



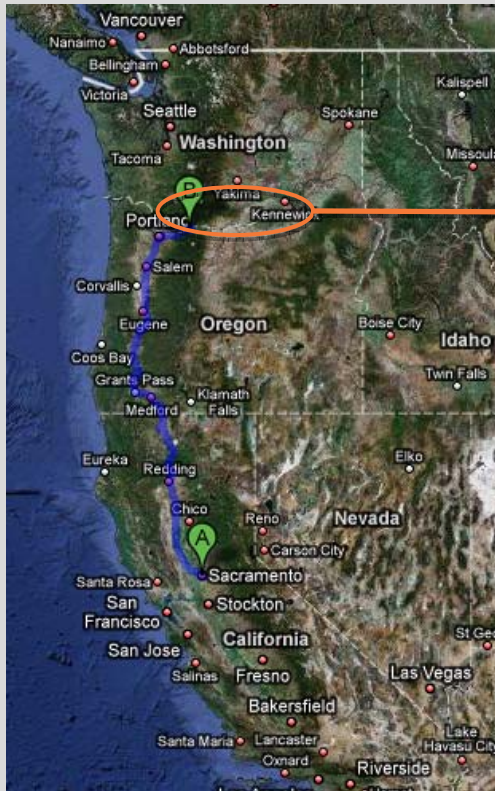
Oregon's Columbia River Gorge – Bridge Facade WBES 2009 – Session 7B

Keith Kaufman

Knife River-Western Oregon Division



Project Location



Columbia River Gorge



I-84 Corridor Strategy

- I-84 Corridor Strategy – November 2005
 - ODOT – Region 1 and 4, Technical Services
 - Columbia River Gorge Commission
 - USDA Forest Service
 - Federal Highways Administration
 - Hood River, Multnomah and Wasco Counties
 - Consultant - OTAK, Inc.
- Provides framework for ODOT to manage and improve I-84 facilities within the CRGNSA.

Columbia River Gorge National Scenic Area

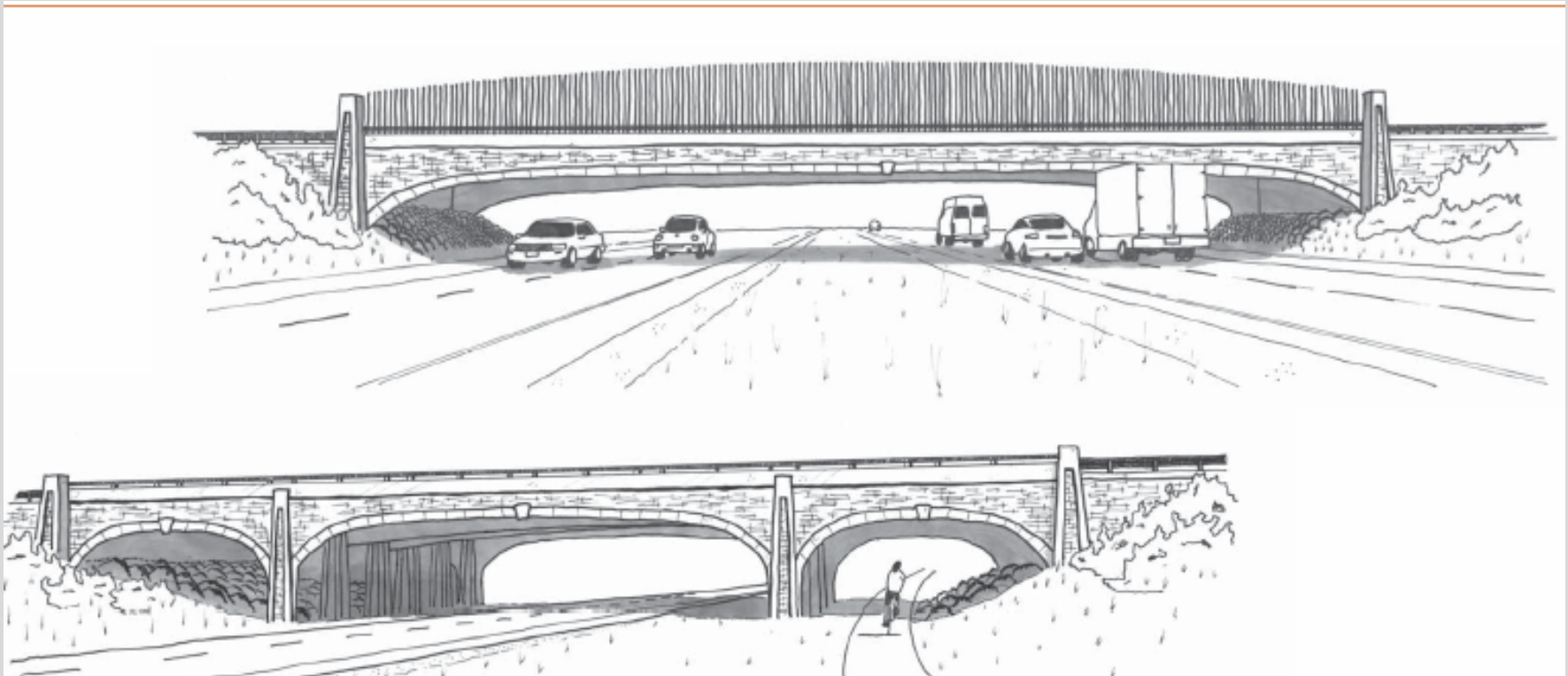
- Established by Congress, 79 miles of I-84.



Bridge Design Concepts

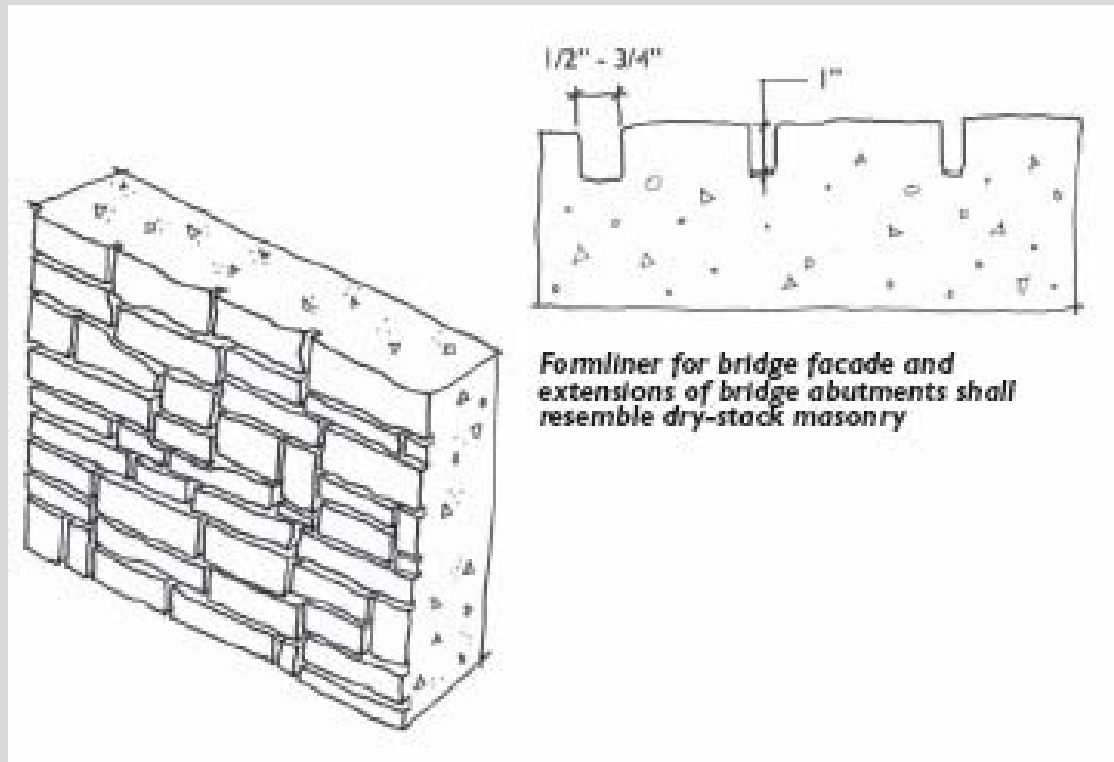
- Cascadian Bridge Style
 - Arch and Elliptical Forms
 - Textured Pier, Abutment and Girder using Form liner
 - Monuments at Bridge Abutments
 - Open Bridge Railing

Bridge Concepts



I-84 Corridor Strategy

Bridge Concepts



I-84 Corridor Strategy

Bridge Concepts



Color 1

- Steel portion of bridge rail (paint)
- Bridge girders (weathering steel or stain if concrete)
- Steel portion of roadside guardrail (weathering steel)
- Back of signs (paint)
- Eastern stone facade (stain)
- Eastern retaining walls (stain)

Color 2

- Western stone facade (stain)
- Western retaining walls (stain)

Color 3

- Bridge screen (paint)

Color 4

- Fences (weathering steel)
- Weigh-in-motion facilities (paint)
- Lighting (paint)
- Sign posts (paint)
- Permanent de-icing systems (paint)
- Truck weigh station facilities (paint)

Color 5

- Median barrier (paint)
- Bridge rail base (stain)
- Abutment wall and pier trim for bridges and culverts (stain)

I-84 Corridor Strategy

Bridge Concepts



I-84 Corridor Strategy



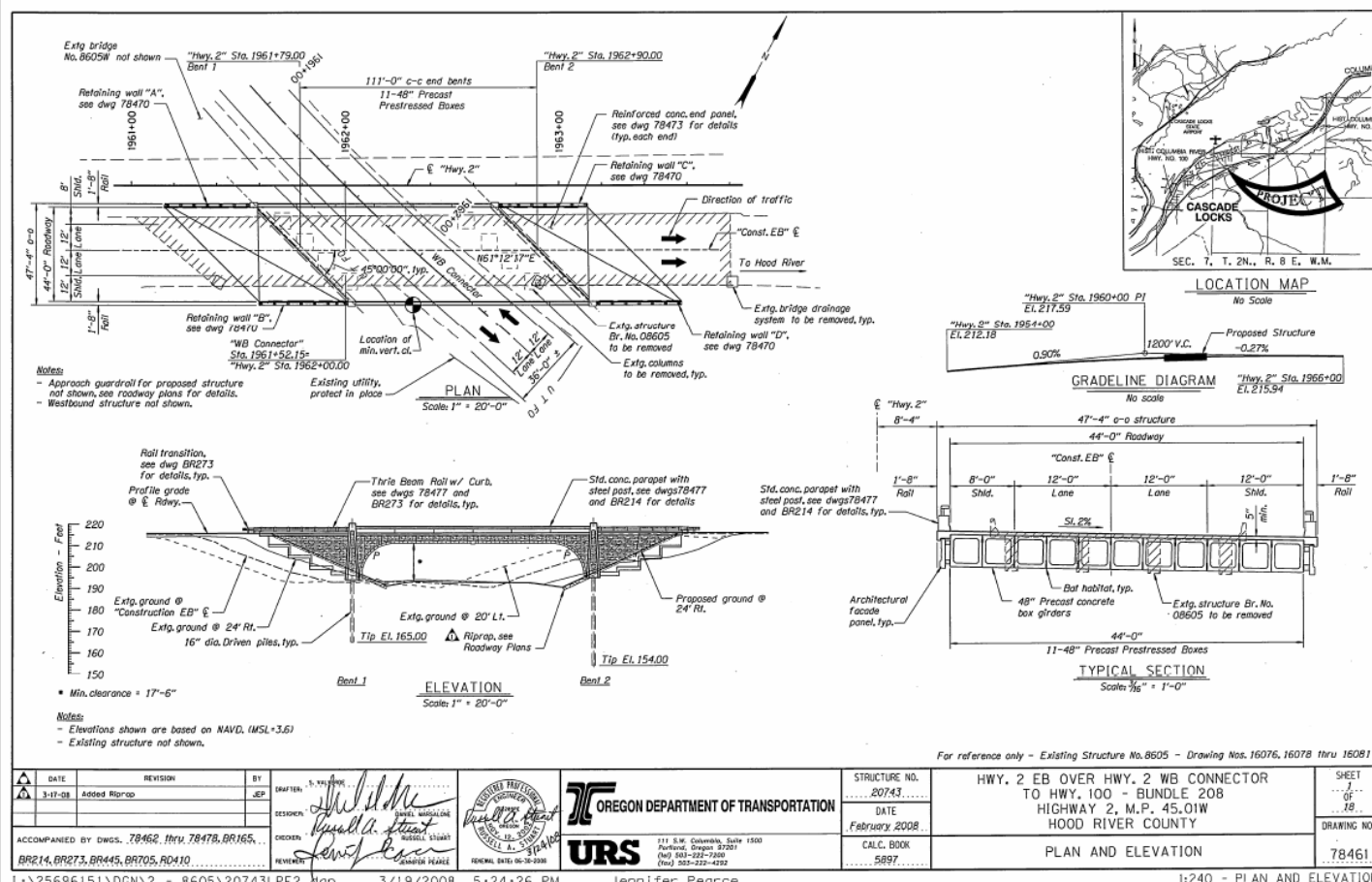
Columbia River Gorge Bridges

- Cascade Locks
 - EB and WB I-84 (Twin Bridges)
 - Single Span, Composite Precast Box Beams
- Moffett Creek Bridge
 - EB I-84
 - Three Span, Composite Steel Plate Girders

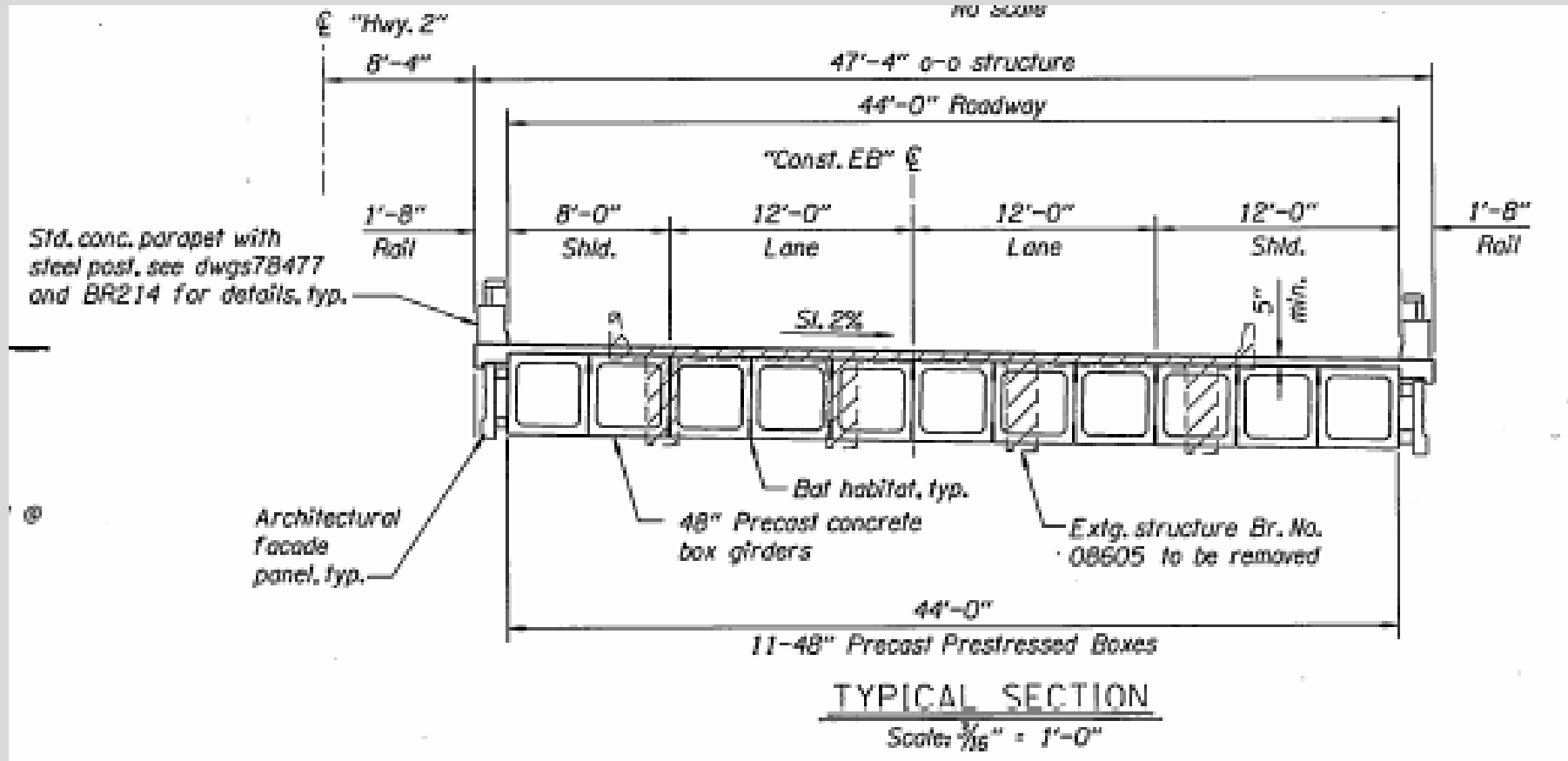
Columbia River Gorge Bridges

- Mosier Creek
 - EB and WB I-84 (Single Bridge)
 - Single Span, Composite 90” Precast Bulb Tee
- Fifteen Mile Creek
 - EB and WB I-84 (Single Bridge)
 - Two Span, Composite 84” Precast Bulb Tee

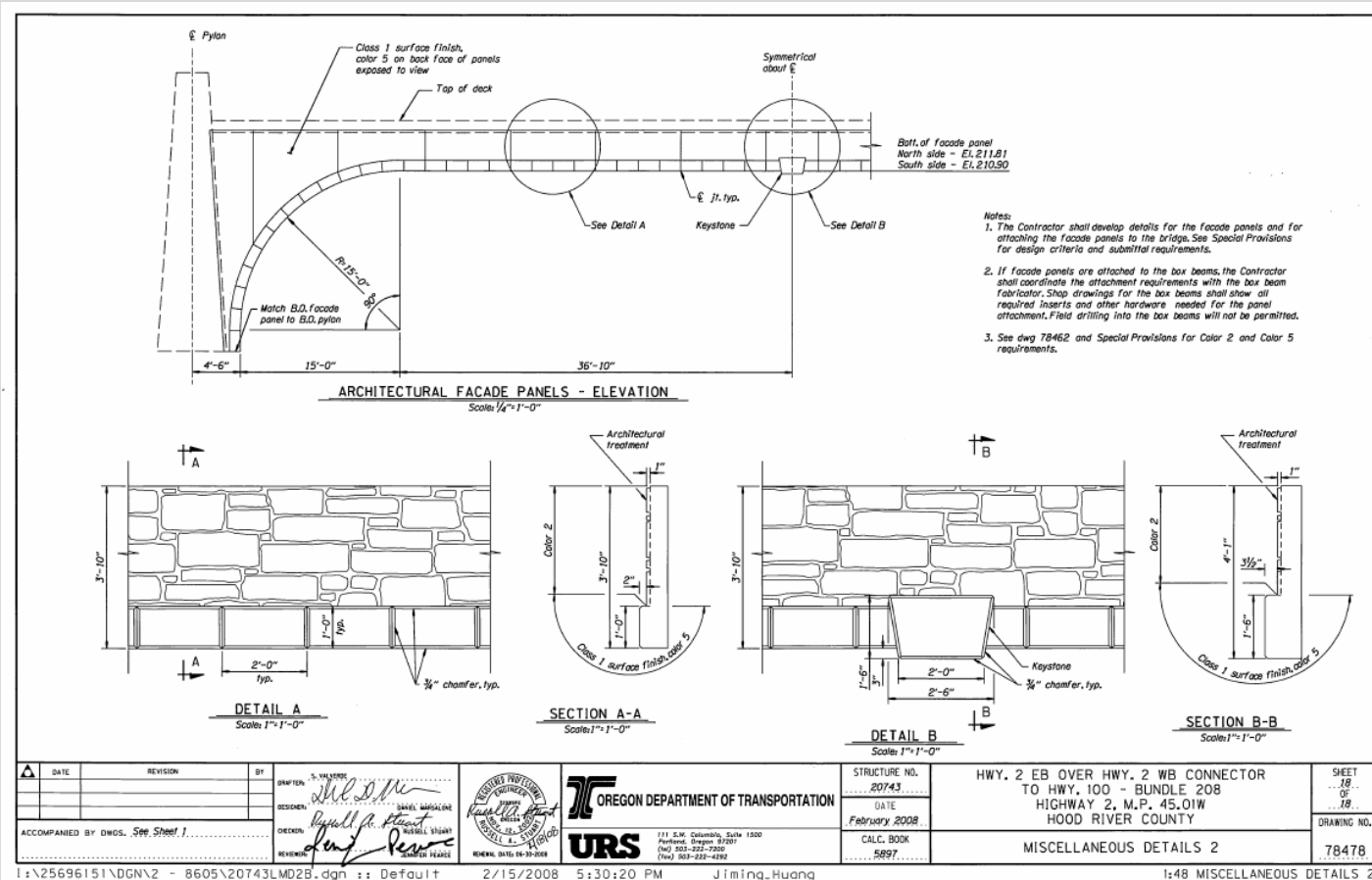
Cascade Locks



Cascade Locks



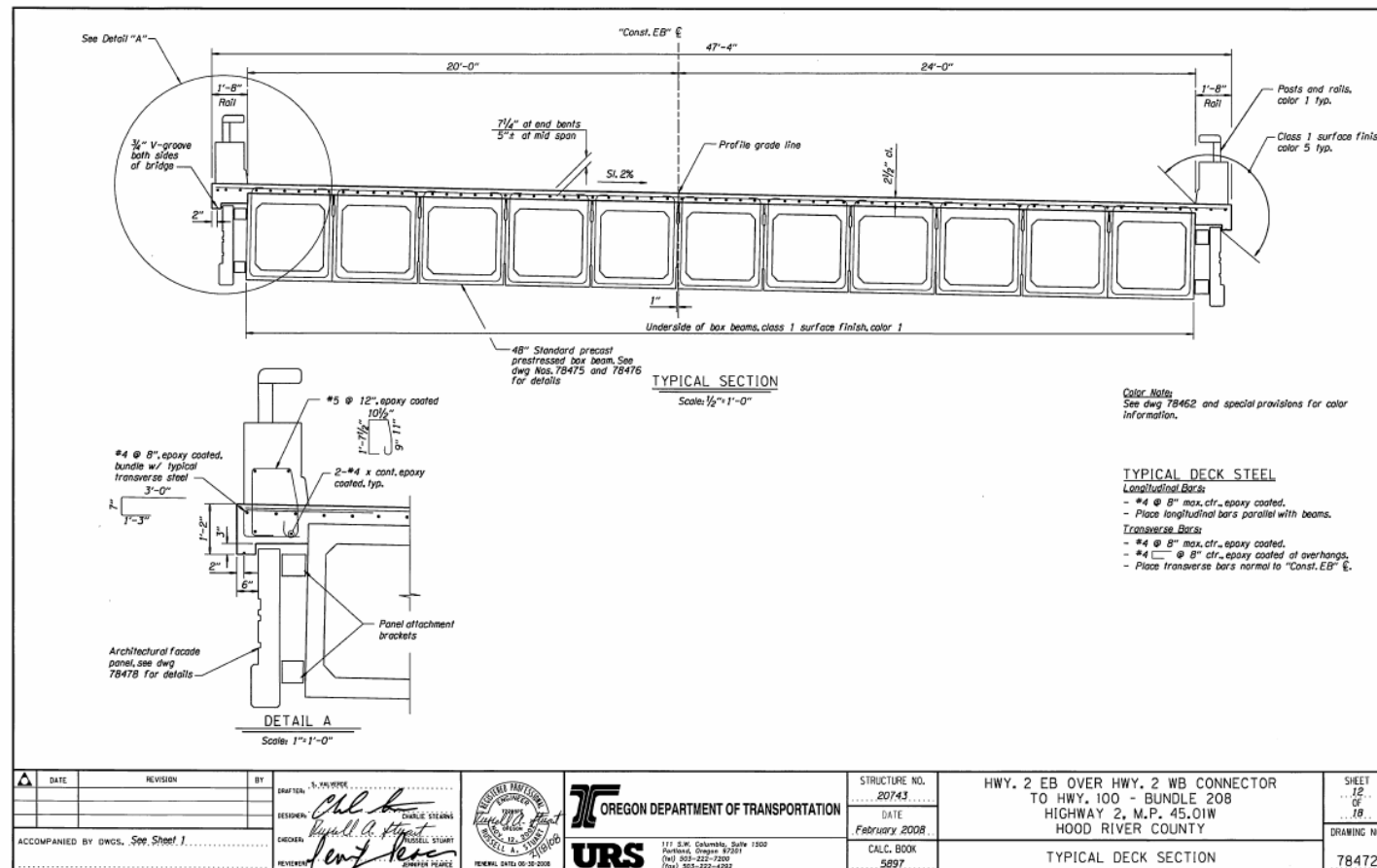
Cascade Locks



DATE	REVISION	BY	DRAWN BY	STRUCTURE NO.	HWY. 2 EB OVER HWY. 2 WB CONNECTOR TO HWY. 100 - BUNDLE 208	SHEET
			S. VALMERE	20743	DATE	18
			DESIGNED BY	February 2008	HIGHWAY 2, M.P. 45.01W	OF
			CHECKED BY		HOOD RIVER COUNTY	18
			REVIEWED BY	CALC. BOOK	MISCELLANEOUS DETAILS 2	DRAWING NO.
				5897		78478

1:\25696151\LDGN\2 - 8605\20743\LD2B.dgn :: Default 2/15/2008 5:30:20 PM Jiming-Huang 1:48 MISCELLANEOUS DETAILS 2

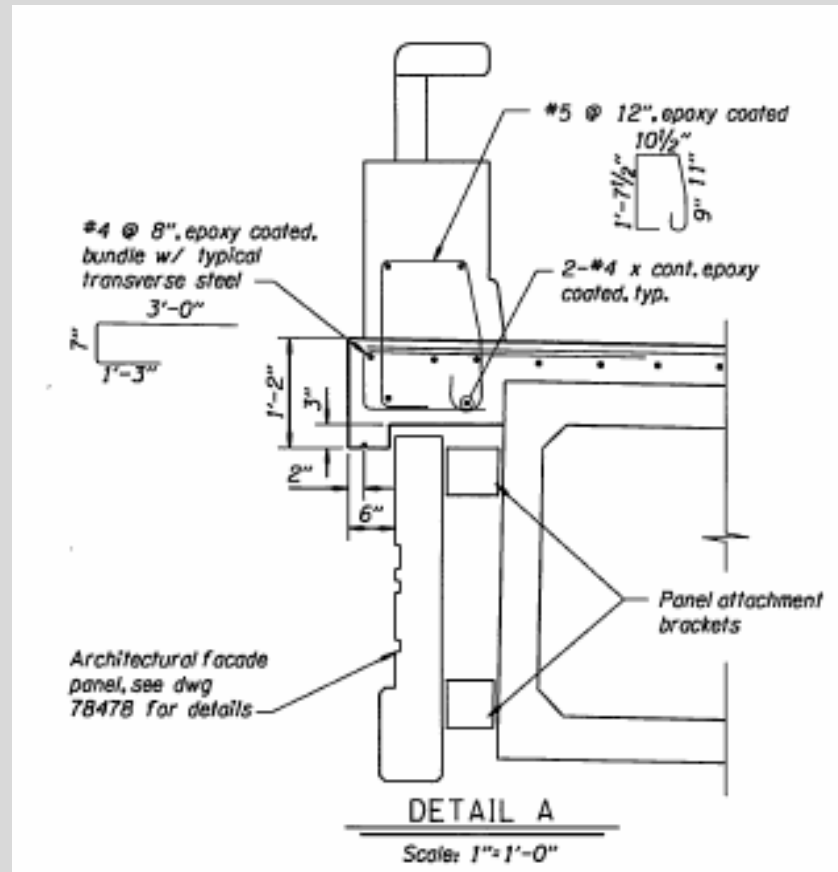
Cascade Locks



I:\25696151\DGN\2 - 8605\20743SDS2.dgn :: Default 2/15/2008 5:31:04 PM Jiming.Huang I:24 - TYPICAL DECK SECTION



Cascade Locks



Cascade Locks



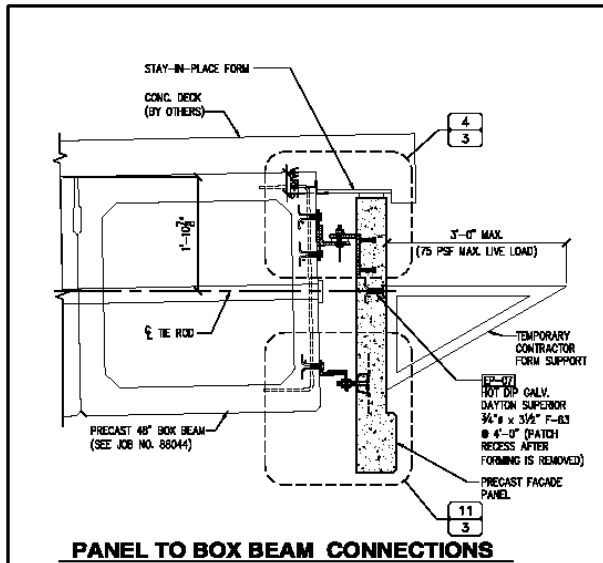
Cascade Locks




Cascade Locks



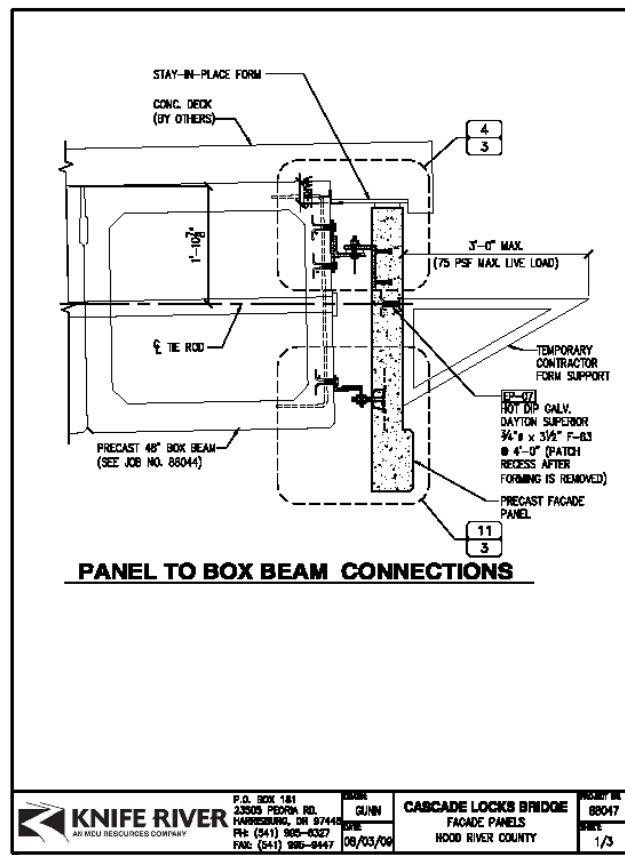
Cascade Locks – Connection Details



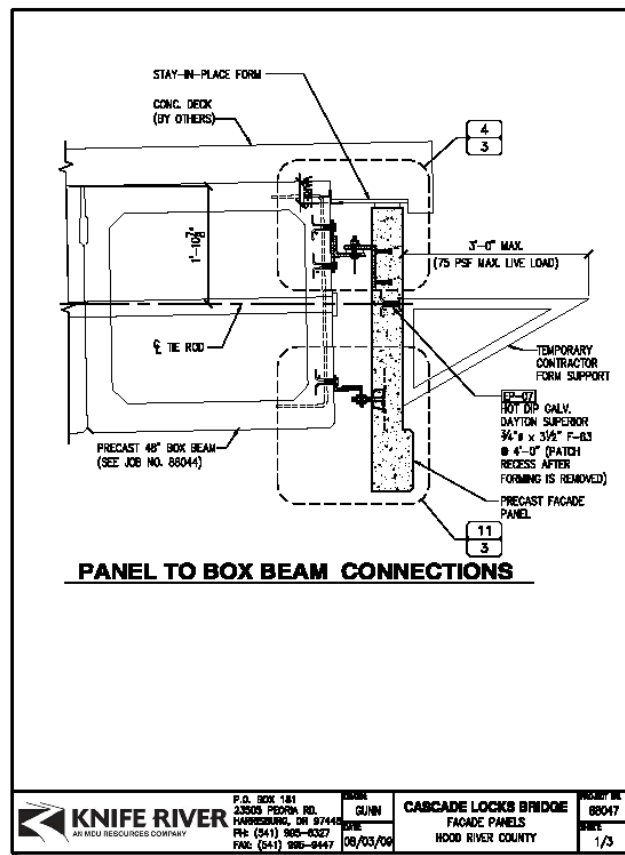
 KNIFE RIVER AN MDU RESOURCES COMPANY	P.O. BOX 181	DATE	CASCADE LOCKS BRIDGE FACADE PANELS HOOD RIVER COUNTY	PROJECT NO.
	23003 PEOPLES RD.	08/03/06		88047
	HARRISBURG, OR 97444			1/3
	PH: (541) 865-0327			
	FAX: (541) 865-0447			



Cascade Locks – Top Conn. Detail



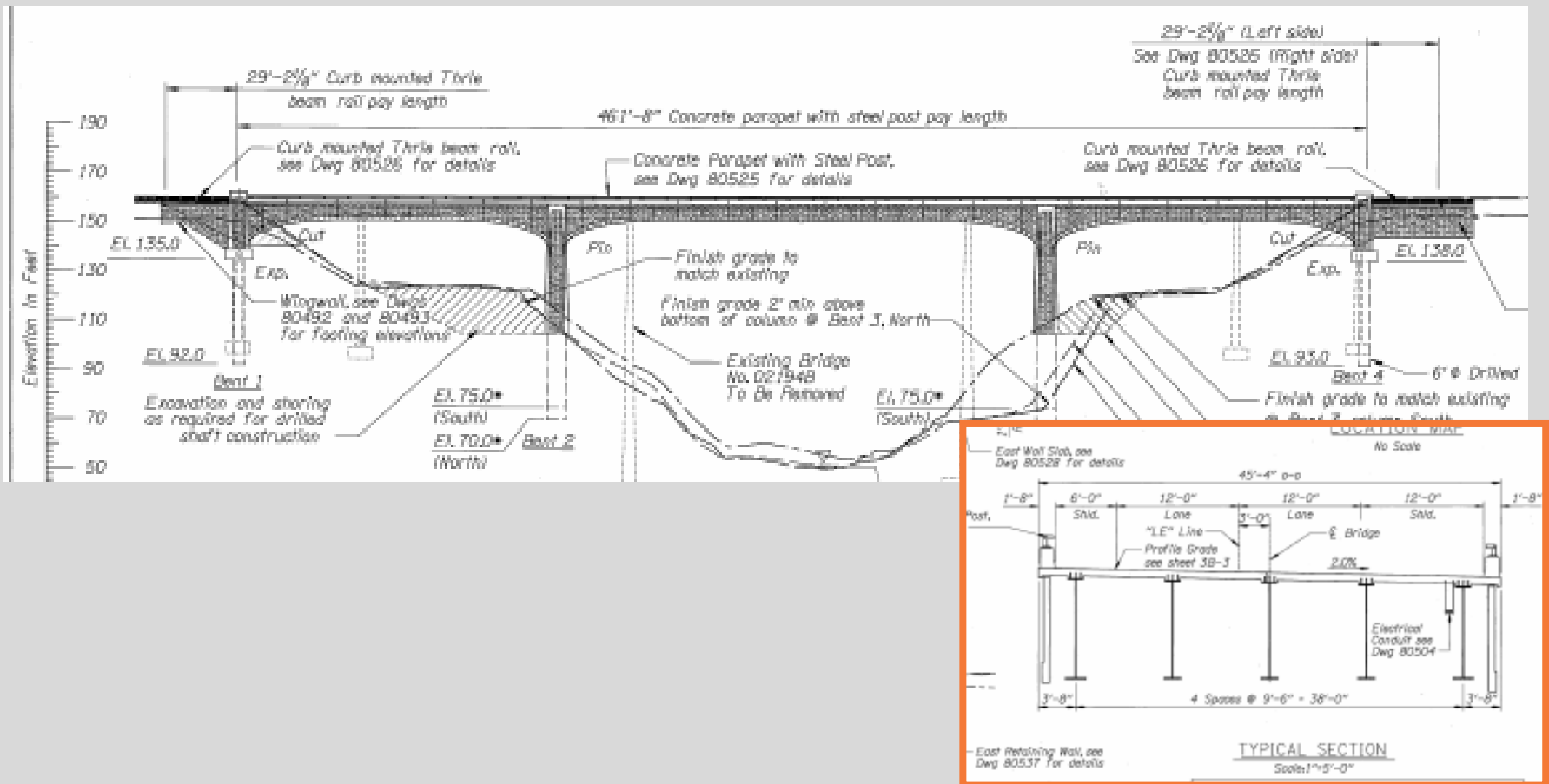
Cascade Locks – Bottom Conn. Detail



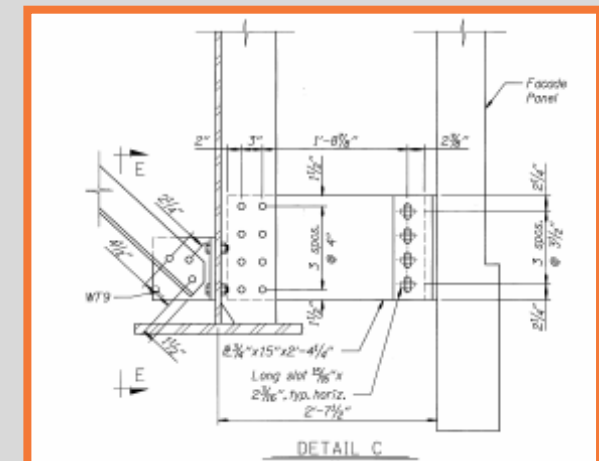
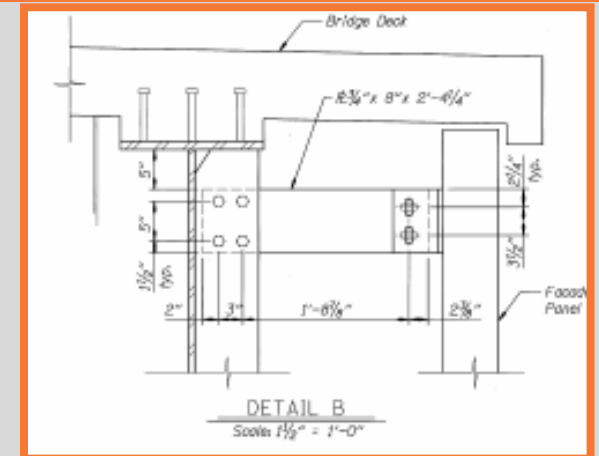
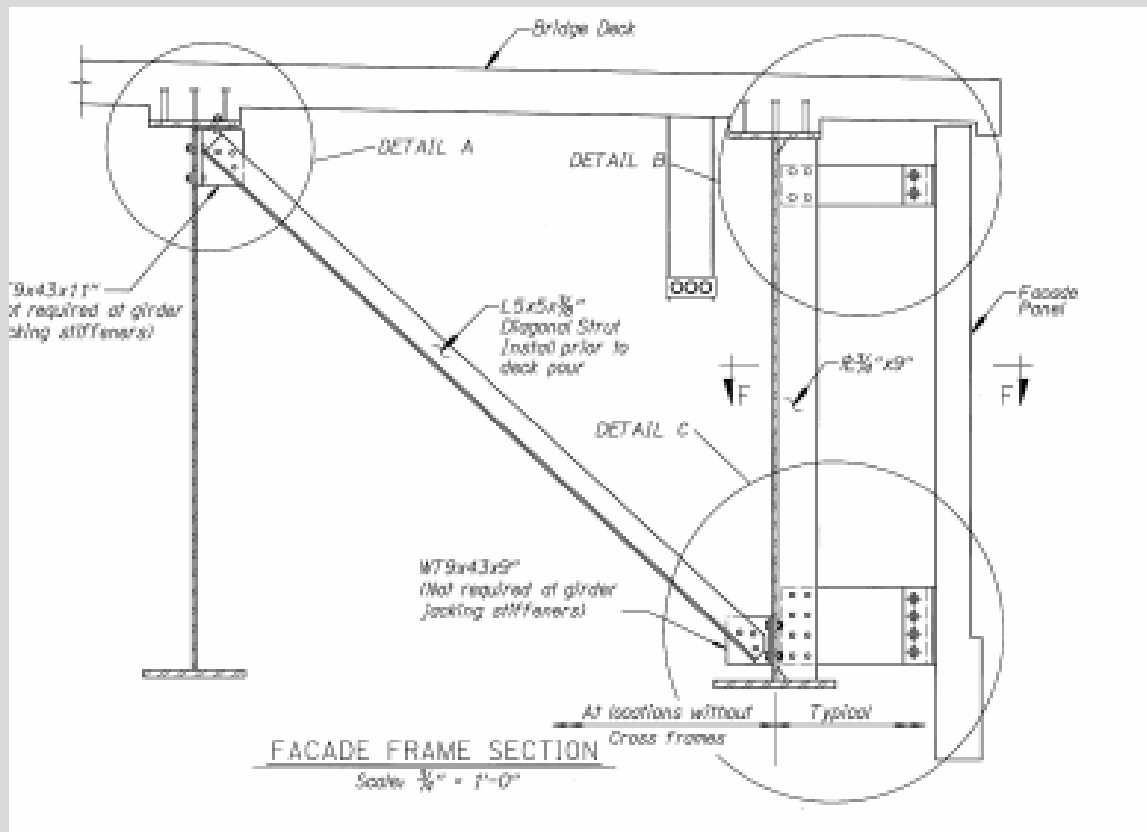
Cascade Locks – Connection Details



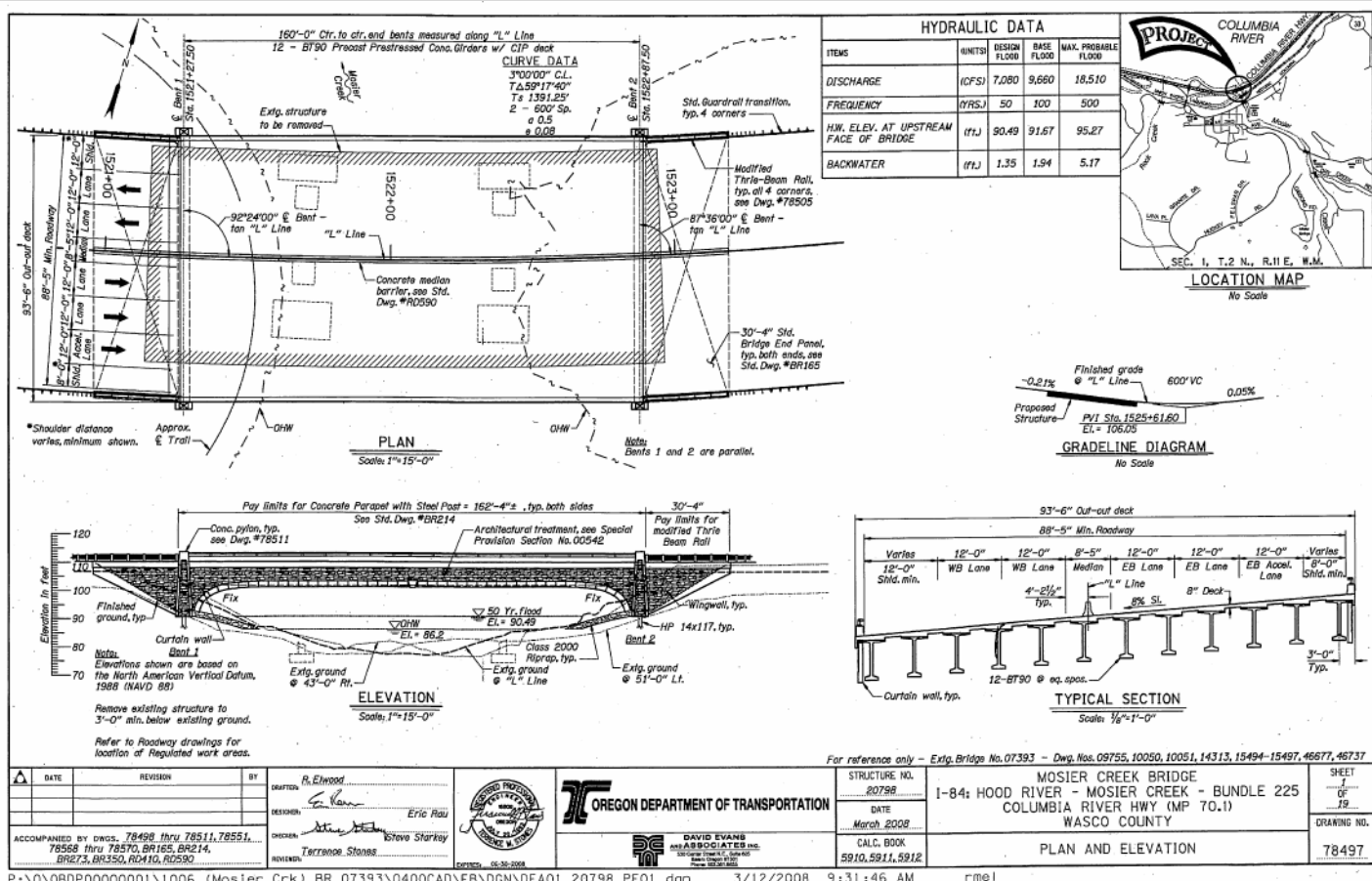
Moffett Creek Bridge



Moffett Creek Bridge



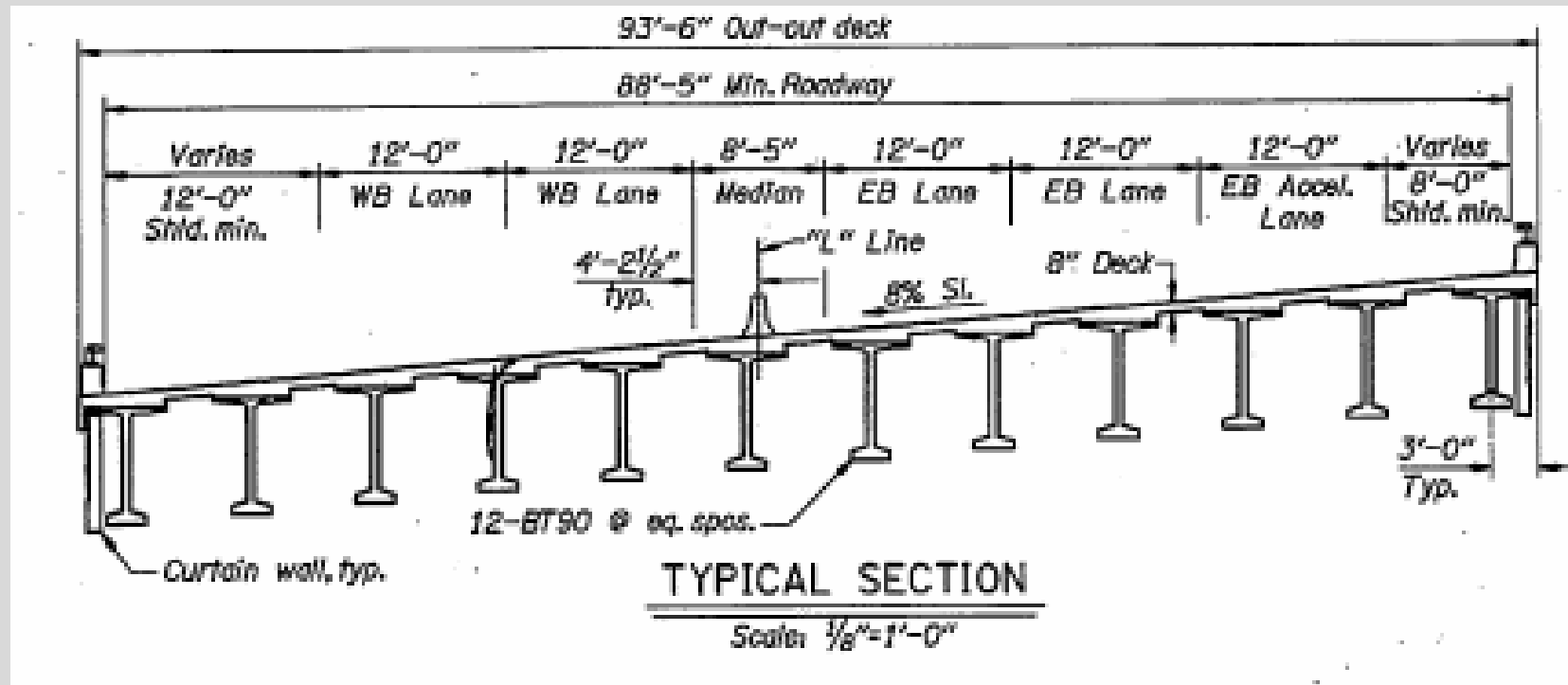
Mosier Creek Bridge



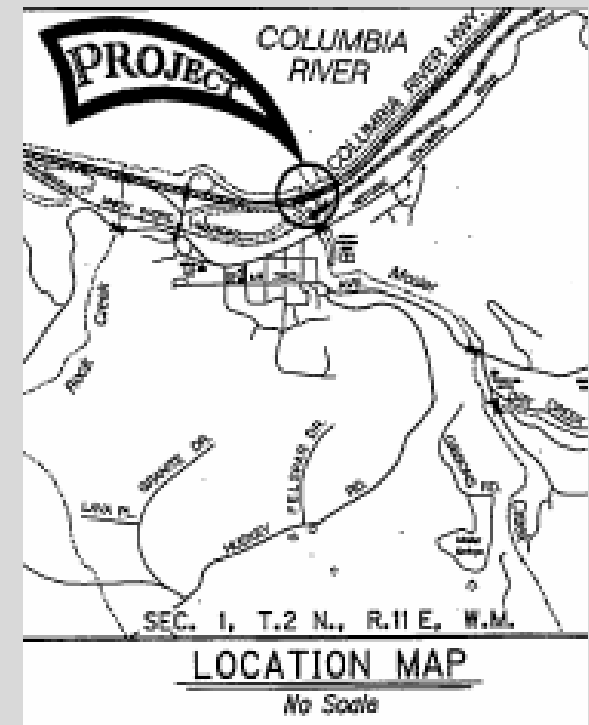
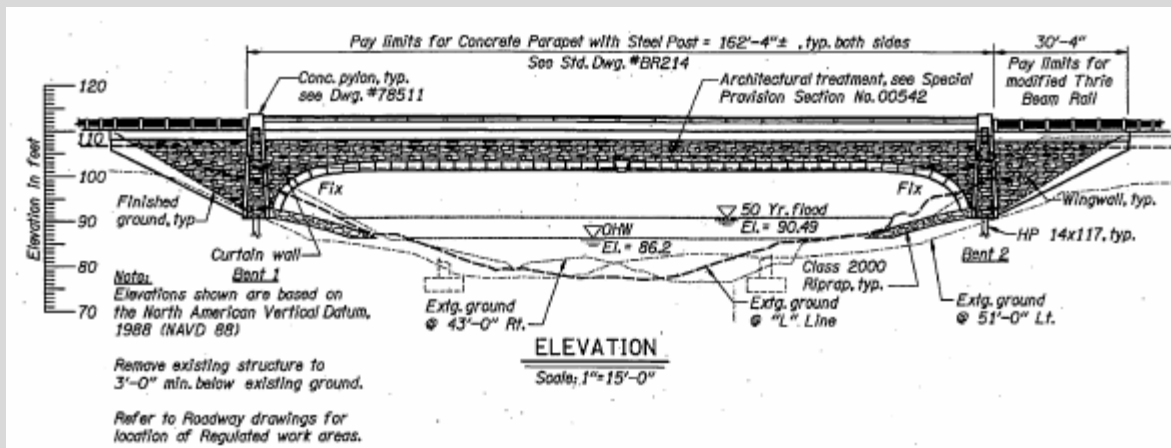
P:\0\0BDP0000001\1006_ (Mosier_Crk) _BR_07393\0400CAD\EB\GDND\EA01_20798_PEO1.dgn 3/12/2008 9:31:46 AM rme1



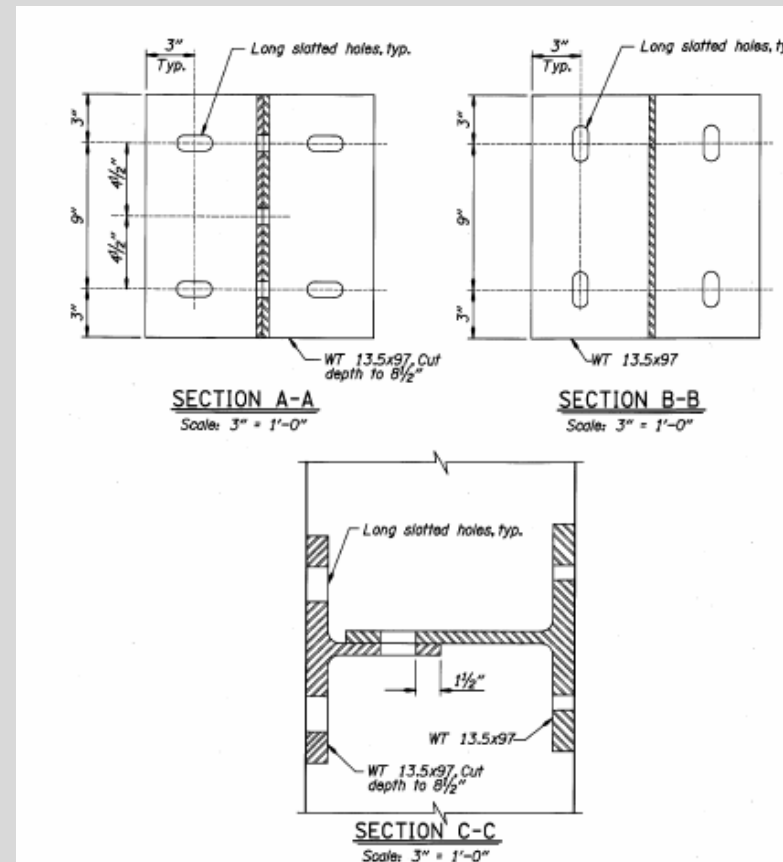
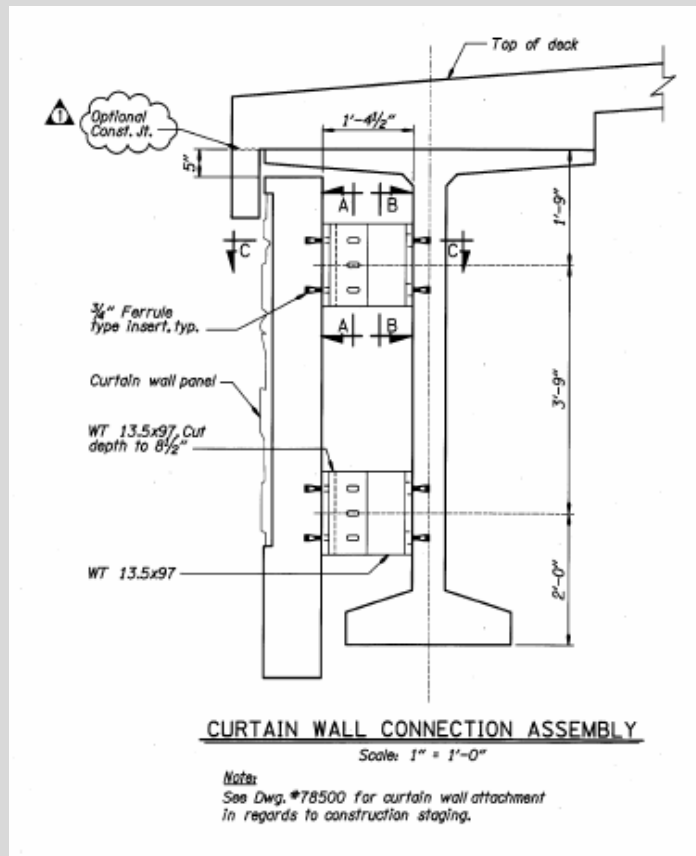
Mosier Creek Bridge



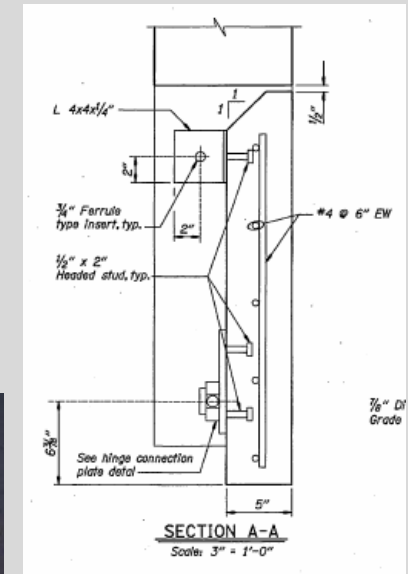
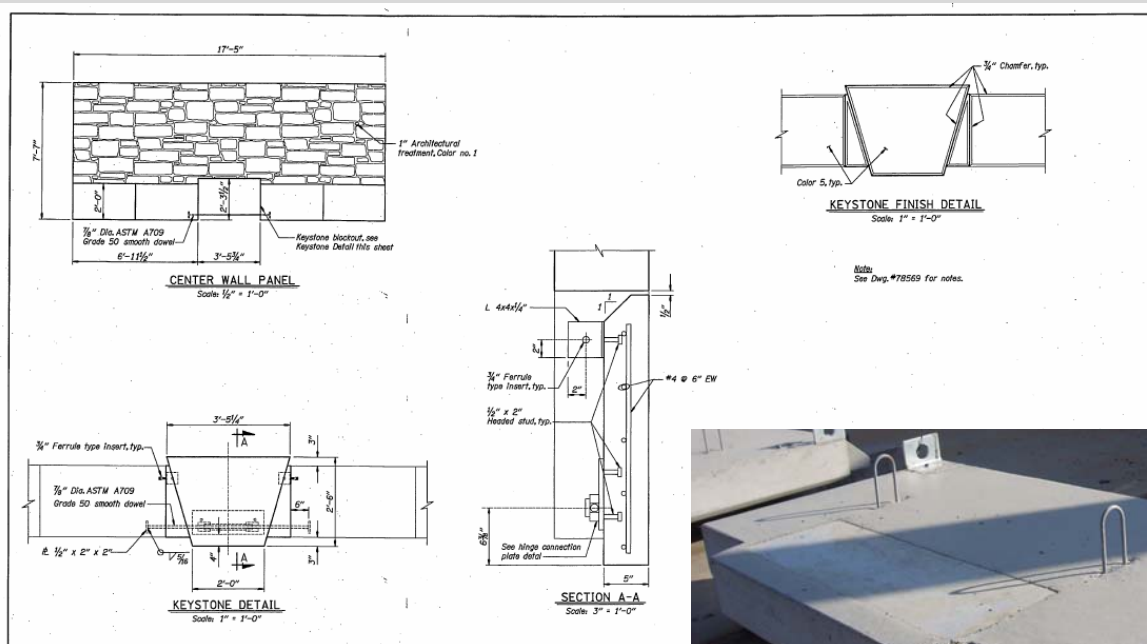
Mosier Creek Bridge – Hydraulics



Mosier Creek Bridge



Mosier Creek Bridge



DATE	REVISION	BY	APP'D
		R. Elwood	
		Eric Rau	
		Steve Starkey	
		TERRANCE STONES	

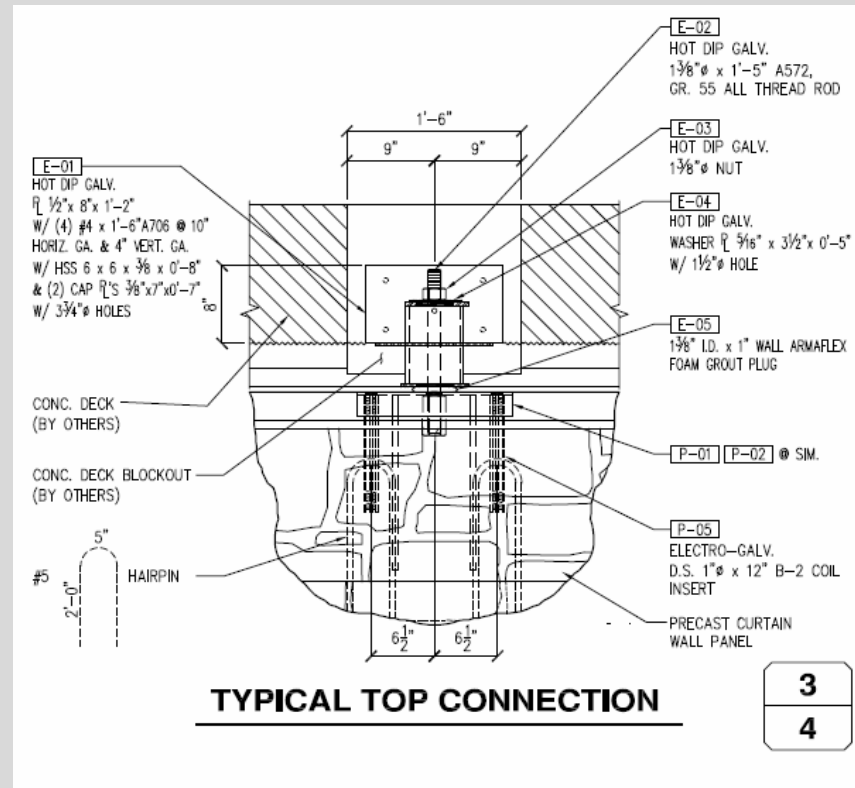
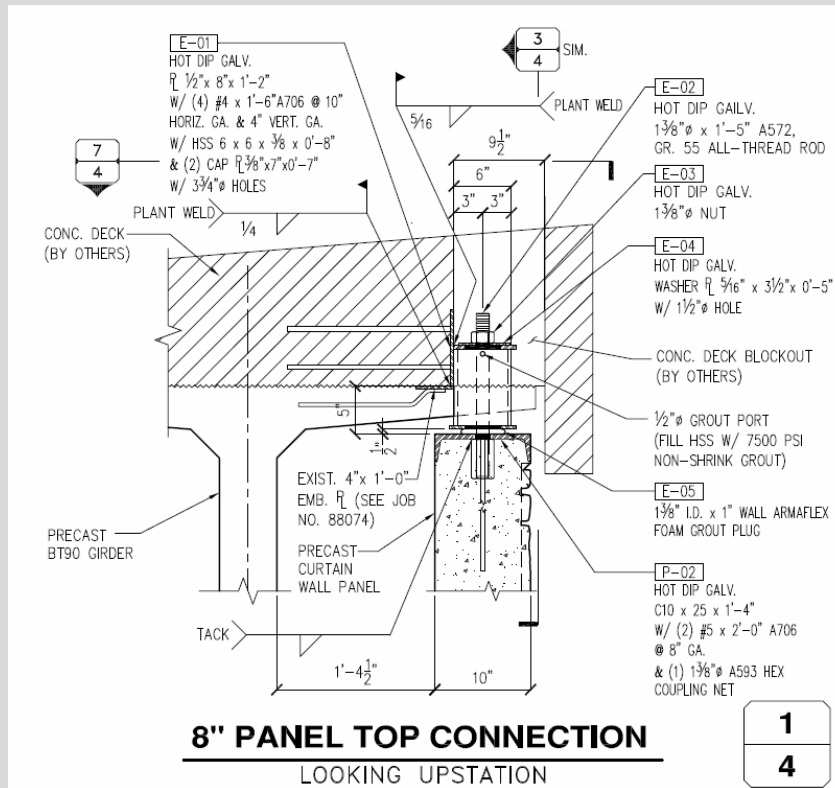
ACCOMPANIED BY DWGS. See sheet 1.

DAVID EVANS AND ASSOCIATES, INC.
1000 NE Oregon Street, Suite 200
Portland, Oregon 97232
503.255.1111

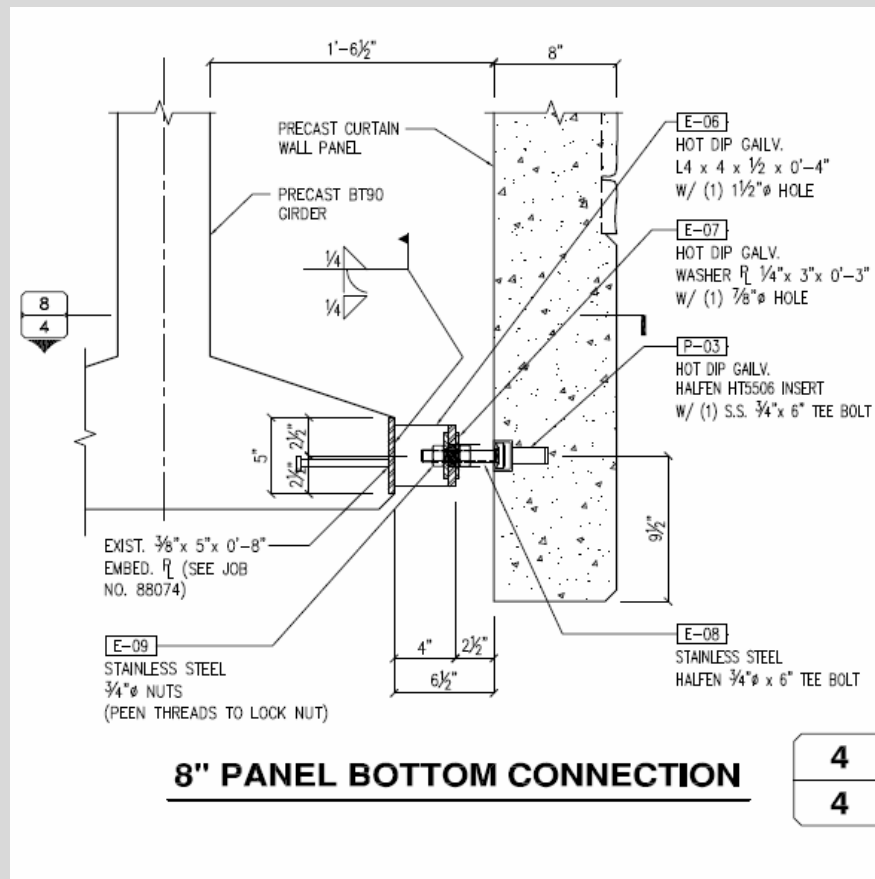
REVISION: 00-00-2008

P:\V\OBDP\00000001\1006 - (Mosier - Crk) - BR_07393\0400CAD\EB\DON\DEA17_20798_CW02.dgn 3/12/2008

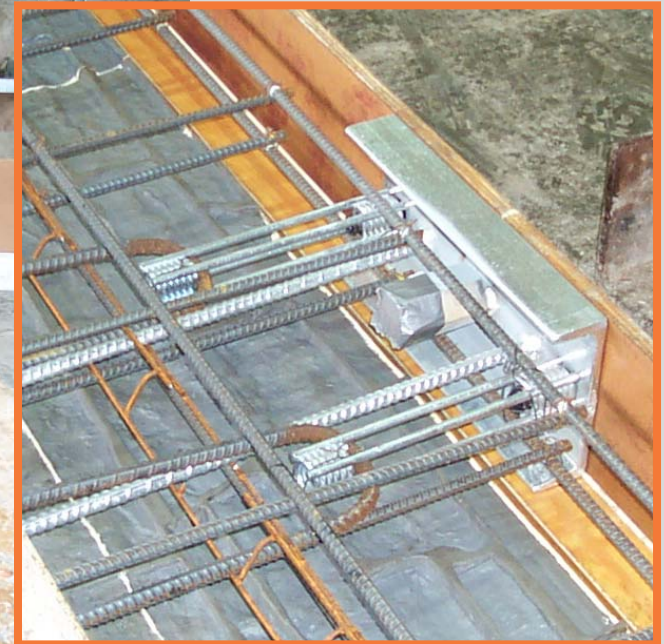
Mosier Creek Bridge – Top Conn.



Mosier Creek Bridge – Bot. Conn.



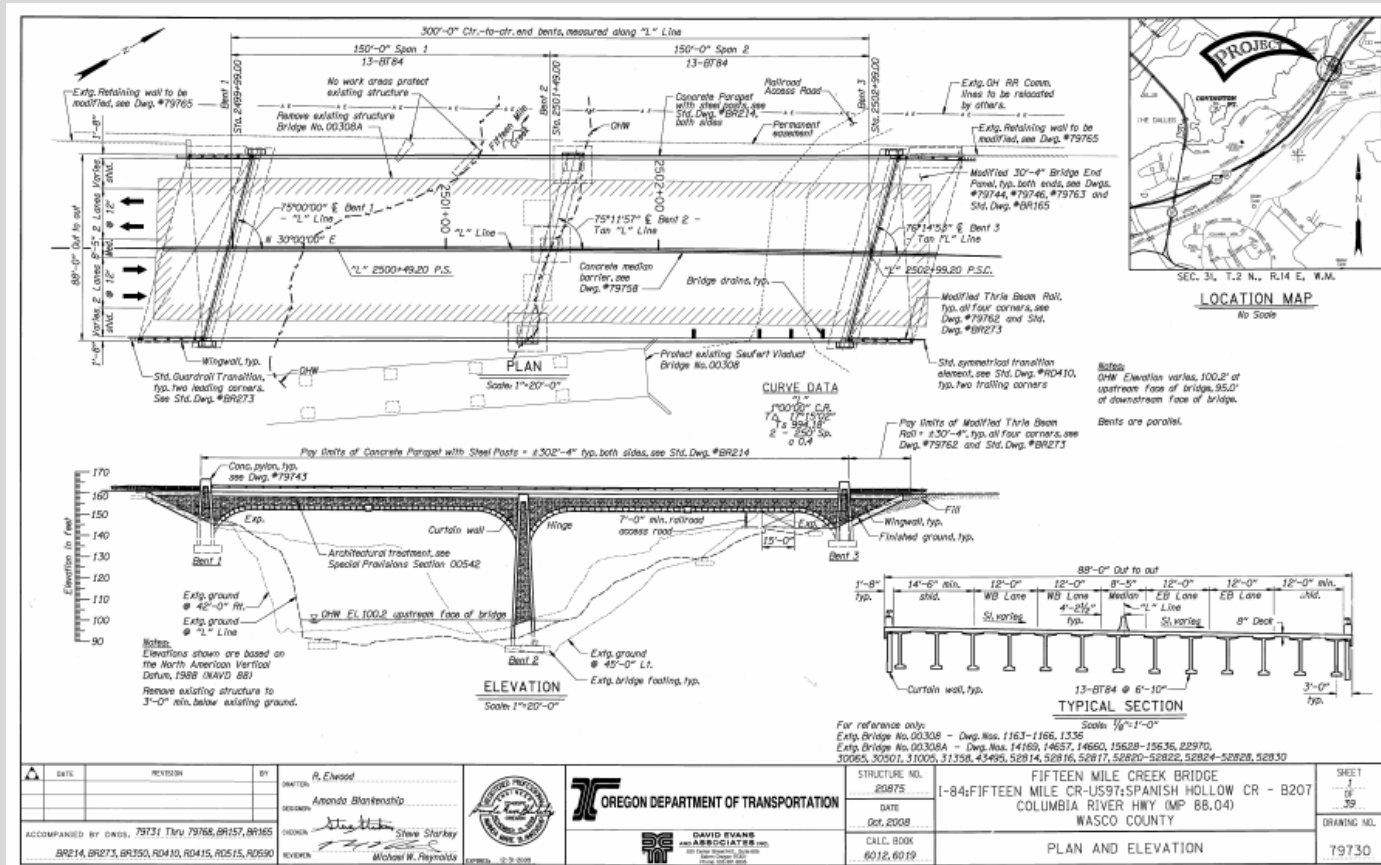
Mosier Creek Bridge



Mosier Creek Bridge



Fifteen Mile Creek



Design Challenges

- Connections, Connections, Connections.....
- Panel Loading
- Panel Erection
- Construction Staging
- Contractor Forming

Reinforcement Conflicts



Precast to CIP Connections



Shipping Configurations



Product Handling



Construction Costs

- Cascade Locks – 2160 SF @ \$128/SF
 - No Engineering Details, Panel Size
- Mosier Creek – 2592 SF @ \$111/SF
 - Hydraulic Loading, Engineering Details Redesigned
- Moffett Creek – 6462 SF @ \$53/SF
 - Engineering Details Complete, Symmetry
- Fifteen Mile – 4845 SF @ \$93/SF
 - Mosier Creek Details Copied and Modified

Future Issues

- Maintenance and Replacement
 - Form Liner
 - Staining
 - Connection Access
 - Product Handling

Thank You

