06-12-2015 LETTING ITEM 180

Call Before You Dig
JULIE ILLINOIS ONE-CALL SYSTEM
1-800-892-0123

ROUTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FAS 941	12-00070-00-BR	PULASKI	11	1
PROJECT NO. BRS-094(115)		CONTRACT NO. 99539		

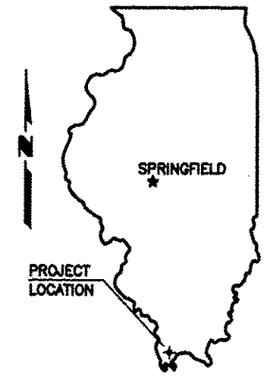
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED

HIGHWAY BRIDGE PROGRAM

FAS ROUTE 941 (ULLIN ROAD/CH9)
SECTION 12-00070-00-BR
PROJECT NO. BRS-094(115)
JOB NO. C-99-552-12
DRAINAGE DITCH

PULASKI COUNTY



SUMMARY OF QUANTITIES

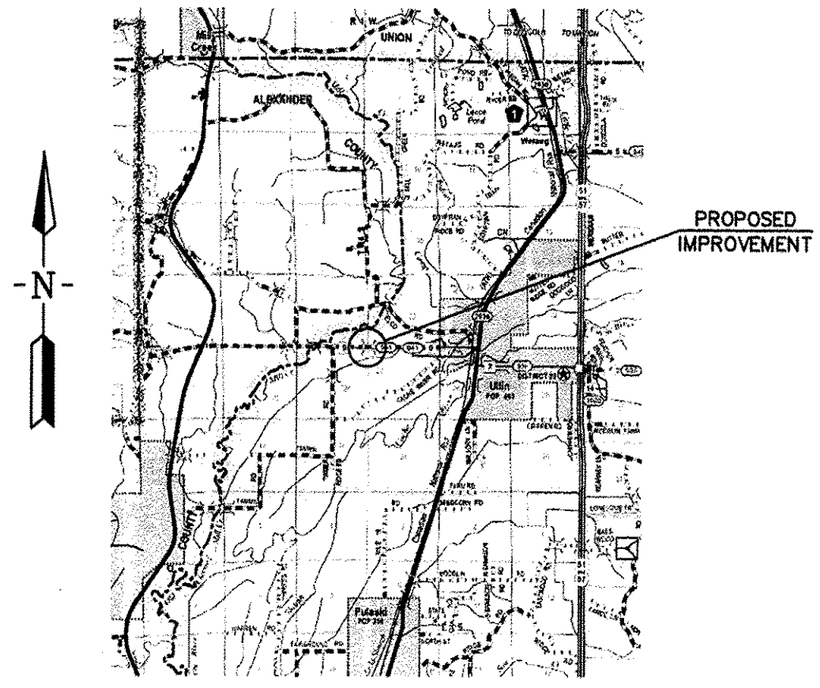
CODE NO.	PAY ITEM	UNIT	TOTAL
Δ LR831020	TRAFFIC BARRIER TERMINAL, TYPE 1	EACH	2
* X2501000	SEEDING, CLASS 2 (SPECIAL)	ACRE	0.8
20200100	EARTH EXCAVATION	CU YD	163
* 20300100	CHANNEL EXCAVATION	CU YD	53
* 20400100	BORROW EXCAVATION	CU YD	723
* 28100807	STONE DUMPED RIPRAP, CLASS A4	TON	129
* 40600275	BITUMINOUS MATERIALS (PRIME COAT)	POUND	199
40600982	HOT-MIX ASPHALT SURFACE REMOVAL - BUTT JOINT	SQ YD	140
40603315	HOT-MIX ASPHALT SURFACE COURSE, MIX "C", N70	TON	43
48101200	AGGREGATE SHOULDERS, TYPE B	TON	111
50100100	REMOVAL OF EXISTING STRUCTURES	EACH	1
50105220	PIPE CULVERT REMOVAL	FOOT	28
50200100	STRUCTURE EXCAVATION	CU YD	79
50300225	CONCRETE STRUCTURES	CU YD	20.6
50300280	CONCRETE ENCASEMENT	CU YD	2.7
50400405	PRECAST PRESTRESSED CONCRETE DECK BEAMS (21" DEPTH)	SQ FT	1,680
50800105	REINFORCEMENT BARS	POUND	2,695
Δ 50900205	STEEL RAILING, TYPE S1	FOOT	114
51200957	FURNISHING METAL SHELL PILES 12" X 0.250"	FOOT	387
51202305	DRIVING PILES	FOOT	387
51203200	TEST PILE METAL SHELLS	EACH	1
51500100	NAME PLATES	EACH	1
542A0229	PIPE CULVERTS, CLASS A, TYPE 1 24"	FOOT	28
58100200	WATERPROOFING MEMBRANE SYSTEM	SQ YD	192
58300100	PORTLAND CEMENT MORTAR FAIRING COURSE	FOOT	504
59300100	CONTROLLED LOW-STRENGTH MATERIAL	CU YD	17.2
Δ 63000003	STEEL PLATE BEAM GUARDRAIL, TYPE A, 9 FOOT POSTS	FOOT	300
Δ 63100075	TRAFFIC BARRIER TERMINAL, TYPE 5A	EACH	4
Δ 63100167	TRAFFIC BARRIER TERMINAL, TYPE 1 (SPECIAL) TANGENT	EACH	2
63200310	GUARDRAIL REMOVAL	FOOT	682
67100100	MOBILIZATION	L SUM	1
Δ 78001110	PAINT PAVEMENT MARKING - LINE 4"	FOOT	360
* Δ 78200410	GUARDRAIL MARKERS, TYPE A	EACH	8
* Δ 78201000	TERMINAL MARKER - DIRECT APPLIED	EACH	4

* SEE SPECIAL PROVISIONS Δ SPECIALTY ITEMS

CONTRACT NO. 99539

E. MILLER ENGINEERING, INC.
CONSULTING ENGINEERS
HARRISBURG, ILLINOIS

John S. Peradotti 2/25/15
John S. Peradotti
PROFESSIONAL ENGINEER
#062-050510
EXPIRES NOV. 30, 2015



LOCATION MAP

SCALE: 1" = 2 MILES

NET LENGTH OF IMPROVEMENT = 552.00 FT. = 0.1045 MILES

INDEX OF SHEETS

CLASSIFICATION : COLLECTOR (RURAL)
ADT : 900
DESIGN SPEED : 50 MPH

ILLINOIS DEPARTMENT OF TRANSPORTATION

Approved 3/9/15
Brad Weston
Pulaski County Engineer

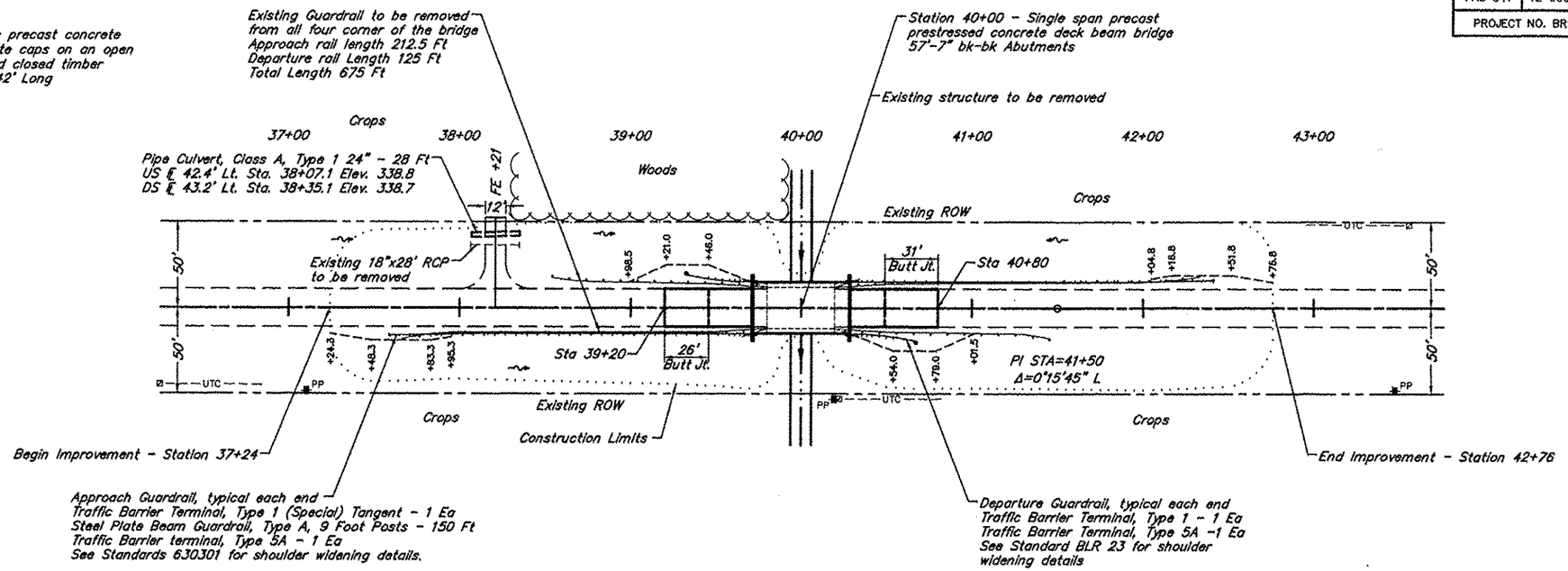
Passed 3/11/2015
Don W. Hillis
District 9 Engineer of Local Roads and Streets

Releasing for Bid Based on Limited Review 3/11/15
Jeffrey L. Keirn
Deputy Director of Highways, Region 5 Engineer
Illinois Department of Transportation

ROUTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FAS 941	12-00070-00-BR	PULASKI	11	2
PROJECT NO. BRS-094(115)		CONTRACT NO. 99539		

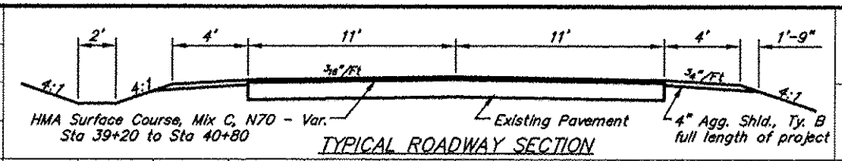
B.M. - Double nails in Power Pole
53' Rt. of Station 40+19
Elev. 340.00

Existing Structure - Two Span precast concrete deck beams with concrete caps on an open timber pile bent pier and closed timber abutments. 26' Wide x 42' Long

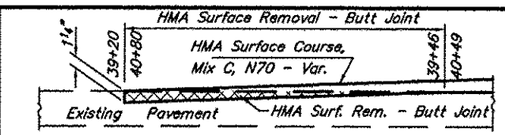


SCALES:
1" = 80' HOR
1" = 10' VER

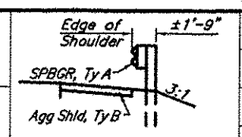
SCHEDULE OF PAVEMENT MARKING LINE 4" (LIN. FT.)		
Location	Centerline (Yellow Dashed)	Edge Line (White Solid)
Sta. 39+20 to Sta. 40+80	40'	320'



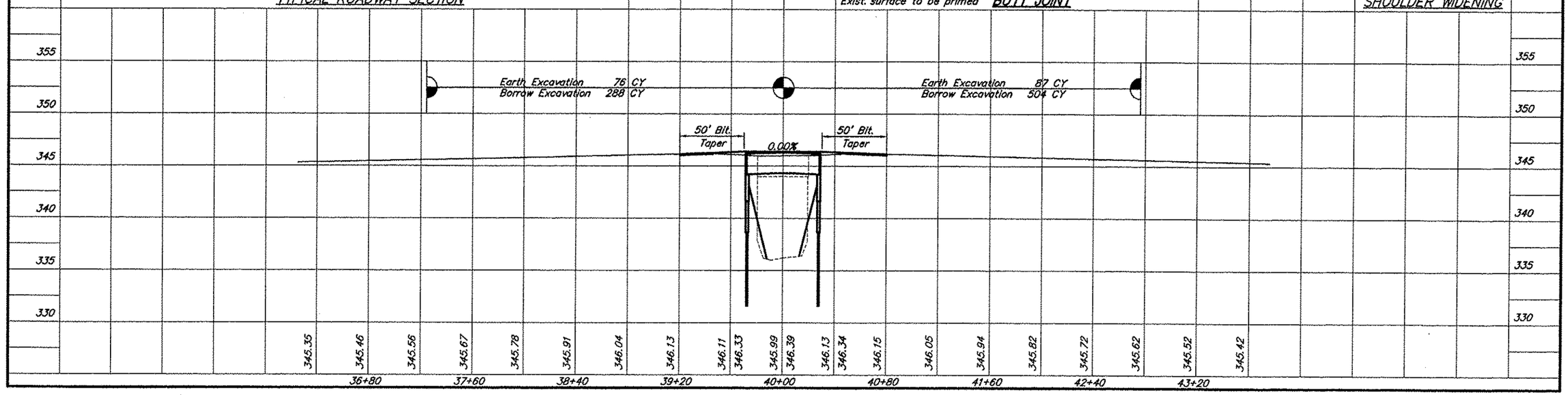
TYPICAL ROADWAY SECTION



BUTT JOINT

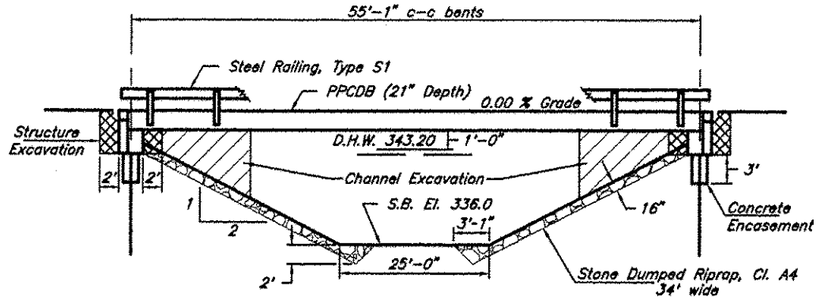


SHOULDER WIDENING



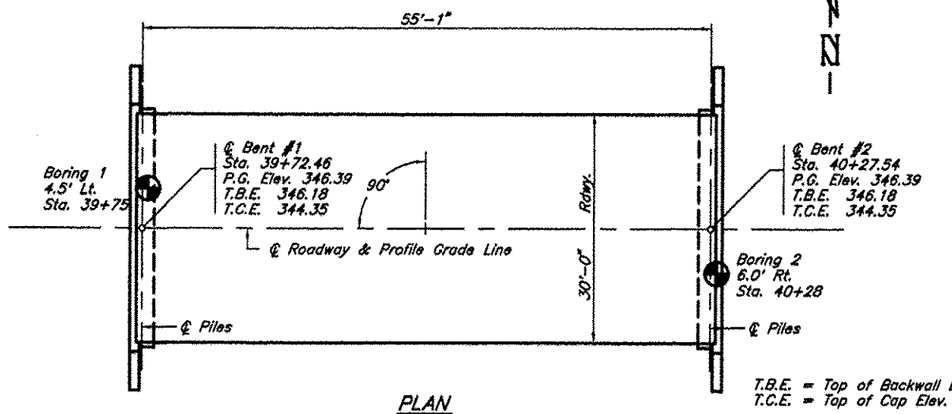
B.M.– Double nail in Power Pole
53' Rt. of Station 40+19
Elev. 340.00

ROUTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FAS 941	12-00070-00-BR	PULASKI	11	3
PROJECT NO. BRS-094(115)		CONTRACT NO. 99539		



ELEVATION

Existing Structure – Two span precast concrete deck beams with concrete caps on an open timber pile bent pier and closed timber pile bent obutments. 26' Wide x 42' Long



T.B.E. = Top of Backwall Elev.
T.C.E. = Top of Cap Elev.

PLAN

GENERAL NOTES

1. Metal Shell piles shall meet ASTM A 252 Grade 3 specifications.
2. Test Piles shall be driven to 110% of the Nominal Required Bearing indicated in the pile data.
3. The Contractor shall drive one test pile, as specified, in a permanent location as directed by the Engineer before ordering the remaining piles.
4. See special provisions for boring logs.
5. A Corrosion inhibitor, as covered in the Standard Specifications, shall be used in the precast prestressed concrete deck beams.

TOTAL BILL OF MATERIAL

Item	Unit	Super	Sub. Piers	Sub. Abuts.	Total
Channel Excavation	Cu. Yds.			53	53
Stone Dumped Riprap, Cl. A4	Tons			129	129
HMA Surf. Cse., Mix "C", N70	Tons	43			43
Removal of Existing Structures	Each				1
Structure Excavation	Cu. Yds.			79	79
Concrete Structures	Cu. Yds.			20.6	20.6
Concrete Encasement	Cu. Yds.			2.7	2.7
P.P. Conc. Dk. Bm. 21" Dp.	Sq. Ft.	1,680			1,680
Reinforcement Bars	Pound			2,695	2,695
Steel Railing, Type S1	Foot	114			114
Furnishing MS Piles 12" X 0.250"	Foot			387	387
Driving Piles	Foot			387	387
Test Pile Metal Shells	Each			1	1
Name Plates	Each			1	1
Waterproofing Membrane System	Sq. Yds.	192			192
P.C. Mortar Fairing Course	Foot	504			504

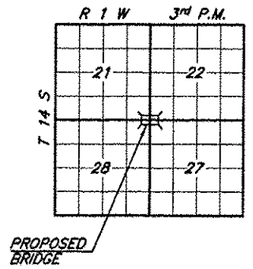
PILE DATA (2-ABUTS.)

Type & Size : Metal Shell 12" x 0.250"
Nominal Required Bearing : 231 kips
Factored Resistance Available : 127 kips
Estimated Length : 43 Feet
Number Required : 10 (Includes 1 Test Pile located in Bent #2)

STATION 40+00
DRAINAGE DITCH
SEC. 12-00070-00-BR BUILT 20___
PULASKI COUNTY
LOADING HL-93
STR. NO. 077-3143

LETTERING FOR NAME PLATE

Locate Name Plate at southwest Corner of Bridge (See Sheet 8)

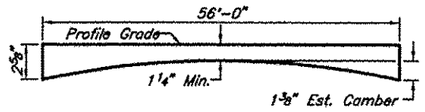


LOCATION SKETCH

I certify that to the best of my knowledge, information and belief, this bridge design is structurally adequate for the design loading shown on the plans. The design is an economical one for the type of structure and comply with the requirements of the current AASHTO LRFD Specifications.

2/25/15
John S. Peradotti
S.E. #081-005671
Expires Nov. 30, 2016

JOHN S. PERADOTTI
081-005671
LICENSED STRUCTURAL ENGINEER
STATE OF ILLINOIS



ANTICIPATED HMA WEARING SURFACE PROFILE

(For information only – beam camber may vary in field.)
Deflection due to Overlay - @ ¼ Pts. = 0.09", @ ℄ = 0.12"

DESIGN SPECIFICATIONS

2014 AASHTO LRFD Bridge Design Specifications and all applicable interims.

LOADING HL-93

Allow 50#/sq. ft. for future wearing surface

SEISMIC DATA

Soil Site Class = E
Design Spectral Acceleration at 0.2 sec. (S_{DS}) = 1.431
Design Spectral Acceleration at 1.0 sec. (S_{D1}) = 0.985
Seismic Performance Zone (SPZ) = 4

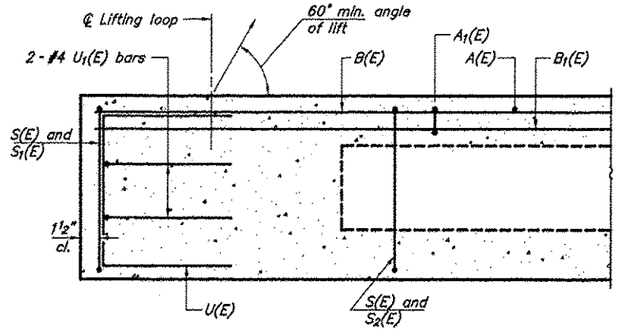
WATERWAY INFORMATION

Drainage Area = 35.8 Sq. Mi. Low Grade Elev. = 345.4 At Sta. 36+74

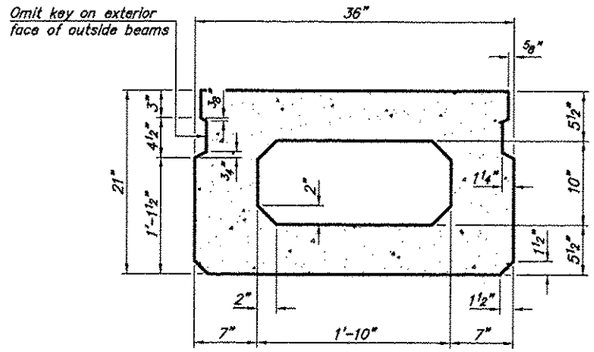
Flood	Freq. Yr.	Q C.F.S.	Opening Sq. Ft. Exist.	Opening Sq. Ft. Prop.	Natural H.W.E.	Head-Ft. Exist.	Head-Ft. Prop.	Headwater El. Exist.	Headwater El. Prop.
Design	20		241.9	287.8	343.20				
Base	100								
Overtopping									
Max. Calc.	500								

GENERAL PLAN & ELEVATION
FAS ROUTE 941 (ULLIN ROAD)
DRAINAGE DITCH
SECTION 12-00070-00-BR
PULASKI COUNTY
STRUCTURE NO. 077-3143

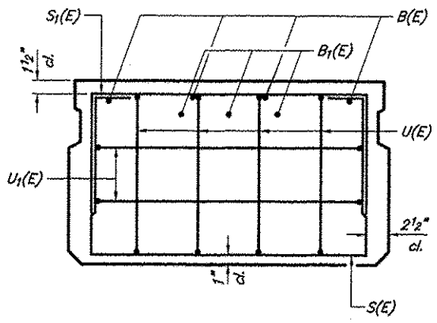
ROUTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO
FAS 941	12-00070-00-BR	PULASKI	11	4
PROJECT NO. BRS-094(115)			CONTRACT NO. 99539	



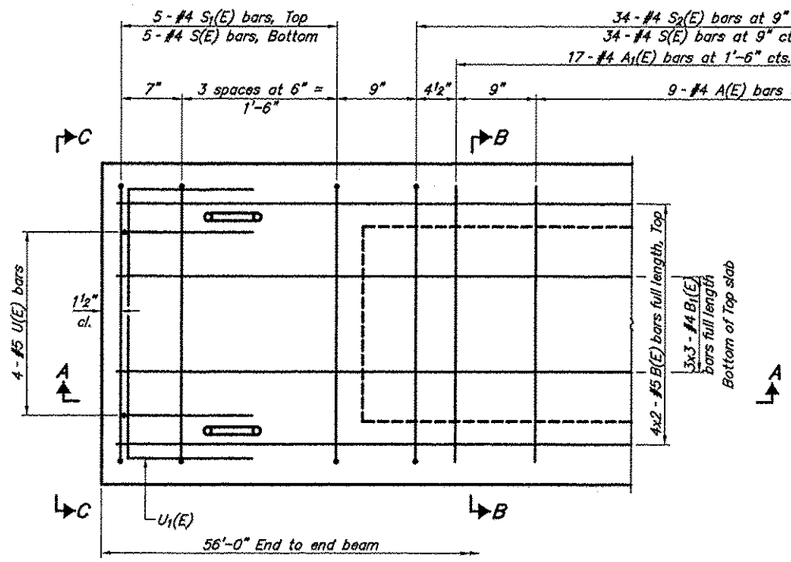
SECTION A-A



SECTION B-B
(Showing dimensions)

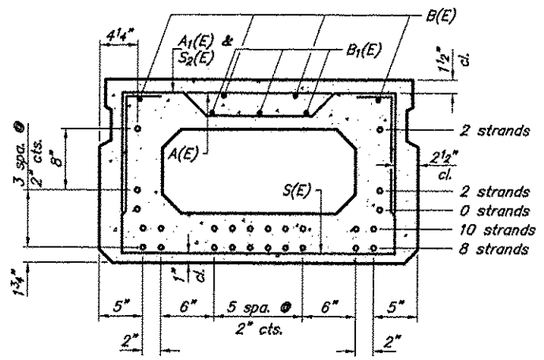


VIEW C-C



PLAN VIEW

Note: Spacing of S(E) and S2(E) bars may be adjusted up to 4" in the immediate area of the transverse tie diaphragms to miss the block outs for the transverse ties.



SECTION B-B
(Showing reinforcement and permissible strand locations)

Note: Place the number of strands specified in each row symmetrically about the centerline of beam in the permissible strand locations shown.

MINIMUM BAR LAP
#4 bar = 2'-0
#5 bar = 2'-6"

BAR LIST
ONE BEAM ONLY
(For information only)

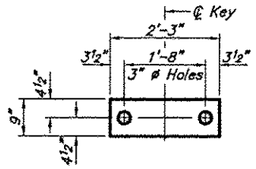
Bar	No.	Size	Length	Shape
A(E)	18	#4	2'-7"	
A1(E)	34	#4	2'-10"	
B(E)	8	#5	29'-2"	
B1(E)	9	#4	19'-11"	
S(E)	78	#4	6'-5"	
S1(E)	10	#4	4'-11"	
S2(E)	68	#4	5'-2"	
U(E)	8	#5	4'-0"	
U1(E)	4	#4	5'-0"	

See sheet 5 of 11 for additional details and Bill of Materials.

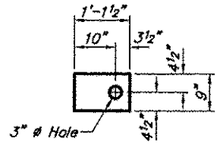
Bars noted thus 4x2-#5 etc. indicates 4 lines of bars with 2 lengths per line.

21" X 36" PPC DECK BEAM
FAS ROUTE 941 (ULLIN ROAD)
DRAINAGE DITCH
SECTION 12-00070-00-BR
PULASKI COUNTY
STRUCTURE NO. 077-3143

ROUTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FAS 941	12-00070-00-BR	PULASKI	11	5
PROJECT NO. BRS-094(115)		CONTRACT NO. 99539		



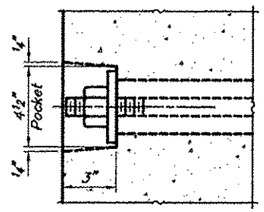
FABRIC BEARING PAD
(Interior)



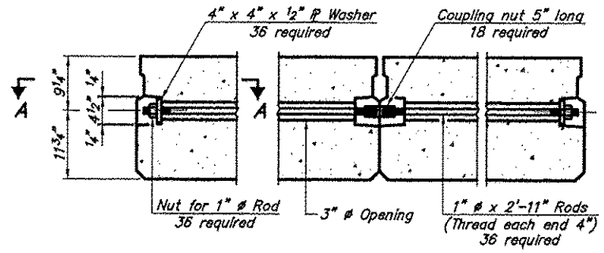
FABRIC BEARING PAD
(Exterior)

FIXED

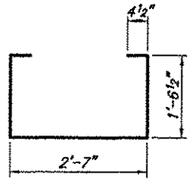
Notes: All bearing pads shall be 1" thick.
Omit holes when using expansion bearings.
Bond expansion bearing pads to substructure.



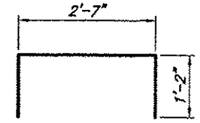
SECTION A-A



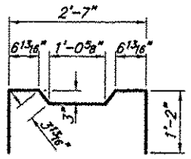
TYPICAL TRANSVERSE TIE ASSEMBLY



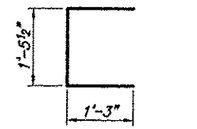
BAR S(E)



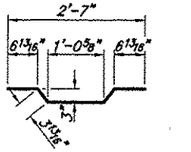
BAR S1(E)



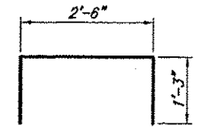
BAR S2(E)



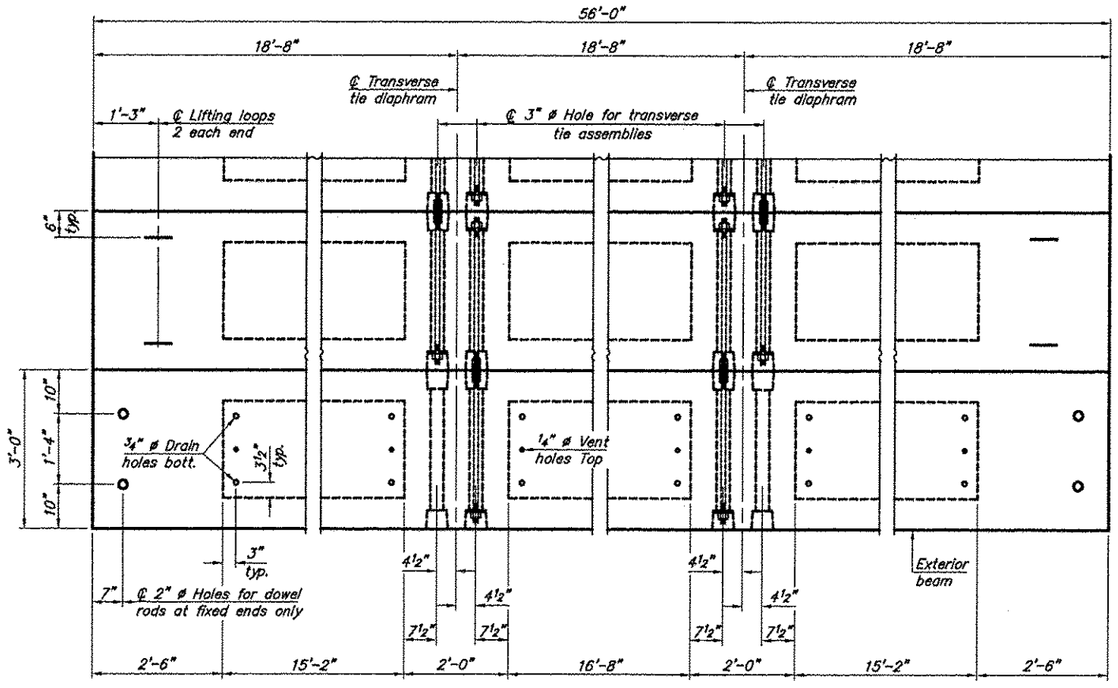
BAR U(E)



BAR A1(E)

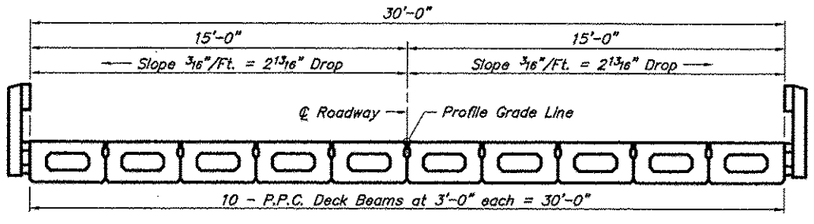


BAR U1(E)

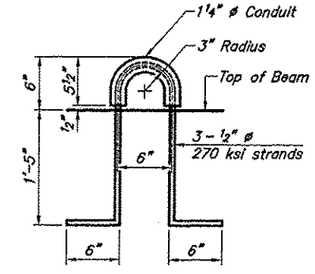


PLAN VIEW

Note: Connect beams in pairs with the transverse tie configuration shown.



CROSS SECTION



LIFTING LOOP DETAIL

NOTES

Prestressing steel shall be uncoated high strength, low relaxation 7-wire strand, Grade 270. The nominal diameter shall be ½" and the nominal cross-sectional area shall be 0.153 sq. in.

The 1" ø rods in the transverse tie assembly shall be tightened to a snug fit and the threads set. Pockets on exterior faces of bridge shall be filled with grout after transverse tie assembly is in place.

Reinforcement bars shall conform to ASTM A 706, Grade 60. (See Special Provisions).

Two ⅛" fabric adjusting shims of the dimensions of the exterior bearing pad shall be provided for each bearing pad location.

A minimum 2½" ø lifting pin shall be used to engage the lifting loops during handling.

Corrosion Inhibitor, per Article 1020.05(b)(12) and 1021.06 of the Standard Specifications, shall be used in the concrete for precast prestressed concrete deck beams.

Compressive strength of prestressed concrete, f'c, shall be 6000 psi.

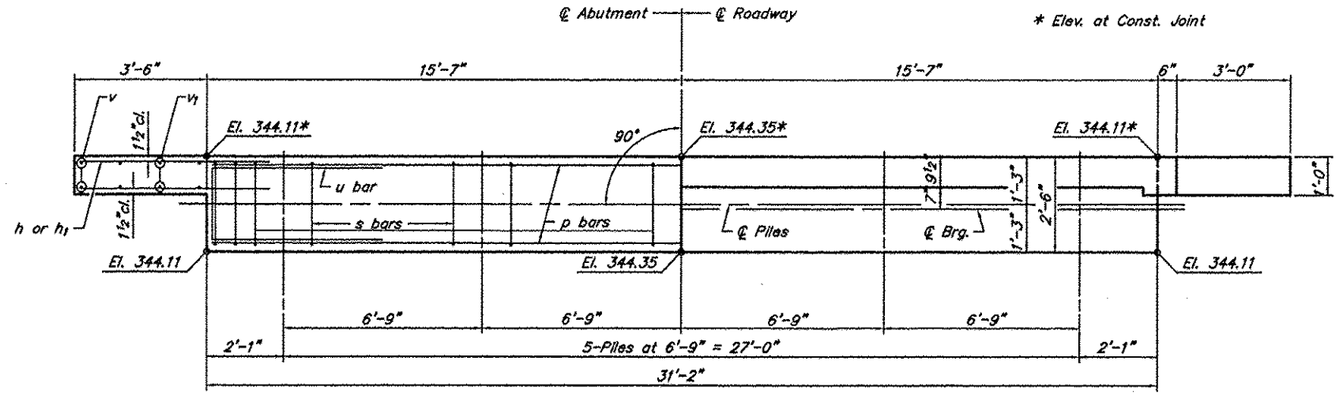
Compressive strength of prestressed concrete at release, f'ci, shall be 5000 psi.

BILL OF MATERIAL

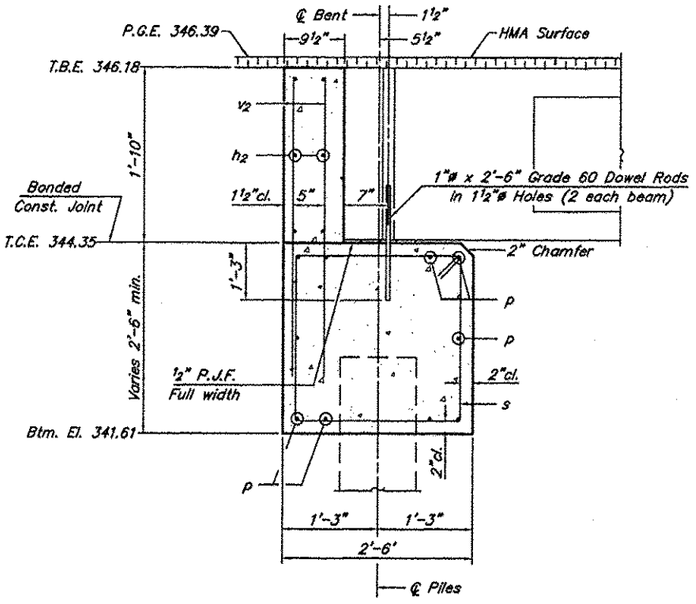
Precast Prestressed Conc. Deck Bms. (21" depth)	Sq. Ft.	1,680

21" X 36" PPC DECK BEAM DETAILS
FAS ROUTE 941 (ULLIN ROAD)
DRAINAGE DITCH
SECTION 12-00070-00-BR
PULASKI COUNTY
STRUCTURE NO. 077-3143

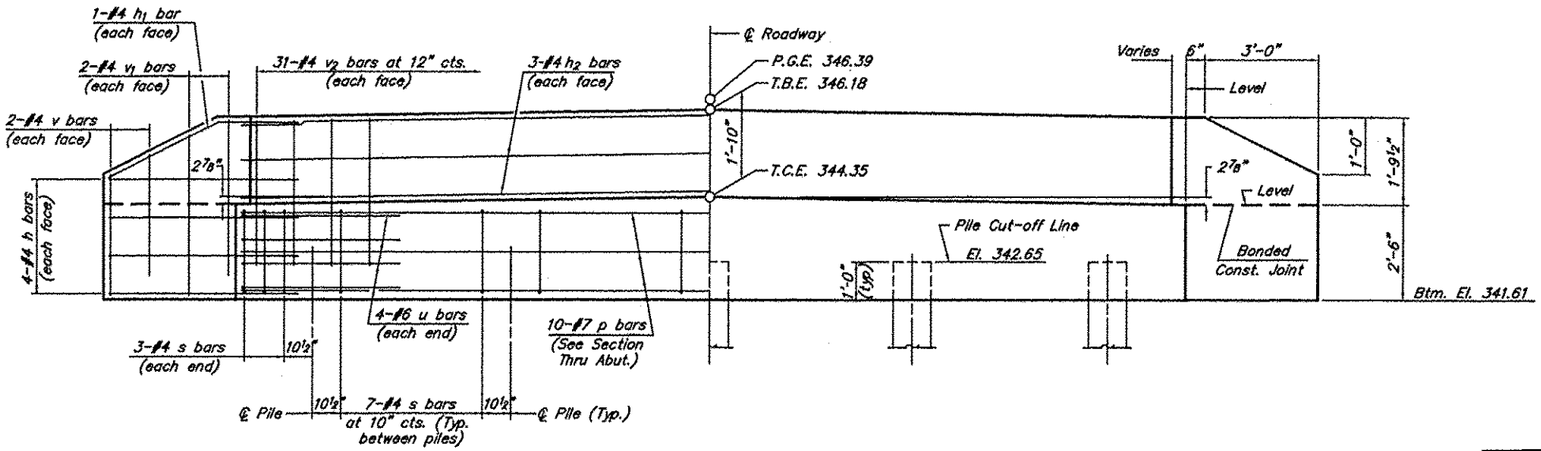
ROUTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO
FAS 941	12-00070-00-BR	PULASKI	11	6
PROJECT NO. BRS-094(115)		CONTRACT NO. 99539		



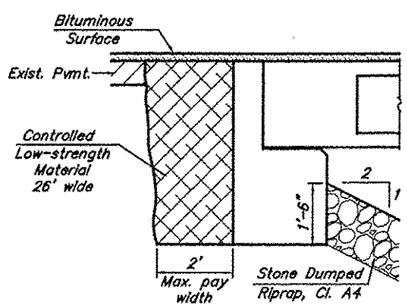
PLAN



SECTION THRU ABUT.
(At Right Angles)



ELEVATION



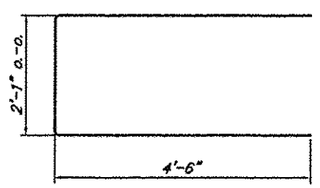
BACKFILL & BERM DETAIL
(At Right Angles to Abut.)

NOTES

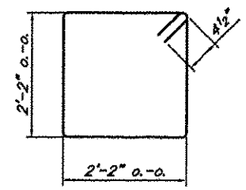
1. The Backwall and the portion of the Wingwalls above the bonded construction joint shall be cast against the in-place beam.
2. Reinforcement bars shall conform to A.A.S.H.T.O. M-31, M-42 or M-53, Grade 60.

DESIGN STRESSES

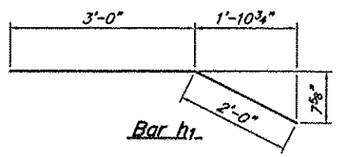
f'c = 3,500 psi
fy = 60,000 psi



Bar u



Bar s



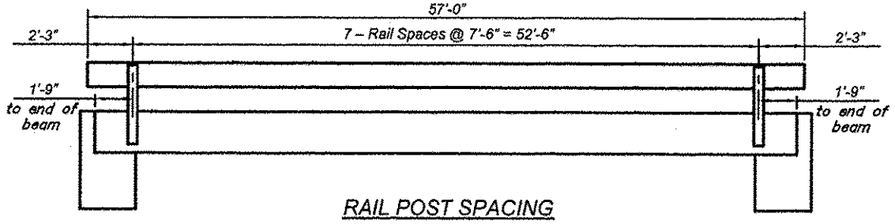
Bar h1

BILL OF MATERIAL
FOR ONE ABUTMENT

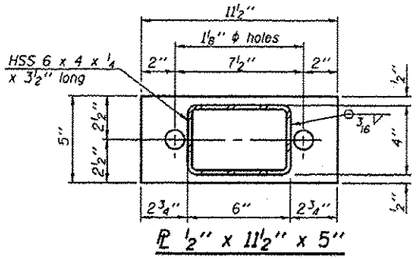
Bar	No.	Size	Length	Shape
h	16	#4	5'-0"	
h1	4	#4	5'-0"	
h2	6	#4	30'-10"	
P	10	#7	30'-10"	
s	34	#4	9'-5"	
u	8	#6	11'-1"	
v	8	#4	3'-2"	
v1	8	#4	3'-11"	
v2	62	#4	3'-5"	
Concrete Structures			10.3 Cu. Yds.	
Reinforcement Bars			1,347.5 Lbs.	

ABUTMENT
FAS ROUTE 941 (ULLIN ROAD)
DRAINAGE DITCH
SECTION 12-00070-00-BR
PULASKI COUNTY
STRUCTURE NO. 077-3143

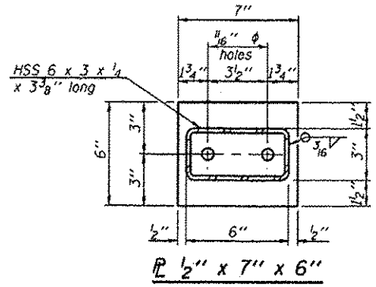
ROUTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FAS 941	12-00070-00-BR	PULASKI	11	7
PROJECT NO. BRS-094(115)		CONTRACT NO. 99539		



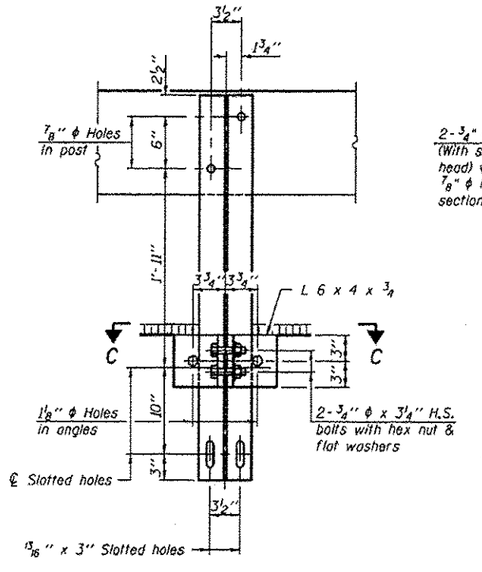
RAIL POST SPACING



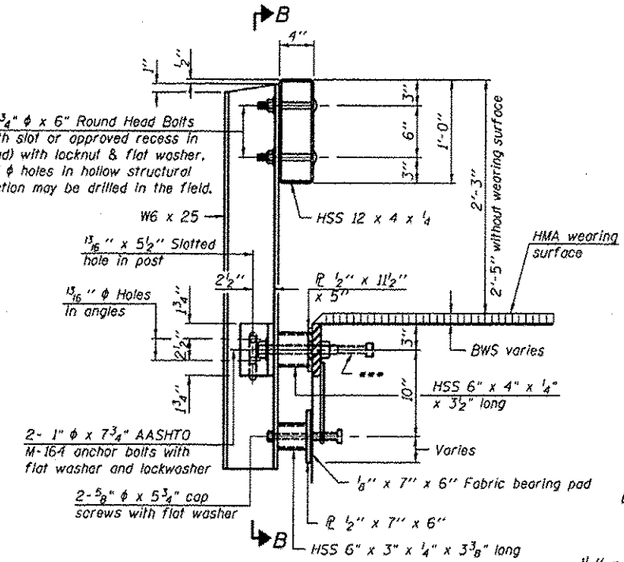
PL 1/2" x 11 1/2" x 5"



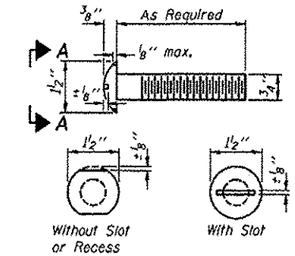
PL 1/2" x 7" x 6"



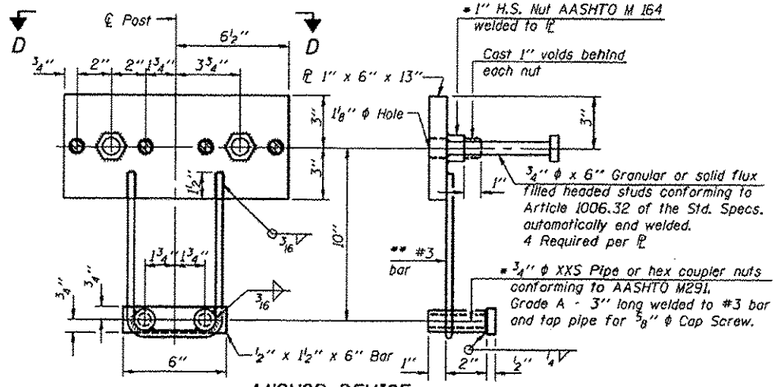
SECTION B-B



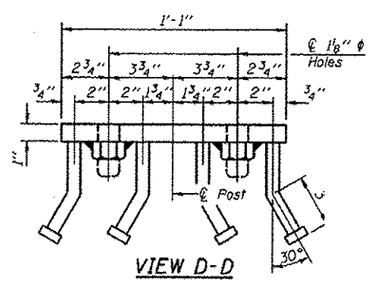
SECTION AT RAILING POST



VIEW A-A
ROUND HEAD BOLT

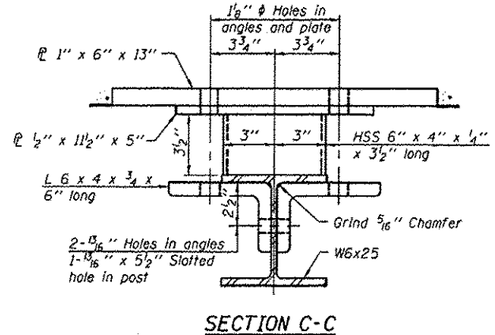


ANCHOR DEVICE

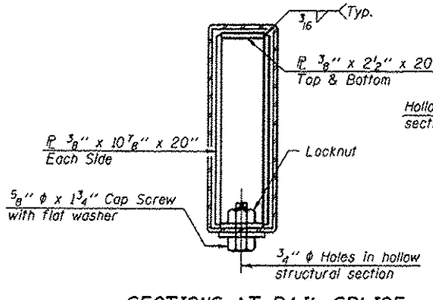


VIEW D-D

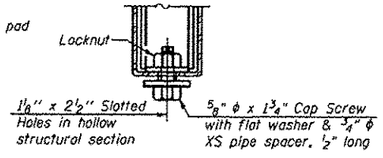
Notes:
All field drilled holes shall be coated with an approved zinc rich paint before erection.
For multi-span bridges, sufficient 1/4" x 6" x 1'-2" galvanized steel shims shall be provided to align rail between adjacent spans. Cost included with Steel Railing, Type S-1.
All steel rail elements shall be galvanized according to Article 509.05 of the Standard Specifications.
* Threaded areas shall be plugged or blocked off during casting of beam.
** Whenever the lower insert assemblies interfere with strand locations, the #3 bars shall be cut and adjusted in order to allow raising or lowering of the lower inserts. Maximum adjustment not to exceed 1/2".
*** The studs of the anchor devices shall be placed below the top reinforcement bars and the outermost longitudinal reinforcement bar shall be placed directly above the studs of the rail post anchor device.
10'-9" Maximum Post Spacing



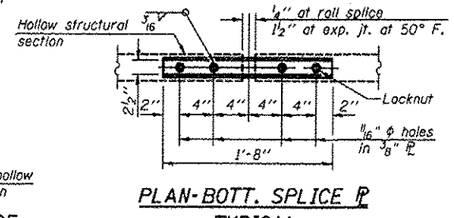
SECTION C-C



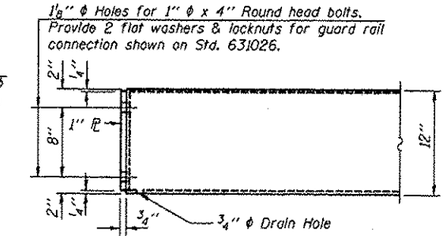
SECTIONS AT RAIL SPLICE

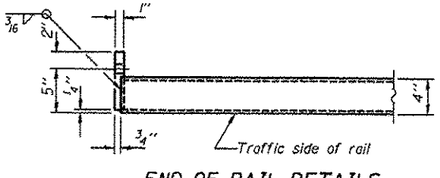


RAIL SPLICE CONNECTION AT EXPANSION JT.



PLAN-BOTT. SPLICE PL TYPICAL





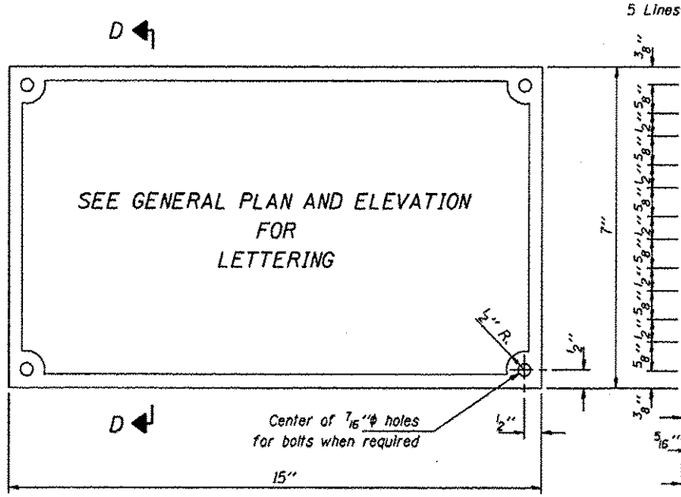
END OF RAIL DETAILS

BILL OF MATERIAL

Item	Unit	Quantity
Steel Railing, Type S-1	Foot	114

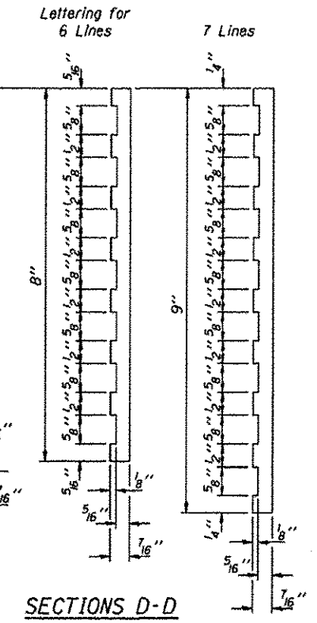
STEEL RAILING, TYPE S-1
FAS ROUTE 941 (ULLIN ROAD)
DRAINAGE DITCH
SECTION 12-00070-00-BR
PULASKI COUNTY
STRUCTURE NO. 077-3143

ROUTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FAS 941	12-00070-00-BR	PULASKI	11	8
PROJECT NO. BRS-094(115)			CONTRACT NO. 99539	

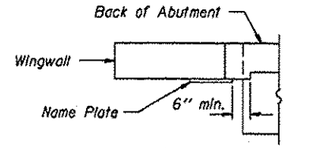


DETAIL OF NAME PLATE

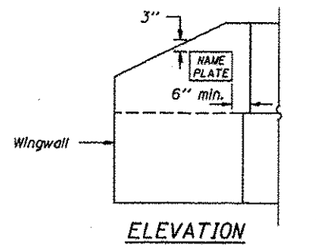
Material: Best quality brass or bronze.
Border & Lettering: Raised 1/8 inch. Square cut and not tapered. Top surface polished.
Fastenings: Four lugs at least three inches long, cast on back of plate.



SECTIONS D-D



PLAN

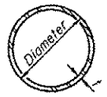


ELEVATION

LOCATION OF NAME PLATE

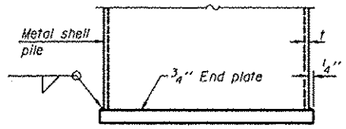
NAME PLATES
FAS ROUTE 941 (ULLIN ROAD)
DRAINAGE DITCH
SECTION 12-00070-00-BR
PULASKI COUNTY
STRUCTURE NO. 077-3143

ROUTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FAS 941	12-00070-00-BR	PULASKI	11	9
PROJECT NO. BRS-094(115)			CONTRACT NO. 99539	

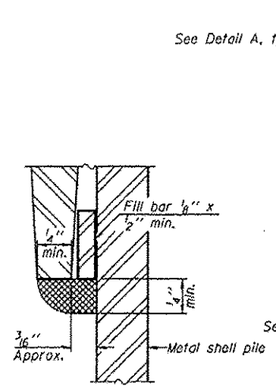


METAL SHELL PILE TABLE

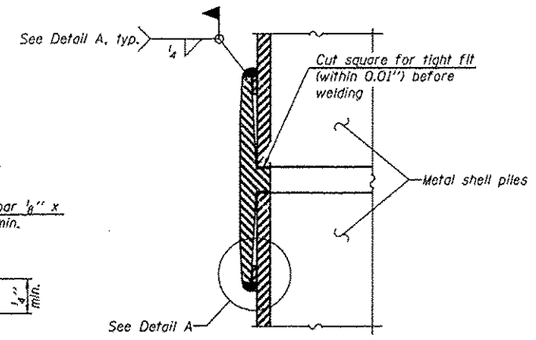
Designation and outside diameter	Wall thickness t	Weight per foot (Lbs./ft.)	Inside volume (yd.³/ft.)
PP12	0.179"	22.60	0.0274
PP12	0.250"	31.37	0.0267
PP14	0.250"	36.71	0.0368
PP14	0.312"	45.61	0.0361



END PLATE ATTACHMENT

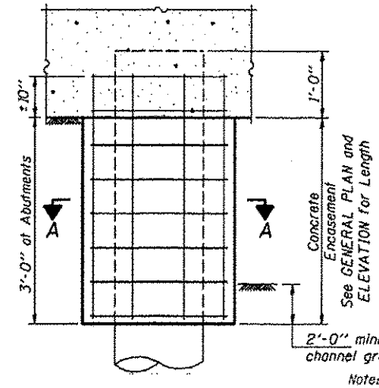


DETAIL A

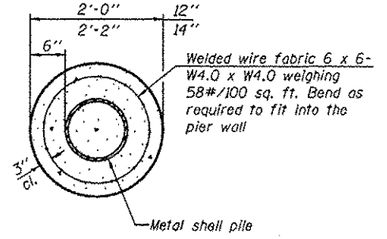


Notes:
The 1/8" x 1/2" min. fill bar may be constructed of 2 bars with a 1/8" max. gap between them.
Pile segments shall be driven to solid contact with splicer before welding.

WELDED COMMERCIAL SPLICE



ELEVATION

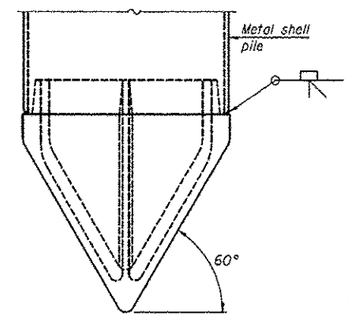


SECTION A-A

Concrete Encasement	
Pile Size	Quantity / Ft.
12" Dia.	0.087 C.Y.
14" Dia.	0.107 C.Y.

Note:
Forms for encasement may be omitted when soil conditions permit.

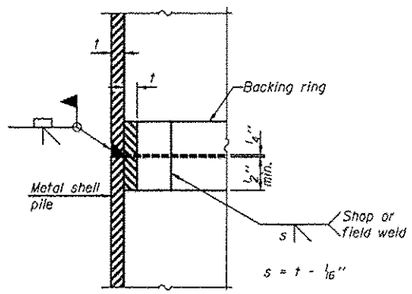
CONCRETE ENCASEMENT



Note A:
When called for on the plans, the Contractor shall furnish metal shell pile shoes consisting of a single piece conical pile point as shown. The pile shoes shall be cast in one piece steel according to either ASTM A 148 Grade 90-60 or AASHTO M 103 Grade 65-35 and shall provide full bearing over the full circumference of the metal shell pile. The pile shoe shall have tapered leads to assure proper alignment and fitting and shall be secured to the pile with a circumferential weld.

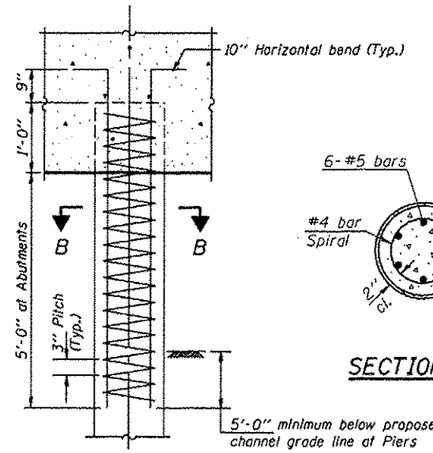
METAL SHELL PILE SHOE ATTACHMENT

(See Note A)



COMPLETE PENETRATION WELD SPLICE

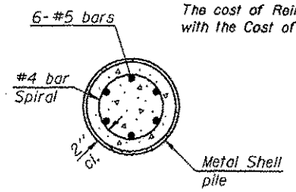
Backing ring made from pile shell. Remove segment to allow reducing circumference and vertically rejoin with partial joint penetration weld.



ELEVATION

Reinforcement cage shall be omitted when Concrete Encasement is provided.

The cost of Reinforcement is included with the Cost of Furnishing Piles.



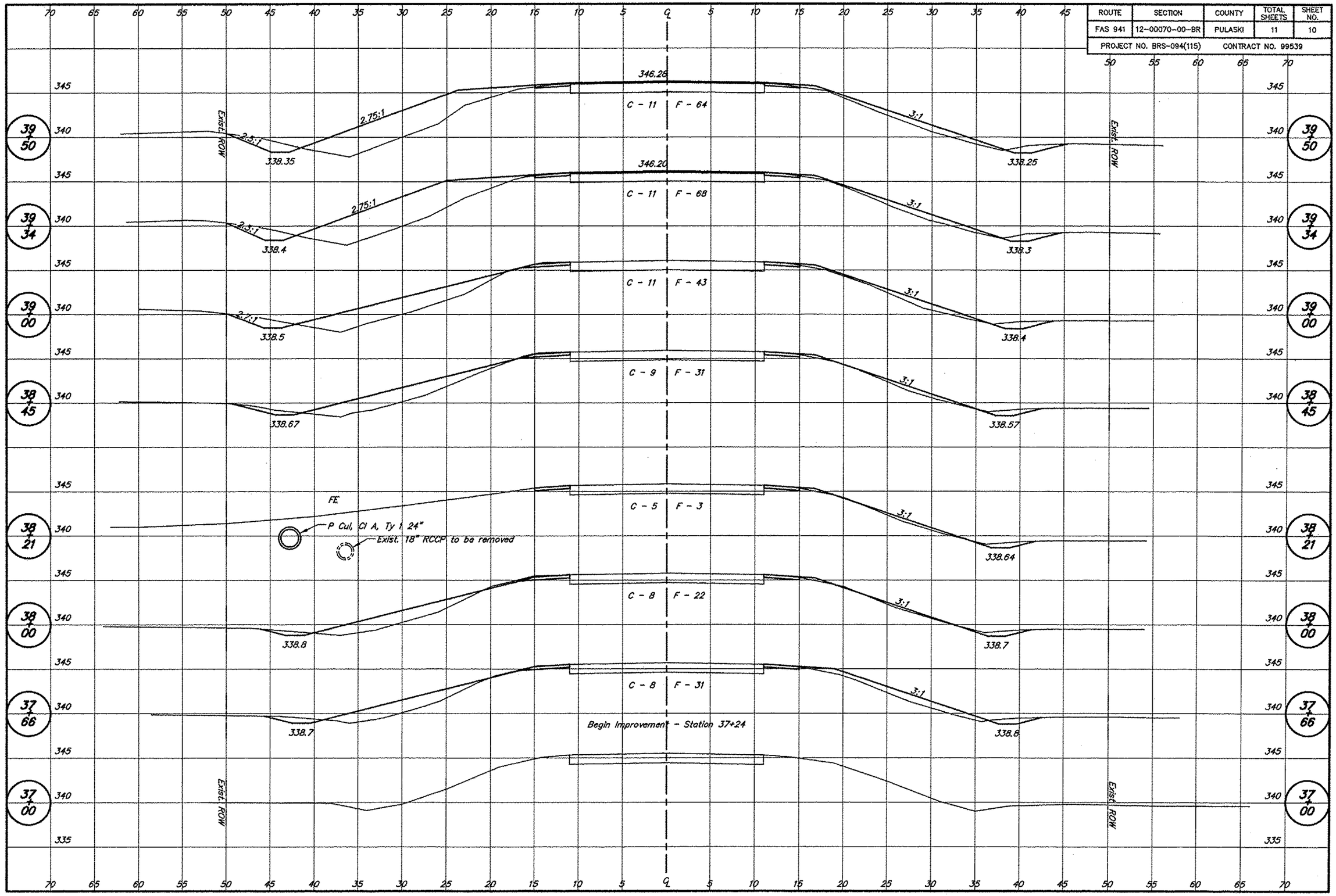
SECTION B-B

METAL SHELL REINFORCEMENT

Note:
The metal shell piles shall be according to ASTM A 252 Grade 3.

PILING DETAILS
FAS ROUTE 941 (ULLIN ROAD)
DRAINAGE DITCH
SECTION 12-00070-00-BR
PULASKI COUNTY
STRUCTURE NO. 077-3143

ROUTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FAS 941	12-00070-00-BR	PULASKI	11	10
PROJECT NO. BRS-094(115)		CONTRACT NO. 99539		



ROUTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FAS 941	12-00070-00-BR	PULASKI	11	11
PROJECT NO. BRS-094(115)		CONTRACT NO. 99539