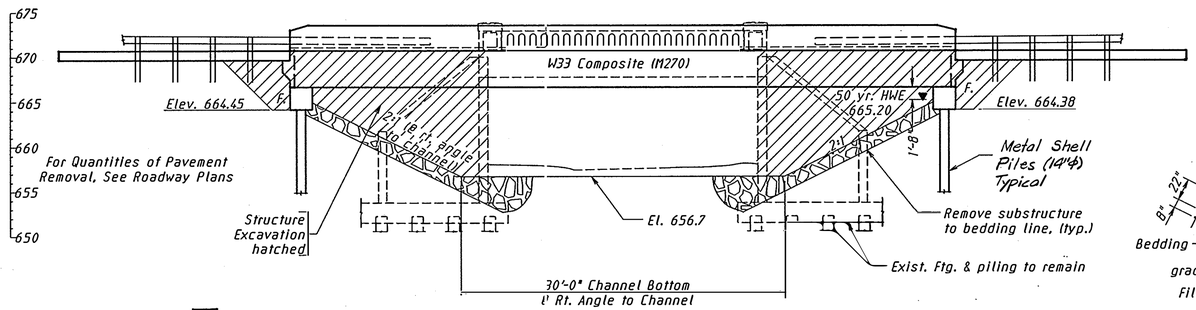
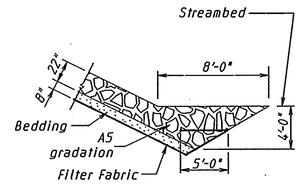
(SIXBRIDGES.HICKORY) HICKORY-1

BENCHMARK: R.R. spike set in west side of power pole on east side of Route 88. First pole north of bridge. Elev. 666.06

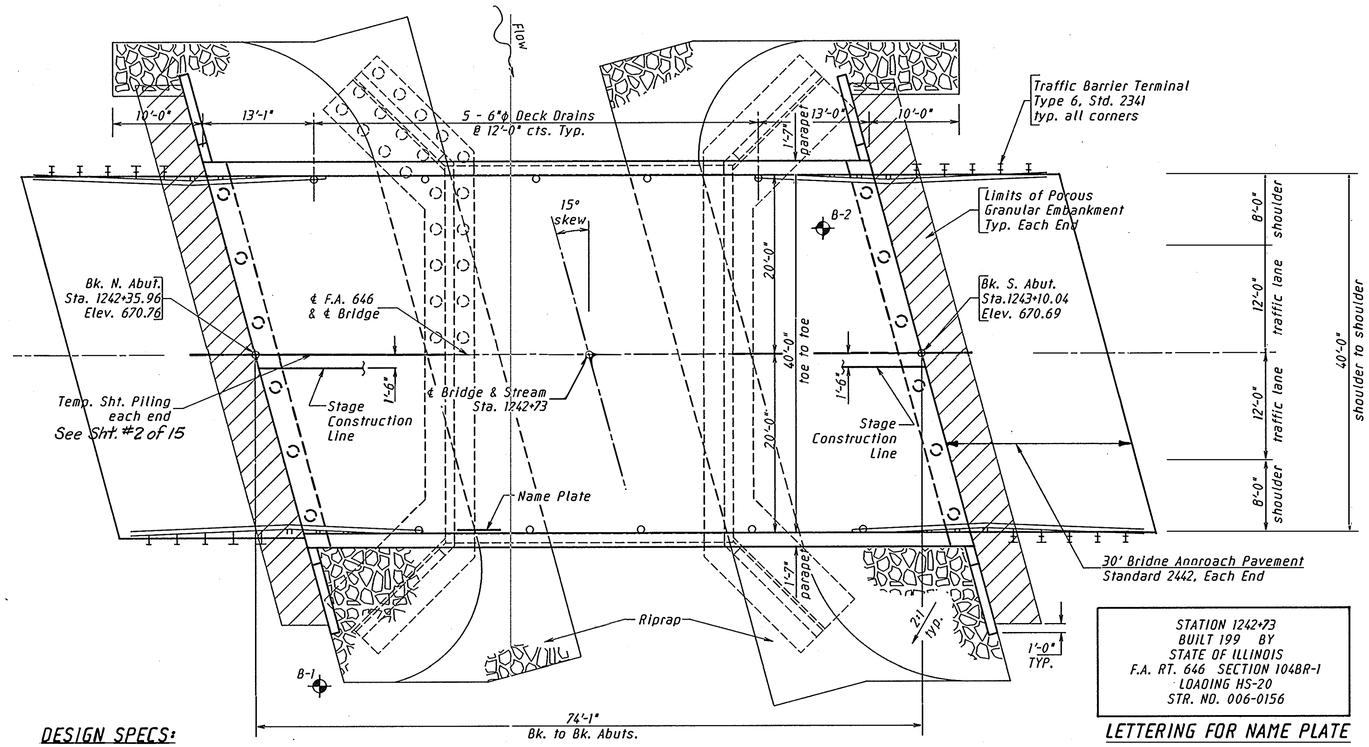
EXISTING STRUCTURE: S.N. 006-0087 - Single span reinforced concrete slab supported by closed reinforced concrete abutments. 40' face to face wide and 32' back to back of abutments. Remove in stages. No salvage. The Contractor shall replace the existing structure with a new one consisting of single span steel beams and a 7 1/2" reinforced concrete slab. Traffic shall be maintained at all times by utilizing stage construction.



ELEVATION



RIPRAP ANCHOR DETAIL



PLAN

STATION 1242+73
BUILT 199 BY
STATE OF ILLINOIS
F.A. RT. 646 SECTION 104BR-1
LOADING HS-20
STR. NO. 006-0156

LETTERING FOR NAME PLATE

See I.D.O.T. Std. 2113

DESIGN SPECS:

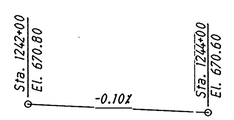
1989 AASHTO with 1990 & 1991 Interim & 1983 Design Specification for Seismic Design of Highway Bridges.

DESIGN LOADING:

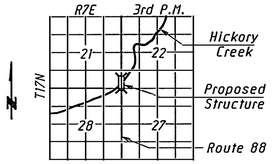
HS 20-44 Allow 25#/sq. ft. for Future Wearing Surface

DESIGN STRESSES:

f'c = 3,500 psi
fy = 60,000 psi (reinf.)
fy = 50,000 psi (struct.), AASHTO M270, Gr. 50
fy = 36,000 psi (struct.), AASHTO M270, Gr. 36



PROFILE GRADE



LOCATION MAP

Larry L. Vieley
LARRY L. VIELEY
ILL. REG. S.E. NO. 4056
DATE: 7/14/92

APPROVED
FOR STRUCTURAL ADEQUACY ONLY
Ralph E. Anderson
Engineer of Bridges and Structures

*104BR-1

ROUTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
S.B.I. F.A. 646	*	BUREAU	46	8
STA.	TO STA.			
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT		

SHEET NO. 1
SHEETS 15

GENERAL NOTES

1. See Sheet #15 for Boring Data.
2. Layout of slope protection system may be varied in the field to suit ground conditions as directed by the Engineer.
3. The Contractor shall drive one 14"ϕ concrete test pile at the North Abutment and one 14"ϕ concrete test pile at the South Abutment in a permanent location as directed by the Engineer before ordering the remainder of the piles.
4. Excavation behind existing abutment wall shall be done before removing the existing superstructure.
5. Calculated weight of Structural Steel = AASHTO M270, Grade 50 66,600 Lbs.
   AASHTO M270, Grade 36 5,150 Lbs.
6. The Zinc-silicate and vinyl paint system shall be used for shop and field painting of Structural Steel except where otherwise noted. The color of the vinyl finish coat shall be Munsell No. 1/8 316 Blue.
7. Field welding of construction accessories will not be permitted to the bottom flange of beams. Field welding in other areas will be permitted only when approved by the Engineer.
8. The main load carrying member components subject to tensile stress shall conform to the Supplemental Requirements for Notch Toughness Zone 2. These components are the wide flange beams.
9. Reinforcement bars shall conform to the requirements of AASHTO M-31, M-42 or M-53 Grade 60.
10. The Contractor shall sawcut the Existing Abutment at the Stage Removal Line before Stage 1 Removal.

TOTAL BILL OF MATERIAL - BRIDGE

Item	Unit	Super.	Sub.	Total
Removal of Existing Structures	Ea.	—	—	1
Bridge Deck Grooving	Sq Yds	329		329
Class X Concrete	Cu Yds	—	24.6	24.6
Class X Concrete Superstructure	Cu Yds	122.3	—	122.3
Stone Riprap, Class A5	Sq Yds	—	512	512
Reinforcement Bars, Epoxy Coated	Lbs.	25,710	3,580	29,290
Furnishing Metal Pile Shells - 14"ϕ	Lin Ft	—	390	390
Driving and Filling Shell (14"ϕ)	Lin Ft	—	390	390
Test Pile Metal Shell (14"ϕ)	Ea.	—	2	2
Furnishing & Erecting Structural Steel	L. S.	1	—	1
Stud Shear Connectors	Ea.	1,608	—	1,608
Structure Excavation	Cu Yds	—	880	880
Porous Granular Embankment	Cu Yds	—	122	122
Temporary Sheet Piling	Sq Ft	—	1,012	1,012
Name Plates	Ea.	1	—	1
* Protective Coat	Sq Yds	390	—	390
Filter Fabric for use with Riprap	Sq Yds	—	512	512
Floor Drains	Ea.	10	—	10

* includes deck, inside face and top of parapet

WATERWAY INFORMATION

Drainage Area = 11.5 sq. mi. Low Grade Elev. = 670.23 ℄ St. 1245+00

Flood	Freq. Yr.	Q. C.F.S.	Opening Sq. Ft. Exist.	Opening Sq. Ft. Prop.	Nat. H.W.E.	Head-ft. Exist.	Head-ft. Prop.	Headwater Elev. Exist.	Headwater Elev. Prop.
Design	50	2385	227	438	665.20	2.14	0.40	667.34	665.60
Base	100	2724	234	452	665.44	4.02	0.56	669.46	666.00
Overtopping									
Max. Calc.	500	3529	250	483	665.95	4.21	0.99	670.16	666.94

GENERAL PLAN AND ELEVATION
F.A. 646 (IL. 88) OVER HICKORY CREEK
SECTION 104BR-1
STRUCTURE #006-0156
STATION 1242+73
BUREAU COUNTY

REVISIONS	
ORG. NO.	
DATE	APRIL 1992
JOB NO.	591-5507-5101

ESE Environmental Science & Engineering, Inc.
8901 NORTH INDUSTRIAL RD., PEORIA, IL. 61615-1589 PHONE (309)693-5694

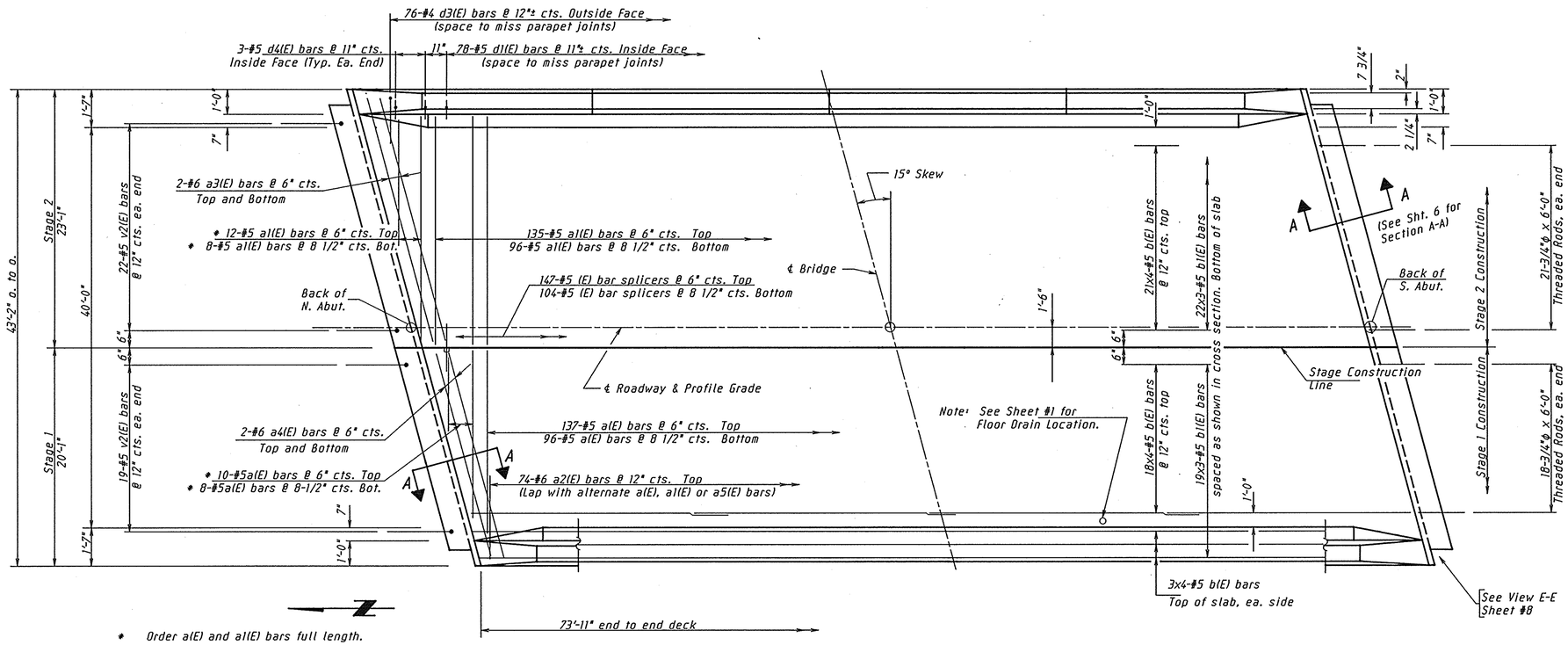
SURVEYED	DJH
DRAWN	TLS
CHECKED	CAH
DESIGNED	CAH
CHECKED	DDB

(S)\XBRIDGES\HICKORYHICKORY-S

*104BR-1

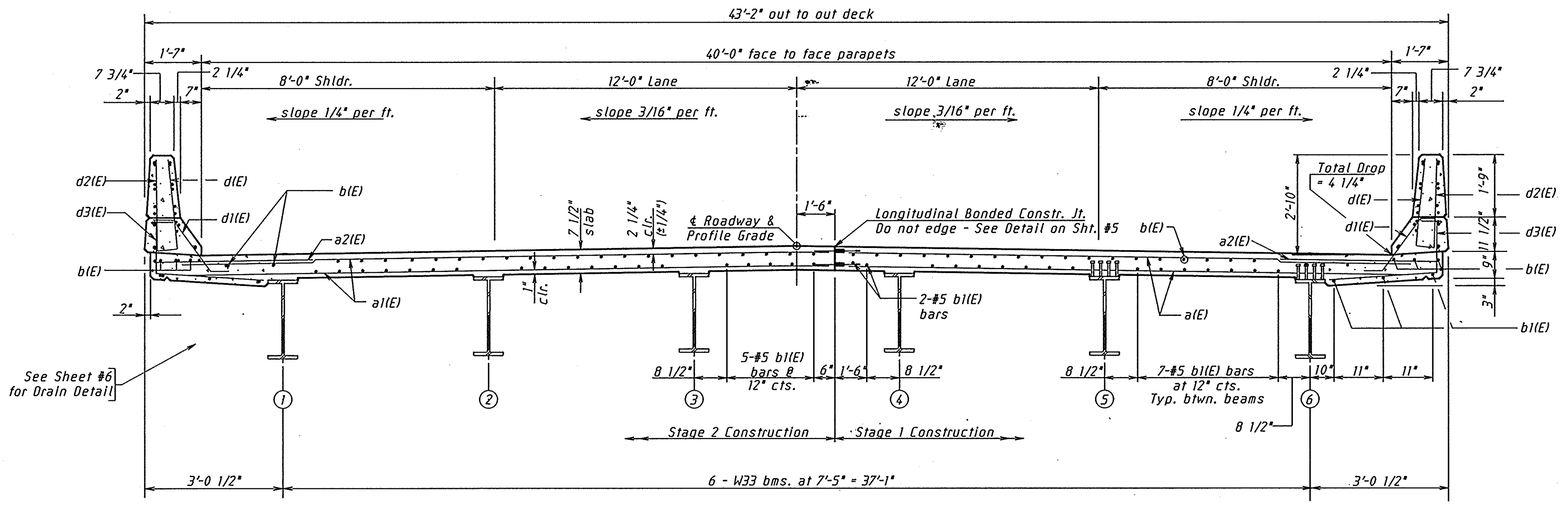
ROAD SYSTEM HIGHWAY DEPT.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
F.A.I. F.A.646	*	BUREAU	46	12
STA.		TO STA.		
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT		

SHEET NO. 5
SHEETS 15



* Order a(E) and a1(E) bars full length. Cut to fit skew and use remainder of bars in opposite end.

-PLAN



CROSS SECTION
(Looking South)

NOTES

1. See Sheet #6 of 15 for Superstructure details and Bill of Material.
2. Reinforcement bars designated (E) shall be epoxy coated.
3. Bars indicated thus 20x3-#5 etc. indicates 20 lines of bars with 3 lengths per line.
4. See Sheet #6 of 15 for parapet reinforcement.
5. Min. bar lap in deck: #5 = 1'-8".

DECK PLAN
F.A. 646 (IL. 88) OVER HICKORY CREEK
SECTION 104BR-1
STRUCTURE #006-0156
STATION 1242+73
BUREAU COUNTY

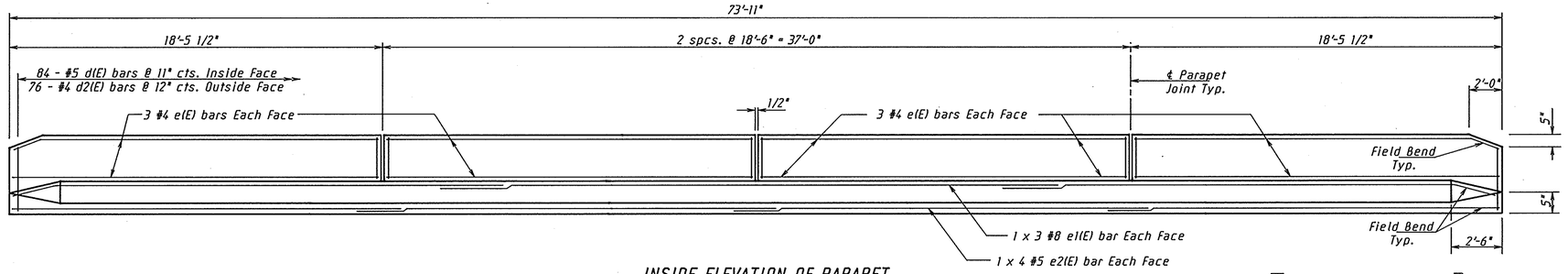
REVISIONS		
ORG. NO.		
DATE	APRIL 1992	
JOB NO.	591-5507-5101	

Environmental Science & Engineering, Inc.
8901 NORTH INDUSTRIAL RD., PEORIA, IL. 61615-1589 PHONE (309)693-5694

SURVEYED	DLH
DRAWN	TLS
CHECKED	CAM
DESIGNED	CAM
CHECKED	DDB

S-1-R (>15°) 12-31-87

(SIXBRIDGES_HICKORY) HICKORY-6



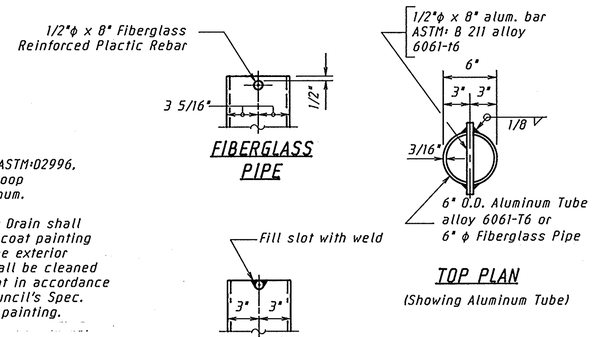
INSIDE ELEVATION OF PARAPET

Minimum bar laps in parapet: #5 = 2'-2", #8 = 4'-6"

*104BR-1

ROAD DISTRICT NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
S.B.I. 14-646	*	BUREAU	46	13
STA.		TO STA.		
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT		

SHEET NO. 6
SHEETS 15



FIBERGLASS PIPE

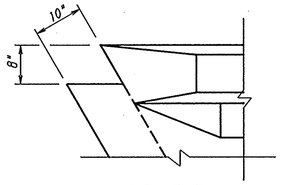
NOTE

Fiberglass Pipe shall conform to ASTM:D2996, with short term rupture strength hoop tensile stress of 30,000 psi minimum.

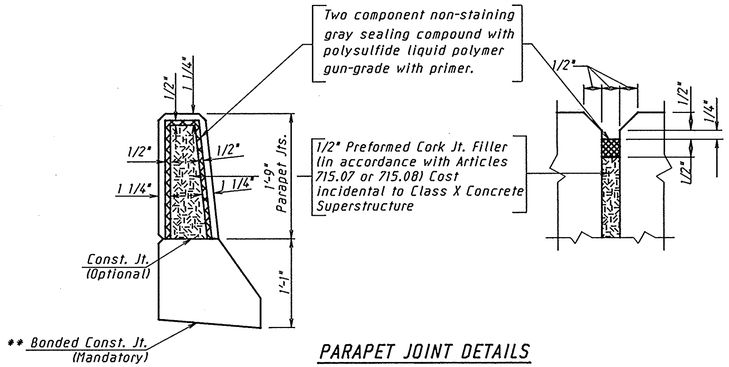
The exterior surfaces of the Floor Drain shall be painted with the vinyl enamel coat painting specified for Structural Steel. The exterior surfaces of the drain shall be cleaned and given a washcoat pretreatment in accordance with Steel Structures Painting Council's Spec. SSPC-SP1 & SSPC-Paint 27 prior to painting.

TOP PLAN

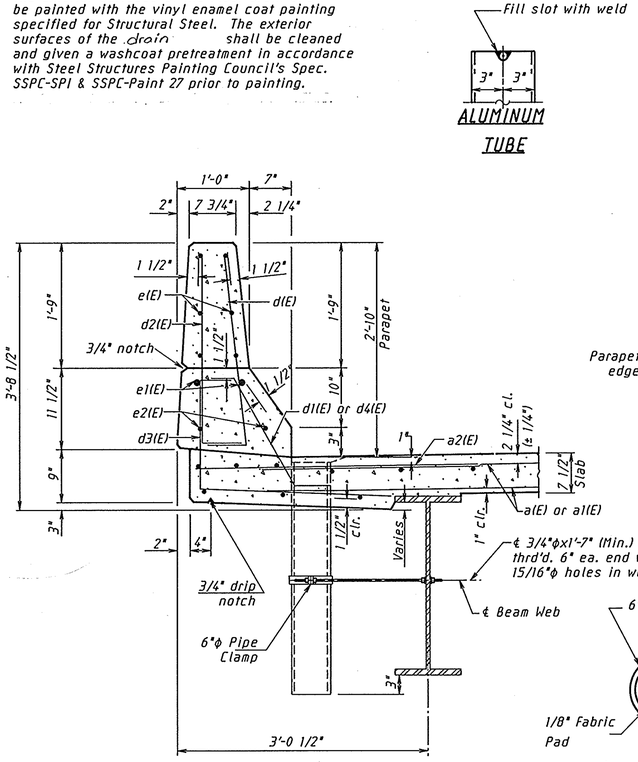
(Showing Aluminum Tube)



VIEW E-E AT CORBEL ENDS



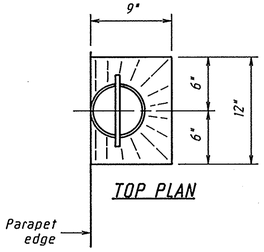
PARAPET JOINT DETAILS



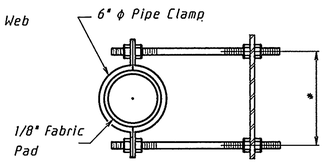
ALUMINUM TUBE

SECTION THRU PARAPET

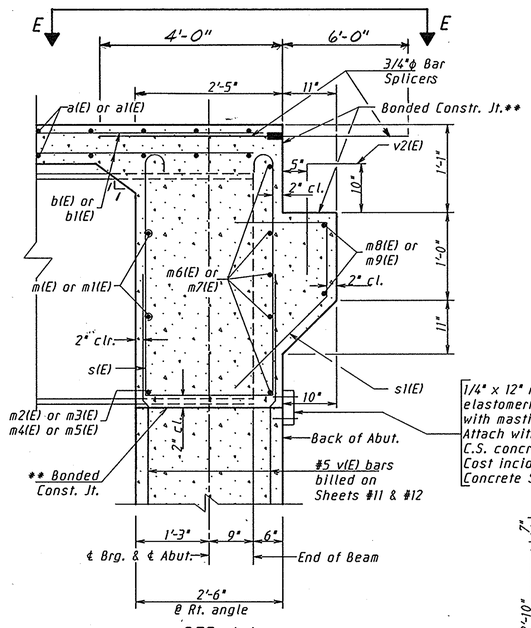
The surface of the Fiberglass pipe shall be free of bond inhibiting agents



TOP PLAN



SECTION A-A

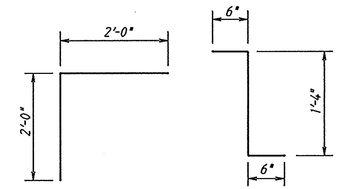


SEC. A-A AT ABUT. (INTEGRAL)

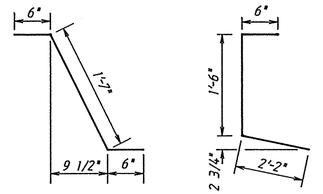
1/4" x 12" non-reinforced elastomeric membrane sealed with mastic (full length). Attach with 1" long flat head, C.S. concrete nails @ 12" cts. Cost incidental to Class X Concrete Superstructure.

NOTE: Reinforcement bars and Class X Concrete are billed with superstructure on Sheet #6 (U.N.O.)

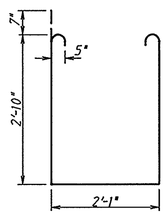
** Bonded Construction Joint in accordance with Article 504.13(a)(2) of Std. Specs.



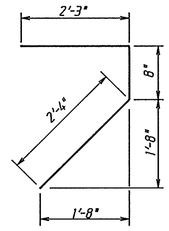
Bar v2(E) | Bar d4(E) | Bar d(E) & d2(E)



Bar d1(E) | Bar d3(E)



Bar s(E)



Bar s1(E)

SUPERSTRUCTURE BILL OF MATERIAL

Bar	No.	Size	Length	Shape
a(E)	251	#5	19'-7"	——
a1(E)	251	#5	22'-7"	——
a2(E)	148	#6	4'-0"	——
a3(E)	8	#6	23'-4"	——
a4(E)	8	#6	20'-3"	——
b(E)	180	#5	19'-8"	——
b1(E)	123	#5	25'-8"	——
d(E)	168	#5	3'-0"	⌐
d1(E)	156	#5	2'-7"	⌐
d2(E)	152	#4	3'-0"	⌐
d3(E)	152	#4	4'-2"	⌐
d4(E)	12	#5	2'-4"	⌐
e(E)	48	#4	18'-1"	——
e1(E)	12	#8	27'-6"	——
e2(E)	16	#5	20'-0"	——
m(E)	4	#5	20'-4"	——
m1(E)	4	#5	23'-8"	——
m2(E)	4	#6	2'-9"	——
m3(E)	8	#6	7'-3"	——
m4(E)	2	#6	2'-0"	——
m5(E)	2	#6	5'-0"	——
m6(E)	10	#6	23'-8"	——
m7(E)	10	#6	20'-4"	——
m8(E)	4	#6	19'-7"	——
m9(E)	4	#6	23'-0"	——
s(E)	82	#5	8'-11"	⊏
s1(E)	82	#5	5'-3"	⊐
v2(E)	82	#5	4'-0"	⌐
Reinforcement Bars, Epoxy Coated			Lbs.	25,710
Class X Concrete Superstructure			Cu. Yds.	122.3

Reinforcement bars designated (E) shall be epoxy coated.

Bars indicated thus 20 x 3 - #5 etc. indicate 20 lines of bars with 3 lengths per line.

PARAPET DETAILS AND SUPERSTRUCTURE
F.A. 646 (IL. 88) OVER HICKORY CREEK
SECTION 104BR-1
STRUCTURE #006-0156
STATION 1242+73
BUREAU COUNTY

REVISIONS	
ORG. NO.	
DATE	APRIL 1992
JOB NO.	591-5507-5101

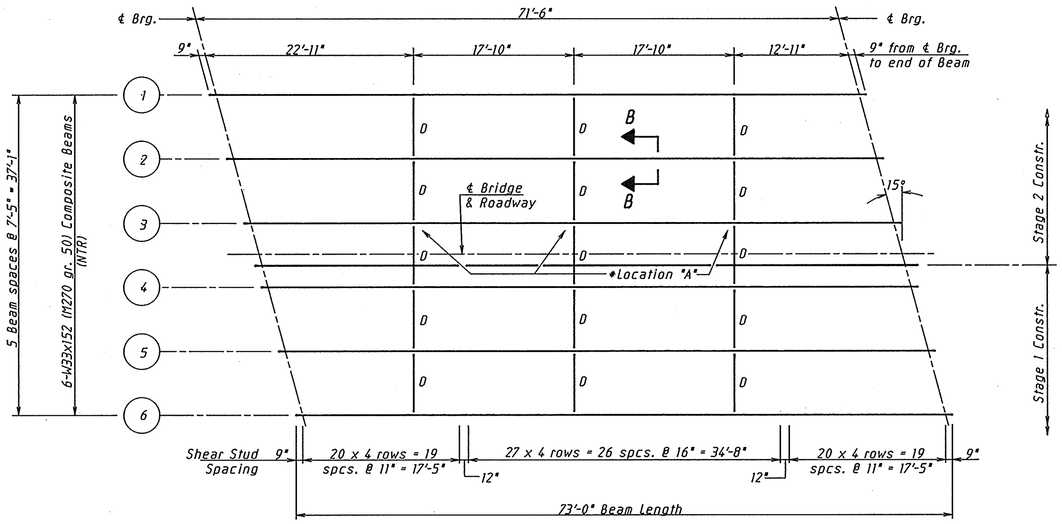
ESE Environmental Science & Engineering, Inc.
8901 NORTH INDUSTRIAL RD., PEORIA, IL. 61615-1589 PHONE (309)693-5694

SURVEYED	DLH
DRAWN	TLS
CHECKED	CAM
DESIGNED	CAM
CHECKED	DDB

(SIXBRIDGES_HICKORY) HICKORY-7

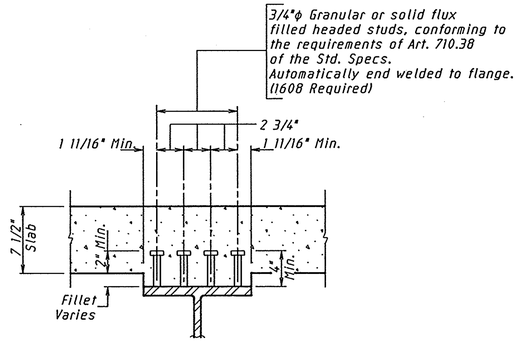
*104BR-1

ROAD SYSTEM AGENCY NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
S.B.I. FA-646	*	BUREAU	46	14
STA.		TO STA.		SHEETS 15
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT		

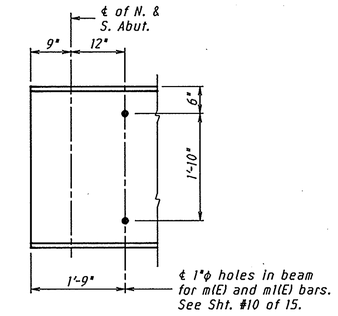


FRAMING PLAN

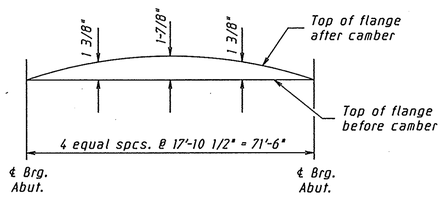
* Use 13/16"x1-1/2" slotted holes in L4x4x1/2 at location "A" only. Provide 5/16" plate washers for slotted holes. Bolts shall be finger tightened prior to the deck pour for Stage 2 Construction. Tighten bolts after deck is poured.



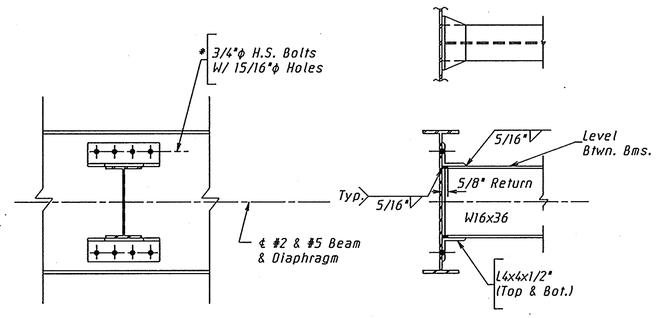
SECTION B-B



END OF BEAM ELEVATION



BEAM CAMBER DIAGRAM



DIAPHRAGM D

Top of Beam Elevations**						
	Beam 1	Beam 2	Beam 3	Beam 4	Beam 5	Beam 6
℄ Brg. S. Abut.	669.681	669.811	669.931	669.931	669.811	669.681
℄ Brg. N. Abut.	669.751	669.871	670.001	670.001	669.871	669.751

** For Fabrication Only

Notes: Two hardened washers shall be required over all oversized holes.
NTR denotes Notch Toughness Requirements

FRAMING PLAN & STEEL DETAILS
F.A. 646 (IL. 88) OVER HICKORY CREEK
SECTION 104BR-1
STRUCTURE #006-0156
STATION 1242+73
BUREAU COUNTY

REVISIONS			
ORG. NO.			
DATE	APRIL 1992		
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Environmental Science & Engineering, Inc.
8901 NORTH INDUSTRIAL RD., PEORIA, IL. 61615-1589 PHONE (309)693-5694

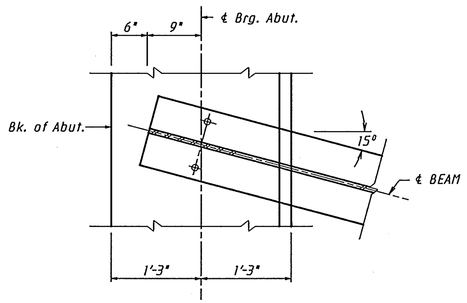
SURVEYED	DLH
DRAWN	TLS
CHECKED	CAH
DESIGNED	CAH
CHECKED	DDB

(SIXBRIDGES_HICKORY) HICKORY-8

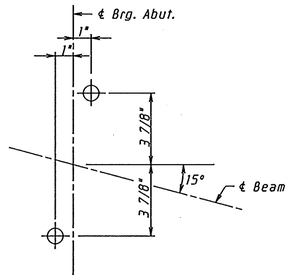
*104BR-1

ROAD SYSTEM MARKS NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
S.N.S. F.A. 646	*	BUREAU	46	15
STA.		TO STA.		
FED. ROAD DIST. NO. 7	ILLINOIS	FED. AID PROJECT		

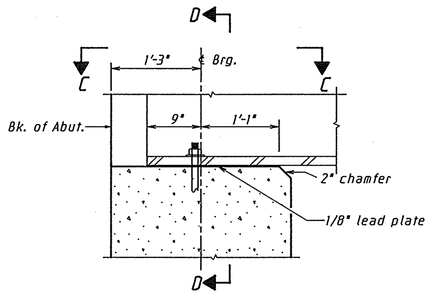
SHEET NO. 8
SHEETS 15



SECTION C-C

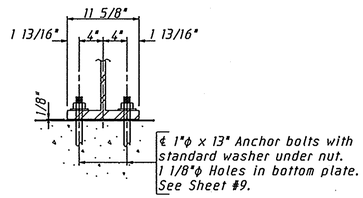


ANCHOR BOLT SETTING PLAN



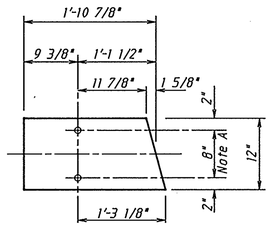
SECTION AT ABUTMENTS

(@ Rt. Angle to Abut.)



SECTION D-D

(@ Rt. Angle to Beam)



PLAN

(1/8" Lead Plate)

Note A: 1 1/8"ϕ Holes for 1"ϕ Anchor Bolts and standard washer under nut. Lead plates shall be incidental to cost of "Furnishing & Erecting Structural Steel."

INTERIOR GIRDER MOMENT TABLE		
		0.5 Sp. #1
Is	(in^4)	8160
Ic	(in^4)	20224
Ss	(in^3)	487
Sc	(in^3)	684.8
Z	(in^3)	559
ℓ	(K/ft.)	0.873
M^{ℓ}	('K)	557.9
s^{ℓ}	(K/ft.)	0.321
Ms^{ℓ}	('K)	205.1
M^{ℓ}	('K)	682.9
M (Imp)	('K)	173.4
$\frac{1}{3}(M^{\ell} + I)$	('K)	1427.2
Ma	('K)	2847.3
Mu	('K)	3823.9
fs ℓnon-comp	(k.s.i.)	13.7
fs ℓ(comp)	(k.s.i.)	4.0
fs $\frac{1}{3}(M^{\ell} + I)$	(k.s.i.)	25.0
fs(Overload)	(k.s.i.)	42.7
VR	(K)	52.9

INTERIOR GIRDER REACTION TABLE		
		Abuts.
R^{ℓ}	(K)	42.7
R^{ℓ}	(K)	42.2
Impact	(K)	10.7
R (Total)	(K)	95.6

NOTES

1. Is and Ss are the moment of inertia and section modulus of the steel section used in computing fs (Overload).
2. Ic and Sc are the moment of inertia and section modulus of the composite section used in computing fs (Overload).
3. VR is the maximum Live Load + Impact shear range in span.
4. Ma (Applied Moment) = $1.3M^{\ell} + Ms^{\ell} + \frac{1}{3}(M^{\ell} + I)$.
5. Mu is the Full Plastic Moment Capacity for the Compact Braced section.
6. fs (Overload) is the sum of the stresses due to $M^{\ell} + Ms^{\ell} + \frac{1}{3}(M^{\ell} + I)$.
7. M^{ℓ} - Moment due to dead loads on non-composite section.
8. Ms^{ℓ} - Moment due to dead loads on composite section.
9. M^{ℓ} - Moment due to live loads on non-composite or composite section.
10. I - Live load impact.
11. Z is the fully plastic section modulus used to determine the fully plastic moments in the non-composite areas.
12. The fully plastic moment capacity (Mu) is computed according to AASHTO 10.48.1 to 10.50.1.1.

BEARING DETAILS
F.A. 646 (IL. 88) OVER HICKORY CREEK
SECTION 104BR-1
STRUCTURE #006-0156
STATION 1242+73
BUREAU COUNTY

REVISIONS			
ORG. NO.			
DATE	APRIL 1992		
JOB NO.	590-5212-5101		

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