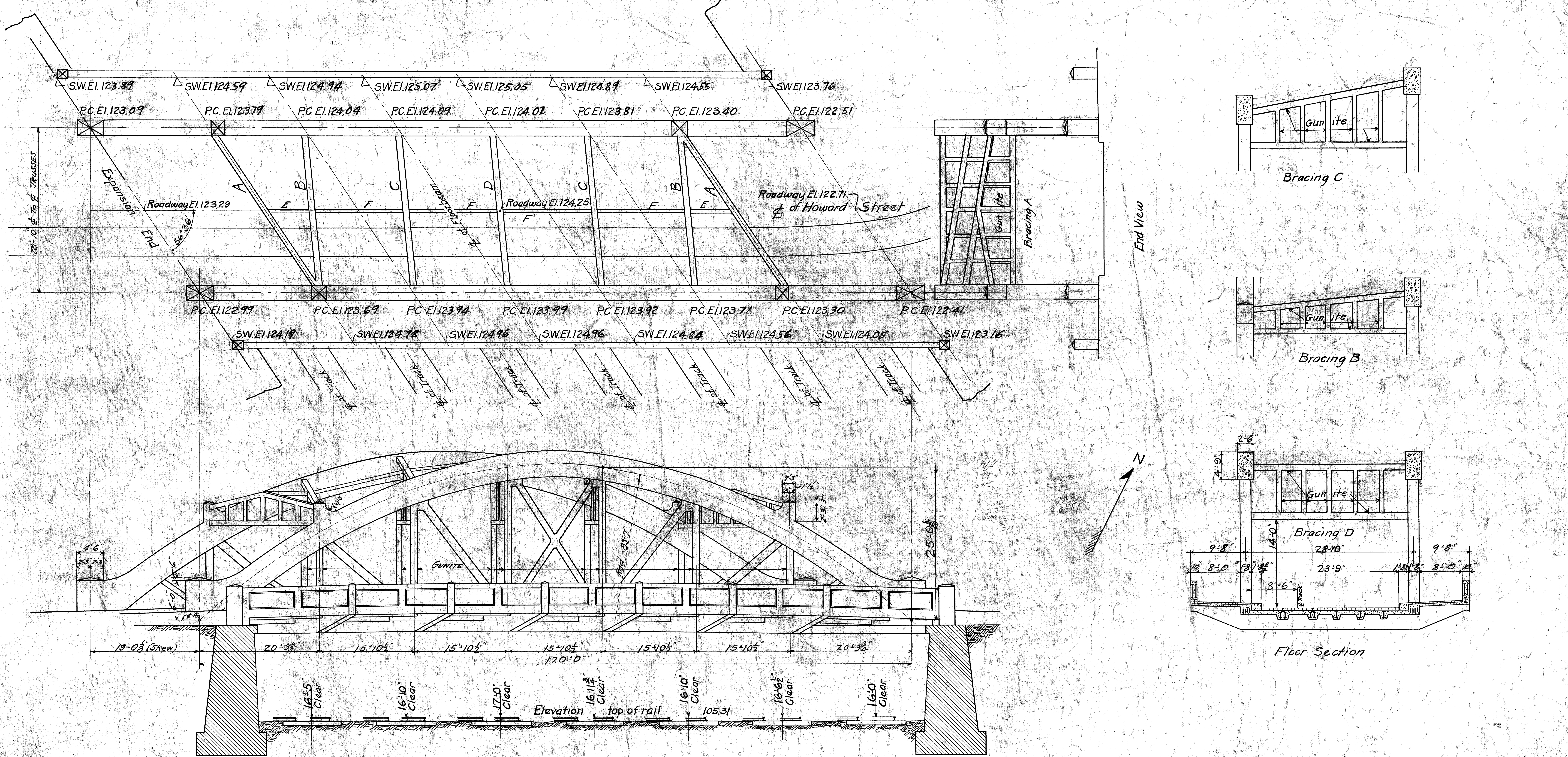


Contractor used "fine" material in concrete encasement of Bracing and Truss Members instead of Gunite as called for originally.

City Of Detroit

Department Of Public Works

Office Of City Engineer

Division Of Grade Separation And Bridges

General Plan

For Howard St. Bridge Over

M.C.R.R. Main Line

Scale $\frac{1}{8}$" = 1'-0"

1A

Sheet 1A

Dec. 1920

File XO 59-1

Note! See shop drawings for complete & revised details.

CITY OF DETROIT

DEPARTMENT OF PUBLIC WORKS
OFFICE OF CITY ENGINEER
DIVISION OF GRADE SEPARATION AND BRIDGES

FLOOR BEAM & STRINGER DETAILS
FOR
HOWARD ST. BRIDGE
OVER
M.C.R.R. MAIN LINE

SCALE ¾" = 1'-0"

Rivets ¾" ⌀
Holes 13/16" ⌀ unless noted.

Rev. 1-8-21

SHEET 3 OF 8 SHEETS

Dec. 1920

3A

File X059-2

For Sections H-H, J-J, K-K & L-L see Sheet 4.

General Notes

Concrete Mix: For Slab & Railing 1:2:4
Protection over Waterproofing in Roadway: 1:2 Mortar
" " " Sidewalk: 1:2:4 with a 1/2" wearing surface of neat cement.

Gunite: Cover all surfaces of Floor Beams & Sidewalk Brackets left exposed after pouring slab with a coat of Gunite about 2" thick.

Expanded Metal: 3" - #12 gage minimum weight.

Wire Mesh: 049 - Amer. Steel & Wire Co's or equal.

All paneling on railing to have 3/4" x 3" bevel.

Note! Contractor used fine aggregate for concrete encasement instead of Gunite.

CITY OF DETROIT

Department Of Public Works
Office Of City Engineer
Division Of Grade Separation And Bridges

DETAILS OF FLOOR SLAB AND ENCASEMENT OF STRUCTURAL STEEL FLOOR MEMBERS FOR HOWARD ST. BRIDGE OVER M.C.R.R. MAIN LINE

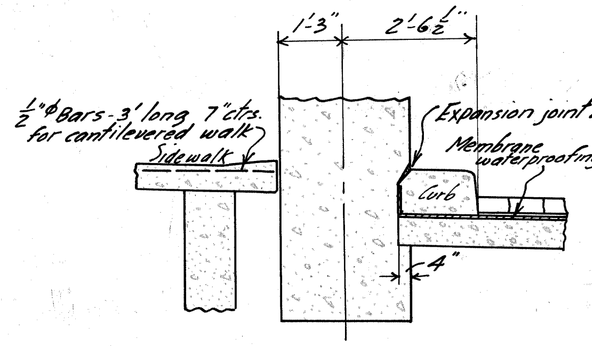
Scales: As Indicated.

Drawn by: R.S.
Chkd by: J.L.B.

Sh. #3 Aug. 1921

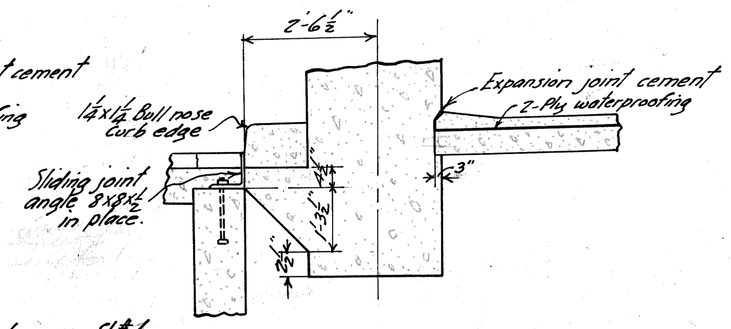
3.

File X059-3

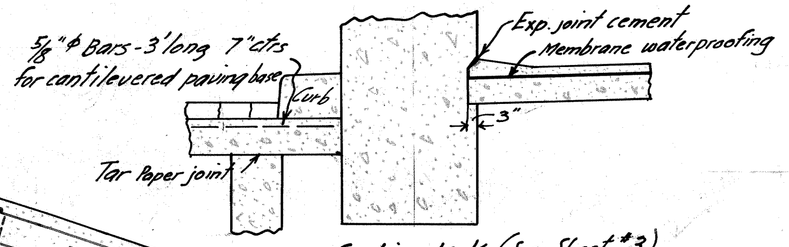


Note! Backwall details shown on Sh. #1.

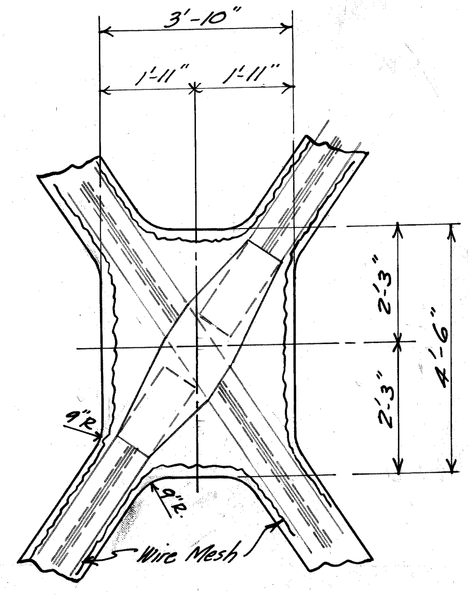
Section H-H (See Sheet #3)



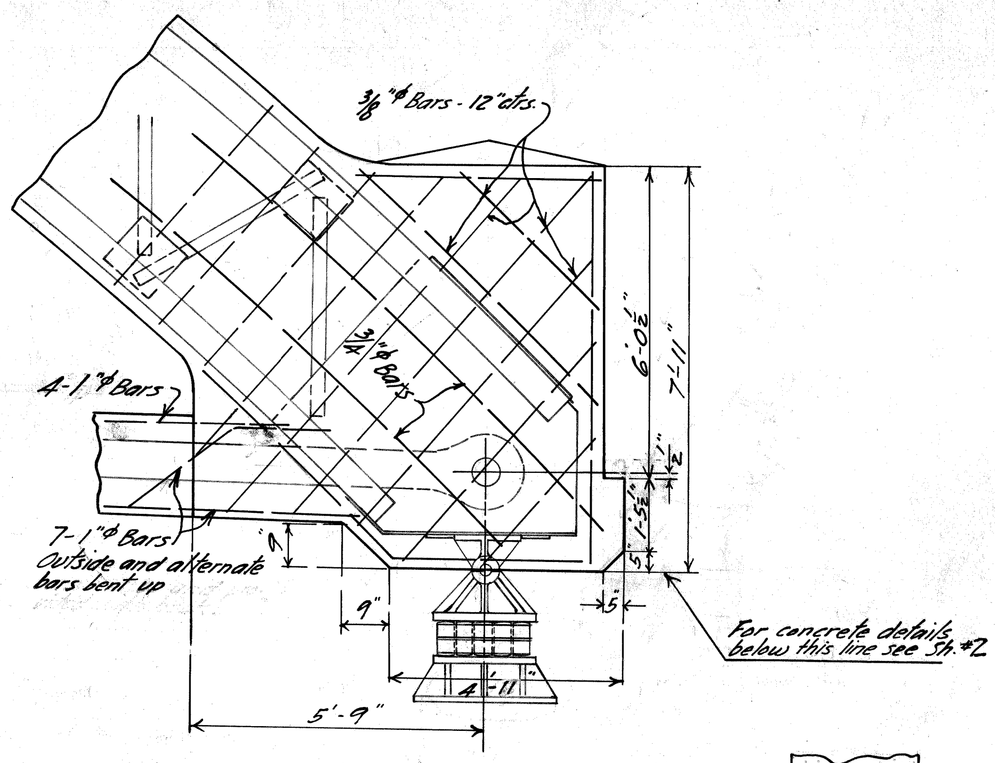
Section J-J (See Sheet #3)



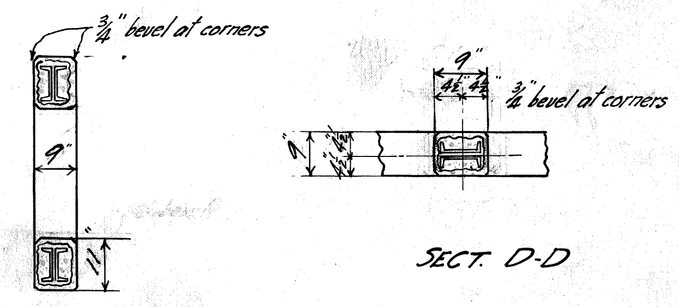
Section K-K (See Sheet #3)
Section L-L. opp. hand.



Encasement of Intersection of Diagonals in Center Panel of Trusses.



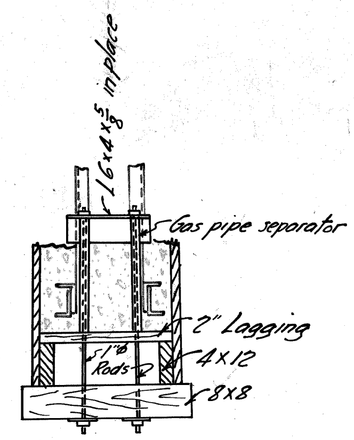
EXPANSION END OF TRUSS



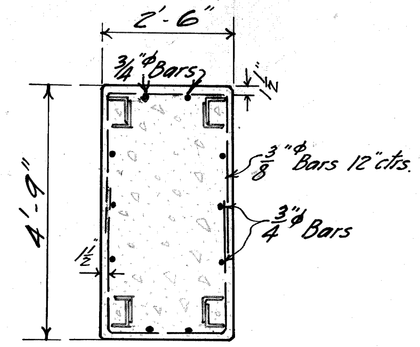
NOTE! All Bracing Encasement similar to that shown in section and side elevation.

SIDE ELEVATION OF TRUSS

NOTE! Sidewalk slab and brackets not shown for sake of clearness.

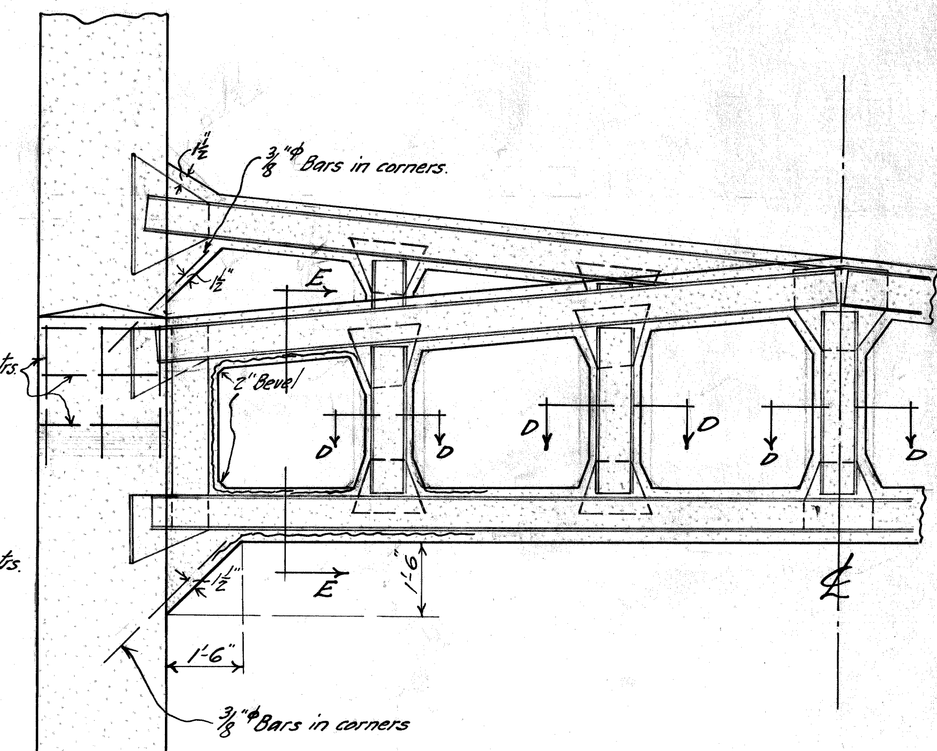


SECT. A-A
Showing Concrete Form Supports.



SECTION B-B

FIXED END OF TRUSS.



END VIEW OF BRIDGE

Showing typical method of encasing Bracing.

NOTES: Top Chord of trusses and floor to be composed of 1 part cement, 2 parts sand and 4 parts stone.

Web members of trusses are to be encased with "Gunite", composed of 1 part cement and 3½ parts sand. The thickness of the encasing on these members shall be about 2 inches.

Bracing members are to be encased with "Gunite" composed as above, the thickness of the encasing shall be ½ inches.

All steel to be encased with "Gunite" shall be completely wrapped with .049 Am. Wire & Steel Co's triangular wire mesh.

Note! Contractor used fine aggregate for concrete encasement instead of Gunite.

CITY OF DETROIT

DEPARTMENT OF PUBLIC WORKS
OFFICE OF CITY ENGINEER
DIVISION OF GRADE SEPARATION AND BRIDGES

DETAILS OF ENCASEMENT OF STRUCTURAL STEEL TRUSS MEMBERS FOR HOWARD ST. BRIDGE OVER M.C.R.R. MAIN LINE

SCALE 1/2"=1'-0"

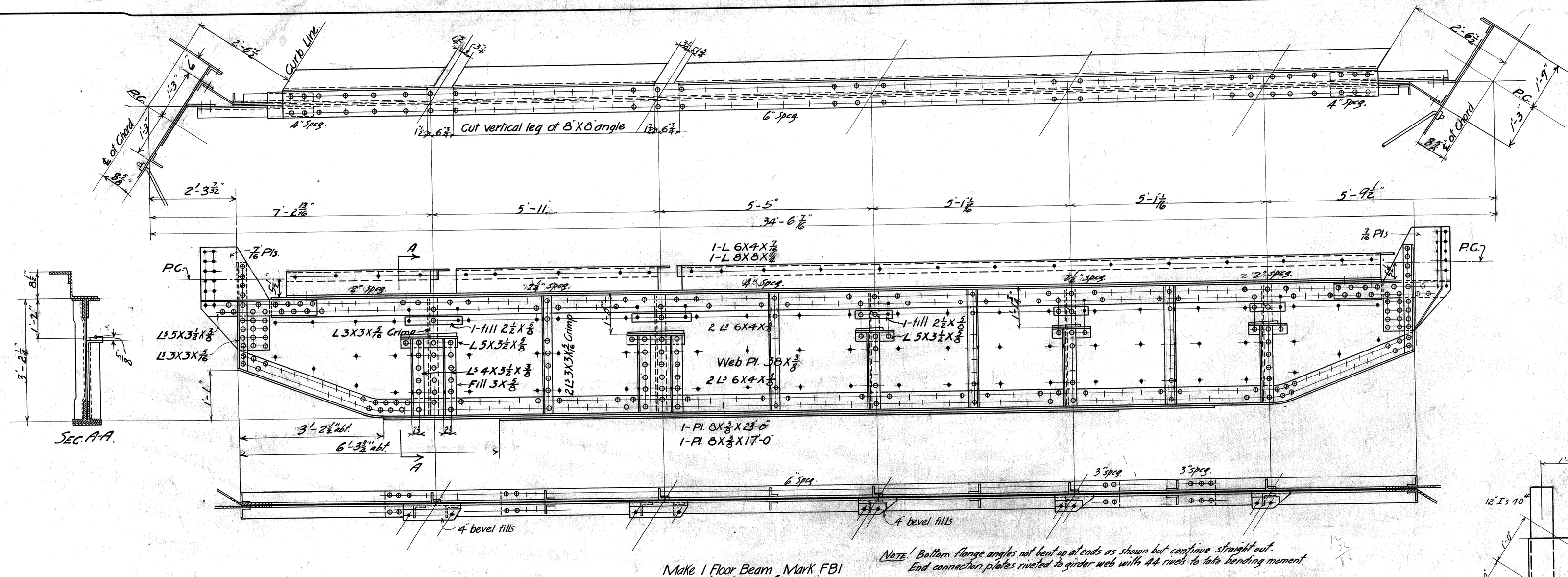
Drwn. by: J.L.B.
Ckd. by: J.L.B.

Sheet 4.

4.

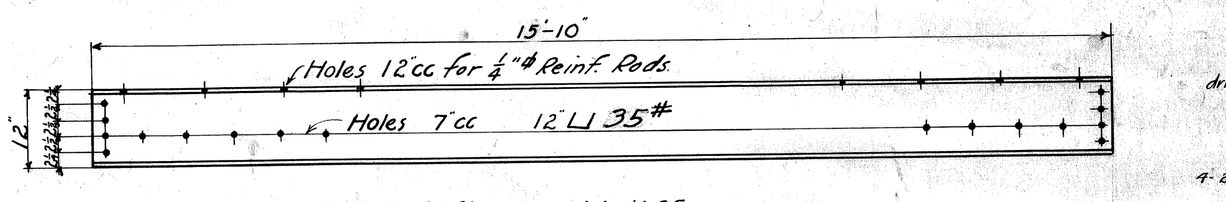
Aug. 1921

File X059-4

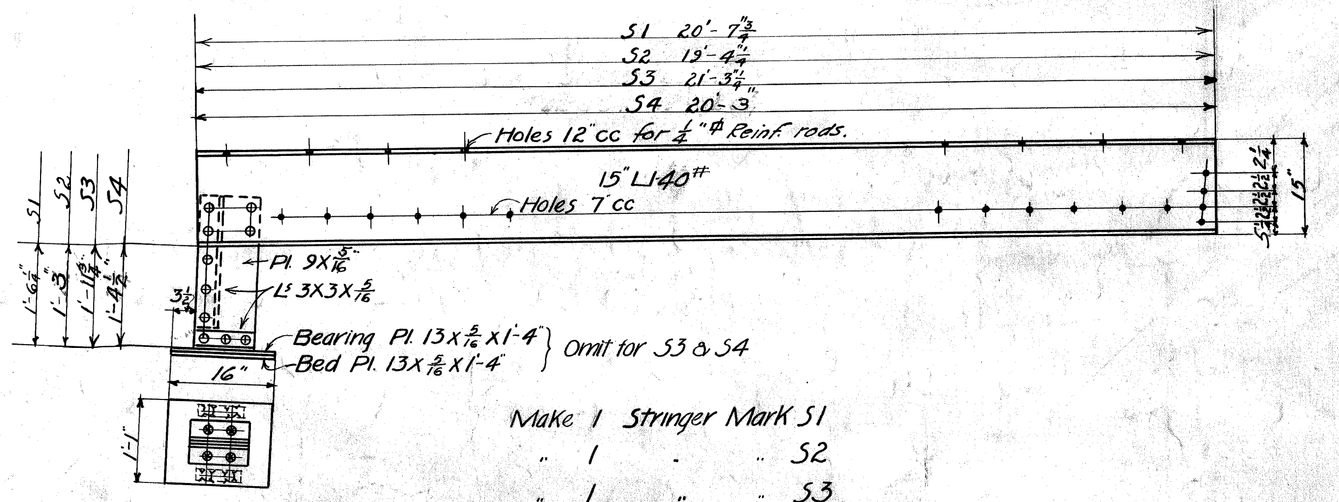


NOTE! Bottom flange angles not bent up at ends as shown but continue straight out.
End connection plates riveted to girder web with 44 rivets to take bending moment.

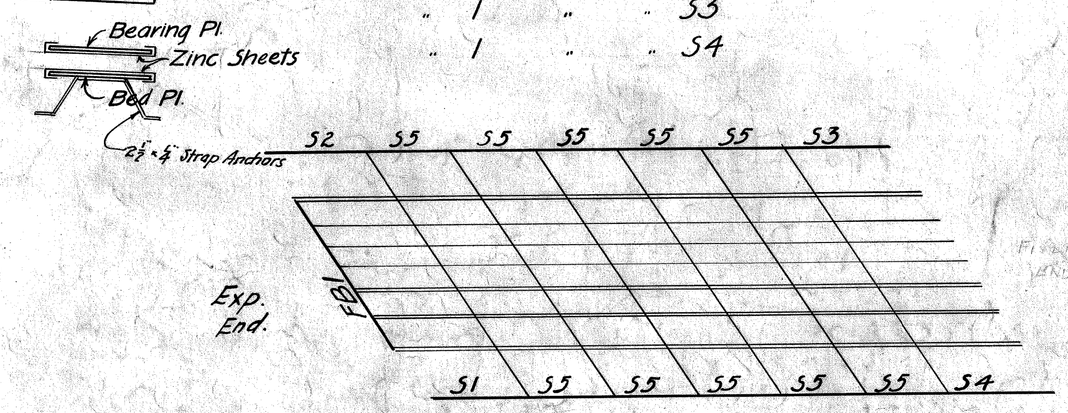
Make 1 Floor Beam Mark FB1
See shop drawing for revisions in details.

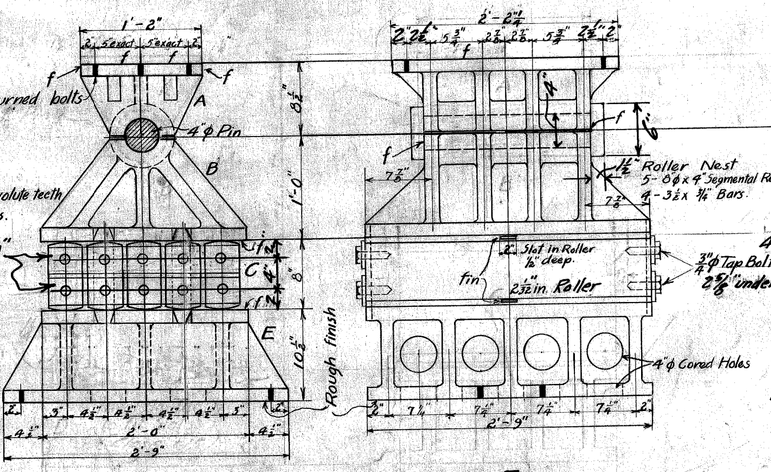


Make 10 Stringers Mark S5

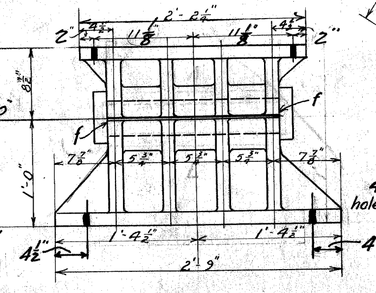


Make 1 Stringer Mark S1
" 1 " " S2
" 1 " " S3
" 1 " " S4



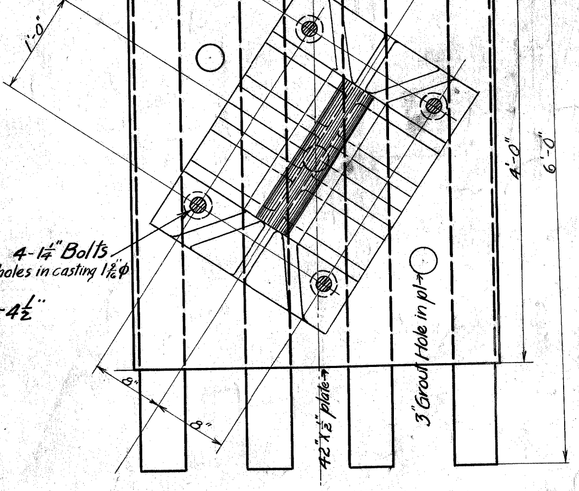


CASTINGS EXPANSION END



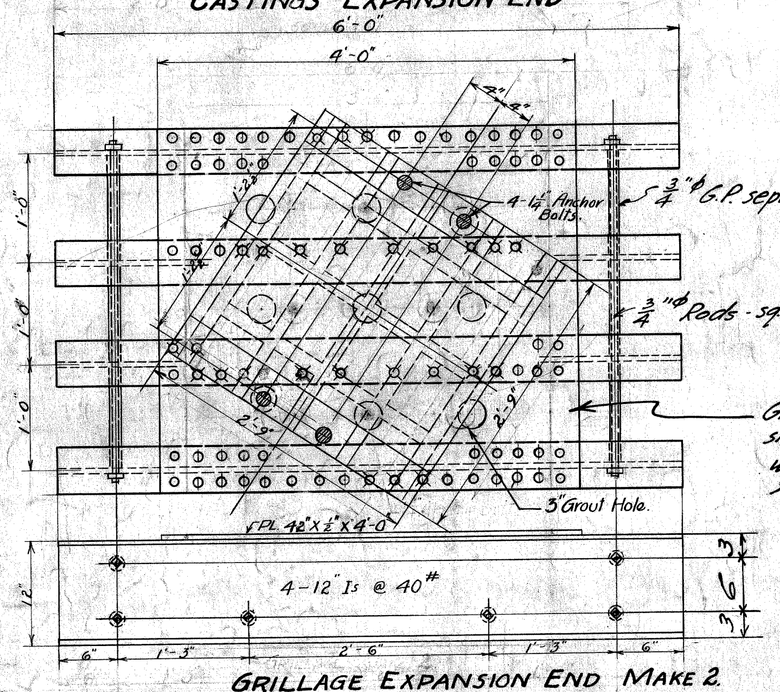
CASTINGS FIXED END

4 Steel Castings A
2 " " B
10 Forged Steel C Rollers.
2 Steel Castings D
2 " " E
4 Pins 4" Diameter.
Castings 1½" Metal unless otherwise marked



GRILLAGE — FIXED END
MAKE 2.
Same as for expansion end except as shown.

SCALE 1"=1'-0"



GRILLAGE EXPANSION END MAKE 2.

CITY OF DETROIT
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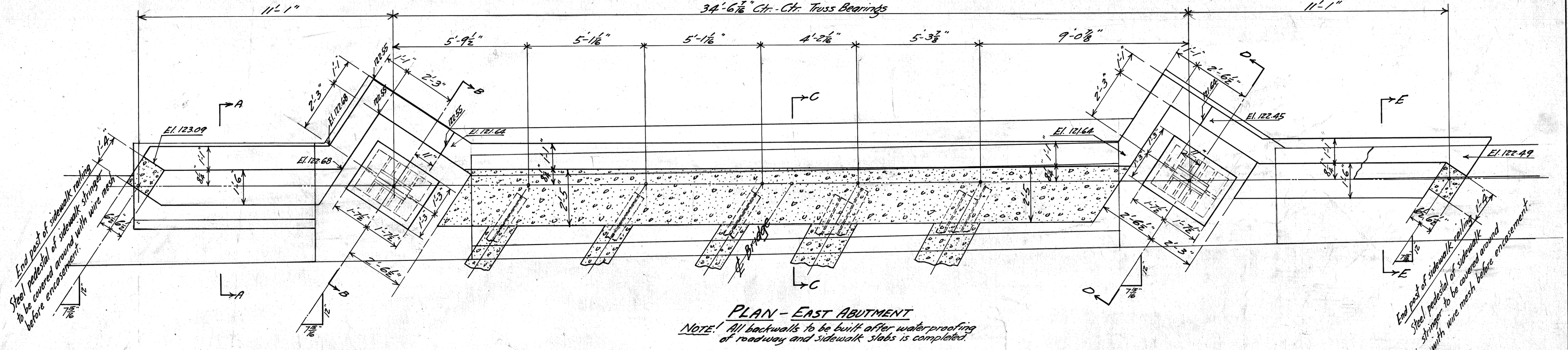
OFFICE OF CITY ENGINEER
DIVISION OF GRADE SEPARATION AND BRIDGES
FLOOR BEAM & STRINGER DETAILS FOR HOWARD ST. BRIDGE OVER M.C.R.R. MAIN LINE
SCALE ¾" AND 1" = 1'-0"

Sheet 4 of 8 Sheets. 4 A

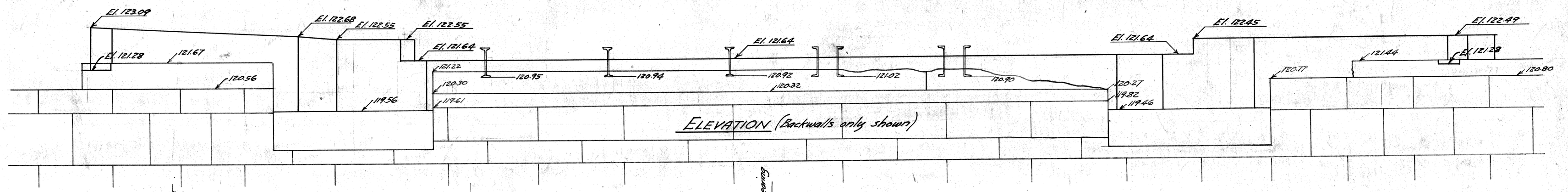
Dec. 1922.

File XO 59-5

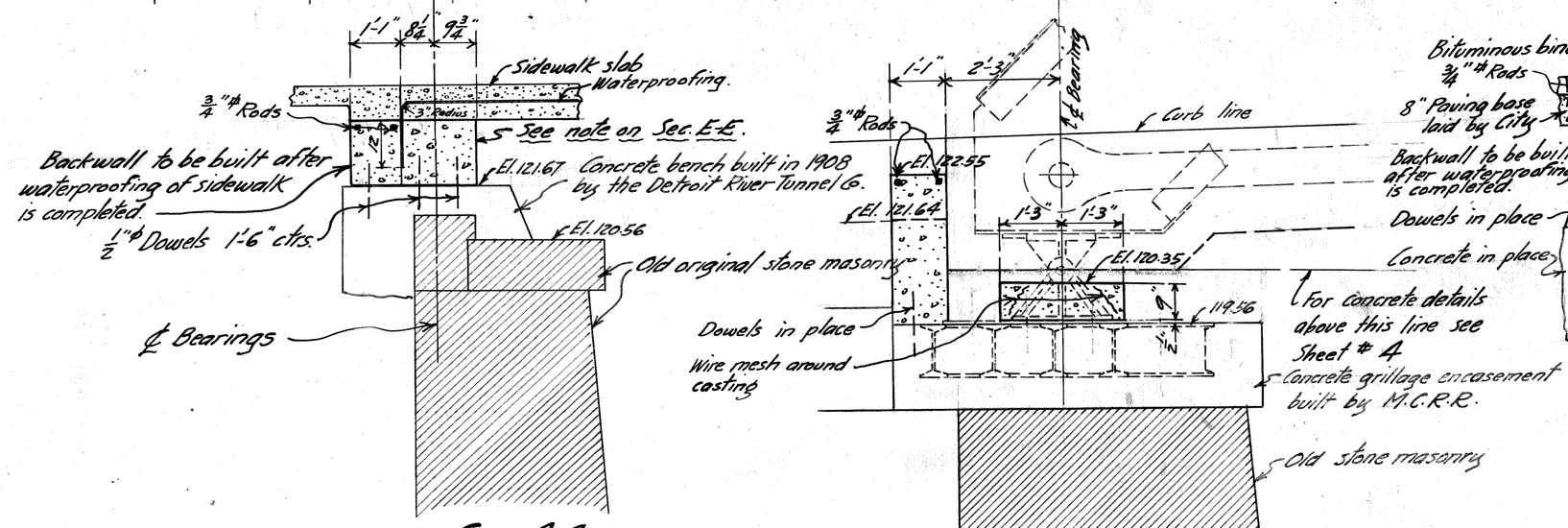


PLAN - EAST ABUTMENT

NOTE! All backwalls to be built after waterproofing of roadway and sidewalk slabs is completed.



ELEVATION (Backwalls only shown)



SEC. A-A.

SEC. B-B As shown
SEC. D-D Opposite hand

NOTE! Elev. figures shown above apply to Sec. B-B only.

SEC. C-C.

SEC. E-E

NOTES:- Concrete contents - (Benches & backwalls) - 12 Cu. yds.
Concrete work on this sheet to be composed of 1 part cement: 2 parts sand: and 4 parts crushed stone.
Top corners of backwalls to be reinforced continuously with 3/4"ϕ Bars as shown. Dowels shall be provided for bonding the old and new concrete work together.
Red or light lines indicate steel work, old masonry or concrete now in place.
Black or heavy lines indicate construction work under this contract unless otherwise noted.

CITY OF DETROIT
DEPARTMENT OF PUBLIC WORKS
OFFICE OF CITY ENGINEER
DIVISION OF GRADE SEPARATION AND BRIDGES.

CONCRETE DETAILS FOR EAST ABUTMENT OF HOWARD ST. BRIDGE OVER M.C.R.R. MAIN LINE

SCALE: 1/2" = 1'-0"

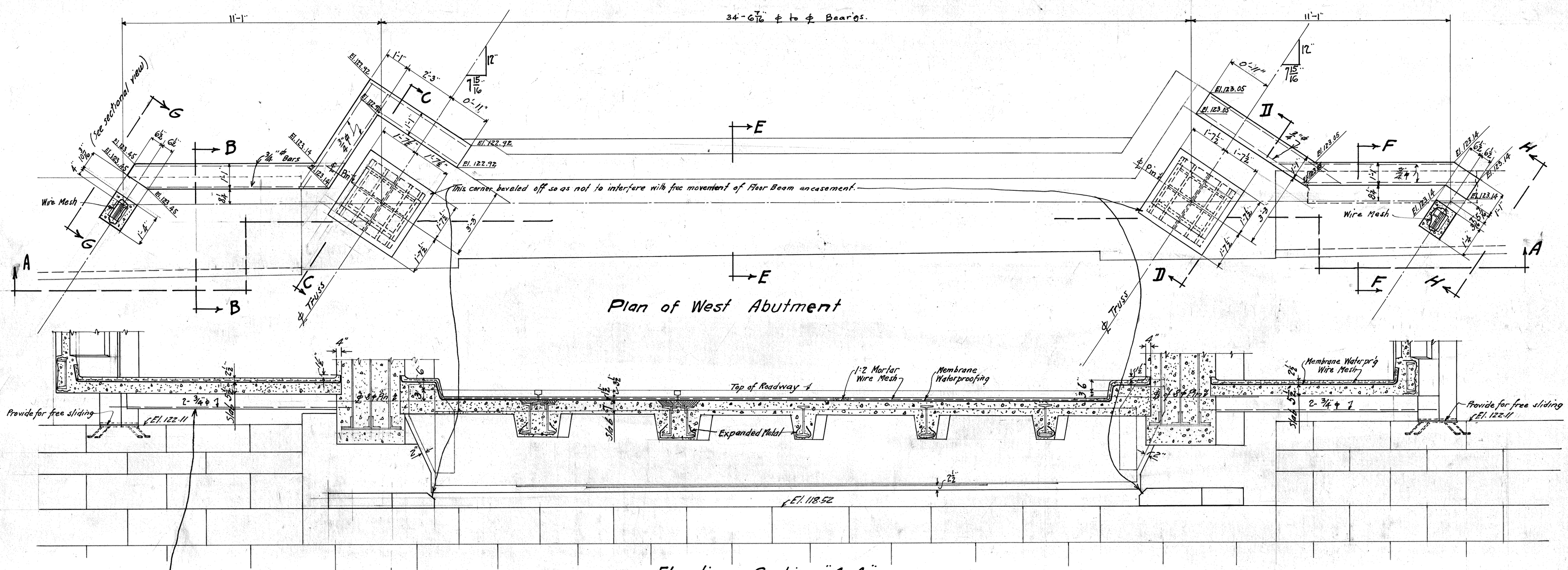
Drawn by: S.L.B.
Ck. by: S.C.B.

Sheet 1 of 4 Sheets

1.

Aug. 1921.

File X059-6



General Notes.

For General Notes see Sheet No 3
For Reinforcing of Slabs see Sheet No 3
Concrete (Backwalls & casting encasement) - 15 yds.
Concrete work on this sheet to be composed of 1 part cement: 2 parts sand: and 4 parts crushed stone.
Top corners of backwalls to be reinforced continuously with 3/4" ℄ bars as shown. Dowels are to be provided wherever required for bonding the old and new concrete together.
Red or light lines indicate steel work, old masonry or concrete now in place.
Black or heavy lines indicate construction work under this contract unless otherwise noted.

CITY OF DETROIT

DEPARTMENT OF PUBLIC WORKS
OFFICE OF CITY ENGINEER
DIVISION OF GRADE SEPARATION AND BRIDGES.

CONCRETE DETAILS FOR WEST ABUTMENT OF HOWARD ST. BRIDGE OVER M.C.R.R. MAIN LINE

SCALE: 1/2" = 1'-0"

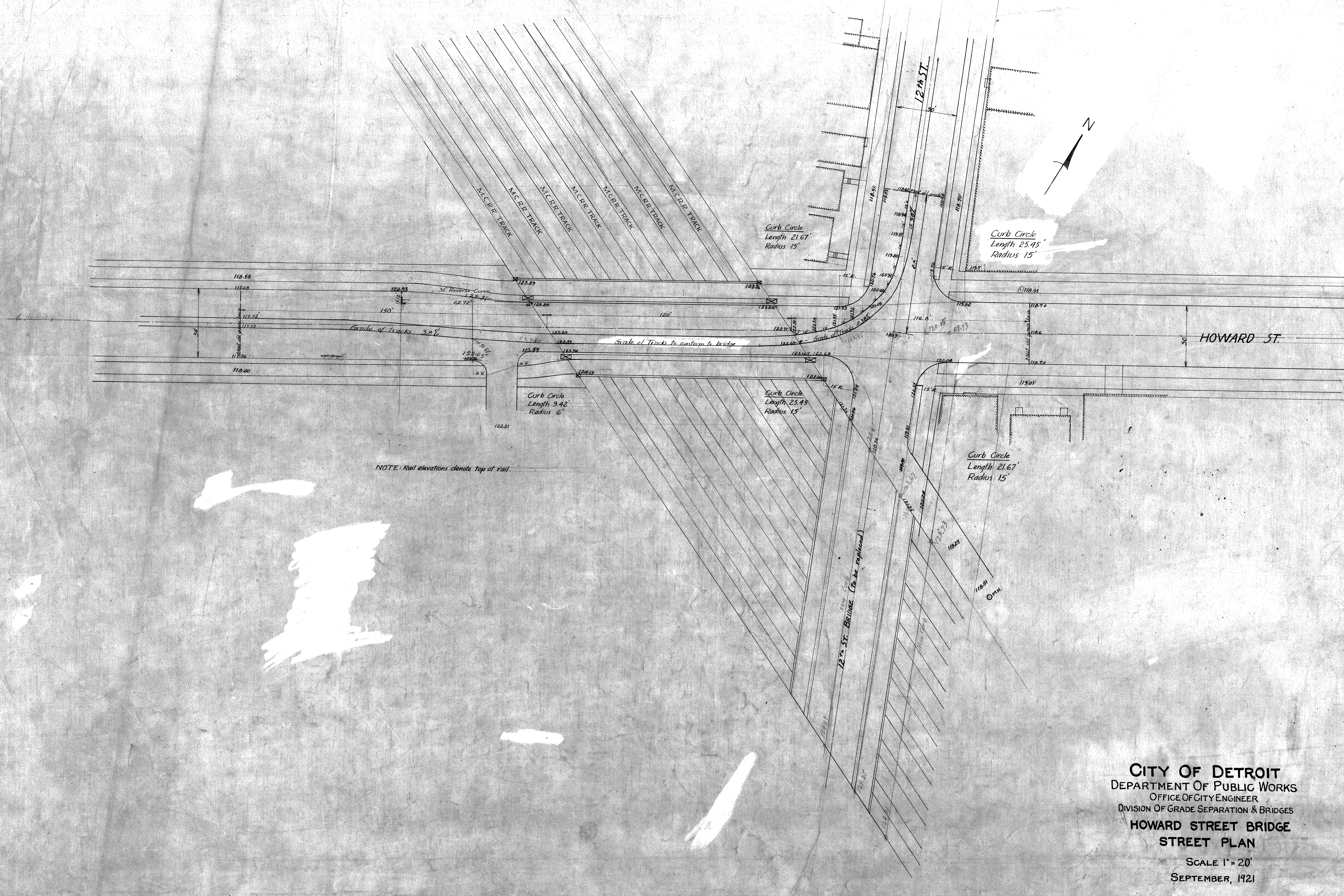
Drwn. by: R.S.
Chkd by: J.L.B.

Sheet 2

2.

Aug. 1921

File XO/c 59-7



CITY OF DETROIT
DEPARTMENT OF PUBLIC WORKS
OFFICE OF CITY ENGINEER
DIVISION OF GRADE SEPARATION & BRIDGES

HOWARD STREET BRIDGE
STREET PLAN

SCALE 1" = 20'

SEPTEMBER, 1921

File XOle 59-8

See shop drawing tracing for full details.

Rivets 3/4"⌀
Holes 13/16"⌀

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DIVISION OF GRADE SEPARATION AND BRIDGES

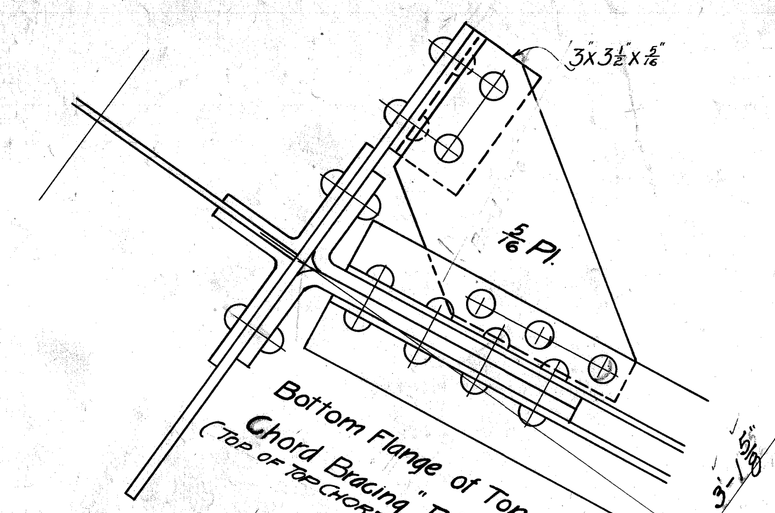
TRUSS DETAILS
FOR
HOWARD ST. BRIDGE
OVER
M.C.R.R. MAIN LINE

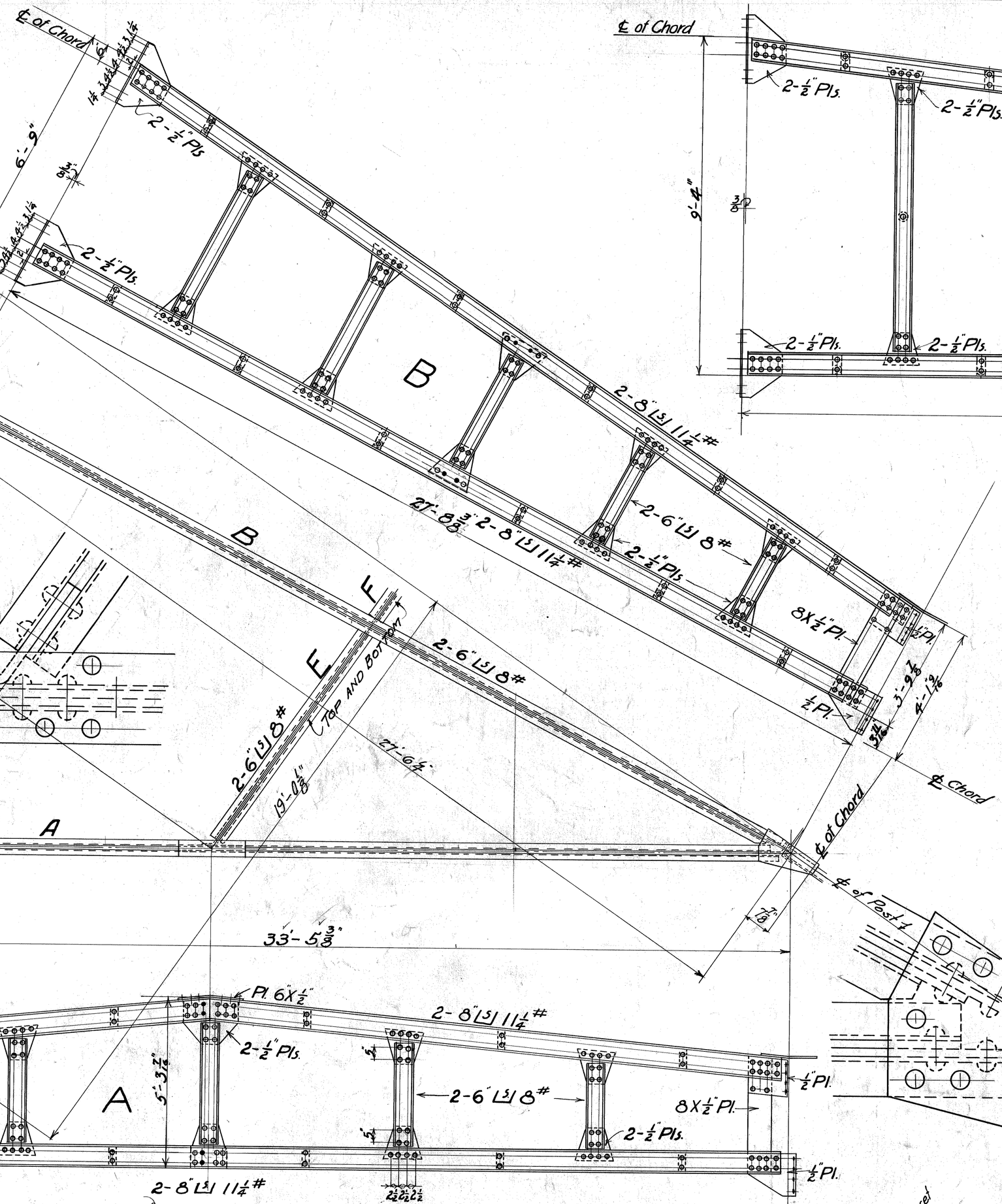
SHEET 2 OF 8 SHEETS. SCALE ½"=1'

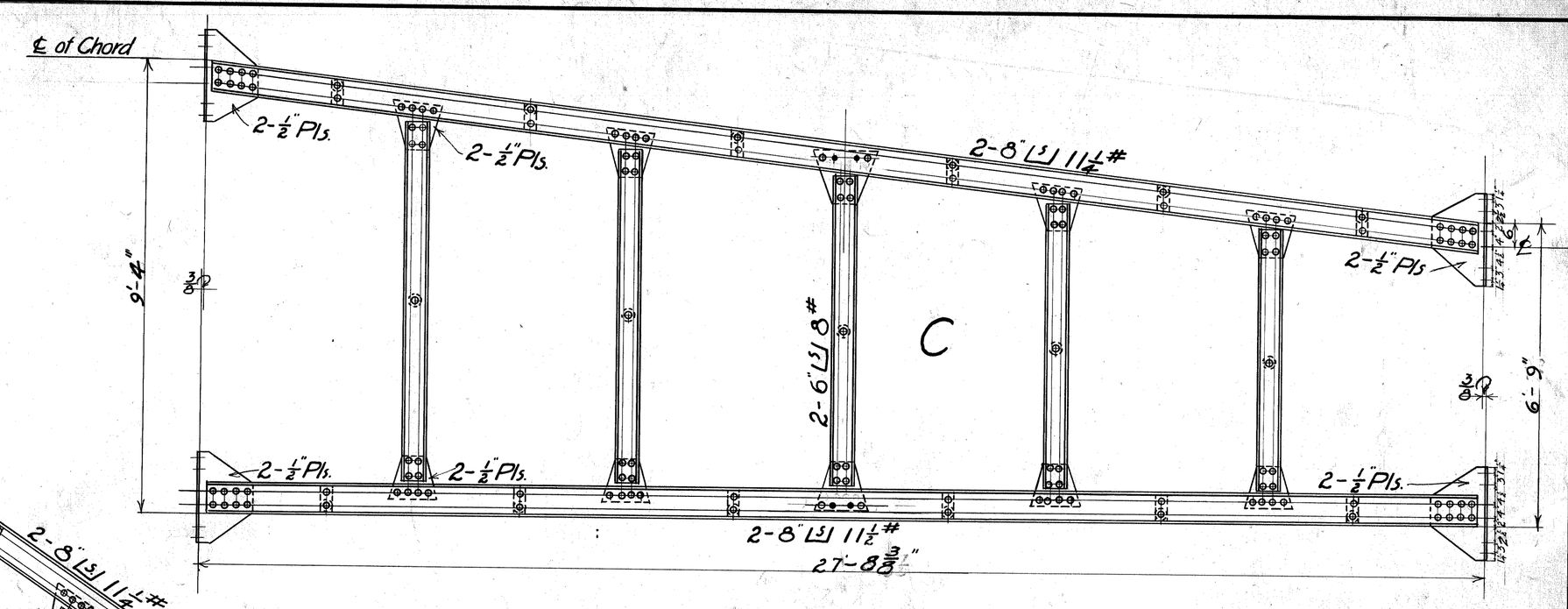
2

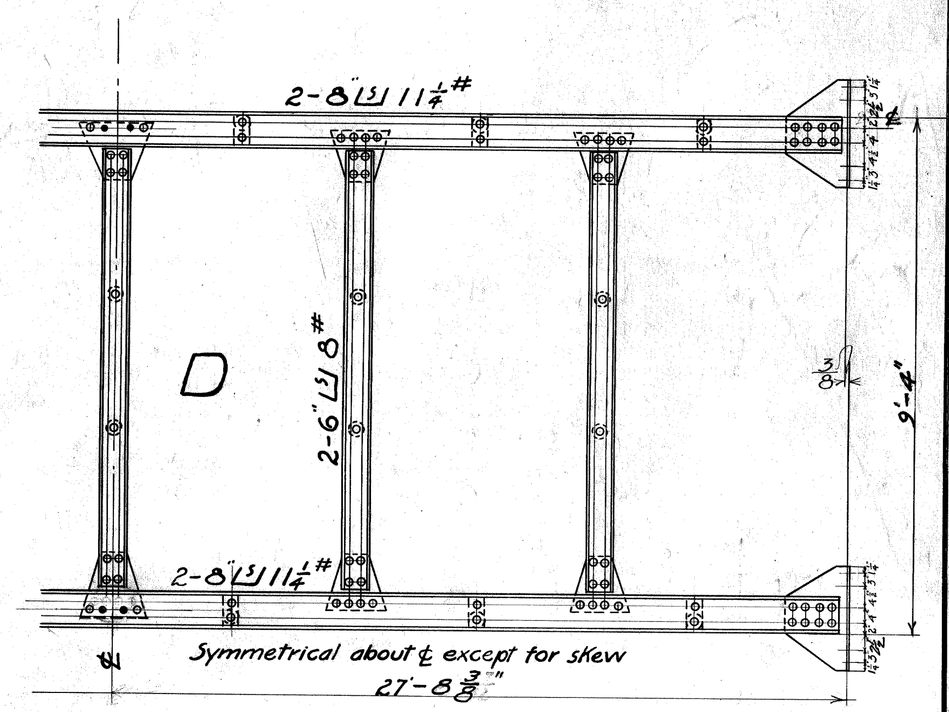
Rev. 11-23-20
Dec. 1920

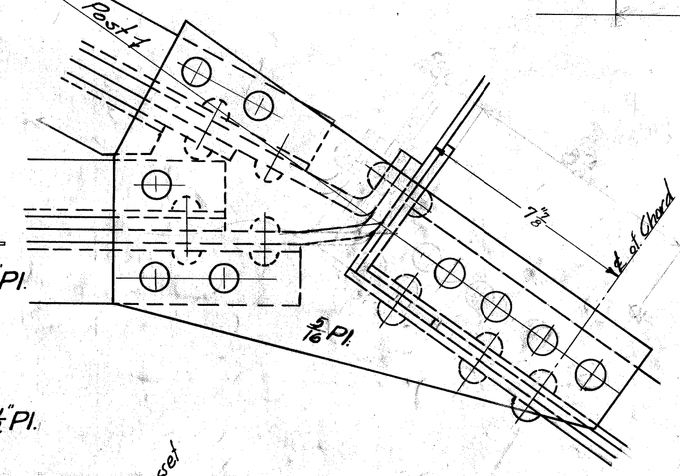
File X069-9

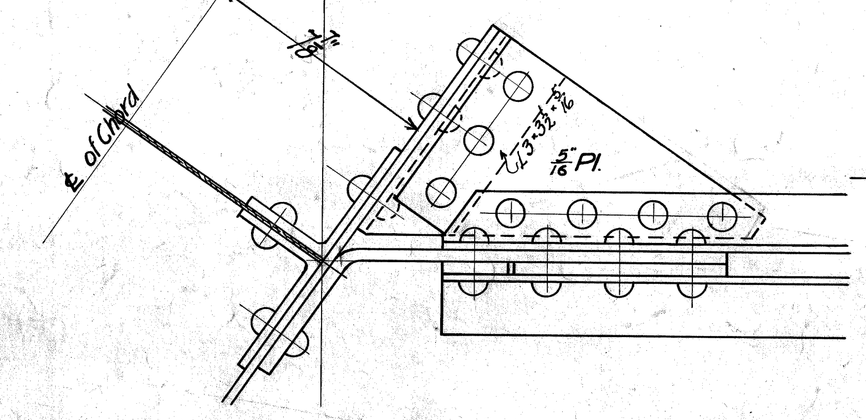


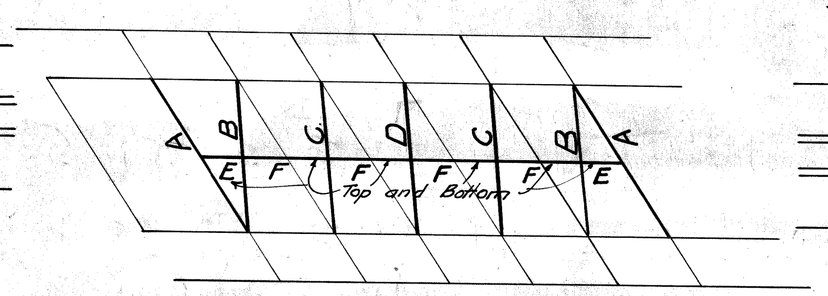


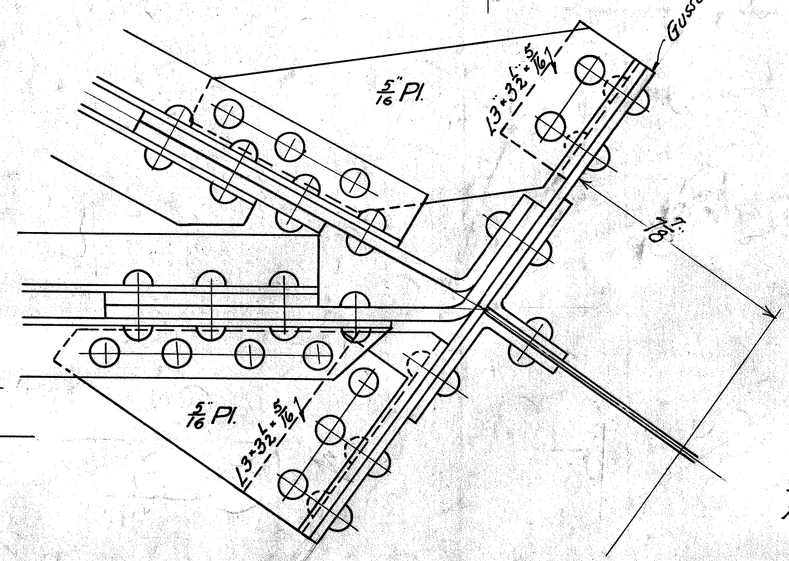












Note :–
Rivets ¾" diam.
Holes 13/16" diam.

Connection details and riveting slightly different on shop drawings. Main material & dimensions agree.

CITY OF DETROIT
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OFFICE OF CITY ENGINEER
DIVISION OF GRADE SEPARATION AND BRIDGES
OVERHEAD BRACING DETAILS FOR HOWARD ST. BRIDGE OVER M.C.R.R. MAIN LINE

SCALE: ½ & 3" = 1'-0"

NOTE: SHEETS 6,7,8 ARE REPLACED BY SHEETS 1,2,3,4 OF CONCRETE DETAILS.

SHEET 5 OF 8 SHEETS.

5.

DEC. 1920

File XO 59-10

SEC. B-B.

SEC. D-D.

SEC. E-E.

SEC. A-A.

SECTION C-C.

VOID

CITY OF DETROIT

DEPARTMENT OF PUBLIC WORKS
OFFICE OF CITY ENGINEER
DIVISION OF GRADE SEPARATION AND BRIDGES

DETAILS AT EAST ABUTMENT FIXED END FOR HOWARD ST. BRIDGE OVER M.C.R.R. MAIN LINE

SCALE ½" = 1'-0" SHEET 6 OF 8 SHEETS 6

Rev. 10-28-70

File XO 59-11

CITY OF DETROIT

DEPARTMENT OF PUBLIC WORKS
OFFICE OF CITY ENGINEER
DIVISION OF GRADE SEPARATION AND BRIDGES

FLOOR DETAILS
HOWARD ST. BRIDGE
OVER
M.C.R.R. MAIN LINE

SCALE ⅜"=1'-0" SHEET 7 OF 8 SHEETS. 7

File XO 59-12

SEC. C-C

SEC. D-D.

SEC. E-E

SEC. B-B.

SEC. A-A.

For reinforcement of railing and post see Sheet No. 7

For floor reinforcement See Sheet No. 7

CITY OF DETROIT

DEPARTMENT OF PUBLIC WORKS
OFFICE OF CITY ENGINEER
DIVISION OF GRADE SEPARATION AND BRIDGES

DETAILS AT WEST ABUTMENT EXPANSION END FOR HOWARD ST. BRIDGE OVER M.C.R.R. MAIN LINE

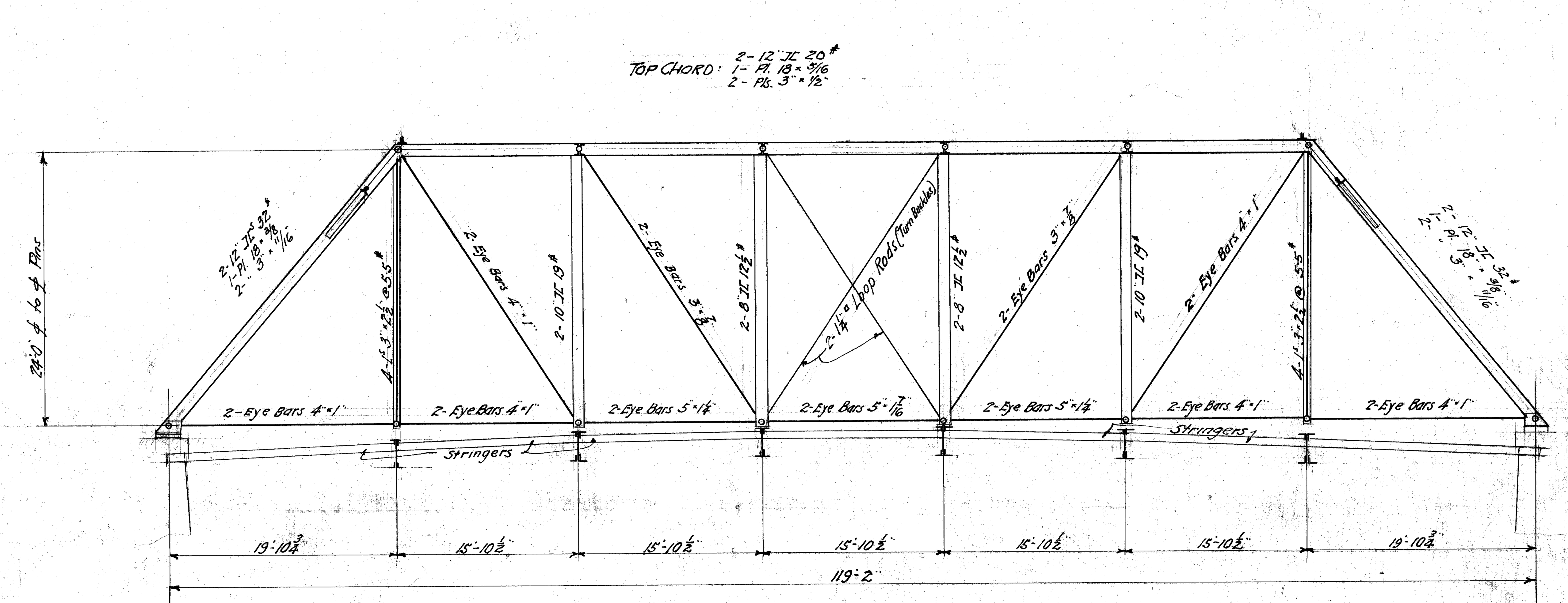
SCALE ½" = 1'-0"

VOID

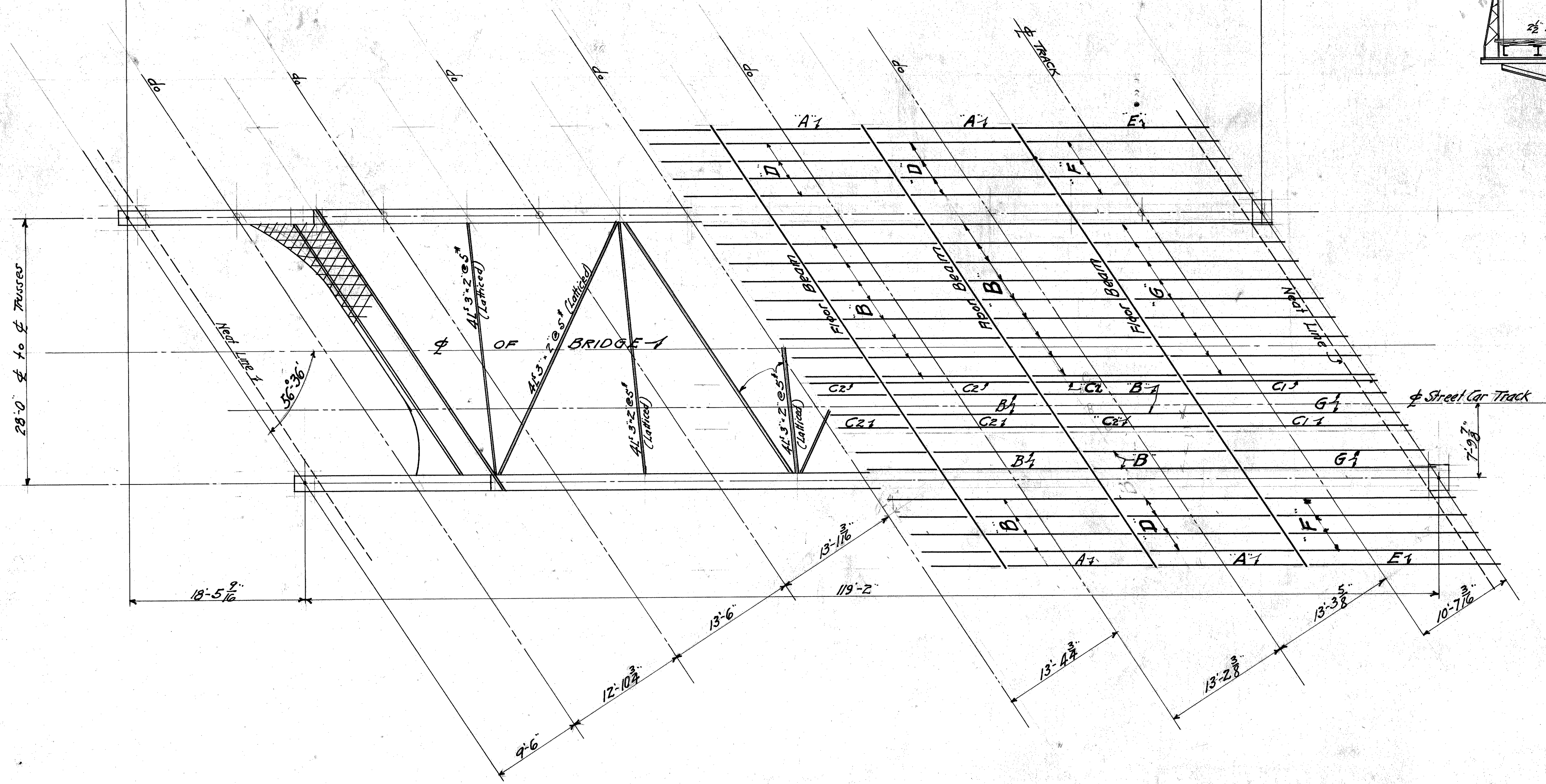
8

Rev. 11-23-20

File XO 59-13



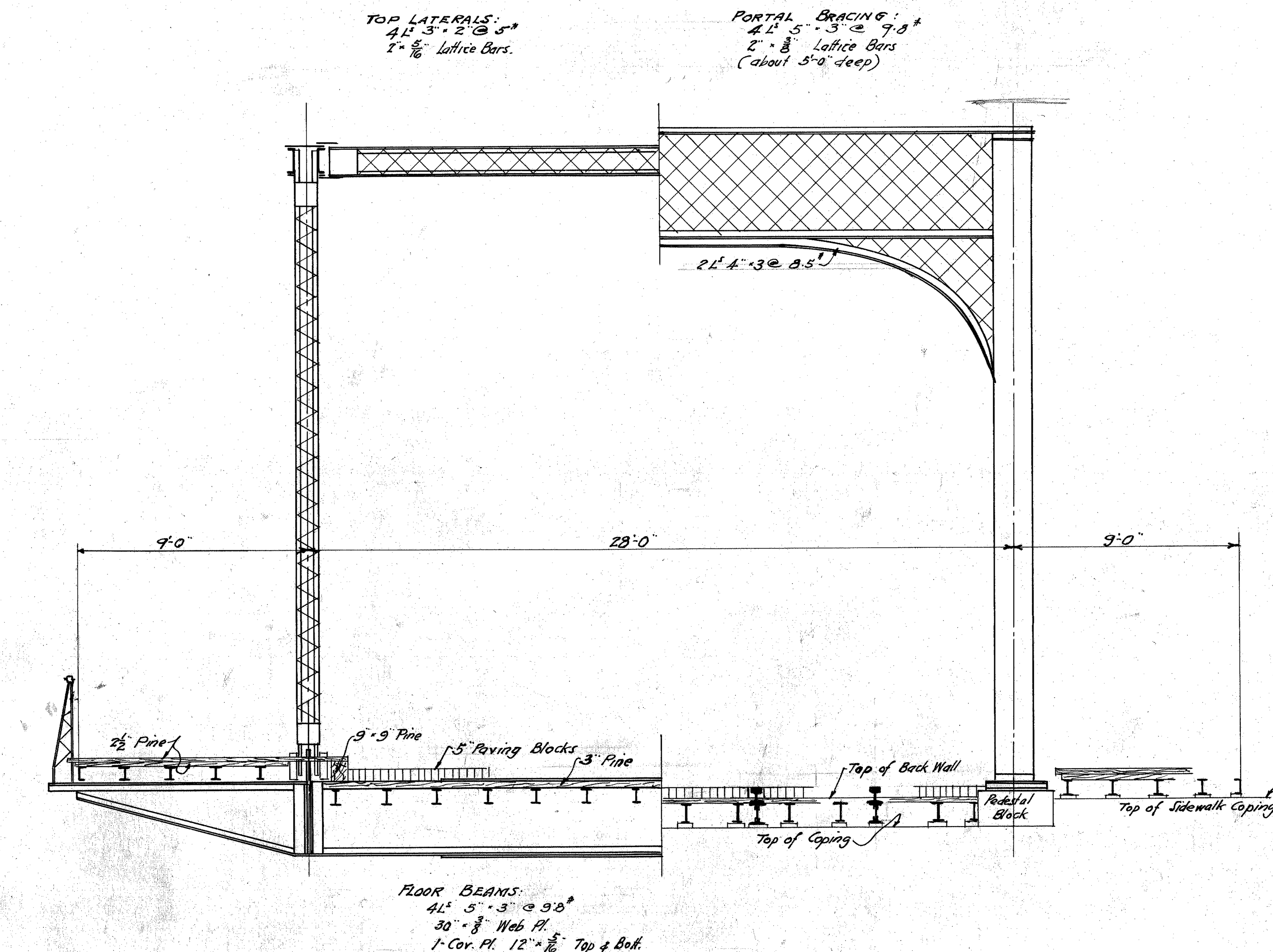
LONGITUDINAL SECTION



PLAN OF TOP LATERAL BRACING

STRINGER PLAN

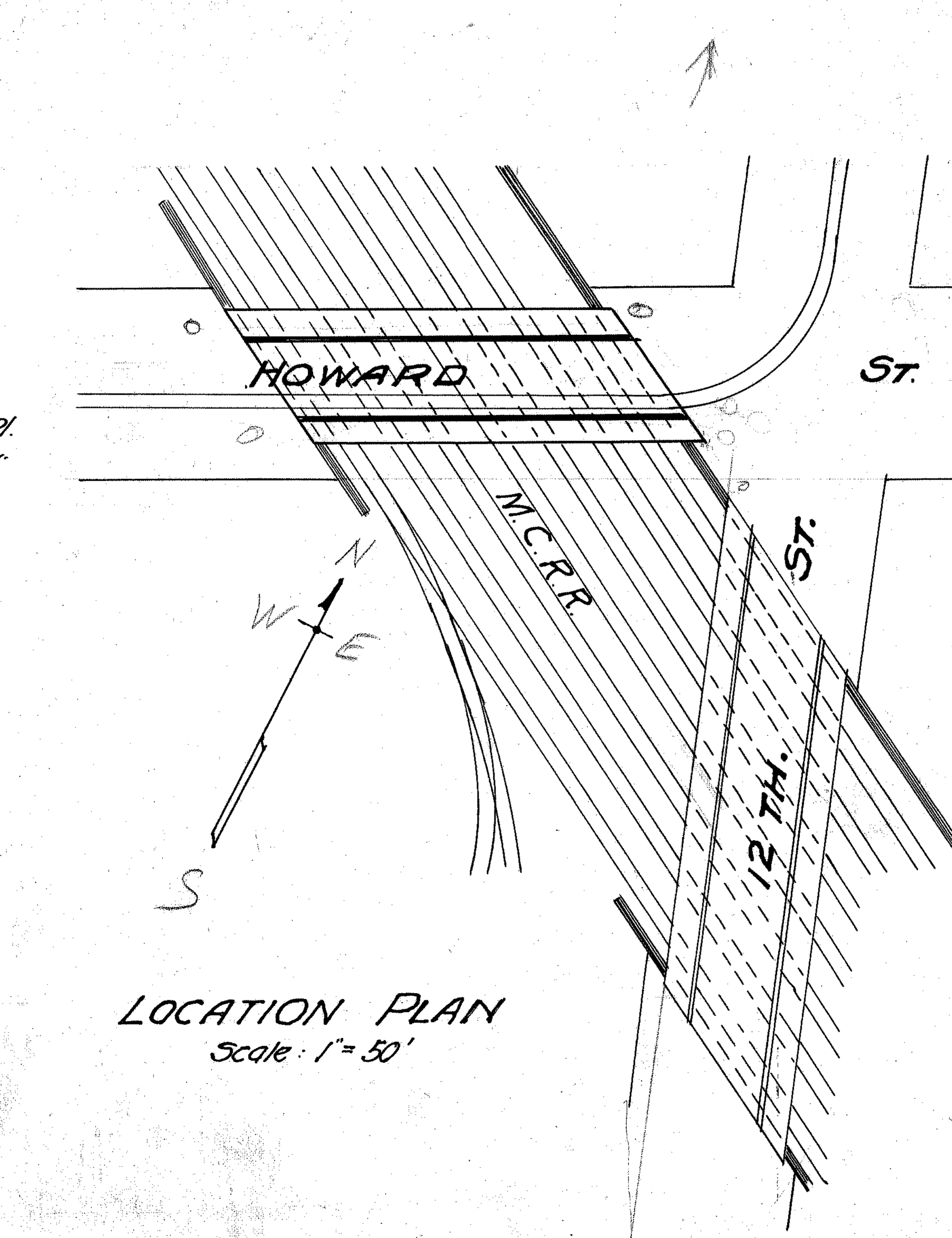
Scale: 1/8" = 1'-0"



HALF CROSS SECTION HALF WEST END ELEVATION

Scale: 1/4" = 1'-0"

STRINGERS	"A"	6" [12#
"	B	8" I 18#
"	C1	4Ls 6" × 4" × 1/2" & 8" × 5/8" Web Pl.
"	C2	4Ls 5" × 4" × 1/2" & 8" × 5/8" " "
"	D	6" I 13#
"	E	6" [16#
"	F	6" I 16#
"	G	8" I 23#



LOCATION PLAN

Scale: 1" = 50'

CITY OF DETROIT

DEPARTMENT OF PUBLIC WORKS

OFFICE OF CITY ENGINEER

DIVISION OF GRADE SEPARATION AND BRIDGES

GENERAL PLAN
PRESENT HOWARD ST. BRIDGE
OVER
M.C.R.R. MAIN LINE

SCALES AS INDICATED

OBSOLETE

OCTOBER - 1920

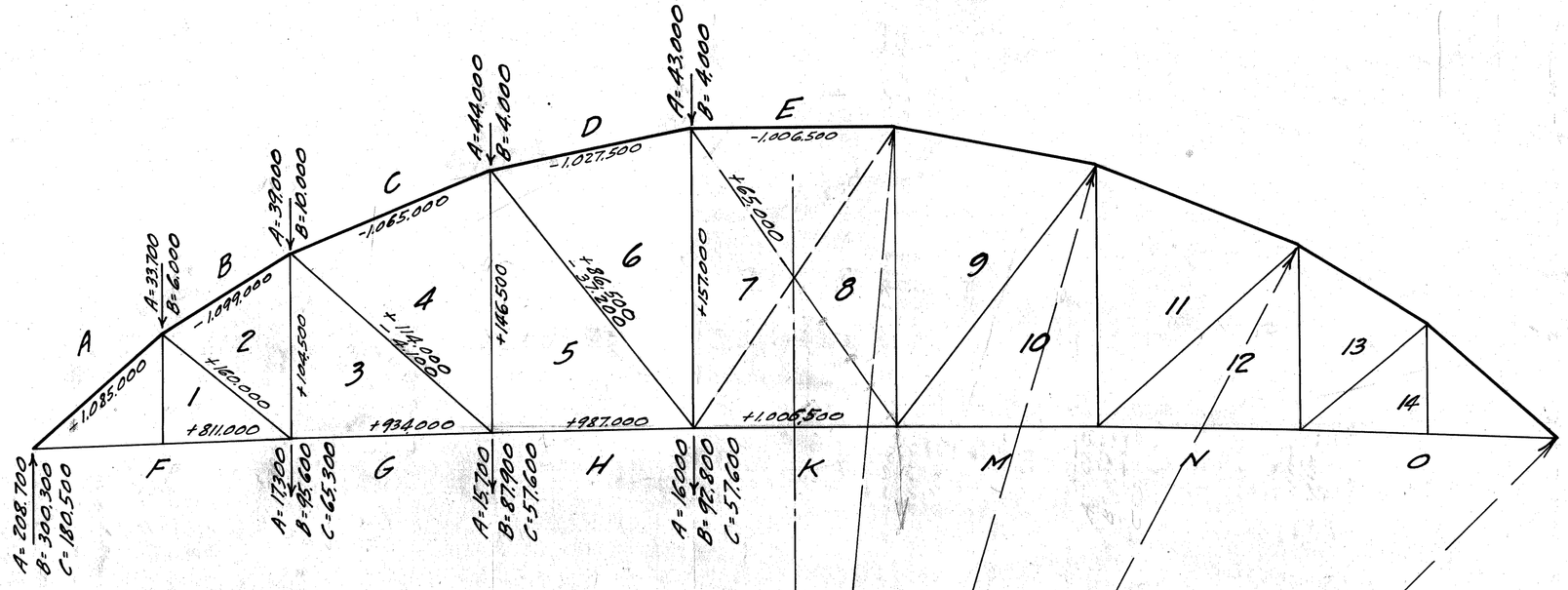
1-A

File X059-14

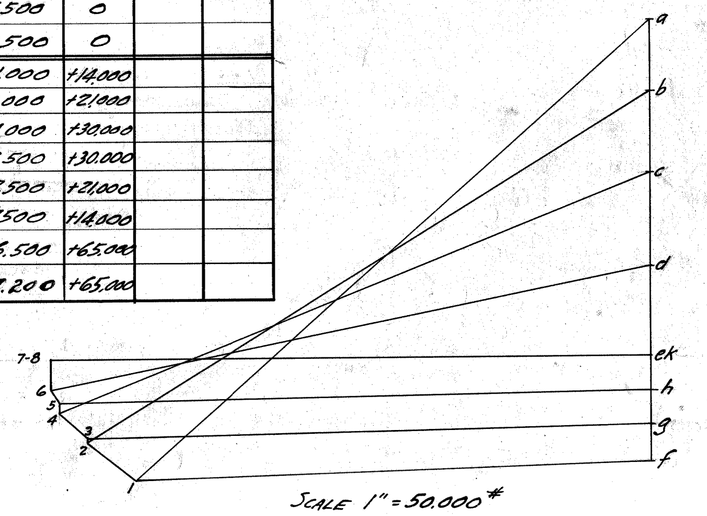
TOP CHORD	A1	B2	C4	D6	E8	
Dead Load "A"	331,000	318,000	306,000	295,000	288,500	
" " B	469,000	485,000	472,000	456,500	447,000	
Live Load	285,000	296,000	287,000	276,000	271,000	
TOTAL	1,085,000	1,099,000	1,065,000	1,027,500	1,006,500	
BOTTOM CHORD	F1	G3	H5	K7		
Dead Load A	247,500	270,500	284,000	288,500		
" " B	350,000	411,500	437,000	447,000		
Live load	213,500	252,000	266,000	271,000		
TOTAL	811,000	934,000	987,000	1,006,500		
VERTICALS	2-3	4-5	6-7	8-9	10-11	12-13
Dead Load "A"	+2000	+5000	+15,000	+15,000	+5000	+2000
" " B	+46,000	+67,000	+86,500	+84,500	+67,000	+46,000
Live Load	+35,000	+47,500	+55,500	+55,500	+47,500	+35,000
TOTAL	+83,000	+119,500	+157,000	+157,000	+119,500	+83,000
Live load at FG	+56,500	+28,500	+6,500	-6,500	-3,500	-2,000
" " at GH	-5,000	+46,000	+9,500	-9,500	-5,500	-3,000
" " at HK	-5,500	-10,000	+14,000	-14,000	-8,000	-4,000
" " at KM	-4,000	-8,000	-14,000	+14,000	-10,000	-5,500
" " " MN	-3,000	-5,500	-9,500	+9,500	+46,000	-5,000
" " " NO	-2,000	-3,500	-6,500	+6,500	+28,500	+56,500
MAX. COMBINED	+104,500	+146,500	+157,000	+157,000	+119,500	+104,500
MIN. "	+14,100	+23,400	+40,700	+40,700	+23,400	+14,100
DIAGONALS	1-2	3-4	5-6	7-8		
Dead Load "A"	+30,000	+18,500	+7,500	0		
" " "B"	+80,000	+35,000	+16,500	0		
Live Load	+50,000	+19,000	+8,500	0		
TOTAL	+160,000	+72,500	+32,500	0		
Live load at FG	+15,000	-41,500	-21,000	+14,000		
" " at GH	+11,000	+19,000	-33,000	+21,000		
" " at HK	+9,000	+16,000	+24,000	+30,000		
" " at KM	+7,000	+12,000	+18,500	+30,000		
" " at MN	+5,000	+8,500	+12,500	+21,000		
" " at NO	+3,000	+5,000	+7,500	+14,000		
Max Combined	+160,000	+114,000	+86,500	+65,000		
MIN. "	+160,000	-4,100	-37,200	+65,000		

+ Indicates Tension
— " Compression

When DL and LL stresses are of opposite character only 70% of the DL stress is considered as counteracting the LL stress.



83'-7" RADIUS FOR TOP CHORD

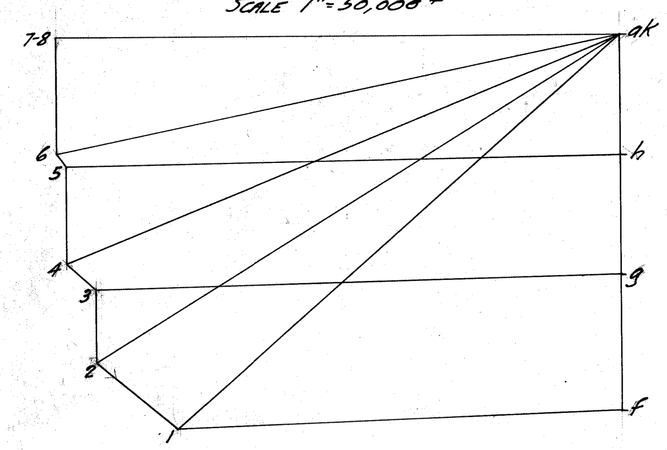


SCALE 1" = 50,000#

"A" DEAD LOAD STRESSES (Plastic concrete top chord encasement. concrete forms, structural steel of truss, floor system, bracing)

STRESS DIAGRAM FOR LIVE LOAD OVER ENTIRE BRIDGE

SCALE 1" = 50,000#



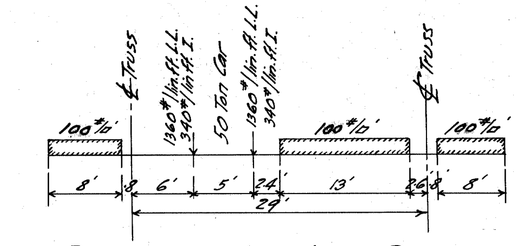
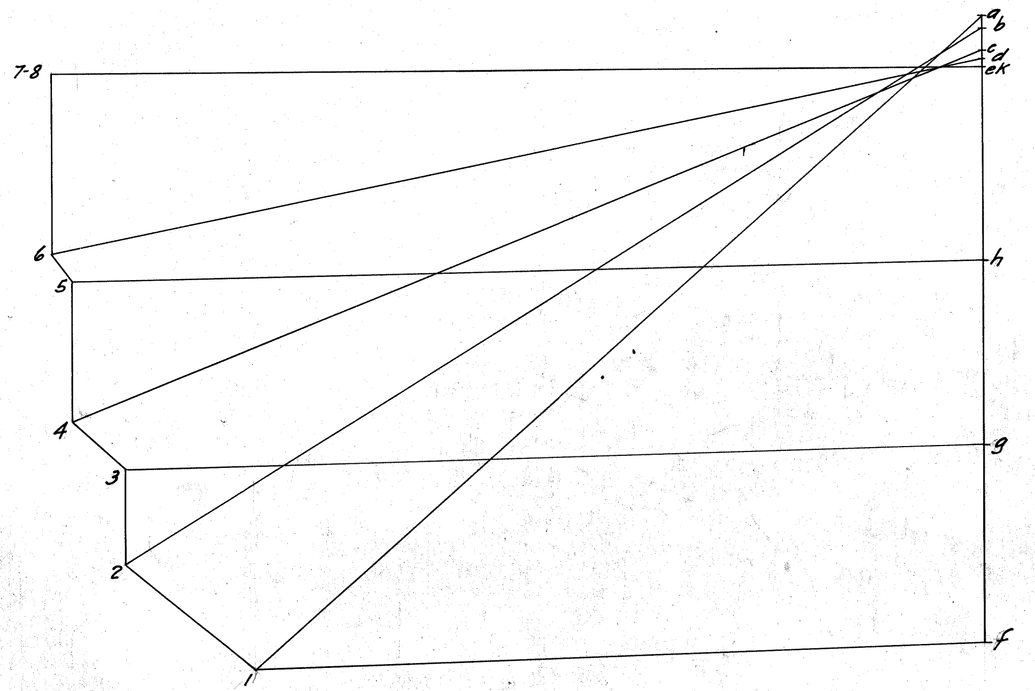


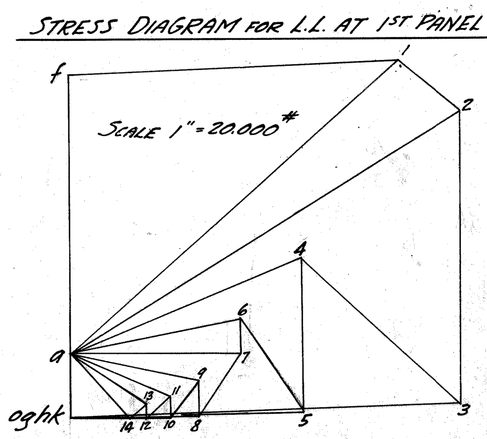
DIAGRAM FOR LIVE LOAD DISTRIBUTION



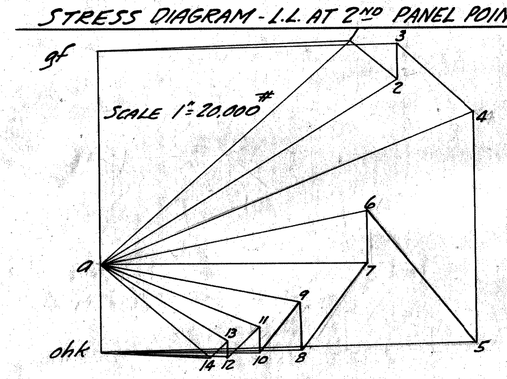
"B" DEAD LOAD STRESSES (Total, exclusive of "A" D.L. Stresses)

SCALE 1" = 50,000#

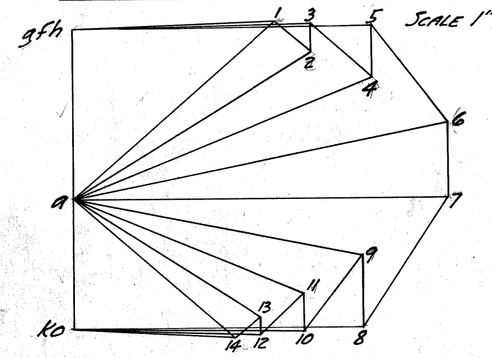
STRESS DIAGRAM FOR L.L. AT 1ST PANEL POINT ONLY



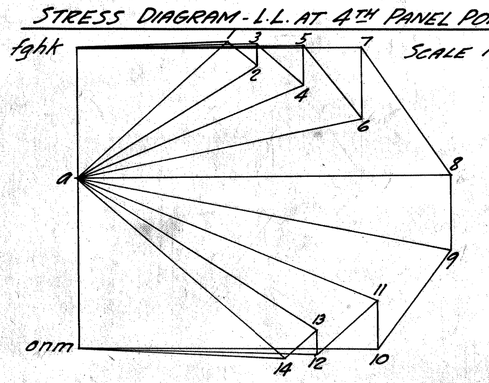
STRESS DIAGRAM - L.L. AT 2ND PANEL POINT ONLY



STRESS DIAGRAM - L.L. AT 3RD PANEL POINT ONLY

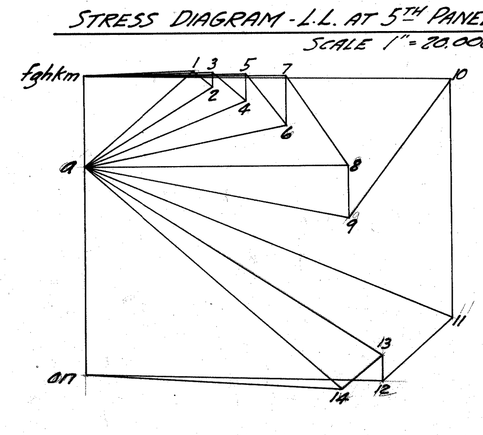


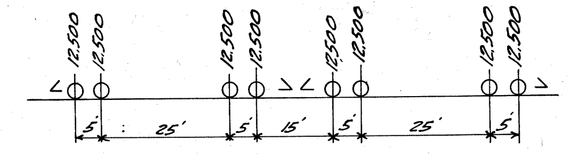
STRESS DIAGRAM - L.L. AT 4TH PANEL POINT ONLY



STRESS DIAGRAM - L.L. AT 5TH PANEL POINT ONLY.

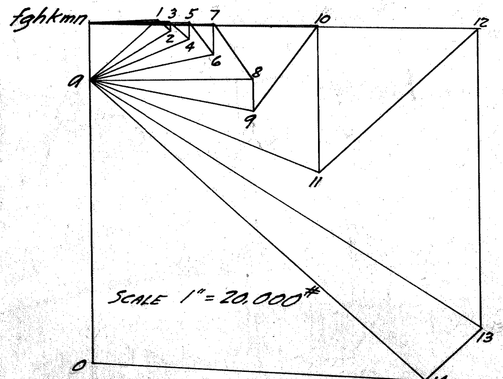
SCALE 1" = 20,000#





ELECTRIC CAR LOADING
(1 Rail)

STRESS DIAGRAM - L.L. AT 6TH PANEL POINT ONLY



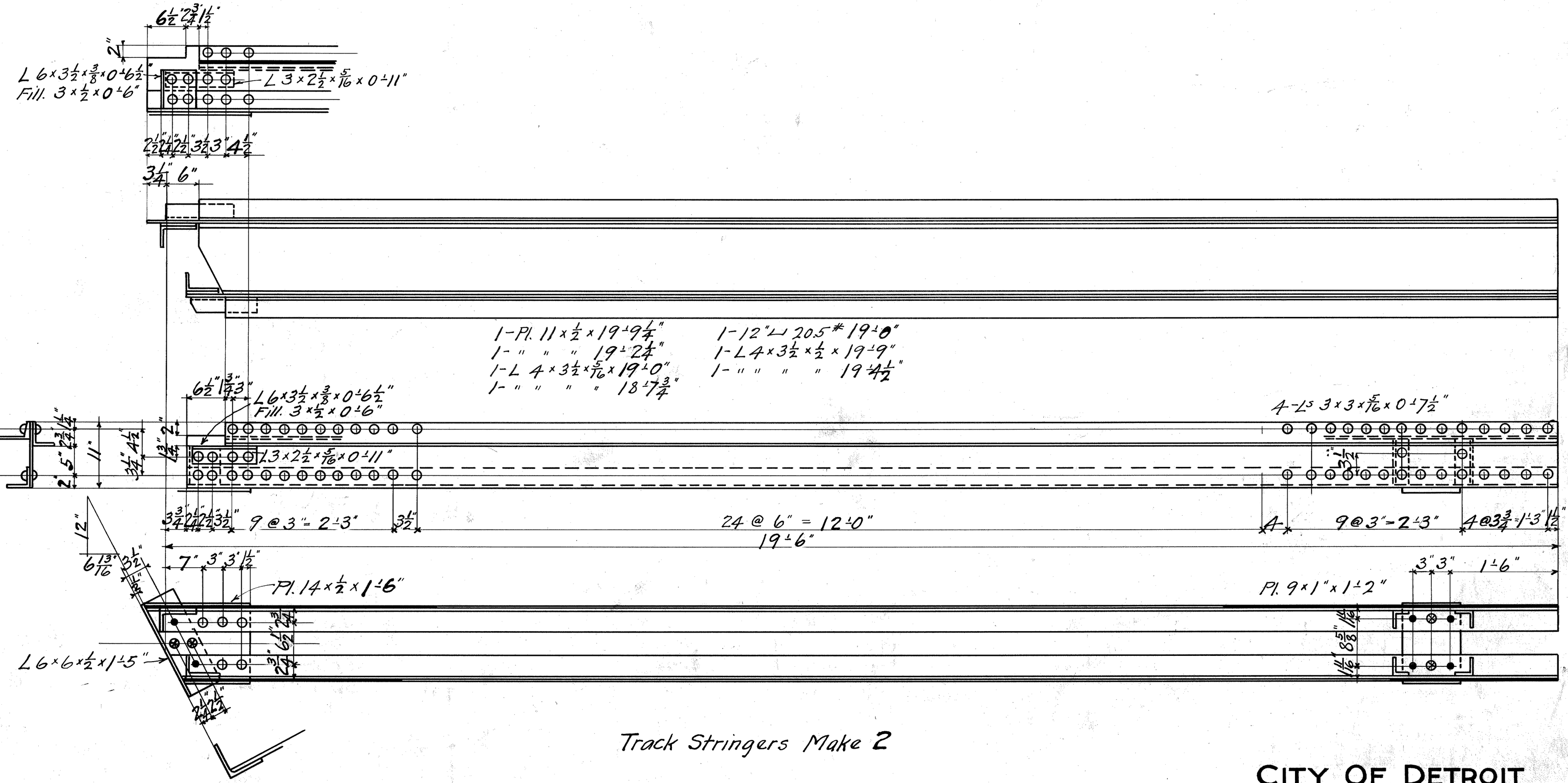
NOTE! Westerly three panels (expansion end) concrete floor, stringer & floor-beam encasement were poured by contractor through a misunderstanding before top chord encasement was poured. Steel top chords were figured for "A" dead load stresses only and as a consequence the members in the westerly end of both trusses are somewhat overstressed beyond the intended allowable unit, 16000#/in²

CITY OF DETROIT
DEPARTMENT OF PUBLIC WORKS
OFFICE OF CITY ENGINEER
DIVISION OF GRADE SEPARATION AND BRIDGES
STRESS SHEET
FOR HOWARD ST. BRIDGE OVER M.C.R.R. MAIN LINE
SCALES AS INDICATED

1-B

Dec. 1920.

FWe XO 59-15



Track Stringers Make 2

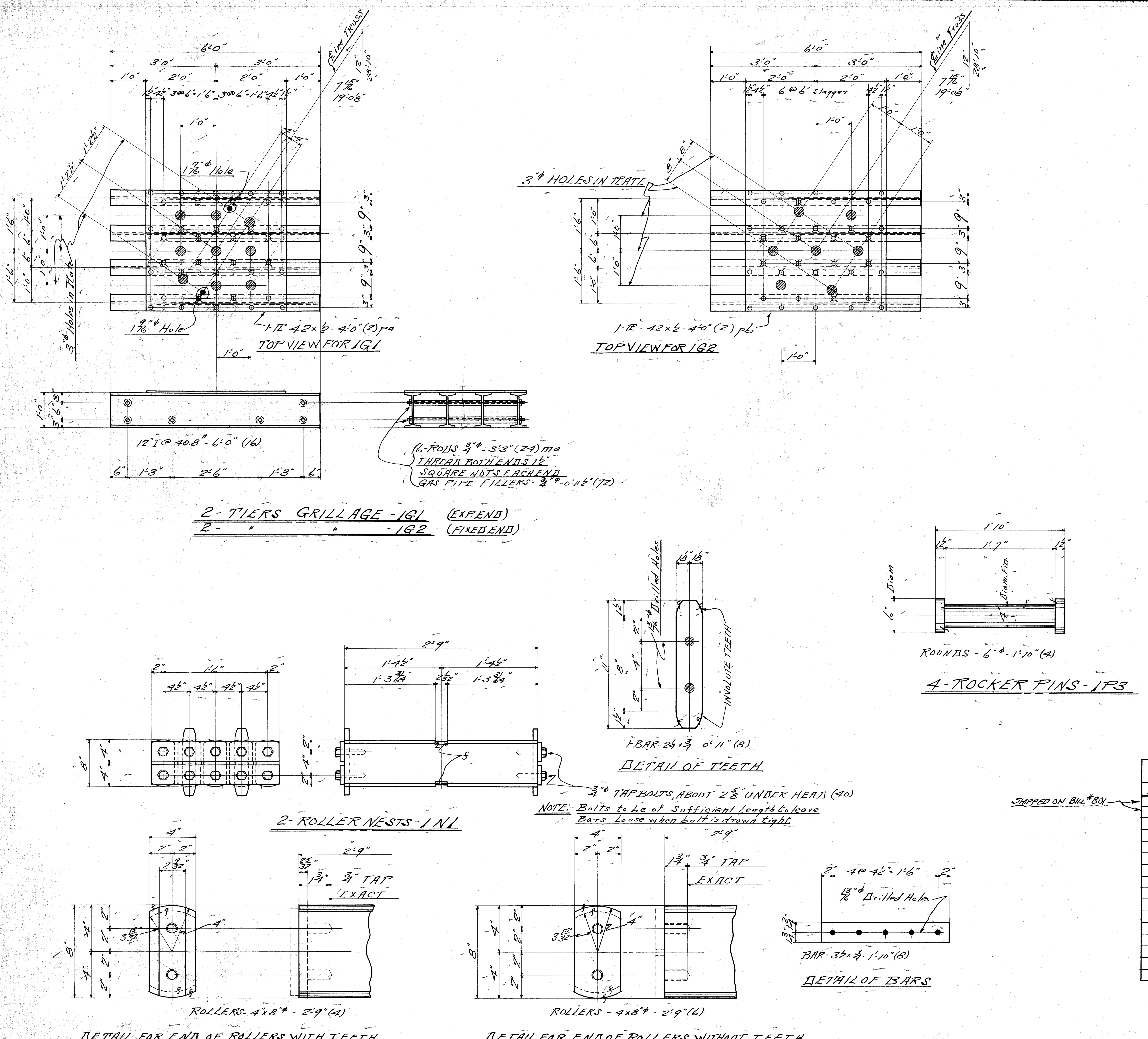
Rivets ¾" diam.
Holes 13/16 "

CITY OF DETROIT
DEPARTMENT OF PUBLIC WORKS
OFFICE OF CITY ENGINEER
DIVISION OF GRADE SEPARATION AND BRIDGES

NEW TRACK STRINGERS
FOR
HOWARD ST. BRIDGE
OVER
M.C.R.R. MAIN LINE

Dec. 11
1917

C-2- II File XO 59-16



NOTE:-
ALL PINS, Bolt thread and nuts and other Machined Surfaces shall be given one coat of WHITE LEAD and TALLOW in SHOP.
EXPANSION ROLLERS ARE to receive One Coat of RED LEAD in SHOP.
Do not Paint Grillage.

Summary of Parts

No	Description	Mark	Mat'l
2	TIERS GRILLAGE	1G1	1a
2	" "	1G2	"
2	ROLLER NESTS	1N1	"
4	Rocker Pins	1P3	"

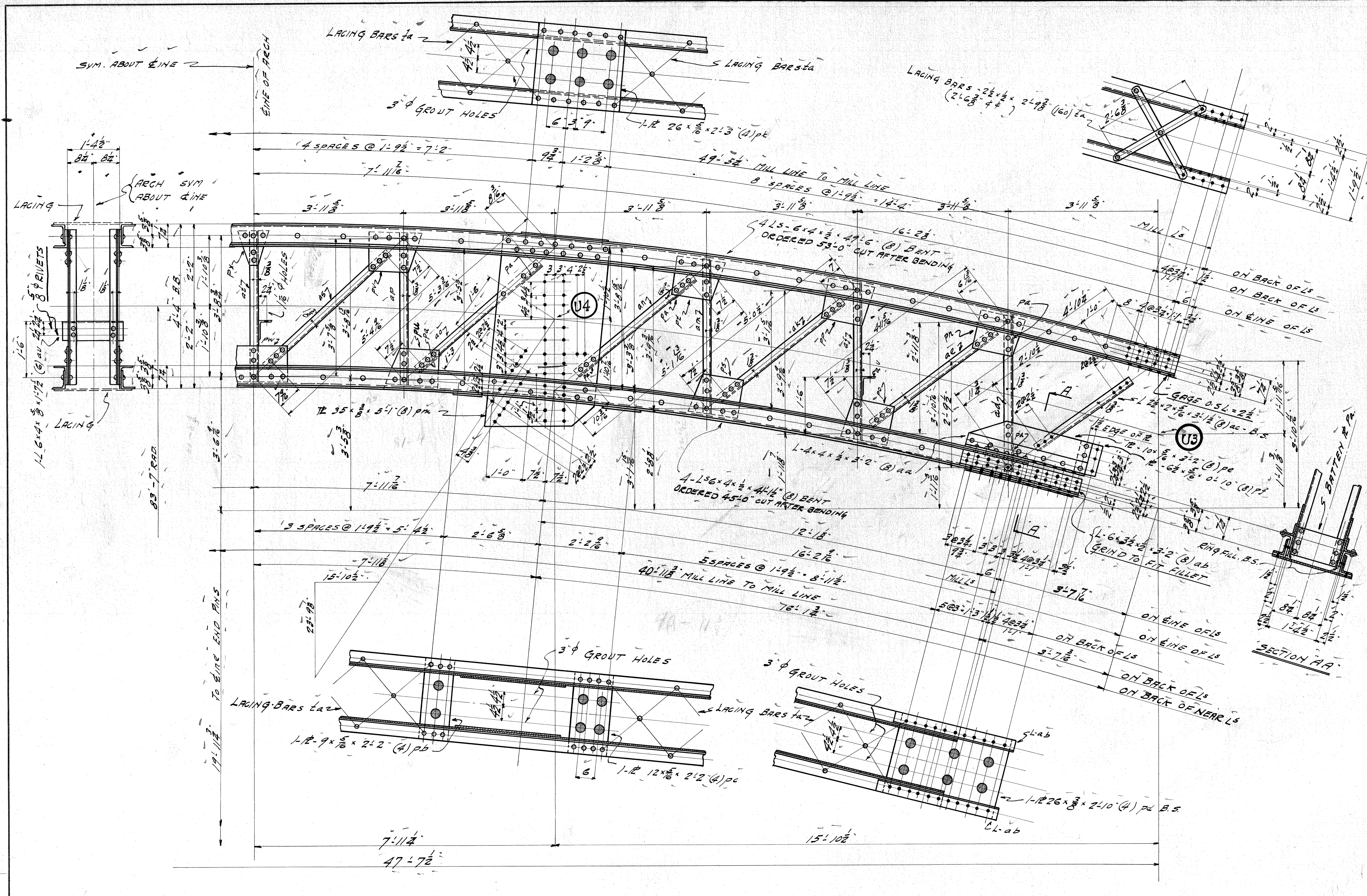
SHIPPED ON BILL # 801

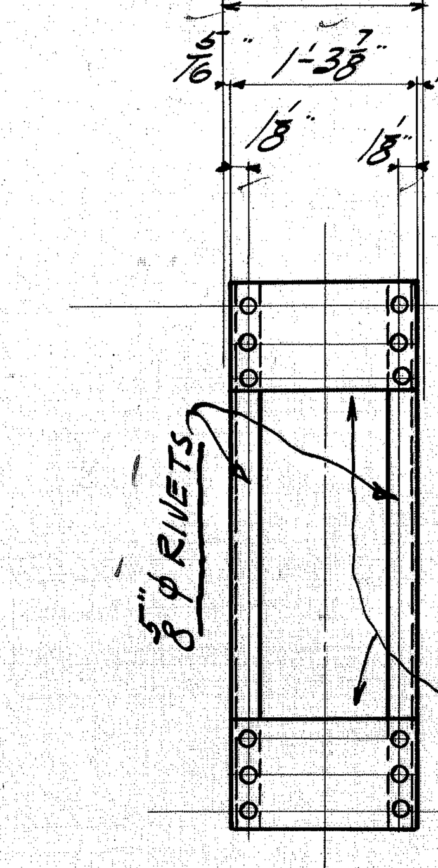
WISCONSIN BRIDGE & IRON CO.
NORTH MILWAUKEE, WISCONSIN

CONTRACT NO. 9292 ERECTED BY W. B. and I. Co.
FOR City of Detroit.
LOCATION Detroit, Mich.
DESCRIPTION Howard St. Bridge
DETAILS OF Grillage, Rollers and etc.
SPECIFICATIONS REAMING None
INSPECTION BY Pittsburg Testing Lab.
SHOP PAINT See Note
FIELD PAINT Two Coats Red Lead on Rollers and Pin after erection
RIVETS ¾" OPEN HOLES 13/16" EXCEPT AS NOTED
MADE BY O. R. Becker DATE Feb. 9th 21
TRACED BY W. H. Peters DATE Mar. 8th 21
CHECKED BY Madsow DATE April 6. 21
SCALE ¾ + 1½" = 1'0" DATE REVISED SHEET NO. 1
SECTION CONT. NO. 9292

File XO 59-17


WISCONSIN BRIDGE & IRON CO.
NORTH MILWAUKEE, WISCONSIN
CONTRACT NO. 9292 ERECTED BY W. Bardt Co.
FOR City of DETROIT
LOCATION DETROIT, MICH.
DESCRIPTION Howard St. Bridge
DETAILS OF ARCH
SPECIFICATIONS SEE NOTE
INSPECTION BY Pittsburg Testing Lab.
SHOP PAINT NONE EXCEPT CONTACT SURFACES
FIELD PAINT NONE
RIVETS 3/4" OPEN HOLES SEE NOTE EXCEPT AS NOTED
MADE BY O.R. Becker DATE 2-24-21
TRACED BY W. H. Peters DATE 3-26-21
SCALE 3/4" = 1'-0" DATE REVISED SHEET NO 2
CONT. NO. 9292
NOTE:-
DIMENSIONS OMITTED and Marked "X" ARE TO BE DETERMINED BY ACTUAL LAYOUT BY TEMPLATE SHOP
ALL HOLES FOR FIELD CONNECTIONS IN MAIN TRUSSES ARE TO BE SUBPUNCHED 11/16" AND REAMED TO 15/16" WHILE TRUSSES ARE ASSEMBLED IN SHOP.
HOLES FOR FLOORBEAM CONNECTIONS ARE TO BE SUBPUNCHED 11/16" AND REAMED TO 15/16" TO A STEEL TEMPLATE NOT LESS THAN 1" THICK
SECTION BB
SECTION AA
SECTION MM
SECTION EE
SECTION FF For L0U3B only
SECTION GG FOR L0U3A only
SECTION HH FOR L0U3B only
SECTION KK
SECTION II
ARCH IS SYMM ABOUT ℄ LINE EXCEPT AS SHOWN OR NOTED
BASE FOR L0U3A only Same as L0U3B except as shown or noted
BASE FOR L0U3B only Same as L0U3B except as shown or noted
2 - SECTIONS ARCH - L0U3B
ALike except at POINT L0
DETAIL FOR BATTEN PLATES "PA"
Schedule of Angles and Plates in Web
3/4" Grout Holes
120'-0" c. to c. of END PINS
SHEET NO. 2
9292
File XO 59-18





DETAIL FOR BATTEN PLATES - Pa

2-ARCH SECTIONS - U3-U3 Billedon 3ab6

SCHEDULE OF ANGLES AND PLATES IN WEB

L - 2½ x 2 x 5/16 x 4'-1½ (8) ad	
L - do. - 4'-0 - (8) ae	
L - do. - 4'-0½ (8) af	
L - do. - 4'-1 - (8) ak	
L - do - 4'-0½ (8) am	
L - do - 3'-11⅝ (8) an	
L - do - 4'-2¾ (8) ao	
L - do - 3'-11⅞ (8) ap	
L - do - 4'-4¾ (8) as	
L - do - 3'-11¾ (4) at	
PL - 12½ x 5/16 - 1'-8 (8) pk	
PL - 12½ x 5/16 - 1'-3 (8) po	
PL - 13 x 5/16 - 1'-3 (8) pp	
PL - 13 x 5/16 - 1'-4 (8) ps	
PL - 12½ x 5/16 - 1'-3½ (8) pt	
PL - 12 x 5/16 - 1'-4 (8) pu	
PL - 12½ x 5/16 - 1'-4½ (8) pv	
PL - 12 x 5/16 - 1'-11 (4) pw	
PL - 11 x 9/16 - 0'-10 (4) px	

NOTE:-
ALL HOLES FOR FIELD CONNECTIONS IN MAIN TRUSSES ARE TO BE SUBPUNCHED 11/16 φ AND REAMED TO 13/16 φ WHILE TRUSSES ARE ASSEMBLED IN SHOP.

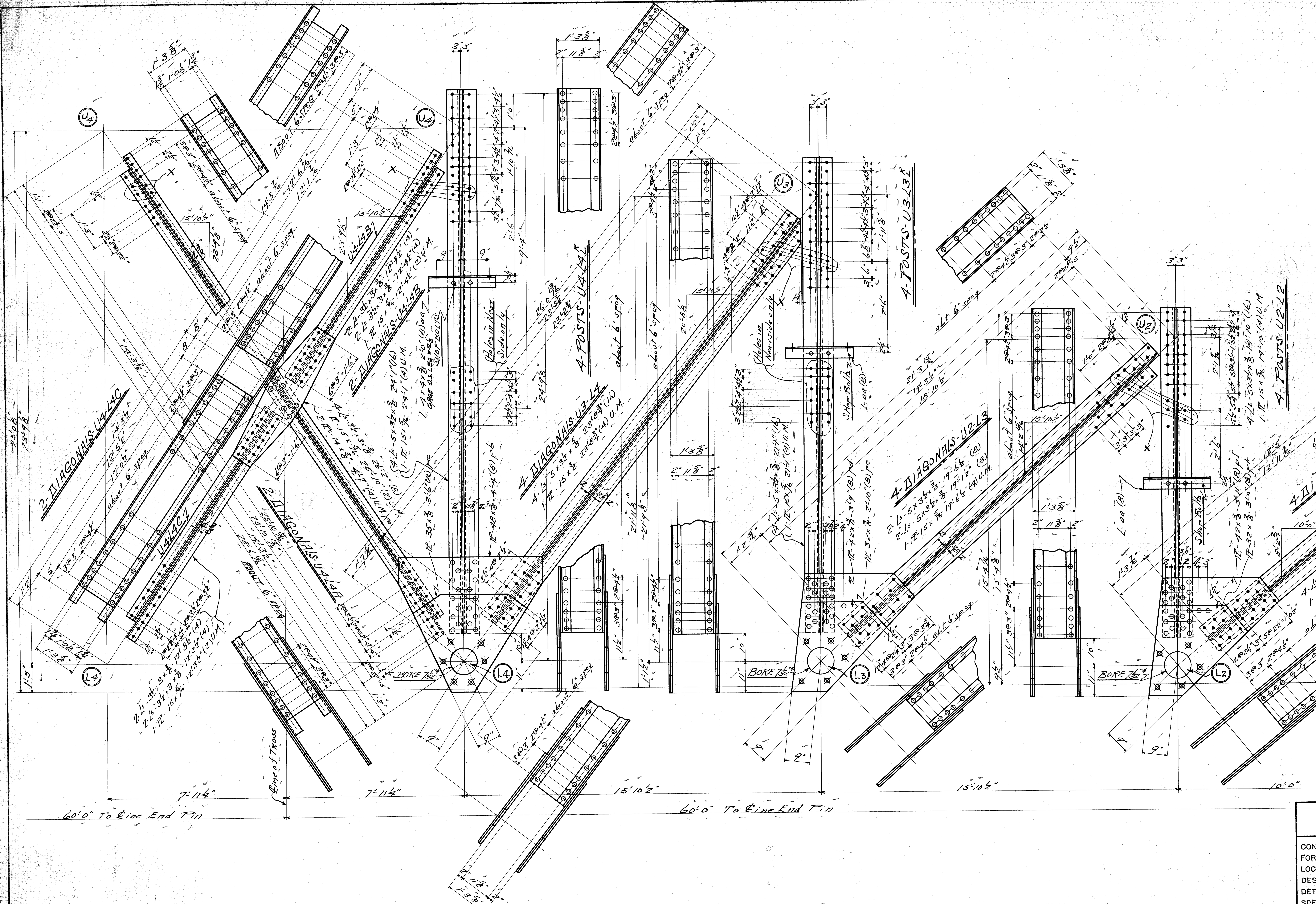
WISCONSIN BRIDGE & IRON CO.
NORTH MILWAUKEE, WISCONSIN

CONTRACT NO. 9292 ERECTED BY W.B.&I.Co.
FOR CITY OF DETROIT MICH.
LOCATION DETROIT MICHIGAN
DESCRIPTION HOWARD ST. BRIDGE
DETAILS OF ARCH SECTIONS
SPECIFICATIONS SPECIAL CITY OF DETROIT SUPPLEMENTAL W.B.&I.Co. REAMING SEE NOTE
INSPECTION BY PITTSBURG TESTING LAB.
SHOP PAINT NONE EXCEPT CONTACT SURFACES
FIELD PAINT NONE
RIVETS ¾ OPEN HOLES SEE NOTE EXCEPT AS NOTED
MADE BY O. R. BECKER DATE 2-26-21
TRACED BY A.K. DATE 3-26-21
CHECKED BY Morrow DATE Mar 31 21
SCALE ¾" = 1'-0" DATE REVISED SHEET NO. 3
SECTION ORB 4-11-21
CONT. NO. 9292

File XO 59-19

Summary of Parts

No	Description	Mark	Mat'l
4	Diagonals	U1-L2	4a
4	"	U2-L3	"
4	"	U3-L4	"
2	"	U4-L4A	"
2	"	U4-L4B	4b
2	"	U4-L4C	"
4	Posts	U2-L2	"
4	"	U3-L3R/L	4c
4	"	U4-L4R/L	"



SHOP NOTE:-

Both sides of Members are alike except as noted.

Holes Marked "X" are to be located from connecting Members by Template Shop.

ALL HOLES FOR FIELD CONNECTIONS IN MAIN TRUSSES ARE TO BE SUBPUNCHED 11/16"⌀ AND REAMED TO 13/16"⌀ WHILE TRUSSES ARE ASSEMBLED IN SHOP.

WISCONSIN BRIDGE & IRON CO.
NORTH MILWAUKEE, WISCONSIN

CONTRACT NO. 9292 ERECTED BY W. B. and I. Co.
FOR City of Detroit
LOCATION Detroit, Mich.
DESCRIPTION Howard St. Bridge
DETAILS OF Web Members
SPECIFICATIONS Special City of Detroit Supplemental W.B.&I.Co. REAMING SEE NOTE
INSPECTION BY Pittsburg Testing Lab.
SHOP PAINT None except contact surfaces — two coats Goheen's Incased Steelcoat Paint.
FIELD PAINT
RIVETS 3/4 ⌀ OPEN HOLES 13/16 ⌀ EXCEPT AS NOTED
MADE BY O. R. Becker DATE Mar 1st 21
TRACED BY W. H. Peters DATE " 9th 21
CHECKED BY DATE Mar 31-21
SCALE Centers 3/4" = 1'0", Details 3" = 1'0" DATE REVISED
SECTION
SHEET NO. 4
CONT. NO. 9292

File XO 59-20