

STATE OF OHIO
DEPARTMENT OF HIGHWAYS

UI-1052 (2)

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	TYPE FUNDS	POST WAR
2	OHIO	UI-1052(2)	POST WAR	

LUCAS COUNTY
CITY OF TOLEDO
TOLEDO EXPRESSWAY SYSTEM
MAUMEE RIVER BRIDGE
LUC 120 - 3.46

TOLEDO EXPRESSWAY SYSTEM

LUC 120 - 3.46
LUCAS COUNTY
CITY OF TOLEDO

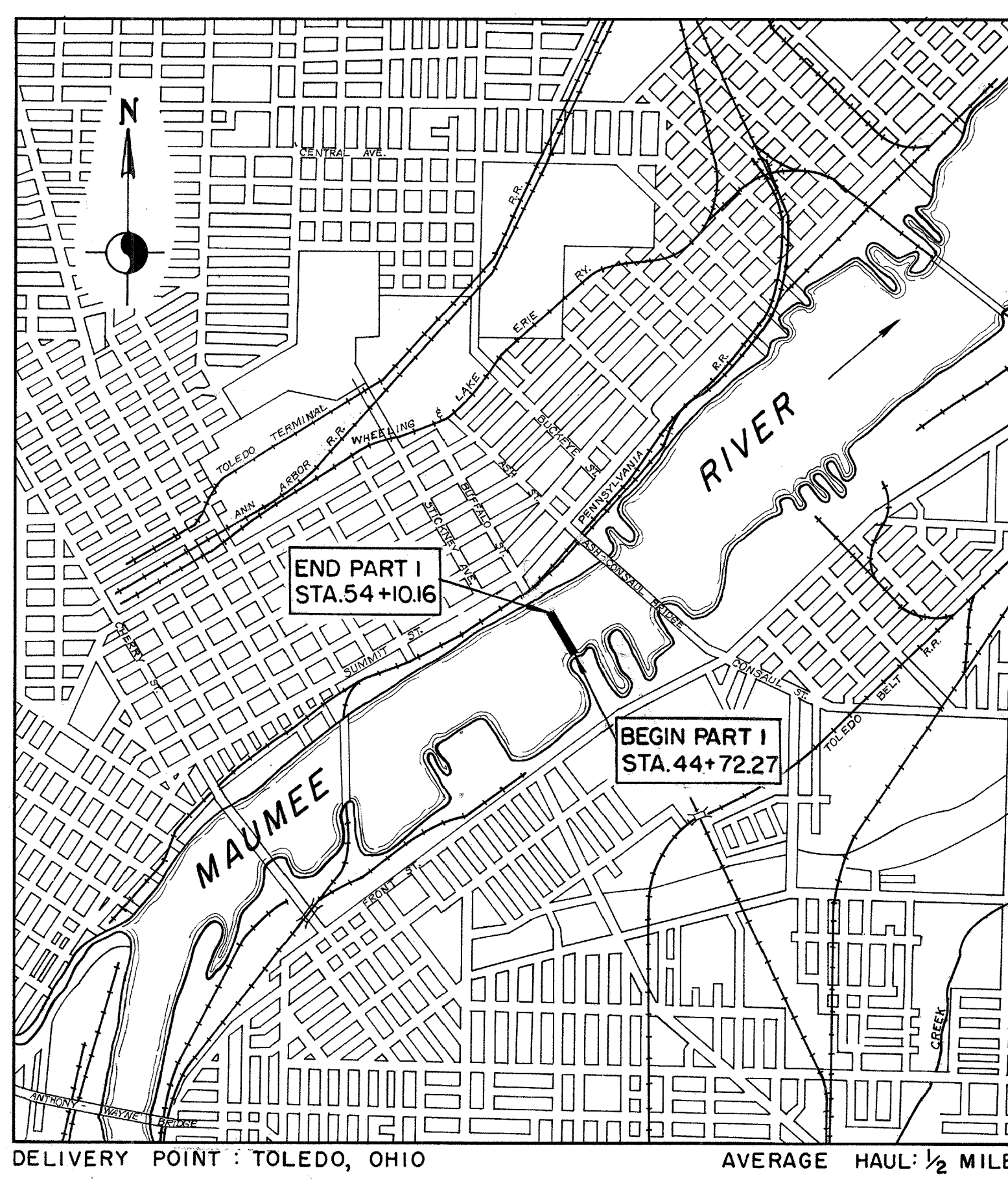
MAUMEE RIVER BRIDGE PART 1 - RIVER PIERS

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15. FENDERS

APPROVED
DATE 12/17/51 Burton R. MacBirtcher
DIRECTOR OF PUBLIC SERVICE, CITY OF TOLEDO

APPROVED
DATE _____
CITY MANAGER, CITY OF TOLEDO



THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO DEPARTMENT OF HIGHWAYS, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL NOT REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH IN THE PLANS AND ESTIMATE.

THE RIGHT OF WAY FOR THIS IMPROVEMENT WILL BE PROVIDED BY THE STATE OF OHIO.

APPROVED
DATE Dec. 18, '51 George H. Lieber
DIVISION DEPUTY DIRECTOR

APPROVED
DATE _____
CHIEF ENGINEER, BUREAU OF MAINTENANCE

APPROVED
DATE 12-18-51 Richard Orth
CHIEF ENGINEER, BUREAU OF BRIDGES & R. R. CROSSINGS

APPROVED
DATE 12-18-51 R. H. Patterson
CHIEF ENGINEER, BUREAU OF LOCATION & DESIGN

APPROVED
DATE 12-18-51 F. J. Schaubert
FIRST ASSISTANT DIRECTOR & CHIEF ENGINEER

APPROVED
DATE 12-18-51 W. Miller
DIRECTOR OF HIGHWAYS

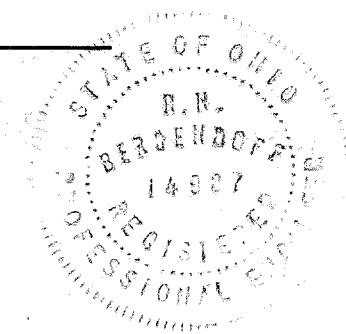
CONSTRUCTION BUREAU
JUN 30 1955
GROUND PHOTOLAB

LINE DATA

BEGIN PART I STA. 44 + 72.27
END PART I STA. 54 + 10.16
NET LENGTH PART I 937.89 FT. OR 0.178 MI.

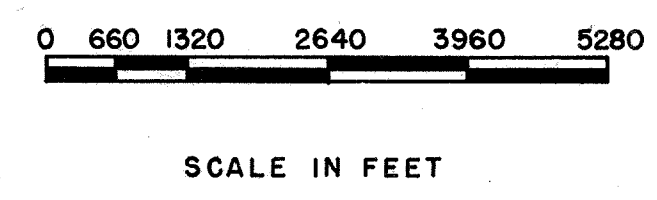
PREPARED AND RECOMMENDED BY
HOWARD NEEDLES TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY NEW YORK

R. N. Bergendoff



SUPPLEMENTAL SPECIFICATIONS
T-171.19 Rev. 7-31-50

LOCATION PLAN



PORTION TO BE IMPROVED

NOTE:
THIS SET OF PLANS, THE FIVE RIVER PIERS OF THE MAUMEE RIVER BRIDGE, COVERS ONLY PART I OF THIS PROJECT. THE APPROACH PIERS, ABUTMENTS, SUPERSTRUCTURE, AND THE CONTIGUOUS HIGHWAY WORK WILL BE LET IN SUBSEQUENT CONTRACTS.

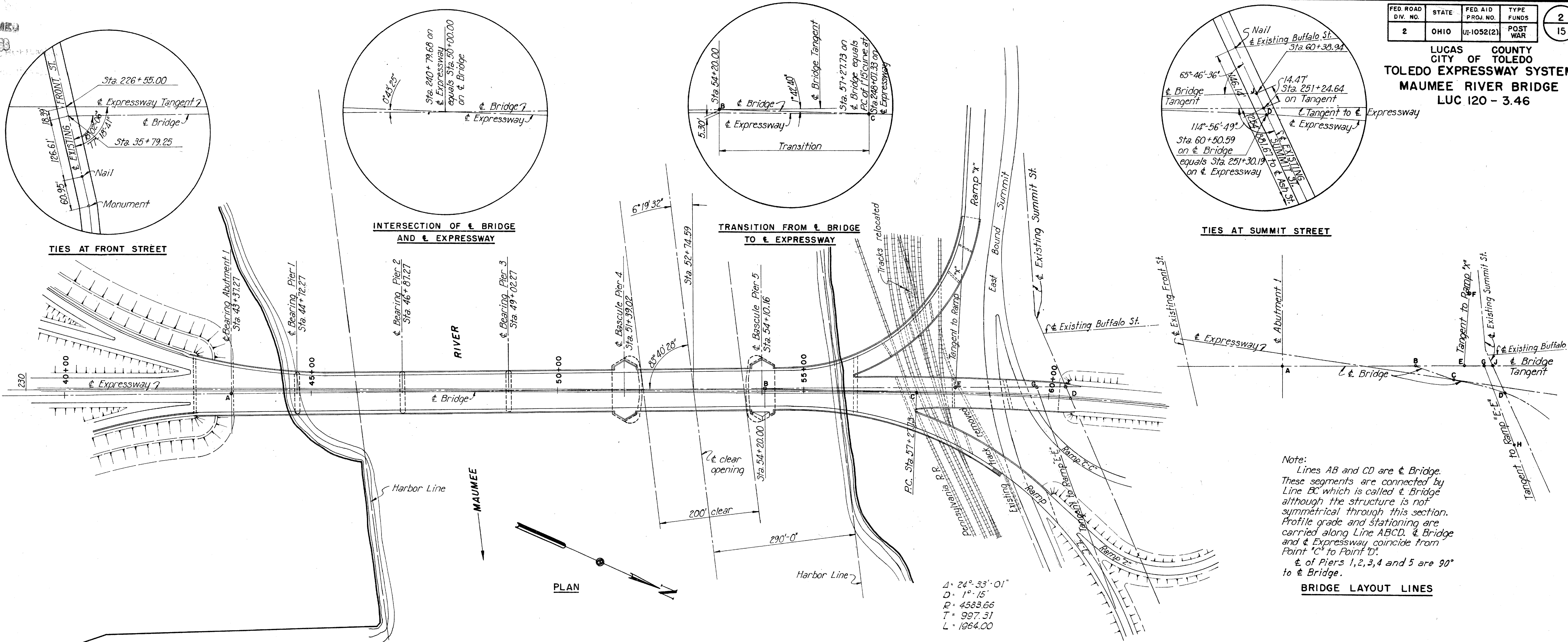
DEPARTMENT OF COMMERCE BUREAU OF PUBLIC ROADS	
RECOMMENDED FOR APPROVAL	
DISTRICT ENGINEER	DATE
APPROVED	
DIVISION ENGINEER	DATE

FILE NO	LUCAS COUNTY
SEC	LUC 120 - 3.46, PART I
DATE OF LETTING	_____, 195__
CONTRACT NO.	

MICROFILMED
JUL 25 1980

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	TYPE FUNDS	2
2	OHIO	U-1052(2)	POST WAR	15

LUCAS COUNTY
CITY OF TOLEDO
TOLEDO EXPRESSWAY SYSTEM
MAUMEE RIVER BRIDGE
LUC 120 - 3.46



TIES AT FRONT STREET

INTERSECTION OF BRIDGE AND EXPRESSWAY

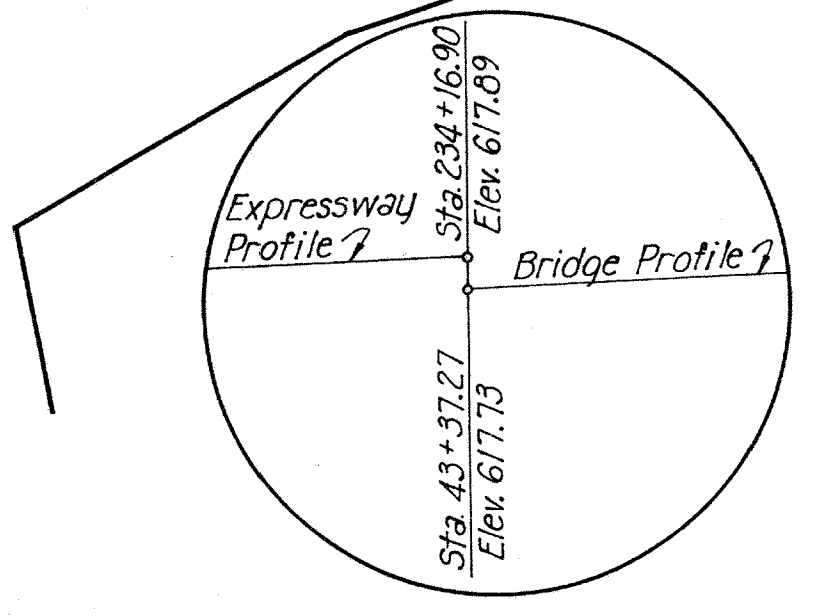
TRANSITION FROM BRIDGE TO EXPRESSWAY

TIES AT SUMMIT STREET

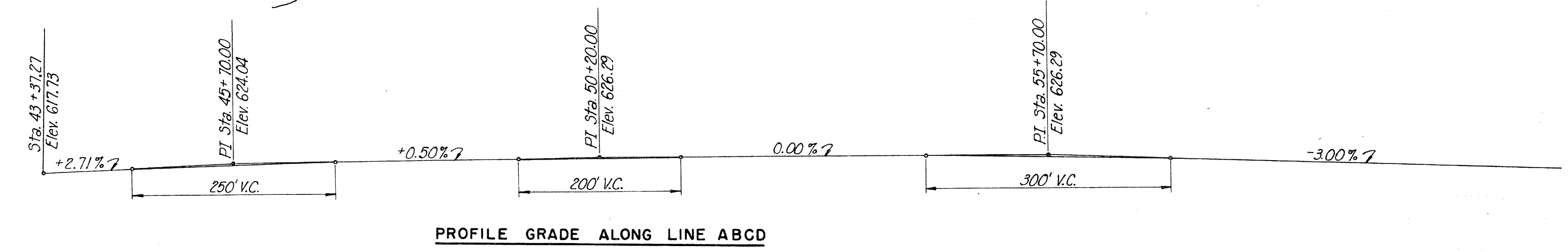
Note:
Lines AB and CD are Bridge. These segments are connected by Line BC which is called Bridge although the structure is not symmetrical through this section. Profile grade and stationing are carried along Line ABCD. Bridge and Expressway coincide from Point 'C' to Point 'D'.
of Piers 1, 2, 3, 4 and 5 are 90° to Bridge.

BRIDGE LAYOUT LINES

$\Delta = 24^{\circ} 33' 01''$
 $D = 1^{\circ} 15'$
 $R = 4583.66$
 $T = 997.31$
 $L = 1964.00$

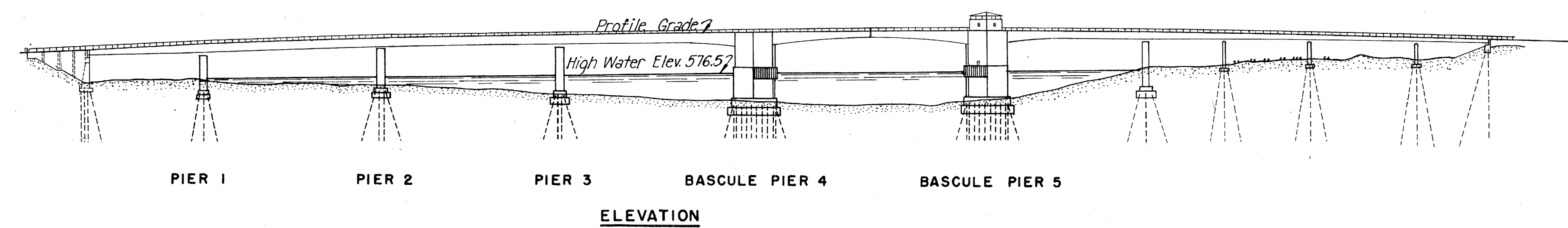


PROFILE TRANSITION AT BEARING ABUTMENT 1



PROFILE GRADE ALONG LINE ABCD

BENCH MARK
City Bench Mark No. 1112 at Ash Street Bridge, northwesterly end of bridge. Brass Bench Mark Plate set in northwesterly end of northerly retaining wall, 28 feet southeasterly of newel post on northerly side of bridge at Summit Street end of railing. Elevation 601.615 feet above Mean Sea Level, New York.



PIER 1 PIER 2 PIER 3 BASCULE PIER 4 BASCULE PIER 5
ELEVATION

PART I

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES

TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-120 - 35

GENERAL PLAN AND ELEVATION

TOLEDO, LUCAS COUNTY, OHIO

SCALE: 1" = 100'
MADE H.B. DATE 8-16-51
TRCD B.L.B. DATE 8-21-51
CKD H.A.M. DATE 9-27-51

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY NEW YORK
810 SHEET 1.02

502

LUCAS COUNTY
CITY OF TOLEDO
TOLEDO EXPRESSWAY SYSTEM
MAUMEE RIVER BRIDGE
LUC 120 - 3.46

NOTES

1. DESIGN SPECIFICATIONS.

"DESIGN SPECIFICATIONS FOR HIGHWAY STRUCTURES", STATE OF OHIO, DEPARTMENT OF HIGHWAYS, DATED OCTOBER 1, 1951, (WITH A LOAD FREQUENCY RATING OF CF 1200-51) ARE USED IN THE DESIGN OF THIS PROJECT.

2. CONSTRUCTION SPECIFICATIONS.

"CONSTRUCTION AND MATERIAL SPECIFICATIONS", STATE OF OHIO, DEPARTMENT OF HIGHWAYS, DATED JANUARY 1, 1951, AS MODIFIED BY NOTES ON THE PLANS AND IN THE PROPOSAL, SHALL GOVERN.

3. SCOPE OF CONTRACT.

SUBSTRUCTURE WORK INCLUDED IN THIS CONTRACT CONSISTS OF CONSTRUCTING THE PORTIONS OF BASCULE SPAN PIERS 4 AND 5 BELOW ELEVATION 585.5 AND THE COMPLETE CONSTRUCTION OF PIERS 1, 2 AND 3.

4. WORKING AREAS.

THE CONTRACTOR SHALL PROVIDE ALL WORKING AREAS AND SPACE REQUIRED FOR STORAGE OF MATERIAL AND OTHER OPERATIONS. A PORTION OF THE RIGHT-OF-WAY FOR THE SOUTH APPROACH TO THIS BRIDGE WILL HAVE BEEN ACQUIRED FROM FRONT STREET TO THE RIVER AND WILL BE AVAILABLE FOR THE CONTRACTOR'S OPERATIONS. AT THE NORTH APPROACH TO THE BRIDGE THE CONTRACTOR MAY ENTER ON PENNSYLVANIA RR CO. PROPERTY TO THE MINIMUM EXTENT NECESSARY TO PERFORM HIS WORK, SUBJECT TO SPECIAL PROVISIONS IN THE PROPOSAL.

5. FIELD OFFICE.

THE CONTRACTOR SHALL PROVIDE A FIELD OFFICE, IN ACCORDANCE WITH SEC. 5-B.01(b) OF THE "CONSTRUCTION AND MATERIAL SPECIFICATIONS" AS SOON AS POSSIBLE AFTER THE AWARD OF THE CONTRACT, HAVING A MINIMUM OF 250 SQUARE FEET OF FLOOR SPACE. THE OFFICE SHALL BE OF WATERTIGHT CONSTRUCTION WITH SUITABLE WINDOWS AND DOORS, PROPERLY SCREENED, AND WITH INTERIOR WALLS AND CEILING FINISHED WITH CELOTEX OR SIMILAR INSULATING BOARD. THE FLOOR SHALL BE DOUBLE THICKNESS. THE OFFICE SHALL BE PROVIDED WITH HEATING, LIGHTING AND TELEPHONE FACILITIES AND SHALL BE EQUIPPED WITH ONE DESK, ONE CAMP TYPE PLAN TABLE, ONE CAMP TYPE WORK TABLE AND TWO CHAIRS. THE CONTRACTOR SHALL MAINTAIN THE OFFICE AND SERVICES UNTIL COMPLETION OF HIS CONTRACT.

6. WORK IN NAVIGABLE WATERS.

ALL CONSTRUCTION OPERATIONS IN THE RIVER SHALL CONFORM TO THE REQUIREMENTS OR DIRECTIONS OF THE DISTRICT ENGINEER, U. S. ARMY AND TO THE REQUIREMENTS OF THE U. S. COAST GUARD. THE CONTRACTOR SHALL NOTIFY THE DISTRICT ENGINEER'S OFFICE, CORPS OF ENGINEERS, U. S. ARMY, SEVEN DAYS IN ADVANCE OF COMMENCEMENT OF WORK IN THE RIVER SO THAT NAVIGATION INTERESTS MAY BE NOTIFIED OF THE PRESENCE OF CONSTRUCTION EQUIPMENT AND ALSO SHALL NOTIFY THE SAME OFFICE WHEN WORK IN THE RIVER IS COMPLETED. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN NAVIGATION LIGHTS AND OTHER NAVIGATION SIGNALS OR FACILITIES WHICH MAY BE REQUIRED ON TEMPORARY CONSTRUCTIONS OR VESSELS, AND SHALL PROVIDE AND MAINTAIN NAVIGATION LIGHTS ON PARTIALLY OR ENTIRELY COMPLETED PIERS FOR THE DURATION OF HIS CONTRACT, IN ACCORDANCE WITH THE REQUIREMENTS OF THE U. S. COAST GUARD. THE CONTRACTOR SHALL APPLY FOR AND SECURE ALL NECESSARY DEPARTMENT OF THE ARMY PERMITS FOR DREDGING AND DUMPING AND FOR CONSTRUCTING FALSEWORK OR OTHER TEMPORARY CONSTRUCTIONS IN THE RIVER. THE CONTRACTOR SHALL PROVIDE AREAS FOR DISPOSAL OF EXCAVATED MATERIALS AT HIS OWN EXPENSE.

7. COFFERDAMS.

AT LEAST FIFTEEN DAYS BEFORE COMMENCING WORK ON THE COFFERDAMS THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL DRAWINGS SHOWING THE CHARACTER AND SUFFICIENCY OF THE COFFERDAMS HE PROPOSES TO USE. COFFERDAMS SHALL BE CONSTRUCTED WITH SUFFICIENT ACCURACY THAT THE CENTER OF THE CONCRETE SEAL COURSE OF EACH PIER SHALL BE WITHIN A CIRCLE SIX INCHES IN DIAMETER OF WHICH THE CENTER IS THE SPECIFIED TRUE CENTRAL VERTICAL AXIS OF THE PIER. THE MAXIMUM SKEW IN THE PIER BASE SHALL BE SUCH THAT THE LONGITUDINAL AXIS OF THE SEAL COURSE DOES NOT DEVIATE FROM THE TRUE SPECIFIED LONGITUDINAL AXIS BY MORE THAN SIX INCHES AT EITHER END OF THE SEAL COURSE. ALL COFFERDAMS SHALL BE REMOVED AFTER PIERS ARE CONSTRUCTED.

8. EXCAVATION MEASUREMENT.

THE METHOD OF MEASUREMENT FOR THE EXCAVATION SHALL BE AS SET FORTH IN SEC. E-2.08 OF THE "CONSTRUCTION AND MATERIAL SPECIFICATIONS" EXCEPT THAT THE BOTTOM PLANE SHALL BE CONSIDERED AS AT THE BOTTOM OF THE SEAL COURSE AND THE VERTICAL PLANES SHALL BE CONSIDERED AS AT THE EDGES OF THE SEAL COURSE ACCORDING TO THE DIMENSIONS SHOWN ON THE PLANS.

9. CLASS OF CONCRETE.

ALL CONCRETE SHALL BE CLASS "C", EXCEPT THE CONCRETE FOR THE SHOE RECESSES, WHICH SHALL BE AS SPECIFIED HEREIN. THE CLASS "C" CONCRETE FOR THE SEAL COURSES SHALL BE AS MODIFIED UNDER "CONCRETE SEAL COURSES".

SHOE RECESSES SHALL BE FILLED WITH NON-SHRINKING CONCRETE, SIMILAR AND EQUAL TO "EMBECO" CONCRETE, COMPOSED OF A MIXTURE OF PORTLAND CEMENT, FINE AGGREGATE, COARSE AGGREGATE, WATER AND EMBECO METALLIC AGGREGATE MANUFACTURED BY THE MASTER BUILDERS COMPANY, CLEVELAND, OHIO. THE AMOUNT OF EMBECO AGGREGATE IN THE MIXTURE SHALL BE 100 POUNDS PER BAG OF PORTLAND CEMENT. CEMENT CONTENT SHALL BE NOT LESS THAN SIX BAGS PER CUBIC YARD AND THE COARSE AGGREGATE SHALL BE NO. 4 SIZE.

10. CONCRETE SEAL COURSES.

CONCRETE FOR SEAL COURSES DEPOSITED UNDER WATER SHALL BE CLASS "C", EXCEPT THAT CEMENT CONTENT SHALL BE INCREASED ONE-HALF BAG OF CEMENT PER CUBIC YARD OF CONCRETE AND SHALL HAVE A SLUMP OF ABOUT SIX INCHES. ADJUSTURES TO INCREASE PLASTICITY, OF A CHARACTER SUITABLE FOR UNDER WATER DEPOSIT, SHALL BE ADDED IF ORDERED OR APPROVED BY THE ENGINEER. CONCRETE DEPOSITED UNDER WATER SHALL BE CAREFULLY PLACED IN A COMPACT MASS IN ITS FINAL POSITION BY MEANS OF TREWIE PIPES OR BY BOTTOM DUMP BUCKETS IN SUCH WAY AS TO PRODUCE A CONTINUOUS COMPLETE MONOLITH OF CONCRETE WITHOUT JOINTS, AND THE CONCRETE SHALL NOT BE DISTURBED AFTER BEING DEPOSITED. CONCRETE SHALL BE DEPOSITED ONLY UNDER STILL WATER. CONCRETE SHALL BE PLACED IN A CONTINUOUS OPERATION UNTIL THE ENTIRE MASS OF THE SEAL HAS BEEN PLACED. A SUFFICIENT NUMBER OF TREWIES OR BUCKETS SHALL BE USED TO INSURE THE CONSTRUCTION OF THE SEAL AS A MONOLITHIC MASS.

TREWIES SHALL CONSIST OF WATERTIGHT TUBES PREFERABLY OF STEEL PIPE TEN INCHES IN DIAMETER OR AS MAY BE APPROVED. COUPLINGS IN TREWIE TUBES SHALL BE WATERTIGHT SCREWED JOINTS OR FLANGED COUPLINGS FITTED WITH GASKETS. TREWIES CONSTRUCTED OF RIVETED SHEET STEEL PIPES WILL BE ACCEPTABLE IF COMPLETELY WELDED SO AS TO BE WATERTIGHT AND CONNECTED WITH SUITABLE FLANGES PROVIDED WITH GASKETS. THE TOP OF EACH TREWIE SHALL CONSIST OF A SHEET STEEL HOPPER OF WATERTIGHT CONSTRUCTION CONNECTED BY WATERTIGHT JOINT TO THE TREWIE. TREWIE PIPES SHALL BE SUFFICIENTLY LONG SO THAT WHEN SET ON THE BOTTOM OF EXCAVATION WHERE CONCRETE IS TO BE DEPOSITED THE HOPPER SHALL EXTEND ABOVE WATER. TREWIES SHALL BE SUPPORTED SO AS TO PERMIT PROPER FILLING OF THE HOPPERS AND SO THAT THE TREWIE CAN BE RAISED VERTICALLY WITH A SLOW MOVEMENT AND LOWERED RAPIDLY TO RETARD THE FLOW OF CONCRETE. THE DISCHARGE END OF THE TREWIE SHALL BE ENTIRELY SEALED AT ALL TIMES BY BEING SET UPON THE BOTTOM OF EXCAVATION OR UPON CONCRETE ALREADY DEPOSITED AND THE TREWIE

TUBE SHALL BE KEPT FULL TO THE BOTTOM OF THE HOPPER. WHEN A BATCH OF CONCRETE IS DUMPED INTO THE HOPPER THE TREWIE SHALL BE SLOWLY RAISED (BUT NOT OUT OF THE CONCRETE AT THE BOTTOM OF THE TREWIE) UNTIL THE BATCH DISCHARGES TO THE BOTTOM OF THE HOPPER; THE TREWIE SHALL THEN BE QUICKLY LOWERED AND THE FLOW OF CONCRETE STOPPED. THE CONTRACTOR SHALL PROVIDE A BOTTOM PLUG OR COVER TO KEEP WATER OUT OF THE TREWIE PIPE DURING THE INITIAL FILLING, AND WHEN STARTING TREWIE WORK ON A SANDY BOTTOM HE SHALL PROVIDE A PLATFORM OR DEFLECTOR PLATE WHICH WILL PERMIT CONCRETE TO DISCHARGE LATERALLY AND PREVENT DISPLACEMENT OF MATERIAL BELOW THE BEARING SURFACE.

IF CONCRETE IS PLACED UNDER WATER BY MEANS OF A BOTTOM DUMP BUCKET, THE BUCKET SHALL HAVE A CAPACITY OF NOT LESS THAN TWO CUBIC YARDS AND THE TOP OF THE BUCKET SHALL BE COVERED. THE BOTTOM DOORS SHALL OPEN FREELY DOWNWARD AND OUTWARD WHEN TRIPPED. THE BUCKET SHALL BE COMPLETELY FILLED AND SLOWLY LOWERED TO AVOID BACKWASH. IT SHALL BE SO DESIGNED THAT IT CANNOT BE DUMPED UNTIL IT RESTS ON THE SURFACE UPON WHICH THE CONCRETE IS TO BE DEPOSITED AND WHEN DISCHARGED SHALL BE WITHDRAWN SLOWLY UNTIL WELL ABOVE THE CONCRETE, WITH THE INTENT TO MAINTAIN AS NEARLY AS POSSIBLE STILL WATER AT THE POINT OF DISCHARGE AND TO AVOID AGITATING THE CONCRETE.

DEPOSIT OF SUCCESSIVE BUCKETS OF CONCRETE SHALL BE MADE CONTINUOUS FROM THOSE PREVIOUSLY DEPOSITED SO AS TO ASSURE A CONTINUOUS BED OF CONCRETE. THE NUMBER OF BUCKETS AND OTHER EQUIPMENT USED SHALL BE ADEQUATE SO THAT A SECOND LAYER OF CONCRETE SHALL BE STARTED ABOVE THE FIRST LAYER BEFORE ANY OF THE CONCRETE SHALL HAVE TAKEN INITIAL SET AND SO THAT THERE MAY BE PRODUCED A COMPLETE CONTINUOUS MONOLITH OF CONCRETE WITHOUT JOINTS OR DIVISIONS.

TYPES OF BOTTOM DUMP BUCKETS AND DETAILS OF TREWIES SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

CONCRETE SEAL COURSES WILL BE MEASURED FOR PAYMENT UNDER ITEM S-1, AND WILL BE COMPUTED FROM THE WIDTH AND LENGTH OF SEAL COURSES SHOWN ON THE PLANS AND PLACED IN CORRECT PLAN POSITION, AND THE ACTUAL AVERAGE DEPTH OF SEAL COURSES PLACED, EXCLUDING THE VOLUME OF ANY CONCRETE PLACED OUT OF POSITION AND IN RECESSES FORMED BY COFFERDAM PILING. JUST BEFORE THE SEAL COURSE IS PLACED IN A COFFERDAM, THE ENGINEER WILL DETERMINE THE AVERAGE ELEVATION OF GROUND IN THIS COFFERDAM AND THAT AVERAGE ELEVATION SHALL BE CONSIDERED THE BOTTOM OF THE SEAL COURSE CONCRETE IN THE DETERMINATION OF QUANTITY.

11. PILES.

ALL BEARING PILES SHALL BE 14 IN. BP 117 POUND. PILES SHALL BE DRIVEN TO PENETRATION REQUIRED TO BEAR ON ROCK OR IN BOULDERS AND BROKEN ROCK OVERLYING THE SOLID ROCK STRATA AND TO DEVELOP BEARING CAPACITY, ACCORDING TO THE SPECIFICATION FORMULA, OF 150 TONS. THE ACTUAL DESIGN WORKING CAPACITY FOR DEAD LOAD PLUS LIVE LOAD IS: PIER 1, 103.5 TONS; PIER 2, 75.5 TONS; PIER 3, 103.5 TONS; PIERS 4 AND 5, 74.8 TONS. THE HAMMER USED SHALL DEVELOP NOT LESS THAN 23,000 FT. LBS. ENERGY PER BLOW. PILE DRIVING WAY, IF NECESSARY, BE SUPPLEMENTED BY AIR JETTING, WATER JETTING, OR COMBINATION AIR-WATER JETTING TO FACILITATE PENETRATION.

PILES SHALL PREFERABLY BE ORDERED IN SUCH LENGTHS AS WILL PERMIT DRIVING EACH PILE IN ONE LENGTH WITHOUT SPLICING. PILES WHICH REQUIRE ADDITIONAL LENGTH TO OBTAIN THE REQUIRED PENETRATION OR THE BEARING CAPACITY SPECIFIED SHALL BE SPLICED IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLANS. ALL PILES SHALL HAVE TIP REINFORCING PLATES AS SHOWN ON THE PLANS. THE COST OF TIP REINFORCING PLATES AND ANY SPLICES WILL BE INCLUDED IN THE CONTRACT UNIT PRICE FOR STEEL PILES.

THE USE OF A FOLLOWER IN THE DRIVING OF PILES UNDER WATER IS PERMISSIBLE. ANY ADJUSTMENT OF THE COEFFICIENT OF THE DRIVING FORMULA THAT IS NECESSARY BECAUSE OF LOSS OF ENERGY DUE TO THE USE OF A FOLLOWER WILL BE DETERMINED FROM THE RESULTS OF TEST LOADING.

AFTER ALL THE PILES IN A FOOTING HAVE BEEN DRIVEN TO THE REQUIRED CAPACITY THE HAMMER SHALL BE REAPPLIED TO FIVE PILES IN THAT FOOTING AND EACH OF SUCH PILES SHALL BE SUBJECTED TO AT LEAST 100 ADDITIONAL BLOWS TO DETERMINE IF THE CAPACITY HAS BEEN RETAINED. IF ANY OF THESE PILES PENETRATES AT A RATE GREATER THAN THE FINAL PENETRATION PER BLOW OF THE ORIGINAL DRIVING, ALL THE PILES IN THAT FOOTING SHALL BE SUBJECTED TO SUCH SUBSEQUENT DRIVING.

12. PILE LOAD TESTS.

TEST LOADS SHALL BE CARRIED TO A VALUE OF 300 TONS UNLESS THE YIELD POINT IS REACHED AT A LESSER TONNAGE.

13. VIBRATING CONCRETE.

ALL CONCRETE EXCEPT THAT IN SEAL COURSES SHALL BE VIBRATED.

14. CONSTRUCTION JOINTS.

BEFORE PROCEEDING WITH CONCRETING OPERATIONS THE CONTRACTOR SHALL FURNISH, FOR APPROVAL OF THE ENGINEER, A SCHEDULE SHOWING THE EXTENT OF THE INDIVIDUAL POURS AND THE SEQUENCE IN WHICH THE POURS ARE TO BE MADE. EACH POUR SHALL BE MADE IN ONE CONTINUOUS OPERATION SO AS TO ASSURE MONOLITHIC WORK WITH CONSTRUCTION JOINTS IN APPROVED LOCATION. ALL CONSTRUCTION JOINTS SHALL BE SO LOCATED AND FORMED AS TO LEAST IMPAIR THE STRENGTH AND APPEARANCE OF THE STRUCTURE. THE HORIZONTAL JOINT IN BASCULE PIERS AT ELEVATION 549.0, AND ANY OTHER HORIZONTAL JOINTS AND VERTICAL JOINTS IN EXTERIOR WALLS OF THE BASCULE PIERS BETWEEN ELEVATION 549.0 AND ELEVATION 585.6 SHALL HAVE WATER STOPS MADE OF 20-OUNCE COPPER SHEET (SEC. M-7.13) AND FORMED AS SHOWN ON THE PLANS. WATER STOPS SHALL BE PLACED OUTSIDE THE EXTERIOR FACE REINFORCING STEEL AND ENDS OF SECTIONS SHALL BE LAPPED AND SOLDERED. PAYMENT FOR COPPER WATER STOPS SHALL BE INCLUDED IN THE CONTRACT PRICE FOR CONCRETE.

15. BAR SPLICES AND CLEARANCES.

UNLESS OTHERWISE SHOWN ON THE PLANS, (1) ALL BARS SHALL BE LAPPED 30 BAR DIAMETERS IN MAKING A SPLICE, (2) MAIN BARS SHALL BE NOT LESS THAN 2 INCHES NOR MORE THAN 2-1/2 INCHES FROM THE FACE OF THE CONCRETE.

16. CONCRETE SURFACE FINISH.

THE TOP SURFACE OF PIERS 1, 2 AND 3 EXCEPT SHOE BEARING AREAS SHALL HAVE WOOD FLOAT FINISH. TOP SURFACES OF BASCULE PIERS AT ELEVATION 549.0 AND ELEVATION 585.6 SHALL HAVE WOOD FLOAT FINISH. STAIR TREADS SHALL HAVE STEEL TROWELED FINISH FOLLOWED BY LIGHT BROOMING TO PROVIDE NON-SLIP SURFACE. EXTERIOR VERTICAL SURFACES ABOVE ELEVATION 570.0, EXCEPT SURFACES CONCEALED BY TIMBER FENDERS, SHALL BE FINISHED ACCORDING TO SEC. S-1.22 OF THE "CONSTRUCTION AND MATERIAL SPECIFICATIONS."

17. STRUCTURAL STEEL.

ITEM S-7, STRUCTURAL STEEL, INCLUDES TEMPLATE-SCREED-FRAMES, LOWER TEMPLATES AND ANCHOR BOLTS FOR SHOES; WROUGHT IRON PIPE HANDRAIL AND CAST IRON RAILING FITTINGS AND ANCHOR BOLTS FOR STAIRWAYS IN BASCULE PIERS; CAST IRON SOIL PIPE, AND CAST IRON DRAIN GRATES AND FRAMES IN BASCULE PIERS.

18. TEMPLATE-SCREED-FRAMES.

THERE SHALL BE PROVIDED FOR EACH SHOE OR BEARING PLATE OF THE SUPERSTRUCTURE SUPPORTED ON PIERS 1, 2 AND 3 A TEMPLATE-SCREED-FRAME MADE OF ANGLES WITH DIMENSIONS AS SHOWN ON THE DRAWINGS. THESE FRAMES SHALL HAVE HOLES FOR THE ANCHOR BOLTS, SHALL BE SCRIBED WITH BOTH TRANSVERSE AND LONGITUDINAL CENTERLINES, AND SHALL BE USED AS TEMPLATES FOR SETTING ANCHOR BOLTS AND AS SCREEDS FOR FINISHING THE TOP SURFACE OF SPECIAL CONCRETE PADS. FRAMES SHALL BE STRAIGHTENED AFTER WELDING AND SHALL BE MACHINED ON THE TOP IF NECESSARY TO PROVIDE A TRUE PLANE SURFACE. A SIMILAR FRAME COMPOSED OF CHANNELS SHALL BE PROVIDED FOR HOLDING THE BOTTOMS OF THE BOLTS IN CORRECT POSITION. ALL ANCHOR BOLTS SHALL BE THREADED TO APPROXIMATELY FOUR INCHES BELOW THE FINAL ELEVATION FOR BOTTOM OF SHOE OR BEARING PLATE AND EACH BOLT SHALL BE EQUIPPED WITH TWO NUTS, ONE ABOVE AND ONE BELOW THE UPPER FRAME. A THIRD NUT SHALL BE PROVIDED FOR EACH BOLT BEFORE COMPLETION OF THE CONTRACT. THE FRAMES TOGETHER WITH THE ANCHOR BOLTS SHALL BE SET IN PLACE, SUITABLY SUPPORTED FROM THE TOP OF THE FORMS AND ADJUSTED TO CORRECT HORIZONTAL POSITION BEFORE PLACING THE TOP LIFT OF PIER CONCRETE. AFTER THE PIER CONCRETE HAS FULLY CURED, THE UPPER FRAME SHALL BE ADJUSTED TO EXACT ELEVATION BY USE OF THE NUTS ABOVE AND BELOW THIS FRAME. THE UPPER FRAME WILL THUS FORM THE SIDES OF A PAD, APPROXIMATELY ONE INCH HIGHER THAN THE GENERAL TOP SURFACE OF THE PIER. THE RECESSES SHALL BE FILLED WITH SPECIAL NON-SHRINKING CONCRETE AS DESCRIBED UNDER "CLASS OF CONCRETE". THIS SPECIAL CONCRETE SHALL BE SCREEDED, TROWELED AND FINISHED TO PROVIDE A SMOOTH LEVEL SURFACE EVEN WITH THE TOP OF THE TEMPLATE-SCREED-FRAME.

19. PAINTING.

ALL STRUCTURAL STEEL SHALL BE PAINTED ON ALL SURFACES, EXCEPT PORTIONS EMBEDDED IN CONCRETE AND THREADED ENDS OF ANCHOR BOLTS, ACCORDING TO ITEM S-8 OF THE "CONSTRUCTION AND MATERIAL SPECIFICATIONS". THREADED ENDS OF ANCHOR BOLTS PROJECTING ABOVE SCREED FRAMES SHALL BE GREASED.

20. WELDING.

ALL WELDING SHALL BE CLASS B, EXCEPT THAT FOR SPLICING AND TIP REINFORCING OF STEEL PILES THE WELDING SHALL BE CLASS A.

21. PROTECTION OF BASCULE PIERS.

THE POCKETS IN THE TOPS OF BASCULE PIERS PROVIDED FOR FUTURE TRUNNION SUPPORTS SHALL BE PROTECTED FROM ENTRY AND FREEZING OF WATER DURING CONSTRUCTION. BEFORE COMPLETION OF THE CONTRACT THE POCKETS SHALL BE COVERED WITH WOOD JOISTS AND SOLID SHEETED DECKING WITH APPROVED ASPHALT ROLL ROOFING. THE ROOFS SHALL BE MADE THOROUGHLY WATERTIGHT. THIS PROTECTION SHALL BE CONSIDERED AS PAID FOR IN THE PRICE PER CUBIC YARD OF CONCRETE.

22. FENDERS.

ALL TIMBER FOR FENDERS SHALL BE 1900#f. GRADE STRUCTURAL YELLOW PINE OR DOUGLAS FIR, ITEM M-8, S4S, AND SHALL BE CREOSOTED IN ACCORDANCE WITH SEC. M-8.24. TIMBER SHALL BE CUT AND BORED BEFORE CREOSOTING WHERE PRACTICABLE. ALL CUTS AND HOLES MADE AFTER CREOSOTING SHALL BE TREATED WITH CREOSOTE OIL. BOLTS, NUTS AND LAG SCREWS SHALL BE STEEL. WASHERS SHALL BE MALLEABLE CAST IRON. HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH SEC. M-7.4(d). LAG SCREWS ON THE EXTERIOR FACE, AND BOLTS COVERED BY OTHER TIMBERS, SHALL BE SET IN COUNTERBORED HOLES WITH MALLEABLE IRON CUP WASHERS SO THAT THE HEADS SHALL BE FLUSH WITH THE FACE OF THE TIMBER.

RUBBING PLATES ON THE FACE OF THE VERTICAL LAGS SHALL BE WROUGHT IRON (SEC. M-7.6), MAYARI R STEEL (AS MANUFACTURED BY THE BETHLEHEM STEEL CO.), CORTEN STEEL (AS MANUFACTURED BY THE U. S. STEEL CO.), OR APPROVED EQUIVALENT, AND SHALL BE ATTACHED TO THE FENDER WITH LEWIS SEALTITE GUARD RAIL BOLTS OR BOLTS WITH EQUIVALENT HEADS. RUBBING PLATES SHALL BE NOT LESS THAN 20 FT. LONG BETWEEN SPLICES. BOLTS SHALL BE OF VARIOUS LENGTHS AS REQUIRED FOR CONNECTION THROUGH VERTICAL LAGS ONLY OR THROUGH LAG AND WALES, AND EACH BOLT SHALL HAVE A MALLEABLE IRON O. G. WASHER AND NUT. BOLT HOLES IN THE RUBBING PLATES SHALL BE SQUARE AND OF SUCH SIZE TO ACCOMMODATE THE RIBS UNDER THE BOLT HEADS.

RUBBING PLATES SHALL BE PAINTED WITH ONE SHOP COAT OF RED LEAD PAINT (SEC. M-9.9) AND TWO FIELD COATS OF GRAPHITE PAINT (SEC. M-9.11).

PAYMENT FOR FENDERS, INCLUDING TIMBER, HARDWARE, WROUGHT IRON PLATES, PAINTING AND ALL INCIDENTALS WILL BE MADE AT THE CONTRACT LUMP SUM PRICE FOR "FENDERS".

23. ELECTRICAL EQUIPMENT.

ELECTRICAL EQUIPMENT INCLUDED IN THIS CONTRACT CONSISTS OF FURNISHING AND INSTALLING CONDUITS FOR SUBMARINE CABLE, ELECTRICAL GROUNDS AND SLEEVES THROUGH FLOORS AND WALLS FOR FUTURE ELECTRICAL WORK IN THE BASCULE PIERS, AND FURNISHING AND INSTALLING ELECTRICAL GROUND IN PIER 2. CONDUIT FOR SUBMARINE CABLE SHALL BE STANDARD WEIGHT GALVANIZED STEEL PIPE OR WELDED WROUGHT IRON PIPE, WITH THREADED FITTINGS, AND SHALL HAVE THE BELL FITTINGS STIPULATED ON THE PLANS ATTACHED TO THE LOWER ENDS, WITH UPPER ENDS CAPPED WITH STANDARD CONDUIT CLOSURE BUSHINGS. SLEEVES SHALL BE PROVIDED THROUGH THE UPPER SLAB AND THROUGH INTERIOR VERTICAL WALLS AT THE LOCATIONS SHOWN ON THE PLANS. SLEEVES MAY BE METAL PIPE, FIBER CONDUIT OR ASBESTOS CEMENT CONDUIT. ELECTRICAL GROUND AT EACH BASCULE PIER AND AT PIER 2 SHALL CONSIST OF NO. 2/0 BARE STRANDED TINNED COPPER WIRE BRAZED TO A STEEL BEARING PILE AND EXTENDED UP TO ELEVATION 586.5 FOR EACH BASCULE PIER AND TO ELEVATION 609.0 AT PIER 2.

STATE OF OHIO DEPARTMENT OF HIGHWAYS BUREAU OF BRIDGES		PART
TOLEDO EXPRESSWAY SYSTEM (FRONT STREET TO SUMMIT STREET) MAUMEE RIVER BRIDGE BR. NO. LU-120 - 35		
GENERAL NOTES		
TOLEDO, LUCAS COUNTY,		OHIO
SCALE	DATE 12-11-51	HOWARD, NEEDLES, TAMMEN & BERGENSON
MADE BY CW	DATE 12-11-51	CONSULTING ENGINEERS
TRCD. CME	DATE 12-12-51	KANSAS CITY NEW YORK
CKD. JT	DATE 12-12-51	810 SHEET- 1.03

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	TYPE FUNDS
2	OHIO	W-1052 (2)	POST WAR

4
15

LUCAS COUNTY
CITY OF TOLEDO
TOLEDO EXPRESSWAY SYSTEM
MAUMEE RIVER BRIDGE
LUC 120 - 3.46

MICROFILMED
JUL 25 1983

ESTIMATED QUANTITIES FOR SUBSTRUCTURE

ITEM	DESCRIPTION	UNIT	PIER 1	PIER 2	PIER 3	PIER 4	PIER 5	GENERAL	TOTAL		
E-2	Cofferdams and Pumping	Lump Sum						Lump Sum	Lump Sum		
E-2	Unclassified Excavation	Cu. Yd.	913	1,217	1,026	5,664	6,251		15,071		
S-1	Concrete (Seal courses, footings, walls, shoe recesses)	Cu. Yd.	1,759	2,176	2,561	11,190	11,190		28,876		
S-4	Reinforcing Steel	Lbs.	12,291	14,339	14,567	263,538	263,538		568,273		
S-7	Structural Steel	Lbs.	3,120	2,635	2,685	2,562	2,952		13,954		
S-16	First Test Pile	Lump Sum						Lump Sum	Lump Sum		
S-17	First Pile Test Load	Lump Sum						Lump Sum	Lump Sum		
S-17	Subsequent Pile Test Loads	Each						3	3		
S-18	Steel Bearing Piles (14 B.P.117)	Lin. Ft.	3,380	4,960	3,870	14,730	15,060		42,000		
S-25	Electrical Equipment	Lump Sum						Lump Sum	Lump Sum		
Special	Fenders	Lump Sum						Lump Sum	Lump Sum		

PART

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES

TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-120 - 35

ESTIMATED QUANTITIES

TOLEDO, LUCAS COUNTY, OHIO

SCALE _____

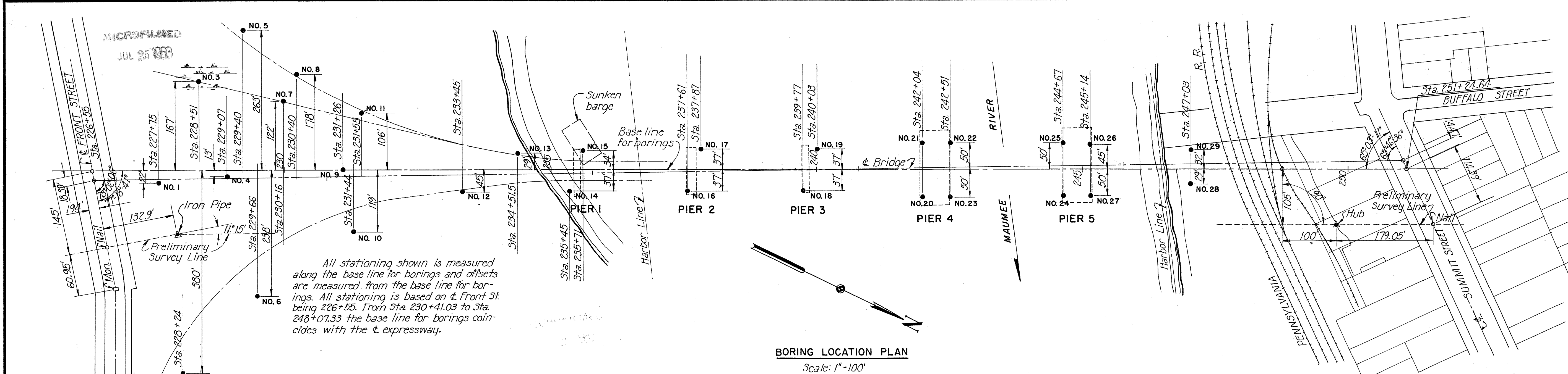
MADE G.D. DATE 9-21-51
TRCD A.H. DATE 12-11-51
CKD J.R.B. DATE 12-12-51

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY NEW YORK

810 SHEET- 1.04

509

Note:
Boring information, logs and samples of materials encountered may be examined in the Division Office, but the State does not guarantee these borings to present a complete picture of subsurface conditions to be encountered.



BORING LOCATION PLAN
Scale: 1"=100'

<p>El. 598.9 El. 597.9 El. 588.9 El. 564.9 El. 544.9 El. 523.9 El. 512.9 El. 505.9 El. 499.3 Elev. 500</p> <p>BORING NO. 1</p> <ul style="list-style-type: none"> Top soil Med. stiff clay Med. clay (scat. peb.) Stiff clay (scat. peb.) Stiff pebbly clay Very hard pebbly clay Stiff pebbly clay Compact sand, gravel, boulders, and broken limestone Top of limestone 	<p>El. 601.1 El. 600.1 El. 590.1 El. 574.5 El. 574.0 El. 573.0 El. 571.5 El. 563.5 El. 561.5 El. 557.5 El. 553.1 El. 526.1 El. 521.1 El. 515.1 El. 506.0 El. 499.6 Elev. 500</p> <p>BORING NO. 2</p> <ul style="list-style-type: none"> Top soil Med. clay Med. clay (scat. peb.) Stiff pebbly clay Silt Compact sand, gravel and boulders Very hard pebbly clay Stiff pebbly clay Compact sand, gravel Compact sand, gravel, boulders and broken limestone Top of limestone 	<p>El. 574.5 El. 574.0 El. 573.0 El. 571.5 El. 563.5 El. 561.5 El. 557.5 El. 553.1 El. 526.1 El. 521.1 El. 515.1 El. 506.0 El. 499.6 Elev. 500</p> <p>BORING NO. 3</p> <ul style="list-style-type: none"> Med. sand Water Med. sand River mud & vegetation Med. clay (scat. peb.) Stiff pebbly clay Compact sand, gravel and little clay Very hard pebbly clay Very compact fine sand, gravel, boulders and broken limestone Top of limestone 	<p>El. 575.0 El. 574.3 El. 569.3 El. 564.8 El. 549.3 El. 525.3 El. 506.3 El. 497.3 El. 492.5 Elev. 500</p> <p>BORING NO. 4</p> <ul style="list-style-type: none"> Water Med. sand River mud & vegetation Med. clay (scat. peb.) Stiff pebbly clay Hard pebbly clay Compact sand, gravel, boulders and broken limestone Top of limestone 	<p>El. 575.0 El. 573.5 El. 565.5 El. 559.5 El. 527.5 El. 521.5 El. 513.5 El. 506.5 El. 497.8 El. 495.5 El. 492.5 Elev. 500</p> <p>BORING NO. 5</p> <ul style="list-style-type: none"> Water Loose sand & large gravel River mud & vegetation Stiff clay, pebbly Very hard pebbly clay, gravel & boulders Stiff clay pebbles Sand, gravel, broken limestone & clay Broken limestone Solid limestone 	<p>El. 578.1 El. 572.1 El. 567.1 El. 554.1 El. 545.1 El. 529.1 El. 526.6 El. 525.1 El. 513.1 El. 505.1 El. 499.1 El. 493.6 Elev. 500</p> <p>BORING NO. 6</p> <ul style="list-style-type: none"> Sand & fine gravel Med. sand (Muddy) Pebbly clay Stiff clay, scat. pebbles Stiff pebbly clay Silty clay Very compact sand & gravel Very hard pebbly clay Stiff pebbly clay Sand, clay, gravel & stones Limestone bedrock 	<p>El. 575.0 El. 573.6 El. 568.6 El. 564.6 El. 556.6 El. 546.8 El. 527.6 El. 523.6 El. 507.6 El. 504.8 El. 497.6 El. 492.3 El. 492.5 Elev. 500</p> <p>BORING NO. 7</p> <ul style="list-style-type: none"> Water Med. sand River mud & vegetation Med. clay Stiff pebbly clay Compact sand & gravel Hard pebbly clay Compact sand & gravel Broken limestone Limestone bedrock 	<p>El. 573.8 El. 566.3 El. 558.8 El. 546.8 El. 529.7 El. 525.2 El. 517.7 El. 504.7 El. 497.0 El. 492.2 El. 491.7 Elev. 500</p> <p>BORING NO. 8</p> <ul style="list-style-type: none"> Clay & gravel layered River mud & vegetation Med. pebbly clay Stiff pebbly clay Silt Stiff pebbly clay Very hard pebbly clay Compact fine sand, gravel, stone & clay-mix Broken limestone Solid limestone 	<p>El. 573.7 El. 566.7 El. 559.2 El. 546.8 El. 529.7 El. 525.2 El. 517.7 El. 504.7 El. 497.0 El. 492.2 El. 491.7 Elev. 500</p> <p>BORING NO. 9</p> <ul style="list-style-type: none"> Med. sand Mud & vegetation Stiff pebbly clay Silt Stiff pebbly clay Very hard pebbly clay Compact fine sand, gravel, stone & clay-mix Broken limestone Solid limestone 	<p>El. 575.6 El. 569.6 El. 558.6 El. 545.6 El. 532.6 El. 523.6 El. 514.6 El. 505.6 El. 496.6 El. 493.6 El. 488.6 Elev. 500</p> <p>BORING NO. 10</p> <ul style="list-style-type: none"> Med. sand Fine sand layered with mud Stiff pebbly clay Clay & scat. pebbles Stiff clay (showing some silt) Loose sand & gravel Very hard pebbly clay Hard pebbly clay Compact sand, clay, gravel & stones Broken limestone Solid limestone bedrock
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STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES

TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-120 - 35

BORINGS

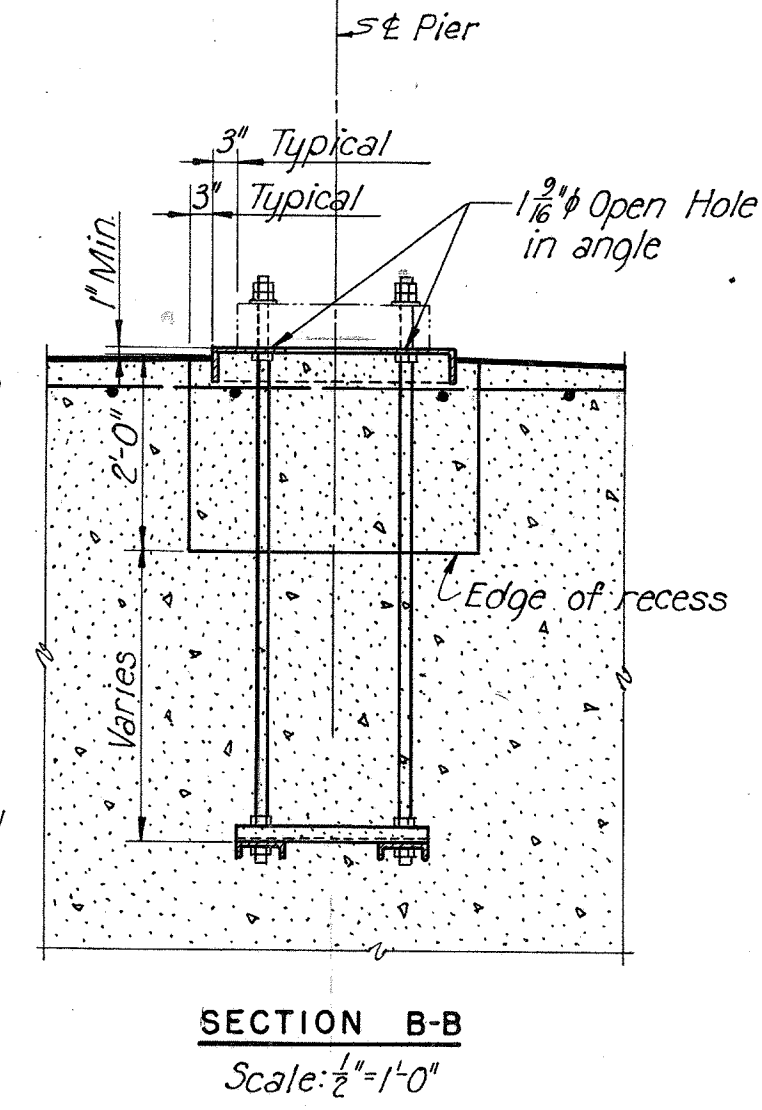
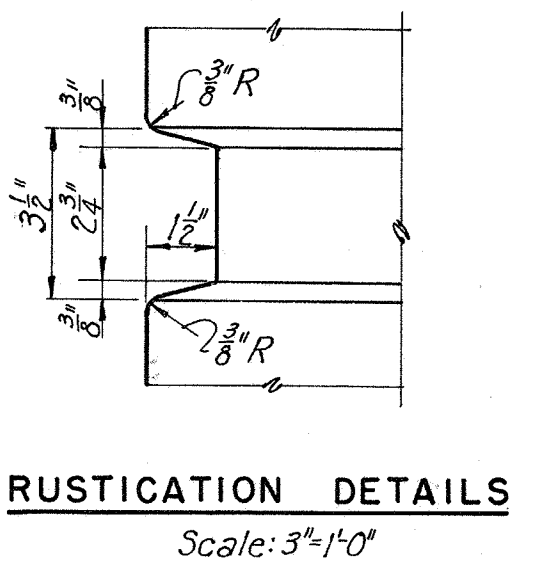
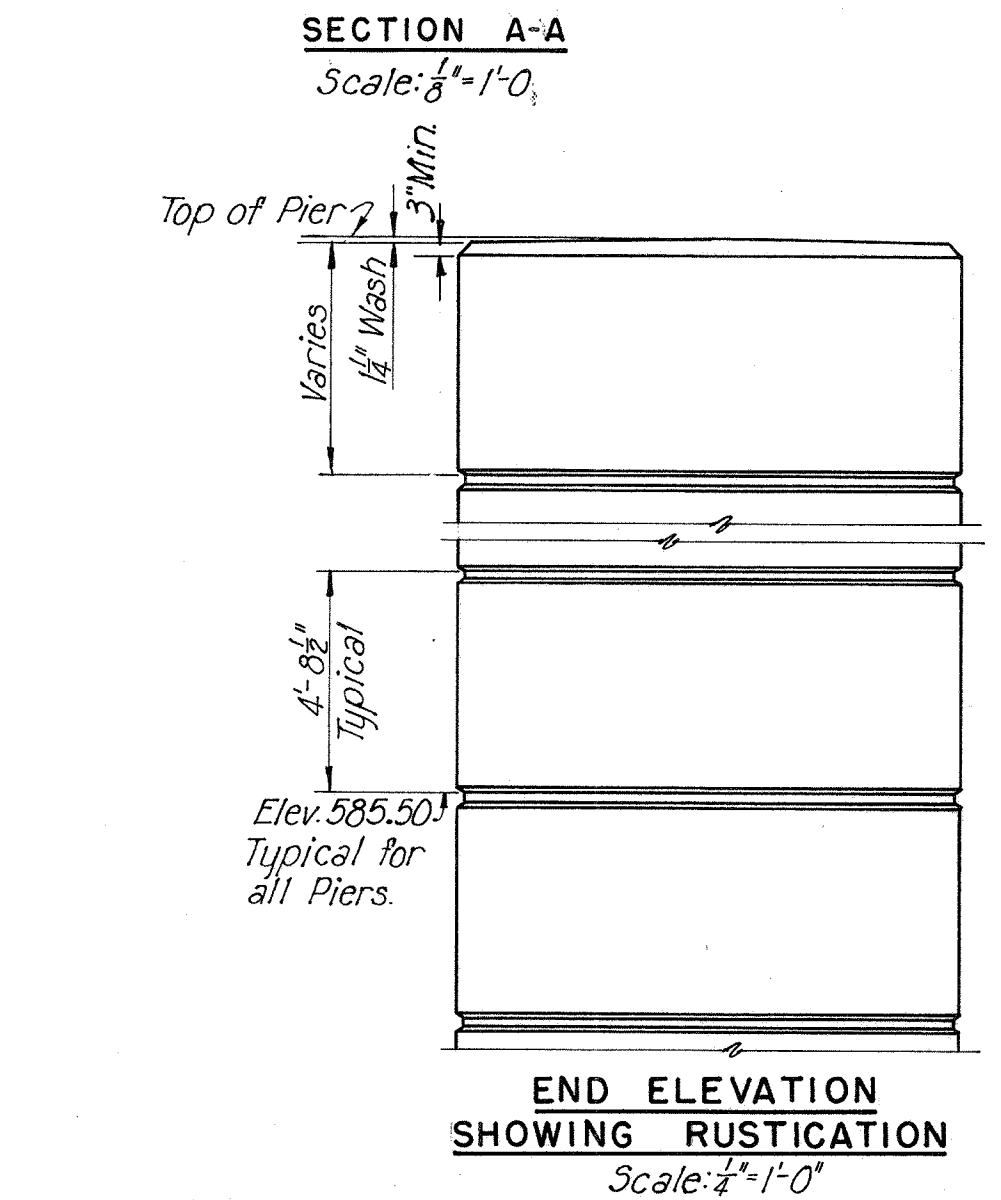
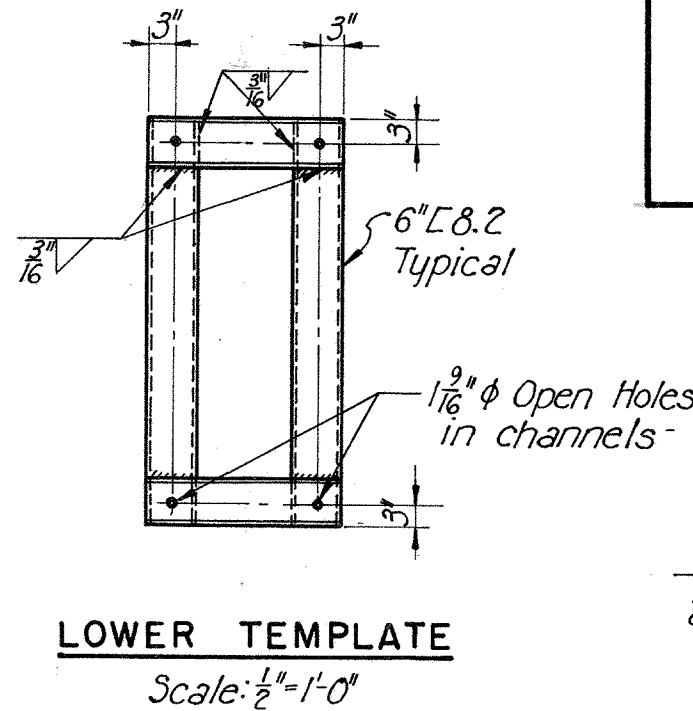
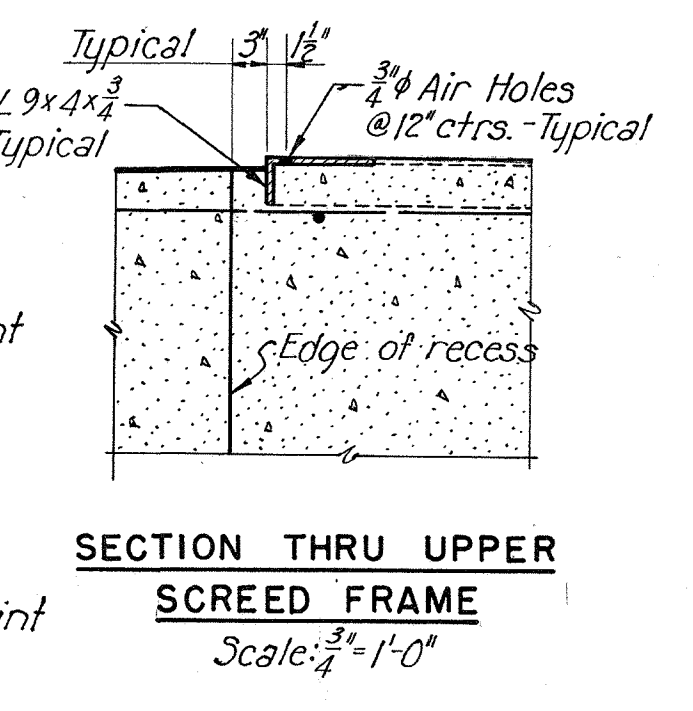
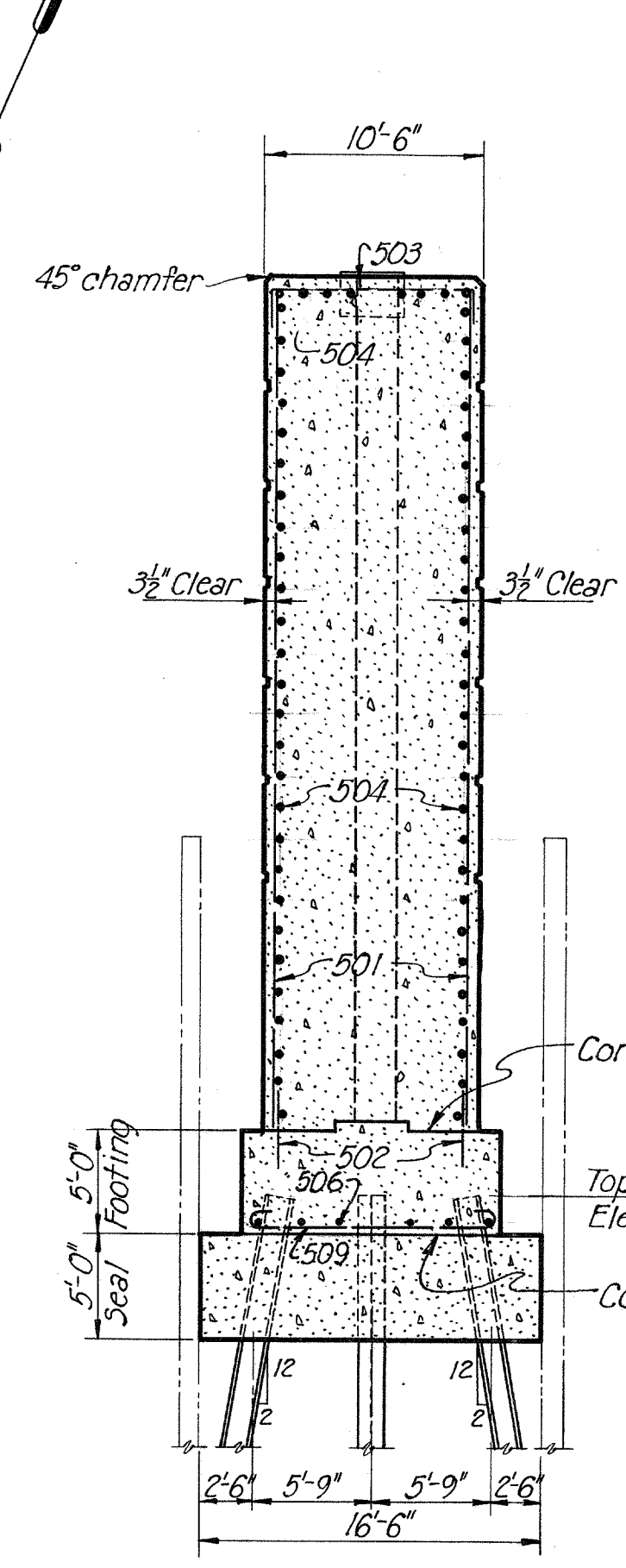
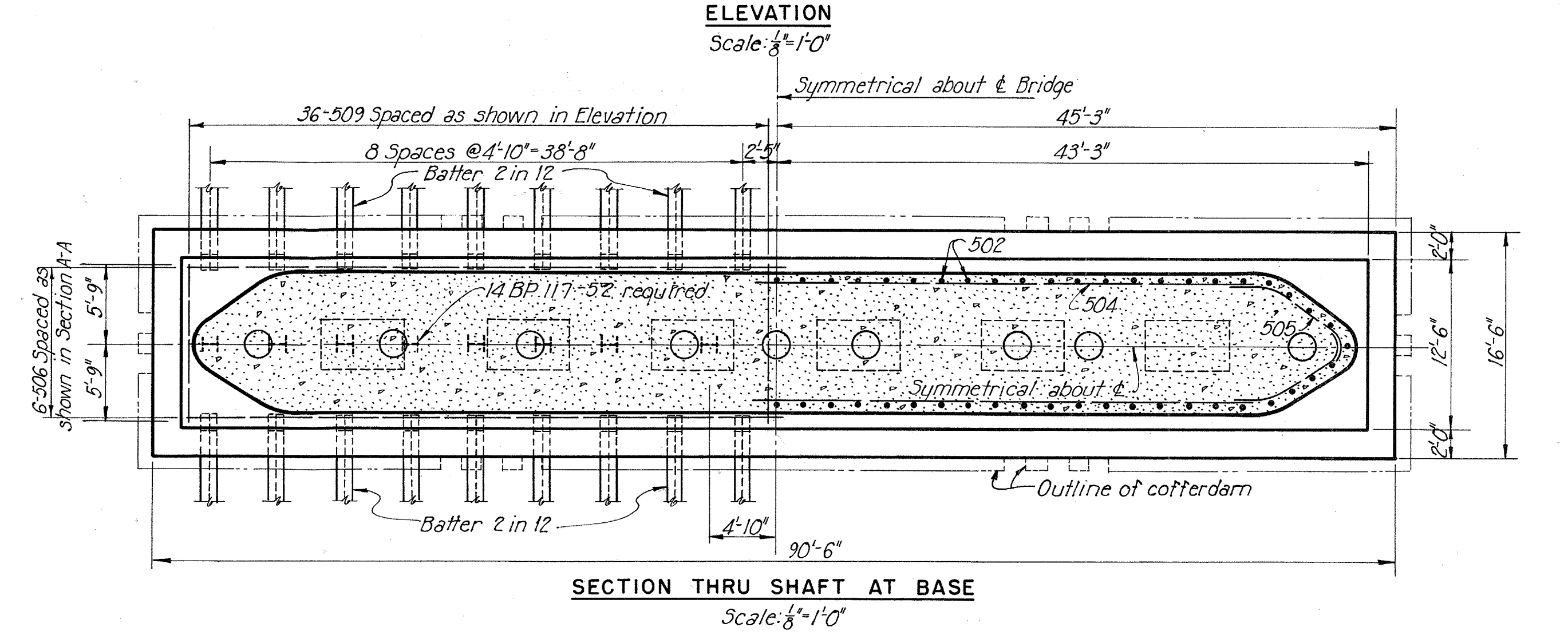
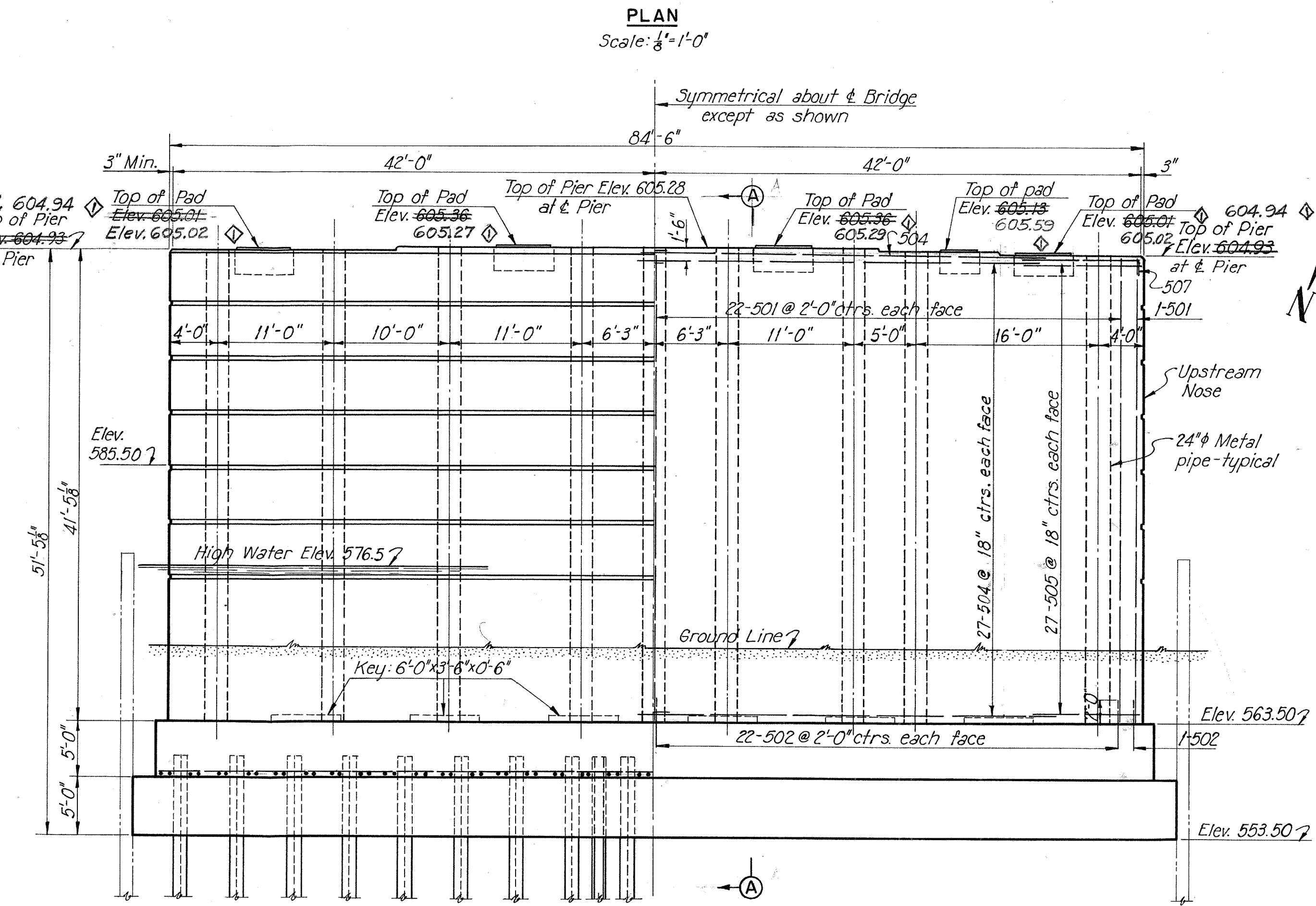
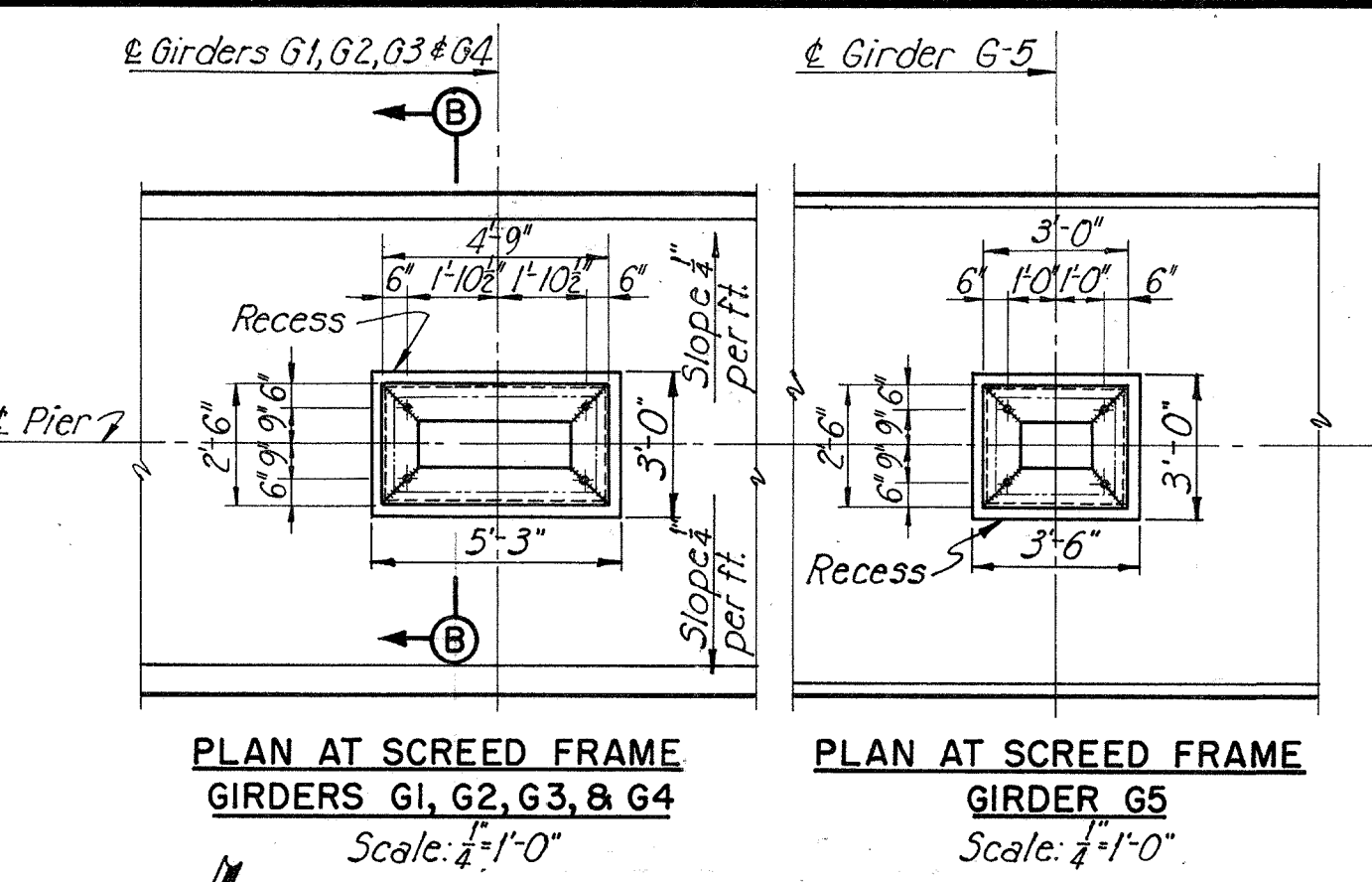
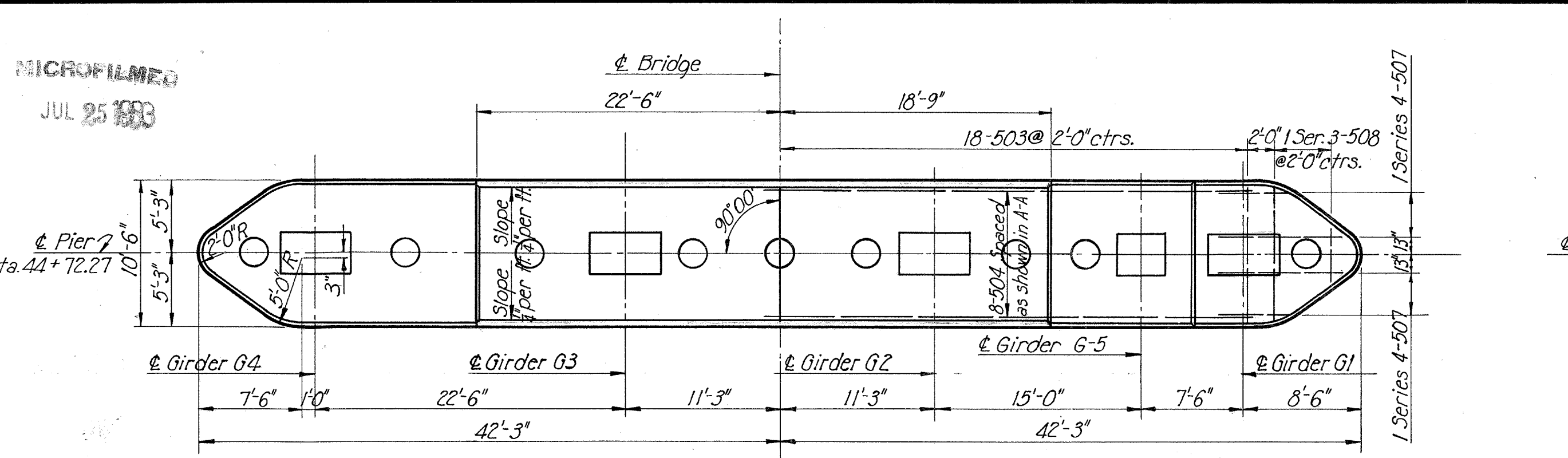
TOLEDO, LUCAS COUNTY, OHIO

SCALE: As Noted
MADE L.E.T. DATE: 8-7-51
TRCD B.L.B. DATE: 8-22-51
CKD E.B.J. DATE: 9-22-51

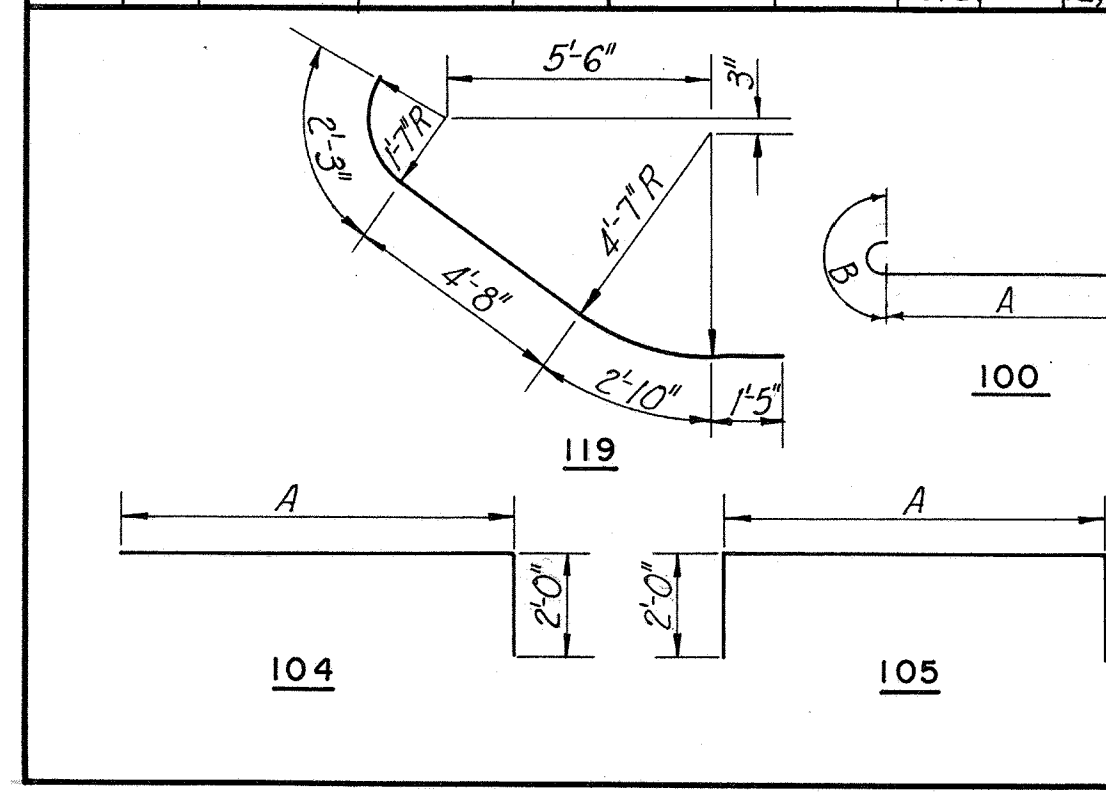
HOWARD, NEEDLES, TAMMEN & BERGENDORF
CONSULTING ENGINEERS
KANSAS CITY NEW YORK

810 SHEET 1.05

MICROFILMED
JUL 25 1983



Mark	Size	Number	Length	Type	Dimensions				Weight
					A	B	C	D	
501	5	88	41'-0"	Str.					37.6
502	5	88	4'-0"	Str.					3.6
503	5	35	13'-8"	105	9'-8"				4.9
504	5	124	36'-0"	Str.					46.5
505	5	108	11'-2"	119					12.5
506	5	12	43'-9"	Str.					5.4
507	5	4 Ser. of 3	5'-6" to 10'-1"	104	3'-6" to 8'-1"				1.3
508	5	2 Ser. of 3	8'-4" to 13'-6"	105	4'-4" to 9'-6"				4.6
509	5	72	13'-3"	100	11'-7"	10"			9.7
Test replacement bar									
5	1	1	8'-0"	Str.					3.0
Total									122.5



GENERAL NOTES ON PIERS

For special concrete in shoe pad recesses, see General Notes, Sheet 3.
For class of concrete, see Sheet 3.
Spacing of piles shown is at bottom of seal.
In Piers 1, 2 and 3 provide 24" ventilation cells formed with metal pipe. Pipes shall be flush with top of pier, and shall be filled with concrete 3 months after pier wall concrete has been placed. Embraco concrete or equal, shall be used for top 3 feet. Provisions shall be made to keep cells dry during freezing weather.

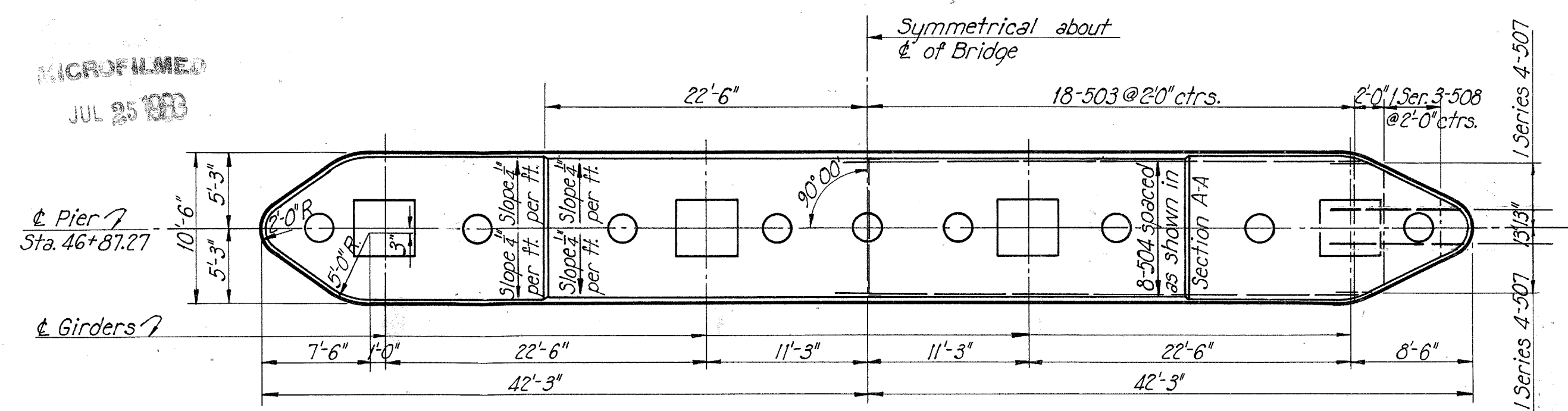
PILE SPLICE & TIP REINFORCEMENT
Scale: 1/4"=1'-0"

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES
TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-120 - 35
PIER 1
TOLEDO, LUCAS COUNTY, OHIO
SCALE 3/4"=1'-0"
MADE BY DATE 9-22-51
TRCD B.L.B. DATE 9-22-51
CKD HAM DATE 9-20-51
HOWARD, NEEDLES, TAMMEN & BERGENSON
CONSULTING ENGINEERS
KANSAS CITY NEW YORK
810 SHEET 1.06

Rev. 11-4-52

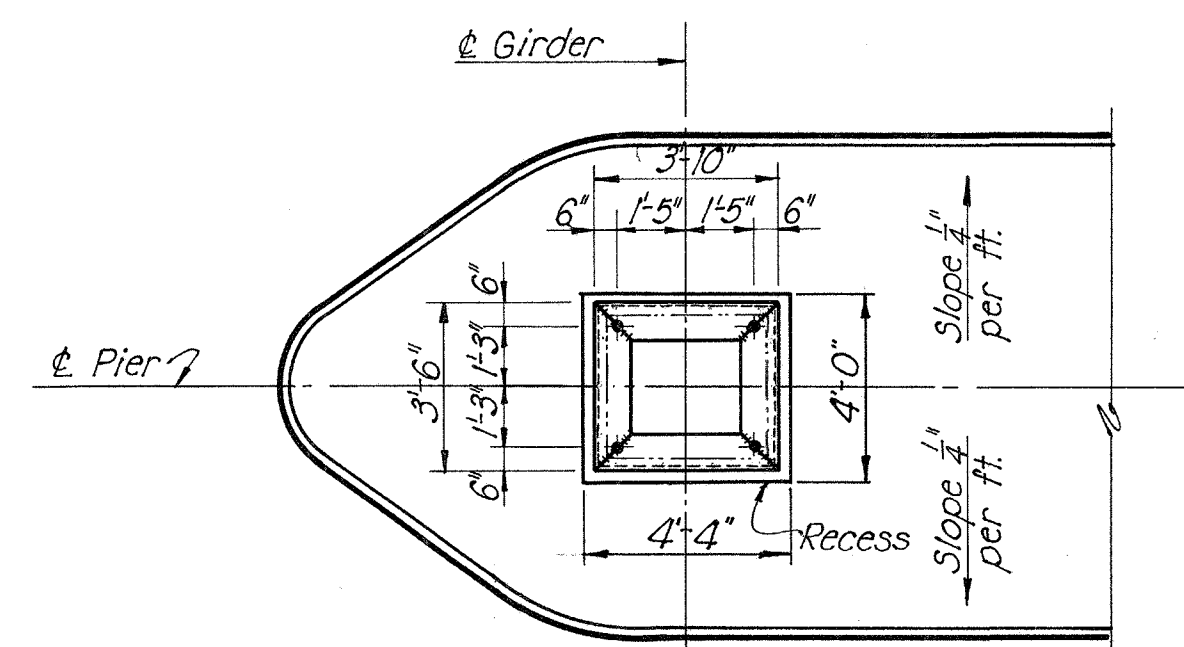
FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	TYPE FUNDS	7
2	OHIO	UH052 (2)	POST WAR	15

LUCAS COUNTY
CITY OF TOLEDO
TOLEDO EXPRESSWAY SYSTEM
MAUMEE RIVER BRIDGE
LUC 120 - 3.46



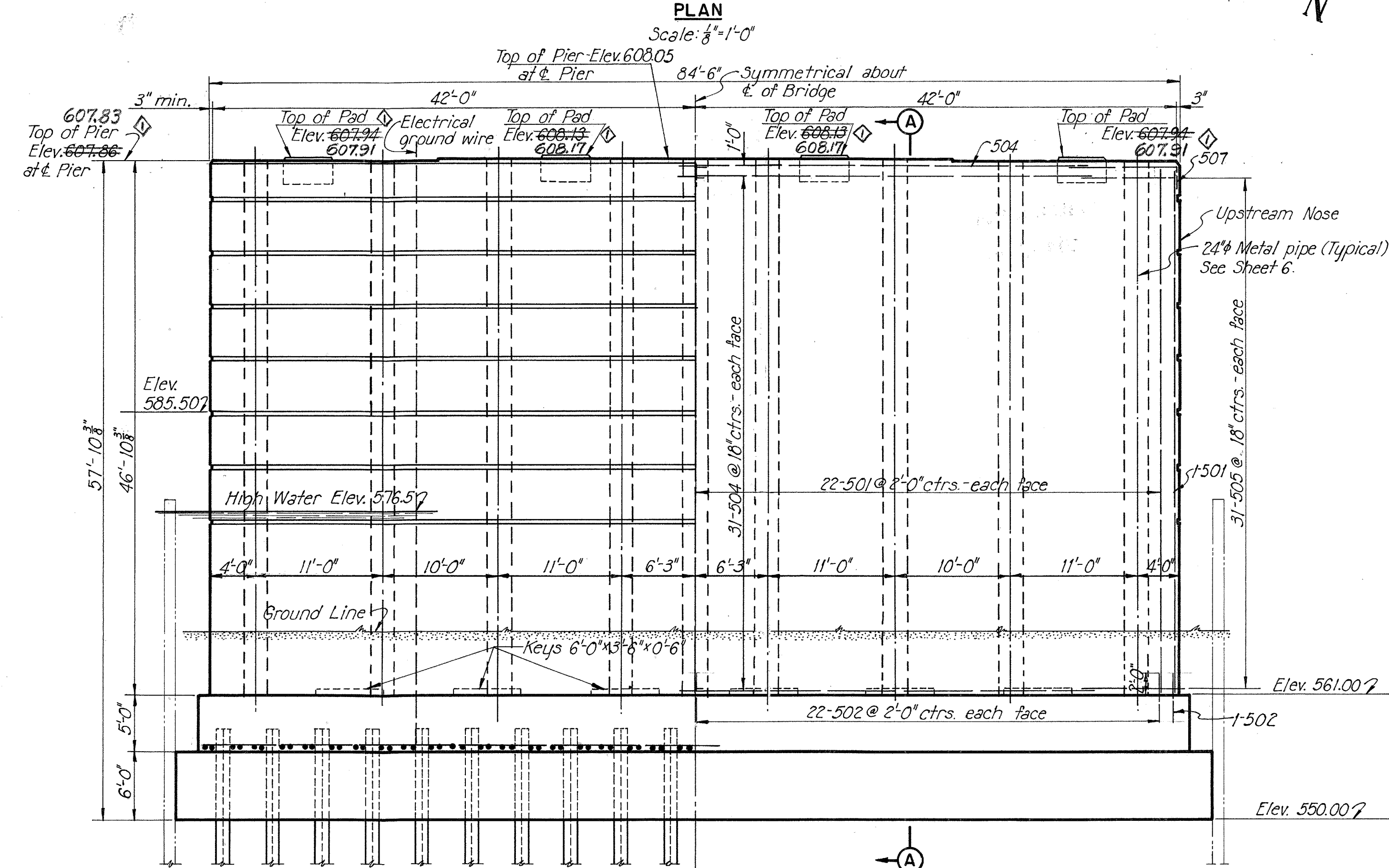
PLAN

Scale: $\frac{1}{4}'' = 1'-0''$



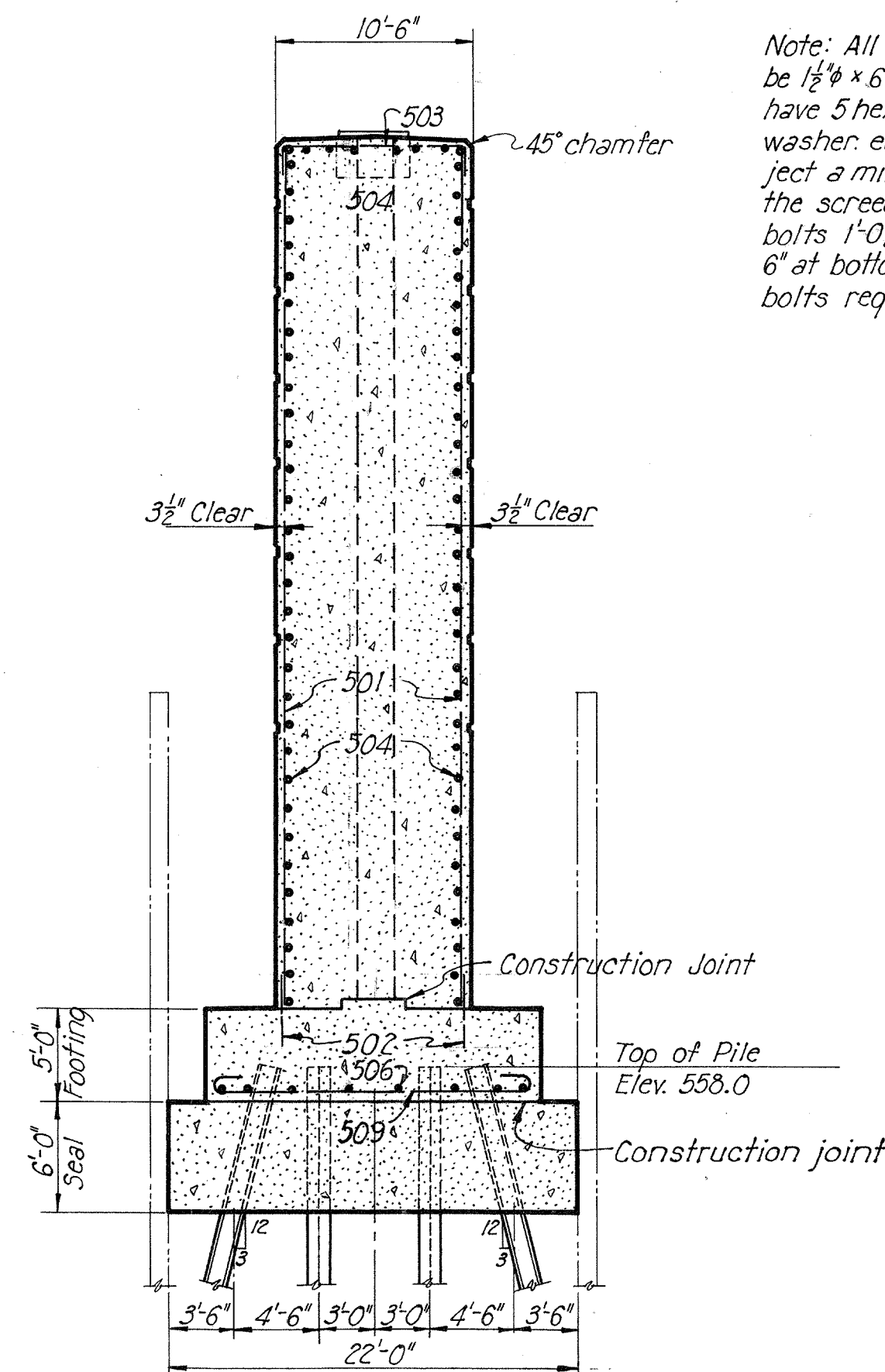
PLAN AT SCREED FRAMES

Scale: $\frac{1}{4}'' = 1'-0''$



ELEVATION

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

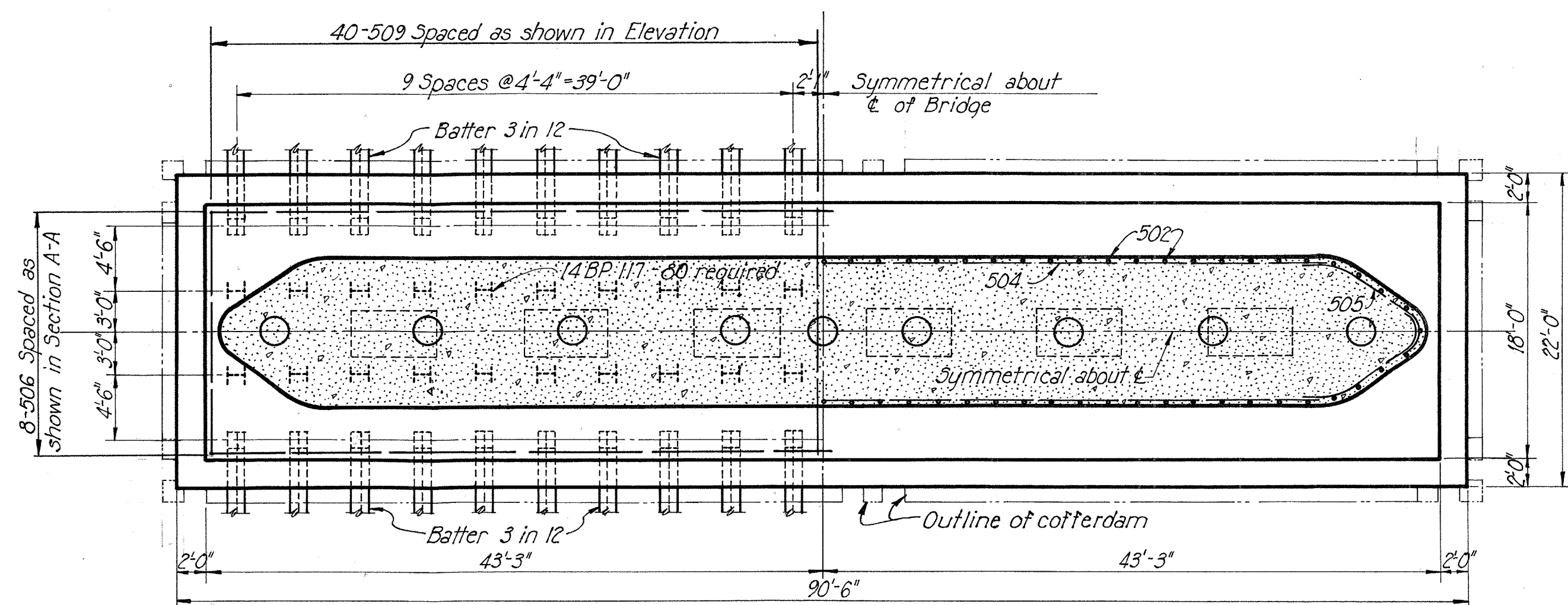
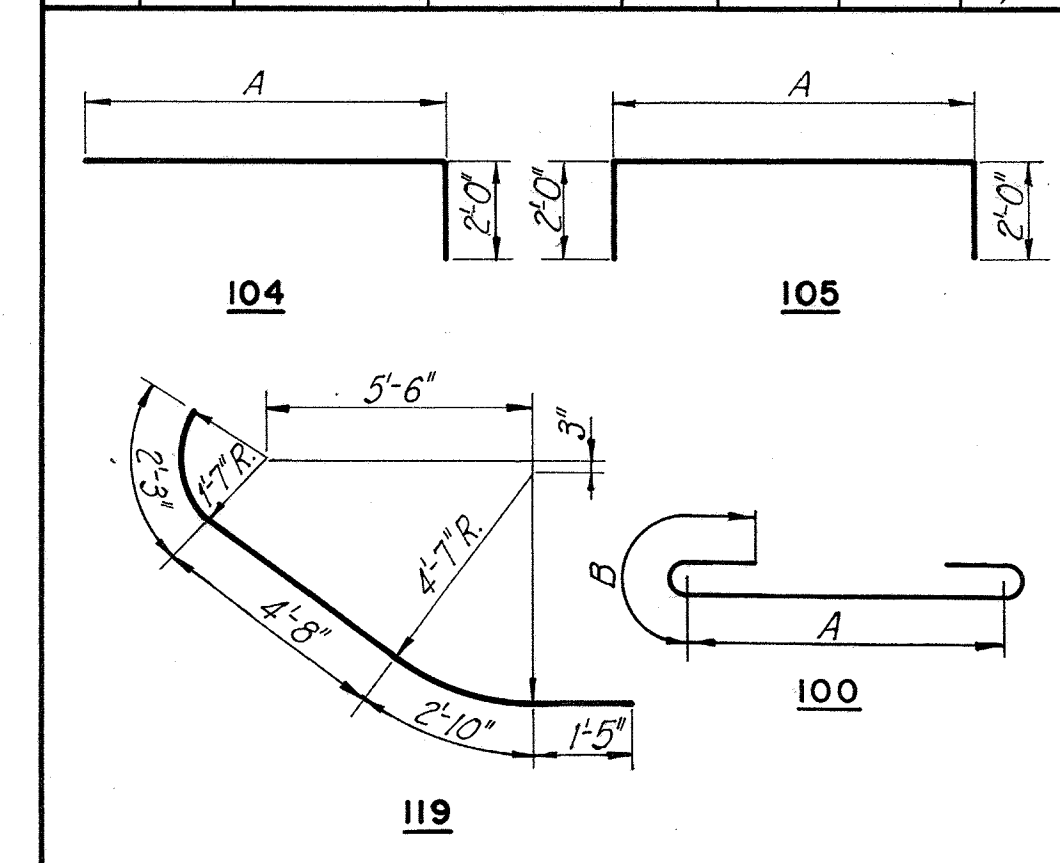


SECTION A-A

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

Note: All anchor bolts shall be $\frac{1}{2}'' \times 6'-0''$ long and shall have 5 hex. nuts and 1- $\frac{3}{8}'' \times \frac{1}{4}''$ washer each. Bolts shall project a minimum of 8" above the screed frame. Thread bolts 1'-0" at top end and 6" at bottom end. Sixteen bolts required for Pier 2.

Mark	Size	Number	Length	Type	Dimensions		Weight Lbs.	
					A	B		
501	5	88	46'-6"	Str.			4268	
502	5	88	4'-0"	Str.			367	
503	5	35	13'-8"	105	9'-8"		499	
504	5	140	36'-0"	Str.			5257	
505	5	124	11'-2"	119			1445	
506	5	16	43'-9"	Str.			731	
507	5	4 Series of 4	5'-6" to 10'-1"	104	8'-6" to 8'-1"		130	
508	5	2 Series of 3	8'-4" to 13'-6"	105	4'-4" to 9'-6"		68	
509	5	80	18'-9"	100	17'-1"	10"	1565	
Test replacement bar	5	2	8'-0"	Str.			9	
Total								14,339



SECTION THRU SHAFT AT BASE

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

Note: For typical screed frame details, rustication details, pile details, and general notes on piers, see Sheet 6.

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES

TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-120 - 35

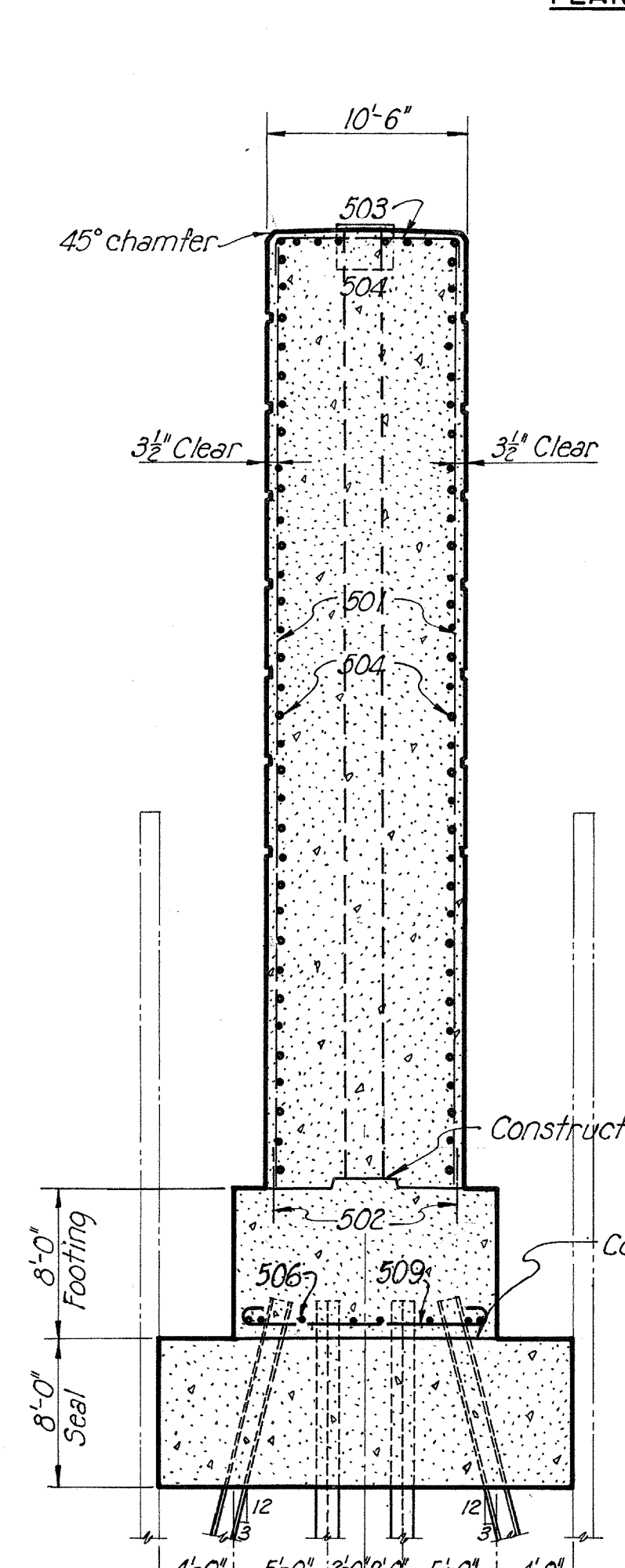
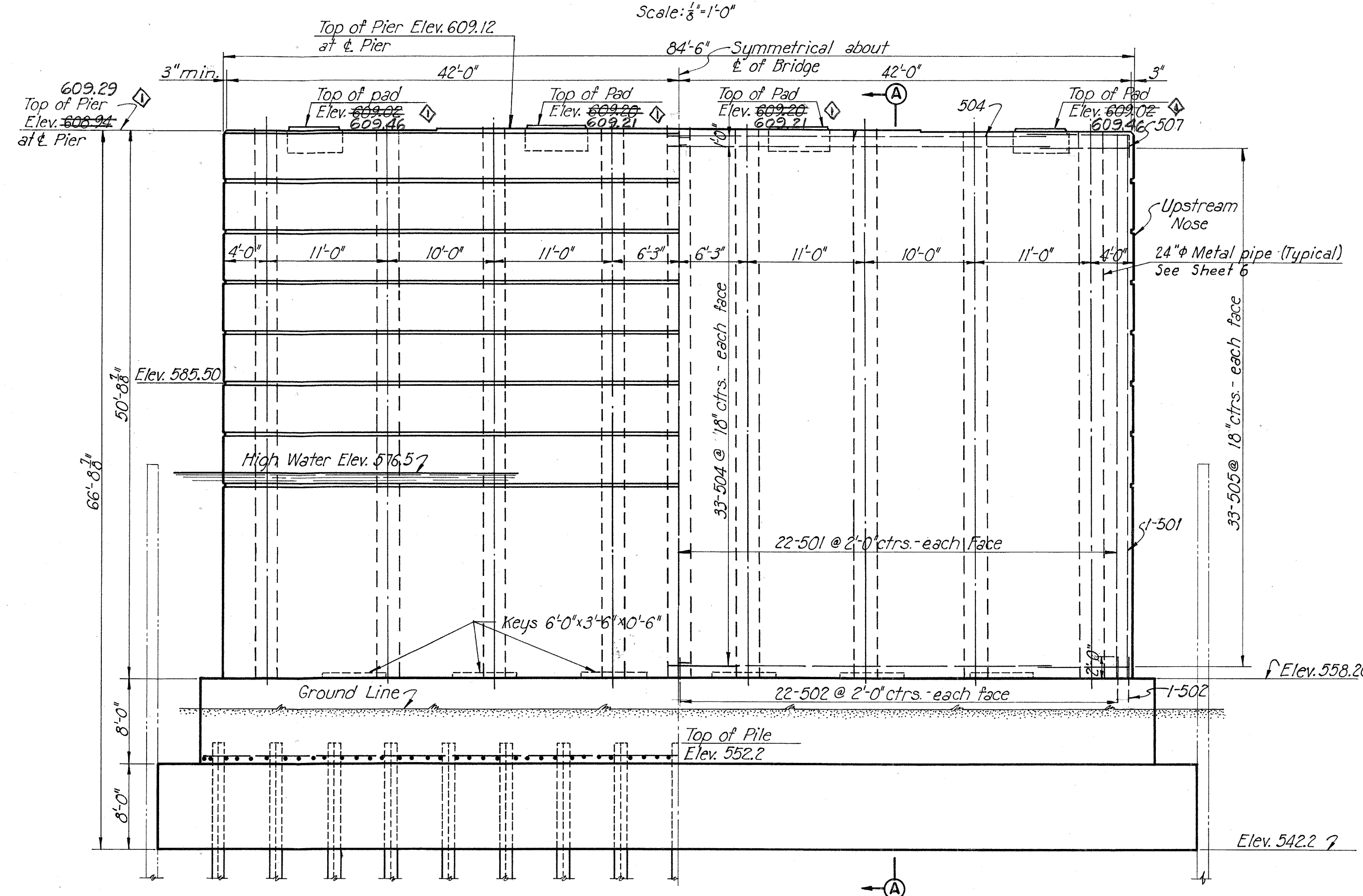
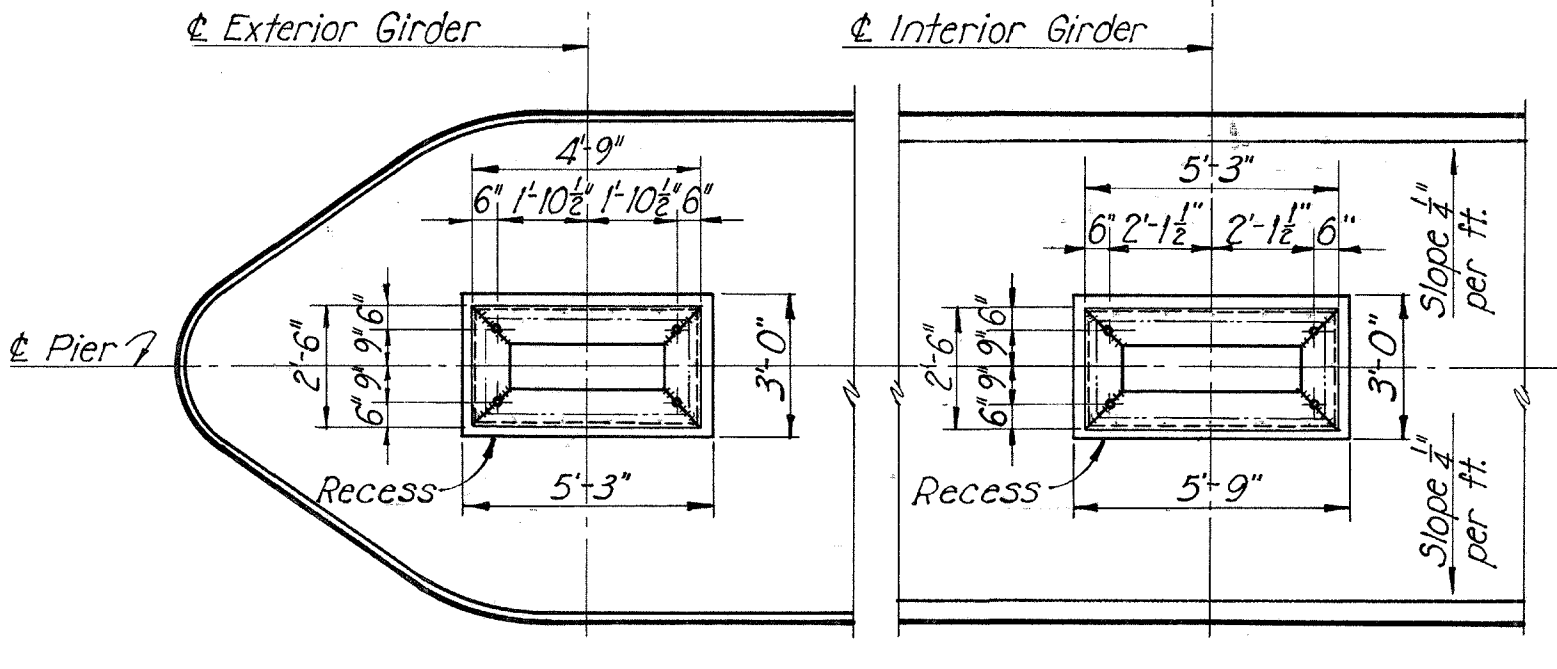
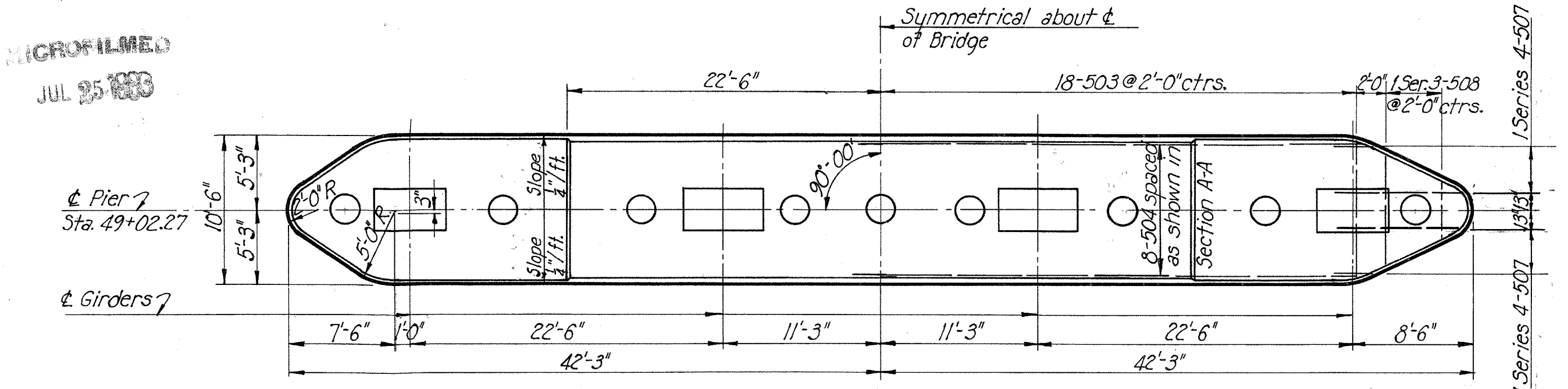
PIER 2
TOLEDO, LUCAS COUNTY, OHIO

SCALE: $\frac{1}{8}'' = 1'-0''$
MADE E.B.J. DATE 8-3-51
TRCD B.L.B. DATE 8-15-51
CKD HAM DATE 8-27-51

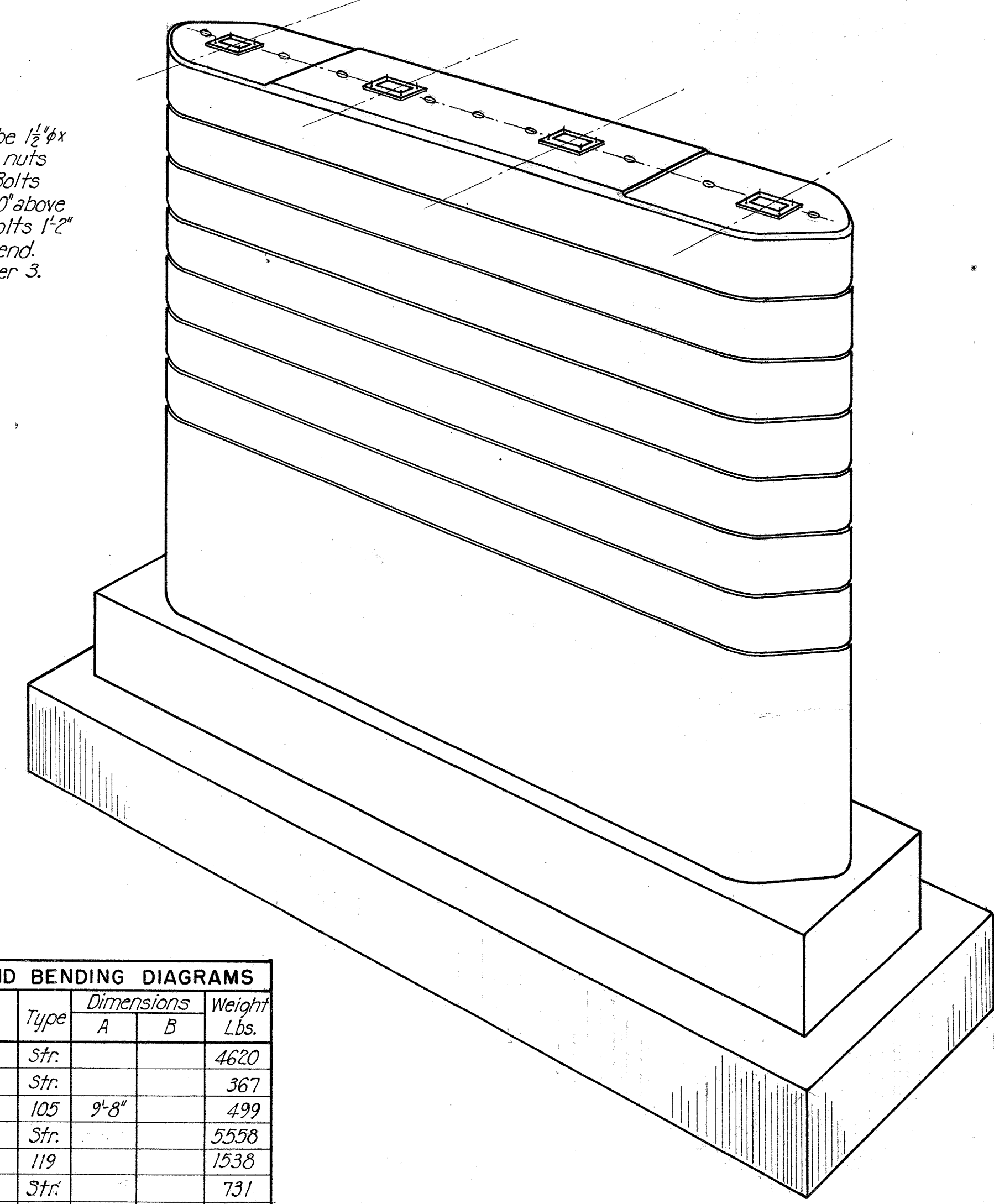
HOWARD, NEEDLES, TAMMEN & BERGENDC
CONSULTING ENGINEERS
KANSAS CITY NEW YORK

810 SHEET 10

Rev. 11-4-52

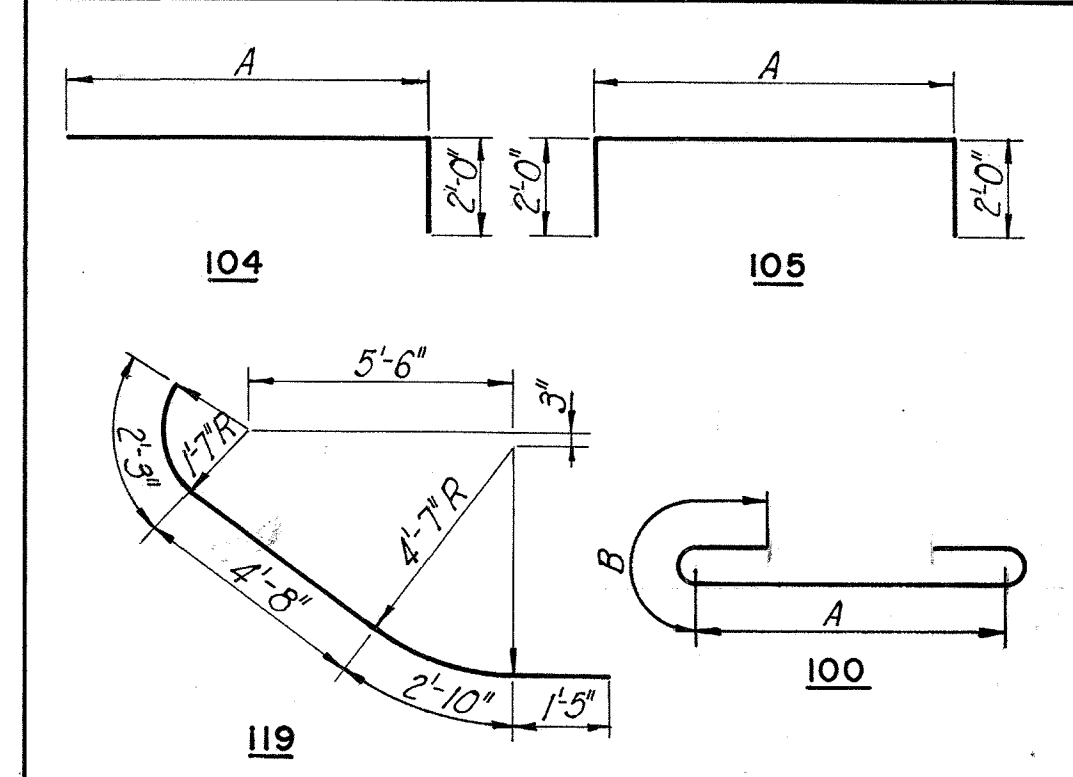


Note: All anchor bolts shall be 1/2" x 6'-0" long and shall have 5 hex nuts and 1-3/4" x 1/2" washer each. Bolts shall project a minimum of 10" above the screed-frame. Thread bolts 1'-2" at top end and 6" at bottom end. Sixteen bolts required for Pier 3.



Mark	Size	Number	Length	Type	Dimensions		Weight Lbs.	
					A	B		
501	5	88	50'-4"	Str.			4620	
502	5	88	4'-0"	Str.			367	
503	5	35	13'-8"	105	9'-8"		499	
504	5	148	36'-0"	Str.			5558	
505	5	132	11'-2"	119			1538	
506	5	16	43'-9"	Str.			731	
507	5	4 Series of 4	5'-6" to 10'-1"	104	3'-6" to 8'-1"		130	
508	5	2 Series of 3	8'-4" to 13'-6"	105	4'-4" to 9'-6"		68	
509	5	68	14'-9"	100	13'-1"	10"	1047	
Test replacement bar	5	1	8'-0"	Str.			9	
Total								14,567

Note: For typical screed frame details, rustication details, pile details and general notes on piers, see Sheet 6.



STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES

TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-120 - 35

PIER 3

TOLEDO, LUCAS COUNTY,

SCALE: 1/4"=1'-0"
MADE BY: HMB DATE: 8-10-51
TRCD: BLS DATE: 8-14-51
CKD: HBA DATE: 8-27-51

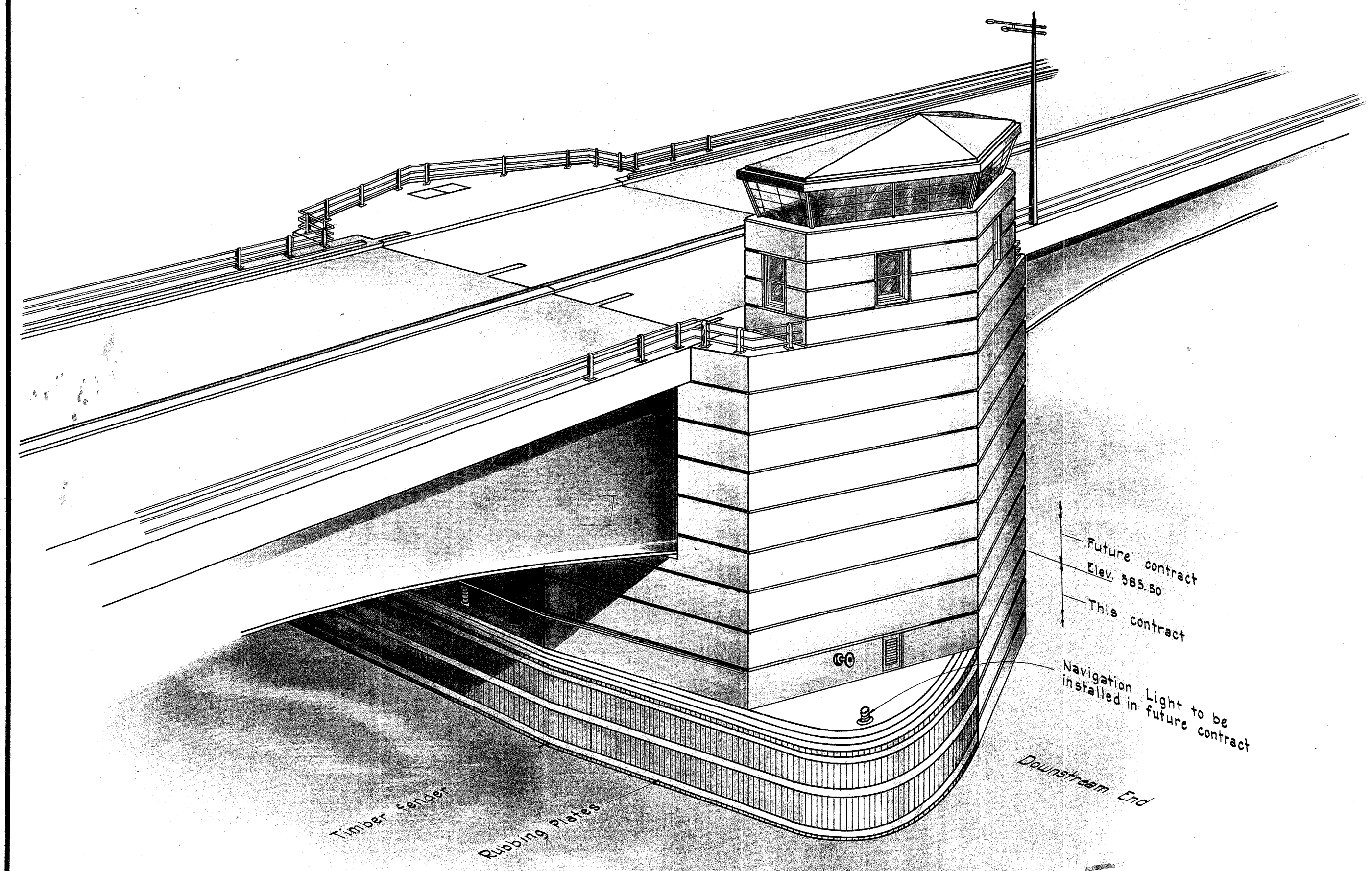
HOWARD, NEEDLES, TAMM
CONSULTING ENGINEERS
KANSAS CITY

Rev. 11-4-52

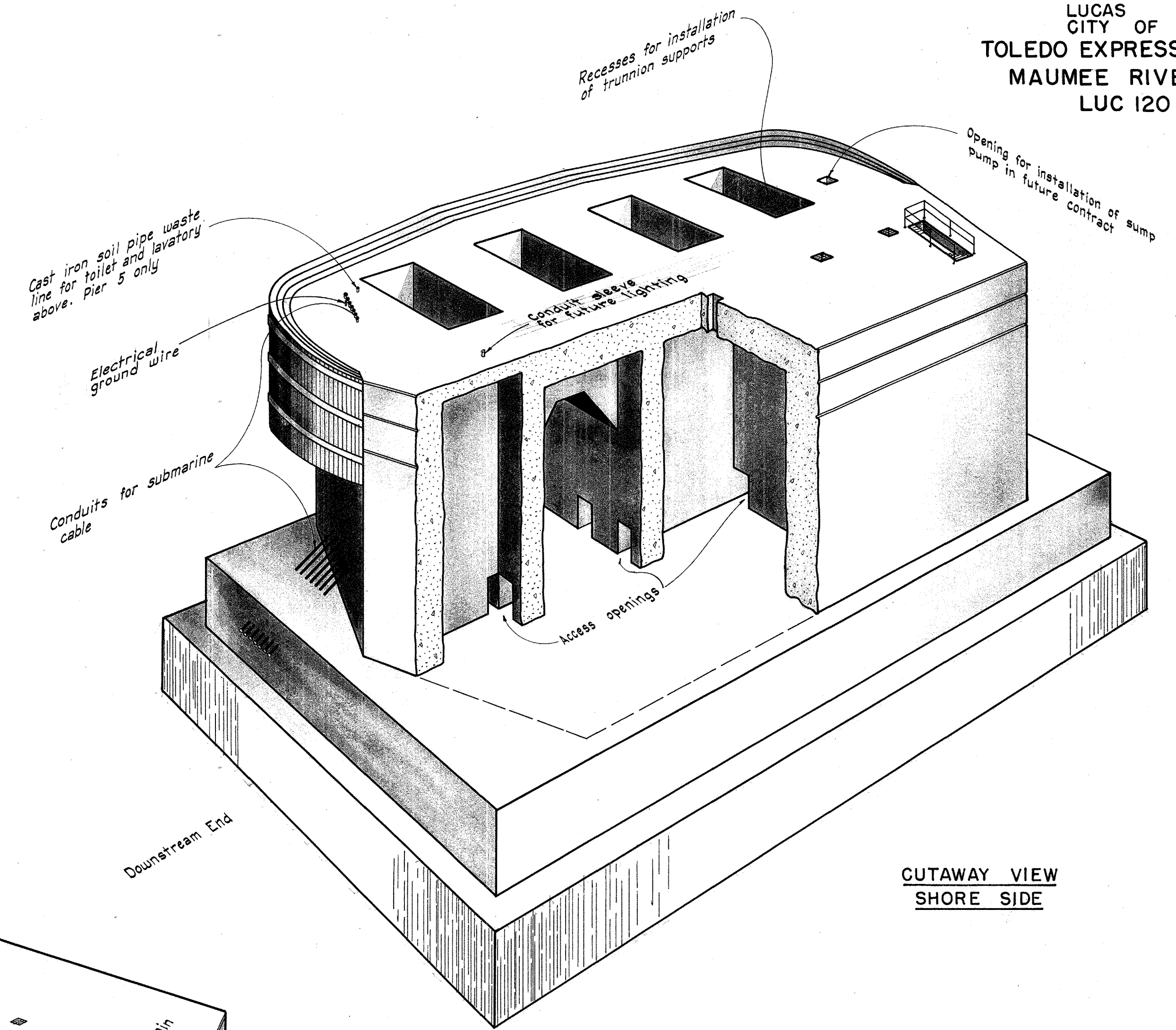
MICROFILMED
JUL 25 1980

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	TYPE FUNDS
2	OHIO	UH-1052 (2)	POST WAR

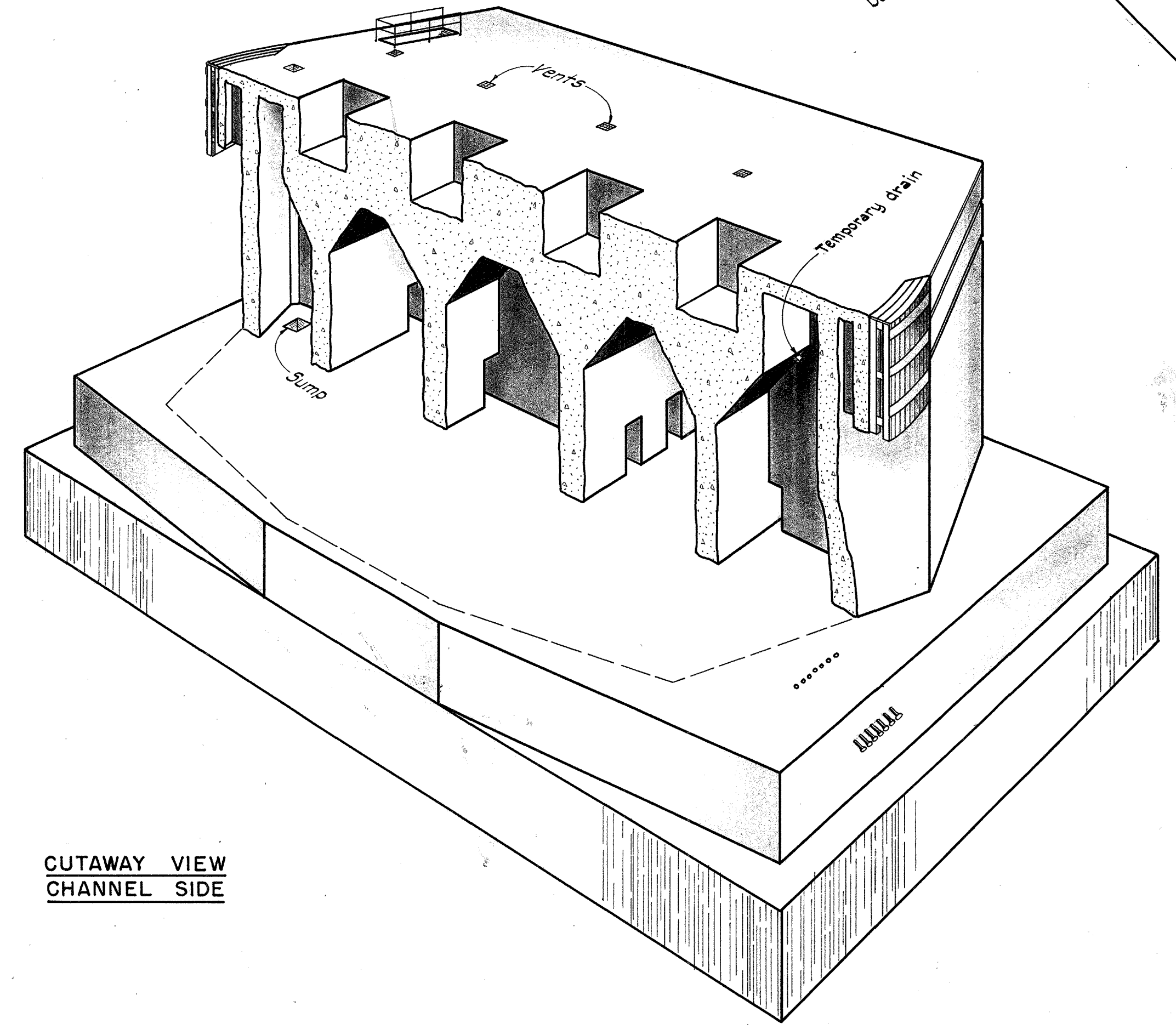
LUCAS COUNTY
CITY OF TOLEDO
TOLEDO EXPRESSWAY SYSTEM
MAUMEE RIVER BRIDGE
LUC 120 - 3.46



PERSPECTIVE VIEW OF COMPLETED PIER



CUTAWAY VIEW
SHORE SIDE



CUTAWAY VIEW
CHANNEL SIDE

Note: Pier 5 shown. Pier 4 similar except for cast iron soil pipe

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES

TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-20 - 35

PERSPECTIVE VIEWS OF BASCULE PIER
TOLEDO, LUCAS COUNTY, OHIO

SCALE _____
MADE W.L.G. DATE 8-15-51
TRCD B.L.B. DATE 8-12-51
CKD JT DATE 12-13-51

HOWARD, NEEDLES, TAMMEN & BERGENSON
CONSULTING ENGINEERS
KANSAS CITY NEW YORK

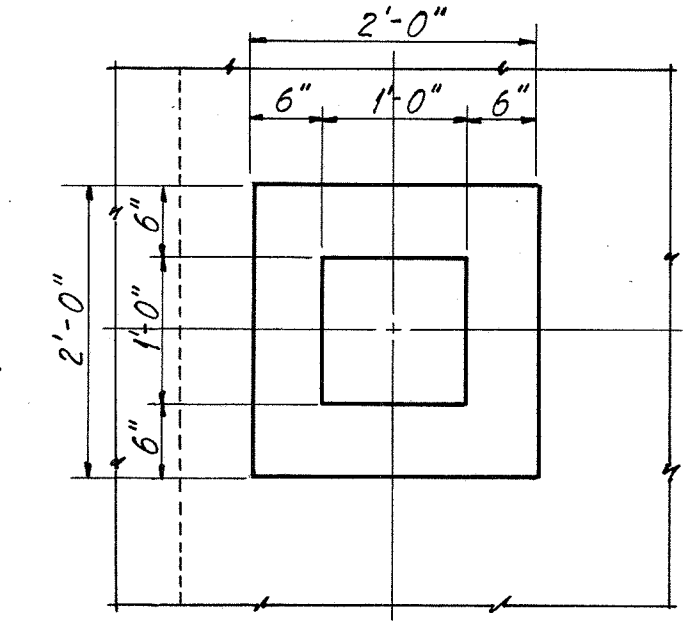
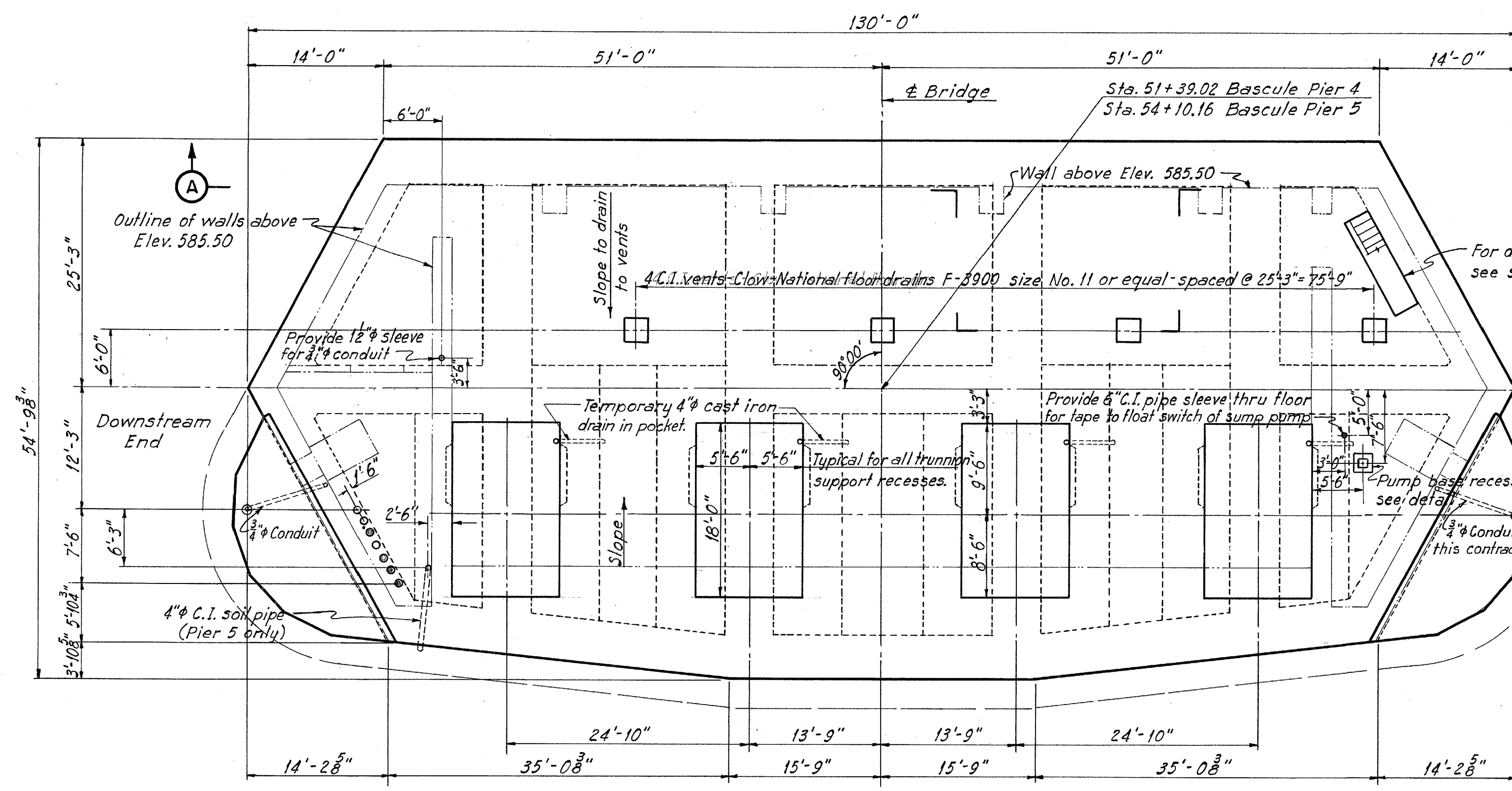
PART _____
810 SHEET 109

512

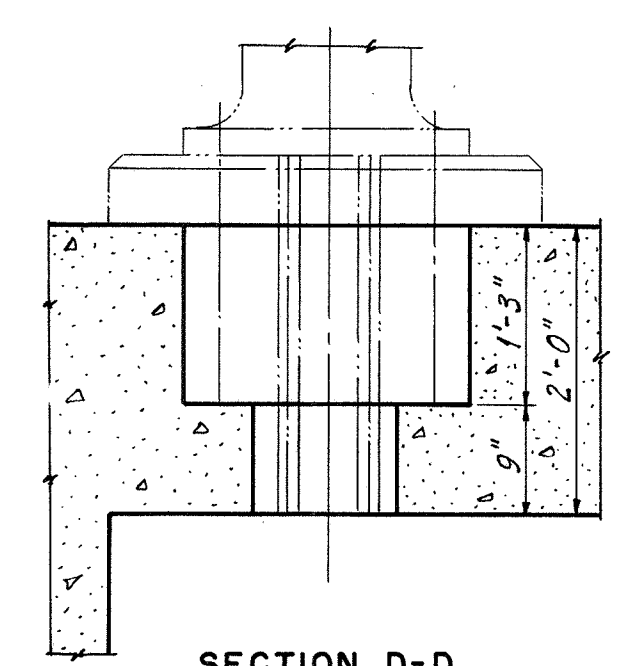
FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	TYPE FUNDS
2	OHIO	UH052 (2)	POST WAR

LUCAS COUNTY
CITY OF TOLEDO
TOLEDO EXPRESSWAY SYSTEM
MAUMEE RIVER BRIDGE
LUC 120 - 3.46

MICROFILMED
JUL 25 1988



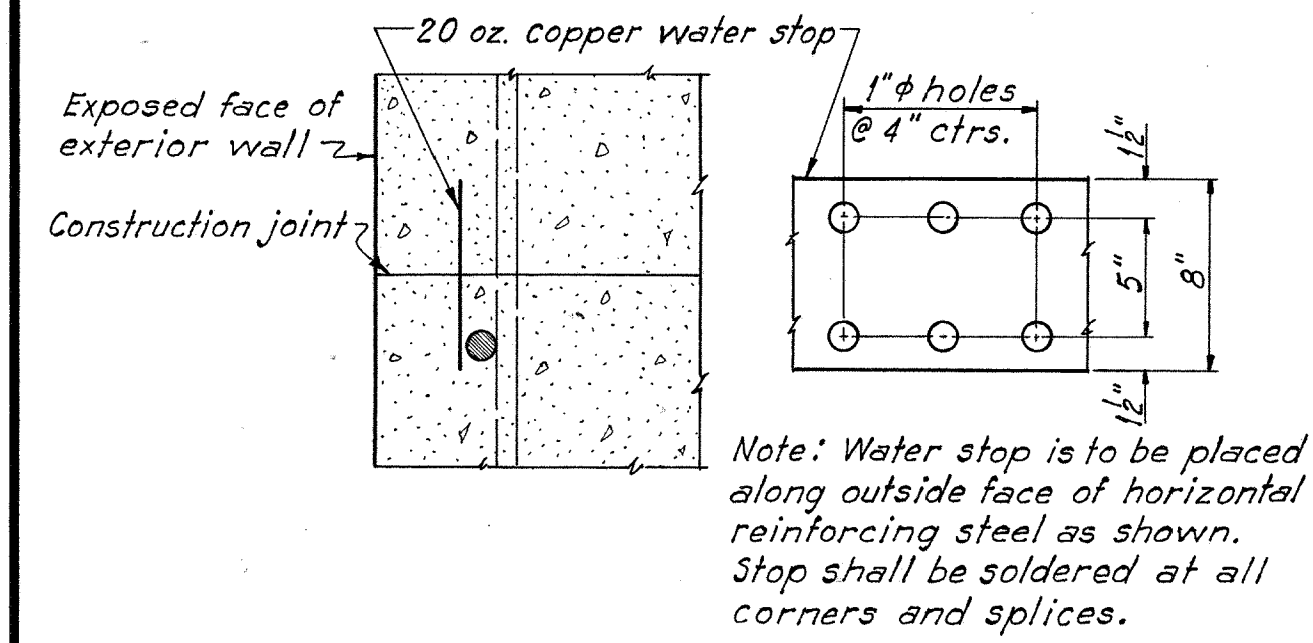
PLAN



SECTION D-D

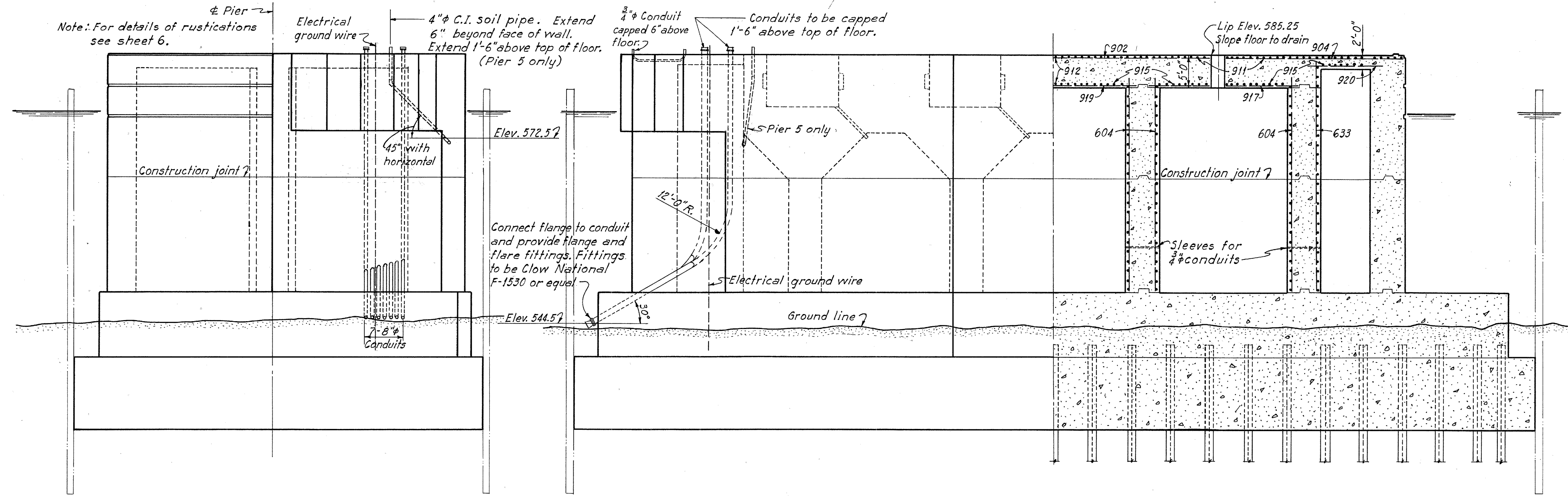
DETAIL OF RECESS FOR PUMP BASE
Scale: 3/4" = 1'-0"

Note: Provide 20 oz. copper water stop at all construction joints from Elev. 549.0 to Elev. 585.0 exterior walls only.



DETAIL OF WATER STOP
Scale: 1/2" = 1'-0"

PLAN AT ELEVATION 585.50
(Pier 4 shown. Pier 5 similar)
Scale: 1" = 10'



ELEVATION - DOWNSTREAM END
Scale: 1" = 10'

HALF ELEVATION - CHANNEL SIDE
Scale: 1" = 10'

HALF SECTION A-A
Scale: 1" = 10'

ELEVATION - UPSTREAM END
Scale: 1" = 10'

Note:
Sumps are located in the upstream ends of Piers 4 and 5.
Submarine cable conduits are located in the downstream ends of Piers 4 and 5.
Cast iron soil pipe is located in the downstream end of Pier 5.

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES

TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-120 - 35

BASCULE PIERS 4 AND 5

TOLEDO, LUCAS COUNTY, OHIO

SCALE: 1" = 10'; 3/4" = 1'-0"

MADE E.B.B. DATE 7-27-51
TRCD E.B.B. DATE 9-21-51
CKD V.R.B. DATE 9-27-51

HOWARD, NEEDLES, TAMMEN & BERGEN
CONSULTING ENGINEERS
KANSAS CITY NEW YORK

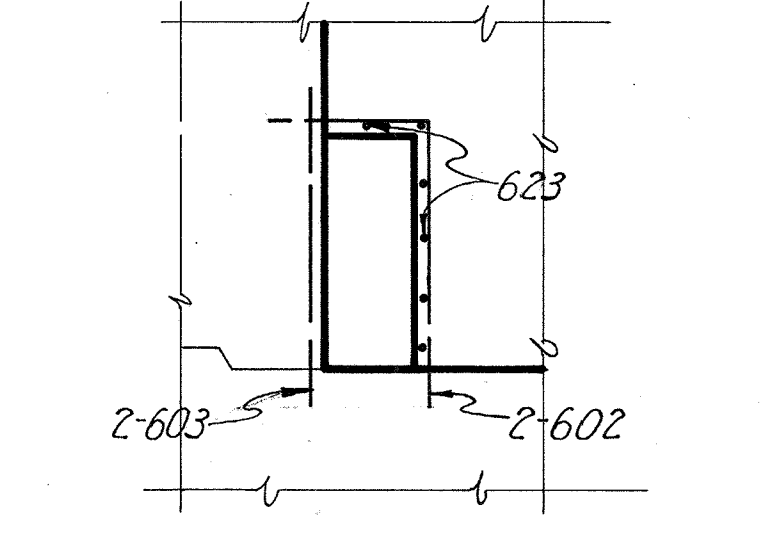
810 SHEET 1.10

506

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	TYPE FUNDS
2	OHIO	UH052 (2)	POST WAR

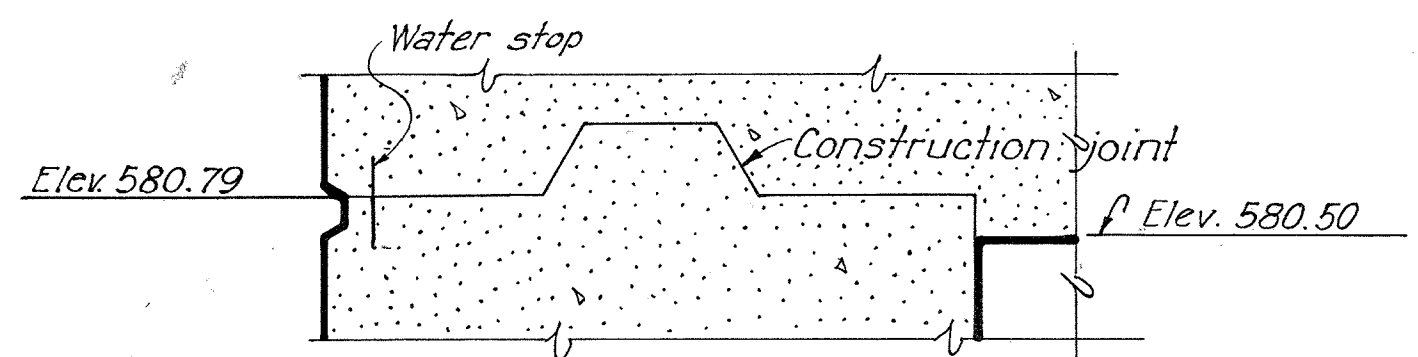
LUCAS COUNTY
CITY OF TOLEDO
TOLEDO EXPRESSWAY SYSTEM
MAUMEE RIVER BRIDGE
LUC 120 - 3.46

MICROFILMED
JUL 25 1983

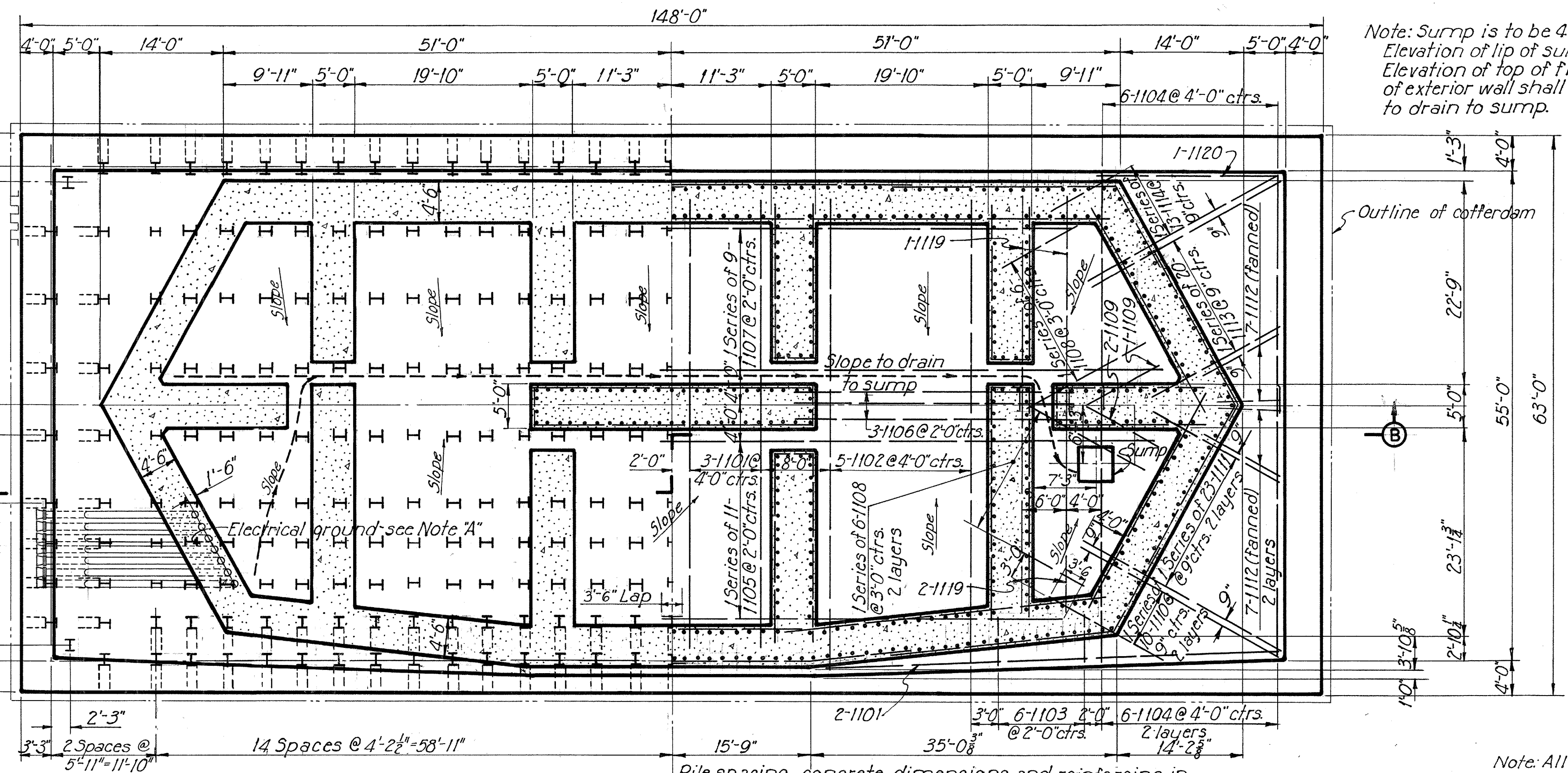


TYPICAL REINFORCEMENT AT DOORS
Scale: 1/8"=1'-0"

Note "A" Provide No. 6 stranded copper wire to be used as electrical ground. Braze or bolt to steel bearing pile and carry up through wall to Elev. 586.0

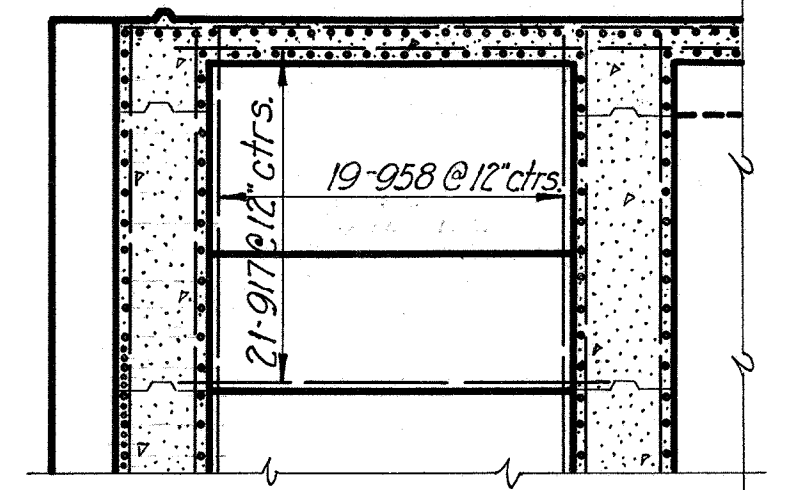


DETAIL "A"
Scale: 1/2"=1'-0"

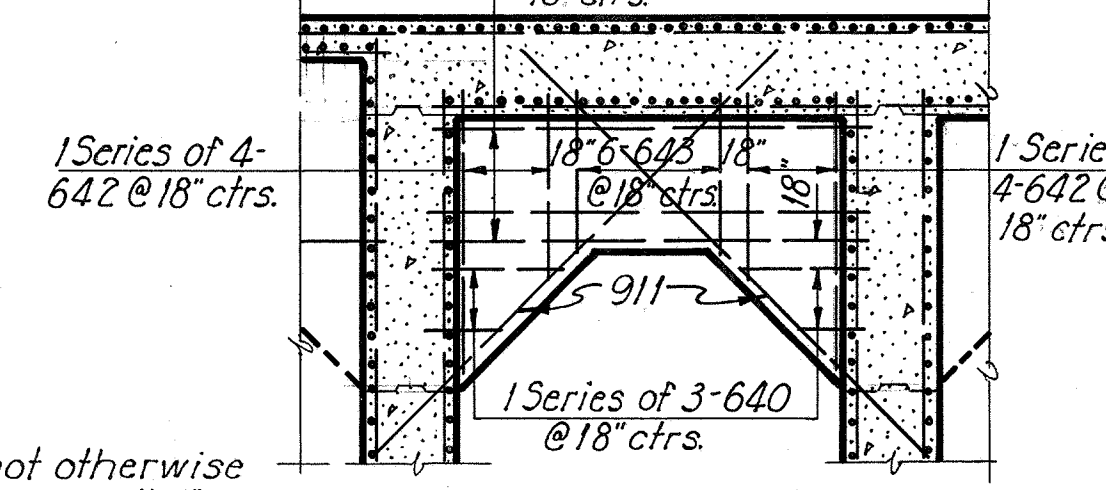


FOOTING PLAN
Scale: 1"=10'

Note: Sump is to be 4'-0" x 4'-0" x 4'-0".
Elevation of lip of sump shall be 548.8.
Elevation of top of floor at inside face of exterior wall shall be 549.0. Slope floor to drain to sump.

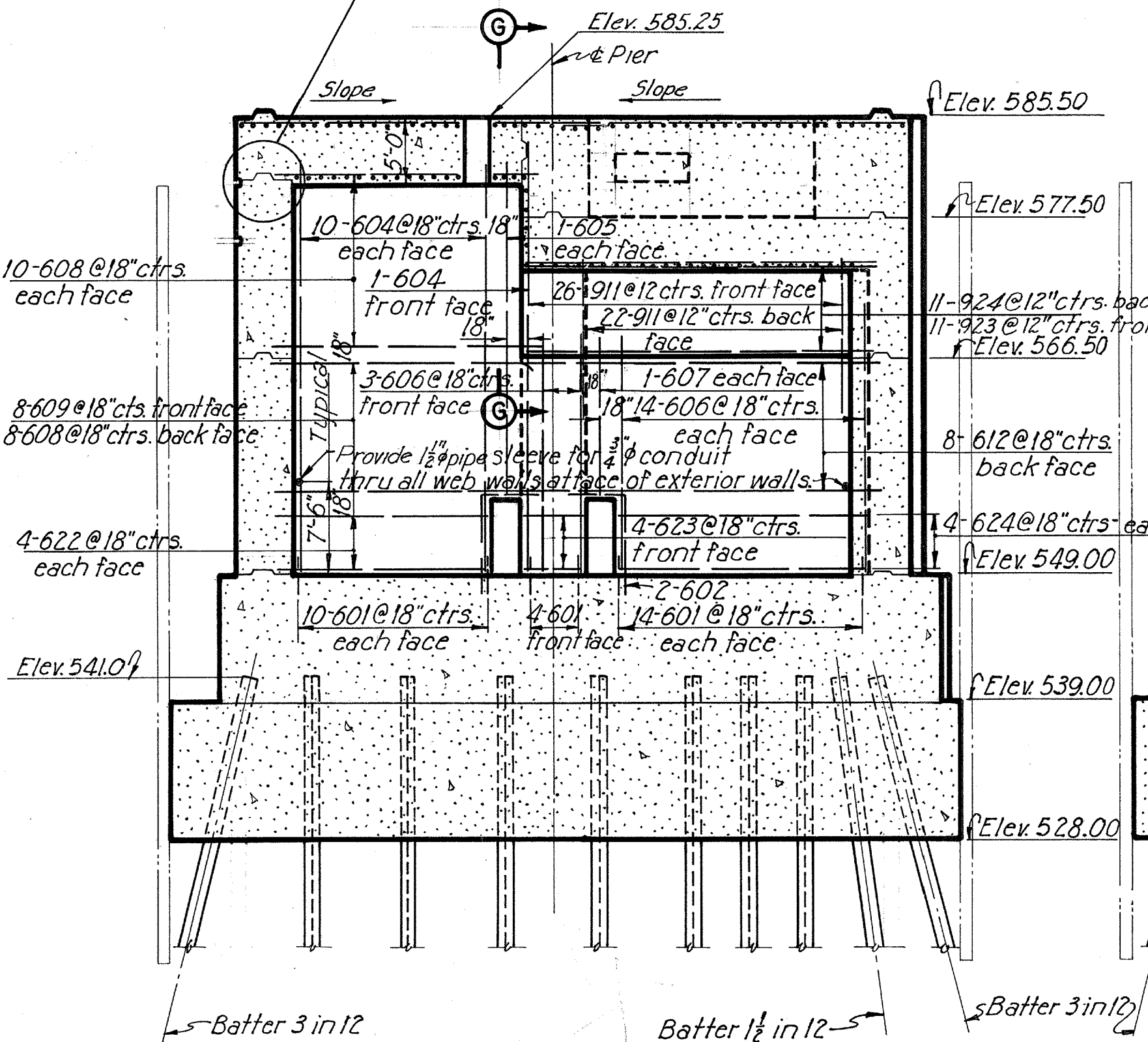


SECTION F-F
Scale: 1"=10'

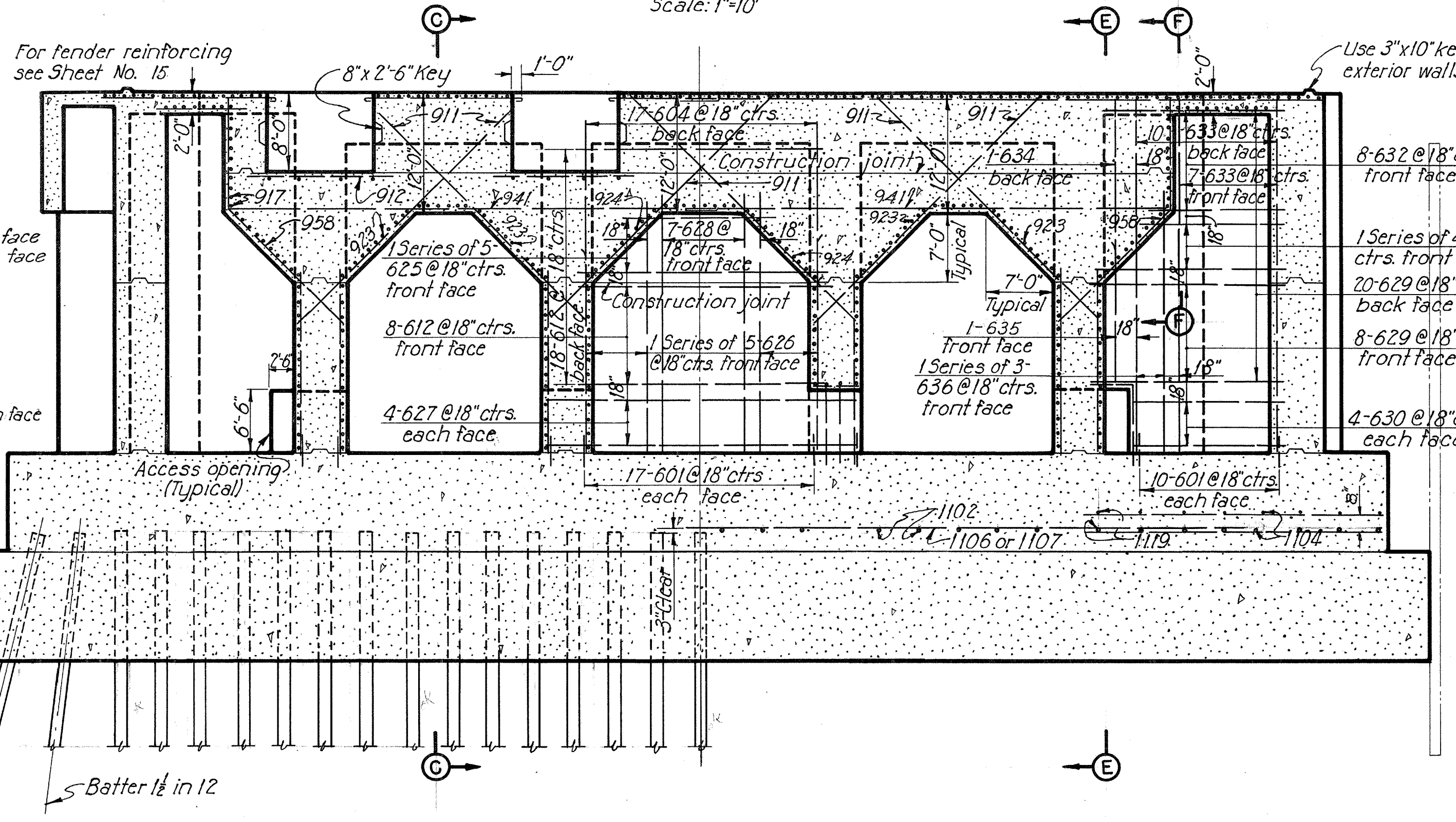


Note: All keys not otherwise shown are to be 6" x 1'-6".

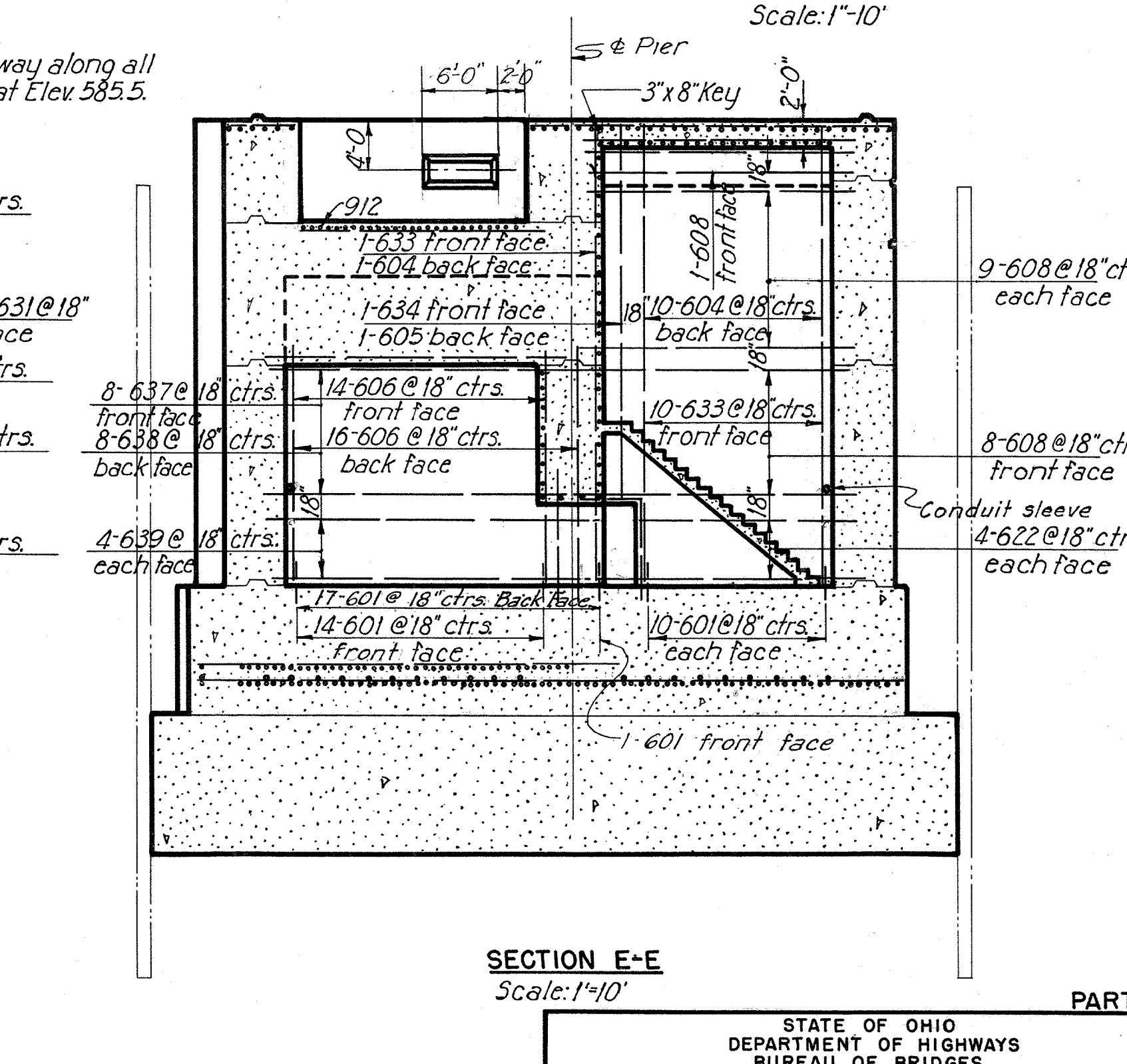
SECTION G-G
Scale: 1"=10'



SECTION C-C
Scale: 1"=10'



LONGITUDINAL SECTION B-B
Scale: 1"=10'



SECTION E-E
Scale: 1"=10'

PILE NOTES:
330-14 BP 117
Spacing of piles shown is at bottom of seal. Elev. 528.0.
For detail of pile splice and tip reinforcement see Sheet No. 6.

Note: Bascule Pier 4 shown. Pier 5 similar

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES

TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-120 - 35

BASCULE PIERS 4 AND 5

TOLEDO, LUCAS COUNTY, OHIO

SCALE: 1/8"=1'-0"; 1/2"=1'-10"

MADE J.R.B. DATE 7-28-51
TRCD L.L. DATE 9-24-51
CKD E.B.J. DATE 9-27-51

HOWARD, NEEDLES, TAMMEN & BERGENCO
CONSULTING ENGINEERS
KANSAS CITY NEW YORK

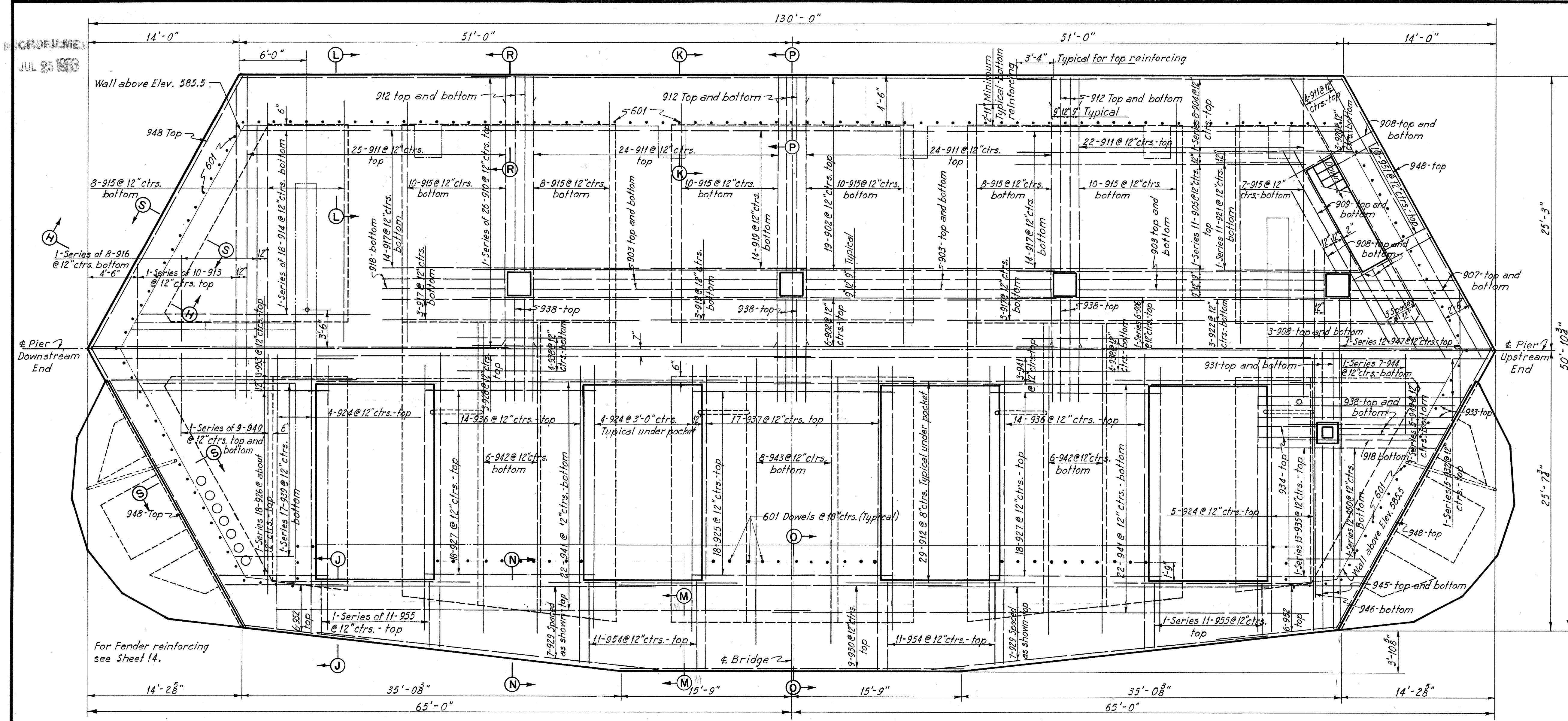
810 SHEET-1.11

507

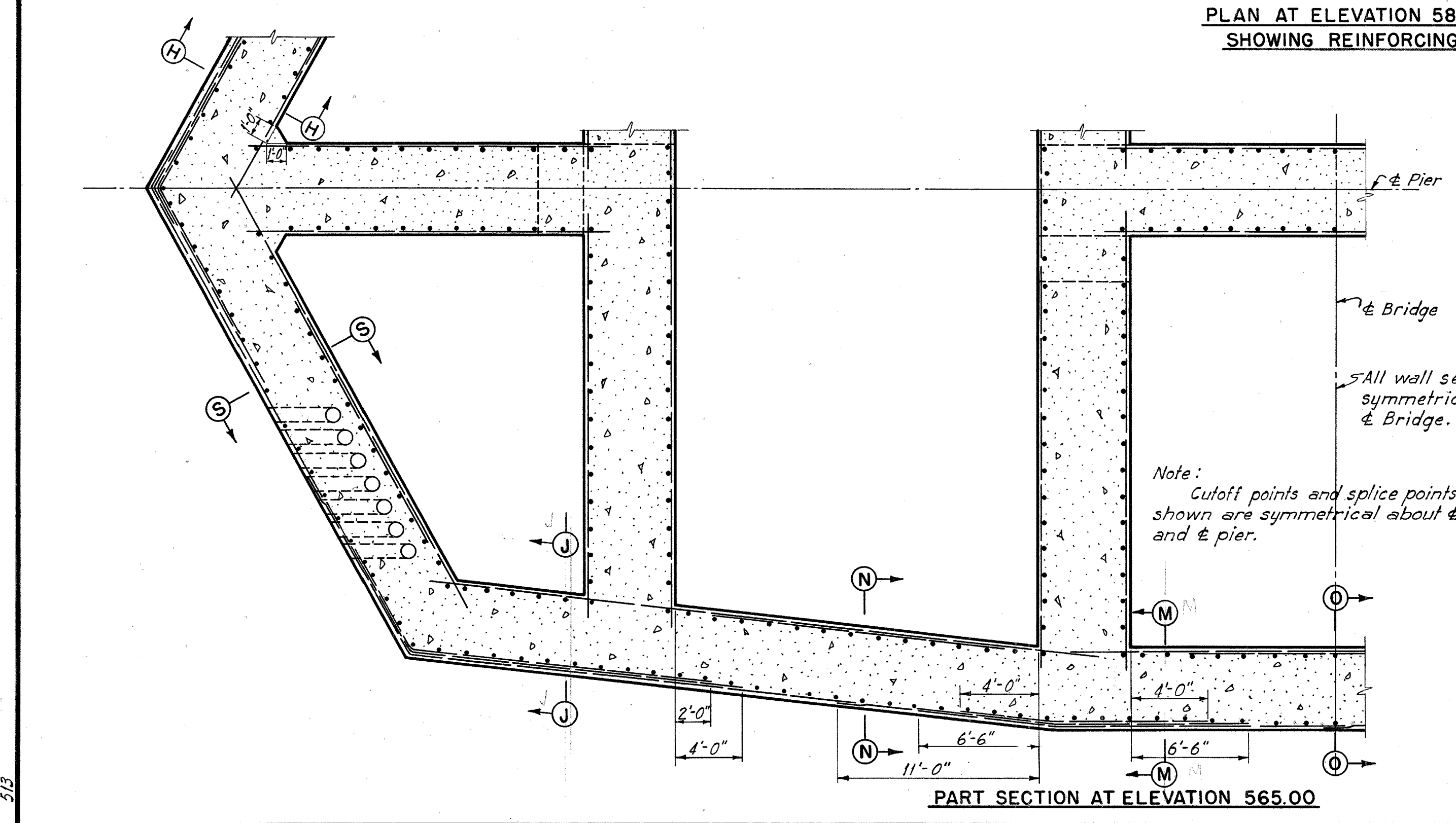
MICROFILMED
JUL 25 1983

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	TYPE FUNDS
2	OHIO	UL-1052(2)	POST WAR

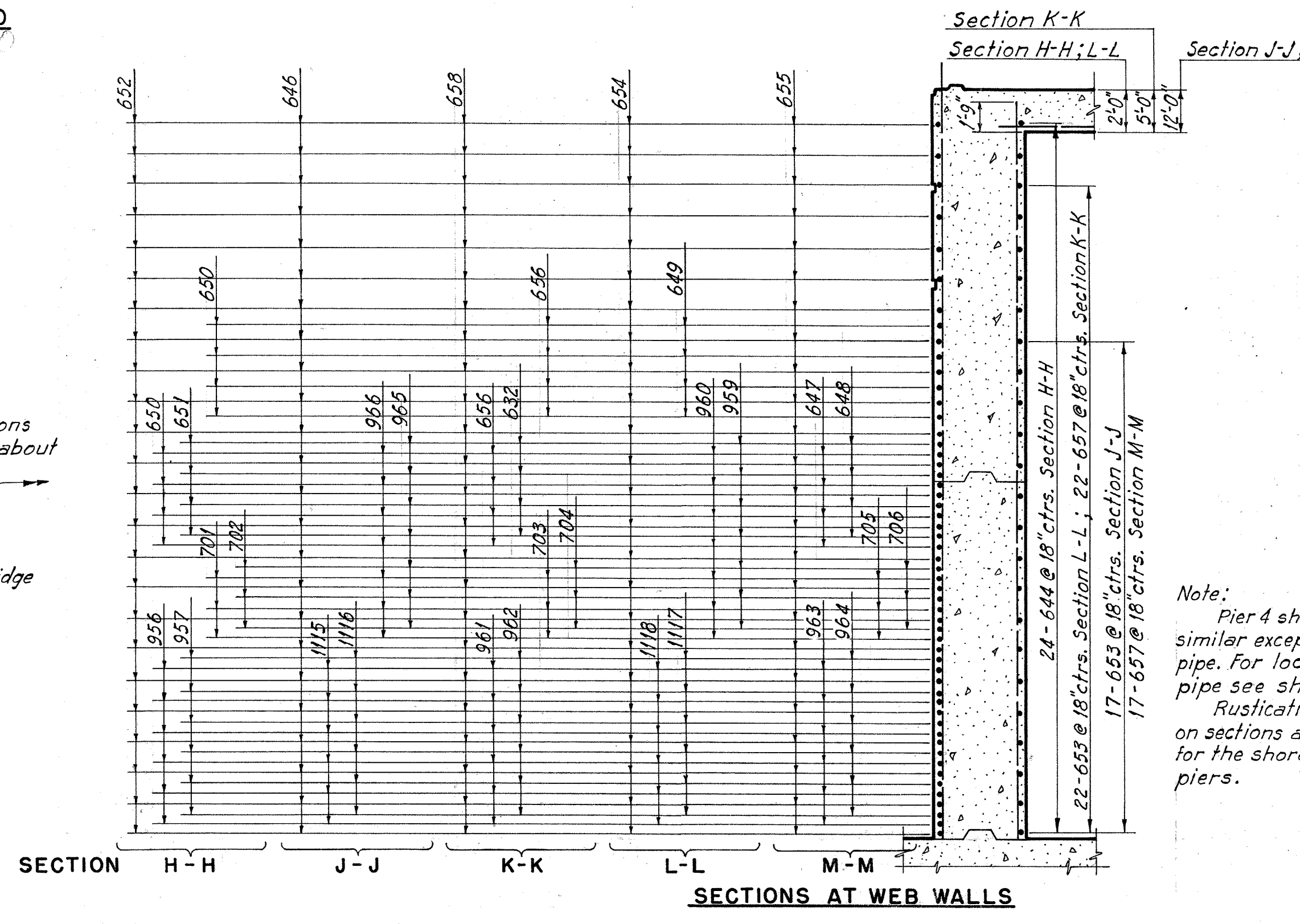
LUCAS COUNTY
CITY OF TOLEDO
TOLEDO EXPRESSWAY SYSTEM
MAUMEE RIVER BRIDGE
LUC 120 - 3.46



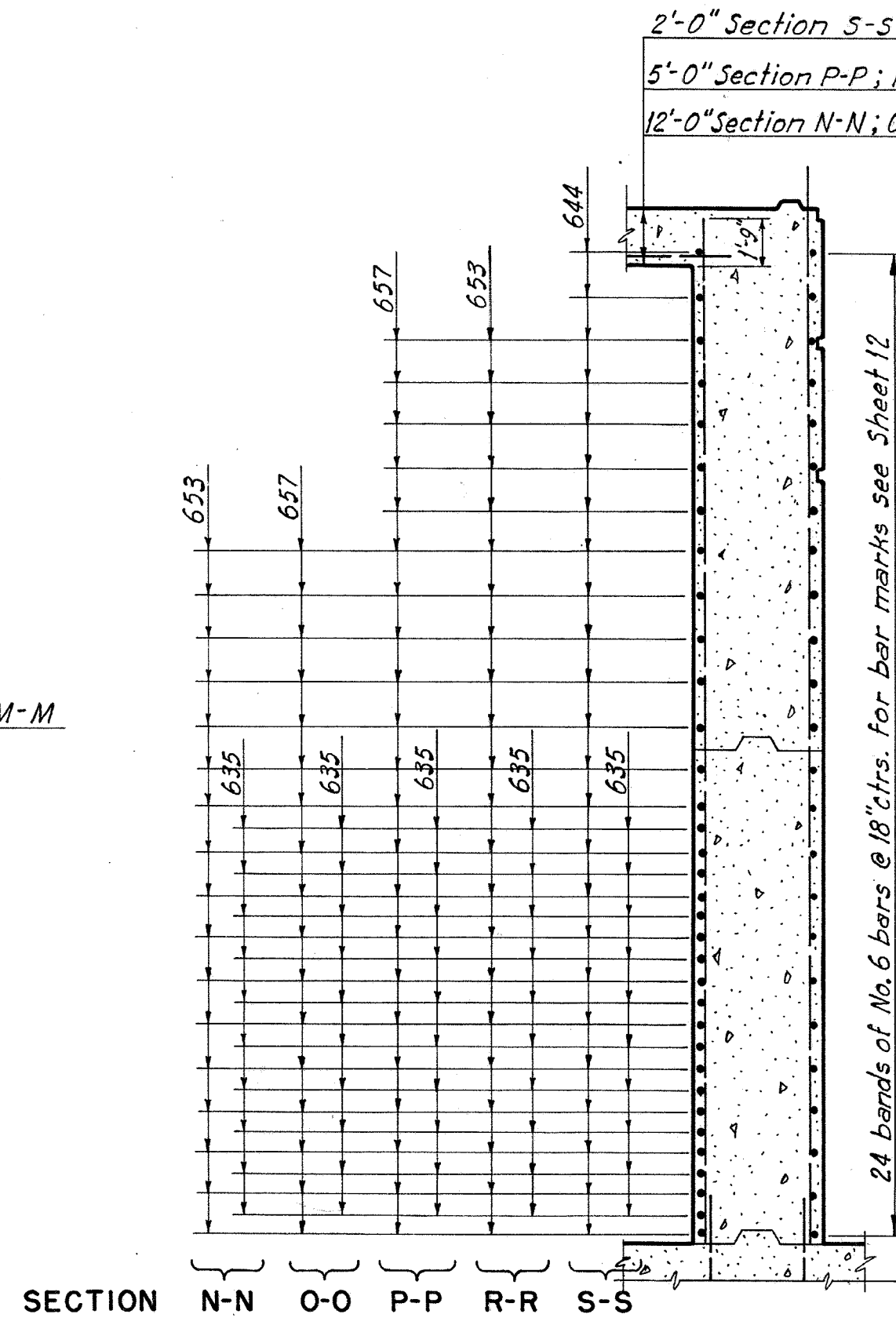
PLAN AT ELEVATION 585.50
SHOWING REINFORCING



PART SECTION AT ELEVATION 565.00



SECTIONS AT WEB WALLS



SECTIONS BETWEEN WEB WALLS

Note:
Pier 4 shown. Pier 5 similar except for C.I. soil pipe. For location of soil pipe see sheet 10.
Rustication lines shown on sections apply to sections for the shore side of the piers.

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES

TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-120 - 35

BASCULE PIERS 4 AND 5

TOLEDO, LUCAS COUNTY, OHIO

SCALE: 1/4" = 1'-0"
MADE E.B.M. DATE 9-12-51
TRCD G.D. DATE 9-20-51
CKD J.R.B. DATE 9-27-51

HOWARD, NEEDLES, TAMMEN & BERGEN
CONSULTING ENGINEERS
KANSAS CITY NEW YORK

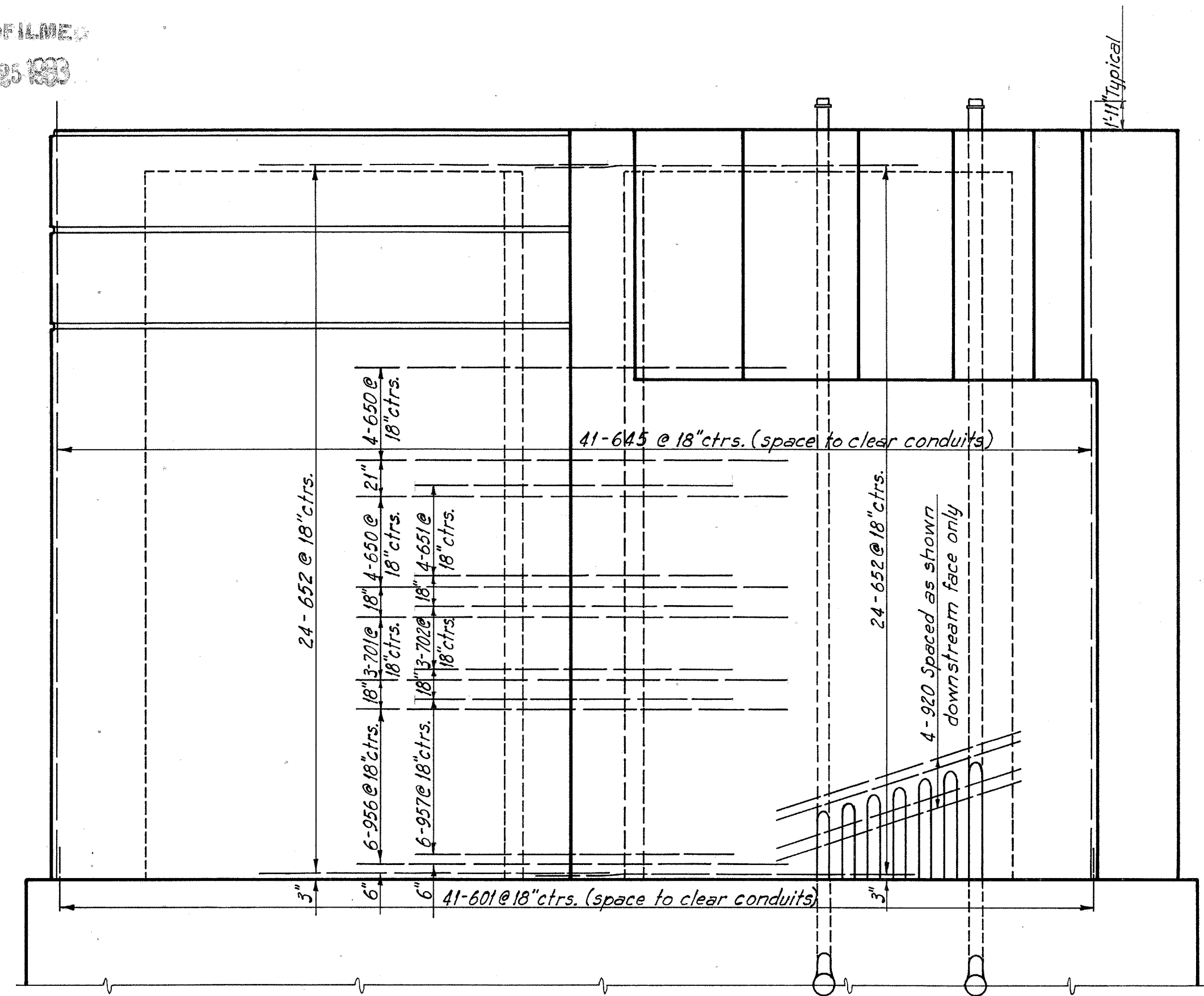
810 SHEET-1.12

MICROFILMED
JUL 25 1953

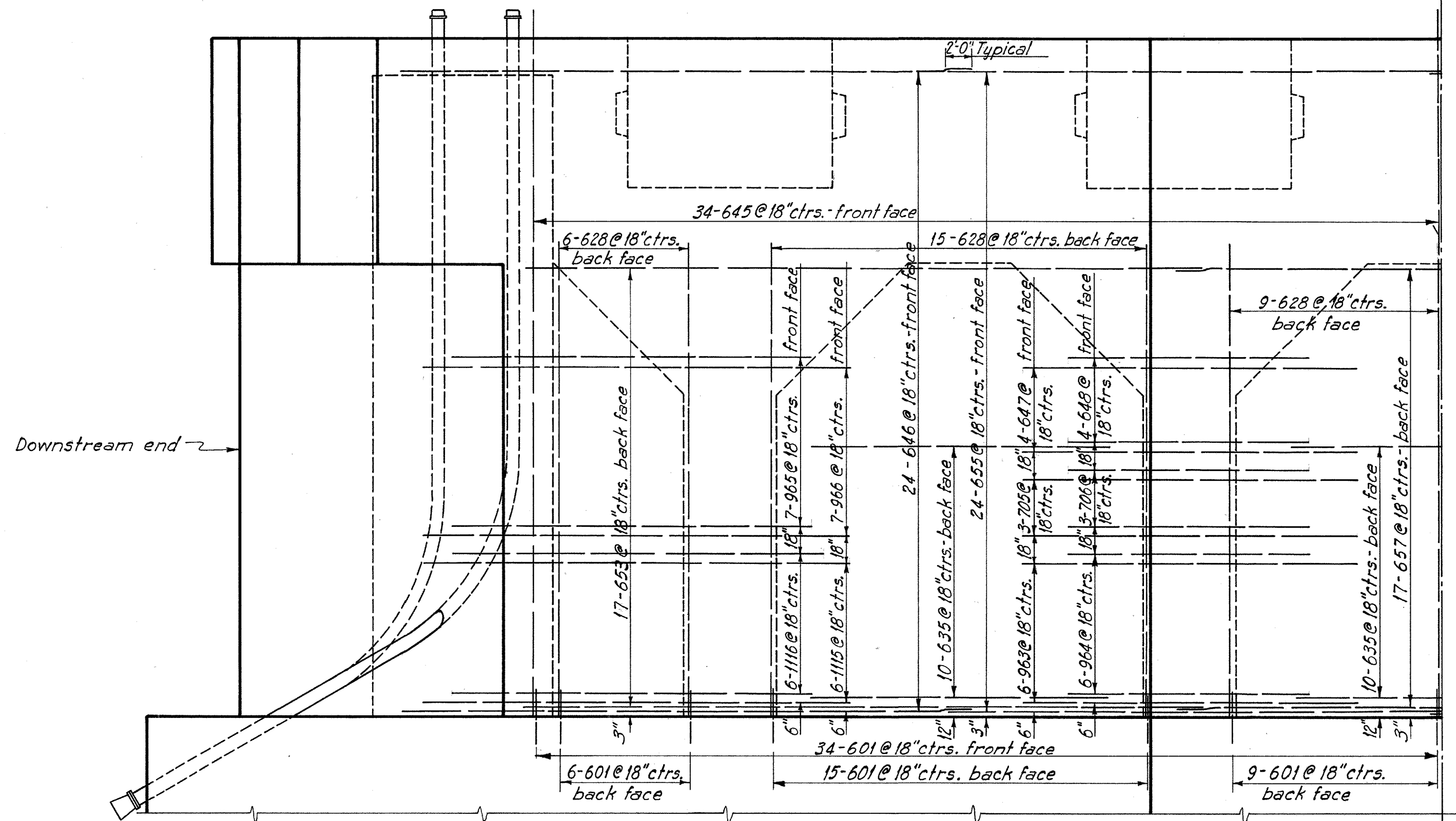
FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	TYPE FUNDS	13
2	OHIO	UI-1052(2)	POST WAR	15

LUCAS COUNTY
CITY OF TOLEDO
TOLEDO EXPRESSWAY SYSTEM
MAUMEE RIVER BRIDGE
LUC 120 - 3.46

Reinforcing symmetrical about & bridge

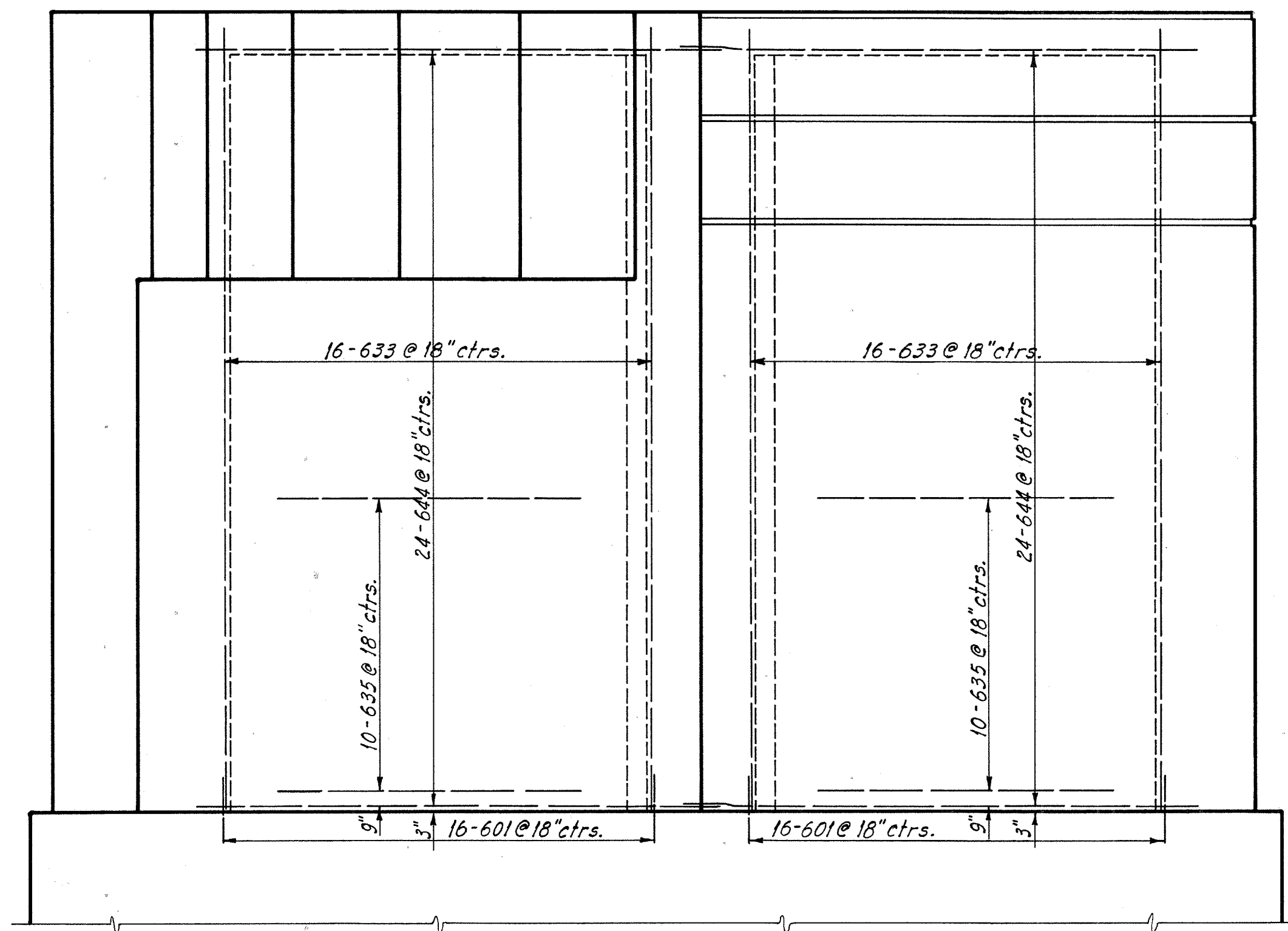


ELEVATION - DOWNSTREAM END
Showing typical reinforcing in front face of exterior walls.

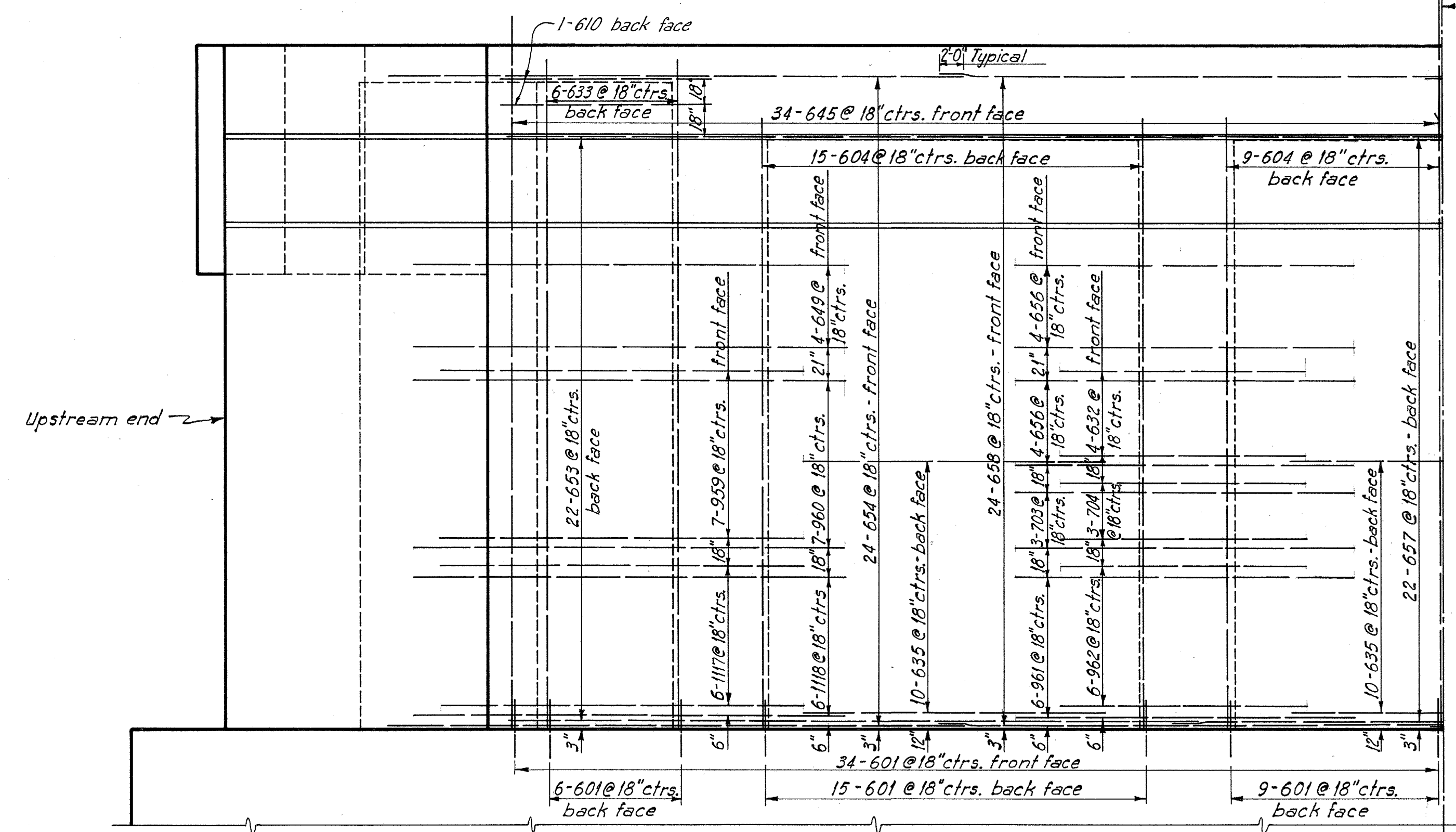


HALF ELEVATION - CHANNEL SIDE

Reinforcing symmetrical about & bridge



ELEVATION - UPSTREAM END
Showing typical reinforcing in back face of exterior walls.



HALF ELEVATION - SHORE SIDE

Note:
For sections through walls see Sheet 12.
Pier 4 shown. Pier 5 similar except for cast iron pipe. For location of pipe see Sheet 10.

PART

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES

TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-120 - 35

BASCULE PIERS 4 AND 5

TOLEDO, LUCAS COUNTY, OHIO

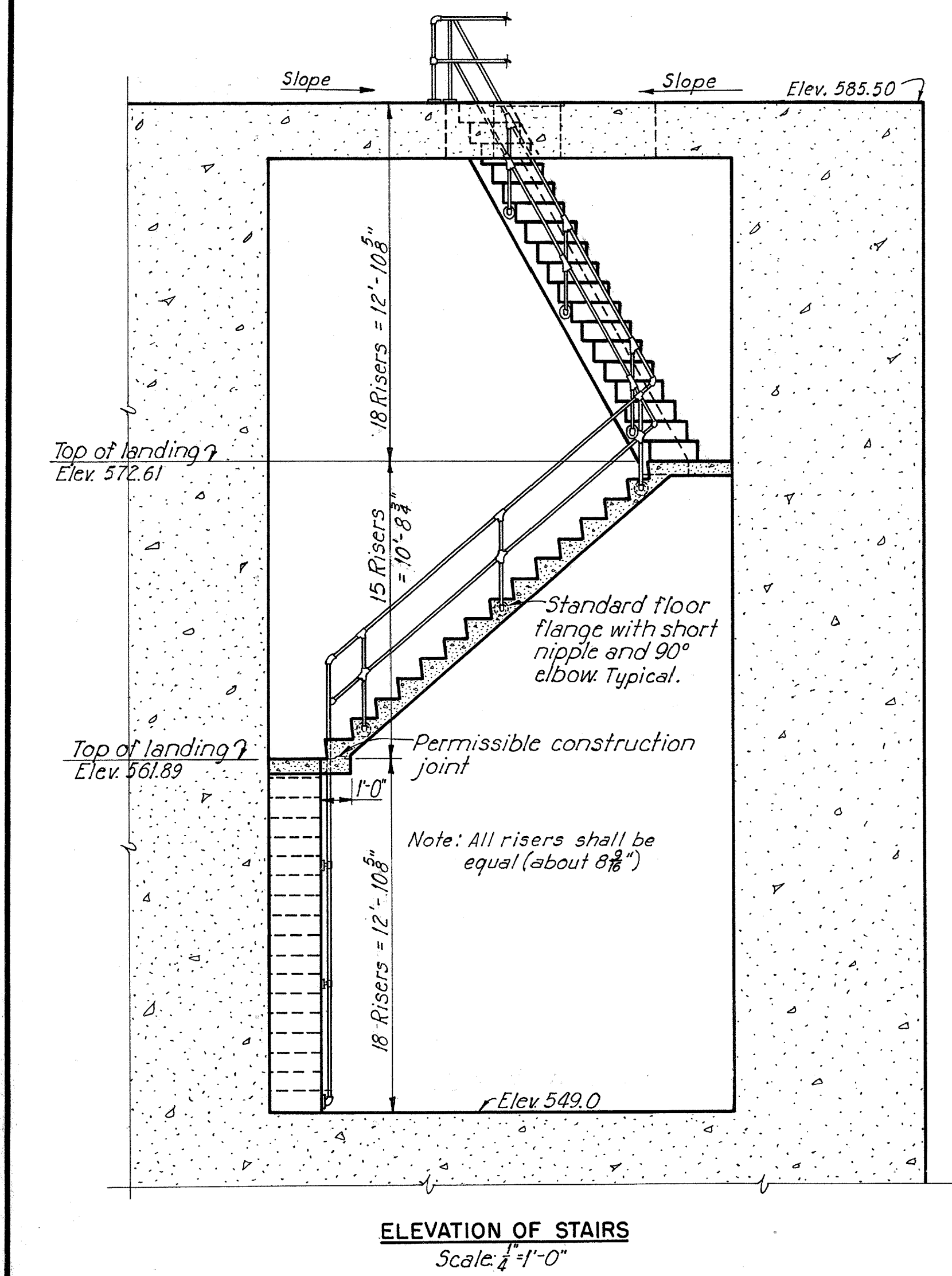
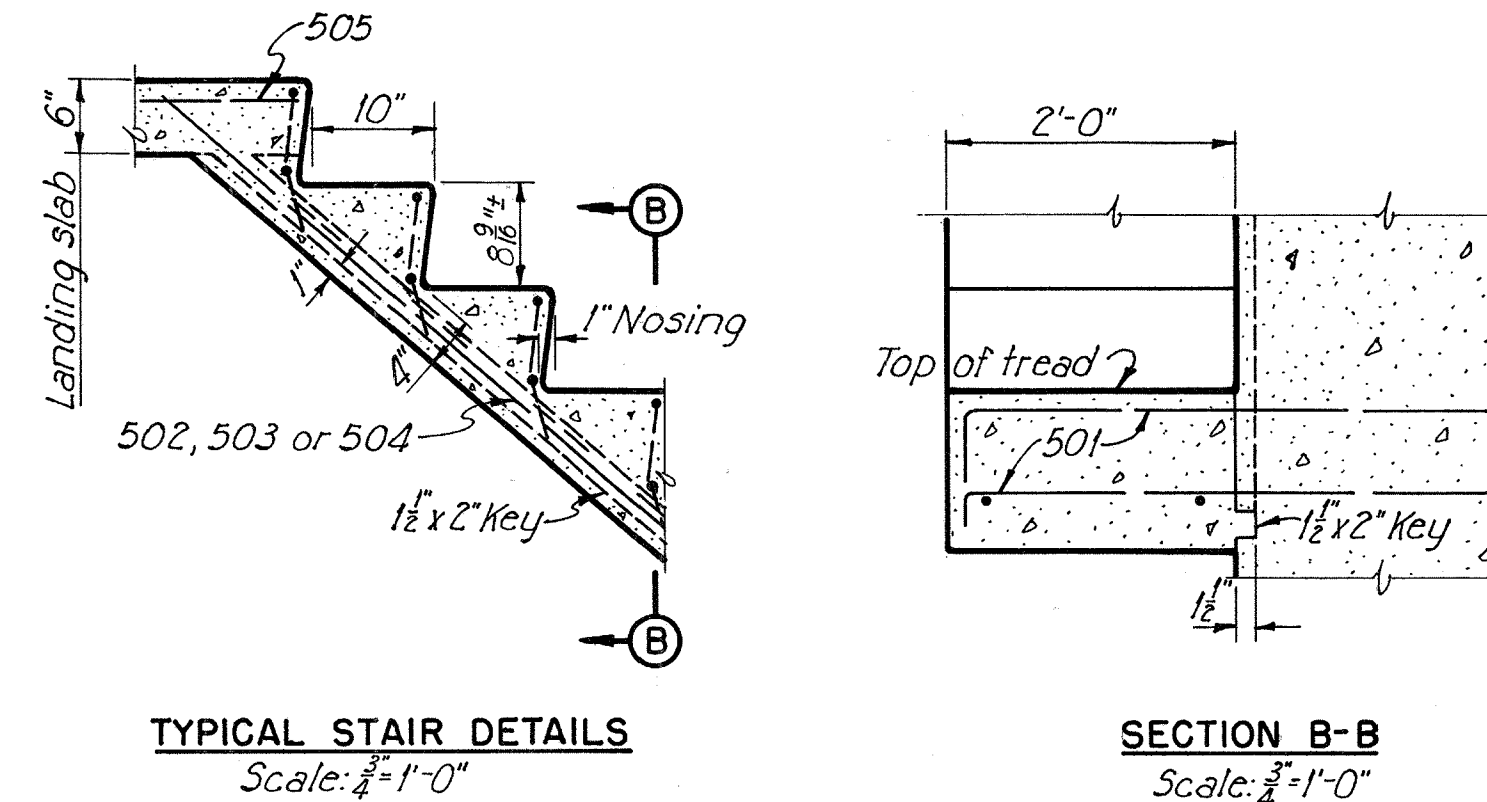
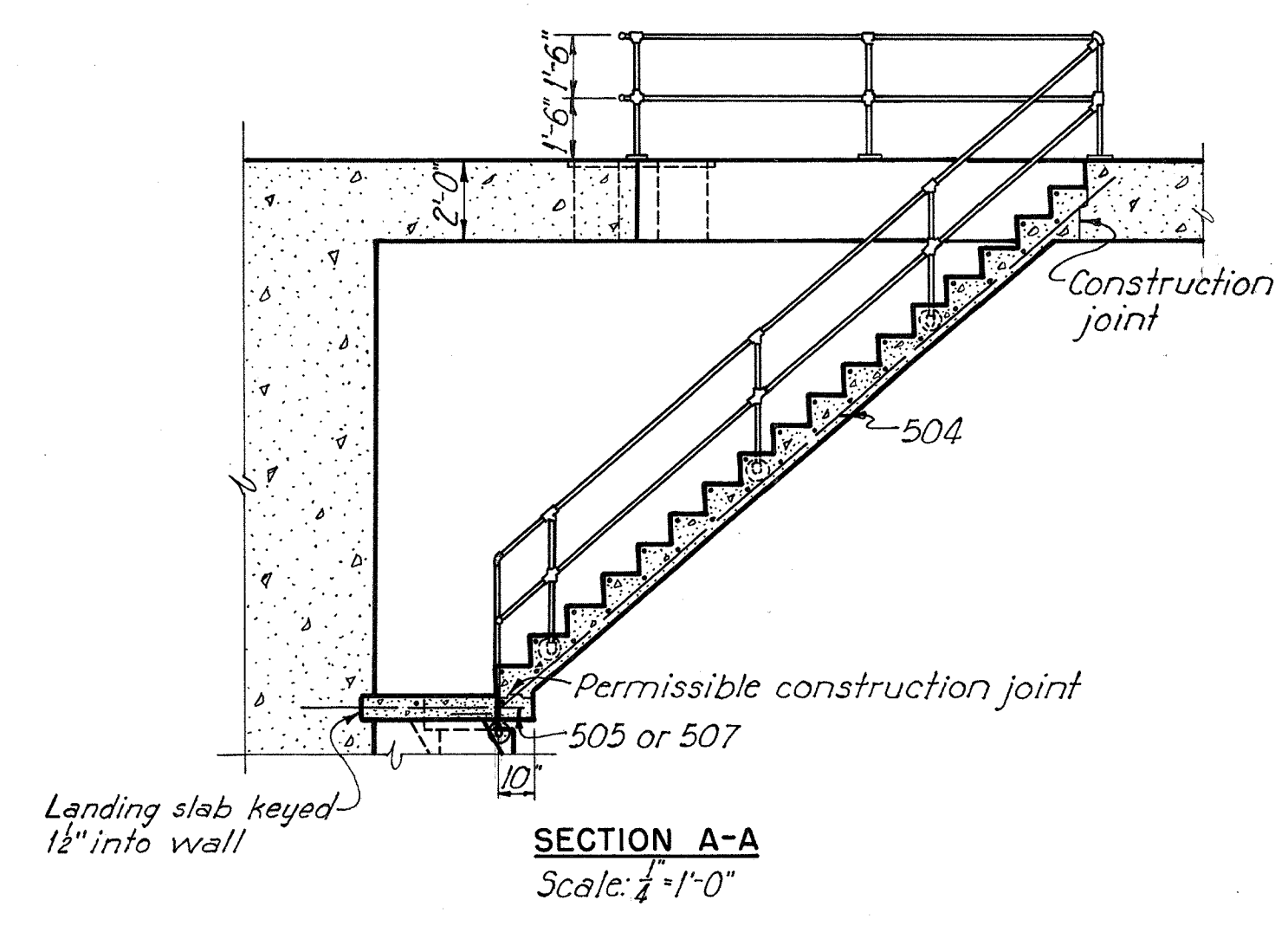
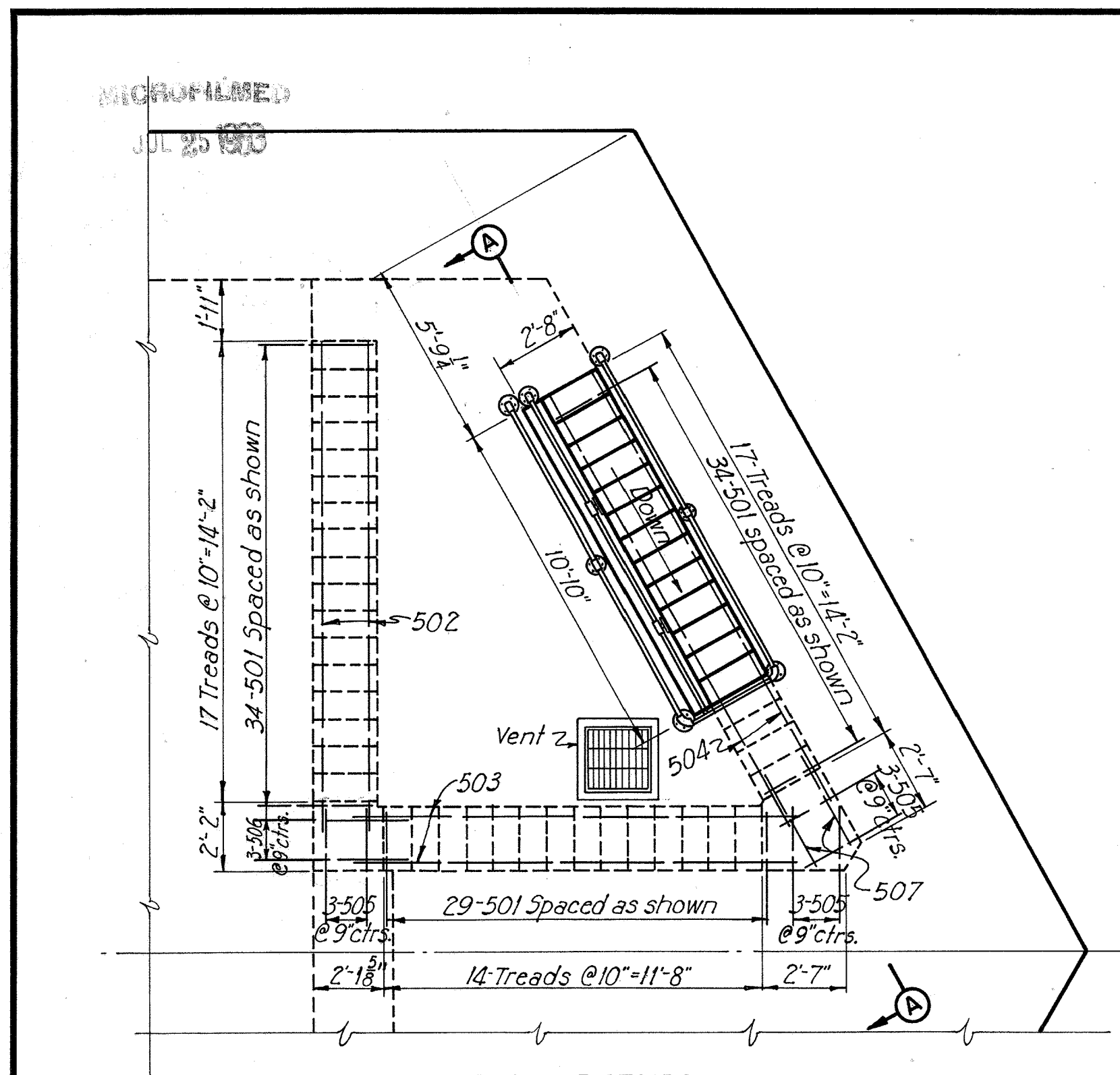
SCALE: 1/8" = 1'-0"
MADE E.B.J. DATE 9-21-51
TRCD G.D. DATE 9-24-51
CKD J.R.B. DATE 9-24-51

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
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KANSAS CITY NEW YORK
810 SHEET 1.13

514

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	TYPE FUNDS
2	OHIO	UH052(2)	POST WAR

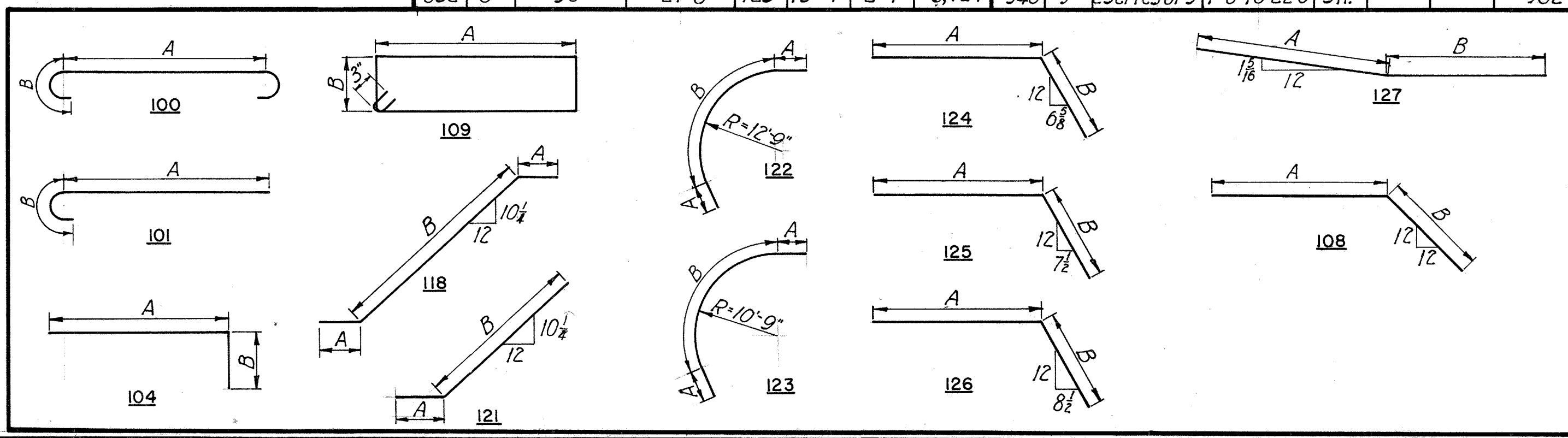
LUCAS COUNTY
CITY OF TOLEDO
TOLEDO EXPRESSWAY SYSTEM
MAUMEE RIVER BRIDGE
LUC 120 - 346



Note: All pipe railings shall be 1 1/2" standard weight galvanized wrought iron.
Fittings shall be galvanized malleable cast iron, threaded plain pattern.
Railing shall be attached to concrete with 3/8" diameter 3 unit ring wedge cinch anchor bolts, National Lead Co. or equal.
Contractor may submit alternate stair details for approval by the Engineer.

REINFORCEMENT SCHEDULE FOR ONE BASCULE PIER - TWO REQUIRED															
Mark	Size	Number	Length	Type	Dimensions A	B	Weight lbs	Mark	Size	Number	Length	Type	Dimensions A	B	Weight lbs
501	5	97	4'-2"	104	3'-8"	0'-6"	422	653	6	78	37'-6"	Str.			4323
502	5	2	21'-2"	121	1'-8"	19'-6"	44	654	6	48	37'-6"	124	25'-10"	11'-8"	2,704
503	5	2	19'-10"	118	1'-8"	16'-6"	42	655	6	48	28'-9"	127	16'-10"	11'-11"	2,073
504	5	2	21'-6"	121	1'-8"	19'-10"	45	656	6	16	18'-0"	Str.			433
505	5	9	3'-9"	Str.			35	657	6	39	29'-6"	Str.			1,728
506	5	3	4'-9"	Str.			15	658	6	48	28'-9"	Str.			2,073
507	5	2	3'-0"	Str.			6	Test	replacement	bar					
Test	replacement	bar													
5	1	8'-0"	Str.				9								
601	6	856	4'-0"	Str.			5,143								
602	6	16	13'-4"	104	4'-8"	8'-8"	320								
603	6	16	10'-6"	Str.			252	701	7	6	24'-6"	125	12'-3"	12'-3"	300
604	6	128	33'-6"	Str.			6,441	702	7	6	18'-6"	125	9'-3"	9'-3"	227
605	6	6	26'-9"	Str.			241	703	7	6	18'-0"	Str.			221
606	6	122	19'-6"	Str.			3,573	704	7	6	13'-0"	Str.			159
607	6	4	12'-9"	Str.			77	705	7	6	18'-0"	127	11'-0"	7'-0"	221
608	6	112	22'-0"	Str.			3,701	706	7	6	13'-0"	127	8'-6"	4'-6"	159
609	6	16	49'-6"	Str.			1,190	Test	replacement	bar					
610	6	36	11'-9"	Str.			635	7	1	9'-0"	Str.				19
611	6	64	9'-9"	Str.			937								
612	6	42	26'-3"	Str.			1,656								
613	6	18	36'-1"	122	5'-2"	25'-9"	975	901	9	8	12'-3"	104	10'-3"	2'-0"	333
614	6	18	30'-7"	123	4'-5"	21'-9"	827	902	9	25	54'-0"	Str.			4,590
615	6	40	28'-4"	109	11'-9"	2'-2"	1,702	903	9	12	22'-9"	Str.			928
616	6	2 Series of 6	3'-2" to 10'-2"	Str.			120	904	9	1 Series of 8	30'-6" to 34'-4"	Str.			882
617	6	16	10'-9"	104			258	905	9	1 Series of 11	28'-2" to 33'-8"	104	25'-6" to 28'-6"	1'-8"	1,156
618	6	2 Series of 5	4'-2" to 9'-8"	Str.			104	906	9	1 Series of 6	41'-7" to 44'-4"	Str.			876
619	6	2 Series of 5	3'-2" to 9'-2"	Str.			93	907	9	4	9'-6"	Str.			129
620	6	2 Series of 4	4'-2" to 8'-8"	Str.			77	908	9	16	8'-3"	Str.			449
621	6	4 Series of 4	13'-8" to 21'-2"	Str.			419	909	9	4	20'-0"	Str.			272
622	6	32	17'-9"	Str.			853	910	9	1 Series of 26	24'-6" to 38'-3"	Str.			2,774
623	6	56	4'-6"	Str.			379	911	9	247	29'-6"	Str.			24,774
624	6	16	21'-9"	Str.			523	912	9	128	17'-9"	Str.			7,725
625	6	1 Series of 5	13'-4" to 25'-4"	Str.			145	913	9	1 Series of 10	12'-6" to 28'-6"	Str.			697
626	6	2 Series of 5	19'-5" to 25'-5"	Str.			337	914	9	1 Series of 18	13'-9" to 23'-0"	Str.			1,125
627	6	8	32'-0"	Str.			385	915	9	71	24'-3"	Str.			5,854
628	6	66	26'-6"	Str.			2,627	916	9	1 Series of 8	10'-0" to 22'-6"	Str.			442
629	6	56	22'-0"	Str.			1,850	917	9	76	26'-0"	Str.			6,718
630	6	16	17'-6"	Str.			421	918	9	3	13'-6"	Str.			138
631	6	2 Series of 4	16'-0" to 20'-6"	Str.			219	919	9	17	28'-6"	Str.			1,647
632	6	24	14'-3"	Str.			514	920	9	7	14'-9"	Str.			351
633	6	132	36'-3"	Str.			7,187	921	9	1 Series of 11	10'-0" to 15'-6"	Str.			477
634	6	4	29'-6"	Str.			177	922	9	3	23'-6"	Str.			240
635	6	102	16'-0"	Str.			2,451	923	9	44	29'-3"	Str.			4,376
636	6	2 Series of 3	22'-9" to 25'-9"	Str.			219	924	9	47	28'-3"	Str.			4,514
637	6	16	23'-6"	Str.			565	925	9	18	19'-1"	100	15'-7"	1'-9"	1,168
638	6	16	47'-3"	Str.			1,136	926	9	1 Series of 18	10'-9" to 20'-3"	101	9'-0" to 18'-6"	1'-9"	949
639	6	16	27'-6"	Str.			661	927	9	36	18'-5"	100	14'-11"	1'-9"	2,254
640	6	4 Series of 3	4'-8" to 7'-8"	Str.			111	928	9	3	45'-9"	Str.			467
641	6	10	23'-9"	Str.			357	929	9	14	31'-6"	Str.			1,500
642	6	4 Series of 4	11'-2" to 15'-6"	Str.			322	930	9	9	32'-0"	Str.			979
643	6	12	8'-9"	Str.			158	931	9	4	6'-0"	Str.			82
644	6	96	28'-6"	Str.			4,109	932	9	1 Series of 5	19'-3" to 21'-3"	Str.			344
645	6	216	38'-6"	Str.			12,491	933	9	2	19'-9"	101	18'-0"	1'-9"	134
646	6	48	38'-0"	126	25'-10"	12'-2"	2,740	934	9	2	6'-7"	101	4'-10"	1'-9"	45
647	6	8	18'-0"	127	11'-0"	7'-0"	216	935	9	1 Series of 13	10'-0" to 18'-2"	101	8'-3" to 9'-3"	1'-9"	623
648	6	8	13'-0"	127	8'-6"	4'-6"	156	936	9	28	27'-0"	Str.			2,570
649	6	8	28'-3"	124	18'-9"	9'-6"	339	937	9	17	28'-3"	Str.			1,633
650	6	16	24'-6"	125	12'-3"	12'-3"	589	938	9	18	12'-0"	Str.			734
651	6	8	18'-6"	125	9'-3"	9'-3"	222	939	9	1 Series of 17	7'-3" to 15'-9"	Str.			665
652	6	96	21'-8"	125	19'-4"	2'-4"	3,124	940	9	2 Series of 9	7'-6" to 22'-0"	Str.			902

Mark	Size	Number	Length	Type	Dimensions A	B	Weight lbs
941	9	47	49'-6"	Str.			
942	9	12	28'-6"	Str.			
943	9	8	28'-6"	Str.			
944	9	1 Series of 7	8'-3" to 19'-0"	Str.			
945	9	4	17'-0"	Str.			
946	9	1	24'-3"	Str.			
947	9	1 Series of 12	10'-0" to 30'-0"	Str.			
948	9	4	28'-9"	Str.			
949	9	1 Series of 5	14'-3" to 16'-6"	Str.			
950	9	1 Series of 12	7'-6" to 13'-6"	Str.			
951	9	10	5'-8"	104	4'-0"	1'-8"	
952	9	12	11'-0"	Str.			
953	9	3	23'-3"	Str.			
954	9	22	7'-9"	Str.			
955	9	2 Series of 11	5'-0" to 6'-3"	Str.			
956	9	12	24'-6"	125	12'-3"	12'-3"	
957	9	12	18'-6"	125	9'-3"	9'-3"	
958	9	38	27'-9"	108	11'-9"	16'-0"	
959	9	14	23'-3"	124	16'-9"	6'-6"	
960	9	14	28'-3"	124	18'-9"	9'-6"	
961	9	12	18'-0"	Str.			
962	9	12	13'-0"	Str.			
963	9	12	18'-0"	127	11'-0"	7'-0"	
964	9	12	13'-0"	127	8'-6"	4'-6"	
965	9	14	23'-3"	126	16'-9"	6'-6"	
966	9	14	28'-3"	126	18'-9"	9'-6"	
Test	replacement	bar					
9	6	10'-0"	Str.				



STATE OF OHIO
DEPARTMENT OF HIGHWAYS
BUREAU OF BRIDGES

TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-120 - 35

BASCULE PIERS 4 AND 5

TOLEDO, LUCAS COUNTY, OHIO

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

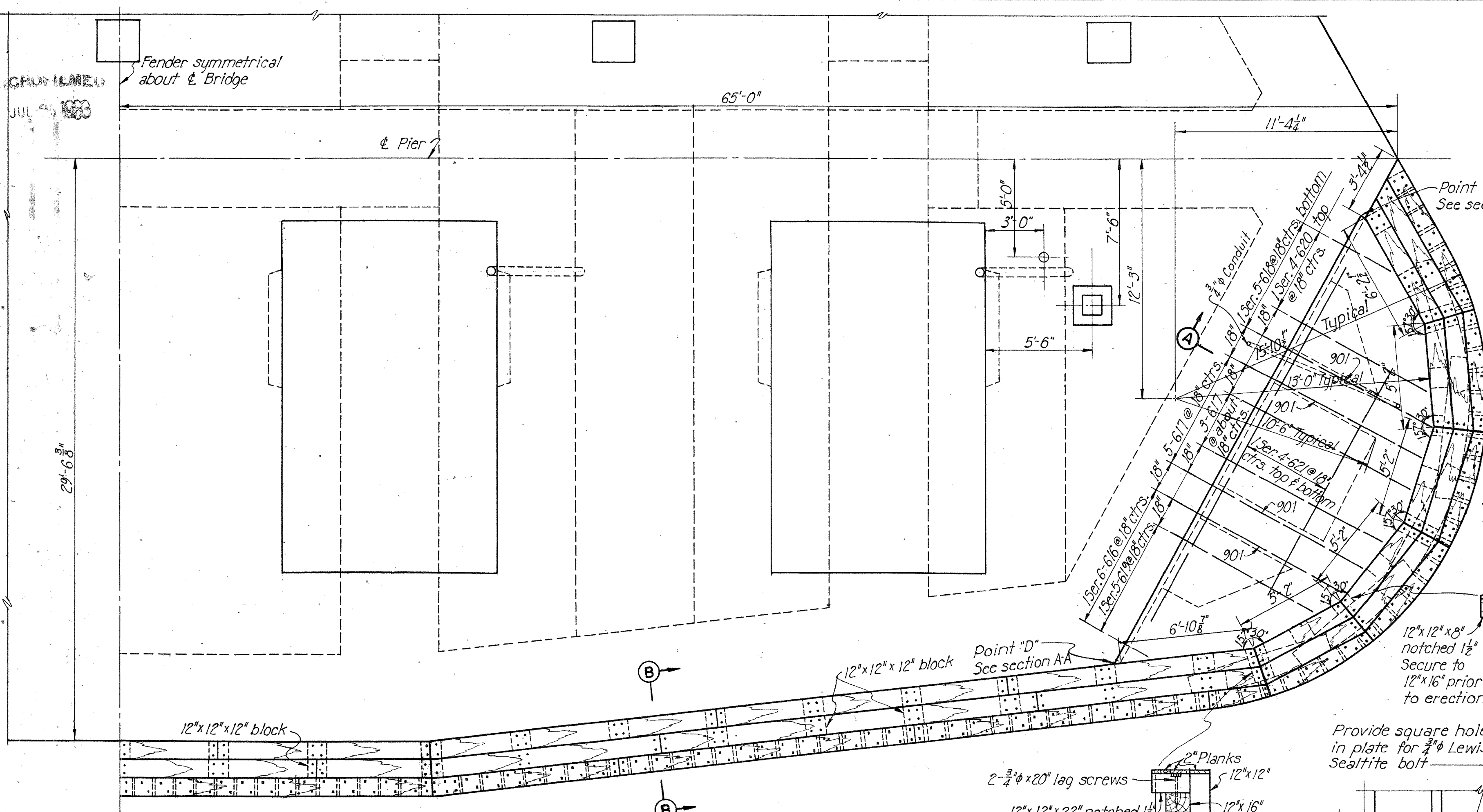
MADE: E.B.J. DATE 9-10-51
TRCD: L.L. DATE 9-29-51
CKD: J.R.B. DATE 9-29-51

HOWARD, NEEDLES, TAMMEN & BERGEN
CONSULTING ENGINEERS
KANSAS CITY NEW YORK

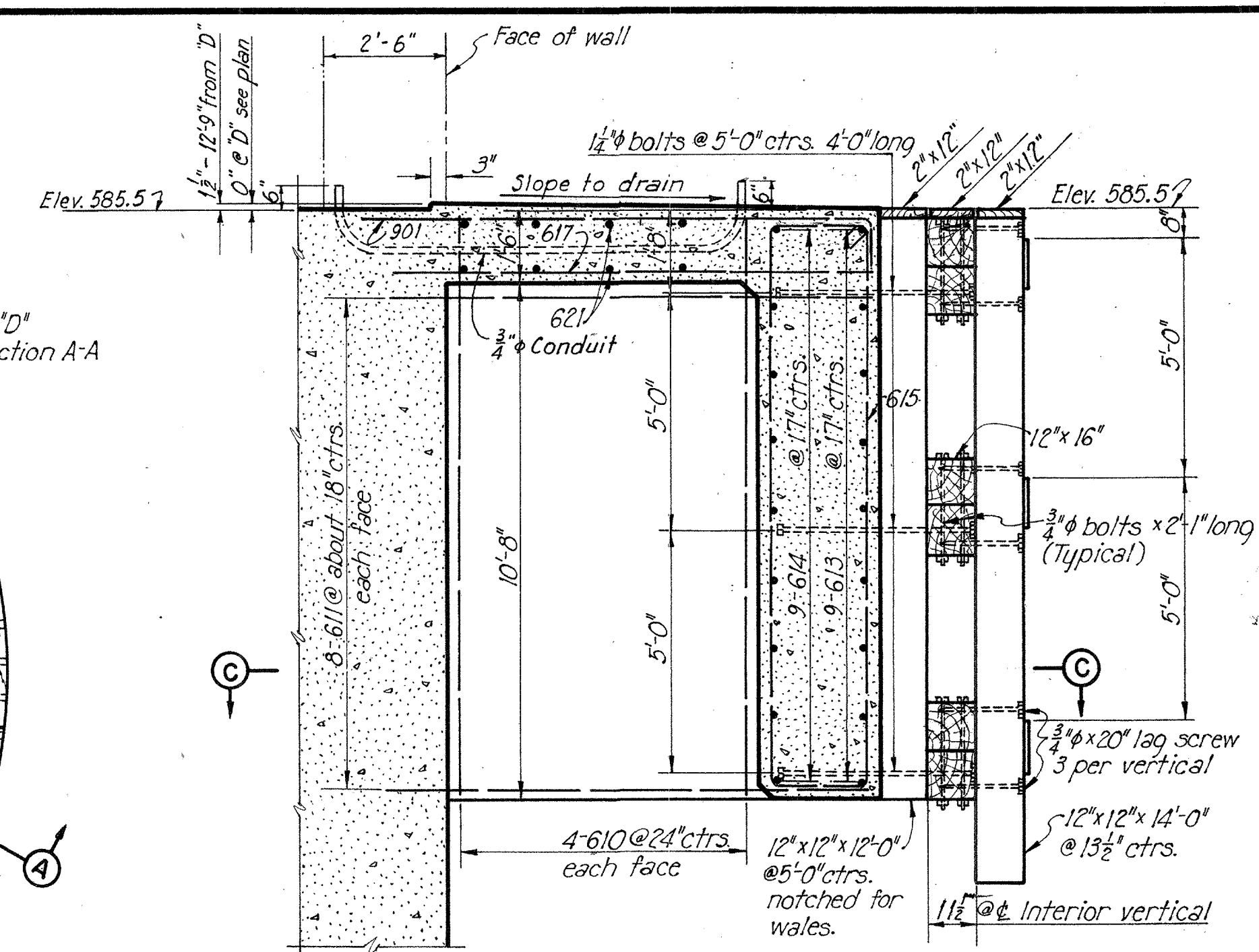
810 SHEET 11

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	TYPE FUNDS	15
2	OHIO	UH-1052 (2)	POST WAR	15

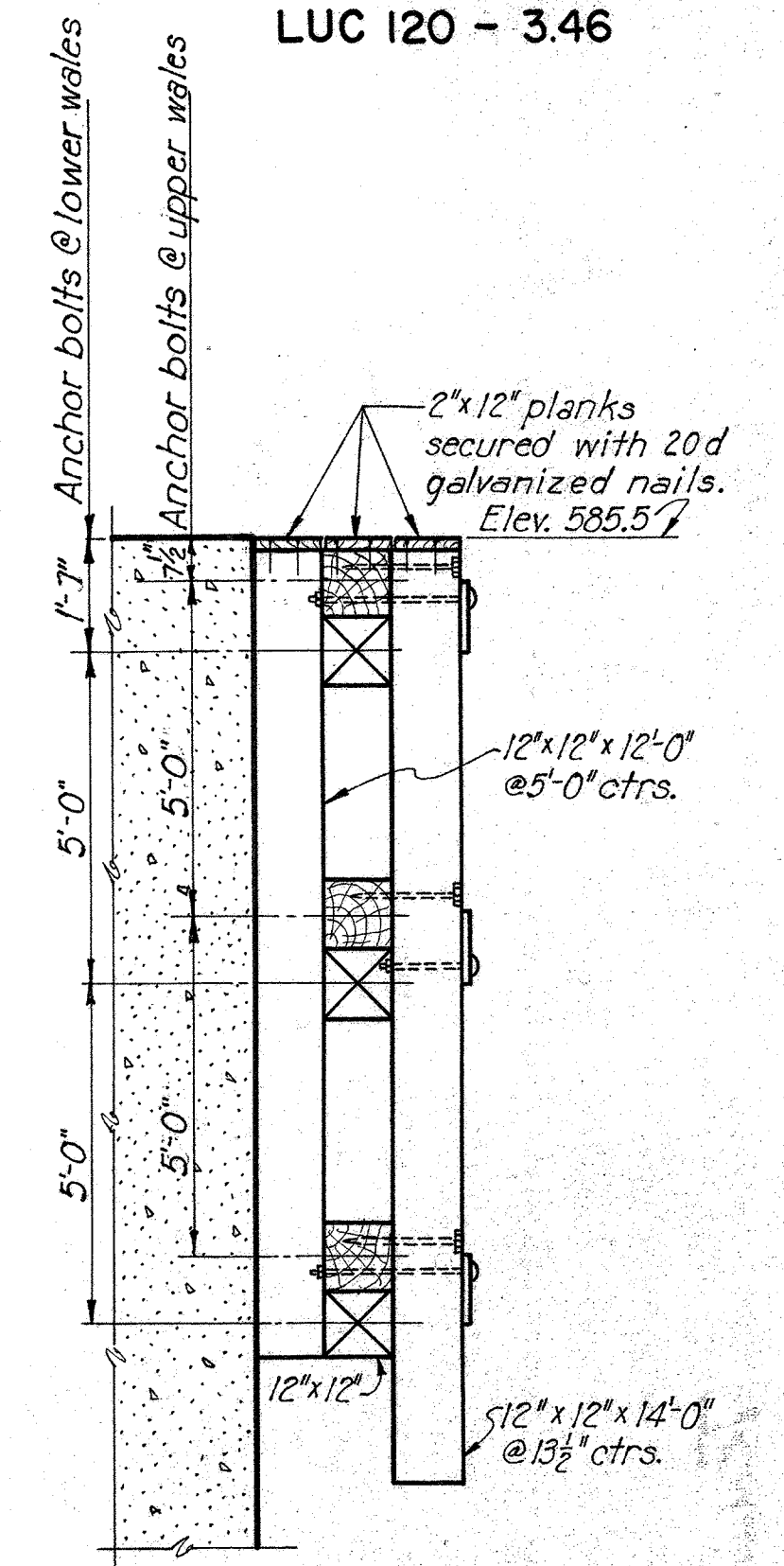
LUCAS COUNTY
CITY OF TOLEDO
TOLEDO EXPRESSWAY SYSTEM
MAUMEE RIVER BRIDGE
LUC 120 - 346



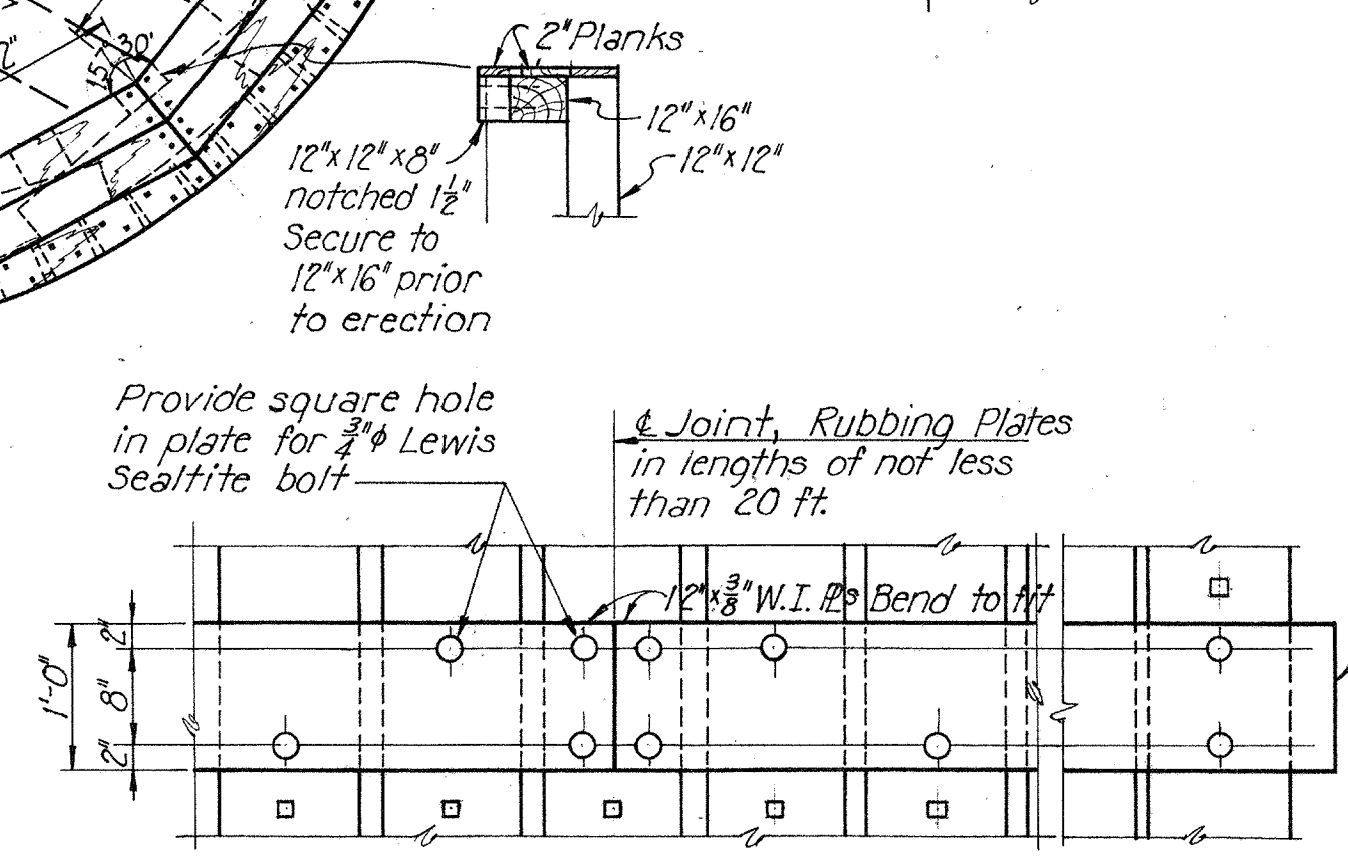
HALF PLAN OF FENDER
Scale: $\frac{1}{4}'' = 1'-0''$



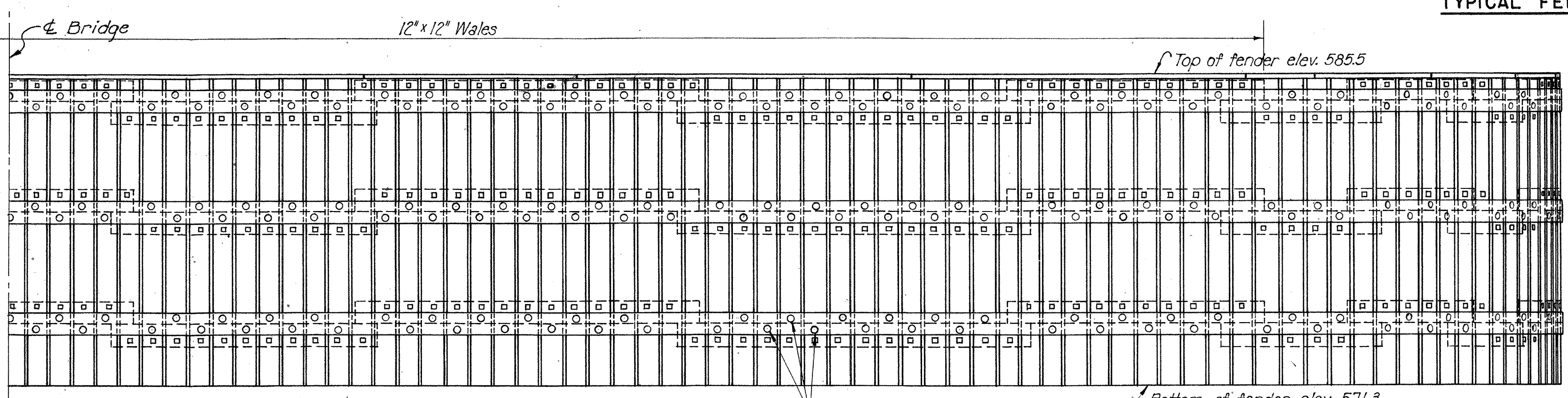
SECTION A-A
Scale: $\frac{3}{8}'' = 1'-0''$



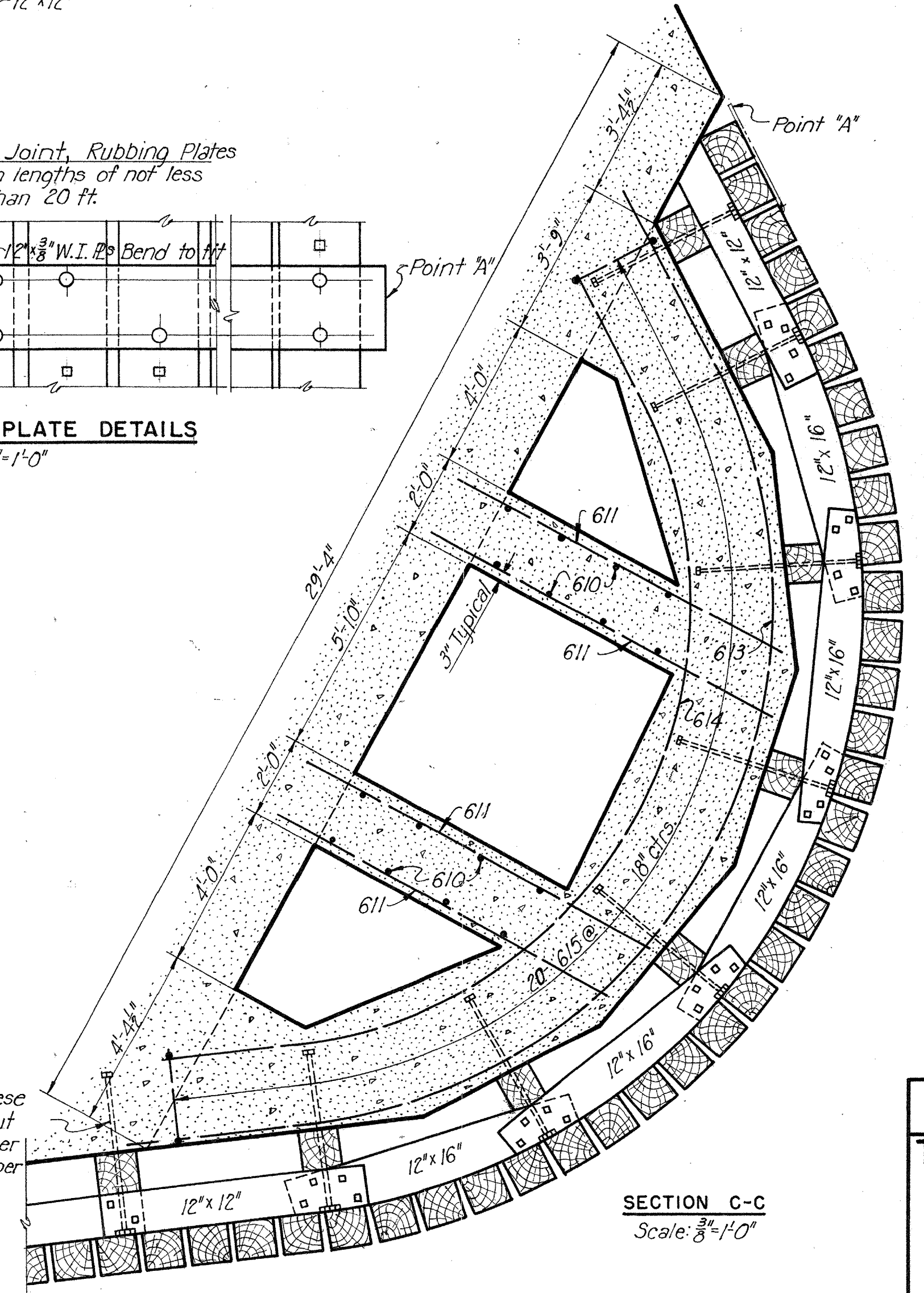
SECTION B-B
Scale: $\frac{3}{8}'' = 1'-0''$



TYPICAL FENDER PLATE DETAILS
Scale: $\frac{3}{8}'' = 1'-0''$



HALF ELEVATION
Scale: $\frac{1}{4}'' = 1'-0''$



SECTION C-C
Scale: $\frac{3}{8}'' = 1'-0''$

$\frac{1}{2}'' \phi \times 4'-0''$ Anchor bolts to be set 2'-1" into pier before concrete is placed.
All timber to be creosoted.
For notes on fenders see sheet 3.
For reinforcement schedule see Sheet 14.
All fender hardware to be galvanized.
Fenders as shown shall be provided on Piers 4 and 5.

Use $\frac{3}{4}'' \phi$ Lewis Sealrite guard rail bolts staggered at each vertical timber. No bolts at interior vertical.

Continue these bolts @ about 5'-0" ctrs. 3 per vertical timber

PART I

STATE OF OHIO
DEPARTMENT OF HIGHWAY
BUREAU OF BRIDGES

TOLEDO EXPRESSWAY SYSTEM
(FRONT STREET TO SUMMIT STREET)
MAUMEE RIVER BRIDGE
BR. NO. LU-120 - 346

FENDERS

TOLEDO, LUCAS COUNTY

SCALE: $\frac{1}{4}'' = 1'-0''$
MADE HAM DATE 8-30-51
TRCD P.L.B. DATE 2-4-51
CKD J.R.B. DATE 9-27-51

HOWARD, NEEDLES, TAMM & BERG
CONSULTING ENGINEERS
KANSAS CITY, MISSOURI

810 SHEET 1