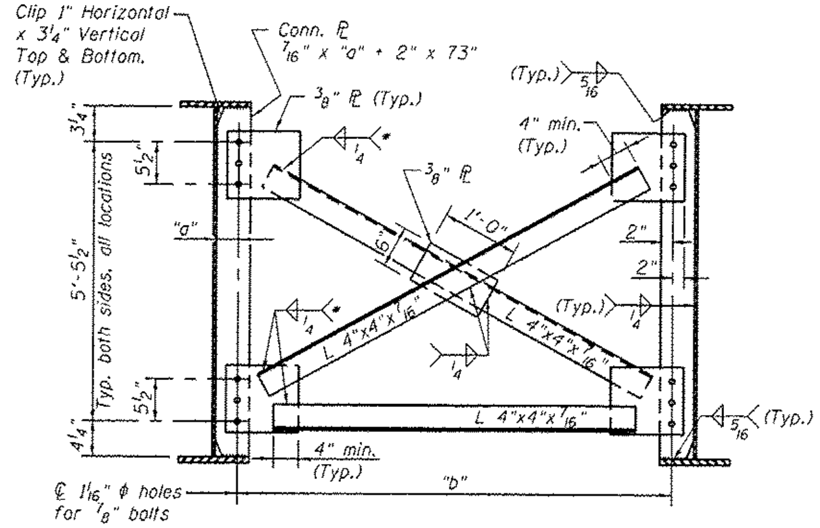
CROSS FRAME DIMENSIONS (a)

BAY	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20	D21
Girder 1-2	6"	6"	6"	6"	6"	6"	6"	6 1/16"	6 1/16"	6"	6"	6 1/16"	6 1/16"	6"	6"	6 1/16"	6 1/16"	6 1/16"	6 1/16"		
Girder 2-3	6 3/16"	6 3/16"	6 3/16"	6 1/8"	6 3/16"	6 3/16"	6 3/16"	6 1/4"	6 1/4"	6 3/16"	6 3/16"	6 1/4"	6 1/4"	6 3/16"	6 3/16"	6 3/16"	6 1/4"	6 1/4"	6 1/4"		
Girder 3-4																				6"	
Girder 4-5																				6"	
Girder 5-6																					6"
Girder 6-7																					6"
Girder 7-8																					6"
Girder 8-9																					6"

BAY	D22	D23	D24	D25	D26	D27	D28	D29	D30	D31	D32	D33	D34	D35	D36	D37	D38	D39	D40	D41	D42
Girder 10-11	6"																				
Girder 11-12	6"																				
Girder 12-13	6"																				
Girder 13-14	6"																				
Girder 14-15		6"																			
Girder 15-16			6"	6"	6"	6"	6"	6"	6"	6 1/16"	6 1/16"	6"	6"	6 1/16"	6 1/16"	6"	6"	6 1/16"	6"	6"	6 1/16"
Girder 16-17			6 1/4"	6 1/4"	6 1/4"	6 1/4"	6 1/4"	6 5/16"	6 1/4"	6 5/16"	6 3/8"	6 1/4"	6 5/16"	6 5/16"	6 3/8"	6 1/4"	6 1/4"	6 5/16"	6 1/4"	6 3/8"	6 7/16"
Girder 17-18			6 7/16"	6 7/16"	6 1/2"	6 1/2"	6 1/2"	6 9/16"	6 1/2"	6 9/16"	6 5/8"	6 1/2"	6 9/16"	6 5/8"	6 11/16"	6 1/2"	6 1/2"	6 5/8"	6 9/16"	6 11/16"	6 3/4"
Girder 18-19			6 5/8"	6 11/16"	6 11/16"	6 3/4"	6 13/16"	6 7/8"	6 11/16"	6 13/16"	6 7/8"	6 13/16"	6 13/16"	6 7/8"	6 15/16"	6 3/4"	6 13/16"	6 7/8"	6 7/8"	6 15/16"	7 1/16"

CROSS FRAME DIMENSIONS (b)

D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20	D21
6'-6"	6'-7 1/2"	6'-9"	6'-10 5/8"	7'-0 1/8"	7'-1 1/4"	7'-2 1/2"	7'-3"	7'-4 1/4"	7'-5 1/2"	7'-6 3/4"	7'-7 3/4"	7'-9"	7'-10 3/4"	8'-0"	8'-1 1/2"	8'-3"	8'-4 1/2"	8'-6"	8'-2"	8'-0"
D22	D23	D24	D25	D26	D27	D28	D29	D30	D31	D32	D33	D34	D35	D36	D37	D38	D39	D40	D41	D42
8'-0"	8'-3"	5'-1 1/2"	5'-4 1/8"	5'-6 3/4"	5'-9 3/8"	6'-0"	6'-2"	6'-4"	6'-5"	6'-7"	6'-9 1/4"	6'-11 1/4"	7'-1 1/4"	7'-3 1/4"	7'-6"	7'-8 1/4"	7'-10 3/4"	8'-1 1/2"	8'-4"	8'-6 1/2"



TYPICAL INTERIOR CROSS FRAME

(2 ea. D1-D19, 38-D20, 76-D21 for SN 025-0111 (WB))
(76-D22, 19-D23, 4 ea. D24-D42 for SN 025-0112 (EB))

* Fillet weld angles along 3 sides of one face of gusset plate

Notes:

Two hardened washers required for each set of oversized holes.

All cross frames between girders shall be installed with erection pins and bolts according to the erection plan approved by the Engineer. Individual cross frames at supports may be temporarily disconnected to install bearing anchor rods.

All cross frames shall be Grade 50. (Revision 1)

INTERIOR GIRDER MOMENT TABLE (For Girder Line 4 WB)		0.4 Sp. 1	Pier	0.6 Sp. 2
I_s	(in⁴)	80956	150013	99291
$I_c(n)$	(in⁴)	177266	-	224293
$I_c(3n)$	(in⁴)	129197	-	159632
$I_c(cr)$	(in⁴)	-	168588	-
S_s	(in³)	2284	4017	3133
$S_c(n)$	(in³)	3065	-	4122
$S_c(3n)$	(in³)	2768	-	3740
$S_c(cr)$	(in³)	-	4191	-
DC1	(k/')	1.32	1.45	1.34
M_{DC1}	('k)	2506	6766	3672
DC2	(k/')	0.17	0.17	0.17
M_{DC2}	('k)	342	824	471
DW	(k/')	0.45	0.45	0.45
M_{DW}	('k)	891	2143	1224
M_{LL+IM}	('k)	3175	3714	3595
M_u (Strength I)	('k)	10453	19202	13306
$\phi_f M_n$	('k)	14966	-	19220
f_s DC1	(ksi)	13.17	20.21	14.06
f_s DC2	(ksi)	1.48	2.37	1.51
f_s DW	(ksi)	3.86	6.14	3.93
f_s (LL+IM)	(ksi)	12.43	10.63	10.47
f_s (Service II)	(ksi)	34.67	42.54	33.11
$0.95R_hF_{yf}$	(ksi)	47.50	65.84	47.50
f_s (Total)(Strength I)	(ksi)	-	56.04	-
$\phi_f F_n$	(ksi)	-	62.39	-
V_f	(k)	81.6	70.4	81.4

INTERIOR GIRDER REACTION TABLE (For Girder Line 4 WB)		W. Abut.	Pier	E. Abut.
R_{DC1}	(k)	78.71	339.63	101.81
R_{DC2}	(k)	11.12	41.07	12.93
R_{DW}	(k)	28.91	106.83	35.18
R_{LL+IM}	(k)	138.83	292.93	143.66
R_{Total}	(k)	257.57	780.46	293.58

I_s, S_s: Non-composite moment of inertia and section modulus of the steel section used for computing f_s (Total-Strength I, and Service II) due to non-composite dead loads (in.⁴ and in.³).

$I_c(n)$, $S_c(n)$: Composite moment of inertia and section modulus of the steel and deck based upon the modular ratio, "n", used for computing f_s (Total-Strength I, and Service II) in uncracked sections due to short-term composite live loads (in.⁴ and in.³).

$I_c(3n)$, $S_c(3n)$: Composite moment of inertia and section modulus of the steel and deck based upon 3 times the modular ratio, "3n", used for computing f_s (Total-Strength I, and Service II) in uncracked sections, due to long-term composite (superimposed) dead loads (in.⁴ and in.³).

$I_c(cr)$, $S_c(cr)$: Composite moment of inertia and section modulus of the steel and longitudinal deck reinforcement, used for computing f_s (Total-Strength I and Service II) in cracked sections, due to both short-term composite live loads and long-term composite (superimposed) dead loads (in.⁴ and in.³).

DC1: Un-factored non-composite dead load (kips/ft.).

M_{DC1}: Un-factored moment due to non-composite dead load (kip-ft.).

DC2: Un-factored long-term composite (superimposed excluding future wearing surface) dead load (kips/ft.).

M_{DC2}: Un-factored moment due to long-term composite (superimposed excluding future wearing surface) dead load (kip-ft.).

DW: Un-factored long-term composite (superimposed future wearing surface only) dead load (kips/ft.).

M_{DW}: Un-factored moment due to long-term composite (superimposed future wearing surface only) dead load (kip-ft.).

M_{LL+IM}: Un-factored live load moment plus dynamic load allowance (impact) (kip-ft.).

M_u (Strength I): Factored design moment (kip-ft.).
$1.25 (M_{DC1} + M_{DC2}) + 1.5 M_{DW} + 1.75 M_{LL+IM}$

$\phi_f M_n$: Compact composite positive moment capacity computed according to Article 6.10.7.1 or non-slender negative moment capacity according to Article A6.1.1 or A6.1.2 (kip-ft).

f_s DC1: Un-factored stress at edge of flange for controlling steel flange due to vertical non-composite dead loads as calculated below (ksi).
M_{DC1} / S_{nc}

f_s DC2: Un-factored stress at edge of flange for controlling steel flange due to vertical composite dead loads as calculated below (ksi).
$M_{DC2} / S_c(3n)$ or $M_{DC2} / S_c(cr)$ as applicable.

f_s DW: Un-factored stress at edge of flange for controlling steel flange due to vertical composite future wearing surface loads as calculated below (ksi).
$M_{DW} / S_c(3n)$ or $M_{DW} / S_c(cr)$ as applicable.

f_s (LL+IM): Un-factored stress at edge of flange for controlling steel flange due to vertical composite live load plus impact loads as calculated below (ksi).
$M_{LL+IM} / S_c(n)$ or $M_{DW} / S_c(cr)$ as applicable.

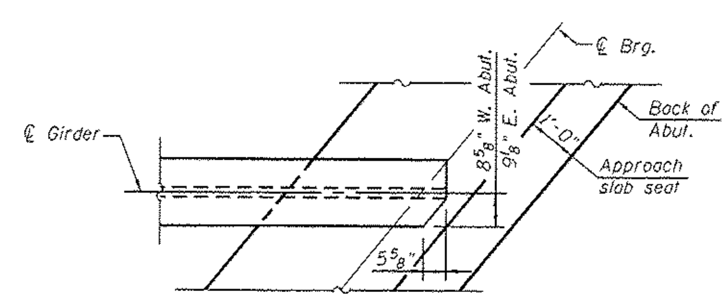
f_s (Service II): Sum of stresses as computed below (ksi).
$f_{sDC1} + f_{sDC2} + f_{sDW} + 1.3 f_s(LL+IM)$

$0.95R_hF_yf$: Composite stress capacity for Service II loading according to Article 6.10.4.2 (ksi).

f_s (Total)(Strength I): Sum of stresses as computed below on non-compact section (ksi).
$1.25 (f_{sDC1} + f_{sDC2}) + 1.5 f_{sDW} + 1.75 f_s(LL+IM)$

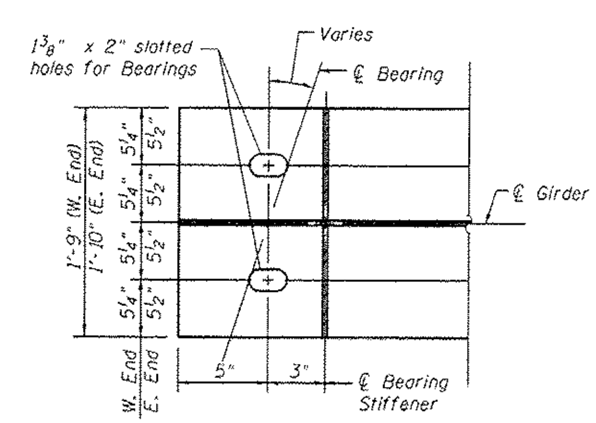
$\phi_f F_n$: Non-Compact composite positive or negative stress capacity for Strength I loading according to Article 6.10.7 or 6.10.8 (ksi).

V_f: Maximum factored shear range in span computed according to Article 6.10.10.



END GIRDER TOP FLANGE CLIP DETAIL

(Showing top flange of steel beam at integral abutment)



END GIRDER DETAIL

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BERNARDIN · LOCHMUELLER & ASSOCIATES INC.	Illinois Design Firm Number 184.001670	CHECKED - ACS	REVISED
	PLOT SCALE =	DRAWN - WJS	REVISED
	PLOT DATE = 8:25:38 AM 9/3/2013	CHECKED - CJF	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

STRUCTURAL STEEL
STRUCTURE NO. 025-0111 & 025-0112

SHEET NO. 55 OF 79 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
57/70	(25-4HVB-1)BY	EFFINGHAM	1760	590
		CONTRACT NO. 74295		
		ILLINOIS FED. AID PROJECT		