BOONE SEC. 101 BR I&R DECEMBER 1, 1989 #23

98%
12-8-90

INDEX OF SHEETS

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2149-11	DELINETORS
2228-4	METAL END SECTION FOR PIPE CULVERTS
2230-15	STEEL PLATE BEAM GUARDRAIL
2298-7	TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES
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2306-3	FLAGMAN TRAFFIC CONTROL SIGN
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2324-6	BRIDGE APPROACH SHOULDER PAVEMENT
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2427	CLASS C AND D PATCHES

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

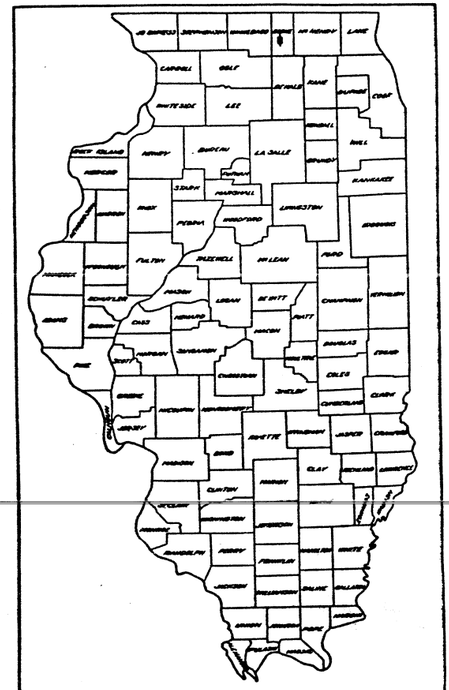
PLANS FOR PROPOSED FEDERAL AID HIGHWAY

F.A. ROUTE 754 (IL. RTE 76)
SECTION 101 BR
~~PROJECT F-BRF-754( )~~
BOONE COUNTY

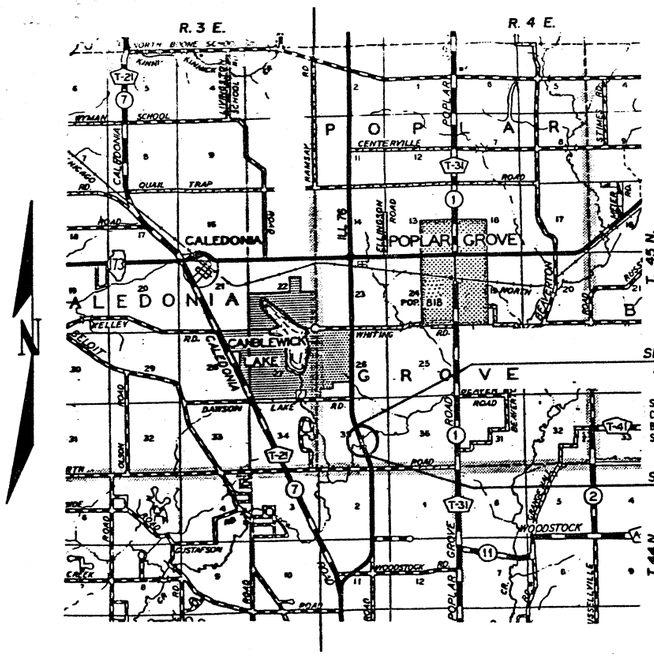
C-92-198-89

RTE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FA 754	101 BR	BOONE	23	1
F.HWY.A. REG. 4	ILLINOIS	PROJECT		

P-92-062-85



LOCATION OF SECTION INDICATED THUS:—



NET LENGTH OF PROJECT = 548 FT. = 0.1038 MILES

DESIGN DESIGNATION
495 (II)-AREA SERVICE — 0.62 (B-20)

SECTION 101 BR
ENDS AT STA. 21+28

SECTION 101 BR INCLUDES A THREE SPAN STEEL I BEAM STRUCTURE CARRYING IL RTE 76 OVER BEAVER CREEK ON R.C. PIERS AND PILE BENT ABUTMENTS SPANS 48'-3 1/2" - 55'-6" - 48'-3 1/2"
STRUCTURE NUMBER 004-0016

SECTION 101 BR
BEGINS AT STA. 15+80

POPULAR GROVE TOWNSHIP
SECTION 35
CALL J.U.L.I.E
BEFORE YOU DIG
800-892-0123

RICHARD A. BAUMANN
8236417
REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS
July 22, 1988

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

SUBMITTED September 14, 19 89
William A. Ost
DISTRICT ENGINEER

EXAMINED October 27, 19 89
Gary D. Gould
ENGINEER OF PLANS AND CONTRACTS

PASSED October 27, 19 89
ENGINEER OF DESIGN

APPROVED October 27, 19 89
DIRECTOR, DIVISION OF HIGHWAYS

DISTRICT 2 - DIXON

PROJECT ENGINEER: CLIFF HOOH
SQUAD LEADER: PATRICK WARKINS

040016
004-0016 CONTRACT NO. 84197

BOONE COUNTY SECTION 101 BR F.A. ROUTE 754

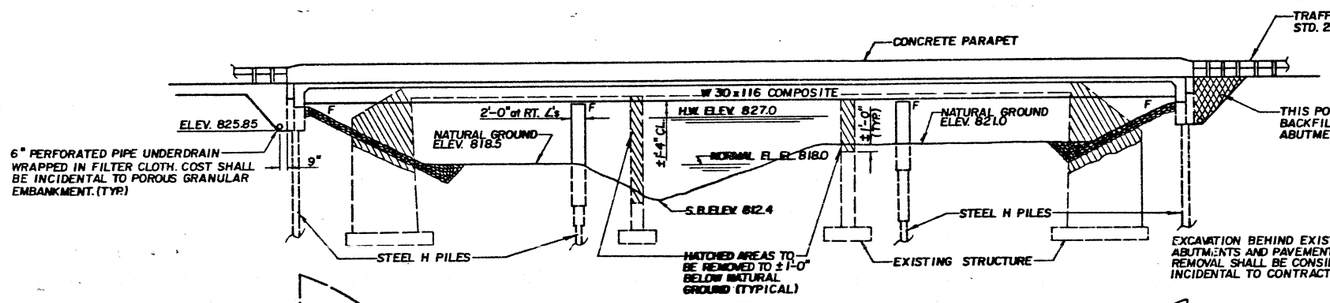
Rev.
2-164

FA 754	101 BR	BOONE	23	8
ILLINOIS PROJECT				

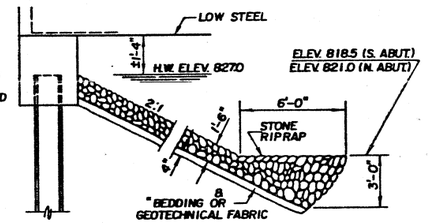
BR. SHT. 1 OF 14

BENCH MARK 11 SAW: USGS SURVEY MARKER SOUTHWEST WINGWALL
ELEV. 830.749

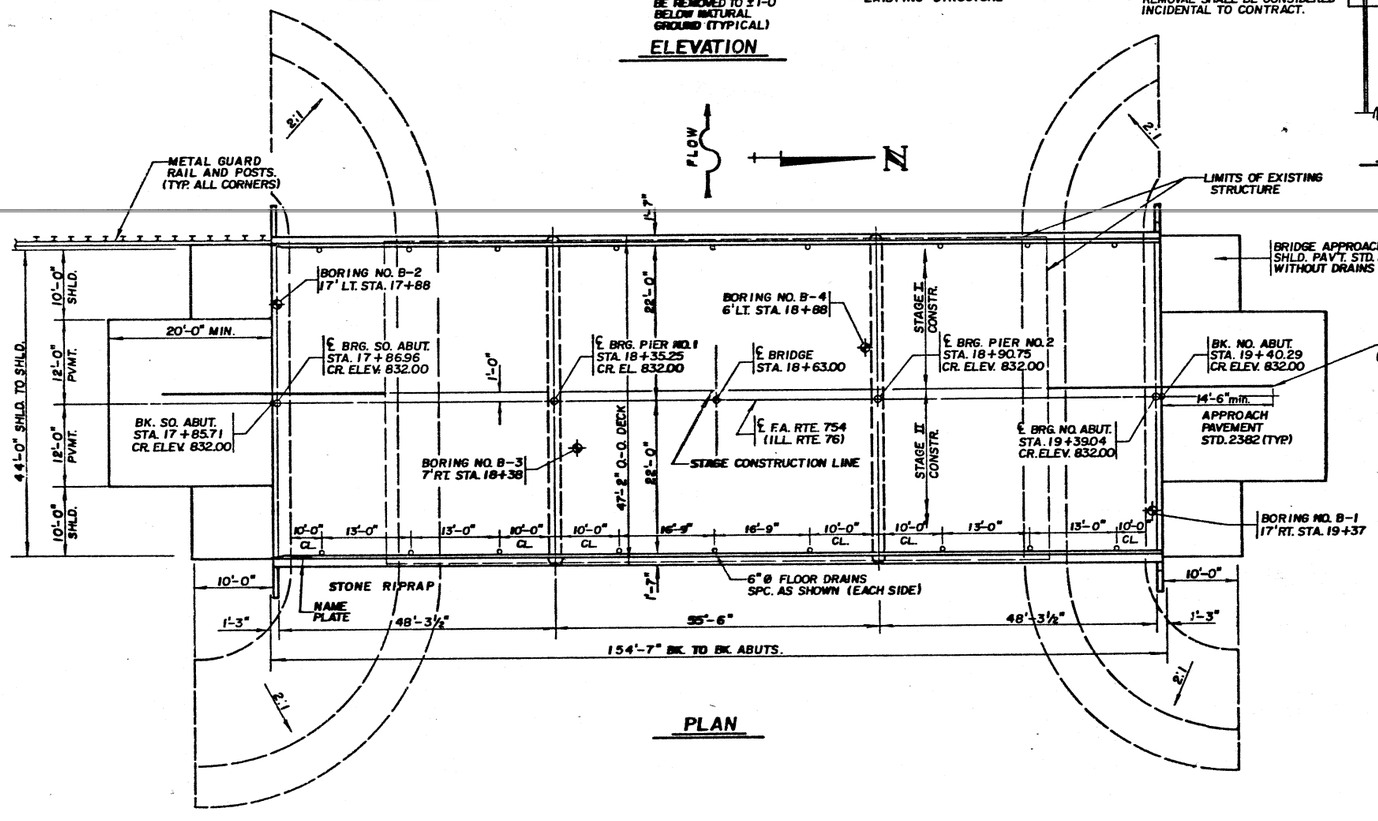
EXISTING STRUCTURE: THREE SPAN REINFORCED CONCRETE DECK GIRDER WIDENED ON EACH SIDE WITH PRECAST PRESTRESSED CONCRETE DECK BEAMS, ON CLOSED CONCRETE ABUTMENTS AND SOLID CONCRETE PIERS, ALSO WIDENED ON EACH SIDE. BUILT IN 1929 AND WIDENED IN 1969 AS SBI 76, SECTION 101-BY. 44 FEET FACE TO FACE OF CURBS, 110 FEET 8 INCHES BACK TO BACK ABUTMENTS. EXISTING STRUCTURE TO BE REMOVED. EXISTING STRUCTURE NUMBER 004-0012. NO SALVAGE. TRAFFIC TO BE MAINTAINED UTILIZING STAGE CONSTRUCTION.



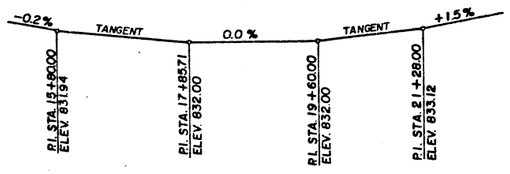
ELEVATION



STONE RIPRAP TREATMENT



PLAN



PROFILE GRADE

F.A. RTE. 754
(ALONG ℄ ROADWAY)

DO NOT SCALE DRAWING, FOLLOW DIMENSIONS

WATERWAY INFORMATION

DRAINAGE AREA = 46.6 SQ. MI. LOW GRADE ELEV. 831.70 at STA. 19+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 EL. EXIST.	HEADWATER EL. PROP.
DESIGN	50	2990	506	713	827.0	1.3	0.4	828.3	827.4
BASE	100	3420	532	753	827.5	1.7	0.5	829.2	828.0
OVERTOPPING									
MAX. CALC.	500	4390	558	798	828.5	1.5	0.7	830.0	829.2

GENERAL NOTES

SEE PROPOSAL FOR BORING DATA.

BEARING SEATS SURFACES SHALL BE CONSTRUCTED OR ADJUSTED TO THE DESIGNATED ELEVATIONS WITHIN A TOLERANCE OF 1/8 INCH. ADJUSTMENT SHALL BE MADE EITHER BY GRINDING THE SURFACE OR BY SHIMMING THE BEARING. TWO 1/8" ADJUSTING SHIMS, OF THE DIMENSIONS OF THE BOTTOM BEARING PLATE, SHALL BE PROVIDED FOR EACH BEARING IN ADDITION TO ALL OTHER PLATES OR SHIMS.

CALCULATED WEIGHT OF STRUCTURAL STEEL: 14,480 LBS. M183
113,470 LBS. M223, GRADE 50

FASTENERS SHALL BE HIGH STRENGTH BOLTS. BOLTS 7/8" Ø, OPEN HOLES 15/16"Ø UNLESS OTHERWISE NOTED.

ANCHOR BOLTS SHALL BE SET BEFORE BOLTING DIAPHRAGMS OVER PIERS.

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 TENSION FLANGES, WEBS AND ALL SPLICE MATERIAL OF THE STEEL BEAMS.

THE CONTRACTOR SHALL DRIVE 1-HP10x42 TEST PILE, AND 1-HP12x53 TEST PILE IN A PERMANENT LOCATION ONE EACH AT SOUTH ABUTMENT, AND AT PIER NO. 2 AS DIRECTED BY THE ENGINEER BEFORE ORDERING THE REMAINDER OF THE PILES.

REINFORCING BARS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M31, M42 OR M53, GRADE 60.

FIELD WELDING OF CONSTRUCTION ACCESSORIES WILL NOT BE PERMITTED TO THE BOTTOM FLANGE OF BEAMS NOR TO THE TOP FLANGE FOR A DISTANCE EQUAL TO ONE-FOURTH THE SPAN LENGTH EACH WAY FROM THE PIER SUPPORTS. FIELD WELDING IN OTHER AREAS WILL BE PERMITTED ONLY WHEN APPROVED BY THE ENGINEER.

THE ZINC-SILICATE AND VINYL PAINT SYSTEM SHALL BE USED FOR SHOP AND FIELD PAINTING OF STRUCTURAL STEEL EXCEPT WHERE OTHERWISE NOTED.

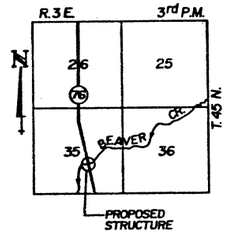
LAYOUT OF STONE RIP RAP MAY BE VARIED IN THE FIELD TO SUIT GROUND CONDITIONS AS DIRECTED BY THE ENGINEER.

ALL STRUCTURAL STEEL FABRICATORS PERFORMING WORK ON THE MAIN LOAD CARRYING COMPONENTS OF STEEL STRUCTURES SHALL BE CERTIFIED UNDER CATEGORY II (AISC) OF THE QUALITY CERTIFICATION PROGRAM.

BILL OF MATERIAL – BRIDGE

ITEM	UNIT	SUPER	SUB	TOTAL
STRUCTURE EXCAVATION	CU.YD.		224	224
CLASS X CONCRETE	CU.YD.		137.7	137.7
STRUCTURAL STEEL	L. SUM	1		1
STUD SHEAR CONNECTORS	EACH	2196		2196
REINFORCEMENT BARS	LBS.	1490	13,520	15,010
REINFORCEMENT BARS (EPOXY COATED)	LBS.	58,270		58,270
FURNISHING STEEL PILES HP 10 x 42	LIN. FT.		375	375
DRIVING STEEL PILES	LIN. FT.		1050	1050
TEST PILES HP12x53	EACH		1	1
FURNISHING STEEL PILES HP 12 x 53	LIN. FT.		675	675
TEST PILES HP10x42	EACH		1	1
FLOOR DRAINS – 6" DIA.	EACH	18		18
* PROTECTIVE COAT	SQ.YD.	881		881
NAMEPLATES	EACH			1
STONE RIP RAP CLASS 5A	SQ.YD.			581
REMOVAL OF EXISTING STRUCTURES	EACH			1
TEMPORARY SHEET PILING	SQ. FT.		1104	1104
CLASS X CONCRETE SUPERSTRUCTURE	CU.YD.	237.1		237.1
POROUS GRANULAR EMBANKMENT	CU.YD.			63
FILTER FABRIC FOR USE WITH RIPRAP	SQ.YD.			581

* INCLUDES DECK SURFACE



LOCATION SKETCH

APPROVED
FOR STRUCTURAL ADEQUACY ONLY

Registered Structural Engineer

STATION 18 + 63.00
BUILT 199 BY
STATE OF ILLINOIS
F.A. ROUTE 754, SEC. 101 BR
LOADING HS 20
STR. NO. 004-0016

DESIGN STRESSES

f'c = 3500 PSI
fy = 60,000 PSI (REINFORCEMENT)
fy = 50,000 PSI (STRUCTURAL STEEL M223, GRADE 50)
fy = 36,000 PSI (STRUCTURAL STEEL M 183)

LETTERING FOR NAMEPLATE

SEE STD. 2113

DESIGN SPECIFICATIONS

1983 AASHTO & 1984, 1985, & 1986 INTERIMS
(ALLOW 25 LBS./SQ.FT FOR FUTURE WEARING SURFACE)

PREPARED BY
Harold P. Wendler & Associates
DIXON, PRINCETON, & ROCKFORD ILLINOIS

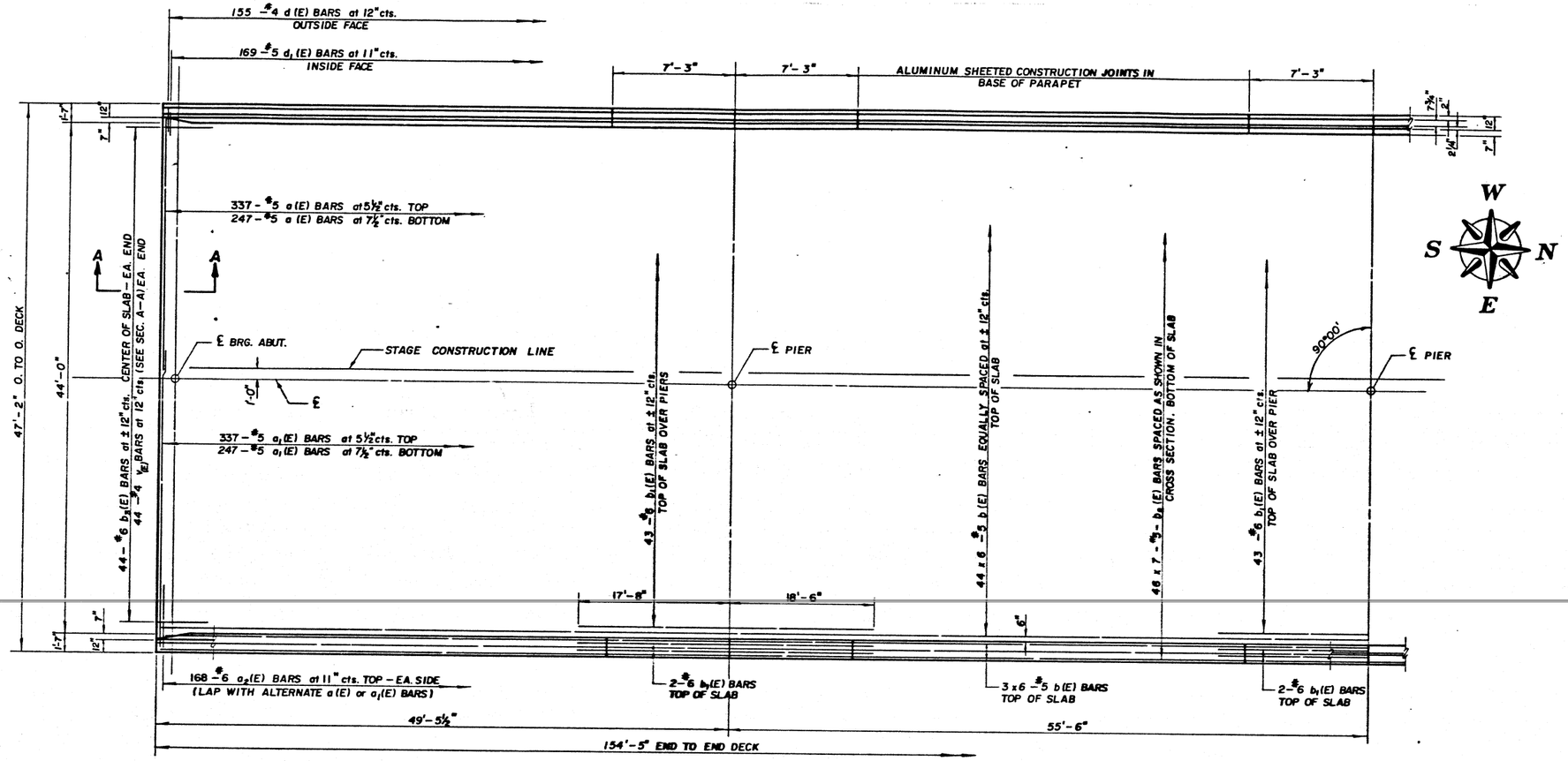
HAROLD P. WENDLER 2743 REGISTERED STRUCTURAL ENGINEER DIXON, ILL.

LOADING HS 20-44

GENERAL PLAN AND ELEVATION
SECTION 101 BR (BEAVER CREEK)
F.A. ROUTE 754 (IL. 76)
BOONE COUNTY
SN 004 – 0016

ROUTE NO.	SEC.	COUNTY	TOTAL SHEETS	SHEET NO.
FA 754	101 BR	BOONE	23	12
ILLINOIS PROJECT				

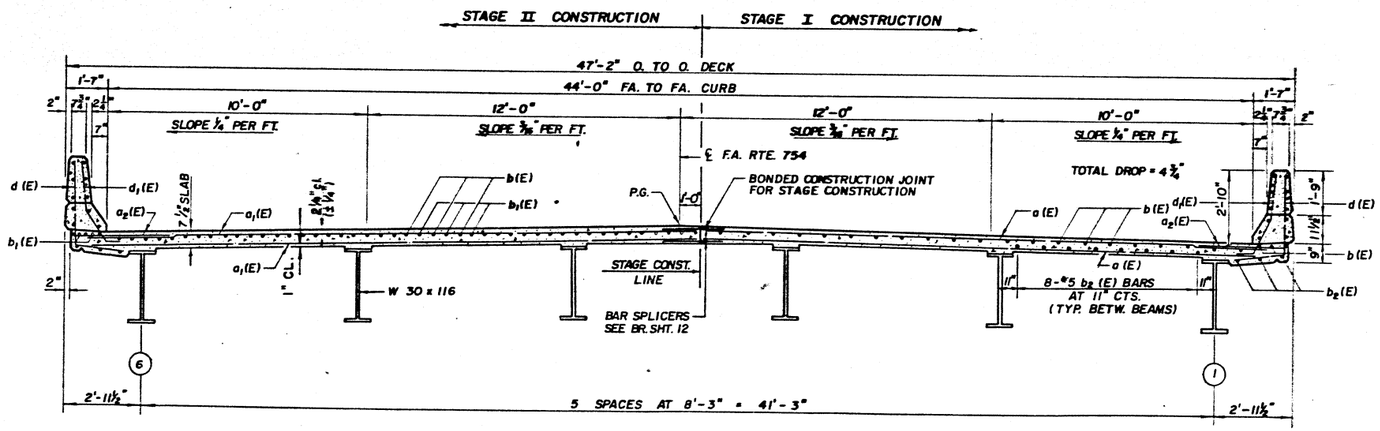
BR. SHT. 5 OF 14



HALF PLAN

MIN. LAP SPLICE

#4 = 1'-8"
#5 = 2'-2"
#6 = 2'-7"



NEAR PIER — NEAR MIDSPAN

CROSS SECTION

(LOOKING SOUTH)

NOTES: SEE BR. SHEET NO. 6 FOR SEC. A-A, SUPERSTRUCTURE DETAILS AND BILL OF MATERIAL.
REINFORCEMENT BARS DESIGNATED (E) SHALL BE EPOXY COATED.
BARS INDICATED THUS 20 x 3 - #5 ETC. INDICATES 20 LINES OF BARS WITH 3 LENGTHS PER LINE.

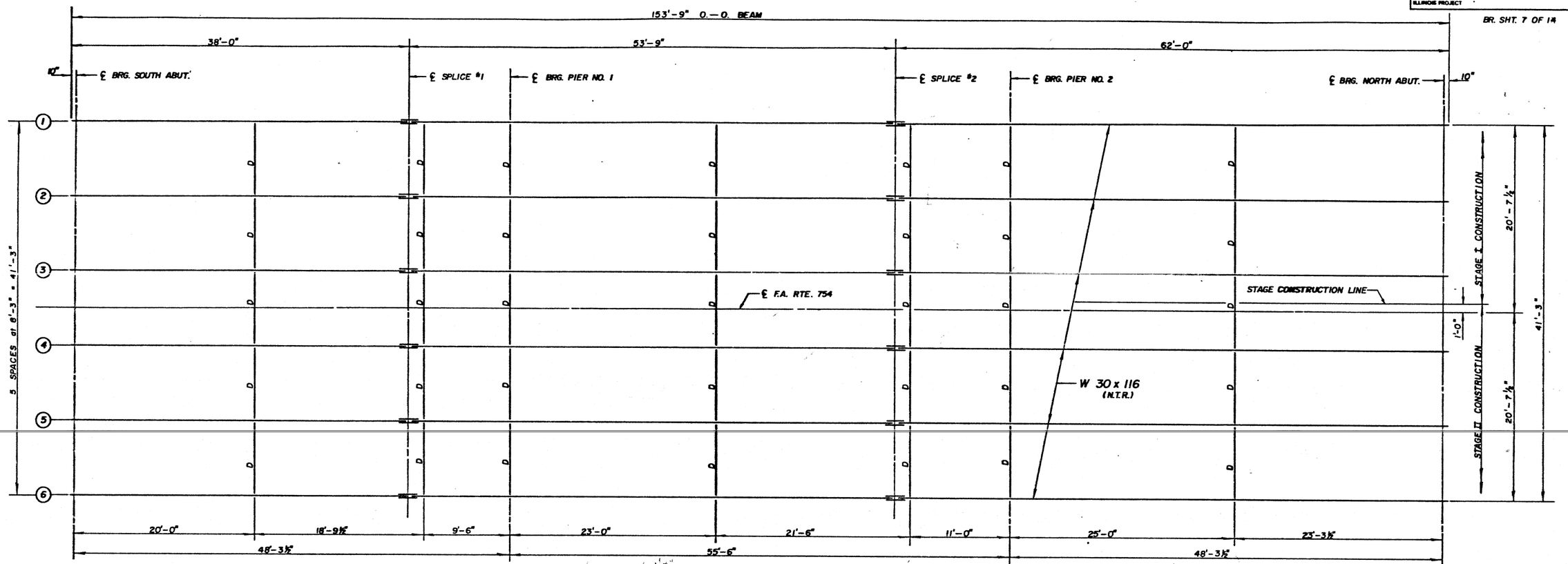
DO NOT SCALE DRAWING, FOLLOW DIMENSIONS

PREPARED BY
Harold P. Wendler & Associates
DIXON, PRINCETON, & ROCKFORD ILLINOIS

SUPERSTRUCTURE
SECTION 101 BR
(BEAVER CREEK)
F.A. ROUTE 754 (IL. 76)
BOONE COUNTY

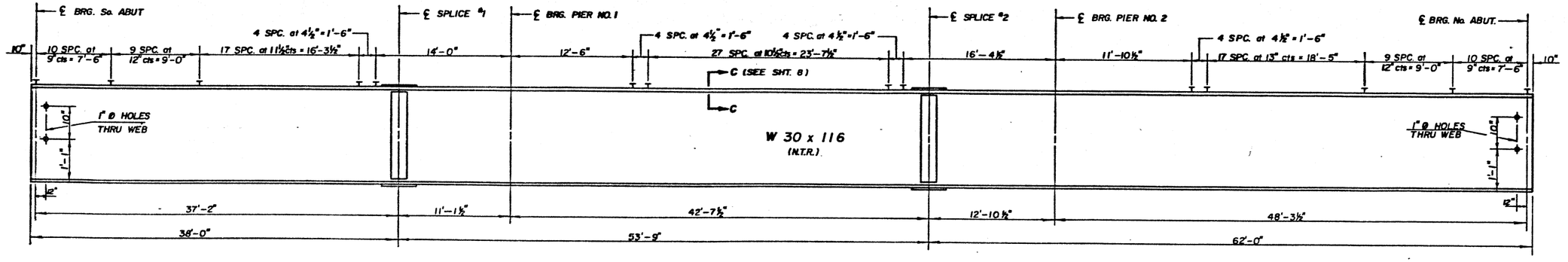
F.A.S. ROUTE NO.	SEC	COUNTY	TOTAL SHEETS	SHEET NO.
FA 754	101 BR	BOONE	23	14
ILLINOIS PROJECT				

BR. SHT. 7 OF 14



FRAMING PLAN

(N.T.R. INDICATES NOTCH TOUGHNESS REQUIREMENTS)
ALL STEEL BEAMS AND SPLICE PLATES SHALL BE AASHTO M223 GRADE 50 STEEL.



BEAM ELEVATION

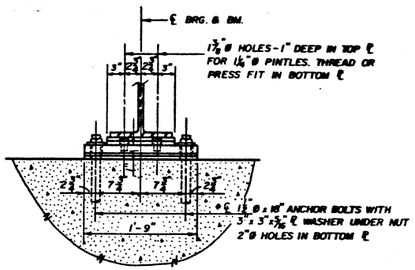
STRUCTURAL STEEL
SECTION 101 BR
(BEAVER CREEK)
F.A. ROUTE 754 (IL. 76)
BOONE COUNTY

PREPARED BY
Harold P. Wendler & Associates
DIXON, PRINCETON, & ROCKFORD ILLINOIS

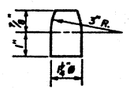
DO NOT SCALE DRAWING, FOLLOW DIMENSIONS

F.A.S. ROUTE NO.	SEC.	COUNTY	TOTAL SHEETS	SHEET NO.
FA 754	101 BR	BOONE	23	15
ILLINOIS PROJECT				

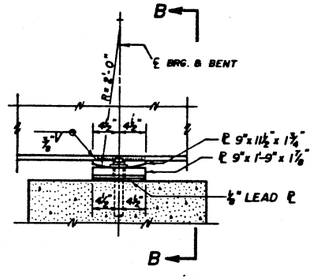
BR. SHT. 8 OF 14



SECTION B-B

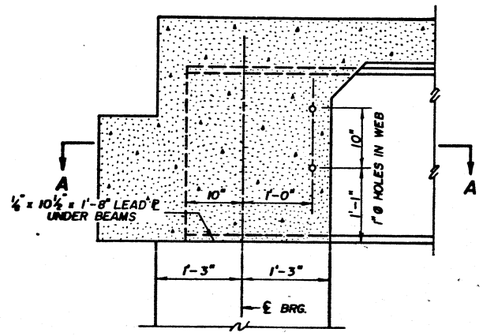


PINTLE



ELEVATION AT PIERS

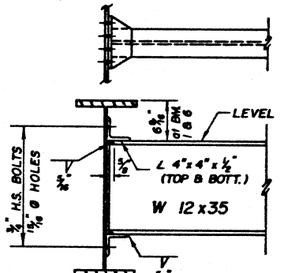
NOTE: AFTER STEEL BEAMS HAVE BEEN ERECTED, HOLES AT PIERS SHALL BE DRILLED AND ANCHOR BOLTS GROUTED IN PLACE. FOR ANCHOR BOLT INSTALLATION SEE SHEET 13.



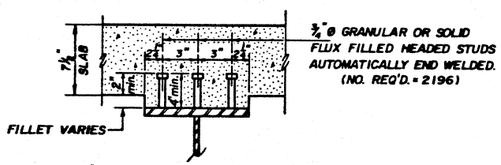
SEC. AT ABUTS.

INTERIOR BEAM MOMENT TABLE

	0.4 SPAN 1 or 3	PIER 1 or 2	0.5 SPAN 2
Is (in^4)	4930	4930	4930
Ic (in^4)	13544		13544
Ss (in^3)	329	329	329
Sc (in^3)	486		486
℄ (k/ft)	0.912	1.253	0.912
M℄ (ft-k)	147	286	96
s℄ (k/ft)	0.341		0.341
Ms℄ (ft-k)	64		58
M_{LL} (ft-k)	390	181	388
M_{IMP} (ft-k)	110	52	110
4/3 (M_{LL} + M_{IMP}) (ft-k)	833	388	830
Ma (ft-k)	1357	877	1279
Mu (ft-k)	2930		2930
fs ℄ (non-comp) (ksi)	5.3	10.4	3.5
fs ℄ (comp) (ksi)	1.7		1.6
fs 4/3 (LL+I) (ksi)	20.6	14.2	20.5
fs (overload) (ksi)	27.7	24.6	25.6
fs (total) (ksi)	36.0	32.0	33.3
VR (k)	35.8		37.5

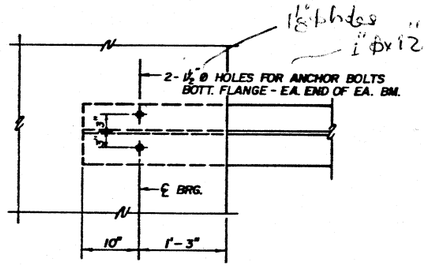


DIAPHRAGM D
(35 REQ'D.)



¾" ø GRANULAR OR SOLID FLUX FILLED HEADED STUDS AUTOMATICALLY END WELDED. (NO. REQ'D. = 2196)

SECTION C-C



SECTION A-A

Mu = FULL PLASTIC MOMENT CAPACITY FOR COMPACT, BRACED SECTION.

Ma = (APPLIED MOMENT) = 1.3 [M ℄ + Ms℄ + 5/3 (ML + I)]

I_s AND S_s ARE THE MOMENT OF INERTIA AND SECTION MODULUS OF THE STEEL SECTION USED IN COMPUTING f_s (TOTAL AND OVERLOAD).

I_c AND S_c ARE THE MOMENT OF INERTIA AND SECTION MODULUS OF THE COMPOSITE SECTION USED IN COMPUTING f_s (TOTAL AND OVERLOAD).

VR IS THE MAXIMUM ℄ + IMPACT SHEAR RANGE IN SPAN.

Z IS THE PLASTIC SECTION MODULUS USED TO DETERMINE THE FULLY PLASTIC MOMENTS IN THE NON-COMPOSITE AREAS.

THE FULLY PLASTIC MOMENT CAPACITY (Mu) IS COMPUTED ACCORDING TO AASHTO 10.48.1 & 10.50.1.1

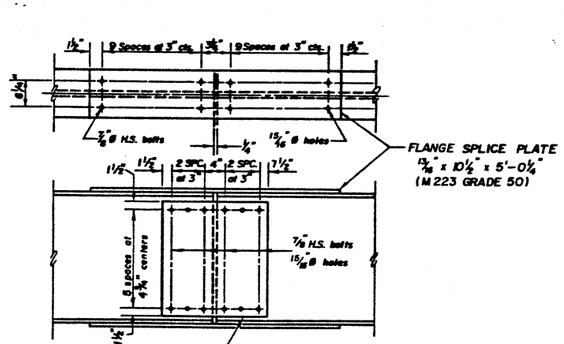
f_s (TOTAL) IS THE SUM OF THE STRESSES DUE TO 1.3 [ML + Ms℄ + 5/3 (ML + I)]

f (OVERLOAD) IS THE SUM OF THE STRESSES DUE TO ML + Ms℄ + 5/3 (ML + I)

TOP OF BEAM ELEVATIONS

LOCATION \ BEAM NO.	1	2	3	4	5	6
℄ BRG. W. ABUT.	830.857	831.029	831.160	831.160	831.029	830.857
℄ SPLICE NO. 1	830.857	831.029	831.160	831.160	831.029	830.857
℄ BRG. PIER NO. 1	830.857	831.029	831.160	831.160	831.029	830.857
℄ SPLICE NO. 2	830.857	831.029	831.160	831.160	831.029	830.857
℄ BRG. PIER NO. 2	830.857	831.029	831.160	831.160	831.029	830.857
℄ BRG. E. ABUT.	830.857	831.029	831.160	831.160	831.029	830.857

NOTE: TWO HARDENED WASHERS ARE REQUIRED OVER 15/16" ø HOLES IN DIAPHRAGM CONNECTION.



DETAIL OF SPLICE
(ALL SPLICE PLATES = N.T.R.)

INTERIOR BEAM REACTION TABLE

	N. ABUT. & S. ABUT.	PIER 1 & 2
R℄ (k)	23.8	71.8
R_{LL} (k)	41.9	49.4
R_{IMP} (k)	12.1	10.8
R_{TOTAL} (k)	77.8	132.0

STRUCTURAL STEEL DETAILS
SECTION 101 BR
(BEAVER CREEK)
F.A. ROUTE 754 (IL. 76)
BOONE COUNTY

PREPARED BY
Harold P. Wendler & Associates
DIXON, PRINCETON, & ROCKFORD ILLINOIS

DO NOT SCALE DRAWING, FOLLOW DIMENSIONS