

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	U-071-13	1963	241	246
		F-090-18	1963	88	93

GENERAL STRUCTURAL NOTES

DESIGN SPECIFICATION:

Design is in accordance with AASHTO Standard Specifications for Highway Bridges, 1961 edition.

- For Palama Separation Structure the contractor shall construct falsework at Palama Street to allow two lane, two way vehicular traffic with vertical clearance of 13 ft. minimum and horizontal clearance of 12 ft. minimum for each traffic lane. The contractor shall also construct a covered pedestrian walkway on the west side of Palama Street. The above work involved in providing the lanes and walkway shall be incidental to the item of concrete in Bridge (Structure No. 4C) and will not be paid for separately. Plans for falsework and pedestrian walkway shall be submitted by the contractor and approved by the Engineer. Contractor's attention is directed to the requirements of Section 7 of the Standard Specifications.
- For pay limits of Excavation & backfill Detail, see Sht. No. 279. Typical Excavation & backfill Detail. Also Sht. No. 279.
- For electrical conduits in Bridges see highway lighting plans.

CONCRETE:

- All concrete shall be Class A-1 unless otherwise noted.
- Surfaces to receive lead base plates shall be poured monolithically with supporting structure. Bearing seats shall be finished with a steel trowel to a smooth level surface at the elevations shown on the plans.
- Cover for reinforcing bars shall be as follows unless noted otherwise:
12" for slabs (including rigid frames), stirrups on sides of box girder webs, and walls not exposed to ground.
2" for formed walls exposed to ground.
2 1/2" for main reinforcing of columns and beams.
3" for footings.
- Reinforcing bars shall be detailed in accordance with ACI. "Manual of Standard Practice for Detailing Reinforced Concrete Highway Structures" unless otherwise noted.
- Reinforcing bars shall be lapped 32 bar diameters, except top bars having more than 12" of concrete below which shall be lapped 40 bar diameters, unless shown otherwise.
- Reinforcing bars shall be securely tied at all intersections and splices and shall be held in place during pouring to maintain their proper location as shown on plans.

CAMBER:

Obtain camber by forming and shoring concrete surfaces above profile grades amount shown in camber diagram.

FORM REMOVAL:

Removal of top slab forms of box girders is optional with contractor. Optional closure slab and diaphragm details shall apply if forms are removed.

PROTECTION OF PROPERTY:

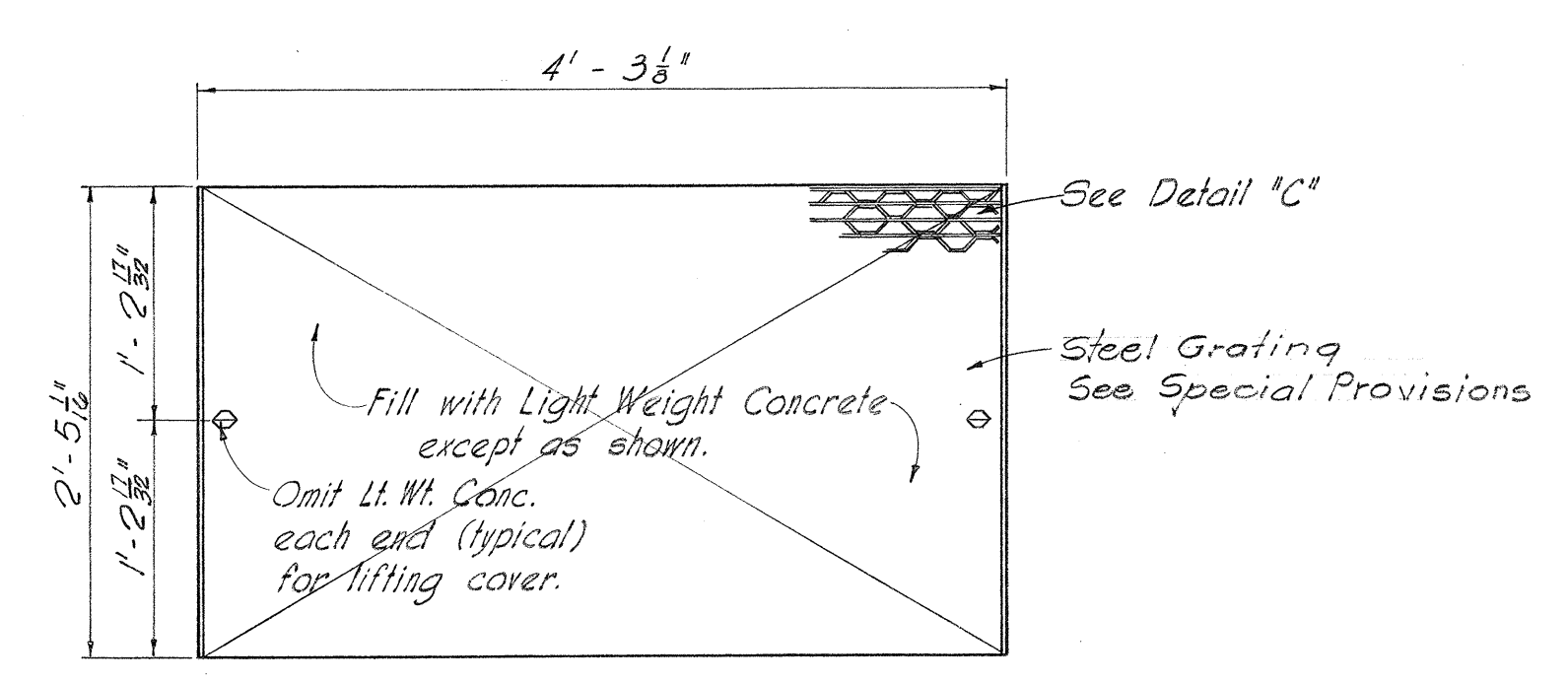
The contractor shall be solely responsible for the protection of adjacent property and structures from damage due to construction and shall repair any damage at his own expense. He shall conduct his work in such a manner and provide such temporary shoring or other measures as may be necessary to insure the safety of adjacent property.

METHOD OF DRIVING PILE:

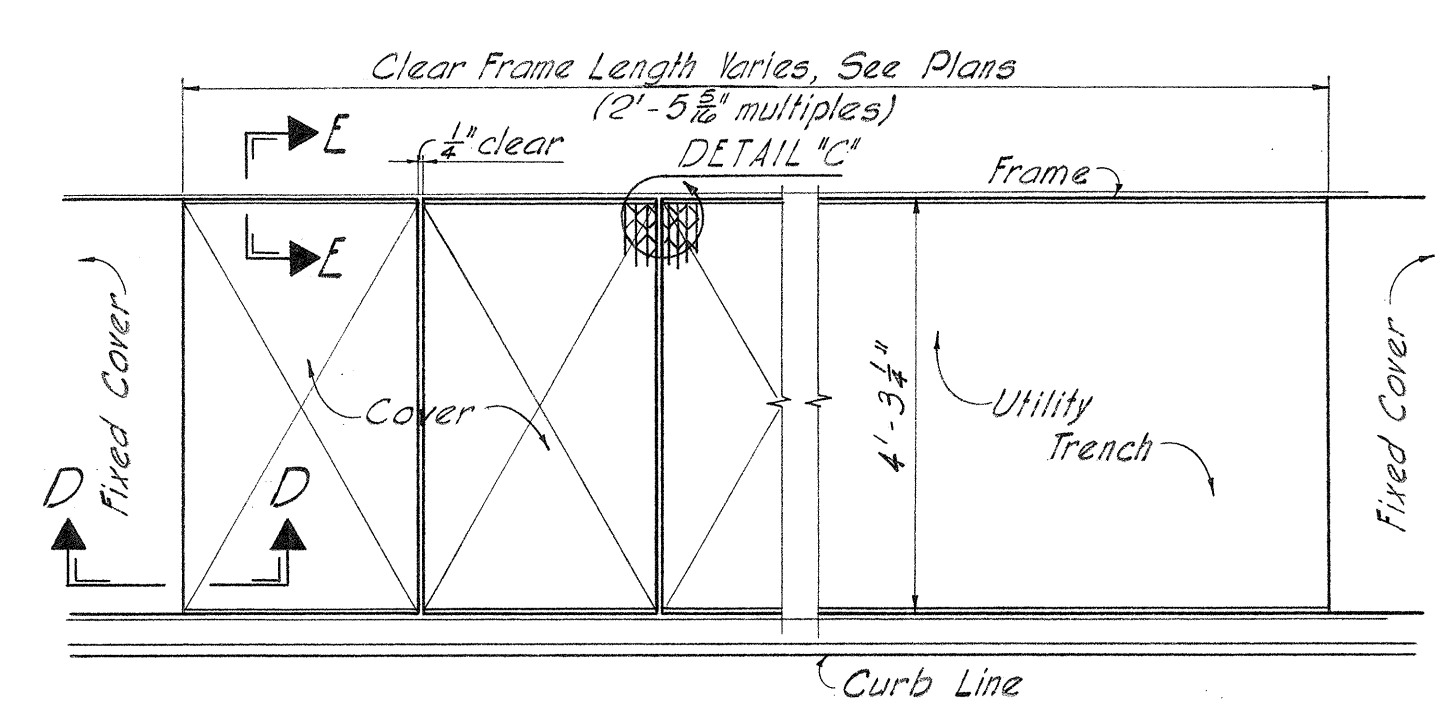
Piles may be driven, subject to the provisions in the Standard Specifications, with a diesel hammer.

CONSTRUCTION METHODS:

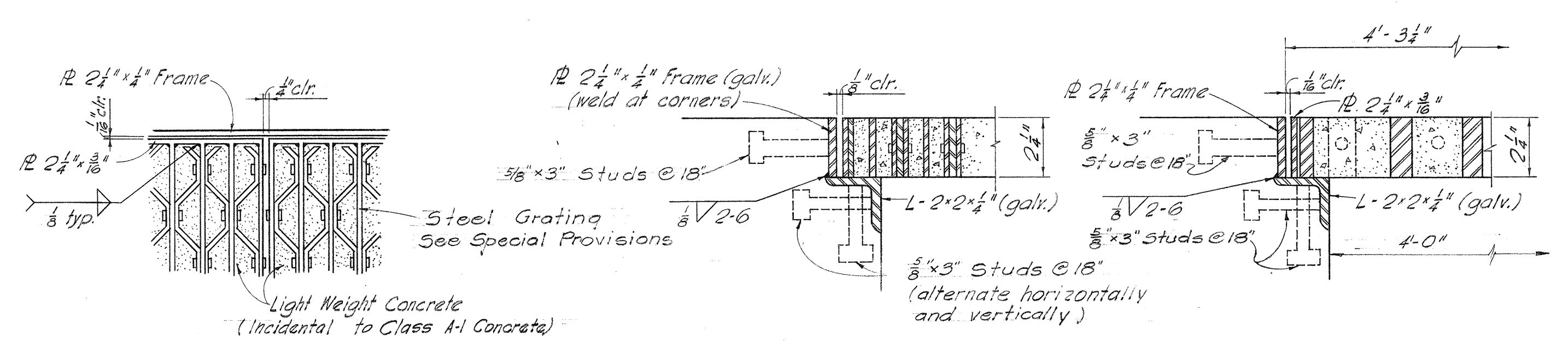
- Backfill behind abutments of box girder structures shall be completely placed and compacted prior to construction of superstructure.
- No backfill shall be placed behind abutments of rigid frame structures until concrete in superstructure has reached a strength of 3000 psi. The backfill must then be placed uniformly and simultaneously at each abutment of a rigid frame structure to avoid unequal lateral earth pressure. Sides of footings shall be excavated and poured to neat lines when called for on the plans; for excavation of bottom of footings, see Standard Specifications. Over excavation beyond neat lines for sides of footings and the elevations indicated on the plans for the bottom of footings shall be backfilled with a minimum of Class D concrete at the Contractor's expense and as directed by the Engineer.
- Forms: Forms for all exposed surfaces of separation structures including retaining walls (except round columns) shall be plywood. Forms for round columns shall be made of material that results in a smooth finish and true dimensions as shown in the plans.
- Finish: See Standard Specifications.
- All voids under a footing over or adjacent to another ftg. shall be backfill with Class D-1 Concrete at least to the edges of footing where excavation extends beyond footing outline. Class D-1 fill Concrete shall be considered incidental to and covered by the applicable unit price for "Structure Excavation at Bridges."



COVER PLAN
1" = 1'-0"



TRENCH PLAN
1/2" = 1'-0"

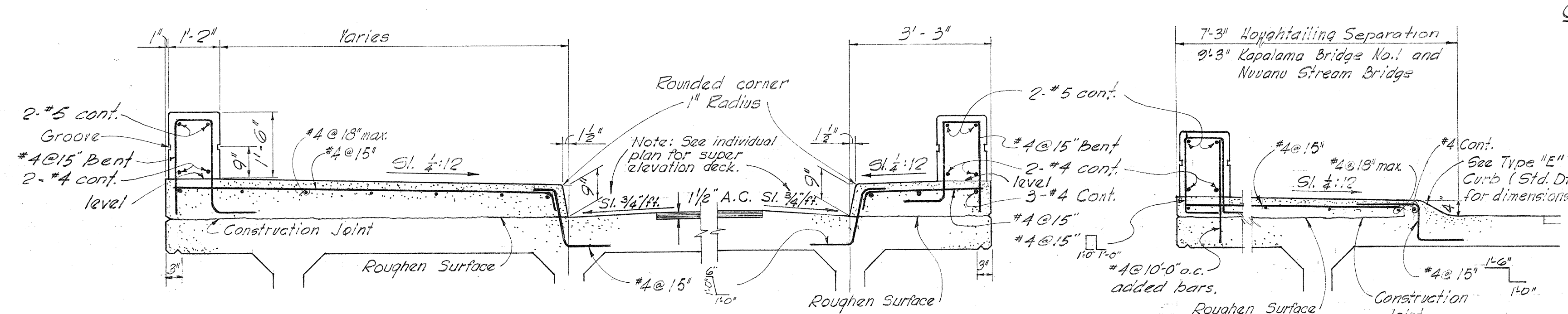


DETAIL C
3" = 1'-0"

SECTION D-D
3" = 1'-0"

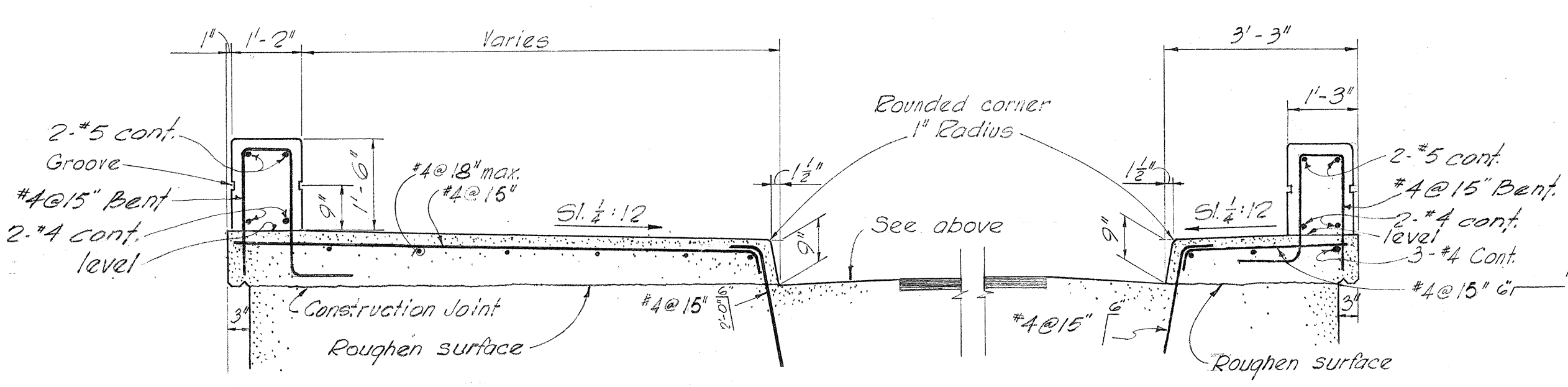
SECTION E-E
3" = 1'-0"

REMOVABLE TRENCH COVER DETAILS

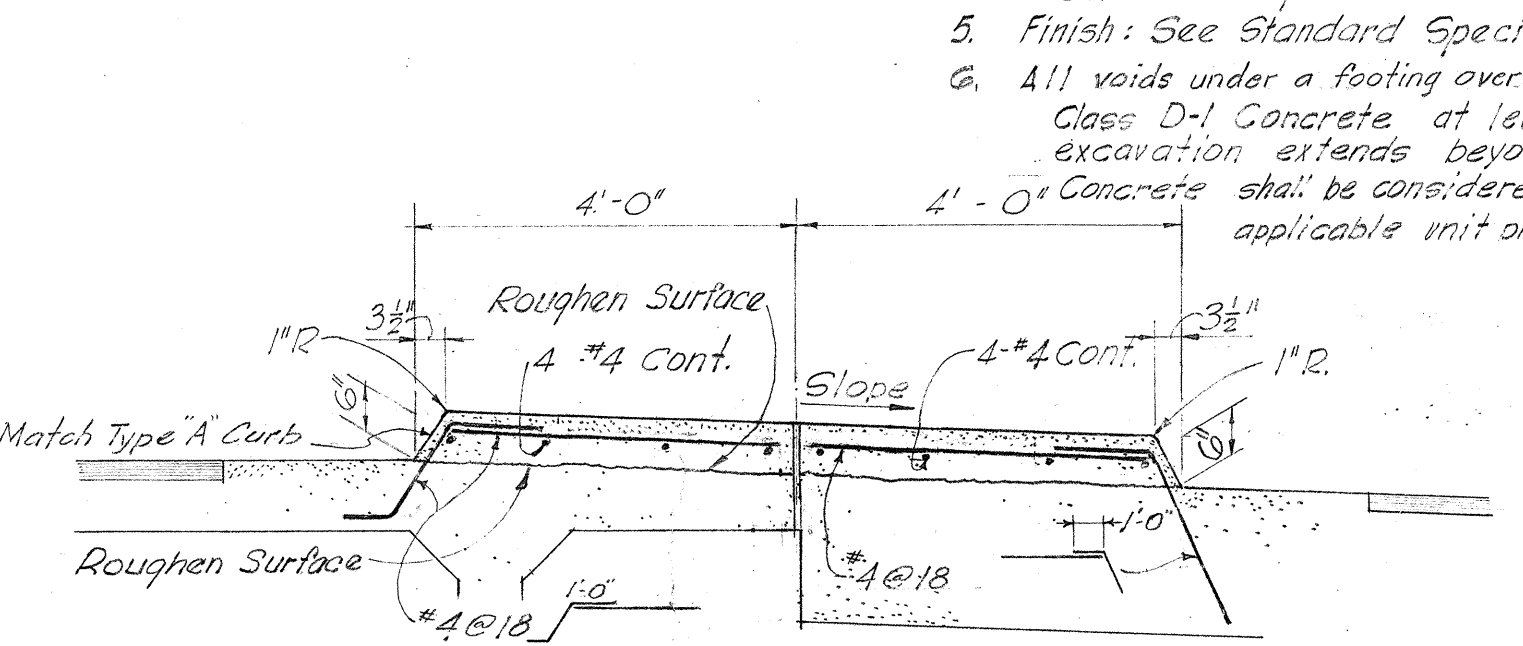


BOX GIRDER AND PRESTRESSED GIRDER

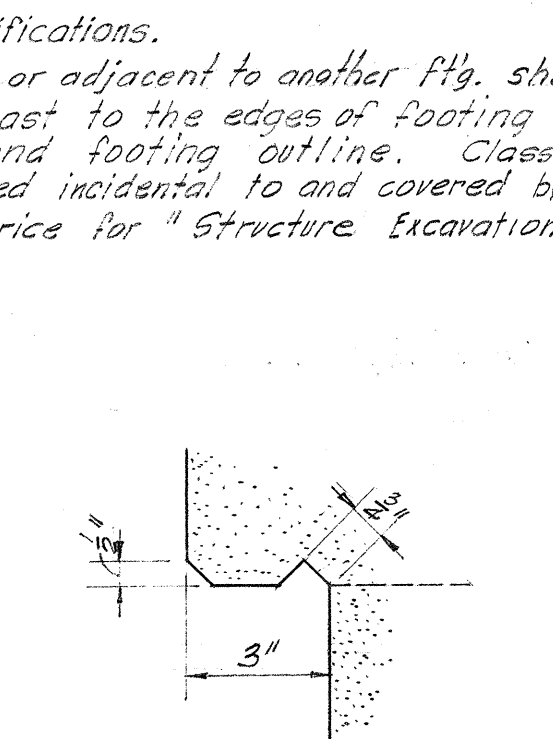
TYP. SHOULDER DETAIL



RIGID FRAME



BOX GIRDER AND PRESTRESSED GIRDER



TYPICAL MEDIAN DETAIL

TYPICAL DRIP DETAIL

TYPICAL SIDEWALK AND CURB DETAILS



MOFFATT, NICHOL & TAYLOR
Associated with
BELT, COLLINS & ASSOC., LTD.
Civil and Structural Engineers

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY
STATE OF HAWAII

TYPICAL DETAILS AND
GENERAL STRUCTURAL NOTES

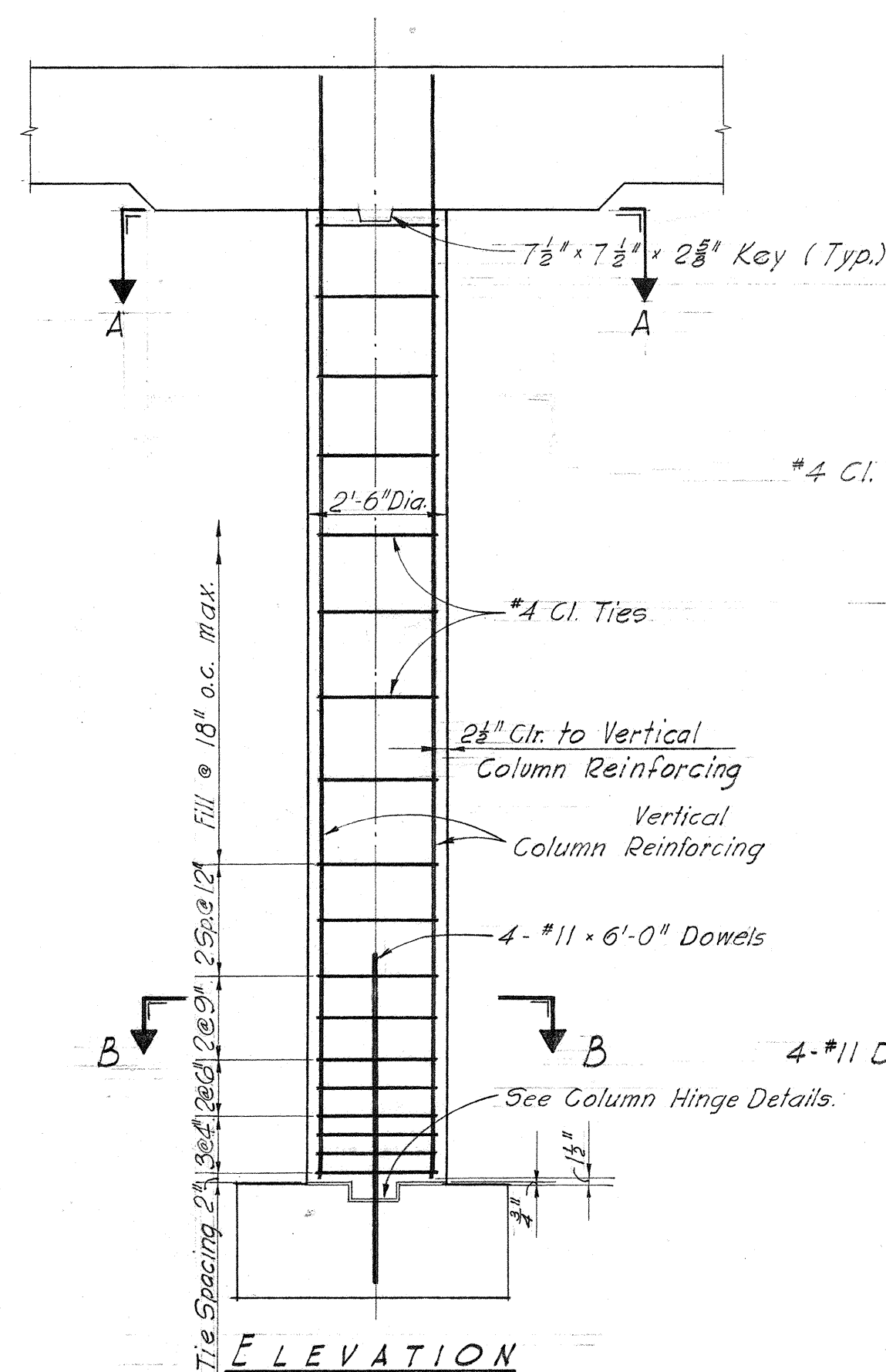
LUNALILO FREEWAY
LILIHA STREET

U-072-1 (3)
F-090-1 (2)

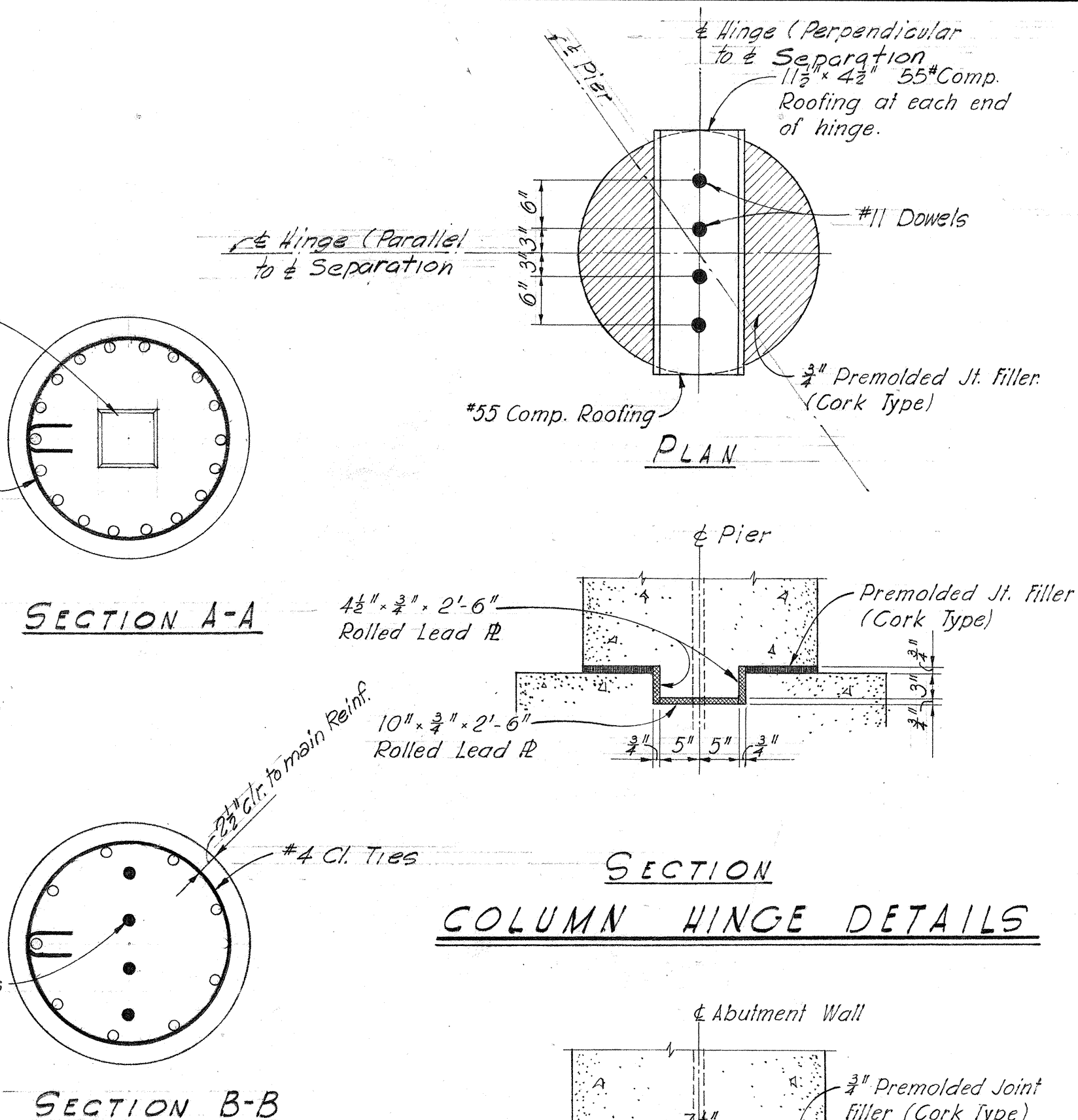
SHEET No. 1 OF 1 SHEETS

009010200.88 007210300.241 278

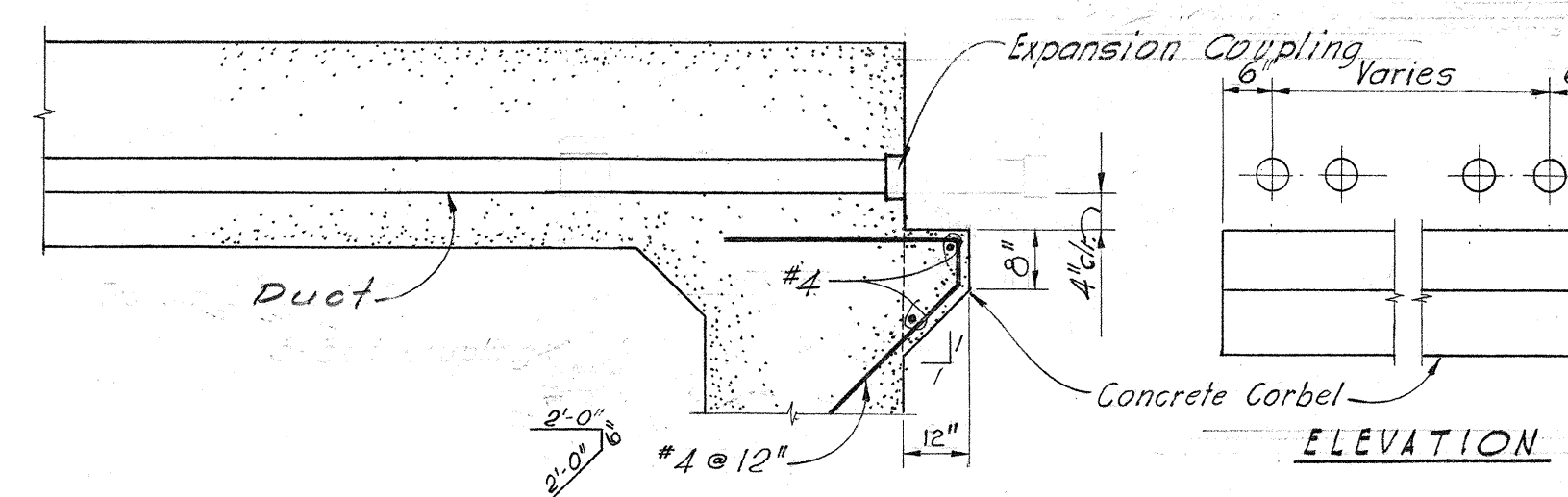
FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOT SHE
HAWAII	HAW.	U-072-1(3)	1963	242	24
		F-090-1(3)	1963	89	9



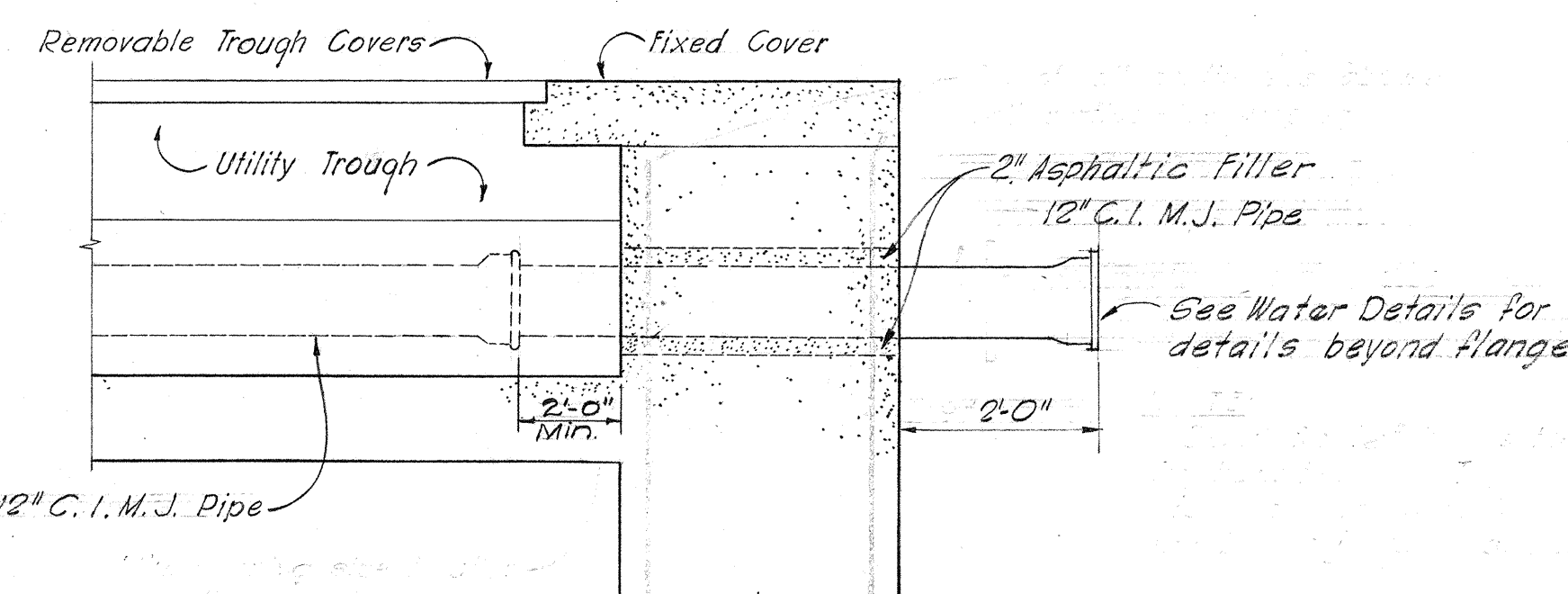
TYPICAL COLUMN DETAILS



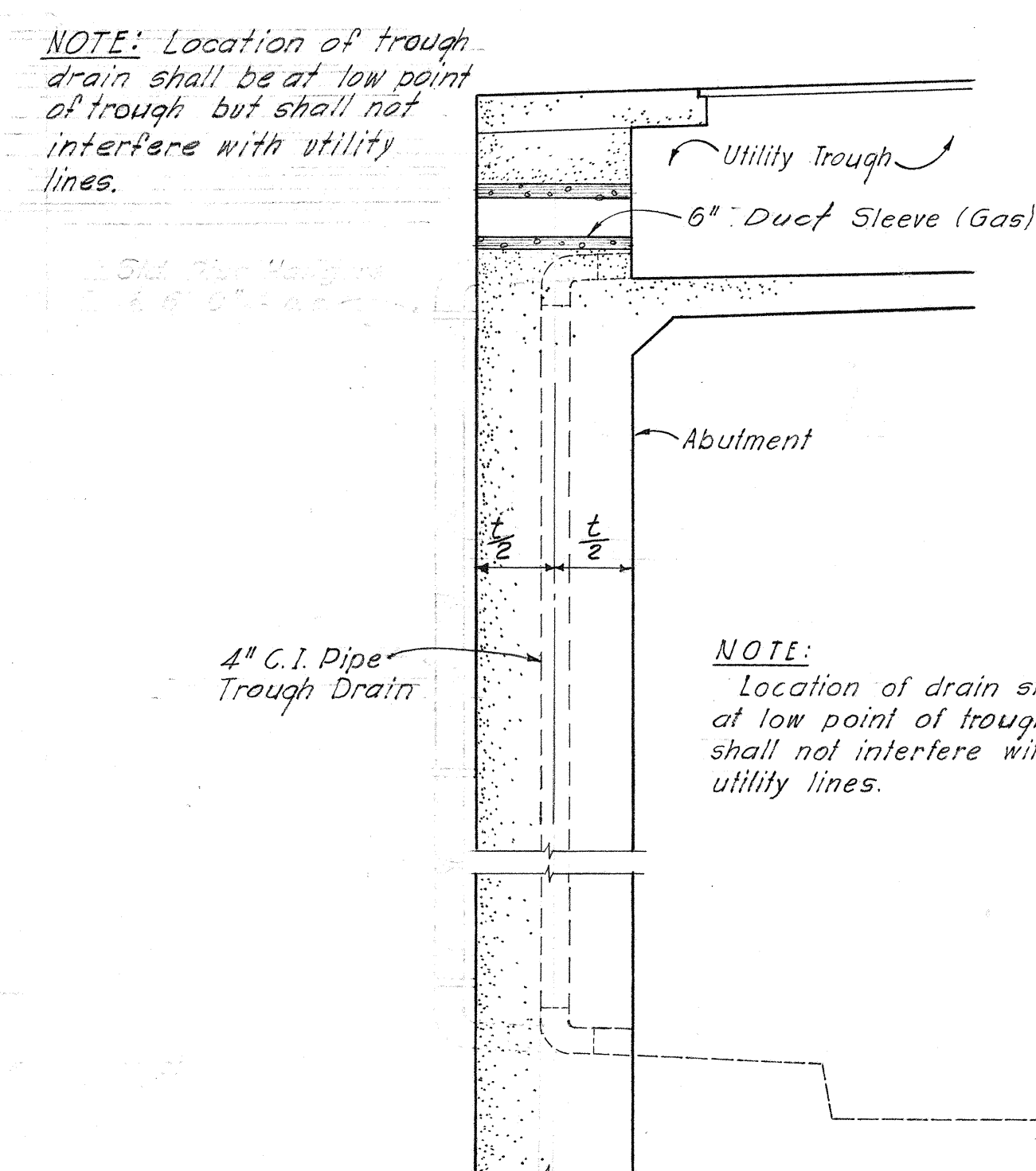
ABUTMENT WALL HINGE DETAIL



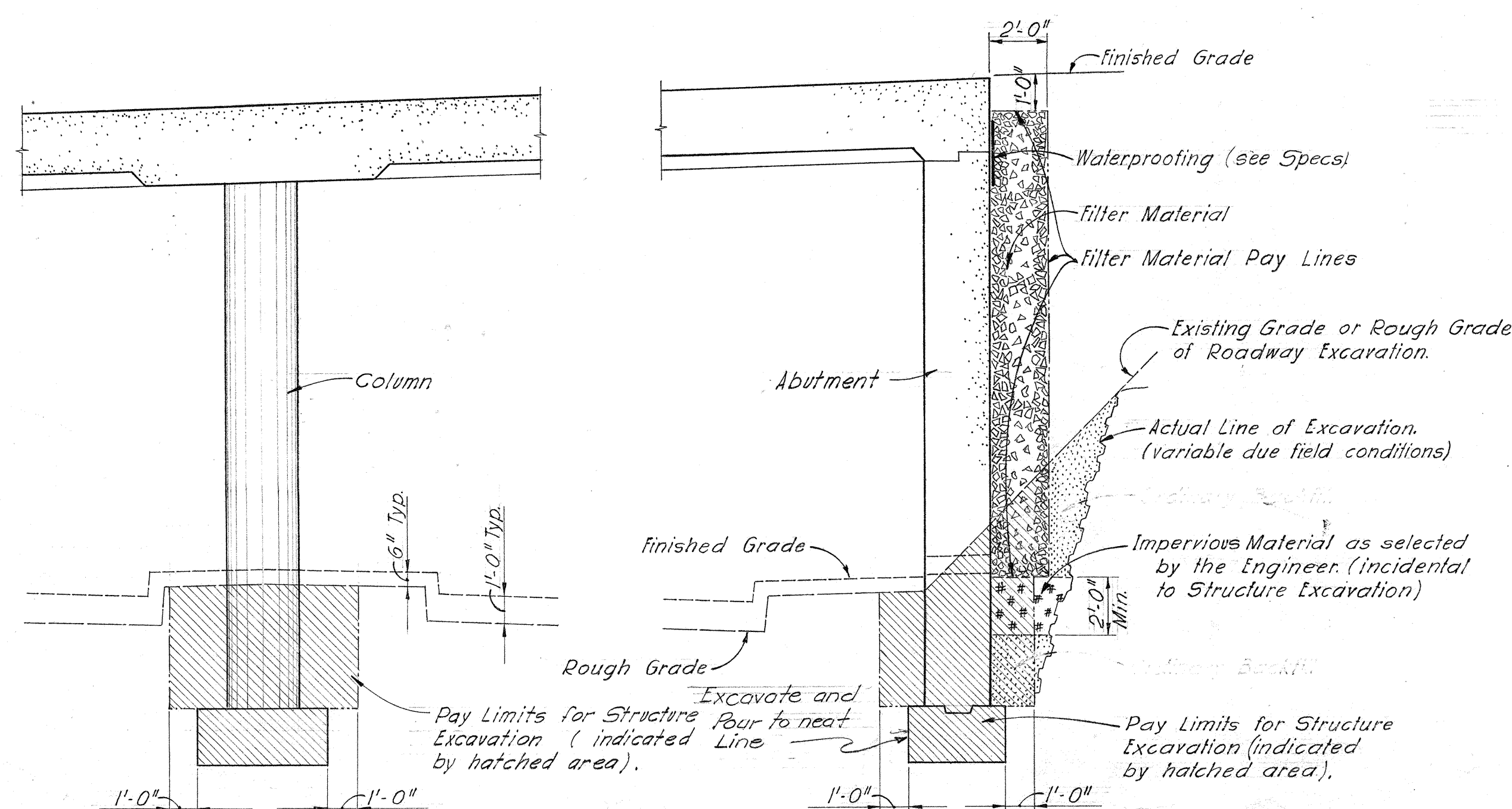
TYPICAL "DUCT" DETAIL



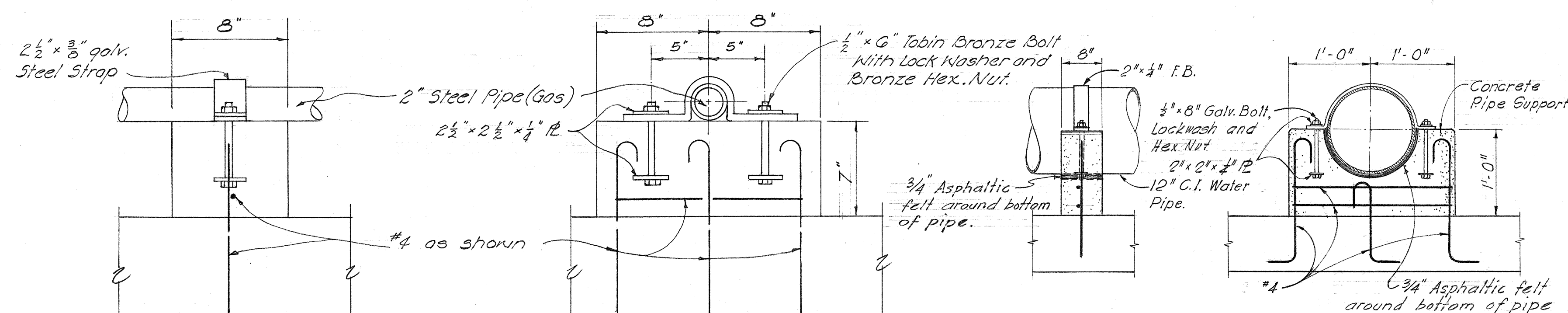
TYPICAL WATER LINE DETAIL



TROUGH DRAIN AND SLEEVE DETAIL



EXCAVATION AND BACKFILL DETAILS



PIPE SUPPORT DETAIL FOR WATER

NOTE:
All exposed metal surface shall be given one coat of red oxide paint and final coat of rust preventive (Metal Gray) approved by the Engineer. Max. spacing of concrete pipe support shall be 8'-0". Support shall be spaced as to keep a distance of approximately 4'-0" from pipe joints.

APPROVED:	
<i>James H. Eng</i>	<i>4/5/63</i>
PRINCIPAL, ELEC. ENGR., H.E. Co., LTD.	DATE
<i>Frank J. Kow</i>	<i>4/14/63</i>
PRINCIPAL, DIST. ENGR., H.E. Co., LTD.	DATE
APPROVED:	
<i>Howard D. Gale</i>	<i>3-22-63</i>
PLANNING ENGR., HON. GAS CO.	DATE
<i>Wm. C. Day</i>	<i>3/20/63</i>
CAHU DISTRIBUTING MGR., HON. GAS CO.	DATE

Approved: W. J. Grunche Date 4/1/63
Asst. Chief Engineer, BWS.



MOFFATT, NICHOL & TAYLOR
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BELT, COLLINS & ASSOC., LTD
Civil and Structural Engineers

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

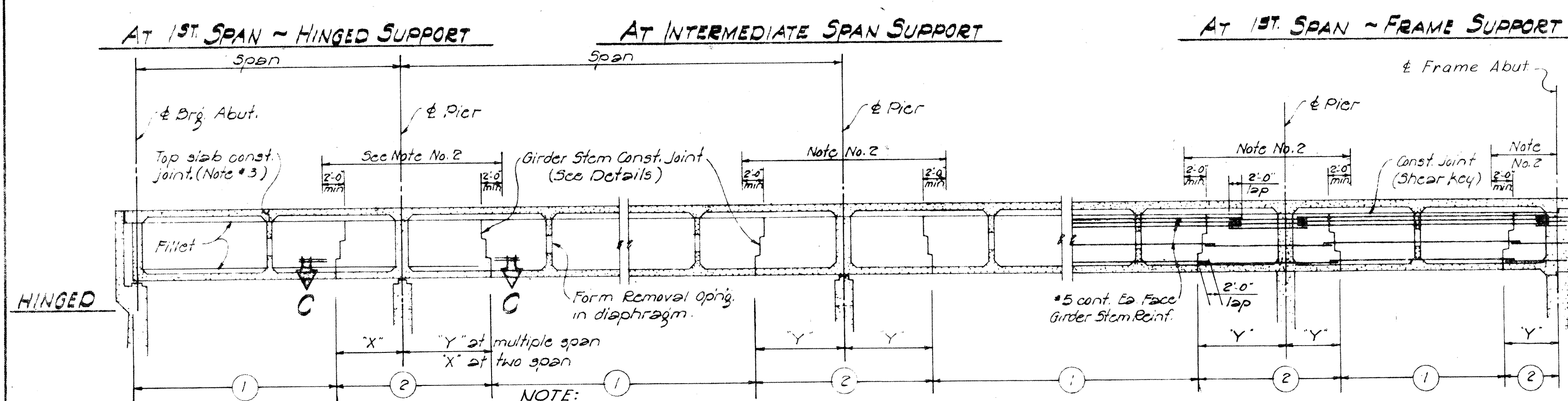
TYPICAL RIGID FRAME DETAILS

LUNALILO FREEWAY LU - 072 - 1 (3)

LILIHA STREET LF - 090 - 1 (2)

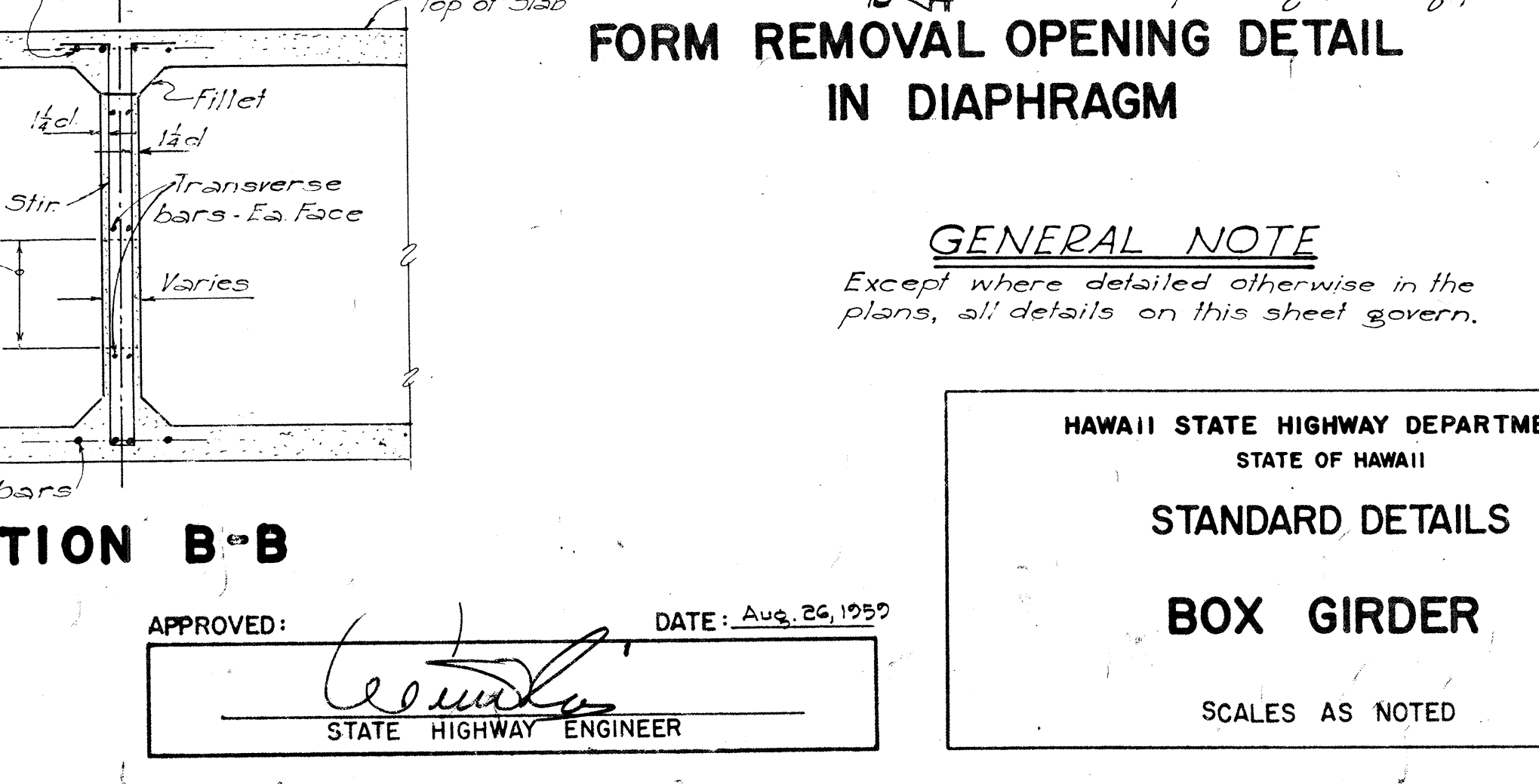
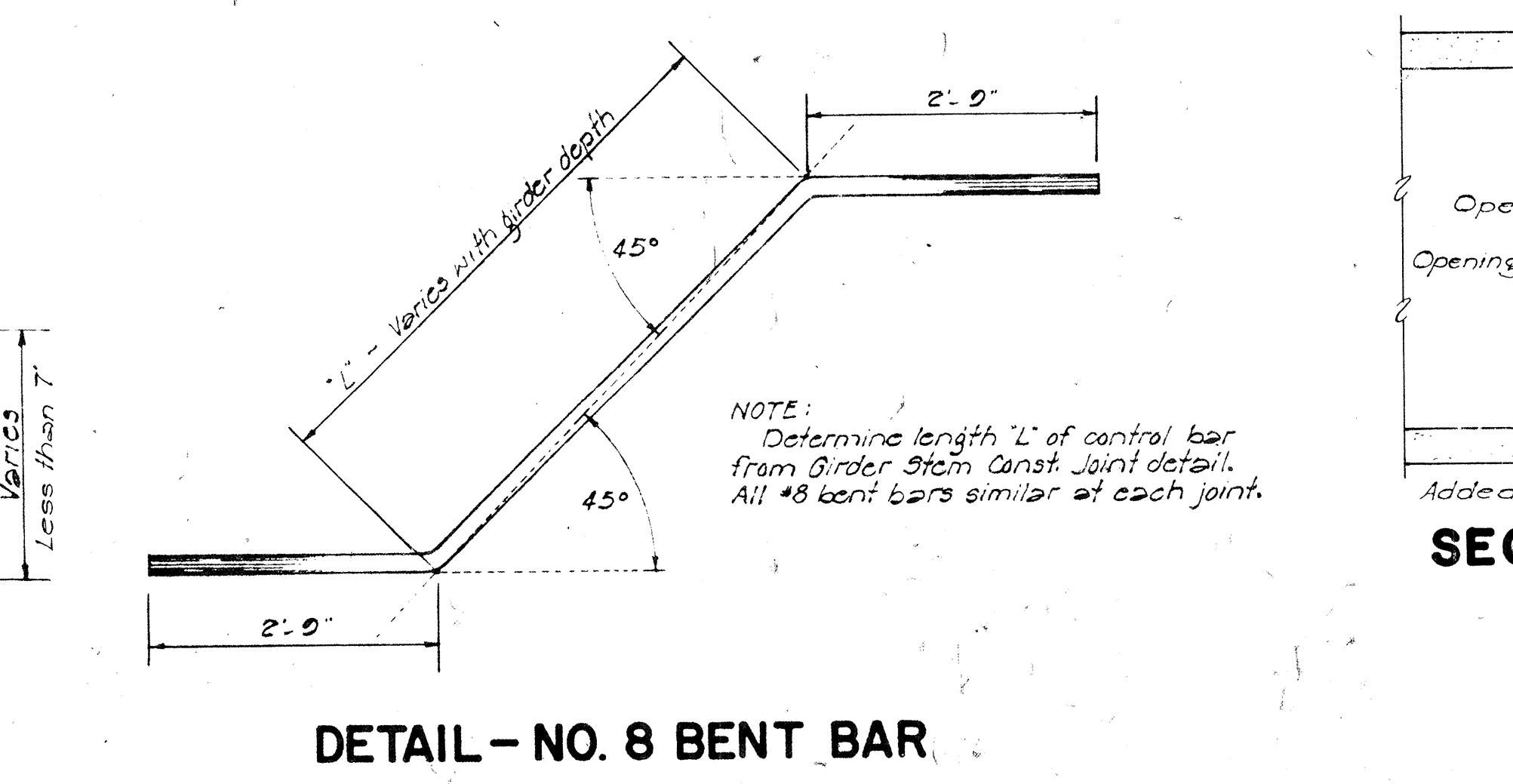
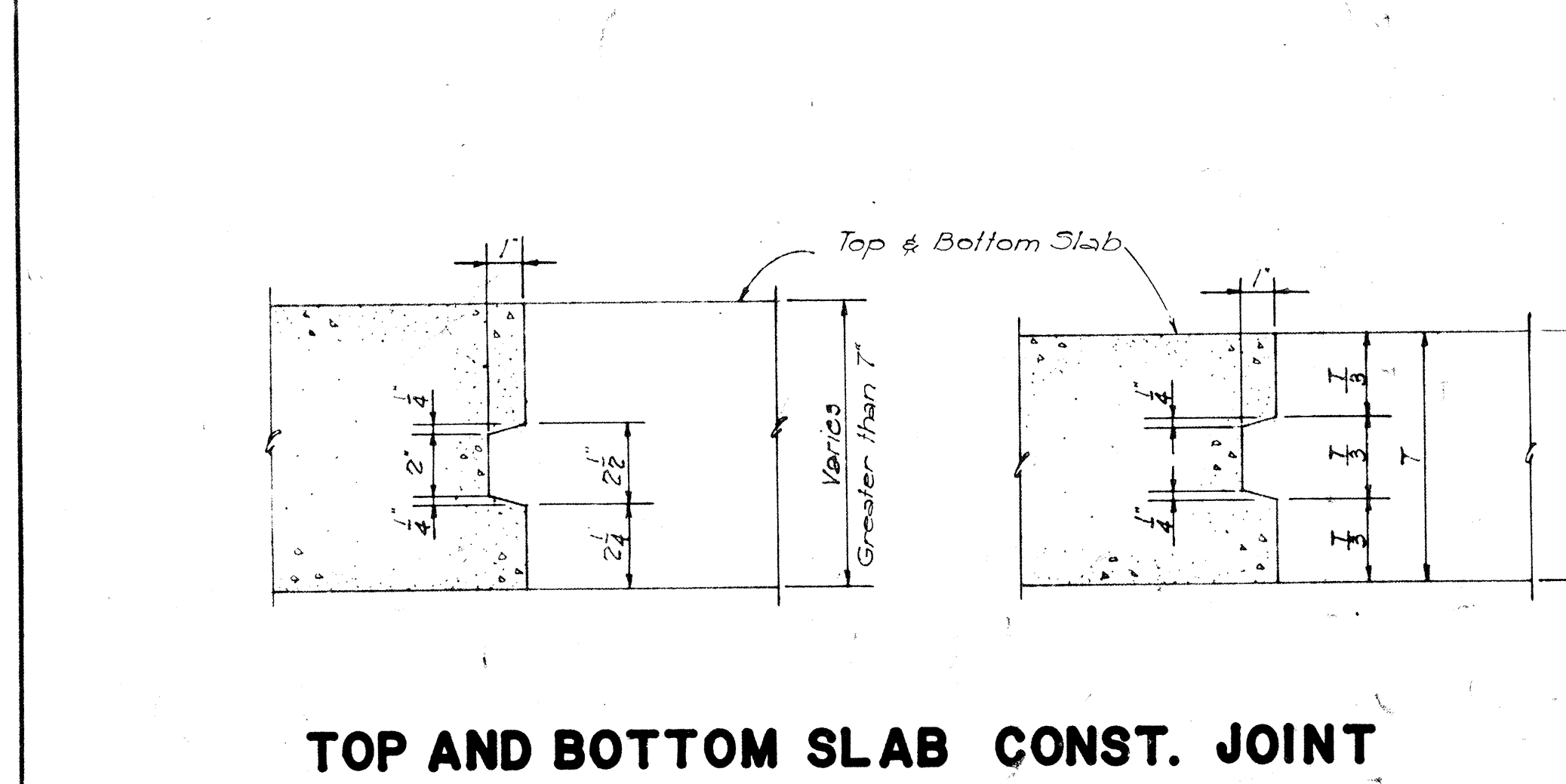
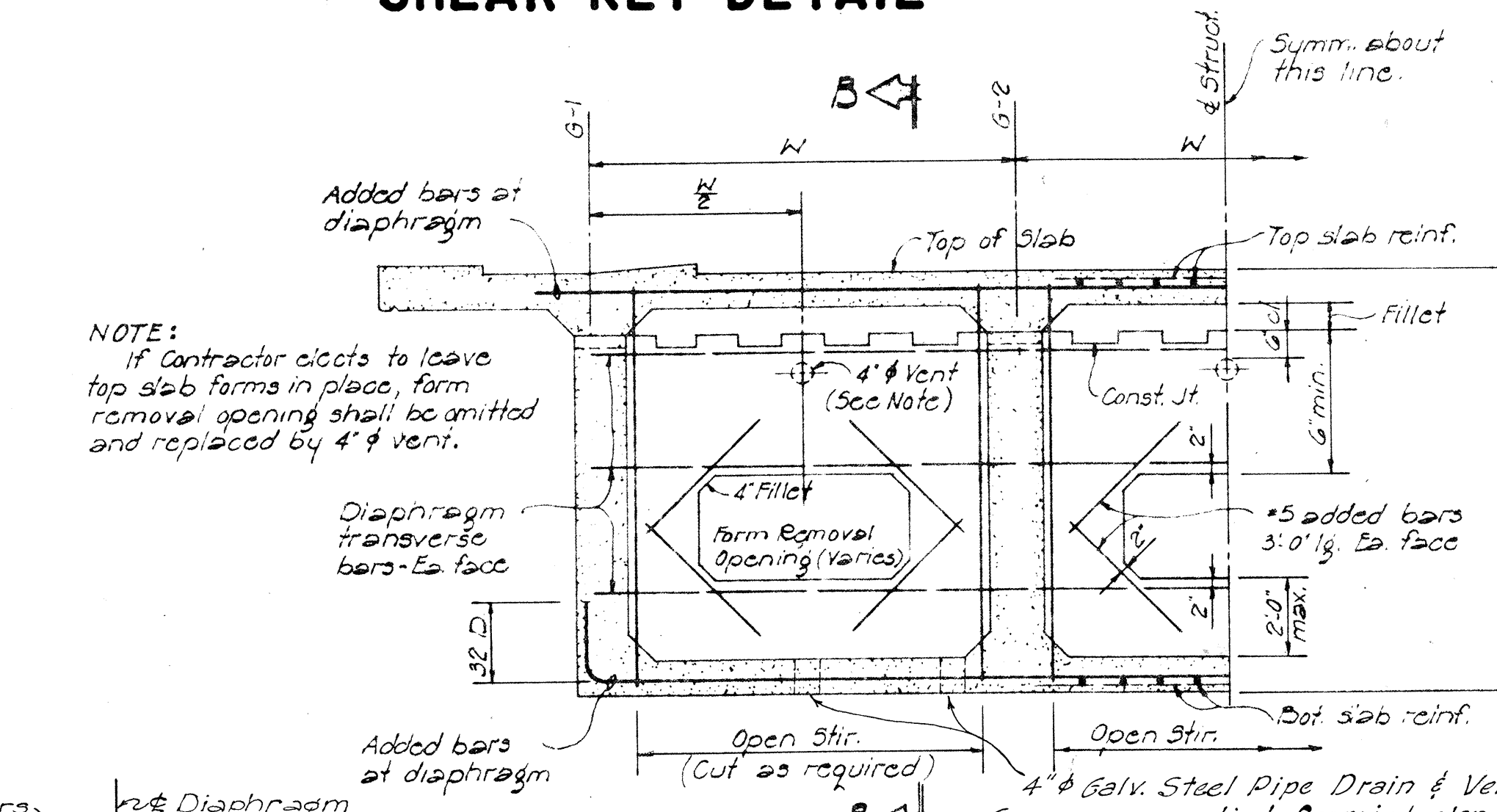
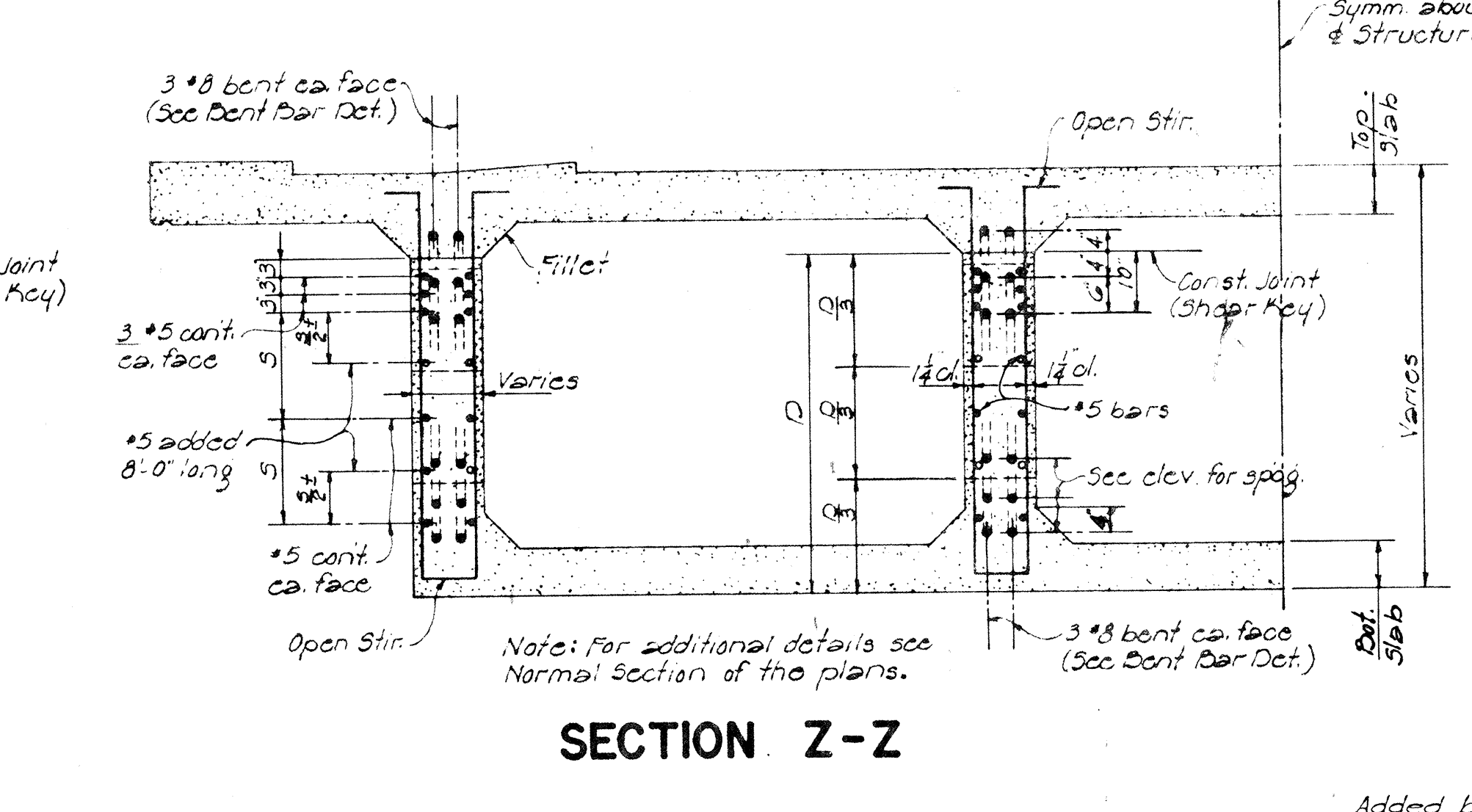
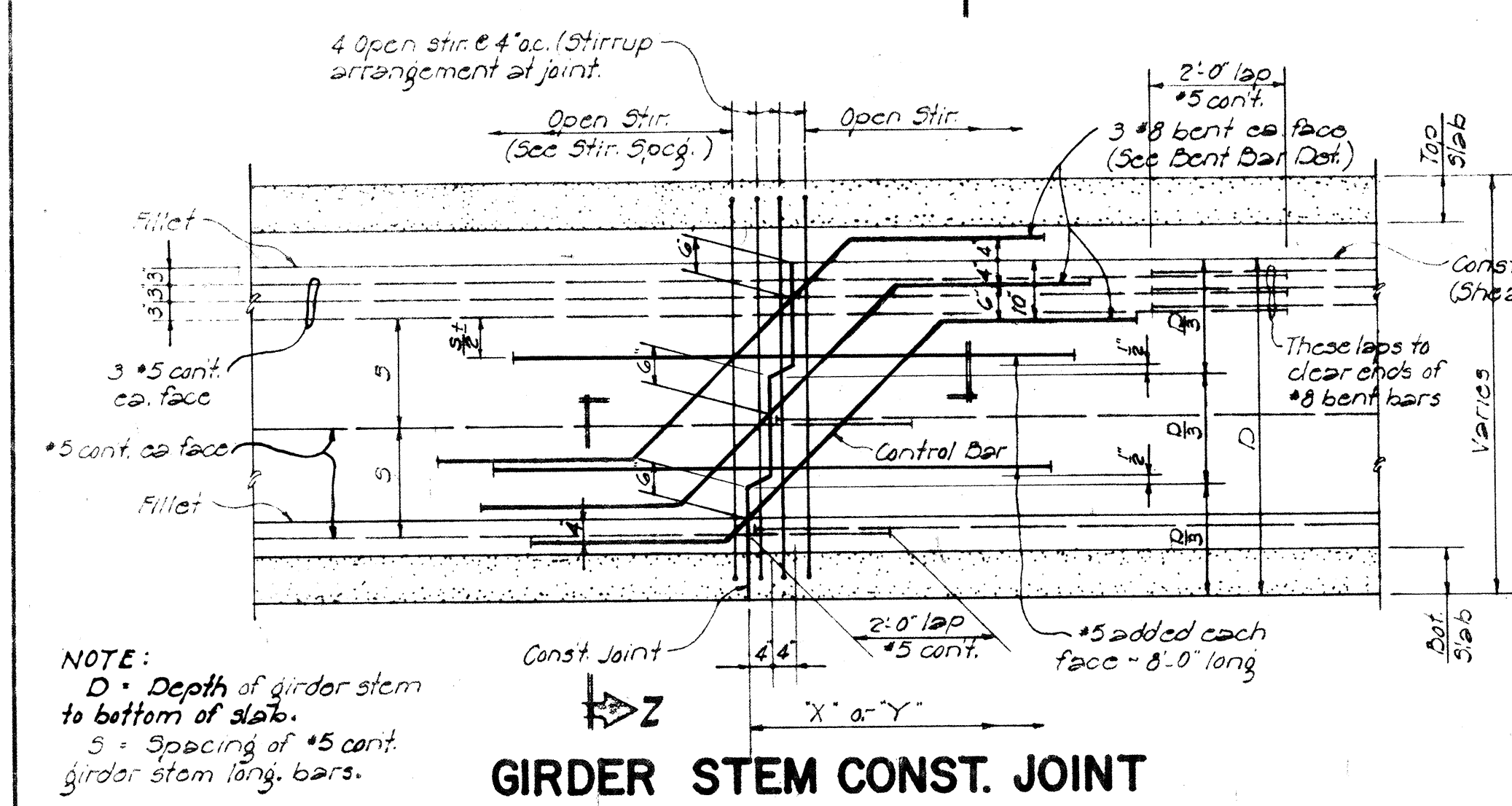
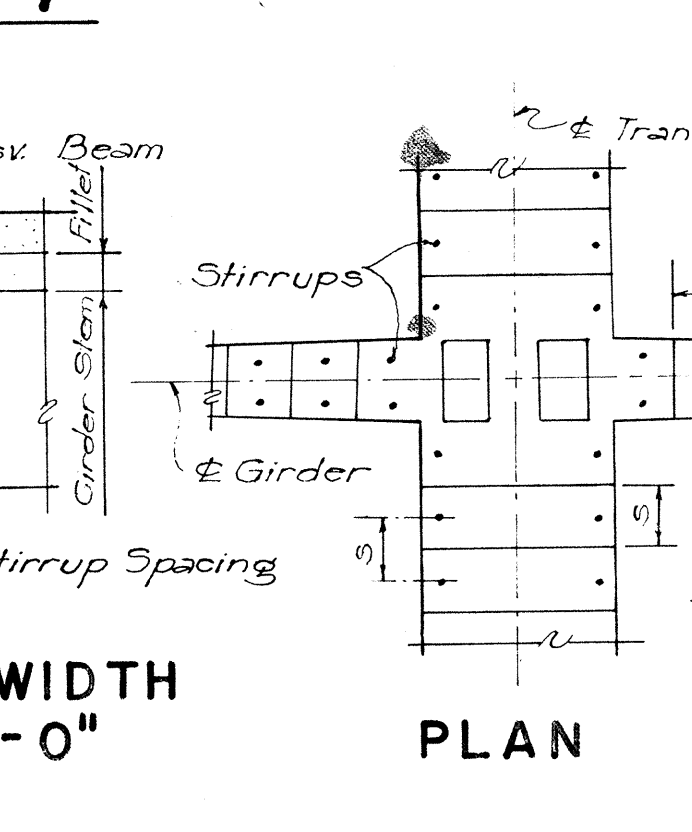
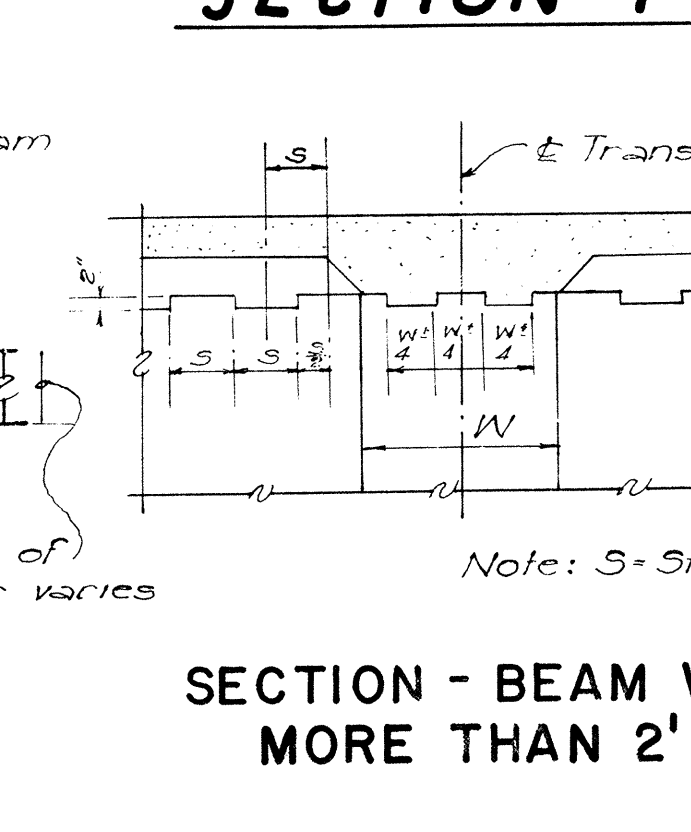
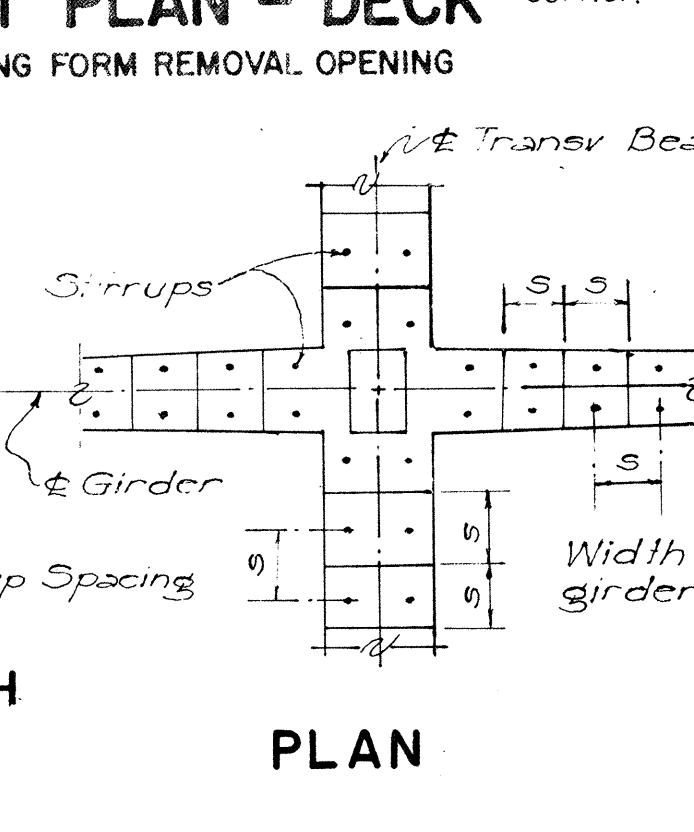
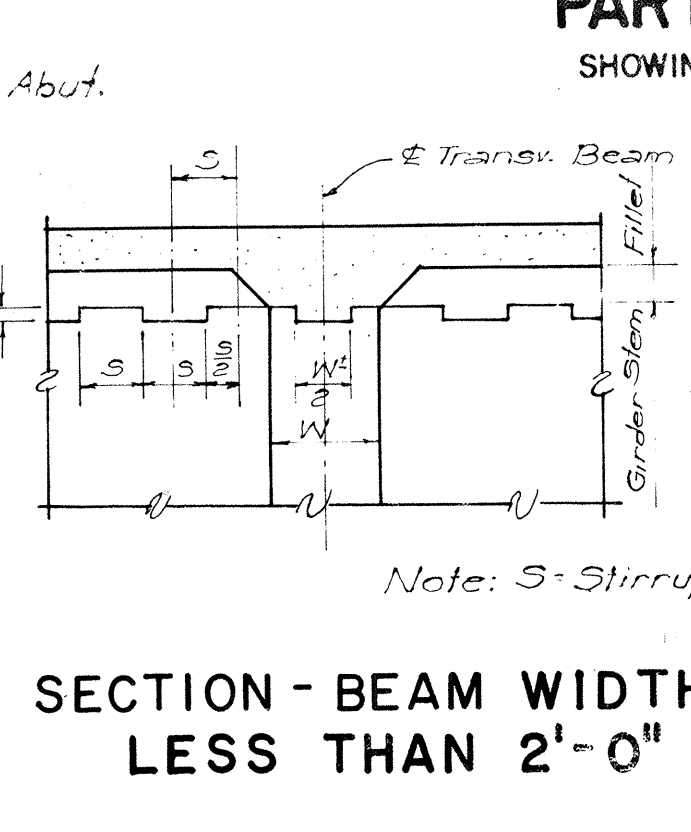
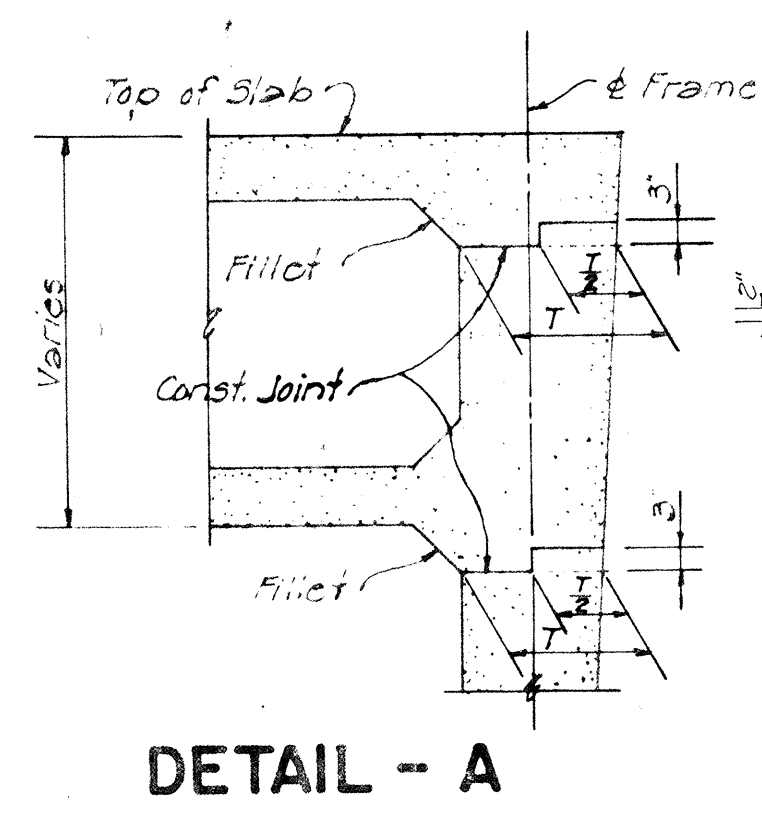
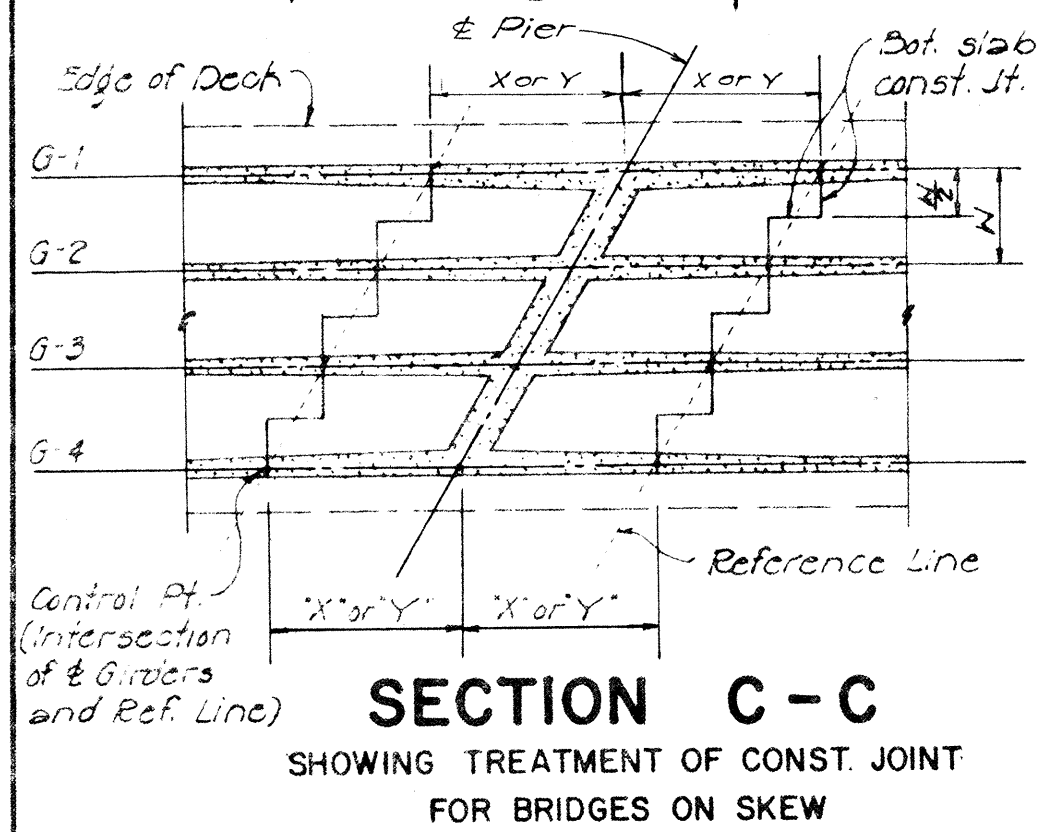
SHEET No. 1 OF 1 SHEETS

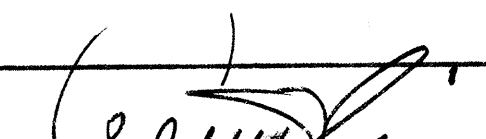
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	U-072-1(3)	1963	243	246
		U-072-1(4)	1963	85	May 59
		F-070-1(2)	1963	90	MAY 62
					NOV. 62



NOTE:
 No. 1 - Numbers (1) & (2) indicate sequence of placing bottom slab & girder stem concrete. (2) may be placed simultaneously with (1) when approved by the Engr., and provided that the (1) sections are placed in adjoining spans. For any deviation from the above the contractor shall submit a diagram to the Engineer for approval.
 No. 2 - No top slab construction joint or form removal opening shall be located in the region over the piers as noted.
 No. 3 - When top slab forms are not removed, const. joint in top slab shall be located over an intermediate diaphragm.
 No. 4 - Dimension "X" = 1/4 span "Y" = 1/5 span
 No. 5 - No lapping of main girder bars shall be permitted at construction joints.

PLACING DIAGRAM FOR SUPERSTRUCTURE CONCRETE



APPROVED:  DATE: Aug. 26, 1959
 STATE HIGHWAY ENGINEER

GENERAL NOTE
 Except where detailed otherwise in the plans, all details on this sheet govern.

HAWAII STATE HIGHWAY DEPARTMENT
 STATE OF HAWAII
STANDARD DETAILS
BOX GIRDER
 SCALES AS NOTED

SHEET NO. OF SHEETS

109010200.90 U09810400.85 U07210300.243 280

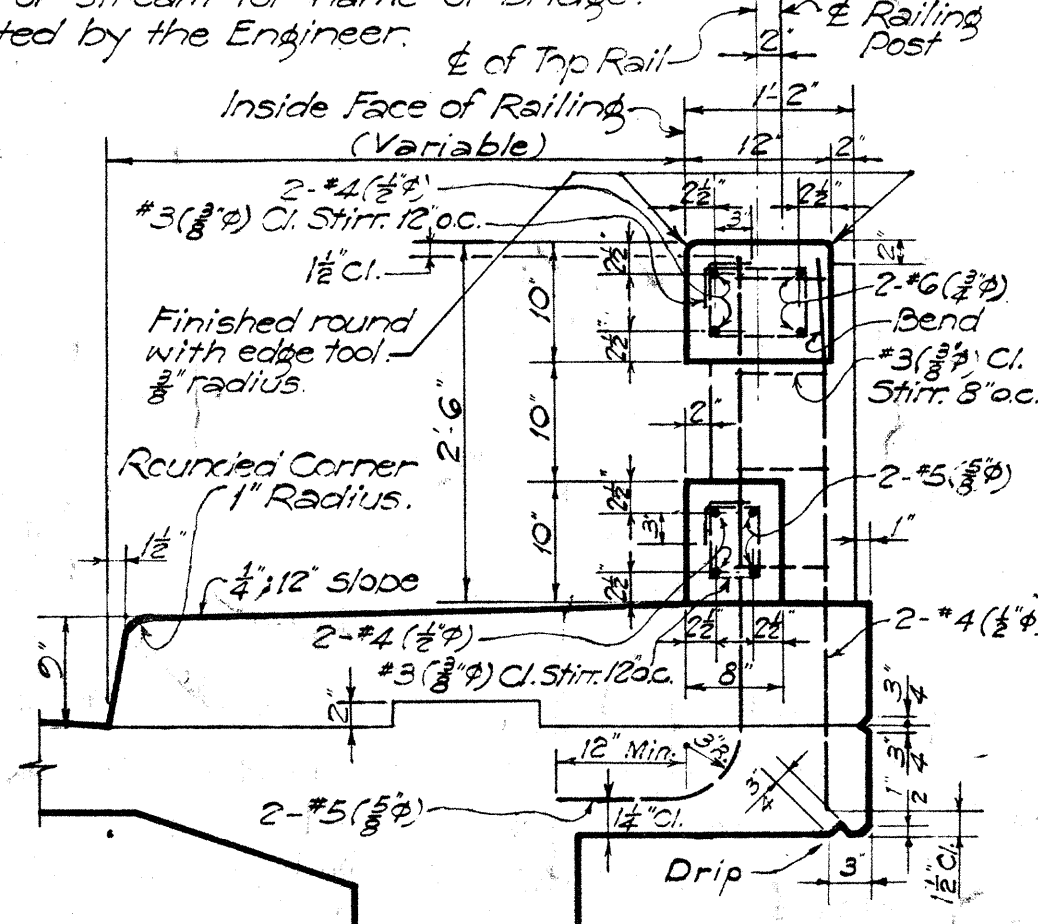
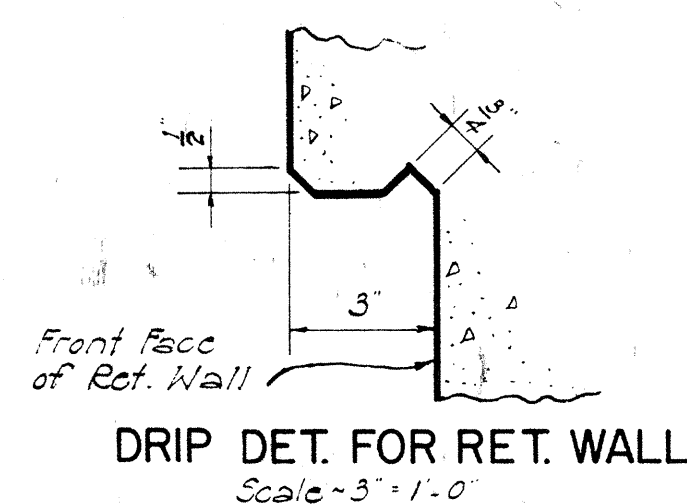
NAME DATE

Use correct name of bridge
LEFT HAND SIDE

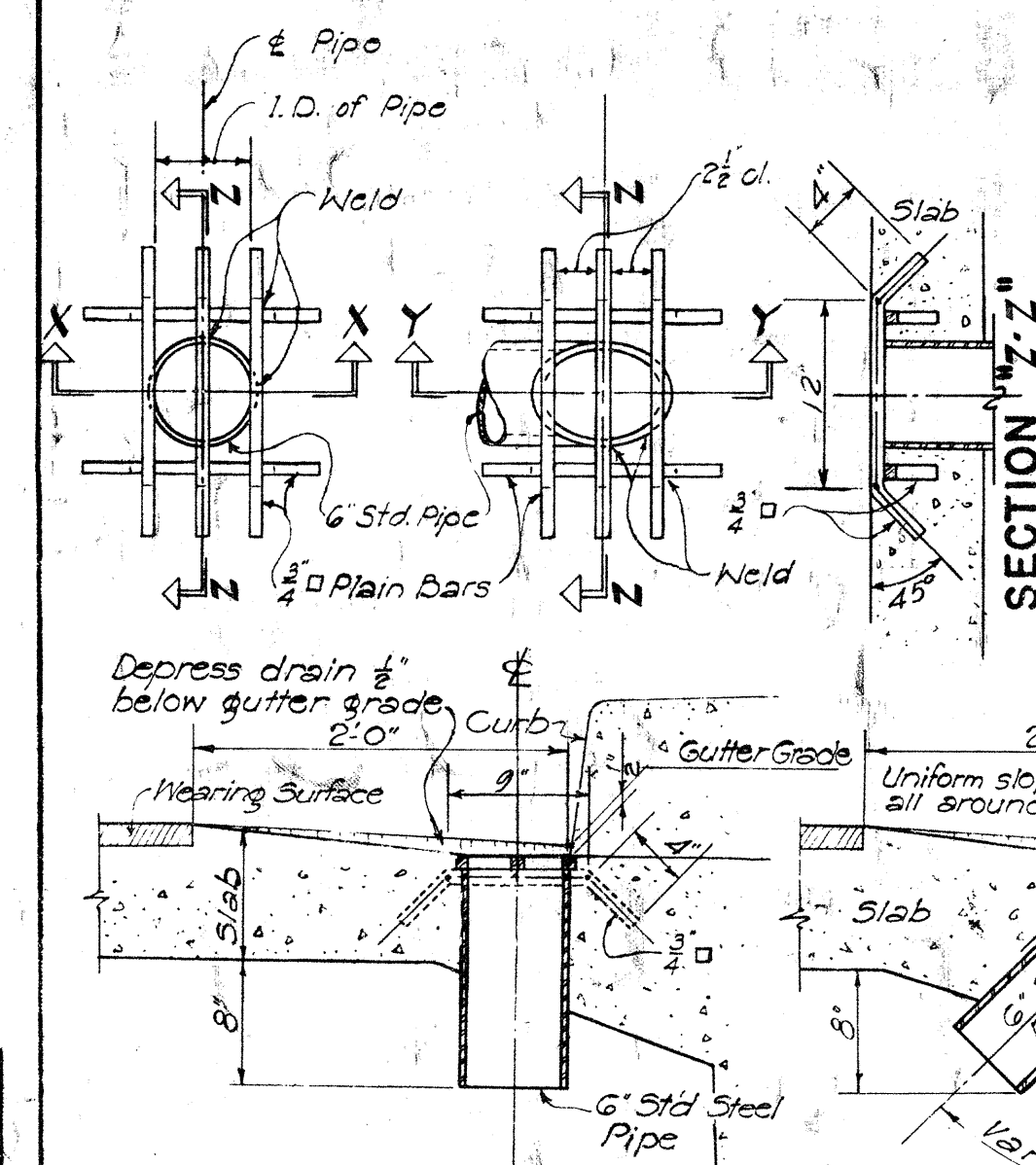
Date of year built
RIGHT HAND SIDE

DETAIL OF LETTERS AND FIGURES AT BOTH APPROACHES

NOTE: Name of bridge to be placed in left end post panels and date in right end post panels on entering bridge using modified block letters 3" in height. In case of stream crossings use name of stream for name of bridge. For all others use name as designated by the Engineer.



END POST GROOVE DET.
Scale: 3/4" = 1'-0"



NOTE! Sidewalk, curb and railing to be poured after release of falsework. Forms for railing and endpost to be made of plywood. SURFACE FINISH: The surface of the concrete railings shall be given a Class 2 Rubbed Finish as specified under Subarticle 46.3 (D) (3) of Section 46 Concrete of the Standard Specifications.

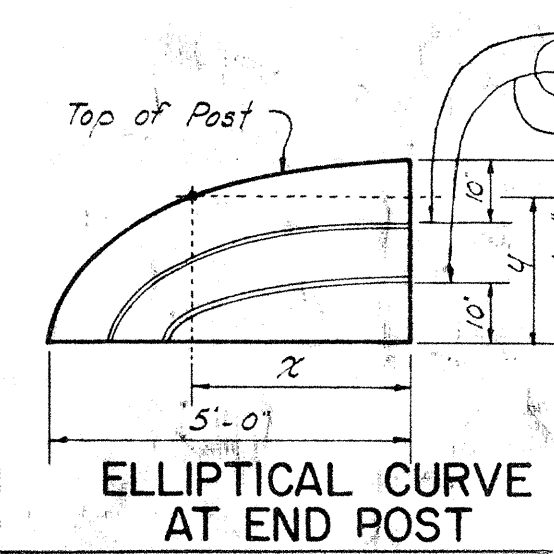
NOTE! Metal drains shall be considered incidental to Class A-1 Concrete in both concrete and steel bridges and will not be paid for separately. Assembly of grillage and pipe shall be hot-dip galvanized after all welding is completed.

X	W=3	W=4	W=5	W=6	W=7	W=8
12.5	0.19	0.16	0.14	0.12	0.09	0.08
25.0	0.75	0.64	0.55	0.49	0.35	0.32
37.5	1.69	1.44	1.25	1.10	0.78	0.72
50.0	3.00	2.56	2.22	1.96	1.38	1.28
62.5	4.00	3.47	3.06	2.76	2.00	1.88
75.0	5.00	4.41	3.91	3.51	2.68	2.52
87.5	6.00	5.33	4.73	4.33	3.32	3.12
100.0	7.00	6.25	5.56	5.11	3.92	3.68
112.5	8.00	7.11	6.33	5.89	4.48	4.24
125.0	9.00	8.00	7.11	6.67	5.12	4.88

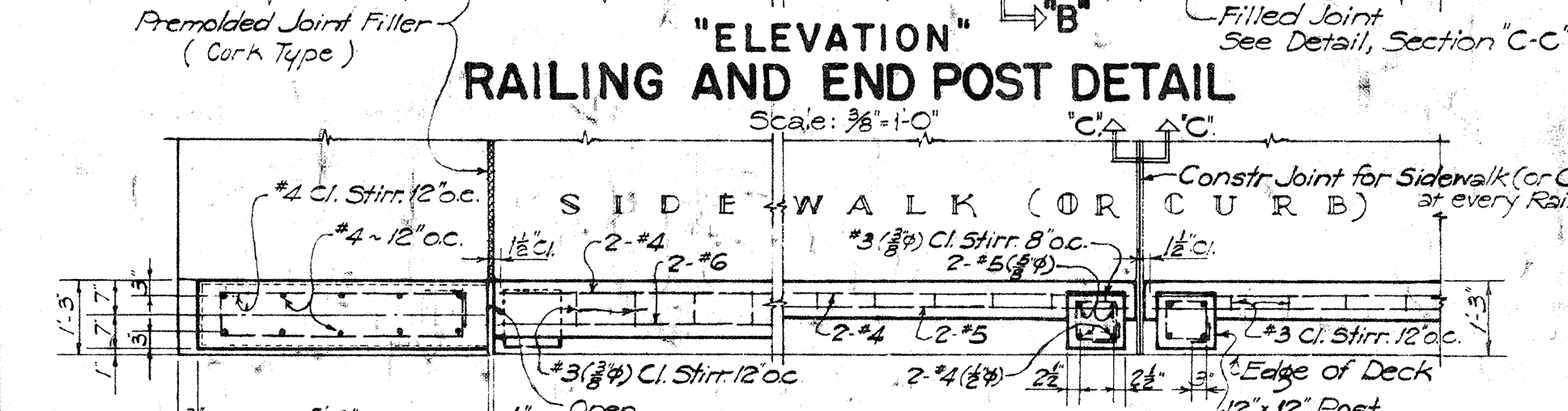
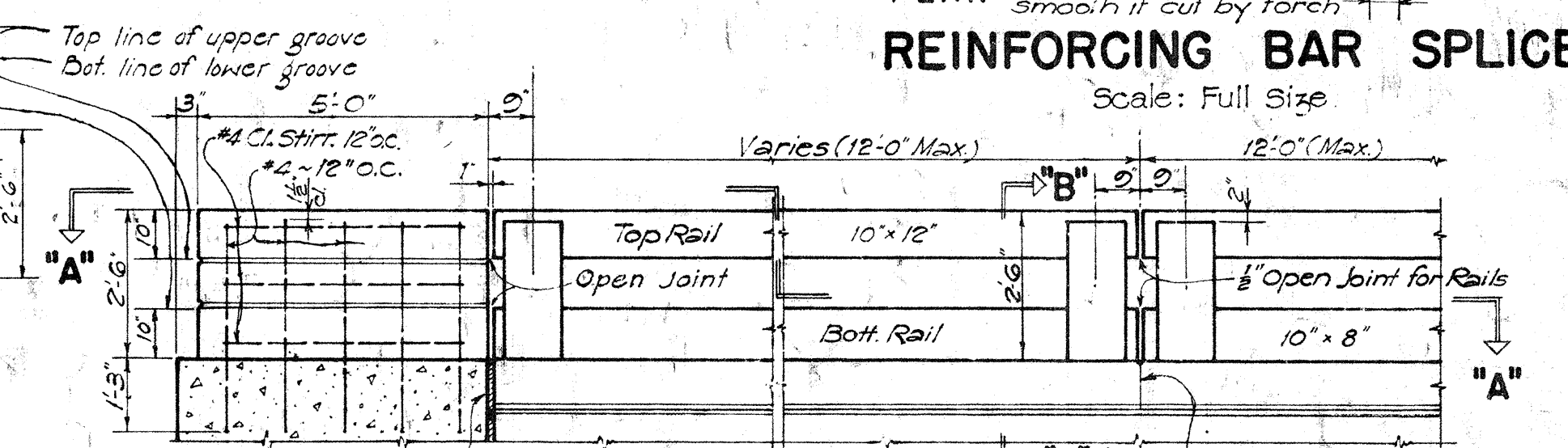
W = Guardrail flare
X = Distance from post at bridge to offset points.
Y = Guardrail flare offset

ELLIPSE COORDINATES

Top of Post	2	0	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	4'-9"	4'-10 1/2"	5'-0"
2	0	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	4'-9"	4'-10 1/2"	5'-0"	0
Top Line of Upper Groove	2	0	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	4'-9"	4'-10 1/2"	5'-0"
2	0	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	4'-9"	4'-10 1/2"	5'-0"	0
Bot Line of Lower Groove	2	0	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	4'-9"	4'-10 1/2"	5'-0"
2	0	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	4'-9"	4'-10 1/2"	5'-0"	0

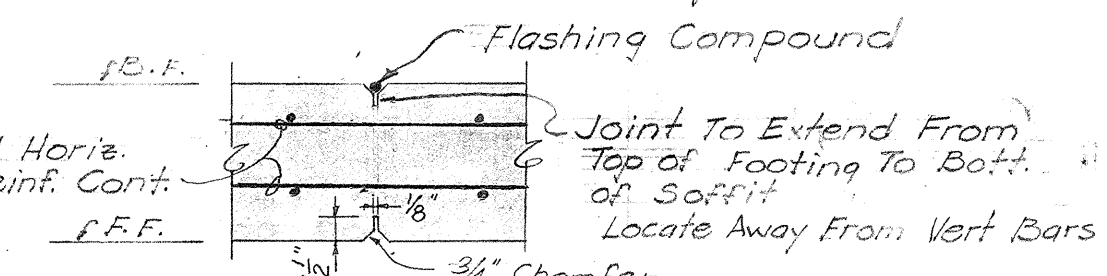
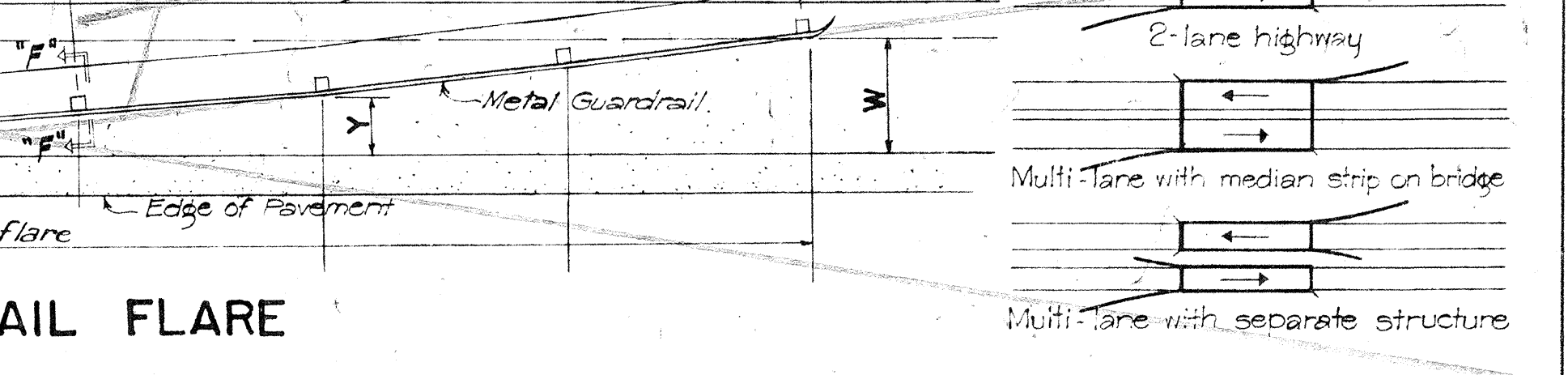


RAILING AND END POST DETAIL



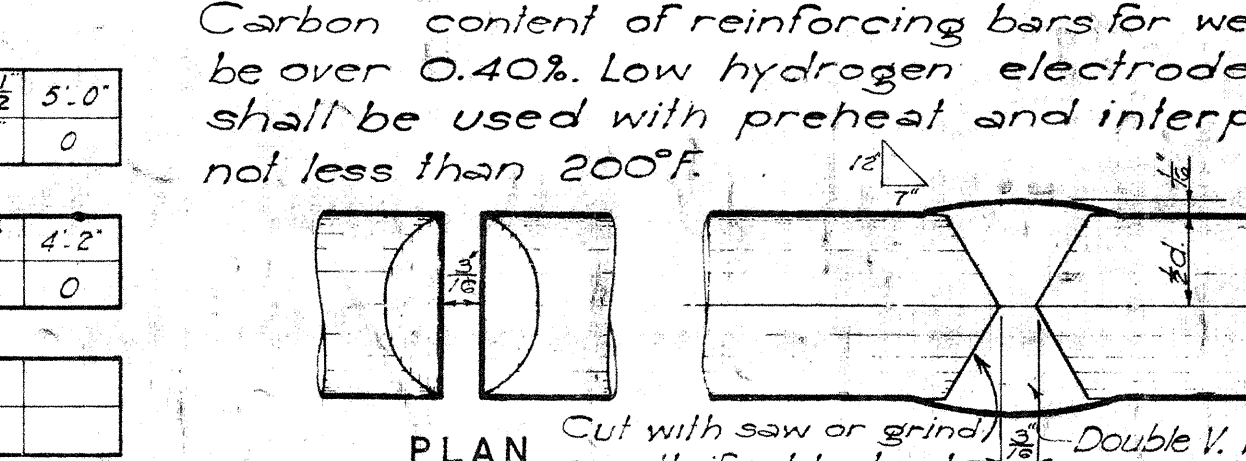
TOP RAIL - Bottom forms for top rails shall be kept in place a minimum of 14 days from date of pour.

PLAN - METAL GUARDRAIL FLARE

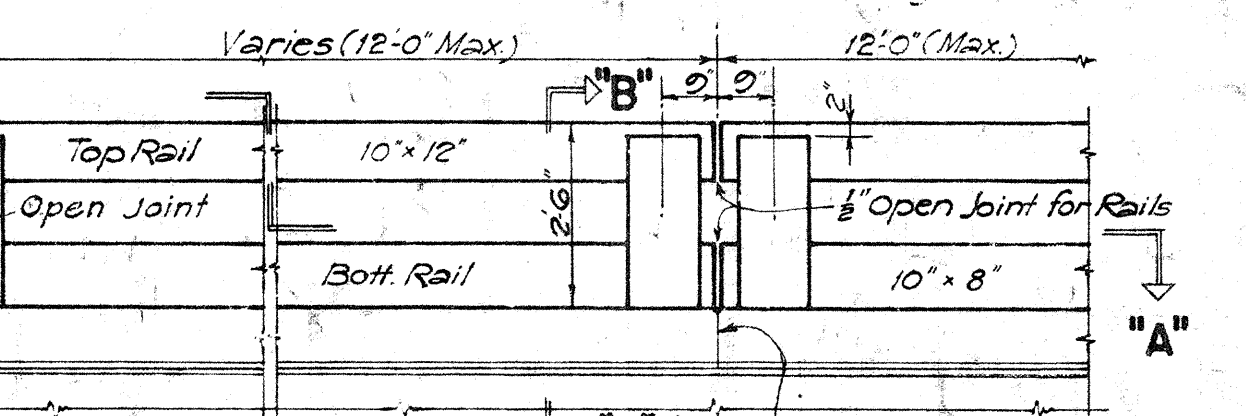


DETAIL OF PIPE HANGERS AND INSERTS

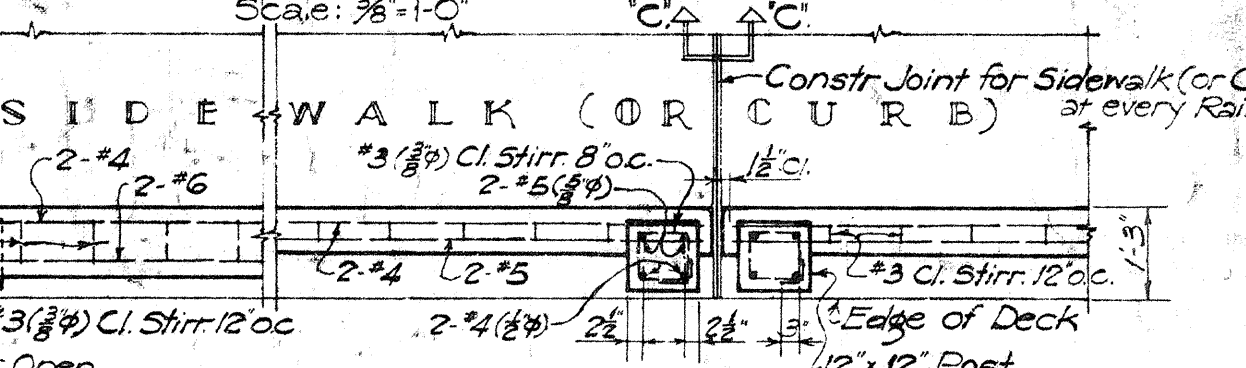
NOTE! Carbon content of reinforcing bars for welding shall not be over 0.40%. Low hydrogen electrodes E7015 or E7016 shall be used with preheat and interpass temperature not less than 200°F.



REINFORCING BAR SPLICE



TIMBER PILE SPLICE



GENERAL NOTE

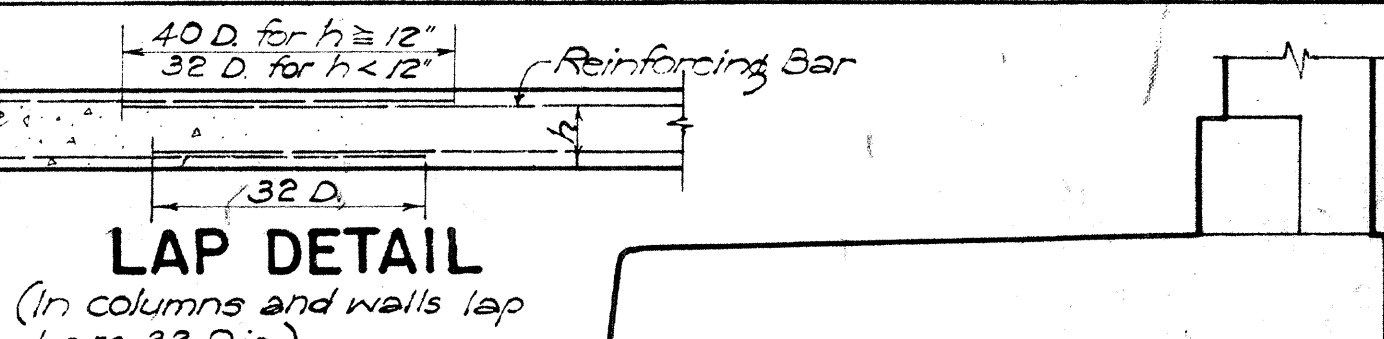
Except where detailed otherwise in the plans, all details on this sheet govern.

GENERAL NOTES

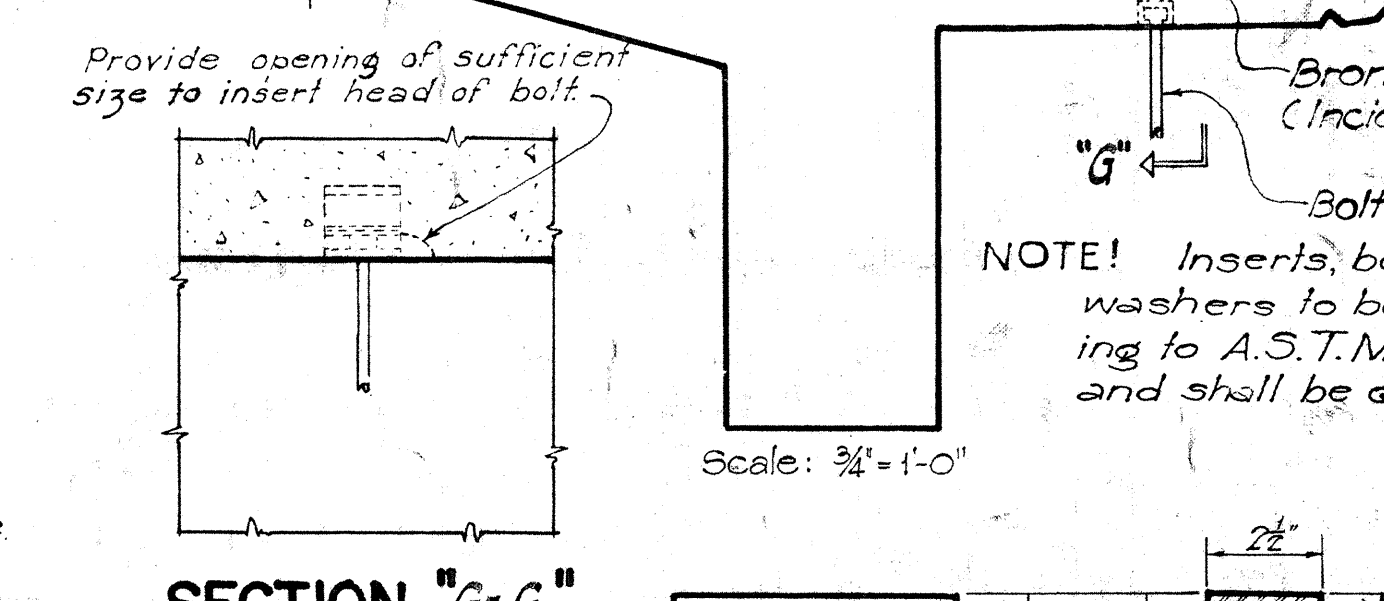
CONCRETE: Class of concrete to be used in different parts of the structure are as noted on plans. REINFORCING STEEL: All reinforcing steel shall be Billet Steel Bars A.S.T.M. A15 intermediate grade. Steel shall be made by the open-hearth or Electric Furnace Process. Mill certificate shall be required. Deformations shall conform to A.S.T.M.-A305. Splicing of reinforcing other than in main deck slab, girder and frame bars shall be done as shown in above sketch except where shown otherwise. Splices are to be staggered. Splices in main girder and frame bars are permitted only in bars exceeding 60'-0" in length at points to be indicated by the Engineer. These splices to be electrically welded according to detail and specifications. No allowance will be made in the quantities for extra weight of steel required for splices not shown on the plans. Minimum spacing between parallel bars shall be 2 1/2 times the diameter of bars, but in no case shall the clear distance between the bars be less than 1 1/2 times the maximum size of the coarse aggregate. All dimensions relating to reinforcing are to centers of bars unless otherwise noted.

CONSTRUCTION JOINTS: All construction joints to have surface roughened and 1:2 cement grout applied immediately before the second pour. Construction joints to be located at places indicated in the plans. See Sec. 46.3 (F) of the "Standard Specifications".

JOINT FILLER: Joint filler, when called for in plans, shall be incidental to concrete and will not be paid for separately.

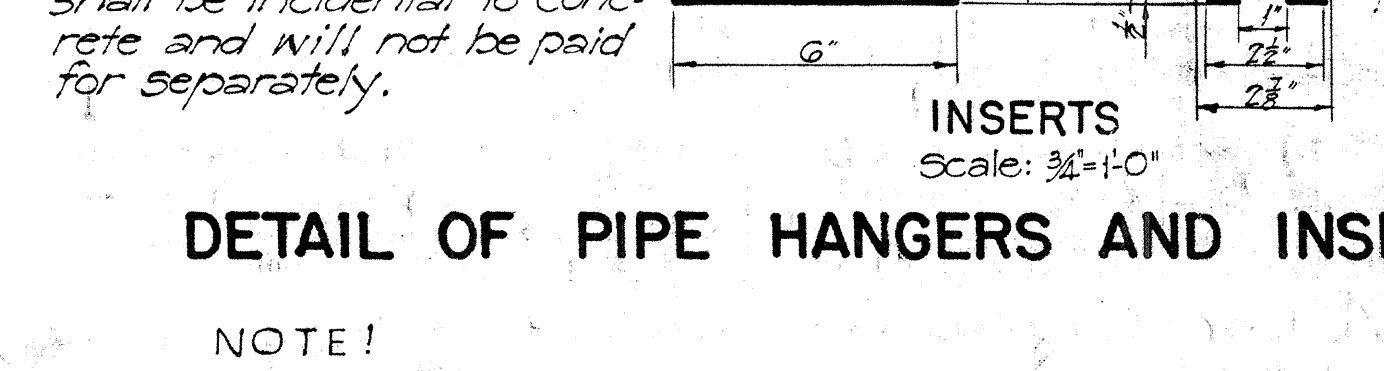


SECTION "G-G"

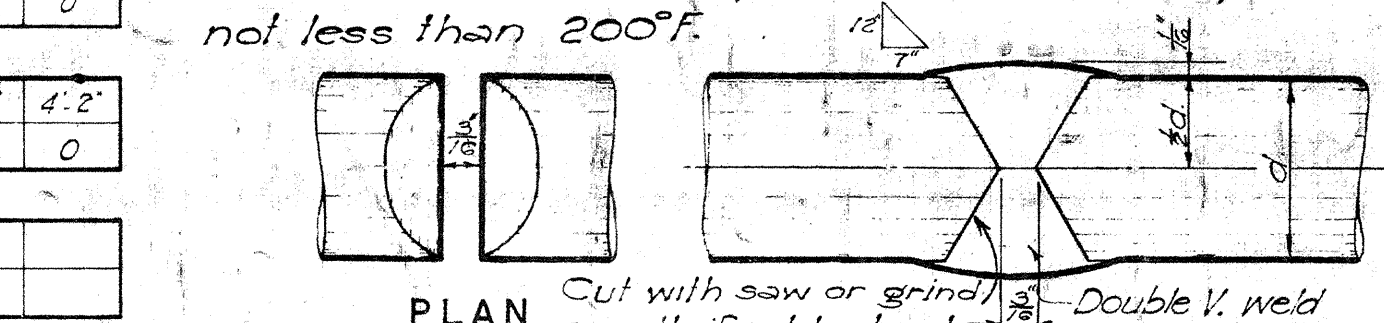


DETAIL OF PIPE HANGERS AND INSERTS

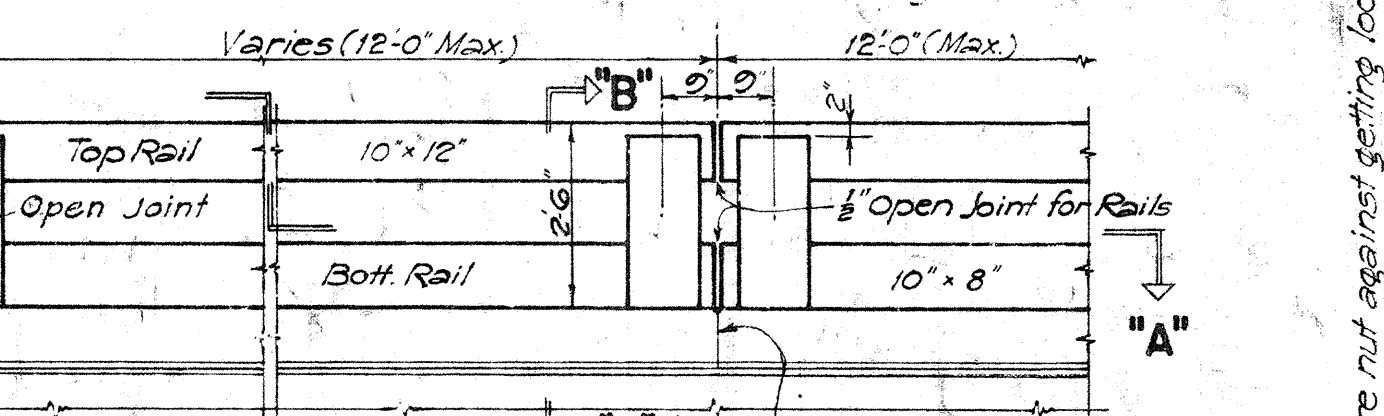
NOTE! Carbon content of reinforcing bars for welding shall not be over 0.40%. Low hydrogen electrodes E7015 or E7016 shall be used with preheat and interpass temperature not less than 200°F.



REINFORCING BAR SPLICE

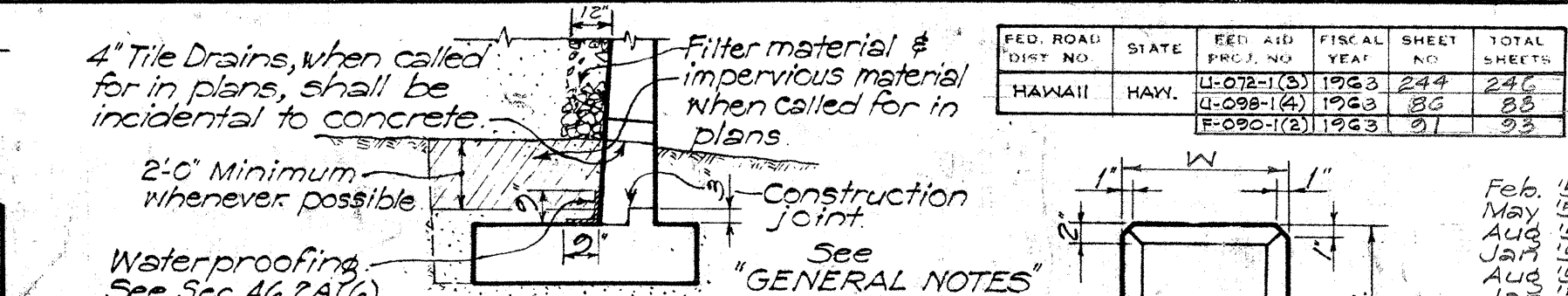


TIMBER PILE SPLICE

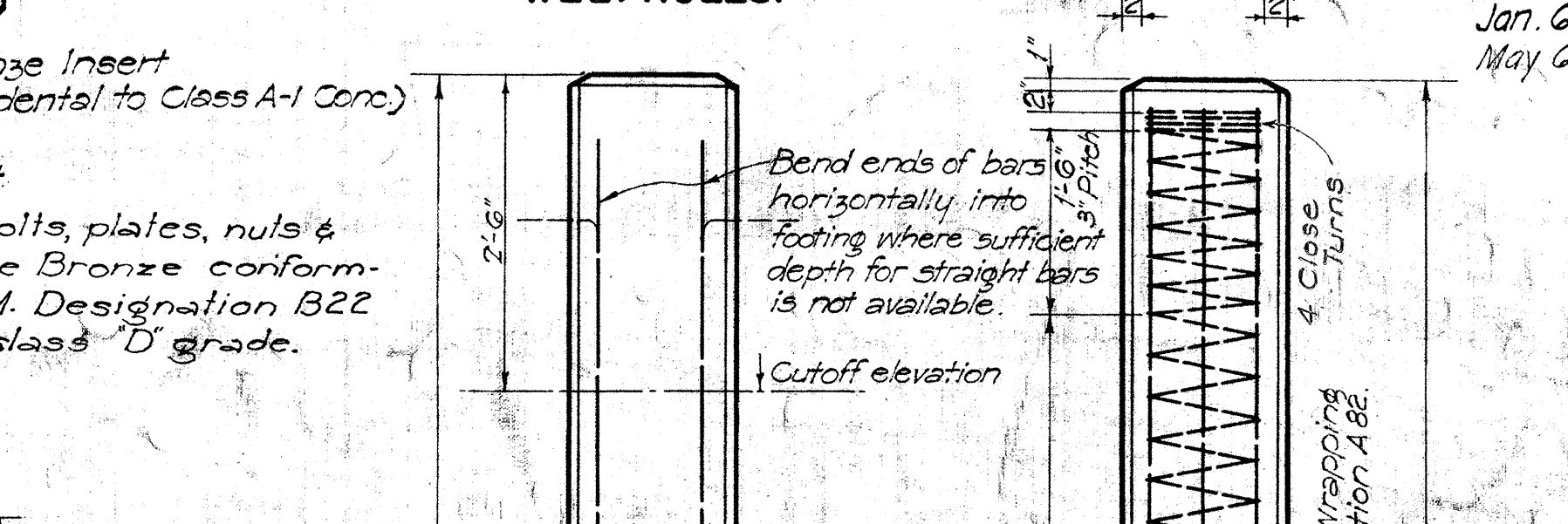


GENERAL NOTE

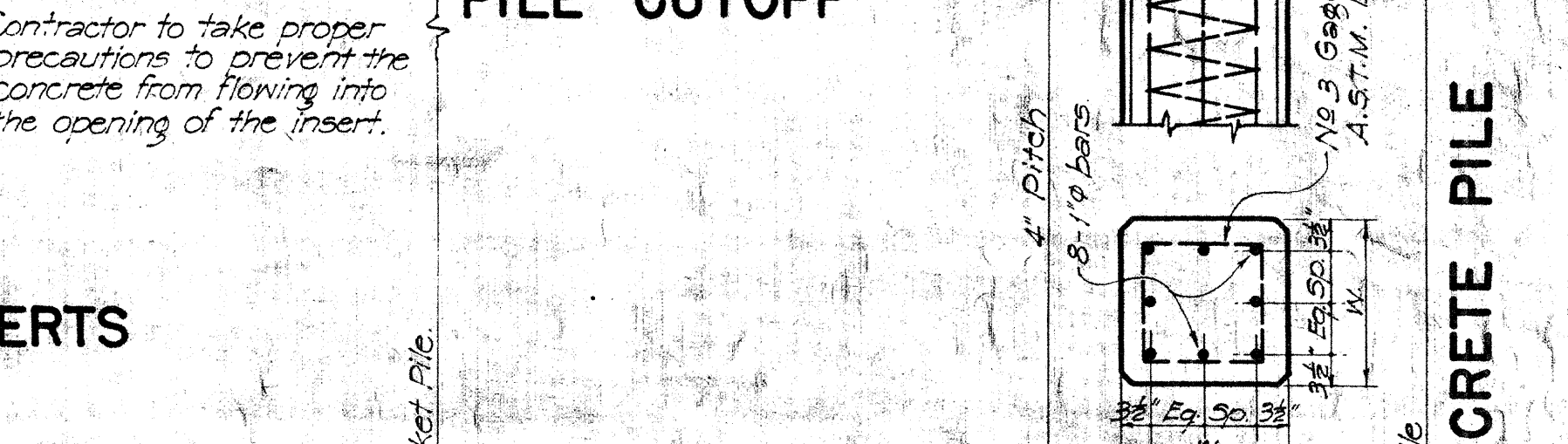
Except where detailed otherwise in the plans, all details on this sheet govern.



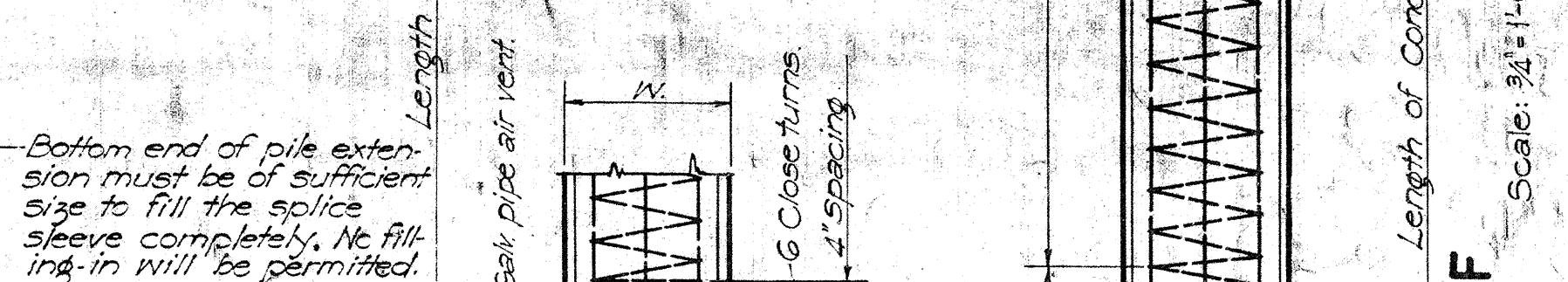
PILE CUTOFF



CONCRETE SOCKET



DETAIL OF CONCRETE PILE



GENERAL NOTE

Unless otherwise noted all sharp corners and re-entrant angles in concrete work shall be chamfered. (See Section 46.3 (C) of the Standard Specifications. Chamfer to be 3/4".

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

STANDARD BRIDGE DETAILS

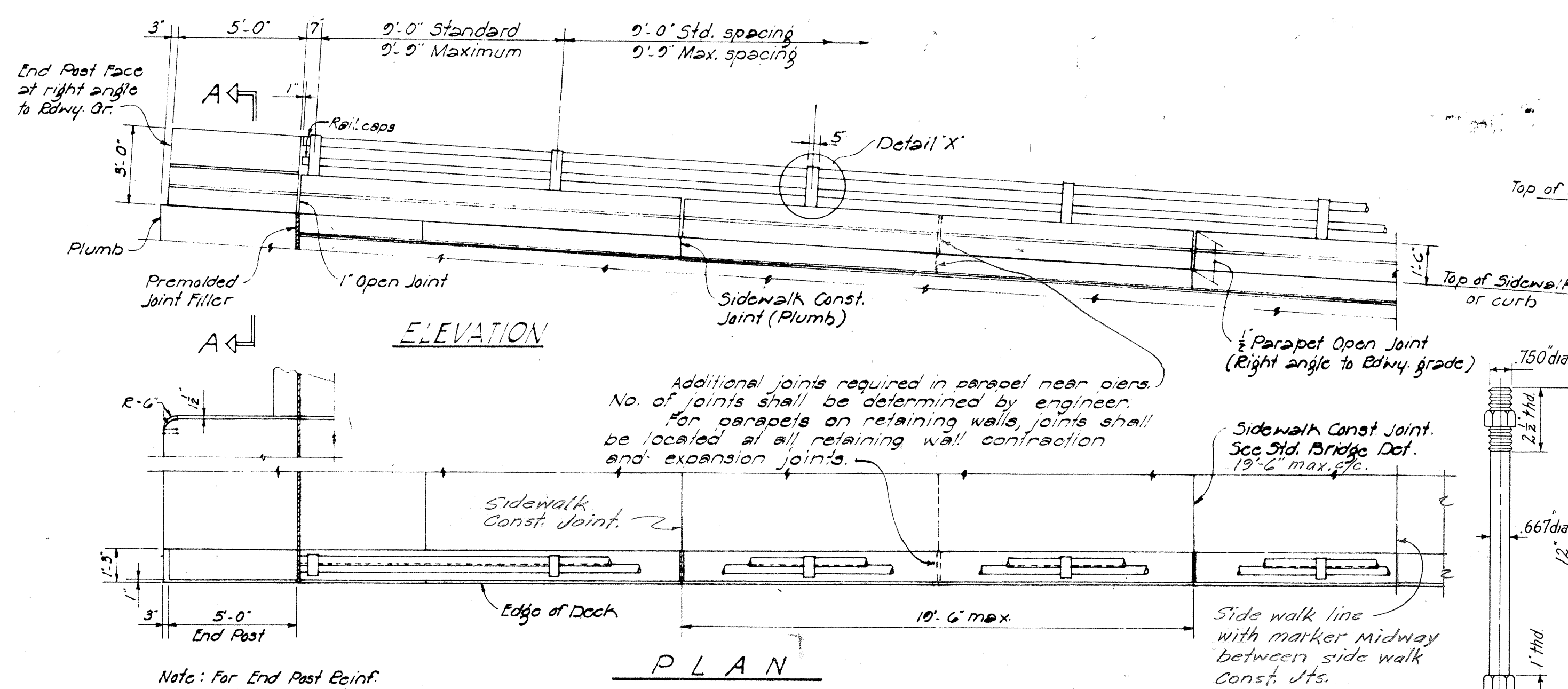
Scales as Noted

APPROVED BY: STATE HIGHWAY ENGINEER

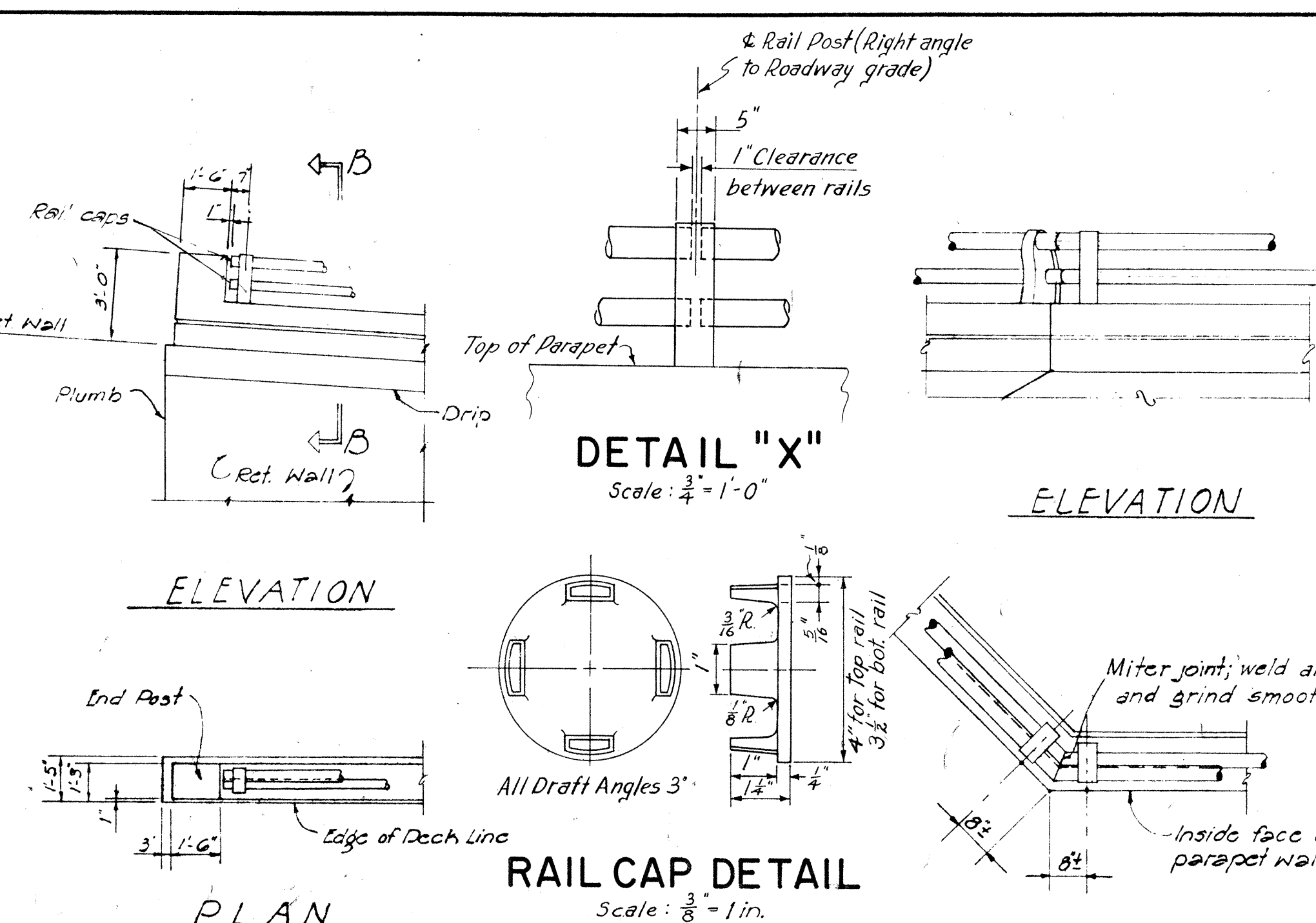
DATE: Aug. 26, 1959

SHEET NO. OF SHEETS

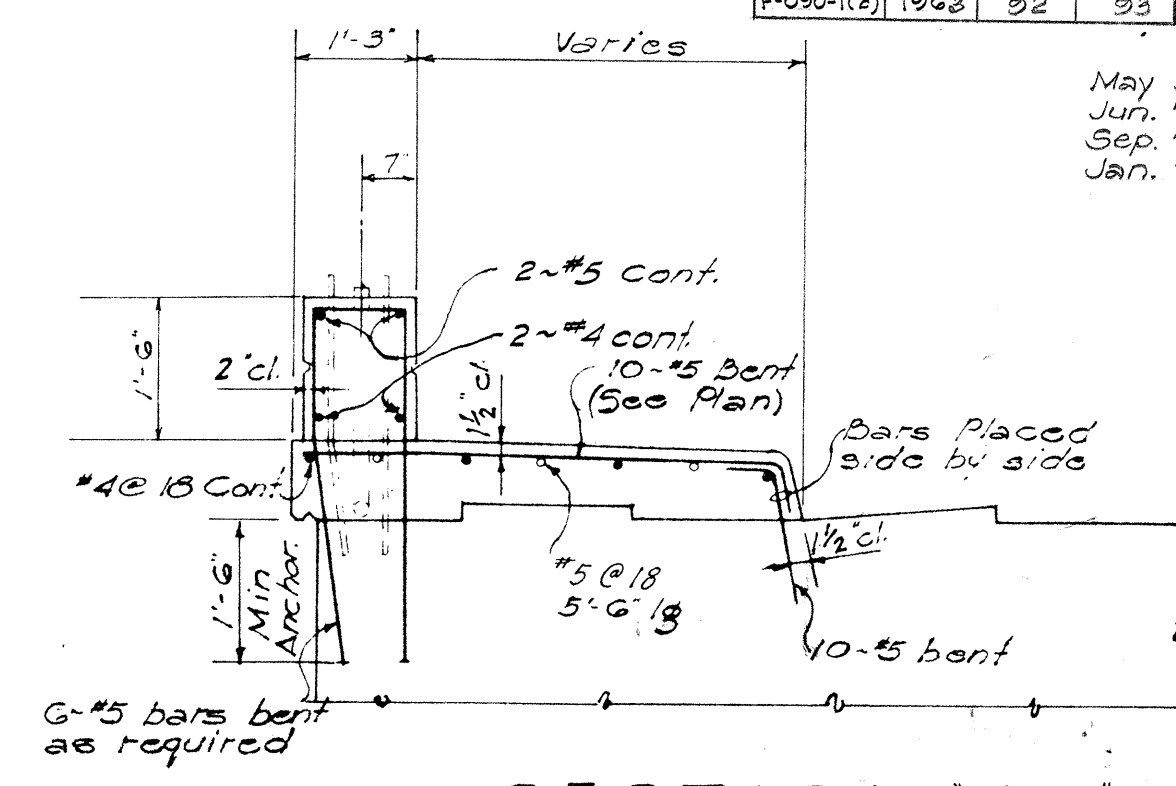
281



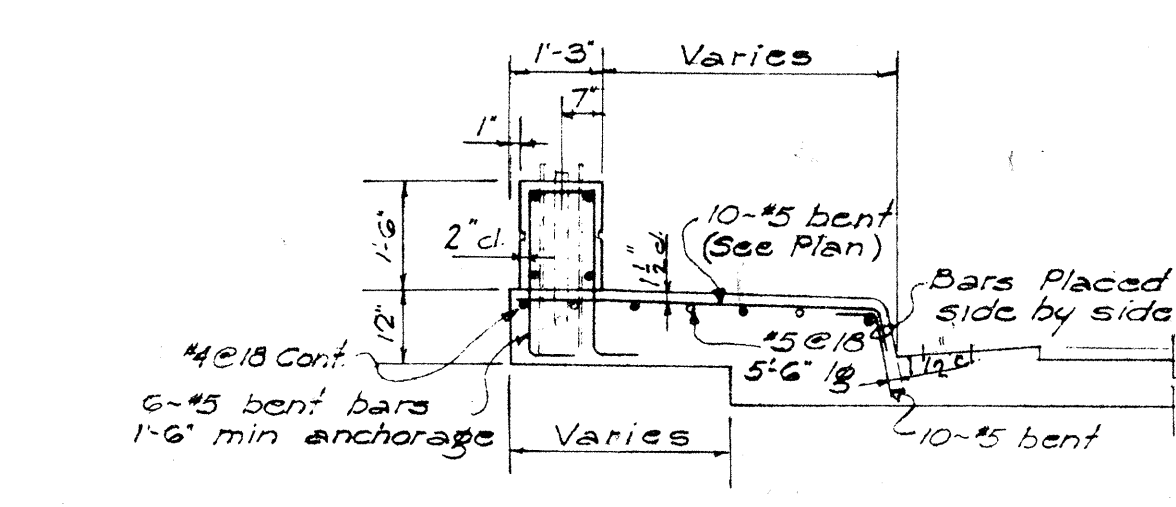
ALUMINUM RAILING DETAIL
Scale - 1/4" = 1'-0"



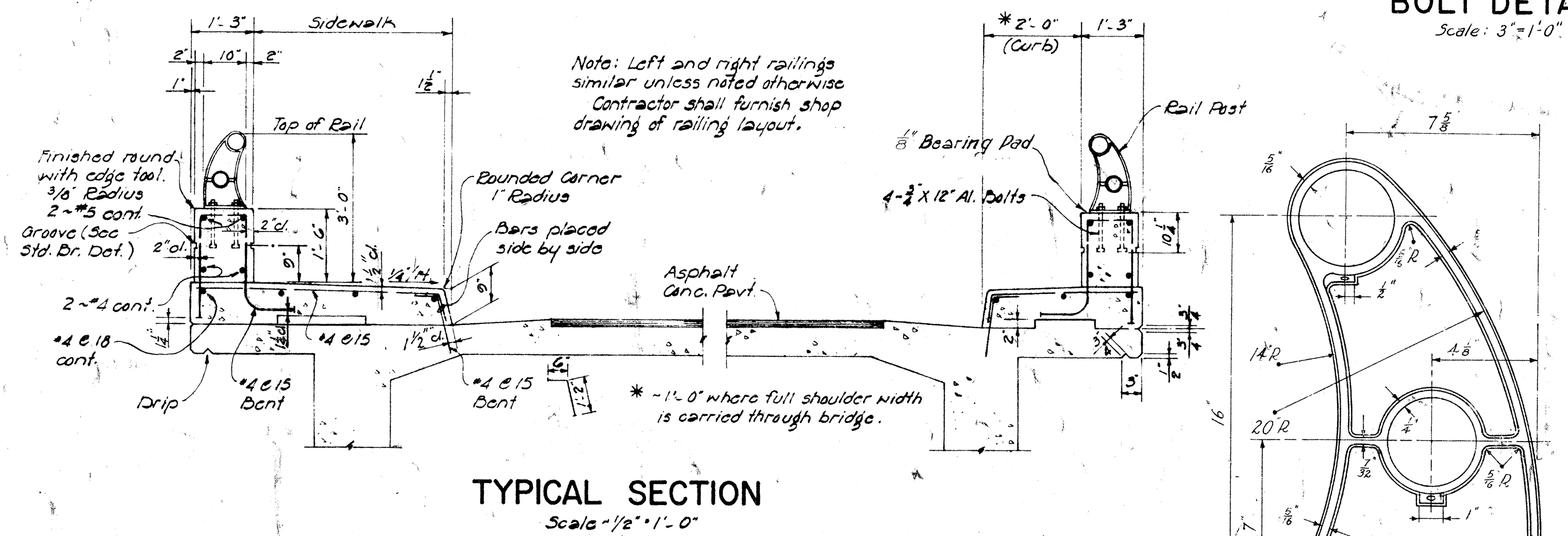
ANCHOR TREATMENT OF RAILING
BOLT DETAIL ON RETAINING WALL
Scale: 3"=1'-0" Scale: 1/4"=1'-0"



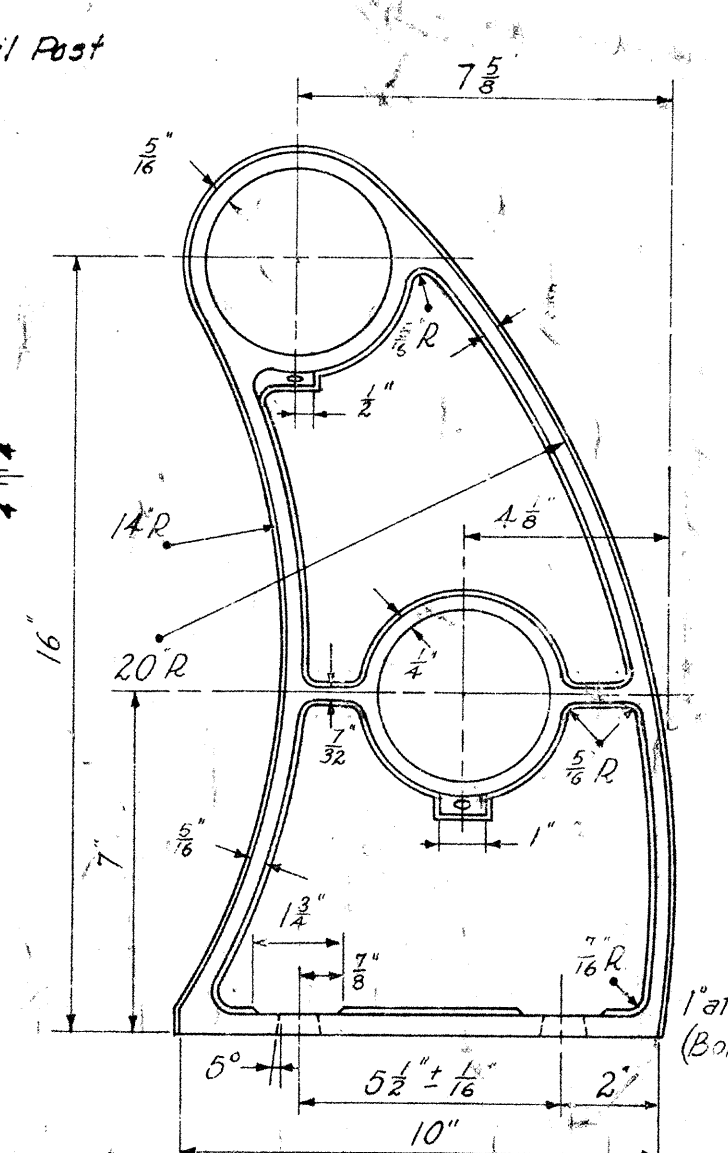
SECTION "X-X"
Scale: $\frac{1}{8}" = 1'-0"$



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

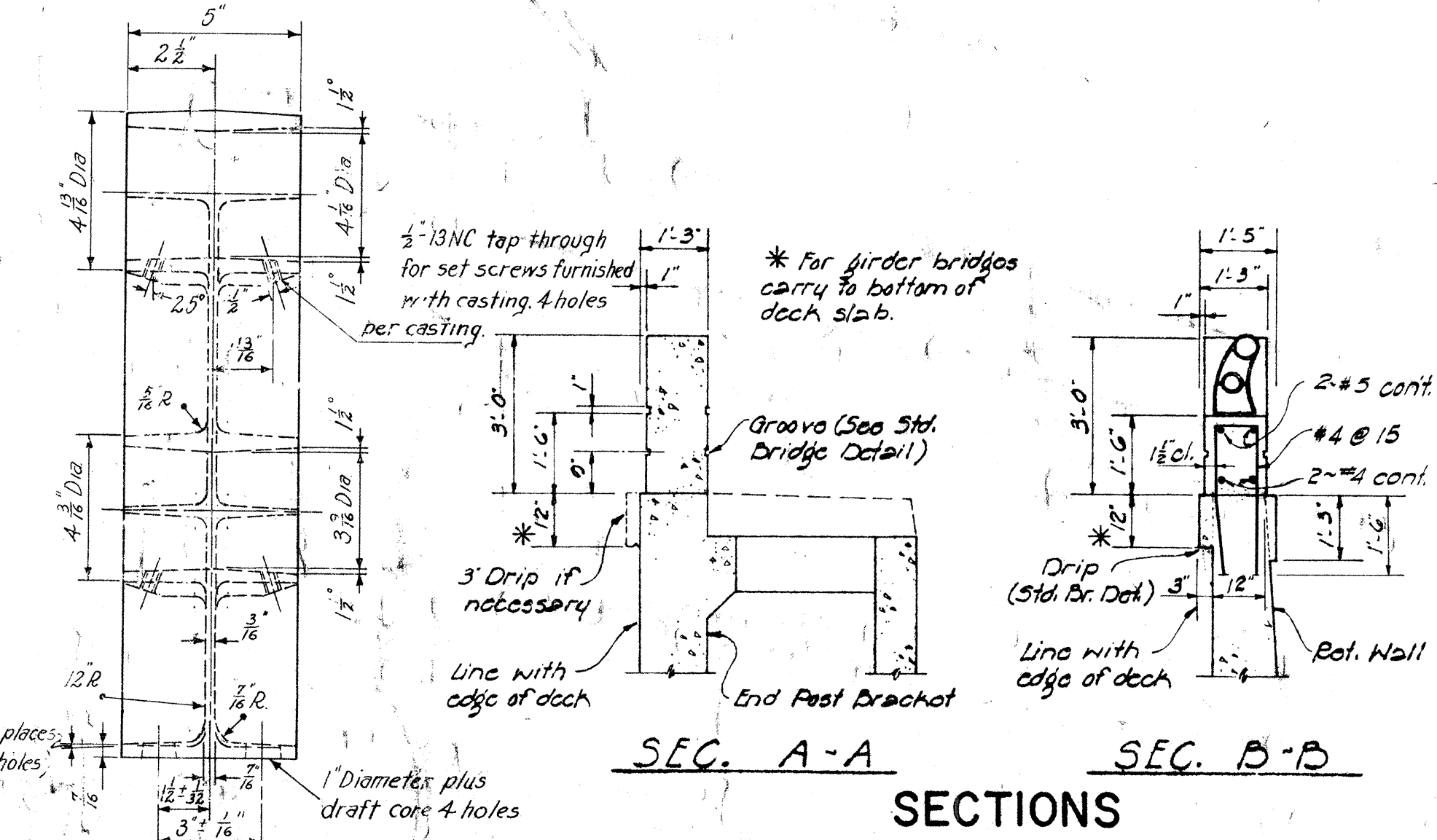


TYPICAL SECTION
Scale - 1/2" = 1' - 0"



RAIL POST DETAIL

Scale: 3" = 1'-0"



SECTIONS
Scale - 3/8" = 1'-0"

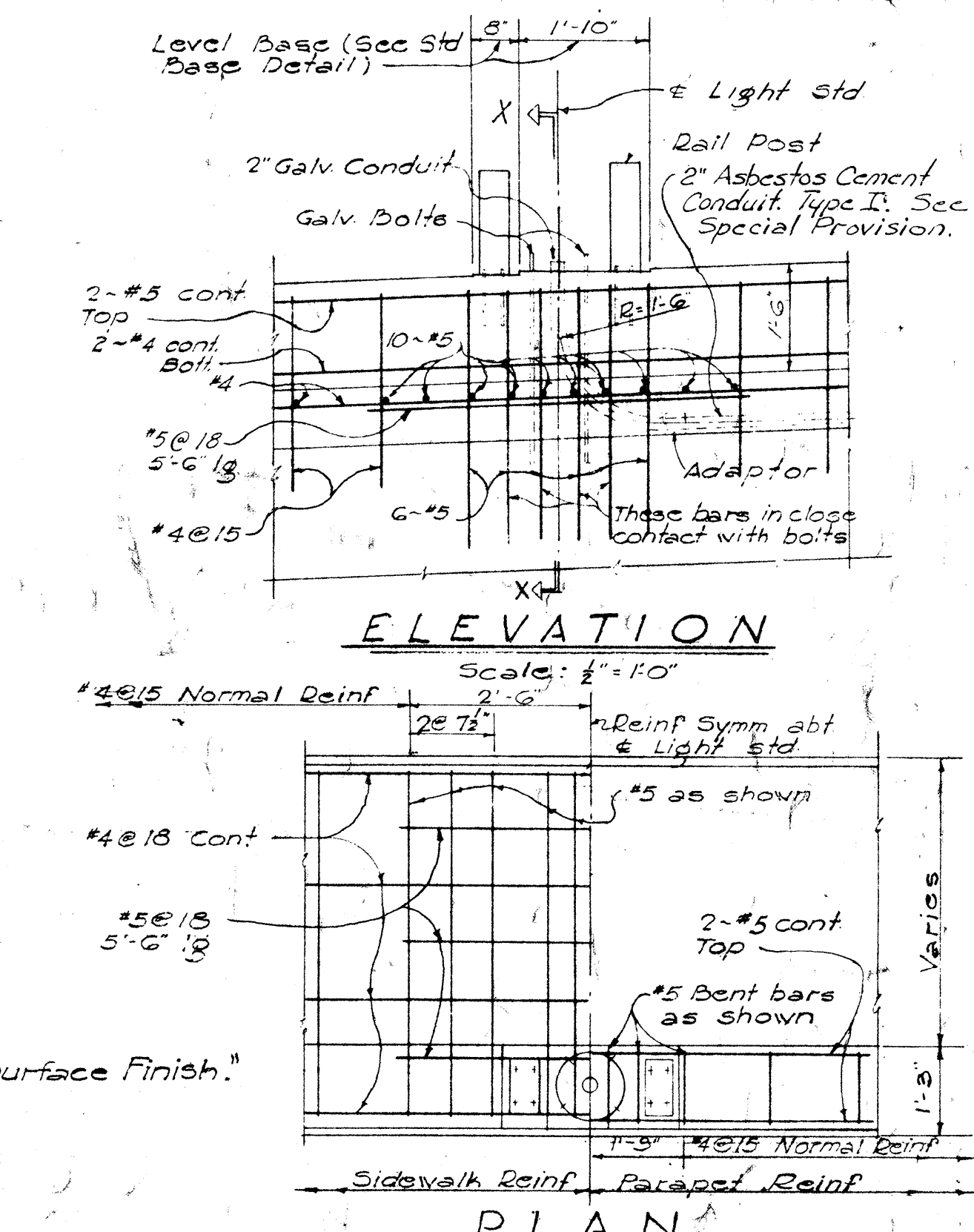
GENERAL NOTE
Except where detailed otherwise in the plans,
all details on this sheet govern.

Aluminum railing, concrete parapet & end post to receive "Class 2 Surface Finish."

SPECIFICATION FOR ALUMINUM RAILING

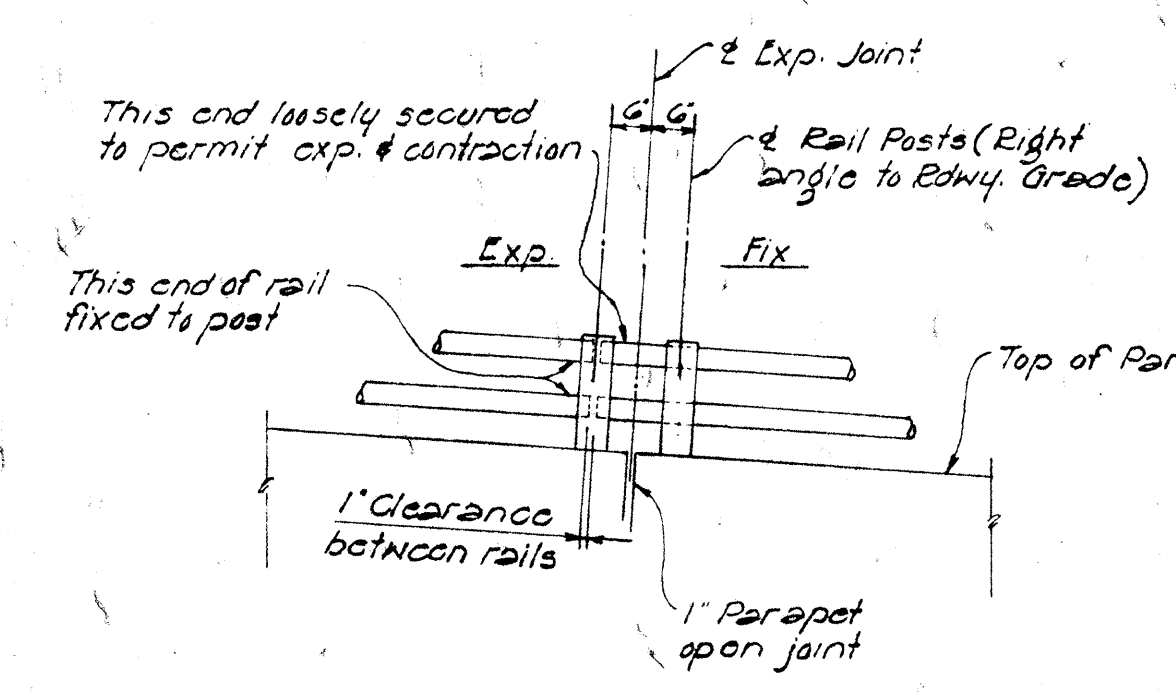
ITEM	DESCRIPTION	ALLOY	UNIT WT
Top Rail	Al Alloy Drawn Or Extruded Tube 4" o.d. x 1/8" thick wall.	6061 - T6	1.70 #/ft.
Bot. Rail	Al Alloy Drawn Or Extruded Tube 3 1/2" o.d. x 1/8" thick wall.	6061 - T6	1.56 #/ft.
* Rail Post	Permanent Mold Casting See Rail Post Detail	Post - A 356-T6 Ref Sec. 2024-T4	16.0 #/sq.
Rail Cap	See Rail Cap Detail	Cap - 356-T6	Top - .115 #/sq. Bot. - .340 #/sq.
Bolts	See Anchor Bolt & Rail Post Detail Use 3000 Nut and Plain Washer	Bolt - 2024-T4 Nut - 6061-T6 Washer -	

* Rail Post Finish: Front, top and rear faces of post shall receive a standard scratch brush finish, to be approved by the Engineer.

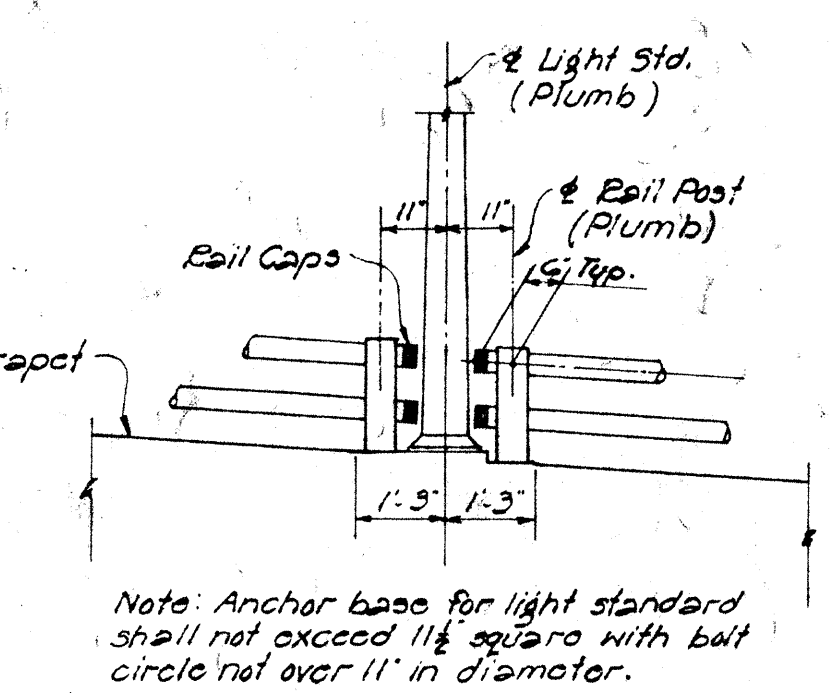


ELEVATION

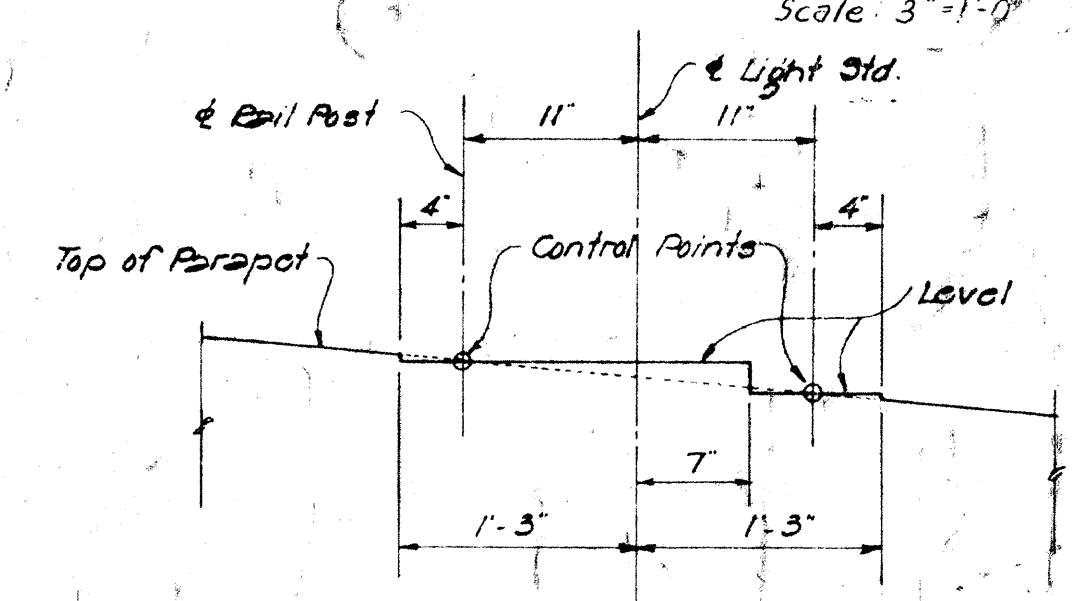
PLAN
Scale: $\frac{1}{2}$ " = 1'-0"
SE REINE DETAIL



TREATMENT OF RAILING
AT EXP. JOINT
Scale ~ 3/8" = 1'-0"



TREATMENT OF RAILING
AT LIGHT STD.
36216 ~ 3/8" x 1'-0"



LIGHT STD. BASE DETAIL

APPROVED _____ DATE Aug 26, 1959

STATE HIGHWAY ENGINEER

Scale: $\frac{1}{2}'' = 1'-0''$

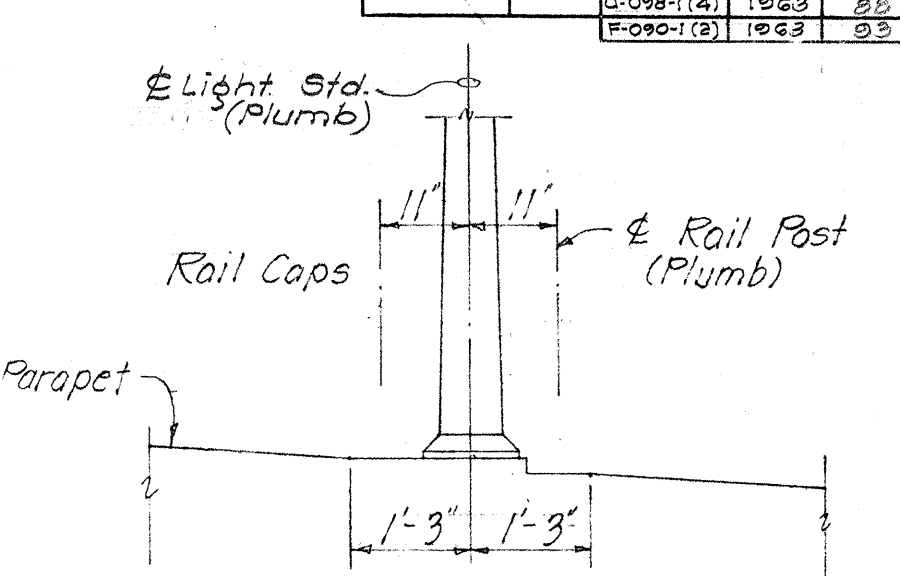
LIGHT STD. BASE REINF. DETAIL

HAWAII STATE HIGHWAY DEPARTMENT
STATE OF HAWAII

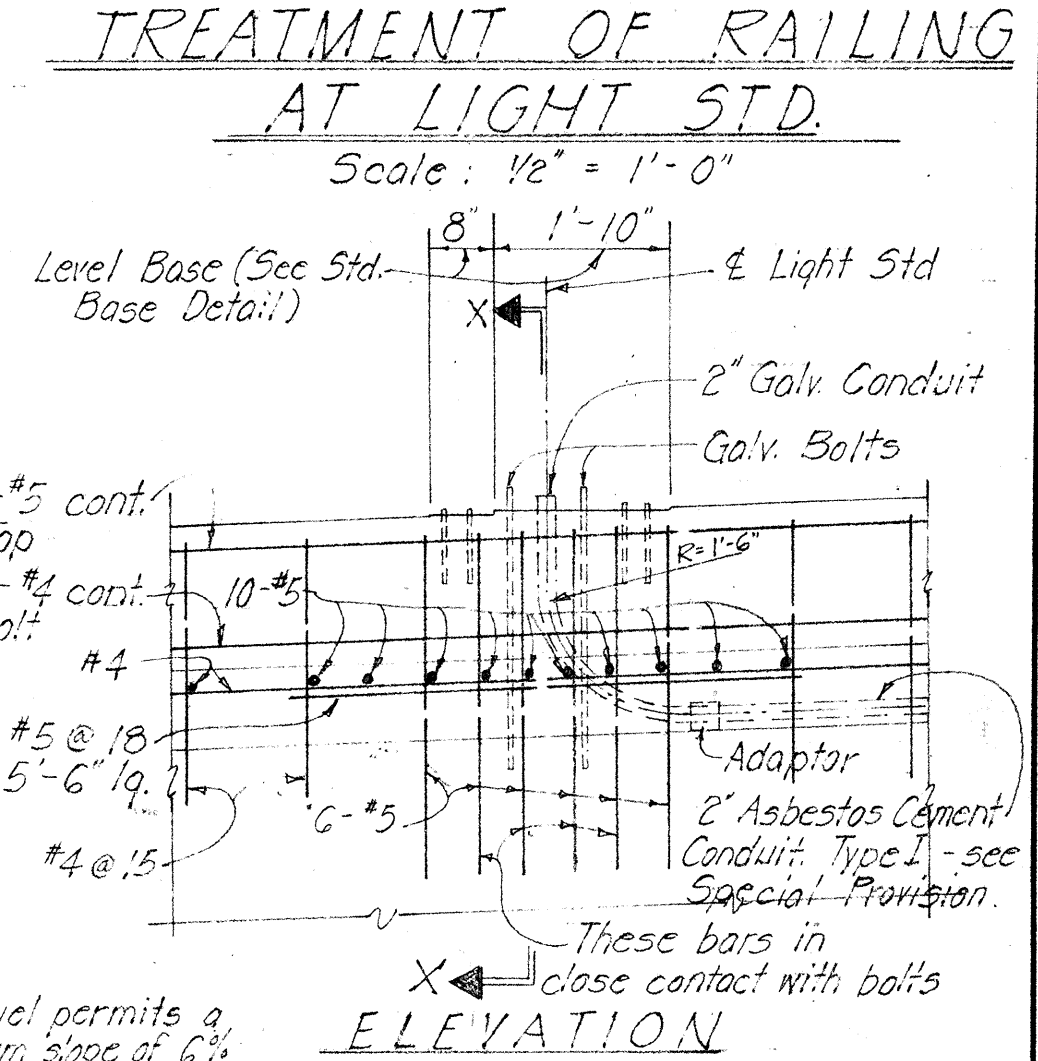
STANDARD DETAILS
ALUMINUM RAILING

SCALE AS NOTED

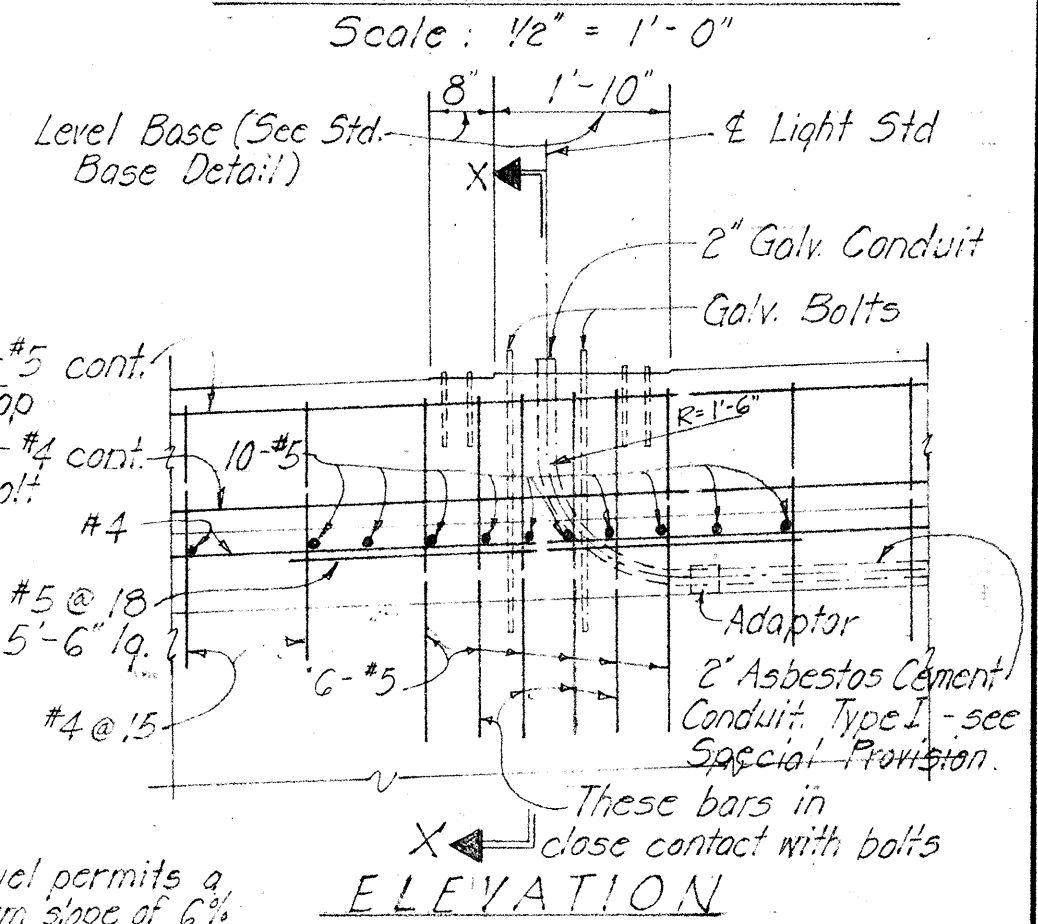
SHEET No. 1 OF 1 SHEETS



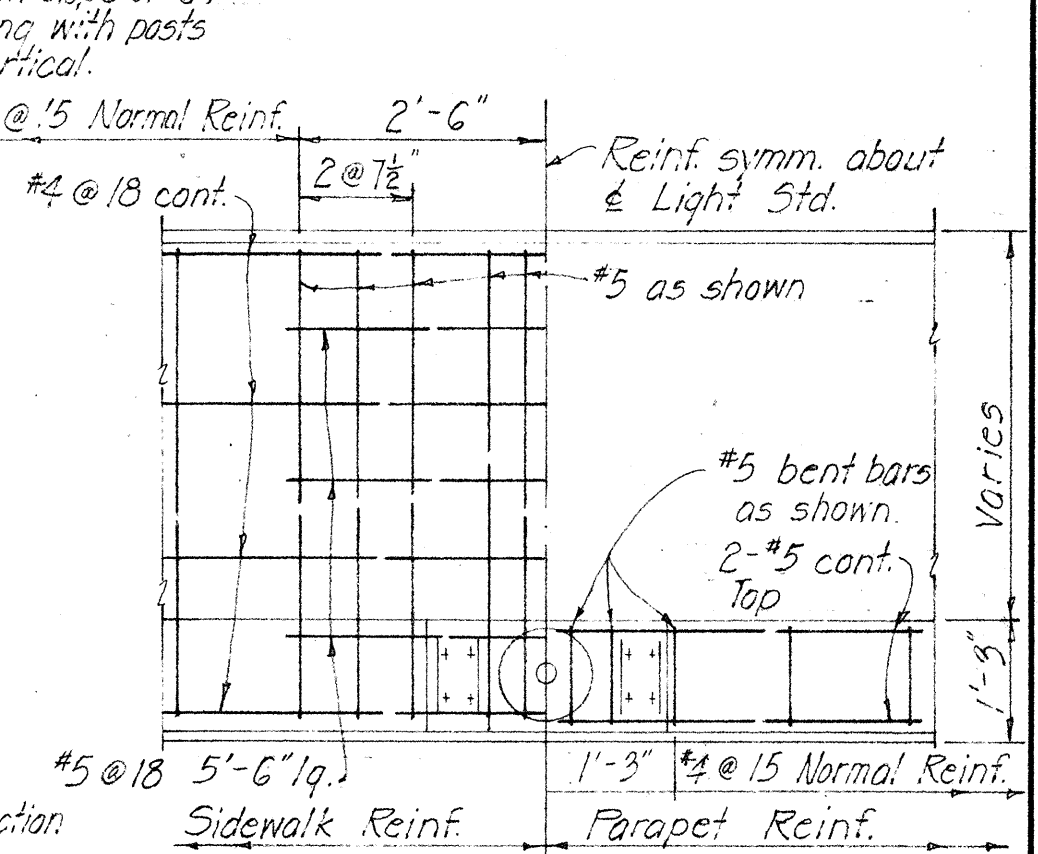
Note: Anchor base for light standard shall not exceed $11\frac{1}{2}$ " square with bolt circle not over 11" in diameter.



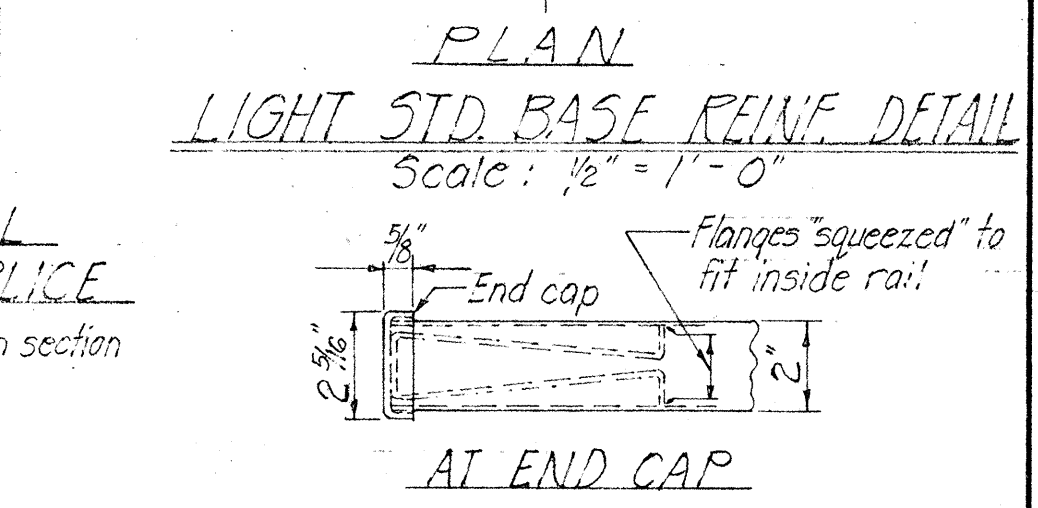
TREATMENT OF RAILING AT LIGHT STD.



Hand-drawn structural drawing of a sidewalk and parapet reinforcement. The drawing shows a cross-section of a concrete wall and sidewalk. The sidewalk is 5'-6" wide and has reinforcement bars (#5 @ 18"). The parapet is 1'-3" high and has reinforcement bars (#5 @ 15"). The drawing includes labels for "Sidewalk Reinf." and "Parapet Reinf." and notes about the reinforcement being symmetrical about the light standard.



SECTION M-M



BRIDGE RAILING
WEDGE BOLT
No Scale

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

STEEL RAILING

Scale as Noted

SHEET No. OF SHEETS