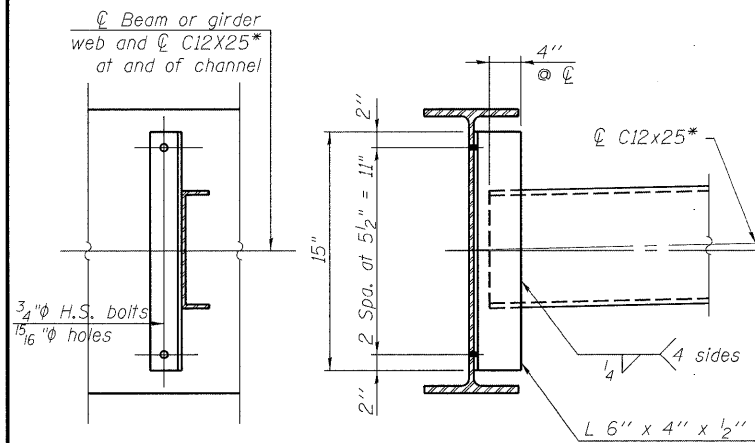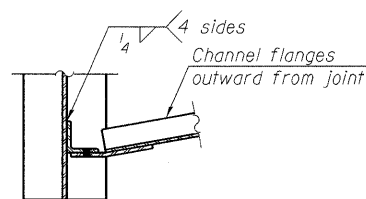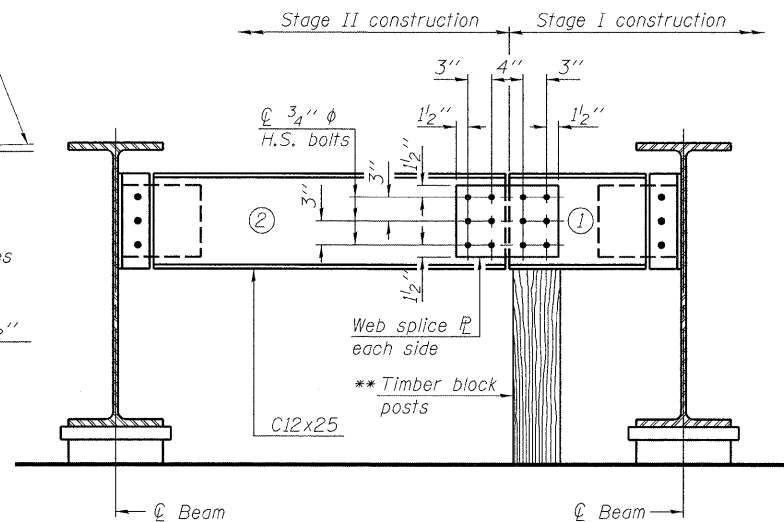# STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

DIAPHRAGM D1
(77 Required)

*C12x30 may be used in lieu C12x25 at no additional cost to the Department. Calculated weight of structural steel is based on the lighter section.

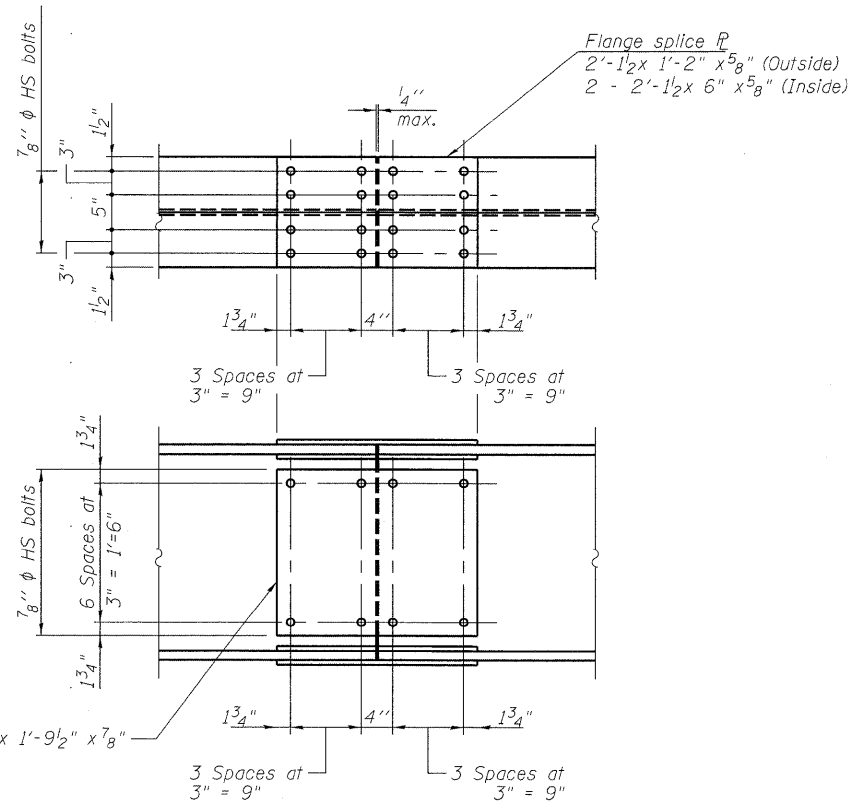Two hardened washers required for each set of oversized holes.

SECTION A-A

DIAPHRAGM D2
(22 Required)

Two hardened washers required for each set of oversized holes.

DIAPHRAGM D2 STAGE CONSTRUCTION SEQUENCE

1.) Order diaphragm in two sections.
2.) Attach section ① of diaphragm to beam
3.) Place timber block posts between section ① of diaphragm and abutment bearing section.
4.) Attach section ② of diaphragm to both beam and section ① of diaphragm during stage II construction with splice plates.
5.) Remove timber block posts.

** Cost of Timber Block Posts is included with Structural Steel.

SPLICE

Splice plates shall conform to the Supplemental Requirements for Notch Toughness. Zone 2

All structural steel splice plates shall be M270 Grade 50 steel.

Note:
All structural steel shall be hot dip galvanized in accordance with the Special Provision for "Hot Dip Galvanizing for Structural Steel."

INTERIOR GIRDER MOMENT TABLE

		0.4 Sp. 1 or 0.6 Sp. 2	Pier
I_s	(in⁴)	6,936	6,936
$I_c(n)$	(in⁴)	18,715	-
$I_c(3n)$	(in⁴)	13,103	-
S_s	(in³)	499	499
$S_c(n)$	(in³)	6,564	-
$S_c(3n)$	(in³)	1,627	-
Z	(in³)	-	563
$DC1$	(k/')	0.934	0.934
M_{DC1}	('k)	357.4	627.1
$DC2$	(k/')	0.224	0.224
M_{DC2}	('k)	102.4	109.4
DW	(k/')	0.216	0.216
M_{DW}	('k)	98.9	105.6
$M_{\ell + IM}$	('k)	852.9	564.9
* M_u (Strength I)	('k)	2,215.7	2,067.8
$\phi_f M_n$, $\phi_f M_{nc}$	('k)	3,360.8	2,078.4
f_s DC1	(ksi)	8.6	15.1
f_s DC2	(ksi)	1.9	2.6
f_s DW	(ksi)	1.8	2.6
f_s $1.3(\ell + IM)$	(ksi)	17.7	17.7
f_s (Service II)	(ksi)	30.0	38.0
** f_s (Total)(Strength I)	(ksi)	-	-
V_f	(k)	23.9	-

* Compact sections
** Non-Compact and slender sections

INTERIOR GIRDER REACTION TABLE

		Abut.	Pier
R_{DC1}	(k)	25.8	85.8
R_{DC2}	(k)	6.8	19.5
R_{DW}	(k)	6.5	18.8
$R_{\ell + IM}$	(k)	75.6	128.3
R_{Total}	(k)	114.7	252.4

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) 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) due to long-term composite (superimposed) dead loads (in.⁴ and in.³).

Z: Plastic Section Modulus of the steel section in non-composite areas. Omit line in Moment Table if not used in design calculations (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.).

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

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

$\phi_f M_n$: Compact composite positive moment capacity computed according to Article 6.10.7.1 (kip-ft.).

$\phi_f M_{nc}$: Compact non-composite negative moment capacity computed according to Article A6.1.1 (kip-ft.).

f_s (Service II): Sum of stresses as computed from the moments below (ksi).
$M_{DC1} + M_{DC2} + M_{DW} + 1.3 M_{\ell + IM}$

f_s (Total)(Strength I): Sum of stresses as computed from the moments below on non-compact section (ksi).
$1.25 (M_{DC1} + M_{DC2}) + 1.5 M_{DW} + 1.75 M_{\ell + IM}$

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

FRAMING DETAILS AND MOMENT AND REACTION TABLES
STRUCTURE NUMBER 016-0610

DESIGNED - ASP
CHECKED - WSP
DRAWN - BEM
CHECKED - ASP

SHEET NO. 23 OF 42 SHEETS	F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	94	0101.8B	COOK	139	99

CONTRACT NO. 60C18

ILLINOIS FED. AID PROJECT