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STRUCTURES DETAILS

SD-501.00	CONCRETE DETAILS AND NOTES	02-09-2012
SD-502.00	CONCRETE DETAILS AND NOTES	10-10-2012
SD-516.10	BRIDGE JOINT ASPHALTIC PLUG	08-29-2011

REVISION: NEW SHEET, NOVEMBER 4, 2013

REVISION SHEETS:

- 2 PRELIMINARY INFORMATION SHEET
- 49 NEXT BEAM DETAILS (2 OF 3)
- 51 CURTAIN WALL DETAILS (1 OF 2)
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- 63 WINGWALL NO 1
- 64 WINGWALL NO 2
- 65 WINGWALL NO 3
- 66 WINGWALL NO 4
- 67 WINGWALL DETAILS (1 OF 2)

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA Date: July 2012

DRAINAGE AREA : 44.4 sq. mi.
 CHARACTER OF TERRAIN : Hilly to mountainous
 STREAM CHARACTERISTICS : Ledge gorge through the bridge
 NATURE OF STREAMBED : Ledge, some boulders

PEAK FLOW DATA

Q 2.33 =	1900 cfs	Q 50 =	4720 cfs
Q 10 =	3250 cfs	Q 100 =	5500 cfs
Q 25 =	4100 cfs	Q 500 =	7000 cfs

DATE OF FLOOD OF RECORD : November 1927
 ESTIMATED DISCHARGE : Unknown
 WATER SURFACE ELEV. : Unknown
 NATURAL STREAM VELOCITY : @ Q50 = 15.4 fps
 ICE CONDITIONS : Moderate
 DEBRIS : Moderate
 DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? Yes
 IS ORDINARY RISE RAPID? Yes
 IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? No
 IF YES, DESCRIBE: _____

WATERSHED STORAGE: <1% HEADWATERS: _____
 UNIFORM: X
 IMMEDIATELY ABOVE SITE: _____

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Concrete arch
 YEAR BUILT: 1924
 CLEAR SPAN(NORMAL TO STREAM): 42'
 VERTICAL CLEARANCE ABOVE STREAMBED: 36'
 WATERWAY OF FULL OPENING: approximately 980 sq. ft.
 DISPOSITION OF STRUCTURE: Remove and replace
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: Ledge

WATER SURFACE ELEVATIONS AT:

Q2.33 =	502.6'	VELOCITY =	9.5 fps
Q10 =	505.6'	"	11.8 fps
Q25 =	507.2'	"	14.4 fps
Q50 =	508.5'	"	15.4 fps
Q100 =	509.8'	"	16.1 fps

LONG TERM STREAMBED CHANGES: There is an 8' deep scour hole through the bridge area. No significant changes are anticipated in the future, due to ledge.

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: Above Q100
 RELIEF ELEVATION: 530.2'
 DISCHARGE OVER ROAD @Q100: None

UPSTREAM STRUCTURE

TOWN: Ripton DISTANCE: 13,200 feet
 HIGHWAY #: VT 152 STRUCTURE #: 14
 CLEAR SPAN: 40' CLEAR HEIGHT: 12'
 YEAR BUILT: 1978 FULL WATERWAY: 480 sq. ft.
 STRUCTURE TYPE: Twin cell reinforced concrete box

DOWNSTREAM STRUCTURE

TOWN: Middlebury DISTANCE: 1584 feet
 HIGHWAY #: T.H. 23 STRUCTURE #: 21
 CLEAR SPAN: 43' CLEAR HEIGHT: 12'
 YEAR BUILT: 1927 FULL WATERWAY: 550 sq. ft.
 STRUCTURE TYPE: Single span steel pony truss bridge

LRFR LOAD RATING FACTORS

LOADING LEVELS	TRUCK						
	H-20	HL-93	3S2	6 AXLE	3A STR.	4A STR.	5A SEMI
TONNAGE	20	36	36	66	30	34.5	38
INVENTORY	2.01	1.06					
POSTING							
OPERATING	2.81	1.49	1.42	0.89	1.14	1.03	1.17
COMMENTS:							

AS BUILT "REBAR" DETAILS

LEVEL I	LEVEL II	LEVEL III
TYPE:	TYPE:	TYPE:
GRADE:	GRADE:	GRADE:

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT	20 year ESAL for flexible pavement from 2014 to 2034 : 417000
2014	1900	250	55	6.6	95	40 year ESAL for flexible pavement from 2014 to 2054 : 953000
2034	2000	260	55	10	150	Design Speed : 25 mph

PROPOSED STRUCTURE

STRUCTURE TYPE: New single span prestressed/precast concrete bridge

CLEAR SPAN(NORMAL TO STREAM): 46'
 VERTICAL CLEARANCE ABOVE STREAMBED: 40'
 WATERWAY OF FULL OPENING: approximately 1125 sq. ft.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	502.6'	VELOCITY=	9.5 fps
Q10 =	505.6'	"	11.8 fps
Q25 =	507.2'	"	14.4 fps
Q50 =	508.5'	"	15.4 fps
Q100 =	509.8'	"	16.1 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: Above Q100
 RELIEF ELEVATION: 531.0'
 DISCHARGE OVER ROAD @Q100: None

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 530.5'
 VERTICAL CLEARANCE: @ Q50 = 22'

SCOUR: The bridge completely spans a natural ledge gorge. No significant scour is anticipated.
 REQUIRED CHANNEL PROTECTION: Type II Stone Fill above Q100

PERMIT INFORMATION

AVERAGE DAILY FLOW: 92 cfs DEPTH OR ELEVATION: _____
 ORDINARY LOW WATER: 42 cfs Elev. 497'
 ORDINARY HIGH WATER: 816 cfs Elev. 500'

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: No temporary bridge required.
 CLEAR SPAN (NORMAL TO STREAM): N/A
 VERTICAL CLEARANCE ABOVE STREAMBED: N/A
 WATERWAY AREA OF FULL OPENING: N/A

ADDITIONAL INFORMATION

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TRAFFIC ON AN OFF SITE DETOUR.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY
4. ACCESS TO NORTH BRANCH RD SHALL BE MAINTAINED

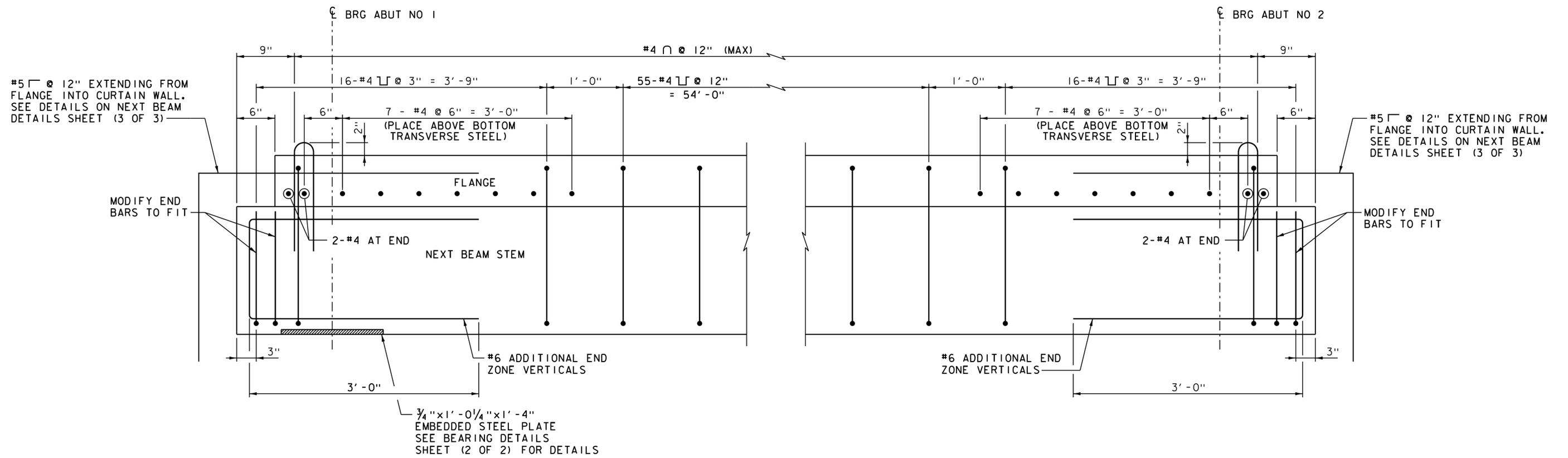
DESIGN VALUES

1. DESIGN LIVE LOAD	HL-93
2. FUTURE PAVEMENT	d _p : 0.0 INCH
3. DESIGN SPAN	L: 61'-6" FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ: 2.75 INCH
5. PRESTRESSING STRAND (0.60 INCH DIAMETER - LOW RELAX)	f _y : 270 KSI
6. PRESTRESSED CONCRETE STRENGTH	f' _c : 10 KSI
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f' _{cr} : 7 KSI
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f' _c : 4.0 KSI
9. CONCRETE, HIGH PERFORMANCE CLASS A	f' _c : 4.0 KSI
10. CONCRETE, HIGH PERFORMANCE CLASS B	f' _c : 3.5 KSI
11. CONCRETE, CLASS C	f' _c : ---
12. REINFORCING STEEL	f _y : 60 KSI
13. STRUCTURAL STEEL AASHTO M270 (GALVANIZED)	f _y : 50 KSI
14. SOIL UNIT WEIGHT	γ: 0.140 KCF
15. NOMINAL BEARING RESISTANCE OF SOIL	q _n : ---
16. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: ---
17. NOMINAL BEARING RESISTANCE OF ROCK	q _n : 29.0 KSF
18. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: 0.45
19. NOMINAL AXIAL PILE RESISTANCE	q _p : ---
20. PILE YIELD STRENGTH ASTM A572	f _y : ---
21. PILE SIZE	φ: ---
22. EST. PILE LENGTH	L _p : ---
23. PILE RESISTANCE FACTOR	φ: ---
24. LATERAL PILE DEFLECTION	Δ: ---
25. BASIC WIND SPEED	V _{3s} : ---
26. MINIMUM GROUND SNOW LOAD	p _g : ---
27. SEISMIC DATA	PGA: --- S _s : --- S ₁ : ---

PROJECT NAME: **MIDDLEBURY**
 PROJECT NUMBER: **RS 0174(8)**

FILE NAME: **z78f217pl.xls** PLOT DATE: 11/1/2013
 PROJECT LEADER: **M.A. COLGAN** DRAWN BY: **B.J. MASSE**
 DESIGNED BY: **VHB** CHECKED BY: **G.S. GOODRICH**
PRELIMINARY INFORMATION SHEET SHEET 2 OF 104

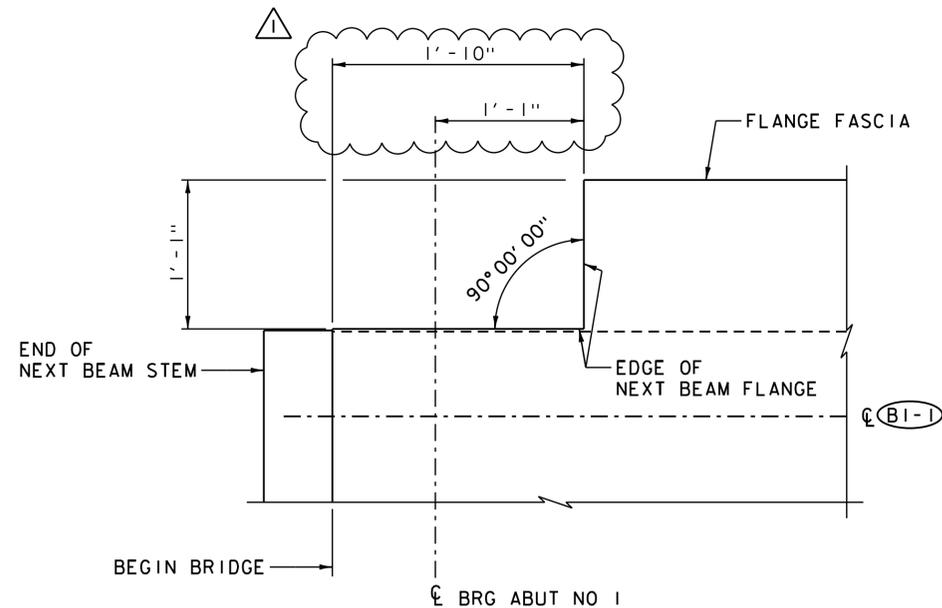




NOTE: TYPICAL REINFORCING BARS IN FLANGE OMITTED FOR CLARITY

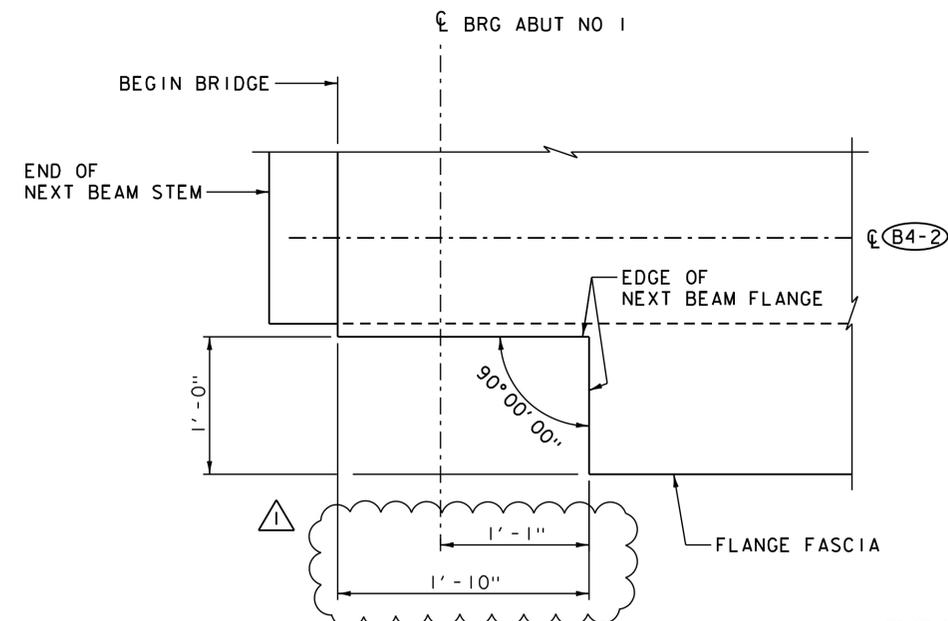
**ADDITIONAL END BEAM REINFORCING
LONGITUDINAL SECTION**

SCALE 1 1/2" = 1'-0"



FLANGE CLIP DETAIL A

(NEXT BEAM 1 AT ABUTMENT NO 1 SHOWN,
NEXT BEAM 1 AT ABUTMENT NO 2 AND NEXT BEAM 4 AT ABUTMENT NO 2 SIMILAR)
SCALE 1 1/2" = 1'-0"



FLANGE CLIP DETAIL B

(NEXT BEAM 4 AT ABUTMENT NO 1)
SCALE 1 1/2" = 1'-0"

REVISION: EDGE OF NEXT BEAM FLANGE DIMENSION, NOVEMBER 4, 2013

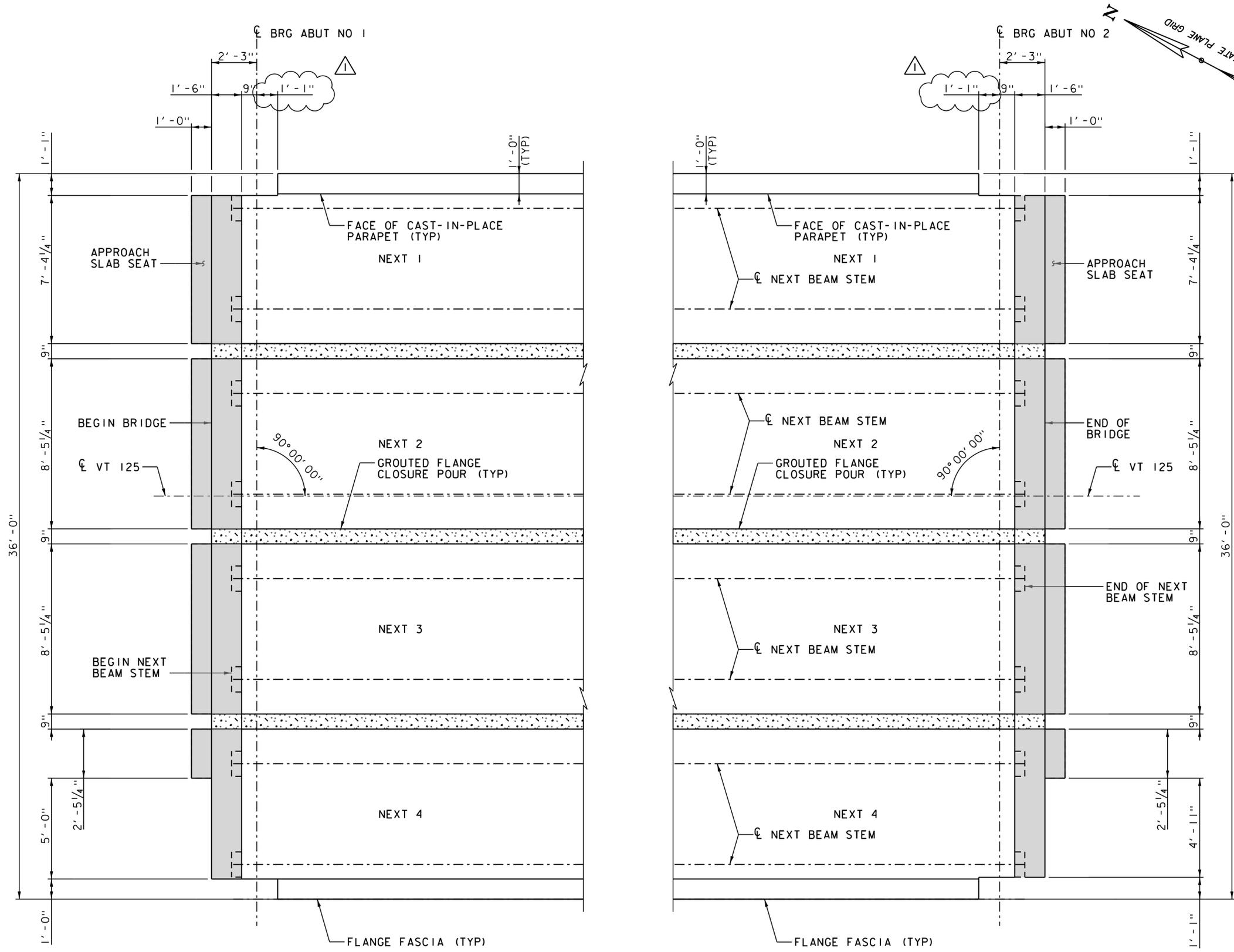
PROJECT NAME: MIDDLEBURY

PROJECT NUMBER: RS 0174(8)

FILE NAME: z78f217sup.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: K.G. KRETSCH
NEXT BEAM DETAILS (2 OF 3)

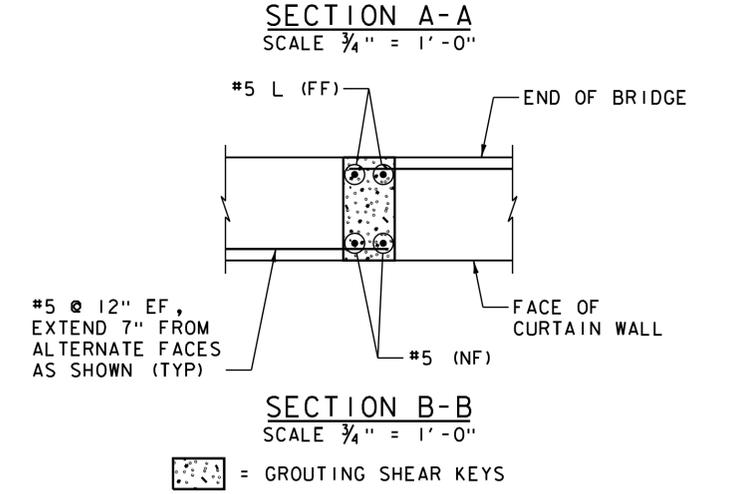
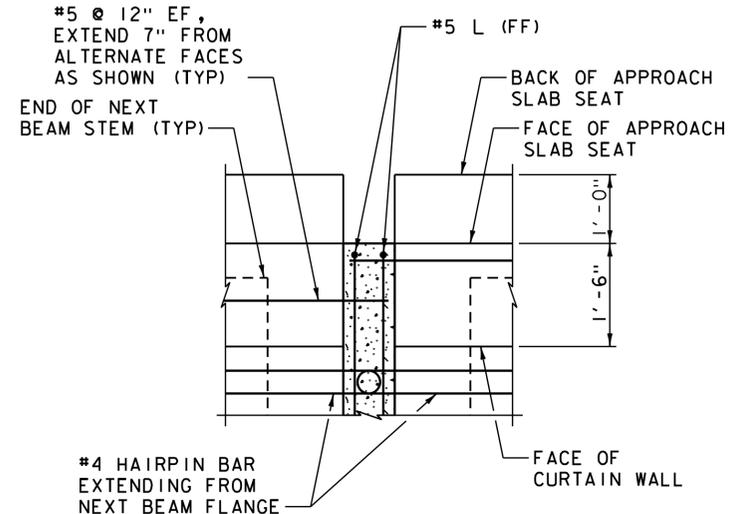
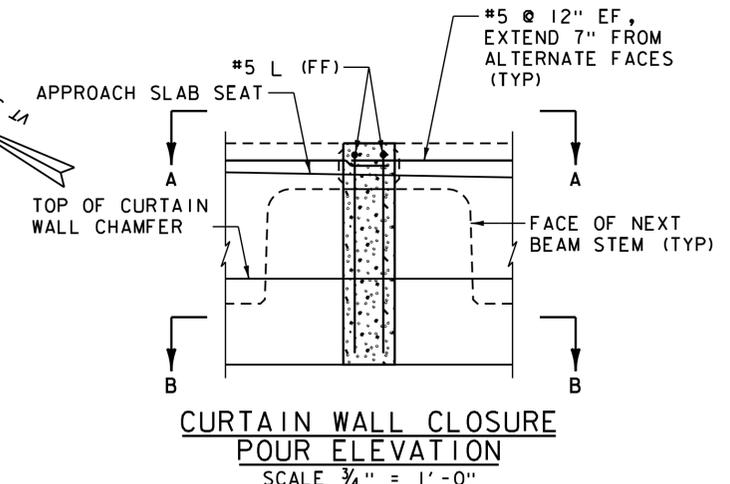
PLOT DATE: 11/4/2013
DRAWN BY: K.D. WENTWORTH
CHECKED BY: G.S. GOODRICH
SHEET 49 OF 104





NEXT BEAM CURTAIN WALL PLAN
SCALE 3/8" = 1'-0"

- LIMITS OF PRECAST CONCRETE CURTAIN WALL

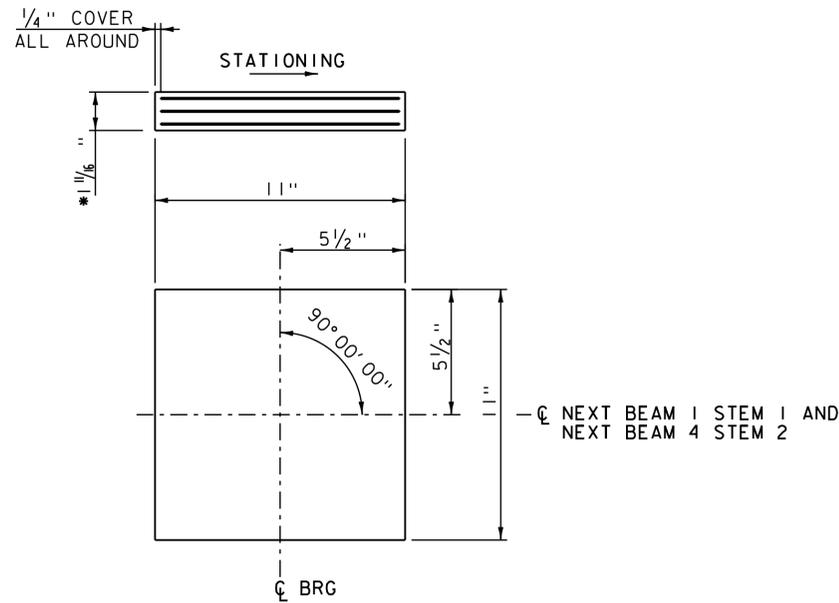


- NOTES:**
- SEE CURTAIN WALL DETAIL SHEET (2 OF 2) FOR VERTICAL CURTAIN WALL DIMENSIONS AND ELEVATIONS.
 - SEE NEXT BEAM DETAILS SHEET (3 OF 3) FOR PRECAST CURTAIN WALL SECTION AND REINFORCING INFORMATION.

REVISION: NEXT BEAM NOTCH DIMENSION, NOVEMBER 4, 2013

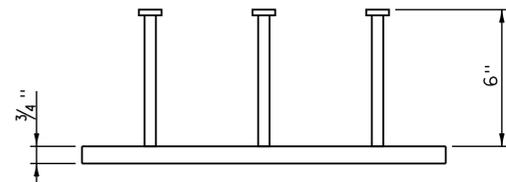
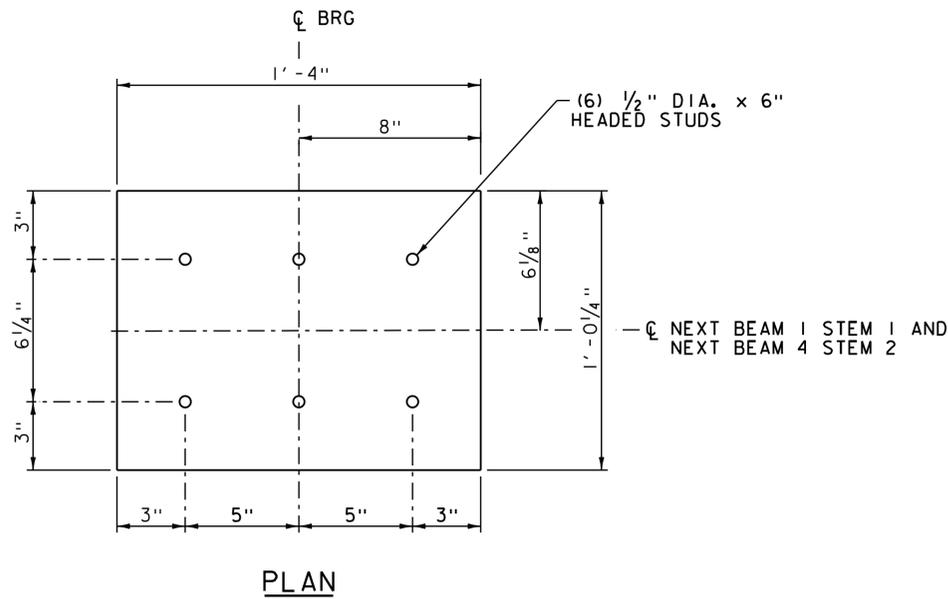


PROJECT NAME: MIDDLEBURY	PLOT DATE: 11/4/2013
PROJECT NUMBER: RS 0174(8)	DRAWN BY: K.D. WENTWORTH
FILE NAME: z78f217sup.dgn	CHECKED BY: G.S. GOODRICH
PROJECT LEADER: M.A. COLGAN	SHEET 51 OF 104
DESIGNED BY: K.G. KRETSCH	
CURTAIN WALL DETAILS (1 OF 2)	

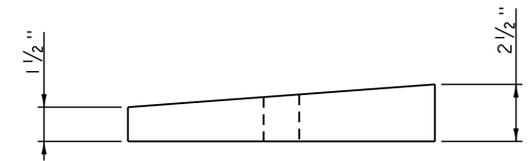
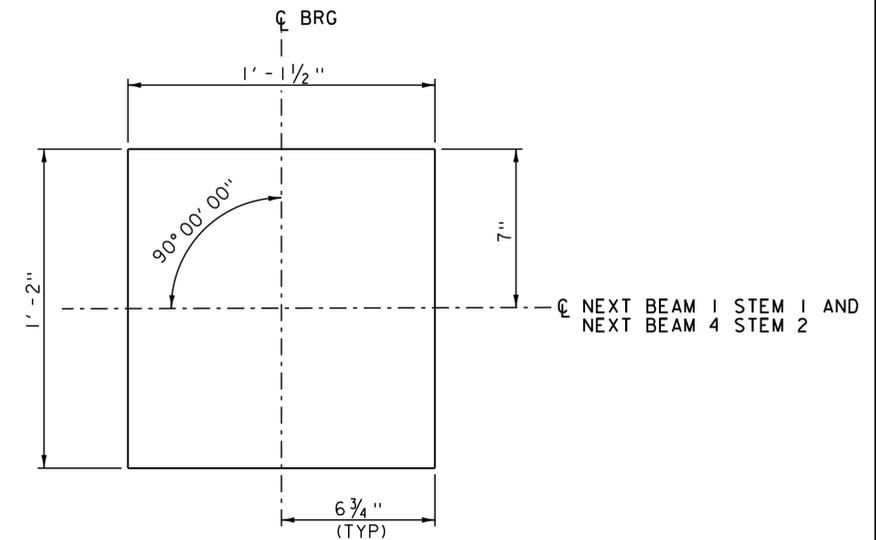


- * 2 - 1/2" INTERIOR ELASTOMER LAYERS
- 2 - 1/4" EXTERIOR ELASTOMER LAYERS
- 3 - 1/16" STEEL REINFORCING PLATES

ELASTOMERIC BEARING (FIXED)
SCALE 3" = 1'-0"

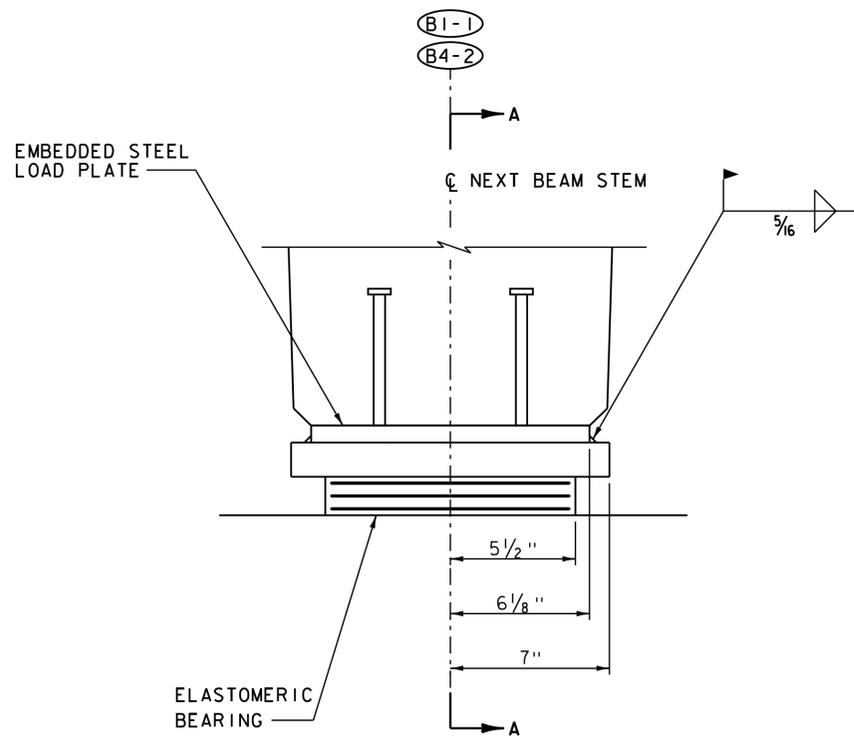


EMBEDDED STEEL PLATE
SCALE 3" = 1'-0"

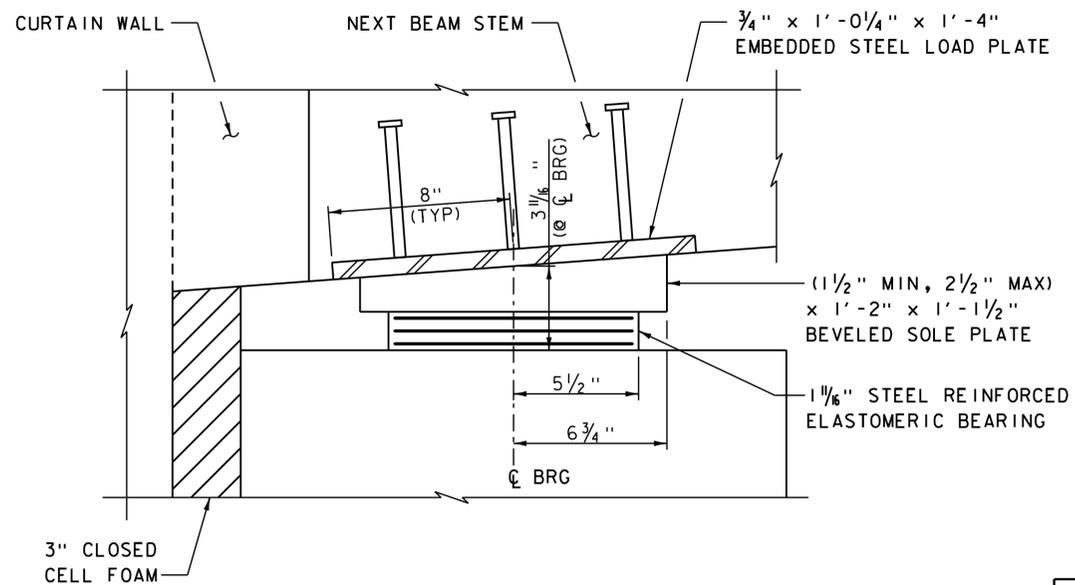


BEVELED SOLE PLATE

(REQUIRED AT NEXT BEAM NO. 1 STEM 1 AND
NEXT BEAM NO. 4 STEM 2 ONLY)
SCALE 3" = 1'-0"



FRONT ELEVATION



SECTION A-A

REVISION: NEW SHEET,
NOVEMBER 4, 2013

NOTES:

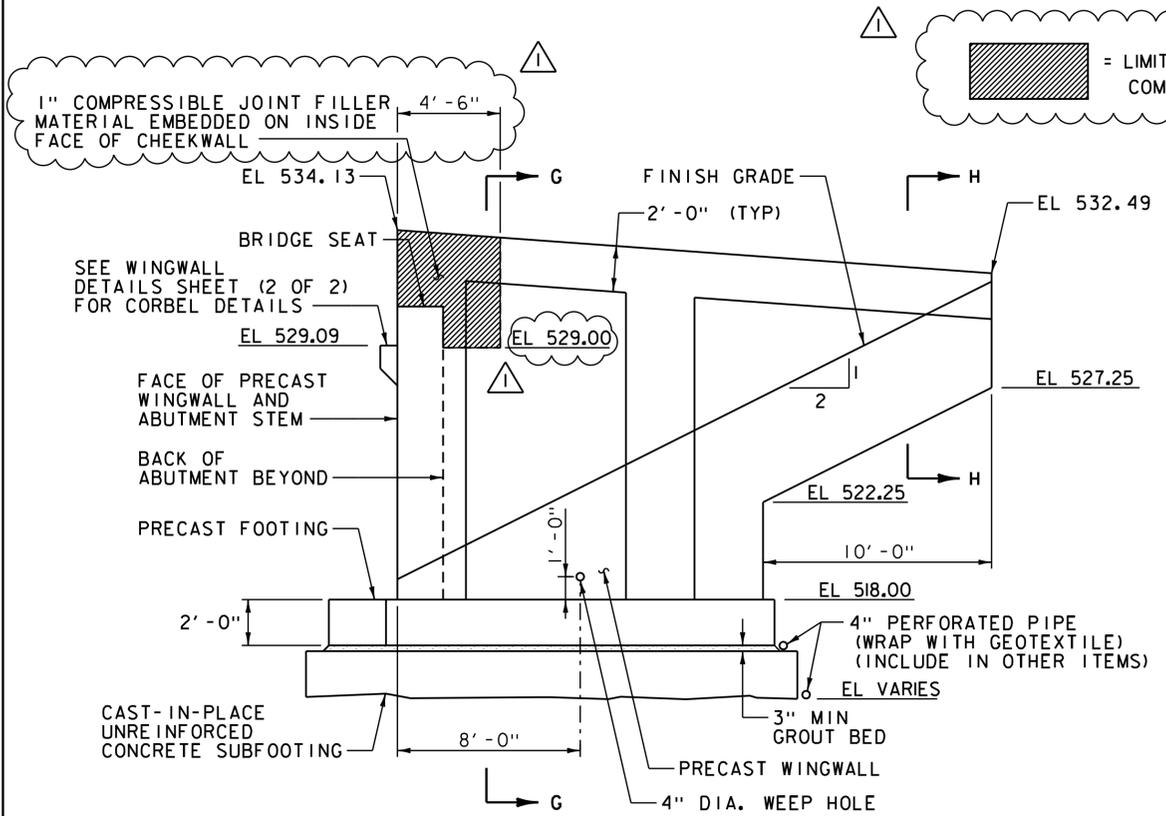
1. SEE BEARING DETAILS SHEET (2 OF 2) FOR ELASTOMERIC BEARING NOTES.
2. EMBEDDED STEEL LOAD PLATES SHALL BE PAID UNDER ITEM 900.640 "SPECIAL PROVISION (PRESTRESSED CONCRETE NEXT D BEAMS) (NEXT 28 D)".
3. EXPANSION BEARING AT ABUTMENT 1 NEXT BEAM 1 STEM 1 AND NEXT BEAM 4 STEM 2 ONLY. ALL OTHER BEARING LOCATIONS AT ABUTMENT NO. 1 SHALL RECEIVE FIXED BEARINGS, SEE BEARING DETAILS SHEET (1 OF 2)

ABUTMENT NO 1 - EXPANSION BEARING DETAILS
(REQUIRED AT NEXT BEAM NO. 1 STEM 1 AND NEXT BEAM NO. 4 STEM 2 ONLY)
SCALE 3" = 1'-0"

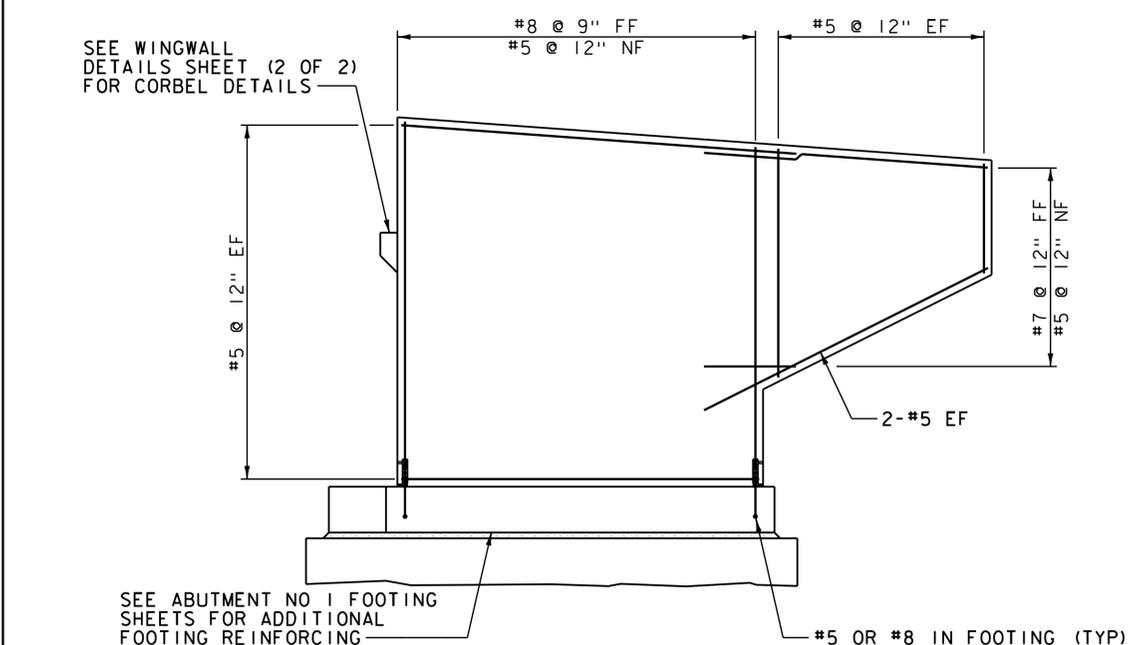


PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: RS 0174(8)
FILE NAME: z78f217brga.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: K.G. KRETSCH
BEARING DETAILS (1a OF 2)

PLOT DATE: 11/4/2013
DRAWN BY: B.J. MASSE
CHECKED BY: G.S. GOODRICH
SHEET 54a OF 104

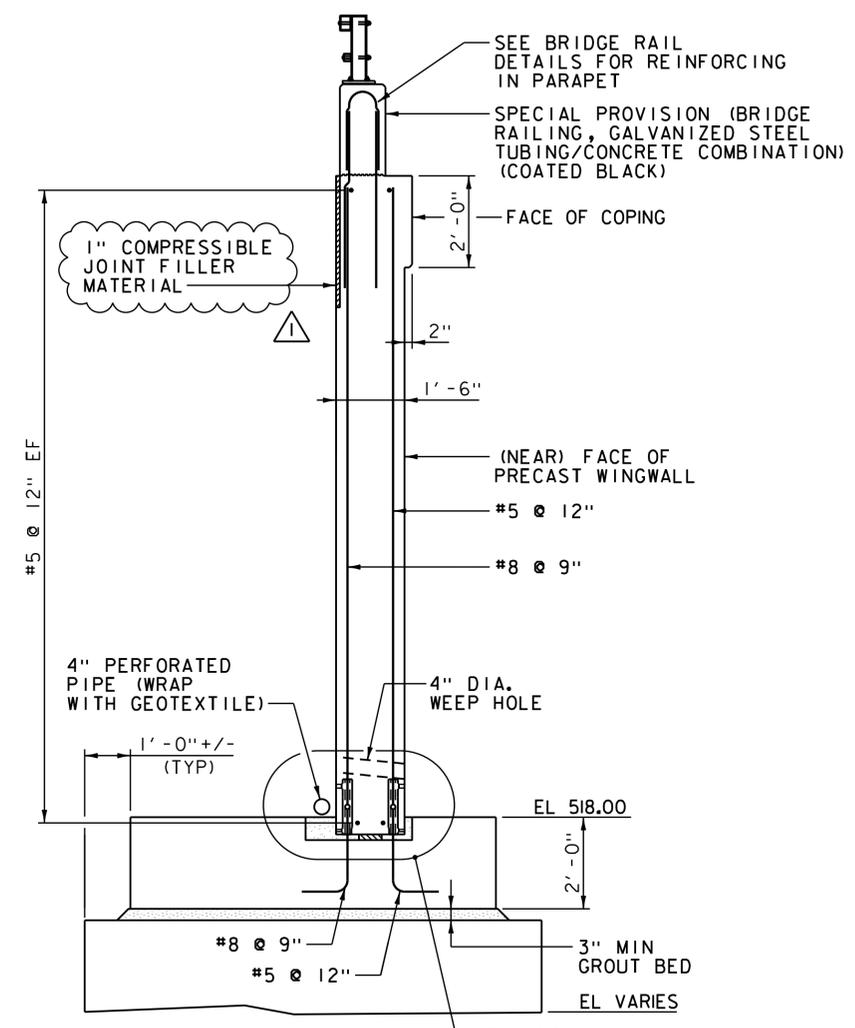


WINGWALL NO. 1
MASONRY ELEVATION
 (CONCRETE PARAPET NOT SHOWN)
 SCALE 1/4" = 1'-0"

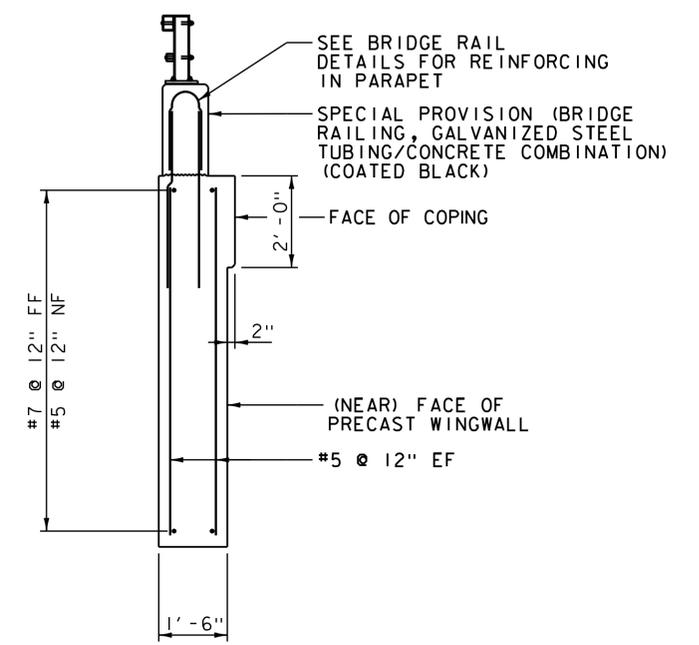


WINGWALL NO. 1
REINFORCING ELEVATION
 (CONCRETE PARAPET NOT SHOWN)
 SCALE 1/4" = 1'-0"

▲ = LIMITS OF EMBEDDED 1" COMPRESSIBLE JOINT FILLER MATERIAL



SECTION G-G
 SCALE 1/2" = 1'-0"



SECTION H-H
 SCALE 1/2" = 1'-0"

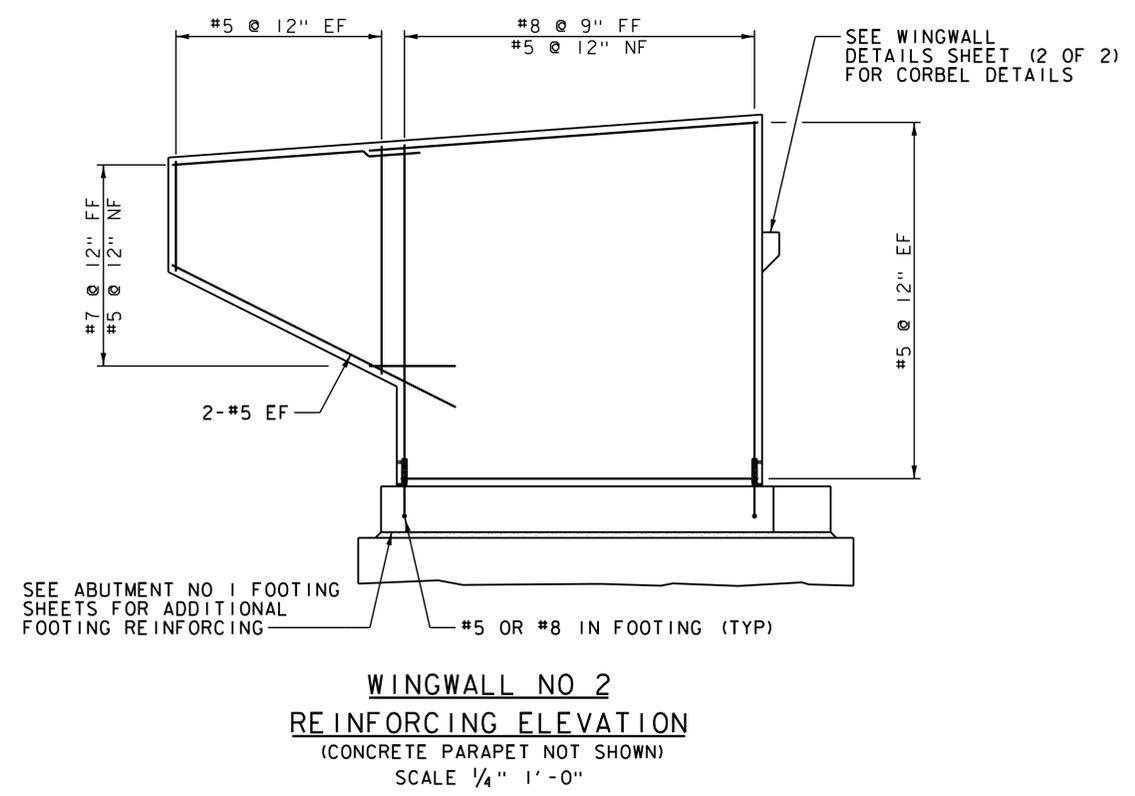
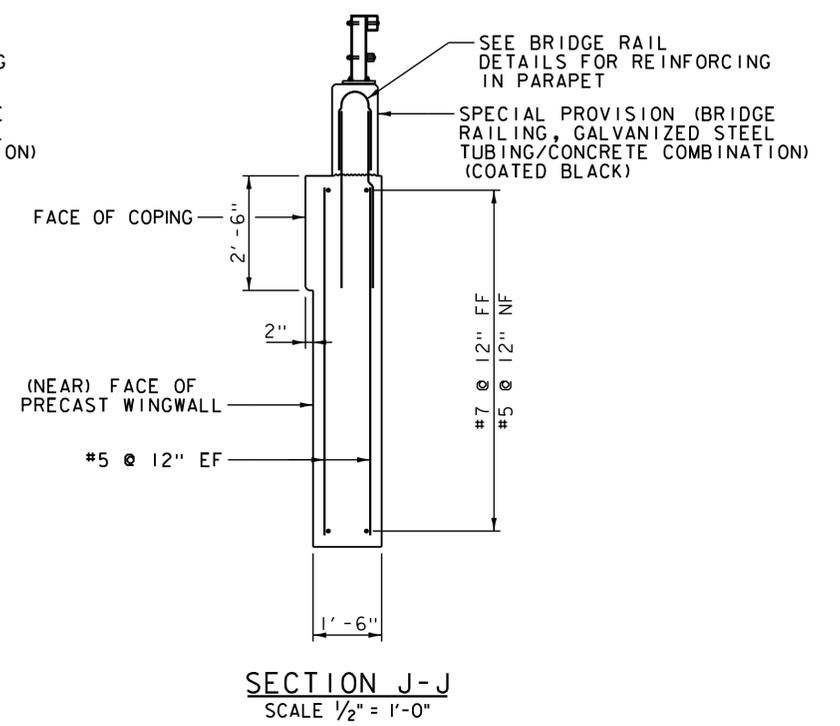
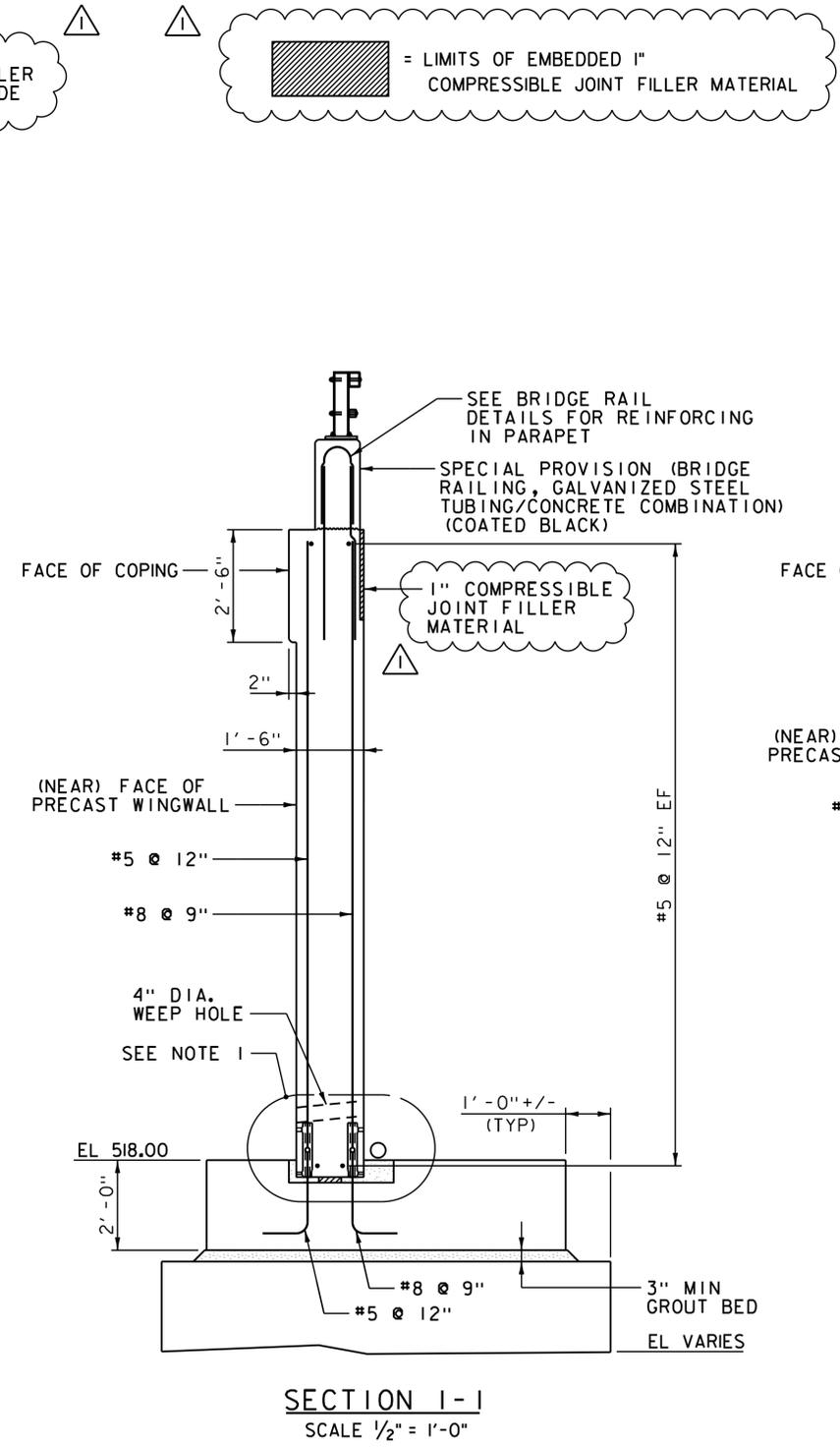
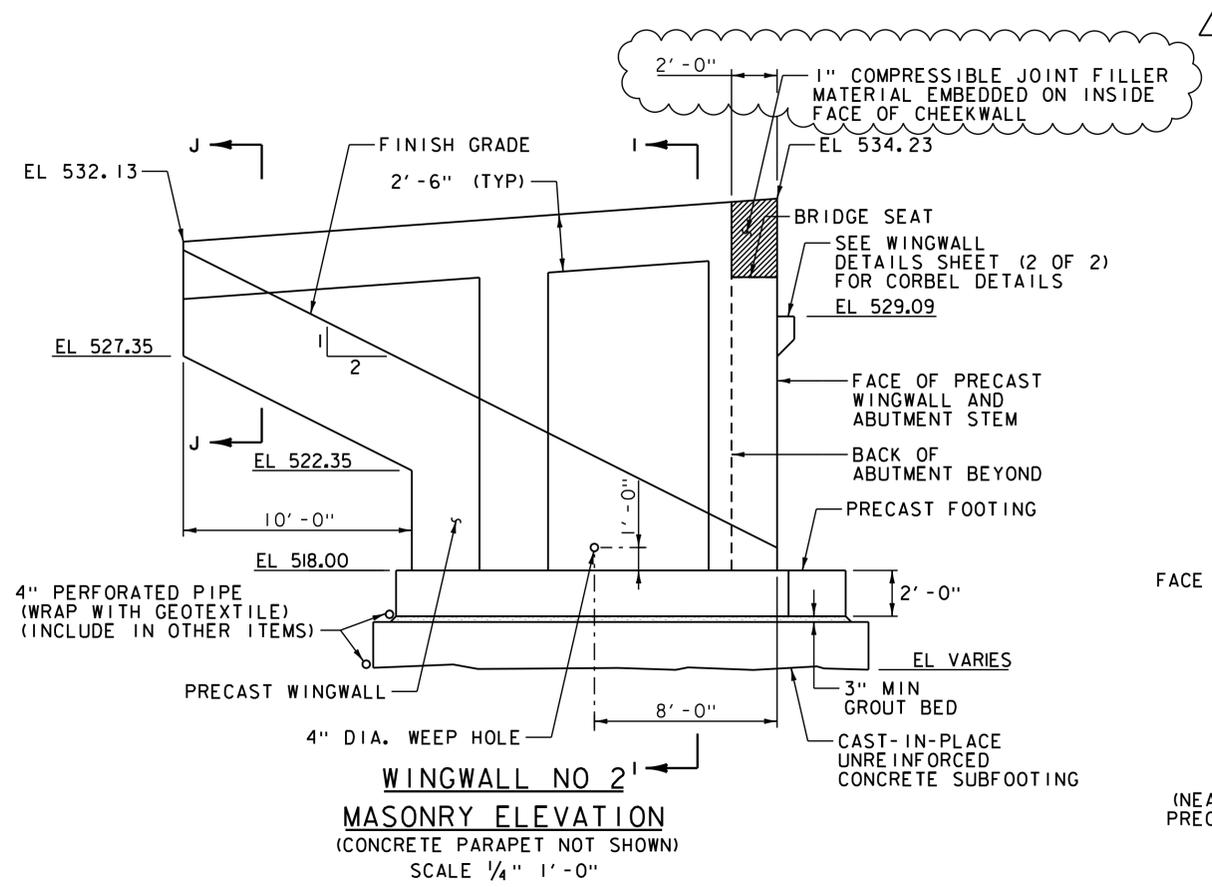
NOTE:
 NF = NEAR FACE
 FF = FAR FACE
 EF = EACH FACE
 ▲ = CUT TO FIT IN FIELD
 3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
 2'-2" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

- NOTES:**
1. SEE WINGWALL DETAILS SHEET (2 OF 2) FOR WINGWALL STEM TO FOOTING CONNECTION DETAIL.
 2. SEE WINGWALL DETAILS SHEET (2 OF 2) FOR WINGWALL STEM VERTICAL JOINT.

▲ REVISION: COMPRESSIBLE JOINT FILLER MATERIAL, NOVEMBER 4, 2013



PROJECT NAME: MIDDLEBURY	PLOT DATE: 11/4/2013
PROJECT NUMBER: RS 0174(8)	DRAWN BY: K.D. WENTWORTH
FILE NAME: z78f217sub.dgn	CHECKED BY: G.S. GOODRICH
PROJECT LEADER: M.A. COLGAN	SHEET 63 OF 104
DESIGNED BY: K.G. KRETSCH	
WINGWALL NO. 1	

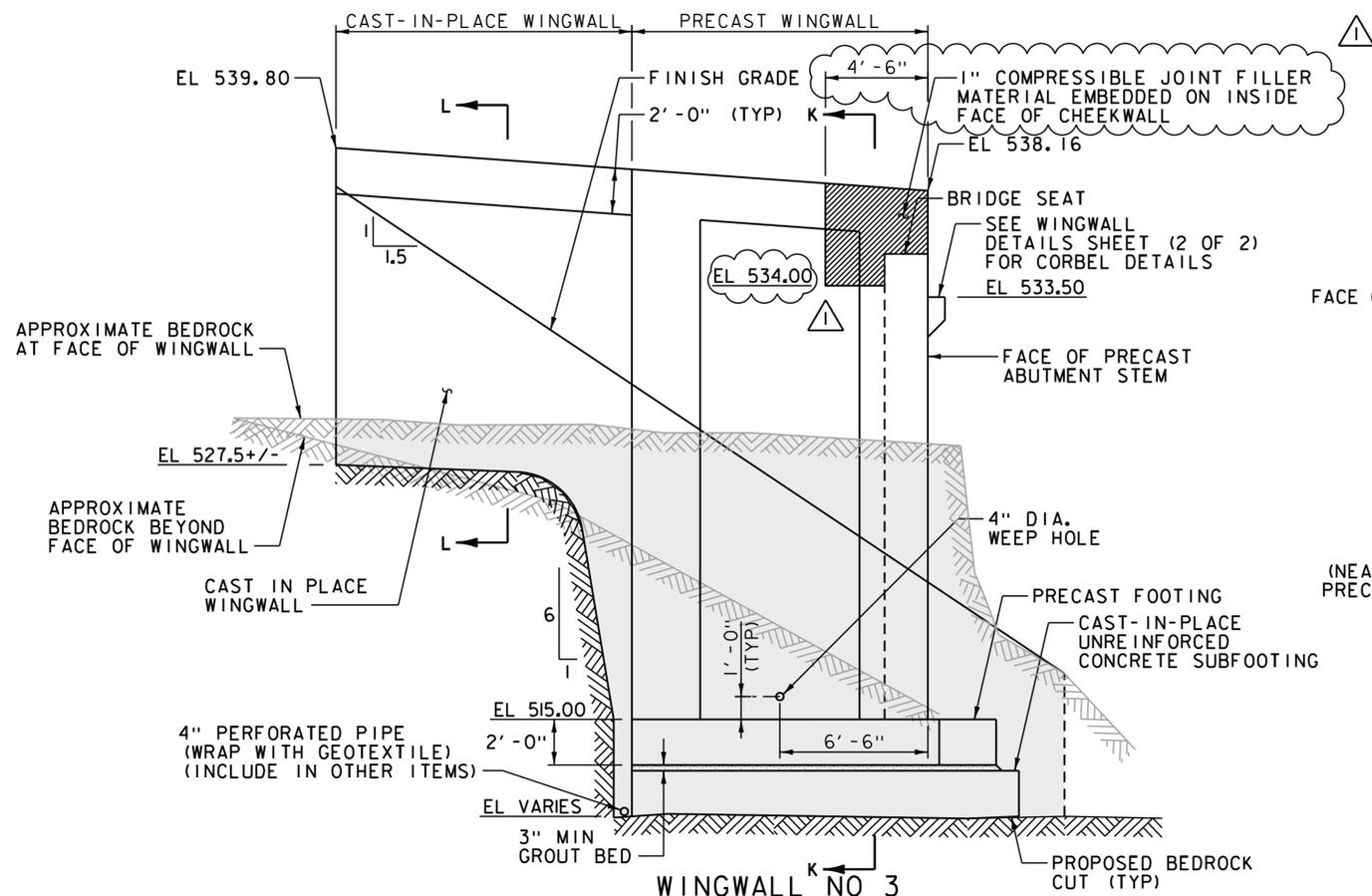


REVISION: COMPRESSIBLE JOINT FILLER MATERIAL, NOVEMBER 4, 2013

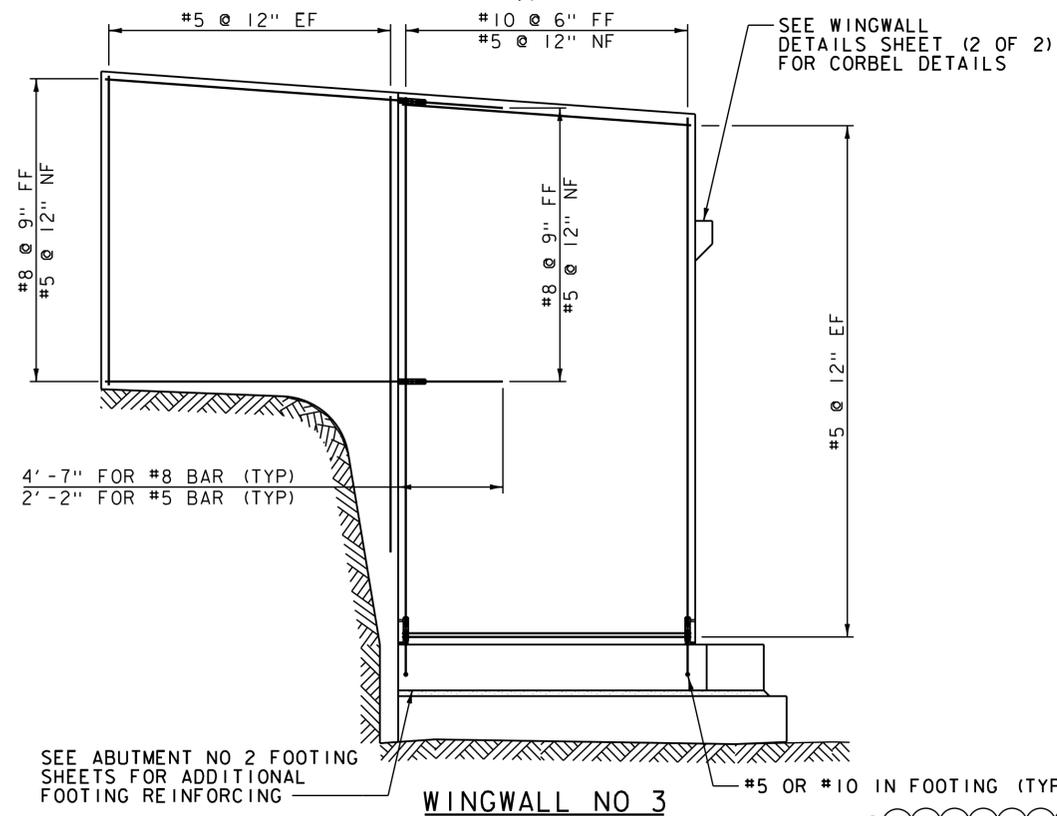
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PROJECT LEADER: M.A. COLGAN	SHEET 64 OF 104
DESIGNED BY: K.G. KRETSCH	
WINGWALL NO 2	

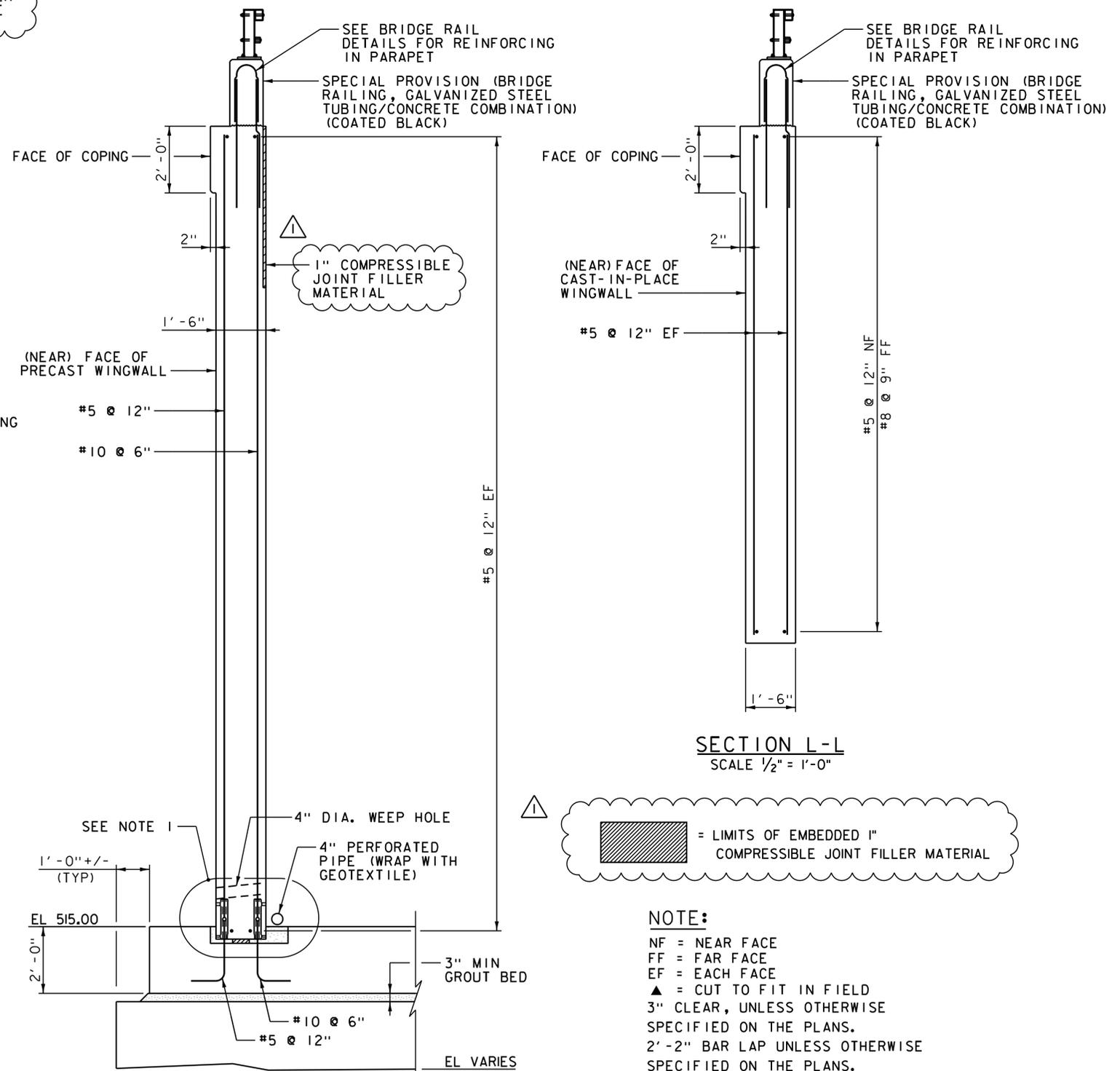




WINGWALL NO 3
MASONRY ELEVATION
 (CONCRETE PARAPET NOT SHOWN)
 SCALE 1/4" = 1'-0"

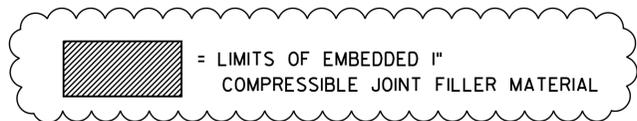


WINGWALL NO 3
REINFORCING ELEVATION
 (CONCRETE PARAPET NOT SHOWN)
 SCALE 1/4" = 1'-0"



SECTION K-K
 SCALE 1/2" = 1'-0"

SECTION L-L
 SCALE 1/2" = 1'-0"



NOTE:
 NF = NEAR FACE
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 EF = EACH FACE
 ▲ = CUT TO FIT IN FIELD
 3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
 2'-2" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

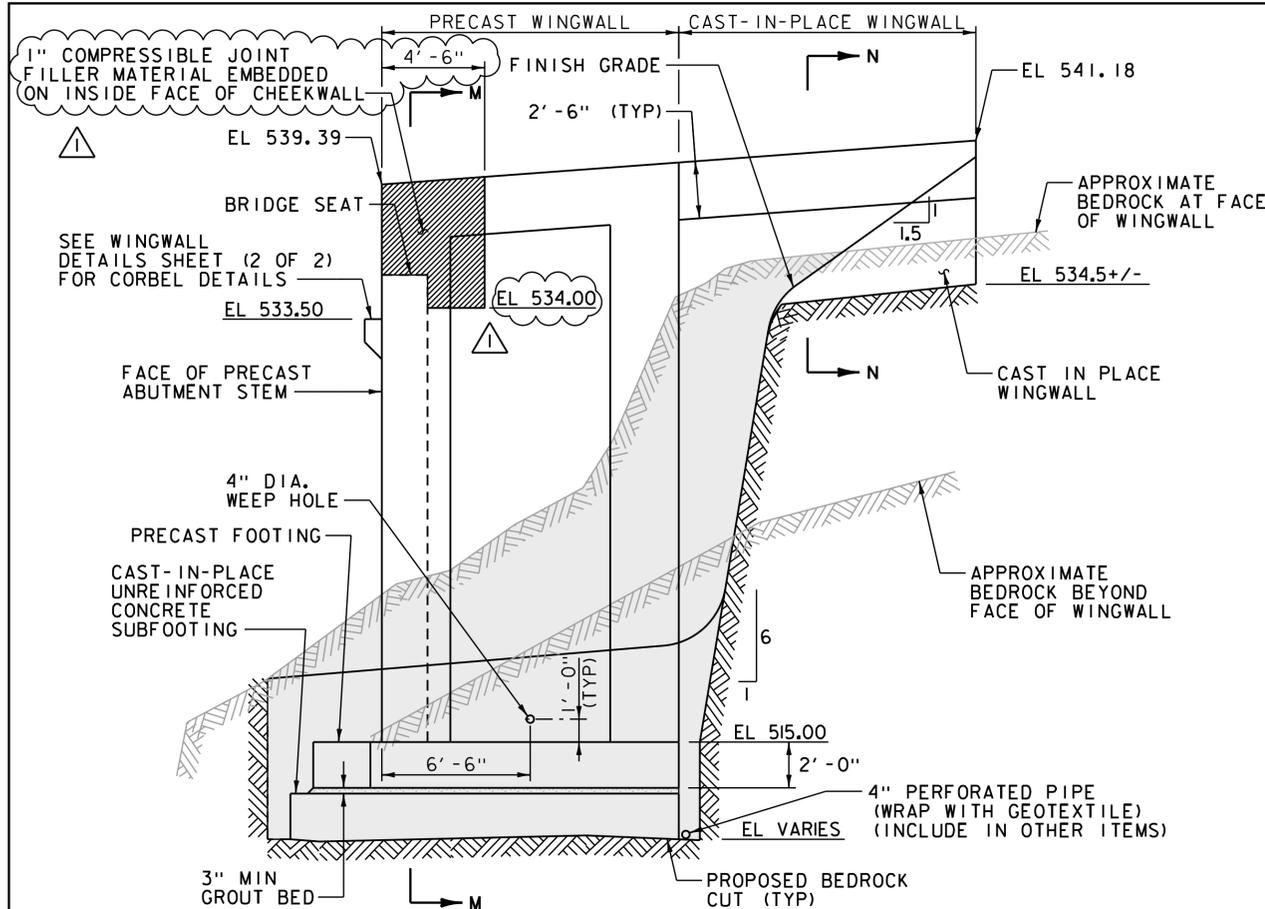
NOTES:
 1. SEE WINGWALL DETAILS SHEET (2 OF 2) FOR WINGWALL STEM TO FOOTING CONNECTION DETAIL.
 2. SEE WINGWALL SHEET (2 OF 2) FOR WINGWALL STEM VERTICAL JOINT.

KEY:
 [Hatched Box] = APPROXIMATE BEDROCK REMOVAL LIMITS

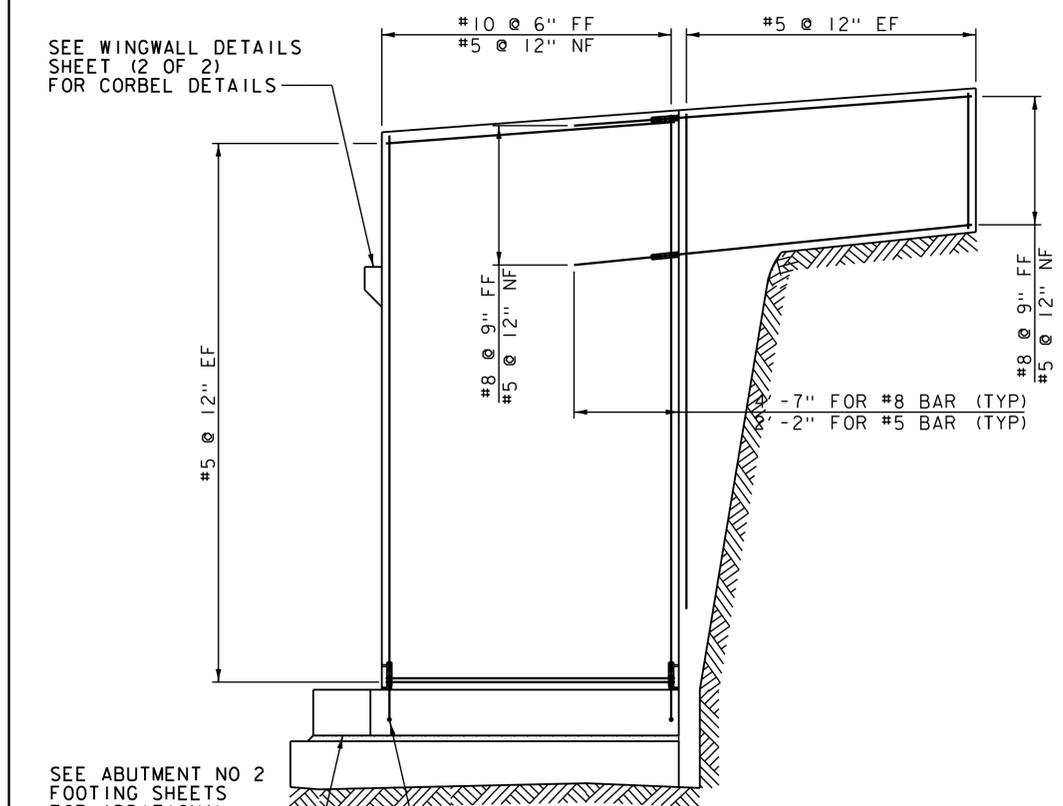
▲ REVISION: COMPRESSIBLE JOINT FILLER MATERIAL, NOVEMBER 4, 2013



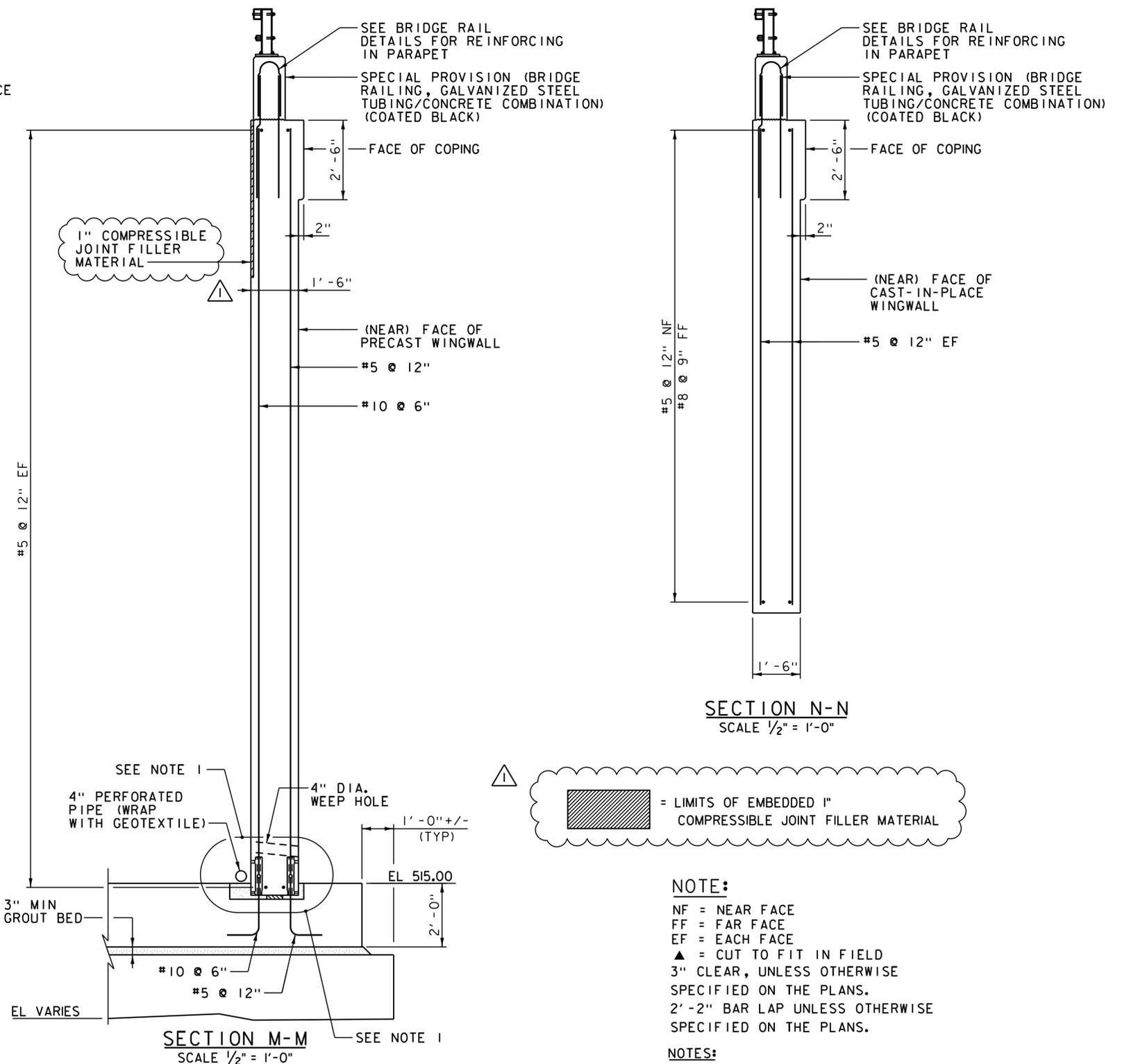
PROJECT NAME: MIDDLEBURY	PLOT DATE: 11/4/2013
PROJECT NUMBER: RS 0174(8)	DRAWN BY: K.D. WENTWORTH
FILE NAME: z78f217sub.dgn	CHECKED BY: G.S. GOODRICH
PROJECT LEADER: M.A. COLGAN	SHEET 65 OF 104
DESIGNED BY: K.G. KRETSCH	
WINGWALL NO 3	



WINGWALL NO 4 MASONRY ELEVATION
(CONCRETE PARAPET NOT SHOWN)
SCALE 1/4" = 1'-0"

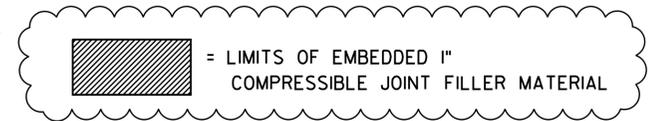


WINGWALL NO 4 REINFORCING ELEVATION
(CONCRETE PARAPET NOT SHOWN)
SCALE 1/4" = 1'-0"



SECTION M-M
SCALE 1/2" = 1'-0"

SECTION N-N
SCALE 1/2" = 1'-0"



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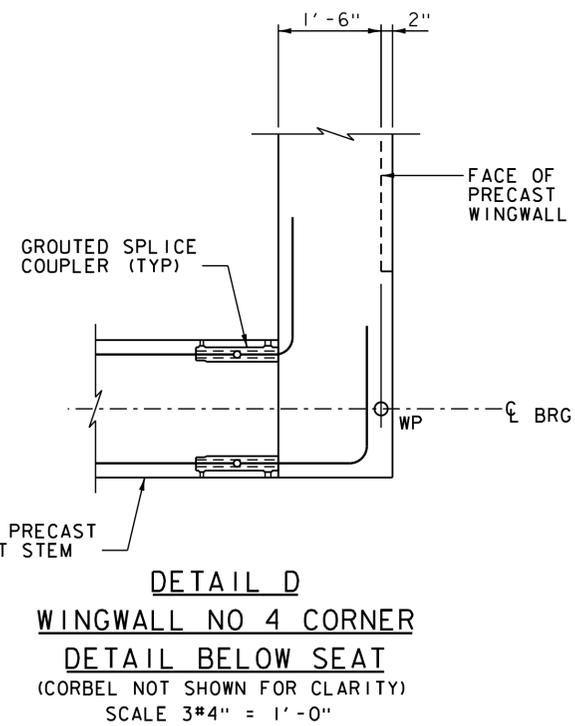
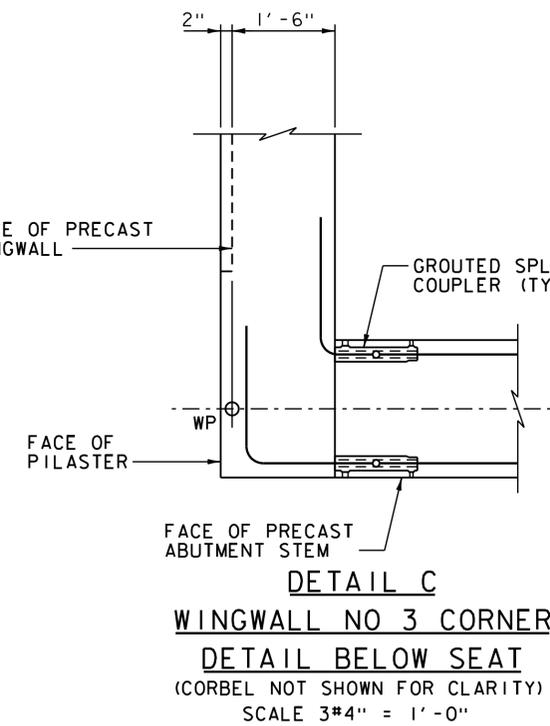
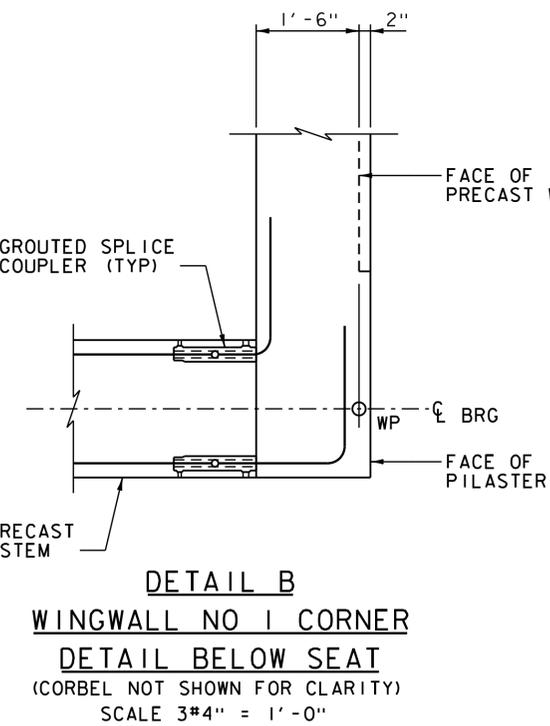
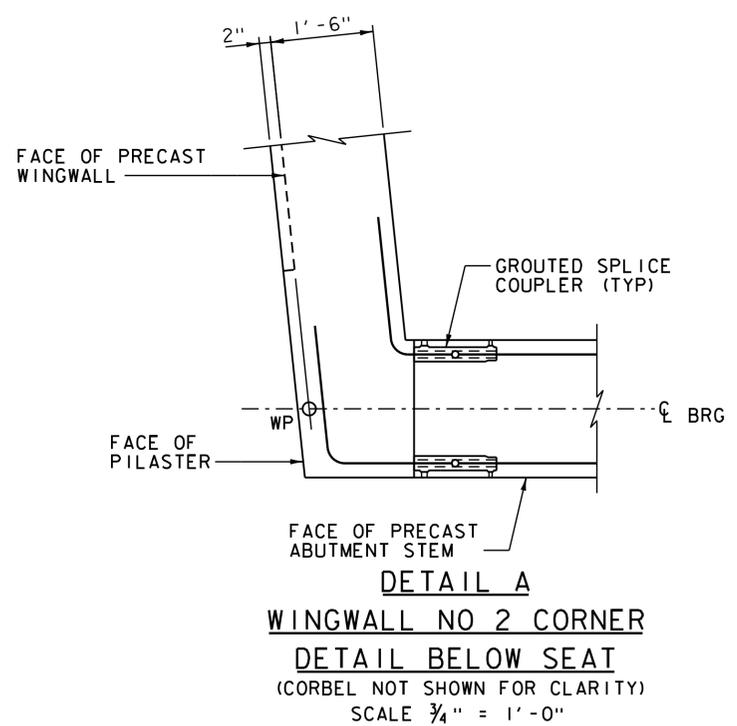
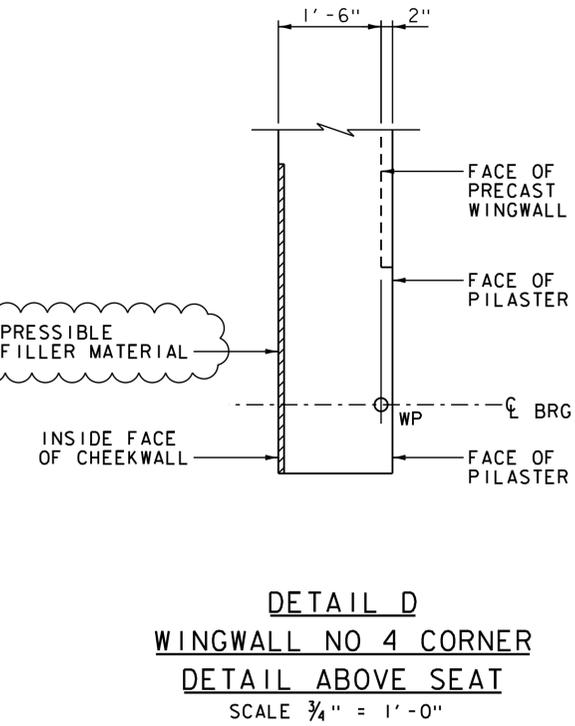
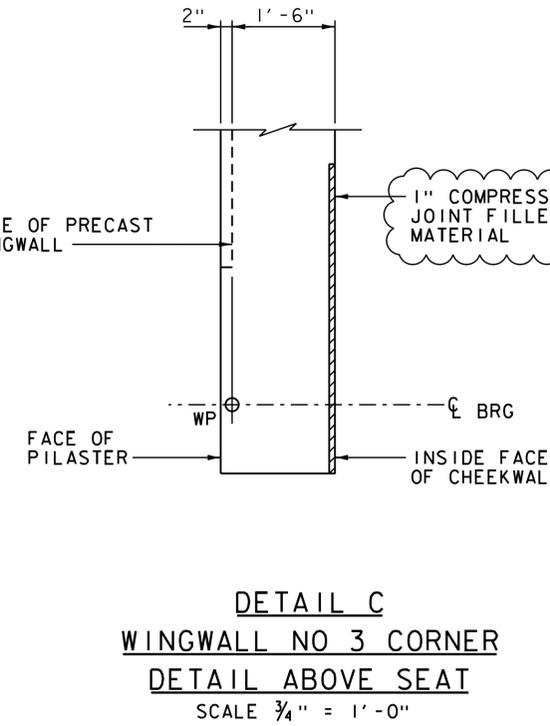
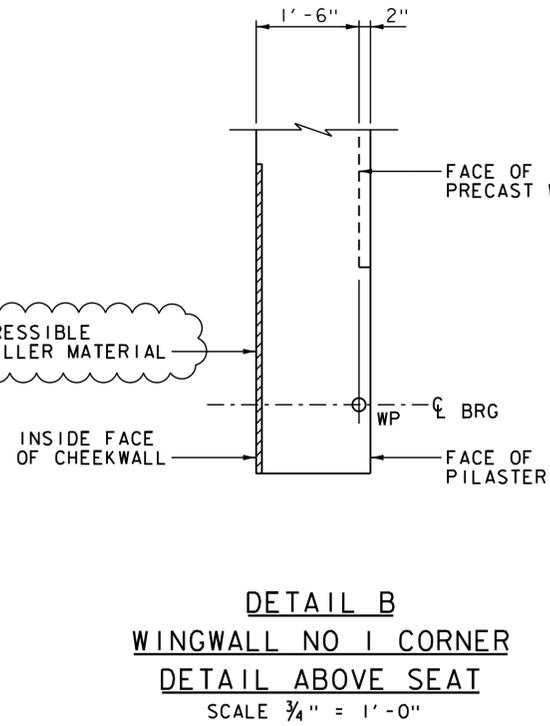
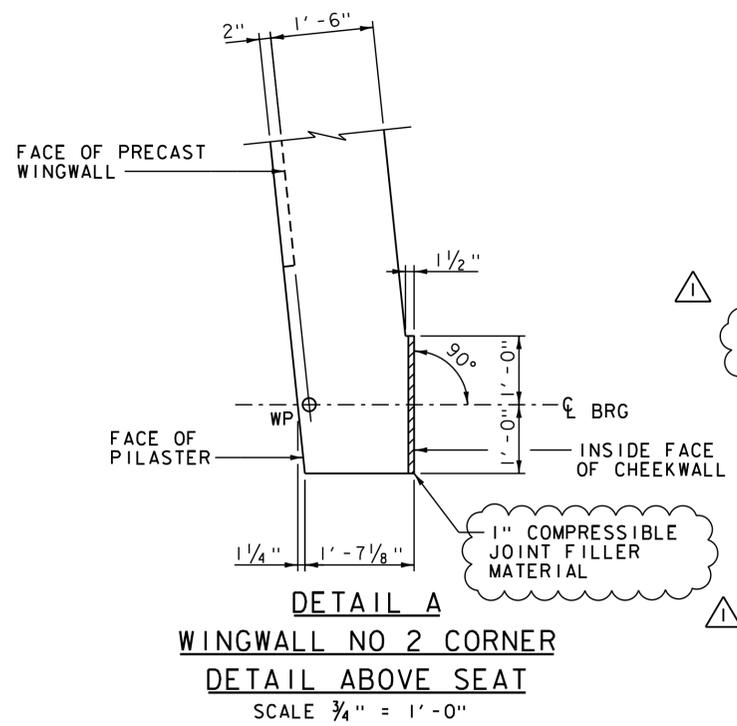
NOTES:
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KEY:
[Hatched Box] = APPROXIMATE BEDROCK REMOVAL LIMITS

REVISION: COMPRESSIBLE JOINT FILLER MATERIAL, NOVEMBER 4, 2013



PROJECT NAME: MIDDLEBURY	PLOT DATE: 11/4/2013
PROJECT NUMBER: RS 0174(8)	DRAWN BY: K.D. WENTWORTH
FILE NAME: z78f217sub.dgn	CHECKED BY: G.S. GOODRICH
PROJECT LEADER: M.A. COLGAN	SHEET 66 OF 104
DESIGNED BY: K.G. KRETSCH	
WINGWALL NO 4	



▲ = LIMITS OF EMBEDDED 1" COMPRESSIBLE JOINT FILLER MATERIAL

▲ REVISION: COMPRESSIBLE JOINT FILLER MATERIAL, NOVEMBER 4, 2013

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PROJECT NAME:	MIDDLEBURY
PROJECT NUMBER:	RS 0174(8)
FILE NAME:	z78f217sub.dgn
PROJECT LEADER:	M.A. COLGAN
DESIGNED BY:	K.G. KRETSCH
WINGWALL DETAILS (1 OF 2)	
PLOT DATE:	11/4/2013
DRAWN BY:	K.D. WENTWORTH
CHECKED BY:	G.S. GOODRICH
SHEET	67 OF 104

