

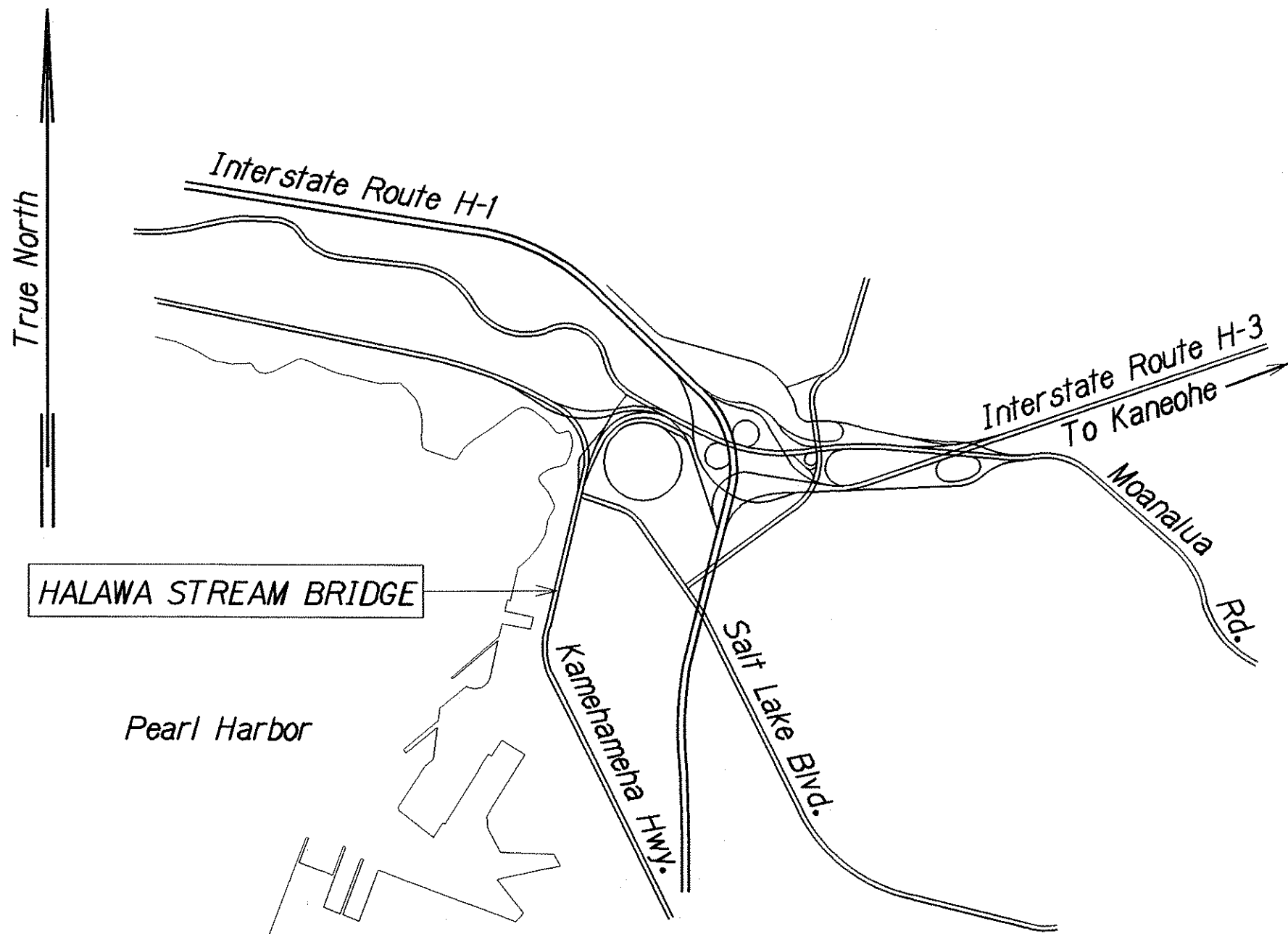
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SYMBOLS AND ABBREVIATIONS

Detail or section designation		Sheet number detail is drawn on	
Sheet number section is cut or detail location			
B-1	Boring numeral and designation		
① ②	Location of concrete seat line		
(E)	Expansion joint		
(H)	Hinged joint		
A = A.B.	Anchor bolt	H = H.E.	Hawaiian Electric
Abut.	Abutment	Hex.	Hexagonal
A.C.	Asphaltic Concrete	H, h	Height
Adj.	Adjacent	Horiz.	Horizontal
Alt.	Alternate	Hwy.	Highway
Alum.	Aluminum	HS	High strength
Approx.	Approximate	I = Inv.	Invert
Az.	Azimuth	Int.	Interior
B = B.F.	Back Face	J = Jt.	Joint
Bal.	Balance	K = Ksi.	Kips per square inch
Bot., Bott.	Bottom	L = L	Length
Bm.	Beam	Lg.	Long
Beg.	Begin	Longit.	Longitudinal
Brg.	Bearing	LT	Left
Bef.	Between	M = Max.	Maximum
C = Cl.	Clear	Min.	Minimum
Cont.	Continue	N = No., #	Number
Corresp.	Corresponding	O = oc	On center
Conc.	Concrete	P = PL	Plate
Col.	Column	Psi	Pounds per Square inch
☉	Center line	R = R	Radius
CIP	Cast in place	Ref.	Reference
CY	Cubic yards	Reinf.	Reinforcement
D = Diag.	Diagonal	Ret.	Retaining
Def.	Detail	Req.	Require
ø	Diameter	Req'd.	Required
Dim.	Dimension	Rdwy.	Roadway
E = Ea.	Each	RT	Right
E.F.	Each face	S = Sch.	Schedule
El., elev.	Elevation	Sect.	Section
E.P.	Edge of pavement	SF	Square foot
Eq.	Equal, equally	Sht.	Sheet
Exc.	Excavation	Spog.	Spacing
Exist.	Existing	Spcs.	Spaces
Exp.	Expansion	Sta.	Station
F = FA	Force account	Std.	Standard
F'c	Strength of Concrete at Time of Initial Prestress	Str.	Stream
F.F.	Front face	Stirr.	Stirrup
Fin.	Finish	Struct.	Structure
Ft.	Foot, feet	Symm.	Symmetrical
Ftg.	Footing	T = Thk.	Thick
G = G, gdr.	Girder	Transv.	Transverse
Galv.	Galvanize	Thru.	Through
Gr., grd.	Ground, grade	TS	Tubular steel
		Typ.	Typical
		V = Vert.	Vertical
		W = WW	Wingwall
		W/	With



LOCATION PLAN

Not To Scale

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HALAWA STREAM BRIDGE
INDEX TO DRAWINGS, LOCATION PLAN,
SYMBOLS AND ABBREVIATIONS
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)
Scale: As Noted Date: Aug. 2000
SHEET No. 51 OF 57 SHEETS

GENERAL NOTES

GENERAL SPECIFICATIONS:

State of Hawaii, Department of Transportation Standard Specifications for Road and Bridge Construction, 1994 and Special Provisions.

DESIGN SPECIFICATIONS:

AASHTO 1998 LRFD Bridge Design Specifications, with 1999 Interim Revisions.

DESIGN LOADS:

- A. Dead Load: A 20 psf allowance for future wearing surface of concrete has been included in dead load calculations. Concrete unit weight of 160 p.c.f. has been used for dead load calculations.
- B. Live Load: HL-93
- C. Seismic Loads: Seismic Zone = 2A, Acceleration = 0.17

MATERIALS:

- A. Structural concrete shall have the following 28 days strength and water-cement ratio:
1. Drilled shaft - 5,000 psi with water-cement ratio of 0.45 max.
 2. Precast / Prestressed girders - 6,000 psi with water-cement ratio of 0.40 max.
 3. All others - 4,000 psi with water-cement ratio of 0.45 max.
- Provide corrosion inhibition admixture to all concrete except drilled shaft (30% calcium nitrite solution @4 gallons/cy min.)
- B. All reinforcing steel shall conform to the requirements of ASTM A 615 and shall be deformed, Grade 60 unless noted otherwise.
- C. Welding electrodes for structural steel shall be E 70.
- D. Welding electrodes for stainless steel shall be E 316.
- E. Elastomeric Bearing Pads shall be 60 hardness with a shear modulus (G) at 73° F of 0.15 KSI.
- F. ASTM A 325 Type I and A 307 anchor bolts, nuts, washers, structural steel shapes and plates shall be hot-dip galvanized after fabrication, unless noted otherwise.
- G. For materials of prestressed concrete girders, see applicable prestressed concrete notes.
- H. The minimum covering measured from the surface of the concrete to the face of any reinforcing bar shall be as follows, except as noted otherwise:
1. Deck Slabs
 - a. Top Bars -- 2"
 - b. Bottom Bars -- 1½" except as noted otherwise
 2. Prestressed Girders -- See Prestressed Concrete Girder Details
 3. Abutments and Piers -- 2"
 4. Concrete cast against earth -- 3"
 5. Exposed to salt water -- 4"
- I. All reinforcement bars shown with bends shall conform to standard ACI hooks unless noted otherwise.
- J. Reinforcing bars shall be detailed according to the latest edition of the ACI Manual of Standard Practice for Detailing Reinforced Concrete Highway Structures unless noted otherwise.
- K. All dimensions relating to reinforcing bars (e.g. spacing of bars, etc.) are to centers of bars unless noted otherwise.
- L. For concrete finish, see Standard Specifications.
- M. Bed course material for slabs shall conform to Section 703J6A of the Standard Specifications. Bed course material shall be incidental to Section 206 - Structural Excavation for Abutment.

CONSTRUCTION REQUIREMENTS:

- A. Refer to Hawaii Standard Specifications for Road, Bridge and Public Works Construction, (Hawaii 1994 edition and Special Provisions).
- B. Exact location of bars shall be arranged so that no interference will occur between vertical reinforcement and horizontal foundation reinforcement.
- C. Except as noted otherwise, all vertical dimensions are measured plumb.
- D. The Contractor shall verify all site conditions and not rely upon these plans for access road or stream location, etc. Conditions may differ from those shown due to work performed by other contracts.
- E. The Contractor shall submit shop drawings for construction of falsework, cofferdams or other obstructions required for construction.
- F. Girder concrete seats receiving elastomeric pads, hinge blocks and creep blocks shall be poured monolithically with the supporting structure. Top of concrete seats shall be finished with a steel trowel to a smooth level surface to the elevation shown on the plans. All points on the surface shall be level to within 1/16 inch. The bottoms of elastomeric bearing pads shall be fastened with adhesives.

- G. In general, top of concrete deck slab shall be constructed to follow the finish roadway vertical and horizontal curves and grades.
- H. Abutment walls shall be backfilled before girders are placed.
- I. Where the plans call for reinforcement bars to be embedded or anchored into existing concrete, see Special Provisions Section 674 - concrete retrofit for the use of adhesive anchors.
- J. Where the plans call for placing fresh plastic concrete against existing concrete, see Special Provisions Section 674 - concrete retrofit for the use of bonding agent.
- K. Existing rail on the makai side of the bridge shall be removed before placing the new deck. Concrete for the new bridge rail shall be placed after the deck concrete has reached 28 days strength.
- L. Existing abutment walls may be partially removed (at no cost to the state) to provide access for construction equipment to the stream bank below. All demolished walls shall be rebuilt to the original condition (plans for the existing structure are available from the State) at no cost to the State. All plans for demolition and rebuilding of the walls shall be approved by the state Engineer. This work shall be considered incidental to Section 202 - Removal of Portions of Existing Bridge.
- M. Repair damaged existing girders (along G-9, G-10, G-11) according to section 675 - Girder Repair.
- N. Drilled shaft operations conducted from existing structures shall not exceed the safe capacity of the structure. The capacity of the structure shall be determined by the Contractor's engineer. The calculations shall be stamped and signed by a Hawaii State registered structural engineer and submitted to the State for approval.

GENERAL:

- A. All items noted incidental will not be paid for separately.
- B. The Contractor shall verify all grades and dimensions before commencing with any work.
- C. The Contractor shall verify the locations of all utility lines near the bridge and notify their respective owners before commencing work of excavation. In the vicinity of existing underground utilities and foundation tie backs, the contractor shall manually dig foundation and drilled shafts to a level below the utilities and foundation tie backs.
- D. Any damage to utility lines that are caused by the Contractor shall be repaired at his expense at no cost to the State.
- E. Construction joints shall be located as shown on the Plans unless noted otherwise.
- F. Unless noted otherwise, all exposed concrete edges shall be chamfered ¾".
- G. In the event of over-excavation, the space between the footing and the ground shall be filled with a minimum of Class D concrete at the Contractor's expense at no cost to the State.
- H. All concrete shall be removed from the exposed joint face of premolded joint filler immediately after removal of the forms.

FOUNDATION:

Reference is made to and incorporated into these plans and specifications: "Structural Foundation Investigation Report - Kamehameha Highway Replacement of Halawa Stream Bridge, F.A.P. No. BR-099-1(19)" dated April 12, 2000 with subsequent Addendum No. 1 dated August 10, 2000 and Addendum No. 2 dated October 6, 2000.

ESTIMATED QUANTITIES

ITEM NO.	ITEM	UNIT	QUANTITY
202.0440	Removal portions of existing bridge	(Lump Sum)	(6600 SF)
206.6300	Structure excavation for piers	CY	300
206.6400	Structure excavation for abutments	CY	404
206.8000	Filter material	CY	22
503.7000	Concrete for bridge superstructure	(Lump sum)	(355 CY)
503.7100	Concrete for pier footings	(Lump sum)	(260 CY)
503.7200	Concrete for piers	(Lump sum)	(256 CY)
503.7300	Concrete for abutments	(Lump sum)	(193 CY)
503.7400	Concrete for bridge approach slabs	(Lump sum)	(120 CY)
504.4100	AASHTO Type III prestressed concrete girder	(Lump sum)	(1832 LF)
507.0200	Metal bike railing	LF	233
507.7600	Concrete bridge rail	LF	481
507.7610	Concrete rail on footing	LF	97
511.0000	Drilled shaft	LF	1890
511.0500	Drilled shaft reinforcing steel	LF	2011
511.1000	Furnishing drilled shaft equipment	(Lump sum)	(Lump sum)
511.1500	Furnishing instrumentation and collecting data	(Lump sum)	(Lump sum)
511.2000	Unclassified shaft excavation	LF	1890
511.3000	Load test	EA	1
511.4000	Permanent casing	LF	1050
511.5000	Pre-drilling for drilled shafts	LF	1980
511.6000	Standard Penetration Test	EA	340
602.1300	Reinforcing steel	(Lump sum)	(255000 #)
606.3500	Guardrail type 3 thrie beam	LF	81
660.0000	Temporary stream crossing structure	(Lump sum)	(Lump sum)
675.0000	Repair existing concrete girders	FA	FA

6/14/01

Revise quantity for Item No. 503.7000

DATE

REVISIONS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE

GENERAL NOTES AND
ESTIMATED QUANTITIES

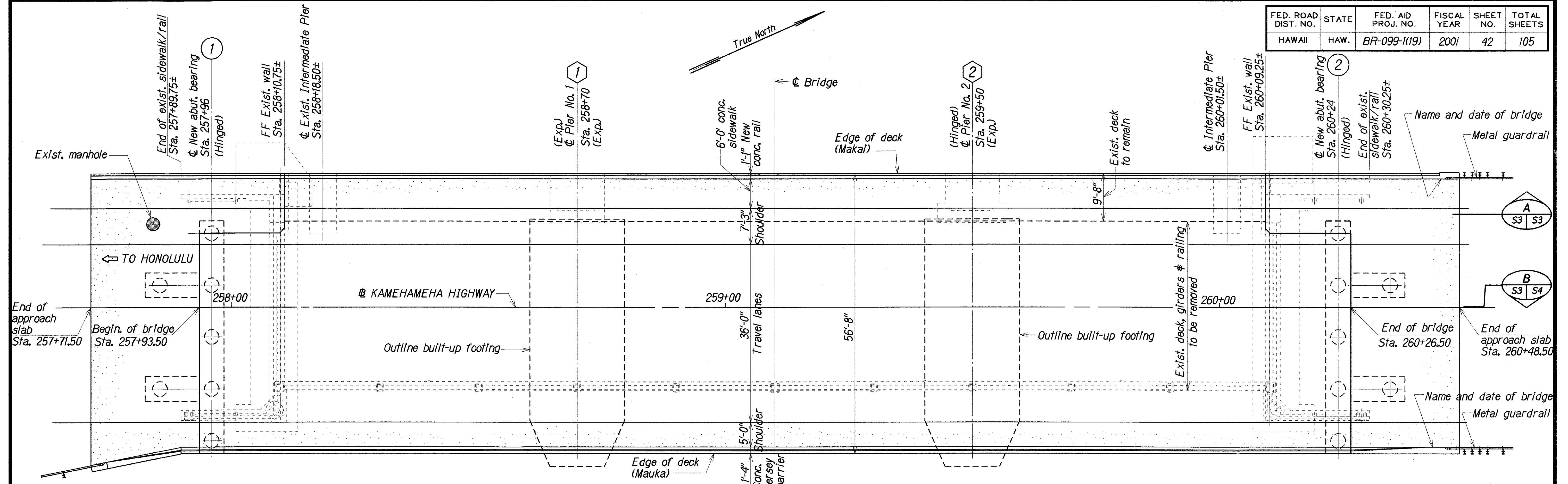
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As NotedDate: Aug. 2000

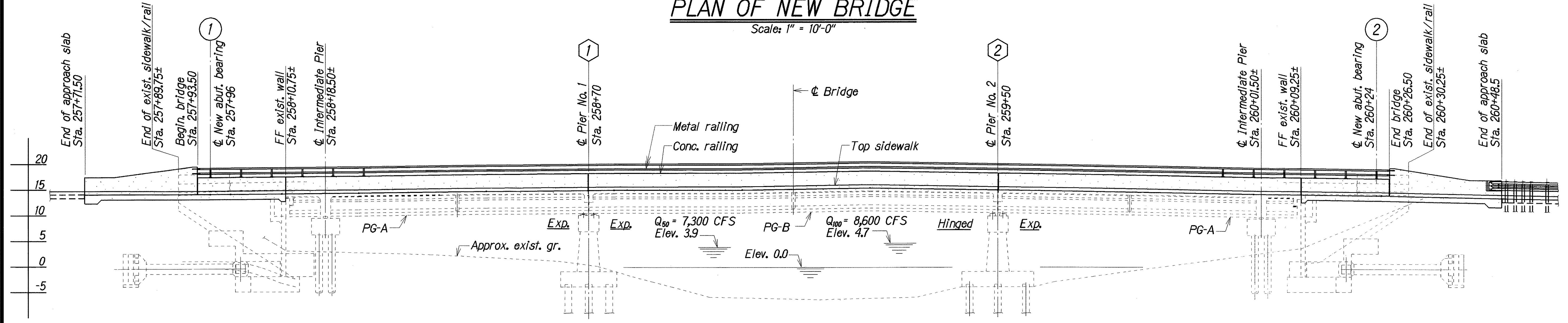
SHEET No. S2 OF 57 SHEETS

ADD. 41

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	42	105



PLAN OF NEW BRIDGE
Scale: 1" = 10'-0"



LONGITUDINAL SECTION
Scale: 1" = 10'-0"

DESIGNED BY	DATE
TRACED BY	DATE
NOTED BY	DATE
CHECKED BY	DATE

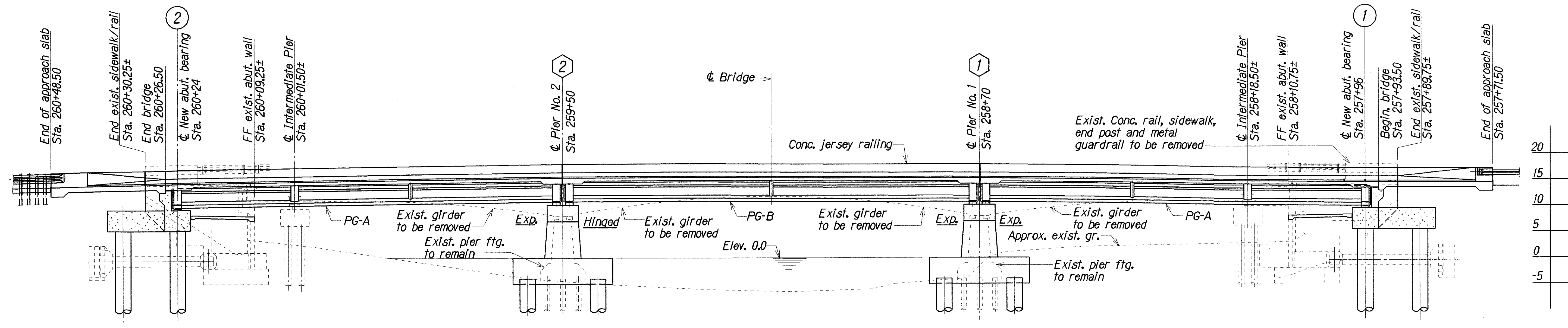
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
PLAN OF NEW BRIDGE
LONGITUDINAL SECTION (MAKAI SIDE)

KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	43	105



LONGITUDINAL SECTION
 Scale: 1" = 10'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	LWA	June 2000
DESIGNED BY	ST, LJK, JW	June 2000
QUANTITIES BY	ST, LJK	June 2000
CHECKED BY	JW	June 2000

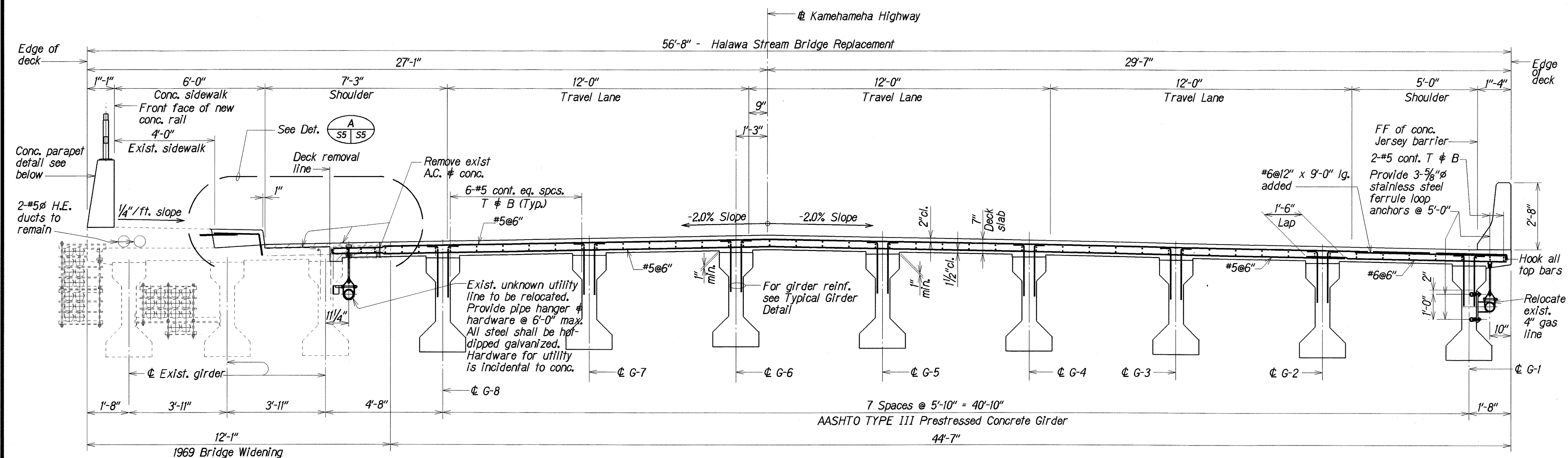
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
LONGITUDINAL SECTION (MAUKA SIDE)

KAMEHAMEHA HIGHWAY
 HALAWA STREAM BRIDGE REPLACEMENT
 Federal Aid Project No. BR-099-1(19)

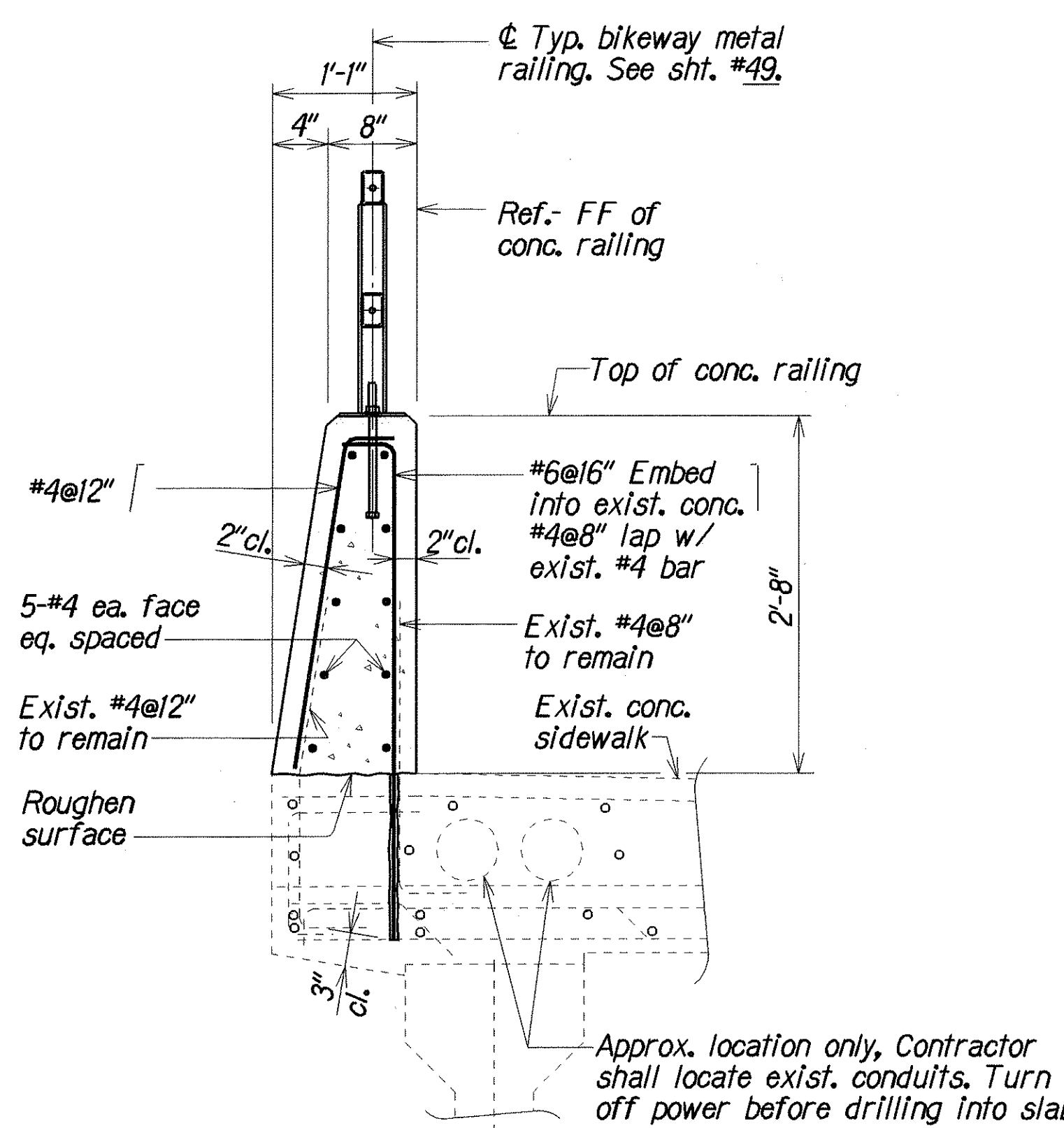
Scale: As Noted Date: Aug. 2000

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HAWAII	HAW.	BR-099-1(19)	2001	44	105



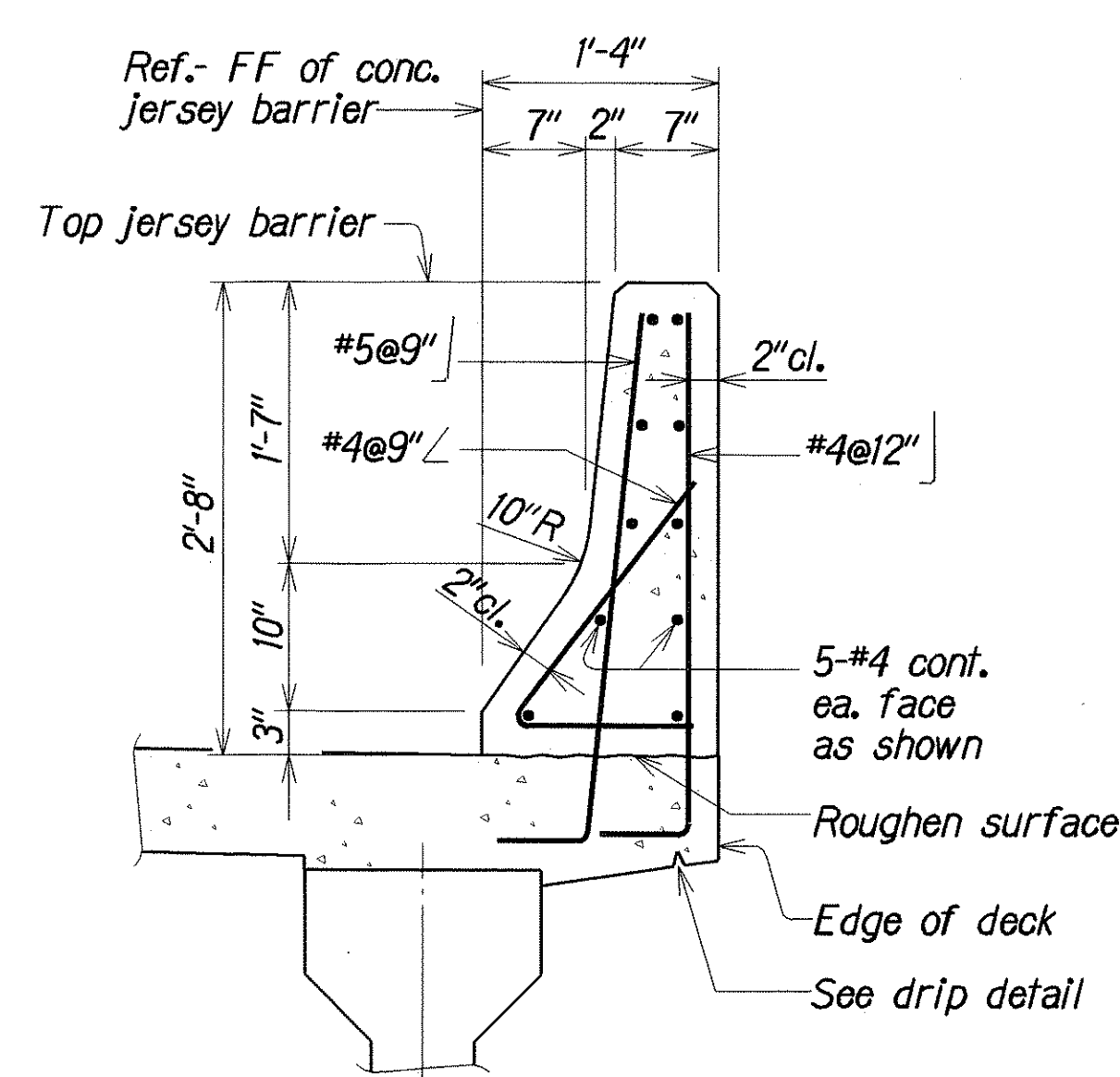
NORMAL DECK SECTION

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



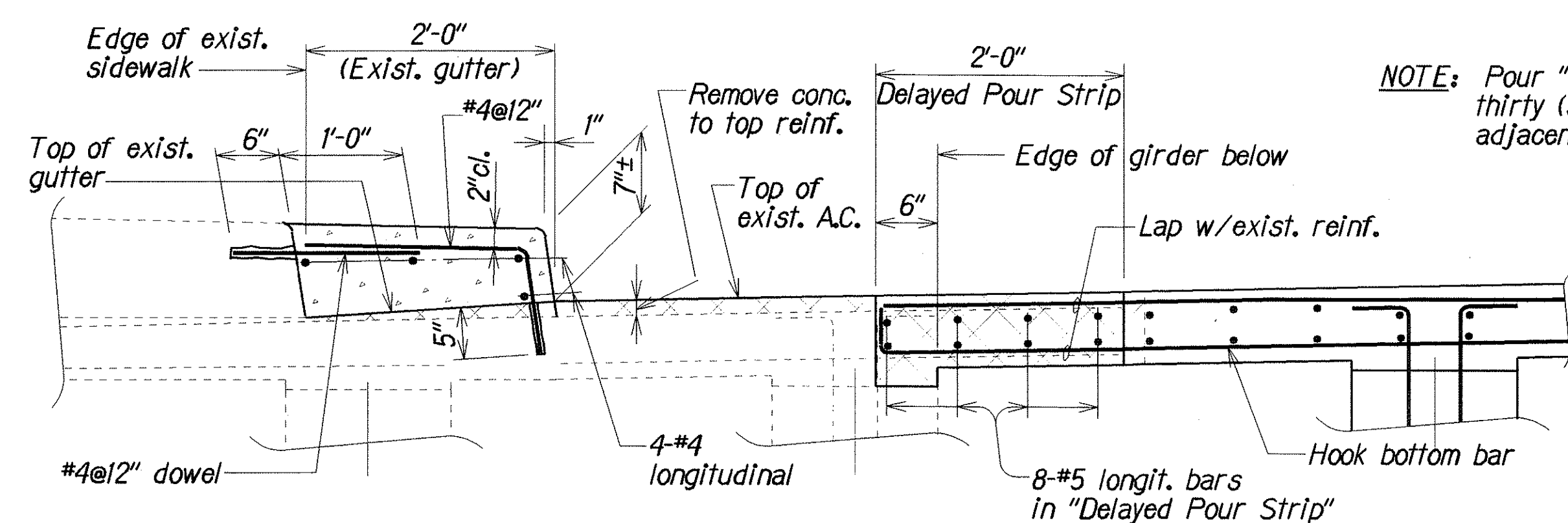
CONCRETE & BIKEWAY RAILING AT DECK SLAB

Scale: 1" = 1'-0"



JERSEY BARRIER ON BRIDGE

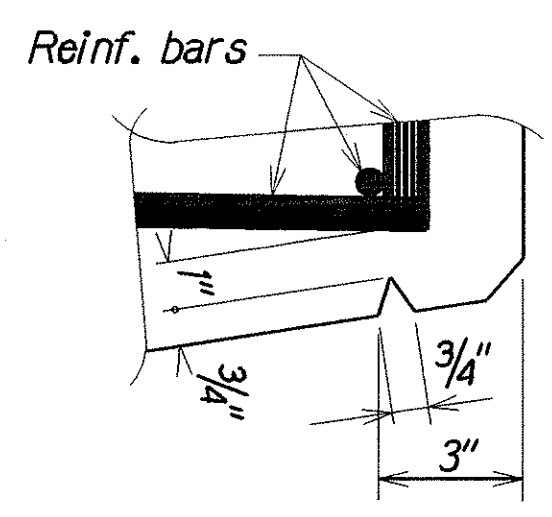
Scale: 1" = 1'-0"



DETAIL

Scale: 1" = 1'-0"

A S5 S5



DRIP DETAIL

Scale: 3" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
NORMAL DECK SECTION, SIDEWALK DETAIL
AND RAILING DETAILS

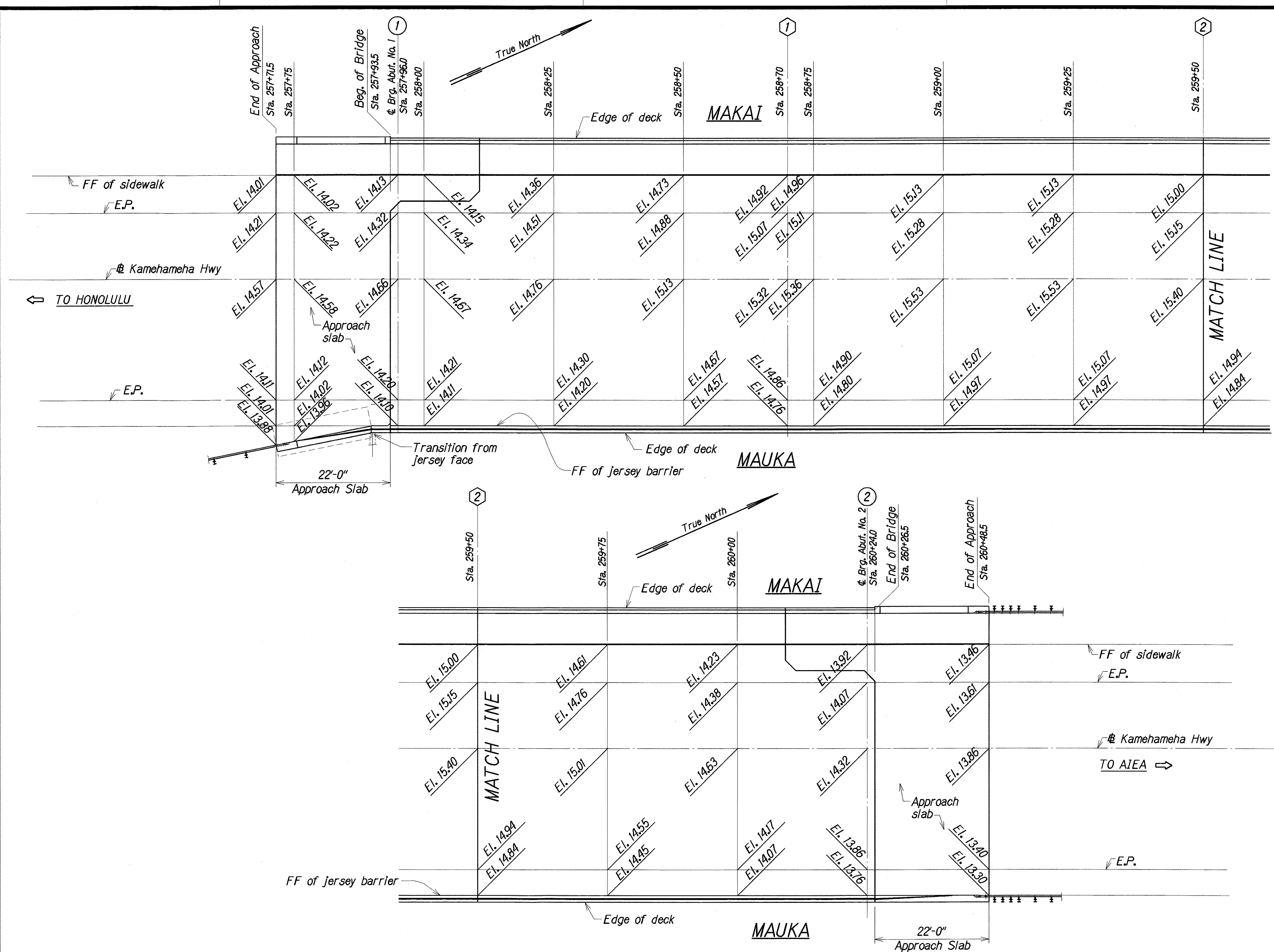
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

SHEET No. S5 OF 57 SHEETS

DESIGNED BY	DATE
TRACED BY	DATE
NOTED BY	DATE
CHECKED BY	DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(119)	2001	45	105



TOP DECK FINISH GRADE PLAN
Scale: 1"=10'-0"

SURVEY PLOTTED BY	DATE
DRAWN BY	AUG 2000
TRACED BY	AUG 2000
DESIGNED BY	AUG 2000
CHECKED BY	AUG 2000
NOTED BY	AUG 2000
DATE	

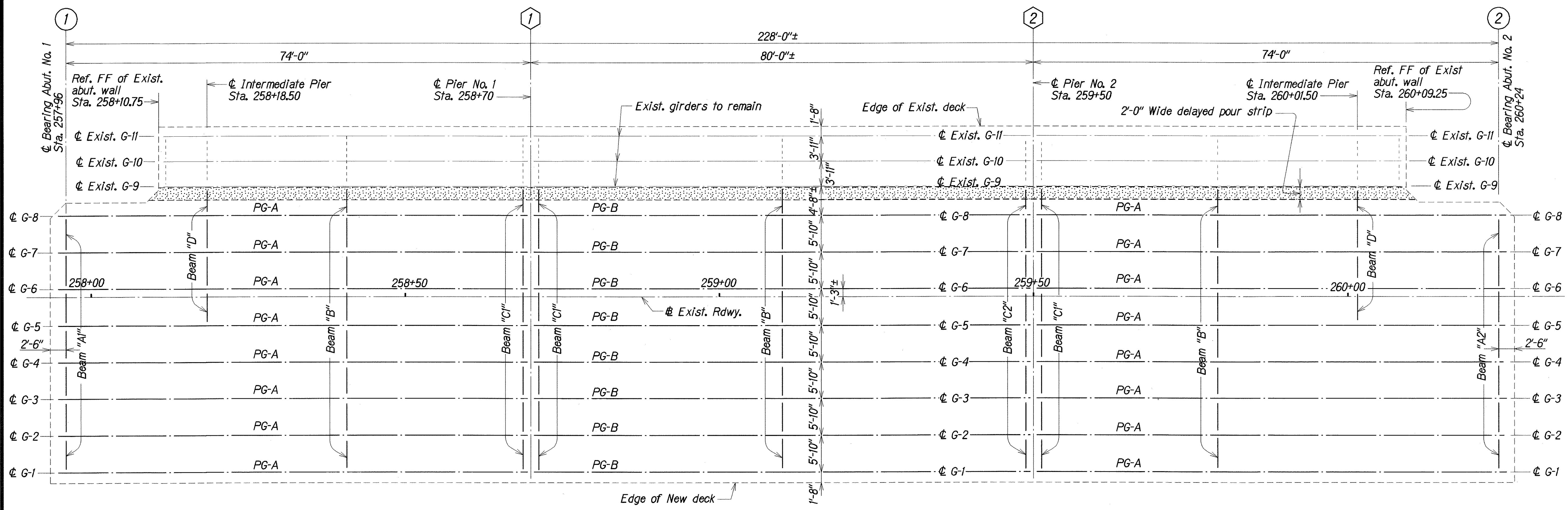
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
TOP DECK FINISH GRADE PLAN

KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(119)

Scale: As Noted Date: Aug. 2000

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	46	105



DECK FRAMING PLAN
Scale: 1/8" = 1'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DESIGNED BY	DATE
QUANTITIES BY	CHECKED BY	DATE
2/10/00	2/10/00	2/10/00

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
DECK FRAMING PLAN
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

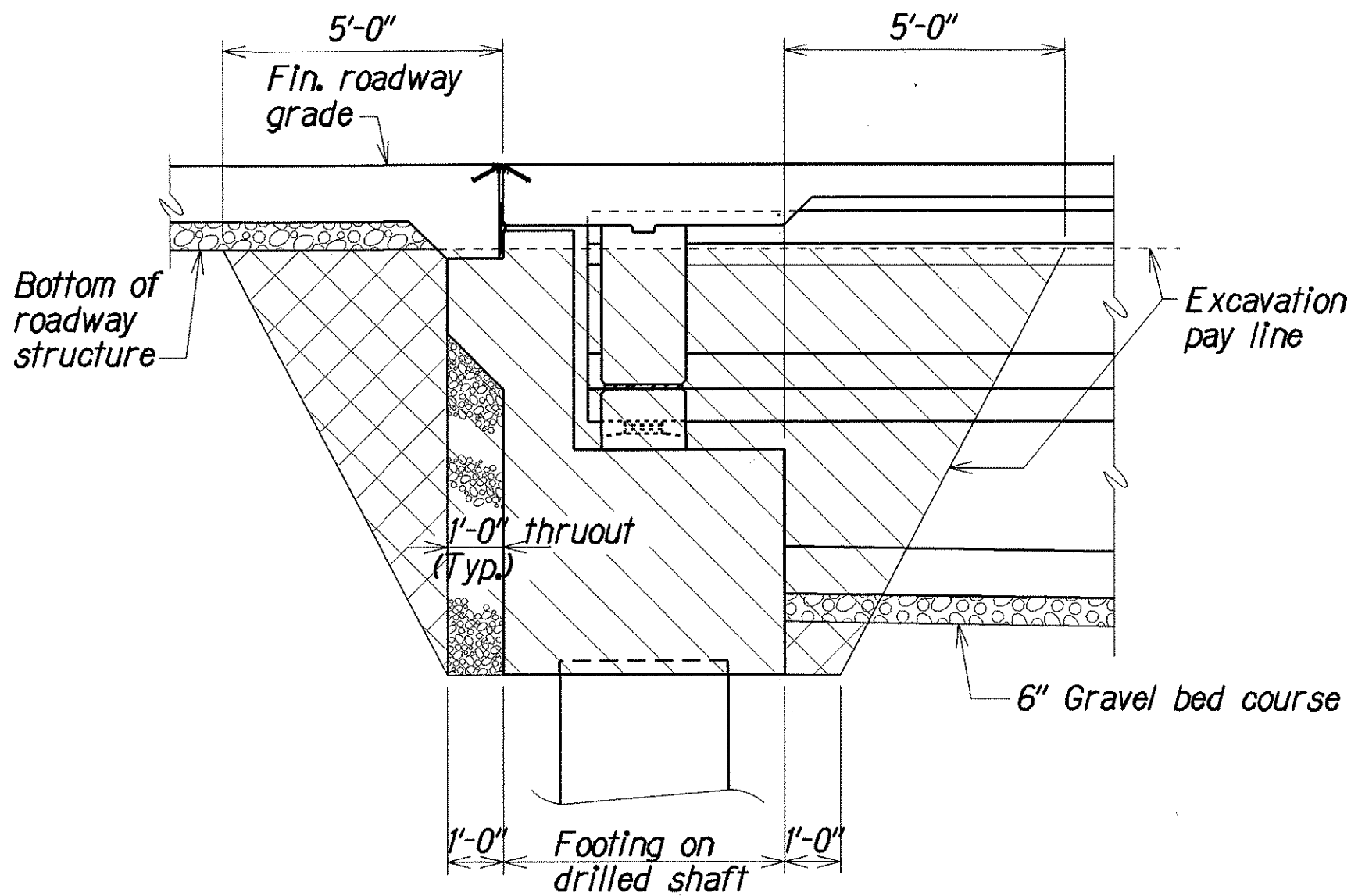
SHEET No. 57 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	47	105

- LEGEND:
- Structure excavation
 - Structure backfill (Incidental to structure excavation)
 - Filter material

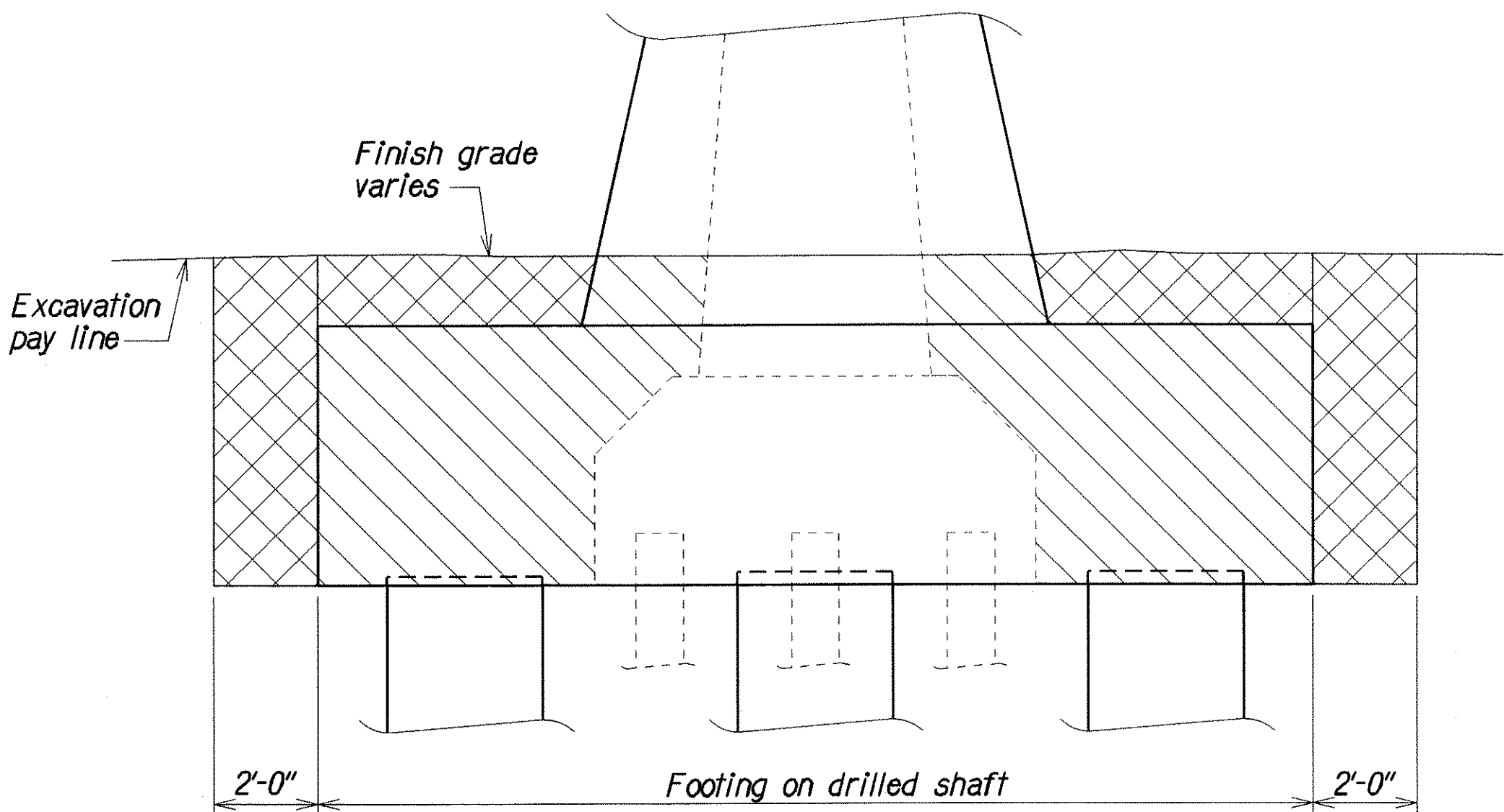
NOTE:

- Impervious material as selected by the Engineer shall be made as impervious as possible by pneumatic tamping or other approved methods and shall be incidental to structure backfill



ABUTMENT EXCAVATION AND BACKFILL PAY LIMITS

Not to Scale



PIER EXCAVATION AND BACKFILL PAY LIMITS

Not to Scale

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	July 2000
Revised	TRACED BY	July 2000
	DESIGNED BY	July 2000
	BOUNDED BY	July 2000
	CHECKED BY	July 2000

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

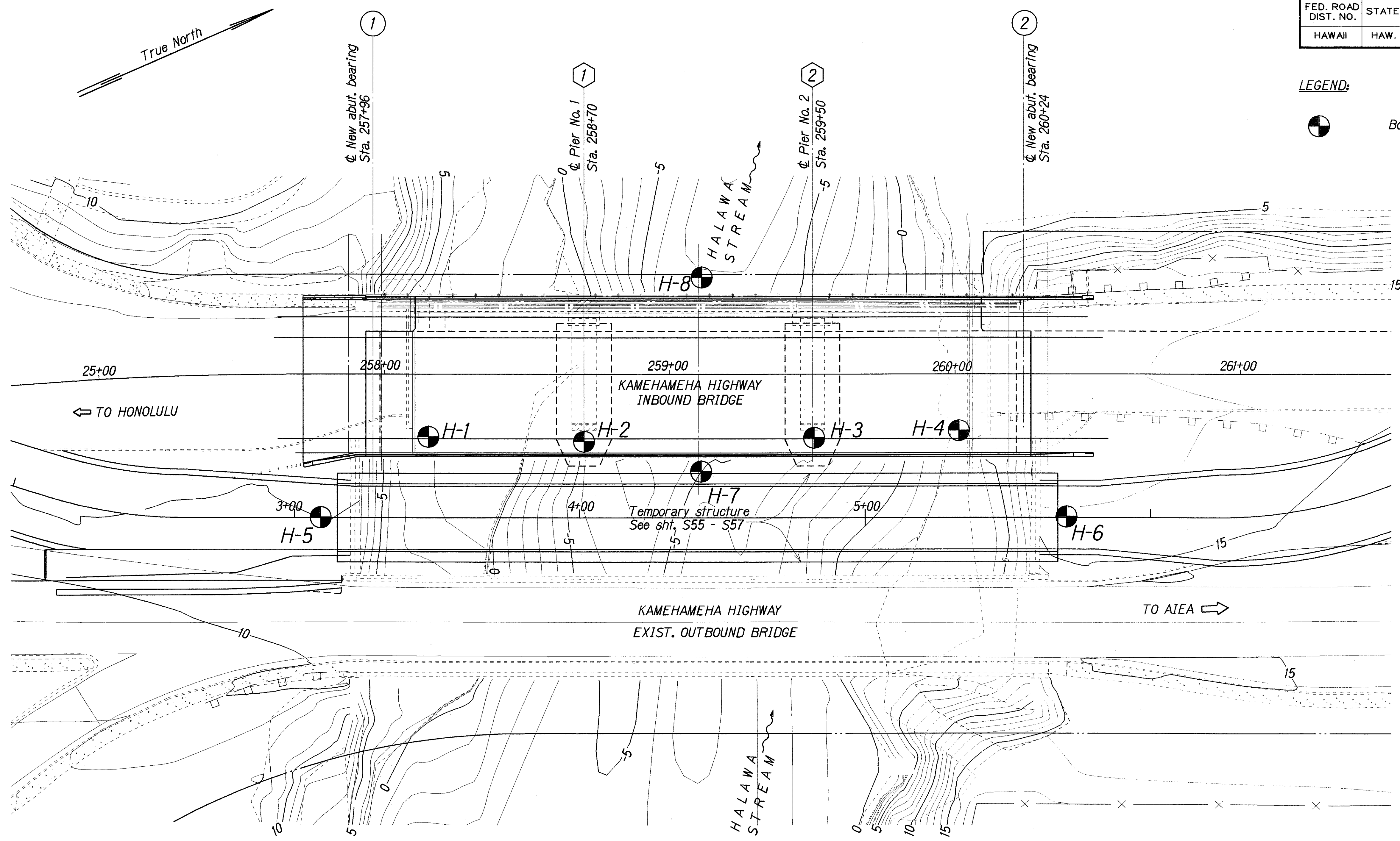
HALAWA STREAM BRIDGE
STRUCTURE EXCAVATION
AND BACKFILL PAY LIMITS
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted
Date: Aug. 2000

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	48	105

LEGEND:

 Boring Site



BORING SITE PLAN

Scale: 1" = 20'-0"

ORIGINAL PLAN	DATE
NOTED	DATE
DESIGNED BY	DATE
CHECKED BY	DATE
DATE	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
BORING SITE PLAN
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted

Date: Aug. 2000

BORING LOGS

Not To Scale

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	49	105

H1 (Ground Elevation = 2.0)						H2 (Ground Elevation = -5.8)						H3 (Ground Elevation = -3.2)						H4 (Ground Elevation = 2.3)											
Depth (feet)	Symbol	N blows/ft	Moisture (%)	Recovery (%)	RQD (%)	Description	Depth (feet)	Symbol	N blows/ft	Moisture (%)	Recovery (%)	RQD (%)	Description	Depth (feet)	Symbol	N blows/ft	Moisture (%)	Recovery (%)	RQD (%)	Description	Depth (feet)	Symbol	N blows/ft	Moisture (%)	Recovery (%)	RQD (%)	Description		
5	R	16	18.9			Medium dense dark gray gravel with clay	5	R	0	95.5			Very soft black clayey silt	5	R	24		0			Soft gray to black clayey silt with sand & gravel	5	R	13	50.3	100		Stiff dark gray clay	
	R	20	24.3			Grades with silt		R	9		26.7		R		14	37.8	50												
	S	13	31.8			stiff dark gray silt & gravel		S	3	34.8	33.3		S		1		0												
10	R	55/0.5	49.9			Dark gray tuff, gravel, muck with shells & very dense rock with silt	10	C			40		Gray tuff boulder with some shell fragments	10	R	2		60			Very soft, grades with fine gravel & fractured shells	10	R	3		44		Very soft dark gray clayey silt	
	S	60/0.5	32.4					S	80	25.2			Very dense gray-brown tuff		S	7		0		S			1		67				
15	C			40	11	Very dense dark gray tuff	15	S	88	27.8			Very dense tuff	15	S	0	70.4	100			Very dense gray-brown sandy gravel with clay	15	S						Medium stiff dark gray clay with silt & gravel
	S	53	18.8			Fractured tuff, gravel with clay		C			90	55			C	67	48.7	80		C			4	130.2	33				
20	S	56/1"	24.0				20	S	60/0.5'	40.3				20	C			0			Highly to moderately weathered gray tuff	20	S					Loose coral & gravel	
	C			90	57	Moderately weathered tuff		C			60	35			S	110	33.5	66.7		C			3		100				
25	S	58/2"	26.9				25	S	35	23.8				25	C			80	33		Moderately weathered tuff	25	S	4	71.4			Very dense dark gray gravel	
	C			100	15	Weak tuff-closely spaced joints with trace of white stain		C			50				S	76/0.8'	23.9	6.7		C			4						
30	S	58/1"					30	C			100	47		30	C			100	75		Highly to moderately weathered gray tuff	30	R	15		33		Highly weathered gray tuff	
	C			80	50	Highly to moderately weathered tuff		S	60/0.5'	23.8			S		60/0.7'	39.1	83		C	69			46.4						
35	S	56/2"					35	C			60	9		35	C			100	47		Moderately weathered tuff	35	C			47		Very stiff dark gray-brown clayey silt	
	C			100	27			S	56	25.8			S		60/0.1'	32.9	20		S	91			27.1						
40	S	56/2"					40	C			70	25		40	C			100	55		Stiff gray-brown clayey silt	40	C			50	25	Grades with clay	
	C			20		Highly weathered fractured tuff		S	60/0.5'	31	40		S		60/0.5'	20.0	40		C					50	12				
45	S	105	43.5			Very dense sand with brown clayey silt	45	C			60	0		45	C			100	55		Moderately weathered tuff	45	S	56/0.5'		0			Highly weathered gray tuff
	C			54	7	Fractured tuff		S	50/0.5'	35.6	26.7		S		60/0.4'	29.7	26.7		C					56	18				
50	S	57/0.25	33.9				50	C			40	11		50	C			100	73		Stiff gray-brown clayey silt	50	S	55/0.25'	39.3			Stiff brown clayey silt	
	C			36	0			S	6	96.6	100		S		60/0.6'		40		C					60					
55	S	48	64.5			Hard gray clay with some brown clay	55	C			50			55	C			100			Stiff gray-brown clayey silt	55	S	23	53.9			Boring terminated at 75 ft.	
	C			30		Very stiff gray clayey silt		S	18	59.2	100		S		13		100		C					100					
60	S	35	55.9			Hard grayish brown clayey silt	60	C			60			60	C			0			Stiff gray-brown clayey silt	60	S	25	66.3			Boring terminated at 75 ft.	
	C			80				C			60				C			50		C					70				
65	S	34	56.5				65	C			60			65	C						Stiff gray-brown clayey silt	65	C			100		Boring terminated at 75 ft.	
	C			40		Very stiff clayey silt		S	36	55.8	100		S		13	67.3	100		C					100					
70	S	24	61.4				70	C			60			70	C						Stiff gray-brown clayey silt	70	C					Boring terminated at 75 ft.	
	C			18		Hard brown clayey silt		S	13	61.1	100		S		14	68.2	100		C					100					
75	S	35	62.1				75							75							Stiff gray-brown clayey silt	75					Boring terminated at 75 ft.		
	C																												
80						Boring terminated at 77.5 ft.	80							80							Stiff gray-brown clayey silt	80					Boring terminated at 75 ft.		

Symbols:

- S Split spoon
- R Ring
- C Core

ORIGINAL PLAN	DATE	BY
NOTED	DATE	BY
DESIGNED	DATE	BY
CHECKED	DATE	BY

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

HALAWA STREAM BRIDGE

BORING LOGS

KAMEHAMEHA HIGHWAY

HALAWA STREAM BRIDGE REPLACEMENT

Federal Aid Project No. BR-099-1(19)

Scale: As Noted

Date: Aug. 2000

SHEET No. 510 OF 57 SHEETS

49

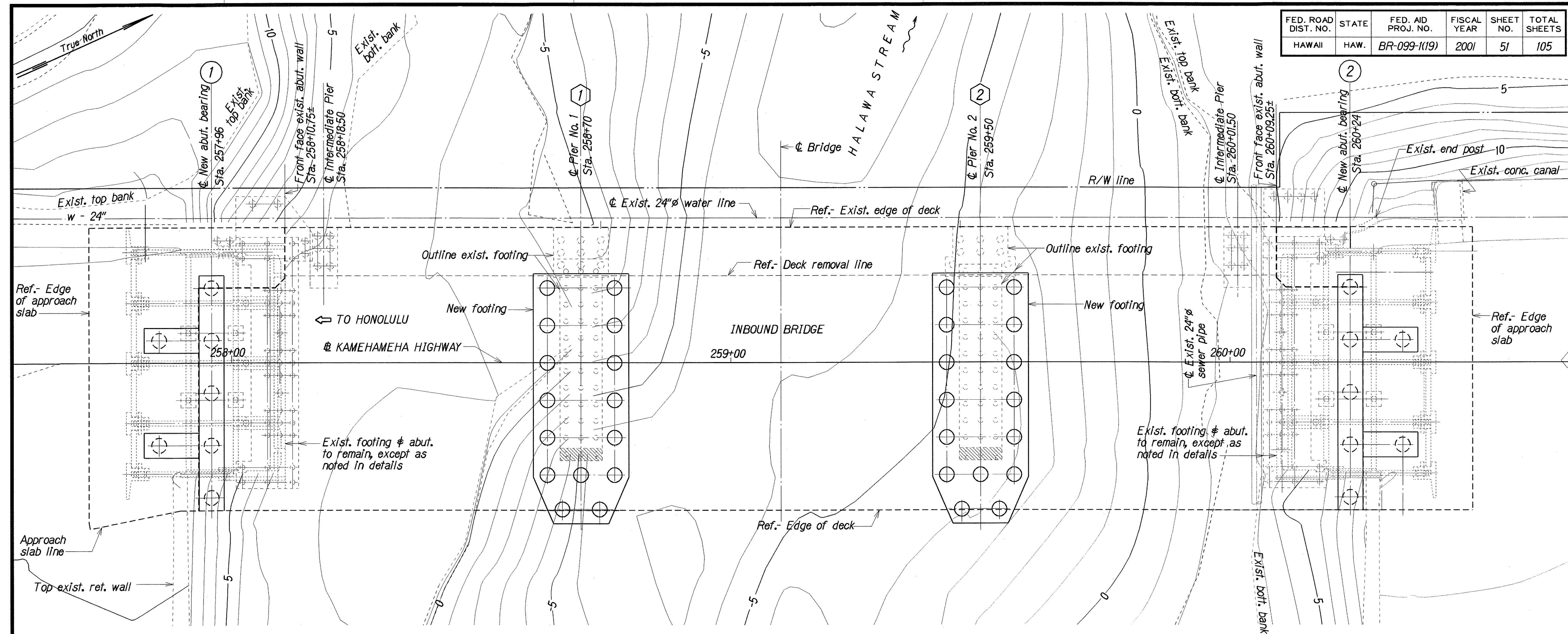
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	50	105

BORING LOGS

Not To Scale

H5 (Ground Elevation = 15.0)						H6 (Ground Elevation = 14.1)						H7 (Ground Elevation = -5.4)						H8 (Ground Elevation = -9.0)											
Depth (feet)	Symbol	N blows/ft	Moisture (%)	Recovery (%)	RQD (%)	Description	Depth (feet)	Symbol	N blows/ft	Moisture (%)	Recovery (%)	RQD (%)	Description	Depth (feet)	Symbol	N blows/ft	Moisture (%)	Recovery (%)	RQD (%)	Description	Depth (feet)	Symbol	N blows/ft	Moisture (%)	Recovery (%)	RQD (%)	Description		
5	R	31	11.5			Very stiff to stiff brown clayey silt with some sand & gravel	5	R	29	31.6			Medium dense brown gravel with trace of sandy silt	5	R	2	101.0				Very soft black clayey silt with trace of shells	5	R	0	100.5			Very soft black clayey silt with some white shells	
	R	42	15					R	20	25.8					R	4	106.1						R	2	106.3				
	S	14	28.8					S	35	27.1					S	8							S	60/0.5'	50.9				Highly weathered gray volcanic tuff
10	R	20	30.7			Med. dense silty gravelly sands	10	R	18				Hard to very stiff brown clayey silt with some gravel & sand	10	R	10	54.8				Medium stiff to stiff gray clayey silt with some shells & sand	10	S	60/0.5'	42.2				
11.5	S	6	33.7			Loose brown sandy silt with some gravel	11.5	S	5	35.4				Soft to medium stiff brown clayey silt	11.5	S	12						Grades to grayish brown						
15	R	19	26.9			Med. dense black Gr. sand	15	R	10				Grades to gray clay silt with some gravel	15	R	9	27.5				Grades to soft	15	C			0			
	S	10	28.3			Loose sandy gravel		R	4	75.8					S	4	43.5												
20	R	7				Medium stiff gray silt with weathered tuff sands & gravel	20	R	7				Grades to very soft with trace of shells	20	R	35	9.5				Gray weathered tuff gravel w/ silt	20	S	110	24.4			Boring terminated at 21.5 ft.	
	S	1	89.1					S	4	93.7					S	21	27.9												
25	R	22	46.0			Grades to very stiff with round gravel & sand	25	R	4				Grades to very soft	25							Boring terminated at 23 ft.	25							
29	R	116	24.4			Very dense weathered volcanic tuff	29	R	5	45.1			Grades to very soft	29							Grades with more coral fragments	29							
30	C			26	8		30	S	1	67.2				30	S								30						
35	C			84	33	Volcanic tuff	35	R	5	73.9			Loose to very loose gray silty sandy gravel with trace of coral fragment	35							Very loose to loose gray silty sandy gravel	35							
40	C			98	40	Volcanic tuff	40	S	3	47.1			Grades to very soft	40							Grades to extremely weathered tuff	40							
45	C			100	77		45	R	7	59.2				45									45						
50						Boring terminated at 50 ft.	50						Grades to very soft	50							Gray highly weathered volcanic tuff, closely jointed	50							
54						Boring terminated at 50 ft.	54	S	11				Grades to very soft	54							Grades to extremely weathered tuff	54							
55						Boring terminated at 50 ft.	55	C			92	9	Grades to very soft	55							Grades to extremely weathered tuff	55							
60						Boring terminated at 50 ft.	60	C			93	23	Grades to very soft	60							Grades to extremely weathered tuff	60							
65						Boring terminated at 50 ft.	65	S	20				Grades to very soft	65							Grades to extremely weathered tuff	65							
70						Boring terminated at 50 ft.	70	C			90	42	Grades to very soft	70							Grades to extremely weathered tuff	70							
						Boring terminated at 50 ft.		S	27				Grades to very soft								Grades to extremely weathered tuff								
						Boring terminated at 50 ft.							Grades to very soft								Grades to extremely weathered tuff								

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	51	105



FOUNDATION PLAN
Scale: 1" = 10'-0"

ORIGINAL PLAN	DATE
DESIGNED BY	DATE
TRACED BY	DATE
NOTED BY	DATE
CHECKED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE

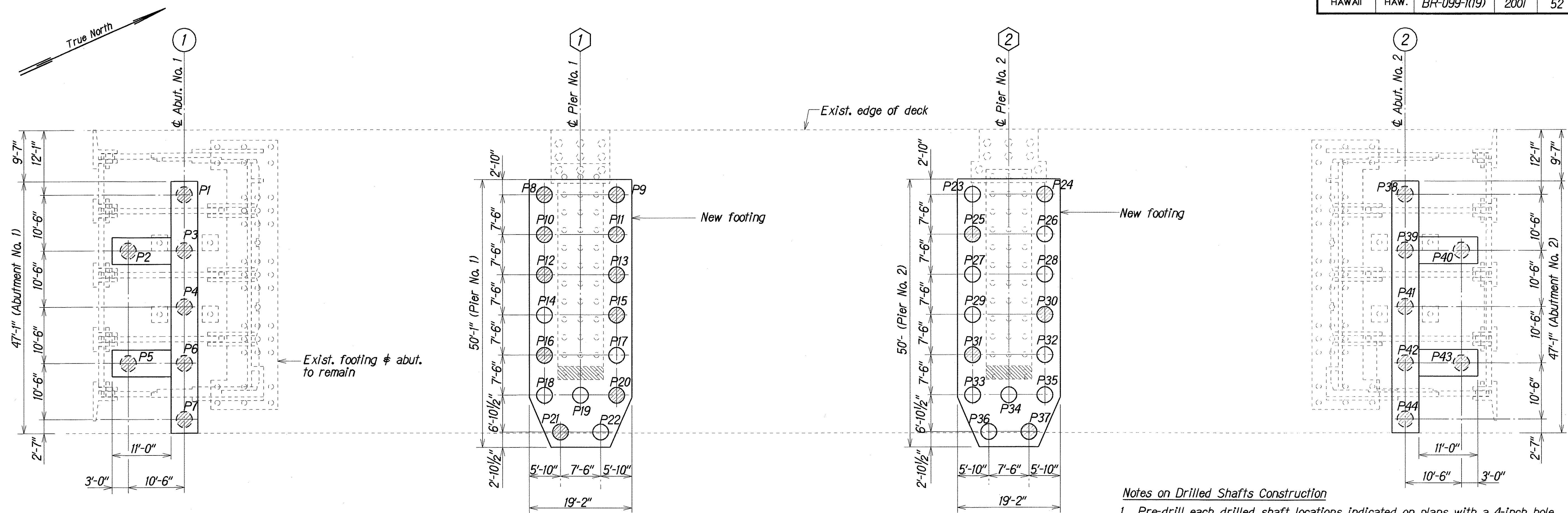
FOUNDATION PLAN

KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

SHEET No. 51 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	52	105



DRILLED SHAFT PLAN

Scale: 1" = 10'-0"

- Legend:**
- Indicates typical drilled shaft. No pre-drilling required.
 - ⊗ Indicates typical drilled shaft. Pre-drilling required. See notes and specifications.

- Notes on Drilled Shafts Construction**
- Pre-drill each drilled shaft locations indicated on plans with a 4-inch hole to elevation of 10 feet below the approximate drilled shaft tip elevation or as directed by the Engineer. Depending on the soil conditions encountered, the depth of pre-drilled hole may be modified by the Engineer. Drilling rig and equipment shall be capable to drill to elevation of -100 feet MSL. Perform standard penetration test at 5 feet intervals below elevation of -10 Feet MSL.
 - Provide log of pre-drilling to the Engineer for each drilled shaft group (Abut. No. 1, Pier No. 1, Pier No. 2 or Abut. No. 2) within 5 working days after completion of pre-drilling for each drilled shaft group. Drilled shaft group is defined as all of drilled shafts @ an individual pier or abut. The final tip elevations of permanent casings and drilled shafts in each drilled shaft group will be determined by the Engineer within 10 working days upon receiving the pre-drilling log. Provide an experience geotechnical or engineering geologist, with minimum 3 years of experiences, to log the pre-drilling operations and to prepare log of pre-drilling. No drilling of the drill shafts shall take place until the Engineer provides the final tip elevations of the permanent casing & drilled shafts.
 - For deep drilled shafts with approximate tip elevations at -85 feet MSL, rifle drilled shaft sidewall with a grooving tool or overreaming bucket from drilled shaft tip elevation to bottom of permanent casing.
 - Rifle drilled shaft sidewall to provide grooves of at least 2 inches deep by 3 inches wide running spirally along the shaft circumference at a pitch of 12 inches. Sidewall rifling shall be considered as incidentals to drilled shaft constructions.
 - Reference to Structural Foundation Investigation Report and Addendum Nos. 1 and 2 prepared by Material Testing and Research Branch, Highways Division, Hawaii for detailed recommendations.

DRILLED SHAFT SCHEDULE

Drilled Shaft Mark	P1 - P7	P8 - P15	P16 - P22	P23 - P37	P38 - P41	P42 - P44
Drilled Shaft Diameter (inches)	36	36	36	36	36	36
Approximate Drilled Shaft Tip Elevation (feet) *	-25	-85	-27	-30	-85	-45
Approximate Bottom of Permanent Casing Elevation (feet) *	-20	-22	-22	-25	-40	-40
LI Elevation (See drilled shaft elevation on S-14) **	-25	-37	-27	-30	-55	-45

- * Exact elevation to be determined by the Geotechnical Engineer during construction.
- ** If "LI Elevation" equals drilled shaft tip elevation, all bars shall be continuous (Do not cut any bars).

ORIGINAL PLAN	DATE
SURVEY PLOTTED BY	MM
DRAWN BY	MM
TRACED BY	MM
DESIGNED BY	MM
CHECKED BY	MM
NOTED BY	MM
DATE	MM

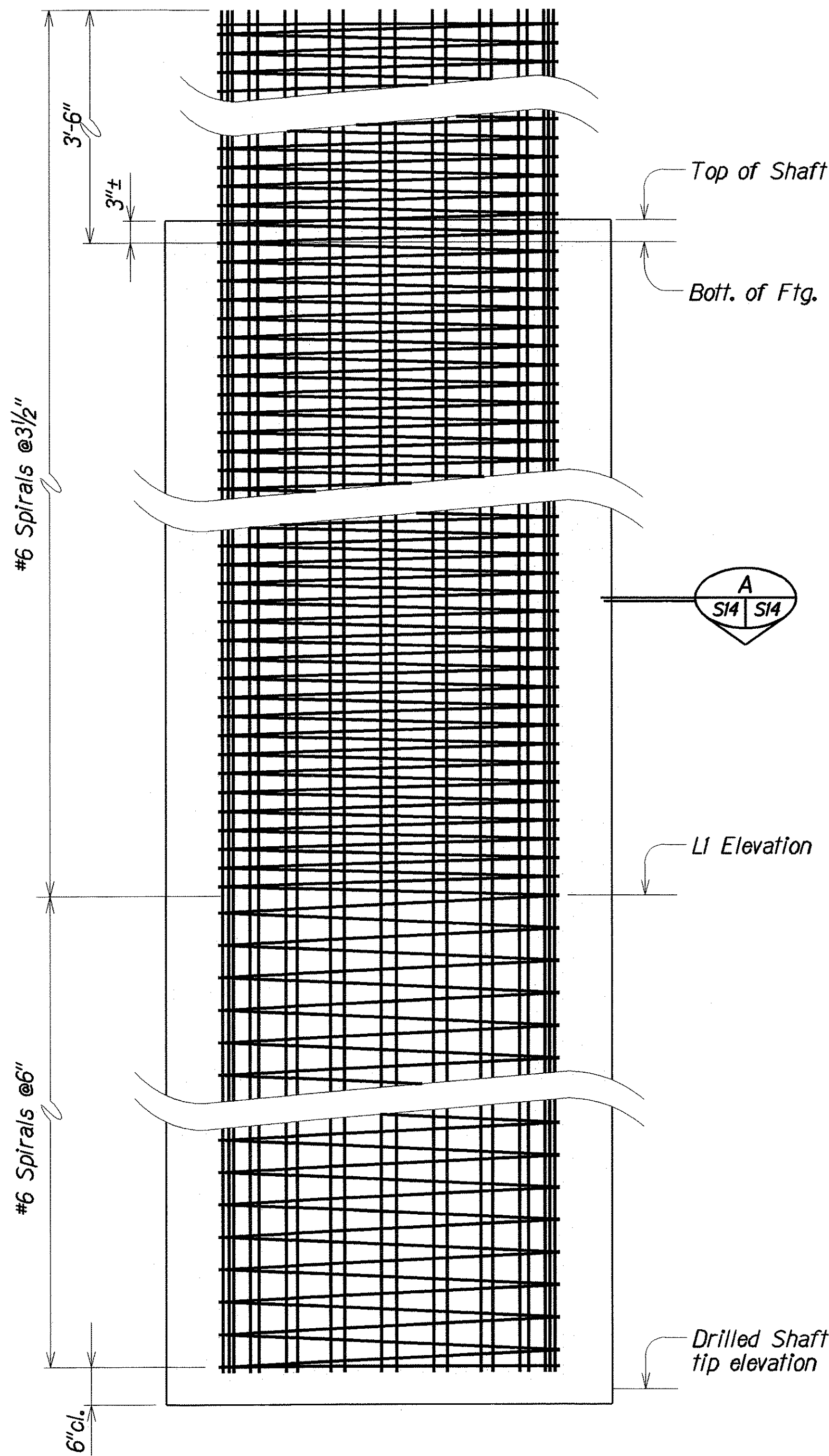
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HALAWA STREAM BRIDGE
DRILLED SHAFT PLAN AND SCHEDULE
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)
Scale: As Noted
Date: Aug. 2000
SHEET No. S13 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	ADD. 53	105

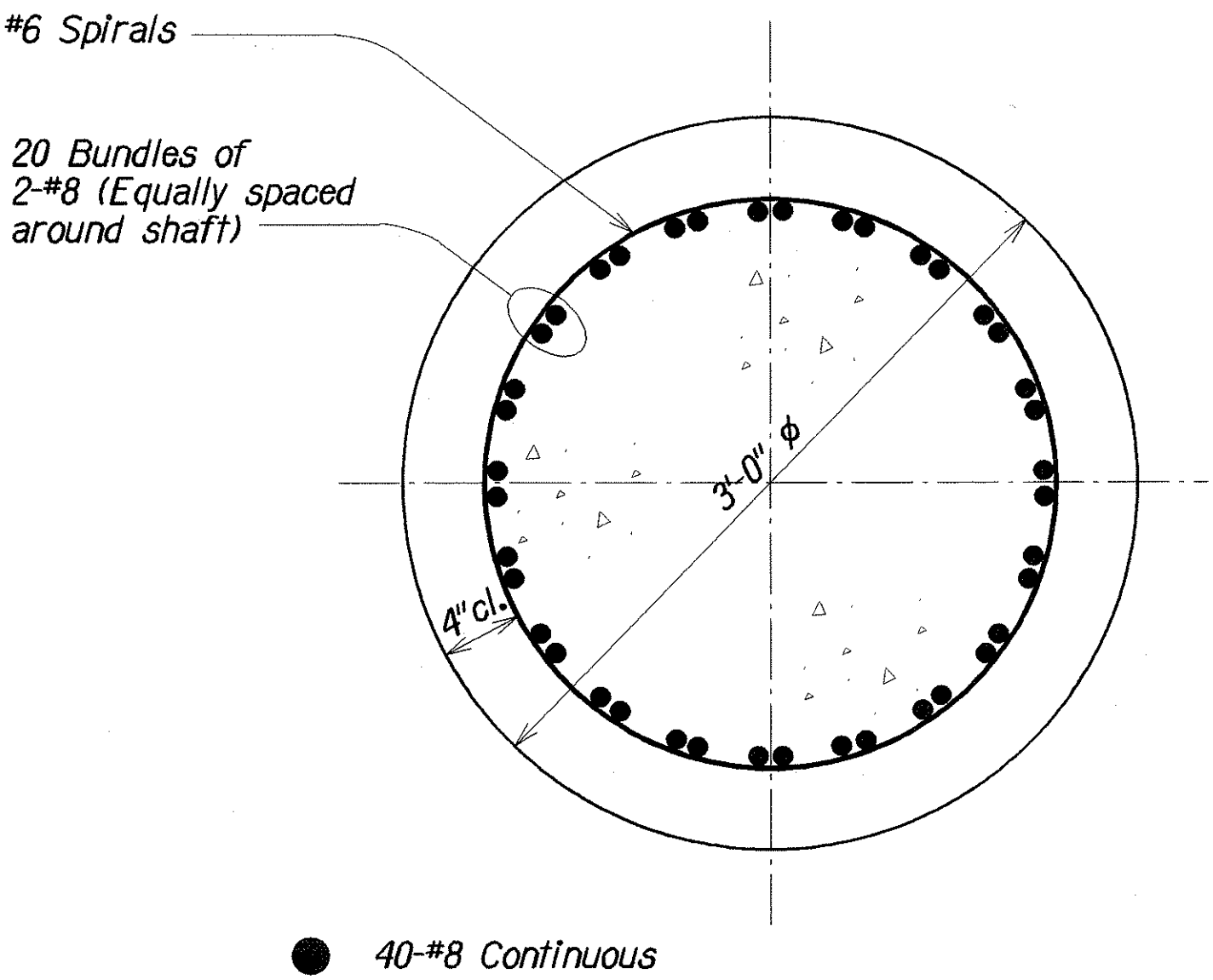


NOTES:

1. Provide permanent casing for drilled shafts through all soft, loose, clay, silt and other unstable materials.
2. Due to close proximity of adjacent shaft locations, the contractor may phase the drilling and concrete placing operation. All costs incurred due to a multiple phase operation shall be considered incidental to "Unclassified shaft excavation".
3. Drilled shaft concrete shall be $f'c = 5,000$ psi strength of 28 days with W/C ratio of 0.45 or less.
4. Lap splice length for #6 spiral reinforcement is 3'-0".
5. Concrete or other non-corrosive spacing devices shall be used to maintain the reinforcement cage in position within the shaft.
6. $f_y = 60,000$ psi.
7. Discontinuous spirals shall be terminated with a 135° hook around vertical reinforcement.
8. All vertical bars shall be continuous.
9. Fabrication of drilled shaft reinf. steel cage shall not start until tip elevations are provided by the Engineer based on pre-drilling. If the Contractor starts fabrication before tip elevations are given, it is done at the Contractor's own volition and the State may order changes at no add'l cost.



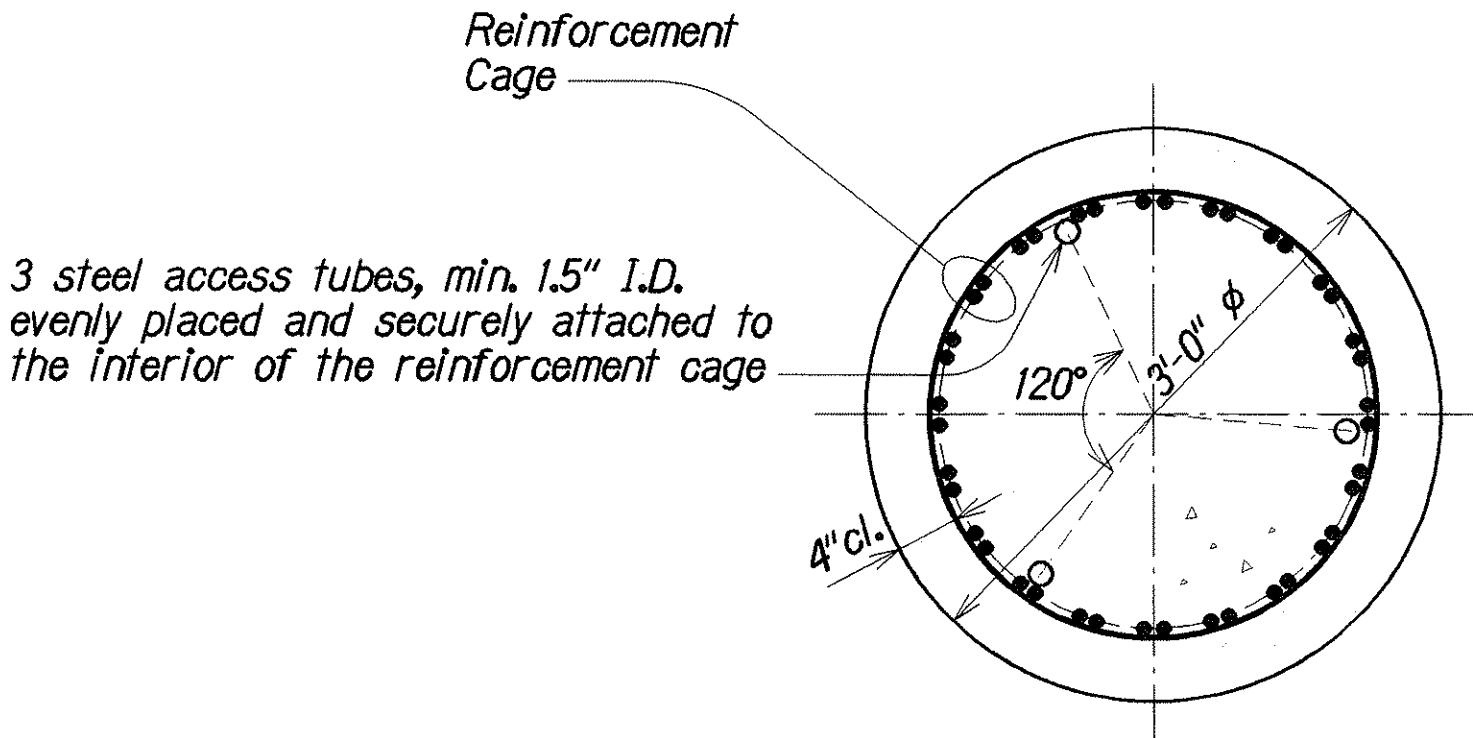
ELEVATION
Not to Scale



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

VERTICAL BAR SPLICES:

1. Stagger splice points not more than 1/3 of total bars at one point.
2. Minimum of 48" vertically between splice points.



ACCESS TUBE DETAIL FOR CROSSHOLE SONIC LOG TEST
Not to Scale



Revised Note.

DATE

REVISIONS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HALAWA STREAM BRIDGE
DRILLED SHAFT ELEVATION AND SECTION,
ACCESS TUBE DETAIL
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted

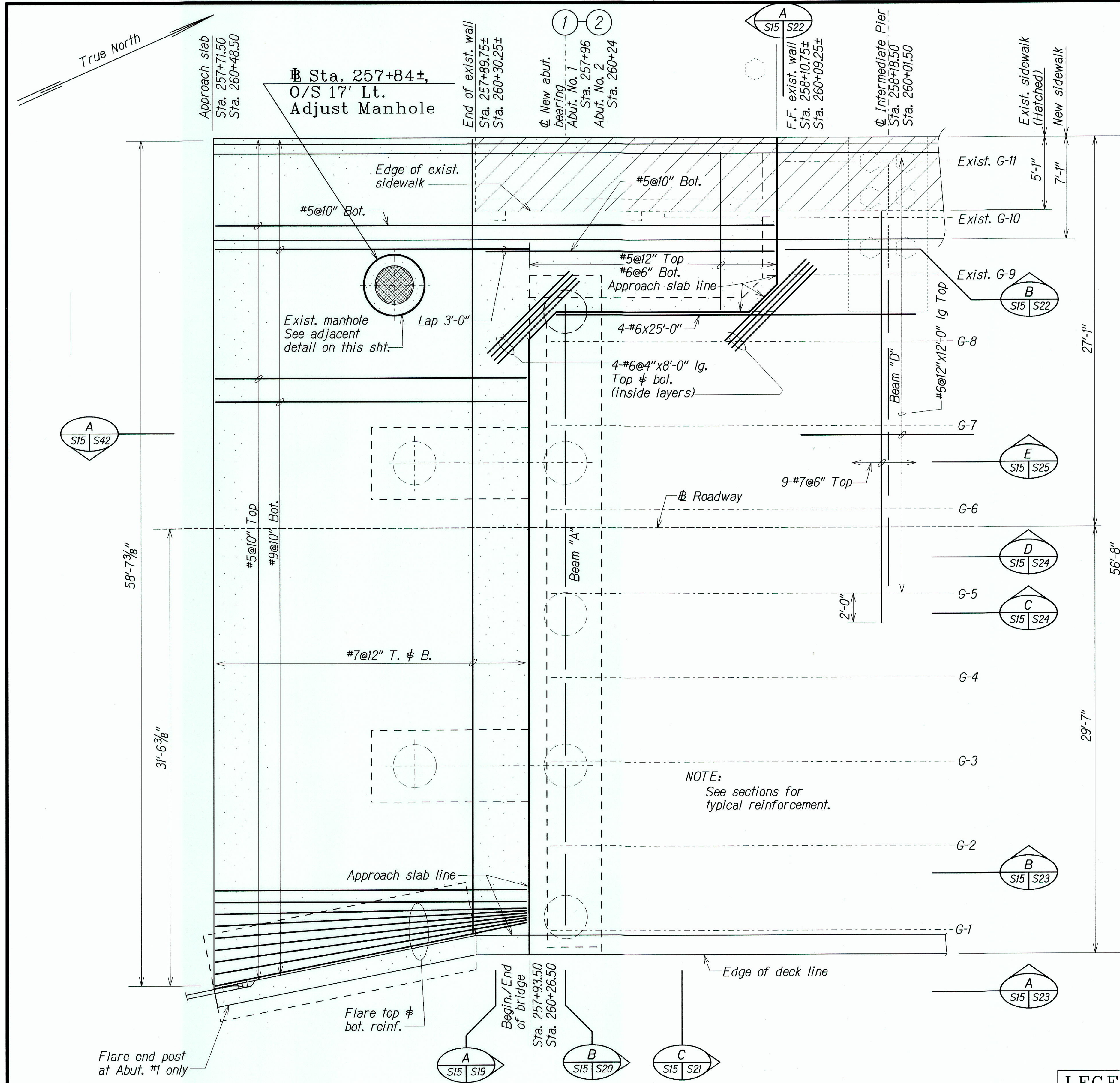
Date: Aug. 2000

SHEET No. S14 OF 57 SHEETS

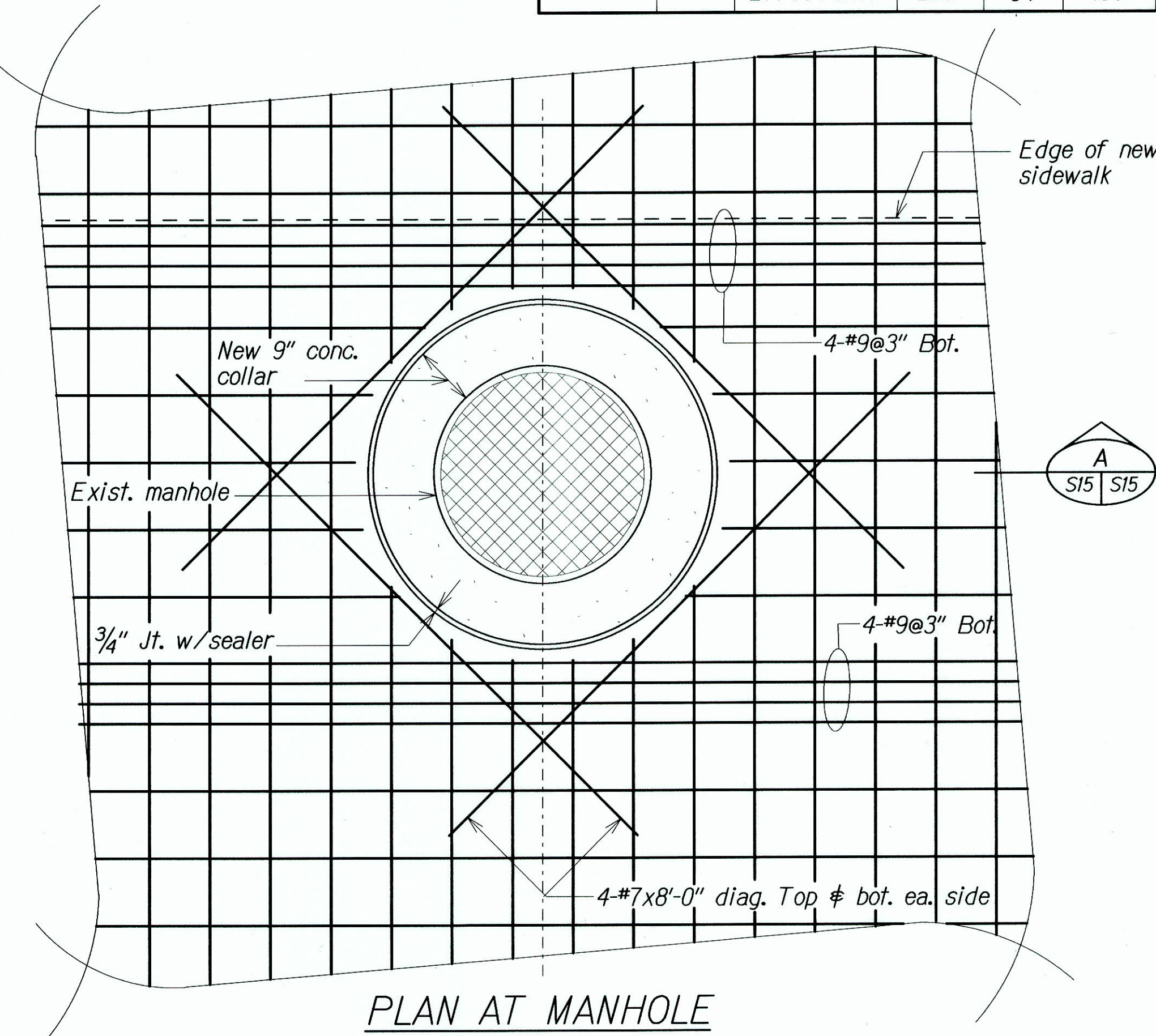
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ORIGINAL PLAN	DATE
SURVEY PLOTTED BY: KAN	AUG 2000
DRAWN BY: LK	AUG 2000
DESIGNED BY: LK	AUG 2000
CHECKED BY: JW	AUG 2000
NOTE BOOK	
No. 2000014	

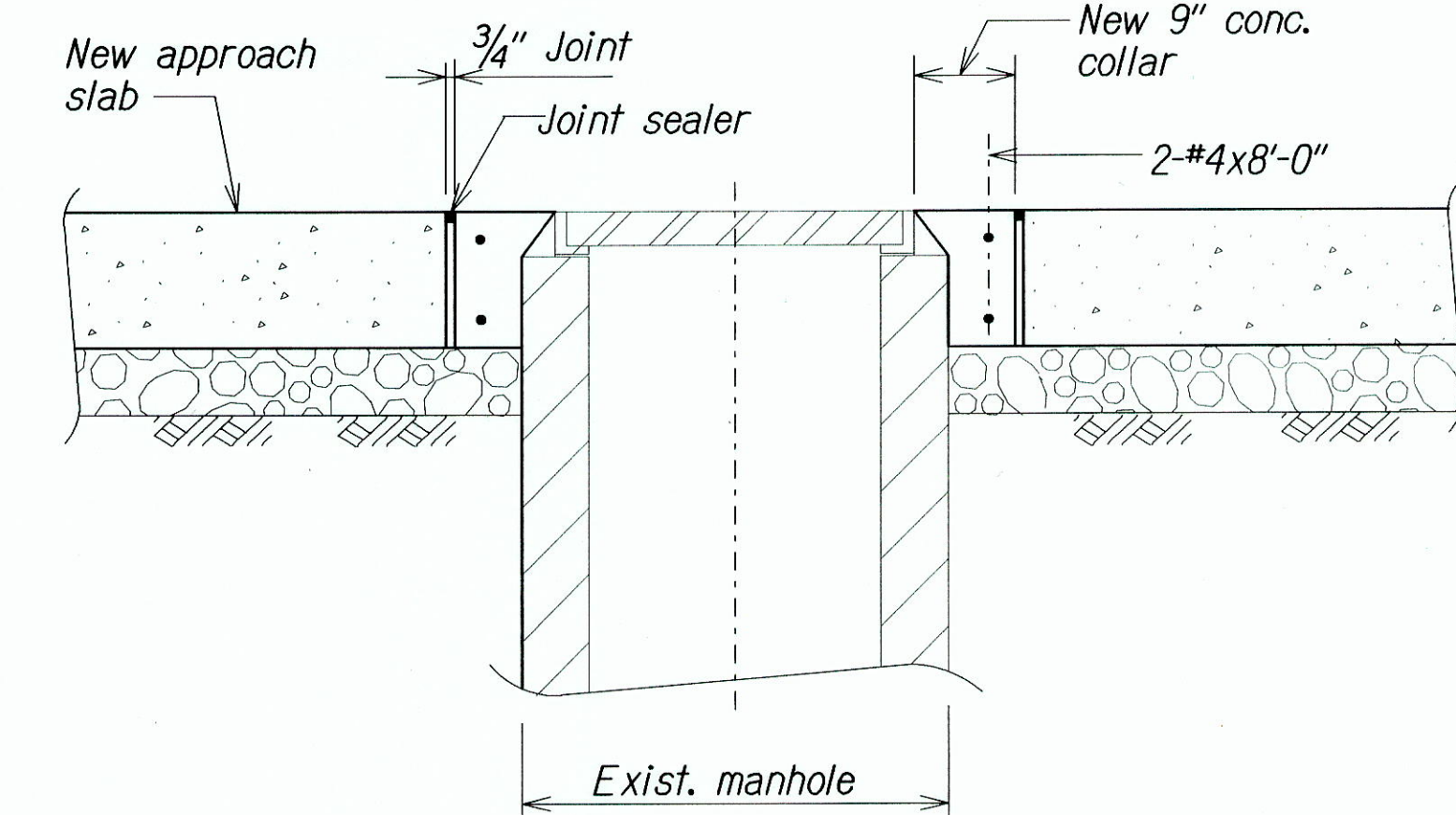
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	54	105



PLAN - ABUTMENT NO. 1
(ABUTMENT NO. 2 - SIMILAR EXCEPT OPPOSITE HAND)
 Scale: 1/4" = 1'-0"



PLAN AT MANHOLE



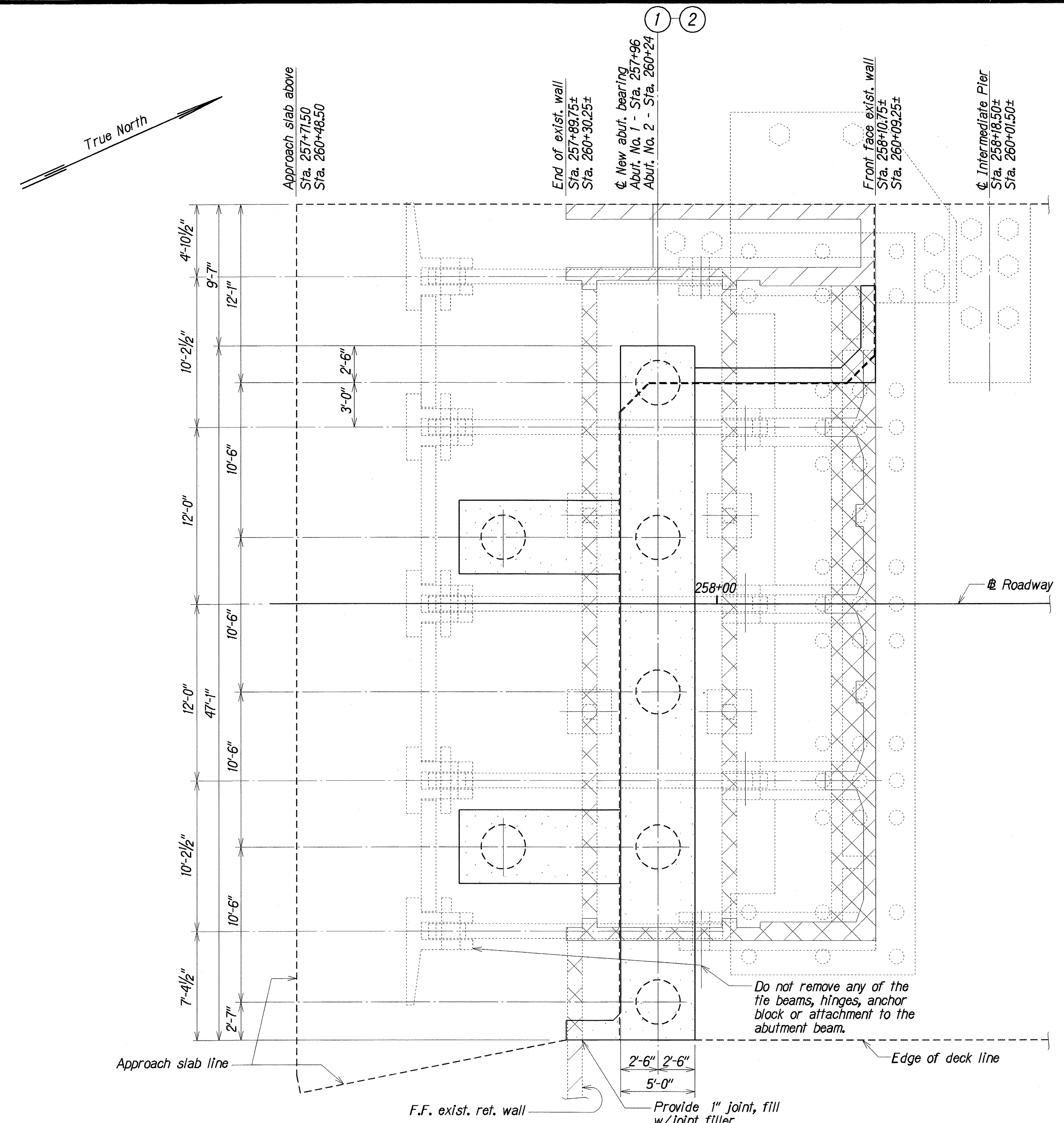
SECTION

DETAILS AT MANHOLE
 Scale: 3/4" = 1'-0"

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
	Text for as-built posting

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
HALAWA STREAM BRIDGE
 PLAN - ABUTMENT NO. 1 & NO. 2
 DETAILS AT MANHOLE
 KAMEHAMEHA HIGHWAY
 HALAWA STREAM BRIDGE REPLACEMENT
 Federal Aid Project No. BR-099-1(19)
 Scale: As Noted Date: Aug. 2000
 SHEET No. S15 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	55	105

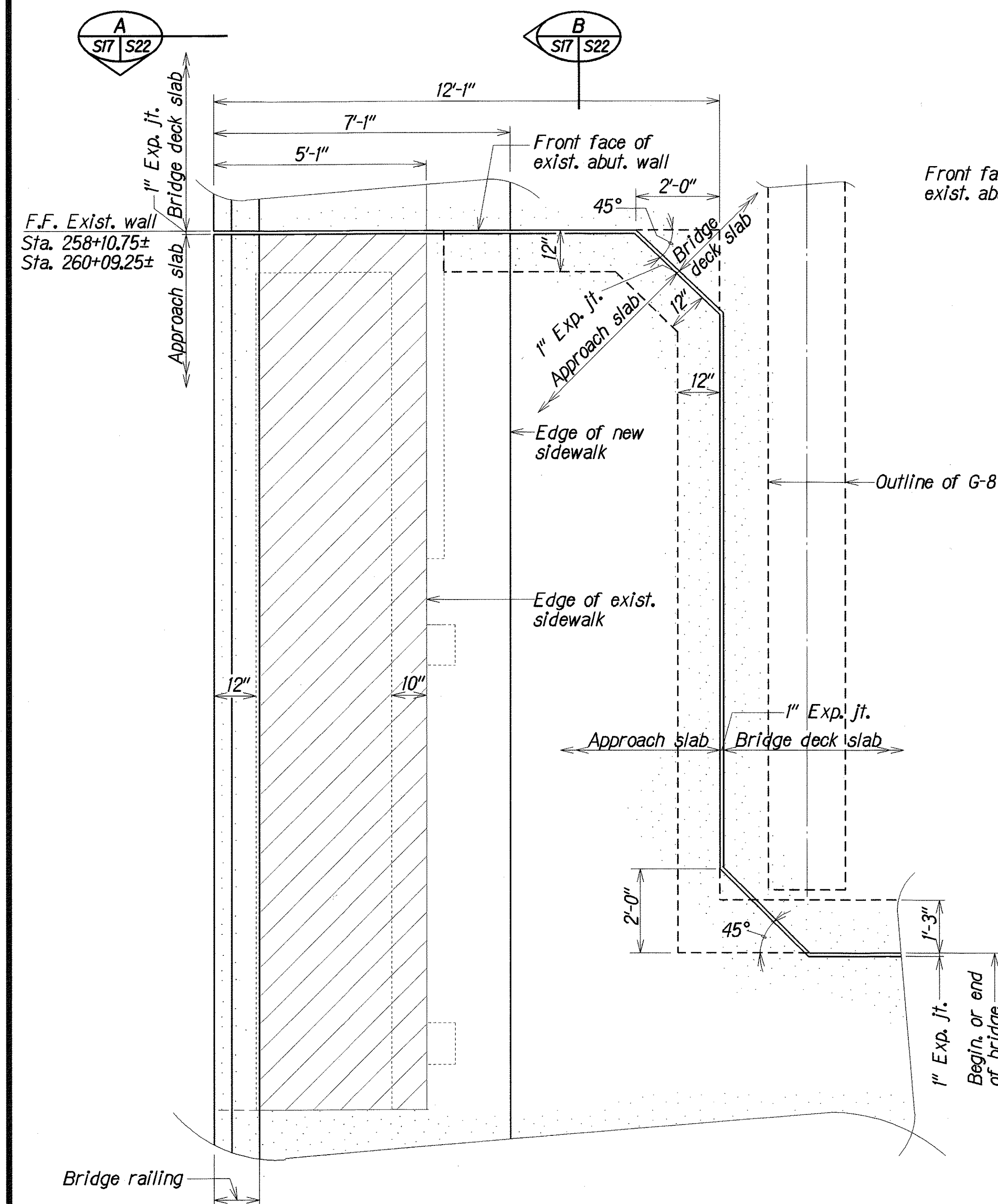


ABUTMENT NO. 1 - DEMOLITION PLAN
(ABUT. NO. 2 - SIMILAR EXCEPT OPPOSITE HAND)
 Scale: 1/4" = 1'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DESIGNED BY	07/08/2000
QUANTITIES BY	CHECKED BY	07/08/2000
2/00/00/00/00		07/08/2000

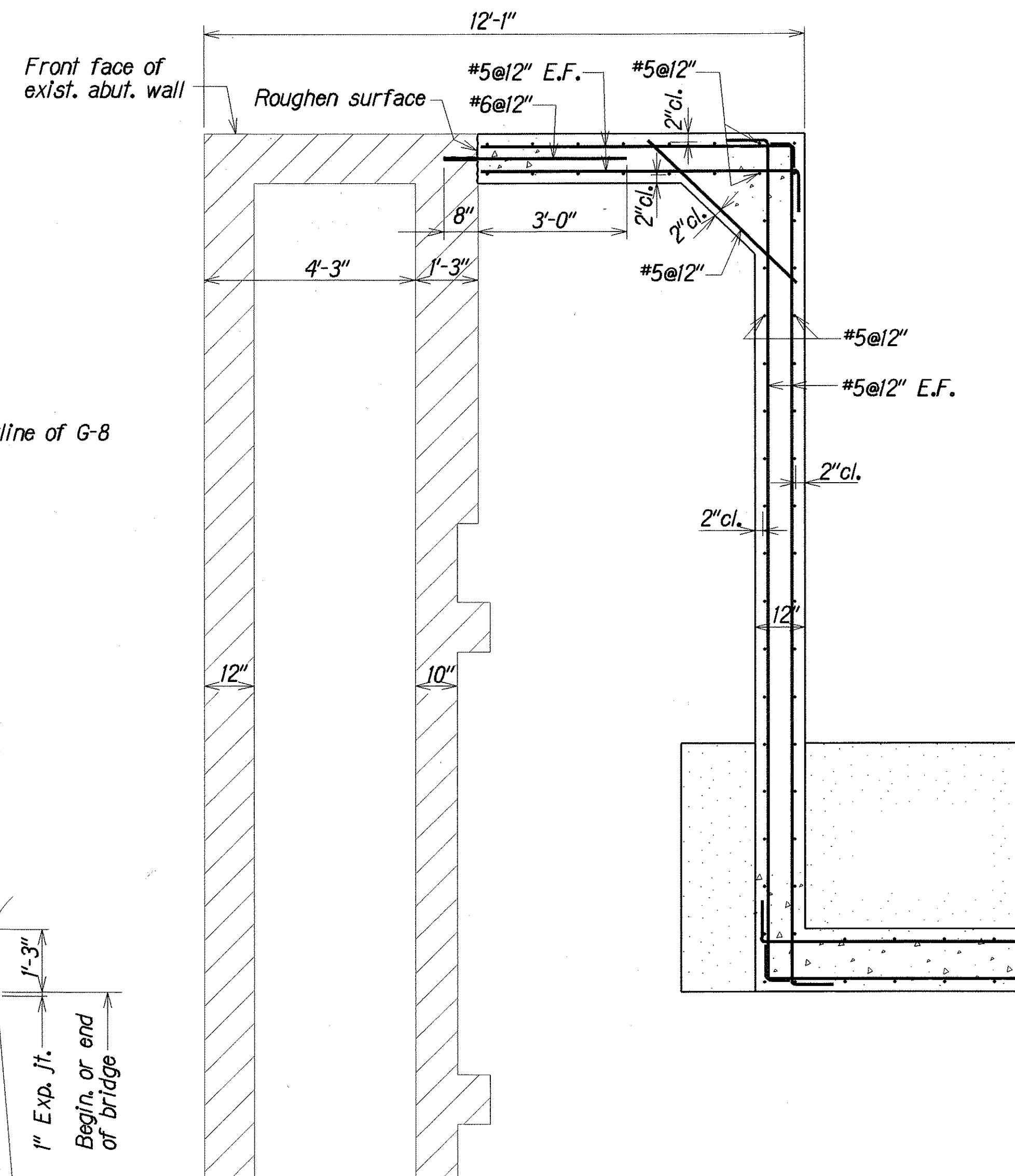
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
HALAWA STREAM BRIDGE
 ABUTMENT NO. 1 - DEMOLITION PLAN
 (ABUTMENT NO. 2 - SIMILAR EXCEPT OPPOSITE HAND)
 KAMEHAMEHA HIGHWAY
 HALAWA STREAM BRIDGE REPLACEMENT
 Federal Aid Project No. BR-099-1(19)
 Scale: As Noted Date: Aug. 2000
 SHEET No. 516 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	56	105



PART PLAN AT APPROACH SLAB

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



SECTION A

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

ORIGINAL PLAN	DATE	BY
NOTED	2/1/2001	LMA
DESIGNED BY	2/1/2001	JW
QUANTITIES BY	2/1/2001	LJK
CHECKED BY	2/1/2001	JW

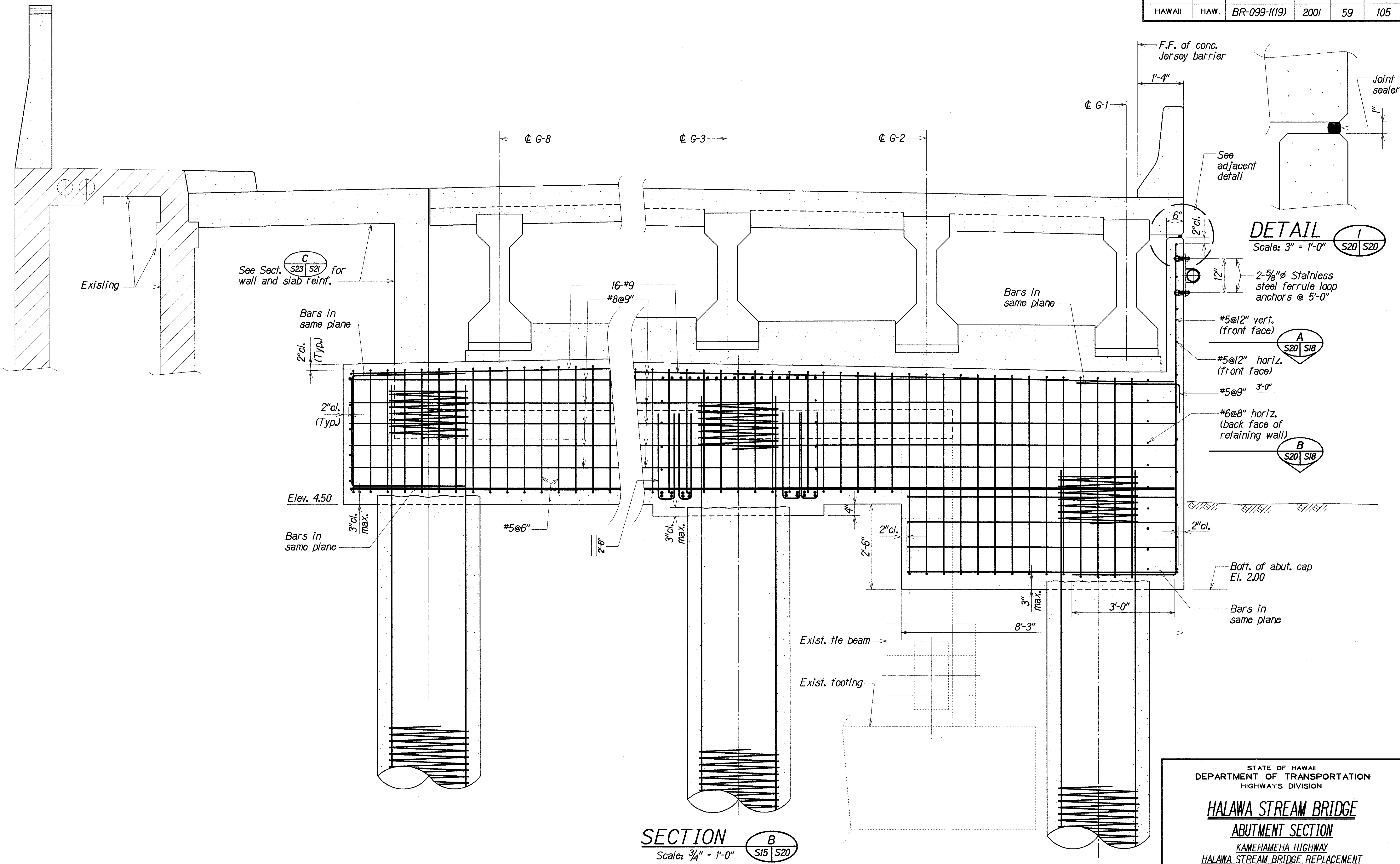
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
PART PLAN AT APPROACH SLAB AND
WALL SECTION
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

SHEET No. 57 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	59	105



DETAIL 1
Scale: 3" = 1'-0"
S20 S20

SECTION B
Scale: 3/4" = 1'-0"
S15 S20

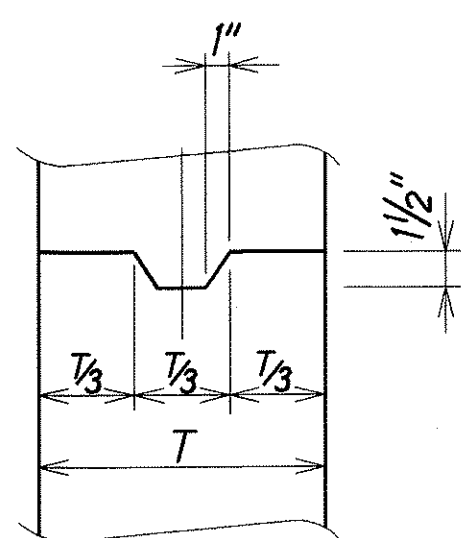
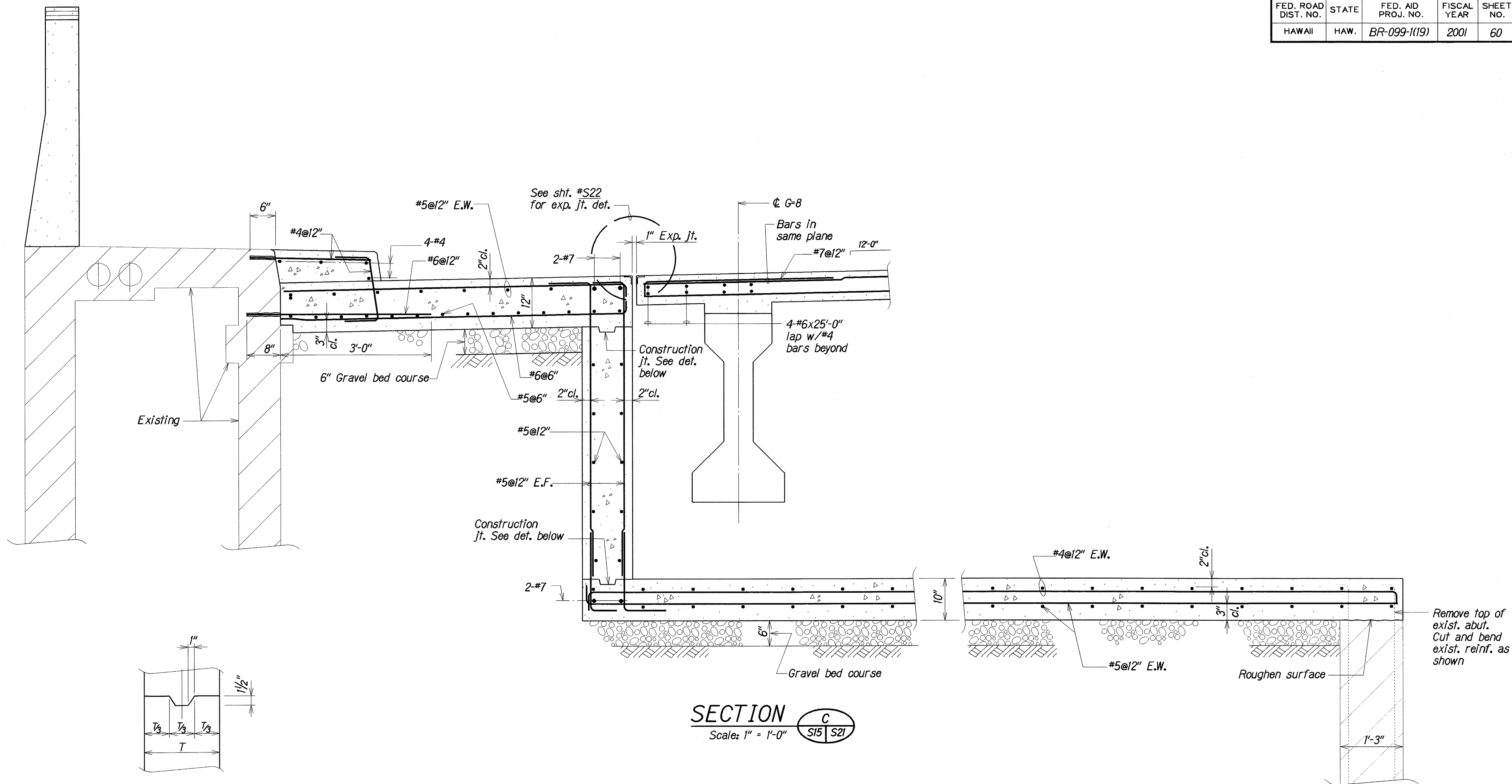
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
ABUTMENT SECTION
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted
Date: Aug. 2000

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTED	DRAWN BY	DATE
DESIGNED BY	CHECKED BY	DATE
NO. 20010520		

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	60	105



CONSTRUCTION JOINT DETAIL

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

SECTION C

Scale: 1" = 1'-0"

DESIGNED BY	DATE
DRAWN BY	DATE
CHECKED BY	DATE
NOTED BY	DATE
ORIGINAL PLAN	DATE

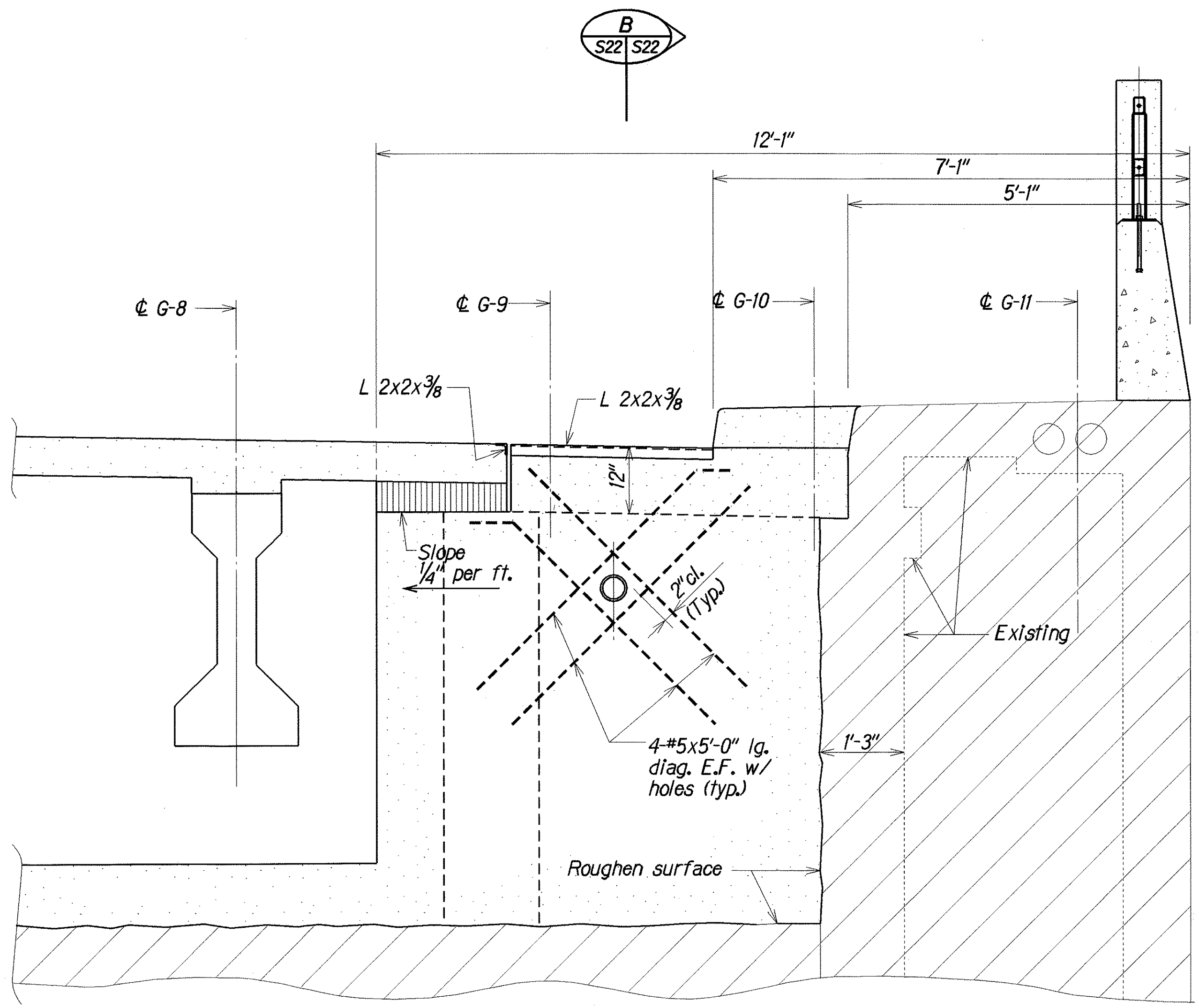
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
WALL SECTION
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

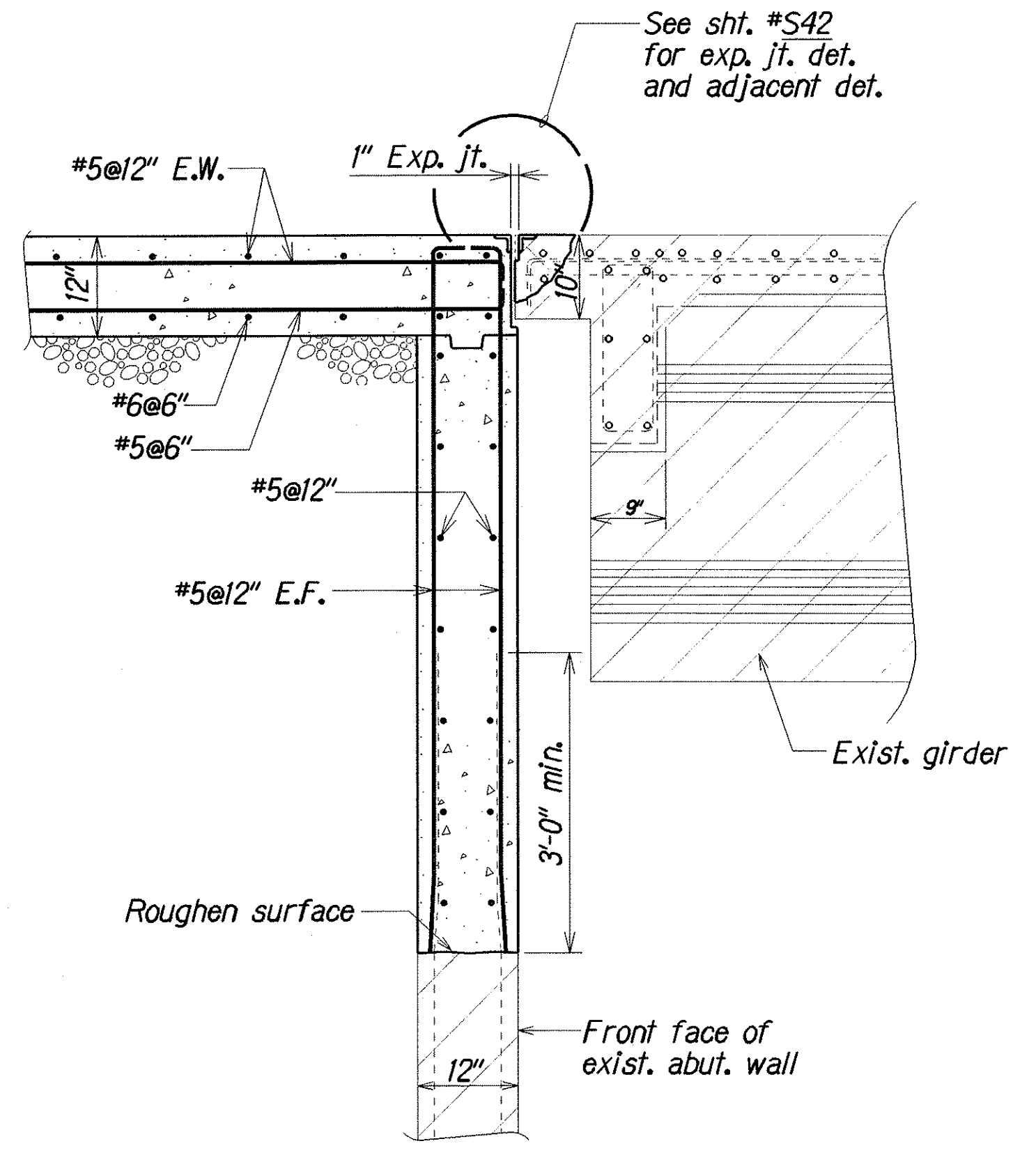
Scale: As Noted Date: Aug. 2000

SHEET No. S21 OF 57 SHEETS

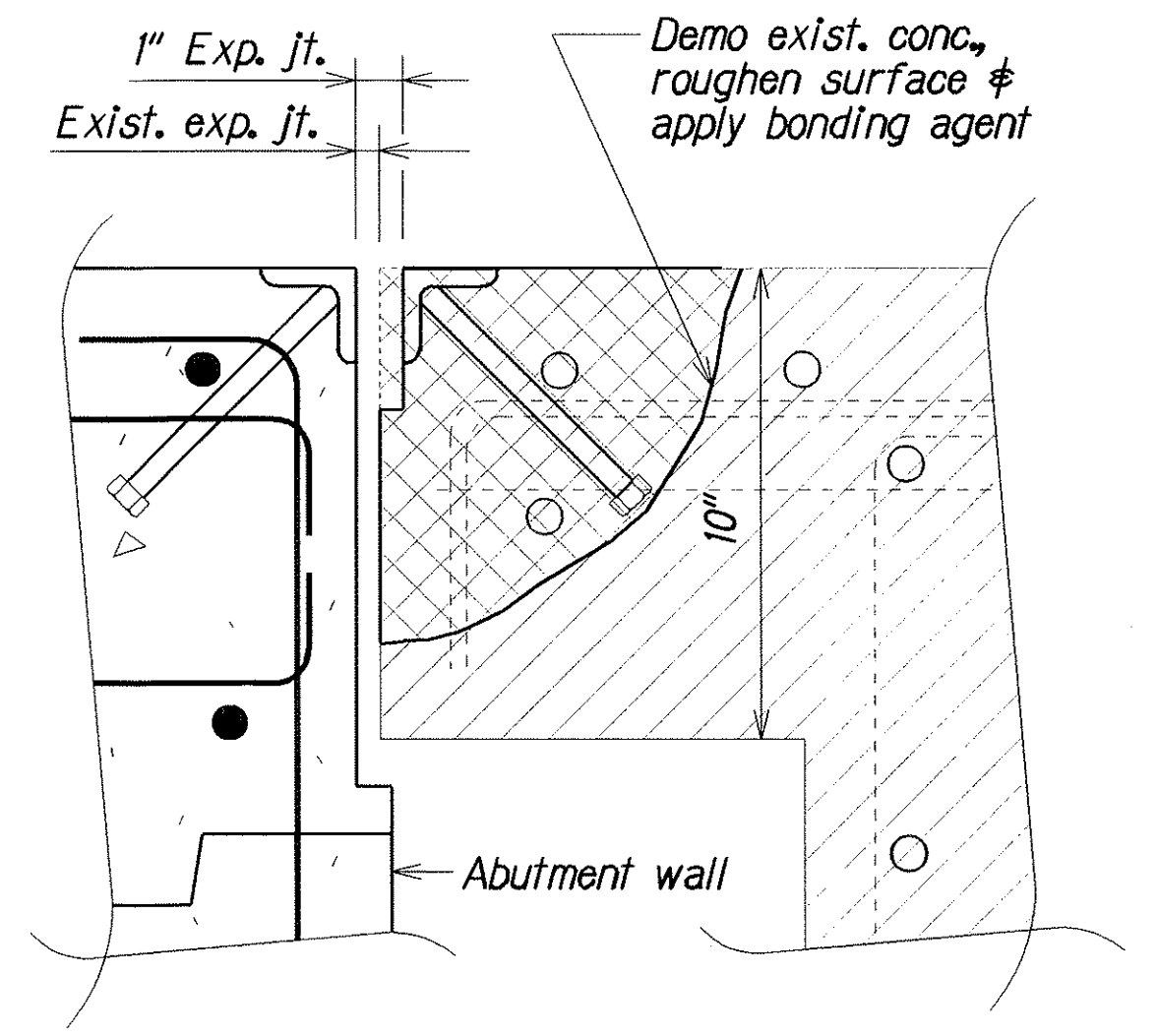
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	61	105



SECTION A
 S15 S22
 Scale: 3/4" = 1'-0"



SECTION B
 S17 S22
 Scale: 3/4" = 1'-0"



EXPANSION JOINT DETAIL AT ABUTMENT WALL
 Scale: 3" = 1'-0"

DESIGNED BY	DATE
TRACED BY	DATE
QUANTITIES BY	DATE
CHECKED BY	DATE

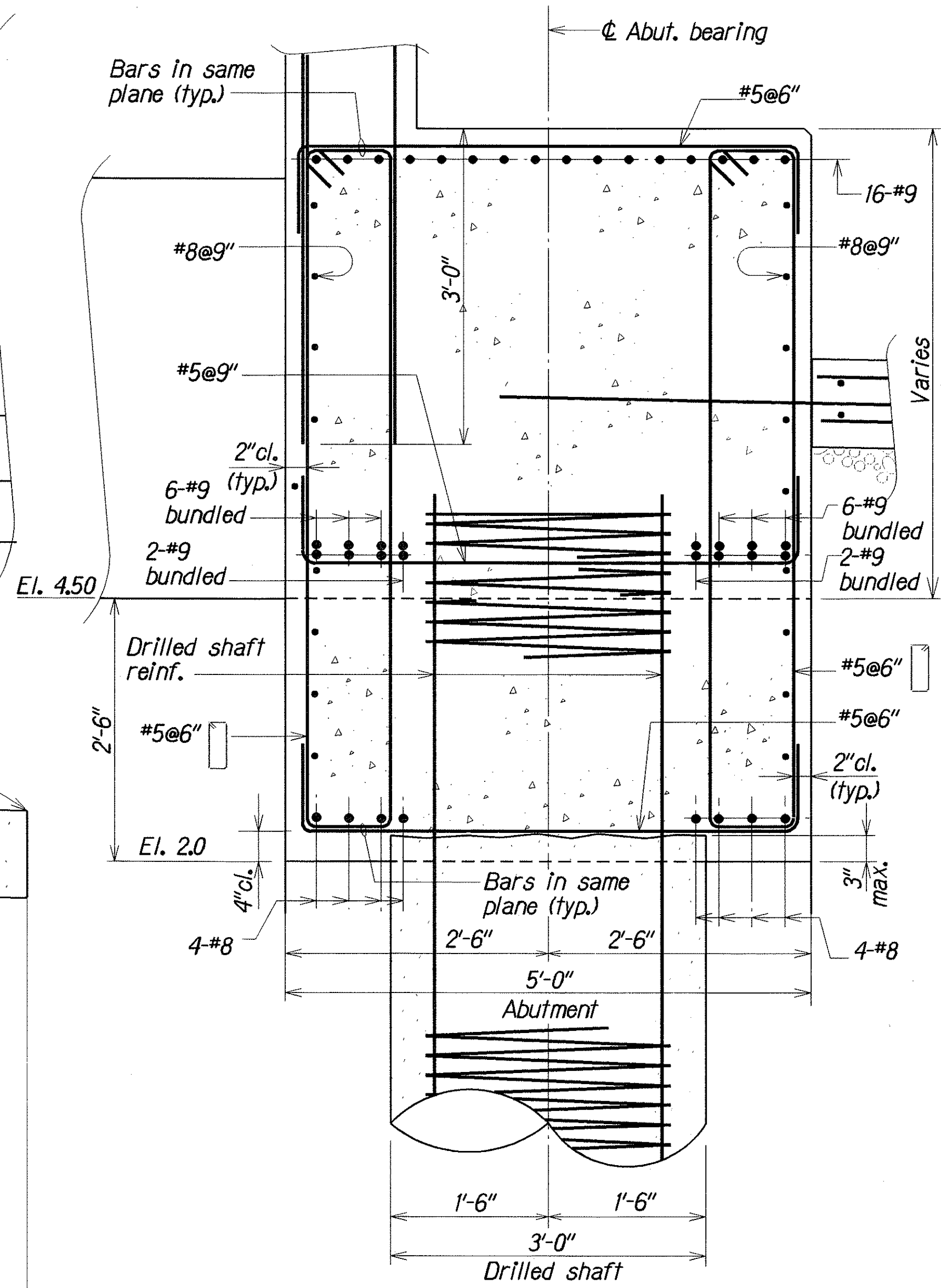
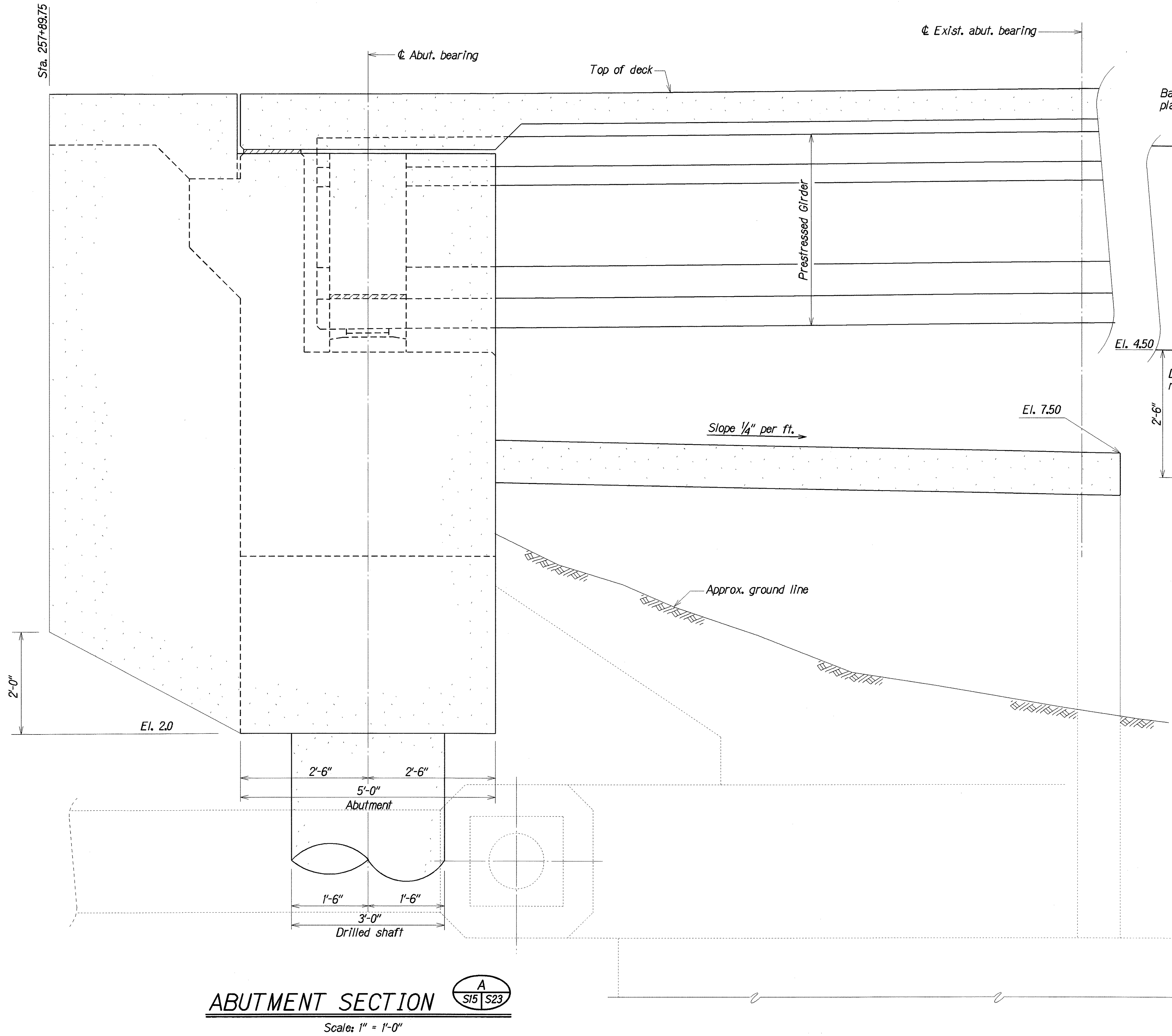
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
 WALL SECTIONS
 KAMEHAMEHA HIGHWAY
 HALAWA STREAM BRIDGE REPLACEMENT
 Federal Aid Project No. BR-099-1(19)

Scale: As Noted

Date: Aug. 2000

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	62	105



ABUTMENT SECTION B
S15 S23
Scale: 1" = 1'-0"

ABUTMENT SECTION A
S15 S23
Scale: 1" = 1'-0"

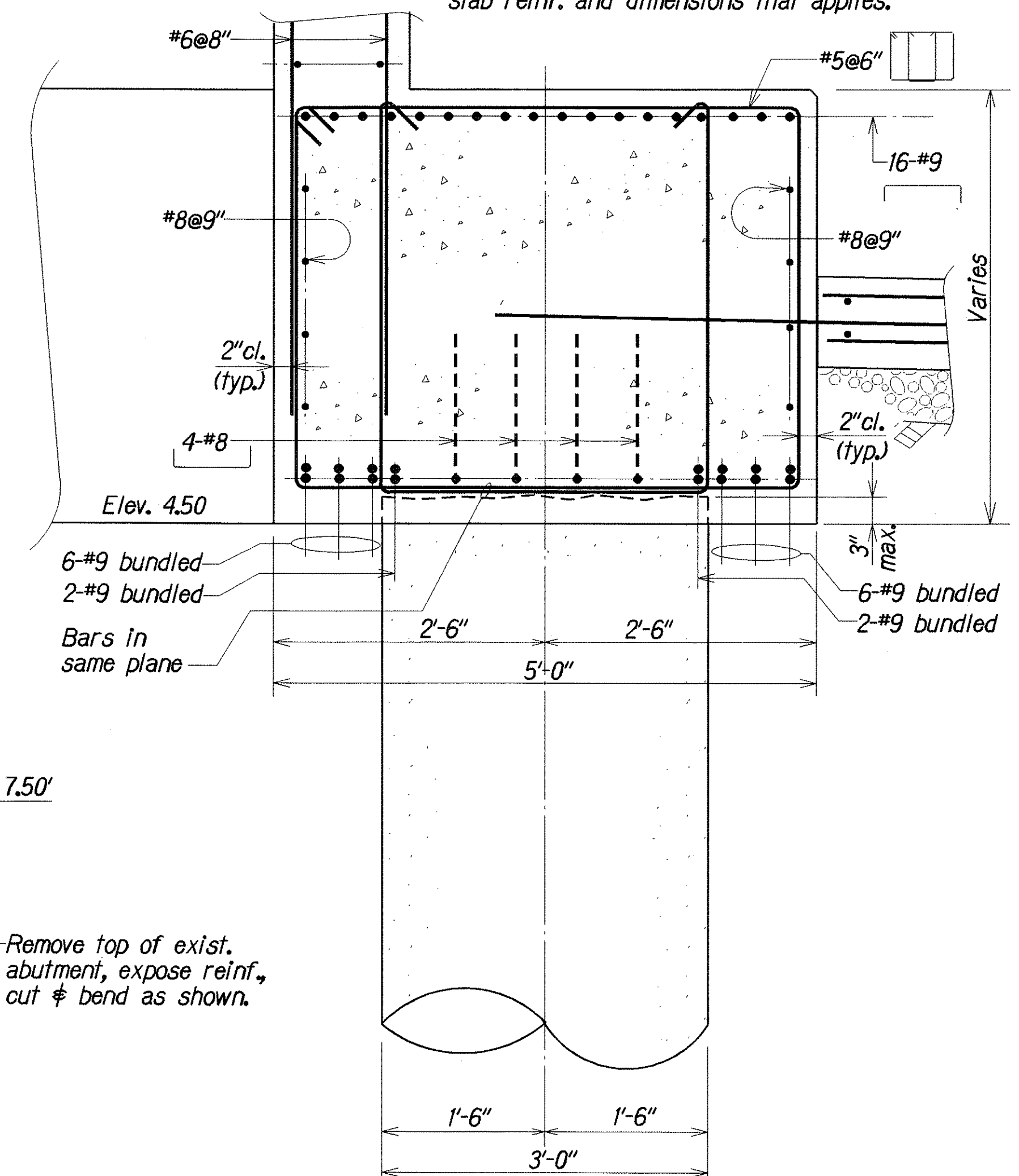
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE WORK	DRAWN BY	JUL 2000
DESIGNED BY	DESIGNED BY	JUL 2000
CHECKED BY	CHECKED BY	JUL 2000

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
ABUTMENT SECTIONS
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

NOTE:
See Abut. Section at right for other abut. reinf.,
slab reinf. and dimensions that applies.



ABUTMENT SECTION C
S15 | S24

AT DRILLED SHAFT

Scale: 1" = 1'-0"

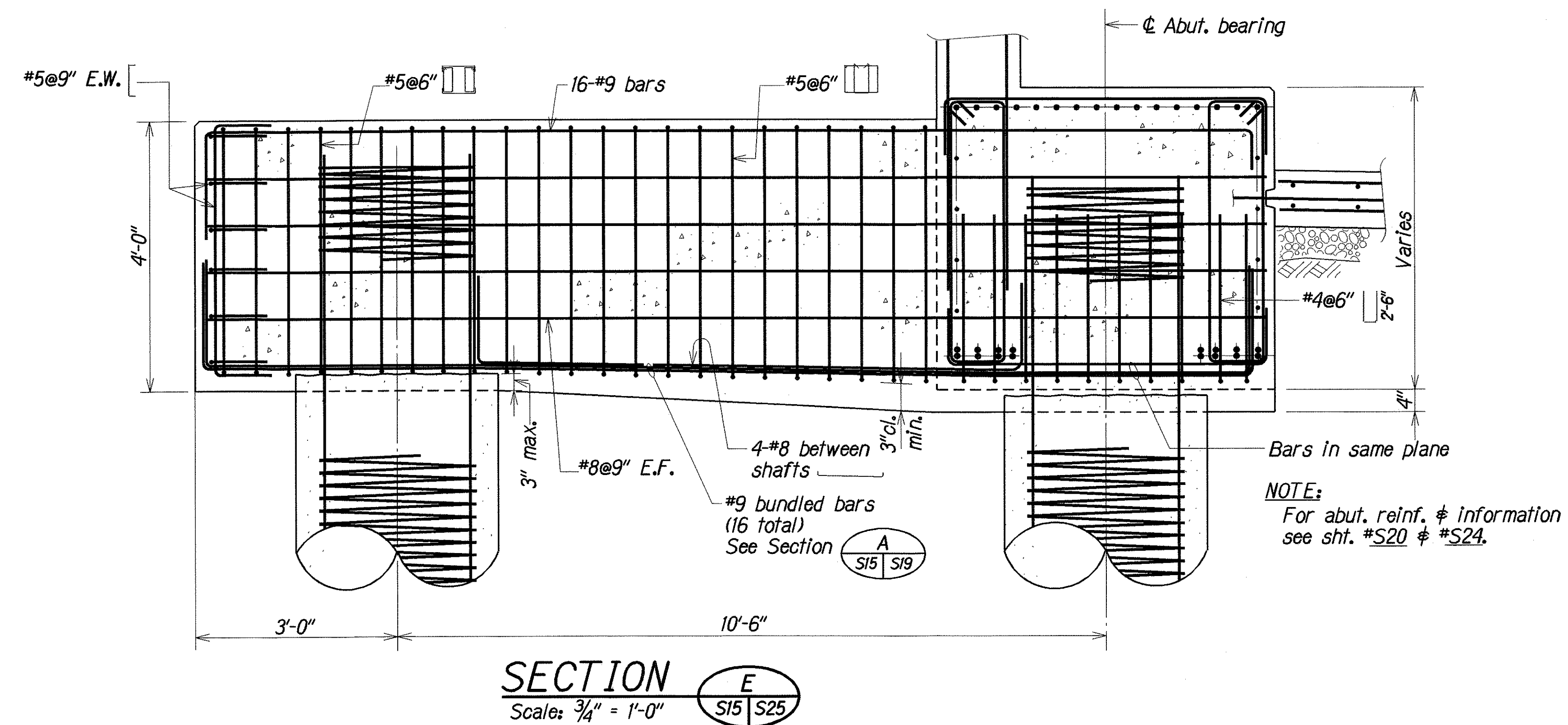
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
ABUTMENT SECTIONS
AT AND BETWEEN DRILLED SHAFT
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

SHEET No. S24 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	64	105



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DESIGNED BY	AUG. 2000
QUANTITIES BY	CHECKED BY	AUG. 2000
2/10/00/25		AUG. 2000

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
ABUTMENT SECTION
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

SHEET No. S25 OF 57 SHEETS

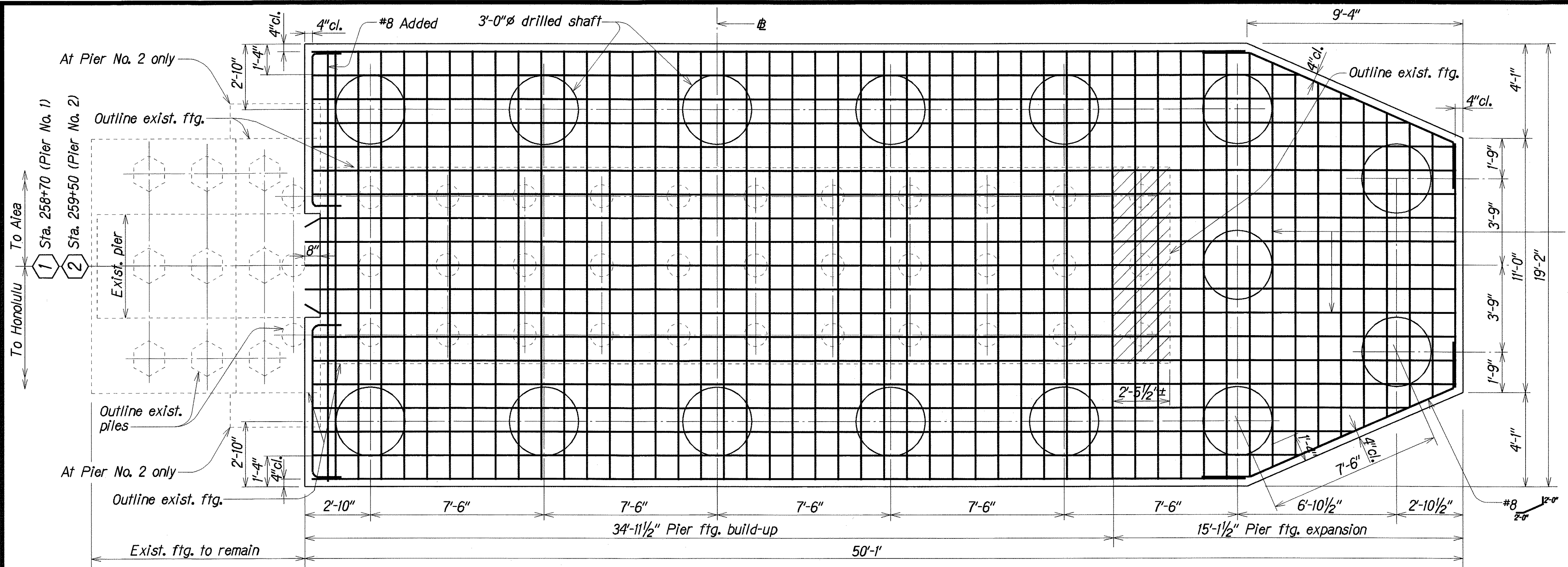
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	65	105

NOTES:

1. Secure dowel with epoxy fill. Epoxy shall be "Double Cartridge" type.
2. Existing pier and rebar shall be cleaned with high pressure fresh water just before concrete pour.

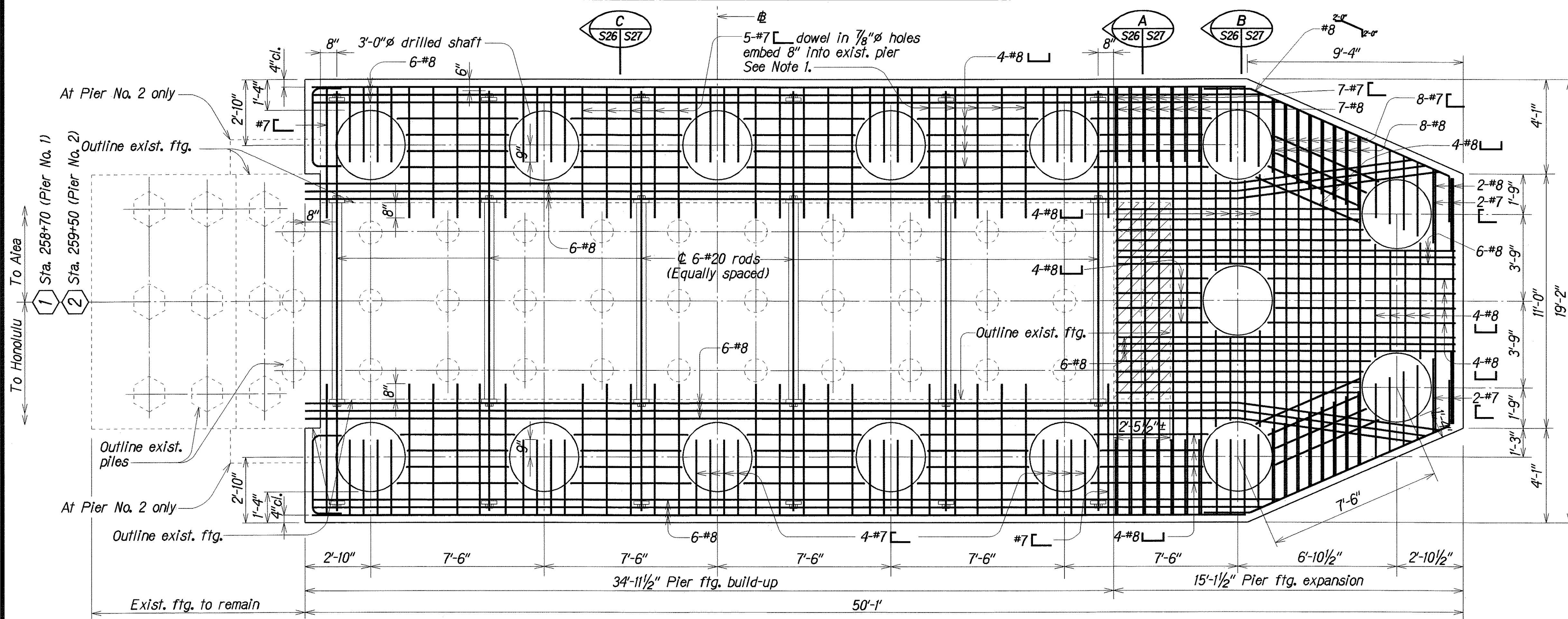
#8@12" o/c top conf. EW

Hatched area limits of exist. pier removal
exist. wooden piles to remain



TOP FOOTING REINFORCEMENT PLAN

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



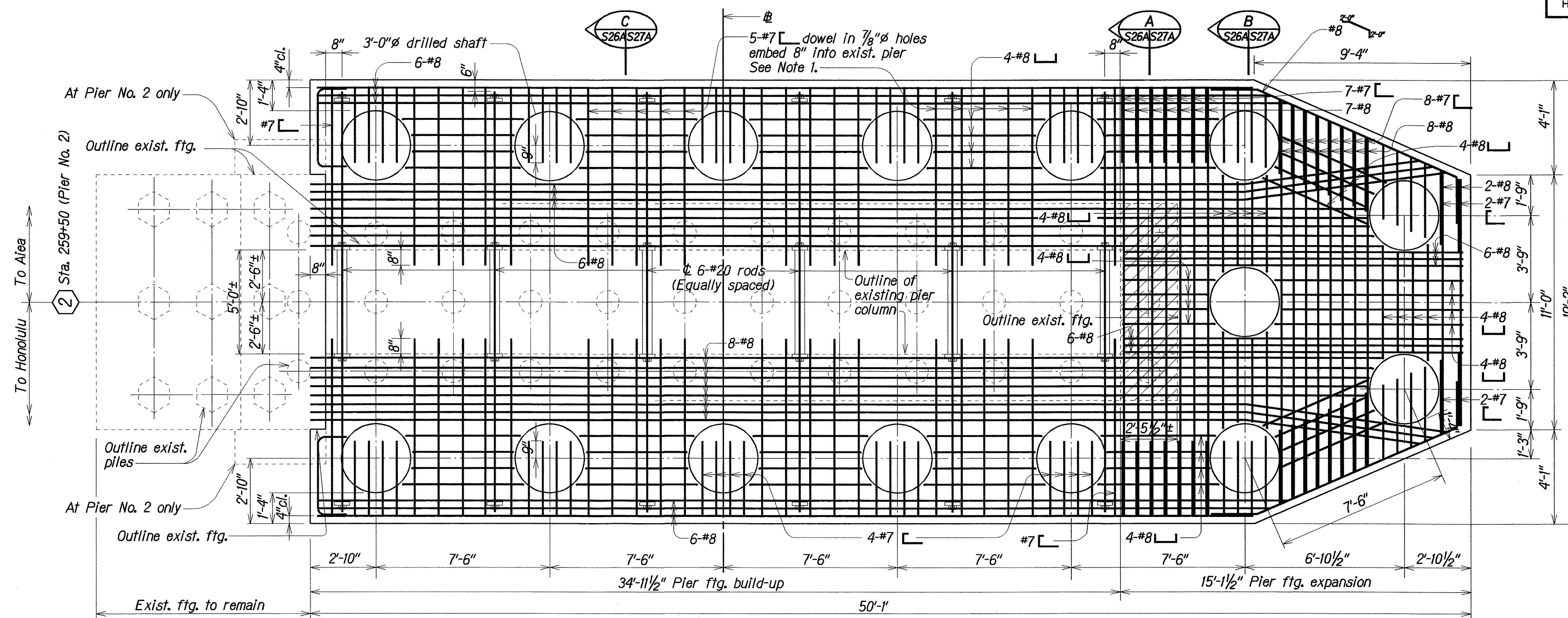
BOTTOM FOOTING REINFORCEMENT PLAN

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

ORIGINAL PLAN	DESIGNED BY	DATE
NOTE BOOK	DESIGNED BY	AUG 2000
2/20/00/26	DESIGNED BY	AUG 2000
	DESIGNED BY	AUG 2000

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HALAWA STREAM BRIDGE
FOOTING REINFORCEMENT PLAN
PIER NO. 1 & PIER NO. 2
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)
Scale: As Noted Date: Aug. 2000

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	C.O. 65S-1	105



BOTTOM FOOTING REINFORCEMENT PLAN AT PIER NO. 2 
Scale: 3/8" = 1'-0"

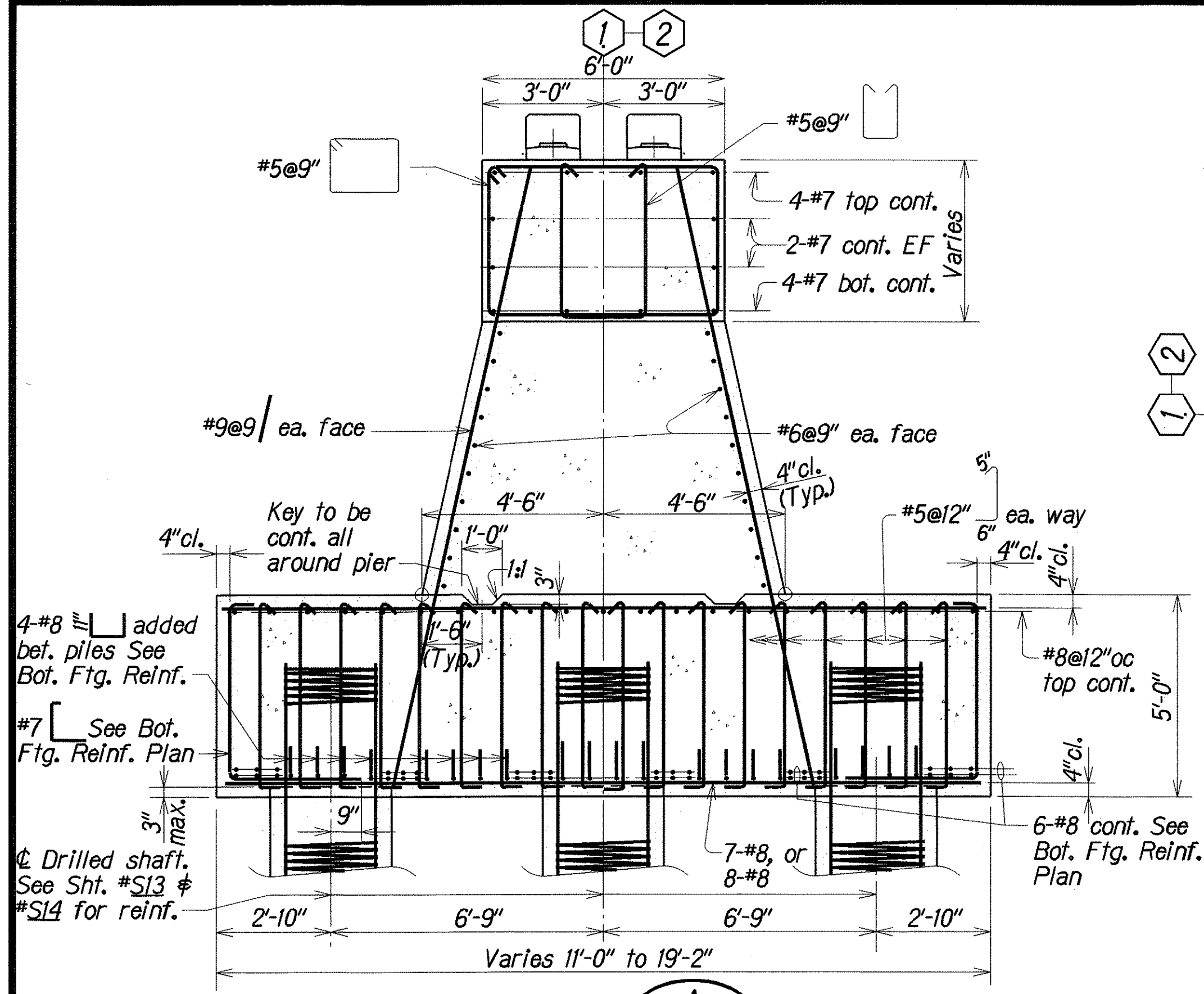
ORIGINAL PLAN	DESIGNED BY	DATE
NOTE BOOK	QUANTITIES BY	DEC 2005
	CHECKED BY	DEC 2005
		DEC 2005

 12/23/05	This sheet was added during change order to reflect changes to Pier No. 2 Footing Plan. This shows the existing condition where the pier column exists instead of the original footing as drawn on sheet Q26.
	DATE: 12/23/05 REVISIONS:
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION HALAWA STREAM BRIDGE FOOTING REINFORCEMENT PLAN PIER NO. 2 KAMEHAMEHA HIGHWAY HALAWA STREAM BRIDGE REPLACEMENT Federal Aid Project No. BR-099-1(19) Scale: As Noted Date: Aug. 2000	

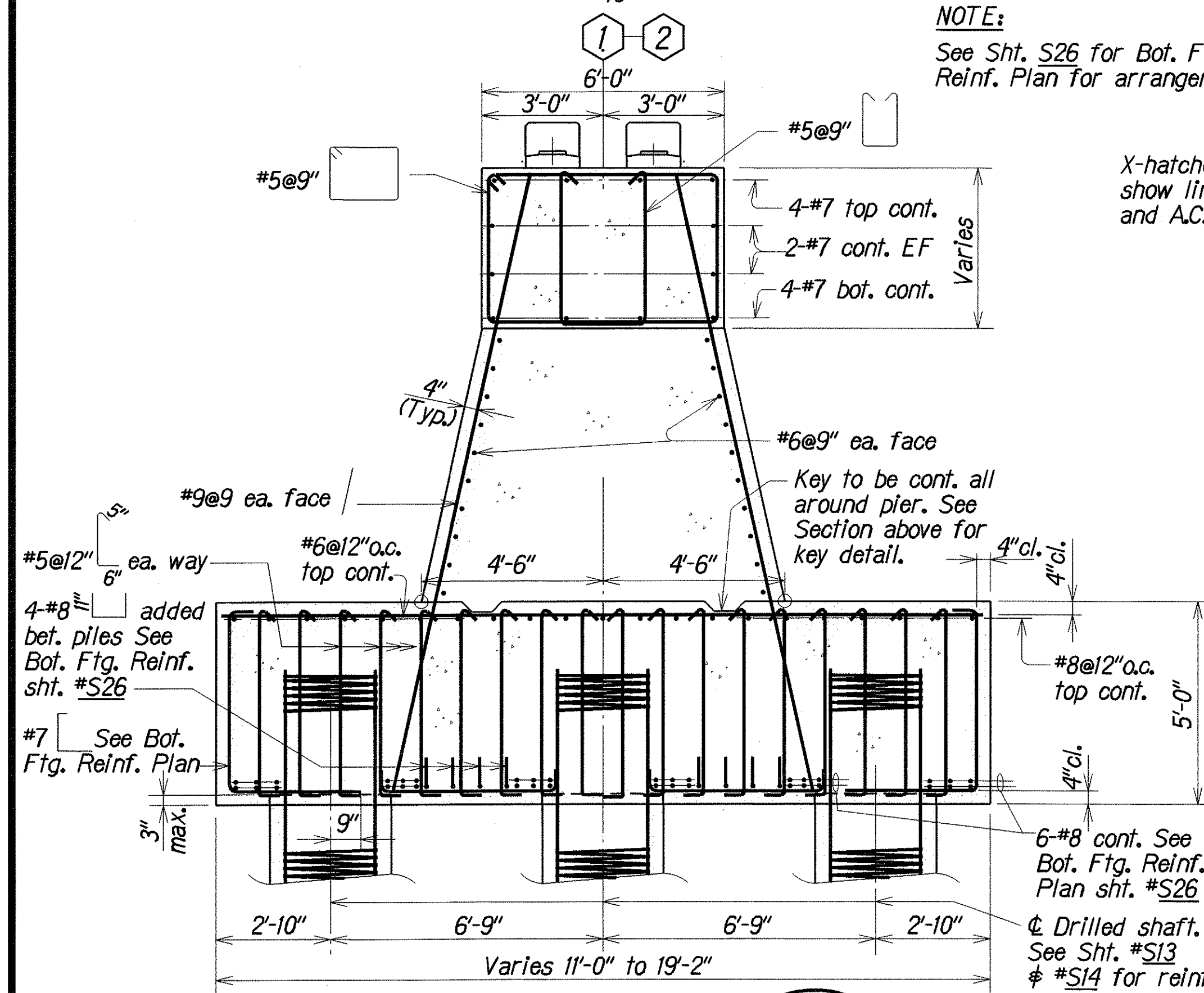
SHEET No. S26A OF 57 SHEETS

C.O. 65S-1

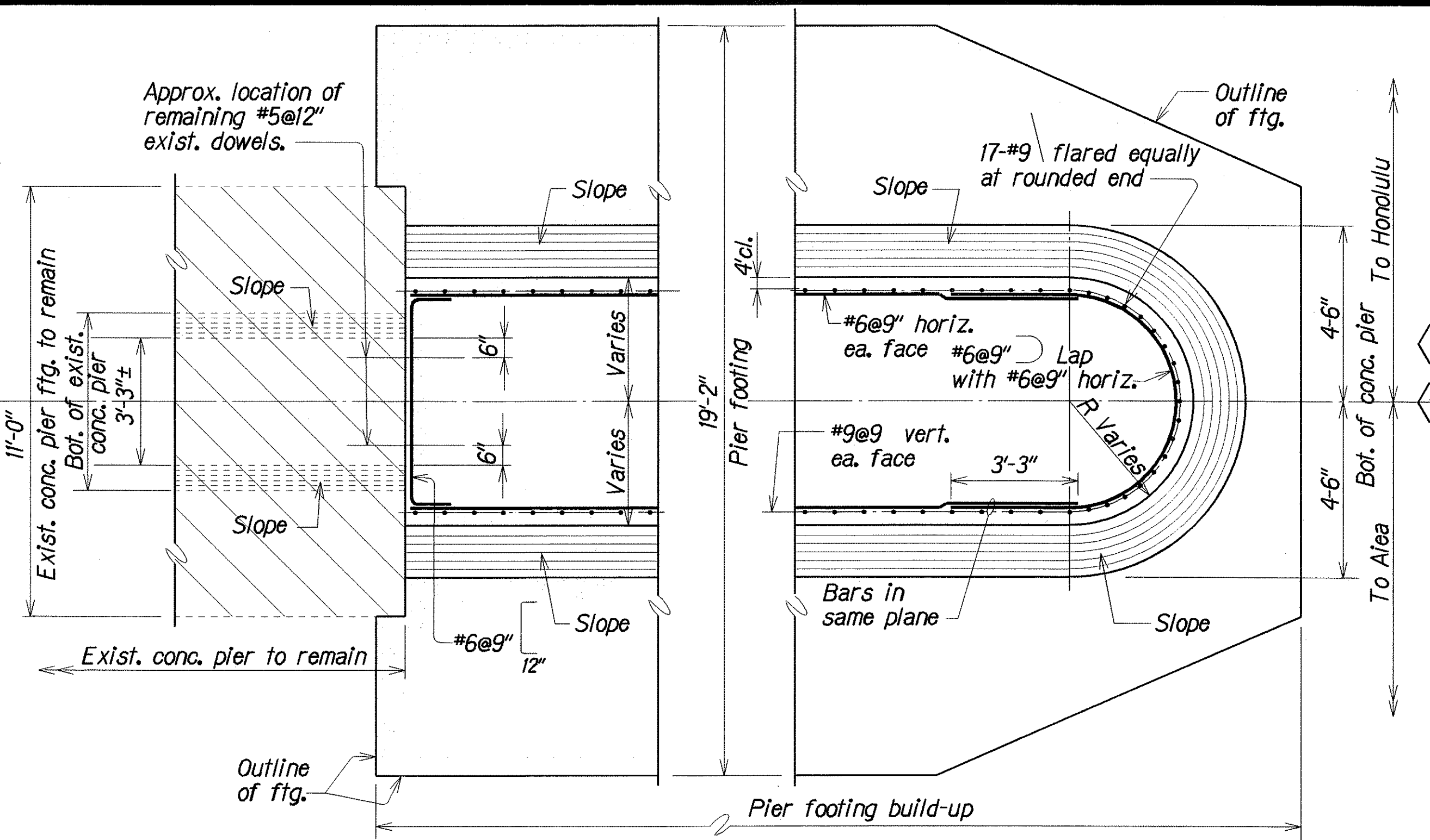
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	66	105



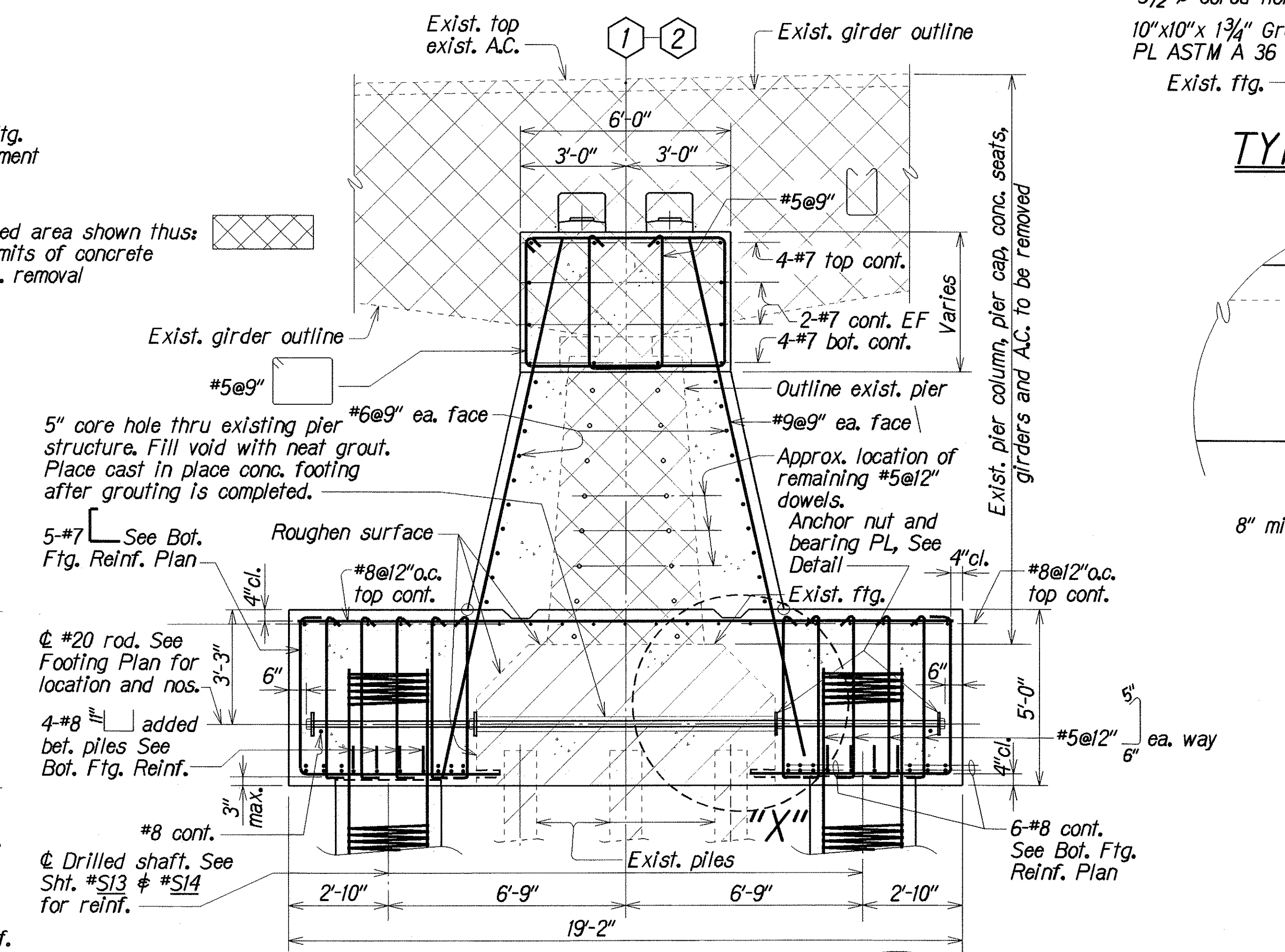
TYPICAL PIER SECTION A BETWEEN PILES
Scale: 3/8" = 1'-0"



TYPICAL PIER SECTION B AT PILES
Scale: 3/8" = 1'-0"



SECTION D
Scale: 3/8" = 1'-0"



TYPICAL PIER SECTION C AT PILES
Scale: 3/8" = 1'-0"

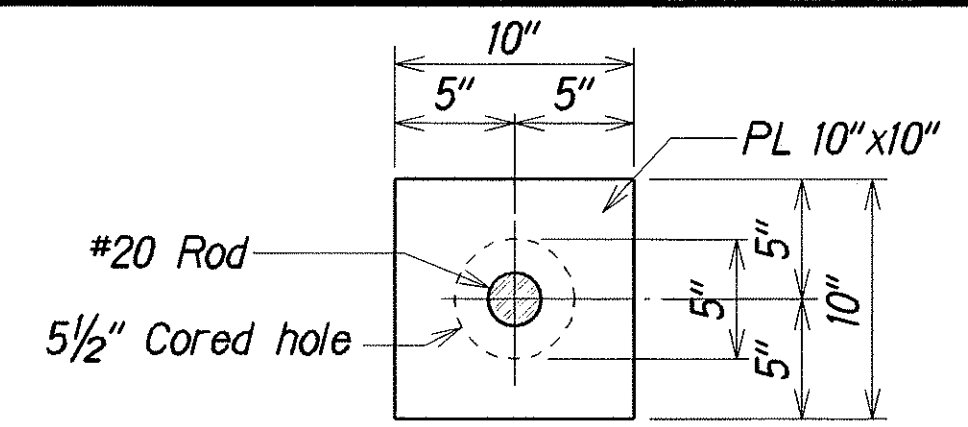
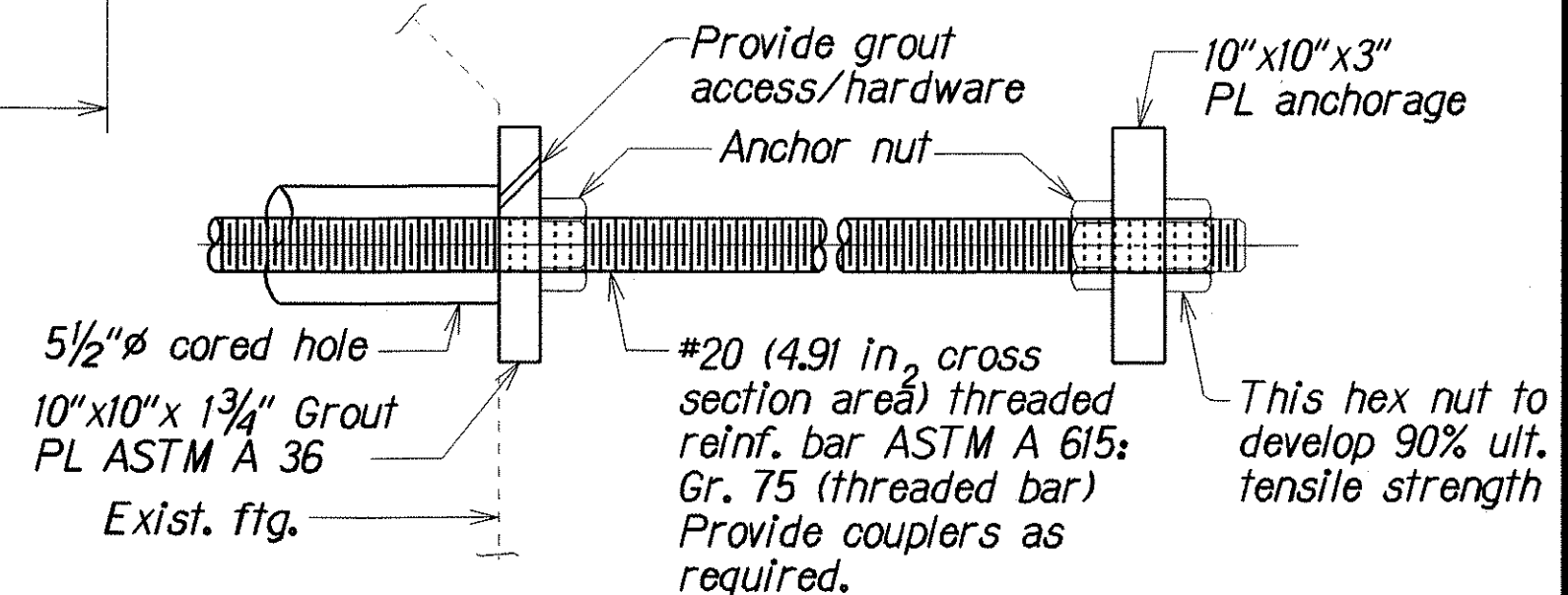
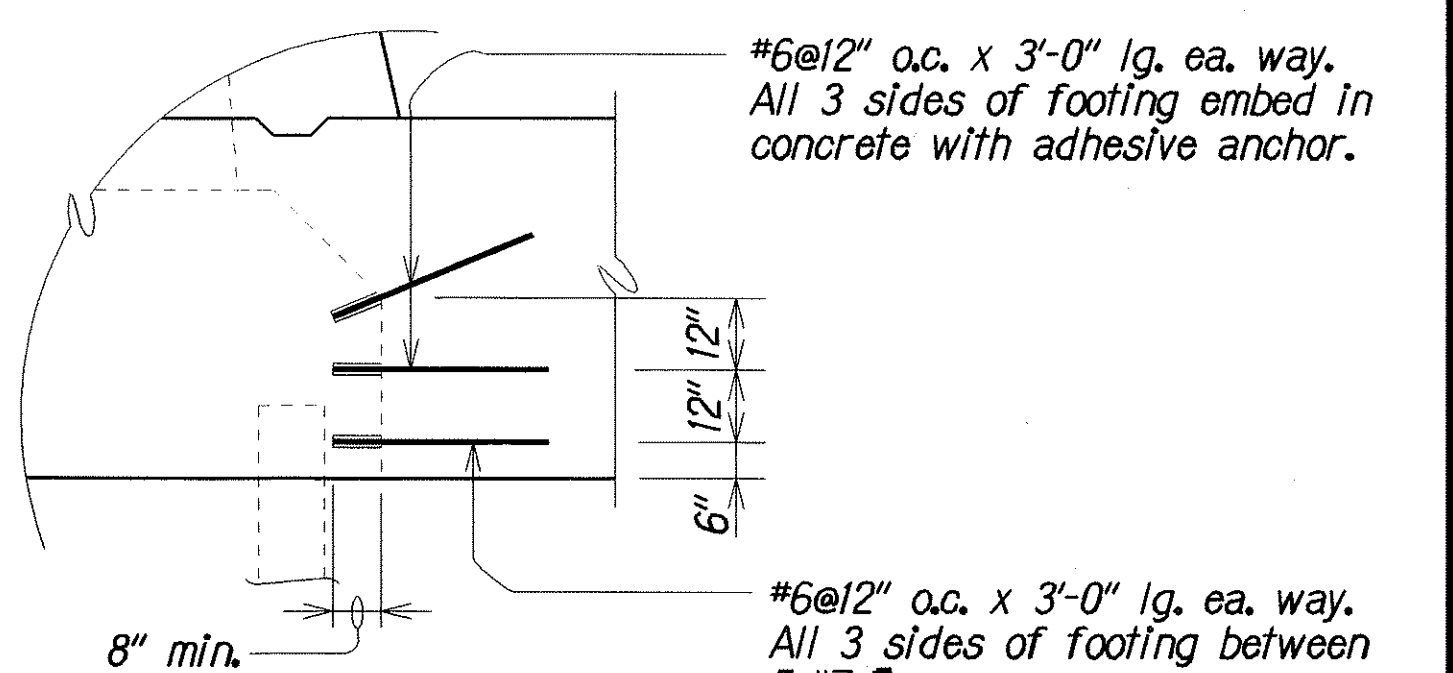


PLATE DETAIL
Scale: 1 1/2" = 1'-0"

- NOTES:**
1. Grout shall conform to 504.03(HX5) of the Hawaii Standard Specifications. Grouting hardware and details to be approved by the Engineer.
 2. Couplers/splicers and nuts will develop not less than ninety (90) percent of the specified minimum ultimate tensile strength of the unspliced reinforcing bar.
 3. All hardware shall be galvanized in accordance with ASTM A 123.
 4. Provide the engineer w/shop drawings of the rod hardware and details; and the grouting hardware and equipment prior to fabrication.



TYPICAL #20 FOOTING ROD
Scale: 1 1/2" = 1'-0"



DETAIL "X"
Scale: 3/8" = 1'-0"

SURVEY PLOTTED BY	DATE
DRAWN BY	June 2000
NOTED BY	June 2000
QUANTITIES BY	June 2000
CHECKED BY	June 2000

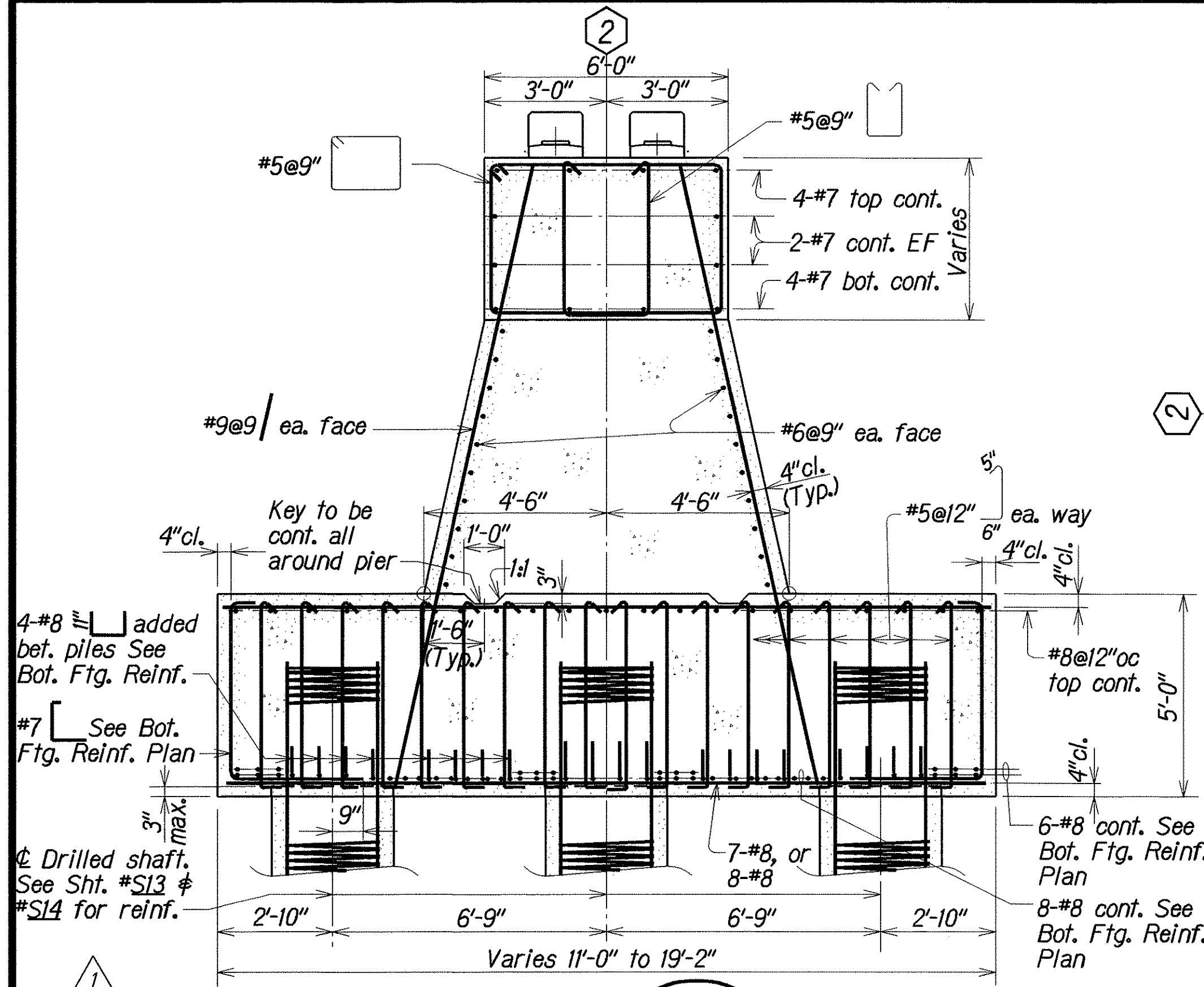
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
PIER SECTIONS
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

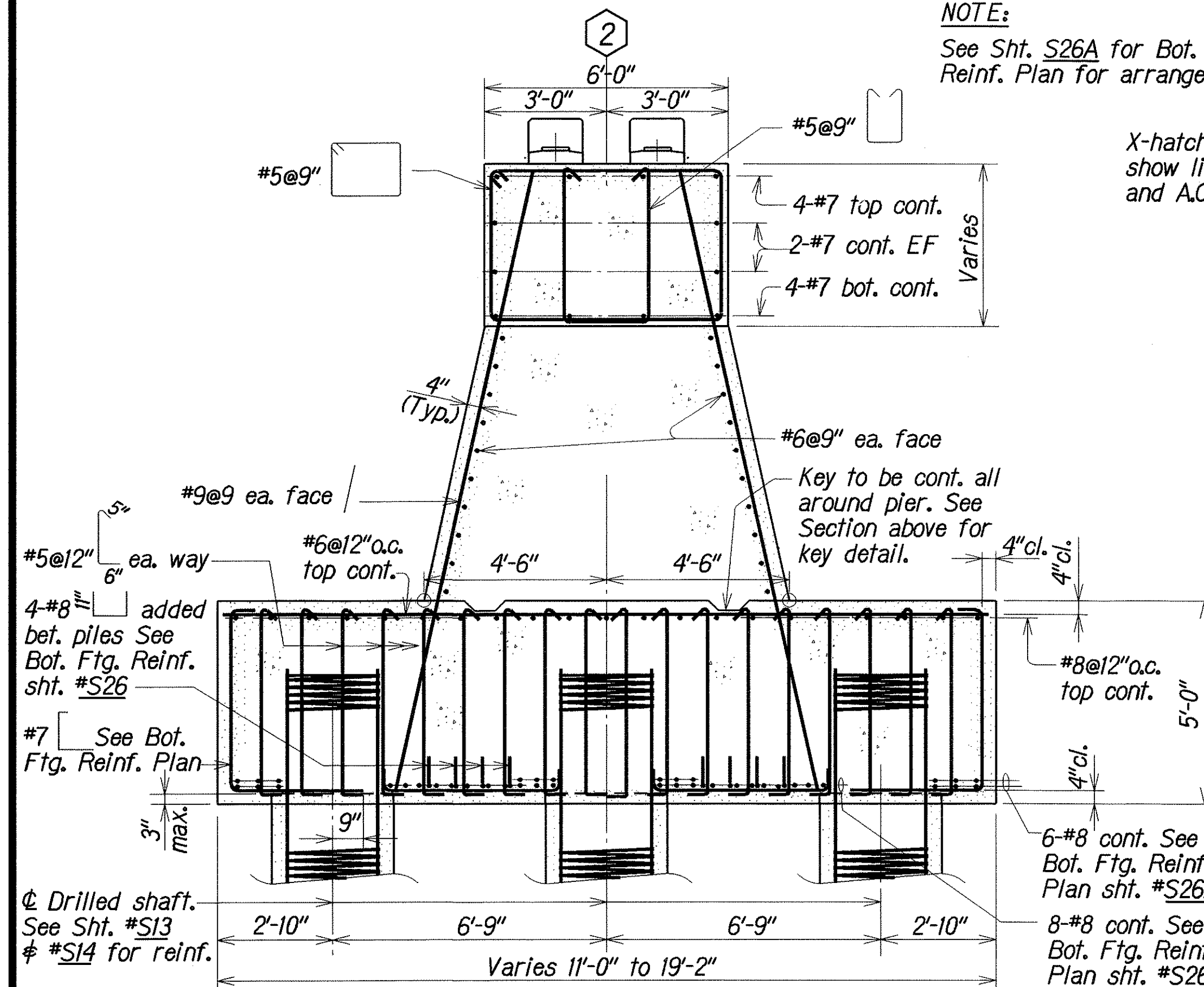
SHEET No. S27 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	C.O. 66S-1	105



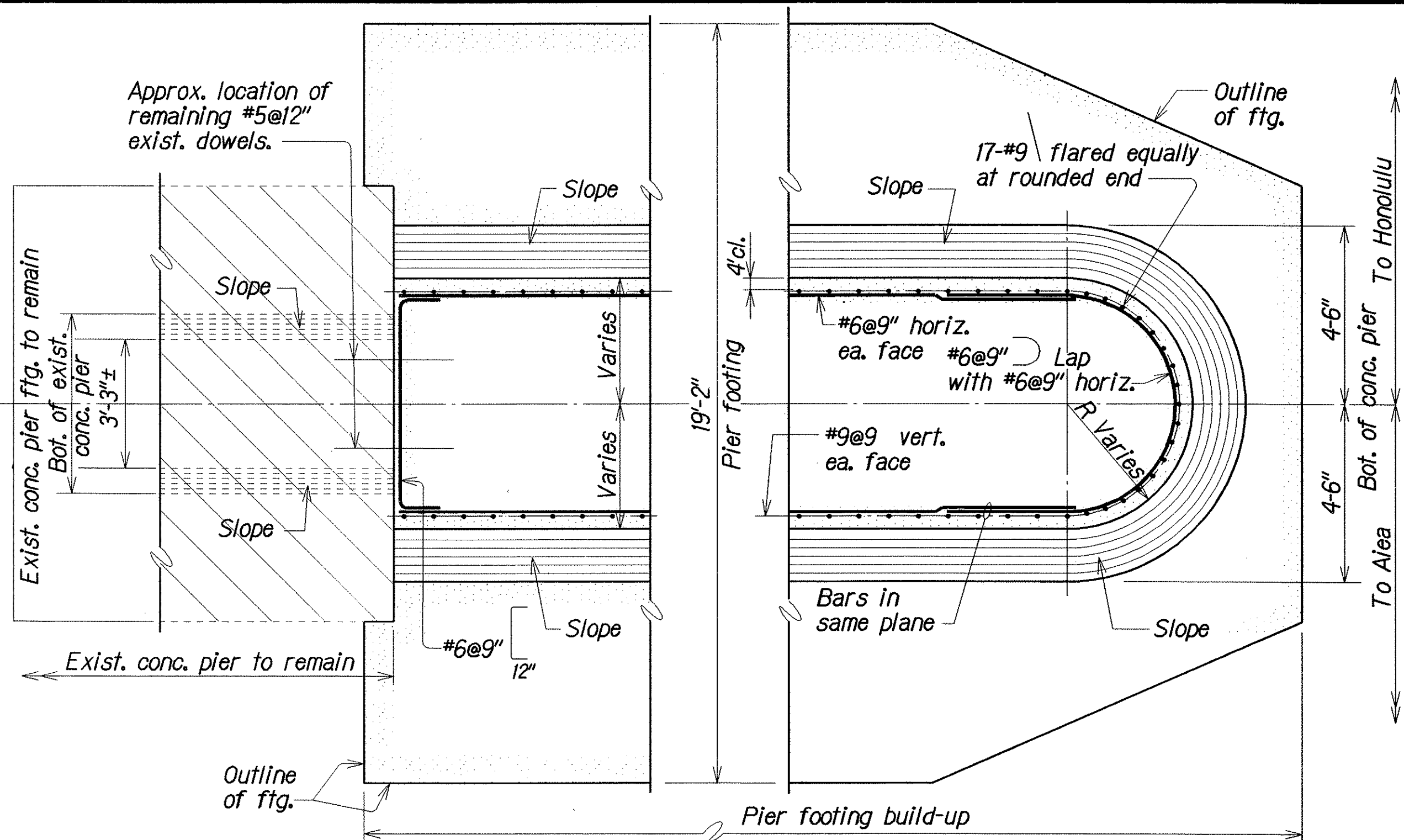
TYPICAL PIER SECTION A BETWEEN PILES

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



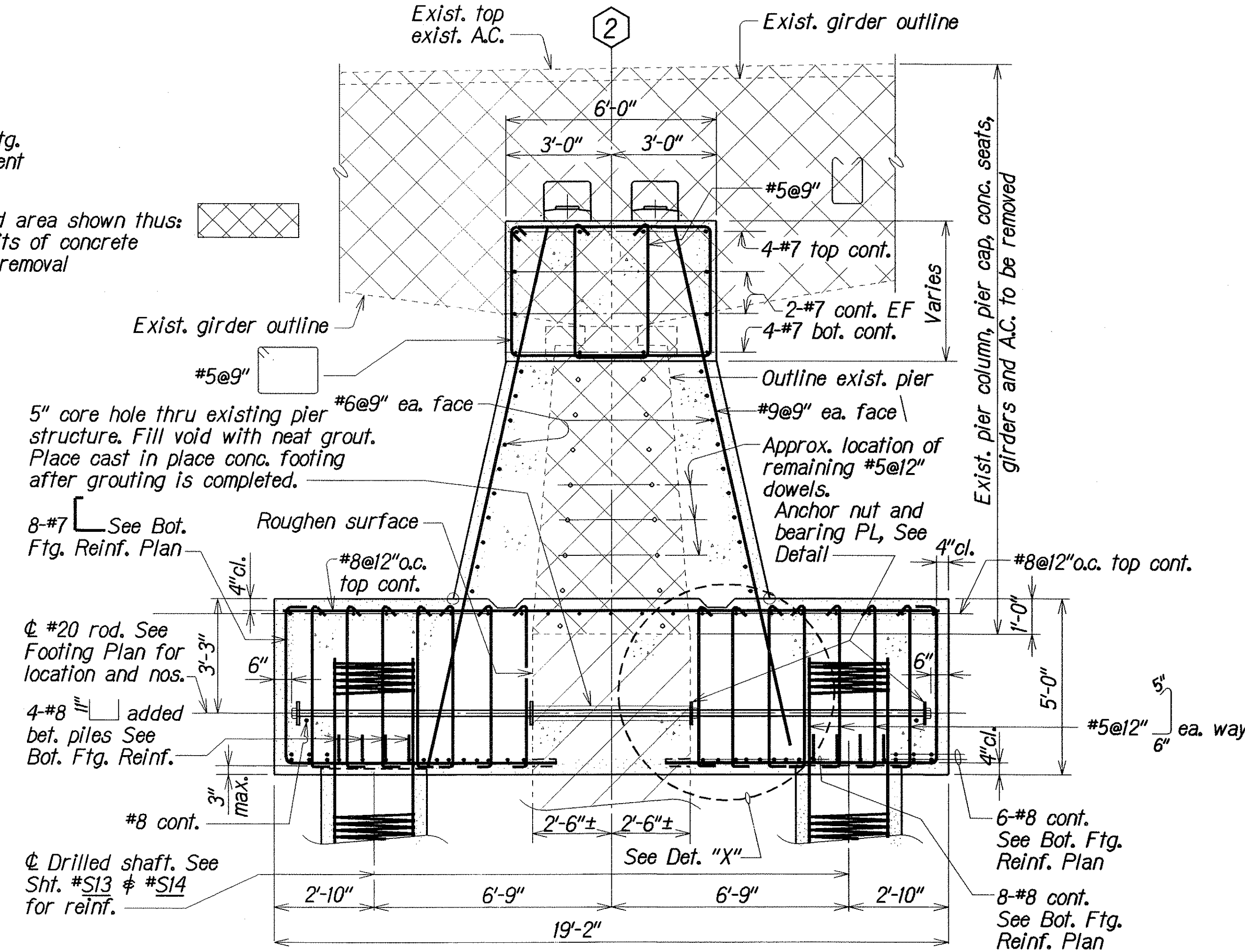
TYPICAL PIER SECTION B AT PILES

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



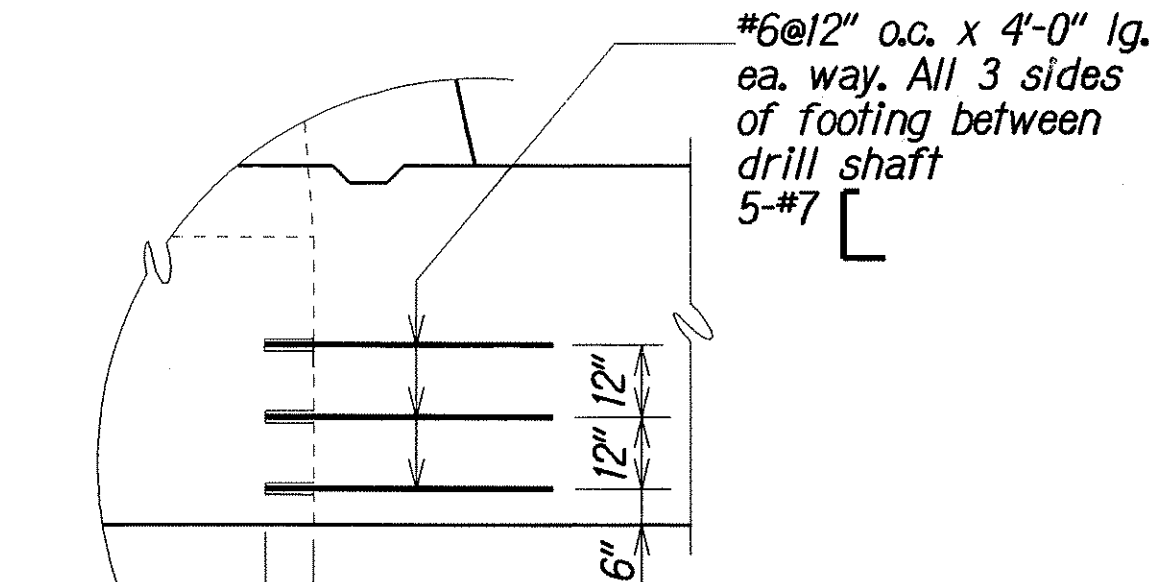
SECTION D

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



PIER NO. 2 SECTION C

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



DETAIL "X"

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

This supplemental sheet was added during change order to accommodate the reinforcement and dimension changes made to the footing at Pier No. 2. This shows the existing condition where the pier column exists instead of the original footing as drawn for the Typical Pier Section on sheet Q27.

DATE	REVISIONS
12/23/05	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HALAWA STREAM BRIDGE
PIER NO. 2 SECTIONS
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

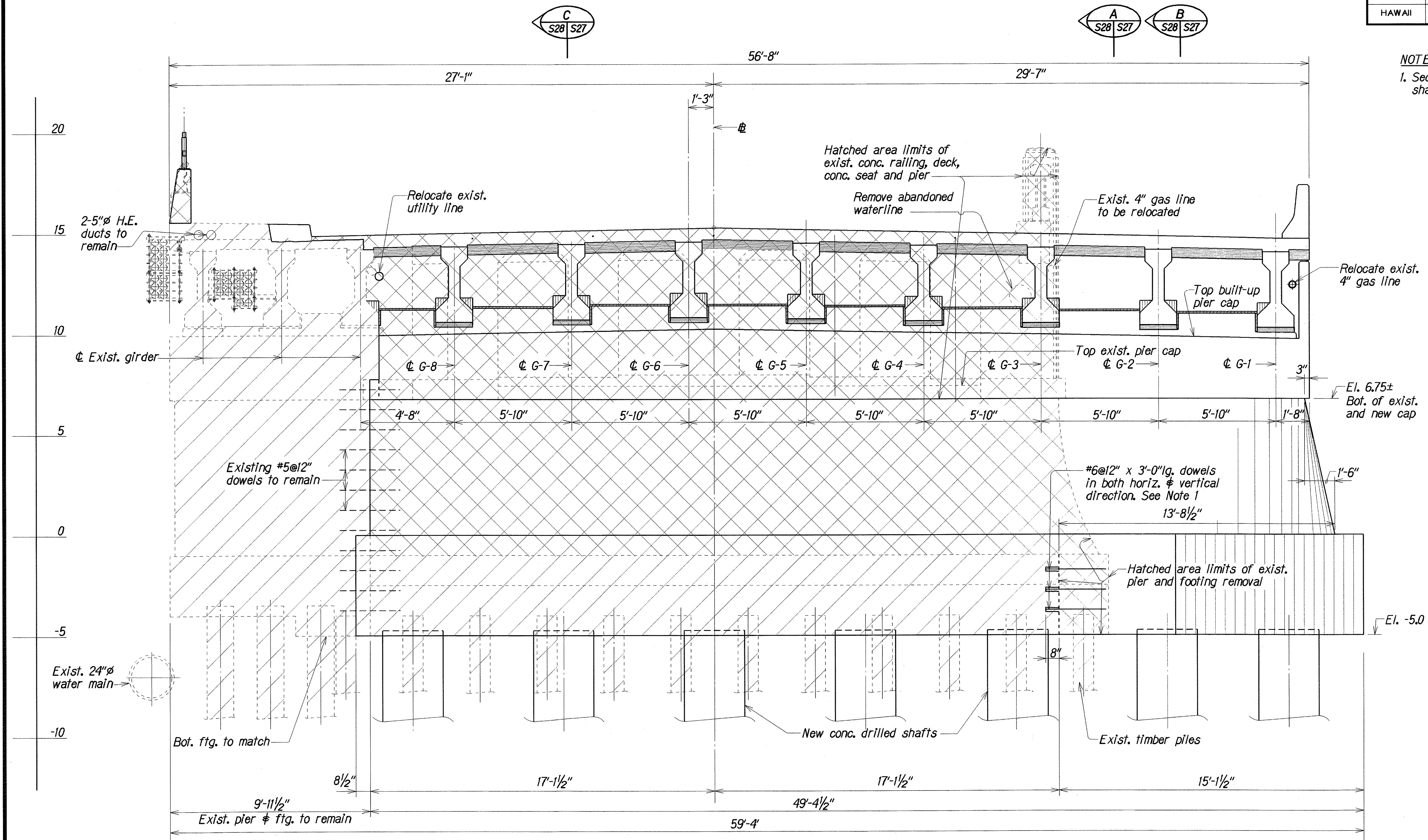
SHEET No. S27A OF 57 SHEETS

C.O. 66S-1

ORIGINAL PLAN	DATE: June 2000
DESIGNED BY: TKM, LMA	TRACED BY: TKM, LMA
CHECKED BY: TKM, LMA	DATE: June 2000
APPROVED BY: TKM, LMA	DATE: June 2000

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	67	105

NOTE:
1. Secure dowels with epoxy fill. Epoxy shall be "Double cartridge" type.



ELEVATION - PIER LINE NO. 1

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

SURVEY PLOTTED BY	DATE
DRAWN BY	June 2000
TRACED BY	June 2000
NOTED BY	June 2000
QUANTITIES BY	June 2000
CHECKED BY	June 2000

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

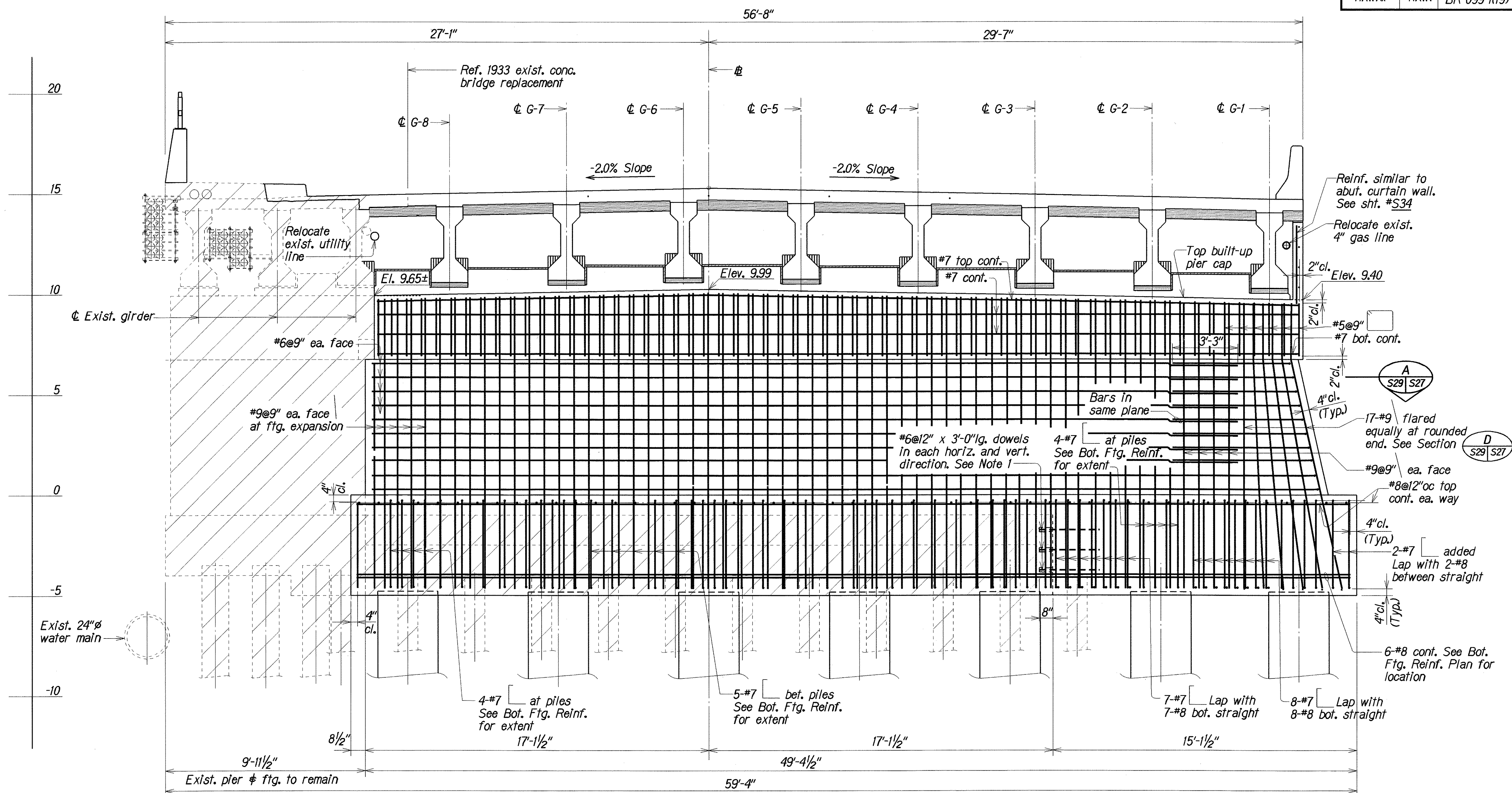
HALAWA STREAM BRIDGE
ELEVATION - PIER LINE NO. 1

KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

SHEET No. 57 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	68	105



NOTE:

1. Secure dowel with epoxy fill. Epoxy shall be "Double Cartridge" type.
2. Concrete seat, creep block and hinge block reinf. not shown. See sht. #S40

REINFORCEMENT DETAIL AT PIER LINE NO. 1

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

SURVEY PLOTTED BY	DATE
DRAWN BY	June 2000
TRACED BY	June 2000
NOTED BY	June 2000
CHECKED BY	June 2000
ORIGINAL PLAN	
NOTE BOOK	
DATE	June 2000

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
REINFORCEMENT DETAIL AT PIER LINE NO. 1

KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

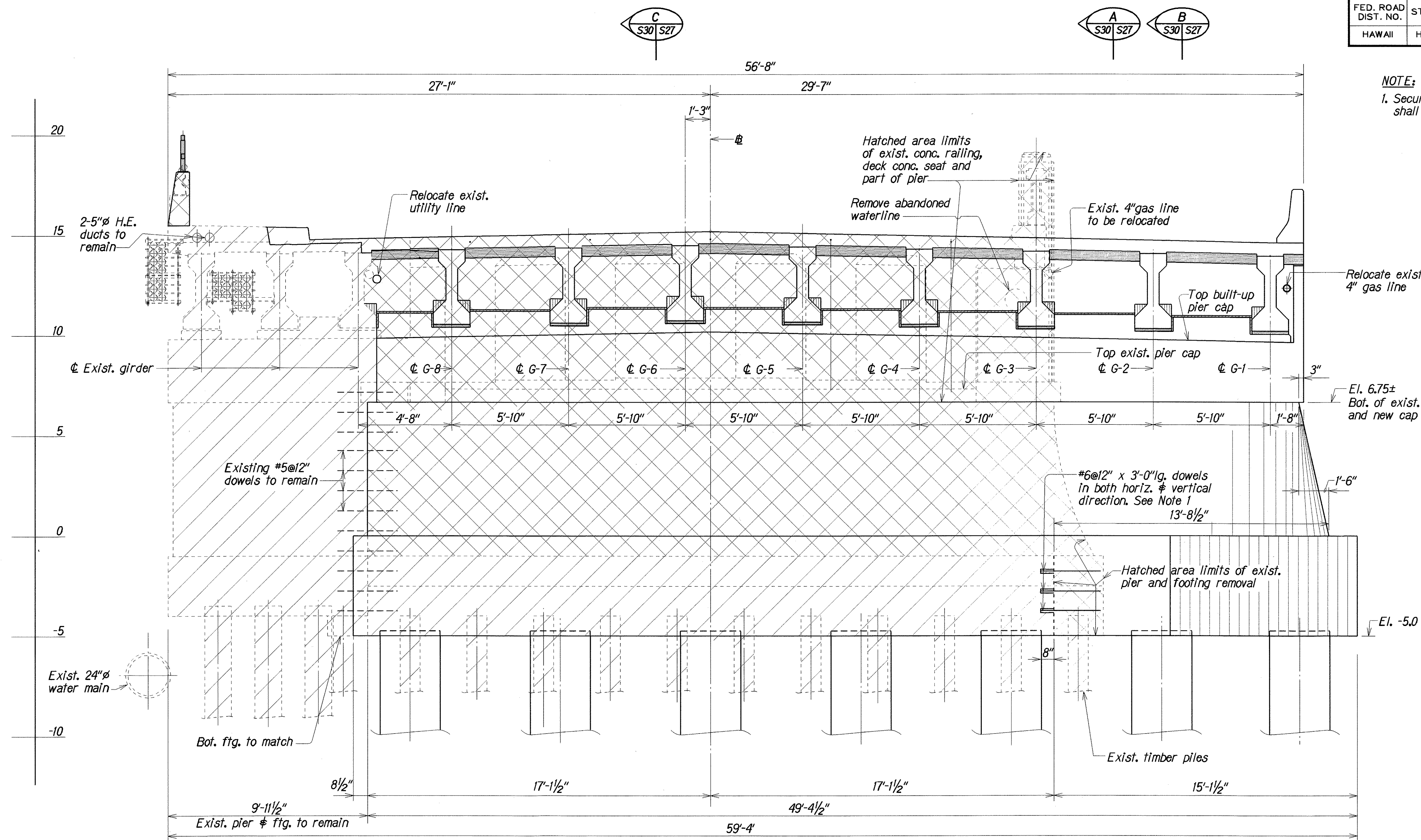
Scale: As Noted Date: Aug. 2000

SHEET No. S29 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	69	105

NOTE:

1. Secure dowels with epoxy fill. Epoxy shall be "Double cartridge" type.



ELEVATION - PIER LINE NO. 2

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	JUL 2000
DESIGNED BY	ST	JUL 2000
CHECKED BY	JW	JUL 2000
IN CHARGE	2/10/00	JUL 2000

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

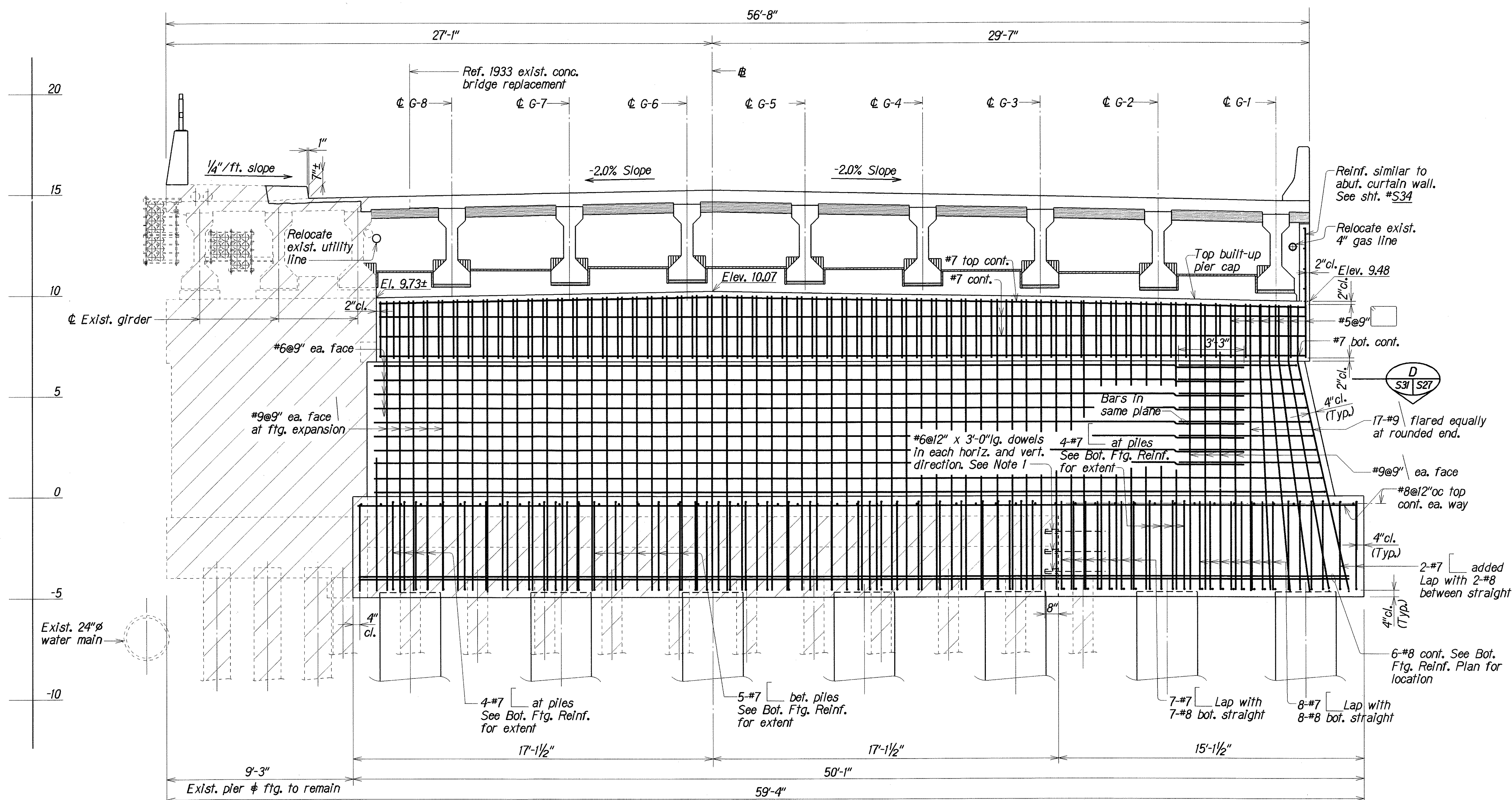
HALAWA STREAM BRIDGE
ELEVATION - PIER LINE NO. 2

KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

SHEET No. 530 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	70	105



NOTE:

1. Secure dowel with epoxy fill. Epoxy shall be "Double Cartridge" type.
2. Concrete seat, creep block and hinge block reinf. not shown. See sh. #S40

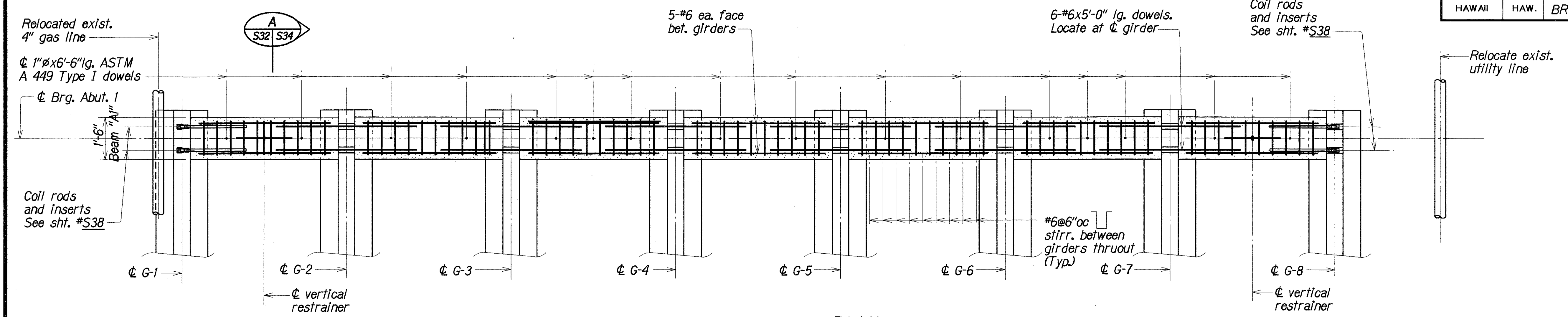
REINFORCEMENT DETAIL AT PIER LINE NO. 2

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

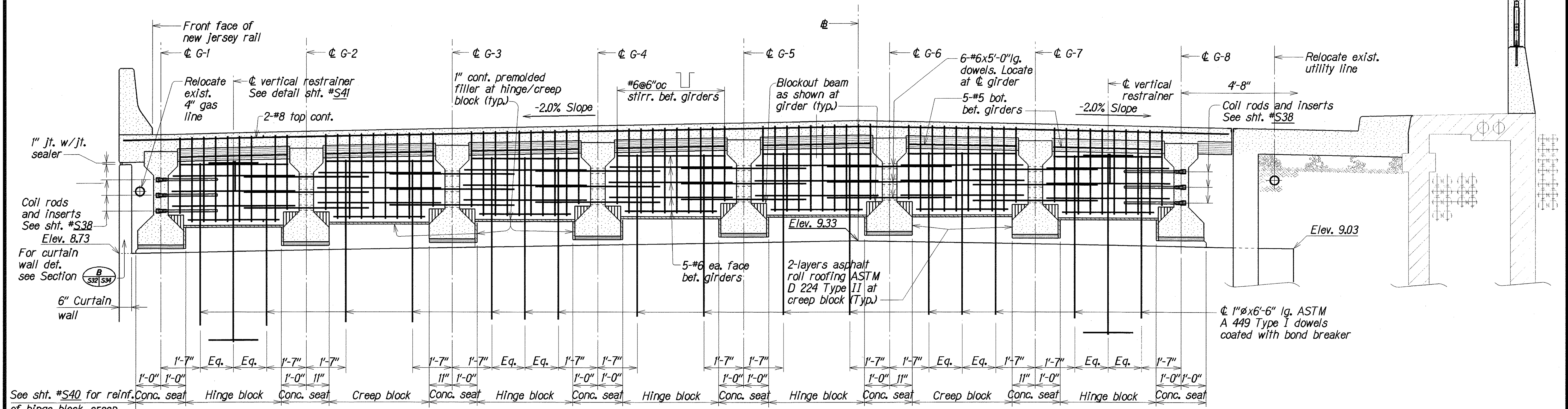
ORIGINAL PLAN	DATE
DESIGNED BY	DATE
CHECKED BY	DATE
NOTED BY	DATE
APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HALAWA STREAM BRIDGE
REINFORCEMENT DETAIL AT PIER LINE NO. 2
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)
Scale: As Noted Date: Aug. 2001
SHEET No. S31 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	71	105



PLAN



ELEVATION

TYPICAL BEAM "A" DETAILS
(AT ABUTMENT NO. 1)

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

DATE	JUN 2000
SURVEY PLOTTED BY	TKM
DRAWN BY	JW, LJK
DESIGNED BY	JW, LJK
QUANTITIES BY	JW, LJK
CHECKED BY	JW
ORIGINAL PLAN	
NOTE BOOK	
No.	24mb05.32

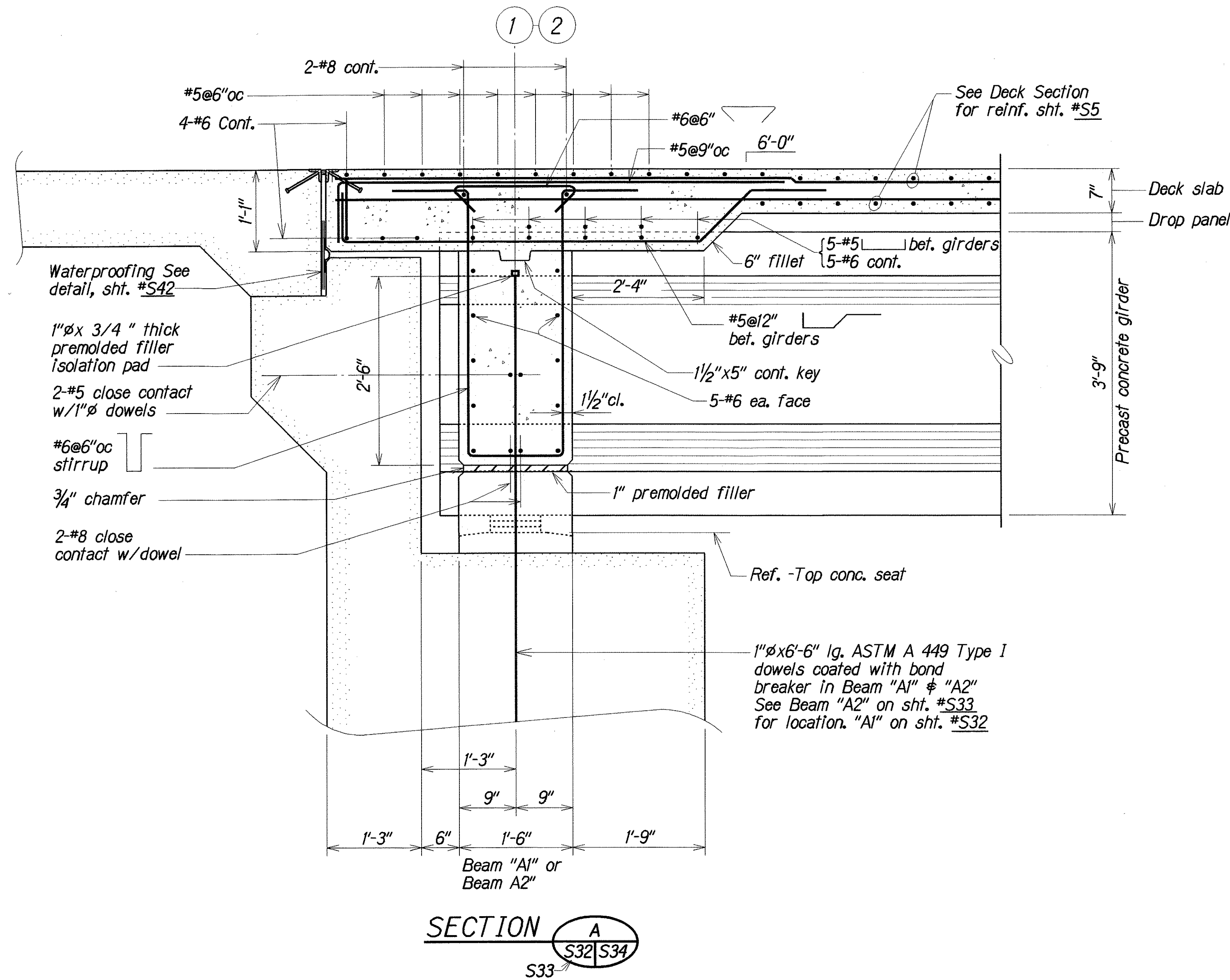
See sht. #S40 for reinf. Conc. seat of hinge block, creep block and concrete seat

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
BEAM "A" DETAILS
AT ABUTMENT NO. 1
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

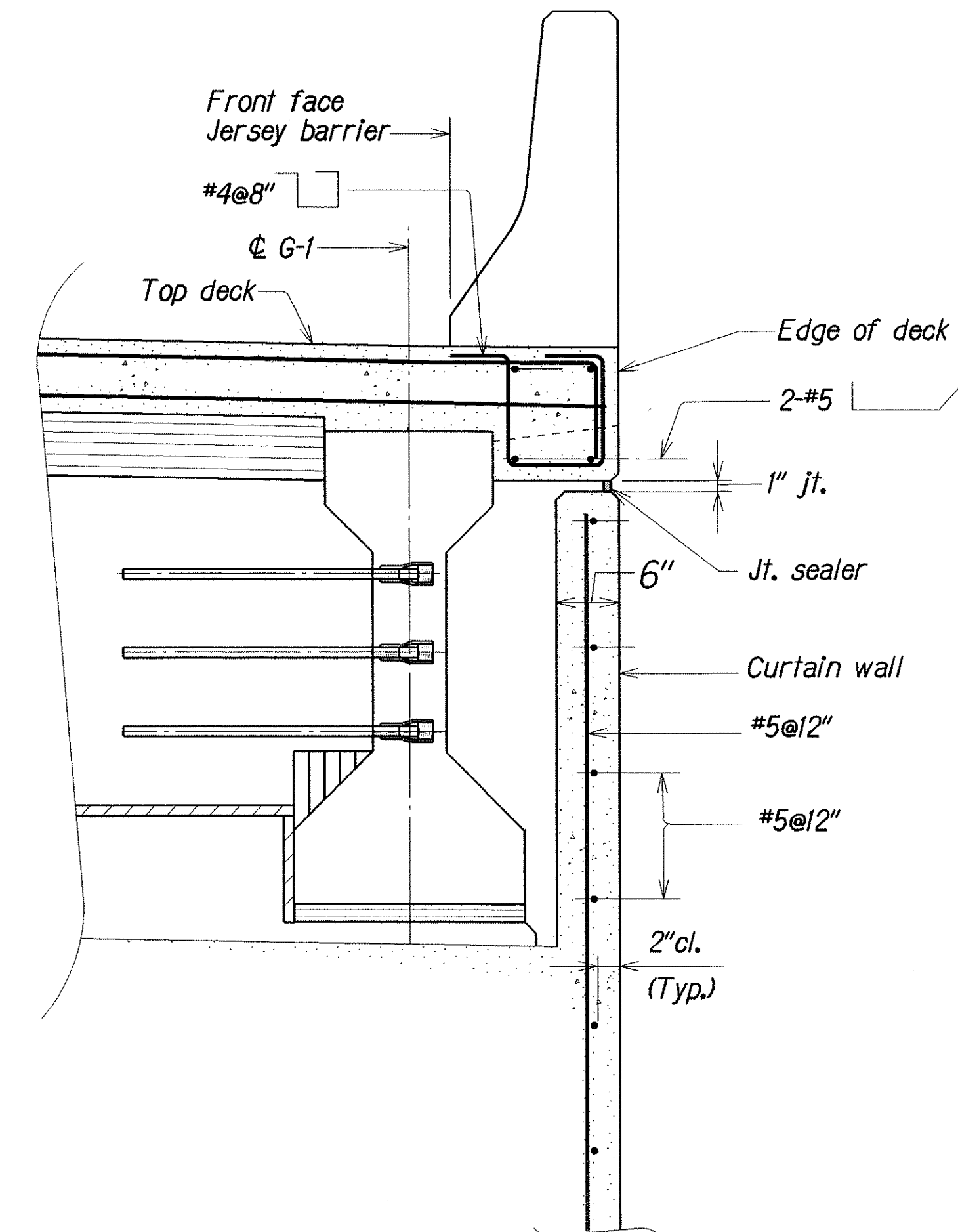
Scale: As Noted Date: Aug. 2000

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	73	105



BEAM "A1" & "A2" DETAILS AT ABUTMENT NO. 1 & NO. 2

Scale: 1"=1'-0"



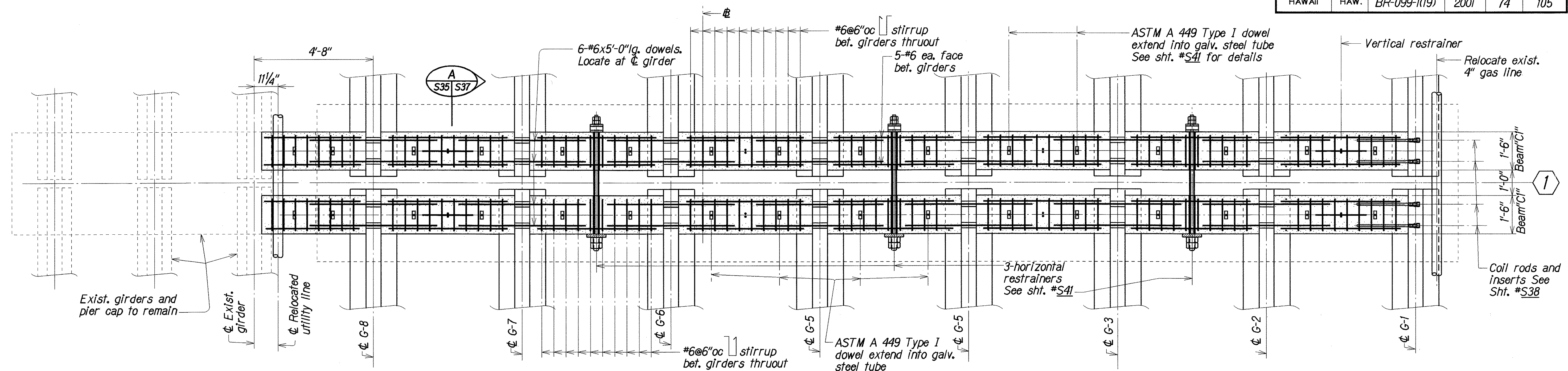
SECTION B
Scale: 1"=1'-0"
S33, S35, S36

SURVEY PLOTTED BY	DATE
DRAWN BY	JUN 2000
TRACED BY	JUN 2000
NOTE BOOK	LKS JW
QUANTITIES BY	LKS JW
CHECKED BY	JUN 2000
Scale: 1/4"=1'-0"	

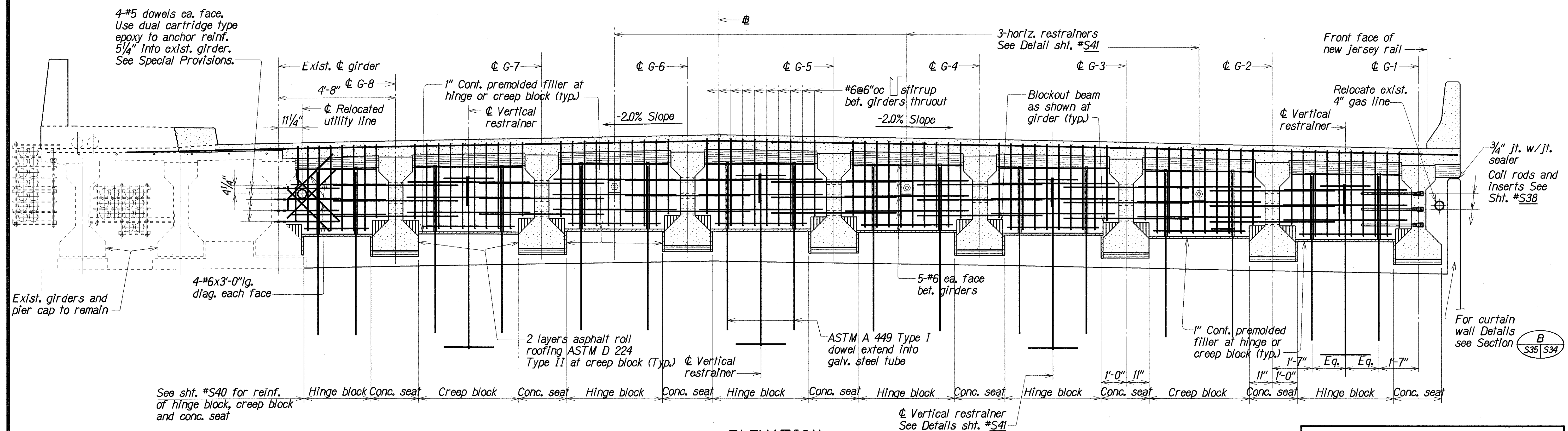
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
HALAWA STREAM BRIDGE
BEAM "A1" AND BEAM "A2" DETAILS
KAMEHAMEHA HIGHWAY HALAWA STREAM BRIDGE REPLACEMENT Federal Aid Project No. BR-099-1(19)
Scale: As Noted Date: Aug. 2000

SHEET No. S34 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	74	105



PLAN



ELEVATION

BEAM "C1" DETAILS AT PIER NO. 1

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

ORIGINAL	DATE
PLAN	JUN 2000
NOTE BOOK	JUN 2000
QUANTITIES BY	JUN 2000
CHECKED BY	JUN 2000

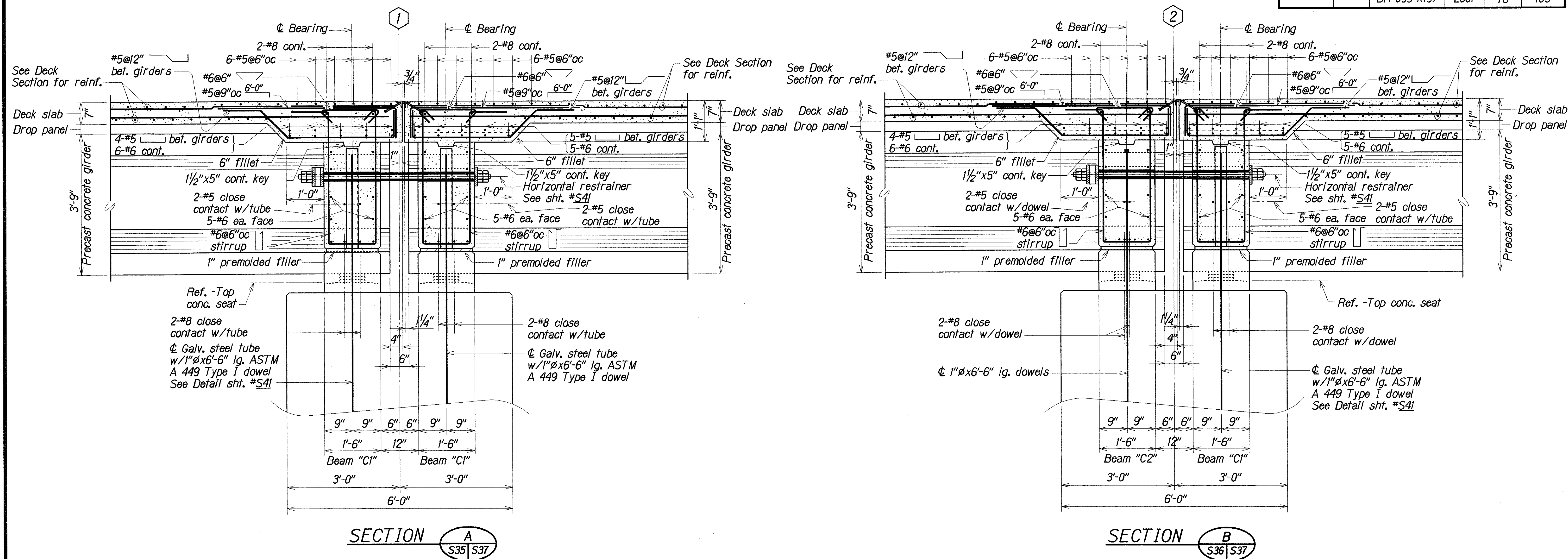
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
BEAM "C1" DETAILS
AT PIER NO. 1
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

SHEET No. S35 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	76	105



ORIGINAL PLAN	DATE
SURVEY PLOTTED BY	JUN 2000
DRAWN BY	TKM
TRACED BY	JUN 2000
NOTED BY	JUN 2000
CHECKED BY	JUN 2000
BY	JUN 2000

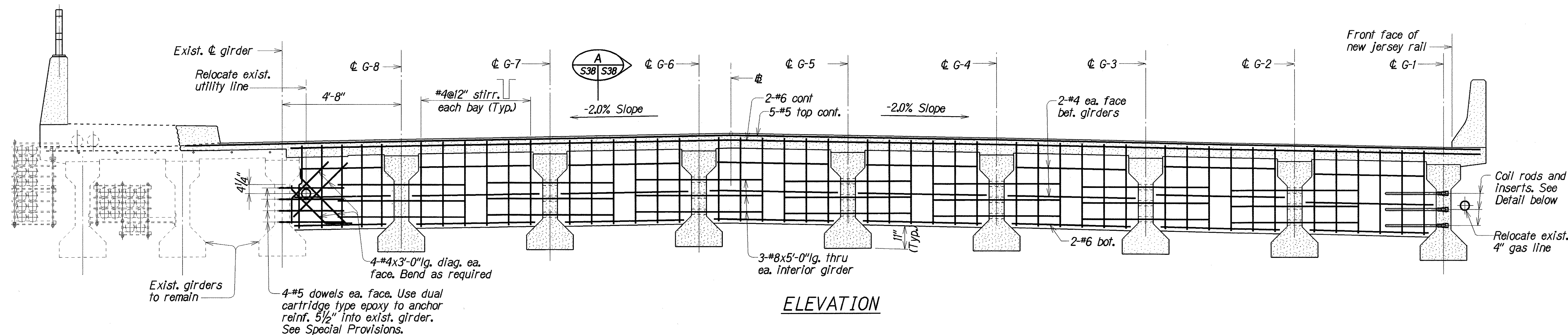
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
BEAM "C1" AND BEAM "C2" DETAILS
AT PIER NO. 1 AND PIER NO. 2
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

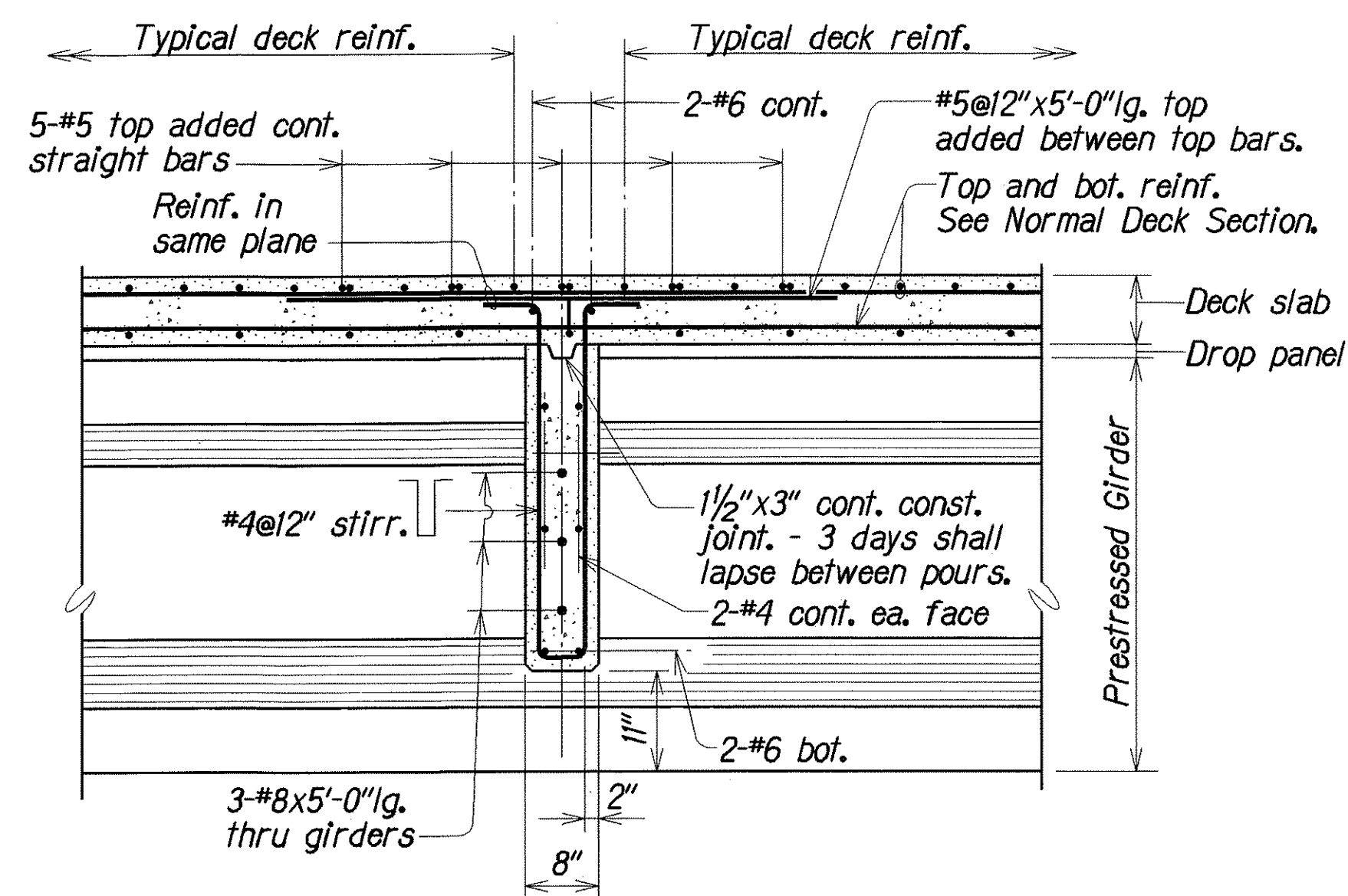
Scale: As Noted Date: Aug. 2000

SHEET No. S37 OF 57 SHEETS

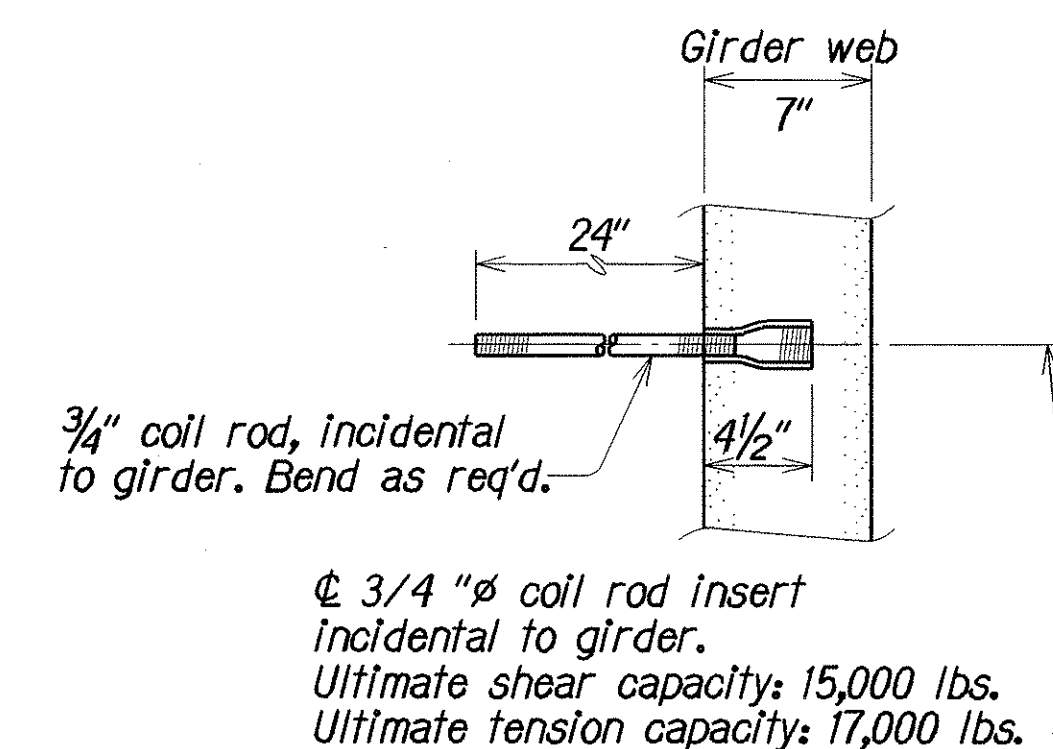
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	77	105



ELEVATION
BEAM "B" DETAIL
Scale: 1/2"=1'-0"



SECTION
Scale: 3/4"=1'-0"
A
S38 S38



TYPICAL INSERT DETAIL
Scale: 1 1/2"=1'-0"

ORIGINAL PLAN	DATE
SURVEY PLOTTED BY	JUN 2000
DRAWN BY	TAM
TRACED BY	JUN 2000
DESIGNED BY	JUN 2000
QUANTITIES BY	JUN 2000
CHECKED BY	JUN 2000
No. 24000538	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
TYPICAL BEAM "B" DETAILS

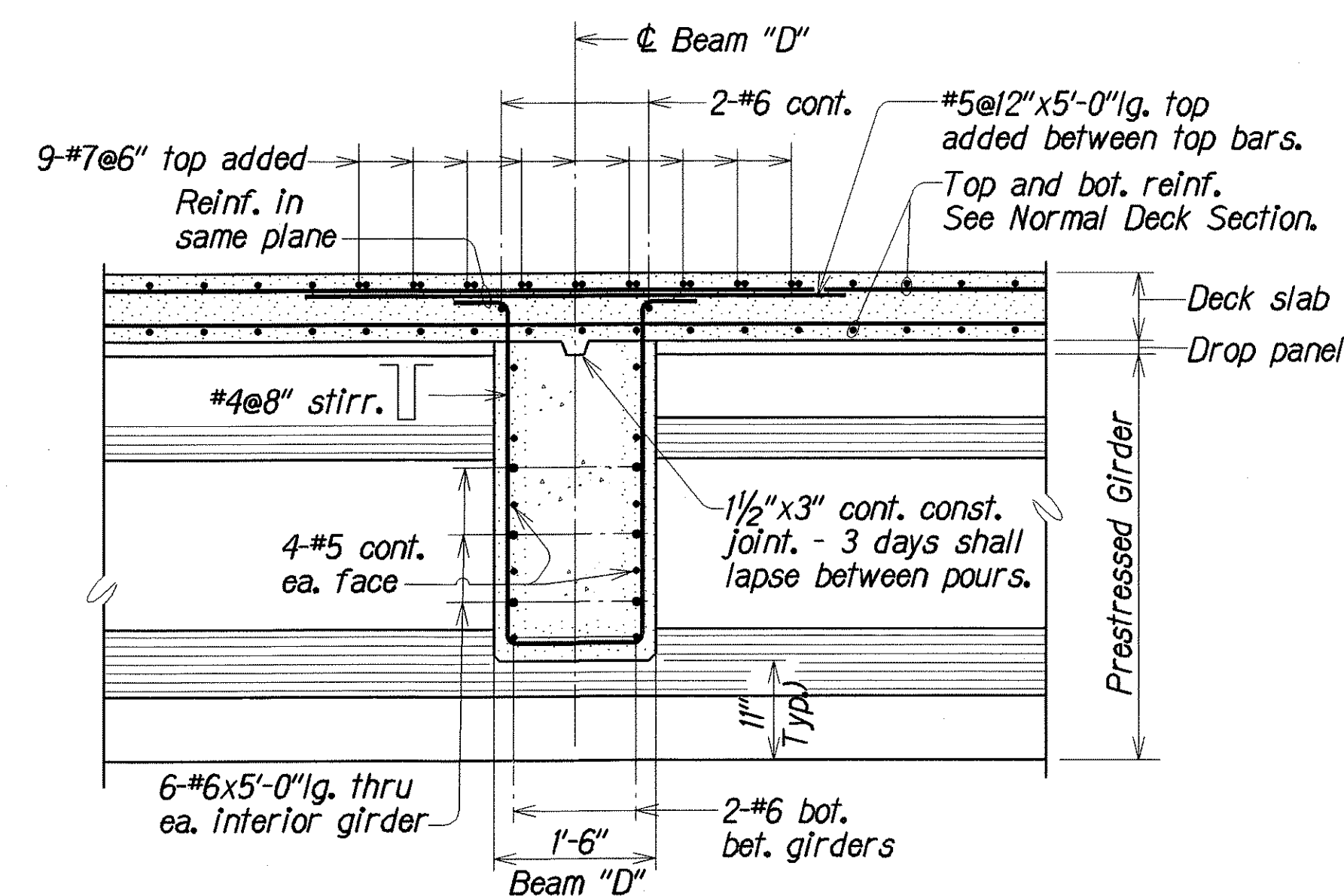
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

This technical drawing illustrates the cross-section of a bridge deck, detailing the reinforcement and structural components. The deck is shown with a -2.0% slope. Key features include:

- Girders:** Existing girders are indicated by dashed lines, while new girders are solid lines. A section cut 'A' is located between G-7 and G-6.
- Reinforcement:**
 - Top Reinforcement:** Includes #4@8" stirrups, 4-#5 continuous bars on each face, and 9-#7 @ 6" top added bars with 2-#6 continuous bars.
 - Bottom Reinforcement:** Consists of 2-#6 bars at the bottom.
 - Diagonal Reinforcement:** 4-#4 x 3'-0" diagonal bars on each face, bent as required.
 - Interior Girder:** 6-#6 x 5'-0" longitudinal bars through the interior girder.
- Other Details:**
 - A 4-#5 dowel bar on each face is used to anchor reinforcement into existing girders, secured with dual cartridge type epoxy.
 - The deck is poured against the top of the existing pier cap.
 - Coil rods and inserts are specified to see Detail sheet #S38.
 - Existing utility lines are to be relocated.

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



SECTION A
Scale: $\frac{3}{4}" = 1' - 0"$ S39 | S39

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

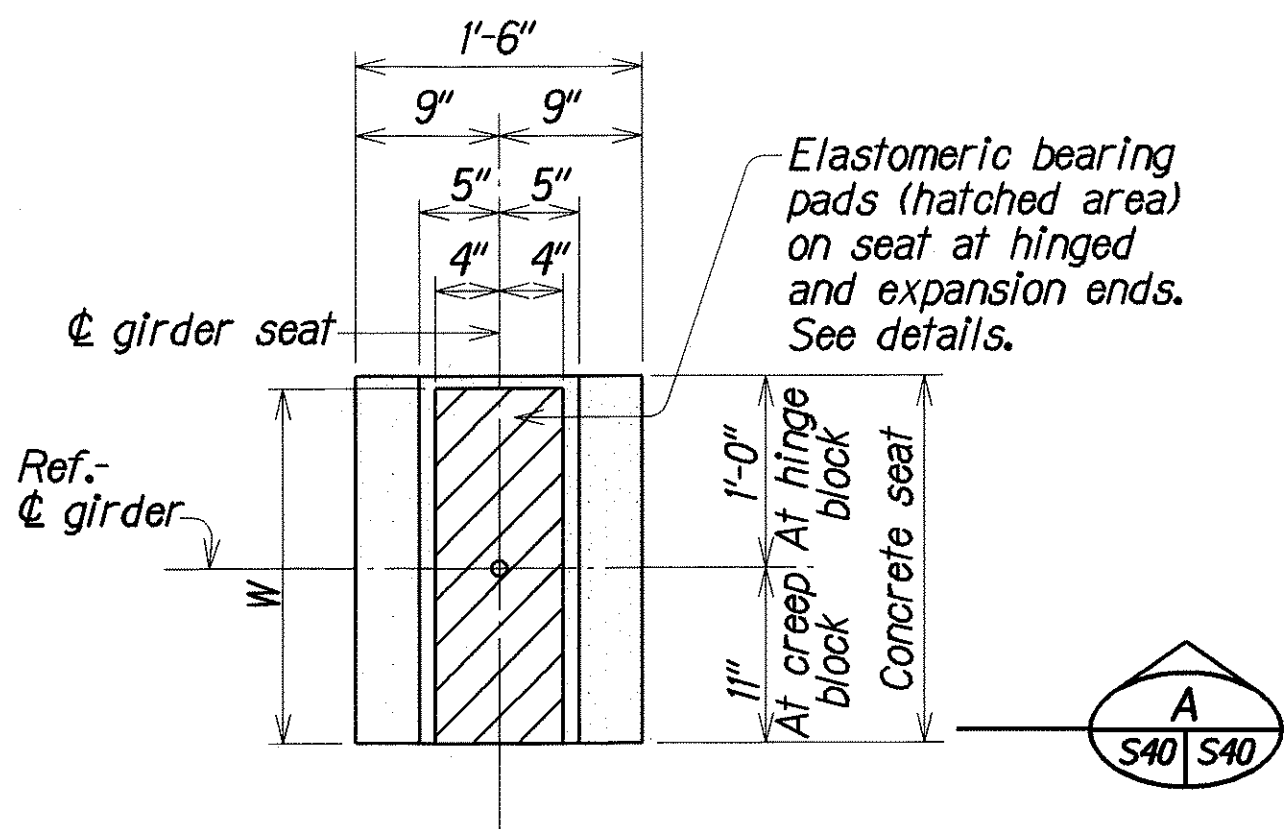
HALAWA STREAM BRIDGE
TYPICAL BEAM "D" DETAILS

KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(I)9

Scale: As Noted Date: Aug. 2000

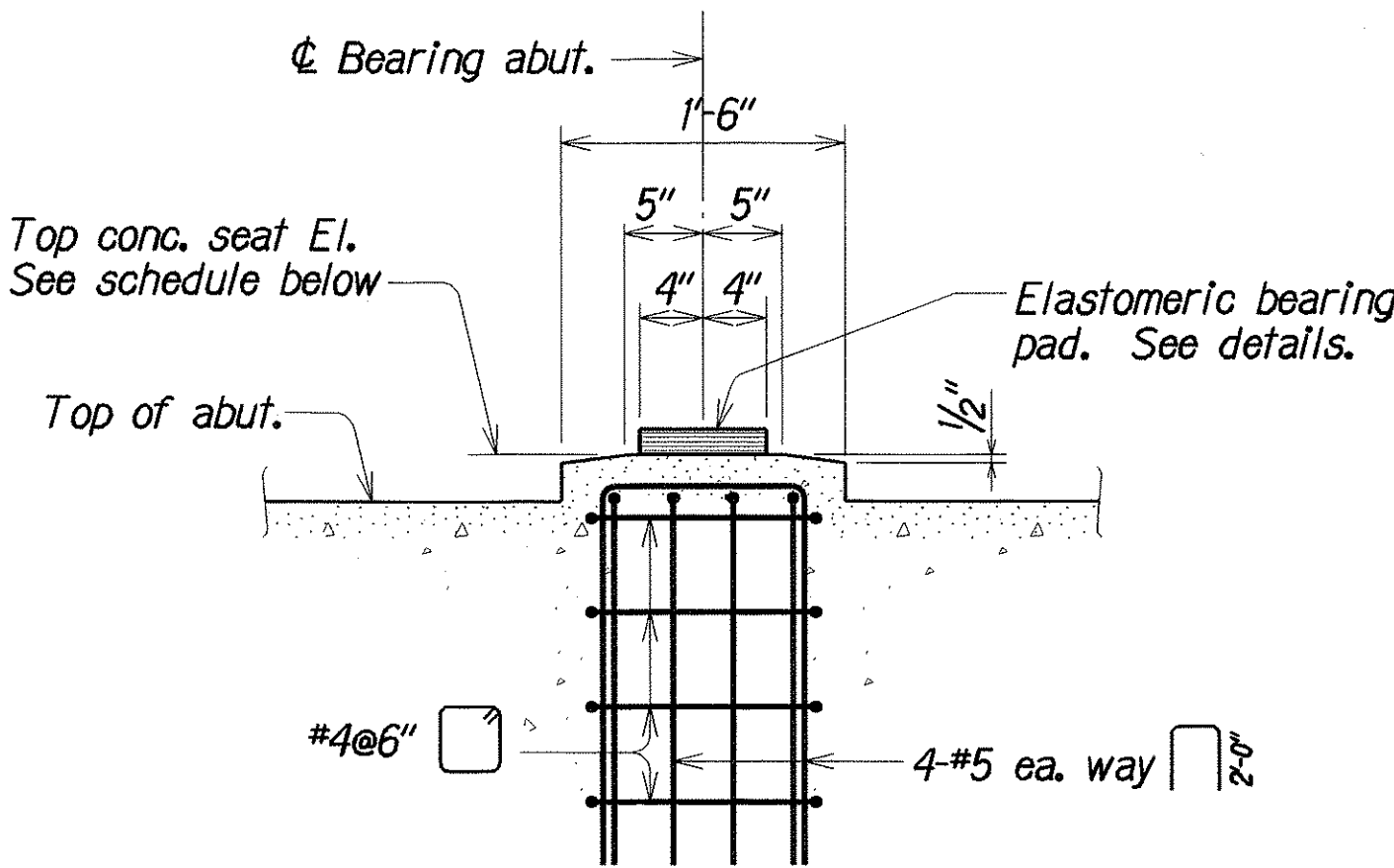
SHEET No. S39 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	79	105



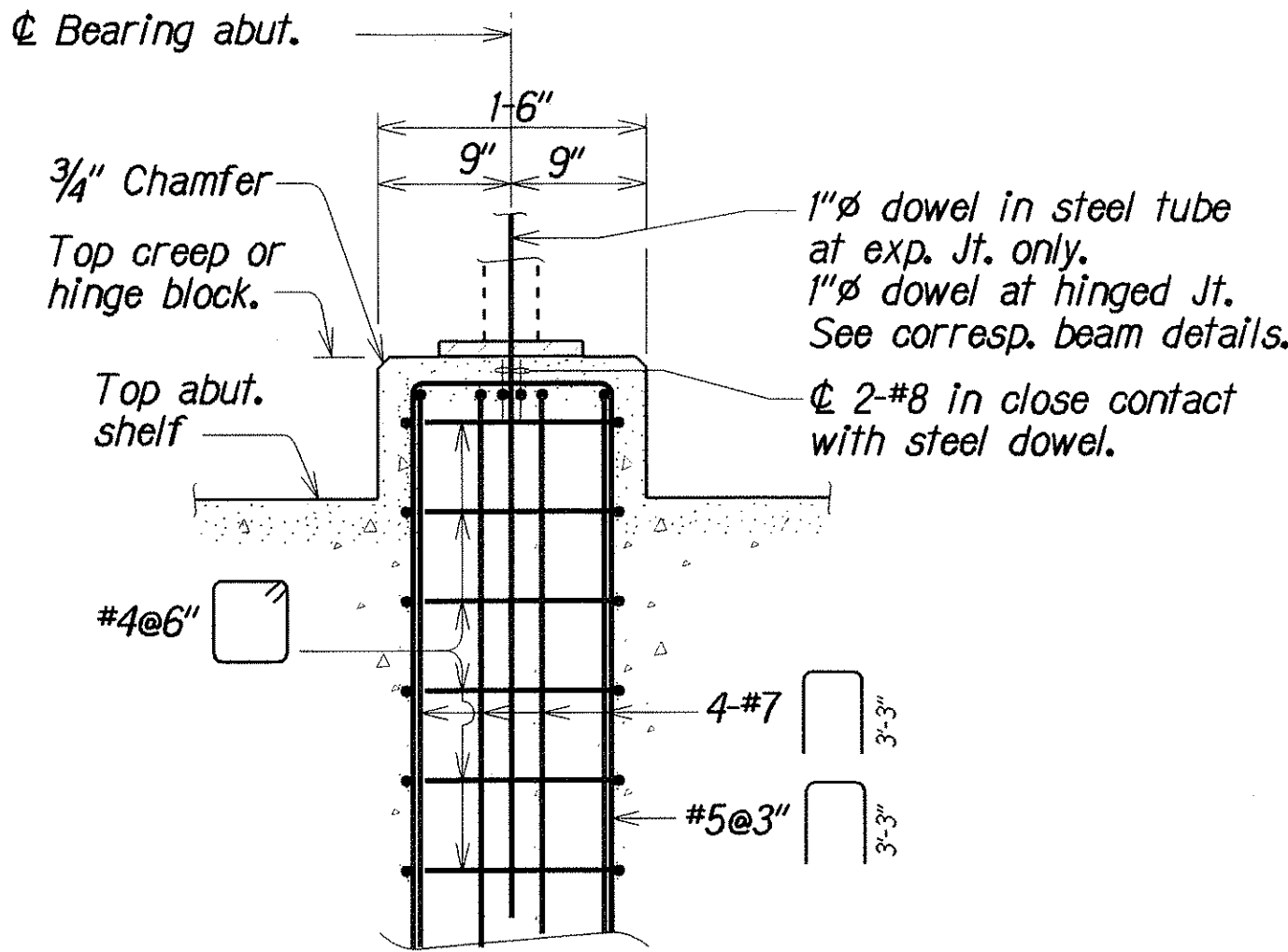
TYPICAL CONC. GIRDER SEAT PLAN

Scale: 1" = 1'-0"



TYPICAL SECTION

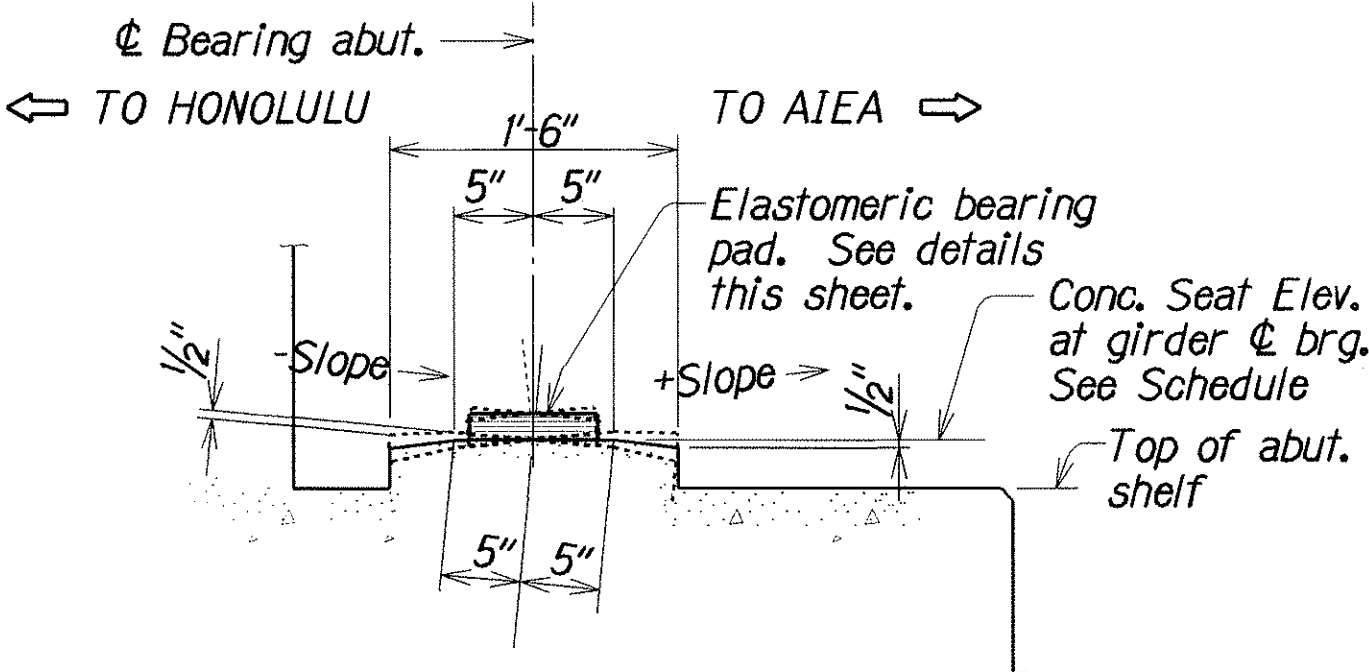
Scale: 1" = 1'-0"



TYPICAL SECTION (AT HINGE OR CREEP BLOCK)

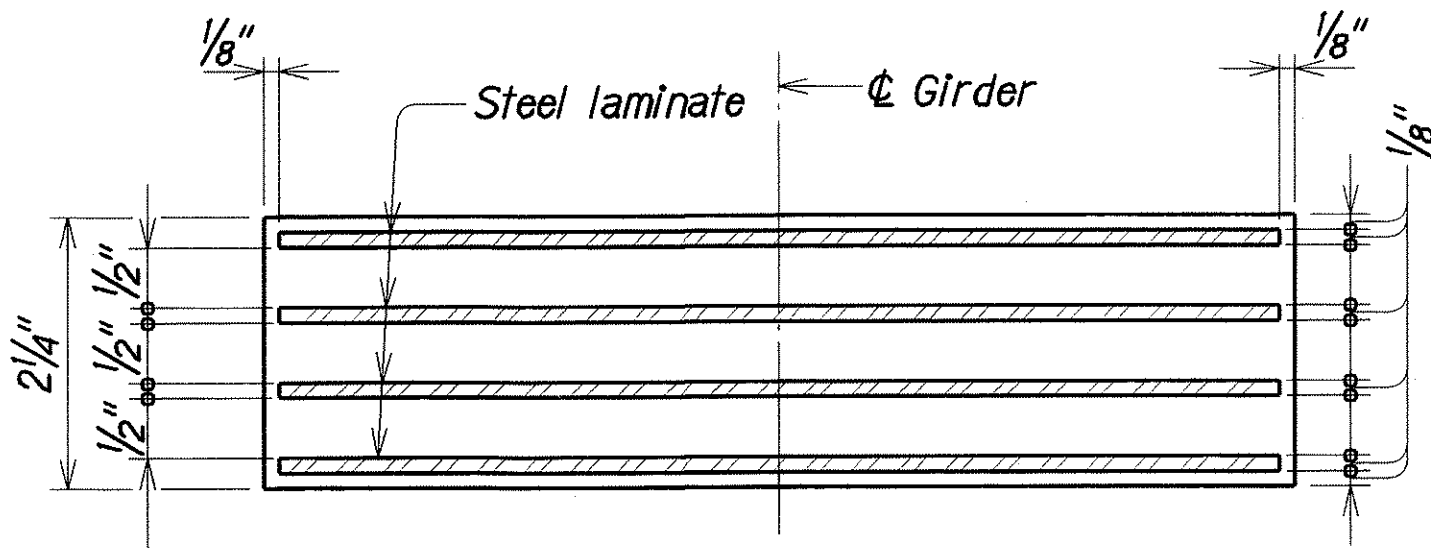
Scale: 1" = 1'-0"

NOTE:
Seat slope direction normal to ϕ girder

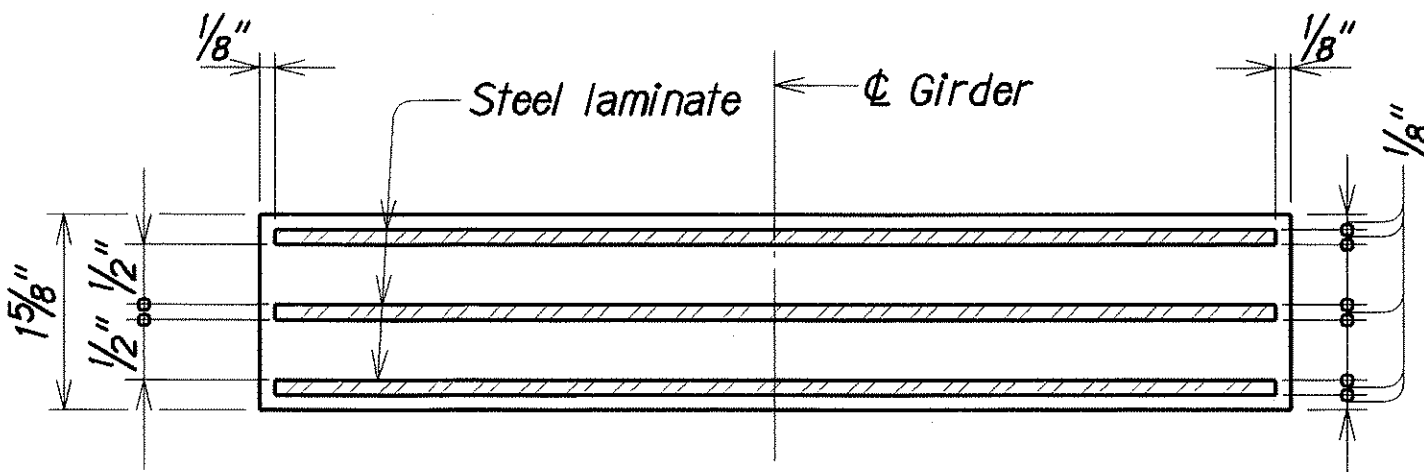


SEAT SLOPE DETAIL

Not to Scale



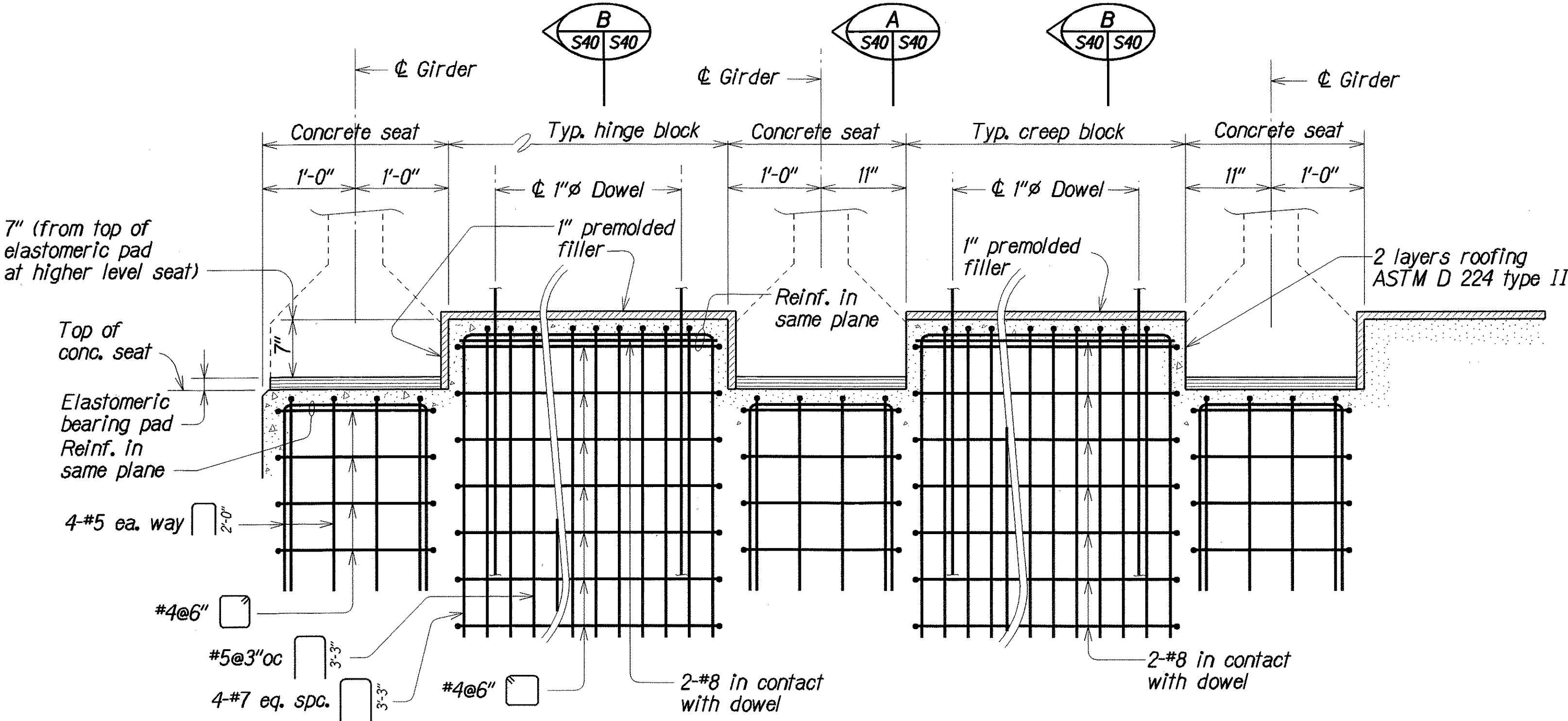
AT EXPANSION BEARING (22"x8")



AT HINGED BEARING (22"x8")

STEEL ELASTOMERIC BEARING PADS

Not to Scale



SEAT ELEVATION AT HINGE & CREEP BLOCK

Scale: 1" = 1'-0"

CONCRETE SEAT ELEVATION AND SEAT SLOPE AT ϕ BEARING

Girder	ABUT. 1 Brg. Elev. (hinge)	Seat Slope	PIER 1			PIER 2			ABUT. 2 Brg. Elev. (hinge)
			Brg. Elev. (exp.)	Brg. Elev. (exp.)	Seat Slope	Brg. Elev. (hinge)	Brg. Elev. (exp.)	Seat Slope	
G1	9.19	+1/8"±2	9.79	9.81	0±2	9.94	9.86	-3/16"±2	8.85
G2	9.31	+1/8"±2	9.91	9.93	0±2	10.06	9.98	-3/16"±2	8.97
G3	9.43	+1/8"±2	10.02	10.04	0±2	10.17	10.09	-3/16"±2	9.09
G4	9.54	+1/8"±2	10.14	10.16	0±2	10.29	10.21	-3/16"±2	9.20
G5	9.66	+1/8"±2	10.26	10.28	0±2	10.41	10.33	-3/16"±2	9.32
G6	9.75	+1/8"±2	10.34	10.36	0±2	10.49	10.41	-3/16"±2	9.41
G7	9.63	+1/8"±2	10.23	10.25	0±2	10.38	10.30	-3/16"±2	9.29
G8	9.51	+1/8"±2	10.11	10.13	0±2	10.26	10.18	-3/16"±2	9.17

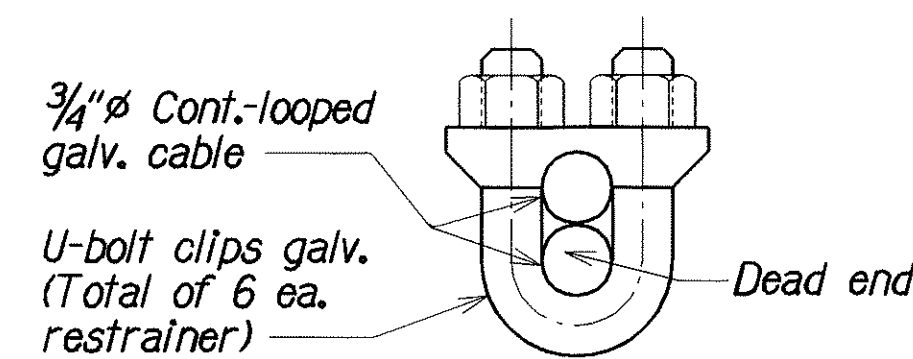
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	AUG 2000
24mbts40	DESIGNED BY	AUG 2000
	CHECKED BY	AUG 2000

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

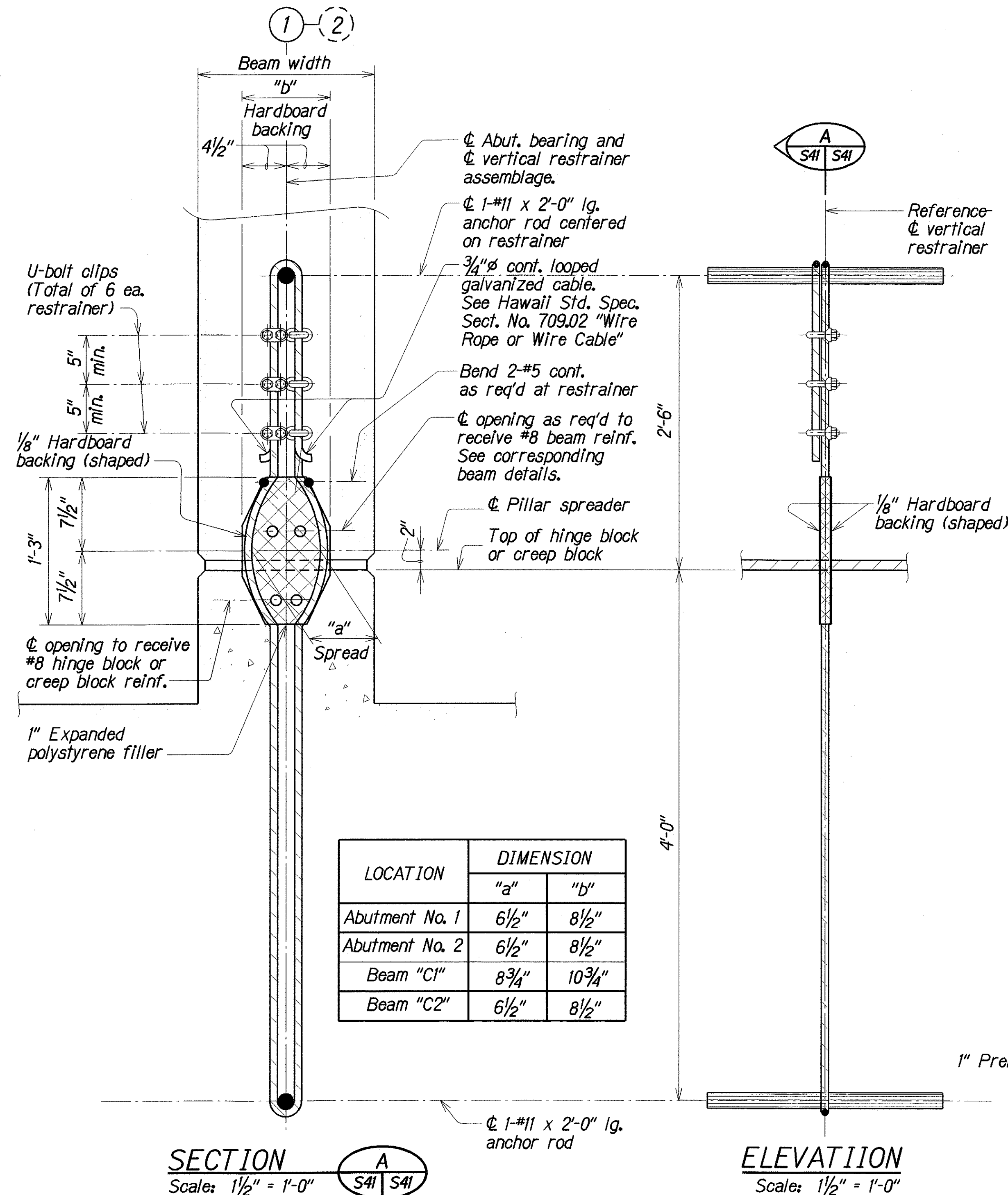
HALAWA STREAM BRIDGE
CONCRETE SEAT DETAILS, SECTIONS,
AND STEEL ELASTOMERIC BEARING PADS
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)
Scale: As Noted Date: Aug. 2000

NOTES:

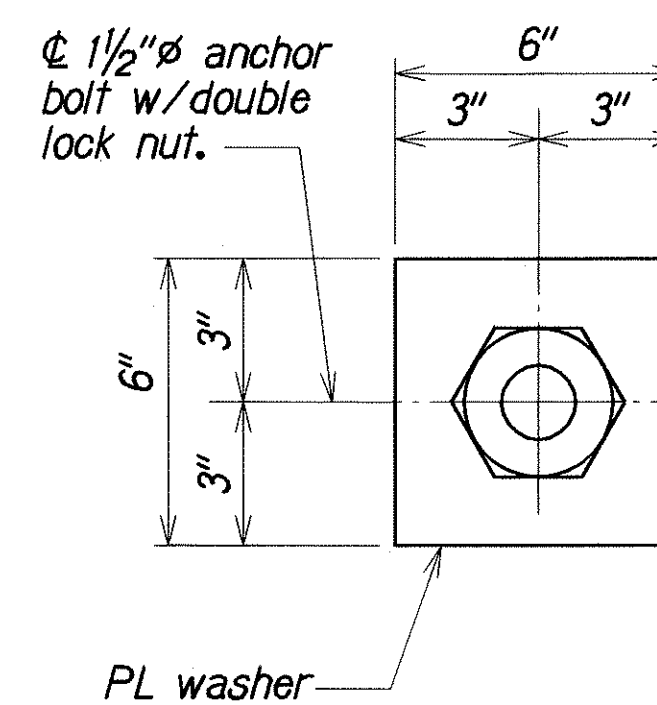
1. All restrainer assemblage incidental to concrete and will not be paid for separately.
2. Restrainer assemblage shall be securely held in place while placing concrete.
3. Hot-dip galvanize all hardware after fabrication.
4. Cellular Rubber Pad shall conform to ASTM D 1056, Type I, Grade IC5.



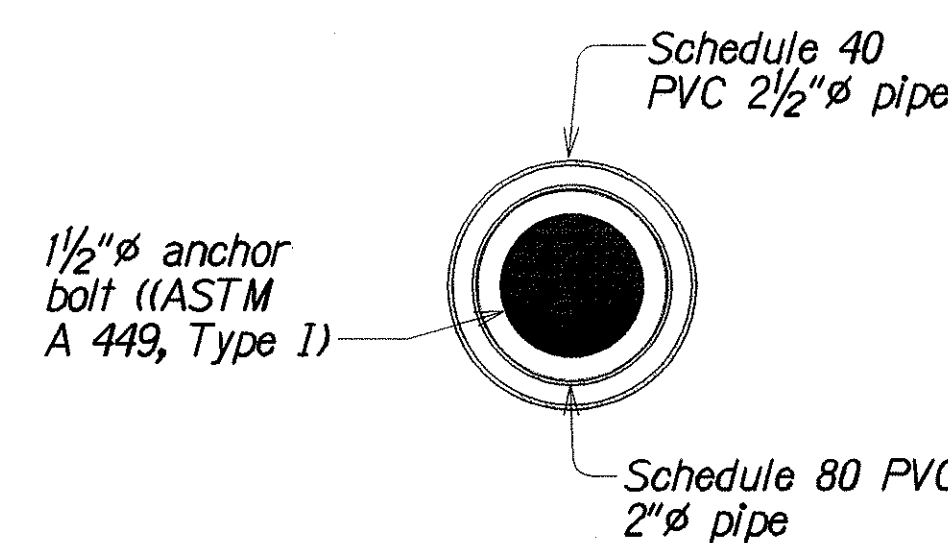
U-BOLT CLIP DETAIL
Scale: 6"=1'-0"



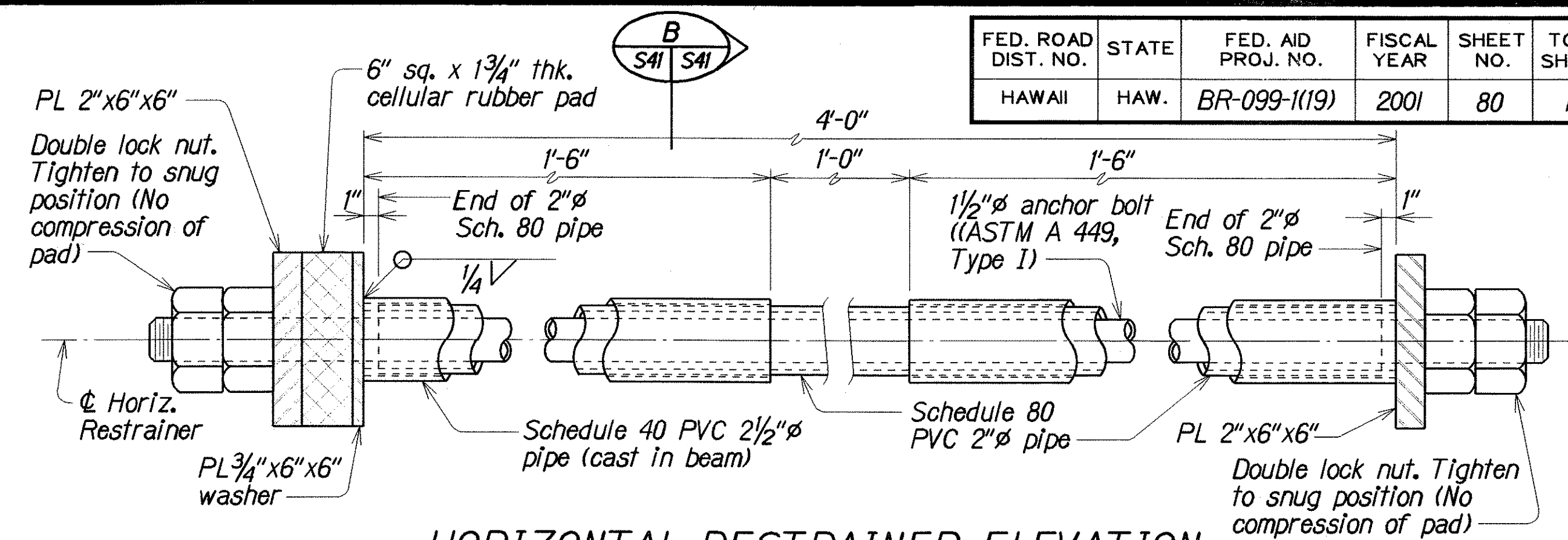
TYPICAL VERTICAL RESTRAINER DETAILS



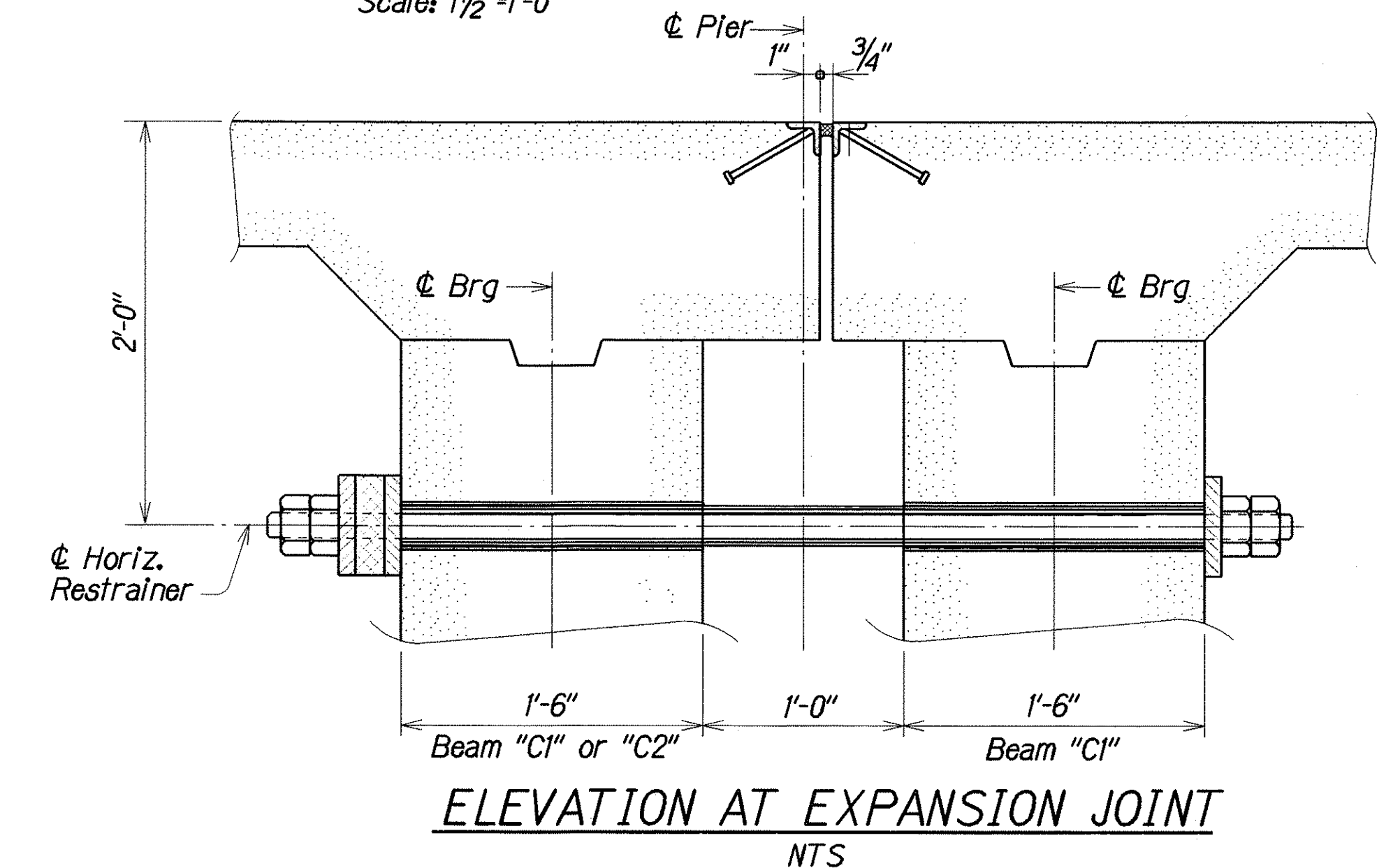
FRONT ELEVATION
Scale: 1 1/2"=1'-0"



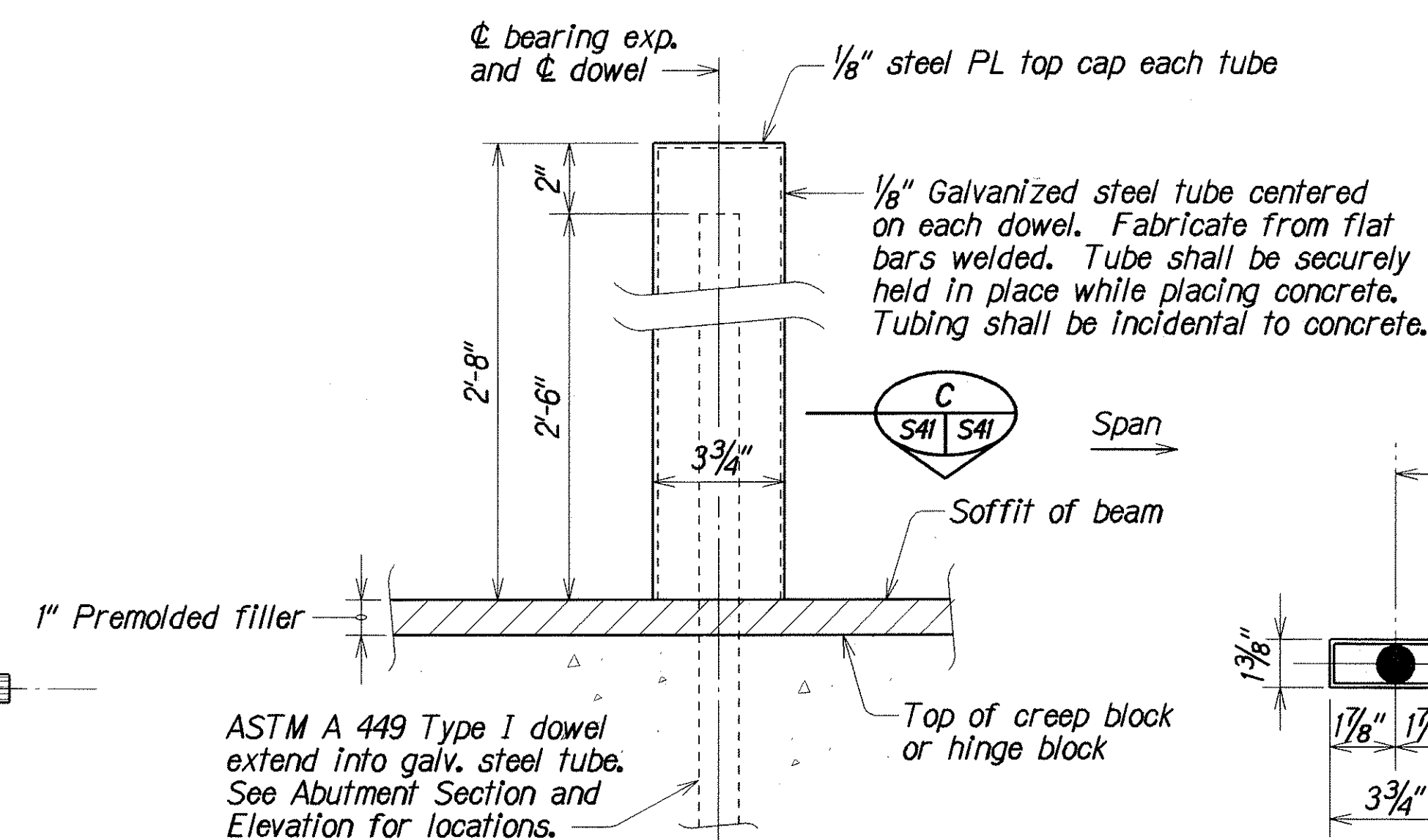
SECTION B
Scale: 3"=1'-0"



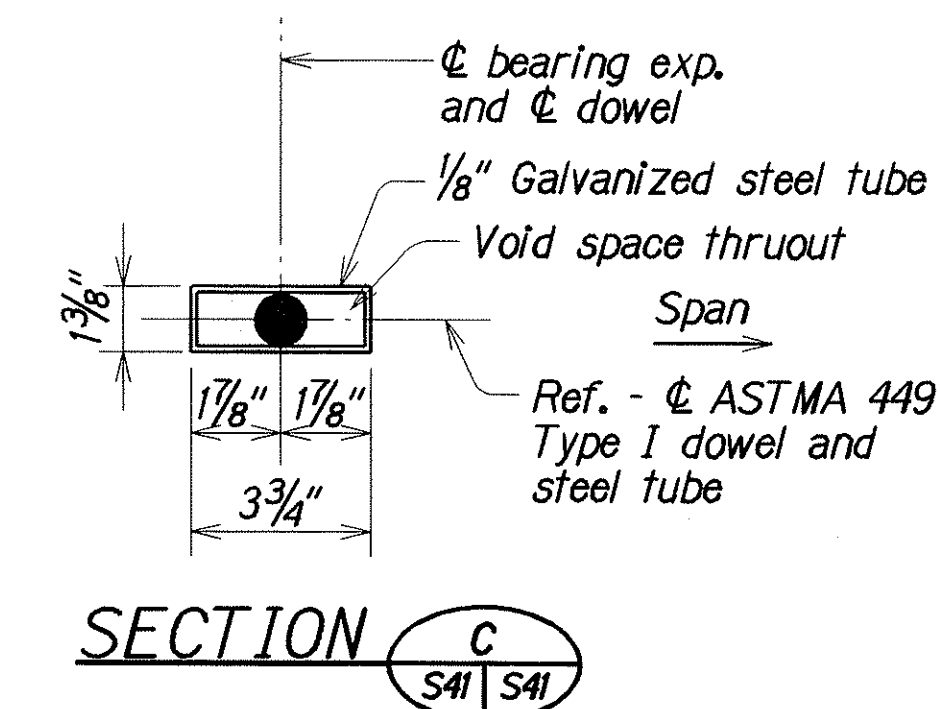
HORIZONTAL RESTRAINER ELEVATION
Scale: 1 1/2"=1'-0"



TYPICAL HORIZONTAL RESTRAINER DETAILS



ELEVATION



SECTION C

TYPICAL - EXPANSION END DOWEL AND STEEL TUBE

Scale: 3" = 1'-0"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	80	105

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
TYPICAL VERTICAL RESTRAINER AND
TYPICAL HORIZONTAL RESTRAINER DETAILS

KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

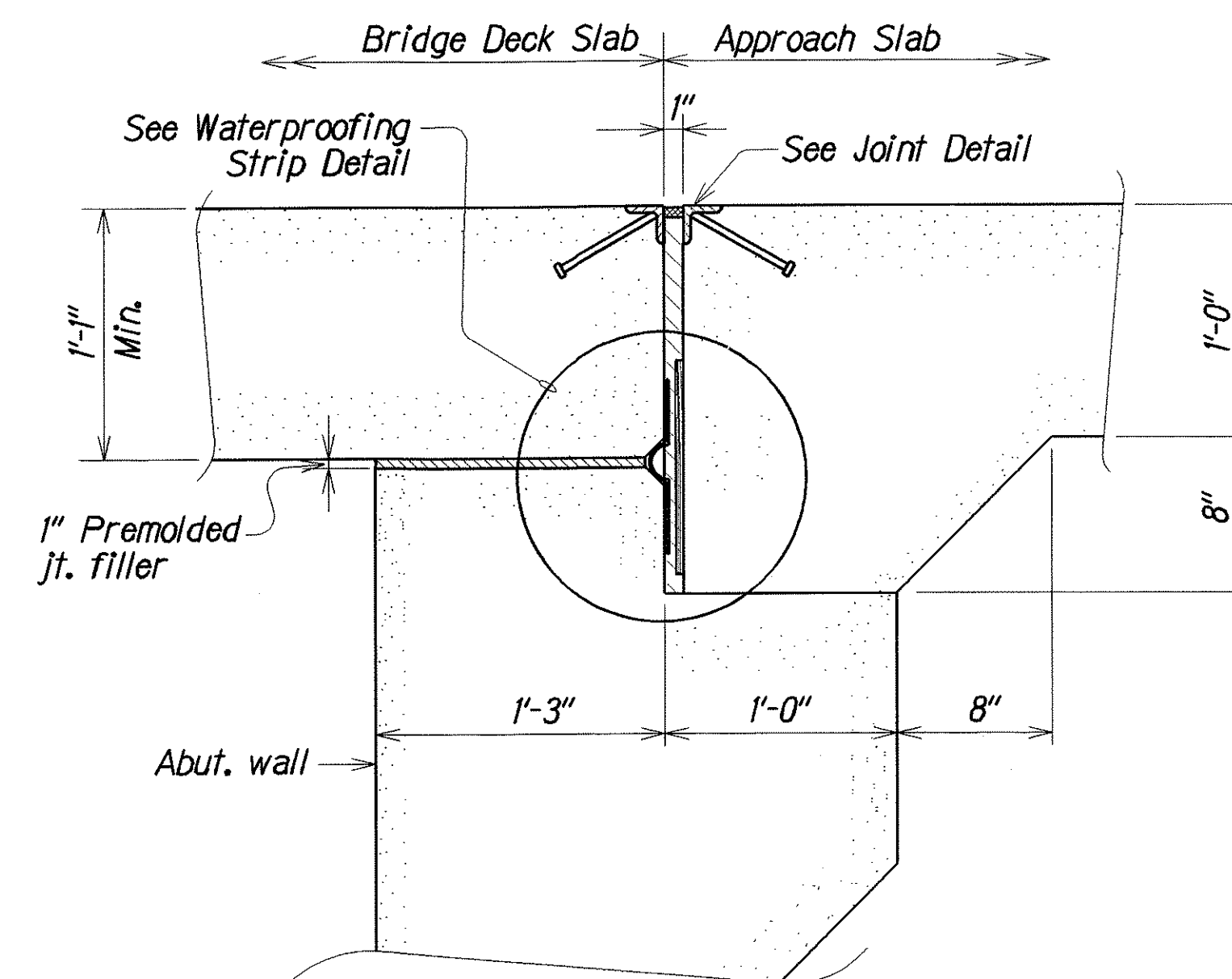
Scale: As Noted Date: Aug. 2000

SHEET No. S41 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(119)	2001	81	105

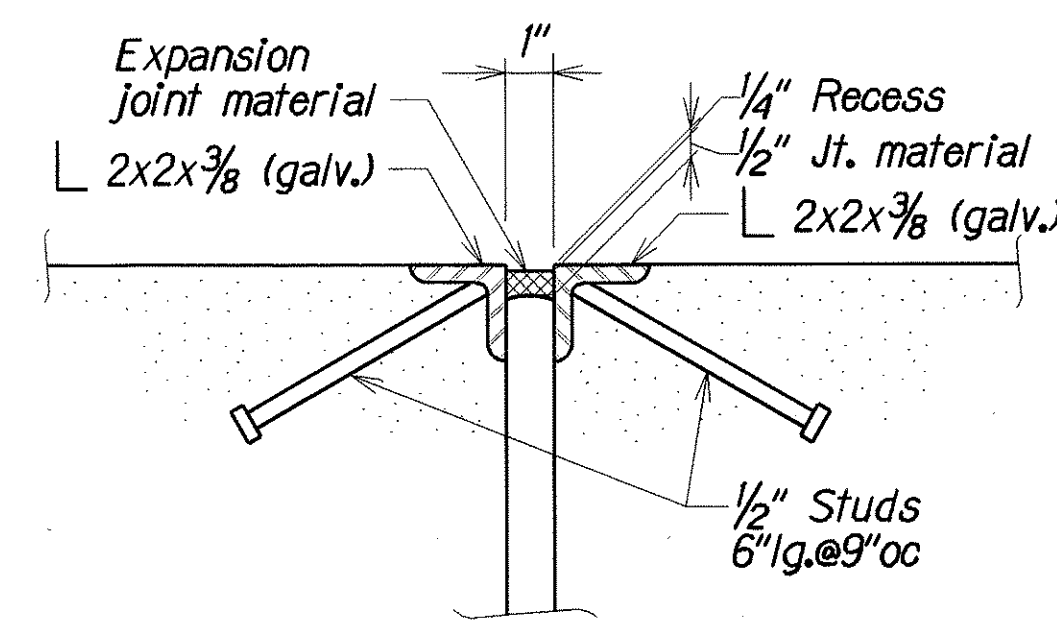
NOTES:

1. Frame rails to be A 36 steel.
2. All stud-anchors to be ASTM A 108 steel.
3. All stud anchors to be electric arc end welded with complete fusion.
4. Expansion joints to follow roadway grade.
5. All joint sealers, waterproofing and premolded jt. fillers shall be incidental to concrete.
6. All assemblies to be piece-marked.
7. All expansion joints and joint sealers shall be considered incidental to concrete.



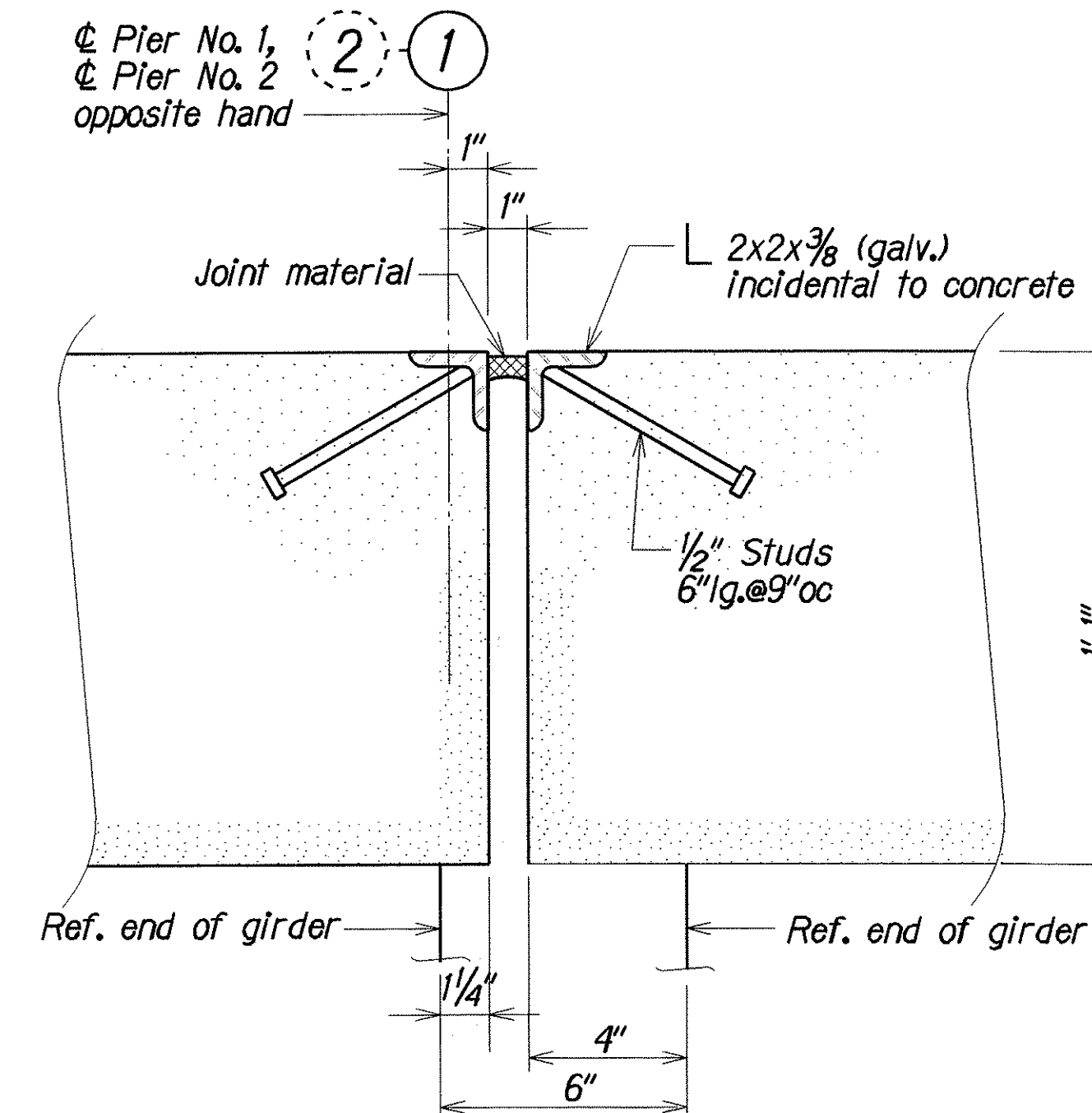
TYPICAL ABUTMENT JOINT DETAILS

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



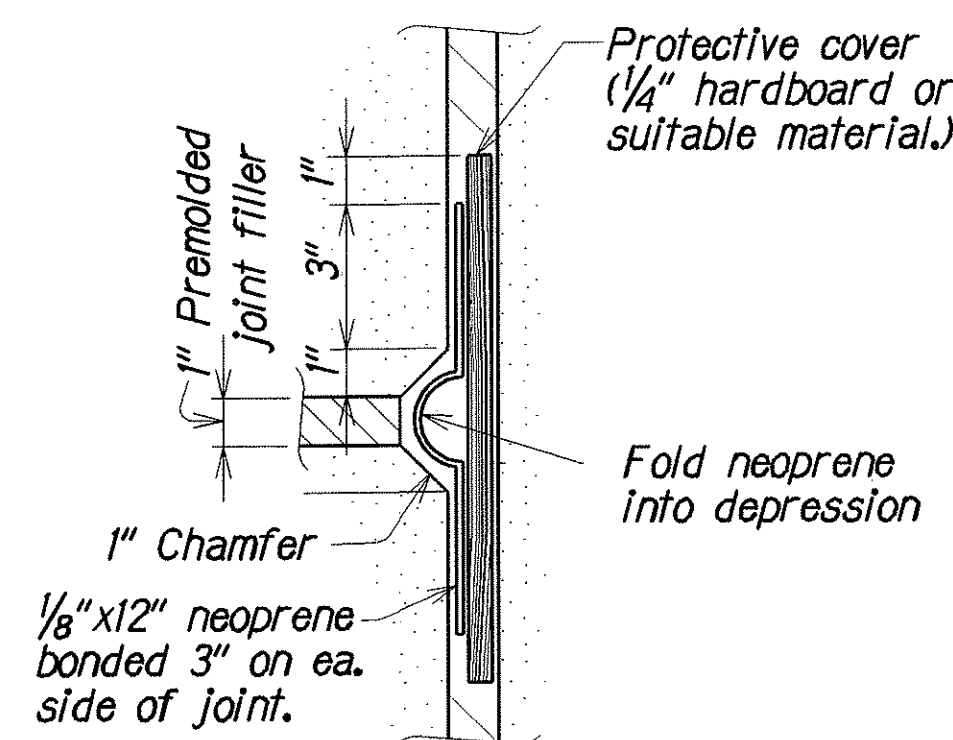
TYPICAL JOINT DETAIL

Scale: 3" = 1'-0"



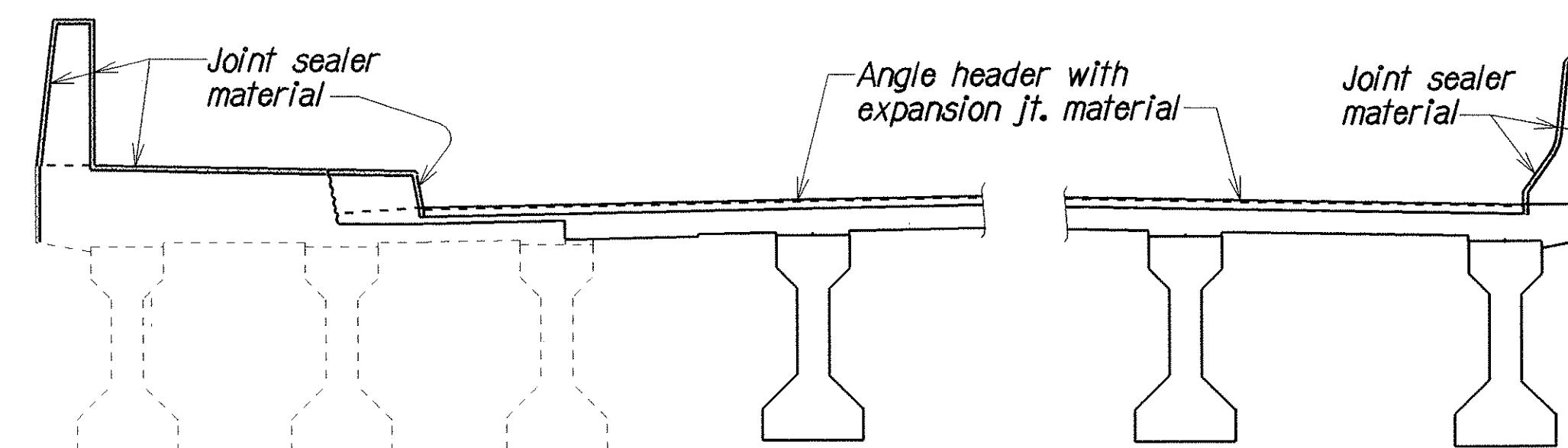
TYPICAL PIER JOINT DETAILS

Scale: 3" = 1'-0"



WATERPROOFING STRIP DETAIL

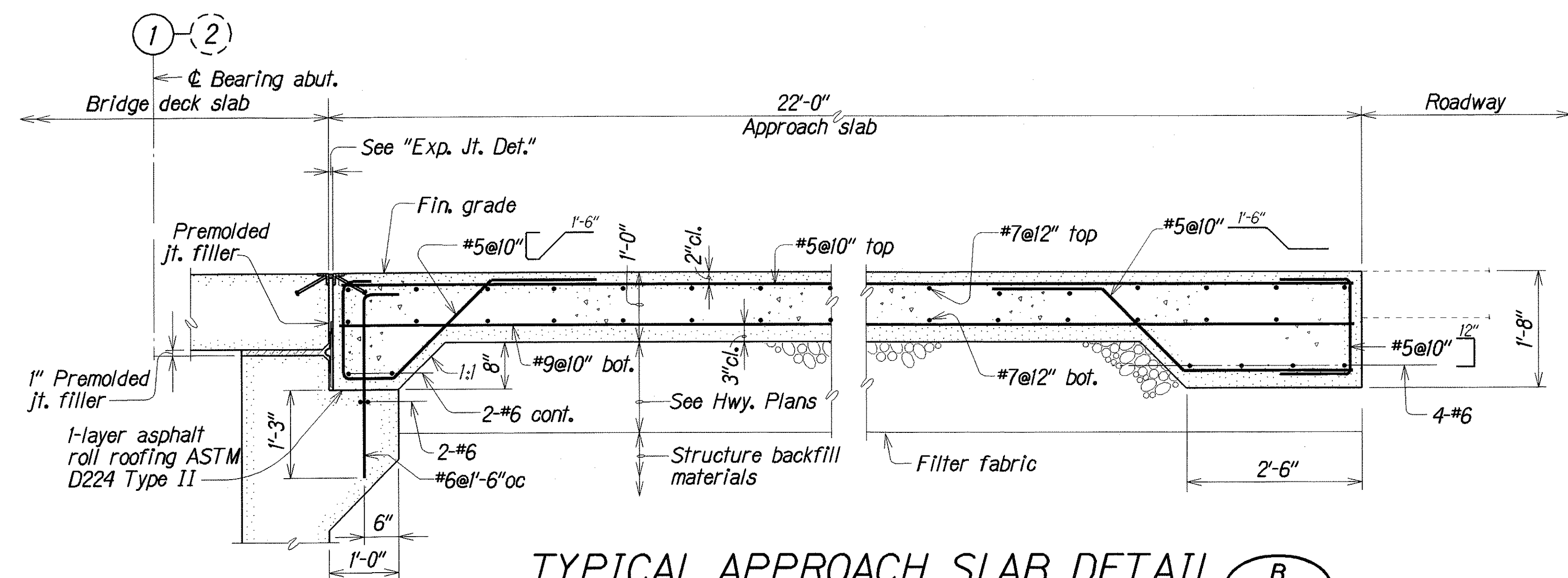
Scale: 3" = 1'-0"



LIMITS OF JOINT DETAIL

Not to Scale

EXPANSION JOINT DETAILS



TYPICAL APPROACH SLAB DETAIL

Scale: 3/4" = 1'-0"

B
S15 S42

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

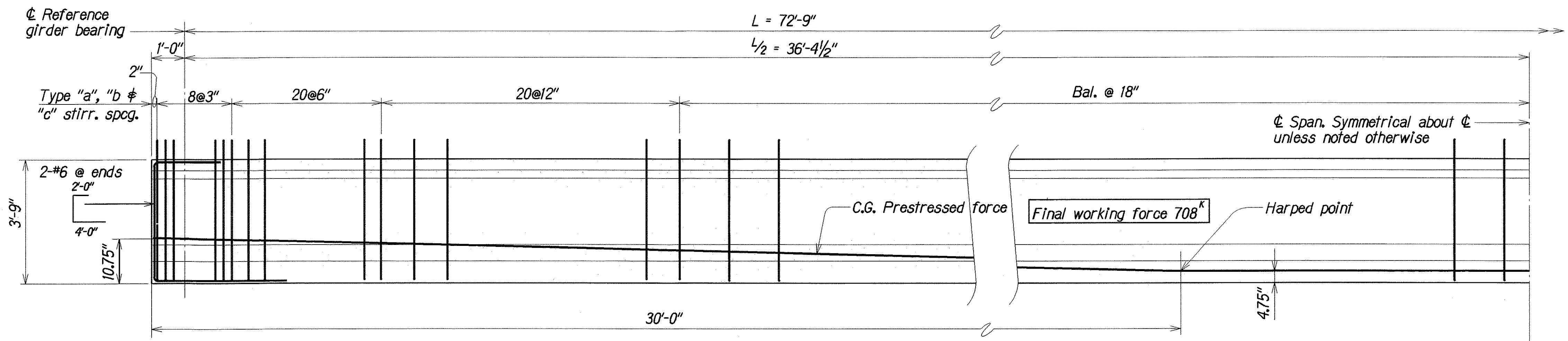
HALAWA STREAM BRIDGE
APPROACH SLAB DETAIL, TYPICAL JOINT
DETAILS AND WATERPROOFING STRIP DETAILS

KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(119)

Scale: As Noted Date: Aug. 2000

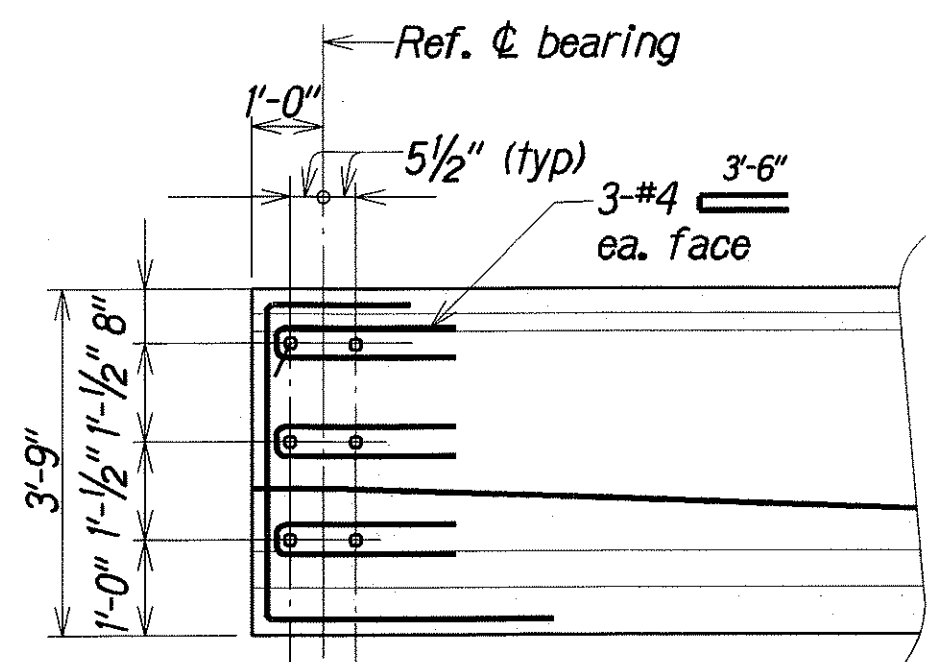
SHEET No. S42 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	82	105

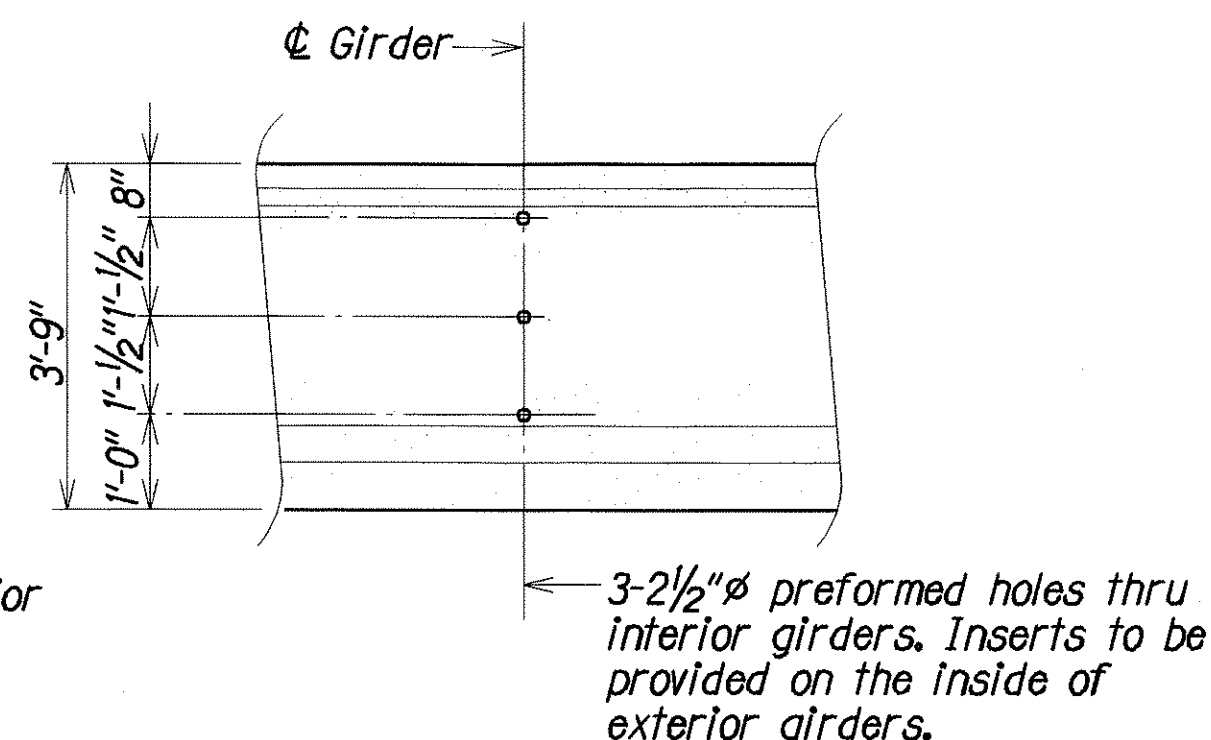


TYPICAL PG-A PRESTRESSED CONCRETE GIRDER

N.T.S.



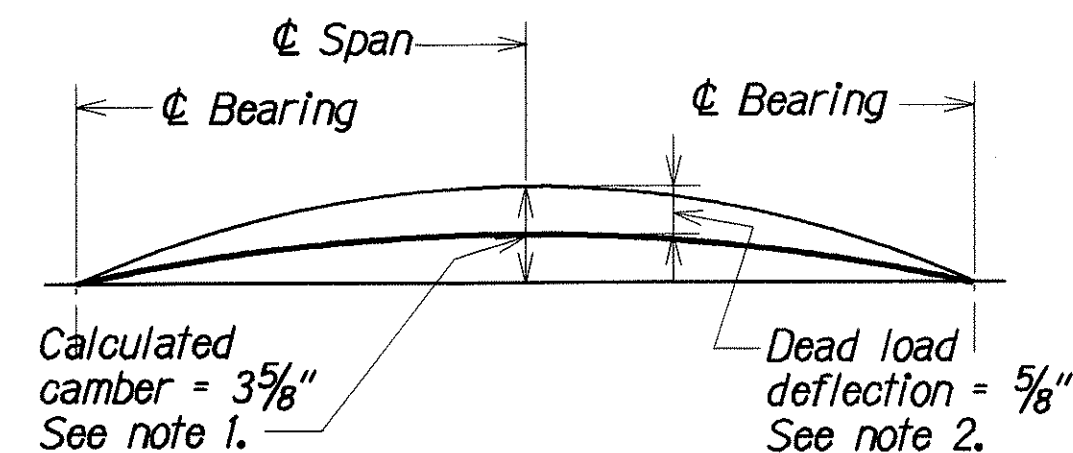
EACH ABUTMENT END



MID SPAN

TYPICAL GIRDER END DETAILS

Not to Scale

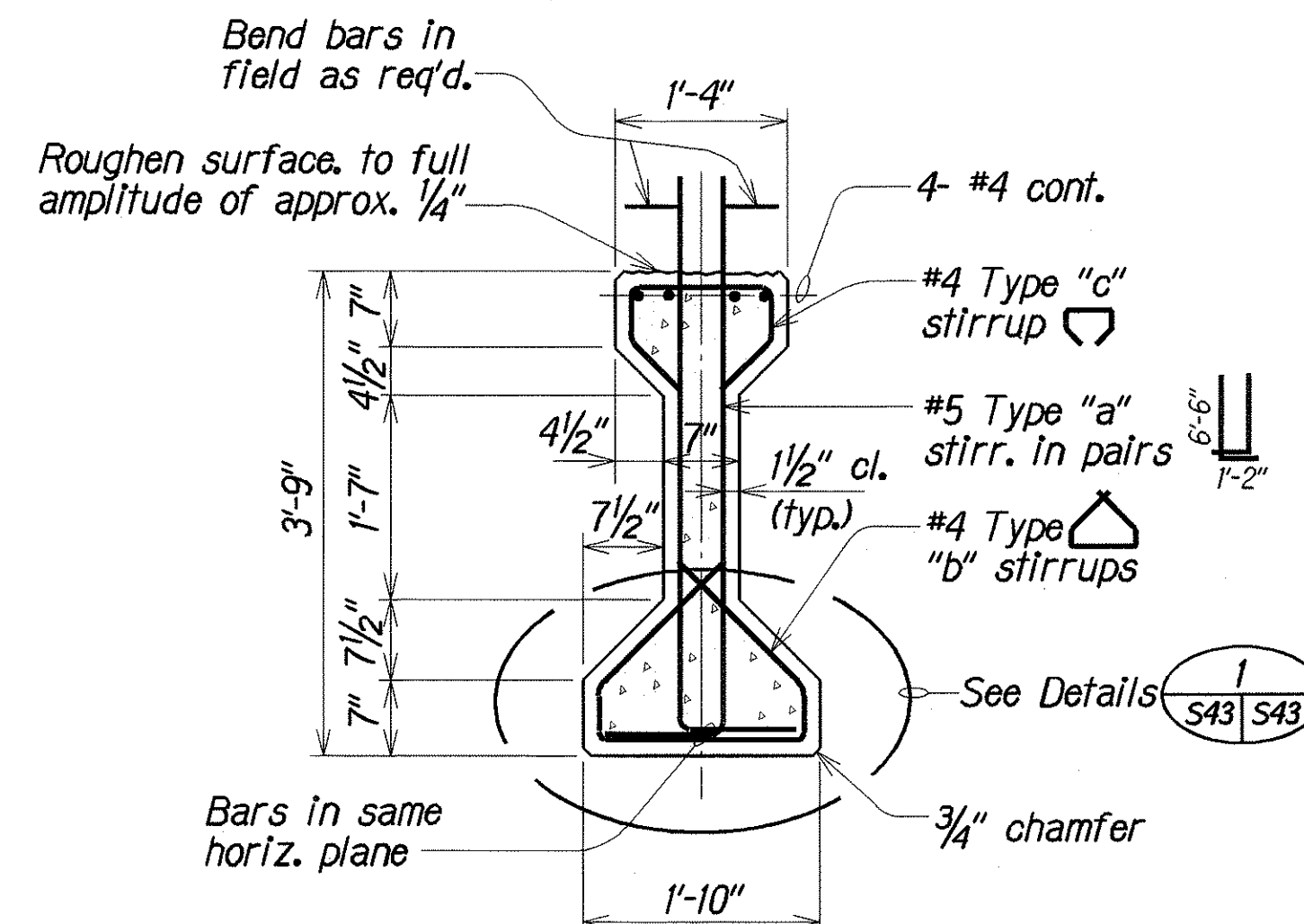


CAMBER DIAGRAM

Not to Scale

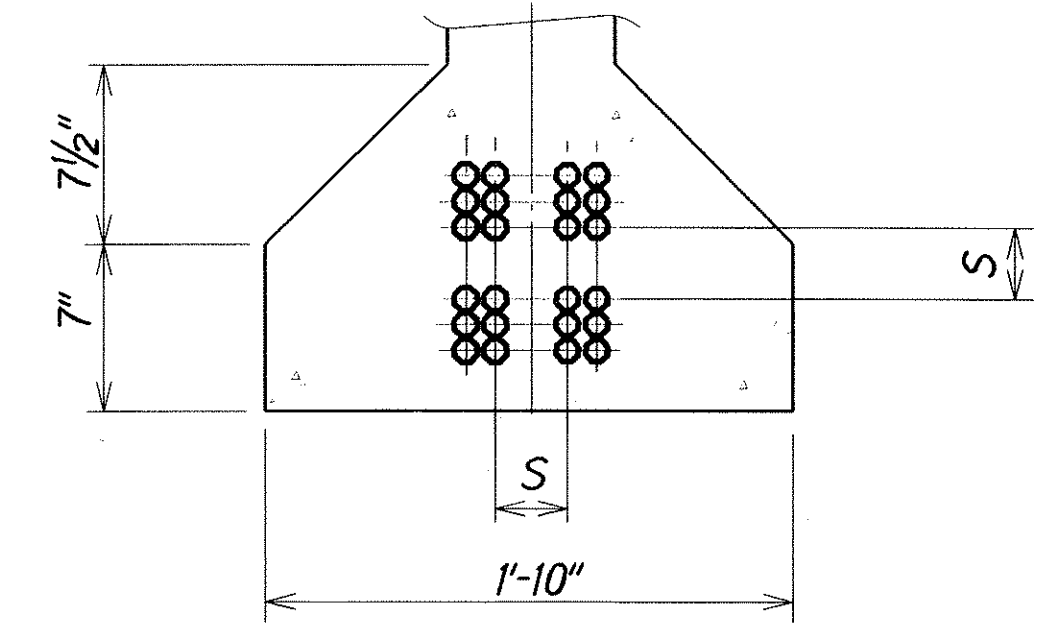
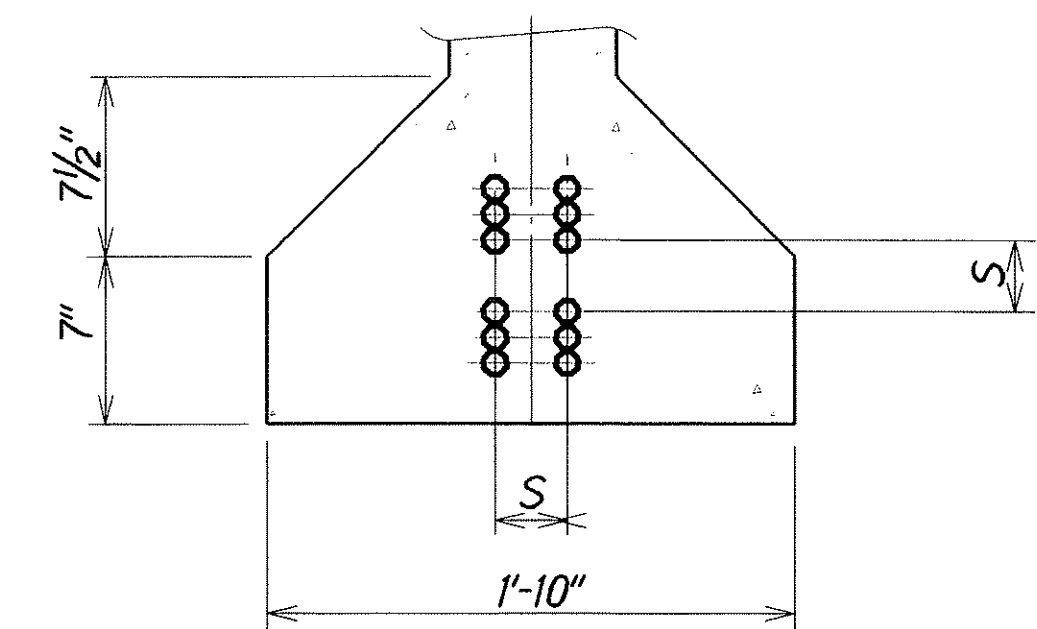
CAMBER AND DEFLECTION NOTES

- The calculated camber includes the effect of the initial prestressed force and the weight of the girder after removal from the bed. Positive values shown for calculated camber indicate a net upward deflection. The calculated camber value has been multiplied by a factor to approximate the effect of camber growth and concrete creep. The actual camber shall not exceed the calculated camber by more than 1/2".
- The dead load deflection includes the combined effects of the weight of slab and diaphragms.
- All cambers and deflections are in inches.



TYPICAL GIRDER SECTION

Scale: 3/4" = 1'-0"



- Strands may be bundled in groups as shown.
- The minimum distance "s" between groups of individual strands is 2" for 1/2 strands.
- "S" is measured between centers of adjacent strands.

DETAILS

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

S43 S43

PRESTRESSED GIRDER NOTES

- Concrete shall have a minimum 28 day compressive strength of 6,000 psi. Provide corrosion inhibiting admixture to girder concrete (30% calcium nitrite solution @ 4 gallons/cy min).
- Prestressed strands shall be 7 wire 1/2" low relaxation steel strands (area = 0.153 in.) with an ultimate strength of 270 ksi. For properties see State Standard Specifications.
- Non-prestressed reinforcing steel shall be Grade 60 unless noted otherwise. For properties see State Standard Specifications.
- Strand pattern shall be symmetrical about the longitudinal centerline of the girder.
- Strand release sequence shall not induce any lateral deflection of the girder.
- The Contractor shall submit his proposed strand pattern and releasing sequence to the Engineer for approval.
- During curing, care shall be taken to avoid any lateral deflection of the beam due to improper orientation.
- Lifting devices shall be placed as close as possible to the center line bearing of the girder. Details and locations of lifting devices shall be submitted to the Engineer for approval. Such approval does not relieve the Contractor of his responsibilities if the girder is damaged due to failure of the lifting device.
- See Framing Plan for locations of diaphragms and girder mark numbers. Lengths shown do not include effects of elastic shortening.
- Allowable Concrete Stresses:
 - Min. Ultimate Conc. Strength before release, $f'_{ci} = 5,000$ psi
 - Tensile Stress after losses (at Service Load) = 0 psi
- Girder dimension L = Horizontal measurement between girder centerline bearing each end. The contractor shall determine total length of girder.

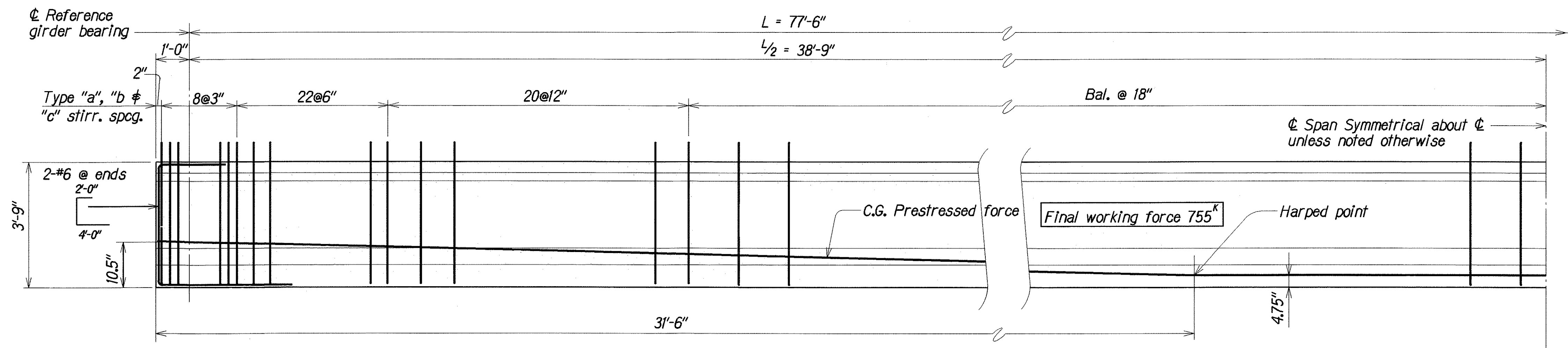
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
TYPICAL PG-A GIRDER DETAILS
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

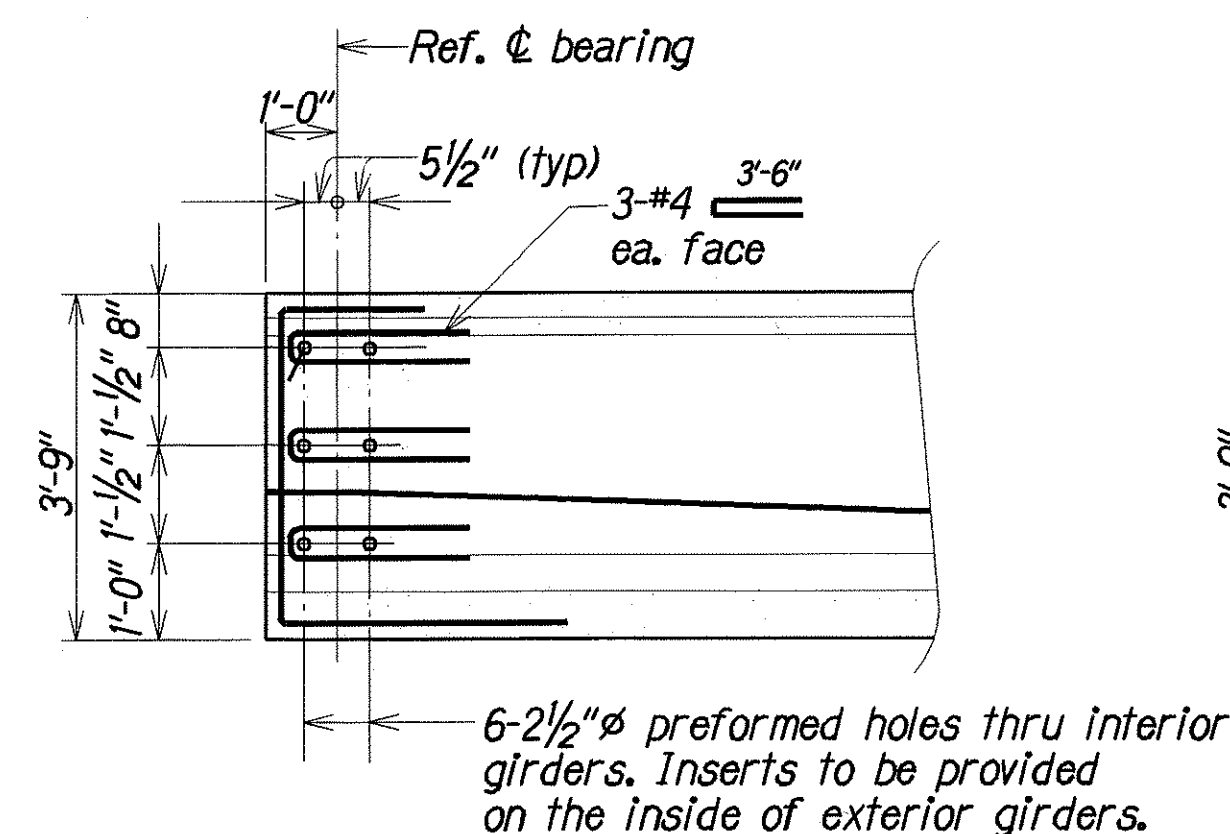
SHEET No. S43 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	83	105

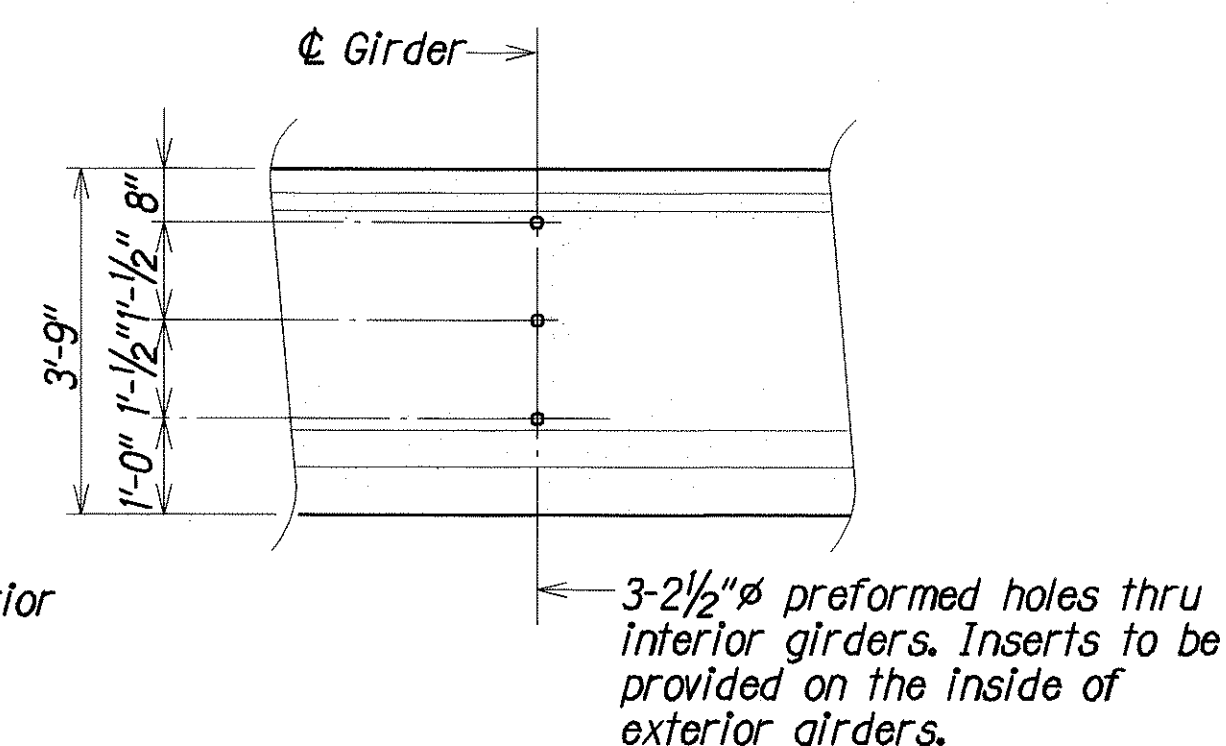


TYPICAL PG-B PRESTRESSED CONCRETE GIRDER (INTERIOR)

N.T.S.



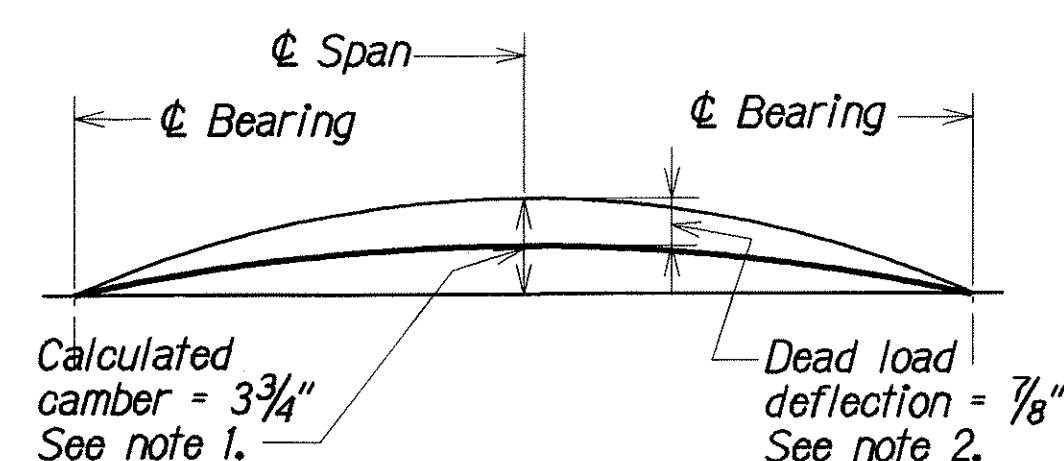
EACH ABUTMENT END



MID SPAN

TYPICAL GIRDER END DETAILS

Not to Scale

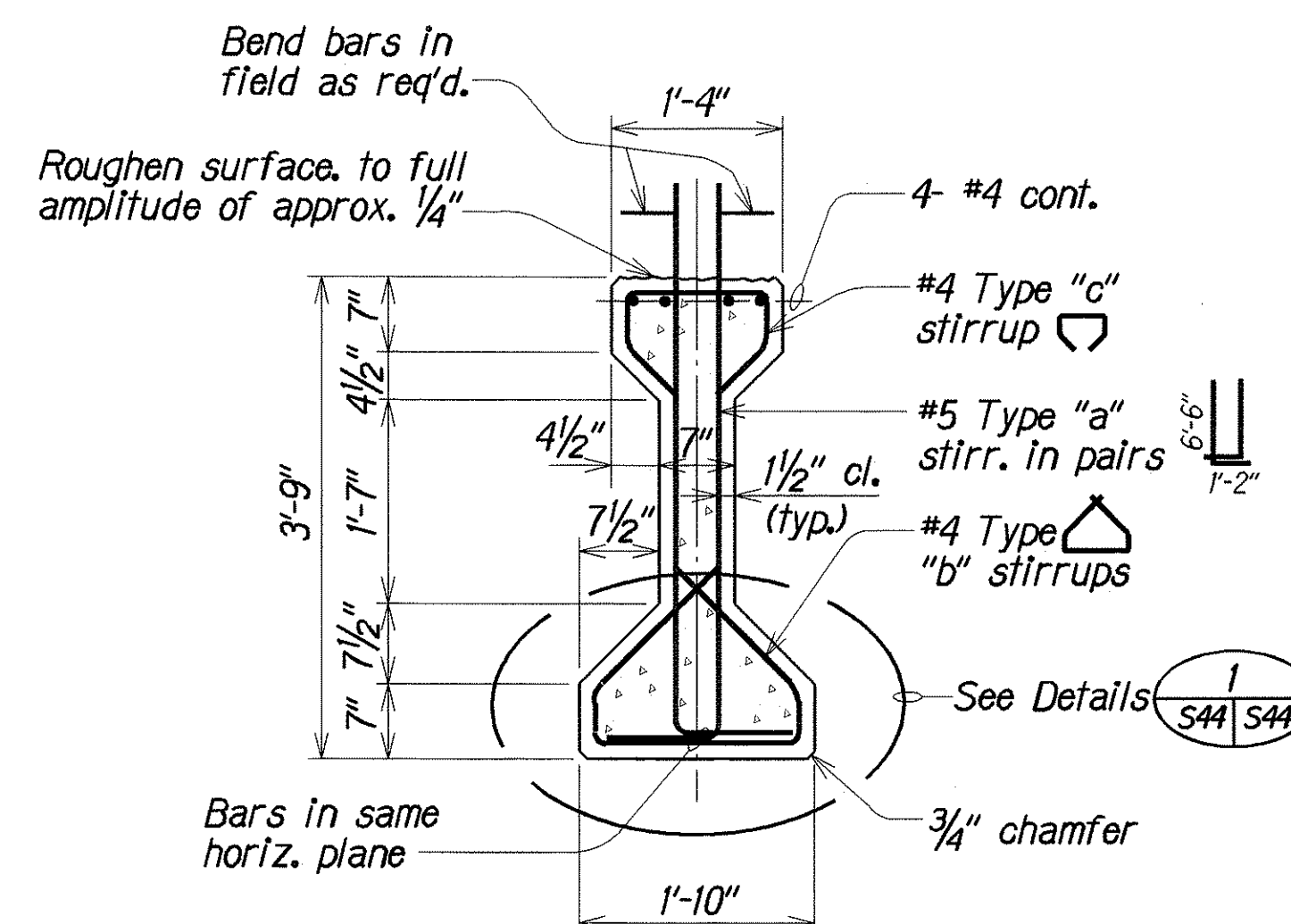


CAMBER DIAGRAM

Not to Scale

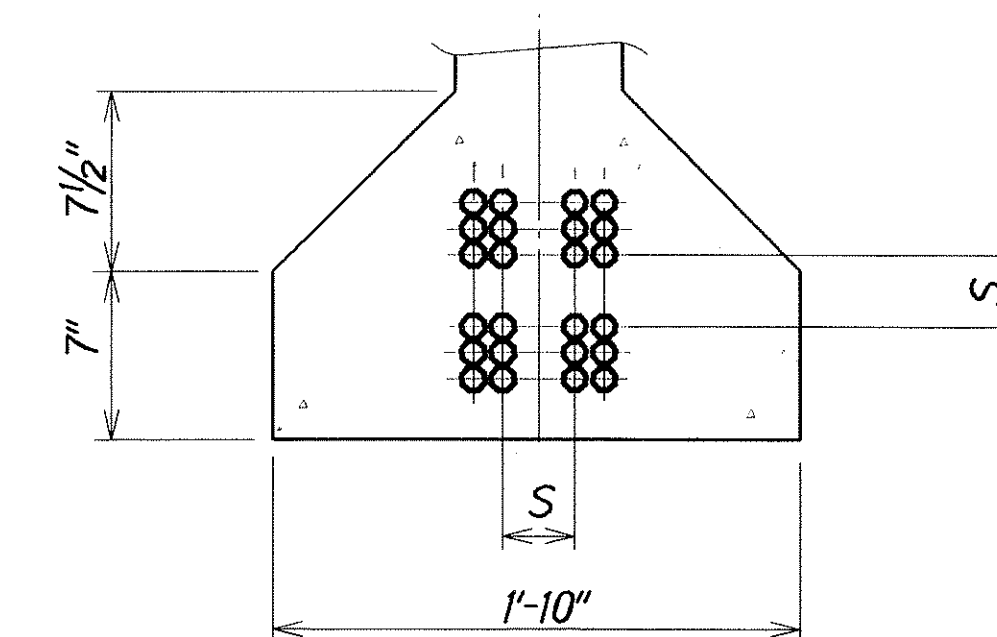
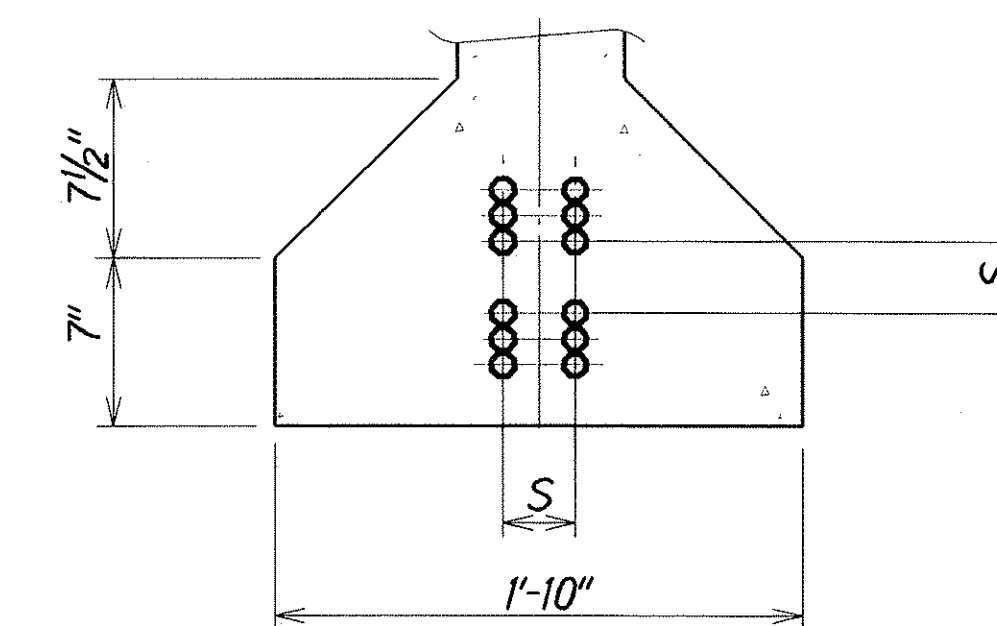
CAMBER AND DEFLECTION NOTES

- The calculated camber includes the effect of the initial prestressed force and the weight of the girder after removal from the bed. Positive values shown for calculated camber indicate a net upward deflection. The calculated camber value has been multiplied by a factor to approximate the effect of camber growth and concrete creep. The actual camber shall not exceed the calculated camber by more than 1/2"
- The dead load deflection includes the combined effects of the weight of slab and diaphragms.
- All cambers and deflections are in inches.



TYPICAL GIRDER SECTION

Scale: 3/4" = 1'-0"



- Strands may be bundled in groups as shown.
- The minimum distance "s" between groups or individual strands is 2" for 1/2 strands
- "S" is measured between centers of adjacent strands.

DETAILS
Scale: 1 1/2" = 1'-0"

PRESTRESSED GIRDER NOTES

- Concrete shall have a minimum 28 day compressive strength of 6,000 psi. Provide corrosion inhibiting admixture to girder concrete (30% calcium nitrite solution @ 4 gallons/cy min).
- Prestressed strands shall be 7 wire 1/2" low relaxation steel strands (area = 0.53 in.) with an ultimate strength of 270 ksi. For properties see State Standard Specifications.
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- Strand pattern shall be symmetrical about the longitudinal centerline of the girder.
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- See Framing Plan for locations of diaphragms and girder mark numbers. Lengths shown do not include effects of elastic shortening.
- Allowable Concrete Stresses:
A. Min. Ultimate Conc. Strength before release, f'ci = 5,000 psi
B. Tensile Stress after losses (at Service Load) = 0 psi
- Girder dimension L = Horizontal measurement between girder centerline bearing each end. The contractor shall determine total length of girder.

ORIGINAL PLAN	DATE	DESIGNED BY	CHECKED BY
PLAN	10/2000	MM	MM
NOTE BOOK	10/2000	MM	MM
QUANTITIES BY	10/2000	MM	MM
CHECKED BY	10/2000	MM	MM

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

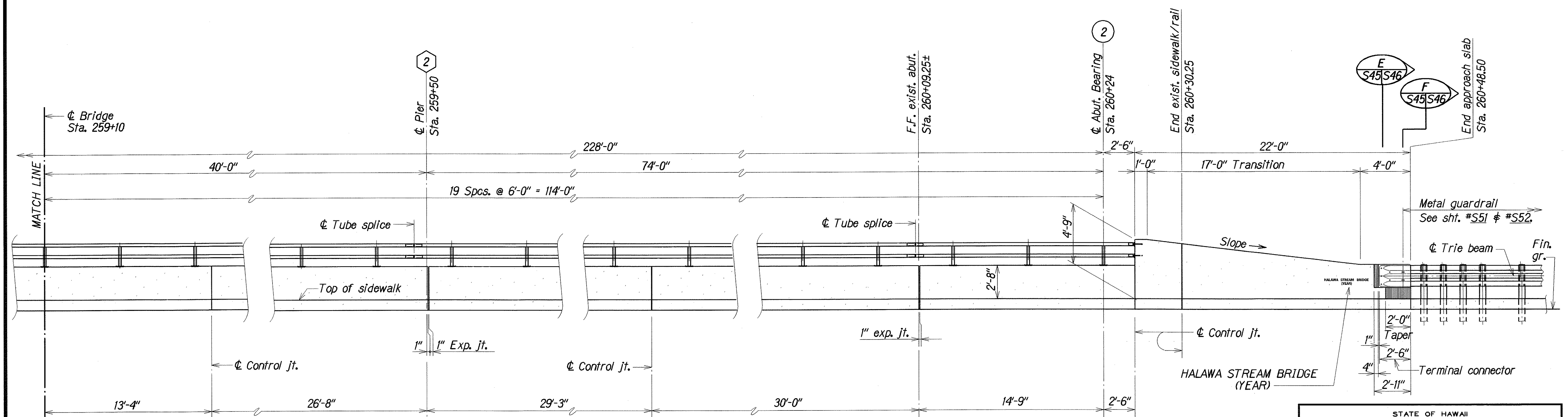
HALAWA STREAM BRIDGE
TYPICAL PG-B GIRDER DETAILS (INTERIOR)
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

SHEET No. 544 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	84	105

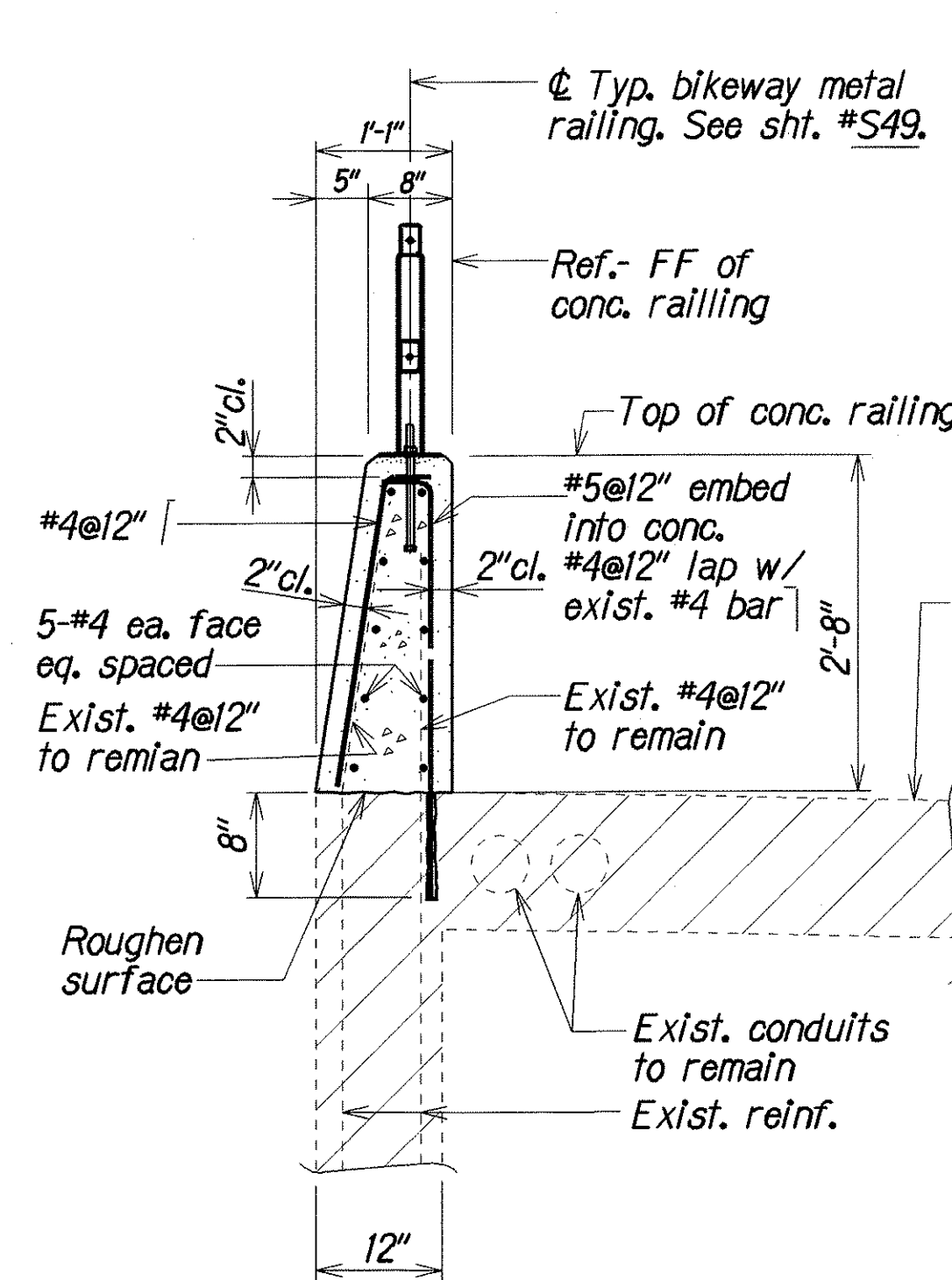
Technical drawing of a bridge deck cross-section and plan view. The plan view shows a 228'-0" long bridge deck with various segments and transitions. The cross-section shows the deck width, sidewalk, and structural details like tube splices and control joints. A table in the top right corner provides project information.



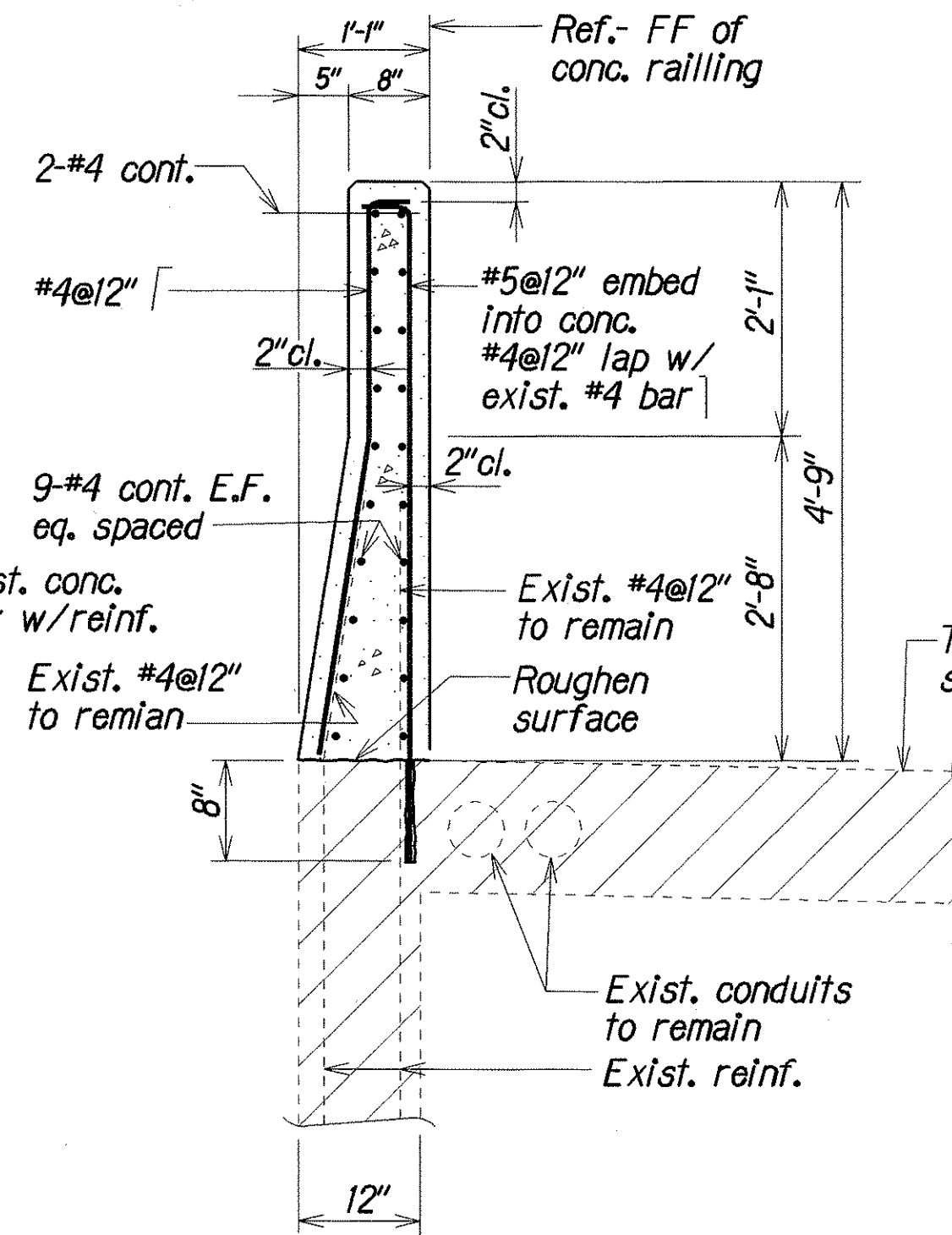
Scale: $\frac{1}{4}'' = 1'-0''$

SHEET No. *S45* OF *57* SHEETS

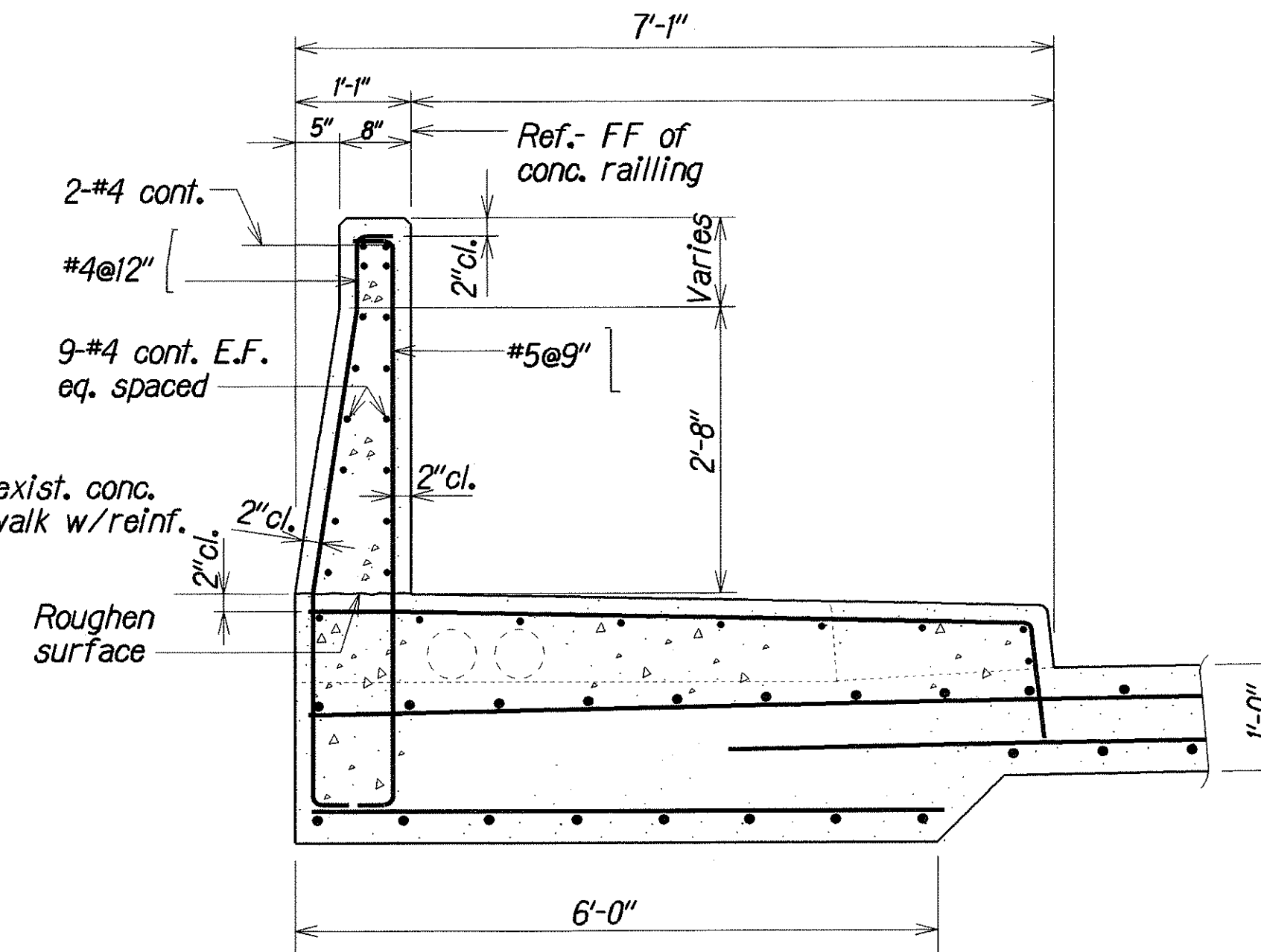
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	85	105



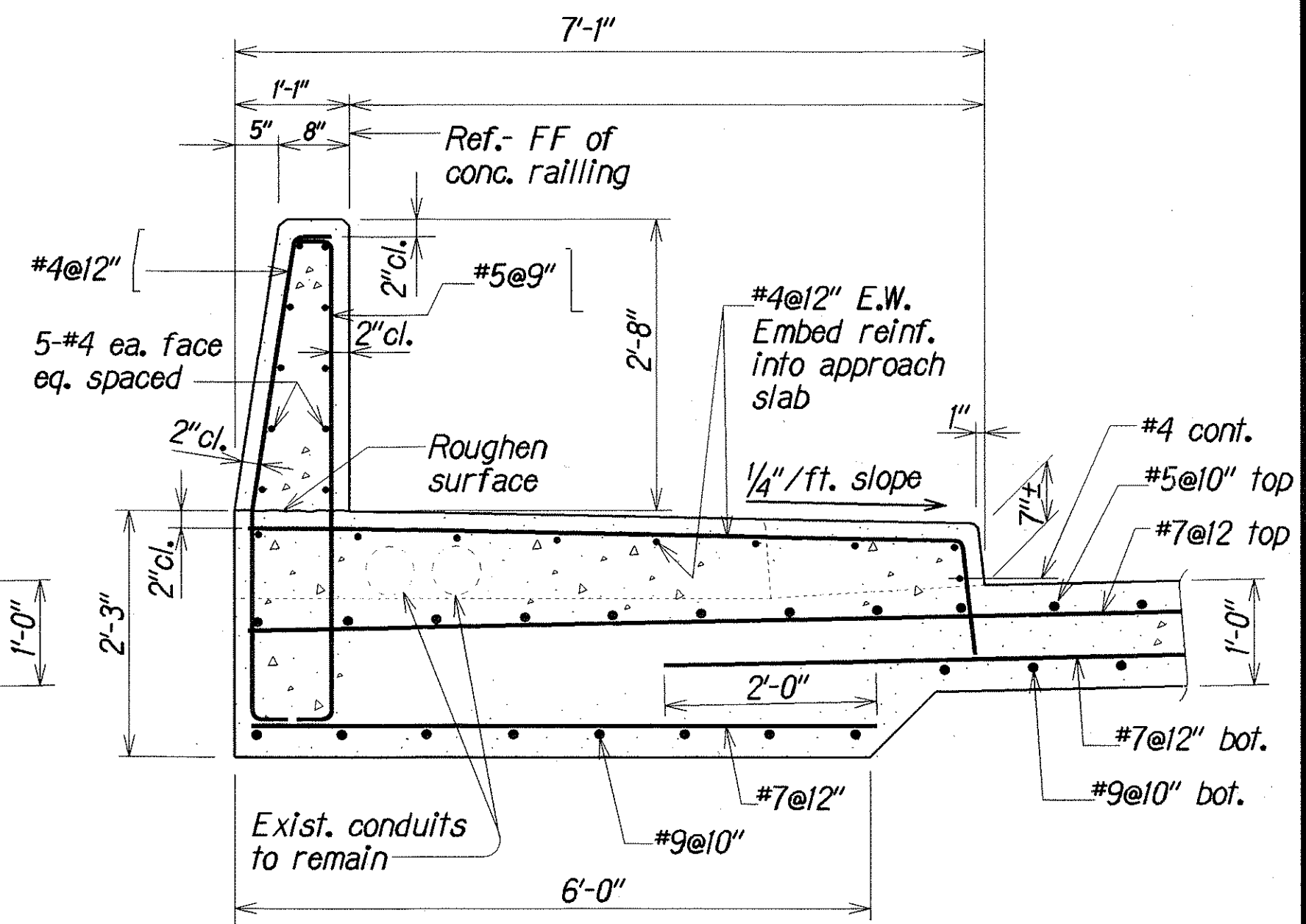
SECTION A
S45 S46



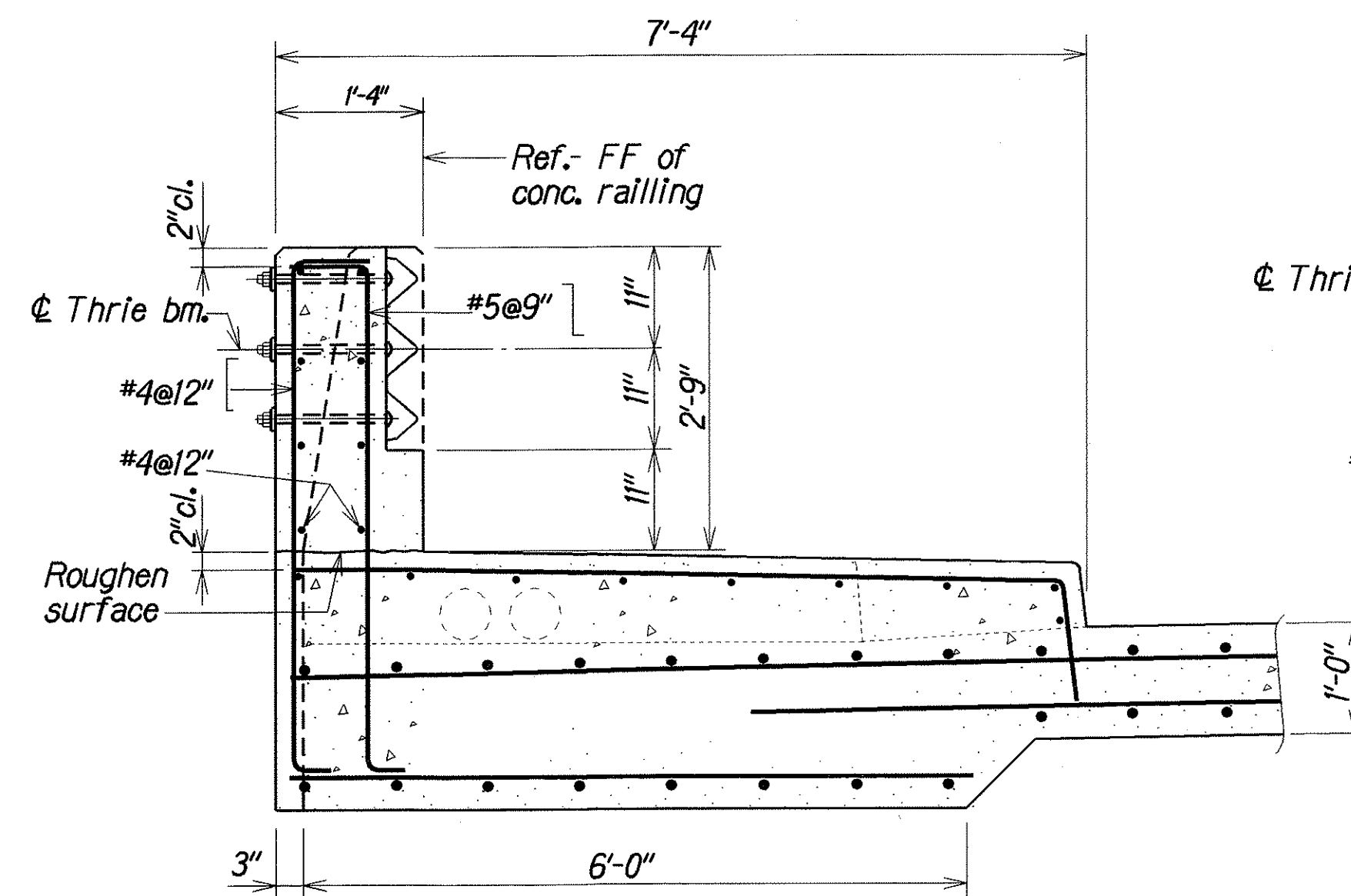
SECTION B
S45 S46



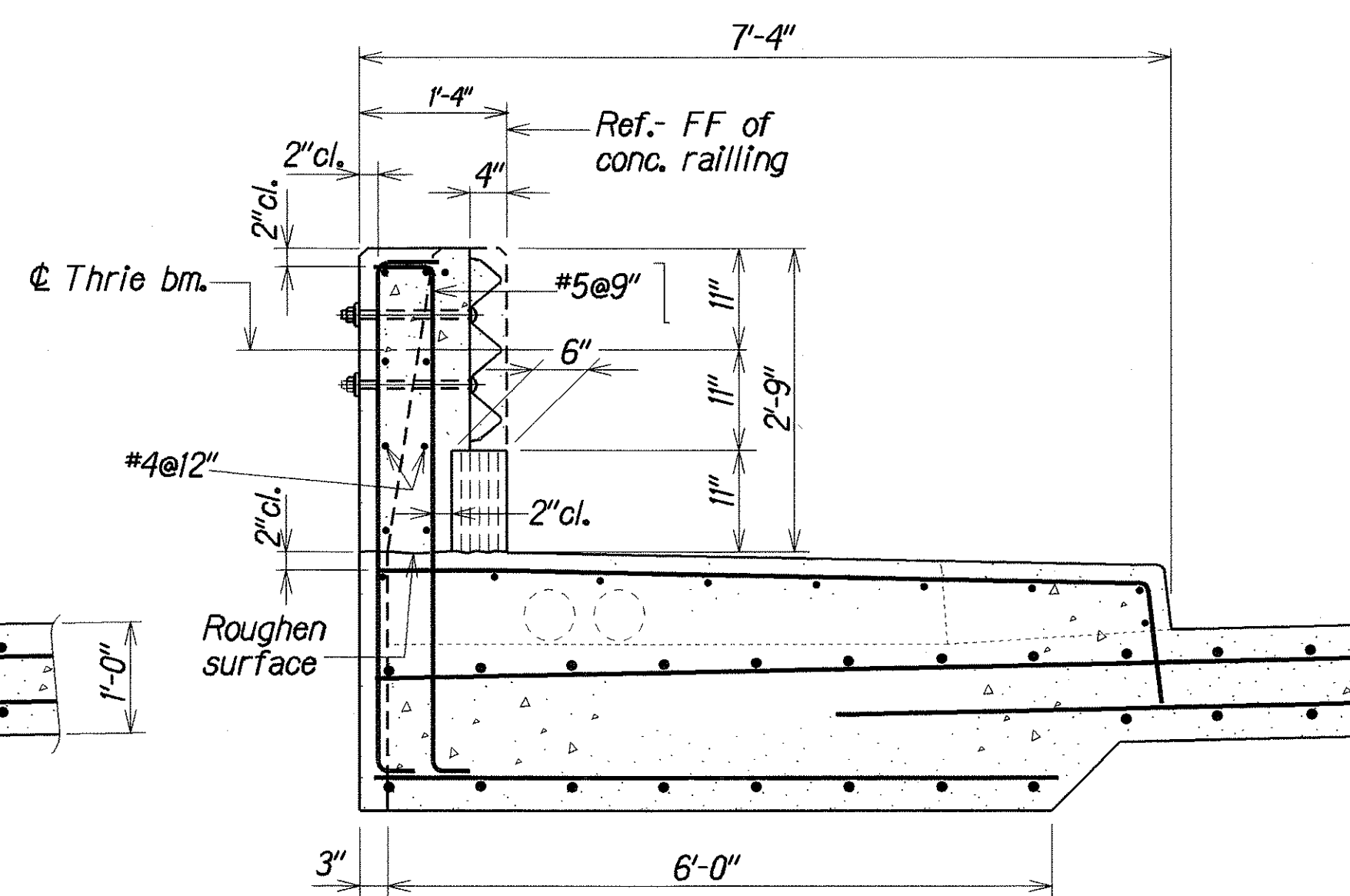
SECTION C
S45 S46



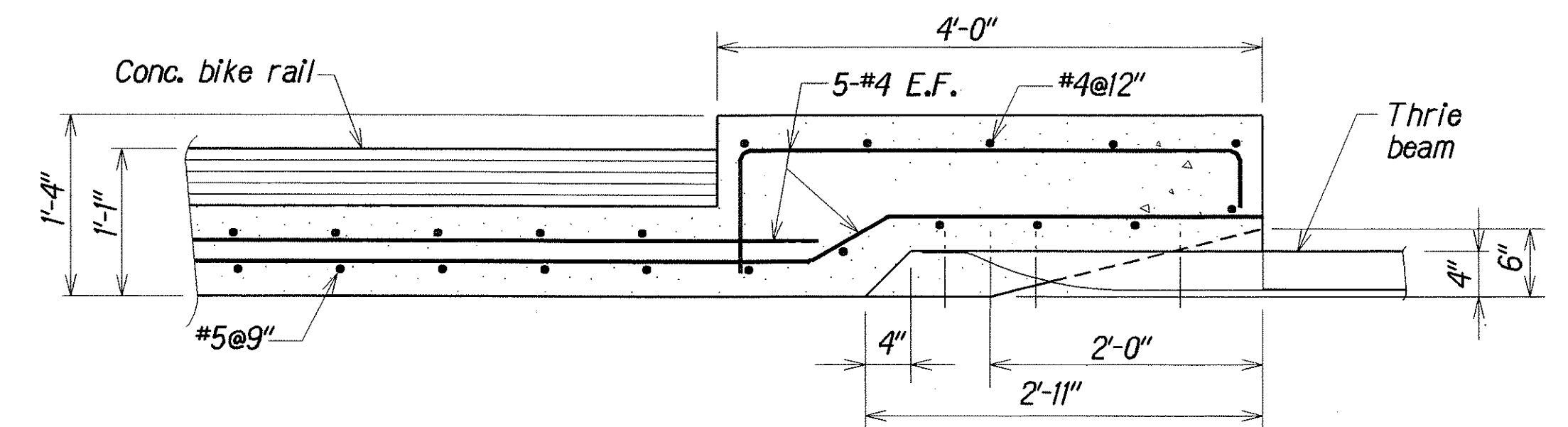
SECTION D
S45 S46



SECTION E
S45 S46



SECTION F
S45 S46



PLAN AT METAL GUARDRAIL CONNECTION
(MAKAI SIDE)
Scale: 1" = 1'-0"

CONCRETE BRIDGE RAIL (MAKAI SIDE)
Scale: 3/4" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HALAWA STREAM BRIDGE
CONCRETE BRIDGE RAIL SECTIONS (MAKAI SIDE)
PLAN AT METAL GUARDRAIL CONNECTION (MAKAI SIDE)
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)
Scale: As Noted Date: Aug. 2000

SHEET No. S46 OF 57 SHEETS

ORIGINAL	DATE	BY
PLAN	7/1/2000	LJA
NOTE BOOK	7/1/2000	LJA
QUANTITIES BY	7/1/2000	LJA
CHECKED BY	7/1/2000	LJA

Project Information:

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	86	105

Bridge Details:

- HALAWA STREAM BRIDGE (YEAR)**
- Pier Line No. 1**
- Abutment Details:**
 - Abut. Bearing Sta. 257+96
 - End of bridge Sta. 260+25
 - End of bridge Sta. 260+30.25
 - End of bridge Sta. 260+24
- Approach Details:**
 - End approach slab Sta. 260+48.50
 - End approach slab Sta. 257+71.50
- Dimensions and Stationing:**
 - Bridge Length: 228'-0"
 - Approach Length: 40'-0"
 - Transition Length: 15'-0"
 - Deck Width: 2'-8"
 - Deck Drain: 2'-8"
 - Control Joints: 30'-0", 7'-0", 7'-0", 30'-0"
 - Expansion Joints: 1" Exp. Jt.
- Structural Details:**
 - Terminal connector
 - W-beam & posts
 - See detail sht. S48
 - See detail sht. S50 for details

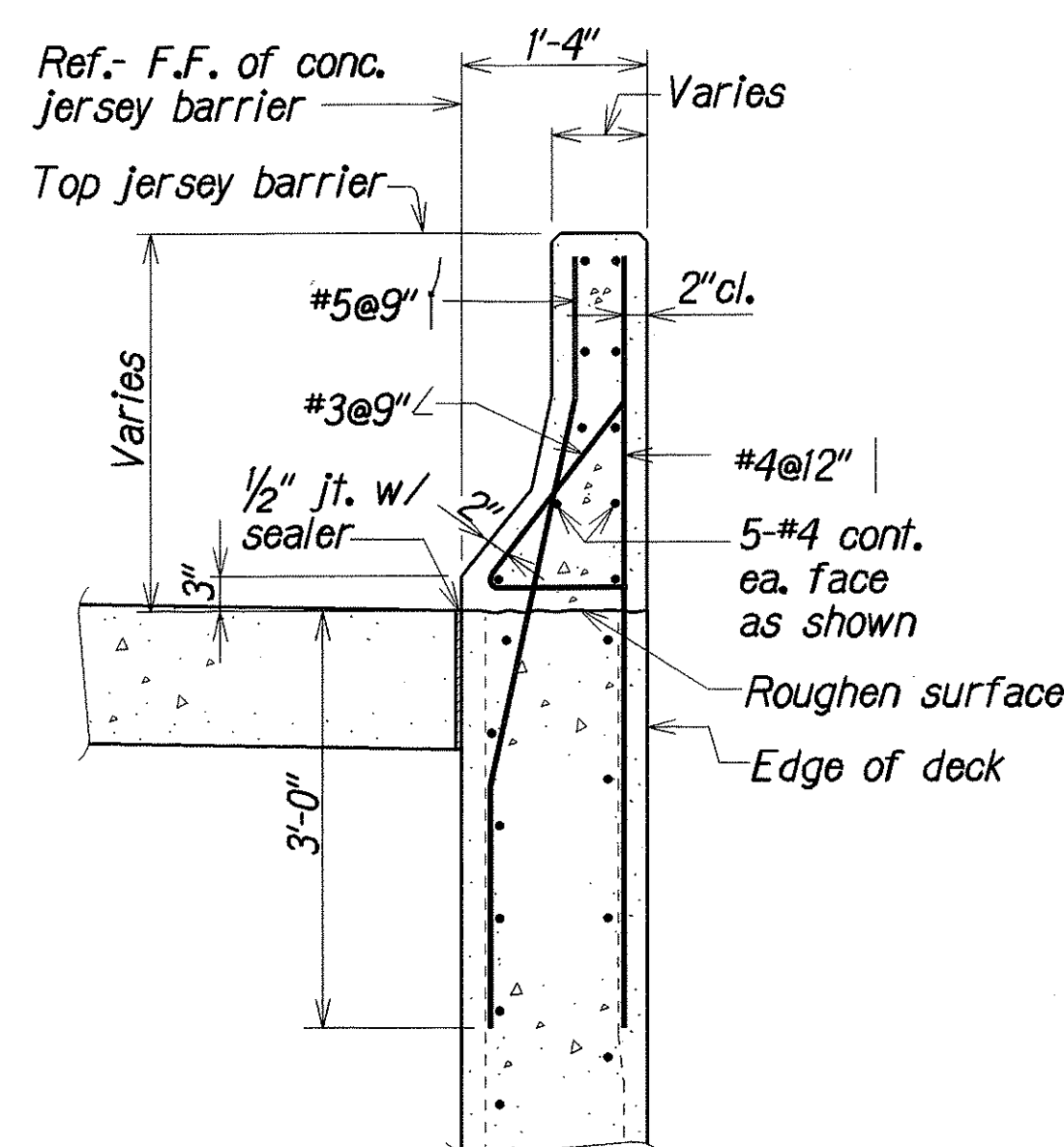
Scale: $\frac{1}{4}'' = 1'-0''$



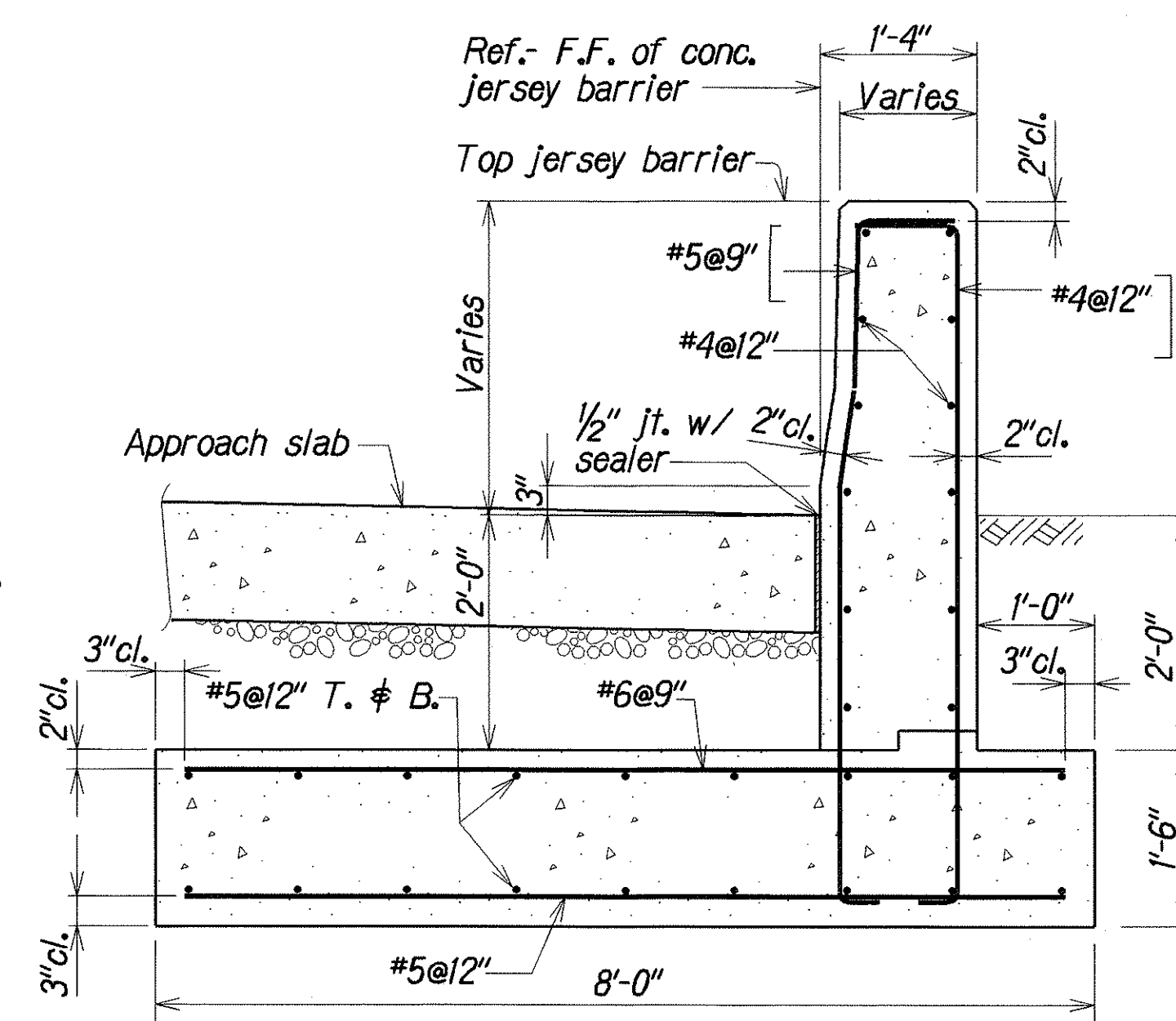
Not to Scale

SHEET No. 547 OF 57 SHEETS

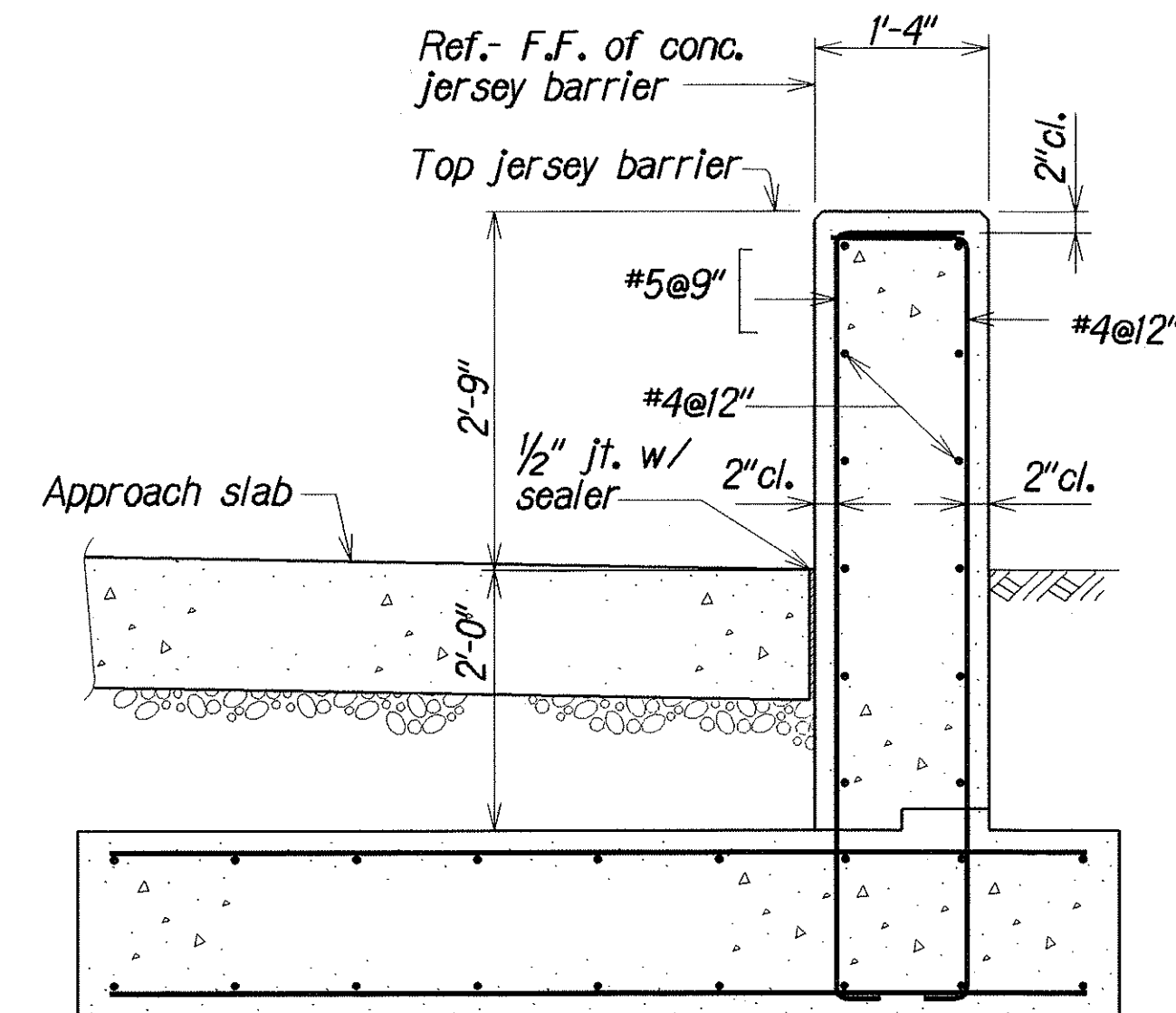
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	87	105



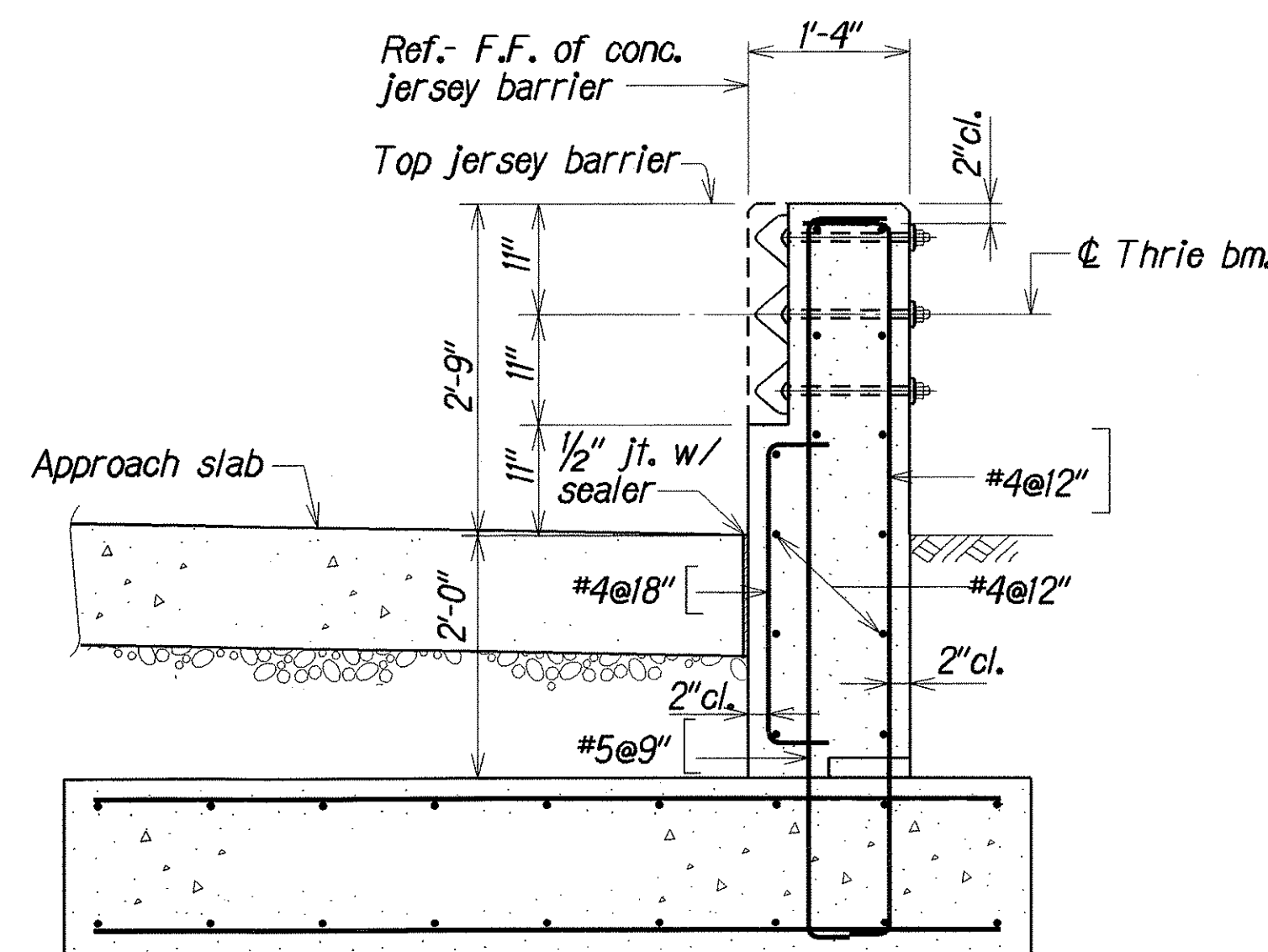
SECTION A
S47 S48



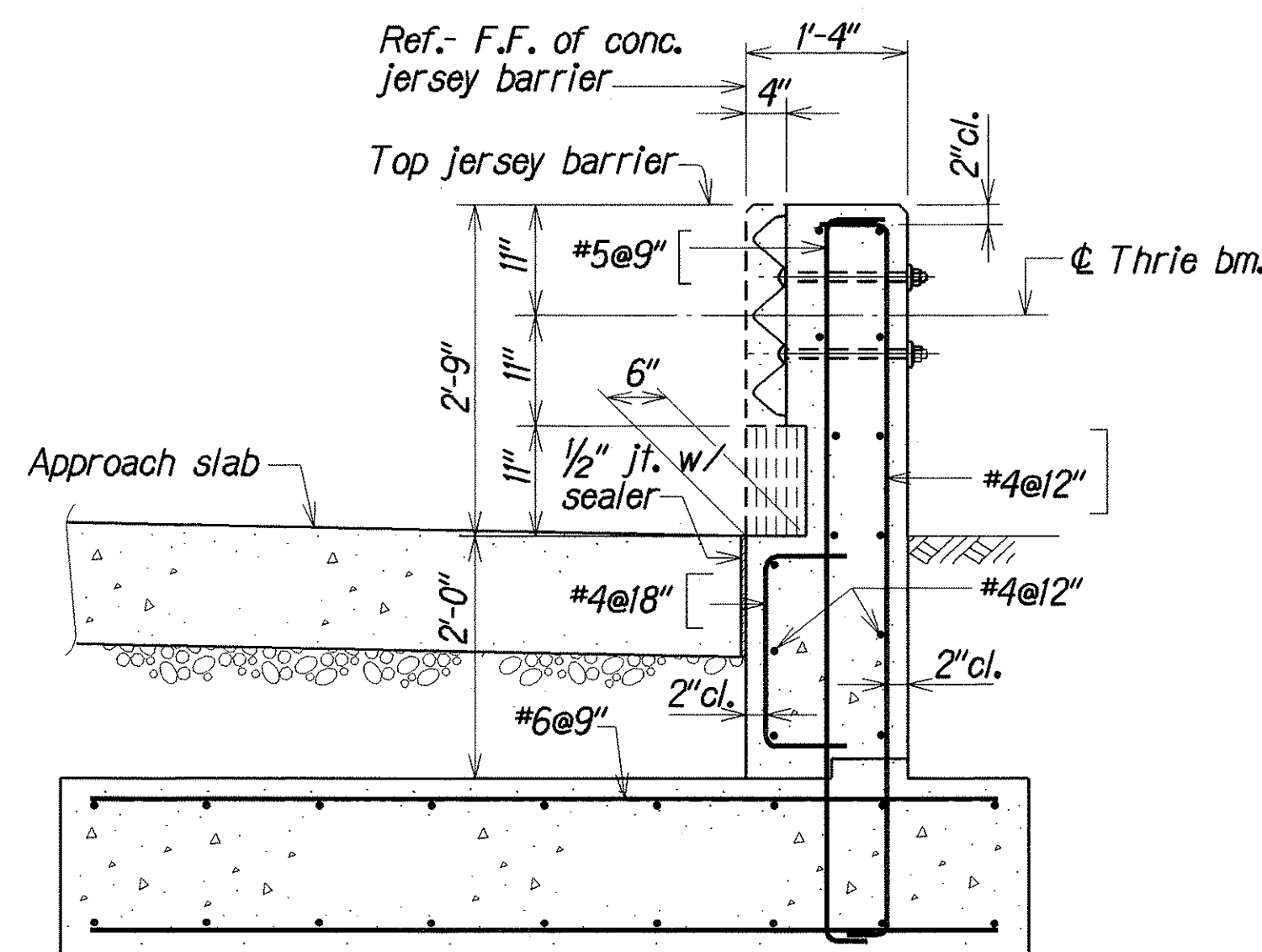
SECTION B
S47 S48



SECTION C
S47 S48



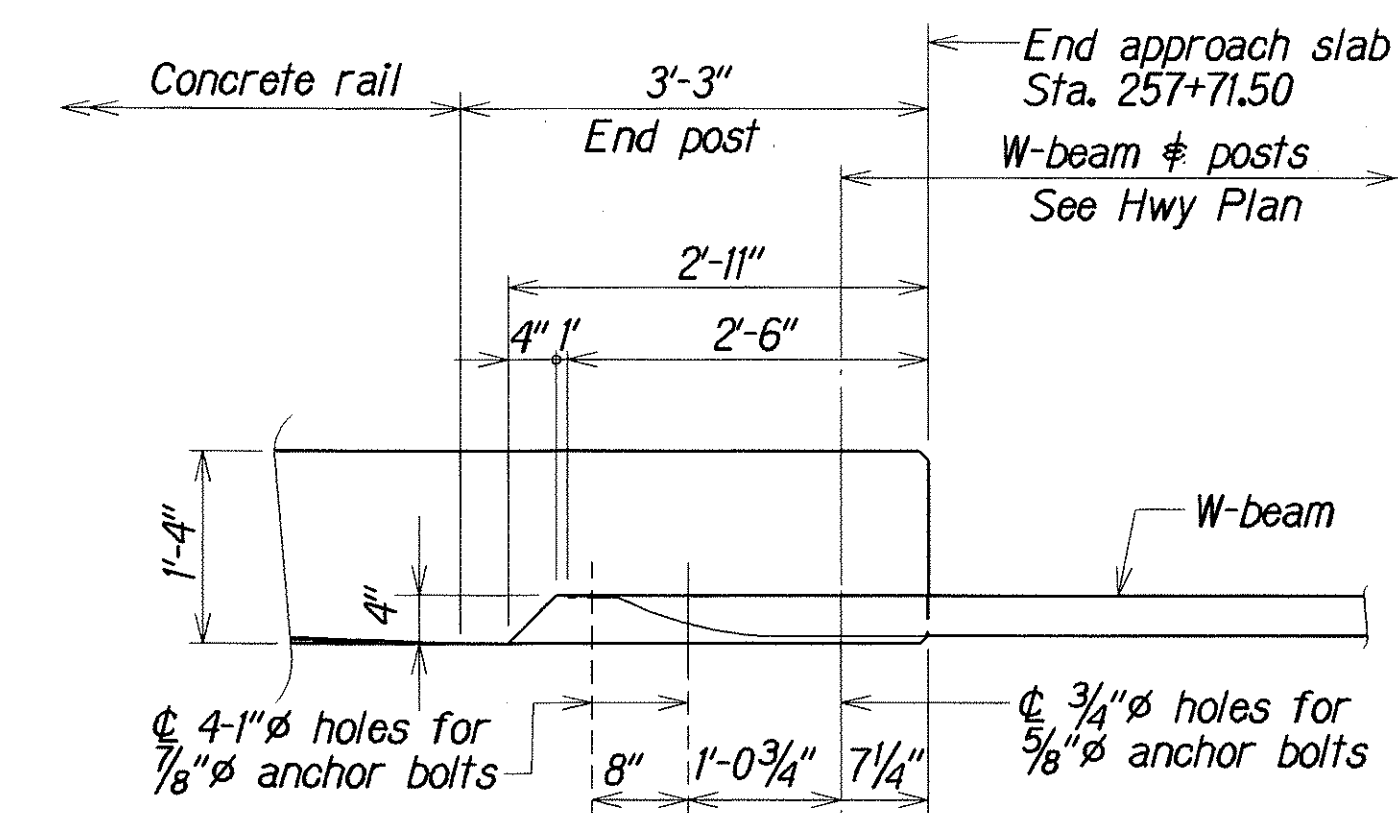
SECTION D
S47 S48



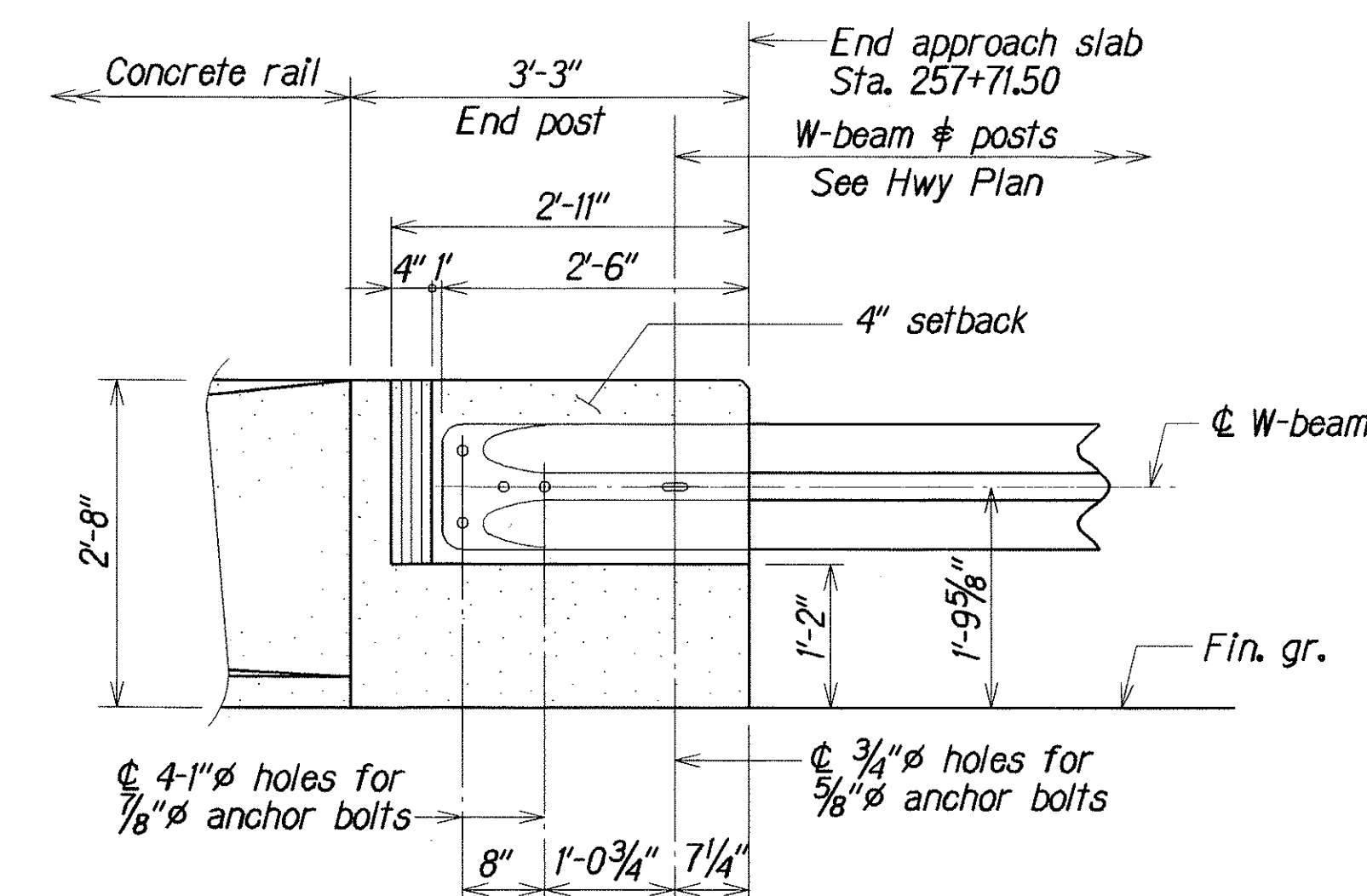
SECTION E
S47 S48

CONCRETE BRIDGE RAIL (MAUKA SIDE) (THRIE BEAM CONNECTION)

Scale: 3/4" = 1'-0"



PLAN



ELEVATION

W-BEAM CONNECTION DETAIL

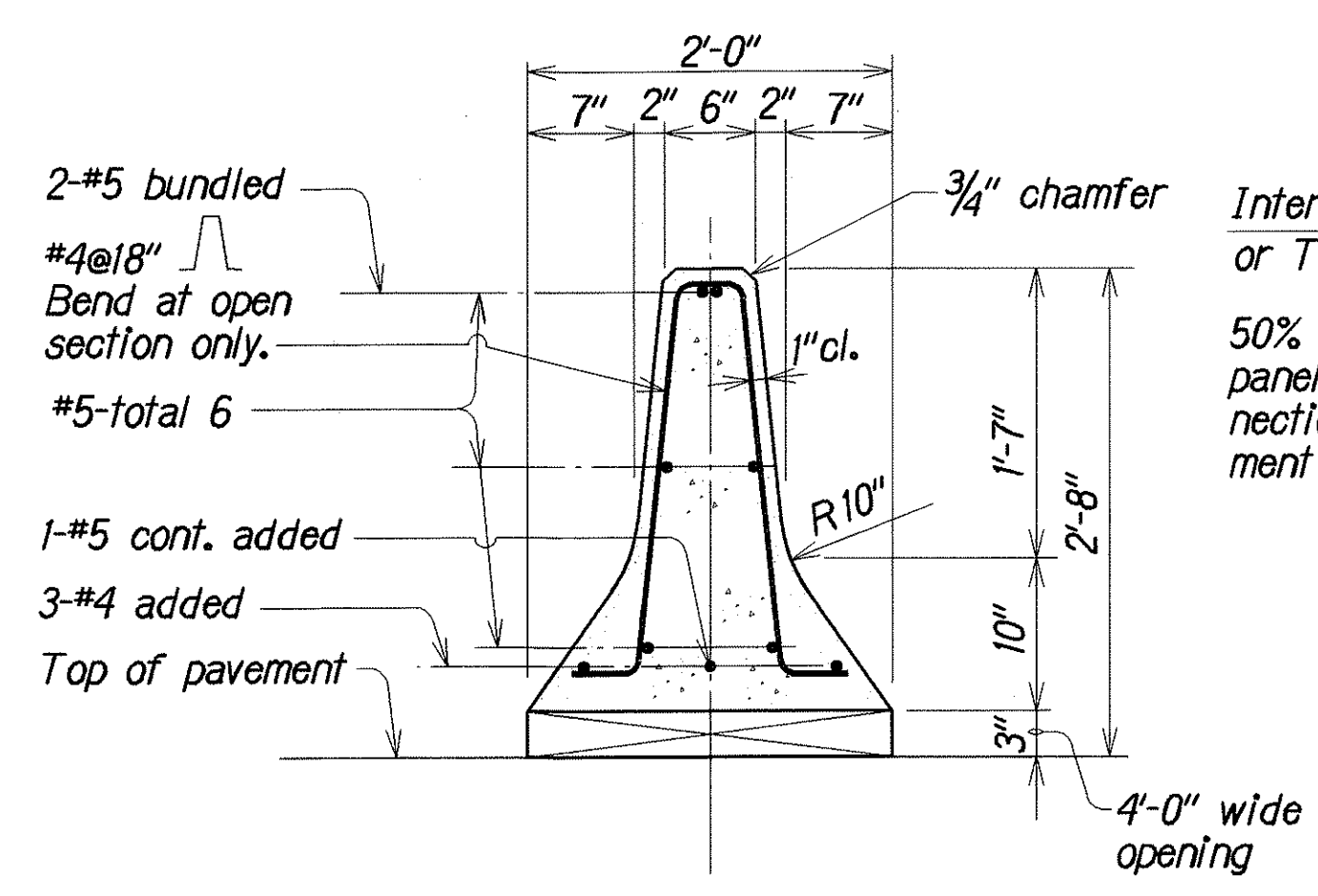
Scale: 3/4" = 1'-0"

ORIGINAL	DATE	BY
PLAN	1/1/00	JK
NOTE	1/1/00	JK
QUANTITIES	1/1/00	JK
CHECKED BY	1/1/00	JK

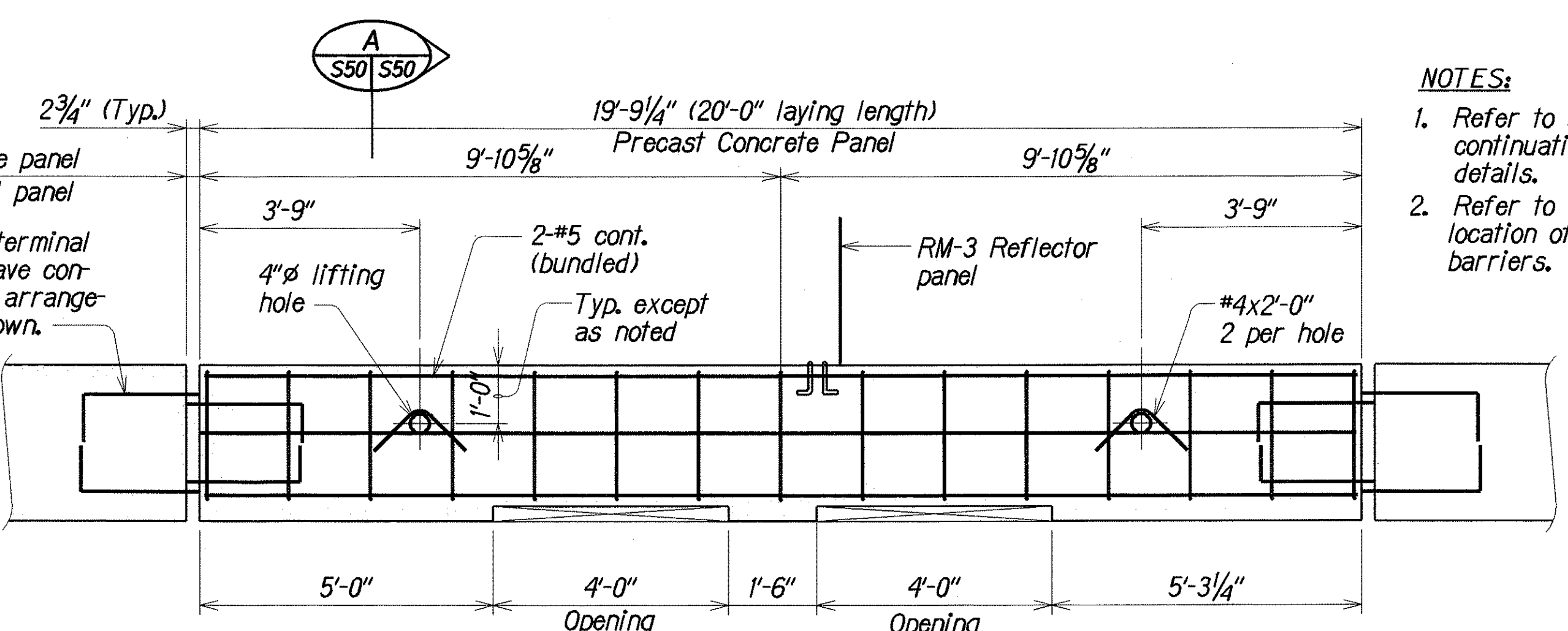
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HALAWA STREAM BRIDGE
CONCRETE BRIDGE RAIL (MAUKA SIDE)
THRIE BEAM & W-BEAM CONNECTION DETAIL
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)
Scale: As Noted Date: Aug. 2000

SHEET No. S48 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	89	105



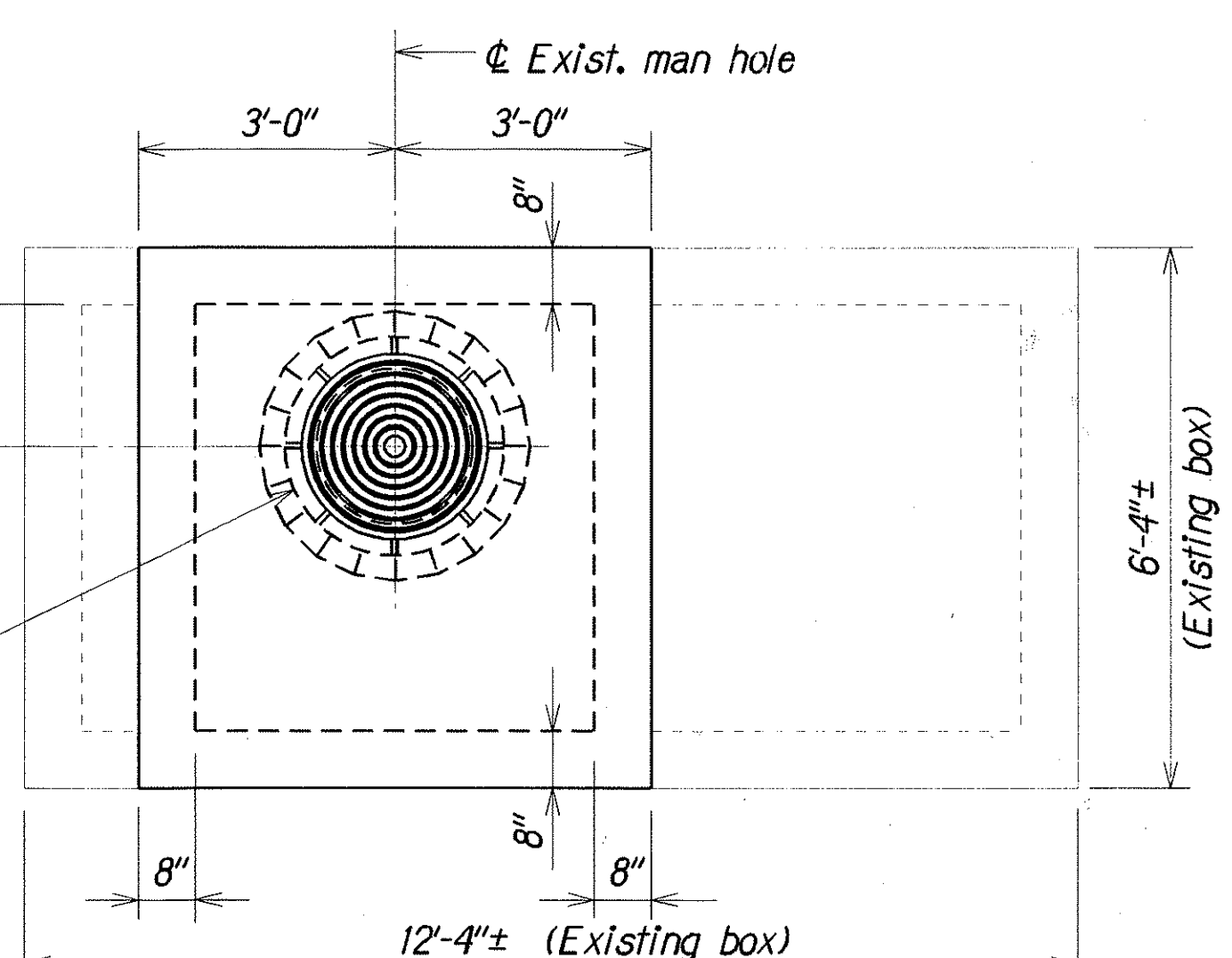
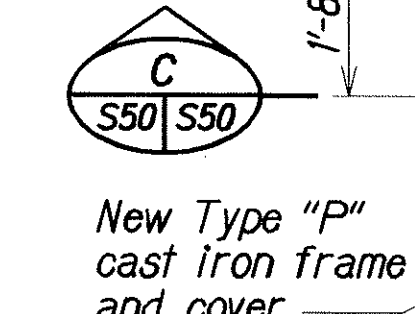
SECTION A
Scale: 1" = 1'-0"



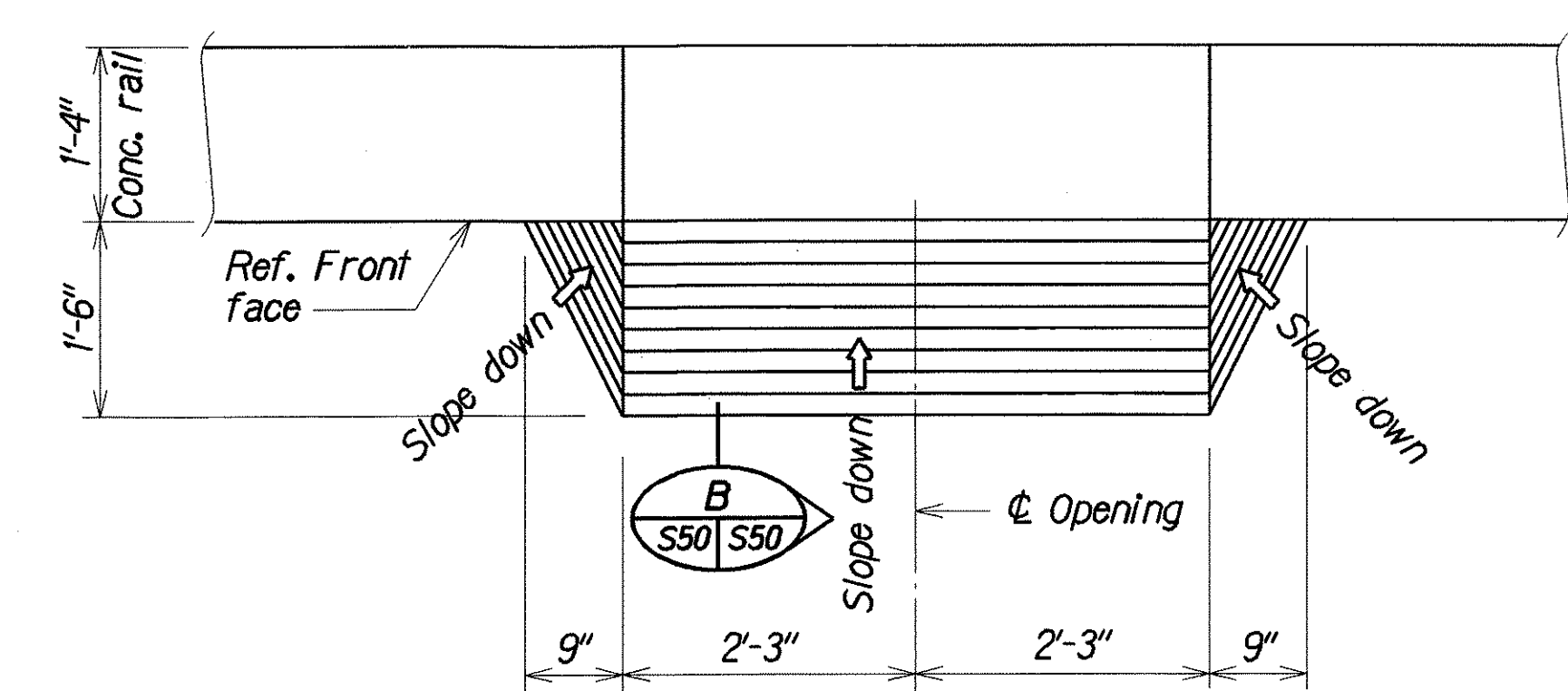
ELEVATION
Scale: 1/2" = 1'-0"

MODIFIED TYPE 4 TEMPORARY BARRIER

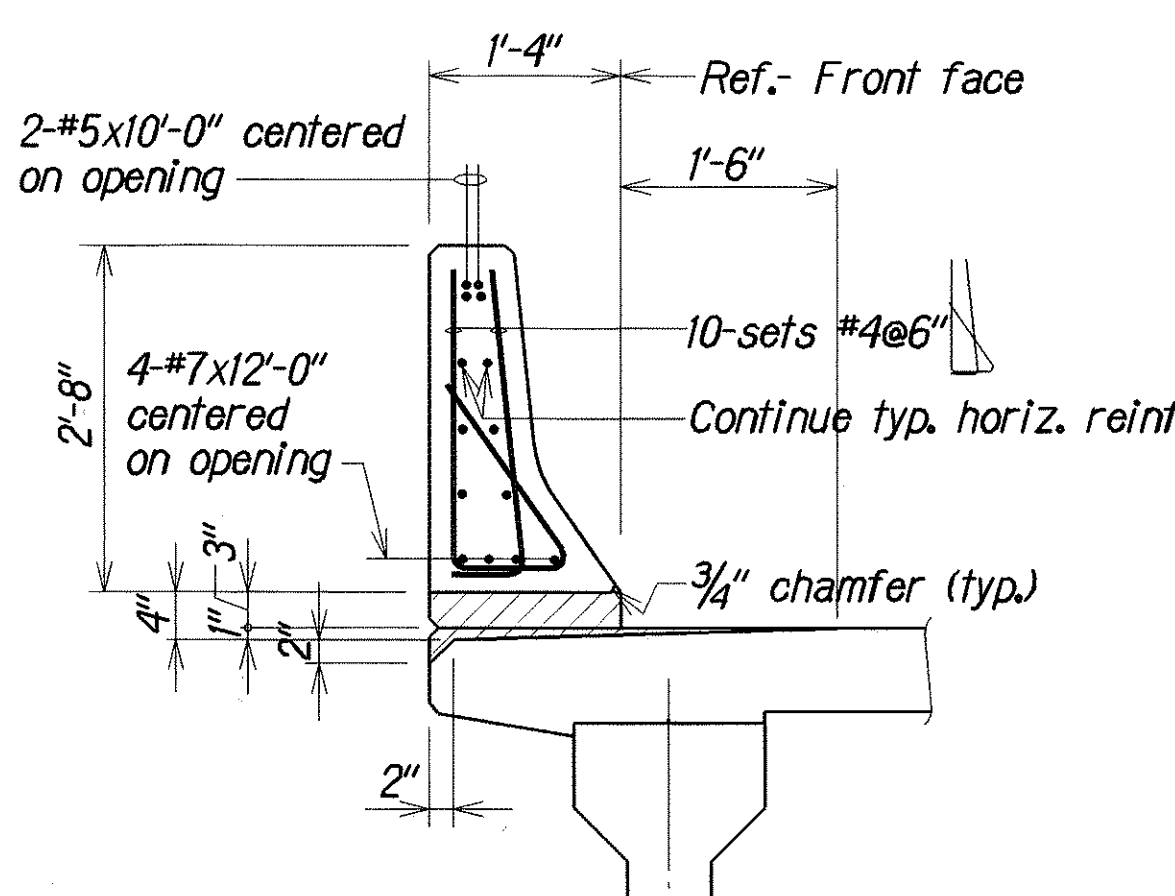
- NOTES:**
1. Refer to Std. Plan TE-64 for continuation of barriers and details.
 2. Refer to civil drawings for location of modified temporary barriers.



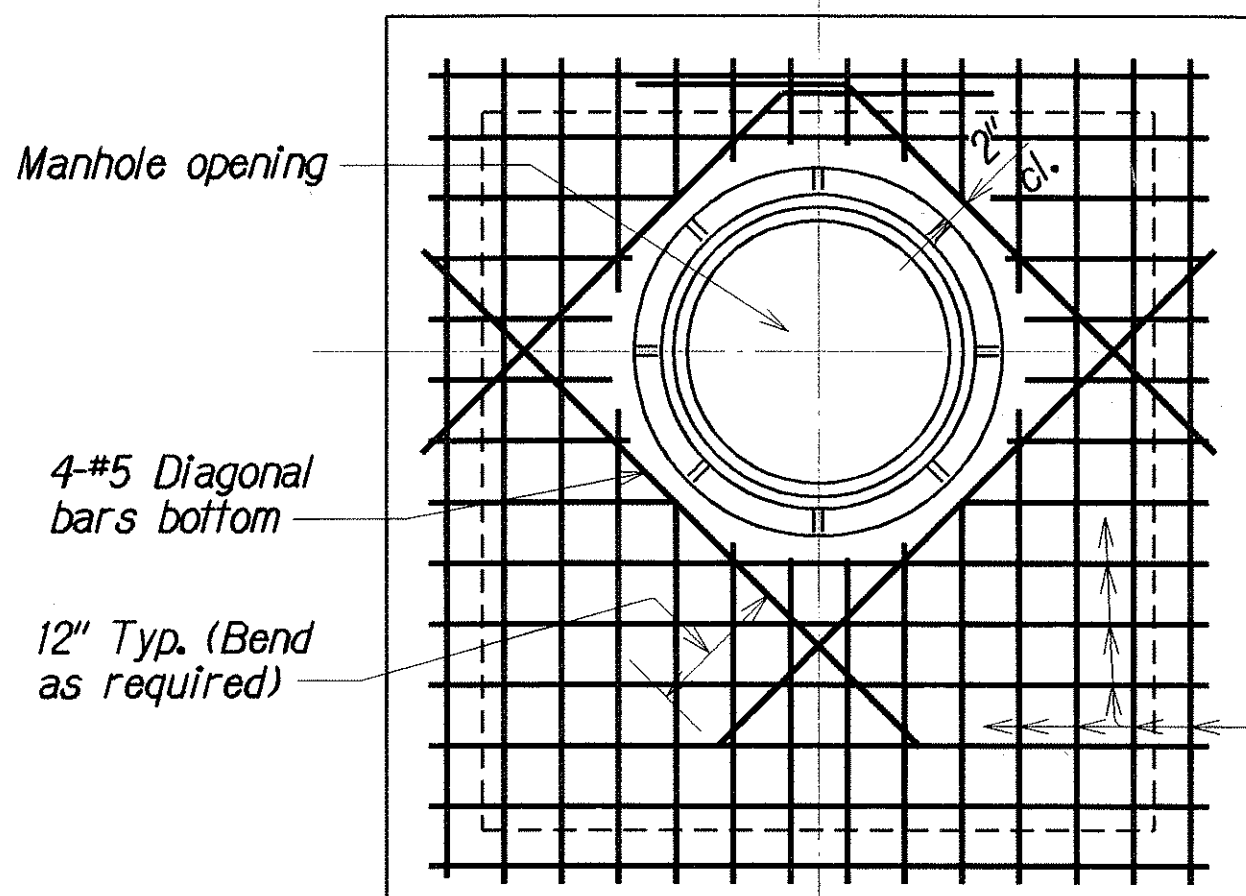
PLAN
Scale: 1/4" = 1'-0"



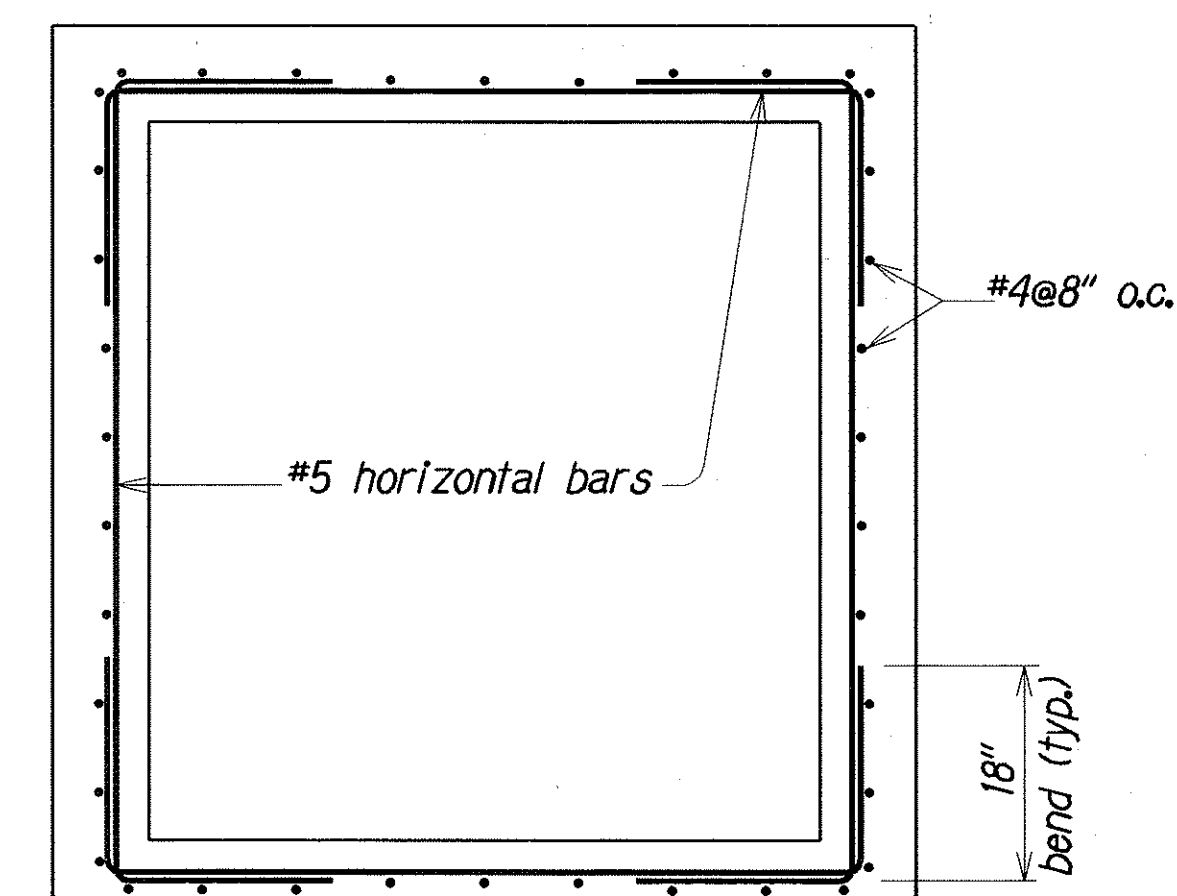
PARTIAL PLAN



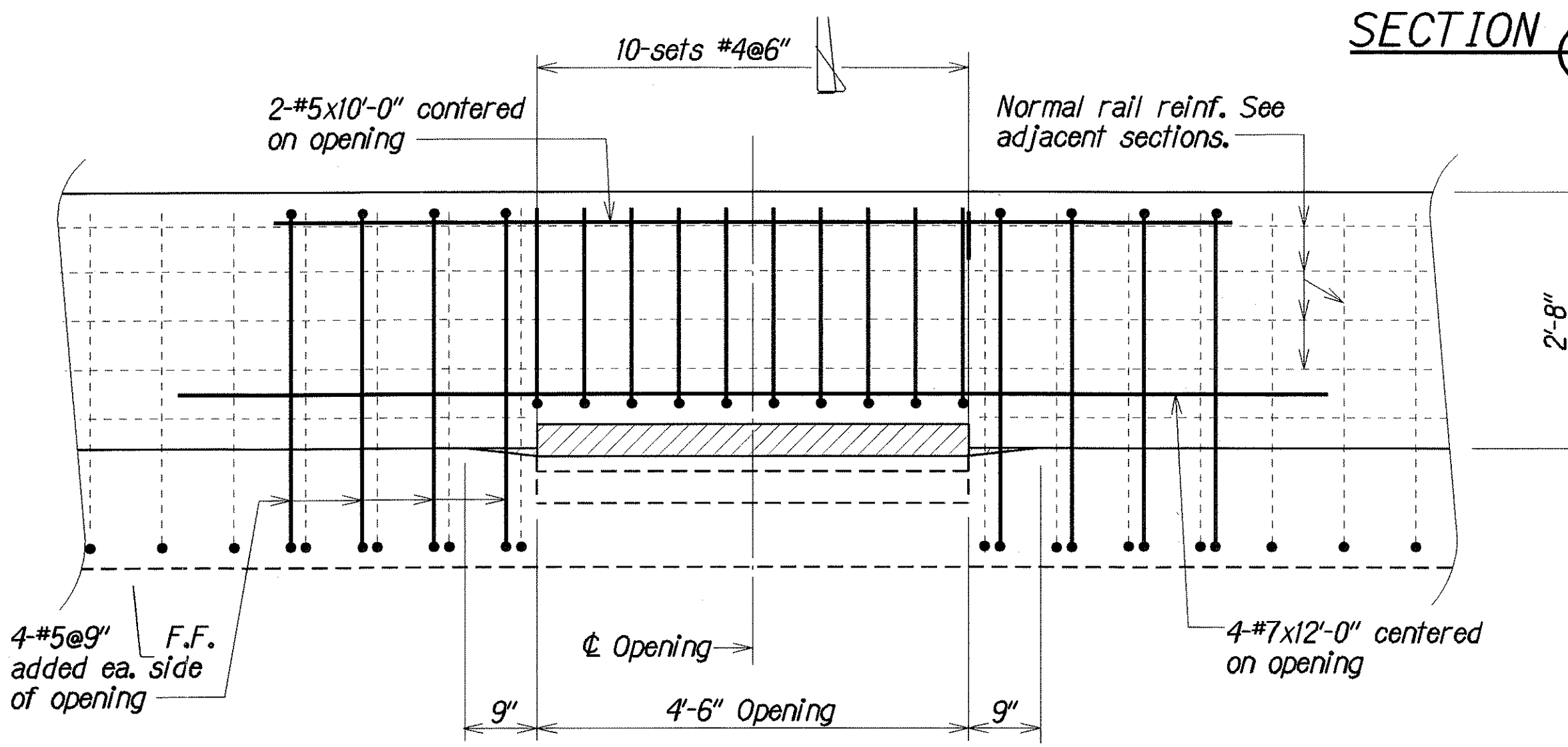
SECTION B
Scale: 1/4" = 1'-0"



PLAN (TOP SLAB REINFORCING)
Scale: 3/4" = 1'-0"



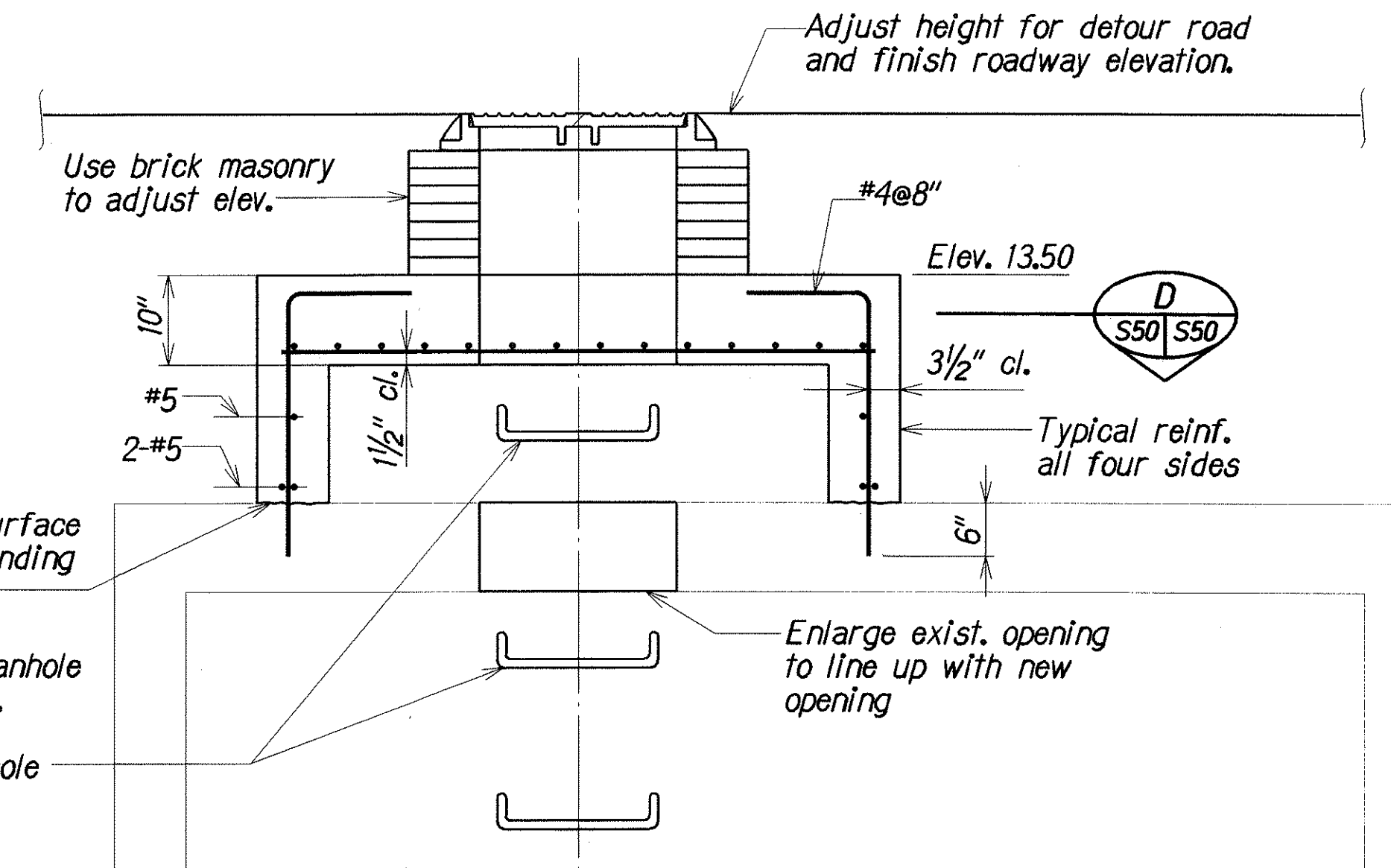
SECTION D
Scale: 3/4" = 1'-0"



PARTIAL ELEVATION

DECK DRAIN DETAILS

Scale: 3/4" = 1'-0"

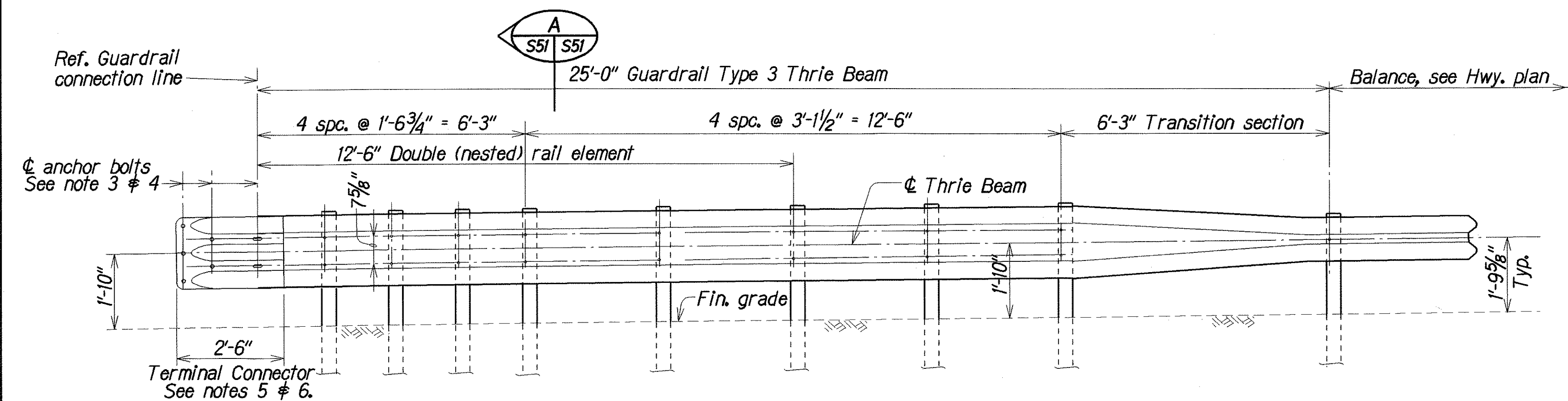


SECTION C
Scale: 3/4" = 1'-0"

MANHOLE DETAILS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HALAWA STREAM BRIDGE
DECK DRAIN DETAILS, MANHOLE DETAILS
& MODIFIED TYPE 4 TEMPORARY BARRIER
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)
Scale: As Noted Date: Aug. 2000

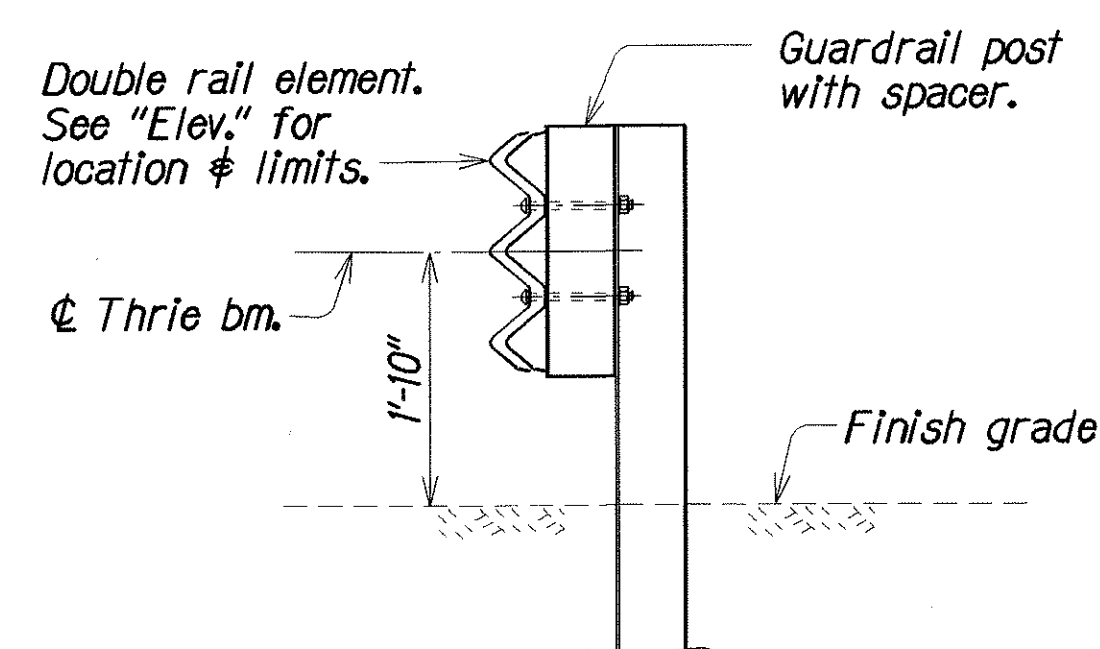
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	90	105



ELEVATION

TYPICAL TYPE 3 THRIE BEAM METAL GUARDRAIL

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



SECTION

Scale: 3/4"=1'-0"

NOTES:

1. The work necessary to connect guardrail to concrete end post shall include all labor, materials, tools, equipment and incidentals necessary to complete the work and shall be incidental to Guardrail Type 3 Thrie Beam on Steel Post and will not be paid for separately.
2. Terminal connector, Thrie Beam Metal Guardrail and Transition Section shall be fabricated from 10 gauge steel conforming to the requirements of AASHTO M 180, Class B, Type II and shall be hot-dip galvanized after fabrication.
3. All anchor bolts shall be high strength bolts conforming to the requirements of ASTM 325 and Standard Specification, Section 713.04.
4. Anchor bolt length shall be such that a snug fit of the elements and full thread engagement plus 1/4" (max) is attained.
5. "Terminal Connector" shall be fabricated from 10 gauge steel conforming to the requirements of AASHTO M 180.
6. "Terminal Connector" and standard spacer, including all anchor bolts, cap PL, nuts and washers, shall be hot-dip galvanized after fabrication.
7. Cap PL shall be fabricated from ASTM A 36.
8. First 25'-0" of guardrail adjoining "Terminal Connector" shall be galvanized steel and supports spaced as shown on the detail drawings. This section of rail shall be placed on tangent to end post or parallel to roadway, unless conditions at site renders it impossible to do so. Flare point to be determined in field.
9. Double (nest 1st panel) thrie beam elements at all end post connections.
10. Where double (nested) beam occur, 12" "Back-up Plate" not required.
11. Heads of through anchor bolts shall be placed on the traffic side of the rail.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	08/19/94
2nd	DESIGNED BY	08/19/94
	QUANTITIES BY	08/19/94
	CHECKED BY	08/19/94

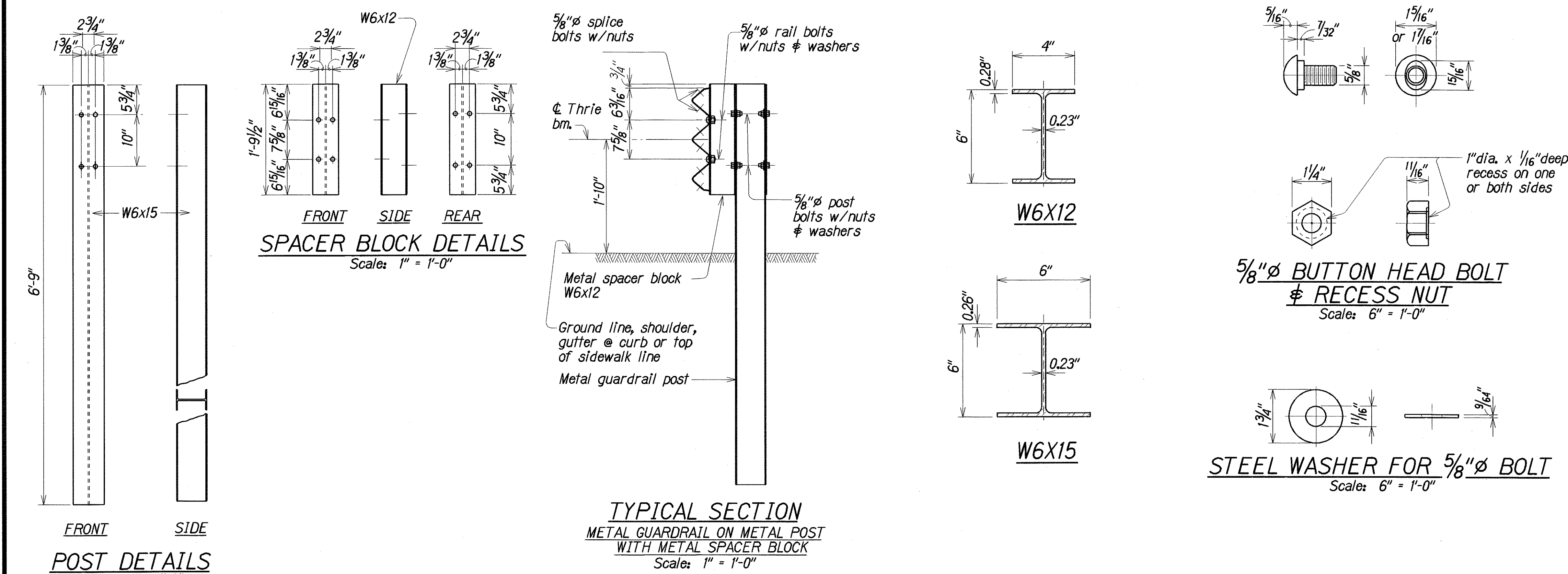
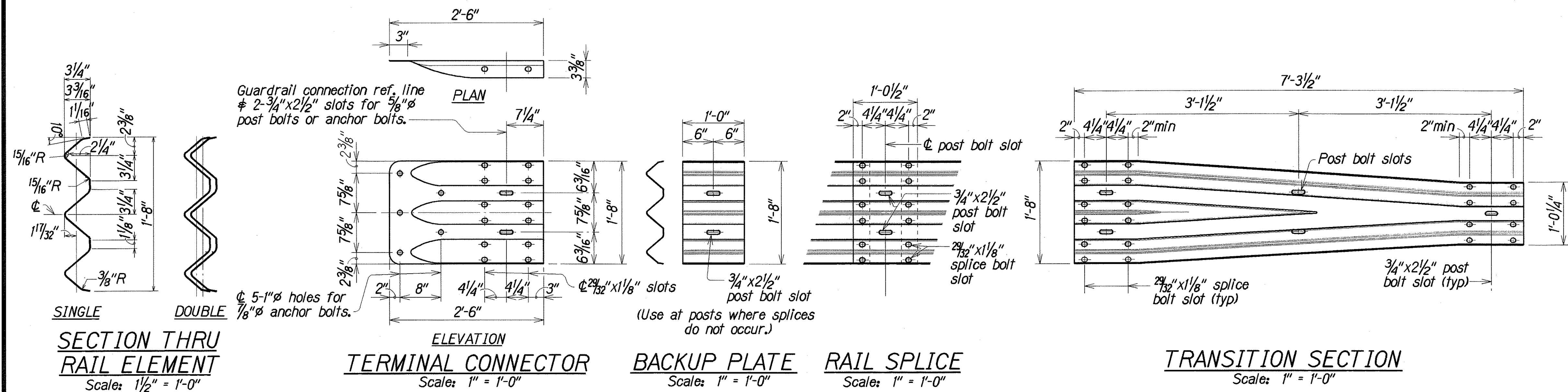
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
TYPICAL TYPE 3 THRIE BEAM
METAL GUARDRAIL
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

SHEET No. 551 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	91	105



METAL GUARDRAIL TYPE 3 THRIE BEAM AND APPURTENANCES DETAILS

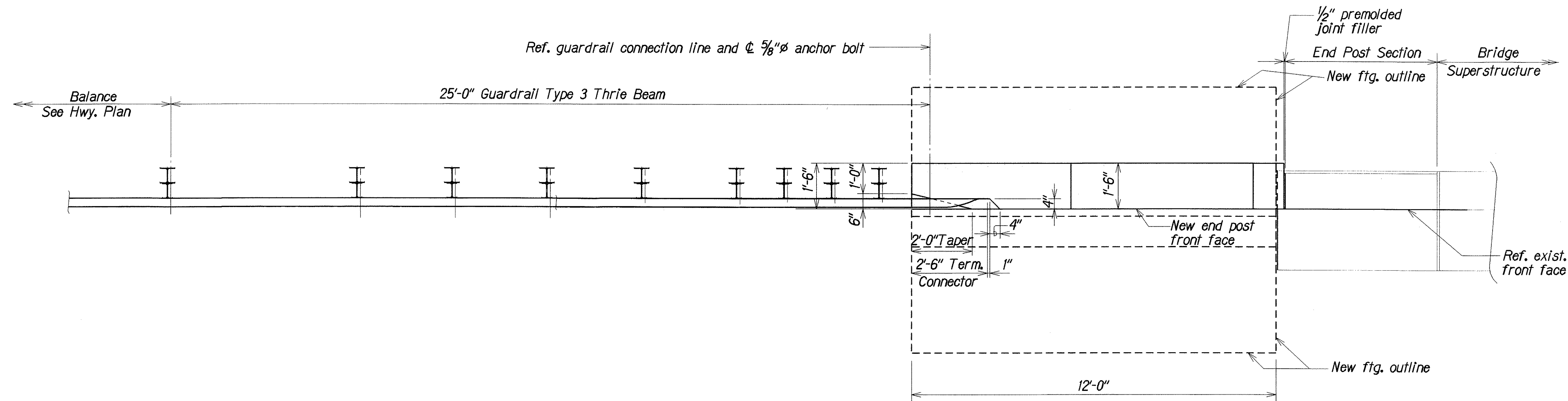
ORIGINAL PLAN	DATE
DESIGNED BY	JUN 2000
DESIGNED BY	JUN 2000
QUANTITIES BY	JUN 2000
CHECKED BY	JUN 2000

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

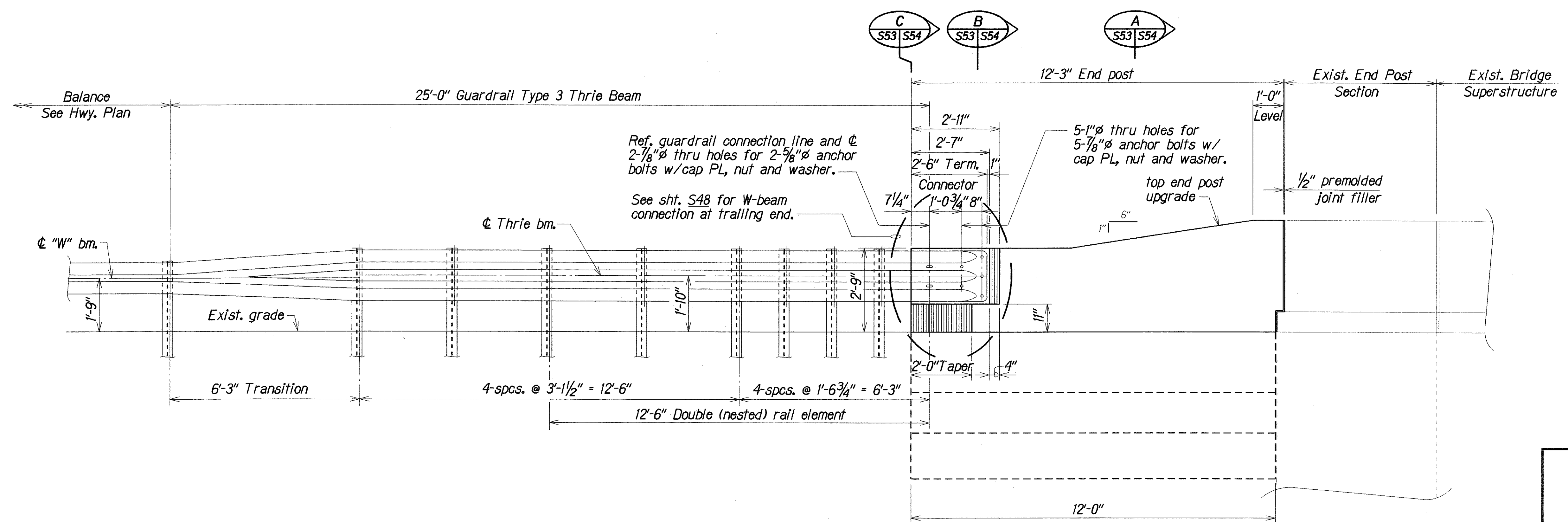
HALAWA STREAM BRIDGE
TYPICAL METAL GUARDRAIL TYPE 3
THRIE BEAM AND APPURTENANCES DETAILS
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	92	105



PLAN



ELEVATION

TYPICAL PLAN AND ELEVATION

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	AUG. 2000
QUANTITIES BY	DESIGNED BY	AUG. 2000
CHECKED BY	NOTED BY	AUG. 2000

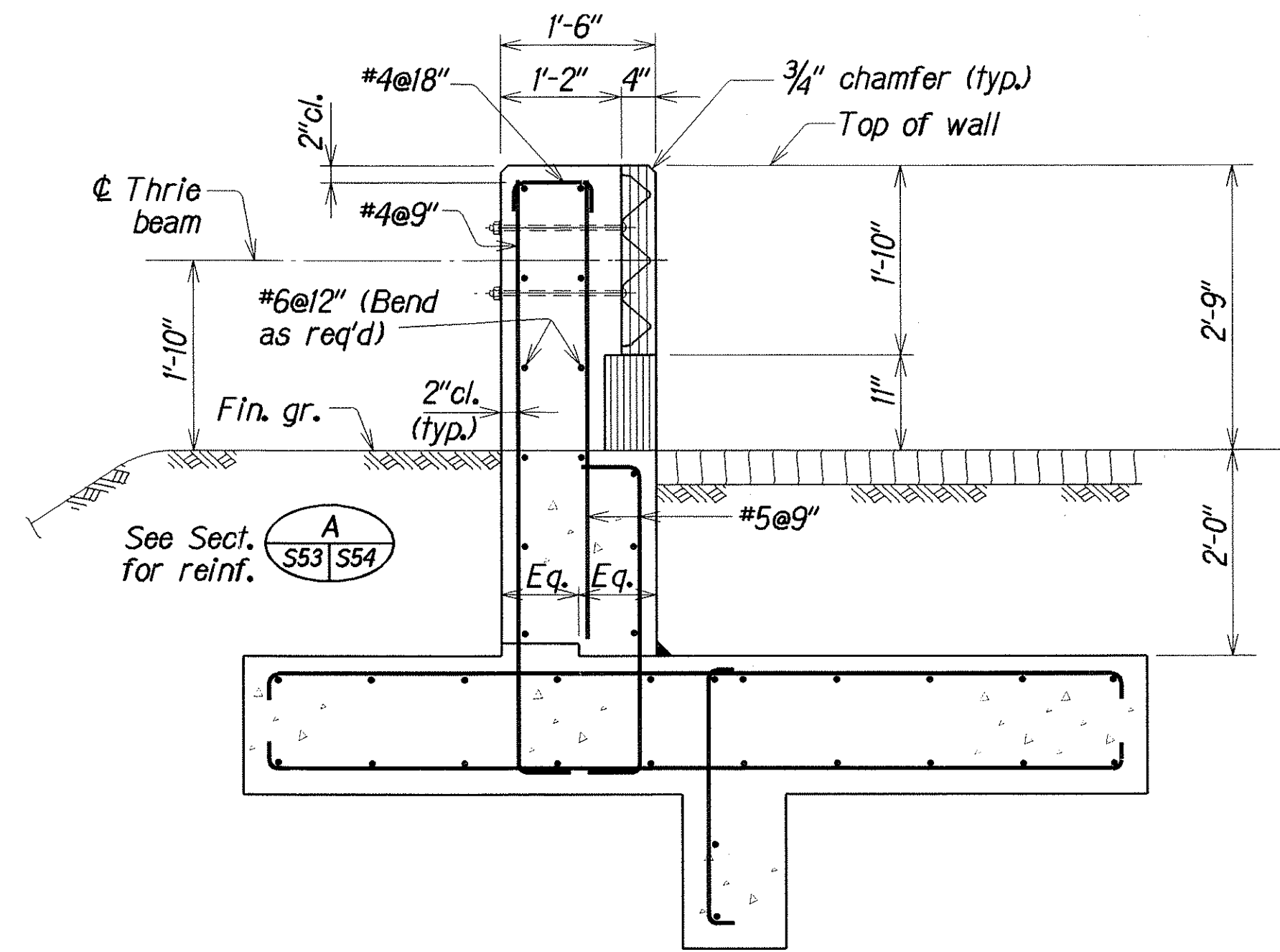
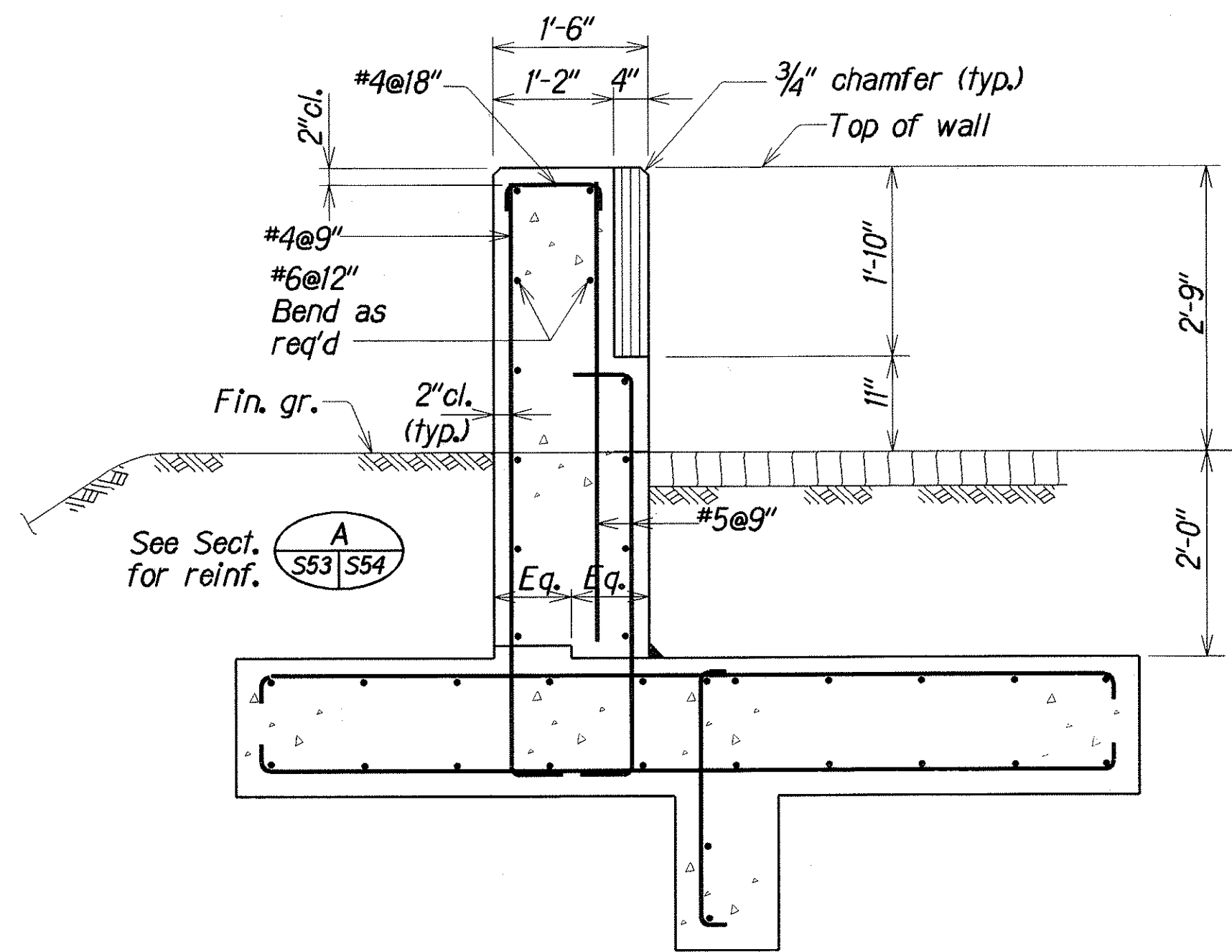
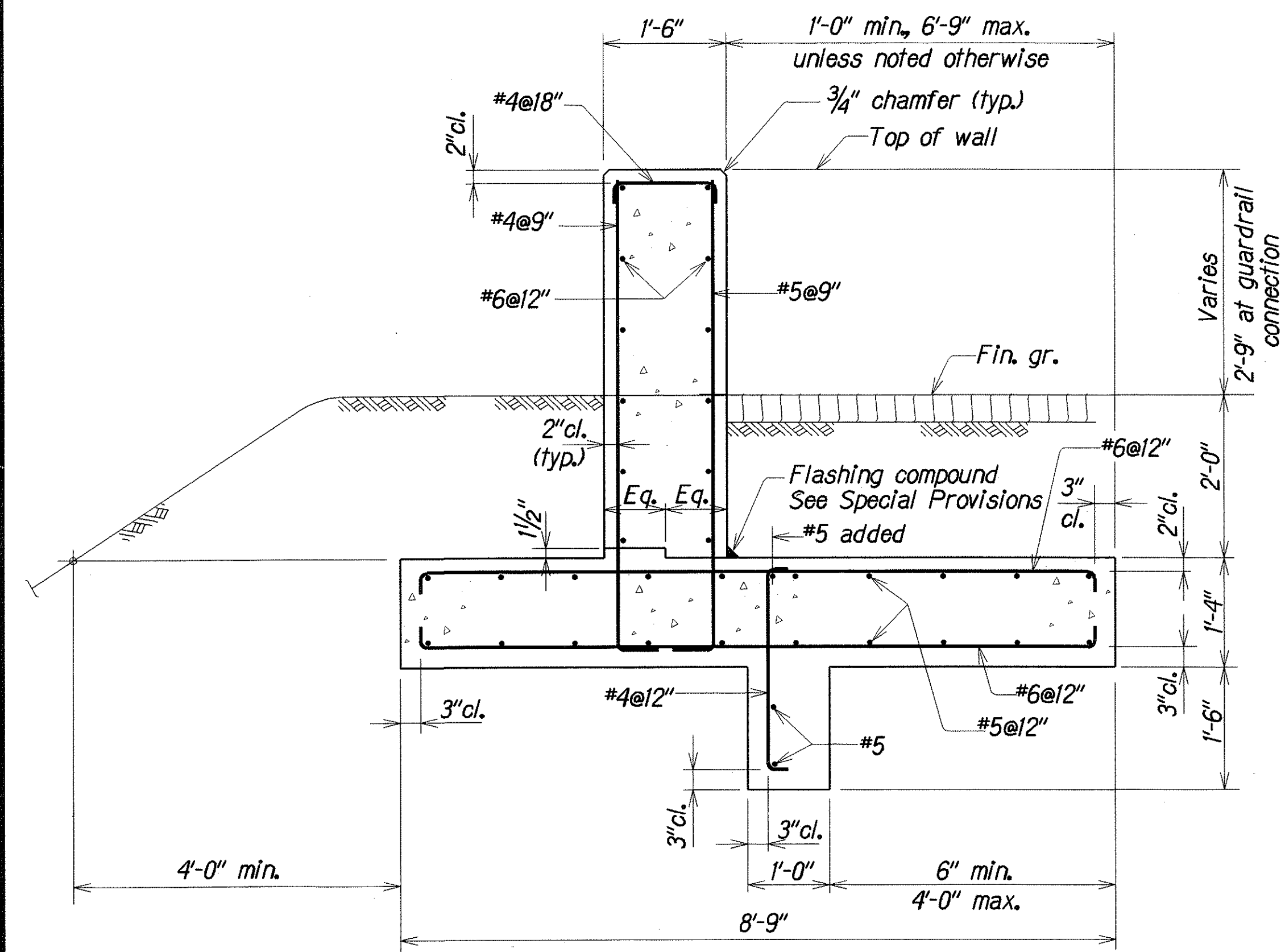
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
END POST AT OUTBOUND BRIDGE
PLAN AND ELEVATION
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)

Scale: As Noted Date: Aug. 2000

SHEET No. S53 OF 57 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	93	105

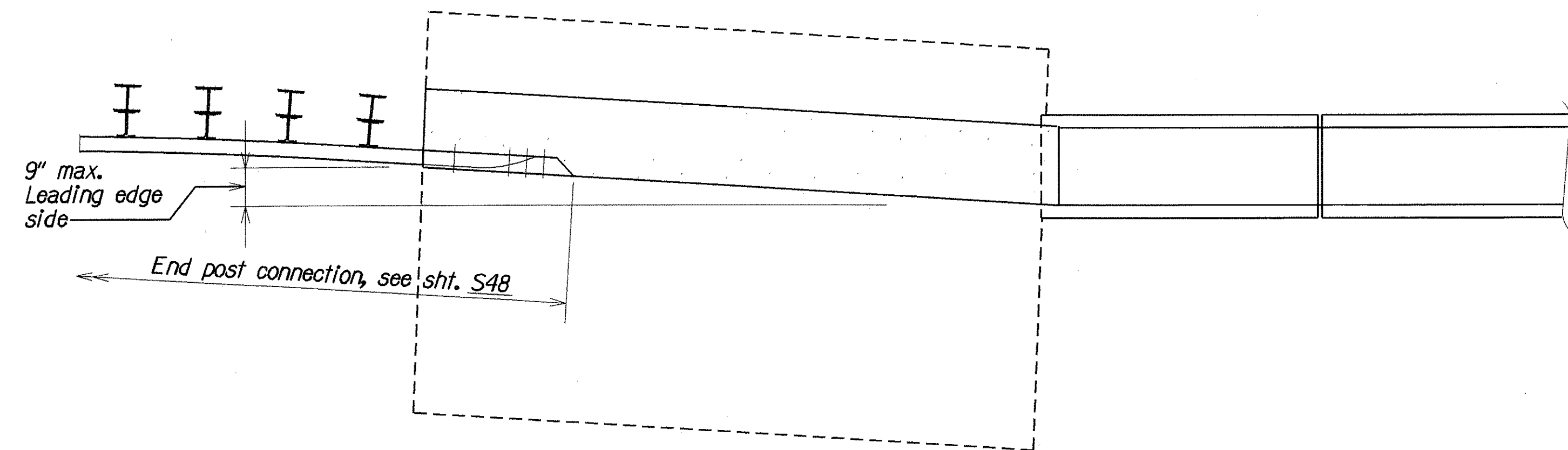


SECTION A
S53 S54

SECTION B
S53 S54

SECTION C
S53 S54

END POST SECTIONS
Scale: 3/4" = 1'-0"



PLAN
Scale: 1/2" = 1'-0"

ORIGINAL PLAN	DATE
DESIGNED BY	DATE
CHECKED BY	DATE
NOTED BY	DATE
APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALAWA STREAM BRIDGE
END POST AT HALAWA BRIDGE OUT BOUND
SECTIONS
KAMEHAMEHA HIGHWAY
HALAWA STREAM BRIDGE REPLACEMENT
Federal Aid Project No. BR-099-1(19)
Scale: As Noted Date: Aug. 2000