

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

| | | | | | |
|-----------------------|----------|-------------------|--------------|-----------|-----------|
| ROUTE NO. | SECTION | COUNTY | TOTAL SHEETS | SHEET NO. | 29 |
| F.A.U. 7706 | 23(B-1) | LOGAN | 179 | 113 | 52 SHEETS |
| FED. ROAD DIST. NO. 7 | ILLINOIS | FED. AID PROJECT- | | | |

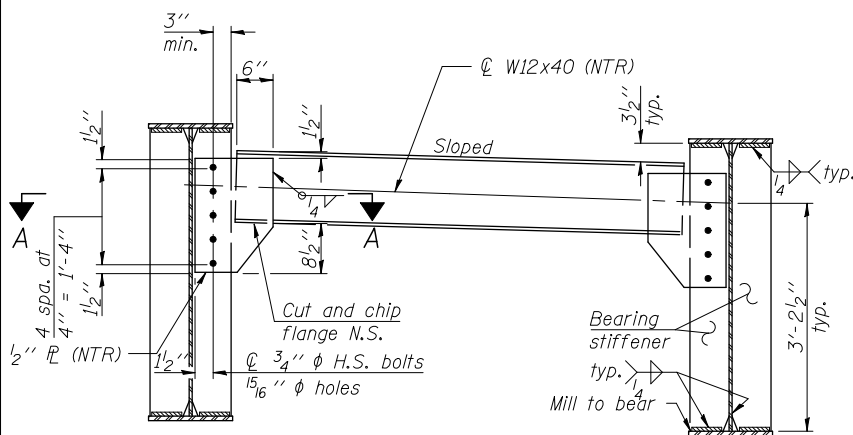
Contract #72789

| | 0.4 Sp. 1 or 0.6 Sp. 5 | Pier 1 or Pier 4 | 0.5 Sp. 2 or 0.5 Sp. 4 | Pier 2 or Pier 3 | 0.5 Sp. 3 |
|---------------------------|---------------------------|------------------|------------------------|------------------|-----------|
| I_s | (in ⁴) 17,086 | 37,697 | 17,086 | 37,697 | 17,086 |
| $I_c(n)$ | (in ⁴) 44,858 | 37,697 | 44,858 | 37,697 | 44,858 |
| $I_c(3n)$ | (in ⁴) 33,271 | 37,697 | 33,271 | 37,697 | 33,271 |
| S_s | (in ³) 690 | 1,478 | 690 | 1,478 | 690 |
| $S_c(n)$ | (in ³) 1,006 | 1,478 | 1,006 | 1,478 | 1,006 |
| $S_c(3n)$ | (in ³) 914 | 1,478 | 914 | 1,478 | 914 |
| S_{xt} | (in ³) 886 | 1,478 | 949 | 1,478 | 930 |
| $DC1$ | (k/ft) 0.944 | 1.065 | 0.944 | 1.065 | 0.944 |
| M_{DC1} | (k) 760 | 1,616 | 345 | 1,303 | 477 |
| $DC2$ | (k/ft) 0.150 | 0.150 | 0.150 | 0.150 | 0.150 |
| M_{DC2} | (k) 134 | 216 | 79 | 185 | 92 |
| DW | (k/ft) 0.360 | 0.360 | 0.360 | 0.360 | 0.360 |
| M_{DW} | (k) 321 | 515 | 187 | 440 | 218 |
| $M_{\xi + imp}$ | (k) 1,580 | 1,522 | 1,392 | 1,507 | 1,454 |
| M_u (Strength I) | (k) 4,364 | 5,727 | 3,247 | 5,157 | 3,584 |
| M_{bt} | (k) 12.7 | 6.7 | 8.6 | 3.8 | 9.5 |
| f_s DC1 | (ksi) 13.23 | 13.12 | 5.99 | 10.58 | 8.29 |
| f_s DC2 | (ksi) 1.76 | 1.75 | 1.03 | 1.50 | 1.20 |
| f_s DW | (ksi) 4.21 | 4.18 | 2.46 | 3.58 | 2.87 |
| f_s 1.3($\xi + I$) | (ksi) 24.50 | 16.07 | 21.59 | 15.90 | 22.55 |
| f_t | (ksi) 6.23 | 1.00 | 4.19 | 0.56 | 4.66 |
| f_s (Service II) | (ksi) 43.70 | 35.12 | 31.07 | 31.56 | 34.91 |
| f_s (Total)(Strength I) | (ksi) 58.03 | 46.49 | 41.53 | 41.87 | 46.52 |
| F_{cr} (Service II) | (ksi) 47.10 | 40.00 | 47.50 | 40.00 | 47.50 |
| V_f | (k) 21.7 | - | 22.5 | - | 22.6 |
| F_{cr} | (ksi) 42.6 | 50 | 43.7 | 50 | 44.7 |

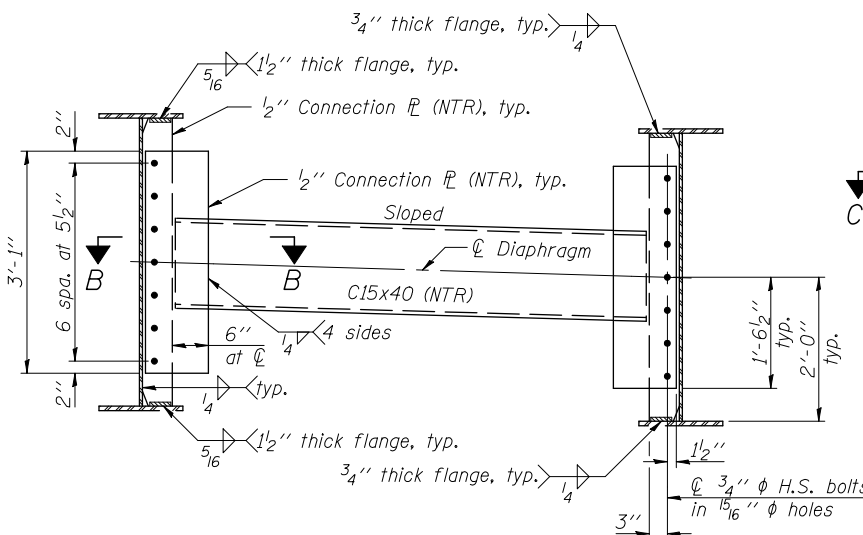
- I_s, S_s : Non-composite moment of inertia and section modulus of the steel section used for computing f_s (Total-Strength I, and Service II) due to non-composite dead loads (in.⁴ and in.³).
- $I_c(n), S_c(n)$: Composite moment of inertia and section modulus of the steel and deck based upon the modular 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).
- S_{xt} : Section modulus about the major axis of section to the controlling flange, tension or compression, taken as yield moment with respect to the controlling flange over the yield strength of the controlling flange (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.).
- $M_{\xi + imp}$: 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 $M_{DW} + 1.75 M_{\xi + imp}$
- M_{bt} : Factored lateral bending moment for controlling flange plate (kip-ft.).
- f_t : Factored calculated normal stress at edge of flange for controlling flange plate due to lateral bending (kip-ft.).
- f_s (Service II): Sum of stresses as computed from the moments below (ksi).
 $M_{DC1} + M_{DC2} + M_{DW} + 1.3 M_{\xi + imp}$
- 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 $M_{DW} + 1.75 M_{\xi + imp}$
- F_{cr} (Service II): Critical flange stress at overload computed according to Article 6.10.4.2 (ksi).
- F_{cr} : Critical flange stress computed according to Article 6.10.7 or 6.10.8 (ksi).
- V_f : Factored shear range computed according to Article 6.10.10.

Note:
 M_{ξ} and R_{ξ} include the effects of centrifugal force and superelevation.

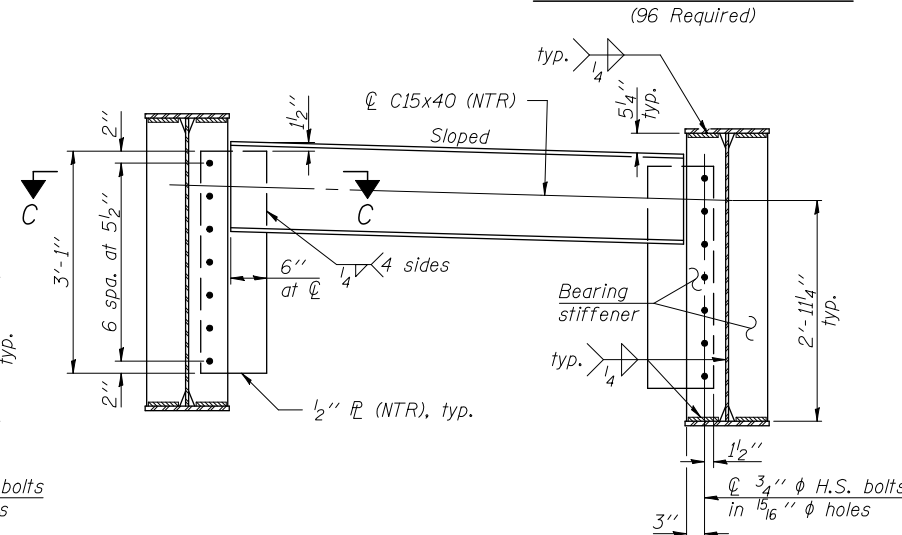
| | N. Abut. or S. Abut | Pier 1 or Pier 4 | Pier 2 or Pier 3 |
|-----------------|---------------------|------------------|------------------|
| R_{DC1} | (k) 38.1 | 133.3 | 118.8 |
| R_{DC2} | (k) 6.4 | 19.6 | 18.0 |
| R_{DW} | (k) 15.2 | 46.9 | 42.9 |
| $R_{\xi + imp}$ | (k) 92.1 | 172.1 | 170.8 |
| R_{Total} | (k) 151.8 | 371.9 | 350.5 |



DIAPHRAGM D
(11 required)

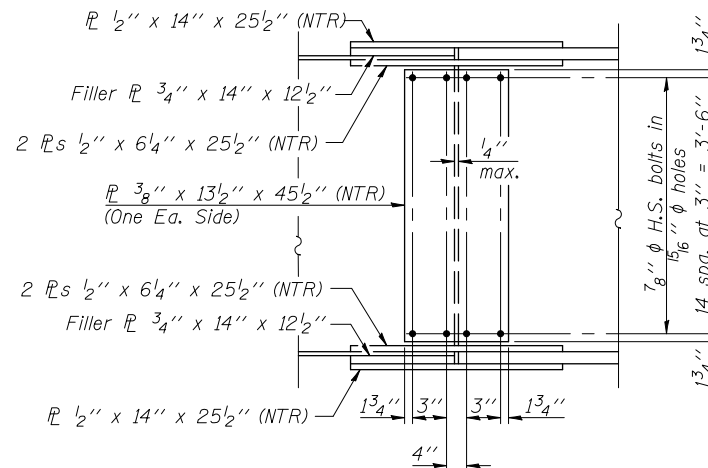
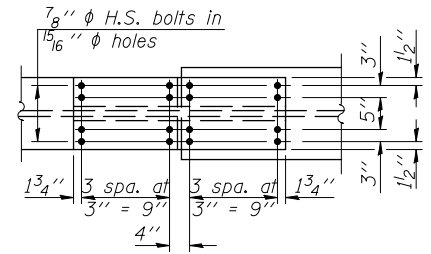


DIAPHRAGM D1
(385 required)

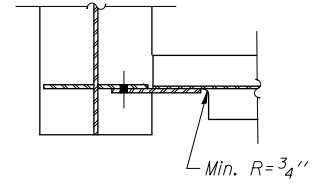


DIAPHRAGM D2
(11 required)

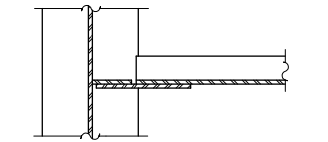
Note:
Two hardened washers required for each set of oversized holes.
Alternate channels C15x50 are permitted to facilitate material acquisition. Calculated weight of structural steel is based on C15x40 sections. The alternate, if utilized, shall be provided at no extra cost to the department.



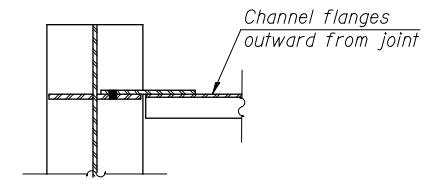
FIELD SPLICE DETAIL
(96 Required)



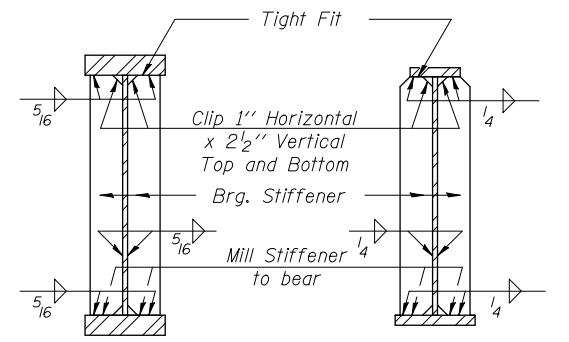
SECTION A-A



SECTION B-B



SECTION C-C



SECTION AT PIER

SECTION AT ABUTMENT

| | |
|----------|-----|
| DESIGNED | JJD |
| CHECKED | EML |
| DRAWN | JJD |
| CHECKED | EML |

HORNER & SHIFRIN, INC.
ENGINEERS

STRUCTURAL STEEL DETAILS
F.A.U. ROUTE 7706 - SECTION 23(B-1)
LOGAN COUNTY
STATION 99+46.00
STRUCTURE NO. 054-0512