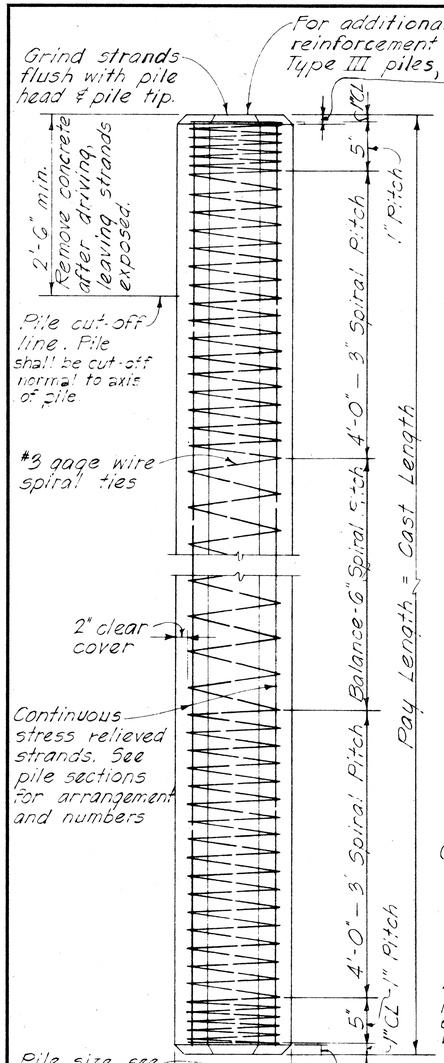
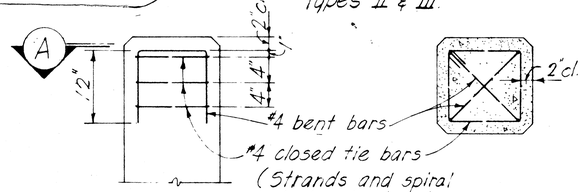
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FAH-1(61)8	1968	104	144

Revision: Feb. 67, Mar. 67
Jan. 68, June 68
Aug. 68, Oct 68

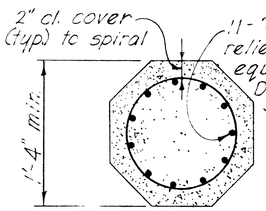


TYPICAL PILE DETAIL



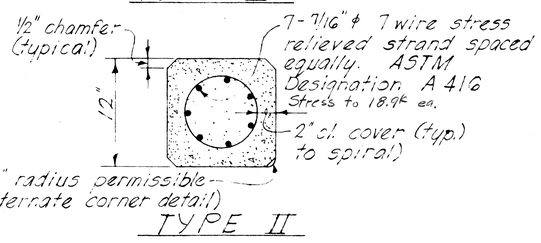
PART ELEVATION SECTION (A)

TYPICAL ADDED REINFORCEMENT PILE ENDS - TYPE II & III ONLY

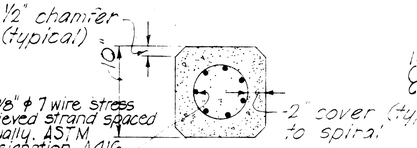


Note: All types of pile spiral reinforcement shall be cold drawn steel wire ASTM A-82

TYPE I



TYPE II



TYPE III

TYPICAL SECTIONS THRU PILES

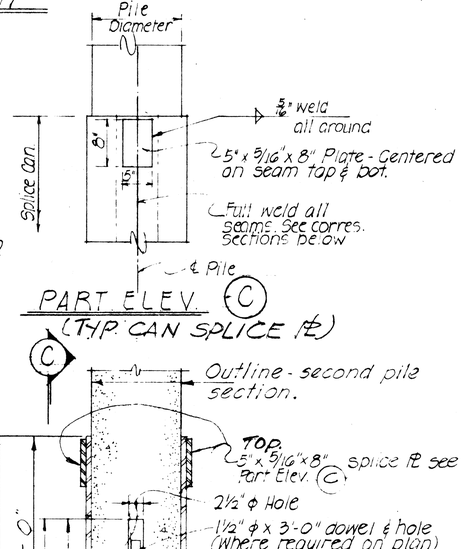
Max. Length "L"*	Max. Length "L"*	Length "L"*
Type I "L" = 53'-0"	Type I "L" = 75'-0"	Type I "L" over 75'-0"
12" Type II "L" = 50'-0"	12" Type II "L" = 72'-0"	12" Type II "L" over 72'-0"
10" Type III "L" = 46'-0"	10" Type III "L" = 66'-0"	10" Type III "L" over 66'-0"
0.30 L 0.70 L	0.21 L 0.58 L 0.21 L	0.15 L 0.35 L 0.35 L 0.15 L

*The length "L" is the distance end to end of pile.

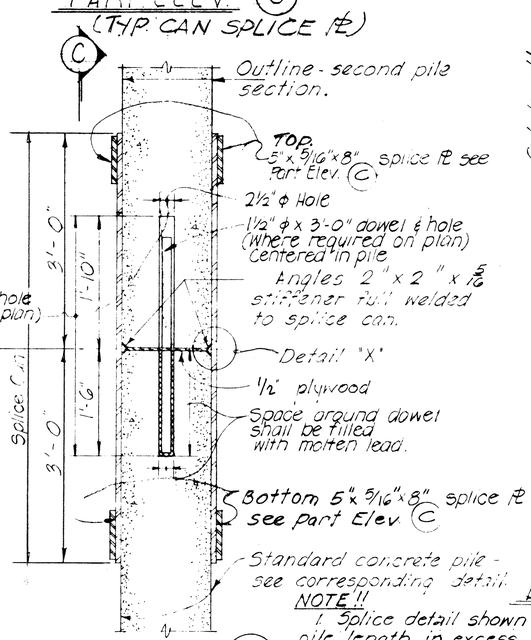
1 POINT PICK-UP 2 POINT PICK-UP 3 POINT PICK-UP

NOTE: Unless special lifting devices are attached for pick-up points, pick-up points shall be plainly marked on all piles after removal of the forms and all lifting shall be done at these points. The use of special, embedded or attached lifting devices, the employment of other pick-up points or any other method of pick-up shall be subject to approval by the Engineer.

NOTE: Concrete in pile build-ups without driving shall be Class A-1 Concrete. Concrete in pile build-ups with driving shall have a minimum compressive cylinder strength f'c of 5000 p.s.i. at 28 days. Build-ups may be driven if the specimen of concrete from which the piles were poured develops a strength of at least 3500 p.s.i. but not earlier than 7 days.



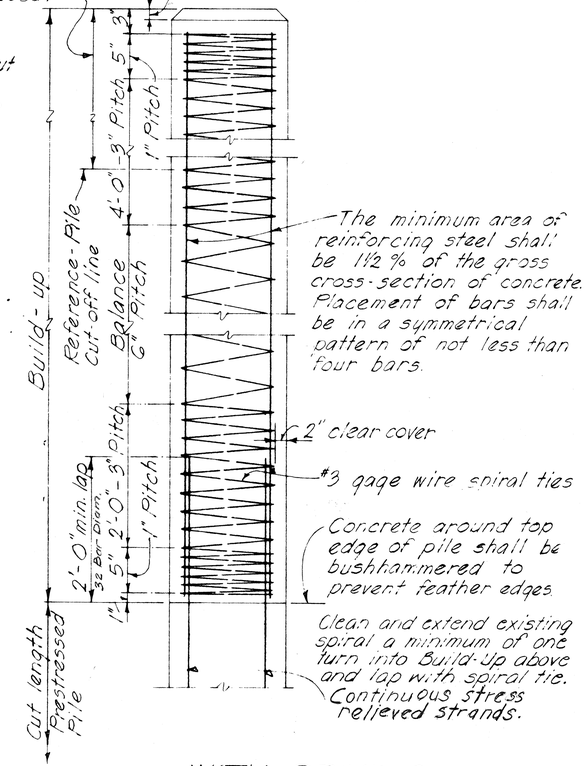
PART ELEV. (C)
(TYP. CAN SPLICE ℄)



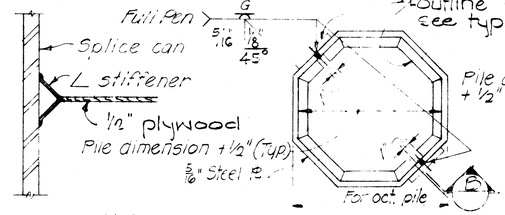
SECTION (B)

TYPICAL PILE SPLICE DETAILS
(FOR PRESTRESSED CONCRETE PILES WHEN CAST IN TWO OR MORE SECTIONS)

NOTE: All welding shall conform to the latest Specifications for Welded Highway & Railway Bridges of the American Welding Society.



WITH DRIVING
TYPICAL PILE BUILD-UP DETAIL



DETAIL 'X' TYPE I TYPE II & III

NOTE!!
1. Splice detail shown above shall not be used except for pile length in excess of 100'-0" long. (See Specifications)
2. Structural steel for splice can shall be ASTM A-36.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
PRESTRESSED CONCRETE PILES

SHEET No. 51 OF 9 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
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No.	QUANTITIES BY	
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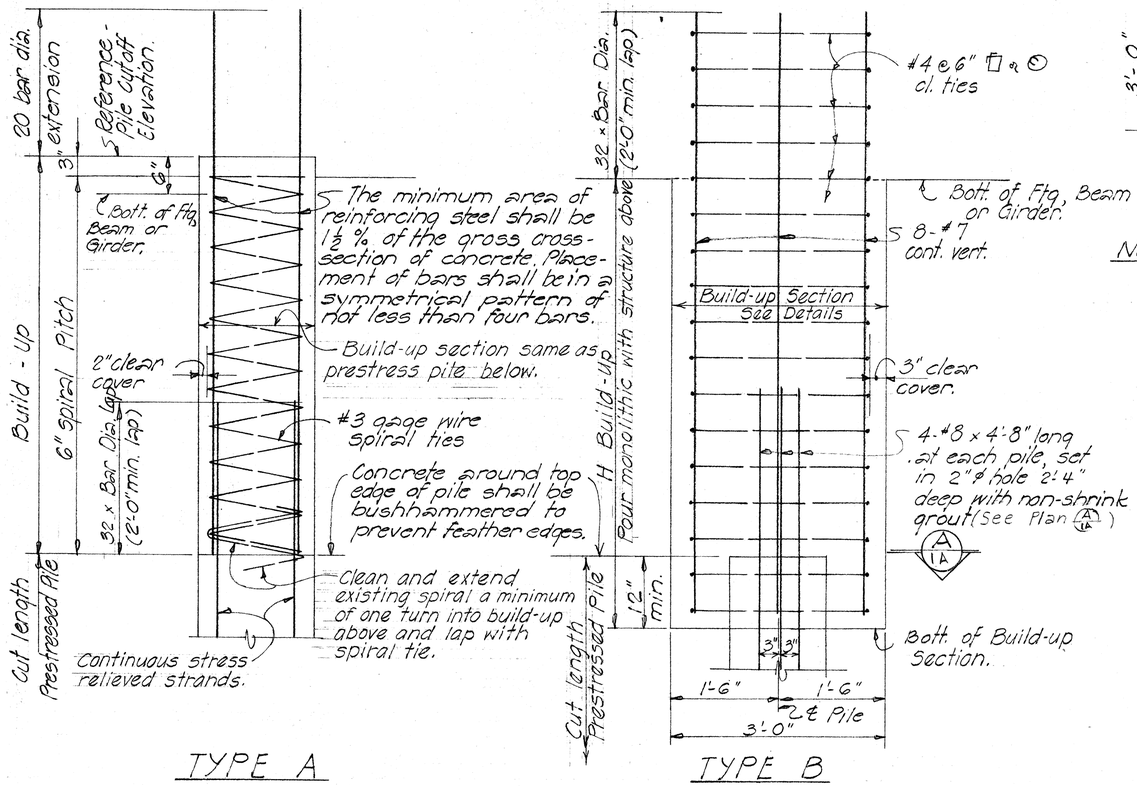
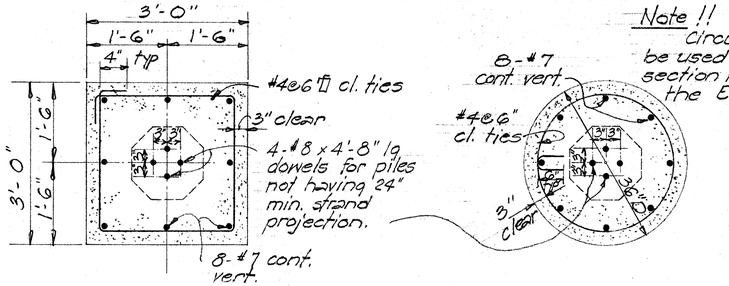
104

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	III-1(69): 8	1968	104 A	144



TYPE A

TYPE B



SQUARE BUILD-UP

CIRCULAR BUILD-UP

SECTION A/1A

Note !! Circular section may be used instead of square section if approved by the Engineer.

Notes:

1. Portion of pile embedded into footing shall be of sound concrete. Damaged portions shall be removed and pile cut-off elev. lowered as required by the Engineer.
2. When height of depressed portion of footing (H) exceeds 4', the depressed section shall be poured separately from the main body of the footing.
3. Depressed portion of footing may be omitted for pile heads embedded at least 4" into footing provided at least 90% of the piles in each footing have the minimum embedment into footing as shown in contract plans.

WITHOUT DRIVING - TYPICAL PILE BUILD-UP DETAILS

NOTE: Selection of pile build-up type without driving to be determined by the Engineer.

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	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

PRESTRESSED CONCRETE PILES

Oct. 1968

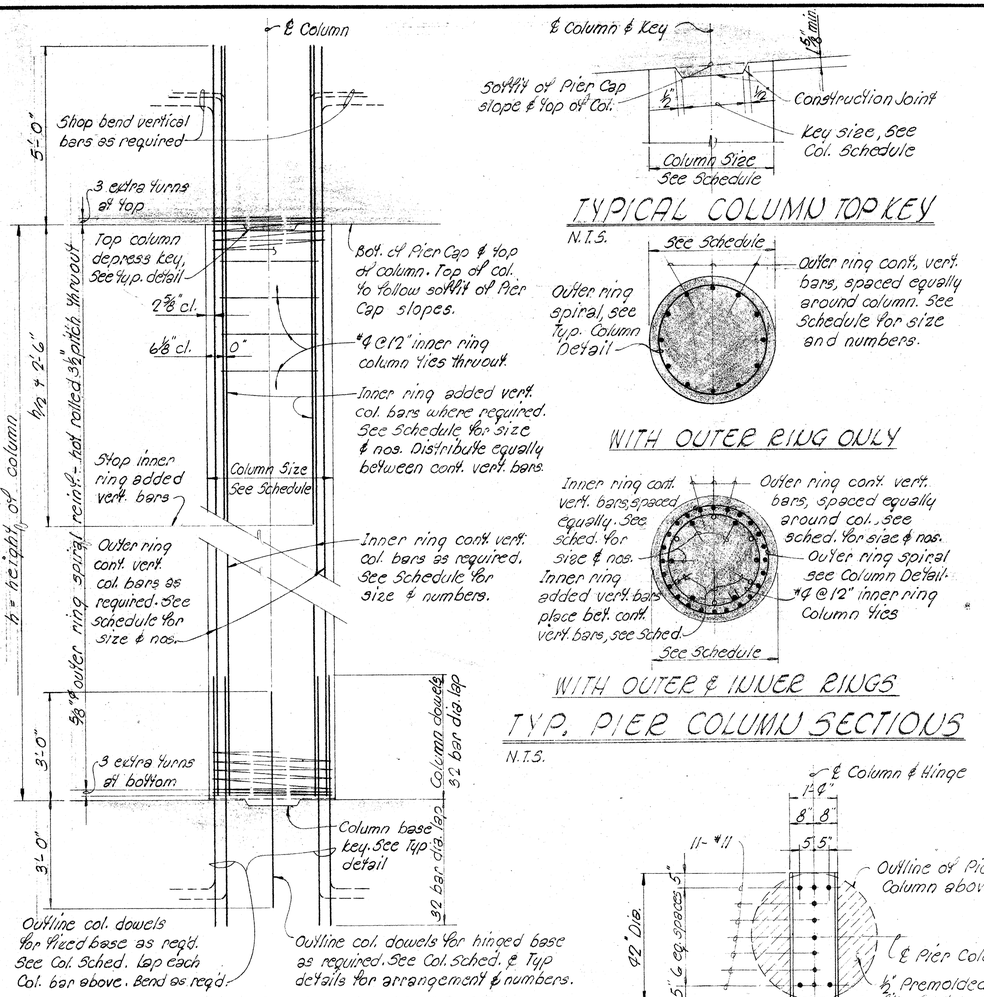
SHEET No. 51A OF 2 SHEETS

104 A 1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	EHI(165)18	1968	105	144

PIER COLUMN SCHEDULE

BRIDGE No.		5							
PIER No.		1 & 2							
COLUMN TOP KEY		16"x16"							
COLUMN SECTION	SIZE	42"ϕ							
	OUTER RING CONT. VERT. REINF.	18-#11							
	INNER RING CONT. VERT. REINF.	—							
	INNER RING ADDED VERT. REINF.	—							
	SPIRAL REINF.	5/8"ϕ @ 3" pitch							
COLUMN BASE DOWELS	FIXED BASE	18-#11							
	HINGED BASE	—							
COLUMN BASE KEY	FIXED BASE	16"x16"							
	HINGED BASE	—							



TYPICAL PIER COLUMN DETAIL

TYPICAL COLUMN TOP KEY

N.T.S.

WITH OUTER RING ONLY

WITH OUTER & INNER RINGS

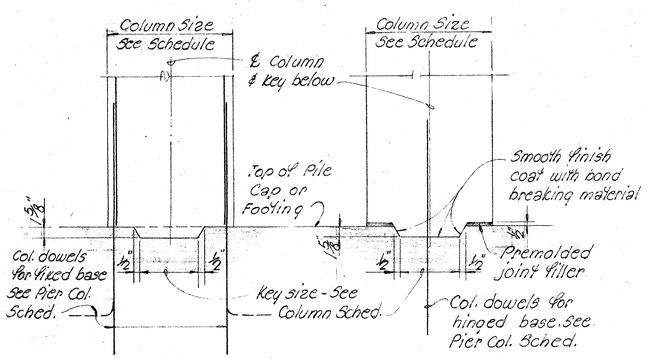
TYP. PIER COLUMN SECTIONS

N.T.S.

TYPE H-1

HINGED BASE DOWELS TYPICAL DETAIL

N.T.S.



AT FIXED BASE AT HINGED BASE

TYPICAL COLUMN BASE KEY DETAIL

N.T.S.

SPECIAL NOTES

1. For General Notes, See Sh. 49
2. References for column lengths:
   a. Structure
   b. Structure
3. The detail drawings on this sheet are made for general applicability to many situations; and particular applications by bridges are as shown in "PIER COLUMN SCHEDULE."

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

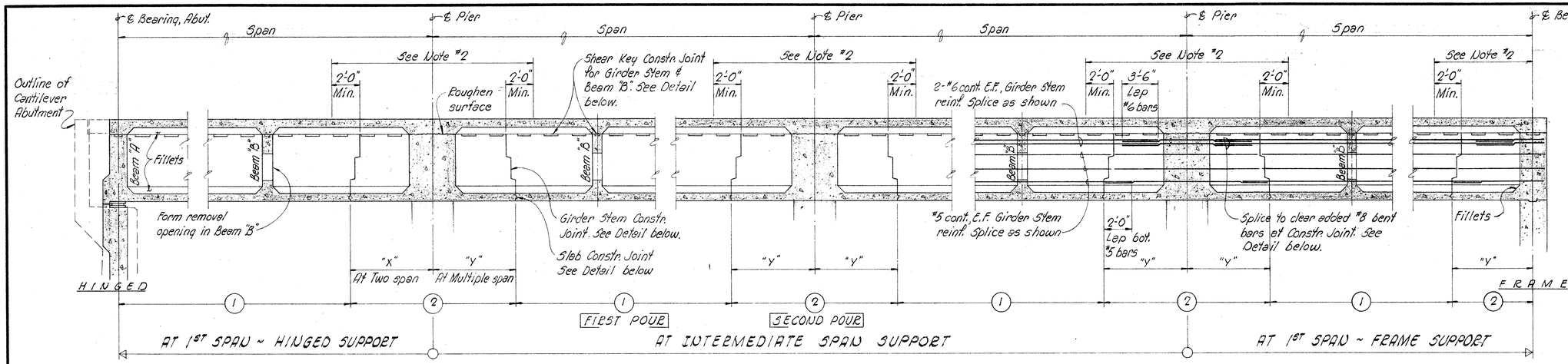
TYPICAL PIER COLUMN

Scale: As shown

SHEET No. 52 OF 9 SHEETS

105 52

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(60):8	1968	106	144

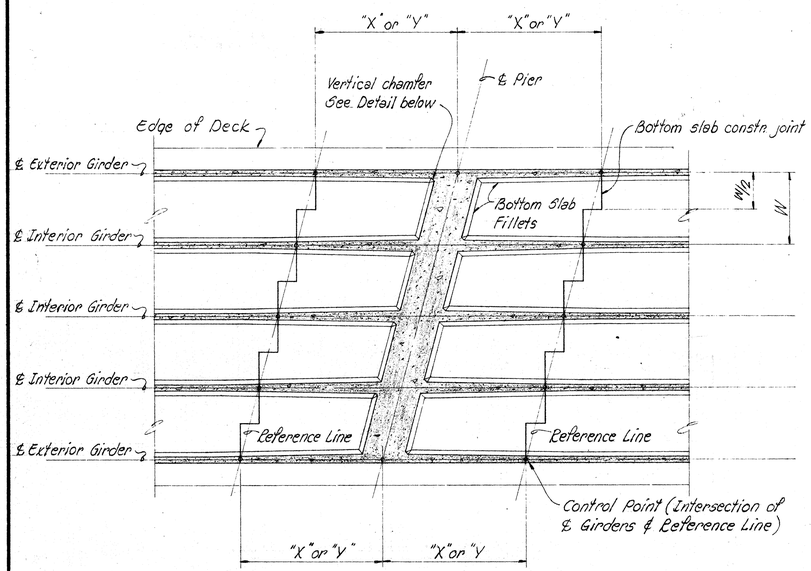


LONGITUDINAL SECTION OF STRUCTURE SHOWING PLACING DIAGRAM FOR SUPERSTRUCTURE CONCRETE

N.T.S.

NOTES

1. Letters (1) & (2) indicate sequence of placing bottom slab & girder stem concrete. (2) may be placed with (1) when approved by the Engineer provided that the (1) sections adjoining the (2) sections are placed in this pour. For any deviation from the above, the Contractor shall submit a diagram to the Engineer for approval.
2. No top slab construction joint or form removal opening shall be located in the region over the piers as noted.
3. Dimension "X" = 1/4 span. & "Y" = 1/5 span.
4. No lapping of main bars shall be permitted at construction joints.
5. See the general arrangement of the particular bridge to determine the applicability of certain details, such as abutments, for example.
6. Roughened surface may be used in place of shear keys when cleaned free of laitance, curing compound & other foreign materials & clean aggregate is exposed by abrasive blast cleaning after the concrete is cured.
7. When top slab is not poured continuously, and top slab forms are not removed, construction joint in top slab shall be located over an intermediate diaphragm.



PARTIAL FRAMING PLAN AT PIER SHOWING CONSTRUCTION JOINTS FOR BRIDGES ON SKEW

N.T.S.

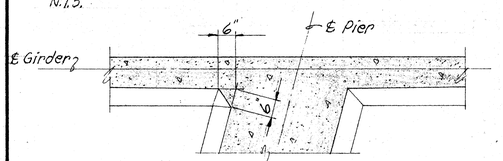
TYPICAL GIRDER STEM CONSTRUCTION JOINT DETAIL

N.T.S.

NOTE! For additional details see Normal Deck Section of corresponding Contract Drawings.

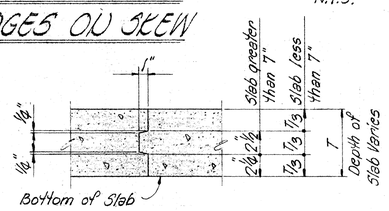
SECTION (A / S3)

N.T.S.



TYPICAL DETAIL OF VERTICAL CHAMFER AT ACUTE INTERSECTION OF SKEWED CONCRETE MEMBERS

N.T.S.



TYPICAL SLAB CONSTR. JOINT DETAIL

N.T.S.

SHEAR KEY DETAIL FOR GIRDER STEM & BM'S "A" & "B"

N.T.S.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CONCRETE BOX GIRDER
SUPERSTRUCTURE CONCRETE PLACING DIAGRAM & JOINTS

Scale: As shown

SHEET No. S3 OF 9 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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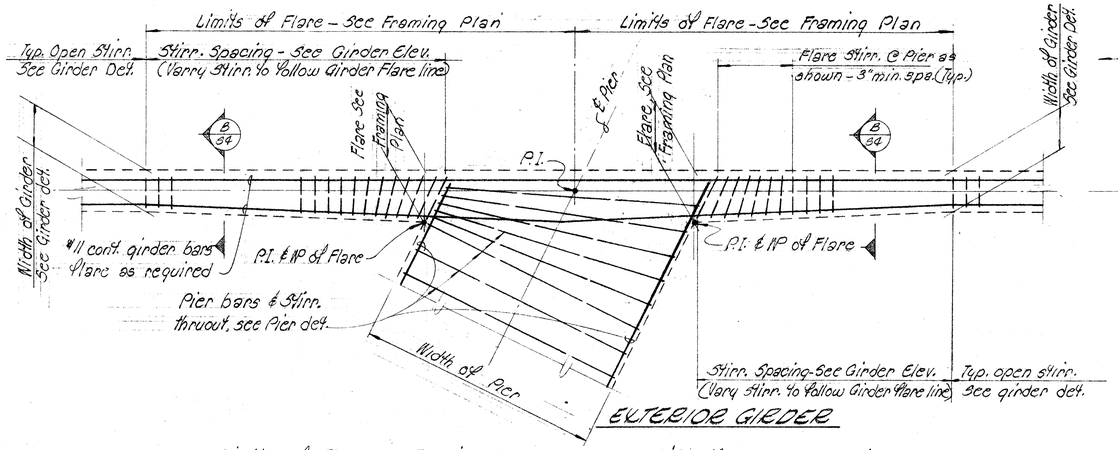
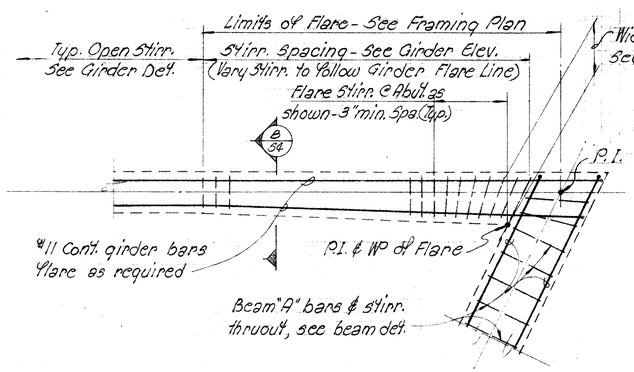
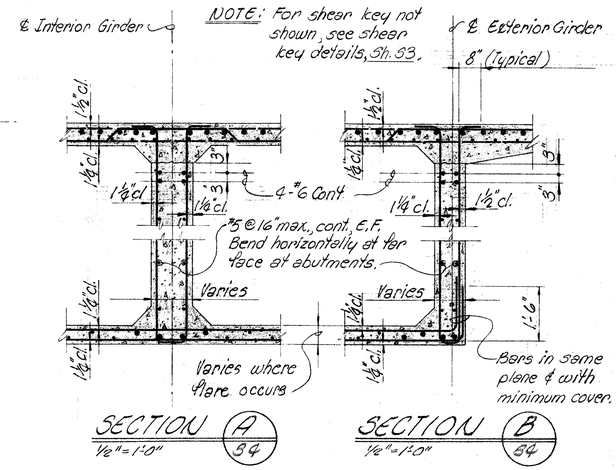
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FHI-1(65):8	1968	107	144



EXTERIOR GIRDER

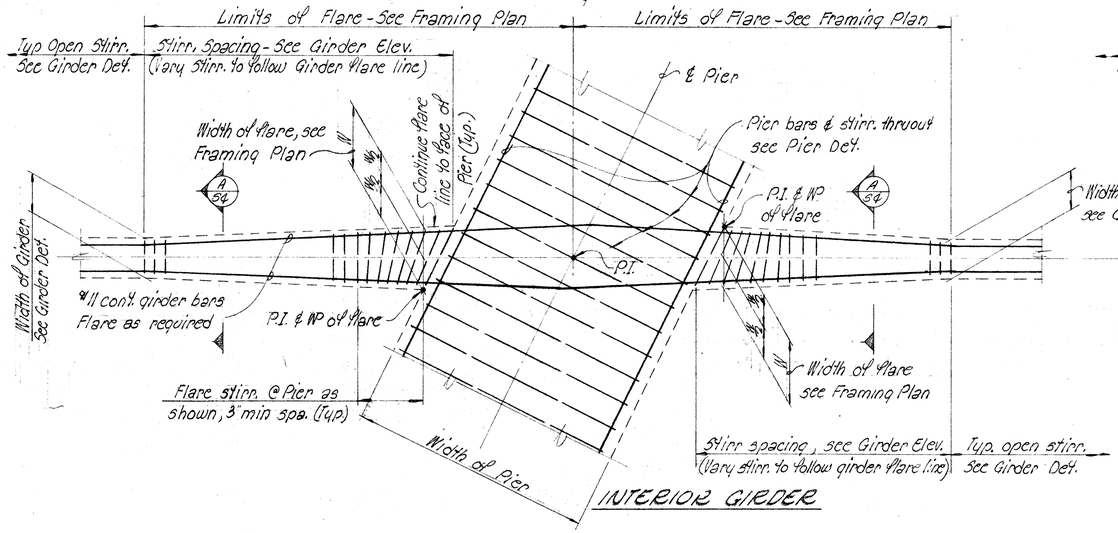


EXTERIOR GIRDER



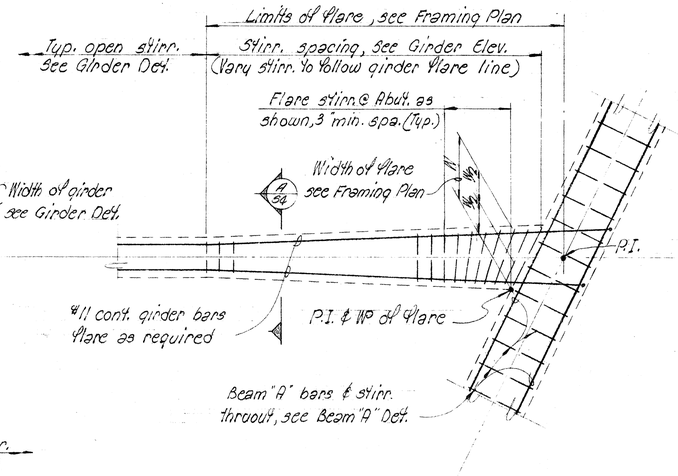
SECTION A/S4
1/2" = 1'-0"

SECTION B/S4
1/2" = 1'-0"



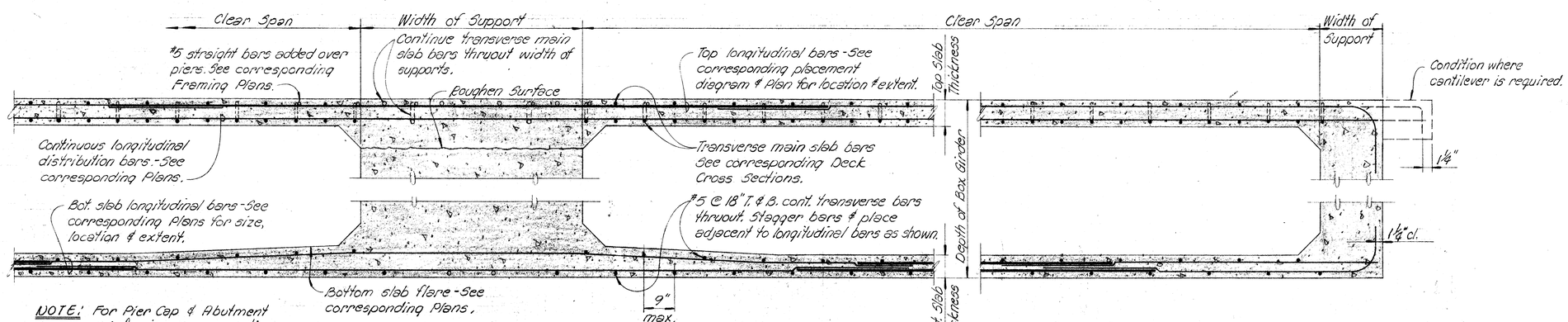
INTERIOR GIRDER

TYP. DETAILS OF GIRDER FLARE @ PIER
N.T.S.



INTERIOR GIRDER

TYP. DETAILS OF GIRDER FLARE @ ABUT.
N.T.S.



NOTE: For Pier Cap & Abutment reinforcing, see respective details.

TYPICAL LONGITUDINAL SECTION THRU DECK
N.T.S.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

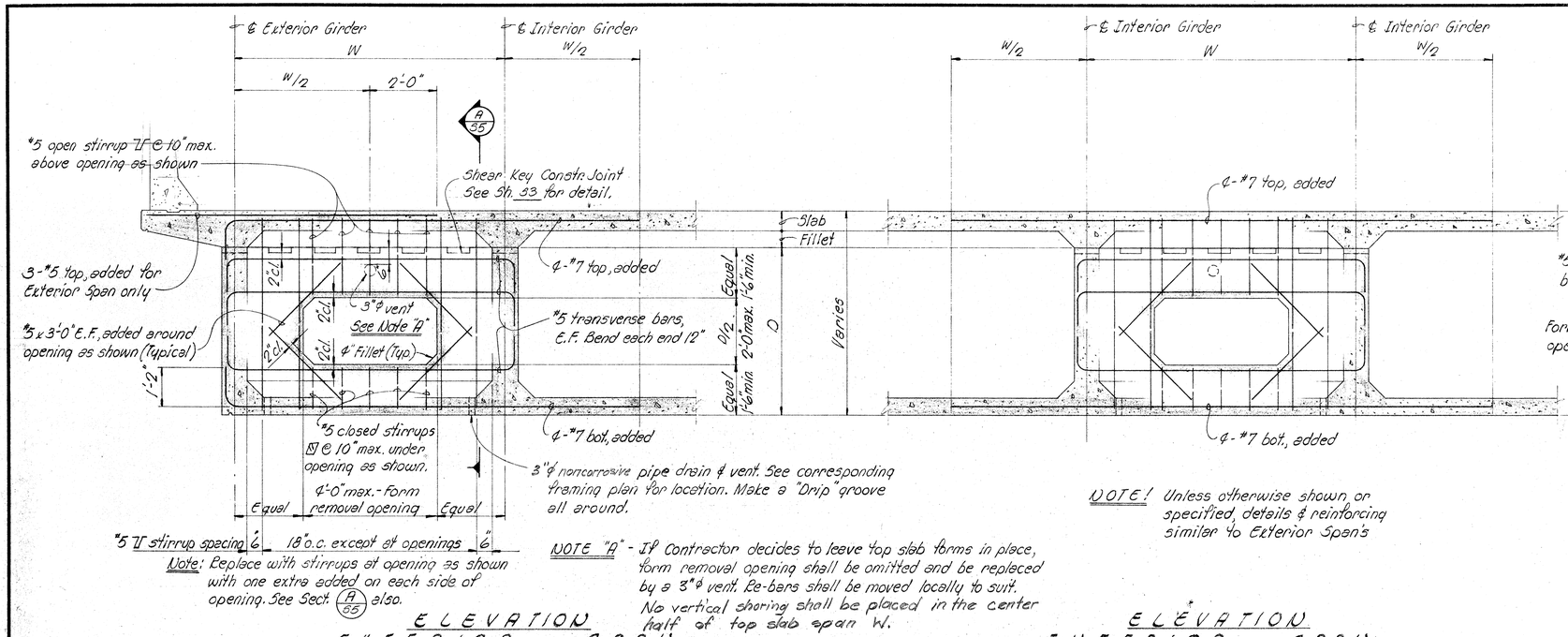
STANDARD DETAILS

CONCRETE BOX GIRDER
GIRDER STEM REINF. & PIER CAP SHEAR KEY

Scale: As shown

SHEET No. S4 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	[illegible]	1968	108	144



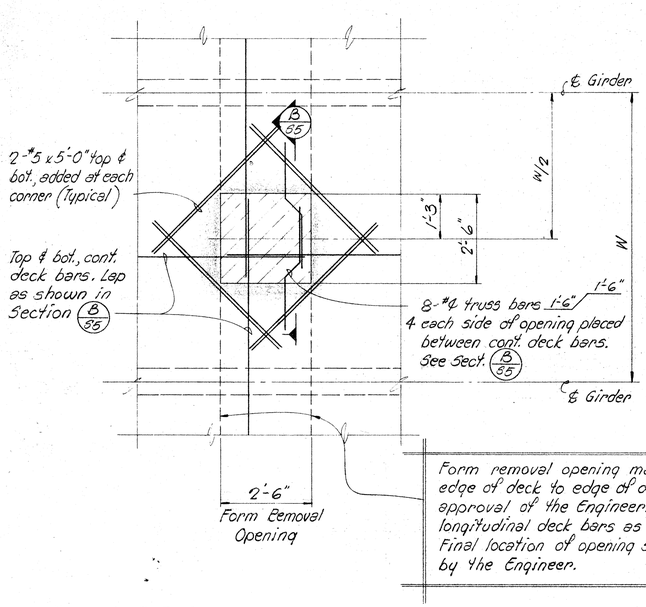
ELEVATION EXTERIOR SPAN

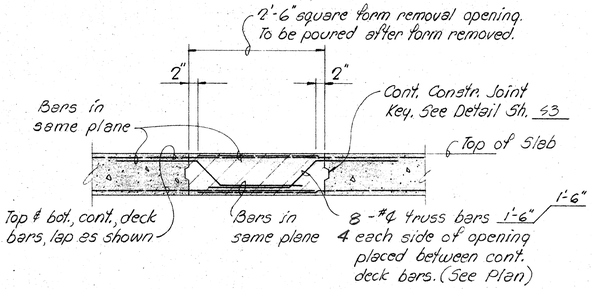
ELEVATION INTERIOR SPAN

SECTION A/55

TYPICAL BEAM "B" DETAILS

N.T.S.





NOTE! Form removal openings shall not be located where main girder bars occur.

SECTION B/55

N.T.S.

Form removal opening may extend from edge of deck to edge of deck, with the approval of the Engineer. Lap small longitudinal deck bars as shown in Sect. B/55. Final location of opening shall be determined by the Engineer.

PART PLAN OF DECK SHOWING FORM REMOVAL OPENING (OPTIONAL)

N.T.S.

ORIGINAL PLAN
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CONCRETE BOX GIRDER
BEAM "B" & FORM REMOVAL OPENING

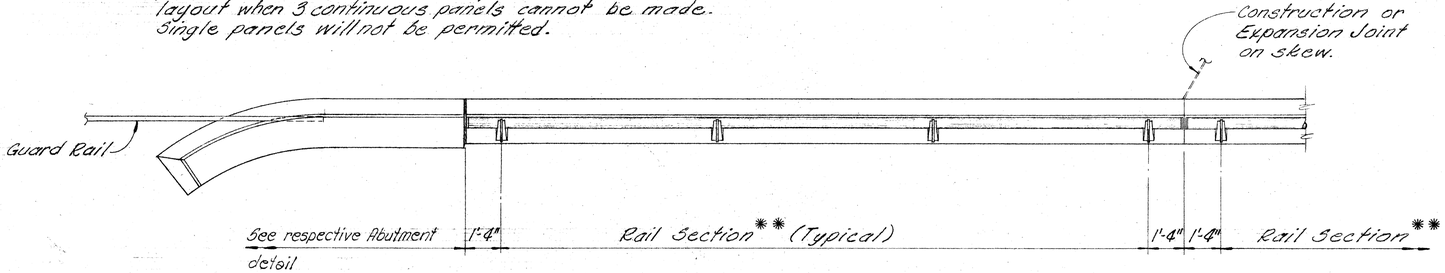
SHEET No. 55 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	EHH(69)8	1968	109	144

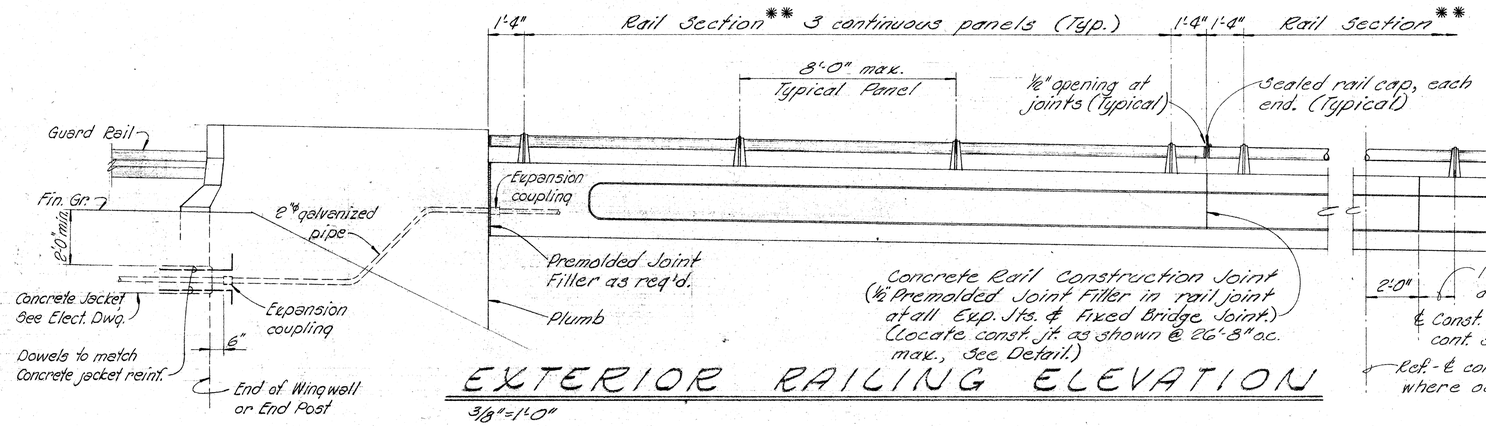
✱✱NOTE: The Contractor shall lay out the railing to provide 3 continuous panels per section where possible. 2 or 4 panels in end sections will be permitted to complete the layout when 3 continuous panels cannot be made. Single panels will not be permitted.

NOTES: 1.- Rail posts shall be normal to grade.
2.- Provide double posts at each expansion joint, fixed bridge joint & as shown on detailed drawings.

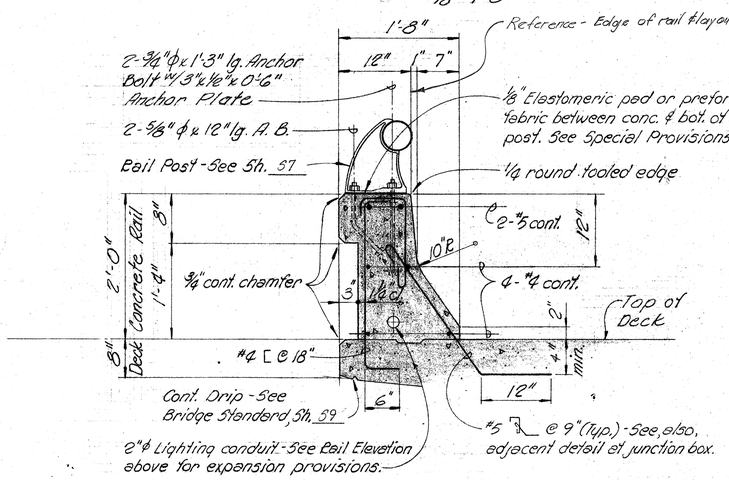
NOTE: Details shown on this sheet are standard details except for modifications as may be required for special conditions. For such conditions refer to corresponding details shown on the plans.



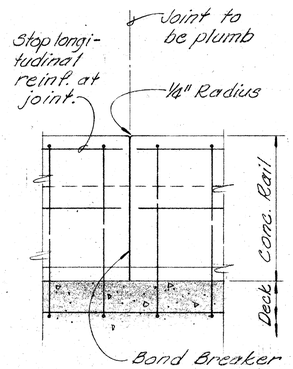
RAILING PLAN
3/8"=1'-0"



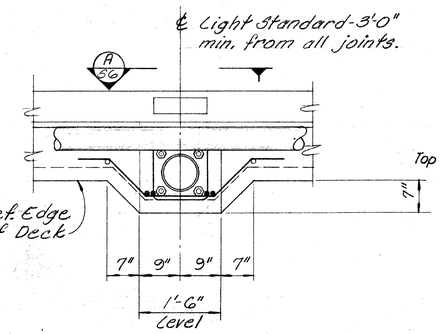
EXTERIOR RAILING ELEVATION
3/8"=1'-0"



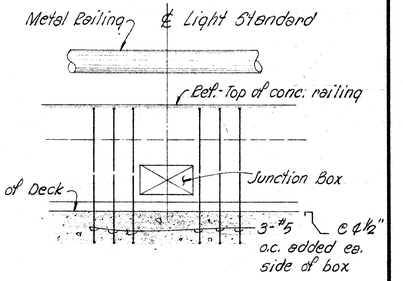
TYP. CONC. RAILING SECT.
1" = 1'-0"



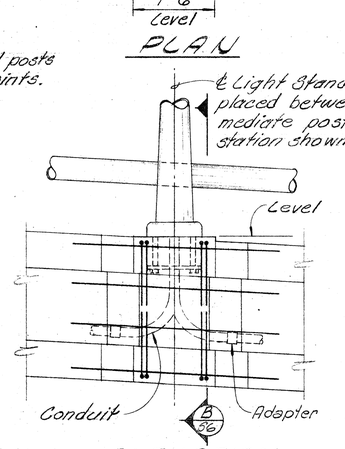
CONCRETE RAIL CONST. JT. DETAIL
1"=1'-0"



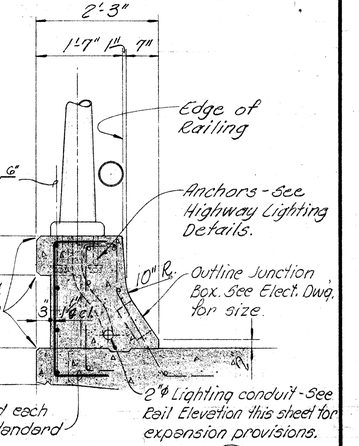
PLAN



ELEVATION A 56



ELEVATION



SECTION B 56

LIGHT STANDARD DETAILS
3/4" = 1'-0"

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

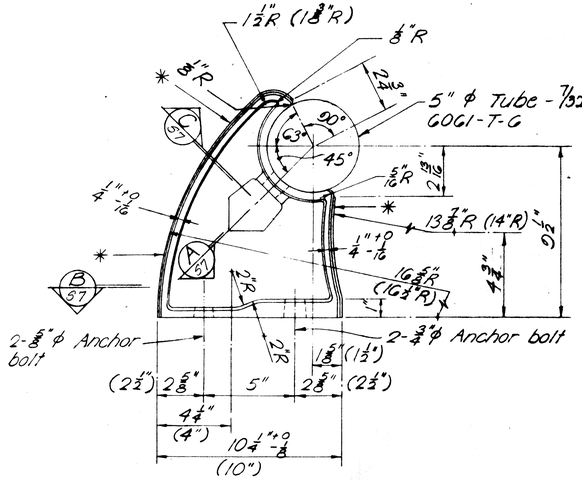
STANDARD DETAILS

METAL BRIDGE RAILING SINGLE RAIL COMBINATION TYPE ON PARAPET

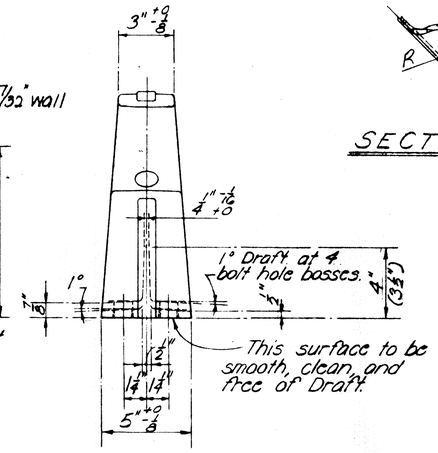
Scale: As shown

SHEET No. 56 OF 9 SHEETS

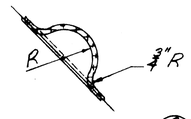
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-(60)-8	1968	110	144



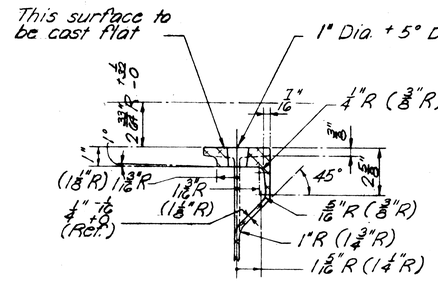
SIDE ELEVATION



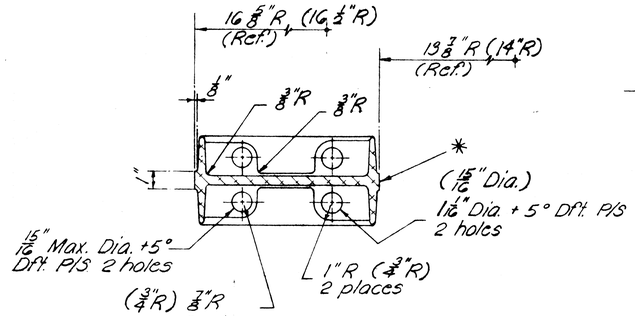
END ELEVATION



SECTION C/57



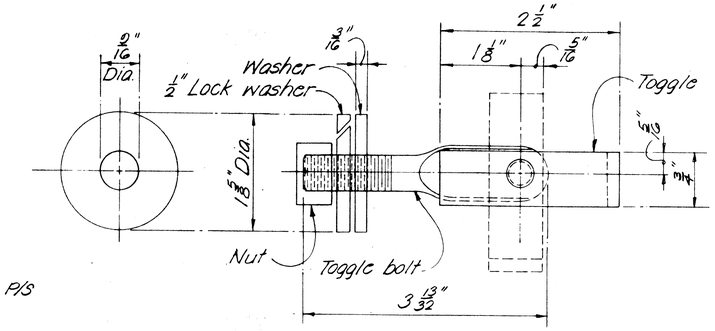
SECTION A/57



SECTION B/57

NOTE:

Toggle Bolt Material - ½"-13 N.C. 1335 C.R. - Steel heat treated R.C. 32-38. ASTM-A354.
Toggle Material - 1015 H.R. steel pickled and oiled. Round edges ASTM-A303.
Washer Material - SAE 1020 H.R. steel plates. ASTM-A-7. Break sharp edges.
Nut - ½"-13 American hex. nut - Heavy Material 1035 C.R. - Steel heat treated ASTM A325 Grade 2H.
Cadmium plating on steel - Type N.S. .0005" thick ASTM-A165. (all parts).
For cast post specifications, see Special Provisions.



WASHER

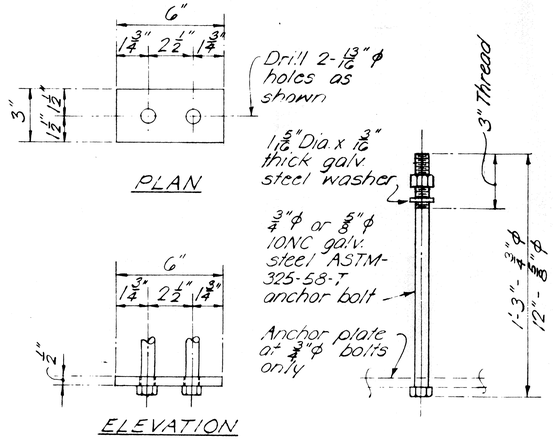
SIDE ELEVATION ASSEMBLAGE

NOTE:

✳ Casting to be supplied with a standard scratch brush finish on entire gating rib surface and as indicated by an asterisk (✳). Finish shall be approved by the Engineer.
Casting to be neatly trimmed and any protruding flash to be broken off.
For cast post specifications, see Special Provisions.
Unless otherwise specified, draft angles to be 3°, corner radii to be 3/32" R, fillet radii to be ⅜" R, casting tol. to be ±1/16", wall thickness to be ±1/32".
Dimensions may be as shown or as shown in parenthesis ( ).

TYPICAL RAIL POST DETAILS

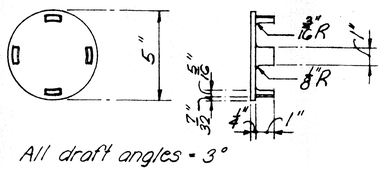
Scale: 3" = 1'-0"



ANCHOR PL DETAIL ANCHOR BOLT

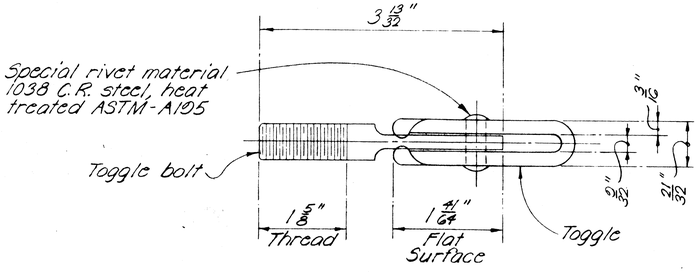
TYPICAL RAIL POST ANCHOR BOLT ASSEMBLY

Scale: 3" = 1'-0"



RAIL CAP DETAIL

Scale: 3" = 1'-0"



TOP PLAN

½" ϕ TOGGLE BOLT DETAILS

Full Scale

GENERAL NOTES

Metal bridge railing shown is for Aluminum bridge railing. See Special Provisions for alternate railing in steel.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS METAL BRIDGE RAILINGS SINGLE RAIL

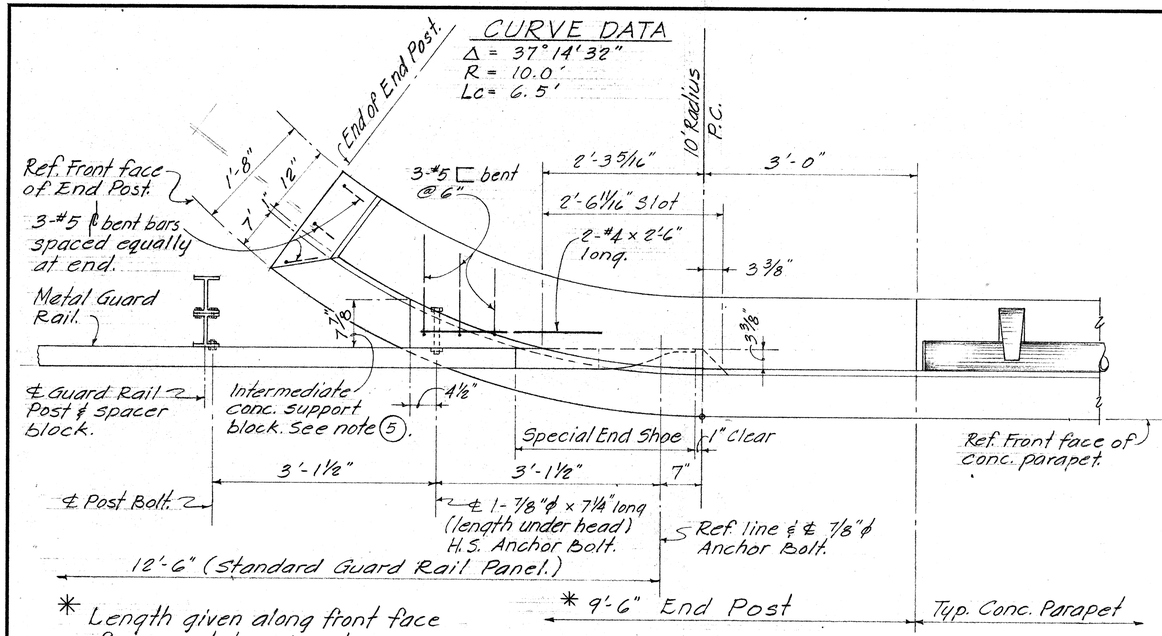
Scale as noted Date: OCT. 1968

SHEET No. 57 OF 9 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | NOTE BOOK | No.

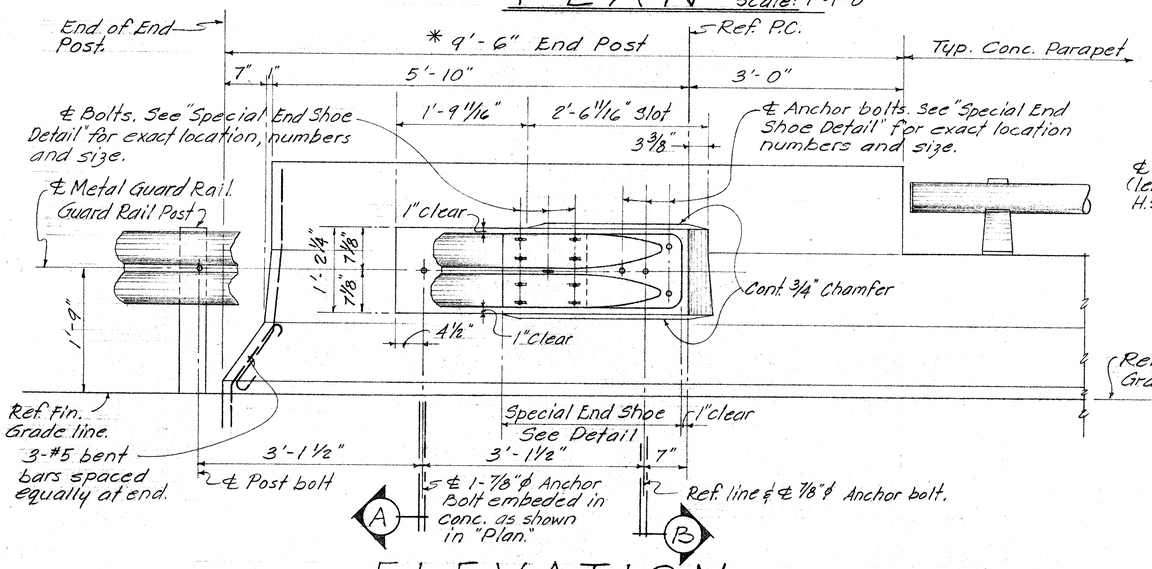
PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IHI-1(69)8	1968	111	144

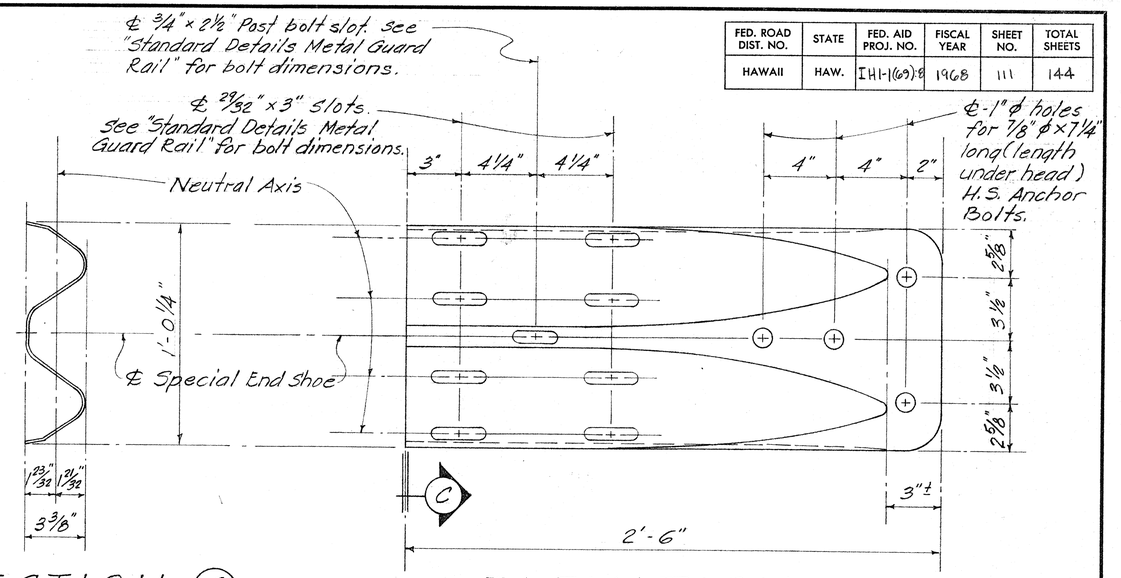


* Length given along front face of parapet & end post.

PLAN Scale: 1"=1'-0"



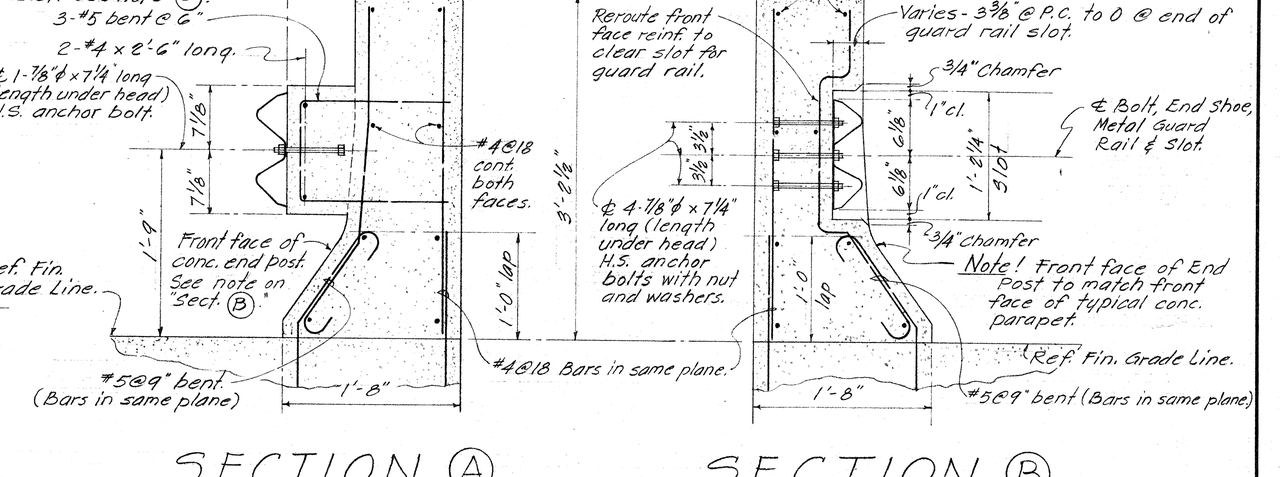
ELEVATION scale: 1"=1'-0"



SECTION (C) ELEVATION

SPECIAL END SHOE DETAILS

Scale: 3"=1'-0"



SECTION (A)
Scale: 1 1/2"=1'-0"

SECTION (B)
Scale: 1 1/2"=1'-0"

NOTES

1. H.S. Bolts shall conform to the requirements of ASTM A-325.
2. All shoe assembly, including anchor bolts, nuts and washers, shall be galvanized.
3. Special End Shoe shall be fabricated from 10 gage steel conforming to the requirements of AASHO 180.
4. First Guard Rail Panel adjoining "Special End Shoe" shall be of galvanized steel. See Special Provisions for requirements.
5. Intermediate support of concrete block shall be installed at approach ends only.
6. Details shown on this sheet are drawn for End Posts used with the Single Rail Type Metal Bridge Railing and Concrete Parapet.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

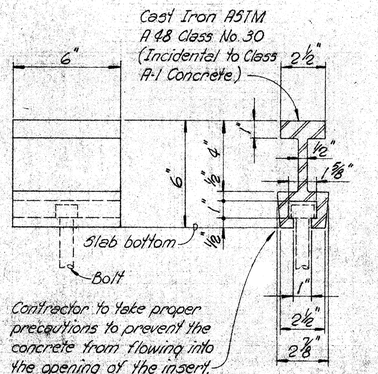
STANDARD END POST CONNECTION TO METAL GUARD RAIL DETAILS (SINGLE RAIL TYPE)

SCALE AS SHOWN DATE: DEC. 1968

SHEET No. 88 OF 9 SHEETS

111

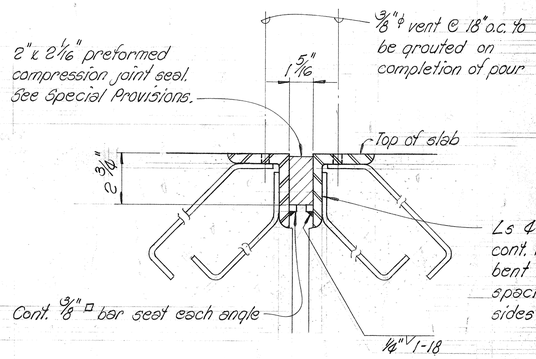
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HFI(69):8	1968	112	144



ELEVATION SECTION

PIPE HANGER & INSERT DETAIL

N.T.S.



Depressed "V" letters ⅜" deep

NAME DATE

3"

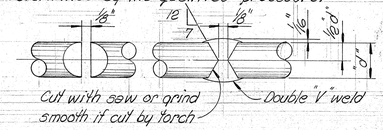
Use correct name of bridge — Date of Year built

NOTES: 1. Refer to corresponding detail drawings for placement of such names & dates at end post.
2. Exact details & spacing of letters & figures shall be as directed by the Engineer.

TYPICAL DETAIL OF LETTERS & FIGURES AT CONCRETE END POST

N.T.S.

NOTE: Carbon content of reinf. bars for welding shall not be over 0.40%. Low hydrogen electrodes shall be used with preheat & interpass temperature determined by the qualified procedure.

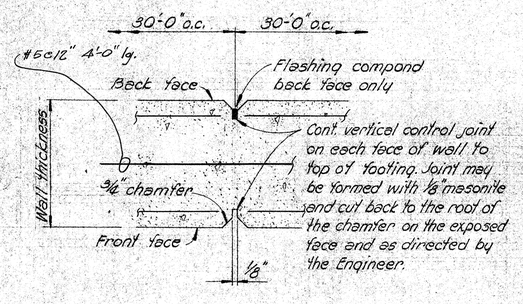


PLAN - REINF. BAR SPLICE

N.T.S.

GENERAL NOTES

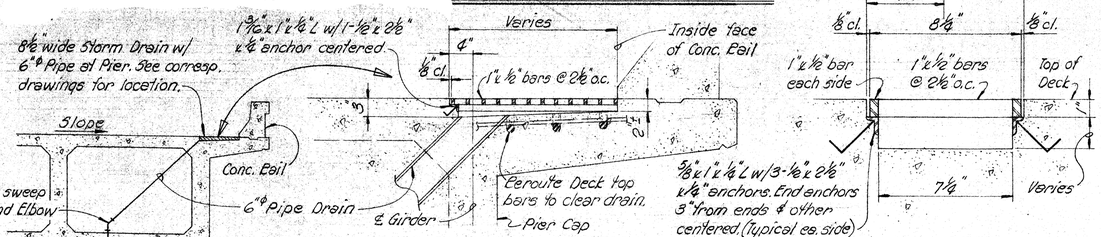
1. Elastomeric Pad - Top & bottom of bridge bearing pads shall be secured against displacement with adhesive approved by the Engineer. Pads shall be incidental to concrete & will not be paid for seperately.
2. All concrete shall be Class A-1 unless otherwise noted.
3. Clearance for reinforcing bars shall be as follows, unless otherwise noted:
   a. For stirrups of beams & pier caps ----- 1½"
   b. For ties of columns ----------- 2"
   c. For formed walls ----------- 2"
   d. For footings ----------- 3"
4. Concrete seats receiving steel plates, lead plates or neoprene pads shall be poured monolithically with supporting structures & top surfaces of the concrete seats shall be finished with a steel trowel to a smooth level at the elevation shown on the plans.
5. Reinforcing shall be detailed in accordance with A.C.I. Manual of Standard Practice for Detailing Reinforced Concrete Highway Structures unless otherwise noted.
6. Reinforcing bars shall be securely tied at all intersections & lap splices & shall be held in place during pouring to maintain their proper locations as shown on plans.
7. Splices of reinforcing - See Special Provisions.
8. Minimum spacing between parallel bars shall be 2½ times the diameter of bars, but in no case shall the clear distance between the bars be less than 1½ times the maximum size of the coarse aggregate.
9. Forms for all exposed surfaces of separation structures & surfaces of retaining walls visible from a traveled way or from a populated area shall shall be plywood except that metal forms may be permitted provided a surface finish satisfactory to the Engineer can be obtained & the use of such forms is approved in writing by the Engineer. Forms for round columns shall be made of materials that will give a smooth finish & true dimensions as given in the plans. Forms for prestressed concrete members shall be either metal or plywood.
10. Vertical column bars shall be arranged in such a manner as to miss pier cap bars above as directed by the Engineer.
11. Except as otherwise noted on drawings, all exterior corners & re-entrant angles in concrete work shall be chamfered ¾" x ¾". See Standard Specifications.
12. All welders & welding procedures shall be qualified according to the requirements of the Special Provisions.



CONTROL JOINT DETAIL

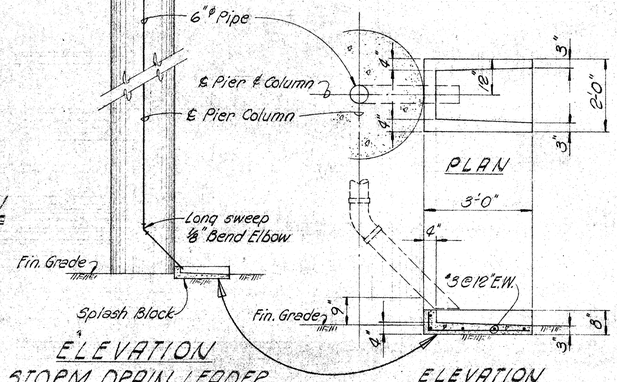
N.T.S.

TYPICAL EXPANSION JOINT DETAIL N.T.S.

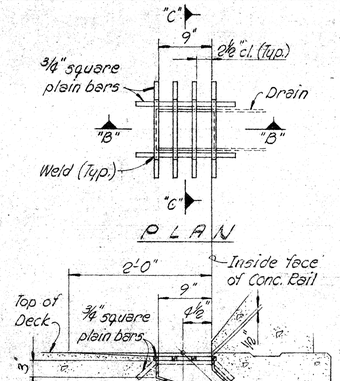


LONGITUDINAL SECTION — CROSS SECTION

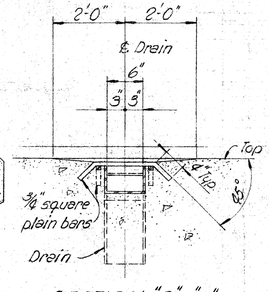
TYPICAL 8½" WIDE STORM DRAIN DETAIL



ELEVATION STORM DRAIN LEADER



ELEVATION — SECTION "B"-"B"



SECTION "C"-"C"

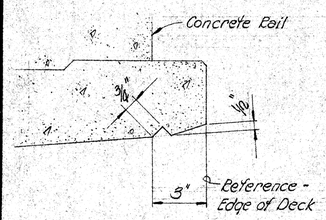
SPLASH BLOCK DETAIL

16 GAUGE BRONZE DRAIN DETAIL

NOTES
1. All pipes to be standard galvanized steel ASTM A120
2. All pipe fittings to be cast iron screwed type drainage fittings (with ⅛ pitch). Federal Specifications WW-P-491a(1).
3. All drain pipes, drain frames, gratings & splash blocks to be incidental to Class A-1 concrete and will not be paid for separately.
4. Assemblage of grillage and pipe shall be hot-dip galvanized after all welding is completed.

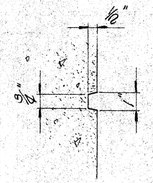
TYPICAL DRAIN DETAILS

N.T.S.



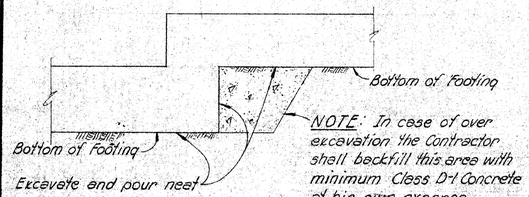
DRIP DETAIL

N.T.S.



END POST GROOVE DETAIL

N.T.S.



EXCAVATION FOR CONTINUOUS FOOTING STEP-UP

N.T.S.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
No.	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

GENERAL NOTES, DRAINS, EXPANSION & CONTROL JOINTS, DRIP, GROOVE, PIPE HANGER INSERT & FOOTING STEP-UP.

Scale: As shown

SHEET No. 59 OF 9 SHEETS

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112 5-9