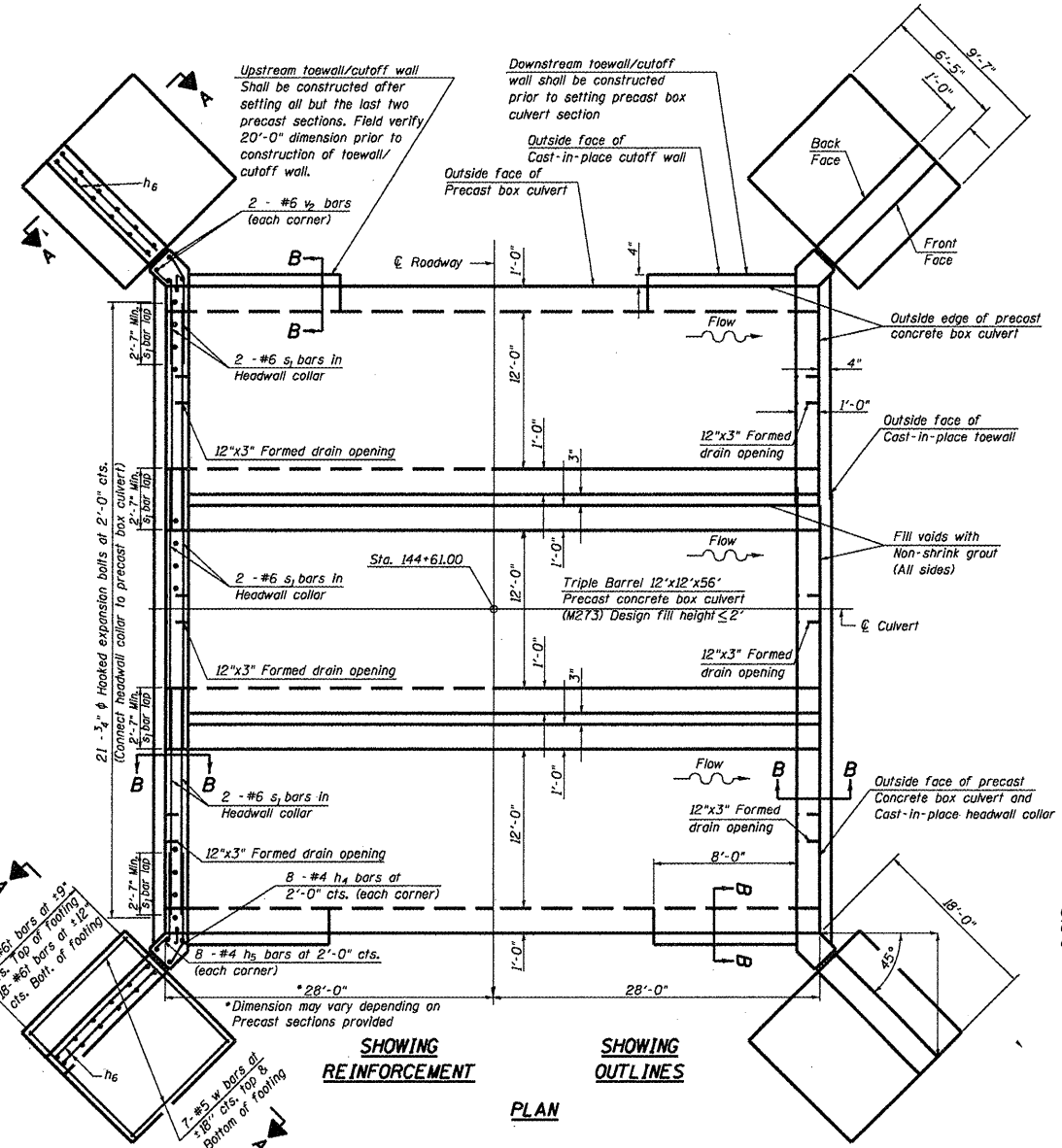


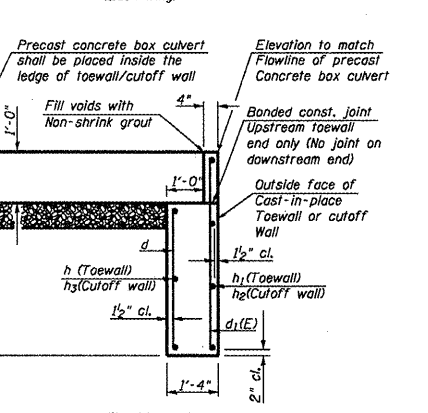
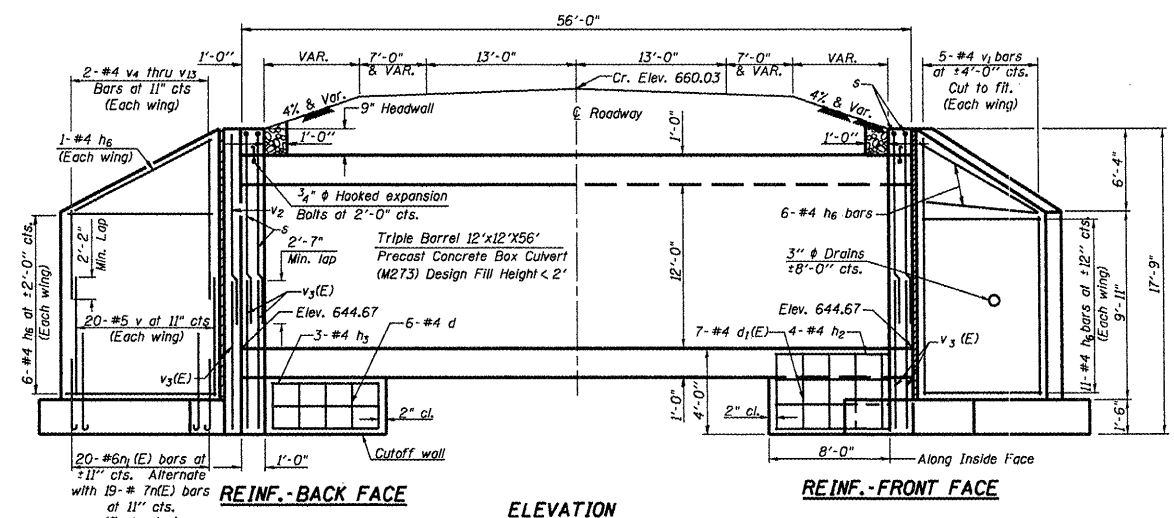
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
816	6RS-1&6BR/BR	DOUGLAS	176	76
STA.	TO STA.			
FED. ROAD DIST. NO.	ILLINOIS FED. AID PROJECT			

Existing structure 021-0033 was built by the State of Illinois in 1919 as FAS Route 659, Section 6BR as a single span reinforced concrete thru girder bridge. In 1970, the substructure was widened and the superstructure was replaced with precast, prestressed concrete deck beams, waterproofing membrane, and 1 1/2" of hot-mix asphalt. In 1995, 1 1/4" of hot-mix asphalt was added to the deck. To be removed. No salvage.



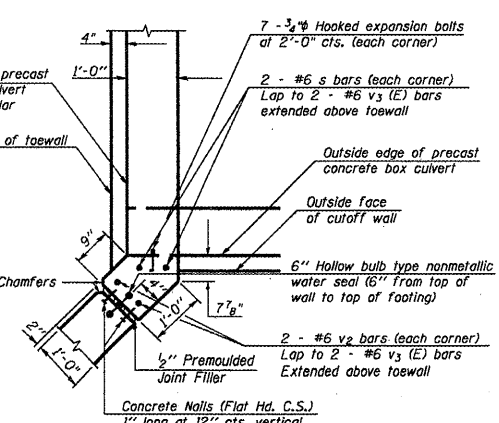
**NOTES**

- Excavation behind existing abutment walls shall be performed to balance front and back soil pressure before removing the existing superstructure.
- The Precast Concrete Box Culvert Sections shall conform to the requirements of AASHTO M273.
- Reinforcement bars shall conform to the requirements of ASTM A 706 Gr 60. See Special Provisions.
- Reinforcement bars designated (E) shall be epoxy coated.
- Expansion bolts shall be 3/4" hooked bolts. The cost of the bolts shall be included in the cost of Box Culvert End Section.
- The Contractor may substitute cast in place inserts and threaded hooked reinforcement bars for the expansion bolts.
- Areas of the precast box in contact with cast in place concrete shall be sandblasted, cleaned and wetted prior to placing concrete in the field according to Article 503.09(b) of the Standard Specifications.
- The joints between precast segments shall be sealed and all voids filled with a mastic joint sealer. In addition, the sides and top shall be sealed with a 12" wide external spalling band meeting the requirements of ASTM C877 Type III. The joint areas to be sealed shall be cleaned and primed according to the manufacturer's directions prior to placing the seal. The seal shall be protected during backfilling to prevent damage.
- End Sections will be paid for at the contract unit price each for BOX CULVERT END SECTION, as outlined in Art. 540.08, which prices shall include all concrete, rebar, and all other items necessary to complete the proposed work. Precast option is not allowed.
- Drain holes shall be provided in accordance with Art. 503.11.
- Voids between the Precast Concrete Box Culvert and the cast-in-place toewall / cutoff wall shall be filled with Non-shrink grout.
- Drawings not to scale.



**SECTION B-B TOEWALL/CUTOFF WALL DETAIL ONLY (SIDE WALL OF PRECAST BOX CULVERT NOT SHOWN)**

Porous Granular Material - CA 7 (6") (Included in pay item for precast box culvert)

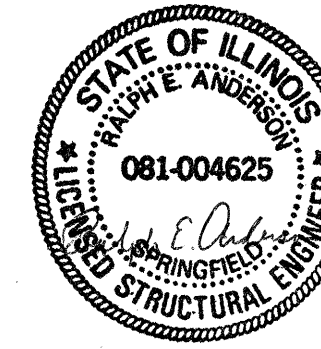
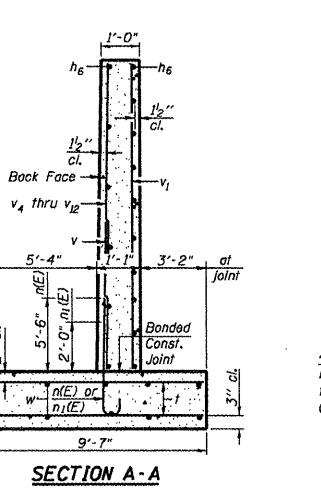


**CAST-IN-PLACE CORNER DETAIL FOR HEADWALL COLLAR**

**DETAIL C**

**WATERWAY INFORMATION TABLE**

DRAINAGE AREA = 13.2 mi. <sup>2</sup>		PROP. LOW GRADE ELEV. = 659.5 FT. @ STA. 141+60			
FREQ. YR.	Q C.F.S.	OPENING SQ. FT.	NAT. H.W.E.	HEAD - FT.	HEADWATER EL.
		EXIST.	PROP.	EXIST.	PROP.
		265	414	0.2	0.1
DESIGN	50	1625	286	656.2	656.3
BASE	100	1882	292	657.9	657.9
MAX. CALC.	500	2500	301	657.4	658.7

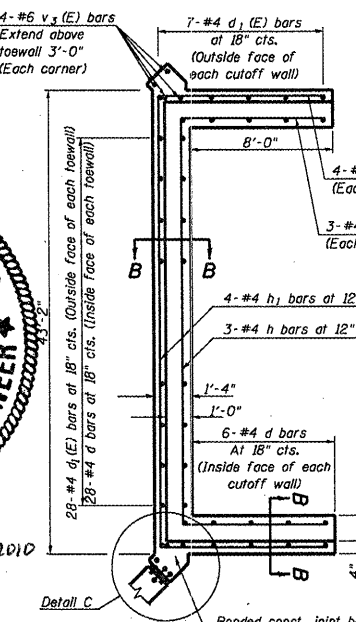


Expires Nov. 30, 2010

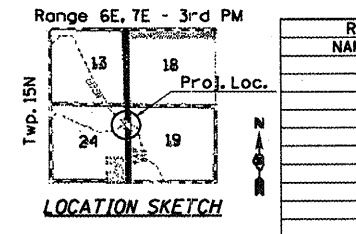
STATION 144+61.00  
BUILT 2009 BY  
STATE OF ILLINOIS  
F.A.P. RTE. 816 SEC. 16BR/BR  
LOADING HS 20-44  
STR. NO. 021-2025

**NAME PLATE**

See Highway Standard 515001-02 for dimensions and placement.  
Name Plate will be paid for at the contract unit price per "EACH" for "NAME PLATES".



**TOEWALL / CUTOFF WALL DETAIL WITH CORNER DIMENSIONS**



REVISIONS	
NAME	DATE
	10/27/08

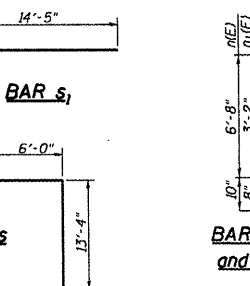
**DESIGN STRESSES**

**Cast in Place**  
f<sub>y</sub> = 60,000 psi  
f'<sub>c</sub> = 3,500 psi

**Precast**  
f<sub>y</sub> = 60,000 psi  
f'<sub>c</sub> = 5,000 psi

Max. Soil Pressure under footing = 3,522 psf

**LOADING HS 20-44**



**BILL OF MATERIAL (ONE END SECTION) FOR INFORMATION ONLY**

Bar	No.	Size	Length	Shape
d	40	#4	2'-8"	
d <sub>1</sub> (E)	42	#4	3'-8"	
h	3	#4	41'-6"	
h <sub>1</sub>	4	#4	42'-10"	
h <sub>2</sub>	8	#4	8'-9"	
h <sub>3</sub>	6	#4	8'-0"	
h <sub>4</sub>	16	#4	1'-2"	
h <sub>5</sub>	16	#4	9"	
h <sub>6</sub>	48	#4	16'-11"	
n(E)	38	#7	7'-6"	
n <sub>1</sub> (E)	40	#6	3'-10"	
s	4	#6	19'-4"	
s <sub>1</sub>	6	#6	14'-5"	
t	84	#6	9'-4"	
v	36	#5	7'-9"	
v <sub>1</sub>	10	#4	15'-11"	
v <sub>2</sub>	4	#6	13'-2"	
v <sub>3</sub> (E)	8	#6	6'-10"	
v <sub>4</sub>	4	#4	4'-8"	
v <sub>5</sub>	4	#4	5'-4"	
v <sub>6</sub>	4	#4	6'-0"	
v <sub>7</sub>	4	#4	6'-8"	
v <sub>8</sub>	4	#4	7'-4"	
v <sub>9</sub>	4	#4	8'-0"	
v <sub>10</sub>	4	#4	8'-8"	
v <sub>11</sub>	4	#4	9'-4"	
v <sub>12</sub>	4	#4	10'-0"	
v <sub>13</sub>	4	#4	10'-8"	
w	28	#5	16'-11"	
Concrete Box Culverts	Cu. Yd.	46.8		
Reinforcement Bars	Pound	990		
Epoxy Coated Reinforcement Bars	Pound	3700		
Expansion Bolt 3/4" #	Each	35		


**TOTAL BILL OF MATERIALS**

Item	Unit	Qty.
Removal of Existing Structures	Each	1
Box Culvert End Section	Each	2
Precast Concrete Box Culvert 12'x12' (M273)	Feet	168
Name Plate	Each	1

ILLINOIS DEPARTMENT OF TRANSPORTATION  
TRIPLE 12'x12' BOX CULVERT

FAP ROUTE 816  
ATWOOD-ARTHUR RD  
SECTION (6BR)BR  
DOUGLAS COUNTY  
021-0033 (EX)  
021-2025 (PR)  
STATION 144+61.00

CONTRACT NO. 90711			
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS
B16	GRS-1&6BRIBR	DOUGLAS	176
SHEET NO.		76A	
STA.		TO STA.	
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT	


**Illinois Department of Transportation**  
 Division of Highways  
 1001 - Region 3/01st 5

Page 1 of 1  
Date 3/21/69

**SOIL BORING LOG**  
 ROUTE FAS 659 DESCRIPTION West Fork Kaskaskia River 1 mile North of Arcola BY BAKER  
 SECTION 6 BR LOCATION NE, SEC. 24, TWP. 15N, RNG. 6E, 3rd PM  
 COUNTY Douglas & Moultrie DRILLING METHOD Hollow Stem Auger HAMMER TYPE Automatic

STRUCT. NO. 021-0033 DEPTH (ft) 100.0 BULGE (ft) 0.0 SHEAR (ft) 0.0 PENETROMETER (ft) 0.0  
 Station 144+90  
 BORING NO. 1 T W Qu T  
 Station 144+90  
 Offset 36.0 ft RT  
 Ground Surface Elev. 654.7 ft (ft) (1/6") (tsf) (%)


Surface Water Elev. _____ ft	D	B	U	M	Surface Water Elev. _____ ft	D	B	U	M
Stream Bed Elev. _____ ft	E	L	C	O	Stream Bed Elev. _____ ft	E	L	C	O
Groundwater Elev.: _____ ft	P	O	S	I	Groundwater Elev.: _____ ft	P	O	S	I
First Encounter _____ ft	T	W	Qu	T	First Encounter _____ ft	T	W	Qu	T
Upon Completion _____ ft	H	S	Qu	T	Upon Completion _____ ft	H	S	Qu	T
After <u>2.5</u> Hrs. _____ ft	(ft)	(1/6")	(tsf)	(%)	After <u>2.5</u> Hrs. _____ ft	(ft)	(1/6")	(tsf)	(%)

STIFF BROWN GRAY MOTTLED CLAY  
 631.7  
 HARD GRAY CLAY LOAM TILL  
 649.2  
 STIFF GRAY BROWN CLAY LOAM TILL  
 645.7  
 STIFF TO HARD GRAY CLAY LOAM TILL  
 634.7

DENSE GRAY SAND  
 44 7.2 12  
 B  
 629.2  
 End of Boring  
 7 3.3 15  
 B  
 10 3.4 13  
 B  
 13 4.1 13  
 B  
 23 4.9 10  
 S  
 35 9.5 9  
 S  
 50 10.3 10  
 S

An assumed centerline elevation of 100.00 and station of 10+00 is used when this information is not available.  
 The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)  
 The SPT (N Value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)


**Illinois Department of Transportation**  
 Division of Highways  
 1001 - Region 3/01st 5

Page 1 of 1  
Date 3/21/69

**SOIL BORING LOG**  
 ROUTE FAS 659 DESCRIPTION West Fork Kaskaskia River 1 mile North of Arcola BY BAKER  
 SECTION 6 BR LOCATION NE, SEC. 24, TWP. 15N, RNG. 6E, 3rd PM  
 COUNTY Douglas & Moultrie DRILLING METHOD Hollow Stem Auger HAMMER TYPE Automatic

STRUCT. NO. 021-0033 DEPTH (ft) 100.0 BULGE (ft) 0.0 SHEAR (ft) 0.0 PENETROMETER (ft) 0.0  
 Station 144+25  
 BORING NO. 2 T W Qu T  
 Station 144+25  
 Offset 19.0 ft LT  
 Ground Surface Elev. 659.0 ft (ft) (1/6") (tsf) (%)

Surface Water Elev. _____ ft	D	B	U	M	Surface Water Elev. _____ ft	D	B	U	M
Stream Bed Elev. _____ ft	E	L	C	O	Stream Bed Elev. _____ ft	E	L	C	O
Groundwater Elev.: _____ ft	P	O	S	I	Groundwater Elev.: _____ ft	P	O	S	I
First Encounter _____ ft	T	W	Qu	T	First Encounter _____ ft	T	W	Qu	T
Upon Completion _____ ft	H	S	Qu	T	Upon Completion _____ ft	H	S	Qu	T
After _____ Hrs. _____ ft	(ft)	(1/6")	(tsf)	(%)	After _____ Hrs. _____ ft	(ft)	(1/6")	(tsf)	(%)

BLACK CLAY FILL  
 655.0  
 STIFF BROWN MOTTLED CLAY  
 646.5  
 HARD GRAY CLAY LOAM TILL  
 623.5  
 End of Boring

HARD GRAY CLAY LOAM TILL (continued)  
 636.5 48 8.1 11  
 DENSE GRAY SAND  
 634.5 28 11.0 10  
 NF  
 646.5 4 2.5 18  
 B  
 10 2.1 14  
 B  
 14 4.7 12  
 B  
 16 6.0 12  
 B

An assumed centerline elevation of 100.00 and station of 10+00 is used when this information is not available.  
 The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)  
 The SPT (N Value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

REVISIONS	
NAME	DATE

ILLINOIS DEPARTMENT OF TRANSPORTATION

**BOX CULVERT SOIL BORINGS**

**STA 144+61.00**

SCALE: VERT. \_\_\_\_\_  
 HORIZ. \_\_\_\_\_

DATE \_\_\_\_\_ DRAWN BY \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_