

Proposed Bridge Improvement Project

Wardsboro BF 013-1(22)

Bridge #73

Concrete:

Mix Designation: P60TER

- | | |
|---------------------------|----------|
| 1. Specified Mix Design - | 5000 PSI |
| 2. Proposed Mix Design - | 6000 PSI |
| 3. Striping Strength - | 3000 PSI |
| 4. Handling Strength - | 3000 PSI |
| 5. Shipping Strength - | 5000 PSI |
| 6. Install Strength - | 5000 PSI |
| 7. Traffic Loading - | 5000 PSI |

Fabrication Tolerances:

- | | |
|---------------------|----------------------------------|
| 1. Width | ±1/4" |
| 2. Height | ±1/4" |
| 3. Length | ±1/2" |
| 4. Rebar Cover | 2" Min. (Unless Noted Otherwise) |
| 5. Rebar Spacing | ±1" |
| 6. Rebar Clearance | ±1/4" |
| 7. Insert Placement | ±1/4" |

Design Notes:

- Design is in accordance w/ ASTM C1577, PCI MNL135, VAOT540 & AASHTO 2010 LRFD Bridge Design Specs Fifth Edition
- Any conflict between tolerances listed above shall result in the usage of the stricter tolerance
- Design Live Load = HL-93
- Materials and manufacturing shall conform to ASTM C1433
- Earth Fill Design: 0'-0" to 2'-0"
- Soil Weight: 130 pcf

Installation Sequence:

- Sub base for box culvert / cut off walls to be compacted and set to appropriate grades/slopes
- Precast cut off walls to be installed
- All elevations are to be checked and verified they match those of plan set
- Begin sequence of installing all box culvert sections
- Clean granular backfill for structures used for backfill of footers & of box culvert so water can reach weep holes if applicable
- Fill all lifting holes, bolt pockets and box culvert grooves and seams w/ non-shrink grout or repair mortar
- ASTM C1675-11 box culvert installation guidelines shall be followed.

SEE GENERAL NOTE #20. FILLING THE JOINTS BETWEEN BOX SEGMENTS WITH GROUT IS NOT REQUIRED.

Reinforcing:

General Notes:

- Reinforcing Steel -
 - Precast box sections, headwalls, & cut off walls shall be level I epoxy coated bar ASTM A615
- Materials and manufacturing shall conform to ASTM C1433
- Bar tied at every intersection.

Tolerances:

- Spacing ±1"
- Clearance ±1/4"

Lap Lengths:

- Per AASHTO 5.11.2.1.1 & 5.11.5.3.1

Lap Length:	
#4 Bar=21"	
#5 Bar=26"	VERIFY LAP LENGTHS
#6 Bar=31"	

Joint Treatment:

Vertical Seams:

Per VTrans Approved Product List 780.02
Overhead & Vertical Concrete Repair Mortar
Applied by Site Contractor

Horizontal Seams / Grout:

Per VTrans Approved Product List 707.03
Mortar, Type IV
Applied by Site Contractor

Waterproofing:

- By others if applicable

SHOP APPLIED PER GENERAL NOTE #22

Miscellaneous:

- All exposed wingwall hardware to be zinc plate galvanized.
- All box culvert bolt pocket hardware to be plain steel
- All Exposed Edges of Concrete Shall be Chamfered

1" x 1"

Legend:

- (A) 2"Ø PVC Sleeve
- (B) 4"Ø PVC Sleeve
- (C) Mechanical Bolt Pocket (A.L. Patterson w/ 1"Ø Galv. Coil Rod)
- (D) Oxford A750-7 Lifting Device
- (E) 1"Ø x 12" CX-9 Coil Loop Insert
- (F) 5/8" FI-42 Flared Loop Ferrule Insert
- (G) Continuous Keyway (See Detail on Page 5 of 6)
- (H) Solid Lines Indicate 3/4" Chamfered Edge (Isometrics)

Vermont Agency of Transportation
RECEIVED
CK'D BY JW OK'D BY JS
June 30, 2014
RESUBMIT YES Rejected
BY KH DATE 7-14-2014



Gary K. Munkelt & Associates
Structural Consulting
Engineers
1180 Welsh Rd, Suite 190
North Wales, PA 19454
Ph: 215-855-8713 F: 215-855-8714

STRUCTURAL DESIGN ONLY

SAME SHOP DRAWING NUMBER AS BF 013-1(21)

CONTRACTORS VISPE:	PRECAST CONCRETE BOX CULVERT SHOP DRAWINGS (#14442)		FABRICATOR: 193 INDUSTRIAL AVE. WILLISTON, VT 05495 Ph: (802) 658-0201
	SUPERVISOR: M. WHEELER DETAILER: I. ADAMS CHECKER: E. Barendse ENGINEER: Gary K. Munkelt & Assoc.	PROJECT NAME: Wardsboro PROJECT #: BF 013-1(22) LOCATION: Wardsboro, VT	
	06/27/2014	COVER_PAGE	1_OF_6

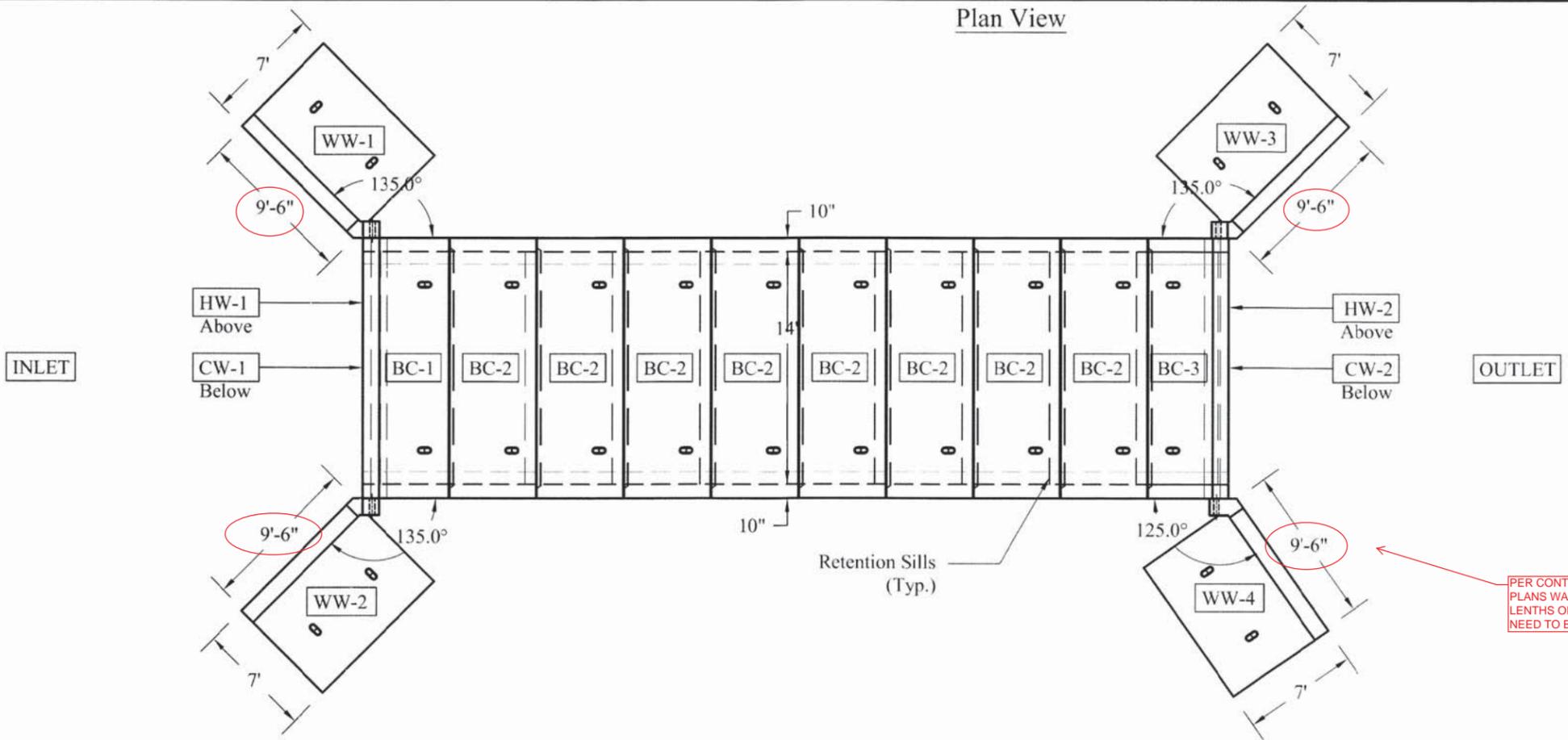
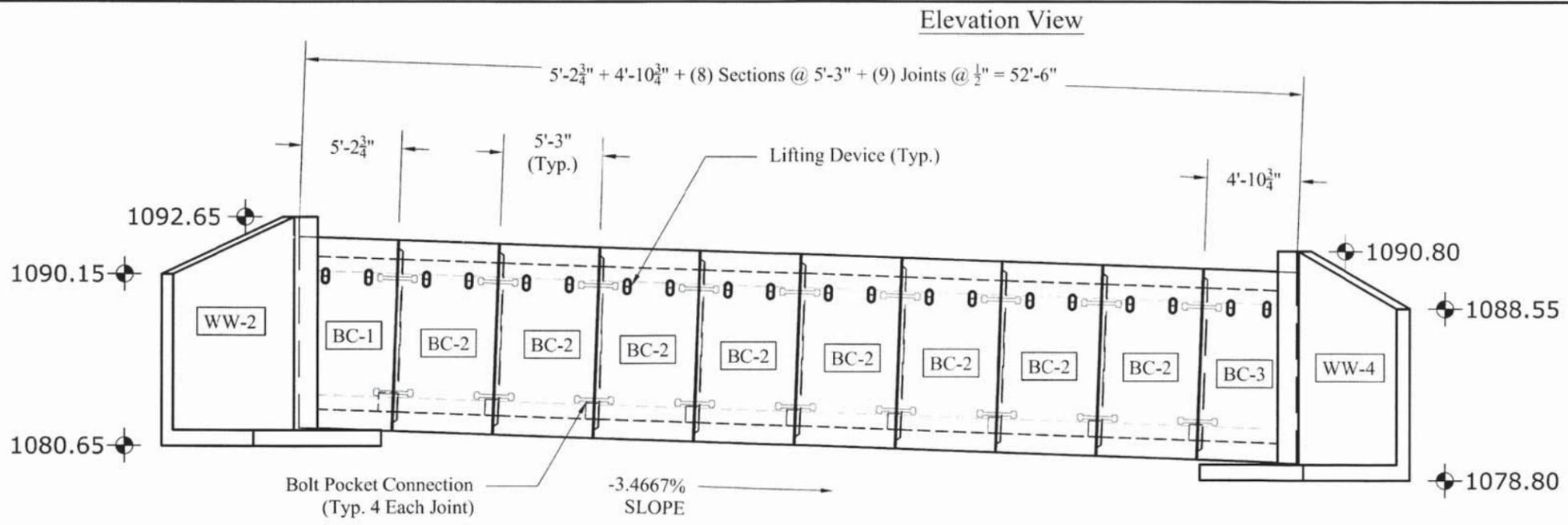


Table of Units				
Name	Qty	Length	Vol.(CY)	Wt.(lbs.)*
BC-1**	1	5'-2 ³ / ₄ "	9.56	38,250
BC-2*	8	5'-3"	9.41	37,654
BC-3**	1	4'-10 ³ / ₄ "	9.54	38,200
WW-1	1	9'-6"	6.35	25,400
WW-2	1	9'-6"	6.35	25,400
WW-3	1	9'-6"	6.35	25,400
WW-4	1	9'-6"	6.34	25,360
CW-1	1	15'-8"	.57	2,280
CW-2	1	15'-8"	.59	2,360

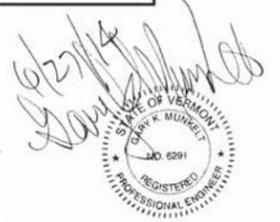
PER CONTRACT PLANS WALL LENGTHS ONLY NEED TO BE 9'-0"

* Baffle Weight Included in BC-2
 ** Baffle and Headwall Included in BC-1 and BC-3



Culvert Specifications	
Inside Dimensions	8'-0"x14'-0"
Waterway Area	84 Sq. Ft.
Top Slab Thickness	12"
Side Wall Thickness	10"
Bottom Slab Thickness	12"

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- (A) 2"Ø PVC Sleeve
- (B) 4"Ø PVC Sleeve
- (C) Mechanical Bolt Pocket (A.L. Patterson w/ 1"Ø Coil Rod)
- (D) Oxford A750-7 Lifting Device
- (E) 1"Øx12" CX-9 Coil Loop Insert
- (F) 3/8" FI-42 Flared Loop Ferrule Insert
- (G) 1 1/2" x 3 1/2" Continuous Keyway
- (H) Solid Lines Indicate 3/4" Chamfer

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 SUPERVISOR: M. WHEELER
 DETAILER: I. ADAMS
 CHECKER: E. Barendse
 ENGINEER: Gary K. Munkelt & Assoc.

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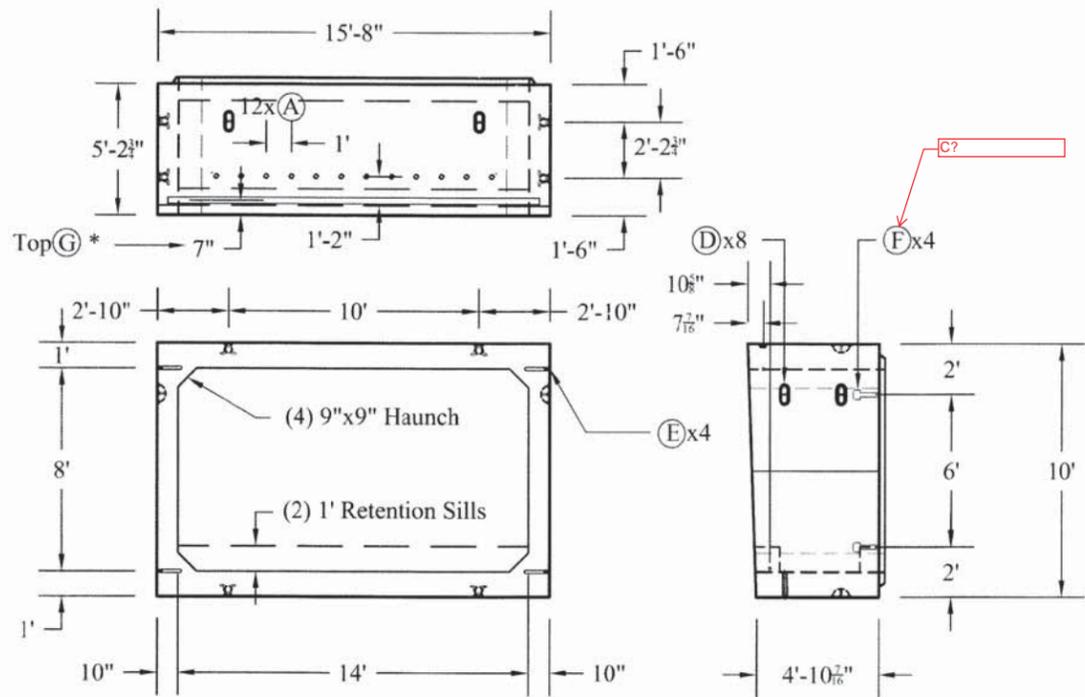


06/27/2014

PLAN_ELEVATION

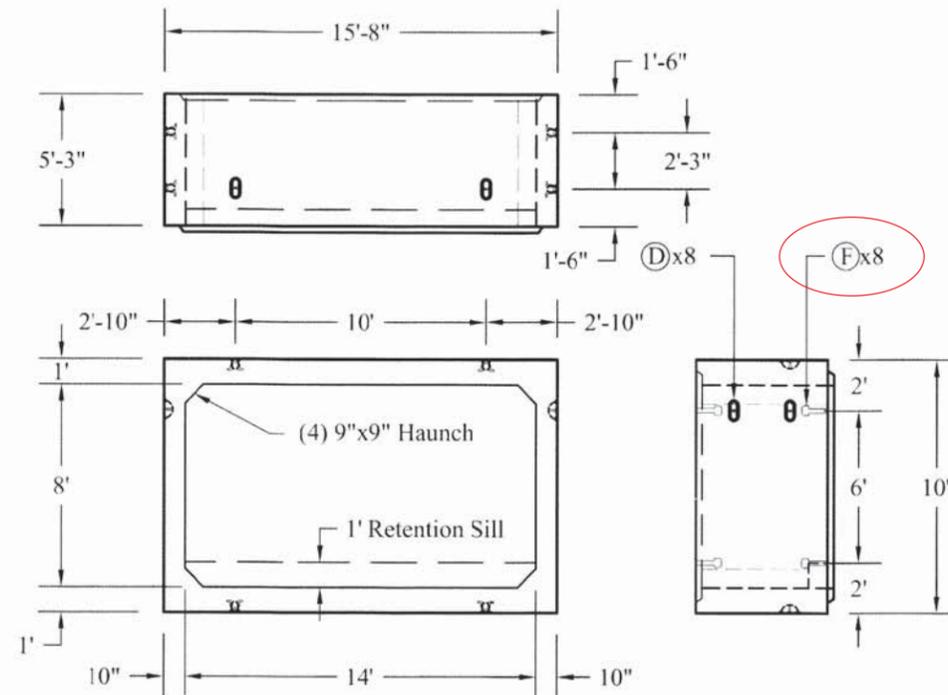
2_OF_6

BC-1 Detail



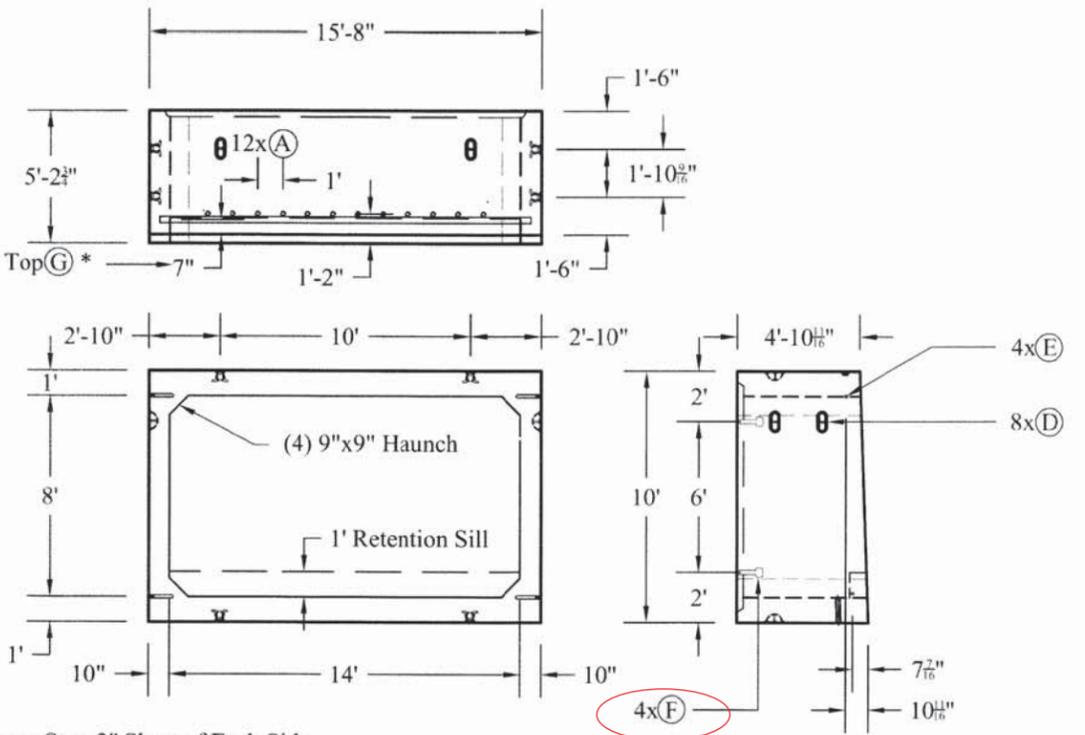
*Keyway to Stop 3" Short of Each Side

BC-2 Detail



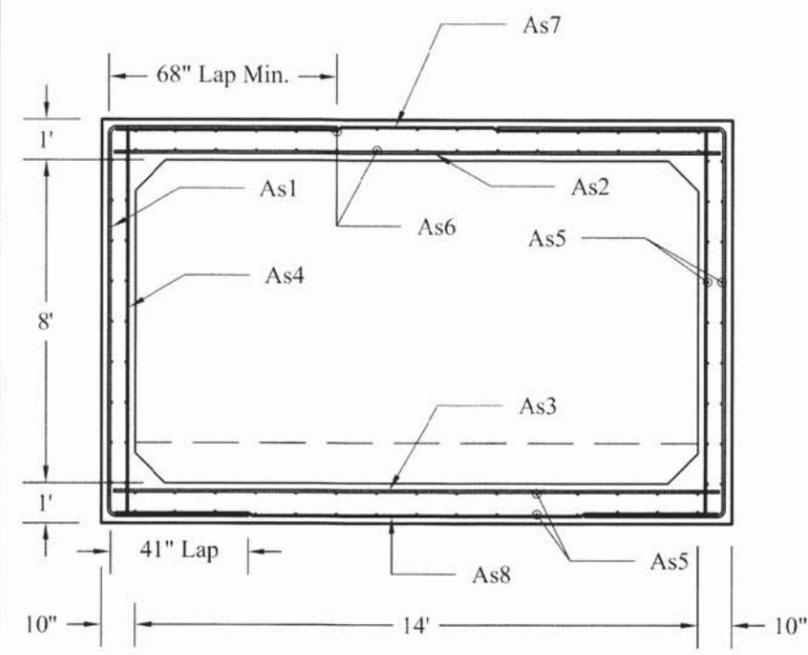
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BC-3 Detail



*Keyway to Stop 3" Short of Each Side

Box Section Reinforcement Detail



Rebar Schedule

Mark	Size	Max Spacing	Length	Type	A	B	C
As1	#6	6"	225"	Bent	68"	116"	41"
As2	#6	6"	184"	Str.	184"		
As3	#5	5"	184"	Str.	184"		
As4	#4	9"	116"	Str.	116"		
As5	#4	12"	Varies	Str.	Varies		
As6	#5	12"	Varies	Str.	Varies		
As7	#4	9"	184"	Str.	184"		
As8	#4	9"	184"	Str.	184"		

Notes: 2" Clear Typical Unless Noted Otherwise

[Signature]
 STATE OF VERMONT
 GARY K. MUNKELT
 NO. 6291
 REGISTERED PROFESSIONAL ENGINEER

PROVIDE THE TOTAL LENGTH OR WEIGHT FOR EACH SIZE OF REBAR FOR THE ENTIRE JOB FOR DETERMINING TESTING REQUIREMENTS.

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 Structural Consulting Engineers
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CONTRACTORS VISPE:

(A) 2"Ø PVC Sleeve	(D) Oxford A750-7 Lifting Device	(G) 1 1/2" x 3 1/2" Continuous Keyway
(B) 4"Ø PVC Sleeve	(E) 1"Øx12" CX-9 Coil Loop Insert	(H) Solid Lines Indicate 1/2" Chamfer
(C) Mechanical Bolt Pocket (A.L. Patterson w/ 1"Ø Coil Rod)	(F) 1/2" FI-42 Flared Loop Ferrule Insert	

PRECAST CONCRETE BOX CULVERT SHOP DRAWINGS (#14442)

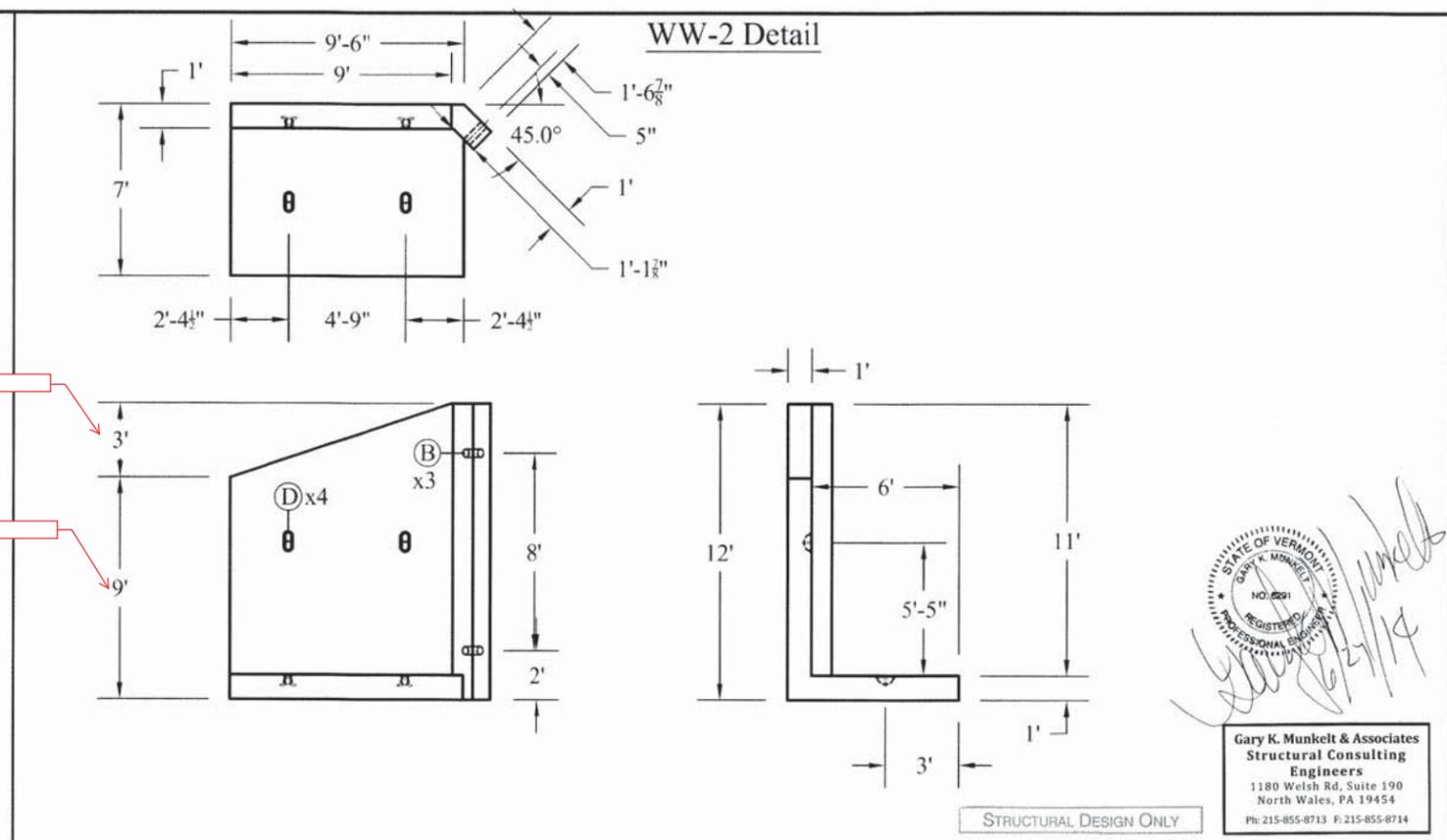
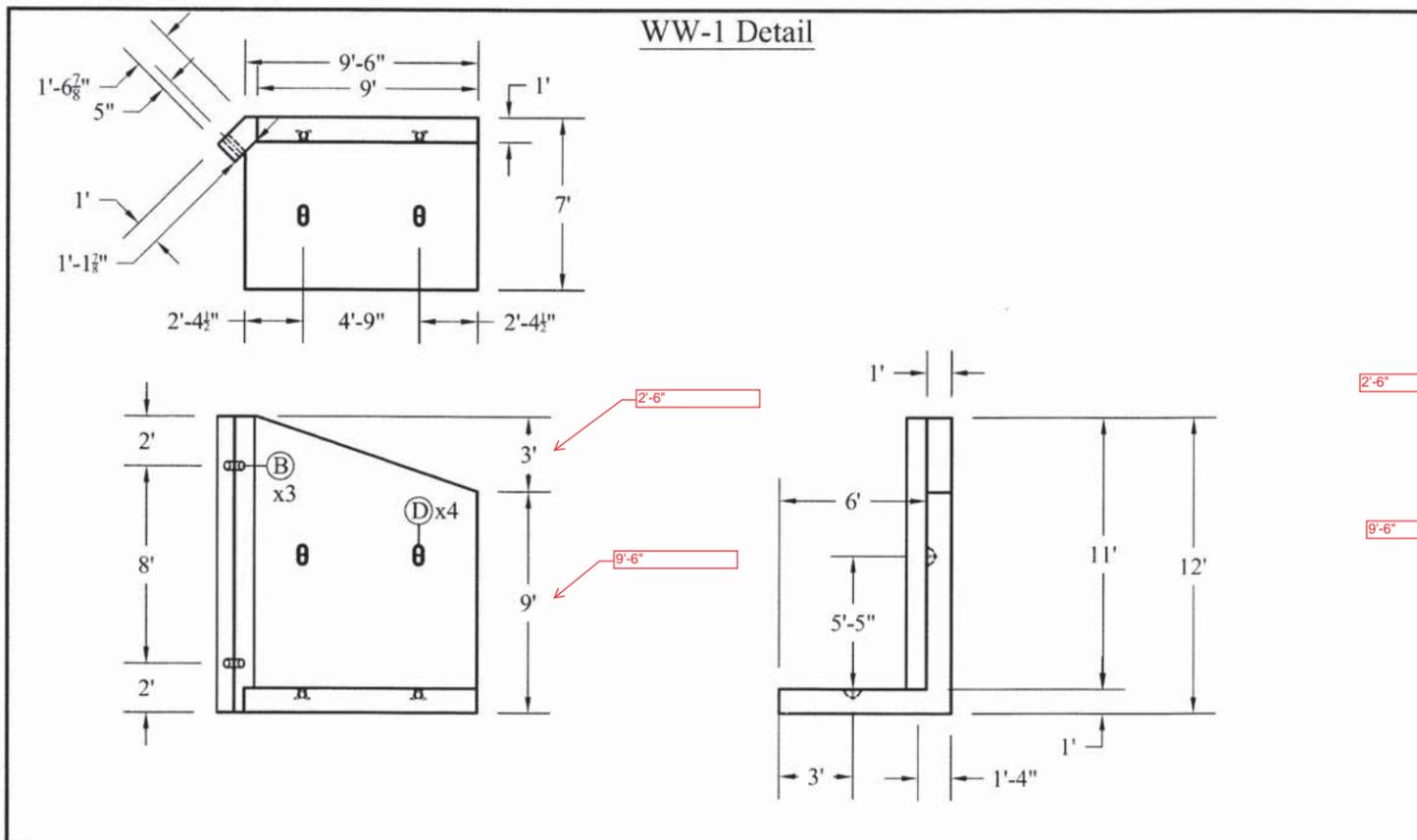
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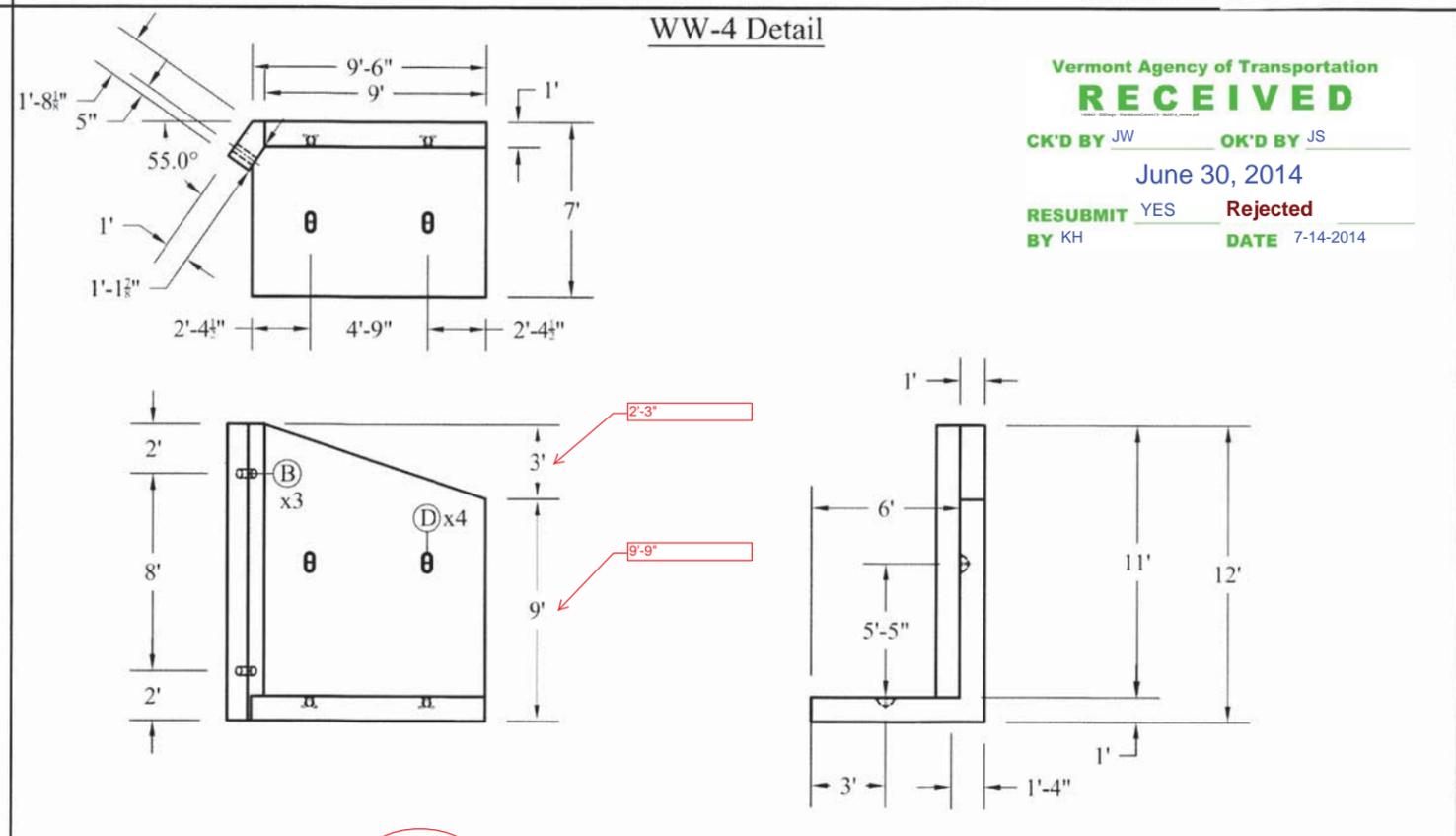
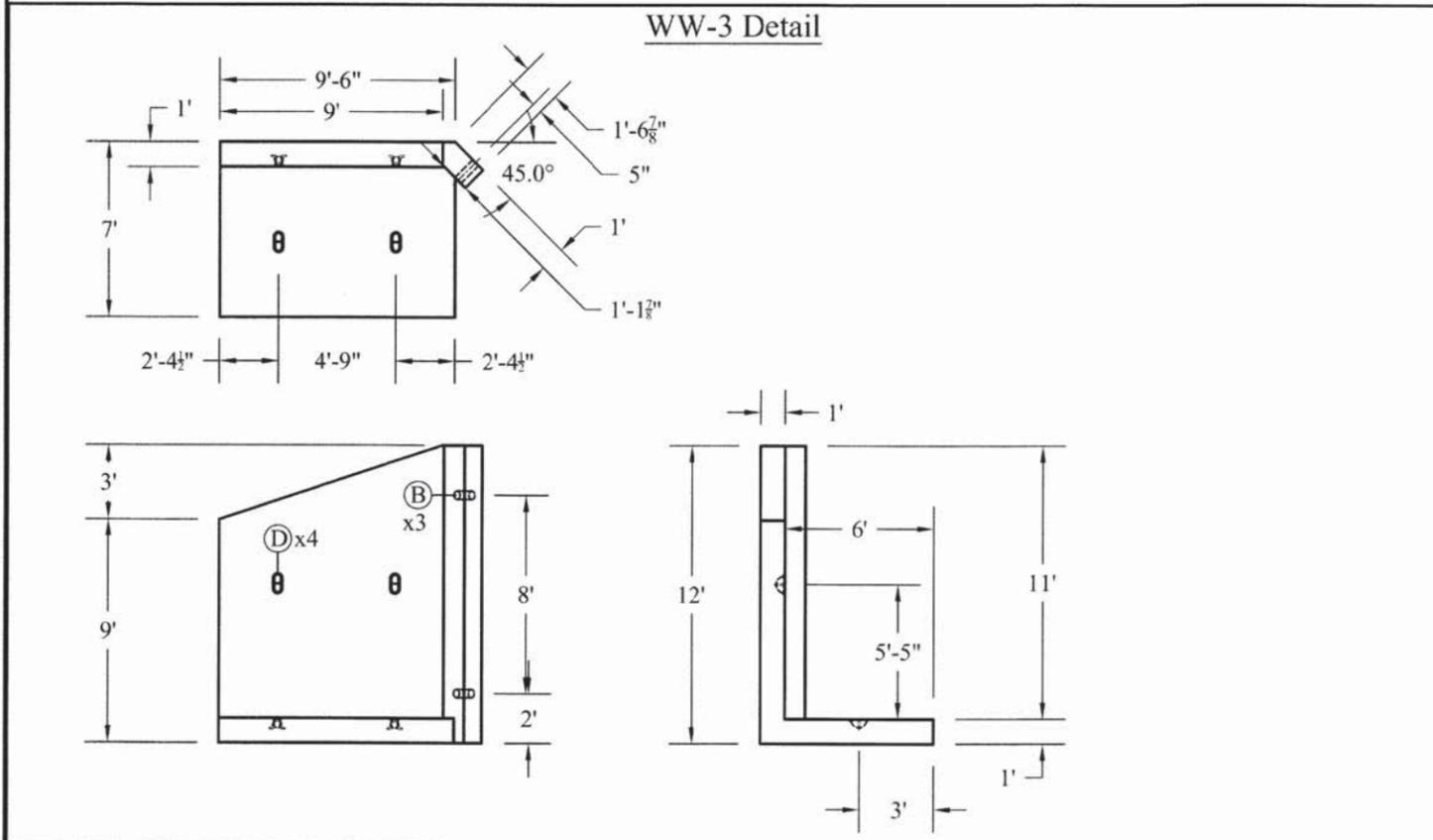
06/27/2014 BOX_SECTIONS 3_OF_6



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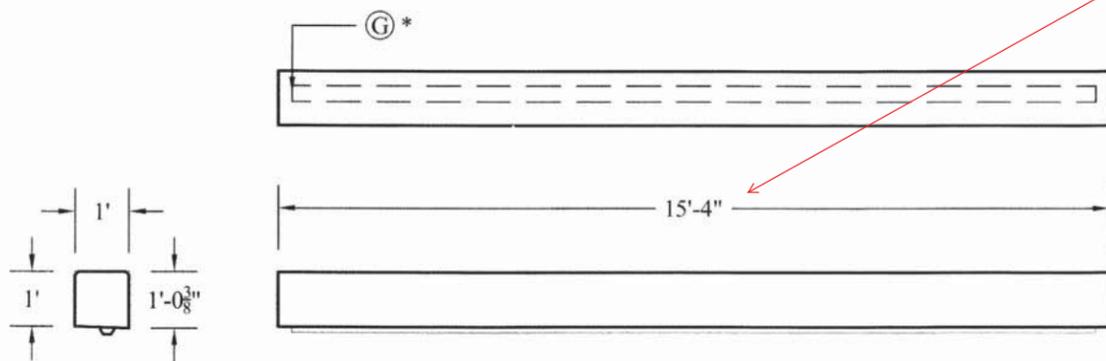


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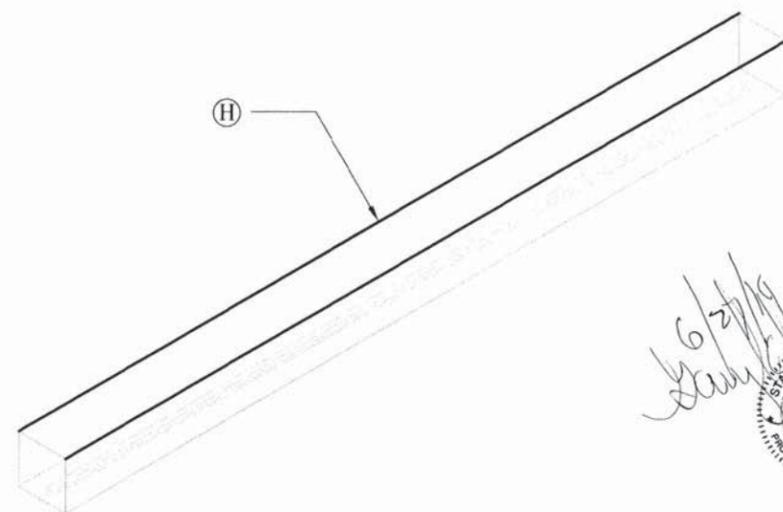
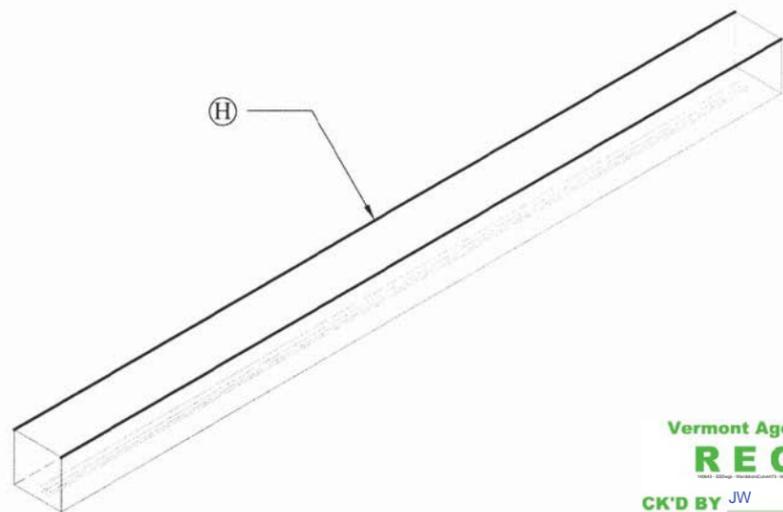
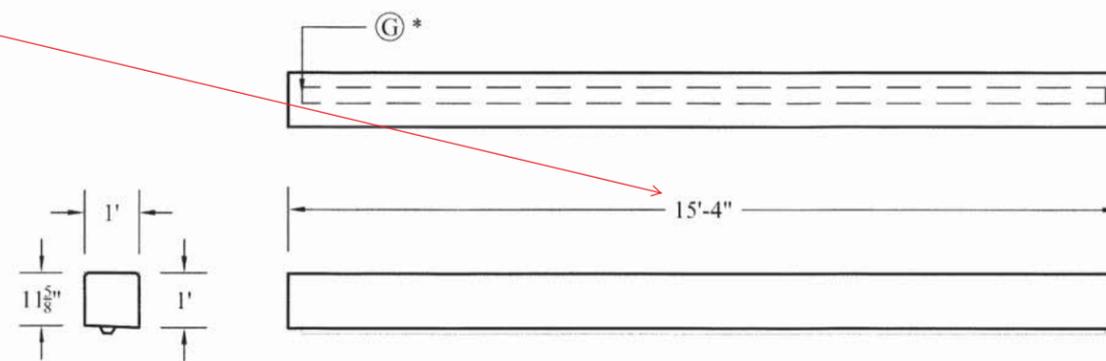
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HW-1 Detail



SHOULDN'T THE HEADWALLS BE 15'-8"?

HW-2 Detail



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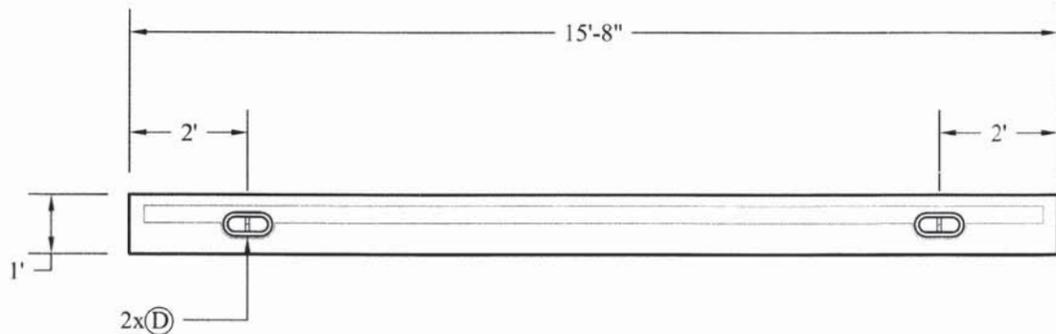
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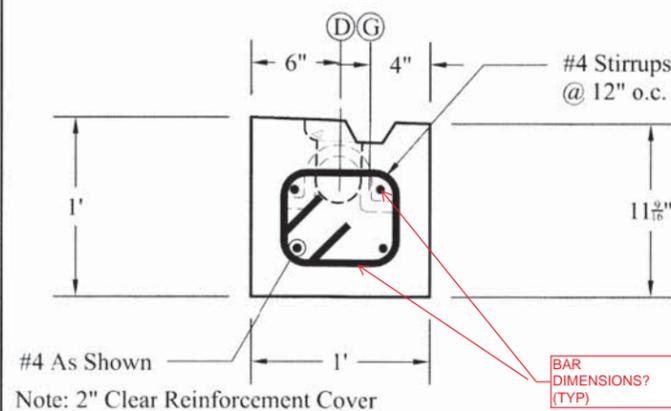
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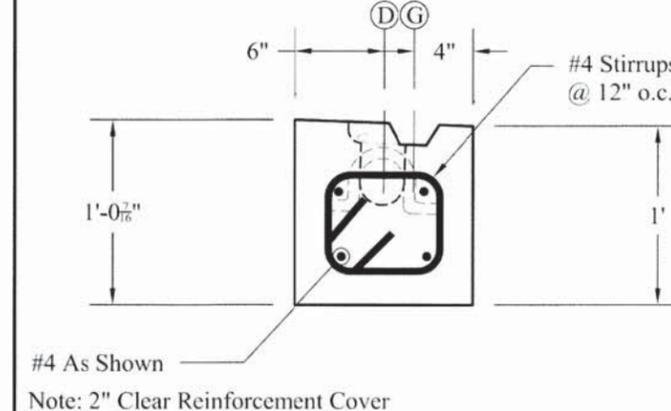
CW-1/2 Detail



CW-1 Detail



CW-2 Detail



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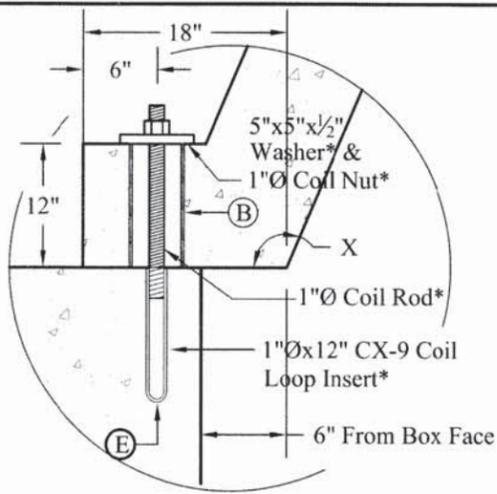
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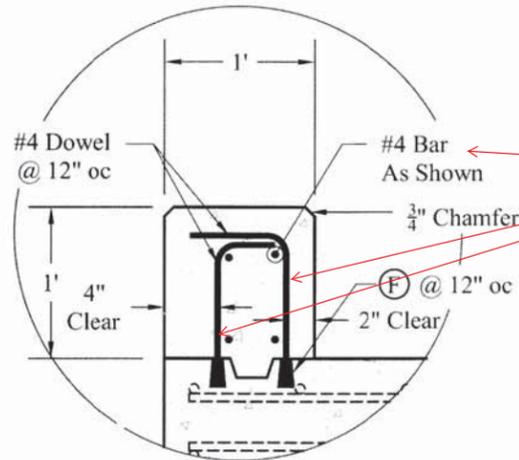
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HEADWALLS_CUTOFFWALLS

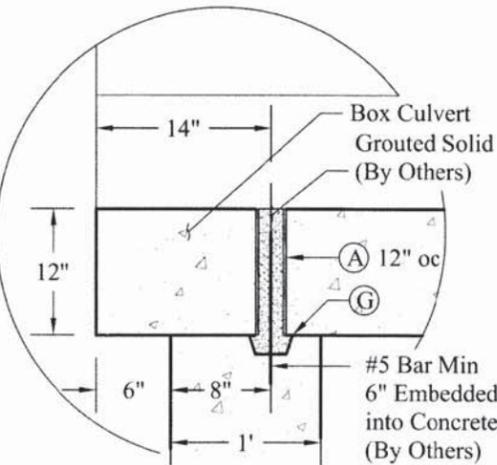
5_OF_6



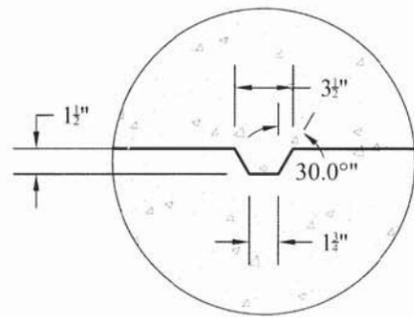
Wing Wall to Box Culvert Connection



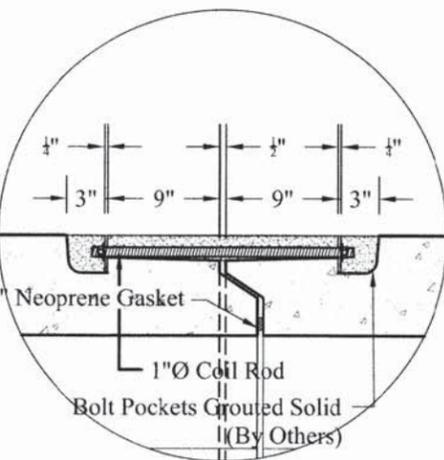
Head Wall to Box Culvert Connection



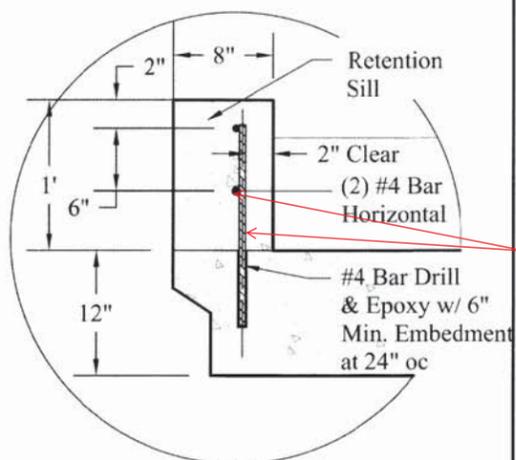
Culvert to Cut Off Wall Connection



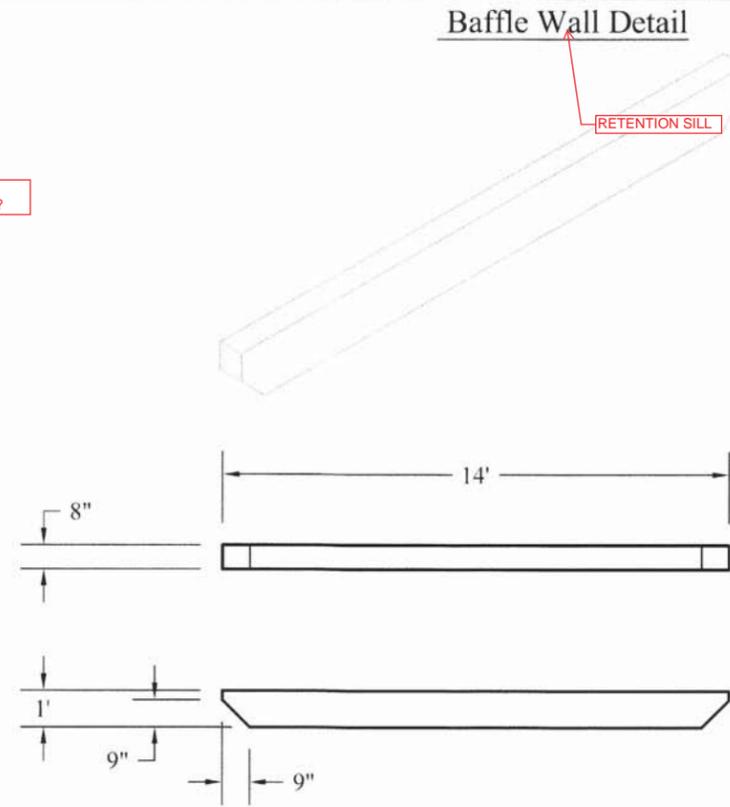
Keyway Detail



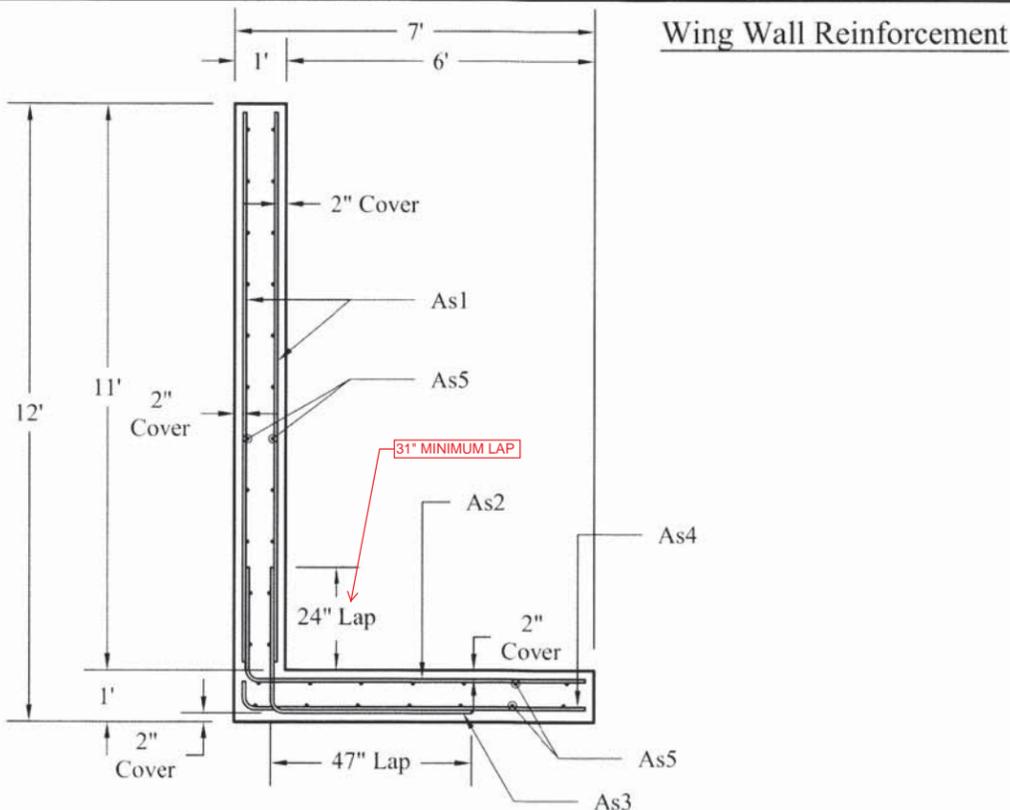
Bolt Pocket Connection Detail



Retention Sill Reinforcing Detail



Baffle Wall Detail



Wing Wall Reinforcement

Rebar Schedule						
Mark	Size	Max Spacing	Length	Type	A	B
As1	#6	8"	Varies	Str		
As2	#6	8"	108"	Bent	26"	82"
As3	#6	8"	81"	Bent	34"	47"
As4	#6	8"	88"	Bent	8"	80"
As5	#5	12"	Varies	Str		

Notes: 2" Clear Typical Unless Noted Otherwise

Bent Bar Guide



VERIFY LENGTH FOR 90 HOOK

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STRUCTURAL DESIGN ONLY

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 - C Mechanical Bolt Pocket (A.L. Patterson w/ 1"Ø Coil Rod)
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CONNECTIONS

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