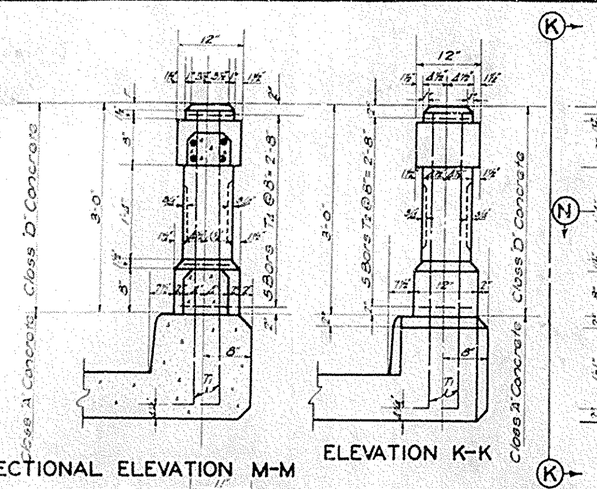
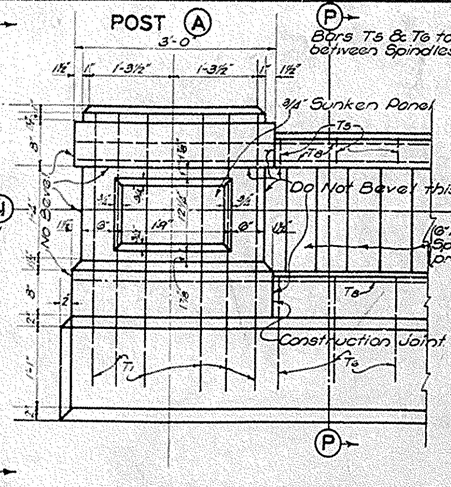
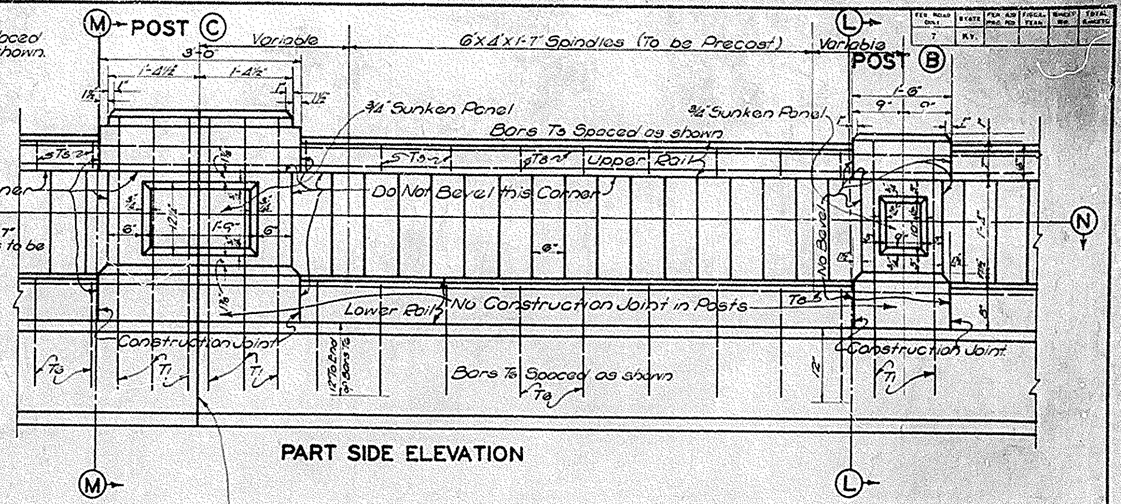


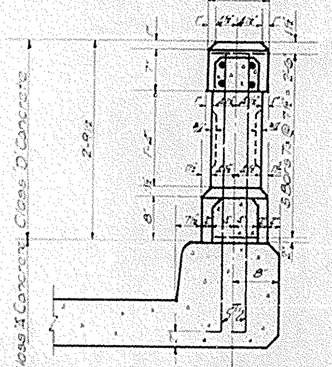
SECTIONAL ELEVATION M-M

ELEVATION K-K

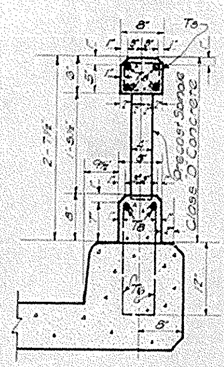




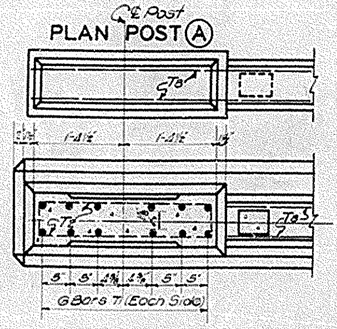
PART SIDE ELEVATION

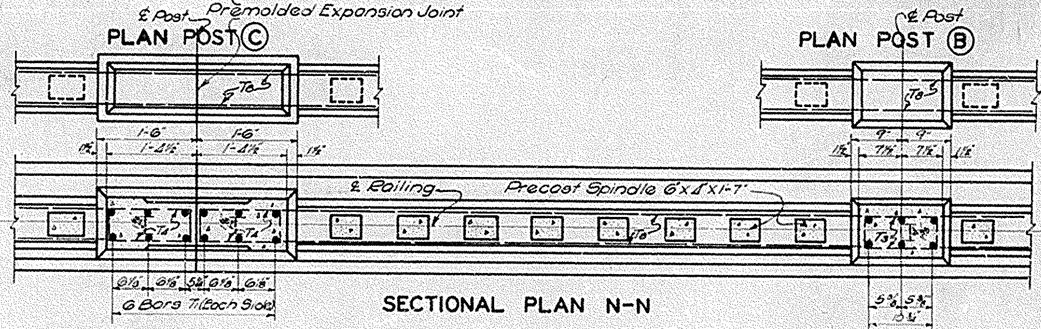


SECTIONAL ELEVATION L-L

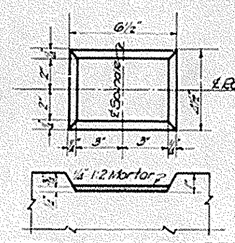


SECTION P-P

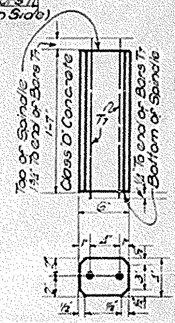




SECTIONAL PLAN N-N



DETAILS OF POCKETS FOR SPINDLES



SPINDLE DETAILS
(Spindles to be Precast)

BILL AND TYPES OF REINFORCEMENT

Mark	Type	No	Size	Length Ft	Length In	Location	Q Ft	Q Lb
T1	①	See Table for No of Bars	⅜" ϕ	4	2	Curb into Posts	3	11
T2	②		"	6	2	Post A	2	6.8
T3	-		"	3	2	Post B	1	05
T4	-		"	3	5	Post C	1	1.14
T5	③		⅝" ϕ	1	0	Top Rail	0	4
T6	-		"	3	10	Curb into Bottom Rail	1	6
T7	Str.		5/8"	1	9	Spindles	-	-
T8	-		"	See Table		Both Rails	-	-

Type ① (All dimensions are out to out)

Type ②

Type ③

INSTRUCTIONS FOR USING TABLE

Table gives necessary information required to detail the reinforcement for Curb, Posts and Rails. Given dimensions for Bars T3 and T4 are for Bars on Post A. Dimensions for Bars on Post B are 2" less and on Post C are 4" less than those given. Bars T6 are 2" long and Bars T8 are 4" long and Short Side in Table.

NOTE

Bars T1 and T6 are to be placed in position before Concrete Curb is poured.

Great care must be exercised in spacing these bars, since the correct Handrail alignment is secured thereby. When the Curb has been placed the Bottom Rail is poured between Posts. Pockets for Spindles must be carefully formed when Bottom Rail is placed. Forms for Posts and Top Rail are next built. The Spindles are set in the pockets of the Bottom Rail and the openings in the bottom of the upper Rail Forms. The Upper Rail and Posts are poured at one operation and the Grout placed around the lower end of the Spindles. Class 'D' Concrete to be used in Rails, Posts and Spindles.

All exposed corners must be beveled ½" unless otherwise shown on plans.

Specifications: State Highway Department, Kentucky, 1932

STANDARD CONSTRUCTION DETAILS FOR HANDRAIL

COMMONWEALTH OF KENTUCKY
STATE HIGHWAY DEPARTMENT

STANDARD HANDRAIL

FOR ALL SPANS

(BALUSTRADE TYPE)

DESIGN H-1 DWG. S-3

BRIDGE

FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				

QUANTITIES IN THIS TABLE ARE FOR RAILING ON BOTH SIDES OF SPAN

SINGLE SPAN

Span Length in Feet	Dimensions A FT	Dimensions A IN	Dimensions B FT	Dimensions B IN	Bars E 1/2" D=10" NO	Bars E 1/2" D=10" Length FT	Bars E 1/2" D=10" Length IN	Bars E 1/2" D=16" NO	Bars E 1/2" D=16" Length FT	Bars E 1/2" D=16" Length IN	Bars F 1/2" NO	Bars F 1/2" Length FT	Bars F 1/2" Length IN	Steel D=10" lbs	Steel D=16" lbs	Concrete Cu Yds
16	8	9			24	4	7	24	5	3	32	8	5	274	287	1.39
18	9	9			24			24			32	9	5	295	308	1.47
20	10	9			24			24			32	10	5	317	330	1.52
22	7	11	7	8	32			32			48	7	6	365		1.75
24	8	7	8	4	32			32			48	8	2	387	405	1.83
26	9	3	9	0	32			32			48	9	10	408		1.91
28	9	11	9	8	32			32			48	9	6	429		1.99
30	8	3	7	9	40			40			64	7	6	477	500	2.19
32	8	6	8	3	40			40			64	8	0	498		2.27
34	9	0	8	9	40			40			64	8	6	520	543	2.36
36	9	6	9	3	40			40			64	9	0	540		2.43
38	10	0	9	9	40			40			64	9	6	562		2.51
40	8	8	8	2	48			48			80	7	11	612	638	2.72
45	9	6	9	2	48			48			80	8	11	664		2.91
50	8	9	8	6	56			56			96	8	3	749	780	3.22

END SPAN X

Span Length in Feet	Dimensions A FT	Dimensions A IN	Dimensions B FT	Dimensions B IN	Bars E 1/2" D=10" NO	Bars E 1/2" D=10" Length FT	Bars E 1/2" D=10" Length IN	Bars E 1/2" D=16" NO	Bars E 1/2" D=16" Length FT	Bars E 1/2" D=16" Length IN	Bars F 1/2" NO	Bars F 1/2" Length FT	Bars F 1/2" Length IN	Bars G 3/8" NO	Bars G 3/8" Length FT	Bars G 3/8" Length IN	Steel D=10" lbs	Steel D=16" lbs	Conc Cu Yds
16	9	1½			16	4	7	16	5	3	32	8	9	4	3	1	254	263	1.26
18	10	1½			16	-	-	16	-	-	32	9	9	4	-	-	275	284	1.34
20	7	6	7	3	24	-	-	24	-	-	48	7	1	4	-	-	325	339	1.55
22	8	2	7	11	24	-	-	24	-	-	48	7	9	4	-	-	347		1.62
24	8	10	8	7	24	-	-	24	-	-	48	8	5	4	-	-	369	382	1.71
26	9	6	9	3	24	-	-	24	-	-	48	9	1	4	-	-	389		1.78
28	10	2	9	11	24	-	-	24	-	-	48	9	9	4	-	-	411		1.86
30	8	2	7	11½	32	-	-	32	-	-	64	7	9	4	-	-	459	479	2.07
32	8	8	8	5½	32	-	-	32	-	-	64	8	3	4	-	-	482		2.14
34	9	2	8	11½	32	-	-	32	-	-	64	8	9	4	-	-	504	522	2.23
36	9	8	9	5½	32	-	-	32	-	-	64	9	3	4	-	-	525		2.30
38	10	2	9	11½	32	-	-	32	-	-	64	9	9	4	-	-	546		2.38
40	8	6	8	8	40	-	-	40	-	-	80	8	1	4	-	-	593	616	2.59
45	9	6	9	5	40	-	-	40	-	-	80	9	0	4	-	-	645		2.78
50	8	9½	8	3	48	-	-	48	-	-	96	8	4	4	-	-	726	753	3.11

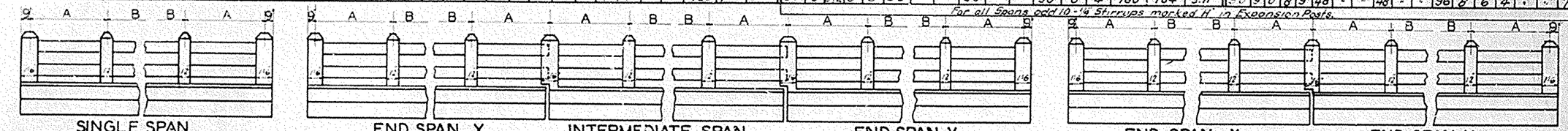
END SPAN Y

Span Length in Feet	Dimensions A FT	Dimensions A IN	Dimensions B FT	Dimensions B IN	Bars E 1/2" D=10" NO	Bars E 1/2" D=10" Length FT	Bars E 1/2" D=10" Length IN	Bars E 1/2" D=16" NO	Bars E 1/2" D=16" Length FT	Bars E 1/2" D=16" Length IN	Bars F 1/2" NO	Bars F 1/2" Length FT	Bars F 1/2" Length IN	Steel D=10" lbs	Steel D=16" lbs	Conc Cu Yds
16	9	1½			24	4	7	24	5	3	32	8	9	238	295	1.26
18	10	1½			24	-	-	24	-	-	32	9	9	309	315	1.34
20	7	6	7	3	32	-	-	32	-	-	48	7	1	359	371	1.55
22	8	2	7	11	32	-	-	32	-	-	48	7	9	380		1.62
24	8	10	8	7	32	-	-	32	-	-	48	8	5	402	413	1.71
26	9	6	9	3	32	-	-	32	-	-	48	9	1	423		1.78
28	10	2	9	11	32	-	-	32	-	-	48	9	9	444		1.86
30	8	2	7	11½	40	-	-	40	-	-	64	7	9	495	511	2.07
32	8	8	8	5½	40	-	-	40	-	-	64	8	3	516		2.14
34	9	2	8	11½	40	-	-	40	-	-	64	8	9	538	553	2.23
36	9	8	9	5½	40	-	-	40	-	-	64	9	3	558		2.30
38	10	2	9	11½	40	-	-	40	-	-	64	9	9	580		2.38
40	8	6	8	8	48	-	-	48	-	-	80	8	1	626	647	2.59
45	9	6	9	5	48	-	-	48	-	-	80	9	1	678		2.78
50	8	9½	8	3	56	-	-	56	-	-	96	8	4	760	784	3.11

For all Spans add 10-1/4 Stirrups marked H in Expansion Posts.

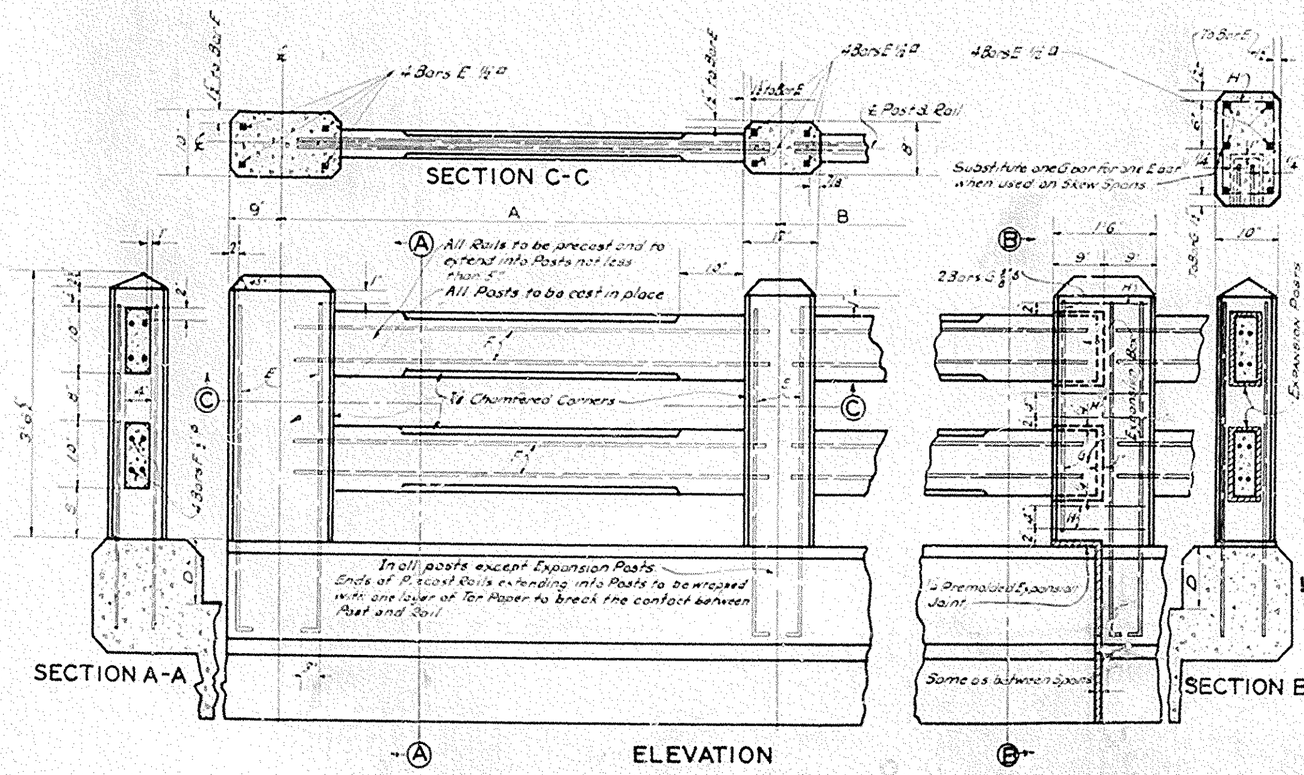
INTERMEDIATE SPAN

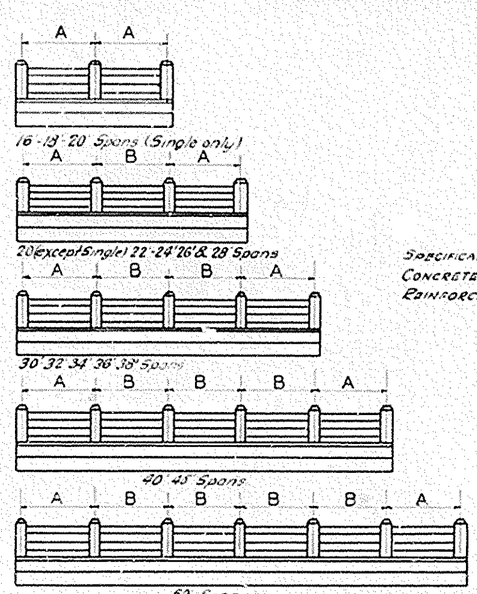
Span Length in Feet	Dimensions A FT	Dimensions A IN	Dimensions B FT	Dimensions B IN	Bars E 1/2" D=10" NO	Bars E 1/2" D=10" Length FT	Bars E 1/2" D=10" Length IN	Bars E 1/2" D=16" NO	Bars E 1/2" D=16" Length FT	Bars E 1/2" D=16" Length IN	Bars F 1/2" NO	Bars F 1/2" Length FT	Bars F 1/2" Length IN	Bars G 3/8" NO	Bars G 3/8" Length FT	Bars G 3/8" Length IN	Steel D=10" lbs	Steel D=16" lbs	Conc Cu Yds
16	9	6			16	4	7	16	5	3	32	9	2	4	3	1	270	272	1.13
18	10	6			16	-	-	16	-	-	32	10	2	4	-	-	291	293	1.21
20	7	9	7	6	24	-	-	24	-	-	48	7	4	4	-	-	341	347	1.42
22	8	5	8	2	24	-	-	24	-	-	48	8	0	4	-	-	362		1.49
24	9	1	8	10	24	-	-	24	-	-	48	8	8	4	-	-	384	391	1.58
26	9	9	9	6	24	-	-	24	-	-	48	9	4	4	-	-	406		1.65
28	10	5	10	2	24	-	-	24	-	-	48	10	0	4	-	-	425		1.73
30	8	4	8	2	32	-	-	32	-	-	64	7	11	4	-	-	475	487	1.94
32	8	10	8	3	32	-	-	32	-	-	64	8	5	4	-	-	496		2.01
34	9	4	9	2	32	-	-	32	-	-	64	8	11	4	-	-	518	530	2.10
36	9	10	9	8	32	-	-	32	-	-	64	9	5	4	-	-	540		2.17
38	10	4	10	2	32	-	-	32	-	-	64	9	11	4	-	-	560		2.25
40	8	9	8	6	40	-	-	40	-	-	80	8	3	4	-	-	609	624	2.47
45	9	9	9	6	40	-	-	40	-	-	80	9	3	4	-	-	660		2.65
50	9	0	8	9	48	-	-	48	-	-	96	8	6	4	-	-	742	764	2.95



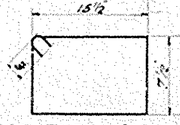
TYPICAL LAYOUT SHOWING SINGLE AND COMBINED SPANS INDICATED IN TABLE

AND MANNER IN WHICH END POST IS USED ON BRIDGES OF MORE THAN ONE SPAN





LAYOUT SHOWING NO. & ARRANGEMENT OF A & B DIMENSIONS.



1/4 ø STIRRUP H FOR EXPANSION POSTS 4'-3" LONG

GENERAL NOTE

SPECIFICATIONS: State Highway Department, Kentucky, 1930.
CONCRETE: Class D concrete to be used thruout.
REINFORCEMENT: Dimension from face of concrete to steel is the clear distance.
Precast mortar or concrete blocks supporting reinforcement shall be spaced not farther apart than 50 diameter of the supported bar.

COMMONWEALTH OF KENTUCKY
STATE HIGHWAY DEPARTMENT

STANDARD HANDRAIL TYPE A FOR CONCRETE BRIDGES

M-8 S-3

DESIGNED BY — DATE
TRACED BY — DATE
CHECKED BY — DATE

Fed. Road Dist.	State	Fed. Pro. No.	Fiscal Year	Sheet No.	Total Sheets
7	Ky.				

QUANTITIES IN THIS TABLE ARE FOR RAILING ON BOTH SIDES OF SPAN

SINGLE SPAN

Span Length in Feet	Dimension A Ft.	A In.	B Ft.	B In.	Bars E-½" ▫ D=10" No.	Length Ft.	Length In.	Bars E-½" ▫ D=1'-6" No.	Length Ft.	Length In.	Bars F-½" ϕ No.	Length Ft.	Length In.	Steel D=10" lbs.	Steel D=1'-6" lbs.	Concrete Cu. yds.
16	8	3			24	4	7	24	5	5	32	8	5	274	287	1.39
18	9	3			24	-	-	24	-	-	32	9	5	295	308	1.47
20	10	3			24	-	-	24	-	-	32	10	5	317	330	1.54
22	7	11	7	8	32	-	-	32	-	-	48	7	6	365		1.75
24	8	7	8	4	32	-	-	32	-	-	48	8	2	387	409	1.85
26	9	3	9	0	32	-	-	32	-	-	48	8	10	408		1.91
28	9	11	9	8	32	-	-	32	-	-	48	9	6	429		1.99
30	8	0	7	9	40	-	-	40	-	-	64	7	6	477	500	2.19
32	8	6	8	3	40	-	-	40	-	-	64	8	0	498		2.27
34	9	0	8	9	40	-	-	40	-	-	64	8	6	520	545	2.36
36	9	6	9	3	40	-	-	40	-	-	64	9	0	540		2.43
38	10	0	9	9	40	-	-	40	-	-	64	9	6	562		2.51
40	8	6	8	2	48	-	-	48	-	-	80	7	11	612	638	2.72
45	9	6	9	2	48	-	-	48	-	-	80	8	11	664		2.91
50	8	9	8	6	56	-	-	56	-	-	96	8	3	749	780	3.24

END SPAN - X

Span Length in Feet	Dimension A Ft.	A In.	B Ft.	B In.	Bars E-½" ▫ D=10" No.	Length Ft.	Length In.	Bars E-½" ▫ D=1'-6" No.	Length Ft.	Length In.	Bars F-½" ϕ No.	Length Ft.	Length In.	Bars G-⅝" ϕ No.	Length Ft.	Length In.	Steel D=10" lbs.	Steel D=1'-6" lbs.	Conc. Cu. yds.
16	9	1½			16	4	7	16	5	5	32	8	9	4	3	1	254	263	1.26
18	10	1½			16	-	-	16	-	-	32	9	9	4	-	-	275	284	1.34
20	7	6	7	3	24	-	-	24	-	-	48	7	1	4	-	-	325	339	1.55
22	8	2	7	11	24	-	-	24	-	-	48	7	9	4	-	-	347		1.62
24	8	10	8	7	24	-	-	24	-	-	48	8	5	4	-	-	369	382	1.71
26	9	6	9	3	24	-	-	24	-	-	48	9	1	4	-	-	389		1.78
28	10	2	9	11	24	-	-	24	-	-	48	9	9	4	-	-	411		1.86
30	8	2	7	11½	32	-	-	32	-	-	64	7	9	4	-	-	459	479	2.07
32	8	8	8	5½	32	-	-	32	-	-	64	8	3	4	-	-	482		2.14
34	9	2	8	11½	32	-	-	32	-	-	64	8	9	4	-	-	504	522	2.23
36	9	8	9	5½	32	-	-	32	-	-	64	9	3	4	-	-	525		2.30
38	10	2	9	11½	32	-	-	32	-	-	64	9	9	4	-	-	546		2.38
40	8	6	8	5	40	-	-	40	-	-	80	8	1	4	-	-	595	616	2.59
45	9	6	9	5	40	-	-	40	-	-	80	9	0	4	-	-	640		2.78
50	8	9½	8	8	48	-	-	48	-	-	96	8	4	4	-	-	726	753	3.11

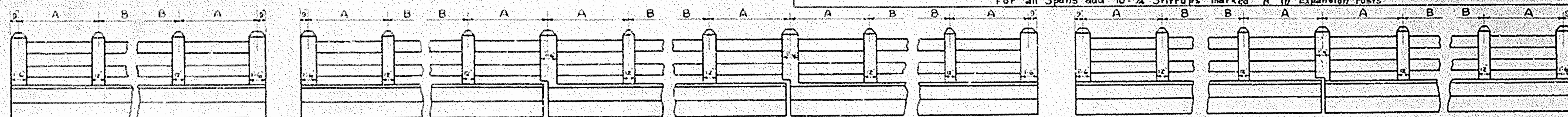
END SPAN - Y

Span Length in Feet	Dimension A Ft.	A In.	B Ft.	B In.	Bars E-½" ▫ D=10" No.	Length Ft.	Length In.	Bars E-½" ▫ D=1'-6" No.	Length Ft.	Length In.	Bars F-½" ϕ No.	Length Ft.	Length In.	Steel D=10" lbs.	Steel D=1'-6" lbs.	Conc. Cu. yds.
16	9	1½			24	4	7	24	5	5	32	8	9	288	295	1.26
18	10	1½			24	-	-	24	-	-	32	9	9	309	315	1.34
20	7	6	7	3	32	-	-	32	-	-	48	7	1	359	271	1.55
22	8	2	7	11	32	-	-	32	-	-	48	7	9	380		1.62
24	8	10	8	7	32	-	-	32	-	-	48	8	5	402	413	1.71
26	9	6	9	3	32	-	-	32	-	-	48	9	1	423		1.78
28	10	2	9	11	32	-	-	32	-	-	48	9	9	444		1.86
30	8	2	7	11½	40	-	-	40	-	-	64	7	9	495	511	2.07
32	8	8	8	5½	40	-	-	40	-	-	64	8	3	516		2.14
34	9	2	8	11½	40	-	-	40	-	-	64	8	9	538	555	2.23
36	9	8	9	5½	40	-	-	40	-	-	64	9	3	558		2.30
38	10	2	9	11½	40	-	-	40	-	-	64	9	9	580		2.38
40	8	6	8	5	48	-	-	48	-	-	80	8	1	626	647	2.59
45	9	6	9	5	48	-	-	48	-	-	80	9	1	678		2.78
50	8	9½	8	8	56	-	-	56	-	-	96	8	4	760	784	3.11

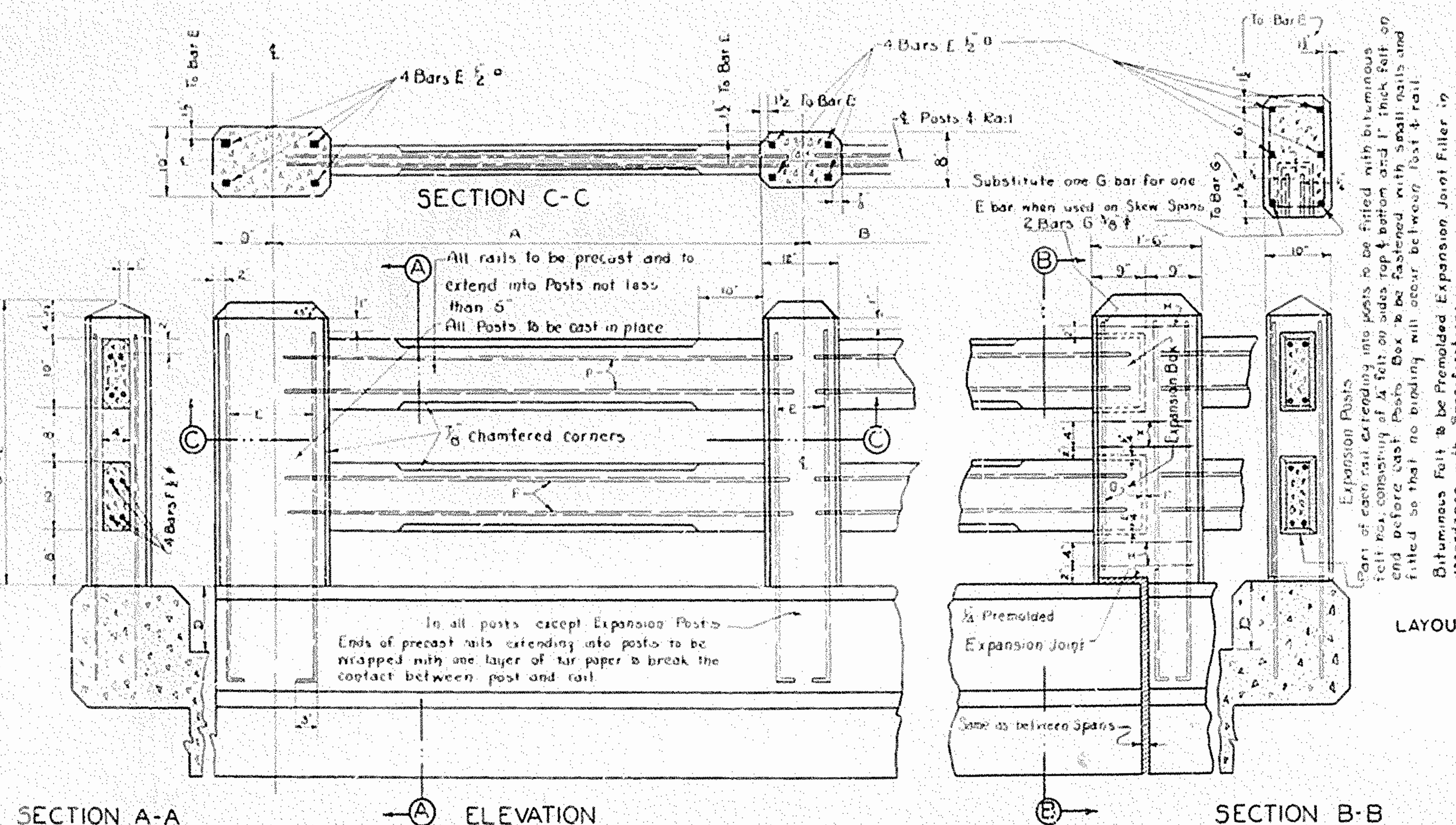
For all Spans add 10-¼" Stirrups marked "H" in Expansion Posts

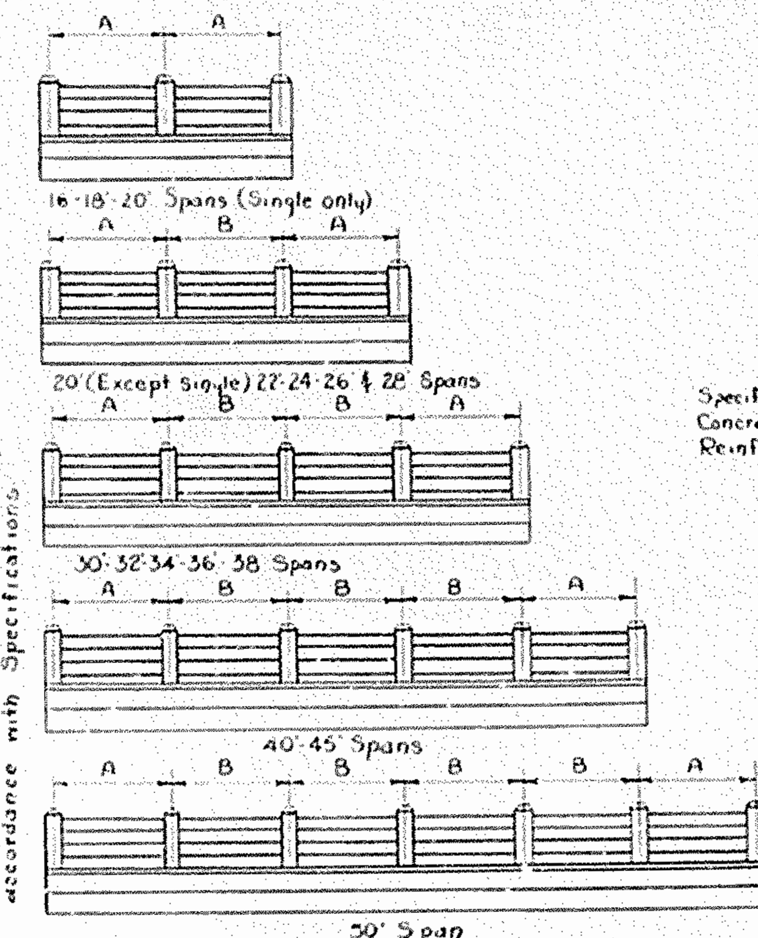
INTERMEDIATE SPAN

Span Length in Feet	Dimension A Ft.	A In.	B Ft.	B In.	Bars E-½" ▫ D=10" No.	Length Ft.	Length In.	Bars E-½" ▫ D=1'-6" No.	Length Ft.	Length In.	Bars F-½" ϕ No.	Length Ft.	Length In.	Bar G-⅝" ϕ No.	Length Ft.	Length In.	Steel D=10" lbs.	Steel D=1'-6" lbs.	Conc. Cu. yds.
16	9	6			16	4	7	16	5	5	32	9	2	4	5	1	270	272	1.13
18	10	6			16	-	-	16	-	-	32	10	2	4	-	-	291	293	1.21
20	7	9	7	6	24	-	-	24	-	-	48	7	4	4	-	-	341	347	1.42
22	8	5	8	2	24	-	-	24	-	-	48	8	0	4	-	-	362		1.49
24	9	1	8	10	24	-	-	24	-	-	48	8	8	4	-	-	384	391	1.58
26	9	9	9	6	24	-	-	24	-	-	48	9	4	4	-	-	404		1.65
28	10	5	10	2	24	-	-	24	-	-	48	10	0	4	-	-	425		1.73
30	8	4	8	2	32	-	-	32	-	-	64	7	11	4	-	-	475	487	1.94
32	8	10	8	8	32	-	-	32	-	-	64	8	5	4	-	-	496		2.01
34	9	4	9	2	32	-	-	32	-	-	64	8	11	4	-	-	518	530	2.10
36	9	10	9	8	32	-	-	32	-	-	64	9	5	4	-	-	540		2.17
38	10	4	10	2	32	-	-	32	-	-	64	9	11	4	-	-	560		2.25
40	8	9	8	6	40	-	-	40	-	-	80	8	3	4	-	-	609	624	2.47
45	9	9	9	6	40	-	-	40	-	-	80	9	3	4	-	-	660		2.65
50	9	0	8	9	48	-	-	48	-	-	96	8	6	4	-	-	744	764	2.98

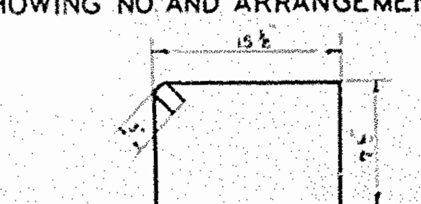


TYPICAL LAYOUTS SHOWING SINGLE AND COMBINED SPANS INDICATED IN TABLE AND MANNER IN WHICH END POST IS USED ON BRIDGES OF MORE THAN ONE SPAN





LAYOUT SHOWING NO. AND ARRANGEMENT OF A & B DIMENSIONS



¼" ϕ STIRRUP "H" FOR EXPANSION POSTS 4" x 3" LONG

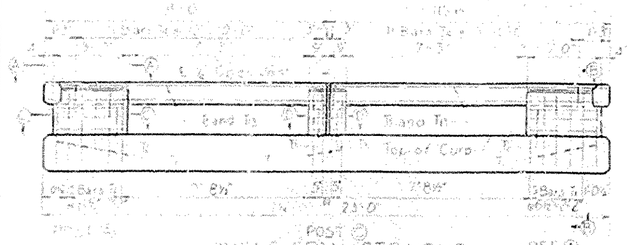
GENERAL NOTE

Specifications: State Highway Department, Kentucky.
Concrete: Class "D" concrete to be used throuout.
Reinforcement: Dimensions from face of concrete to steel is clear distance. Precast mortar or concrete blocks supporting reinforcement shall be spaced not farther apart than 50 diameters of the supported bar.

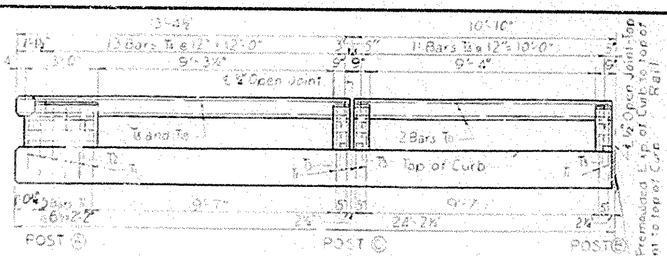
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

STANDARD HANDRAIL TYPE - A FOR CONCRETE BRIDGES

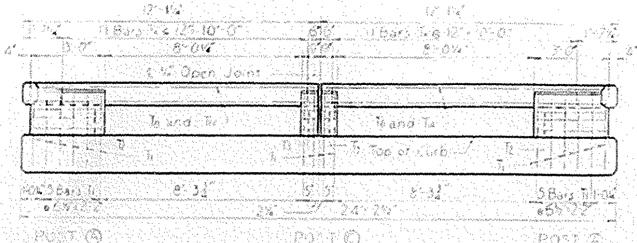
Submitted By — Bridge Engr.
Approved By — State Hwy. Engr.
Drawing No. M-8
S-3



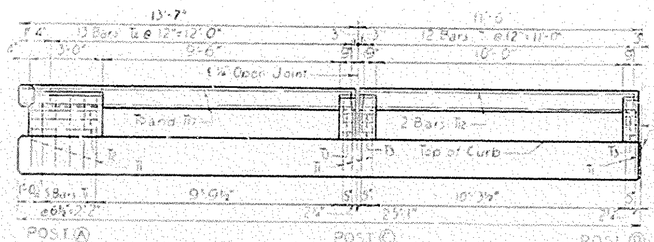
SINGLE SPAN-STRAIGHT



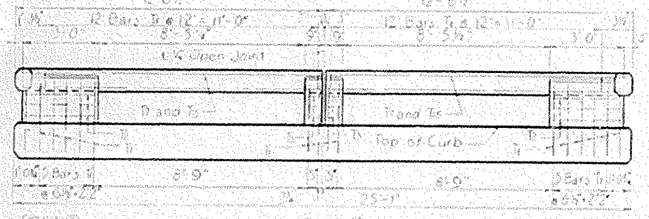
END SPAN-LONG RAIL-30° SKEW



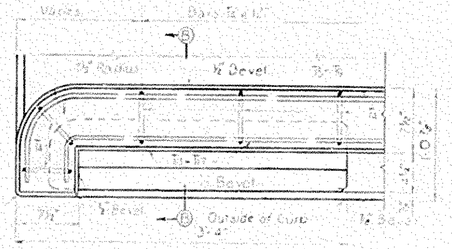
SINGLE SPAN-30° SKEW



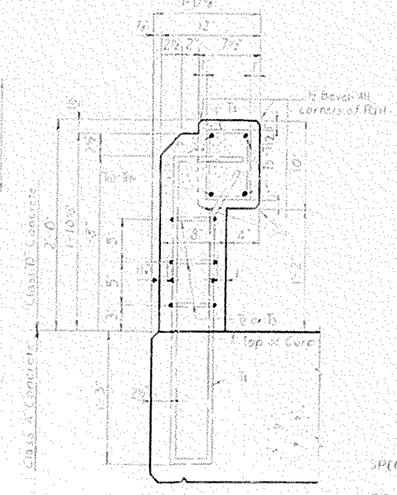
END SPAN-LONG RAIL-45° SKEW



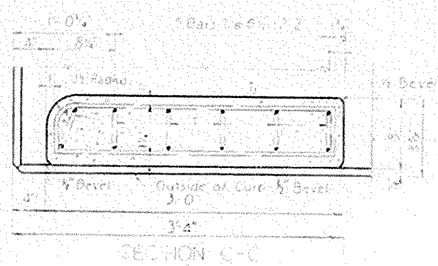
SINGLE SPAN-45° SKEW



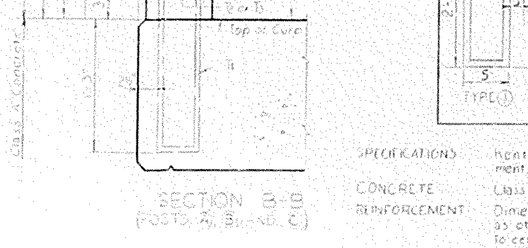
PLAN A-A



SECTION B-B
(POSTS Ⓐ, Ⓑ AND Ⓒ)

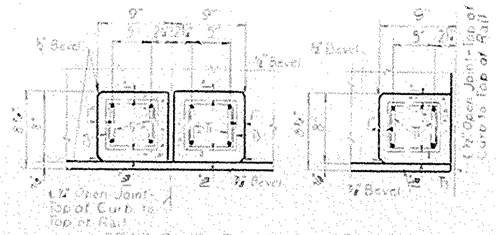


SECTION C-C
(POST Ⓑ)



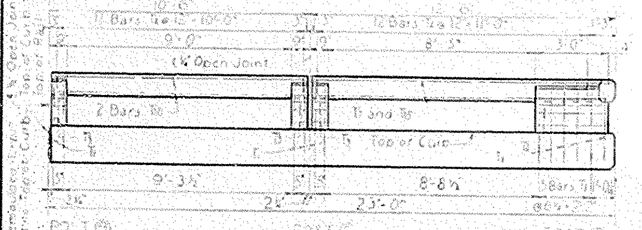
PART ELEVATION

When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.



SECTION D-D
(POST Ⓒ)

SECTION E-E
(POST Ⓔ)



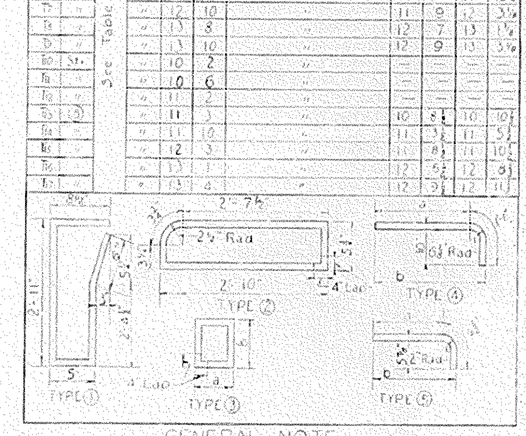
END SPAN-STRAIGHT, OR SHORT RAIL 30° OR 45° SKEW

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

20' R.S.D.G. SPAN		NUMBER															CONCRETE CLASS "D" CU. YDS.	REINFORCEMENT LBS.
		Ta	Tb	Tc	Td	Te	Tf	Tg	Th	Ti	Tj	Tk	Tl	Tm	Tn	To		
STRAIGHT	SINGLE	TWO RAILS	32	12	12	52	8	–	–	–	–	–	–	8	–	–	–	–	1.5	508
	INTERMEDIATE	TWO RAILS	16	–	24	48	–	–	–	–	–	–	–	16	–	–	–	–	1.1	368
	END	TWO RAILS	24	6	18	50	–	–	4	–	–	8	–	–	–	–	4	–	1.3	439
30° SKEW	SINGLE	TWO RAILS	32	12	12	52	–	8	–	–	–	–	–	–	8	–	–	–	1.5	519
	INTERMEDIATE	TWO RAILS	16	–	24	48	–	–	–	–	–	–	–	16	–	–	–	–	1.1	368
	END	LONG RAIL	12	3	9	26	–	–	–	2	–	–	4	–	–	–	–	2	0.7	225
	END	SHORT RAIL	12	3	9	25	–	–	2	–	–	4	–	–	–	–	2	–	0.6	219
45° SKEW	SINGLE	TWO RAILS	32	12	12	56	–	–	8	–	–	–	–	–	–	8	–	–	1.5	530
	INTERMEDIATE	TWO RAILS	16	–	24	48	–	–	–	–	–	–	–	16	–	–	–	–	1.1	368
	END	LONG RAIL	12	3	9	27	–	–	–	2	–	–	4	–	–	–	–	2	0.7	230
	END	SHORT RAIL	12	3	9	25	–	–	2	–	–	4	–	–	–	–	2	–	0.6	219

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
Ta	①		⅝ ø	6	7	Curb into Posts	–	–	–	–
Tb	②		⅝ ø	7	0	Post Ⓐ	–	–	–	–
Tc	③		⅝ ø	2	6	Posts Ⓑ and Ⓒ	0	6½	0	5½
Td			"	2	9	Rail	0	8	0	5½
Te	①		⅝ ø	11	9	"	10	5	11	2½
Tf			"	12	5	"	11	4	11	10½
Tg			"	12	10	"	11	9	12	3½
Th			"	13	8	"	12	7	13	1½
Ti			"	13	10	"	12	9	13	3½
Tj	②		⅝ ø	10	2	"	–	–	–	–
Tk			"	10	6	"	–	–	–	–
Tl			"	11	2	"	–	–	–	–
Tm	②		⅝ ø	11	3	"	10	5½	10	10½
Tn			"	11	10	"	11	3½	11	5½
To			"	12	3	"	11	8½	11	10½
Tp			"	13	1	"	12	6½	12	9½
Tq			"	13	4	"	12	9½	12	11½



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways Current Specifications with Amendments.

CONCRETE: Class "D" concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A. S. T. M. Designation A 305 (current specifications).

BEVELED EDGES: All exposed edges to beveled ¾ unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD HANDRAIL
DECK GIRDER 20 FT. SPAN
ALL ROADWAY WIDTHS

1951

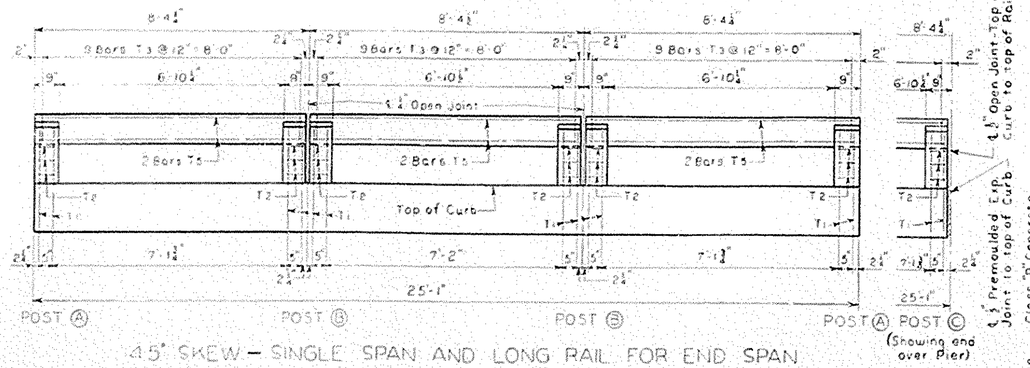
APPROVED BY: _____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

DRAWING NO. H-70

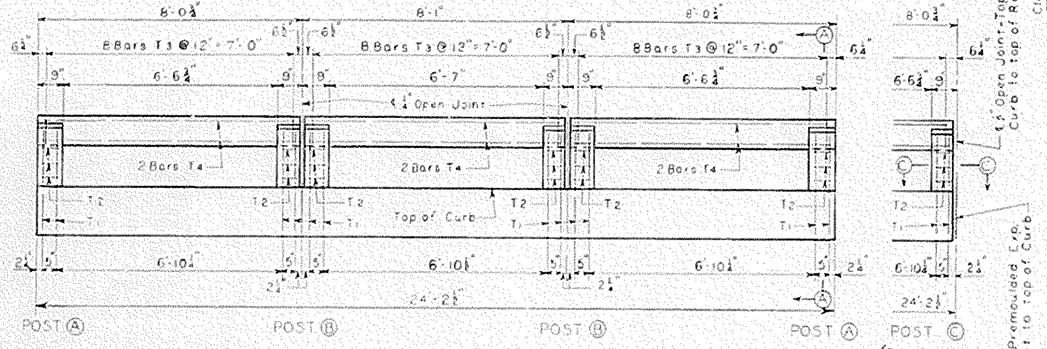
REVISED
REVISED
REVISED

DESIGNED BY _____ DATE _____
DETAILED BY _____ CHECKED BY _____ DATE _____
TRACED BY _____ CHECKED BY _____ DATE _____

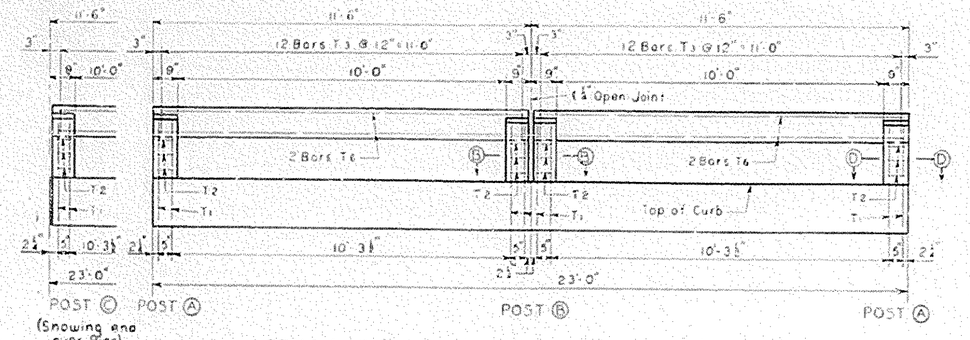
BRIDGE



45° SKEW — SINGLE SPAN AND LONG RAIL FOR END SPAN

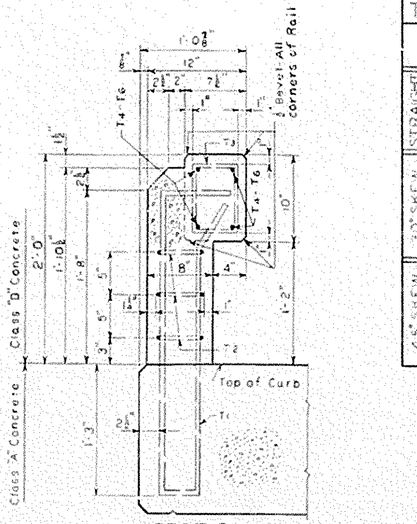


30° SKEW — SINGLE SPAN AND LONG RAIL FOR END SPAN

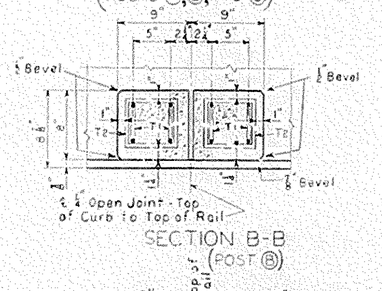


STRAIGHT — SINGLE, INTERMEDIATE, AND END SPAN

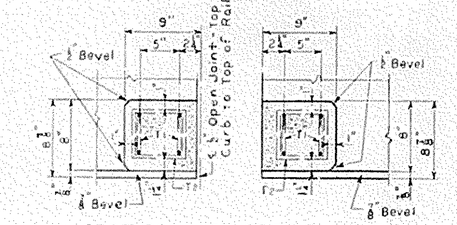
30° AND 45° SKEW — INTERMEDIATE SPAN AND SHORT RAIL FOR END SPAN



SECTION A-A
(POSTS Ⓐ, Ⓑ, AND Ⓒ)

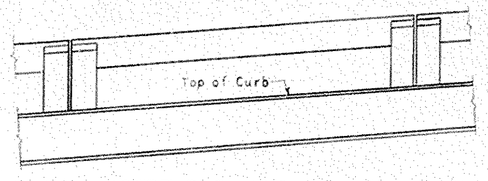


SECTION B-B
(POST Ⓑ)



SECTION C-C
(POST Ⓒ)

SECTION D-D
(POST Ⓐ)



PART ELEVATION

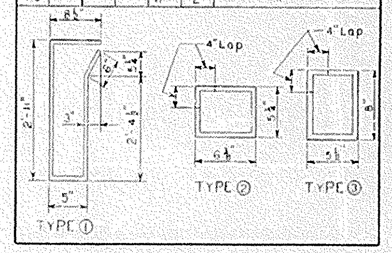
when bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

20' R.C.D.G. SPAN			NUMBER T1	T2	T3	T4	T5	T6	CONCRETE CLASS "D" CU. YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	16	24	48	—	—	16	1.1	368
	INTERMEDIATE	TWO RAILS	16	24	48	—	—	16	1.1	368
	END	TWO RAILS	16	24	48	—	—	16	1.1	368
30° SKEW	SINGLE	TWO RAILS	24	36	48	24	—	—	1.3	442
	INTERMEDIATE	TWO RAILS	16	24	48	—	—	16	1.1	368
	END	LONG RAIL	12	18	24	12	—	—	0.5	221
	END	SHORT RAIL	8	12	24	—	—	8	0.6	184
45° SKEW	SINGLE	TWO RAILS	24	36	54	—	24	—	1.3	455
	INTERMEDIATE	TWO RAILS	16	24	48	—	—	16	1.1	368
	END	LONG RAIL	12	18	27	—	12	—	0.7	227
	END	SHORT RAIL	8	12	24	—	—	8	0.6	184

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO	SIZE	LENGTH FT.	LENGTH IN.	LOCATION
T1	①	See Table above	#5	6	7	Curb into Posts
T2	②		#4	2	6	Posts Ⓐ, Ⓑ and Ⓒ
T3	③		"	2	9	Rail
T4	Str.		¾"ø	7	9	"
T5	"		"	8	0	"
T6	"		"	11	2	"



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways Current Specifications with Amendments.

CONCRETE: Class "D" concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A 305 - current specifications.

BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

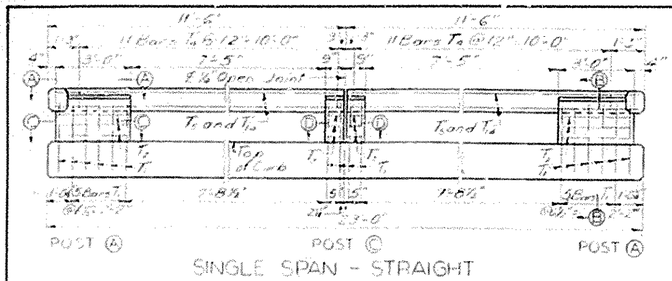
STANDARD HANDRAIL
DECK GIRDER 20 FT. SPAN
ALL ROADWAY WIDTHS
1951

APPROVED BY:
_____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

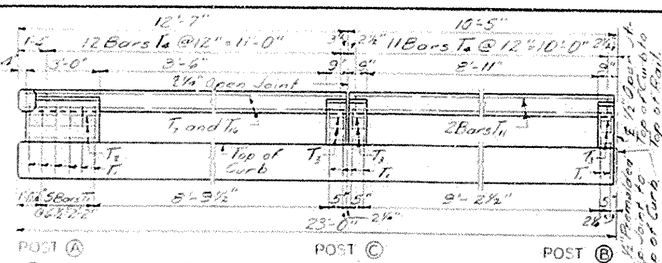
DRAWING NO. H80

DESIGNED BY T.D.A. CHECKED BY C.E.C. (C.H.S.) DATE 7/21 REVISED
DETAILED BY T.V.T./D.H.O. CHECKED BY DATE REVISED
TRACED BY CHECKED BY DATE REVISED

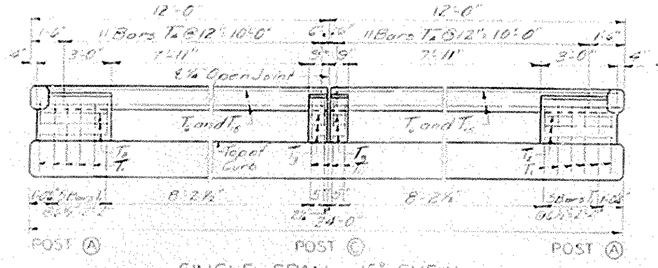
BRIDGE



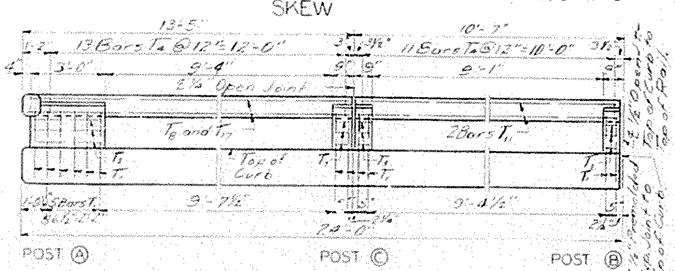
SINGLE SPAN - STRAIGHT



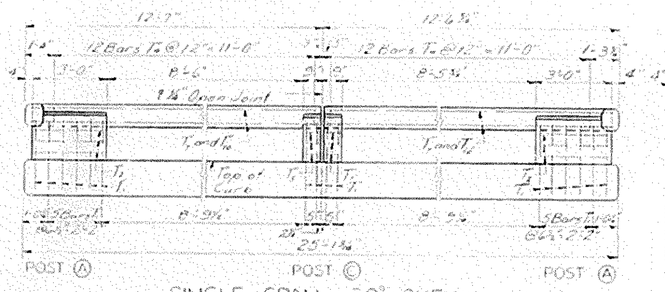
END SPAN - STRAIGHT; OR SHORT RAIL - 15°, 30°, OR 45° SKEW



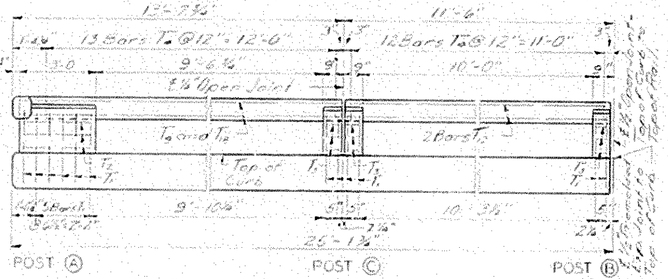
SINGLE SPAN - 15° SKEW



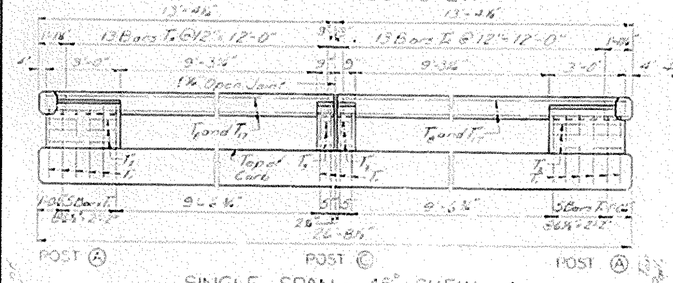
END SPAN - LONG RAIL - 15° SKEW



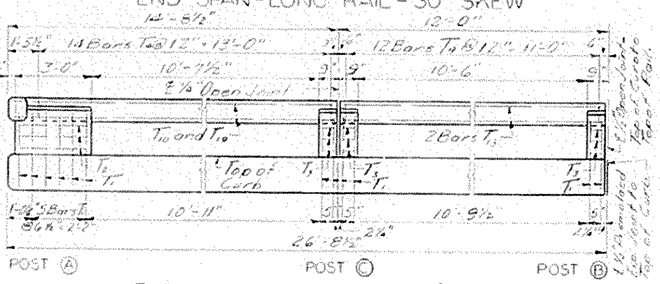
SINGLE SPAN - 30° SKEW



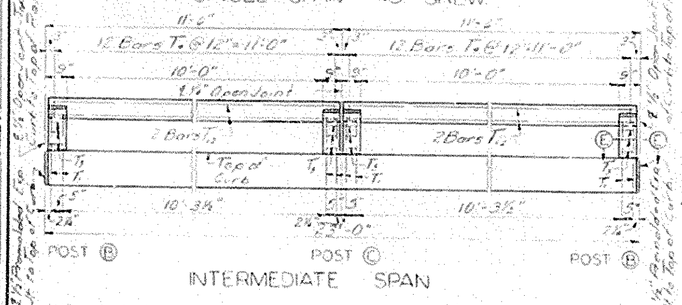
END SPAN - LONG RAIL - 30° SKEW



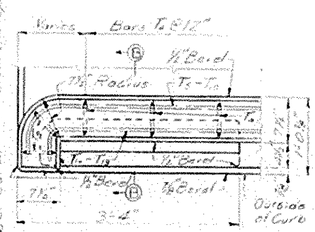
SINGLE SPAN - 45° SKEW



END SPAN - LONG RAIL - 45° SKEW



INTERMEDIATE SPAN



PART ELEVATION

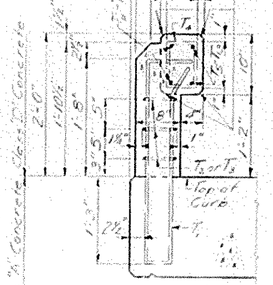
When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

PLAN A-A

SECTION C-C (POST A)

SECTION D-D (POST C)

SECTION E-E (POST B)



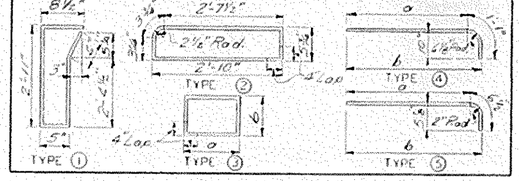
SECTION B-B (POSTS A, B, AND C)

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

20' R.C.D.G. SPAN			NUMBER T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}	T_{17}	T_{18}	T_{19}	CONCRETE CLASS 'D' CU. YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	32	12	12	52	8	—	—	—	—	—	—	—	—	8	—	—	—	—	—	1.5	508
	INTERMEDIATE	TWO RAILS	16	—	24	48	—	—	—	—	—	—	—	16	—	8	—	—	—	—	—	1.1	368
	END	TWO RAILS	24	6	18	50	—	—	4	—	—	—	8	—	—	—	4	—	—	—	—	1.3	428
15° SKEW	SINGLE	TWO RAILS	32	12	12	52	—	8	—	—	—	—	—	—	—	8	—	—	—	—	—	1.5	517
	INTERMEDIATE	TWO RAILS	16	—	24	46	—	—	—	—	—	—	—	16	—	—	—	—	—	—	—	1.1	368
	END	LONG RAIL	12	3	9	26	—	—	—	2	—	—	2	—	—	—	—	2	—	—	—	1.3	443
	END	SHORT RAIL	12	3	9	25	—	—	2	—	—	—	4	—	—	—	2	—	—	—	—		
30° SKEW	SINGLE	TWO RAILS	32	12	12	56	—	—	8	—	—	—	—	—	—	—	8	—	—	—	—	1.5	530
	INTERMEDIATE	TWO RAILS	16	—	24	48	—	—	—	—	—	—	—	16	—	—	—	—	—	—	—	1.1	368
	END	LONG RAIL	12	3	9	27	—	—	—	2	—	—	4	—	—	—	—	2	—	—	—	1.3	449
	END	SHORT RAIL	12	3	9	25	—	—	2	—	—	—	4	—	—	—	2	—	—	—	—		
45° SKEW	SINGLE	TWO RAILS	32	12	12	60	—	—	—	8	—	—	—	—	—	—	—	8	—	—	—	1.6	548
	INTERMEDIATE	TWO RAILS	16	—	24	48	—	—	—	—	—	—	—	16	—	—	—	—	—	—	—	1.1	368
	END	LONG RAIL	12	3	9	28	—	—	—	—	2	—	4	—	—	—	—	—	2	—	—	1.4	457
	END	SHORT RAIL	12	3	9	25	—	—	2	—	—	—	4	—	—	—	2	—	—	—	—		

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	1	See Table above	#5	6	7	Curb into Posts	—	—	—	—
T_2	2		#3	7	0	Post A	—	—	—	—
T_3	3		"	2	6	Posts B and C	0	6¾	0	5¼
T_4	"		"	2	9	Rail	0	8	0	5½
T_5	4		#5	11	9	"	10	8	11	2¼
T_6	"		"	12	3	"	11	2	11	8½
T_7	"		"	12	10	"	11	9	12	3⅜
T_8	"		"	13	6	"	12	7	13	1⅝
T_9	"		"	13	11	"	12	10	13	4⅞
T_{10}	"		"	15	0	"	13	11	14	5⅛
T_{11}	5½		"	10	1	"	—	—	—	—
T_{12}	"		"	11	2	"	—	—	—	—
T_{13}	"		"	11	8	"	—	—	—	—
T_{14}	5		"	11	3	"	10	8½	10	10½
T_{15}	"		"	11	9	"	11	2½	11	4½
T_{16}	"		"	12	4	"	11	9½	11	11½
T_{17}	"		"	13	1	"	12	6½	12	8½
T_{18}	"		"	13	5	"	12	10½	13	0½
T_{19}	"		"	14	5	"	13	10½	14	0½



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class "D" concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

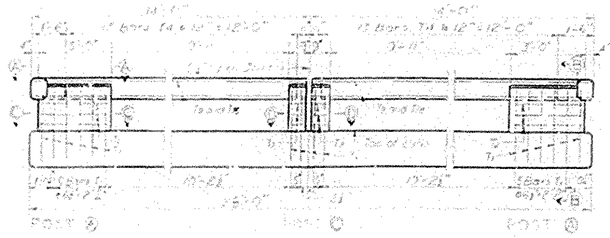
BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

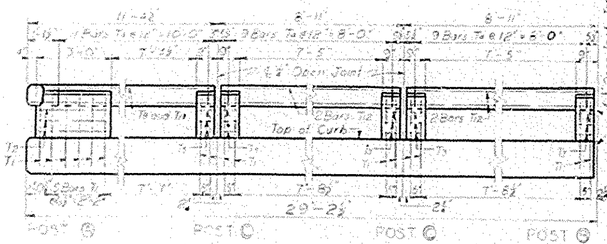
STANDARD OPEN TYPE HANDRAIL FOR 20 FT. SPAN R.C.D.G. ALL ROADWAY WIDTHS WITH 2'-6" CURB

DRAWING NO. H-130

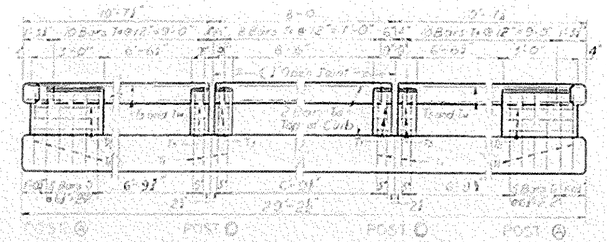
BRIDGE



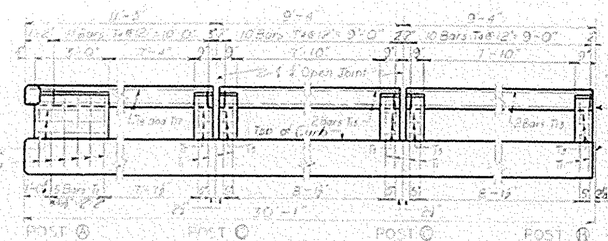
SINGLE SPAN — STRAIGHT



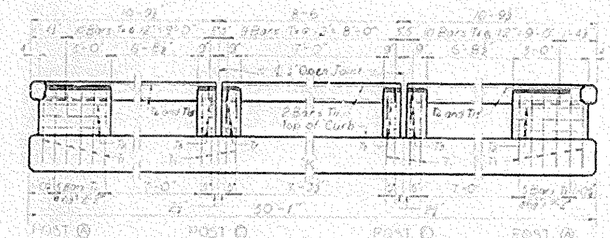
END SPAN — LONG RAIL — 30° SKEW



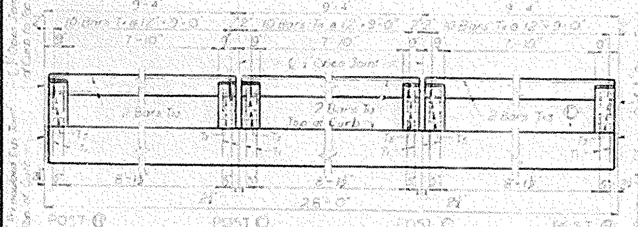
SINGLE SPAN — 30° SKEW



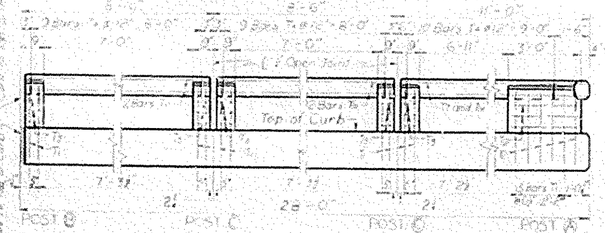
END SPAN — LONG RAIL — 45° SKEW



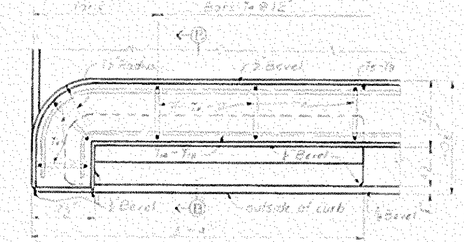
SINGLE SPAN — 45° SKEW



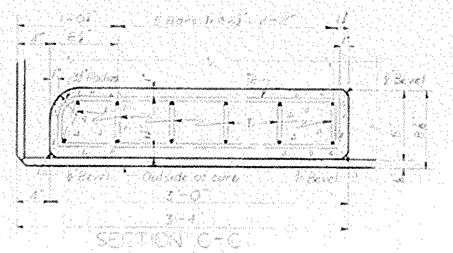
INTERMEDIATE SPAN



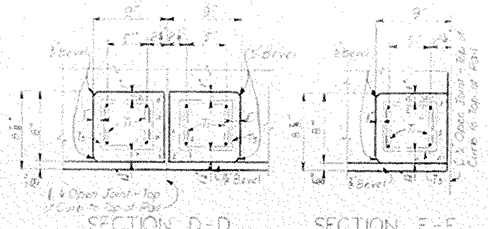
END SPAN — STRAIGHT OR SHORT RAIL 30° OR 45° SKEW



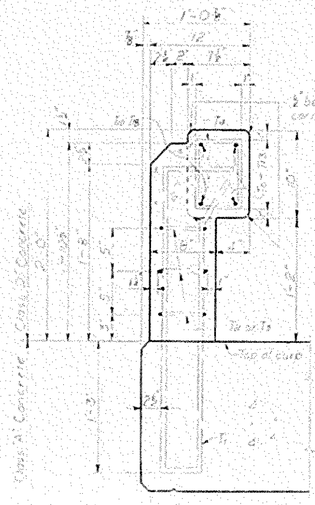
PLAN A-A



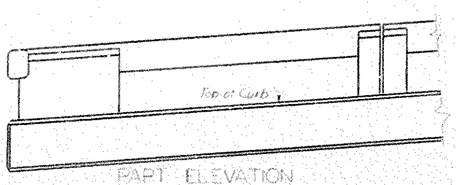
SECTION C-C (POST A)



SECTION D-D (POST C) SECTION E-E (POST B)



SECTION B-B (POSTS A, B AND C)



PART ELEVATION

When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

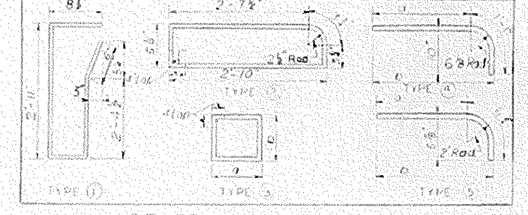
TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

	25' R.C.D.G. SPAN		NUMBER T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	CONCRETE CLASS D CU. YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	32	12	12	60	–	–	–	–	8	–	–	–	–	–	–	8	1.7	558
	INTERMEDIATE	TWO RAILS	24	–	36	60	–	–	–	–	–	–	–	24	–	–	–	–	1.4	486
	END	TWO RAILS	32	6	30	60	–	–	4	–	–	–	16	–	–	–	4	–	1.6	554
30° SKEW	SINGLE	TWO RAILS	40	12	24	64	8	–	–	–	8	–	–	8	–	–	–	–	1.8	636
	INTERMEDIATE	TWO RAILS	24	–	36	60	–	–	–	–	–	–	24	–	–	–	–	–	1.4	486
	END	LONG. RAIL	16	3	15	31	–	–	2	–	–	8	–	–	–	2	–	–	0.8	283
	END	SHORT RAIL	16	3	15	30	–	–	2	–	–	8	–	–	–	2	–	–	0.8	277
45° SKEW	SINGLE	TWO RAILS	40	12	24	66	–	8	–	–	–	8	–	–	8	–	–	–	1.9	645
	INTERMEDIATE	TWO RAILS	24	–	36	60	–	–	–	–	–	–	24	–	–	–	–	–	1.4	486
	END	LONG. RAIL	16	3	15	33	–	–	2	–	–	–	8	–	–	2	–	–	0.8	289
	END	SHORT RAIL	16	3	15	30	–	–	2	–	–	8	–	–	–	2	–	–	0.8	277

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T1	①		#5	6	7	Curb into Posts				
T2	②		#3	7	0	POST (A)				
T3	③		"	2	6	Posts (B) and (C)	0	6½	0	5½
T4			"	2	9	Rail	0	8	0	11½
T5	④		#5	10	11	"	9	10	10	1⅛
T6	"		"	11	1	"	10	0	10	6⅛
T7	"		"	11	5	"	10	2	10	9⅛
T8	"		"	11	8	"	10	7	11	1⅛
T9	"		"	14	3	"	13	2	13	8⅛
T10	"		"	17	8	"				
T11	"		"	8	2	"				
T12	"		"	8	7	"				
T13	"		"	9	0	"				
T14	⑤		"	10	1	"	0	0½	9	11½
T15	"		"	10	6	"	9	11½	10	1⅛
T16	"		"	10	3	"	10	2½	10	1½
T17	"		"	11	1	"	10	6⅛	10	5⅛
T18	"		"	13	9	"	13	2⅛	13	2⅝

SEE TABLE ABOVE



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class D concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A 305 - Current specifications.

BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

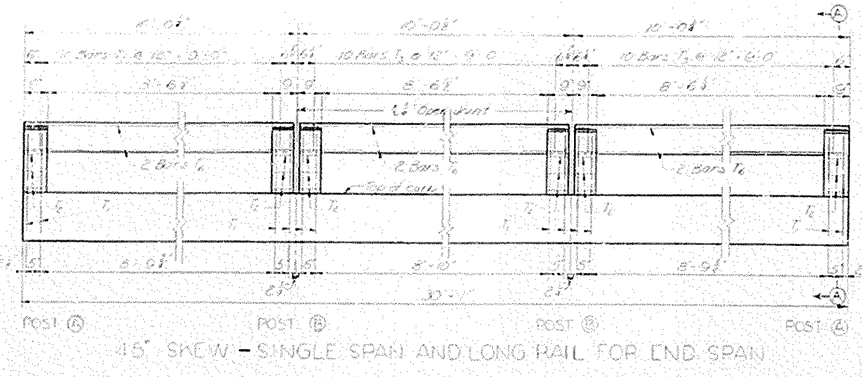
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD HANDRAIL
DECK GIRDER 25 FT. SPAN
ALL ROADWAY WIDTHS

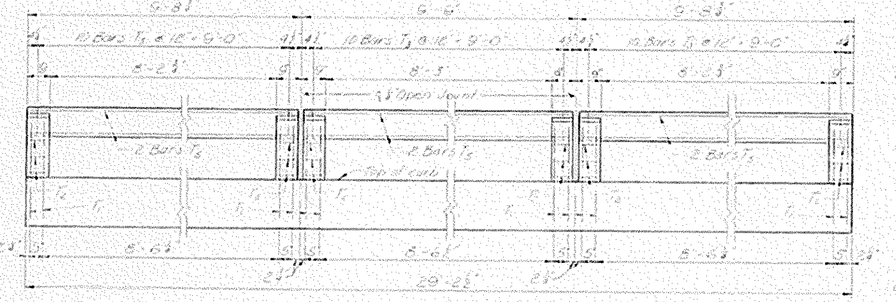
APPROVED BY: _____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER
195

DRAWING NO. H-71

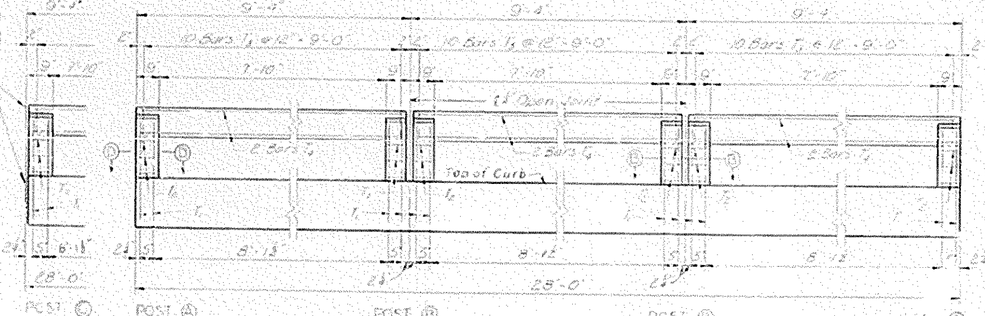
BRIDGE



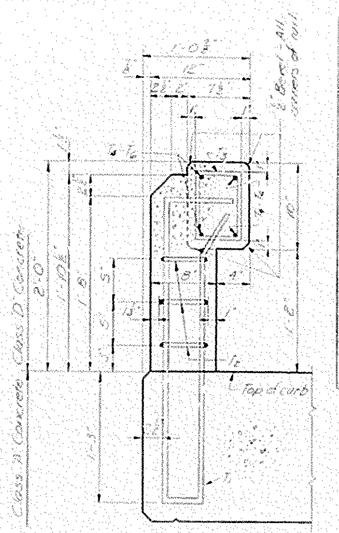
45° SKEW - SINGLE SPAN AND LONG RAIL FOR END SPAN



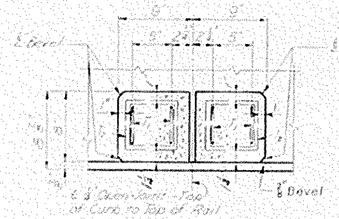
30° SKEW - SINGLE SPAN AND LONG RAIL FOR END SPAN



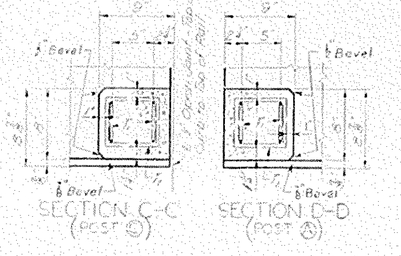
STRAIGHT - SINGLE, INTERMEDIATE, AND END SPAN
30° AND 45° SKEW - INTERMEDIATE RAIL AND SHORT RAIL END SPAN



SECTION A-A
(POSTS (A), (B), AND (C))

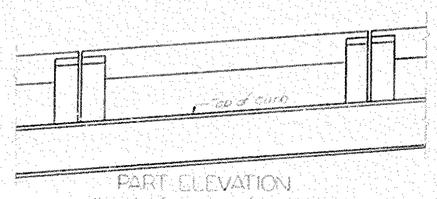


SECTION B-B
(POST (B))



SECTION C-C
(POST (C))

SECTION D-D
(POST (A))



PART ELEVATION

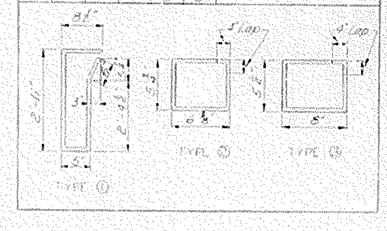
When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

	25' R.C.D.G. SPAN		NUMBER T_1	T_2	T_3	T_4	T_5	T_6	CONCRETE CLASS "D" CU. YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	24	36	60	24	—	—	1.4	486
	INTERMEDIATE	TWO RAILS	24	36	60	24	—	—	1.4	486
	END	TWO RAILS	24	36	60	24	—	—	1.4	486
30° SKEW	SINGLE	TWO RAILS	24	36	60	—	24	—	1.5	496
	INTERMEDIATE	TWO RAILS	24	36	60	24	—	—	1.4	486
	END	LONG RAIL	12	18	30	—	12	—	0.7	248
	END	SHORT RAIL	12	18	30	12	—	—	0.7	243
45° SKEW	SINGLE	TWO RAILS	24	36	60	—	—	24	1.5	503
	INTERMEDIATE	TWO RAILS	24	36	60	24	—	—	1.4	486
	END	LONG RAIL	12	18	30	—	—	12	0.8	251
	END	SHORT RAIL	12	18	30	12	—	—	0.7	243

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT	LENGTH IN	LOCATION
T_1	①	Table Above	#5	6	7	Curb into Posts
T_2	②		"	2	6	Posts (A), (B), and (C)
T_3	③		"	2	9	Rail
T_4	Str.		#4	0	0	—
T_5	—		"	0	5	—
T_6	—		"	0	8	—



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class 'D' concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances, except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation A 305- current specifications.

BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

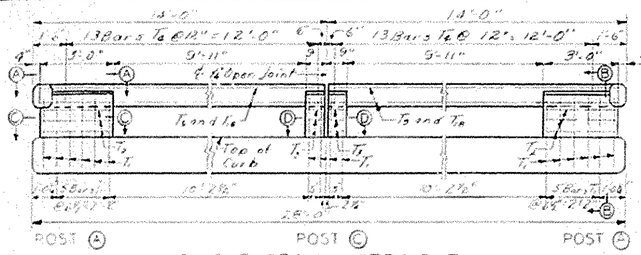
STANDARD HANDRAIL
DECK GIRDER 25 FT. SPAN
ALL ROADWAY WIDTHS

1951

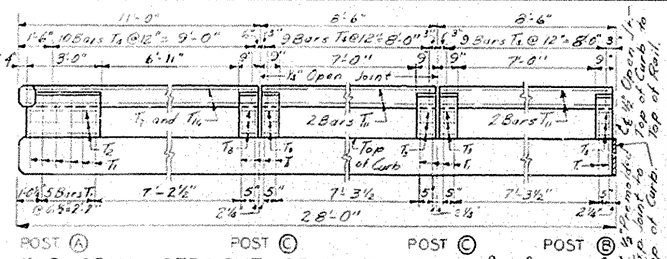
APPROVED BY:	BRIDGE ENGINEER / STATE HIGHWAY ENGINEER	DRAWING NO. H-81

DESIGNED BY: [illegible] DATE 8-51 REVISED
DETAILED BY: [illegible] DATE 9-51 REVISED
TRACED BY: [illegible] DATE REVISED
CHECKED BY: [illegible] DATE REVISED

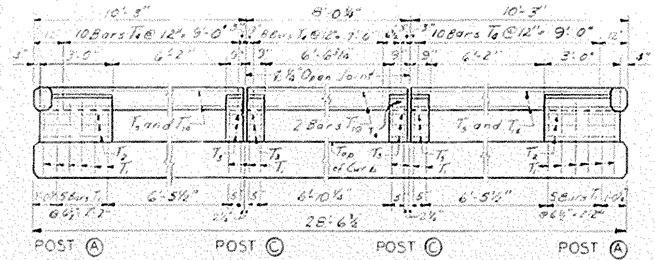
BRIDGE



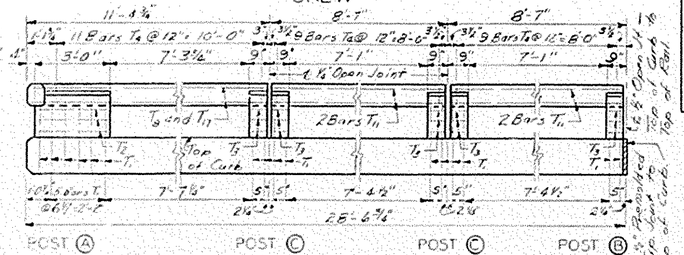
SINGLE SPAN - STRAIGHT



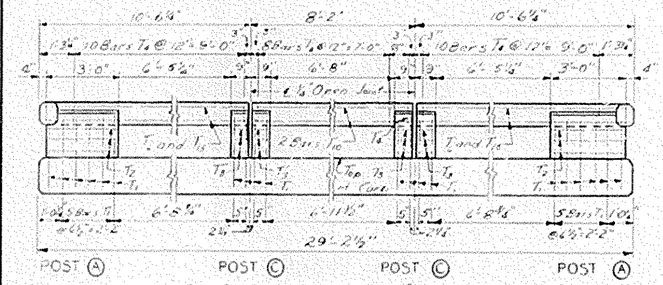
END SPAN - STRAIGHT: OR SHORT RAIL - 15°, 30°, OR 45° SKEW



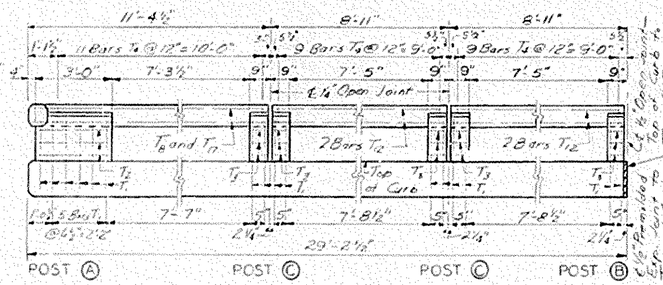
SINGLE SPAN - 15° SKEW



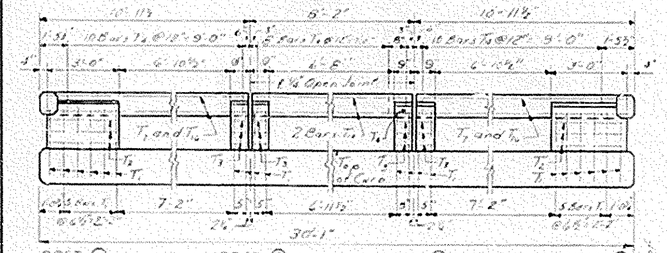
END SPAN - LONG RAIL - 15° SKEW



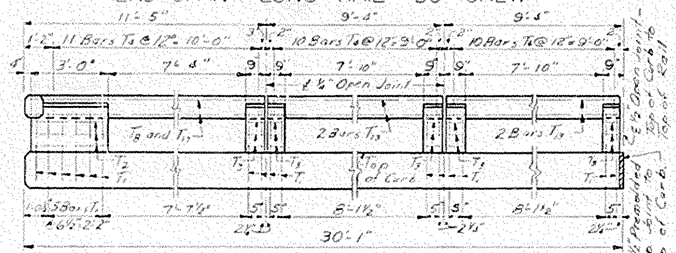
SINGLE SPAN - 30° SKEW



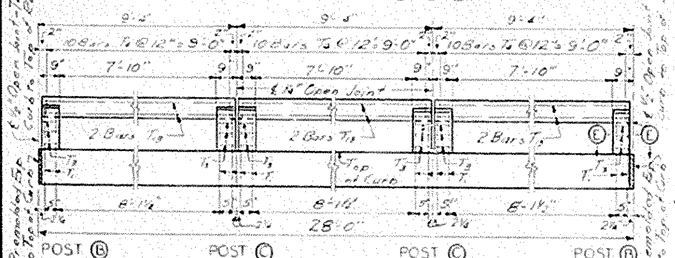
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN - 45° SKEW



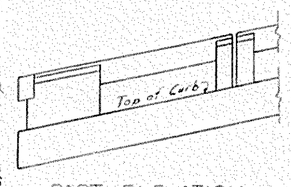
END SPAN - LONG RAIL - 45° SKEW



INTERMEDIATE SPAN

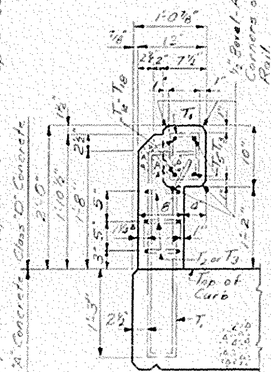
TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

25' R.C.D.G. SPAN			NUMBER																CONCRETE CLASS 'D' CU. YDS.	REINFORCEMENT LBS.
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}	T_{17}	T_{18}	
STRAIGHT	SINGLE	TWO RAILS	32	12	12	60	—	—	—	—	8	—	—	—	—	—	—	—	—	8	1.7	558
	INTERMEDIATE	TWO RAILS	24	—	36	60	—	—	—	—	—	—	—	24	—	—	—	—	—	—	1.4	486
	END	TWO RAILS	32	6	30	60	—	—	4	—	—	—	16	—	—	—	—	4	—	—	1.6	554
15° SKEW	SINGLE	TWO RAILS	40	12	24	66	8	—	—	—	8	—	—	—	—	—	8	—	—	—	1.8	633
	INTERMEDIATE	TWO RAILS	24	—	36	60	—	—	—	—	—	—	—	24	—	—	—	—	—	—	1.4	486
	END	LONG RAIL	16	3	15	31	—	—	—	2	—	—	8	—	—	—	—	—	2	—	1.6	556
	END	SHORT RAIL	16	3	15	30	—	—	2	—	—	—	8	—	—	—	—	2	—	—		
30° SKEW	SINGLE	TWO RAILS	40	12	24	66	—	8	—	—	8	—	—	—	—	—	8	—	—	—	1.8	636
	INTERMEDIATE	TWO RAILS	24	—	36	60	—	—	—	—	—	—	—	24	—	—	—	—	—	—	1.4	486
	END	LONG RAIL	16	3	15	31	—	—	—	2	—	—	8	—	—	—	—	—	2	—	1.6	560
	END	SHORT RAIL	16	3	15	30	—	—	2	—	—	—	8	—	—	—	—	2	—	—		
45° SKEW	SINGLE	TWO RAILS	40	12	24	66	—	—	8	—	—	8	—	—	—	—	8	—	—	—	1.9	645
	INTERMEDIATE	TWO RAILS	24	—	36	60	—	—	—	—	—	—	—	24	—	—	—	—	—	—	1.4	486
	END	LONG RAIL	16	3	15	33	—	—	—	2	—	—	—	8	—	—	—	—	2	—	1.6	565
	END	SHORT RAIL	16	3	15	30	—	—	2	—	—	—	8	—	—	—	—	2	—	—		



PART ELEVATION

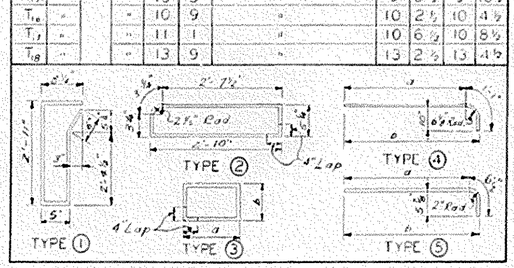
When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.



SECTION B-B
(POSTS A, B, AND C)

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	SEE TABLE ABOVE	#5	6	7	CURB INTO POSTS	—	—	—	—
T_2	②		#3	7	0	POST A	—	—	—	—
T_3	③		"	2	6	POSTS B AND C	0	6½	0	5¾
T_4	"		"	2	9	RAIL	0	8	0	5½
T_5	④		#5	10	6	"	9	5	9	11⅝
T_6	"		"	10	10	"	9	9	10	3⅜
T_7	"		"	11	3	"	10	2	10	8⅝
T_8	"		"	11	8	"	10	7	11	1⅜
T_9	"		"	14	3	"	13	2	13	8⅛
T_{10}	STR.		"	7	9	"	—	—	—	—
T_{11}	"		"	8	2	"	—	—	—	—
T_{12}	"		"	8	7	"	—	—	—	—
T_{13}	"		"	9	0	"	—	—	—	—
T_{14}	⑤		"	10	0	"	9	5½	9	7½
T_{15}	"		"	10	3	"	9	6½	9	10⅜
T_{16}	"		"	10	9	"	10	2½	10	4½
T_{17}	"		"	11	1	"	10	6½	10	8½
T_{18}	"		"	13	9	"	13	2½	13	4½



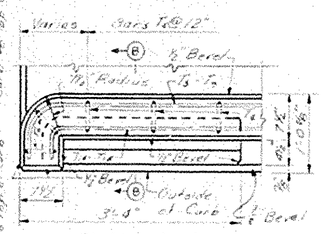
GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

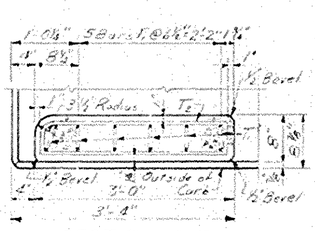
CONCRETE: Class "D" concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

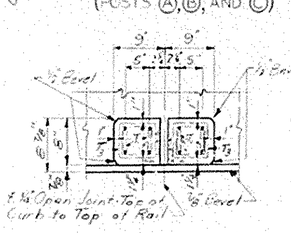
BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.



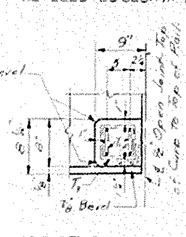
PLAN A-A



SECTION C-C
(POST A)



SECTION D-D
(POST C)



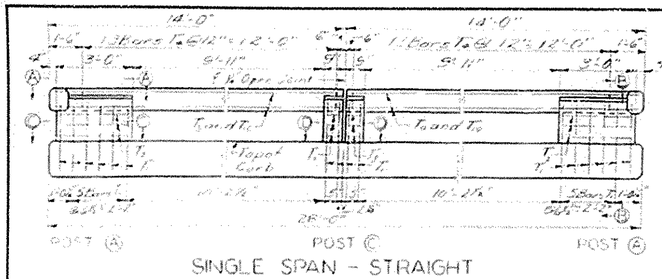
SECTION E-E
(POST B)

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

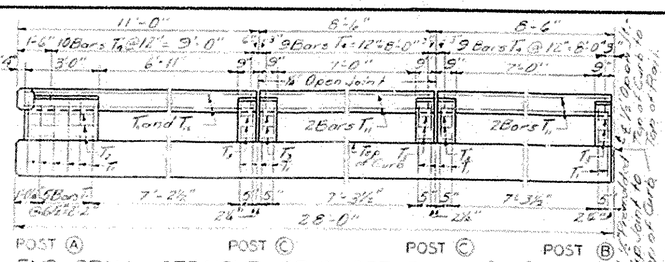
STANDARD OPEN TYPE HANDRAIL
FOR 25 FT. SPAN R.C.D.G.
ALL ROADWAY WIDTHS
WITH 10½" CURB

DRAWING No. H-141

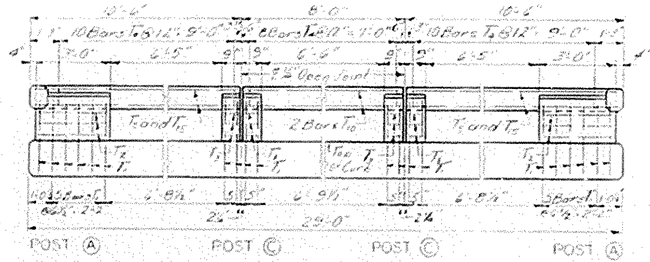
BRIDGE



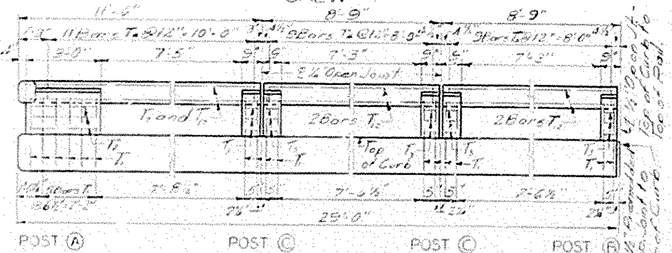
SINGLE SPAN - STRAIGHT



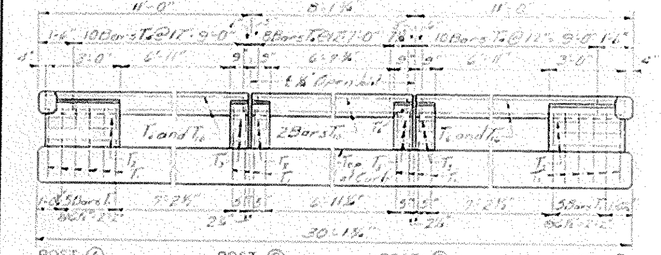
END SPAN - STRAIGHT; OR SHORT RAIL - 15°, 30° OR 45° SKEW



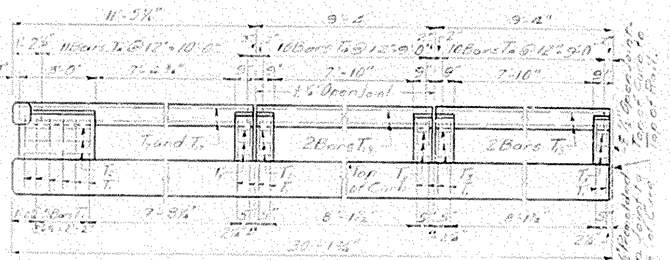
SINGLE SPAN - 15° SKEW



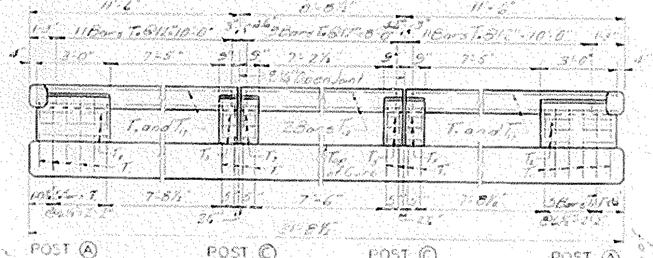
END SPAN - LONG RAIL - 15° SKEW



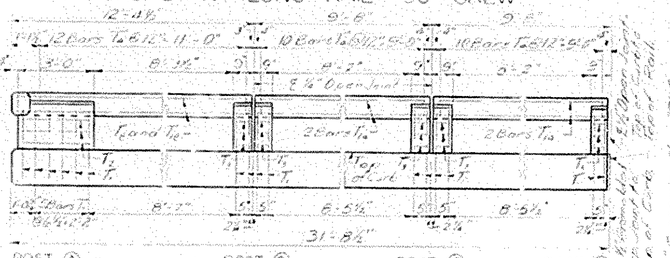
SINGLE SPAN - 30° SKEW



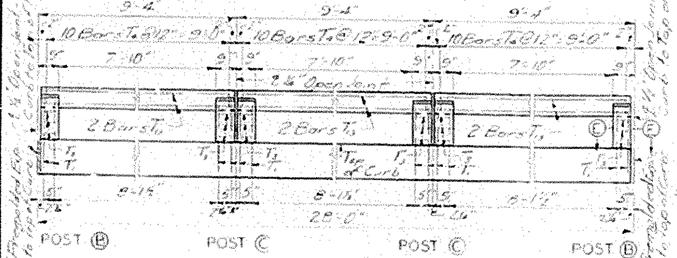
END SPAN - LONG RAIL - 30° SKEW



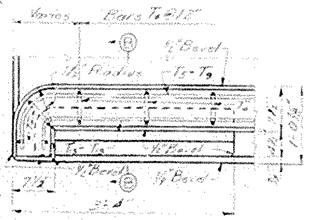
SINGLE SPAN - 45° SKEW



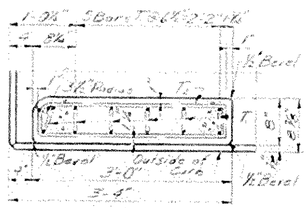
END SPAN - LONG RAIL - 45° SKEW



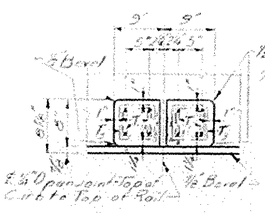
INTERMEDIATE SPAN



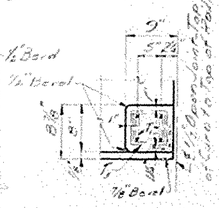
PLAN A-A



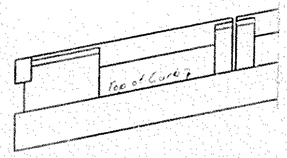
SECTION C-C (POST (A))



SECTION D-D (POST (C))

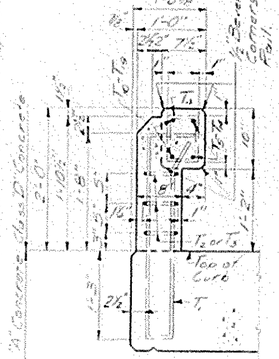


SECTION E-E (POST (B))



PART ELEVATION

When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.



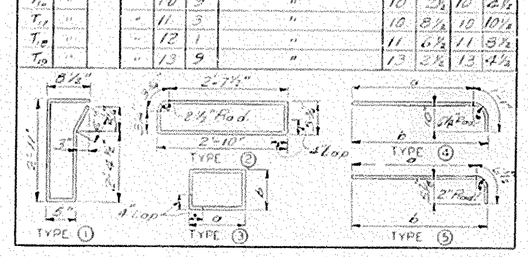
SECTION B-B (POSTS (A), (B), AND (C))

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

25' R.C.D.G. SPAN			NUMBER																CONCRETE CLASS 'D' CU. YDS	REINFORCEMENT LBS.
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}	T_{17}	T_{18}	T_{19}	
STRAIGHT	SINGLE	TWO RAILS	32	12	12	30	–	–	–	–	8	–	–	–	–	–	–	–	–	–	6	1.7	558
	INTERMEDIATE	TWO RAILS	24	–	36	60	–	–	–	–	–	–	–	24	–	–	–	–	–	–	–	1.4	486
	END	TWO RAILS	32	6	30	60	–	4	–	–	–	16	–	–	–	–	–	4	–	–	–	1.6	554
15° SKEW	SINGLE	TWO RAILS	40	12	28	64	8	–	–	–	8	–	–	–	–	8	–	–	–	–	–	1.8	631
	INTERMEDIATE	TWO RAILS	24	–	36	60	–	–	–	–	–	–	–	24	–	–	–	–	–	–	–	1.4	486
	END	LONG RAIL	16	3	15	31	–	–	2	–	–	–	8	–	–	–	–	2	–	–	–	1.6	559
	END	SHORT RAIL	16	3	15	30	–	2	–	–	–	8	–	–	–	–	–	2	–	–	–		
30° SKEW	SINGLE	TWO RAILS	40	12	28	66	–	8	–	–	–	8	–	–	–	–	–	8	–	–	–	1.9	645
	INTERMEDIATE	TWO RAILS	24	–	36	60	–	–	–	–	–	–	–	24	–	–	–	–	–	–	–	1.4	486
	END	LONG RAIL	16	3	15	33	–	–	2	–	–	–	8	–	–	–	–	2	–	–	–	1.6	566
	END	SHORT RAIL	16	3	15	30	–	2	–	–	–	8	–	–	–	–	–	2	–	–	–		
45° SKEW	SINGLE	TWO RAILS	40	12	28	70	–	–	8	–	–	–	8	–	–	–	–	–	8	–	–	1.9	663
	INTERMEDIATE	TWO RAILS	24	–	36	60	–	–	–	–	–	–	–	24	–	–	–	–	–	–	–	1.4	486
	END	LONG RAIL	16	3	15	34	–	–	2	–	–	–	8	–	–	–	–	2	–	–	–	1.7	573
	END	SHORT RAIL	16	3	15	30	–	2	–	–	–	8	–	–	–	–	–	2	–	–	–		

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	See Table above	#5	5	7	Curb into Post	–	–	–	–
T_2	②		#3	7	0	Post (A)	–	–	–	–
T_3	③		"	2	6	Posts (B) and (C)	0	6½	0	5½
T_4	"		"	2	9	Rail	0	8	0	5½
T_5	④		#5	10	9	"	9	8	10	2½
T_6	"		"	11	3	"	10	2	10	8½
T_7	"		"	11	9	"	10	8	11	2½
T_8	"		"	12	8	"	11	7	12	1½
T_9	"		"	14	3	"	13	2	13	8½
T_{10}	Str.		"	7	8	"	–	–	–	–
T_{11}	"		"	8	2	"	–	–	–	–
T_{12}	"		"	8	5	"	–	–	–	–
T_{13}	"		"	9	0	"	–	–	–	–
T_{14}	"		"	9	2	"	–	–	–	–
T_{15}	⑤		"	10	3	"	9	8½	9	10½
T_{16}	"		"	10	5	"	10	2½	10	4½
T_{17}	"		"	11	3	"	10	8½	10	10½
T_{18}	"		"	12	1	"	11	6½	11	8½
T_{19}	"		"	13	9	"	13	2½	13	4½



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class "D" concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

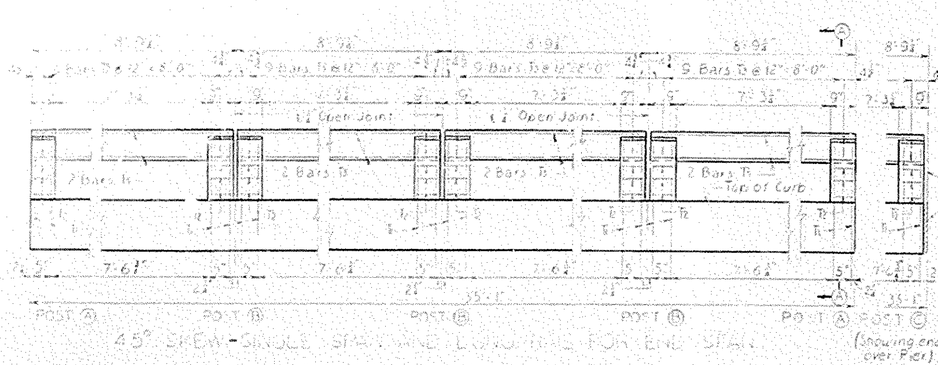
BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

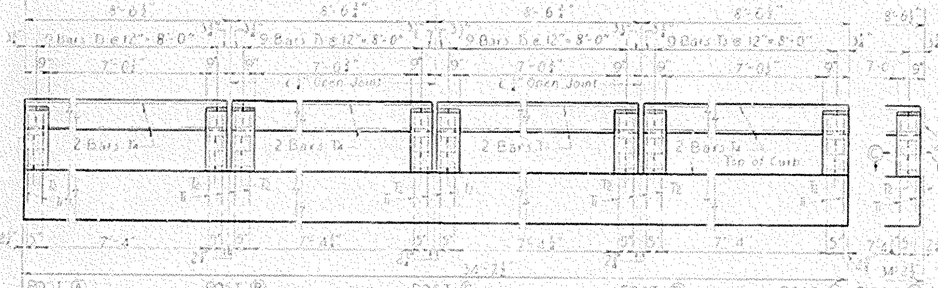
STANDARD OPEN TYPE HANDRAIL
FOR 25 FT. SPAN R.C.D.G.
ALL ROADWAY WIDTHS
WITH 2'-6" CURB

DRAWING NO. H-131

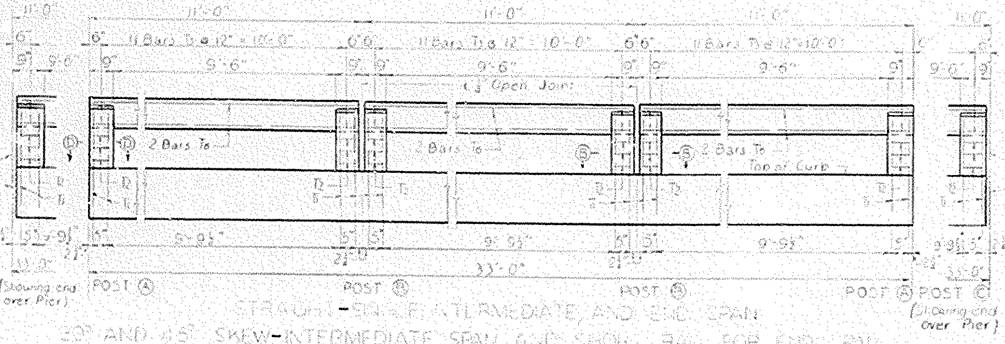
BRIDGE



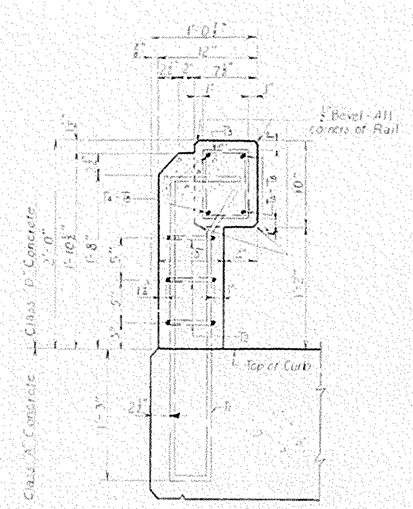
45° SKEW - SINGLE SPAN AND CURB RAIL FOR END SPAN



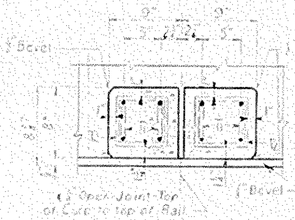
30° SKEW - SINGLE SPAN AND CURB RAIL FOR END SPAN



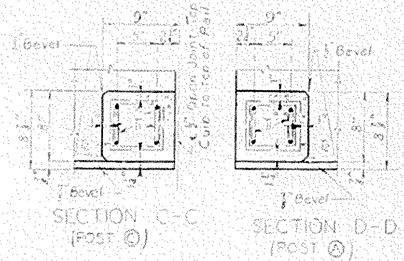
STRAIGHT - SINGLE, INTERMEDIATE, AND END SPAN
20° AND 45° SKEW - INTERMEDIATE SPAN AND SHORT RAIL FOR END SPAN



SECTION A-A
(POSTS Ⓐ, Ⓑ, AND Ⓒ)

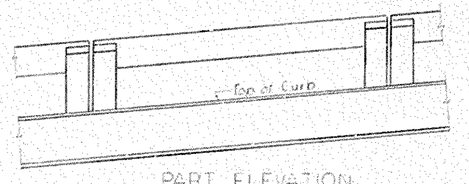


SECTION B-B
(POST Ⓑ)



SECTION C-C
(POST Ⓒ)

SECTION D-D
(POST Ⓐ)



PART ELEVATION

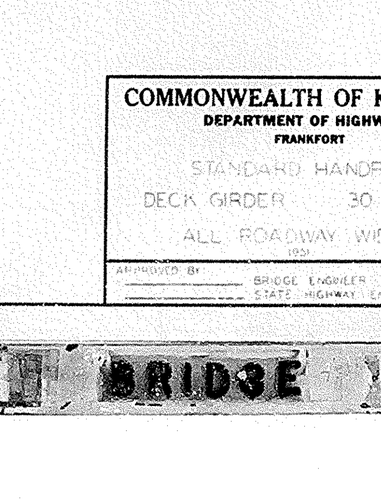
When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

30' R C D G SPAN			NUMBER						CONCRETE CLASS "B" CU YDS	REINFORCEMENT LBS
			Ta	Tb	Tc	Td	Te	Tf		
STRAIGHT	SINGLE	TWO RAILS	24	36	66	—	—	24	1.6	534
	INTERMEDIATE	TWO RAILS	24	36	66	—	—	24	1.6	534
	END	TWO RAILS	24	36	66	—	—	24	1.6	534
30° SKEW	SINGLE	TWO RAILS	32	48	72	32	—	—	1.8	612
	INTERMEDIATE	TWO RAILS	24	36	66	—	—	24	1.6	534
	END	LONG RAIL	16	24	36	16	—	—	0.9	306
	END	SHORT RAIL	12	18	33	—	—	12	0.8	267
45° SKEW	SINGLE	TWO RAILS	32	48	72	—	32	—	1.8	620
	INTERMEDIATE	TWO RAILS	24	36	66	—	—	24	1.6	534
	END	LONG RAIL	16	24	36	—	16	—	0.9	310
	END	SHORT RAIL	12	18	33	—	—	12	0.8	267

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO	SIZE	LENGTH FT.	LENGTH IN.	LOCATION
Ta	①	Same as Tb	1" ℄	6	7	Curb into Posts
Tb	②		1" ℄	2	6	Posts Ⓐ, Ⓑ, and Ⓒ
Tc	③		⅞" ℄	2	9	Rail
Td	Stir.		⅝" ℄	3	2	
Te	"		"	3	5	
Tf	"		"	10	8	



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current specifications with Amendments.

CONCRETE: Class "B" concrete to be used in handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A305 - current specifications.

BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

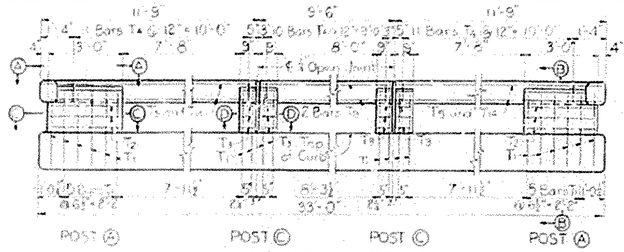
STANDARD HANDRAIL
DECK GIRDER 30 FT. SPAN
ALL ROADWAY WIDTHS
1951

APPROVED BY: _____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

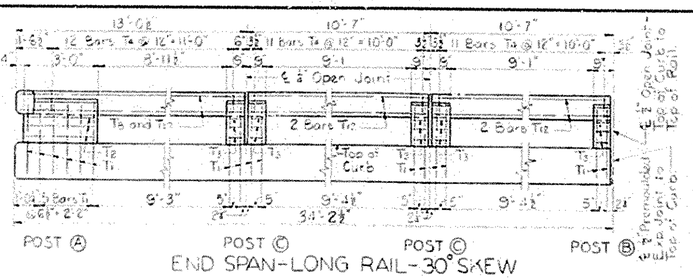
DRAWING NO. H82

REVISED BY ____ CHECKED BY ____ DATE ____
DETAILED BY ____ CHECKED BY ____ DATE ____
TRACED BY ____ CHECKED BY ____ DATE ____
REVISED
REVISED
REVISED

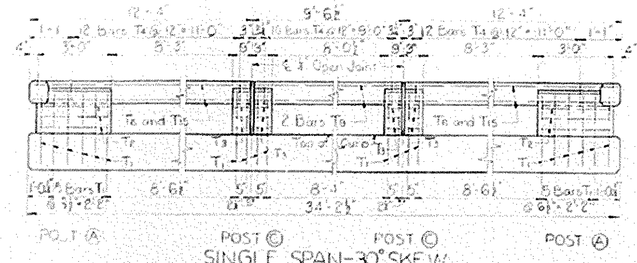
BRIDGE



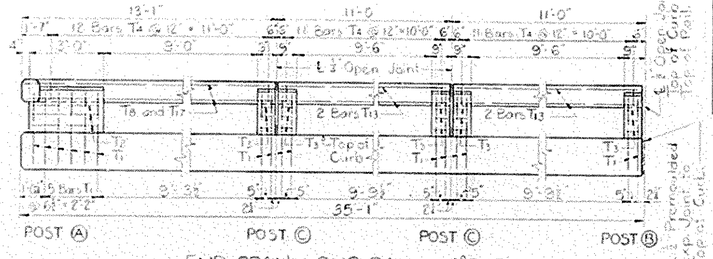
SINGLE SPAN-STRAIGHT



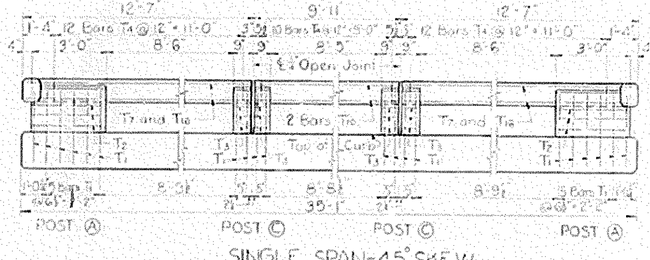
END SPAN-LONG RAIL-30° SKEW



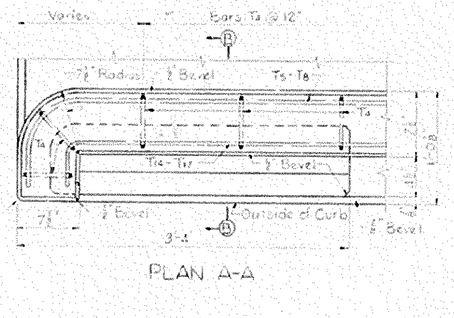
SINGLE SPAN-30° SKEW



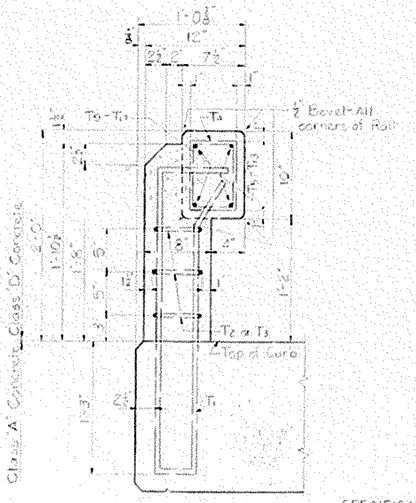
END SPAN-LONG RAIL-45° SKEW



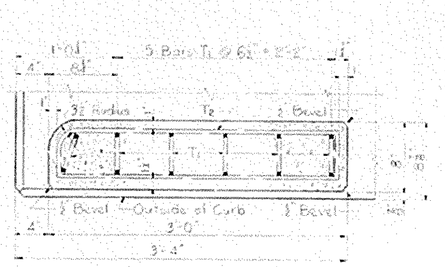
SINGLE SPAN-45° SKEW



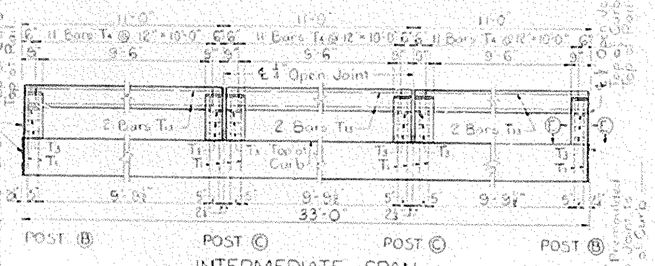
PLAN A-A



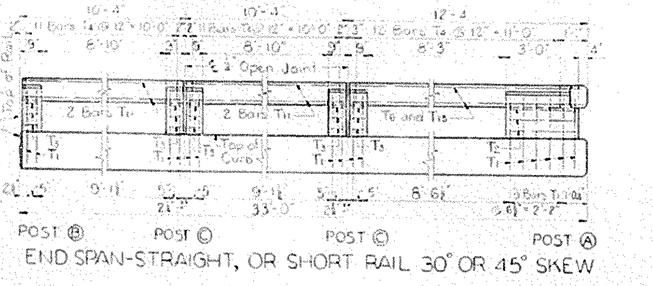
SECTION B-B
(POSTS Ⓐ, Ⓑ, AND Ⓒ)



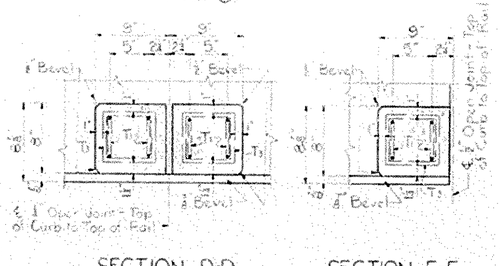
SECTION C-C
(POST Ⓐ)



INTERMEDIATE SPAN

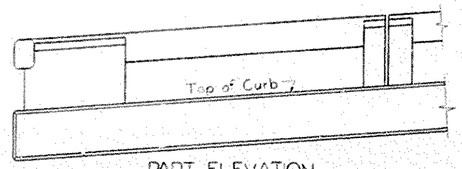


END SPAN-STRAIGHT, OR SHORT RAIL 30° OR 45° SKEW



SECTION D-D
(POST Ⓒ)

SECTION E-E
(POST Ⓑ)



PART ELEVATION

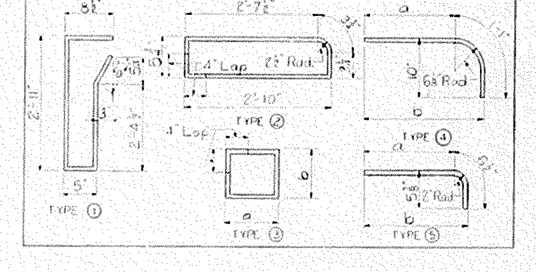
When bridge is on a plus or minus grade, the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

30' R.C.D.G. SPAN			NUMBER															CONCRETE CLASS 'D' CU. YDS.	REINFORCEMENT LBS.
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}	T_{17}		
STRAIGHT	SINGLE	TWO RAILS	40	12	24	72	8	–	–	–	8	–	–	–	–	8	–	–	–	2.0	676
	INTERMEDIATE	TWO RAILS	24	–	36	66	–	–	–	–	–	–	–	–	24	–	–	–	–	1.6	534
	END	TWO RAILS	32	6	30	72	–	4	–	–	–	–	16	–	–	–	4	–	–	1.8	608
30° SKEW	SINGLE	TWO RAILS	40	12	24	76	–	8	–	–	8	–	–	–	–	–	8	–	–	2.0	690
	INTERMEDIATE	TWO RAILS	24	–	36	66	–	–	–	–	–	–	–	–	24	–	–	–	–	1.6	534
	END	LONG RAIL	16	3	15	36	–	–	–	2	–	–	–	8	–	–	–	–	2	0.9	309
	END	SHORT RAIL	16	3	15	36	–	2	–	–	–	–	8	–	–	–	2	–	–	0.9	304
45° SKEW	SINGLE	TWO RAILS	40	12	24	76	–	–	8	–	–	8	–	–	–	–	–	8	–	2.0	697
	INTERMEDIATE	TWO RAILS	24	–	36	66	–	–	–	–	–	–	–	–	24	–	–	–	–	1.6	534
	END	LONG RAIL	16	3	15	36	–	–	–	2	–	–	–	8	–	–	–	–	2	0.9	312
	END	SHORT RAIL	16	3	15	36	–	2	–	–	–	–	8	–	–	–	2	–	–	0.9	304

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	No.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①		5/8" ϕ	6	7	Curb into Posts	–	–	–	–
T_2	②		5/8" ϕ	7	0	Post Ⓐ	–	–	–	–
T_3	③		"	2	6	Posts Ⓑ and Ⓒ	0	6 5/8	0	5 1/8
T_4	"		"	2	9	Rail	0	8	0	5 1/2
T_5	④		3/4" ϕ	12	0	"	10	11	11	5 1/8
T_6	"		"	12	7	"	11	6	12	0 1/8
T_7	"		"	12	10	"	11	9	12	3 1/8
T_8	"		"	13	4	"	12	3	12	9 1/8
T_9	Str.		"	9	2	"	–	–	–	–
T_{10}	"		"	9	7	"	–	–	–	–
T_{11}	"		"	10	0	"	–	–	–	–
T_{12}	"		"	10	3	"	–	–	–	–
T_{13}	"		"	10	8	"	–	–	–	–
T_{14}	⑤		"	11	6	"	10	11	11	1
T_{15}	"		"	12	1	"	11	6	11	6 1/2
T_{16}	"		"	12	4	"	11	9	11	11
T_{17}	"		"	12	9	"	12	2 1/2	12	4 1/2



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways' current Specifications with Amendments.

CONCRETE: Class 'D' concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A305-current specifications.

BEVELED EDGES: All exposed edges to be beveled 3/4" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD HANDRAIL

DECK GIRDER 30 FT. SPAN

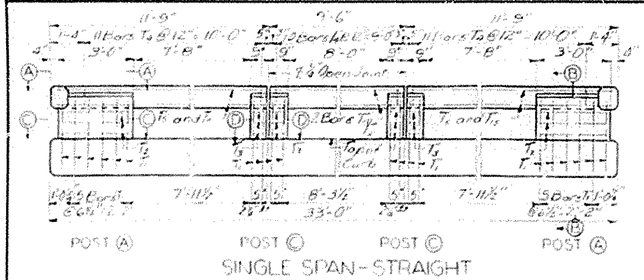
ALL ROADWAY WIDTHS

PSI

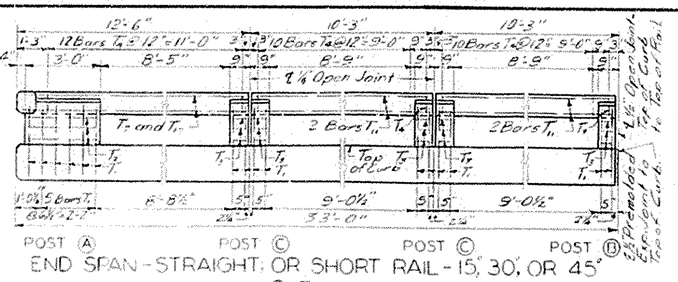
APPROVED BY: _____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

DRAWING NO. H72

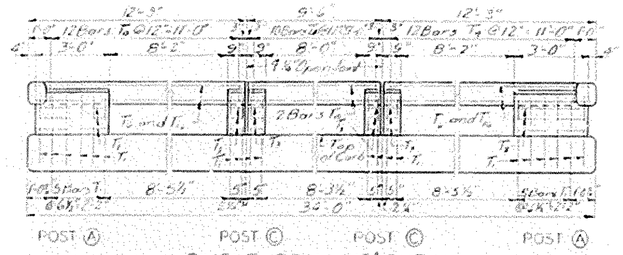
BRIDGE



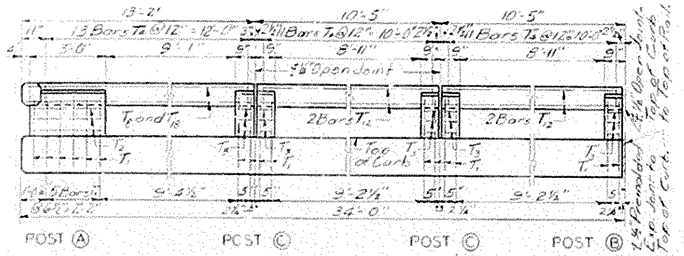
SINGLE SPAN - STRAIGHT



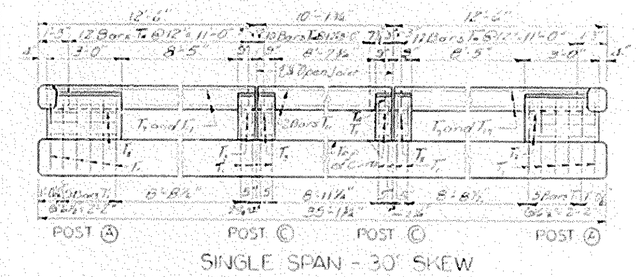
END SPAN - STRAIGHT OR SHORT RAIL - 15°, 30°, OR 45° SKEW



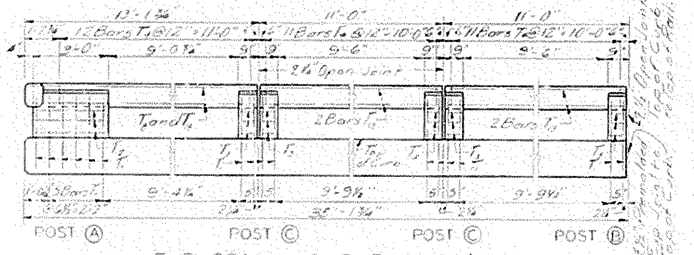
SINGLE SPAN - 15° SKEW



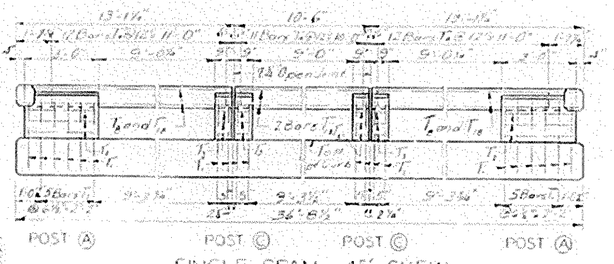
END SPAN - LONG RAIL - 15° SKEW



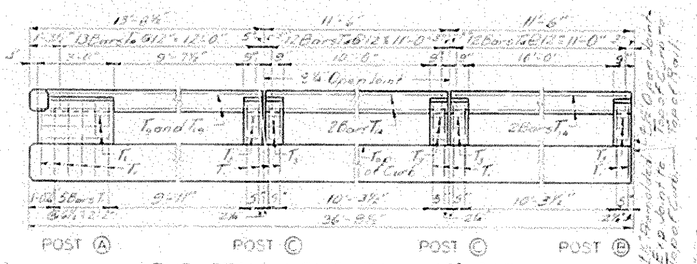
SINGLE SPAN - 30° SKEW



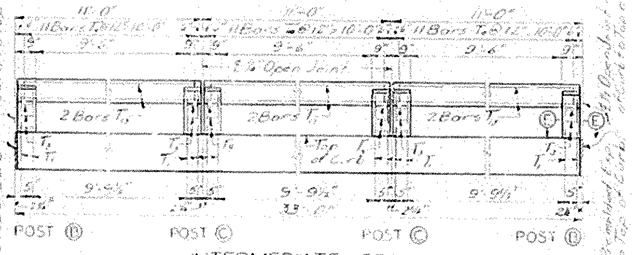
END SPAN - LONG RAIL - 30° SKEW



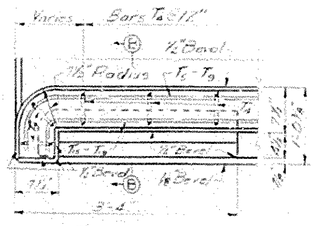
SINGLE SPAN - 45° SKEW



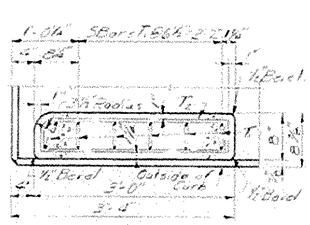
END SPAN - LONG RAIL - 45° SKEW



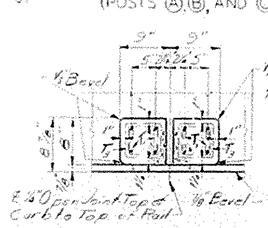
INTERMEDIATE SPAN



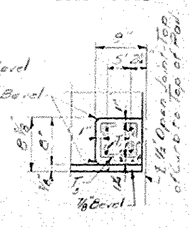
PLAN A-A



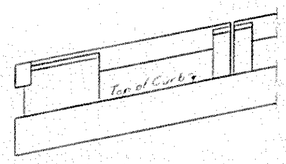
SECTION C-C (POST Ⓐ)



SECTION D-D (POST Ⓒ)

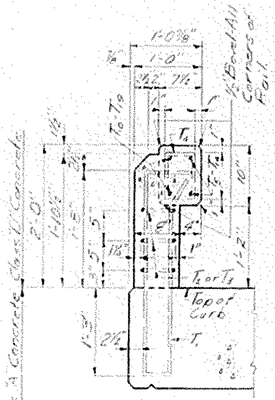


SECTION E-E (POST Ⓑ)



PART ELEVATION

When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.



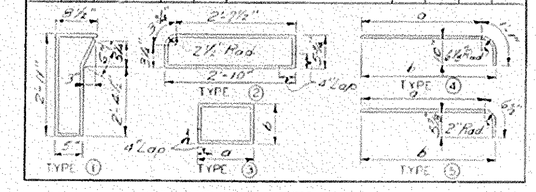
SECTION B-B (POSTS Ⓐ, Ⓑ, AND Ⓒ)

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

30' R.C.D.G. SPAN			NUMBER T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}	T_{17}	T_{18}	T_{19}	CONCRETE CLASS 'D' CU. YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	40	12	24	72	8	—	—	—	—	8	—	—	—	—	8	—	—	—	—	2.0	676
	INTERMEDIATE	TWO RAILS	24	—	36	66	—	—	—	—	—	—	—	—	24	—	—	—	—	—	—	1.6	534
	END	TWO RAILS	32	6	30	72	—	—	4	—	—	—	14	—	—	—	—	4	—	—	—	1.8	607
15° SKEW	SINGLE	TWO RAILS	40	12	24	76	—	8	—	—	—	8	—	—	—	—	8	—	—	—	—	2.0	688
	INTERMEDIATE	TWO RAILS	24	—	36	66	—	—	—	—	—	—	—	—	24	—	—	—	—	—	—	1.6	534
	END	LONG RAIL	16	3	15	37	—	—	2	—	—	—	8	—	—	—	—	—	2	—	—	1.8	612
	END	SHORT RAIL	16	3	15	36	—	—	2	—	—	—	8	—	—	—	—	2	—	—	—		
30° SKEW	SINGLE	TWO RAILS	40	12	24	78	—	—	8	—	—	—	8	—	—	—	—	—	8	—	—	2.0	700
	INTERMEDIATE	TWO RAILS	24	—	36	66	—	—	—	—	—	—	—	—	24	—	—	—	—	—	—	1.6	534
	END	LONG RAIL	16	3	15	36	—	—	2	—	—	—	8	—	—	—	—	—	2	—	—	1.8	616
	END	SHORT RAIL	16	3	15	36	—	—	2	—	—	—	8	—	—	—	—	2	—	—	—		
45° SKEW	SINGLE	TWO RAILS	40	12	24	78	—	—	—	8	—	—	—	8	—	—	—	—	—	8	—	2.1	713
	INTERMEDIATE	TWO RAILS	24	—	36	66	—	—	—	—	—	—	—	—	24	—	—	—	—	—	—	1.6	534
	END	LONG RAIL	16	3	15	39	—	—	—	2	—	—	—	—	—	8	—	—	—	2	—	1.9	626
	END	SHORT RAIL	16	3	15	36	—	—	2	—	—	—	8	—	—	—	—	2	—	—	—		

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	See Table above	#5	6	7	Curb into Posts	—	—	—	—
T_2	②		#3	7	0	Post Ⓐ	—	—	—	—
T_3	③		"	2	6	Posts Ⓑ and Ⓒ	0	6⅜	0	5⅛
T_4	"		"	2	9	Rail	0	8	0	5½
T_5	④		#5	12	0	"	10	11	11	5⅛
T_6	"		"	12	6	"	11	5	11	11⅛
T_7	"		"	12	9	"	11	8	12	2⅛
T_8	"		"	13	5	"	12	2	12	10⅛
T_9	"		"	14	0	"	12	11	13	5⅛
T_{10}	Str.		"	9	2	"	—	—	—	—
T_{11}	"		"	9	10	"	—	—	—	—
T_{12}	"		"	10	1	"	—	—	—	—
T_{13}	"		"	10	8	"	—	—	—	—
T_{14}	"		"	11	2	"	—	—	—	—
T_{15}	⑤		"	11	6	"	10	11½	11	1½
T_{16}	"		"	12	0	"	11	5½	11	7½
T_{17}	"		"	12	3	"	11	6½	11	10½
T_{18}	"		"	12	10	"	12	3½	12	5½
T_{19}	"		"	13	5	"	12	10½	13	0½



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class "D" concrete to be used in handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.

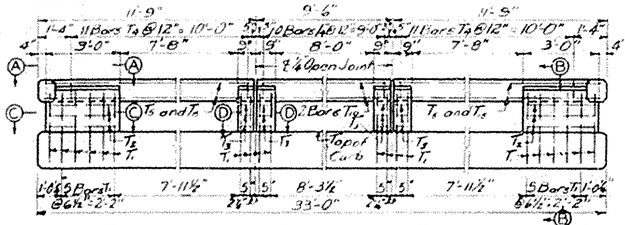
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD OPEN TYPE HANDRAIL FOR 30 FT. SPAN R.C.D.G. ALL ROADWAY WIDTHS WITH 2'-6" CURB

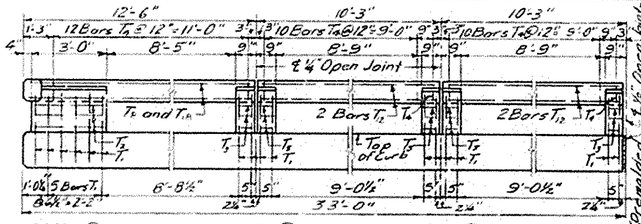
DRAWING NO. H-132 | INDEX

DATE | REVISED BY | CHECKED BY

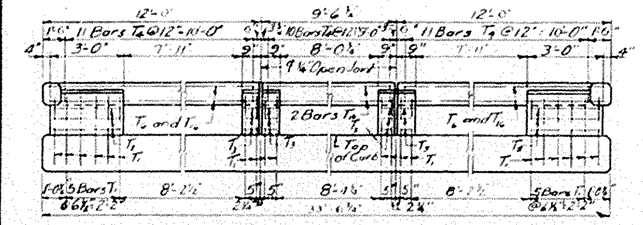
BRIDGE



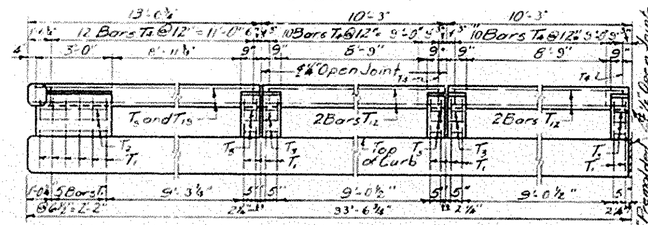
SINGLE SPAN - STRAIGHT



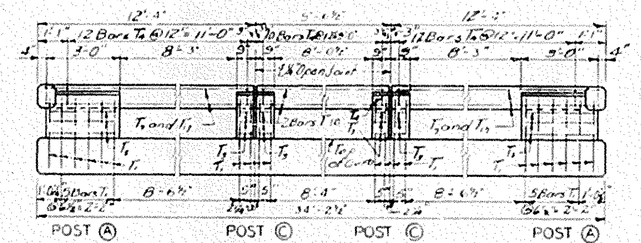
END SPAN - STRAIGHT; OR SHORT RAIL - 15°, 30°, OR 45° SKEW



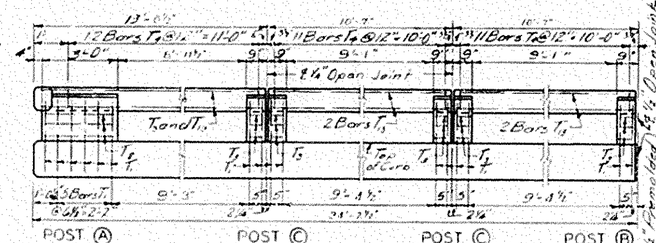
SINGLE SPAN - 15° SKEW



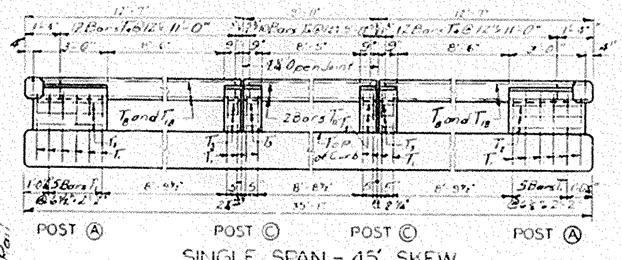
END SPAN - LONG RAIL - 15° SKEW



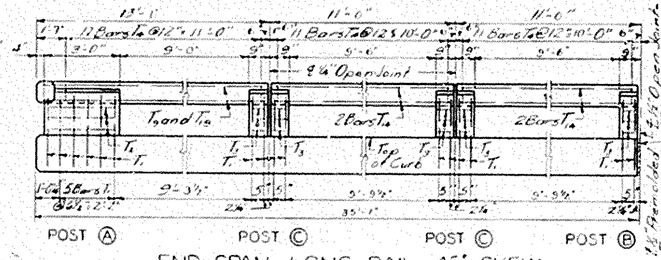
SINGLE SPAN - 30° SKEW



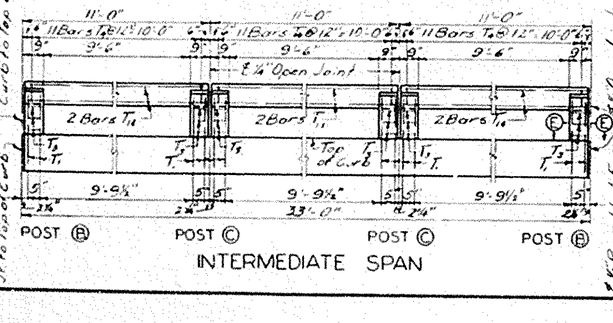
END SPAN - LONG RAIL - 30° SKEW



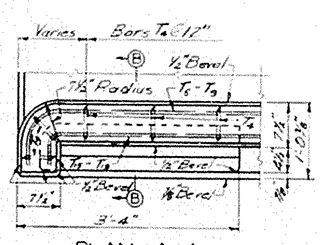
SINGLE SPAN - 45° SKEW



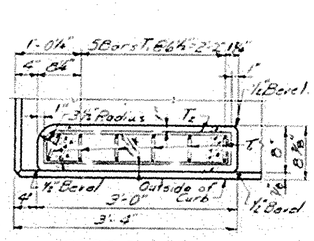
END SPAN - LONG RAIL - 45° SKEW



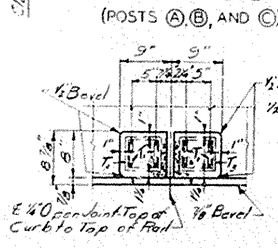
INTERMEDIATE SPAN



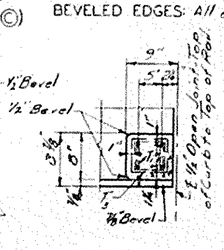
PLAN A-A



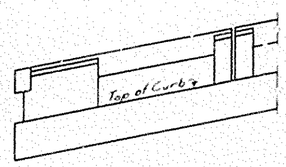
SECTION C-C (POST Ⓐ)



SECTION D-D (POST Ⓒ)

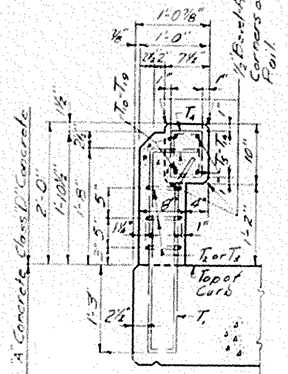


SECTION E-E (POST Ⓑ)



PART ELEVATION

When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.



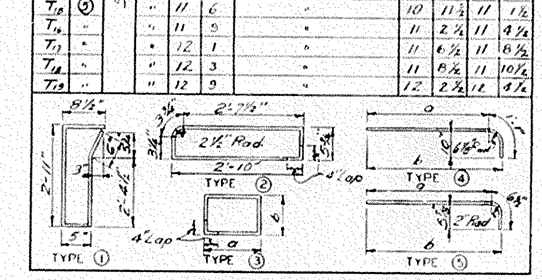
SECTION B-B (POSTS Ⓐ, Ⓑ, AND Ⓒ)

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

30' R C D G SPAN			NUMBER																CONCRETE CLASS 'D' CU. YDS.	REINFORCEMENT LBS.
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}	T_{17}	T_{18}	T_{19}	
STRAIGHT	SINGLE	TWO RAILS	40	12	24	72	8	—	—	—	—	8	—	—	—	—	8	—	—	—	—	2.0	676
	INTERMEDIATE	TWO RAILS	24	—	36	66	—	—	—	—	—	—	—	—	—	24	—	—	—	—	—	1.6	534
	END	TWO RAILS	32	6	30	72	—	—	—	4	—	—	—	16	—	—	—	—	—	4	—	1.8	608
15° SKEW	SINGLE	TWO RAILS	40	12	24	72	—	8	—	—	—	8	—	—	—	—	—	8	—	—	—	2.0	680
	INTERMEDIATE	TWO RAILS	24	—	36	66	—	—	—	—	—	—	—	—	—	24	—	—	—	—	—	1.6	534
	END	LONG RAIL	16	3	15	36	—	—	—	—	2	—	—	8	—	—	—	—	—	—	2	1.8	610
	END	SHORT RAIL	16	3	15	36	—	—	—	2	—	—	—	8	—	—	—	—	—	2	—		
30° SKEW	SINGLE	TWO RAILS	40	12	24	76	—	—	8	—	—	8	—	—	—	—	—	—	8	—	—	2.0	650
	INTERMEDIATE	TWO RAILS	24	—	36	66	—	—	—	—	—	—	—	—	—	24	—	—	—	—	—	1.6	534
	END	LONG RAIL	16	3	15	36	—	—	—	—	2	—	—	8	—	—	—	—	—	—	2	1.8	613
	END	SHORT RAIL	16	3	15	36	—	—	—	2	—	—	—	8	—	—	—	—	—	2	—		
45° SKEW	SINGLE	TWO RAILS	40	12	24	76	—	—	—	8	—	—	—	8	—	—	—	—	—	—	8	2.1	696
	INTERMEDIATE	TWO RAILS	24	—	36	66	—	—	—	—	—	—	—	—	—	24	—	—	—	—	—	1.6	534
	END	LONG RAIL	16	3	15	36	—	—	—	—	2	—	—	—	—	8	—	—	—	—	2	1.9	617
	END	SHORT RAIL	16	3	15	36	—	—	—	2	—	—	—	8	—	—	—	—	—	2	—		

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	See Table above	#5	6	7	Curb into Posts	—	—	—	—
T_2	②		#3	7	0	Post Ⓐ	—	—	—	—
T_3	③		"	2	6	Posts Ⓑ and Ⓒ	0	6½	0	5¼
T_4	"		"	2	9	Rail	0	8	0	5½
T_5	④		#5	12	0	"	10	11	11	5⅛
T_6	"		"	12	3	"	11	2	11	8¼
T_7	"		"	12	7	"	11	6	12	0⅛
T_8	"		"	12	9	"	11	8	12	2⅛
T_9	"		"	13	3	"	12	2	12	8⅛
T_{10}	Str.		"	9	2	"	—	—	—	—
T_{11}	"		"	9	7	"	—	—	—	—
T_{12}	"		"	9	11	"	—	—	—	—
T_{13}	"		"	10	3	"	—	—	—	—
T_{14}	"		"	10	8	"	—	—	—	—
T_{15}	⑤		"	11	6	"	10	11½	11	1½
T_{16}	"		"	11	9	"	11	2¼	11	4¼
T_{17}	"		"	12	1	"	11	6½	11	8½
T_{18}	"		"	12	3	"	11	8¾	11	10¼
T_{19}	"		"	12	9	"	12	2¾	12	4¼



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class 'D' concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.

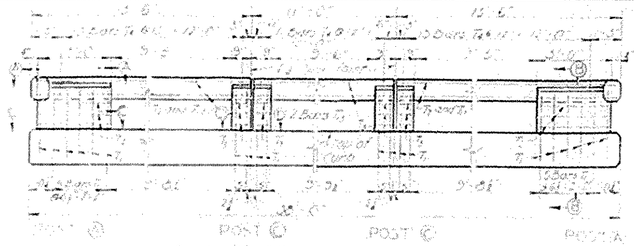
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD OPEN TYPE HANDRAIL FOR 30 FT. SPAN R.C.D.G. ALL ROADWAY WIDTHS WITH 2'-1" GUTTER LINE TO FASCIA

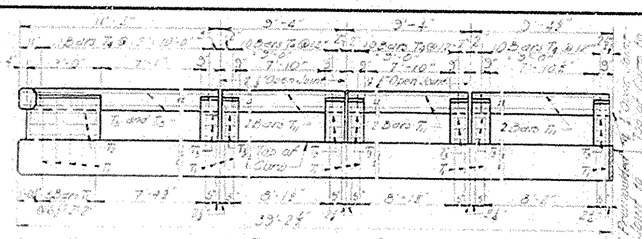
DRAWING NO. H-142

INDEX

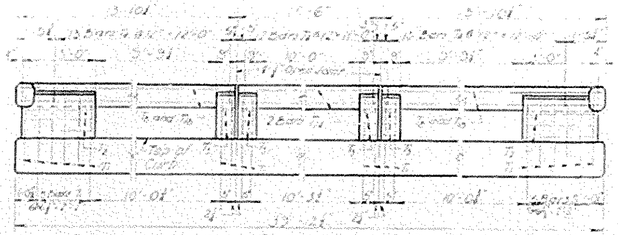
BRIDGE



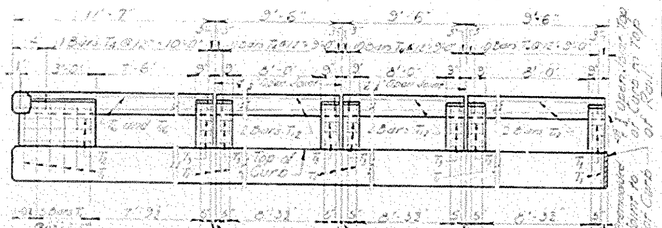
SINGLE SPAN – STRAIGHT



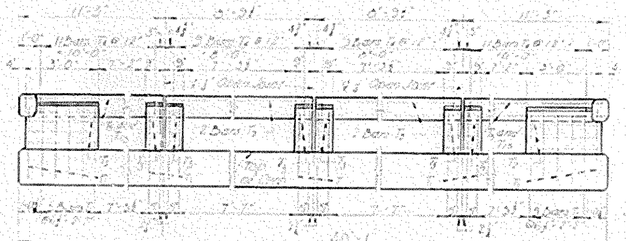
END SPAN-LONG RAIL-30° SKEW



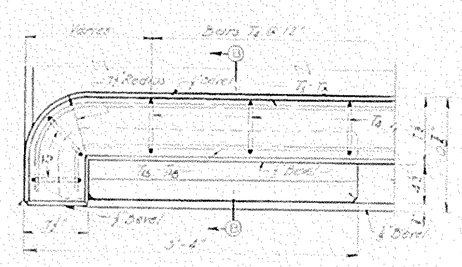
SINGLE SPAN – 30° SKEW



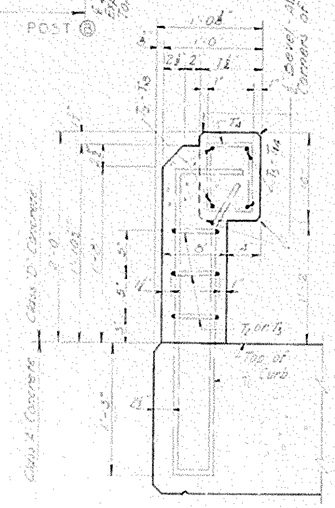
END SPAN-LONG RAIL-45° SKEW



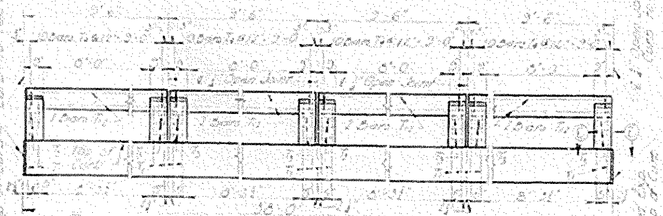
SINGLE SPAN – 45° SKEW



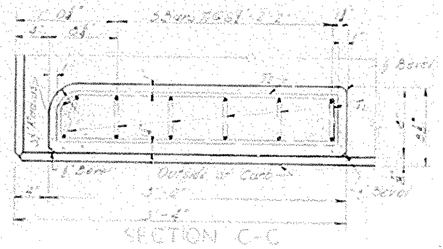
PLAN A-B



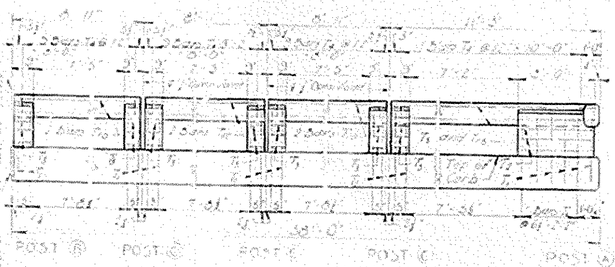
SECTION B-B
(POSTS A, B, AND C)



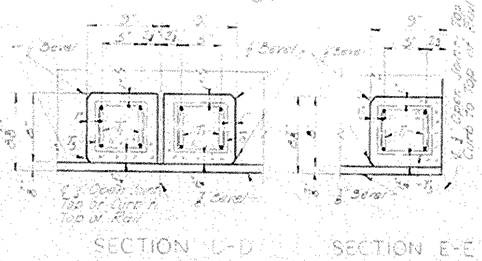
INTERMEDIATE SPAN



SECTION C-C
(POST A)

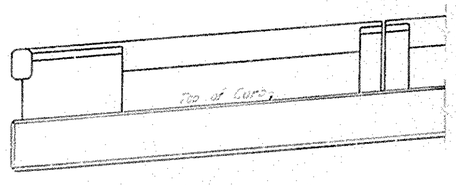


END SPAN – STRAIGHT OR SHORT RAIL 30° OR 45° SKEW



SECTION D-D
(POST C)

SECTION E-E
(POST B)



PART ELEVATION

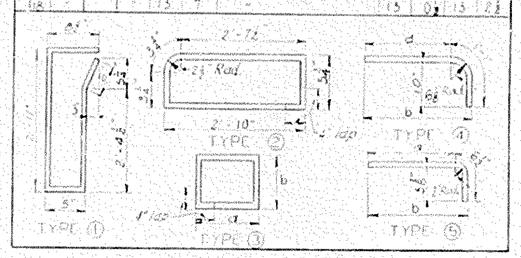
When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

35' R.C.O.G. SPAN		NUMBER															CONCRETE CLASS "D" CU. YDS.	REINFORCEMENT LBS.
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}	T_{17}	T_{18}	
STRAIGHT	SINGLE TWO RAILS	40	12	24	84	–	–	8	–	–	–	–	–	8	–	–	–	8	–	2.2	728
	INTERMEDIATE TWO RAILS	32	–	48	80	–	–	–	–	–	–	–	32	–	–	–	–	–	–	1.9	654
	END TWO RAILS	40	6	42	80	4	–	–	–	–	24	–	–	–	4	–	–	–	–	2.1	721
30° SKEW	SINGLE TWO RAILS	40	12	24	84	–	–	–	8	–	–	–	–	–	8	–	–	–	8	2.2	740
	INTERMEDIATE TWO RAILS	32	–	48	80	–	–	–	–	–	–	–	32	–	–	–	–	–	–	1.9	654
	END LONG RAIL	20	3	21	43	2	–	–	–	–	12	–	–	–	2	–	–	–	–	1.1	369
	END SHORT RAIL	20	3	21	40	2	–	–	–	12	–	–	–	–	2	–	–	–	–	1.0	360
45° SKEW	SINGLE TWO RAILS	48	12	36	88	8	–	–	–	16	–	–	–	–	8	–	–	–	–	2.4	813
	INTERMEDIATE TWO RAILS	32	–	48	80	–	–	–	–	–	–	–	32	–	–	–	–	–	–	1.9	654
	END LONG RAIL	20	3	21	43	–	2	–	–	–	–	–	12	–	–	2	–	–	–	1.1	372
	END SHORT RAIL	20	3	21	40	2	–	–	–	–	12	–	–	–	2	–	–	–	–	1.0	360

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT	LENGTH IN	LOCATION	a FT	a IN	b FT	b IN
T_1	①		⅝" ø	6	7	Curb into Posts	–	–	–	–
T_2	②		⅝" ø	7	0	Post (A)	–	–	–	–
T_3	③		–	2	6	Posts (B) and (C)	0	6½	0	5½
T_4			–	2	9	Rail	0	8	0	5½
T_5	④		⅝" ø	11	5	"	10	4	10	10½
T_6			–	11	10	"	10	9	11	3½
T_7			–	13	0	"	12	6	13	2½
T_8			–	14	2	"	13	1	13	7½
T_9	See		–	8	5	"	–	–	–	–
T_{10}			–	8	7	"	–	–	–	–
T_{11}			–	9	0	"	–	–	–	–
T_{12}			–	9	2	"	–	–	–	–
T_{13}			–	10	8	"	–	–	–	–
T_{14}			–	11	1	"	–	–	–	–
T_{15}	⑤		–	10	11	"	10	4½	10	6½
T_{16}			–	11	4	"	10	9½	10	11½
T_{17}			–	13	3	"	12	8½	12	10½
T_{18}			–	13	7	"	13	0½	13	2½



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class 'D' concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A 305-current specifications.

BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

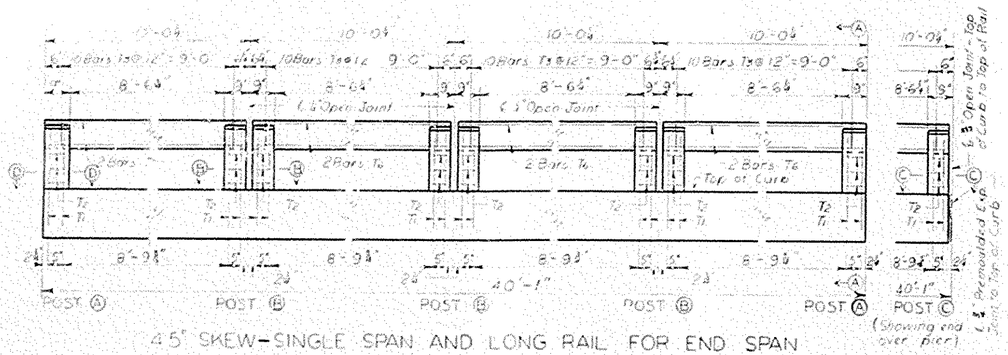
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD HANDRAIL
DECK GIRDER 35 FT. SPAN
ALL ROADWAY WIDTHS
1951

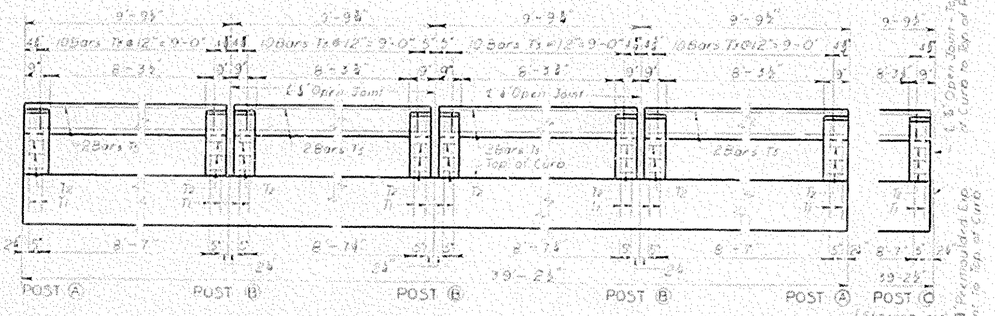
DESIGNED BY _____ DETAILED BY _____ TRACED BY _____ CHECKED BY _____ APPROVED BY _____ BRIDGE ENGINEER
STATE HIGHWAY ENGINEER

DRAWING NO. H-73

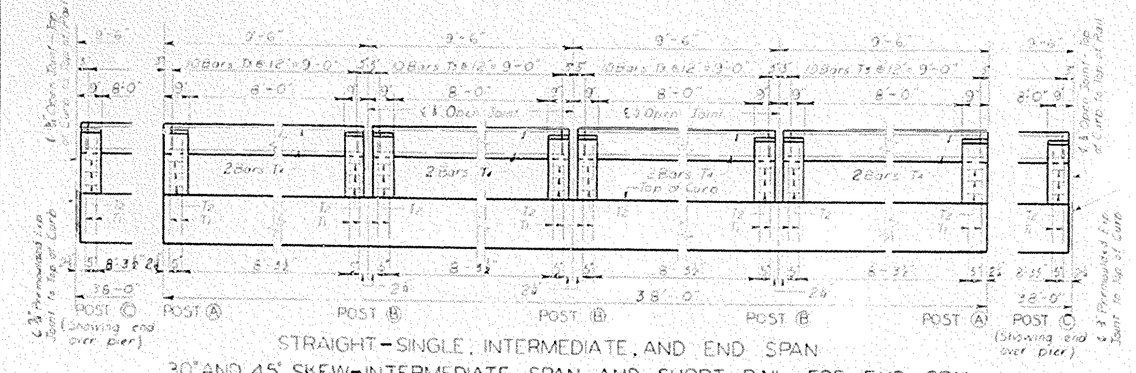
BRIDGE



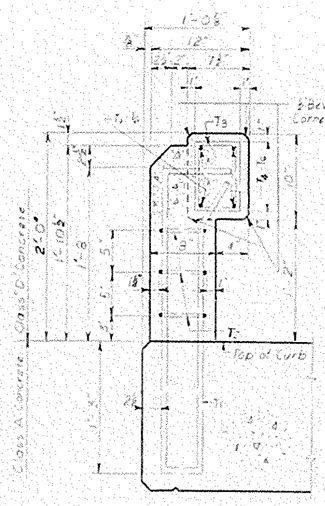
45° SKEW-SINGLE SPAN AND LONG RAIL FOR END SPAN



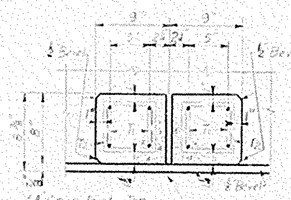
30° SKEW-SINGLE SPAN AND LONG RAIL FOR END SPAN



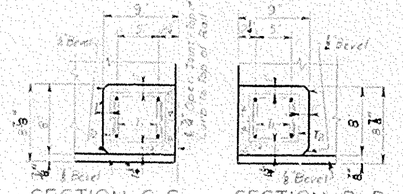
STRAIGHT-SINGLE, INTERMEDIATE, AND END SPAN
30° AND 45° SKEW-INTERMEDIATE SPAN AND SHORT RAIL FOR END SPAN



SECTION A-A
(POSTS (A) (B) and (C))

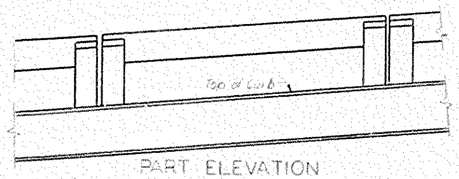


SECTION B-B
(POST (B))



SECTION C-C
(POST (C))

SECTION D-D
(POST (A))



PART ELEVATION

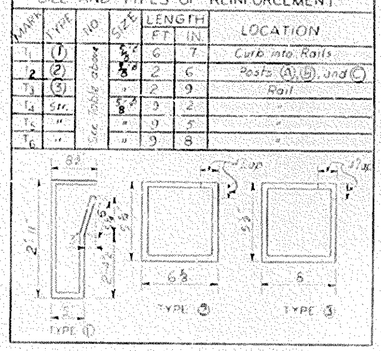
When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

35' R.C.D.G. SPAN			NUMBER T_1	T_2	T_3	T_4	T_5	T_6	CONCRETE CLASS 'D' CU YDS	REINFORCEMENT LBS
STRAIGHT	SINGLE	TWO RAILS	32	48	80	32	–	–	1.9	654
	INTERMEDIATE	TWO RAILS	32	48	80	32	–	–	1.9	654
	END	TWO RAILS	32	48	80	**32**	–	–	1.9	654
30°SKEW	SINGLE	TWO RAILS	32	48	80	–	32	–	2.0	662
	INTERMEDIATE	TWO RAILS	32	48	80	32	–	–	1.9	654
	END	LONG RAIL	16	24	40	–	**16**	–	1.0	331
	END	SHORT RAIL	16	24	40	16	–	–	1.0	327
45°SKEW	SINGLE	TWO RAILS	32	48	80	–	–	32	2.0	670
	INTERMEDIATE	TWO RAILS	32	48	80	32	–	–	1.9	654
	END	LONG RAIL	16	24	40	–	–	**16**	1.0	335
	END	SHORT RAIL	16	24	40	16	–	–	1.0	327

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT	LENGTH IN	LOCATION
T1	(1)	See table above	⅝" ø	6	7	Curb into Rails
T2	(2)		⅝" ø	2	6	Posts (A), (B), and (C)
T3	(3)		⅝" ø	9		Rail
T4	Str.		⅝" ø	3	2	"
T5	"		"	9	5	"
T6	"		"	9	8	"



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class "D" concrete to be used in handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances, except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A 305-current specifications.

BEVELED EDGES: All exposed edges to be beveled ¾ unless otherwise noted.

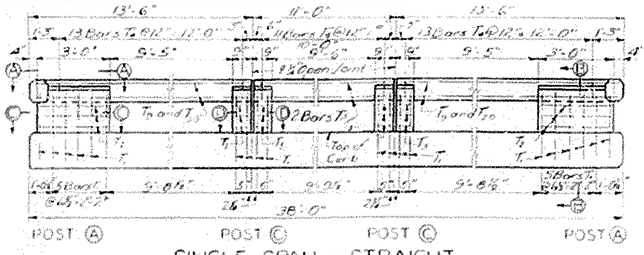
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD HANDRAIL
DECK GIRDER 35 FT. SPAN
ALL ROADWAY WIDTHS
1951

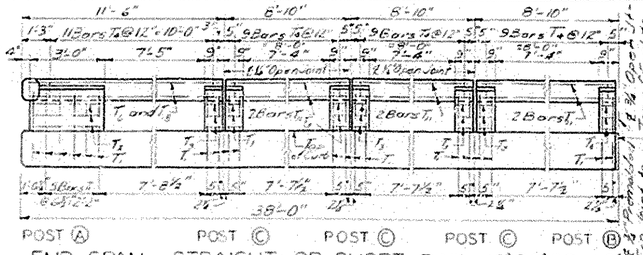
APPROVED BY: _____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

DRAWING NO. H-83

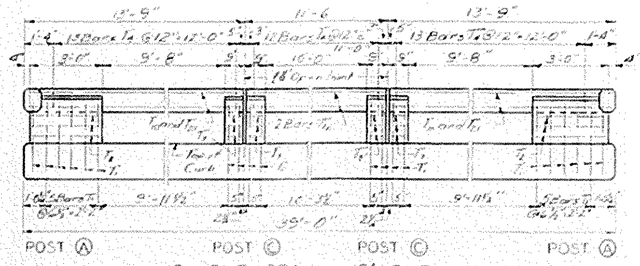
BRIDGE



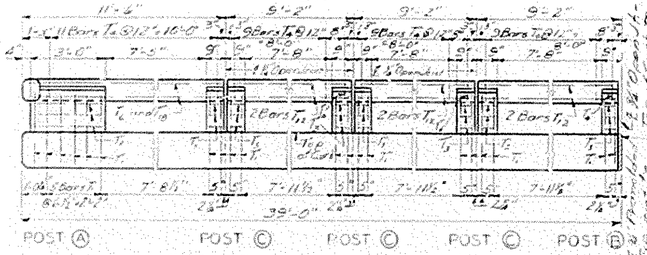
SINGLE SPAN - STRAIGHT



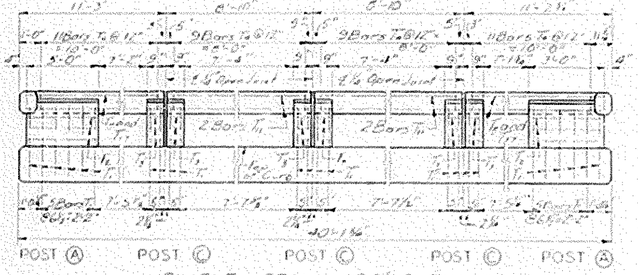
END SPAN - STRAIGHT; OR SHORT RAIL - 15°, 30°, OR 45° SKEW



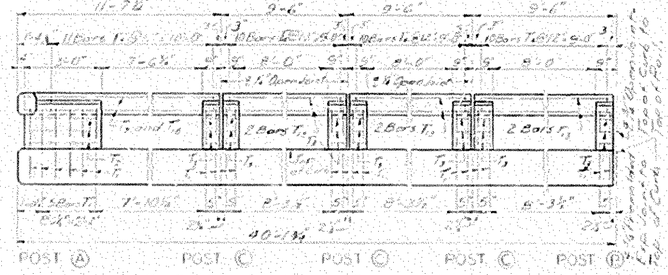
SINGLE SPAN - 15° SKEW



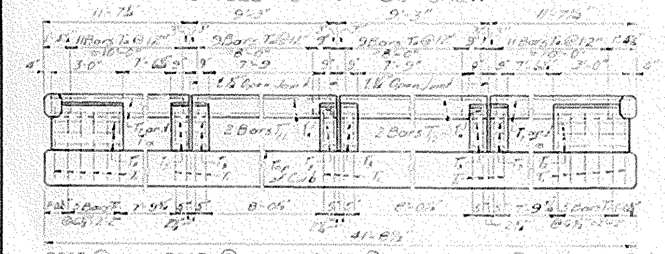
END SPAN - LONG RAIL - 15° SKEW



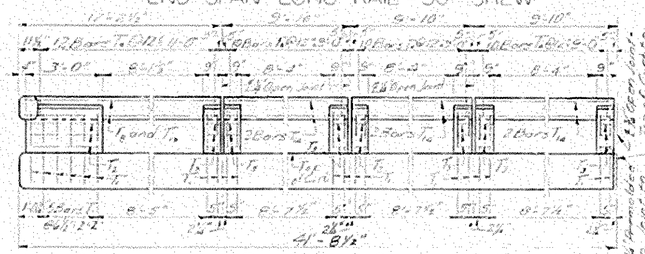
SINGLE SPAN - 30° SKEW



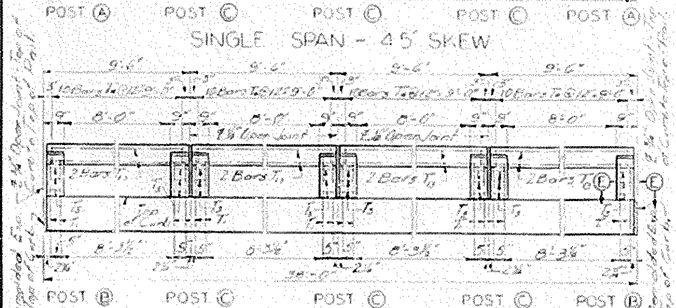
END SPAN - LONG RAIL - 30° SKEW



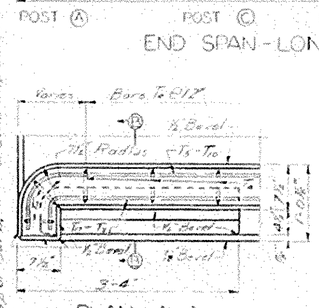
SINGLE SPAN - 45° SKEW



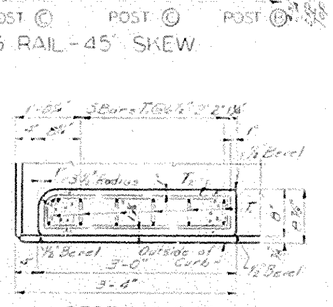
END SPAN - LONG RAIL - 45° SKEW



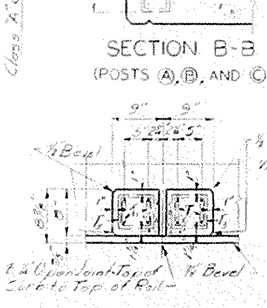
INTERMEDIATE SPAN



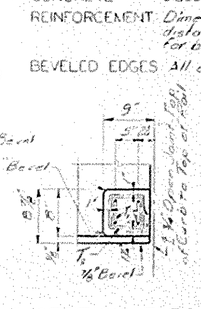
PLAN A-A



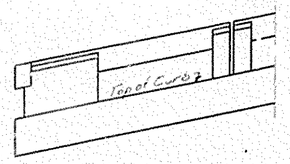
SECTION C-C (POST Ⓑ)



SECTION D-D (POST Ⓒ)

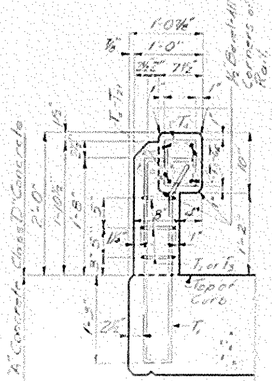


SECTION E-E (POST Ⓑ)



PART ELEVATION

When bridge is on a plus or minus grade the top of all pads and rail shall be parallel to the grade line. Sides of all posts shall be vertical.



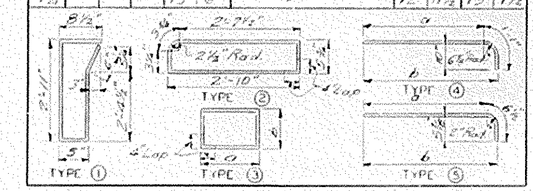
SECTION B-B (POSTS Ⓐ, Ⓑ, AND Ⓒ)

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

35' R.C.D.G. SPAN			NUMBER																				CONCRETE CLASS 'D' CU. YDS	REINFORCEMENT LBS
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}	T_{17}	T_{18}	T_{19}	T_{20}	T_{21}	
STRAIGHT	SINGLE	TWO RAILS	40	12	24	82	–	–	–	–	8	–	–	–	–	–	–	8	–	–	–	8	–	2.2	720
	INTERMEDIATE	TWO RAILS	32	–	48	80	–	–	–	–	–	–	–	–	32	–	–	–	–	–	–	–	–	1.9	654
	END	TWO RAILS	40	6	42	80	–	4	–	–	–	24	–	–	–	–	–	–	–	4	–	–	–	2.1	721
15° SKEW	SINGLE	TWO RAILS	40	12	24	84	–	–	–	–	8	–	–	–	–	–	–	8	–	–	–	–	8	2.2	738
	INTERMEDIATE	TWO RAILS	32	–	48	80	–	–	–	–	–	–	–	–	32	–	–	–	–	–	–	–	–	1.9	654
	END	LONG RAIL	20	3	21	43	–	2	–	–	–	–	–	12	–	–	–	–	2	–	–	–	–	2.1	729
	END	SHORT RAIL	20	3	21	40	–	2	–	–	–	12	–	–	–	–	–	–	2	–	–	–	–		
30° SKEW	SINGLE	TWO RAILS	48	12	36	88	8	–	–	–	–	16	–	–	–	–	–	8	–	–	–	–	–	2.4	816
	INTERMEDIATE	TWO RAILS	32	–	48	80	–	–	–	–	–	–	–	–	32	–	–	–	–	–	–	–	–	1.9	654
	END	LONG RAIL	20	3	21	43	–	–	2	–	–	–	–	–	12	–	–	–	–	2	–	–	–	2.1	733
	END	SHORT RAIL	20	3	21	40	–	2	–	–	–	–	12	–	–	–	–	–	–	2	–	–	–		
45° SKEW	SINGLE	TWO RAILS	48	12	36	92	–	–	8	–	–	–	–	16	–	–	–	–	8	–	–	–	–	2.4	831
	INTERMEDIATE	TWO RAILS	32	–	48	80	–	–	–	–	–	–	–	–	32	–	–	–	–	–	–	–	–	1.9	654
	END	LONG RAIL	20	3	21	44	–	–	–	2	–	–	–	–	–	12	–	–	–	–	2	–	–	2.2	741
	END	SHORT RAIL	20	3	21	40	–	2	–	–	–	12	–	–	–	–	–	–	–	2	–	–	–		

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	See Table above	#5	6	7	Curb into Posts	—	—	—	—
T_2	②		#3	7	0	Post Ⓐ	—	—	—	—
T_3	③		"	2	6	Posts Ⓑ and Ⓒ	0	5½	0	5½
T_4	"		"	2	9	Rail	0	8	0	5½
T_5	④		#5	11	6	"	10	5	10	11½
T_6	"		"	11	9	"	10	8	11	2½
T_7	"		"	11	11	"	10	10	11	4½
T_8	"		"	12	6	"	11	6	11	11½
T_9	"		"	13	9	"	12	8	13	2½
T_{10}	"		"	14	0	"	12	11	13	5½
T_{11}	Str.		"	8	6	"	—	—	—	—
T_{12}	"		"	8	10	"	—	—	—	—
T_{13}	"		"	9	2	"	—	—	—	—
T_{14}	"		"	9	6	"	—	—	—	—
T_{15}	"		"	10	8	"	—	—	—	—
T_{16}	"		"	11	2	"	—	—	—	—
T_{17}	⑤		"	11	0	"	10	5½	10	7½
T_{18}	"		"	11	3	"	10	8½	10	10½
T_{19}	"		"	11	11	"	11	4½	11	6½
T_{20}	"		"	13	3	"	12	8½	13	10½
T_{21}	"		"	13	6	"	12	11½	13	1½



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class "D" concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.

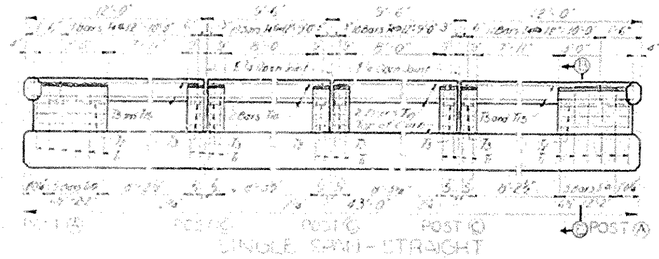
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD OPEN TYPE HANDRAIL FOR 35 FT. SPAN R.C.D.G. ALL ROADWAY WIDTHS WITH 2'-6" CURB

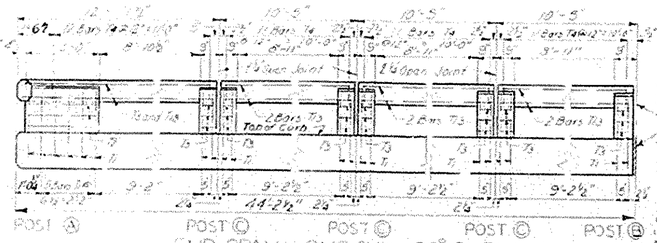
DRAWING NO. H-173

INDEX

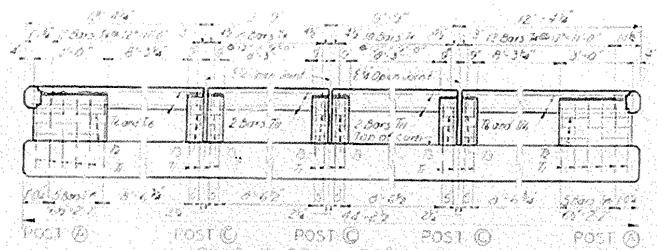
BRIDGE



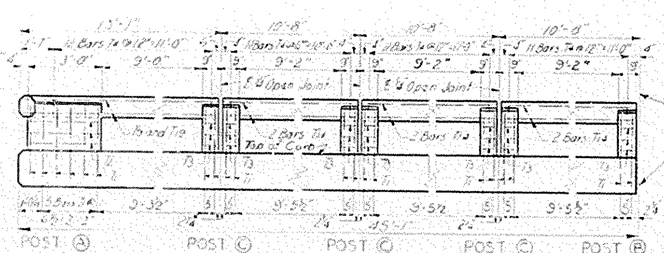
SINGLE SPAN - STRAIGHT



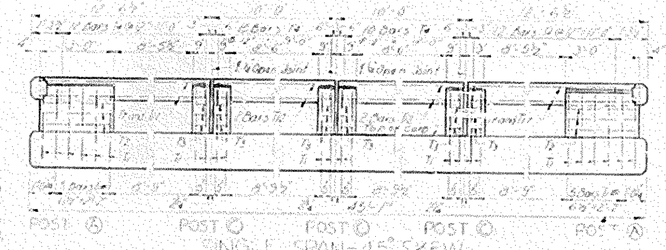
END SPAN - LONG RAIL - 30° SKEW



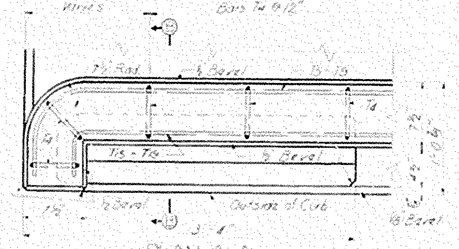
SINGLE SPAN - 30° SKEW



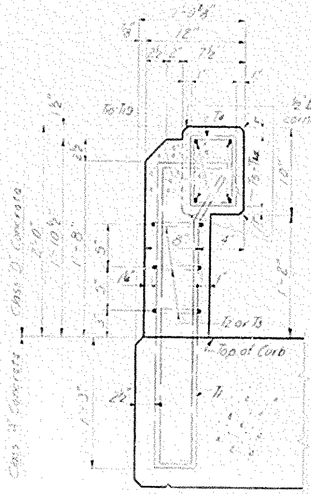
END SPAN - LONG RAIL - 45° SKEW



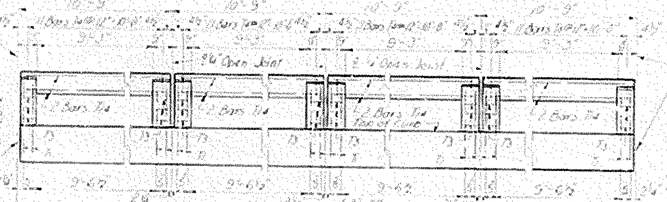
SINGLE SPAN - 45° SKEW



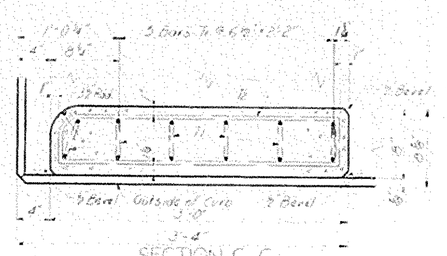
PLAN A-A



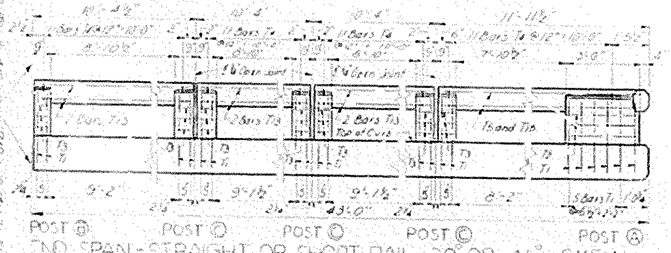
SECTION B-B
(POSTS Ⓐ, Ⓑ, AND Ⓒ)



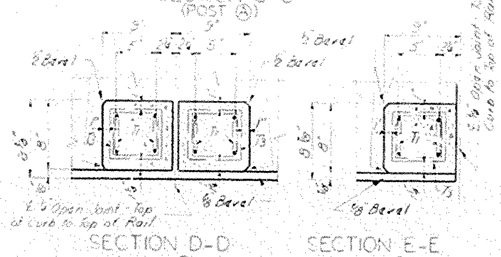
INTERMEDIATE SPAN



SECTION C-C
(POST Ⓐ)

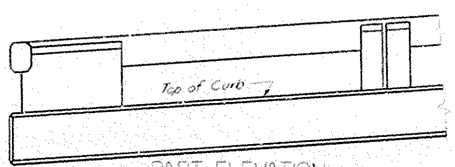


2ND SPAN - STRAIGHT OR SHORT RAIL 30° OR 45° SKEW



SECTION D-D
(POST Ⓒ)

SECTION E-E
(POST Ⓑ)



PART ELEVATION

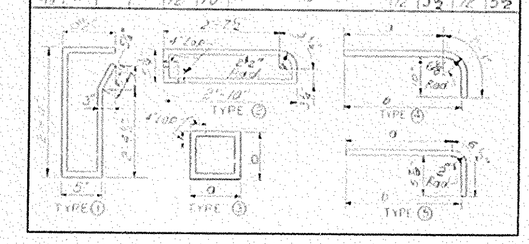
When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

40' R.C.D.G. SPAN		NUMBER																	CONCRETE CLASS 'D' CU. YDS.	REINFORCEMENT LBS.
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}	T_{17}	T_{18}	T_{19}		
STRAIGHT	SINGLE	TWO RAILS	48	12	36	32	19	—	—	—	—	16	—	—	—	—	8	—	—	—	2.5	843
	INTERMEDIATE	TWO RAILS	32	—	48	38	—	—	—	—	—	—	—	—	32	—	—	—	—	—	2.1	701
	END	TWO RAILS	40	6	42	22	4	—	—	—	—	—	—	24	—	4	—	—	—	—	2.3	775
30° SKEW	SINGLE	TWO RAILS	48	12	36	36	—	6	—	—	—	16	—	—	—	—	8	—	—	—	2.5	858
	INTERMEDIATE	TWO RAILS	32	—	48	80	—	—	—	—	—	—	—	—	32	—	—	—	—	—	2.1	701
	END	LONG RAIL	20	3	21	47	—	—	—	2	—	—	—	12	—	—	—	2	—	—	1.2	393
	END	SHORT RAIL	20	3	21	46	2	—	—	—	—	—	—	12	—	2	—	—	—	—	1.1	388
45° SKEW	SINGLE	TWO RAILS	48	12	36	36	—	—	8	—	—	—	16	—	—	—	8	—	—	—	2.5	865
	INTERMEDIATE	TWO RAILS	32	—	48	68	—	—	—	—	—	—	—	—	32	—	—	—	—	—	2.1	701
	END	LONG RAIL	20	3	21	47	—	—	—	—	2	—	—	—	12	—	—	—	—	2	1.2	397
	END	SHORT RAIL	20	3	21	46	2	—	—	—	—	—	—	—	12	—	2	—	—	—	1.1	388

BILL AND TYPES OF REINFORCEMENT

MARK	SHAPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	SEE TABLE ABOVE	#5	5	7	Curb into Posts	—	—	—	—
T_2	②		#5	7	0	Post Ⓐ				
T_3	③		"	2	6	Posts Ⓑ and Ⓒ	0	6⅜	0	5½
T_4	④		"	2	5	Rails	0	6	0	5½
T_5	⑤		#7	12	3	"	11	2	11	8⅛
T_6	"		"	12	8	"	11	7	12	1⅛
T_7	"		"	12	10	"	11	9	12	3⅛
T_8	"		"	13	3	"	12	2	12	8⅛
T_9	"		"	13	4	"	12	3	12	9⅛
T_{10}	⑥		#5	3	2	"	—	—	—	—
T_{11}	"		"	3	5	"	—	—	—	—
T_{12}	"		"	3	8	"	—	—	—	—
T_{13}	"		"	10	0	"	—	—	—	—
T_{14}	"		"	10	4	"	—	—	—	—
T_{15}	⑤		"	11	9	"	11	1½	11	3½
T_{16}	"		"	12	1	"	11	6½	11	8½
T_{17}	"		"	12	3	"	1	8½	11	10½
T_{18}	"		"	12	8	"	12	1½	12	3½
T_{19}	"		"	12	10	"	12	3½	12	5½



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.
CONCRETE: Class 'D' concrete to be used in handrail.
REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A305 current specifications.
BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.

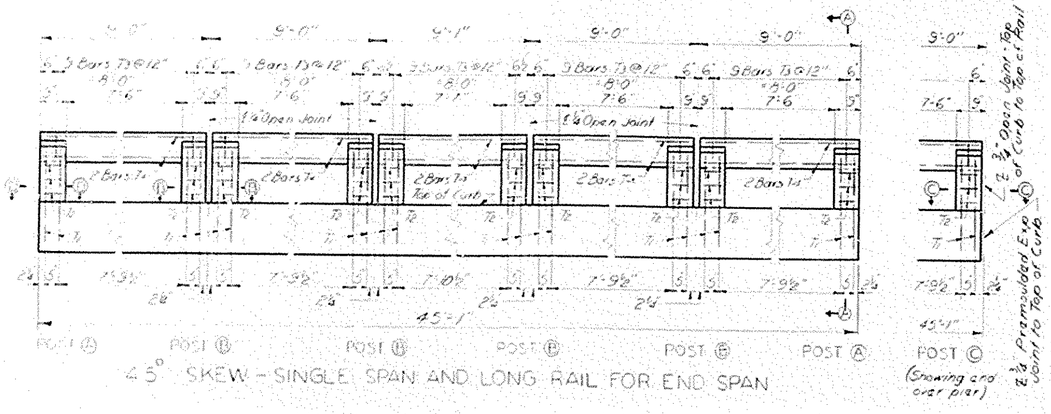
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD HANDRAIL
DECK GIRDER 40 FT. SPAN
ALL ROADWAY WIDTHS
1959

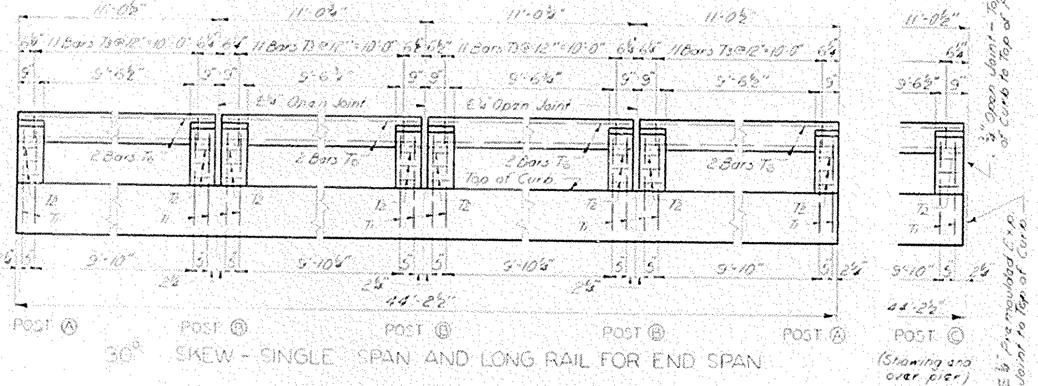
APPROVED BY: _____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

DRAWING NO. H74

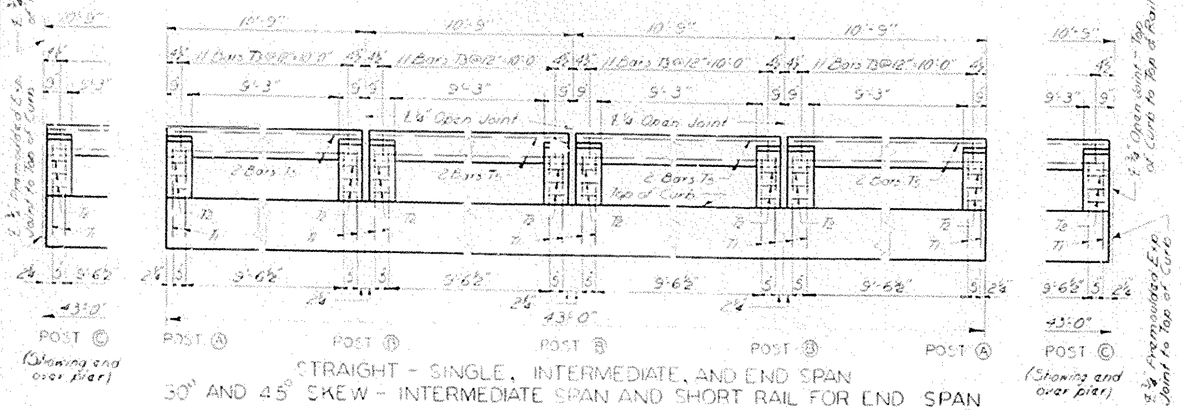
BRIDGE



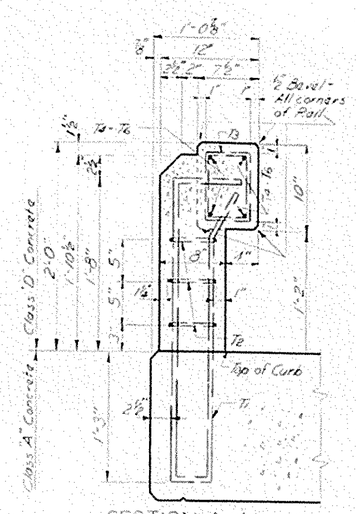
45° SKEW - SINGLE SPAN AND LONG RAIL FOR END SPAN



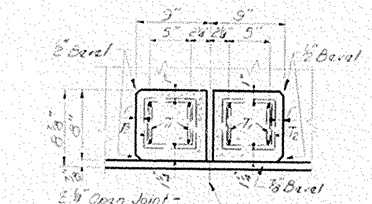
30° SKEW - SINGLE SPAN AND LONG RAIL FOR END SPAN



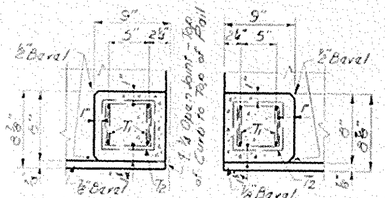
STRAIGHT - SINGLE, INTERMEDIATE, AND END SPAN
30° AND 45° SKEW - INTERMEDIATE SPAN AND SHORT RAIL FOR END SPAN



SECTION A-A
(POSTS Ⓐ, Ⓑ, AND Ⓒ)

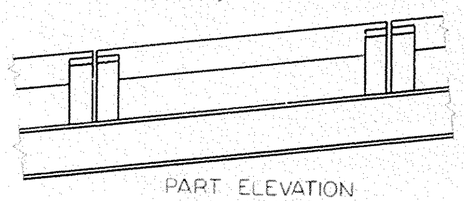


SECTION B-B
(POST Ⓑ)



SECTION C-C
(POST Ⓒ)

SECTION D-D
(POST Ⓐ)



PART ELEVATION

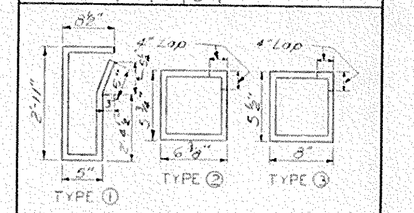
When bridge is on a plus or minus grade, the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

40' R.C.D.G. SPAN			NUMBER T1	T2	T3	T4	T5	T6	CONCRETE CLASS 'D' Cu. Yds.	REINFORCEMENT Lbs.
STRAIGHT	SINGLE	TWO RAILS	32	48	88	–	32	–	2.1	704
	INTERMEDIATE	TWO RAILS	32	48	88	–	32	–	2.1	704
	END	TWO RAILS	32	48	88	–	32	–	2.1	704
30° SKEW	SINGLE	TWO RAILS	32	48	88	–	–	32	2.2	712
	INTERMEDIATE	TWO RAILS	32	48	88	–	32	–	2.1	704
	END	LONG RAIL	16	24	44	–	–	16	1.1	356
	END	SHORT RAIL	16	24	44	–	16	–	1.1	352
45° SKEW	SINGLE	TWO RAILS	40	60	90	40	–	–	2.3	786
	INTERMEDIATE	TWO RAILS	32	48	88	–	32	–	2.1	704
	END	LONG RAIL	20	30	45	20	–	–	1.2	393
	END	SHORT RAIL	16	24	44	–	16	–	1.1	352

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH Ft.	LENGTH In.	LOCATION
T1	①	See Table Above	⅝"	6	7	Curb into Posts
T2	②		⅜"	2	6	Post Ⓑ
T3	③		"	2	9	Posts Ⓐ, Ⓑ, and Ⓒ
T4	Str.		⅝" Ø	8	8	Rail
T5	"		-	10	5	"
T6	"		"	10	8	"



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class 'D' concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A 305 - current specifications.

BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.

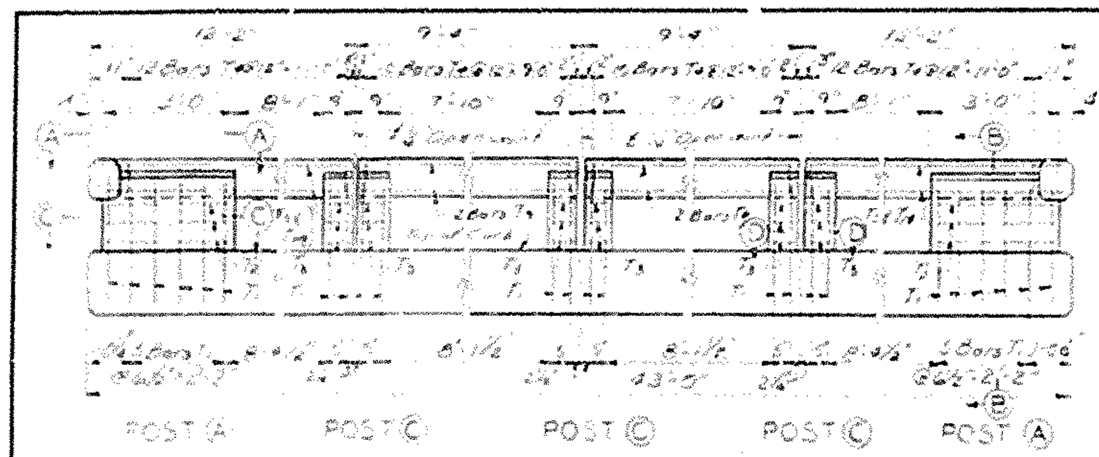
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD HANDRAIL
DECK GIRDER 40 FT. SPAN
ALL ROADWAY WIDTHS

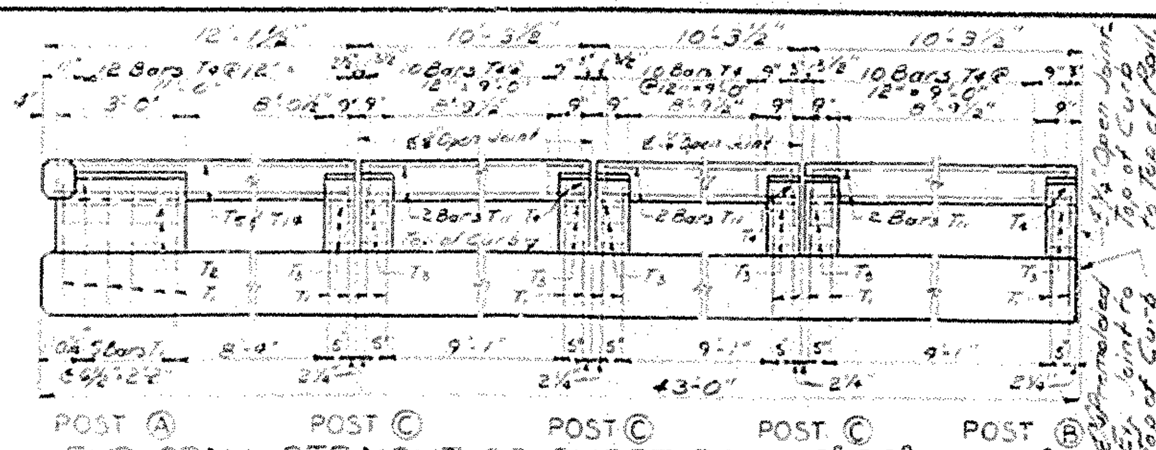
APPROVED BY:
_____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

DRAWING NO. 784

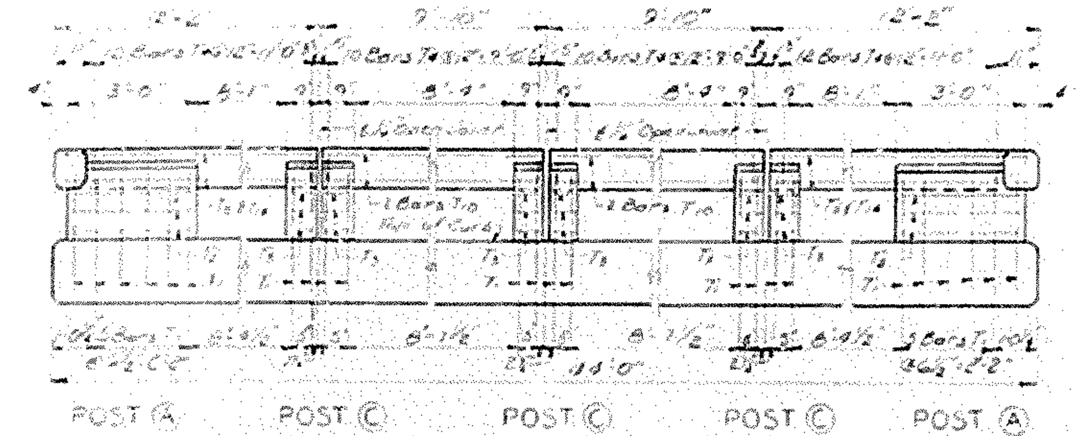
BRIDGE



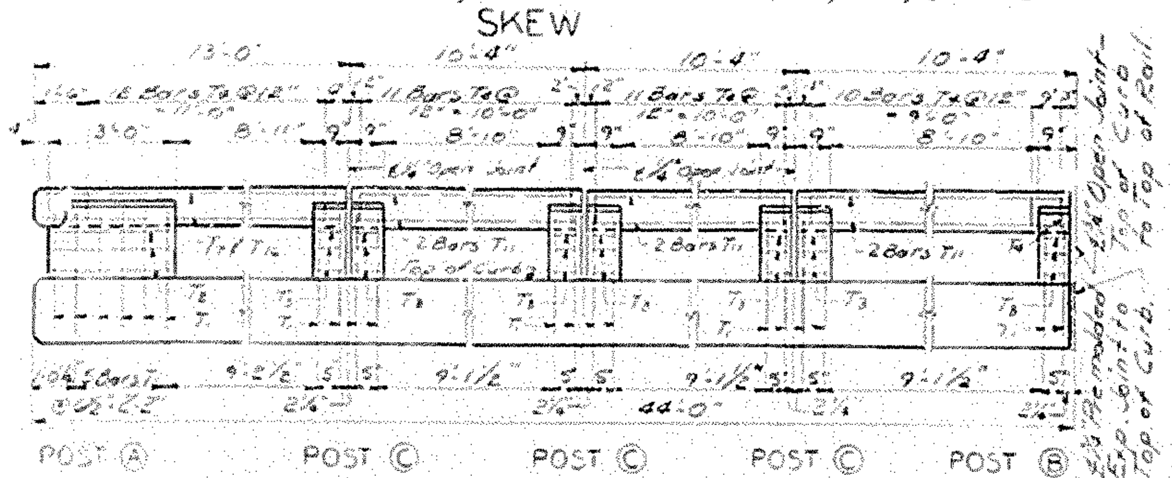
SINGLE SPAN - STRAIGHT



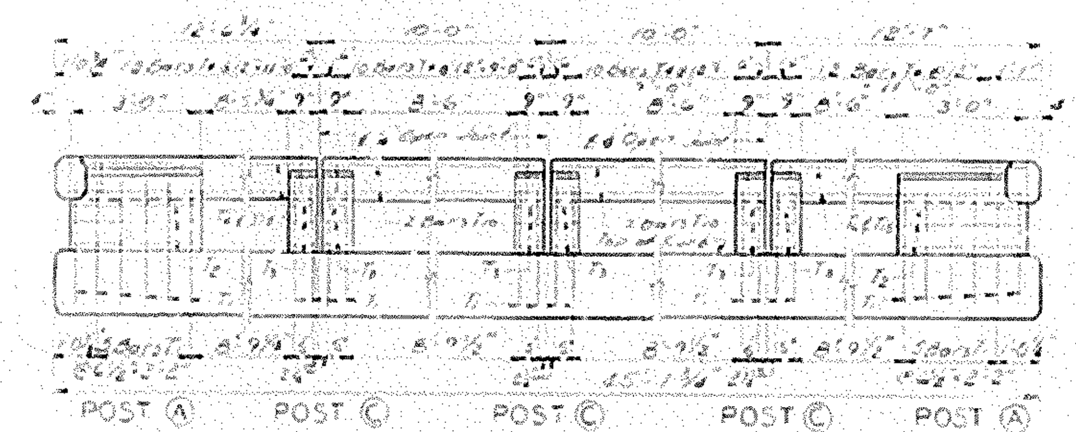
END SPAN - STRAIGHT; OR SHORT RAIL - 15°, 30°, OR 45° SKEW



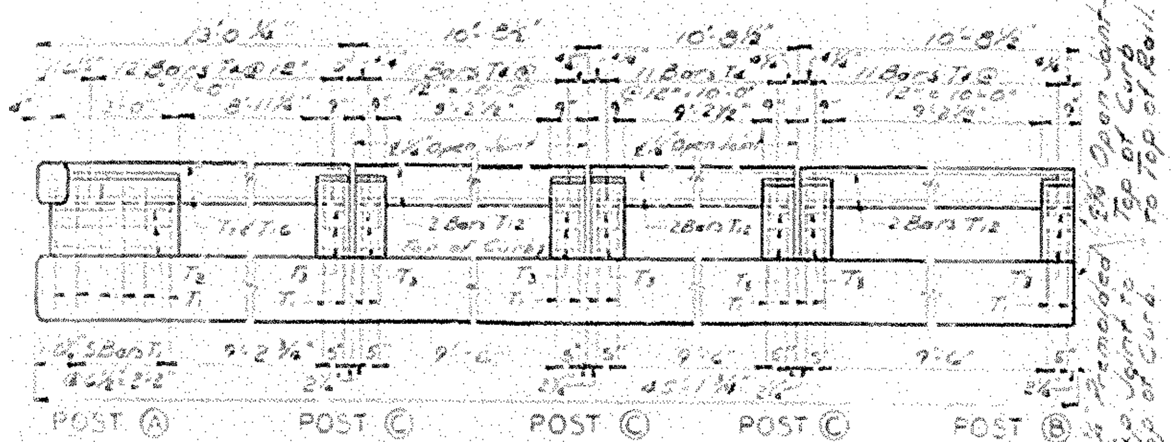
SINGLE SPAN - 15° SKEW



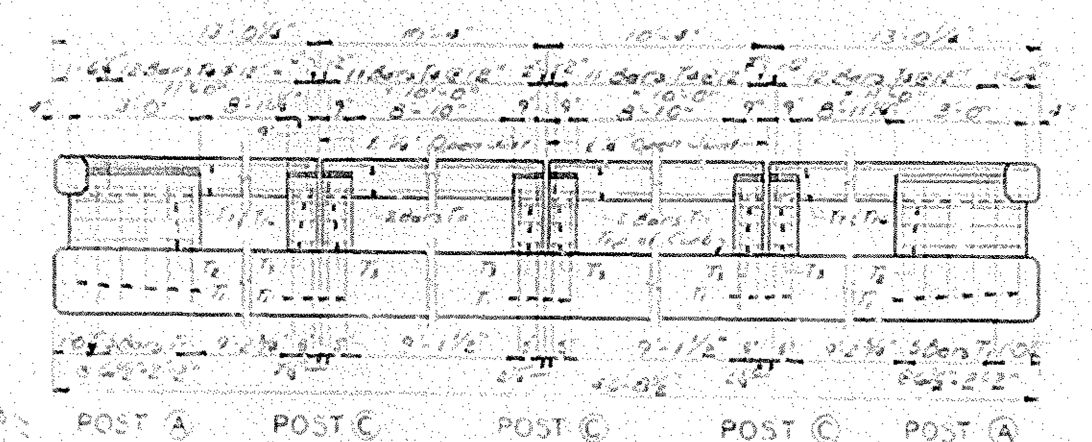
END SPAN - LONG RAIL - 15° SKEW



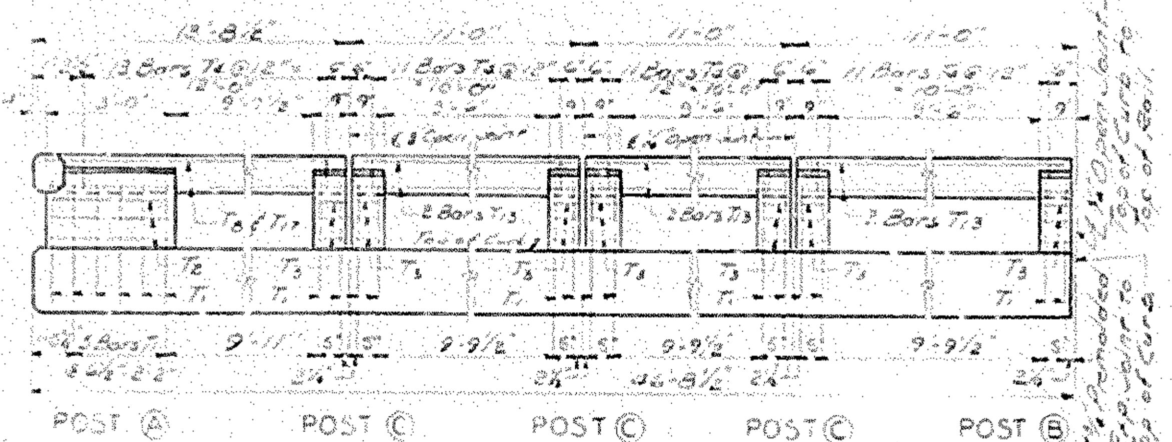
SINGLE SPAN - 30° SKEW



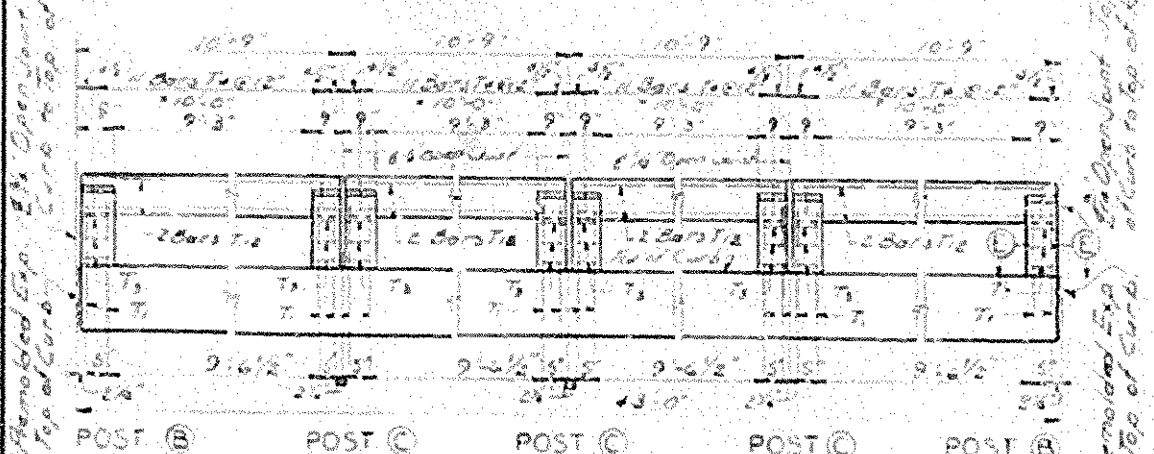
END SPAN - LONG RAIL - 30° SKEW



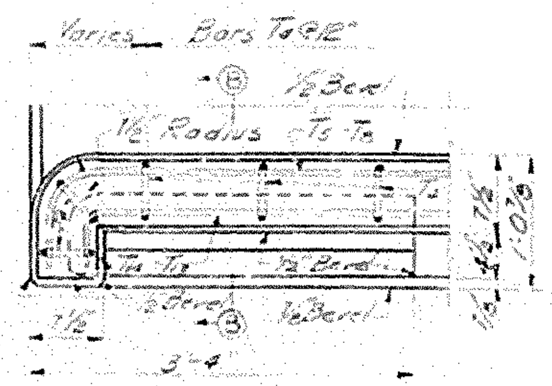
SINGLE SPAN - 45° SKEW



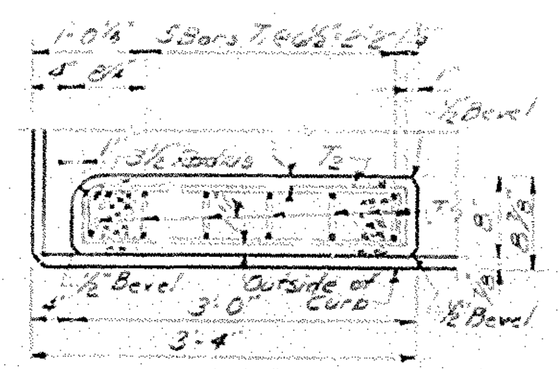
END SPAN - LONG RAIL - 45° SKEW



INTERMEDIATE SPAN



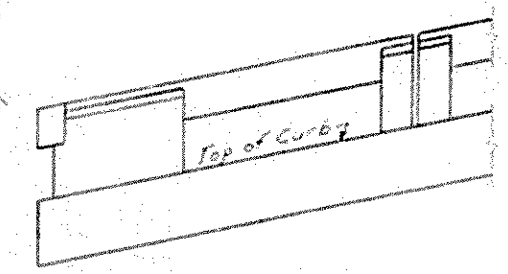
PLAN A-A



SECTION C-C
(POST Ⓐ)

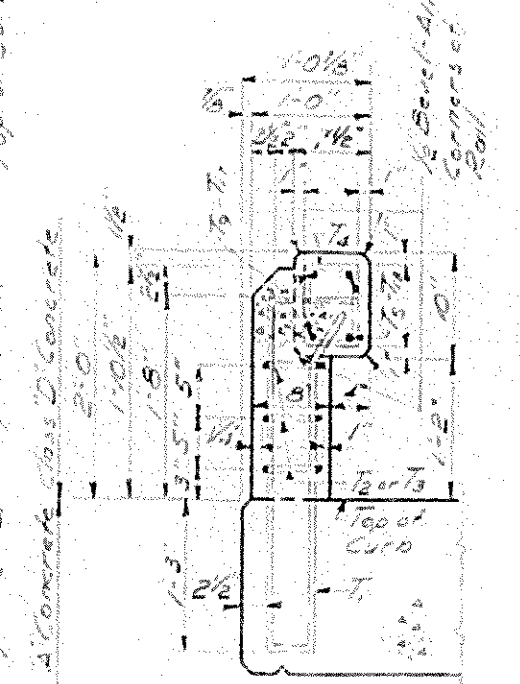
TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

	40' R.C.D.G. SPAN		NUMBER																	CONCRETE CLASS "D" CU. YDS.	REINFORCEMENT LBS.
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}	T_{17}		
STRAIGHT	SINGLE	TWO RAILS	48	12	36	96	8	—	—	—	16	—	—	—	—	8	—	—	—	2.5	647
STRAIGHT	INTERMEDIATE	TWO RAILS	32	—	48	88	—	—	—	—	—	—	—	32	—	—	—	—	—	2.1	704
STRAIGHT	END	TWO RAILS	40	6	42	94	4	—	—	—	—	—	24	—	—	4	—	—	—	2.3	779
15° SKEW	SINGLE	TWO RAILS	48	12	36	96	8	—	—	—	—	16	—	—	—	8	—	—	—	2.5	855
15° SKEW	INTERMEDIATE	TWO RAILS	32	—	48	88	—	—	—	—	—	—	—	32	—	—	—	—	—	2.1	704
15° SKEW	END	LONG RAIL	20	3	21	47	—	—	2	—	—	—	12	—	—	—	—	2	—	2.3	782
15° SKEW	END	SHORT RAIL	20	3	21	47	2	—	—	—	—	—	12	—	—	2	—	—	—		
30° SKEW	SINGLE	TWO RAILS	48	12	36	96	—	8	—	—	—	16	—	—	—	—	8	—	—	2.5	863
30° SKEW	INTERMEDIATE	TWO RAILS	32	—	48	88	—	—	—	—	—	—	—	32	—	—	—	—	—	2.1	704
30° SKEW	END	LONG RAIL	20	3	21	47	—	—	2	—	—	—	—	12	—	—	—	2	—	2.3	787
30° SKEW	END	SHORT RAIL	20	3	21	47	2	—	—	—	—	—	12	—	—	2	—	—	—		
45° SKEW	SINGLE	TWO RAILS	48	12	36	100	—	—	8	—	—	—	16	—	—	—	—	8	—	2.6	882
45° SKEW	INTERMEDIATE	TWO RAILS	32	—	48	88	—	—	—	—	—	—	—	32	—	—	—	—	—	2.1	704
45° SKEW	END	LONG RAIL	20	3	21	48	—	—	—	2	—	—	—	—	12	—	—	—	2	2.4	795
45° SKEW	END	SHORT RAIL	20	3	21	47	2	—	—	—	—	—	12	—	—	2	—	—	—		

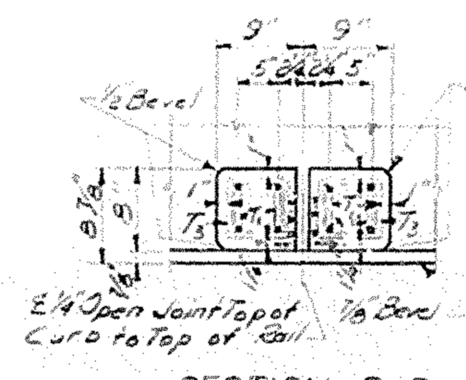


PART ELEVATION

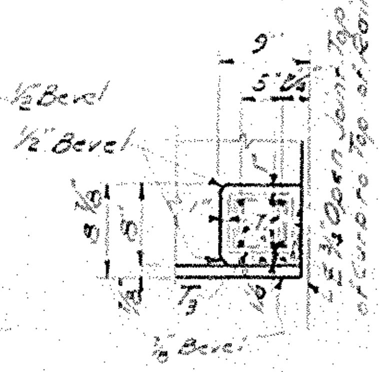
When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.



SECTION B-B
(POSTS Ⓐ, Ⓑ, AND Ⓒ)



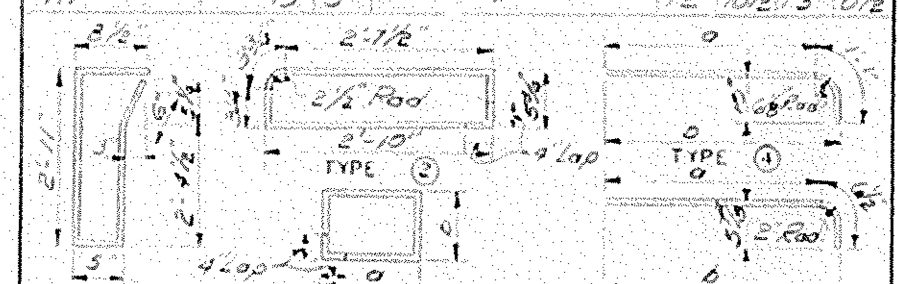
SECTION D-D
(POST Ⓒ)



SECTION E-E
(POST Ⓑ)

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	See Table above	#5	6	7	Curb into Posts	—	—	—	—
T_2	②		#3	7	0	Post Ⓐ	—	—	—	—
T_3	③		"	2	6	Posts Ⓑ and Ⓒ	0	6⅜	0	5¾
T_4	"		"	2	9	Rail	0	8	0	5½
T_5	④		#5	12	5	"	11	4	11	10⅛
T_6	"		"	12	10	"	11	9	12	3⅛
T_7	"		"	13	3	"	12	2	12	8⅛
T_8	"		"	14	0	"	12	11	13	5⅛
T_9	Str.		"	9	0	"	—	—	—	—
T_{10}	"		"	9	6	"	—	—	—	—
T_{11}	"		"	10	0	"	—	—	—	—
T_{12}	"		"	10	5	"	—	—	—	—
T_{13}	"		"	10	8	"	—	—	—	—
T_{14}	⑤		"	11	10	"	11	3½	11	5½
T_{15}	"		"	12	4	"	11	9½	11	11½
T_{16}	"		"	12	9	"	12	2½	12	4½
T_{17}	"		"	13	5	"	12	10½	13	0½



TYPE ① TYPE ② TYPE ③ TYPE ④ TYPE ⑤

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class "D" concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

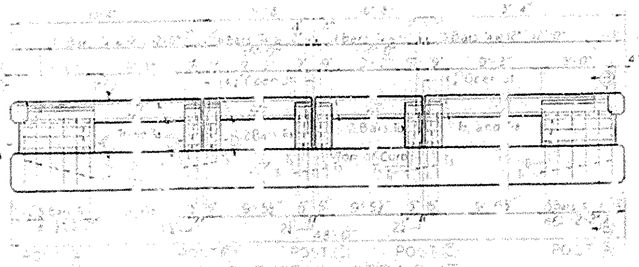
BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.

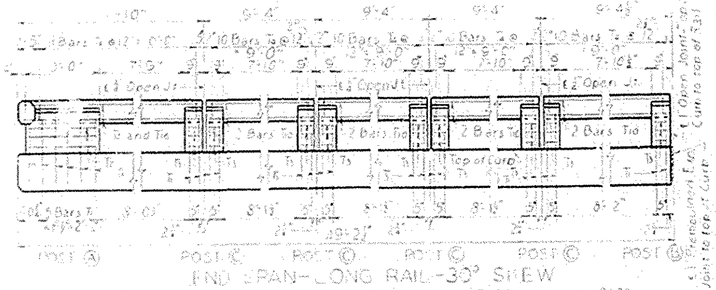
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

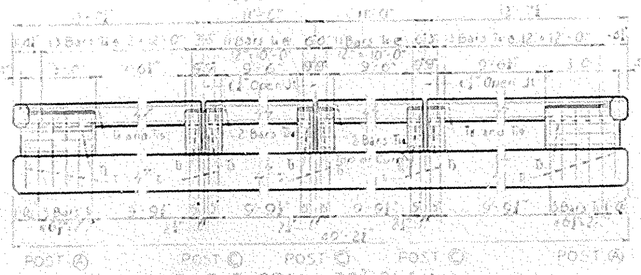
STANDARD OPEN TYPE HANDRAIL
FOR 40 FT. SPAN R.C.D.G.
ALL ROADWAY WIDTHS
WITH 2'-5" CURB

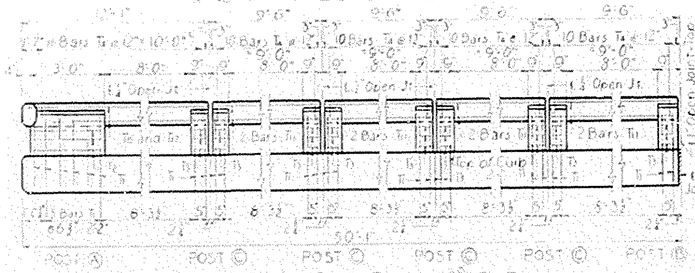
DRAWING No. H-134

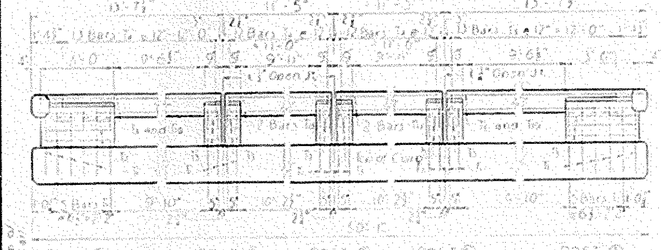
BRIDGE

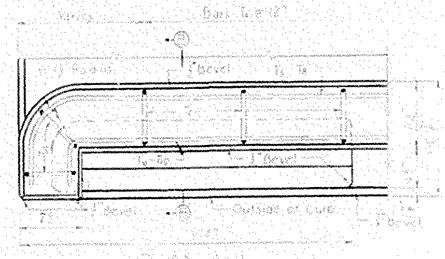


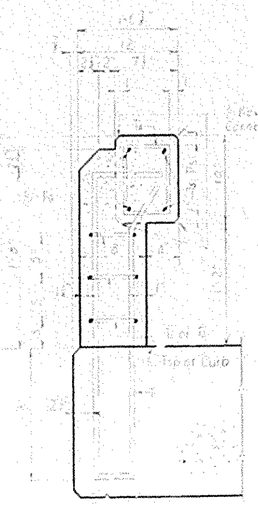


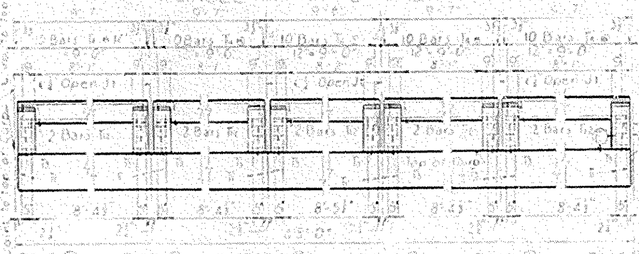


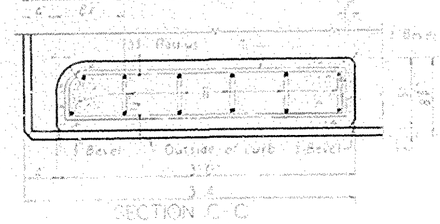


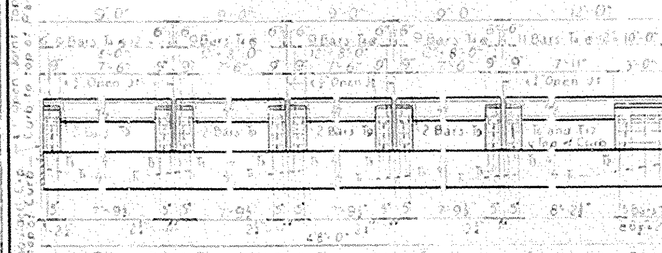


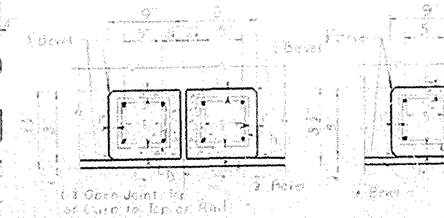


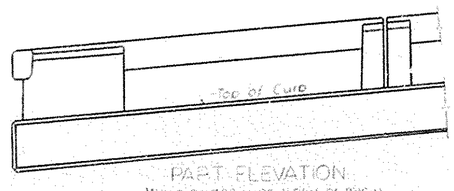












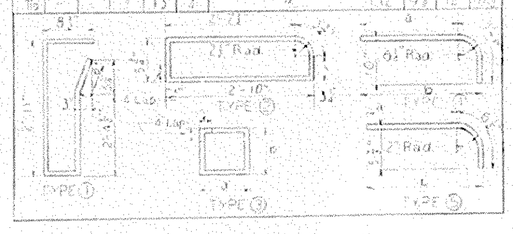
When bridge is on a grade or parallel grade, the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

			NUMBER																CONCRETE CLASS "D" CU YDS	REINFORCEMENT LBS
			①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯		
STRAIGHT	SINGLE	TWO RAILS	4	5	12	36	04	-	-	8	-	-	-	-	16	-	-	-	8	-	2.7	897
	INTERMEDIATE	TWO RAILS	4	0	-	60	00	-	-	-	-	-	-	-	10	-	-	-	-	-	2.4	820
	END	TWO RAILS	3	8	6	54	98	-	4	-	-	-	02	-	-	-	-	-	4	-	2.6	807
30° SKEW	SINGLE	TWO RAILS	4	5	12	36	04	-	-	-	5	-	-	-	-	16	-	-	-	8	2.7	908
	INTERMEDIATE	TWO RAILS	4	0	-	60	00	-	-	-	-	-	-	-	10	-	-	-	-	-	2.4	820
	END	LONG RAIL	2	4	3	27	53	2	-	-	-	-	16	-	-	-	-	-	2	-	1.3	452
	END	SHORT RAIL	2	4	3	27	49	-	2	-	-	-	16	-	-	-	-	-	2	-	1.3	443
45° SKEW	SINGLE	TWO RAILS	4	8	12	36	08	-	-	-	8	-	-	-	-	16	-	-	-	8	2.7	919
	INTERMEDIATE	TWO RAILS	4	0	-	60	00	-	-	-	-	-	-	-	10	-	-	-	-	-	2.4	820
	END	LONG RAIL	2	4	3	27	53	-	2	-	-	-	16	-	-	-	-	-	2	-	1.3	456
	END	SHORT RAIL	2	4	3	27	49	-	2	-	-	-	16	-	-	-	-	-	2	-	1.3	443

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT	LENGTH IN	LOCATION	D FT	D IN	D FT	D IN
①		Same Type Above	#5	6	7	Curb into Posts	-	-	-	-
②			#6	7	0	Posts Ⓐ	-	-	-	-
③				2	6	Posts Ⓑ and Ⓒ	0	10	0	5
④				3	5	Rail	6	5	0	5
⑤			#4	10	1	"	12	0	11	6
⑥				12	3	"	11	2	11	8
⑦				13	7	"	12	6	13	10
⑧				13	11	"	12	10	13	4
⑨				8	8	"	-	-	-	-
⑩				9	0	"	-	-	-	-
⑪				2	2	"	-	-	-	-
⑫				9	3	"	-	-	-	-
⑬				10	2	"	-	-	-	-
⑭				10	8	"	-	-	-	-
⑮							-	-	-	-
⑯							-	-	-	-
⑰	⑤			11	1	"	11	0	11	2
⑱				11	9	"	11	3	11	4
⑲				13	1	"	12	6	12	8
⑳				13	7	"	12	10	12	11



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.
CONCRETE: Class "D" Concrete to be used in Handrail.
REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation A305- current specifications.
BEVELED EDGES: All exposed edges to be beveled 3/4" unless otherwise noted.

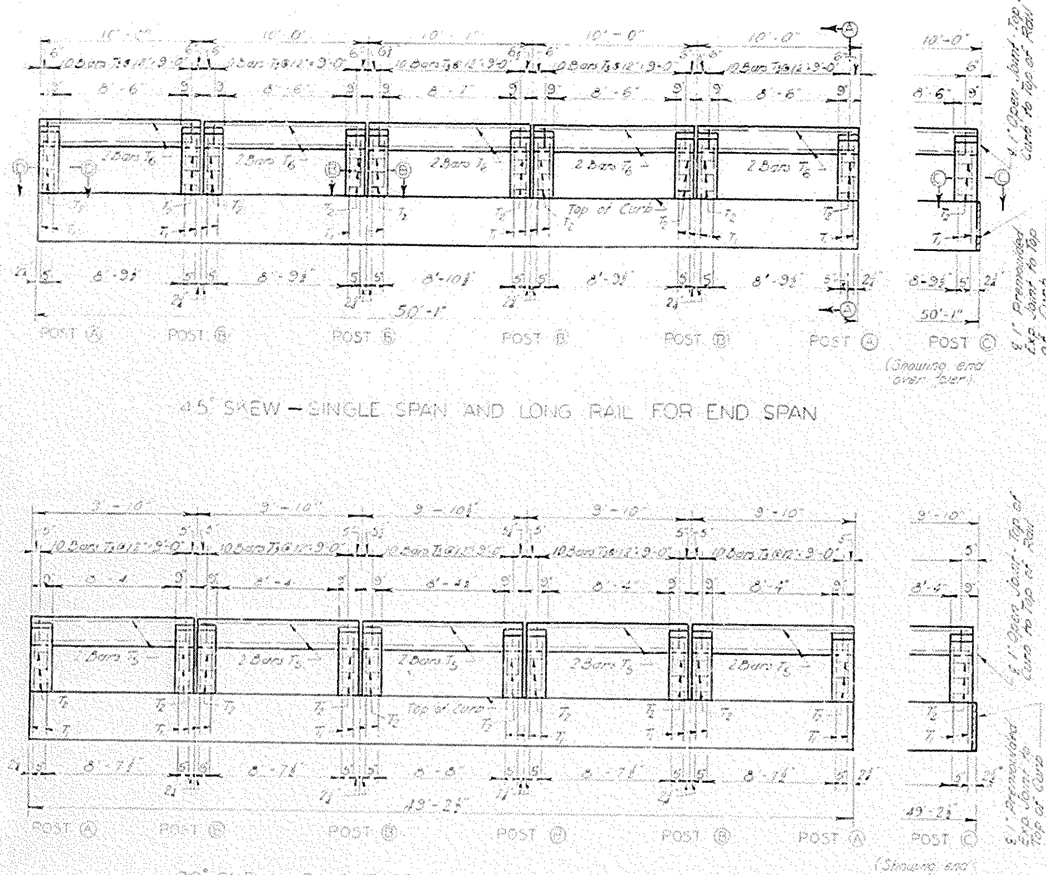
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD HANDRAIL
DECK GIRDER 45 FT SPAN
ALL ROADWAY WIDTHS

APPROVED BY _____ BRIDGE ENGINEER
STATE HIGHWAY ENGINEER

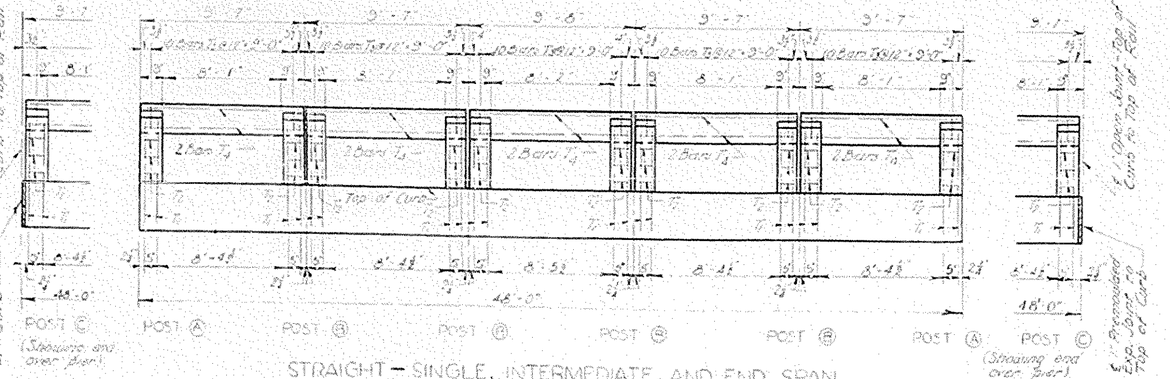
DRAWING NO. H-75

BRIDGE



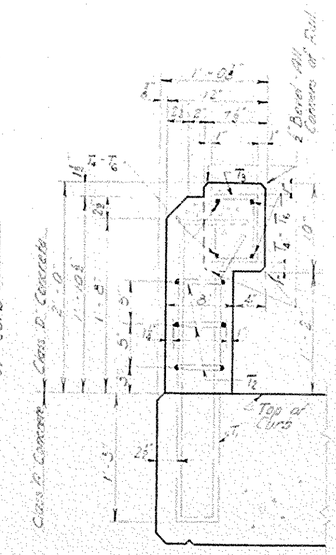
45° SKEW – SINGLE SPAN AND LONG RAIL FOR END SPAN

30° SKEW – SINGLE SPAN AND LONG RAIL FOR END SPAN

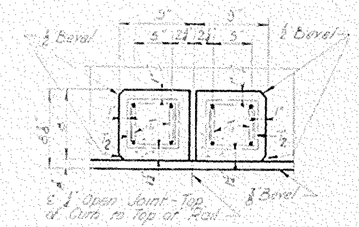


STRAIGHT – SINGLE, INTERMEDIATE, AND END SPAN

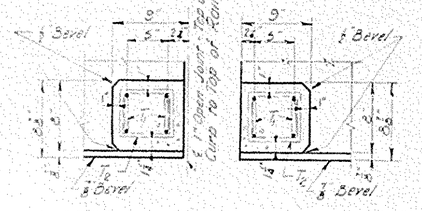
30° AND 45° SKEW – INTERMEDIATE SPAN AND SHORT RAIL FOR END SPAN



SECTION A - A
(POSTS Ⓐ, Ⓑ AND Ⓒ)



SECTION B - B
(POST Ⓑ)



SECTION C - C
(POST Ⓒ)

SECTION D - D
(POST Ⓐ)

PART ELEVATION

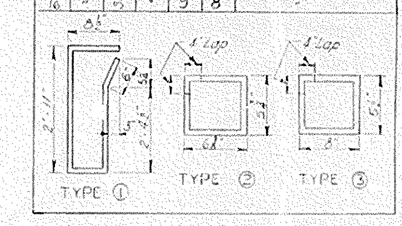
When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

45° R.C.D.G. SPAN			NUMBER T_1	T_2	T_3	T_4	T_5	T_6	CONCRETE CLASS "D" CU. YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	40	60	100	40	—	—	2.4	820
	INTERMEDIATE	TWO RAILS	40	60	100	40	—	—	2.4	820
	END	TWO RAILS	40	60	100	40	—	—	2.4	820
30° SKEW	SINGLE	TWO RAILS	40	60	100	—	40	—	2.5	851
	INTERMEDIATE	TWO RAILS	40	60	100	40	—	—	2.4	820
	END	LONG RAIL	20	30	50	—	20	—	1.2	415
	END	SHORT RAIL	20	30	50	20	—	—	1.2	410
45° SKEW	SINGLE	TWO RAILS	40	60	100	—	—	40	2.5	838
	INTERMEDIATE	TWO RAILS	40	60	100	40	—	—	2.4	820
	END	LONG RAIL	20	30	50	—	—	20	1.2	419
	END	SHORT RAIL	20	30	50	20	—	—	1.2	410

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION
T_1	①	40	½"	6	7	Curb into Posts
T_2	②③	60	½"	2	6	Posts Ⓐ, Ⓑ, and Ⓒ
T_3	③	100	½"	2	9	Rail
T_4	Str.	See Table Above	½"	9	3	"
T_5	"	"	½"	9	6	"
T_6	"	"	½"	9	8	"



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class D concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A-305-current specifications.

BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

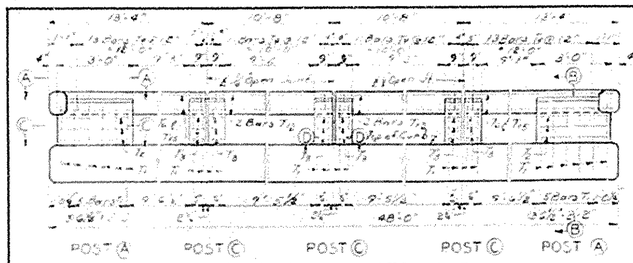
STANDARD HANDRAIL
DECK GIRDER 45 FT. SPAN
ALL ROADWAY WIDTHS
1951

APPROVED BY: _____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

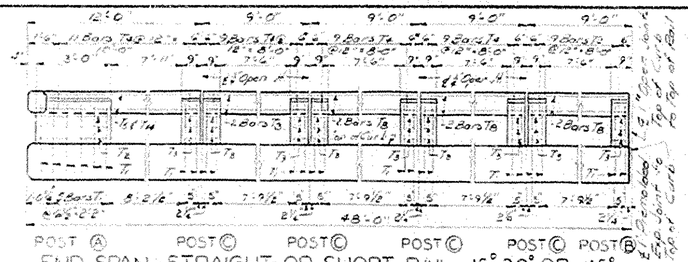
DRAWING NO. H85

REVISED BY ... DATE ... CHECKED BY ... REVISED ...
TRACED BY ... DATE ... CHECKED BY ... REVISED ...

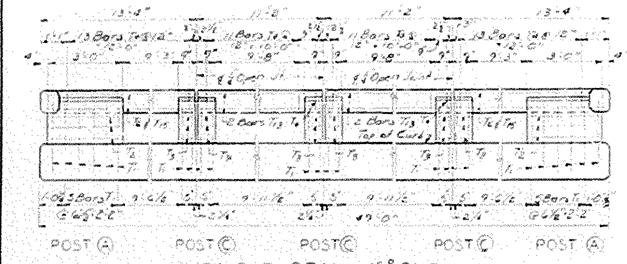
BRIDGE



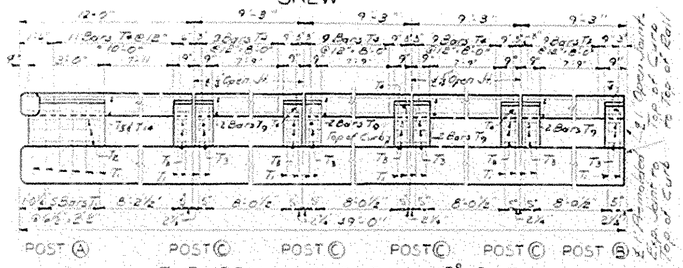
SINGLE SPAN - STRAIGHT



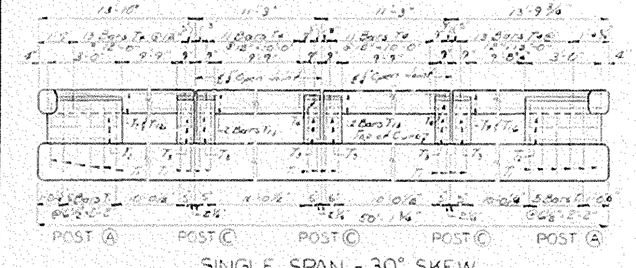
END SPAN - STRAIGHT; OR SHORT RAIL - 15°, 30°, OR 45° SKEW



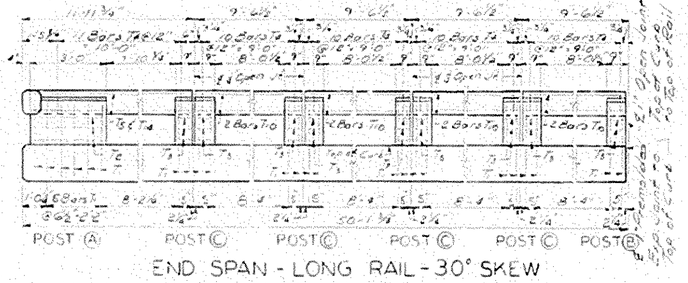
SINGLE SPAN - 15° SKEW



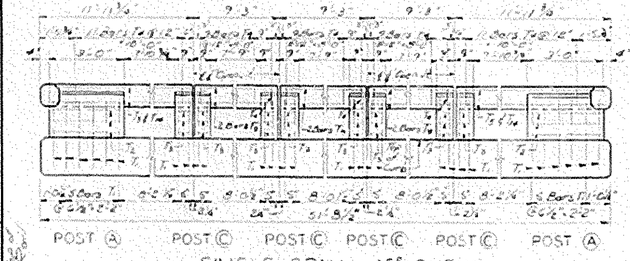
END SPAN - LONG RAIL - 15° SKEW



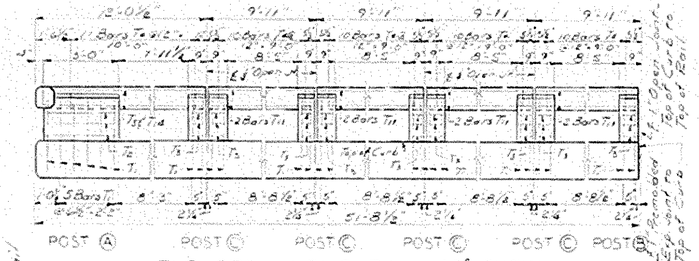
SINGLE SPAN - 30° SKEW



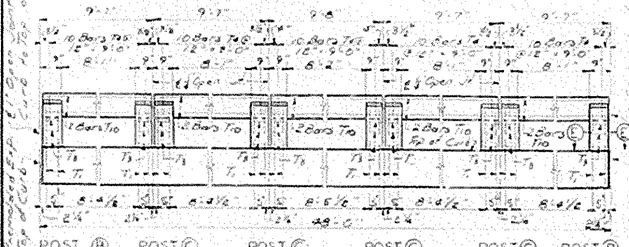
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN - 45° SKEW



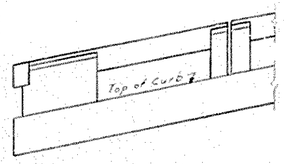
END SPAN - LONG RAIL - 45° SKEW



INTERMEDIATE SPAN

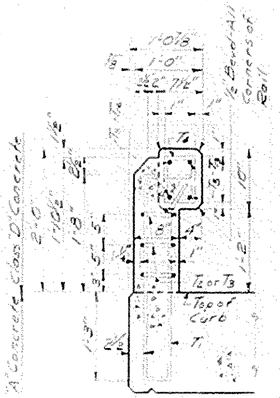
TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

45° R.C.I.G. SPAN			NUMBER T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	CONCRETE CLASS 'D' CU. YDS	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	48	12	36	104	—	8	—	—	—	—	—	16	—	—	8	—	2.7	897
	INTERMEDIATE	TWO RAILS	40	—	60	100	—	—	—	—	—	40	—	—	—	—	—	—	2.4	817
	END	TWO RAILS	48	6	54	96	4	—	—	32	—	—	—	—	—	4	—	—	2.6	887
15° SKEW	SINGLE	TWO RAILS	48	12	36	108	—	8	—	—	—	—	—	—	16	—	8	—	2.7	910
	INTERMEDIATE	TWO RAILS	40	—	60	100	—	—	—	—	—	40	—	—	—	—	—	—	2.4	817
	END	LONG RAIL	24	3	27	53	2	—	—	—	16	—	—	—	—	2	—	—	2.6	895
	END	SHORT RAIL	24	3	27	49	2	—	—	16	—	—	—	—	—	2	—	—		
30° SKEW	SINGLE	TWO RAILS	48	12	36	108	—	—	8	—	—	—	—	—	16	—	—	8	2.7	918
	INTERMEDIATE	TWO RAILS	40	—	60	100	—	—	—	—	—	40	—	—	—	—	—	—	2.4	817
	END	LONG RAIL	24	3	27	53	2	—	—	—	—	16	—	—	—	2	—	—	2.6	899
	END	SHORT RAIL	24	3	27	49	2	—	—	16	—	—	—	—	—	2	—	—		
45° SKEW	SINGLE	TWO RAILS	56	12	48	112	8	—	—	—	24	—	—	—	—	8	—	—	2.9	1000
	INTERMEDIATE	TWO RAILS	40	—	60	100	—	—	—	—	—	40	—	—	—	—	—	—	2.4	817
	END	LONG RAIL	24	3	27	53	2	—	—	—	—	—	16	—	—	2	—	—	2.7	906
	END	SHORT RAIL	24	3	27	49	2	—	—	16	—	—	—	—	—	2	—	—		



PART ELEVATION

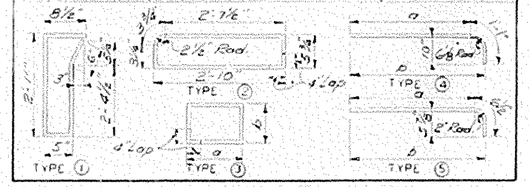
When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.



SECTION B-B
(POSTS (A), (B), AND (C))

BILL AND TYPES OF REINFORCEMENT

MARK	FIG.	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T1	①	See Table above	#5	6	7	Curb into Posts	—	—	—	—
T2	②		#3	7	0	Post (A)	—	—	—	—
T3	③		"	2	6	Posts (B) and (C)	0	6⅜	0	3¾
T4	"		"	2	9	Rail	0	8	0	5½
T5	④		#5	12	3	"	11	2	11	8⅛
T6	"		"	13	7	"	12	6	13	0⅛
T7	"		"	14	1	"	13	0	13	6⅛
T8	Str		"	5	8	"	—	—	—	—
T9	"		"	8	11	"	—	—	—	—
T10	"		"	9	2	"	—	—	—	—
T11	"		"	9	7	"	—	—	—	—
T12	"		"	10	4	"	—	—	—	—
T13	"		"	10	10	"	—	—	—	—
T14	⑤		"	11	9	"	11	2½	11	4½
T15	"		"	13	1	"	12	6½	12	8½
T16	"		"	13	7	"	13	0½	13	2½



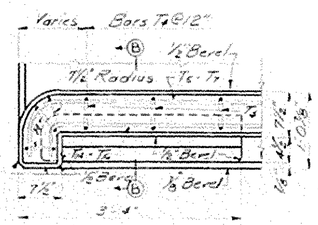
GENERAL NOTE

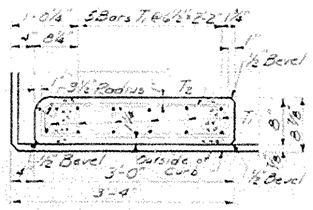
SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

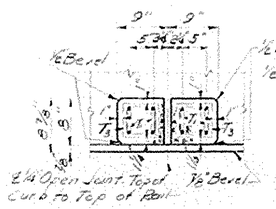
CONCRETE: Class 'D' concrete to be used in Handrail.

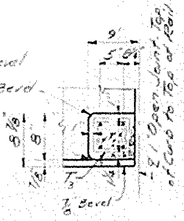
REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.









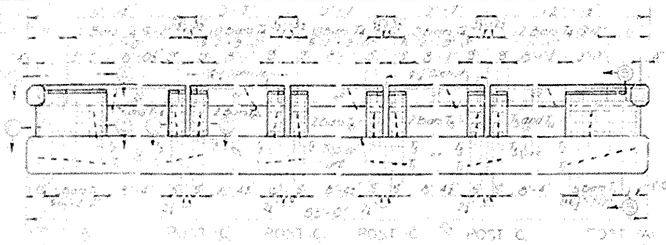
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD OPEN TYPE HANDRAIL FOR 45 FT SPAN R.C.D.G. ALL ROADWAY WIDTHS WITH 2'-6" CURB

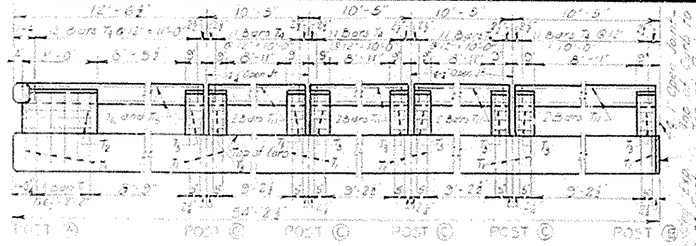
DRAWING No. H-135

INDEX

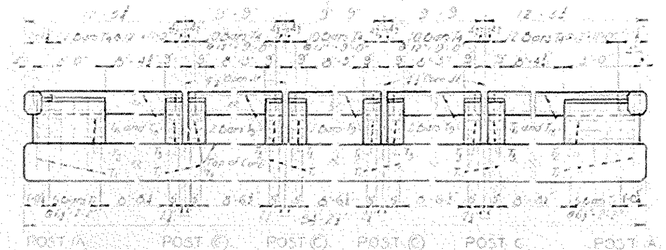
BRIDGE



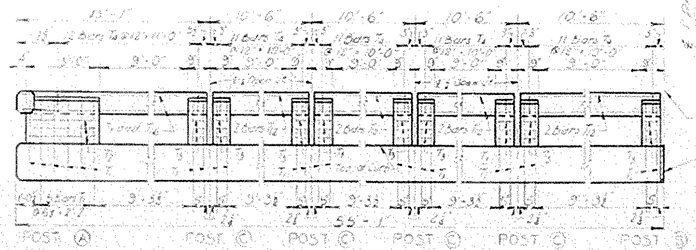
SINGLE SPAN — STRAIGHT



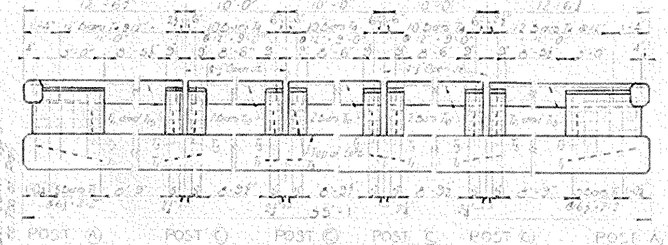
END SPAN — LONG RAIL — 30° SKEW



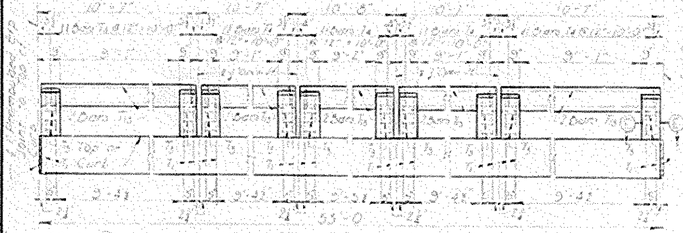
SINGLE SPAN — 30° SKEW



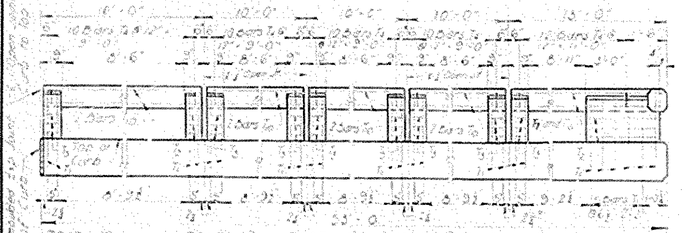
END SPAN — LONG RAIL — 45° SKEW



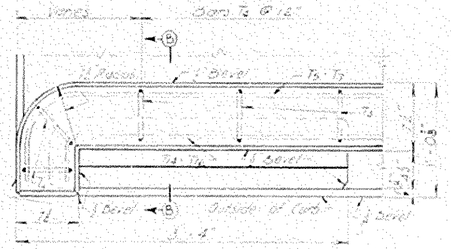
SINGLE SPAN — 45° SKEW



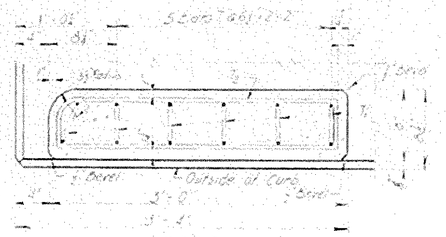
INTERMEDIATE SPAN



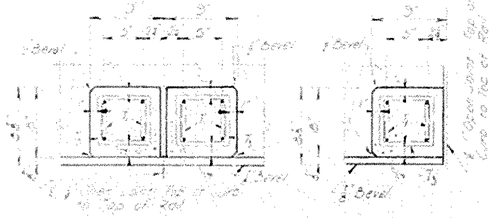
END SPAN — STRAIGHT, OR SHORT RAIL 30° OR 45° SKEW



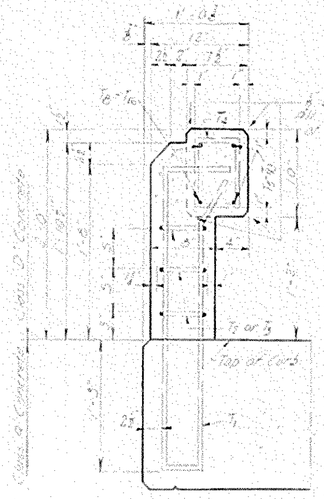
PLAN A-A



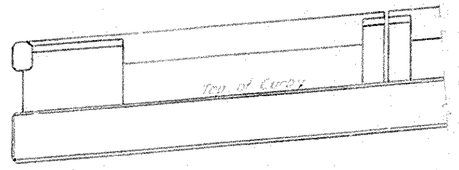
SECTION C-C (POST ⓑ)



SECTION D-D (POST ⓒ) SECTION E-E (POST ⓓ)



SECTION B-B (POSTS Ⓐ, Ⓑ AND Ⓒ)



PART ELEVATION

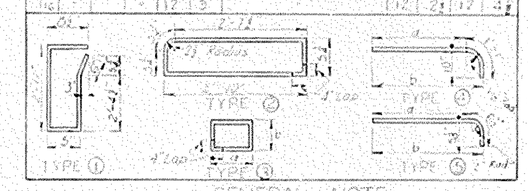
When bridge is on a grade line or minus grade the handrail and posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

50' R.C.D.G. SPAN		NUMBER															CONCRETE CLASS "D" CU. YDS.	REINFORCEMENT LBS.
		T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}	
STRAIGHT	SINGLE TWO RAILS	56	12	48	116	8	–	24	–	–	–	–	–	8	–	–	3.0	1015
	INTERMEDIATE TWO RAILS	40	–	60	110	–	–	–	–	–	–	–	40	–	–	–	2.6	872
	END TWO RAILS	48	6	54	108	–	–	4	–	32	–	–	–	–	–	4	2.8	939
30° SKEW	SINGLE TWO RAILS	56	12	48	116	–	8	–	24	–	–	–	–	–	8	–	3.0	1025
	INTERMEDIATE TWO RAILS	40	–	60	110	–	–	–	–	–	–	–	40	–	–	–	2.6	872
	END LONG RAIL	24	3	27	58	–	2	–	–	–	16	–	–	–	2	–	1.4	478
	END SHORT RAIL	24	3	27	54	–	–	2	–	16	–	–	–	–	–	2	1.4	463
45° SKEW	SINGLE TWO RAILS	56	12	48	116	–	8	–	–	24	–	–	–	–	8	–	3.0	1032
	INTERMEDIATE TWO RAILS	40	–	60	110	–	–	–	–	–	–	–	40	–	–	–	2.6	872
	END LONG RAIL	24	3	27	58	–	–	2	–	–	16	–	–	–	2	–	1.4	482
	END SHORT RAIL	24	3	27	54	–	–	2	–	16	–	–	–	–	–	2	1.4	469

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT. IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	See Table above	#3	6 7	Curb and Posts	–	–	–	–
T_2	②		#3	7 0	Post Ⓒ	–	–	–	–
T_3	③			2 6	Posts Ⓐ and Ⓒ	0	10½	0	5½
T_4				2 9	Rail	0	8	0	5½
T_5	④		#3	12 5	"	11	4	11	10½
T_6				12 9	"	11	8	12	2½
T_7				13 3	"	12	2	12	8½
T_8				9 3	"	–	–	–	–
T_9				9 5	"	–	–	–	–
T_{10}				9 8	"	–	–	–	–
T_{11}				10 1	"	–	–	–	–
T_{12}				10 2	"	–	–	–	–
T_{13}				10 3	"	–	–	–	–
T_{14}	⑤			10 10	"	11	3½	11	5½
T_{15}				12 5	"	11	8½	11	10½
T_{16}				12 9	"	12	2½	12	4½



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

CONCRETE: Class "D" concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation A-305 current specifications.

BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD HANDRAIL

DECK GIRDER 50 FT. SPAN

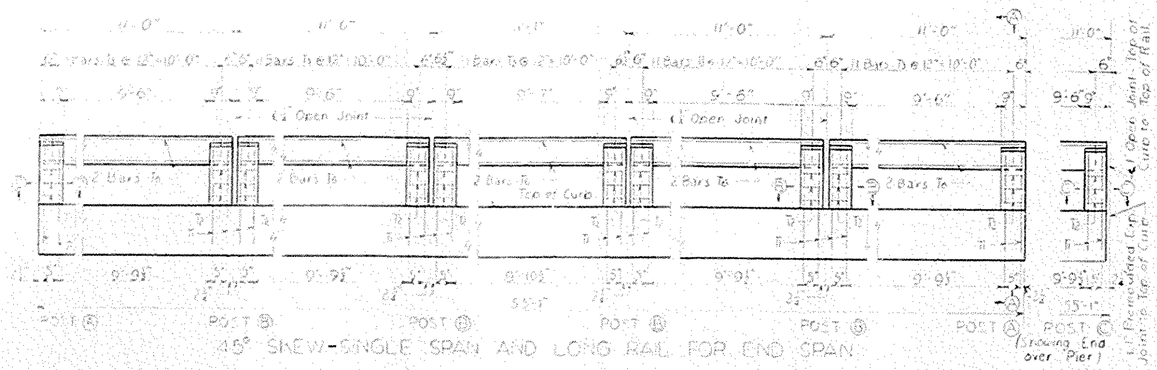
ALL ROADWAY WIDTHS

1941

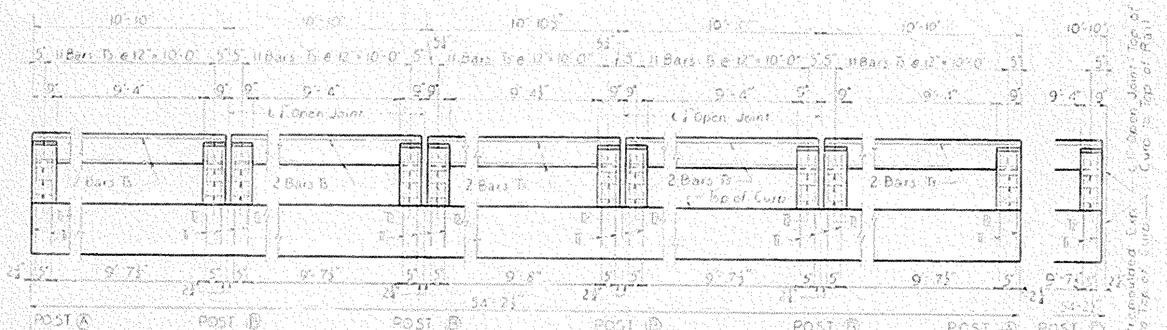
APPROVED BY: _____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

DRAWING NO. H76

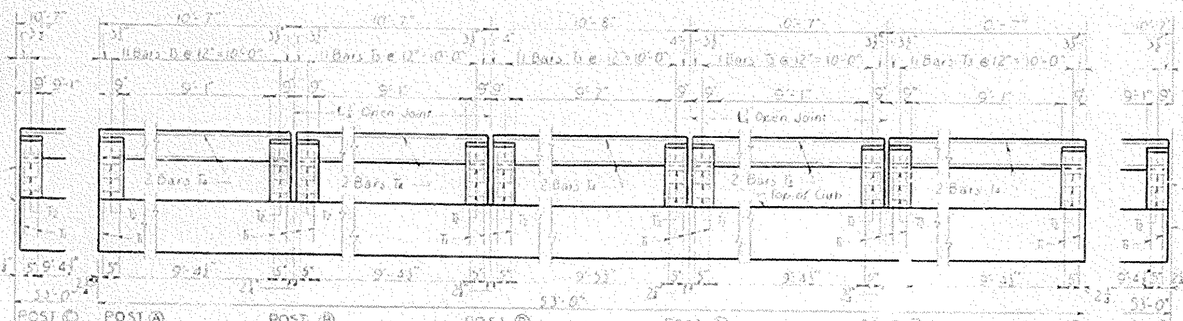
BRIDGE



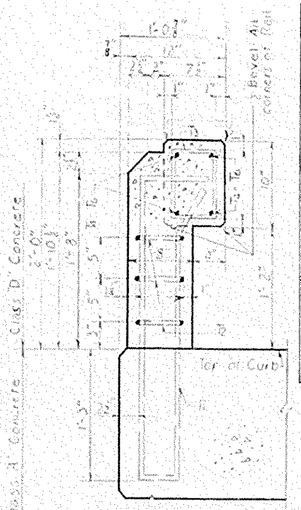
45° SKEW-SINGLE SPAN AND LONG RAIL FOR END SPAN



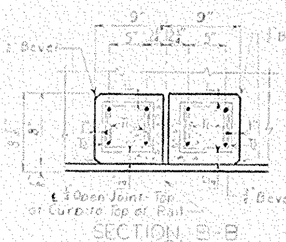
30° SKEW-SINGLE SPAN AND LONG RAIL FOR END SPAN



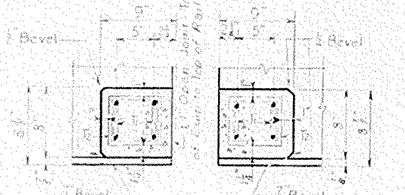
STRAIGHT-SINGLE, INTERMEDATE, AND END SPAN
30° AND 45° SKEW-INTERMEDATE SPAN AND SHORT RAIL FOR END SPAN



SECTION A-A
(POSTS Ⓐ Ⓓ AND Ⓒ)

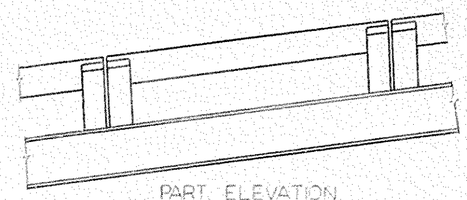


SECTION B-B
(POST Ⓑ)



SECTION C-C
(POST Ⓒ)

SECTION D-D
(POST Ⓐ)



PART ELEVATION

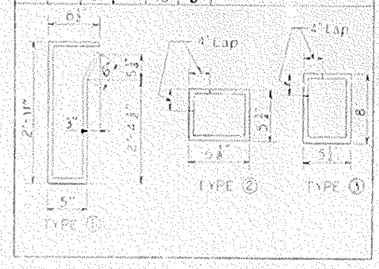
When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

50' R.C. D.C. SPAN			NUMBER						CONCRETE CLASS "D" CU YDS.	REINFORCEMENT LBS
			Ts	Tb	Tc	Td	Te	Tf		
STRAIGHT	SINGLE	TWO RAILS	40	60	110	40	–	–	2.6	872
	INTERMEDIATE	TWO RAILS	40	60	110	40	–	–	2.6	872
	END	TWO RAILS	40	60	110	40	–	–	2.6	872
SKEW 30°	SINGLE	TWO RAILS	40	60	110	–	40	–	2.7	883
	INTERMEDIATE	TWO RAILS	20	60	110	40	–	–	2.6	872
	END	LONG RAIL	20	30	55	–	20	–	1.3	441
	END	SHORT RAIL	20	30	55	20	–	–	1.3	436
SKEW 45°	SINGLE	TWO RAILS	40	60	110	–	–	40	2.7	890
	INTERMEDIATE	TWO RAILS	40	60	110	40	–	–	2.6	872
	END	LONG RAIL	20	30	55	–	–	20	1.3	445
	END	SHORT RAIL	20	30	55	20	–	–	1.3	436

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION
Ts	(1)	See Table Above	⅝ ø	6	7	Cure into Posts
Tb	(2)		⅝ ø	2	6	Posts Ⓐ Ⓑ and Ⓒ
Tc	(3)		⅝ ø	2	9	Rail
Td	Str		⅝ ø	10	3	"
Te	"		⅝ ø	10	6	"
Tf	"		⅝ ø	10	8	"



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Ammendments.

CONCRETE: Class "D" concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A 305 - current specifications.

BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

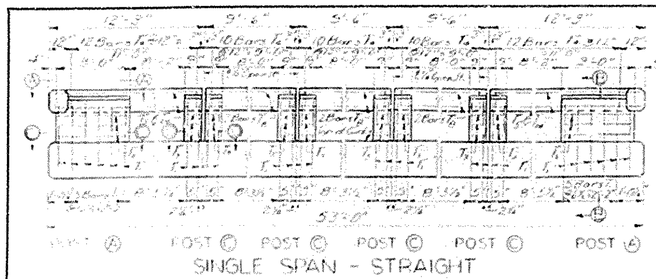
STANDARD HANDRAIL
DECK GIRDER 50 FT. SPAN
ALL ROADWAY WIDTHS

APPROVED BY: _____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

DRAWING NO. H-86

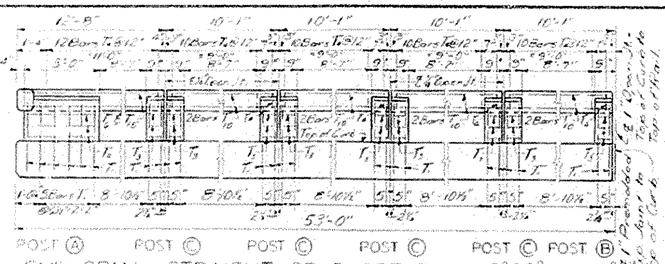
DESIGNED BY: [illegible] CHECKED BY: [illegible] DATE: [illegible]
DETAILED BY: [illegible] CHECKED BY: [illegible] DATE: [illegible]
TRACED BY: [illegible] CHECKED BY: [illegible] DATE: [illegible]
REVISED
REVISED
REVISED

BRIDGE



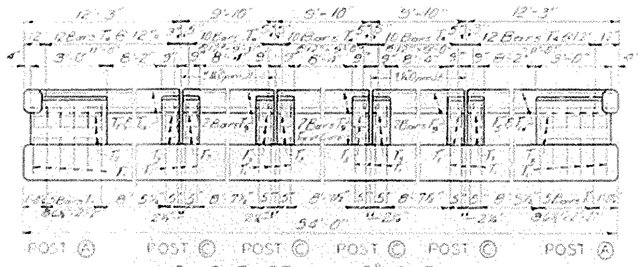
POST Ⓐ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓐ

SINGLE SPAN - STRAIGHT



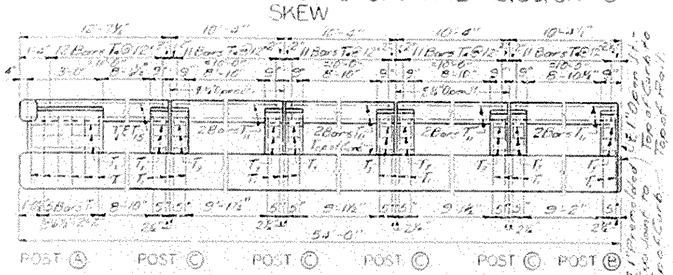
POST Ⓐ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓑ

END SPAN - STRAIGHT, OR SHORT RAIL - 15°, 30° OR 45° SKEW



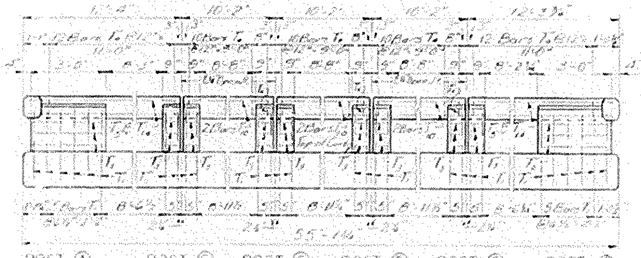
POST Ⓐ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓐ

SINGLE SPAN - 15° SKEW



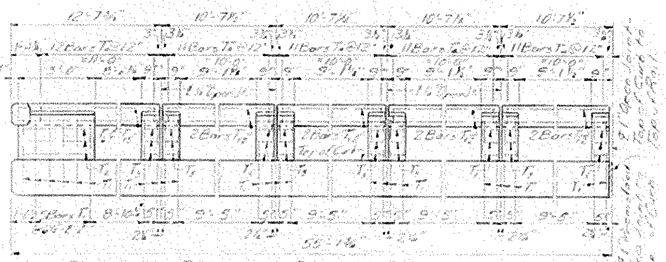
POST Ⓐ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓑ

END SPAN - LONG RAIL - 15° SKEW



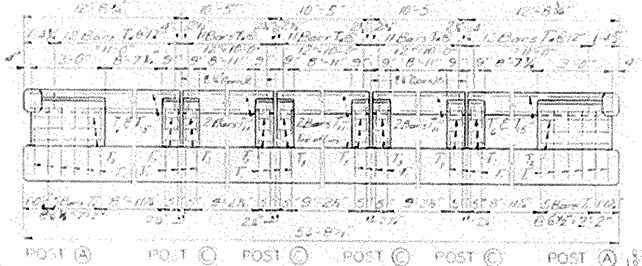
POST Ⓐ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓐ

SINGLE SPAN - 30° SKEW



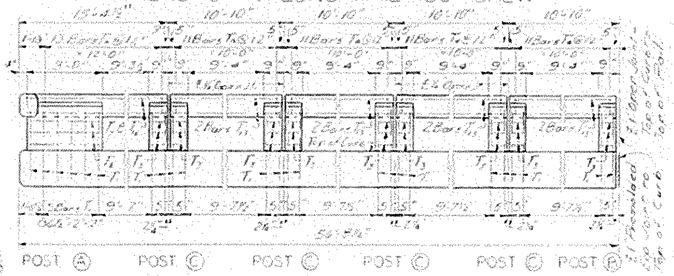
POST Ⓐ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓑ

END SPAN - LONG RAIL - 30° SKEW



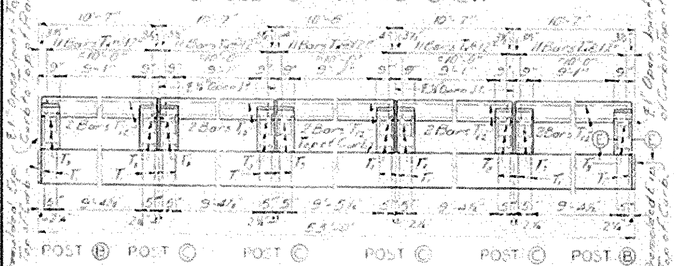
POST Ⓐ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓐ

SINGLE SPAN - 45° SKEW



POST Ⓐ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓑ

END SPAN - LONG RAIL - 45° SKEW

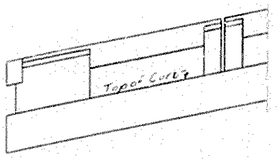


POST Ⓑ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓒ POST Ⓑ

INTERMEDIATE SPAN

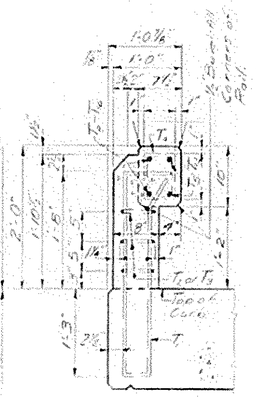
TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

50' R.C.D.G. SPAN			NUMBER														CONCRETE CLASS 'D' CU. YDS	REINFORCEMENT LBS.
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}		
STRAIGHT	SINGLE	TWO RAILS	56	12	48	116	8	—	—	24	—	—	—	—	—	8	—	—	3.0	1015
	INTERMEDIATE	TWO RAILS	40	—	60	110	—	—	—	—	—	—	—	40	—	—	—	—	2.6	872
	END	TWO RAILS	48	6	54	116	—	4	—	—	—	32	—	—	—	—	4	—	2.8	945
15° SKEW	SINGLE	TWO RAILS	56	12	48	116	8	—	—	—	24	—	—	—	—	8	—	—	3.0	1023
	INTERMEDIATE	TWO RAILS	40	—	60	110	—	—	—	—	—	—	—	40	—	—	—	—	2.6	872
	END	LONG RAIL	24	3	27	58	—	2	—	—	—	—	16	—	—	—	2	—	2.8	951
	END	SHORT RAIL	24	3	27	58	—	2	—	—	—	16	—	—	—	—	2	—		
30° SKEW	SINGLE	TWO RAILS	56	12	48	122	8	—	—	—	—	24	—	—	—	8	—	—	3.0	1036
	INTERMEDIATE	TWO RAILS	40	—	60	110	—	—	—	—	—	—	—	40	—	—	—	—	2.6	872
	END	LONG RAIL	24	3	27	58	—	2	—	—	—	—	—	16	—	—	2	—	2.8	955
	END	SHORT RAIL	24	3	27	58	—	2	—	—	—	16	—	—	—	—	2	—		
45° SKEW	SINGLE	TWO RAILS	56	12	48	122	—	8	—	—	—	—	24	—	—	8	—	—	3.1	1048
	INTERMEDIATE	TWO RAILS	40	—	60	110	—	—	—	—	—	—	—	40	—	—	—	—	2.6	872
	END	LONG RAIL	24	3	27	59	—	—	2	—	—	—	—	—	16	—	—	2	2.9	964
	END	SHORT RAIL	24	3	27	58	—	2	—	—	—	16	—	—	—	—	2	—		



PART ELEVATION

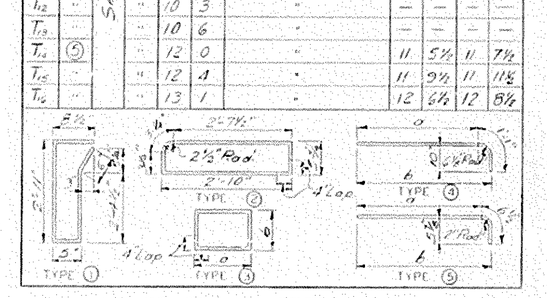
When bridge is on a plus or minus grade the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical



SECTION B-B
(POSTS Ⓐ, Ⓑ, AND Ⓒ)

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	See Table above	#5	6	7	Curb to Posts	—	—	—	—
T_2	②		#3	7	0	Post Ⓐ	—	—	—	—
T_3	③		"	2	6	Posts Ⓑ and Ⓒ	0	6½	0	5½
T_4	"		"	2	9	Rail	0	8	0	5½
T_5	④		#5	12	6	"	11	5	11	11⅛
T_6	"		"	12	11	"	11	10	12	4⅛
T_7	"		"	13	8	"	12	7	13	1⅛
T_8	Stir		"	9	2	"	—	—	—	—
T_9	"		"	9	6	"	—	—	—	—
T_{10}	"		"	9	9	"	—	—	—	—
T_{11}	"		"	10	0	"	—	—	—	—
T_{12}	"		"	10	3	"	—	—	—	—
T_{13}	"		"	10	6	"	—	—	—	—
T_{14}	⑤		"	12	0	"	11	5½	11	7½
T_{15}	"		"	12	4	"	11	9½	11	11⅝
T_{16}	"		"	13	1	"	12	6½	12	8½



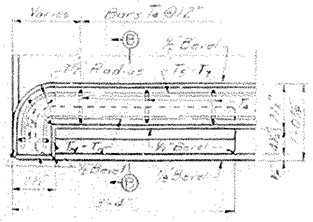
GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways current Specifications with Amendments.

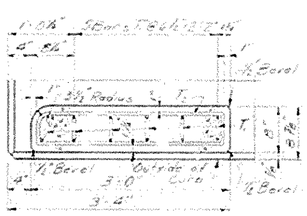
CONCRETE: Class "D" concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

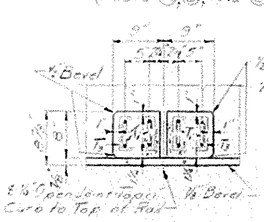
BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.



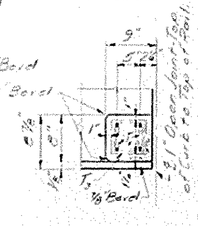
PLAN A-A



SECTION C-C
(POST Ⓐ)



SECTION D-D
(POST Ⓒ)

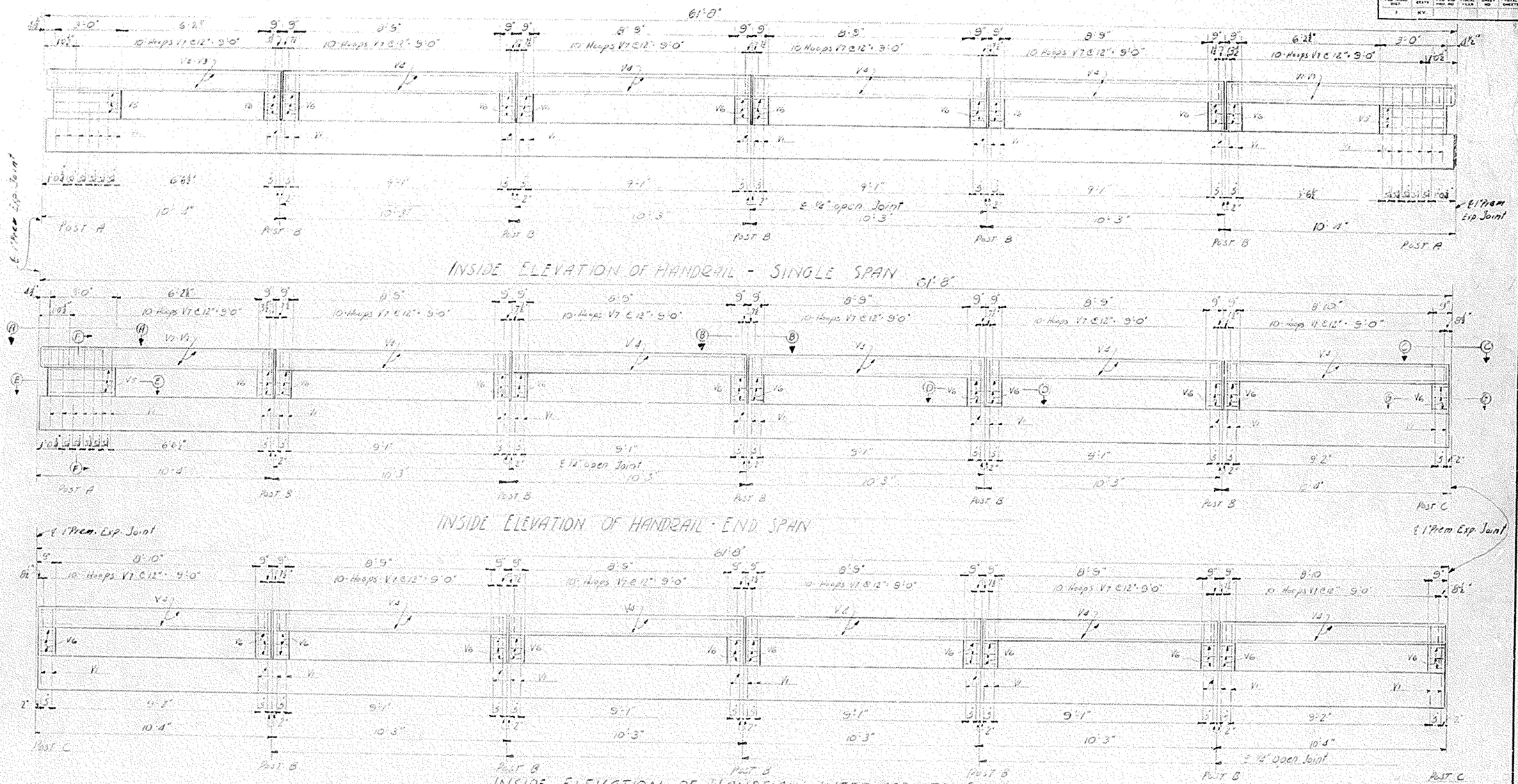


SECTION E-E
(POST Ⓑ)

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD OPEN TYPE HANDRAIL
FOR 50 FT SPAN R.C.D.G.
ALL ROADWAY WIDTHS
WITH 2'-6" CURB

DRAWING No. H-136 | INDEX

BRIDGE

NOTE

Sides of all posts to be vertical and top of rail to be parallel to ℄ grade. All exposed corners on rail and posts not noted to have ½" bevels.

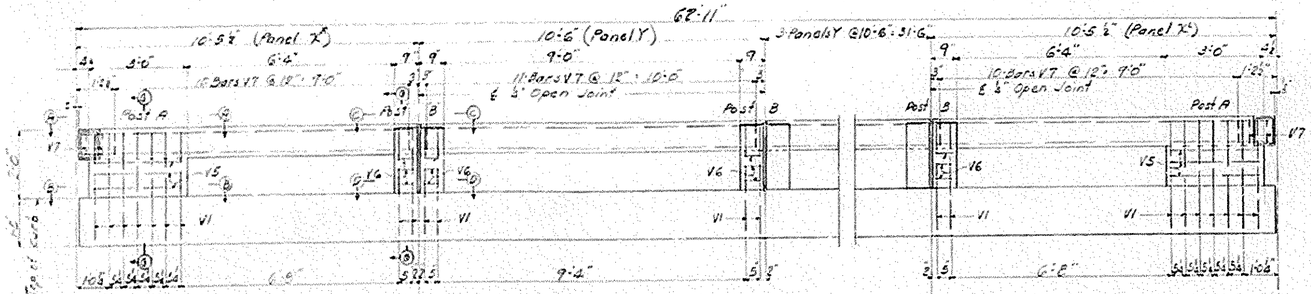
HANDRAIL (2 SHEETS)

Sheet 1 of 2

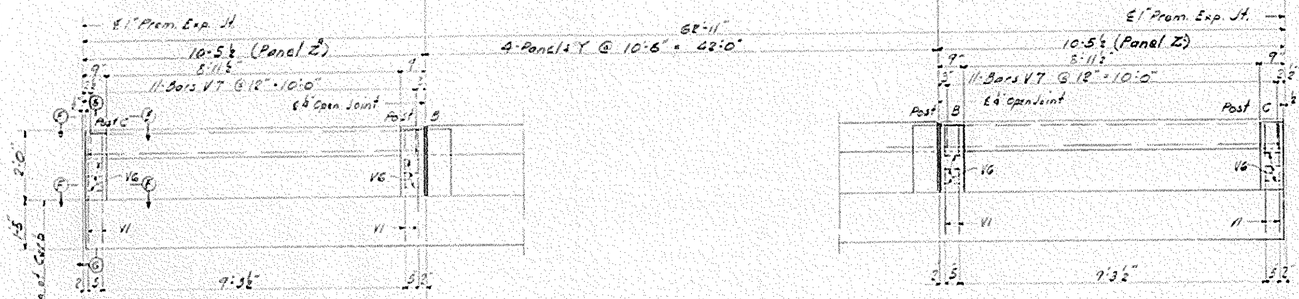
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
STANDARD HANDRAIL
FOR 60 FT. I-BEAM SPAN
0° SKEW - 12 Ft. ROADWAY

ROAD	PROJECT NO.
STATION	
BRIDGE NUMBER	DRAWING NO. 8586

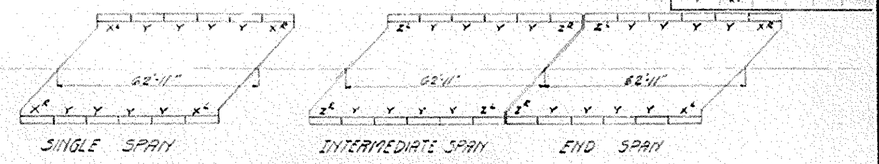
BRIDGE



ELEVATION OF RAIL SINGLE SPAN



ELEVATION OF RAIL INTERMEDIATE SPAN

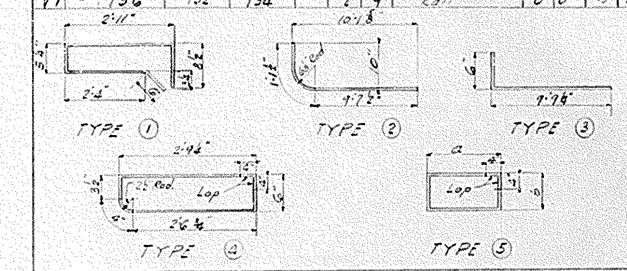


SINGLE SPAN INTERMEDIATE SPAN END SPAN

MARKING DIAGRAMS

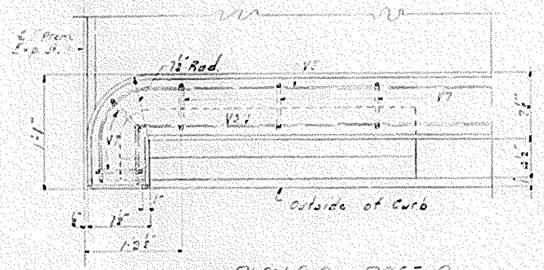
BILL OF REINFORCEMENT (ONE SPAN)

Mark	Type	Number Single Span	Interm. Span	End Span	Size	Length Ft.	Length In.	Location	a Ft.	a In.	b Ft.	b In.
V1	①	68	48	58	⅝	6	7	All Posts				
V2	②	8	0	4	"	10	9	Posts A				
V3	③	3	0	4	"	10	2	" "				
V4	Stir.	32	48	40	"	10	2	Rail				
V5	④	12	0	6	⅜	7	0	Hoops Post A				
V6	⑤	60	72	66	"	2	7	Posts B & C	0	6½	0	6
V7	"	136	192	134	"	2	9	Rail	0	8	0	9½

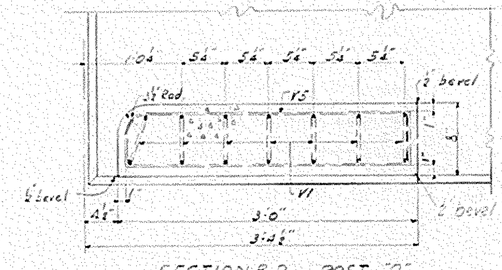


ESTIMATE OF QUANTITIES (ONE SPAN)

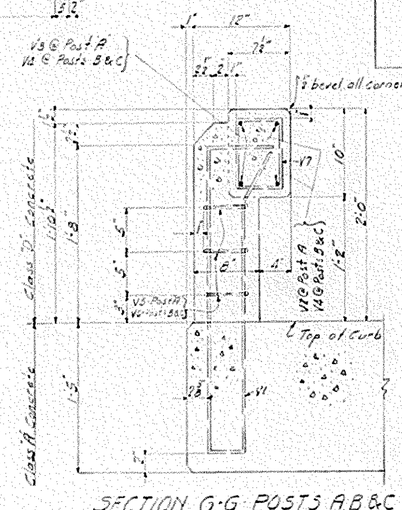
SINGLE SPAN		
Concrete Class D	35	Cu. Yd.
Reinforcement	1210	Lb.
INTERMEDIATE SPAN		
Concrete Class D	31	Cu. Yd.
Reinforcement	1040	Lb.
END SPAN		
Concrete Class D	33	Cu. Yd.
Reinforcement	1130	Lb.



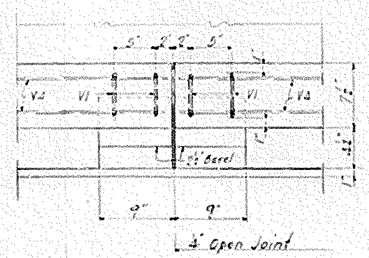
PLAN A-A POST A



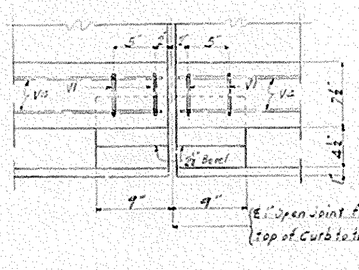
SECTION B-B - POST "A"



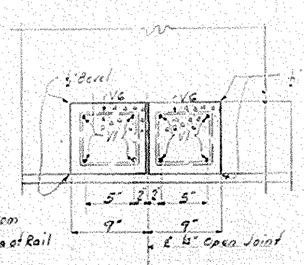
SECTION G-G POSTS A, B & C



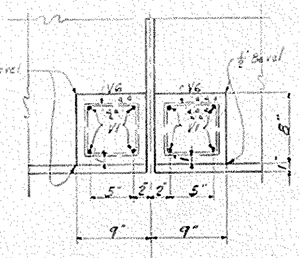
PLAN C-C POST B



PLAN E-E POST C



SECTION D-D POST B



SECTION F-F POST C

HANDRAIL

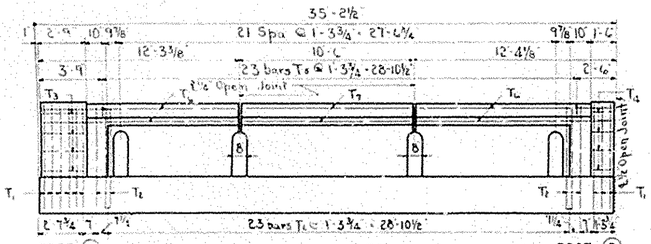
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

STANDARD HANDRAIL
FOR 60 FT I BEAM SPAN
45° SKEW · 12 FT ROADWAY

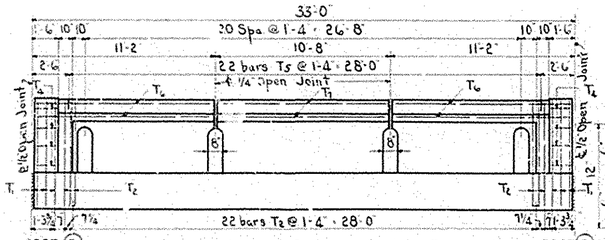
ROAD
STATION PROJECT NO.
BRIDGE NUMBER DRAWING NO. 8615 INDEX

BRIDGE

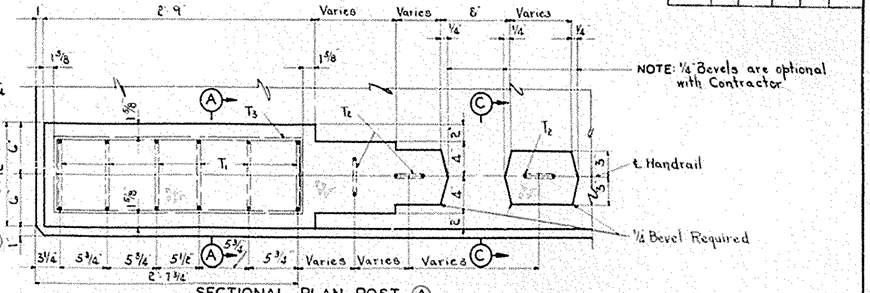
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	Ky.				



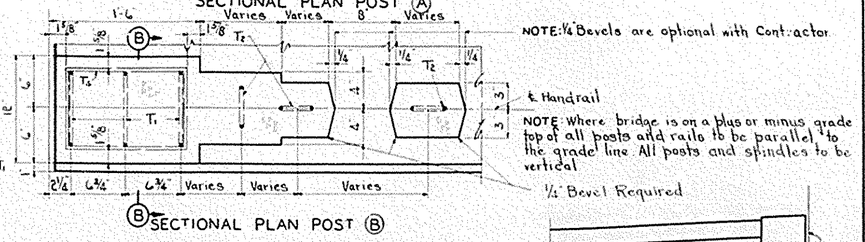
END SPAN - LONG CURB - 45° SKEW



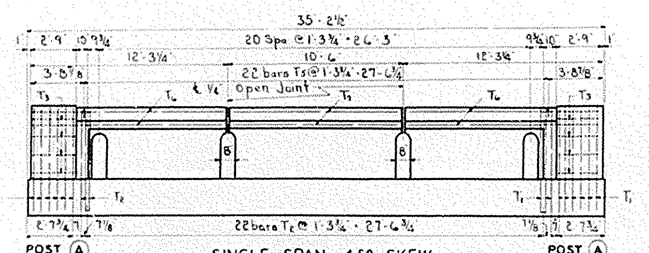
INTERMEDIATE SPAN - STRAIGHT, 30° OR 45° SKEW



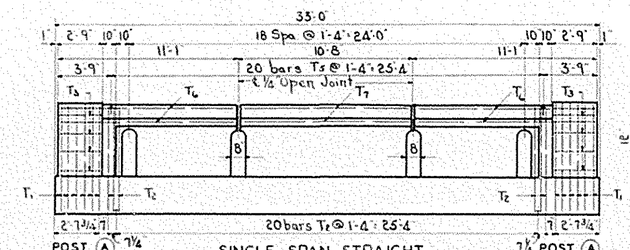
SECTIONAL PLAN POST (A)



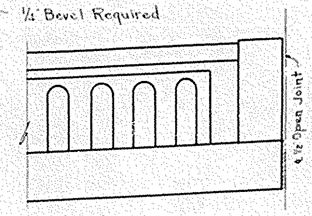
(B) SECTIONAL PLAN POST (B)



SINGLE SPAN 45° SKEW

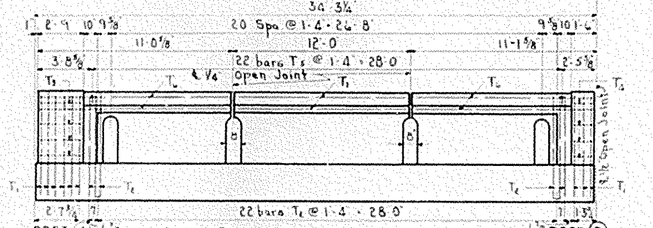


SINGLE SPAN STRAIGHT

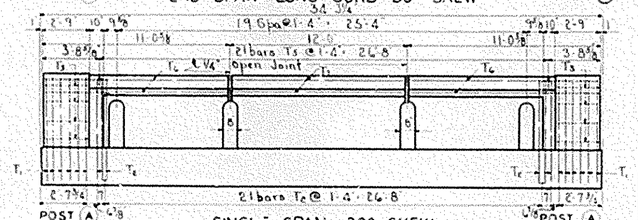


PART ELEVATION

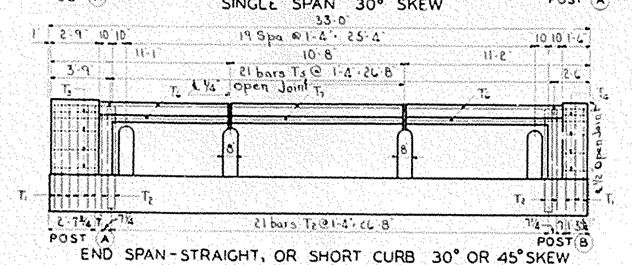
Showing relation of posts, spindles, and rail to grade line when bridge is on a plus or minus grade



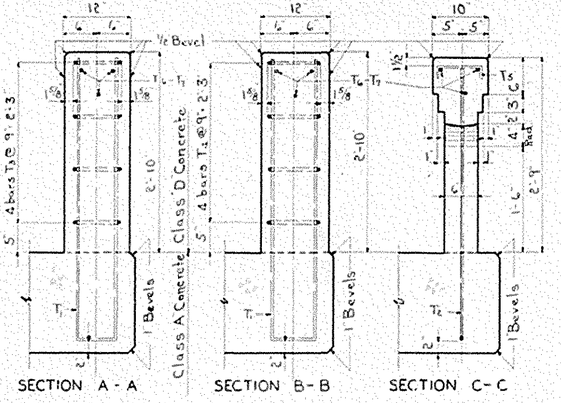
END SPAN - LONG CURB - 30° SKEW



SINGLE SPAN 30° SKEW



END SPAN - STRAIGHT, OR SHORT CURB 30° OR 45° SKEW



BILL AND TYPES OF REINFORCEMENT

Mark	Type	No.	Size	Length Ft	Length In	Location	a Ft	a In	b Ft	b In
T	(1)	See Table	⅝"ϕ	8	5	Posts A & B	3	11½	0	8
T₂	-		-	7	11	Spindles	3	10½	0	4
T₃	(2)		⅜"ϕ	7	2	Hoops Posts A	2	5¾	0	8¾
T₄	-		-	4	8	Hoops Posts B	1	2¾	0	8¾
T₅	(3)		½"ϕ	0	11	Rail	—	—	—	—
T₆	Str		-	See Table			—	—	—	—
T₇	-		-	See Table			—	—	—	—

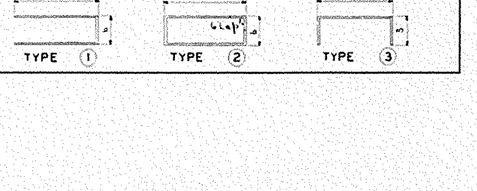


TABLE OF REINFORCEMENT AND ESTIMATED QUANTITIES

30 FOOT SPAN			T 1 NO.	T 2 NO.	T 3 NO.	T 4 NO.	T 5 NO.	T 6 NO.	T 6 LENGTH Ft	T 6 LENGTH In	T 7 NO.	T 7 LENGTH Ft	T 7 LENGTH In	CONCRETE CLASS 'D' CU. YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	24	44	16	—	40	12	10	10	6	10	5	3.6	770
	INTERMEDIATE	TWO RAILS	12	48	—	16	44	12	10	10	6	10	5	3.3	690
	END	TWO RAILS	18	46	8	8	42	12	10	10	6	10	5	3.5	730
30° SKEW	SINGLE	TWO RAILS	24	46	16	—	42	12	10	10	6	11	9	3.7	790
	INTERMEDIATE	TWO RAILS	12	48	—	16	44	12	10	10	6	10	5	3.3	690
	END	LONG RAIL	9	24	4	4	22	6	10	10	3	11	9	3.5	740
		SHORT RAIL	9	23	4	4	21	6	10	10	3	10	5		
45° SKEW	SINGLE	TWO RAILS	24	48	16	—	44	12	12	0	6	10	3	3.8	810
	INTERMEDIATE	TWO RAILS	12	48	—	16	44	12	10	10	6	10	5	3.3	690
	END	LONG RAIL	9	25	4	4	23	6	12	0	3	10	3	3.5	750
		SHORT RAIL	9	23	4	4	21	6	10	10	3	10	5		

GENERAL NOTE

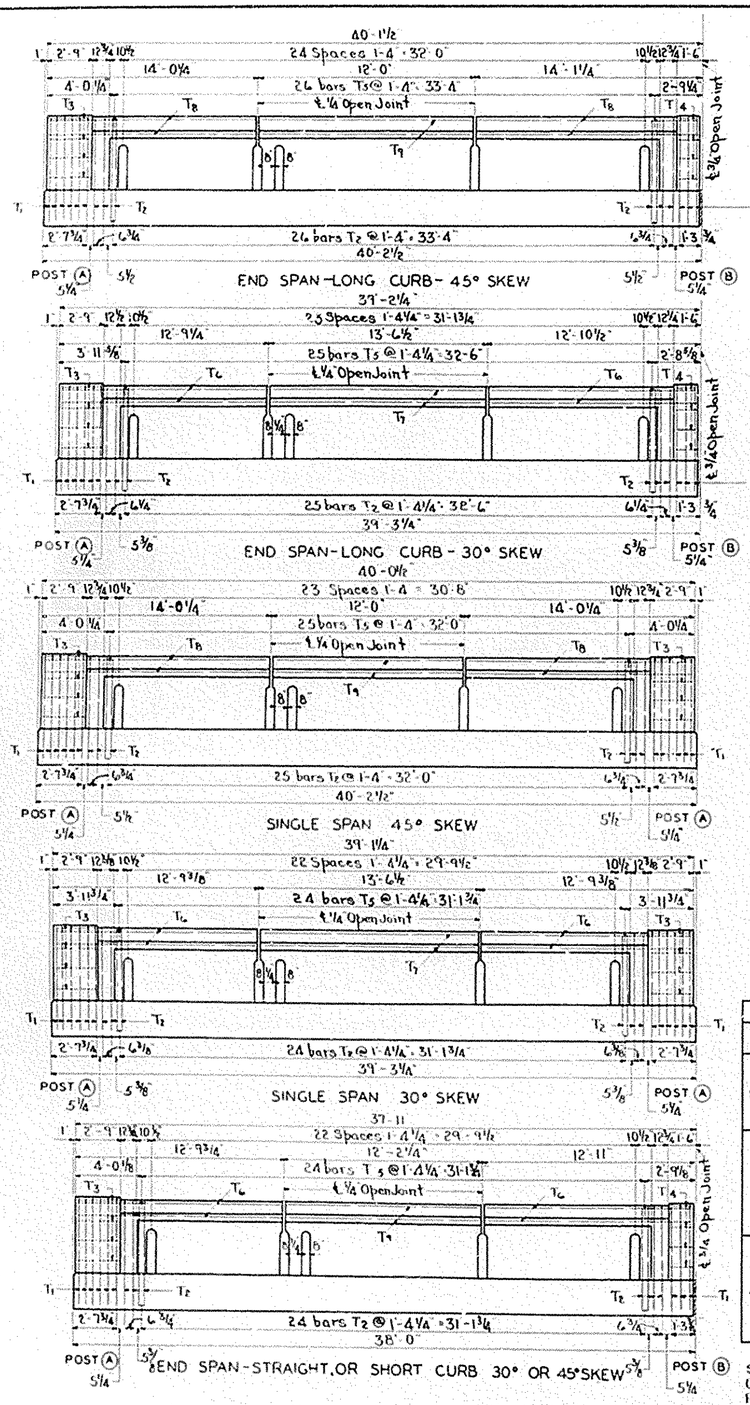
Specifications: Kentucky Department of Highways (1938 Standard with Amendments)
Concrete: Class 'D' concrete to be used in handrail
Reinforcement: Dimension shown from face of concrete is clear distance unless otherwise shown. Bars of Structural and Intermediate grade new billet steel may be combined on this project or bars of hard grade new billet and rail steel may be combined on this project but a mixing of these two permissible combinations will not be allowed.
Beveled Edges: All exposed edges shall be beveled ¼" unless otherwise noted.

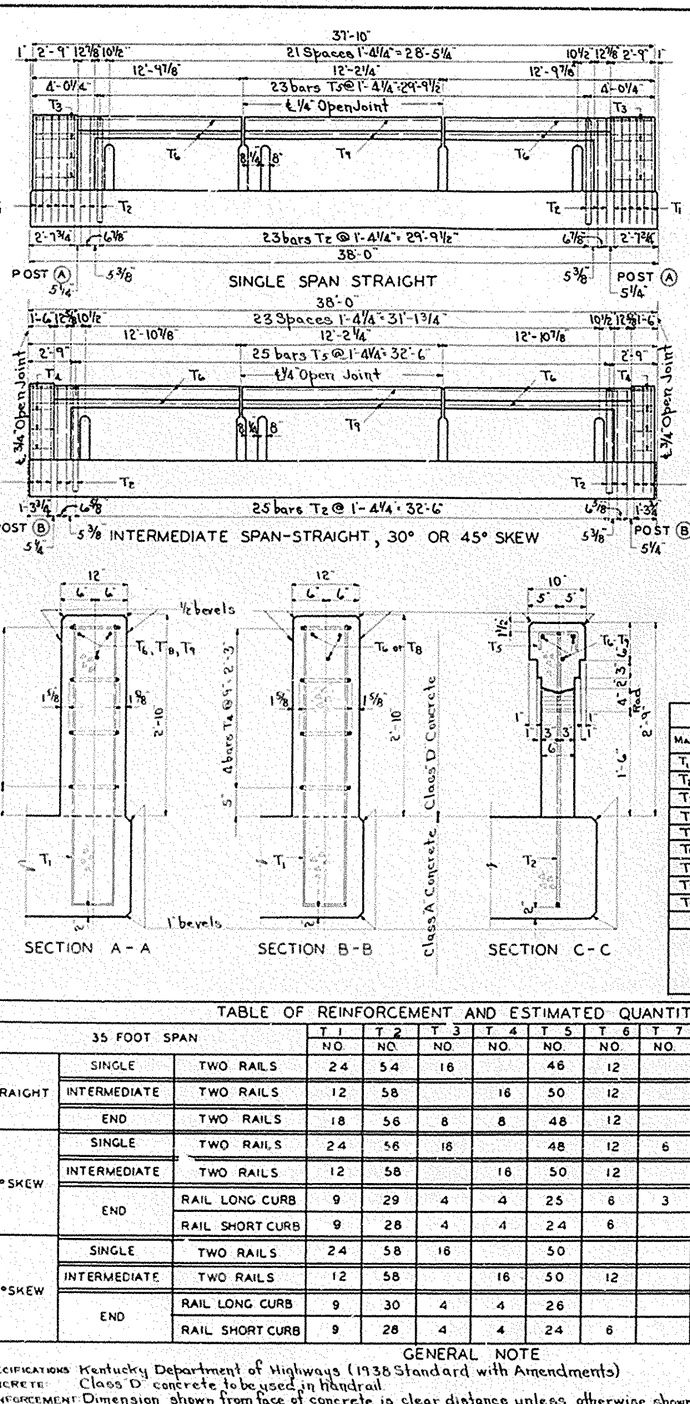
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

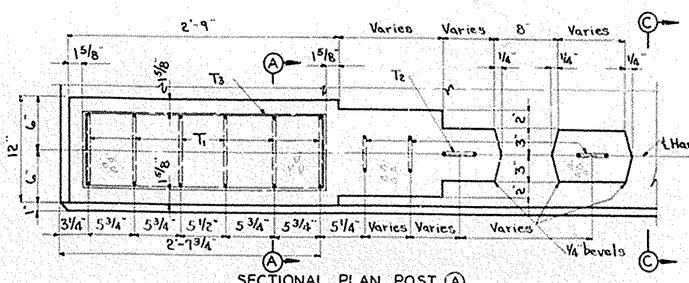
STANDARD HANDRAIL
DECK GIRDERS 30FT. SPANS

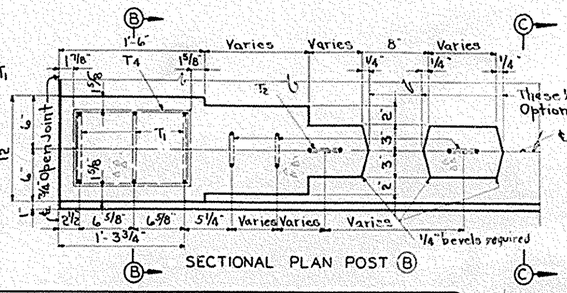
DRAWING No.	REVISED
H-40	

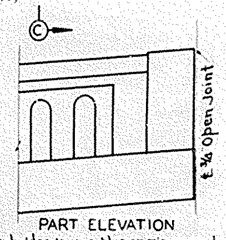
BRIDGE











When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

BILL AND TYPES OF REINFORCEMENT

Mark	Type	No.	Size	Length Ft.	Length In.	Location	a Ft.	a In.	b Ft.	b In.
T1	(1)	Table	5/8" ø	8	5	Posts A & B	3	11½	0	8
T2	-	Sec	-	7	11	Spindles	3	10½	0	4
T3	(2)		3/16 x 4	7	2	Posts A	2	5¾	0	8¾
T4	-		-	4	8	Posts B	1	2½	0	8¾
T5	(1)		½" ø	0	11	Rail	0	3	0	7
T6	Str		-	12	6	"	—	—	—	—
T7	-		-	13	3	"	—	—	—	—
T8	-		-	13	9	"	—	—	—	—
T9	-		-	11	9	"	—	—	—	—

TYPE (1) TYPE (2)

TABLE OF REINFORCEMENT AND ESTIMATED QUANTITIES

35 FOOT SPAN			T 1 NO.	T 2 NO.	T 3 NO.	T 4 NO.	T 5 NO.	T 6 NO.	T 7 NO.	T 8 NO.	T 9 NO.	CONCRETE CLASS D CU. YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	24	54	16		46	12			6	4.1	880
	INTERMEDIATE	TWO RAILS	12	58		16	50	12			6	3.8	790
	END	TWO RAILS	18	56	8	8	48	12			6	3.9	830
30° SKEW	SINGLE	TWO RAILS	24	56	16		48	12	6			4.2	900
	INTERMEDIATE	TWO RAILS	12	58		16	50	12			6	3.8	790
	END	RAIL LONG CURB	9	29	4	4	25	6	3			4.0	840
		RAIL SHORT CURB	9	28	4	4	24	6			3		
45° SKEW	SINGLE	TWO RAILS	24	58	16		50			12	6	4.2	920
	INTERMEDIATE	TWO RAILS	12	58		16	50	12			6	3.8	790
	END	RAIL LONG CURB	9	30	4	4	26			6	3	4.0	860
		RAIL SHORT CURB	9	28	4	4	24	6			3		

GENERAL NOTE

Specifications: Kentucky Department of Highways (1938 Standard with Amendments)

Concrete: Class 'D' concrete to be used in Handrail.

Reinforcement: Dimension shown from face of concrete is clear distance unless otherwise shown. Bars of Structural and Intermediate grade new billet steel may be combined on this project or bars of hard grade new billet and rail steel may be combined on this project but a mixing of these two permissible combinations will not be allowed.

Beveled Edges: All exposed edges shall be beveled ½" unless otherwise noted.

COMMONWEALTH OF KENTUCKY

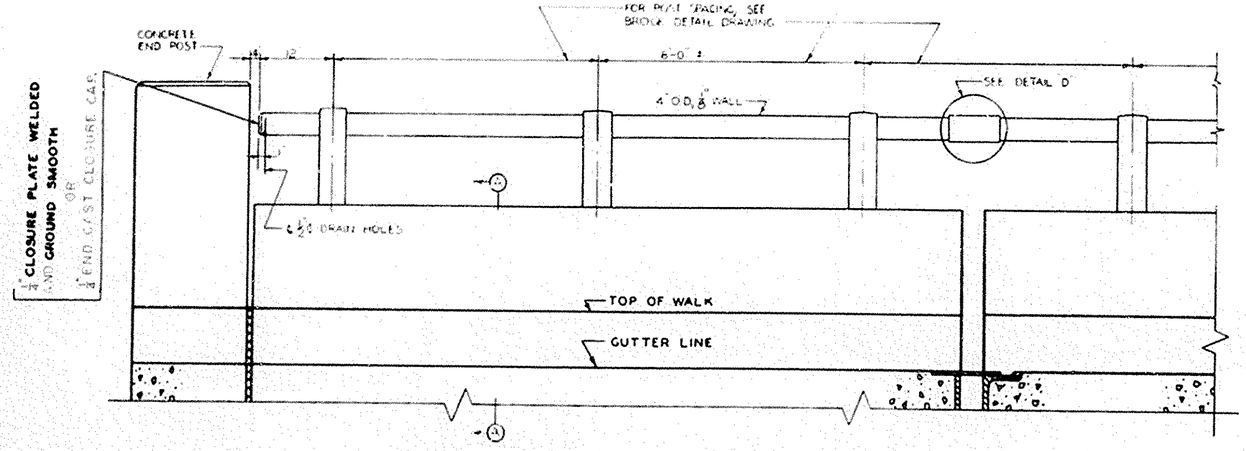
DEPARTMENT OF HIGHWAYS

STANDARD HANDRAIL

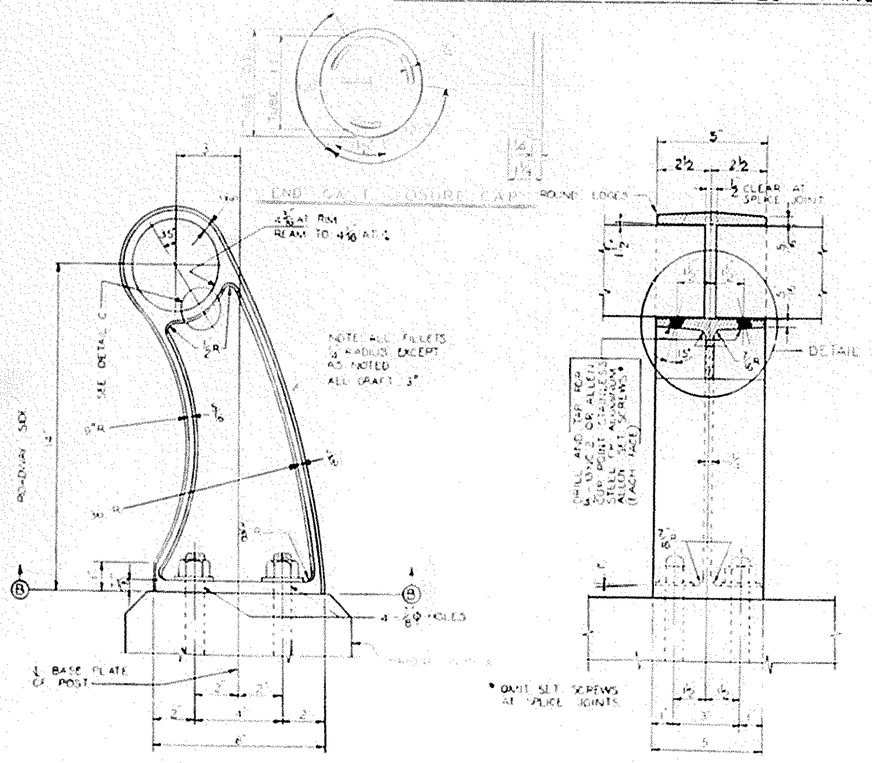
DECK GIRDERS 35FT. SPANS

Sheet No. H-41

BRIDGE



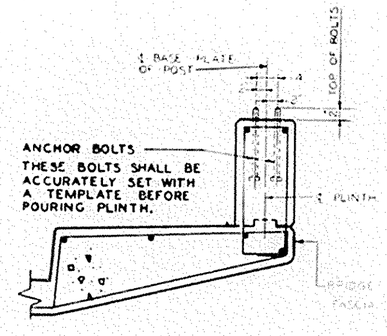
INSIDE ELEVATION OF ERECTED HANDRAIL



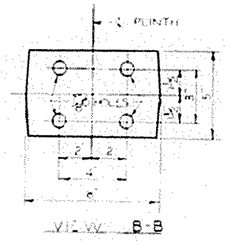
SIDE ELEVATION

SECTIONAL ELEVATION

POST

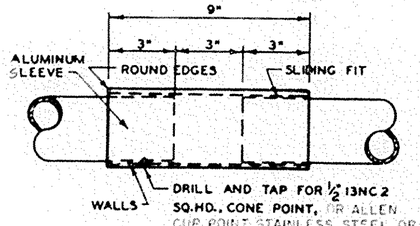


SECTION A-A



VIEW B-B

(POST BASE)



DETAIL "D"
(TO BE USED AT EXPANSION ONLY)

GENERAL NOTE

ALUMINUM POSTS: SEE SPECIAL SPECIFICATIONS NO. 16-56 FOR ALUMINUM POSTS.

FABRICATION

GENERAL SEE DETAIL DRAWINGS FOR EXACT SPACING OF POSTS. THE CONTRACTOR SHALL FURNISH THE DEPARTMENT OF HIGHWAYS WITH COMPLETE SHOP DETAIL PLANS OF HANDRAIL FOR APPROVAL.

CUTTING: SAW AND MILL ALL CUTS.

HOLES: ALL HOLES IN CASTINGS SHALL BE CORED.

WELDING: USE INERT GAS SHIELDED ARC. NO FLUX. WELDING NOT PERMITTED EXCEPT AS SHOWN ON THIS SHEET.

FINISH: POST AND TUBES SHALL BE FINISHED ON EXTERIOR FACES AND EDGES WITH A 120 SANDING BELT.

APPEARANCE: SCORING OR MARRING OF SURFACES SUFFICIENT TO CAUSE OBJECTIONABLE APPEARANCE SHALL BE CAUSE FOR REJECTION OF DAMAGED PIECE.

MEASUREMENT

ERECTION: HANDRAIL POSTS SHALL BE SET AT RIGHT ANGLES TO FASCIA LINE. TUBING SHALL BE ERECTED ON A LINE PARALLEL TO THE FASCIA LINE. WASHER SHIMS (MAXIMUM THICKNESS 1/8") MAY BE USED BETWEEN CONCRETE AND POST BASE FOR POST AND OR TUBING ALIGNMENT. THE VOID SPACE UNDER THE POST BASE SHALL BE FILLED WITH AN ALUMILASTIC COMPOUND OR APPROVED EQUAL, SO AS TO COMPLETELY INSULATE THE ALUMINUM FROM THE CONCRETE. THE CONTRACTOR SHALL FURNISH THE DEPARTMENT OF HIGHWAYS WITH COMPLETE ERECTION DETAIL PLANS SHOWING LOCATION OF SPLICES AND ERECTION DETAILS FOR APPROVAL.

MATERIAL

TUBING: ALUMINUM A.S.T.M. DESIGNATION B-235 ALLOY 6061-T6 OR 6062-T6 TUBING LENGTHS TO EQUAL 3 POST SPACES; 25 FEET OR LESS.

POSTS: ALUMINUM A.S.T.M. SPECIFICATIONS B 108 CURRENT SPECIFICATIONS, ALLOY DESIGNATION SG 70B AND THE CASTING SHALL BE HEAT-TREATED TO A T-6 TEMPER INSTEAD OF T-61 TEMPER LISTED IN B 108-59 FOR ALLOY SG 70 B IN ORDER TO PRODUCE PROPERTIES LISTED UNDER "TENSILE PROPERTIES" GIVEN IN (A 356-T6).

ANCHOR BOLTS: 3/4"ø X 12" SQUARE HEAD MACHINE BOLTS THREADED 2". FURNISH WITH ONE (1) HEX. NUT AND ONE (1) WASHER EACH. ALL TO CONFORM TO A.S.T.M. DESIGNATION A 276, TYPES 302, 303 OR 304 CURRENT SPECIFICATIONS, OR TO CONFORM TO A.S.T.M. DESIGNATION A 307 CURRENT SPECIFICATIONS AND GALVANIZED IN ACCORDANCE WITH A.S.T.M. DESIGNATION A 153.

SET SCREWS: 1/2"ø 13 NC SQUARE HEAD OR ALLEN CUP POINT STAINLESS STEEL SET SCREWS, A.S.T.M. DESIGNATION A 276, TYPE 302, 303, OR 304, CURRENT SPECIFICATIONS ; OR ALLUMINUM ALLOY SET SCREWS 1/2"ø 13 NC 2 SQUARE HEAD OR ALLEN CUP POINT (2024-T4 WITH 205 ALUMILITE FINISH) A.S.T.M. B 211-55T ALLOY CG 42A CONDITION T4 ANODIC COATING .0002 INCHES CHROMATE SEALED.

CLOSURE PLATE: 1/4" THICK A.S.T.M. DESIGNATION B-209 ALLOY 6S T1A, CURRENT SPECIFICATIONS, TEMPER T-6.

NOTARIZED MILL TEST REPORTS: NOTARIZED MILL TEST REPORTS IN TRIPLICATE SHALL BE FURNISHED SHOWING THAT THE MATERIALS COMPLY WITH THE SPECIFICATIONS.

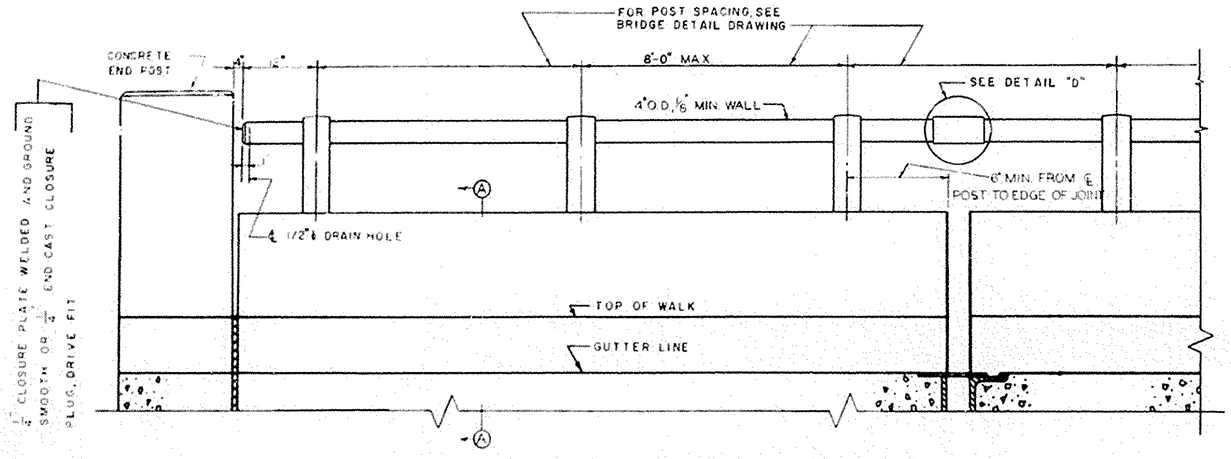
PAYMENT PAYMENT WILL BE MADE ON THE BASIS OF THE MEASURED LENGTH OF HANDRAIL BETWEEN ENDS. PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR COMPLETE HANDRAIL IN PLACE, INCLUDING ANCHOR BOLTS, AND SHALL BE COMPLETE COMPENSATION FOR ALL MATERIALS, EQUIPMENT, TOOLS AND LABOR INCIDENTAL TO THE MANUFACTURE, FABRICATION AND ERECTION OF THE HANDRAIL.

END CAST CLOSURE CAPS: END CLOSURE CAPS SHALL CONFORM TO A.S.T.M. B-26 ALLOY S5B-T CURRENT SPECIFICATIONS.

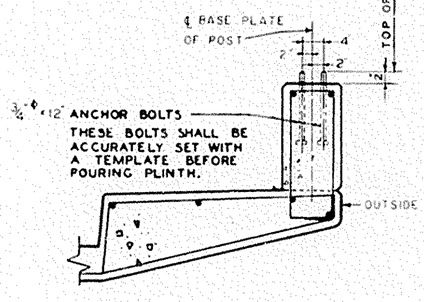
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD ALUMINUM HANDRAIL

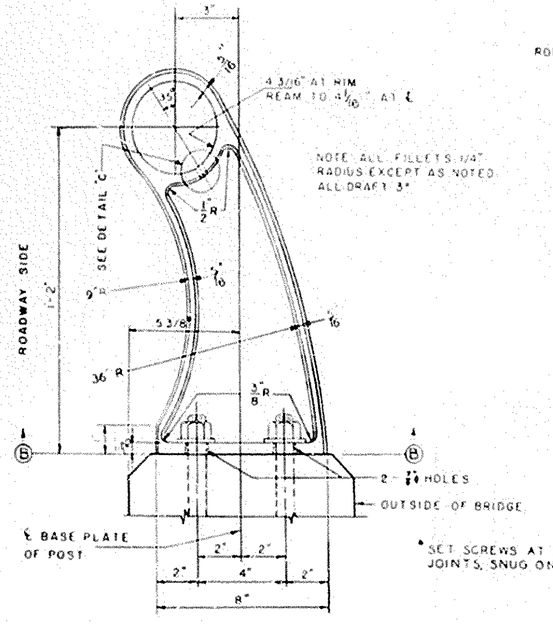
BRIDGE NUMBER | DRAWING NO. H 112 | SHEET



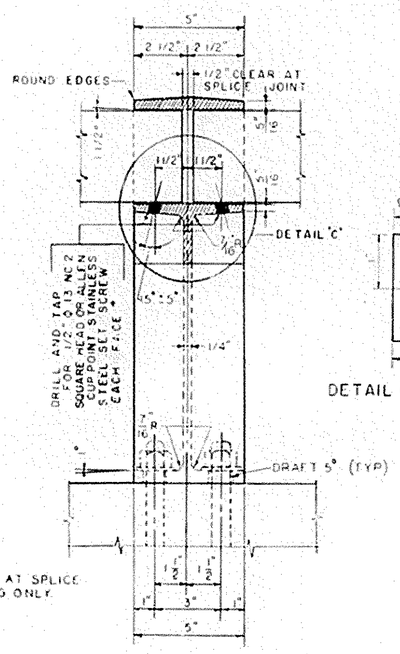
INSIDE ELEVATION OF ERECTED HANDRAIL



SECTION A-A

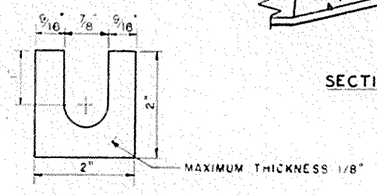


SIDE ELEVATION

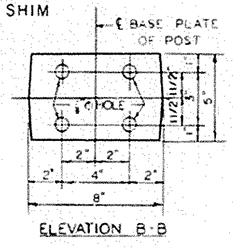


SECTIONAL ELEVATION

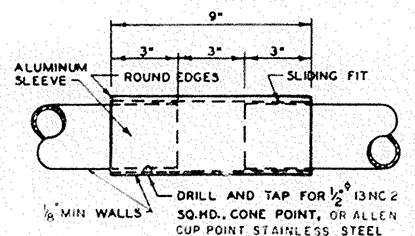
* SET SCREWS AT SPLICE JOINTS, SNUG ONLY.



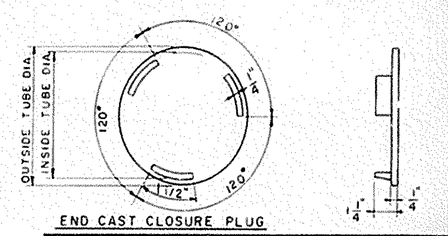
DETAIL OF WASHER SHIM



ELEVATION B-B



DETAIL "D"
(TO BE USED AT EXP. DAM ONLY)



END CAST CLOSURE PLUG

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Current Edition with Revisions

FABRICATION

GENERAL: See Detail Drawings for exact spacing of posts. The Contractor shall furnish the Department of Highways with complete shop detail plans of handrail for approval.

CUTTING: Saw and mill all cuts.

HOLES: All holes in castings shall be core.

WELDING: Use inert gas shield arc. No flux. Tubing not permitted except as shown on this sheet.

FINISH: Posts, Tubing, and Expansion Sleeve shall receive a normal mill finish.

APPEARANCE: Scoring or marring of surfaces sufficient to cause objectionable appearance shall be cause for rejection of damaged piece.

MEASUREMENT

ERECTION: Handrail Posts shall be set at right angles to fascia line. Tubing shall be erected on a line parallel to the fascia line. Washer shims (maximum thickness 1/8") may be used between concrete and post base for post and or tubing alignment. The void space under the post base shall be filled with an alumilastic compound or approved equal so as to completely insulate the aluminum from the concrete. The contractor shall furnish the Department of Highways with complete erection detail plans showing location of splices and erection details for approval.

PAYMENT: Payment will be made on the basis of the measured length of handrail between ends. Payment will be made at the contract unit price per linear foot for complete handrail in place, including anchor bolts, and shall be complete compensation for all materials, equipment, tools and labor incidental to the manufacture, fabrication and erection of the handrail.

MATERIALS

TUBING & SLEEVE: Aluminum ASTM B-221, alloy 6061-T6511, or alloy 6063-T6. Tubing lengths to equal three post spaces, 25 feet or less.

POSTS: See Special Provision No. 71 for Cast Aluminum Bridge Railing Posts.

ANCHOR BOLTS: 3/4" ø x 12" square head machine bolts threaded 2". Furnish with one (1) hex. nut and one (1) washer each. All to conform to ASTM A-276, type 302, or 304 or ASTM A-307 for low carbon steel machine bolts and nuts galvanized in accordance with ASTM A-153.

SET SCREWS: 1/2" ø 13 NC 2 square head cone point, square head or allen cup point stainless steel set screws, ASTM A-276, type 302 or 304.

CLOSURE PLATE: 1/4" thick ASTM B-209, alloy 6061-T6, welded in place and ground smooth.

END CAST CLOSURE PLUG: 1/4" thick ASTM B-26, alloy SSB-F or ASTM B-108, alloy SSB-F, or Aluminum Association alloy A-356.

NOTARIZED MILL TEST REPORTS: Notarized mill test reports or statements certifying that the materials comply with the Specifications, shall be furnished in triplicate to the Department of Highways.

WASHER SHIMS: Washer shims shall meet the requirements of ASTM B-209 alloy alclad 2024-T3 or alloy 1100.

WELDING MATERIAL: Welding and welding material shall conform to "Specifications for Welded Highway and Railway Bridges", current edition, of the American Welding Society.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD ALUMINUM HANDRAIL

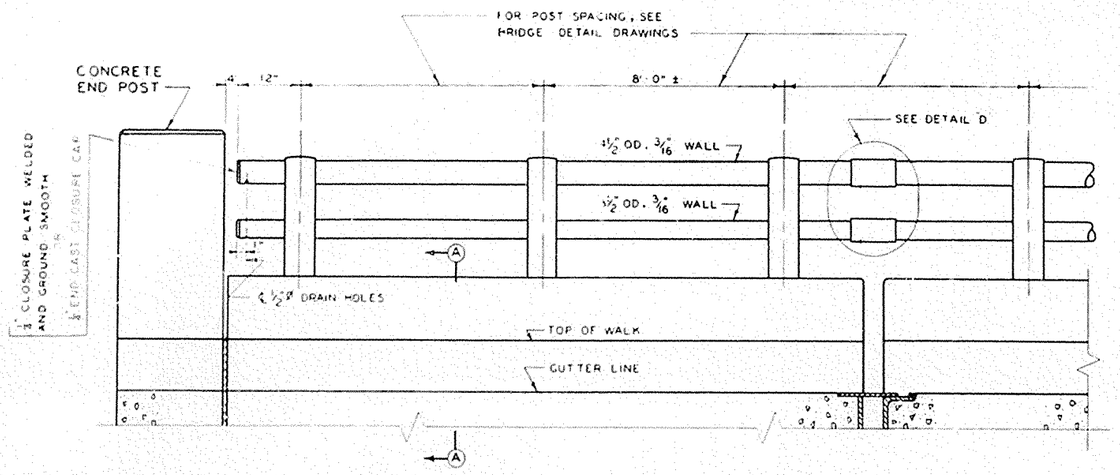
BRIDGE NUMBER	DRAWING NO. H1128	SHEET

POST

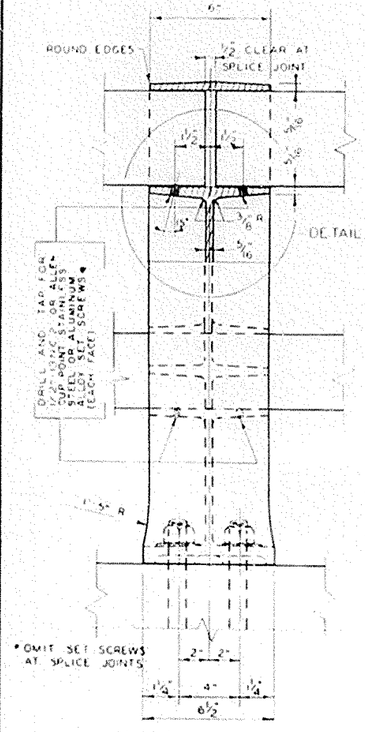
APPROVED BY ... DIRECTOR DIVISION OF BRIDGES — DATE

DESIGNED BY	CHECKED BY	REVISED BY	DATE
DETAILED BY	CHECKED BY	REVISED BY	DATE
TRACED BY	CHECKED BY	REVISED BY	DATE

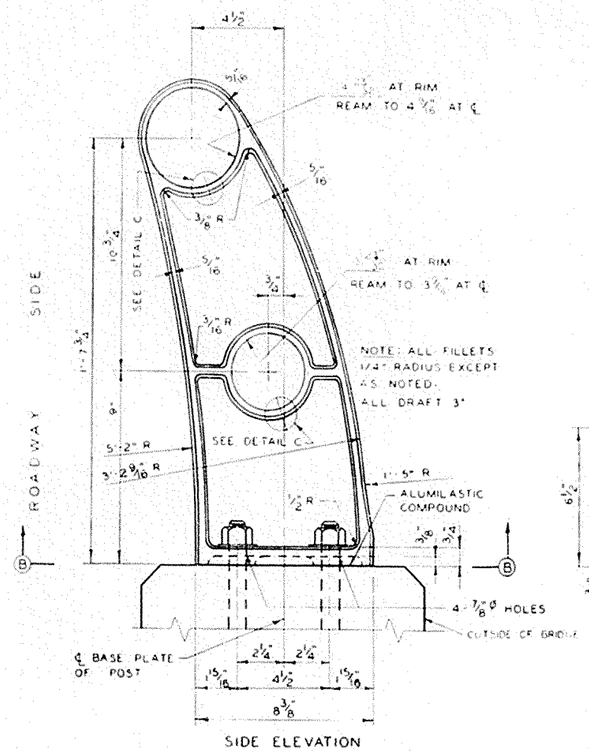
BRIDGE



INSIDE ELEVATION OF ERECTED HANDRAIL

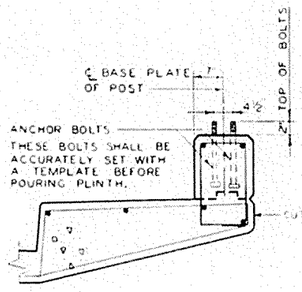


FRONT SECTIONAL ELEVATION

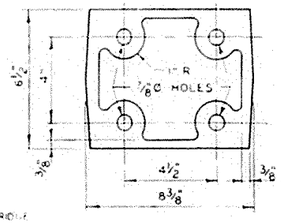


SIDE ELEVATION

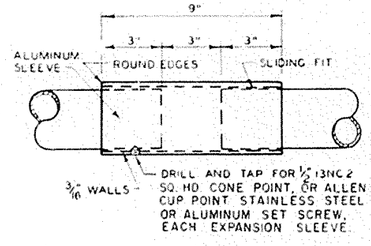
POST



SECTION A-A



ELEVATION B-B



DETAIL "D"
(TO BE USE AT EXP. DAM ONLY)

GENERAL NOTE

ALUMINUM POSTS:	SEE SPECIAL SPECIFICATION NO. 14-SE FOR ALUMINUM POSTS.
	FABRICATION
GENERAL:	SEE DETAIL DRAWINGS FOR EXACT SPACING OF POSTS. THE CONTRACTOR SHALL FURNISH THE DEPARTMENT OF HIGHWAYS WITH COMPLETE SHOP DETAIL PLANS OF HANDRAIL FOR APPROVAL.
CUTTING:	SAW AND MILL ALL CUTS.
HOLES:	ALL HOLES IN CASTINGS SHALL BE CORED.
WELDING:	USE INERT GAS SHIELDED ARC, NO FLUX. WELDING NOT PERMITTED EXCEPT AS SHOWN ON THIS SHEET.
FINISH: APPEARANCE:	POST AND TUBES SHALL BE FINISHED ON EXTERIOR FACES AND EDGES WITH A 120 SANDING BELT. SCORING OR MARRING OF SURFACES SUFFICIENT TO CAUSE OBJECTIONABLE APPEARANCE SHALL BE CAUSE FOR REJECTION OF DAMAGED PIECE.
	MEASUREMENT
ERECTION:	HANDRAIL POSTS SHALL BE SET AT RIGHT ANGLES TO FASCIA LINE. TUBING SHALL BE ERECTED ON A LINE PARALLEL TO THE FASCIA LINE. WASHER SHIMS (MAXIMUM THICKNESS 1/8") MAY BE USED BETWEEN CONCRETE AND POST BASE FOR POST AND OR TUBING ALIGNMENT. THE VOID SPACE UNDER THE POST BASE SHALL BE FILLED WITH AN ALUMILASTIC COMPOUND OR APPROVED EQUAL SO AS TO COMPLETELY INSULATE THE ALUMINUM FROM THE CONCRETE. THE CONTRACTOR SHALL FURNISH THE DEPARTMENT OF HIGHWAYS WITH COMPLETE ERECTION DETAIL PLANS SHOWING LOCATION OF SPLICES AND ERECTION DETAILS FOR APPROVAL.
	MATERIAL
TUBING:	ALUMINUM A.S.T.M. DESIGNATION B-221, ALLOY 6061-T6 OR 6062-T6.
	TUBING LENGTHS TO EQUAL 3 POST SPACES; 25 FEET OR LESS.
POSTS:	ALUMINUM A.S.T.M. SPECIFICATIONS B-108 CURRENT SPECIFICATIONS, ALLOY DESIGNATION 56 70B AND 71B CASTING SHALL BE HEAT TREATED TO A T6 TEMPER INSTEAD OF T61 TEMPER LISTED IN B 108-59 FOR ALLOY 53 70 B IN ORDER TO PRODUCE PROPERTIES LISTED UNDER "TENSILE PROPERTIES" GIVEN IN (A 356-T6).
ANCHOR BOLTS:	3/4" Ø X 12" SQUARE HEAD MACHINE BOLTS THREADED 2". FURNISH WITH ONE (1) HEX. NUT AND FIVE (5) WASHER EACH. ALL TO CONFORM TO A.S.T.M. DESIGNATION A 276, TYPES 302, 303 OR 304 CURRENT SPECIFICATIONS, OR TO CONFORM TO A.S.T.M. DESIGNATION A 307 CURRENT SPECIFICATIONS AND GALVANIZED IN ACCORDANCE WITH A.S.T.M. DESIGNATION A 153.
SET SCREWS:	1/2" Ø 13NC 2 SQUARE HEAD OR ALLEN CUP POINT STAINLESS STEEL SET SCREWS, A.S.T.M. DESIGNATION A 276, TYPE 302, 303 OR 304, CURRENT SPECIFICATIONS; OR ALUMINUM ALLOY SET SCREWS 1/2" Ø 13 NC 2 SQUARE HEAD OR ALLEN CUP POINT (2024-T6 WITH 205 ALUMILITE FINISH) A.S.T.M. B211-56T ALLOY EQ 32A CONFORM TO ANODIC COATING .0002 INCHES CHROMATE SEALED.
CLOSURE PLATE:	¼" THICK A.S.T.M. DESIGNATION B-209 ALLOY QS 11A, CURRENT SPECIFICATIONS, TEMPER T-6.
NOTARIZED MILL TEST REPORTS:	NOTARIZED MILL TEST REPORTS IN TRIPLICATE SHALL BE FURNISHED SHOWING THAT THE MATERIALS COMPLY WITH THE SPECIFICATIONS.
PAYMENT	PAYMENT WILL BE MADE ON THE BASIS OF THE MEASURED LENGTH OF HANDRAIL BETWEEN ENDS. PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR COMPLETE HANDRAIL IN PLACE, INCLUDING ANCHOR BOLTS, AND SHALL BE COMPLETE COMPENSATION FOR ALL MATERIALS, EQUIPMENT, TOOLS AND LABOR INCIDENTAL TO THE MANUFACTURE, FABRICATION AND ERECTION OF THE HANDRAIL.

END CAST CLOSURE CAP: ½" END CLOSURE CAPS SHALL CONFORM TO A.S.T.M. B-26 ALLOY S5B-F CURRENT SPECIFICATIONS.

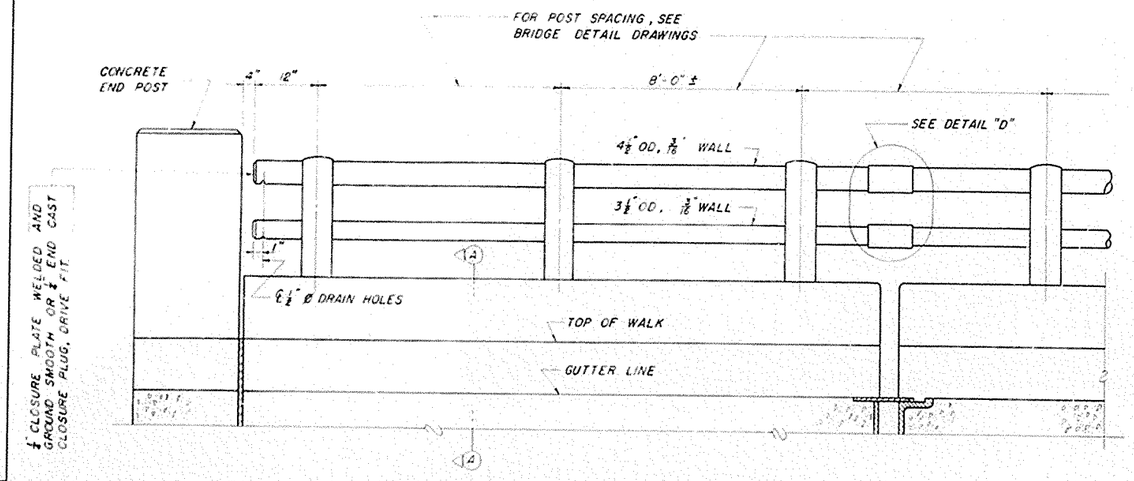
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
7	KY.			

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

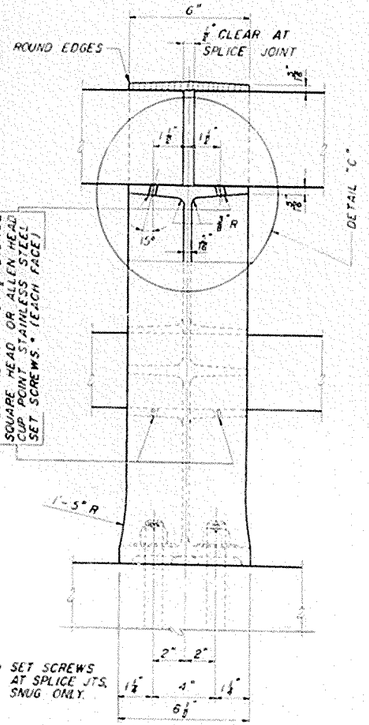
STANDARD ALUMINUM HANDRAIL

DRAWING NO. H 110

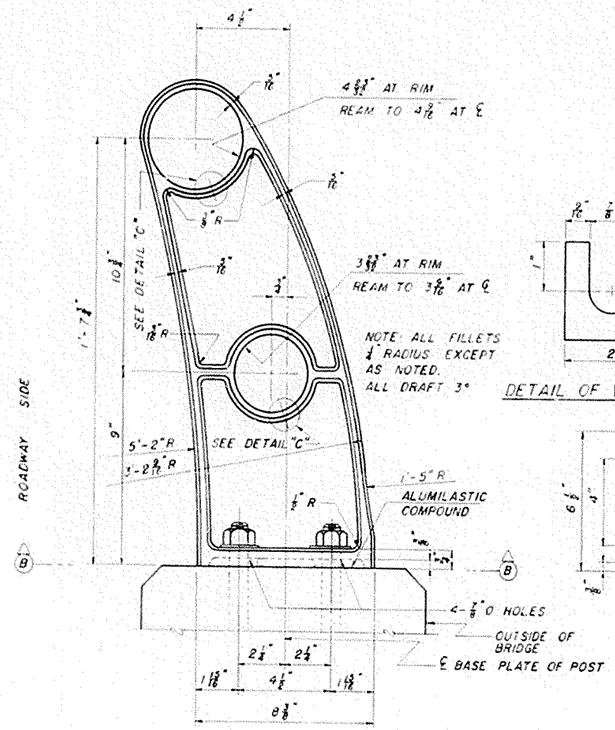
BRIDGE



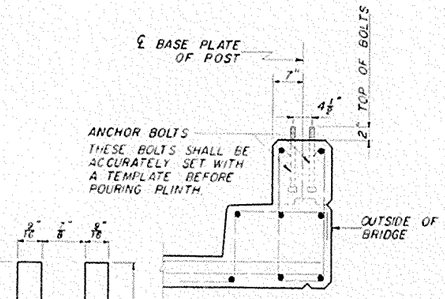
INSIDE ELEVATION OF ERECTED HANDRAIL



FRONT SECTIONAL ELEVATION

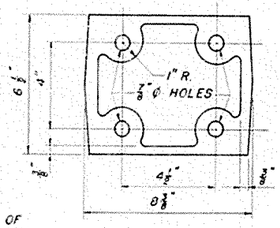


SIDE ELEVATION

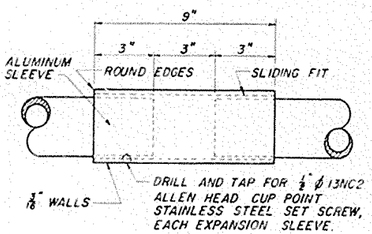


DETAIL OF WASHER SHIM

SECTION A-A



ELEVATION B-B



DETAIL "D"
(TO BE USED AT EXP DAM ONLY)

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Current Edition with Revisions.

FABRICATION

GENERAL: See Detail Drawings for exact spacing of post. The Contractor shall furnish the Department of Highways with complete shop detail plans of Handrail for approval.

CUTTING: Saw and mill all cuts.

HOLES: All holes in castings shall be cored.

WELDING: Use inert gas shielded arc. No flux. Welding not permitted except as shown on this sheet.

FINISH: Post, Tubing, and Expansion Sleeves shall receive a normal mill finish.

APPEARANCE: Scoring or marring of surfaces sufficient to cause objectionable appearance shall be cause for rejection of damaged piece.

MEASUREMENT

ERECTION: Handrail Post shall be set at right angles to fascia line. Tubing shall be erected on a line parallel to the fascia line. Bashes shims (maximum thickness 1/8") may be used between concrete and post base for post and or tubing alignment. The void space under the post base shall be filled with an elumiastic compound or approved equal so as to completely insulate the aluminum from the concrete. The contractor shall furnish the Department of Highways with complete erection detail plans showing location of splices and erection details for approval.

PAYMENT: Payment will be made on the basis of the measured length of handrail between ends. Payment will be made at the contract unit price per linear foot for complete handrail in place, including anchor bolts, and shall be complete compensation for all materials, equipment, tolls and labor incidental to the manufacture, fabrication and erection of the handrail.

MATERIALS

TUBING & SLEEVE: Aluminum ASTM B-221, alloy 6061 -T6511 or alloy 6063-T6. Tubing lengths to equal three post spaces, 25 feet or less.

POST: See Special Provision No. 71 for Cast Aluminum Bridge Railing Post.

ANCHOR BOLTS: 3/4" ø x 12" square head machine bolts threaded 2 inches. Furnish with one (1) hex. nut and one (1) washer each. All to conform to ASTM A-276, type 302 or 304 or ASTM A-307 for low-carbon steel machine bolts and nuts galvanized in accordance with ASTM A-153.

SET SCREWS: 1-2" ø 13 nc-2 socket head or allen head cup point stainless steel set screws. ASTM A-276, type 302 or 304.

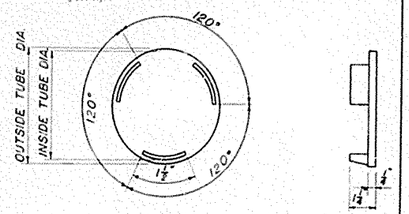
CLOSURE PLATE: 1/4" thick ASTM B-209, alloy 6061-T6, welded in place and ground smooth.

END CAST CLOSURE PLUG: 1/4" thick ASTM E-26, alloy SSB-F or ASTM B-108, alloy SSB-F or Aluminum Assoc. alloy A-356.

NOTARIZED MILL TEST REPORTS: Notarized mill test reports or statements certifying that the materials comply with the Specifications, shall be furnished in triplicate to the Department of Highways.

WASHER SHIMS: Washer shims shall meet the requirements of ASTM B-209 alloy alclad 2024-T3 or alloy 1100.

WELDING MATERIAL: Welding and welding material shall conform to "Specifications for Welded Highway and Railway Bridges," current edition, of The American Welding Society.



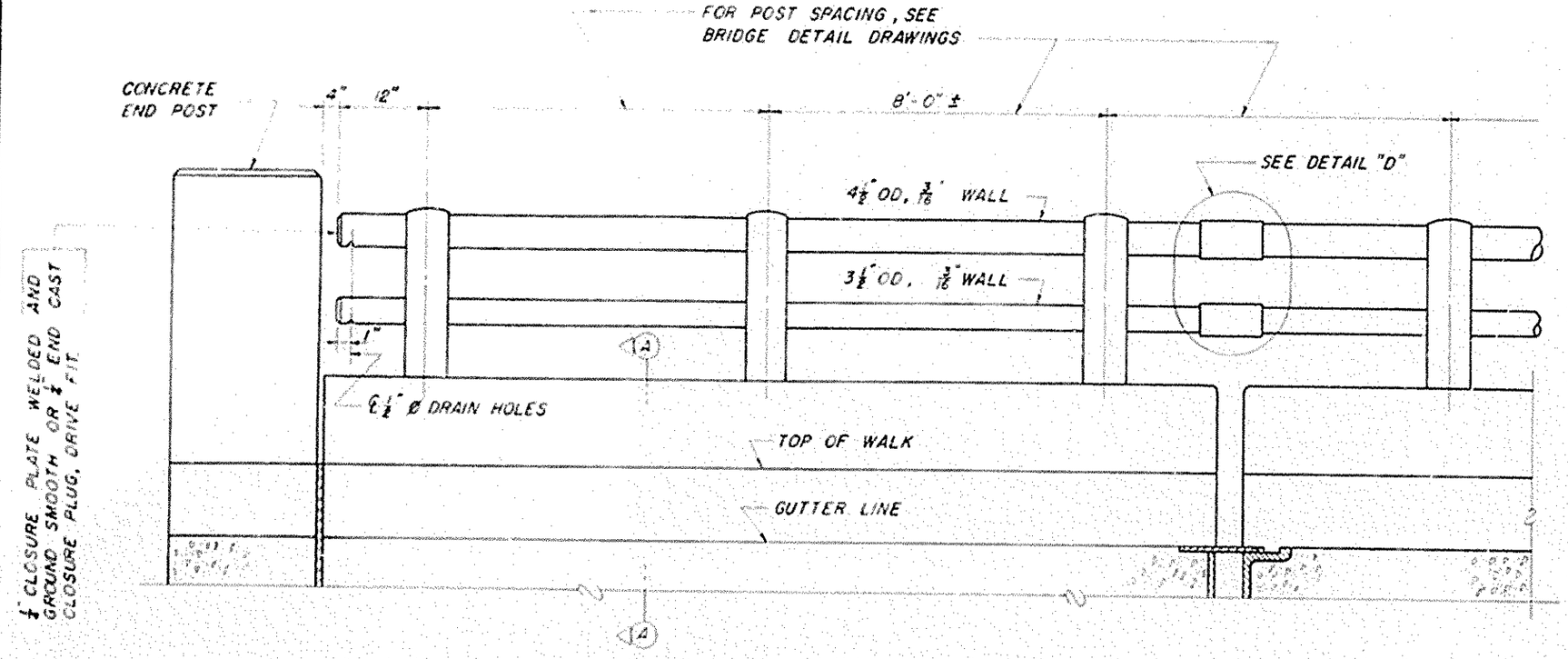
END CAST CLOSURE PLUG

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

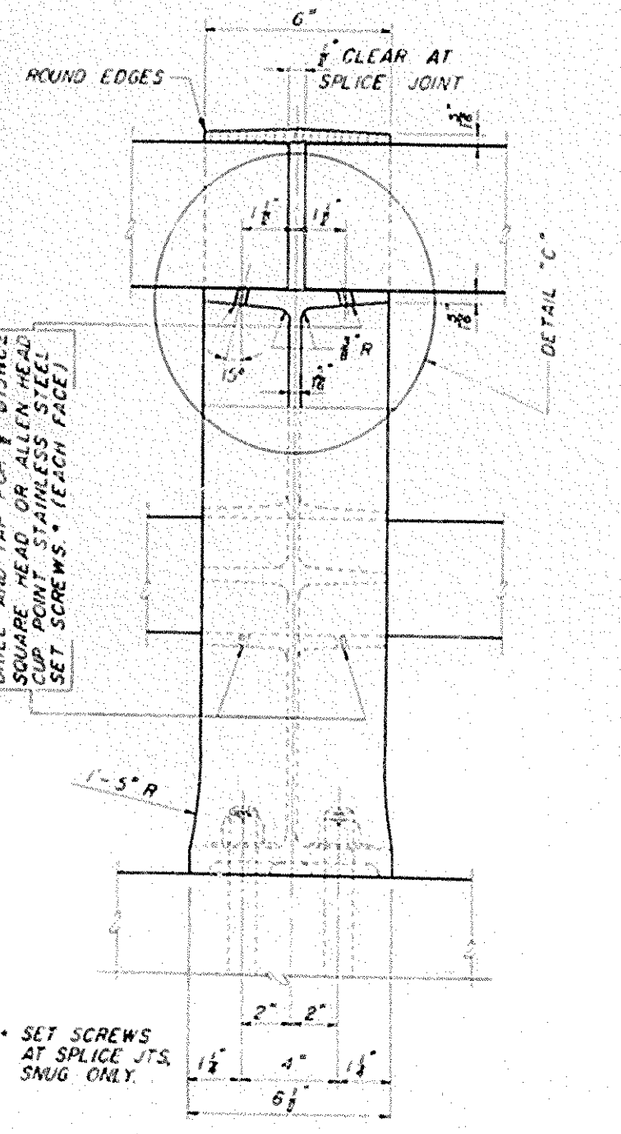
STANDARD ALUMINUM HANDRAIL

APPROVED _____ STATE HIGHWAY ENGINEER
DATE 5-19-69
DRAWING NO. H110-A

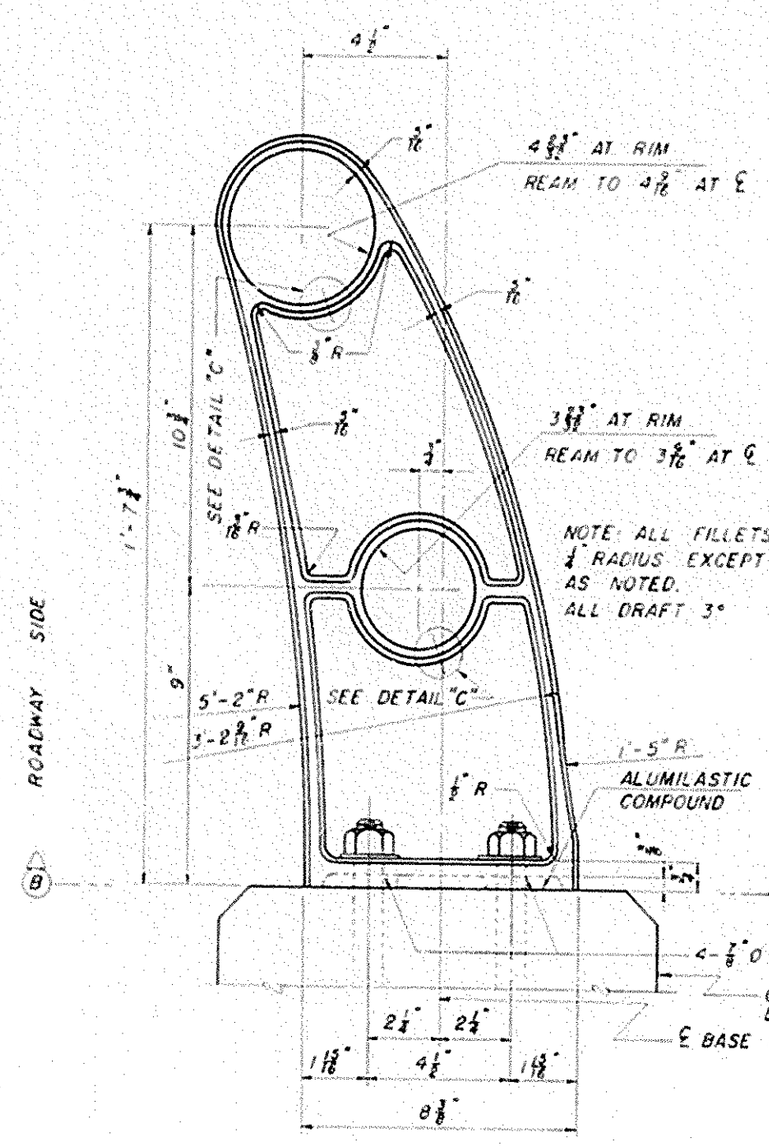
APPROVED _____ DIRECTOR DIV. OF BRIDGES
REVIEWED BY _____ ASST. STATE HIGHWAY ENGINEER
DESIGNED BY _____
DETAILED BY _____
CHECKED BY _____
TRACED BY _____



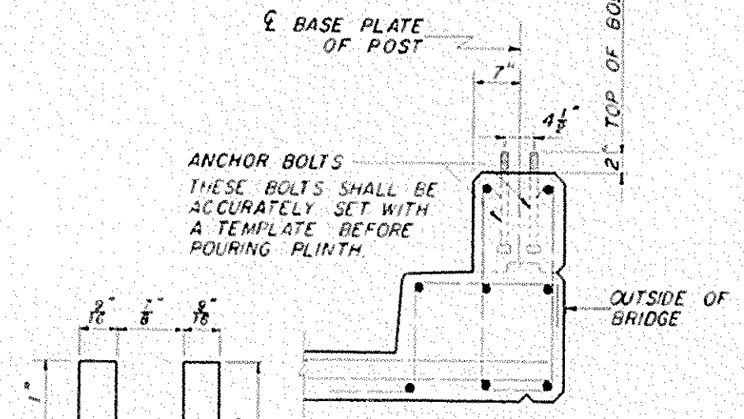
INSIDE ELEVATION OF ERECTED HANDRAIL



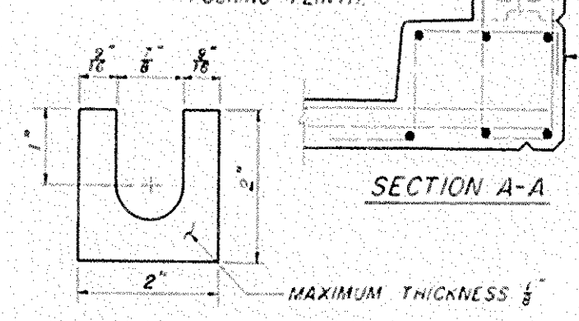
FRONT SECTIONAL ELEVATION



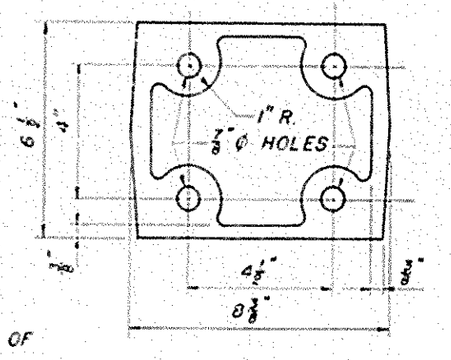
SIDE ELEVATION



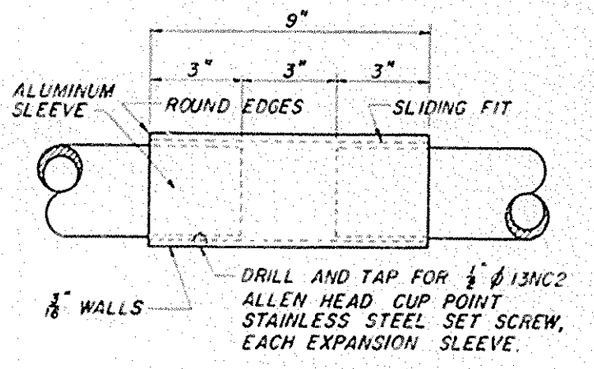
SECTION A-A



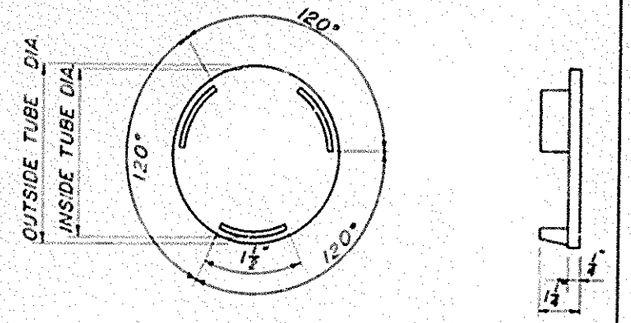
DETAIL OF WASHER SHIM



ELEVATION B-B



DETAIL "D"
(TO BE USED AT EXP. DAM ONLY)



END CAST CLOSURE PLUG

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Current Edition with Revisions.

FABRICATION

GENERAL: See Detail Drawings for exact spacing of post. The Contractor shall furnish the Department of Highways with complete shop detail plans of Handrail for approval.

CUTTING: Saw and mill all cuts.

HOLES: All holes in castings shall be cored.

WELDING: Use inert gas shielded arc. No flux. Welding not permitted except as shown on this sheet.

FINISH: Post, Tubing, and Expansion Sleeves shall receive a normal mill finish.

APPEARANCE: Scoring or marring of surfaces sufficient to cause objectionable appearance shall be cause for rejection of damaged piece.

MEASUREMENT

ERECTION: Handrail Post shall be set at right angles to fascia line. Tubing shall be erected on a line parallel to the fascia line. Washer shims (maximum thickness 1/8") may be used between concrete and post base for post and or tubing alignment. The void space under the post base shall be filled with an alumilastic compound or approved equal so as to completely insulate the aluminum from the concrete. The contractor shall furnish the Department of Highways with complete erection detail plans showing location of splices and erection details for approval.

PAYMENT: Payment will be made on the basis of the measured length of handrail between ends. Payment will be made at the contract unit price per linear foot for complete handrail in place, including anchor bolts, and shall be complete compensation for all materials, equipment, tolls and labor incidental to the manufacture, fabrication and erection of the handrail.

MATERIALS

TUBING & SLEEVE: Aluminum ASTM B-221, alloy 6061 -T6511, or alloy 6063-T6. Tubing lengths to equal three post spaces, 75 feet or less.

POST: See Special Provision No. 71 for Cast Aluminum Bridge Railing Post.

ANCHOR BOLTS: ¾" x 12" square head machine bolts threaded 2 inches. Furnish with one (1) hex. nut and one (1) washer each. All to conform to ASTM A-276, type 302, or 304 or ASTM A-307 for low-carbon steel machine bolts and nuts galvanized in accordance with ASTM A-153.

SET SCREWS: ½"-13 x 2 square head or allen head cup point stainless steel set screws. ASTM A-276, type 302 or 304.

CLOSURE PLATE: ¼" thick ASTM B-209, alloy 6061-T6, welded in place and ground smooth.

END CAST CLOSURE PLUG: ¼" thick ASTM B-26, allot 535-F or ASTM B-108, alloy 535-F or Aluminum Assoc. alloy A-356.

NOTARIZED MILL TEST REPORTS: Notarized mill test reports or statements certifying that the materials comply with the Specifications, shall be furnished in triplicate to the Department of Highways.

WASHER SHIMS: Washer shims shall meet the requirements of ASTM B-209 alloy alclad 2024-T3 or alloy 1100.

WELDING MATERIAL: Welding and welding material shall conform to "Specifications for Welded Highway and Railway Bridges," current edition, of The American Welding Society.

APPROVED BY _____ DIRECTOR DIV. OF BRIDGES — REVIEWED BY _____ ASST. STATE HIGHWAY ENGINEER

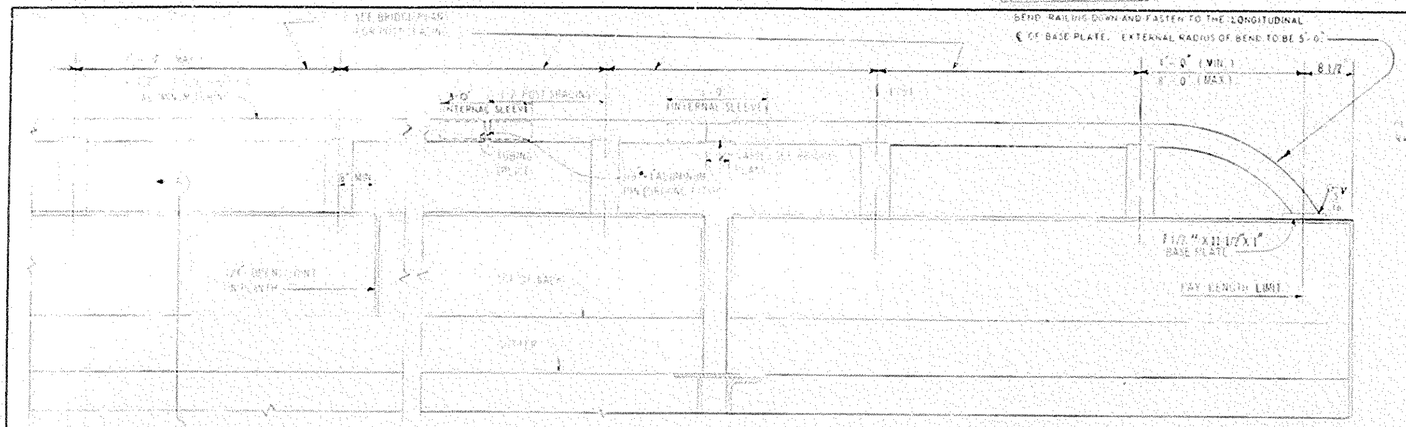
DESIGNED BY _____ CHECKED BY _____
DETAILED BY _____ CHECKED BY _____
TRACED BY _____ CHECKED BY _____

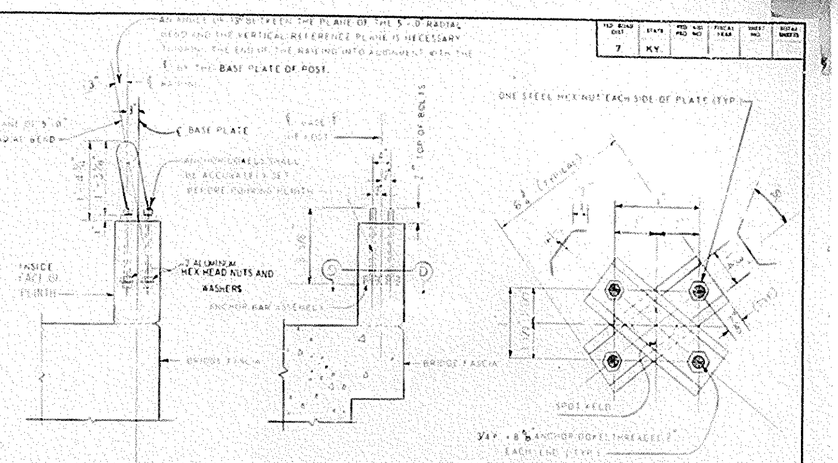
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD ALUMINUM HANDRAIL

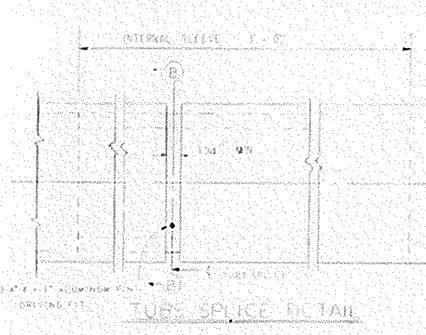
APPROVED	DATE	DRAWING NO.
L.O. Pilcher, STATE HIGHWAY ENGINEER	5-9-69	H110-A

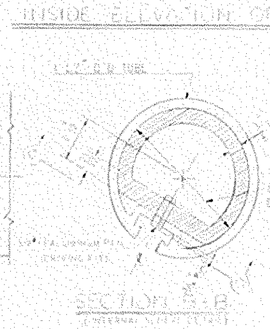
BRIDGE

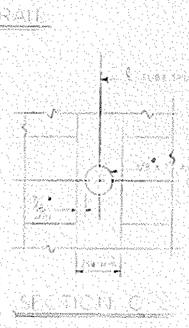


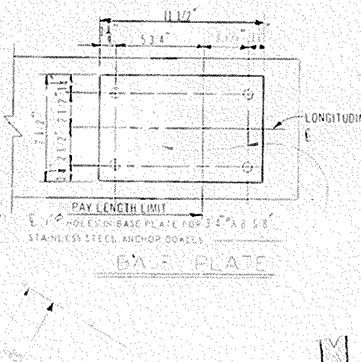


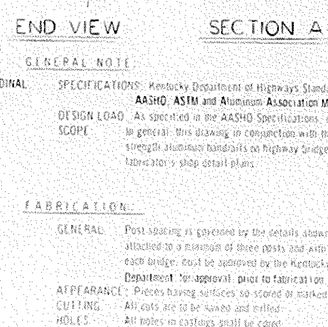
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				

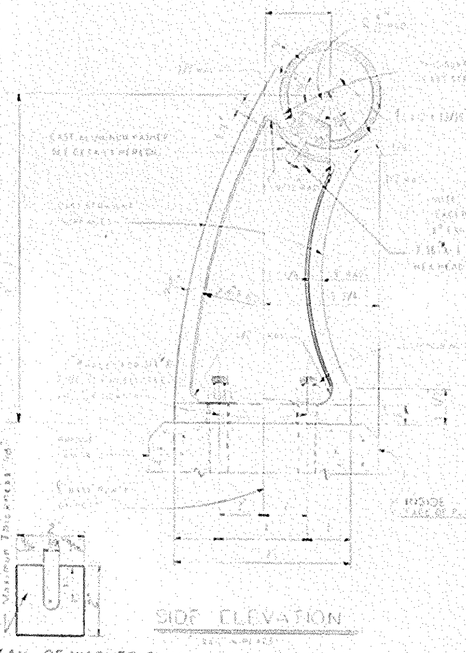


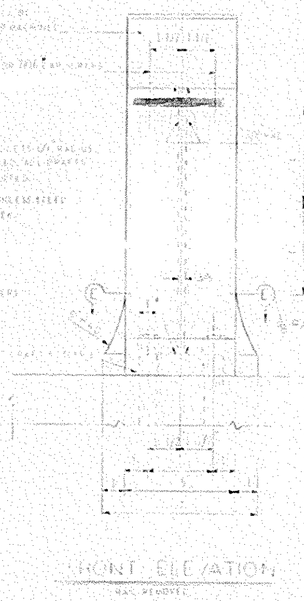


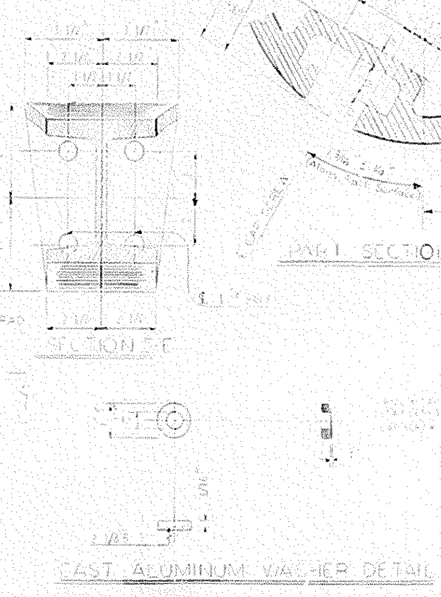


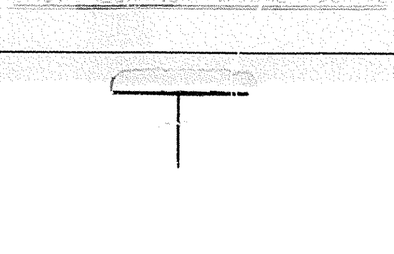


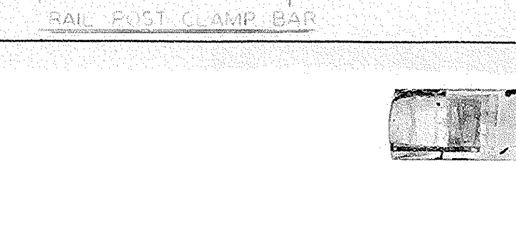












GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Current Edition, with Revisions, AASHO, ASTM and Aluminum Association Material Specifications, Current Edition, are also applicable as designated hereon.

DESIGN LOAD: As specified in the AASHO Specifications, current edition.

SCOPE: In general, this drawing in connection with the specifications covers the furnishing and erection of high strength aluminum handrails on highway bridge structures. The additional plans required for each bridge are the bridge plans and the fabricator's shop detail plans.

FABRICATION:

GENERAL: Post spacing as governed by the details shown on the bridge plans. The end result shall be a continuous rail, with each rail section being attached to a minimum of three posts and with each joint being spliced as detailed hereon. Fabricator's shop detail plans, as required for each bridge, must be approved by the Kentucky Department of Highways, and the Contractor is responsible for furnishing these plans to the Department for approval, prior to fabrication.

APPEARANCE: Pieces having surfaces so scored or marked as to cause an objectionable appearance will be rejected.

CUTTING: All cuts are to be sawed and milled.

HOLES: All holes in castings shall be cored.

WELDING: Welding shall be done by an arc welding process in which no welding flux is used. Filler material for welding shall conform to ASTM B285, Current Specifications, Classification ER 4043 or ER 5356.

BENDING: The bending radius for forming down the railing ends is to be 5'-0". Creeping of the clamp bar slot at posts adjacent to a bend will require positioning of the clamp bar before and during the bend.

ERECTION MEASUREMENT AND PAYMENT:

ERECTION: Posts shall be set at right angles to the bridge fascia line and perpendicular to grade. The alignment of the railing shall be parallel to the fascia line. Special fabrication of curvature will be required when fascia lines are curved. U-shaped washer shims having a maximum thickness of 1/8" may be used under the posts to obtain desired alignment of post or rail. The void space under the posts shall be filled with mastiastic compound, or an approved equal, so as to completely insulate the aluminum from the concrete.

MEASUREMENT: The work actually completed and accepted in place shall be measured along the rail in linear feet within the pay length limits.

PAYMENT: Payment will be made for the quantity measured as described above, at the contract unit price per linear foot and such payment shall be full compensation for all materials and work necessary for completion.

MATERIAL:

TUBING, SLEEVE AND CLAMPS: Shall meet the requirements of ASTM B221 alloy 6061-T6511 or alloy 6063-T6, using normal mill finish.

CAP SCREWS: Stainless Steel cap screws shall conform to ASTM A276 type 302 or 304.

POSTS AND BASE PLATES: Cast aluminum posts and base plates shall be in accordance with the AASHO Designation M193-64 for Cast Aluminum Railing Post, using normal mill finish.

WASHERS: Cast aluminum washers shall be Aluminum Association alloy A344-T4 or ASTM B 108 alloy 356-F. Washer Shims shall be in accordance with ASTM B209 alloy 1100 or alloy alclad 2024-T3. All other washers shall be ASTM B209 alloy alclad 2024-T3.

NUTS: All nuts shall comply with American Hexagon ASA Specification B18.2 for dimensions. Aluminum Nuts shall be ASTM B211 alloy 6061-T6 or 6262-T9, American standard finished hexagon, thick nuts, Class 2B thread. Steel Nuts in the anchor bar assembly shall be ASTM A307 Grade A.

CAP SCREWS: Stainless steel cap screws shall conform to ASTM A276 type 302 or 304.

DOWELS: Stainless steel anchor dowels shall conform to ASTM A276 type 430 except that their ultimate strength shall be 100,000 p.s.i. minimum. Threads shall be rolled.

ANCHOR CHANNEL BARS: Shall conform to ASTM A36.

MILL TEST REPORTS: Notarized mill test reports or statements certifying that the materials comply with the Specifications, shall be furnished in triplicate to the Department of Highways.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD HIGH STRENGTH ALUMINUM HANDRAIL

APPROVED _____ STATE HIGHWAY ENGINEER

DRAWING NO. H117D

DATE 4-6-70

APPROVED BY: C.G. Coor. DIRECTOR DIVISION OF BRIDGES — ASSISTANT STATE HIGHWAY ENGINEER

REVIEWED BY: _____ DATE _____

REVISIONS	DATE	CHECKED BY	DATE
REVISED			
REVISED			
REVISED			

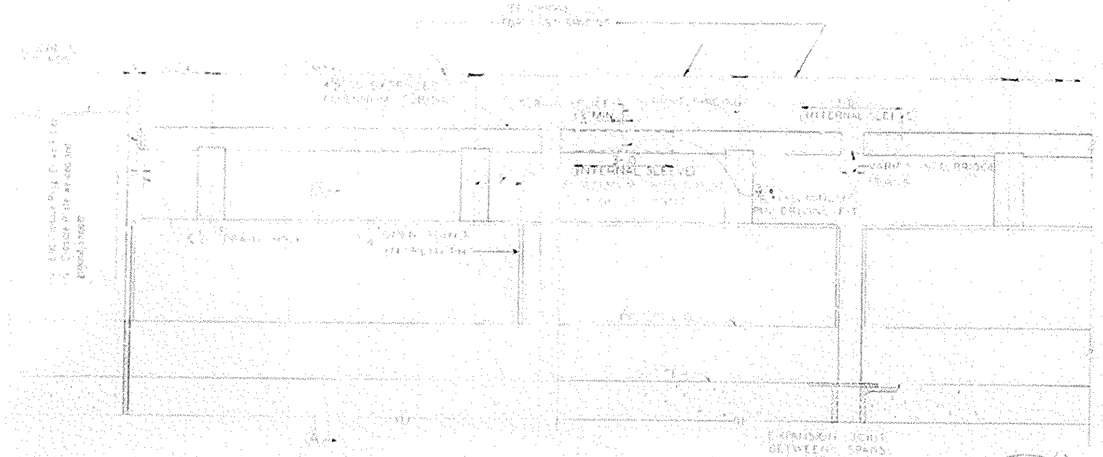
DETAILED BY _____ DATE _____

CHECKED BY _____ DATE _____

APPROVED BY _____

BRIDGE

FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Current Edition with Revisions. AASHO, ASTM and Aluminum Association Material Specifications, Current Editions, are also applicable as designated hereon.

DESIGN LOAD: As specified in the AASHO Specifications, current edition.

SCOPE: In general, this drawing in conjunction with the specifications covers the furnishing and erection of high strength aluminum handrails on highway bridge structures. The additional plans required for each bridge are the bridge plans, and the fabricator's shop detail plans.

FABRICATION

GENERAL: Post spacing is governed by the details shown on the bridge plans. The end result shall be a continuous rail, with each rail section being attached to a minimum of three posts and with each joint being spliced as detailed hereon. Fabricator's shop detail plans, as required for each bridge, must be approved by the Kentucky Department of Highways, and the Contractor is responsible for furnishing these plans to the Department for approval prior to fabrication.

APPEARANCE: Pieces having surfaces so scored or marked as to cause an objectionable appearance will be rejected.

CUTTING: All cuts are to be sawed and milled.

HOLES: All holes in castings shall be cored.

WELDING: Welding shall be done by an arc welding process in which no welding flux is used. Filler material for welding shall conform to ASTM B285, current specifications, Classification ER 4043 or ER 5356.

ERECTION, MEASUREMENT AND PAYMENT

ERECTION: Posts shall be set at right angles to the bridge fascia line and perpendicular to grade. The alignment of the railing shall be parallel to the fascia line. Special fabrication of curvature will be required when fascia lines are curved. U-shaped washer shims having a minimum thickness of 1/8" may be used under the posts to obtain desired alignment of post or rail. The void space under the posts shall be filled with aluminastic compound or an approved equal, so as to completely insulate the aluminum from the concrete.

MEASUREMENT: The work actually completed and accepted in place shall be measured along the rail in lineal feet between ends.

PAYMENT: Payment will be made for the quantity measured as described above, at the contract unit price per lineal foot and such payment shall be full compensation for all materials and work necessary for completion.

MATERIAL

TUBING, SLEEVE AND CLAMPS: Shall meet the requirements of ASTM B221 alloy 6061-T6511 or alloy 6063-T6, using normal mill finish.

END CAST CLOSURE PLUG: Shall conform to ASTM B26 alloy 356-F, ASTM B108 alloy 356-F or Aluminum Association alloy A344 untreated.

POSTS: Cast aluminum posts shall be in accordance with AASHO designation M193-64 for Cast Aluminum Railing Post, using normal mill finish.

WASHERS: Cast aluminum washers shall be Aluminum Association alloy A344-T4 or ASTM B108 Alloy 356-F. Washer Shims shall be in accordance with ASTM B209 alloy 1100 or alloy of clad 2024-T3. All other washers shall be ASTM B209 alloy of clad 2024-T3.

NUTS: All nuts shall comply with American hexagon ASA Specifications B18.2 for dimensions.
Aluminum Nuts shall be ASTM B211 alloy 6061-T6 or 6262-T9, American standard finished hexagon, thick nuts, class 2B thread.
Steel Nuts in the anchor bar assembly shall be ASTM A307 Grade A.

CAP SCREWS: Stainless steel shall conform to ASTM A276 type 302 or 304.

DOWELS: Stainless steel anchor dowels shall conform to ASTM A276 type 430 except that their ultimate strength shall be 100,000 p.s.i. minimum. Threads shall be rolled.

ANCHOR CHANNEL BARS: Shall conform to ASTM A36.

MILL TEST REPORTS: Notarized mill test reports showing or statements certifying that the materials comply with the Specifications, shall be furnished in triplicate to the Department of Highways.

CLOSURE PLATE: Shall meet the requirements of ASTM B209 alloy 6061-T6.

APPROVED BY _____ DIRECTOR DIV. OF BRIDGES 3/16/65

DESIGNED BY _____ CHECKED BY _____ DATE _____
DETAILED BY _____ CHECKED BY _____ DATE _____
TRACED BY _____ CHECKED BY _____ DATE _____

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

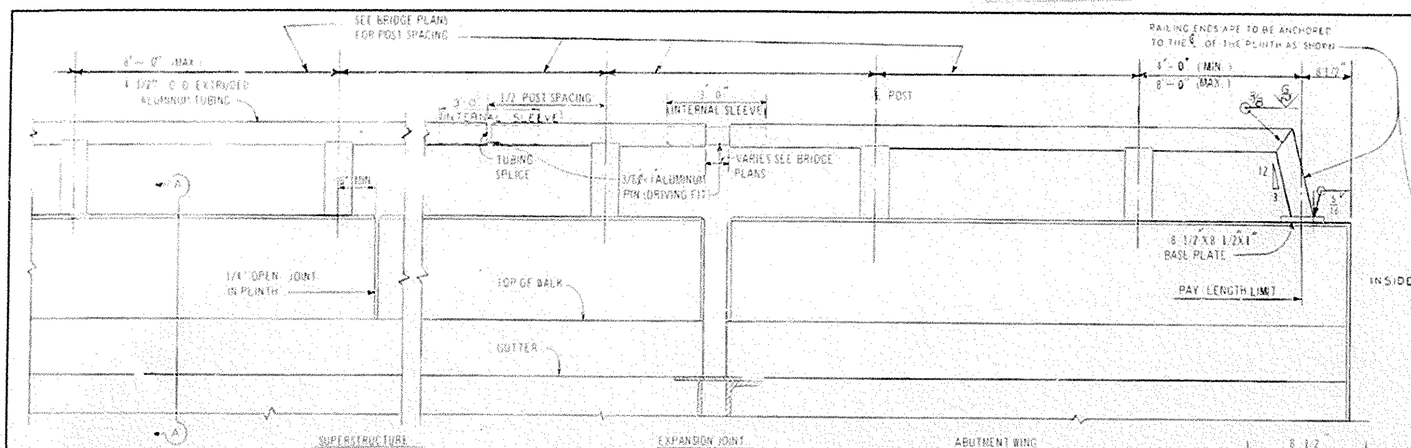
STANDARD HIGH STRENGTH ALUMINUM HANDRAIL

BRIDGE NUMBER

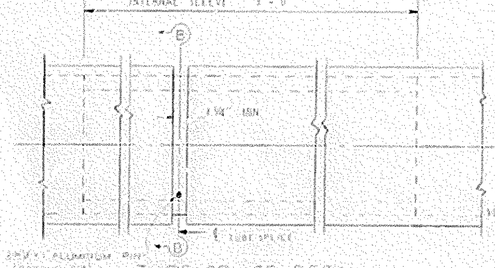
DRAWING INDEX: H115F

BRIDGE

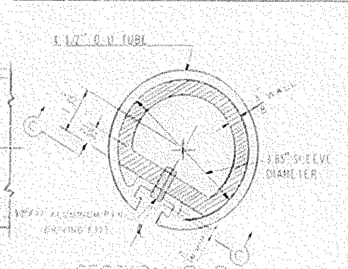
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



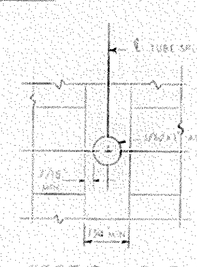
INSIDE ELEVATION OF HANDRAIL



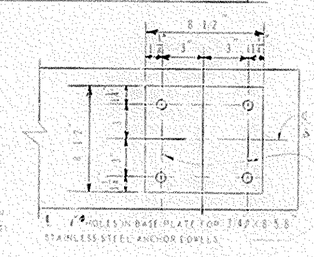
TUBE SPLICE DETAIL



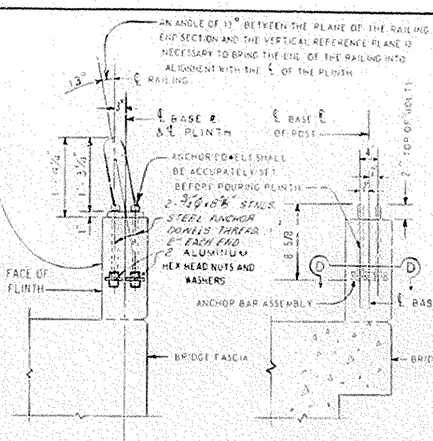
SECTION B-B
(INTERNAL SLEEVE DETAIL)



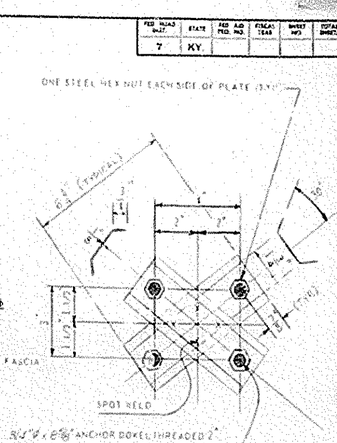
SECTION C-C



BASE PLATE



END VIEW



SECTION A-A

SECTION D-D

GENERAL NOTE:

SPECIFICATIONS: Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Current Edition with revisions. AASHO, ASTM and Aluminum Association Material Specifications, Current Editions, are also applicable as designated hereon.

DESIGN LOAD: As specified in the AASHO Specifications, current edition.

SCOPE: In general, this drawing in conjunction with the specifications covers the furnishing and erection of high strength aluminum handrails on highway bridge structures. The additional plans required for each bridge are the bridge plans and the fabricator's shop detail plans.

FABRICATION:

GENERAL: Post spacing is governed by the details shown on the bridge plans. The end result shall be a continuous rail, with each rail section being attached to a minimum of three posts and with each joint being spliced as detailed hereon. Fabricator's shop detail plans, as required for each bridge, must be approved by the Kentucky Department of Highways, and the Contractor is responsible for furnishing these plans to the Department for approval prior to fabrication.

APPEARANCE: Pieces having surfaces so scored or marked as to cause an objectionable appearance will be rejected.

CUTTING: All cuts are to be sawed and milled.

HOLES: All holes in castings shall be cored.

WELDING: Welding shall be done by an arc welding process in which no welding flux is used. Filler material for welding shall conform to AS1M B285, Current Specifications Classification ER 4043 or ER 5356.

ERECTION, MEASUREMENT AND PAYMENT:

ERECTION: Posts shall be set at right angles to the bridge fascia line and perpendicular to grade. The alignment of the railing shall be parallel to the fascia line. Special fabrication of curvature will be required when fascia lines are curved. U-shaped washer shims having a maximum thickness of 1/8" may be used under the posts to obtain desired alignment of post or rail. The void space under the posts shall be filled with a plastic compound, or an approved equal, so as to completely insulate the aluminum from the concrete.

MEASUREMENT: The work actually completed and accepted in place, will be measured along the rail in linear feet within the pay length limits.

PAYMENT: Payment will be made for the quantity measured as described above, at the contract unit price, per linear foot and such payment shall be full compensation for all materials and work necessary for completion.

MATERIAL:

TUBING, SLEEVE AND CLAMPS: Shall meet the requirements of ASTM B221 alloy 6061-T6511 or alloy 6063-T6, using normal mill finish.

CAP SCREWS: Stainless Steel cap screws shall conform to ASTM A276 type 302 or 304.

POSTS AND BASE PLATES: Cast aluminum posts and base plates shall be in accordance with the AASHO Designation M193-67 for Cast Aluminum Railing Post, using normal mill finish.

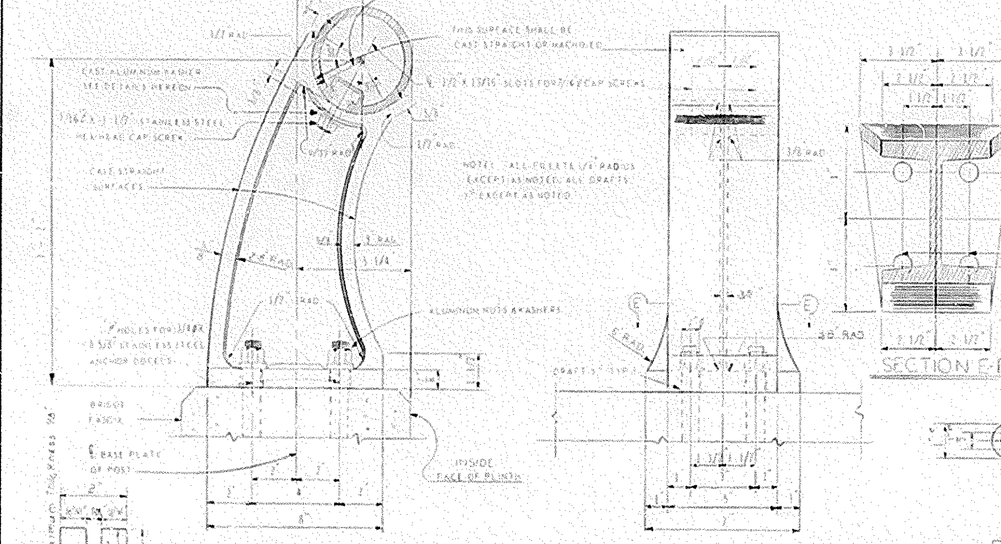
WASHERS: Cast aluminum washers shall be Aluminum Association alloy A-344-T4 or ASTM B 108 alloy 356-F. Washer Shims shall be in accordance with ASTM B209 alloy 1100 or alloy alclad 2024-T3. All other washers shall be ASTM B209 alloy alclad 2024-T3.

NUTS: All nuts shall comply with American Hexagon ASA Specification B18.2 for dimensions. Aluminum nuts shall be ASTM B211 alloy 6061-T6 or 6262-T9, American standard finished hexagon, thick nuts, class 2B thread. Steel nuts in the anchor assembly shall be ASTM A307 Grade A.

DOWELS: Stainless steel anchor dowels shall conform to ASTM A276 type 430 except that their ultimate strength shall be 100,000 psi minimum. Threads shall be rolled.

ANCHOR CHANNEL BARS: Shall conform to ASTM A36.

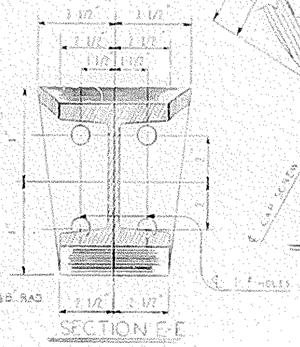
MILL TEST REPORTS: Notarized mill test reports or statements certifying that the materials comply with the Specifications, shall be furnished in duplicate to the Department of Highways.

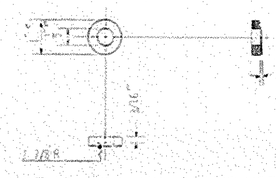


SIDE ELEVATION
(RAIL IN PLACE)

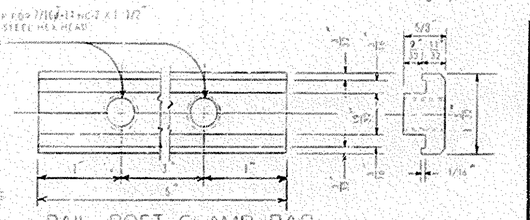
FRONT ELEVATION
(RAIL REMOVED)

PART SECTION OF RAILING





CAST ALUMINUM WASHER DETAIL



RAIL POST CLAMP BAR

DETAIL OF WASHER SHIM

APPROVED BY C. F. Cole JR. DIRECTOR DIVISION OF BRIDGES

DESIGNED BY	DETAILED BY	TRACED BY	CHECKED BY	CHECKED BY	CHECKED BY
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

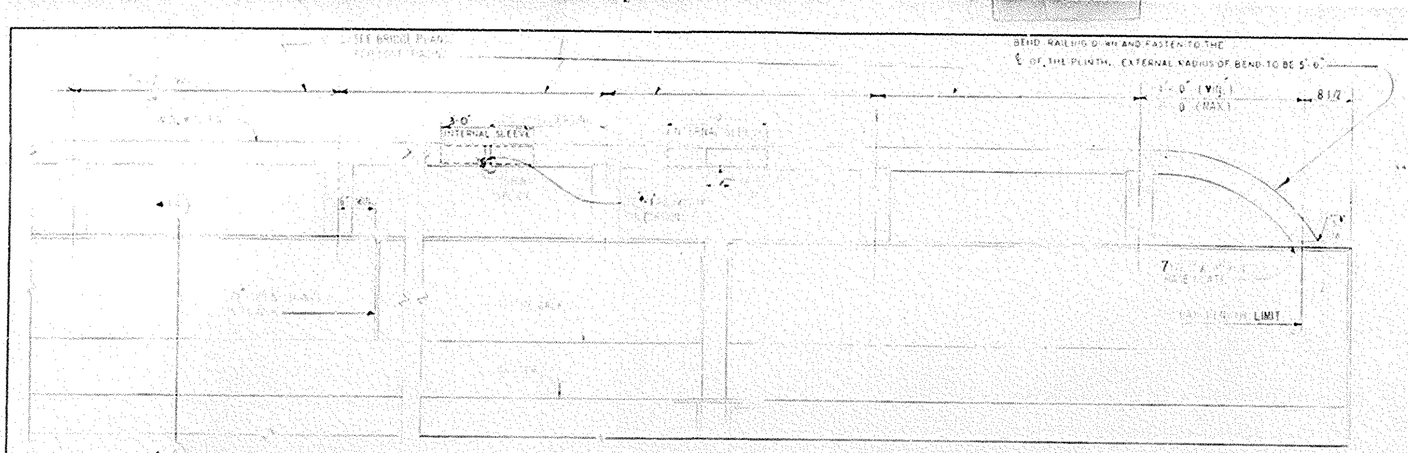
DATE	DATE	DATE
5-11	3-12	3-13
8-11	8-12	8-13

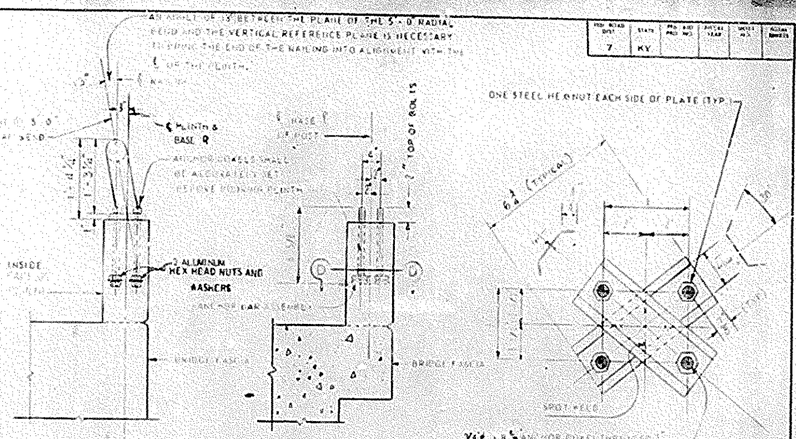
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

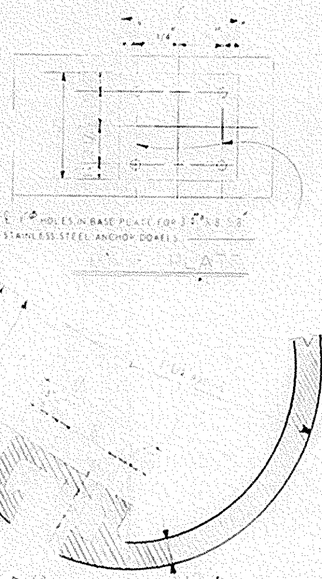
STANDARD HIGH STRENGTH ALUMINUM HANDRAIL

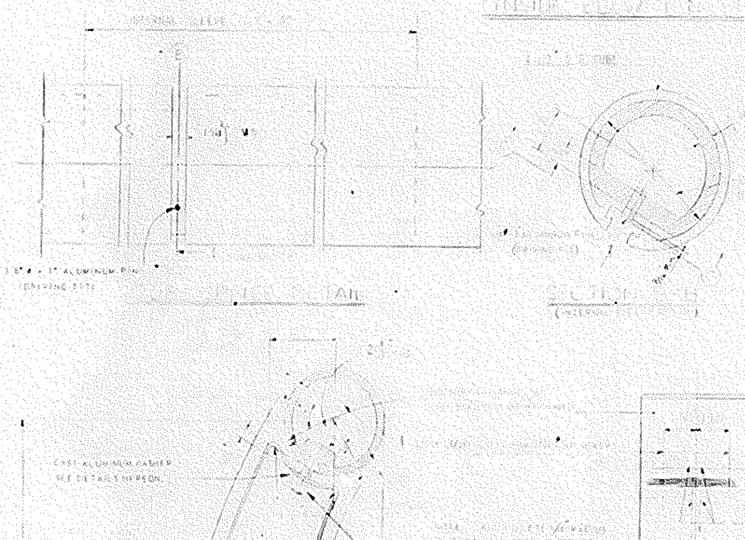
BRIDGE NUMBER	DRAWING NO.	SHEET
	H116C	

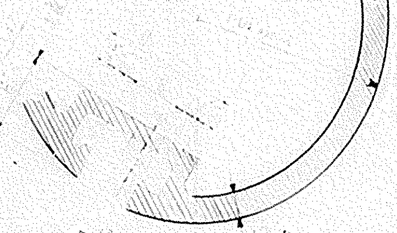
BRIDGE

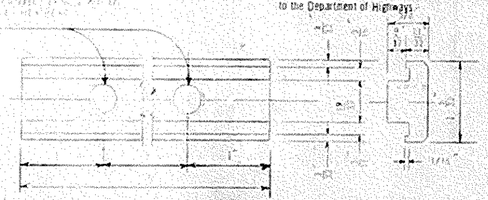












END VIEW SECTION A-A SECTION D-D

GENERAL NOTE:

SPECIFICATIONS: Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Current Edition with Revision, AASHO, ASTM and Aluminum Association Material Specifications, Current Edition, are also applicable as designated hereon.

DESIGN LOAD: As specified in the AASHO Specifications, current edition.

SCOPE: In general, this drawing in conjunction with the specifications, covers the furnishing and erection of high strength aluminum handrails on highway bridge structures. The additional plans required for each bridge are the bridge plans and the fabricator's shop detail plans.

FABRICATION:

GENERAL: Post spacing is governed by the details shown on the bridge plans. The end result shall be a continuous rail with each rail section being attached to a minimum of three posts and with each joint being spliced as detailed hereon. Fabricator's shop detail plans, as required for each bridge, must be approved by the Kentucky Department of Highways, and the Contractor is responsible for furnishing these plans to the Department for approval prior to fabrication.

APPEARANCE: Pieces having surfaces so scored or marked as to cause an objectionable appearance will be rejected.

CUTTING: All cuts are to be sawed and milled.

HOLES: All holes in castings shall be cored.

WELDING: Welding shall be done by an arc welding process in which no welding flux is used. Filler material for welding shall conform to ASTM B285, Current Specifications, Classification ER 4043 or ER 5356.

BENDING: The bending radius for turning down the railing ends is to be 5'-0". Crimping of the clamp bar slot at posts adjacent to a bend will require positioning of the clamp bar before and during the bend.

ERECTION MEASUREMENT AND PAYMENT:

ERECTION: Posts shall be set at right angles to the bridge fascia line and perpendicular to grade. The alignment of the railing shall be parallel to the fascia line. Special fabrication of curvature will be required when fascia lines are curved. U-shaped washer shims having a maximum thickness of 1/8" may be used under the posts to obtain desired alignment of post or rail. The void space under the posts shall be filled with alumilastic compound, or an approved equal, so as to completely insulate the aluminum from the concrete.

MEASUREMENT: The work actually completed and accepted in place shall be measured along the rail in linear feet within the pay length limits.

PAYMENT: Payment will be made for the quantity measured as described above, at the contract unit price per linear foot and such payment shall be full compensation for all materials and work necessary for completion.

MATERIAL:

TUBING, SLEEVE, AND CLAMPS: Shall meet the requirements of ASTM B221 alloy 6061-T6511 or alloy 6063-T6, using normal mill finish.

CAP SCREWS: Stainless Steel cap screws shall conform to ASTM A276 type 302 or 304.

POSTS AND BASE PLATES: Cast aluminum posts and base plates shall be in accordance with the AASHO Designation M193-64 for Cast Aluminum Railing Post, using normal mill finish.

WASHERS: Cast aluminum washers shall be Aluminum Association alloy A344-T4 or ASTM B 108 alloy SS6-F. Washer Shims shall be in accordance with ASTM B209 alloy 1100 or alloy alclad 2024-T3. All other washers shall be ASTM B209 alloy alclad 2024-T3.

NUTS: All nuts shall comply with American Hexagon ASA Specification B18.2 for dimensions. Aluminum Nuts shall be ASTM B211 alloy 6061-T6 or 6262-T9, American standard finished hexagon, thick nuts, Class 2B thread. Steel Nuts in the anchor bar assembly shall be ASTM A307 Grade A.

CAP SCREWS: Stainless steel cap screws shall conform to ASTM A276 type 302 or 304.

DOWELS: Stainless steel anchor dowels shall conform to ASTM A276 type 430 except that their ultimate strength shall be 100,000 p.s.i. minimum. Threads shall be rolled.

ANCHOR CHANNEL BARS: Shall conform to ASTM A36.

MILL TEST REPORTS: Notarized mill test reports or statements certifying that the materials comply with the specifications, shall be furnished in triplicat to the Department of Highways.

FED. ROAD DIST.	STATE	PROJ. AND PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				

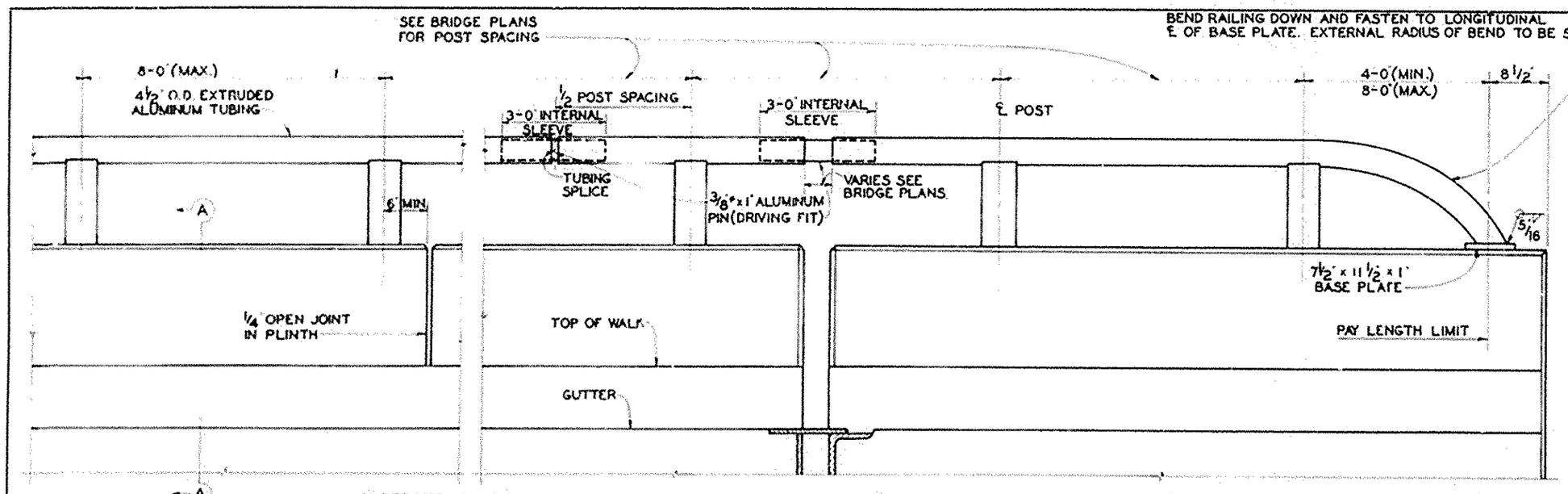
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD
HIGH STRENGTH ALUMINUM
HANDRAIL

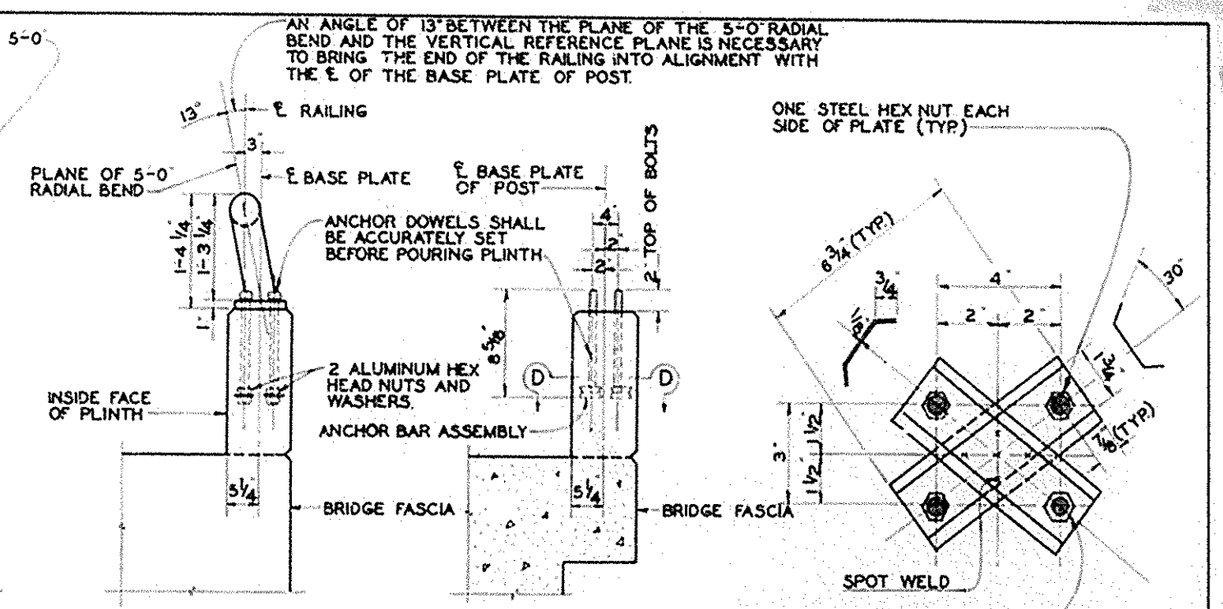
BRIDGE NUMBER	DRAWING NO.	SHEET
	H117C	

APPROVED BY C. G. Davis DIRECTOR DIVISION OF BRIDGES 8/14/64
DRAWN BY [illegible] DATE 8/13/64
TRACED BY [illegible] DATE 8/13/64
CHECKED BY [illegible] DATE 8/13/64
SPECIFICATIONS FOR ALUMINUM ALLOY 6061-T6 EXTRUDED TUBING, ASTM B221
SPECIFICATIONS FOR CAST ALUMINUM ALLOY 356-T6 SAND CASTINGS, ASTM B26
SPECIFICATIONS FOR CAST ALUMINUM ALLOY 356-T6 PERMANENT MOLD CASTINGS, ASTM B108
SPECIFICATIONS FOR ALUMINUM ALLOY 6061-T6 EXTRUDED ROD, BAR, SHAPES AND TUBE, ASTM B211
SPECIFICATIONS FOR STAINLESS STEEL BOLTING MATERIAL FOR GENERAL PURPOSE APPLICATIONS, ASTM A276 TYPE 304
8/13/64

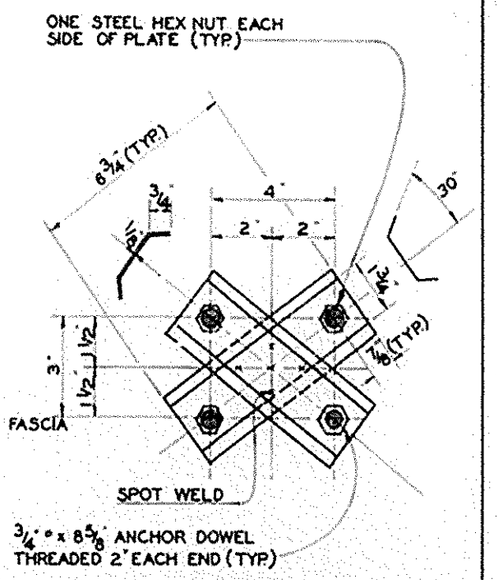
BRIDGE



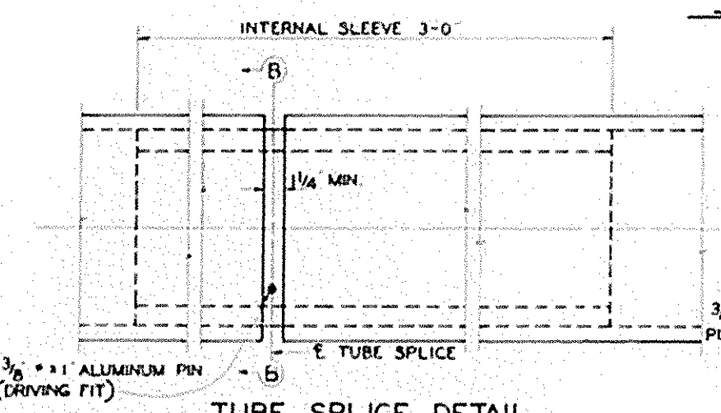
INSIDE ELEVATION OF HANDRAIL



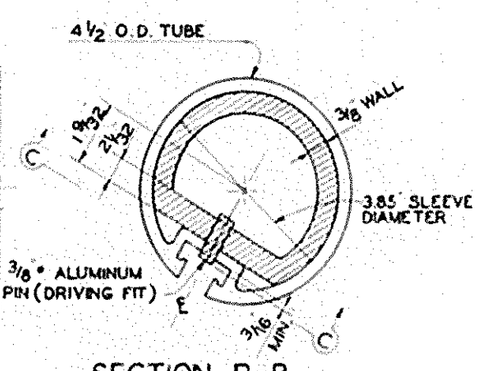
END VIEW



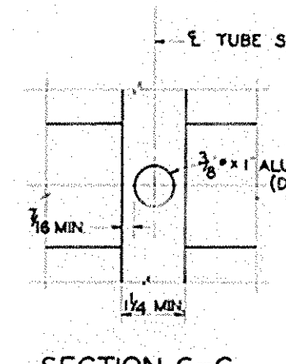
SECTION D-D



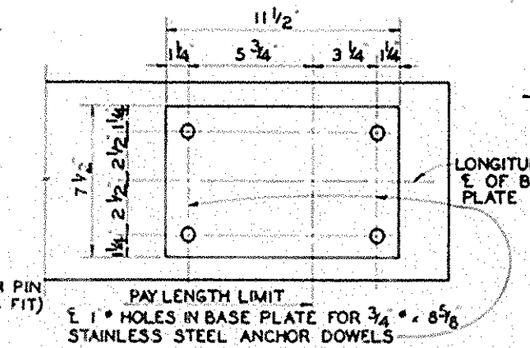
TUBE SPLICE DETAIL



SECTION B-B
(INTERNAL SLEEVE DETAIL)



SECTION C-C



BASE PLATE

END VIEW — SECTION A-A

GENERAL NOTE

SPECIFICATIONS: KENTUCKY DEPARTMENT OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, CURRENT EDITION WITH REVISIONS, AASHO, ASTM, AWS AND ALUMINUM ASSOC. MATERIAL SPECIFICATIONS CURRENT EDITION ARE ALSO APPLICABLE AS DESIGNATED HEREON.

DESIGN LOAD: AS SPECIFIED IN THE AASHO SPECIFICATIONS CURRENT EDITION.

SCOPE: IN GENERAL, THIS DRAWING IN CONJUNCTION WITH THE SPECIFICATIONS COVERS THE FURNISHING AND ERECTION OF HIGH STRENGTH ALUMINUM HANDRAILS ON HIGHWAY BRIDGE STRUCTURES. THE ADDITIONAL PLANS REQUIRED FOR EACH BRIDGE ARE THE BRIDGE PLANS AND THE FABRICATORS SHOP DETAIL PLANS.

FABRICATION

GENERAL: POST SPACING IS GOVERNED BY THE DETAILS SHOWN ON THE BRIDGE PLANS. THE END RESULT SHALL BE A CONTINUOUS RAIL, WITH EACH RAIL SECTION BEING ATTACHED TO A MINIMUM OF THREE POSTS AND WITH EACH JOINT BEING SPLICED AS DETAILED HEREON. FABRICATORS SHOP DETAIL PLANS, AS REQUIRED FOR EACH BRIDGE, MUST BE APPROVED BY THE KENTUCKY DEPARTMENT OF HIGHWAYS, AND THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING THESE PLANS TO THE DEPARTMENT FOR APPROVAL PRIOR TO FABRICATION.

APPEARANCE: PIECES HAVING SURFACES SO SCORED OR MARKED AS TO CAUSE AN OBJECTIONABLE APPEARANCE WILL BE REJECTED.

CUTTING: ALL CUTS ARE TO BE SAWED AND MILLED.

HOLES: ALL HOLES IN CASTINGS SHALL BE CORED.

WELDING: WELDING SHALL BE DONE BY AN ARC WELDING PROCESS IN WHICH NO WELDING FLUX IS USED. FILLER MATERIAL FOR WELDING SHALL CONFORM TO AWS A5.10, CURRENT SPECIFICATION, CLASSIFICATION ER 4043 OR ER 5356.

BENDING: THE BENDING RADIUS FOR TURNING DOWN THE RAILING ENDS IS TO BE 5'-0" CRIMPING OF THE CLAMP BAR SLOT AT POSTS ADJACENT TO A BEND WILL REQUIRE POSITIONING OF THE CLAMP BAR BEFORE AND DURING THE BEND.

ERECTION, MEASUREMENT AND PAYMENT

ERECTION: POSTS SHALL BE SET AT RIGHT ANGLES TO THE BRIDGE FASCIA LINE AND PERPENDICULAR TO GRADE. THE ALIGNMENT OF THE RAILING SHALL BE PARALLEL TO THE FASCIA LINE. SPECIAL FABRICATION OF CURVATURE WILL BE REQUIRED WHEN FASCIA LINES ARE CURVED. U-SHAPED WASHER SHIMS HAVING A MAXIMUM THICKNESS OF 1/8" MAY BE USED UNDER THE POSTS TO OBTAIN DESIRED ALIGNMENT OF POST OR RAIL. THE VOID SPACE UNDER THE POSTS SHALL BE FILLED WITH ALUMILASTIC COMPOUND OR AN APPROVED EQUAL SO AS TO COMPLETELY INSULATE THE ALUMINUM FROM THE CONCRETE.

MEASUREMENT: THE WORK ACTUALLY COMPLETED AND ACCEPTED IN PLACE SHALL BE MEASURED ALONG THE RAIL IN LINEAR FEET WITHIN THE PAY LENGTH LIMITS.

PAYMENT: PAYMENT WILL BE MADE FOR THE QUANTITY MEASURED AS DESCRIBED ABOVE, AT THE CONTRACT UNIT PRICE PER LINEAR FOOT AND SUCH PAYMENT SHALL BE FULL COMPENSATION FOR ALL MATERIALS AND WORK NECESSARY FOR COMPLETION.

MATERIAL

TUBING, SLEEVE AND CLAMPS: SHALL MEET THE REQUIREMENTS OF ASTM B221 ALLOY 6061-T6511 OR ALLOY 6063-T6, USING NORMAL MILL FINISH.

CAP SCREWS: STAINLESS STEEL CAP SCREWS SHALL COMFORM TO ASTM A276 TYPE 302 OR 304.

POSTS AND BASE PLATES: CAST ALUMINUM POSTS AND BASE PLATES SHALL BE IN ACCORDANCE WITH THE AASHO DESIGNATION M193-64 FOR CAST ALUMINUM RAILING POST USING NORMAL MILL FINISH.

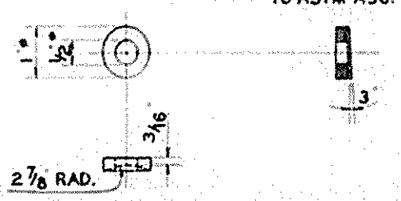
WASHERS: CAST ALUMINUM WASHERS SHALL BE ALUMINUM ASSOCIATION ALLOY A344-T4 OR ASTM B108 ALLOY 55B-F. WASHER SHIMS SHALL BE IN ACCORDANCE WITH ASTM B209 ALLOY 1100-0 OR ALLOY ALCLAD 2024-T3. ALL OTHER WASHERS SHALL BE ASTM B209 ALLOY ALCLAD 2024-T3.

NUTS: ALL NUTS SHALL COMPLY WITH AMERICAN HEXAGON AND SPECIFICATION B18.2.2 FOR DIMENSIONS ALUMINUM NUTS SHALL BE ASTM B211 ALLOY 6061-T6 OR 6262-T9 AMERICAN STANDARD FINISHED HEXAGON THICK NUTS, CLASS 2B THREAD. STEEL NUTS IN ANCHOR BAR ASSEMBLY SHALL BE ASTM A307-GRADE A.

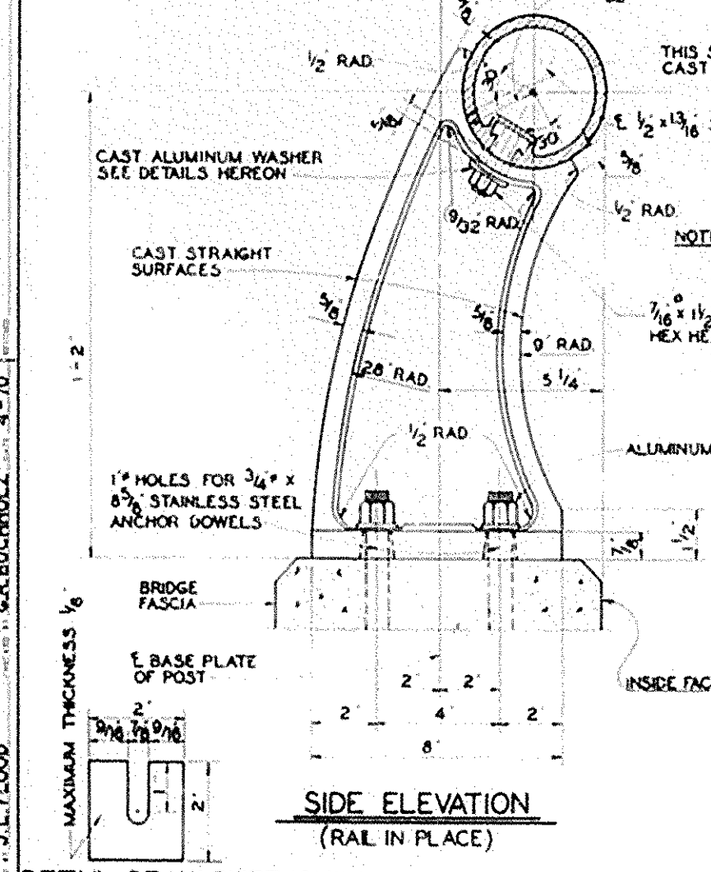
DOWELS: STAINLESS STEEL ANCHOR DOWELS SHALL CONFORM TO ASTM A276 TYPE 430 EXCEPT THAT THEIR ULTIMATE STRENGTH SHALL BE 100,000 P.S.I. MINIMUM. THREADS SHALL BE ROLLED.

MILL TEST REPORTS: NOTARIZED MILL TEST REPORTS OR STATEMENTS CERTIFYING THAT THE MATERIALS COMPLY WITH THE SPECIFICATIONS, SHALL BE FURNISHED IN TRIPLICATE TO THE DEPARTMENT OF HIGHWAYS.

ANCHOR CHANNEL BARS: SHALL CONFORM TO ASTM A36.

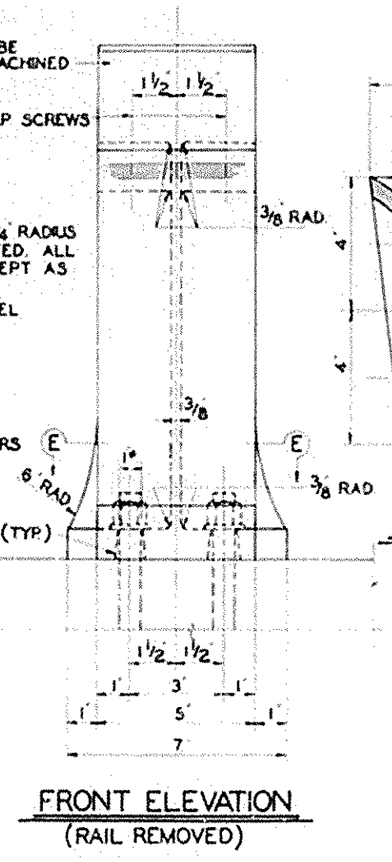


CAST ALUMINUM WASHER DETAIL

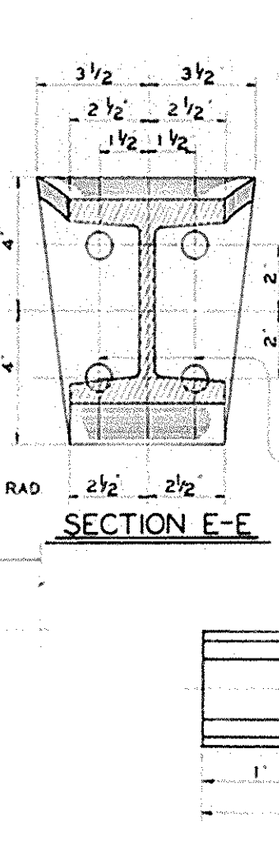


DETAIL OF WASHER SHIM

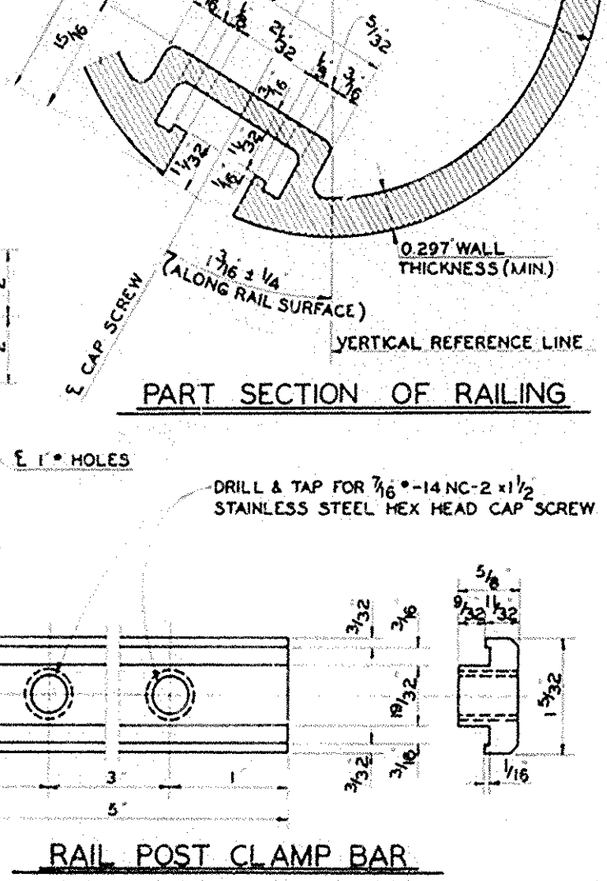
SIDE ELEVATION
(RAIL IN PLACE)



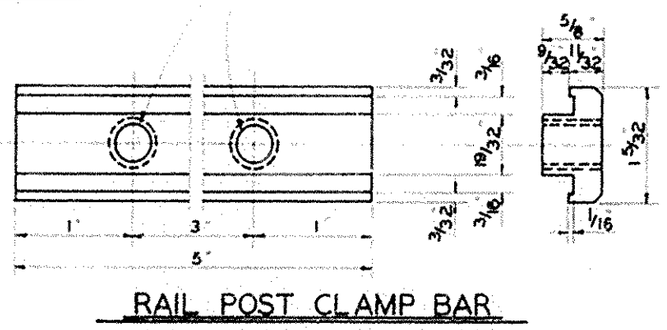
FRONT ELEVATION
(RAIL REMOVED)



SECTION E-E



PART SECTION OF RAILING



RAIL POST CLAMP BAR

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD HIGH STRENGTH ALUMINUM HANDRAIL

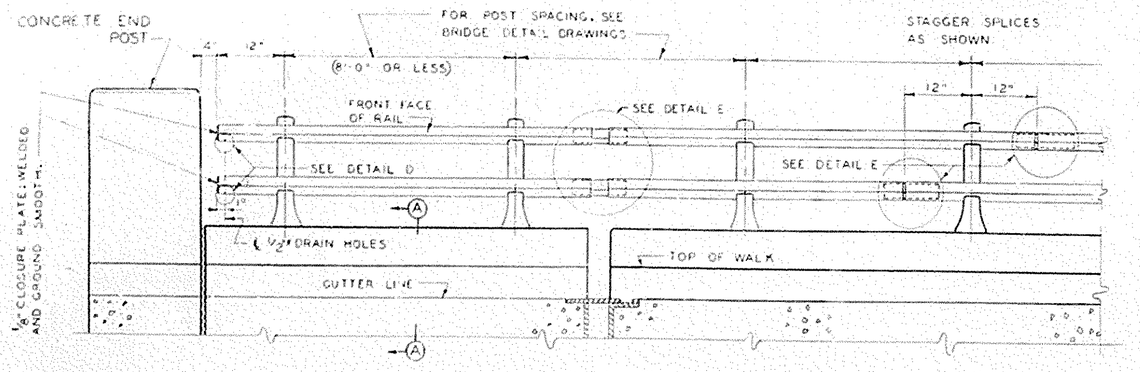
APPROVED: STATE HIGHWAY ENGINEER

DRAWING NO. H117E

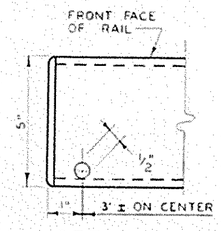
DATE 4 - 70

APPROVED BY C. Yarber Jr. Cook 7/13/70 DIRECTOR DIVISION OF BRIDGES
REVIEWED BY ASSISTANT STATE HIGHWAY ENGINEER
ALUM. ASSOC. DESIGNATION FOR WASHERS CORRECTED J.L.F. 7/1/70
DESIGNED BY J.L. FLOOD CHECKED BY G.R. BUCHHOLZ DATE 4-70
LETTING DATE

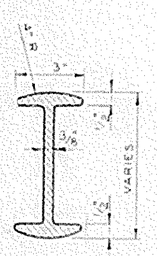
BRIDGE



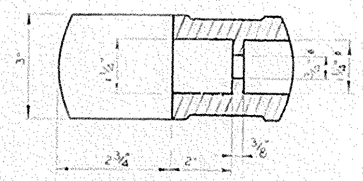
INSIDE ELEVATION OF ERECTED HANDRAIL



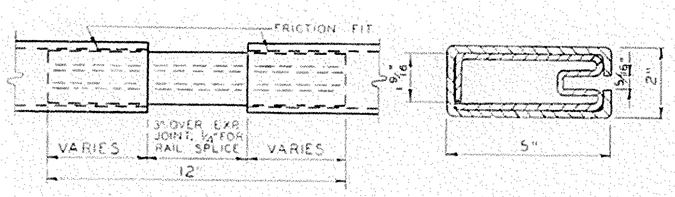
DETAIL D
SHOWING LOCATION OF DRAIN HOLES



SECTION B-B



SECTION C-C
(ENLARGED)



DETAIL E

GENERAL NOTE

FABRICATION

GENERAL: SEE DETAIL DRAWINGS FOR EXACT SPACING OF POSTS. HANDRAIL ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVES SHALL HAVE PROPER CURVATURE, AS SHOWN ON DETAIL PLANS. FABRICATED INTO EACH LENGTH OF RAIL BEFORE GALVANIZING. 1/2" DRAIN HOLES SHALL BE PLACED APPROX. 3'-0" CENTER TO CENTER IN EACH RAIL; SEE DETAIL D. THE CONTRACTOR SHALL FURNISH THE DEPT. OF HIGHWAYS WITH COMPLETE SHOP DETAIL PLANS FOR APPROVAL.

HOLES: ALL HOLES IN CASTINGS SHALL BE CORED.

WELDING: NOT PERMITTED EXCEPT AS SHOWN ON THIS SHEET.

GALVANIZING: ANCHOR BOLTS, NUTS, WASHERS, POSTS, WEDGES, RAIL, RAIL INSERTS, AND WELDS SHALL BE GALVANIZED IN ACCORDANCE WITH THE PROPER ASTM SPECIFICATIONS AFTER FABRICATION.

APPEARANCE: SCORING OR MARRING OF SURFACES SUFFICIENT TO CAUSE OBJECTIONABLE APPEARANCE SHALL BE CAUSE FOR REJECTION OF DAMAGED PIECE.

MATERIALS

RAIL: 5" X 2" X 1/8" STEEL RAIL, ASTM DES. A-245, GRADE-C GALVANIZED IN ACCORDANCE WITH ASTM SPEC. A-123. RAIL LENGTH TO INCLUDE TWO POST SPACES; 16' OR LESS. EACH SECTION OF RAIL TO BE FURNISHED WITH AN INSERT IN ONE END AS SHOWN IN DETAIL E.

POSTS: MALLEABLE IRON CASTING, ASTM DES. A-47, GRADE 35018. GALVANIZED IN ACCORDANCE WITH ASTM SPEC. A-123.

ANCHOR BOLTS: 1⅛ X 12" SQUARE HEAD MACHINE BOLTS THREADED 2". FURNISH WITH ONE HEX HEAD NUT AND ONE WASHER EA. ALL TO CONFORM TO ASTM DES. A-307. ALL GALVANIZED IN ACCORDANCE WITH ASTM SPECIFICATION A-153.

WEDGE: MALLEABLE IRON CASTING, ASTM DES. A-47, GRADE 35018. GALVANIZED IN ACCORDANCE WITH ASTM SPEC. A-123.

WEDGE SET SCREW: 5/8-11 SOCKET HEAD CAP SCREW AND SPRING LOCK WASHER, ZINC PLATED IN ACCORDANCE WITH ASTM SPECIFICATION A-164, TYPE 1,5.

FABRIC PADS: 5" X 10" PREFORMED FABRIC PADS TO CONFORM TO KENTUCKY DEPARTMENT OF HIGHWAYS STANDARD SPECIFICATIONS SECTION 5.2.3-B-4.

WELDING MATERIAL SHALL CONFORM TO AMERICAN WELDING SOCIETY CURRENT SPEC. FOR WELDED HIGHWAY AND RAILROAD BRIDGES.

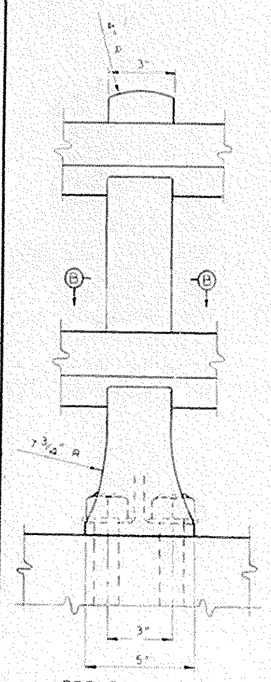
ERECTION

HANDRAIL POSTS SHALL BE SET ON FABRIC PADS, AND AT RIGHT ANGLES TO FACIA LINE. RAIL SHALL BE ERECTED ON A LINE PARALLEL TO FACIA LINE. THE CONTRACTOR SHALL FURNISH THE DEPARTMENT OF HIGHWAYS WITH COMPLETE ERECTION DETAIL PLANS, SHOWING LOCATION OF SPLICES AND ERECTION DETAILS, FOR APPROVAL.

MEASUREMENT AND PAYMENT

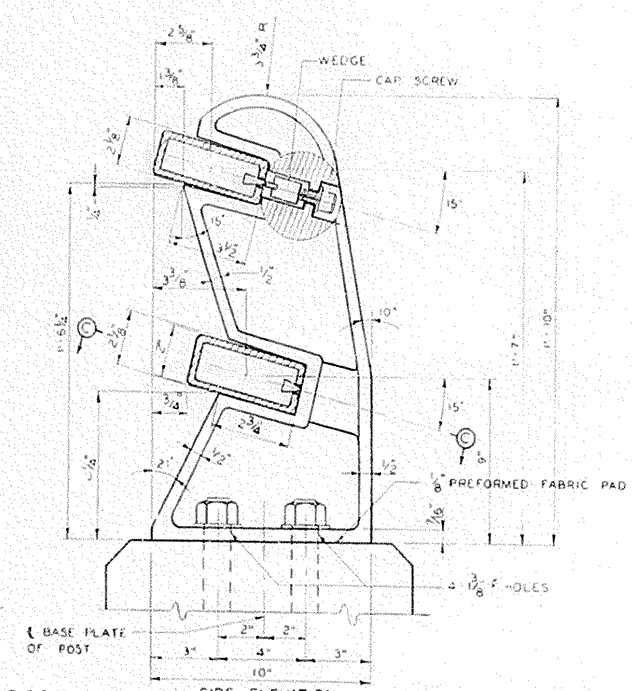
PAYMENT WILL BE ON THE BASIS OF THE MEASURED LENGTH OF THE HANDRAIL BETWEEN ENDS. PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR THE COMPLETE HANDRAIL IN PLACE, INCLUDING ANCHOR BOLTS, AND SHALL BE COMPLETE COMPENSATION FOR ALL MATERIALS, EQUIPMENT, TOOLS, AND LABOR INCIDENTAL TO THE MANUFACTURE, FABRICATION, AND ERECTION OF THE HANDRAIL.

ALL ASTM SPECIFICATIONS CURRENT

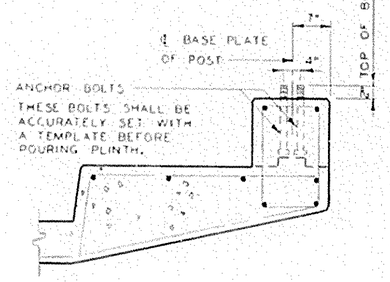


FRONT ELEVATION

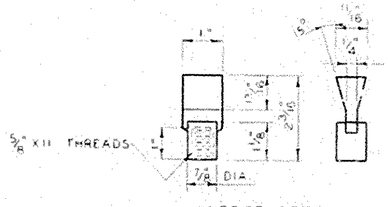
POST



SIDE ELEVATION



SECTION A-A



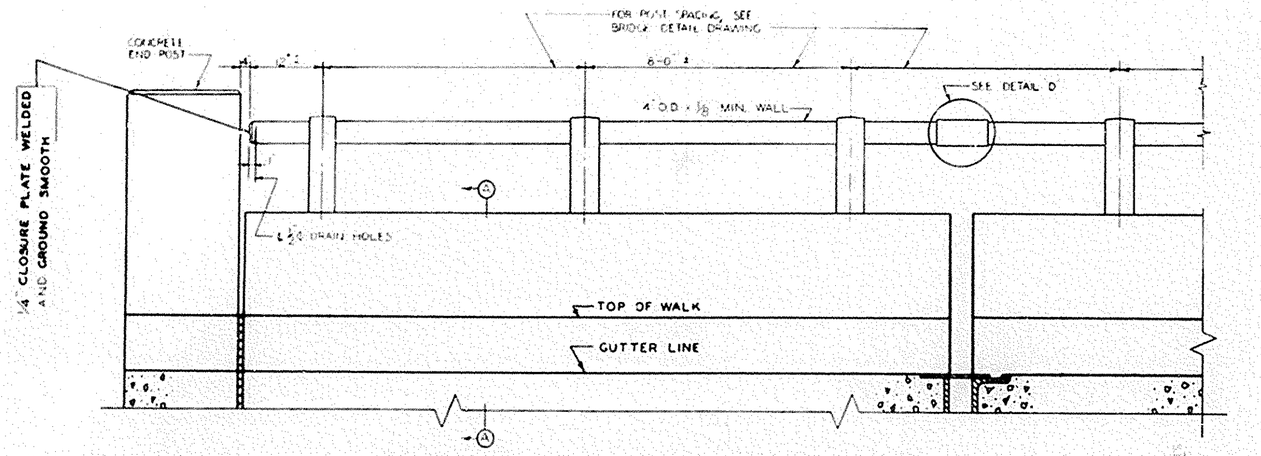
WEDGE DETAILS

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

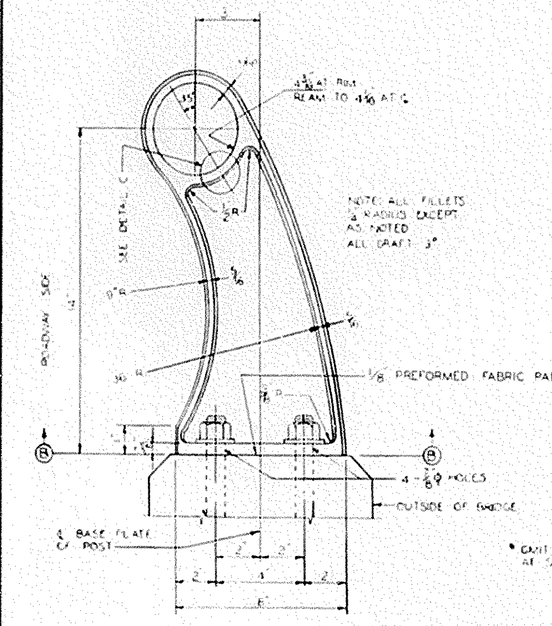
STANDARD STEEL HANDRAIL

DRAWING H-111

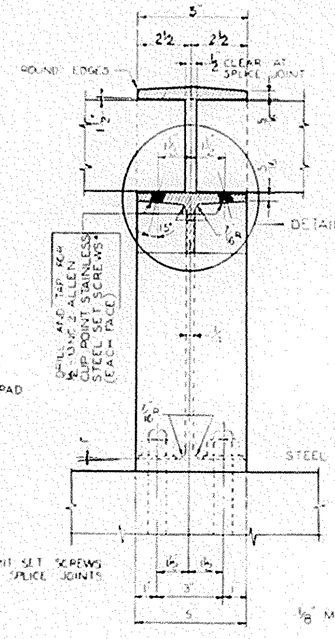
BRIDGE



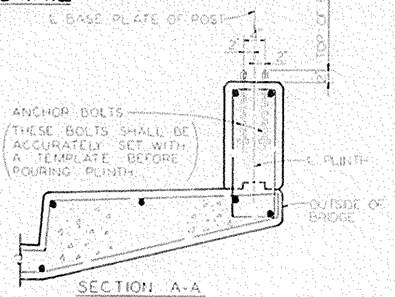
INSIDE ELEVATION OF ERECTED HANDRAIL



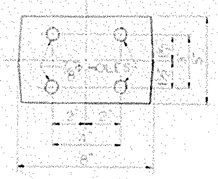
SIDE ELEVATION



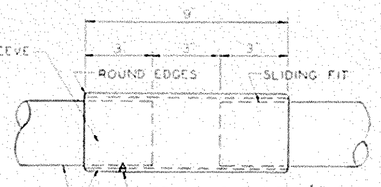
SECTIONAL ELEVATION



SECTION A-A



ELEVATION B-B



DETAIL 'D'
(TO BE USED AT EXP. DAM ONLY)

POST

GENERAL NOTE

FABRICATION

GENERAL: SEE DETAIL DRAWING FOR EXACT SPACING OF POSTS. HANDRAIL CURVED HORIZONTALLY MAY BE FURNISHED IN SINGLE PANEL CHORD LENGTHS UNLESS OTHERWISE NOTED ON THE PLANS. THE CONTRACTOR SHALL FURNISH THE DEPARTMENT OF HIGHWAYS WITH COMPLETE SHOP DETAIL PLANS OF HANDRAIL FOR APPROVAL.

GALVANIZING: ANCHOR BOLTS, NUTS, WASHERS, POSTS, SLEEVES AND COMPLETED RAILS SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE PROPER A.S.T.M. SPECIFICATION AFTER FABRICATION. BENDING FOR CURVATURE, DRILLING OF DRAIN HOLES, END FINISHING AND WELDING OF CLOSURE PLATES SHALL ALL BE DONE BEFORE GALVANIZING.

FITTING: SAW AND MILL ALL CUTS.

HOLES: ALL HOLES IN CASTINGS SHALL BE CORED.

WELDING: WELDING NOT PERMITTED EXCEPT AS SHOWN ON THIS SHEET.

REPAIRING: SCARING OR MARRING OF SURFACES SUFFICIENT TO CAUSE OBJECTIONABLE APPEARANCE SHALL BE CAUSE FOR REJECTION OF DAMAGED PIECE.

NOTARIZED MILL TEST REPORT: NOTARIZED MILL TEST REPORTS IN TRIPLICATE SHALL BE FURNISHED SHOWING THAT THE MATERIALS COMPLY WITH THE SPECIFICATIONS.

ERECTION, MEASUREMENT AND PAYMENT

ERECTION: HANDRAIL POSTS SHALL BE SET ON FABRIC PADS AT RIGHT ANGLES TO THE FASCIA LINE. TUBING SHALL BE ERECTED ON A LINE PARALLEL TO THE FASCIA LINE. THE CONTRACTOR SHALL FURNISH THE DEPARTMENT OF HIGHWAYS WITH COMPLETE ERECTION DETAIL PLANS SHOWING LOCATION OF SPLICES AND ERECTION DETAILS FOR APPROVAL.

DAMAGED COATING: GALVANIZED MATERIALS SHALL BE LOADED, HAULED AND HANDLED IN SUCH A MANNER THAT THE GALVANIZING WILL NOT BE DAMAGED. ALL ABRADED AND DAMAGED SURFACES SHALL BE REGALVANIZED OR REPAIRED AS APPROVED BY THE ENGINEER. DAMAGED SPELTER COATING MAY BE REPAIRED, IF APPROVED, BY THOROUGHLY WIRE BRUSHING THE DAMAGED AREA AND REMOVING ALL LOOSE AND CRACKED SPELTER COATING, AFTER WHICH THE CLEANED AREA SHALL BE PAINTED WITH TWO (2) COATS OF ZINC OXIDE, ZINC DUST PAINT CONFORMING TO THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-15145, THE PAINT TO BE PROPERLY COMPOUNDED IN A SUITABLE VEHICLE IN THE RATIO OF ONE PART ZINC OXIDE TO FOUR (4) PARTS ZINC DUST, BY WEIGHT. COST OF REPLACING, REGALVANIZING OR REPAIRING SHALL BE AT THE EXPENSE OF THE CONTRACTOR.

PAYMENT: PAYMENT WILL BE MADE ON THE BASIS OF THE MEASURED LENGTH OF THE HANDRAIL BETWEEN ENDS. PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR COMPLETE HANDRAIL IN PLACE, INCLUDING ANCHOR BOLTS, AND SHALL BE COMPLETE COMPENSATION FOR ALL MATERIALS, EQUIPMENT, TOOLS AND LABOR INCIDENTAL TO THE MANUFACTURE, FABRICATION AND ERECTION OF THE HANDRAIL.

MATERIAL

TUBING: 4" O.D. GALVANIZED SEAMLESS STEEL PIPE, IN ACCORDANCE WITH A.S.T.M. DESIGNATION A 53, TYPE S, GRADE B, CURRENT SPECIFICATIONS. CUTTING LENGTHS TO EQUAL NINETEEN (19) POST SPACES, WHICH WILL YIELD 251 FEET OR LESS. TUBING TO BE GALVANIZED INSIDE AND OUTSIDE IN ACCORDANCE WITH A.S.T.M. DESIGNATION A 123.

POSTS: CARBON STEEL CASTINGS A.S.T.M. DESIGNATION A 27, CURRENT SPECIFICATIONS, GRADE 70-36 GALVANIZED IN ACCORDANCE WITH A.S.T.M. SPECIFICATION A 123.

BOLTS & NUTS: ¾"Ø x 11" SQUARE HEAD MACHINE BOLTS THREADED 2½", FURNISH WITH ONE (1) HEX. NUT AND ONE (1) WASHER EACH. ALL TO CONFORM TO A.S.T.M. DESIGNATION A 276, TYPES 302, 303 OR 304, CURRENT SPECIFICATIONS, OR TO CONFORM TO A.S.T.M. DESIGNATION A 307, CURRENT SPECIFICATIONS, AND GALVANIZED IN ACCORDANCE WITH A.S.T.M. DESIGNATION A 153.

SET SCREWS: ½"-13NC-2 ALLEN CUP POINT STAINLESS STEEL SET SCREWS, A.S.T.M. DESIGNATION A 276, TYPES 302, 303 OR 304, CURRENT SPECIFICATIONS.

CLOSURE PLATE: ¼" PLATE A.S.T.M. DESIGNATION A 7, CURRENT SPECIFICATIONS, GALVANIZED IN ACCORDANCE WITH A.S.T.M. SPECIFICATION A 123.

WELDING MATERIAL: ELECTRODE AND WELDING OPERATORS SHALL CONFORM TO AMERICAN WELDING SOCIETY, CURRENT SPECIFICATIONS, FOR WELDED HIGHWAY AND RAILWAY BRIDGES.

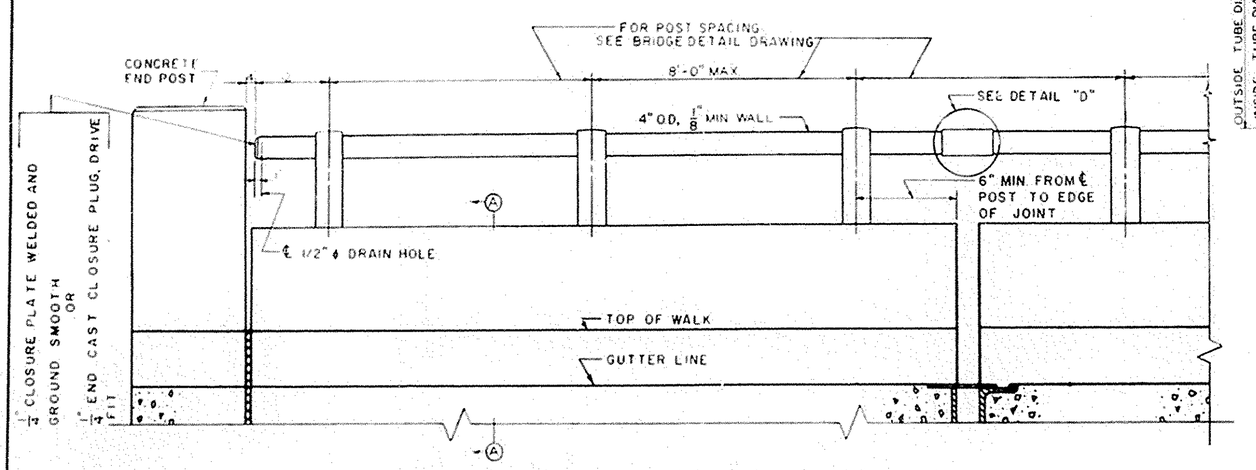
FABRIC PADS: USE ⅛" THICK PREFORMED FABRIC PADS TO CONFORM TO KENTUCKY DEPARTMENT OF HIGHWAYS STANDARD SPECIFICATIONS SECTION 914-3.6(4).

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

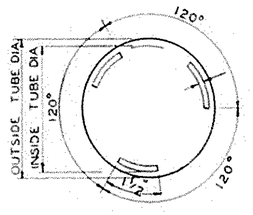
STANDARD GALVANIZED STEEL HANDRAIL

BRIDGE NUMBER | DRAWING NO H-113 | SHEET

BRIDGE



INSIDE ELEVATION OF ERECTED HANDRAIL



END CAST CLOSURE PLUG

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Current Edition with Revisions.

FABRICATION

GENERAL: See Detail Drawings for exact spacing of posts. Handrail curved horizontally may be furnished in single panel chord lengths unless otherwise noted on the plans. The Contractor shall furnish the Department of Highways with complete shop detail plans of Handrail for approval.

GALVANIZING: Anchor Bolts, Nuts, Washers, Washer Shims, Posts, Sleeves and complete Rails shall be Hot-Dipped Galvanized in accordance with the proper ASTM specification after fabrication. Bending for curvature, drilling of drain holes, end finishing and welding of closure plates shall be done before galvanizing.

CUTTING: Saw and mill all cuts.

HOLES: All holes in castings shall be cored.

WELDING: Welding not permitted except as shown on this sheet.

APPEARANCE: Scoring or marring of surfaces sufficient to cause objectionable appearance shall be cause for rejection of damaged piece.

DAMAGED COATING: All galvanized materials shall be loaded, hauled and handled in such a manner that the galvanizing will not be damaged. All abraded and damaged surfaces shall be regalvanized or repaired as approved by the Engineer. Damaged spelter coating may be repaired, if approved, by thoroughly wire brushing the damaged area and removing all loose and cracked spelter coating, after which the cleaned area shall be painted with two coats of zinc oxide-zinc dust paint conforming to the requirements of Federal Specification TT-P-641B, Type 2. The cost of replacing, regalvanizing or repairing shall be that of the Contractor.

MEASUREMENT AND ERECTION

PAYMENT: Payment will be made on the basis of the measured length of the Handrail between ends. Payment will be made at the contract unit price per linear foot for complete handrail in place, including anchor bolts, and shall be complete compensation for all materials, equipment, tools and labor incidental to the manufacture, fabrication and erection of the handrail.

ERECTION: Handrail Posts shall be set on fabric pads at right angles to the fascia line. Tubing shall be erected on a line parallel to the fascia line. The Contractor shall furnish the Department of Highways with complete erection detail plans showing location of splices and erection details for approval.

MATERIALS

TUBING & SLEEVE: 4" O.D. Galvanized Seamless Steel Pipe, in accordance with ASTM A-53, Type S, Grade B. Tubing lengths to equal three (3) post spaces. Twenty-five (25) feet or less. Tubing to be galvanized inside and outside in accordance with ASTM A-123.

POSTS & END CAST CLOSURE PLUGS: Carbon Steel castings ASTM A-27, Grade 70-36 galvanized in accordance with ASTM A-123.

ANCHOR BOLTS: 3/4" ϕ x 12" square head machine bolts threaded 2". Furnish with one (1) hex. nut and one (1) washer each. All to conform to ASTM A-276, Type 302 or 304 or ASTM A-307 for low-carbon steel machine bolts and nuts galvanized in accordance with ASTM A-153.

WASHER SHIMS: Maximum thickness 1/8", to conform to ASTM A-276, Type 302 or 304 or ASTM A-307 galvanized in accordance with ASTM A-153.

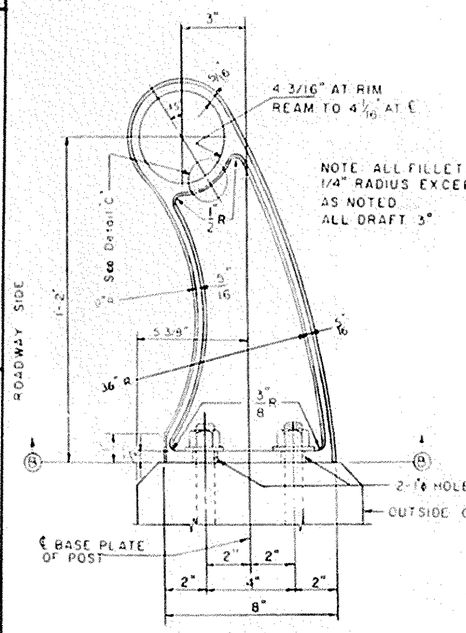
SET SCREWS: 1/2" ϕ 13 NC-2 square head cone point, square head or allen cup point stainless steel set screws. ASTM A-276, Type 302 or 304.

CLOSURE PLATES: 1/4" thick ASTM A-36 galvanized in accordance with ASTM A-123.

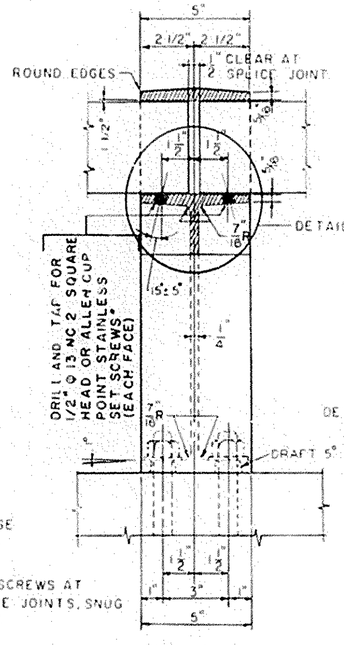
WELDING MATERIAL: Welding and Welding Material shall conform to American Welding Society, current specifications, for Welded Highway and Railway Bridges.

FABRIC PADS: 5" x 8" x 1/8" preformed fabric pads to conform to Kentucky Department of Highways Standard Specification Article 408.3.2D.

NOTARIZED MILL TEST REPORTS: Notarized mill test reports or statements certifying that the materials comply with the Specifications, shall be furnished in triplicate to the Department of Highways.

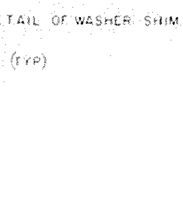


SIDE ELEVATION

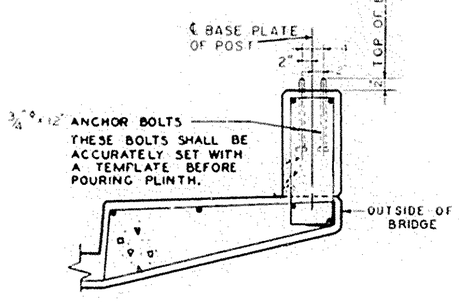


*SET SCREWS AT SPLICE JOINTS, SNUG ONLY.

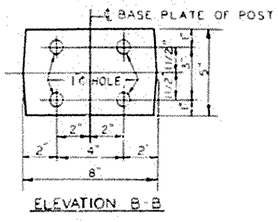
SECTIONAL ELEVATION



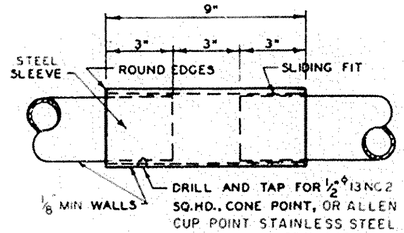
DETAIL OF WASHER SHIM



SECTION A-A



ELEVATION B-B



DETAIL "D"
(TO BE USED AT EXP. DAM ONLY)

POST

APPROVED BY _____ DIRECTOR DIVISION OF BRIDGES

	DATE
DESIGNED BY	
DETAILED BY	
TRACED BY	
CHECKED BY	
CHECKED BY	
CHECKED BY	
REVISED	
REVISED	
REVISED	

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD GALVANIZED STEEL HANDRAIL

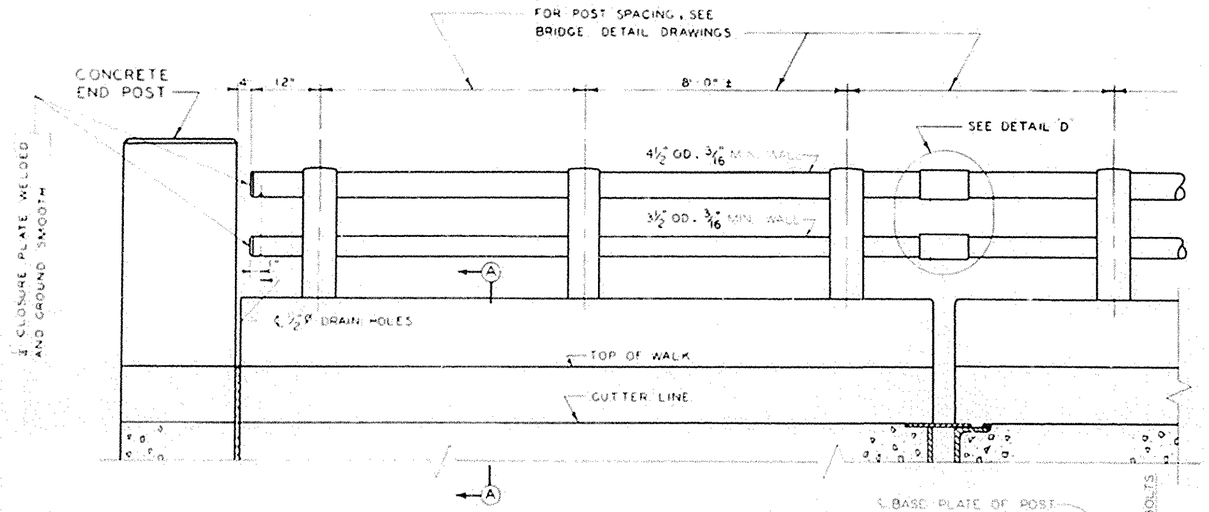
BRIDGE NUMBER	DRAWING NO. H 113A	SHEET

BRIDGE

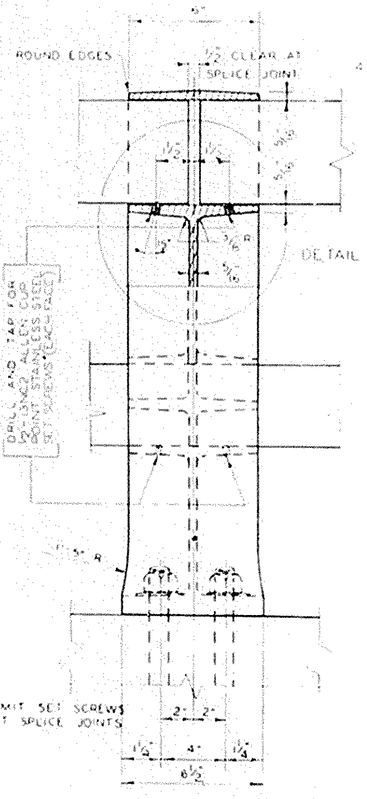
FED. ROAD SYST.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
7	KY.			

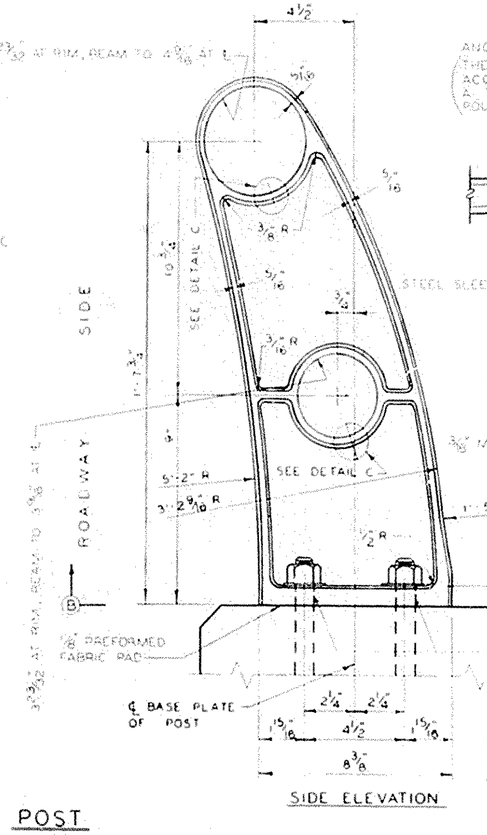
GENERAL NOTE

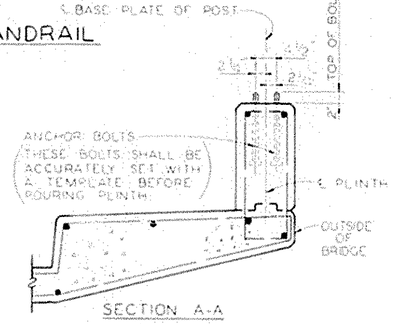
HANDRAILS CURVED HORIZONTALLY MAY BE FURNISHED IN SINGLE CHORD LENGTHS UNLESS OTHERWISE NOTED ON THE PLANS. THE CONTRACTOR SHALL FURNISH THE DEPARTMENT OF HIGHWAYS

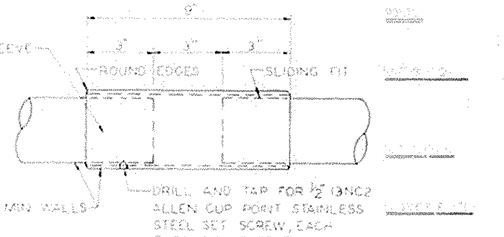


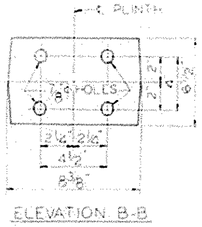
INSIDE ELEVATION OF ERECTED HANDRAIL











NOTE
ALL FILLETS ⅛" RADIUS EXCEPT AS NOTED.
ALL DRAFT 3°.

POST

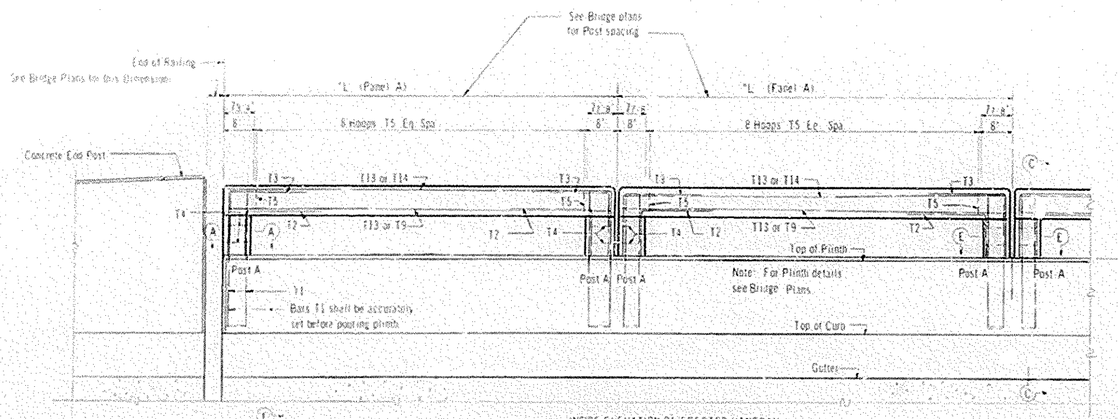
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD GALVANIZED STEEL HANDRAIL

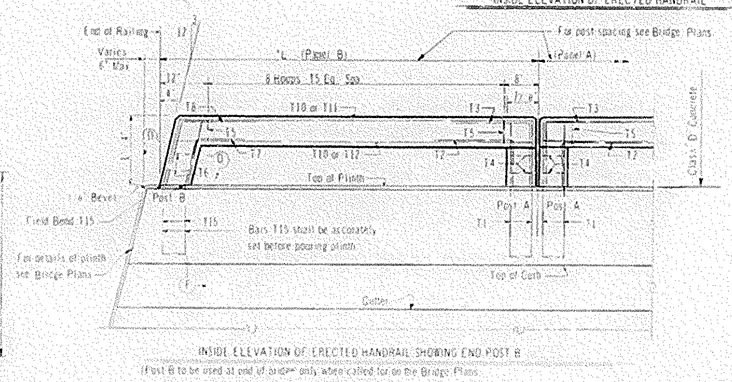
DRAWING NO. H-114 | SHEET

BRIDGE

FED ROAD DIST.	STATE	FED AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				

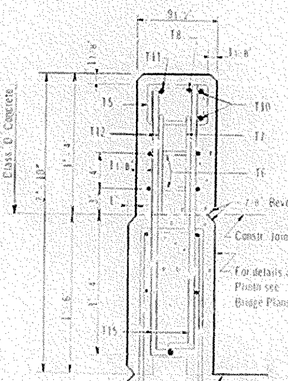


INSIDE ELEVATION OF ERECTED HANDRAIL

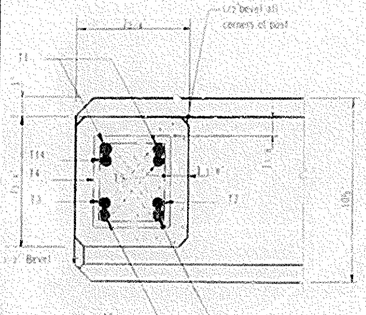


INSIDE ELEVATION OF ERECTED HANDRAIL SHOWING END POST B

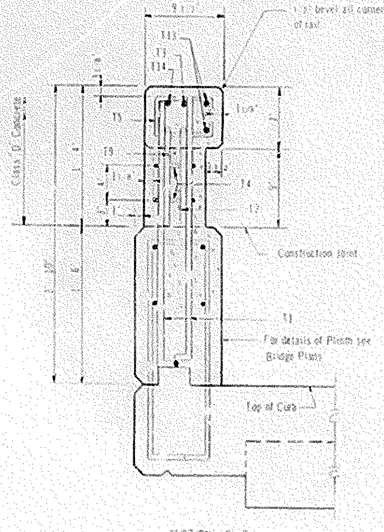
(Post B to be used at end of single only, when called for on the Bridge Plans)



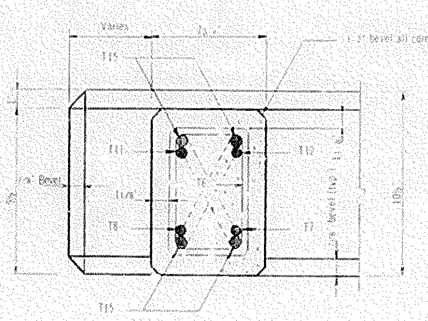
SECTION F - F
POST B



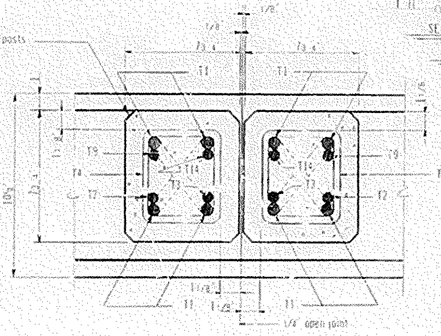
SECTION A - A



SECTION C - C
POST A



SECTION D - E



SECTION E - E

GENERAL NOTE:

SPECIFICATIONS: Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Current Edition with Supplements, shall apply to this project.

DESIGN LOAD: This handrail is designed for the loads specified in the AASHO Specifications, current edition with amendments, including the Interim 1964 Specifications.

SCOPE: This drawing in conjunction with the bridge plans, the Specifications and the special provisions, as noted, covers the construction of high strength concrete handrail on highway bridge structures.

MATERIALS:

CONCRETE: The concrete used throughout the handrail shall be Class "D" in accordance with the Specifications.

REINFORCEMENT: The steel reinforcement shall be intermediate or hard grade in accordance with ASTM A15 for billet steel, or ASTM A16 for rail steel as specified in Section 631 of the Specifications. The dimensions shown from face of concrete to bars are clear distances. Bar spacings shown are distances center to center of bars.

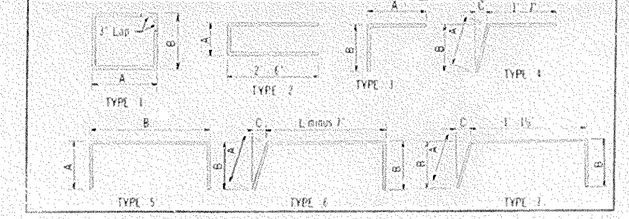
MEASUREMENT AND PAYMENT:

MEASUREMENT: The work actually completed and accepted in place shall be measured along the rail in linear feet.

PAYMENT: Payment will be made for the quantity measured as described above, at the contract unit price per linear foot and such payment shall be full compensation for all work necessary for completion.

BILL OF REINFORCEMENT (ONE PANEL)

Mark	Type	Number Panel A	Number Panel B	Size	Length Ft.	Length In.	Location	A Ft.	A In.	B Ft.	B In.	C Ft.	C In.
T1	2	4	2	6	5	3	Plinth to Post	0	5 5/8	—	—	—	—
T2	3	2	1	6	2	5	Post A & Rail	1	1	0	11	—	—
T3	3	2	1	6	2	8	Post A & Rail	1	1	1	2⅝	—	—
T4	1	4	2	3	2	2	Post A Hoops	0	5½	0	5½	—	—
T5	1	8	8	3	2	4	Rail Hoops	0	7⅛	0	4 3/8	—	—
T6	1	—	2	3	2	4	Post B Hoops	0	5½	0	6½	—	—
T7	4	—	1	6	2	6	Rail & Post B	0	11½	0	11⅝	0	2⅜
T8	4	—	1	6	2	9	Rail & Post B	1	2⅜	1	2⅝	0	3⅝
T9	5	1	—	6	"L" plus 10"		Rail & Post (Panel A)	0	11⅝	"L" minus 9½"		—	—
T10	Str.	—	2	6	"L" minus 7"		Rail (Panel B)	—	—	—	—	—	—
T11	6	—	1	6	"L" plus (1'-2")		Rail & Post (Panel B)	1	2⅜	1	2⅝	0	3⅝
T12	7	—	1	6	"L" plus 7"		Rail & Post (Panel B)	0	11⅝	0	11⅝	0	2⅜
T13	Str.	2	—	6	"L" minus 3"		Rail (Panel A)	—	—	—	—	—	—
T14	5	1	—	6	"L" plus (1'-11")		Rail & Post (Panel A)	1	2⅝	"L" minus 3⅝"		—	—
T15	2	—	2	6	5	4	Plinth to Post	0	6 3/8	—	—	—	—



* L = Panel Length of Handrail. L is not to exceed 8'-0".

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD

HIGH STRENGTH CONCRETE

HANDRAIL

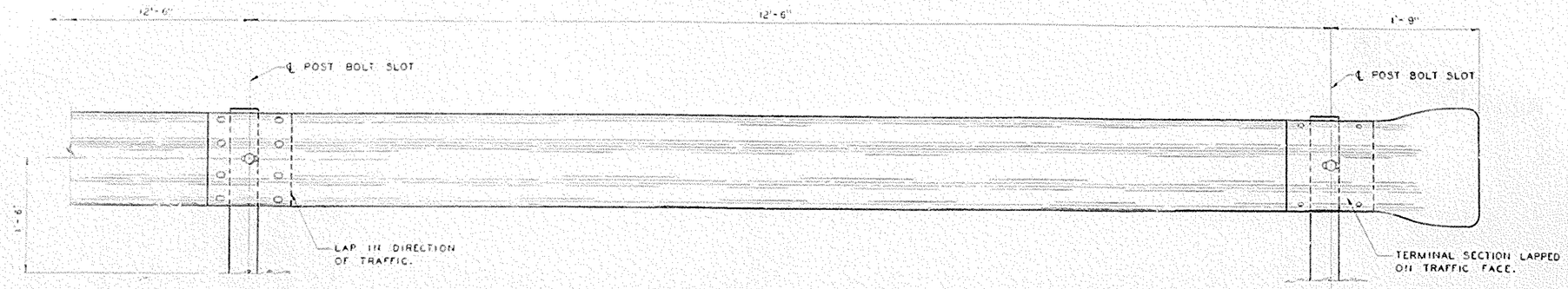
BRIDGE NUMBER | DRAWING NO. H1508 | INDEX

APPROVED BY [illegible] DIRECTOR DIVISION OF BRIDGES 1/16/68

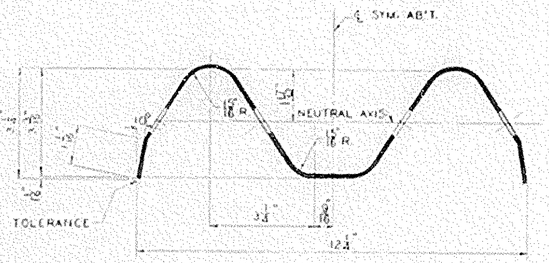
DESIGNED BY [illegible] DATE
CHECKED BY [illegible] DATE
DETAILED BY [illegible] DATE
TRACED BY DATE
CHECKED BY DATE

BRIDGE

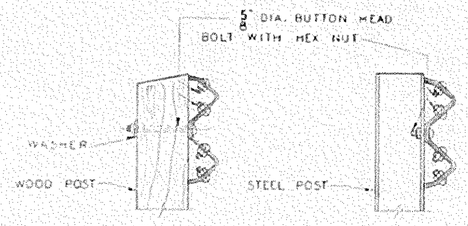
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



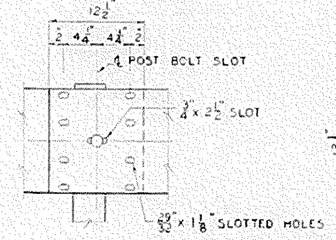
ELEVATION OF RAIL



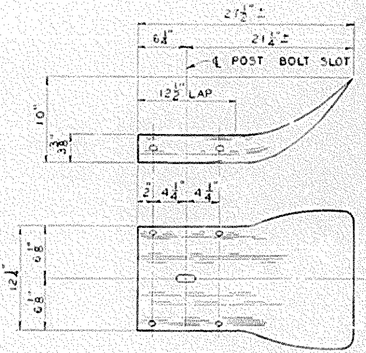
SECTON THRU RAIL ELEMENT



ARRANGEMENT AT POSTS



RAIL SPLICE



SECTION THRU TERMINAL IS THE SAME AS SECTION THRU RAIL ELEMENT.

TERMINAL SECTION

GENERAL NOTE

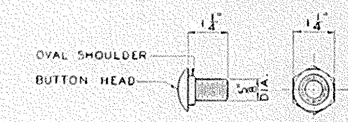
SPECIFICATIONS: KENTUCKY DEPARTMENT OF HIGHWAYS, 1956 EDITION WITH AMENDMENTS.

GUARD RAIL: THE GUARD RAIL, INCLUDING ALL ELEMENTS AND FITTINGS NECESSARY FOR A COMPLETE INSTALLATION, SHALL BE A BEAM TYPE METAL GUARD RAIL (60,000 LBS. MINIMUM BREAKING STRENGTH AT JOINTS) IN ACCORDANCE WITH THE SPECIFICATIONS AND AMENDMENT NO. 36, AND SHALL NOT BE LESS THAN 12 INCHES WIDE AND THREE INCHES DEEP. THE COST OF FURNISHING, PLACING AND PAINTING ALL GUARD RAILS AND FITTINGS IS TO BE INCLUDED IN THE UNIT PRICE BID FOR GUARD RAILS. ALL NUTS AND BOLTS CONNECTING THE RAILS SHALL BE GALVANIZED STEEL OR ALUMINUM ALLOY.

PAINTING: STEEL GUARD RAILS TO BE SHOP PAINTED WITH ONE COAT OF RED LEAD PAINT, TYPE 1, (OR MANUFACTURER'S PAINT, IF APPROVED BY THE DEPARTMENT'S LABORATORY) AND FIELD PAINTED WITH ONE COAT OF RED LEAD PAINT TYPE 1, AND ONE COAT OF ALUMINUM PAINT.

MATERIAL: THE GUARD RAILS AND TERMINAL SECTIONS SHALL BE STEEL BEAM TYPE, (DEEP), IN ACCORDANCE WITH THE SPECIFICATIONS AND AMENDMENT NO. 36 OR ALUMINUM ALLOY BEAM TYPE IN ACCORDANCE WITH THE SPECIFICATIONS. ALUMINUM ALLOY GUARD RAILS SHALL CONFORM TO A.S.T.M. SPECIFICATIONS B209-58T ALLOY CLAD 6061A, TEMPER T3. ALUMINUM TERMINAL SECTIONS SHALL CONFORM TO A.S.T.M. SPECIFICATION B209-58T ALLOY CLAD 6061A, TEMPER T42.

NUTS AND BOLTS: ALL STEEL NUTS, BOLTS AND WASHERS SHALL CONFORM TO THE SPECIFICATIONS AND SHALL BE GALVANIZED IN CONFORMITY WITH ARTICLE 7.16.11 OF THE SPECIFICATIONS. ALL ALUMINUM ALLOY BOLTS SHALL CONFORM TO A.S.T.M. SPECIFICATIONS B211-58T ALLOY 6061A, TEMPER T4. ALL ALUMINUM ALLOY NUTS SHALL CONFORM TO A.S.T.M. SPECIFICATION B211-58T ALLOY 6S 11A, TEMPER T6.



SPLICE BOLT NUT

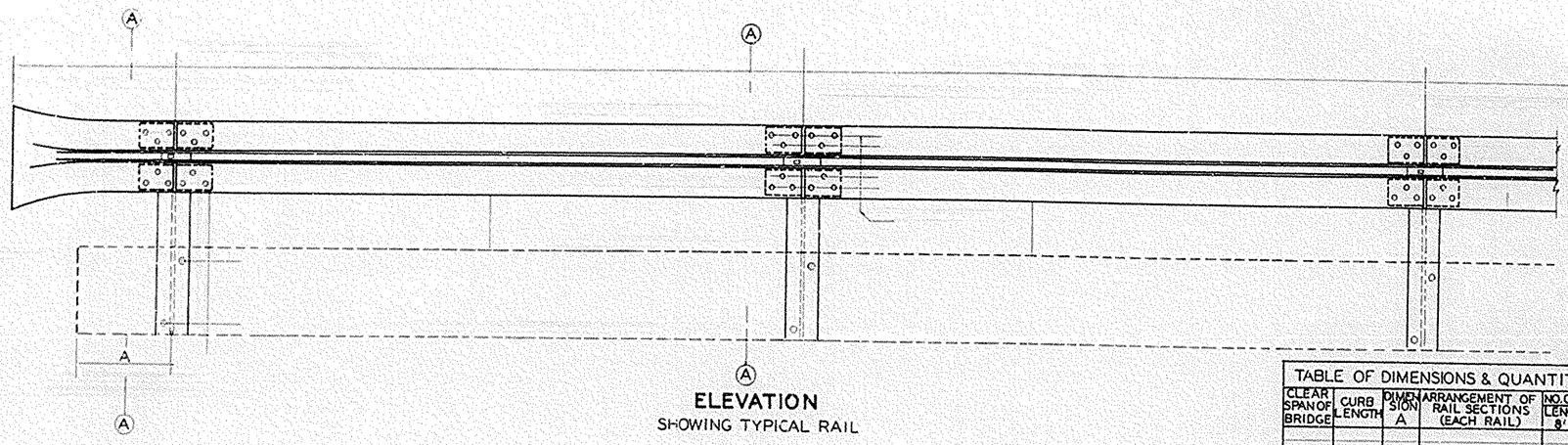
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD BEAM TYPE GUARD RAIL

DRAWING NO. BR-6 | INDEX X

BRIDGE

FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				

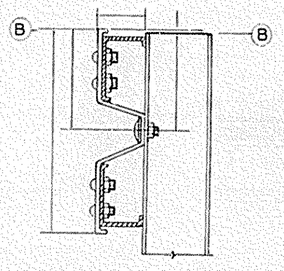


ELEVATION
SHOWING TYPICAL RAIL

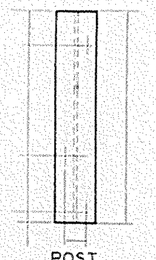
TABLE OF DIMENSIONS & QUANTITIES (TWO RAILS)

CLEAR SPAN OF BRIDGE	CURB LENGTH	DIMENSION A	ARRANGEMENT OF RAIL SECTIONS (EACH RAIL)	NO. OF RAIL SECTI LENGTH 8'0"	LENGTH 10'0"	NO. POSTS REQ'D.	NO. POSTS REQ'D	WEIGHT

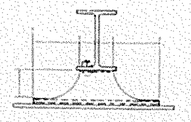
WASHER BG-104



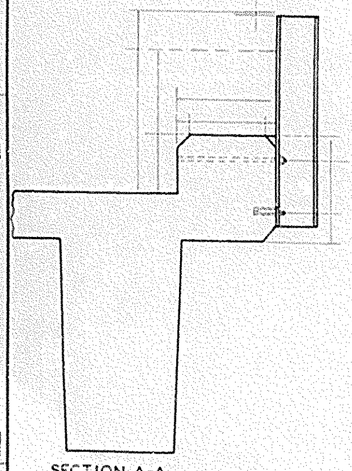
DETAIL AT POST



POST



SECTION B-B



SECTION A-A

GENERAL NOTE

THIS RAIL MANUFACTURED BY THE BETHLEHEM STEEL CO.
FOR DETAILS NOT SHOWN HEREON SEE BETHLEHEM SHEET NO. 120 & FOLDER 474

DESIGNED BY	REVISED
TRACED BY	REVISED
CHECKED BY	REVISED

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

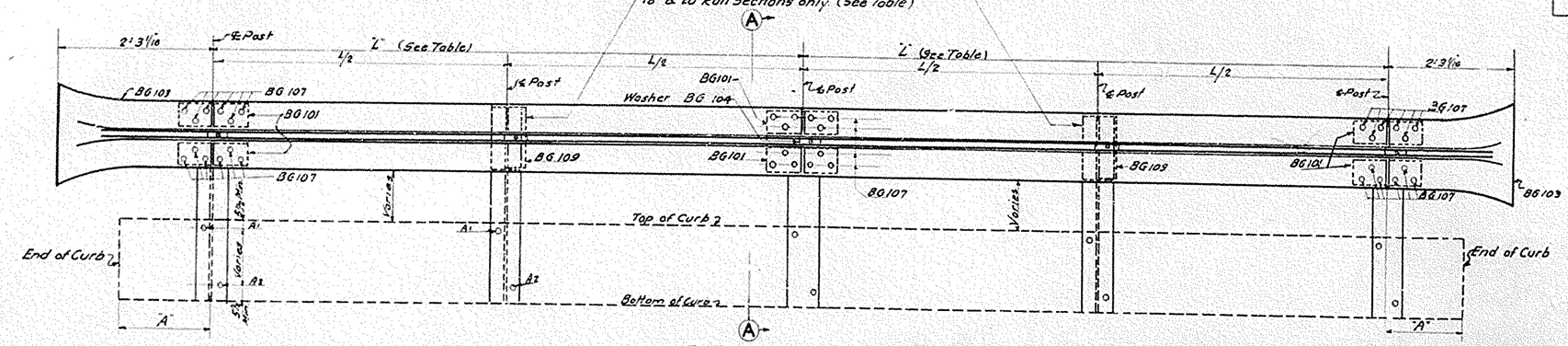
PROPOSED BEAM TYPE
METAL GUARD RAIL
FOR EXISTING BRIDGES

DRAWING No.	SHEET

BRIDGE

FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				

NOTE: Intermediate Posts are required on 16', 18' & 20' Rail Sections only. (See Table)

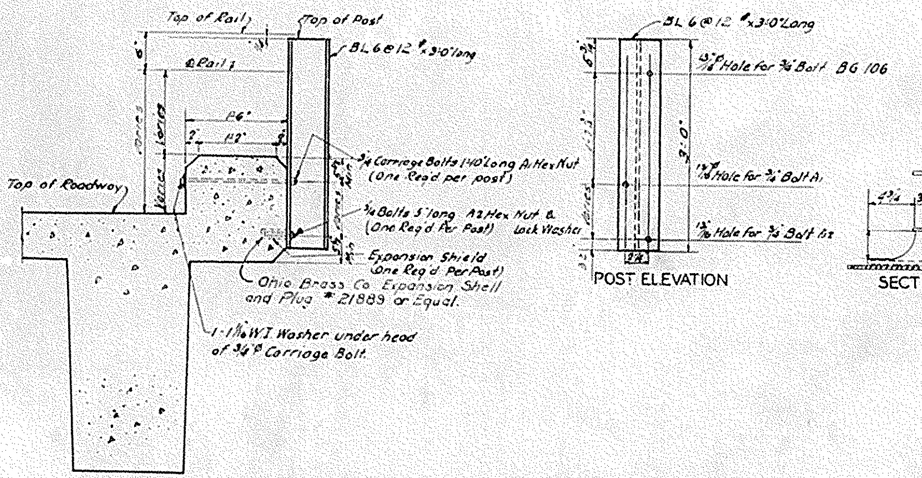


ELEVATION

(Showing Typical Combinations for one rail)

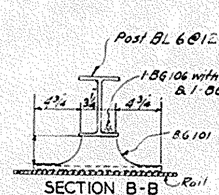
TABLE OF DIMENSIONS AND QUANTITIES -(TWO RAILS)

CLEAR SPAN OF BRIDGE	CURB LENGTH	DIMEN. "A"	ARRANGEMENT OF RAIL SECTIONS — EACH RAIL	NO. OF RAIL SECTIONS L=8'	L=10'	L=16'	L=18'	L=20'	NO. OF SECTIONS BG 103 REQ'D.	NO. OF POSTS REQ'D.	NO. OF BG 101 REQ'D.	NO. OF BG 109 REQ'D.	NO. OF BG 106 WITH HEX NUTS REQ'D.	NO. OF BG 107 WITH HEX NUTS REQ'D.	NO. OF CARRIAGE BOLTS A1 WITH HEX NUTS REQ'D.	NO. OF EXPAN. SHIELDS REQ'D.	NO. OF BOLTS A2 WITH HEX NUTS REQ'D.	NO. OF LOCK WASH. FOR 1/4" BOLTS REQ'D.	NO. OF WI WASH. FOR 3/4" BOLTS REQ'D.	NO. OF WASH. BG 104 REQ'D.
16'-0"	19'-0"	1'-6"	BG 103-16'-BG 103	—	—	2	—	—	4	6	8	2	6	48	6	6	6	12	6	6
18'-0"	21'-0"	1'-6"	BG 103-18'-BG 103	—	—	—	2	—	4	6	8	2	6	48	6	6	6	12	6	6
20'-0"	23'-0"	1'-6"	BG 103-20'-BG 103	—	—	—	—	2	4	6	8	2	6	48	6	6	6	12	6	6
22'-0"	25'-0"	2'-6"	BG 103-20'-BG 103	—	—	—	—	2	4	6	8	2	6	48	6	6	6	12	6	6
24'-0"	27'-0"	1'-6"	BG 103-8'-16'-BG 103	2	—	2	—	—	4	8	12	2	8	72	8	8	8	16	8	8
26'-0"	29'-0"	1'-6"	BG 103-8'-18'-BG 103	2	—	—	2	—	4	8	12	2	8	72	8	8	8	16	8	8
28'-0"	31'-0"	1'-6"	BG 103-10'-18'-BG 103	—	2	—	2	—	4	8	12	2	8	72	8	8	8	16	8	8
30'-0"	33'-0"	1'-6"	BG 103-10'-20'-BG 103	—	2	—	—	2	4	8	12	2	8	72	8	8	8	16	8	8
32'-0"	35'-0"	1'-6"	BG 103-16'-16'-BG 103	—	—	4	—	—	4	10	12	4	10	72	10	10	10	20	10	10
34'-0"	37'-0"	1'-6"	BG 103-16'-18'-BG 103	—	—	2	2	—	4	10	12	4	10	72	10	10	10	20	10	10
36'-0"	39'-0"	1'-6"	BG 103-18'-18'-BG 103	—	—	—	4	—	4	10	12	4	10	72	10	10	10	20	10	10
38'-0"	41'-0"	1'-6"	BG 103-18'-20'-BG 103	—	—	—	2	2	4	10	12	4	10	72	10	10	10	20	10	10
40'-0"	43'-0"	1'-6"	BG 103-20'-20'-BG 103	—	—	—	—	4	4	10	12	4	10	72	10	10	10	20	10	10
45'-0"	48'-0"	1'-0"	BG 103-10'-18'-18'-BG 103	—	2	—	4	—	4	12	16	4	12	96	12	12	12	24	12	12
50'-0"	53'-0"	2'-6"	BG 103-16'-16'-16'-BG 109	—	—	6	—	—	4	14	16	6	14	96	14	14	14	28	14	14

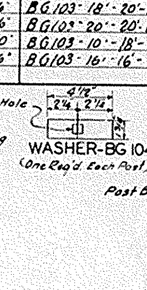


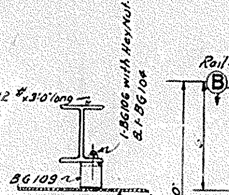
SECTION A-A

POST ELEVATION

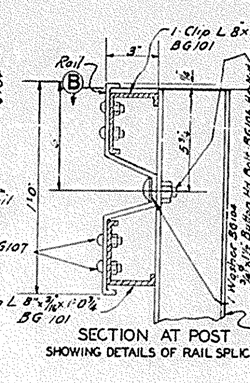


SECTION B-B

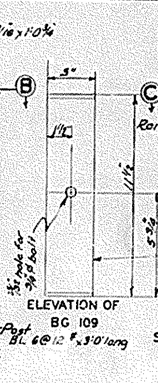




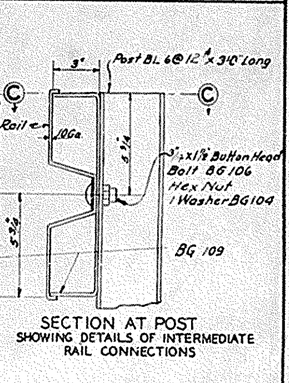
SECTION C-C



SECTION AT POST
SHOWING DETAILS OF RAIL SPLICE



ELEVATION OF BG 109



SECTION AT POST
SHOWING DETAILS OF INTERMEDIATE RAIL CONNECTIONS

GENERAL NOTE

Specifications: Ky. Department of Highways (1956 Standard with Amendments.)

Guard Rail: — The Guard Rail shall be a Beam Type Metal Guard Rail (70000# breaking strength at the joints) with a beam depth of 3" and shall be in accordance with Std. Specifications and shall include all elements, fittings, posts and anchor bolts necessary for complete installation.

Nuts and Bolts: All nuts and bolts (except bolts A1 and A2) to be galvanized in accordance with the specifications.

Paint: One shop coat of red lead paint and one field coat of red lead paint and one field coat of aluminum paint shall be applied to all rail sections, posts and washers in accordance with the Specifications. The red lead paint, the aluminum pigment and the vehicle for aluminum paint, shall conform to the requirements of the Standard Specifications.

Type of Rail: The details shown on this sheet are for general information only and do not imply that only this type of guard rail will be accepted. Bids on alternate types of guard rails conforming to Ky. Highway Specifications 1956 may be submitted.

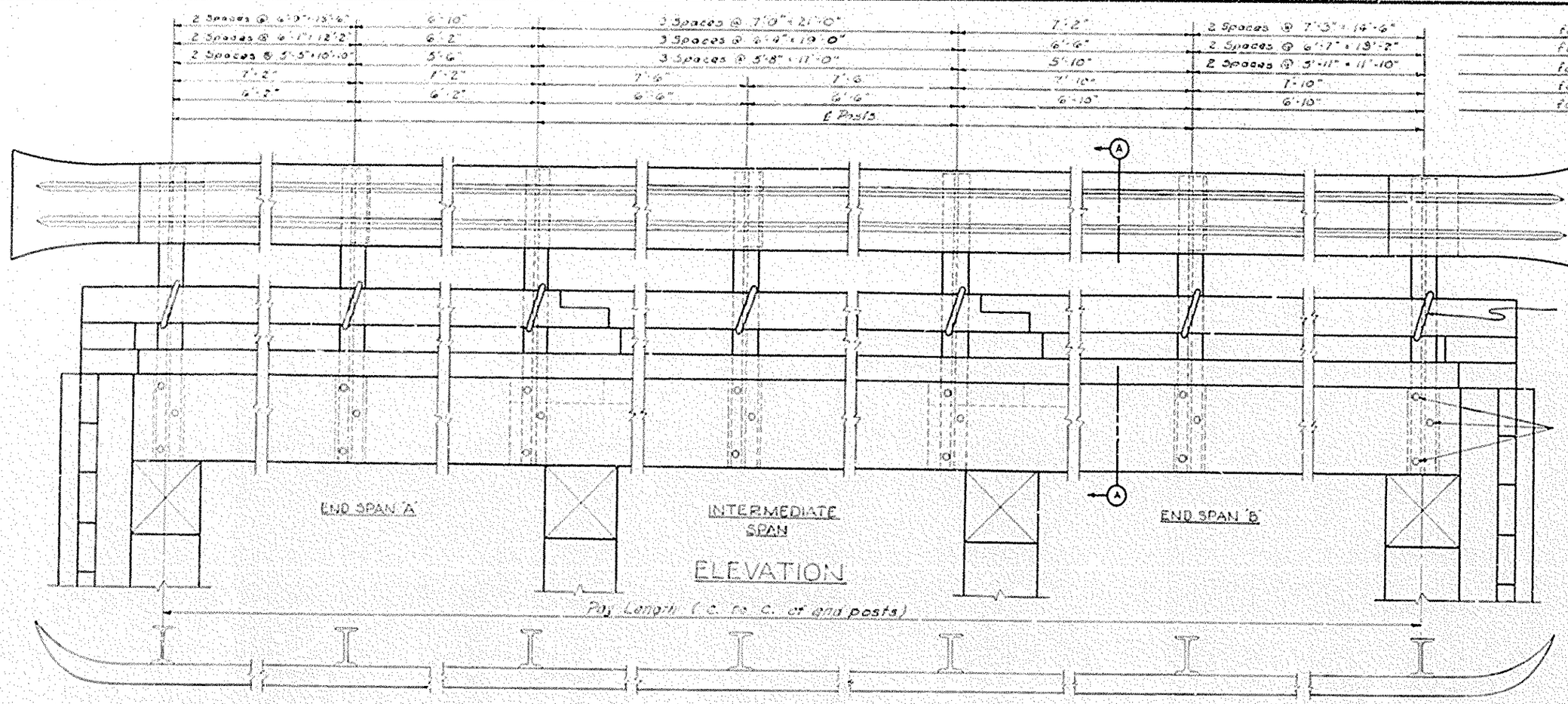
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

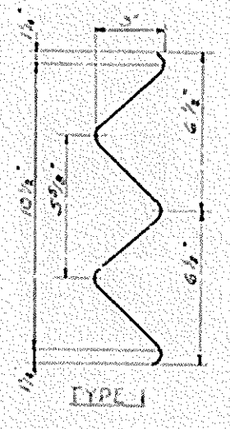
SAFETY BEAM GUARD RAIL FOR EXISTING BRIDGES

DRAWING NO. 9187

BRIDGE

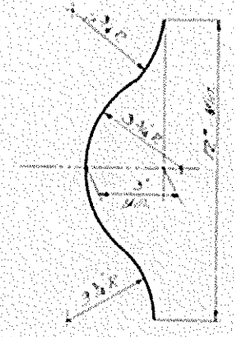
20





TYPE 1

TYPE 2



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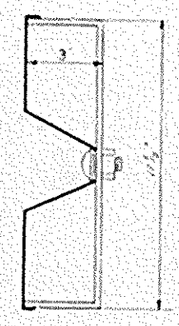

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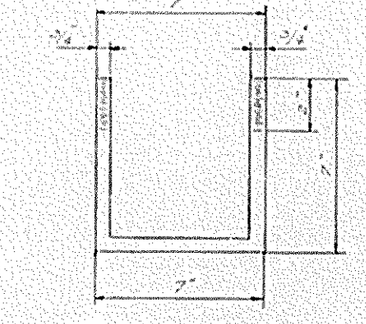
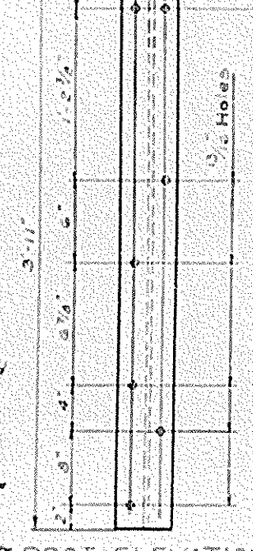
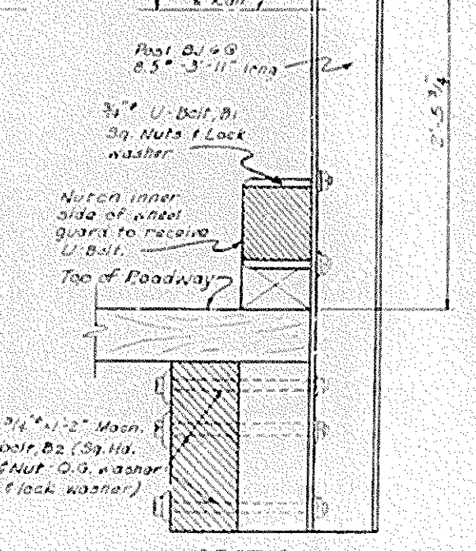


DETAIL OF U-BOLT

(2 Sq. Nuts & 2 Lock Washers required for each bolt)



POST ELEVATION



SECTION A-A

(Rail not shown)

ITEM	13 Ft. Span						15 Ft. Span						17 Ft. Span						19 Ft. Span						21 Ft. Span					
	LENGTH		NO. PCS. IN 1 SPAN				LENGTH		NO. PCS. IN 1 SPAN				LENGTH		NO. PCS. IN 1 SPAN				LENGTH		NO. PCS. IN 1 SPAN				LENGTH		NO. PCS. IN 1 SPAN			
	FT.	IN.	END SPAN	INTER SPAN	END SPAN	SINGLE SPAN	FT.	IN.	END SPAN	INTER SPAN	END SPAN	SINGLE SPAN	FT.	IN.	END SPAN	INTER SPAN	END SPAN	SINGLE SPAN	FT.	IN.	END SPAN	INTER SPAN	END SPAN	SINGLE SPAN	FT.	IN.	END SPAN	INTER SPAN	END SPAN	SINGLE SPAN
Post (B1 & B2 @ 8.5°)	3	11	6	4	4	6	3	11	6	4	4	6	3	11	8	6	6	8	3	11	8	6	6	8	3	11	8	6	6	8
B1 (U-Bolt, See details)			6	4	4	6			6	4	4	6			8	6	6	8			8	6	6	8			8	6	6	8
B2 Mach. Bolt w/ nut and washer			18	12	12	18			18	12	12	18			24	18	18	24			24	18	18	24			24	18	18	24
O.G. Washer			12	8	8	12			12	8	8	12			16	12	12	16			16	12	12	16			16	12	12	16
Lock Washer			30	20	20	30			30	20	20	30			40	30	30	40			40	30	30	40			40	30	30	40

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, 1945 Standard With amendments.

GUARD RAIL: The guard rail shall be a Beam Type metal Guard Rail (10,000# breaking strength at the joints) with a beam depth of 3" and shall be in accordance with Standard Specifications 711-2.3 and 711.4-C including all elements, fittings, posts and bolts necessary for complete installation.

NUTS AND BOLTS: All nuts and bolts to be galvanized in accordance with the specifications.

PAINT: One shop coat of red lead paint and one field coat of red lead paint and one field coat of aluminum paint shall be applied to all rail sections, posts and washers in accordance with the specifications. The red lead paint, the aluminum pigment, and the vehicle for aluminum paint, shall conform to the requirements of the Standard Specifications.

TYPE OF RAIL: Bitter type, as shown on this sheet.

PAY LENGTH: Pay length shall be center to center End Posts as indicated on the plans. Price of end sections projecting beyond centers of End Posts to be included in the price bid per linear foot for the pay length. This pay length shall be full compensation for the furnishing, preparing, placing, and erecting of all materials for the complete rail, for all shop work, elements, fittings, posts, bolts, painting and field work, and for all labor, equipment, tools, and incidentals to complete the work.

RAIL SPLICES: Location of splices to be determined by length of sections ordered. Splices may be made between posts or at posts.

DESIGNED BY: C.R.S. DETAILED BY: C.R.S. CHECKED BY: E.D.M. DATE: 8/55

DATE REVISED

DATE REVISED

DATE REVISED

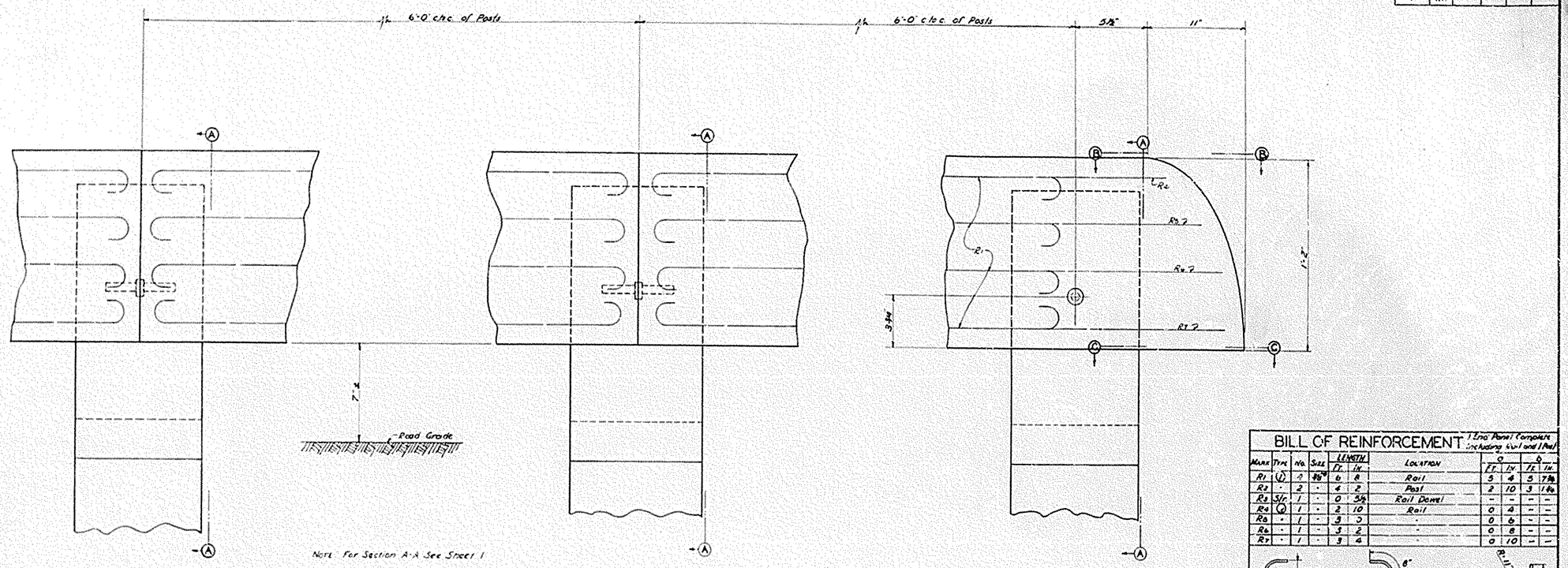
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT
COUNTY OF

SAFETY BEAM GUARD RAIL FOR TIMBER BRIDGES

ROAD
STATION PROJECT NO.
BRIDGE NUMBER
DRAWING NO. BR-1
INDEX

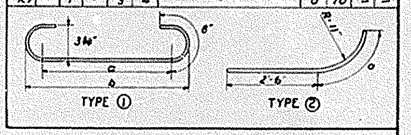
BRIDGE

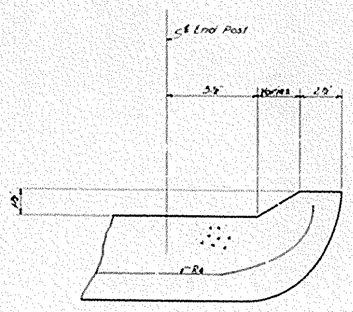
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



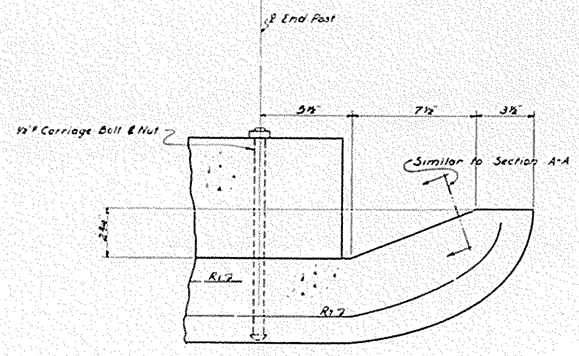
BILL OF REINFORCEMENT
1 End Panel Complete including Rail and 1 Post

Mark	Type	No.	Size	Length Ft.	Length In.	Location	Q Ft.	Q In.	D Ft.	D In.
R1	(1)	1	#8	6	8	Rail	5	4	5	7 3/8
R2	-	2	-	4	2	Post	2	10	3	1 3/8
R3	(2)	1	-	0	5 3/8	Rail Dowel	-	-	-	-
R4	(2)	1	-	2	10	Rail	0	4	-	-
R5	-	1	-	3	3	-	0	6	-	-
R6	-	1	-	3	2	-	0	8	-	-
R7	-	1	-	3	4	-	0	10	-	-





SECTION B - B



SECTION C - C

NOTE:
Intermediate Guard Rail Sections and Post are Standard as detailed on Sheet 1.

Detail shown is for right nose guard. Left nose guard detail is same opposite hand.

Sheet 2 of 2

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

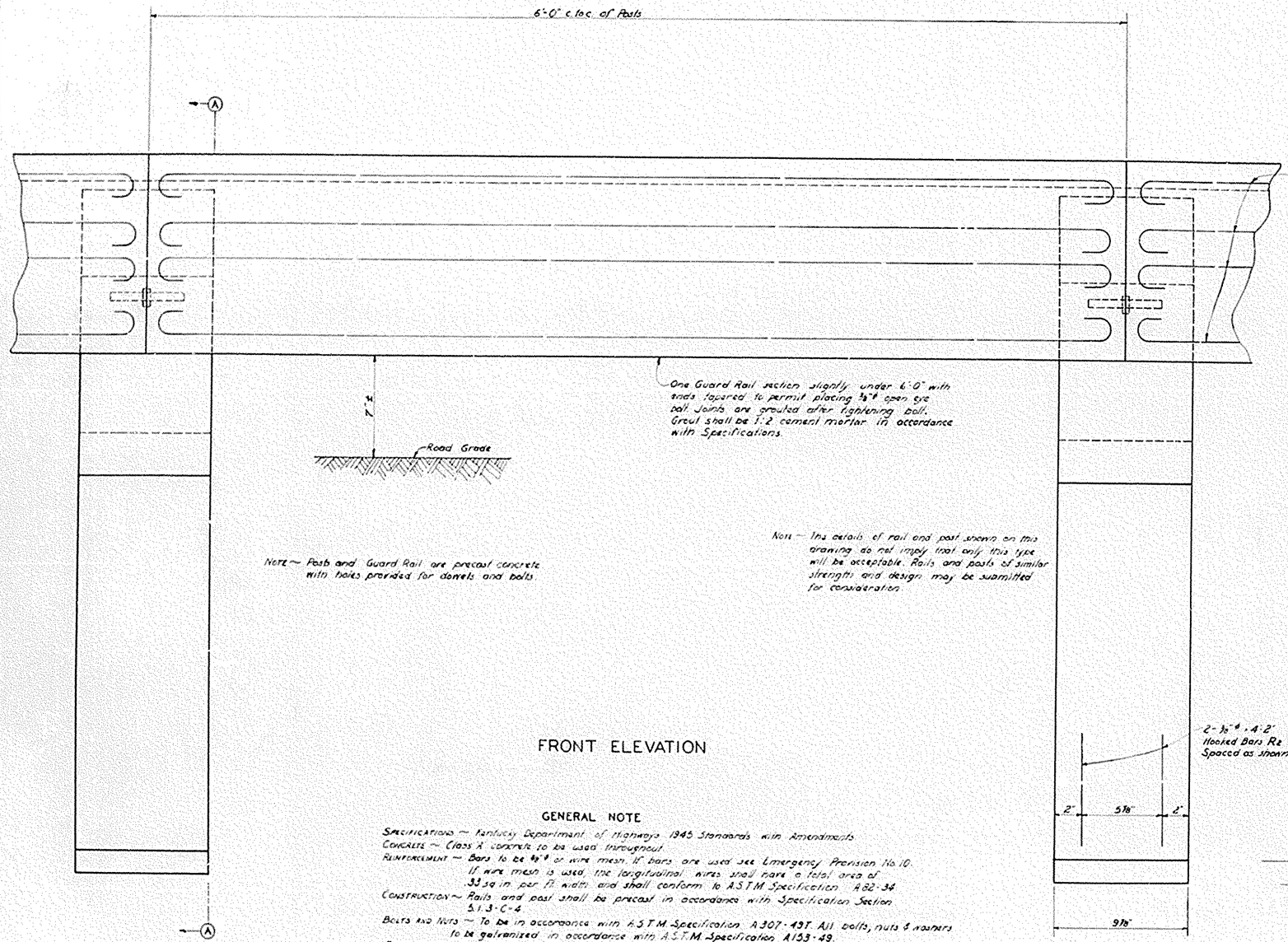
STANDARD PRECAST CONCRETE GUARD RAIL

BRIDGE NUMBER	DRAWING NO. BR-2	ORDER

DESIGNED BY
DETAILED BY
TRACED BY
CHECKED BY
CHECKED BY
CHECKED BY
DATE
DATE 8-51
REVISED
REVISED
REVISED

BRIDGE

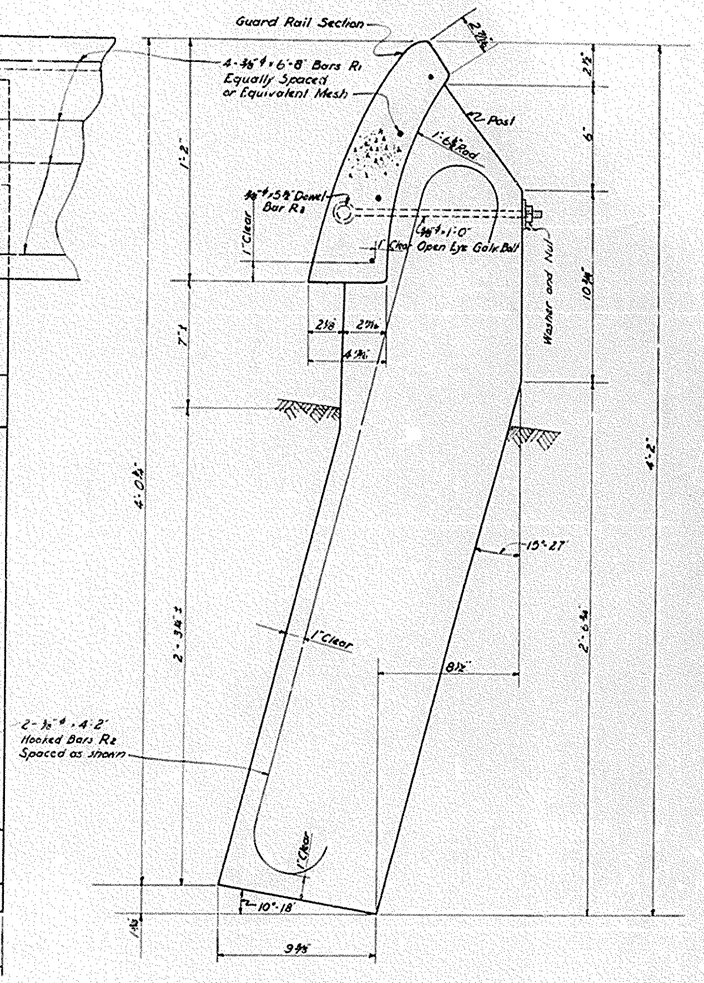
FED. ROAD DIV.#	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



FRONT ELEVATION

Note — Posts and Guard Rail are precast concrete with holes provided for dowels and bolts.

Note — The details of rail and post shown on this drawing do not imply that only this type will be acceptable. Rails and posts of similar strengths and design may be submitted for consideration.



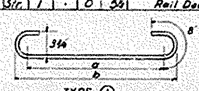
SECTION A - A

GENERAL NOTE

SPECIFICATIONS — Kentucky Department of Highways 1945 Standards with Amendments.
CONCRETE — Class A concrete to be used throughout.
REINFORCEMENT — Bars to be ½"ϕ or wire mesh. If bars are used see Emergency Provision No. 10. If wire mesh is used, the longitudinal wires shall have a total area of .33 sq in. per ft. width, and shall conform to A.S.T.M. Specification A 82-34.
CONSTRUCTION — Rails and post shall be precast in accordance with Specification Section 5.1.3-C-4.
BOLTS AND NUTS — To be in accordance with A.S.T.M. Specification A 307-49T. All bolts, nuts & washers to be galvanized in accordance with A.S.T.M. Specification A 153-49.
PAYMENT — Rails shall be paid for at a lump sum bid price for each section 6 ft. in length. Post shall be paid for at a lump sum bid price for each post. The bid prices shall include the cost of all labor and materials necessary for the satisfactory completion of this work.

BILL OF REINFORCEMENT (1 PANEL COMPLETE W/ CASTING BOLT AND POST)

MARK	TYPE	No.	SIZE	LENGTH Ft.	LENGTH In.	LOCATION	a Ft.	a In.	b Ft.	b In.
R1	①	4	¾ϕ	6	8	Rail	5	4	5	7 7/8
R2	·	2	·	4	2	Post	2	10	3	1 4/8
R3 Str.		1	·	0	5½	Rail Dowel	—	—	—	—



TYPE ①

Sheet 1 of 2

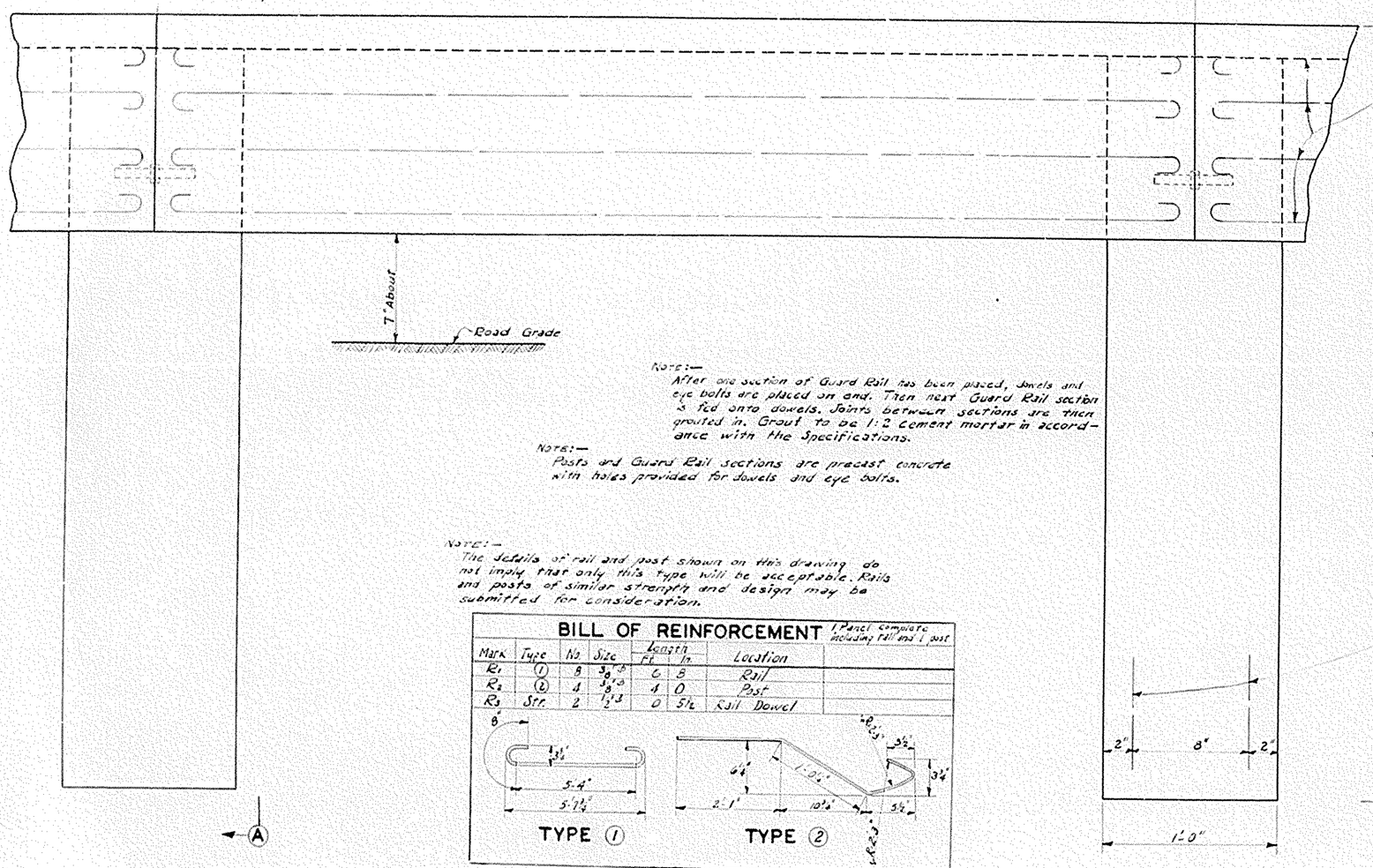
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
STANDARD PRECAST CONCRETE GUARD RAIL

DRAWING NO. BR-2

BRIDGE

Fed. Road Dist.	State	Fed. Aid Proj. No.	Fiscal Year	Sheet No.	Total Sheets
7	Ky.				

6'-0" C. to C. of Posts



NOTE:—
After one section of Guard Rail has been placed, dowels and eye bolts are placed on and. Then next Guard Rail section is fed onto dowels. Joints between sections are then grouted in. Grout to be 1:2 cement mortar in accordance with the Specifications.

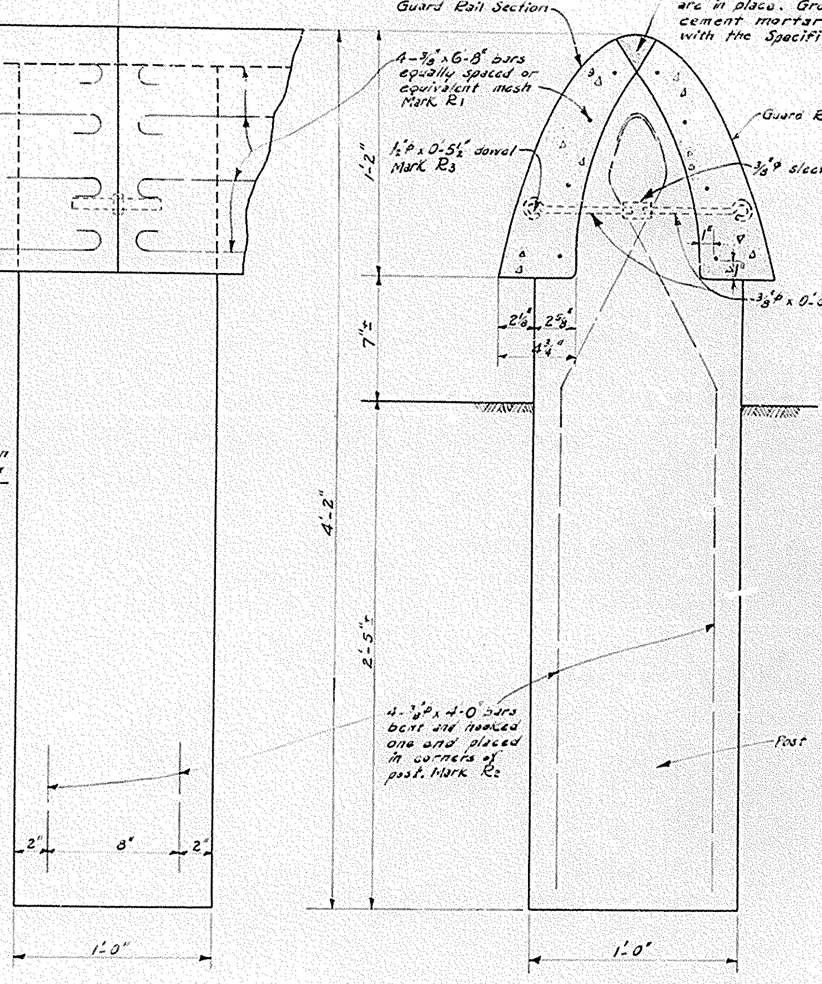
NOTE:—
Posts and Guard Rail sections are precast concrete with holes provided for dowels and eye bolts.

NOTE:—
The details of rail and post shown on this drawing do not imply that only this type will be acceptable. Rails and posts of similar strength and design may be submitted for consideration.

BILL OF REINFORCEMENT (1 Panel comprises including rail and 1 post)

Mark	Type	No	Size	Length ft	Length in	Location
R_1	(1)	8	$\frac{3}{8}$ ø	6	8	Rail
R_2	(2)	4	$\frac{3}{8}$ ø	4	0	Post
R_3	Str.	2	$\frac{1}{2}$ ø	0	5½	Rail Dowel

FRONT ELEVATION
CENTER GUARD RAIL
FOR
FOUR LANE HIWAY



SECTION A-A

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways 1945 Standards with amendments.
CONCRETE: Class "A" concrete to be used throuout.
REINFORCEMENT: Bars to be ⅜ø or wire mesh. If bars are used see Emergency Provision No. 10 If wire mesh is used the longitudinal wires shall have a total area of .33 Sq. in. per foot width and shall conform to A.S.T.M. Specification A82-34.
CONSTRUCTION: Rails and post shall be precast in accordance with Section 5.1.3-04 of the Specifications.
BOLTS AND NUTS: To be in accordance with A.S.T.M. Specification A 307-49 T. Eye bolts to be galvanized in accordance with A.S.T.M. Specification A153-49.
PAYMENT: Rails shall be paid for at a lump sum bid price for each section 6 Ft. in length. Posts shall be paid for at a lump sum bid price for each post. The bid prices shall include the cost of all labor and materials necessary for the satisfactory completion of this work.

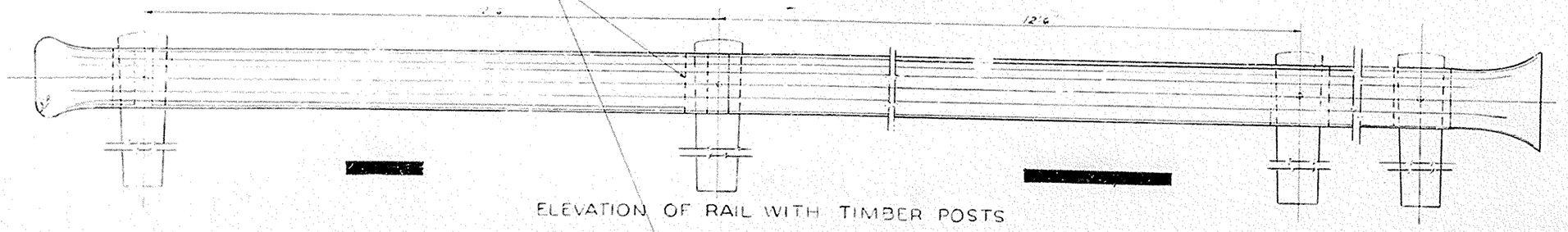
ISSUED BY
DATE
DATE
DATE
DATE
REVISED
REVISED
REVISED

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
STANDARD PRECAST CONCRETE CENTER GUARD RAIL

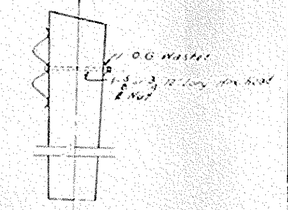
DRAWING No. BR-3

BRIDGE

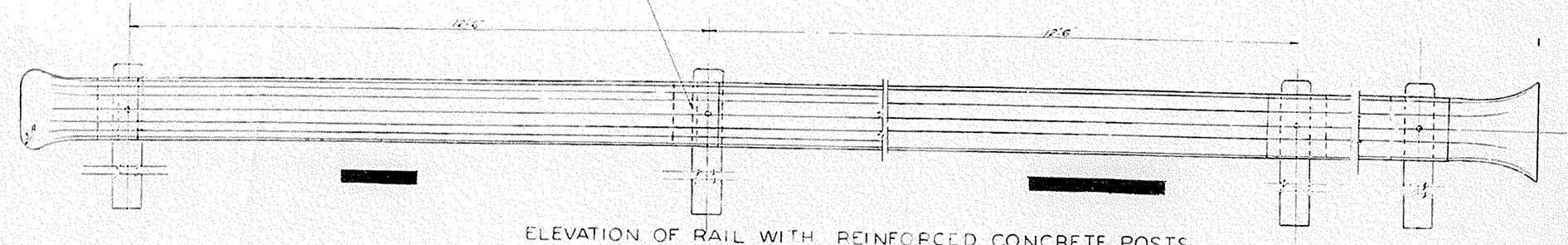
FLOW OF TRAFFIC
Lap of Plates shall be with direction of traffic movement



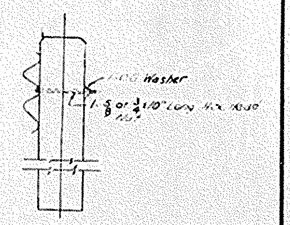
ELEVATION OF RAIL WITH TIMBER POSTS



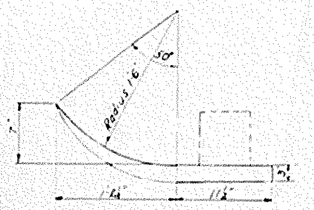
ELEVATION



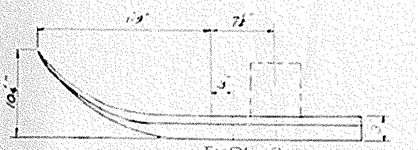
ELEVATION OF RAIL WITH REINFORCED CONCRETE POSTS



ELEVATION



TYPE 1



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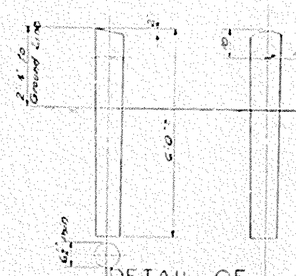
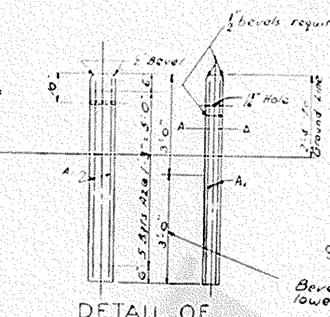
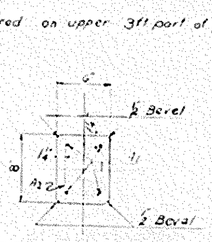


DETAIL OF TIMBER POST

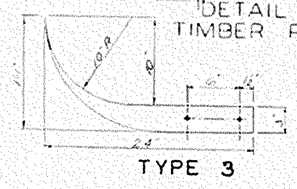


DETAIL OF CONCRETE POST

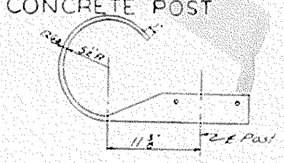
½ Bevels required on upper 3ft part of post.
Bevels not required on lower 3ft part of post



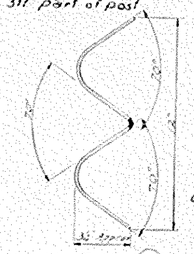
SECTION A-A



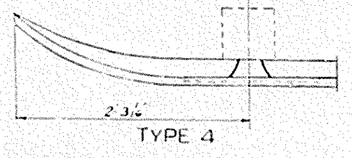
TYPE 3



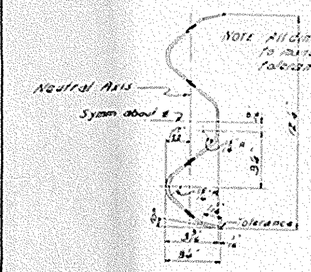
TYPE 6



TYPE 5



TYPE 4



TYPE 6

Note: Any of the six types of rail shown will be satisfactory provided they meet the Specifications of the Dept. of Highways.

NOTE:
The manufacturer's standard rail punching is acceptable

BILL OF REINFORCEMENT FOR CONCRETE POST						
MARK	TYPE	NO. PER POST	BAR SIZE	LENGTH FT	LENGTH IN	LOCATION
A1	5ft	4	5	5	9	Vertical Bars
A2	1	5	2	2	1	Tie

3" Lap

TYPE 7

GENERAL NOTE

SPECIFICATIONS: Kentucky Dept. of Highways 1945 Standard with Amendments.

GUARD RAIL: The guard rail shall be a beam type metal guard rail (70,000# breaking strength of the joints) with a beam depth and gage which shall be in accordance with SHS specifications, 7.17.2-B and 7.17.4-C including all elements, fittings, posts and bolts necessary for complete installation and painting.

NUTS AND BOLTS: All nuts and bolts to be galvanized in accordance with specifications.

PAINT: One shop coat of red lead, one field coat of red lead and one field coat of aluminum paint shall be applied to all rail sections and washers in accordance with specifications. The red lead, the aluminum pigment and the vehicle for aluminum paint shall conform to the requirements of the Standard Specifications.

PAYMENT: Guard rails shall be paid for at a lump sum bid price for each section 12'-6" in length. End rail sections shall be paid for at a lump sum bid price for each section. Posts shall be paid for at a lump sum bid price for each post. The bid prices shall include the cost of all labor and materials necessary for the satisfactory completion of this work. One shop coat of red lead shall be included in the price bid for guard rails.

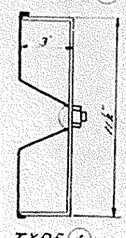
CONCRETE POSTS: Class "A" concrete to be used throuout. Posts shall be cast in accordance with Sec. 7.21.2 and shall be wired in accordance with Sec. 5.1.3.C.4.

TREATED TIMBER POSTS: To be in accordance with Specification Sec. 7.21.1-B.

TYPE 1

TYPE 3

TYPE 2



TYPE 4

VOID

ENDS

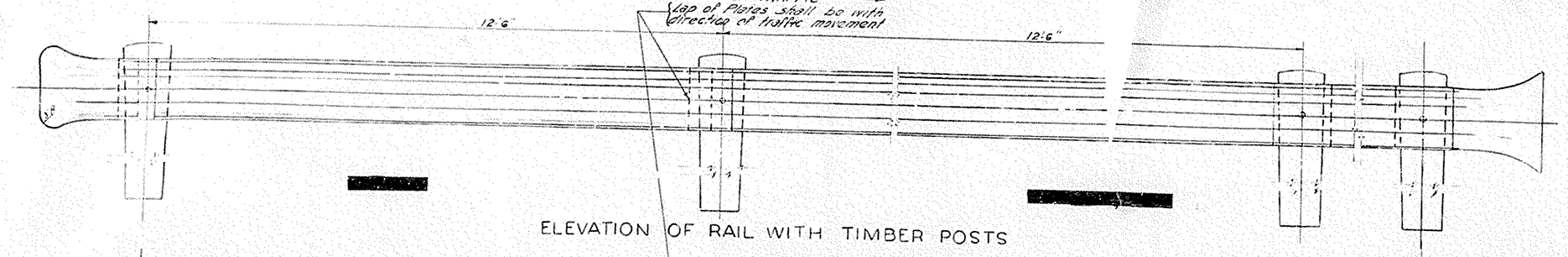
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

STANDARD METAL BEAM TYPE GUARD RAIL WITH TIMBER OR PRECAST CONCRETE POSTS

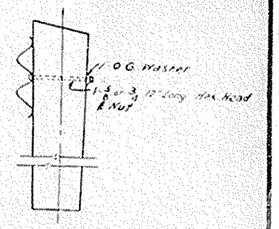
BRIDGE NUMBER BR-4

MAINTENANCE

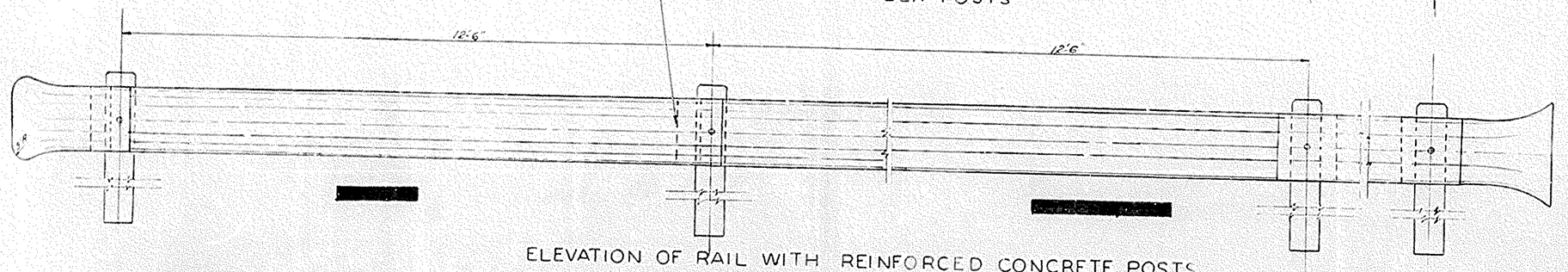
BRIDGE



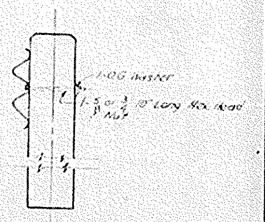
ELEVATION OF RAIL WITH TIMBER POSTS



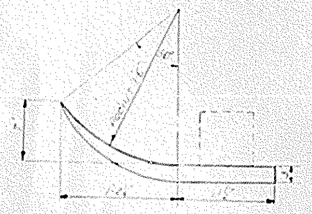
ELEVATION



ELEVATION OF RAIL WITH REINFORCED CONCRETE POSTS

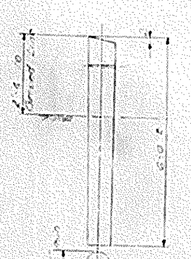


ELEVATION

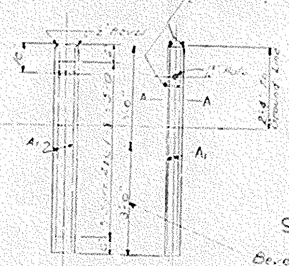


TYPE 1

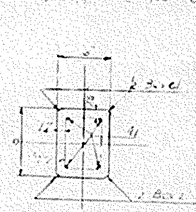
TYPE 2



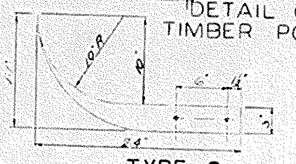
DETAIL OF TIMBER POST



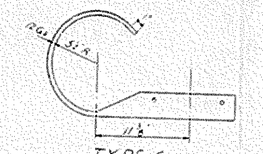
DETAIL OF CONCRETE POST



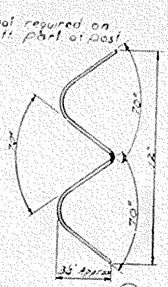
SECTION 4-A



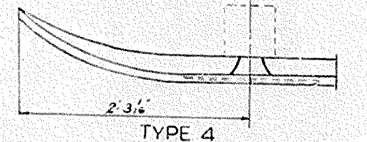
TYPE 3



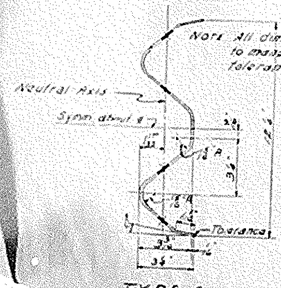
TYPE 6



TYPE 5



TYPE 4



TYPE 6

Note: All of the six types of rail shown will be satisfactory provided they meet the Specifications of the Dept of Highways.

NOTE:
The manufacturer's standard rail punching is acceptable

BILL OF REINFORCEMENT FOR CONCRETE POST

MARK	TYP.	NO. PER POST	BAR SIZE	LENGTH FT.	LENGTH IN.	LOCATION
A1	Str.	4	5	5	9	Vertical Bars
A2	1	5	2	2	1	Tie

4" Lap

TYPE 1

GENERAL NOTE

SPECIFICATIONS: Publish Dept of Highways 1945 Standard with Amendments.

GUARD RAIL: The guard rail shall be a Beam Type Metal Guard Rail (10,000 lbs breaking strength of the joints) with a base depth and cross section that shall be in accordance with Std. Specifications 7.17.2-B and 7.17.2-C including all elements, fittings, posts, and bolts necessary for the complete installation and painting.

NUTS AND BOLTS: All nuts and bolts to be galvanized in accordance with specifications.

PAINT: One shop coat of red lead.

[illegible] of red lead ____ and one field coat of aluminum paint shall be applied to all rail sections and washers in accordance with the specifications. The red lead, the aluminum pigment and the vehicle for aluminum paint shall conform to the requirements of the Standard Specifications.

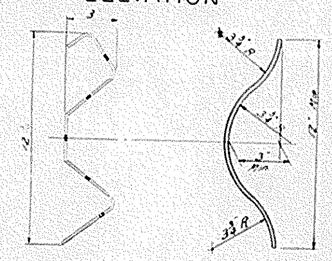
METHOD OF MEASUREMENT: The length of guard rail paid for shall be the linear feet, measured along the face of the guard rail from center to center of end posts of each continuous length. End sections are considered as incidental and will not be included in the measurement.

BASIS OF PAYMENT: Payment will be made at the contract price per linear foot, which price and payment shall include furnishing and placing all guard rails and fittings, including end sections and [redacted] posts, excavating, back filling, painting as specified, disposing of surplus material, and for all labor, equipment, tools and incidentals necessary to complete the work.

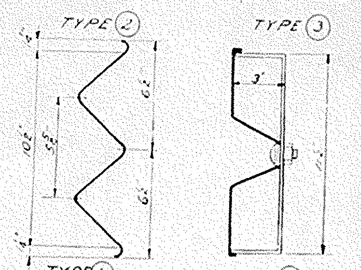
CONCRETE POSTS: Class "A" concrete to be used throughout. Posts shall be cast in accordance with Sec. 7.21.2 and shall be wired in accordance with Sec. 5.13.C-4.

TREATED TIMBER POSTS: To be in accordance with Specification Sec 7.21.1-B.

Concrete Posts will be required unless otherwise shown on plan & on proposal.



TYPE 2 TYPE 3



TYPE 1 TYPE 4

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

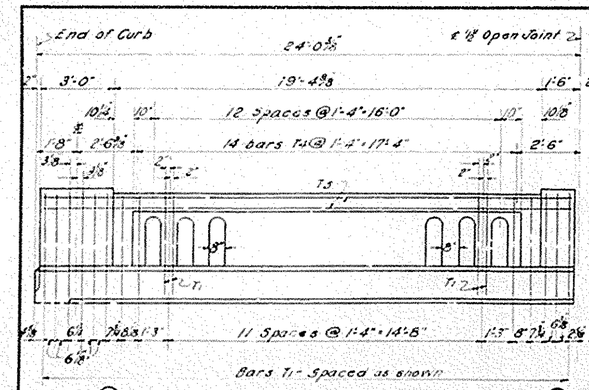
STANDARD METAL BEAM TYPE GUARD RAIL WITH TIMBER OR PRECAST CONCRETE POSTS

BRIDGE NUMBER BR-5

CONSTRUCTION

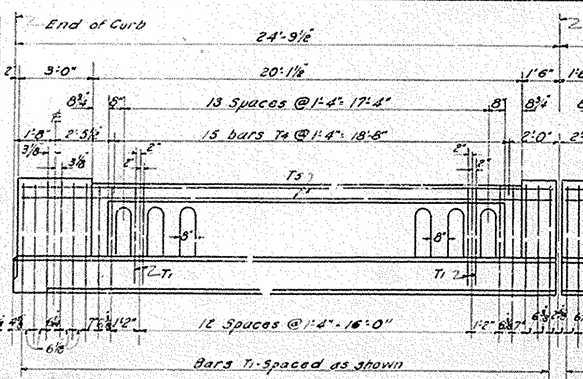
BRIDGE

FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	F. YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



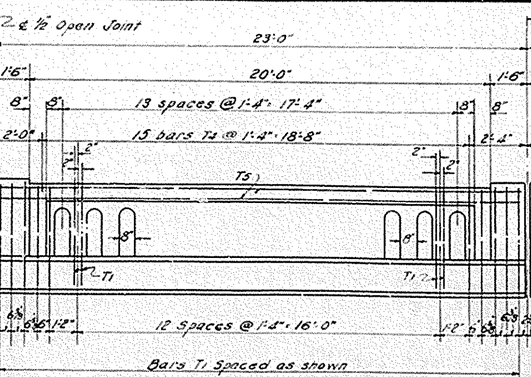
POST Ⓐ Ⓒ

RAIL - END SPAN - LONG CURB - 30° SKEW



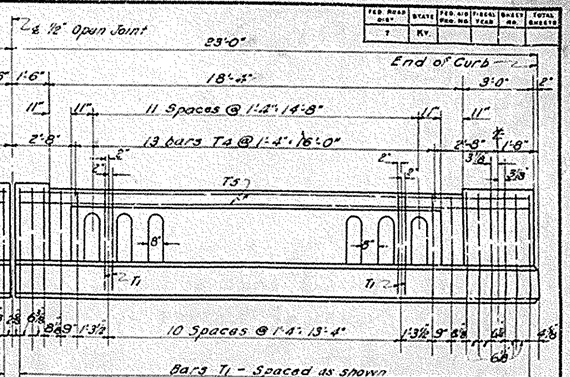
POST Ⓐ Ⓒ

RAIL - END SPAN - LONG CURB - 45° SKEW



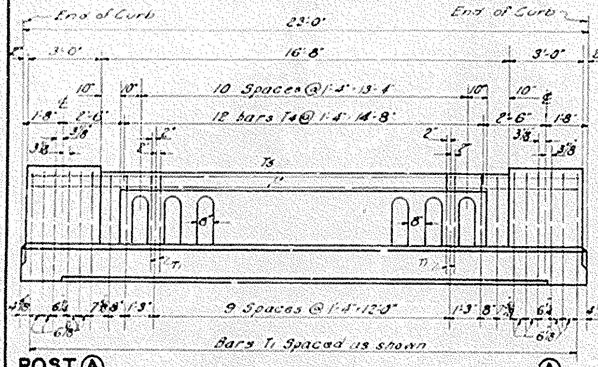
Ⓒ Ⓒ

RAIL - INTERMEDIATE SPAN - STRAIGHT - 30° OR 45° SKEW



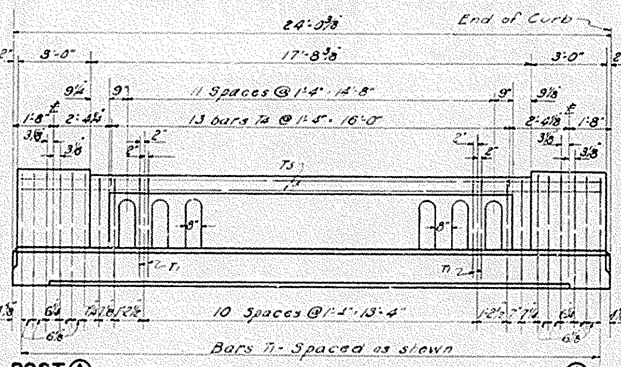
Ⓒ POST Ⓐ

RAIL - END SPAN - STRAIGHT OR SHORT CURB 30° OR 45° SKEW



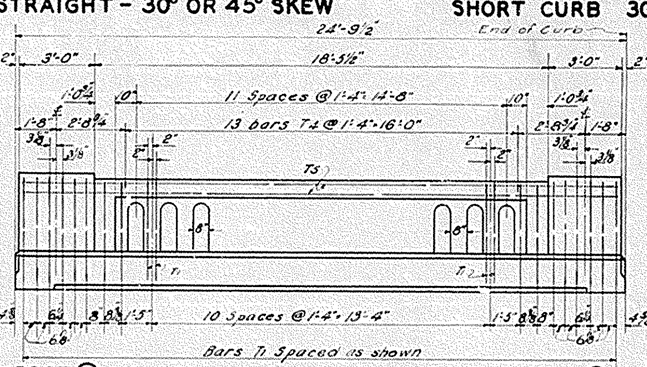
POST Ⓐ Ⓐ

RAIL - SINGLE SPAN - STRAIGHT



POST Ⓐ Ⓐ

RAIL - SINGLE SPAN - 30° SKEW

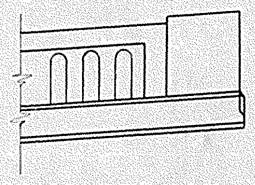


POST Ⓐ Ⓐ

RAIL - SINGLE SPAN - 45° SKEW

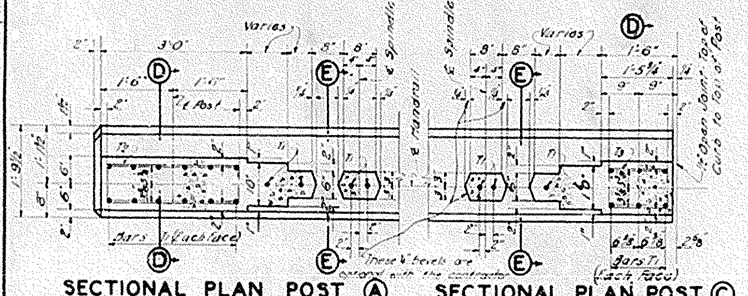
NOTE:-

When bridge is on a plus or minus grade tops of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

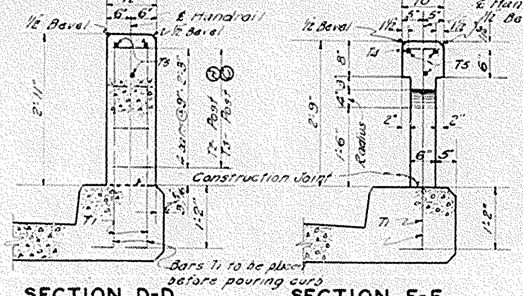


PART ELEVATION

(Showing relation of Posts, Spindles and Rail to grade line when bridge is on a plus or minus grade.)



SECTIONAL PLAN POST Ⓐ SECTIONAL PLAN POST Ⓒ

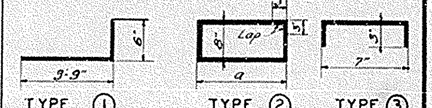


SECTION D-D SECTION E-E

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO	SIZE	LENGTH Ft.	LENGTH In.	LOCATION	a Ft.	a In.
T1	①	See Table	½"	4	2	Curb into Posts & Spindles	-	-
T2	②		⅝"	6	10	Posts Ⓐ	2	8
T3	-		"	3	10	" Ⓒ	1	2
T4	③		½"	0	11	Top of Rail	-	-
T5	Str.		-	See Table		Rail	-	-

(All dimensions are out to out)



GENERAL NOTE

SPECIFICATIONS:- State Highway Department, Kentucky

CONCRETE Class "D" concrete to be used in Handrail & Posts.

STEEL REINFORCEMENT:- To be deformed bars. Dimensions shown from the face of concrete are the clear distances. Dimensions shown for bar spacing are the distances center to center of bars. All reinforcement shall be held securely in correct position by means of precast mortar or concrete blocks and wired at all intersections. Precast mortar or concrete blocks supporting reinforcement shall be spaced not further apart than 50 diameters of the supported bar.

BEVELS:- All corners of Handrail to be beveled ¾ unless otherwise noted hereon.

TABLE OF REINFORCEMENT AND ESTIMATED QUANTITIES

20 Ft. SPAN			T1 Number	T2 Number	T3 Number	T4 Number	T5 Number	T5 Ft.	T5 In.	Concrete Class "D" Cu. Yds.	Reinforcement Lbs.
STRAIGHT	Single	Two Rails	96	16	-	24	4	22	4	2.9	510
	Intermediate	Two Rails	84	-	16	30	6	22	8	2.5	460
	End	Two Rails	88	8	8	26	6	22	6	2.7	480
30° SKEW	Single	Two Rails	100	16	-	26	6	23	5	3.0	530
	Intermediate	Two Rails	84	-	16	30	6	22	8	2.5	460
	End	Rail: Long Curb	46	4	4	14	3	23	5	2.8	490
		Rail: Short Curb	44	4	4	13	3	22	6		
45° SKEW	Single	Two Rails	100	16	-	26	6	24	2	3.1	540
	Intermediate	Two Rails	84	-	16	30	6	22	8	2.5	460
	End	Rail: Long Curb	48	4	4	15	3	24	3	2.8	500
		Rail: Short Curb	44	4	4	13	3	22	6		

DESIGNED BY: [illegible] DATE 2-54
TRACED BY: K. Reed DATE 2-54
CHECKED BY: Sonderfur DATE

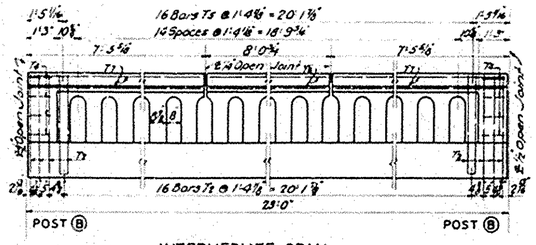
Revised Check Prints Received 9-5-58 - 5-2-60 - 5-3-60

COMMONWEALTH OF KENTUCKY
STATE HIGHWAY DEPARTMENT

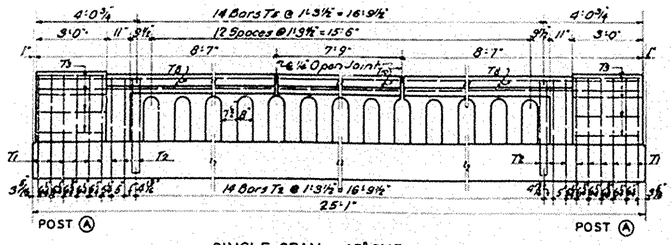
STANDARD HANDRAIL
DECK GIRDERS 20FT. SPANS

DRAWING NO. H-10

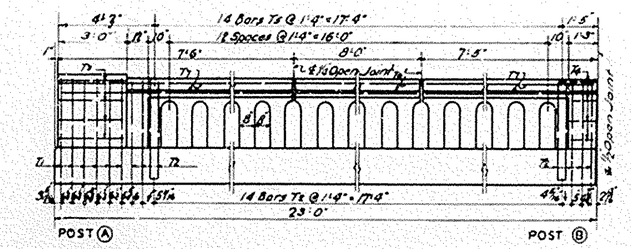
BRIDGE



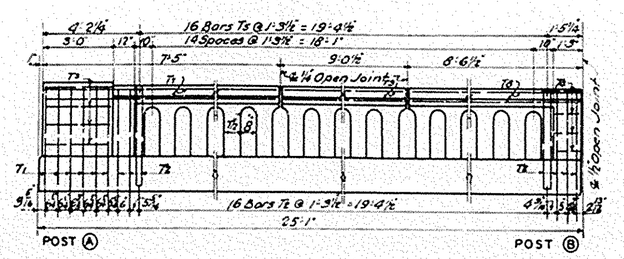
INTERMEDIATE SPAN



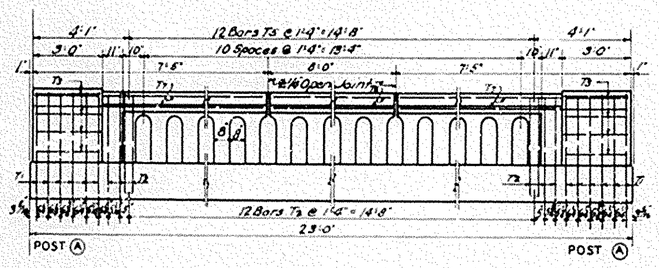
SINGLE SPAN 45° SKEW



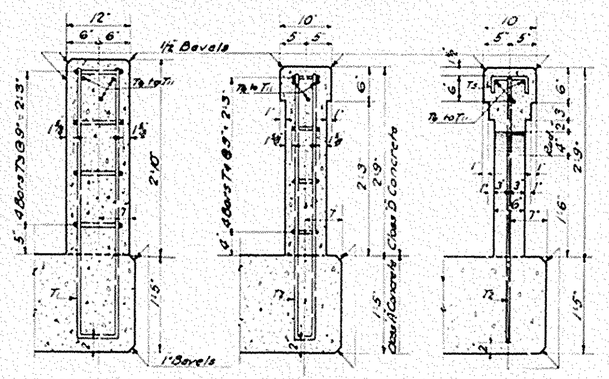
END SPAN - STRAIGHT, OR SHORT RAIL 30° OR 45° SKEW

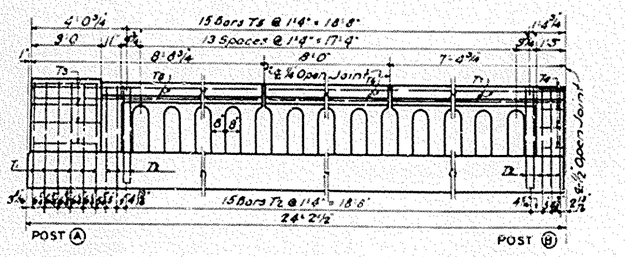


END SPAN - LONG RAIL 45° SKEW

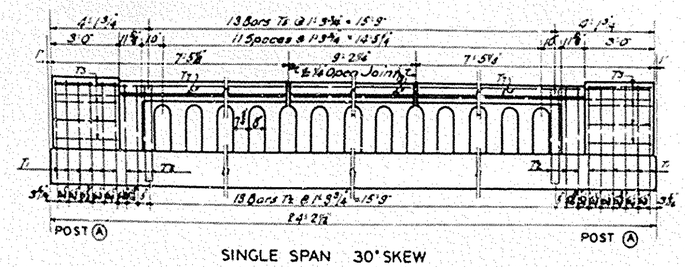


SINGLE SPAN - STRAIGHT

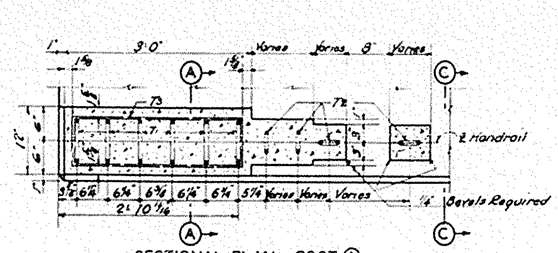




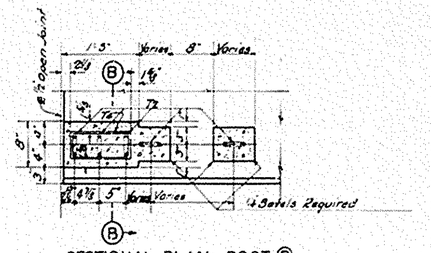
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN 30° SKEW



SECTIONAL PLAN - POST Ⓐ



SECTIONAL PLAN - POST Ⓑ

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways 1945 Standard with Amendments.
CONCRETE: Class D concrete to be used in Handrail.
REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A 305 - current specifications.

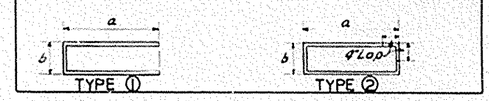
BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

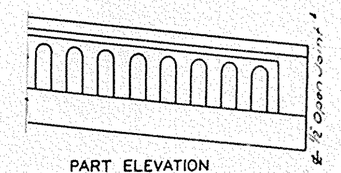
TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

20 FOOT SPAN			T1 NO.	T2 NO.	T3 NO.	T4 NO.	T5 NO.	T6 NO.	T7 NO.	T8 NO.	T9 NO.	T10 NO.	T11 NO.	CONCRETE CLASS 'D' CU.YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	24	32	16	-	24	6	12	-	-	-	-	2.8	620
	INTERMEDIATE	TWO RAILS	-	44	-	16	32	6	12	-	-	-	-	2.1	490
	END	TWO RAILS	12	38	8	8	28	6	12	-	-	-	-	2.5	560
30°SKEW	SINGLE	TWO RAILS	24	34	16	-	26	-	12	-	6	-	-	2.9	640
	INTERMEDIATE	TWO RAILS	-	44	-	16	32	6	12	-	-	-	-	2.1	490
	END	LONG RAIL	6	20	4	4	15	3	3	3	-	-	-		
	END	SHORT RAIL	6	19	4	4	14	3	6	-	-	-	-	2.5	570
45°SKEW	SINGLE	TWO RAILS	24	36	16	-	28	-	-	12	-	6	-	3.0	670
	INTERMEDIATE	TWO RAILS	-	44	-	16	32	6	12	-	-	-	-	2.1	490
	END	LONG RAIL	6	21	4	4	16	-	3	3	3	-	-		
	END	SHORT RAIL	6	19	4	4	14	3	6	-	-	-	-	2.5	580

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN	LOCATION	a FT	a IN	b FT	b IN
T1	(1)	See Table	4 @	8	5	Post 'A'	3	11½	0	8
T2	"		"	7	11	Post B & Spindles	3	10½	0	4
T3	(2)		3 @	7	3	Post 'A'	2	8¾	0	6¾
T4	"		"	3	2	Post 'B'	0	11¼	0	4¾
T5	(1)		12 @	0	11	Rail	0	3	0	7
T6	Str.		"	7	9	"	—	—	—	—
T7	"		"	7	2	"	—	—	—	—
T8	"		"	8	"	"	—	—	—	—
T9	"		"	8	10	"	—	—	—	—
T10	"		"	7	6	"	—	—	—	—





PART ELEVATION

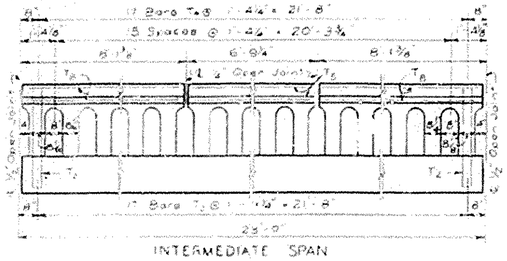
When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
STANDARD HANDRAIL
DECK GIRDER 20FT. SPAN
22FT. 24FT. AND 26FT. ROADWAY

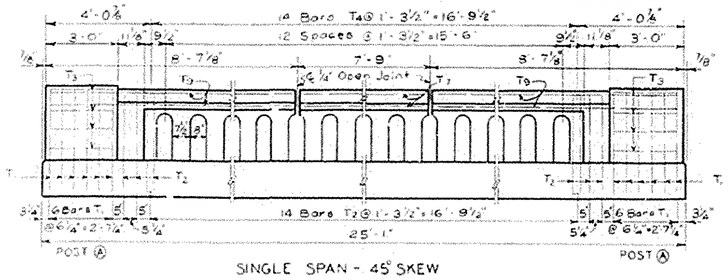
REVISED - H 50

BRIDGE

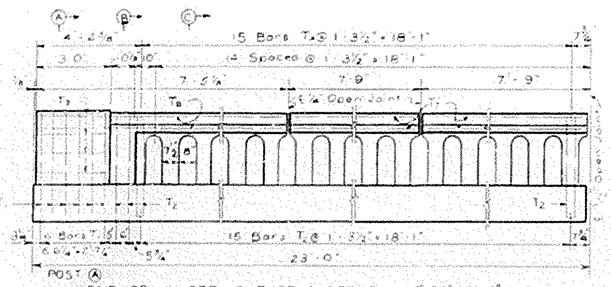
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



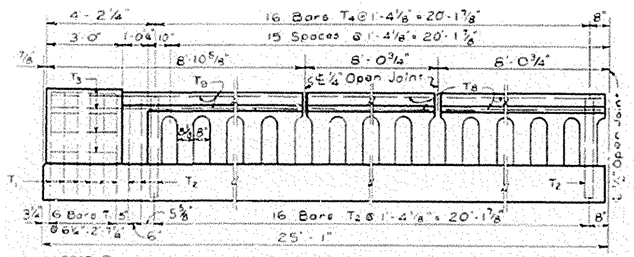
INTERMEDIATE SPAN



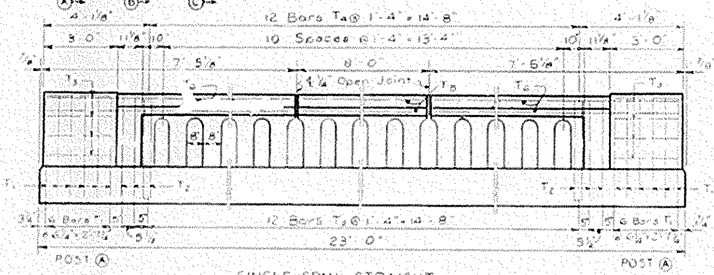
SINGLE SPAN - 45° SKEW



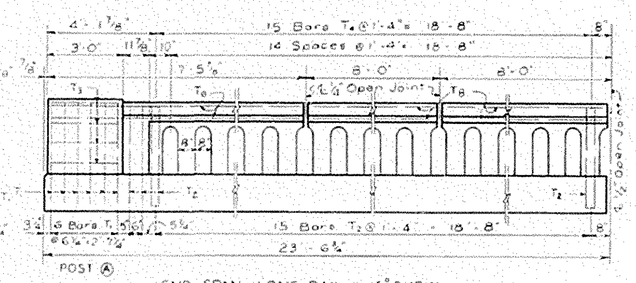
END SPAN - STRAIGHT OR SHORT RAIL-15°,30° OR 45° SKEW



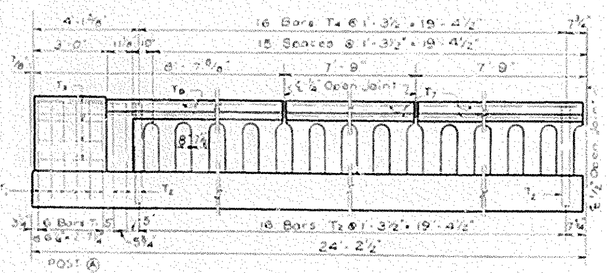
END SPAN - LONG RAIL - 45° SKEW



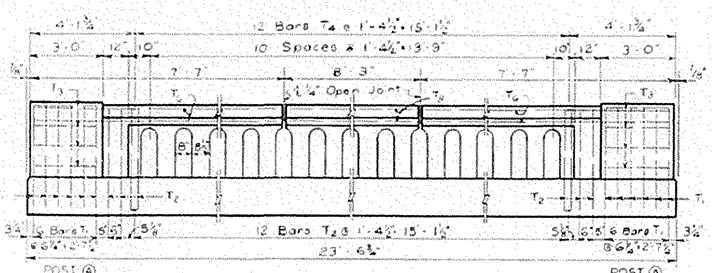
SINGLE SPAN - STRAIGHT



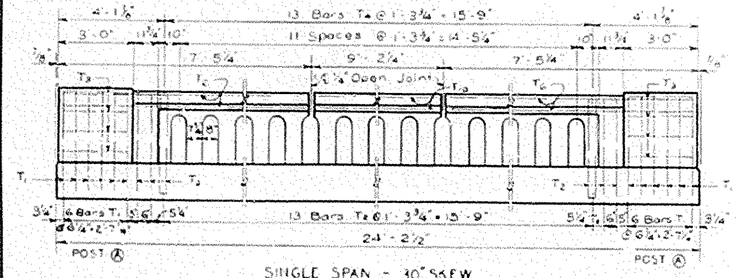
END SPAN - LONG RAIL - 15° SKEW



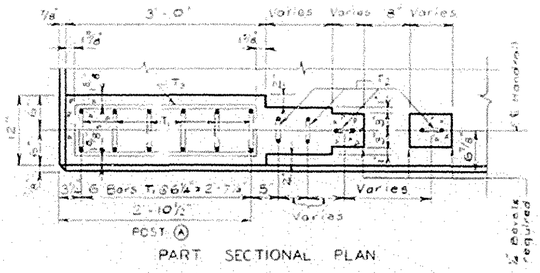
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN - 15° SKEW



SINGLE SPAN - 30° SKEW

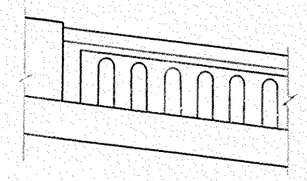


PART SECTIONAL PLAN

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

20 FOOT SPAN			NUMBER OF BARS									CONCRETE CLASS "D" (CU. YDS)	REINFORCEMENT (LBS)
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	
STRAIGHT	SINGLE	TWO RAILS	24	32	16	24	—	12	—	6	—	—	2.8	622
	INTERMEDIATE	TWO RAILS	—	34	—	34	6	—	—	12	—	—	2.0	389
	END	TWO RAILS	12	34	8	30	—	6	12	—	—	—	2.4	515
15° SKEW	SINGLE	TWO RAILS	24	32	16	24	—	12	—	6	—	—	2.9	622
	INTERMEDIATE	TWO RAILS	—	34	—	34	6	—	—	12	—	—	2.0	389
	END	LONG RAIL	6	17	4	15	—	3	—	6	—	—	2.4	516
	END	SHORT RAIL	6	17	4	15	—	3	6	—	—	—		
30° SKEW	SINGLE	TWO RAILS	24	34	16	26	—	12	—	—	—	6	2.9	645
	INTERMEDIATE	TWO RAILS	—	34	—	34	6	—	—	12	—	—	2.0	389
	END	LONG RAIL	6	18	4	16	—	—	6	—	3	—	2.4	526
	END	SHORT RAIL	6	17	4	15	—	3	6	—	—	—		
45° SKEW	SINGLE	TWO RAILS	24	36	16	28	—	—	6	—	12	—	3.0	666
	INTERMEDIATE	TWO RAILS	—	34	—	34	6	—	—	12	—	—	2.0	389
	END	LONG RAIL	6	18	4	16	—	—	—	6	3	—	2.5	527
	END	SHORT RAIL	6	17	4	15	—	3	6	—	—	—		

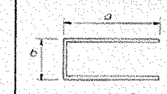
When bridge is on a plus or minus grade, top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.



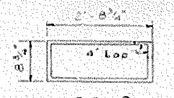
PART ELEVATION

BILL AND TYPES OF REINFORCEMENT

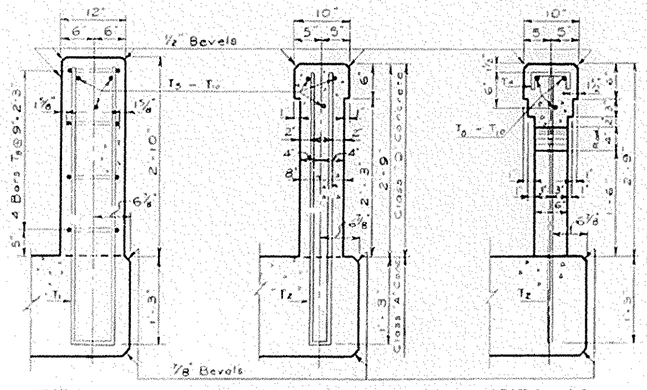
MARK	TYPE	NO	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	See Table	#5	8	5	Post "A"	3	11½	0	8
T_3			"	7	11	Spindles	3	10½	0	4
T_4	②		#3	7	5	Post "A"	–	–	–	–
T_8	①		#4	0	11	Rail	0	3	0	7
T_6	Str		"	6	6	"	–	–	–	–
T_{10}	"		"	7	2	"	–	–	–	–
T_7	"		"	7	5	"	–	–	–	–
T_8	"		"	7	8	"	–	–	–	–
T_9	"		"	8	4	"	–	–	–	–
T_{10}	"		"	8	11	"	–	–	–	–



TYPE ①



TYPE ②



SECTION A-A SECTION B-B SECTION C-C

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, Current Specifications with Amendments.

CONCRETE: Class 'D' Concrete to be used in handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ¼" unless otherwise noted.

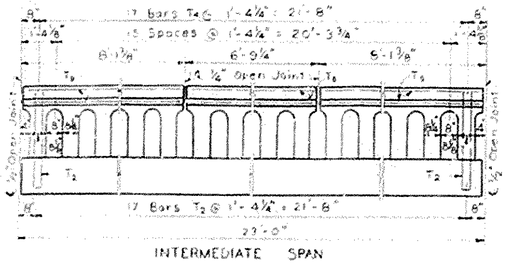
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD SPINDLE HANDRAIL FOR 20 FT SPAN R.C.D.G STR., 15°, 30° OR 45° SKEW WITH 10½" CURB

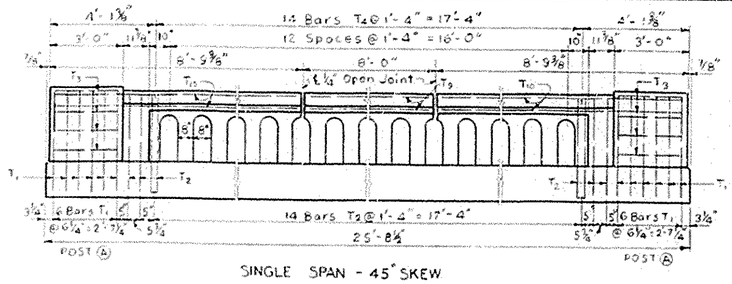
DRAWING NO.	INDEX
H-100	

BRIDGE

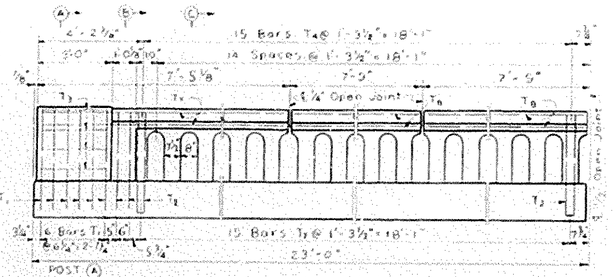
SELF BOARD APPV	STATE	FED AID PROJ NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



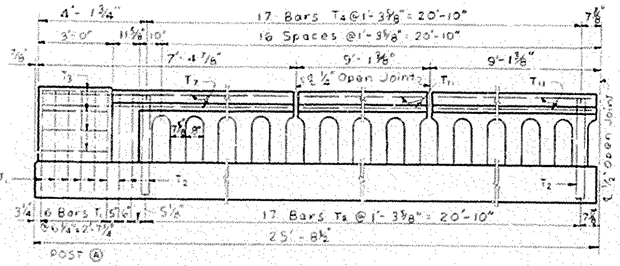
INTERMEDIATE SPAN



SINGLE SPAN - 45° SKEW

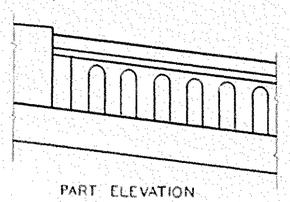


END SPAN - STRAIGHT, OR SHORT RAIL - 15°, 30°, OR 45° SKEW



END SPAN - LONG RAIL - 45° SKEW

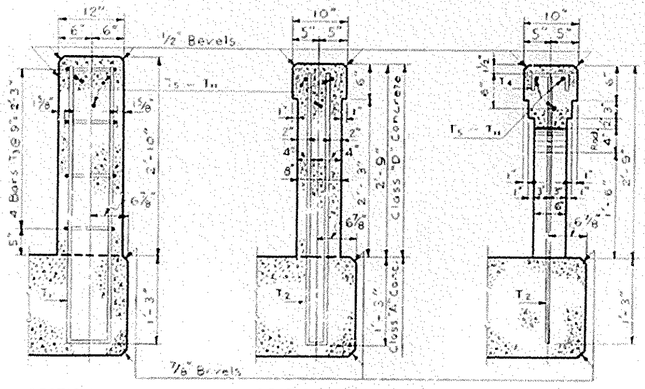
When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

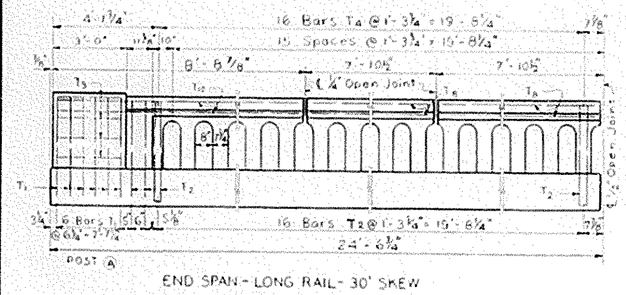


PART ELEVATION

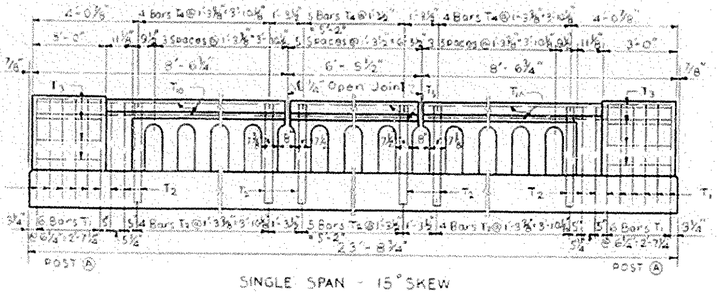
TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES														
20 FOOT SPAN			NUMBER										CONCRETE CLASS "D" (CU. YDS.)	REINFORCEMENT (LBS.)
			T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	
STRAIGHT	SINGLE	TWO RAILS	24	32	16	24	—	—	12	—	6	—	—	2.8	622
	INTERMEDIATE	TWO RAILS	—	34	—	34	—	6	—	—	12	—	—	2.0	389
	END	TWO RAILS	12	34	8	30	—	—	6	12	—	—	—	2.4	515
15° SKEW	SINGLE	TWO RAILS	24	34	16	26	6	—	—	—	12	—	—	2.8	643
	INTERMEDIATE	TWO RAILS	—	34	—	34	—	6	—	—	12	—	—	2.0	389
	END	LONG RAIL	6	17	4	15	—	—	3	—	6	—	—	2.4	516
	END	SHORT RAIL	6	17	4	15	—	—	3	6	—	—	—		
30° SKEW	SINGLE	TWO RAILS	24	34	16	26	—	—	12	—	—	—	6	2.9	644
	INTERMEDIATE	TWO RAILS	—	34	—	34	—	6	—	—	12	—	—	2.0	389
	END	LONG RAIL	6	18	4	16	—	—	—	6	—	3	—	2.4	526
	END	SHORT RAIL	6	17	4	15	—	—	3	6	—	—	—		
45° SKEW	SINGLE	TWO RAILS	24	36	16	28	—	—	—	—	6	12	—	3.0	667
	INTERMEDIATE	TWO RAILS	—	34	—	34	—	6	—	—	12	—	—	2.0	389
	END	LONG RAIL	6	19	4	17	—	—	3	—	—	—	6	2.5	538
	END	SHORT RAIL	6	17	4	15	—	—	3	6	—	—	—		

BILL AND TYPES OF REINFORCEMENT										
MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T1	①	See Table	#5	8	5	Post "A"	1	1½	0	8
T2	"		"	7	11	Spindles	3	10½	0	4
T3	②		#3	7	5	Post "A"	—	—	—	—
T4	③		#4	0	11	Rail	0	3	0	7
T5	5½		"	6	2	"	—	—	—	—
T6	"		"	6	6	"	—	—	—	—
T7	"		"	7	1	"	—	—	—	—
T8	"		"	7	5	"	—	—	—	—
T9	"		"	8	3	"	—	—	—	—
T10	"		"	8	8	"	—	—	—	—
T11	"		"	8	10	"	—	—	—	—

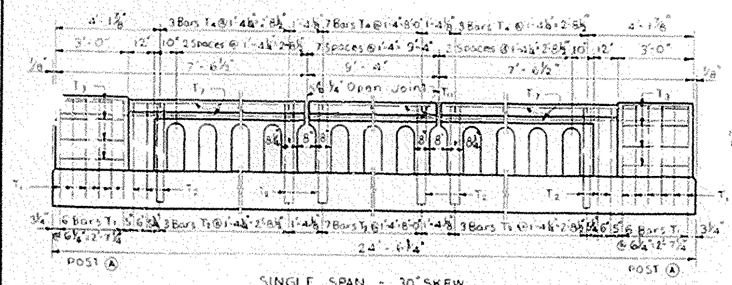




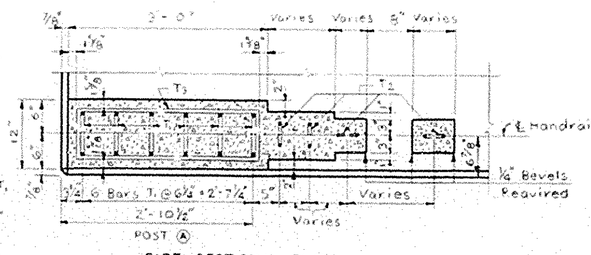
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN - 15° SKEW



SINGLE SPAN - 30° SKEW



PART SECTIONAL PLAN

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, Current Specifications with Amendments.

CONCRETE: Class "D" Concrete to be used in Handrail.

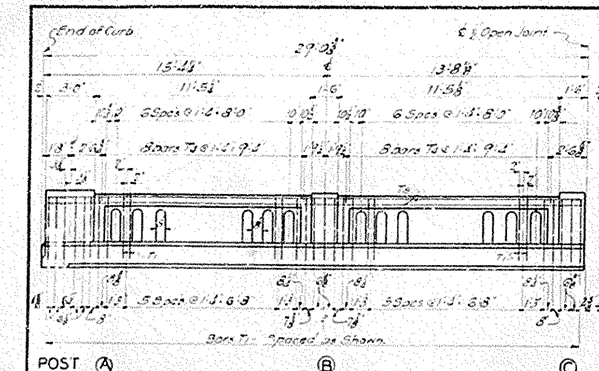
REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ¼" unless otherwise noted.

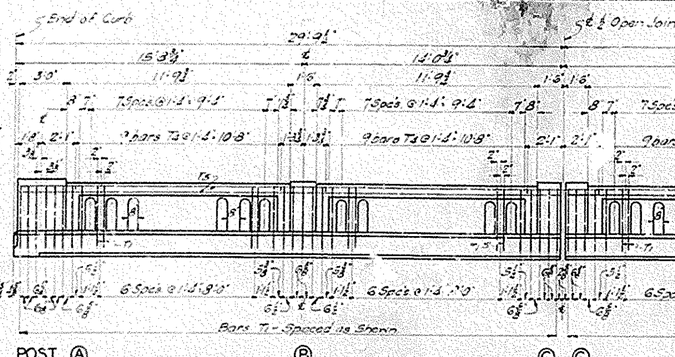
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD SPINDLE HANDRAIL FOR 20 FT. SPAN R.C.D.G. STR., 15°, 30°, OR 45° SKEW WITH 1'-6" CURB

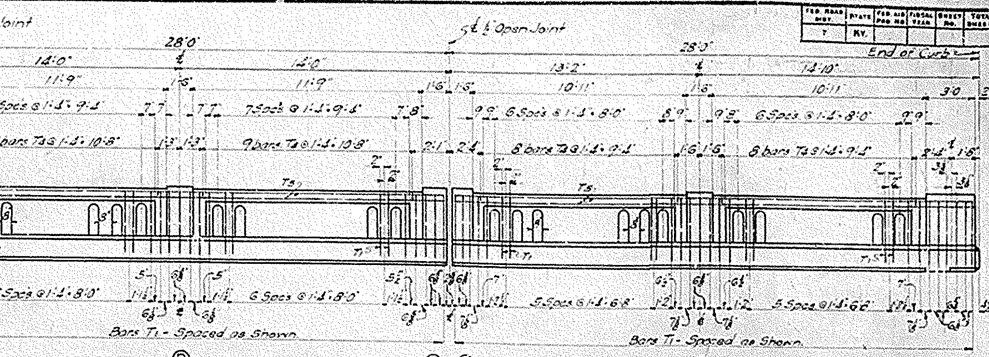
BRIDGE NUMBER	DRAWING NO. H-120	ADDD



RAIL - END SPAN - LONG CURB - 30° SKEW

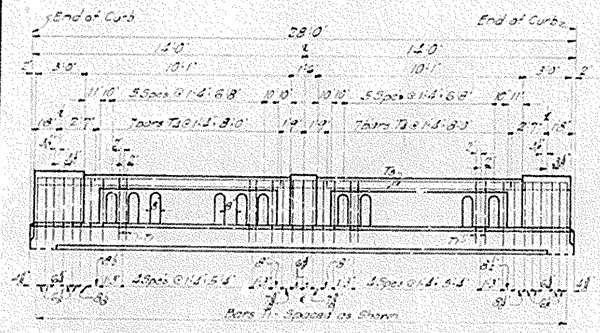


RAIL - END SPAN - LONG CURB - 45° SKEW

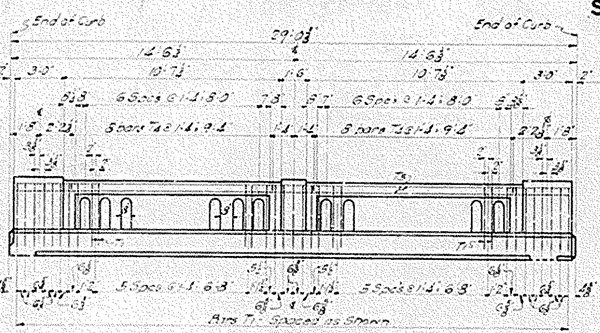


RAIL - INTERMEDIATE SPAN - STRAIGHT - 30° OR 45° SKEW

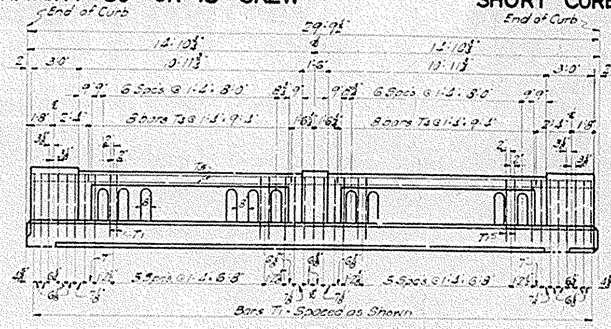
RAIL - END SPAN - STRAIGHT OR SHORT CURB 30° OR 45° SKEW



RAIL - SINGLE SPAN - STRAIGHT

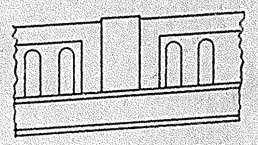


RAIL - SINGLE SPAN - 30° SKEW

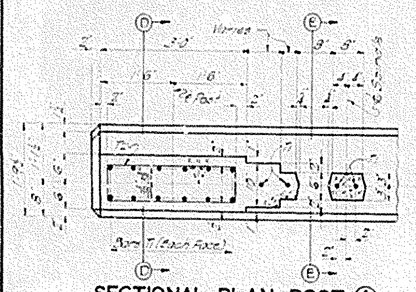


RAIL - SINGLE SPAN - 45° SKEW

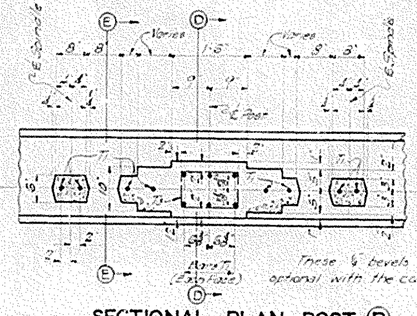
NOTE -
When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical



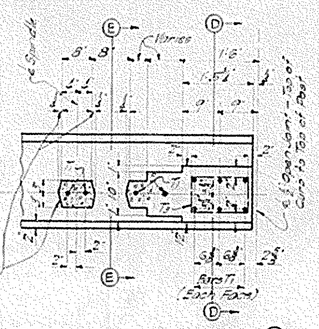
PART ELEVATION
(Showing relation of Posts, Spindles and Rail to grade line when bridge is on a plus or minus grade)



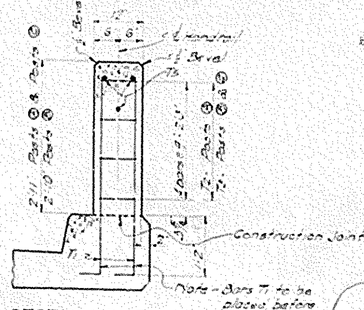
SECTIONAL PLAN POST Ⓐ



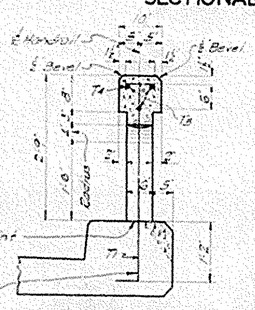
SECTIONAL PLAN POST Ⓑ



SECTIONAL PLAN POST Ⓒ



SECTION D-D



SECTION E-E

BILL AND TYPES OF REINFORCEMENT

Mark	Type	No.	Size	Length Ft	Length In	Location	Spacing Ft	Spacing In
T1	①		½" ⌀	4	2	Curb into Posts & Spindles	—	—
T2	②		⅝" ⌀	6	10	Posts Ⓐ	2	8
T3	-	See Table	-	3	10	" Ⓑ & Ⓒ	1	2
T4	③		½" ⌀	0	11	Top of Rail	-	-
T5	Str.		-	See Table		Rail	—	-

(All dimensions are out to out)

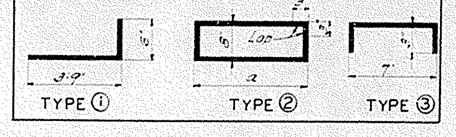


TABLE OF REINFORCEMENT AND ESTIMATED QUANTITIES

25 FT. SPAN			T1 Numbers	T2 Number	T3 Number	T4 Number	T5 Number	T5 Length Ft	T5 Length In	Concrete Class 'D' Cu. Yds.	Reinforcement Lbs.
STRAIGHT	Single	Two Rails	113	16	8	28	6	27	4	3.7	620
	Intermediate	Two Rails	108	-	24	36	6	27	8	3.2	590
	End	Two Rails	112	8	16	32	6	27	6	3.4	610
30° SKEW	Single	Two Rails	124	16	8	32	6	28	5	3.7	660
	Intermediate	Two Rails	108	-	24	36	6	27	8	3.2	590
	End	Rail - Long Curb	58	1	8	16	3	28	6	3.5	610
		Rail - Short Curb	56	1	8	16	3	27	6		
45° SKEW	Single	Two Rails	124	16	8	32	6	29	2	3.8	670
	Intermediate	Two Rails	108	-	24	36	6	27	8	3.2	590
	End	Rail - Long Curb	60	1	8	18	3	29	1	3.5	620
		Rail - Short Curb	56	1	8	16	3	27	6		

GENERAL NOTE

Specifications - State Highway Department, Kentucky, (1932 Standard with subsequent adopted amendments.)
Concrete - Class 'D' concrete to be used in Handrail & Posts.
Reinforcement - To be deformed bars. Dimensions shown from the faces of concrete are clear distances. Dimensions shown for bar spacing are the distances center to center of bars. All reinforcement shall be securely held in correct position by means of precast mortar or concrete blocks and wired at all intersections. Precast mortar or concrete blocks supporting reinforcement shall be spaced not farther apart than 50 diameters of the supported bar.
Bevels - All corners of handrail to be beveled ¾" unless otherwise noted hereon.

DESIGNED BY Chas. Hall
TRACED BY Chas. Hall
CHECKED BY Edgar Ewing
REVISED ½ SQUARE NOSE ADDED 11-23-33
REVISED
REVISED
DATE 8-2-34
DATE
DATE

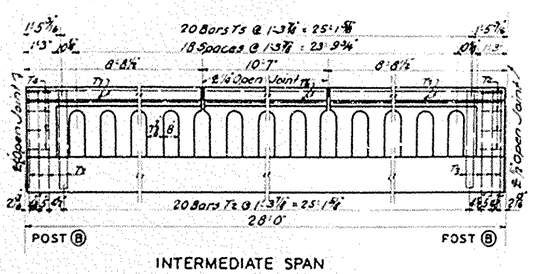
COMMONWEALTH OF KENTUCKY
STATE HIGHWAY DEPARTMENT

STANDARD HANDRAIL
DECK GIRDERS - 25 FT. SPANS

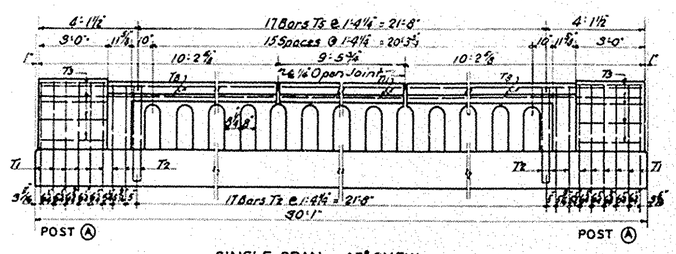
ADOPTED - H-11

BRIDGE

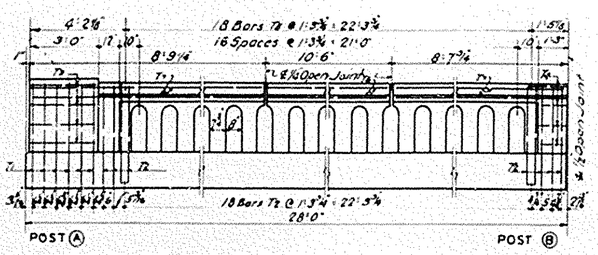
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



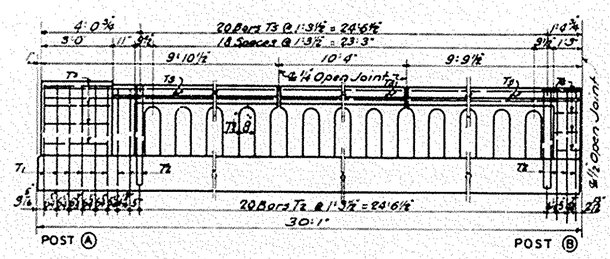
INTERMEDIATE SPAN



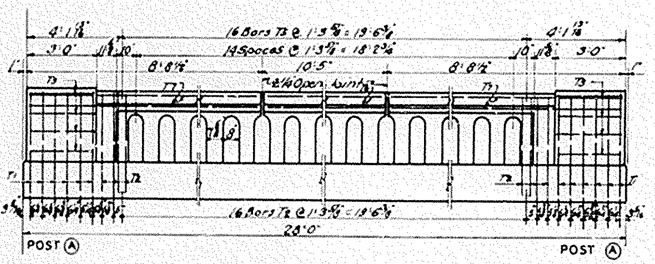
SINGLE SPAN 45° SKEW



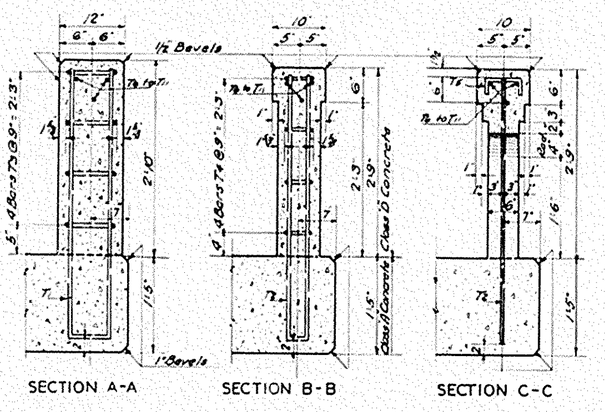
END SPAN - STRAIGHT, OR SHORT RAIL 30° OR 45° SKEW



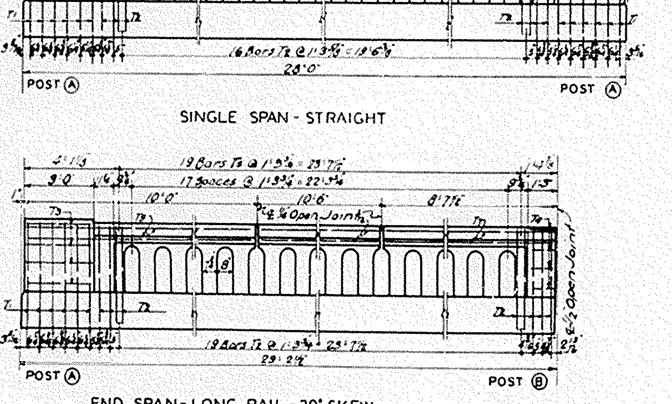
END SPAN - LONG RAIL 45° SKEW



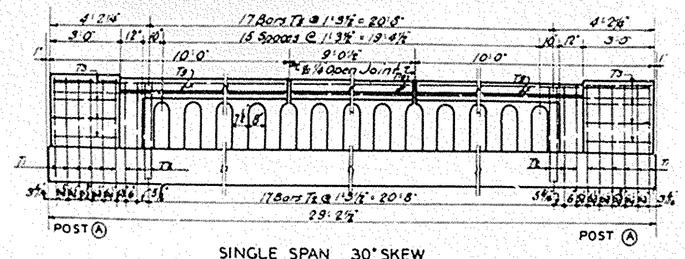
SINGLE SPAN - STRAIGHT



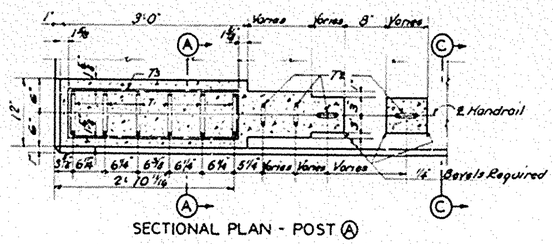
SECTION A-A SECTION B-B SECTION C-C



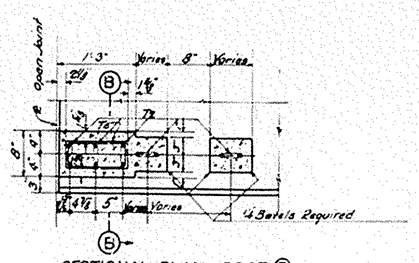
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN 30° SKEW



SECTIONAL PLAN - POST A



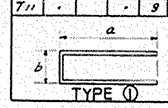
SECTIONAL PLAN - POST B

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

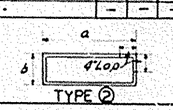
25 FOOT SPAN			T1 NO.	T2 NO.	T3 NO.	T4 NO.	T5 NO.	T6 NO.	T7 NO.	T8 NO.	T9 NO.	T10 NO.	T11 NO.	CONCRETE CLASS 'D' CU.YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	24	40	16	-	32	6	12	-	-	-	-	3.2	710
	INTERMEDIATE	TWO RAILS	-	52	-	16	40	6	12	-	-	-	-	2.5	580
	END	TWO RAILS	12	46	8	8	36	6	12	-	-	-	-	2.9	650
30°SKEW	SINGLE	TWO RAILS	24	42	16	-	34	-	-	-	12	6	-	3.3	740
	INTERMEDIATE	TWO RAILS	-	52	-	16	40	6	12	-	-	-	-	2.5	580
	END	LONG RAIL	6	24	4	4	19	3	3	-	3	-	-		
	END	SHORT RAIL	6	23	4	4	18	3	6	-	-	-	-	2.9	660
45°SKEW	SINGLE	TWO RAILS	24	42	16	-	34	-	-	12	-	-	6	3.4	740
	INTERMEDIATE	TWO RAILS	-	52	-	16	40	6	12	-	-	-	-	2.5	580
	END	LONG RAIL	6	25	4	4	20	-	-	3	6	-	-		
	END	SHORT RAIL	6	23	4	4	18	3	6	-	-	-	-	2.9	670

BILL AND TYPES OF REINFORCEMENT

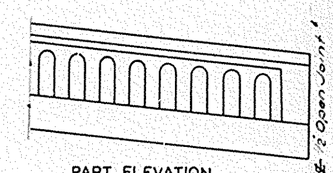
MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN	LOCATION	a FT.	a IN	b FT.	b IN
T1	(1)	See Table	#9	8	5	Post 'A'	3	11½	0	8
T2	"		"	7	11	Post B & Spindles	3	10½	0	4
T3	(2)		#8	7	9	Post 'A'	2	8¾	0	8¾
T4	"		-	3	2	Post 'B'	0	11½	0	4¾
T5	(1)		#3	0	11	Rail	0	9	0	7
T6	Str.		"	10	3	"	—	—	—	—
T7	"		"	8	5	"	—	—	—	—
T8	"		"	10	0	"	—	—	—	—
T9	"		"	9	7	"	—	—	—	—
T10	"		"	8	10	"	—	—	—	—
T11	"		"	9	3	"	—	—	—	—



TYPE (1)



TYPE (2)



PART ELEVATION

When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways 1965 Standard with amendments.
CONCRETE: Class D concrete to be used in Handrail.
REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A 305 - current specifications.

BEVELED EDGES: All exposed edges to be beveled ¼" unless otherwise noted.

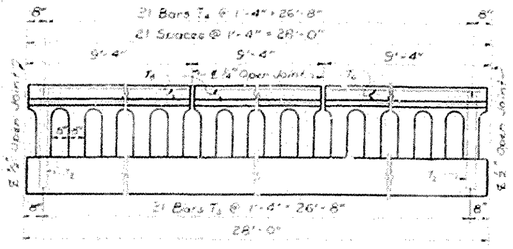
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
STANDARD HANDRAIL
DECK GIRDER 25FT. SPAN
22FT.-24FT. AND 28FT. ROADWAY

DESIGNED BY	DATE	REVISED	DRAWN BY	DATE	REVISED	TRACED BY	DATE	REVISED	CHECKED BY	DATE	REVISED
[illegible]	3-24-65	3-24-65	[illegible]	3-24-65	3-24-65	[illegible]	3-24-65	3-24-65	[illegible]	3-24-65	3-24-65

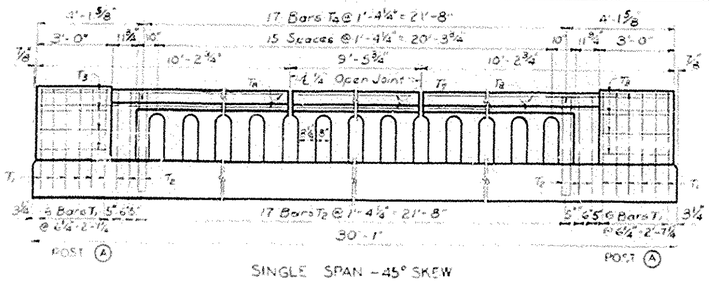
DRAWING NO. H51

BRIDGE

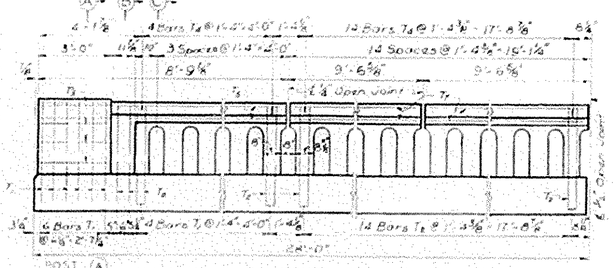
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



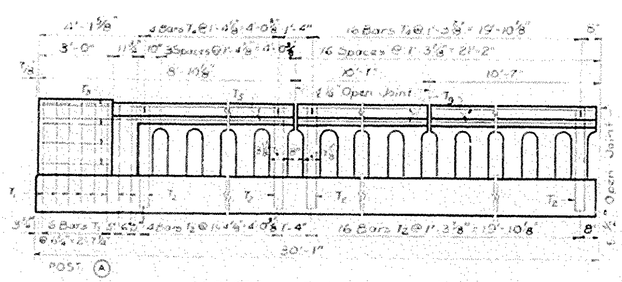
INTERMEDIATE SPAN



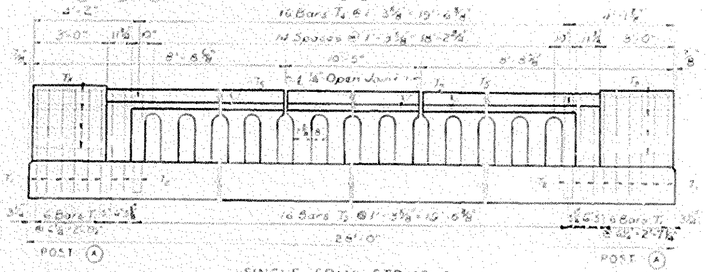
SINGLE SPAN - 45° SKEW



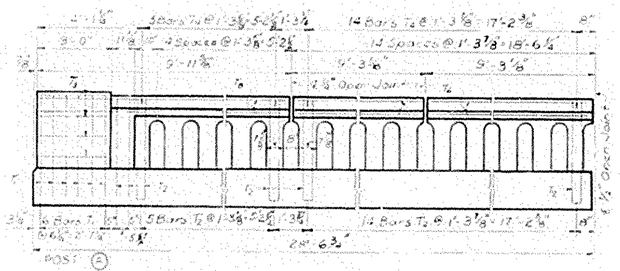
END SPAN - STRAIGHT; OR SHORT RAIL - 15°, 30° OR 45° SKEW



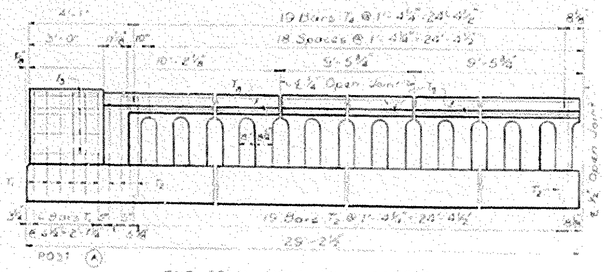
END SPAN - LONG RAIL - 45° SKEW



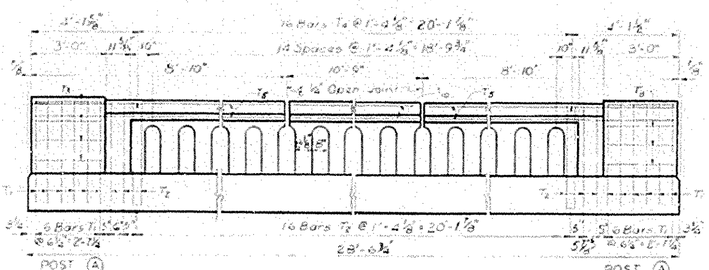
SINGLE SPAN - STRAIGHT



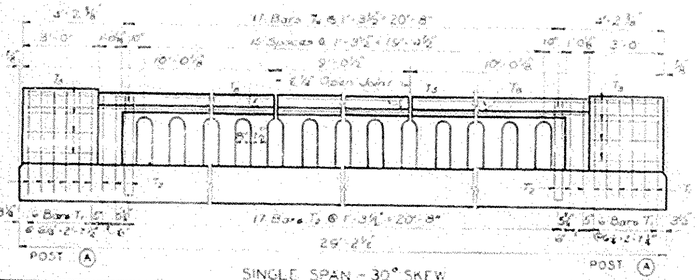
END SPAN - LONG RAIL - 15° SKEW



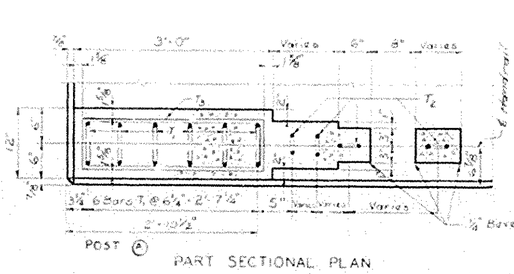
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN - 15° SKEW



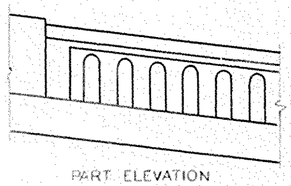
SINGLE SPAN - 30° SKEW



PART SECTIONAL PLAN

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

25 FOOT SPAN			NUMBER OF BARS										CONCRETE CLASS "D" (CU. YDS.)	REINFORCEMENT (LBS.)
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}		
STRAIGHT	SINGLE	TWO RAILS	24	40	16	32	12	—	—	—	6	—	3.2	713
	INTERMEDIATE	TWO RAILS	—	42	—	42	—	18	—	—	—	—	2.4	480
	END	TWO RAILS	12	40	8	36	6	—	12	—	—	—	2.8	587
15° SKEW	SINGLE	TWO RAILS	24	40	16	32	12	—	—	—	—	6	3.3	714
	INTERMEDIATE	TWO RAILS	—	42	—	42	—	18	—	—	—	—	2.4	480
	END	LONG RAIL	6	21	4	19	—	6	—	3	—	—	2.8	598
	END	SHORT RAIL	6	20	4	18	3	—	6	—	—	—		
30° SKEW	SINGLE	TWO RAILS	24	42	16	34	6	—	—	12	—	—	3.3	734
	INTERMEDIATE	TWO RAILS	—	42	—	42	—	18	—	—	—	—	2.4	480
	END	LONG RAIL	6	21	4	19	—	—	6	3	—	—	2.9	599
	END	SHORT RAIL	6	20	4	18	3	—	6	—	—	—		
45° SKEW	SINGLE	TWO RAILS	24	42	16	34	—	—	6	12	—	—	3.4	737
	INTERMEDIATE	TWO RAILS	—	42	—	42	—	18	—	—	—	—	2.4	480
	END	LONG RAIL	6	22	4	20	3	—	—	—	6	—	2.9	609
	END	SHORT RAIL	6	20	4	18	3	—	6	—	—	—		



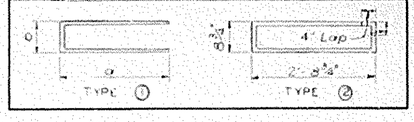
PART ELEVATION

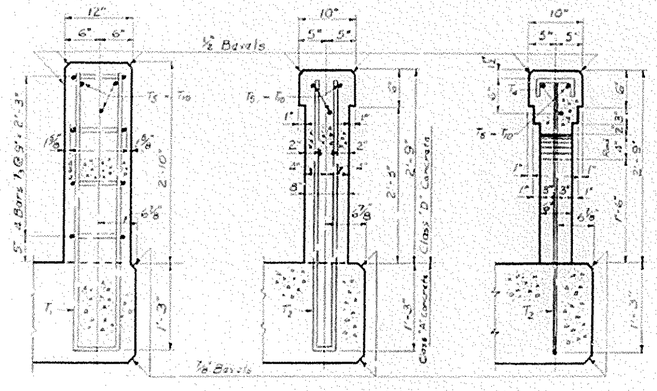
When bridge is on a plus or minus grade, top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	60	#5	8	5	Post "A"	3	11½	0	8
T_2	"	"	"	7	11	Spindles	3	10½	0	4
T_3	"	"	#3	7	5	Post "A"	—	—	—	—
T_4	"	"	#4	0	11	Rail	0	3	3	7
T_5	"	"	"	8	5	"	—	—	—	—
T_6	"	"	"	6	11	"	—	—	—	—
T_7	"	"	"	9	2	"	—	—	—	—
T_8	"	"	"	9	8	"	—	—	—	—
T_9	"	"	"	10	1	"	—	—	—	—
T_{10}	"	"	"	10	5	"	—	—	—	—

See Table





SECTION A-A SECTION B-B SECTION C-C

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, Current Specifications with Amendments.

CONCRETE: Class "D" Concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

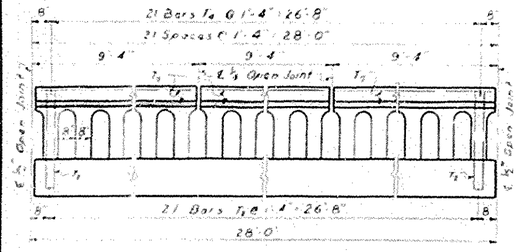
STANDARD SPINDLE HANDRAIL FOR 25 FT. SPAN R.C.D.G. STR., 15°, 30°, OR 45° SKEW WITH 10½" CURB

DRAWING	INDEX
H-101	

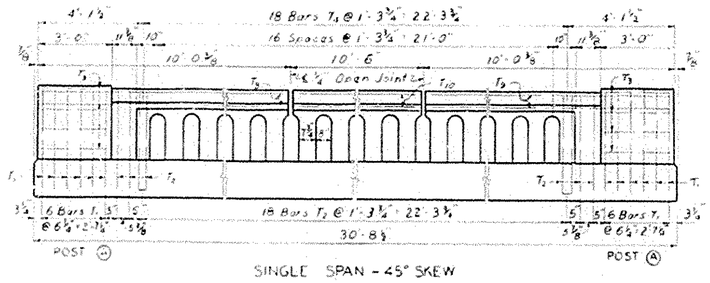
DESIGNED BY: C. Brown DATE: 3-6-56
DETAILED BY: M.F. Baker DATE: 3-6-56
CHECKED BY: DATE:
TRACED BY: DATE:
CHECKED BY: DATE:
REVISED DATE:
REVISED DATE:

BRIDGE

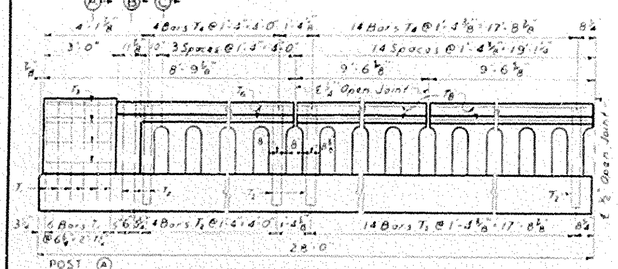
PROJECT NUMBER	STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY				



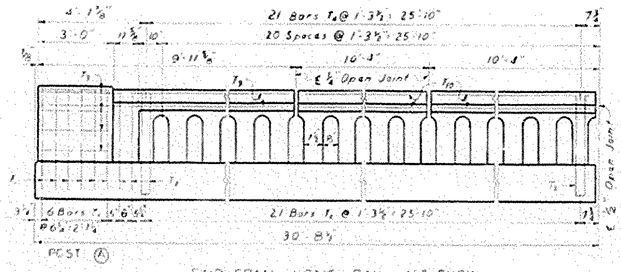
INTERMEDIATE SPAN



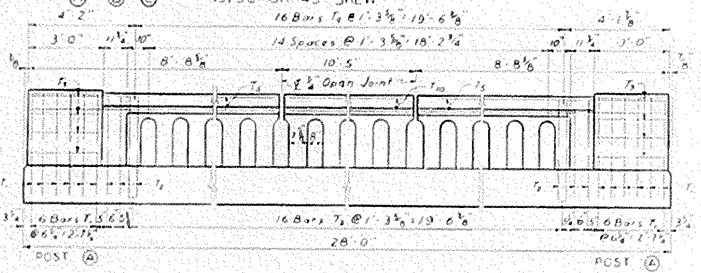
SINGLE SPAN - 45° SKEW



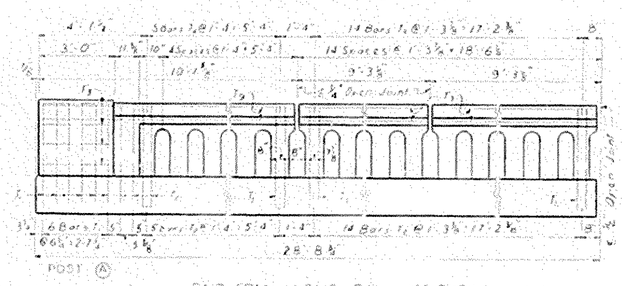
END SPAN - STRAIGHT; OR SHORT RAIL - 15°, 30° OR 45° SKEW



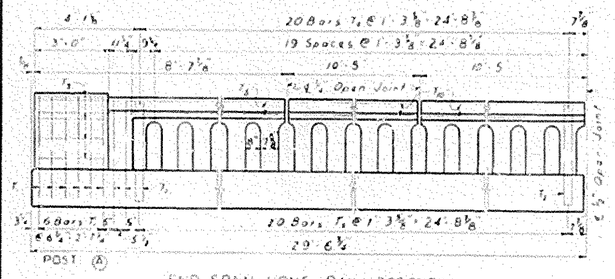
END SPAN - LONG RAIL - 45° SKEW



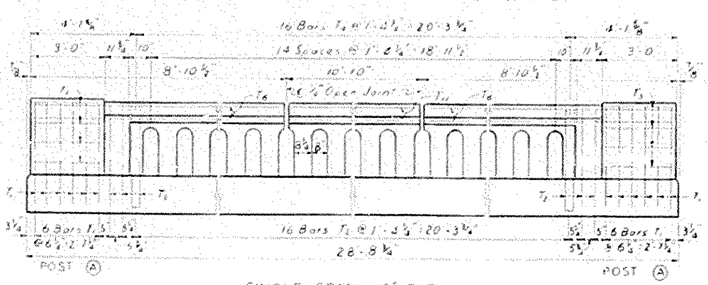
SINGLE SPAN - STRAIGHT



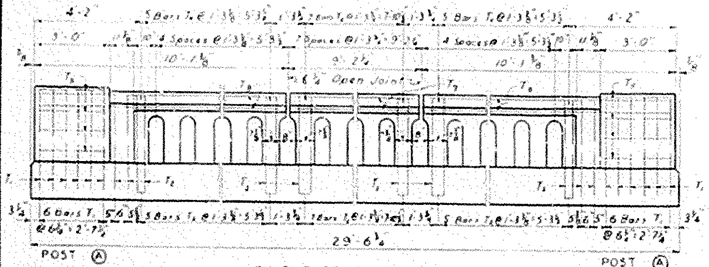
END SPAN - LONG RAIL - 15° SKEW



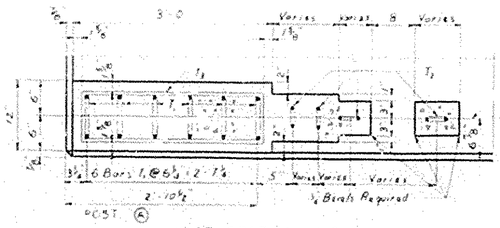
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN - 15° SKEW



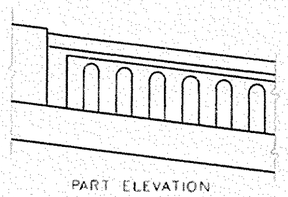
SINGLE SPAN - 30° SKEW



PART SECTIONAL PLAN

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

25 FOOT SPAN			NUMBER OF BARS										CONCRETE CLASS "D" (CU. YDS.)	REINFORCEMENT (LBS.)
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}		
STRAIGHT	SINGLE	TWO RAILS	24	40	16	32	12	—	—	—	—	6	3.2	712
	INTERMEDIATE	TWO RAILS	—	42	—	42	—	—	18	—	—	—	2.4	480
	END	TWO RAILS	12	40	8	36	—	6	—	12	—	—	2.8	588
15° SKEW	SINGLE	TWO RAILS	24	40	16	32	—	12	—	—	—	6	3.3	715
	INTERMEDIATE	TWO RAILS	—	42	—	42	—	—	18	—	—	—	2.4	480
	END	LONG RAIL	6	21	4	19	—	—	6	—	3	—	2.8	598
	END	SHORT RAIL	6	20	4	18	—	3	—	6	—	—		
30° SKEW	SINGLE	TWO RAILS	24	42	16	34	—	—	6	—	12	—	3.4	736
	INTERMEDIATE	TWO RAILS	—	42	—	42	—	—	18	—	—	—	2.4	480
	END	LONG RAIL	6	22	4	20	3	—	—	—	—	6	2.9	609
	END	SHORT RAIL	6	20	4	18	—	3	—	6	—	—		
45° SKEW	SINGLE	TWO RAILS	24	44	16	36	—	—	—	—	12	6	3.4	758
	INTERMEDIATE	TWO RAILS	—	42	—	42	—	—	18	—	—	—	2.4	480
	END	LONG RAIL	6	23	4	21	—	—	—	3	6	—	2.9	620
	END	SHORT RAIL	6	20	4	18	—	3	—	6	—	—		

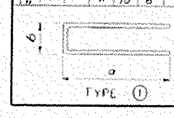


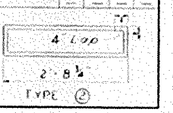
PART ELEVATION

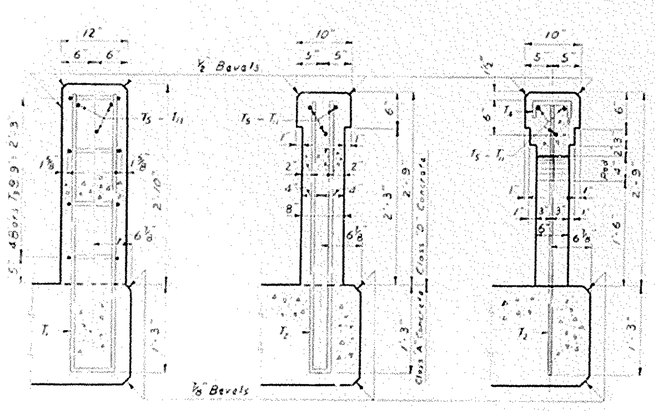
When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	3	#5	8	5	Post A	3	11½	0	8
T_2	"	"	"	7	11	Spindles	3	10½	0	3
T_3	②	3	#3	7	5	Post A				
T_4	③	4	#4	0	11	Rail	0	3	0	7
T_5	Str.	"	"	8	4	"	—	—	—	—
T_6	"	"	"	8	6	"	—	—	—	—
T_7	"	"	"	9	11	"	—	—	—	—
T_8	"	"	"	9	3	"	—	—	—	—
T_9	"	"	"	5	8	"	—	—	—	—
T_{10}	"	"	"	10	0	"	—	—	—	—
T_{11}	"	"	"	10	6	"	—	—	—	—







SECTION A-A SECTION B-B SECTION C-C

GENERAL NOTE

SPECIFICATIONS: *Kentucky Department of Highways, Current Specifications with Amendments.*

CONCRETE: *Class "D" Concrete to be used in Handrail.*

REINFORCEMENT: *Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.*

BEVELED EDGES: *All exposed edges to be beveled ¾ unless otherwise noted.*

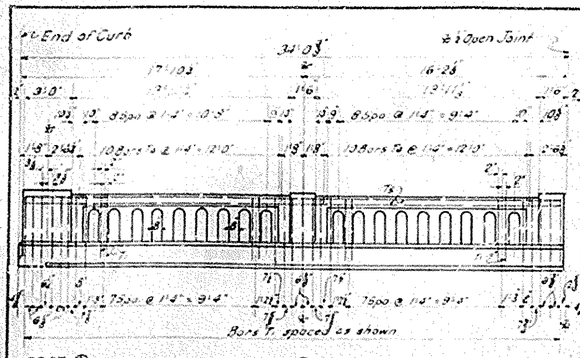
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD SPINDLE HANDRAIL FOR 25 FT. SPAN R.C.D.G. STR., 15°, 30°, OR 45° SKEW WITH 1'-6" CURB

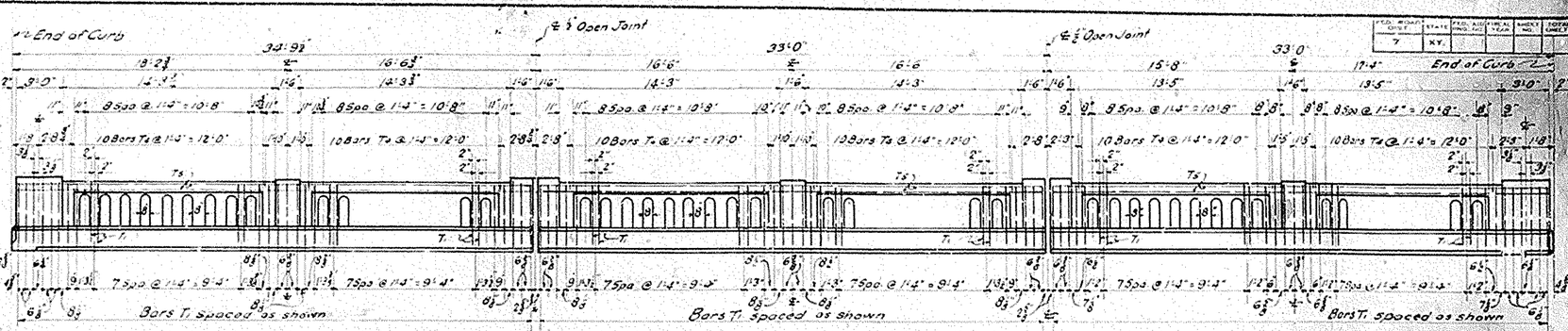
DRAWING NO. H-1121

ORDER

BRIDGE



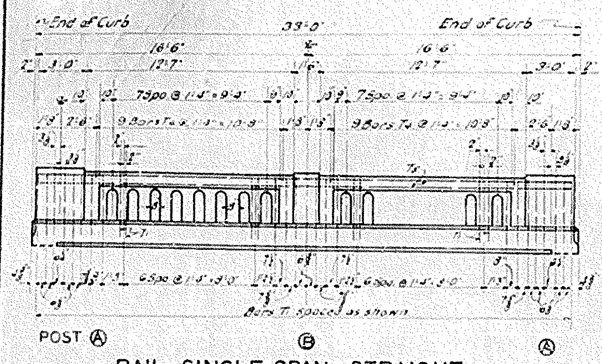
RAIL - END SPAN - LONG CURB - 30° SKEW



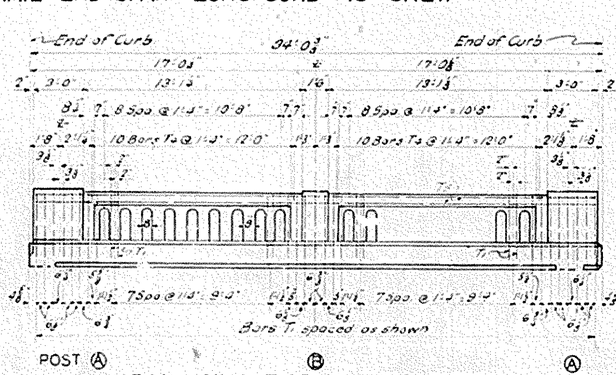
RAIL - END SPAN - LONG CURB 45° SKEW

RAIL - INTERMEDIATE SPAN STRAIGHT - 30° OR 45° SKEW

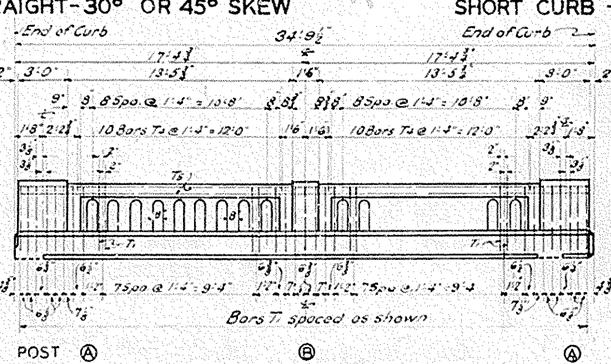
RAIL - END SPAN - STRAIGHT OR SHORT CURB - 30° OR 45° SKEW



RAIL - SINGLE SPAN - STRAIGHT

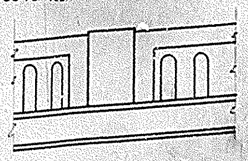


RAIL - SINGLE SPAN - 30° SKEW

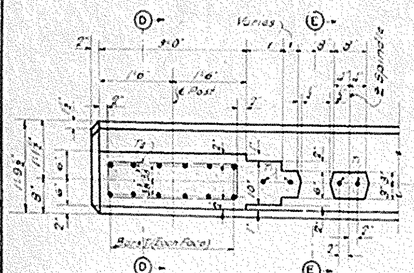


RAIL - SINGLE SPAN - 45° SKEW

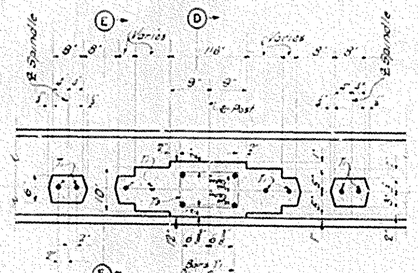
NOTE:
When bridge is on a plus or minus grade top of all Posts and Rails to be parallel to the grade line. All Posts and Spindles to be vertical.



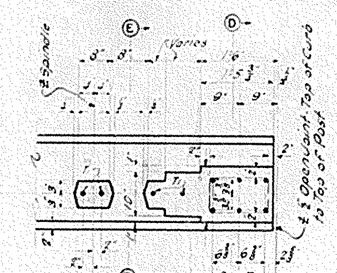
PART ELEVATION
(Showing relation of Posts, Spindles and Rail to Grade Line when Bridge is on a plus or minus grade)



SECTIONAL PLAN POST Ⓐ



SECTIONAL PLAN POST Ⓑ

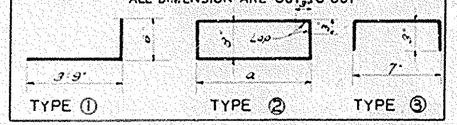


SECTIONAL PLAN POST Ⓒ

BILL AND TYPES OF REINFORCEMENT

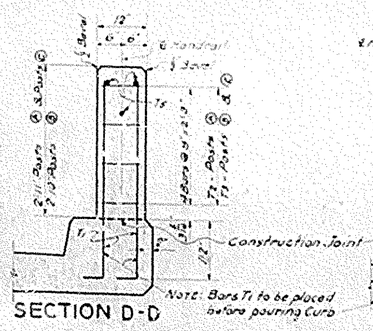
Mark	Type	No	Size	Length Ft.	Length In.	Location	a Ft.	a In.
T1	①	See Table	#5	4	2	Curb into Posts & Spindles	-	-
T2	②		#5	6	10	Posts Ⓐ	2	8
T3	"		-	3	10	" Ⓑ Ⓒ	1	2
T4	③		#5	0	11	Top of Rail	-	-
T5	Str.		-			Rail	-	-

ALL DIMENSION ARE OUT TO OUT

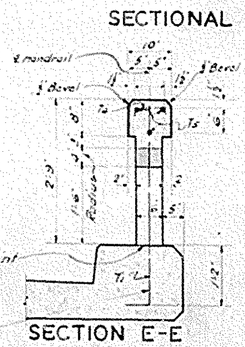


GENERAL NOTE

Specifications — State Highway Department, Kentucky, Standard with subsequent adopted amendments.
Concrete — Class D concrete to be used in Handrail & Posts.
Steel Reinforcement — To be deformed bars. Dimensions shown from the face of concrete are the clear distances. Dimensions shown for bar spacing are the distances center to center of bars. All reinforcement shall be securely held in correct position by means of precast mortar or concrete blocks and wired at intersections. Precast mortar or concrete blocks supporting reinforcement shall be spaced not further apart than 50 diameters of the supported bar.
Bevels — All corners of Handrail to be beveled ¾" unless otherwise noted hereon.



SECTION D-D



SECTION E-E

TABLE OF REINFORCEMENT AND ESTIMATED QUANTITIES

30 FT SPAN			T1 Number	T2 Number	T3 Number	T4 Number	T5 Number	T5 Length Ft.	T5 Length In.	Concrete Class D Cu. Yds.	Reinforcement-Lbs
STRAIGHT	Single	Two Rails	132	16	8	36	6	32	4	4.1	710
	Intermediate	Two Rails	116	-	24	40	6	32	7	3.8	640
	End	Two Rails	128	8	16	40	6	32	6	3.8	690
30° SKEW	Single	Two Rails	140	16	8	40	6	33	4	4.1	750
	Intermediate	Two Rails	116	-	24	40	6	32	7	3.8	640
	End	Rail - Long Curb	64	4	8	20	3	33	6	3.9	700
		Rail - Short Curb	64	4	8	20	3	32	6		
45° SKEW	Single	Two Rails	140	16	8	40	6	33	1	4.2	750
	Intermediate	Two Rails	116	-	24	40	6	32	7	3.8	640
	End	Rail - Long Curb	64	4	8	20	3	34	3	4.0	700
		Rail - Short Curb	64	4	8	20	3	33	6		

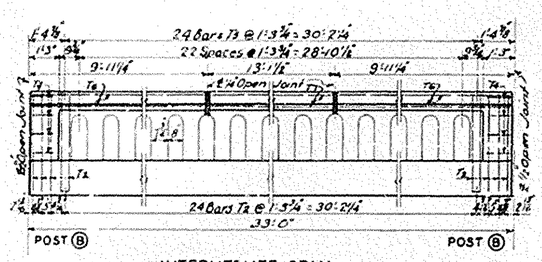
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

STANDARD HANDRAIL FOR DECK-GIRDERS 30 FT. SPANS

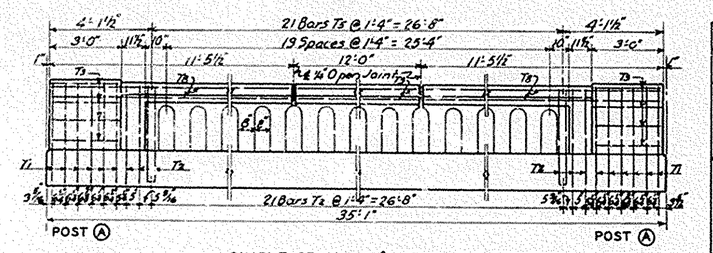
DRAWING H-12

DESIGNED BY GIBBS

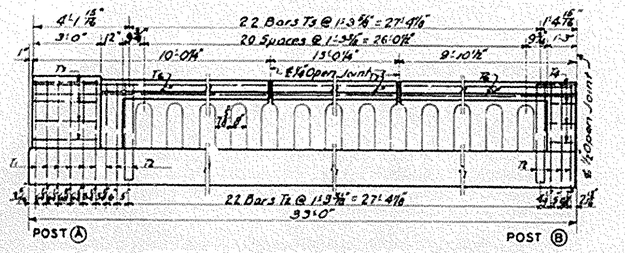
BRIDGE



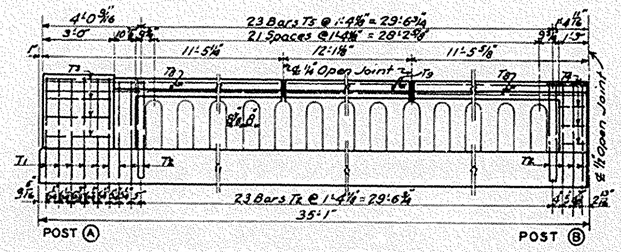
INTERMEDIATE SPAN



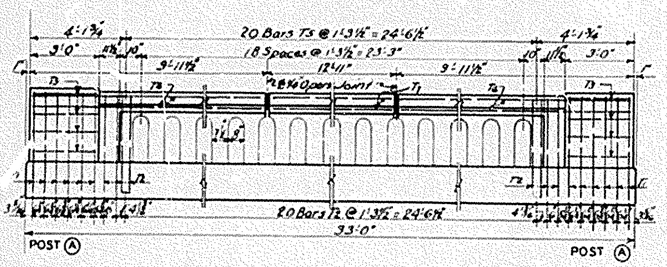
SINGLE SPAN 45° SKEW



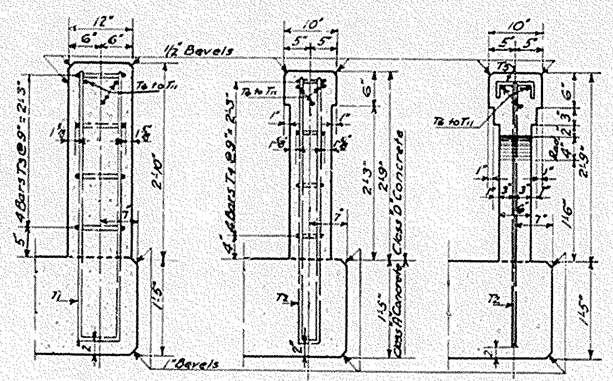
END SPAN - STRAIGHT, OR SHORT RAIL 30° OR 45° SKEW



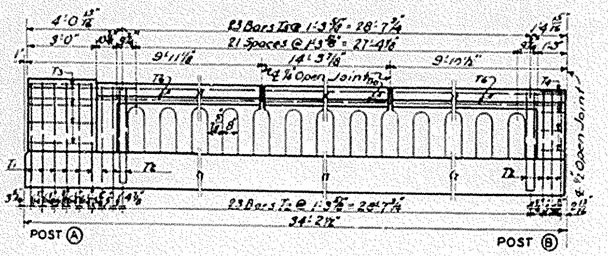
END SPAN - LONG RAIL 45° SKEW



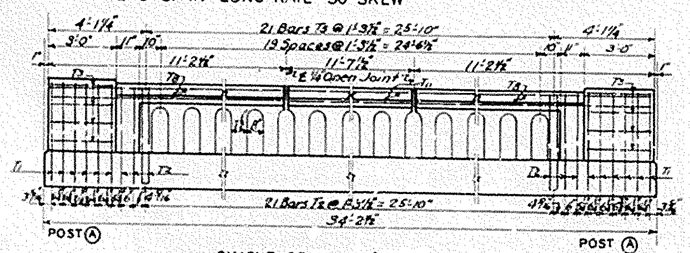
SINGLE SPAN - STRAIGHT



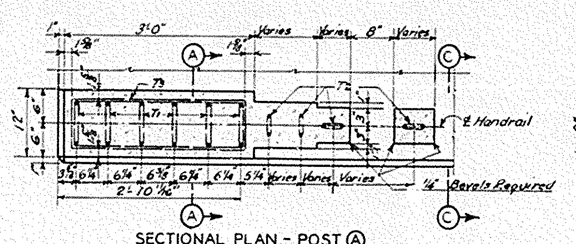
SECTION A-A SECTION B-B SECTION C-C



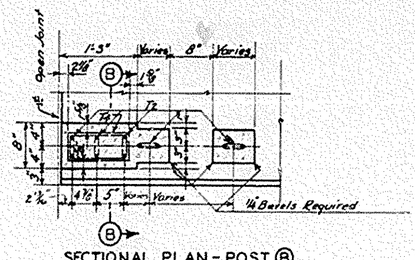
END SPAN - LONG RAIL - 30° SKEW



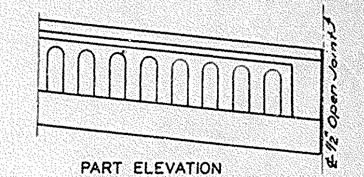
SINGLE SPAN 30° SKEW



SECTIONAL PLAN - POST (A)



SECTIONAL PLAN - POST (B)



PART ELEVATION

When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

30 FOOT SPAN			T1 NO.	T2 NO.	T3 NO.	T4 NO.	T5 NO.	T6 NO.	T7 NO.	T8 NO.	T9 NO.	T10 NO.	T11 NO.	CONCRETE CLASS 'D' CU YDS	REINFORCEMENT LBS
STRAIGHT	SINGLE	TWO RAILS	24	48	16	–	40	12	6	–	–		–	3.6	800
	INTERMEDIATE	TWO RAILS	–	60	–	16	48	12	6	–	–	–	–	2.9	670
	END	TWO RAILS	12	54	8	8	44	12	6	–	–	–	–	3.3	740
30° SKEW	SINGLE	TWO RAILS	24	50	16	–	42	–	–	12	–	–	6	3.7	830
	INTERMEDIATE	TWO RAILS	–	60	–	16	48	12	6	–	–	–	–	2.9	670
	END	LONG RAIL	6	28	4	4	23	6	–	–	–	3	–		
	END	SHORT RAIL	6	27	4	4	22	6	3	–	–	–	–	3.3	750
45° SKEW	SINGLE	TWO RAILS	24	50	16	–	42	–	–	12	6	–	–	3.8	830
	INTERMEDIATE	TWO RAILS	–	60	–	16	48	12	6	–	–	–	–	2.9	670
	END	LONG RAIL	6	28	4	4	23	–	–	6	3	–	–		
	END	SHORT RAIL	6	27	4	4	22	6	3	–	–	–	–	3.4	750

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T1	(1)	See Table	⅝" ϕ	8	5	Post "A"	3	11½	0	8
T2	"		"	7	11	Post B & Spindles	3	10½	0	8
T3	(2)		⅝" ϕ	7	5	Post "A"	2	8⅛	0	8⅝
T4	"		"	3	2	Post "B"	0	11¼	0	8¾
T5	(1)		1¼" ϕ	0	11	Rail	0	3	0	7
T6	Str.		"	9	8	"	—	—	—	—
T7	"		"	12	8	"	—	—	—	—
T8	"		"	11	0	"	—	—	—	—
T9	"		"	11	9	"	—	—	—	—
T10	"		"	14	0	"	—	—	—	—
T11	"		"	11	5	"	—	—	—	—

TYPE (1)

TYPE (2)

GENERAL NOTE

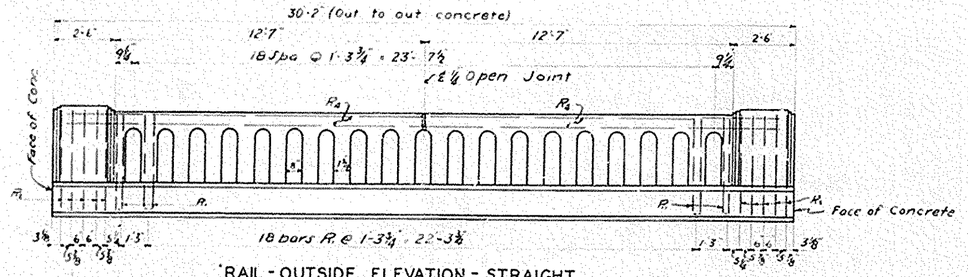
Specifications: Kentucky Department of Highways 1945 Standard with Amendments.
Concrete: Class 'D' concrete to be used in Handrail.
Reinforcement: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A 305 - current specifications.

Beveled Edges: All exposed edges to be beveled ¼" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
STANDARD HANDRAIL
DECK GIRDER 30 FT. SPAN
24 FT. AND 26 FT. ROADWAY

H-52

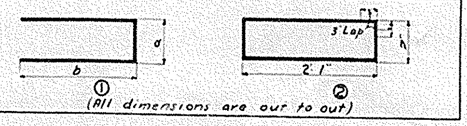
BRIDGE



RAIL - OUTSIDE ELEVATION - STRAIGHT

BILL AND TYPES OF REINFORCEMENT

Mark	Type	No	Size	Length Ft	Length In	Location	a Ft	a In	b Ft	b In
R1	①		½" D	7	10	Curb into Spindle	0	1½	3	9½
R2	"	5 per ft	"	8	4	Post	0	6¼	4	0
R3	②		⅜" P	5	6	"				
R4	St'r		½" D	See Table		Rail				



① ② (All dimensions are out to out)

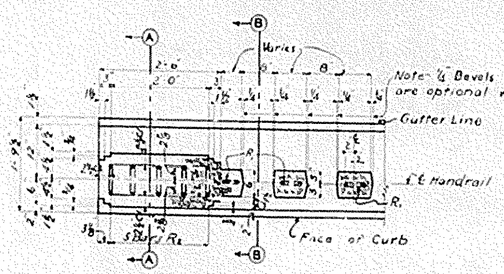
TABLE OF REINFORCEMENT AND ESTIMATED QUANTITIES

30 Foot Span		R1 Number	R2 Number	R3 Number	R4 Number	R4 Length Ft	R4 Length In	Concrete Class "D" Cu. Yds.	Reinforcement Lbs.
Straight	Two Rails	40	20	16	8	14	9	2.7	540
30° Skew									
45° Skew									

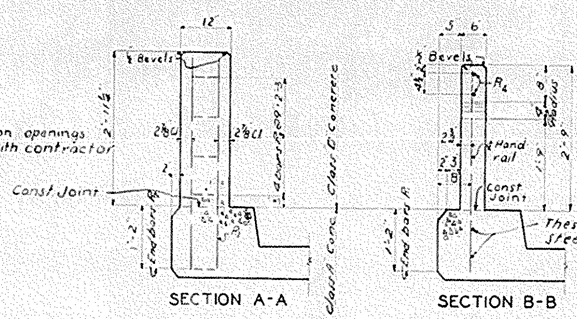
GENERAL NOTE

Specifications — Department of Highways, Kentucky. (1938 Standard).

Concrete — Class D Concrete to be used in handrail.
Reinforcement — All bar dimensions are to ℄ of bars except as noted.
Bevels — All corners of Handrail to be beveled ½" unless otherwise noted hereon.
Construction Note — When bridge is on a plus or minus grade tops of all posts and rail to be parallel to the grade line. All sides of openings and parts to be vertical.

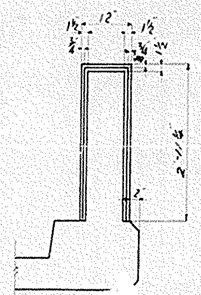


PART SECTIONAL PLAN



SECTION A-A SECTION B-B

Note — Bars R3 & R4 to be in place before pouring curbs.



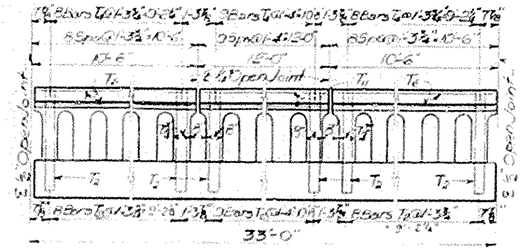
END ELEVATION OF POST

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

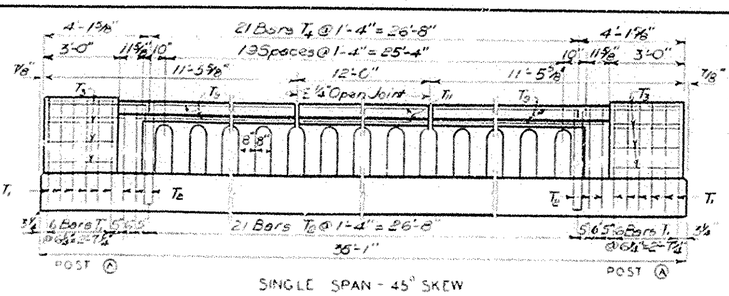
STANARD CONCRETE HANDRAIL
FOR
30 FT. I-BEAM SPANS
0° SKEWS

DRAWING H-22

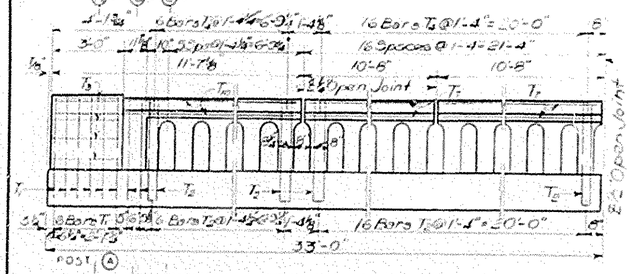
BRIDGE



INTERMEDIATE SPAN

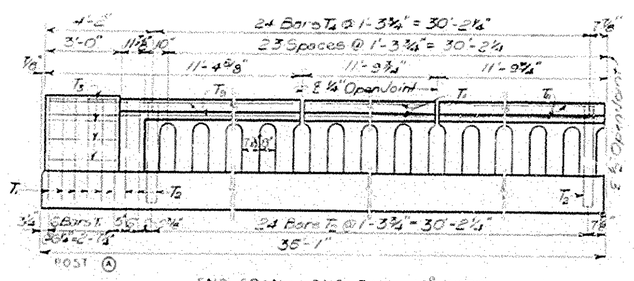


SINGLE SPAN - 45° SKEW

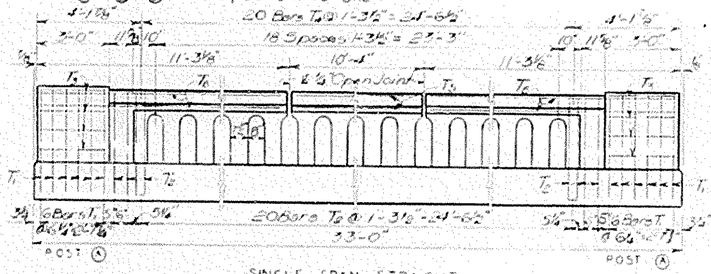


Ⓐ - Ⓑ - Ⓒ

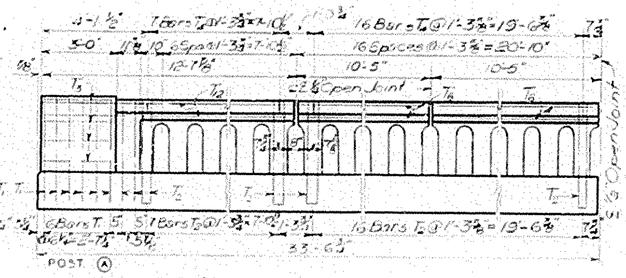
END SPAN - STRAIGHT OR SHORT RAIL - 15°, 30° OR 45° SKEW



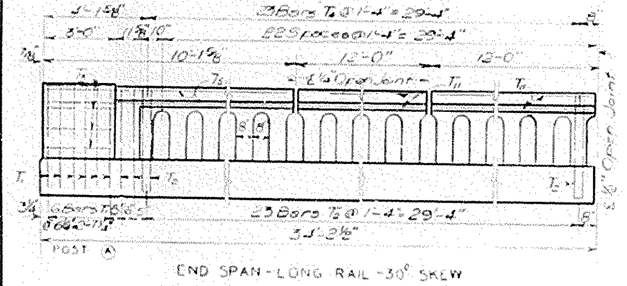
END SPAN - LONG RAIL - 45° SKEW



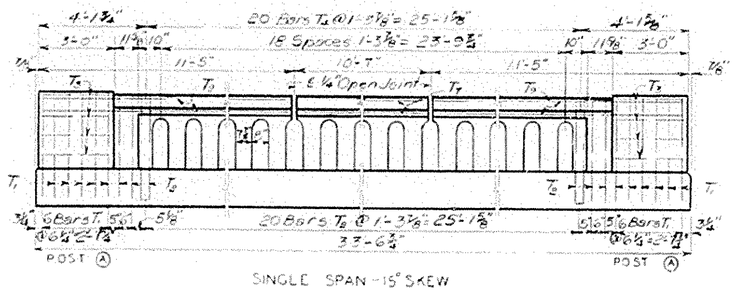
SINGLE SPAN - STRAIGHT



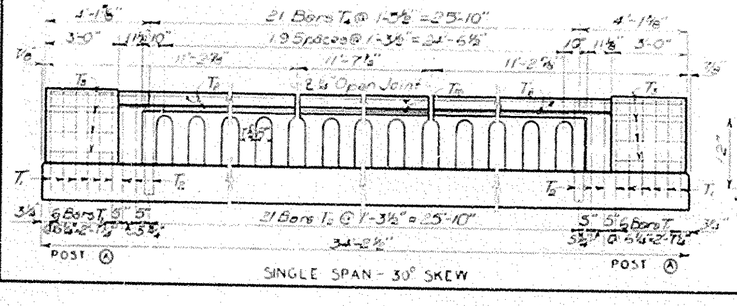
END SPAN - LONG RAIL - 15° SKEW



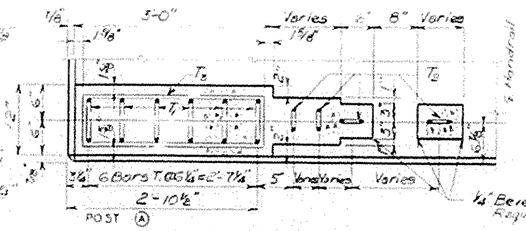
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN - 15° SKEW



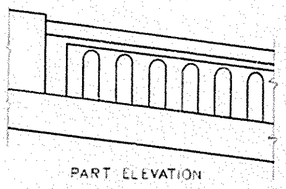
SINGLE SPAN - 30° SKEW



PART SECTIONAL PLAN

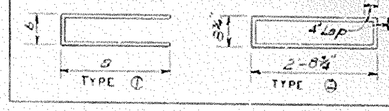
TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES															
30 FOOT SPAN			NUMBER OF BARS											CONCRETE CLASS 'D' (CU. YDS.)	REINFORCEMENT (LBS.)
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	
STRAIGHT	SINGLE	TWO RAILS	24	48	16	40	6	—	—	12	—	—	—	—	3.6	803
	INTERMEDIATE	TWO RAILS	—	50	—	50	—	12	—	—	—	—	6	—	2.6	570
	END	TWO RAILS	12	48	8	44	—	—	12	—	—	6	—	—	3.2	679
15° SKEW	SINGLE	TWO RAILS	24	48	16	40	—	—	6	—	12	—	—	—	3.7	806
	INTERMEDIATE	TWO RAILS	—	50	—	50	—	12	—	—	—	—	6	—	2.8	570
	END	LONG RAIL	6	25	4	23	—	6	—	—	—	—	—	3	3.2	689
	END	SHORT RAIL	6	24	4	22	—	—	6	—	—	3	—	—		
30° SKEW	SINGLE	TWO RAILS	24	50	16	42	—	—	—	12	—	6	—	—	3.7	827
	INTERMEDIATE	TWO RAILS	—	50	—	50	—	12	—	—	—	—	6	—	2.8	570
	END	LONG RAIL	6	25	4	23	3	—	—	—	—	6	—	—	3.3	689
	END	SHORT RAIL	6	24	4	22	—	—	6	—	—	3	—	—		
45° SKEW	SINGLE	TWO RAILS	24	50	16	42	—	—	—	—	12	—	6	—	3.8	829
	INTERMEDIATE	TWO RAILS	—	50	—	50	—	12	—	—	—	—	6	—	2.8	570
	END	LONG RAIL	6	26	4	24	—	—	—	3	—	6	—	—	3.3	701
	END	SHORT RAIL	6	24	4	22	—	—	6	—	—	3	—	—		

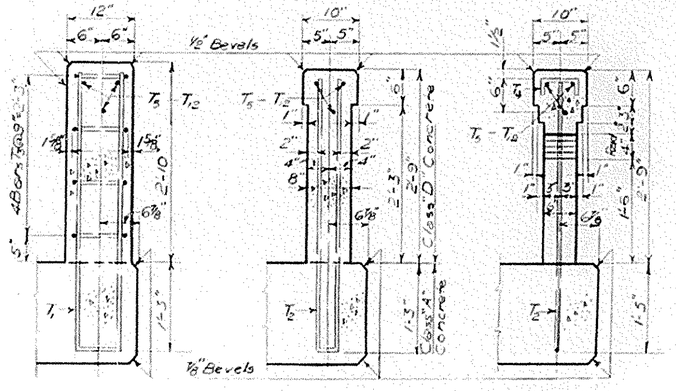
BILL AND TYPES OF REINFORCEMENT									
MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN.	LOCATION	a FT.	a IN.	b FT	b IN.
T_1	①	See Table	#5	8	5	Post "A"	3	11½	0	8
T_2	"		"	7	11	Spindle	3	10½	0	4
T_3	Ⓑ		#3	7	5	Post "A"	—	—	—	—
T_4	Ⓒ		#4	0	11	Rail	0	3	0	7
T_5	Stir.		"	1	10	"	—	—	—	—
T_6	"		"	10	1	"	—	—	—	—
T_7	"		"	10	3	"	—	—	—	—
T_8	"		"	10	11	"	—	—	—	—
T_9	"		"	11	1	"	—	—	—	—
T_{10}	"		"	11	4	"	—	—	—	—
T_{11}	"		"	11	6	"	—	—	—	—
T_{12}	"		"	12	4	"	—	—	—	—



PART ELEVATION

When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.





SECTION A-A SECTION B-B SECTION C-C

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, Current Specifications with Amendments.

CONCRETE: Class "D" Concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to beveled ¼" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD SPINDLE HANDRAIL FOR 30 FT. SPAN R.C.D.G. STR., 15°, 30° OR 45° SKEW WITH 10½" CURB

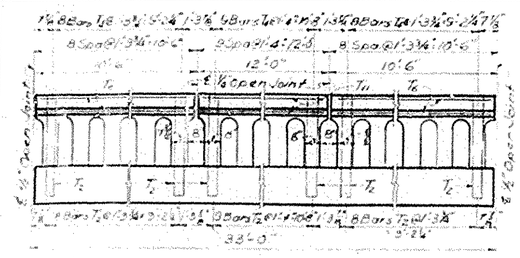
DRAWING NO. H-02

BRIDGE

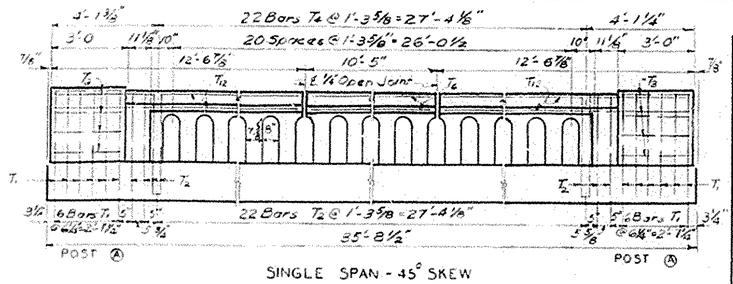
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

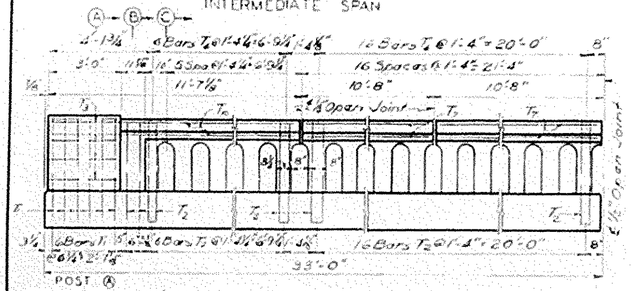
30 FOOT SPAN			NUMBER OF BARS											CONCRETE CLASS "D" (CU. YDS.)	REINFORCEMENT (LBS.)
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	
STRAIGHT	SINGLE	TWO RAILS	24	48	16	40	—	6	—	12	—	—	—	—	3.6	804
	INTERMEDIATE	TWO RAILS	—	50	—	50	—	12	—	—	—	—	6	—	2.8	570
	END	TWO RAILS	12	48	8	44	—	—	12	—	—	6	—	—	3.2	679
15° SKEW	SINGLE	TWO RAILS	24	48	16	40	—	—	6	—	12	—	—	—	3.7	807
	INTERMEDIATE	TWO RAILS	—	50	—	50	—	12	—	—	—	—	6	—	2.8	570
	END	LONG RAIL	6	25	4	23	3	—	—	—	—	6	—	—	3.2	689
	END	SHORT RAIL	6	24	4	22	—	—	6	—	—	3	—	—		
30° SKEW	SINGLE	TWO RAILS	24	50	16	42	—	—	—	12	—	6	—	—	3.8	827
	INTERMEDIATE	TWO RAILS	—	50	—	50	—	12	—	—	—	—	6	—	2.8	570
	END	LONG RAIL	6	25	4	23	—	—	—	3	—	6	—	—	3.3	691
	END	SHORT RAIL	6	24	4	22	—	—	6	—	—	3	—	—		
45° SKEW	SINGLE	TWO RAILS	24	52	16	44	—	6	—	—	—	—	—	12	3.9	850
	INTERMEDIATE	TWO RAILS	—	50	—	50	—	12	—	—	—	—	6	—	2.8	570
	END	LONG RAIL	6	26	4	24	—	—	—	3	—	6	—	—	3.3	702
	END	SHORT RAIL	6	24	4	22	—	—	6	—	—	3	—	—		



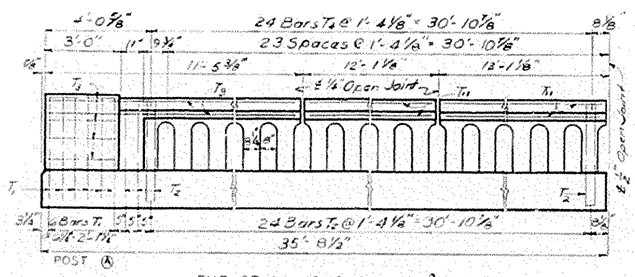
INTERMEDIATE SPAN



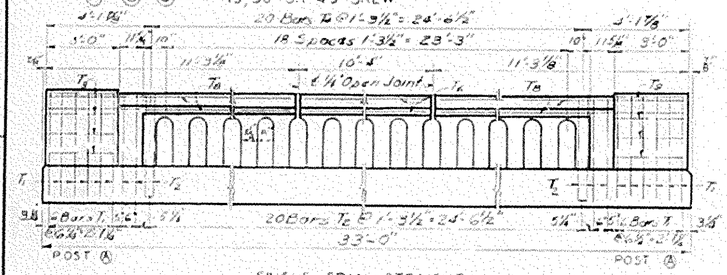
SINGLE SPAN - 45° SKEW



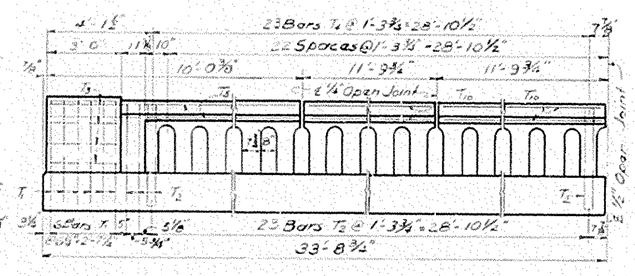
END SPAN - STRAIGHT, OR SHORT RAIL - 15°, 30° OR 45° SKEW



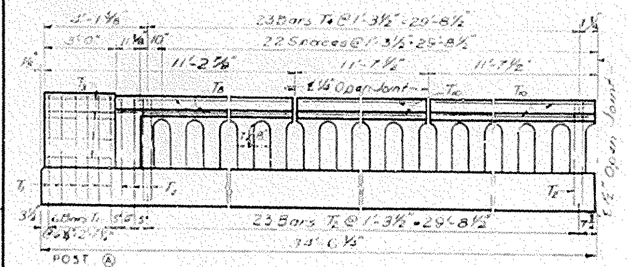
END SPAN - LONG RAIL - 45° SKEW



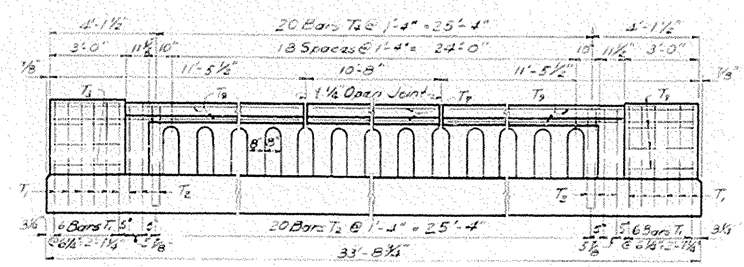
SINGLE SPAN - STRAIGHT



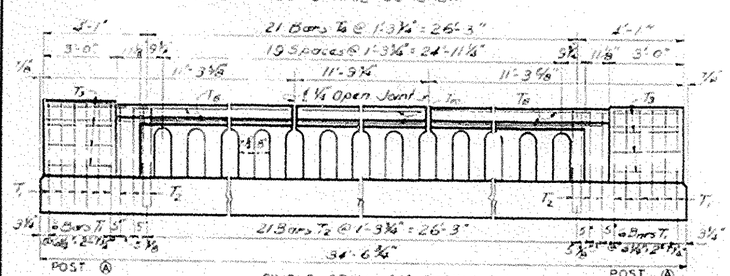
END SPAN - LONG RAIL - 15° SKEW



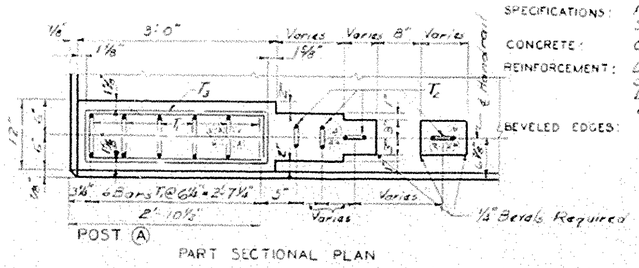
END SPAN - LONG RAIL - 30° SKEW



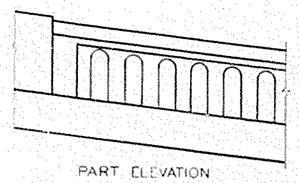
SINGLE SPAN - 15° SKEW



SINGLE SPAN - 30° SKEW



PART SECTIONAL PLAN

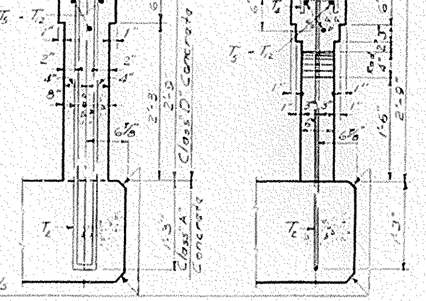


PART ELEVATION

When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT	LENGTH IN	LOCATION	a FT	a IN	b FT	b IN
T_1	①	See Table	#5	8	5	Post "A"	3	11½	0	8
T_2	"		"	7	11	Spindles	3	10½	0	4
T_3	Ⓒ		#3	7	5	Post "A"	—	—	—	—
T_4	Ⓓ		#4	0	11	Rail	0	3	0	7
T_5	Str.		"	9	9	"	—	—	—	—
T_6	"		"	10	0	"	—	—	—	—
T_7	"		"	10	4	"	—	—	—	—
T_8	"		"	10	11	"	—	—	—	—
T_9	"		"	11	2	"	—	—	—	—
T_{10}	"		"	11	5	"	—	—	—	—
T_{11}	"		"	11	8	"	—	—	—	—
T_{12}	"		"	12	3	"	—	—	—	—



GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, Current Specifications with Amendments.

CONCRETE: Class "D" Concrete to be used in handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.

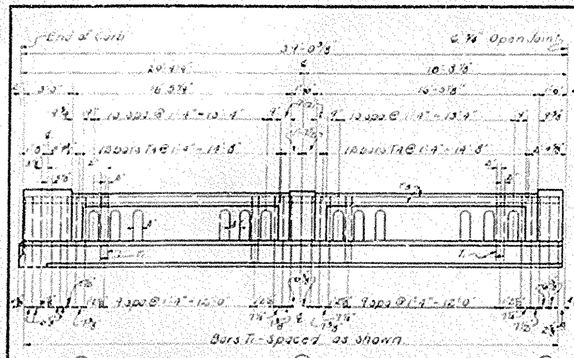
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD SPINDLE HANDRAIL FOR 30 FT. SPAN R.C.D.G. STR., 15°, 30° OR 45° SKEW WITH 1'-6" CURB

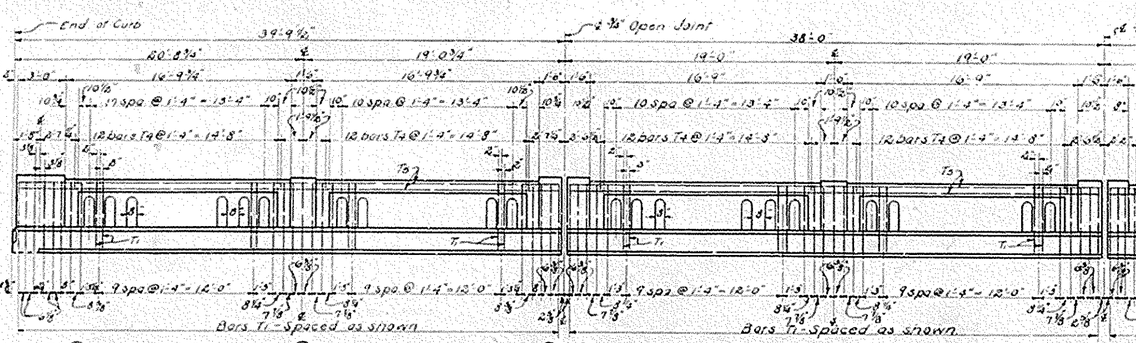
DRAWING NO. H-122 | INDEX

BRIDGE

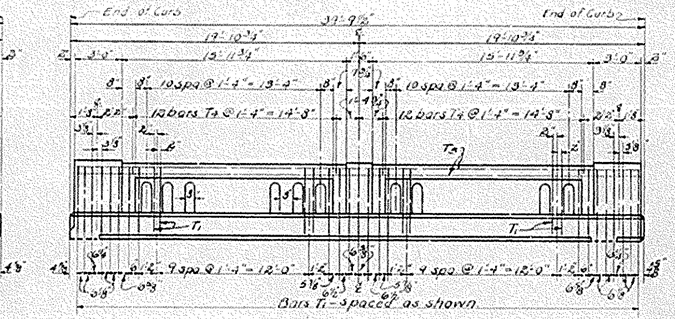
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



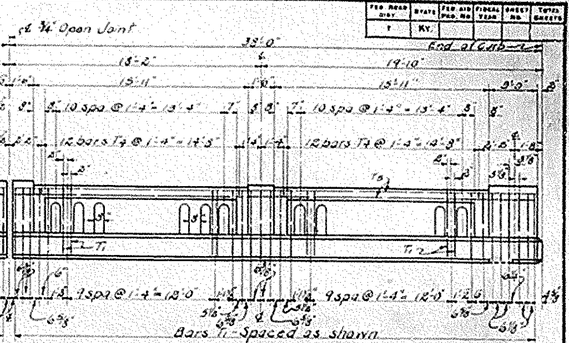
RAIL-END SPAN-LONG CURB-30° SKEW



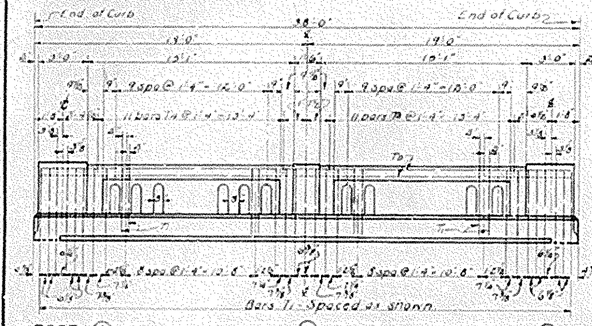
RAIL-END SPAN-LONG CURB-45° SKEW



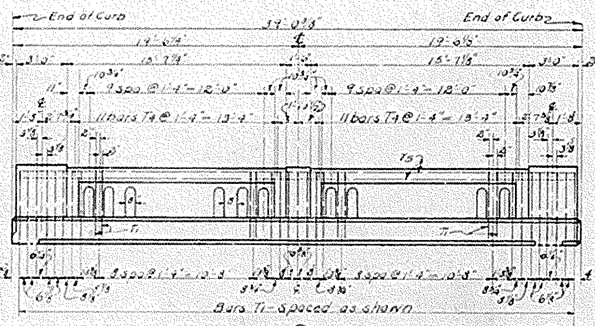
RAIL-INTERMEDIATE SPAN-STRAIGHT-30° OR 45° SKEW



RAIL-END SPAN-STRAIGHT OR SHORT CURB 30° OR 45° SKEW



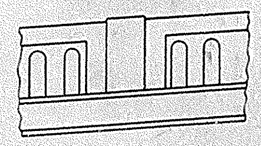
RAIL-SINGLE SPAN-STRAIGHT



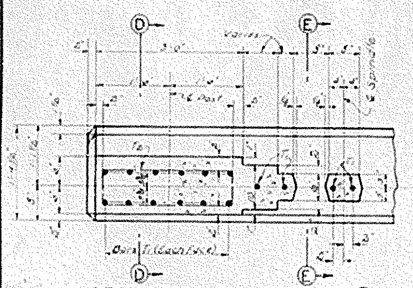
RAIL-SINGLE SPAN-30° SKEW

RAIL-SINGLE SPAN-45° SKEW

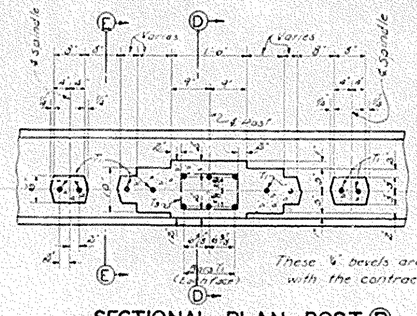
NOTE:-
When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.



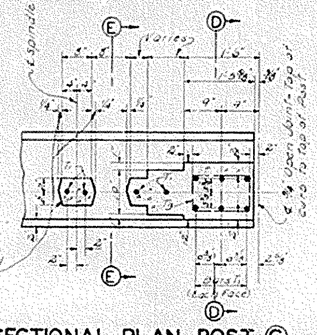
PART ELEVATION
(Showing relation of posts, spindles and rail to grade line when bridge is on a plus or minus grade.)



SECTIONAL PLAN POST Ⓐ



SECTIONAL PLAN POST Ⓑ

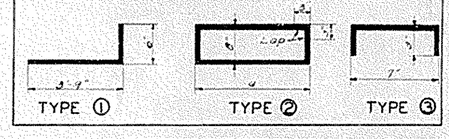


SECTIONAL PLAN POST Ⓒ

BILL AND TYPES OF REINFORCEMENT

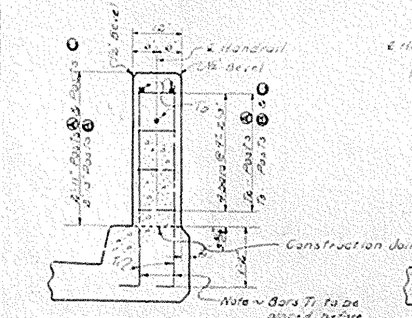
Mark	Type	No.	Size	Length Ft	Length In	Location	a Ft	a In
T1	①	See Table	½" ø	4	2	Curb into Post & Spindles	—	—
T2	②		⅝" ø	6	10	Posts Ⓐ	2	8
T3			-	3	10	" Ⓑ & Ⓒ	1	2
T4	③		½" ø	10	11	Top of Rail	—	—
T5	Str.		-	See Table		Rail	—	—

(All dimensions are out to out)

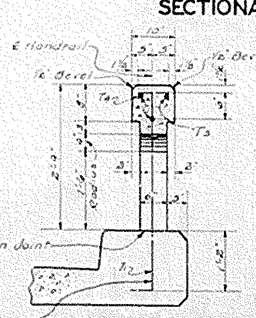


GENERAL NOTE

Specifications: State Highway Department Kentucky, (1932 Standard with subsequent adopted amendments.)
Concrete: Class "D" Concrete to be used in Handrail & Posts.
Steel Reinforcement. To be deformed bars. Dimensions shown from the face of concrete are the clear distances. Dimensions shown for bar spacing are the distances center to center of bars. All reinforcement shall be securely held in correct position by means of precast mortar or concrete blocks and wired at all intersections. Precast mortar or concrete blocks supporting reinforcement shall be spaced not farther apart than 30 diameters of the supported bar.
Bevels: All corners of handrail to be beveled ¼" unless otherwise noted hereon.



SECTION D-D



SECTION E-E

TABLE OF REINFORCEMENT AND ESTIMATED QUANTITIES

35 FT. SPAN			T1 Number	T2 Number	T3 Number	T4 Number	T5 Number	T5 Length Ft	T5 Length In	Concrete Class "D" Cu. Yds.	Reinforcement Lbs.
Straight	Single	Two Rails	148	16	8	44	6	37	4	4.5	800
	Intermediate	Two Rails	132	—	24	48	6	37	7	4.2	730
	End	Two Rails	144	8	16	48	6	37	6	4.3	780
30° Skew	Single	Two Rails	148	16	8	44	6	38	4	4.6	810
	Intermediate	Two Rails	132	—	24	48	6	37	7	4.2	730
	End	Rail-Long Curb	72	4	8	24	3	38	6	4.3	780
		Rail-Short Curb	72	4	8	24	3	37	6		
45° Skew	Single	Two Rails	156	16	8	48	6	39	1	4.6	840
	Intermediate	Two Rails	132	—	24	48	6	37	7	4.2	730
	End	Rail-Long Curb	72	4	8	24	3	39	3	4.4	790
		Rail-Short Curb	72	4	8	24	3	37	6		

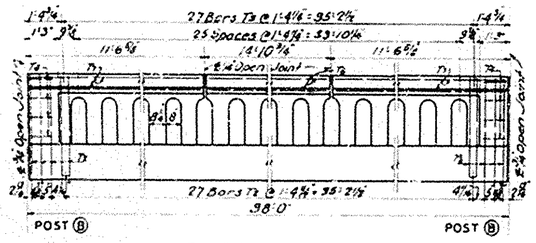
COMMONWEALTH OF KENTUCKY
STATE HIGHWAY DEPARTMENT

STANDARD HANDRAIL
DECK GIRDERS-35FT. SPANS

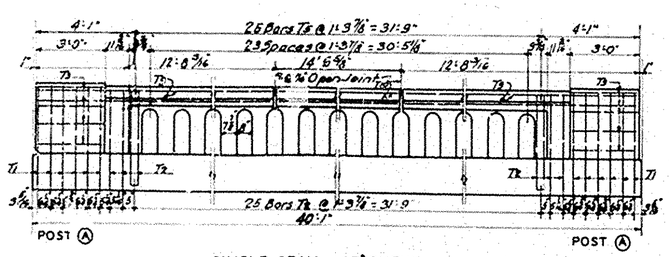
H-13

STRESS	DATE
STRESS	DATE
STRESS	DATE

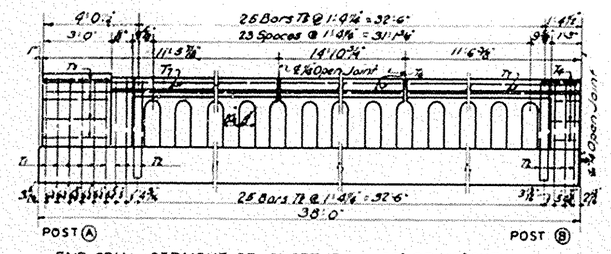
BRIDGE



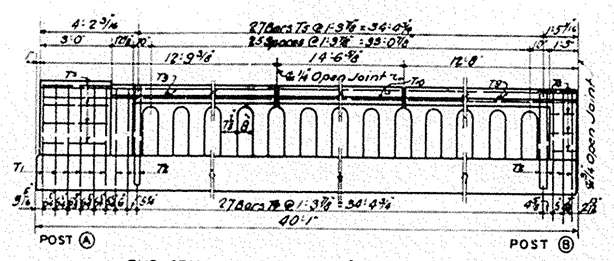
INTERMEDIATE SPAN



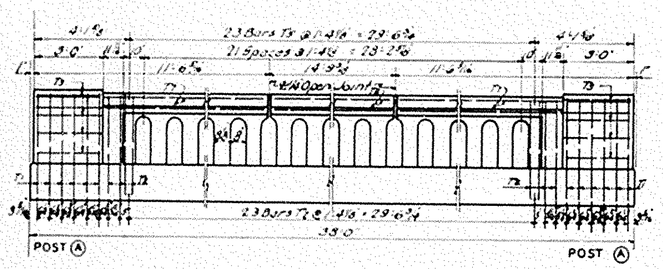
SINGLE SPAN 45° SKEW



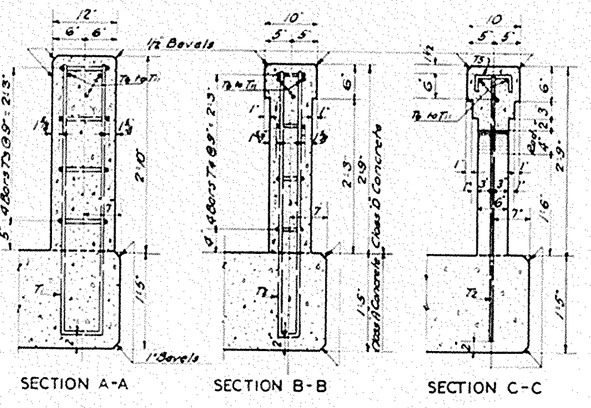
END SPAN - STRAIGHT, OR SHORT RAIL 30° OR 45° SKEW



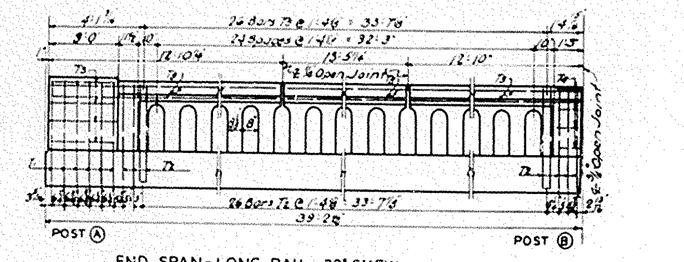
END SPAN - LONG RAIL 45° SKEW



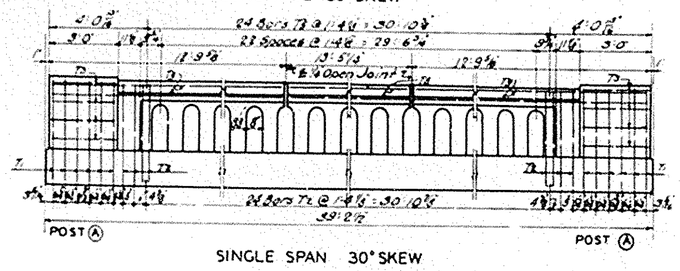
SINGLE SPAN - STRAIGHT



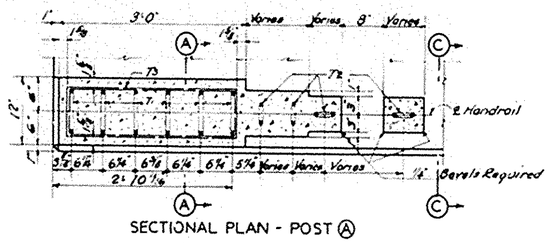
SECTION A-A SECTION B-B SECTION C-C



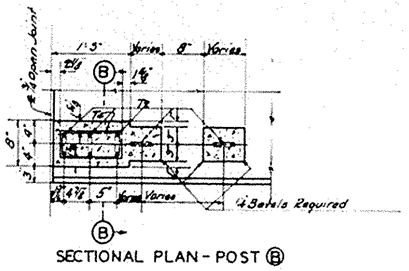
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN 30° SKEW



SECTIONAL PLAN - POST Ⓐ



SECTIONAL PLAN - POST Ⓑ

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways 1945 Standard with Amendments

CONCRETE: Class D concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform To A.S.T.M. Designation: A 305 - current specifications.

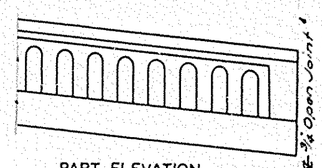
BEVELED EDGES: All exposed edges to be beveled ¼ unless otherwise noted.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

35 FOOT SPAN			T1 NO.	T2 NO.	T3 NO.	T4 NO.	T5 NO.	T6 NO.	T7 NO.	T8 NO.	T9 NO.	T10 NO.	T11 NO.	CONCRETE CLASS 'D' CU.YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	24	54	16	-	46	6	12	-	-	-	-	4.1	880
	INTERMEDIATE	TWO RAILS	-	66	-	16	54	6	12	-	-	-	-	3.4	750
	END	TWO RAILS	12	60	8	8	50	6	12	-	-	-	-	3.7	810
30° SKEW	SINGLE	TWO RAILS	24	56	16	-	48	-	-	6	12	-	-	4.2	900
	INTERMEDIATE	TWO RAILS	-	66	-	16	54	6	12	-	-	-	-	3.4	750
	END	LONG RAIL	6	31	4	4	26	-	-	3	6	-	-		
	END	SHORT RAIL	6	30	4	4	25	3	6	-	-	-	-	3.9	820
45° SKEW	SINGLE	TWO RAILS	24	58	16	-	50	-	-	-	12	6	-	4.2	920
	INTERMEDIATE	TWO RAILS	-	66	-	16	54	6	12	-	-	-	-	3.4	750
	END	LONG RAIL	6	32	4	4	27	-	-	-	6	9	-		
	END	SHORT RAIL	6	30	4	4	25	3	6	-	-	-	-	3.8	830

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN	LOCATION	a FT.	a IN	b FT.	b IN
T1	①	See Table	#9	8	5	Post 'A'	3	11½	0	8
T2	"		"	7	11	Post B & Spindles	3	10½	0	4
T3	②		#8	7	3	Post 'A'	2	8⅝	0	8⅝
T4	"		"	3	2	Post 'B'	0	11⅛	0	4¾
T5	①		1½"	0	11	Rail	0	3	0	7
T6	Str.		"	14	7	"	—	—	—	—
T7	"		"	11	3	"	—	—	—	—
T8	"		"	13	2	"	—	—	—	—
T9	"		"	12	5	"	—	—	—	—
T10	"		"	14	4	"	—	—	—	—



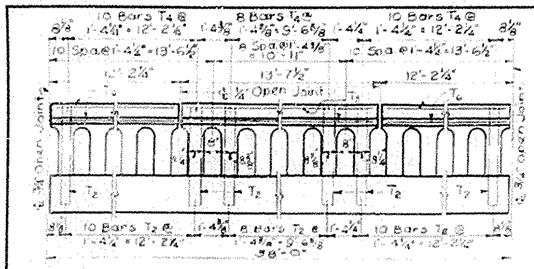
PART ELEVATION

When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

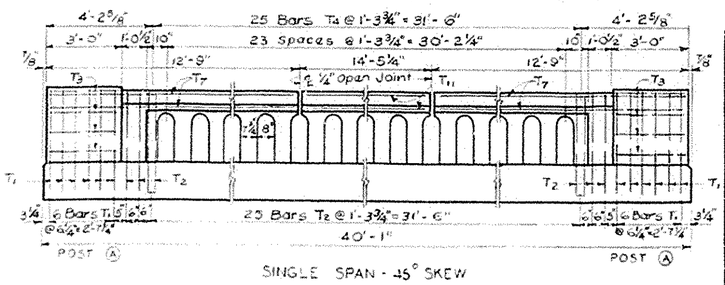
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
STANDARD HANDRAIL
DECK GIRDER 35FT. SPAN
22FT.-24 FT. AND 26FT. ROADWAY

H 53

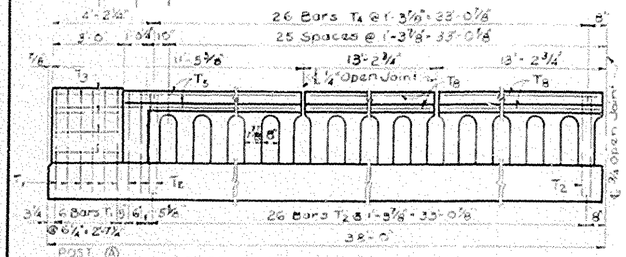
BRIDGE



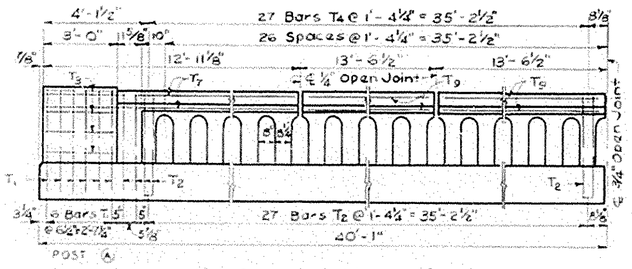
INTERMEDIATE SPAN



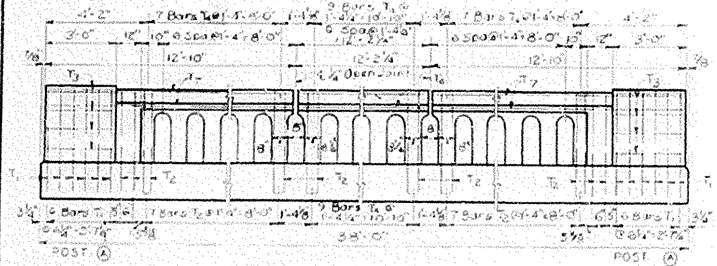
SINGLE SPAN - 45° SKEW



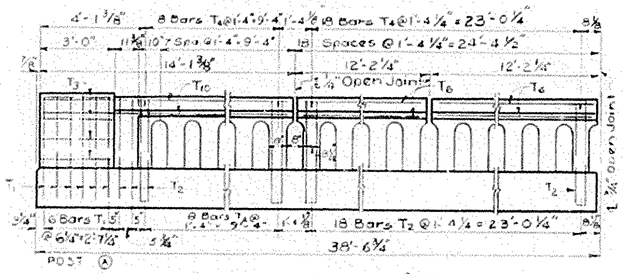
END SPAN - STRAIGHT; OR SHORT RAIL - 15°, 30°, OR 45° SKEW



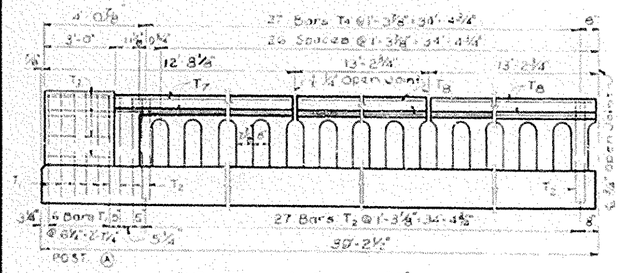
END SPAN - LONG RAIL - 45° SKEW



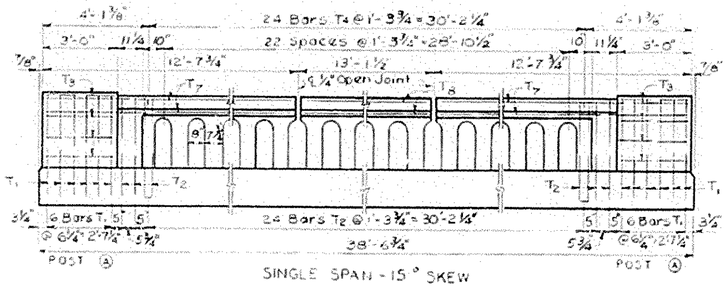
SINGLE SPAN - STRAIGHT



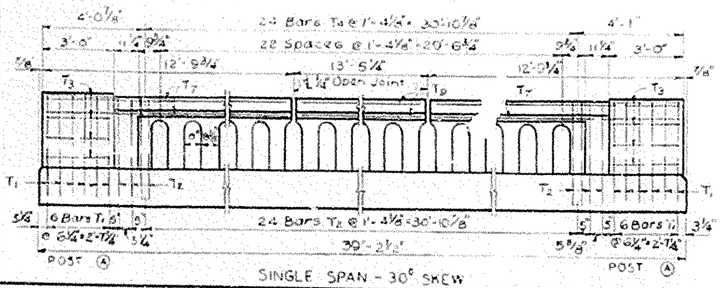
END SPAN - LONG RAIL - 15° SKEW



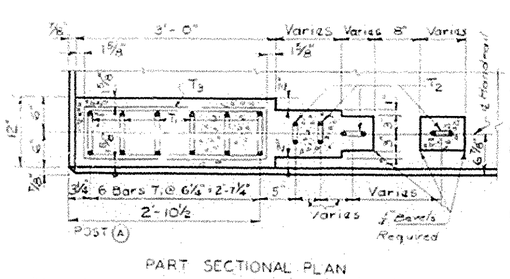
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN - 15° SKEW



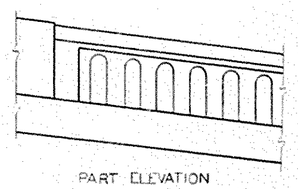
SINGLE SPAN - 30° SKEW



PART SECTIONAL PLAN

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

35 FOOT SPAN			NUMBER OF BARS										CONCRETE CLASS "D" (CU. YDS.)	REINFORCEMENT (LBS.)
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	
STRAIGHT	SINGLE	TWO RAILS	24	54	16	46	—	6	12	—	—	—	—	4.1	876
	INTERMEDIATE	TWO RAILS	—	56	—	56	—	12	—	—	6	—	—	3.2	644
	END	TWO RAILS	12	56	8	52	6	—	—	12	—	—	—	3.6	770
15° SKEW	SINGLE	TWO RAILS	24	56	16	48	—	—	12	6	—	—	—	4.1	897
	INTERMEDIATE	TWO RAILS	—	56	—	56	—	12	—	—	6	—	—	3.2	644
	END	LONG RAIL	6	28	4	26	—	6	—	—	—	3	—	3.7	771
	END	SHORT RAIL	6	28	4	26	3	—	—	6	—	—	—		
30° SKEW	SINGLE	TWO RAILS	24	56	16	48	—	—	12	—	6	—	—	4.2	899
	INTERMEDIATE	TWO RAILS	—	56	—	56	—	12	—	—	6	—	—	3.2	644
	END	LONG RAIL	6	29	4	27	—	—	3	6	—	—	—	3.7	781
	END	SHORT RAIL	6	28	4	26	3	—	—	6	—	—	—		
45° SKEW	SINGLE	TWO RAILS	24	58	16	50	—	—	12	—	—	—	6	4.2	920
	INTERMEDIATE	TWO RAILS	—	56	—	56	—	12	—	—	6	—	—	3.2	644
	END	LONG RAIL	6	29	4	27	—	—	3	—	6	—	—	3.7	782
	END	SHORT RAIL	6	28	4	26	3	—	—	6	—	—	—		

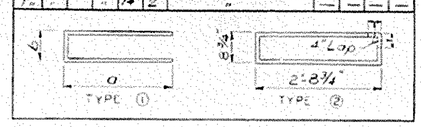


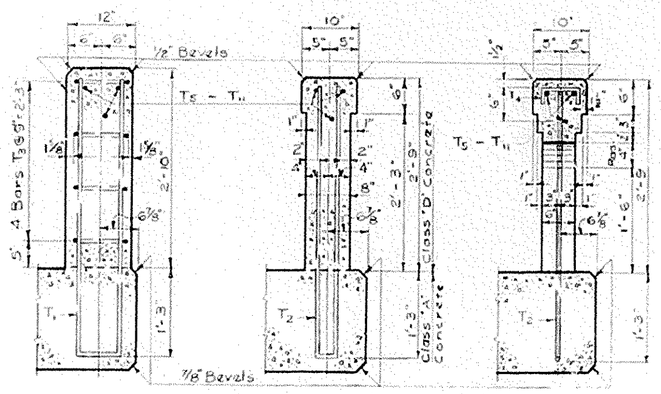
PART ELEVATION

When bridge is on a plus or minus grade, top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	L FT.	L IN.
T_1	①		#5	8	5	Post "A"	3	11½	0	8
T_2			#5	7	11	Spindles	3	10½	0	4
T_4	②		#3	7	5	Post "A"				
T_5	Sec 15.6.6		#4	0	11	Rail	0	3	0	7
T_6			"	11	2	"				
T_7			"	11	10	"				
T_8			"	12	4	"				
T_9			"	12	10	"				
T_{10}			"	13	2	"				
T_{11}			"	13	10	"				
T_{12}			"	14	2	"				





SECTION A-A SECTION B-B SECTION C-C

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, Current Specifications with Amendments.

CONCRETE: Class "D" Concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

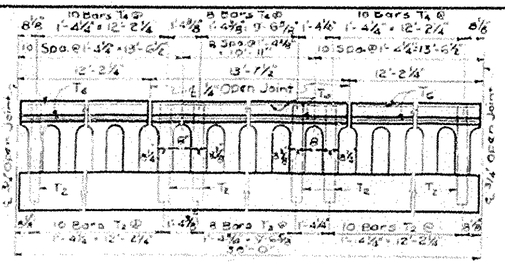
BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

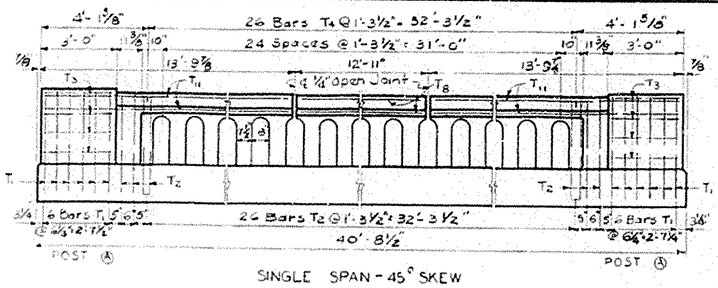
STANDARD SPINDLE HANDRAIL FOR 35 FT. SPAN R.C.D.G. ST.R., 15°, 30°, OR 45° SKEW WITH 10½" CURB

DRAWING NO. H-103 INDEX

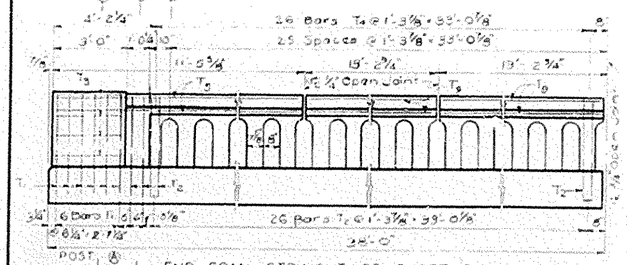
BRIDGE



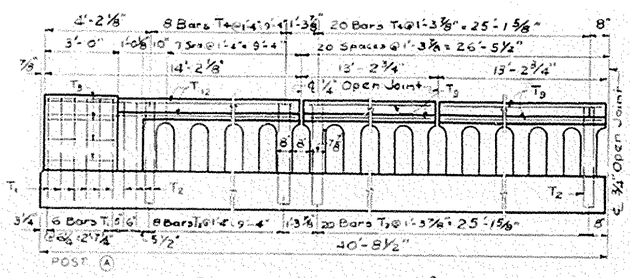
INTERMEDIATE SPAN



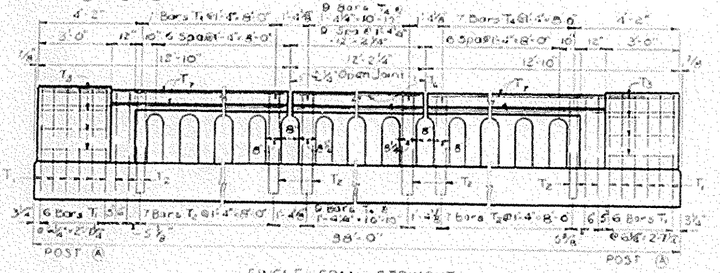
SINGLE SPAN - 45° SKEW



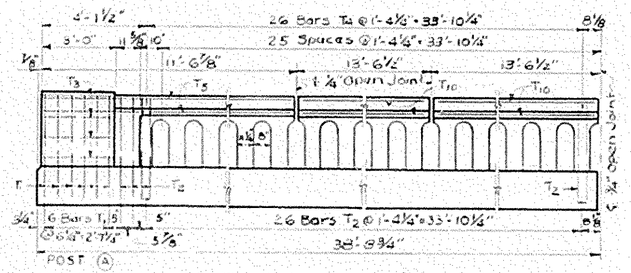
END SPAN - STRAIGHT, OR SHORT RAIL - 15°, 30°, OR 45° SKEW



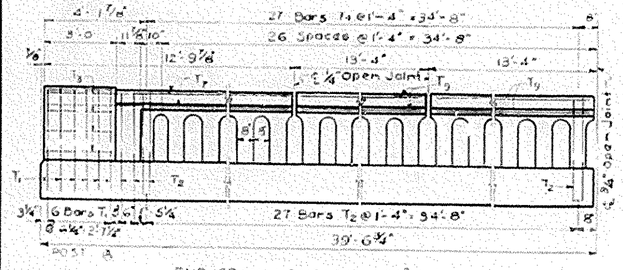
END SPAN - LONG RAIL - 45° SKEW



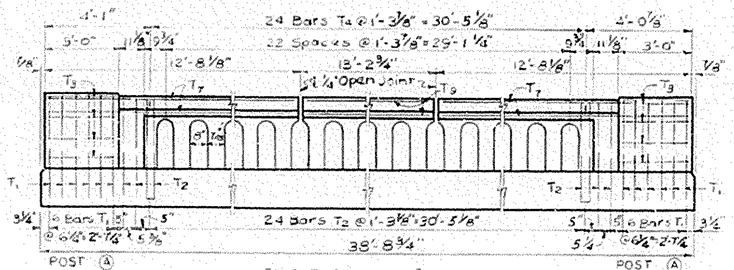
SINGLE SPAN - STRAIGHT



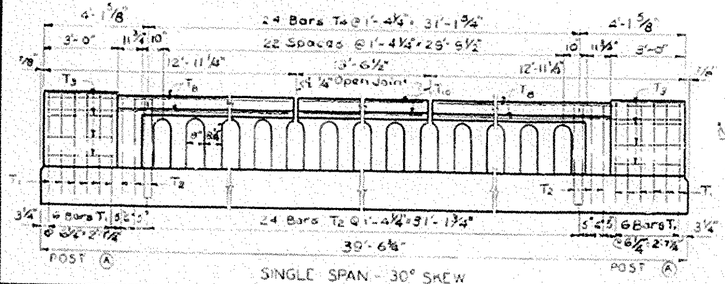
END SPAN - LONG RAIL - 15° SKEW



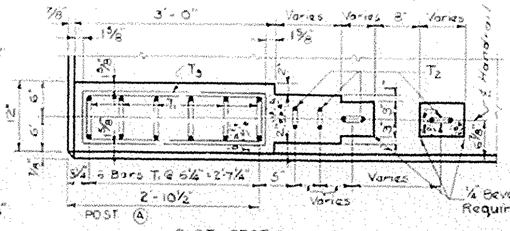
END SPAN - LONG RAIL - 30° SKEW



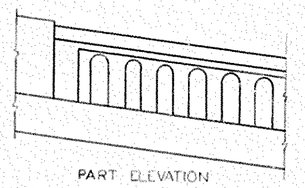
SINGLE SPAN - 15° SKEW



SINGLE SPAN - 30° SKEW



PART SECTIONAL PLAN



PART ELEVATION

When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

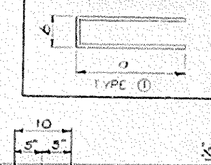
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY				

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

35 FOOT SPAN			NUMBER OF BARS											CONCRETE CLASS D (CU.YDS.)	REINFORCEMENT (LBS.)
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	
STRAIGHT	SINGLE	TWO RAILS	24	54	16	46	—	6	12	—	—	—	—	—	4.1	876
	INTERMEDIATE	TWO RAILS	—	56	—	56	—	12	—	—	—	6	—	—	3.2	645
	END	TWO RAILS	12	56	8	52	6	—	—	—	12	—	—	—	3.6	770
15° SKEW	SINGLE	TWO RAILS	24	56	16	48	—	—	12	—	6	—	—	—	4.1	898
	INTERMEDIATE	TWO RAILS	—	56	—	56	—	12	—	—	—	6	—	—	3.2	645
	END	LONG RAIL	6	28	4	26	3	—	—	—	6	—	—	—	3.7	772
	END	SHORT RAIL	6	28	4	26	3	—	—	—	6	—	—	—		
30° SKEW	SINGLE	TWO RAILS	24	56	16	48	—	—	—	12	—	6	—	—	4.2	901
	INTERMEDIATE	TWO RAILS	—	56	—	56	—	12	—	—	—	6	—	—	3.2	645
	END	LONG RAIL	6	29	4	27	—	—	3	—	6	—	—	—	3.7	782
	END	SHORT RAIL	6	28	4	26	3	—	—	—	6	—	—	—		
45° SKEW	SINGLE	TWO RAILS	24	60	16	52	—	—	—	6	—	—	12	—	4.3	941
	INTERMEDIATE	TWO RAILS	—	56	—	56	—	12	—	—	—	6	—	—	3.2	645
	END	LONG RAIL	6	30	4	28	—	—	—	—	6	—	—	3	3.8	793
	END	SHORT RAIL	6	28	4	26	3	—	—	—	6	—	—	—		

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①		#5	8	5	T_1 & T_{12}	3	11½	0	8
T_2	"		"	7	11	Spindles	3	10½	0	4
T_3	②		#3	7	3	Post & Rail	3	10½	0	4
T_4	③		#4	0	11	"	0	3	0	7
T_5	③		"	11	2	"	—	—	—	—
T_6	"		"	11	10	"	—	—	—	—
T_7	"		"	12	5	"	—	—	—	—
T_8	"		"	12	7	"	—	—	—	—
T_9	"		"	12	11	"	—	—	—	—
T_{10}	"		"	13	3	"	—	—	—	—
T_{11}	"		"	13	6	"	—	—	—	—
T_{12}	"		"	13	11	"	—	—	—	—



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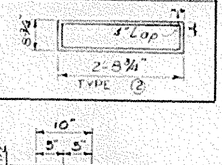
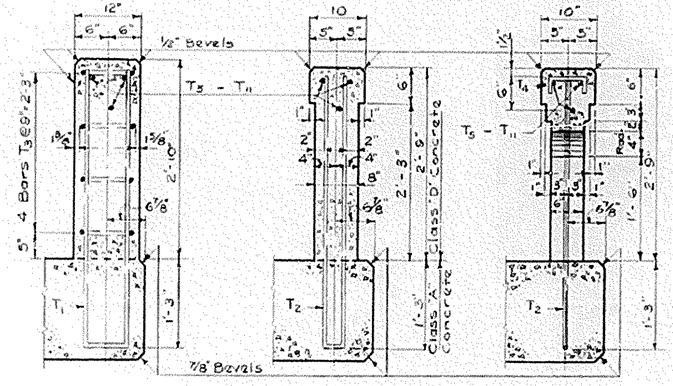


TYPE ②



SECTION A-A SECTION B-B SECTION C-C

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, Current Specifications with Amendments.

CONCRETE: Class "D" Concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

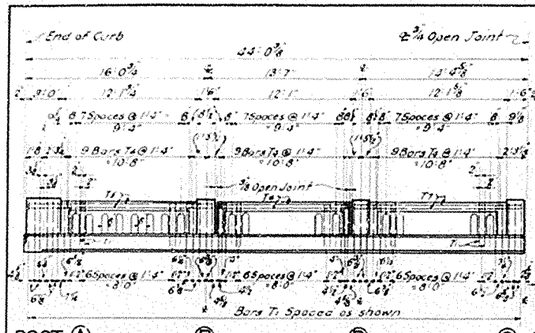
BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD SPINDLE HANDRAIL FOR 35 FT. SPAN R.C.D.G. STR., 15°, 30°, OR 45° SKEW WITH 1'-6" CURB

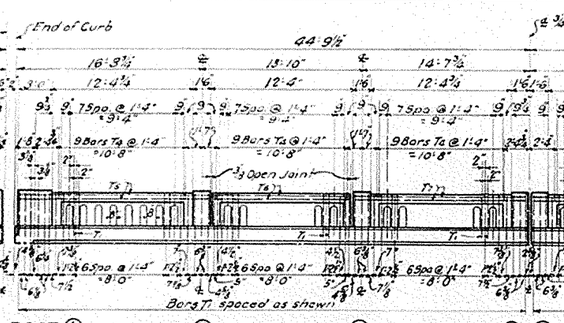
DRAWING	INDEX
10-11-123	

BRIDGE



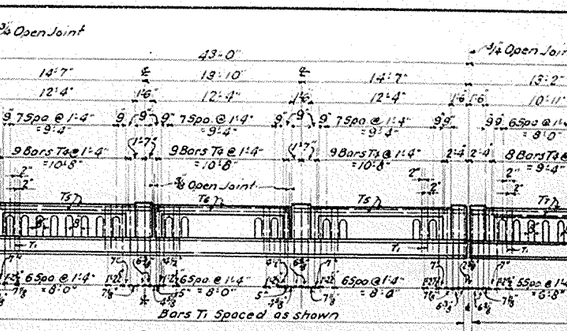
POST Ⓐ Ⓑ Ⓑ Ⓒ

RAIL – END SPAN – LONG CURB – 30° SKEW



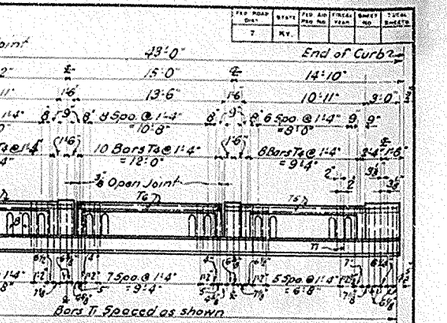
POST Ⓐ Ⓑ Ⓑ Ⓒ Ⓒ

RAIL – END SPAN – LONG CURB – 45° SKEW



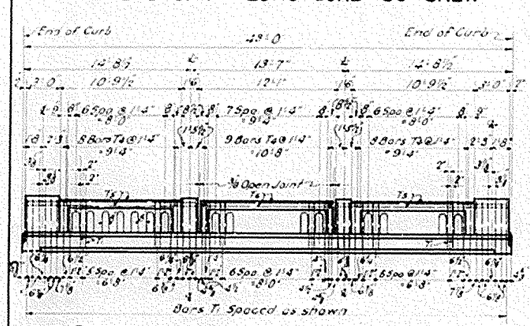
Ⓑ Ⓑ Ⓒ Ⓒ Ⓑ Ⓑ POST Ⓐ

RAIL – INTERMEDIATE SPAN – STRAIGHT – 30° OR 45° SKEW



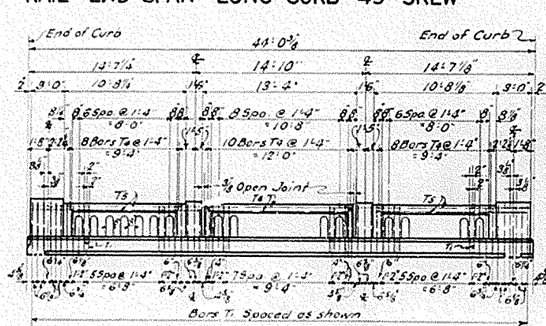
Ⓑ Ⓑ POST Ⓐ

RAIL – END SPAN – STRAIGHT OR SHORT CURB, 30° OR 45° SKEW



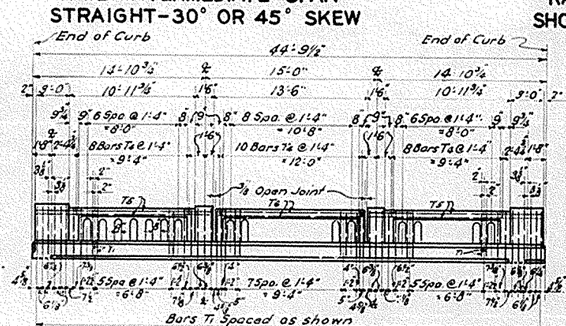
POST Ⓐ Ⓑ Ⓑ Ⓐ

RAIL – SINGLE SPAN – STRAIGHT



POST Ⓐ Ⓑ Ⓑ Ⓐ

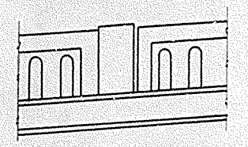
RAIL – SINGLE SPAN – 30° SKEW



POST Ⓐ Ⓑ Ⓑ Ⓐ

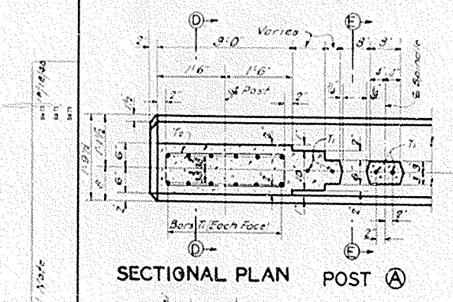
RAIL – SINGLE SPAN – 45° SKEW

NOTE:
When Bridge is on a plus or minus grade Top of all Posts and Rails to be parallel to the Grade Line. All Posts and Spindles to be Vertical.



PART ELEVATION

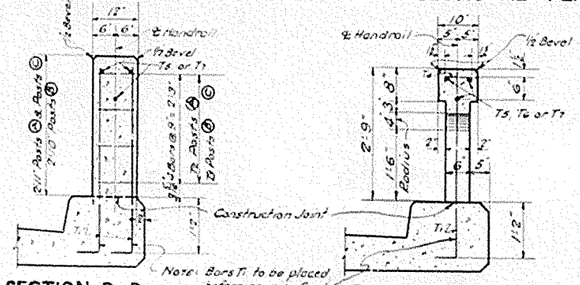
(Showing relation of Posts, Spindles and Rails to Grade Line when Bridge is on a plus or minus grade.)



SECTIONAL PLAN POST Ⓐ

SECTIONAL PLAN POST Ⓑ

SECTIONAL PLAN POST Ⓒ

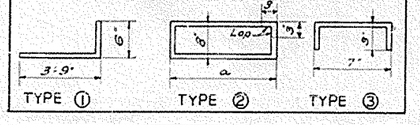


SECTION D-D SECTION E-E

BILL AND TYPES OF REINFORCEMENT

Mark	Type	No	Size	Length Ft	Length In	Location	a Ft	a In
T1	①	See Table	½ @	4	2	Curbs into Posts & Spindles	-	-
T2	②		⅜ @	6	10	Posts Ⓐ	2	8
T3	-		-	3	10	Posts Ⓑ & Ⓒ	1	2
T4	③		½ @	0	11	Top of Rail	-	-
T5	Str.		-	See Table		Rail	-	-
T6	"		-	-		-	-	-
T7	"		-	-		-	-	-

(All dimensions are out to out)



TYPE ① TYPE ② TYPE ③

TABLE OF REINFORCEMENT AND ESTIMATED QUANTITIES

40 FT. SPAN			T1 Number	T2 Number	T3 Number	T4 Number	T5 Number	T5 Length Ft	T5 Length In	T6 Number	T6 Length Ft	T6 Length In	T7 Number	T7 Length Ft	T7 Length In	Concrete Class "D" Cu Yds	Reinforcement Lbs.
STRAIGHT	Single	Two Rails	184	16	16	50	12	14	11	6	11	8	-	-	-	5.2	970
	Intermediate	Two Rails	168	-	32	54	12	14	11	6	11	11	-	-	-	4.8	900
	End	Two Rails	176	8	24	52	6	15	0	6		1	6	13	5	5.0	930
30° SKEW	Single	Two Rails	188	16	16	52	12	14	10	6		11	-	-	-	5.3	990
	Intermediate	Two Rails	168	-	32	54	12	14	11	6	11	11	-	-	-	4.8	900
	End	Rail-Long Curb	90	4	12	27	3	16	4	3	11	8	3	14	9	5.1	940
		Rail-Short Curb	88	4	12	26	3	15	0	3	13	1	3	13	5		
45° SKEW	Single	Two Rails	188	16	16	52	12	15	2	6	13	1	-	-	-	5.4	990
	Intermediate	Two Rails	168	-	32	54	12	14	11	6	11	11	-	-	-	4.8	900
	End	Rail-Long Curb	90	4	12	27	3	16	7	3	11	11	3	15	0	5.1	940
		Rail-Short Curb	88	4	12	26	3	15	0	3	13	1	3	13	5		

GENERAL NOTE

Specifications: Kentucky Department of Highways (1938 Standard with Amendments)
Concrete: Class D concrete to be used thruout
Reinforcement: Dimension shown from face of concrete is clear distance.
Bevels: All corners of Handrail to be beveled ¼ unless otherwise noted on plans

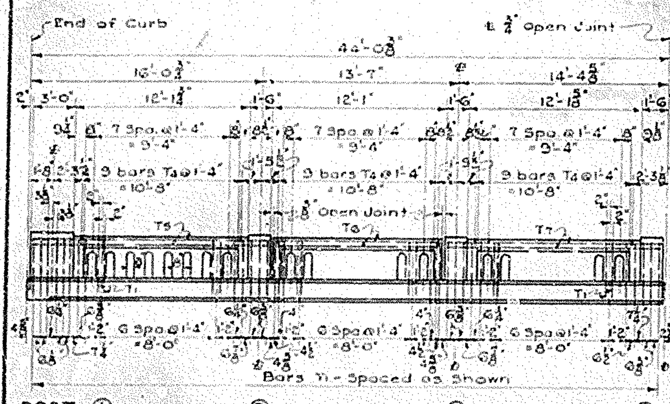
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

STANDARD HANDRAIL
DECK GIRDERS 40FT SPAN

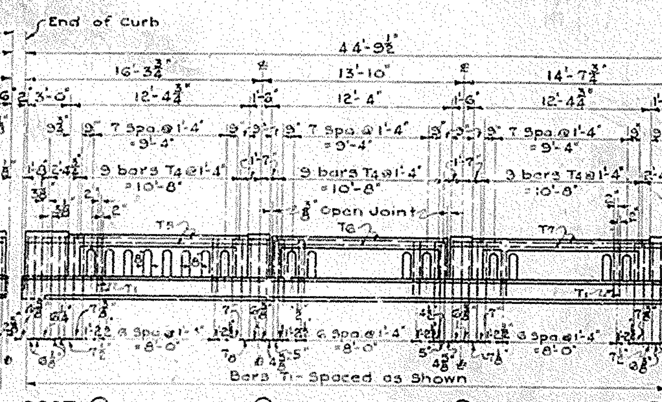
DRAWING H-14

BRIDGE

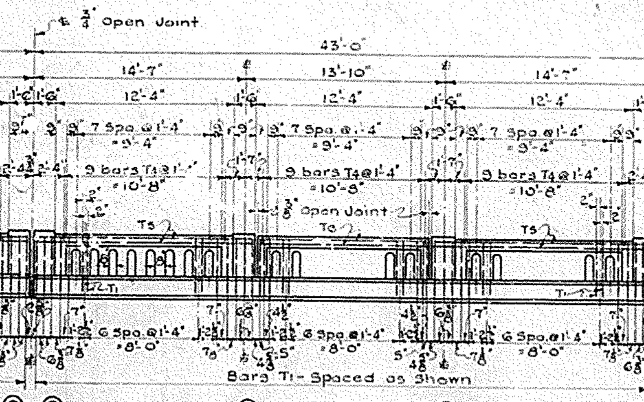
Fed. Road Dist.	State	Fed. Aid Proj. No.	Fiscal Year	Sheet No.	Total Sheets
7	KY.				



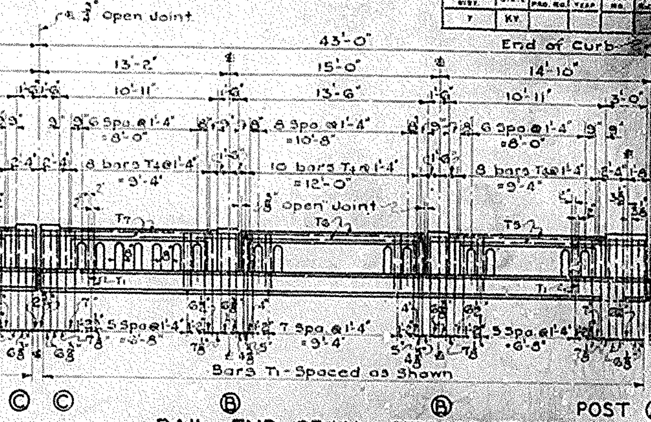
RAIL-END SPAN-LONG CURB-30° SKEW



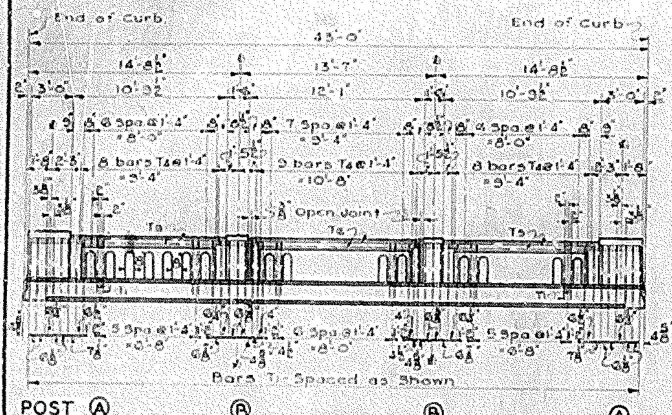
RAIL-END SPAN-LONG CURB-45° SKEW



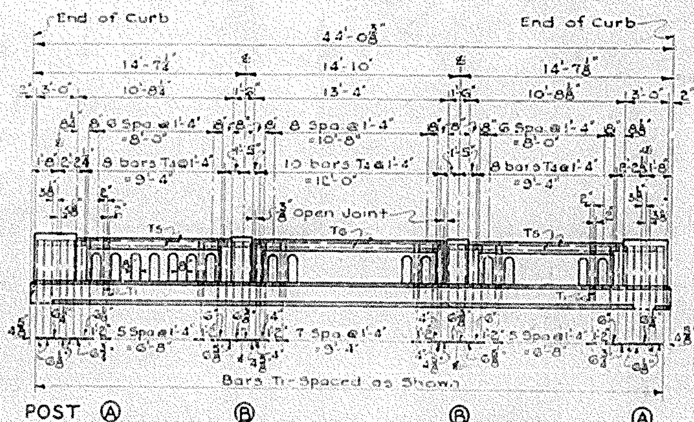
RAIL-INTERMEDIATE SPAN-STRAIGHT-30° OR 45° SKEW



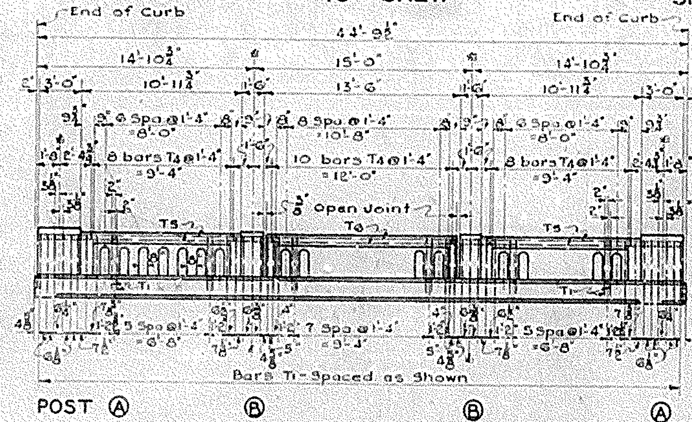
RAIL-END SPAN-STRAIGHT OR SHORT CURB, 30° OR 45° SKEW



RAIL-SINGLE SPAN-STRAIGHT

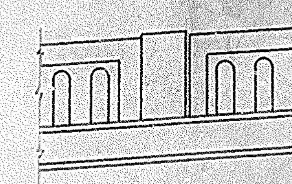


RAIL-SINGLE SPAN-30° SKEW



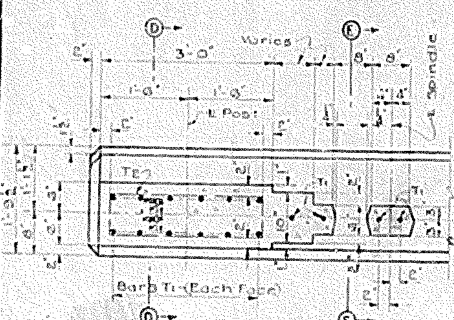
RAIL-SINGLE SPAN-45° SKEW

NOTE:
When bridge is on a plus or minus grade top of All Posts and Rail to be parallel to the grade line. All Posts and Spindles to be Vertical.

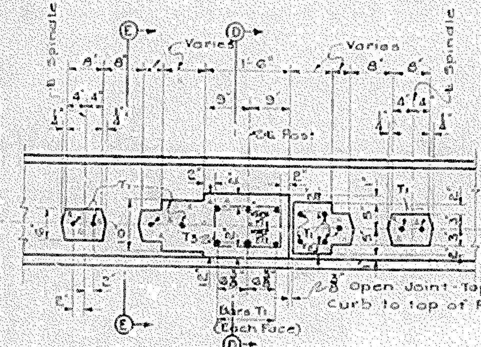


PART ELEVATION

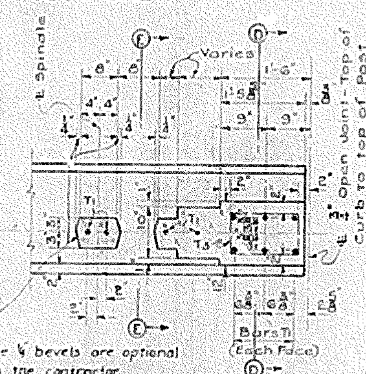
(Showing relation of Posts, Spindles and Rail to grade line when bridge is on a plus or minus grade.)



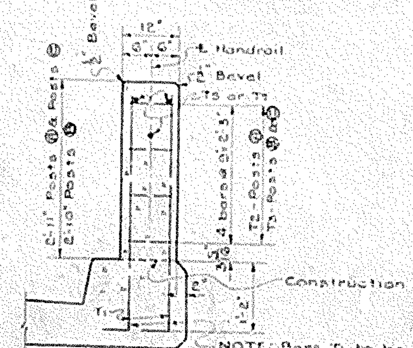
SECTIONAL PLAN POST Ⓐ



SECTIONAL PLAN POST Ⓑ

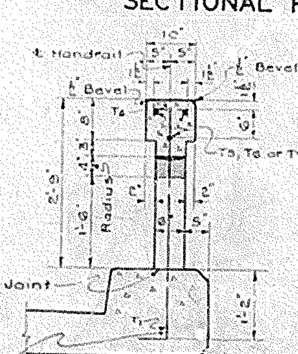


SECTIONAL PLAN POST Ⓒ



SECTION D-D

NOTE: Bars T1 to be placed before pouring curb.

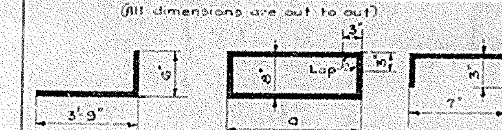


SECTION E-E

BILL AND TYPES OF REINFORCEMENT

Mark	Type	No.	Size	Length Ft.	Length In.	Location	a Ft.	a In.
T1	①	See Table	[illegible]	4	2	Curb into Posts & Spindles	-	-
T2	②		[illegible]	6	10	Posts Ⓐ	2	8
T3	"		"	3	10	Posts Ⓑ & Ⓒ	1	2
T4	③		[illegible]	0	11	Top of Rail	-	-
T5	Str.		"	See Table		Rail	-	-
T6	"		"	"		"	-	-
T7	"		"	"		"	-	-

(All dimensions are out to out)



TYPE ① TYPE ② TYPE ③

TABLE OF REINFORCEMENT AND ESTIMATED QUANTITIES

40 FT. SPAN			T1 Number	T2 Number	T3 Number	T4 Number	T5 Number	T5 Length Ft.	T5 Length In.	T6 Number	T6 Length Ft.	T6 Length In.	T7 Number	T7 Length Ft.	T7 Length In.	Concrete Class "D" Cu. Yds.	Reinforcement Lbs.
Straight	Single	Two Rails	184	16	16	50	12	14	11	6	11	8	-	-	-	5.2	970
	Intermediate	Two Rails	168	-	32	54	12	14	11	6	11	11	-	-	-	4.8	900
	End	Two Rails	176	8	24	52	6	15	0	6	13	1	6	13	5	5.0	930
30° Skew	Single	Two Rails	188	16	16	52	12	14	10	6	12	11	-	-	-	5.3	990
	Intermediate	Two Rails	168	-	32	54	12	14	11	6	11	11	-	-	-	4.8	900
	End	Rail-Long Curb	90	4	12	27	3	16	4	3	11	8	3	14	9	5.1	940
		Rail-Short Curb	88	4	12	26	3	15	0	3	13	1	3	13	5		
45° Skew	Single	Two Rails	188	16	16	52	12	15	2	8	13	1	-	-	-	5.4	990
	Intermediate	Two Rails	168	-	32	54	12	14	11	6	11	11	-	-	-	4.8	900
	End	Rail-Long Curb	90	4	12	27	3	16	7	3	11	11	3	15	0	5.1	940
		Rail-Short Curb	88	4	12	26	3	15	0	3	13	1	3	13	5		

GENERAL NOTE

SPECIFICATIONS: State Highway Department, Kentucky, (1932 Standard with subsequent adopted amendments).

CONCRETE: Class "D" Concrete to be used in Handrail and Posts.

STEEL REINFORCEMENT: To be deformed bars. Dimensions shown from the face of concrete are the clear distances. Dimensions shown for bar spacing are the distances center to center of bars. All reinforcement shall be securely held in correct position by means of precast mortar or concrete blocks and wired at all intersections. Precast mortar or concrete blocks supporting reinforcement shall be spaced not farther apart than 50 diameters of the supported bar.

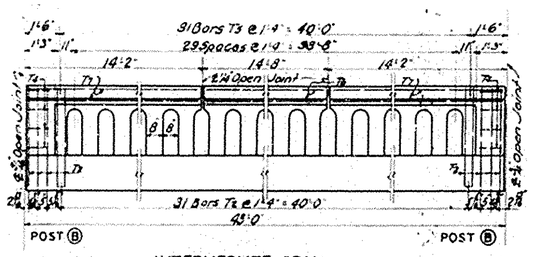
BEVELS: All Corners of Handrail to be beveled 1/4" unless otherwise noted hereon.

COMMONWEALTH OF KENTUCKY
STATE HIGHWAY DEPARTMENT

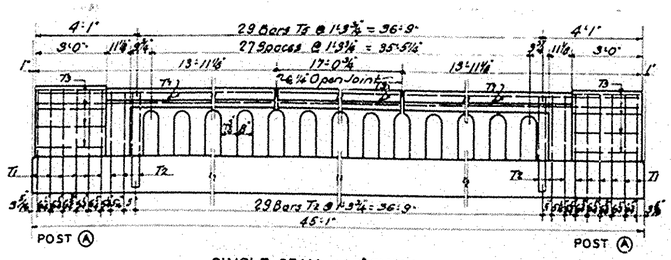
STANDARD HANDRAIL
DECK GIRDERS-40 FT. SPANS

H-14

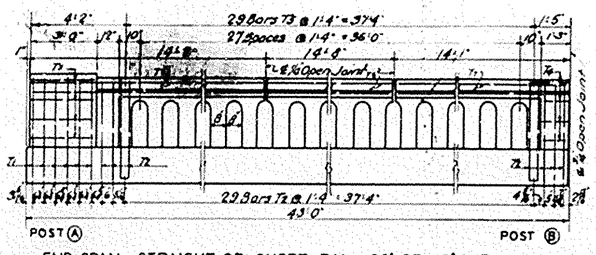
BRIDGE



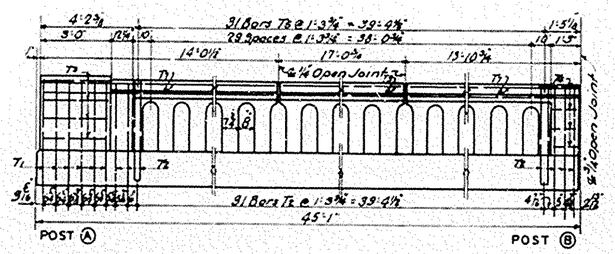
INTERMEDIATE SPAN



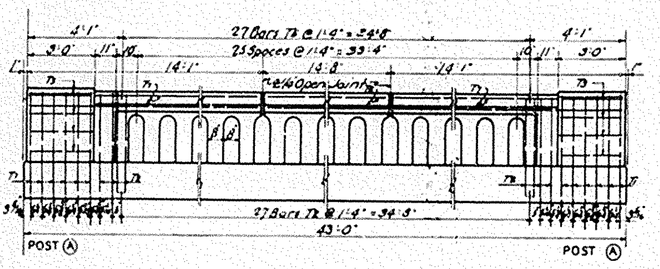
SINGLE SPAN 45° SKEW



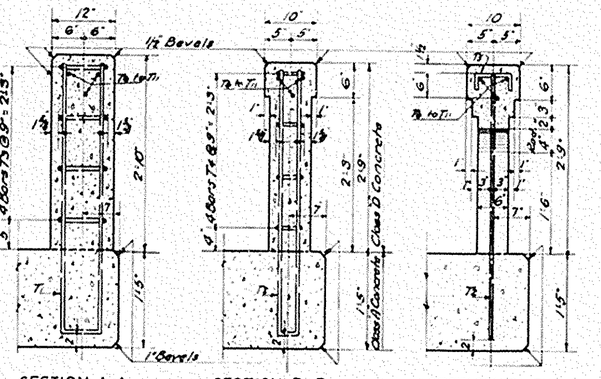
END SPAN - STRAIGHT, OR SHORT RAIL 30° OR 45° SKEW

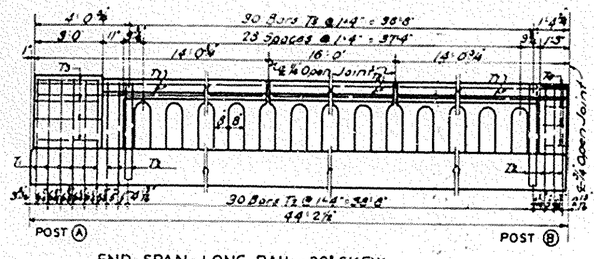


END SPAN - LONG RAIL 45° SKEW

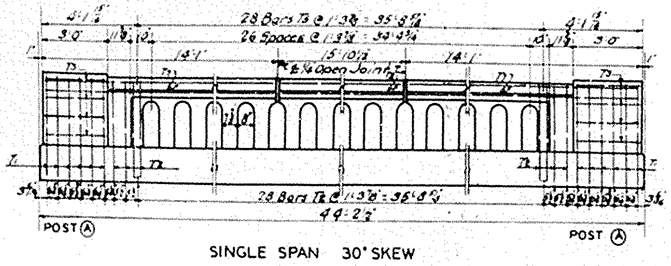


SINGLE SPAN - STRAIGHT

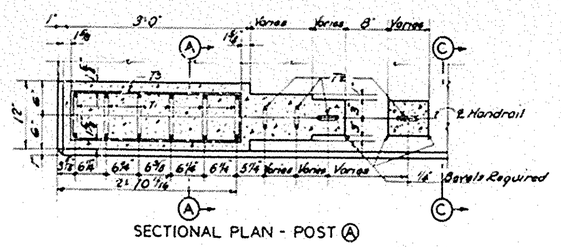


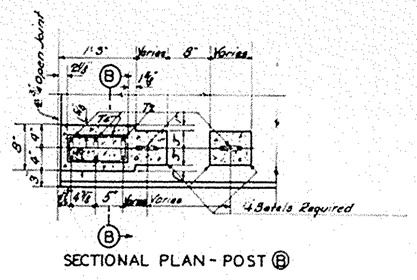


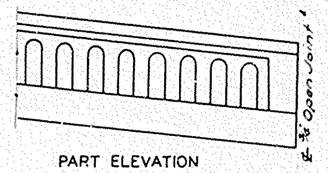
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN 30° SKEW







PART ELEVATION

When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

40 FOOT SPAN			T1 NO.	T2 NO.	T3 NO.	T4 NO.	T5 NO.	T6 NO.	T7 NO.	T8 NO.	T9 NO.	T10 NO.	T11 NO.	CONCRETE CLASS 'D' CU.YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	24	62	16	-	54	6	12	-	-	-	-	45	970
	INTERMEDIATE	TWO RAILS	-	74	-	16	62	6	12	-	-	-	-	38	840
	END	TWO RAILS	12	68	8	8	58	6	12	-	-	-	-	41	900
30°SKEW	SINGLE	TWO RAILS	24	64	16	-	56	-	12	6	-	-	-	46	930
	INTERMEDIATE	TWO RAILS	-	74	-	16	62	6	12	-	-	-	-	38	840
	END	LONG RAIL	6	35	4	4	30	-	6	3	-	-	-		
	END	SHORT RAIL	6	34	4	4	29	3	6	-	-	-	-	42	910
45°SKEW	SINGLE	TWO RAILS	24	66	16	-	58	-	12	-	6	-	-	47	1010
	INTERMEDIATE	TWO RAILS	-	74	-	16	62	6	12	-	-	-	-	38	840
	END	LONG RAIL	6	36	4	4	31	-	6	-	3	-	-		
	END	SHORT RAIL	6	34	4	4	29	3	6	-	-	-	-	42	920

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN	LOCATION	a FT	a IN	b FT	b IN
T1	(1)	See Table	4@	8	5	Post 'A'	3	11½	0	8
T2	"		"	7	11	Post B & Spindles	3	10½	0	4
T3	(2)		3@	7	3	Post A	2	8¾	0	5⅜
T4	"		-	3	2	Post B	0	11¼	0	4¾
T5	(1)		12@	0	11	Rail	0	3	0	7
T6	Str.		"	14	5	"	—	—	—	—
T7	"		"	13	8	"	—	—	—	—
T8	"		"	15	8	"	—	—	—	—
T9	"		"	16	10	"	—	—	—	—

GENERAL NOTE

Specifications: Kentucky Department of Highways 1965 Standard with Amendments

Concrete Class D concrete to be used in Handrail.

Reinforcement Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A 305 - current specifications.

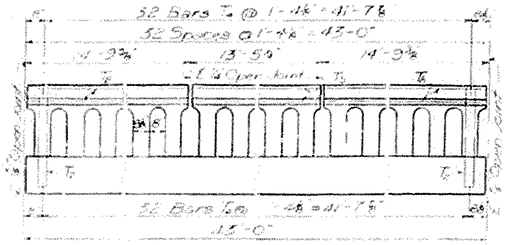
Beveled Edges: All exposed edges to be beveled ¾ unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
STANDARD HANDRAIL
DECK GIRDER 40FT. SPAN
22FT. 24FT. AND 26FT. ROADWAY

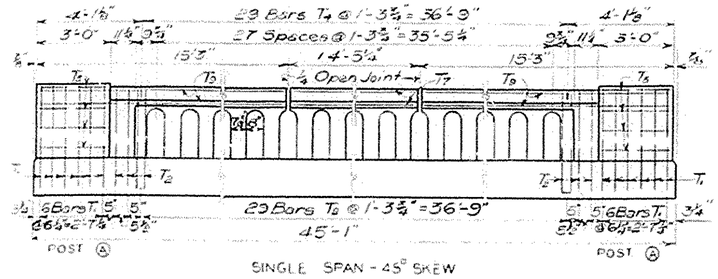
DRAWING NO. - H 54

BRIDGE

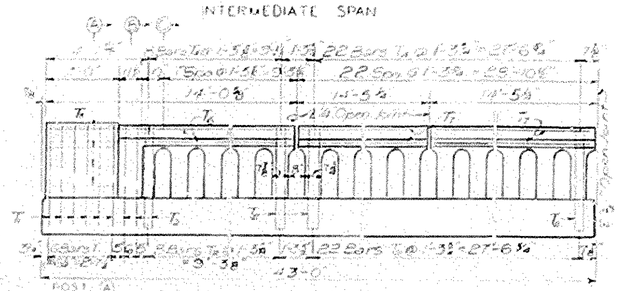
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



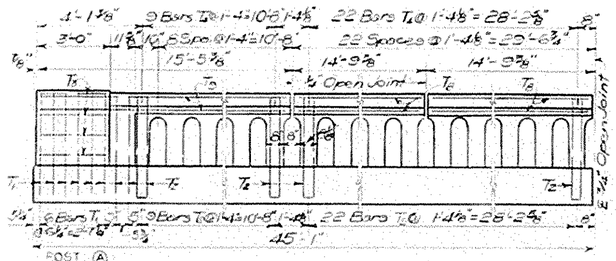
INTERMEDIATE SPAN



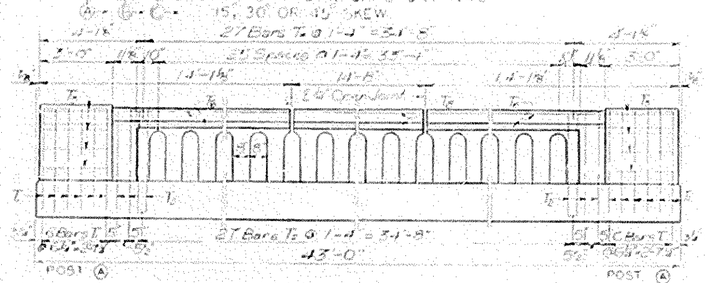
SINGLE SPAN - 45° SKEW



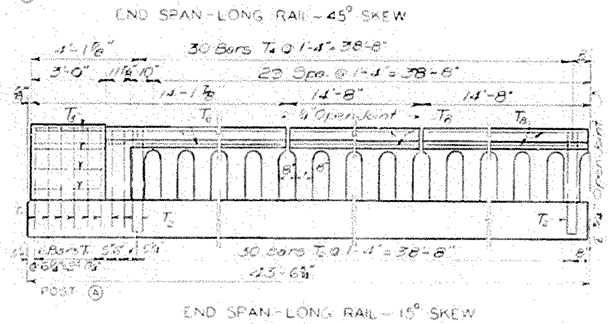
END SPAN - STRAIGHT OR SHORT RAIL - 15°, 30° OR 45° SKEW



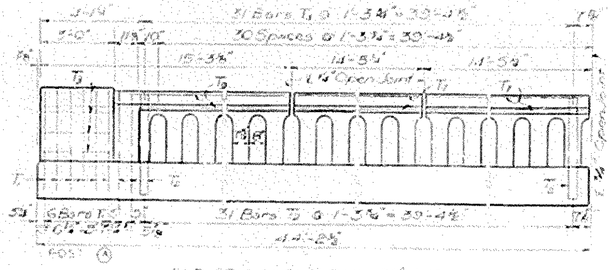
END SPAN - LONG RAIL - 45° SKEW



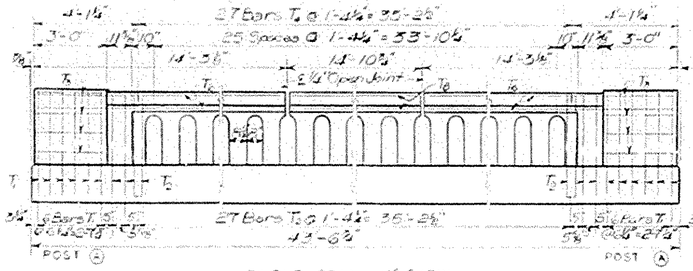
SINGLE SPAN - STRAIGHT



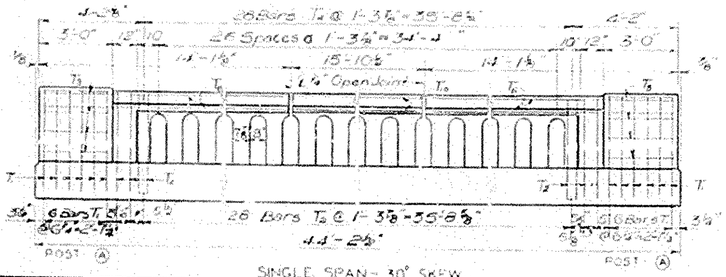
END SPAN - LONG RAIL - 15° SKEW



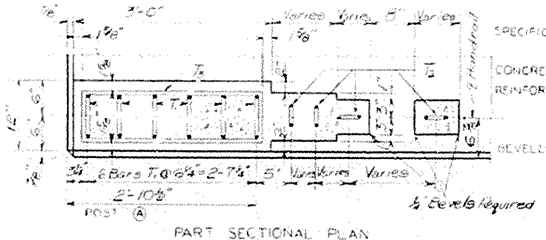
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN - 15° SKEW



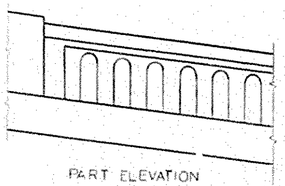
SINGLE SPAN - 30° SKEW



PART SECTIONAL PLAN

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

40 FOOT SPAN			NUMBER OF BARS T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	CONCRETE CLASS 'D' (CU YDS)	REINFORCEMENT (LBS)
STRAIGHT	SINGLE	TWO RAILS	24	62	16	54	—	12	—	6	—	—	4.5	968
	INTERMEDIATE	TWO RAILS	—	64	—	64	6	—	—	12	—	—	3.7	735
	END	TWO RAILS	12	64	8	60	—	6	12	—	—	—	4.1	861
15° SKEW	SINGLE	TWO RAILS	24	62	16	54	—	12	—	6	—	—	4.6	968
	INTERMEDIATE	TWO RAILS	—	64	—	64	6	—	—	12	—	—	3.7	735
	END	LONG RAIL	6	32	4	30	—	3	—	6	—	—	4.1	862
	END	SHORT RAIL	6	32	4	30	—	3	6	—	—	—		
30° SKEW	SINGLE	TWO RAILS	24	64	16	56	—	12	—	—	—	6	4.6	991
	INTERMEDIATE	TWO RAILS	—	64	—	64	6	—	—	12	—	—	3.7	735
	END	LONG RAIL	6	33	4	31	—	—	6	—	3	—	4.1	872
	END	SHORT RAIL	6	32	4	30	—	3	6	—	—	—		
45° SKEW	SINGLE	TWO RAILS	24	66	16	58	—	—	6	—	12	—	4.7	1012
	INTERMEDIATE	TWO RAILS	—	64	—	64	6	—	—	12	—	—	3.7	735
	END	LONG RAIL	6	33	4	31	—	—	—	6	3	—	4.2	873
	END	SHORT RAIL	6	32	4	30	—	3	6	—	—	—		

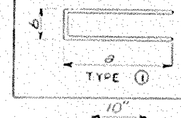


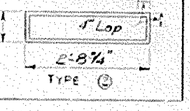
PART ELEVATION

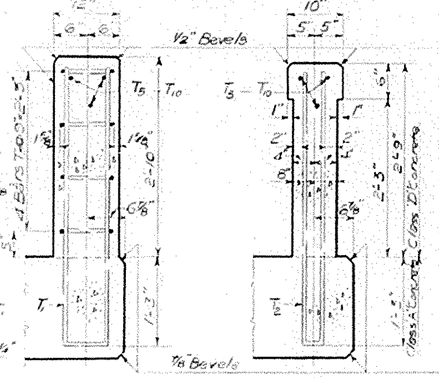
When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

BILL AND TYPES OF REINFORCEMENT

MARK	SHAPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	BEND FT.	BEND IN.	HOOK FT.	HOOK IN.
T1	①	See Table	#5	8	5	Post "A"	3	11½	0	8
T2	"		"	7	11	Spindles	3	10½	0	4
T3	⑥		#5	7	5	Post "A"	—	—	—	—
T4	②		#4	0	11	Rail	0	3	0	7
T5	SEE TABLE		"	13	5	"	—	—	—	—
T6	"		"	13	7	"	—	—	—	—
T7	"		"	13	9	"	—	—	—	—
T8	"		"	14	4	"	—	—	—	—
T9	"		"	14	11	"	—	—	—	—
T10	"		"	15	7	"	—	—	—	—

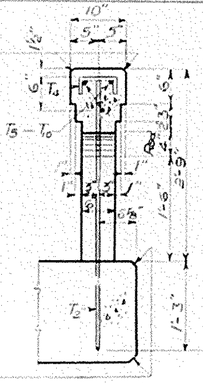






SECTION A-A

SECTION B-B



SECTION C-C

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, Current Specifications with Amendments

CONCRETE: Class "D" concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ½" unless otherwise noted.

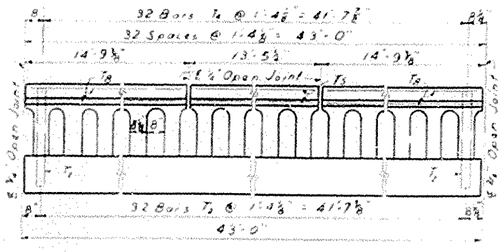
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD SPINDLE HANDRAIL
FOR 40 FT. SPAN R.C.D.G.
STR. 15°, 30° OR 45° SKEW
WITH 10½" CURB

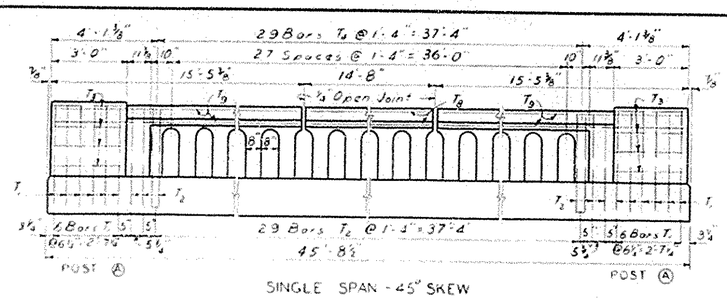
DRAWING NO. H-104 | INDEX

BRIDGE

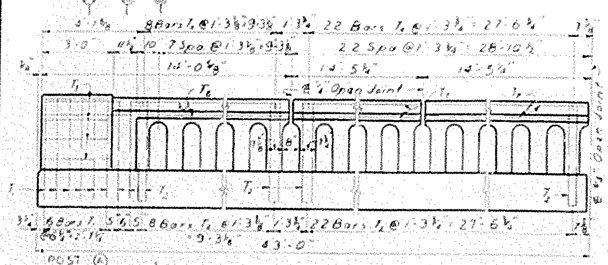
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEARS	SHEET NO.	TOTAL SHEETS
7	KY.				



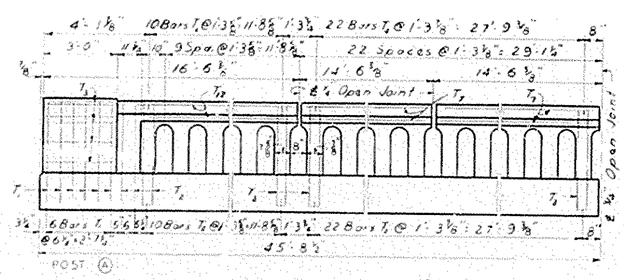
INTERMEDIATE SPAN



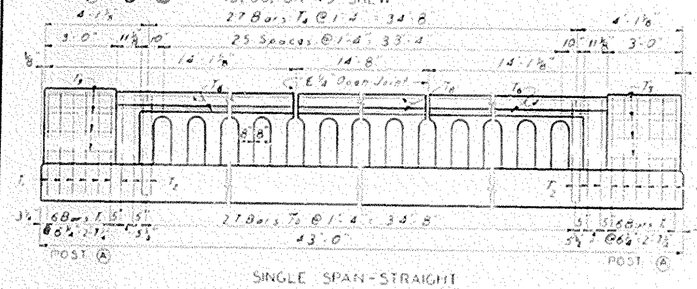
SINGLE SPAN - 45° SKEW



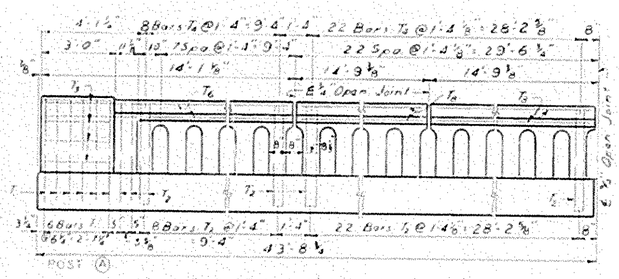
END SPAN - STRAIGHT, OR SHORT RAIL - 15°, 30° OR 45° SKEW



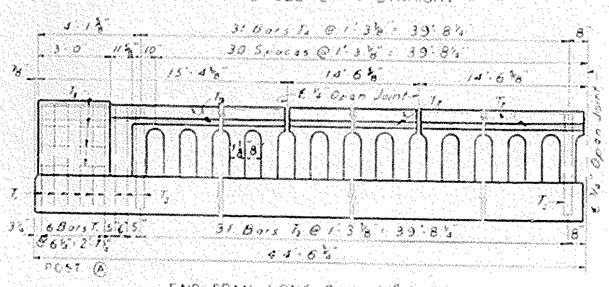
END SPAN - LONG RAIL - 45° SKEW



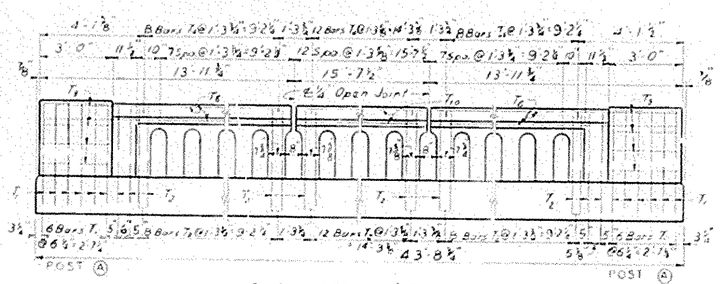
SINGLE SPAN - STRAIGHT



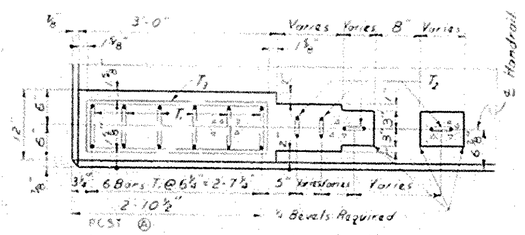
END SPAN - LONG RAIL - 15° SKEW



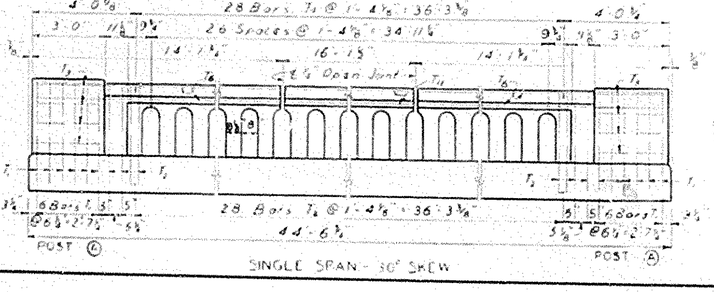
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN - 15° SKEW



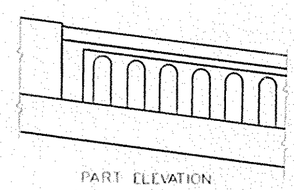
PART SECTIONAL PLAN



SINGLE SPAN - 30° SKEW

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

40 FOOT SPAN			NUMBER OF BARS											CONCRETE CLASS "D" (CU. YDS.)	REINFORCEMENT (LBS.)
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	
STRAIGHT	SINGLE	TWO RAILS	24	62	16	54	—	12	—	6	—	—	—	—	4.5	967
	INTERMEDIATE	TWO RAILS	—	64	—	64	6	—	—	12	—	—	—	—	3.7	735
	END	TWO RAILS	12	64	8	60	—	6	12	—	—	—	—	—	4.1	861
15° SKEW	SINGLE	TWO RAILS	24	64	16	56	—	12	—	—	—	6	—	—	4.5	989
	INTERMEDIATE	TWO RAILS	—	64	—	64	6	—	—	12	—	—	—	—	3.7	735
	END	LONG RAIL	6	32	4	30	—	3	—	6	—	—	—	—	4.1	862
	END	SHORT RAIL	6	32	4	30	—	3	6	—	—	—	—	—		
30° SKEW	SINGLE	TWO RAILS	24	64	16	56	—	12	—	—	—	—	6	—	4.6	991
	INTERMEDIATE	TWO RAILS	—	64	—	64	6	—	—	12	—	—	—	—	3.7	735
	END	LONG RAIL	6	33	4	31	—	—	6	—	3	—	—	—	4.1	872
	END	SHORT RAIL	6	32	4	30	—	3	6	—	—	—	—	—		
45° SKEW	SINGLE	TWO RAILS	24	66	16	58	—	—	—	6	12	—	—	—	4.7	1014
	INTERMEDIATE	TWO RAILS	—	64	—	64	6	—	—	12	—	—	—	—	3.7	735
	END	LONG RAIL	6	34	4	32	—	—	6	—	—	—	—	3	4.2	883
	END	SHORT RAIL	6	32	4	30	—	3	6	—	—	—	—	—		

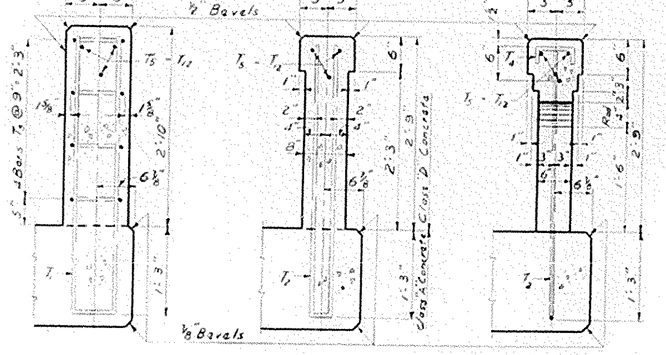


PART ELEVATION

When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①	See Table	#5	8	5	Post "A"	3	11⅝	0	8
T_2	"		"	7	11	Spindles	3	10⅜	0	4
T_3	"		#3	7	5	Post "A"	—	—	—	—
T_4	②		#3	0	11	Rail	0	9	0	7
T_5	Str.		"	13	2	"	—	—	—	—
T_6	"		"	13	8	"	—	—	—	—
T_7	"		"	14	1	"	—	—	—	—
T_8	"		"	14	4	"	—	—	—	—
T_9	"		"	15	1	"	—	—	—	—
T_{10}	"		"	15	4	"	—	—	—	—
T_{11}	"		"	15	10	"	—	—	—	—
T_{12}	"		"	16	3	"	—	—	—	—



SECTION A-A SECTION B-B SECTION C-C

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, Current Specifications with Amendments.

CONCRETE: Class "D" Concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ½ unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD SPINDLE HANDRAIL FOR 40 FT. SPAN R.C.D.G. STR, 15°, 30°, OR 45° SKEW WITH 1'-6" CURB

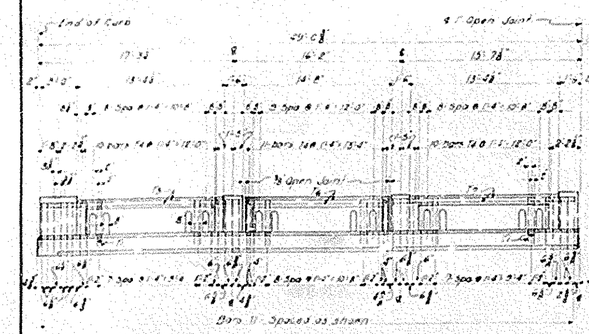
DRAWING NO.	INDEX
H-124	

DESIGNED BY J. Feldhaus CHECKED BY
DETAILED BY J. Feldhaus CHECKED BY
TRACED BY CHECKED BY

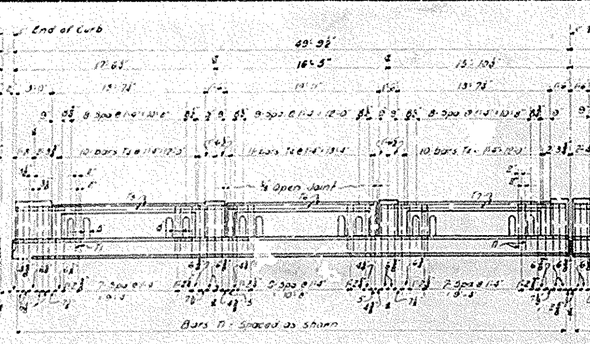
DATE REVISED
DATE REVISED
DATE REVISED

BRIDGE

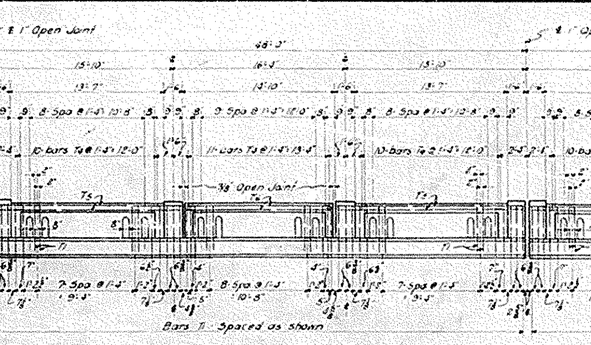
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



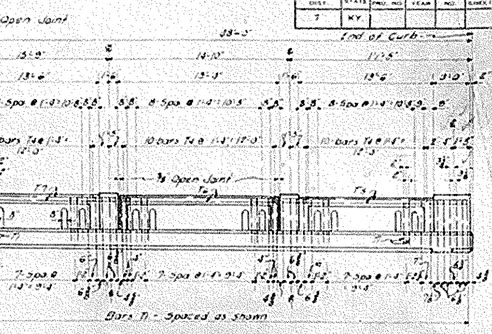
RAIL-END SPAN-LONG CURB-30° SKEW



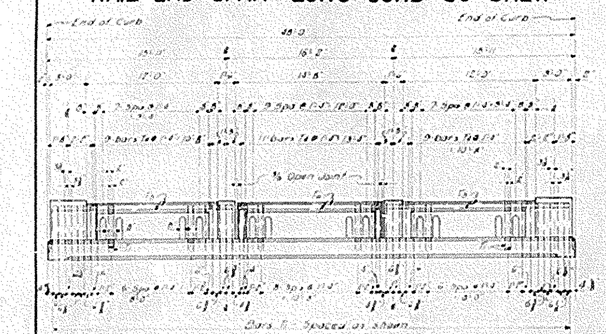
RAIL-END SPAN-LONG CURB-45° SKEW



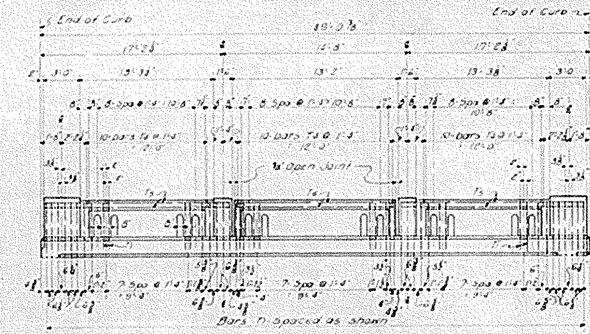
RAIL-INTERMEDIATE SPAN-STRAIGHT-30° OR 45° SKEW



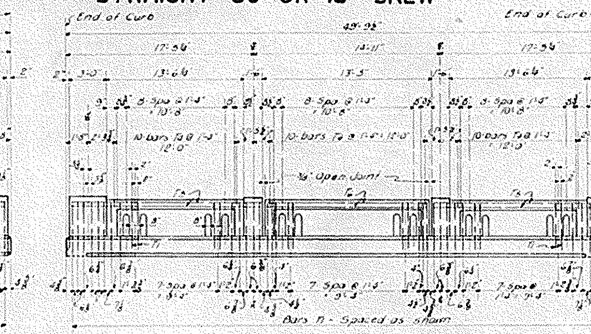
RAIL-END SPAN-STRAIGHT OR SHORT CURB 30° OR 45° SKEW



RAIL-SINGLE SPAN-STRAIGHT

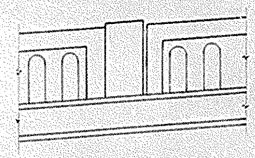


RAIL-SINGLE SPAN-30° SKEW

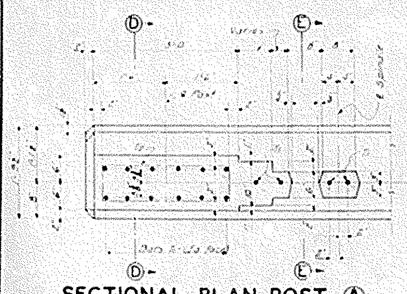


RAIL-SINGLE SPAN-45° SKEW

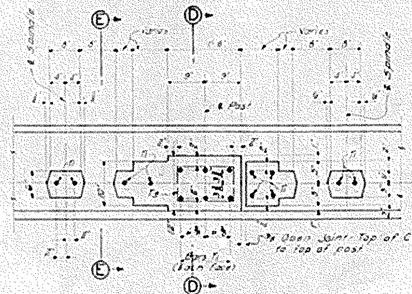
NOTE:
When bridge is on a plus or minus grade top of all Posts and Rail to be vertical to the Grade Line. All Posts and Spindles to be Vertical.



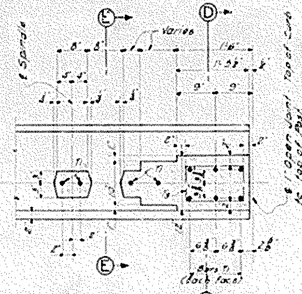
PART ELEVATION
(Showing relation of Posts, Spindles and Rail to the Grade Line when Bridge is on a Plus or Minus grade)



SECTIONAL PLAN POST Ⓐ



SECTIONAL PLAN POST Ⓑ

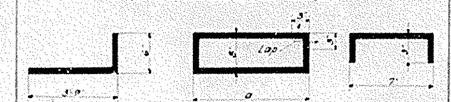


SECTIONAL PLAN POST Ⓒ

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN	LOCATION	Ø FT	Ø IN
T1	①	SEE TABLE	12"	4	2	Curb into Post & Spindles		
T2	②		⅝"	6	10	Post Ⓐ	2	8
T3	-		-	3	10	Posts Ⓑ & Ⓒ	1	2
T4	④		14"	0	11	Top of Rail		
T5	Str.		-	SEE TABLE		Rail		
T6	-		-	-	-	-	-	-
T7	-		-	-	-	-	-	-

(All dimensions are out to out)



TYPE ① TYPE ② TYPE ③

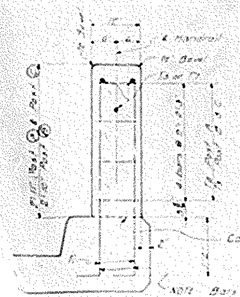
GENERAL NOTE

SPECIFICATIONS — State Highway Department, Kentucky (1952 Standard with subsequent adopted amendments)

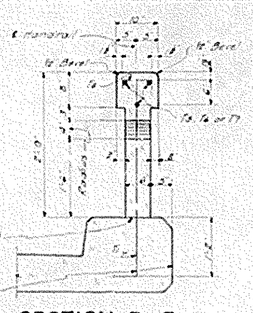
CONCRETE — Class 'D' Concrete to be used in Handrail and Posts.

STEEL REINFORCEMENT — Dimensions shown from the face of concrete to steel are clear distances. Precast mortar or concrete blocks supporting reinforcement shall be spaced not further apart than 50 diameters of the supported bar.

BEVELS — All corners of Handrail to be beveled ¾" unless otherwise noted hereon.



SECTION D-D



SECTION E-E

TABLE OF REINFORCEMENT AND ESTIMATED QUANTITIES

45 FT. SPAN			T1 NUMBER	T2 NUMBER	T3 NUMBER	T4 NUMBER	T5 NUMBER	T5 LENGTH FT	T5 LENGTH IN	T6 NUMBER	T6 LENGTH FT	T6 LENGTH IN	T7 NUMBER	T7 LENGTH FT	T7 LENGTH IN	CONCRETE CLASS 'D' Cu. Yds.	REINFORCEMENT Lbs.
STRAIGHT	SINGLE	Two Rails	200	16	16	58	12	16	8	6	14	3	—	—	—	5.6	1060
	INTERMEDIATE	Two Rails	184	—	32	62	12	16	2	6	14	5	—	—	—	5.3	980
	END	Two Rails	192	8	24	60	6	17	8	6	12	11	6	16	1	5.4	1020
30° SKEW	SINGLE	Two Rails	208	16	16	60	12	17	5	6	12	9	—	—	—	5.7	1080
	INTERMEDIATE	Two Rails	184	—	32	62	12	16	8	6	14	5	—	—	—	5.3	980
	END	Rail-Long Curb	98	4	12	31	3	17	6	3	14	3	3	16	10	5.5	1030
		Rail-Short Curb	96	4	12	30	3	17	8	3	12	11	3	16	1		
45° SKEW	SINGLE	Two Rails	204	16	16	60	12	17	8	6	13	0	—	—	—	5.8	1080
	INTERMEDIATE	Two Rails	184	—	32	62	12	16	2	6	14	5	—	—	—	5.3	980
	END	Rail-Long Curb	98	4	12	31	3	17	8	3	14	6	3	16	1	5.5	1030
		Rail-Short Curb	96	4	12	30	3	17	8	3	12	11	3	16	1		

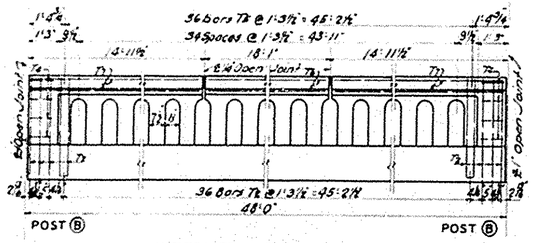
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

STANDARD HANDRAIL
DECK GIRDERS — 45 FT. SPANS

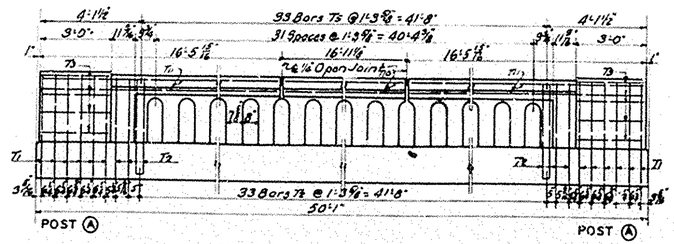
DRAWING	ENG.
H-15	

DESIGNED BY C. Morris
DRAWN BY
TRACED BY
CHECKED BY

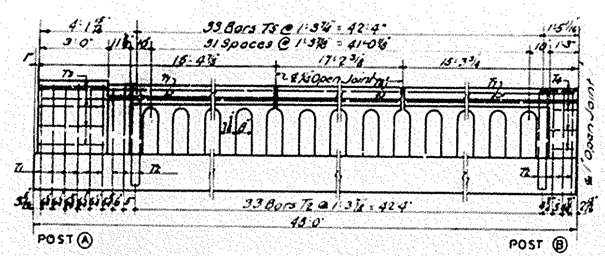
BRIDGE



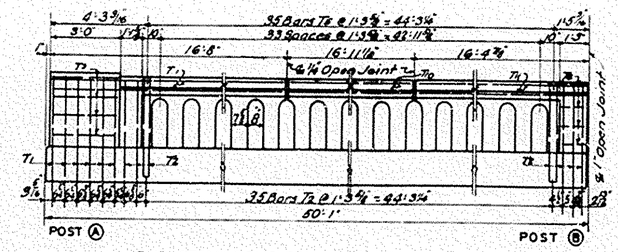
INTERMEDIATE SPAN



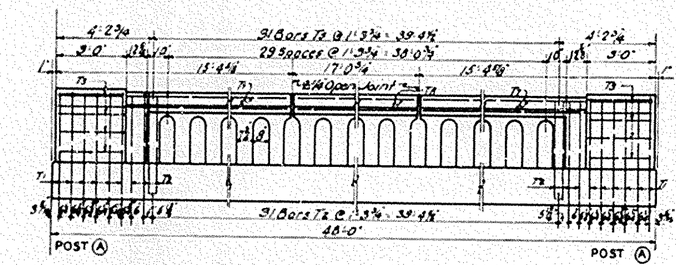
SINGLE SPAN 45° SKEW



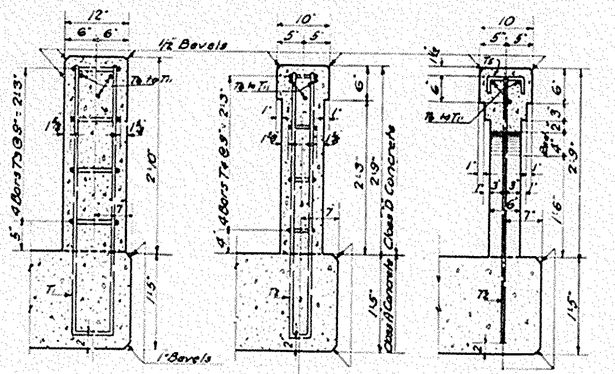
END SPAN - STRAIGHT, OR SHORT RAIL 30° OR 45° SKEW

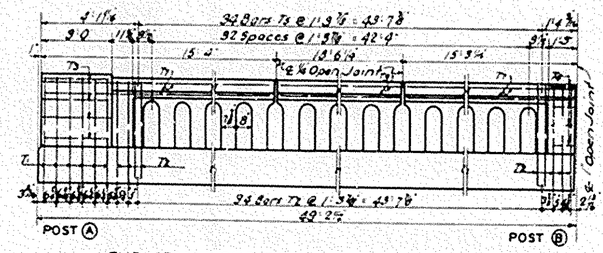


END SPAN - LONG RAIL 45° SKEW

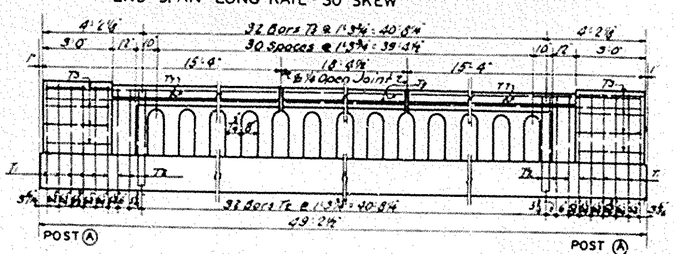


SINGLE SPAN - STRAIGHT

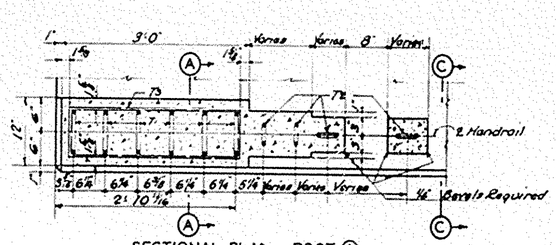


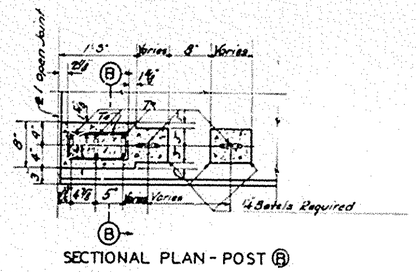


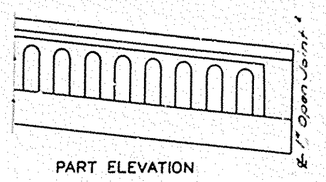
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN 30° SKEW







PART ELEVATION

When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES														
45 FOOT SPAN			T1 NO.	T2 NO.	T3 NO.	T4 NO.	T5 NO.	T6 NO.	T7 NO.	T8 NO.	T9 NO.	T10 NO.	T11 NO.	CONCRETE CLASS 'D' CU YDS	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	24	70	16	-	62	-	12	6	-	-	-	4.9	1060
	INTERMEDIATE	TWO RAILS	-	84	-	16	72	6	12	-	-	-	-	4.2	950
	END	TWO RAILS	12	76	8	8	66	-	12	6	-	-	-	4.6	930
30° SKEW	SINGLE	TWO RAILS	24	72	16	-	64	-	12	-	6	-	-	5.0	1080
	INTERMEDIATE	TWO RAILS	-	84	-	16	72	6	12	-	-	-	-	4.2	950
	END	LONG RAIL	6	39	4	4	34	-	6	-	3	-	-		
	END	SHORT RAIL	6	38	4	4	33	-	6	3	-	-	-	4.6	1000
45° SKEW	SINGLE	TWO RAILS	24	74	16	-	66	-	-	-	-	6	12	5.1	1100
	INTERMEDIATE	TWO RAILS	-	84	-	16	72	6	12	-	-	-	-	4.2	950
	END	LONG RAIL	6	40	4	4	35	-	-	-	-	3	6		
	END	SHORT RAIL	6	38	4	4	33	-	6	3	-	-	-	4.6	1010

BILL AND TYPES OF REINFORCEMENT										
MARK	TYPE	NO	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T1	(1)	See Table	4@9	8	5	Post 'A'	3	11⅞	0	8
T2	"		-	7	11	Post 'B' & Spindles	3	10⅞	0	4
T3	(2)		3@5	7	3	Post 'A'	2	5¾	0	5⅞
T4	"		-	3	2	Post 'B'	0	11⅞	0	4¾
T5	(1)		18@	0	11	Rail	0	3	0	7
T6	Stir.		-	17	10	"	—	—	—	—
T7	"		-	16	9	"	—	—	—	—
T8	"		-	16	10	"	—	—	—	—
T9	"		-	18	2	"	—	—	—	—
T10	-		-	16	8	"	—	—	—	—
T11	-		-	16	2	"	—	—	—	—

GENERAL NOTE

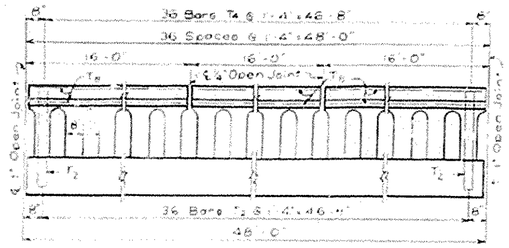
Specifications: Kentucky Department of Highways 1965 Standard with Amendments.
Concrete: Class 'D' concrete to be used in Handrail.
Reinforcement: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation A 305 - current specifications.
Beveled Edges: All exposed edges to be beveled ¾" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
STANDARD HANDRAIL
DECK GIRDER 45FT SPAN
22FT-24FT. AND 26FT. ROADWAY

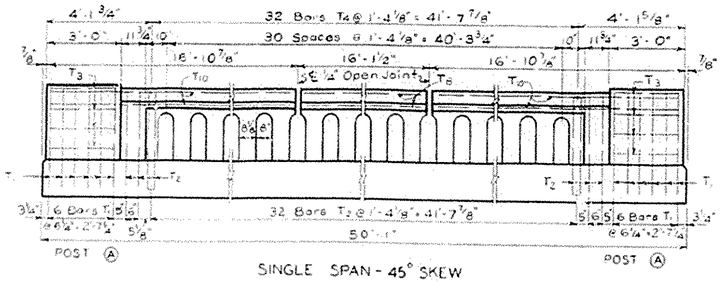
STANDARD H55

BRIDGE

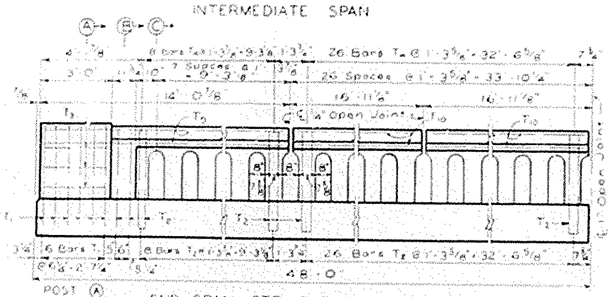
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY				



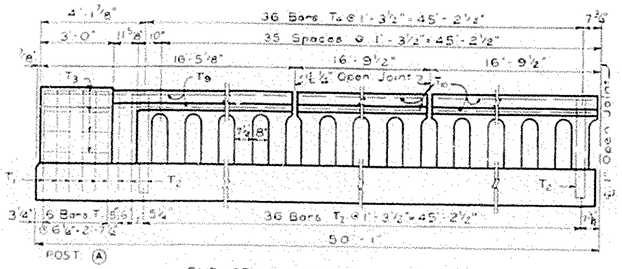
INTERMEDIATE SPAN



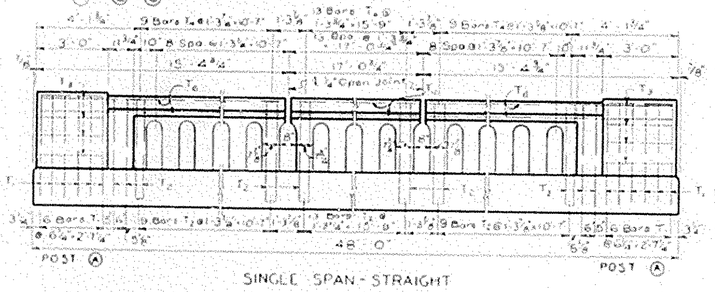
SINGLE SPAN - 45° SKEW



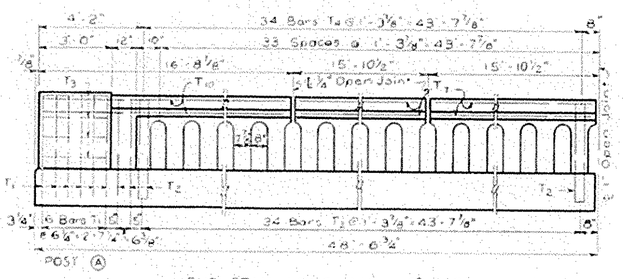
END SPAN - STRAIGHT, OR SHORT RAIL - 15°, 30° OR 45° SKEW



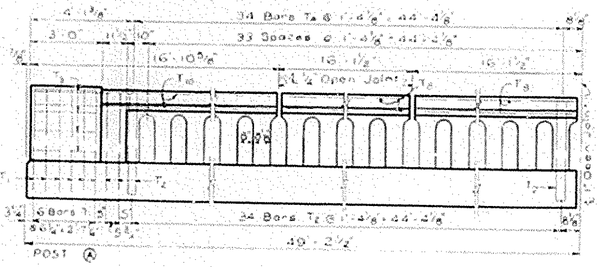
END SPAN - LONG RAIL - 45° SKEW



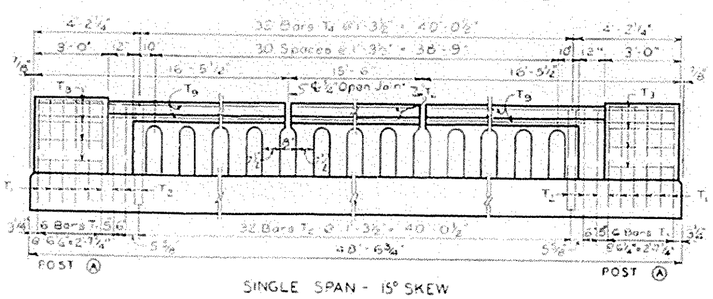
SINGLE SPAN - STRAIGHT



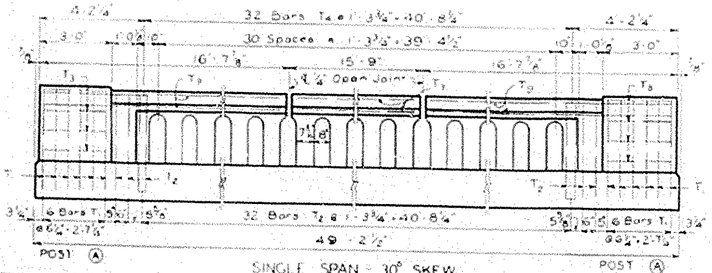
END SPAN - LONG RAIL - 15° SKEW



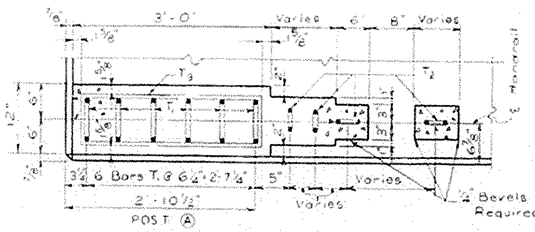
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN - 15° SKEW



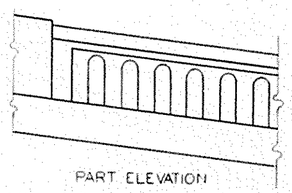
SINGLE SPAN - 30° SKEW



PART SECTIONAL PLAN

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

45 FOOT SPAN			NUMBER OF BARS										CONCRETE CLASS "D" (CU. YDS.)	REINFORCEMENT (LBS.)
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}		
STRAIGHT	SINGLE	TWO RAILS	24	70	16	62	—	12	—	—	—	6	4.9	1058
	INTERMEDIATE	TWO RAILS	—	72	—	72	—	—	—	18	—	—	4.1	827
	END	TWO RAILS	12	72	8	68	6	—	—	—	—	12	4.5	951
15° SKEW	SINGLE	TWO RAILS	24	72	16	64	—	6	—	—	12	—	4.9	1079
	INTERMEDIATE	TWO RAILS	—	72	—	72	—	—	—	18	—	—	4.1	827
	END	LONG RAIL	6	36	4	34	—	—	6	—	—	3	4.5	952
	END	SHORT RAIL	6	36	4	34	3	—	—	—	—	6		
30° SKEW	SINGLE	TWO RAILS	24	72	16	64	—	—	6	—	12	—	5.0	1080
	INTERMEDIATE	TWO RAILS	—	72	—	72	—	—	—	18	—	—	4.1	827
	END	LONG RAIL	6	36	4	34	—	—	—	6	—	3	4.5	953
	END	SHORT RAIL	6	36	4	34	3	—	—	—	—	6		
45° SKEW	SINGLE	TWO RAILS	24	72	16	64	—	—	—	6	—	12	5.1	1084
	INTERMEDIATE	TWO RAILS	—	72	—	72	—	—	—	18	—	—	4.1	827
	END	LONG RAIL	6	38	4	36	—	—	—	—	3	6	4.5	974
	END	SHORT RAIL	6	36	4	34	3	—	—	—	—	6		

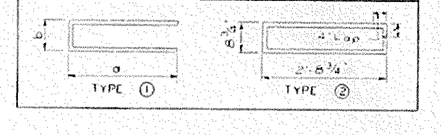


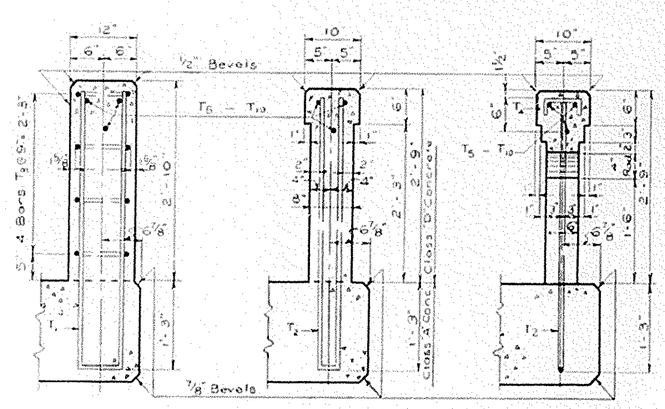
PART ELEVATION

When bridge is on a plus or minus grade, top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN	LOCATION	a FT	a IN	b FT	b IN
T_1	①	See Table	#5	8	5	Post "A"	3	11 1/2	0	8
T_2	—		—	7	11	Spindles	3	10 1/2	0	4
T_3	②		#3	7	5	Post "A"	—	—	—	—
T_4	①		#4	0	11	Rail	0	3	0	7
T_5	S+r		—	13	9	"	—	—	—	—
T_6	—		—	15	1	"	—	—	—	—
T_7	—		—	15	5	"	—	—	—	—
T_8	—		—	15	8	"	—	—	—	—
T_9	—		—	16	2	"	—	—	—	—
T_{10}	—		—	16	6	"	—	—	—	—





SECTION A-A SECTION B-B SECTION C-C

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, Current Specifications with Amendments.

CONCRETE: Class "D" Concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances, except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

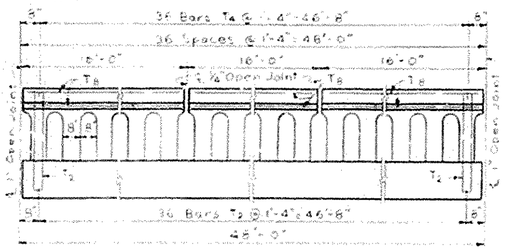
BEVELED EDGES: All exposed edges to be beveled 1/4" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

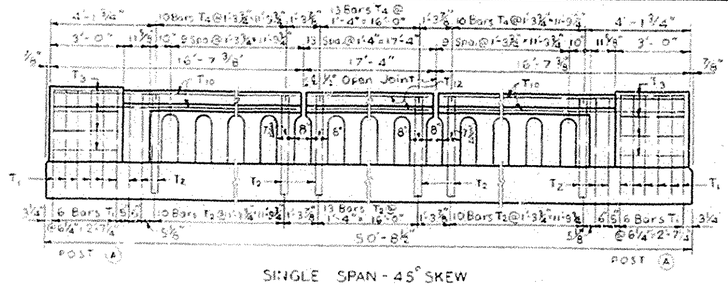
STANDARD SPINDLE HANDRAIL FOR 45 FT. SPAN R.C.D.G. STR., 15°, 30°, OR 45° SKEW WITH 10 1/2" CURB

DRAWING NO.	INDEX
H-05	

BRIDGE

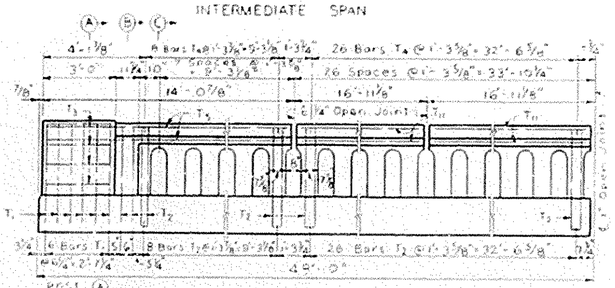


INTERMEDIATE SPAN

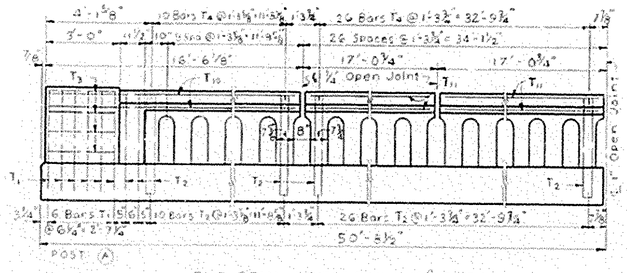


SINGLE SPAN - 45° SKEW

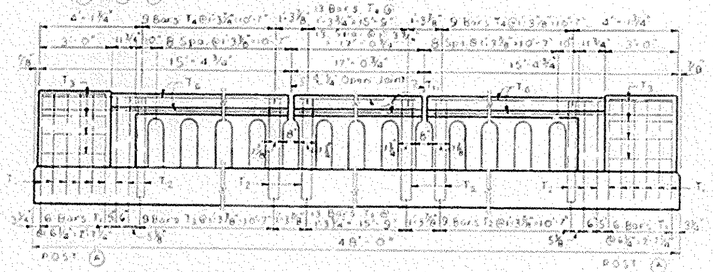
TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES															
45 FOOT SPAN			NUMBER OF BARS											CONCRETE CLASS "D" (CU. YDS.)	REINFORCEMENT (LBS.)
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	
STRAIGHT	SINGLE	TWO RAILS	24	70	16	62	—	12	—	—	—	—	6	—	4.9	1059
	INTERMEDIATE	TWO RAILS	—	72	—	72	—	—	—	18	—	—	—	—	4.1	827
	END	TWO RAILS	12	72	8	68	6	—	—	—	—	—	12	—	4.5	952
15° SKEW	SINGLE	TWO RAILS	24	72	16	64	—	—	6	—	—	12	—	—	5.0	1080
	INTERMEDIATE	TWO RAILS	—	72	—	72	—	—	—	18	—	—	—	—	4.1	827
	END	LONG RAIL	6	36	4	34	—	—	—	—	6	—	3	—	4.5	953
	END	SHORT RAIL	6	36	4	34	3	—	—	—	—	—	—	6		
30° SKEW	SINGLE	TWO RAILS	24	72	16	64	—	—	—	6	—	12	—	—	5.1	1081
	INTERMEDIATE	TWO RAILS	—	72	—	72	—	—	—	18	—	—	—	—	4.1	827
	END	LONG RAIL	6	36	4	34	—	—	—	—	6	—	3	—	4.6	955
	END	SHORT RAIL	6	36	4	34	3	—	—	—	—	—	—	6		
45° SKEW	SINGLE	TWO RAILS	24	74	16	66	—	—	—	—	—	12	—	6	5.1	1104
	INTERMEDIATE	TWO RAILS	—	72	—	72	—	—	—	18	—	—	—	—	4.1	827
	END	LONG RAIL	6	38	4	36	—	—	—	—	3	6	—		4.6	974
	END	SHORT RAIL	6	36	4	34	3	—	—	—	—	—	6	—		



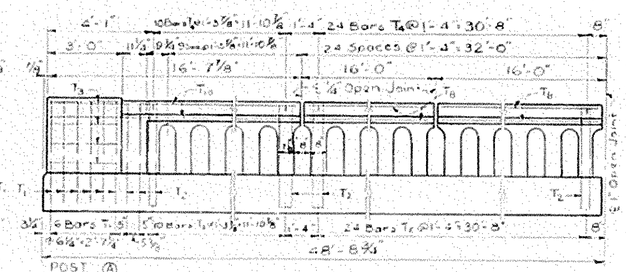
END SPAN - STRAIGHT, OR SHORT RAIL - 15°, 30°, OR 45° SKEW



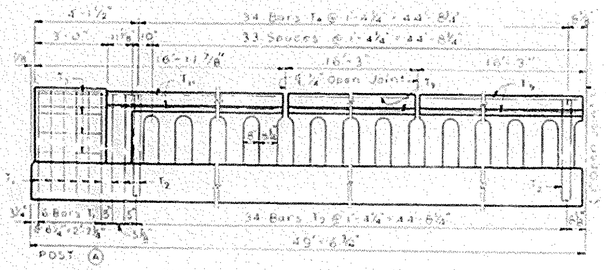
END SPAN - LONG RAIL - 45° SKEW



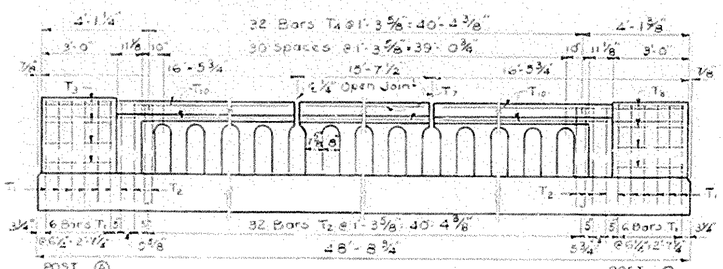
SINGLE SPAN - STRAIGHT



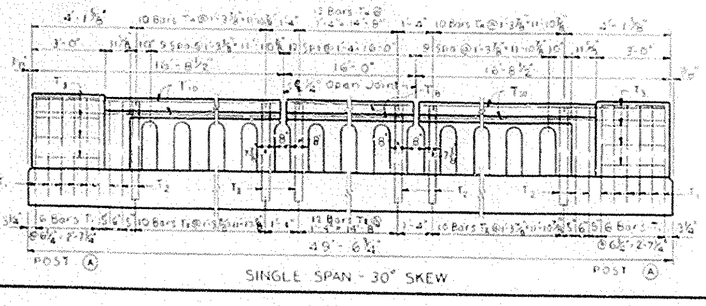
END SPAN - LONG RAIL - 15° SKEW



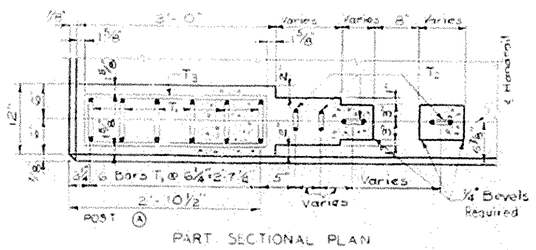
END SPAN - LONG RAIL - 30° SKEW



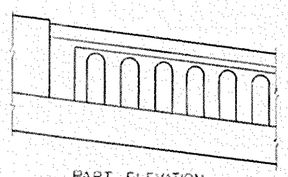
SINGLE SPAN - 15° SKEW



SINGLE SPAN - 30° SKEW



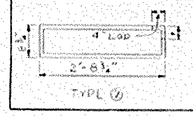
PART SECTIONAL PLAN



PART ELEVATION

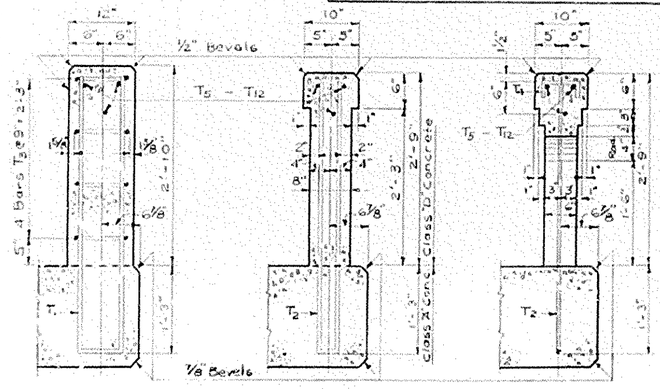
When bridge is on a plus or minus grade, top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

BILL AND TYPES OF REINFORCEMENT										
MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	Q FT.	Q IN.	D FT.	D IN.
T_1	①	See Table	#5	8	5	Post "A"	3	11½	0	8
T_2	"		"	7	11	Spindles	3	10½	0	4
T_3	②		#3	7	5	Post "A"				
T_4	①		#4	0	11	Rail	0	3	0	7
T_5	Str.		"	13	9	"				
T_6	"		"	15	1	"				
T_7	"		"	15	4	"				
T_8	"		"	15	8	"				
T_9	"		"	15	11	"				
T_{10}	"		"	16	2	"				
T_{11}	"		"	16	7	"				
T_{12}	"		"	17	0	"				



TYPE ②

TYPE ①



SECTION A-A SECTION B-B SECTION C-C

GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, Current Specifications with Amendments.

CONCRETE: Class "D" Concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ¼ unless otherwise noted.

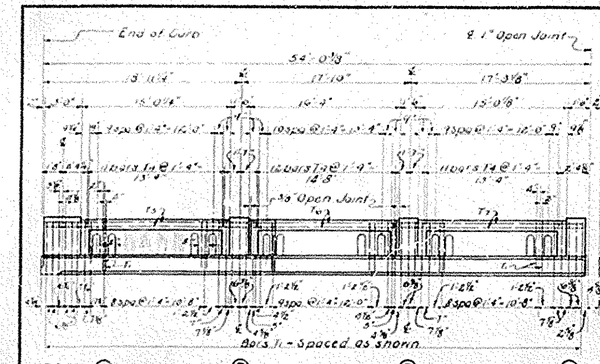
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD SPINDLE HANDRAIL FOR 45 FT. SPAN R.C.D.G. STR., 15°, 30°, OR 45° SKEW WITH 1'-6" CURB

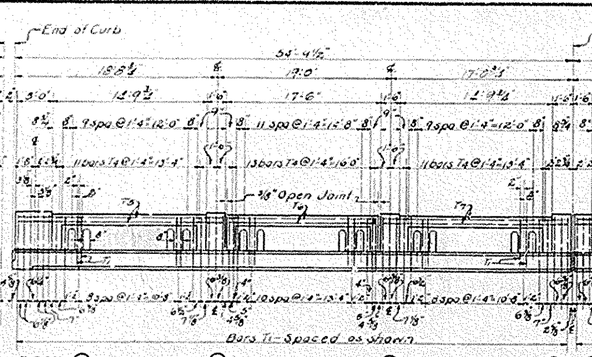
DRAWING No. H-125

DESIGNED BY A. J. Steilberg
DETAILED BY A. J. Steilberg
CHECKED BY

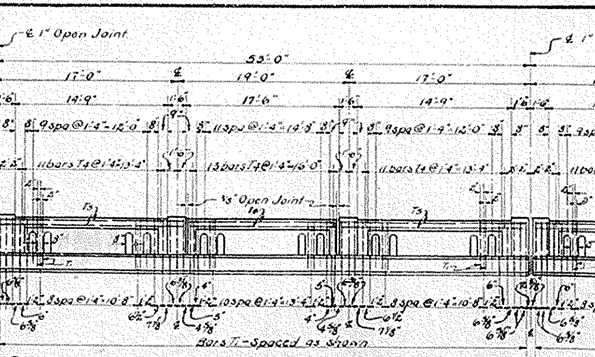
BRIDGE



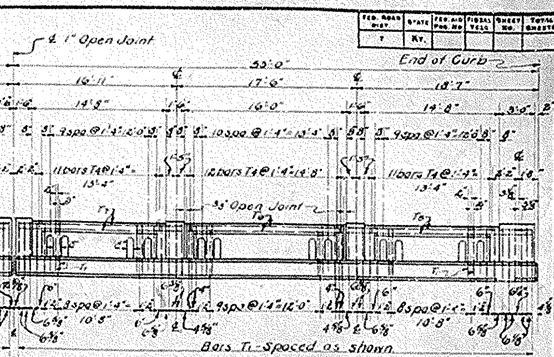
RAIL - END SPAN - LONG CURB - 30° SKEW



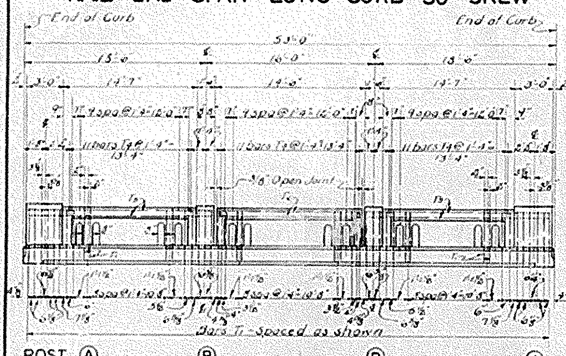
RAIL - END SPAN - LONG CURB - 45° SKEW



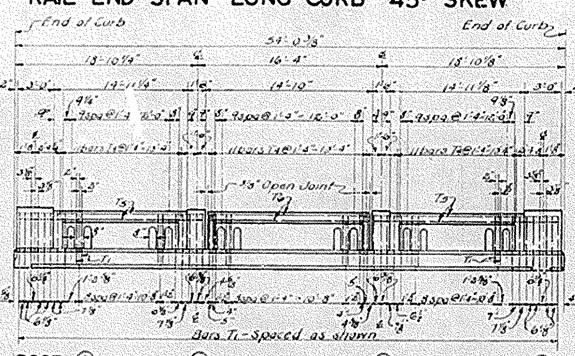
RAIL - INTERMEDIATE SPAN - STRAIGHT - 30° OR 45° SKEW



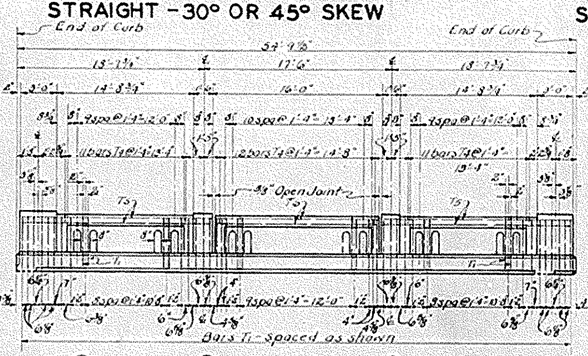
RAIL - END SPAN - STRAIGHT OR SHORT CURB, 30° OR 45° SKEW



RAIL - SINGLE SPAN - STRAIGHT

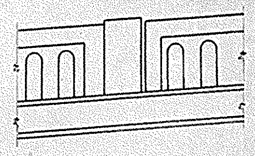


RAIL - SINGLE SPAN - 30° SKEW

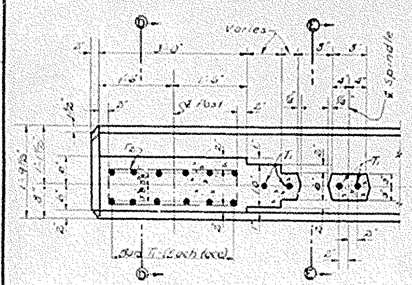


RAIL - SINGLE SPAN - 45° SKEW

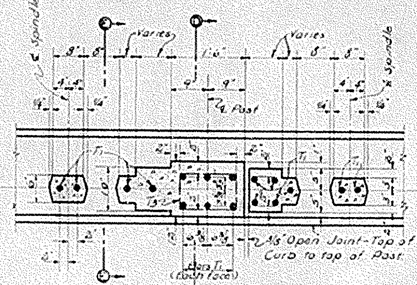
NOTE:
When bridge is on a plus or minus grade top of All Posts and Rail to be parallel to the grade line. All Posts and Spindles to be Vertical.



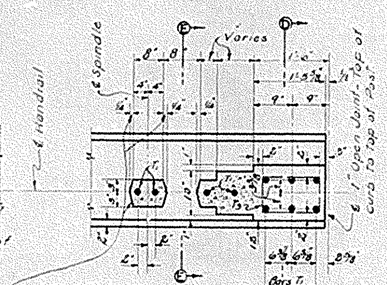
PART ELEVATION
(Showing relation of Posts, Spindles and Rail to grade line when Bridge is on a plus or minus grade.)



SECTIONAL PLAN POST Ⓐ



SECTIONAL PLAN POST Ⓑ

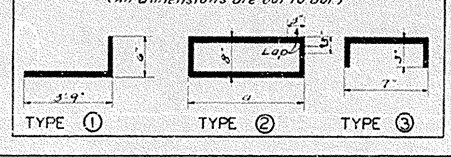


SECTIONAL PLAN POST Ⓒ

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT	LENGTH IN	LOCATION	a FT	a IN
T1	①	SEE TABLE	½" ⌀	4	2	Curb into Posts & Spindles	—	—
T2	②		⅜" ⌀	6	10	Posts Ⓐ	2	8
T3	"		"	3	10	Posts Ⓑ & Ⓒ	1	2
T4	③		½" ⌀	0	11	Top of Rail	—	—
T5	Str.		"	See Table		Rail	—	—
T6	"		"	"	"	"	—	—
T7	"		"	"	"	"	—	—

(All dimensions are out to out.)



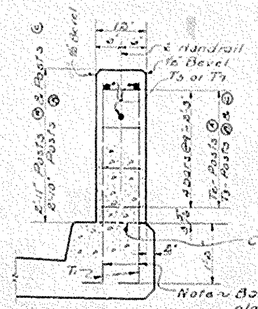
GENERAL NOTE

SPECIFICATIONS: State Highway Department, Kentucky, CPM-52 Standard with subsequent adopted amendments.)

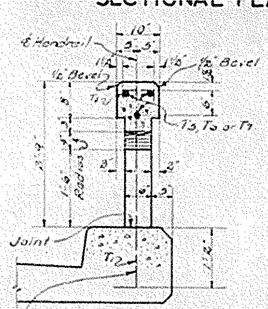
CONCRETE: Class 'D' Concrete to be used in Handrail and Posts.

STEEL REINFORCEMENT: To be deformed bars. Dimensions shown from the face of Concrete are the clear distances. Dimensions shown for bar spacing are the distances center to center of bars. All reinforcement shall be securely held in correct position by means of precast mortar or concrete blocks and wired at all intersections. Precast mortar or concrete blocks supporting reinforcement shall be spaced not farther apart than 50 diameters of the supported bar.

BEVELS: All corners of Handrail to be beveled ¼" unless otherwise noted hereon.



SECTION D-D



SECTION E-E

TABLE OF REINFORCEMENT AND ESTIMATED QUANTITIES

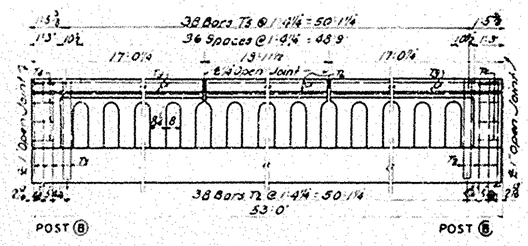
50 FT. SPAN			T1 Number	T2 Number	T3 Number	T4 Number	T5 Number	T5 LENGTH FT	T5 LENGTH IN	T6 Number	T6 LENGTH FT	T6 LENGTH IN	T7 Number	T7 LENGTH FT	T7 LENGTH IN	CONCRETE Class 'D' Cu Yds.	REINFORCEMENT Lbs.
STRAIGHT	SINGLE	TWO RAILS	216	16	16	66	12	18	9	6	14	1	—	—	—	6.0	1140
	INTERMEDIATE	TWO RAILS	200	—	32	70	12	17	4	6	17	1	—	—	—	5.7	1070
	END	TWO RAILS	208	8	24	68	6	18	10	6	15	7	6	17	3	5.9	1110
30° SKEW	SINGLE	TWO RAILS	216	16	16	66	12	19	1	6	14	5	—	—	—	6.2	1150
	INTERMEDIATE	TWO RAILS	200	—	32	70	12	17	4	6	17	1	—	—	—	5.7	1070
	END	RAIL-LONG CURB	104	4	12	34	3	19	2	3	15	11	3	17	7	5.9	1110
		RAIL-SHORT CURB	104	4	12	34	3	18	10	3	15	7	3	17	3		
45° SKEW	SINGLE	TWO RAILS	220	16	16	68	12	18	11	6	15	7	—	—	—	6.2	1170
	INTERMEDIATE	TWO RAILS	200	—	32	70	12	17	4	6	17	1	—	—	—	5.7	1070
	END	RAIL-LONG CURB	100	4	12	35	3	19	0	3	17	1	3	17	5	5.9	1120
		RAIL-SHORT CURB	104	4	12	34	3	18	10	3	15	7	3	17	3		

COMMONWEALTH OF KENTUCKY
STATE HIGHWAY DEPARTMENT

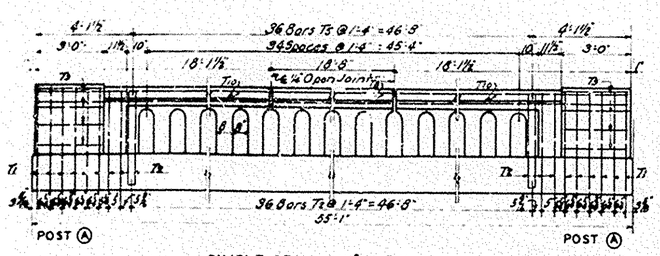
STANDARD HANDRAIL
DECK GIRDERS - 50 FT. SPANS

H-16

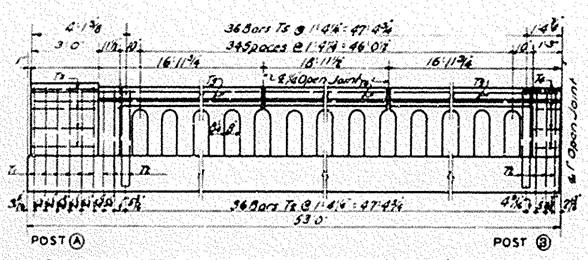
BRIDGE



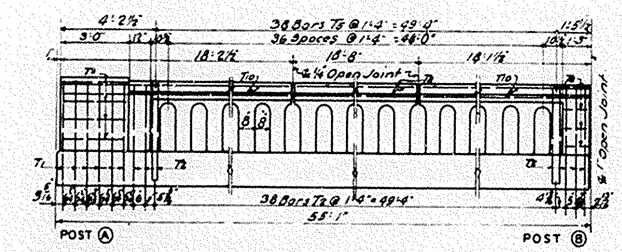
INTERMEDIATE SPAN



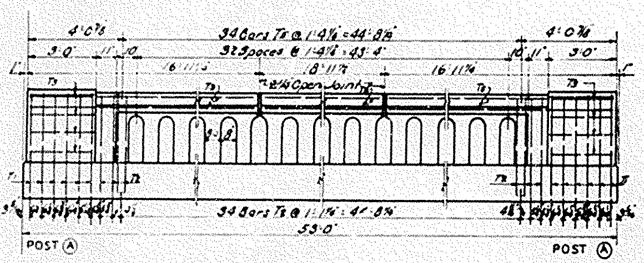
SINGLE SPAN 45° SKEW



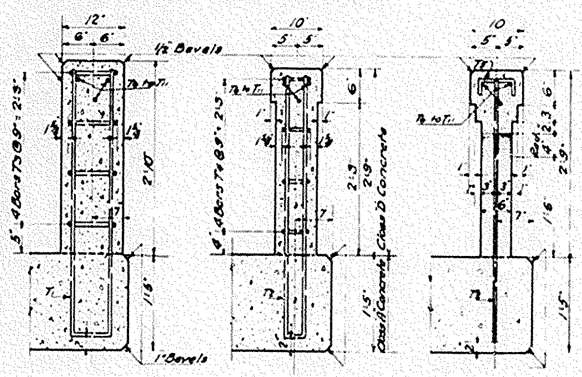
END SPAN - STRAIGHT, OR SHORT RAIL 30° OR 45° SKEW

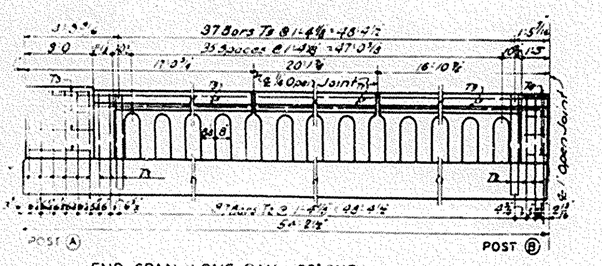


END SPAN - LONG RAIL 45° SKEW

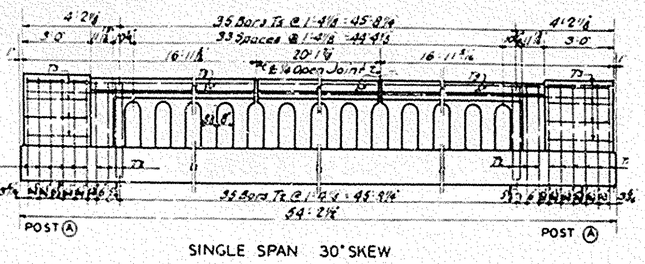


SINGLE SPAN - STRAIGHT

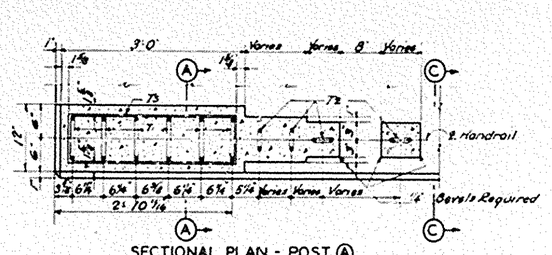




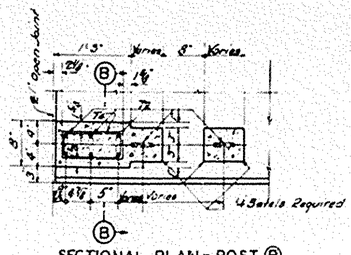
END SPAN - LONG RAIL - 30° SKEW



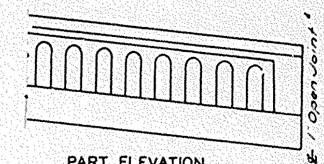
SINGLE SPAN 30° SKEW



SECTIONAL PLAN - POST A



SECTIONAL PLAN - POST B



PART ELEVATION

When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

50 FOOT SPAN			T1 NO.	T2 NO.	T3 NO.	T4 NO.	T5 NO.	T6 NO.	T7 NO.	T8 NO.	T9 NO.	T10 NO.	T11 NO.	CONCRETE CLASS 'D' CU.YDS.	REINFORCEMENT LBS.
STRAIGHT	SINGLE	TWO RAILS	24	76	16	-	68	6	-	-	12	-	-	54	1130
	INTERMEDIATE	TWO RAILS	-	88	-	16	76	6	-	-	12	-	-	47	1000
	END	TWO RAILS	12	82	8	8	72	6	-	-	12	-	-	50	1070
30°SKEW	SINGLE	TWO RAILS	24	78	16	-	70	-	6	-	12	-	-	55	1160
	INTERMEDIATE	TWO RAILS	-	88	-	16	76	6	-	-	12	-	-	47	1000
	END	LONG RAIL	6	42	4	4	37	-	3	-	6	-	-	51	1030
	END	SHORT RAIL	6	41	4	4	36	3	-	-	6	-	-		
45°SKEW	SINGLE	TWO RAILS	24	80	16	-	72	-	-	6	-	12	-	55	1180
	INTERMEDIATE	TWO RAILS	-	88	-	16	76	6	-	-	12	-	-	47	1000
	END	LONG RAIL	6	43	4	4	38	-	-	3	-	6	-	51	1090
	END	SHORT RAIL	6	41	4	4	36	3	-	-	6	-	-		

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN	LOCATION	a FT	a IN	b FT	b IN
T1	(1)	See Table	#9	8	5	Post A	3	11½	0	8
T2	"		"	7	11	Post B & Spindles	3	10½	0	4
T3	(2)		#9	7	3	Post A	2	8⅜	0	6⅜
T4	"		"	3	2	Post B	0	11⅛	0	4⅜
T5	(1)		#8	0	11	Rail	0	3	0	7
T6	Str.		"	18	8	"	—	—	—	—
T7	"		"	19	11	"	—	—	—	—
T8	"		"	18	5	"	—	—	—	—
T9	"		"	16	8	"	—	—	—	—
T10	"		"	17	11	"	—	—	—	—

GENERAL NOTE

Specifications: Kentucky Department of Highways 1945 Standard with Amendments

Concrete: Class D concrete to be used in Handrail.

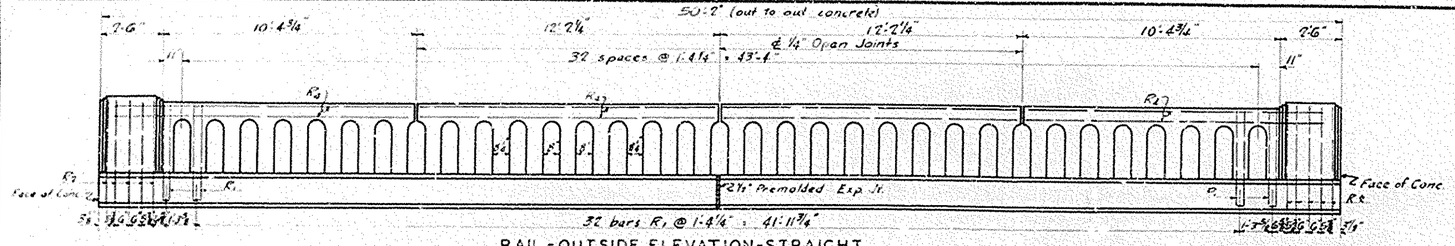
Reinforcement: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. The deformations of all reinforcing steel bars shall conform to A.S.T.M. Designation: A 305 - current specifications. but a mixing of these two permissible combinations will not be allowed.

Beveled Edges: All exposed edges to be beveled ¾ unless otherwise noted.

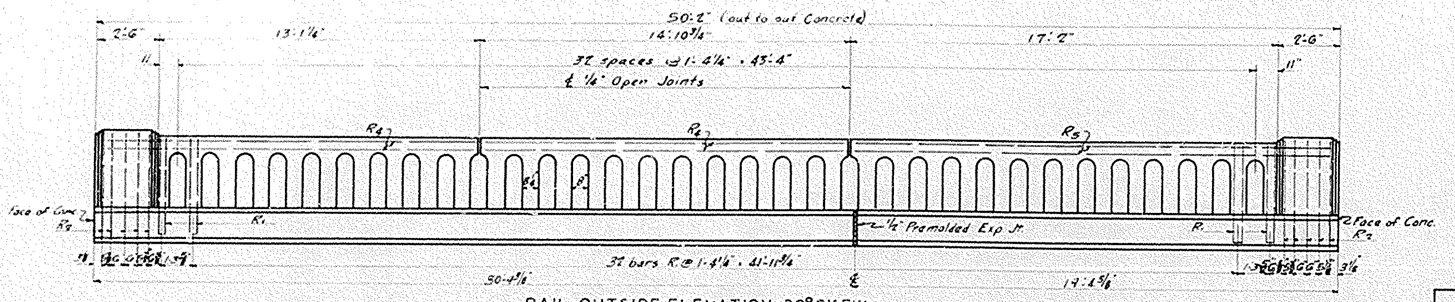
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
STANDARD HANDRAIL
DECK GIRDER 50FT. SPAN
24FT. AND 26FT. ROADWAY

DRAWING H-56

BRIDGE



RAIL - OUTSIDE ELEVATION - STRAIGHT



RAIL - OUTSIDE ELEVATION - 30° SKEW

PROJECT NO.	STATE	FED. AID PROJ. NO.	LOCAL PROJECT	SHEET NO.	TOTAL SHEETS
7	KY.				

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN	LOCATION	a FT	a IN	b FT	b IN
R1	①	SEE TABLE	½"ø	7	10	Curb into Spindles	0	6¼	3	9¾
R2	"		"	8	4	Post	0	6¼	4	0
R3	②		⅜"ø	5	6	"	—	—	—	—
R4	Str		½"ø	See Table		Rail	—	—	—	—
R5	Str		"	See Table		"	—	—	—	—

(All dimensions are out to out)

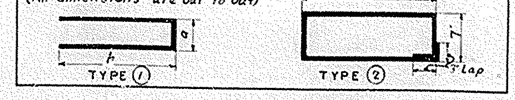
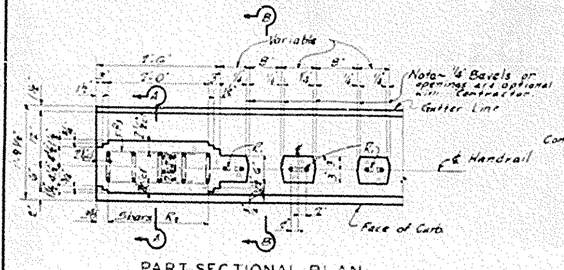
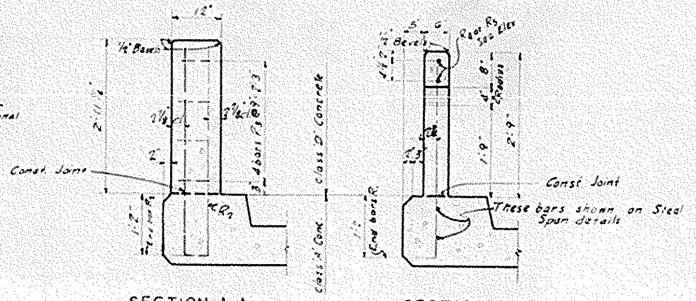


TABLE OF REINFORCEMENT AND ESTIMATED QUANTITIES

50 FT SPAN		R1 NUMBER	R2 NUMBER	R3 NUMBER	R4 NUMBER	R4 LENGTH FT	R4 LENGTH IN	R5 NUMBER	R5 LENGTH FT	R5 LENGTH IN	CONCRETE CLASS "D" CU. YDS.	REINFORCEMENT LBS.
STRAIGHT	TWO RAILS	68	20	16	16	11	11	—	—	—	4.0	790
30° SKEW	TWO RAILS	68	20	16	8	14	8	4	19	2	4.0	790



PART SECTIONAL PLAN

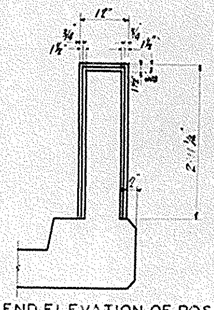


SECTION A-A SECTION B-B

Note: Bars R1 & R2 to be in place before pouring curb.

GENERAL NOTE

Specifications: Kentucky Department of Highways. (1938 Standard).
Concrete: Class "D" concrete to be used in handrail.
Reinforcement: All bar dimensions are to ℄ of bars except as noted.
Bevels: All corners of Handrail to be beveled ¼" unless otherwise noted hereon.
Construction Note: When bridge is on a plus or minus grade tops of all posts and rail to be parallel to the grade line. All sides of openings and posts to be vertical.



END ELEVATION OF POST

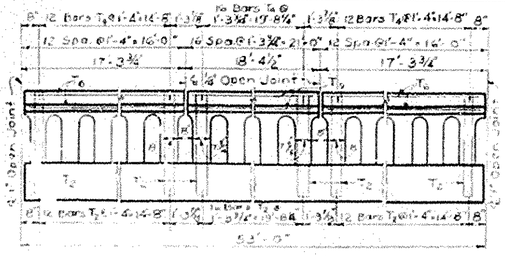
DESIGNED BY: C. Culpepper DATE: 7-6-38
TRACED BY: J.L.U. DATE: 7-6-38
CHECKED BY: P.E.L.Jr. DATE: 7-6-38
REVISED FOR 1938 Specs. DATE: 7-6-38
REVISED DATE
REVISED DATE

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
STANDARD CONCRETE HANDRAIL FOR 50 FT. I-BEAM SPANS 0° - 30° SKEWS

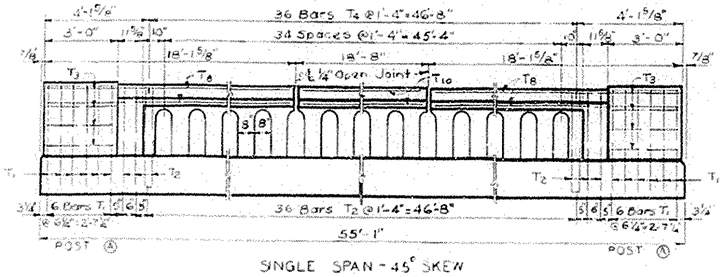
DRAWING NO. H-26 INDEX

BRIDGE

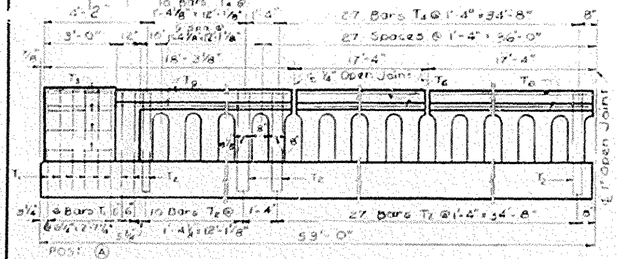
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				



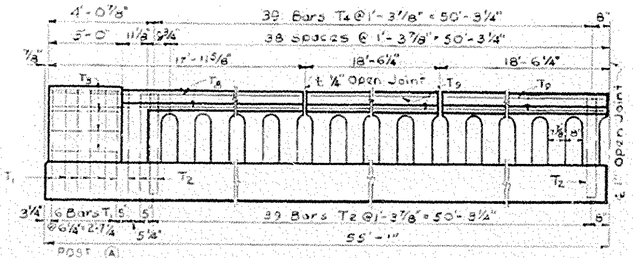
INTERMEDIATE SPAN



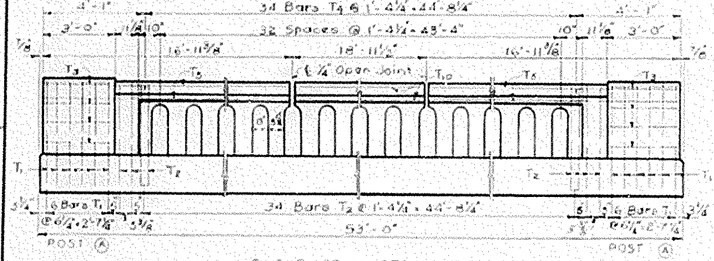
SINGLE SPAN - 45° SKEW



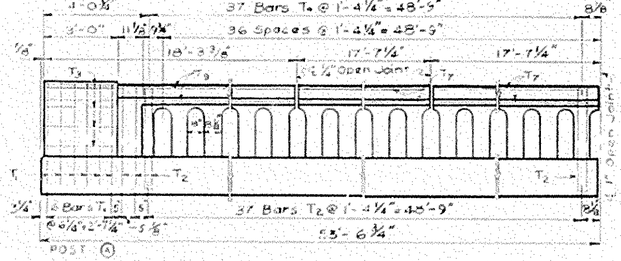
END SPAN - STRAIGHT OR SHORT RAIL - 15°, 30° OR 45° SKEW



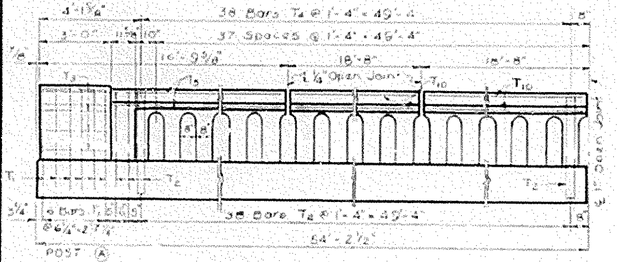
END SPAN - LONG RAIL 45° SKEW



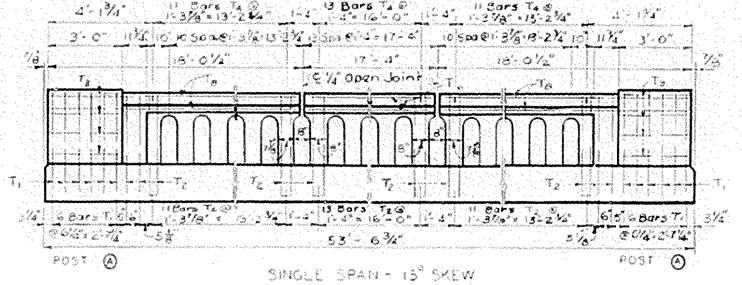
SINGLE SPAN - STRAIGHT



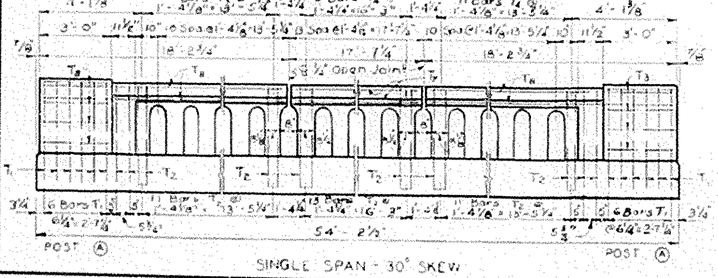
END SPAN - LONG RAIL - 15° SKEW



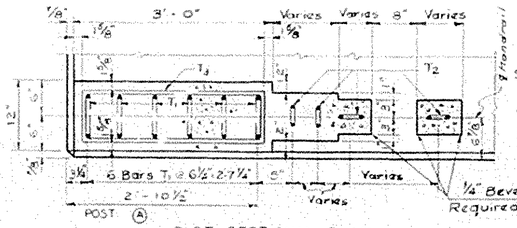
END SPAN - LONG RAIL - 30° SKEW



SINGLE SPAN - 15° SKEW



SINGLE SPAN - 30° SKEW



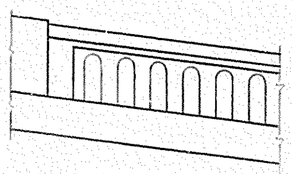
PART SECTIONAL PLAN

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

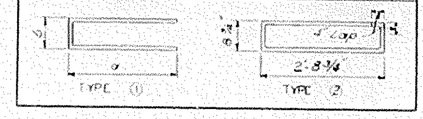
50 FOOT SPAN			NUMBER OF BARS										CONCRETE CLASS "D" (CU. YDS.)	REINFORCEMENT (LBS.)
			T_1	T_2	T_5	T_4	T_3	T_6	T_7	T_8	T_9	T_{10}		
STRAIGHT	SINGLE	TWO RAILS	24	76	16	68	12	—	—	—	—	6	5.4	1130
	INTERMEDIATE	TWO RAILS	—	80	—	80	—	12	—	—	6	—	4.5	918
	END	TWO RAILS	12	78	8	74	—	12	—	—	6	—	4.9	1025
15° SKEW	SINGLE	TWO RAILS	24	78	16	70	—	6	—	12	—	—	5.4	1152
	INTERMEDIATE	TWO RAILS	—	80	—	80	—	12	—	—	6	—	4.5	918
	END	LONG RAIL	6	39	4	37	—	—	6	—	3	—	5.0	1026
	END	SHORT RAIL	6	39	4	37	—	6	—	—	3	—		
30° SKEW	SINGLE	TWO RAILS	24	78	16	70	—	—	6	12	—	—	5.5	1153
	INTERMEDIATE	TWO RAILS	—	80	—	80	—	12	—	—	6	—	4.5	918
	END	LONG RAIL	6	40	4	38	3	—	—	—	—	6	5.0	1037
	END	SHORT RAIL	6	39	4	37	—	6	—	—	3	—		
45° SKEW	SINGLE	TWO RAILS	24	80	16	72	—	—	—	12	—	6	5.5	1175
	INTERMEDIATE	TWO RAILS	—	80	—	80	—	12	—	—	6	—	4.5	918
	END	LONG RAIL	6	41	4	39	—	—	—	3	6	—	5.0	1047
	END	SHORT RAIL	6	39	4	37	—	6	—	—	3	—		

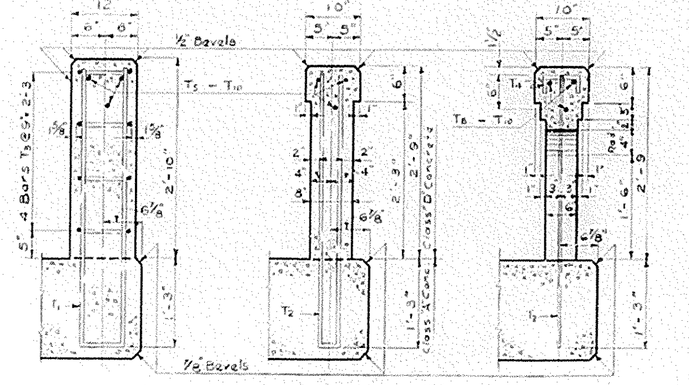
BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	D FT.	D IN.	E FT.	E IN.
T_1	①	See Table	#5	8	5"	Post "A"	3	11½	0	8
T_2	"	"	"	7	11	Spindles	3	10½	0	4
T_3	⑥	"	#3	7	3	Post "A"				
T_4	⑦	"	#3	0	11	Rail	0	3	0	7
T_5	Str.	"	"	16	6	"	—	—	—	—
T_6	—	"	"	17	0	"	—	—	—	—
T_7	—	"	"	17	8	"	—	—	—	—
T_8	—	"	"	18	0	"	—	—	—	—
T_9	—	"	"	18	4	"	—	—	—	—
T_{10}	—	"	"	18	4	"	—	—	—	—



PART ELEVATION
When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.





GENERAL NOTE

SPECIFICATIONS: - Kentucky Department of Highways, Current Specifications with Amendments.

CONCRETE: Class "D" Concrete to be used in Handrail.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

STANDARD SPINDLE HANDRAIL FOR 50 FT. SPAN R.C.D.G. STR., 15°, 30°, OR 45° SKEW WITH 10½" CURB

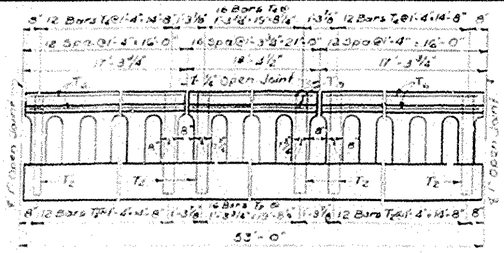
DRAWING NO.	INDEX
H-106	

DESIGNED BY: V. Engelhardt, CHECKED BY: [illegible]
DETAILED BY: A.E. McGinnis, CHECKED BY:
TRACED BY:

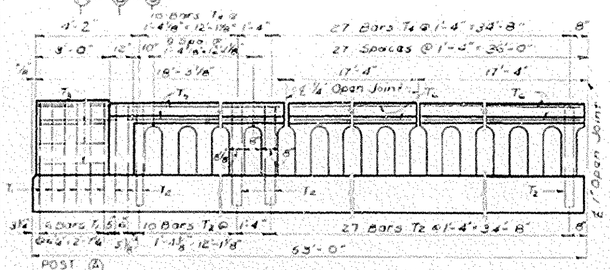
REVISED	DATE
REVISED	DATE
REVISED	DATE

BRIDGE

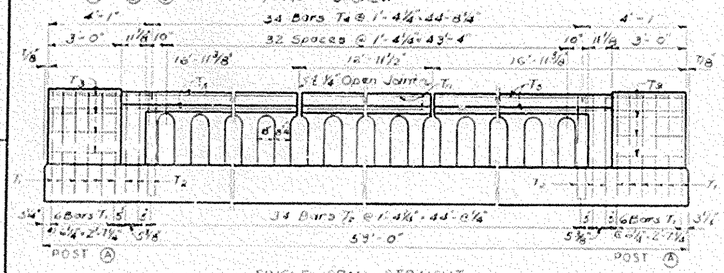
FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY				



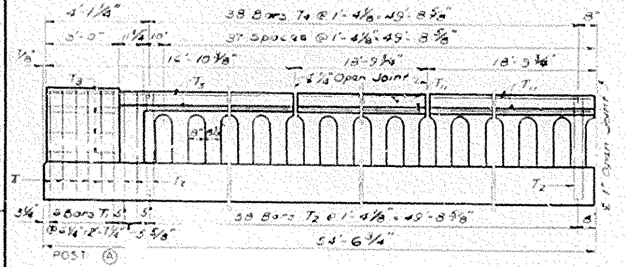
INTERMEDIATE SPAN



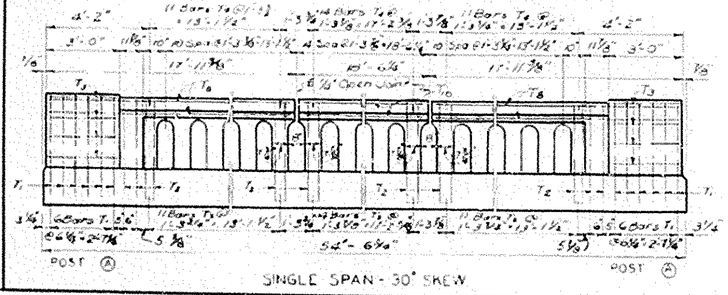
END SPAN - STRAIGHT, OR SHORT RAIL - 15°, 30° OR 45° SKEW



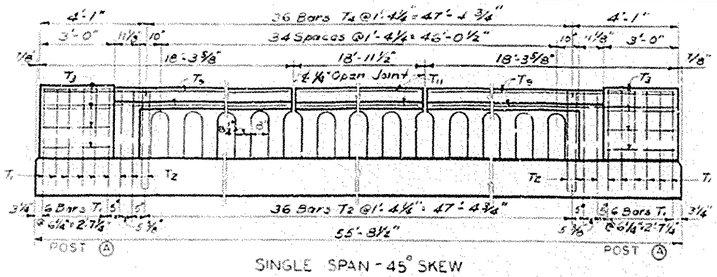
SINGLE SPAN - STRAIGHT



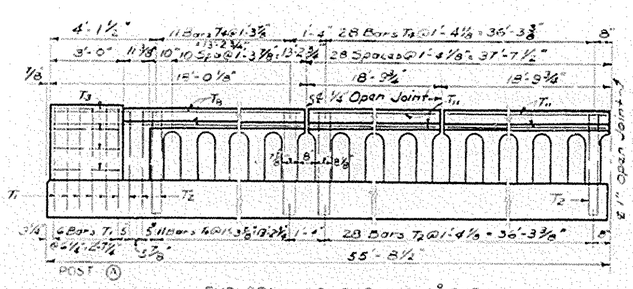
END SPAN - LONG RAIL - 30° SKEW



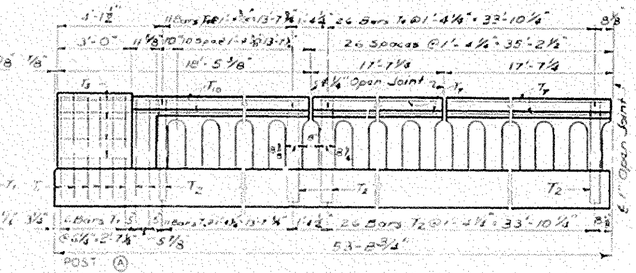
SINGLE SPAN - 30° SKEW



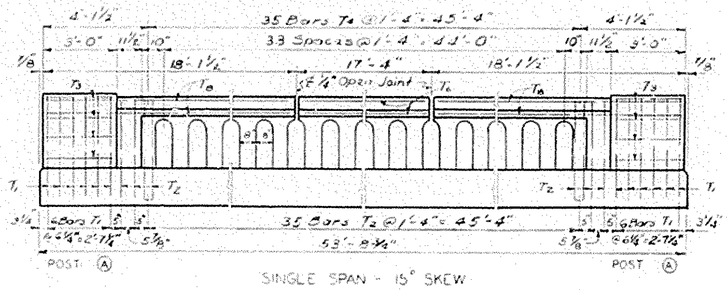
SINGLE SPAN - 45° SKEW



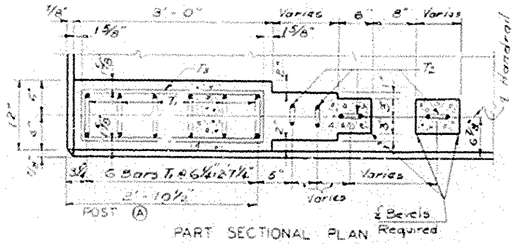
END SPAN - LONG RAIL - 45° SKEW



END SPAN - LONG RAIL - 15° SKEW



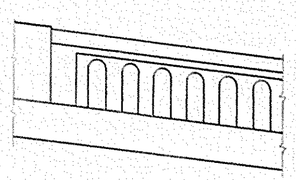
SINGLE SPAN - 15° SKEW



PART SECTIONAL PLAN

TABLE OF REINFORCEMENT AND ESTIMATE OF QUANTITIES

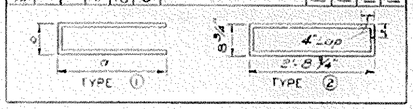
50 FOOT SPAN			NUMBER OF BARS										CONCRETE CLASS "D" (CU. YDS.)	REINFORCEMENT (LBS.)
			T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	
STRAIGHT	SINGLE	TWO RAILS	24	76	16	68	12	—	—	—	—	—	6	5.4	1132
	INTERMEDIATE	TWO RAILS	—	80	—	80	—	12	—	—	—	6	—	4.5	918
	END	TWO RAILS	12	78	8	74	—	12	—	—	—	6	—	4.9	1025
15° SKEW	SINGLE	TWO RAILS	24	78	16	70	—	6	—	12	—	—	—	5.4	1132
	INTERMEDIATE	TWO RAILS	—	80	—	80	—	12	—	—	6	—	—	4.5	918
	END	LONG RAIL	6	39	4	37	—	—	6	—	—	3	—	5.0	1027
	END	SHORT RAIL	6	39	4	37	—	6	—	—	—	3	—		
30° SKEW	SINGLE	TWO RAILS	24	80	16	72	—	—	—	12	—	6	—	5.5	1174
	INTERMEDIATE	TWO RAILS	—	80	—	80	—	12	—	—	6	—	—	4.5	918
	END	LONG RAIL	6	40	4	38	3	—	—	—	—	—	6	5.0	1037
	END	SHORT RAIL	6	39	4	37	—	6	—	—	3	—	—		
45° SKEW	SINGLE	TWO RAILS	24	80	16	72	—	—	—	—	12	—	6	5.6	1178
	INTERMEDIATE	TWO RAILS	—	80	—	80	—	12	—	—	6	—	—	4.5	918
	END	LONG RAIL	6	41	4	39	—	—	—	3	—	—	6	5.0	1049
	END	SHORT RAIL	6	39	4	37	—	6	—	—	3	—	—		

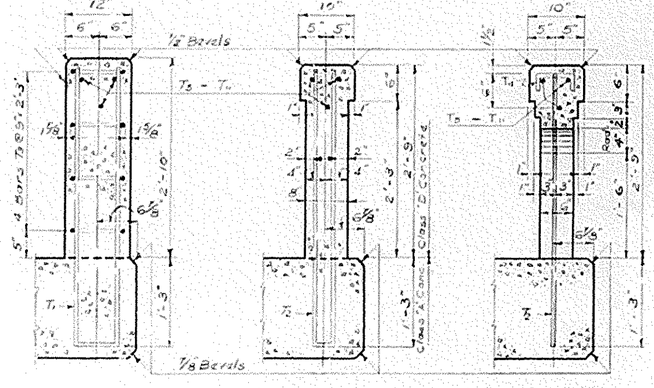


PART ELEVATION
When bridge is on a plus or minus grade top of all posts and rail to be parallel to the grade line. All posts and spindles to be vertical.

BILL AND TYPES OF REINFORCEMENT

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.
T_1	①		#5	8	5	Post "A"	3	11½	0	8
T_2			#	7	11	Spindles	3	10½	0	4
T_3	②		#3	7	3	Post "A"	—	—	—	—
T_4	①		#4	0	11	Rail	0	3	0	7
T_5	STR.		#	16	7		—	—	—	—
T_6	-		#	17	0	-	—	—	—	—
T_7	-		#	17	3	-	—	—	—	—
T_8	-		#	17	5	-	—	—	—	—
T_9	-		#	18	0	-	—	—	—	—
T_{10}	-		#	18	2	-	—	—	—	—
T_{11}	-		#	18	6	-	—	—	—	—





GENERAL NOTE

SPECIFICATIONS: Kentucky Department of Highways, Current Specifications with Amendments.

CONCRETE: Class "D" Concrete to be used in Handrails.

REINFORCEMENT: Dimensions from face of concrete to bars are clear distances except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

BEVELED EDGES: All exposed edges to be beveled ¾" unless otherwise noted.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

STANDARD SPINDLE HANDRAIL FOR 50 FT. SPAN R.C.D.G. STR., 15°, 30° OR 45° SKEW WITH 1'-6" CURB

DRAWING	INDEX
H-126	

BRIDGE

FED. ROAD DIV.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	KY.				

QUANTITIES IN STANDARD R.C. HANDRAIL — 1933 SERIES

ALL ROADWAYS — STRAIGHT

SPAN		20'	25'	30'	35'	40'	45'	50'
DRAWING NO.		H-10	H-11	H-12	H-13	H-14	H-15	H-16
END SPAN	CONC.	2.7	3.4	3.8	4.3	5.0	5.4	5.9
	REINF.	480	610	690	780	930	1020	1110
INTERMEDIATE SPAN	CONC.	2.5	3.2	3.8	4.2	4.8	5.3	5.7
	REINF.	460	590	660	730	900	980	1070
SINGLE SPAN	CONC.	2.9	3.7	4.1	4.5	5.2	5.6	6.0
	REINF.	510	620	710	800	930	1060	1140

NOTE: Concrete shown above is Class D Concrete.

QUANTITIES IN STANDARD R.C. HANDRAIL — 1933 SERIES

ALL ROADWAYS — 30° SKEW

SPAN		20'	25'	30'	35'	40'	45'	50'
DRAWING NO.		H-10	H-11	H-12	H-13	H-14	H-15	H-16
END SPAN	CONC.	2.8	3.5	3.9	4.3	5.1	5.5	5.9
	REINF.	490	640	700	780	940	1030	1110
INTERMEDIATE SPAN	CONC.	2.5	3.2	3.8	4.2	4.8	5.3	5.7
	REINF.	460	590	640	730	900	980	1070
SINGLE SPAN	CONC.	3.0	3.7	4.1	4.6	5.3	5.7	6.2
	REINF.	530	660	750	840	990	1080	1150

NOTE: Concrete shown above is Class D Concrete.

QUANTITIES IN STANDARD R.C. HANDRAIL — 1933 SERIES

ALL ROADWAYS — 45° SKEW

SPAN		20'	25'	30'	35'	40'	45'	50'
DRAWING NO.		H-10	H-11	H-12	H-13	H-14	H-15	H-16
END SPAN	CONC.	2.8	3.5	4.0	4.4	5.1	5.5	5.9
	REINF.	500	620	700	790	940	1030	1120
INTERMEDIATE SPAN	CONC.	2.5	3.2	3.8	4.2	4.8	5.3	5.7
	REINF.	460	590	640	730	900	980	1070
SINGLE SPAN	CONC.	3.1	3.8	4.2	4.6	5.4	5.8	6.2
	REINF.	540	670	750	840	990	1090	1170

NOTE: Concrete shown above is Class D Concrete.

DESIGNED BY: L. [illegible] DATE: [illegible]
TRACED BY: [illegible] DATE: [illegible]
CHECKED BY: R.L. [illegible] DATE: [illegible]

DETAILED — DATE
DETAILED — DATE
DETAILED — DATE

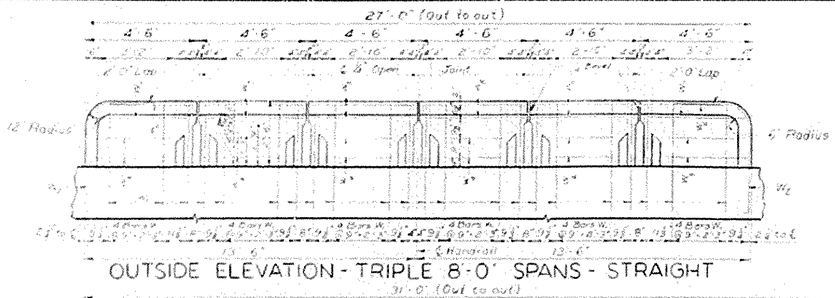
COMMONWEALTH OF KENTUCKY
STATE HIGHWAY DEPARTMENT

QUANTITIES IN STANDARD
R.C. HANDRAIL
1933 SERIES

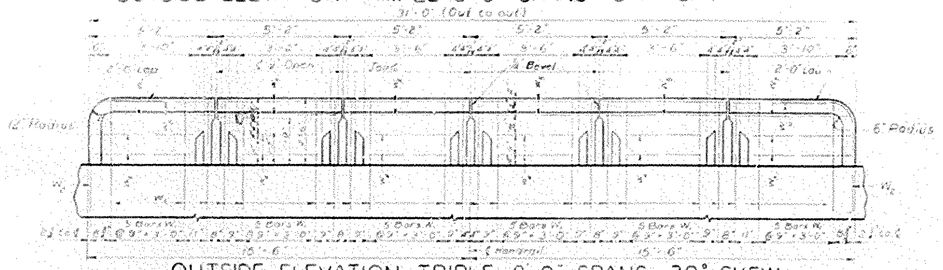
DRAWING NO. H-17 | SHEET

44

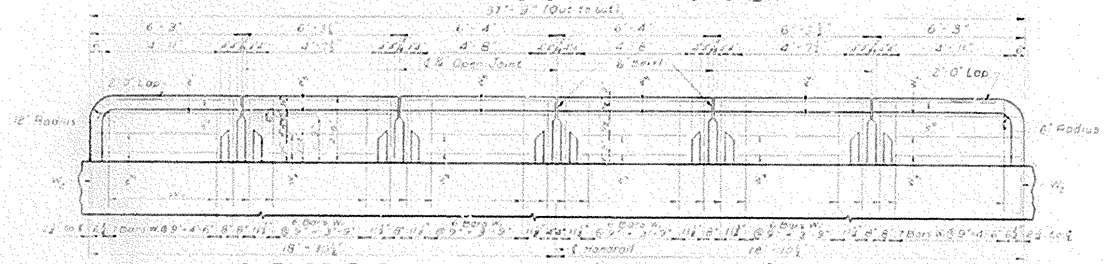
BRIDGE



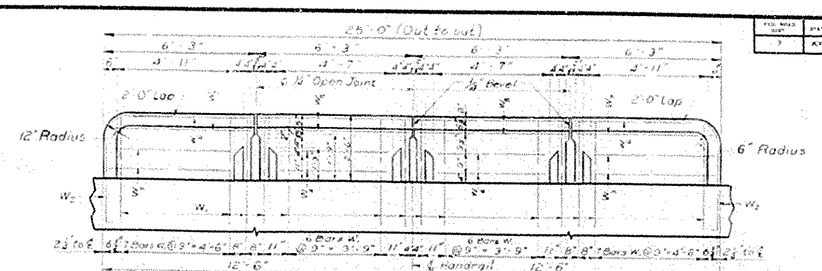
OUTSIDE ELEVATION - TRIPLE 8'-0" SPANS - STRAIGHT



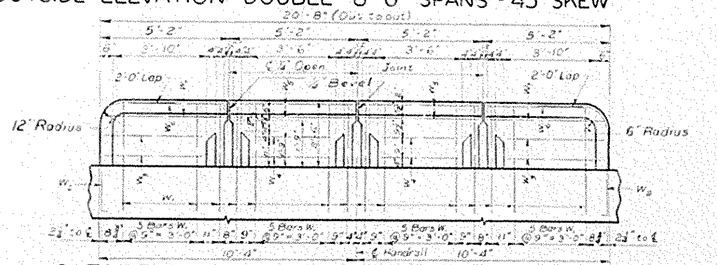
OUTSIDE ELEVATION - TRIPLE 8'-0" SPANS - 30° SKEW



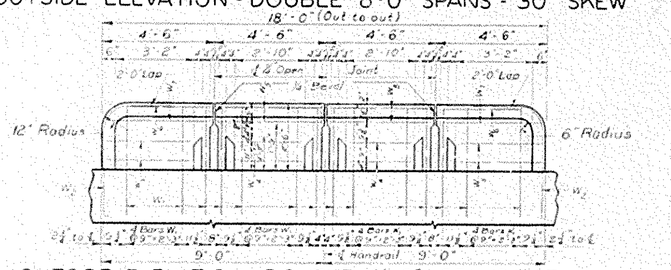
OUTSIDE ELEVATION - TRIPLE 8'-0" SPANS - 45° SKEW



OUTSIDE ELEVATION - DOUBLE 8'-0" SPANS - 45° SKEW



OUTSIDE ELEVATION - DOUBLE 8'-0" SPANS - 30° SKEW



OUTSIDE ELEVATION - DOUBLE 8'-0" SPANS - STRAIGHT

BILL AND TYPES OF REINFORCEMENT (REINFORCEMENT SHOWN IS FOR TWO RAILS - ONE AT EACH END OF CULVERT)

TRIPLE 8'-0" SPANS 0° SKEW

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.
W_1	①	68	#4	4	3
W_2	②	4	"	6	9
W_3	Str.	8	"	3	4
W_4	"	16	"	2	6
W_5	"	16	"	4	2
W_6	"	4	"	3	4
W_7	"	4	"	4	2

TRIPLE 8'-0" SPANS 30° SKEW

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.
W_1	①	80	#4	4	3
W_2	②	4	"	6	9
W_3	Str.	8	"	4	0
W_4	"	16	"	3	2
W_5	"	16	"	4	10
W_6	"	4	"	4	0
W_7	"	4	"	4	10

TRIPLE 8'-0" SPANS 45° SKEW

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.
W_1	①	96	#4	4	3
W_2	②	4	"	6	9
W_3	Str.	8	"	5	1
W_4	"	16	"	4	4
W_5	"	16	"	6	0
W_6	"	4	"	5	1
W_7	"	4	"	5	11

DOUBLE 8'-0" SPANS 0° SKEW

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.
W_1	①	44	#4	4	3
W_2	②	4	"	6	9
W_3	Str.	8	"	3	4
W_4	"	8	"	2	6
W_5	"	8	"	4	2
W_6	"	4	"	3	4
W_7	"	4	"	4	2

DOUBLE 8'-0" SPANS 30° SKEW

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.
W_1	①	52	#4	4	3
W_2	②	4	"	6	9
W_3	Str.	8	"	4	0
W_4	"	8	"	3	2
W_5	"	8	"	4	10
W_6	"	4	"	4	0
W_7	"	4	"	4	10

DOUBLE 8'-0" SPANS 45° SKEW

MARK	TYPE	NO.	SIZE	LENGTH FT.	LENGTH IN.
W_1	①	64	#4	4	3
W_2	②	4	"	6	9
W_3	Str.	8	"	5	1
W_4	"	8	"	4	3
W_5	"	8	"	5	11
W_6	"	4	"	5	1
W_7	"	4	"	5	11

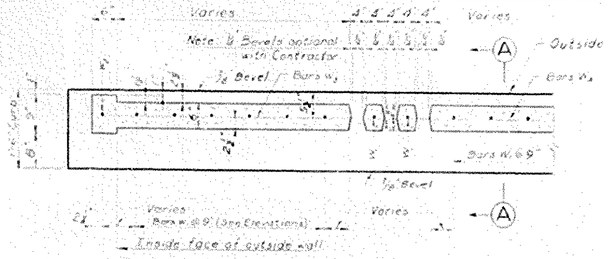
FOR ALL SPANS

LOCATION	BENT TYPES
Panels Curb to Rail	TYPE ① Outside Rad=10¾"
" "	
End Panels	
Intermediate Panels	
Panels	
Rail	TYPE ②
Panels	

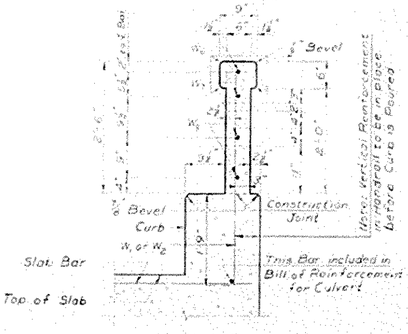
ESTIMATE OF QUANTITIES

Triple 8'-0" Spans 0° Skew	Triple 8'-0" Spans 30° Skew	Triple 8'-0" Spans 45° Skew	Double 8'-0" Spans 0° Skew	Double 8'-0" Spans 30° Skew	Double 8'-0" Spans 45° Skew
Concrete, Class "A" 2.9 cuyds	Concrete, Class "A" 2.9 cuyds	Concrete, Class "A" 3.6 cuyds	Concrete, Class "A" 1.7 cuyds	Concrete, Class "A" 2.0 cuyds	Concrete, Class "A" 2.4 cuyds
Reinforcement 320 lbs	Reinforcement 376 lbs	Reinforcement 455 lbs	Reinforcement 216 lbs	Reinforcement 253 lbs	Reinforcement 311 lbs

QUANTITIES SHOWN ARE FOR TWO RAILS - ONE AT EACH END OF CULVERT



PART SECTIONAL PLAN



SECTION A - A

GENERAL NOTE

Specifications: Kentucky Department of Highways, with subsequent adopted Amendments.

Concrete: Class "A" concrete to be used throughout.

Reinforcement: Dimensions from face of concrete to bars are clear distances, except as otherwise shown. Dimensions for bar spacing are distances center to center of bars. Deformations on all bars shall conform to A.S.T.M. designation: A-305, current specifications.

Construction Note: Concrete Railing shall not be poured until the Falsework supporting the Culvert Top Slab and Headwalls has been removed.

Beveled Edges: All exposed edges to be beveled ½" unless otherwise noted.

Note: Handrail to be used only when specified on Culvert detail plans.

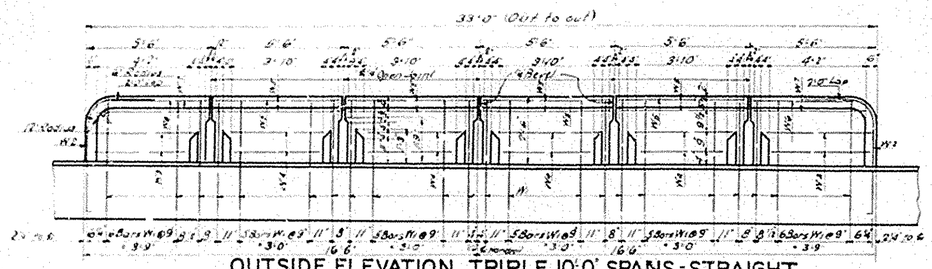
DESIGNED BY
DETAILED BY R.D. Bedford CHECKED BY
TRACED BY CHECKED BY
DATE
REVISED
DATE
REVISED
DATE
REVISED
DATE

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

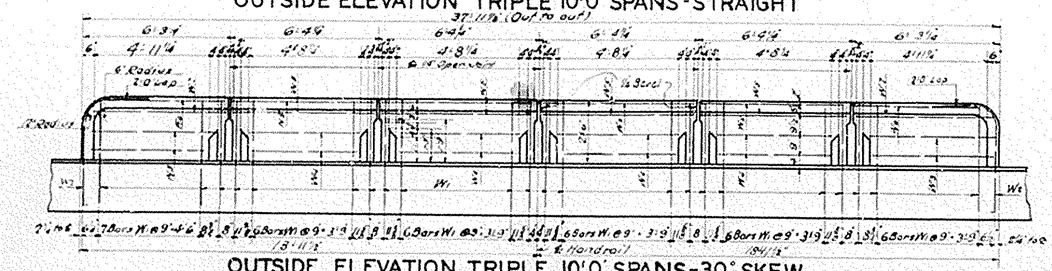
STANDARD HANDRAIL FOR TRIPLE & DOUBLE 8'-0" R.C. CULVERTS 0° - 30° - 45° SKEWS

BRIDGE NUMBER	DRAWING NO. C.R.4	INDEX

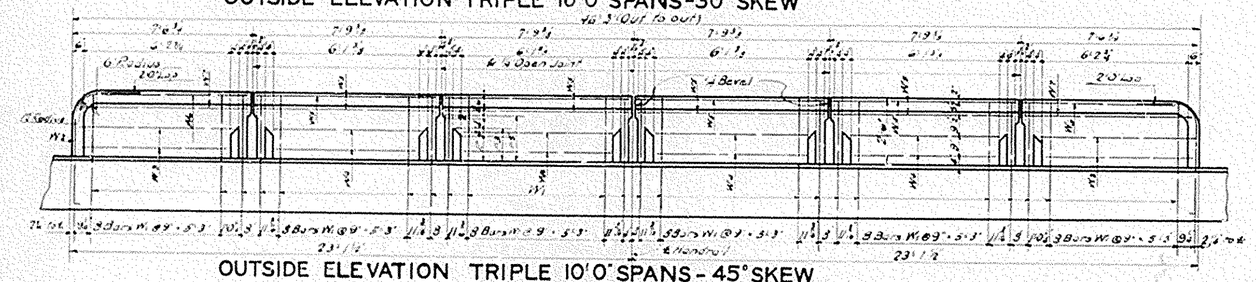
BRIDGE



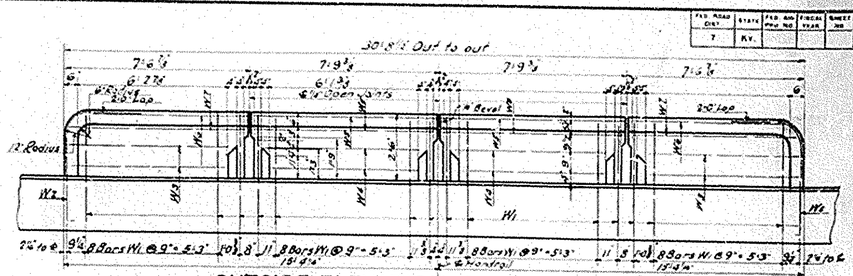
OUTSIDE ELEVATION TRIPLE 10'0" SPANS - STRAIGHT



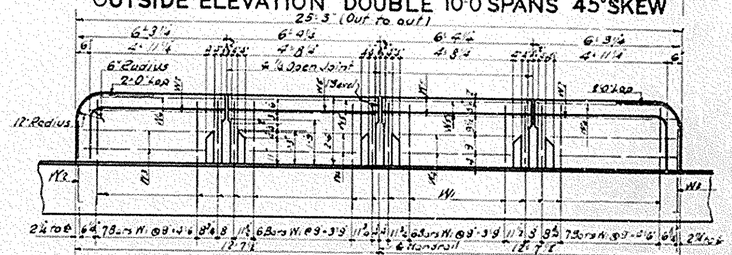
OUTSIDE ELEVATION TRIPLE 10'0" SPANS - 30° SKEW



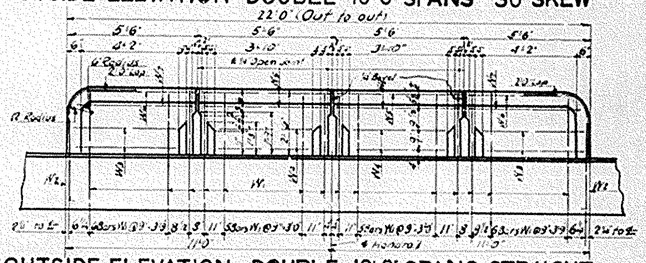
OUTSIDE ELEVATION TRIPLE 10'0" SPANS - 45° SKEW



OUTSIDE ELEVATION DOUBLE 10'0" SPANS 45° SKEW



OUTSIDE ELEVATION DOUBLE 10'0" SPANS 30° SKEW



OUTSIDE ELEVATION DOUBLE 10'0" SPANS STRAIGHT

BILL AND TYPES OF REINFORCEMENT

REINFORCEMENT SHOWN IS FOR TWO RAILS - ONE AT EACH END OF CULVERT

10'0" TRIPLE SPANS 0° SKEW

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN
W1	(1)	93	#5	4	3
W2	(2)	4	"	6	9
W3	Str.	8	"	4	4
W4	"	16	"	3	6
W5	"	16	"	5	9
W6	"	4	"	5	2
W7	"	4	"	5	2

10'0" TRIPLE SPANS 30° SKEW

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN
W1	(1)	98	#5	4	3
W2	(2)	4	"	6	9
W3	Str.	8	"	4	4
W4	"	8	"	3	6
W5	"	16	"	5	9
W6	"	4	"	5	2
W7	"	4	"	5	11

10'0" TRIPLE SPANS 45° SKEW

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN
W1	(1)	116	#5	4	3
W2	(2)	4	"	6	9
W3	Str.	8	"	6	5
W4	"	8	"	5	10
W5	"	16	"	7	6
W6	"	4	"	6	6
W7	"	4	"	7	3

10'0" DOUBLE SPANS 0° SKEW

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN
W1	(1)	56	#5	4	3
W2	(2)	4	"	6	9
W3	Str.	8	"	4	4
W4	"	8	"	3	6
W5	"	8	"	5	3
W6	"	4	"	4	2
W7	"	4	"	5	2

10'0" DOUBLE SPANS 30° SKEW

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN
W1	(1)	69	#5	4	3
W2	(2)	4	"	6	9
W3	Str.	8	"	4	4
W4	"	8	"	3	6
W5	"	8	"	6	1
W6	"	4	"	5	2
W7	"	4	"	6	0

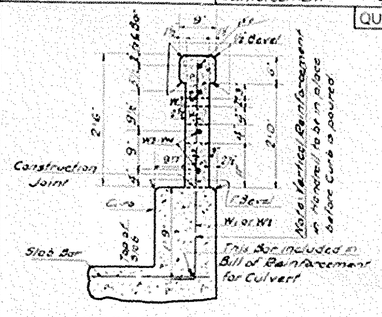
10'0" DOUBLE SPANS 45° SKEW

MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN
W1	(1)	76	#5	4	3
W2	(2)	4	"	6	9
W3	Str.	8	"	6	5
W4	"	8	"	5	9
W5	"	8	"	7	6
W6	"	4	"	6	6
W7	"	4	"	7	3

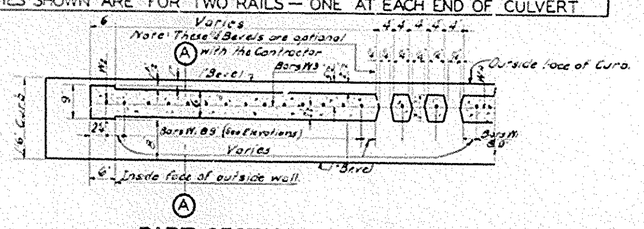
ESTIMATE OF QUANTITIES

10'0" TRIPLE SPANS 0° SKEW		10'0" TRIPLE SPANS 30° SKEW		10'0" TRIPLE SPANS 45° SKEW		10'0" DOUBLE SPANS 0° SKEW		10'0" DOUBLE SPANS 30° SKEW		10'0" DOUBLE SPANS 45° SKEW	
Concrete, Class A	31 Cu Yds	Concrete, Class A	37 Cu Yds	Concrete, Class A	45 Cu Yds	Concrete, Class A	21 Cu Yds	Concrete, Class A	24 Cu Yds	Concrete, Class A	30 Cu Yds
Reinforcement	998 Lbs	Reinforcement	459 Lbs	Reinforcement	560 Lbs	Reinforcement	272 Lbs	Reinforcement	312 Lbs	Reinforcement	376 Lbs

QUANTITIES SHOWN ARE FOR TWO RAILS — ONE AT EACH END OF CULVERT



SECTION A-A

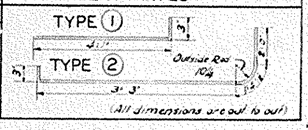


PART SECTIONAL PLAN

FOR ALL SPANS — LOCATION

- Dowels Curb to Rail
- End Panels
- Intermediate Panels
- Panels
- Rail
- Panels

FOR ALL SPANS — BENT TYPES



GENERAL NOTE

Specifications: State Highway Department, Kentucky with subsequent adopted Amendments.

Concrete: Class A concrete to be used throughout.

Reinforcement: Dimensions from face of concrete to bars are clear distances, except as otherwise shown. Dimensions for bar spacing are distances center to center of bars.

Construction Note: Concrete Railing shall not be poured until the False Work supporting the Culvert Top Slab and Headwalls has been removed.

Beveled Edges: All exposed edges to be beveled ¾ unless otherwise noted.

Note: Handrail to be used only when specified on Culvert detail plans.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

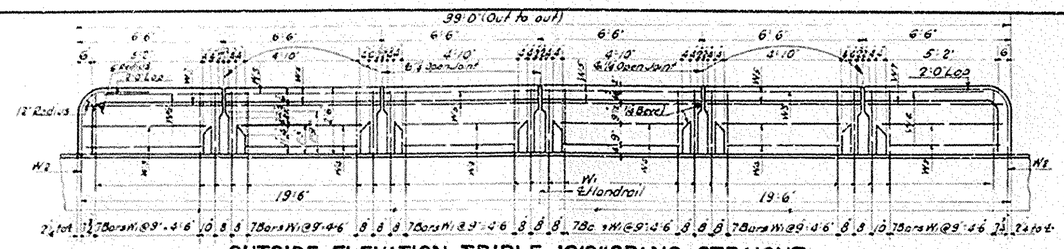
STANDARD HANDRAIL FOR TRIPLE AND DOUBLE 10'0" R.C. CULVERTS 0° - 30° - 45° SKEWS

DRAWING: 4 CR.1

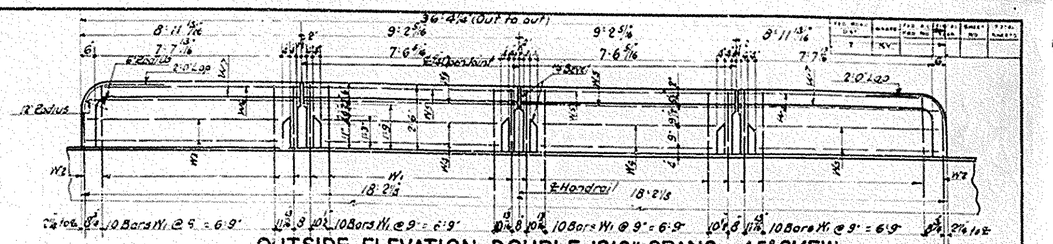
SHEET:

ORIGINAL IN INK

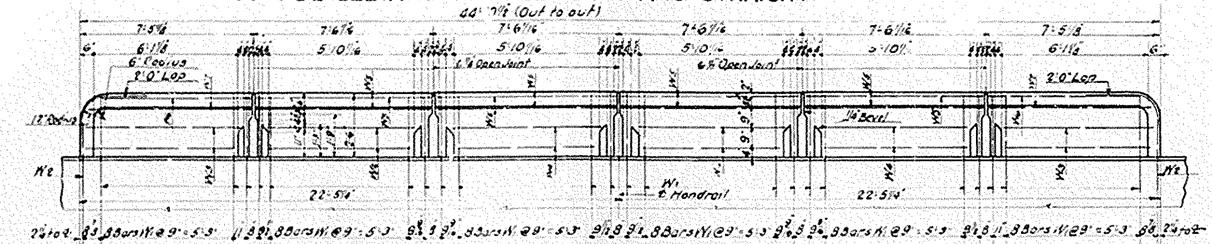
BRIDGE



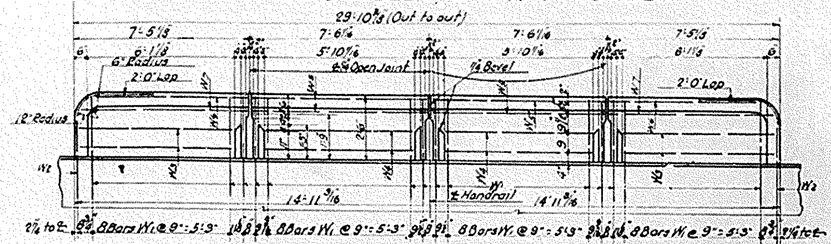
OUTSIDE ELEVATION TRIPLE 12'0" SPANS STRAIGHT



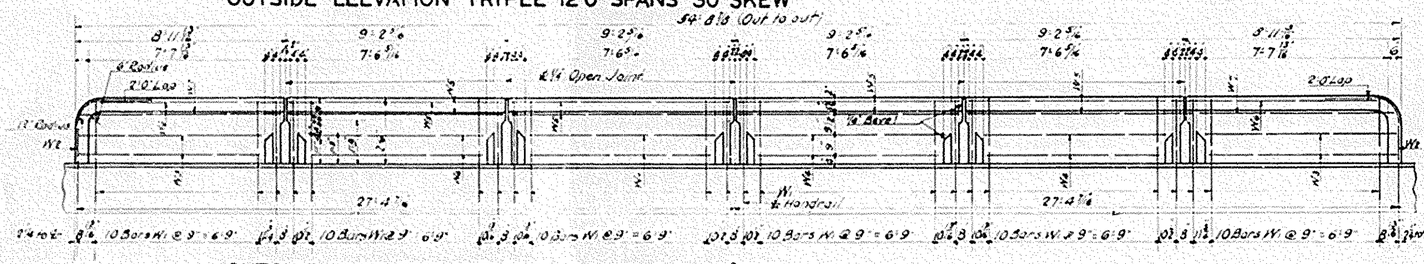
OUTSIDE ELEVATION DOUBLE 12'0" SPANS 45° SKEW



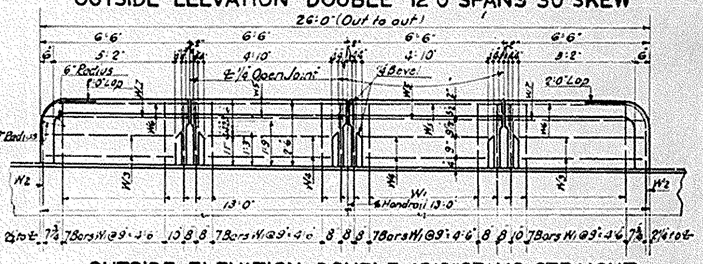
OUTSIDE ELEVATION TRIPLE 12'0" SPANS 30° SKEW



OUTSIDE ELEVATION DOUBLE 12'0" SPANS 30° SKEW



OUTSIDE ELEVATION TRIPLE 12'0" SPANS 45° SKEW



OUTSIDE ELEVATION DOUBLE 12'0" SPANS STRAIGHT

BILL AND TYPES OF REINFORCEMENT—REINFORCEMENT SHOWN IS FOR TWO RAILS—ONE AT EACH END OF CULVERT

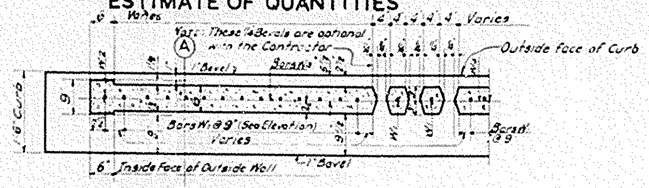
12'0" TRIPLE SPANS 0° SKEW						12'0" TRIPLE SPANS 30° SKEW						12'0" TRIPLE SPANS 45° SKEW					
MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN	MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN	MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN
W1	1	102	1/2 ø	4	3	W1	1	116	1/2 ø	4	3	W1	1	120	1/2 ø	4	3
W2	2	3	-	6	9	W2	2	4	-	6	9	W2	2	4	-	6	9
W3	Str	8	-	5	3	W3	Str	8	-	6	9	W3	Str	8	-	7	10
W4	-	16	-	3	6	W4	-	16	-	5	6	W5	-	16	-	7	2
W5	-	16	-	6	3	W5	-	16	-	7	3	W5	-	16	-	8	11
W6	-	4	-	5	4	W6	-	4	-	6	3	W6	-	4	-	7	10
W7	-	4	-	6	2	W7	-	4	-	6	11	W7	-	4	-	8	8
Concrete Class 'A' 38 Cu Yds						Concrete Class 'A' 43 Cu Yds						Concrete Class 'A' 54 Cu Yds					
Reinforcement 487 Lbs						Reinforcement 552 Lbs						Reinforcement 673 Lbs.					

12'0" DOUBLE SPANS 0° SKEW						12'0" DOUBLE SPANS 30° SKEW						12'0" DOUBLE SPANS 45° SKEW					
MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN	MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN	MARK	TYPE	NO	SIZE	LENGTH FT	LENGTH IN
W1	1	68	1/2 ø	4	3	W1	1	76	1/2 ø	4	3	W1	1	92	1/2 ø	4	3
W2	2	4	-	6	9	W2	2	4	-	6	9	W2	2	4	-	6	9
W3	Str	8	-	5	4	W3	Str	8	-	6	9	W3	Str	8	-	6	9
W4	-	8	-	4	7	W1	-	8	-	5	6	W4	-	8	-	7	2
W5	-	8	-	6	3	W5	-	8	-	7	3	W5	-	8	-	8	11
W6	-	4	-	5	4	W6	-	4	-	6	3	W6	-	4	-	7	10
W7	-	4	-	6	2	W7	-	4	-	6	11	W7	-	4	-	8	8
Concrete Class 'A' 25 Cu Yds						Concrete Class 'A' 29 Cu Yds						Concrete Class 'A' 36 Cu Yds					
Reinforcement 327 Lbs.						Reinforcement 370 Lbs						Reinforcement 445 Lbs.					

FOR ALL SPANS	FOR ALL SPANS
LOCATION	BENT TYPES
Dowels: Curb to Rail	TYPE 1 / TYPE 2
" " "	
End Panels	
Intermediate Panels	
Panels	
Rail	

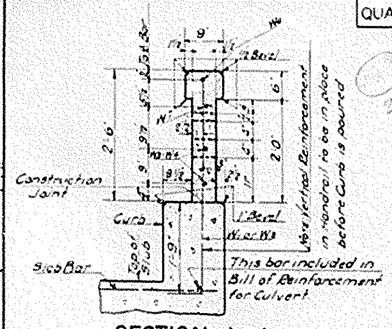
QUANTITIES SHOWN ARE FOR TWO RAILS - ONE AT EACH END OF CULVERT

ESTIMATE OF QUANTITIES



A

PART SECTIONAL PLAN



SECTION A-A

GENERAL NOTE

Specifications: Kentucky Department of Highways.

Concrete: Class 'A' concrete to be used thruout.

Reinforcement: Dimension from face of concrete to bar is clear distance. Dimension for bar spacing is the distance center to center of bar.

Construction Note: Concrete railing shall not be poured until the Falsework supporting the culvert Top Slab and Headwalls has been removed.

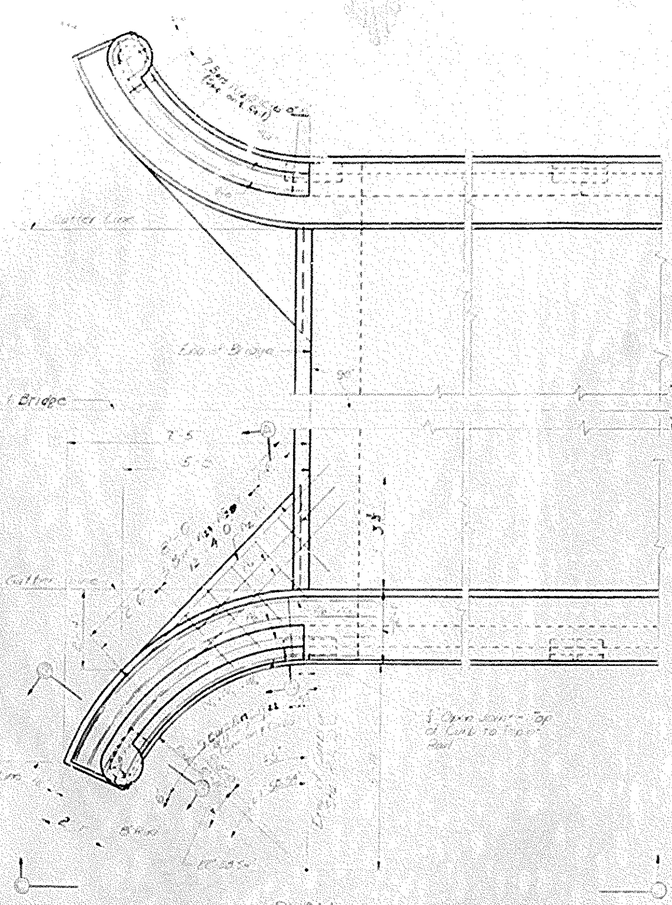
Beveled Edges: All exposed edges to be beveled 1/4 unless otherwise noted.

Note: Handrail to be used only when specified on culvert detail plans.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
STANDARD HANDRAIL FOR TRIPLE & DOUBLE 12'0" R.C. CULVERTS 0°-30°-45° SKEWS

DRAWING - CR 2

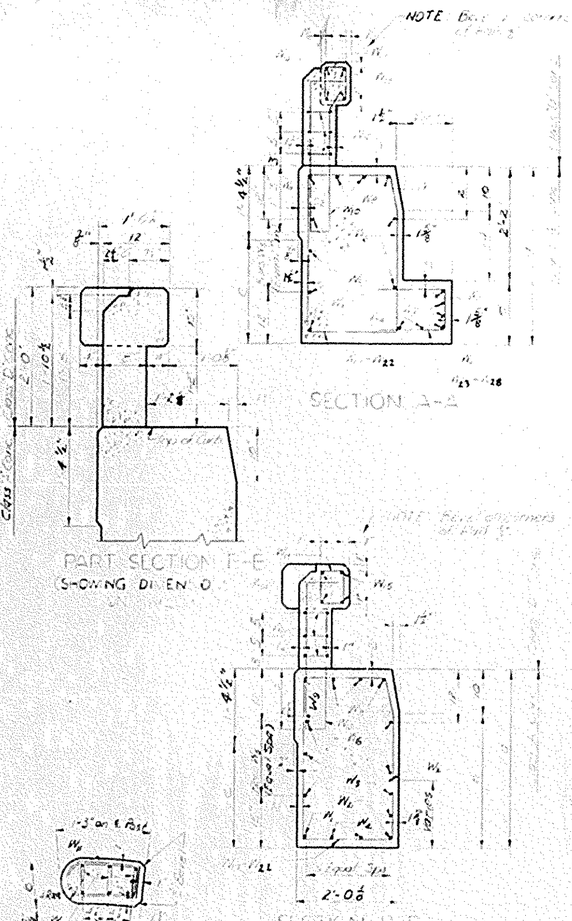
BRIDGE

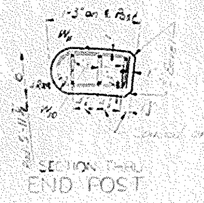


PLAN

ELEVATION C-C

When bridge is on a pr. curve, make the top of all posts and rail shall be parallel to the grade line. Sides of all posts shall be vertical.





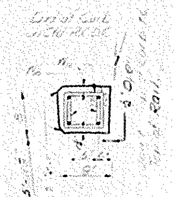


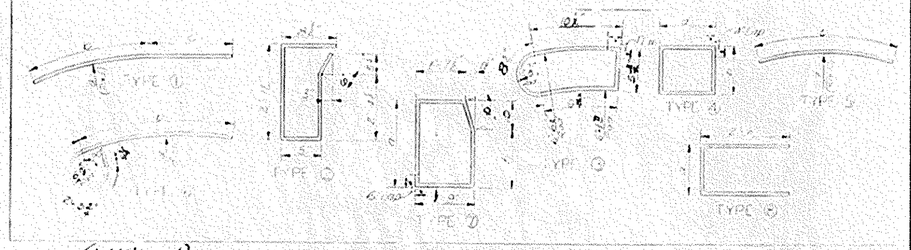
TABLE OF VARIABLE DIMENSIONS

Skew	a		b		c		d	
	'	in.	'	in.	ft.	in.	ft.	in.
20	20'	3	1½	2	3½	1	9	0	11½
25	20'	3	6½	2	8½	2	2	1	4½
30	20'	3	7½	2	9½	2	3	1	5½
35	20'	4	1½	3	4½	2	9	1	11½
40	20'	4	1½	3	3½	2	9	1	11½
45	20'	4	8½	3	10½	3	4	2	0½
50	20'	5	3½	4	5½	3	11	3	1½

BILL OF REINFORCEMENT (For One End Span)

Mark	Type	Size	Length	Location	No.	Total Length
W1	①		2 7			
W2	"		9			
W3	"		4			
W4	"		0 9			6
W5	"	6 6 8				7 2
W6	"		4			
W7	"		4			
W8	"		9			9 7 0
W9	"					
W10	②					
W11	③					
W12	④					
W13	"		8			5½
W14	⑤					
W15	⑥					3
W16	④	2		Wing		2
W17	⑦			Wing Haunch		
W18	"	18				
W19	"	18	10 9			3 4 2 6
W20	"	18 18	11 9			10 3
W21	"	18	12 11			4 5 3 7
W22	"	18	14 1			5 0 4 2
W23	⑧	10	5 6	Wing Haunch		0 8
W24	"	10	5 10			1 0
W25	"	10	5 11			1 1
W26	"	10 10	6 5			1 7
W27	"	10	7 0			2 2
W28	"	10	7 7	" "		2 9

TYPES OF REINFORCEMENT



(Additional)
ESTIMATE OF QUANTITIES (for One End Span)

Item	20' Roadway, Skew						
	20°	25°	30°	35°	40°	45°	50°
Class A Concrete, cu. yds.	44	5.1	5.2	6.0	6.0	7.0	8.0
Class B Concrete, Seals, cu. yds.	2.1	2.1	2.5	2.5	2.5	2.5	2.5
Reinforcement, lbs.	862	881	885	935	935	978	1017

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT
WINGS FOR STD. R.C.D.G.
END SPAN — STRAIGHT
20' ROADWAY

BRIDGE ENGINEER
STATE HIGHWAY ENG.

SHEET A

BRIDGE

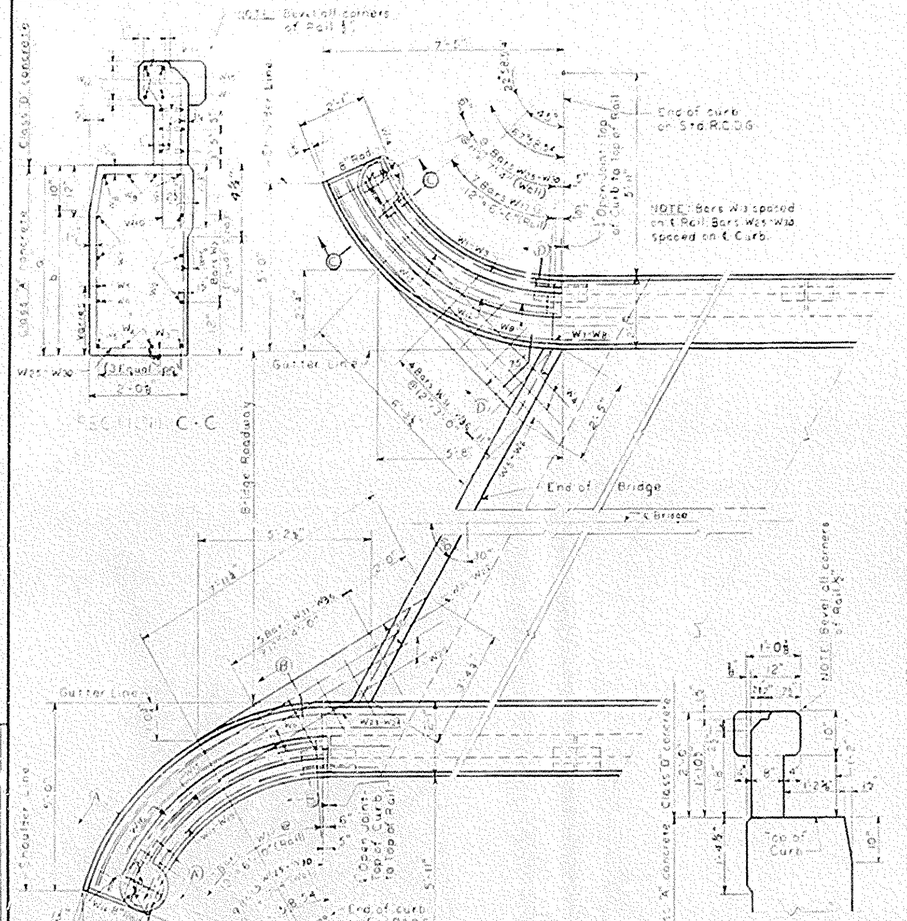


TABLE OF VARIABLE DIMENSIONS

SPAN	ROAD	a FT	a IN	b FT	b IN	c FT	c IN	d FT	d IN
20	20	3	1½	2	3½	1	9	0	11½
25	20	3	6½	2	8½	2	2	1	4½
30	20	3	7½	2	9½	2	3	1	5½
35	20	4	1½	3	3½	2	9	1	11½
40	20	4	1½	3	3½	2	9	1	11½
45	20	4	8½	3	10½	3	4	2	6½
50	20	5	3½	4	5½	3	11	3	1½

ESTIMATE OF QUANTITIES (For One End Span)

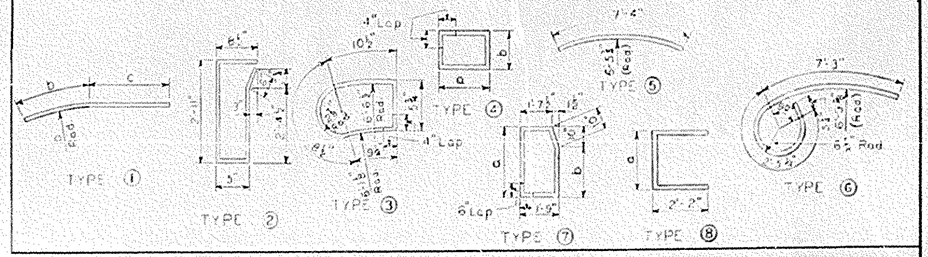
ITEM	20' ROADWAY SPAN 20'	25'	30'	35'	40'	45'	50'
Class A Concrete (Cu. Yds.)	4.2	4.9	5.0	5.7	5.7	6.6	7.6
Class D Concrete (Cu. Yds.)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Reinforcement (Lbs.)	871	891	901	945	945	988	1026

ADDITIONAL

BILL OF REINFORCEMENT (For One End Span)

MARK	TYPE	NUMBER FOR 20' ROADWAY SPAN 20'	25'	30'	35'	40'	45'	50'	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.	c FT.	c IN.
W1	①	1	1	1	1	1	1	1	1"	11	2	Top of Curb	6	2	7	2	4	0
W2	"	3	3	3	4	4	4	5	⅝"	8	11	Outside of W.Wall	6	2	7	2	1	9
W3	"	1	1	1	1	1	1	1	⅝"	9	3	Bottom of W.Wall	6	2	7	2	2	1
W4	"	2	2	2	2	2	2	2	"	9	7	Wall into Haunch	6	9	2	6	7	1
W5	"	2	2	2	2	2	2	2	"	10	2	" " "	7	9	2	11	7	3
W6	"	—	—	1	—	1	2	2	⅝"	8	0	" " "	7	9½	2	11	6	11
W7	"	2	2	2	2	2	2	2	"	9	11	Inside of W.Wall	7	9½	9	1	0	10
W8	"	1	1	1	1	1	1	1	1"	12	1	Top of Curb	7	7½	8	11	3	2
W9	"	4	4	4	4	4	4	4	"	11	6	" " "	6	9	7	10	3	6
W10	②	10	10	10	10	10	10	10	⅝"	6	7	Posts						
W11	③	6	6	6	6	6	6	6	"	3	4	End Posts	—	—	—	—		
W12	④	6	6	6	6	6	6	6	"	2	6	Interior Posts	0	6½	0	5½	—	—
W13	"	14	14	14	14	14	14	14	"	2	9	Rail	0	8	0	5½	—	—
W14	"	2	2	2	2	2	2	2	"	4	2	Rail at End Post	1	2	0	8		
W15	⑤	4	4	4	4	4	4	4	⅝"	7	4	Rail	—	—	—	—	—	—
W16	⑥	4	4	4	4	4	4	4	"	10	2	"	—	—	—	—	—	—
W17	①	1	1	1	1	1	1	1	1"	10	3	Top of Curb	6	2	7	2	3	1
W18	"	3	3	3	4	4	4	5	⅝"	8	0	Outside of W.Wall	6	2	7	2	0	10
W19	"	1	1	1	1	1	1	1	⅝"	8	4	Bottom of W.Wall	6	2	7	2	1	2
W20	"	2	2	2	2	2	2	2	"	12	1	Wall into Haunch	6	9	4	3	7	10
W21	"	2	2	2	2	2	2	2	"	13	7	" " "	7	9	5	0	8	7
W22	"	—	—	—	1	1	2	2	⅝"	13	3	" " "	7	9½	5	0	8	8
W23	"	2	2	2	2	2	2	2	"	10	11	Inside of W.Wall	7	9½	9	1	1	10
W24	"	1	1	1	1	1	1	1	1"	12	10	Top of Curb	7	7½	8	11	3	11
W25	⑦	18	—						⅝"	9	9	Wing Walls	2	10	2	0	—	—
W26	"	—	18	—					"	10	7	" "	3	3	2	5	—	—
W27	"			18					"	10	9	" "	3	4	2	6	—	—
W28	"				18	18			"	11	9	" "	3	10	3	0	—	—
W29	"				—	—	18		"	12	11	" "	4	5	3	1	—	—
W30	"							18	"	14	1	" "	5	0	4	2	—	—
W31	⑧	9							"	4	9	Wing Haunch	0	7½	—	—	—	—
W32	"		9						"	5	2	" "	1	0½	—	—	—	—
W33	"			9					"	5	3	" "	1	1½	—	—	—	—
W34	"				9	9			"	5	9	" "	1	7½	—	—	—	—
W35	"						9		"	6	4	" "	2	2½	—	—	—	—
W36	"							9	"	6	11	" "	2	9½	—	—	—	—

TYPES OF REINFORCEMENT



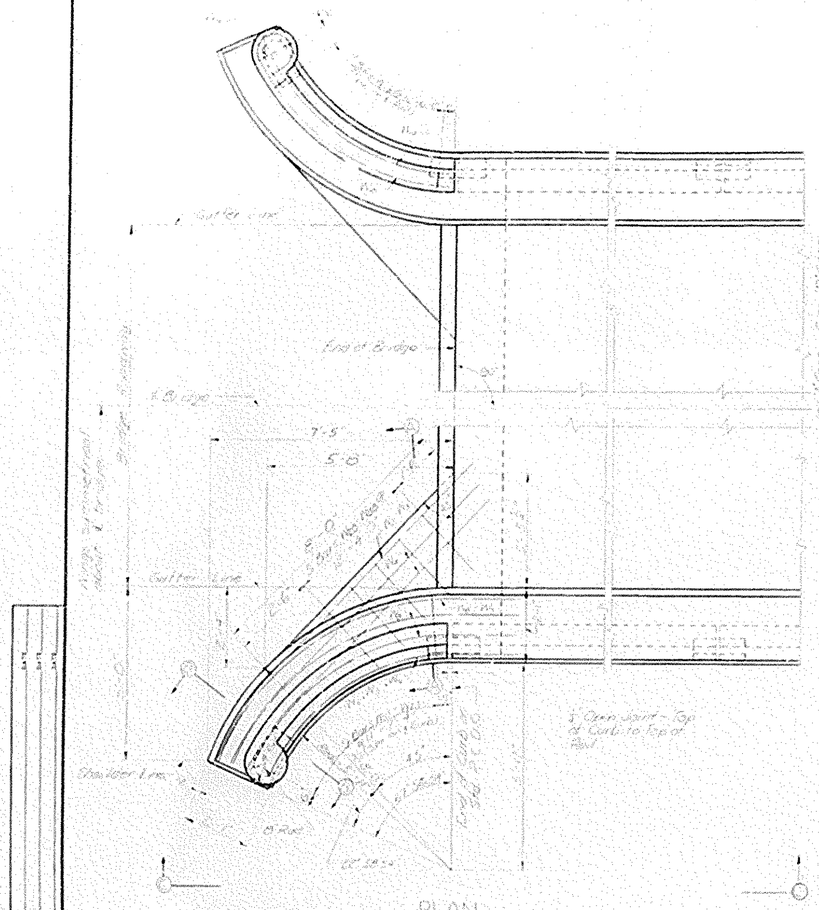
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

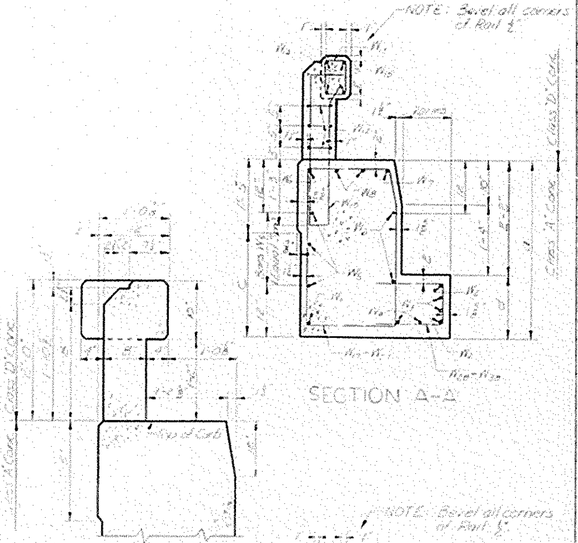
WINGS FOR STD. R.C.D.G.
END SPAN — 30° SKEW
20' ROADWAY

L. Bay — BRIDGE ENGINEER
STATE HIGHWAY ENGR.

DRAWING NO. H-68A

BRIDGE





ADDITIONAL BILL AND TYPES OF REINFORCEMENT (FOR ONE END SPAN)

MARK	TYPE	NUMBER FOR CL ROADWAY SPAN 20	25	30	35	40	45	50	NUMBER FOR 22 ROADWAY SPAN 20	25	30	35	40	45	50	NUMBER FOR 24 ROADWAY SPAN 20	25	30	35	40	45	50	NUMBER FOR 26 ROADWAY SPAN 20	25	30	35	40	45	50	#	LENGTH FT	IN	LOCATION	a FT	IN	b FT	IN	c FT	IN
W_1	(1)	2	2	2	2	2	2	-	2	2	2	2	2	2	-	2	2	2	2	2	2	-	2	2	2	2	2	2	-	4	8	2	Outside of W. Wall	6	2	7	2	1	0
W_2	-	4	4	4	4	4	4	-	4	4	4	4	4	4	-	4	4	4	4	4	4	-	4	4	4	4	4	4	-		11	9	Wall and Footing	7	3	8	11	8	10
W_3	-	-	2	2	2	2	2	-	-	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	11	5	"	6	9½	8	11	8	6
W_4	-	4	4	4	4	4	4	-	4	4	4	4	4	4	-	4	4	4	4	4	4	-	4	4	4	4	4	4	-	1	10	10	"	6	3	7	2	6	4
W_5	-	6	6	6	8	8	10	-	6	6	6	8	10	10	-	6	6	6	8	8	10	-	6	6	6	8	8	10	-	1	7	10	"	6	2	7	2	0	8
W_6	-	4	4	4	4	4	4	-	4	4	4	4	4	4	-	4	4	4	4	4	4	-	4	4	4	4	4	4	-	1	9	9	Inside of W. Wall	7	0½	9	1	0	8
W_7	-	2	2	2	2	2	2	-	2	2	2	2	2	2	-	2	2	2	2	2	2	-	2	2	2	2	2	2	-	1	11	10	Top of Curb	7	7½	8	11	2	11
W_8	-	4	4	4	4	4	4	-	4	4	4	4	4	4	-	4	4	4	4	4	4	-	4	4	4	4	4	4	-		10	9	"	6	9	7	10	2	11
W_9	-	2	2	2	2	2	2	-	2	2	2	2	2	2	-	2	2	2	2	2	2	-	2	2	2	2	2	2	-		10	1	"	6	2	7	2	2	11
W_{10}	(2)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1	6	7	Posts	-	-	-	-	-	-
W_{11}	(5)	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	1	3	2	End Post	-	-	-	-	-	-
W_{12}	(3)	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6		2	6	Interior Post	0	8¾	0	5½	-	-
W_{13}	-	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14		2	9	Rail	0	9	0	5½	-	-
W_{14}	(5)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1	7	4		6	5¾	7	4	-	-
W_{15}	(6)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		10	2		6	9¾	7	5	-	-
W_{16}	(4)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	4	2	Rail at End Post	1	3	1	8	-	-
W_{17}	(7)	18	-	-	-	-	-	-	-	-	-	-	-	-	18	18	-	-	-	-	-	-	18	18	-	-	-	-	-	1	9	9	Wing Walls	2	10	2	0	-	-
W_{18}	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	18	-	-	-	-		10	7	"	3	3	3	5	-	-
W_{19}	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	18	-	-	-		11	0	"	3	5½	3	7½	-	-
W_{20}	-	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	18	-	-		11	5	"	3	8	2	10	-	-
W_{21}	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	18	-	-	-		11	9	"	3	10	3	0	-	-
W_{22}	-	-	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	18	-	-		12	6	"	4	2½	3	11	-	-
W_{23}	-	-	-	18	18	-	-	-	-	-	-	-	-	-	-	-	18	18	-	-	-	-	-	-	18	18	-	-	-		12	11	"	4	5	3	7	-	-
W_{24}	-	-	-	-	-	-	18	18	-	-	-	-	-	-	-	-	-	-	18	18	-	-	-	-	-	-	18	18	-		13	9	"	4	10	4	0	-	-
W_{25}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	18		14	3	"	5	1½	4	3	-	-
W_{26}	-	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	18	-	-	-		14	7	"	5	3	4	5	-	-
W_{27}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18		15	3	"	5	7	4	9	-	-
W_{28}	(8)	10	-	-	-	-	-	-	-	-	-	-	-	-	10	10	-	-	-	-	-	-	10	10	-	-	-	-	-		9	5	Wing Haunches	0	7½	-	-	-	-
W_{29}	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	10	-	-	-	-		5	10	"	1	10½	-	-	-	-
W_{30}	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	10	-	-	-		6	0	"	1	9	-	-	-	-
W_{31}	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	10	-	-		6	3	"	1	5½	-	-	-	-
W_{32}	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	10	-	-	-		6	5	"	1	7½	-	-	-	-
W_{33}	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	10	-	-		6	9	"	1	11½	-	-	-	-
W_{34}	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	10	-		7	0	"	2	1½	-	-	-	-
W_{35}	-	-	-	-	-	-	10	10	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	10		7	3	"	2	3½	-	-	-	-
W_{36}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	10		7	10	"	2	7½	-	-	-	-
W_{37}	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	10		8	2	"	2	9½	-	-	-	-

TABLE OF VARIABLE DIMENSIONS

Skew from	a		b		c		d	
		FT	IN	FT	IN	FT	IN	
20°	20	2	1	2	10	5	10	2
	25	2	3	2	10	5	11	1
	30	2	5	2	11	6	1	0
25°	20	2	5	2	10	5	11	1
	25	2	10	3	0	6	2	0
	30	3	2	3	2	6	5	0
30°	20	2	10	2	11	6	1	1
	25	3	4	3	5	6	7	0
	30	3	9	3	10	6	11	0
35°	20	3	3	3	4	6	8	0
	25	3	8	3	9	6	11	0
	30	4	1	4	2	7	3	0
40°	20	3	8	3	9	6	11	0
	25	4	2	4	3	7	3	0
	30	4	8	4	9	7	9	0
45°	20	4	10	4	11	7	5	0
	25	5	3	5	4	7	10	0
	30	5	9	5	10	8	4	0
50°	20	5	7	5	8	8	0	0
	25	6	2	6	3	8	6	0
	30	6	9	6	10	8	11	0

ESTIMATE OF ADDITIONAL QUANTITIES (FOR ONE END SPAN)

ITEM	22' ROADWAY SPAN 20'	25'	30'	35'	40'	45'	50'	24' ROADWAY SPAN 20'	25'	30'	35'	40'	45'	50'	26' ROADWAY SPAN 20'	25'	30'	35'	40'	45'	50'
Conc. Class "A"	3.3	3.3	3.3	6.3	7.2	7.2	8.5	5.1	5.6	5.8	6.8	7.8	7.9	9.1	4.4	4.6	5.3	6.1	7.1	7.7	8.2
Conc. "B"	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Reinforcement (Lbs.)	861	861	906	935	978	978	1029	881	906	917	953	1009	1009	1060	861	861	881	935	978	978	1021

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

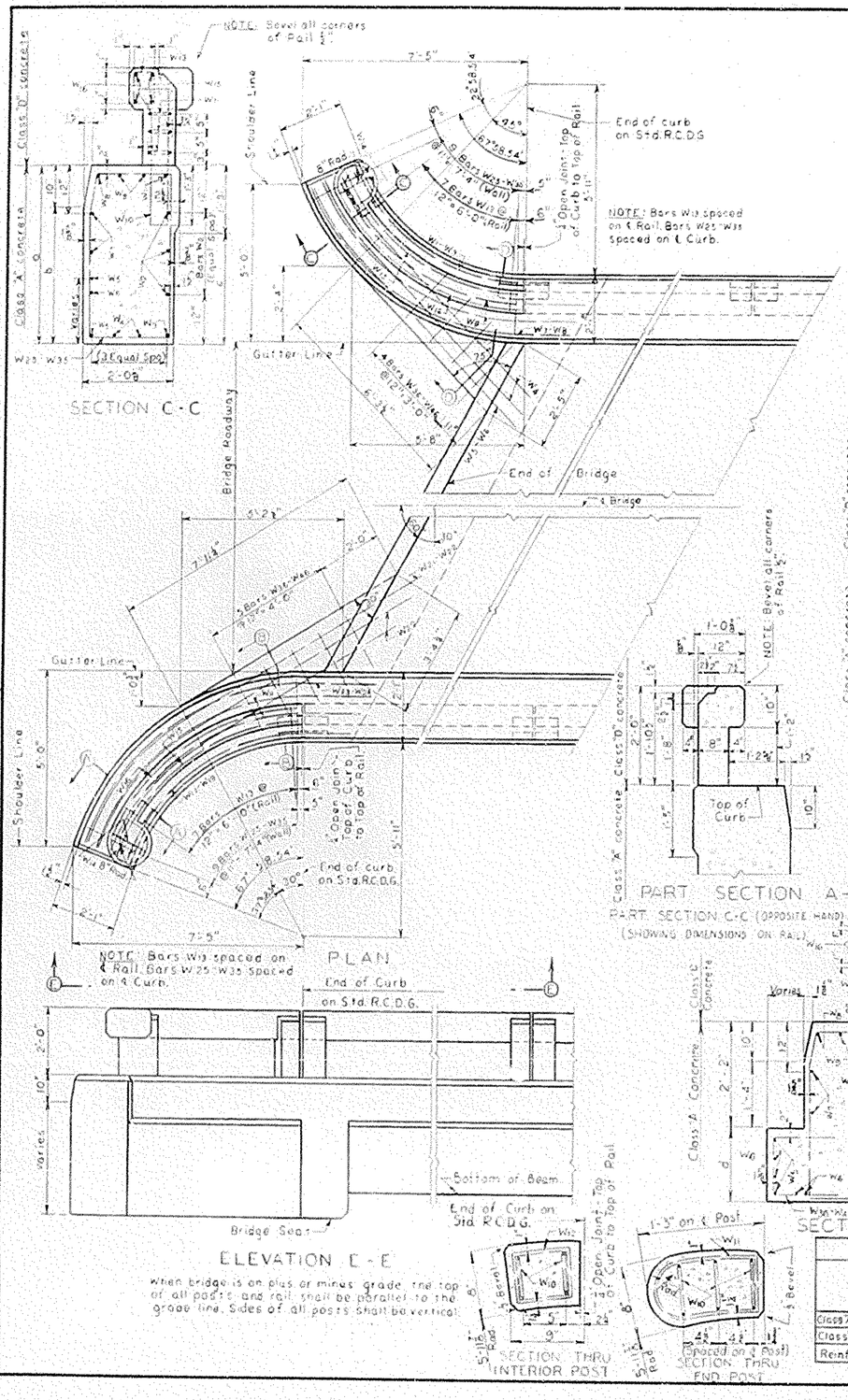
WINGS FOR STD. R.C.D.G.
END SPAN — STRAIGHT
22', 24', AND 26' ROADWAY

FOR

APPROVED BY: _____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

DRAWING NO. H-87

BRIDGE

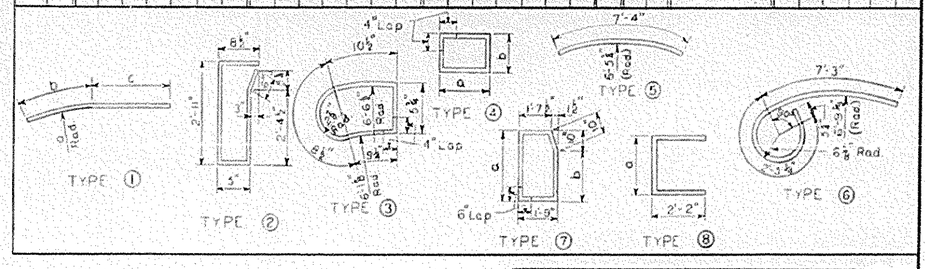


ADDITIONAL BILL AND TYPES OF REINFORCEMENT (FOR ONE END SPAN)

MARK	TYPE	NUMBER FOR 22' ROADWAY — SPAN 20'	25'	30'	35'	40'	45'	50'	NUMBER FOR 24' ROADWAY — SPAN 20'	25'	30'	35'	40'	45'	50'	NUMBER FOR 26' ROADWAY — SPAN 20'	25'	30'	35'	40'	45'	50'	SIZE	LENGTH FT.	LENGTH IN.	LOCATION	a FT.	a IN.	b FT.	b IN.	c FT.	c IN.
W1	①	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1½"	11	2	Top of Curb	6	2	7	2	4	0
W2	"	3	3	3	4	4	4	5	3	3	3	4	5	5	5	3	3	3	4	4	4	5	⅝"	8	11	Outside of W.Wall	6	2	7	2	1	9
W3	"	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	⅜"	9	3	Bottom of W.Wall	6	2	7	2	2	1
W4	"	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	"	9	7	Wall into Haunch	6	9	7	6	7	1
W5	"	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	½"	10	2	" " "	7	9	2	11	7	3
W6	"	—	—	1	1	2	2	2	—	1	1	1	2	2	3	—	—	1	1	2	2	2	⅝"	8	10	" " "	7	9½	2	11	6	11
W7	"	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	"	9	11	Inside of W.Wall	7	9½	9	1	0	10
W8	"	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	⅝"	12	1	Top of Curb	7	7½	8	11	3	2
W9	"	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	"	11	6	" " "	6	9	7	10	3	8
W10	②	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	⅜"	6	7	Posts	—	—	—	—	—	—
W11	③	6	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	⅝"	3	4	End Posts	—	—	—	—	—	—
W12	④	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	"	2	6	Interior Posts	0	6½	0	5⅜	—	—
W13	"	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	"	2	9	Rail	0	8	0	5½	—	—
W14	"	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	"	4	2	Rail at End Post	1	2	0	8	—	—
W15	⑤	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	⅝"	7	4	Rail	—	—	—	—	—	—
W16	⑥	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	"	10	2	" " "	—	—	—	—	—	—
W17	⑦	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	⅝"	10	3	Top of Curb	6	2	7	2	3	1
W18	"	3	3	3	4	4	4	5	3	3	3	4	5	5	5	3	3	3	4	4	4	5	⅝"	8	0	Outside of W.Wall	6	2	7	2	0	10
W19	"	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	⅜"	8	4	Bottom of W.Wall	6	2	7	2	1	2
W20	"	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	"	12	1	Wall into Haunch	6	9	4	3	7	10
W21	"	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	½"	13	7	" " "	7	9	5	0	8	7
W22	"	—	—	1	1	2	2	2	—	1	1	1	2	2	3	—	—	1	1	2	2	2	⅝"	13	3	" " "	7	9½	5	0	8	3
W23	"	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	"	10	11	Inside of W.Wall	7	9½	9	1	1	10
W24	"	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	⅝"	12	10	Top of Curb	7	7½	8	11	3	11
W25	⑦	18	—	—	—	—	—	—	—	—	—	—	—	—	—	18	18	—	—	—	—	—	⅝"	9	9	Wing Walls	2	10	2	0	—	—
W26	"	—	18	—	—	—	—	—	18	—	—	—	—	—	—	—	—	18	—	—	—	—	"	10	7	" " "	3	3	2	5	—	—
W27	"	—	—	18	—	—	—	—	—	18	—	—	—	—	—	—	—	—	—	—	—	—	"	11	0	" " "	3	5½	2	7½	—	—
W28	"	—	—	—	—	—	—	—	—	—	18	—	—	—	—	—	—	—	—	—	—	—	"	11	5	" " "	3	8	2	10	—	—
W29	"	—	—	18	—	—	—	—	—	—	—	—	—	—	—	—	—	18	—	—	—	—	"	11	9	" " "	3	10	3	0	—	—
W30	"	—	—	—	—	—	—	—	—	—	18	—	—	—	—	—	—	—	—	—	—	—	"	12	6	" " "	4	2½	3	4½	—	—
W31	"	—	—	—	18	18	—	—	—	—	—	—	—	—	—	—	—	—	18	18	—	—	"	12	11	" " "	4	5	3	7	—	—
W32	"	—	—	—	—	—	—	—	—	—	—	18	18	—	—	—	—	—	—	—	—	—	"	13	9	" " "	4	10	4	0	—	—
W33	"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18	—	"	14	3	" " "	5	1	4	3	—	—
W34	"	—	—	—	—	18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	"	14	7	" " "	5	3	4	5	—	—
W35	"	—	—	—	—	—	—	—	—	—	—	—	18	—	—	—	—	—	—	—	—	—	"	15	3	" " "	5	7	4	9	—	—
W36	⑧	9	—	—	—	—	—	—	—	—	—	—	—	—	—	9	9	—	—	—	—	—	"	4	9	Wing Haunches	0	7½	—	—	—	—
W37	"	—	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	—	—	—	—	"	5	2	" " "	1	0½	—	—	—	—
W38	"	—	—	9	—	—	—	—	—	9	—	—	—	—	—	—	—	—	—	—	—	—	"	5	4	" " "	1	2½	—	—	—	—
W39	"	—	—	—	—	—	—	—	—	—	9	—	—	—	—	—	—	—	—	—	—	—	"	5	7	" " "	1	5½	—	—	—	—
W40	"	—	—	—	9	—	—	—	—	—	—	—	—	—	—	—	—	—	9	—	—	—	"	5	9	" " "	1	7½	—	—	—	—
W41	"	—	—	—	—	—	—	—	—	—	—	9	—	—	—	—	—	—	—	—	—	—	"	6	1	" " "	1	11½	—	—	—	—
W42	"	—	—	—	—	9	9	—	—	—	—	—	—	—	—	—	—	—	—	9	9	—	"	6	4	" " "	2	2½	—	—	—	—
W43	"	—	—	—	—	—	—	—	—	—	—	—	9	9	—	—	—	—	—	—	—	—	"	6	9	" " "	2	7½	—	—	—	—
W44	"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	—	"	7	0	" " "	2	10½	—	—	—	—
W45	"	—	—	—	9	—	—	—	—	—	—	—	—	9	—	—	—	—	—	—	—	—	"	7	2	" " "	3	0½	—	—	—	—
W46	"	—	—	—	—	—	—	—	—	—	—	—	—	—	9	—	—	—	—	—	—	—	"	7	6	" " "	3	4½	—	—	—	—

TABLE OF VARIABLE DIMENSIONS

SPAN	ROADWAY	a FT.	a IN.	b FT.	b IN.	c FT.	c IN.	d FT.	d IN.
20'	22'	3	2½	2	4½	1	9½	1	0½
	24'	3	1	2	9	2	2	1	5
	26'	3	2	2	4	1	9	1	0
25'	22'	3	8	2	10	2	3	1	6
	24'	3	10½	3	10½	2	5½	1	8½
	26'	3	3	2	5	1	10	1	1
30'	22'	3	9½	2	11½	2	4½	1	7½
	24'	4	0	3	2	2	7	1	10
	26'	3	8	2	10	2	3	1	6
35'	22'	4	3	3	5	2	10	2	1
	24'	4	6½	3	8½	3	1½	2	4½
	26'	4	2	3	4	2	9	2	0
40'	22'	4	10	4	0	3	5	2	8
	24'	5	2	4	4	3	9	3	0
	26'	4	9	3	11	3	4	2	7
45'	22'	4	10	4	0	3	5	2	8
	24'	5	2½	4	4½	3	9½	3	0½
	26'	4	9	3	11	3	4	2	7
50'	22'	5	7	4	5	4	2	3	5
	24'	5	11	5	1	4	6	3	9
	26'	5	5	4	7	4	0	3	3



ESTIMATE OF ADDITIONAL QUANTITIES (FOR ONE END SPAN)

ITEM	22' ROADWAY — SPAN 20'	25'	30'	35'	40'	45'	50'	24' ROADWAY — SPAN 20'	25'	30'	35'	40'	45'	50'	26' ROADWAY — SPAN 20'	25'	30'	35'	40'	45'	50'
Class "A" concrete (Cu. Yds.)	4.5	5.3	5.5	6.2	7.2	7.2	8.5	5.1	5.6	5.8	6.7	7.8	7.8	9.0	4.5	4.6	5.3	6.1	7.1	7.1	8.2
Class "D" concrete (Cu. Yds.)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Reinforcement (Lbs.)	871	891	916	945	988	988	1038	891	916	926	962	1018	1018	1069	871	871	891	945	988	988	1030

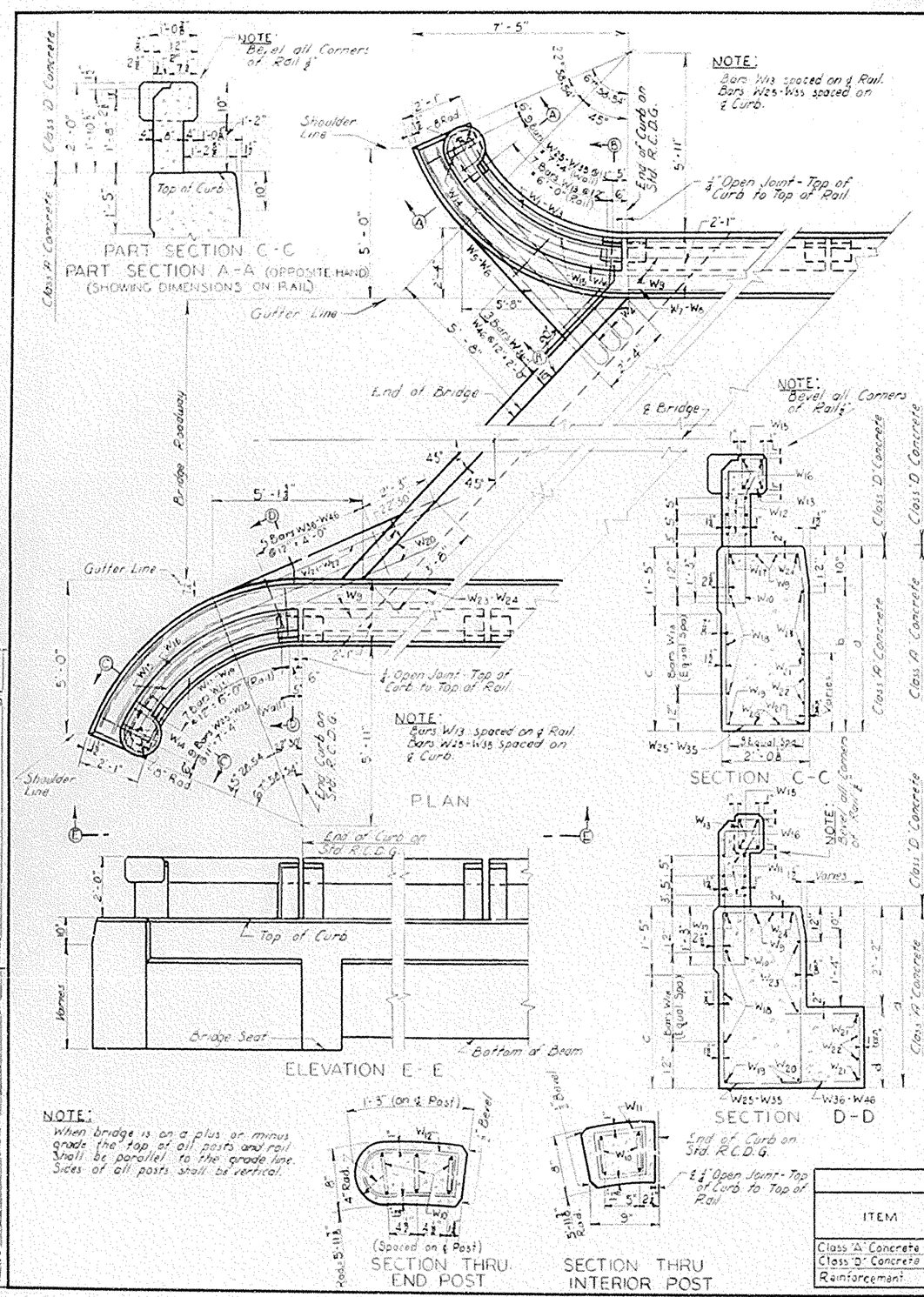
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

WINGS FOR STD. R.C.D.G.
END SPAN — 30° SKEW
22', 24', AND 26' ROADWAY
1951

APPROVED BY: _____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

DRAWING NO. H-88

BRIDGE

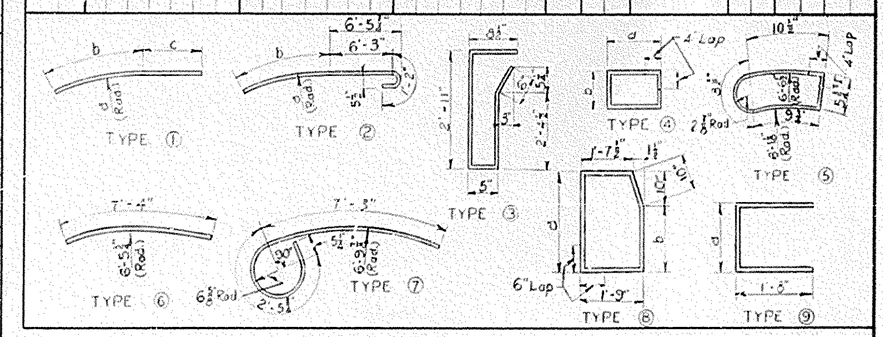


ADDITIONAL BILL AND TYPES OF REINFORCEMENT (FOR ONE END SPAN)

MARK	TYPE	NUMBER FOR 22' ROADWAY SPAN 20'	25'	30'	35'	40'	45'	50'	NUMBER FOR 24' ROADWAY SPAN 20'	25'	30'	35'	40'	45'	50'	NUMBER FOR 26' ROADWAY SPAN 20'	25'	30'	35'	40'	45'	50'	SIZE	LENGTH FT.	IN.	LOCATION	d FT.	d IN.	b FT.	b IN.	c FT.	c IN.
W1	①	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1"ø	11	11	Top of Curb	6	2	7	2	4	9
W2	-	3	3	3	4	4	4	5	3	3	3	4	5	5	5	3	3	3	4	4	4	5	½" ø	9	8	Outside of W Wall	6	2	7	2	2	6
W3	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	"	10	0	Bottom of W Wall	6	2	7	2	2	10
W4	②	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	"	5	11	Wall into Haunch	6	9	2	6	—	—
W5	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	"	10	4	" "	7	9	2	11	—	—
W6	③	—	—	1	1	2	2	2	—	1	1	2	2	3	—	—	—	1	2	2	2	2	½" ø	9	3	" "	7	9½	2	11	6	4
W7	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	"	10	0	Inside of W Wall	7	9½	9	1	0	11
W8	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1"ø	12	3	Top of Curb	7	7½	8	11	3	4
W9	-	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	"	12	1	Top of Curbs	6	9	7	10	4	3
W10	④	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	⅝" ø	6	7	Posts	—	—	—	—	—	—
W11	⑤	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	⅝" ø	2	6	Interior Post	0	6½	0	5½	—	—
W12	⑤	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	"	3	4	End Post	—	—	—	—	—	—
W13	⑤	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	"	2	9	Rail	0	8	0	5½	—	—
W14	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	"	4	2	Rail at End Post	1	2	0	8	—	—
W15	⑥	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	⅝" ø	7	4	" "	—	—	—	—	—	—
W16	⑦	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	"	10	2	" "	—	—	—	—	—	—
W17	⑦	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1"ø	10	5	Top of Curb	6	2	7	2	3	3
W18	-	3	3	3	4	4	4	5	3	3	3	4	5	5	5	3	3	3	4	4	4	5	½" ø	8	2	Outside of W Wall	6	2	7	2	1	0
W19	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	"	8	6	Bottom of W Wall	6	2	7	2	1	4
W20	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	"	12	10	Wall into Haunch	6	9	5	2	7	8
W21	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	"	14	11	" "	7	9	6	0	8	11
W22	-	—	—	1	1	2	2	2	—	1	1	2	2	3	—	—	—	1	2	2	2	2	½" ø	14	7	" "	7	9½	6	0	8	7
W23	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	"	11	8	Inside of W Wall	7	9½	9	1	2	7
W24	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1"ø	13	8	Top of Curb	7	7½	8	11	4	9
W25	⑧	18							18							18	18						⅝" ø	9	9	Wing Walls	2	10	2	0	—	—
W26	-		18							18								18					"	10	7	" "	3	3	2	5	—	—
W27	-			18							18								18				"	11	0	" "	3	5½	2	7½	—	—
W28	-				18							18								18			"	11	5	" "	3	8	2	10	—	—
W29	-					18							18								18		"	11	9	" "	3	10	3	0	—	—
W30	-						18							18								18	"	12	6	" "	4	2½	3	4½	—	—
W31	-					18	18							18	18						18	18	"	12	11	" "	4	5	3	7	—	—
W32	-																						"	13	9	" "	4	10	4	0	—	—
W33	-																					18	"	14	3	" "	5	1	4	3	—	—
W34	-					18																	"	14	7	" "	5	3	4	7	—	—
W35	-														18								"	15	3	" "	5	7	4	9	—	—
W36	⑨	8														8	8						"	3	9	Wing Haunches	0	7½	—	—	—	—
W37	-		8							8								8					"	4	2	" "	1	0½	—	—	—	—
W38	-			8							8								8				"	4	4	" "	1	2½	—	—	—	—
W39	-				8							8								8			"	4	7	" "	1	5½	—	—	—	—
W40	-			8									8								8		"	4	9	" "	1	7½	—	—	—	—
W41	-						8							8									"	5	1	" "	1	10½	—	—	—	—
W42	-				8	8						8	8						8	8			"	5	4	" "	2	2½	—	—	—	—
W43	-													8	8								"	5	9	" "	2	7½	—	—	—	—
W44	-																					8	"	6	0	" "	2	10½	—	—	—	—
W45	-					8																	"	6	2	" "	3	0½	—	—	—	—
W46	-														8								"	6	6	" "	3	4½	—	—	—	—

TABLE OF VARIABLE DIMENSIONS

SPAN	RDWY	d FT.	d IN.	b FT.	b IN.	c FT.	c IN.	d FT.	d IN.
20'	22'	3	2½	2	4½	1	9½	1	10½
	24'	3	7	2	9	2	2	1	5
	26'	3	2	2	4	1	9	1	0
25'	22'	3	8	2	10	2	3	1	6
	24'	3	10½	3	0½	2	5½	1	8½
	26'	3	3	2	5	1	10	1	1
30'	22'	3	9½	2	11½		4½	1	7½
	24'	4	0	3	2	2	7	1	10
	26'	3	8	2	10	2	3	1	6
35'	22'	4	3	3	5	2	10	2	1
	24'	4	6½	3	8½	3	1½	2	4½
	26'	4	2	3	4	2	9	2	0
40'	22'	4	10	4	0	3	5	2	8
	24'	5	2	4	4	3	9	3	0
	26'	4	9	3	11	3	4	2	7
45'	22'	4	10	4	0	3	5	2	8
	24'	5	2½	4	4½	3	9½	3	0½
	26'	4	9	3	11	3	4	2	7
50'	22'	5	7	4	9	4	2	3	5
	24'	5	11	5	1	4	6	3	9
	26'	5	5	4	7	4	0	3	3



ESTIMATE OF ADDITIONAL QUANTITIES (FOR ONE END SPAN)

ITEM	22' ROADWAY SPAN 20'	25'	30'	35'	40'	45'	50'	24' ROADWAY SPAN 20'	25'	30'	35'	40'	45'	50'	26' ROADWAY SPAN 20'	25'	30'	35'	40'	45'	50'
Class 'A' Concrete (Cu. Yds.)	4.6	5.4	5.6	6.3	7.3	7.3	8.6	5.2	5.7	5.9	6.8	7.9	8.0	9.1	4.5	4.7	5.4	6.2	7.2	7.2	8.3
Class 'D' Concrete (Cu. Yds.)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Reinforcement (Lbs.)	881	900	926	955	998	998	1046	900	926	935	972	1029	1029	1079	881	881	900	955	998	998	1040

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT

WINGS FOR STD. R.C.D.G.
END SPAN — 45° SKEW
22', 24', AND 26' ROADWAY
1951

APPROVED BY _____ BRIDGE ENGINEER
_____ STATE HIGHWAY ENGINEER

DRAWING NO. H-89

BRIDGE