

S U M M A R Y

PROJECT : HONOAPIILANI HIGHWAY
Kahana to Alaeloa

PROJECT NO.: F-030-1(13)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030- 1(3)	1978	CO 36	174

17 Sep. 79 Quantities Revised

DATE	REVISION
------	----------

[illegible]

SHEET NO. 10H OF 31 SHEETS

CO 36

DRAINAGE

SUMMARY

PROJECT : HONOAPIILANI HIGHWAY
Kahana to Alaeloa

PROJECT NO.: F-030-1(13)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030- 1(13)	1978	37	174

ITEM NO.		206.	207.	503.		503.	602.	603.	603.	603.	603.	603.	603.	603.	603.	603.	603.		604.	604.	604.	604.	604.	612.		206.	206.	206.	503.	503.	602.				
		100	010	000		201	1000	0010	1006		2088	2672	6142	6423	7220	7222	7228	7280	7380		2150	2360	2370	2600	2700	0100		4200	7231	8000	1032	0100	0032		
UNIT USED		C.Y.	C.Y.	C.Y.		C.Y.	Lb.	C.Y.	L.F.		L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.		Ea.	Ea.	Ea.	L.F.	Ea.	C.Y.		C.Y.	C.Y.	C.Y.	L.S.	C.Y.	L.S.			
TYPE OF STRUCTURE	STATION (FROM - TO)	Structure Excavation Other Than At Bridges	Ditch and Channel Excavation	Class A Concrete Other Than in Bridges		Class B Concrete Other Than in Bridges		Reinforcing Steel Other Than in Bridges	Bed Course Material for Culvert	18" RCP, Class III		36" CMP, Sht. "1" x 0.109"	65" x 40" CMP Arch, Sht. "1" x 0.168"	48" CMP, Sht. "1" x 0.138" or 48" RCP, Class I	66" CMP (2 1/2 x 1/2), Sht. "1" x 0.168" or 66" CMP (3' x 1'), Sht. "1" x 0.168" or 66" RCP, Class IV	24" CMP, Sht. "1" x 0.109" or 24" RCP, Class III or 24" ACP, Class III	24" CMP, Sht. "1" x 0.109" or 24" RCP, Class III or 24" ACP, Class III	24" CMP, Sht. "1" x 0.109" or 24" RCP, Class III or 24" ACP, Class III	24" CMP, Sht. "1" x 0.168" or 24" RCP, Class III or 24" ACP, Class III	30" CMP, Sht. "1" x 0.109" or 24" RCP, Class III or 24" ACP, Class III	36" CMP, Sht. "1" x 0.109" or 36" RCP, Class III or 36" ACP, Class III		Type A Cast Iron Frame and Cover	Type G/G-45° Steel Frame and Grate	Type G/G-45° Steel Frame and Grate	Debris Rack	Removing, Cleaning, Painting and Reinstalling G/G-45° Steel Frame & Grate	Grouted Rubble Paving		Structure Excavation for Box Culvert and Wingwalls	Structure Backfill for Box Culvert and Wingwalls	Filter Material	Concrete in Box Culvert and Wingwalls	CRM	Reinforcing steel in Box Culvert and Wingwalls
Type G/G-45° C.D.I.	Sta. 140+75 N.B.	53		25				33										59			1														
Type G/G-45° C.D.I.	Sta. 143+25 S.B.	221		40				219								2445																			
Type G/G-45° C.D.I.	Sta. 143+300 N.B.	73		30				175								68.1																			
Type "A" Inlet Struct.	Sta. 148+44.1 ± 96 104.3 Rt.	500	8	70				565																											
Type "G" Outlet Struct.	Sta. 148+62.9 ± 96 60.6 Lt.	25	8	180				1961																											
Type G/G-45° C.D.I.	Sta. 152+50 S.B.	269		25				33								223																			
Type G/G-45° C.D.I.	Sta. 154+25 N.B.	56		30				180	3.22							47																			
Type G/G-45° C.D.I.	Sta. 154+75 S.B.	167		40				447								96.7																			
Type G/G-45° C.D.I.	Sta. 154+75 N.B.	61		25				183	2.59							46.75																			
Type G/G-45° C.D.I.	Sta. 155+25 N.B.	60		30				180	3.15							75																			
Type "F" S.D.M.H.	Sta. 155+75, 96 20.2' Lt.	82	4	50				370								72.6																			
Std. C.H.W.	Sta. 155+75, 96 20.2' Lt.	5	3			2.0		42																											
Type G/G-45° C.D.I.	Sta. 159+25 N.B.	75		30				190								53																			
Std. C.H.W.	Sta. 159+25, 96 22 ± Rt.	5	26			2.0		42																											
Std. C.H.W.	Sta. 160+00, 96 66.5 ± Lt.	6	2			2.0		42																	3										
Type G/G-45° C.D.I.	Sta. 160+00 S.B.	56		30				180								39																			
Std. C.H.W.	Sta. 160+50, 96 67 ± Rt.	5	3			2.0		42																											
Type G/G-45° C.D.I.	Sta. 160+50 N.B.	55		30				191								45.7																			
Type G/G-45° C.D.I.	Sta. 161+00 S.B.	86		30				180								97.2																			
Type "A" Outlet Struct.	Sta. 162+48.6 78.9 96 78.7 Lt.	15	15	80				773																											
SUB TOTAL 2		1965	69	74.5		80		6028	8.26					337		10725				1	3	9	13	3											

S U M M A R Y

PROJECT : HONOAPIILANI HIGHWAY
Kahana to Alaeloa

PROJECT NO.: F-030-1(13)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030- 1(3)	1978	0038	174

17 Sep. 79 Quantities Revised

DATE	REVISION
------	----------

[illegible]

		DRAINAGE SUMMARY																												<table><tr><td>FED. ROAD DIST. NO.</td><td>STATE</td><td>FED. AID PROJ. NO.</td><td>FISCAL YEAR</td><td>SHEET NO.</td><td>TOTAL SHEETS</td></tr><tr><td>HAWAII</td><td>HAW.</td><td>F-030-1(13)</td><td>1978</td><td>0039</td><td>174</td></tr></table>						FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS	HAWAII	HAW.	F-030-1(13)	1978	0039	174																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
HAWAII	HAW.	F-030-1(13)	1978	0039	174																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
PROJECT: HONOAPIILANI HIGHWAY Kahana to Alaeloa		PROJECT NO.: F-030-1(13)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
17Sep79 Quantities Revised																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
DATE REVISION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
ITEM NO.		207.		609.			640.	640.	640.	640.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

S U M M A R Y

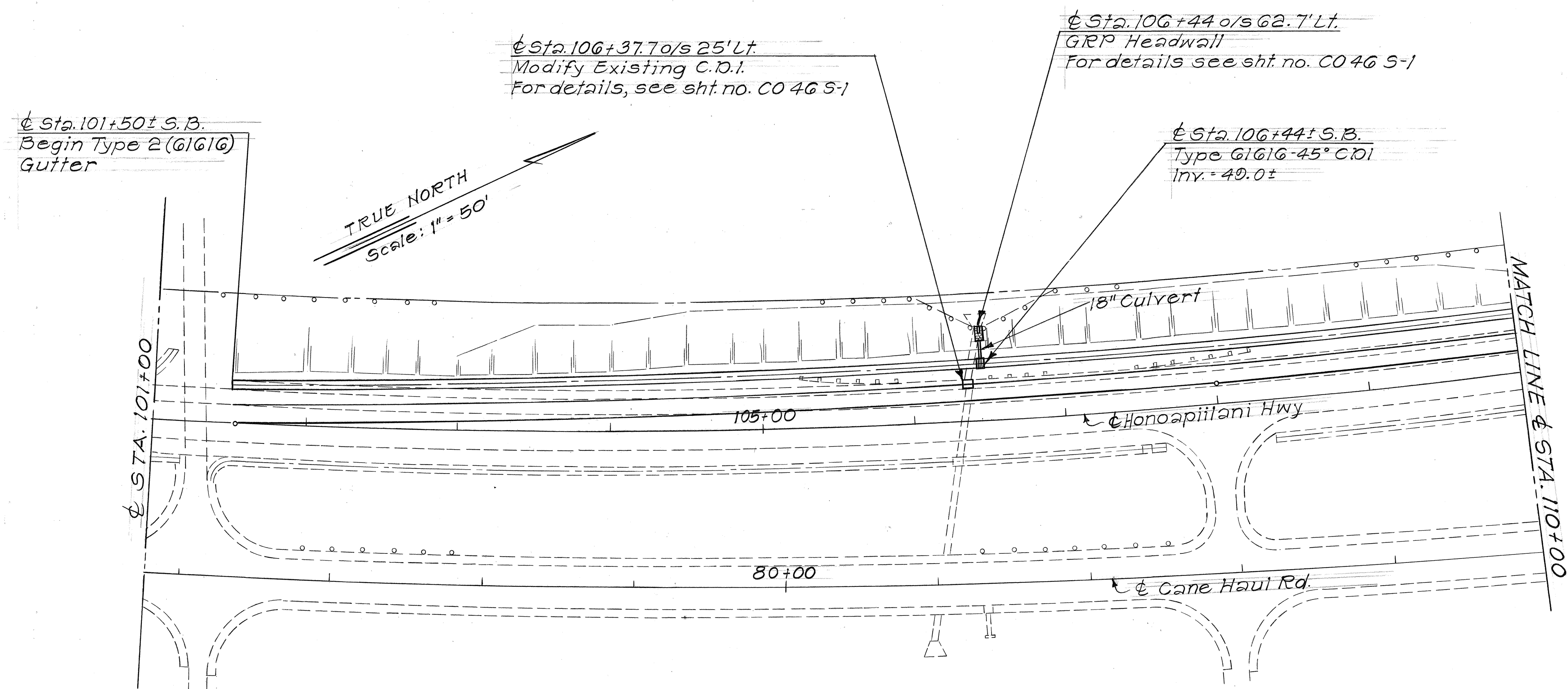
PROJECT : HONOAPIILANI HIGHWAY
Kahana to Alaeloa

PROJECT NO.: F-030-1(13)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	10304(13)	1978	40	174

ITEM NO.		206.	207.	503.	503.	602.	603.	603.	603.	604.	612.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
----------	--	------	------	------	------	------	------	------	------	------	------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	C040 S-1	174



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

17 Sep 79	Revised Drainage Structure to accomodate new Roadway Intersection
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE & IRRIGATION PLAN
HONOAPIILANI HIGHWAY
Kahana to Aiealoa
F.A. Proj. No. F-030-1(13)

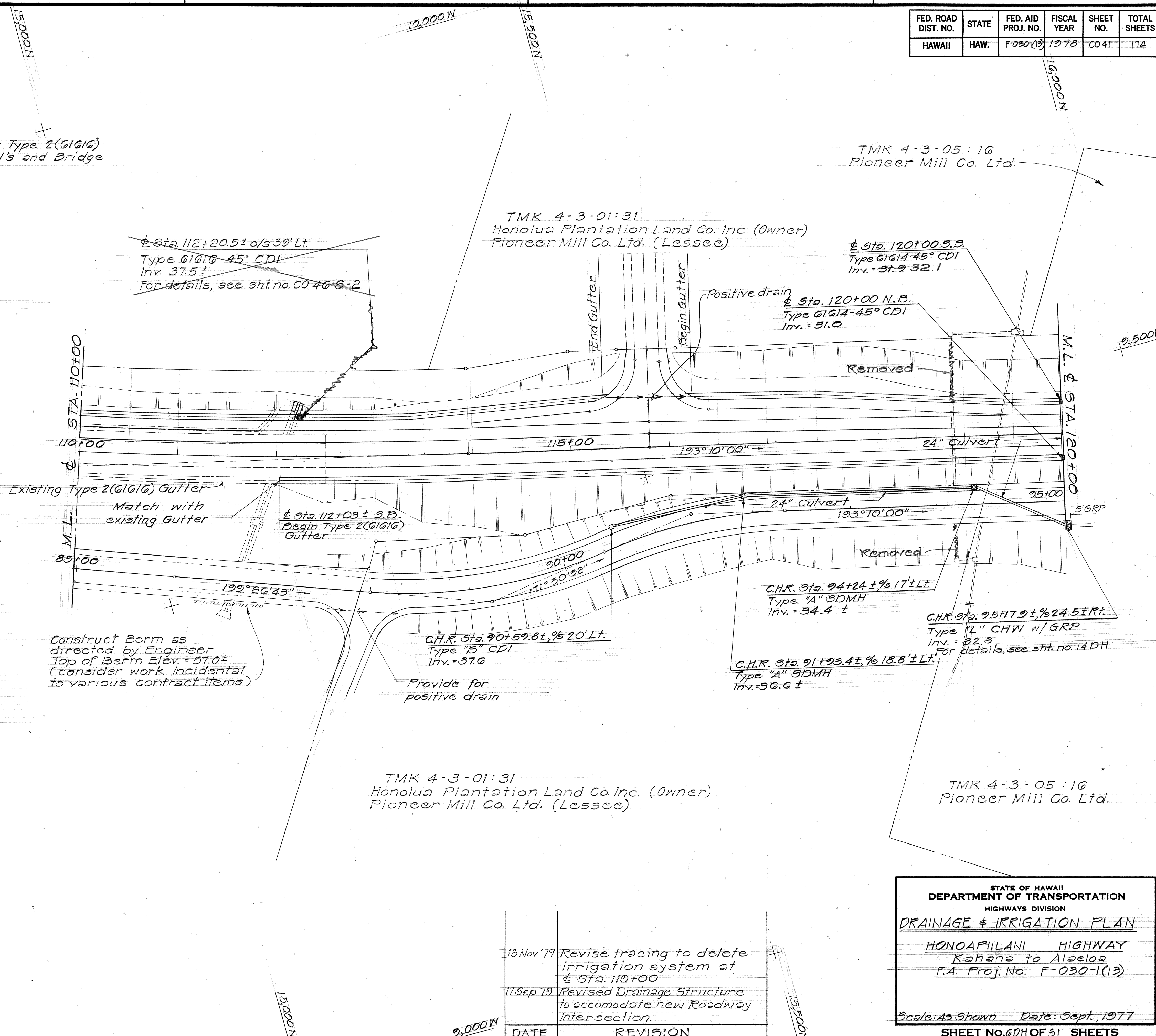
Scale: As Shown Date: Sept. 1979
SHEET No. 501-A OF 31 SHEETS

C040 S-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	CO 41	174

GENERAL NOTES FOR DRAINAGE AND IRRIGATION

1. G/G/G gutter, C.D.I.'s and inlet and outlet structures are listed below with its respective sheet numbers where details are found
 Type 2(G/G/G) Gutter Sht.no. 25DH Transition for Type 2(G/G/G)
 Type G/G/G-45° C.D.I. Sht.no. 27DH Gutter at C.D.I.'s and Bridge
 Type G/G/G-45° C.D.I. Sht.no. 26DH Sht. no. 25DH
 Type "A" Inlet and Outlet Concrete Structure Sht.no. 21DH
2. Where plans show cut and plug or cut existing pipes, concrete shall be used to plug existing pipes. Also, existing irrigation pipes not shown on the plans shall be cut and plug or cut as directed by the Engineer. Work to be done as noted above and concrete shall be considered incidental to Roadway Excavation.
3. Irrigation plans and details are on sheet nos. 21 to 81
4. The final location of the standard manhole rungs shall be determined by the Engineer. Manhole rungs shall be considered incidental to Class "A" Concrete. Manhole rungs (12" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (16 inches from the bottom) is required if "H" is 4 feet 6 inches or less. For typical spacing of manhole rungs, see sht. no. 27DH as shown for Type G/G/G-45° C.D.I.
5. Where plans call for grade to drain, consider as as unlined ditches. For total quantity, see drainage summary under unlined ditches.
6. The locations and inverts shown for irrigation facilities on the plans are approximate. For exact or final locations of irrigation facilities (siphon inlets and outlets, distribution boxes, pipes, ditches and intake boxes), the Contractor shall consult the project Engineer before commencing any installation of irrigation facilities.
7. All GRP lining shall have a minimum thickness of 2 inches except where otherwise noted.
8. All existing irrigation pipes shall be removed from within the R/W line as directed by the Engineer. Work as noted above shall be considered incidental to Roadway Excavation.
9. Backfilling of existing irrigation ditches shall be considered incidental to Roadway Excavation.
10. Where fill is required to install irrigation facilities, no payment shall be made but shall be considered incidental to Roadway Excavation.



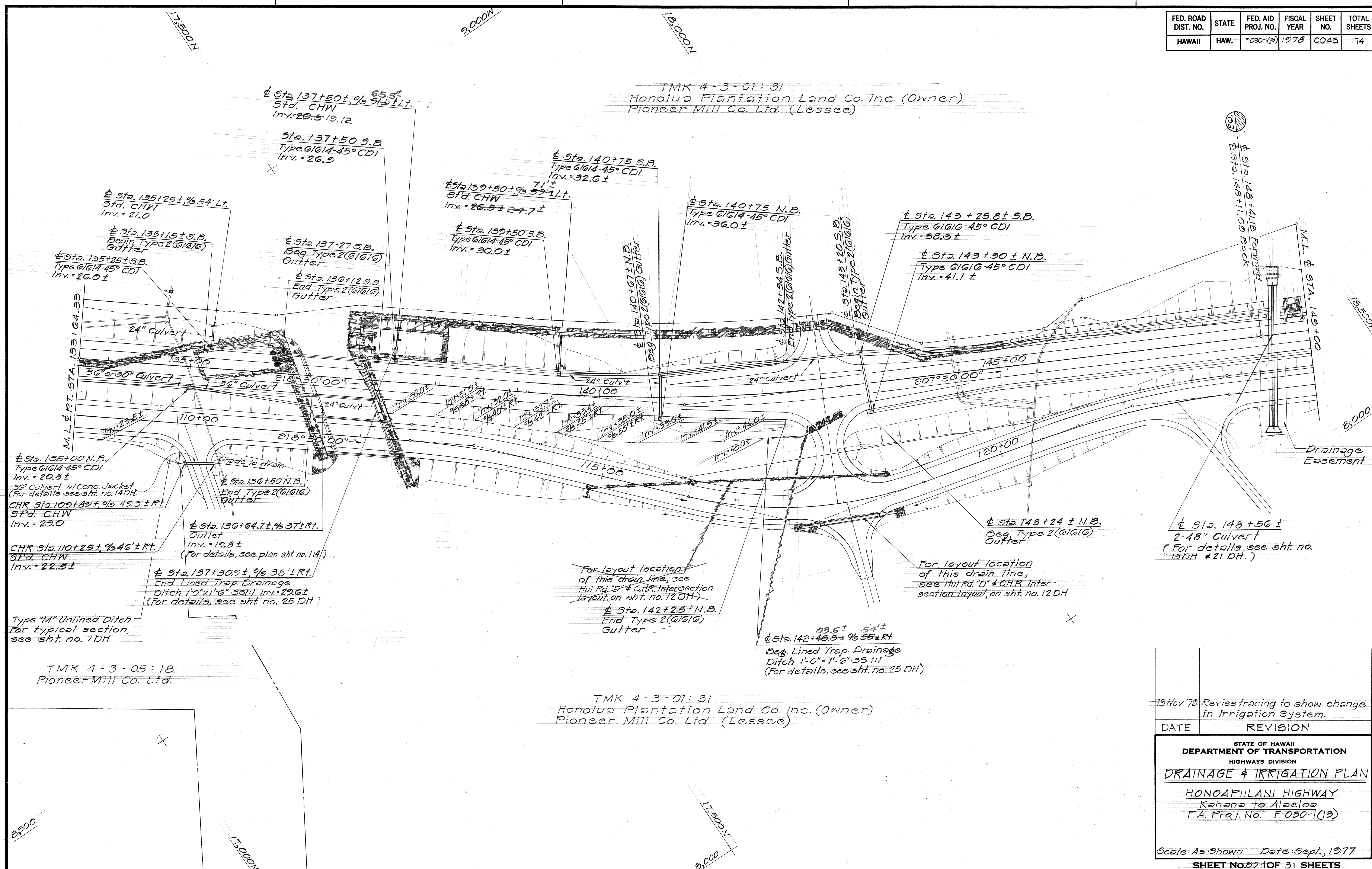
DATE	BY
DESIGNED BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
TRACED BY	
DRAWN BY	
ORIGINAL PLAN	

DATE	REVISION
13 Nov '79	Revised tracing to delete irrigation system at Sta. 110+00
17 Sep 79	Revised Drainage Structure to accommodate new Roadway Intersection.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
DRAINAGE & IRRIGATION PLAN	
HONOAPIILANI HIGHWAY Kahala to Alaeos F.A. Proj. No. F-030-1(13)	
Scale: As Shown	Date: Sept., 1977
SHEET No. 60 OF 31 SHEETS	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	C043	174

TMK 4-3-01:31
Honolua Plantation Land Co. Inc. (Owner)
Pioneer Mill Co. Ltd. (Lessee)



DATE	_____
DESIGNED BY	_____
CHECKED BY	_____
QUANTITIES BY	_____
NOTE BOOK	_____
ORIGINAL PLAN	_____

TMK 4-3-05:18
Pioneer Mill Co. Ltd.

TMK 4-3-01:31
Honolua Plantation Land Co. Inc. (Owner)
Pioneer Mill Co. Ltd. (Lessee)

13 Nov '79 Revise tracing to show change in Irrigation System.

DATE	REVISION

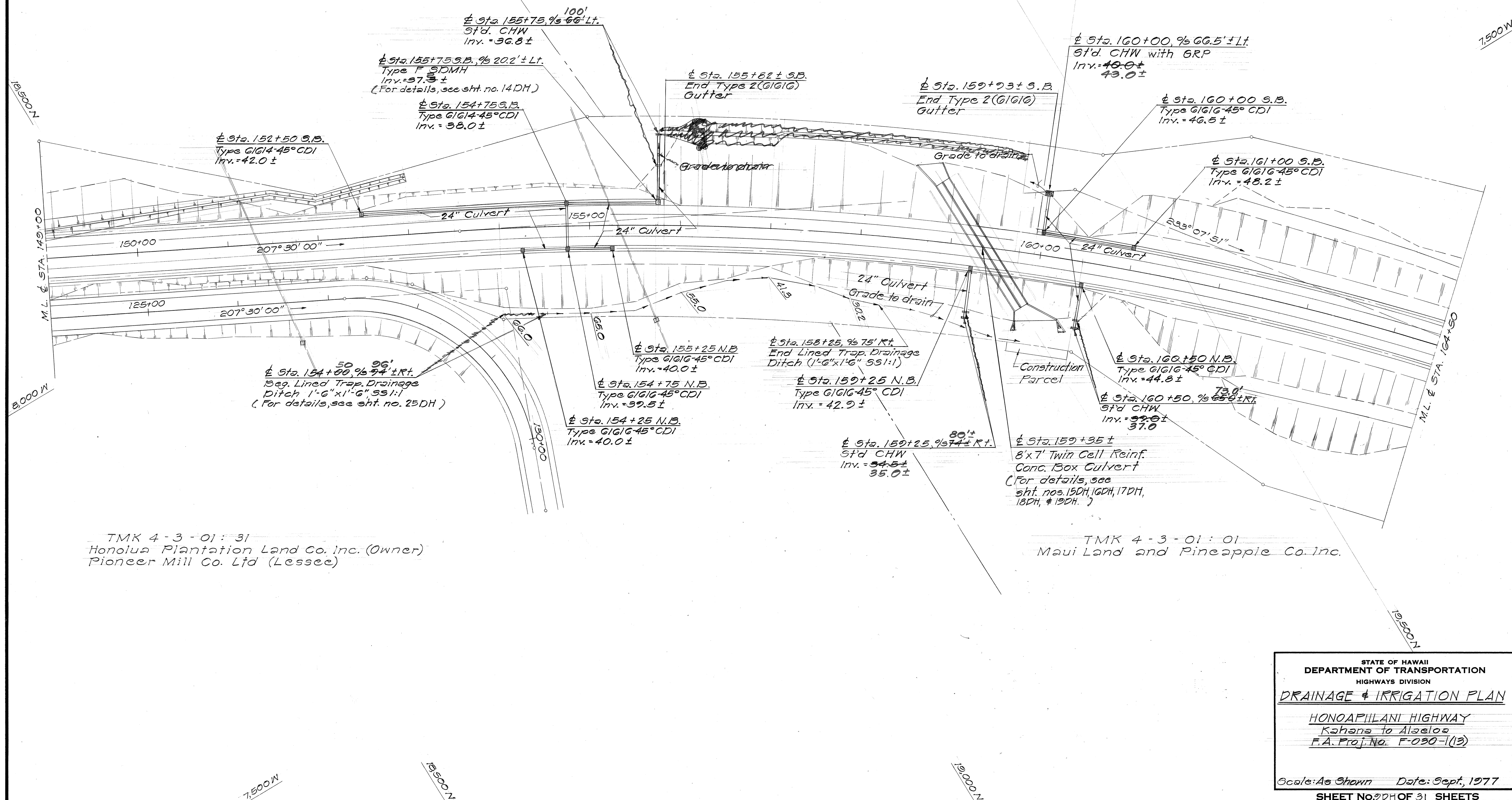
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE & IRRIGATION PLAN
HONOAPIILANI HIGHWAY
Kahala to Alae
F.A. Proj. No. F-030-1(13)

Scale: As Shown Date: Sept., 1977
SHEET NO. 43 OF 31 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	44	174

TMK 4-3-01:31
Honolua Plantation Land Co. Inc. (Owner)
Pioneer Mill Co. Ltd (Lessee)

TMK 4-3-01:01
Maui Land and Pineapple Co. Inc.



TMK 4-3-01:31
Honolua Plantation Land Co. Inc. (Owner)
Pioneer Mill Co. Ltd (Lessee)

TMK 4-3-01:01
Maui Land and Pineapple Co. Inc.

DATE	SURVEY ELICITED BY
DATE	DRAWN BY
DATE	DESIGNED BY
DATE	CHECKED BY

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE & IRRIGATION PLAN

HONOAPIILANI HIGHWAY
Kahana to Alaeos
F.A. Proj. No. F-030-1(13)

Scale: As Shown Date: Sept., 1977

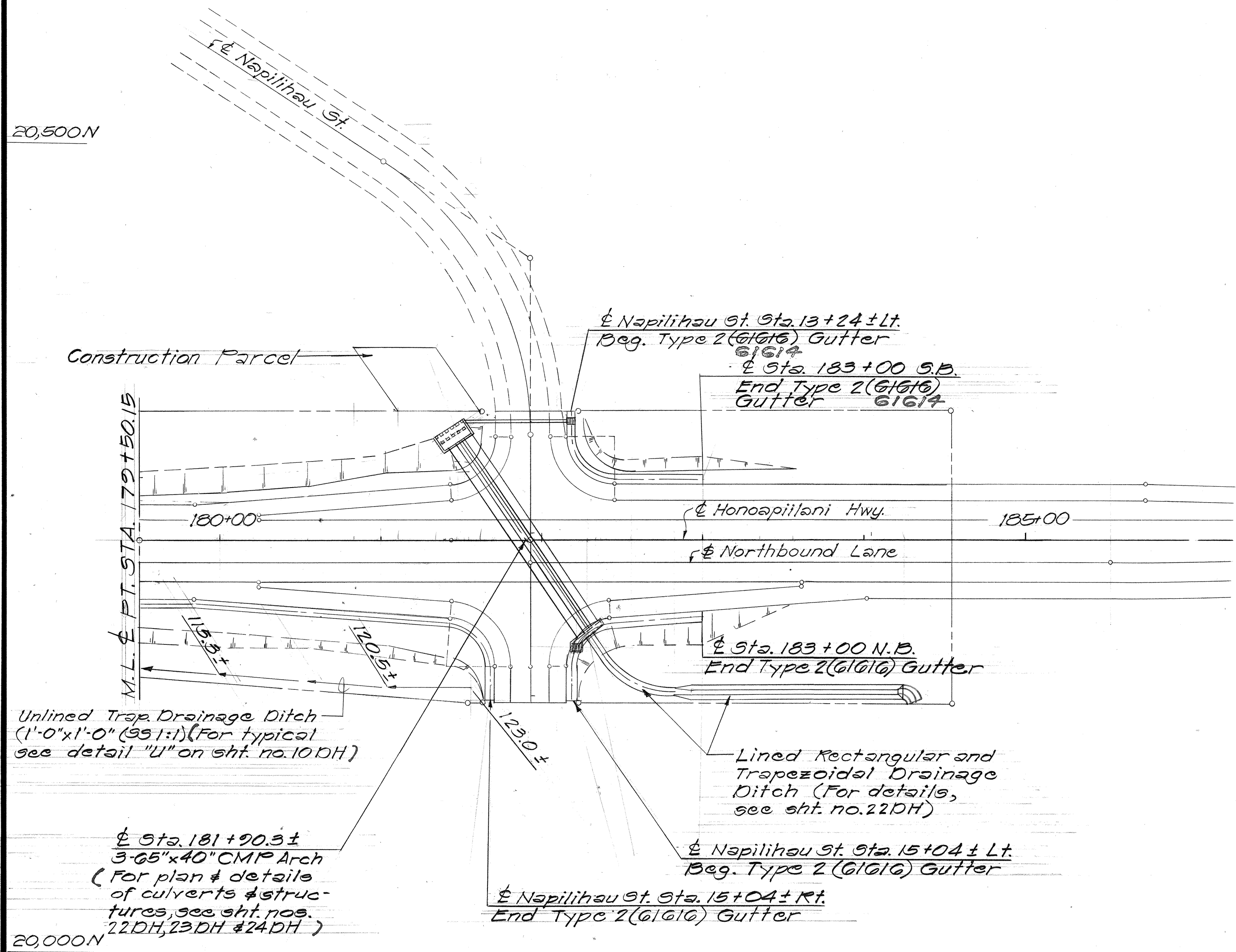
SHEET NO. 31 OF 31 SHEETS

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

SHEET No. 100H OF 31 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	46	174

4,500 W



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

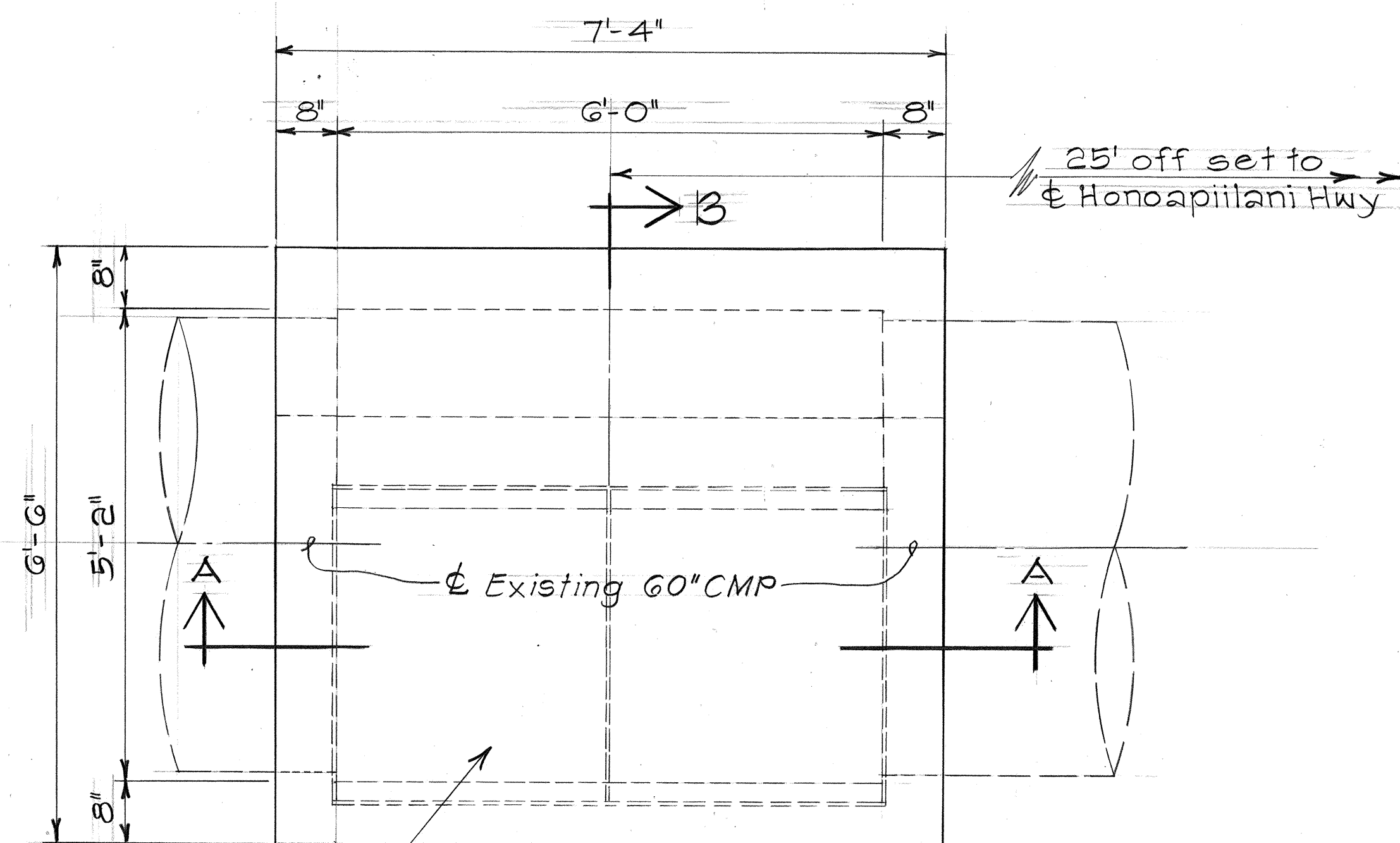
DRAINAGE & IRRIGATION PLAN

HONOAPIILANI HIGHWAY
Kahana to Alaeola
F.A. Proj. No. F-030-1(13)

Scale: As Shown Date: Sept., 1977

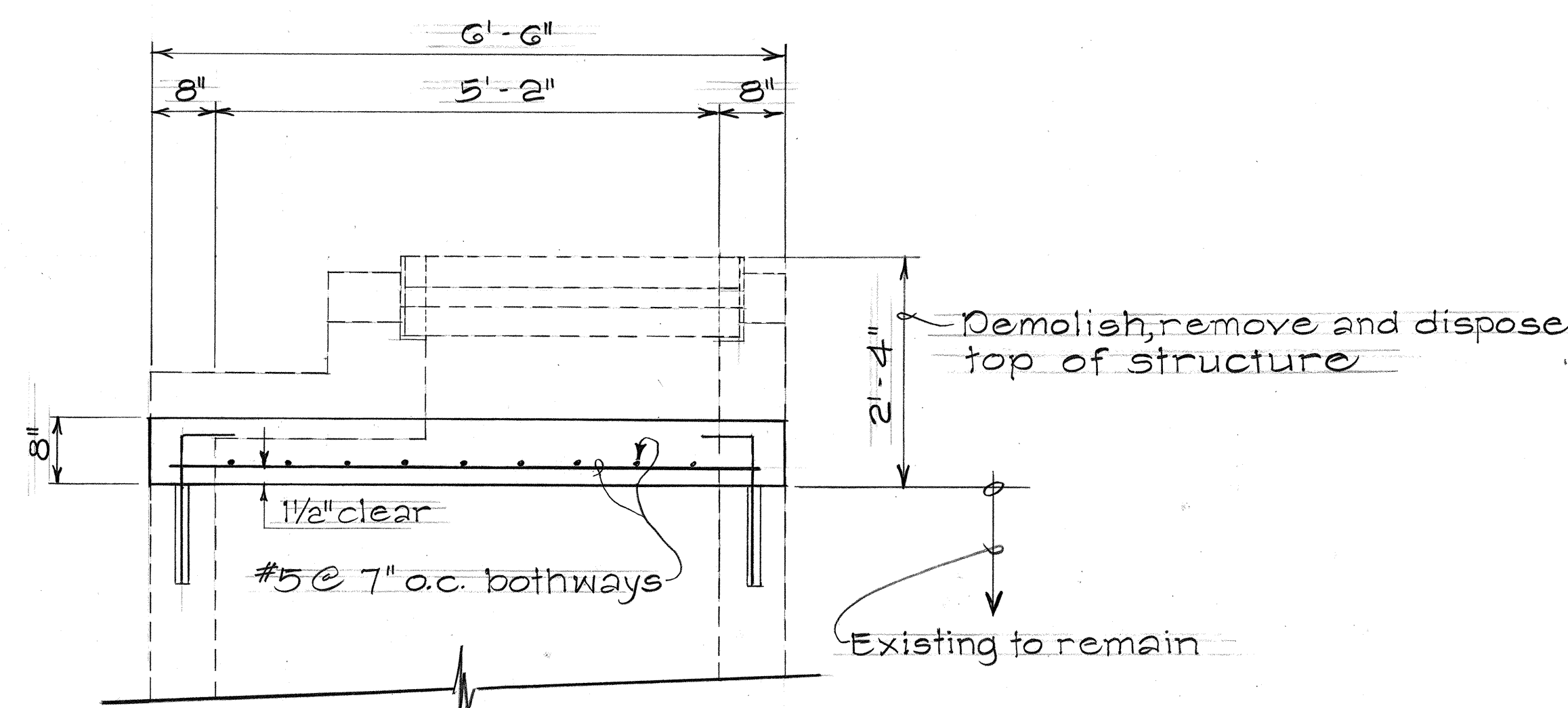
SHEET NO. 46 OF 31 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	C046 S-1	174

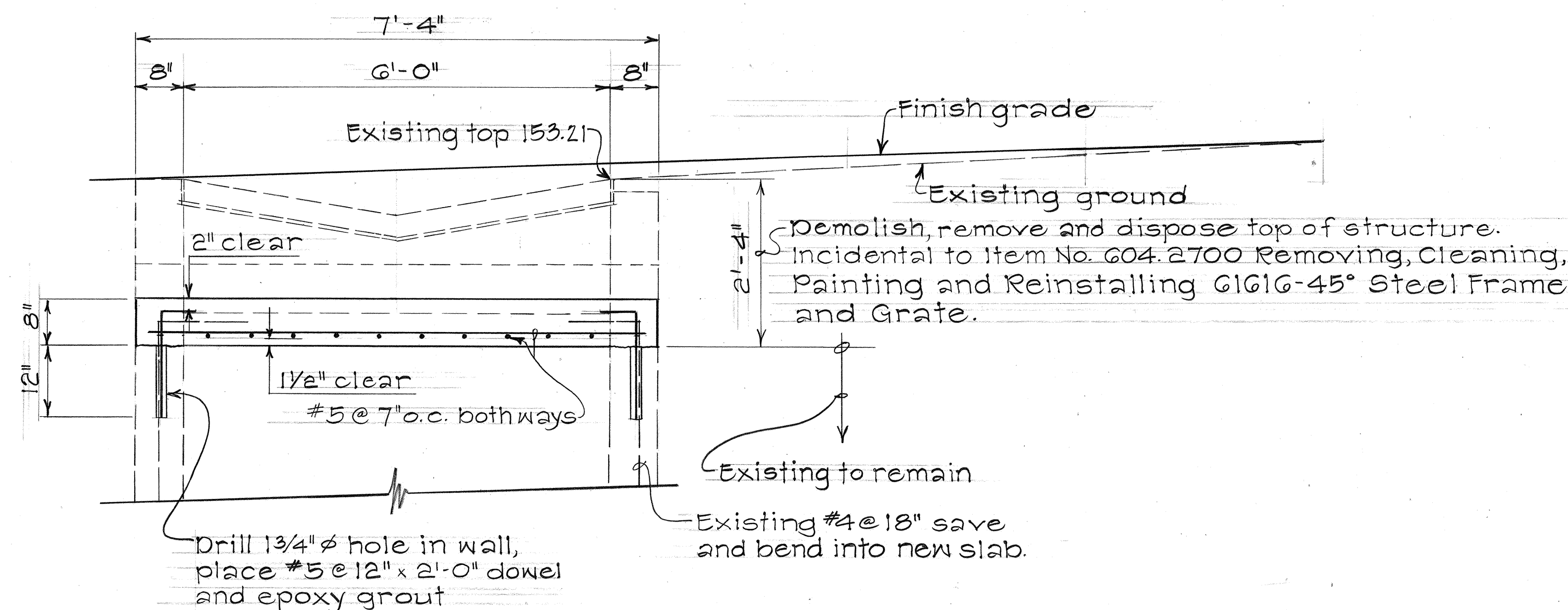


Demolish and remove top of structure, salvage existing GIG-45° steel frame and grate.

PLAN



SECTION "B-B"

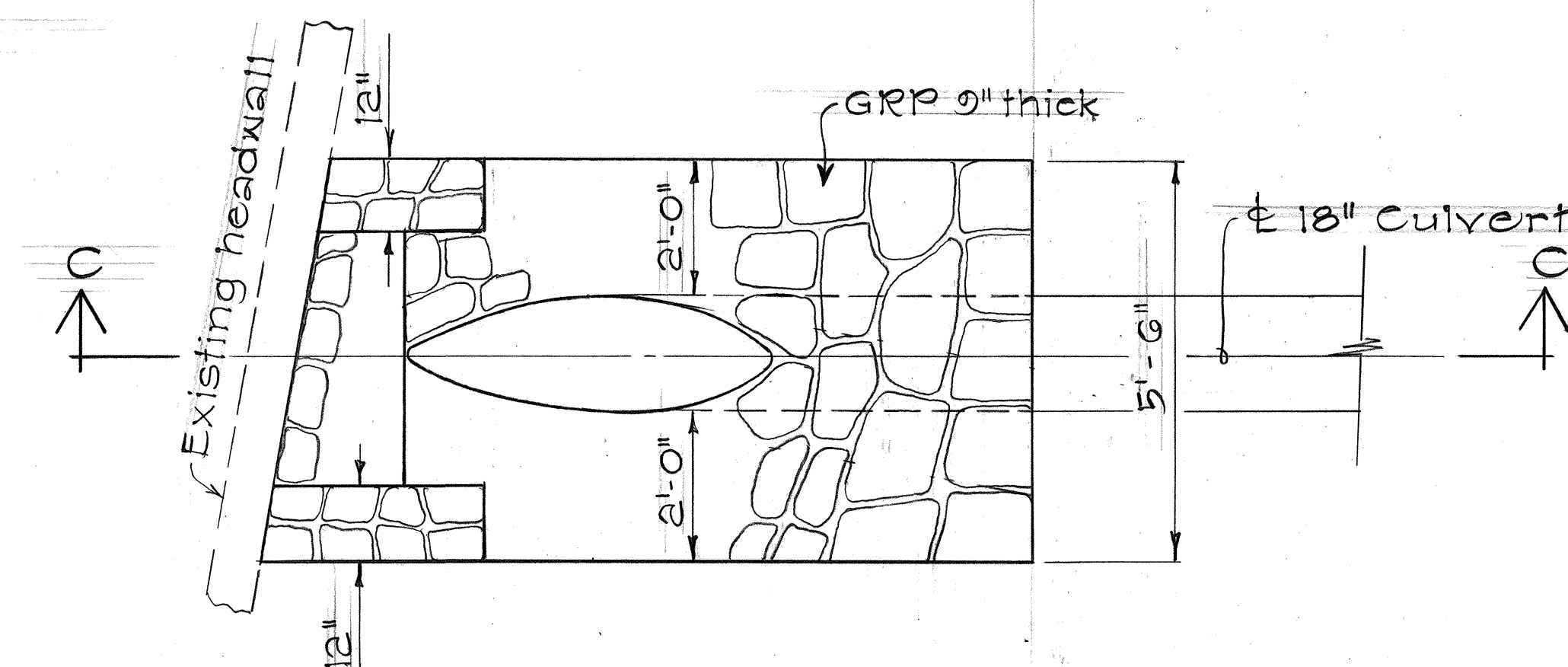


SECTION "A-A"

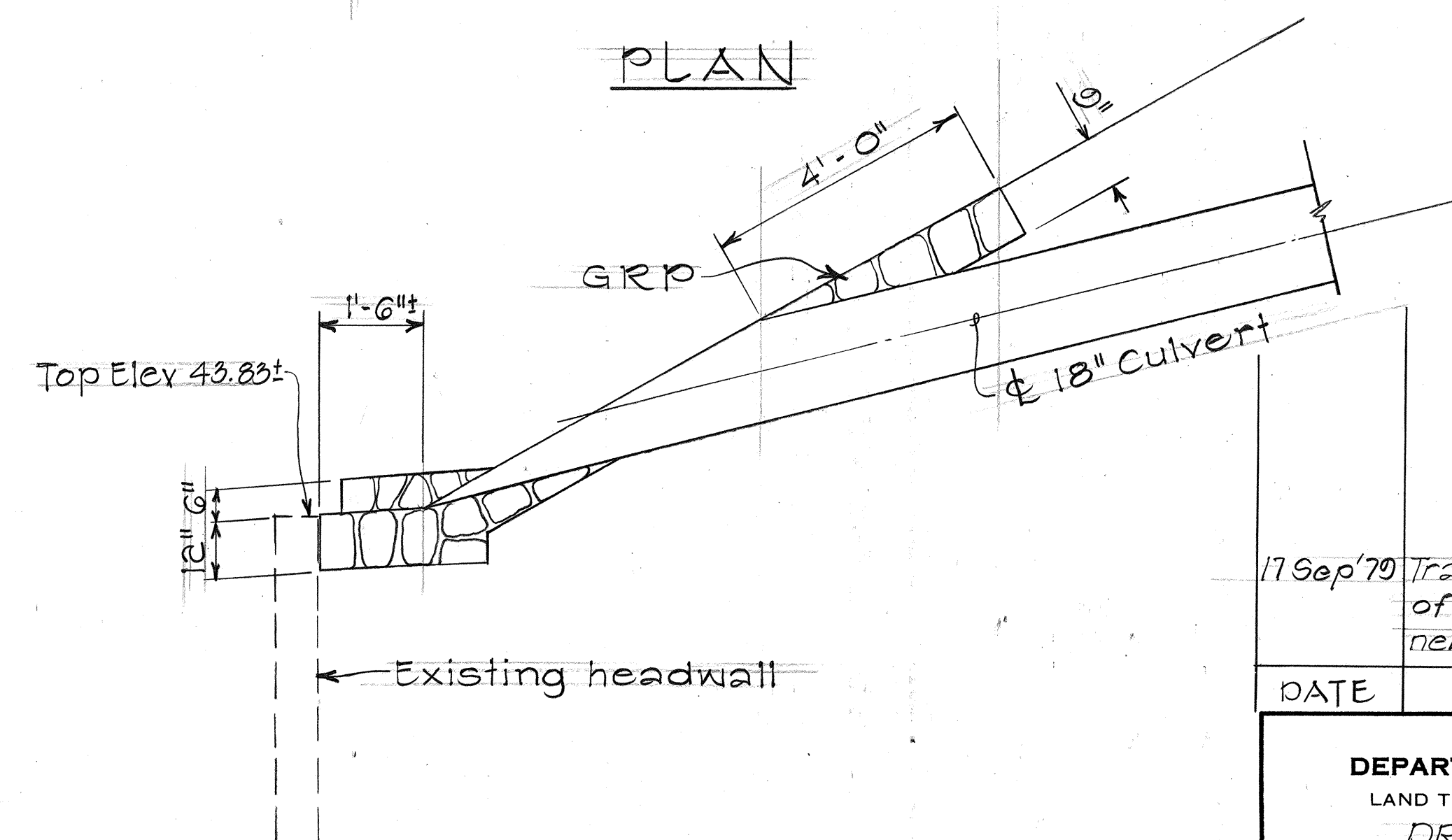
Note: Only non-pneumatic type of drill as approved by the Engineer will be permitted for drilling holes in concrete

CONCRETE DROP INTAKE AT STA. 106+37.7 o/s 25' LT.

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



PLAN



SECTION "C-C"

GRP HEADWALL AT STA. 106+44 o/s 62.7' LT.

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

17 Sep 79 Tracing added to show details of drainage structures for new roadway intersection.

DATE REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS

HONOAPIILANI HIGHWAY
Kahana to Alaeola
F.A. Proj. No. F-030-1(13)

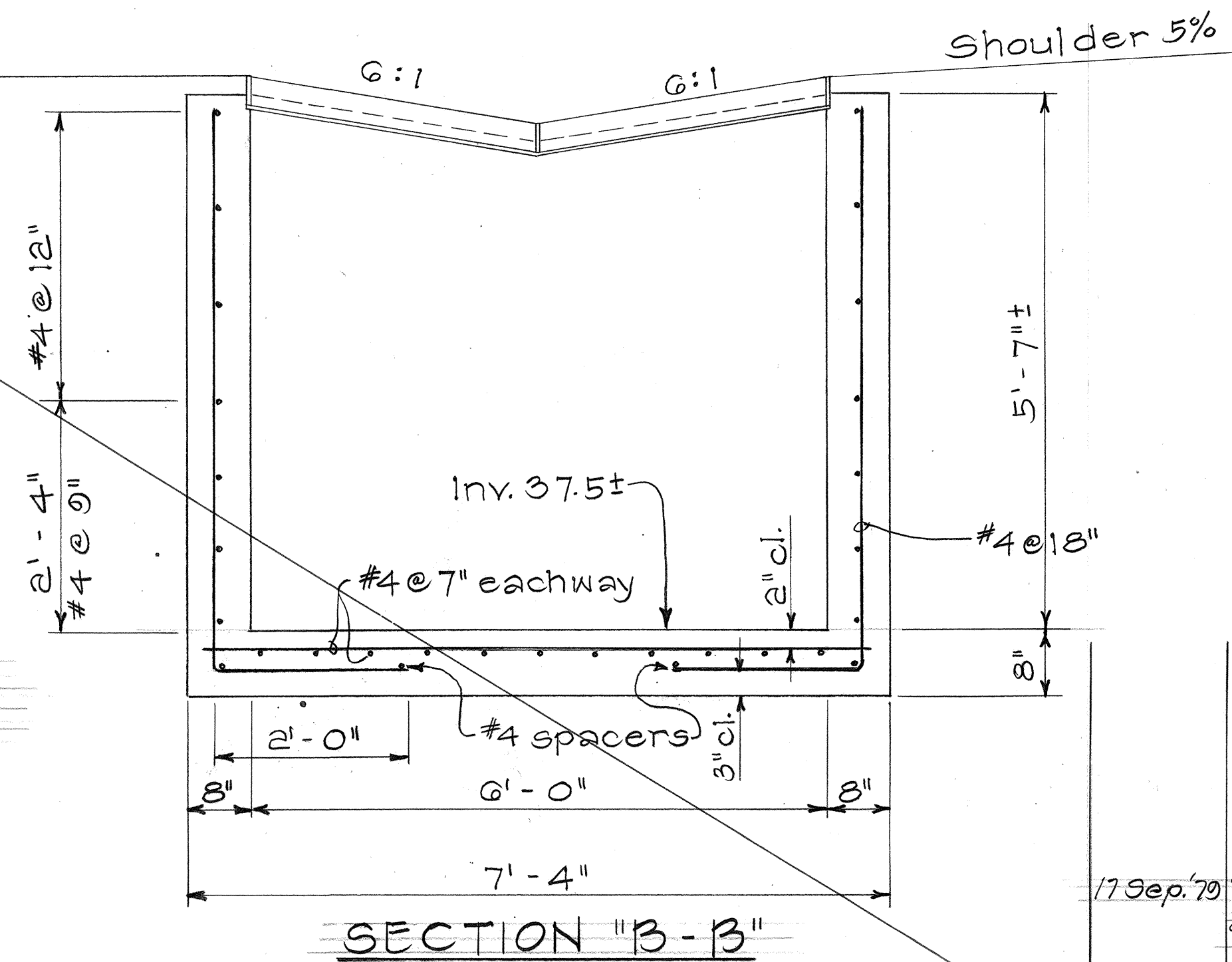
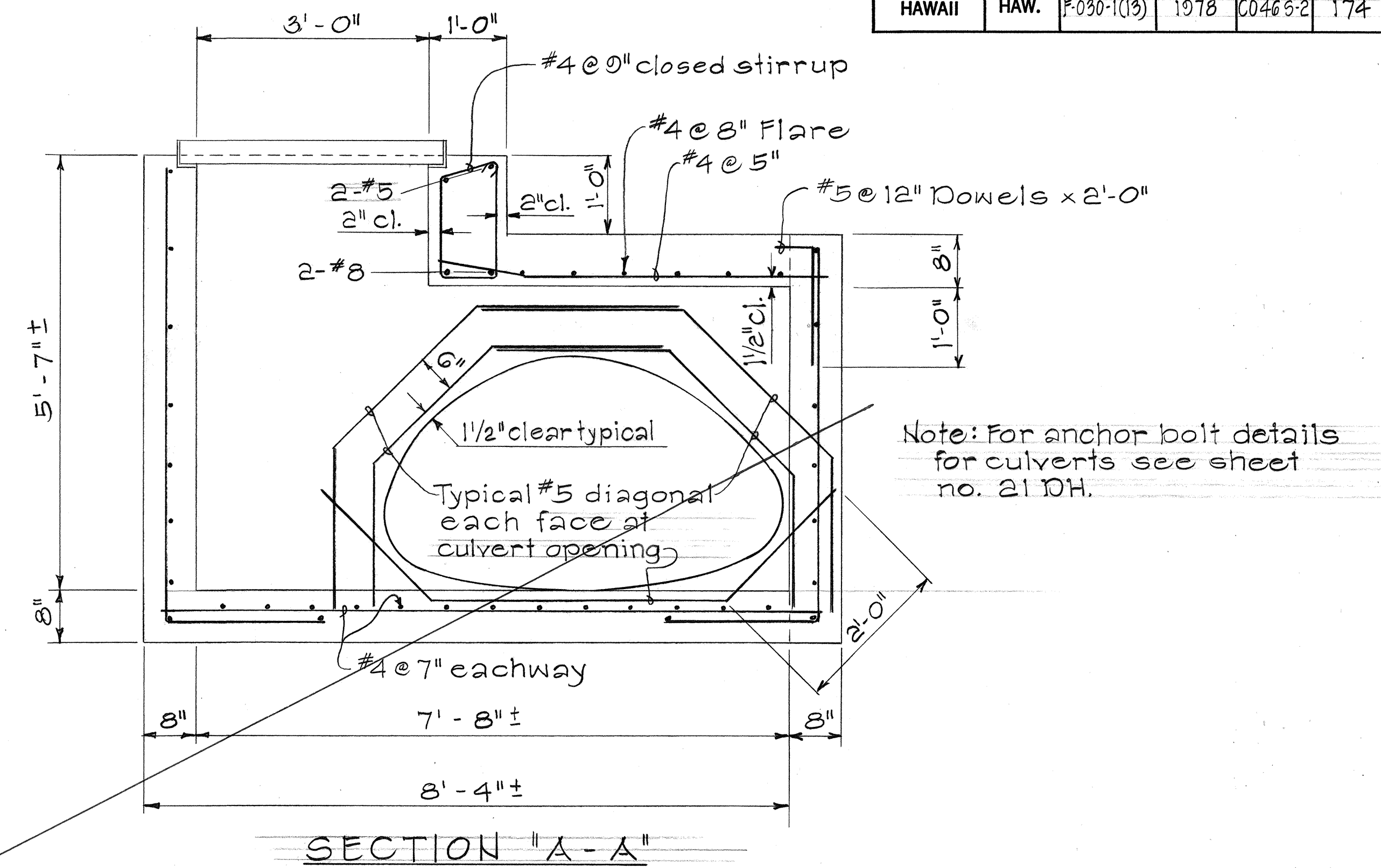
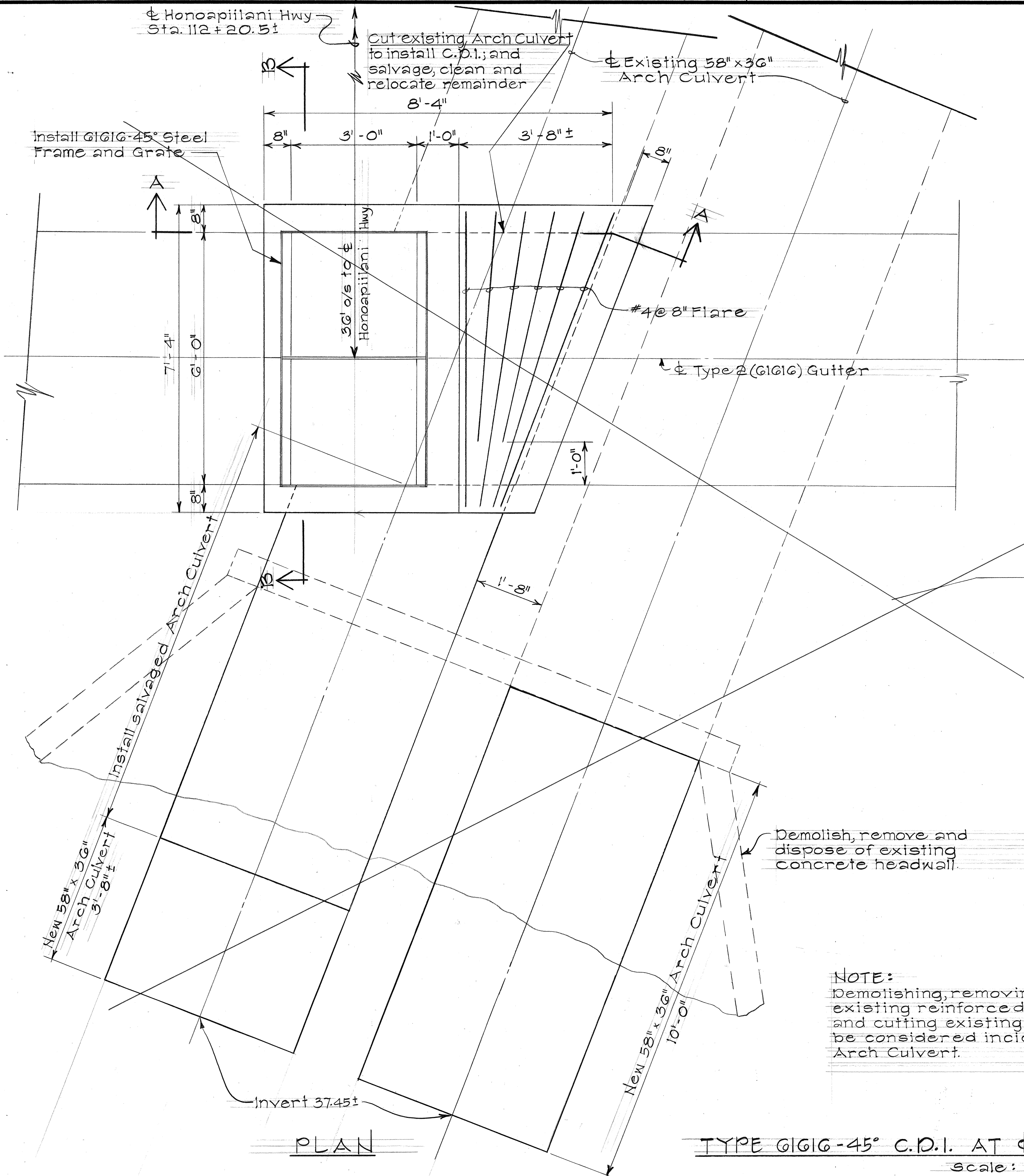
Scale: As Shown Date: Sept., 1979

SHEET No. 120HAOF 31 SHEETS

C046 S-1

ORIGINAL PLAN	DATE
DESIGNED BY	
TRACED BY	
NOTE BOOK	
QUANTITIES BY	
CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	004652	174



NOTE:
Demolishing, removing and disposing of existing reinforced concrete headwall and cutting existing Arch Culvert shall be considered incidental to new 58' x 36' Arch Culvert.

NOT IN CONTRACT

17 Sep '79 Tracing added to show details of drainage structures for new roadway intersection.

DATE REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS

HONOAPIILANI HIGHWAY
Kahana to Alaeos
F.A. Proj. No. F-030-1(13)

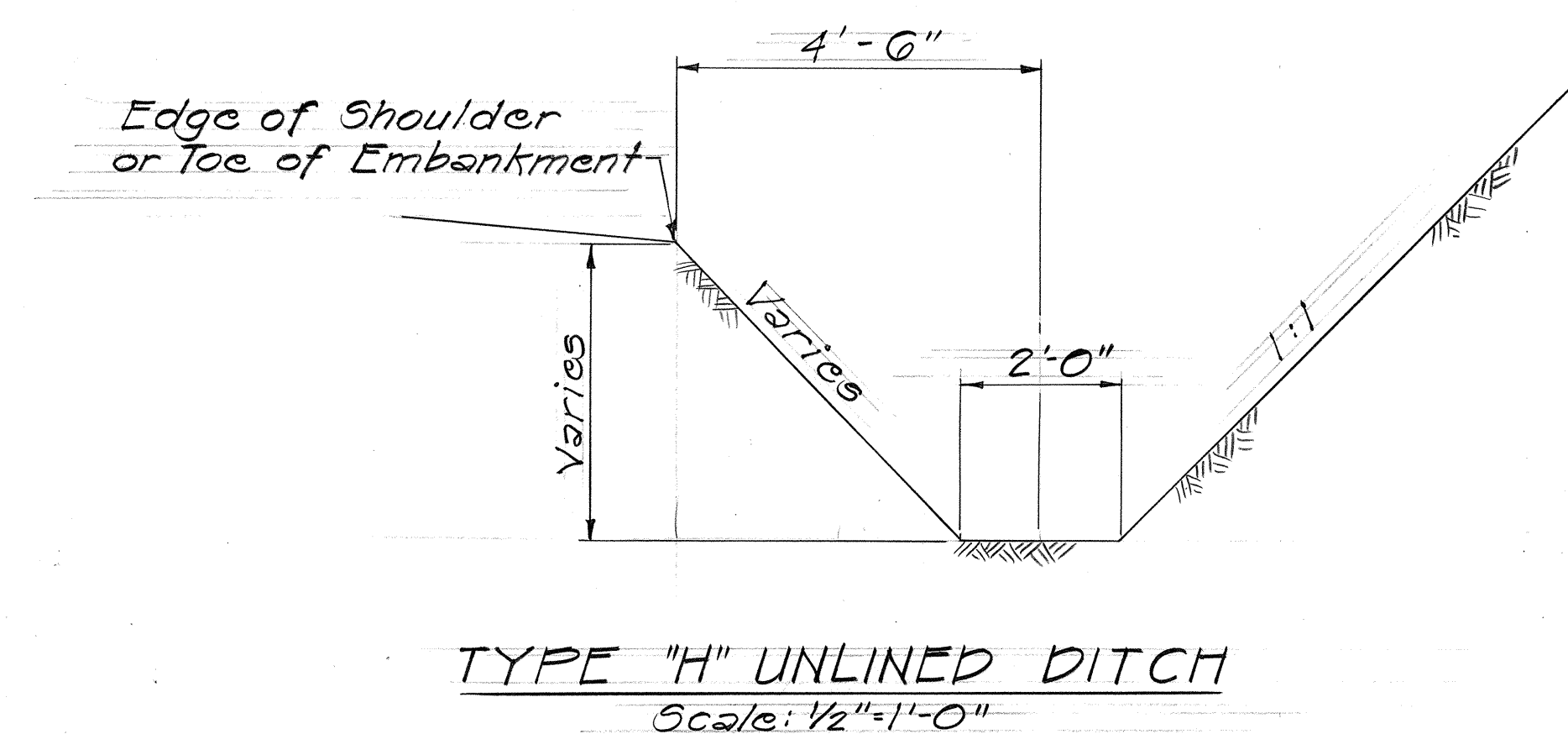
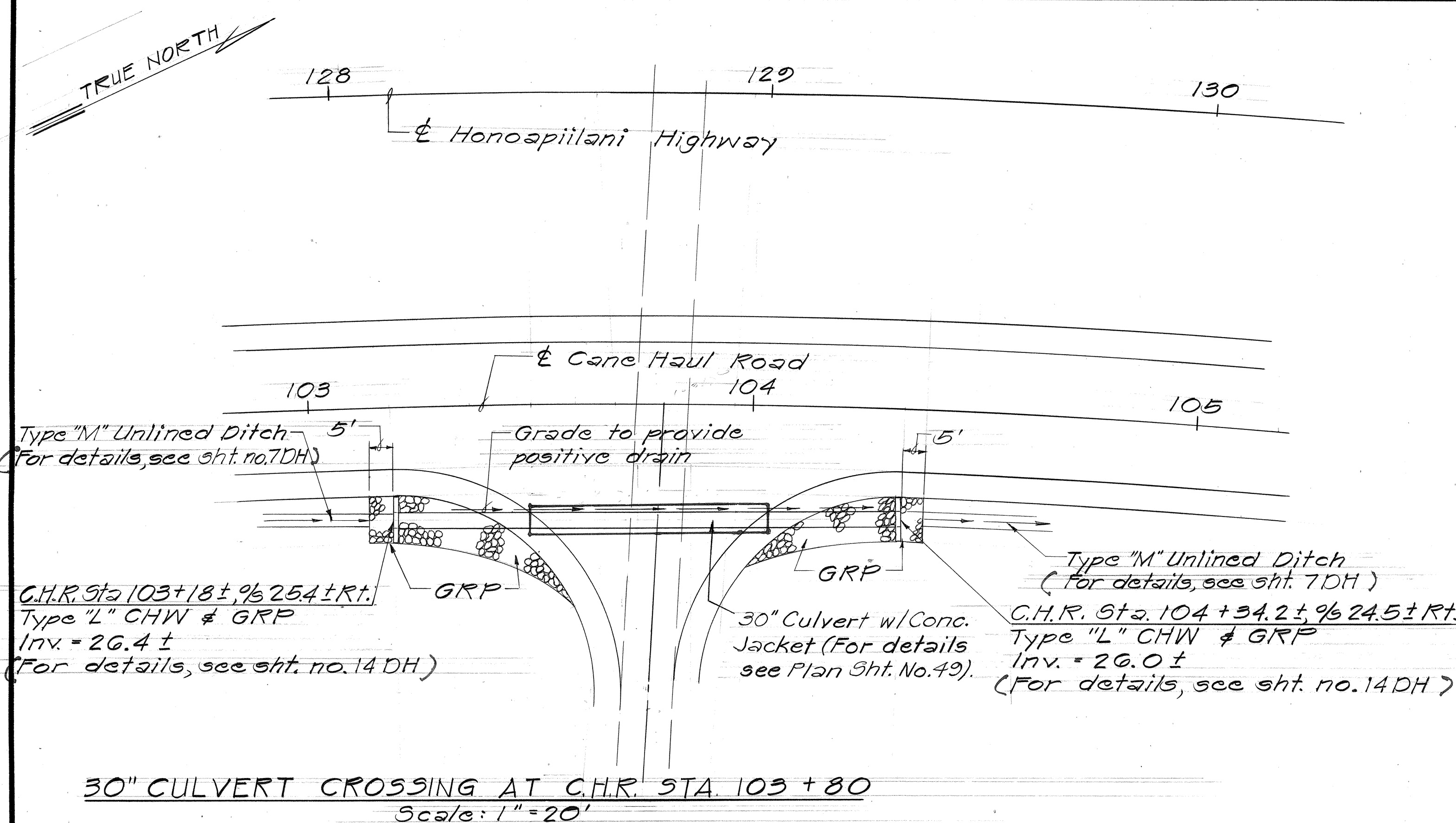
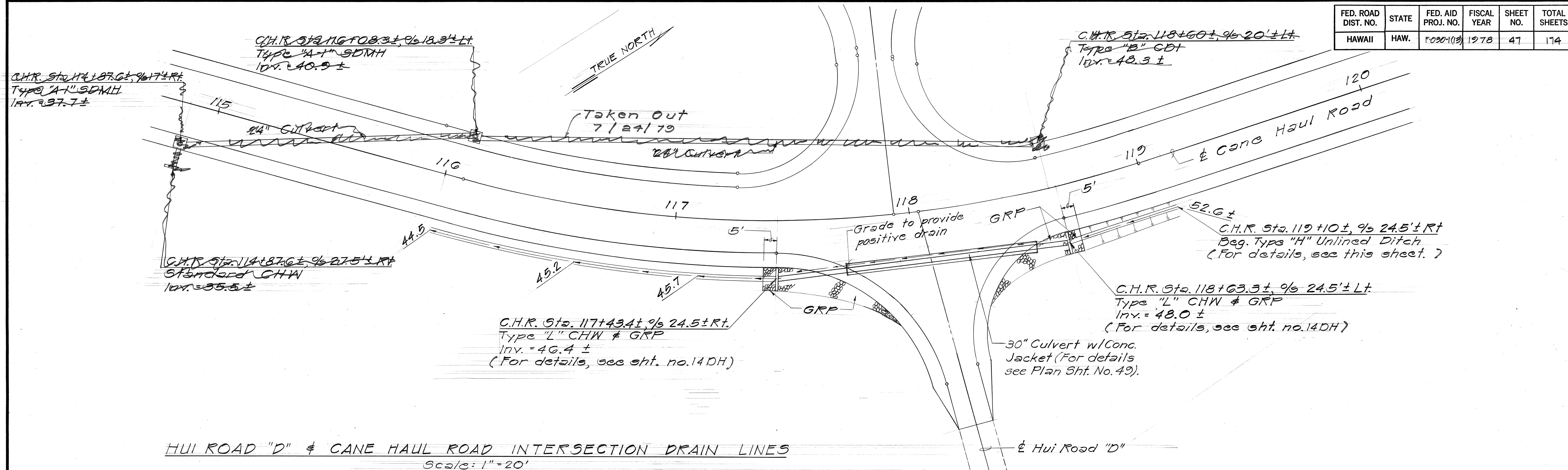
Scale: As Shown Date: Sept., 1979

SHEET NO. 12 OF 31 SHEETS

C046S-2

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

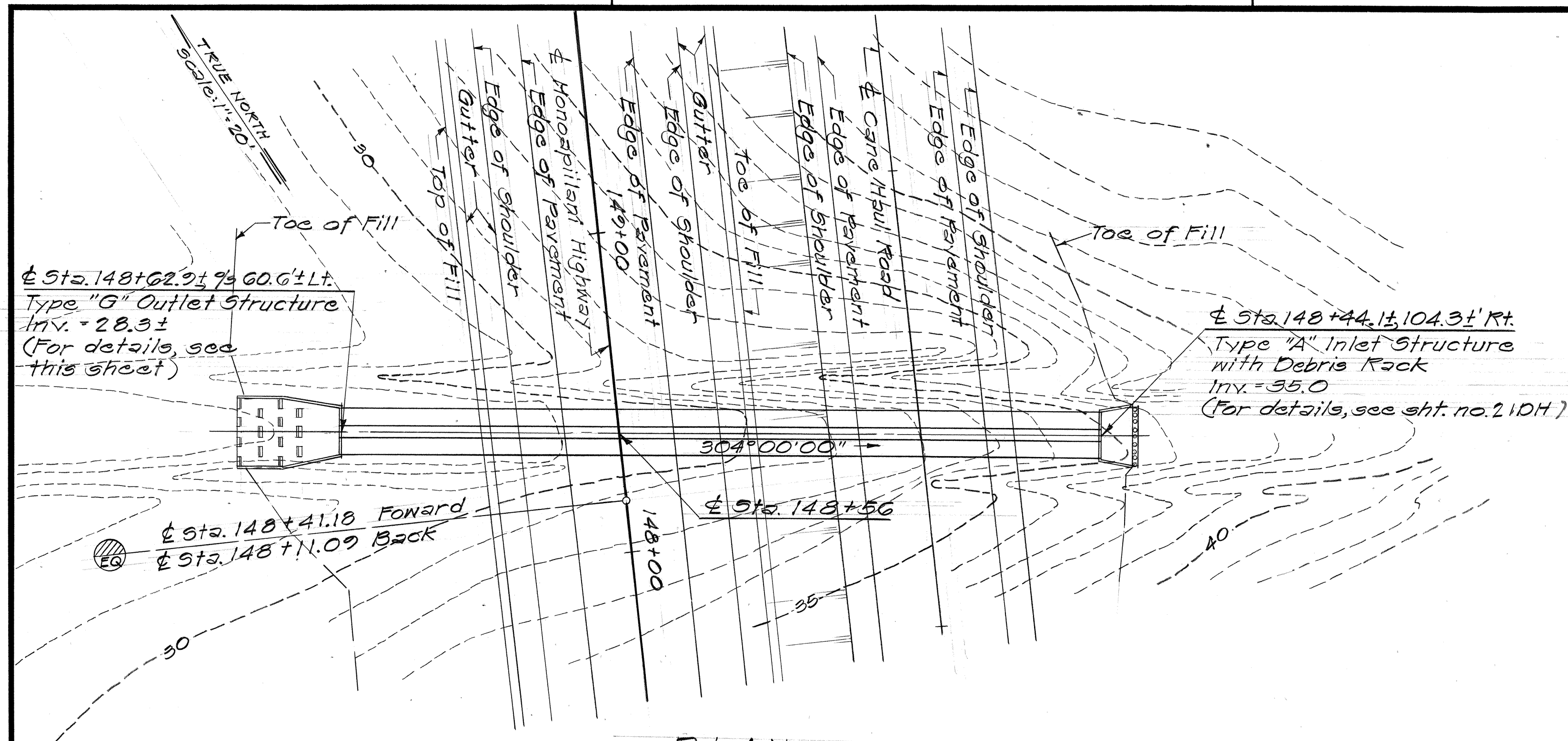
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	47	174



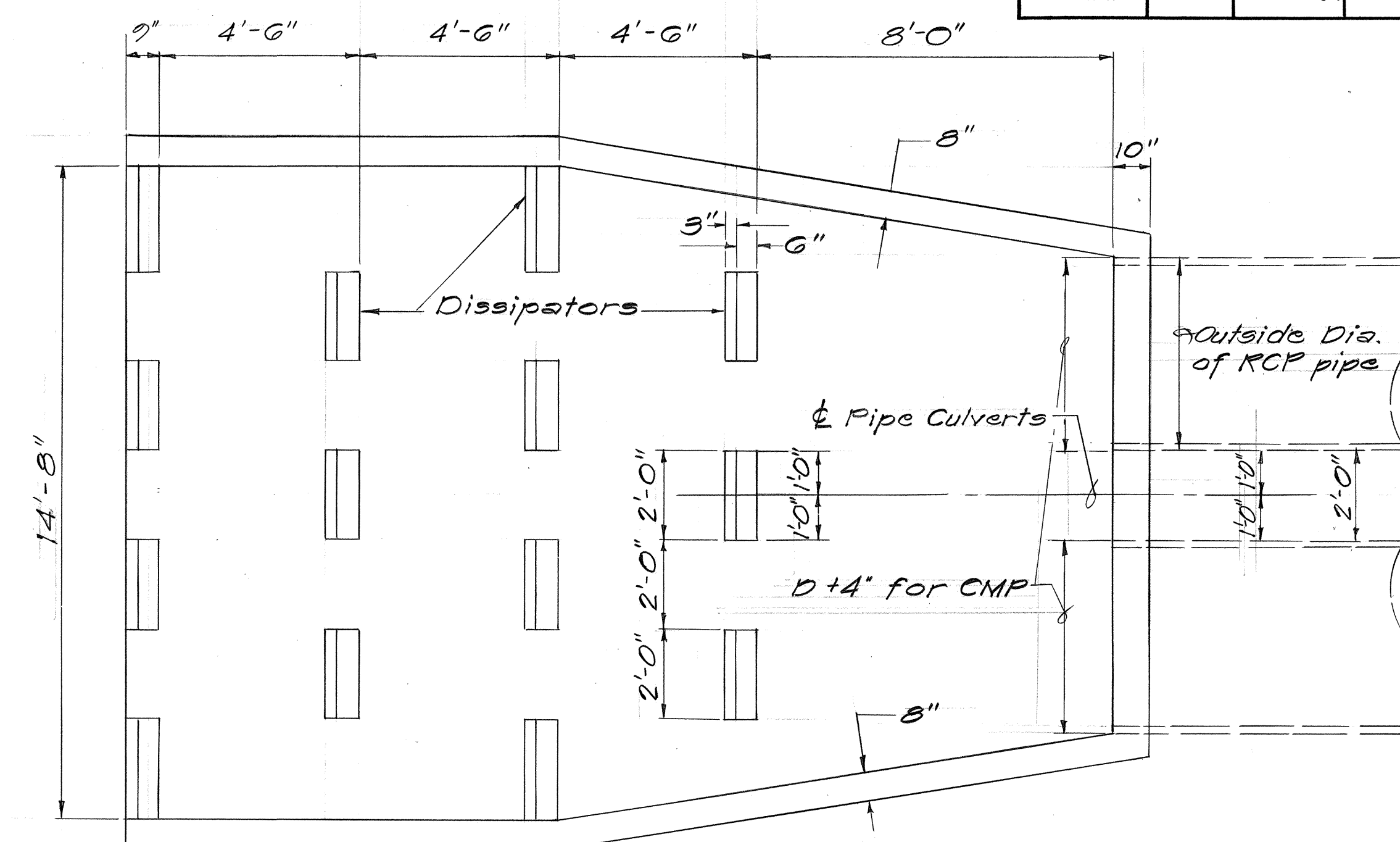
6/15/78	Included Concrete Jacket for 30" Culvert at C.H.R. Sta. 103+80 & Sta. 118+00 per Addendum No. 2.
DATE	REVISION

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS
HONOAPIILANI HIGHWAY Kahana to Alaeos F.A. Proj. No. F-030-1(13)
Scale: As Shown Date: Sept., 1977
SHEET NO. 47 OF 51 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-103	1978	48	174



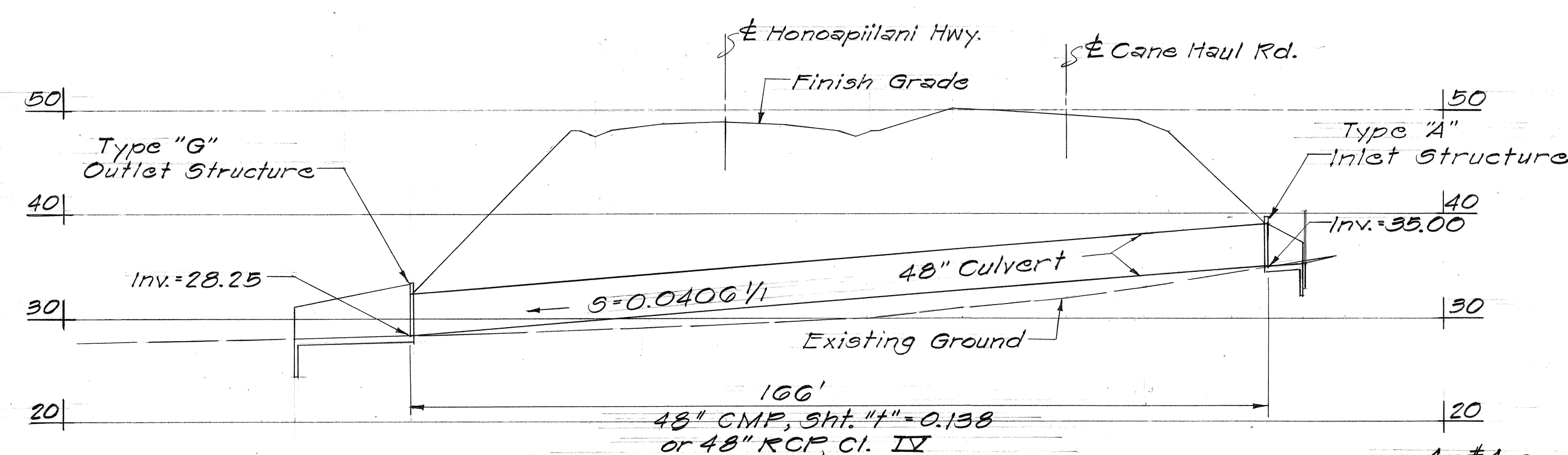
PLAN



PLAN

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

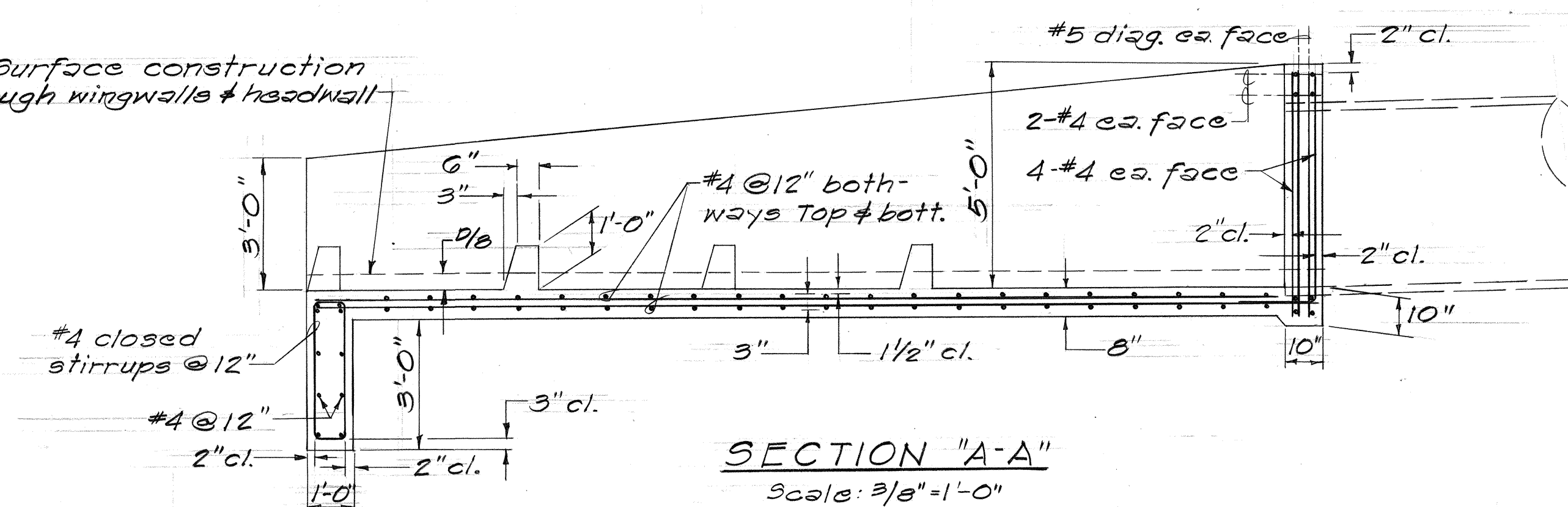
NOTE: Anchor bolts will be required for CMP culverts. For details, see sht. no. 21DH. Consider incidental to the various contract items.



PROFILE

Scale: Vert.: 1"=10'
Horiz.: 1"=20'

Raked Surface construction
Joint through wingwalls & headwall

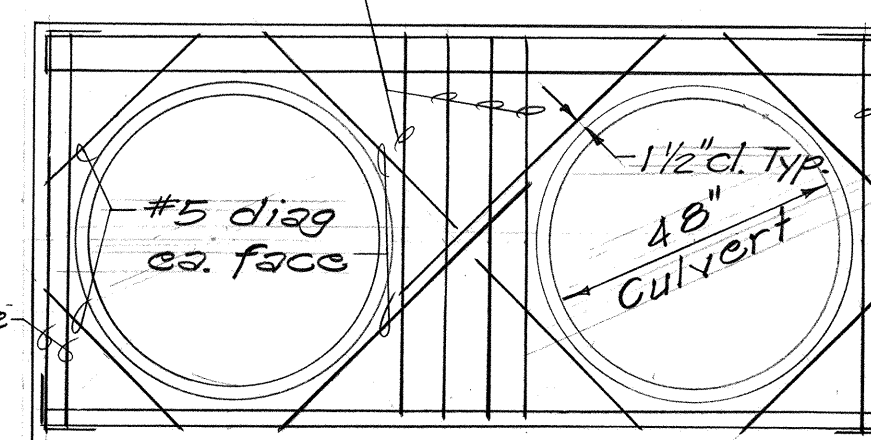


SECTION "A-A"

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

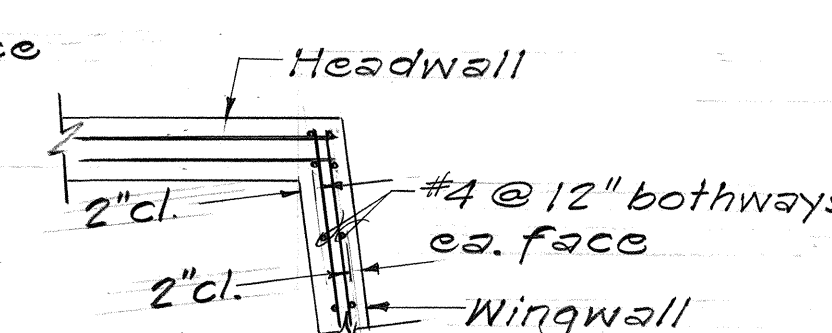
Note: For dissipator reinforcing see sht. no. 23DH

4-#4 ea. face
evenly spaced



HEADWALL REINFORCING

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



WINGWALL REINFORCING

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

TYPE "G" OUTLET STRUCTURE AT & STA. 148+62.9 ± 1/3 60.6 ± LT

2-48" CULVERTS AT & STA. 148+56

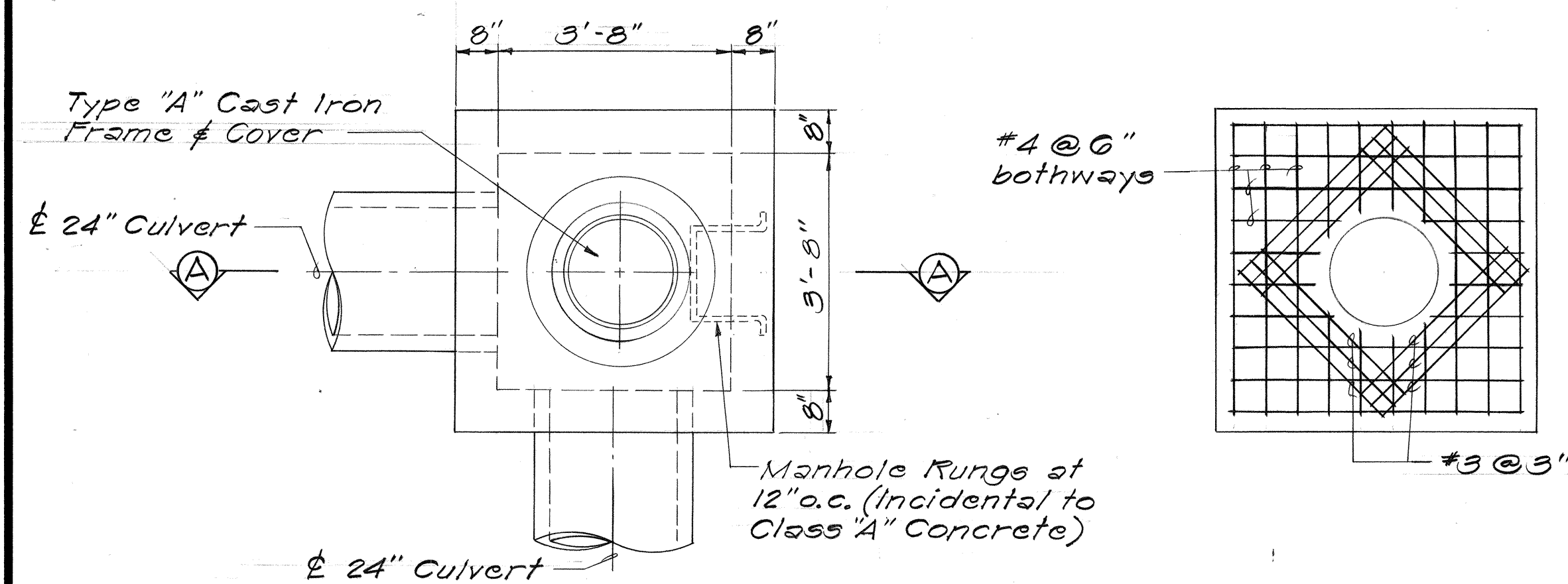
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

HONOAPIILANI HIGHWAY
Kahala to Alaeos
F.A. Proj. No. F-030-1(13)

Scale: As Shown Date: Sept., 1977

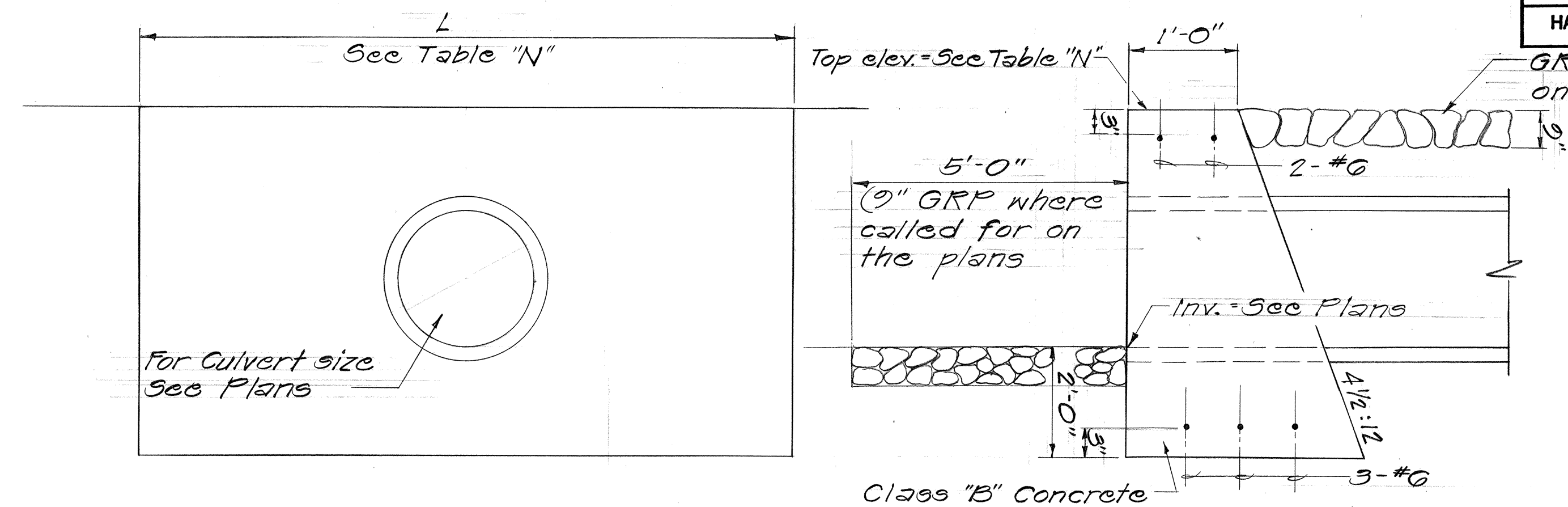
SHEET NO. 33DH OF 31 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F030-1(13)	1978	49	174



PLAN

SECTION B-B



FRONT ELEVATION

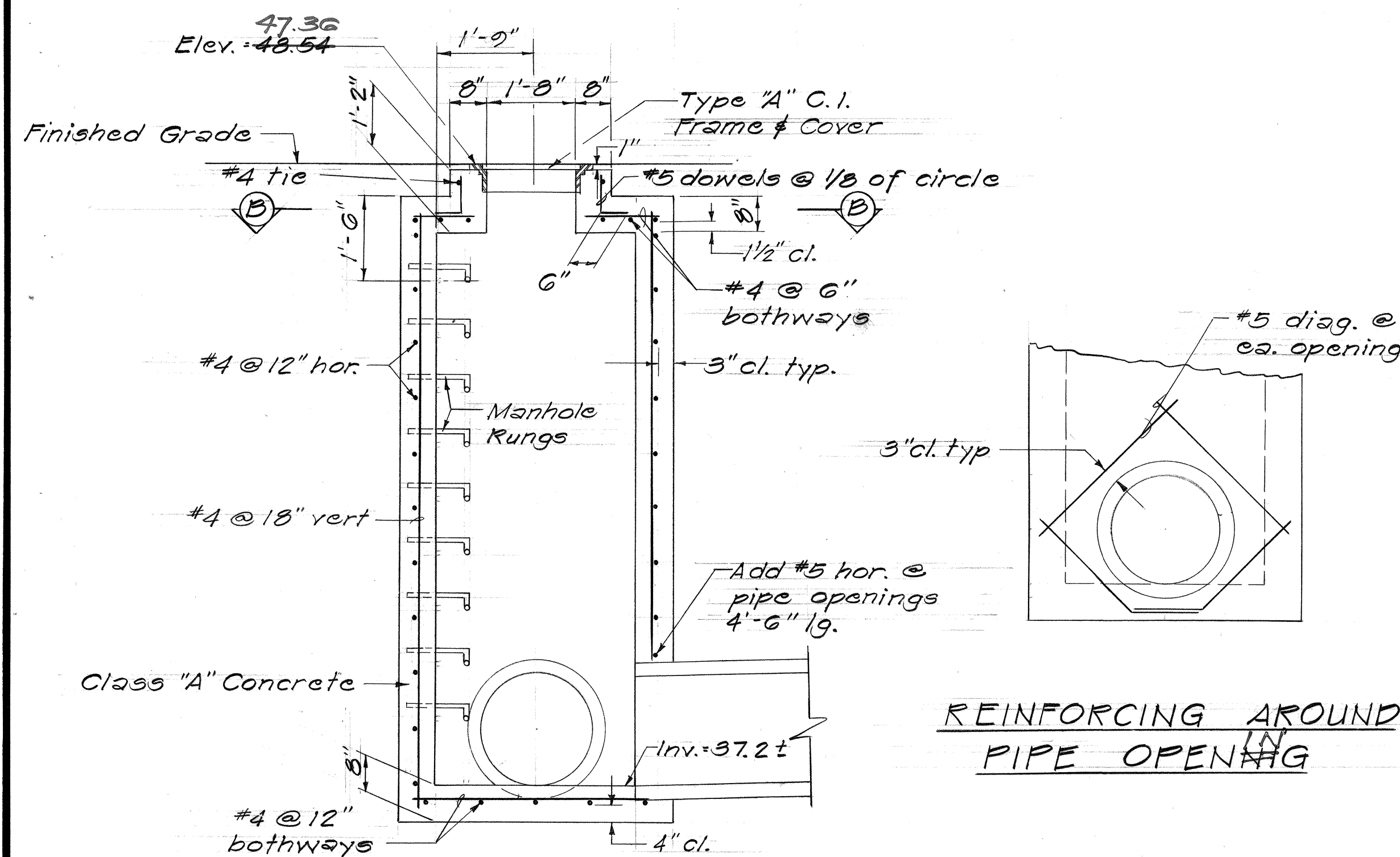
SECTION

TABLE "N"

Location	L	Top of Wall Elev.
C.H.R. Sta. 97+17.9 ±, 9% 25 ± Rt.	10'-0" ±	36.0 ±
C.H.R. Sta. 103+18 ±, 9% 25 ± Rt.	11'-6" ±	31.3 ±
C.H.R. Sta. 104+34.2 ±, 9% 24.5 ± Rt.	10'-0" ±	29.6 ±
C.H.R. Sta. 117+43.4 ±, 9% 24.5 ± Rt.	10'-6" ±	50.0 ±
C.H.R. Sta. 118+63.3 ±, 9% 24.5 ± Rt.	10'-6" ±	51.3 ±

TYPE "L" CONCRETE HEADWALL

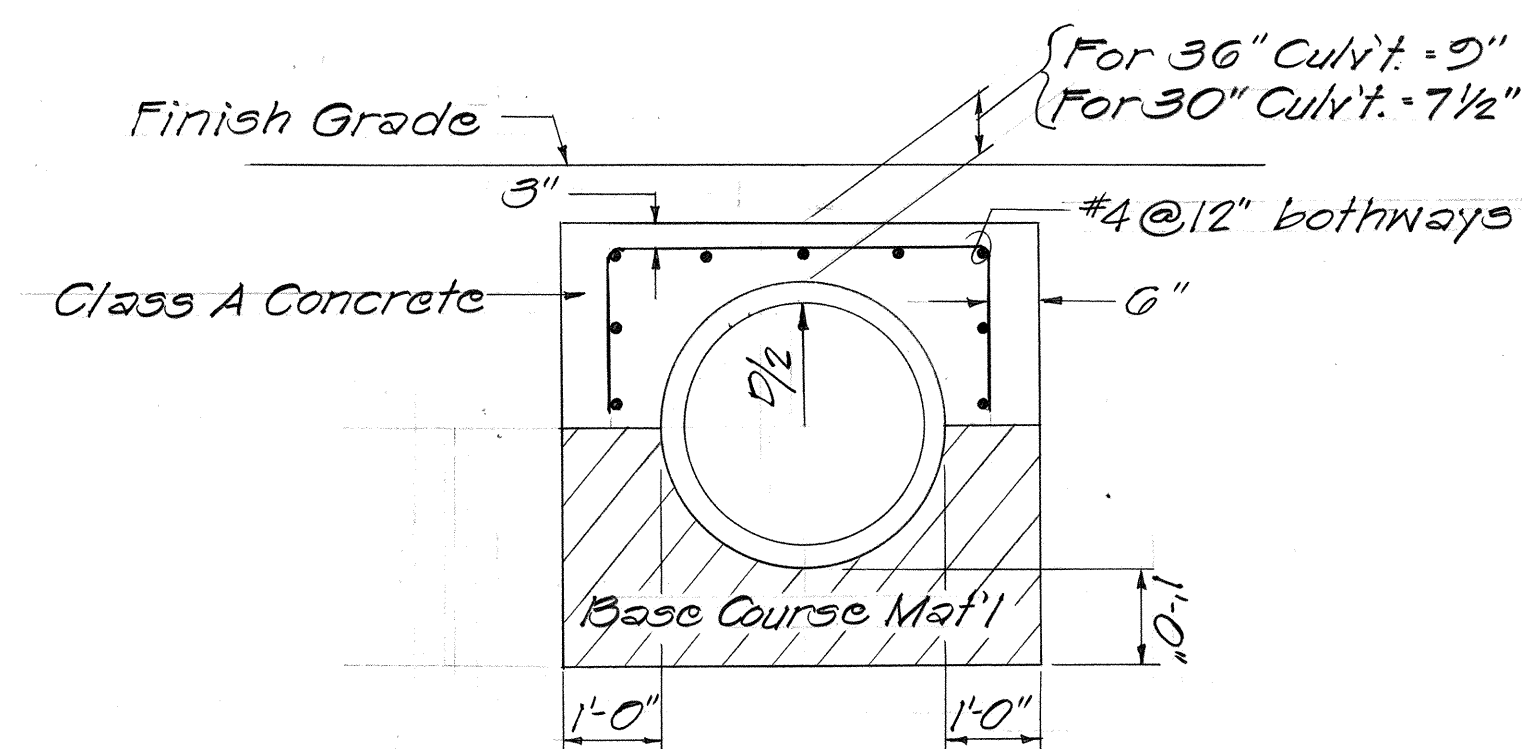
Scale: 1/2"=1'-0"



SECTION A-A

TYPE F SDMH AT & STA. 155+75, 9% 20.0' LT.

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



CONCRETE JACKET DETAIL

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

ORIGINAL PLAN	DATE
DESIGNED BY	
NOTED BY	
CHECKED BY	

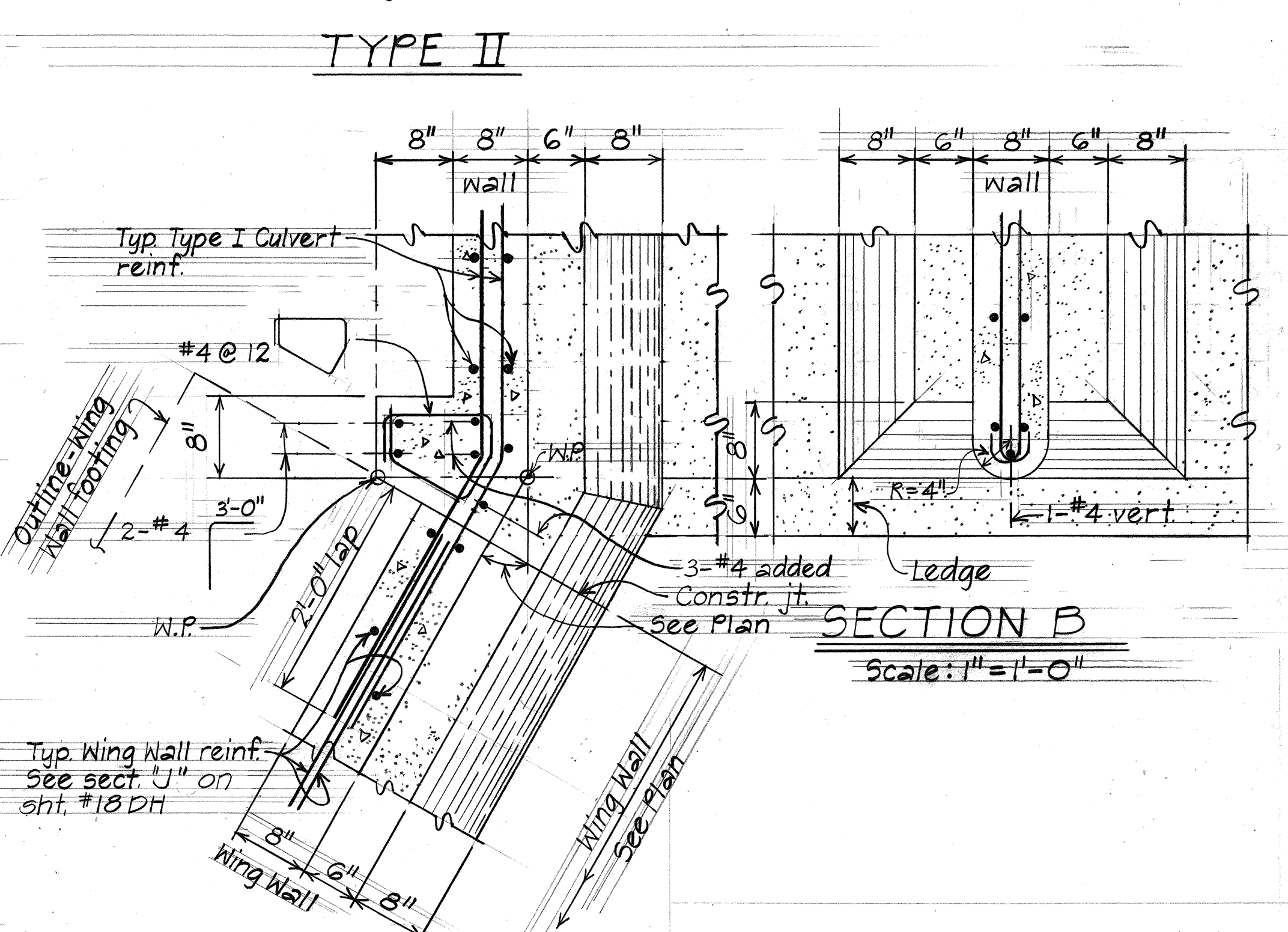
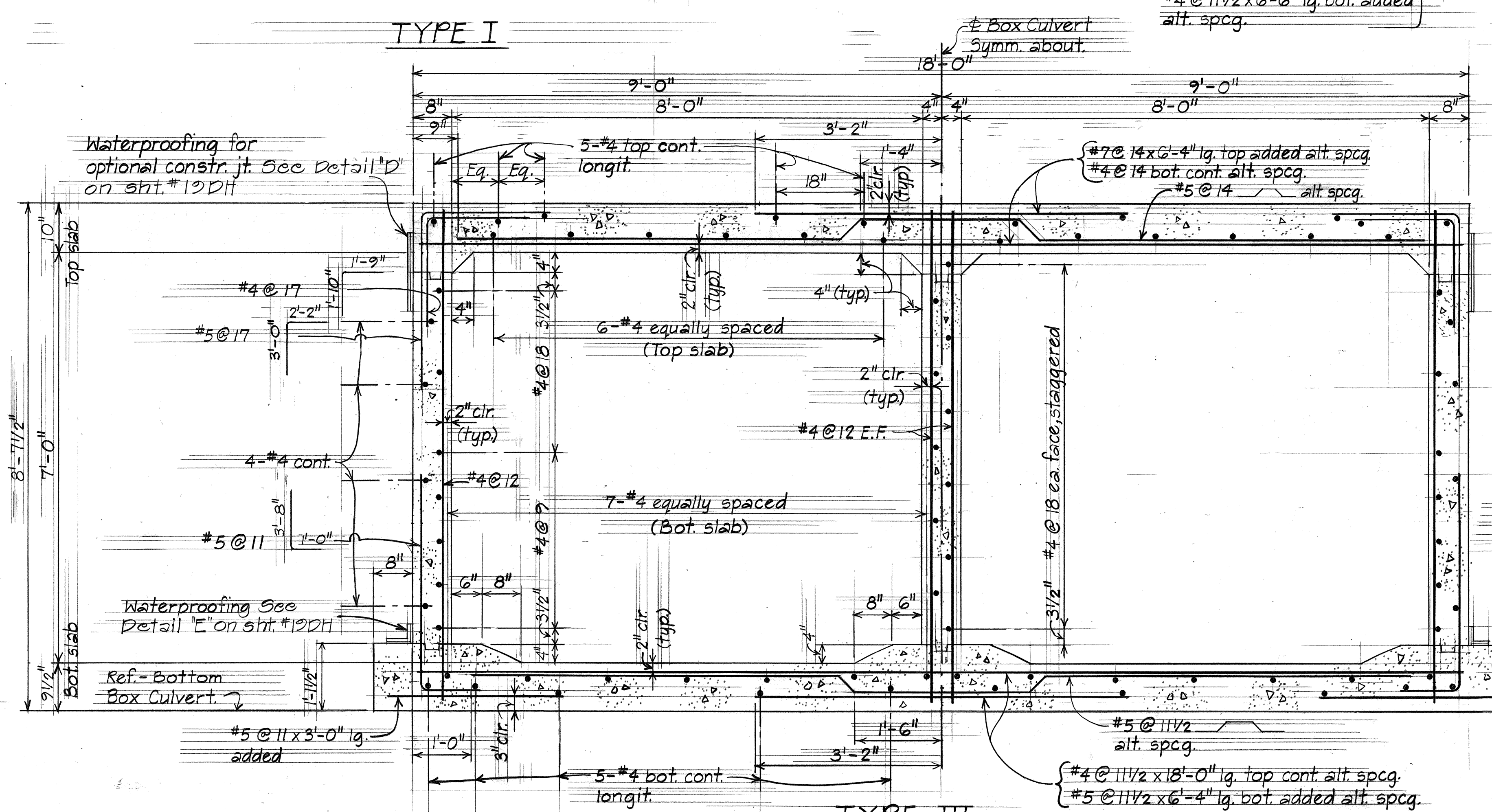
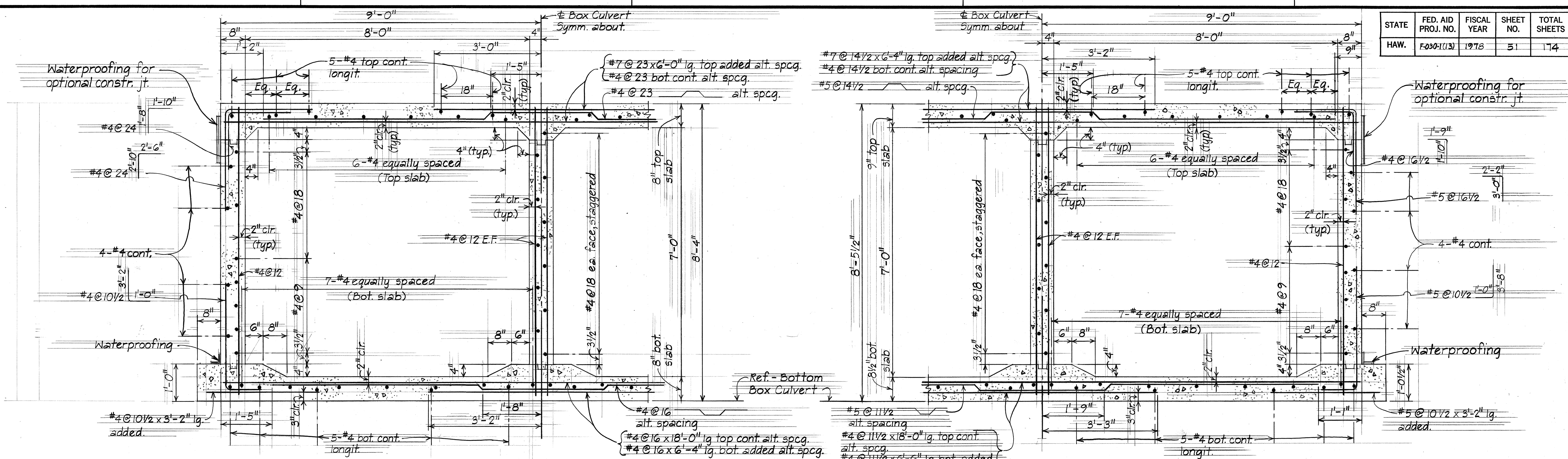
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

HONOAPIILANI HIGHWAY
Kahana to Alaeos
F.A. Proj. No. F-030-1(13)

Scale: As Shown Date: Sept., 1977

SHEET NO. 49 OF 51 SHEETS

STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAW.	F-030-1(13)	1973	51	174



TYPICAL SECTIONS - TWIN CELL BOX CULVERT Scale: 3/4" = 1'-0"

ORIGINAL PLAN	DATE
DRAWN BY	
DESIGNED BY	
NOTED BY	
CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

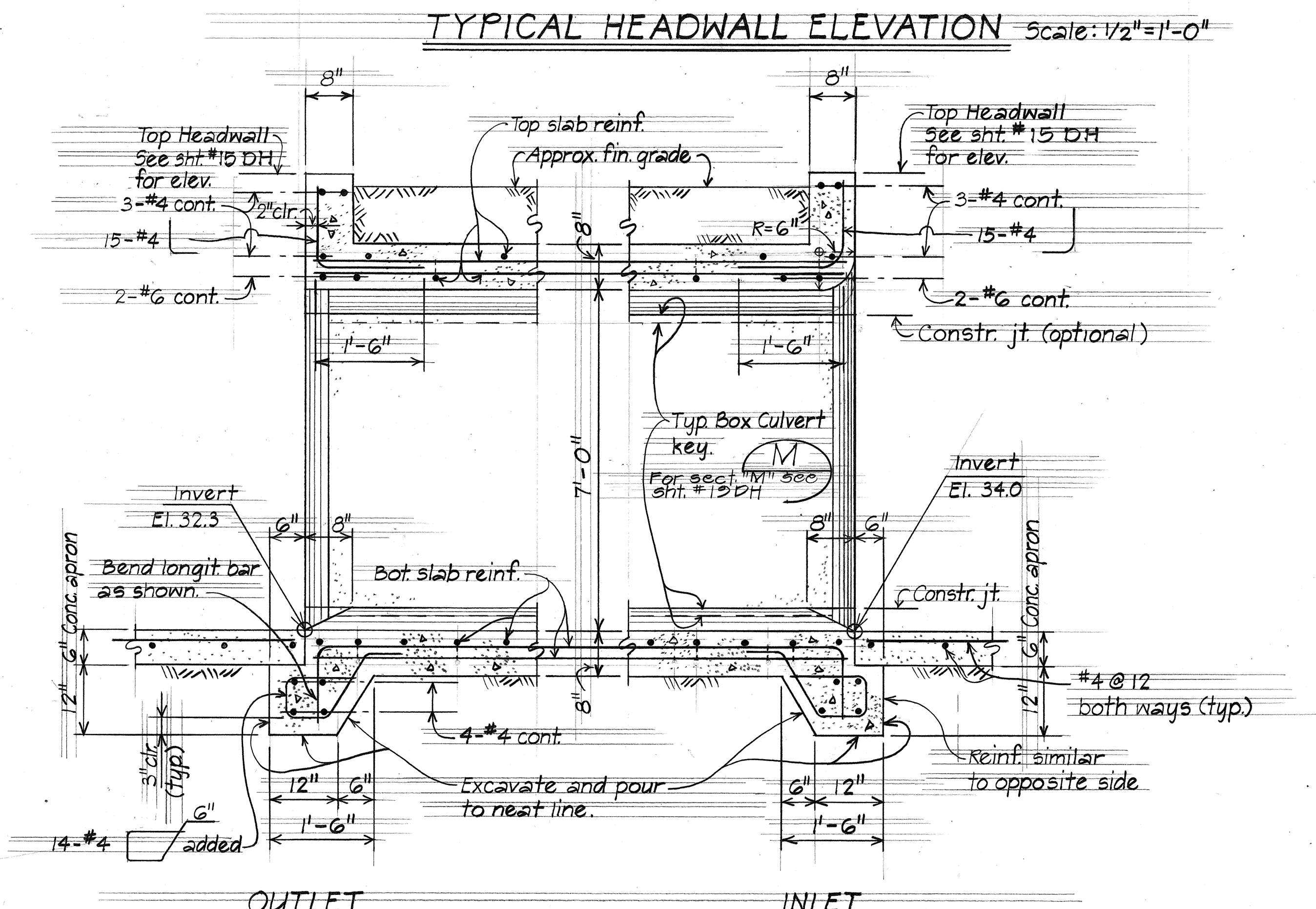
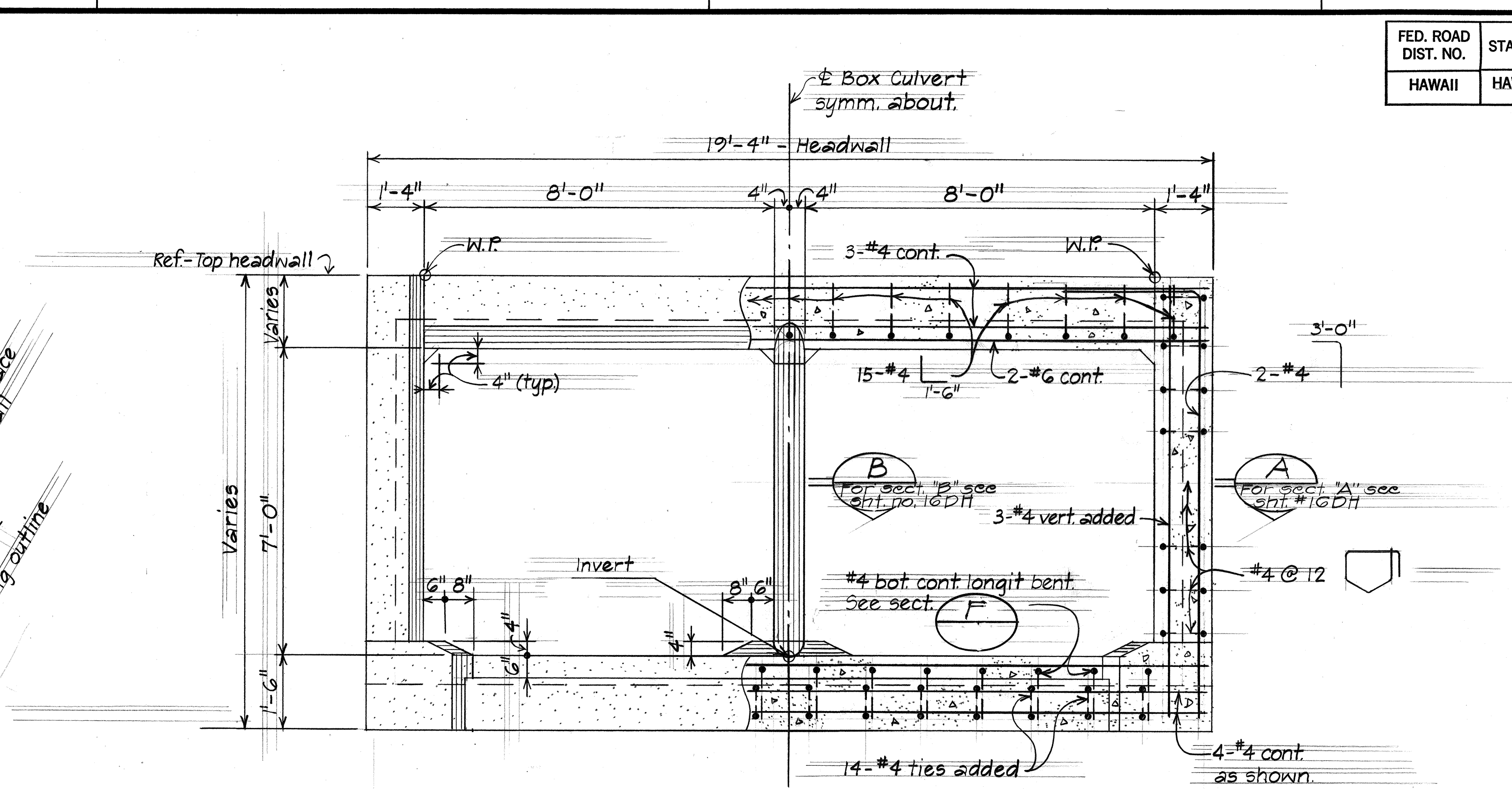
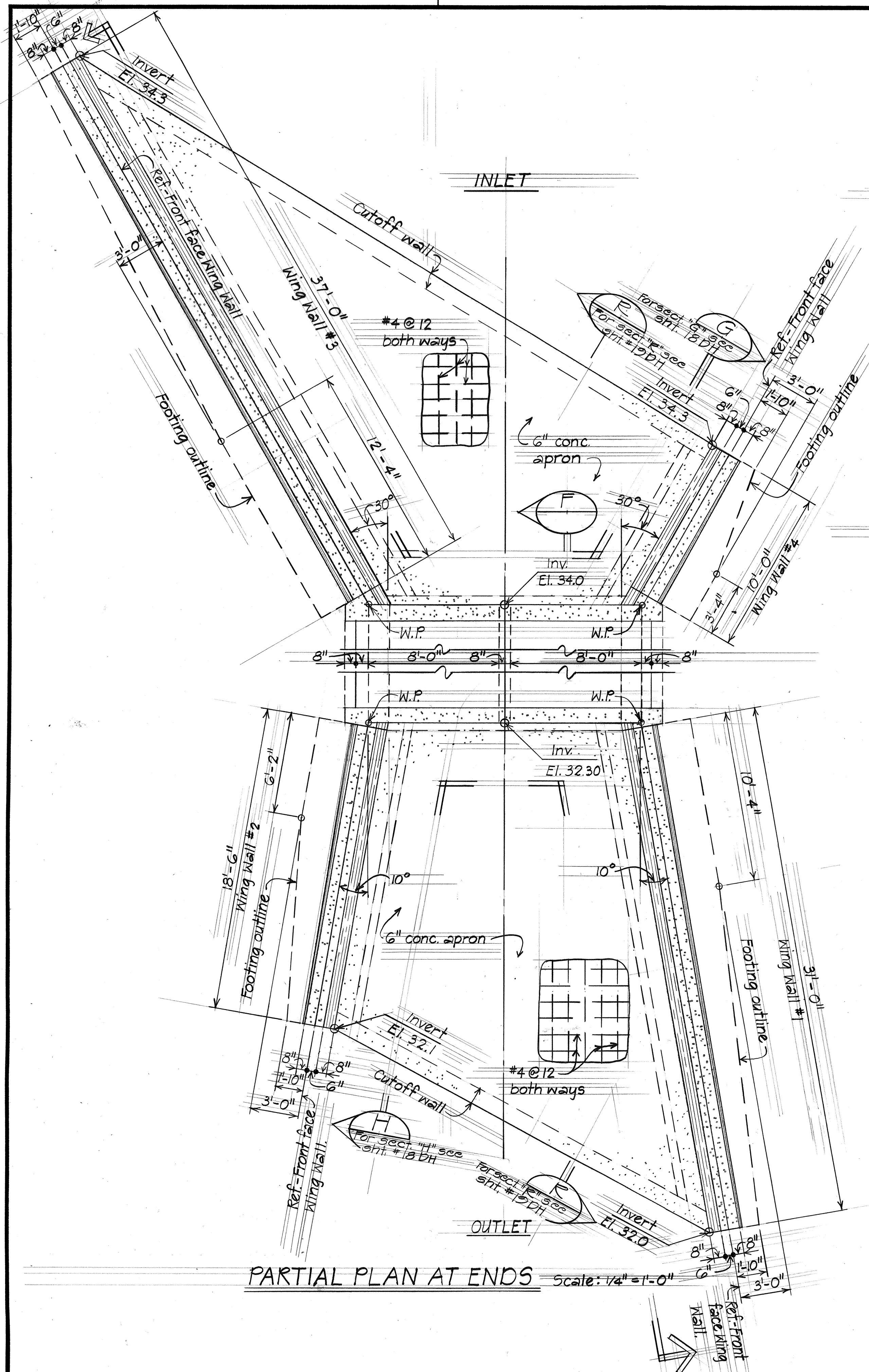
DRAINAGE DETAILS

HONOAHIILANI HIGHWAY
Kahana to Alaeloa
F.A. Proj. No. F-030-1(13)

Scale: As noted Date: Dec. 1977

SHEET NO. 100H OF 31 SHEETS

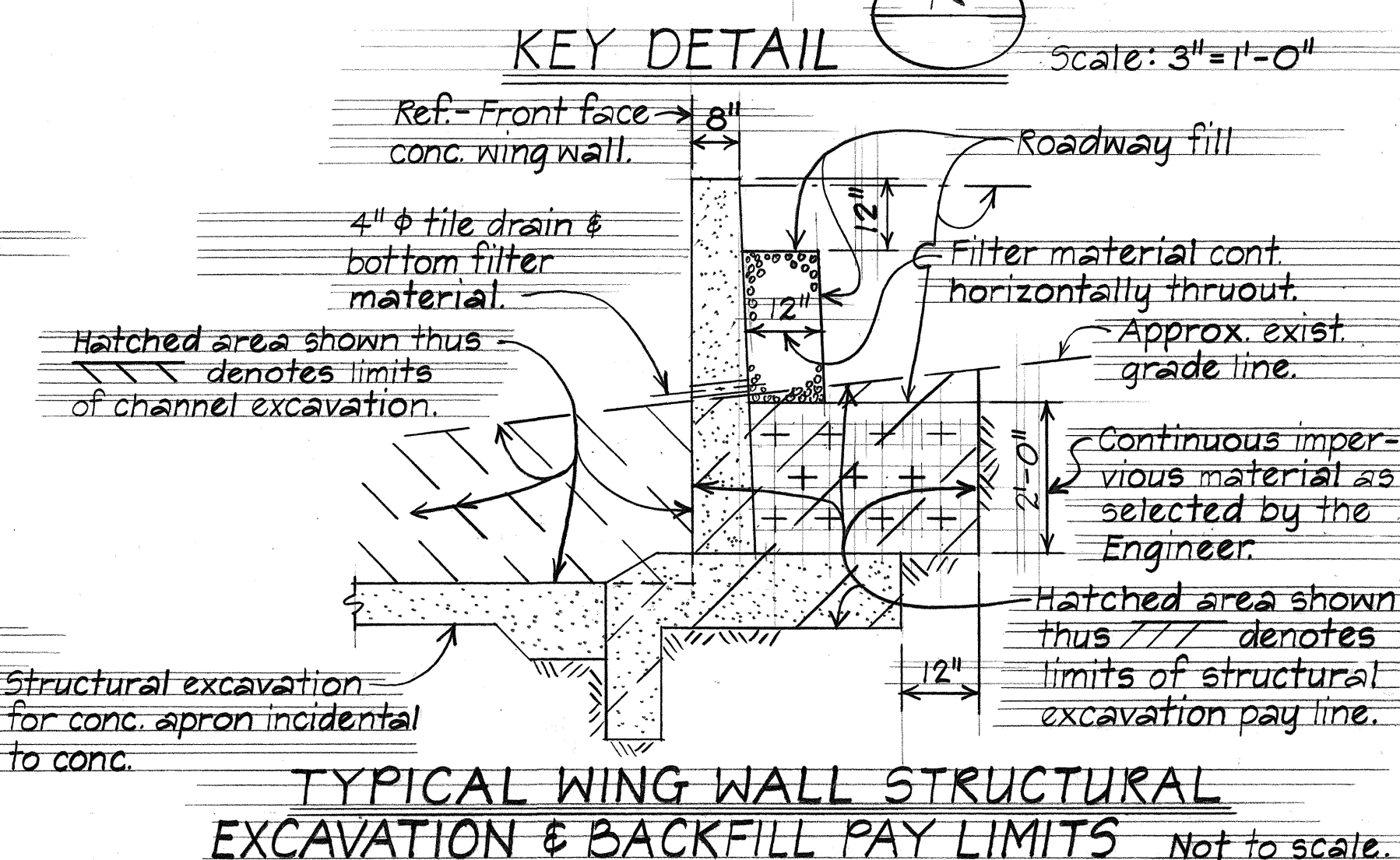
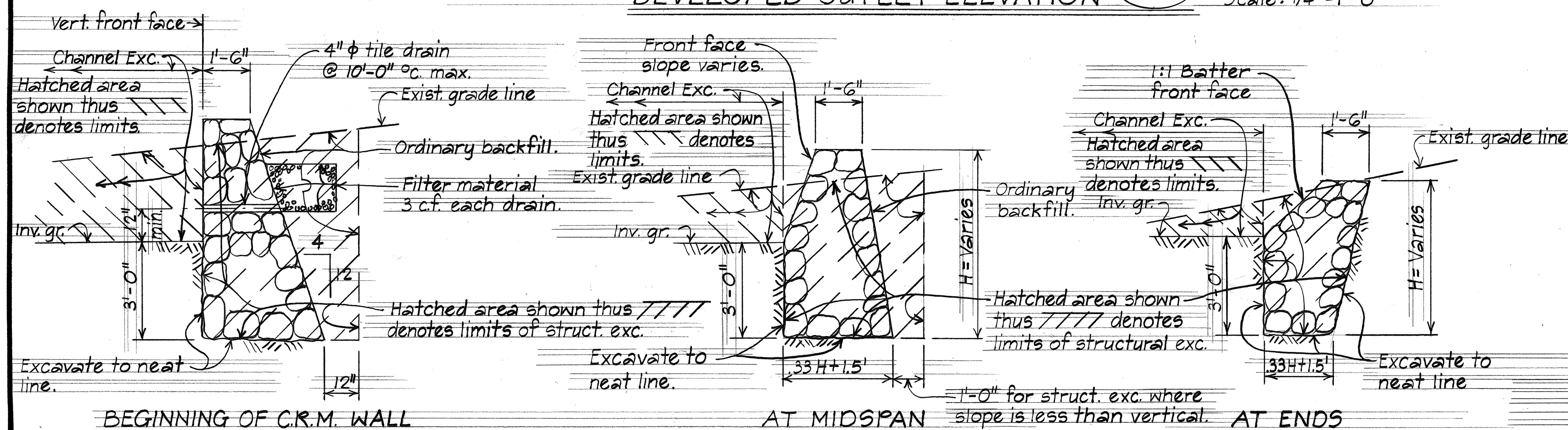
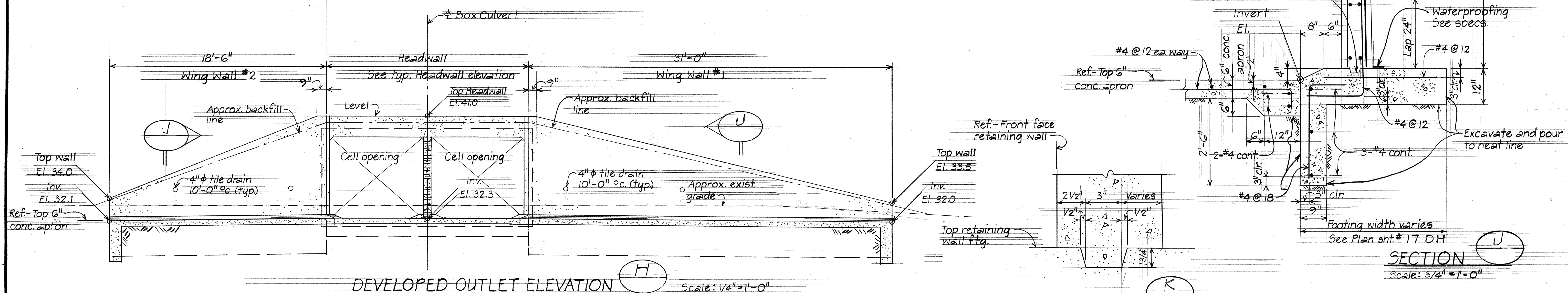
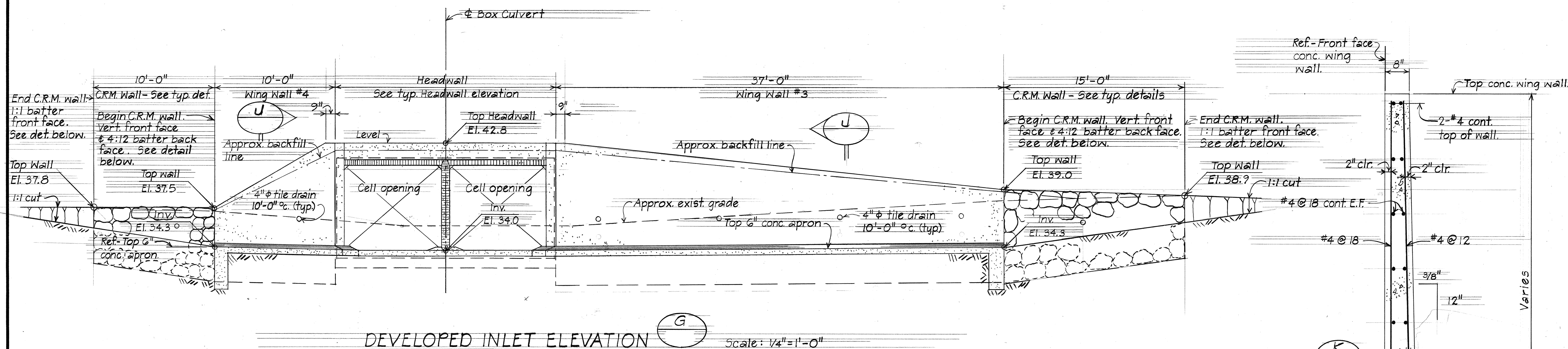
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	52	174



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

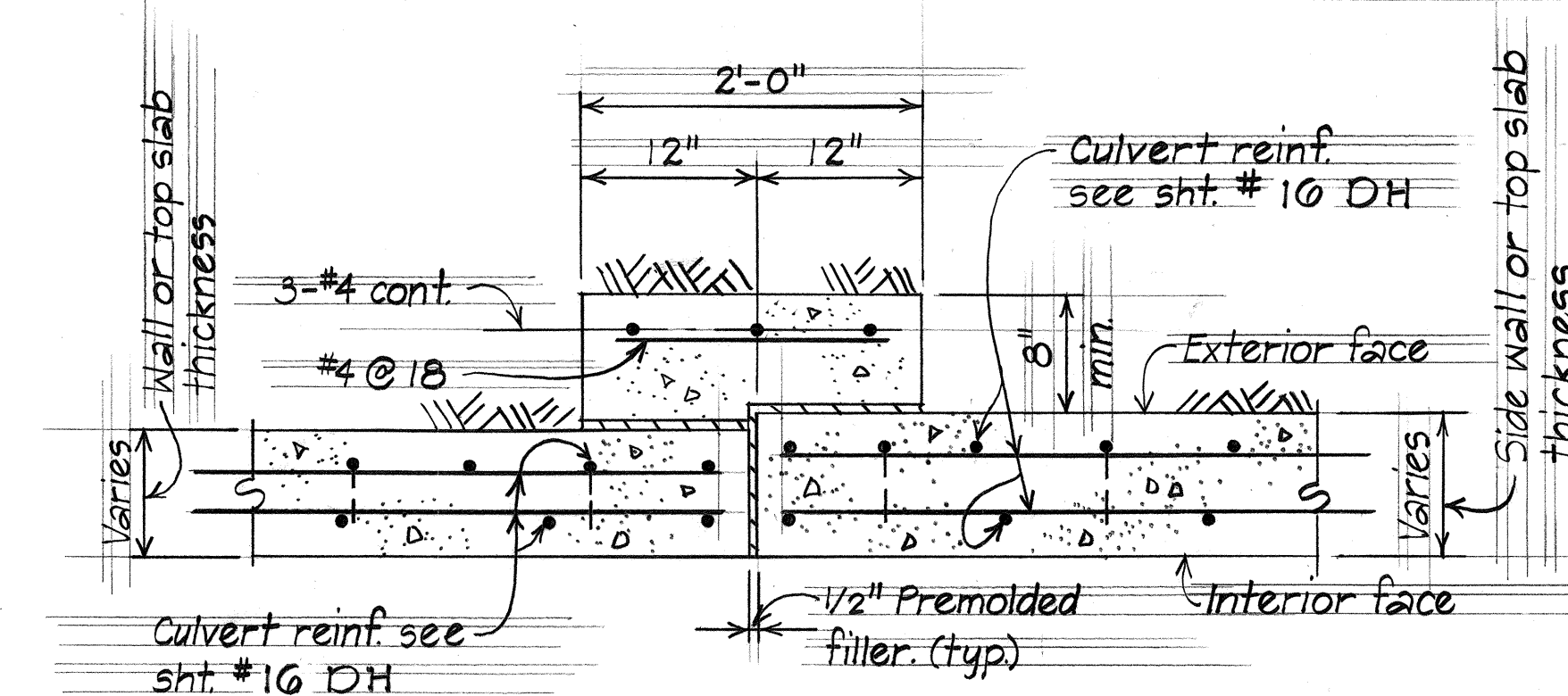
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS
HONOAPIILANI HIGHWAY
Kahana to Aiea
F.A. Proj. No. F-030-1(13)
Scale: As noted Date: Dec., 1977
SHEET No. 174 OF 31 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	53	174

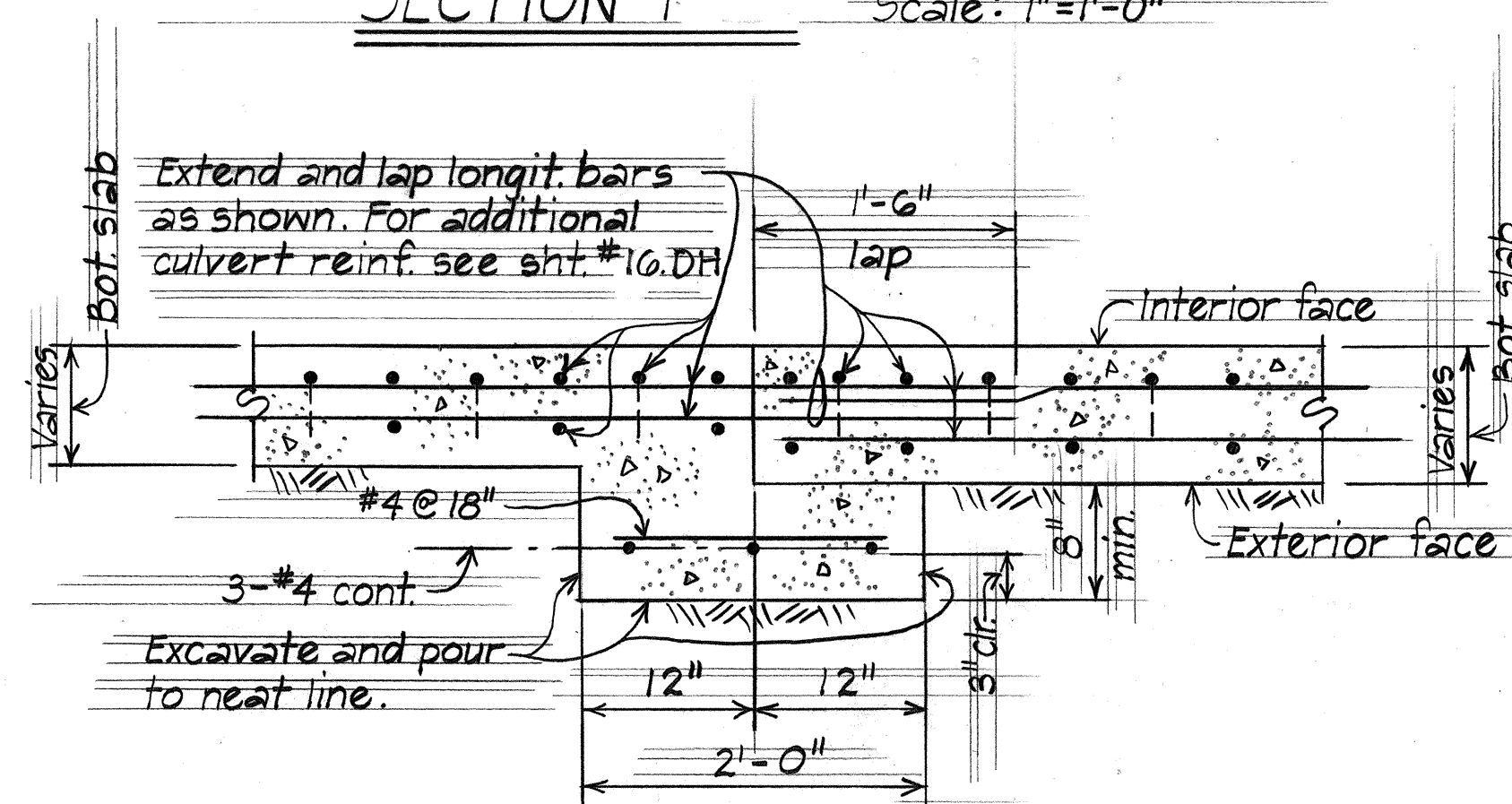


STATE OF HAWAII DEPARTMENT OF TRANSPORTATION LAND TRANSPORTATION FACILITIES DIVISION DRAINAGE DETAILS HONOAPIILANI HIGHWAY Kahana to Alaola F.A. Proj. No. F-030-1(13) Scale: As noted Date: Dec. 1977 SHEET No. 182HOF 31 SHEETS

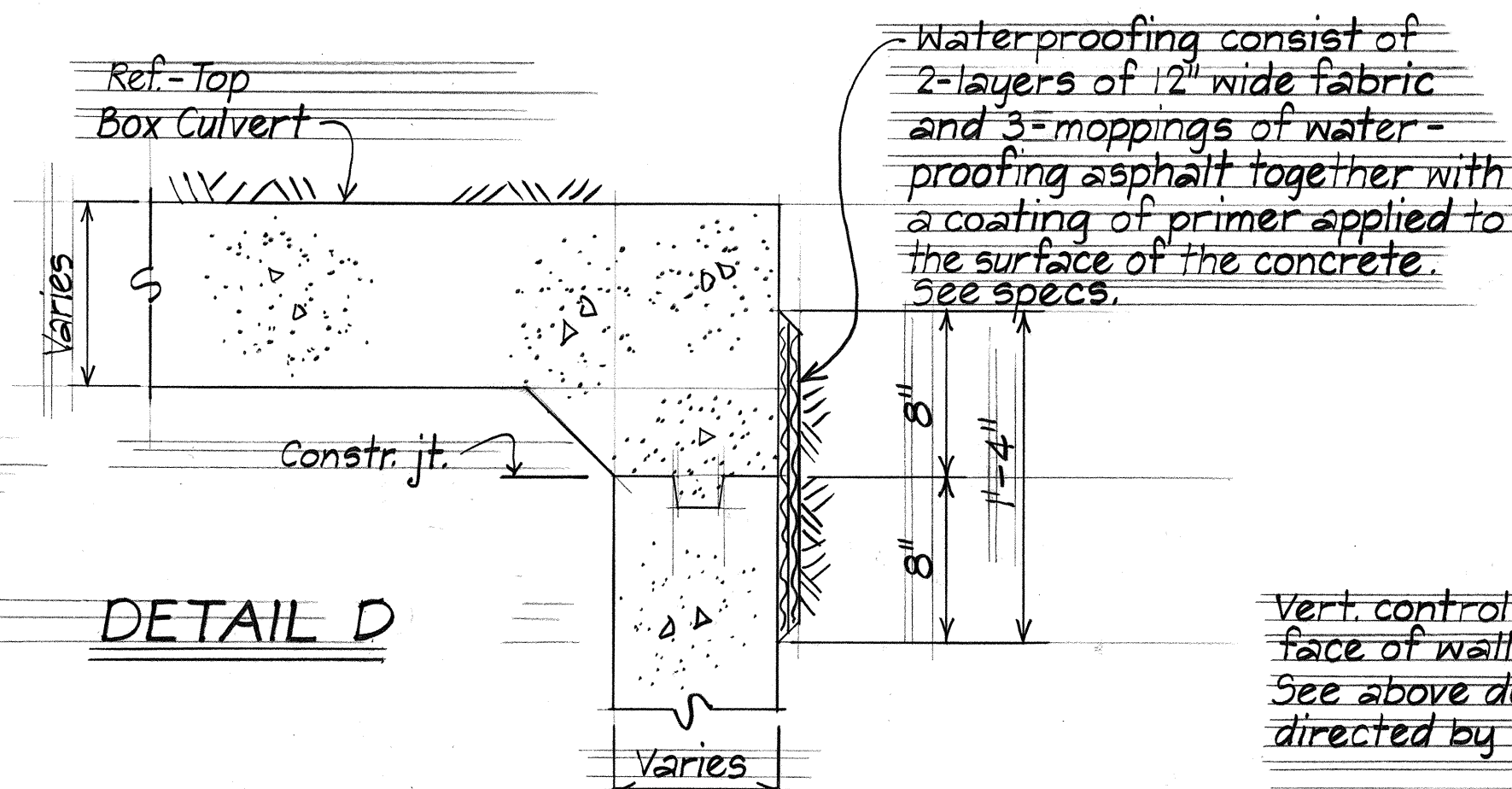
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	54	174



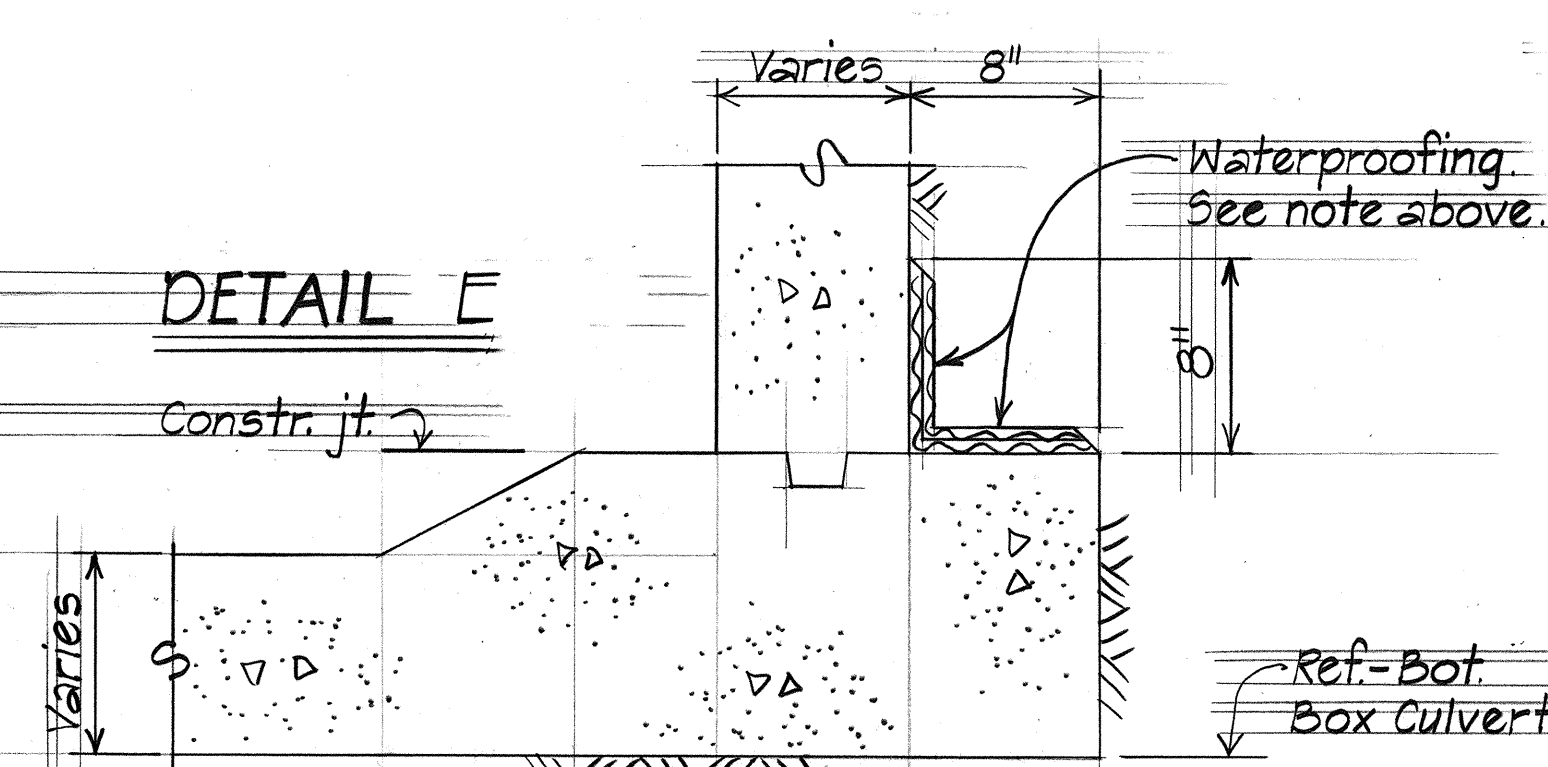
SECTION P Scale: 1"=1'-0"



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



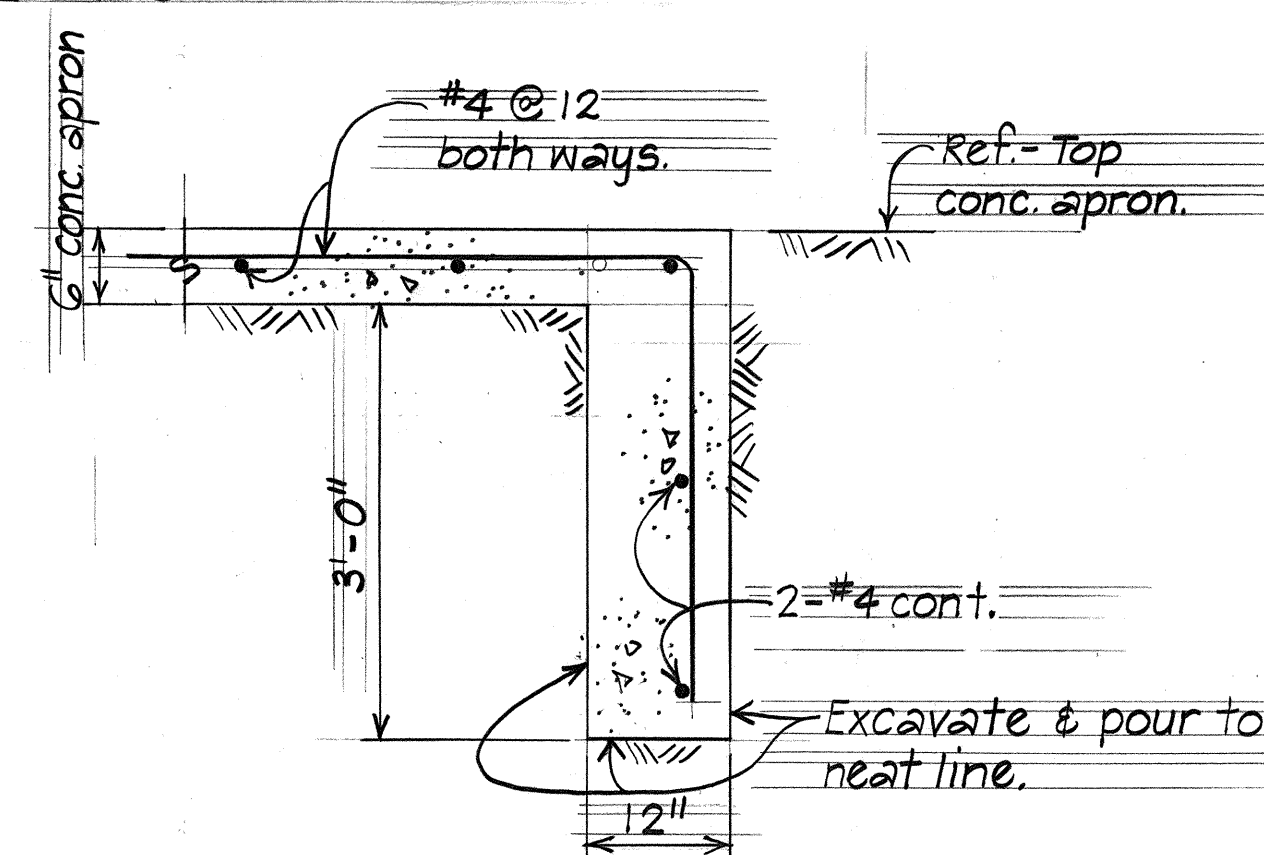
DETAIL D



DETAIL E

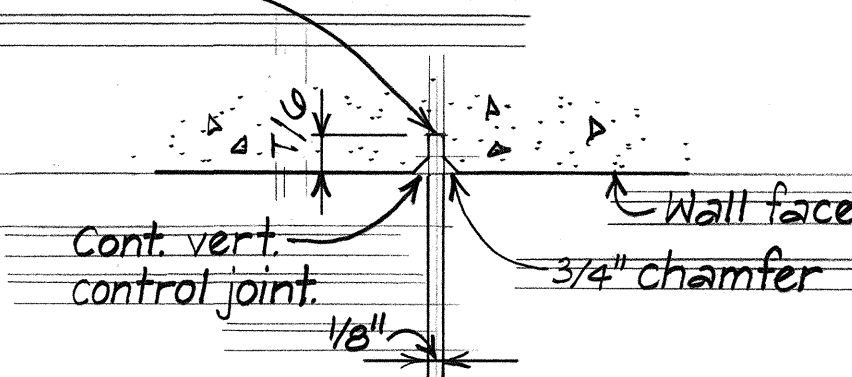
TYPICAL ASPHALT WATERPROOFING DETAIL

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



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

Joint may be formed with 1/8" masonite & cut back to the root of the chamfer on the exposed face.



Vert. control joint on each face of wall to top of footing. See above detail and as directed by the Engineer.

#5 x 4'-0" added center of wall. 12" vertical spacing thruout.

AT CULVERT WALLS

CONTROL JOINT DETAIL

Not to scale

Vert. control joint on each face of wall to top of footing. See above detail and as directed by the Engineer.

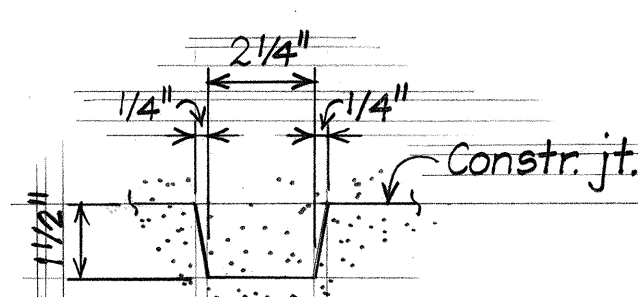
#5 x 4'-0" added center of wall. 12" spacing thruout.

AT TOP SLAB

(Bottom slab similar except as otherwise noted)

PART ELEVATION TYPICAL CONCRETE COLLAR DETAIL

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



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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

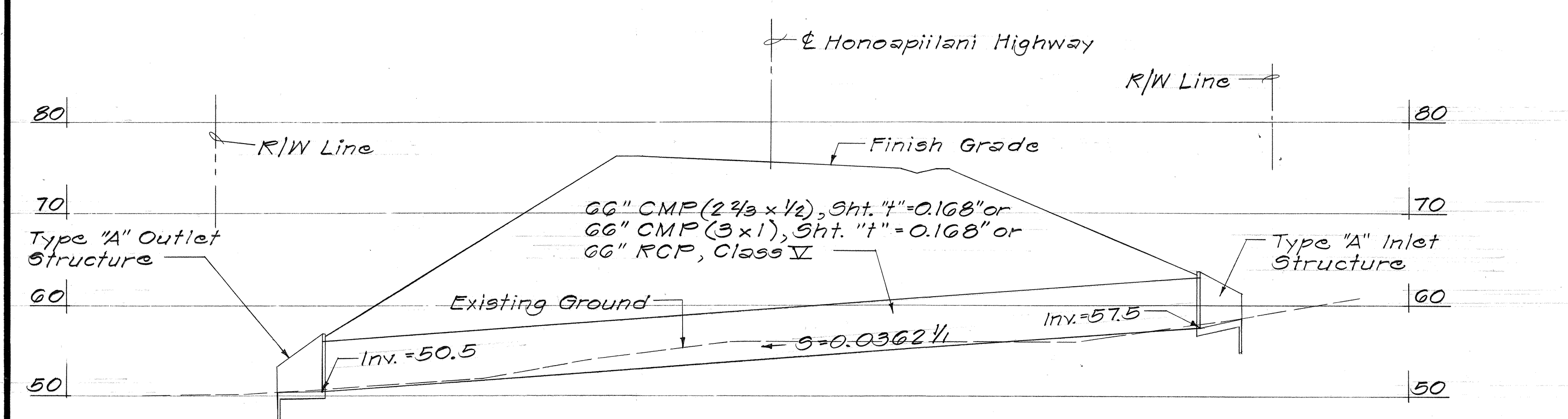
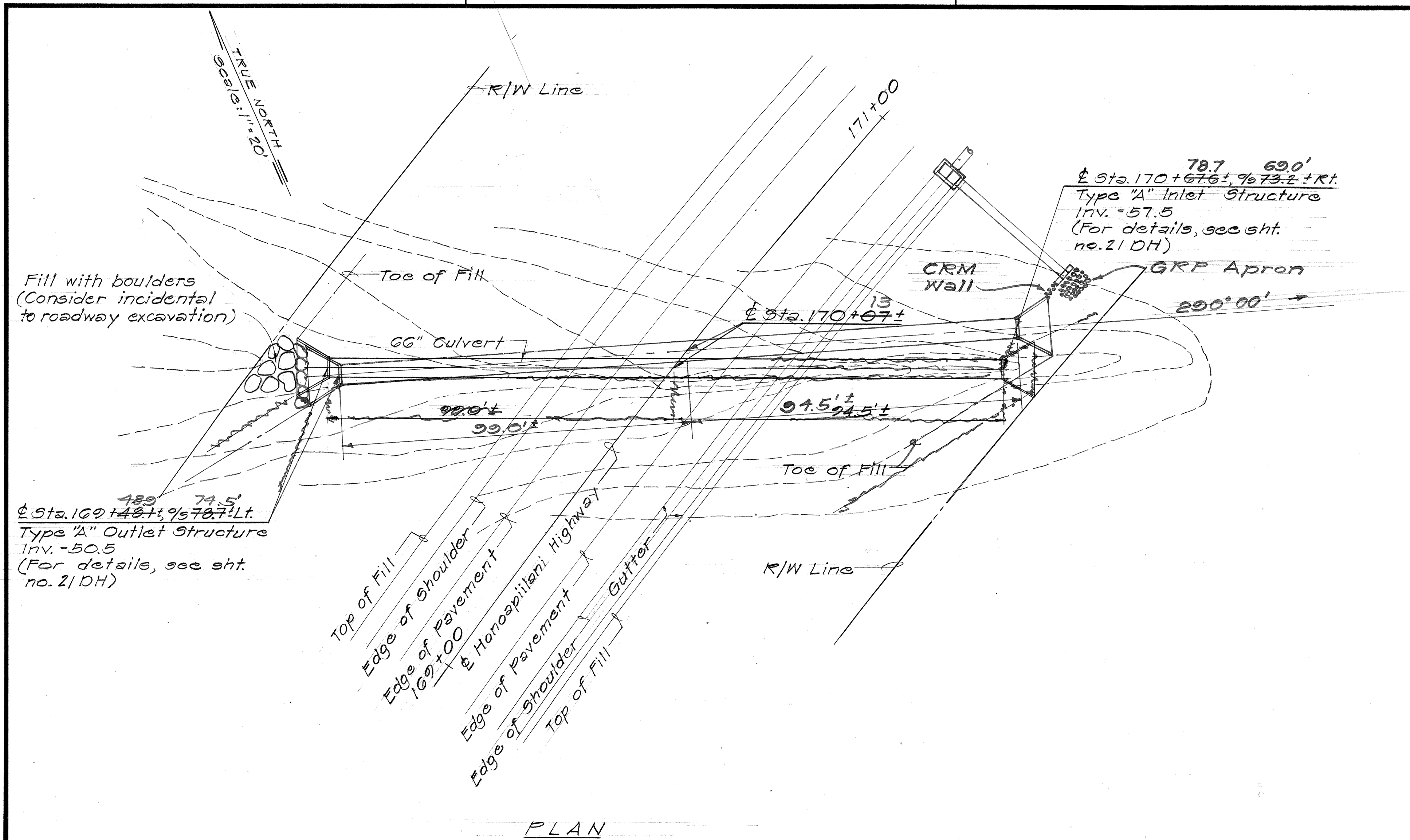
DRAINAGE DETAILS

HONOAPIILANI HIGHWAY
Kahana to Aiea
F.A. Proj. No. F-030-1(13)

Scale: As noted Date: Dec., 1977

SHEET NO. 54 OF 31 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	55	174



66" CULVERT AT STA. 170+07.1

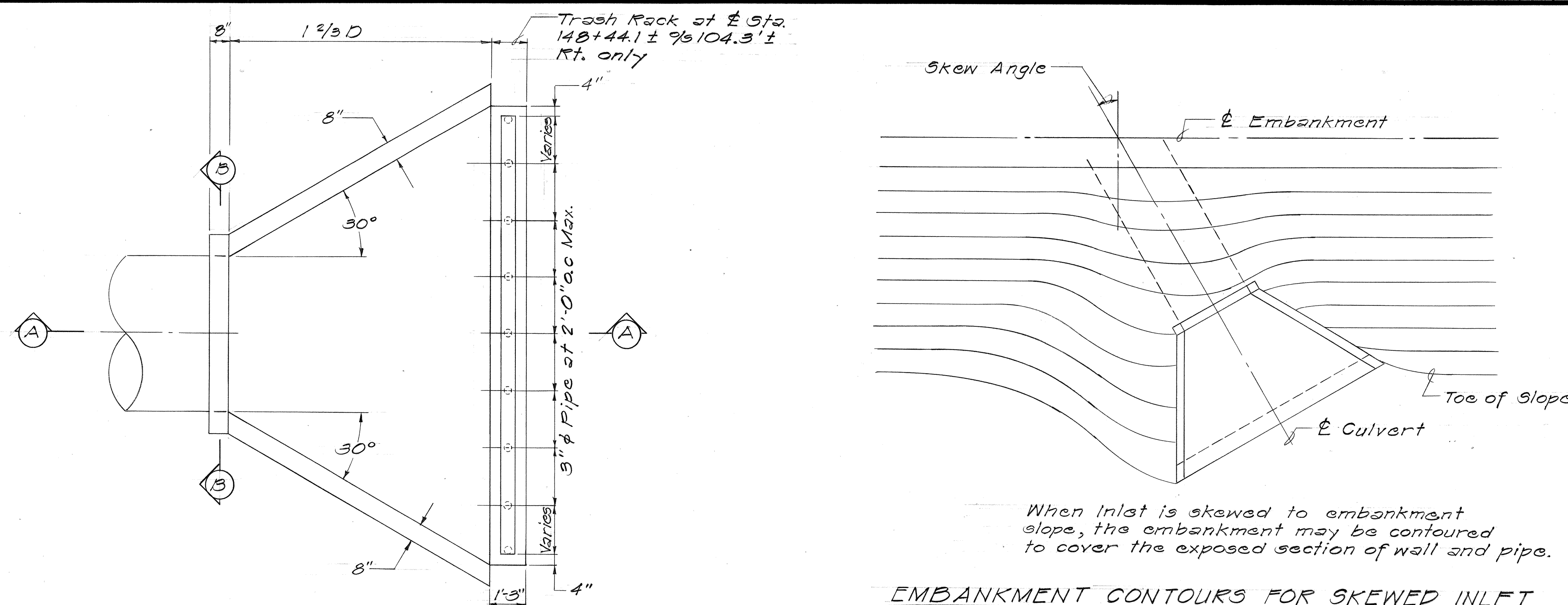
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS
HONOAPIILANI HIGHWAY
Kahala to Alaeos
F.A. Proj. No. F-030-1(13)
Scale: As Shown Date: Sept, 1977
SHEET No. 20 OF 21 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	56	174

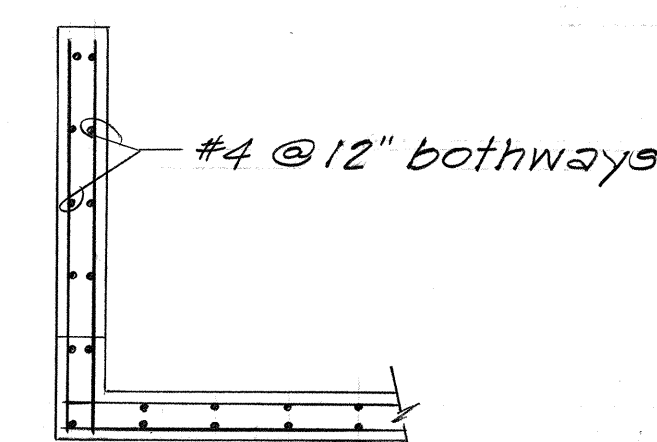
GENERAL NOTES

- Concrete: All concrete shall be Class A.
- Cut-off Wall: The depth of wall shown on the plan may be reduced if rock is encountered at a higher elevation.
- Multiple Pipe Installation: To permit careful placing and tamping of backfill material, clear spacing for multiple pipe installations shall be not less than one-half the diameter of the larger pipe between sides of adjacent pipes, but not required to exceed three feet.
- Anchor Bolts: Anchor bolts are not required for concrete pipe.

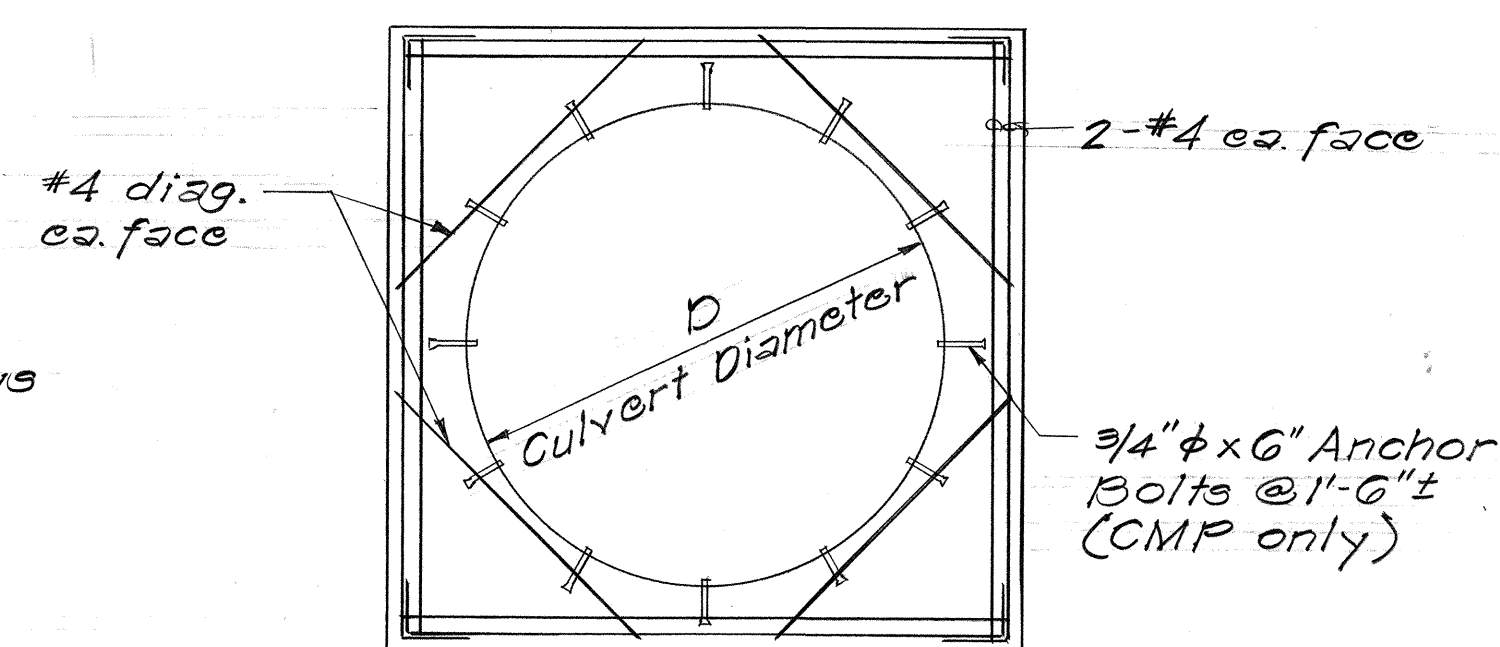


EMBANKMENT CONTOURS FOR SKEWED INLET

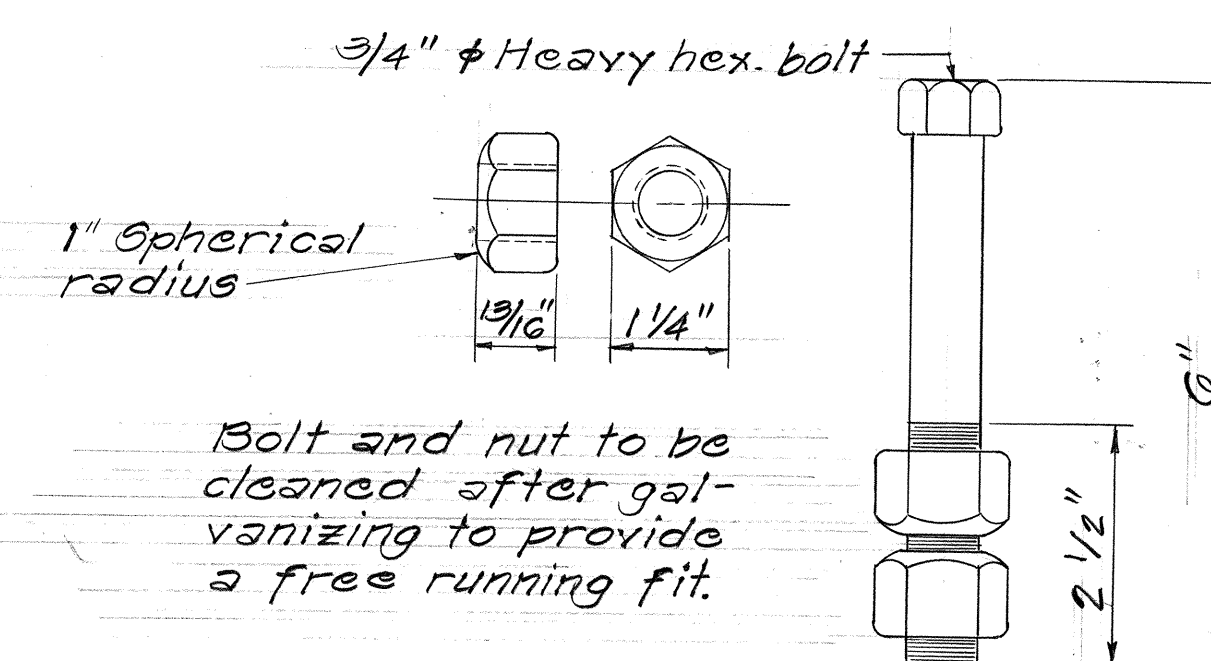
PLAN



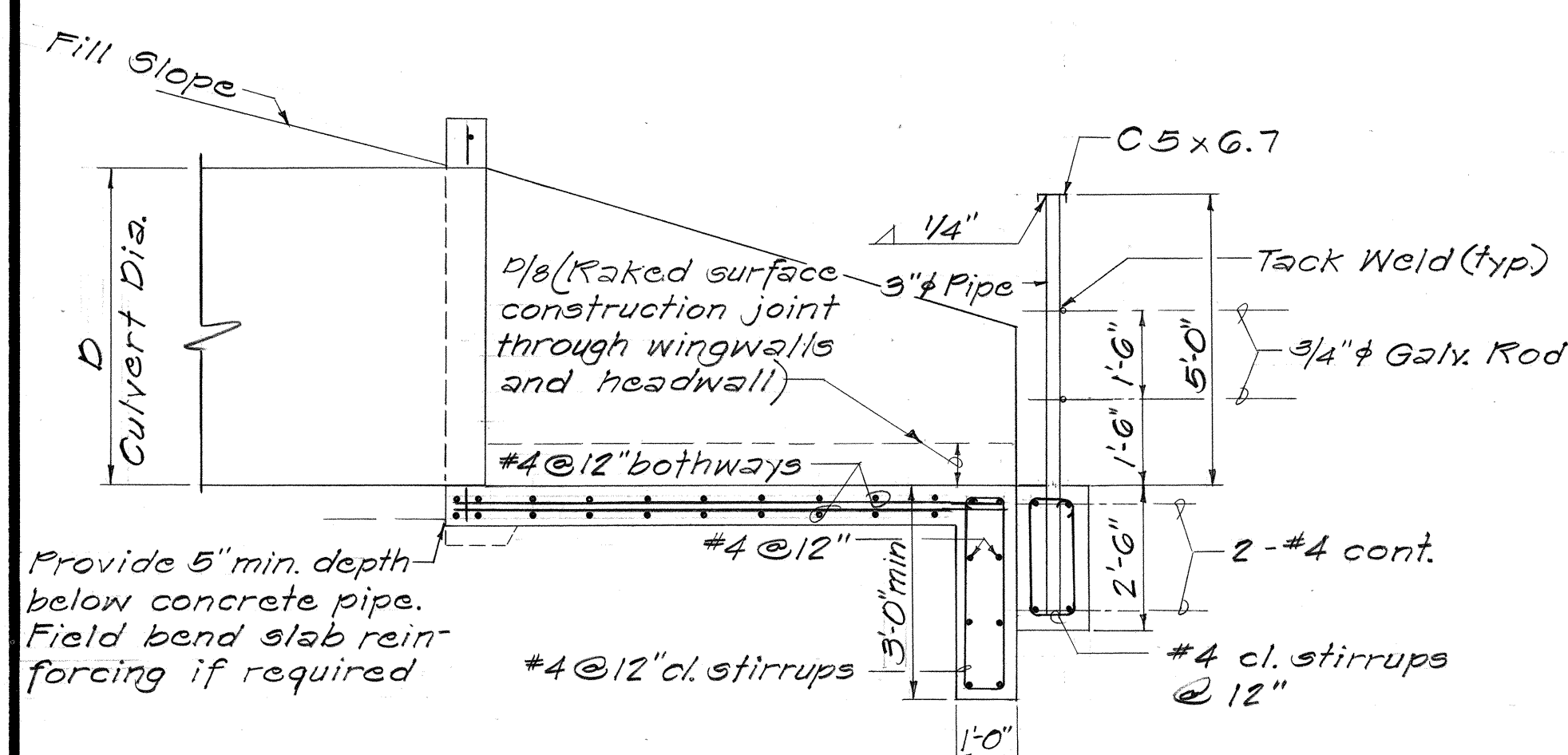
WINGWALL



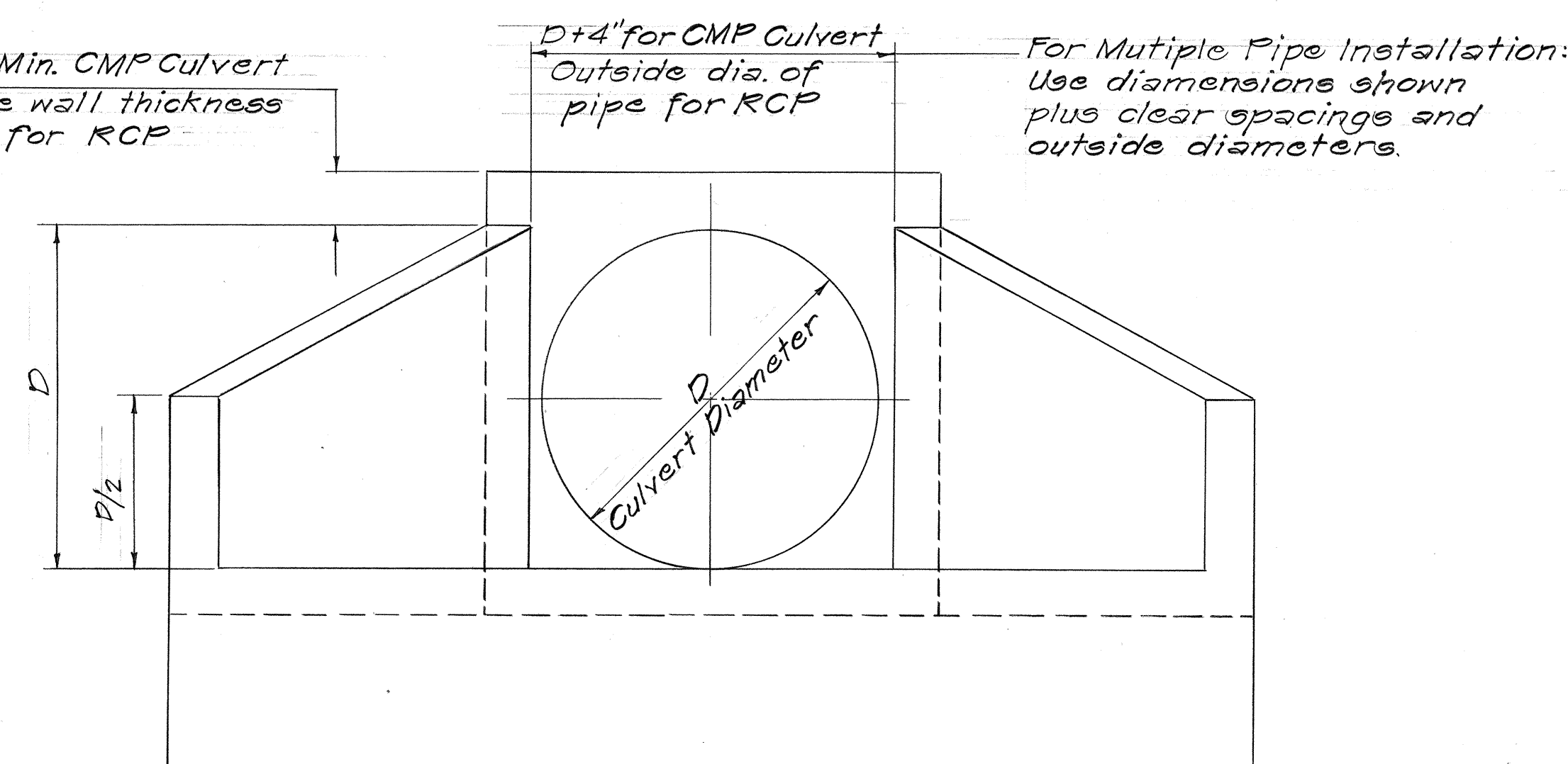
SECTION "B-B"



ANCHOR BOLT DETAIL



SECTION "A-A"



FRONT ELEVATION

TYPE A INLET AND OUTLET STRUCTURE & DEBRIS RACK

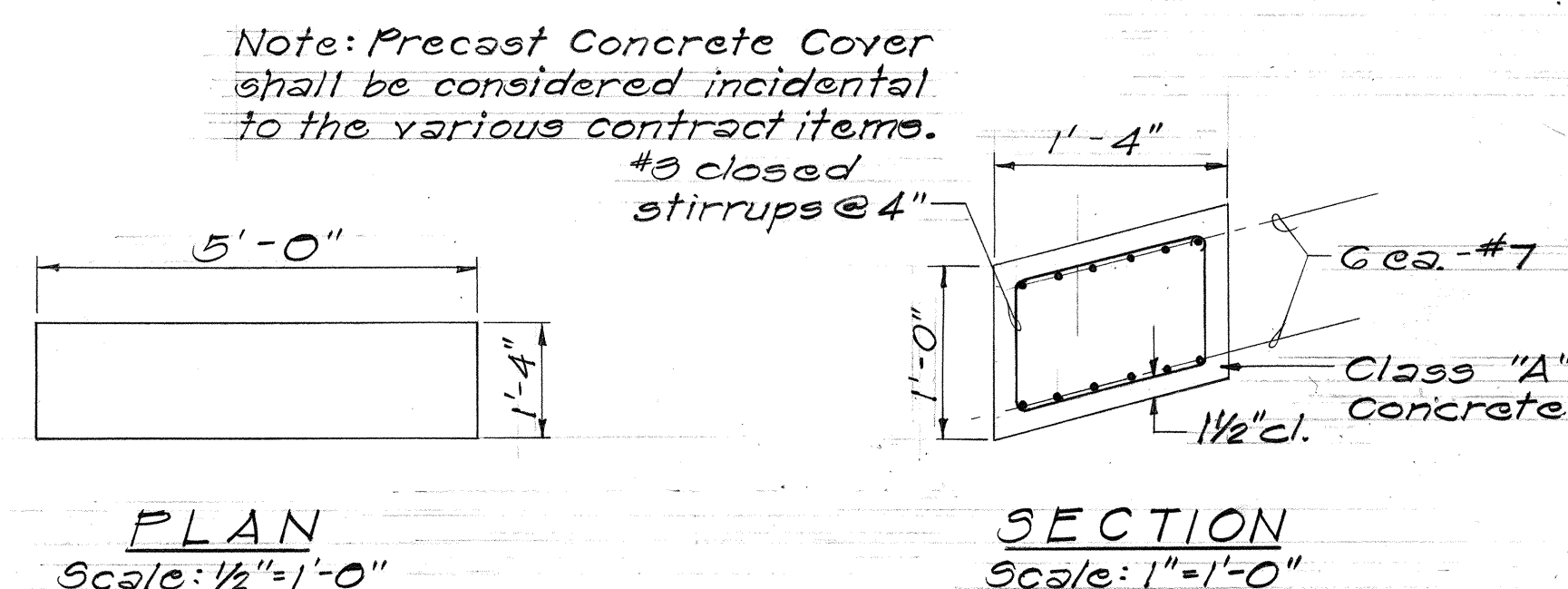
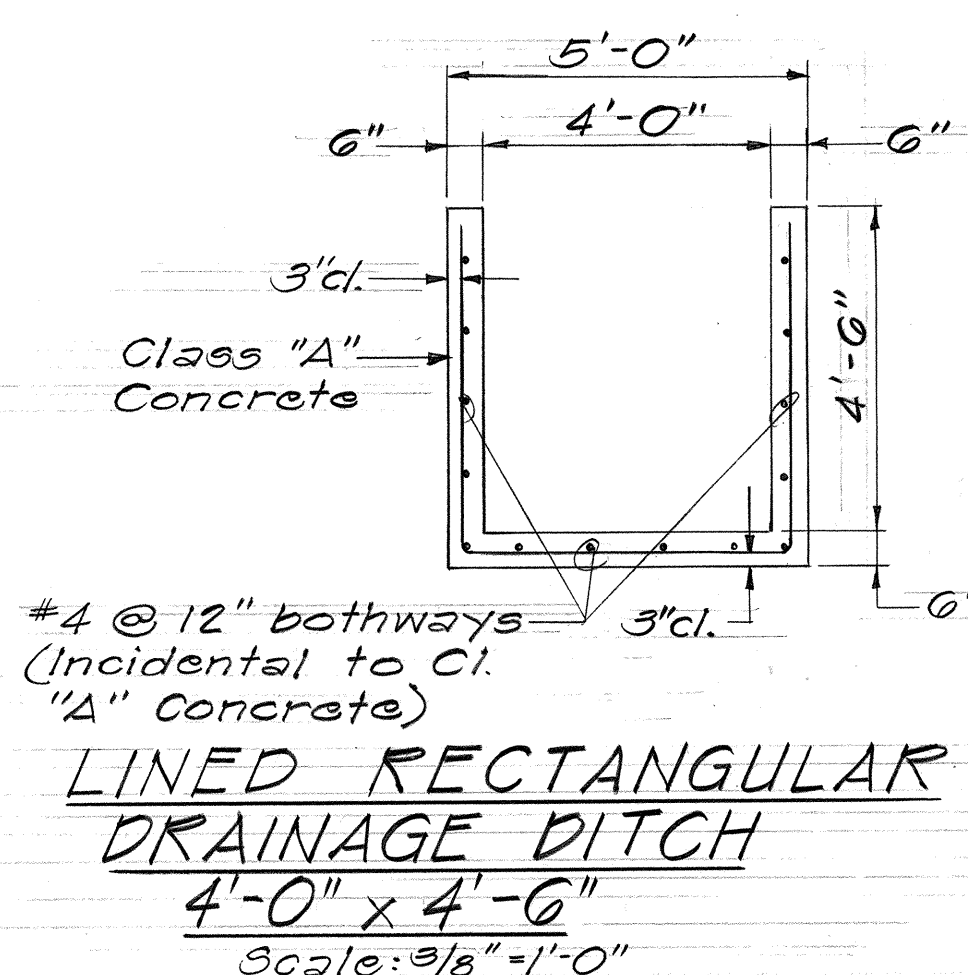
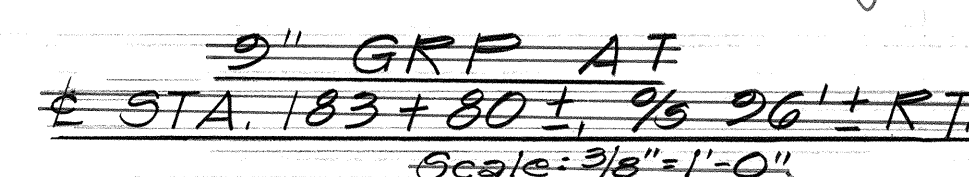
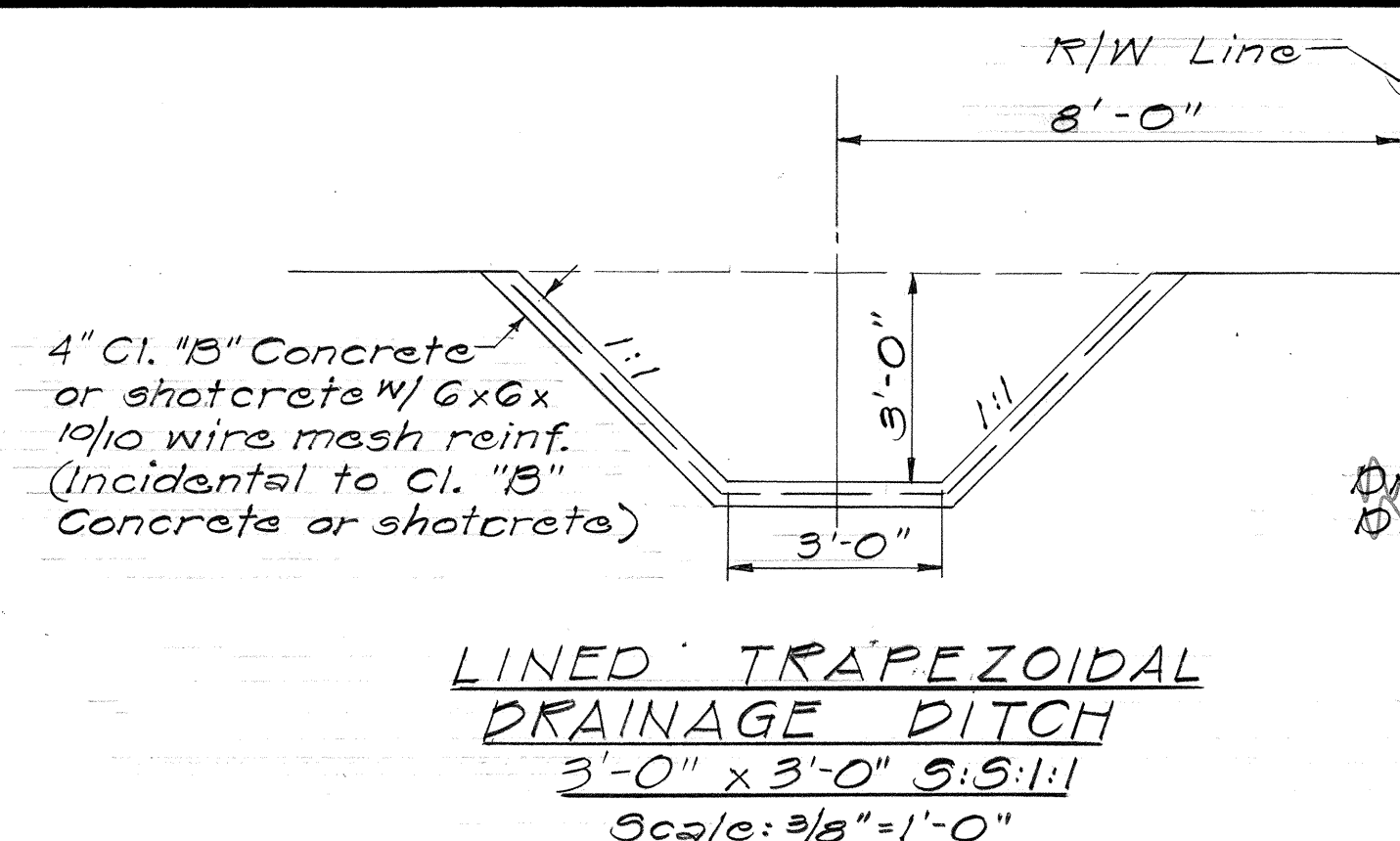
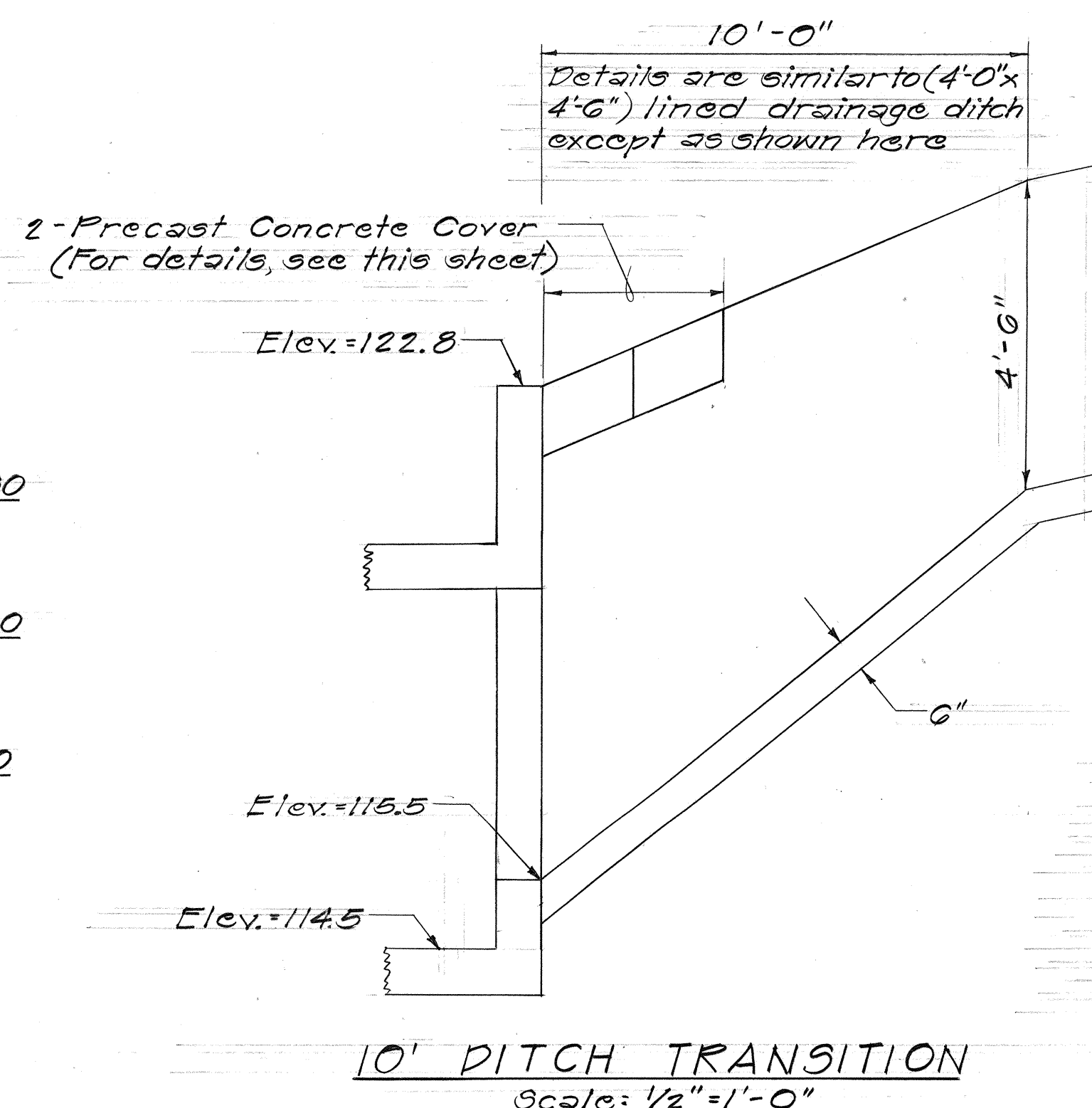
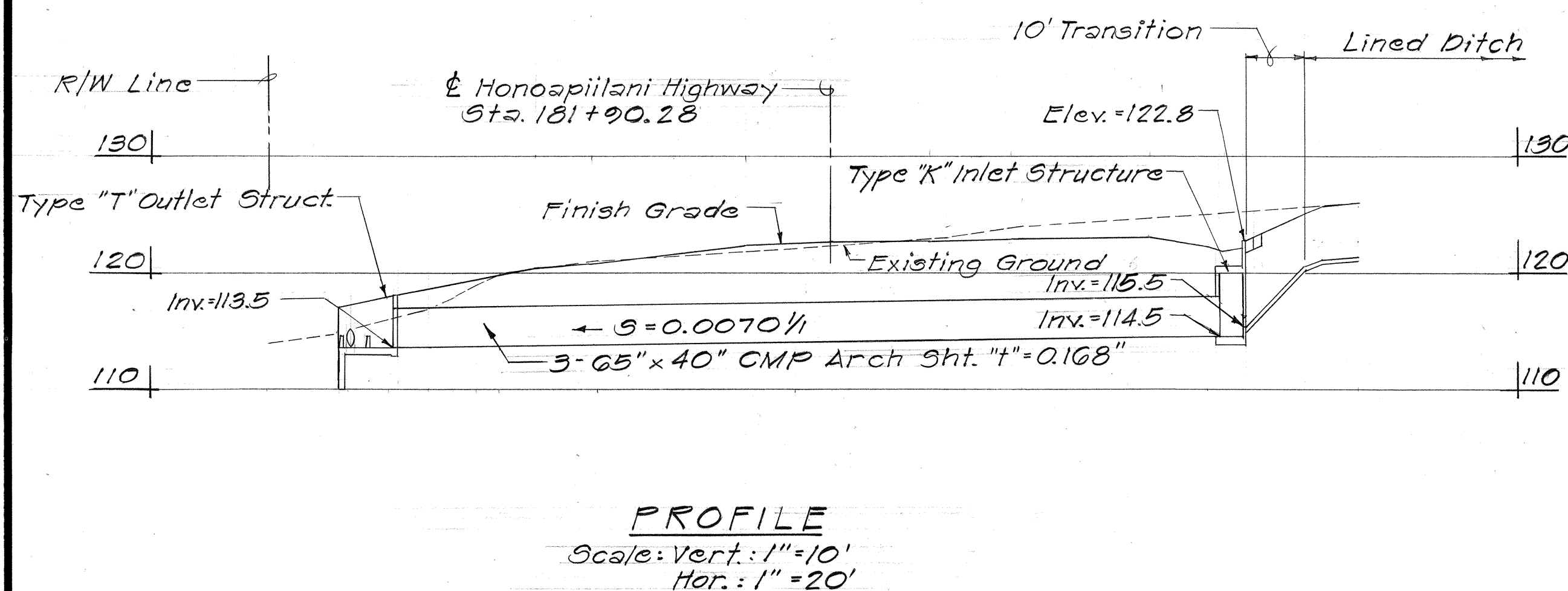
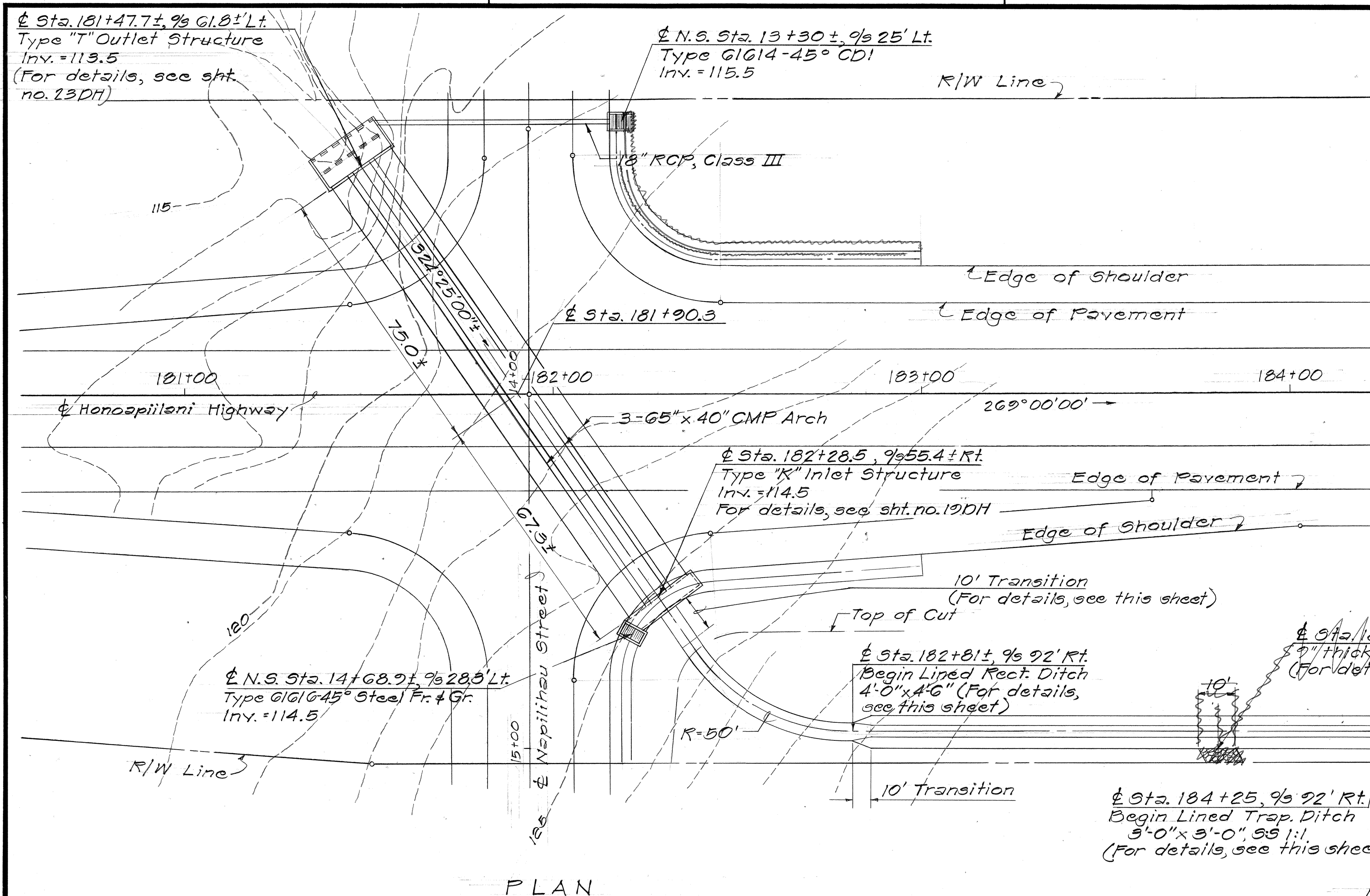
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
DRAINAGE DETAILS

HONOLULU HIGHWAY
 Kahala to Aiea
 F.A. Proj. No. F-030-1(13)

Not to Scale Date: Sept. 1977

SHEET NO. 12 OF 31 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	57	174

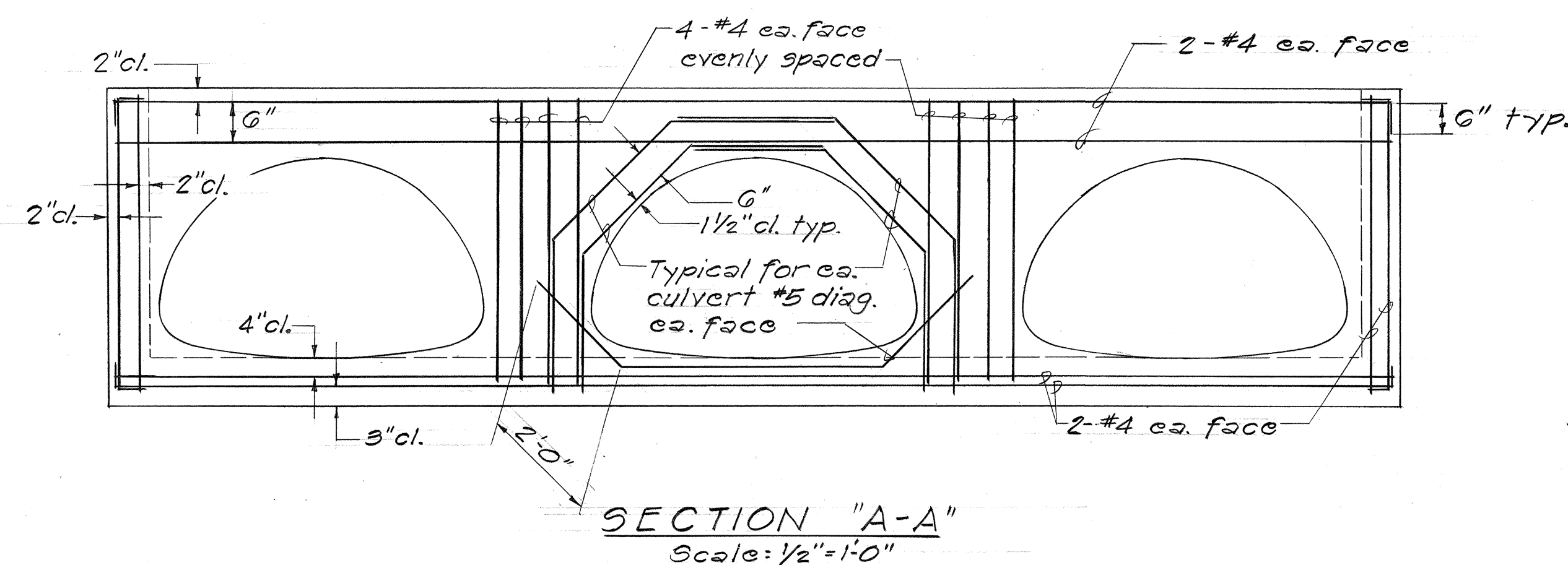
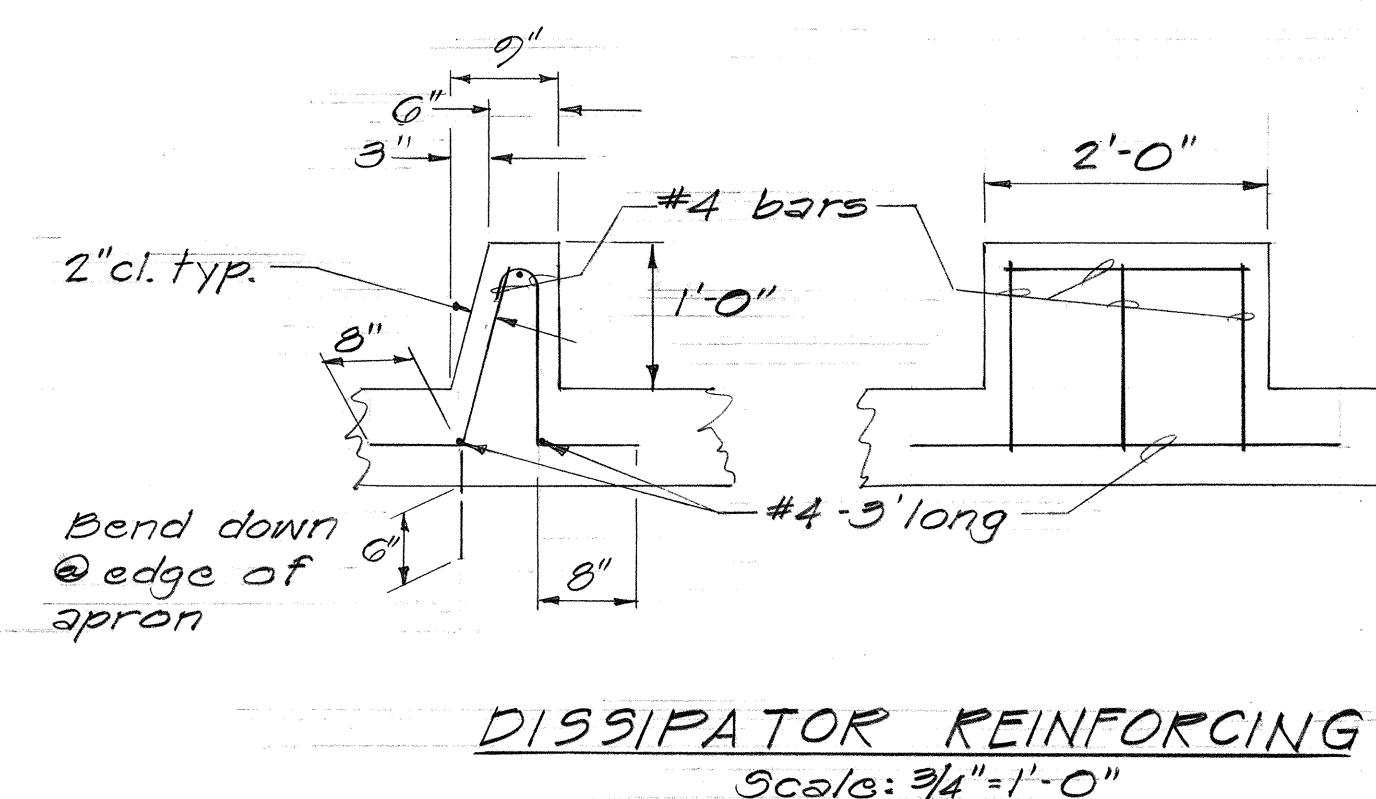
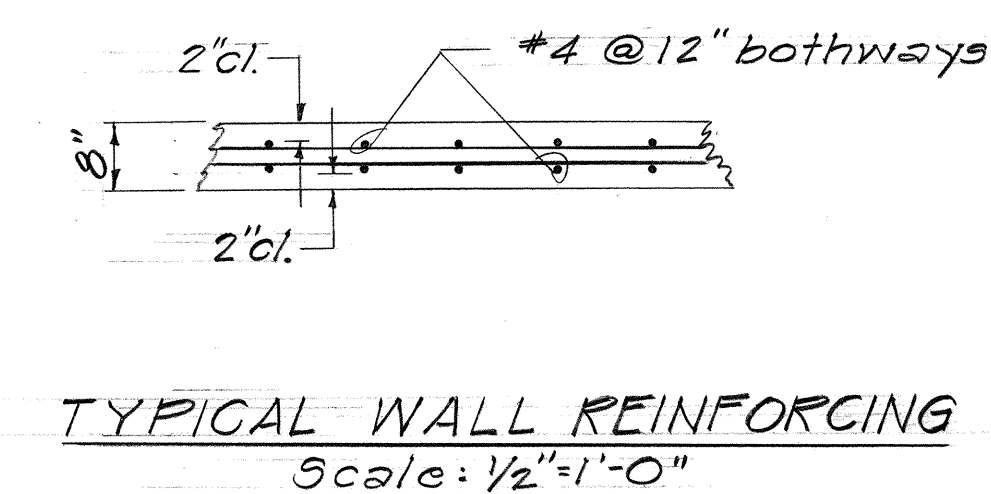
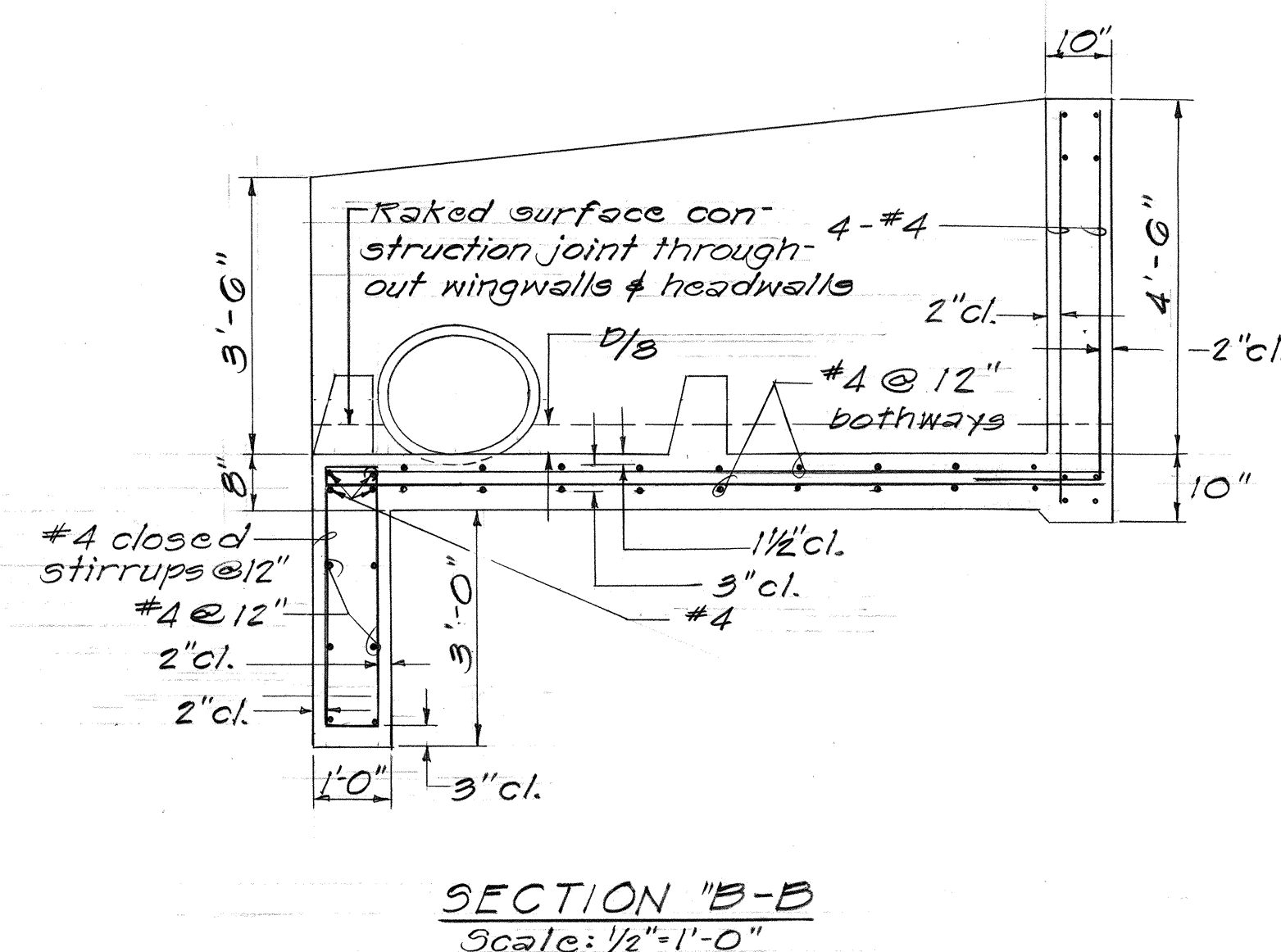
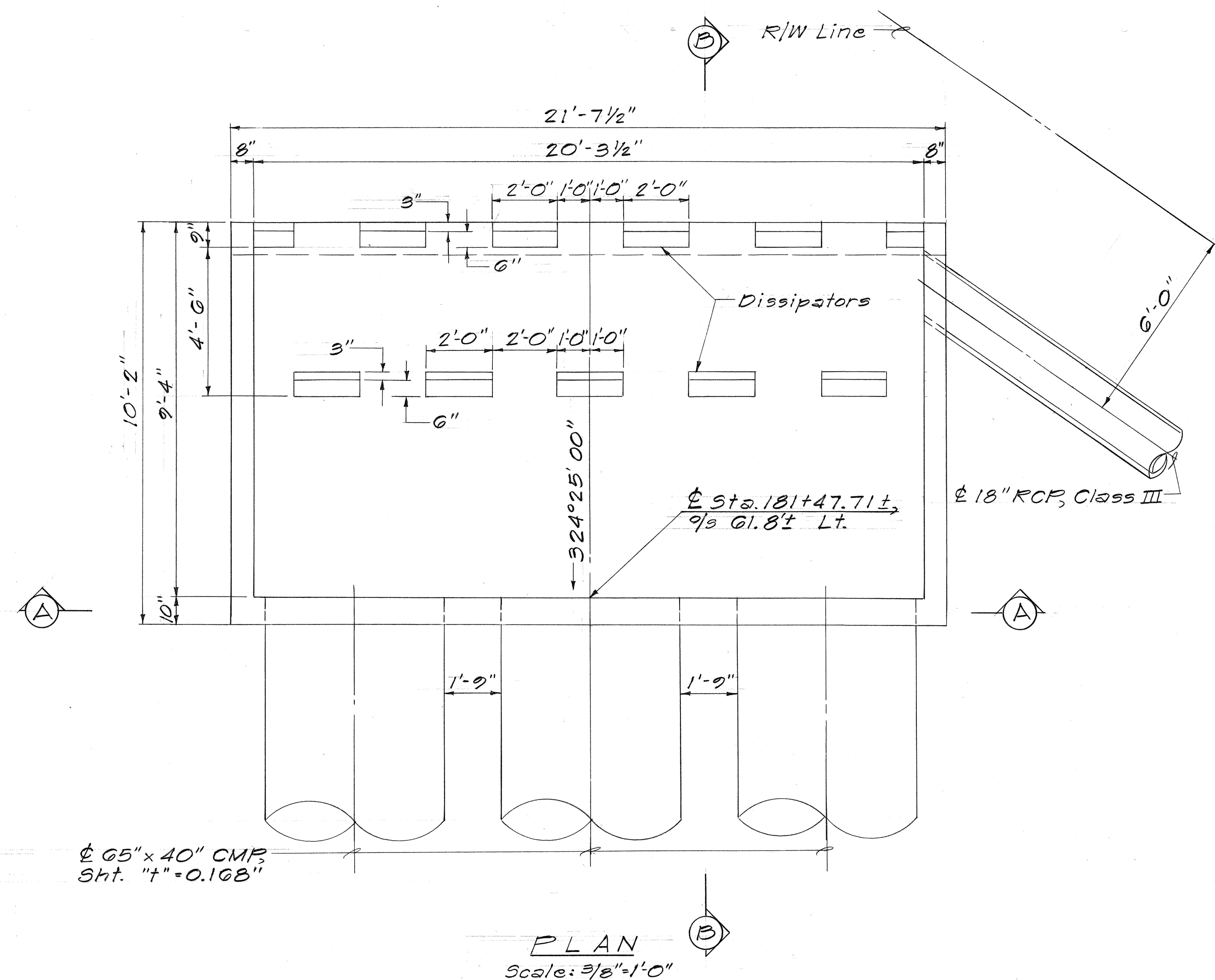


NOTE: Payment for transition: Lined Drainage Ditch transition from lined drainage ditch to lined drainage ditch shall be paid under lined drainage ditch 1/2 of transition to each type. Lined drainage ditch transition at the beginning or end shall be paid for under the adjacent downstream or upstream ditch type.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS
HONAPIILANI HIGHWAY
Kahala to Aiea
F.A. Proj. No. F-030-1(13)

Scale: As Shown Date: Sept., 1977
SHEET NO. 22 OF 31 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	58	174



TYPE "T" OUTLET STRUCTURE AT $\pm \text{Sta. } 181+47.71 \pm, \frac{1}{8} \text{ G.I.B. } \pm \text{ Lt.}$

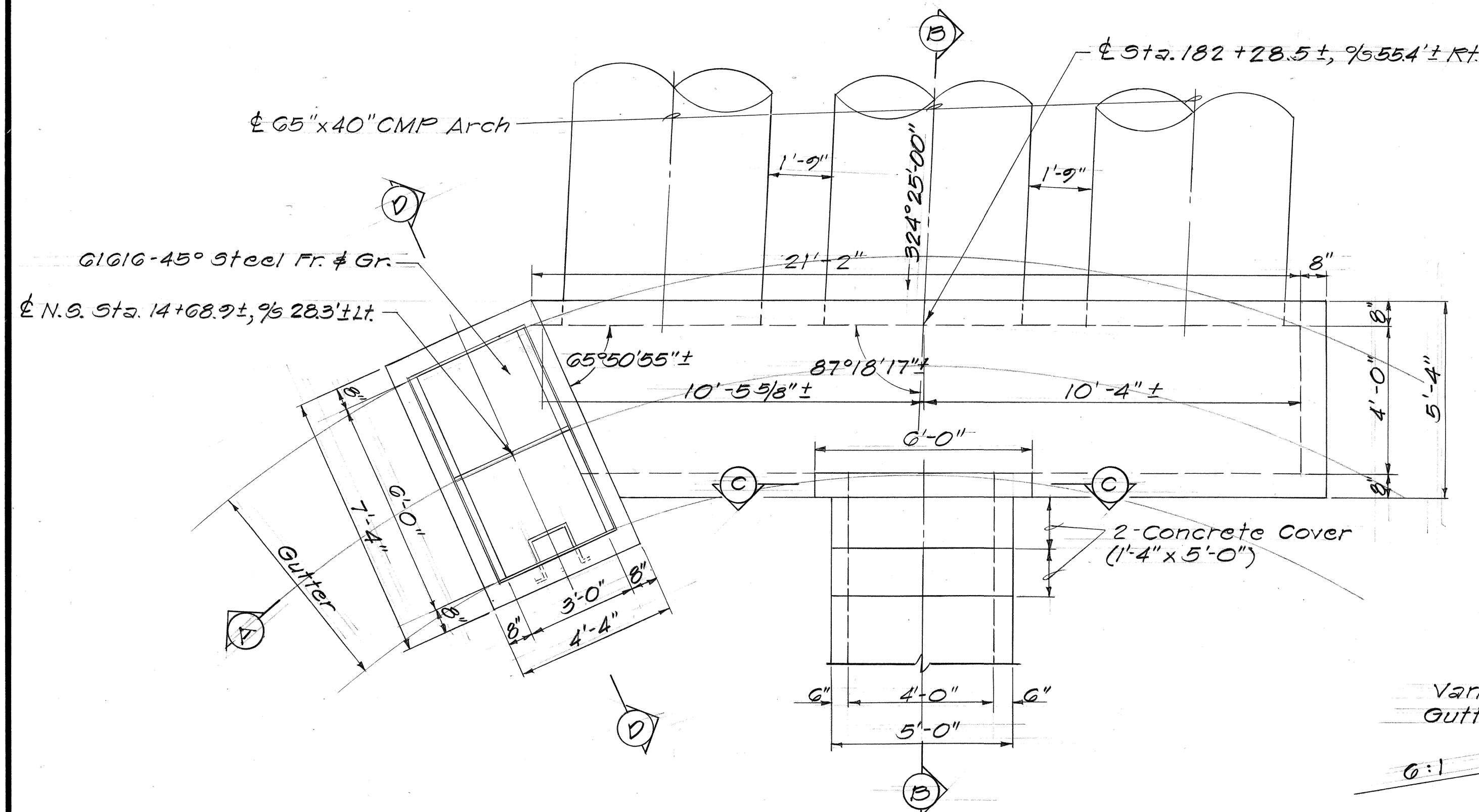
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

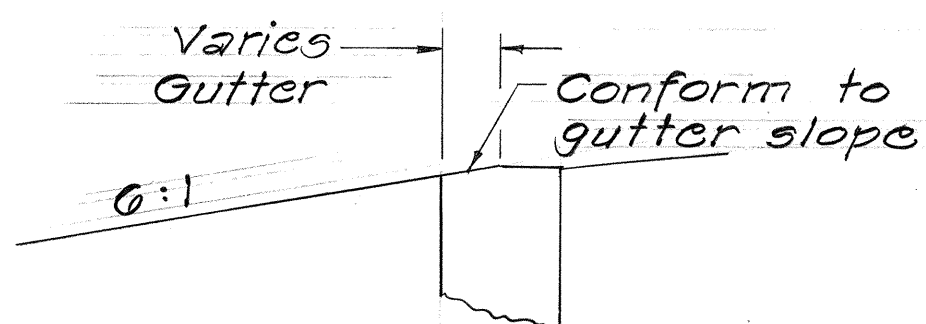
HONOAPIILANI HIGHWAY
Kahala to Alaeos
F.A. Proj. No. F-030-1(13)

Scale: As Shown Date: Sept., 1977
SHEET NO. 58 OF 31 SHEETS

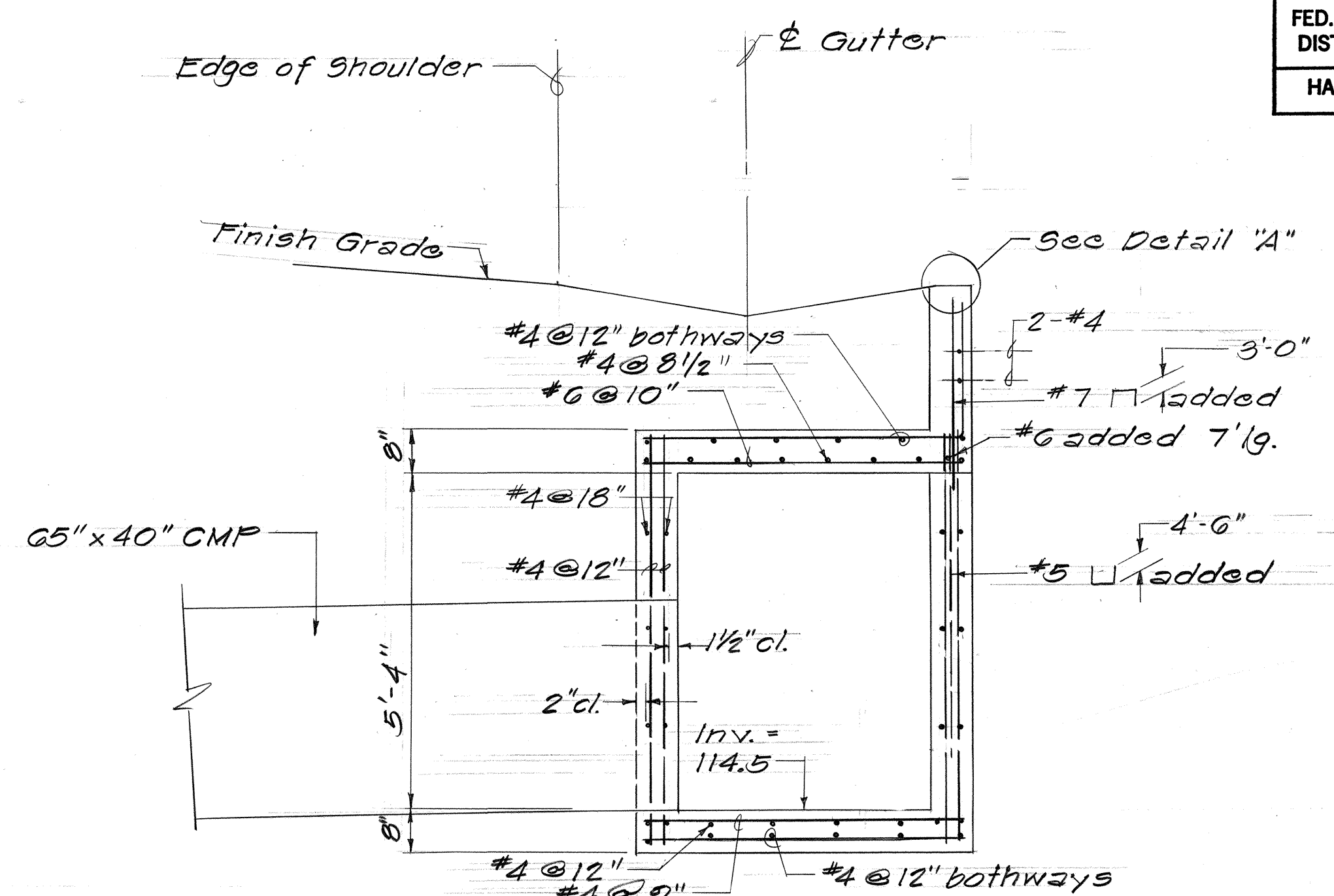
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F0301(19)	1978	59	174



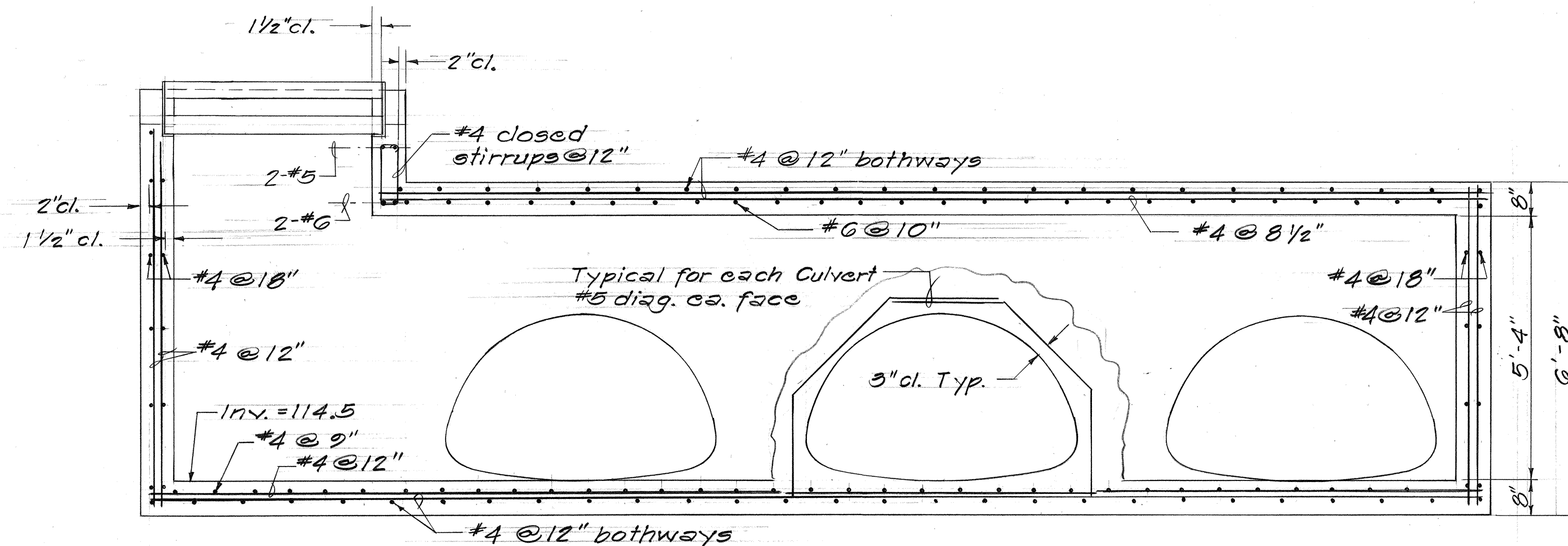
PLAN
Scale: 3/8"=1'-0"



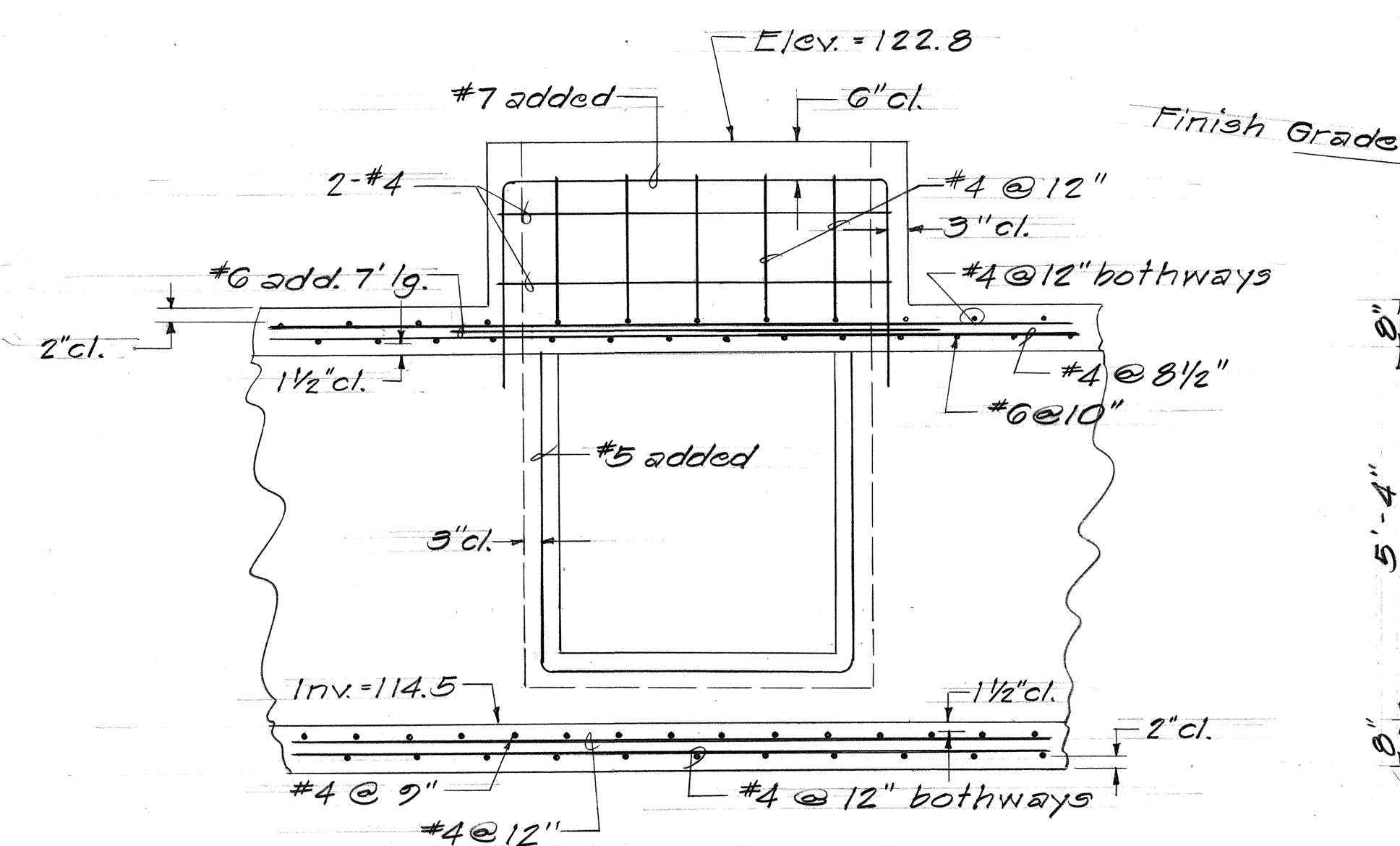
DETAIL "A"
Not to Scale



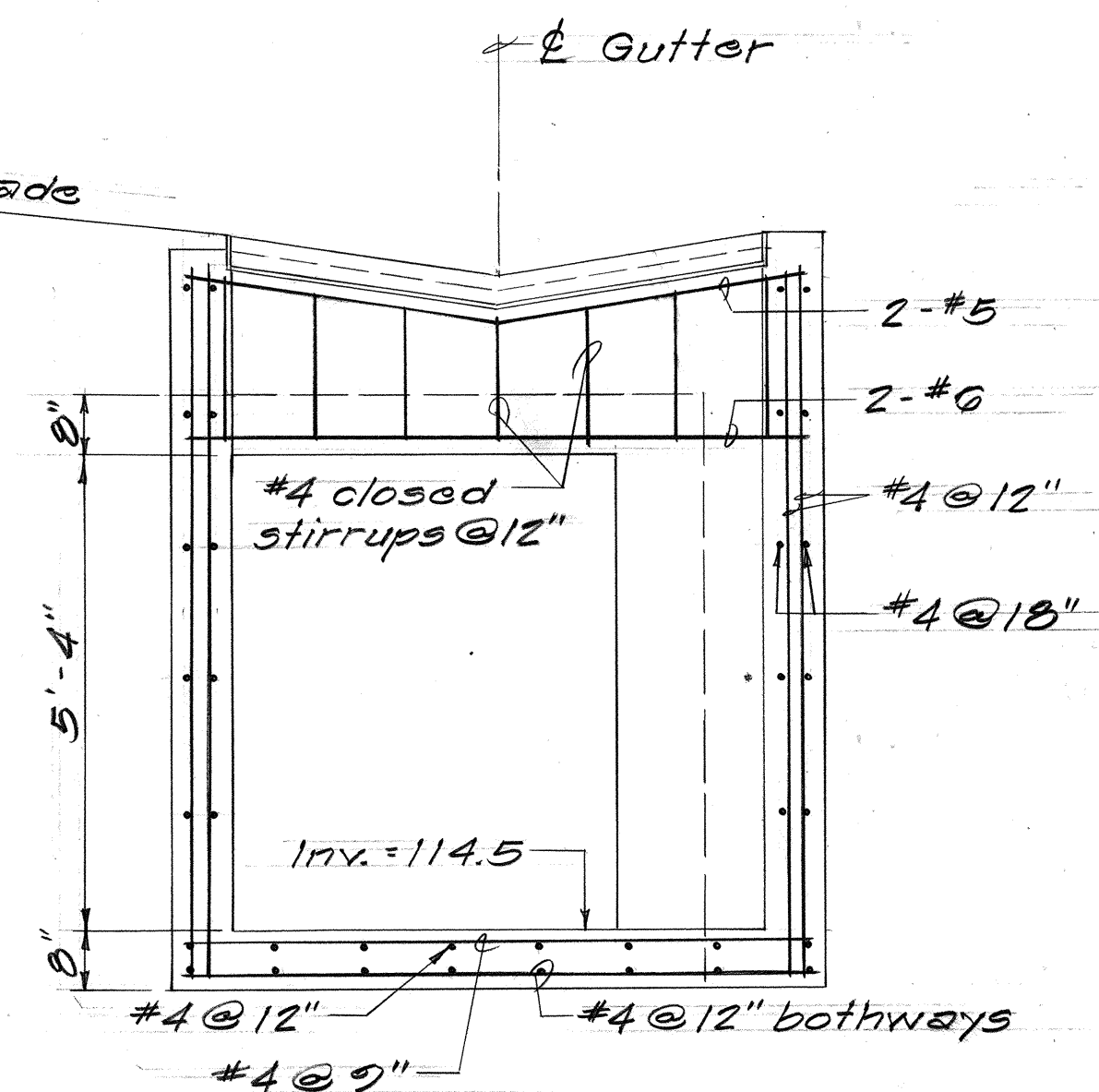
SECTION "B-B"
Scale: 1/2"=1'-0"



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



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



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

TYPE "K" INLET STRUCTURE AT STA. 182+28.5±, 9/5 40' RT

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

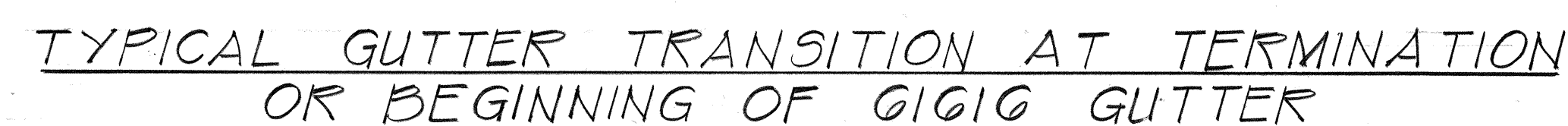
HONOAPIILANI HIGHWAY
Kahana to Alaeola
F.A. Proj. No. F-0301(19)

Scale: As Shown Date: Sept. 1977

SHEET NO. 24 OF 31 SHEETS

NOTES:

1. For details of dowels at construction joints for Type 2(G/G/G) Gutter see plan sht. no. 26.
2. For location of Guard Rail see Roadway Plans
3. Payment for transition: Lined drainage ditch transition from lined drainage ditch to lined drainage ditch shall be paid under lined drainage ditch $\frac{1}{2}$ of transition to each type. Lined drainage ditch transition at the beginning or end shall be paid for under the adjacent ditch type.



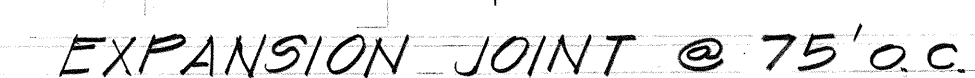
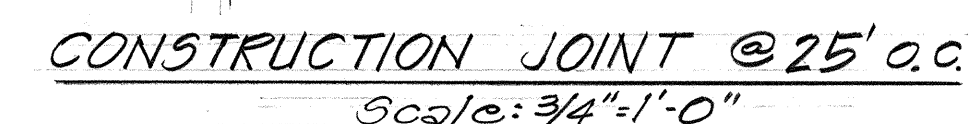
Sec/c: $\frac{1}{2}'' = 1'-0''$



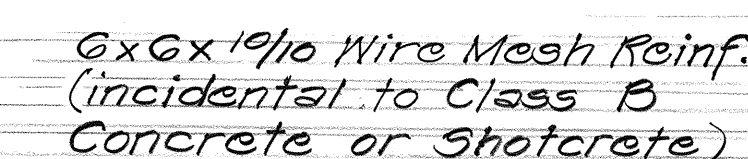
Scw/c: $\frac{3}{8}$ " = 1'-0"



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

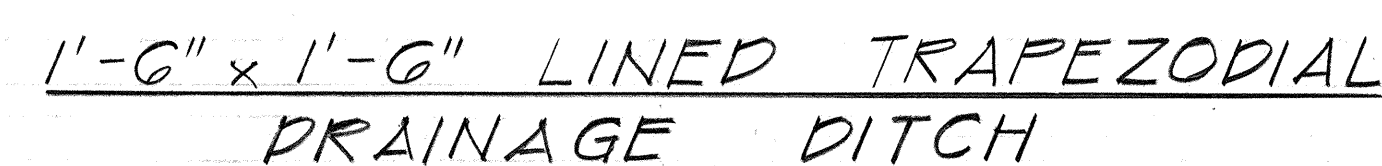


Sec/c: $3/8" = 1'-0"$



1'-0" x 1'-6" LINED TRAPEZOIDAL DRAINAGE DITCH

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



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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

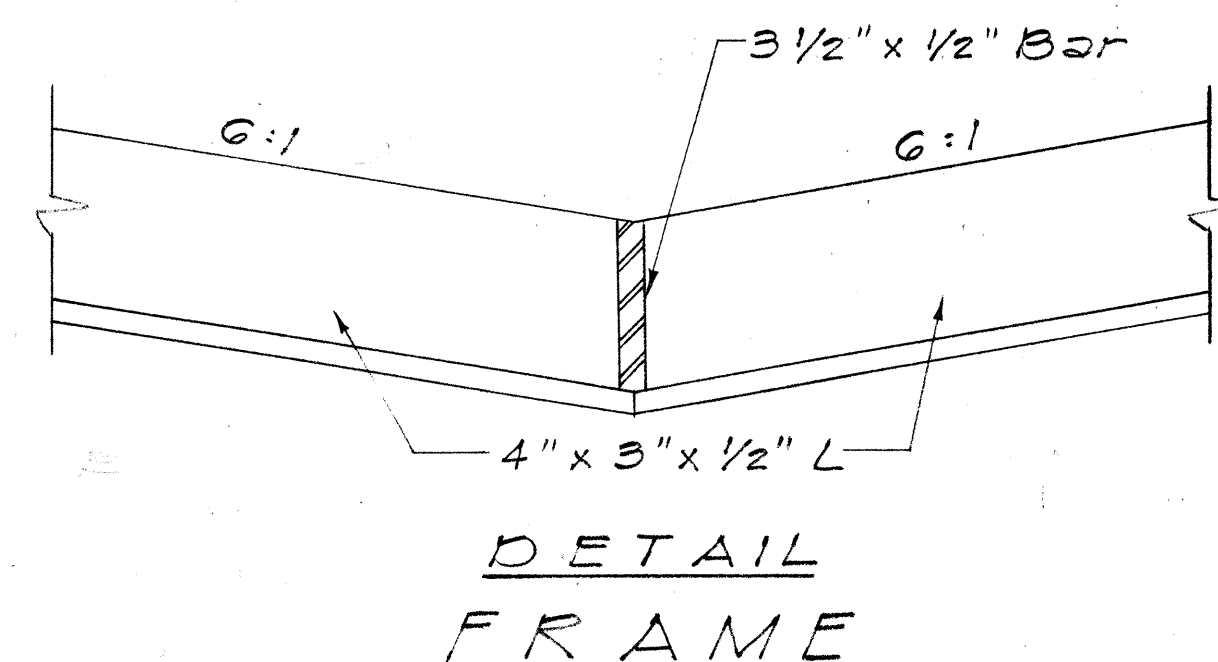
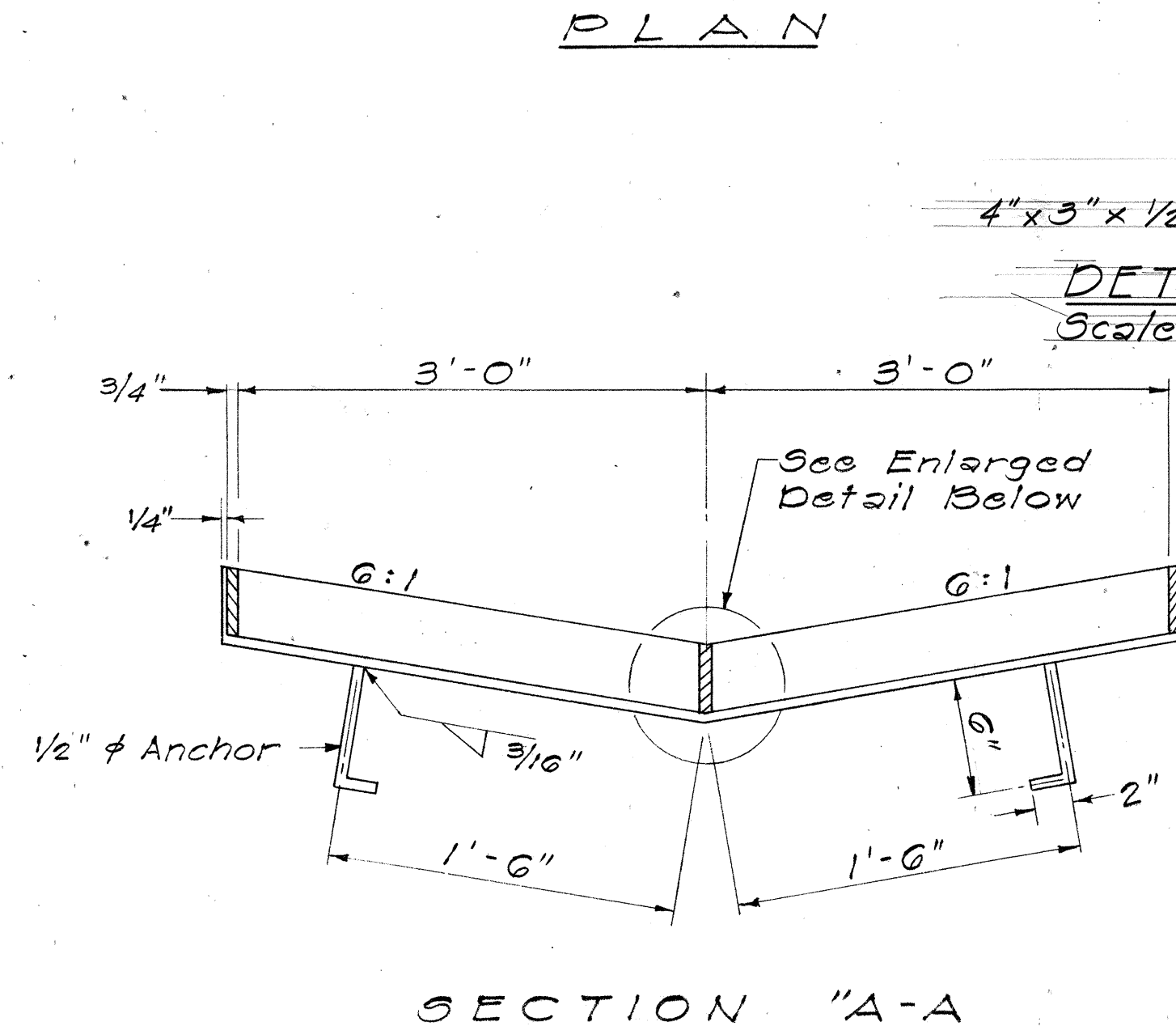
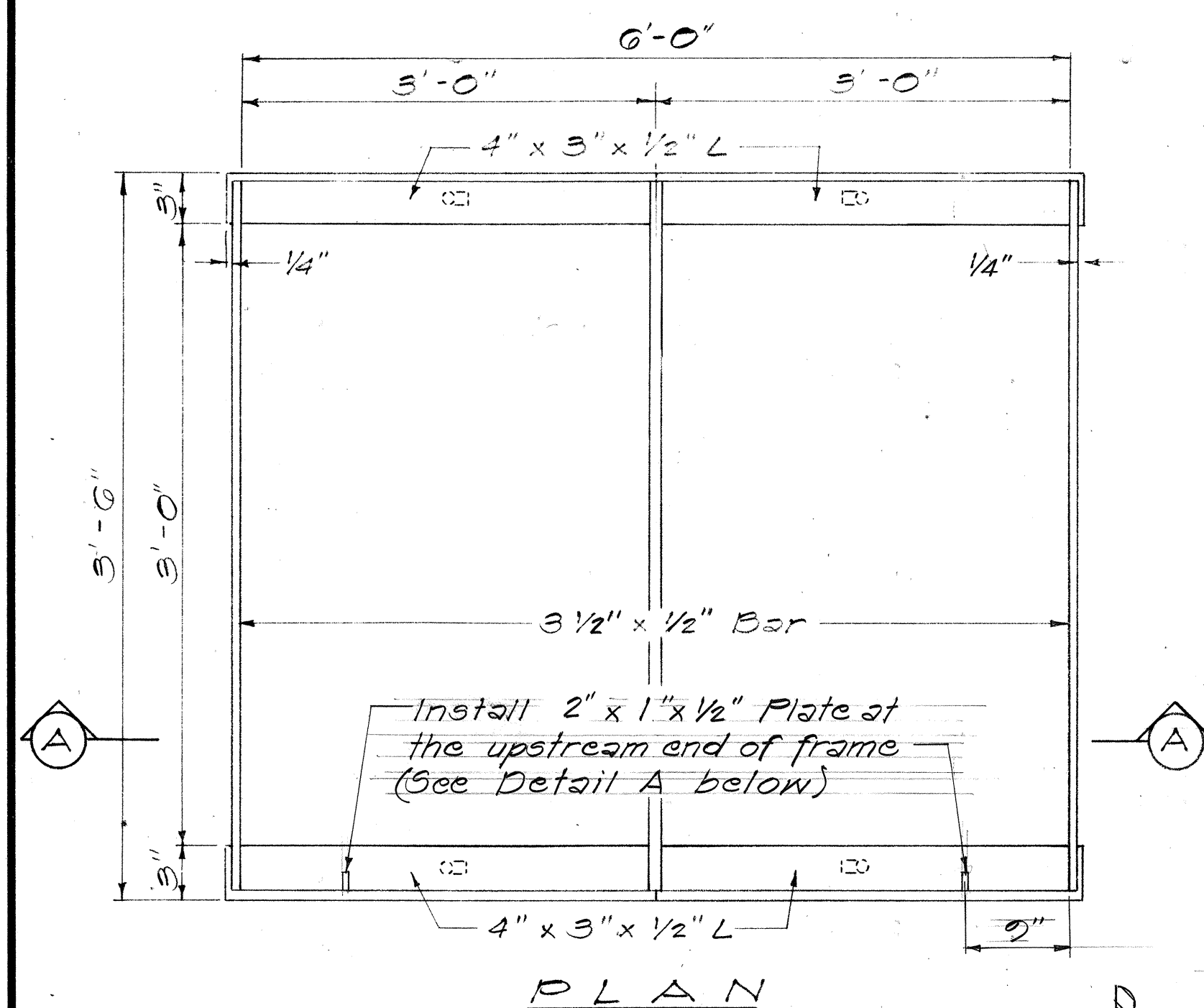
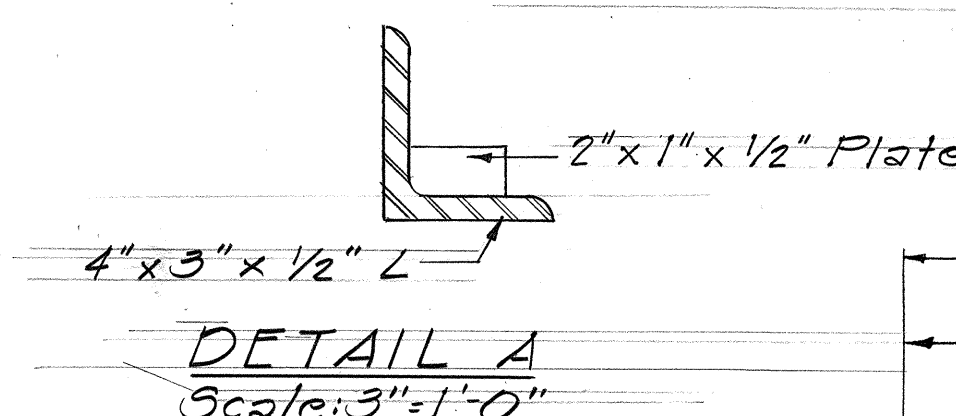
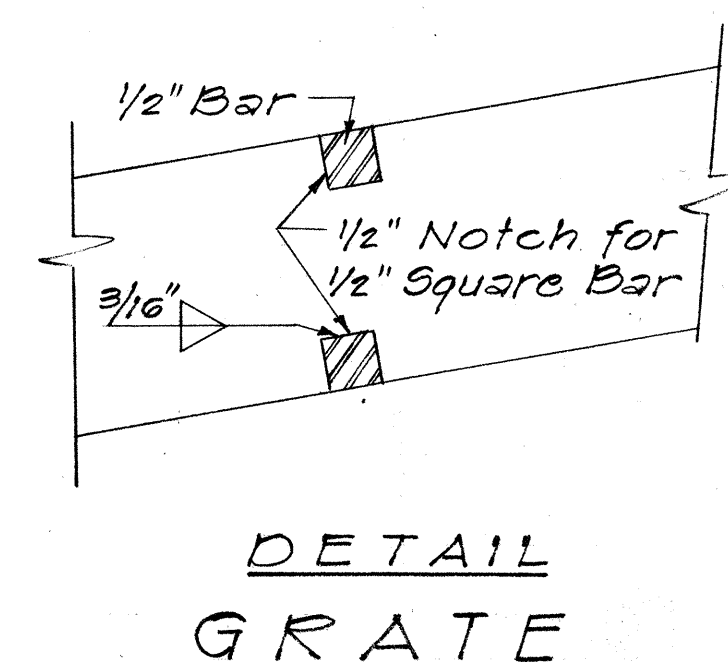
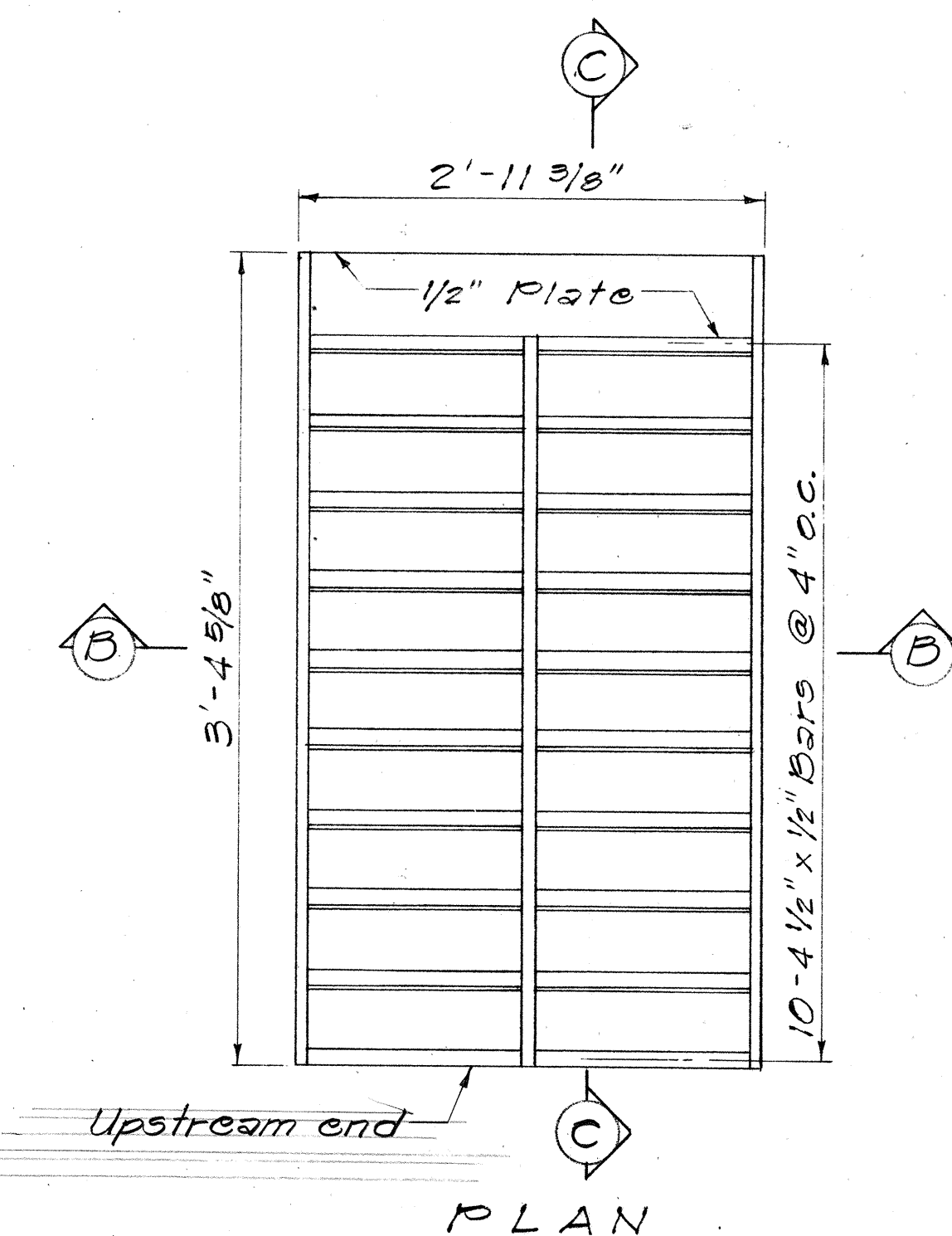
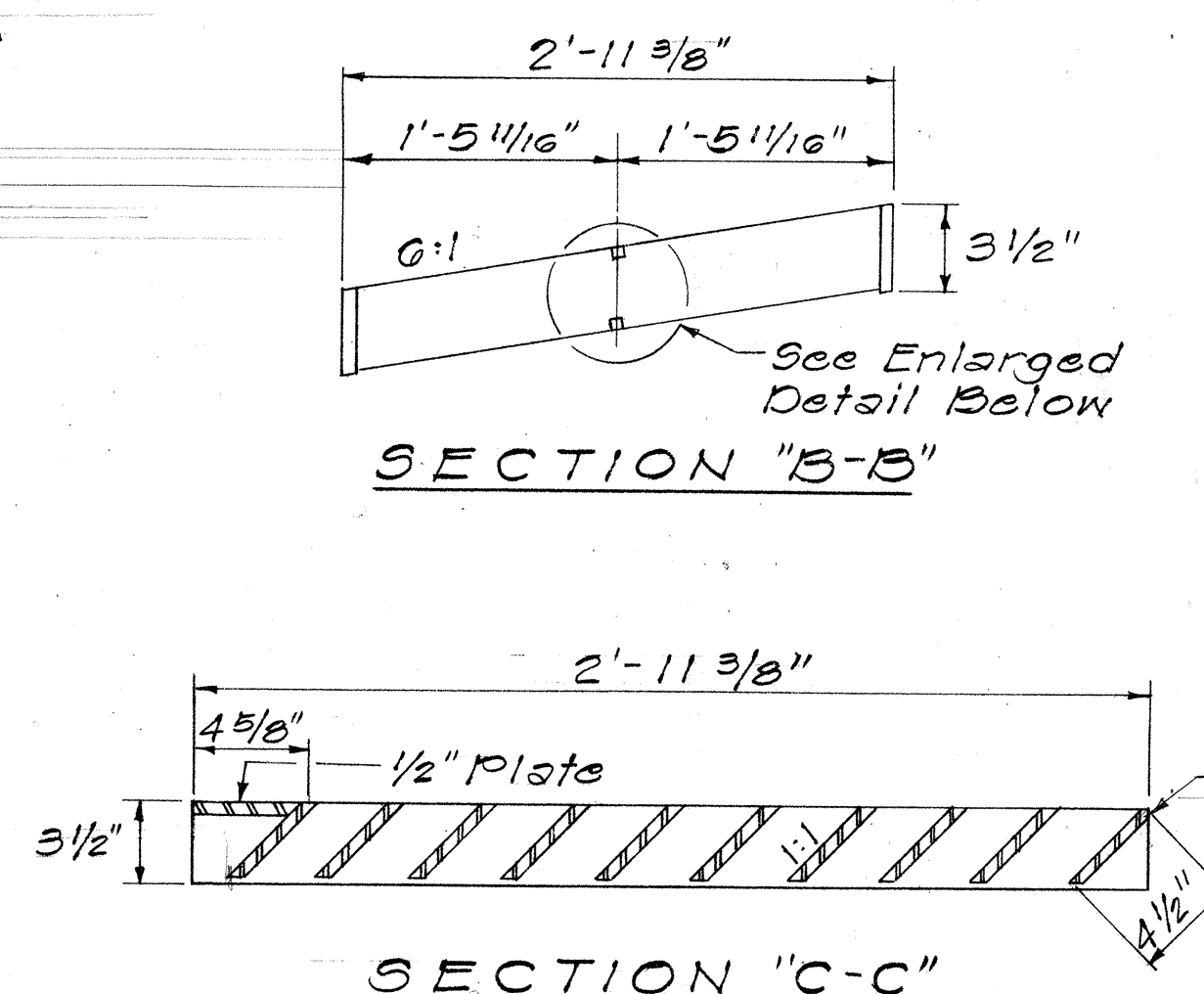
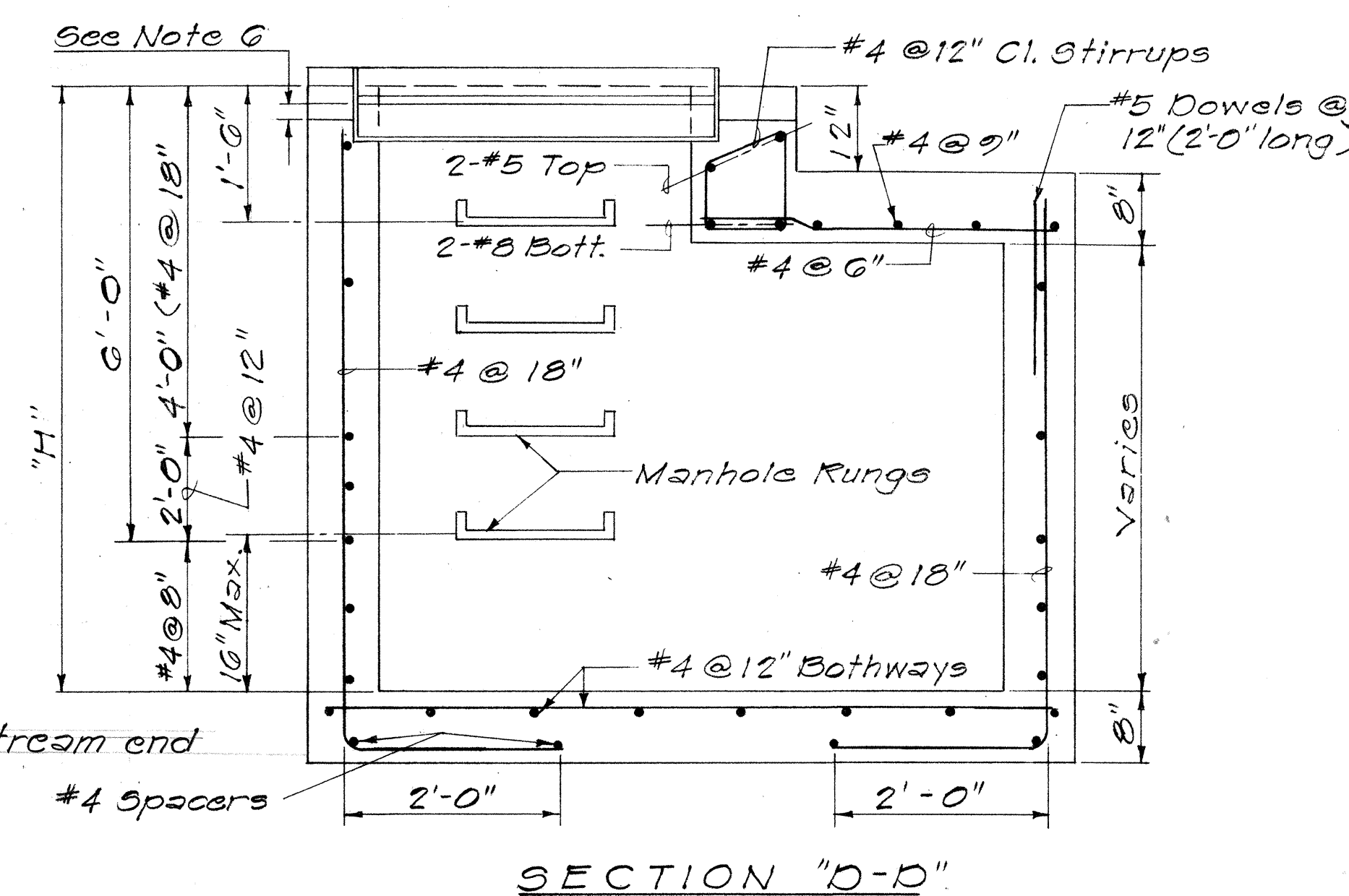
HONOAPIHLANI HIGHWAY
· Kahana to Alaeoa
F.A. Proj. No. F-030-1(13)

Scale: As Shown Date: Sept. 1977

SHEET No. 25 OF 31 SHEETS

GENERAL NOTES

- TYPE GIGIG-45° STEEL FRAME AND GRATE AND DROP INTAKE



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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

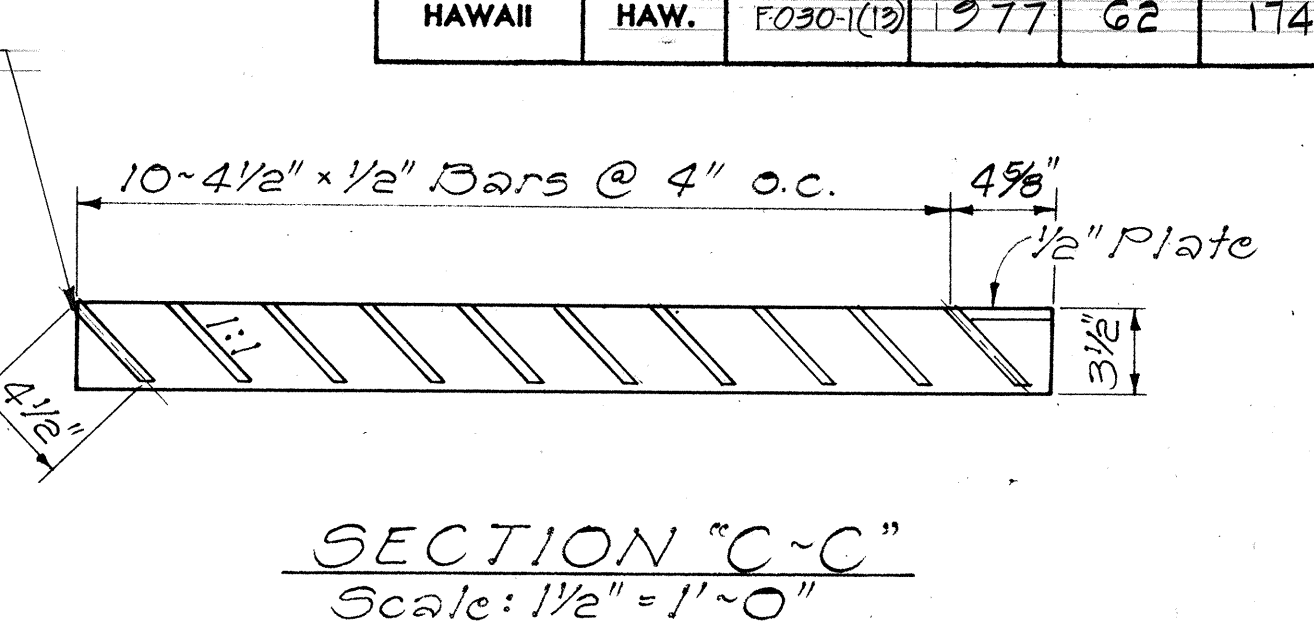
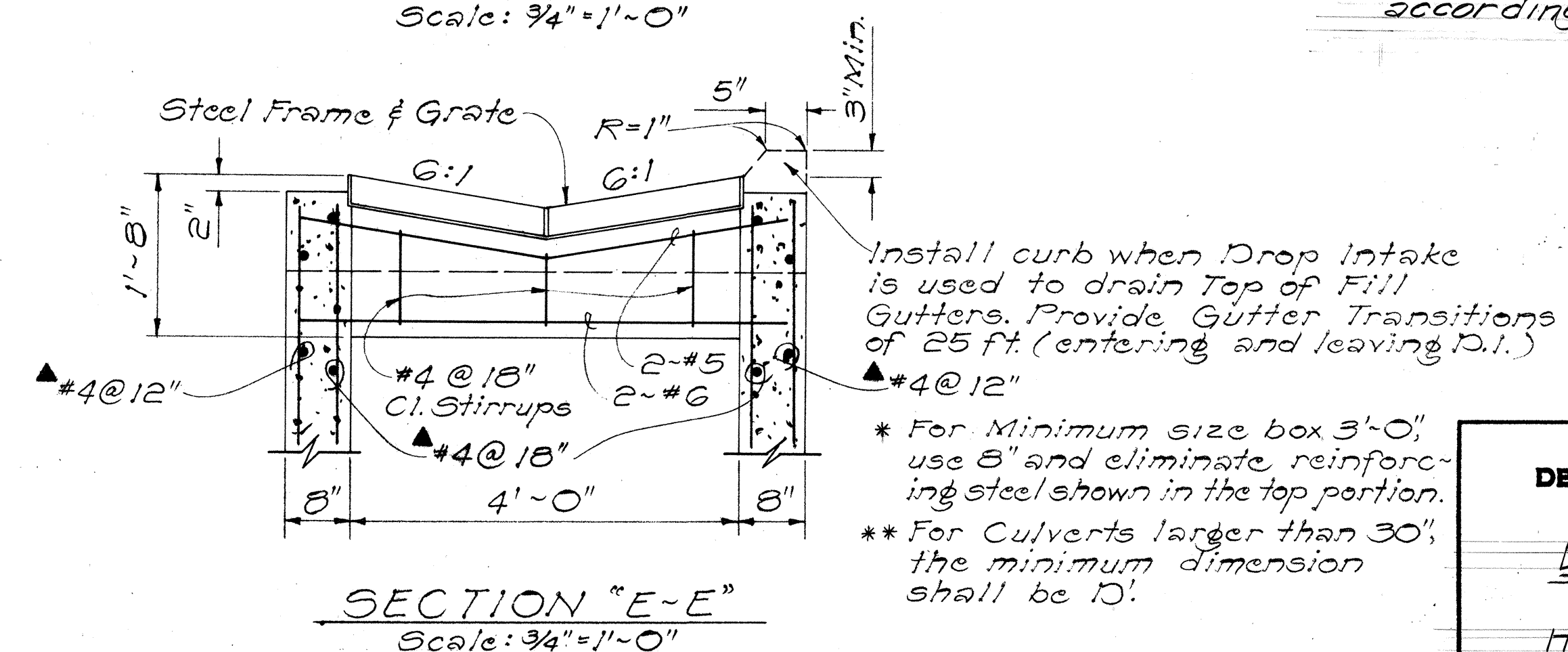
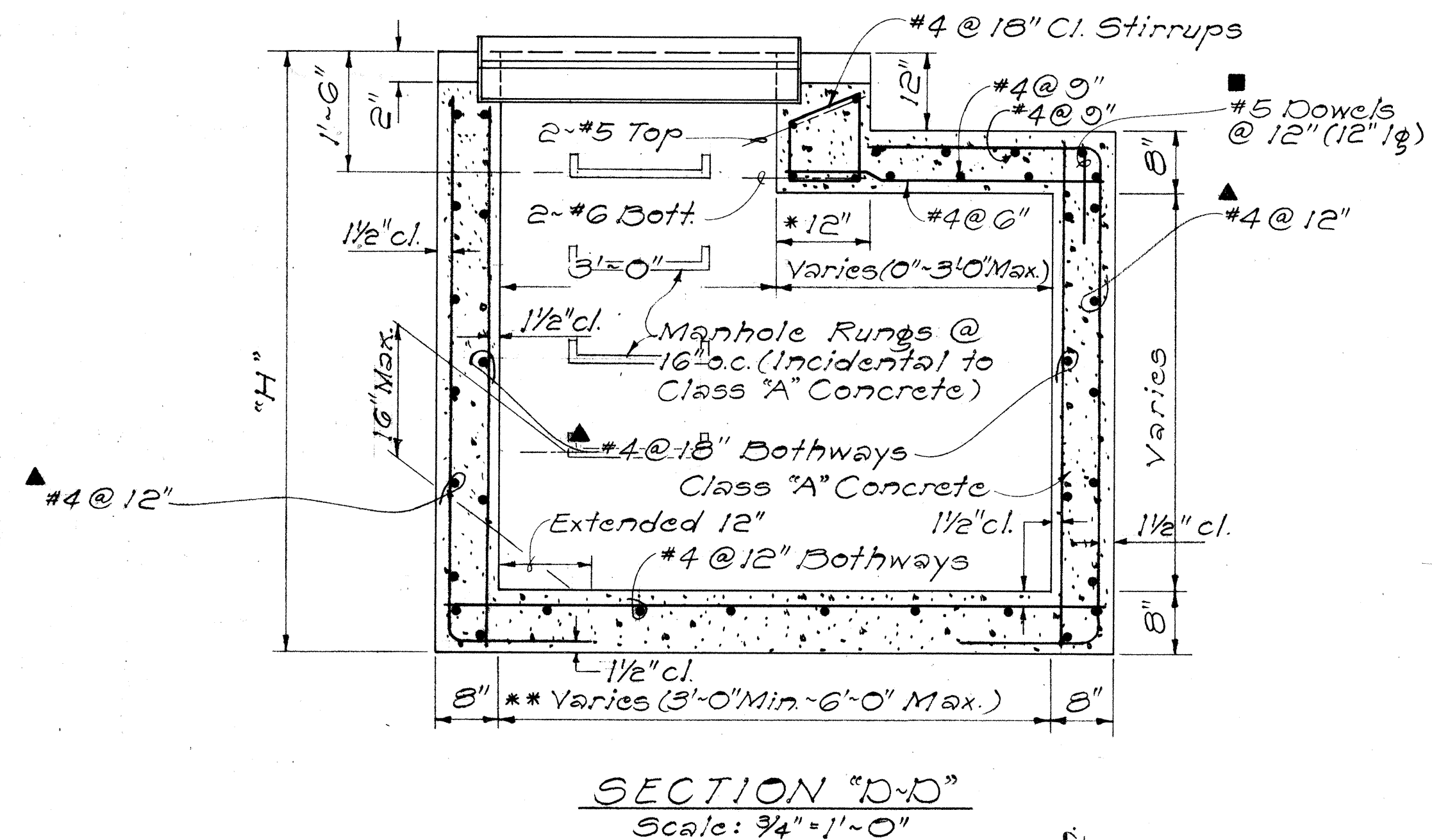
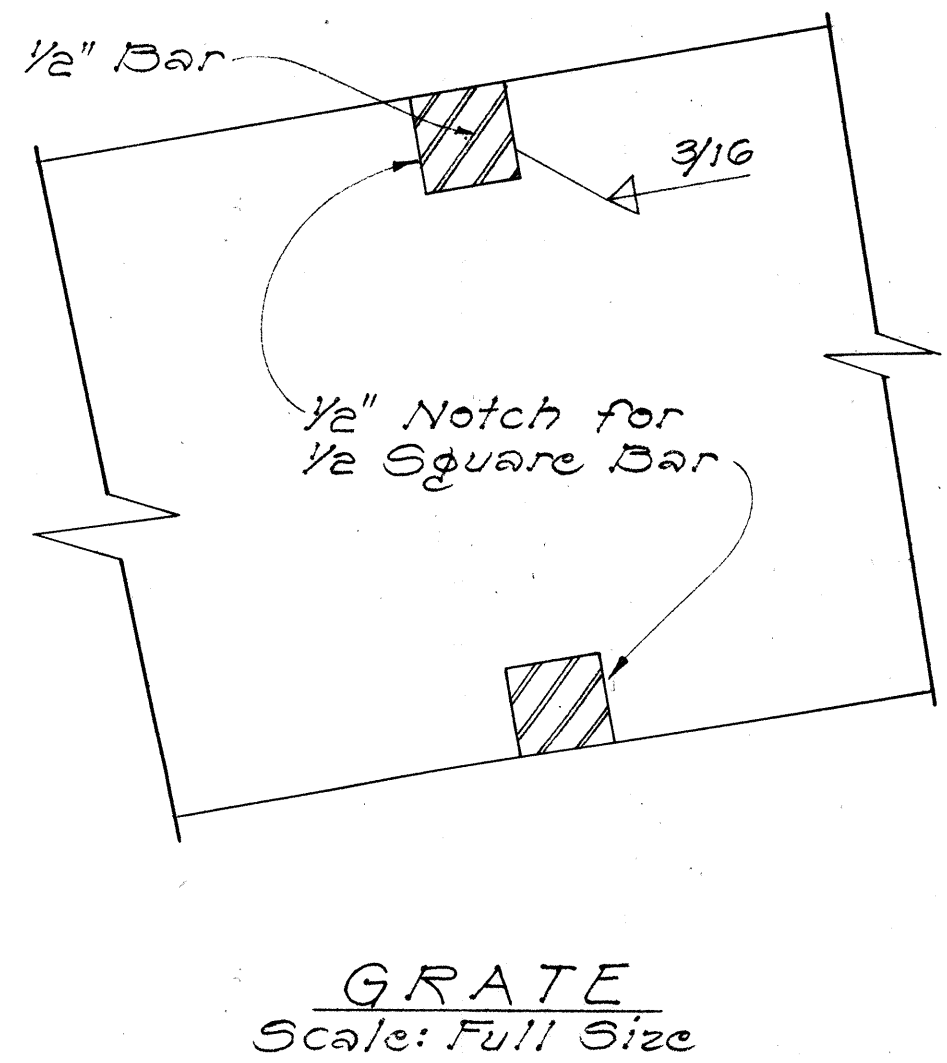
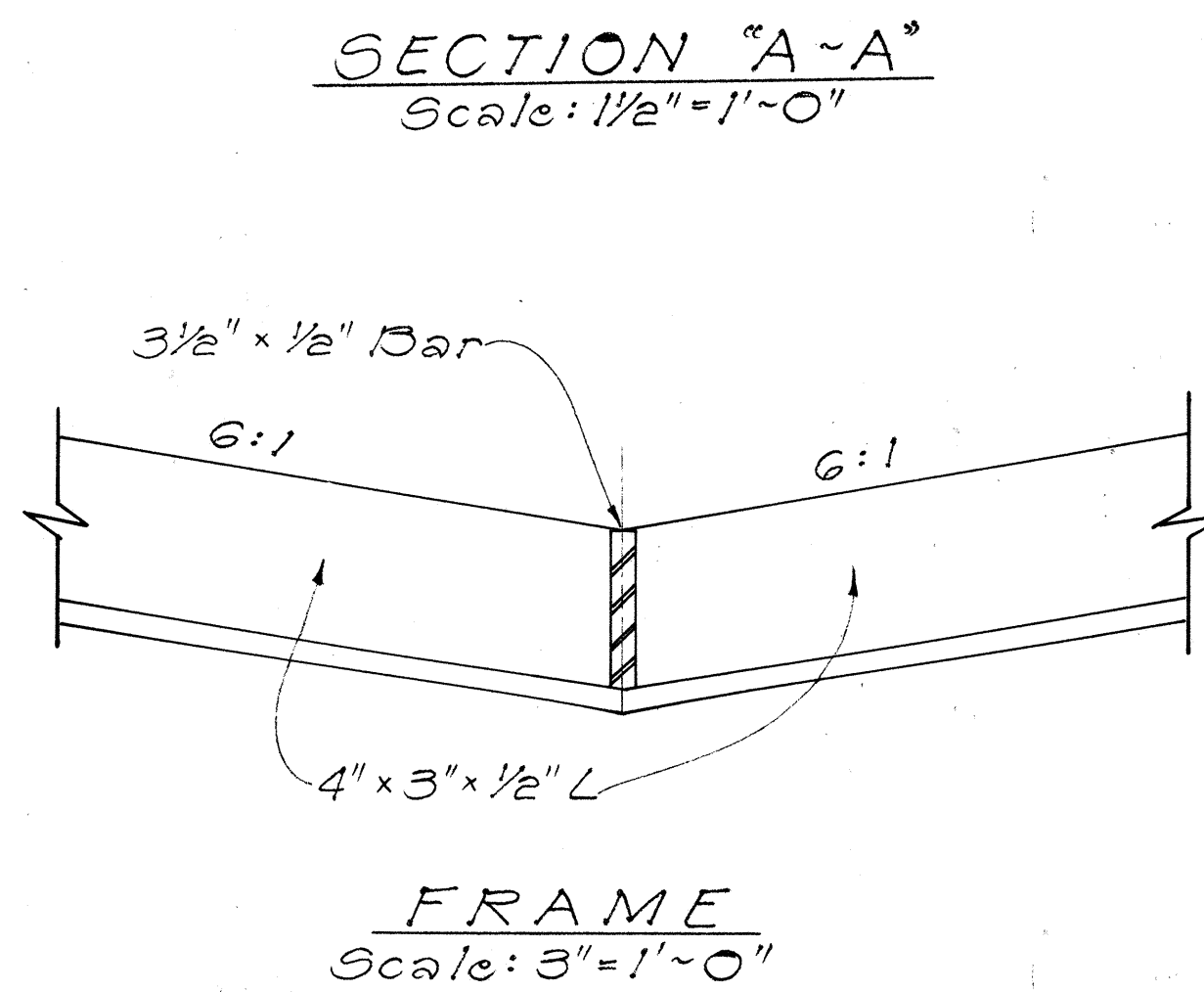
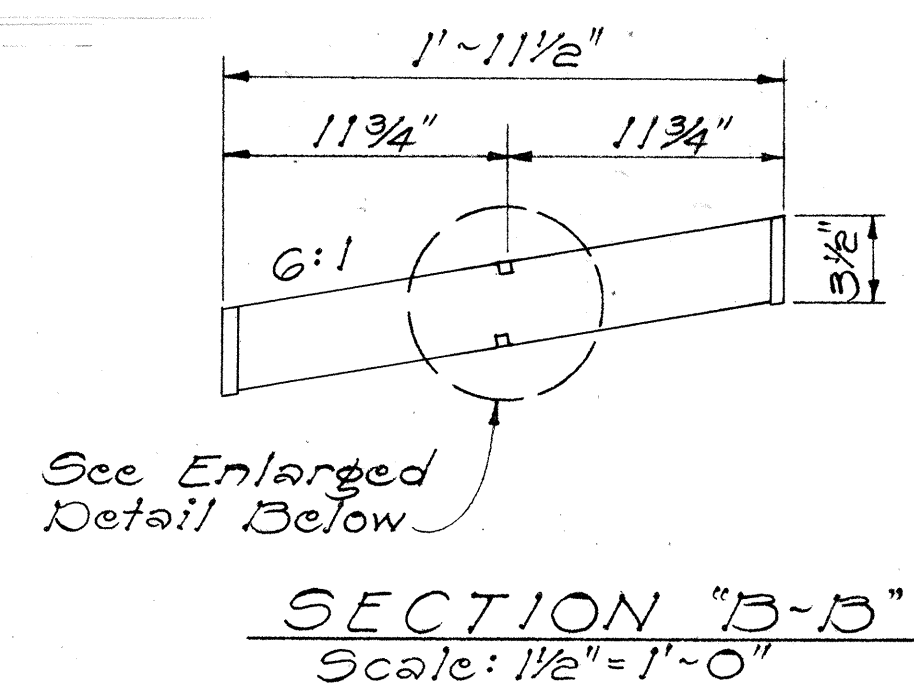
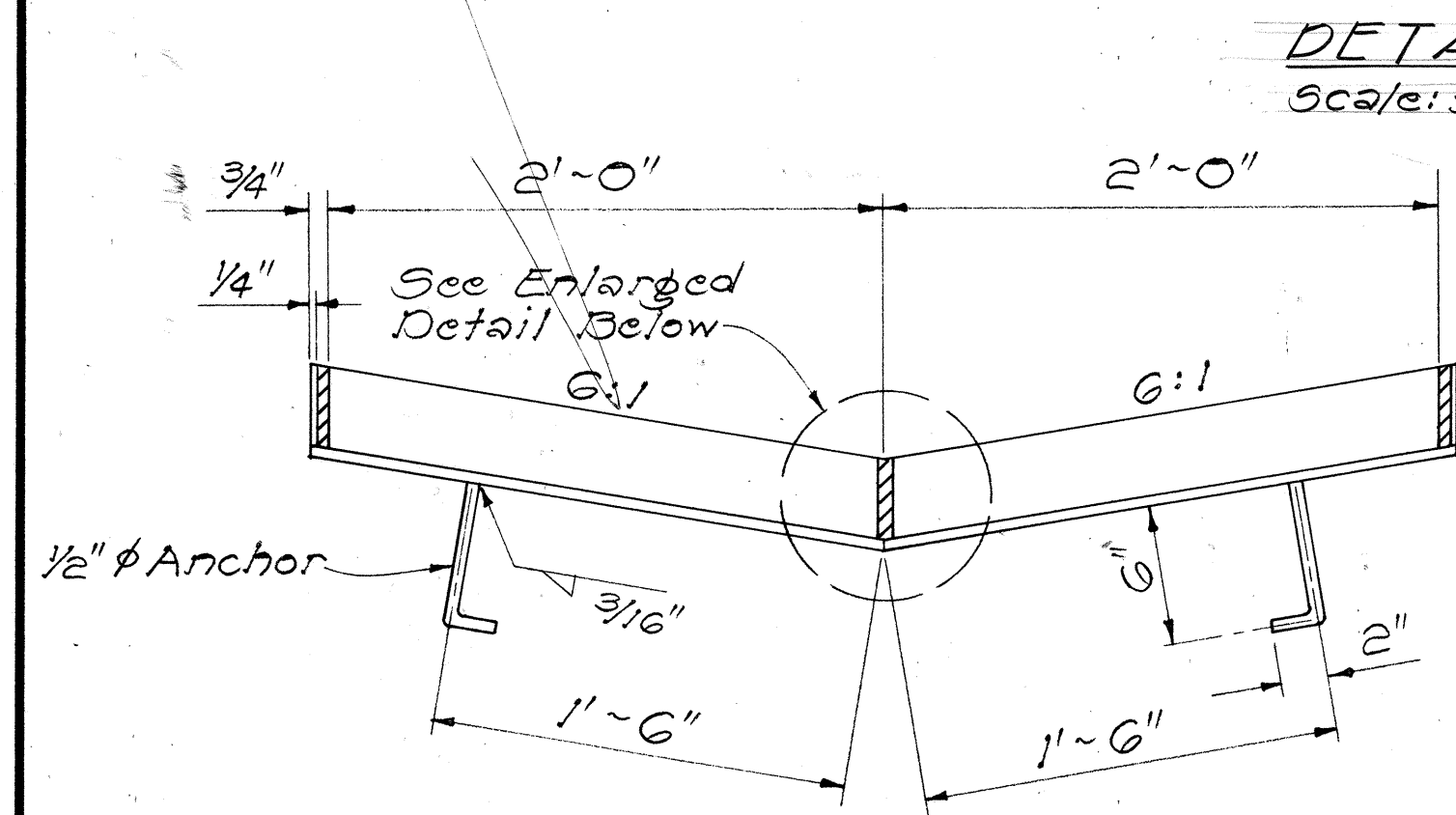
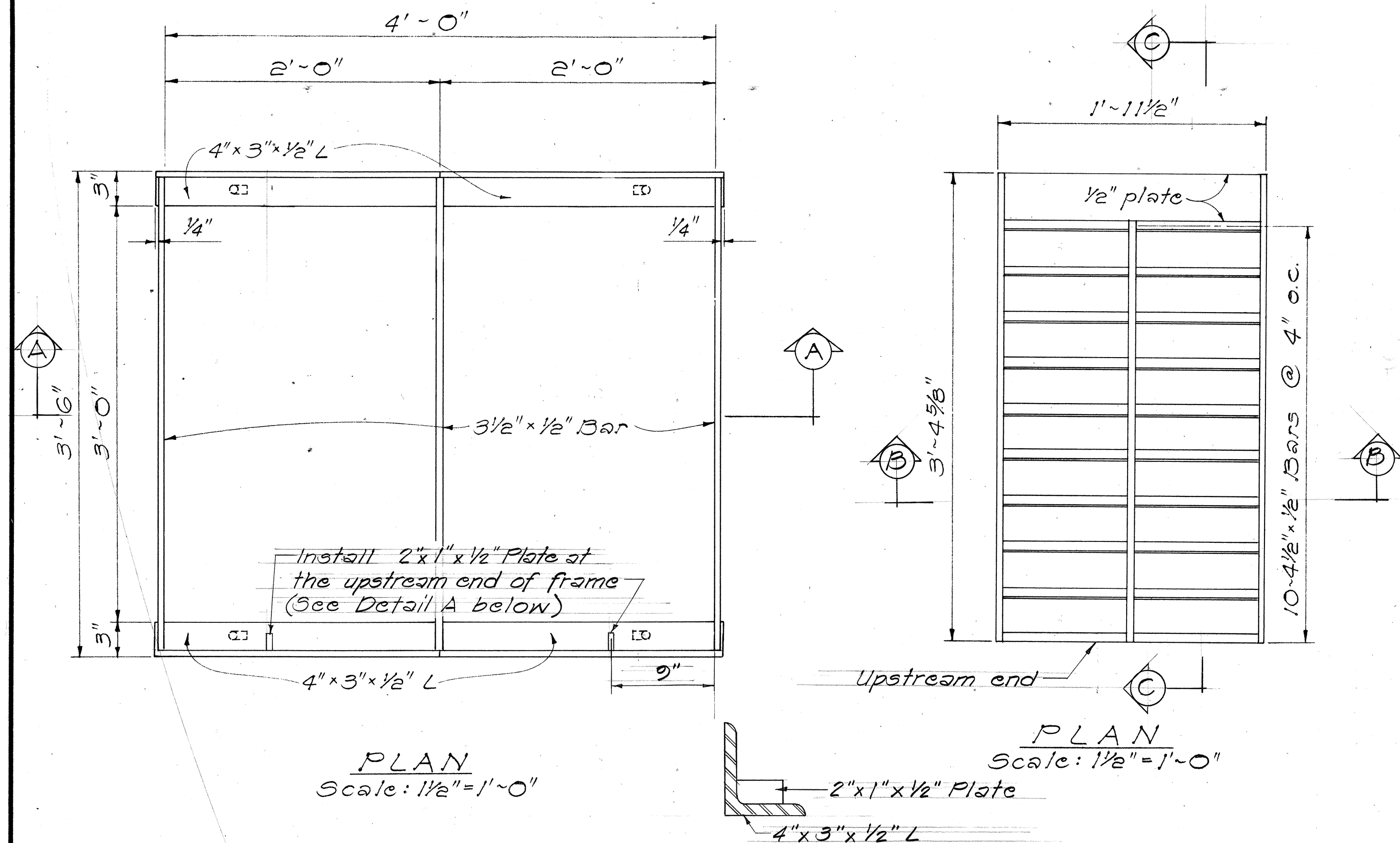
DRAINAGE DETAILS

HONOAPILANI HIGHWAY
Kahala to Aiealo
F.A. Proj. No. F-030-1(13)

Scale: Not to Scale Date: Sept., 1977

SHEET NO. 20 OF 31 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(12)	1977	62	174



GENERAL NOTES

- Grates and Frames shall be hot dip galvanized after fabrication, see specification.
- All welds 3/8" unless otherwise noted.
- The Frame and Grate materials shall conform to the specifications of ASTM Designation Structural Steel A283, Grade D and the Standard Specifications.
- Culvert shall leave Drop Intake from any position and any direction indicated by plans or ordered by the Engineer. Culverts may both enter and leave Drop Intake so that Drop Intake will act as manhole.
- Manhole Rungs (16" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (12 inches from the bottom) is required if "H" is 4 feet 6 inches or less. Manhole Rungs may be placed at any location as ordered by the Engineer.
- Added reinforcing for Drop Intake when "H" exceeds 6'-0".
- Provide #5 Dowels only when "H" is less than 6'-0".
- Bituminous Gutter Type 7 (G1G1G) Top of concrete wall for Drop Intake shall be 2" below top of steel frame for grates. Concrete Gutter Type 2 (G1G1G) Top of concrete wall for Drop Intake shall be flush with top of steel frame for grates and shall be sloped accordingly.

Install curb when Drop Intake is used to drain Top of Fill Gutters. Provide Gutter Transitions of 25 ft. (entering and leaving D.I.)

* For Minimum size box 3'-0" use 8" and eliminate reinforcing steel shown in the top portion.

** For Culverts larger than 30", the minimum dimension shall be 10'.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

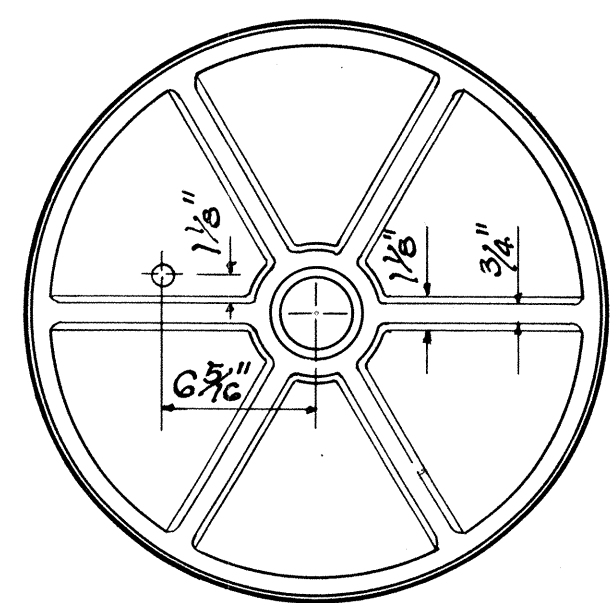
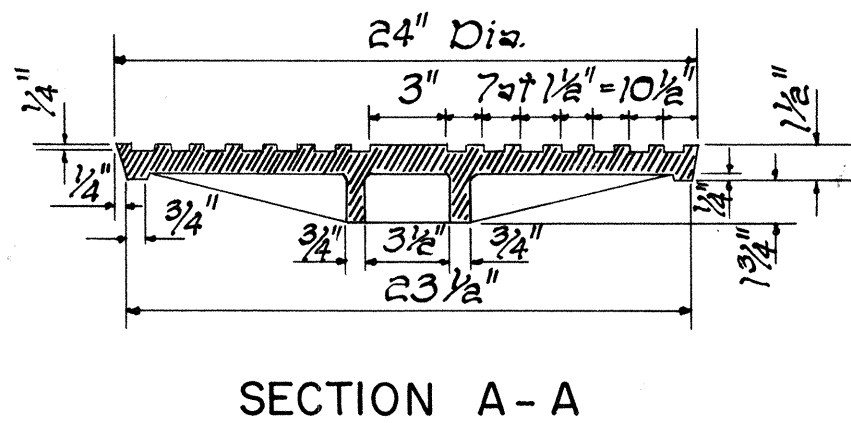
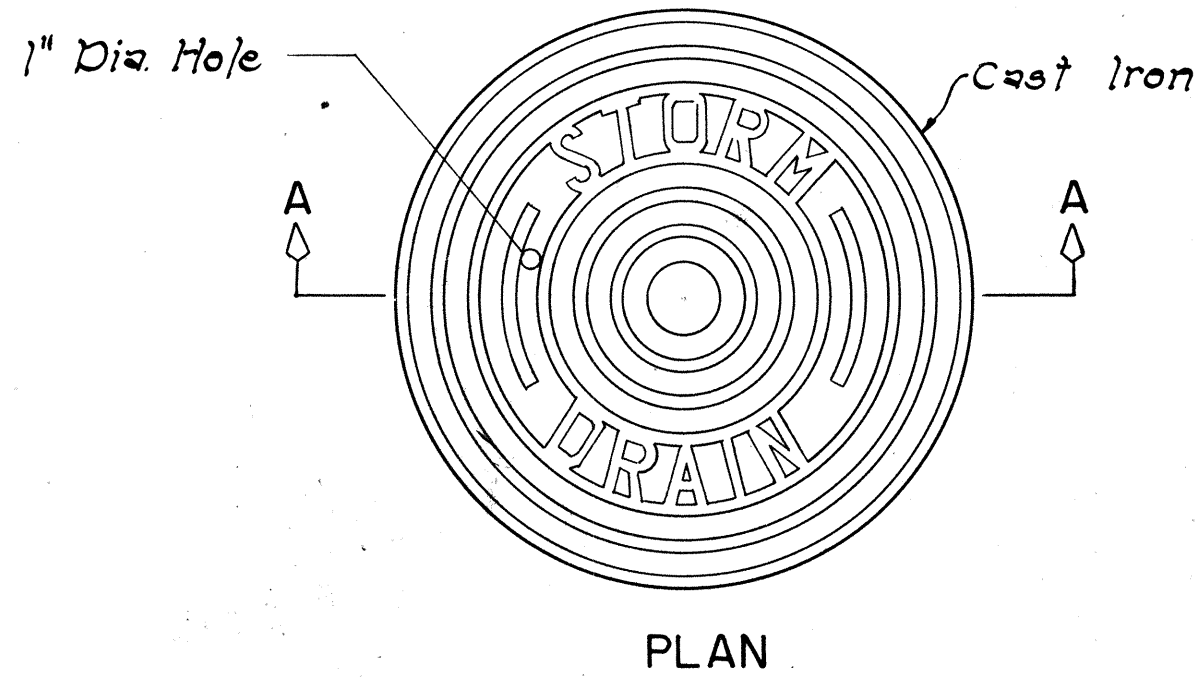
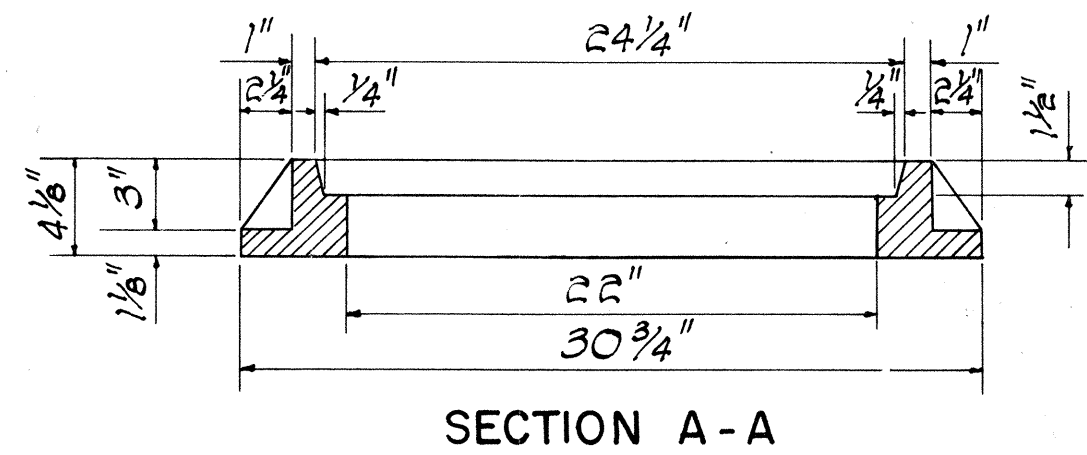
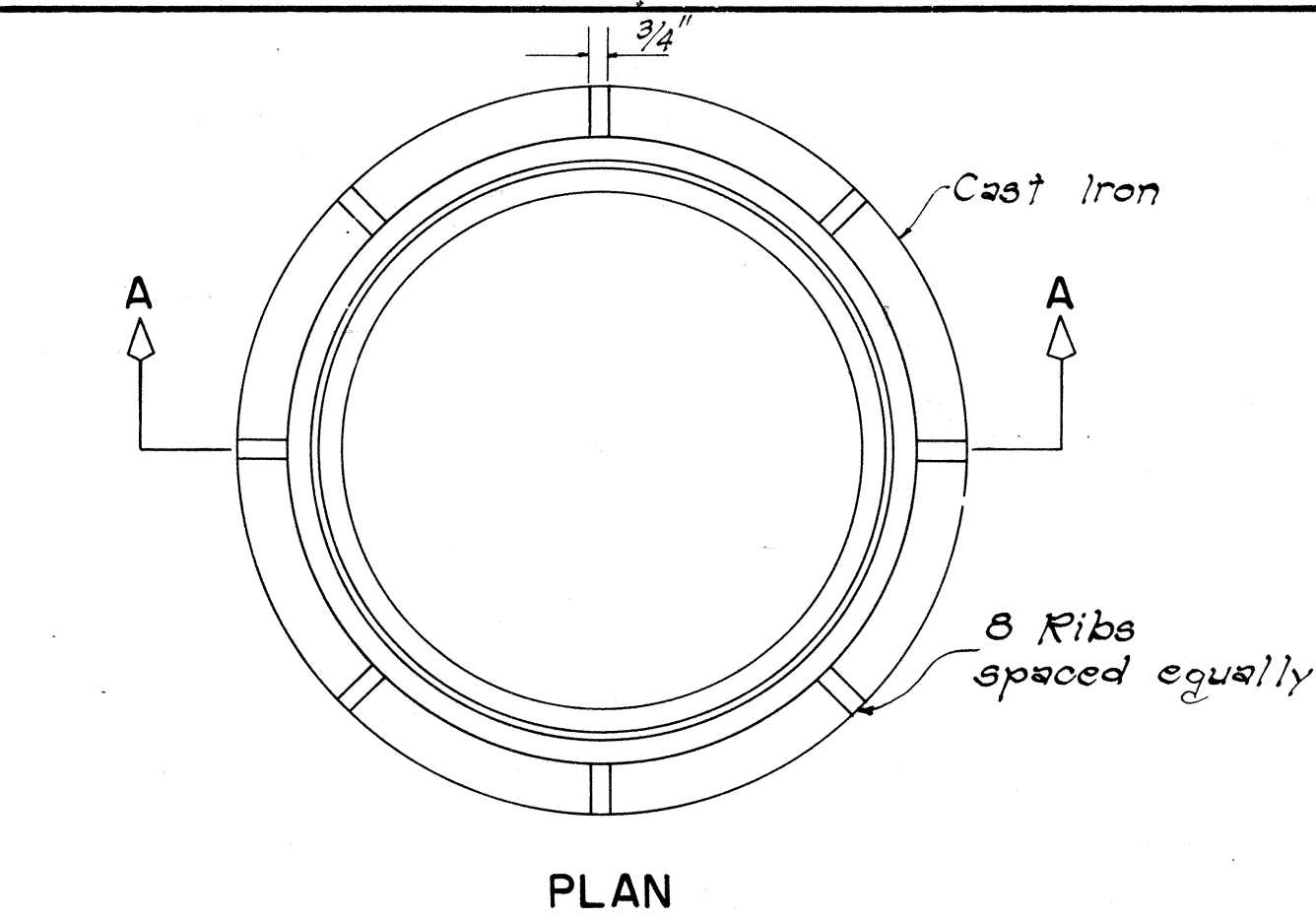
HONOAPILANI HIGHWAY
Kahala to Aiea
F.A. Proj. No. F-030-1(13)

Scale: As Shown Date: Sept, 1977
SHEET No. 270 OF 31 SHEETS

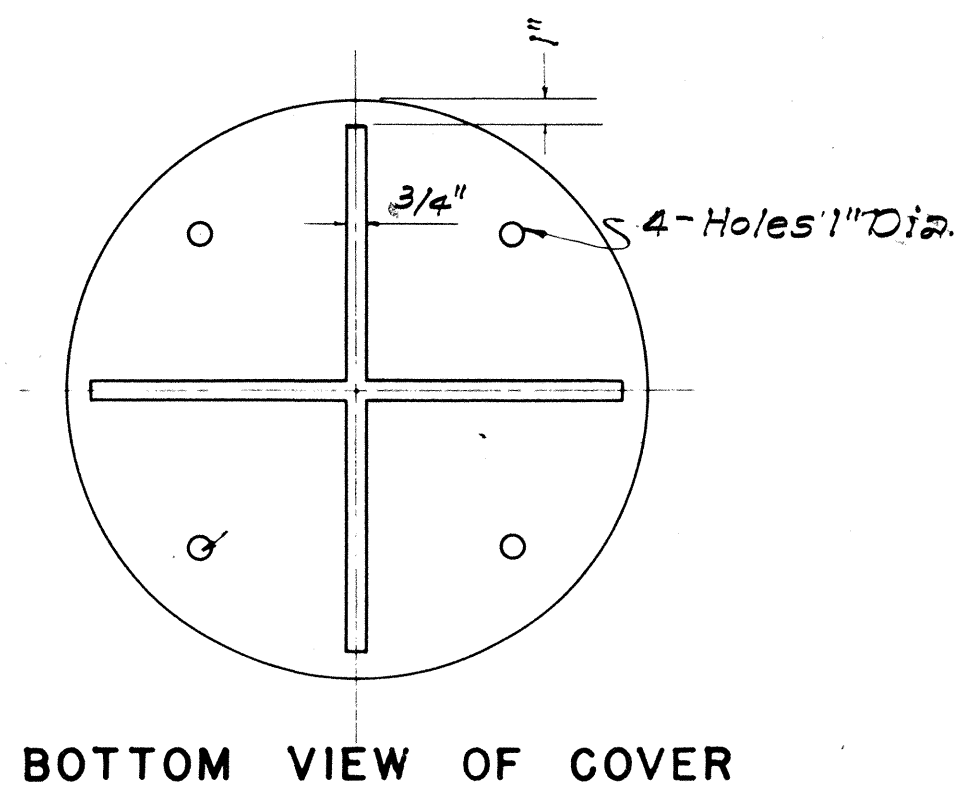
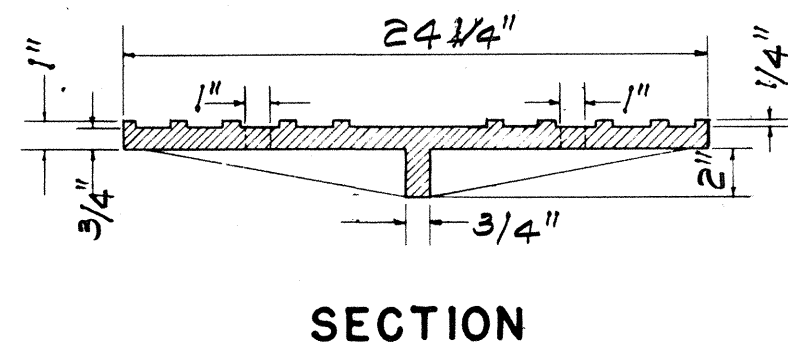
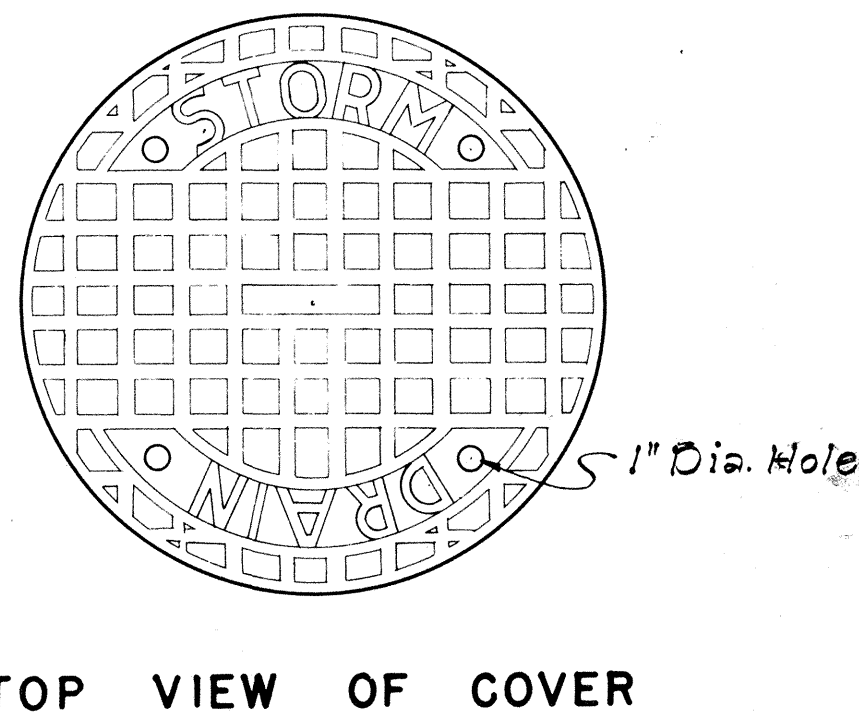
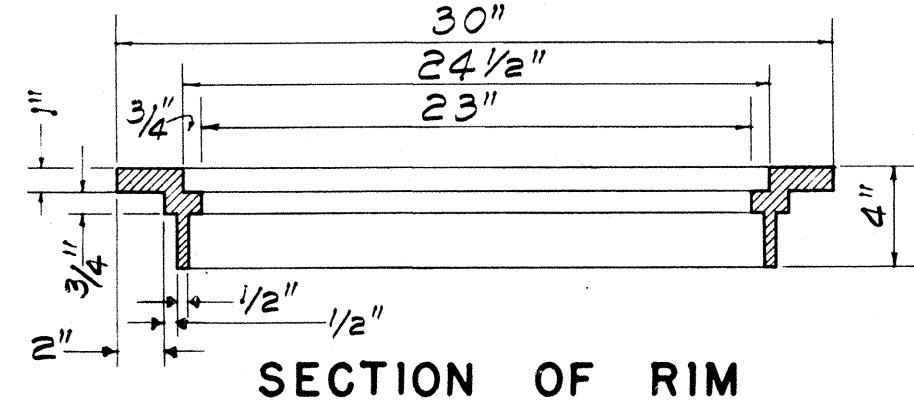
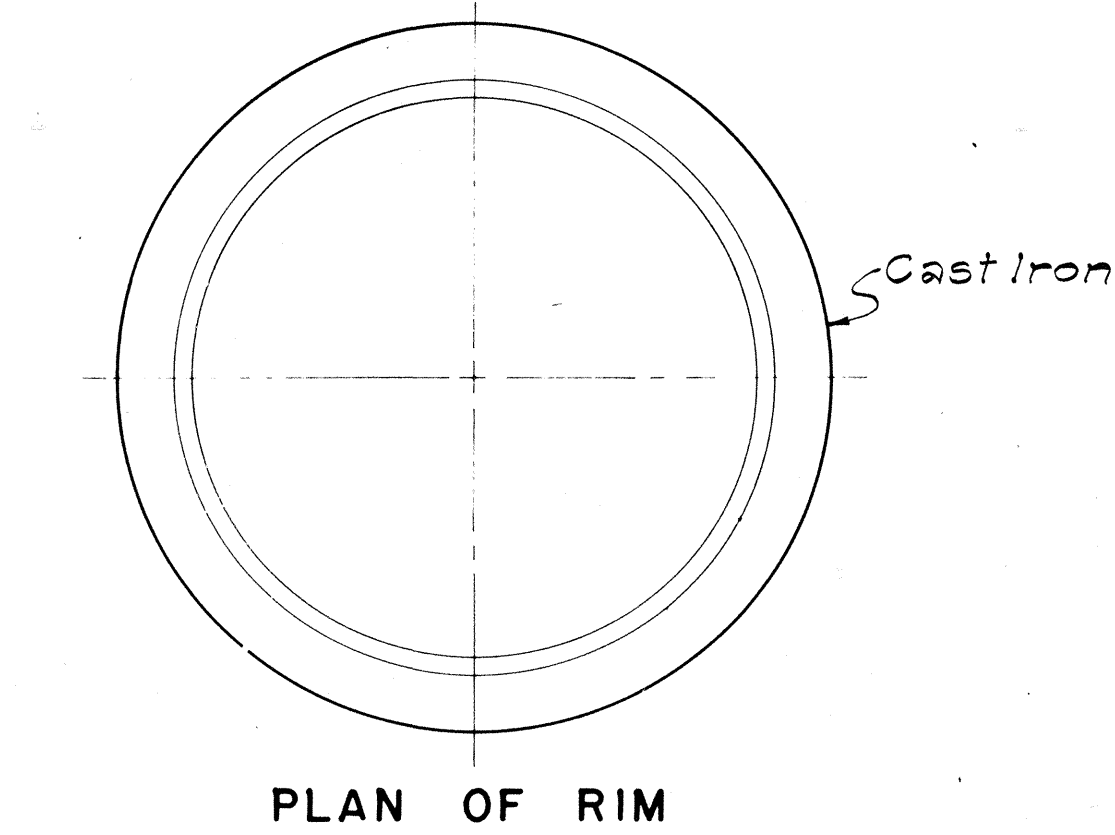
DETAILS OF TYPE G1G14-45° FRAME AND GRATES AND DROP INTAKE Scale: As Shown

SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
QUANTITIES BY	
CHECKED BY	
NO.	

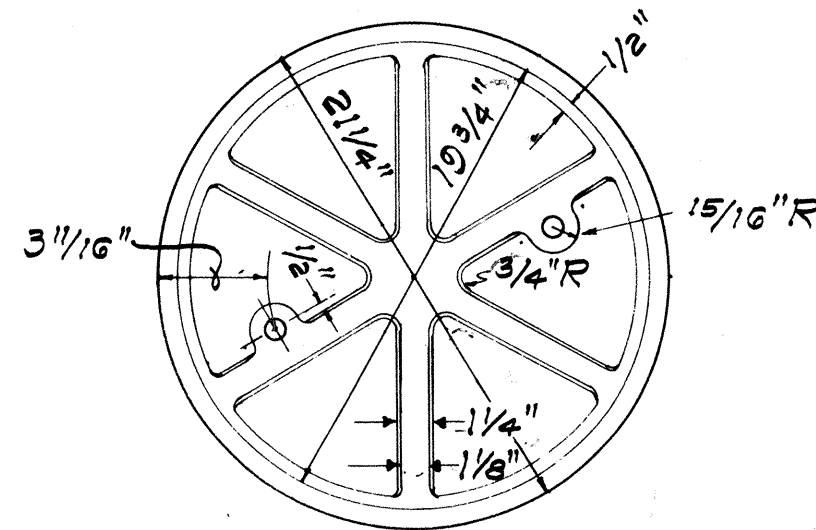
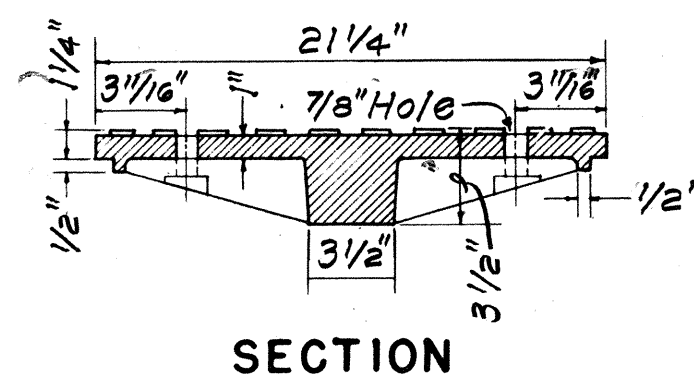
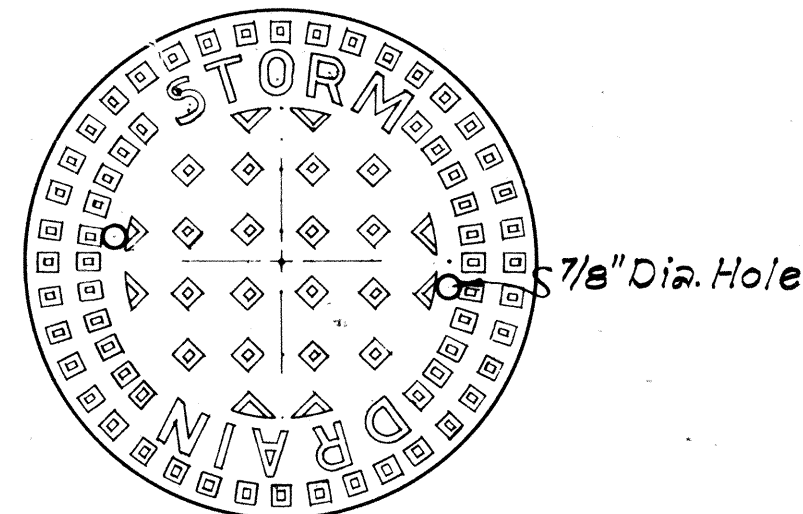
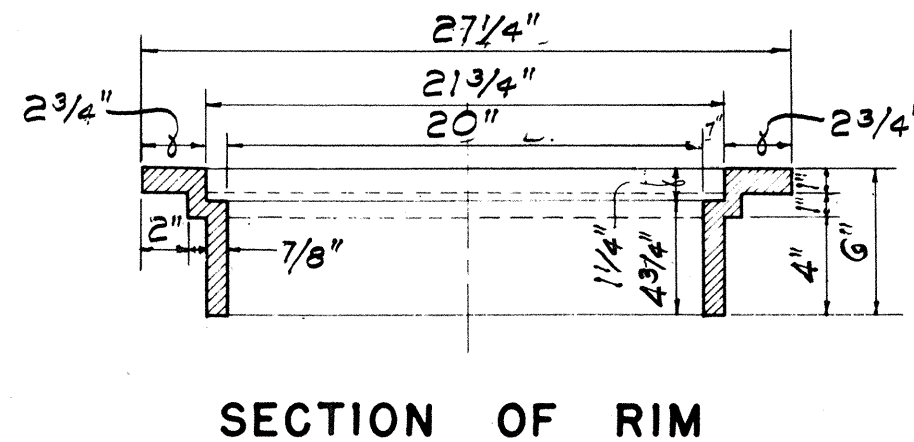
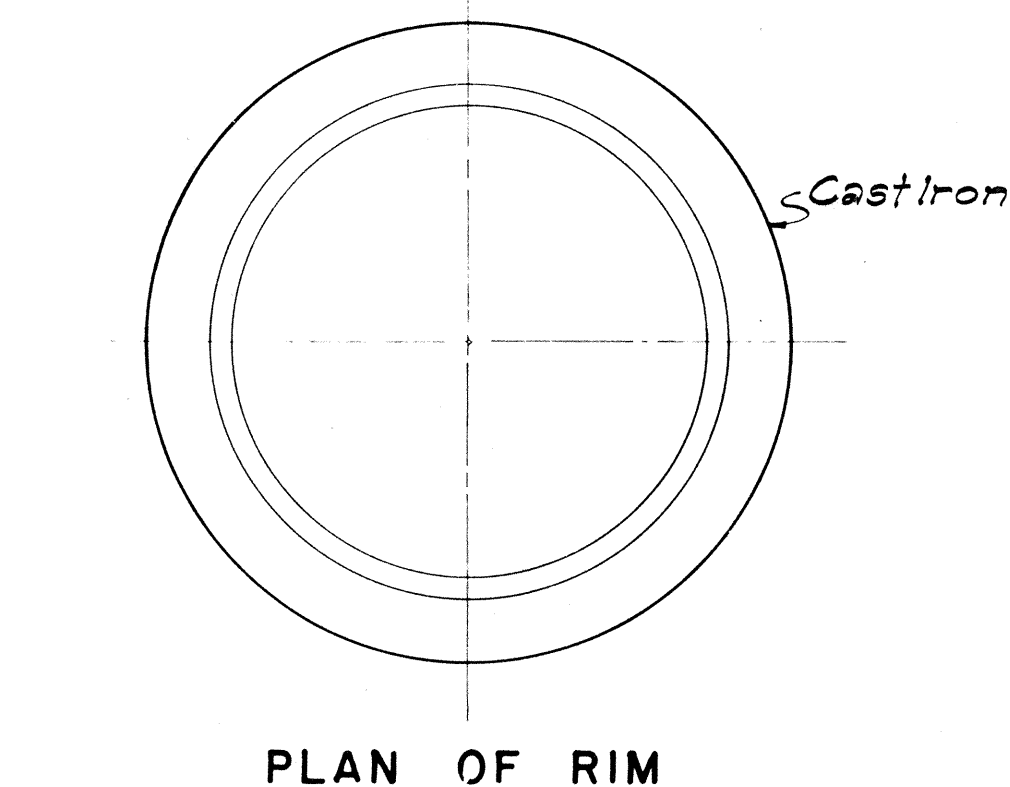
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F030-1(13)	1978	64	174



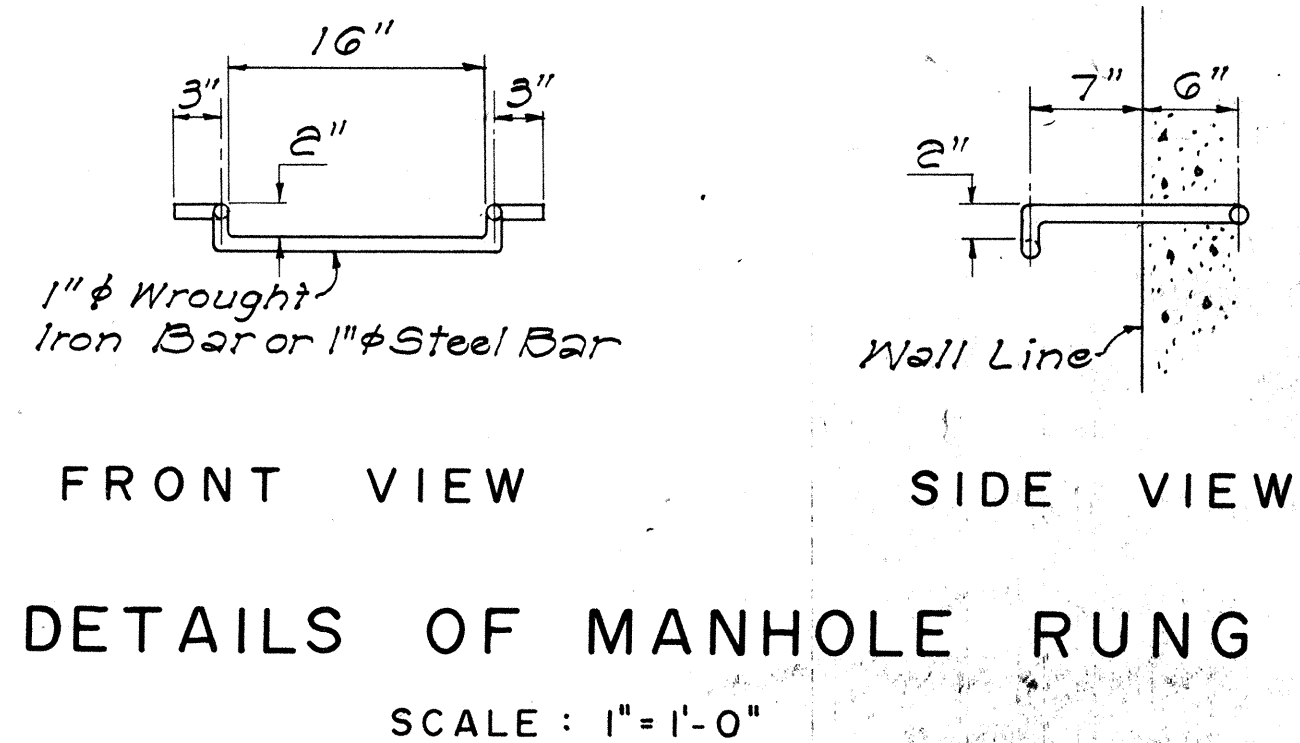
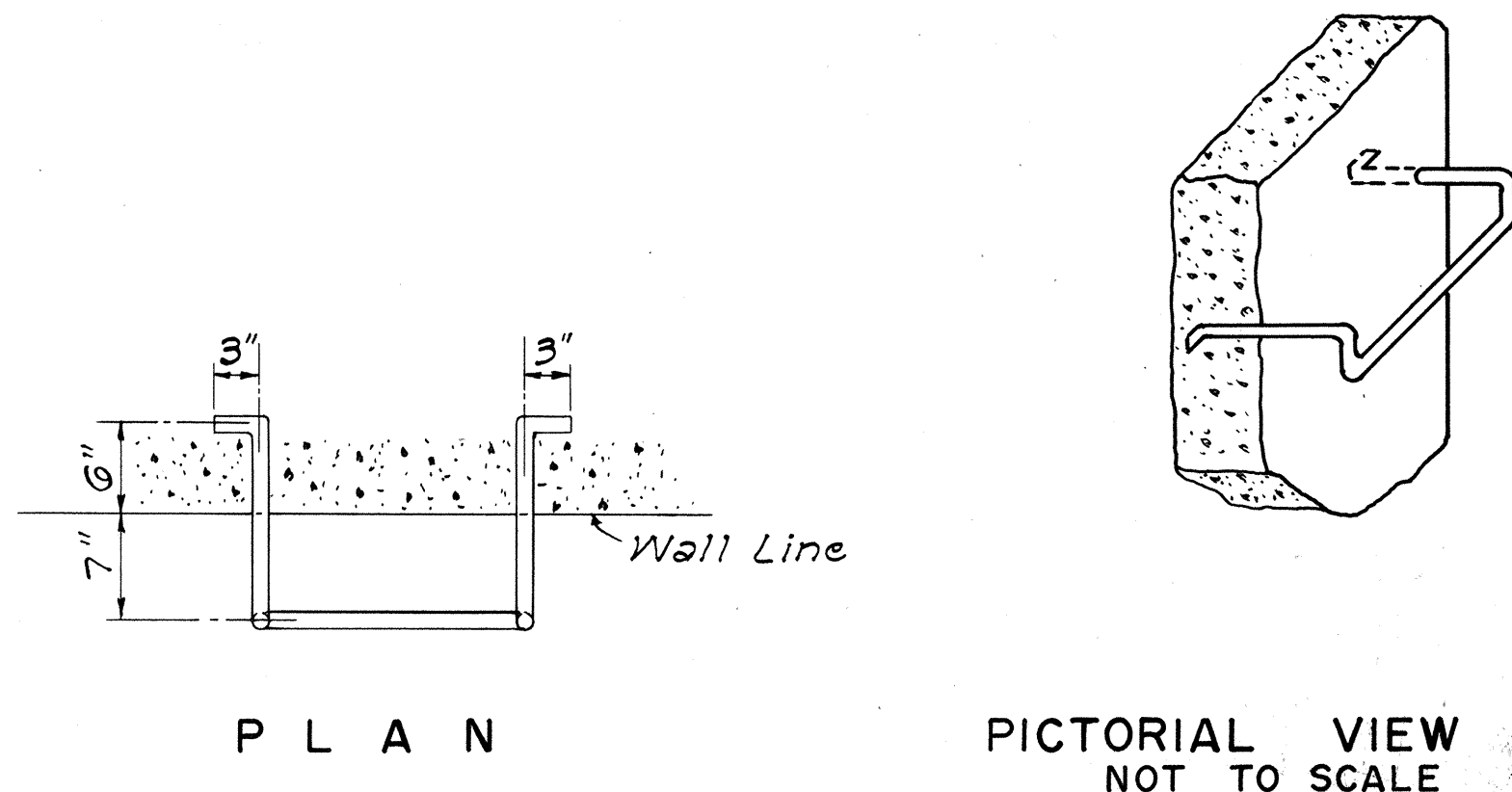
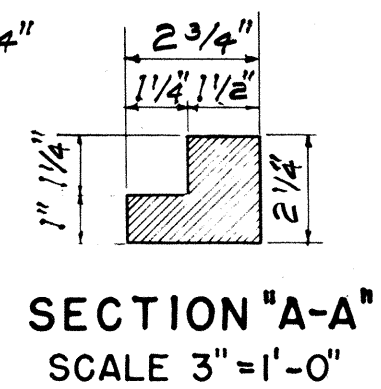
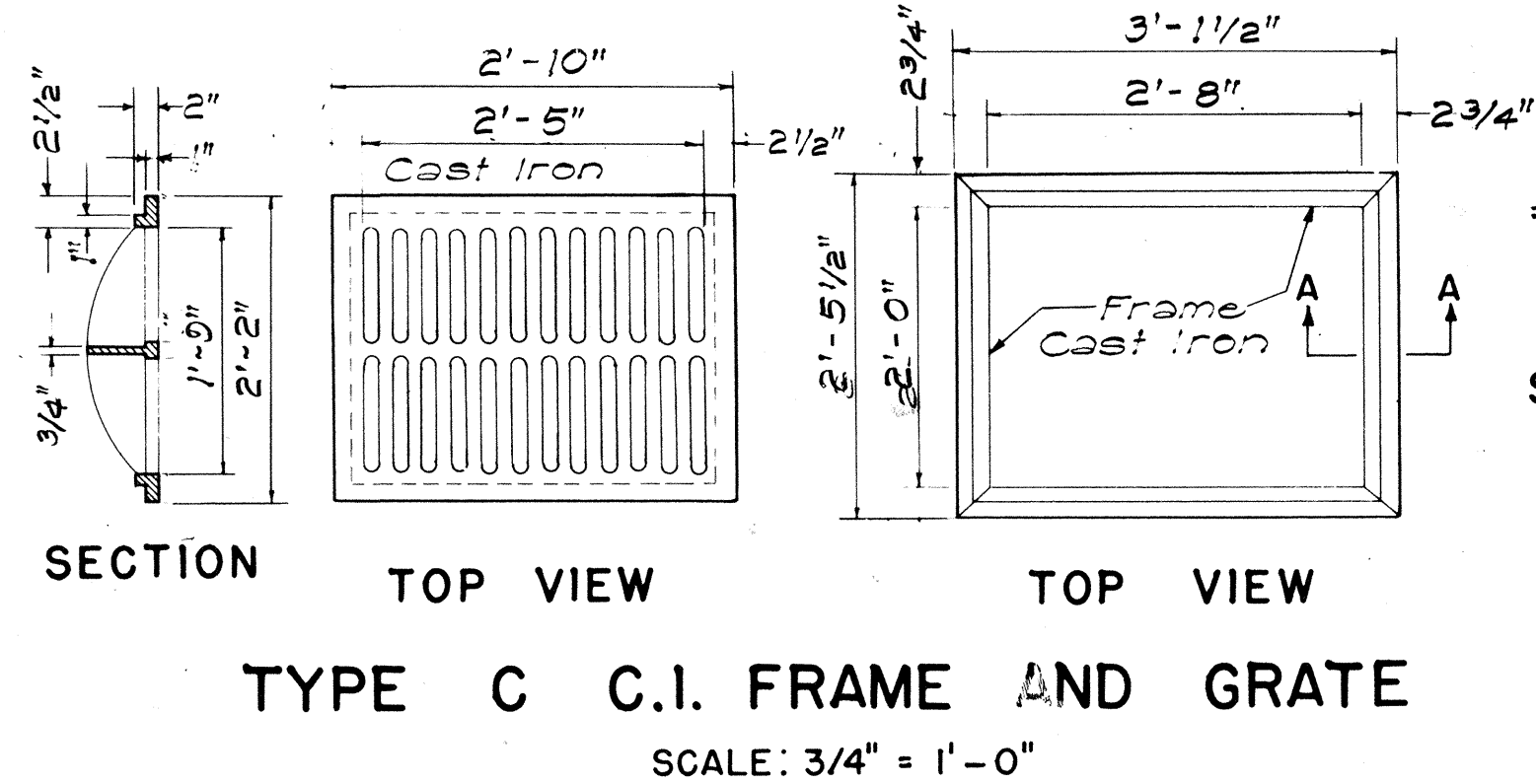
DETAILS OF TYPE "P"
CAST IRON FRAME AND COVER
SCALE: 1-1/2" = 1'-0"



DETAILS OF TYPE "B"
CAST IRON FRAME AND COVER
SCALE: 1-1/2" = 1'-0"



DETAILS OF TYPE "A"
CAST IRON FRAME AND COVER
SCALE: 1-1/2" = 1'-0"



DETAILS OF MANHOLE RUNG
SCALE: 1" = 1'-0"

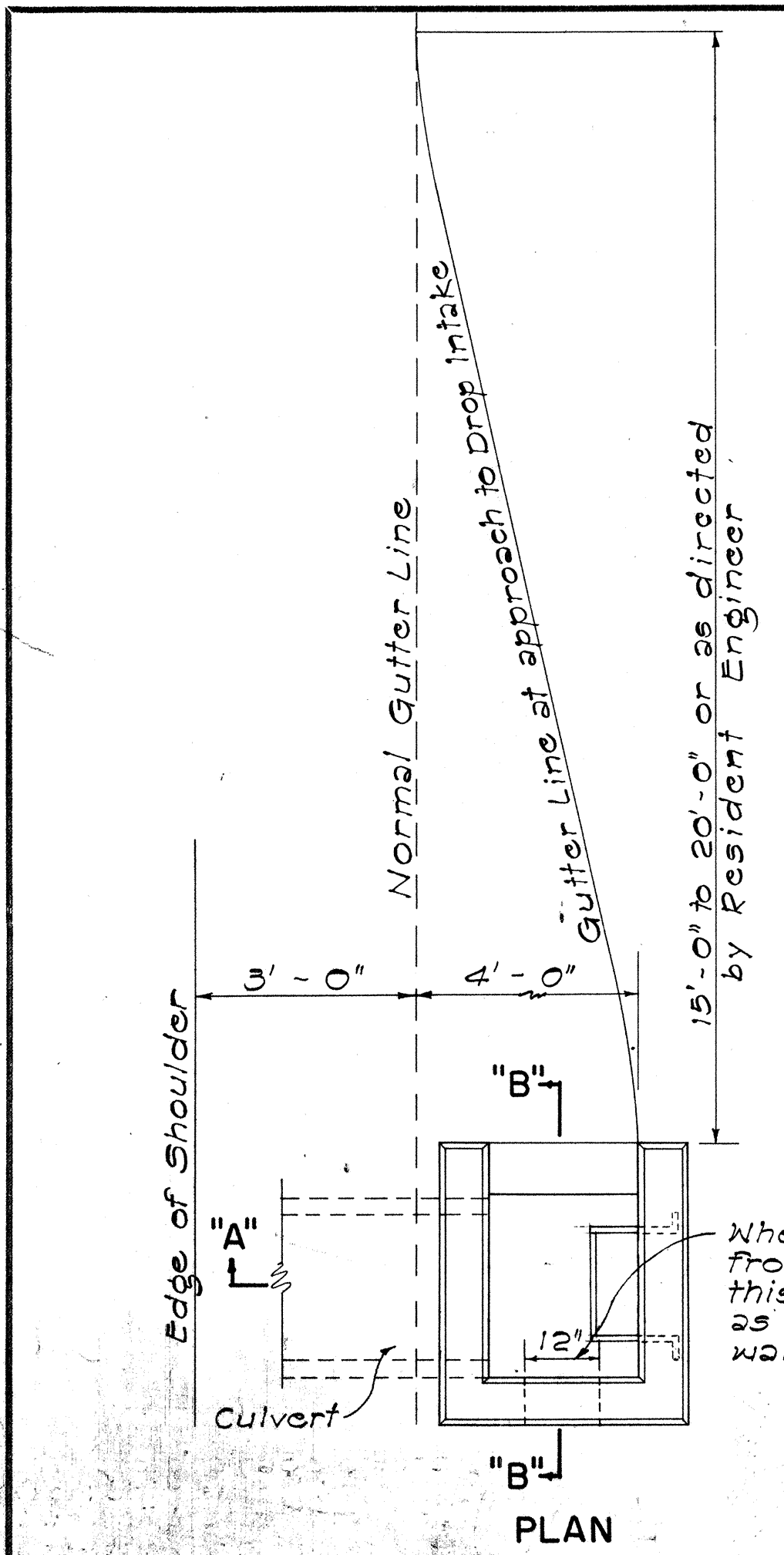
APPROVAL RECOMMENDED:	12-17-69
HYDRAULIC DESIGN ENGINEER	DATE
APPROVED:	12-17-69
ASSISTANT CHIEF, ENGINEERING	DATE

NO.	REVISION	APPROVED BY	DATE
1.	Detail of Type "P" Cast Iron Frame and Cover	H.T.	1-6-11
2.	Details of Manhole Rungs to conform to OSHA.	H.T.	1-21-15
3.	Option for Manhole Rungs	H.T.	1-18-16

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
STANDARD DETAILS CATCH BASIN AND MANHOLE CASTINGS
Scale: As Noted
Date: July, 1969
SHEET NO. 64 OF 31 SHEETS

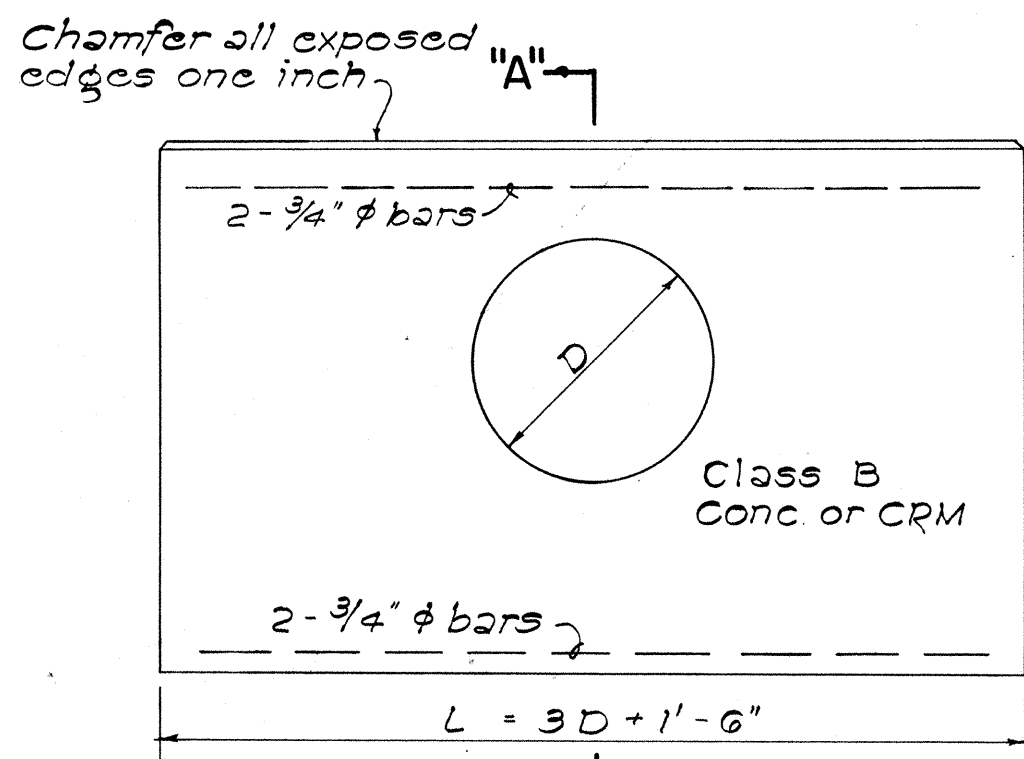
DESIGNED BY: L. Calisiro
DRAWN BY: L. Calisiro
CHECKED BY: L. Calisiro
DATE: 12-17-69
QUANTITIES BY: L. Calisiro
NOTE BOOK: L. Calisiro
NO. 64

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F030-1(13)	1978	65	174

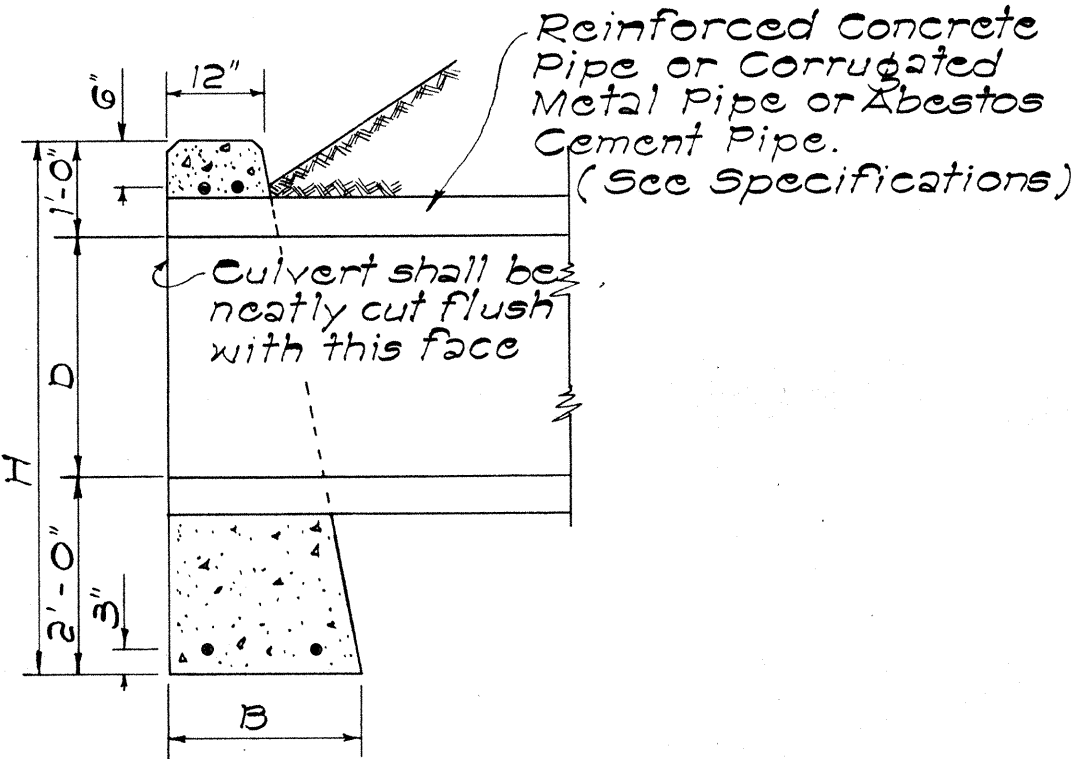


DATA - CONC. DROP INTAKE					Where Variable Equals
D'	D	L-D'+6"	S	Cu. Yds.	
23"	18"	2'-5"	8"	1.41	4'-6"
30"	24"	3'-0"	8"	1.72	5'-0"
37"	30"	3'-7"	9"	2.32	5'-6"
44"	36"	4'-2"	9"	2.73	6'-0"
51"	42"	4'-9"	10"	3.54	6'-6"
58"	48"	5'-4"	10"	4.01	7'-0"

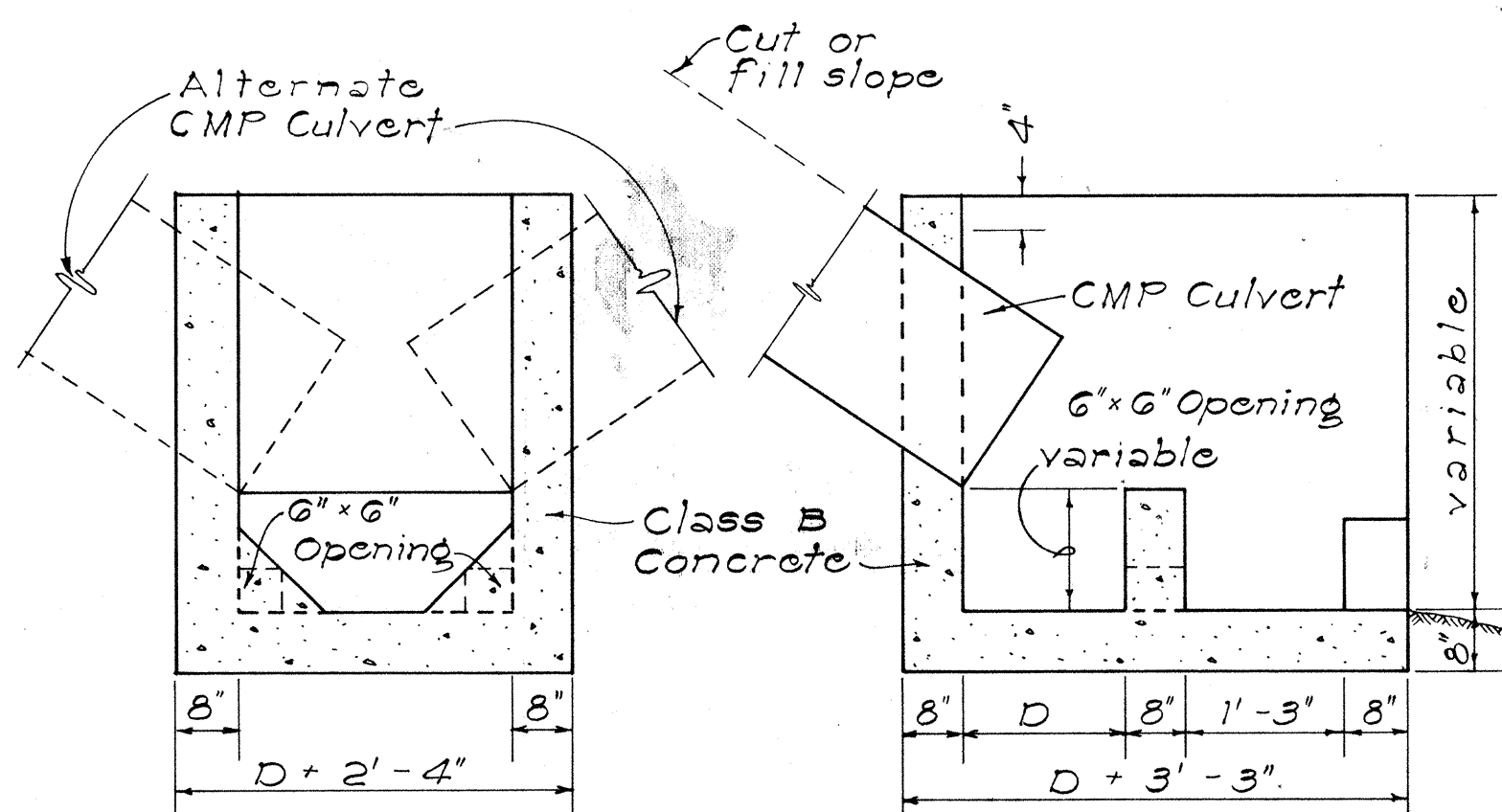
Note: Dimension "X" is assumed as 2'-4" in figuring the above quantities.



ELEVATION



SECTION "A-A"



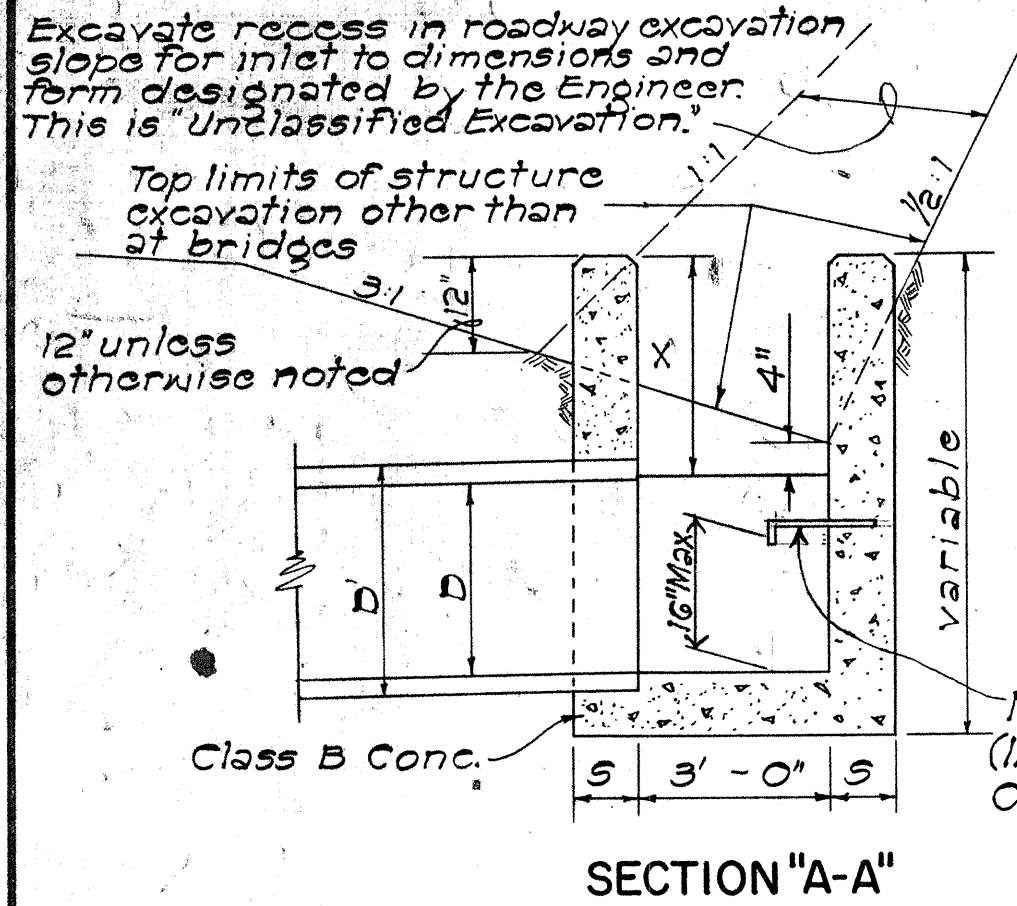
SECTION "C-C"

SECTION "D-D"

DATA FOR CONC. HEADWALL					Cl. B CONC. For B.C.P.	Cl. B CONC. For C.M.P.	Steel For One Headwall		
D	B	L	H		Cu. Yd.	Cu. Yd.	No. of Bars	Size	Length
18"	1'-6"	6'-0"	4'-6"		1.12	1.17	4	3/4"	5'-6"
24"	1'-6"	7'-6"	5'-0"		1.52	1.60	4	3/4"	7'-0"
30"	2'-0"	9'-0"	5'-6"		2.32	2.40	4	3/4"	8'-6"
36"	2'-0"	10'-6"	6'-0"		2.94	3.13	4	3/4"	10'-0"
42"	2'-6"	12'-0"	6'-6"		4.19	4.47	4	3/4"	11'-6"
48"	2'-6"	13'-6"	7'-0"		5.01	5.36	4	3/4"	13'-0"

DATA - MASONRY HEADWALL					CRM FOR R.C.P.	CRM FOR C.M.P.
D	B	L	H		Cu. Yd.	Cu. Yd.
18"	1'-9"	6'-0"	4'-6"		1.24	1.29
24"	2'-0"	7'-6"	5'-0"		1.83	1.92
30"	2'-3"	9'-0"	5'-6"		2.56	2.70
36"	2'-6"	10'-6"	6'-0"		3.43	3.66

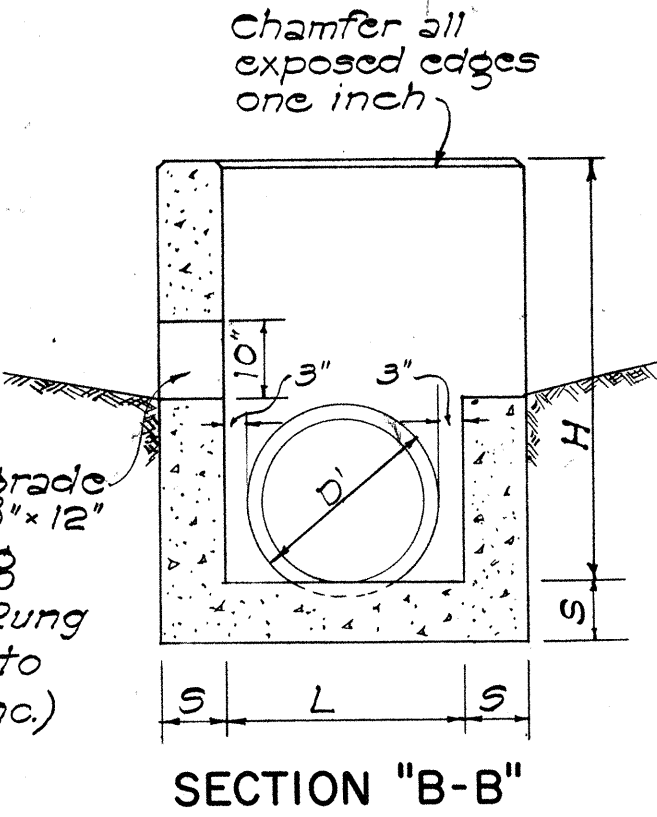
DETAIL OF HEADWALL
Scale: 1/2" = 1'-0"



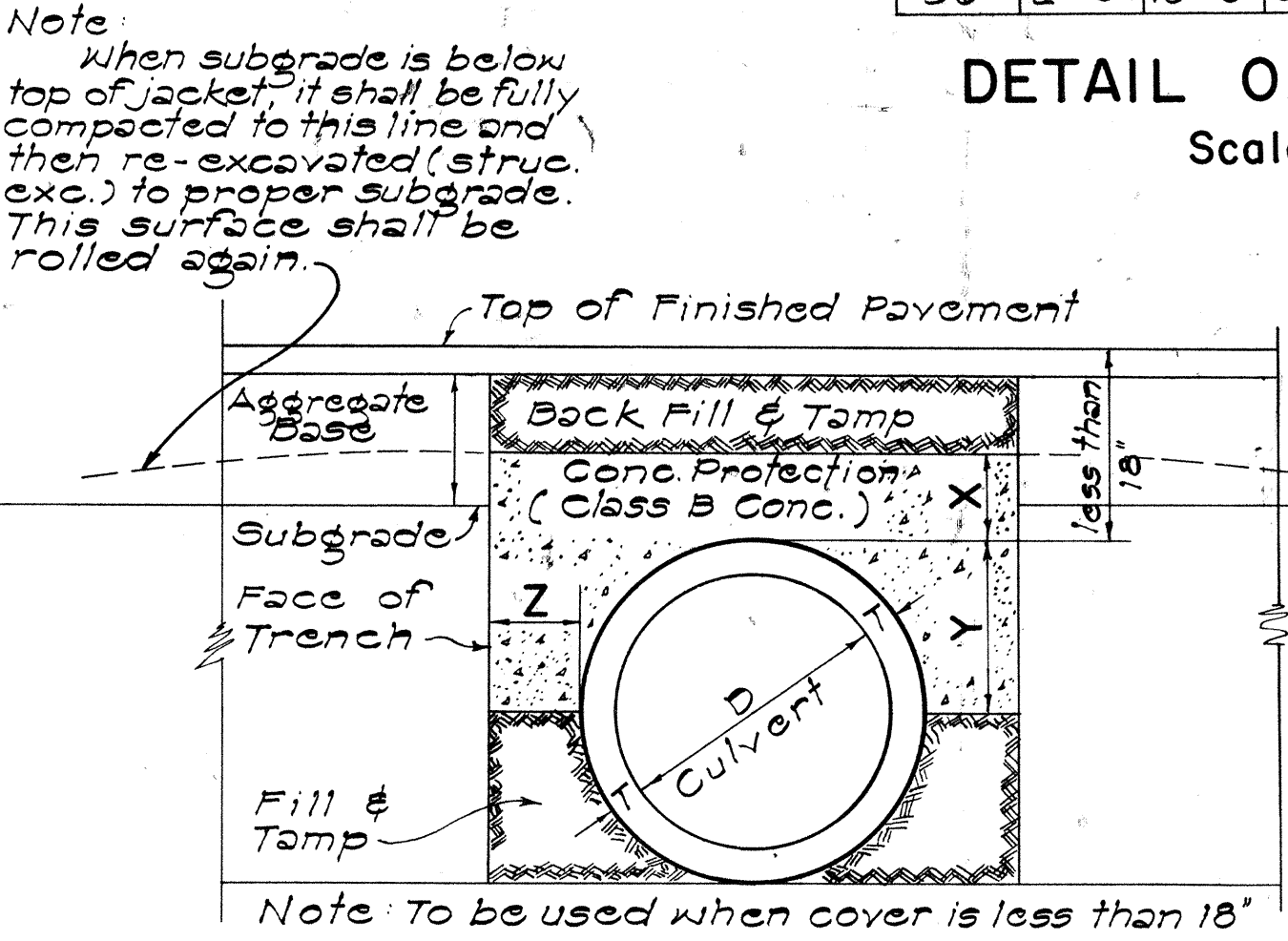
DETAIL OF CONCRETE DROP INTAKE
Scale: 1/2" = 1'-0"

GENERAL NOTES

- Culvert shall enter and leave Drop Intake from any position and in the direction indicated by the plans or ordered by the Engineer.
- D' shall be the maximum outside dimension of the culvert at the Drop Intake wall.
- Manhole Rungs (12" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (16 inches from the bottom) is required if "H" is 4 feet 6 inches or less. Manhole Rungs may be placed at any location as ordered by the Engineer.

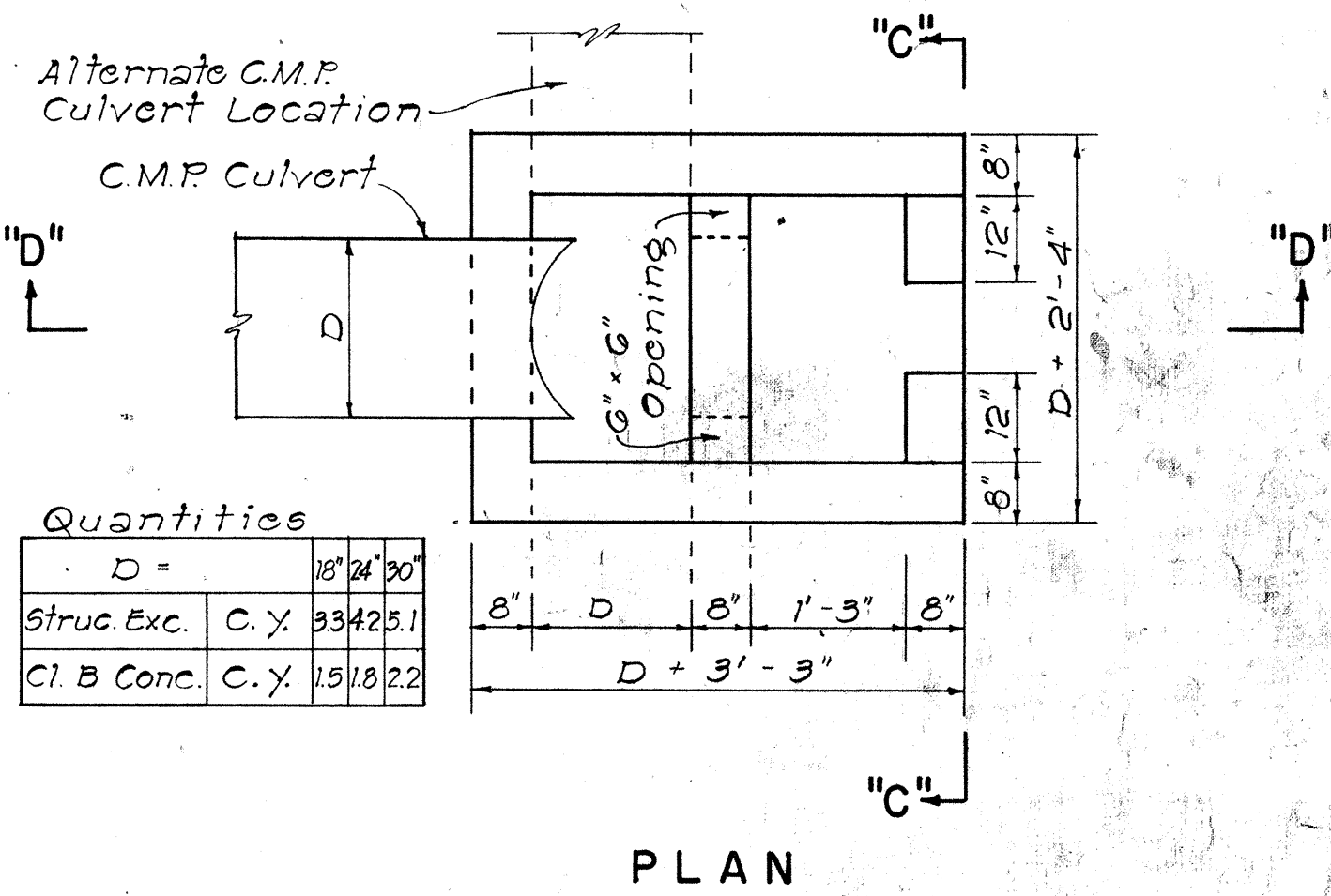


SECTION "B-B"



DATA FOR CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18" D.	2D + T	Z must be from pipe to face of trench
7" for 24" D		Minimum = X
8" for 30" D		Maximum pay quantity will be Z = 12"
9" for 36" D		
10" for 42" D		
11" for 48" D		
12 for 54" D		

SECT. OF CULVERT WITH CONC. PROTECTION
Scale: 1" = 1'-0"



DETAILS OF CONC. DROP BOX AT
OUTLET OF CULVERT PIPE
NOT TO SCALE

APPROVAL	RECOMMENDED:	
	HYDRAULIC DESIGN ENGINEER	12-17-69 DATE
APPROVED:	ASSISTANT CHIEF, ENGINEERING	12-17-69 DATE

NO.	REVISION	APPROVED BY	DATE
1	Spacing on Manhole Rungs to conform to OSHA.	H.I.	1-21-78

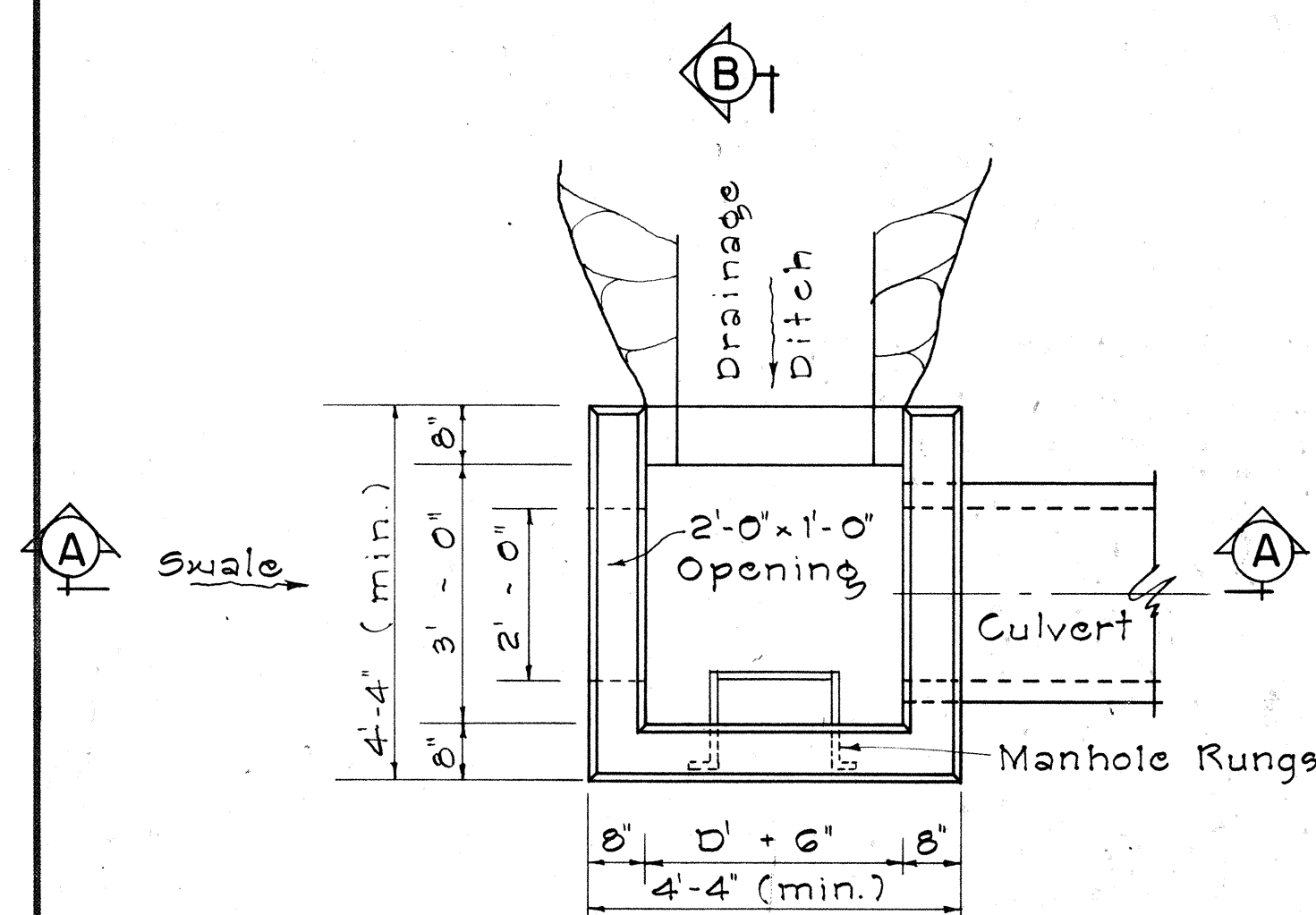
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
DROP INTAKE, HEADWALL &
CONCRETE PROTECTION

Scale: As Noted. Date: Aug. 1967
SHEET No. 307 OF 31 SHEETS DH. 10

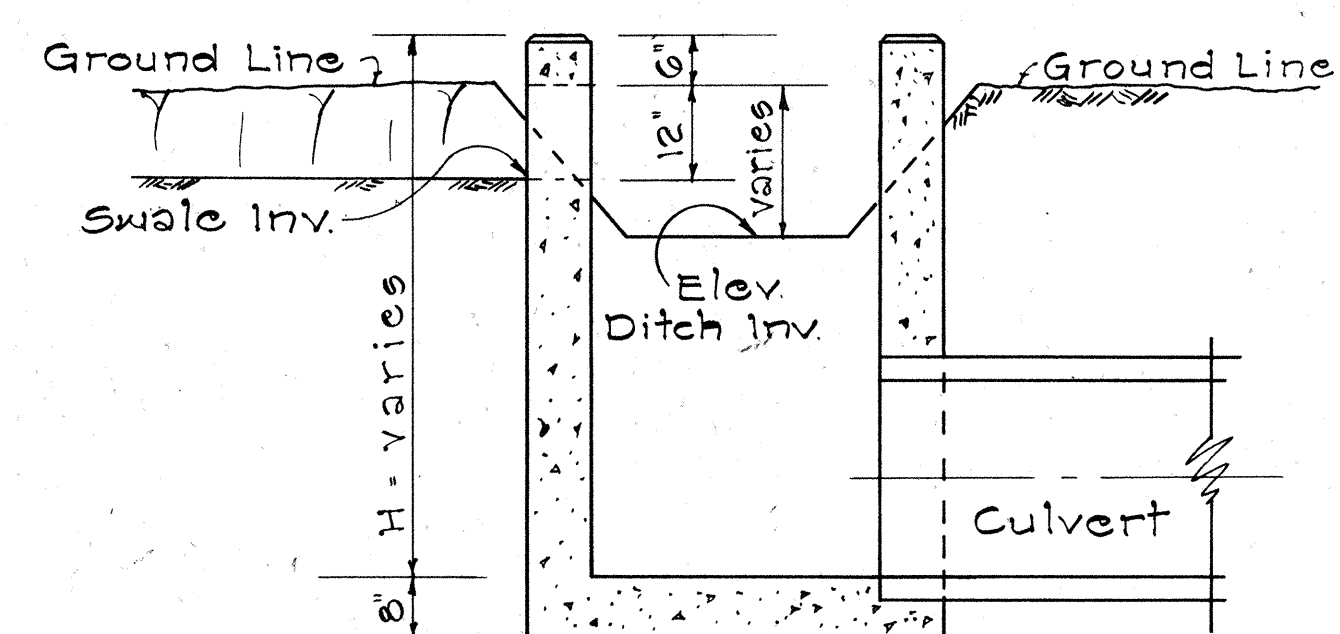
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F0304(13)	1978	66	174

GENERAL NOTES

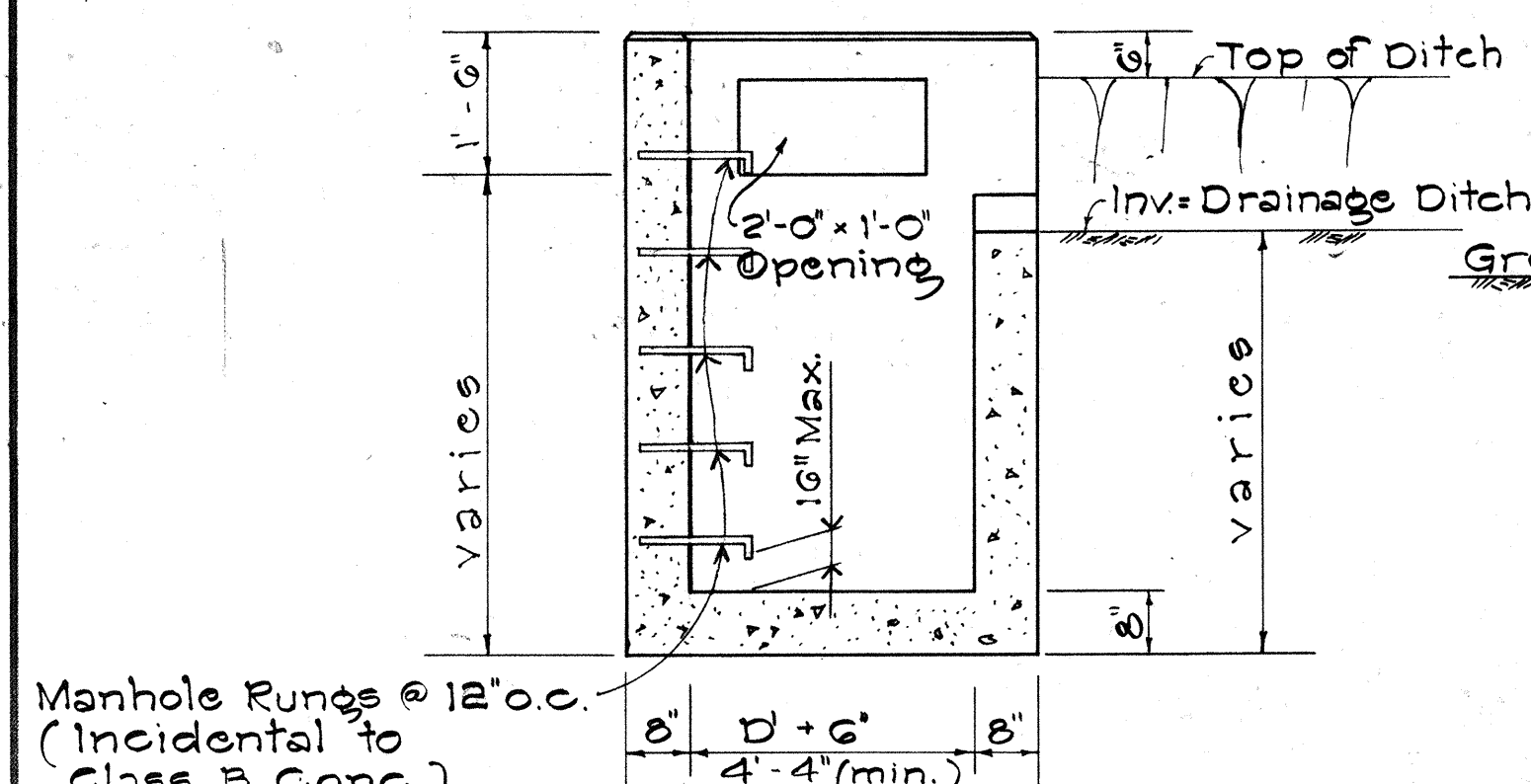
1. All concrete shall be Class "B" unless otherwise noted.
2. Exposed edges of all drainage structures shall be chamfered one inch.
3. Culvert shall enter and leave Drop Intake from any position and in the direction indicated by the plans or ordered by the Engineer.
4. Manhole Rungs (12" o.c.) are req'd. when "H" is greater than 4'-6". Only one rung (16 inches from the bottom) is required if "H" is 4'-6" or less. Manhole Rungs may be placed at any location as ordered by the Engineer.



PLAN



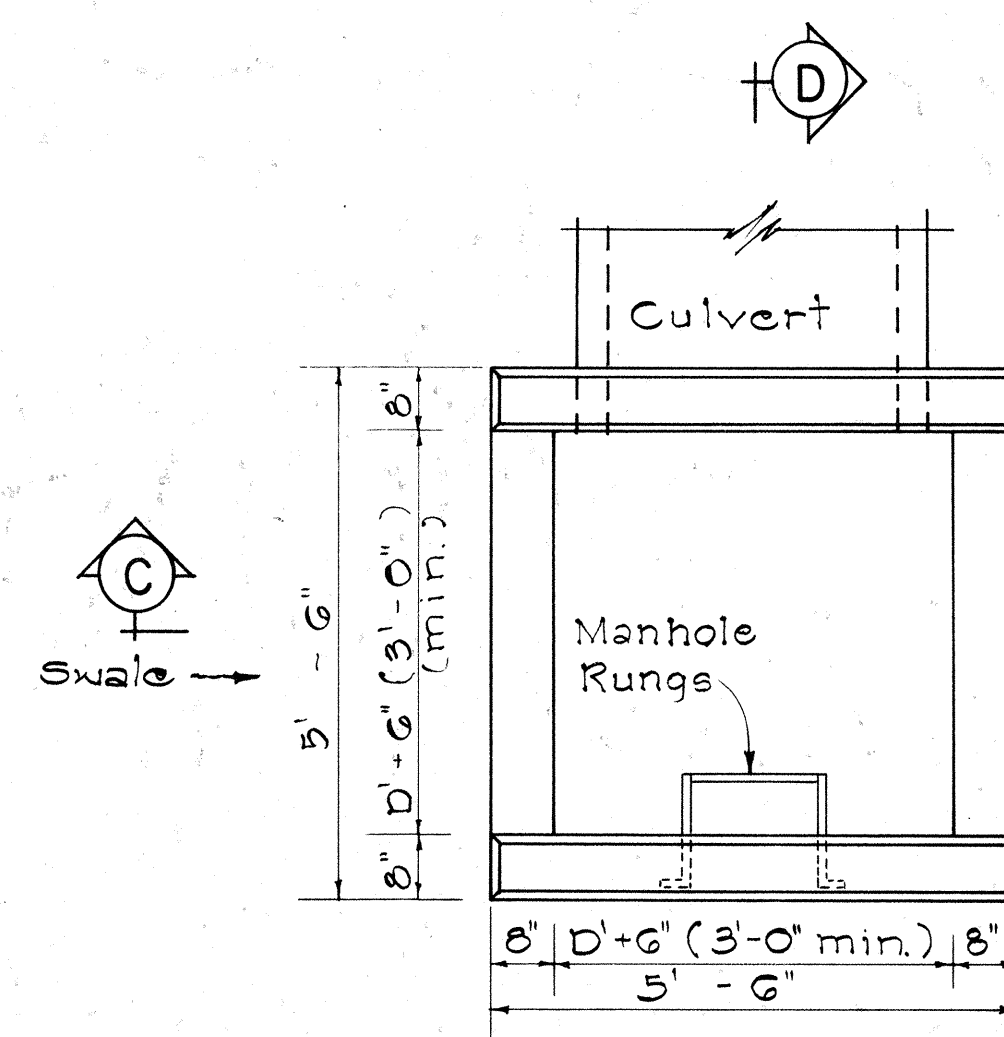
SECTION "A-A"



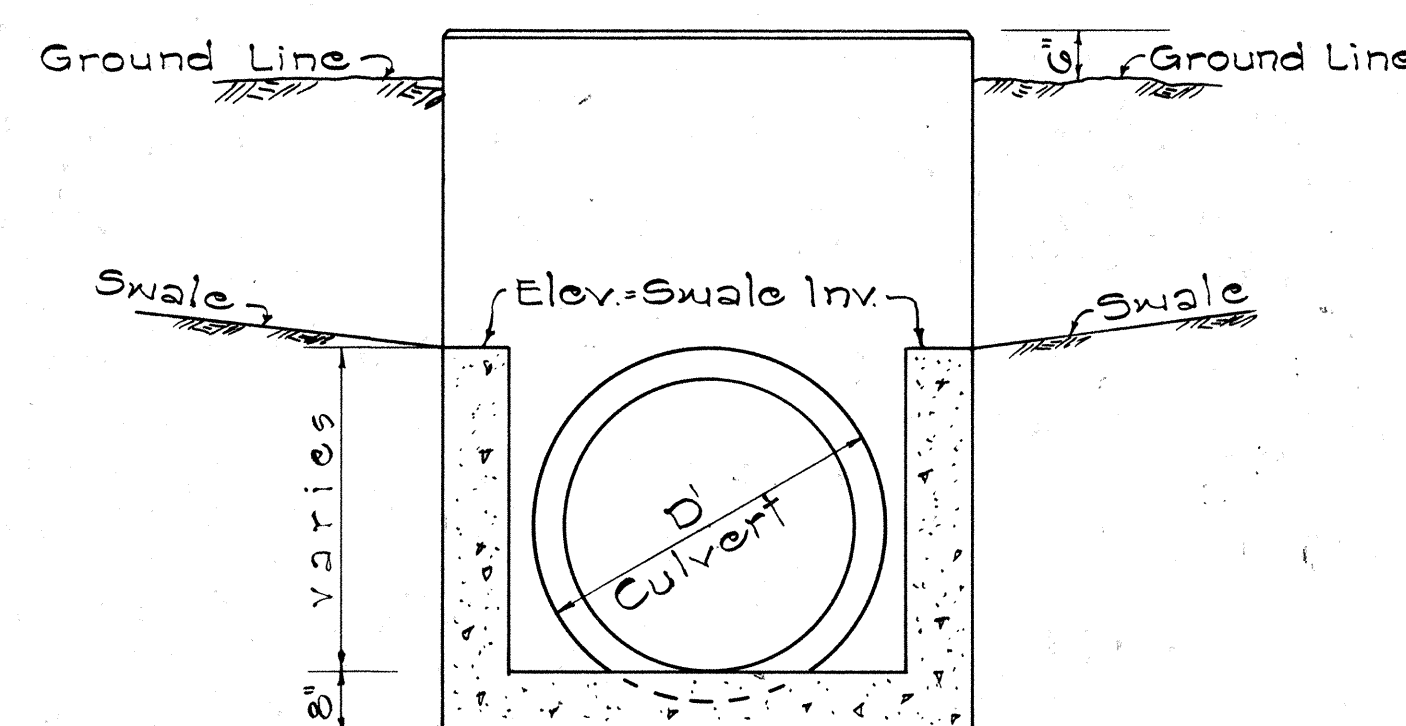
SECTION "B-B"

TYPE "A" CONCRETE DROP INTAKE

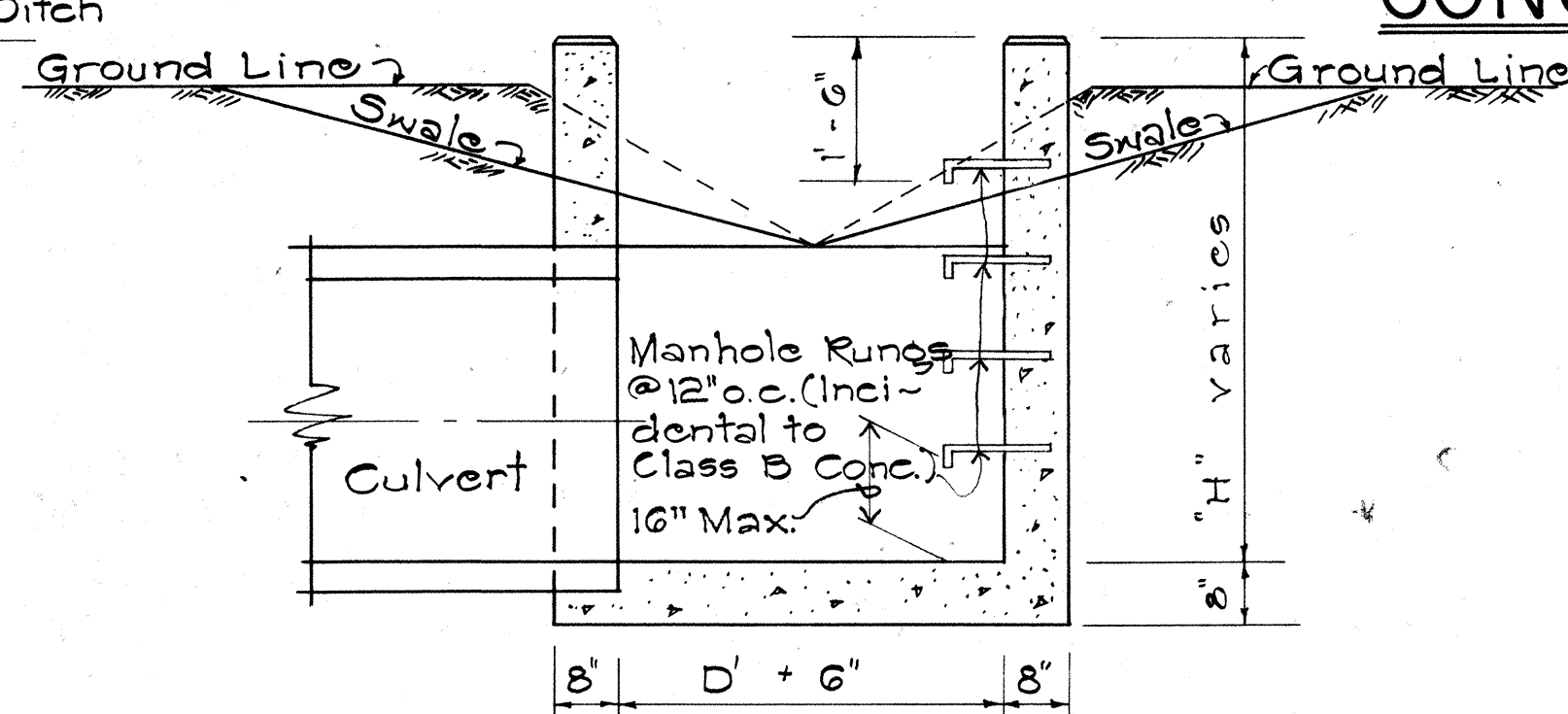
Scale: 1/2" = 1'-0"



PLAN



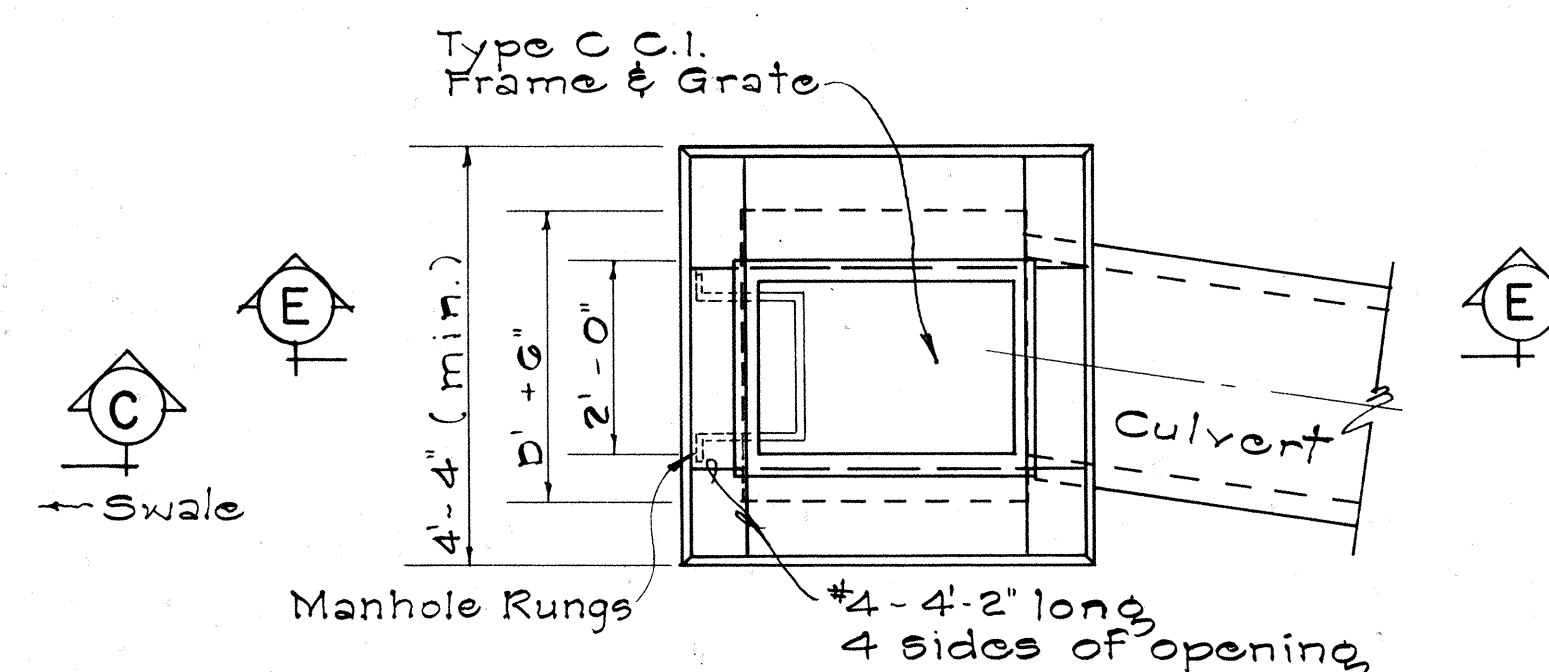
SECTION "C-C"



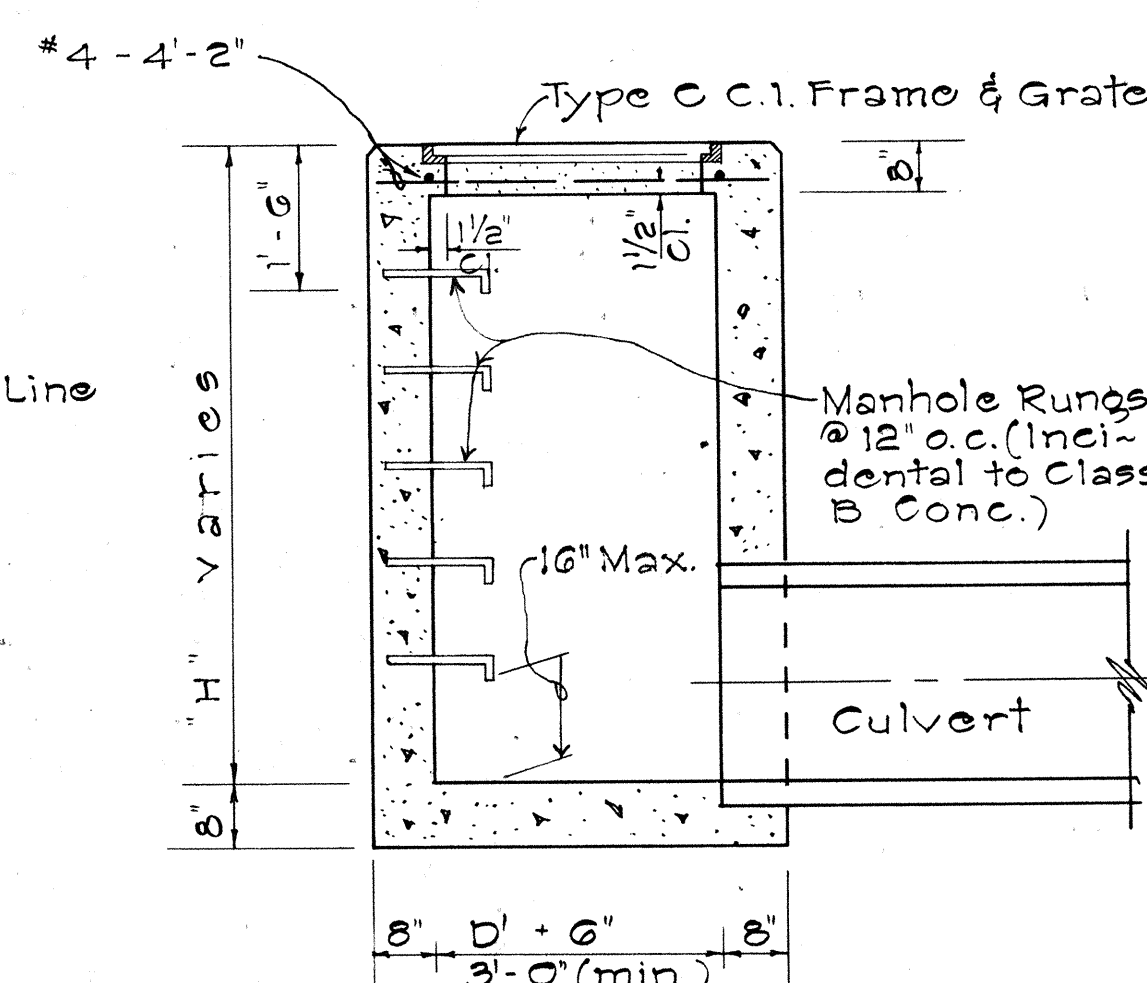
SECTION "D-D"

TYPE "B" CONCRETE DROP INTAKE

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



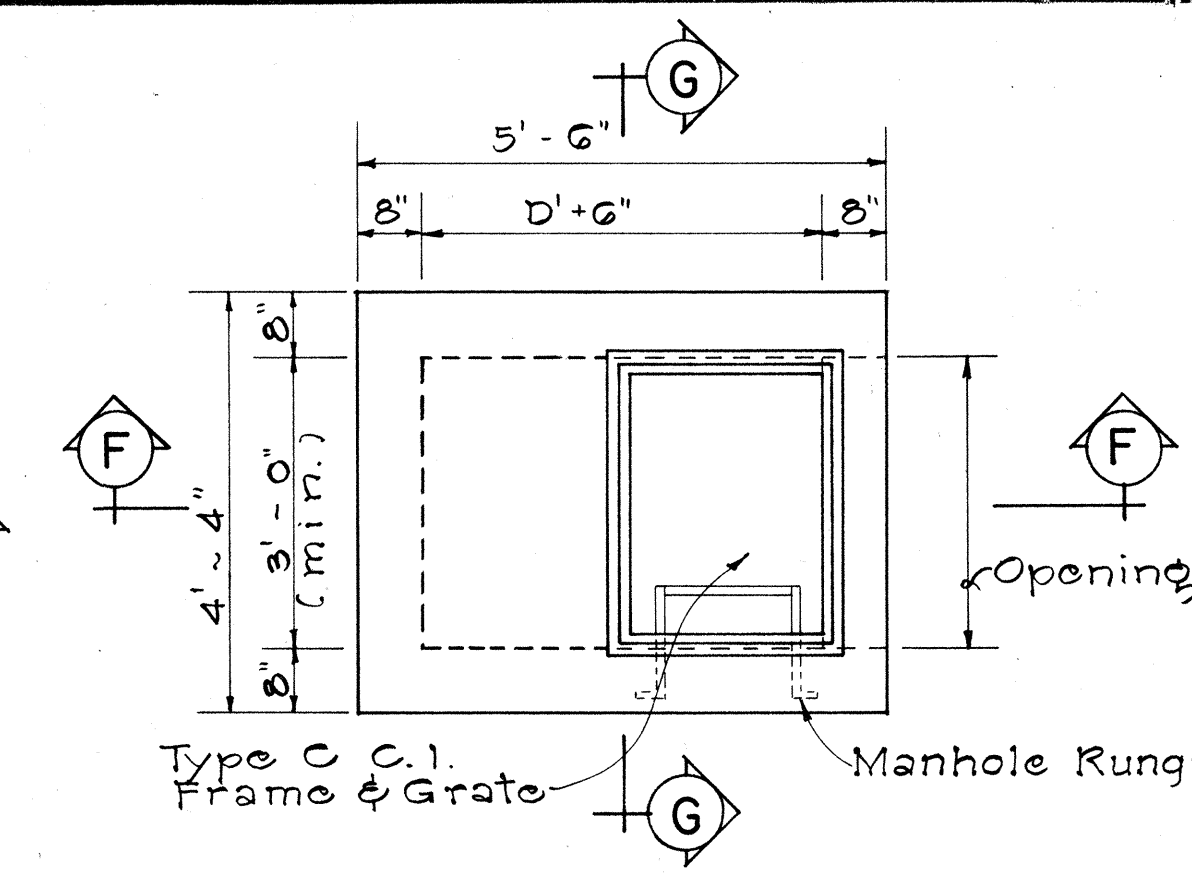
PLAN



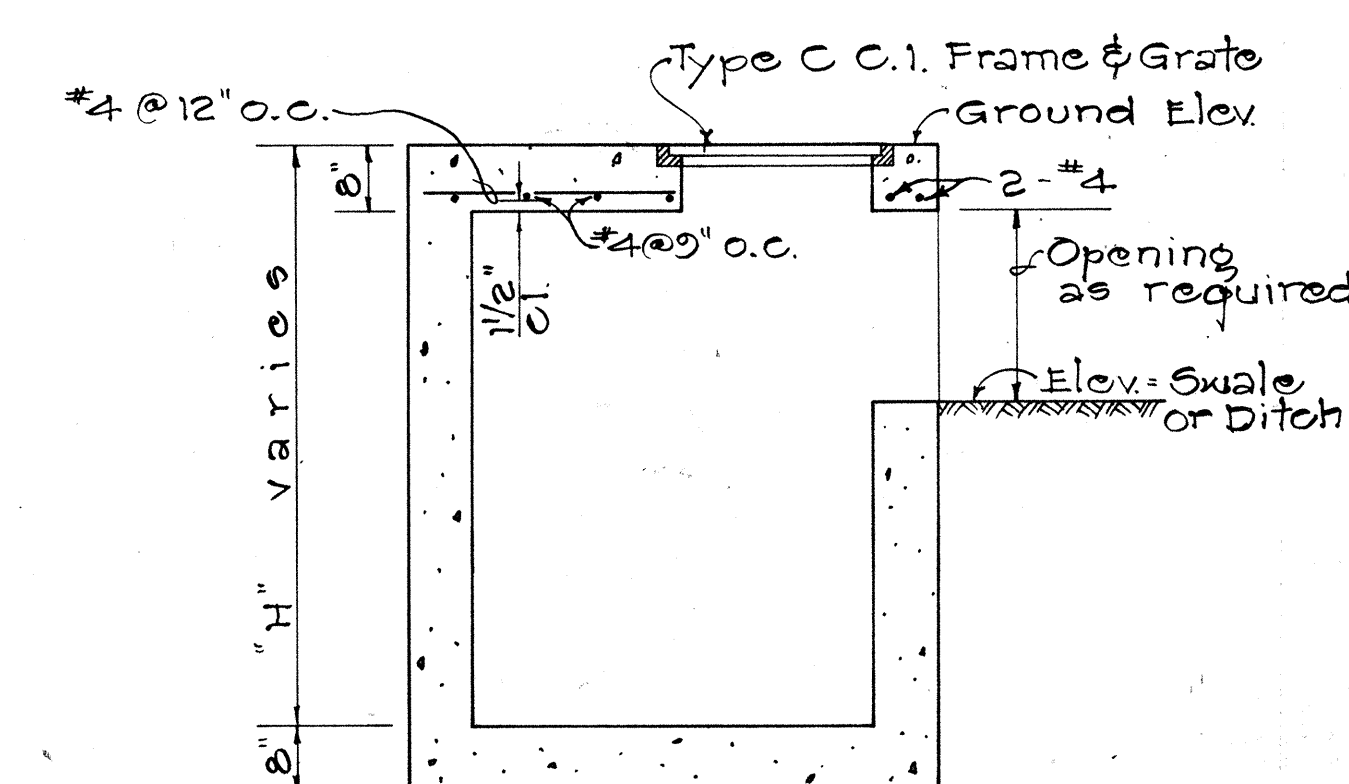
SECTION "E-E"

TYPE "C" GRATED CONCRETE DROP INTAKE

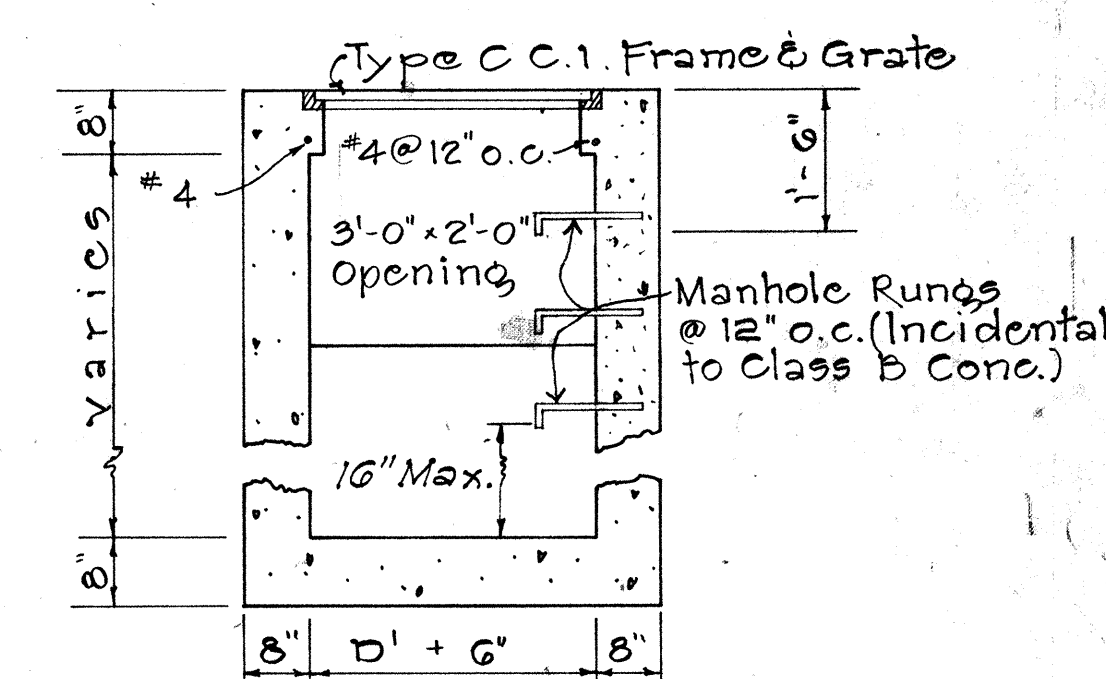
Scale: 1/2" = 1'-0"



PLAN



SECTION "F-F"



SECTION "G-G"

TYPE "D" GRATED CONCRETE DROP INTAKE

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

APPROVAL RECOMMENDED:

HYDRAULIC DESIGN ENGINEER

12-17-69
DATE

APPROVED:

ASSISTANT CHIEF, ENGINEERING

12-17-69
DATE

NO.	REVISION	APPROVED BY	DATE
1	Spacing on Manhole Rungs to conform to OSHA.	H.I.	1-21-75

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
TYPE "A", "B", "C", AND "D"
CONCRETE DROP INTAKE

Scale: As Noted Date: July, 1969

SHEET No. 217H OF 21 SHEETS DH19

S U M M A R Y

PROJECT : HONOAPIILANI HIGHWAY
Kahana to Alaeloa

PROJECT NO.: F-030-1 (13)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	6067	174

[illegible]

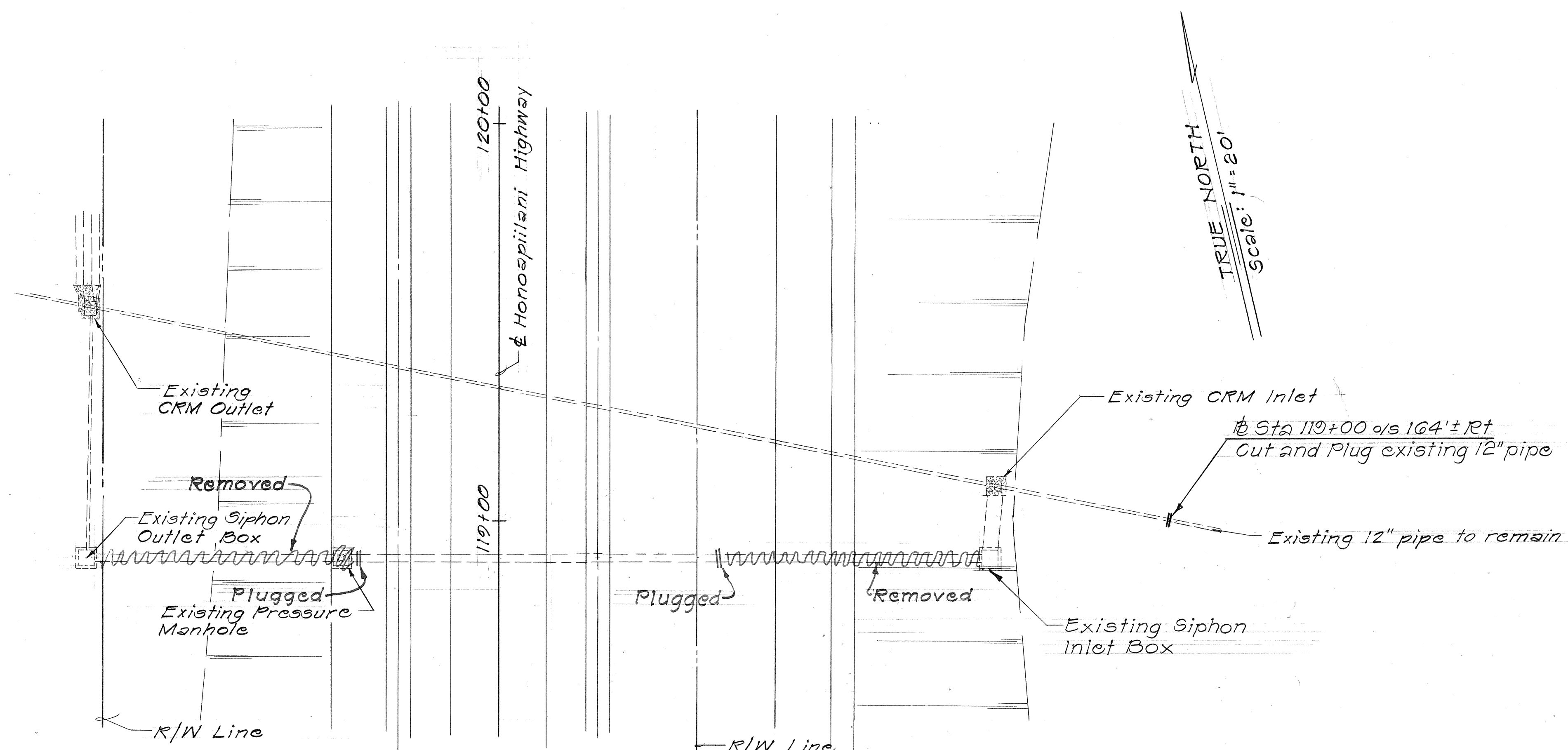
13 Nov '79	Quantities revised
DATE	REVISION

SHEET NO. I OF 8 SHEETS

CO 67

October, 1970

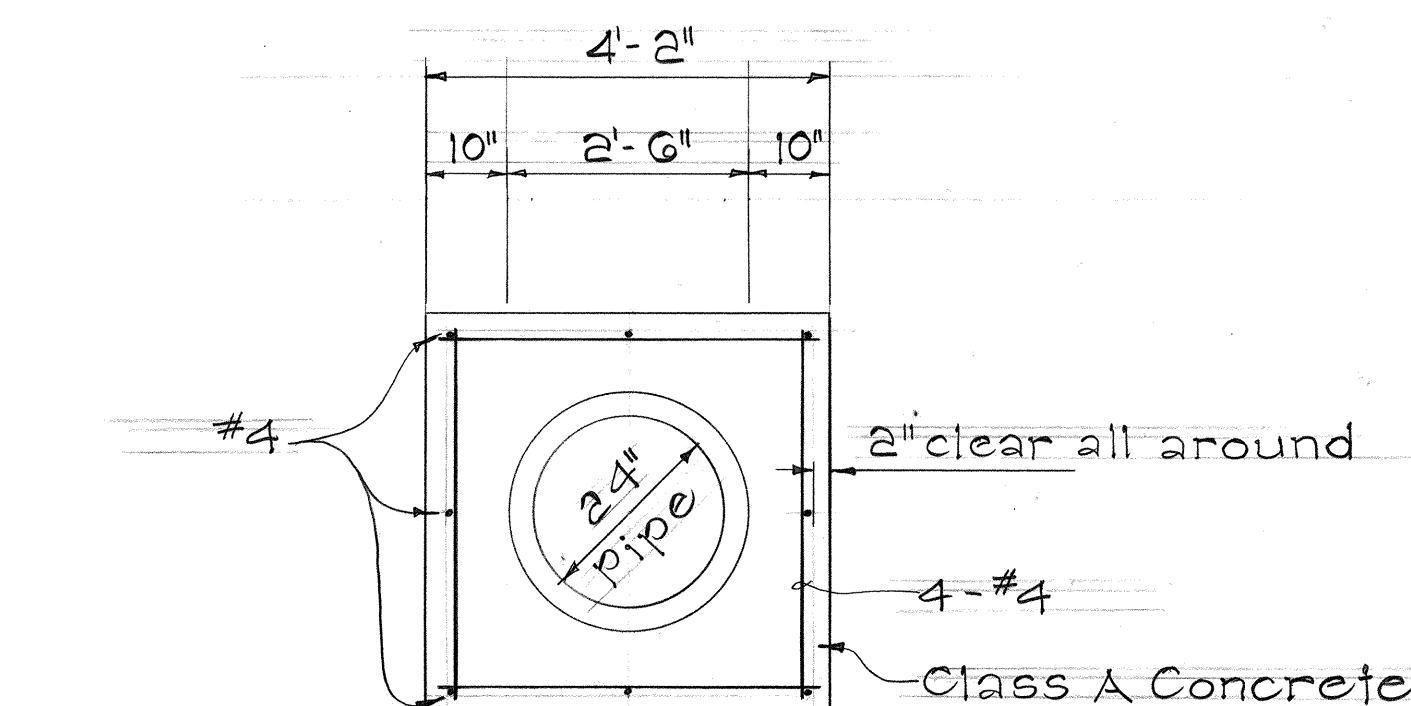
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1112	1978	CO 68	174



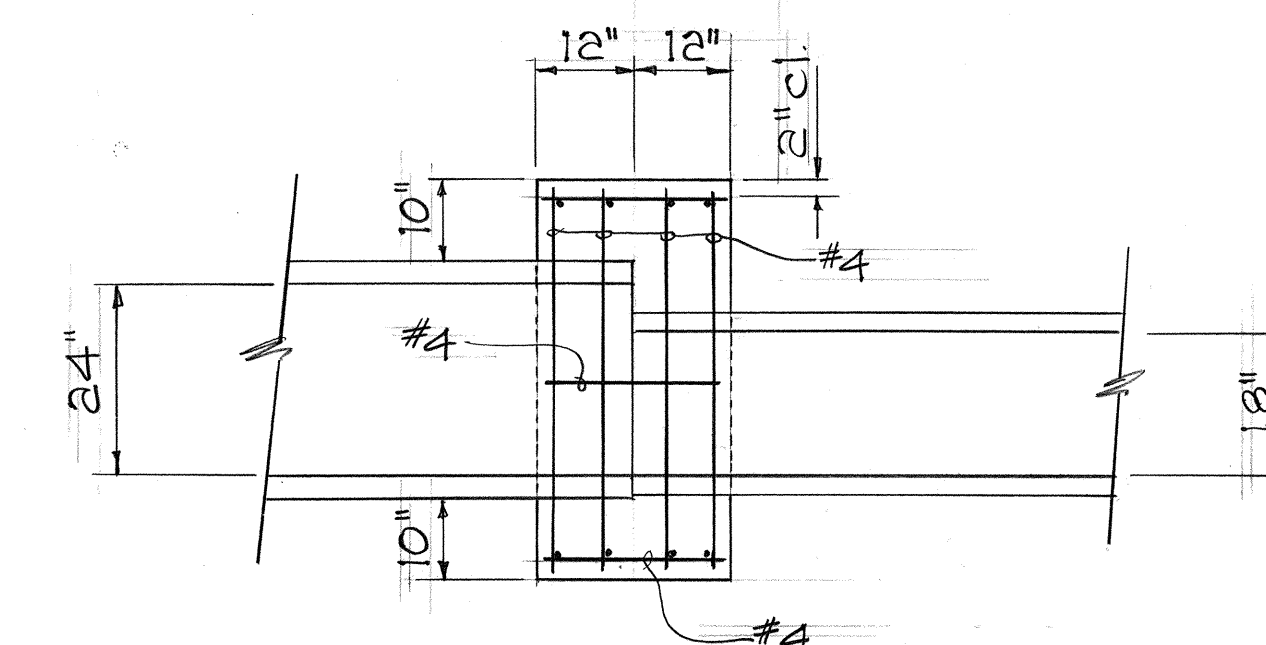
PLAN
Scale: 1" = 20'

NOTE: Existing siphon pipes, structures, and lined ditches shall be removed and graded as directed by the Engineer. Existing siphon pipes be cut & plug as directed by the Engineer. Work as mentioned above shall be considered incidental to the various contract items.

EXISTING IRRIGATION FACILITIES AT & STA 119+00



FRONT VIEW

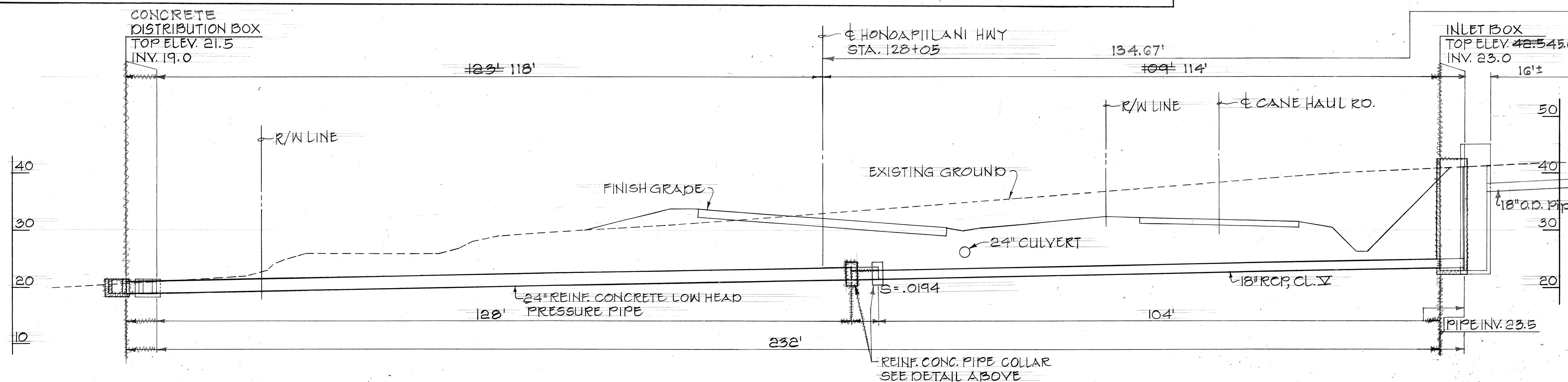


SIDE VIEW

REINFORCED CONCRETE PIPE COLLAR

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

CONCRETE DISTRIBUTION BOX
TOP ELEV. 42.2
INV. 37.7



& PROFILE AT & STA 128+05

Scale: 1" = 10'

13 Nov 79 Tracing revised to show profile of crossing at & Sta. 128+05. Delete siphon inlet box (Sta. 119+00 o/s 164' Rt), siphon outlet box (Sta. 119+00 o/s 132' Rt) and pressure manhole (Sta. 119+00 o/s 42.5' Rt). Delete notes #1 to #6. Delete 24" siphon pipes. Cut and plug existing 12" irrigation pipe at & Sta. 119+00 o/s 164' Rt.

DATE REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

IRRIGATION PLAN

HONOAPIILANI HIGHWAY
Kahala to Alaeos
F.A. Proj. No. F-030-1(13)

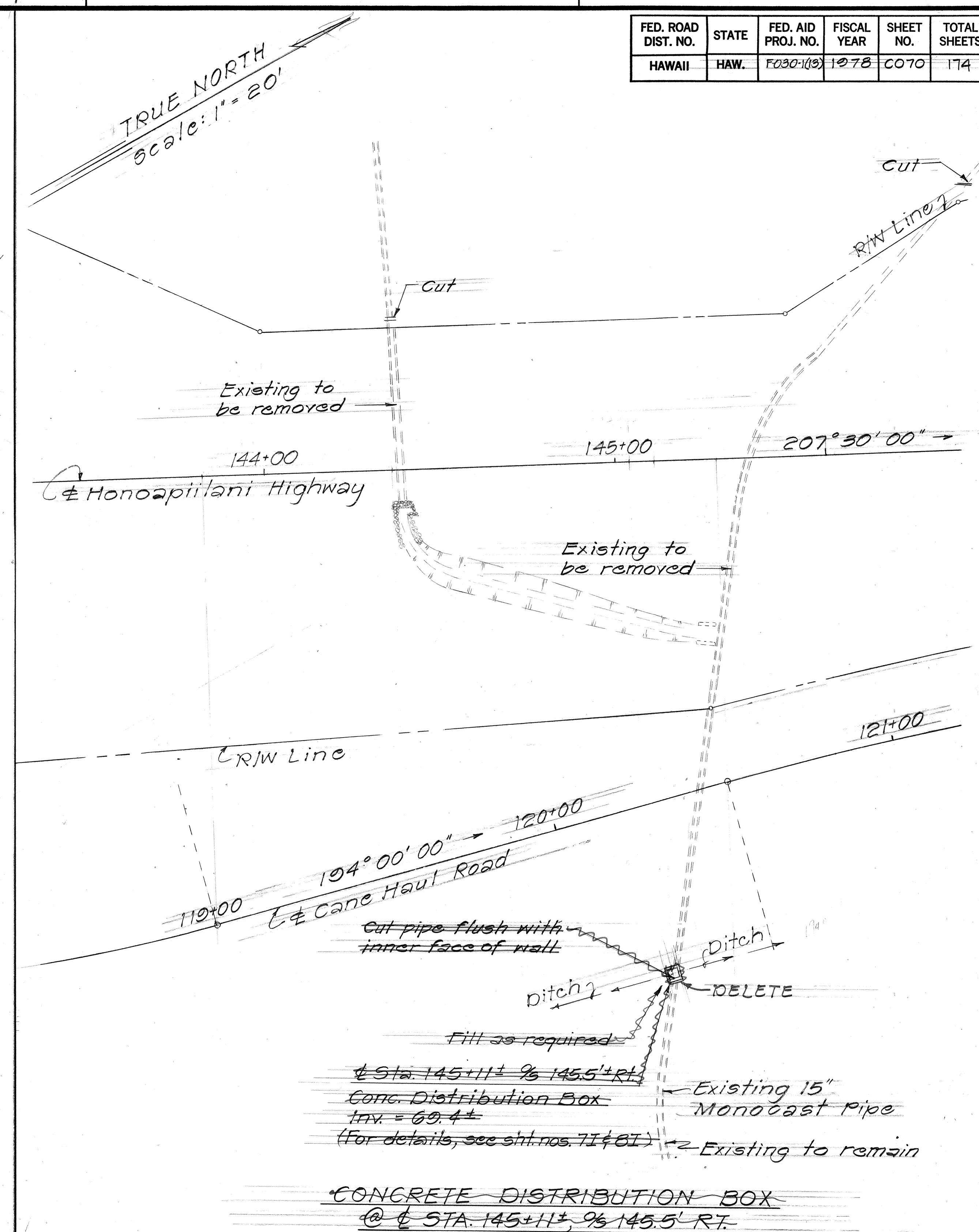
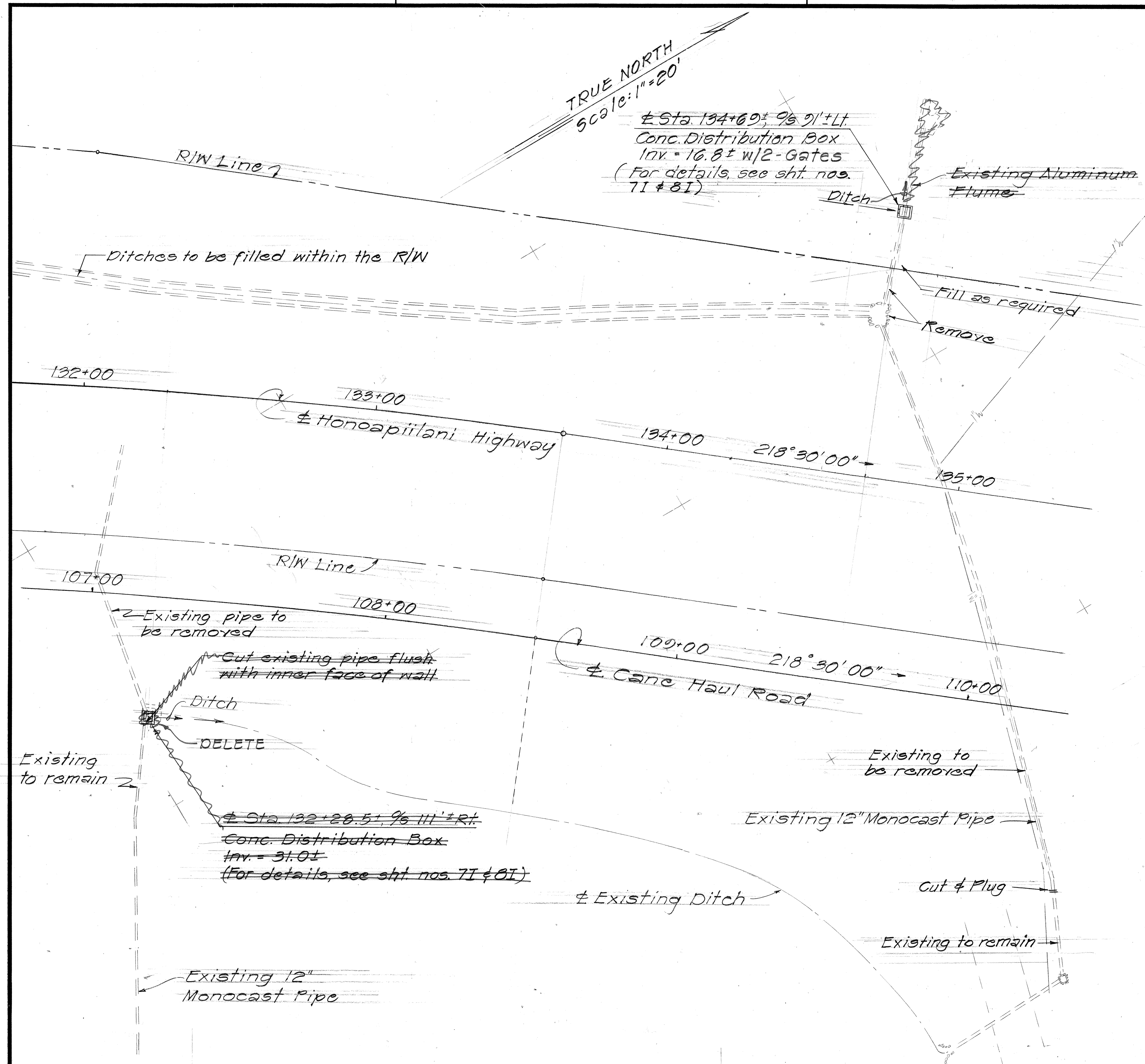
Scale: As Shown Date: Sept, 1977

SHEET NO. 21 OF 8 SHEETS

CO 68

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F030-1(3)	1978	C070	174



DATE	BY
13 Nov '79	DESIGNED BY
	DRAWN BY
	CHECKED BY
	NOTED BY
	QUANTITIES BY
	NO.

13 Nov '79 Delete 3" PVC pipe between Sta 144+00 Lt & 145+60 Lt. Delete 4" PVC pipe at Sta. 145+60.

DATE	REVISION
------	----------

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

IRRIGATION PLAN

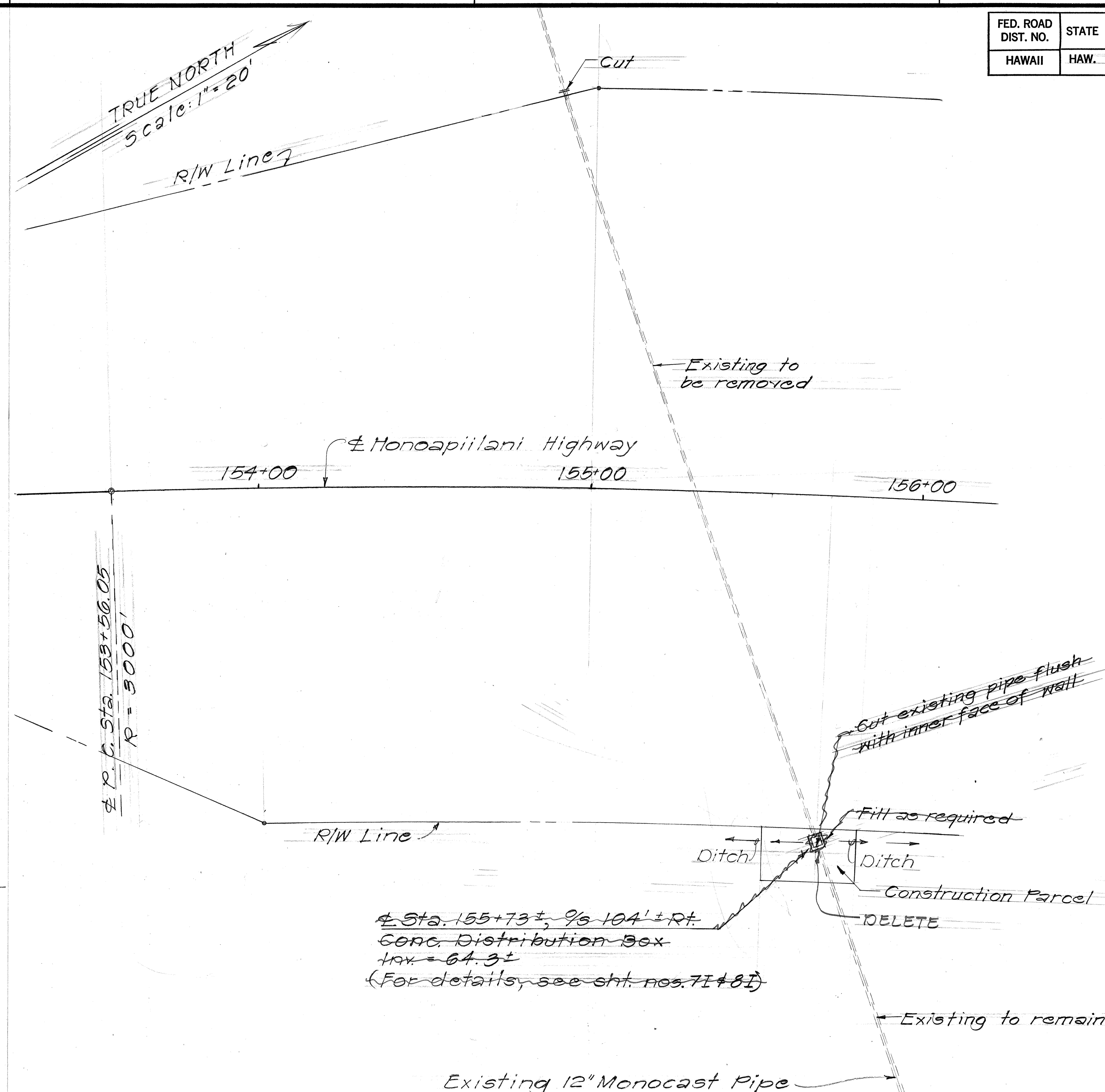
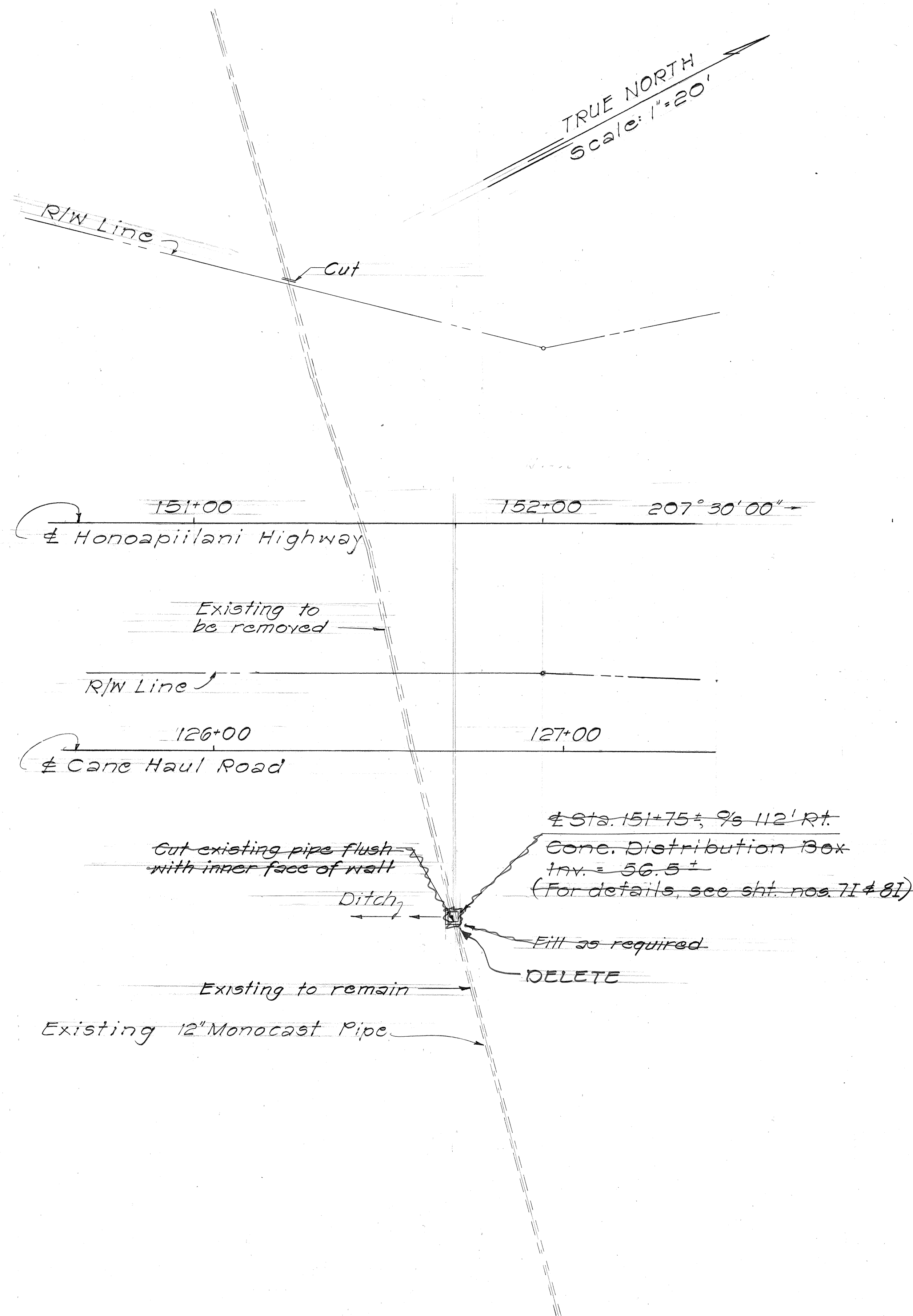
HONOAPIILANI HIGHWAY
Kahala to Alaeos
F.A. Proj. No. F-030-1(3)

Scale: As Shown Date: Sept, 1977
SHEET NO. 41 OF 8 SHEETS

C070

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F030-1(13)	1978	71	174

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



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

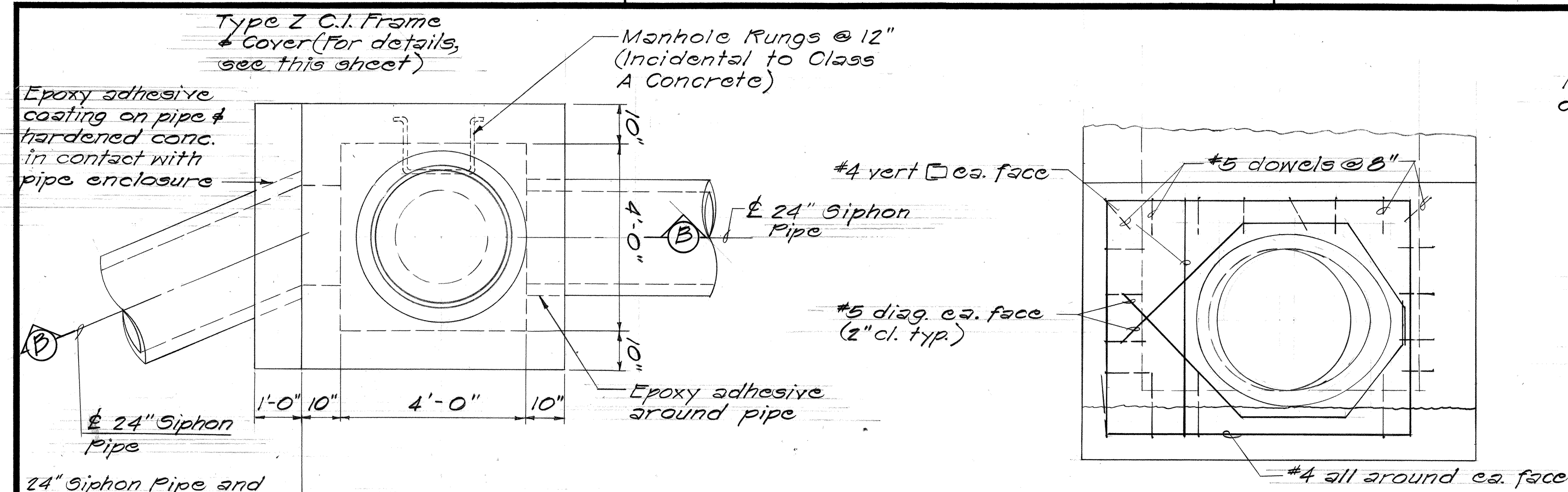
IRRIGATION PLAN

HONOAPIILANI HIGHWAY
Kahana to Aiealoa
P.A. Proj. No. F-030-1(13)

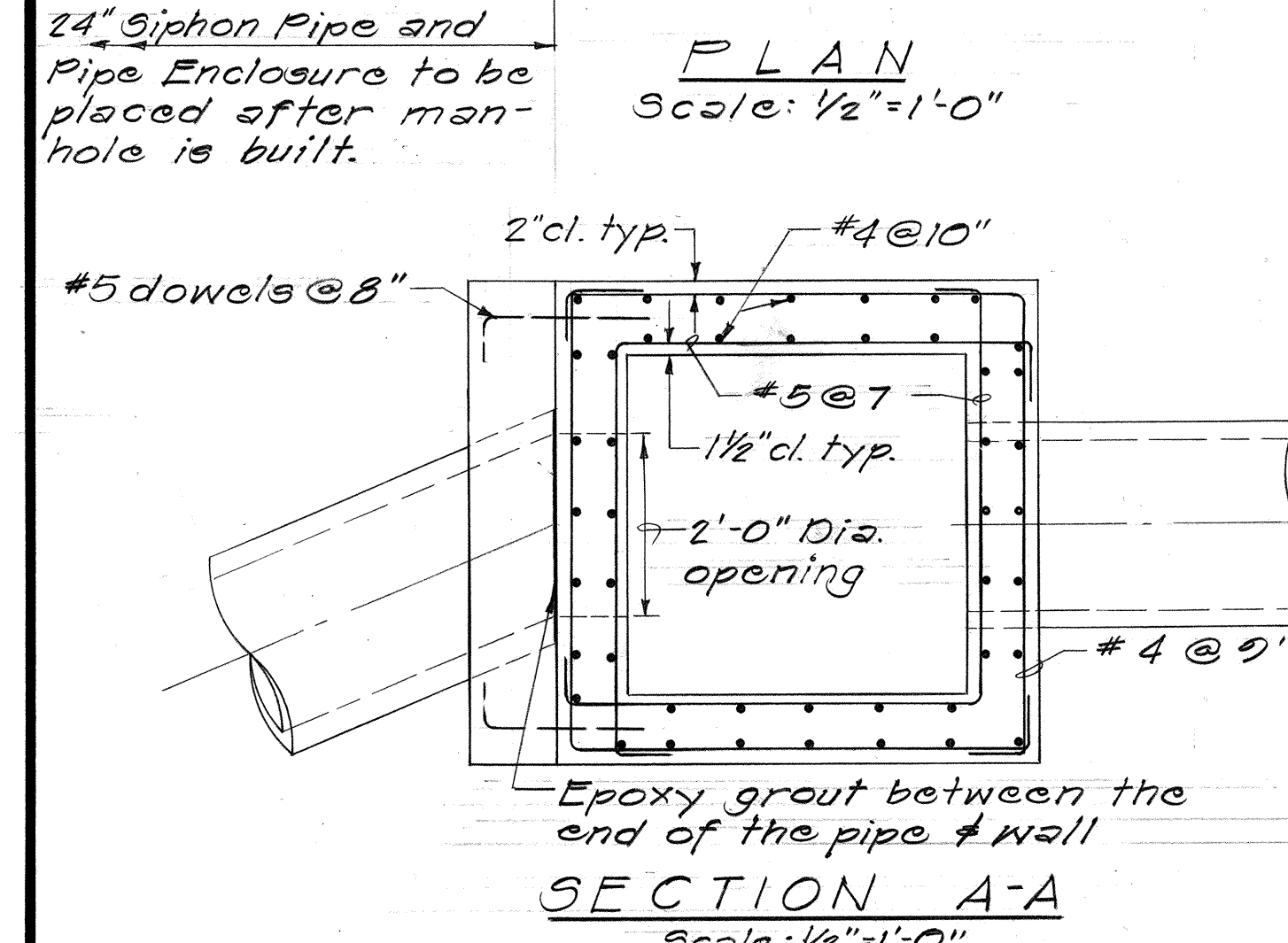
Scale: As Shown Date: Sept, 1977

SHEET No. 51 OF 8 SHEETS

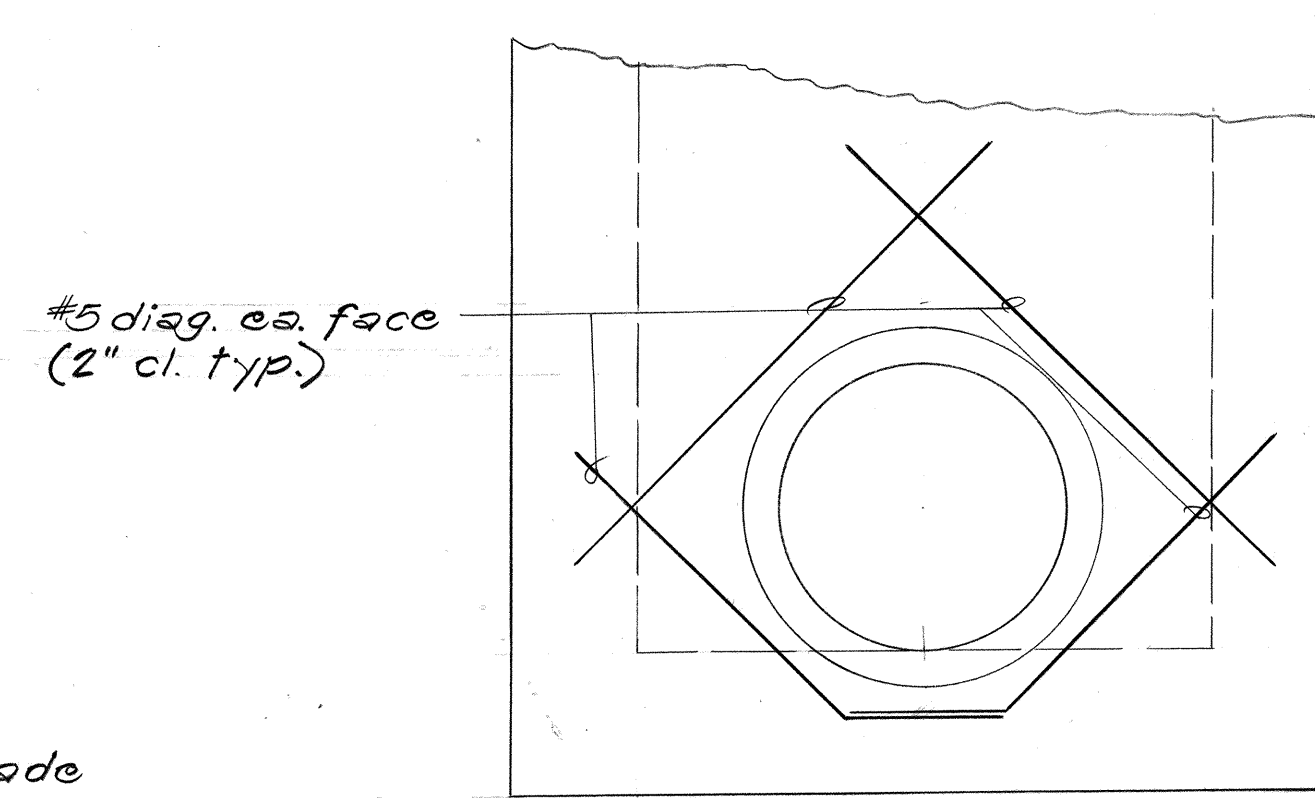
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F0307(13)	1978	C072	174



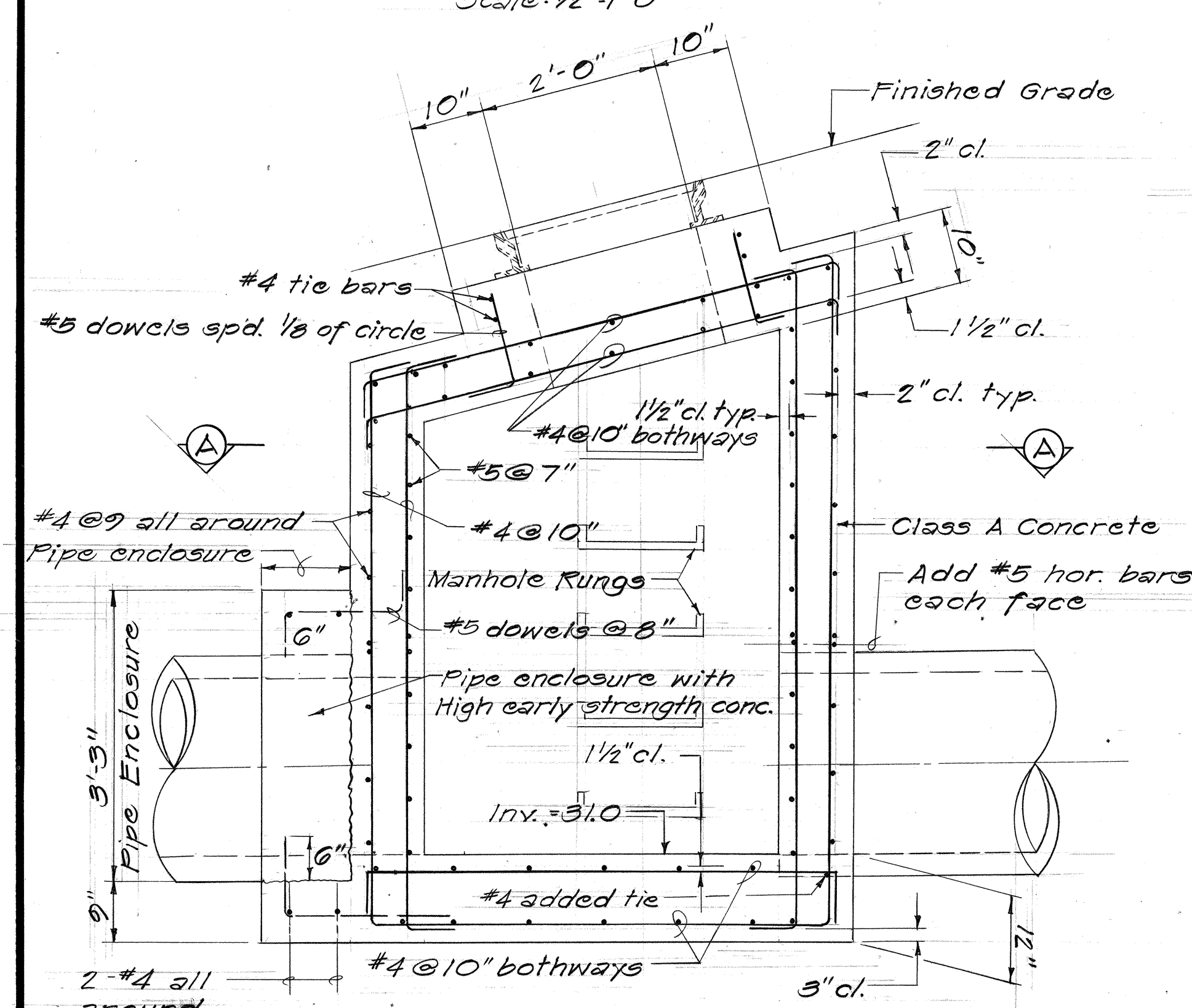
PIPE ENCLOSURE REINFORCING
Scale: 3/4"=1'-0"



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

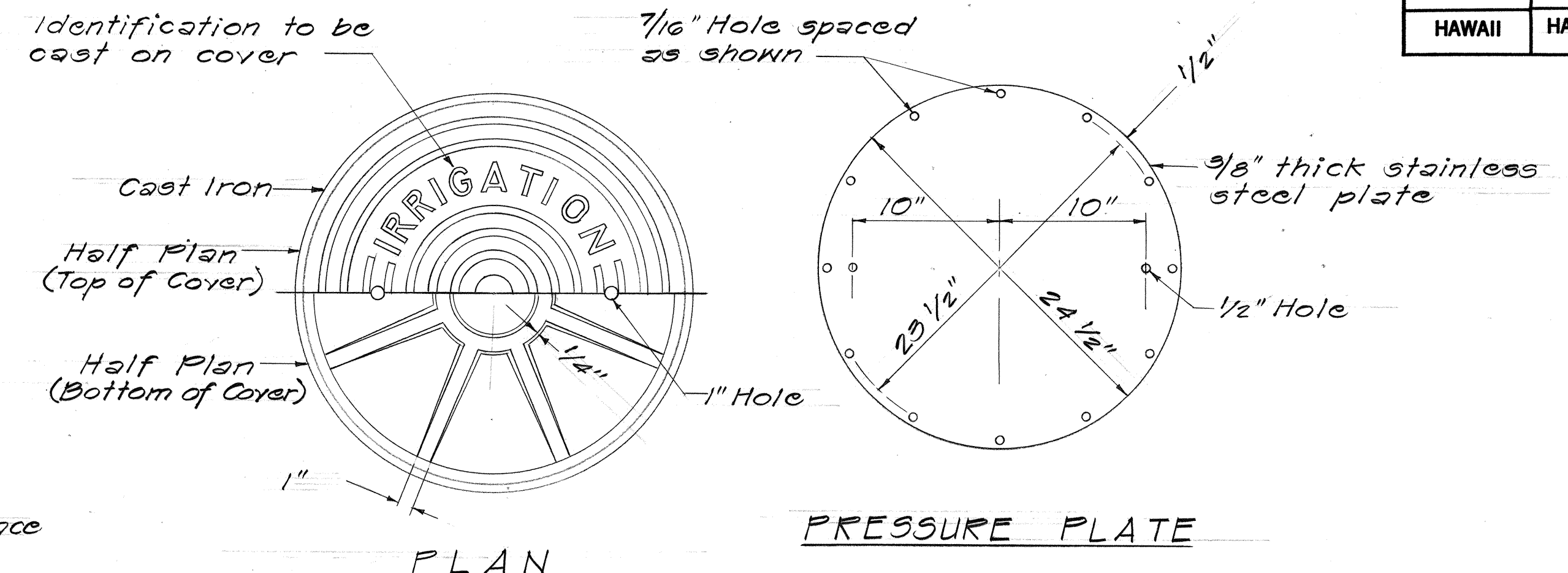


REINFORCING AT BOTH OPENINGS IN M.H. BOX
Scale: 3/4"=1'-0"



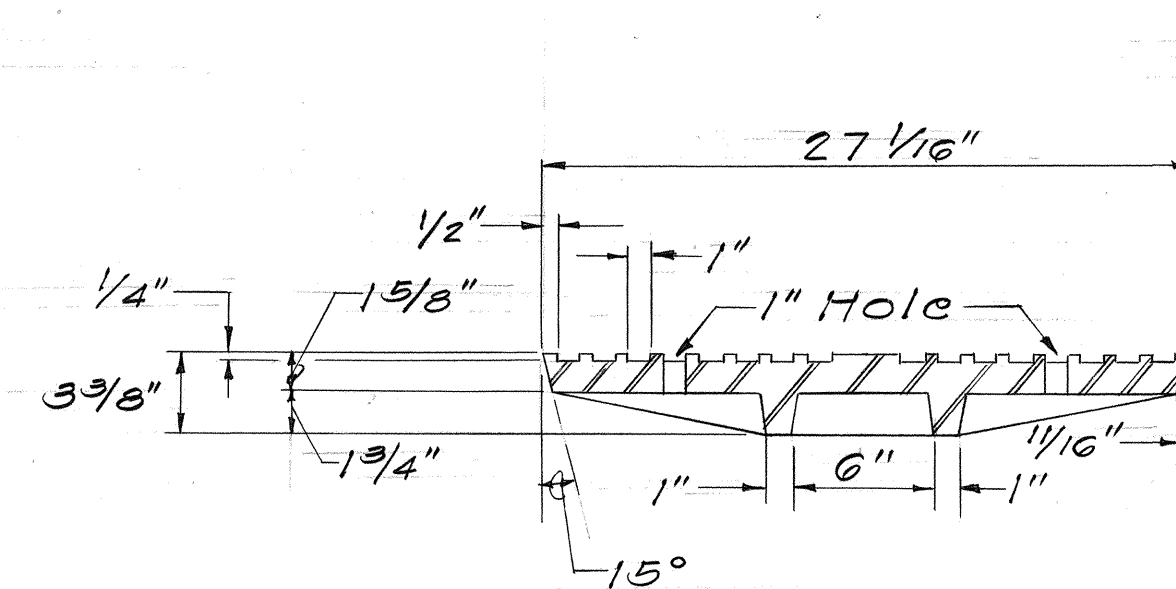
SECTION B-B
Scale: 3/4"=1'-0"

PRESSURE MANHOLE AT & STA. 119+00, 1/8 42.5' ± RT.

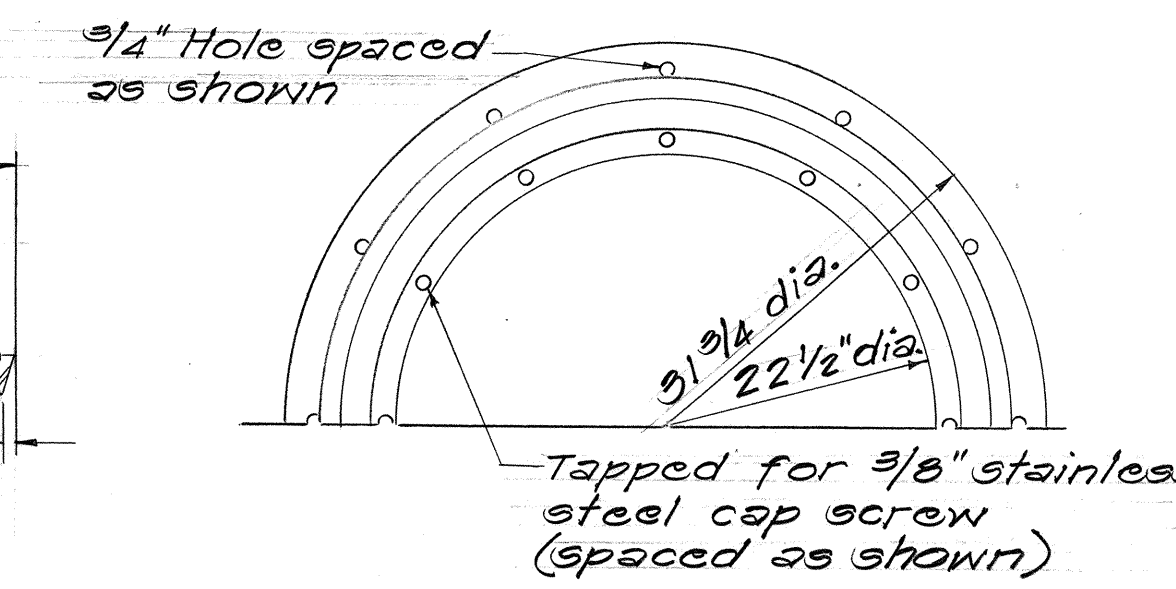


PLAN

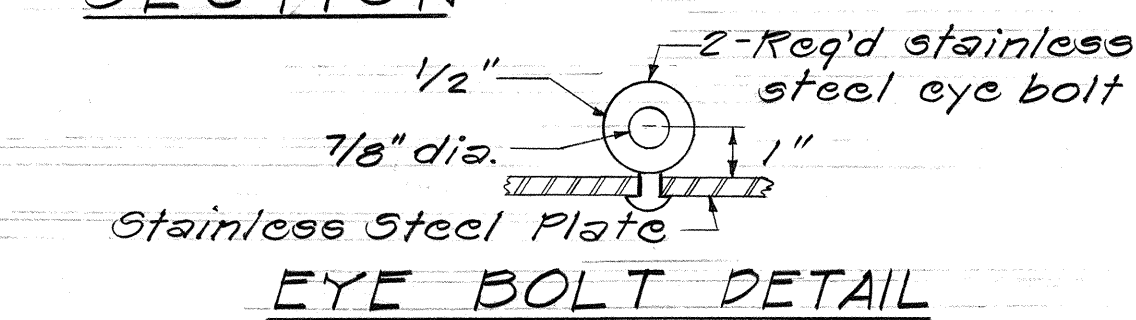
PRESSURE PLATE



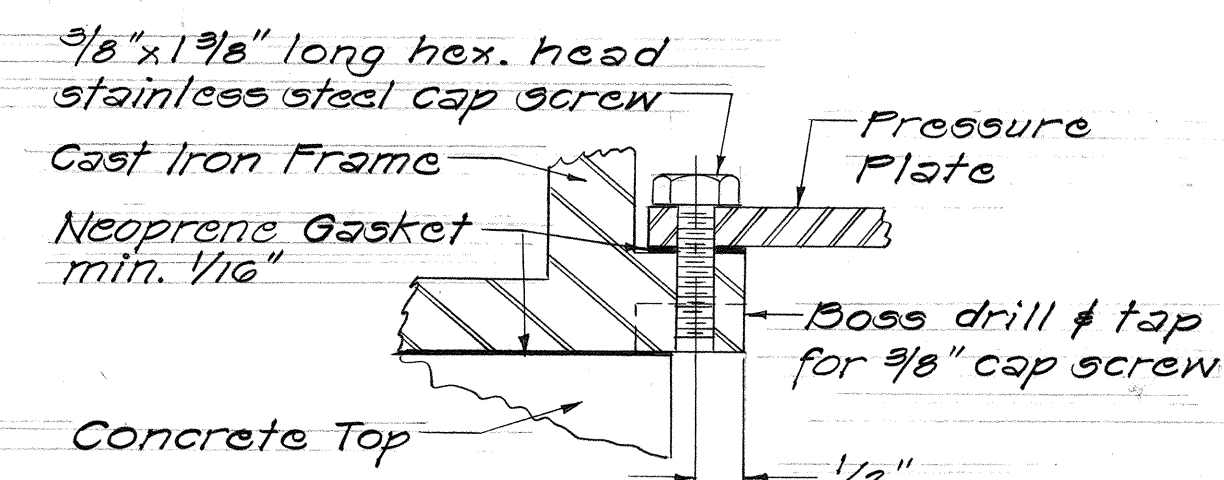
SECTION



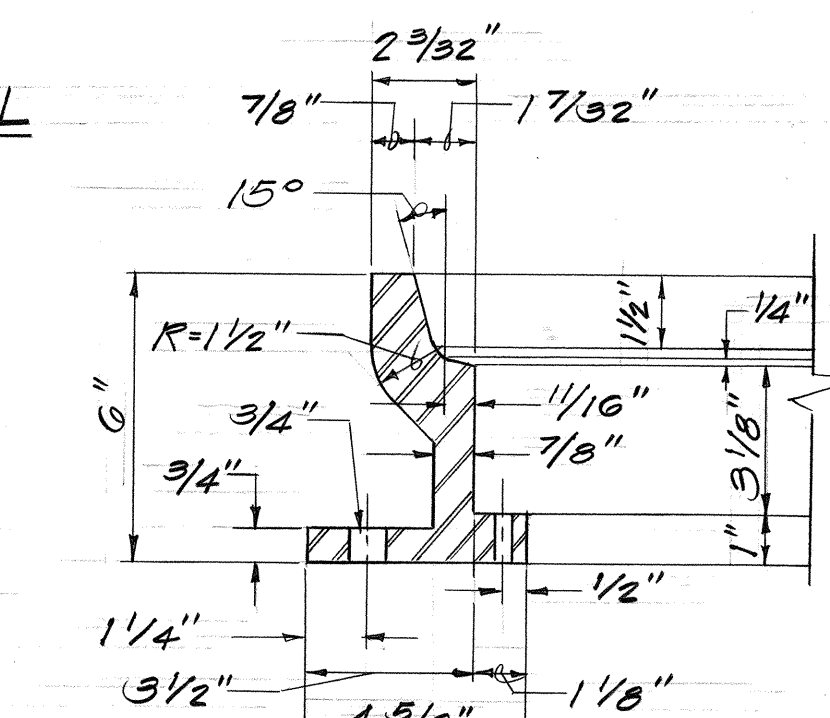
HALF PLAN OF FRAME



EYE BOLT DETAIL



CAP SCREW DETAIL



FRAME SECTION

TYPE Z CAST IRON FRAME & COVER FOR PRESSURE MANHOLE
Not to Scale

ORIGINAL PLAN	DATE
DESIGNED BY	
TRACED BY	
QUANTITIES BY	
CHECKED BY	

13 Nov 79 Tracing deleted from contract plan due to relocation of irrigation crossing to Sta 128+05

DATE REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

IRRIGATION DETAILS

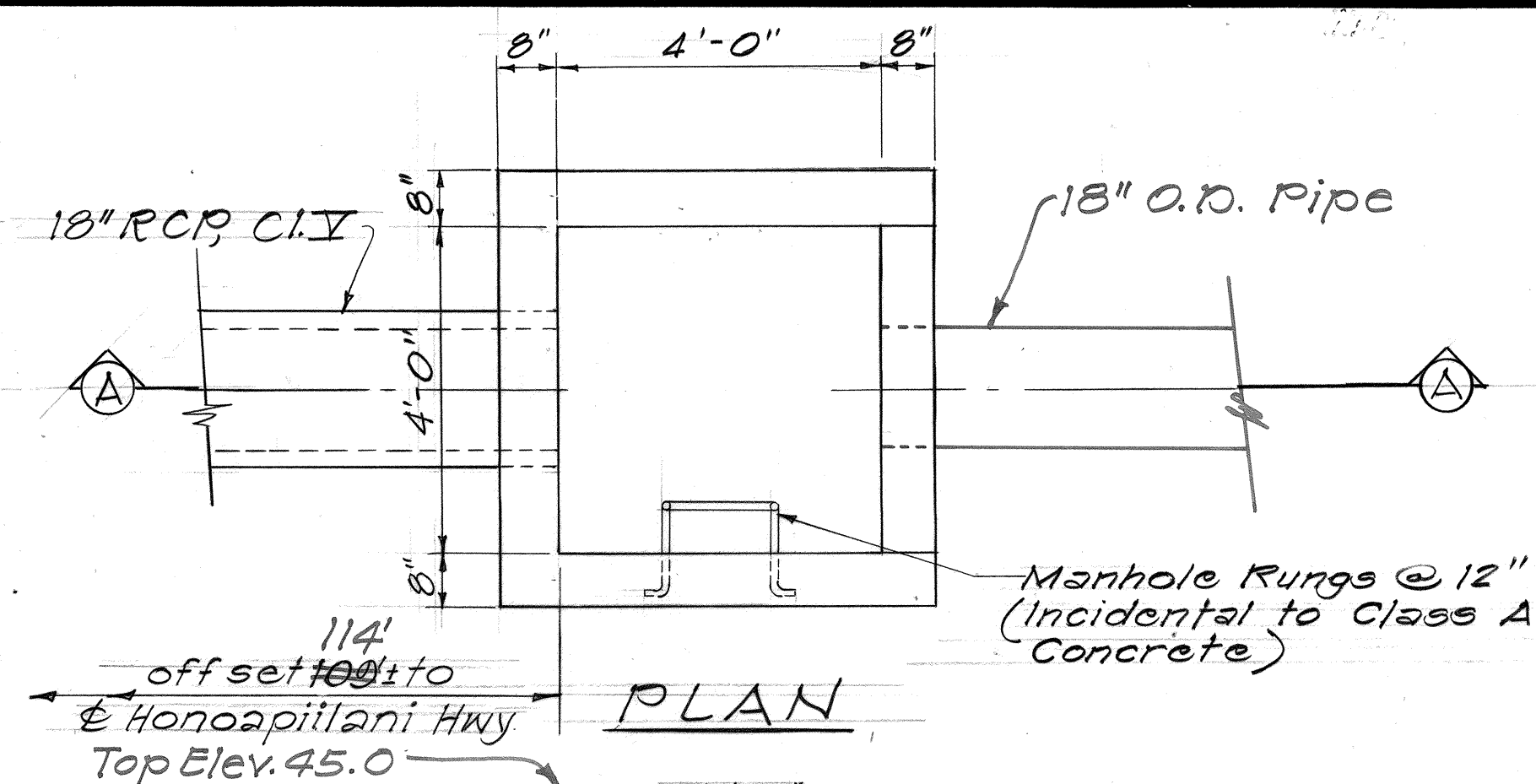
HONOAPILANI HIGHWAY
Kahana to Aiea
F.A. Proj. No. F-0307(13)

Scale: As Shown Date: Sept., 1977

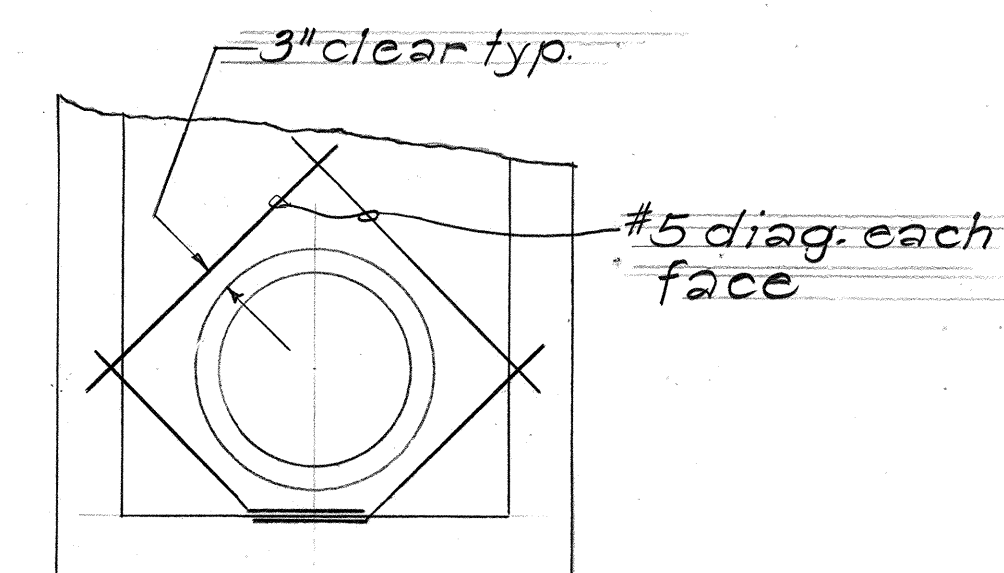
SHEET NO. 01 OF 8 SHEETS

C072

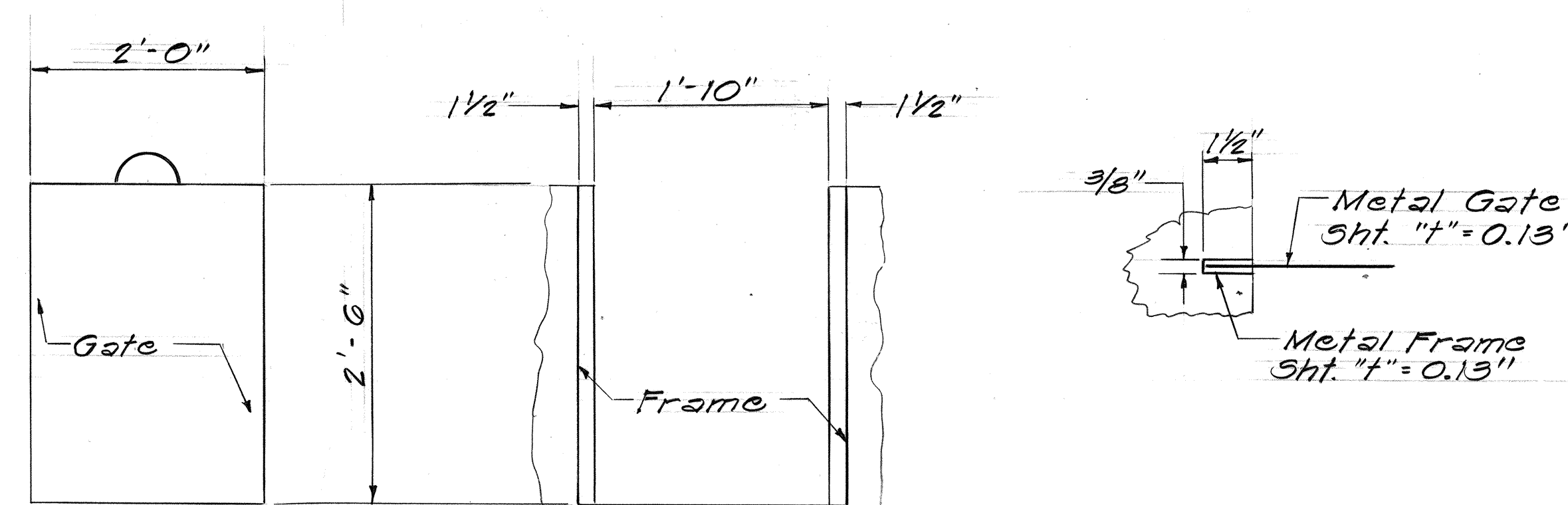
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-030-1(13)	1978	6073	174



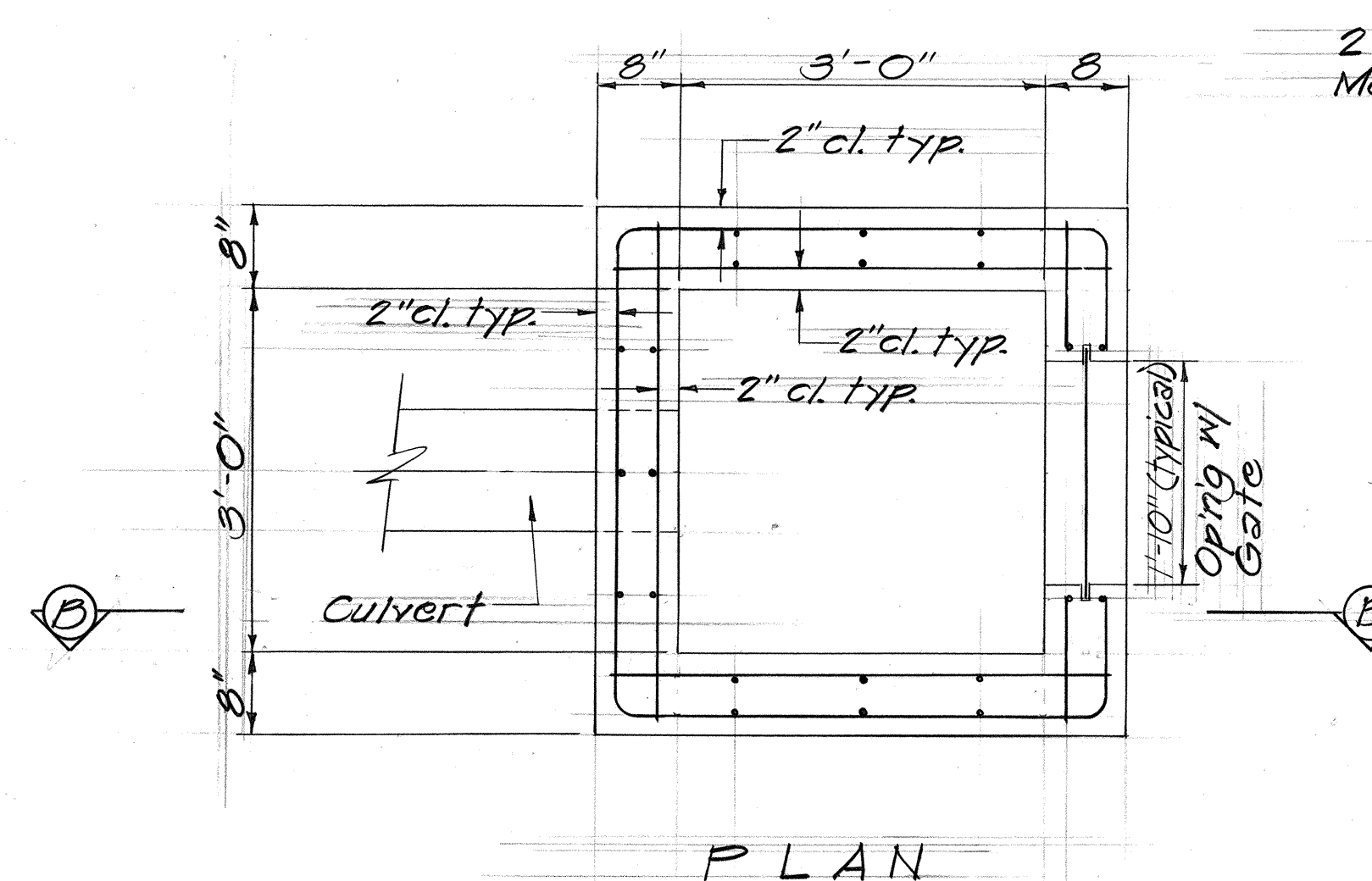
SECTION "A-A"



INLET BOX AT STA. 128+05 ± 0/5109 RT.
Scale: 1/2" = 1'-0"

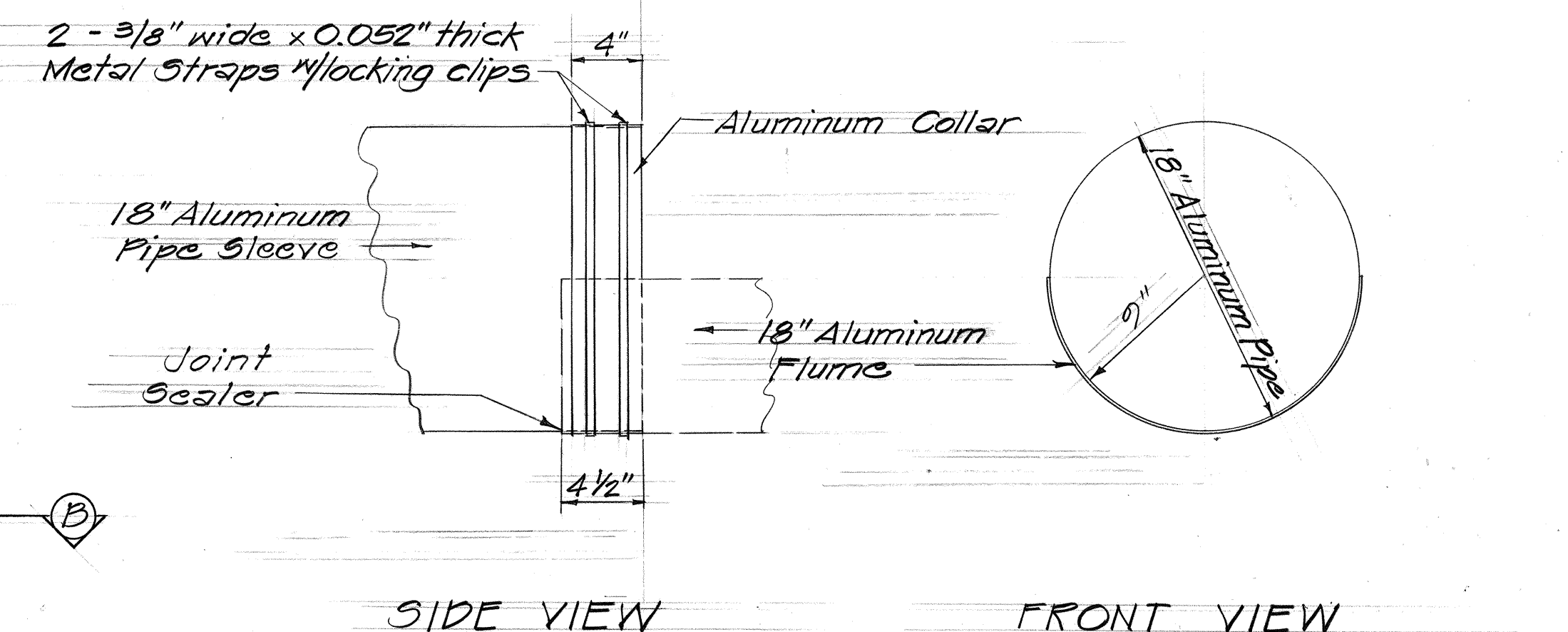


METAL FRAME AND GATE
Not to Scale



SECTION B-B

CONCRETE
TYPICAL DISTRIBUTION BOX REINFORCING
Scale: 3/4" = 1'-0"



ALUMINUM COLLAR
CONNECTION DETAIL

- NOTE:
1. All reinforcing bars are #4 at 12" o.c.
 2. For locations of pipe(s) and/or gate(s) see plans

13 Nov '79 Tracing revised to show detail of box at Sta. 128+05 ± 0/5109 RT. Delete 24" siphon pipes and boxes at Sta. 119+00

DATE REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

IRRIGATION DETAILS

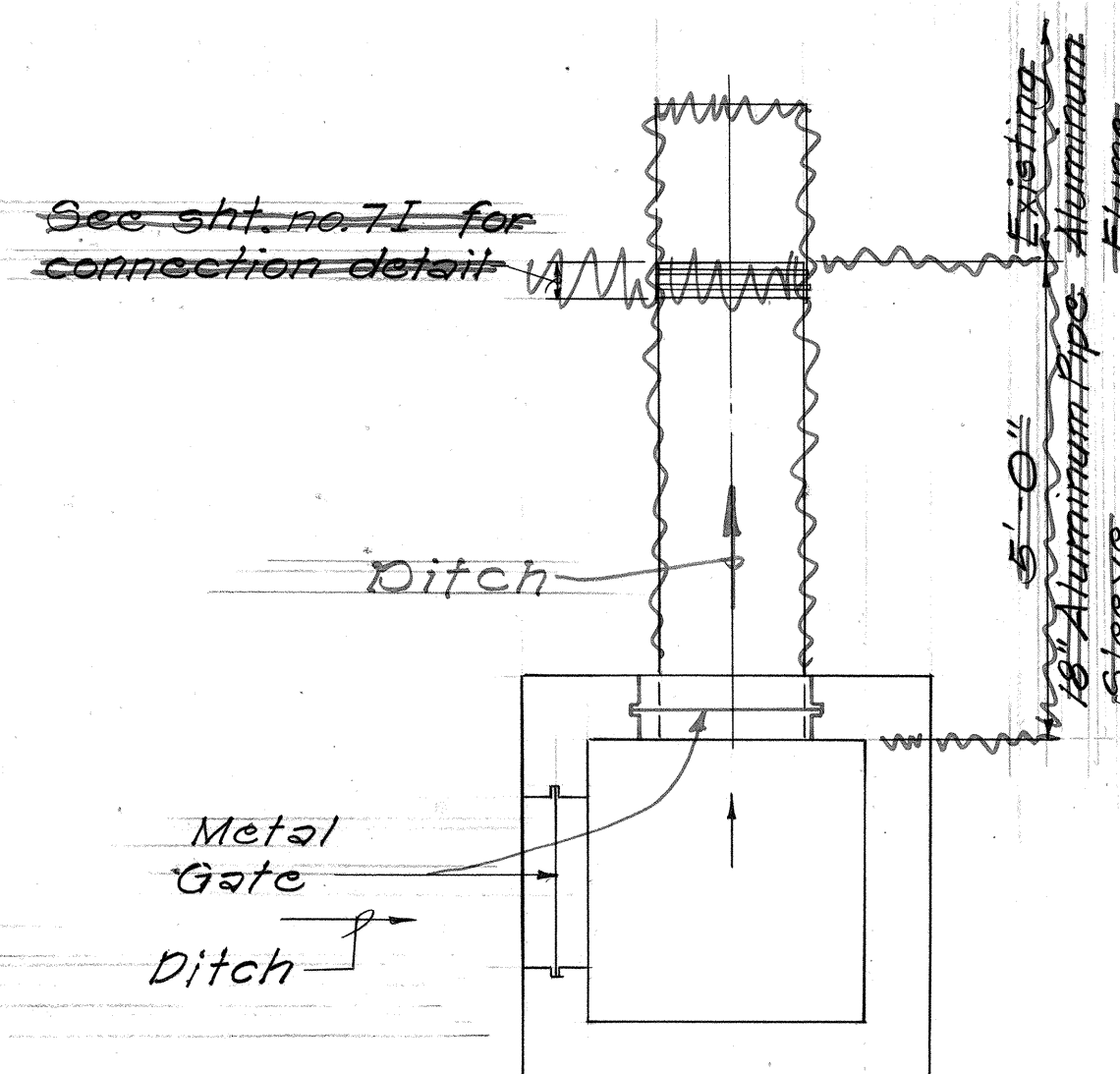
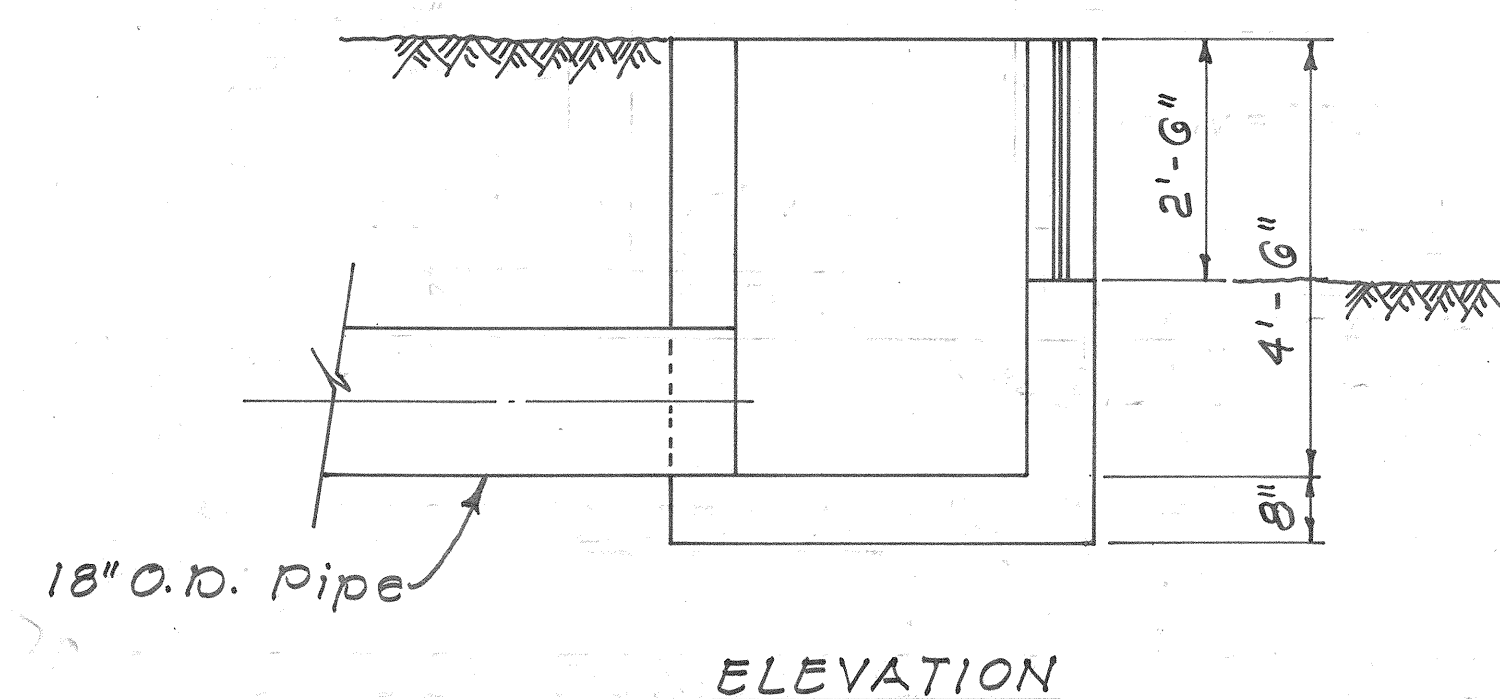
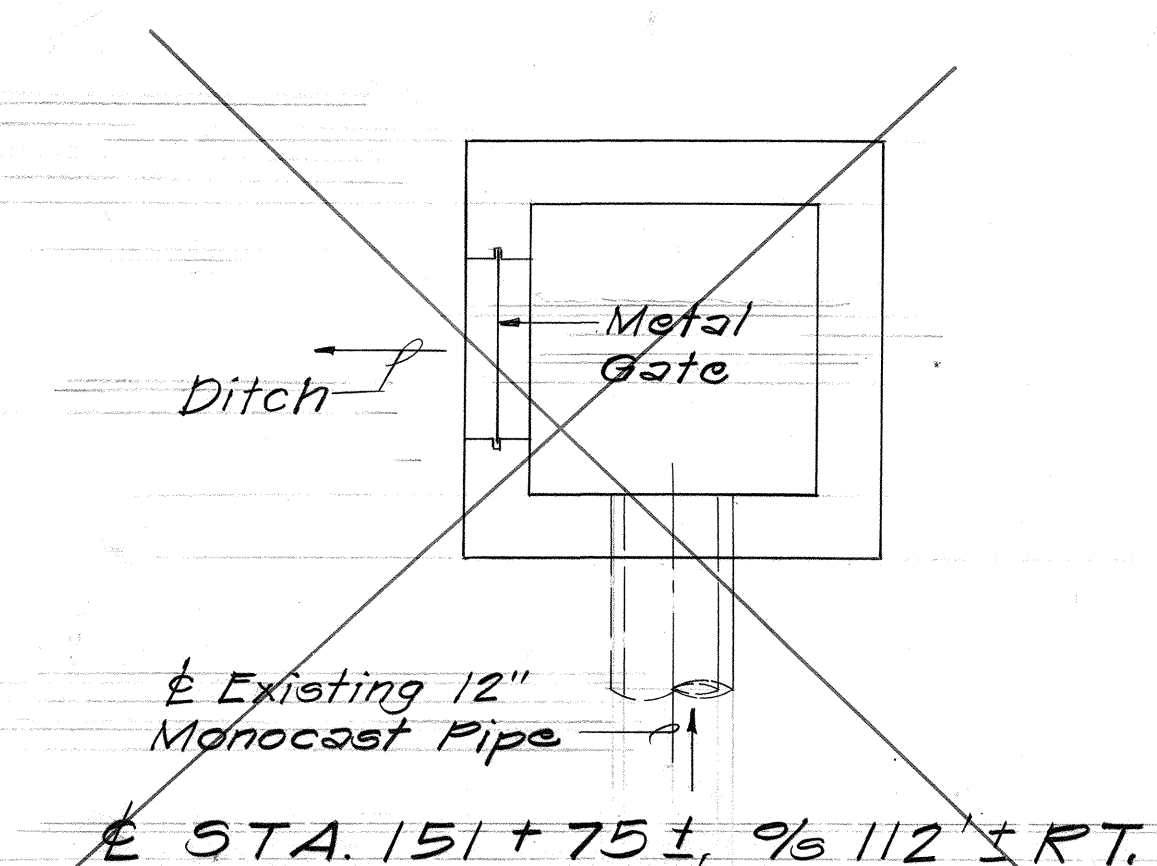
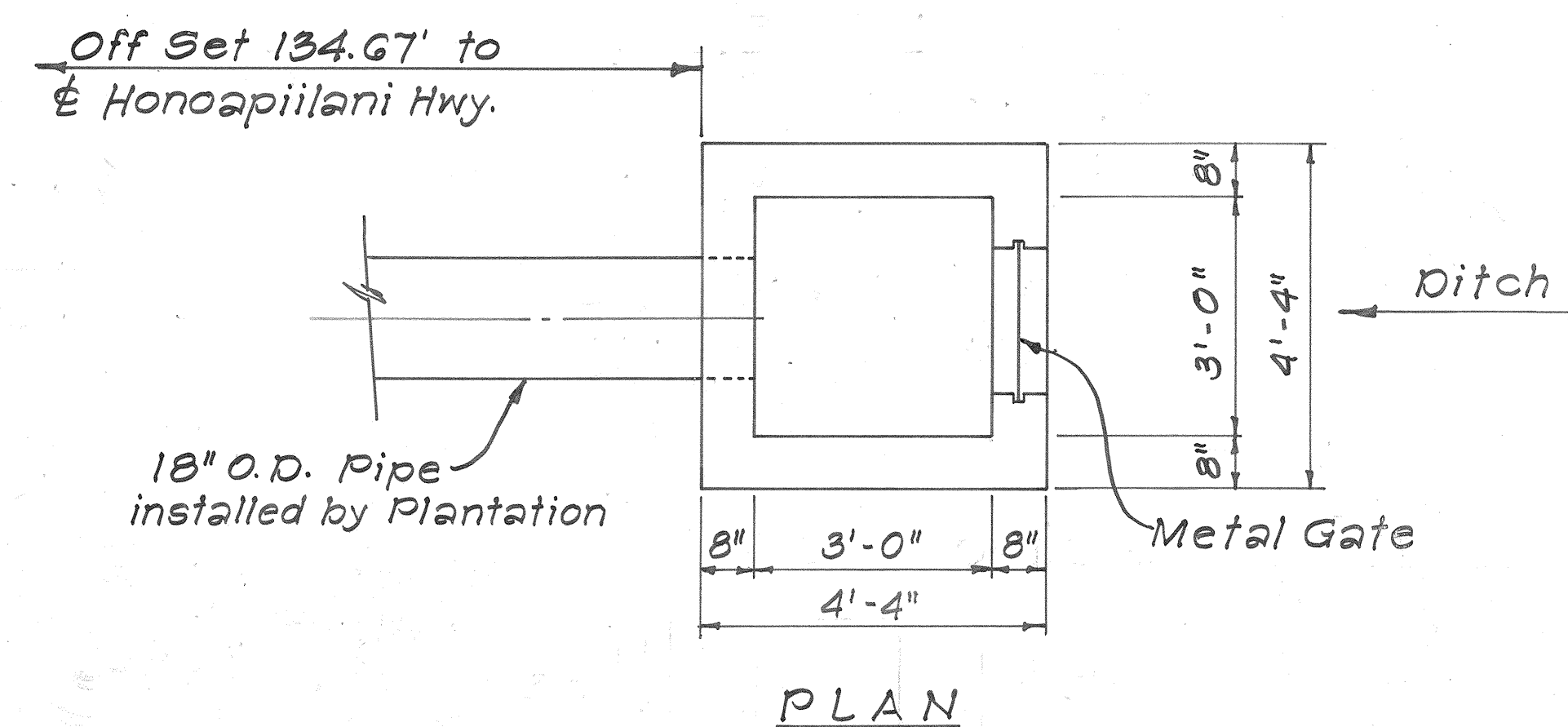
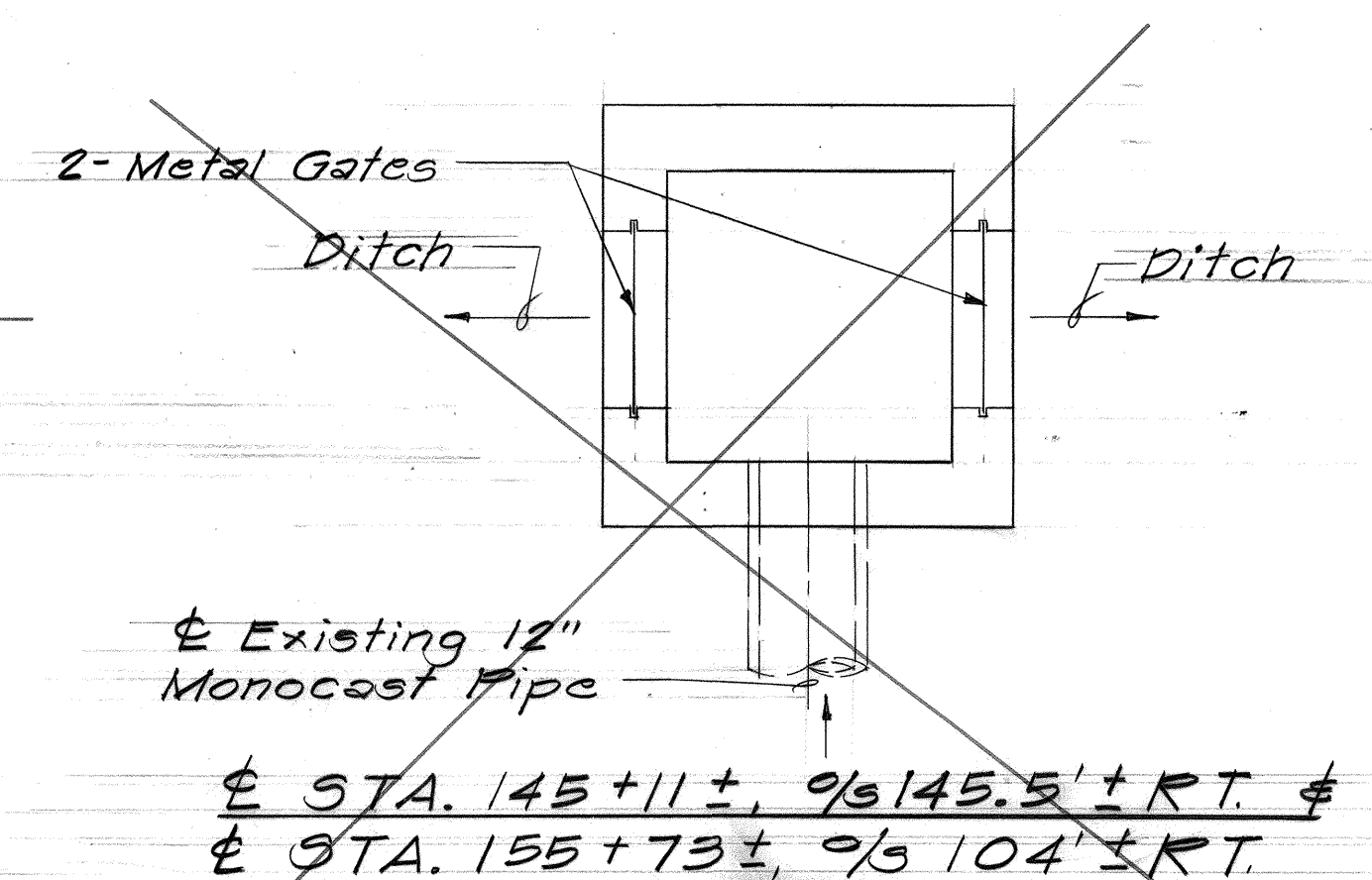
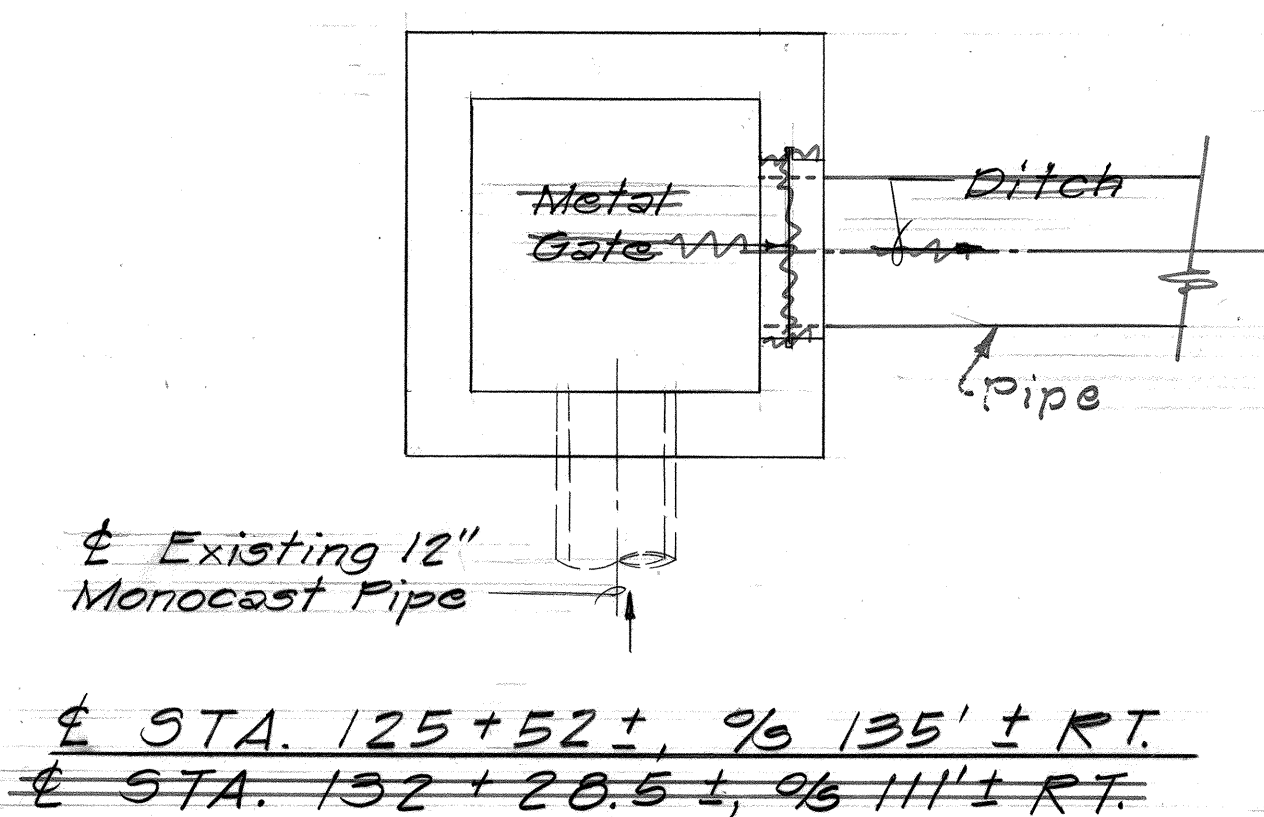
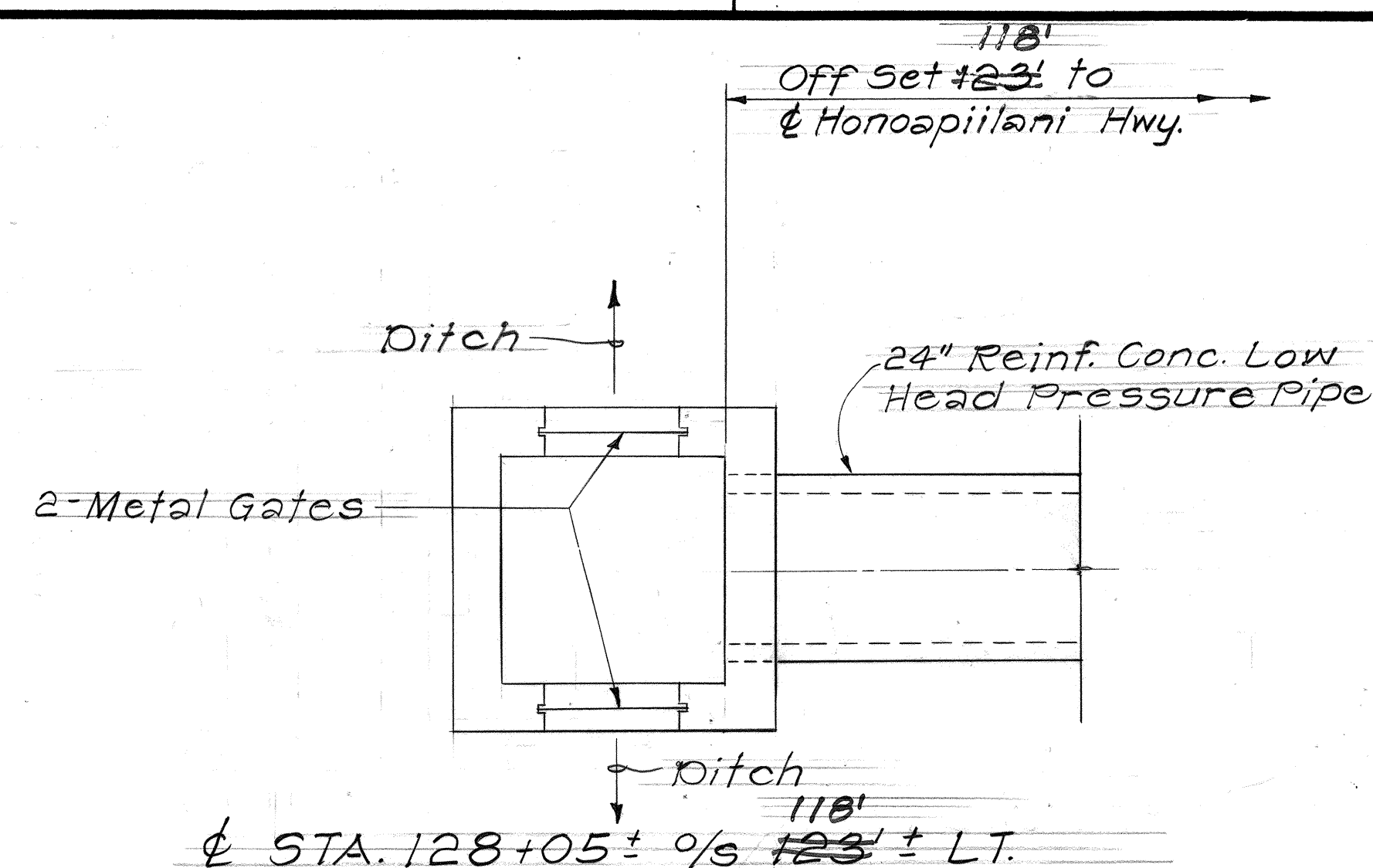
HONOAPIILANI HIGHWAY
Kahana to Aiealoe
F.A. Proj. No. F-030-1(13)

Scale: As Shown Date: Sept, 1977
SHEET NO. 71 OF 8 SHEETS

C073

ORIGINAL PLAN	DATE
DESIGNED BY	
TRACED BY	
NOTED BY	
CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F030-1(13)	1978	CO 74	174



- NOTES:
1. For reinforcing of concrete distribution box see sheet no. 71.
 2. For details of Metal Frame and Gate see sheet no. 71.
 3. Ditch to be constructed by the Plantation.

DETAIL OF CONCRETE DISTRIBUTION BOX
AT & STA 128+05 %s 134.67' RT.
Scale: 1/2" = 1'-0"

NOTE: 1. For reinforcing and dimensions of distribution boxes, see sht. no. 7I

2. For details of Metal Frames and Gates, see sht. no. 7I

3. All ditches to be constructed by the Plantation.

£ STA. 134 + 69 ±, 9/5 21' ± Lt.

PLAN OF CONCRETE DISTRIBUTION BOXES

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

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

13 Nov '70	Tracing revised to show detail of box at Sta. 128+05%±123' LT.
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

IRRIGATION DETAILS

HONOAPIILANI HIGHWAY
Kahana to Alaelo
F.A. Proj. No. F-030-1(13)

Scale: As Shown Date: Sept., 1977

SHEET No. 81 OF 8 SHEETS

CO 74