

S U M M A R Y

PROJECT : HANAMAULU VIADUCT

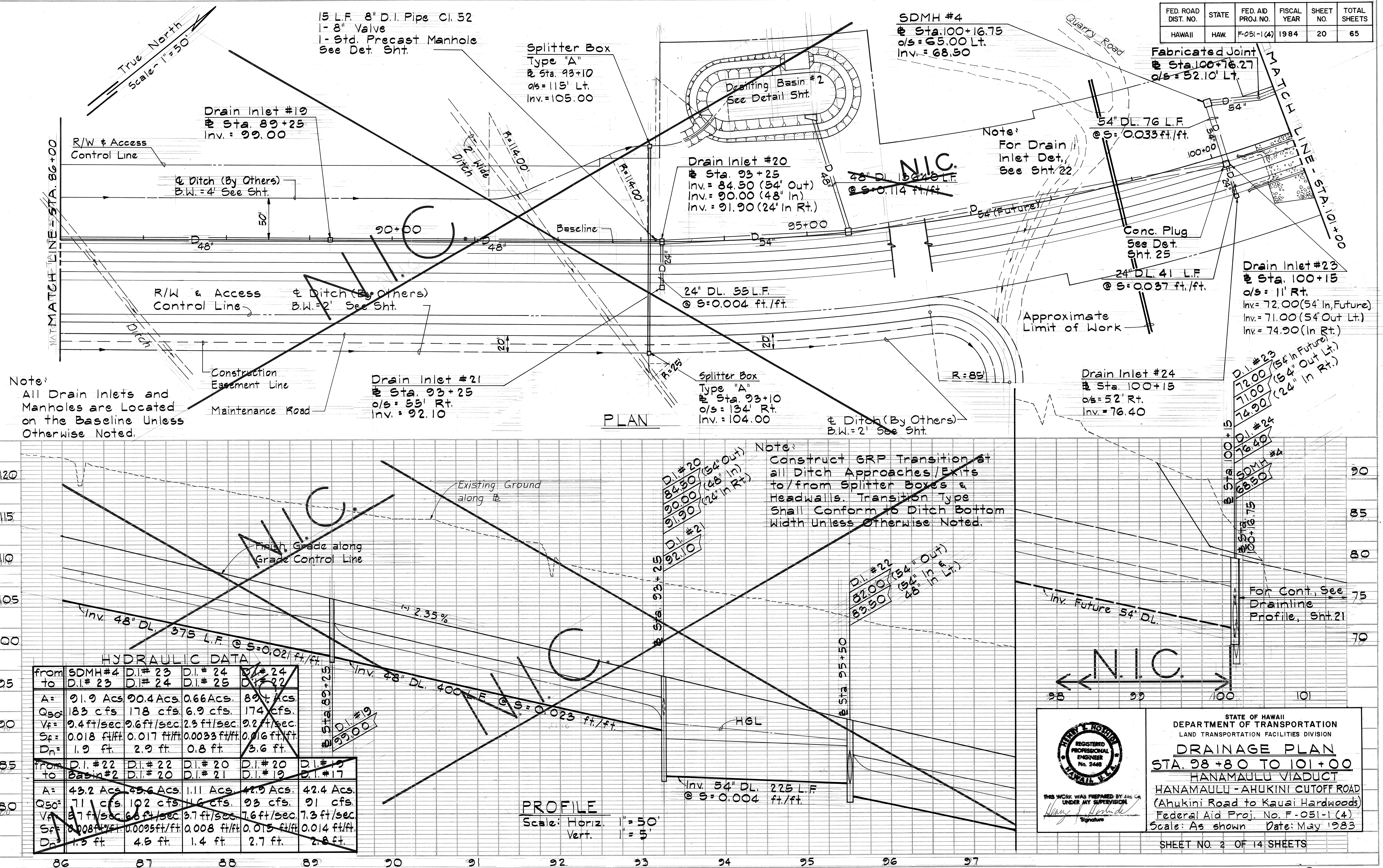
PROJECT NO.: F - 051 - 1(4)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-051-1(4)	1984	19	65

[illegible]

PLAN		BY	DATE
	SURVEYED		
	PLOTTED		
	ALIGNMENT CHECKED		
	RT. OF WAY CHECKED		
NOTE BOOK NO. _____			

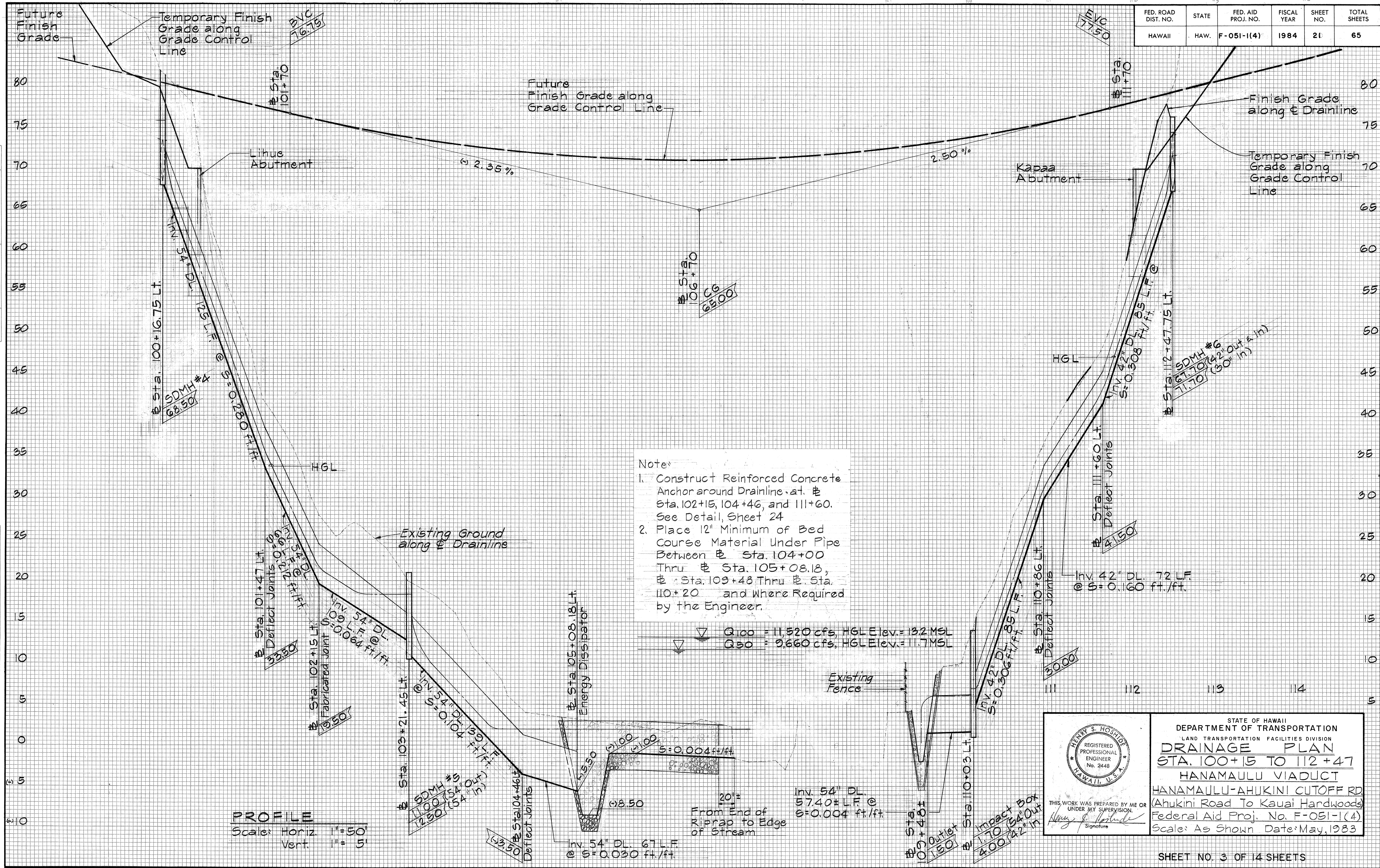
PROFILE		BY	DATE
SURVIVED			
PLOTTED			
GRADES CHECKED			
NOTE BOOK			
B. M.'S NOTED			
N.O.			
STRUCTURE NOTATION'S CH'KD.			



FINAL SURVEY	DATE
SURVEYED	
PLOTTED	
NOTE BOOK	
NO.	

ORIGINAL SURVEY	DATE
SURVEYED	
PLOTTED	
NOTE BOOK	
NO.	

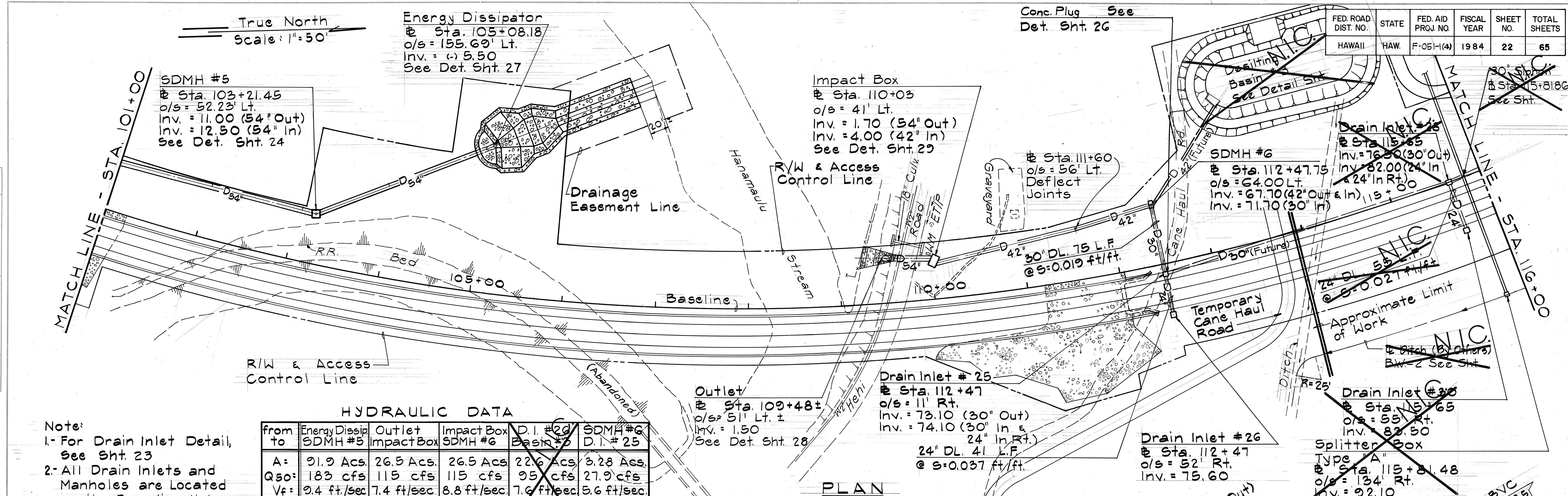
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-051-1(4)	1984	21	65



PLAN	SURVEYED	DATE
NO.	BY	
	ALIGNED	
	RT. OF WAY CHECKED	

PROFILE	SURVEYED	DATE
NO.	BY	
	GRADES CHECKED	
	B.M.'S NOTED	
	STRUCTURE NOTATIONS CHKD.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-051-1(4)	1984	22	65

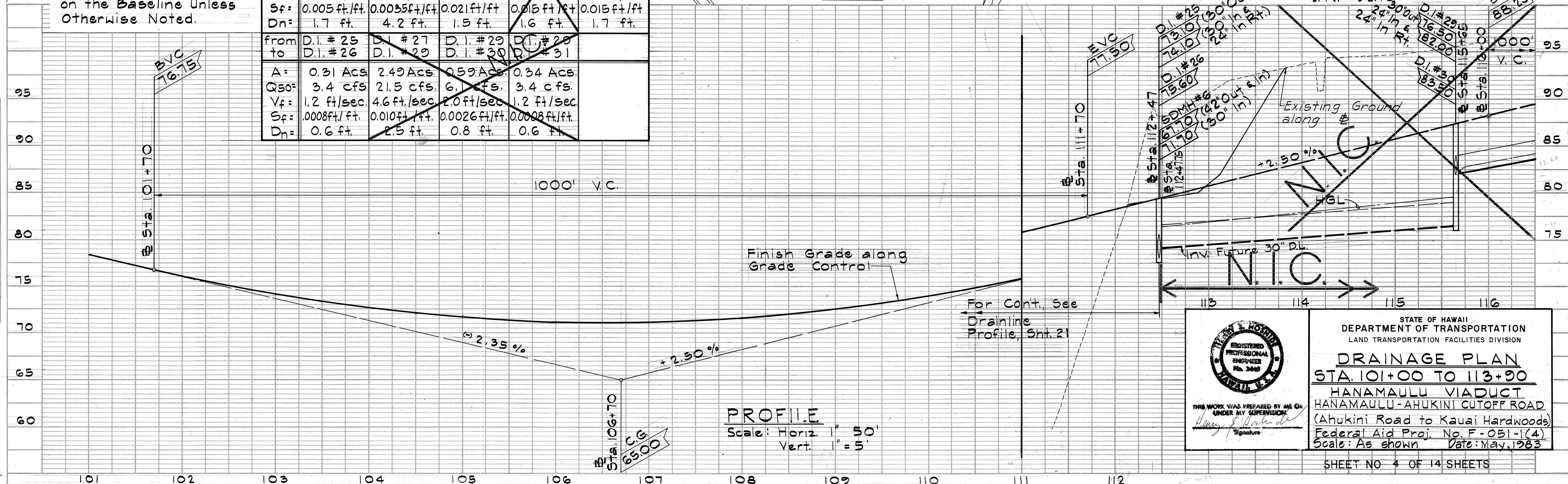


Note:
1- For Drain Inlet Detail, See Sht. 23
2- All Drain Inlets and Manholes are Located on the Baseline Unless Otherwise Noted.

HYDRAULIC DATA

from to	Energy Dissip. SDMH #5	Outlet Impact Box	Impact Box SDMH #6	D.I. #25 Basin #5	SDMH #6 D.I. #25
A=	91.9 Acs.	26.5 Acs.	26.5 Acs.	22.6 Acs.	3.28 Acs.
Q50=	183 cfs	115 cfs	115 cfs	95 cfs	27.9 cfs
Vf=	0.4 ft/sec	7.4 ft/sec	8.8 ft/sec	7.6 ft/sec	5.6 ft/sec.
Sf=	0.005 ft/ft.	0.0035 ft/ft.	0.021 ft/ft	0.015 ft/ft	0.015 ft/ft
Dn=	1.7 ft.	4.2 ft.	1.5 ft.	1.6 ft.	1.7 ft.

from to	D.I. #25 D.I. #26	D.I. #27 D.I. #29	D.I. #29 D.I. #30	D.I. #30 D.I. #31
A=	0.31 Acs.	2.49 Acs.	0.59 Acs.	0.34 Acs.
Q50=	3.4 cfs	21.5 cfs.	6.1 cfs.	3.4 cfs.
Vf=	1.2 ft/sec	4.6 ft./sec	2.0 ft/sec	1.2 ft/sec
Sf=	.0008 ft/ft.	0.010 ft/ft.	0.0026 ft/ft.	0.0008 ft/ft.
Dn=	0.6 ft.	2.5 ft.	0.8 ft.	0.6 ft.



PROFILE
Scale: Horiz. 1" = 50'
Vert. 1" = 5'

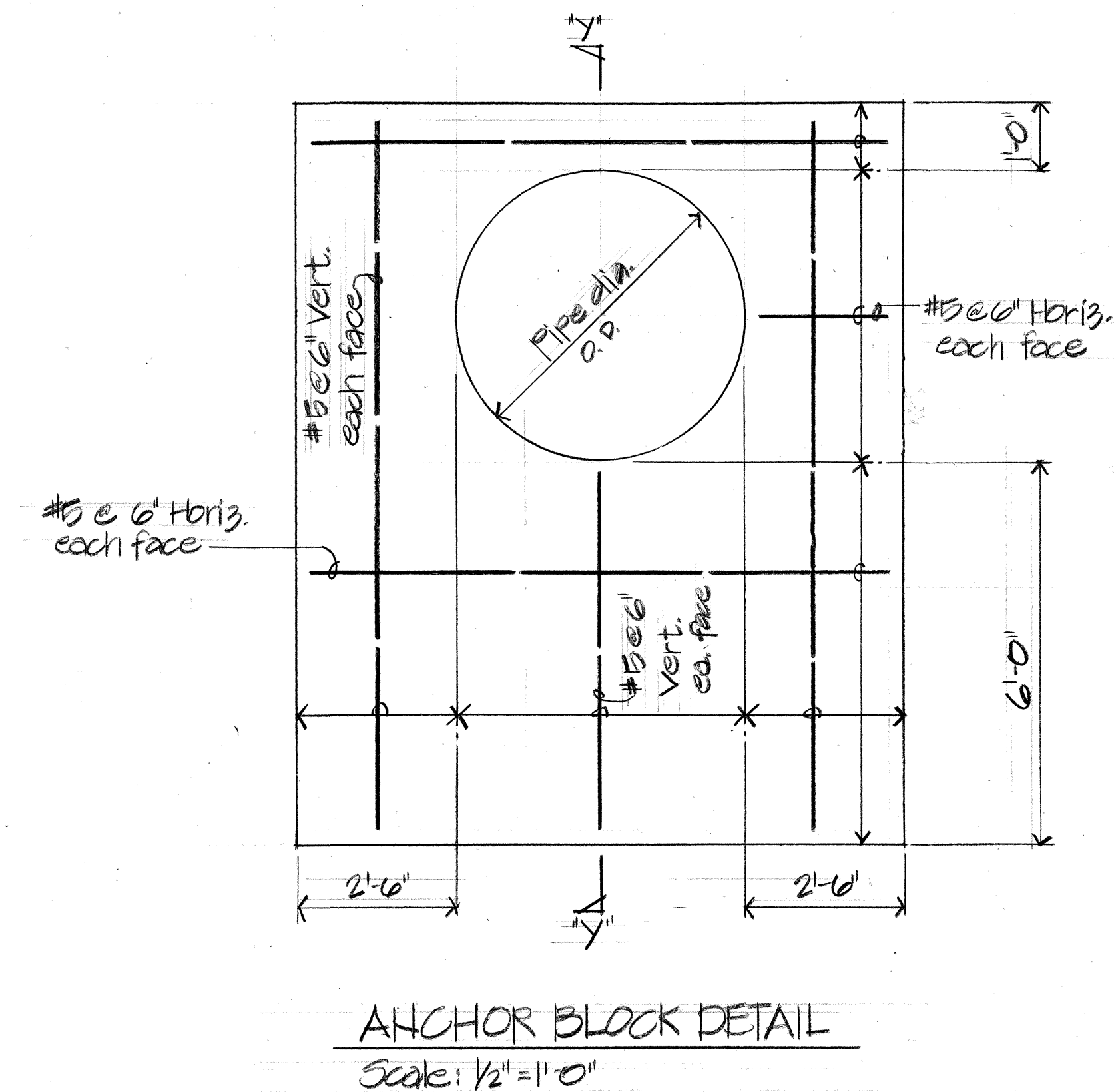
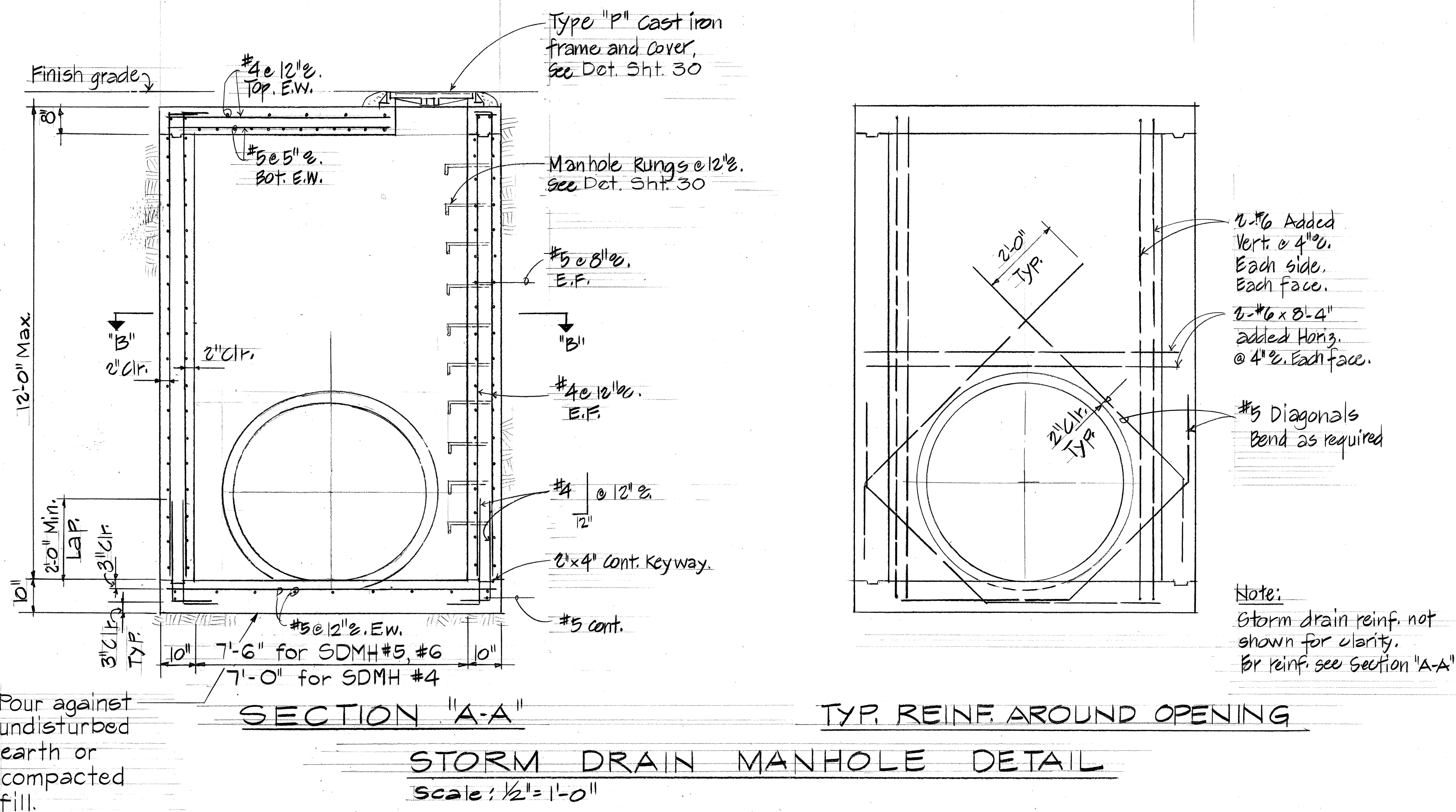
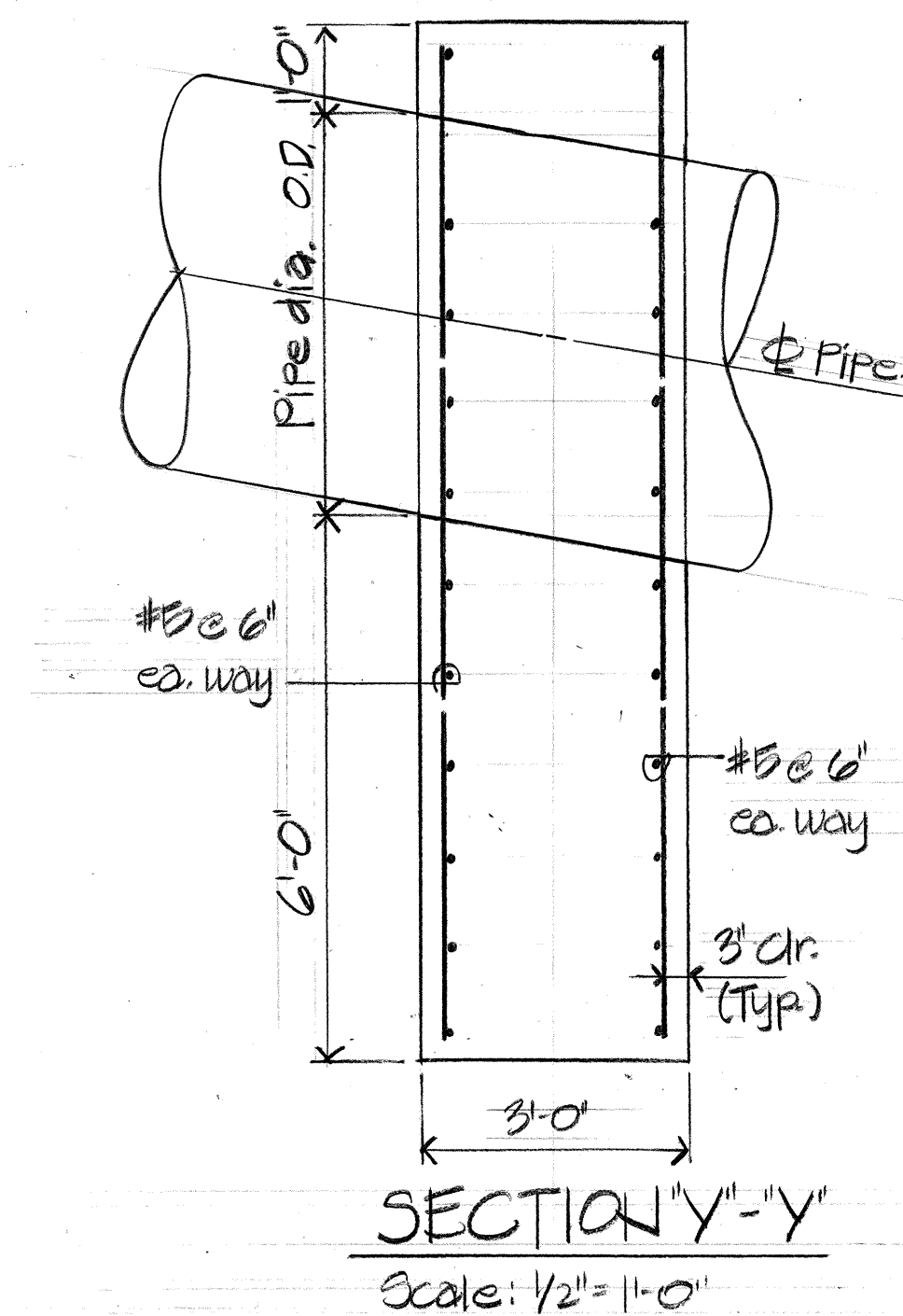
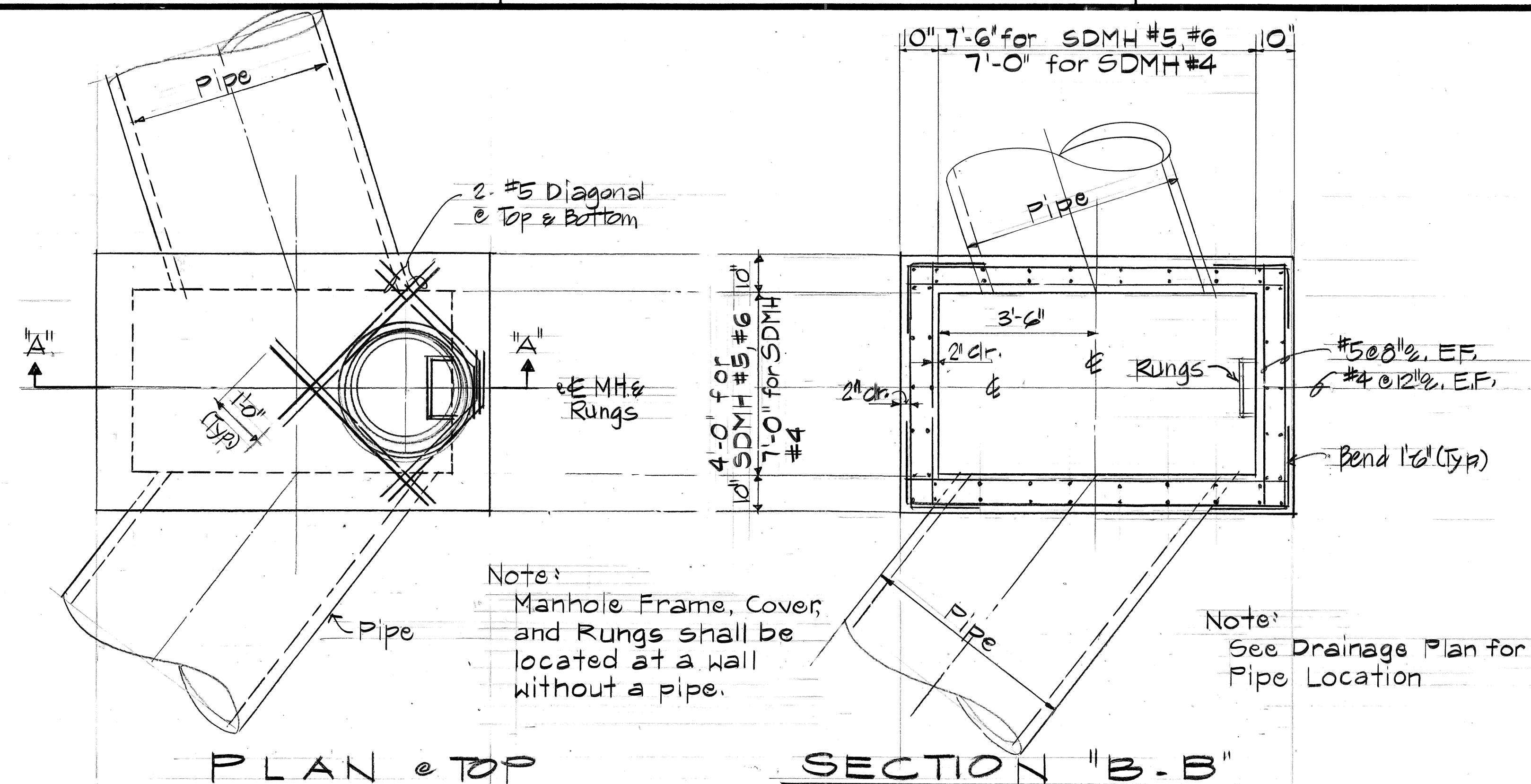
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
Signature
Date: May, 1983

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

DRAINAGE PLAN
STA. 101+00 TO 113+00
HANAMAULU VIADUCT
HANAMAULU-AHUKINI CUTOFF ROAD
(Ahukini Road to Kauai Hardwoods)
Federal Aid Proj. No. F-051-1(4)
Scale: As shown Date: May, 1983

SHEET NO. 4 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-051-1(4)	1984	24	65



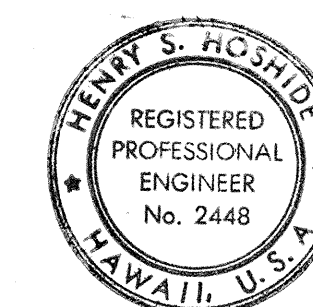
ORIGINAL PLAN	SURVEY PLOTTED BY _____	DATE _____
	DRAWN BY _____	" "
	TRACED BY _____	" "
NOTE BOOK	DESIGNED BY _____	" "
	QUANTITIES BY _____	" "
No. _____	CHECKED BY _____	" "

Pour against
undisturbed
earth or
compacted
fill.



THIS WORK WAS PREPARED BY ME OR

Myron Opule
Signature



THIS WORK WAS PREPARED BY ME
UNDER MY SUPERVISION.
Harry S. Smith
Signature

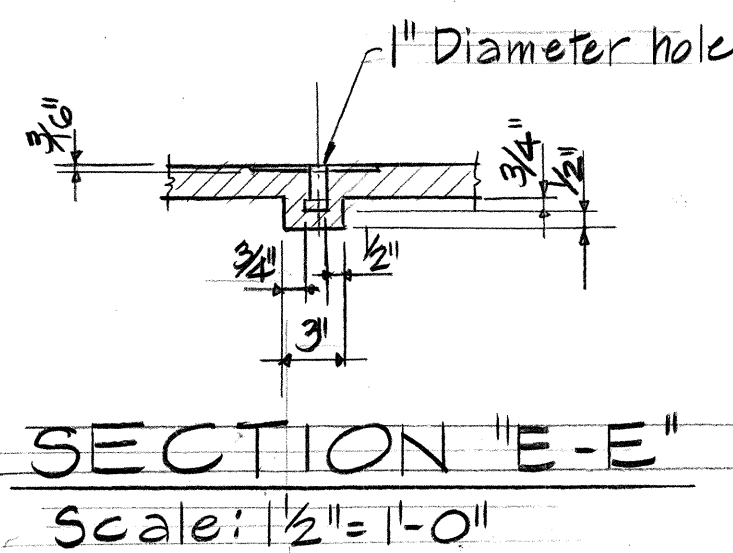
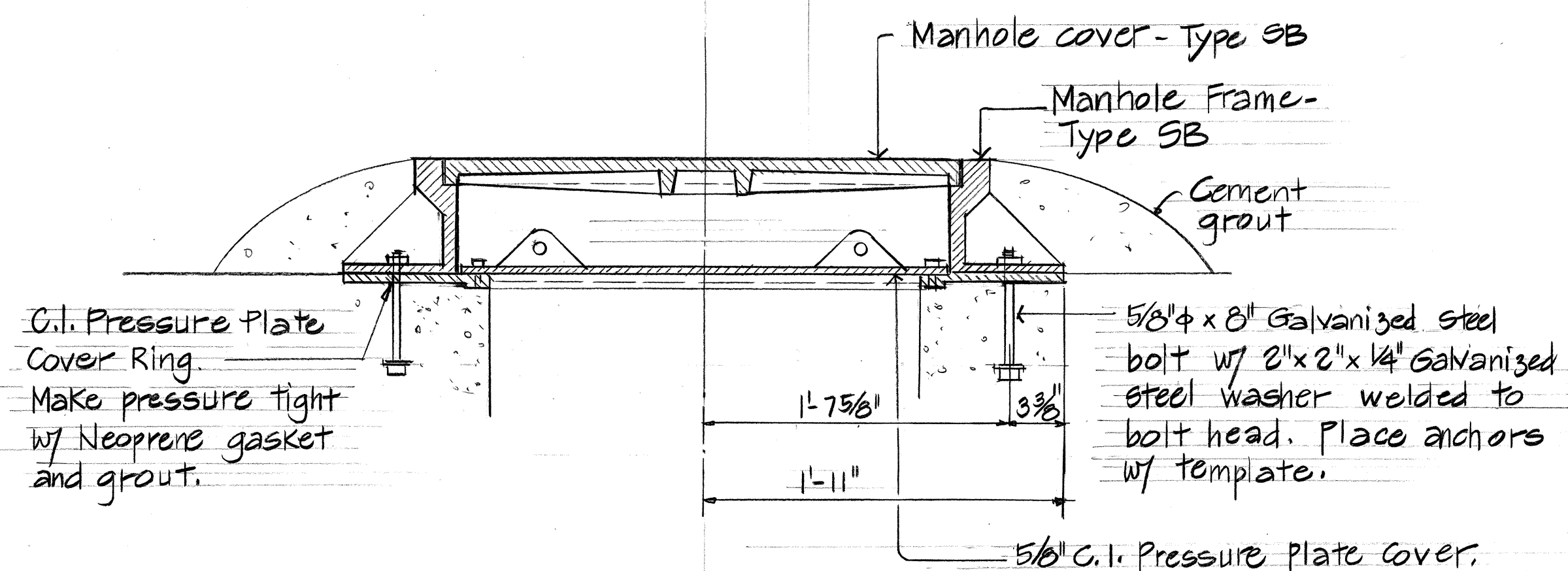
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STORM DRAIN MANHOLE DETAILS

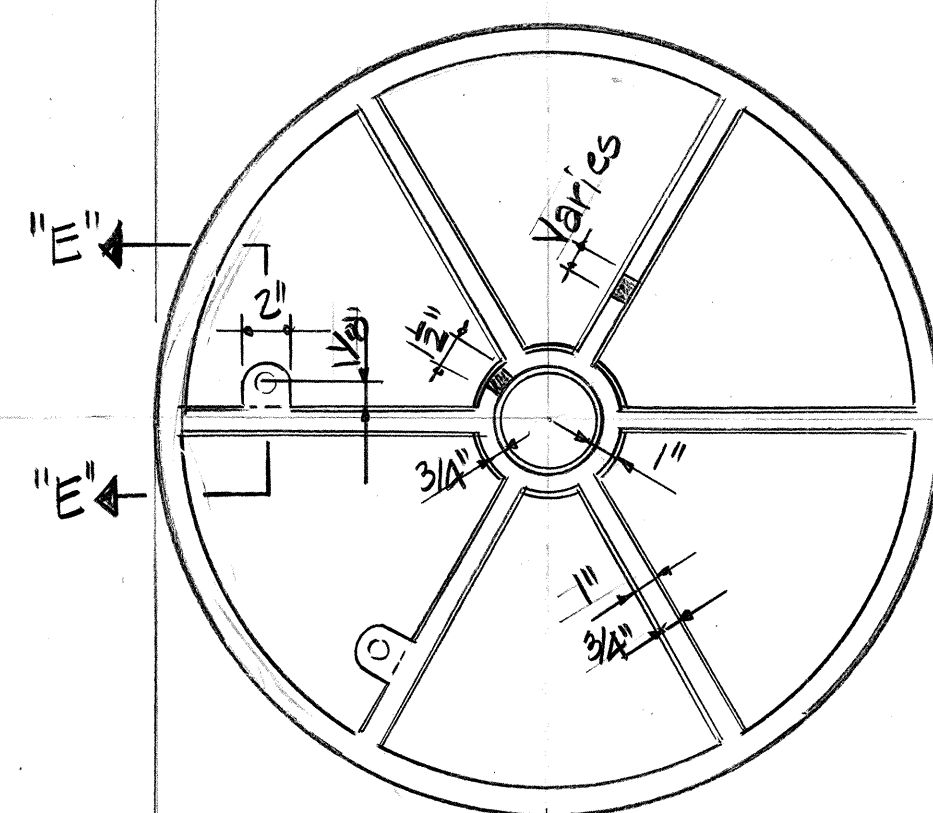
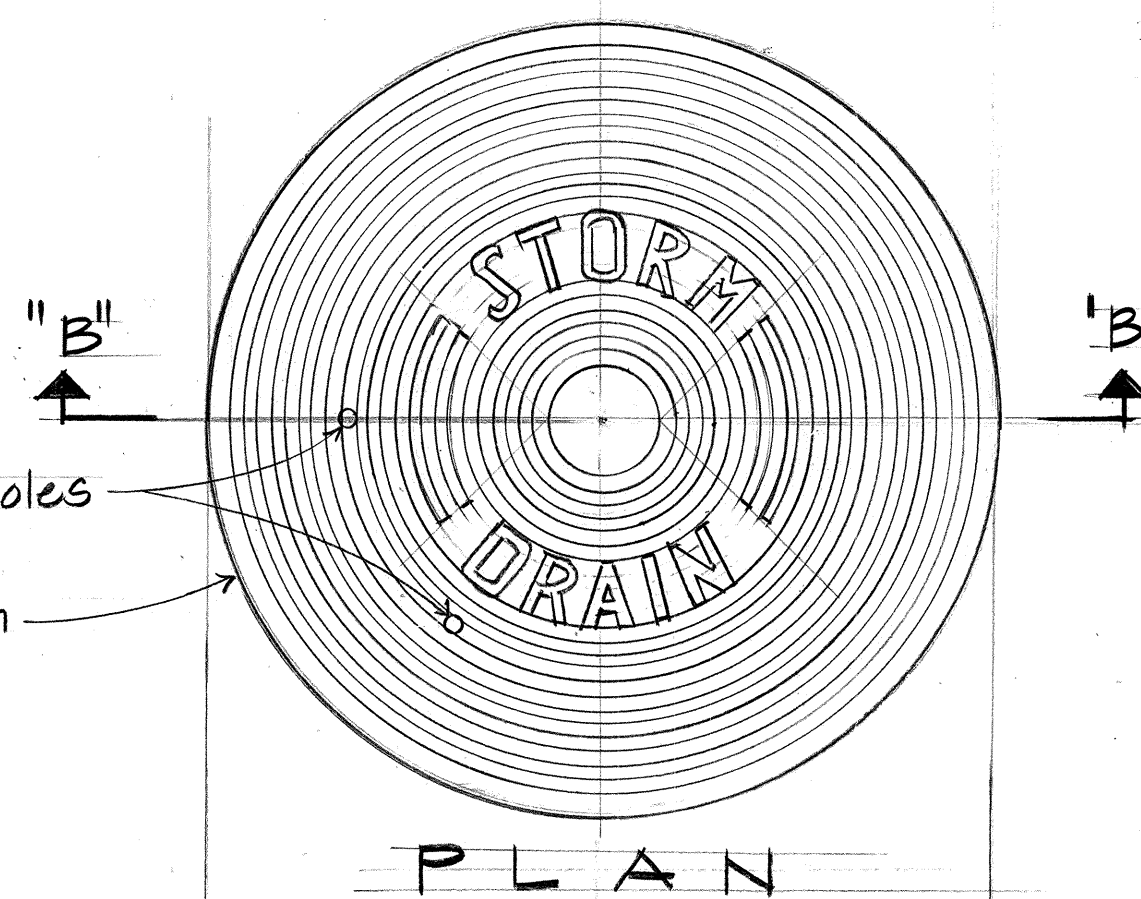
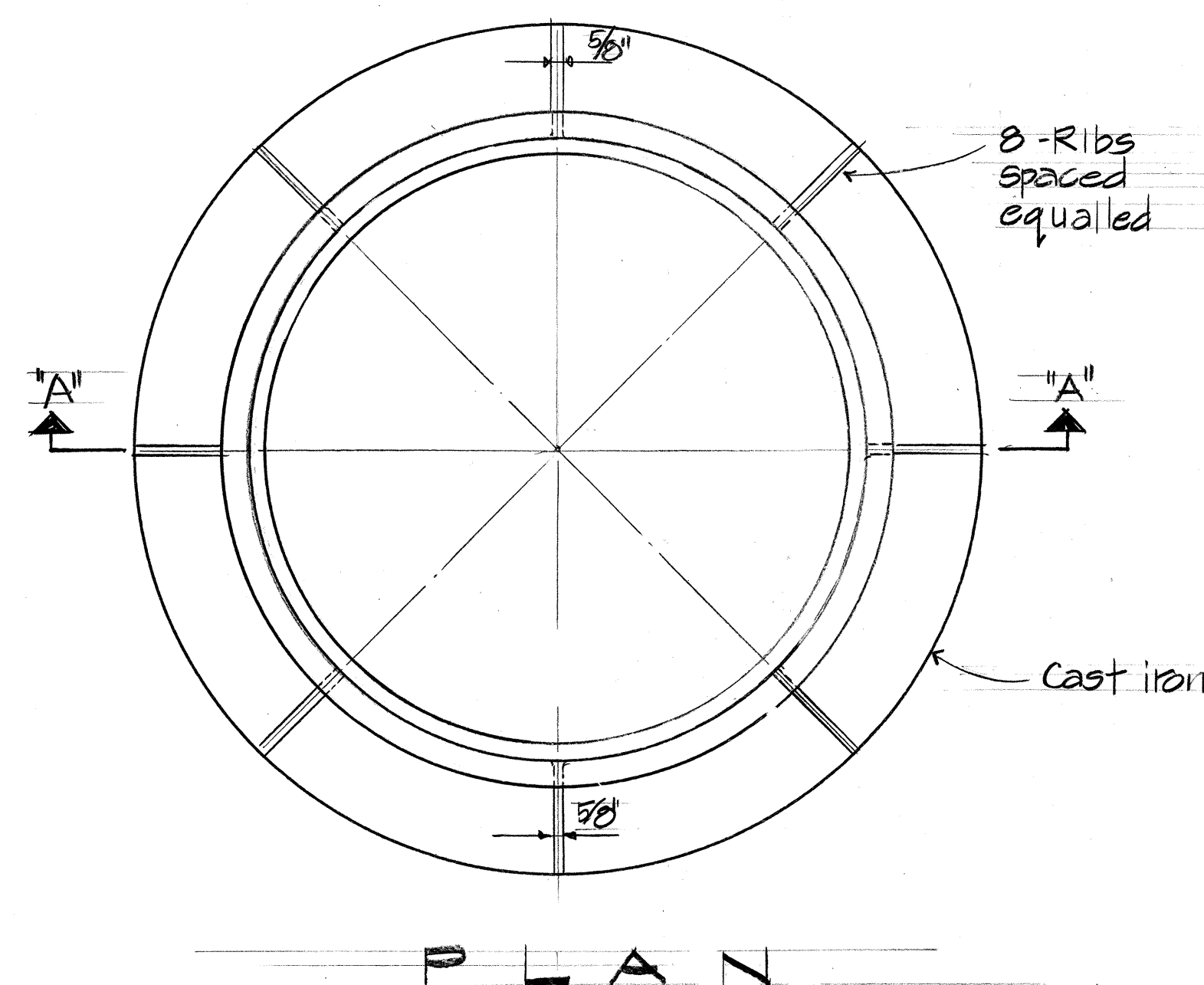
HANAMAULU VIADUCT
HANAMAULU-AHUKINI CUTOFF ROAD
(Ahukini Road to Kauai Hardwoods)
Federal Aid Proj. No. F-051-1(4)
Scale: As Shown. Date: May, 1983

SHEET NO. 6 OF 14 SHEETS

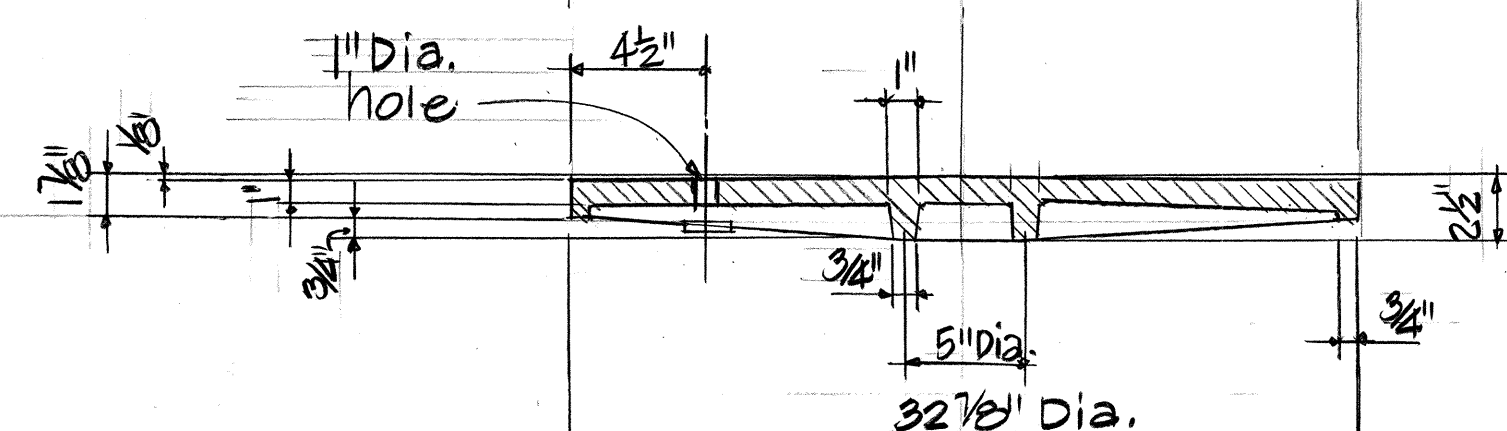
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-051-1(4)	1984	25	65



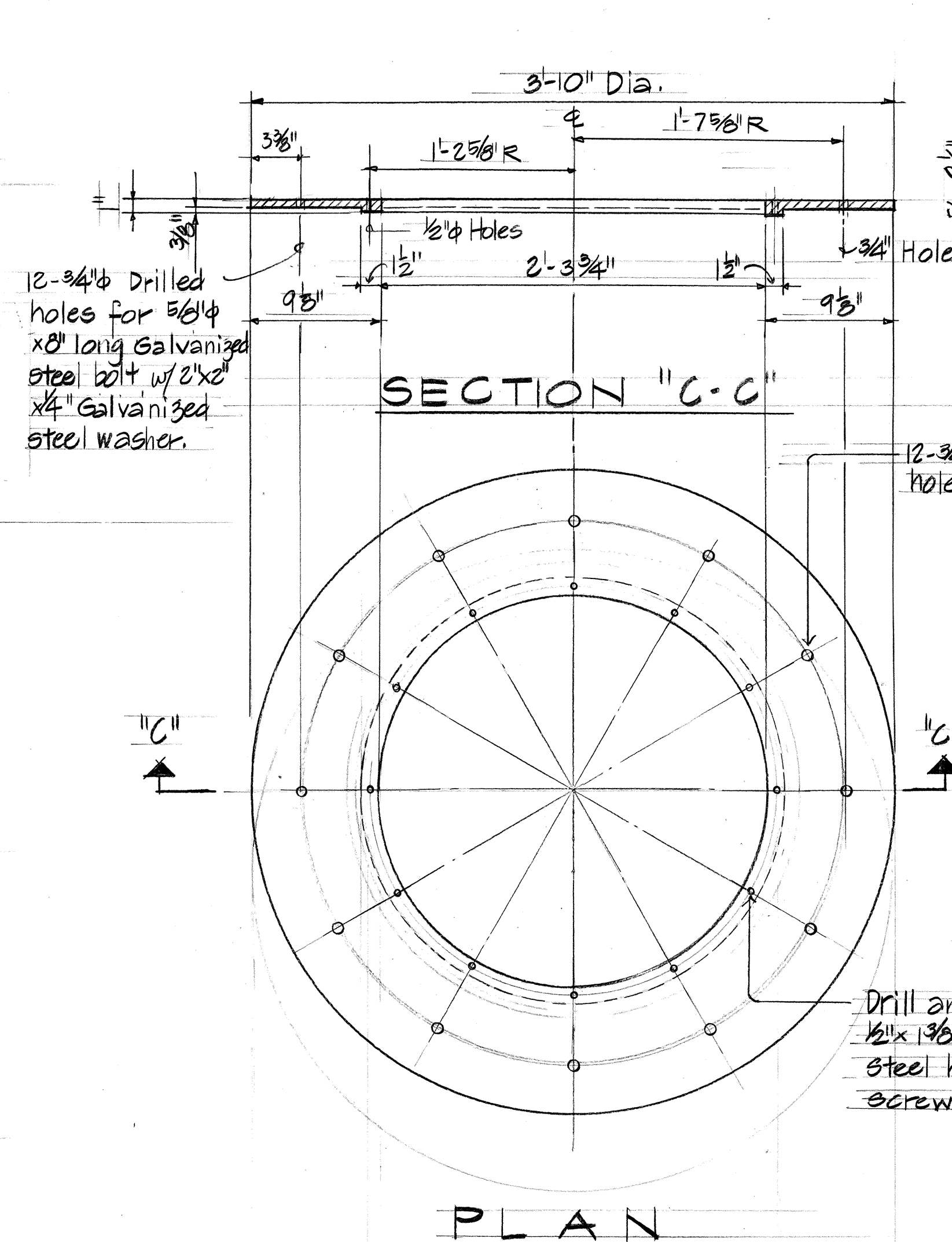
MODIFIED TYPE SB PRESSURE MANHOLE FRAME & COVER
Scale: 1/2" = 1'-0"



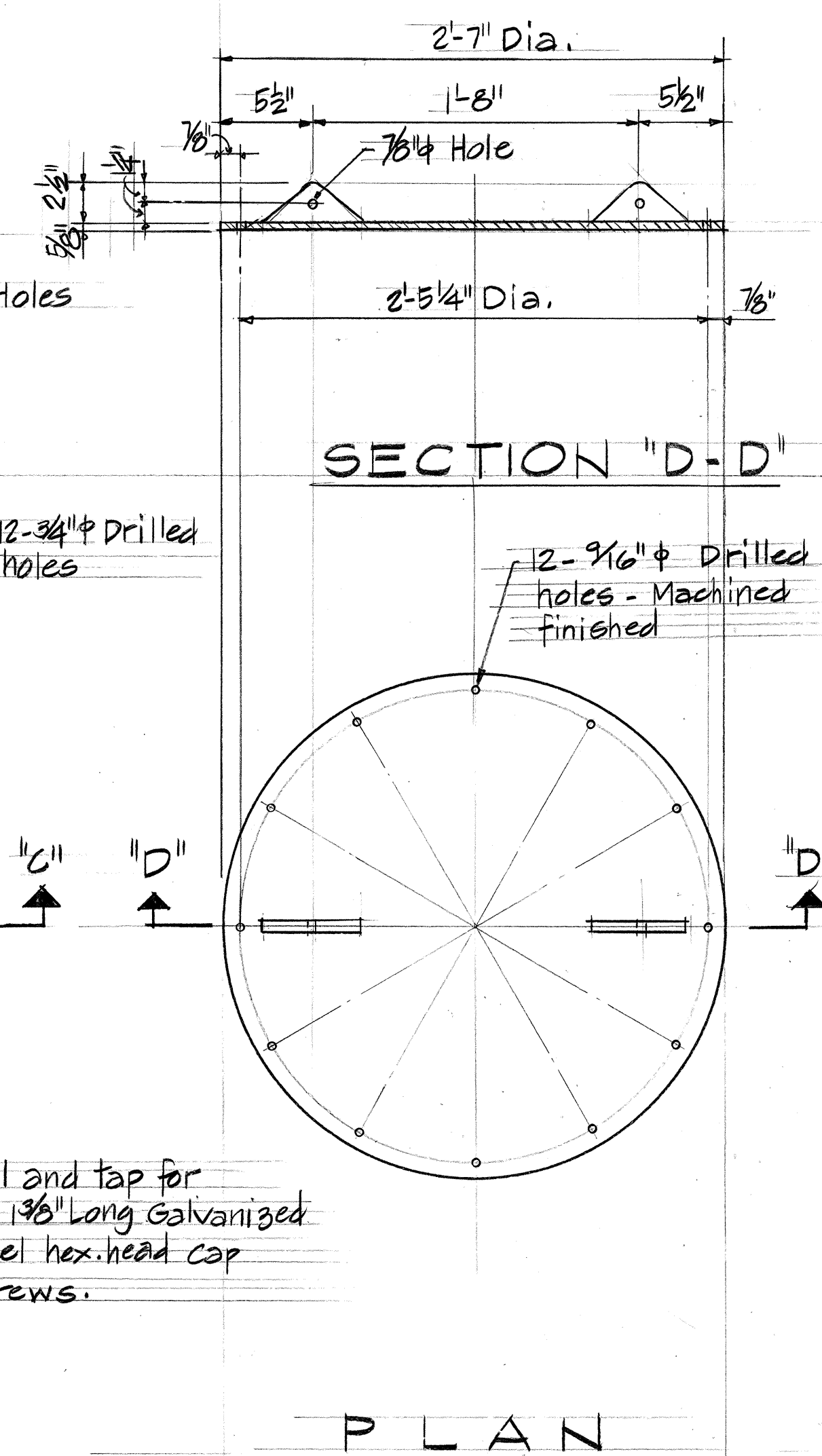
BOTTOM VIEW OF COVER



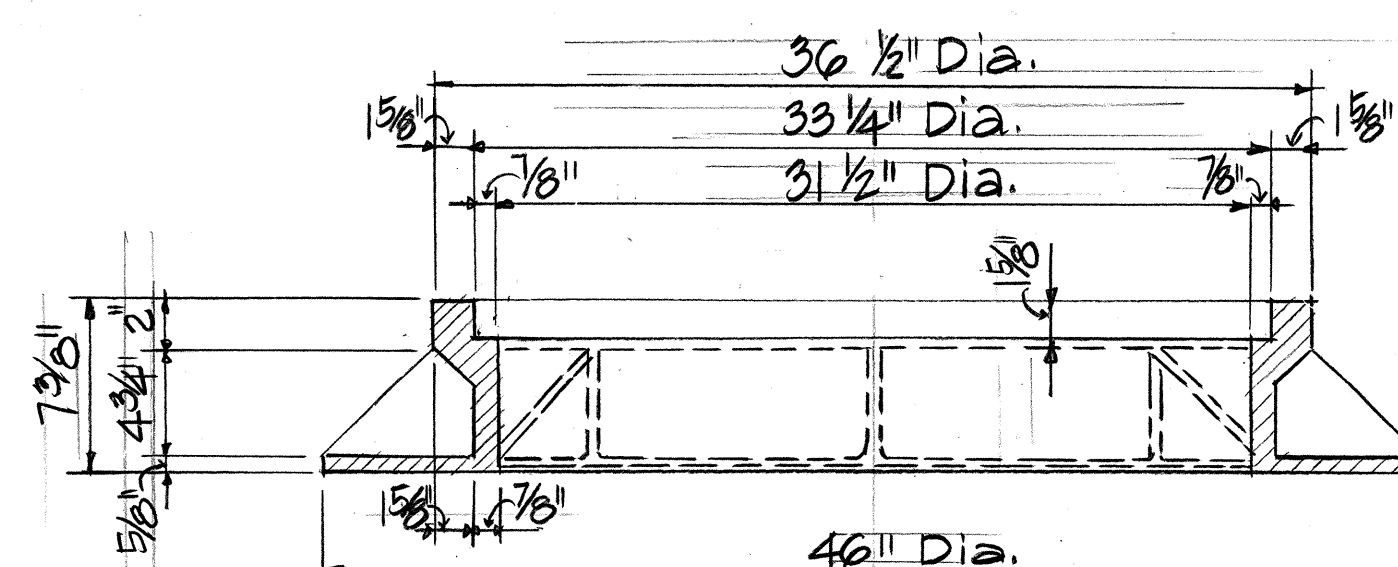
SECTION "B-B"
MANHOLE COVER - TYPE SB
Scale: 1/2" = 1'-0"



C.I. PRESSURE PLATE COVER RING DETAIL
Scale: 1/2" = 1'-0"

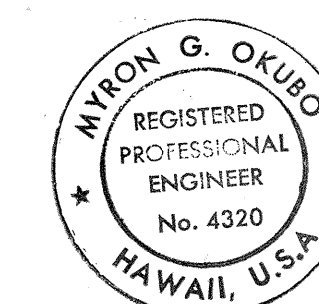


5/8" C.I. PRESSURE PLATE COVER DETAIL
Scale: 1/2" = 1'-0"

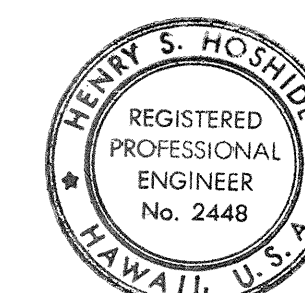


SECTION "A-A"
MANHOLE FRAME - TYPE SB
Scale: 1/2" = 1'-0"

ORIGINAL PLAN	DATE
SURVEY PLOTTED BY	
DRAWN BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Myron Okubo
Signature

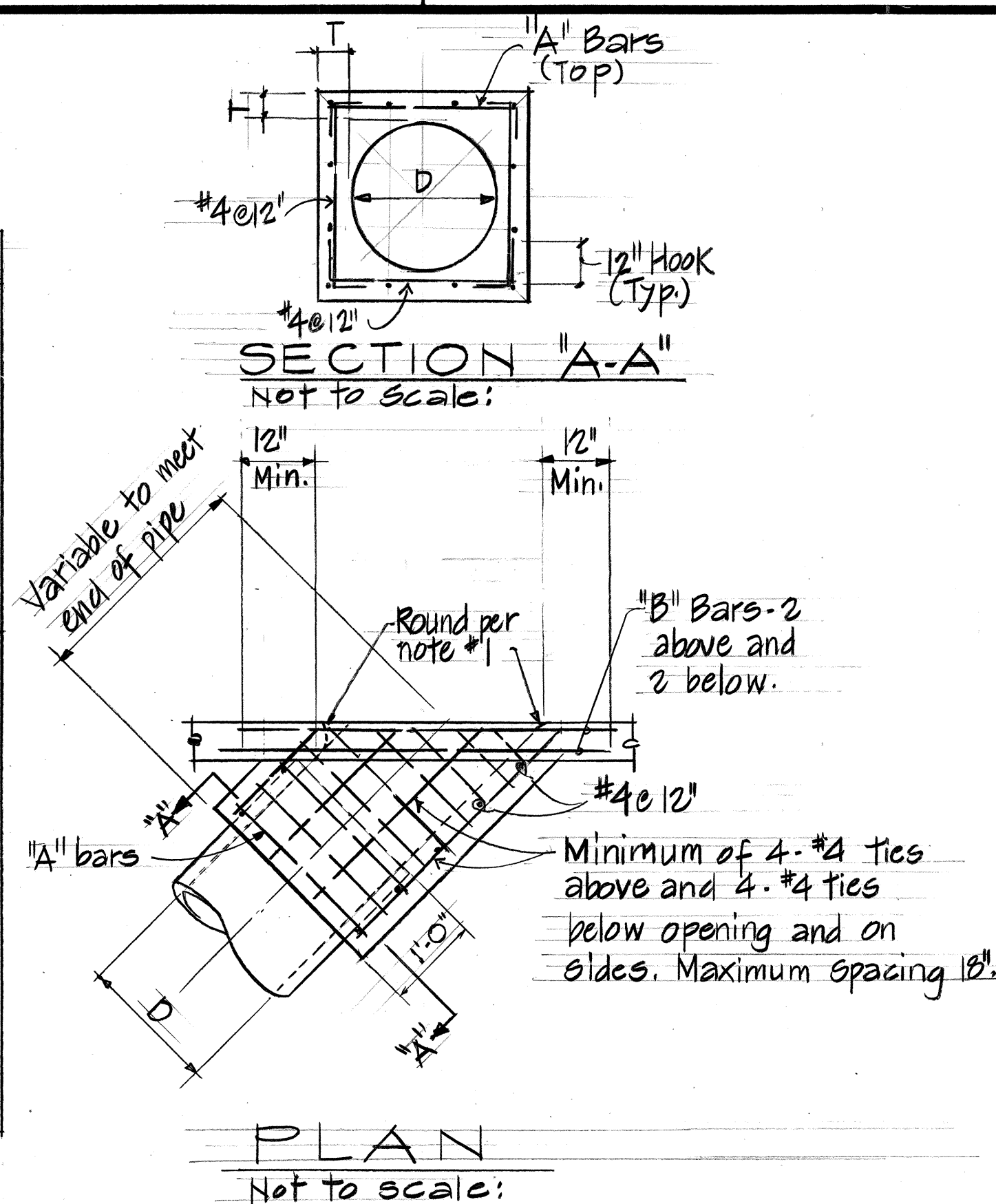


THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Henry S. Hoshida
Signature

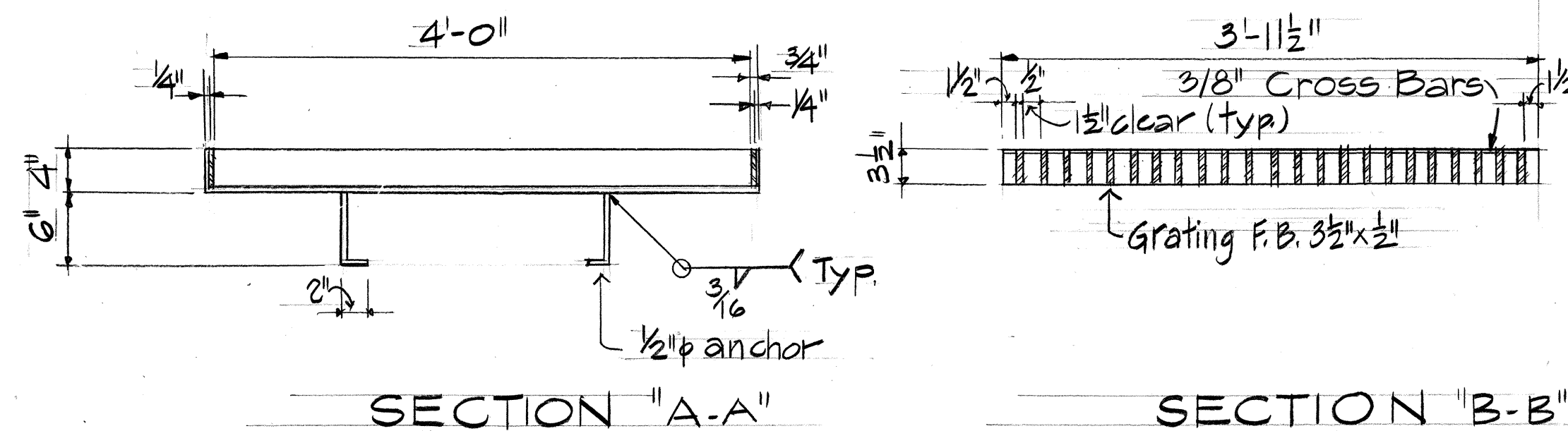
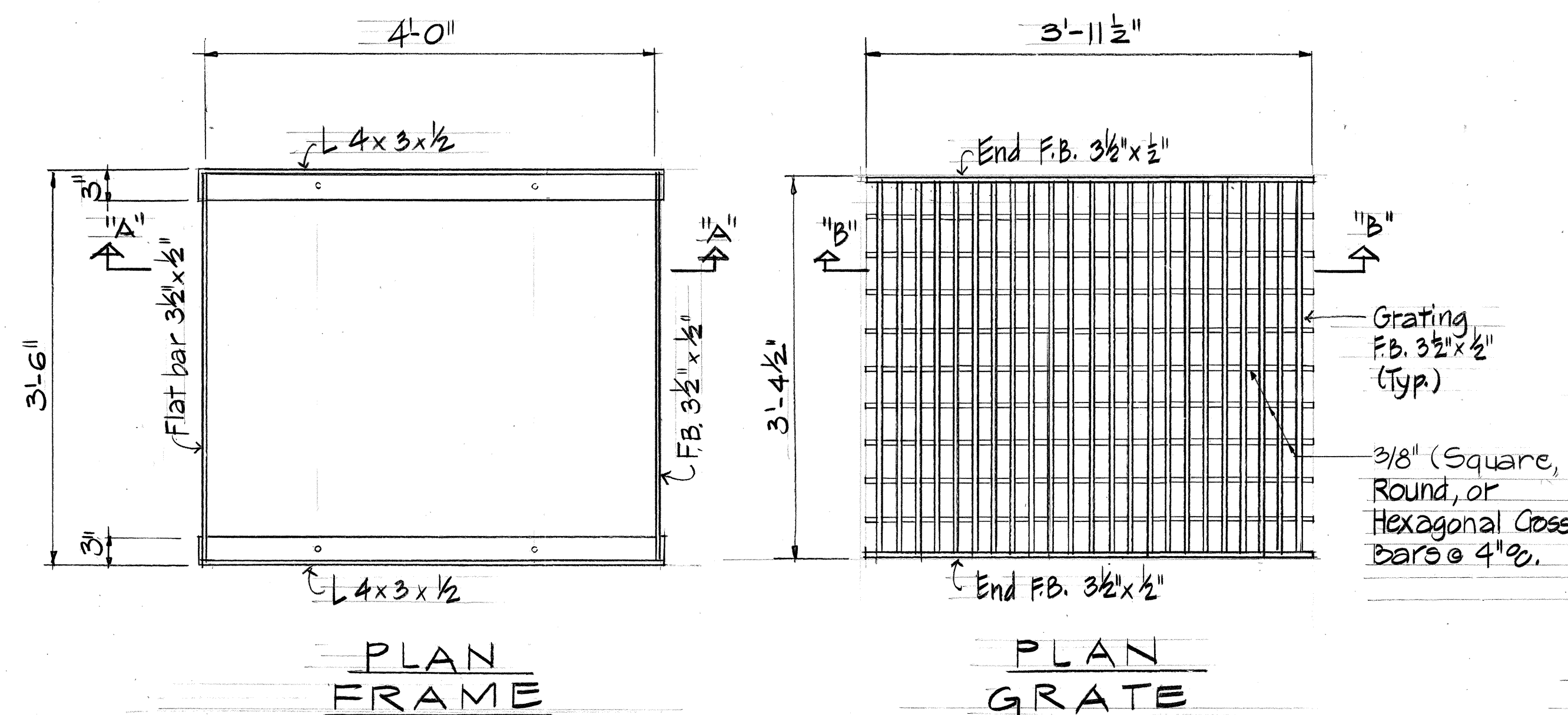
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
MODIFIED TYPE SB PRESSURE MANHOLE FRAME & COVER
HANAMAULU VIADUCT
HANAMAULU - AHUKINI CUTOFF ROAD
(Ahukini Road to Kala'i Hardwoods)
Federal Aid Proj. No. F-051-1(4)
Scale: AS SHOWN Date: May, 1983
SHEET NO. 7 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-051-1(4)	1984	26	65

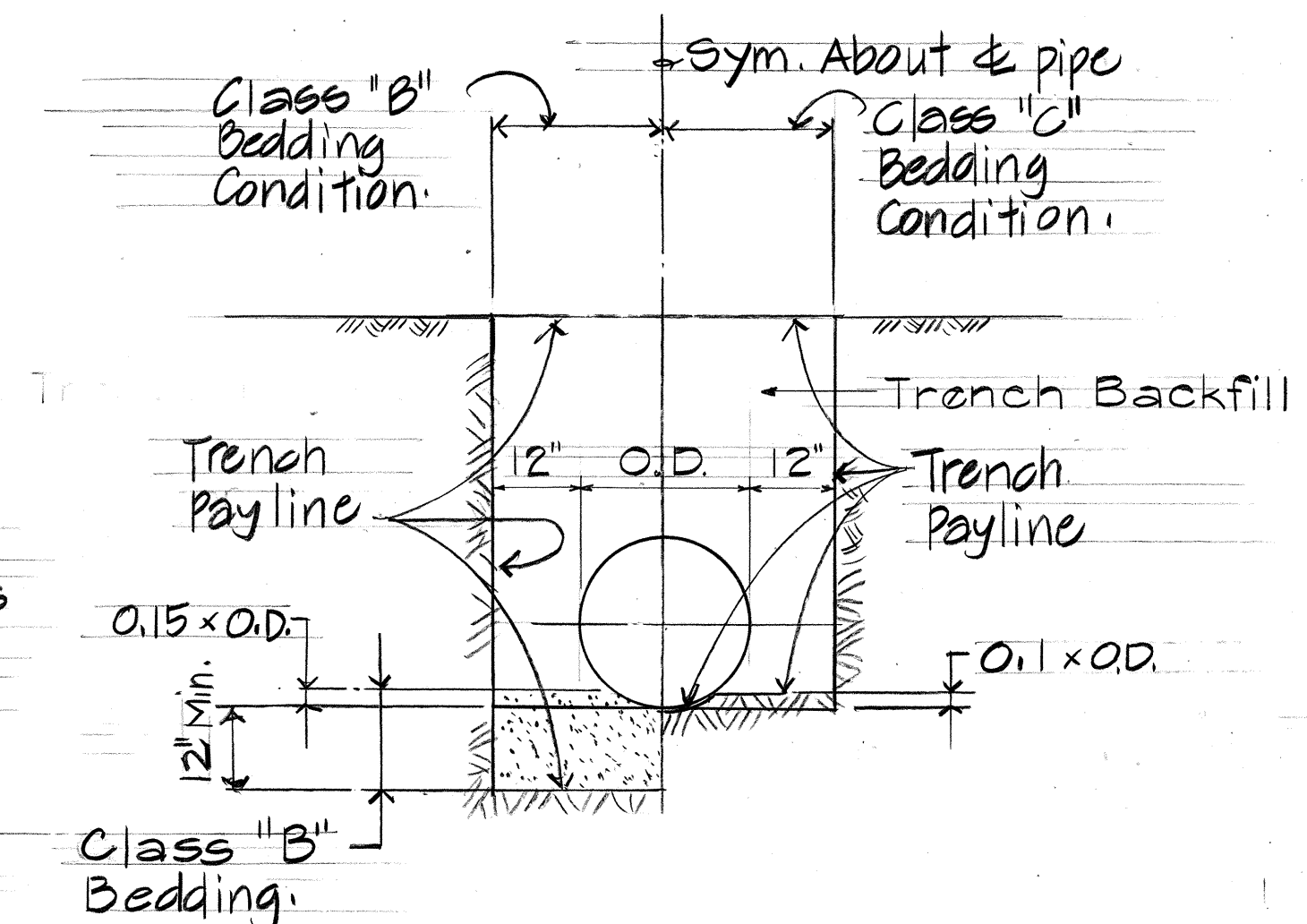
D	T	"A" bar	"B" bar
24"	6"	↑	↑
27"	6 1/2"	#4 @ 6"	#5
30"	7"	↑	↑
33"	7"	↑	↑
36"	7 1/2"	↑	↑
39"	8"	↑	↑
42"	8"	↑	↑
45"	8"	↑	↑
48"	8"	↑	↑
51"	8"	↑	↑
54"	8"	↑	↑
57"	10"	#5 @ 6"	#6
60"	10"	↑	↑
63"	10"	↑	↑
66"	11"	↑	↑
69"	11"	↑	↑
72"	11"	↑	↑



- Notes:
1. Round edge of outlet 3" radius.
 2. Reinforcement shall be 1/2" inches clear from the face of concrete.
 3. "D" is interior diameter (I.D.) of pipe.

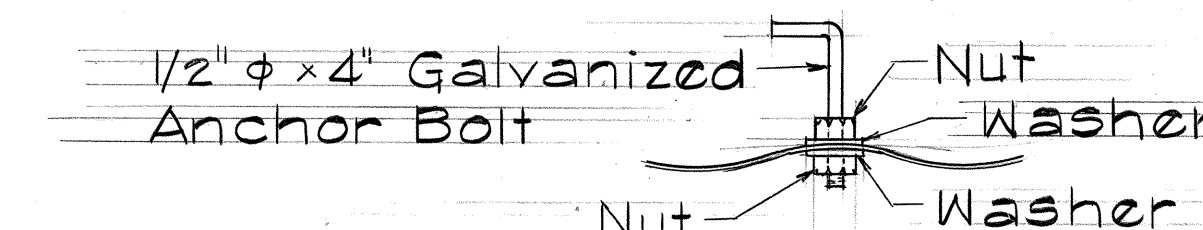


FLAT STEEL FRAME & GRATE
Scale: 1" = 1'-0"



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

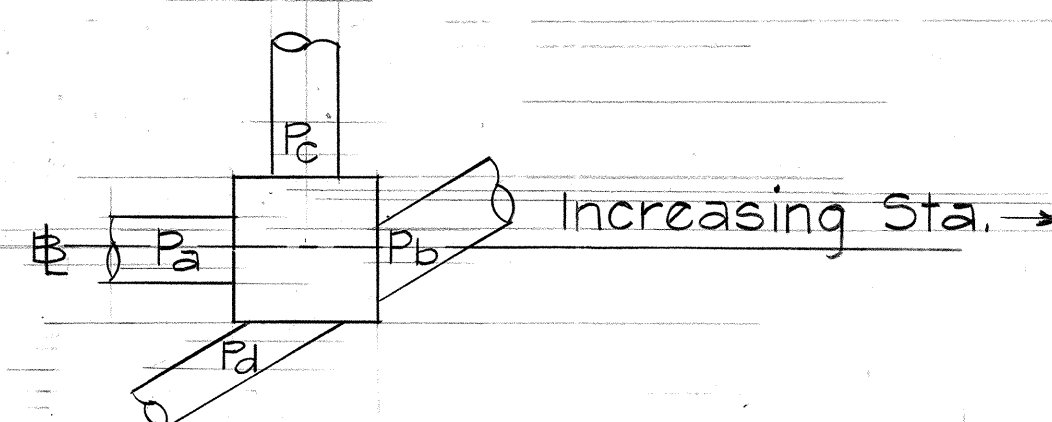
- Note:
1. 1/2" φ x 4" Anchor Bolt w/ Washers and Nuts. Galvanized, Maximum Spacing 12" O.C. Around Perimeter of C.M.P.



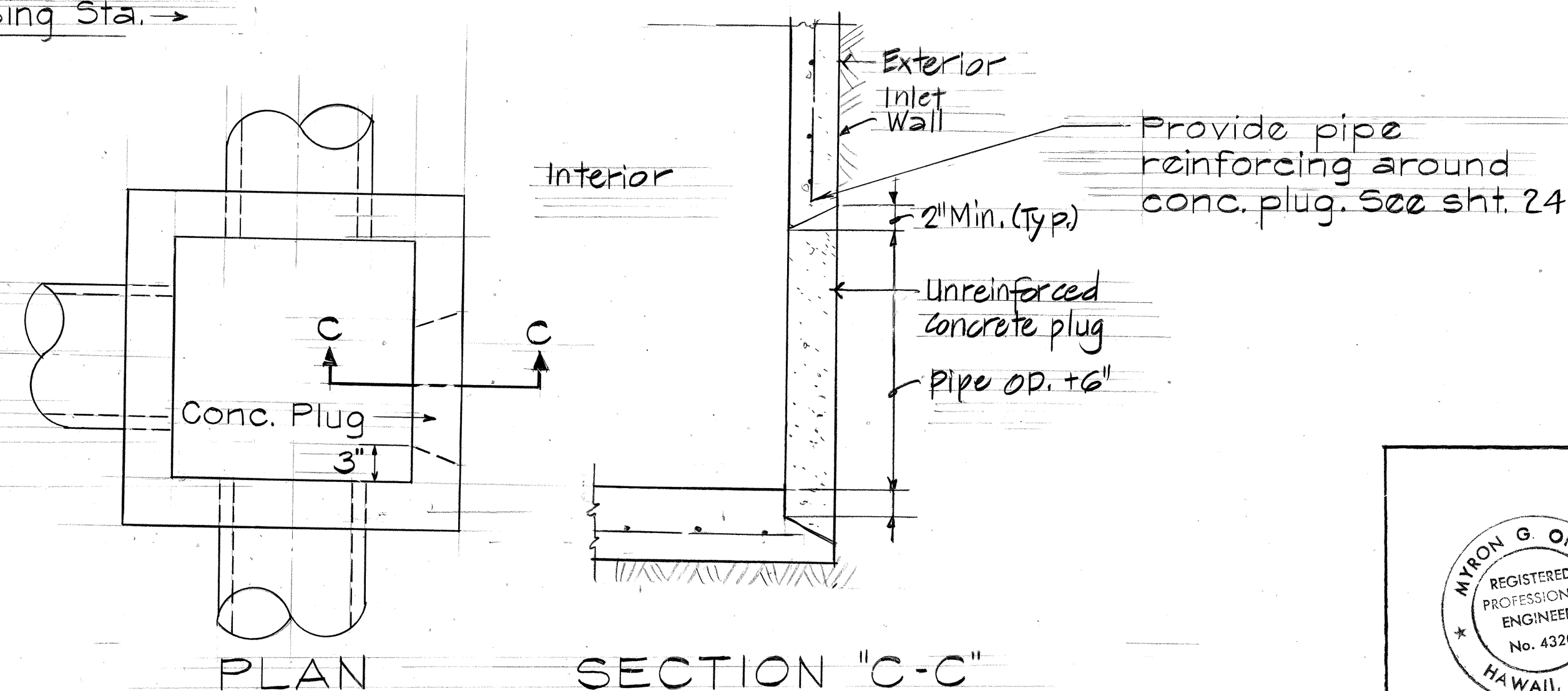
CMP OR ALUMINUM ALTERNATE ANCHOR BOLT DETAIL
NTS

STRUCTURE	STA.	JUNCTION STRUCTURE REQUIRED
		P _a P _b P _c P _d
SDMH #4	100 + 15	x
SDMH #5	103 + 15.37	x
Impact Box	110 + 04.76	x

* D.I. Denotes Drain Inlet

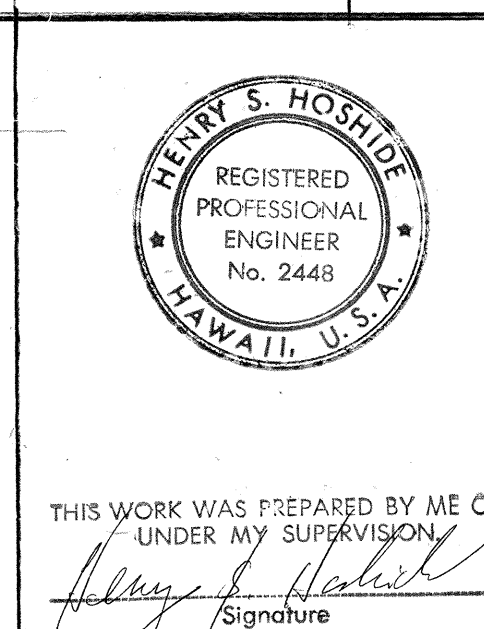
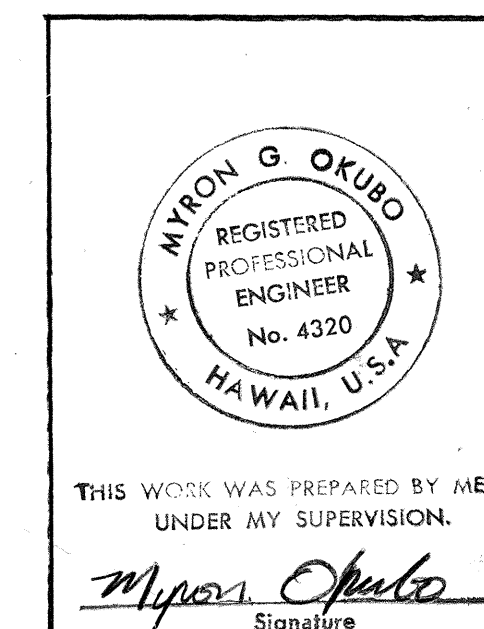


PIPE KEY PLAN
No Scale



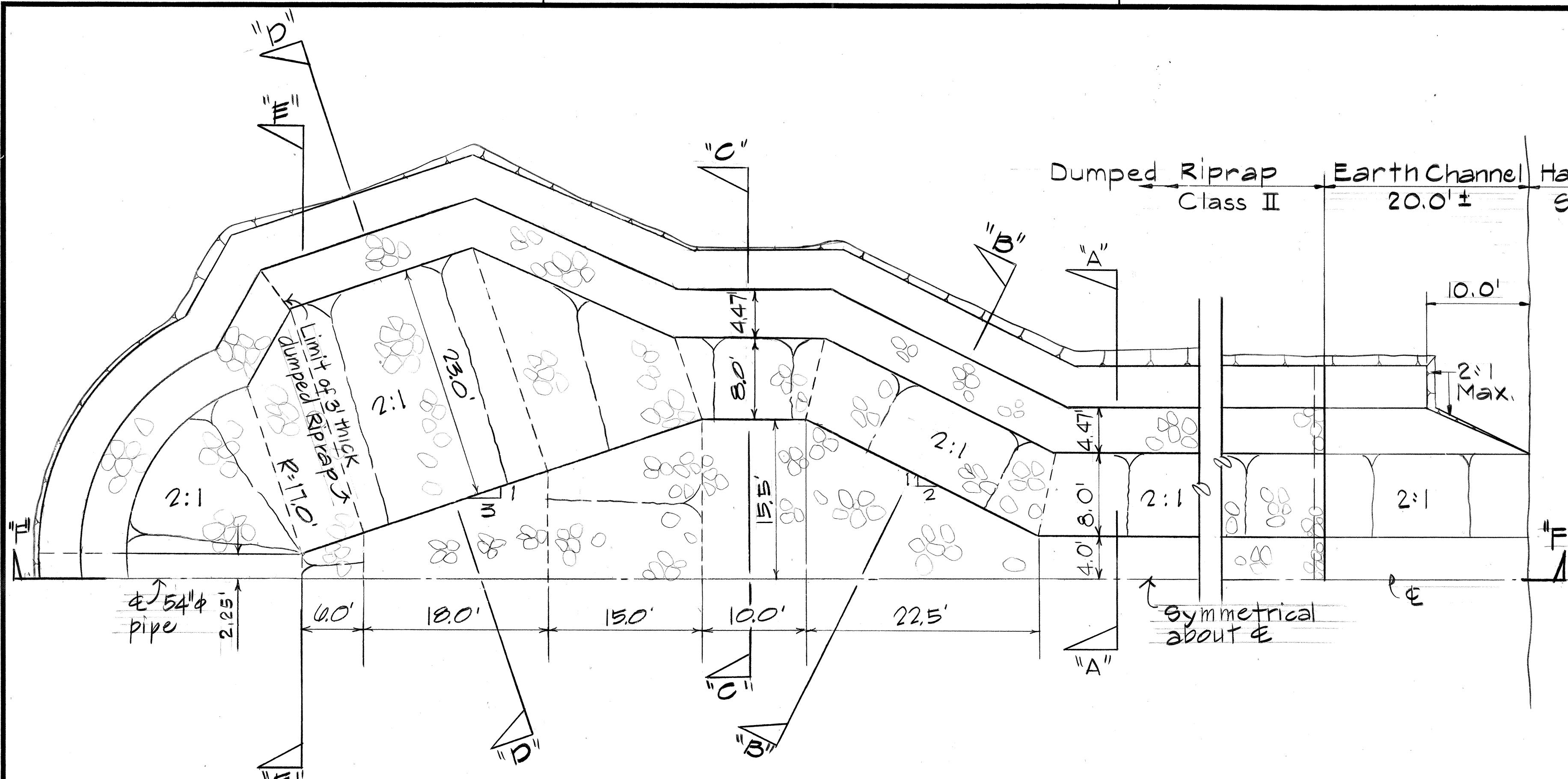
CONCRETE PLUG
NTS

Date	Revision
12/3/84	Revised Typical Trench Section.

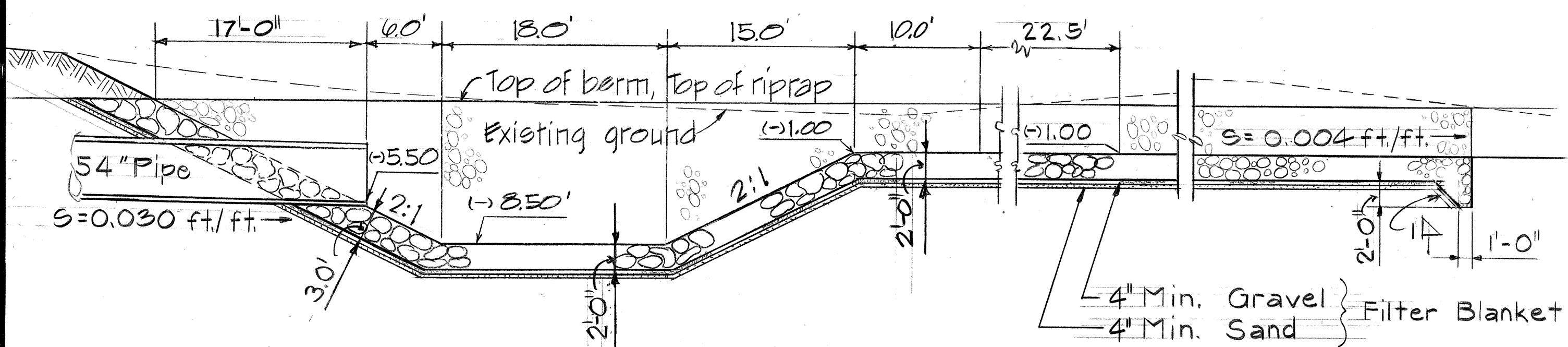


STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
DRAIN INLET STRUCTURE DETAILS
HANAMAULU VIADUCT HANAMAULU-AHIKINI CUTOFF ROAD (AhiKini Road to Kauai Hardwoods) Federal Aid Proj. No. F-051-1(4) Scale: As shown. Date: May, 1983
SHEET NO. 8 OF 14 SHEETS

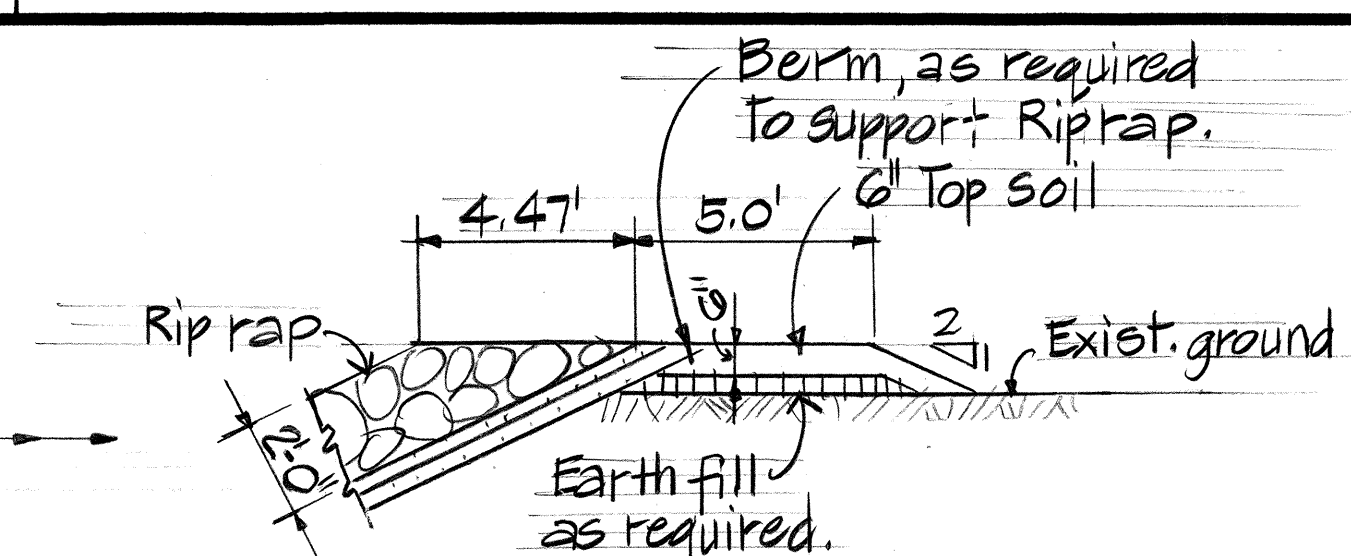
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-051-1(4)	1984	27	65



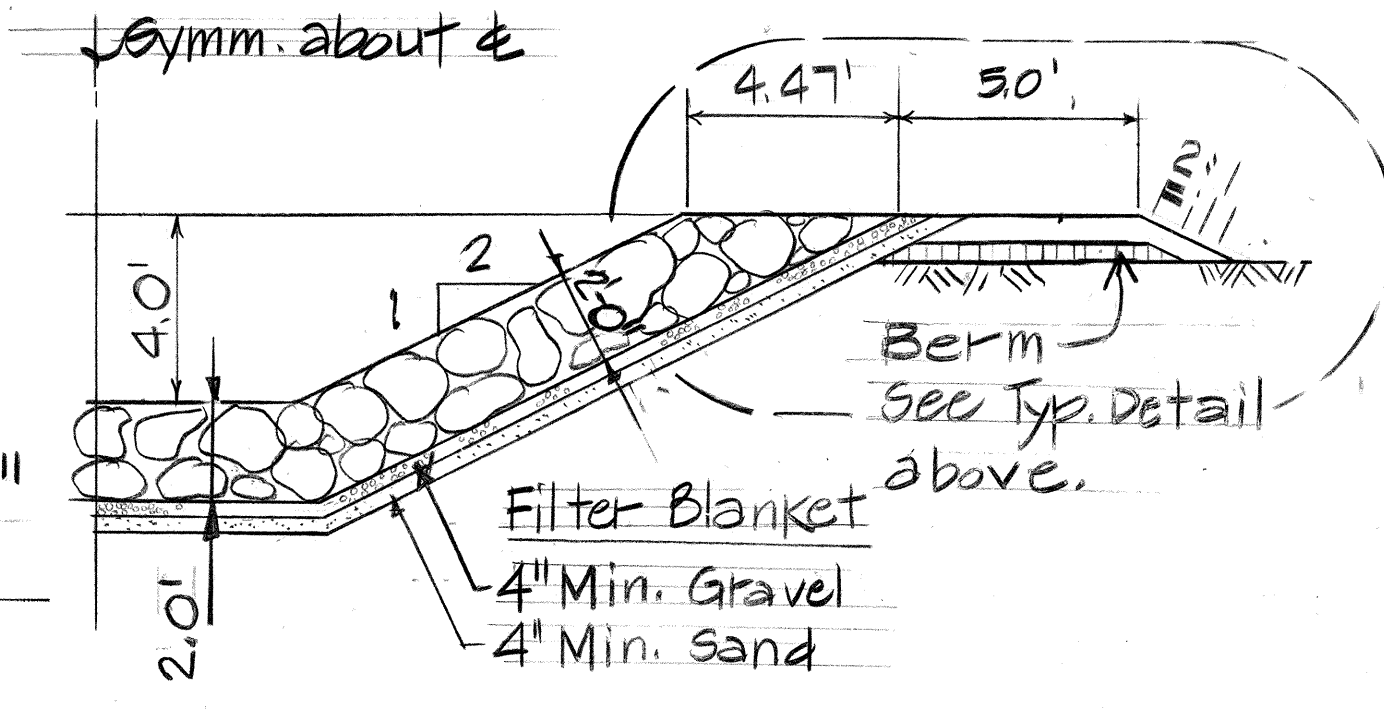
ENERGY DISSIPATOR - PLAN
Scale: 1" = 8'-0"



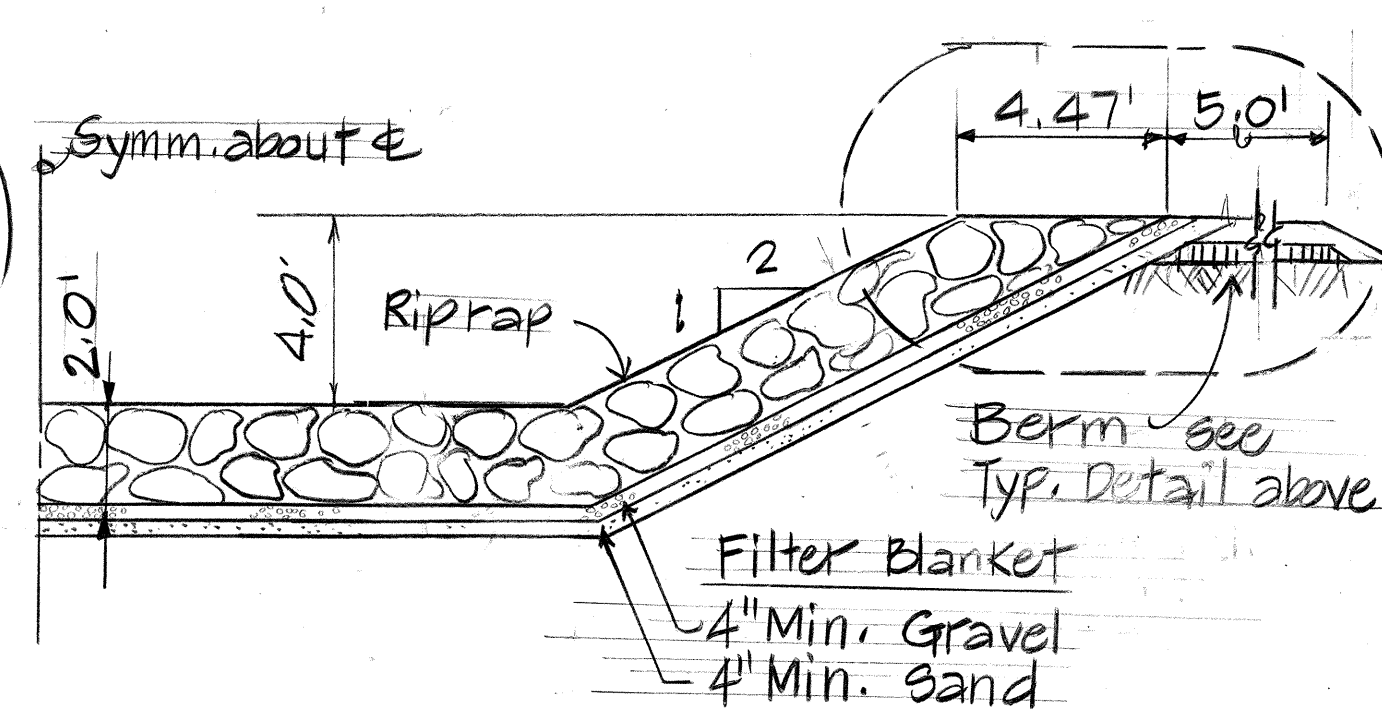
SECTION "F"
Scale: 1" = 8'-0"



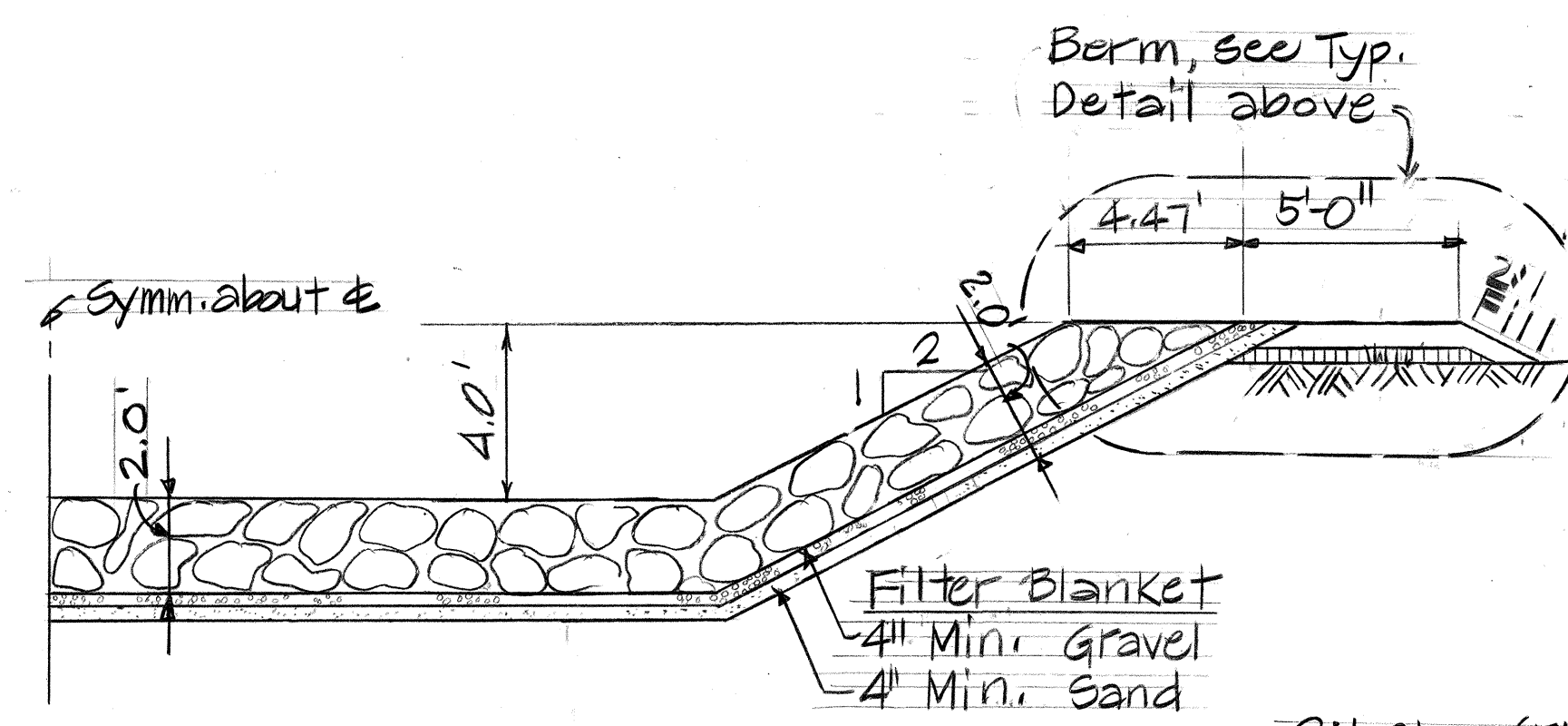
TYPICAL BERM DETAIL
Scale: 1" = 4'-0"



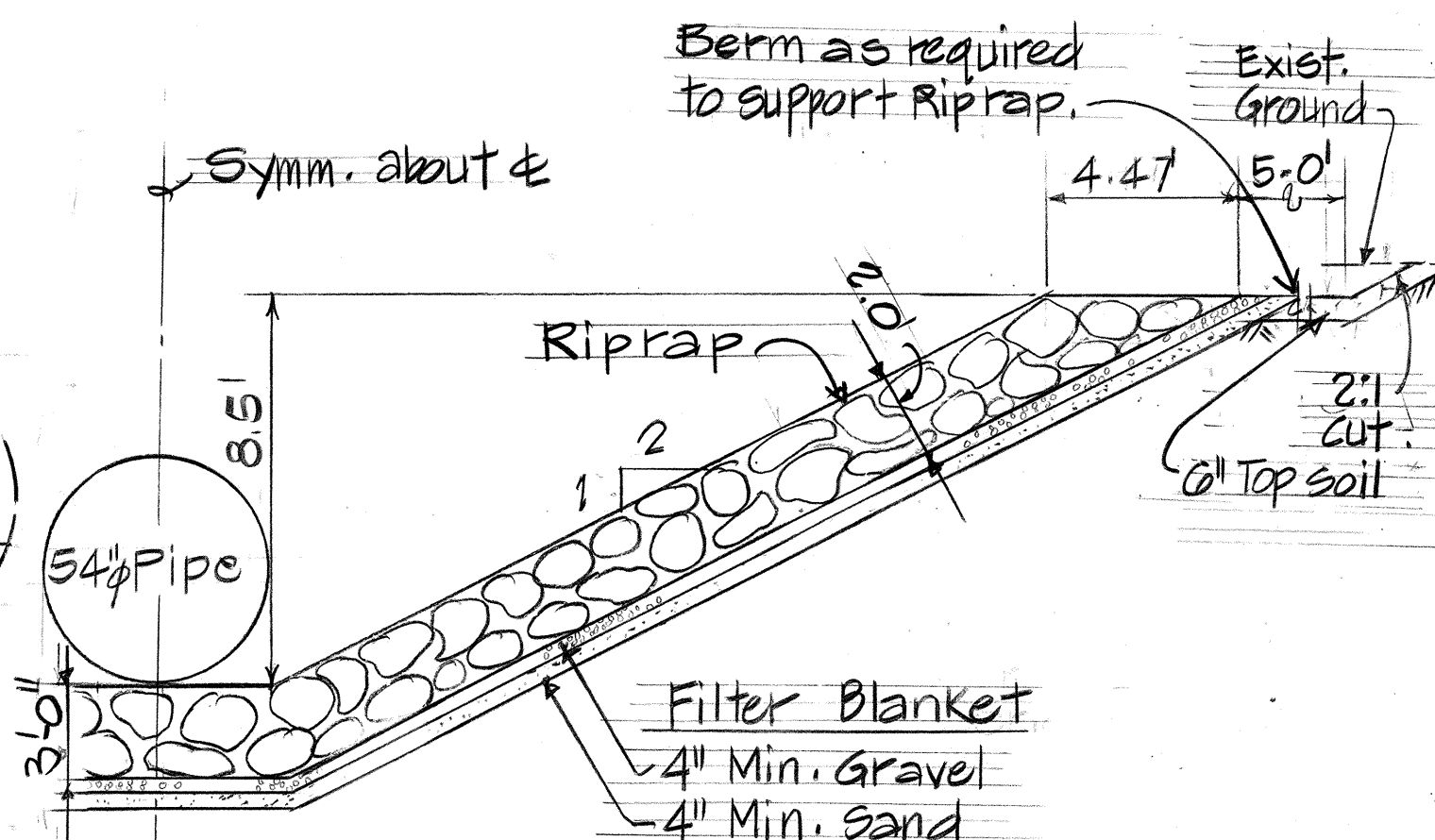
SECTION "A-A"
Scale: 1" = 4'-0"



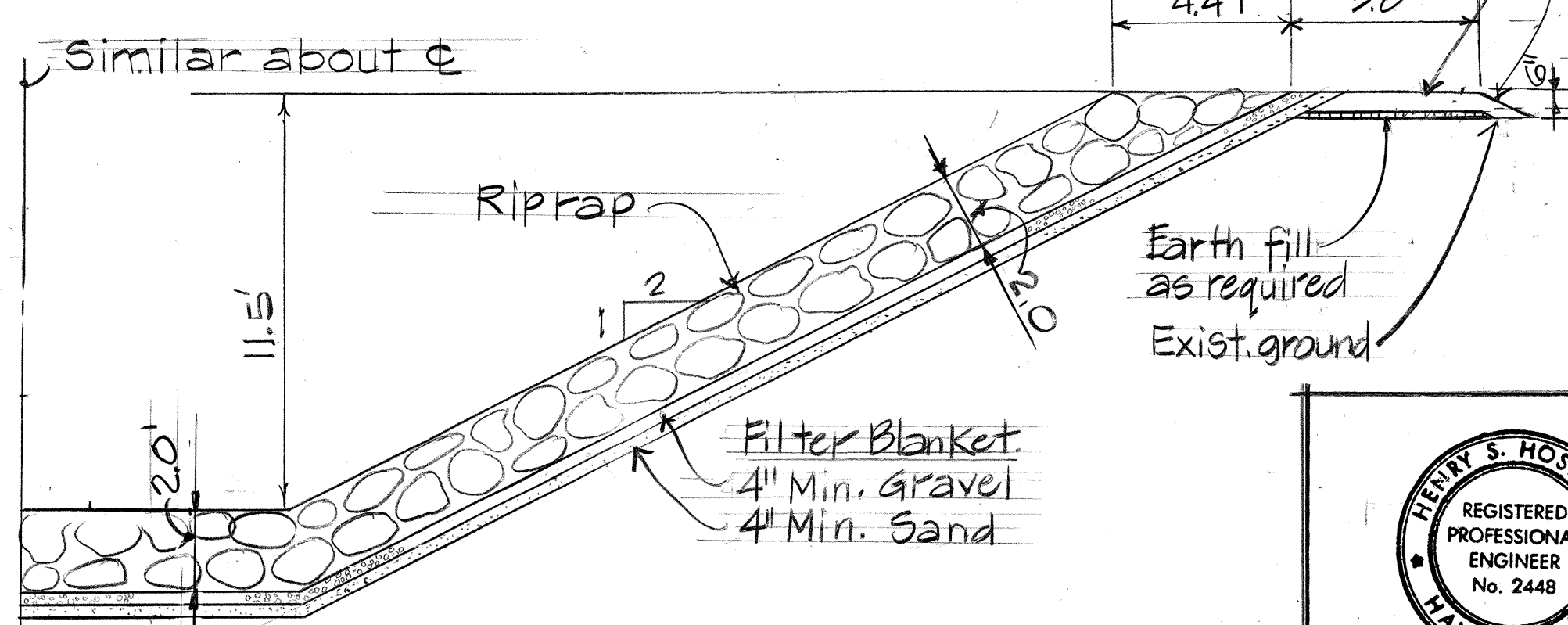
SECTION "B-B"
Scale: 1" = 4'-0"



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



SECTION "E-E"
Scale: 1" = 4'-0"



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

12/31/84 Added limit of 3' thick dumped Riprap.
Date: Revision



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Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
ENERGY DISSIPATOR DETAIL
AT STA. 105+08.18
HANAMAULU VIADUCT
HANAMAULU-AHUKINI CUTOFF ROAD
(Ahukini Road to Kaula Hardwoods)
Federal Aid Proj. No. F-051-1(4)
Scale: As shown Date: May, 1983

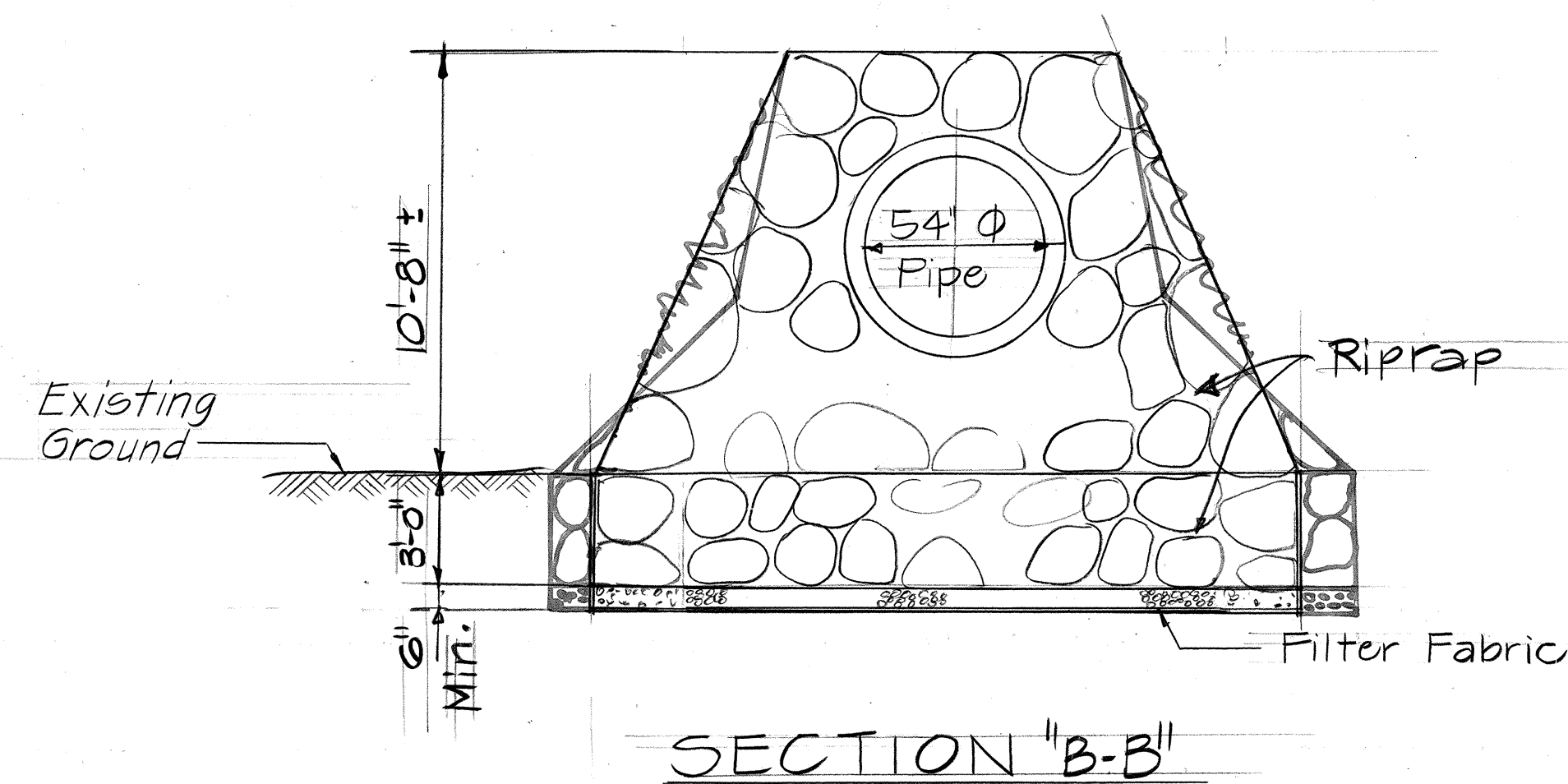
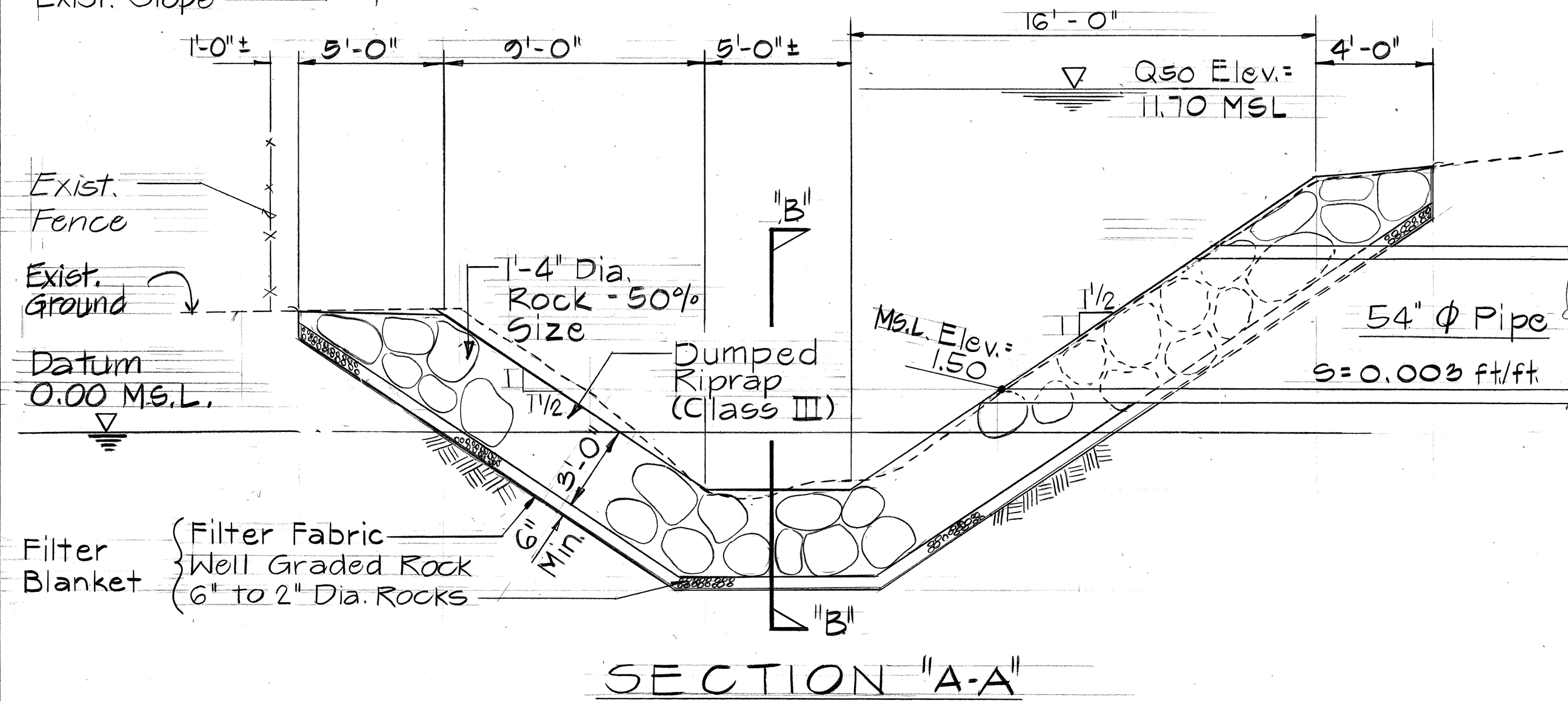
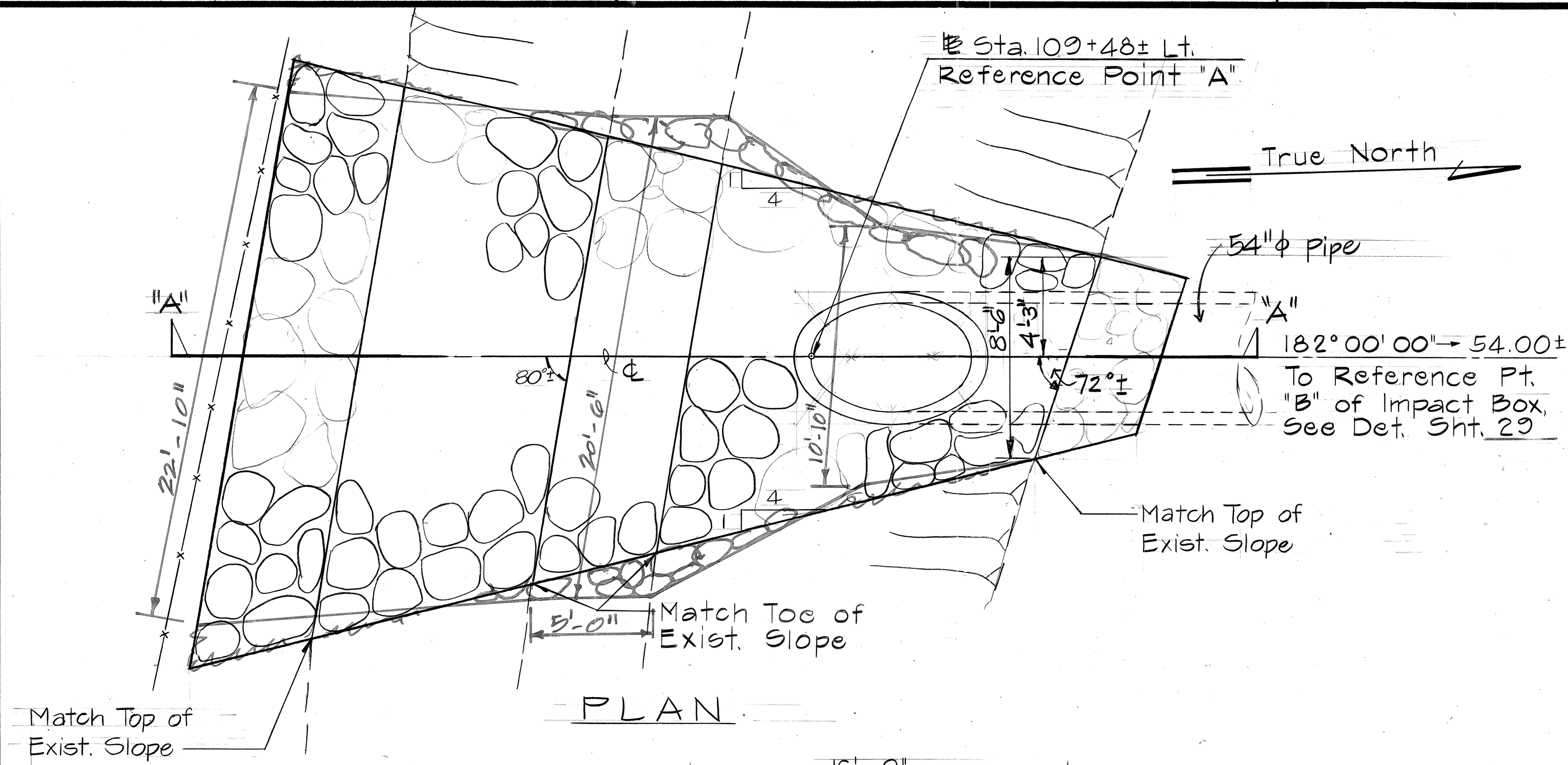
SHEET NO. 3 OF 14 SHEETS

ADD. 27

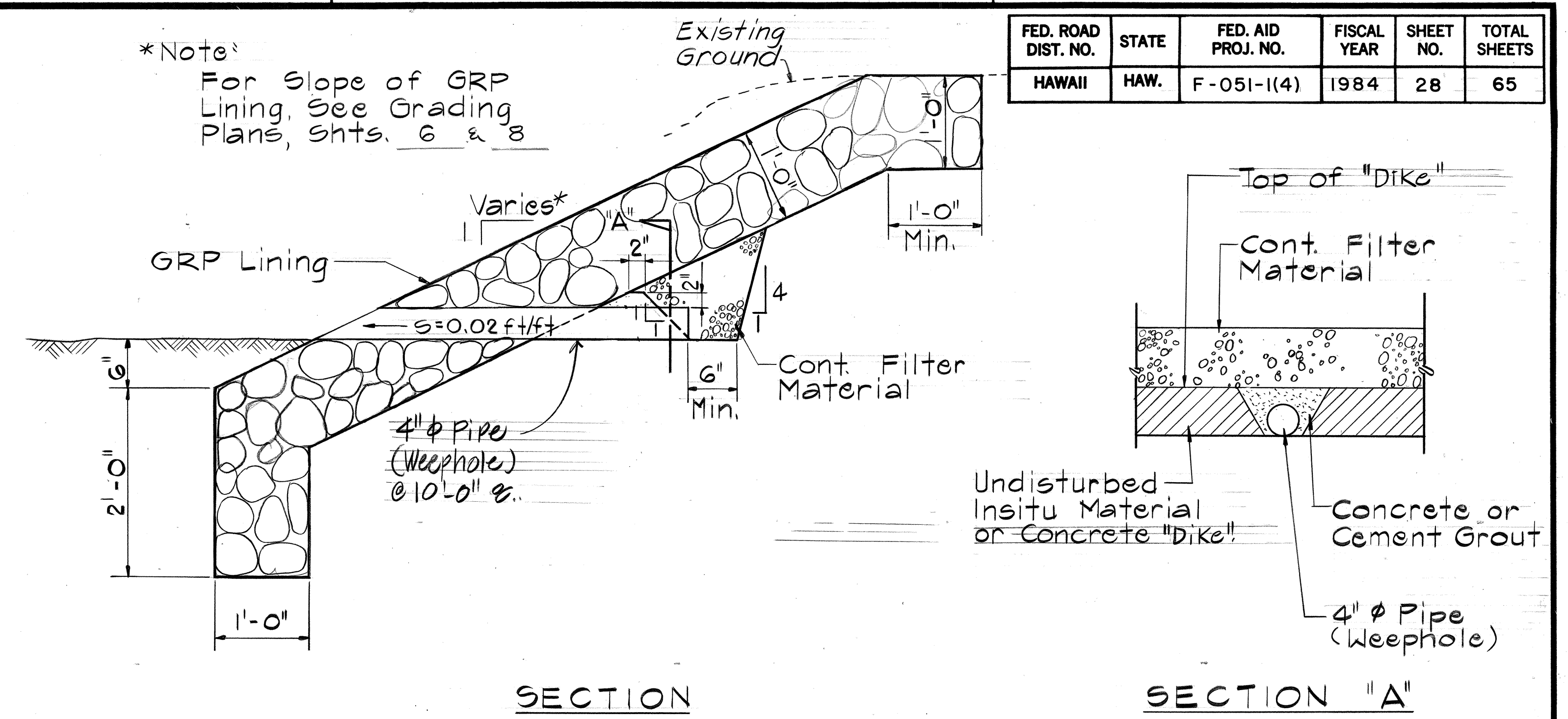
1/16 - PHASE I 97 PHASE I

DATE	12/31/84
DESIGNED BY	...
CHECKED BY	...
NOTED BY	...
ORIGINAL PLAN	...
NO.	...

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-051-1(4)	1984	28	65



OUTLET STRUCTURE DETAIL
Scale: 1/4" = 1'-0"



GRP LINING AND WEEPHOLE DETAIL
Scale: 1" = 1'-0"



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Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

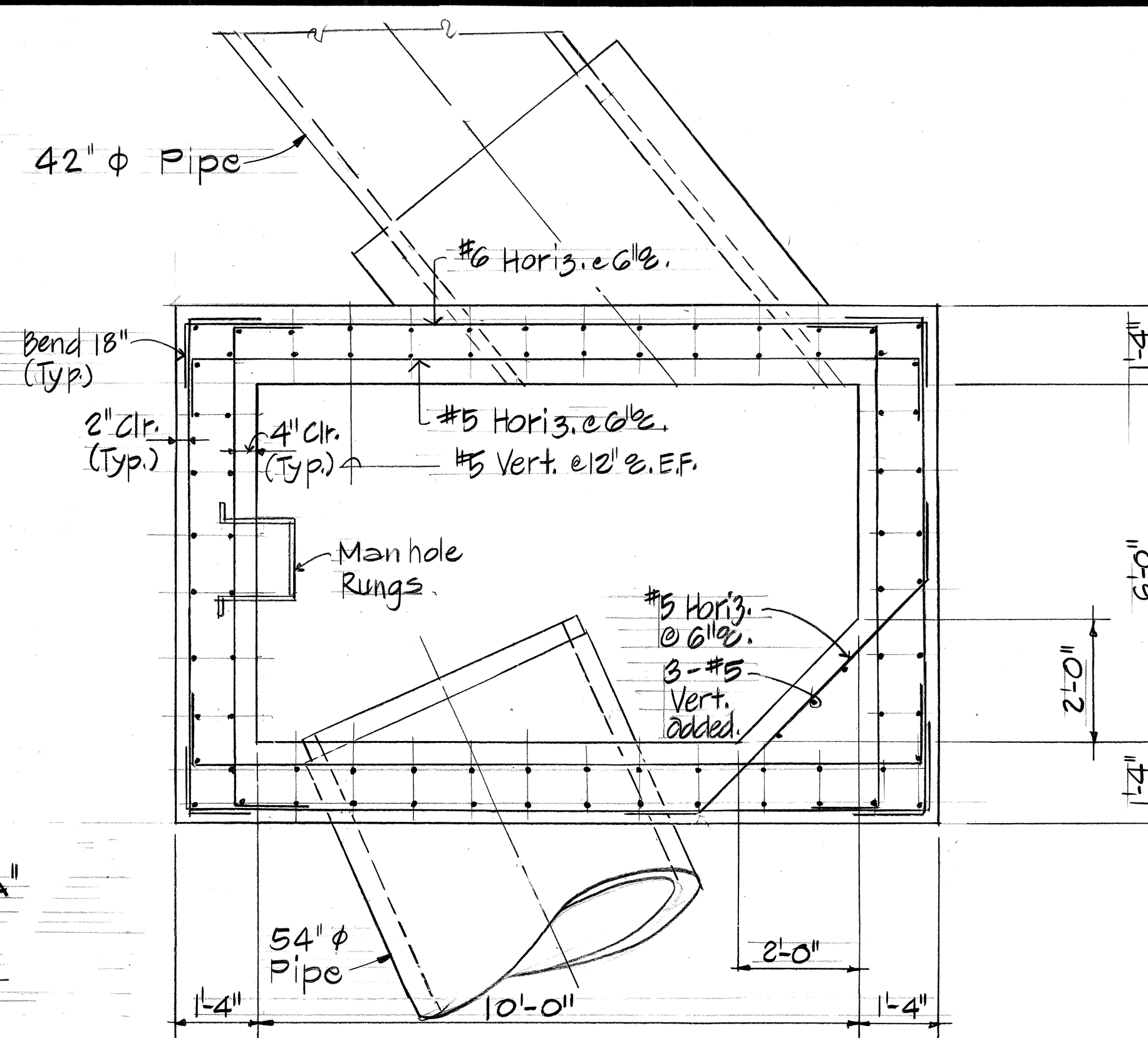
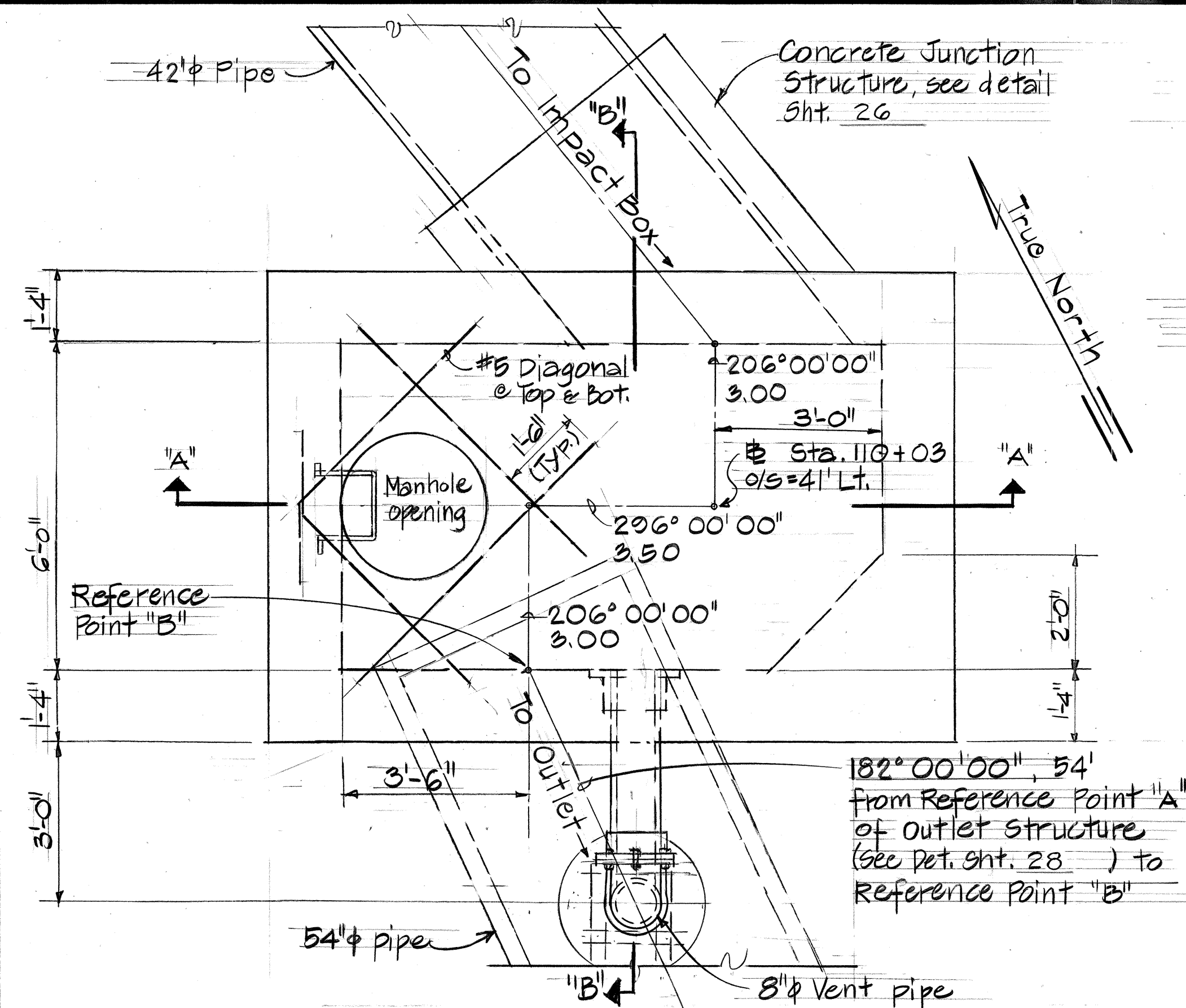
OUTLET STRUCTURE @ Sta. 109+48±
DETAIL, & GRP LINING DETAIL

HANAMAULU VIADUCT
HANAMAULU-AHUKINI CUTOFF ROAD
(Ahukini Road To Kauai Hardwoods)
Federal Aid Proj. No. F-051-1(4)
Scale: As Shown Date: May, 1983

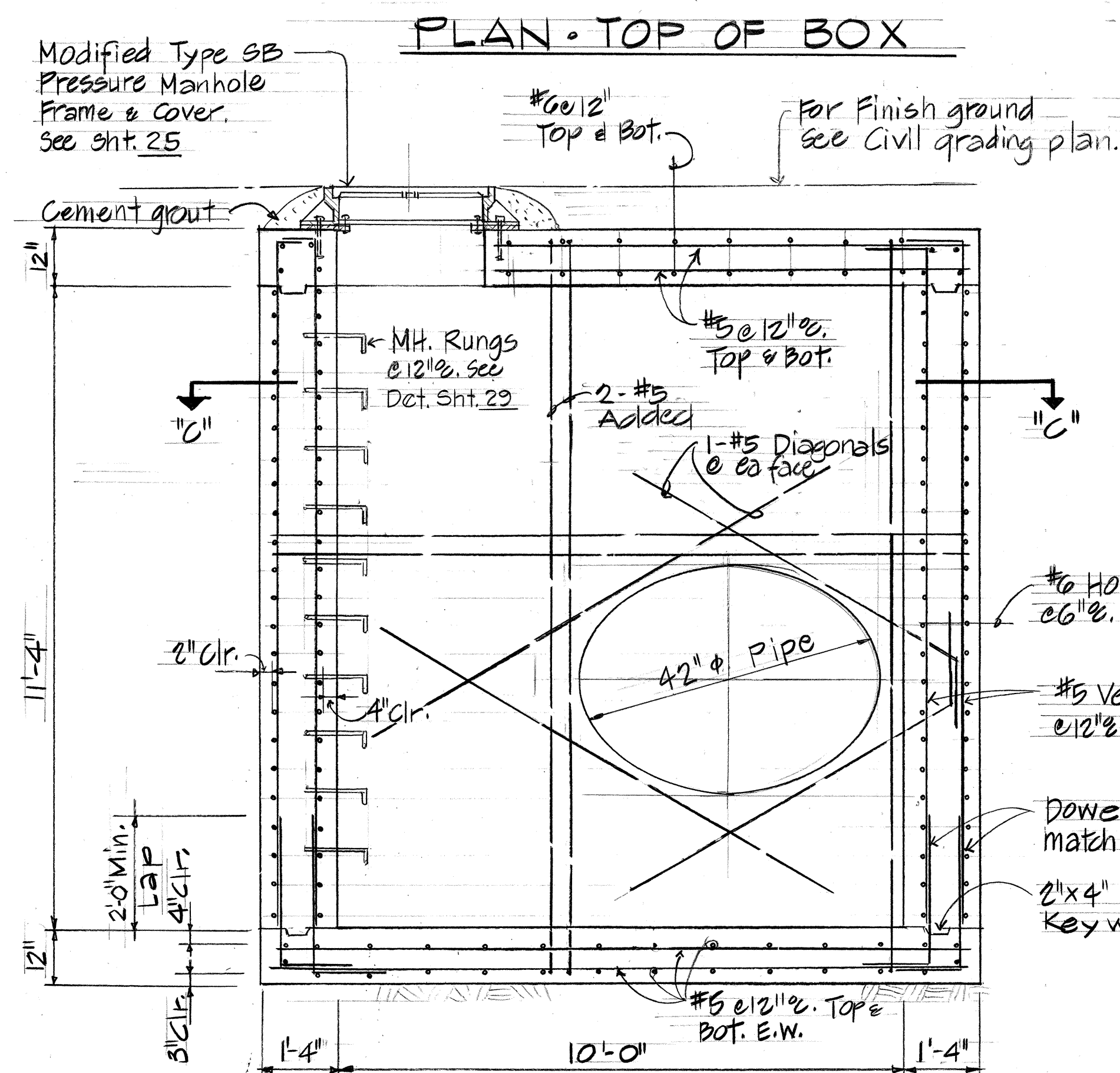
SHEET NO. 10 OF 14 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F - 051-1(4)	1984	29	65



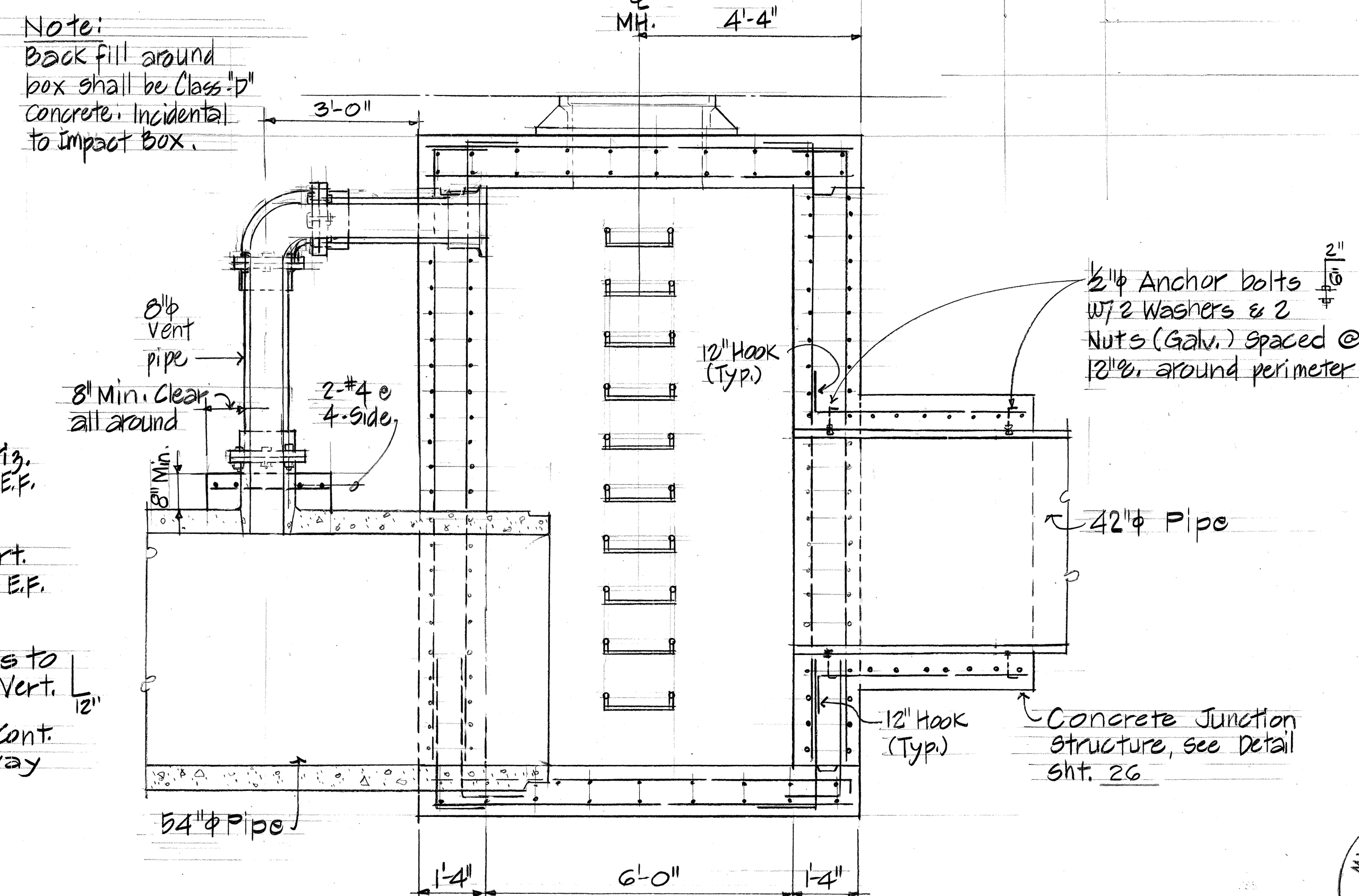
SECTION "C-C"



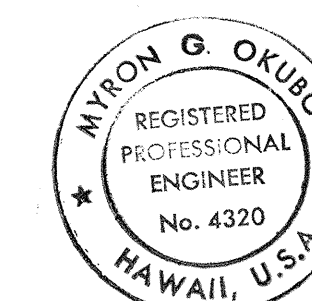
SECTION "A-A"

IMPACT BOX DETAIL

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



SECTION "B-B"



THIS WORK WAS PREPARED BY ME OR
UNDER MY SUPERVISION

Myron Opusto
Signature



100

THIS WORK WAS PREPARED BY ME OR
UNDER MY SUPERVISION.
Henry J. Baskin

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

IMPACT BOY DETAIL

© \$ STA. 110+03 Lt.

HANAMAULU VIADUCT

HANAMADLU - AHUKINI CUTOFF ROAD

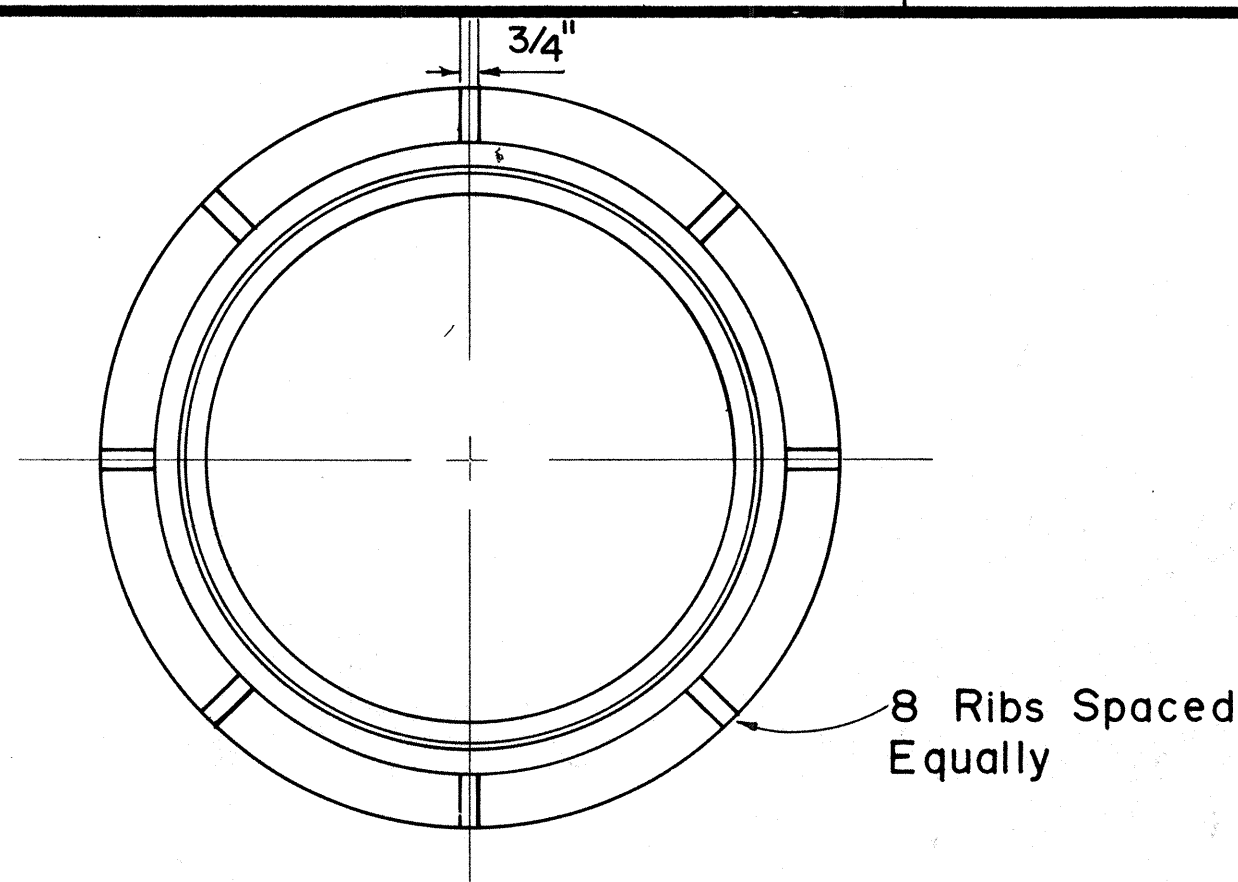
(Ahukini Road to Kaihi Hardwoods)

Federal Aid Proj. NO. F-05-1(4)

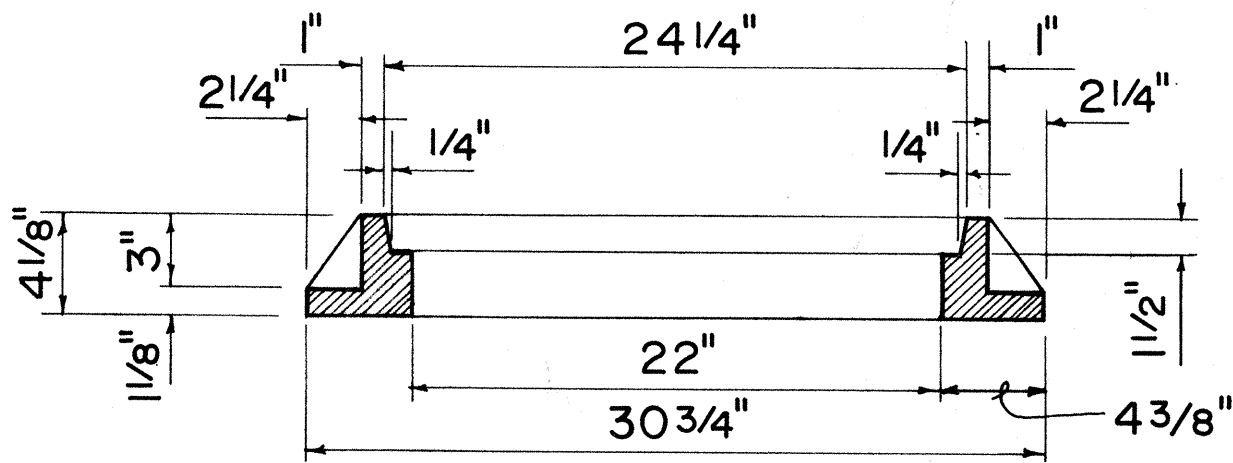
Scale: As Shown. Date: May, 1983

SHEET No. 11 OF 4 SHEETS

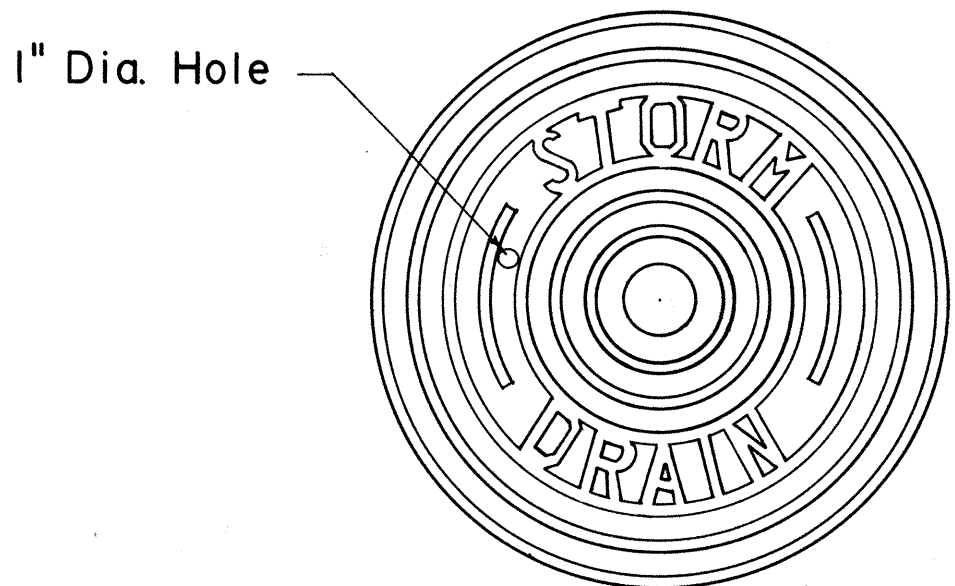
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-051-1(4)	1984	30	65



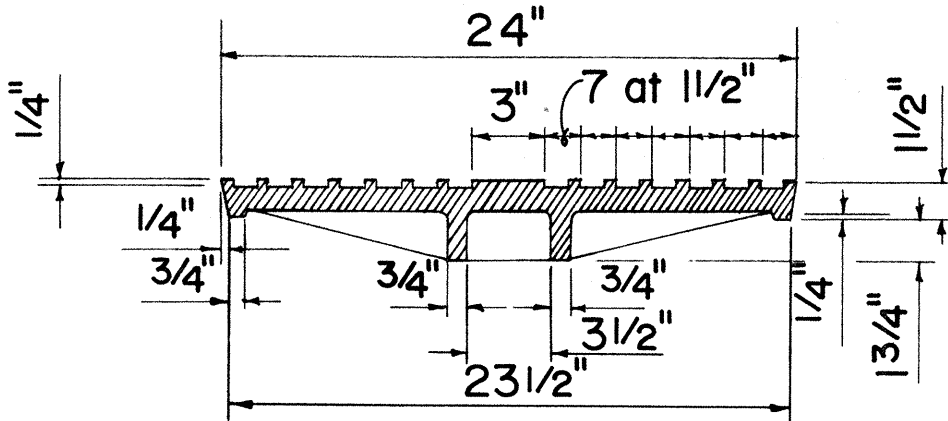
PLAN OF FRAME



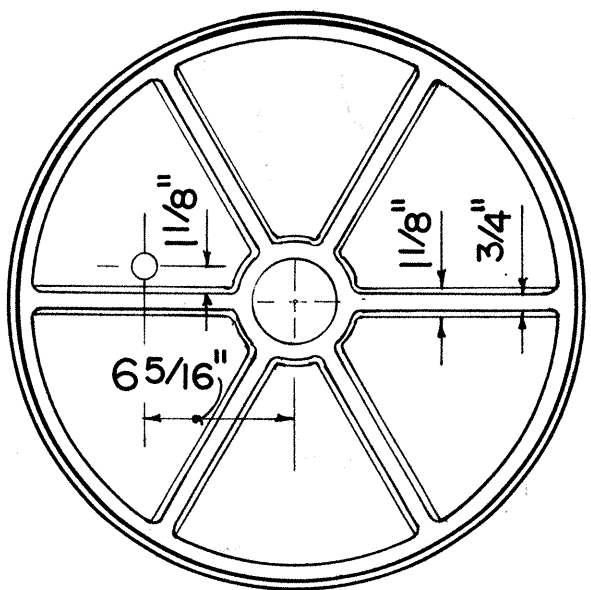
SECTION OF FRAME



TOP VIEW OF COVER

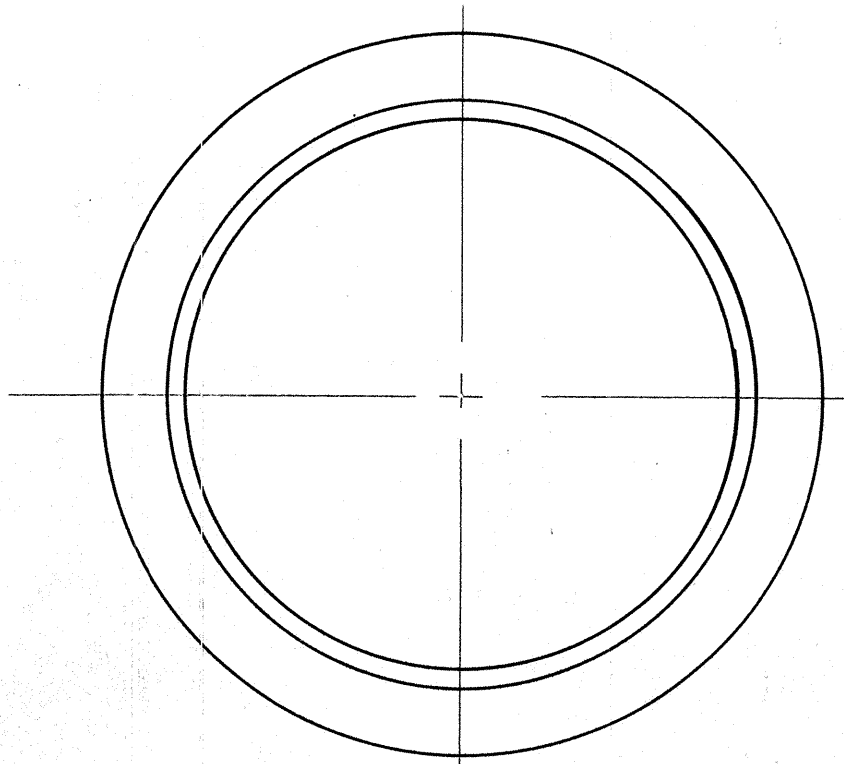


SECTION

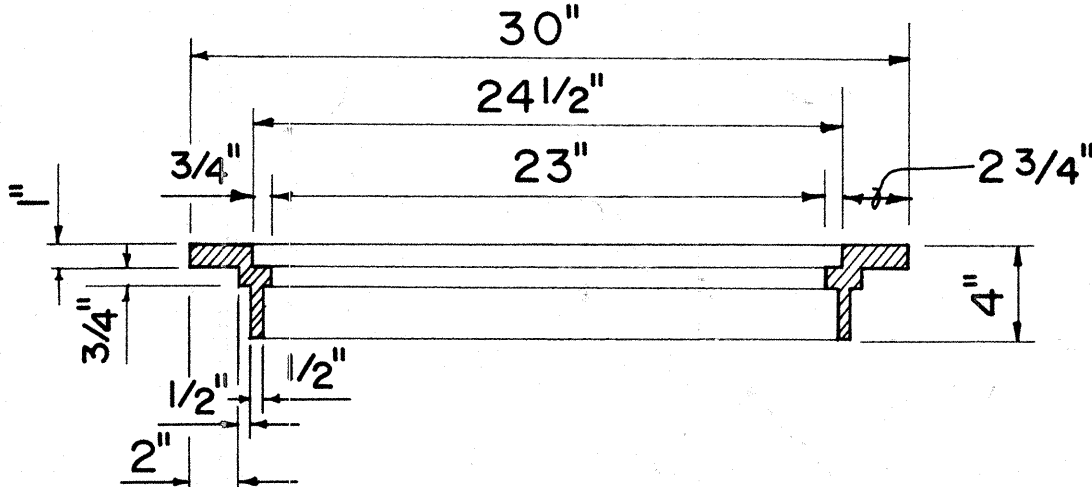


BOTTOM VIEW OF COVER

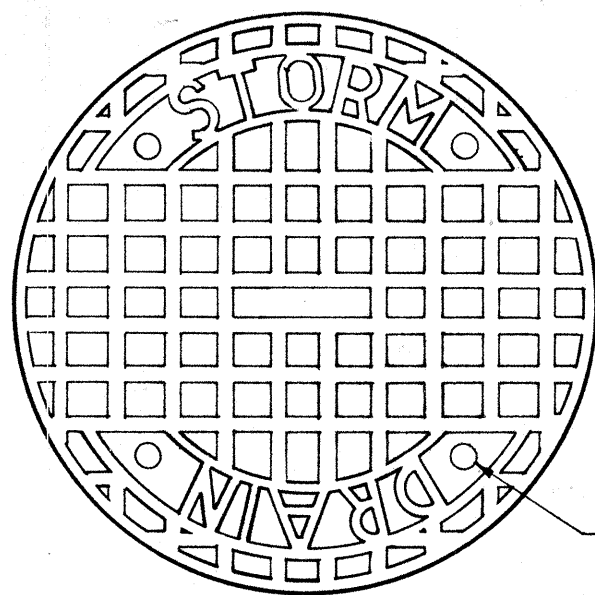
TYPE "P" CAST IRON
FRAME AND COVER



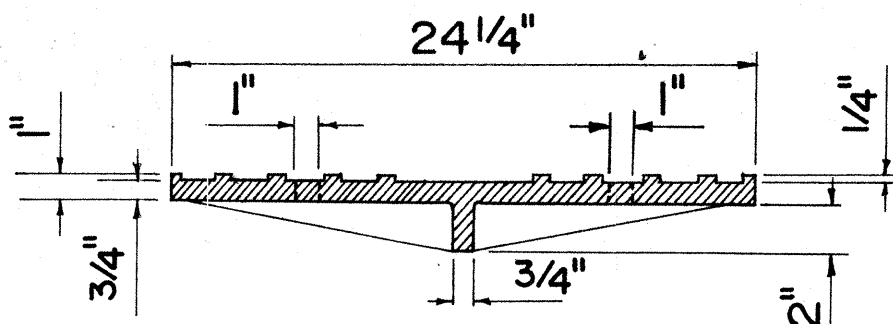
PLAN OF FRAME



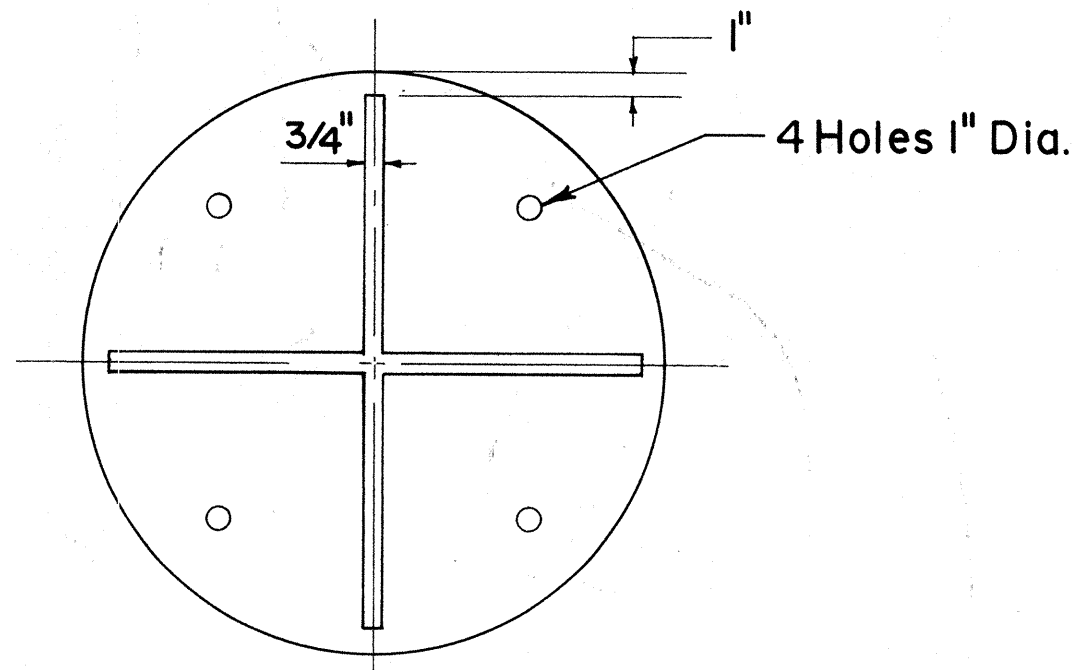
SECTION OF FRAME



TOP VIEW OF COVER

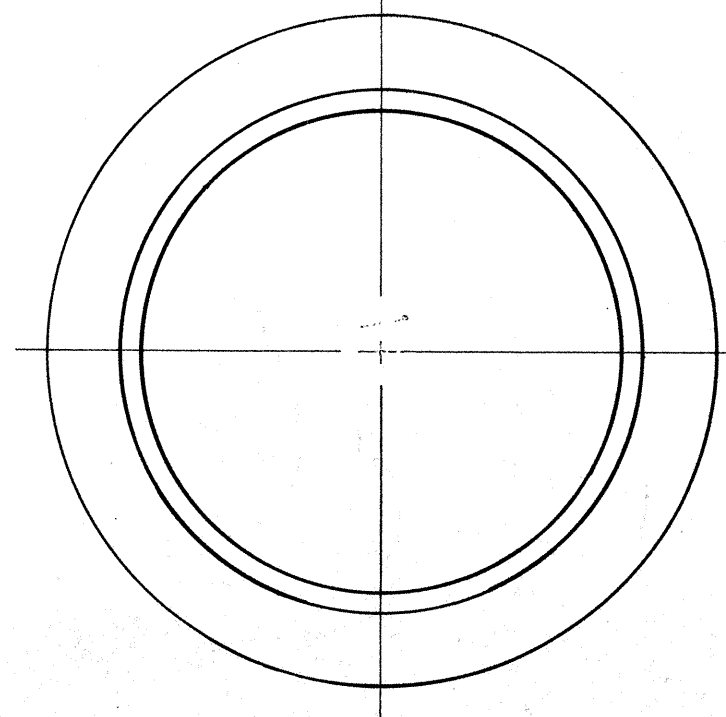


SECTION

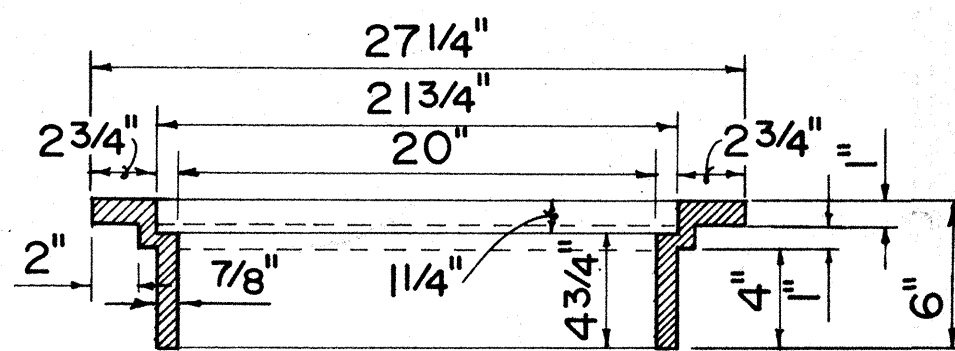


BOTTOM VIEW OF COVER

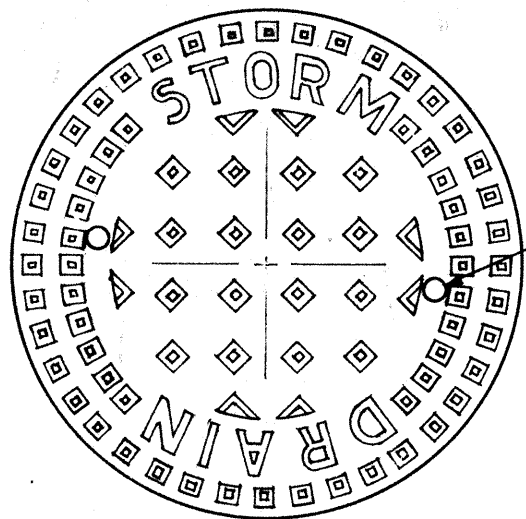
TYPE "B" CAST IRON
FRAME AND COVER



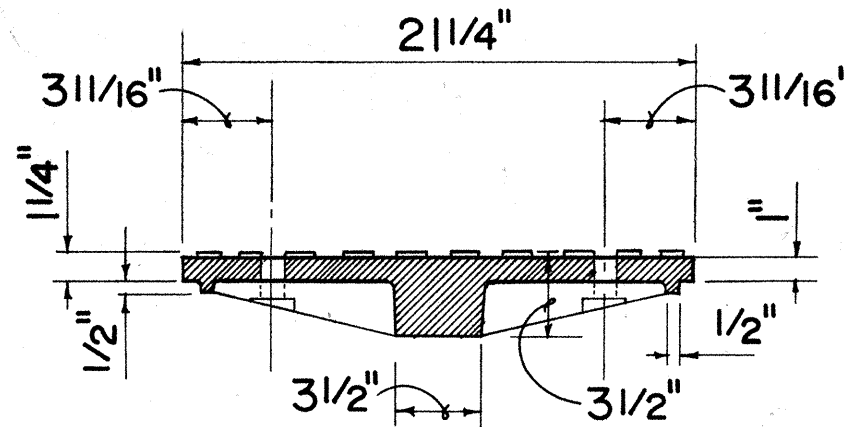
PLAN OF FRAME



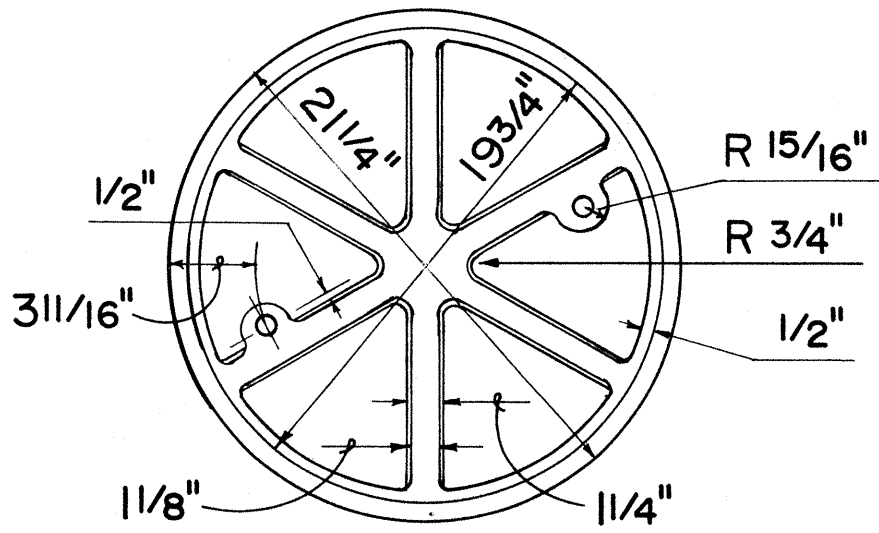
SECTION OF FRAME



TOP VIEW OF COVER

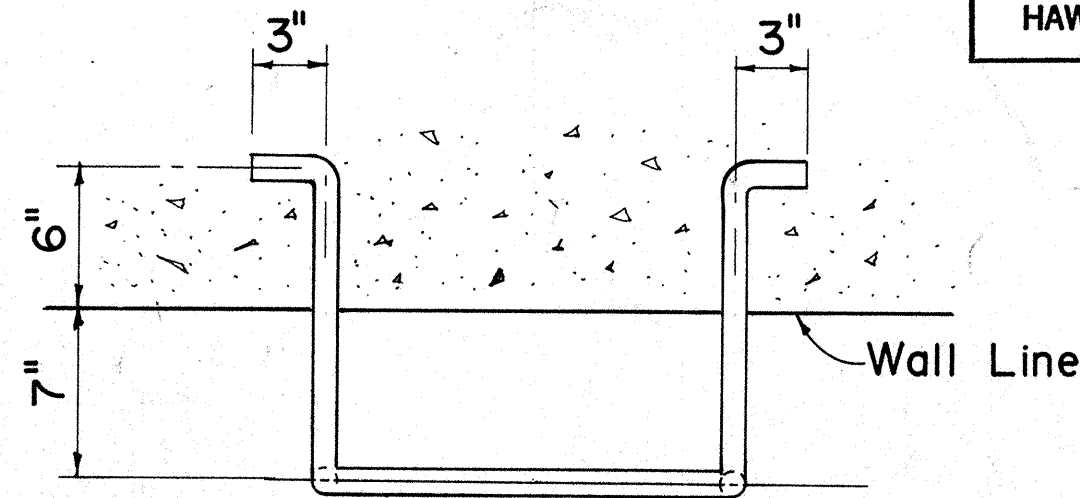


SECTION

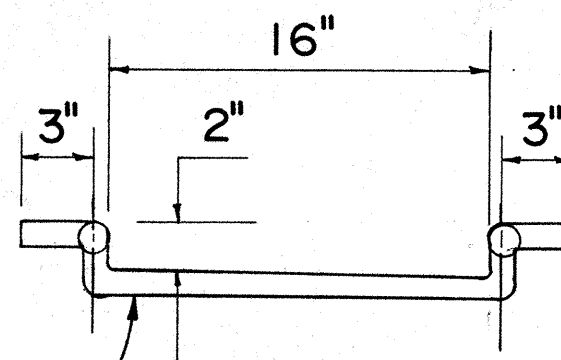


BOTTOM VIEW OF COVER

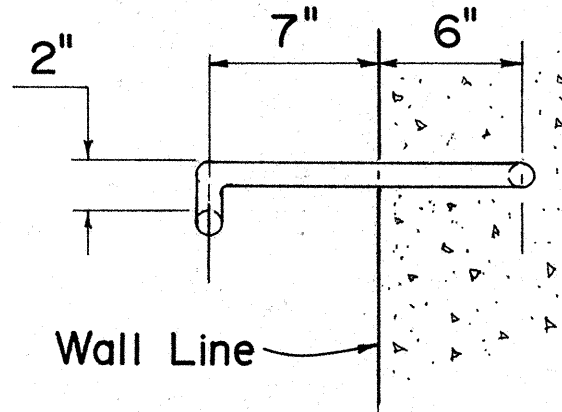
TYPE "A" CAST IRON
FRAME AND COVER



PLAN



FRONT VIEW



SIDE VIEW

MANHOLE RUNG

APPROVAL RECOMMENDED:
P. Takano 6-19-79
 HYDRAULIC DESIGN ENGINEER DATE

APPROVED:
Herbert Zakeishi 6-22-79
 ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 6 approved 12-17-69	H.P.	6/22/79

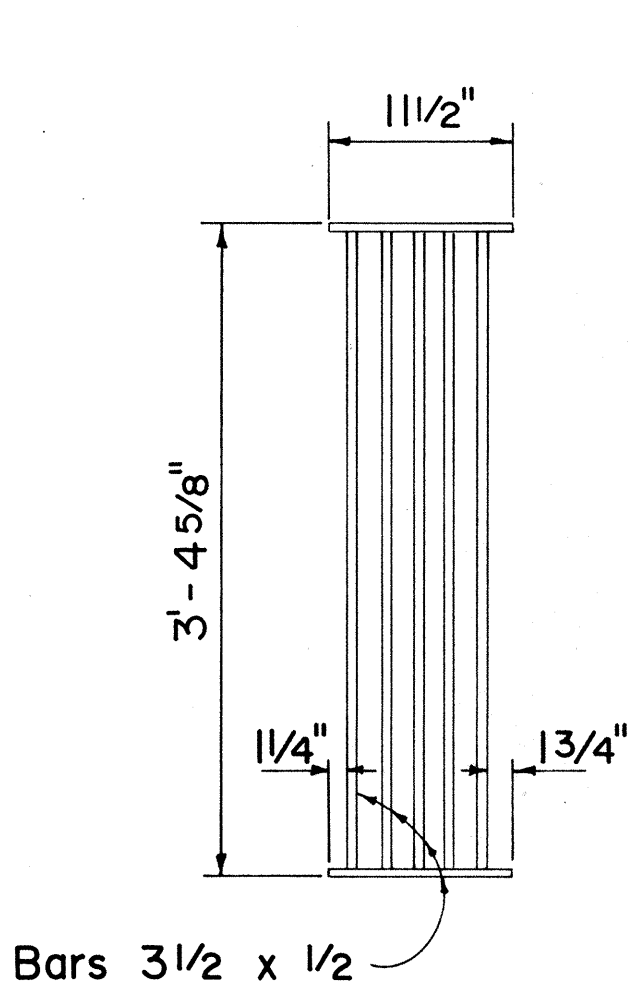
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
STANDARD DETAILS CATCH BASIN AND MANHOLE CASTINGS
Not To Scale Date: Dec. 1977

SHEET NO. 12 OF 14 SHEETS DH 6

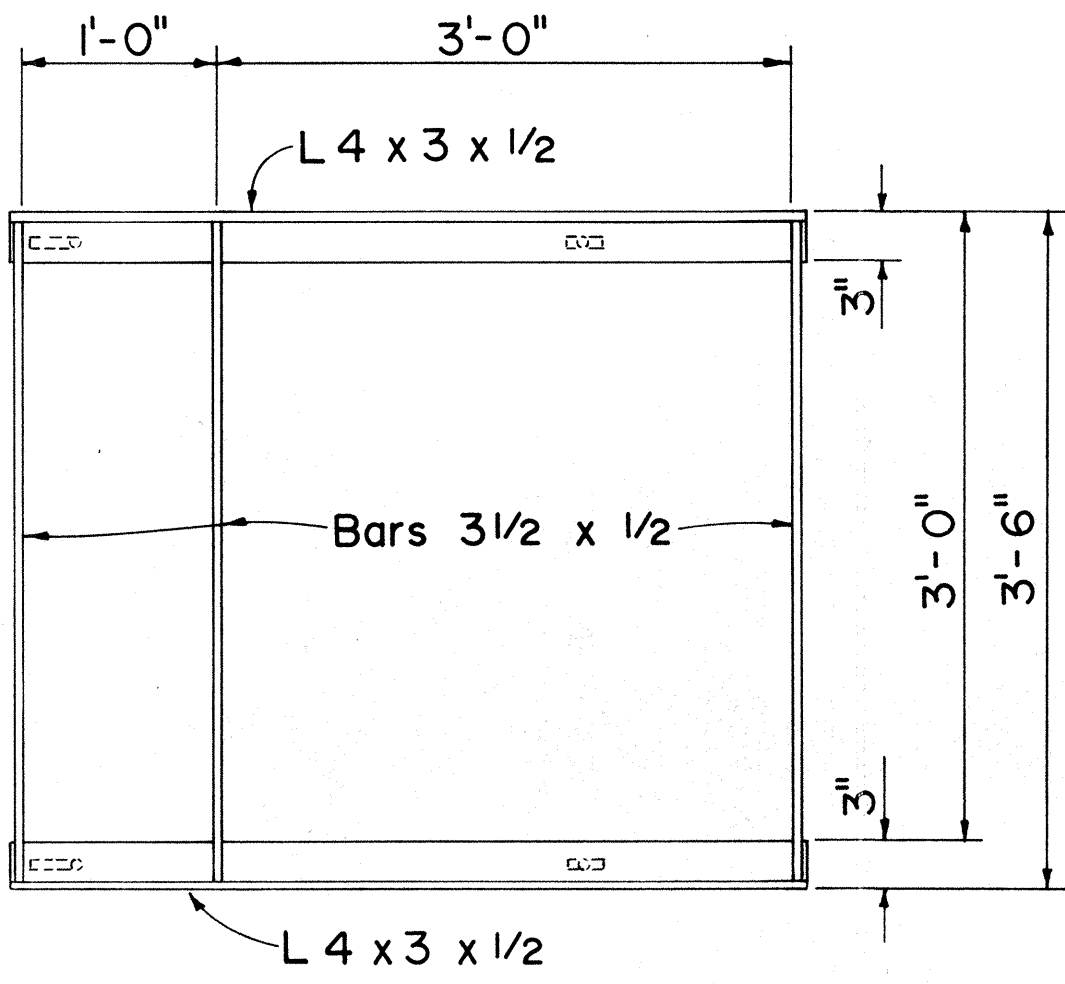
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-051-1(4)	1984	31	65

GENERAL NOTE

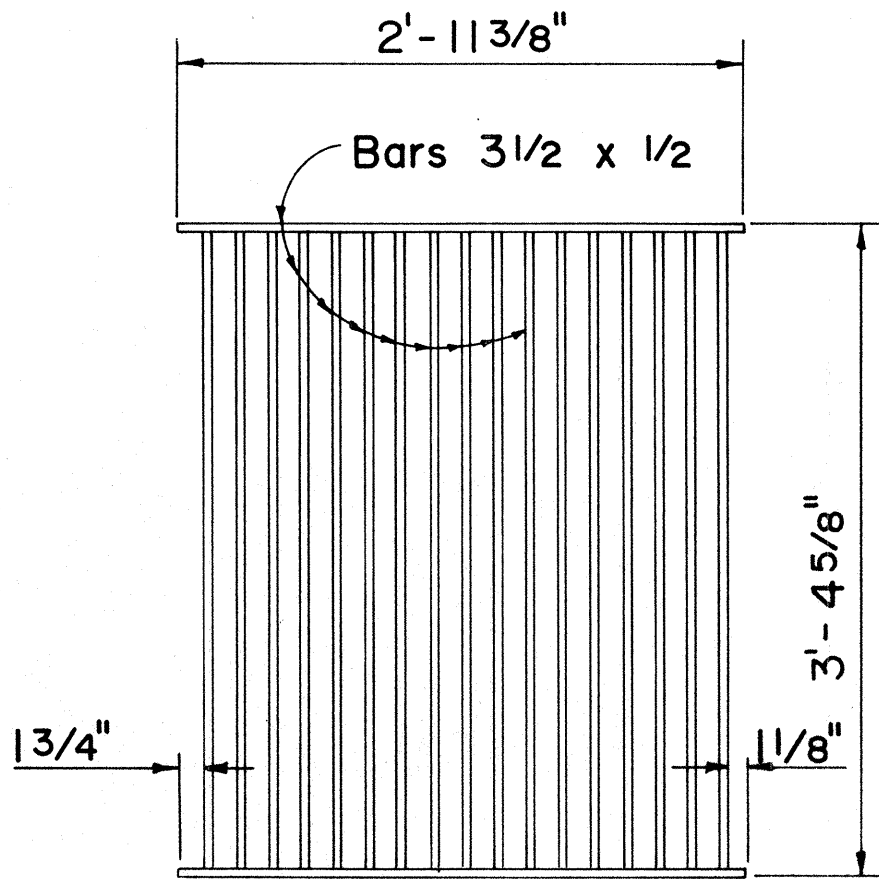
1. All welds 3/8" unless otherwise noted.



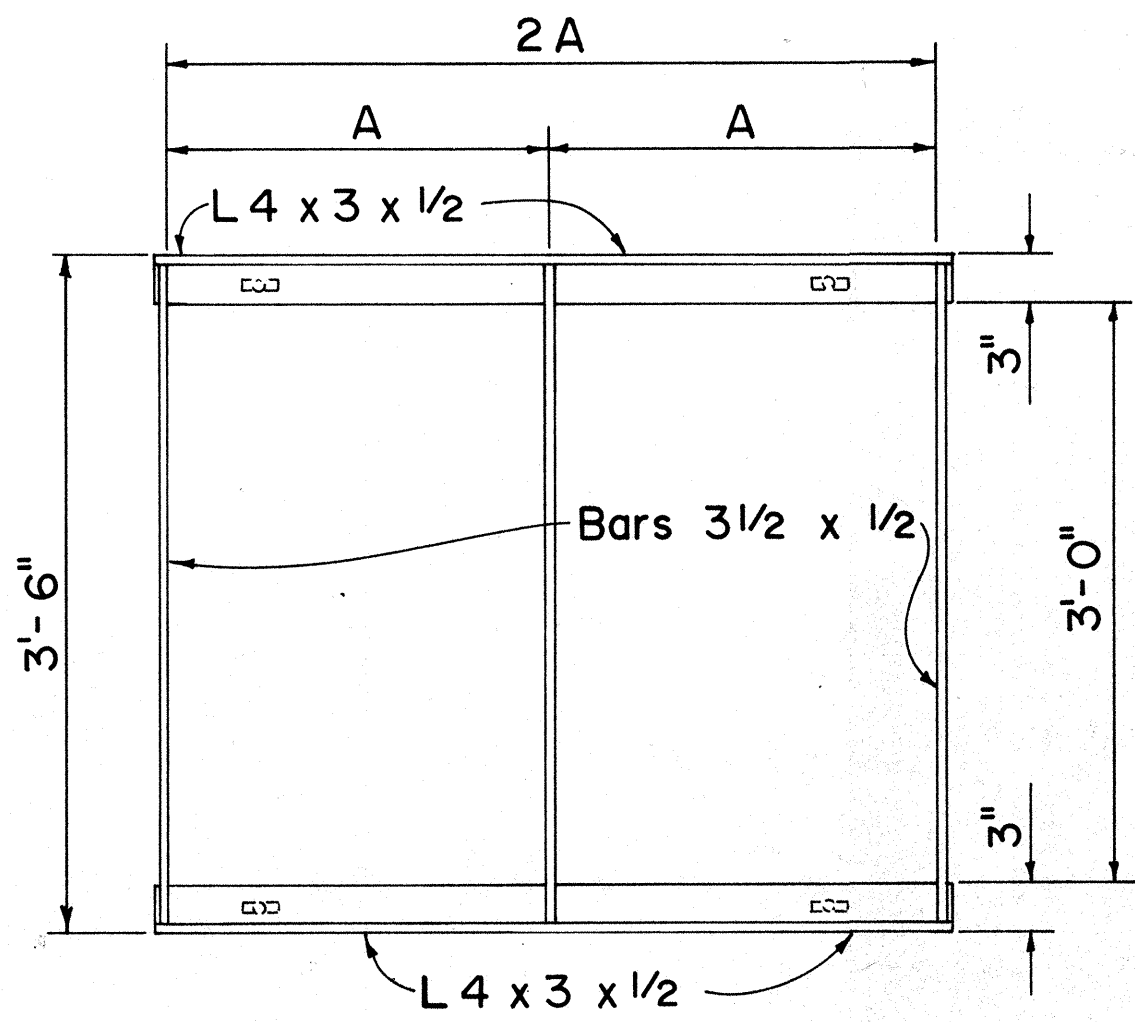
PLAN



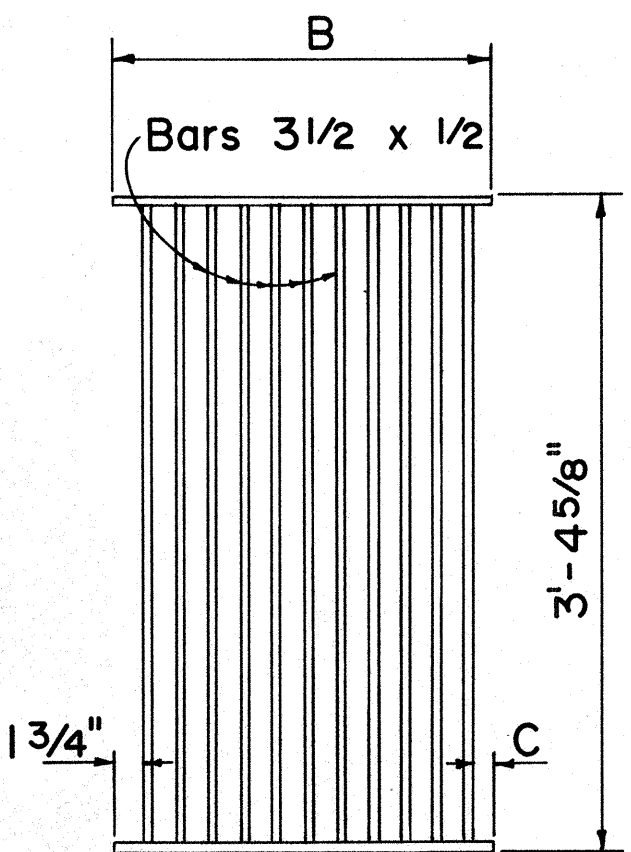
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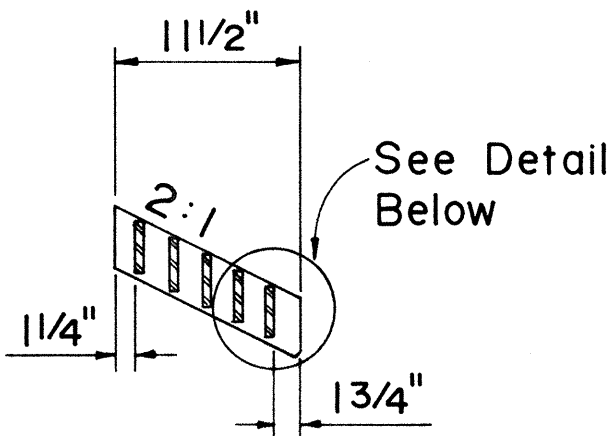
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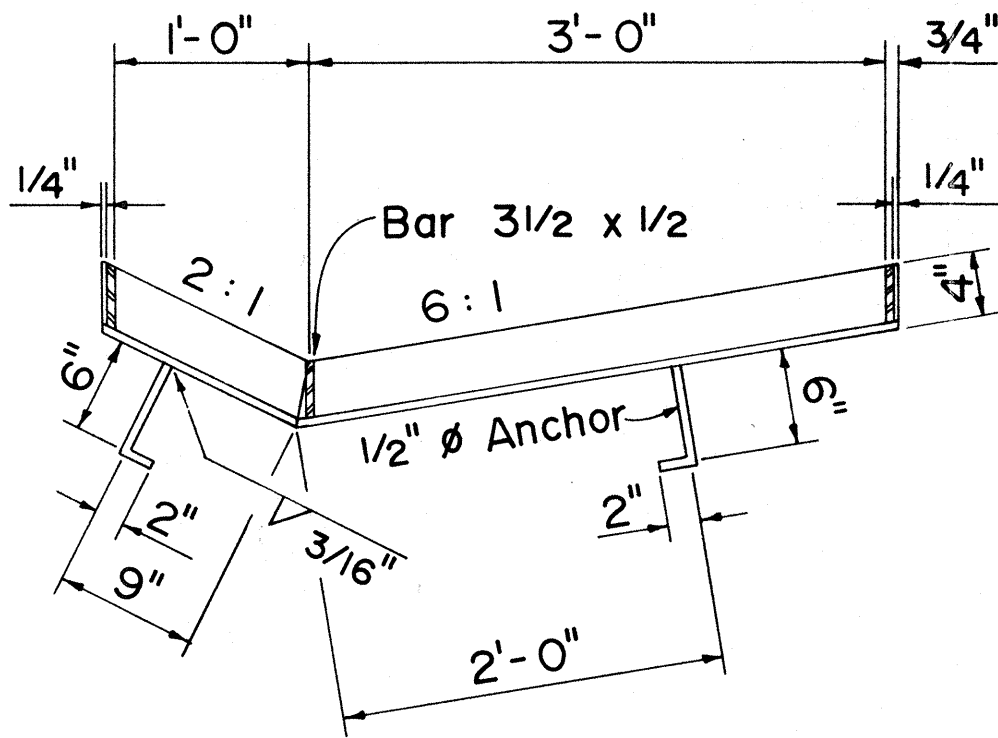
PLAN



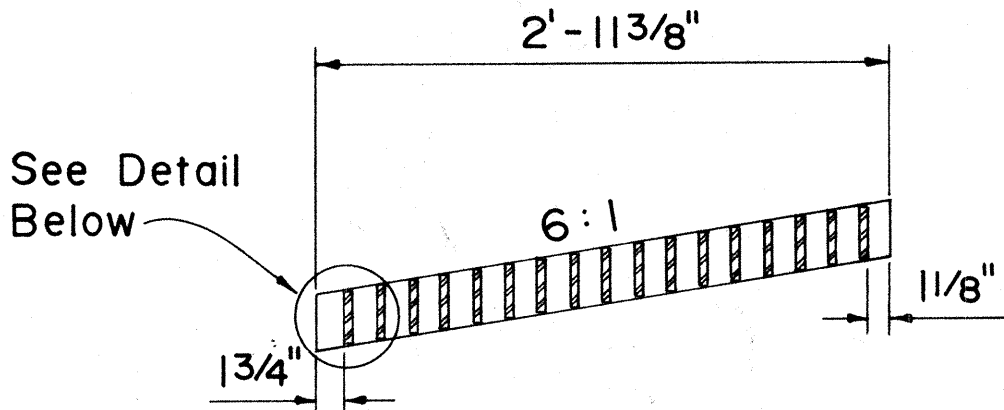
PLAN



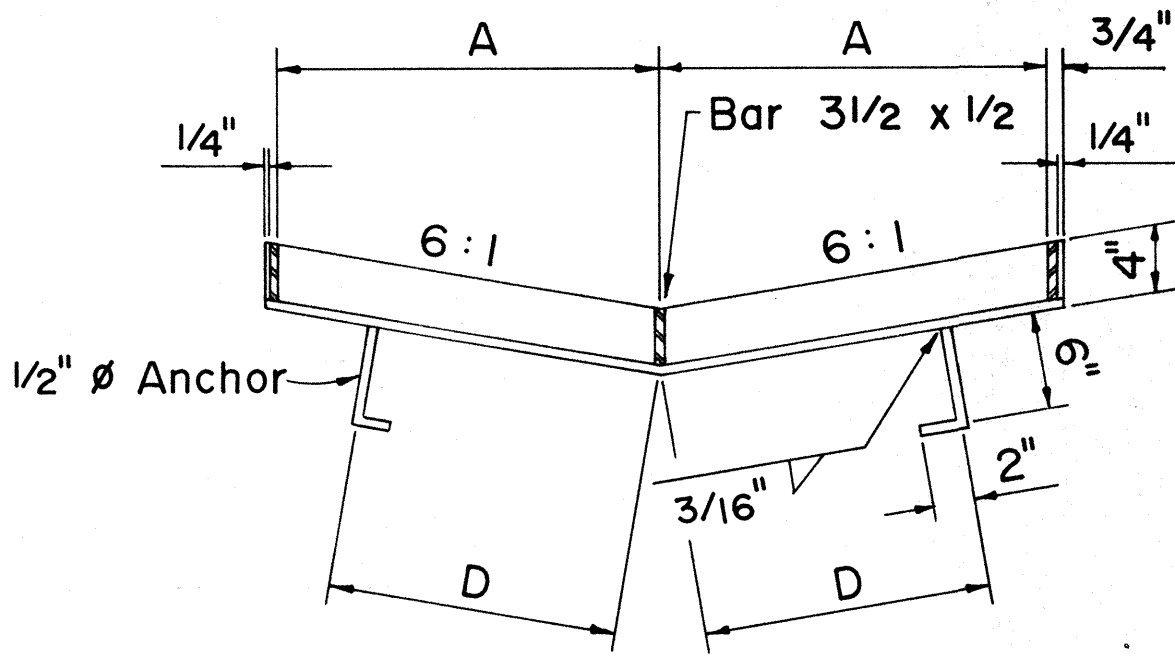
SECTION



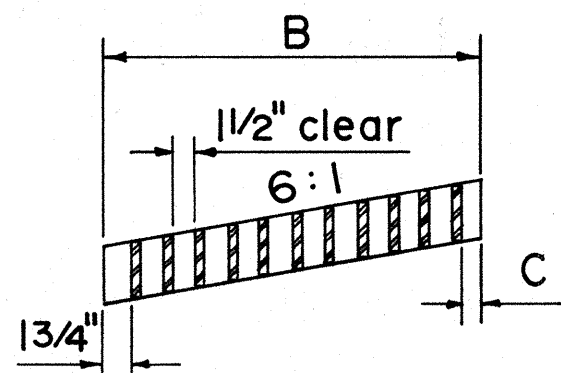
SECTION



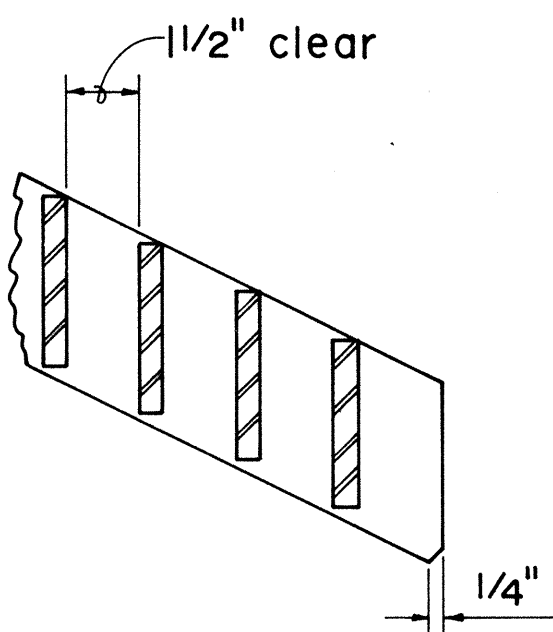
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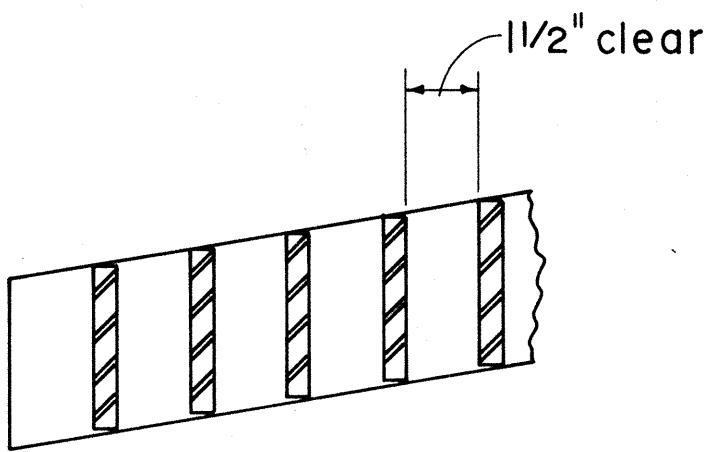
SECTION



SECTION



GRATE



GRATE

61614 OR 61616 STEEL FRAME AND GRATE

DIMENSIONS					
TYPE	NO. BARS	A	B	C	D
61614	11	2'-0"	1'-11 1/2"	1 1/4"	1'-6"
61616	17	3'-0"	2'-11 3/8"	1 1/8"	2'-0"

APPROVAL RECOMMENDED:
P. Pakano 6-19-79
 HYDRAULIC DESIGN ENGINEER DATE
 APPROVED:
Robert Zalewski 6-22-79
 ASSISTANT CHIEF, ENGINEERING DATE

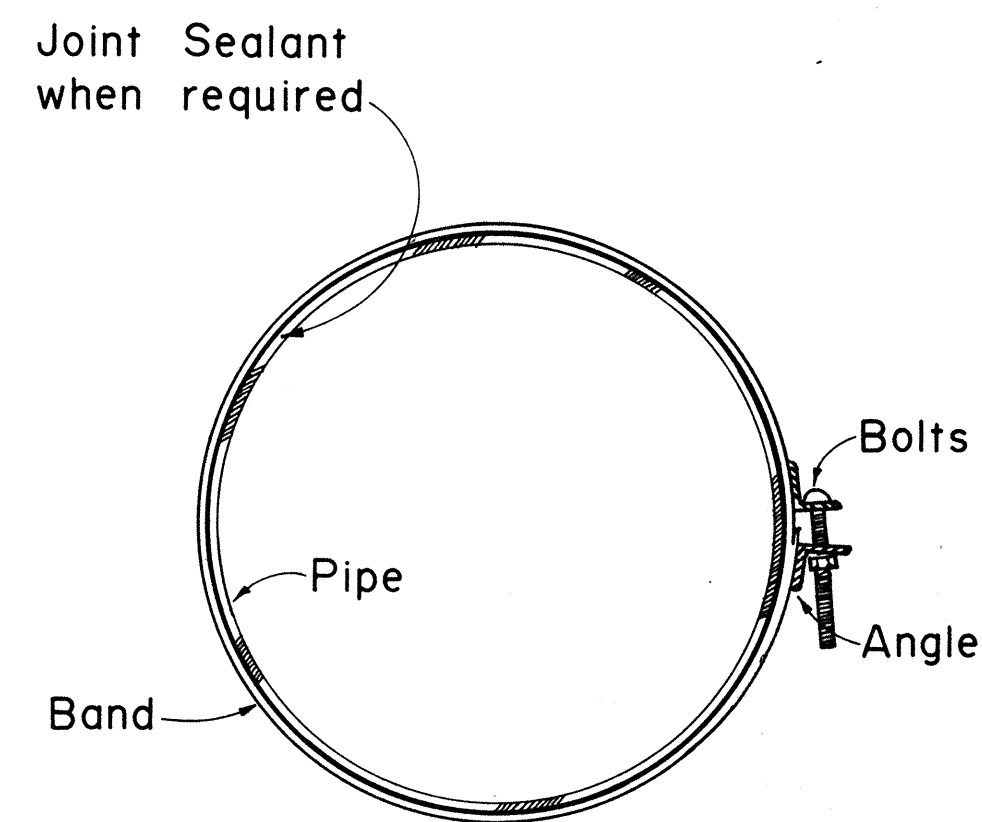
NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 8 & DH 9 approved 12-17-69	Ht.	6/22/79
2.	Revise standard nomenclature for rolled steel shapes.	Ht.	4/21/82

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
 STANDARD DETAILS
 61214, 61614 & 61616
 STEEL FRAMES AND GRATES
 Not To Scale Date: Dec. 1977

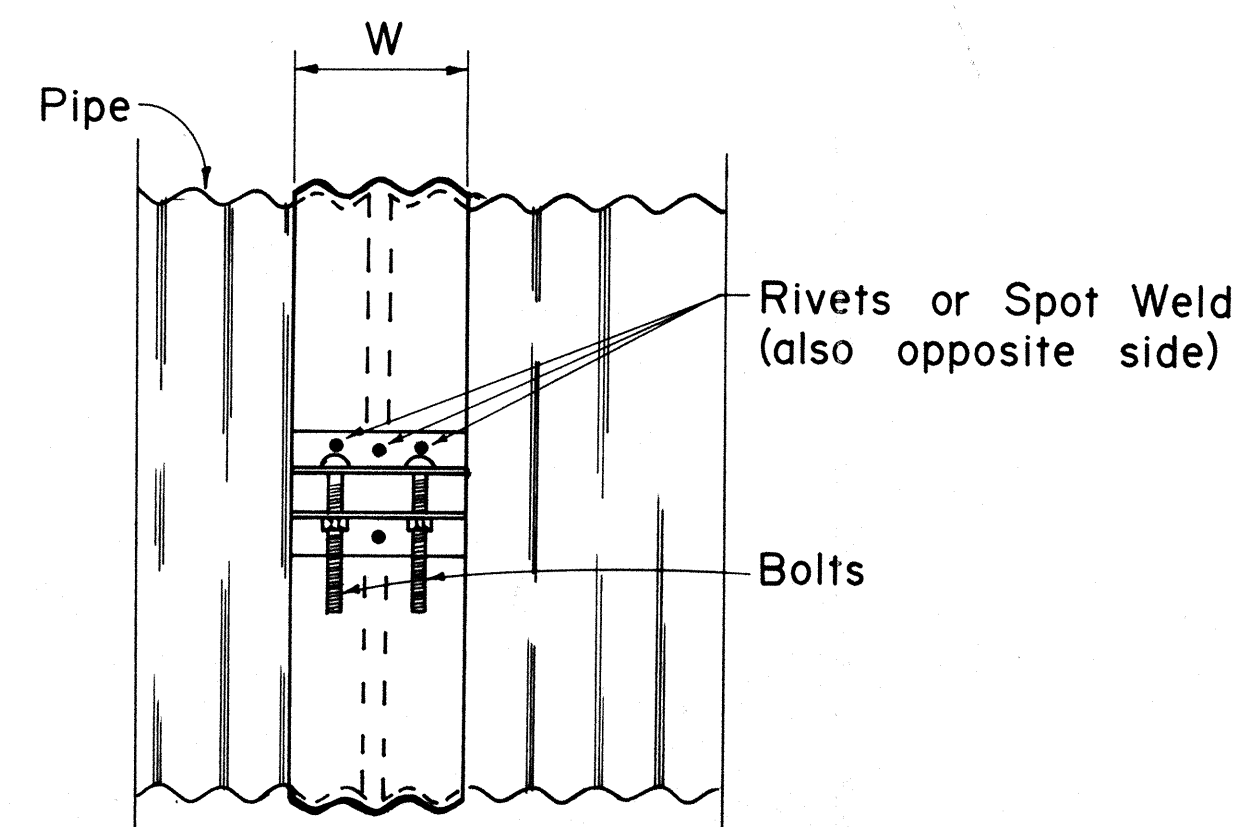
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-051-1(4)	1984	32	65

GENERAL NOTES

- All coupling band connection hardware shall be galvanized or electro plated in accordance with Standard Specifications.
- For pipe arches use same width band as for round pipe of same periphery.
- Two pieces band required for pipe greater than 48" diameter.
- Fillet welds of equivalent strengths may be substituted for spot welds or rivets.
- Dimensions and thickness shown are in inches and are nominal.
- Band thickness shall be not more than 2 standard thicknesses lighter than the thickness of the pipe, and, in no case shall be lighter than 0.079 inch.

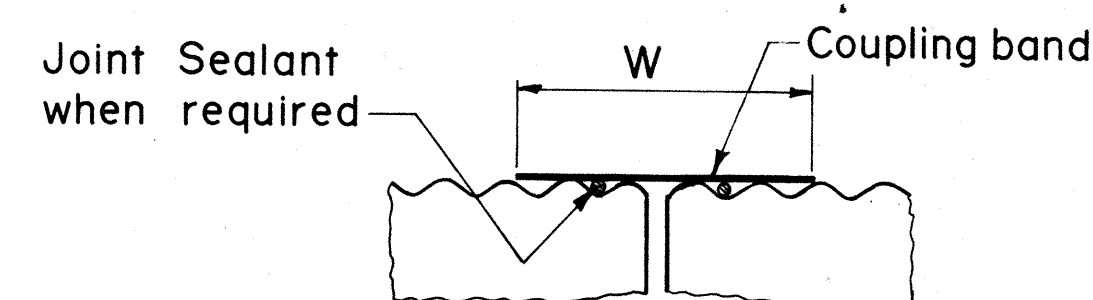
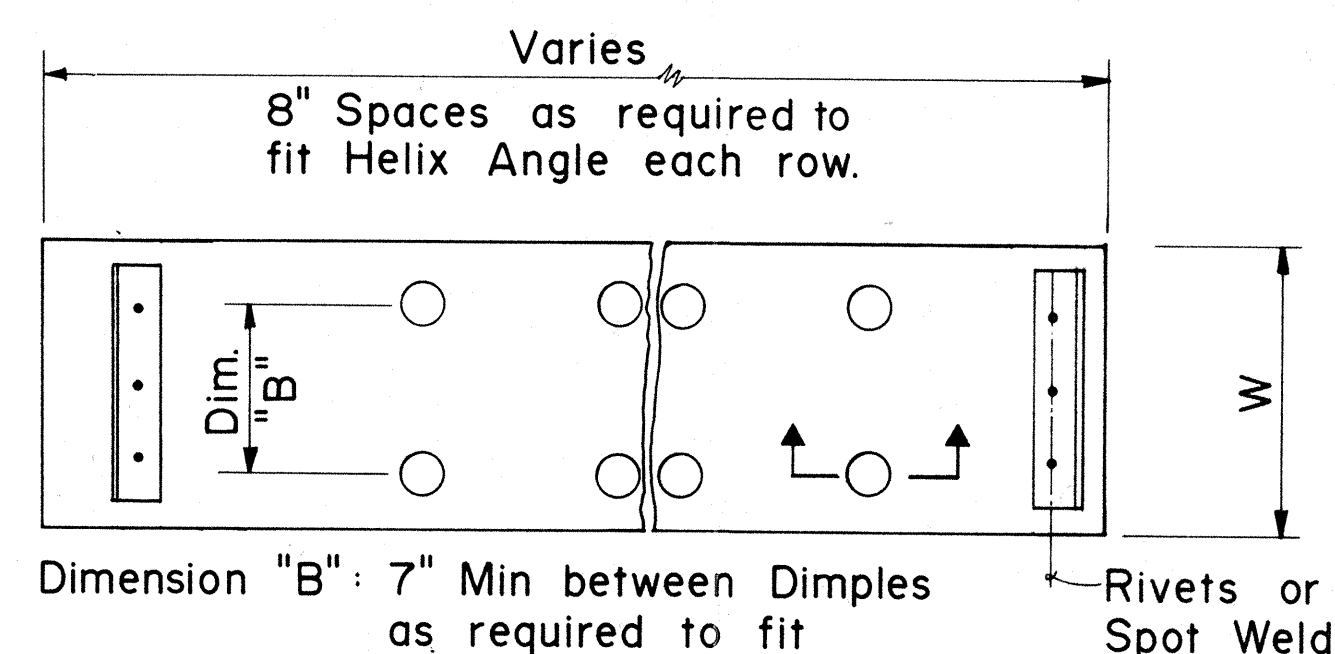
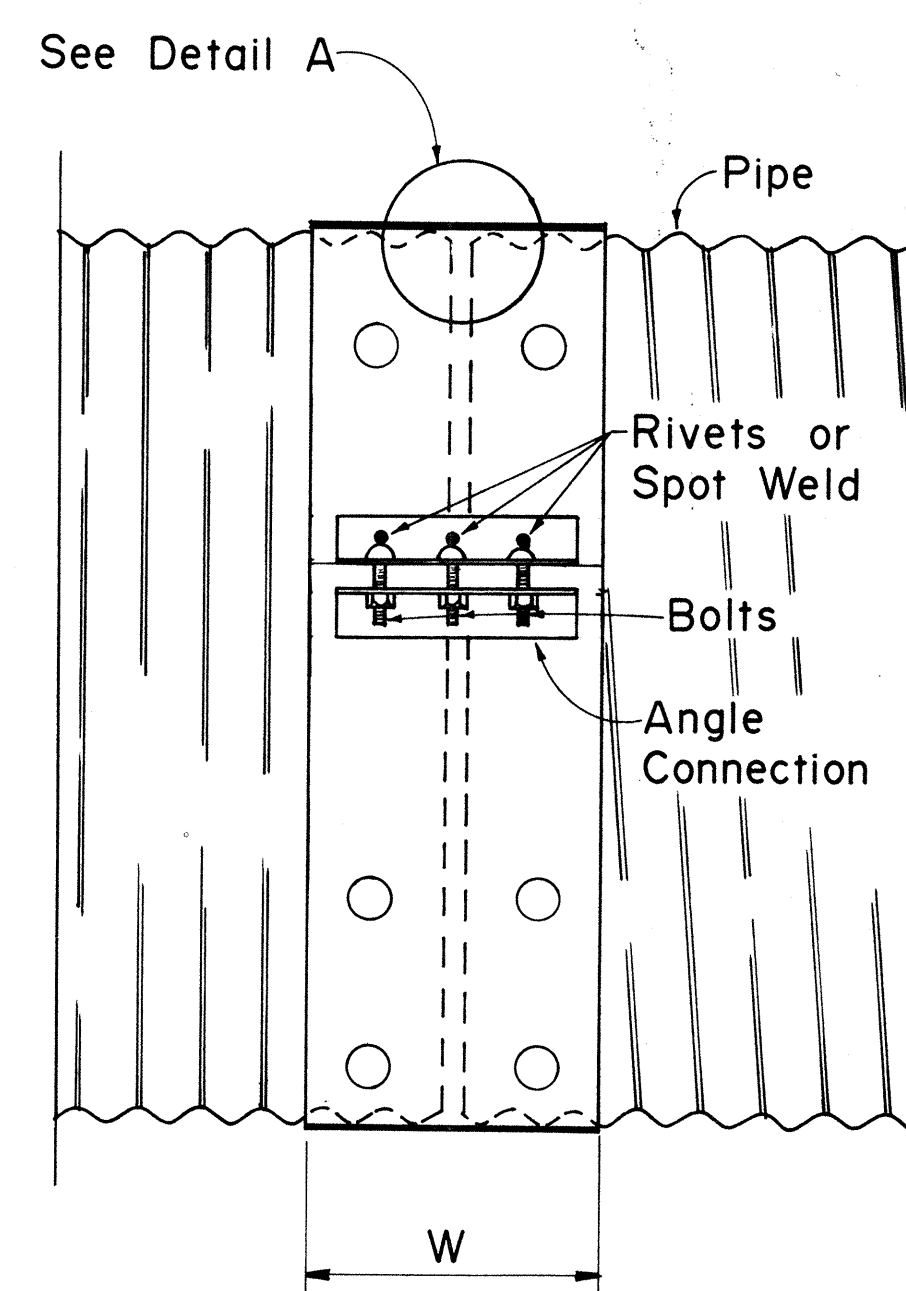


END VIEW



SIDE VIEW

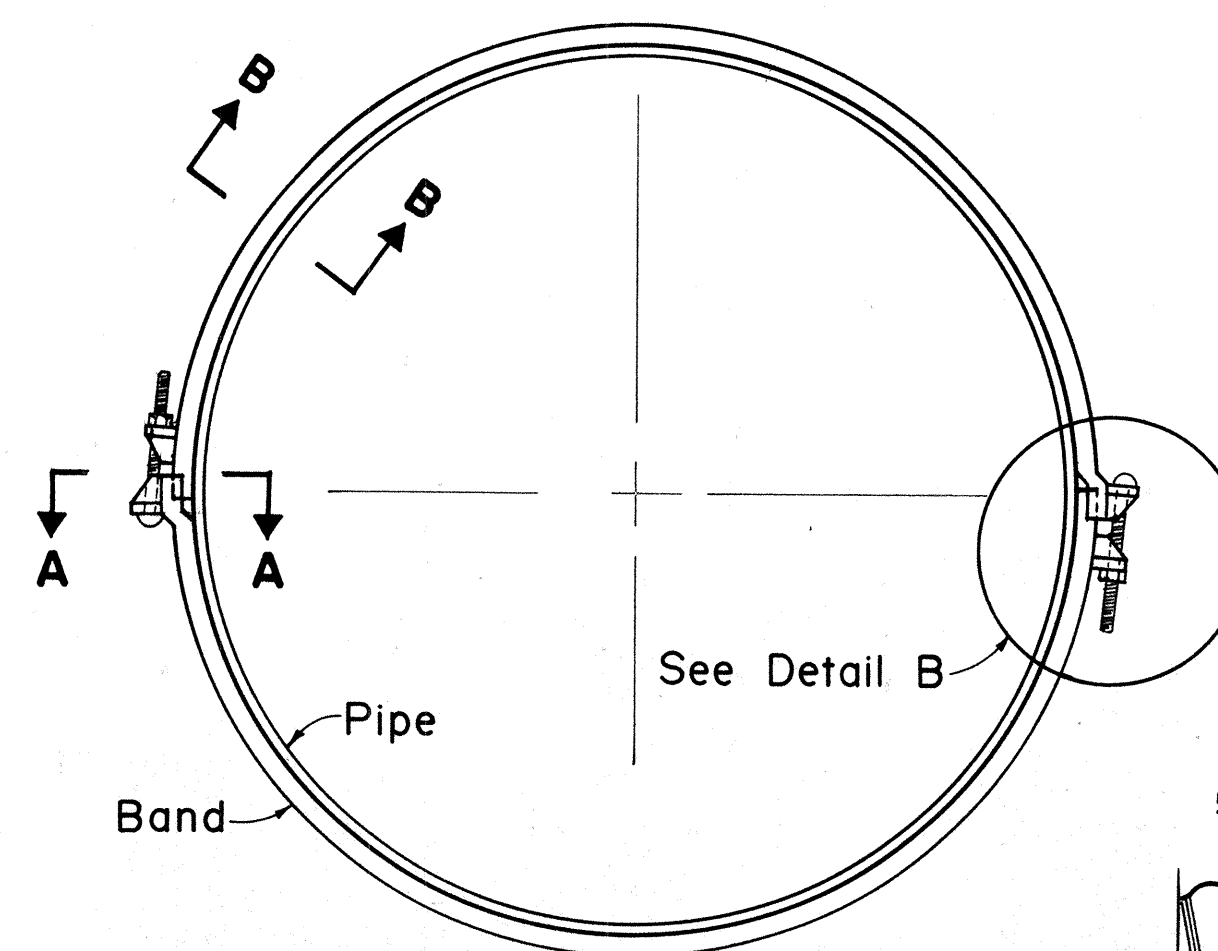
ANNULAR COUPLING BAND



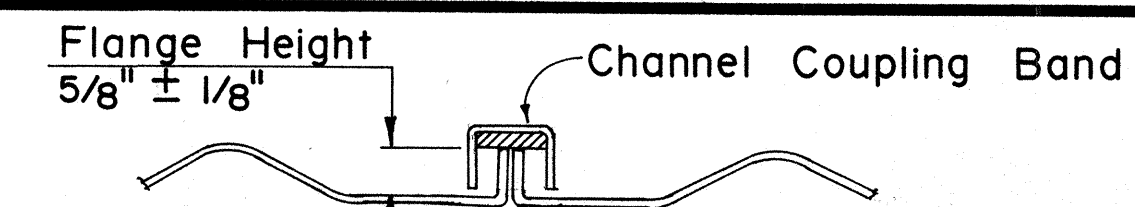
DETAIL A

SECTION THRU DIMPLES

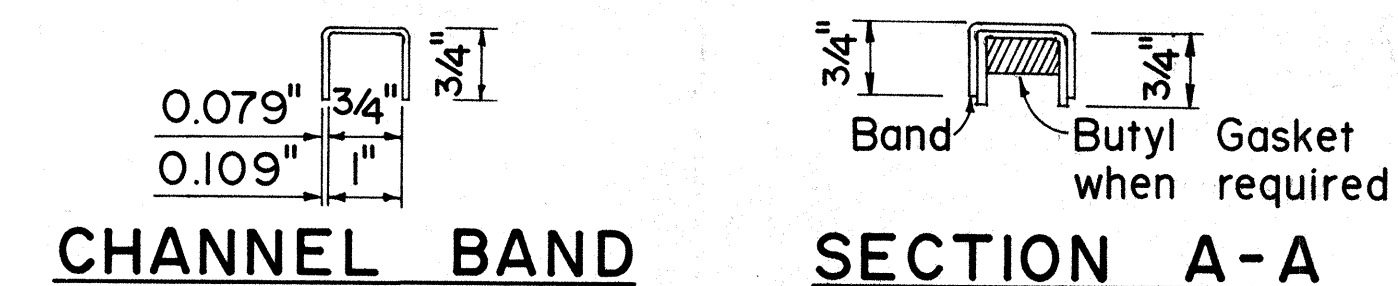
UNIVERSAL COUPLING BAND ANGLE CONNECTION



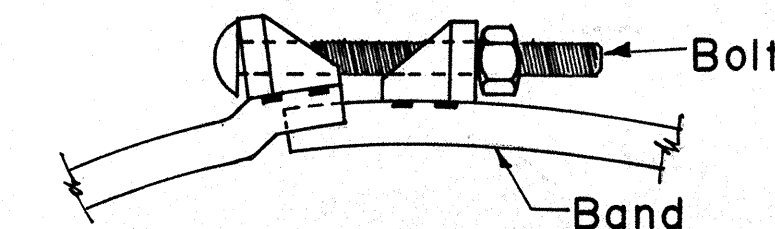
END VIEW



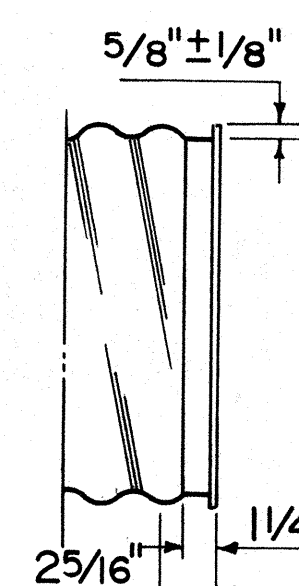
SECTION B-B BOX END LUG CONNECTOR



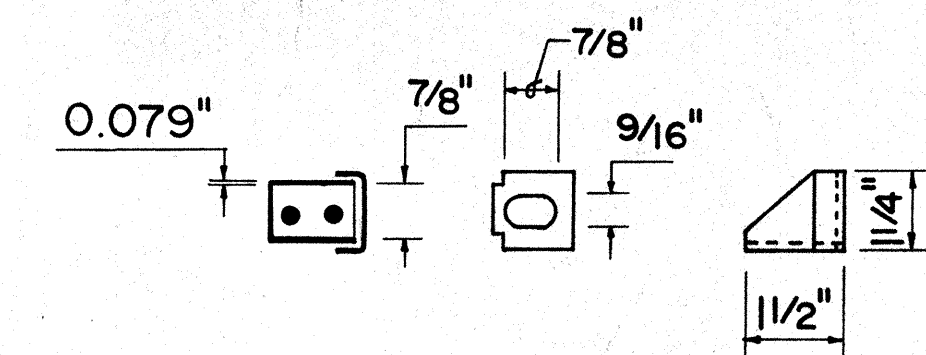
CHANNEL BAND SECTION A-A



DETAIL B

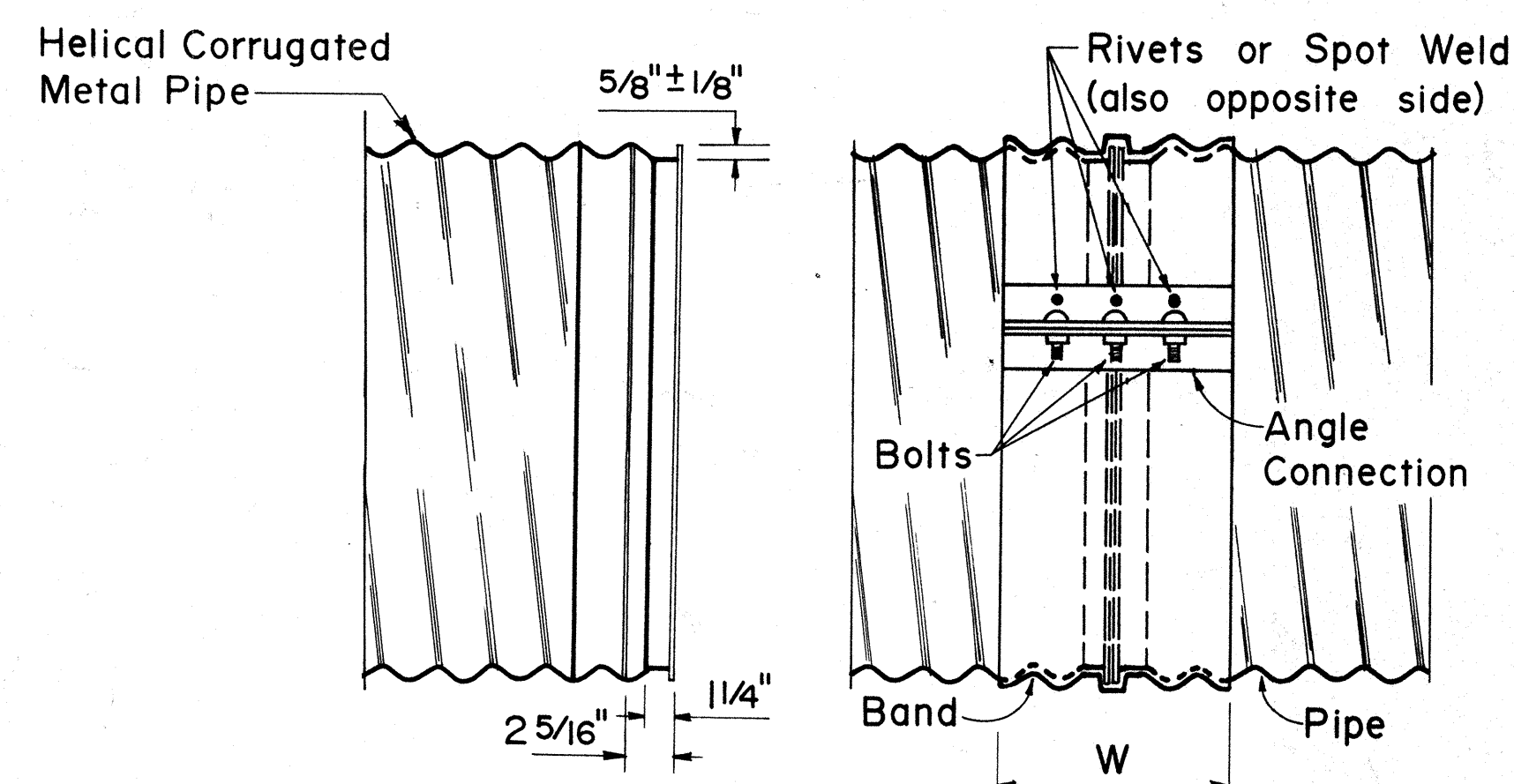


REFORMED END

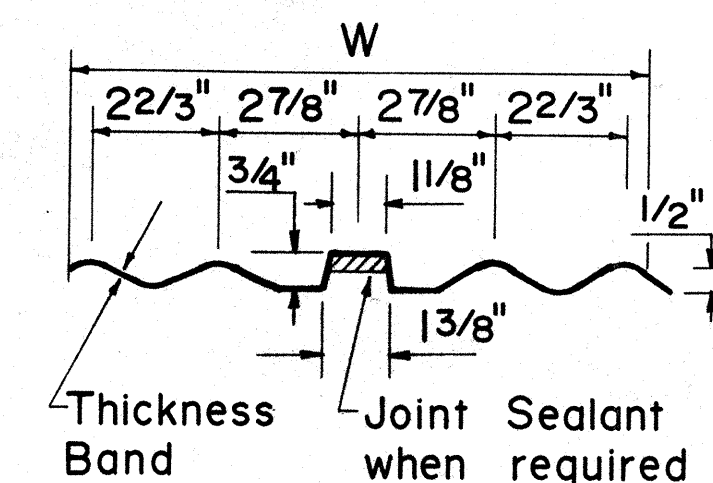


DETAIL LUG

CHANNEL COUPLING BAND FOR USE ON REFORMED END C.M.P.



REFORMED END SIDE VIEW



SECTION

WING CHANNEL COUPLING BAND FOR REFORMED END H.C.M.P.

COUPLING TYPE	CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS	ANGLE CONNECTIONS-QUANTITIES PER CONNECTION			
					DIMENSIONS	BOLTS	RIVETS	SPOT WELD
UNIVERSAL	22/3 x 1/2	12 - 36	10 1/2	0.079-0.138	2ea 2x2x3/16x 7	2 ea 1/2 x 6	3ea 3/8	3ea 1/2
		42- 60	16 1/2	0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
		66-84	16 1/2	0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	
	3 x 1	36 - 72	10 1/2	0.079-0.138	2ea 2x2x3/16x 7	2 ea 1/2 x 6	3ea 3/8	
		78-120	16 1/2	0.079-0.138	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	
ANNULAR	22/3 x 1/2	12 - 36	7	0.079-0.138	2ea 2x2x3/16x 7	2 ea 1/2 x 6	3ea 3/8	3ea 1/2
		42- 72	12	0.079-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
		78- 84	12	0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
	3 x 1	36- 42	14	0.079-0.109	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	
		48- 84	14	0.079-0.109	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
		90-120	14	0.079-0.109	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	

COUPLING TYPE	CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS	LUG TYPE CONNECTORS-QUANTITIES PER CONNECTION		
					DIMENSIONS	BOLTS	SPOT WELD
CHANNEL	22/3 x 1/2	12 - 72		0.079-0.138	2 ea Lugs	1 ea 1/2 x 6	4 ea 1/2
		36- 72		0.079-0.138	2 ea Lugs	1 ea 1/2 x 6	4 ea 1/2
WING	22/3 x 1/2	12 - 72	12	0.079-0.138	6 ea Lugs	3 ea 1/2 x 6	12ea 1/2
		78- 84	12	0.168	6 ea Lugs	3 ea 1/2 x 6	12ea 1/2
	3 x 1	36-120	12	0.079-0.109	6 ea Lugs	3 ea 1/2 x 6	12ea 1/2

APPROVAL RECOMMENDED:
P. Pakano 9-7-79
 HYDRAULIC DESIGN ENGINEER DATE

APPROVED:
Robert S. Zafish 9-14-79
 ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

STANDARD DETAILS
 C.M.P. COUPLING DETAILS
 STANDARD JOINT

Not To Scale Date: Sept. 1979