

URBAN

SUMMARY OF QUANTITIES

CONSTRUCTION TYPE CODE

CODE NO	ITEM	UNIT	TOTAL QUANTITIES	Knox Co. Fed 80-State20 X271-2A				
44213200	SAW CUTS	FOOT	673.6	673.6				
50102400	CONCRETE REMOVAL	CU YD	73.2	73.2				
50104720	REMOVAL OF EXISTING CONCRETE DECK	EACH	2	2				
50157300	PROTECTIVE SHIELD	SQ YD	1472	1472				
50200100	STRUCTURE EXCAVATION	CU YD	427.4	427.4				
50300100	FLOOR DRAINS	EACH	20	20				
50300225	CONCRETE STRUCTURES	CU YD	28.3	28.3				
50300255	CONCRETE SUPER STRUCTURE	CU YD	907.5	907.5				
50300260	BRIDGE DECK GROOVING	SQ YD	2517	2517				
50300300	PROTECTIVE COAT	SQ YD	3020	3020				
50500405	FURNISHING AND ERECTING STRUCTURAL STEEL	POUND	△ 12,280	12,280				
50500505	STUD SHEAR CONNECTORS	EACH	△ 12,210	12,210				
50500715	JACK AND REMOVE EXISTING BEARINGS	EACH	36	36				
50600600	CLEANING AND PAINTING STEEL BRIDGE NO. 1	L SUM	1	1				
50600700	CLEANING AND PAINTING STEEL BRIDGE NO. 2	L SUM	1	1				
50606401	CONTAINMENT AND DISPOSAL OF LEAD PAINT CLEANING RESIDUES NO.1	L SUM	1	1				
50606402	CONTAINMENT AND DISPOSAL OF LEAD PAINT CLEANING RESIDUES NO.2	L SUM	1	1				
50800205	REINFORCEMENT BARS, EPOXY COATED	POUND	△ 199,820	199,820				

△ REVISED 5-21-08

FILE NAME	USER NAME = legnedm	DESIGNED -	REVISED -
S:\GEN\DRAF\STD&PLNS\Squad\168216	person\general.dgn	DRAWN -	REVISED -
	PLOT SCALE = 100.0000' / IN.	CHECKED -	REVISED -
	PLOT DATE = 3/19/2008	DATE -	REVISED -

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

SUMMARY OF QUANTITIES

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
313	(21-HB-1)1	KNOX	55	4
FED. ROAD DIST. NO.			ILLINOIS FED. AID PROJECT	
			CONTRACT NO. 68216	

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.	SHEET NO. 1
F.A.P. 313	(21-HB-11)	KNOX	55	13	35 SHEETS
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT			

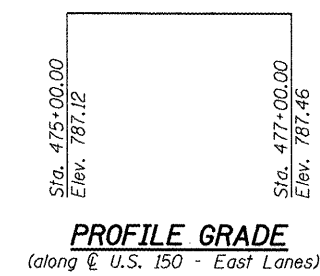
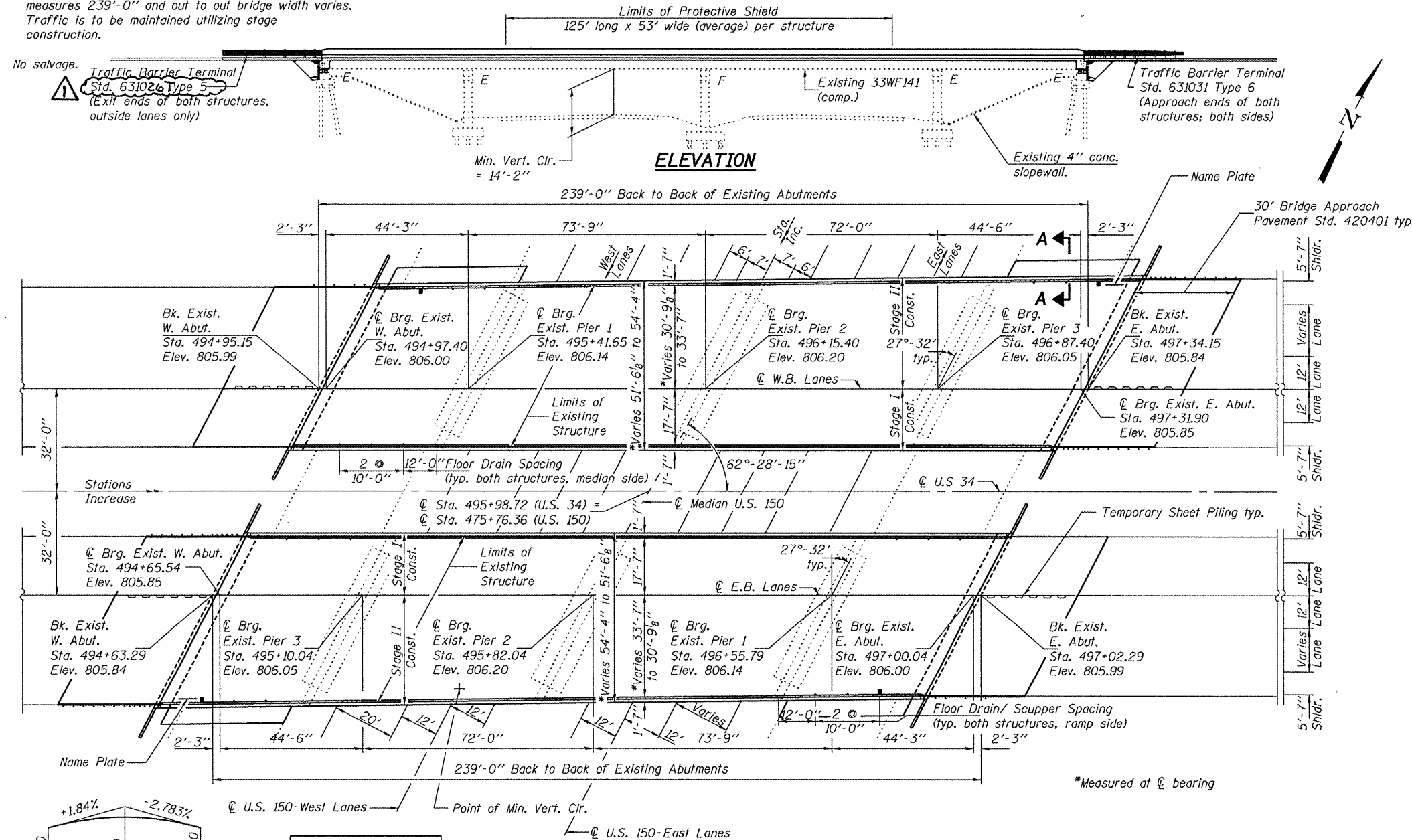
Contract #68216

Bench Mark: A264, located at the Galesburg Municipal Airport, set vertically in the southwest face of the terminal building, about 30' southeast of the west corner of the building, and 30" above the sidewalk. Elevation 764.933

Existing Structure: The existing structures were originally built in 1965 as F.A. Route 29, Section 21HB. The existing structures are four span continuous, non-composite, rolled steel girder structures on pile bent abutments and multi-column piers on pile supported footings. The back to back of abutments measures 239'-0" and out to out bridge width varies. Traffic is to be maintained utilizing stage construction.

SCOPE OF WORK

1. Remove and replace bearings at the abutments.
2. Repair substructure.
3. Remove existing wingwalls as shown.
4. Repair slopewall. For slopewall Repair, see Roadway Plans.



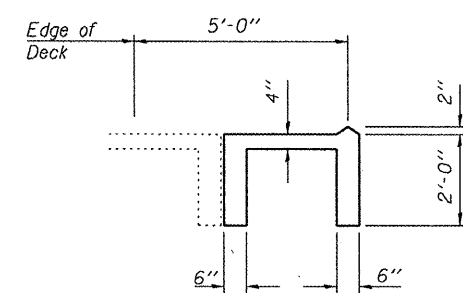
STATION 495+98.72  
RE-BUILT 20 BY  
STATE OF ILLINOIS  
F.A.P. RTE. 313 - SEC. (21-HB-11)  
LOADING HS20  
STRUCTURE NO. 048-0021 (WB)

STATION 495+98.72  
RE-BUILT 20 BY  
STATE OF ILLINOIS  
F.A.P. RTE. 313 - SEC. (21-HB-11)  
LOADING HS20  
STRUCTURE NO. 048-0022 (EB)

**LOADING HS-20-44**  
Allow 50#/sq. ft. for future wearing surface.

**DESIGN SPECIFICATIONS**  
2002 AASHTO

**NAME PLATE**  
See Std. 515001  
Existing Name Plates shall be cleaned and relocated next to new Name Plate. Cost included with "Name Plates".



SECTION A-A

Slopewall shall be reinforced with welded wire fabric, 6" x 6" - W4.0 x W4.0, weighing 58 lbs. per 100 sq. ft.

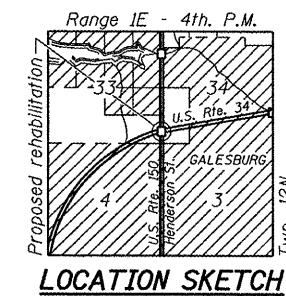
DESIGN STRESSES

**FIELD UNITS**  
New Construction  
 $f'_c = 3,500$  psi  
 $f_y = 60,000$  psi (reinforcement)  
 $f_y = 36,000$  psi (structural steel)

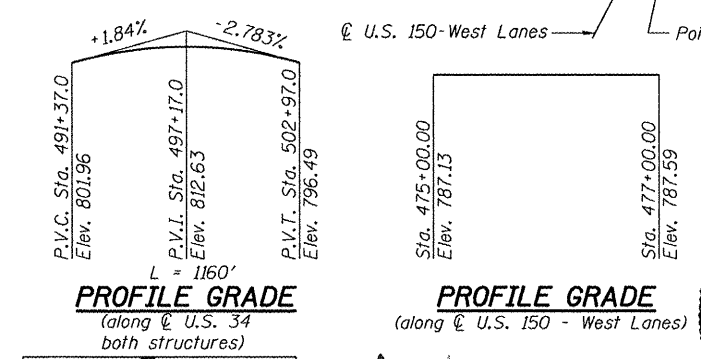
Existing Construction  
 $f'_c = 3,500$  psi  
 $f_y = 40,000$  psi (reinforcement)  
 $f_y = 36,000$  psi (Structural Steel)

SEISMIC DATA

Seismic Performance Category (SPC) = A  
Bedrock Acceleration Coefficient (A) = 0.048g  
Site Coefficient (S) = 1.1



**GENERAL PLAN & ELEVATION**  
**U.S. ROUTE 34 OVER**  
**U.S. ROUTE 150 (HENDERSON STREET)**  
**F.A.P. ROUTE 313 - SECTION (21-HB-11)**  
**KNOX COUNTY**  
**STA. 495+98.72**  
**STRUCTURE NO. 048-0021 (WB)**  
**STRUCTURE NO. 048-0022 (EB)**



DESIGNED: Fess Teklehaimanot  
CHECKED: Shmuel Shmuel  
DRAWN: Greg Farmer  
CHECKED: FT/DPN

APR 29 2008  
EXAMINED: [Signature]  
PASSED: [Signature]

REVISED 5-21-08

EXPIRES 11-30-2008

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
F.A.P. 313	(21-HB-11)	KNOX	SS 19	35 SHEETS
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT		

Contract #68216

**GENERAL NOTES**

Fasteners shall be AASHTO M164 Type 1, mechanically galvanized bolts. Bolts 3/4 in.  $\phi$ , holes 13/16 in.  $\phi$ , unless otherwise noted.  
No field welding is permitted except as specified in the contract documents.  
The Contractor shall test the existing welds by non-destructive methods within 2 ft. of the end of the existing cover plates for cracks after removal of the existing concrete deck. Dye penetrant (PT), magnetic particle (MT), or other approved testing method shall be performed by qualified personnel approved by the Engineer. If cracks are found, report them to the Bureau of Bridges and Structures for disposition. The cost of testing is included in Removal of Existing Concrete Deck. The cost of crack repair, if necessary, will be paid for according to Article 109.04 of the Standard Specifications.  
Reinforcement bars shall conform to the requirements of ASTM A 706 Gr 60 (IL Modified). See Special Provisions.  
Reinforcement bars designated (E) shall be epoxy coated.

Prior to pouring the new concrete deck, all heavy or loose rust, loose mill scale, and other loose or potentially detrimental foreign material shall be removed from the surfaces in contact with concrete. Tightly adhered paint may remain unless otherwise noted. Removal shall be accomplished by methods that will not damage the steel and the cost will be included in the pay item covering removal of the existing concrete.  
As directed by the Engineer, existing construction accessories welded to the top flange of beams shall be removed. The weld areas shall be ground flush and inspected for cracks using magnetic particle testing (MT) or dye penetrant testing (PT) by an individual acceptable to the Engineer. Any cracks that cannot be removed by grinding 1/4 inch deep shall be identified and reported to the Bureau of Bridges and Structures for further disposition. The cost of removing welded accessories, grinding and inspecting weld areas and grinding cracks will be paid for according to Article 109.04 of the Standard Specifications.

Plan dimensions and details relative to existing plans are subject to routine variations. The Contractor shall field verify existing dimensions and details affecting new construction and make necessary approved adjustments prior to construction or ordering of materials. Such variations shall not be cause for additional compensation for a change in scope of the work, however, the Contractor will be paid for the quantity actually furnished based upon the unit price bid for the work.

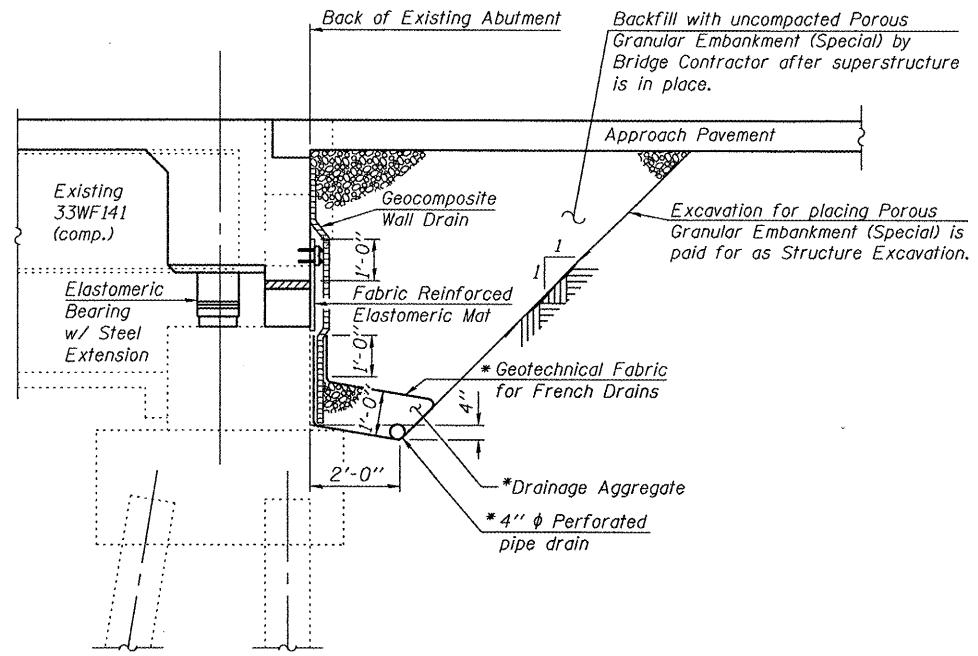
Bearing seat surfaces shall be constructed or adjusted to their designated elevations within a tolerance of 1/8 inch (0.01 ft.). Adjustment shall be made either by grinding the surface or by shimming the bearings.  
The existing structural steel coating contains lead. The Contractor shall take appropriate precautions to deal with the presence of lead on this project.  
If the Contractor elects to use cantilever forming brackets on the exterior beams, the brackets shall be placed at the same locations as required for the hardwood blocks in Article 503.06(b) of the Standard Specifications. If additional cantilever forming brackets are required, hardwood blocking shall be wedged between the exterior and first interior beam at each of these additional bracket locations.

Cleaning and painting of the existing structural steel shall be as specified in the special provision for "Cleaning and Painting Existing Steel Structures". All existing steel shall be cleaned per Near White Blast Cleaning SSPC-SP10. All existing steel shall be painted according to the requirements of Paint System 1-OZ/E/U. The color of the final finish coat for all interior steel surfaces shall be Gray, Munsell No. 5B 7/1. The color of the final finish coat for the exterior and bottom flange of the fascia beams shall be Blue, Munsell No. 10B 3/6.

A minimum of 2 air monitors will be required to monitor abrasive blasting operations at this site, see special provision for "Containment and Disposal of Lead Paint Cleaning Residues".  
All new structural steel shall be shop painted with an inorganic zinc rich primer per AASHTO M 300, Type 1. Field painting included with "Cleaning and Painting Existing Steel Structures."

**TOTAL BILL OF MATERIAL**

ITEM	UNIT	SUPER	SUB	TOTAL
Slopedwall 4"	Sq. Yd.		64.4	64.4
Removal of Existing Concrete Deck	Each	2		2
Concrete Removal	Cu. Yd.		73.2	73.2
Structure Excavation	Cu. Yd.		427.4	427.4
Concrete Structures	Cu. Yd.		28.3	28.3
Concrete Superstructure	Cu. Yd.	907.5		907.5
Bridge Deck Grooving	Sq. Yd.	2517		2517
Protective Coat	Sq. Yd.	3020		3020
Elastomeric Bearing Assembly, Type I	Each	36		36
Stud Shear Connectors	Each	12210		12210
Reinforcement Bars, Epoxy Coated	Pound	199820	5160	204980
Name Plates	Each	2		2
Bar Splicers	Each	1550	8	1558
Floor Drains	Each	20		20
Drainage Scupper, DS-12	Each	4		4
Jack and Remove Existing Bearings	Each	36		36
Porous Granular Embankment (Special)	Cu. Yd.		321.5	321.5
Structural Repair of Concrete (Depth equal to or less than 5")	Sq. Ft.		54.0	54.0
Pipe Underdrains for Structures, 4"	Foot		337	337
Temporary Sheet Piling	Sq. Ft.		416	416
Concrete Sealer	Sq. Ft.		8730	8730
Geocomposite Wall Drain	Sq. Yd.		184	184
Protective Shield	Sq. Yd.	1472		1472
Anchor Bolts, 1"	Each	72		72
Furnishing and Erecting Structural Steel	Lbs.	12280		12280
Cleaning & Painting Steel Bridge No. 1	L. Sum	1		1
Cleaning & Painting Steel Bridge No. 2	L. Sum	1		1
Containment & Disposal of Lead Paint Cleaning Residues No. 1	L. Sum	1		1
Containment & Disposal of Lead Paint Cleaning Residues No. 2	L. Sum	1		1



**SECTION THRU SEMI-INTEGRAL ABUTMENT**  
(Horiz. dim. @ Rt. L's)

\* Included in the cost of Pipe Underdrains for Structures, 4"  
Note:  
All drainage system components shall extend to 2'-0" from the end of each wingwall except an outlet pipe shall extend until intersecting with the side slopes. The pipes shall drain into concrete headwalls. (See Article 601.05 of the Standard Specifications and Highway Standard 601101).

**INDEX OF SHEETS**

- 1 General Plan and Elevation
- 2 General Data
- 3 Stage Construction Details
- 4 Temporary Concrete Barrier Details
- 5-12 Top of Slab Elevations
- 13-16 Top of Approach Slab Elevations
- 17 Superstructure
- 18-21 Superstructure Details
- 22 Diaphragm Details
- 23 Drainage Scuppers DS-12
- 24 Structural Steel
- 25 Structural Steel Details
- 26 Bearing Details
- 27-28 Abutment Concrete Removal
- 29 Abutment Concrete Removal Details
- 30-31 Concrete Repair Details
- 32-33 Abutment Details
- 34 Bar Splicer Assembly Details
- 35 Concrete Parapet Slipforming Option

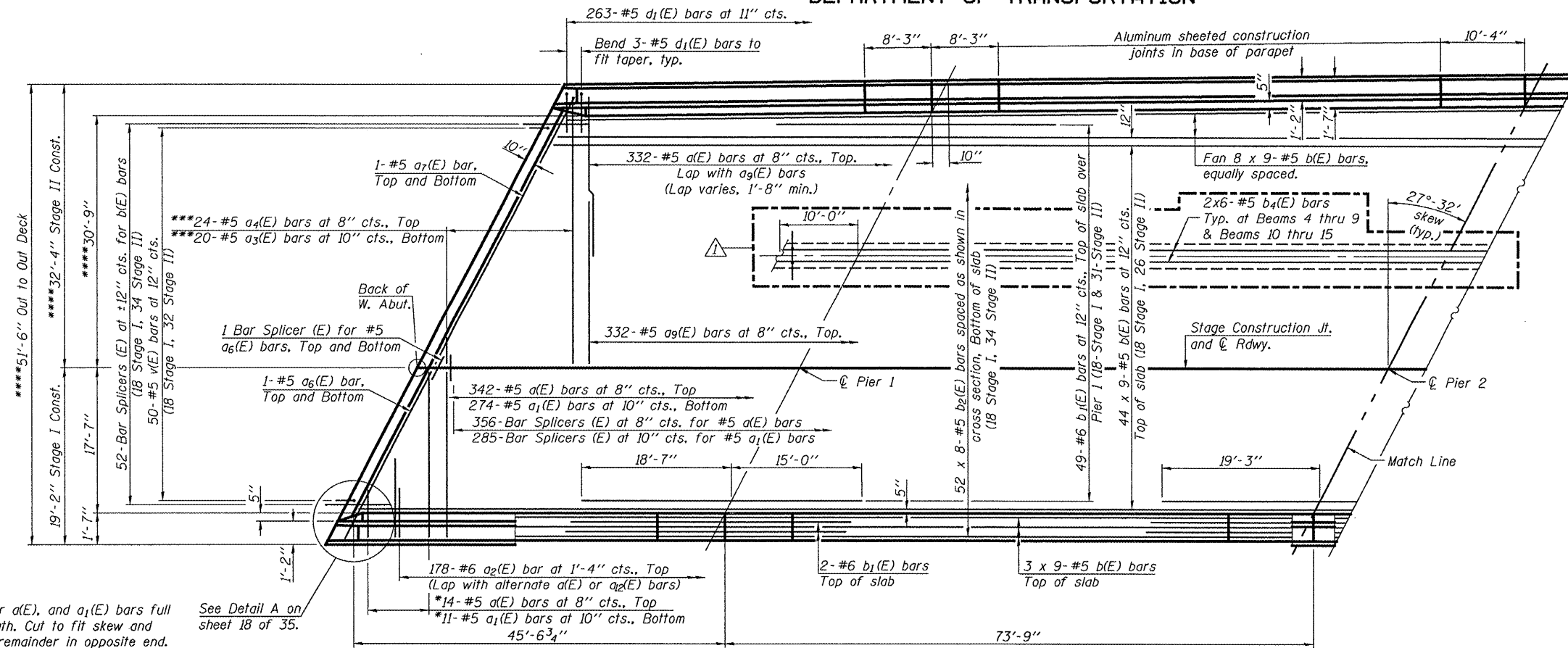
**GENERAL DATA**  
F.A.P. ROUTE 313 - SECTION (21-HB-11)  
KNOX COUNTY  
STA. 495+98.72  
STRUCTURE NO. 048-0021 (WB)  
STRUCTURE NO. 048-0022 (EB)

DESIGNED FT	April 28 2008
CHECKED DPN	EXAMINED <i>Thomas J. Demagallo</i> PRINCIPAL ENGINEER OF BRIDGE DESIGN
DRAWN Gregory D. Farmer	PASSED <i>Ralph E. Anderson</i> ENGINEER OF BRIDGES AND STRUCTURES
CHECKED FT/DPN	

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

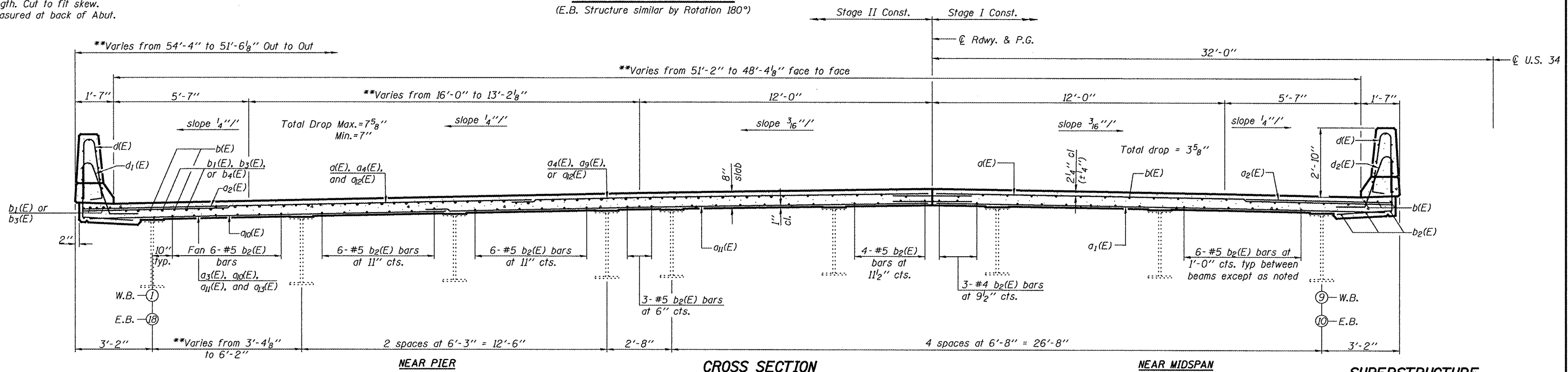
ROUTE NO.	SECTION	COUNTY	DATE	SHEET	SHEET NO.
F.A.P. 313	(21-HB-11)	KNOX	SS	34	35 SHEETS
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT			

Contract #68216



Notes: See sheet 19 of 35 for superstructure details and Bill of Material.  
Bars indicated thus 52 x 8-#5 etc. indicates 52 lines of bars with 8 lengths per line.  
See sheets 20 & 21 of 35 for Parapet reinforcement  
See sheet 22 of 35 for diaphragm details.  
Placing of  $u_2(E)$  &  $u_3(E)$  bars may require rearranging to miss the shear studs.

\*Order  $a_1(E)$  and  $a_2(E)$  bars full length. Cut to fit skew and use remainder in opposite end.  
\*\*\*Order  $a_3(E)$  and  $a_4(E)$  bars full length. Cut to fit skew.  
\*\*\*\*Measured at back of Abut.



DESIGNED FT	April 28 2008
CHECKED DPN	EXAMINED <i>Thomas Demas</i>
DRAWN Gregory D. Farmer	PASSED <i>Ralph E. Anderson</i>
CHECKED FT/DPN	ENGINEER OF BRIDGES AND STRUCTURES

\*\*Measured at  $\phi$  bearing

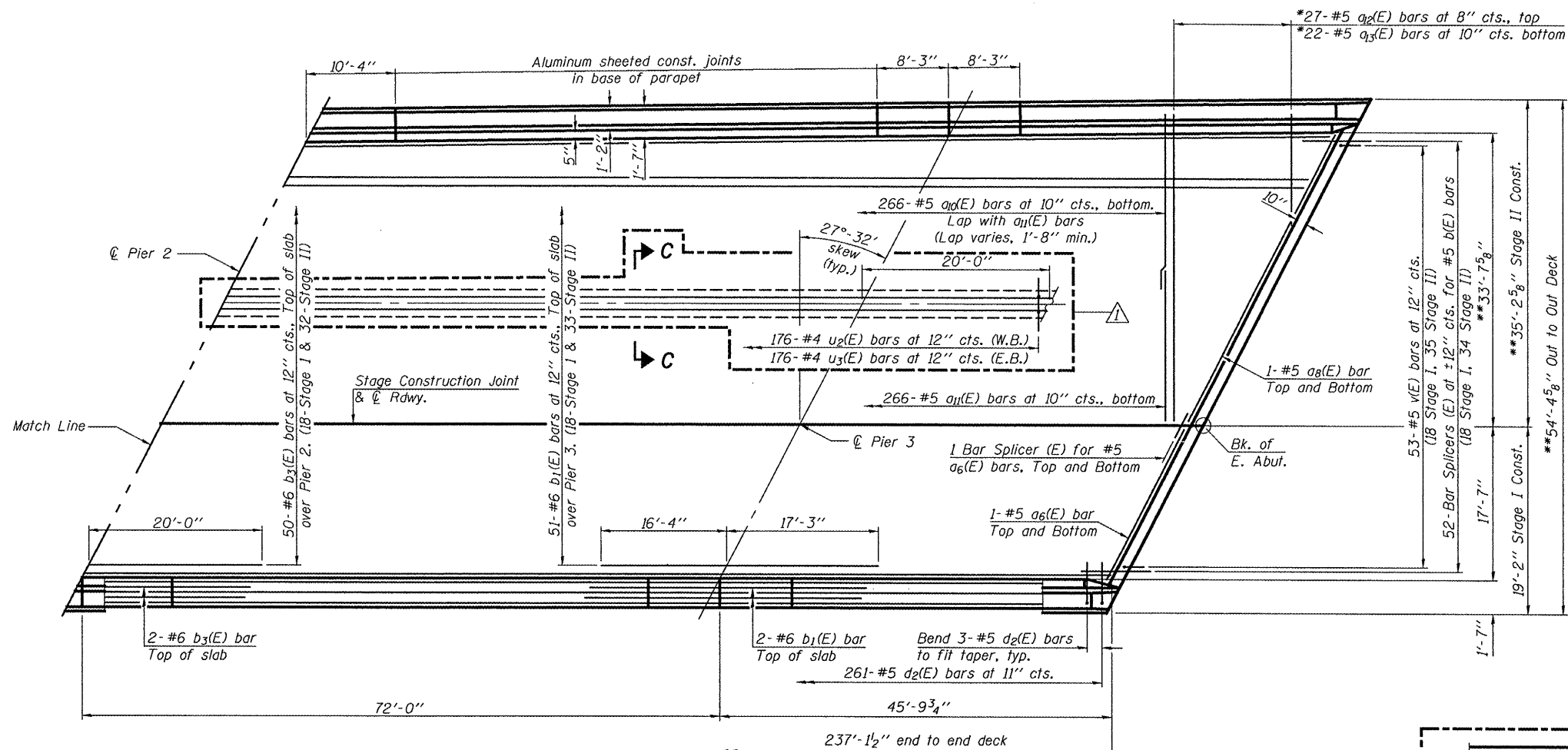
**SUPERSTRUCTURE**  
F.A.P. ROUTE 313 - SECTION (21-HB-11)  
KNOX COUNTY  
STA. 495+98.72  
STRUCTURE NO. 048-0021  
STRUCTURE NO. 048-0022

Revised 5/21/2008, FT

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

ROUTE NO.	SECTION	COUNTY	SHEET	SHEET NO.
F.A.P. 313	(21-HB-11)	KNOX	SS 35	18
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT		35 SHEETS

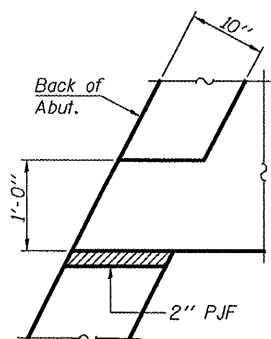
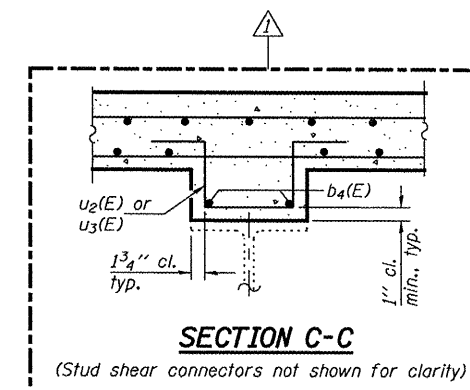
Contract #68216



Notes: See sheet 19 of 35 for superstructure details and Bill of Material.  
See sheets 20 & 21 of 35 for Parapet reinforcement  
See sheet 22 of 35 for diaphragm details.

**PLAN-W.B. STRUCTURE**  
(East Bound Structure similar by rotation 180°)

**MINIMUM BAR LAP**  
#5 bar = 1'-8"



**DETAIL A**  
Parapet and approach not shown. Detail shown at South West corner of the West Bound Bridge, and the North East corner of the East Bound Bridge. The rest of the corners are similar.

\*Order  $a_2(E)$  and  $a_3(E)$  bar full length. Cut to fit skew.  
\*\*Measured at back of Abutment

DESIGNED	FT
CHECKED	DPN
DRAWN	Gregory D. Farmer
CHECKED	FT/DPN

April 28 2008

EXAMINED *Thomas J. Demagali*  
ENGINEER OF BRIDGE DESIGN

PASSED *Ralph E. Anderson*  
ENGINEER OF BRIDGES AND STRUCTURES

**SUPERSTRUCTURE DETAILS**  
F.A.P. ROUTE 313 - SECTION (21-HB-11)  
KNOX COUNTY  
STA. 495+98.72  
STRUCTURE NO. 048-0021  
STRUCTURE NO. 048-0022

Revised 5/21/2008, FT

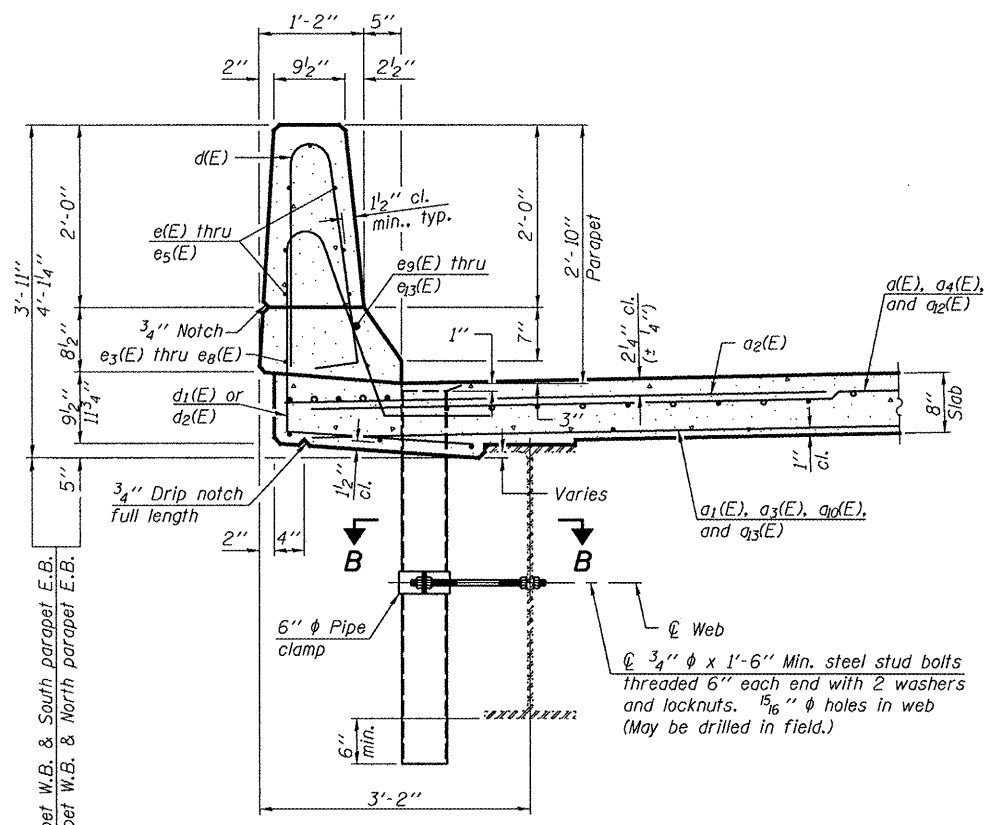
STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
F.A.P. 313	(21-HB-11)	KNOX	5536	19
FED. ROAD DIST. NO. 7		ILLINOIS	FED. AID PROJECT	35 SHEETS

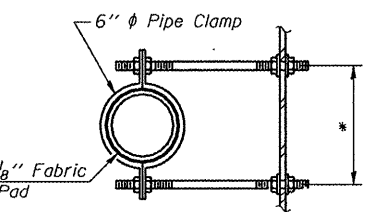
Contract #68216

TWO SUPERSTRUCTURES  
BILL OF MATERIAL

Bar	No.	Size	Length	Shape
a(E)	1376	#5	18'-8"	
a <sub>1</sub> (E)	570	#5	18'-5"	
a <sub>2</sub> (E)	712	#6	6'-0"	
a <sub>3</sub> (E)	40	#5	30'-9"	
a <sub>4</sub> (E)	48	#5	31'-0"	
a <sub>5</sub> (E)	32	#5	2'-0"	
a <sub>6</sub> (E)	8	#5	21'-1"	
a <sub>7</sub> (E)	4	#5	35'-11"	
a <sub>8</sub> (E)	4	#5	39'-2"	
a <sub>9</sub> (E)	664	#5	18'-1"	
a <sub>10</sub> (E)	532	#5	21'-3"	
a <sub>11</sub> (E)	532	#5	16'-8"	
a <sub>12</sub> (E)	54	#5	33'-10"	
a <sub>13</sub> (E)	44	#5	33'-7"	
b(E)	1044	#5	28'-0"	
b <sub>1</sub> (E)	216	#6	33'-7"	
b <sub>2</sub> (E)	832	#5	31'-3"	
b <sub>3</sub> (E)	108	#6	39'-3"	
b <sub>4</sub> (E)	144	#5	30'-9"	
d(E)	1040	#5	5'-7"	
d <sub>1</sub> (E)	526	#5	7'-10"	
d <sub>2</sub> (E)	522	#5	8'-0"	
e(E)	84	#4	18'-10"	
e <sub>1</sub> (E)	84	#4	18'-1"	
e <sub>2</sub> (E)	84	#4	17'-6"	
e <sub>3</sub> (E)	64	#4	10'-1"	
e <sub>4</sub> (E)	128	#4	8'-0"	
e <sub>5</sub> (E)	28	#4	19'-1"	
e <sub>6</sub> (E)	16	#4	19'-9"	
e <sub>7</sub> (E)	8	#4	27'-5"	
e <sub>8</sub> (E)	8	#4	28'-4"	
e <sub>9</sub> (E)	16	#8	20'-10"	
e <sub>10</sub> (E)	16	#8	8'-0"	
e <sub>11</sub> (E)	8	#8	28'-6"	
e <sub>12</sub> (E)	8	#8	10'-1"	
e <sub>13</sub> (E)	8	#8	29'-4"	
m(E)	24	#6	10'-3"	
m <sub>1</sub> (E)	20	#6	21'-0"	
m <sub>2</sub> (E)	12	#6	7'-2"	
m <sub>3</sub> (E)	16	#6	3'-0"	
m <sub>4</sub> (E)	4	#6	4'-2"	
m <sub>5</sub> (E)	10	#6	35'-11"	
m <sub>6</sub> (E)	10	#6	39'-2"	
m <sub>7</sub> (E)	12	#6	9'-9"	
m <sub>8</sub> (E)	4	#6	6'-6"	
m <sub>9</sub> (E)	2	#6	3'-4"	
m <sub>10</sub> (E)	2	#6	6'-8"	
m <sub>11</sub> (E)	8	#6	11'-0"	
m <sub>12</sub> (E)	10	#6	35'-0"	
m <sub>13</sub> (E)	10	#6	38'-3"	
m <sub>14</sub> (E)	20	#6	20'-2"	
m <sub>15</sub> (E)	8	#6	13'-5"	
s(E)	226	#5	7'-4"	
s <sub>1</sub> (E)	198	#4	9'-4"	
u(E)	218	#5	3'-2"	
u <sub>2</sub> (E)	1056	#4	3'-0"	
u <sub>3</sub> (E)	1056	#4	3'-2"	
v(E)	206	#5	3'-4"	
Reinforcement Bars, Epoxy Coated	Pound		199820	
Concrete Superstructure	Cu. Yds.		907.5	

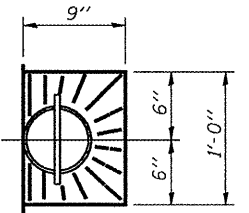


SECTION THRU PARAPET

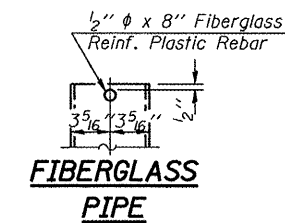


SECTION B-B

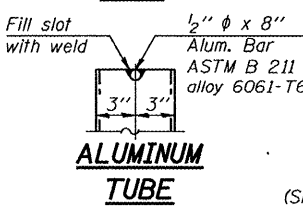
\* Dimension as required by Pipe Clamp



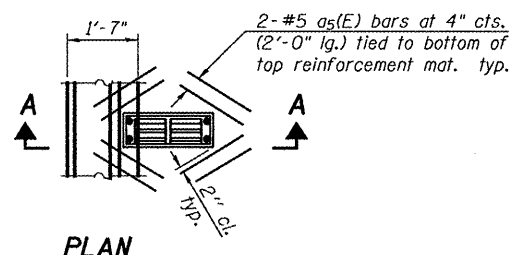
TOP PLAN



FIBERGLASS PIPE

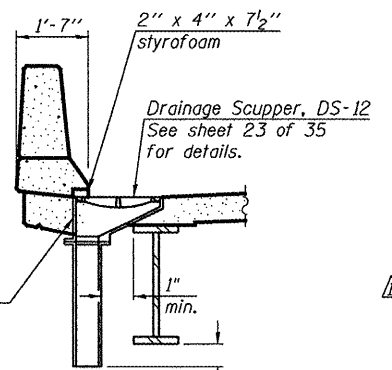


ALUMINUM TUBE



PLAN

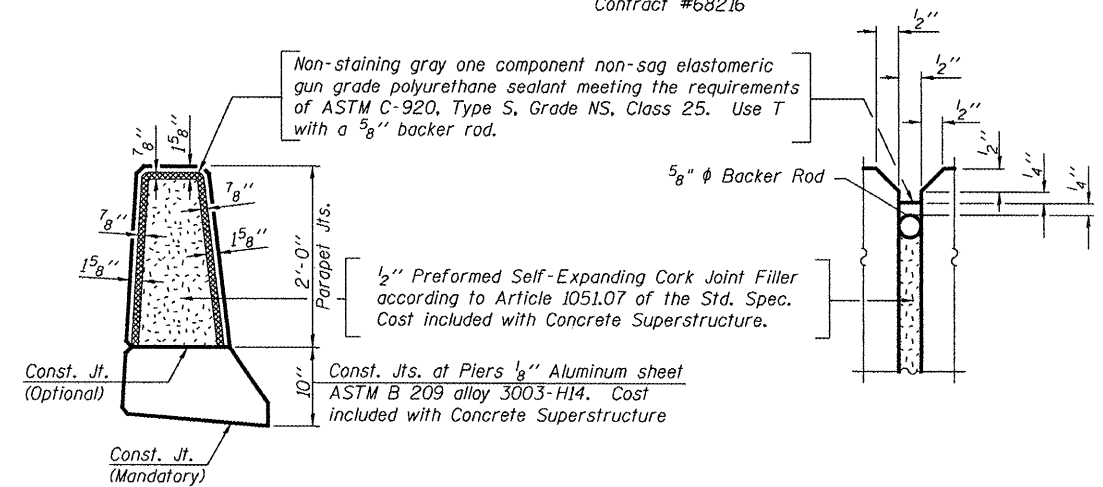
Note: Cut longitudinal reinforcement to clear drainage scuppers.



SECTION A-A

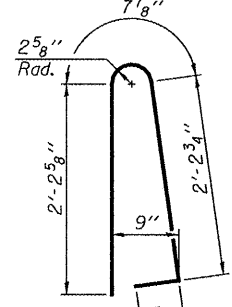
DESIGNED FT
CHECKED DPN
DRAWN Gregory D. Farmer
CHECKED FT/DPN

APRIL 28 2008
EXAMINED <i>Thomas J. Demas</i>
PASSED <i>Robert C. Anderson</i>

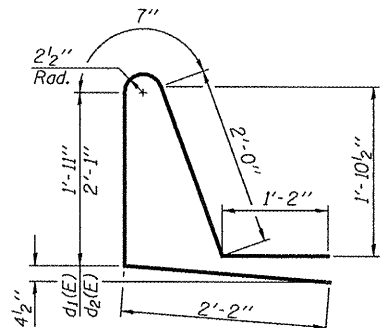


PARAPET JOINT DETAILS

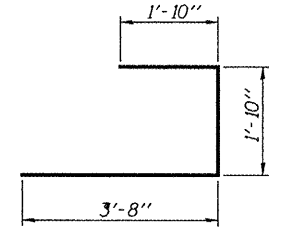
Notes:  
The exterior surfaces of the floor drains shall be painted with the finish coat as specified in the special provisions for Cleaning and Painting Existing Steel Structures. The exterior surfaces of the drains shall be cleaned according to Steel Structures Painting Council's Spec. SSPC-SP1 prior to painting.  
Fiberglass pipe shall conform to ASTM D 2996, with short-time rupture strength hoop tensile stress of 30,000 p.s.i. minimum.



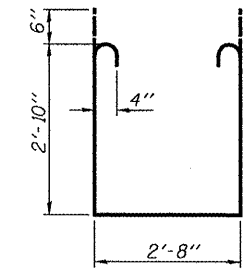
BAR d(E)



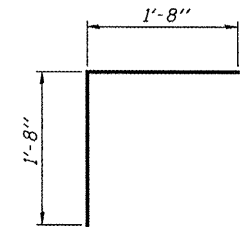
BAR d<sub>1</sub>(E) and d<sub>2</sub>(E)



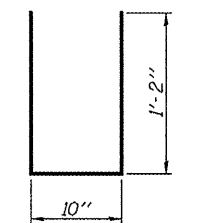
BAR s(E)



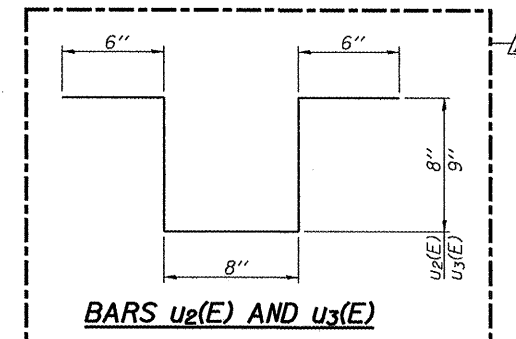
BAR s<sub>1</sub>(E)



BAR v(E)



u(E) BAR



BARS u<sub>2</sub>(E) AND u<sub>3</sub>(E)

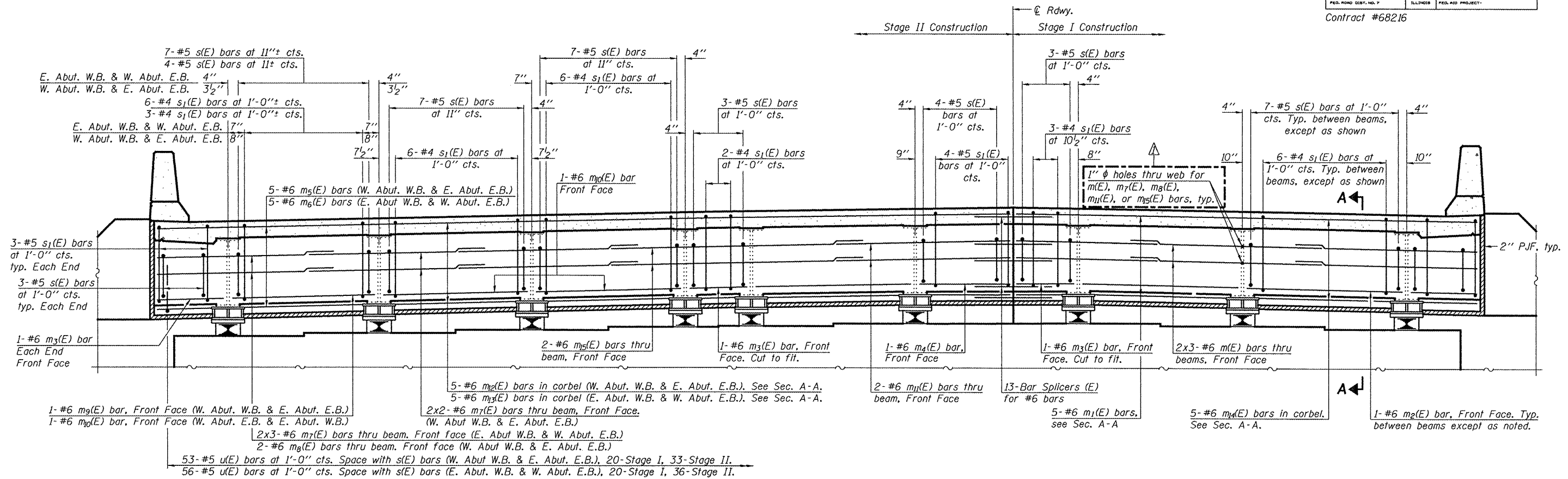
SUPERSTRUCTURE DETAILS  
F.A.P. ROUTE 313 - SECTION (21-HB-11)  
KNOX COUNTY  
STA. 495+98.72  
STRUCTURE NO. 048-0021  
STRUCTURE NO. 048-0022

Revised 5/21/2008 FT

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

ROUTE NO.	SECTION	COUNTY	SHEET	SHEET NO.
F.A.P. 313	(21-HB-11)	KNOX	55 39	35 SHEETS
FED. ROAD DIST. NO. 7		ILLINOIS	FED. AID PROJECT	

Contract #68216

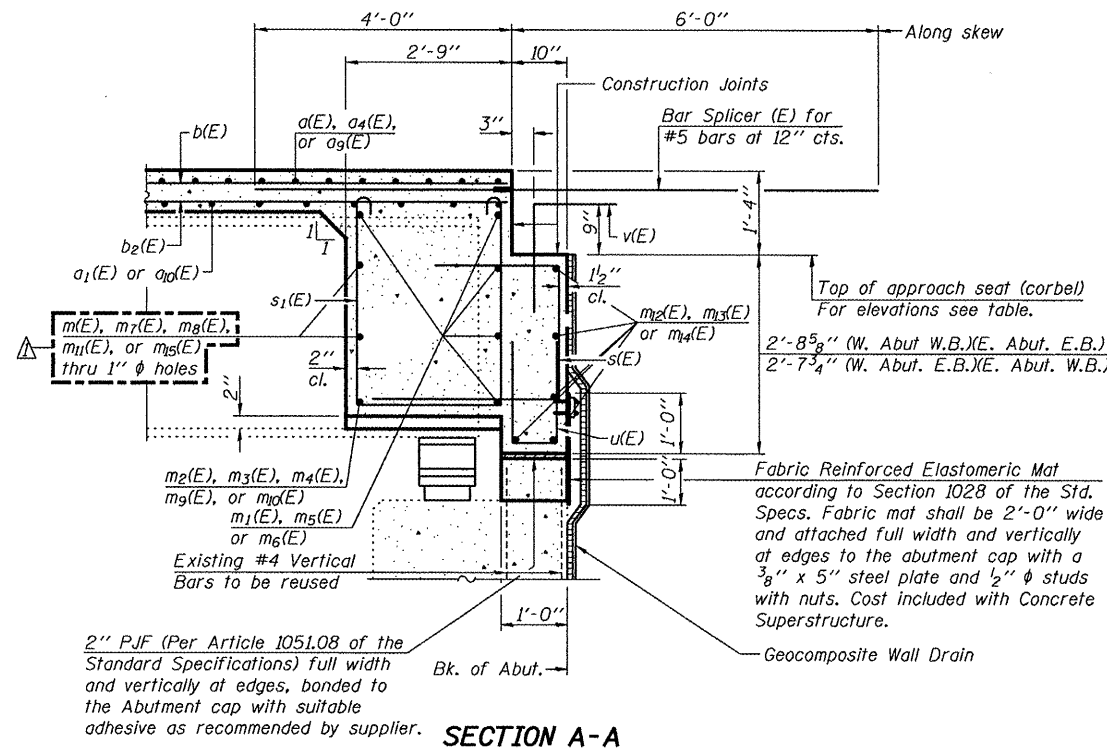


**DIAPHRAGM ELEVATION AT ABUTMENTS**

(Looking East at East Abutment W.B. shown, other locations similar, except as noted)  
(Side retainers adjacent to bearings not shown for clarity)

**TOP OF CORBEL ELEVATION AT BACK OF ABUTMENT**

Location	W.B. Structure	E.B. Structure
West Abutment		
North Edge of Parapet	804.15	804.26
⊘ Roadway & P.G.	804.66	804.51
South Edge of Parapet	804.32	803.77
East Abutment		
North Edge of Parapet	803.77	804.32
⊘ Roadway & P.G.	804.51	804.66
South Edge of Parapet	804.26	804.15



**MINIMUM BAR LAP**

#6 Bar = 2'-9"

Notes: Reinforcement bars in diaphragm are billed with superstructure on sheet 19 of 35.  
Concrete in diaphragm is included with Concrete Superstructure on sheet 19 of 35.  
For details of s(E), s<sub>1</sub>(E), v(E), and u(E) see sheet 19 of 35.  
The s(E), s<sub>1</sub>(E) and u(E) bars shall be placed parallel to the beams. Spacing for these bars shall be at right angles to the beams. See sheet 34 of 35 for Bar Splicer Details.

**DIAPHRAGM DETAILS**  
**F.A.P. ROUTE 313 - SECTION (21-HB-11)**  
**KNOX COUNTY**  
**STA. 495+98.72**  
**STRUCTURE NO. 048-0021**  
**STRUCTURE NO. 048-0022**

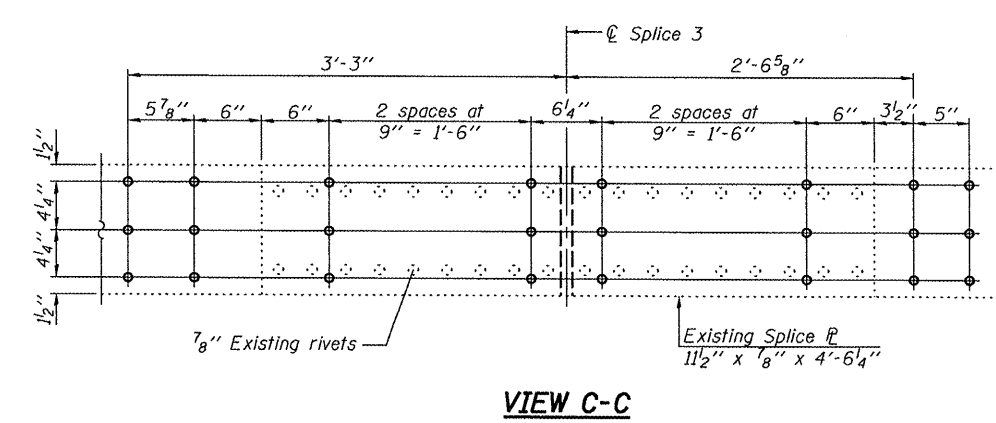
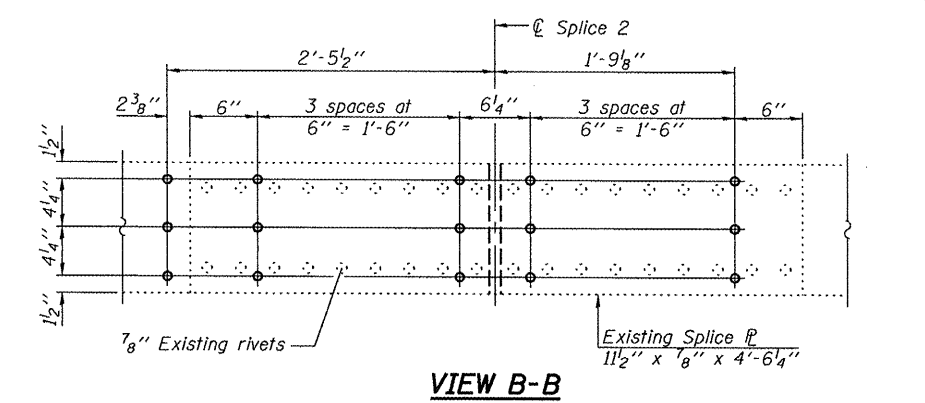
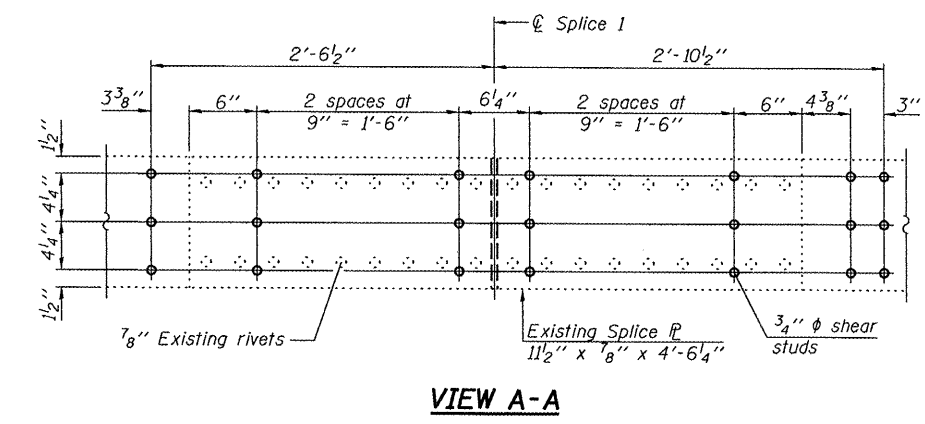
DESIGNED FT	April 28 2008
CHECKED DPN	EXAMINED <i>Thomas J. Demas</i>
DRAWN Gregory D. Farmer	PASSED <i>Ralph E. Anderson</i>
CHECKED FT/DPN	ENGINEER OF BRIDGES AND STRUCTURES





STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

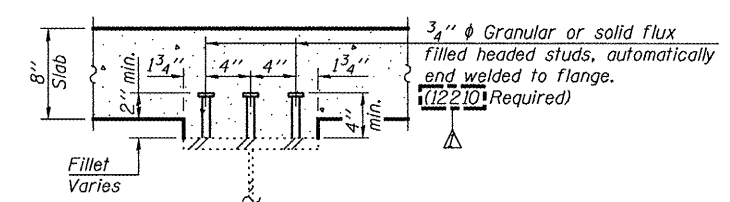
ROUTE NO.	SECTION	COUNTY	SHEET	SHEET NO.
F.A.P. 313	(21-HB-11)	KNOX	55	42
FED. ROAD DIST. NO. 7		ILLINOIS	FED. AID PROJECT	
		Contract #68216		35 SHEETS



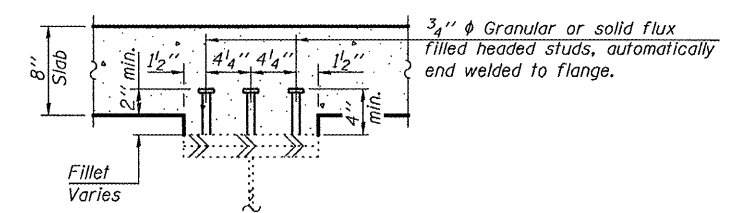
	0.4 Sp. 1	Pier 1	0.5 Sp. 2	Pier 2	0.5 Sp. 3	Pier 3	0.6 Sp. 4
$I_s$ ( $in^4$ )	7450	7450	7450	11227	7450	7450	7450
$I_c(n)$ ( $in^4$ )	19570		19570		19570		19570
$I_c(3n)$ ( $in^4$ )	14331		14331		14331		14331
$S_s$ ( $in^3$ )	448	448	448	650	448	448	448
$S_c(n)$ ( $in^3$ )	652		652		652		652
$S_c(3n)$ ( $in^3$ )	589		589		589		589
$Z$ ( $in^3$ )				597			
$Q$ ( $k/ft$ )	0.905	1.338	0.905	1.338	0.905	1.338	0.905
$M_D$ ( $k$ )	85	438	215	671	196	414	95
$s_D$ ( $k/ft$ )	0.433		0.433		0.433		0.433
$M_{sD}$ ( $k$ )	54		140		129		57
$M_L$ ( $k$ )	270	215	446	296	434	210	273
$M_{Imp}$ ( $k$ )	80	58	112	75	110	57	81
$S_3 [M_L + M_{Imp}]$ ( $k$ )	584	455	930	617	907	445	589
$M_o$ ( $k$ )	940	1161	1671	1675	1601	1117	964
$M_u$ ( $k$ )	1967		2693	1790	2049		1983
$f_s Q$ non-comp (ksi)	2.3	11.7	5.8	12.4	5.2	11.1	2.5
$f_s Q$ (comp) (ksi)	1.1		2.8		2.6		1.2
$f_s S_3 [M_L + M_{Imp}]$ (ksi)	10.7	12.2	17.1	11.4	16.7	11.9	10.8
$f_s$ (Overload) (ksi)	14.1	23.9	25.7	23.8	24.5	23.0	14.5
$f_s$ (Total) (ksi)		31.1				29.9	
VR ( $k$ )	48.9		44.7		44.9		44.8

	W. Abut.	Pier 1	Pier 2	Pier 3	E. Abut.
$R_D$ ( $k$ )	*50.0	85.7	104.2	83.6	*50.8
$R_L$ ( $k$ )	33.2	42.1	47.2	41.8	33.3
$Imp.$ ( $k$ )	9.8	11.4	11.9	11.4	9.8
$R_{Total}$ ( $k$ )	93.0	139.2	163.3	136.8	93.9

\*Dead load reactions include 30.3 kips for concrete diaphragm and approach pavement.

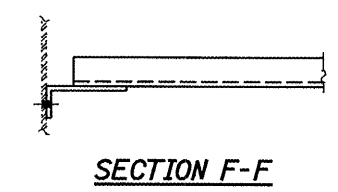


SECTION D-D



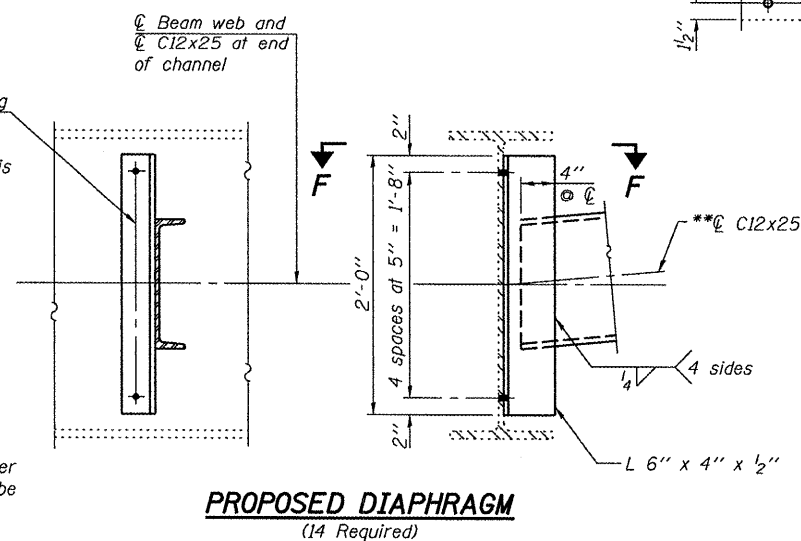
SECTION E-E  
(At existing splice plate)

- $I_s, S_s$ : Non-composite moment of inertia and section modulus of the steel section used for computing  $f_s$  (Total and Overload) 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 and Overload) 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 and Overload) 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 ( $in^3$ ).
- $Q$ : Un-factored non-composite dead load (kips/ft.).
- $M_D$ : Un-factored moment due to non-composite dead load (kip-ft.).
- $s_D$ : Un-factored long-term composite (superimposed) dead load (kips/ft.).
- $M_{sD}$ : Un-factored moment due to long-term composite (superimposed) dead load (kip-ft.).
- $M_L$ : Un-factored live load moment (kip-ft.).
- $M_{Imp}$ : Un-factored moment due to impact (kip-ft.).
- $M_o$ : Factored design moment (kip-ft.).  
 $1.3 [M_D + M_{sD} + \frac{5}{8} (M_L + M_{Imp})]$
- $M_u$ : Compact composite moment capacity according to AASHTO LFD 10.50.1.1 or compact non-composite moment capacity according to AASHTO LFD 10.48.1 (kip-ft.).
- $f_s$  (Overload): Sum of stresses as computed from the moments below (ksi).  
 $M_D + M_{sD} + \frac{5}{8} (M_L + M_{Imp})$
- $f_s$  (Total): Sum of stresses as computed from the moments below on a non-compact section (ksi).  
 $1.3 [M_D + M_{sD} + \frac{5}{8} (M_L + M_{Imp})]$
- VR: Maximum  $\frac{1}{4}$  impact horizontal shear range within the composite portion of the span for stud shear connector design (kips).



SECTION F-F

Field drill  $\frac{13}{16}$ "  $\phi$  holes in existing beams thru  $\frac{1}{16}$ "  $\phi$  holes in new connection angles for  $\frac{3}{4}$ "  $\phi$  H.S. Bolts. Cost of field drilling is included with Furnishing and Erecting Structural Steel.



PROPOSED DIAPHRAGM  
(14 Required)

\*\*Alternate channel C12x30 may be used to facilitate material acquisition. The calculated weight of structural steel is based on the lighter section C12x25. The alternate, if utilized, will be provided at no extra cost to the department.

DESIGNED FT	April 28 2008
CHECKED DPN	EXAMINED <i>Thomas J. Demagalli</i>
DRAWN Gregory D. Farmer	PASSED <i>Ralph E. Anderson</i>
CHECKED FT/DPN	ENGINEER OF BRIDGES AND STRUCTURES

STRUCTURAL STEEL DETAILS  
F.A.P. ROUTE 313 - SECTION (21-HB-11)  
KNOX COUNTY  
STA. 495+98.72  
STRUCTURE NO. 048-0021  
STRUCTURE NO. 048-0022