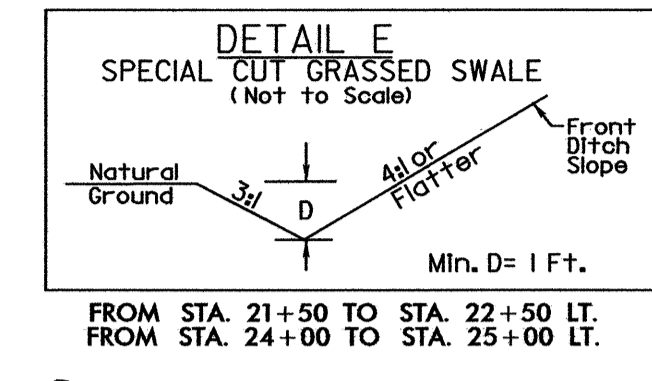
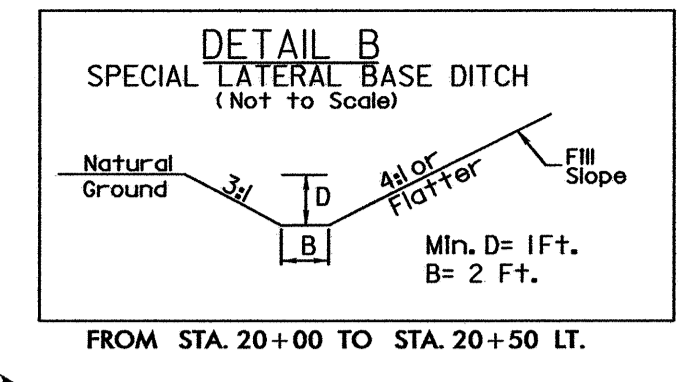
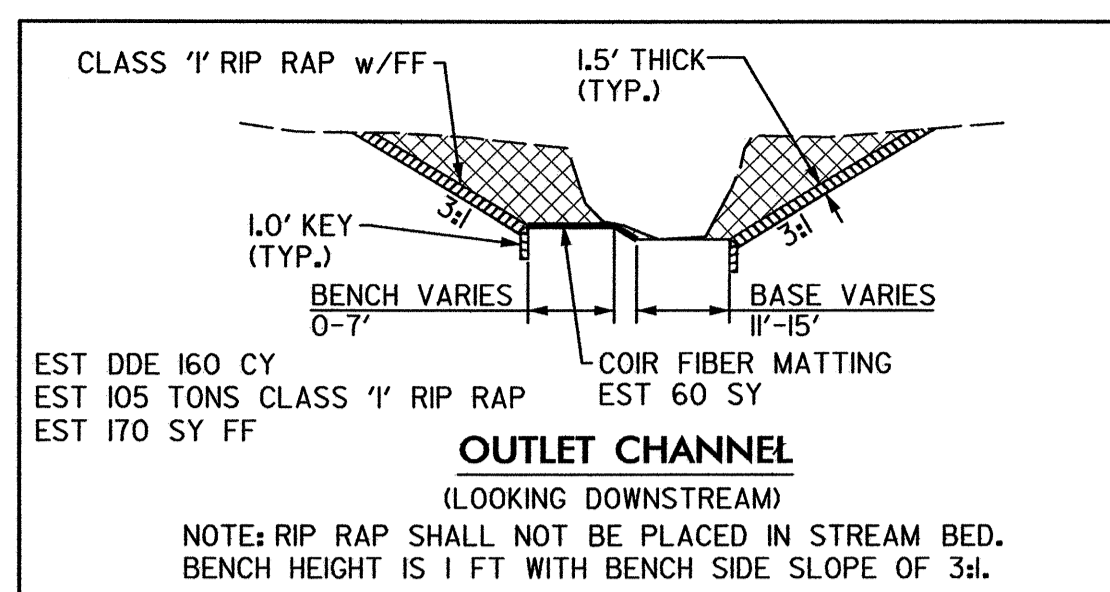
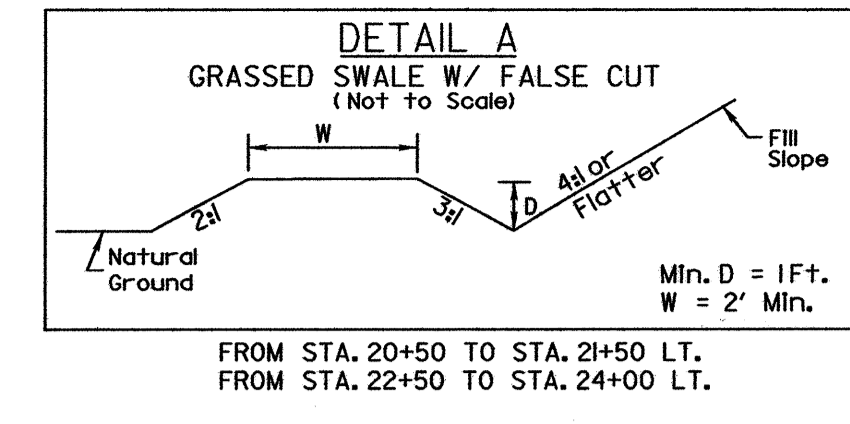
LOCATION	ASPHALT REMOVAL	ASPHALT BREAK-UP	CONCRETE REMOVAL	CONCRETE BREAK-UP
-L- 13+50 TO -L- 18+25	1000			
-L- 18+60 TO -L- 22+25	758			
TOTAL	1758			
SAY	1760			

ESTIMATE DRAINAGE DITCH EXCAVATION = 470 C.Y.
 ESTIMATE UNDERCUT = 500 C.Y.
 ESTIMATE SELECT GRANULAR MATERIAL = 400 C.Y.
 ESTIMATE CLASS IV SUBGRADE STABILIZATION MATERIAL = 100 TONS

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

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

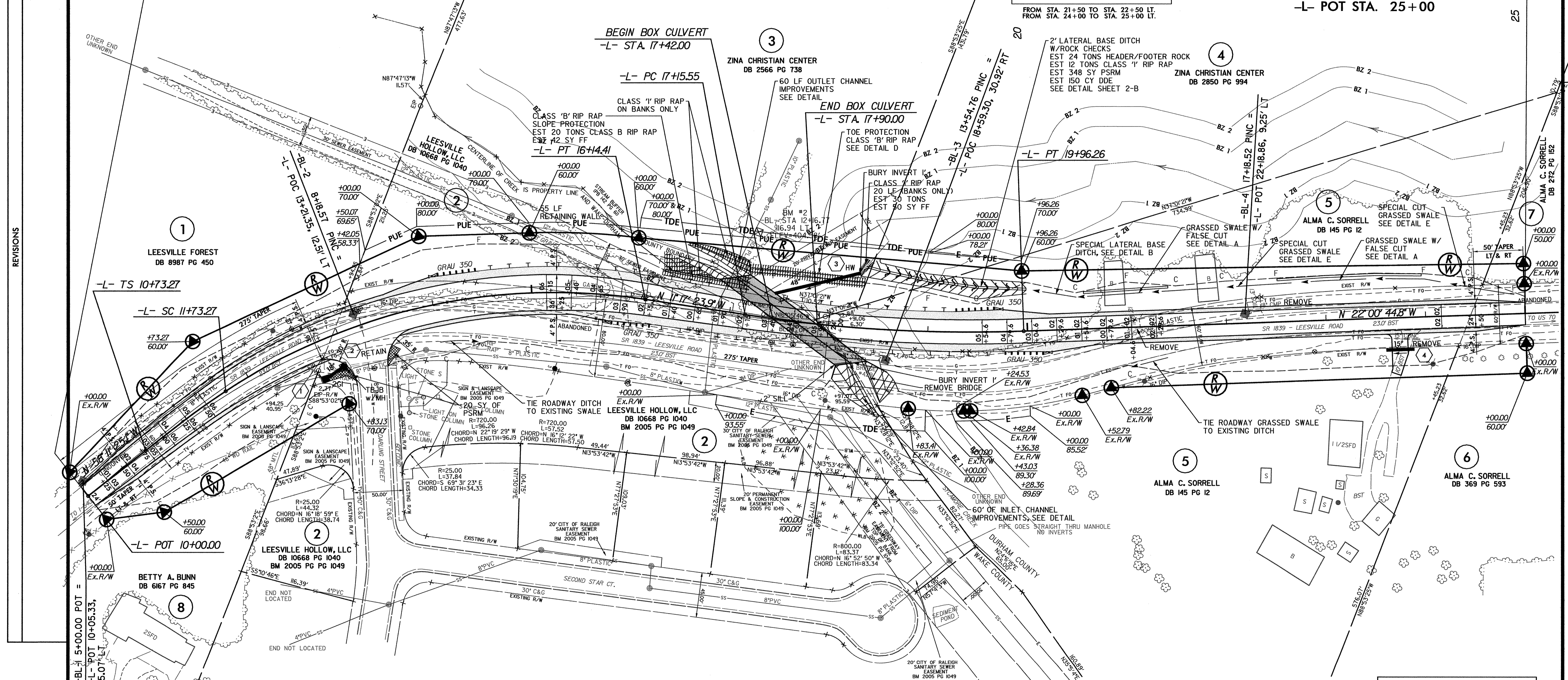
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 J.C. & Associates, P.C.



END PROJECT B-3528
 -L- POT STA. 25+00

BEGIN PROJECT B-3528
 -L- POC STA. 10+00

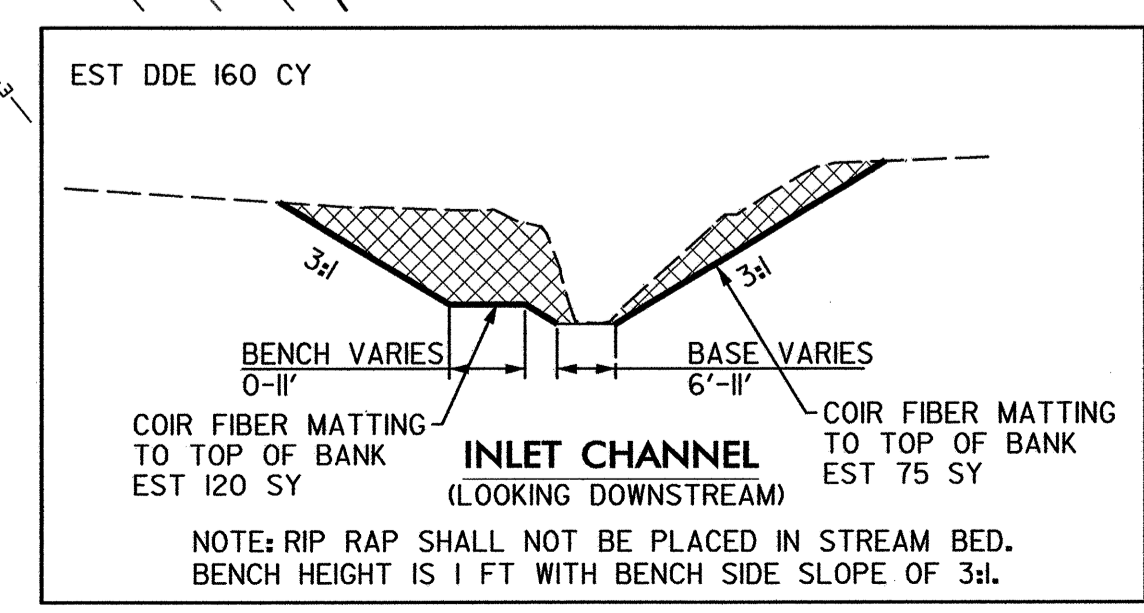
NC GRID NAD 83



PI Sta 11+39.96
 $\Delta = 42^{\circ} 07' 32.5''$ (RT)
 $D = 9^{\circ} 32' 57.5''$
 $L = 441.4'$
 $T = 231.07'$
 $R = 600.00'$
 $SE = 0.060$
 $DS = 43$ mph

PI Sta 14+04.35
 $\Delta = 10^{\circ} 43' 20.9''$ (LT)
 $D = 3^{\circ} 49' 11.0''$
 $L = 280.71'$
 $T = 140.77'$
 $R = 1,500.00'$
 $SE = 0.050$
 $DS = 50$ mph

PI Sta 18+56.32
 $\Delta = 10^{\circ} 43' 20.9''$ (LT)
 $D = 3^{\circ} 49' 11.0''$
 $L = 280.71'$
 $T = 140.77'$
 $R = 1,500.00'$
 $SE = 0.050$
 $DS = 50$ mph



FOR CULVERT PLANS SEE SHEET C-1 THRU C-10
 NOTE: SEE TRAFFIC CONTROL PLANS FOR TEMPORARY SHORING.
 FOR RETAINING WALL DETAIL, SEE SHEET NO. 2-A.
 FOR -L- PROFILE, SEE SHEET NO. 5.

* DESIGN EXCEPTION REQUIRED

REVISIONS

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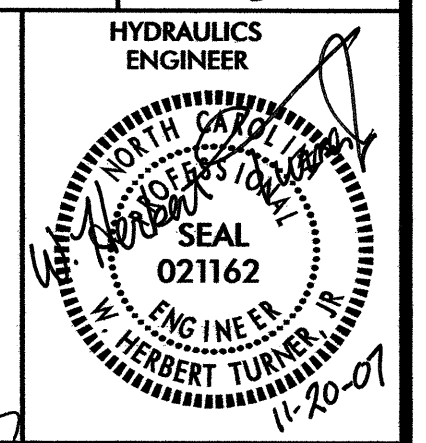
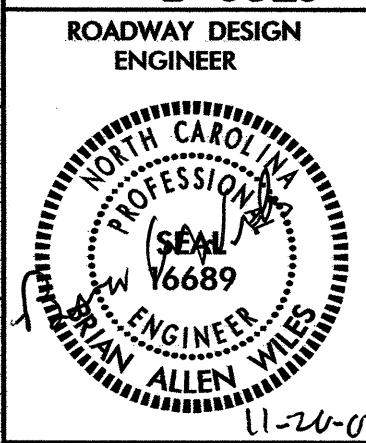
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B.M.*1 EL = 404.98'
RR SPIKE SET IN 1" PINE
92' LT OF -BL- STA 4+84
108' LT OF -L- STA 10+00

B.M.*2 EL = 404.58'
RR SPIKE SET IN 1 3/4" CHERRY
117' LT OF -BL- STA 12+17
84' LT OF -L- STA 17+17

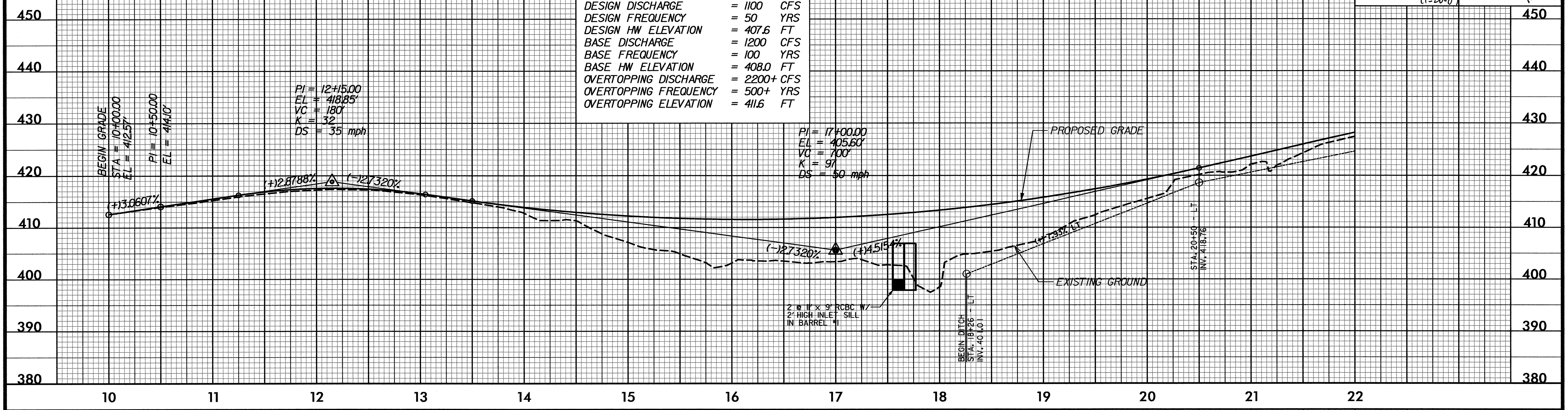
KO & ASSOCIATES, P.C.
Consulting Engineers
5121 KINGDOM WAY, SUITE 100, RALEIGH, N.C. 27607
(919) 551-6066

PROJECT REFERENCE NO. B-3528
SHEET NO. 5



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1100 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 407.6 FT
BASE DISCHARGE	= 1200 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 408.0 FT
OVERTOPPING DISCHARGE	= 2200+ CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 411.6 FT



PI = 12+15.00
EI = 418.85'
VC = 180'
K = 32
DS = 35 mph

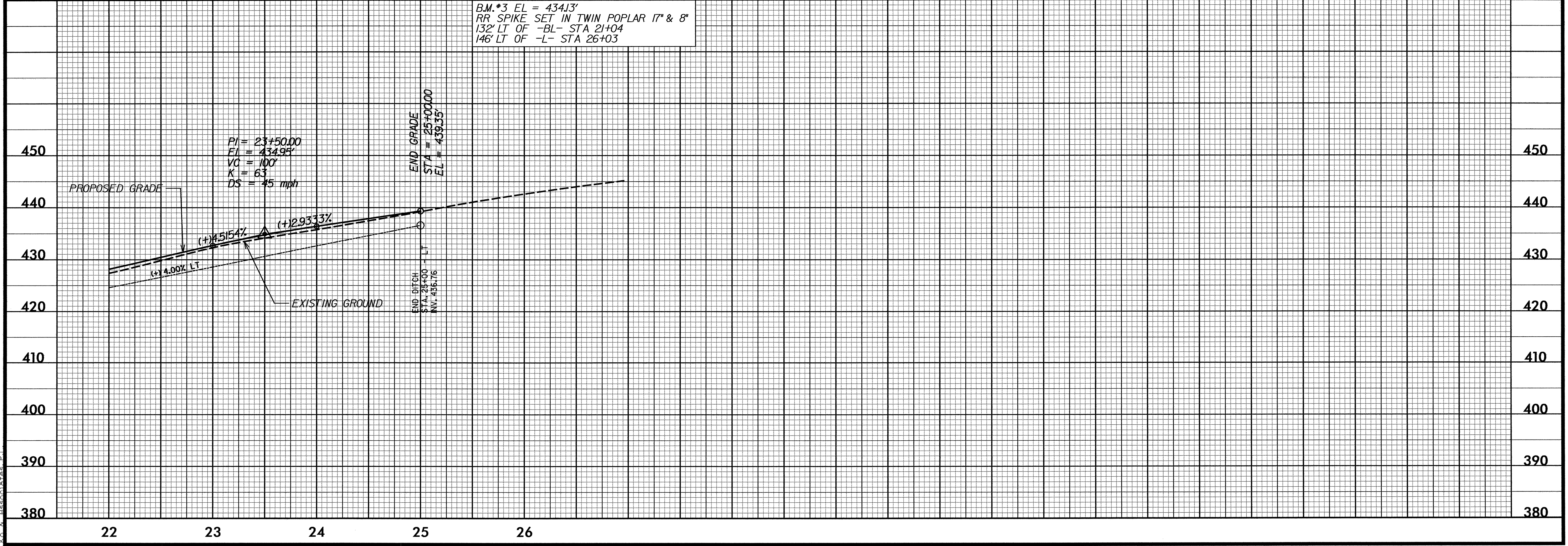
PI = 17+00.00
EI = 405.60'
VC = 700'
K = 91
DS = 50 mph

2 x 11 x 9 RCBC W/
2" HIGH INLET SILL
IN BARREL

BEGIN DITCH
STA. 18+26 - LT
INV. 404.01

STA. 20+50 - LT
INV. 418.76

B.M.*3 EL = 434.13'
RR SPIKE SET IN TWIN POPLAR 17" & 8"
132' LT OF -BL- STA 21+04
146' LT OF -L- STA 26+03



PI = 23+50.00
EI = 434.95'
VC = 100'
K = 63
DS = 45 mph

END GRADE
STA. 25+00.00
EL = 439.35'

END DITCH
STA. 23+00 - LT
INV. 436.76

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