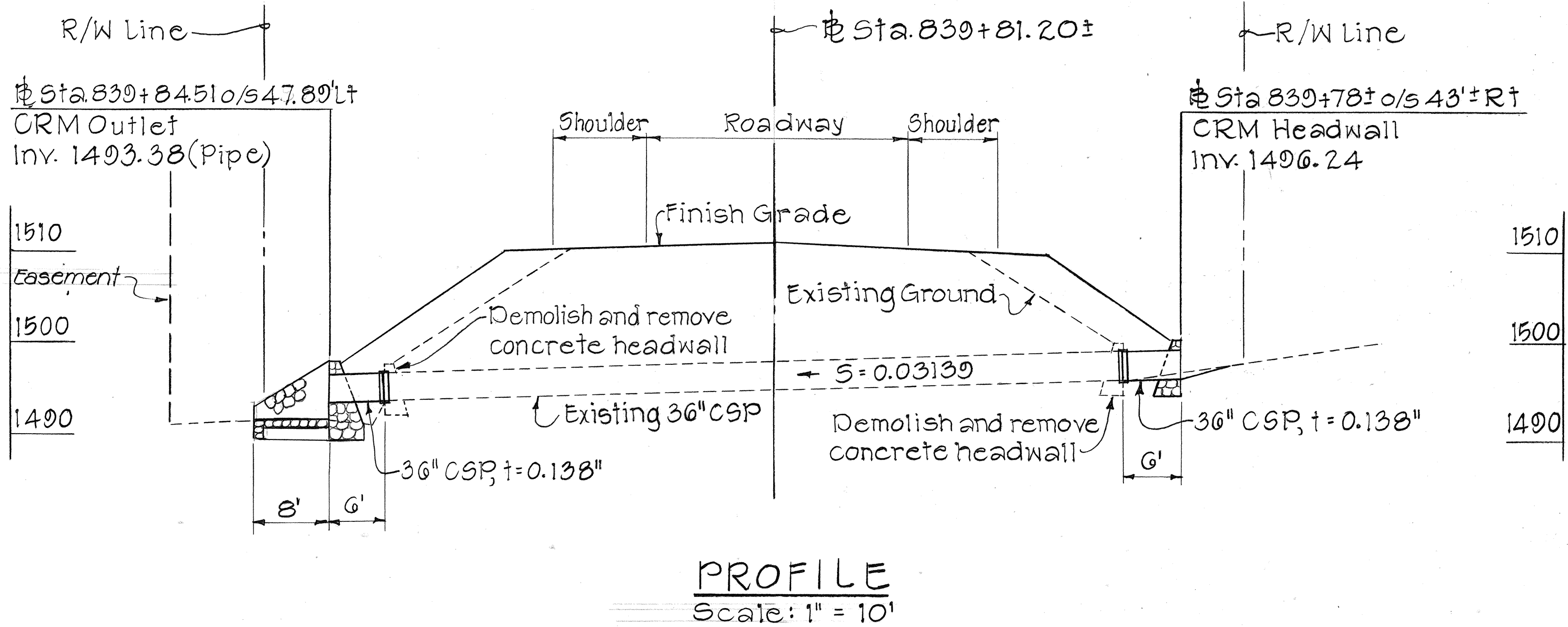
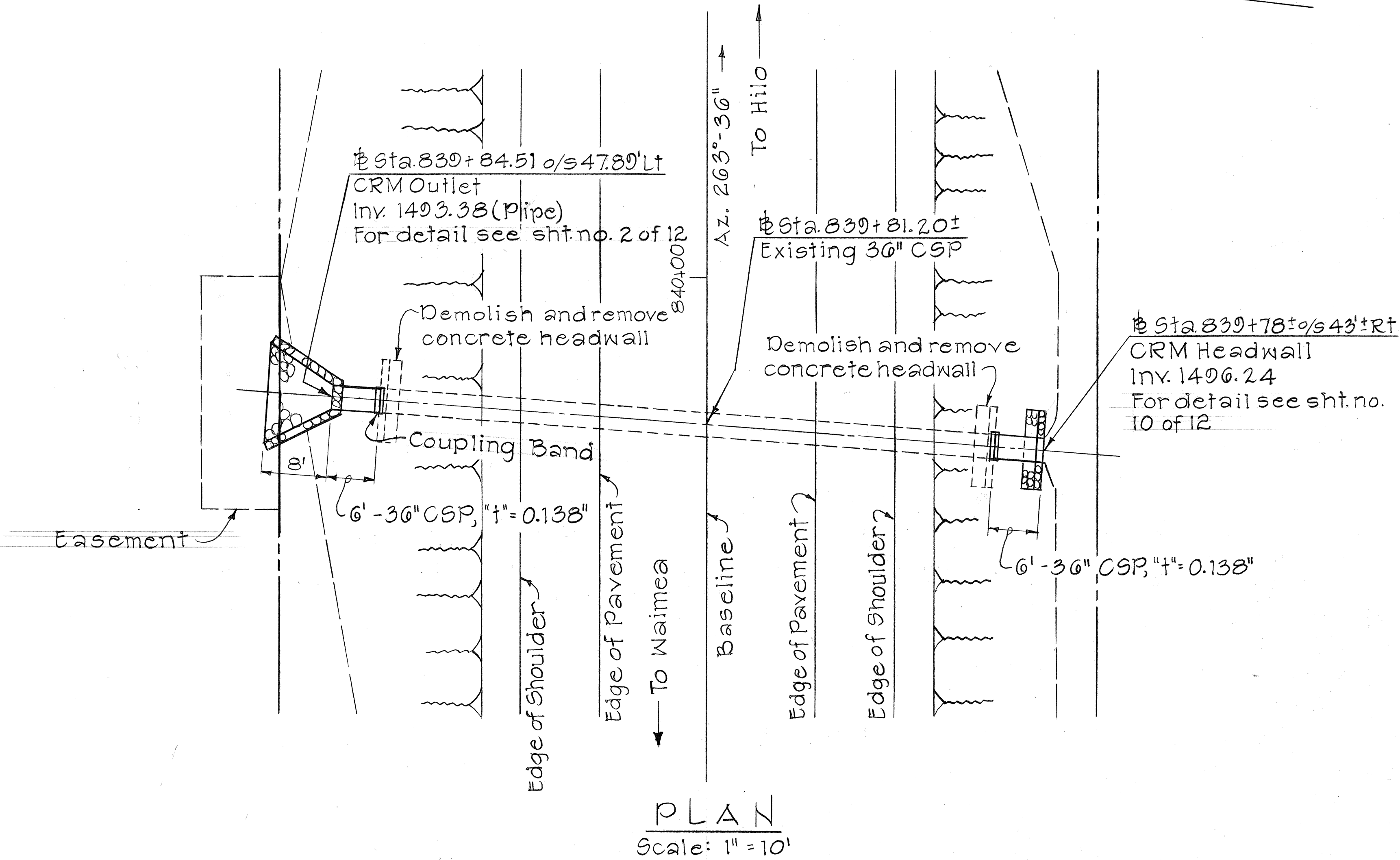


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-010-1(15)	1985	12	43

ESTIMATED QUANTITIES

DRAINAGE FACILITY	UNIT USED	C.Y.	C.Y.	C.Y.	C.Y.	LBS.	C.Y.	L.F.	L.F.	L.F.	C.Y.
	STATION TYPE OF STRUCTURE	Structure Excavation Other Than at Bridges	Ditch and Channel Excavation	Class A Concrete Other Than in Bridges	Cement Rubble Masonry	Reinforcing Steel Other Than in Bridges	Bed Course Material For Culvert	36-Inch Corrugated Steel Pipe, Sht. Thk., 0.138 Inch	60-Inch Structural Steel Plate Pipe No. 10 Gage	78-Inch Structural Steel Plate Pipe No. 10 Gage	Grouted Rubble Paving
A	Sta. 839+78 ± 43' Rt. CRM Headwall	16.0	0.7		4.0			6			
	Sta. 839+84.5 ± 48' Lt. CRM Outlet	16.0	1.0		14.1			6			1.4
B	Sta. 841+81.50 ± 36.19' Rt. Concrete Inlet	27.0		7.5		180		12			
	Sta. 842+57.23 ± 63.07' Lt. CRM Outlet	33.0	44.5		7.6			10			1.5
C	Sta. 846+30.48 ± 38' Rt. CRM Inlet	44.0			11.5	4.0		8			
	Sta. 846+30.48 ± 39' Lt. CRM Outlet	45.6			12.7	4.0		8			3.4
D	Sta. 851+05 ± 34' Rt. to Sta. 851+34 ± 40.5' Rt. Spillway		3.5	1.8							
	Sta. 851+44.19 ± 36.86' Lt. CRM Headwall	88.9			19.3	7.1			12		
	Sta. 851+95.81 ± 36.86' Lt. CRM Outlet	55.9			54.4	5.9			10	5.3	
E	Sta. 854+40 ± 31' Rt. CRM Inlet	19.1			7.8			8			
	Sta. 854+40 ± 50' Lt. CRM Outlet	48.0			5.4			6			1.4
F	Sta. 857+49.80 ± 42' Lt. 2' High Wall on Exist. Outlet			2.1	120						
TOTAL		422.7	49.7	11.4	136.8	300	21.0	52	16	22	13.0

NOTE: Drainage Facilities "A", "B", "C", "D", "E", & "F" shall be paid for on a lump sum basis.



36" CULVERT AT STA. 839+81.20±

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

DRAINAGE DETAILS

HAWAII BELT ROAD

INTERSECTION IMPROVEMENTS

AT PLUMERIA ROAD

FED AID PROJECT NO. F-010-1(15)

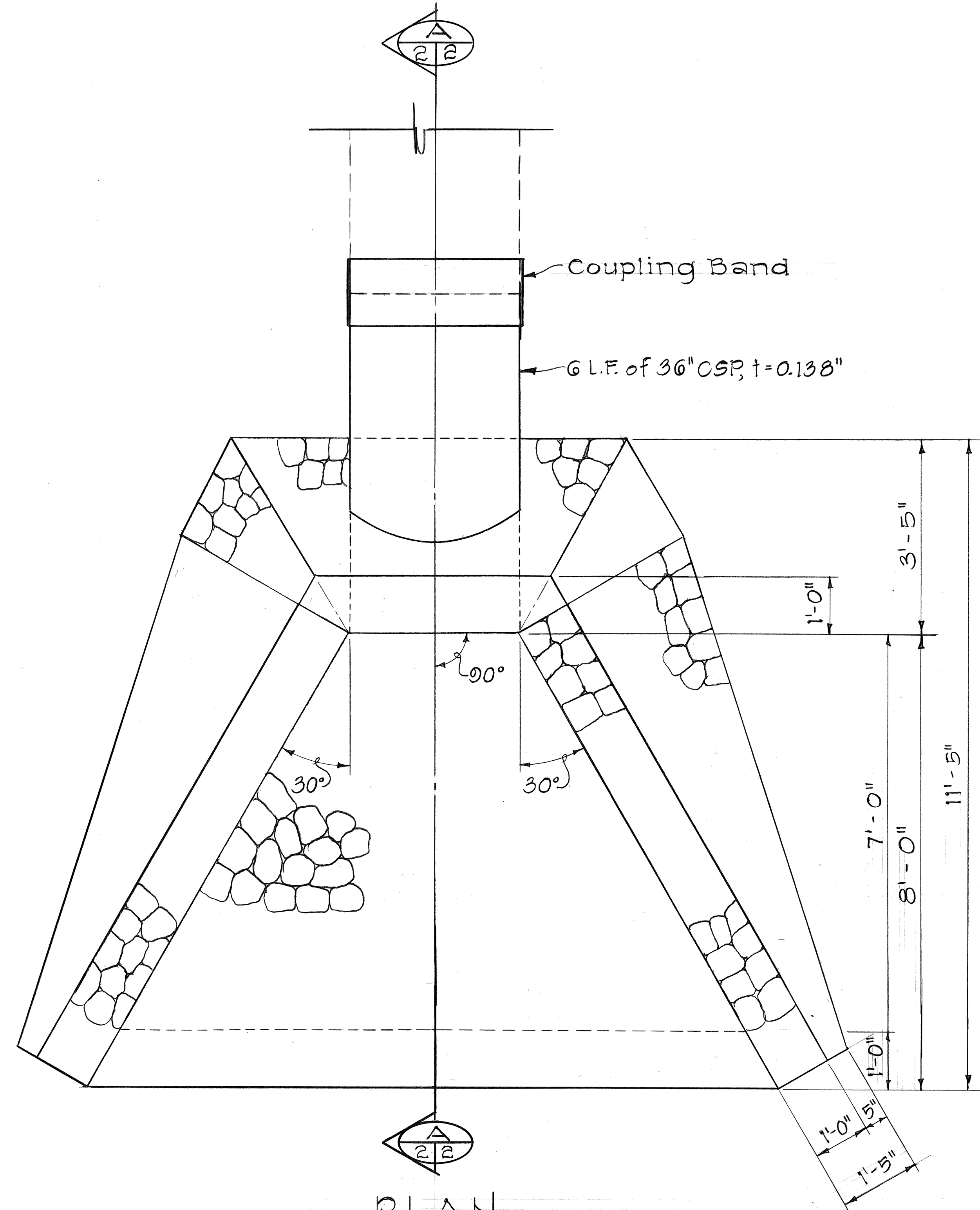
Scale: 1" = 10'

Date: Mar 1985

SHEET NO. 11 OF 12 SHEETS

ORIGINAL PLAN	DATE
SURVEY PLOTTED BY	
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
NO.	

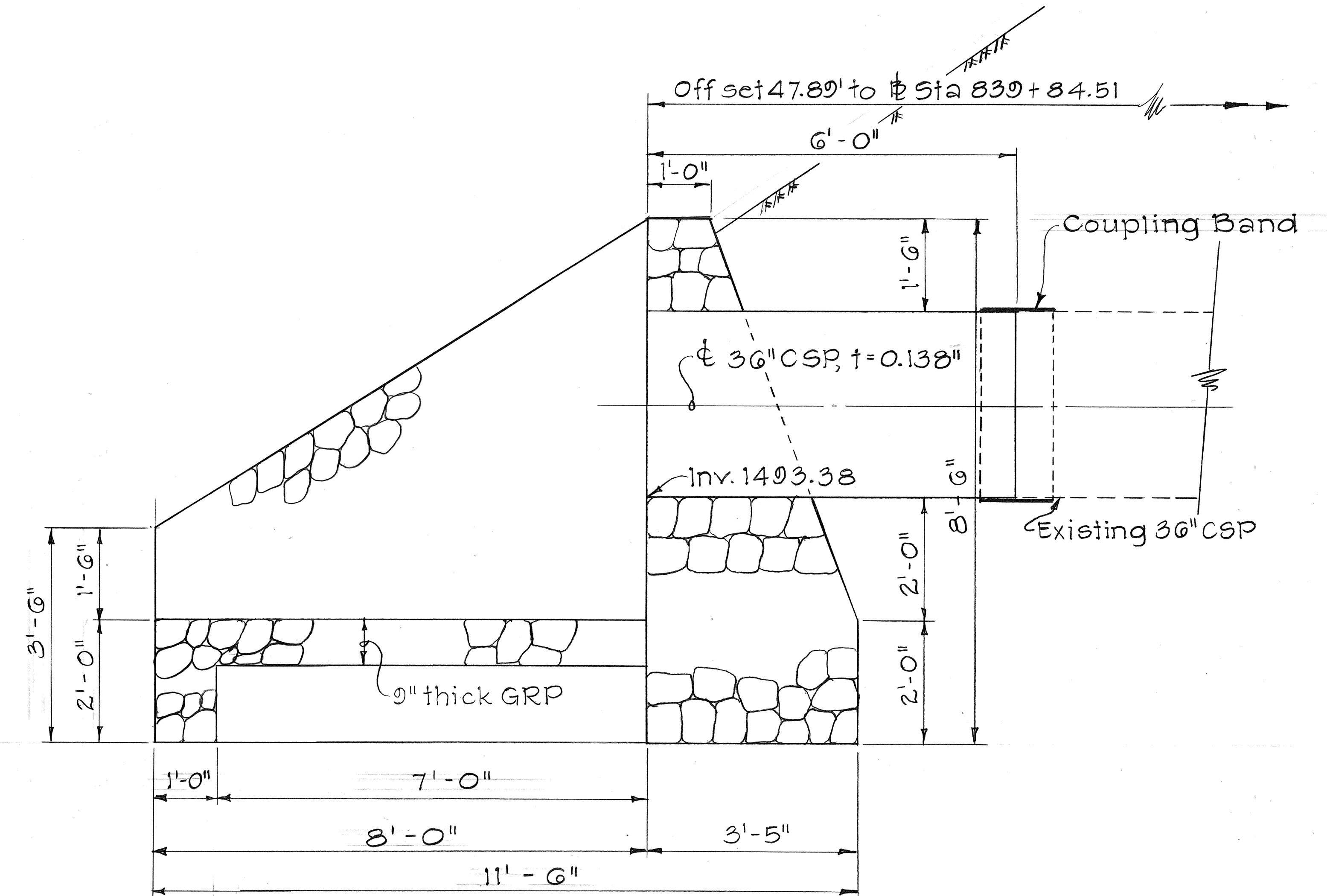
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-010-1(15)	1985	13	43



PLAN

CRM OUTLET DETAIL AT STA 839+84.51 o/s 47.89' LT.

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



SECTION A
2/2

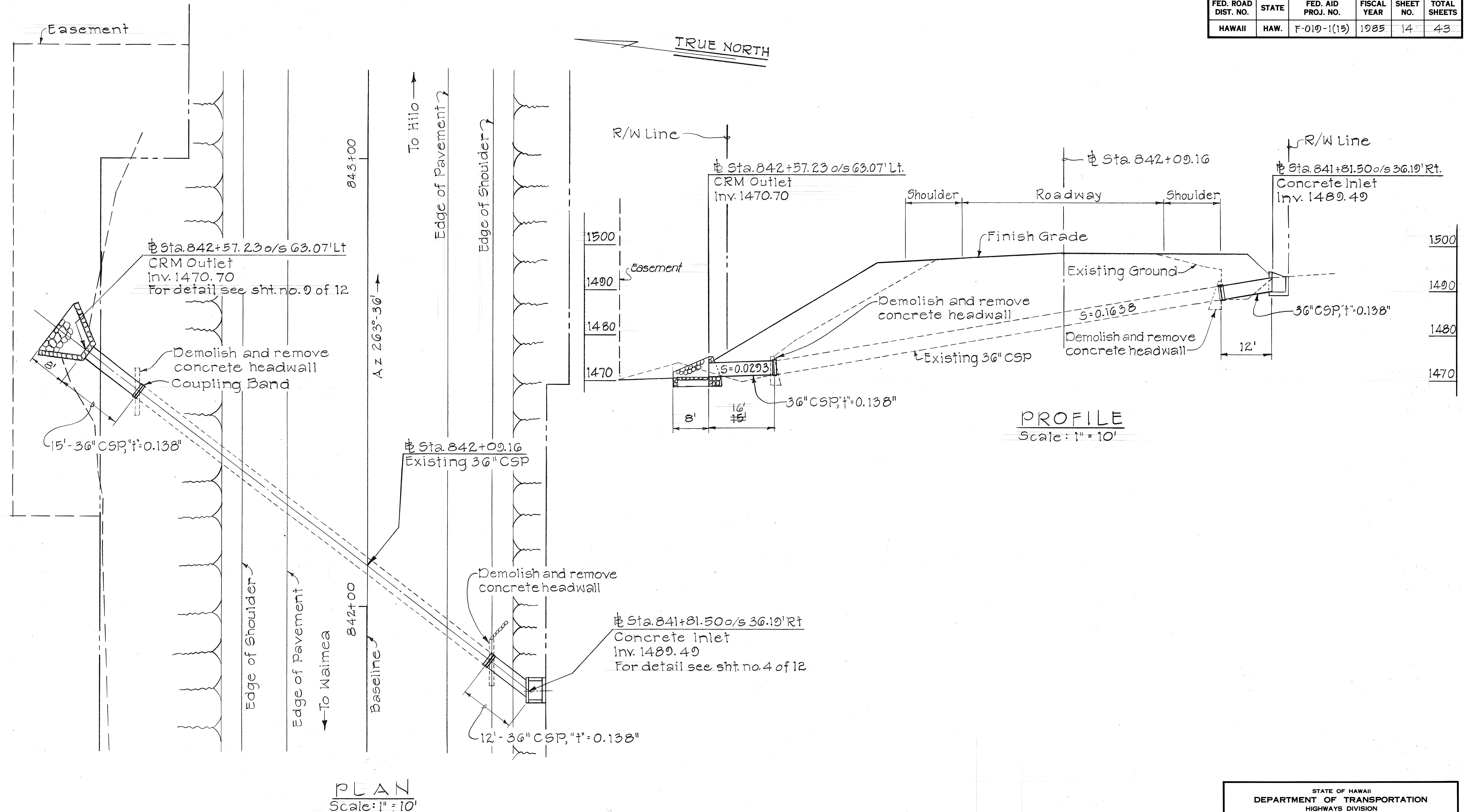
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS
HAWAII BELT ROAD
INTERSECTION IMPROVEMENTS
AT PLUMERIA ROAD
FED AID PROJECT NO. F-010-1(15)

Scale: 3/4" = 1'-0" Date: Mar 1985

SHEET No. H2 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-019-1(15)	1985	14	43



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

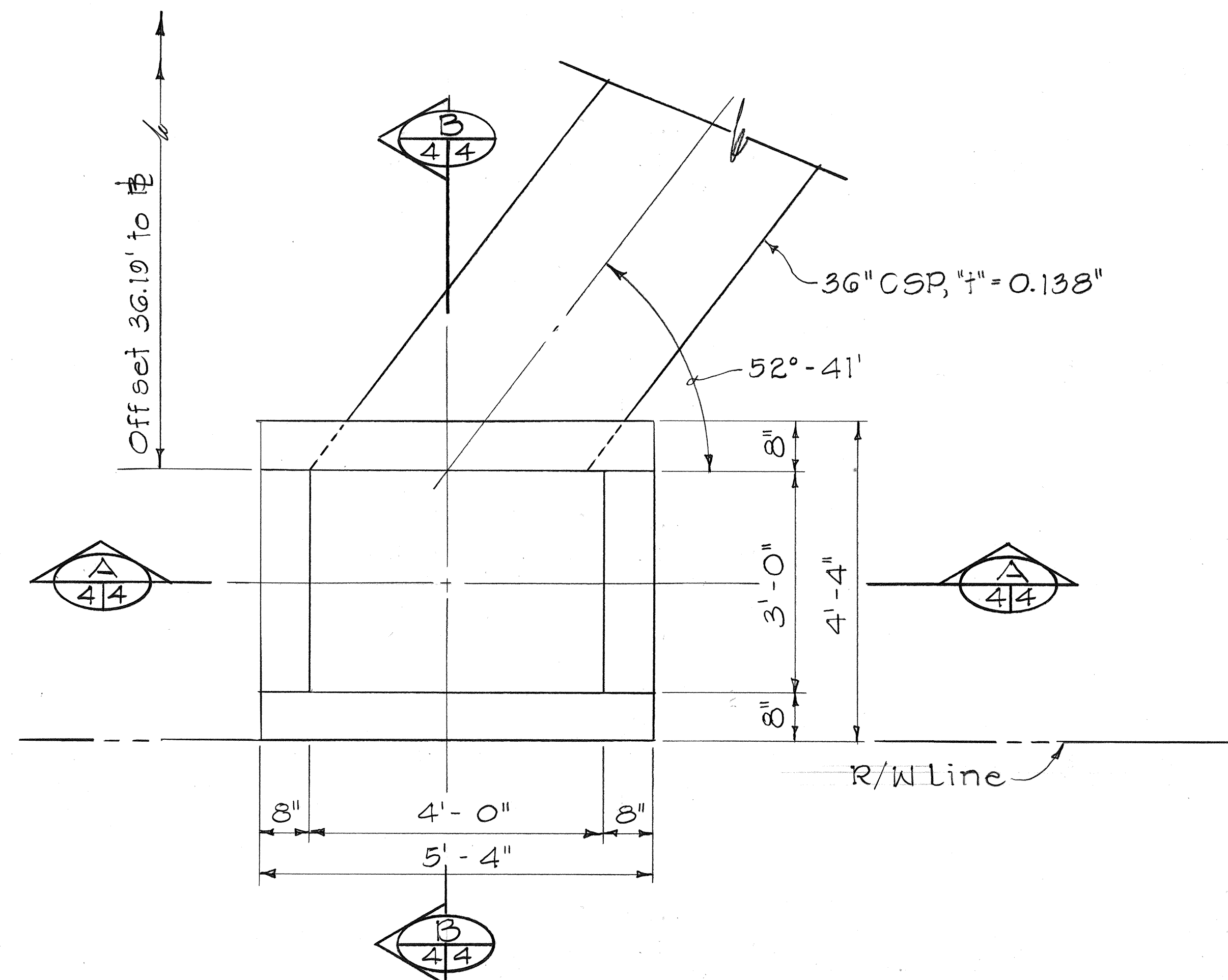
DRAINAGE DETAILS
HAWAII BELT ROAD
INTERSECTION IMPROVEMENTS
AT PLUMERIA ROAD
FED AID PROJECT NO. F-019-1(15)

Scale: 1" = 10' Date: Mar 1985

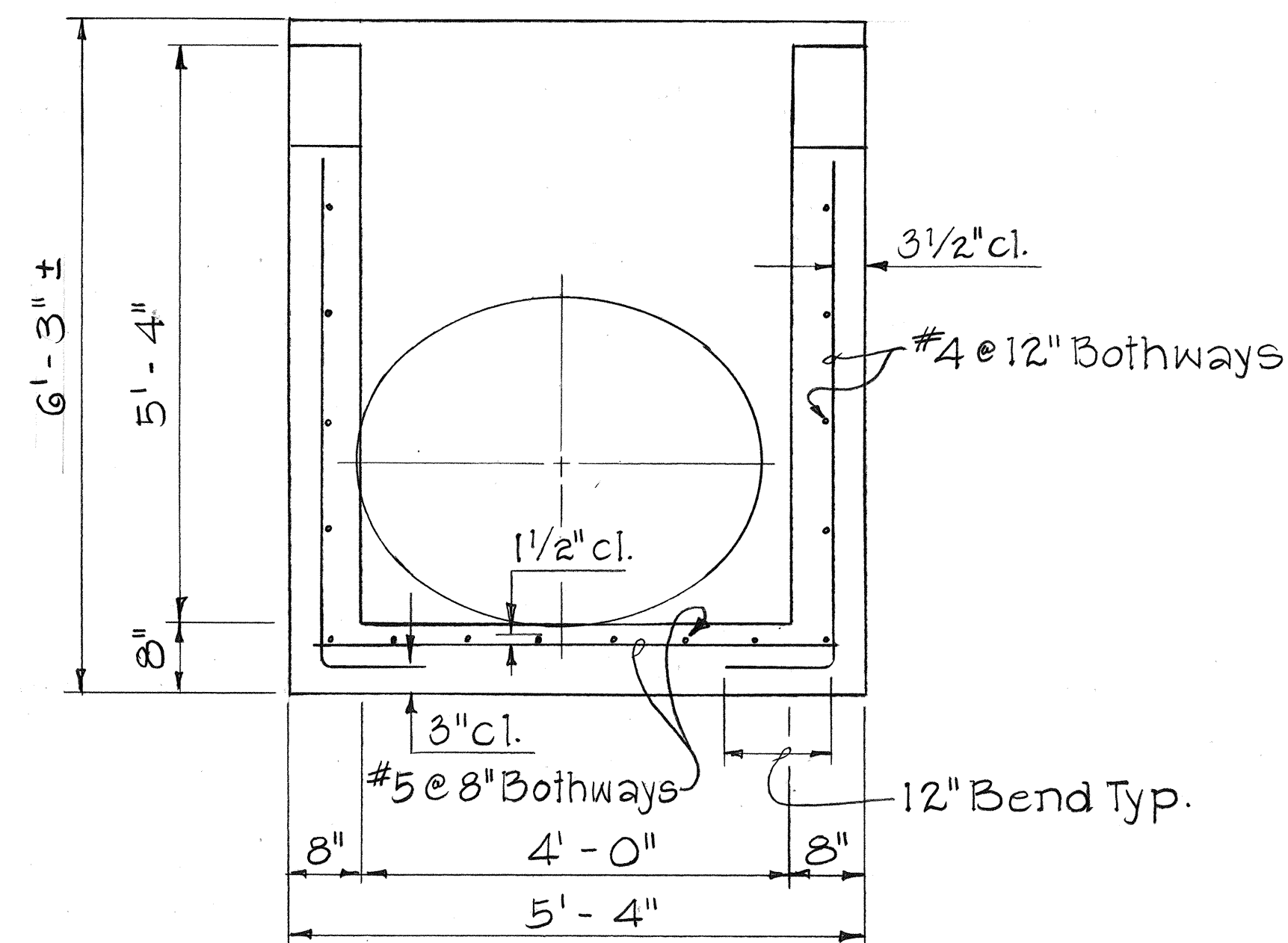
SHEET No. H3 OF 12 SHEETS

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

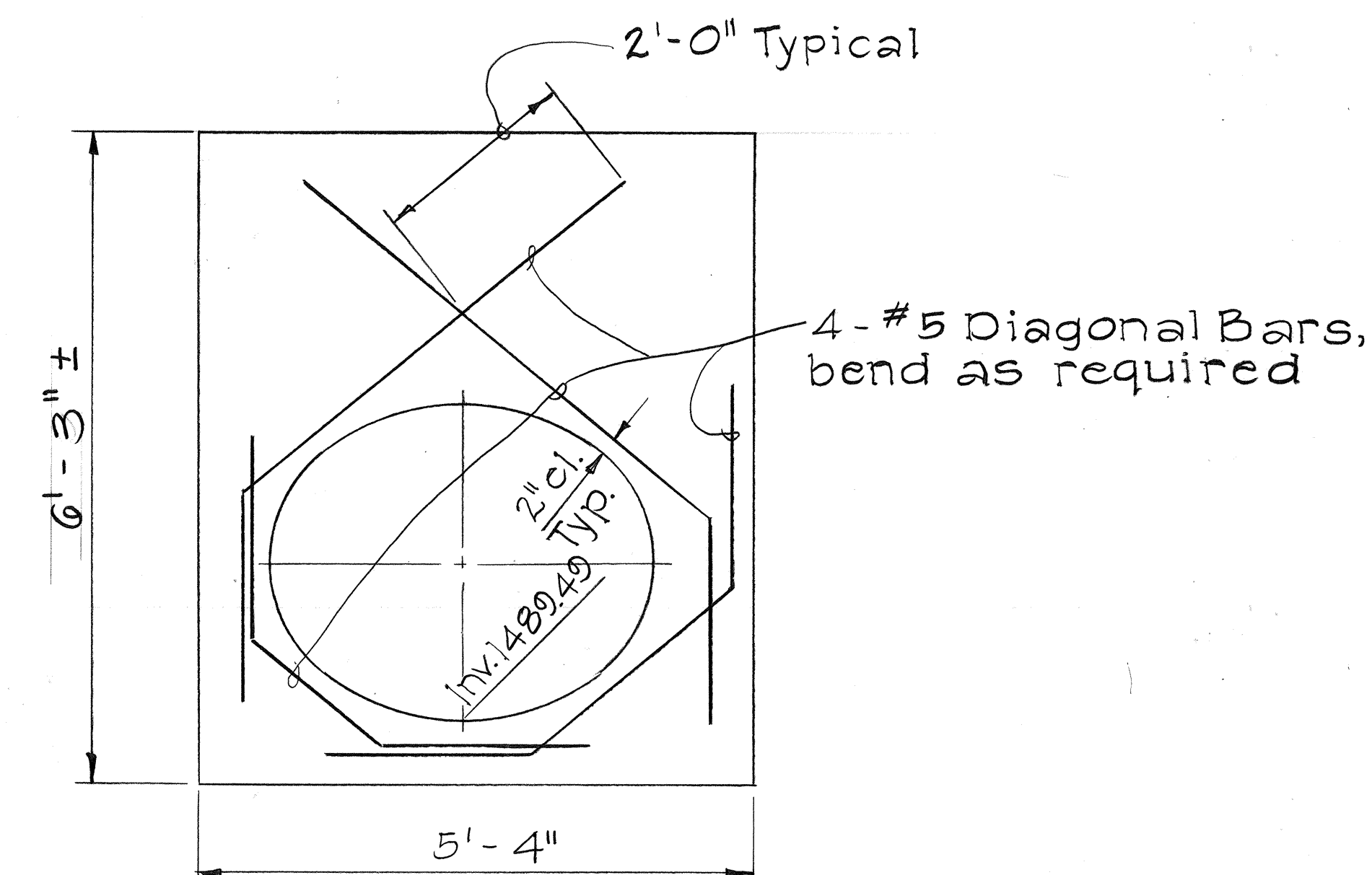
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-010-1(15)	1985	15	43



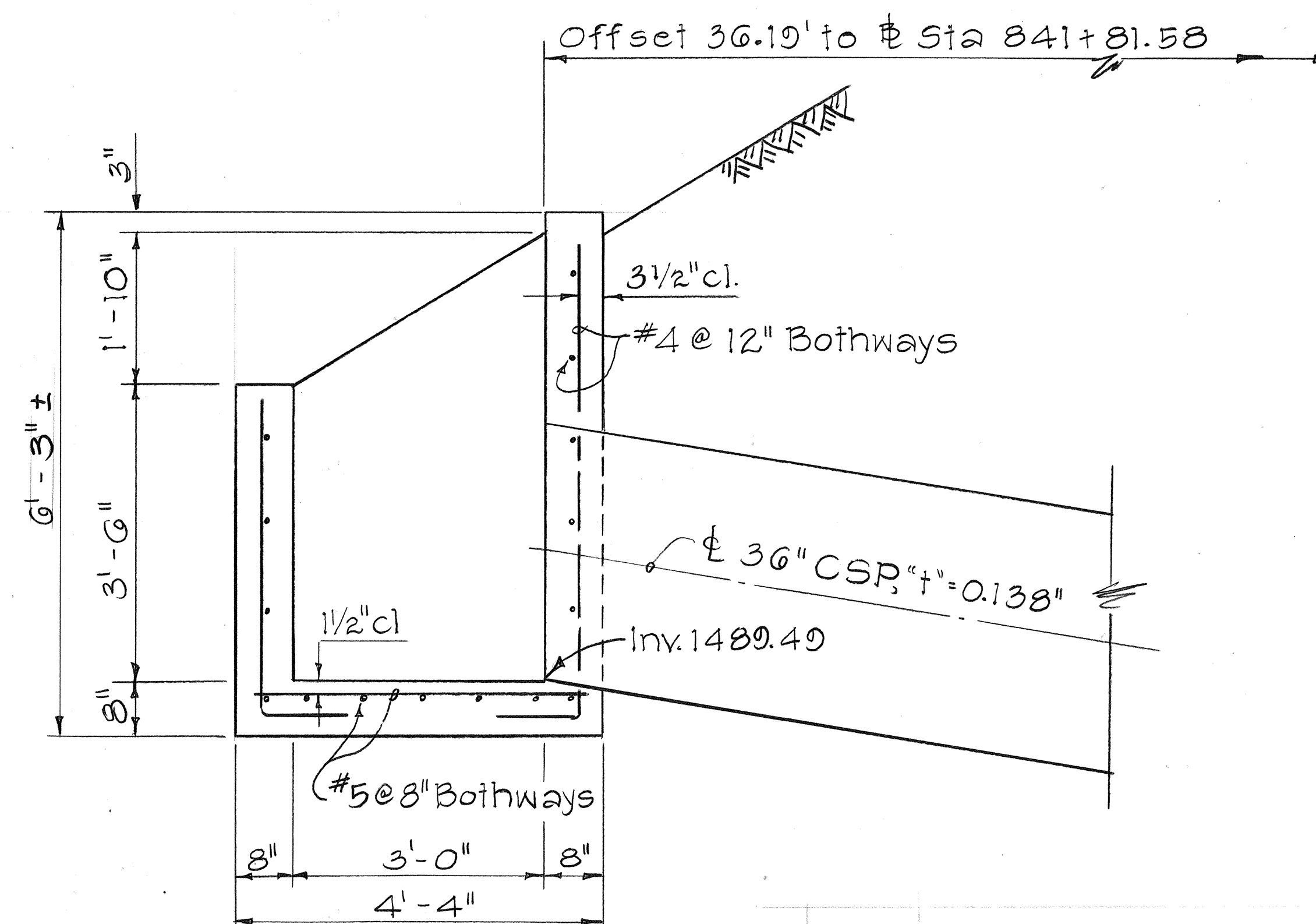
PLAN VIEW OF WALL REINFORCING



SECTION A-A



ADDED REINFORCING FOR CULVERT OPENING



SECTION B-B

CONCRETE INLET AT Φ STA. 841+81.58 o/s 36.10' RT.

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

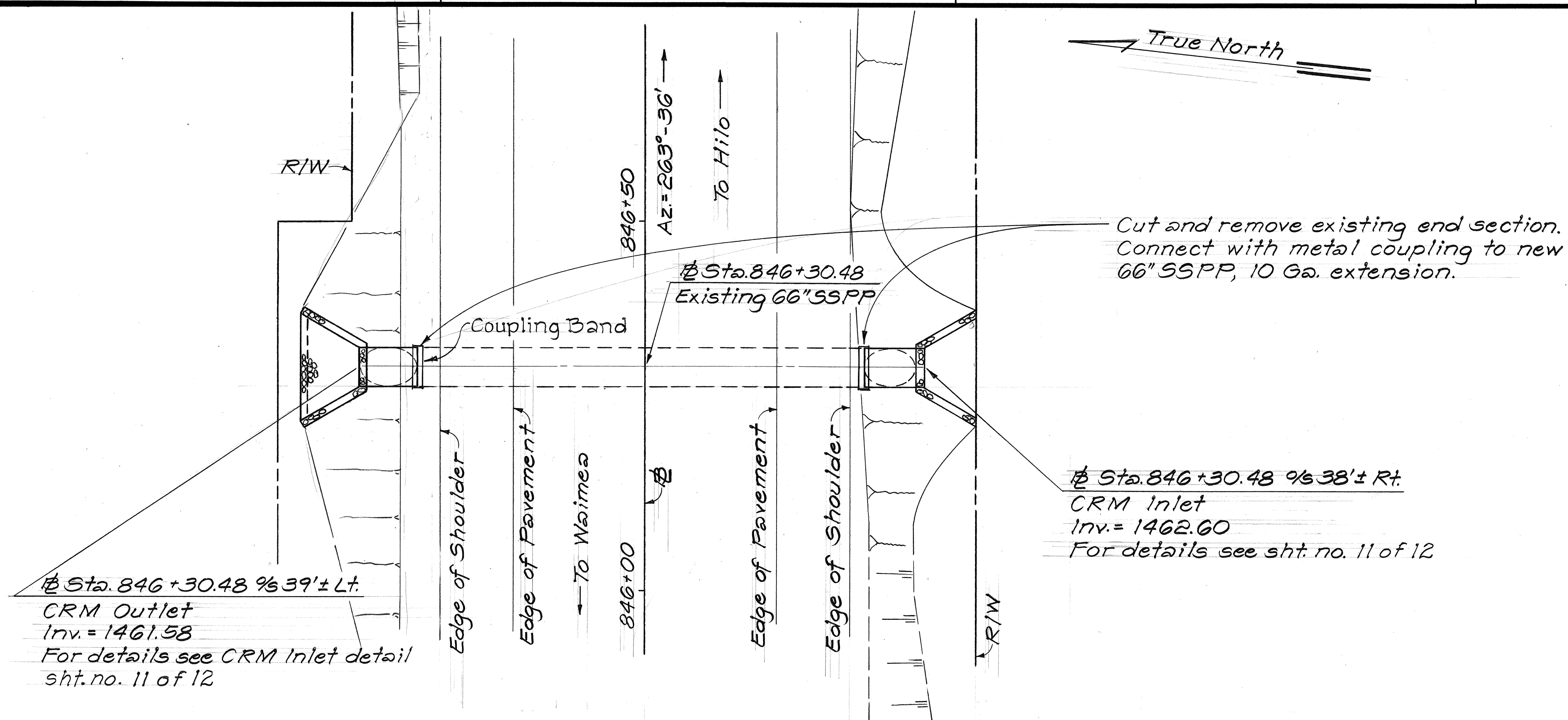
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS
HAWAII BELT ROAD
INTERSECTION IMPROVEMENTS
AT PLUMERIA ROAD
FED AID PROJECT NO. F-010-1(15)

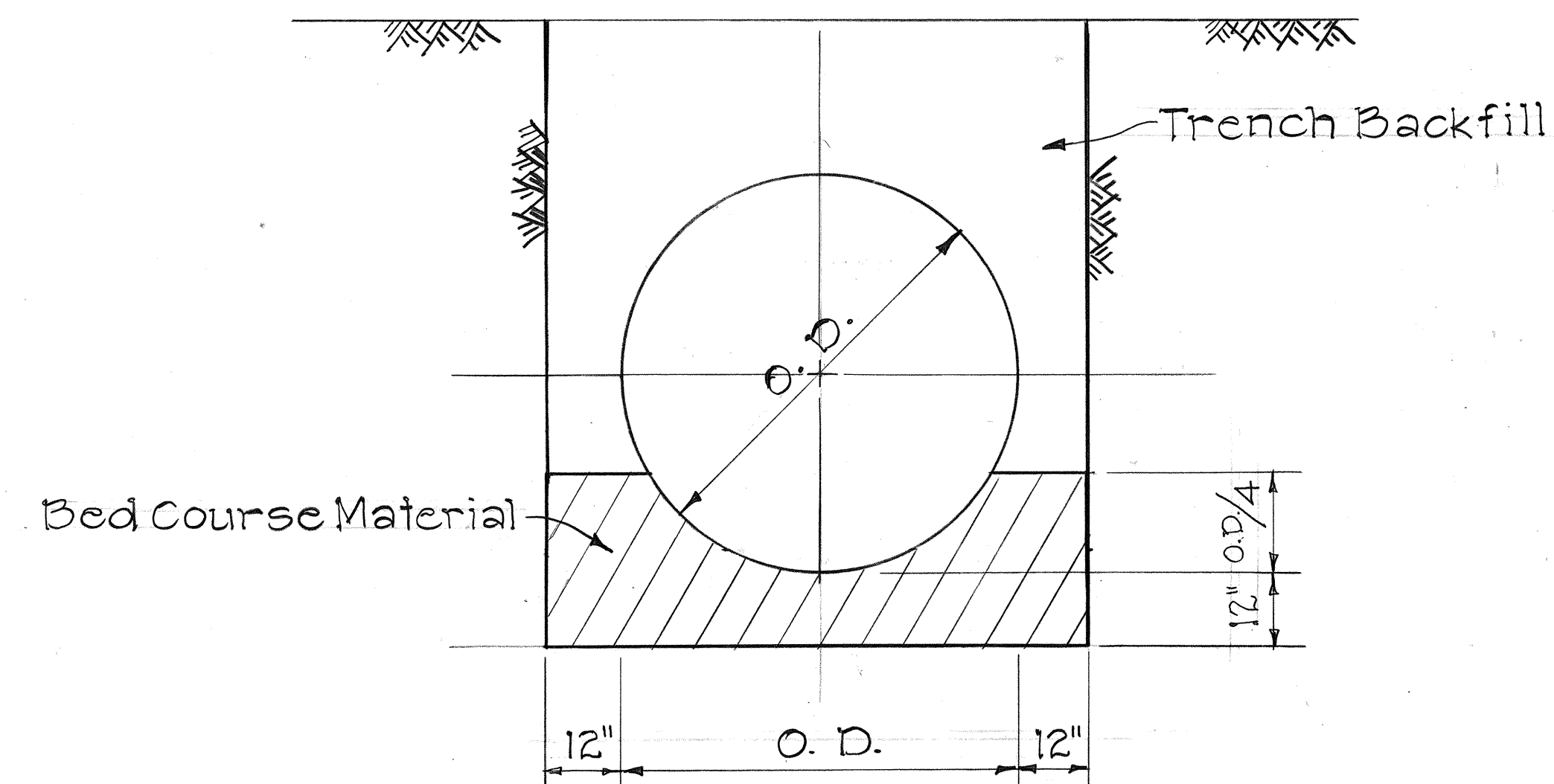
Scale: 3/4" = 1'-0" Date: Mar 1985

SHEET No. H4 OF 12 SHEETS

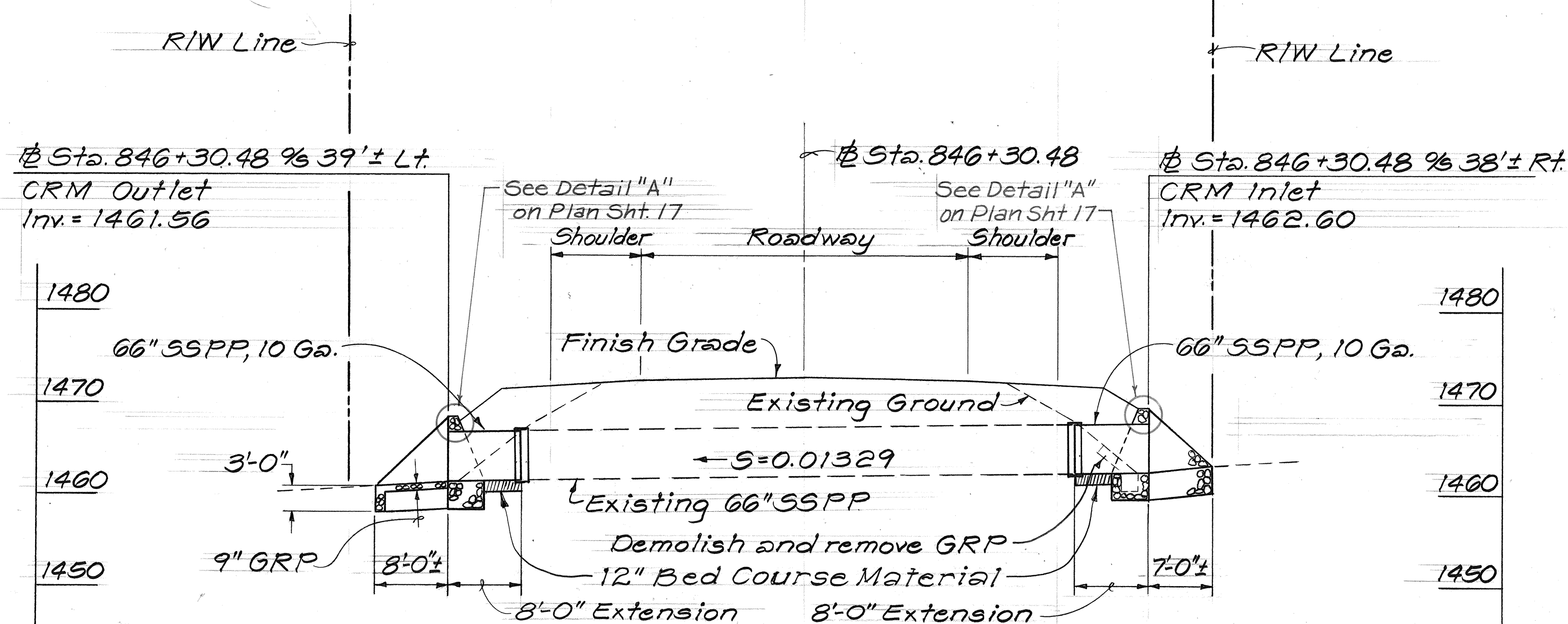
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-019-1(15)	1985	16	43



PLAN
Scale: 1" = 10'-0"



TYPICAL 12" BED COURSE MATERIAL
FOR CULVERT DETAIL
Scale: 1/2" = 1'-0"



PROFILE
Scale: 1" = 10'-0"

66" CULVERT AT STA. 846+30.48

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

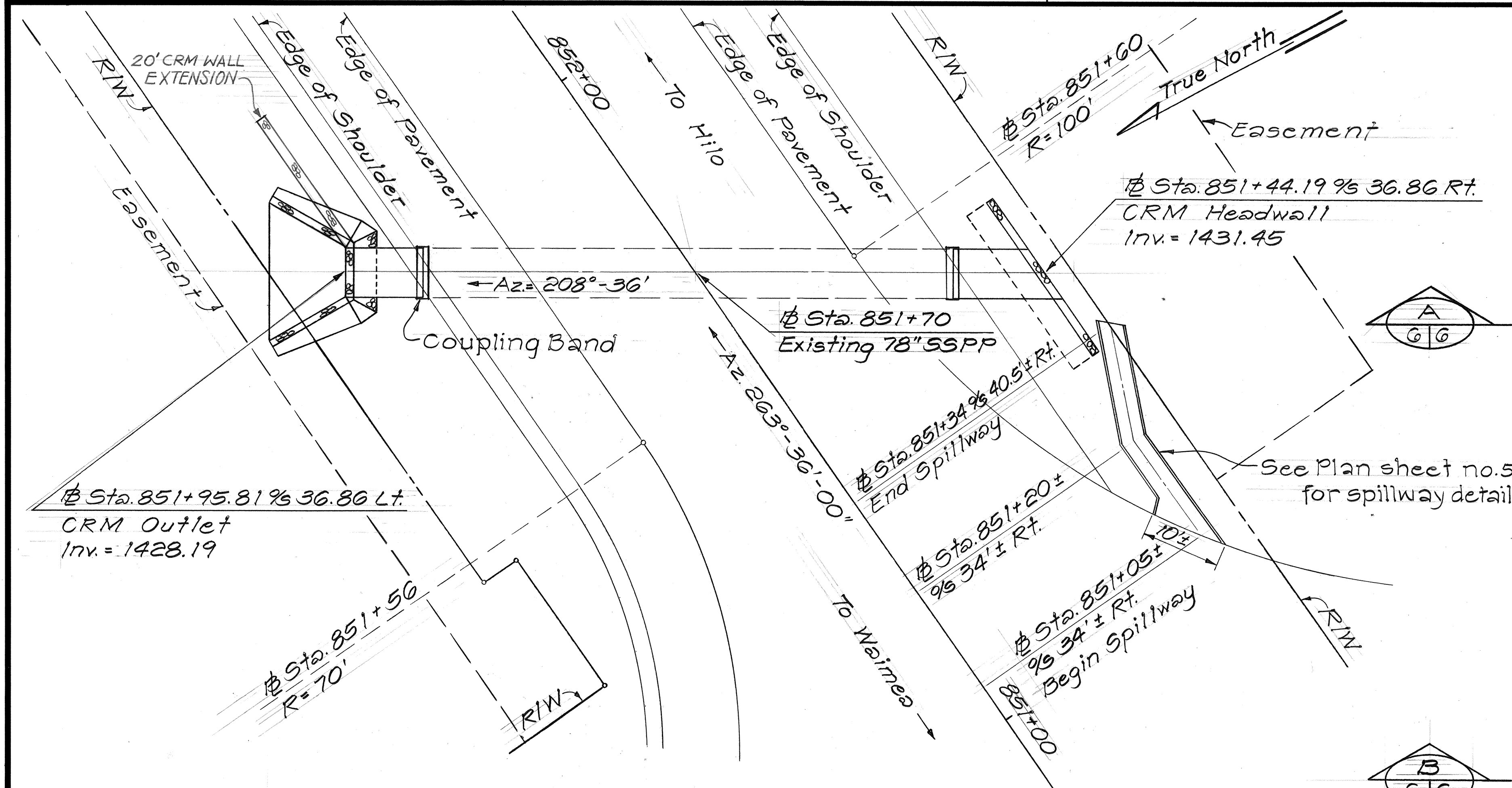
DRAINAGE DETAILS

HAWAII BELT ROAD
INTERSECTION IMPROVEMENTS
AT PLUMERIA ROAD
FED AID PROJECT NO. F-019-1(15)

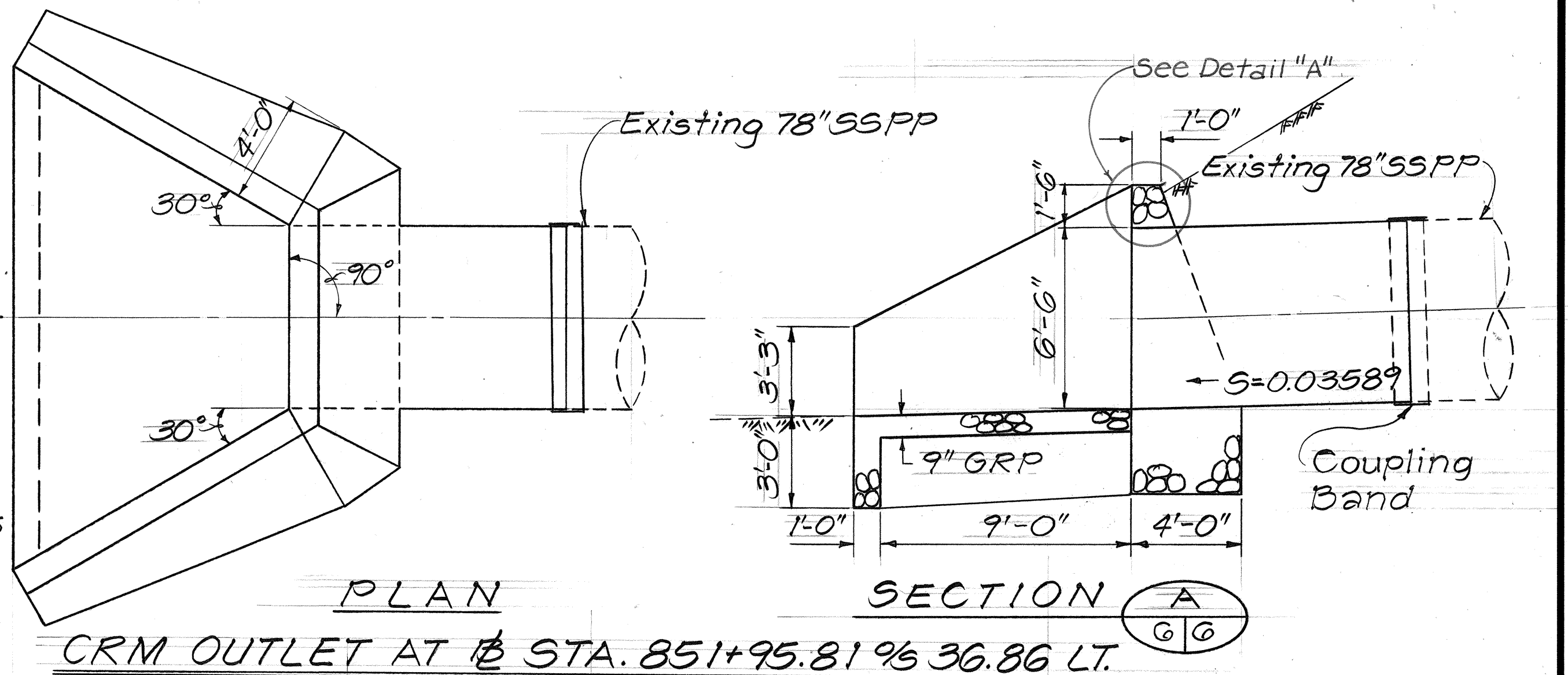
Scale: 1" = 10' Date: Mar 1985

SHEET NO. H 5 OF 12 SHEETS

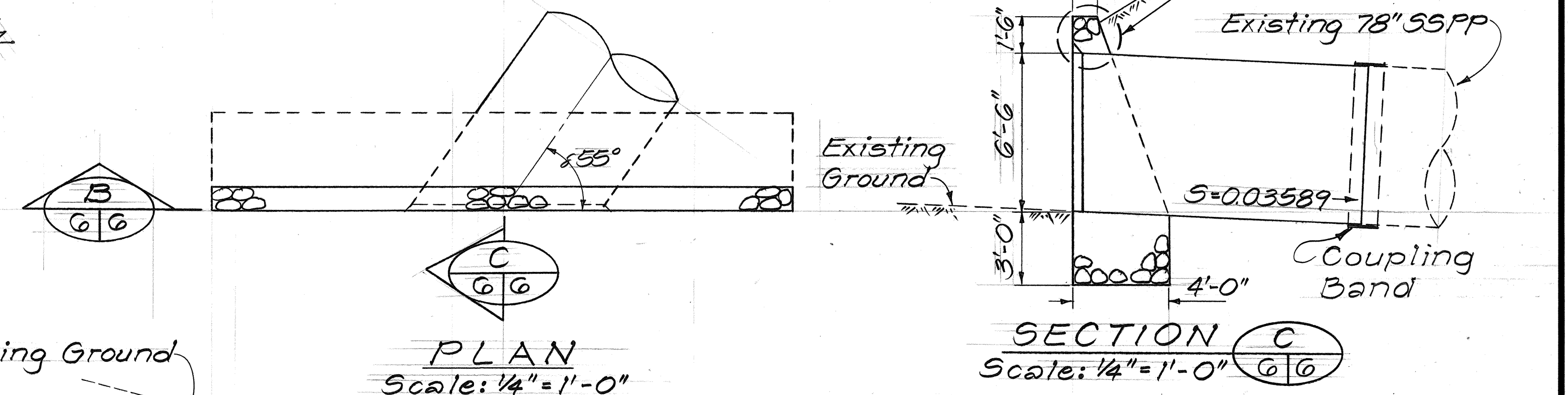
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-019-1(15)	1985	17	43



PLAN
Scale: 1"=10'



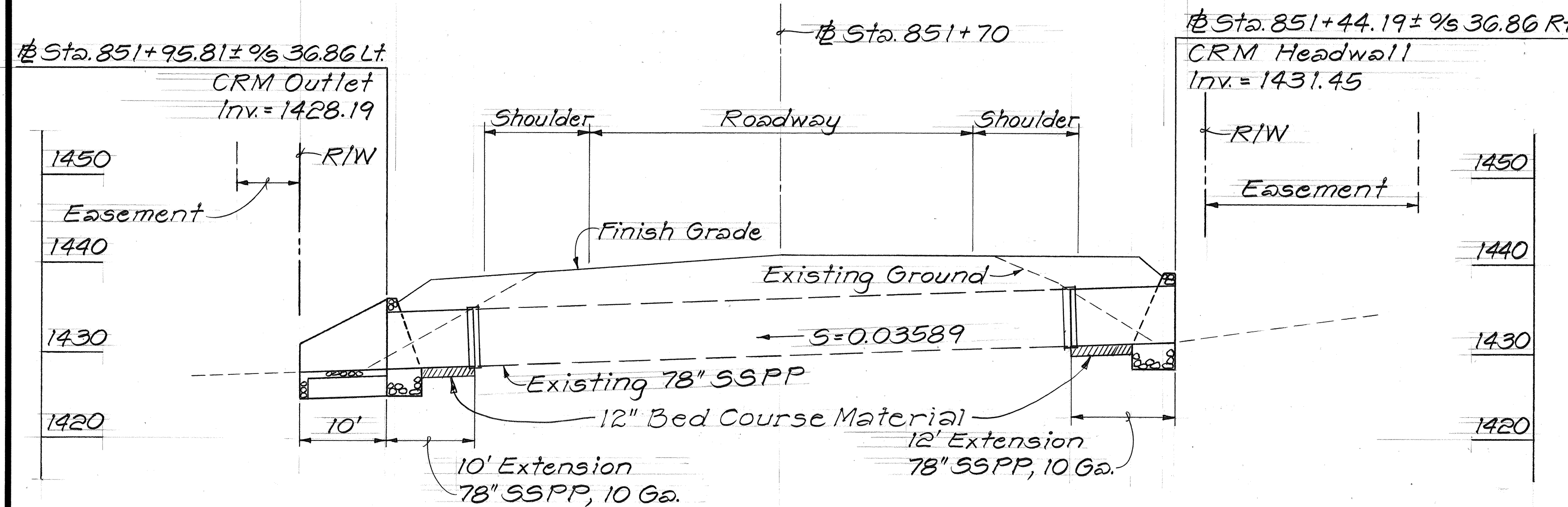
PLAN
CRM OUTLET AT STA. 851+95.81 ± 36.86 LT.
Scale: 1/4"=1'-0"



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

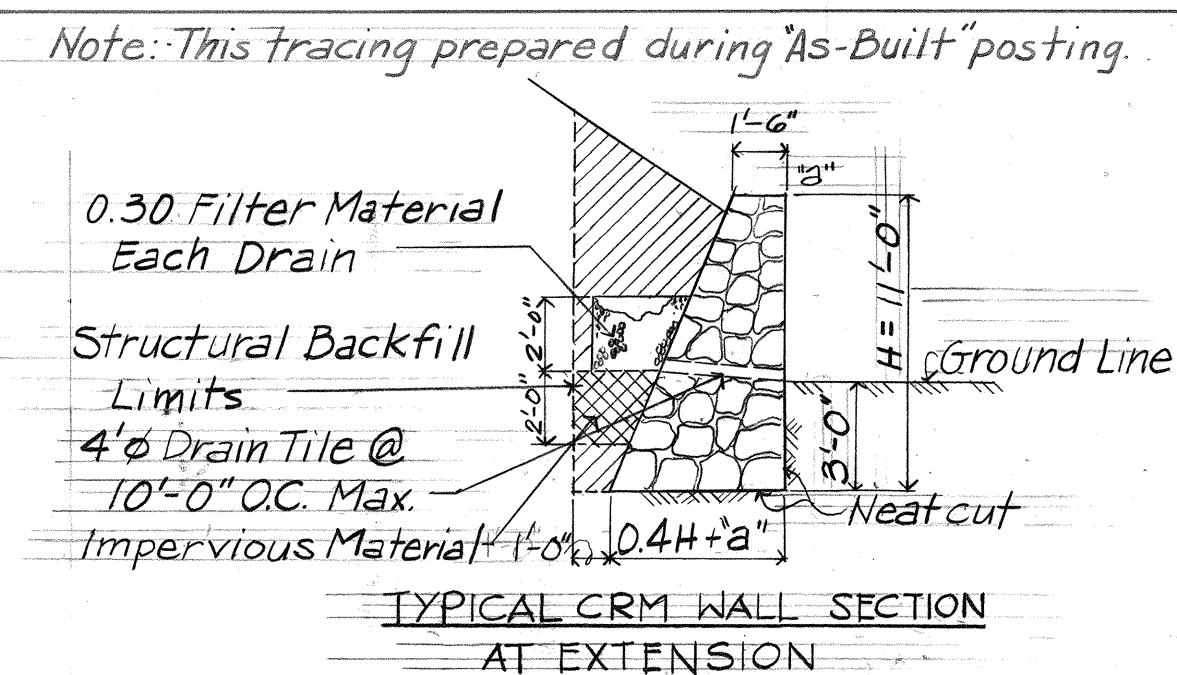
SECTION (B)
Scale: 1/4"=1'-0"

CRM HEADWALL AT STA. 851+44.19 ± 36.86 RT.



PROFILE
Scale: 1"=10'

78" CULVERT AT STA. 851+70

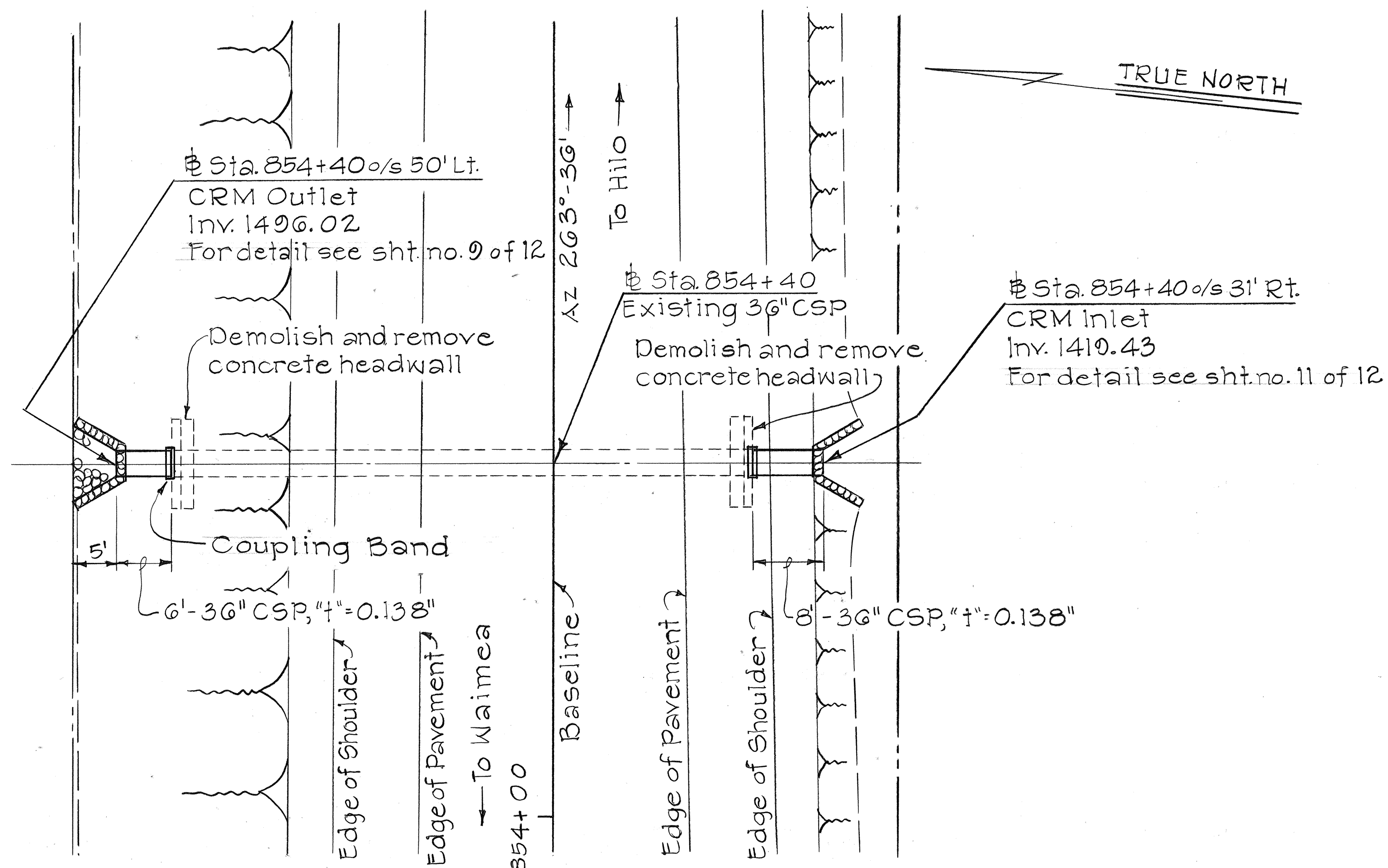


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

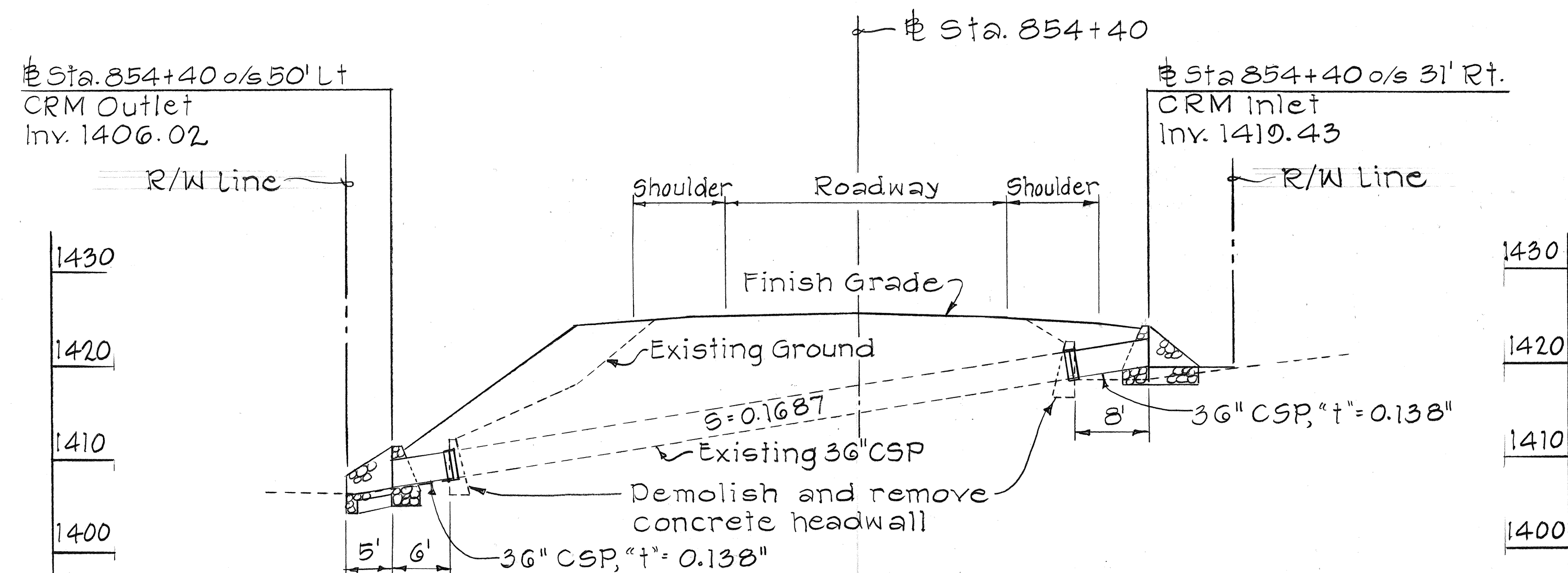
DRAINAGE DETAILS
HAWAII BELT ROAD
INTERSECTION IMPROVEMENTS
AT PLUMERIA ROAD
FED AID PROJECT NO. F-019-(15)

Scale: As Noted Date: Mar 1985
SHEET No. H 6 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-010-1(15)	1985	18	43



PLAN
Scale: 1" = 10'



PROFILE
Scale: 1" = 10'

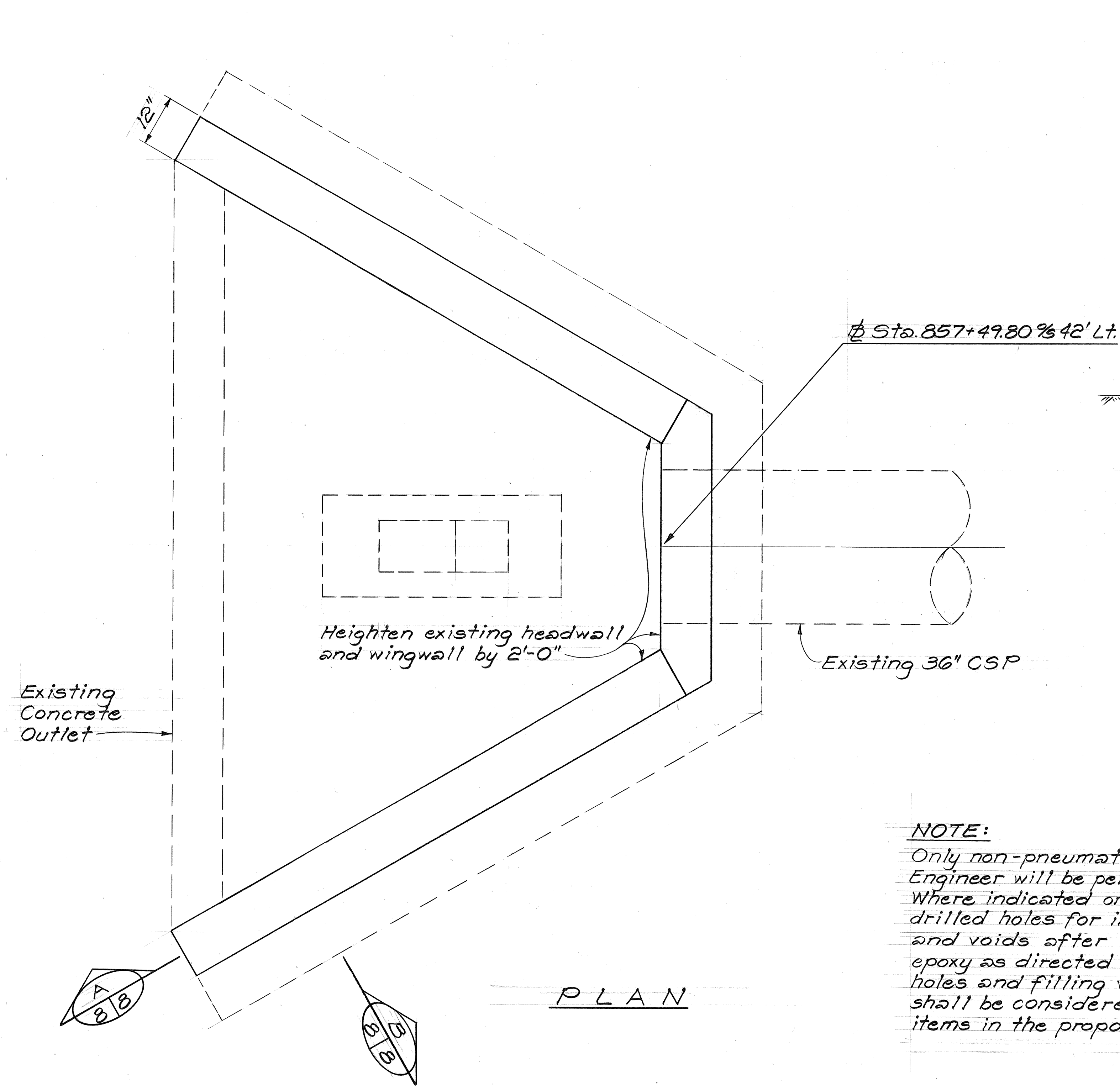
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS
HAWAII BELT ROAD
INTERSECTION IMPROVEMENTS
AT PLUMERIA ROAD
FED AID PROJECT NO. F-010-1(15)

Scale: 1" = 10' Date: Mar 1985

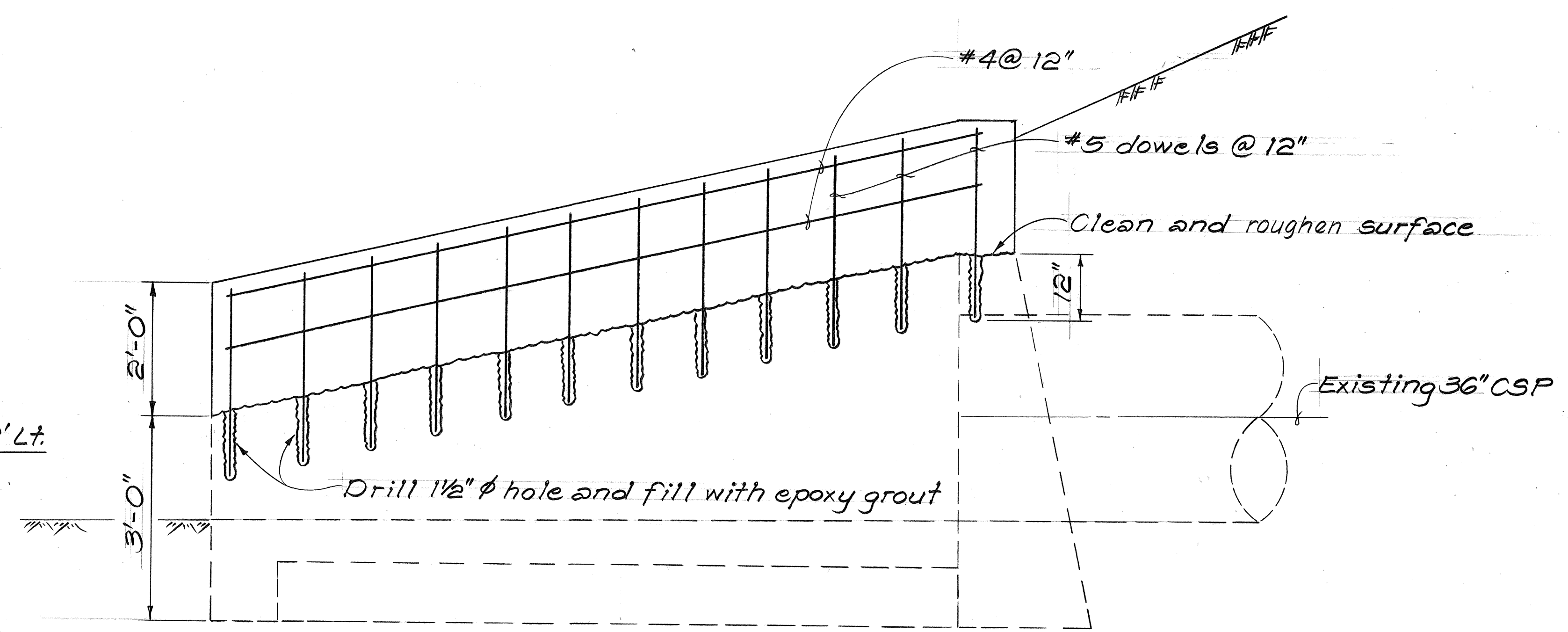
SHEET No. H 7 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-019-1(15)	1985	19	43

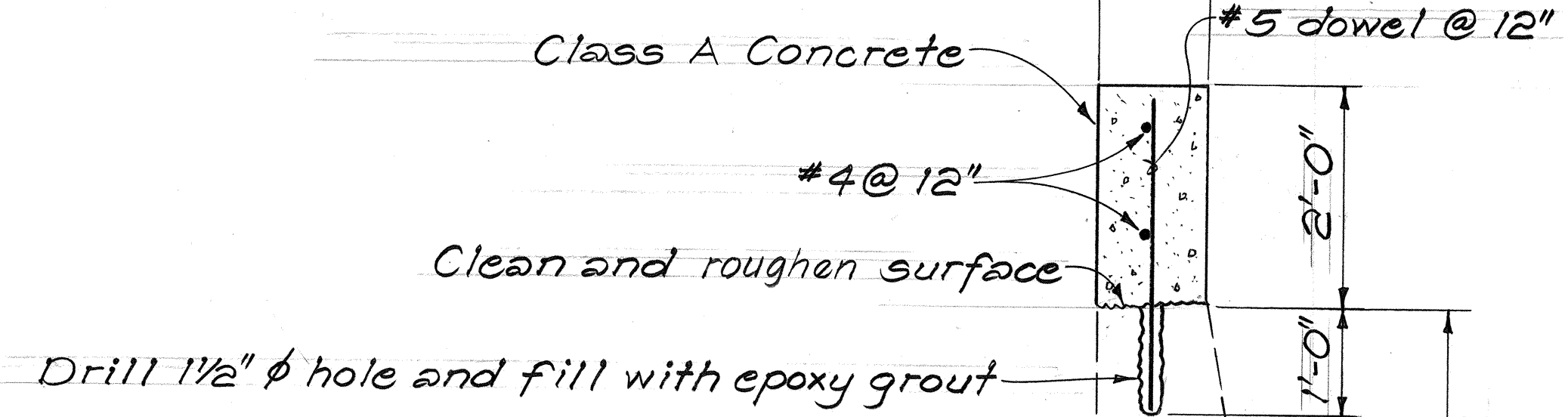


NOTE:

Only non-pneumatic type of drill as approved by the Engineer will be permitted for drilling holes in concrete. Where indicated on plans, the approximate diameter of drilled holes for installation of dowels shall be 1 1/2 inches; and voids after installing dowels shall be filled with epoxy as directed by the Engineer. The work (Drilling 1 1/2" holes and filling voids with epoxy) as mentioned above shall be considered incidental to the various contract items in the proposal.



SECTION A



SECTION B

CONCRETE OUTLET DETAIL AT STA. 857+49.80 % 42' LT.

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

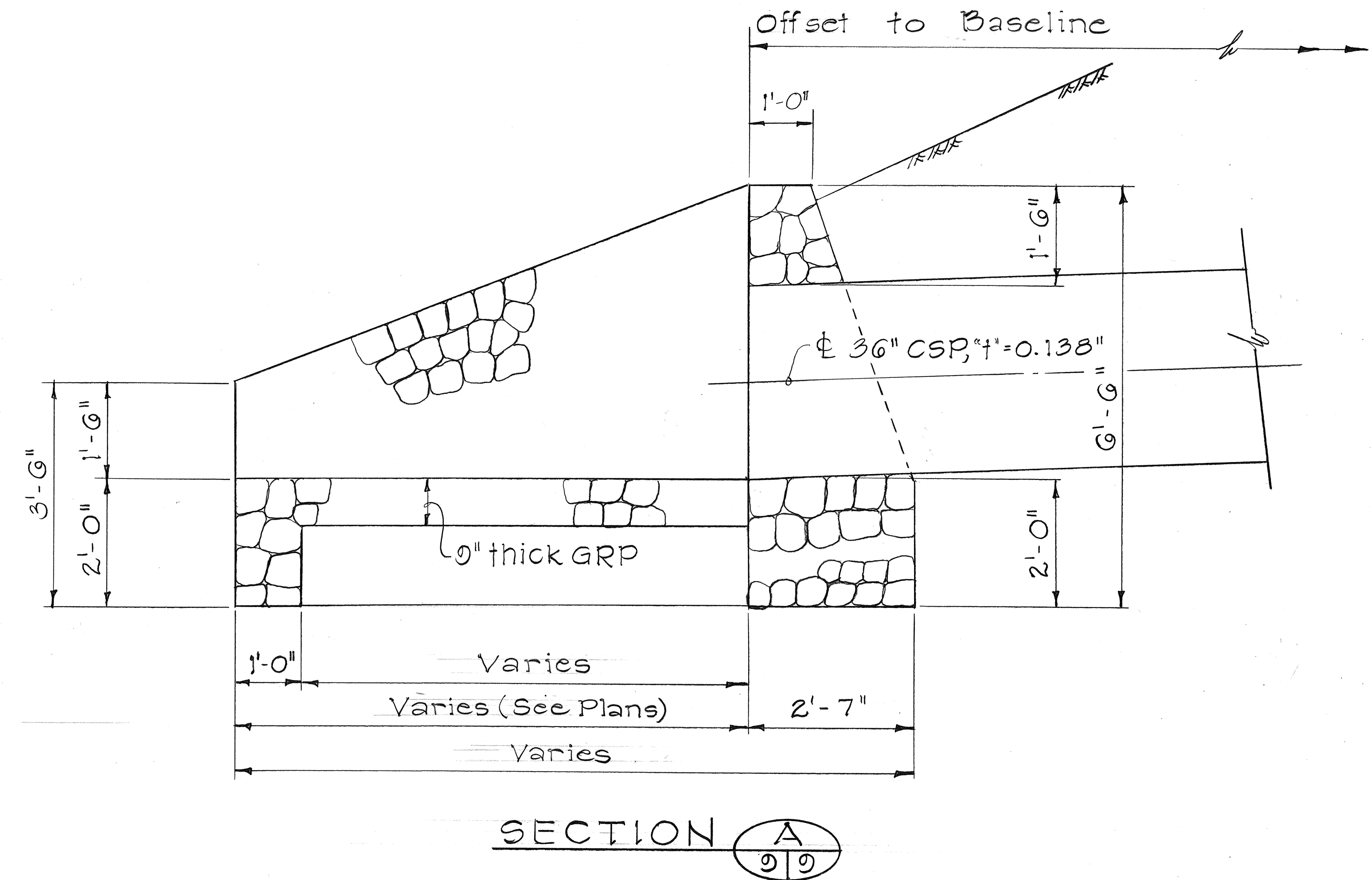
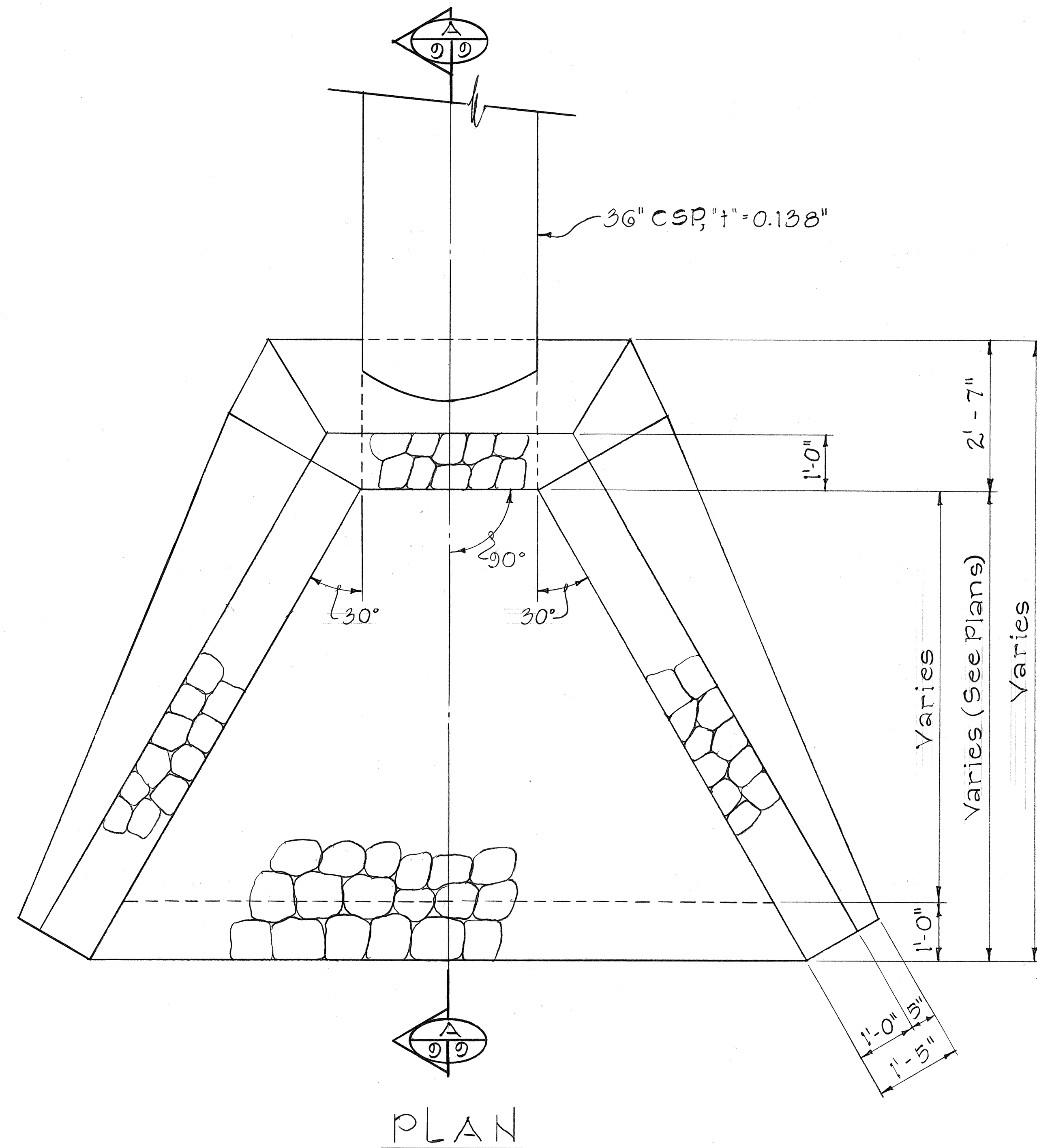
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS
HAWAII BELT ROAD
INTERSECTION IMPROVEMENTS
AT PLUMERIA ROAD
FED AID PROJECT NO. F-019-1(15)

Scale: 3/4"=1'-0" Date: Mar 1985

SHEET No. 18 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-019-1(15)	1985	20	43



TYPICAL DETAILS OF CRM OUTLET

Scale: $\frac{3}{4}" = 1'-0"$

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

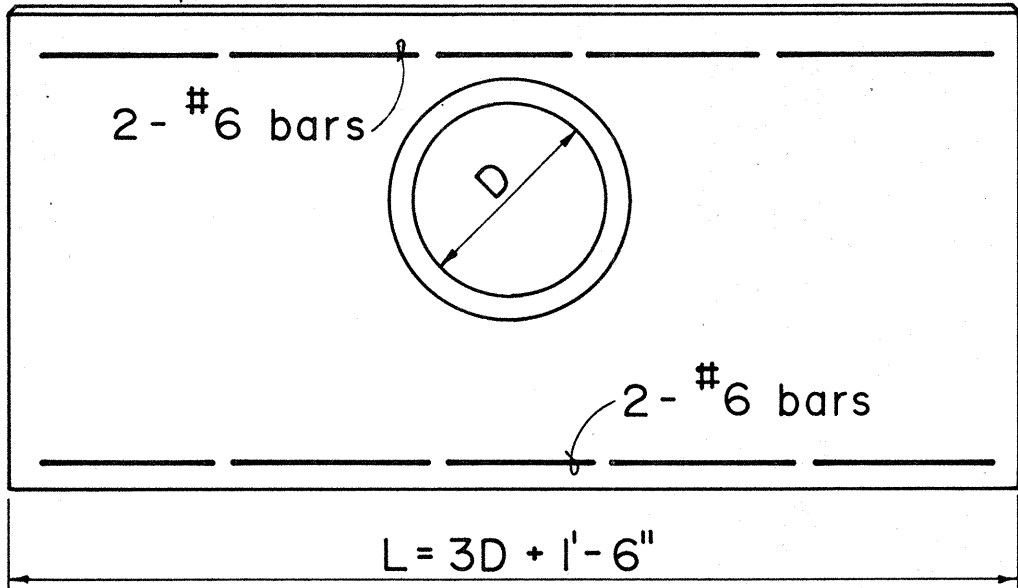
DRAINAGE DETAILS
HAWAII BELT ROAD
INTERSECTION IMPROVEMENTS
AT PLUMERIA ROAD
FED AID PROJECT NO. F-019-1(15)

Scale: $\frac{3}{4}" = 1'-0"$ Date: Mar 1985

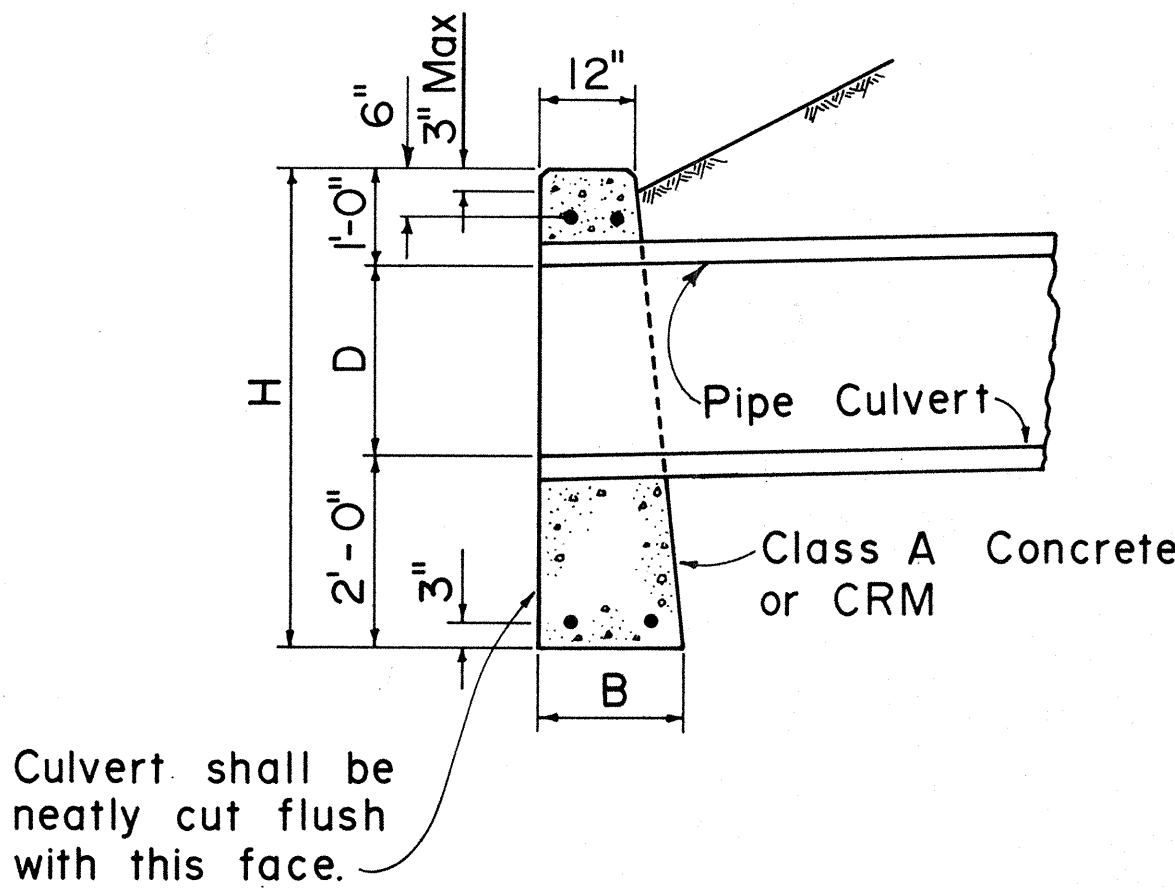
SHEET No. H 9 OF 12 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-019-1(19)	1985	21	43

Chamfer all exposed edges one inch



ELEVATION



SECTION

DATA FOR CONC. HDWL.			
D	B	L	H
18"	1'-6"	6'-0"	4'-6"
24"	1'-6"	7'-6"	5'-0"
30"	2'-0"	9'-0"	5'-6"
36"	2'-0"	10'-6"	6'-0"
42"	2'-6"	12'-0"	6'-6"
48"	2'-6"	13'-6"	7'-0"

DATA FOR CRM HDWL.			
D	B	L	H
18"	1'-9"	6'-0"	4'-6"
24"	2'-0"	7'-6"	5'-0"
30"	2'-3"	9'-0"	5'-6"
36"	2'-6"	10'-6"	6'-0"

CONCRETE OR CRM HEADWALL

APPROVAL RECOMMENDED:
T. Nakano
 HYDRAULIC DESIGN ENGINEER 6-19-79
 DATE

APPROVED:
Harbert Zabeishi
 ASSISTANT CHIEF, ENGINEERING 6-22-79
 DATE

NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 10 approved 12-17-69	H.T.	6/22/79
2.	Change Class of concrete	H.T.	12/4/80

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

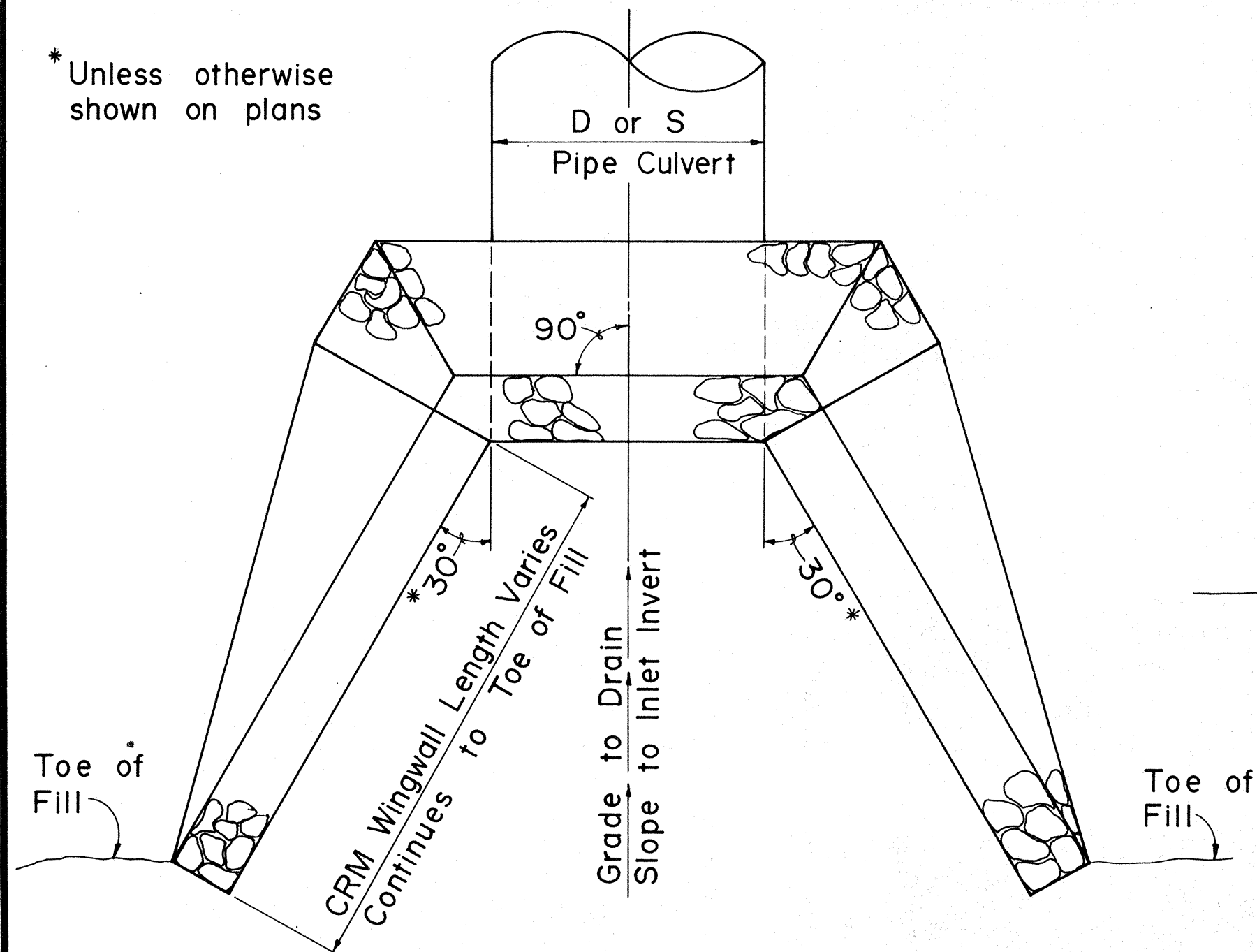
STANDARD DETAILS
CONCRETE OR CEMENT
RUBBLE MASONRY HEADWALLS

Not To Scale
Date: June 1979

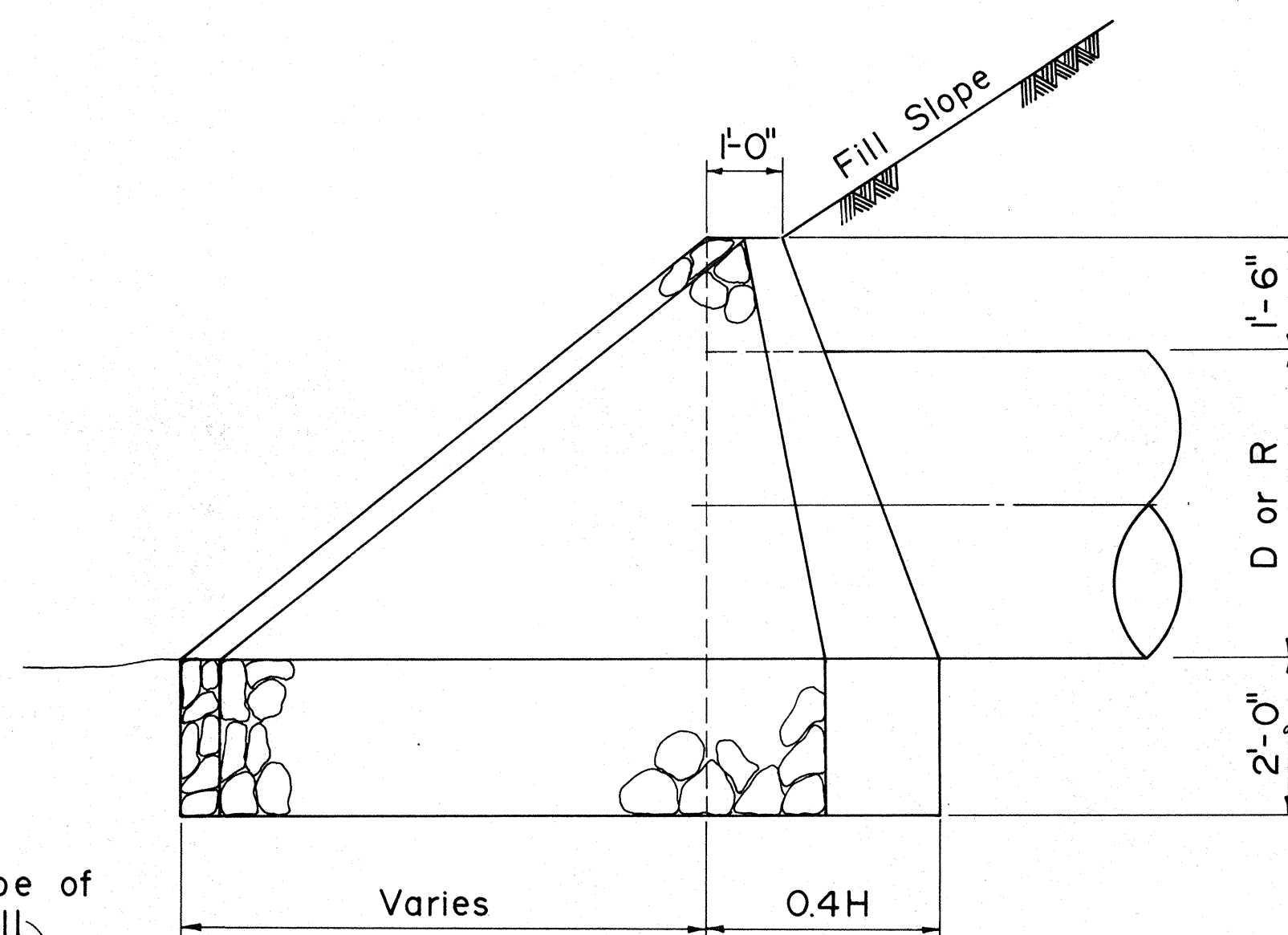
ORIGINAL	SURVEY PLOTTED BY	DATE
PLAN	DRAWN BY	
NOTE BOOK	TRACED BY	
No.	CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-010-1(19)	1985	22	43

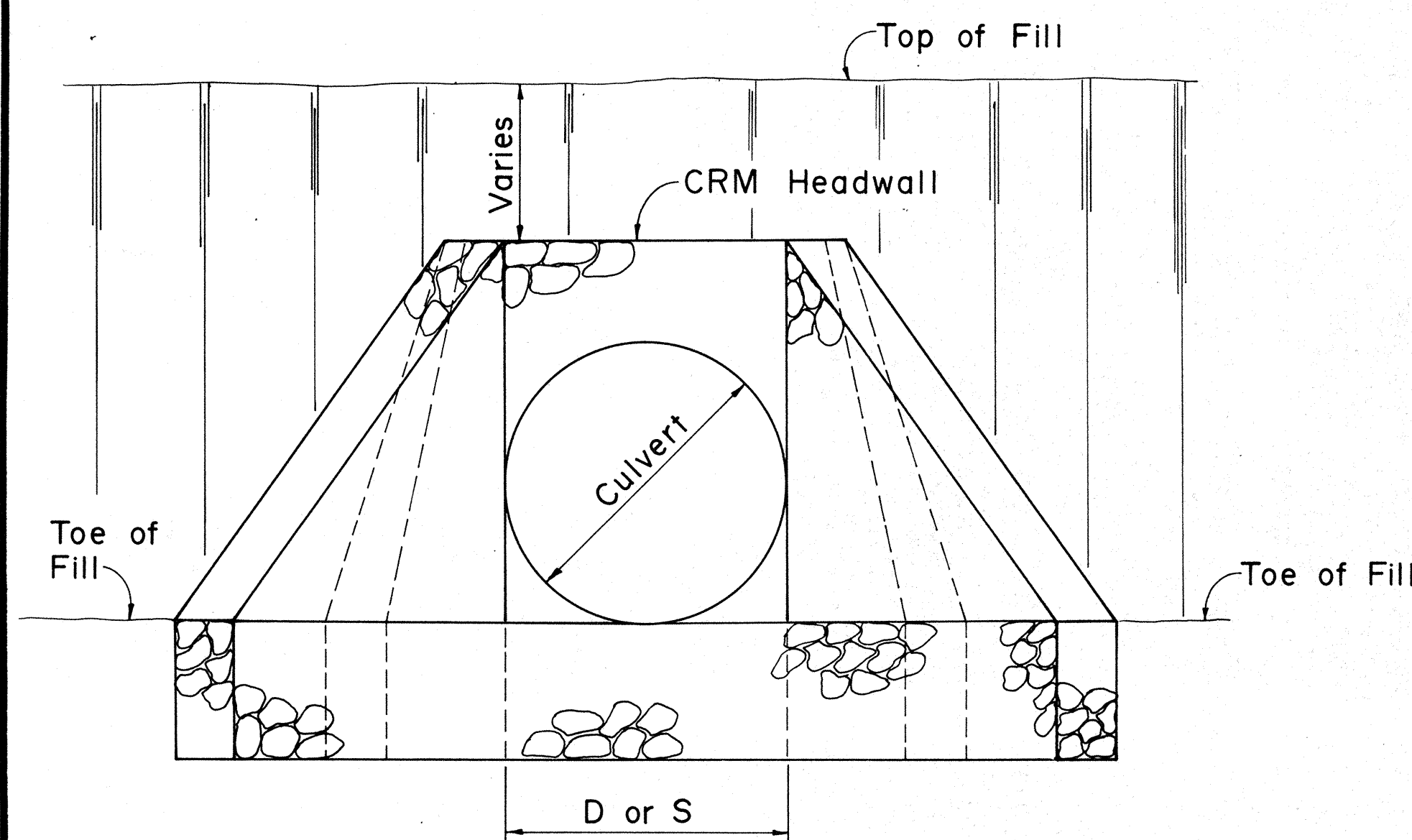
*Unless otherwise shown on plans



PLAN



SIDE ELEVATION



FRONT ELEVATION

NOTE:

D = Diameter of Pipe Culvert
R = Rise of Pipe-Arch Culvert
S = Span of Pipe Arch Culvert

CEMENT RUBBLE MASONRY INLET STRUCTURE

APPROVAL RECOMMENDED:

P. Nakano
HYDRAULIC DESIGN ENGINEER 6-19-79
DATE

APPROVED:
Harold Sakai
ASSISTANT CHIEF, ENGINEERING 6-22-79
DATE

NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 16 approved 12-17-69	H.C.	6/22/79

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
STANDARD DETAILS
CEMENT RUBBLE MASONRY INLET STRUCTURE
Not To Scale Date: Dec. 1977

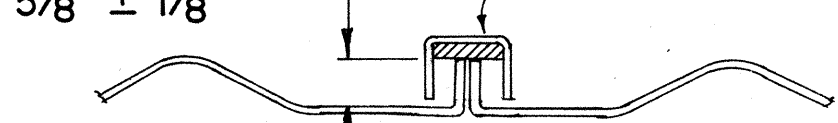
SHEET NO. 11 OF 12 SHEETS DH 16

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-010-1(18)	1985	23	43

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.

Flange Height
5/8" ± 1/8"



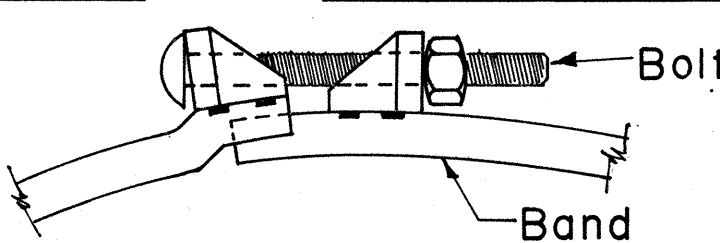
SECTION B-B BOX END LUG CONNECTOR

0.079"
0.109"

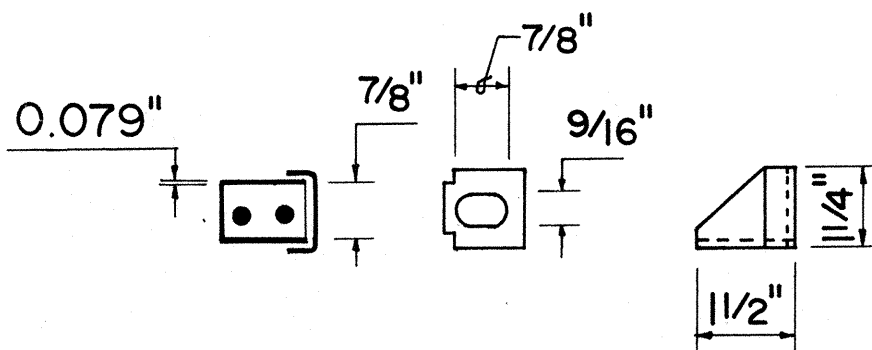
CHANNEL BAND

3/4"
3/4"
Band Butyl Gasket when required

SECTION A-A



DETAIL B



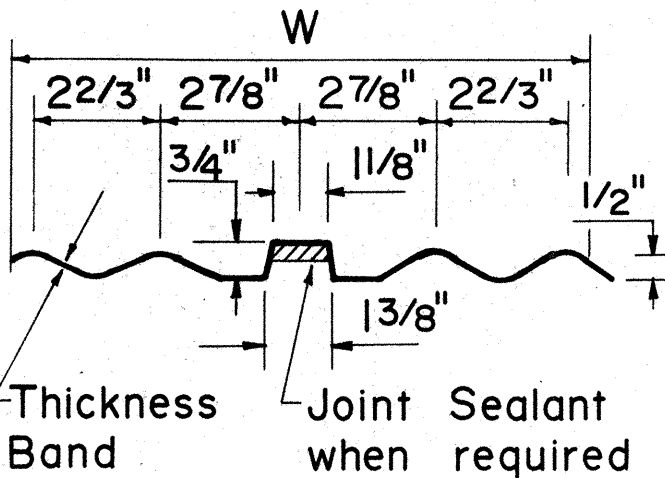
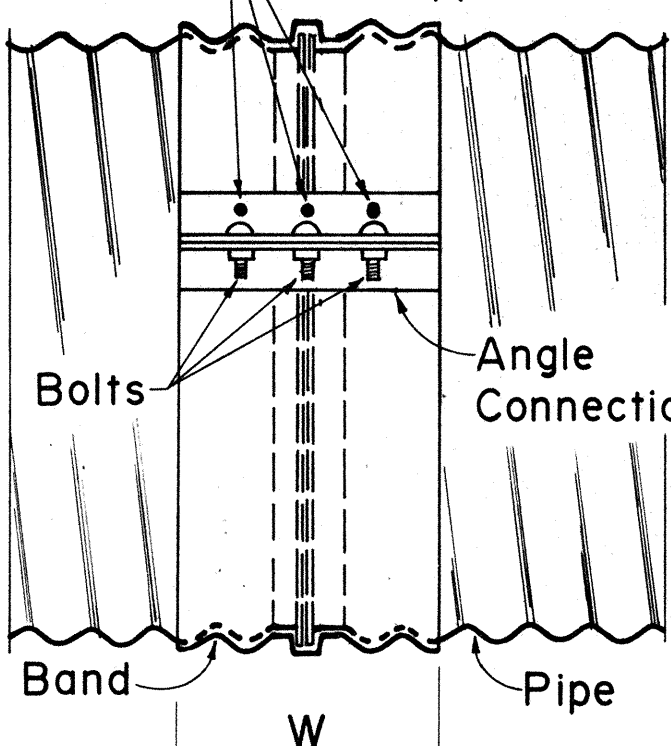
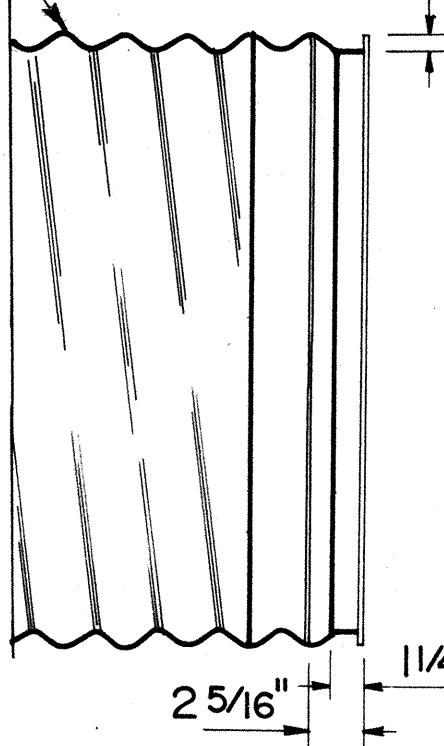
REFORMED END DETAIL LUG

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

Helical Corrugated Metal Pipe

5/8" ± 1/8"

Rivets or Spot Weld (also opposite side)

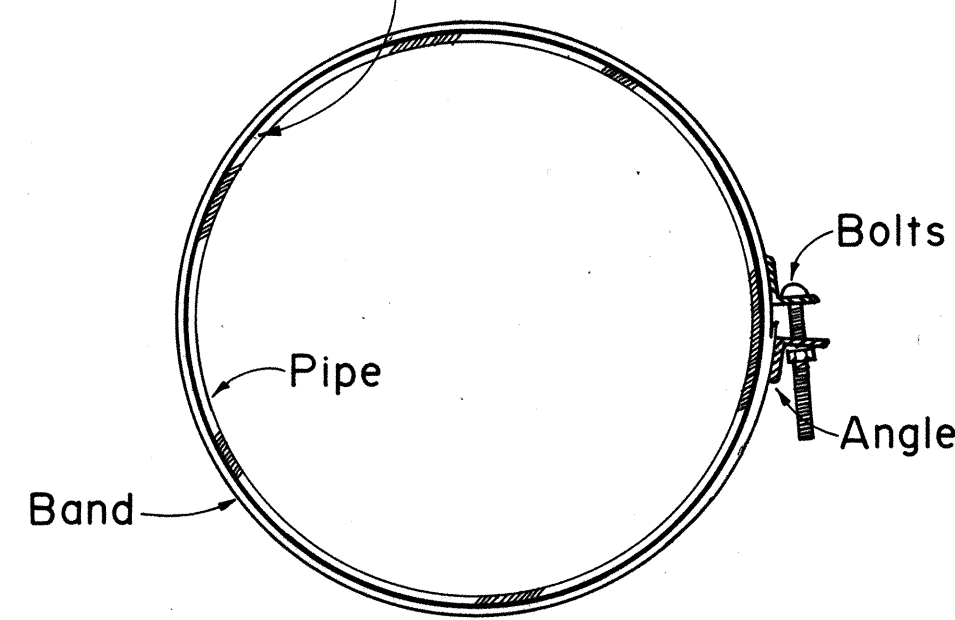


SECTION

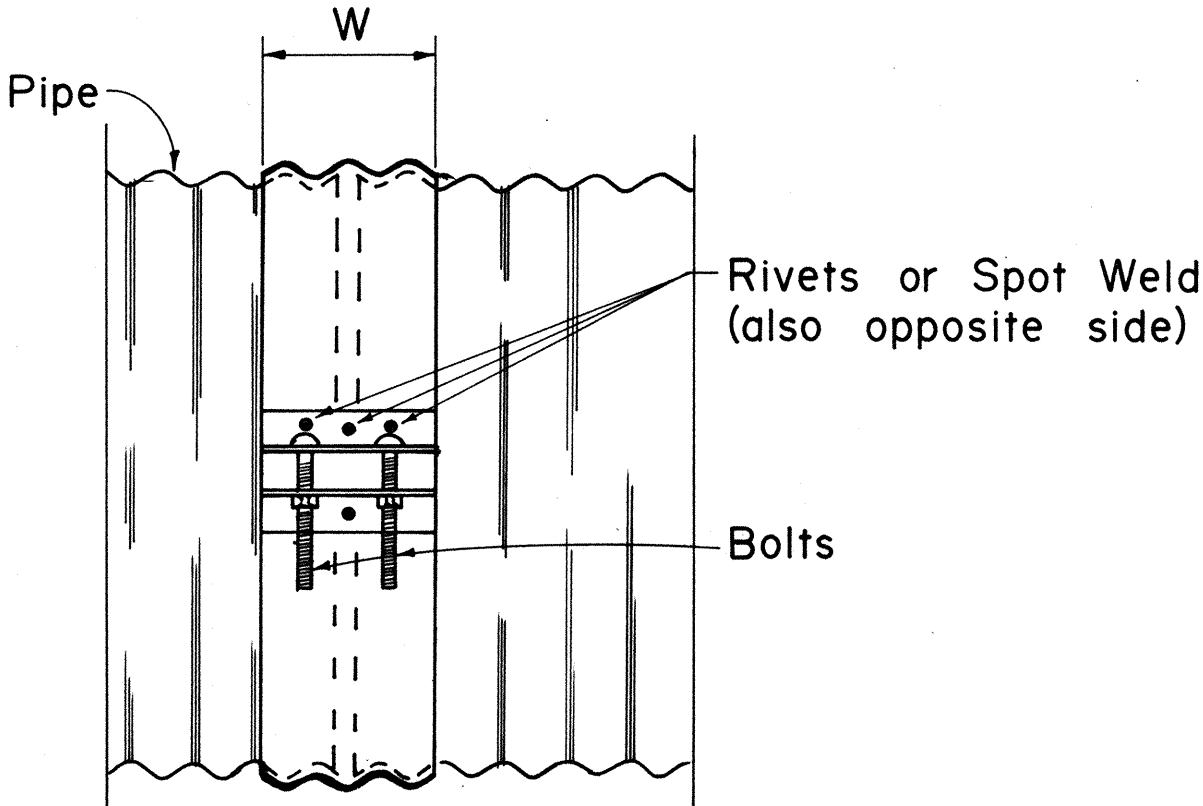
REFORMED END SIDE VIEW

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

Joint Sealant when required



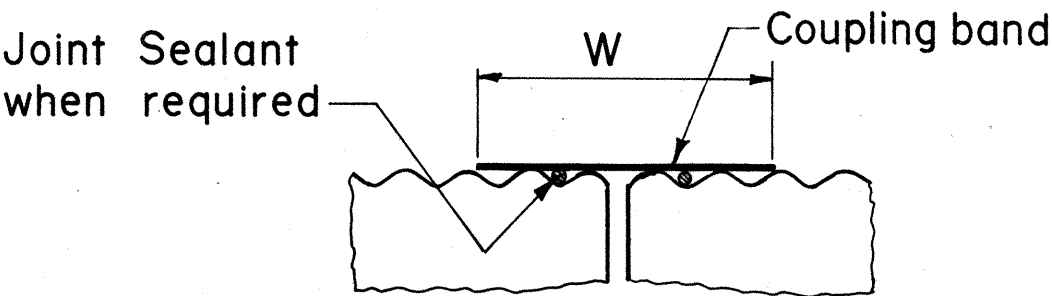
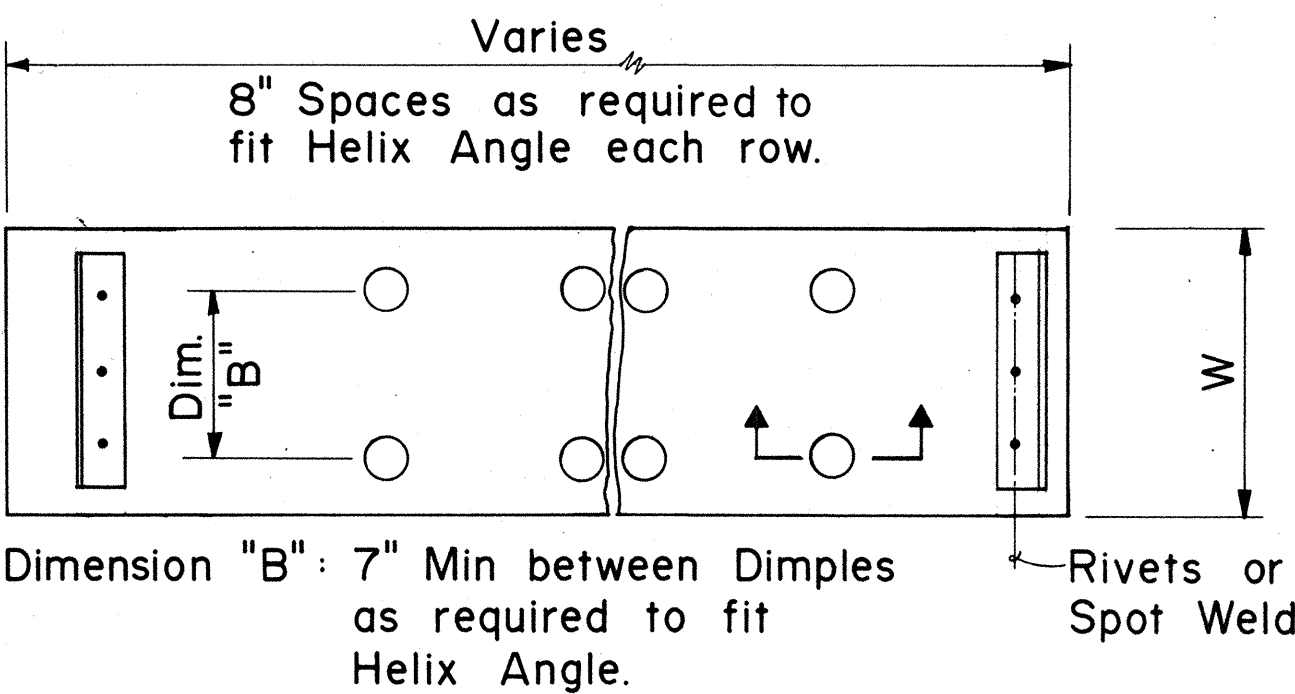
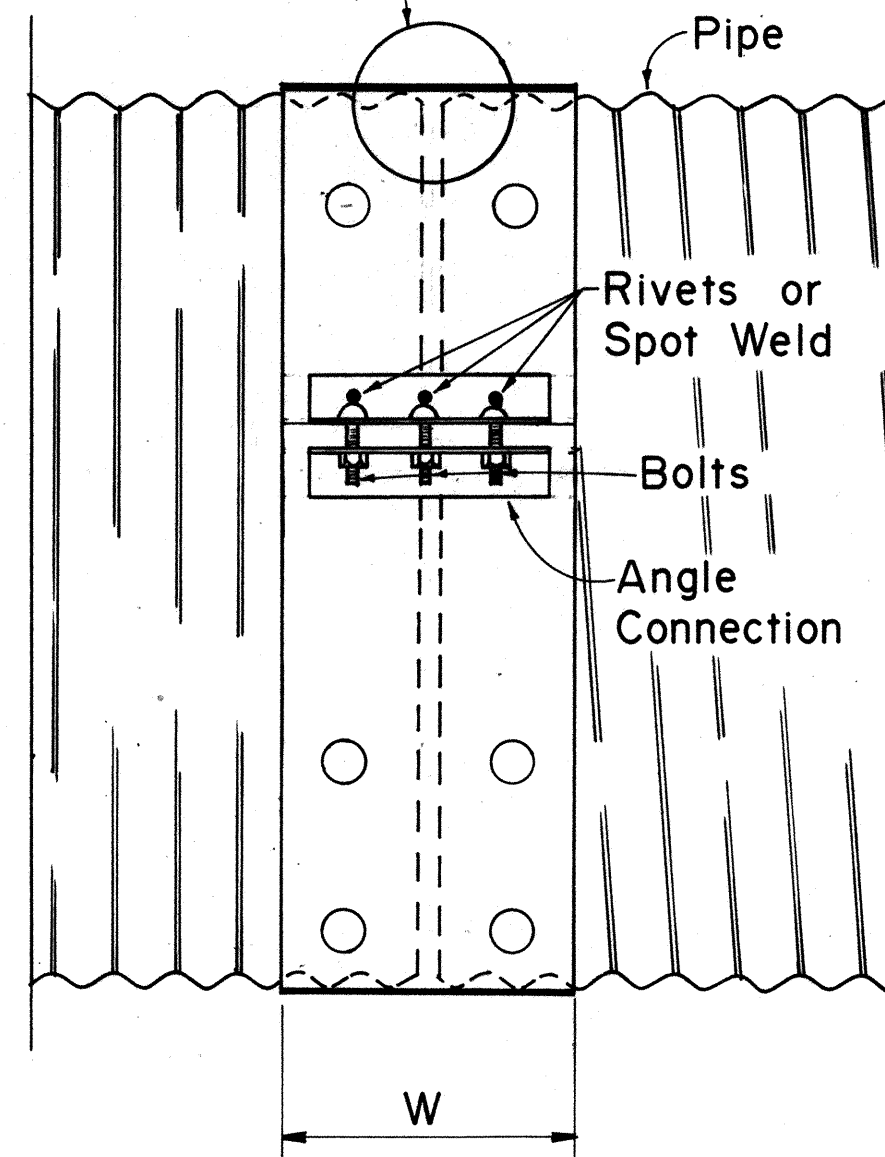
END VIEW



SIDE VIEW

ANNULAR COUPLING BAND

See Detail A



DETAIL A

SECTION THRU DIMPLES

UNIVERSAL COUPLING BAND ANGLE CONNECTION

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	0.075-0.138	2ea 2x2x3/16 x 7	2 ea 1/2 x 6	3ea 3/8	3ea 1/2
		42- 60	16 1/2	0.164-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
		66-84	16 1/2	0.164-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	
	3 x 1	36- 72	10 1/2	0.075-0.138	2ea 2x2x3/16 x 7	2 ea 1/2 x 6	3ea 3/8	
		78-120	16 1/2	0.075-0.138	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	
ANNULAR	22/3 x 1/2	12 - 36	7	0.075-0.138	2ea 2x2x3/16 x 7	2 ea 1/2 x 6	3ea 3/8	3ea 1/2
		42- 72	12	0.075-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
		78- 84	12	0.164-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
	3 x 1	36- 42	14	0.075-0.109	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	
		48-84	14	0.075-0.109	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
		90-120	14	0.075-0.109	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		0.075-0.138	2 ea Lugs	1 ea 1/2 x 6	4 ea 1/2
	3 x 1	36- 72		0.075-0.138	2 ea Lugs	1 ea 1/2 x 6	4 ea 1/2
WING	22/3 x 1/2	12 - 72	12	0.075-0.138	6 ea Lugs	3 ea 1/2 x 6	12 ea 1/2
	3 x 1	78- 84	12	0.164-0.168	6 ea Lugs	3 ea 1/2 x 6	12 ea 1/2
		36-120	12	0.075-0.109	6 ea Lugs	3 ea 1/2 x 6	12 ea 1/2

APPROVAL RECOMMENDED:

P. Takano
HYDRAULIC DESIGN ENGINEER 9-7-79 DATE

APPROVED:

Shelton Z. Zafrahi
ASSISTANT CHIEF, ENGINEERING 9-14-79 DATE

NO.	REVISION	APPROVED BY	DATE
1.	Revise pipe wall thickness from table and delete note #6.	<i>PSD</i>	9-7-83

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

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

Not To Scale Date: Sept. 1979

SHEET No. H12OF 12 SHEETS DH18