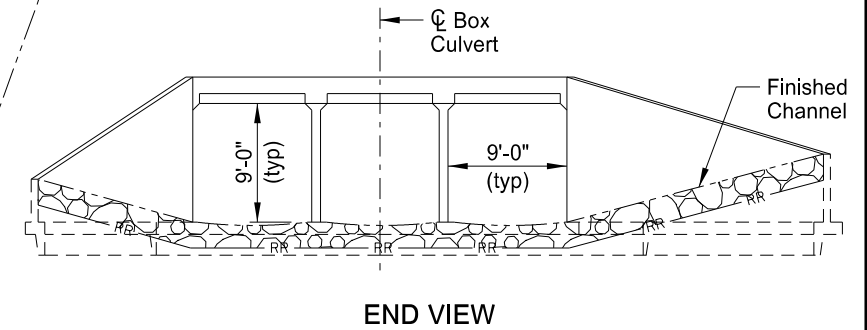
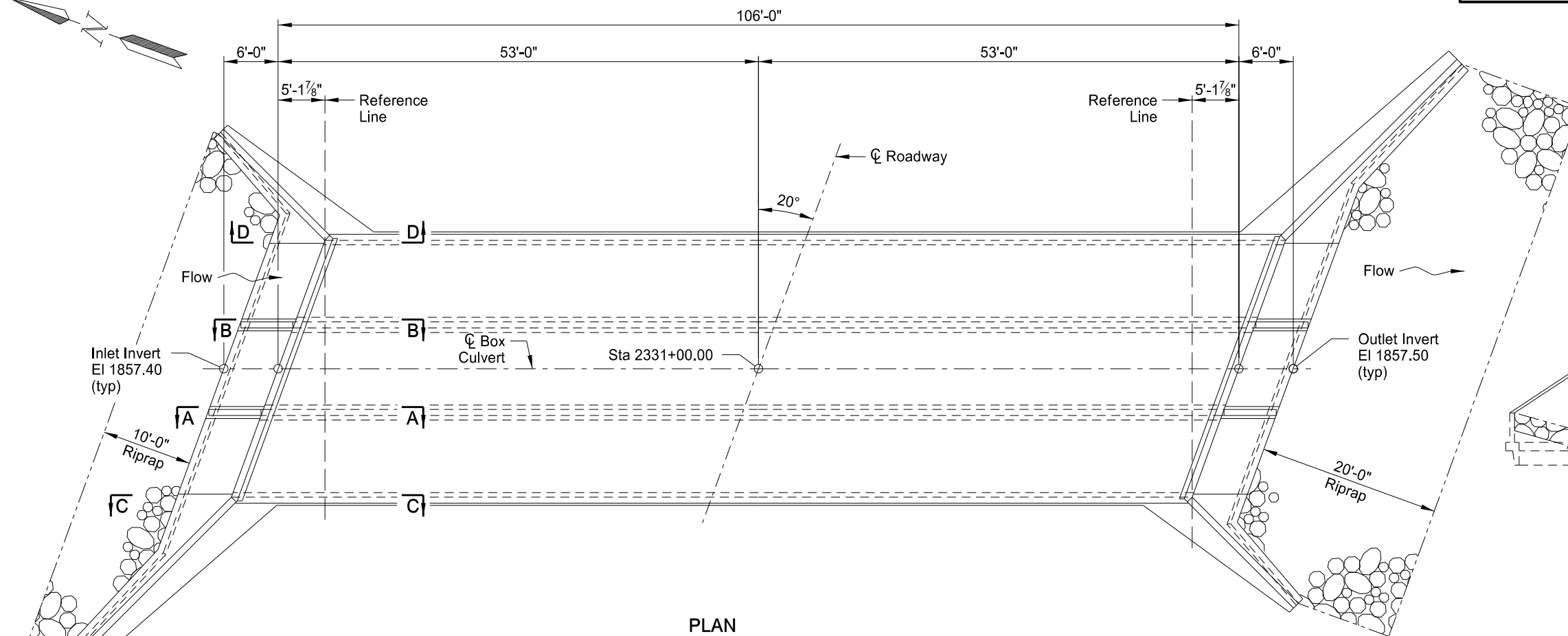
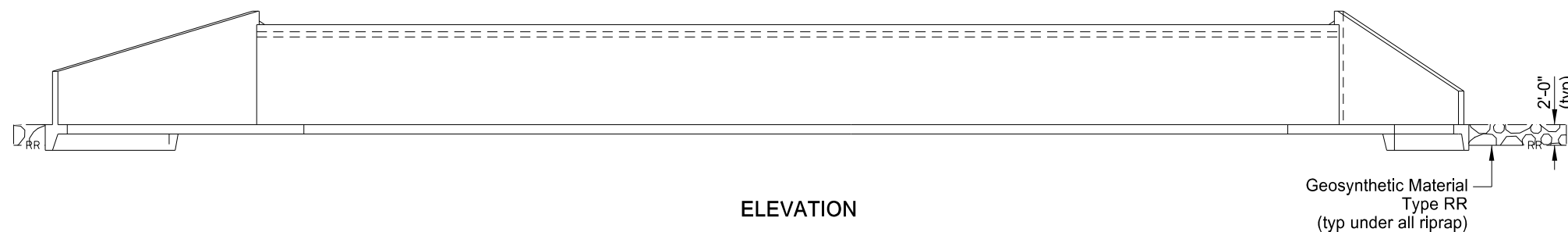


STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	project number	170	1



NOTE:
See Dwg 0-000.000-10 for Sections A-A and B-B.
See Dwg 0-000.000-11 for Sections C-C and D-D.

DESIGN STRENGTHS:
f'c = 3,000 psi ~ Class AE-3 Concrete
fy = 60,000 psi ~ Reinforcing Steel
Load & Resistance Factor Design



HYDRAULIC DATA:

Drainage Area	93.3 sq mi
Stream Gradient	0.0002 ft/ft
Design Frequency	50 yr
Design Discharge	1255 cfs
Design Headwater Stage	1867.5 ft
Design Tailwater Stage	1867.0 ft
Velocity Through Bridge	5.8 fps
100-Year Frequency Discharge	1687 cfs
100-Year Frequency Headwater	1869.5 ft
Overtopping Stage	1873.30 ft
Overtopping Discharge	2159± cfs

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
L SUM				1
202	0105	REMOVAL OF STRUCTURE	EA	1
210	0050	BOX CULVERT EXCAVATION	CY	725
210	0210	FOUNDATION FILL	EA	1
210	0405	FOUNDATION PREPARATION-BOX CULVERT	CY	95
256	0200	RIPRAP GRADE II	CY	323.5
602	1131	CLASS AE-3 CONCRETE-BOX CULVERT	LBS	45,747
612	0114	REINFORCING STEEL-GRADE 60-BOX CULVERT	SY	530
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	190
709	0155	GEOSYNTHETIC MATERIAL TYPE RR		

This drawing is preliminary and not for construction or implementation purposes.

SPECIAL PROVISIONS	
SSP 2	MIGRATORY BIRD TREATY ACT
HL-93 DESIGN LOADING	
LOCATION 20° SKEW	
CLEAR SPAN 3 x 9' CLEAR HEIGHT 9' MAXIMUM FILL 0' STATION: 2331+00.00	
REINFORCED CONCRETE TRIPLE BOX CULVERT LAYOUT	
ND DEPARTMENT OF TRANSPORTATION BRIDGE DIVISION	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	project number	170	2

NOTES

- 100 SCOPE OF WORK: Work at this site consists of removing an existing structure and building a new triple barrel 9' x 9' x 106'-0" reinforced concrete box culvert.
- 202 REMOVAL OF STRUCTURE: The existing structure is a triple 8' x 8' x 85'-0" reinforced concrete box culvert. Include all work required to remove the bridge and old abutments from a previous structure in the contract unit price for "Removal of Structure."
- 210 ORDINARY BACKFILL: Compact material as specified in Section 203.04 G.2.a, "ND T 180."
- 602 CLASS AE-3 CONCRETE: The strength requirements of Section 802.01 A.2 "Class AE and AAE Mixes" are revised to develop a design compressive strength of 3,000 psi (AE-3) and 4,000 psi (AAE-3) at 28 days.

Cast the following elements of each section in one continuous run:

1. Floor slab and wing footings
2. Each intermediate wall up to the bottom of fillets
3. Each sidewall up to the bottom of fillets with its adjacent wings complete to the top
4. Roof slab and parapets

Allow the concrete in the walls to set at least two hours before the roof slab is poured.

- 602 CURING CONCRETE: Wet cure all concrete surfaces not covered by forms. Cover the concrete with a double thickness of burlap. Maintain surface moisture between the final finish and placement of burlap by periodic applications of a light fog spray of water. Keep the burlap continuously moist until the end of the curing period.
- 602 WEATHER LIMITATIONS: All requests in accordance with 602.04 C.4 "Weather Limitations" require approval from the NDDOT Bridge Division.
- 612 REINFORCING STEEL: When the distance between end bars is not evenly divisible by bar spacing, adjust the odd distance by a few irregular spaces near the center, not at the ends of the culvert.

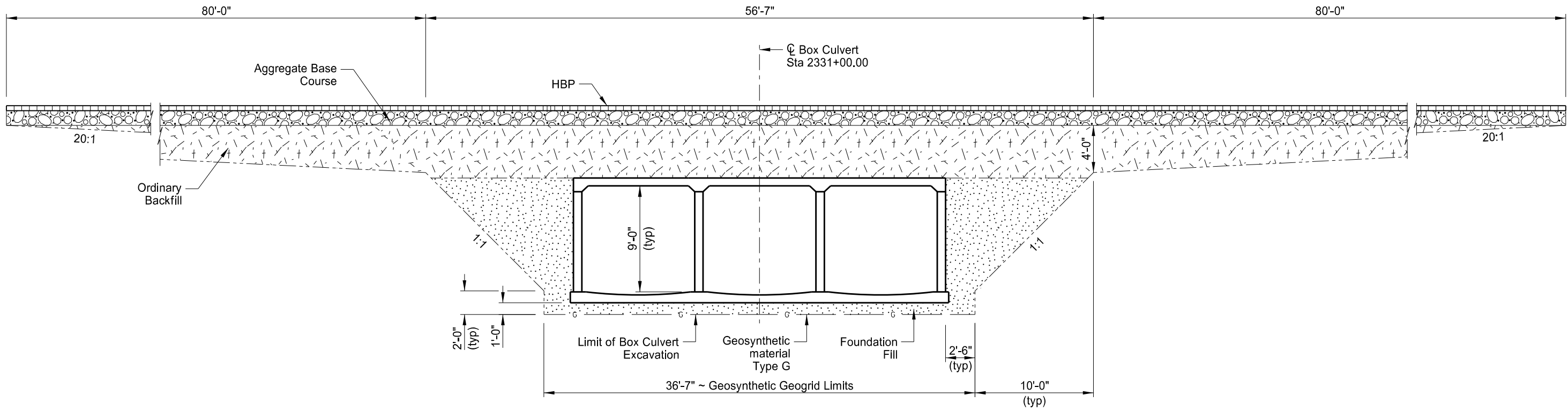
Place bolsters and bar supports for the roof steel at a maximum of 4 foot spacing.

Dimensions of bent bars are given out to out.

This document
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implementation
purposes.

PRELIMINARY

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	project number	170	3



(SHOWING SECTION ALONG ϕ ROADWAY)
**GEOSYNTHETIC GEOGRID PLACEMENT AND FOUNDATION FILL
 THROUGH EXISTING EMBANKMENT**

NOTES:

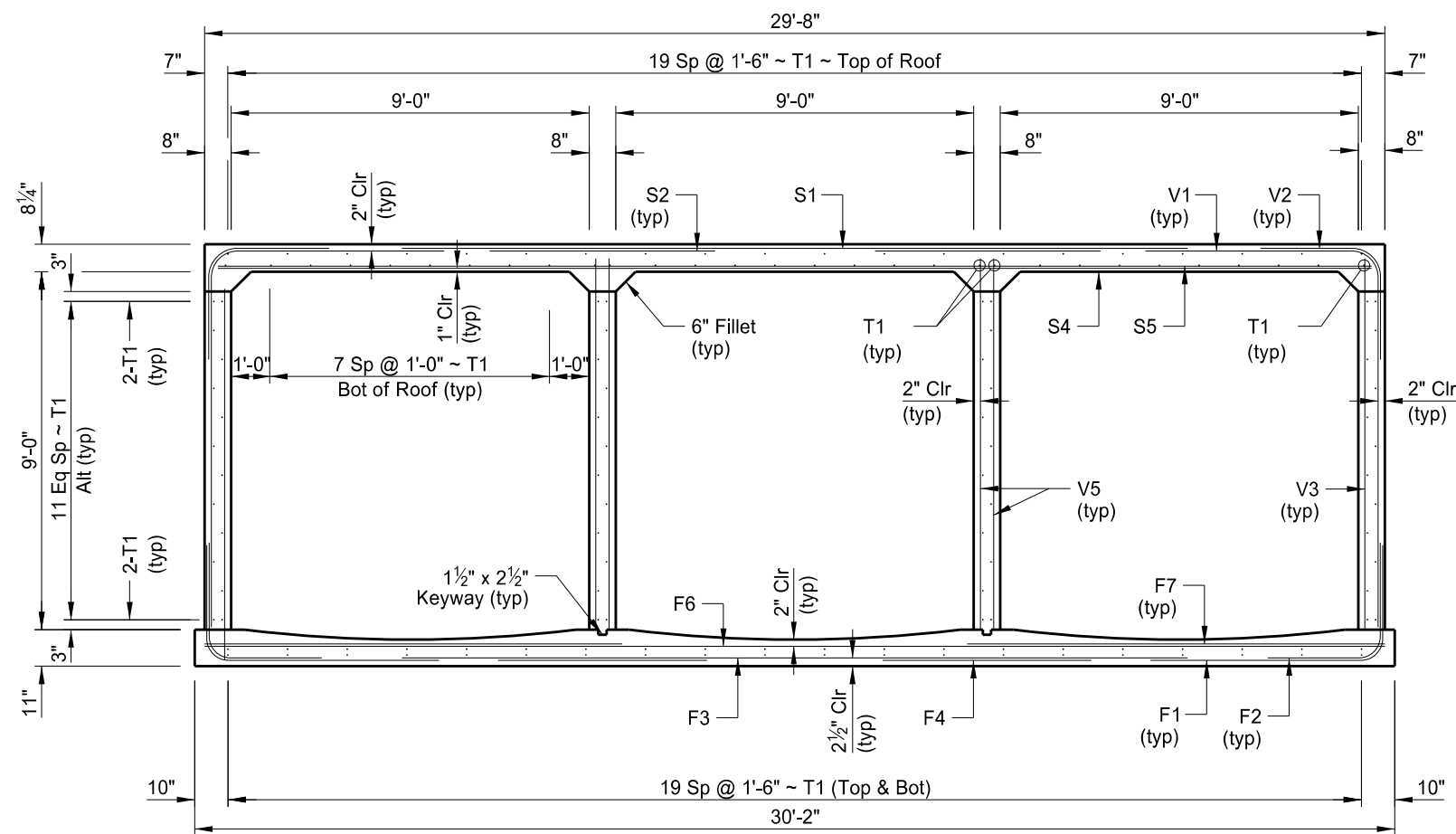
Provide a 1'-0" minimum depth of foundation fill under the floor. Remove and replace all unsound material under the box with foundation fill. The engineer will determine the depth required.

Extend the geosynthetic material and foundation fill to the end of the apron.

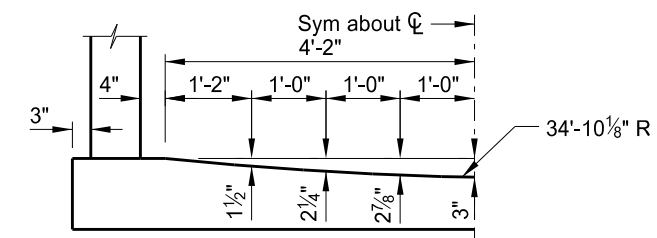
This drawing is preliminary and not for construction or implementation purposes.

LOCATION
EXCAVATION & FOUNDATION FILL DETAIL

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	project number	170	4



SECTION OF BARREL



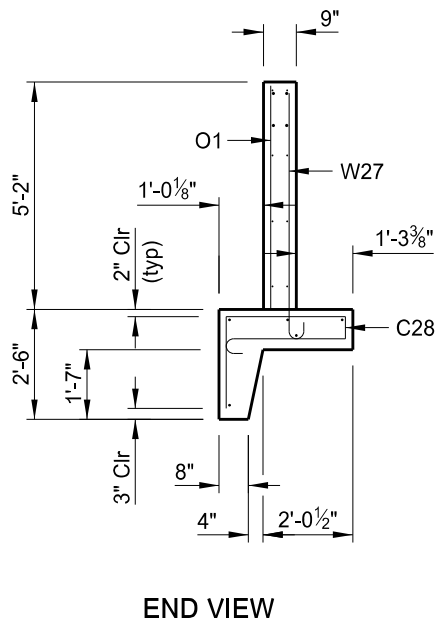
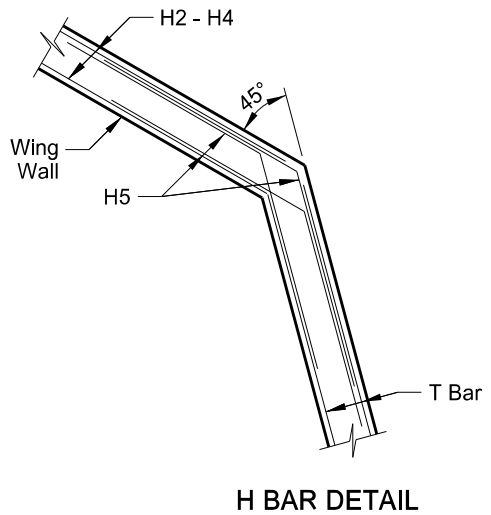
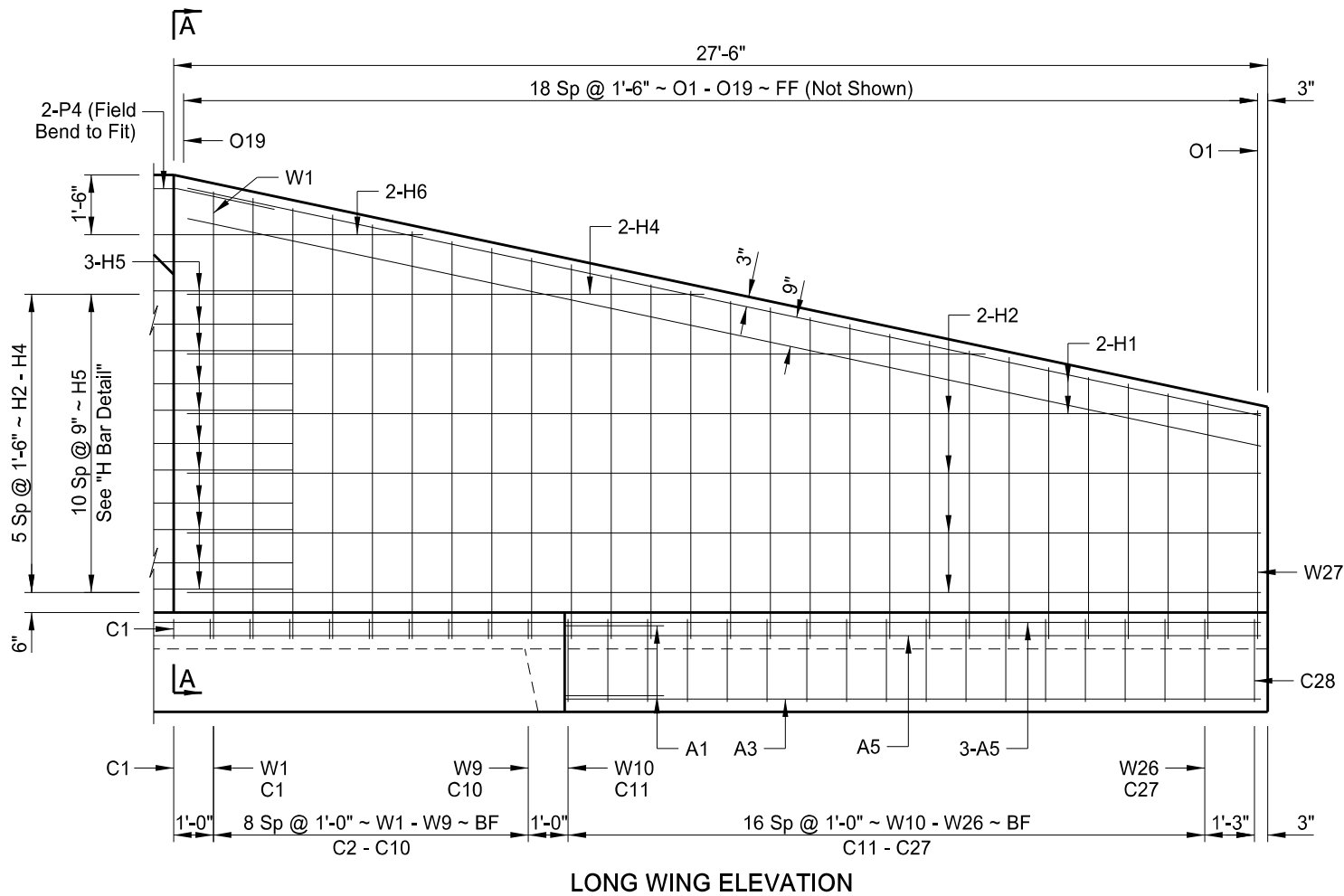
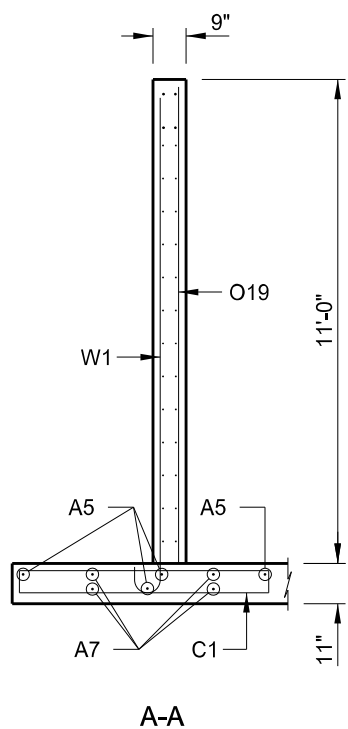
CURVED FLOOR OFFSETS

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

LOCATION
BARREL SECTION

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	project number	170	5

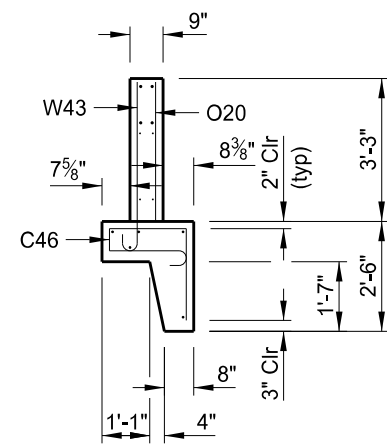


NOMENCLATURE:
 FF = FRONT FACE
 BF = BACK FACE

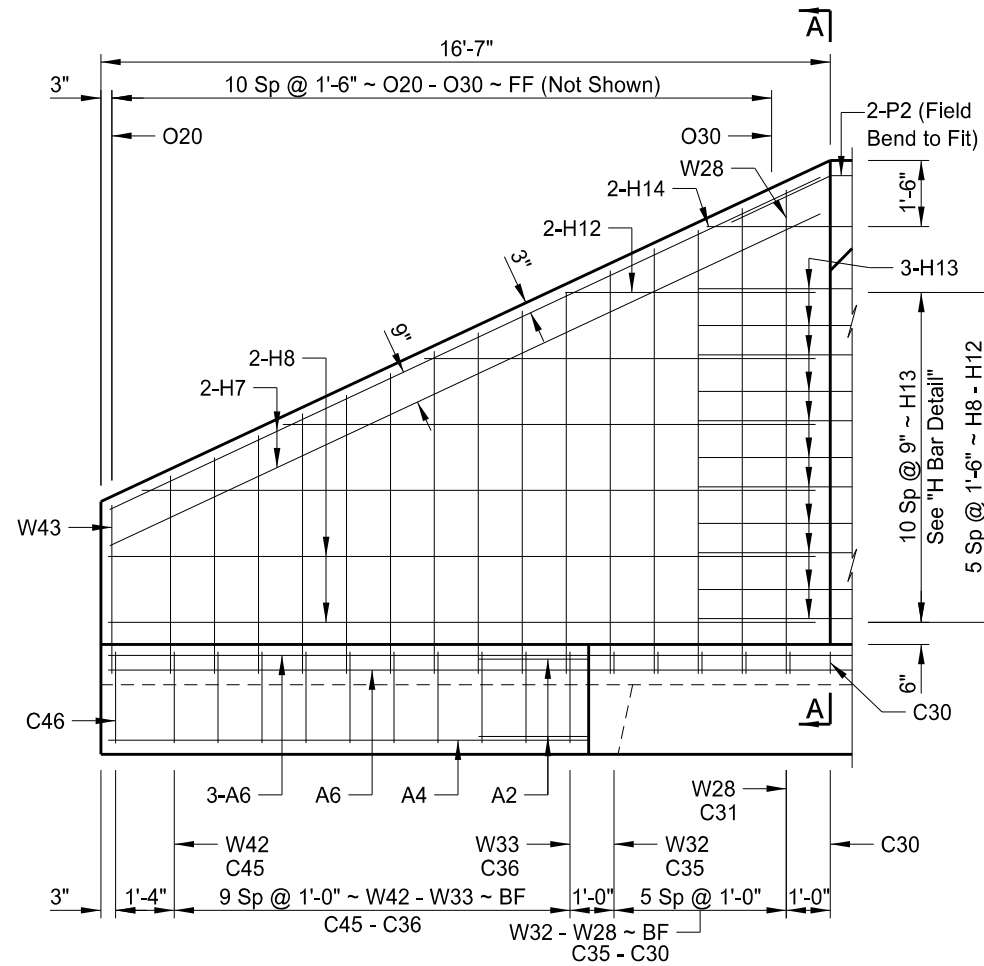
This drawing is preliminary and not for construction or implementation purposes.

LOCATION
 LONG WING DETAILS

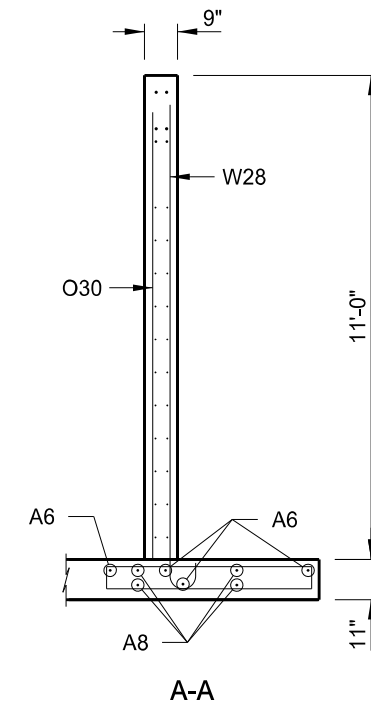
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	project number	170	6



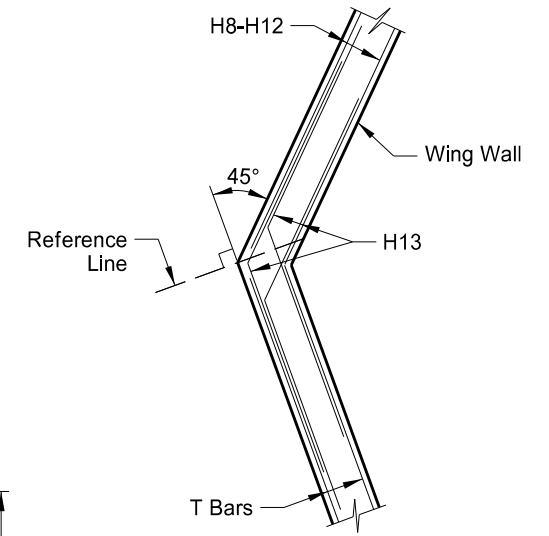
END VIEW



SHORT WING ELEVATION



A-A



H BAR DETAIL

NOMENCLATURE:

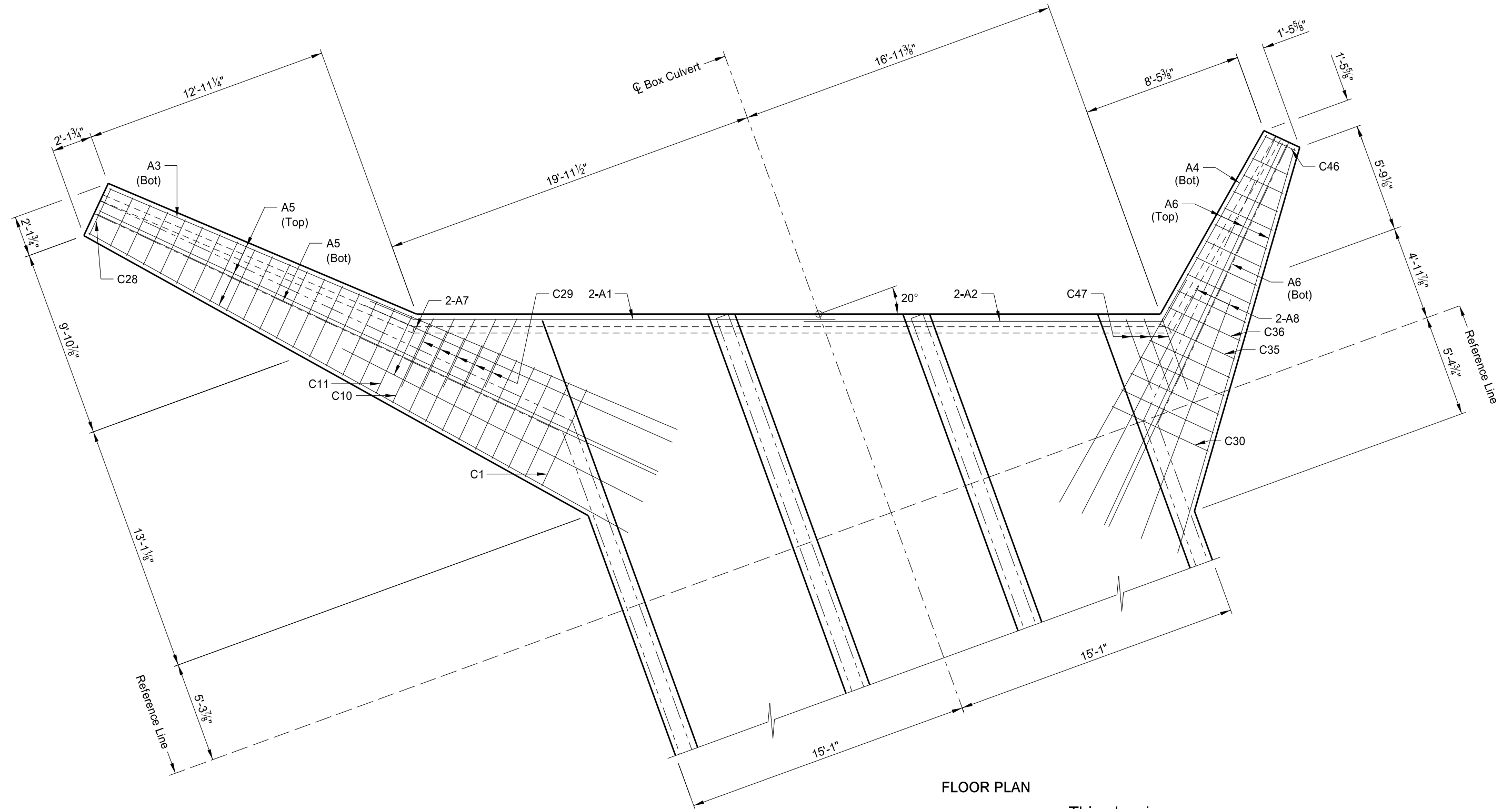
FF = FRONT FACE
 BF = BACK FACE

This drawing is preliminary and not for construction or implementation purposes.

LOCATION
SHORT WING DETAILS

23 U.S.C. 407
 NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	project number	170	7

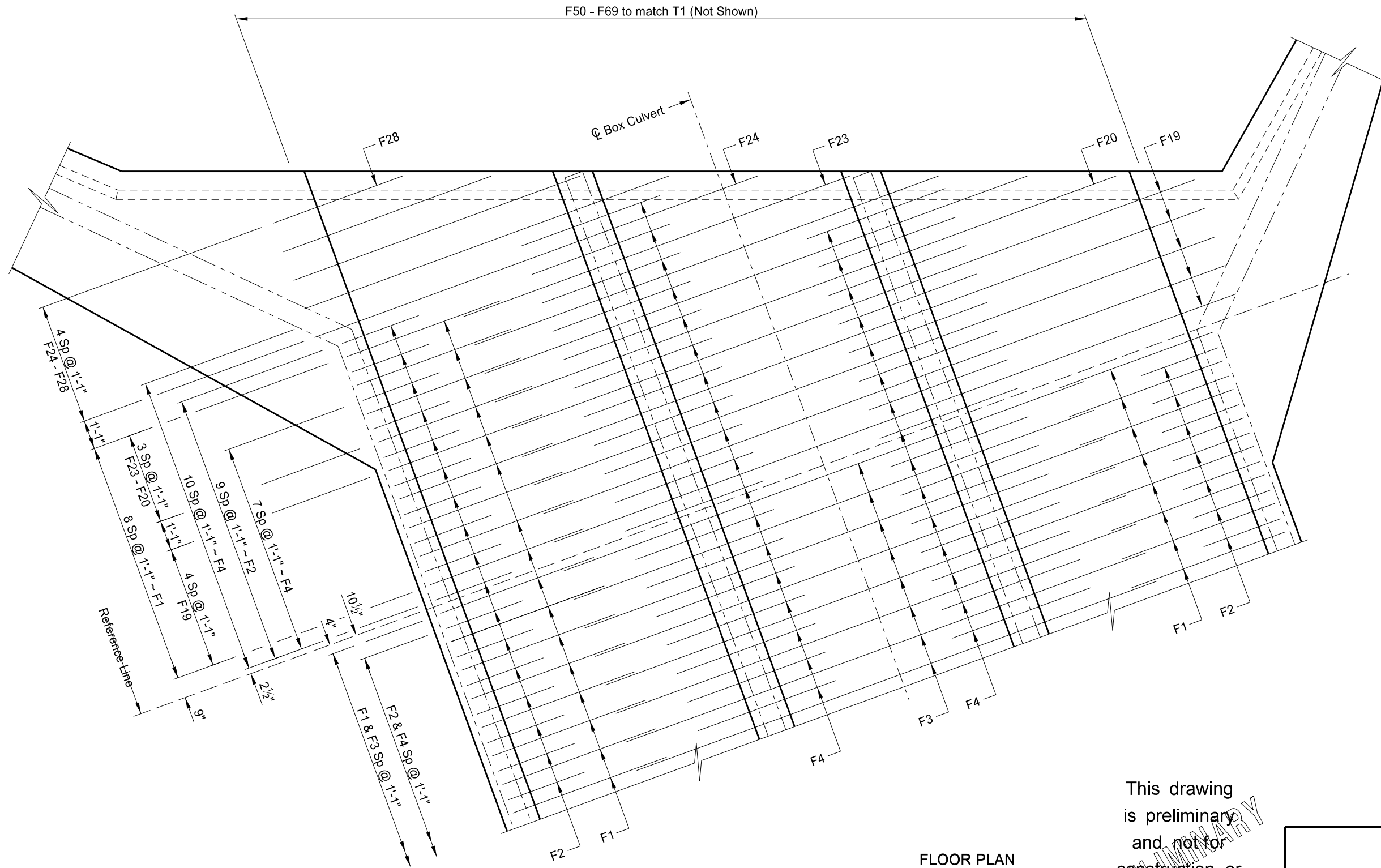


FLOOR PLAN

This drawing is preliminary and not for construction or implementation purposes.

LOCATION
 (SHOWING DIMENSIONS &
 WING FOOTING REINFORCING)
 FLOOR DETAIL

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	project number	170	8



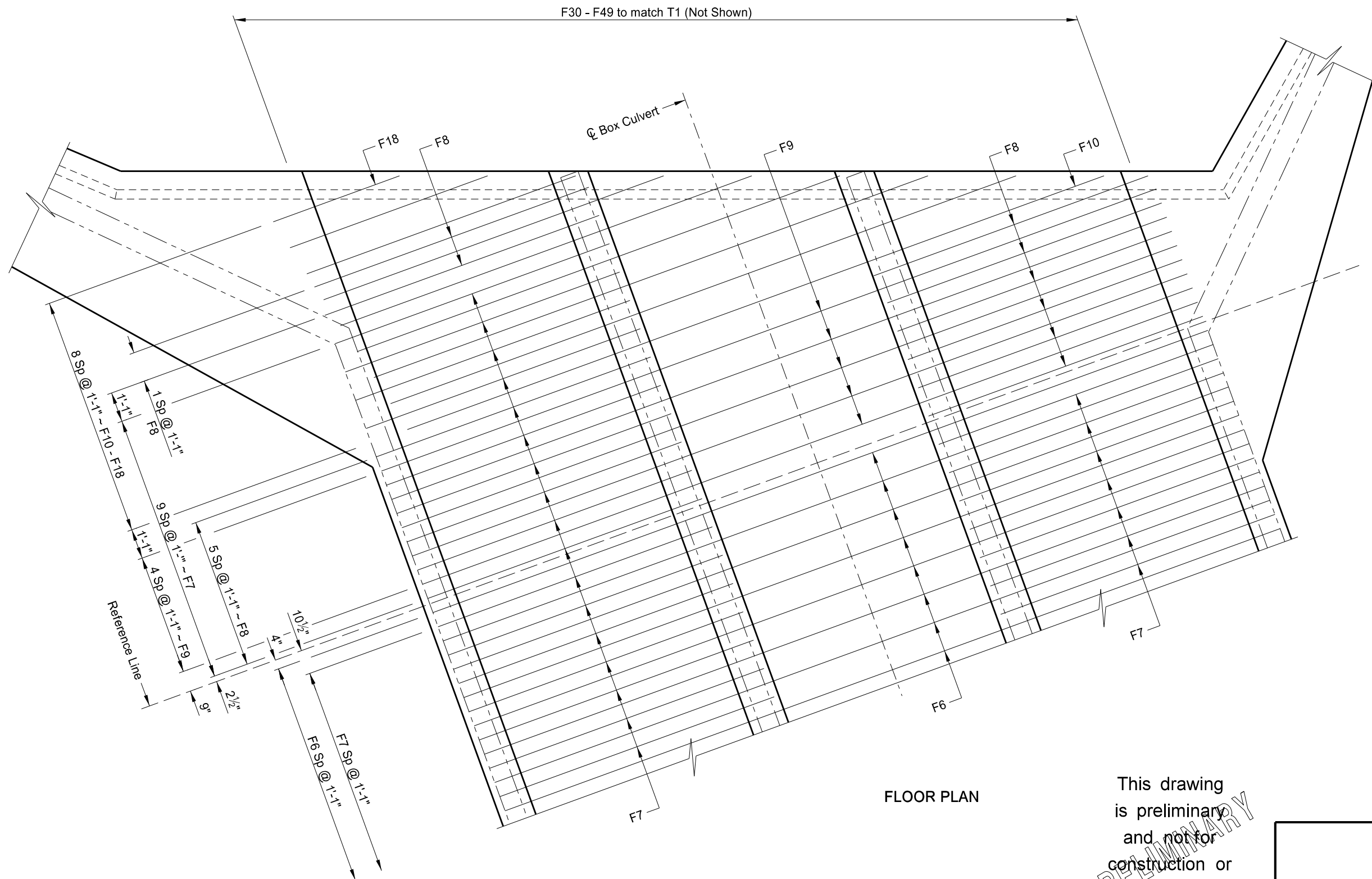
FLOOR PLAN

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

LOCATION (SHOWING BOTTOM MAT REINFORCING) FLOOR DETAIL
--

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	project number	170	9



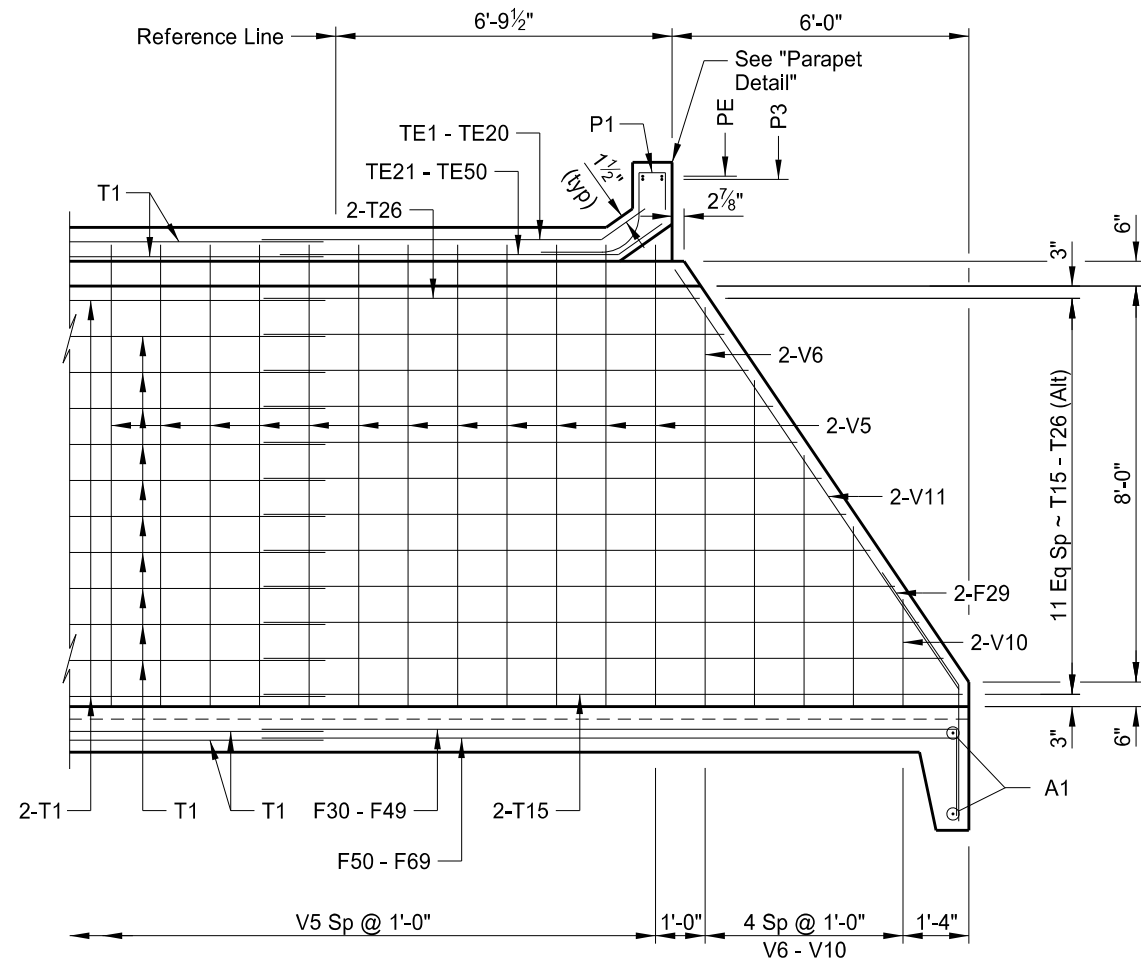
FLOOR PLAN

This drawing is preliminary and not for construction or implementation purposes.

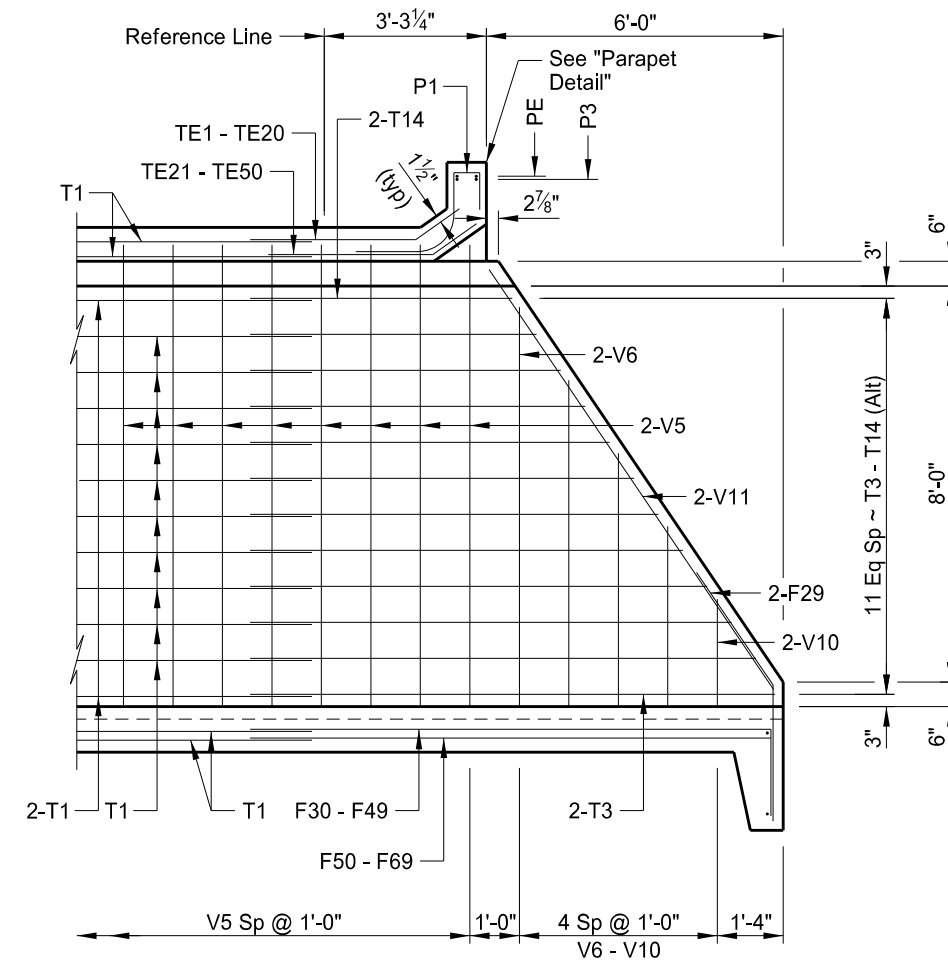
PRELIMINARY

LOCATION (SHOWING TOP MAT REINFORCING) FLOOR DETAIL

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	project number	170	10

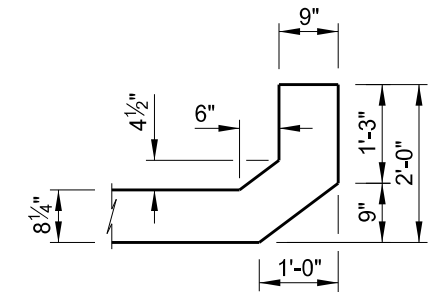


(INNER WALL)
 A-A



(INNER WALL)
 B-B

LONGITUDINAL SECTIONS



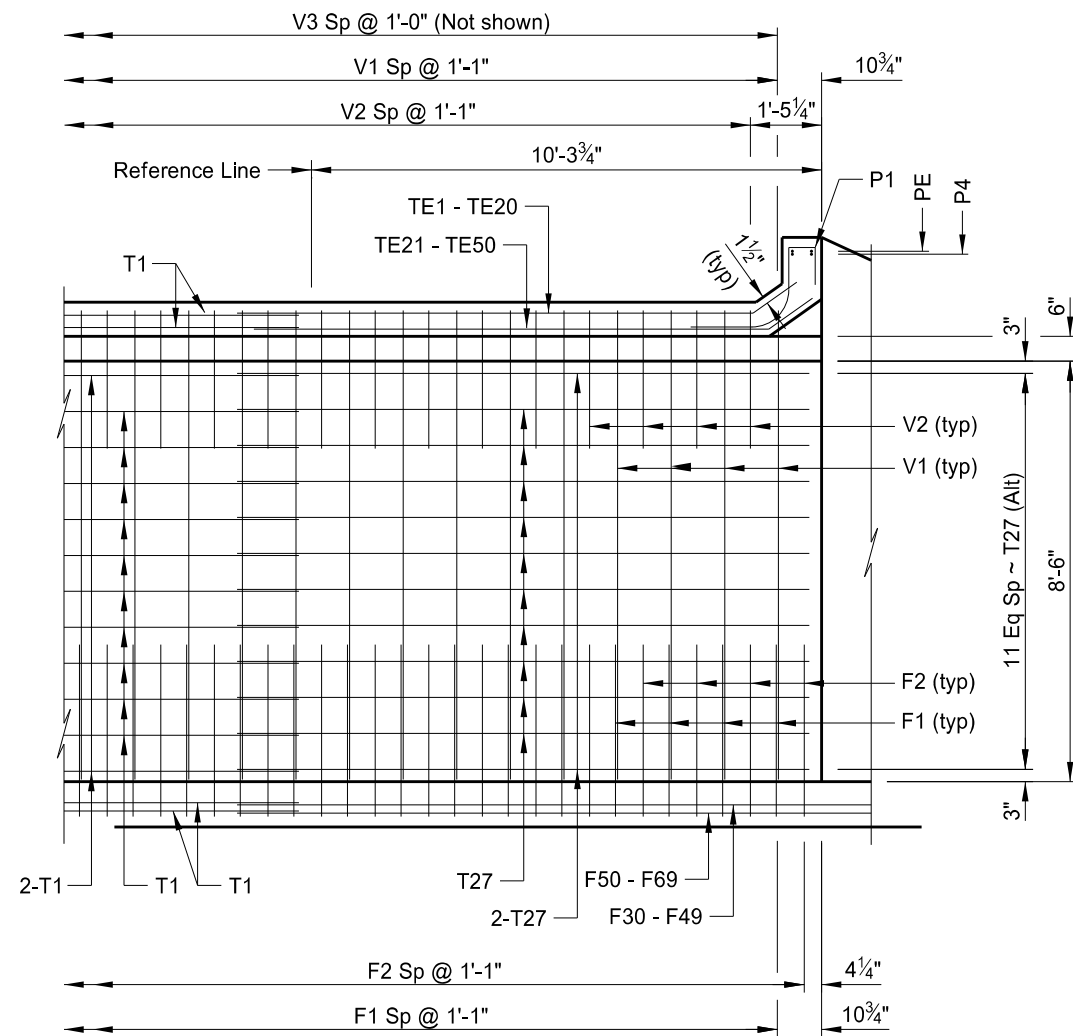
PARAPET DETAIL

NOTE:
 See Dwg 0-000.000-1 for location of Sections A-A and B-B.

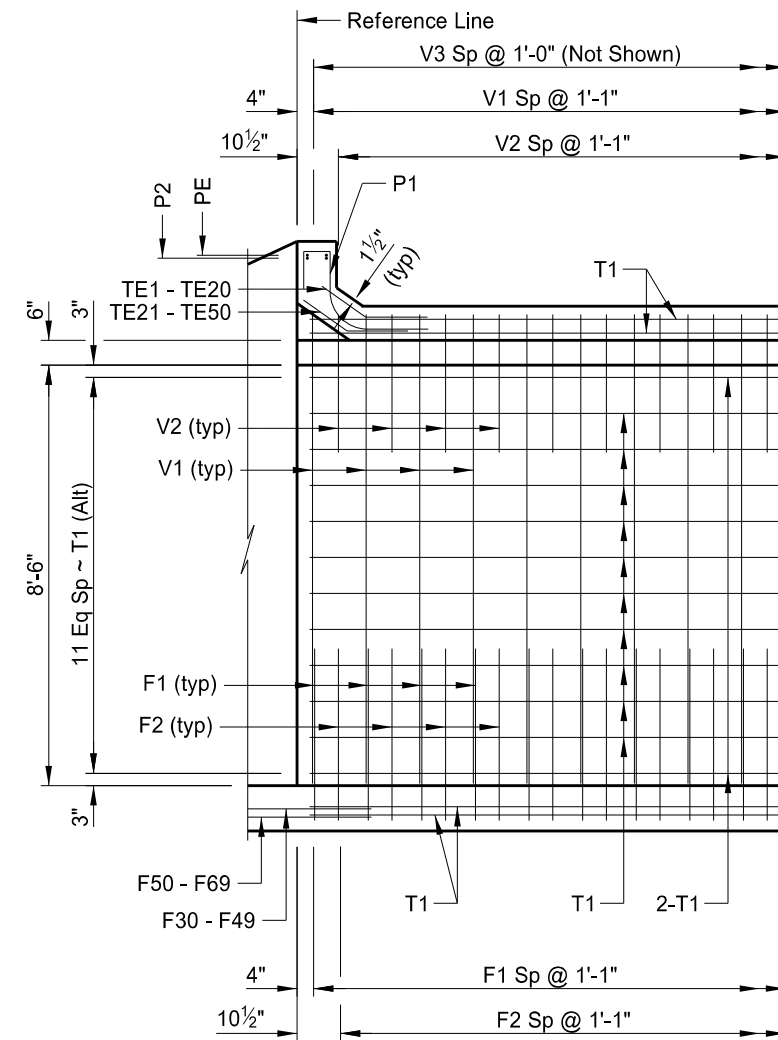
This drawing
 is preliminary
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 implementation
 purposes.

LOCATION
INNER WALL DETAILS & PARAPET DETAIL

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	project number	170	11



(OUTER WALL)
C-C



(OUTER WALL)
D-D

LONGITUDINAL SECTIONS

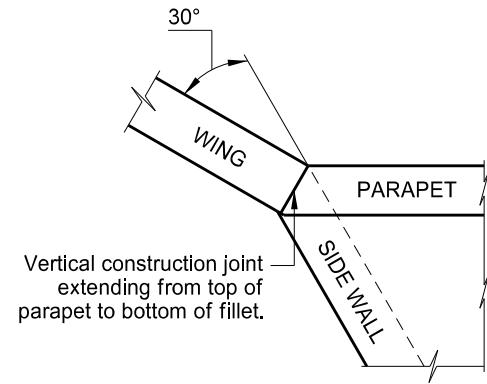
NOTE:

See Dwg 0-000.000-1 for location of Sections C-C and D-D.

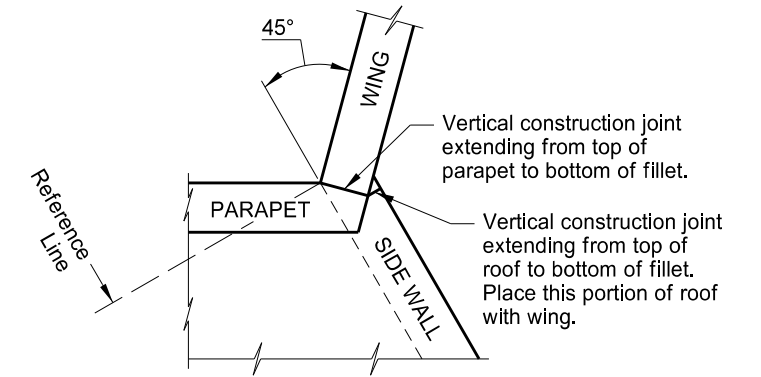
This drawing is preliminary and not for construction or implementation purposes.

LOCATION
 OUTER WALL DETAILS

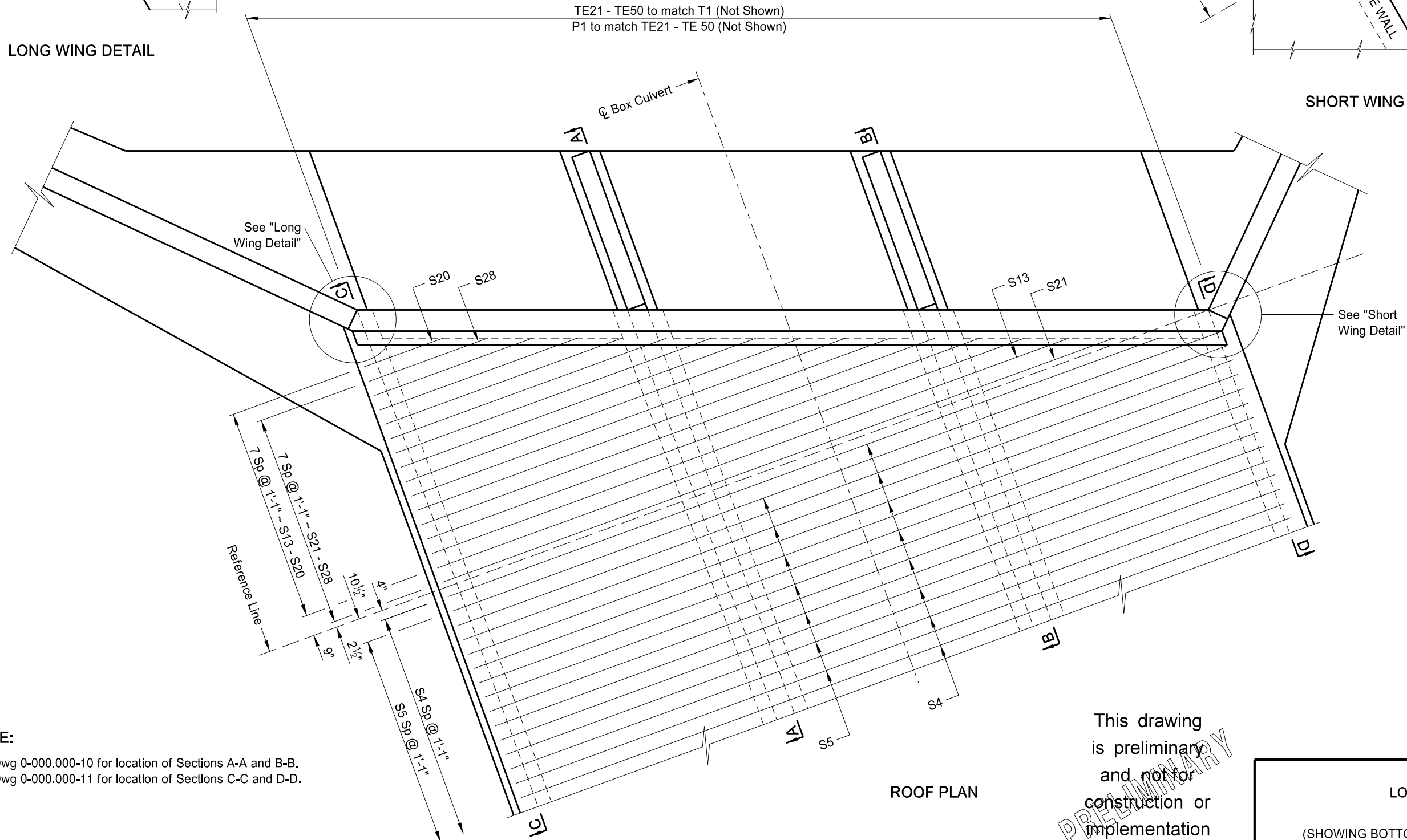
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	project number	170	12



LONG WING DETAIL



SHORT WING DETAIL



ROOF PLAN

NOTE:

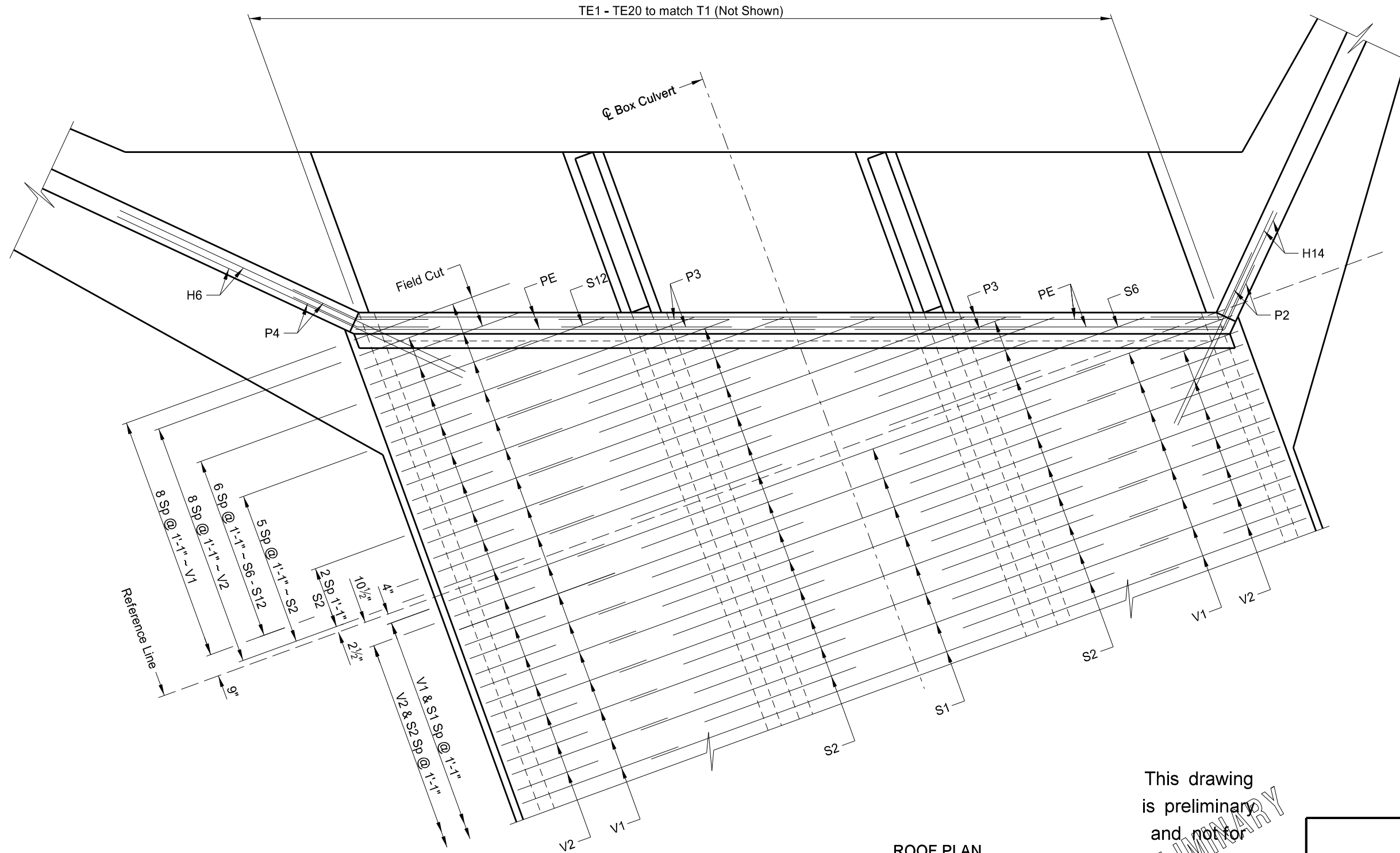
See Dwg 0-000.000-10 for location of Sections A-A and B-B.
See Dwg 0-000.000-11 for location of Sections C-C and D-D.

This drawing is preliminary and not for construction or implementation purposes.

PRELIMINARY

LOCATION (SHOWING BOTTOM MAT REINFORCING) ROOF DETAILS
--

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	project number	170	13



ROOF PLAN

This drawing is preliminary and not for construction or implementation purposes.

LOCATION
(SHOWING TOP MAT & PARAPET REINFORCING)
ROOF DETAIL

BAR LIST (CONSTANT)					BAR LIST (CONSTANT)					BAR LIST (CONSTANT)				
MARK	SIZE	NO.	LENGTH	SHAPE	MARK	SIZE	NO.	LENGTH	SHAPE	MARK	SIZE	NO.	LENGTH	SHAPE
W1	7	2	12'-1"	BENT	W28	7	2	11'-10"	BENT	F8	5	16	10'-6"	STR.
W2	7	2	11'-10"	BENT	W29	7	2	11'-4"	BENT	F9	5	10	29'-8"	STR.
W3	7	2	11'-8"	BENT	W30	7	2	10'-10"	BENT	F10-F18	5	2 SETS	141'-9"	STR.
W4	7	2	11'-5"	BENT	W31	7	2	10'-5"	BENT	F19	5	10	25'-11"	STR.
W5	7	2	11'-3"	BENT	W32	6	2	9'-9"	BENT	F20-F23	5	2 SETS	76'-6"	STR.
W6	7	2	11'-0"	BENT	W33	6	2	9'-4"	BENT	F24-F28	5	2 SETS	54'-5"	STR.
W7	7	2	10'-10"	BENT	W34	5	2	8'-9"	BENT	F29	6	8	5'-6"	BENT
W8	7	2	10'-7"	BENT	W35	5	2	8'-3"	BENT	F30-F49	4	2 SETS	284'-2"	BENT
W9	6	2	10'-3"	BENT	W36	4	2	7'-9"	BENT	F50-F69	4	2 SETS	249'-2"	STR.
W10	6	2	10'-0"	BENT	W37	4	2	7'-3"	BENT					
W11	6	2	9'-9"	BENT	W38	4	2	6'-10"	BENT	S6-S12	6	2 SETS	93'-4"	STR.
W12	6	2	9'-7"	BENT	W39	4	2	6'-4"	BENT	S13-S20	5	2 SETS	124'-8"	STR.
W13	5	2	9'-3"	BENT	W40	4	2	5'-10"	BENT	S21-S28	4	2 SETS	136'-8"	STR.
W14	5	2	9'-1"	BENT	W41	4	2	5'-5"	BENT					
W15	5	2	8'-10"	BENT	W42	4	2	4'-11"	BENT	T3	4	4	10'-8"	STR.
W16	5	2	8'-8"	BENT	W43	4	2	4'-4"	BENT	T4-T13	4	2 SETS	80'-5"	STR.
W17	5	2	8'-5"	BENT						T14	4	4	5'-4"	STR.
W18	4	2	8'-2"	BENT	C30	5	2	12'-10"	BENT	T15	4	4	14'-2"	STR.
W19	4	2	7'-11"	BENT	C31	5	2	12'-4"	BENT	T16-T25	4	2 SETS	115'-5"	STR.
W20	4	2	7'-9"	BENT	C32	5	2	11'-10"	BENT	T26	4	4	8'-10"	STR.
W21	4	2	7'-6"	BENT	C33	5	2	11'-6"	BENT	T27	4	28	11'-7"	STR.
W22	4	2	7'-3"	BENT	C34	5	2	11'-0"	BENT					
W23	4	2	7'-1"	BENT	C35	5	2	10'-6"	BENT	TE1-TE20	4	2 SETS	140'-0"	BENT
W24	4	2	6'-10"	BENT	C36	5	2	11'-8"	BENT	TE21-TE50	4	2 SETS	213'-9"	BENT
W25	4	2	6'-8"	BENT	C37	4	2	11'-1"	BENT					
W26	4	2	6'-5"	BENT	C38	4	2	10'-7"	BENT					
W27	4	2	6'-2"	BENT	C39	4	2	10'-1"	BENT					
					C40	4	2	9'-7"	BENT	BAR LIST (VARIABLE)				
C1	5	2	12'-10"	BENT	C41	4	2	9'-3"	BENT	V1	4	194	15'-0"	BENT
C2	5	2	12'-8"	BENT	C42	4	2	8'-9"	BENT	V2	5	194	5'-6"	BENT
C3	5	2	12'-4"	BENT	C43	4	2	8'-3"	BENT	V3	4	214	9'-4"	STR.
C4	5	2	12'-2"	BENT	C44	4	2	7'-9"	BENT	V5	4	428	9'-4"	STR.
C5	5	2	12'-0"	BENT	C45	4	2	7'-3"	BENT					
C6	5	2	11'-10"	BENT	C46	4	2	6'-7"	BENT	F1	4	194	9'-0"	BENT
C7	5	2	11'-6"	BENT	C47	4	6	6'-1"	BENT	F2	5	198	6'-3"	BENT
C8	5	2	11'-4"	BENT						F3	5	89	19'-9"	STR.
C9	5	2	11'-2"	BENT	H7	7	8	17'-10"	STR.	F4	5	214	5'-3"	STR.
C10	5	2	11'-0"	BENT	H8	4	8	16'-2"	STR.	F6	5	89	29'-8"	STR.
C11	5	2	12'-4"	BENT	H9	4	4	15'-4"	STR.	F7	5	196	10'-6"	STR.
C12	5	2	12'-2"	BENT	H10	4	4	12'-2"	STR.					
C13	5	2	11'-10"	BENT	H11	4	4	8'-11"	STR.	S1	6	89	19'-9"	STR.
C14	4	2	11'-7"	BENT	H12	4	4	5'-9"	STR.	S2	6	194	5'-8"	STR.
C15	4	2	11'-5"	BENT	H13	4	66	6'-0"	BENT	S4	5	89	29'-0"	STR.
C16	4	2	11'-1"	BENT	H14	6	4	8'-3"	STR.	S5	4	88	29'-0"	STR.
C17	4	2	10'-11"	BENT										
C18	4	2	10'-9"	BENT	O20-O30	4	2 SETS	73'-4"	STR.					
C19	4	2	10'-7"	BENT										
C20	4	2	10'-3"	BENT	A1	6	4	24'-9"	BENT					
C21	4	2	10'-1"	BENT	A2	6	4	21'-6"	BENT					
C22	4	2	9'-11"	BENT	A3	6	2	17'-8"	STR.					
C23	4	2	9'-9"	BENT	A4	6	2	11'-1"	STR.					
C24	4	2	9'-5"	BENT	A5	6	8	32'-7"	STR.					
C25	4	2	9'-3"	BENT	A6	6	8	22'-3"	STR.					
C26	4	2	9'-1"	BENT	A7	6	8	17'-10"	STR.					
C27	4	2	8'-9"	BENT	A8	6	8	13'-6"	STR.					
C28	4	2	8'-7"	BENT										
C29	4	10	6'-1"	BENT	P1	4	60	4'-7"	BENT					
					P2	6	4	5'-0"	BENT					
H1	7	8	27'-7"	STR.	P3	6	8	6'-0"	STR.					
H2	4	16	27'-1"	STR.	P4	6	4	5'-0"	BENT					
H3	4	4	20'-1"	STR.	PE	6	8	16'-2"	STR.					
H4	4	4	13'-1"	STR.										
H5	4	66	6'-0"	BENT	V6	4	8	8'-0"	STR.					
H6	6	4	13'-5"	STR.	V7	4	8	6'-7"	STR.					
					V8	4	8	5'-1"	STR.					
O1-O19	4	2 SETS	151'-2"	STR.	V9	4	8	3'-7"	STR.					
					V10	4	8	2'-2"	STR.					
					V11	6	8	10'-3"	STR.					

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	project number	170	14

23 U.S.C. 407
NDDOT Reserves All Objections

NOTES:

1. Verify the quantity, size, and shape of the bar reinforcement against the structure drawings and immediately notify the Engineer of any discrepancies. Discrepancies in the bar list will not be cause for adjustment of the contract unit price.
2. All dimensions are out to out of bars.
3. Nominal length of each bent bar or cut bar is the sum total of the detailing dimensions for that bar, unless otherwise noted.
4. The radius dimension in the "Bar Details" indicates the outside radius.

NOTE:

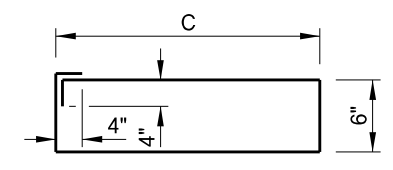
Unless construction requirements dictate otherwise, the Contractor has the option to construct the box culvert using construction joints or as one continuous unit. If construction joints are used, the longitudinal bar lengths may be adjusted, but a minimum lap length of 1'-3" must be maintained.

CONCRETE FORMULAS	
ENTIRE FLOOR	"L" x 0.86974 + 30.78759 = 123.0 CY
TWO OUTSIDE WALLS & FOUR WINGS	"L" x 0.41975 + 18.65734 = 63.2 CY
INSIDE WALLS	"L" x 0.41975 + 2.80882 = 47.3 CY
ENTIRE ROOF	"L" x 0.83256 + 1.69937 = 90.0 CY
TOTAL	"L" x 2.54180 + 53.95312 = 323.5 CY

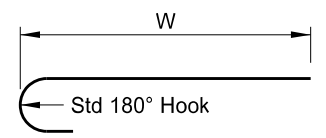
This drawing is preliminary and not for construction or implementation purposes.

QUANTITIES	
CLASS AE-3 CONCRETE	323.5 CY
REINFORCING STEEL	45,747 LBS
LOCATION	
REINFORCING BAR LIST	

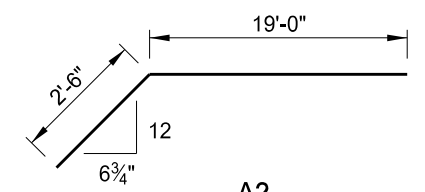
23 U.S.C. 407
NDDOT Reserves All Objections



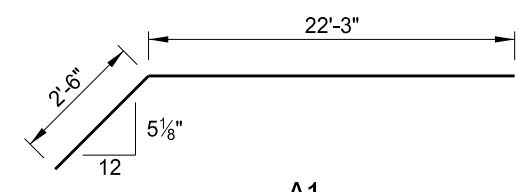
C1 - C10 & C30 - C35



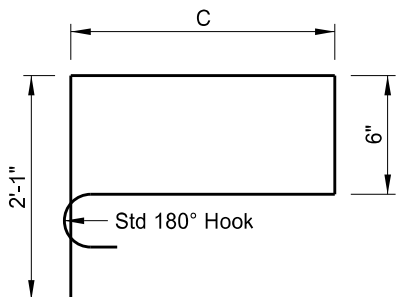
W1 - W43



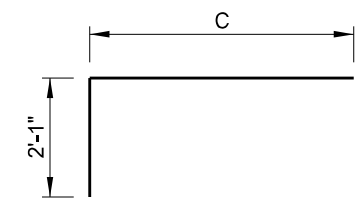
A2



A1



C11 - C28 & C36 - C46



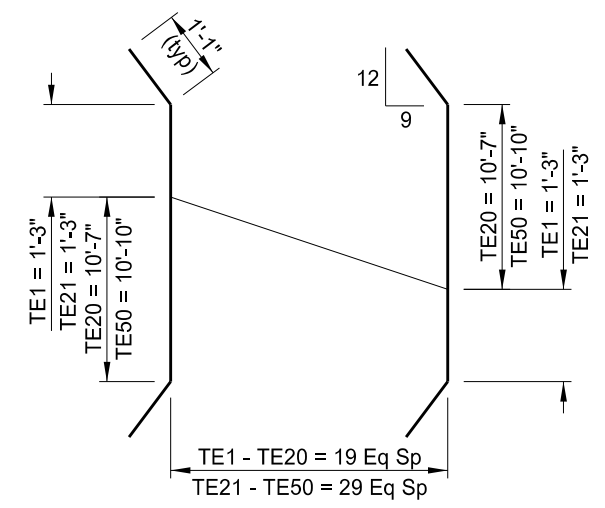
C29 & C47

MARK	"C"
C1	5'-7"
C2	5'-6"
C3	5'-4"
C4	5'-3"
C5	5'-2"
C6	5'-1"
C7	4'-11"
C8	4'-10"
C9	4'-9"
C10	4'-8"
C11	4'-7"
C12	4'-6"
C13	4'-4"
C14	4'-0"
C15	4'-2"
C16	4'-0"
C17	3'-11"
C18	3'-10"
C19	3'-9"
C20	3'-7"
C21	3'-6"
C22	3'-5"
C23	3'-4"
C24	3'-2"
C25	3'-1"
C26	3'-0"
C27	2'-10"
C28	2'-9"
C29	4'-0"
C30	5'-7"
C31	5'-4"
C32	5'-1"
C33	4'-11"
C34	4'-8"
C35	4'-5"
C36	4'-3"
C37	4'-0"
C38	3'-9"
C39	3'-6"
C40	3'-3"
C41	3'-1"
C42	2'-10"
C43	2'-7"
C44	2'-4"
C45	2'-1"
C46	1'-9"
C47	4'-0"

MARK	"W"
W1	11'-3"
W2	11'-0"
W3	10'-10"
W4	10'-7"
W5	10'-5"
W6	10'-2"
W7	10'-0"
W8	9'-9"
W9	9'-7"
W10	9'-4"
W11	9'-1"
W12	8'-11"
W13	8'-8"
W14	8'-6"
W15	8'-3"
W16	8'-1"
W17	7'-10"
W18	7'-8"
W19	7'-5"
W20	7'-3"
W21	7'-0"
W22	6'-9"
W23	6'-7"
W24	6'-4"
W25	6'-2"
W26	5'-11"
W27	5'-8"
W28	11'-0"
W29	10'-6"
W30	10'-0"
W31	9'-7"
W32	9'-1"
W33	8'-8"
W34	8'-2"
W35	7'-8"
W36	7'-3"
W37	6'-9"
W38	6'-4"
W39	5'-10"
W40	5'-4"
W41	4'-11"
W42	4'-5"
W43	3'-10"

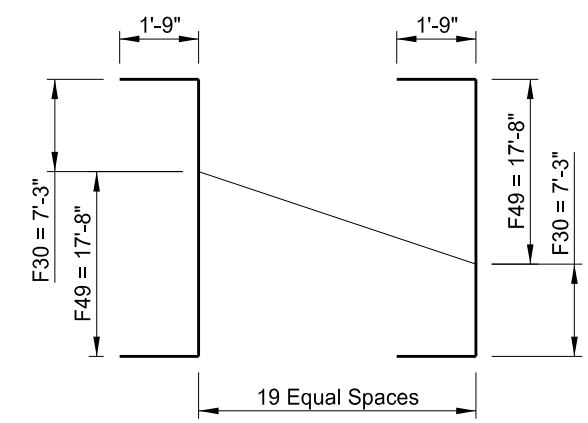
MARK	LENGTH	BL1	BL2	SPACES
O1-O19	151'-2"	5'-1"	10'-10"	18
Q20-O30	73'-4"	3'-2"	10'-2"	10
F10-F18	141'-9"	4'-10"	26'-8"	8
F20-F23	76'-6"	14'-8"	23'-7"	3
F24-F28	54'-5"	4'-11"	16'-10"	4
F50-F69	249'-2"	7'-3"	17'-8"	19
S6-S12	93'-4"	4'-5"	22'-3"	6
S13-S20	124'-8"	5'-2"	26'-0"	7
S21-S28	136'-8"	6'-8"	27'-6"	7
T4-T13	80'-5"	5'-10"	10'-3"	9
T16-T25	115'-5"	9'-4"	13'-9"	9

STRAIGHT BAR SET DETAIL



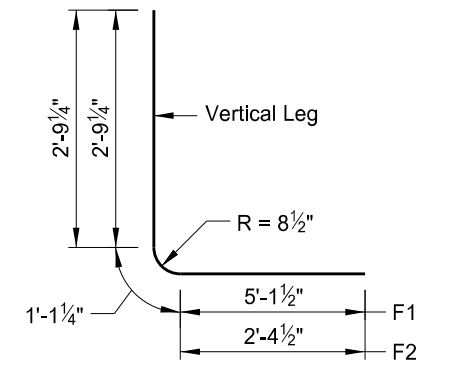
TE1-TE20
TE21-TE50

2 SETS SHOWN
2 SETS REQUIRED
LENGTH 1 SET TE1-TE20 = 140'-0"
LENGTH 1 SET TE21-TE50 = 213'-9"

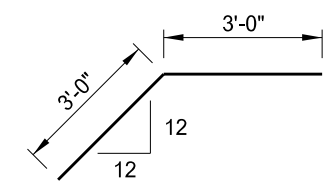


F30 - F49

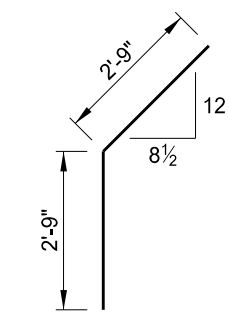
2 SETS SHOWN
2 SETS REQUIRED
LENGTH 1 SET = 284'-2"



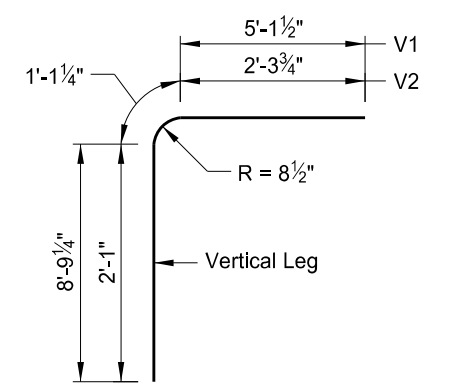
F1 & F2



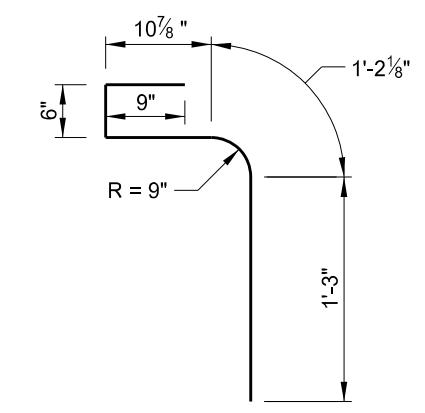
H5 & H13



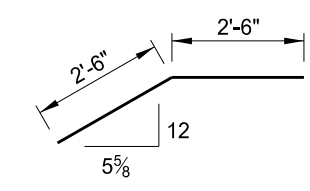
F29



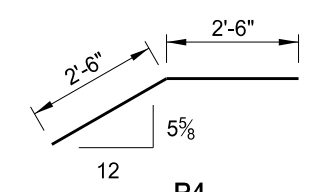
V1 & V2



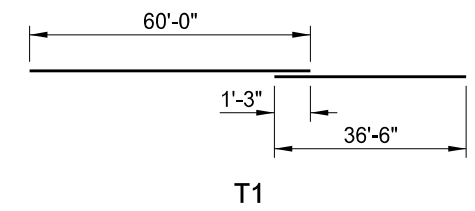
P1



P2



P4



T1

This drawing is preliminary and not for construction or implementation purposes.

LOCATION
BAR DETAILS