

DRAINAGE SUMMARY

PROJECT: INTERSTATE ROUTE H 2, MILILANI INTERCHANGE
(Waikakalaua Gulch to Kipapa Gulch)
PROJECT NO.: 1-H 2-1(7):4

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H2-1(7):4	1973	87	229

ITEM NO.		206.01	206.70	503.001	503.201	602.101	603.001/0	603.208/4	603.208/8	603.722/2		603.300/2	603.302/2	603.305/0	603.307/0	603.313/8	603.307/4	603.313/4	612/0	618/0	622/2	622/7	622/8	655/0	722/0	728/0	734/0	738/0	744/8	750/0	201	202	232	236	237	239	252	341/0	612.01				
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.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	Ea.	Ea.	Ea.	Ea.	Ea.	Ea.	L.F.	L.F.	C.Y.				
TYPE OF STRUCTURE	STATION (FROM - TO)	Structure Excavation Other Than at Bridges	Structural Backfill for Structural Plate Culverts	Concrete Other Than in Bridges	Class B Concrete Other Than in Bridges	Reinforcing Steel Other Than in Bridges	Bed Course Material for Culvert	24-Inch CMP, Sht. 4'x0.109"	36-Inch CMP, Sht. 4'x0.109"	24-Inch CMP, Sht. 4'x0.109 or 24-Inch RCP, Cl. II or 24-Inch ACP, Cl. II		60-Inch Structural Plate Pipe No. 12 Gauge	132-Inch Structural Plate Pipe No. 12 Gauge	60-Inch Structural Plate Pipe No. 10 Gauge	120-Inch Structural Plate Pipe No. 10 Gauge	144-Inch Structural Plate Pipe No. 8 Gauge	132-Inch Structural Plate Pipe No. 10 Gauge	132-Inch Structural Plate Pipe No. 8 Gauge	48-Inch CMP, Sht. 4'x0.109" or 48-Inch RCP, Cl. III	54-Inch CMP, Sht. 4'x0.109" or 48-Inch RCP, Cl. III	60-Inch CMP, Sht. 4'x0.109" or 48-Inch RCP, Cl. III	60-Inch CMP, Sht. 4'x0.109" or 54-Inch RCP, Cl. III	60-Inch CMP, Sht. 4'x0.109" or 54-Inch RCP, Cl. II	60-Inch Structural Plate Pipe No. 8 Ga. or 54-Inch RCP, Cl. II	24-Inch CMP, Sht. 4'x0.109" or 24-Inch RCP, Cl. III or 24-Inch ACP, Cl. III	30-Inch CMP, Sht. 4'x0.109" or 24-Inch RCP, Cl. III or 24-Inch ACP, Cl. III	30-Inch CMP, Sht. 4'x0.109" or 30-Inch RCP, Cl. III or 30-Inch ACP, Cl. III	36-Inch CMP, Sht. 4'x0.109" or 30-Inch RCP, Cl. III or 30-Inch ACP, Cl. III	36-Inch CMP, Sht. 4'x0.109" or 36-Inch RCP, Cl. III or 36-Inch ACP, Cl. III	42-Inch CMP, Sht. 4'x0.109" or 36-Inch RCP, Cl. III or 36-Inch ACP, Cl. III	Type A C.I. Frame & Cover	Type B C.I. Frame & Cover	Type A-12 Steel Frame & Grate	Type 616/4 Steel Frame & Grate	Type 616/6 Steel Frame & Grate	Installing Finished Type 616/6 Steel Frame & Grate	Debris Rack	132-Inch Structural Plate Pipe No. 1 Ga.	Grouted Rubble Paving				
"C2" C.B.	141+33 ± Lt.	55		6.0		384																			60						1												
61614 C.D.I	141+33 ±	47		3.0		40																			60											1							
"B2" C.B.	141+33 ± Rt.	33		9.0		384																										1											
"C2" C.B.	143+50 ± Lt.	52		5.5		384																			60							1											
61614 C.D.I	143+50 ±	46		3.0		40																			60											1							
"B2" C.B.	143+50 ± Rt.	234		6.5		384																										1											
"C2" C.B.	145+50 ± Lt.	52		5.5		384																			60							1											
61614 C.D.I	145+50 ±	47		3.0		40																			60											1							
"B2" C.B.	145+50 ± Rt.	202		6.5		384																										1											
61616 C.D.I	147+50 ±	202		3.5		47																			196													1					
61616 C.D.I	149+50 ±	201		3.5		47																			196													1					
61616 C.D.I	154+50 ±	45		3.0		47																			54													1					
61614 C.D.I	154+50 ± Rt.	164		2.0		40																			246													1					
61616 C.D.I	157+00 ±	45		3.0		47																			54													1					
61614 C.D.I	157+00 ± Rt.	164		2.0		47																			246													1					
61616 C.D.I	159+50 ±	47		3.5		47																			54													1					
61614 C.D.I	159+50 ± Rt.	215		2.5		40																															1						
Std. CHW'S	161+50 Lt. 96/114 ±	179			3.0	84				274																																	
61616 C.D.I	162+00 ±	45		3.0		47																			54													1					
61614 C.D.I Std. CHW	162+00 ± Rt.	45		2.0	2.5	91																															1						
144" Culvert Inlet & Outlet Structures	164+46 ±	678	200	83.0		7210	266																																				
61616 C.D.I	166+00 ±	45		3.0		47																				54													1				
61614 C.D.I Std. CHW	166+00 ± Rt.	27		2.5	1.5	82																				22												1					
61614 C.D.I	168+00 ± Rt.	133		2.0		40																															1						
61614 C.D.I	170+00 ± Lt.	55		2.0		40																															1						
61616 C.D.I	170+00 ±	344		3.0		47																																1					
61616 C.D.I	173+00 ±	455		3.5		47																																1					

DRAINAGE SUMMARY

PROJECT: INTERSTATE ROUTE H 2, MILILANI INTERCHANGE
(Waikakalaua Gulch to Kipapa Gulch)
PROJECT NO.: 1-H 2-1(7):4

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7)-4	1973	88	229

ITEM NO.		206. O1	206. 70	503 001	503 201	602. 101	603. 0010	603. 2084	603. 2088	603. 7222
UNIT	USED	C.Y.	C.Y.	C.Y.	C.Y.	L.b.	C.Y.	Z.F.	Z.F.	Z.F.
TYP OF STRUC TURE	STATION (FROM - TO)	Structure Excavation Other Than at Bridges	Structural Backfill for Structural Plate Culverts	Concrete Other Than in Bridges	Class B Concrete Other Than in Bridges	Reinforcing Steel Other Than in Bridges	Bed Course Material for Culvert	24-Inch CMP Sht. "4"x0.109"	36-Inch CMP Sht. "4"x0.109"	24-Inch CMP Sht. "4"x0.109" or 24-Inch RCP Cl. II or 24-Inch ACP Cl. IV
		60- Inch Structural Plate Pipe No. 12 Gauge	132- Inch Structural Plate Pipe No. 12 Gauge	60- inch Structural Plate Pipe No. 10 Gauge	120- Inch Structural Plate Pipe No. 10 Gauge	144- Inch Structural Plate Pipe No. 8 Gauge	132- Inch Structural Plate Pipe No. 10 Gauge	132- Inch Structural Plate Pipe No. 8 Gauge	48- Inch CMP Sht. "4"x0.109" or 48-Inch RCP, CL III	54- Inch CMP Sht. "4"x0.109" or 48-Inch RCP, CL III
		60- Inch CMP Sht. "4"x0.109" or 54-Inch RCP, CL IV	60- Inch Structural Plate Pipe No. 8 Ga. or 54-Inch RCP, CL V	24-Inch CMP Sht. "4"x0.109" or 24-Inch RCP, CL III or 24-Inch ACP, CL III	30-Inch CMP Sht. "4"x0.109" or 24-Inch RCP, CL III or 24-Inch ACP, CL III	30-Inch CMP Sht. "4"x0.109" or 30-Inch RCP, CL III or 30-Inch ACP, CL III	36-Inch CMP Sht. "4"x0.109" or 30-Inch RCP, CL III or 30-Inch ACP, CL III	36-Inch CMP Sht. "4"x0.109" or 36-Inch RCP, CL III or 36-Inch ACP, CL III	42-Inch CMP Sht. "4"x0.109" or 36-Inch RCP, CL III or 36-Inch ACP, C.I. III	Type A C.I. Frame & Cover
		Type D C.I. Frame & Cover	Type A-IE Steel Frame & Grate	Type GIGI4 Steel Frame & Grate	Type GIGI6 Steel Frame & Grate	Installing Furnished Type GIGI6 Steel Frame & Grate	Debris Rack	132-Inch Structural Plate Pipe No. 1 Ga.	Grouted Rubble Paving	
G/G I/G C/D I	+/- 176+00 ±	554		4.0		47				296
"C2" CB	+/- 178+00 ± Rt.	131		5.5		384				
G/G I/G C/D I	+/- 179+00 ±	554		4.0		47				296
"C2" CB	+/- 180+00 ± Rt.	131		5.5		384				
"C2" CB	+/- 182+00 ± Rt.	69		5.5		384				
G/G I/G C/D I	+/- 182+00 ±	569		4.0		47				232
"C2" CB	+/- 184+00 ± Rt.	76		7.0		384				78
G/G I/G C/D I	+/- 184+35 ± Lt.	63		3.0		47				70
G/G I/G C/D I	+/- 184+35 ±	562		4.0		47				212
"C2" CB	+/- 186+00 ± Rt.	56		7.0		384				86
G/G I/G C/D I	+/- 186+50 ± Lt.	66		3.0		47				70
G/G I/G C/D I	+/- 186+50 ±	285		5.0		47				112
2'-132" Culvert, Inlet & Outlet Str. # 3-C/D's	+/- 187+90 ±	10290	15880	2595		10457	2647	14	12	336
"C2" CB	+/- 190+00 ± Rt.	172		7.0		384				198
Median C/D I	+/- 190+90 ± Rt.	52		3.0						76
G/G I/G C/D I	+/- 190+90 ± Lt.	341		3.0		47				196
"C2" CB	+/- 192+00 ± Rt.	190		8.0		384				198
"C2" CB	+/- 194+00 ± Rt.	48		8.0		384				68
G/G I/G C/D I	+/- 194+00 ±	52		3.5		47				68
G/G I/G C/D I	+/- 194+00 ± Lt.	381		4.0		47				288
G/G I/G C/D I	+/- 197+00 ±	66		3.5		47				68
G/G I/G C/D I	+/- 197+00 ± Lt.	380		4.5		47				288
"C2" CB	I.B. +/- 199+50 ± Rt.	87		8.0		384				84
G/G I/G C/D I	I.B. +/- 200+00 ± Lt.	64		3.0		47				66
G/G I/G C/D I	O.B. +/- 200+00 ± Lt.	440		5.5		47				294
G/G I/G C/D I	I.B. +/- 203+00 ± Lt.	51		3.5		47				68
G/G I/G C/D I	O.B. +/- 203+00 ± Lt.	449		5.5		47				194

DRAINAGE

S U M M A R Y

PROJECT: INTERSTATE ROUTE H 2, MILILANI INTERCHANGE
(Waikakalaua Gulch to Kipapa Gulch)
PROJECT NO.: I-H 2-1(7):4

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-42-1(7)-4	1973	89	229

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DRAINAGE SUMMARY

PROJECT: INTERSTATE ROUTE H 2, MILILANI INTERCHANGE
(Waikakalaua Gulch to Kipapa Gulch)
PROJECT NO.: 1-H 2-1(7):4

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H2-1(7):4	1973	20	229

ITEM NO.		206	206	503	503	602	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	604	604	604	604	604	604	604	603	612		
		01	70	001	201	101	0010	2084	2088	7222	3002	3026	3050	3070	3138	3074	3134	6120	6180	6296	6297	6298	6550	7220	7280	7340	7380	7448	7500	201	202	232	236	237	239	252	3410	01	
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.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	Ea.	Ea.	Ea.	Ea.	Ea.	Ea.	L.F.	L.F.	C.Y.		
TYPE OF STRUCTURE	STATION (FROM - TO)	Structure Excavation Other Than at Bridges	Structural Backfill for Structural plate Culverts	Concrete Other Than in Bridges	Class B Concrete Other Than in Bridges	Reinforcing Steel Other Than in Bridges	Bed Course Material for Culvert	24-Inch CMP, Sht. 4"x0.109"	36-Inch CMP, Sht. 4"x0.109"	24-Inch CMP Sht. 4"x0.109" or 24-Inch RCP, C.I. III or 24-Inch ACP, C.I. III	60-Inch Structural Plate Pipe No. 12 Gage	132-Inch Structural Plate Pipe No. 12 Gage	60-Inch Structural Plate Pipe No. 10 Gage	120-Inch Structural Plate Pipe No. 10 Gage	144-Inch Structural Plate Pipe No. 8 Gage	132-Inch Structural Plate Pipe No. 10 Gage	132-Inch Structural Plate Pipe No. 8 Gage	48-Inch CMP Sht. 4"x0.109" or 48-Inch RCP, C.I. III	54-Inch CMP, Sht. 4"x0.109" or 48-Inch RCP, C.I. III	60-Inch CMP Sht. 4"x0.109" or 48-Inch RCP, C.I. III	60-Inch CMP, Sht. 4"x0.109" or 54-Inch RCP, C.I. III	60-Inch CMP, Sht. 4"x0.109" or 54-Inch RCP, C.I. IV	60-Inch Structural Plate Pipe No. 8 Gage or 54-Inch RCP, C.I. III	24-Inch CMP Sht. 4"x0.109" or 24-Inch RCP, C.I. III or 24-Inch ACP, C.I. III	30-Inch CMP Sht. 4"x0.109" or 24-Inch RCP, C.I. III or 24-Inch ACP, C.I. III	30-Inch CMP Sht. 4"x0.109" or 30-Inch RCP, C.I. III or 30-Inch ACP, C.I. III	36-Inch CMP Sht. 4"x0.109" or 30-Inch RCP, C.I. III or 30-Inch ACP, C.I. III	36-Inch CMP Sht. 4"x0.109" or 36-Inch RCP, C.I. III or 36-Inch ACP, C.I. III	42-Inch CMP Sht. 4"x0.109" or 36-Inch RCP, C.I. III or 36-Inch ACP, C.I. III	Type A C.I. Frame & Cover	Type B C.I. Frame & Cover	Type A-12 Steel Frame & Grate	Type G1614 Steel Frame & Grate	Type G1616 Steel Frame & Grate	Installing Furnished Type G1616 Steel Frame & Grate	Debris Rack	132-Inch Structural Plate Pipe No. 1 Gage	Grouted Rubble Paving	
RAMP MW-1																																							
"B2" CB	7+00±Lt	74		7.0		384																		86						1									
"B2" CB	10+00±Lt	86		7.0		384																		92						1									
"B2" CB	13+50±Lt	102		5.5		384																		146						1									
"D2" CB	15+00±Lt	256		5.0		366																					150			1									
"C2" CB	16+25±Lt	.88		5.5		384																		122						1									
RAMP MW-2																																							
"C2" CB	19+00±Lt	175		5.5		384																		272						1									
STD CHW	22+00±Rt+71±	188			3.0	60																						260											
G1G14 CDI	22+58±Rt	26		2.0		40																		28										1					
G1G14 CDI	22+50±Lt	48		3.0	2.5	91																												1					
"C"SDMH	24+80±Lt	167		6.0		209																								1									
RAMP WM-1																																							
G1G14 CDI	7+00±Rt	55		2.0		40																		74										1					
"C2" CB	10+25±Rt	158		5.5		384																		192						1									
"D2" CB	12+17±Rt	160		5.0		366																					124			1									
"B2" CB	13+75±Rt	133		5.5		384																		154						1									
G1G14 CDI STD CHW	19+00±Rt	24		2.0	1.5	82																		20										1					
G1G14 CDI	21+25±Rt	75		2.5		40																		102										1					
G1G14 CDI	26+60±Lt	33		2.0		40																		38										1					
"C" CB	26+97±Rt	51		7.0	1.5	150																		46						1									

DRAINAGE SUMMARY

PROJECT: INTERSTATE ROUTE H 2, MILILANI INTERCHANGE
(Waikakalua Gulch to Kipapa Gulch)
PROJECT NO.: 1-H 2-1(7):4

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H2-1(7):4	1973	91	229

ITEM NO.		206.01	206.70	503.001	503.201	602.101	603.0010	603.2084	603.2088	603.7222		603.3002	603.3022	603.3050	603.3070	603.3138	603.3074	603.3134	603.6120	603.6180	603.6296	603.6297	603.6298	603.6550	603.7220	603.7280	603.7340	603.7380	603.7448	603.7500	604.201	604.202	604.232	604.236	604.237	604.239	604.252	603.3410	612.01						
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.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	Ea.	Ea.	Ea.	Ea.	Ea.	Ea.	L.F.	L.F.	C.Y.						
TYPE OF STRUCTURE	STATION (FROM - TO)	Structure Excavation Other Than at Bridges	Structural Backfill for Structural plate Culverts	Concrete Other Than in Bridges	Class B Concrete Other Than in Bridges	Reinforcing Steel Other Than in Bridges	Bed Course Material for Culvert	24-Inch CMP Sht. 4"x0.109"	36-Inch CMP Sht. 4"x0.109"	24-Inch CMP Sht. 4"x0.109" or 24-Inch RCP C.I. IV or 24-Inch ACP C.I. IV		60-Inch Structural Plate Pipe No. 12 Gage	132-Inch Structural Plate Pipe No. 12 Gage	60-Inch Structural Plate Pipe No. 10 Gage	120-Inch Structural Plate Pipe No. 10 Gage	144-Inch Structural Plate Pipe No. 8 Gage	132-Inch Structural Plate Pipe No. 10 Gage	132-Inch Structural Plate Pipe No. 8 Gage	48-Inch CMP Sht. 4"x0.109" or 48-Inch RCP, C.I. III	54-Inch CMP Sht. 4"x0.109" or 48-Inch RCP, C.I. III	60-Inch CMP Sht. 4"x0.109" or 48-Inch RCP, C.I. III	60-Inch CMP Sht. 4"x0.109" or 54-Inch RCP, C.I. III	60-Inch CMP Sht. 4"x0.109" or 54-Inch RCP, C.I. IV	60-Inch Structural Plate Pipe No. 8 Ga. or 54-Inch RCP, C.I. IV	24-Inch CMP Sht. 4"x0.109" or 24-Inch RCP, C.I. III or 24-Inch ACP, C.I. III	30-Inch CMP Sht. 4"x0.109" or 24-Inch RCP, C.I. III or 24-Inch ACP, C.I. III	30-Inch CMP Sht. 4"x0.109" or 30-Inch RCP, C.I. III or 30-Inch ACP, C.I. III	36-Inch CMP Sht. 4"x0.109" or 30-Inch RCP, C.I. III or 30-Inch ACP, C.I. III	36-Inch CMP Sht. 4"x0.109" or 36-Inch RCP, C.I. III or 36-Inch ACP, C.I. III	48-Inch CMP Sht. 4"x0.109" or 36-Inch RCP, C.I. III or 36-Inch ACP, C.I. III	Type A C.I. Frame & Cover	Type B C.I. Frame & Cover	Type A-12 Steel Frame & Grate	Type 61614 Steel Frame & Grate	Type 61616 Steel Frame & Grate	Installing Furnished Type 61616 Steel Frame & Grate	Debris Rack	132-Inch Structural Plate Pipe No. 1 Ga.	Grouted Rubble Paving						
RAMP HM-1																																													
61614 CDI	10+25±Rt	25		2.0		40																				26																			
61614 CDI STD CHW	10+20±Lt	48		2.0	1.5	82																				58																			
"A2" CB	15+50±Lt	201		8.0		462																				288						1													
"A2" CB	18+50±Lt	52		8.5		462																				48						1													
"B2" CB	21+50±Lt	775		10.0		384																292										1													
RAMP MH-2																																													
"B" CB STD CHW	4+28±Rt	48		7.0	1.5	150																				42							1												
61614 CDI	4+60±Lt	36		2.5		40																				40																			
61614 CDI	9+50±Rt	191		2.0		40																				294																			
RAMP MH-1																																													
"A2" CB	12+50±Rt	221		8.5		462																				298							1												
"C2" CB	15+50±Rt	35		7.5		384																				32							1												
"C2" CB	19+00±Rt	60		7.0		384																				90							1												
"C2" CB	22+00±Rt	56		7.0		384																				84							1												
"C2" CB	25+00±Rt	49		7.5		384																				80							1												
"A2" CB	28+48±Rt	625		7.5		462																			256								1												

DRAINAGE SUMMARY

PROJECT: INTERSTATE ROUTE H 2, MILILANI INTERCHANGE
(Waikakalaua Gulch to Kipapa Gulch)
PROJECT NO.: I-H 2-1(7):4

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H2-1(7)-4	1973	92	229

ITEM NO.		602	602	503	503	602	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	603	6
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DRAINAGE SUMMARY

PROJECT: INTERSTATE ROUTE H 2, MILILANI INTERCHANGE
(Waikakalaua Gulch to Kipapa Gulch)
PROJECT NO.: 1-H 2-1(7):4

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7):4	1973	93	229

[illegible]

DRAINAGE SUMMARY

PROJECT: INTERSTATE ROUTE H 2, MILILANI INTERCHANGE
(Waikakalaua Gulch to Kipapa Gulch)
PROJECT NO.: I-H 2-1(7):4

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7):4	1973	94	229

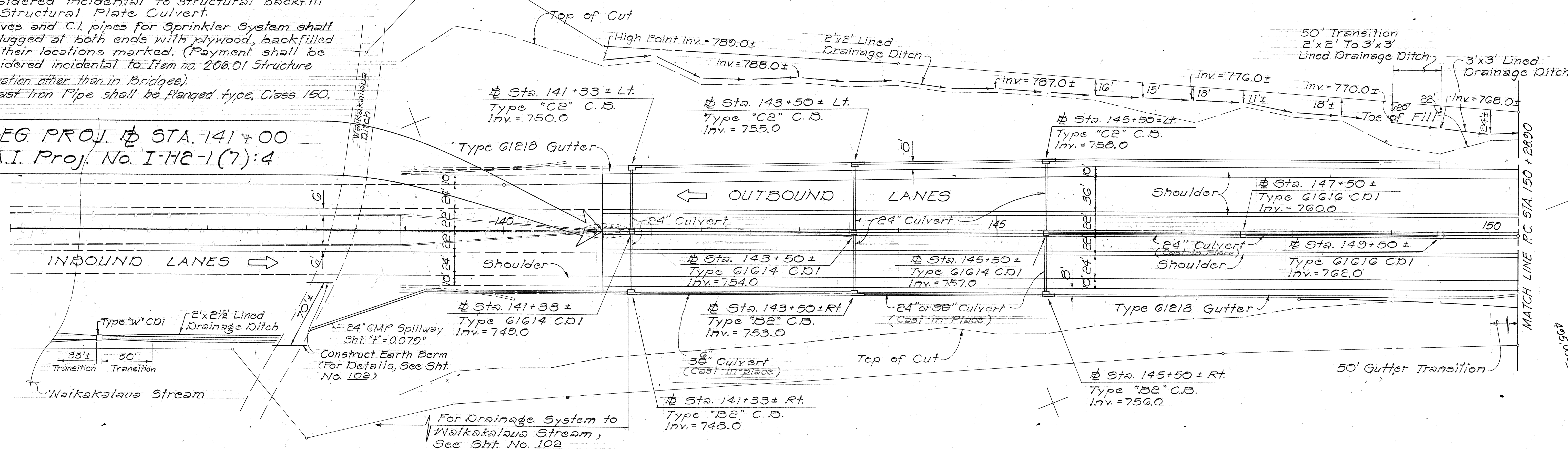
[illegible]

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7):4	1973	95	229

GENERAL DRAINAGE NOTE:

1. See typical section for gutter details.
2. See typical section and sheet no. 114 for underdrain details.
3. The exact location of drainage structures in Waikakalua and Kipapa Streams shall be determined by the engineer in the field.
4. All Structural Plate Culvert, shall be factory elongated 5% along the vertical diameter.
5. If large boulders are encountered during excavation, the contractor shall at random imbed the boulders at the outlet of the following culvert locations:
Sta. 164+46±, Sta. 187+90±, O.B. Sta. 212+30± and Rd. "B" Sta. 9+00±. The above work shall be considered incidental to structural backfill for Structural Plate Culvert.
6. Sleeves and C.I. pipes for Sprinkler System shall be plugged at both ends with plywood, backfilled and their locations marked. (Payment shall be considered incidental to Item no. 206.01 Structure Excavation other than in Bridges).
7. 6" Cast Iron Pipe shall be flanged type, Class 150.

BEG. PROJ. STA. 141+00
F.A.I. Proj. No. I-H2-1(7):4



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

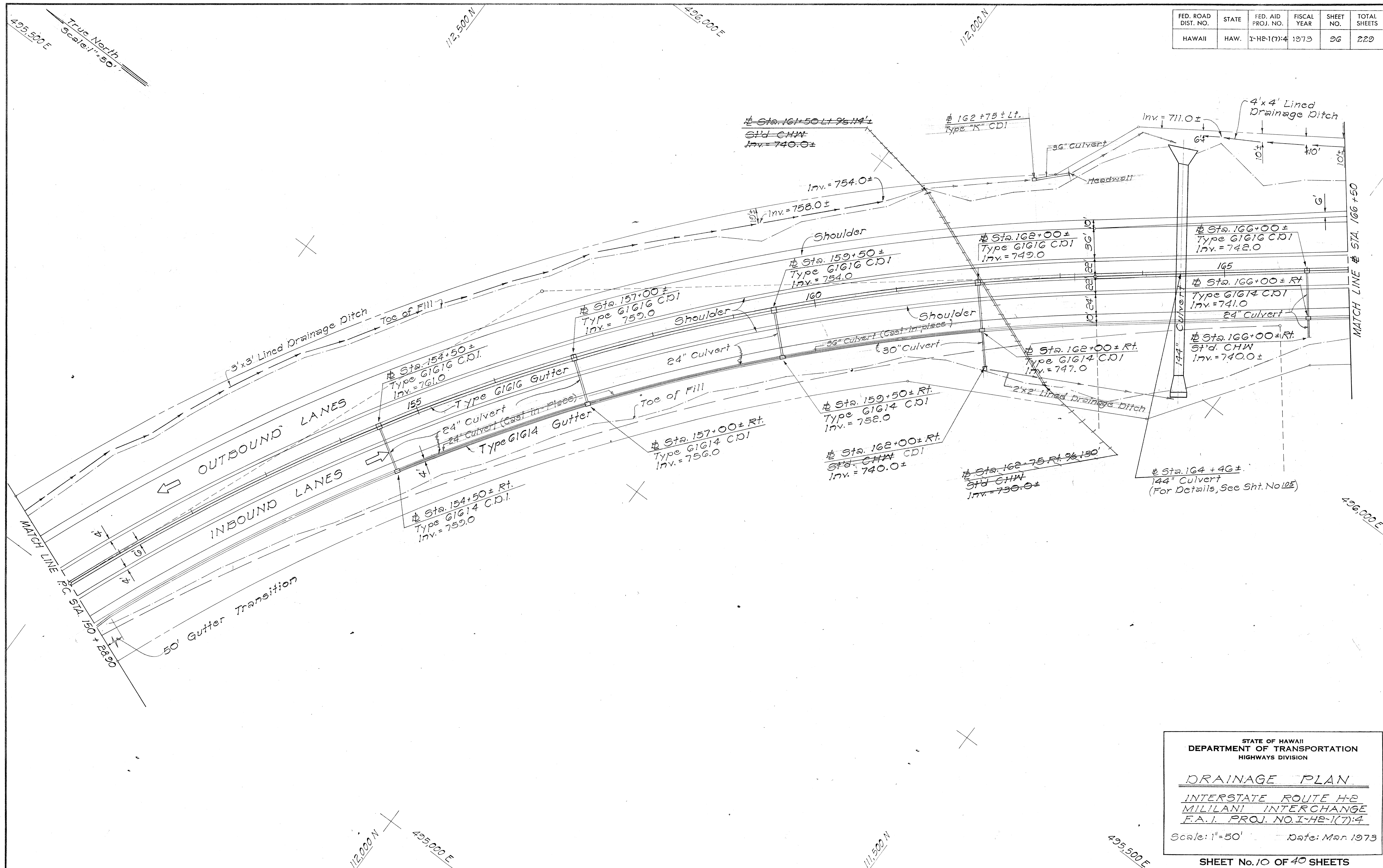
DRAINAGE PLAN

INTERSTATE ROUTE H2
MILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-1(7):4

Scale: 1" = 50' Date: Mar. 1973

SHEET No. 9 OF 40 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7):4	1973	96	229



ORIGINAL PLAN	DATE
DRAWN BY	
TRACED BY	
NOTED BY	
CHECKED BY	
No.	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

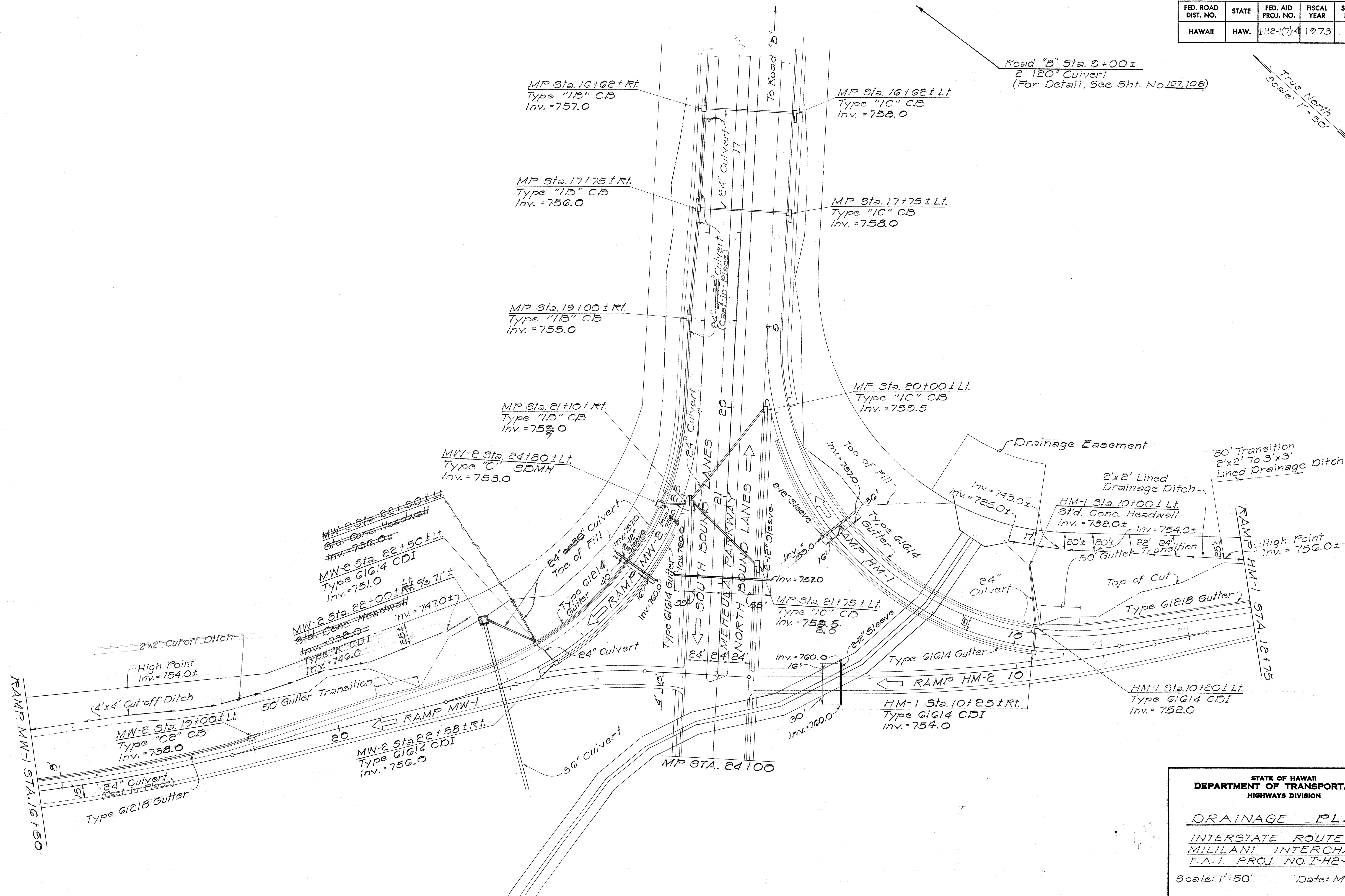
INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-1(7):4

Scale: 1"=50' Date: Mar. 1973

SHEET No. 10 OF 40 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-2-1(7):4	1973	98	229



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

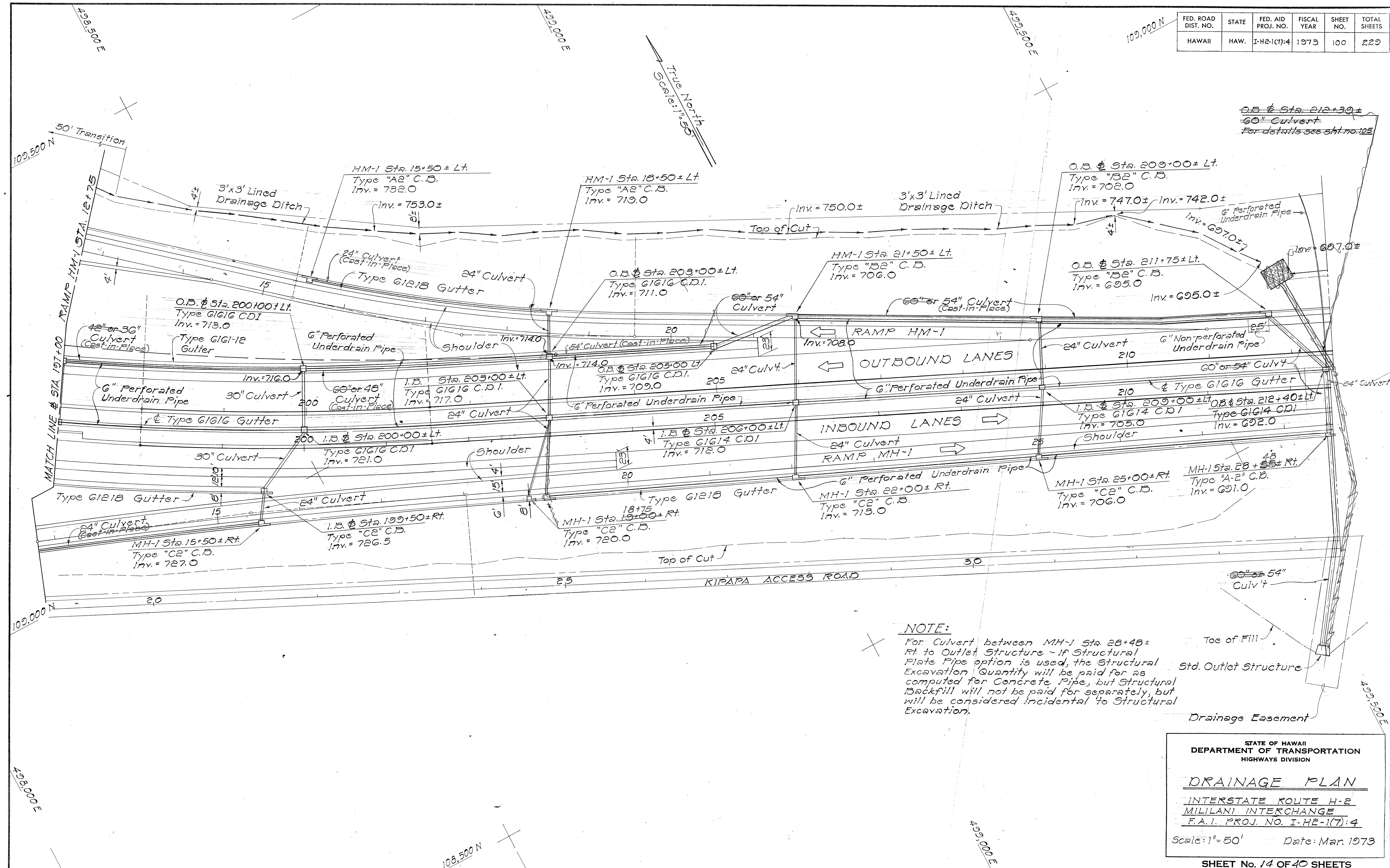
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-1(C):4

Scale: 1"=50' Date: Mar. 1973

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7)-4	1973	100	220



NOTE:
For Culvert between MH-1 Sta. 28+48± Rt. to Outlet Structure - if Structural Plate Pipe option is used, the Structural Excavation Quantity will be paid for as computed for Concrete Pipe, but Structural Backfill will not be paid for separately, but will be considered incidental to Structural Excavation.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

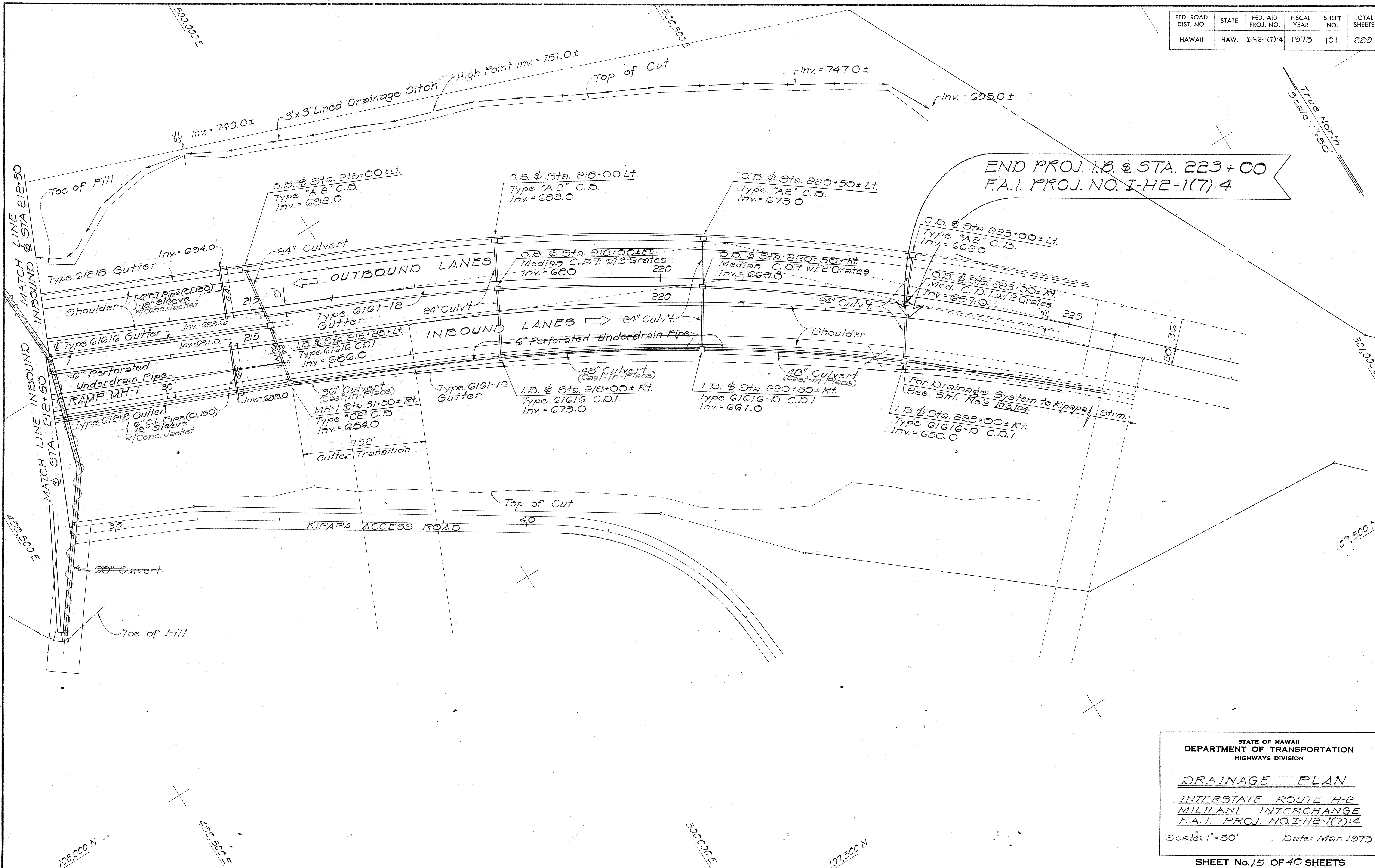
INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-1(7)-4

Scale: 1"=50' Date: Mar. 1973

SHEET No. 14 OF 40 SHEETS

DATE	_____
SURVEY PLOTTED BY	_____
DRAWN BY	_____
TRACED BY	_____
NOTED BY	_____
CHECKED BY	_____
NO.	_____

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7):4	1973	101	229



DATE	_____
DESIGNED BY	_____
DRAWN BY	_____
CHECKED BY	_____
NOTED BY	_____
NO.	_____

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

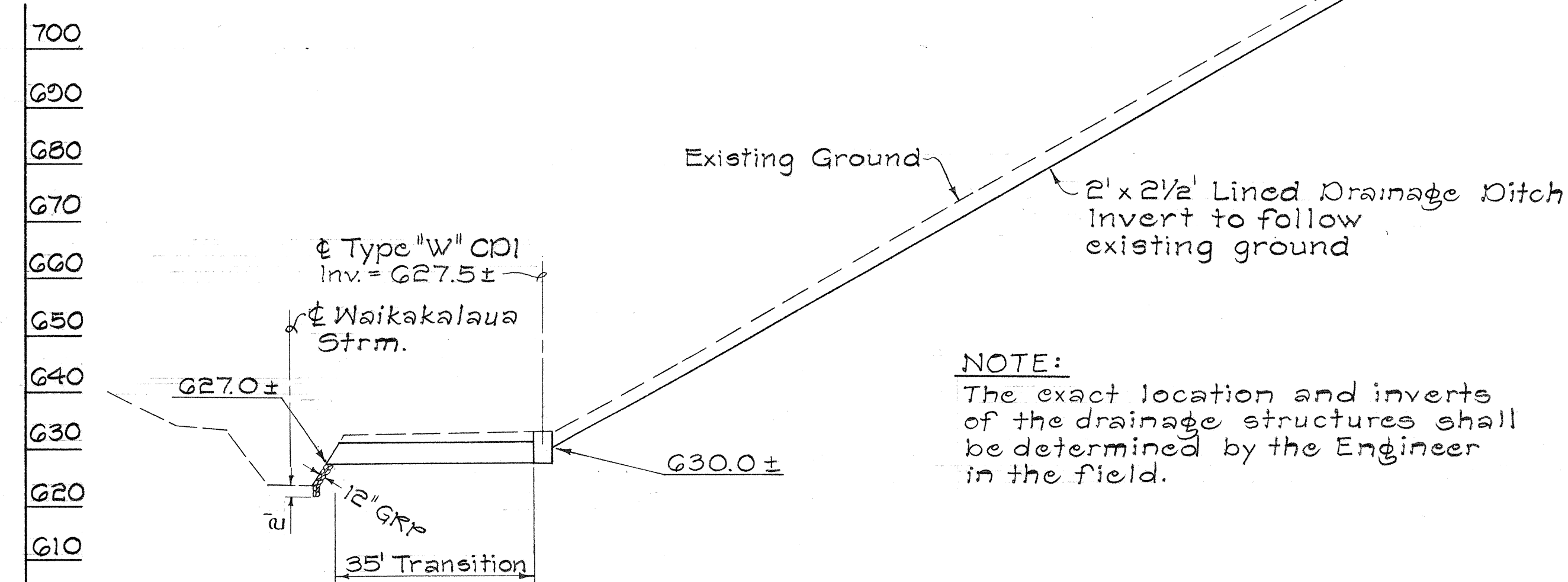
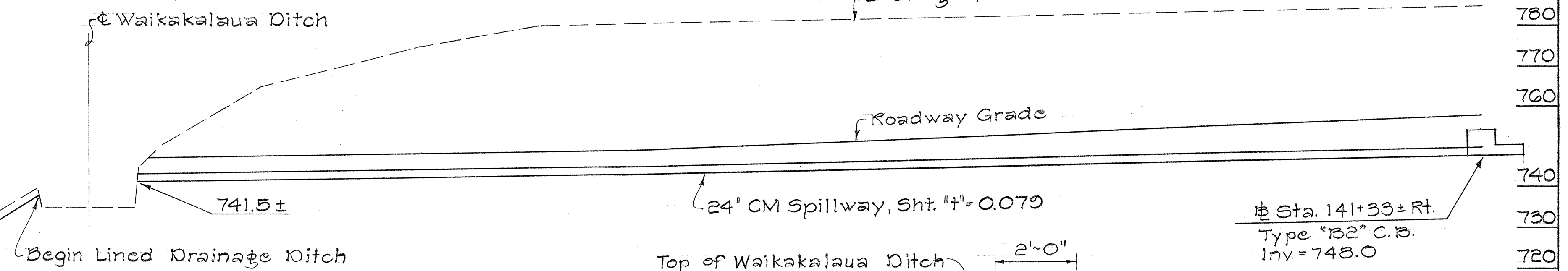
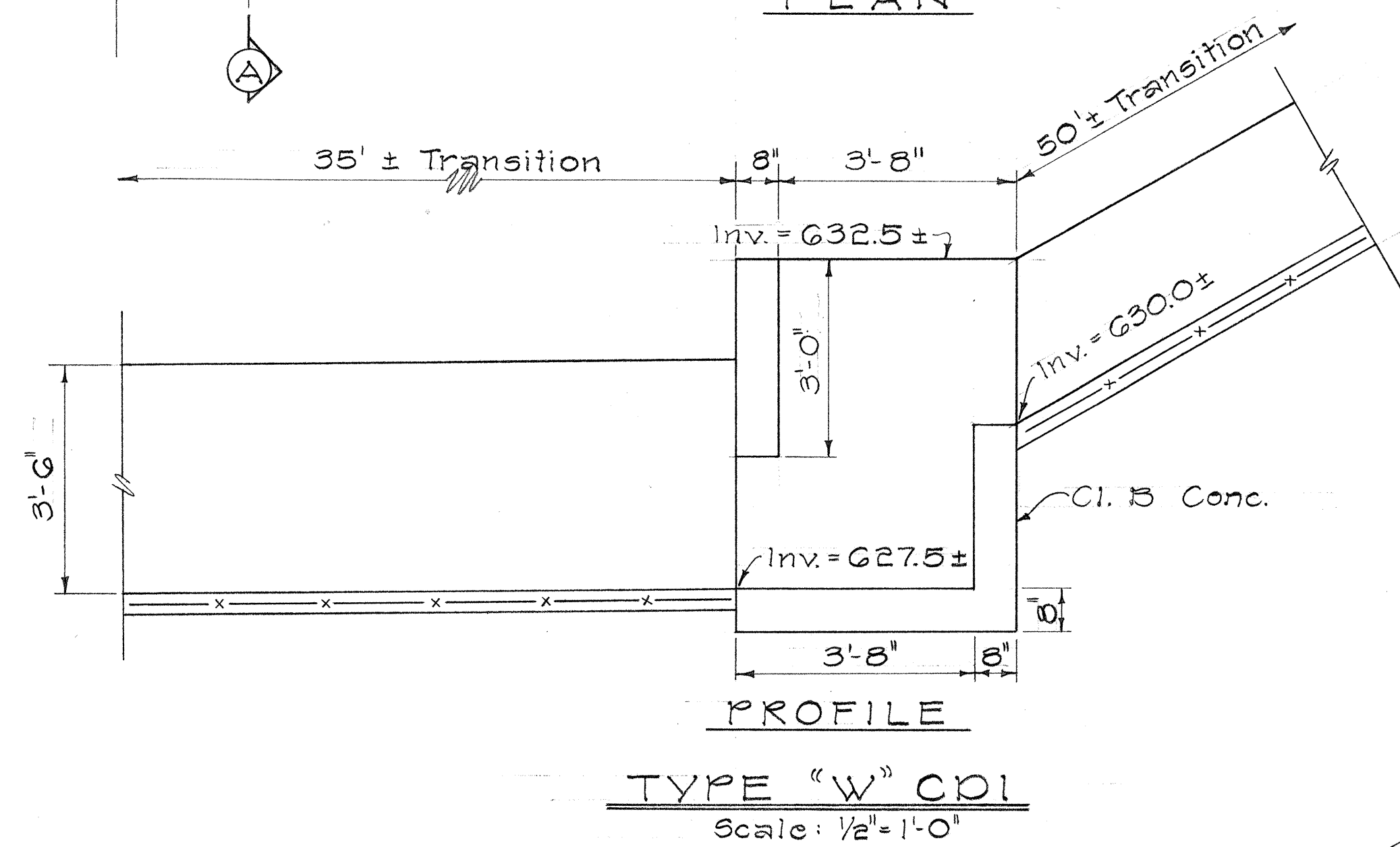
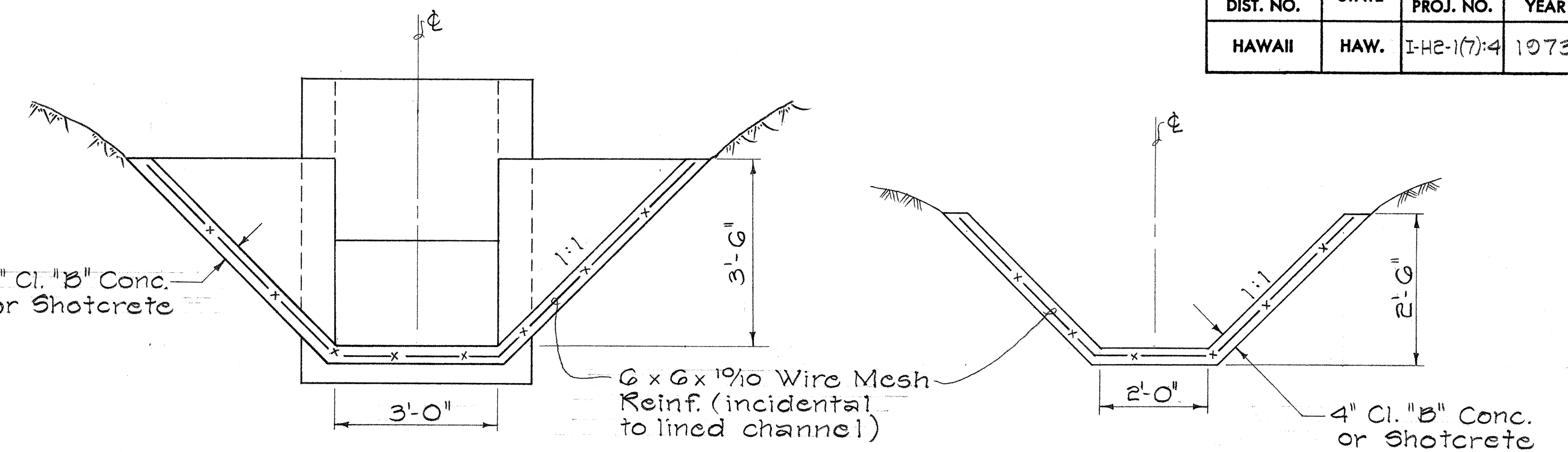
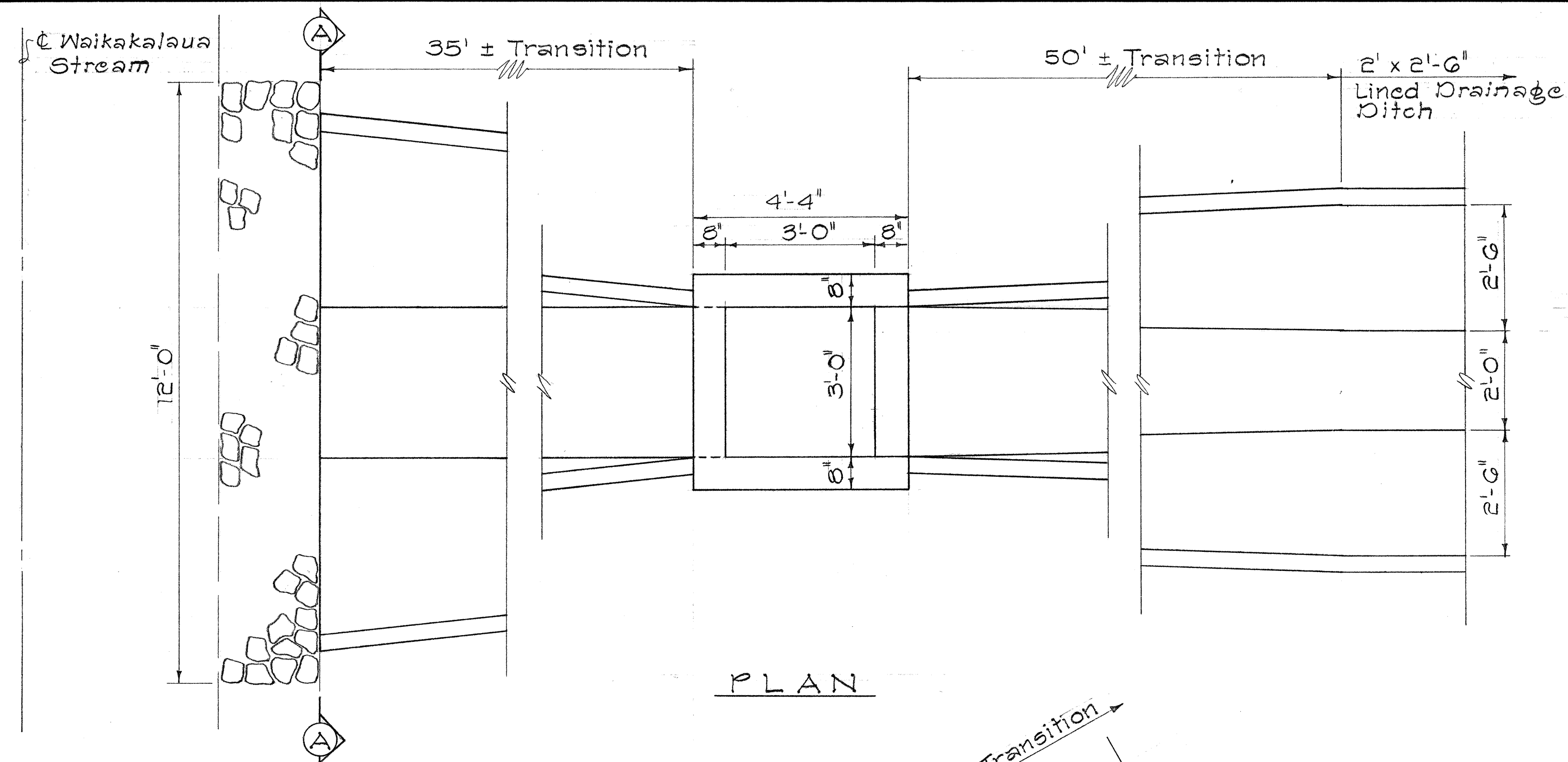
DRAINAGE PLAN

INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-1(7):4

Scale: 1"=50' Date: Mar 1973

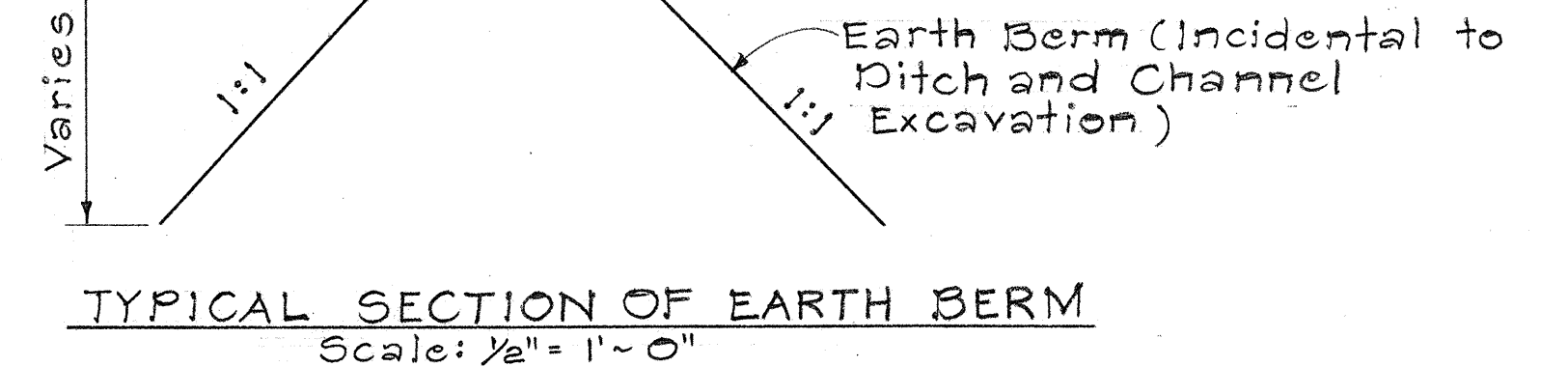
SHEET No. 15 OF 40 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-42-1(7):4	1973	102	229



NOTE:
The exact location and inverts of the drainage structures shall be determined by the Engineer in the field.

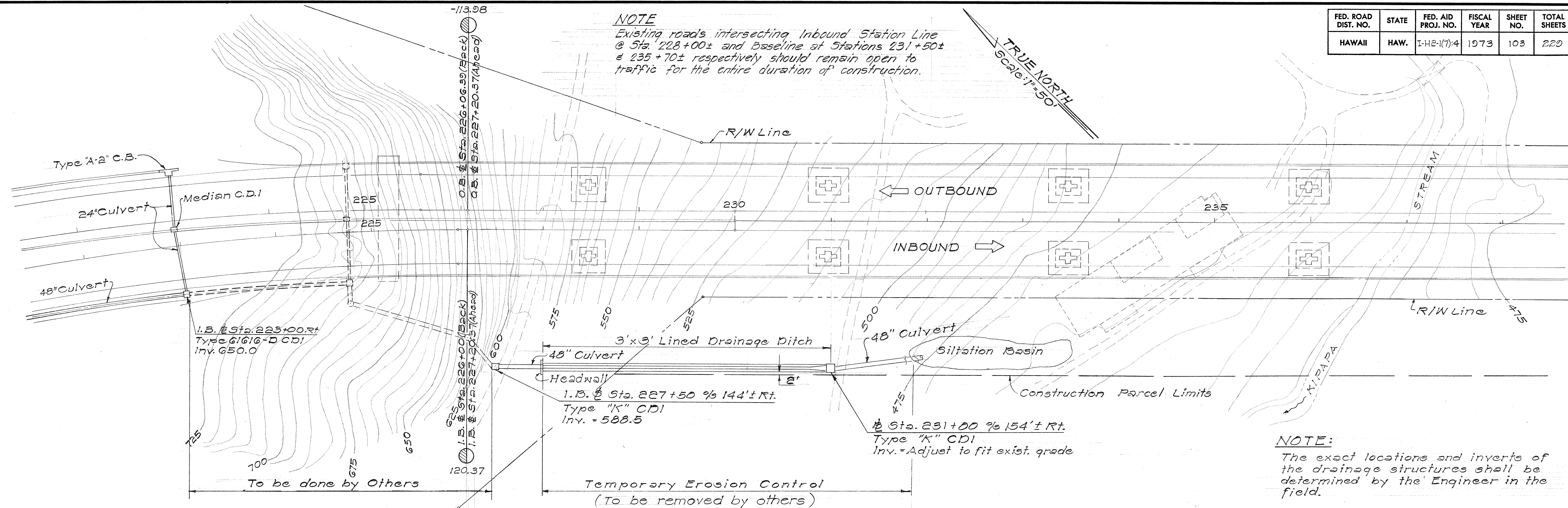
NOTE:
Pipe Anchors to be incid. to C.M. Spillway



PROFILE ALONG & DRAINAGE SYSTEM
Scale: 1" = 20'

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS
DRAINAGE SYSTEM DETAILS
INTO WAIKAKALAUA STREAM
INTERSTATE ROUTE H-2
MILLILANI INTERCHANGE
F.A.I. Proj. No. I-42-1(7):4
Scale As Noted
SHEET No. 16 OF 40 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7):4	1973	103	220



NOTE:
The exact locations and inverts of the drainage structures shall be determined by the Engineer in the field.

ORIGINAL PLAN	SURVEY PLATTED BY	DATE
NOTE BOOK	DRAWN BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

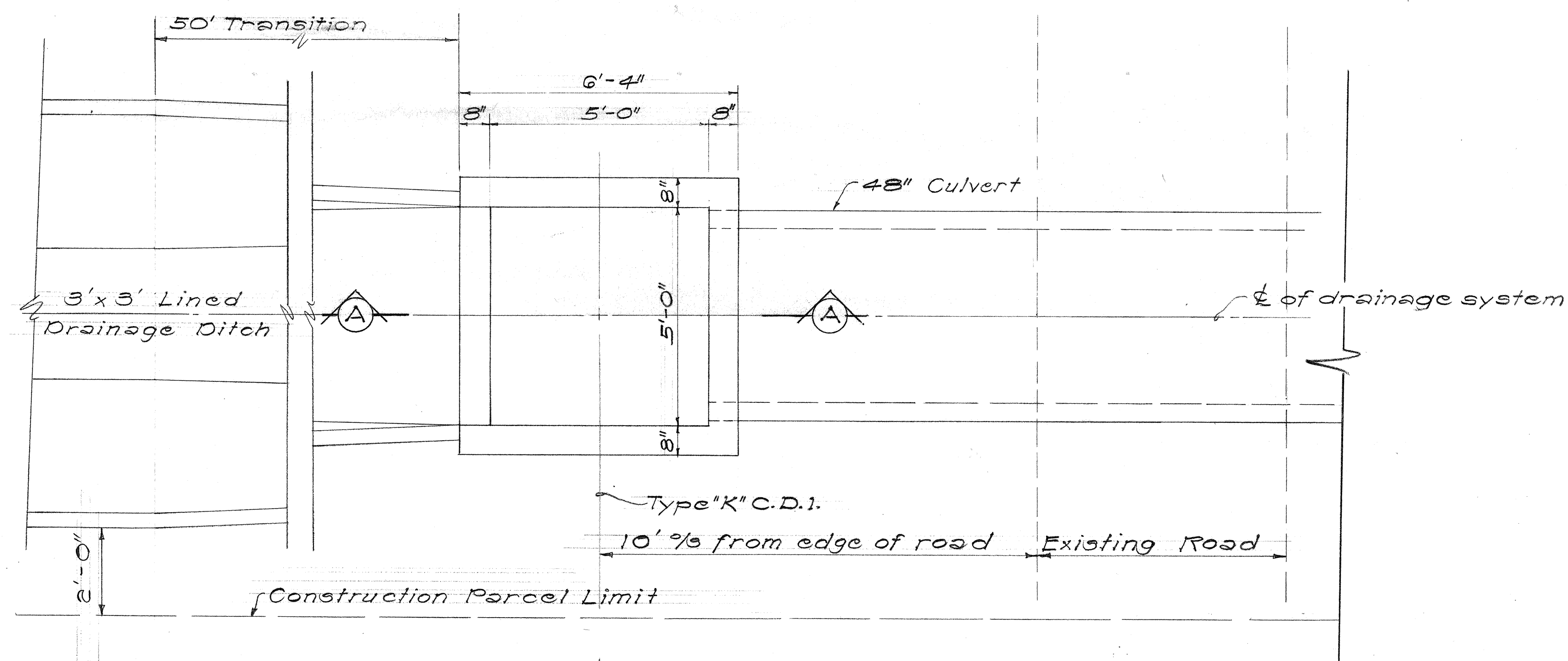
12-16-74	Removed profile and plan of temporary diversion ditch. Revised location of temporary diversion ditch.
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS
DRAINAGE SYSTEM
INTO KIPAPA STREAM
INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-1(7):4
Scale: 1"=50'

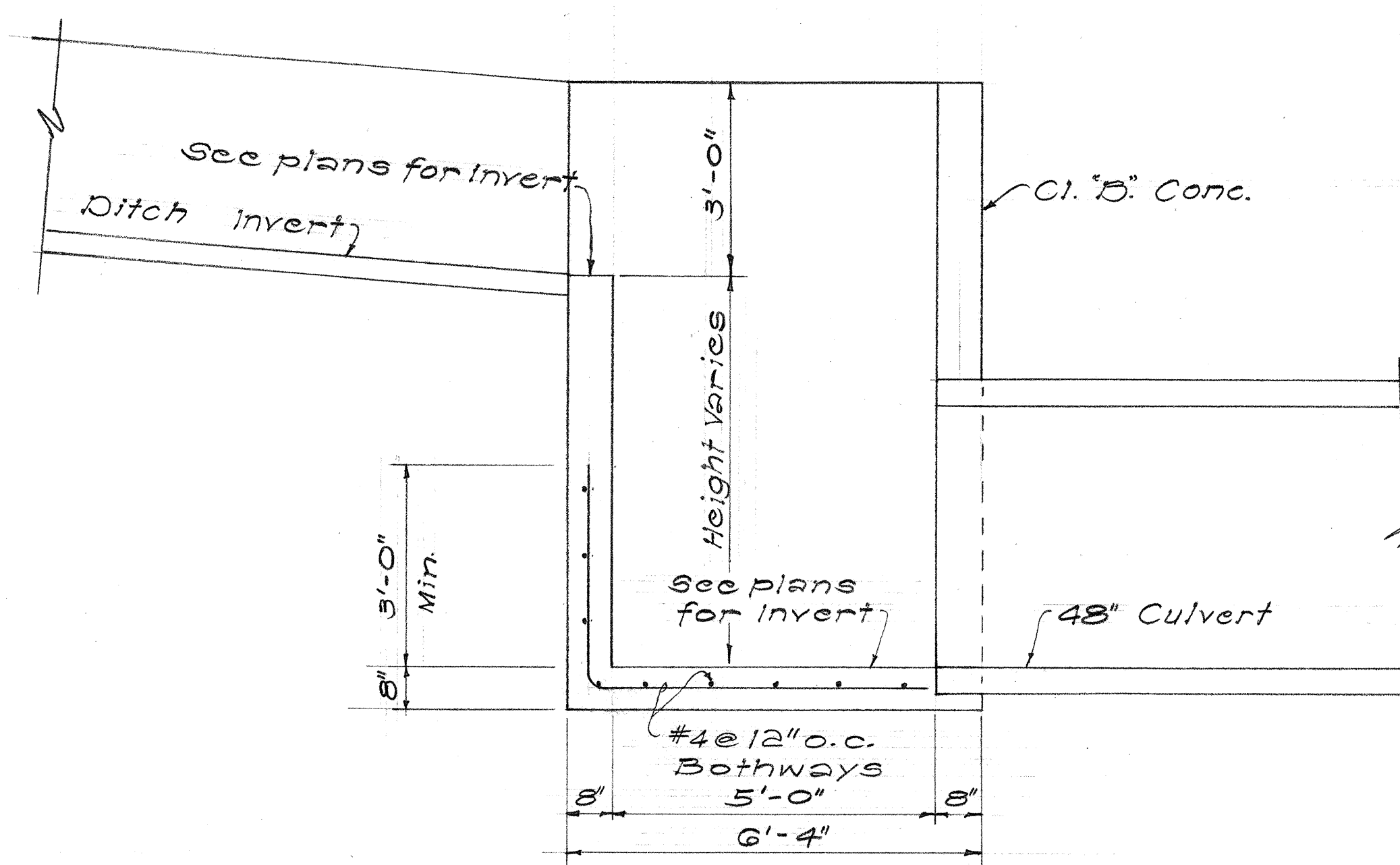
SHEET No. 17 OF 40 SHEETS

C.O.103

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IHE-1(7):4	1973	104	220

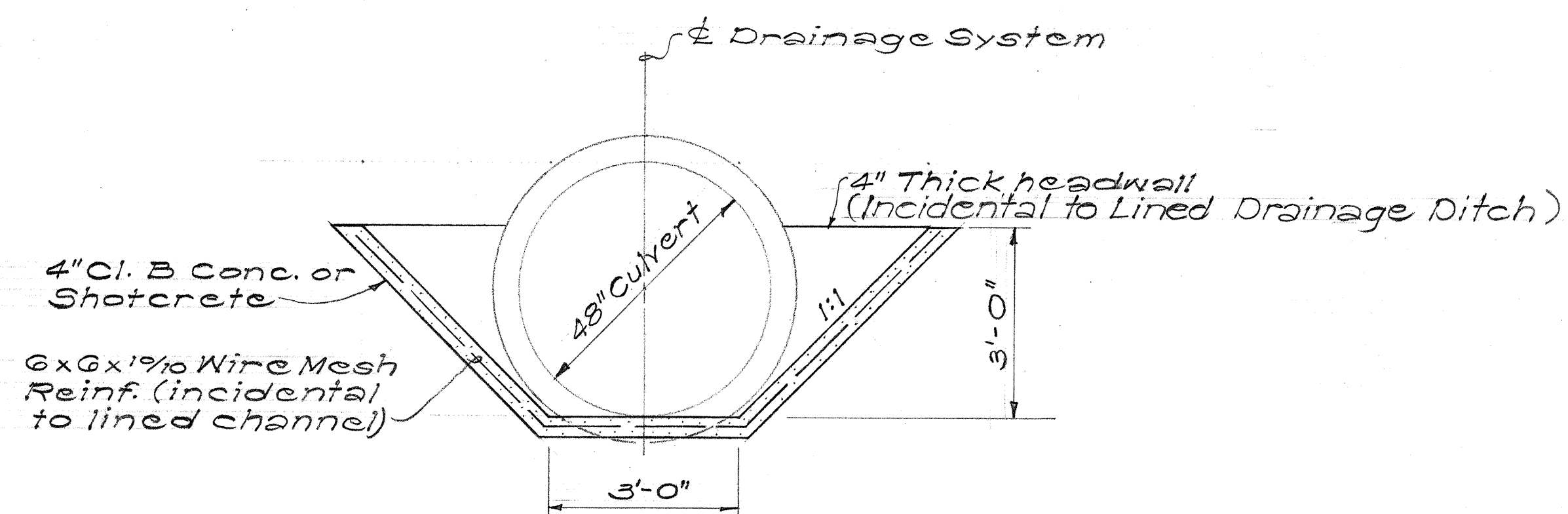


PLAN



SECTION "A-A"

TYPICAL DETAIL OF TYPE "K" C.D.I.



SECTION "B-B"

TYPICAL DETAIL OF 3'x3' LINED DRAINAGE DITCH

TYPICAL DETAILS OF DRAINAGE SYSTEM INTO KIPAPA GULCH

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

12-16-74	Eliminated spillway and outlet details.
DATE	REVISION

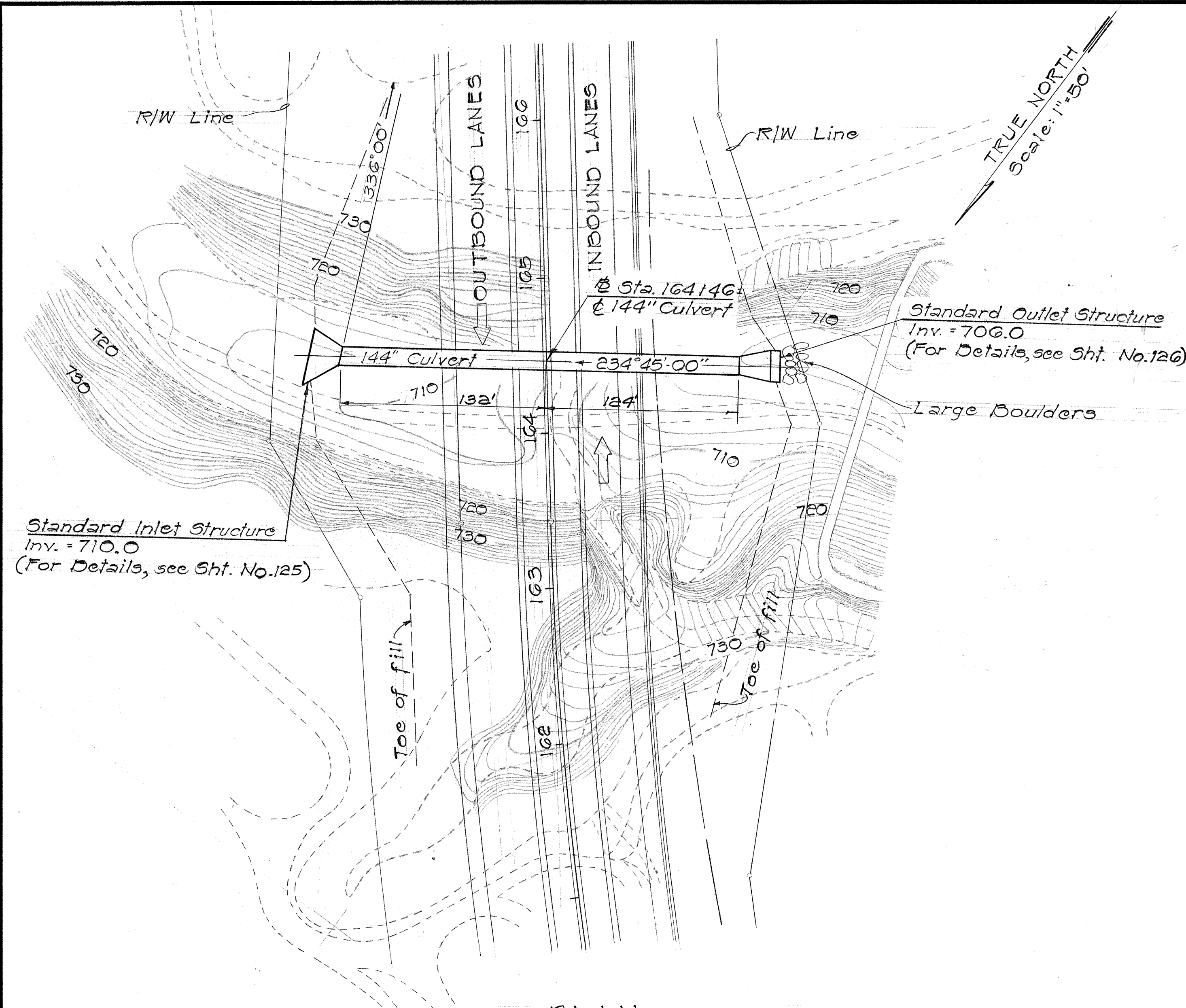
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS
DRAINAGE SYSTEM DETAILS
INTO KIPAPA STREAM
INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-1(7):4
Scale: As Noted Date: Mar. 1973

SHEET No. 18 OF 40 SHEETS

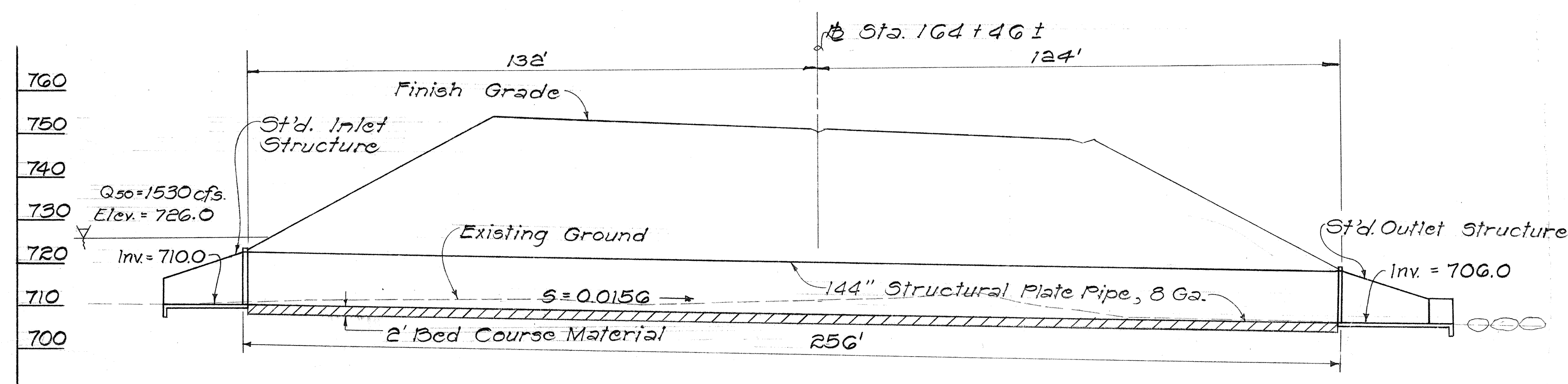
C.O.104

DESIGNED BY	DATE
CHECKED BY	
NOTED BY	
ORIGINAL PLAN	
NO.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7):4	1973	105	220



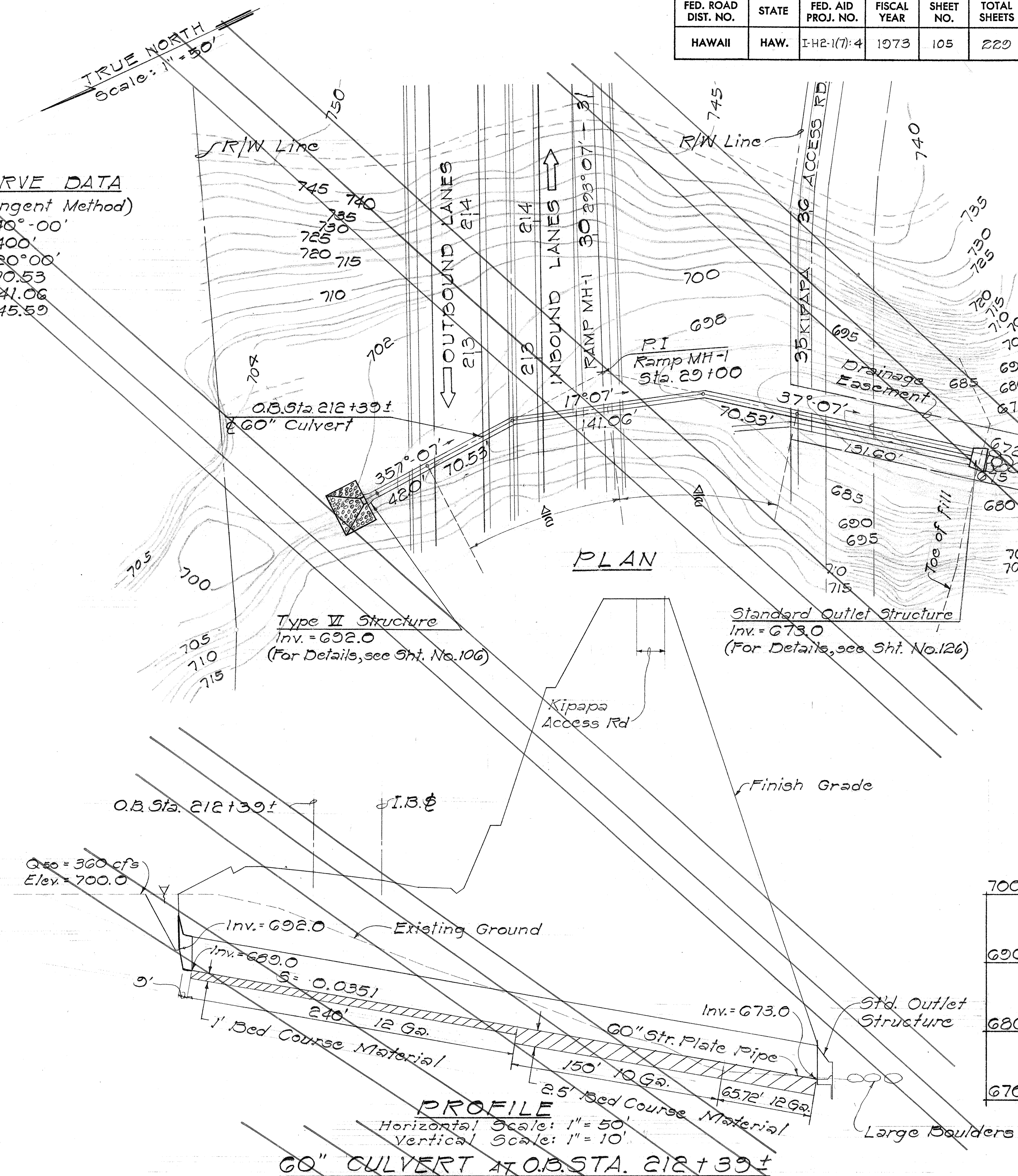
PLAN
Scale: 1" = 50'



PROFILE
Scale: 1" = 20'

144" CULVERT AT STA. 164+46±

CURVE DATA
(Tangent Method)
Δ = 40°-00'
R = 400'
Δa = 80°-00'
t = 70.53
2t = 141.06
T = 145.59



PROFILE

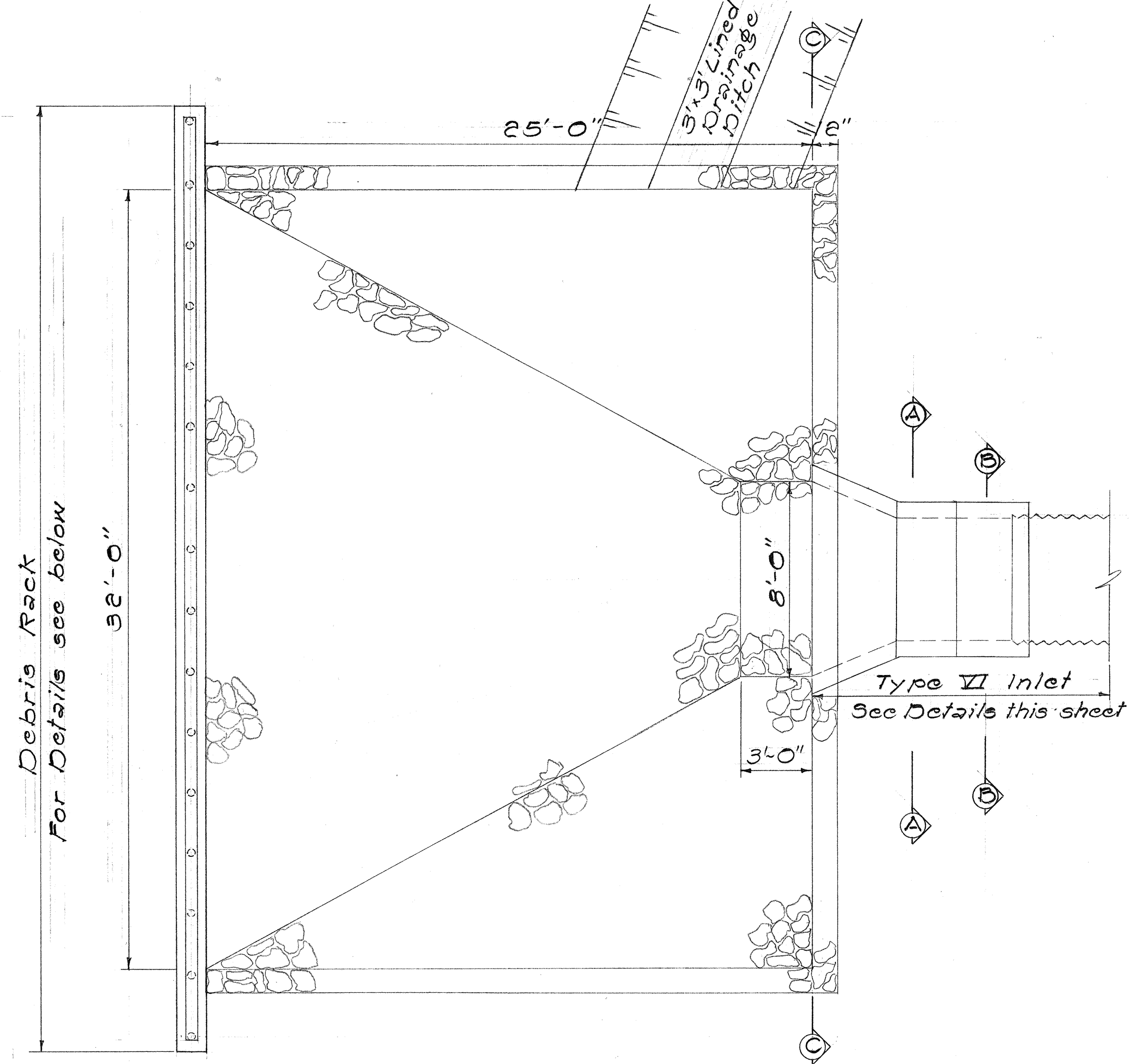
Horizontal Scale: 1" = 50'
Vertical Scale: 1" = 10'

60" CULVERT AT O.B. STA. 212+39±

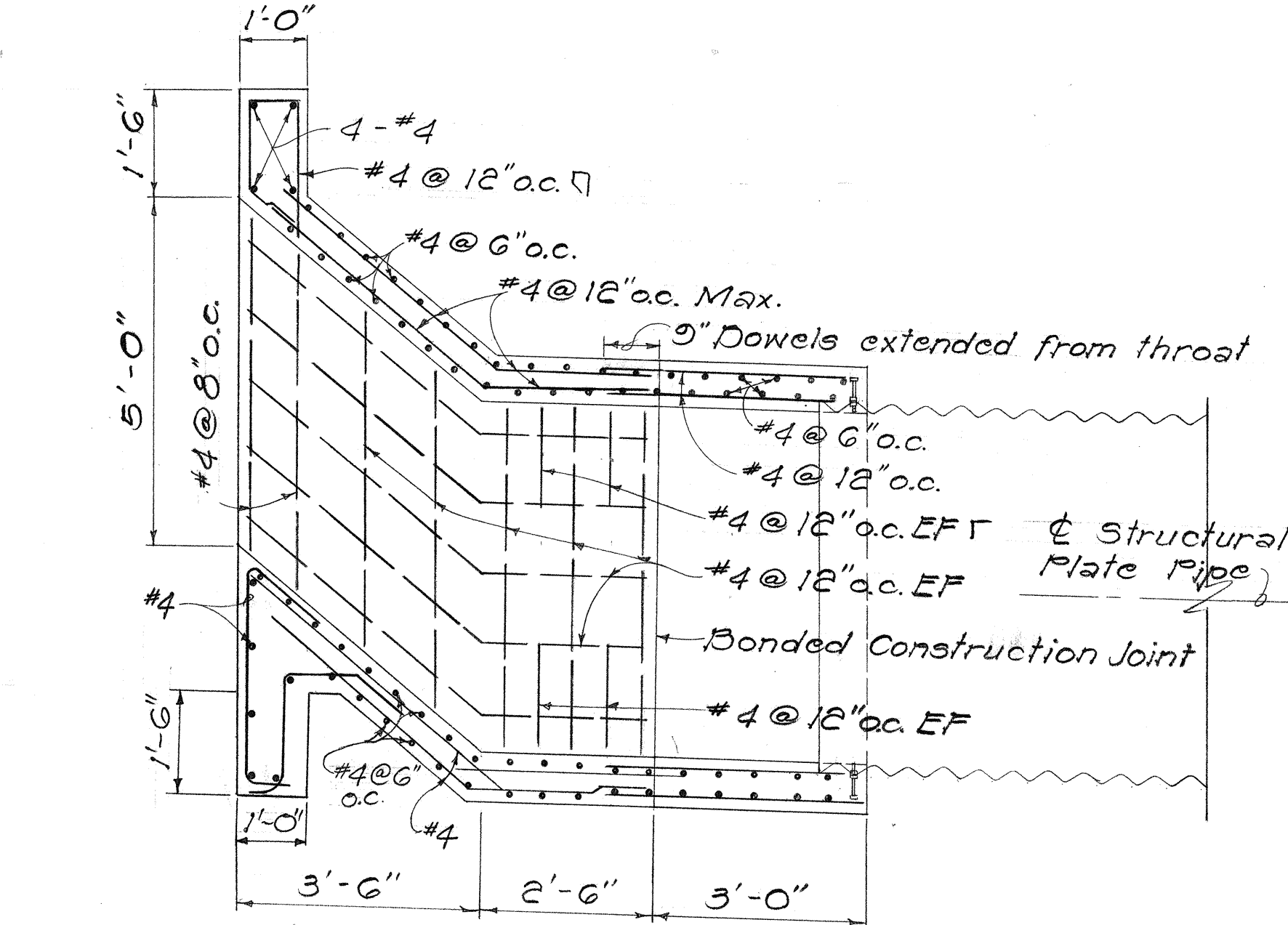
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS
144" CULVERT AT STA. 164+46±
AND 60" CULVERT AT O.B. STA. 212+39±
INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-1(7):4
Scale: As Noted Date: Mar. 1973

SHEET No. 10 OF 40 SHEETS

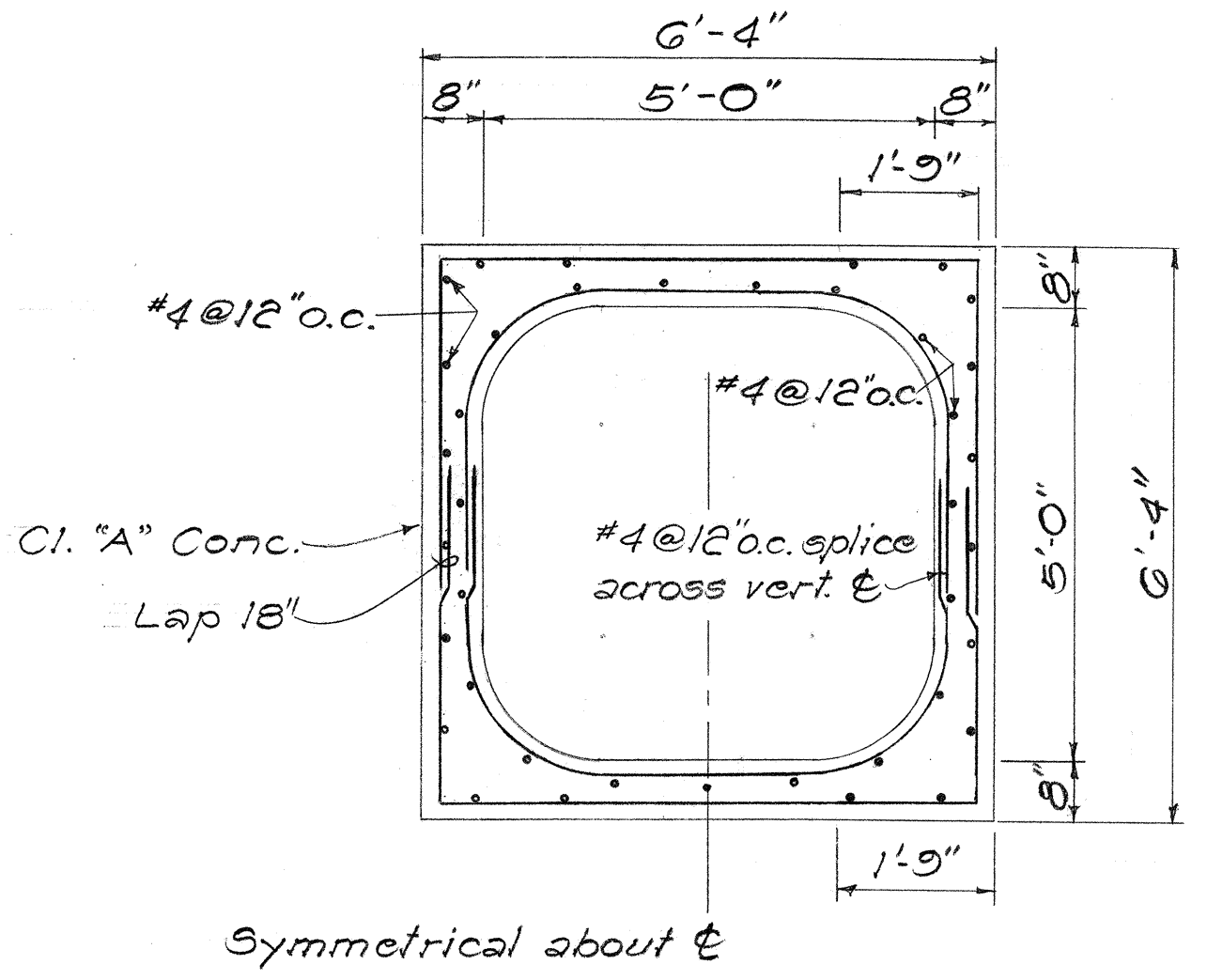
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7)4	1973	106	229



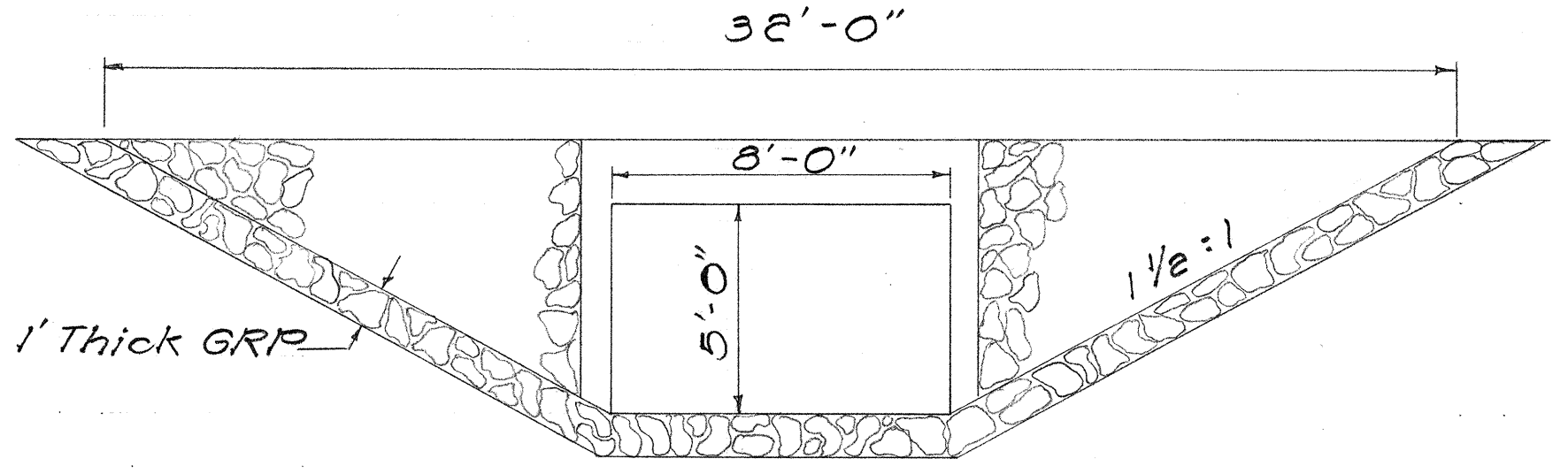
PLAN
Scale: 1/4" = 1'-0"



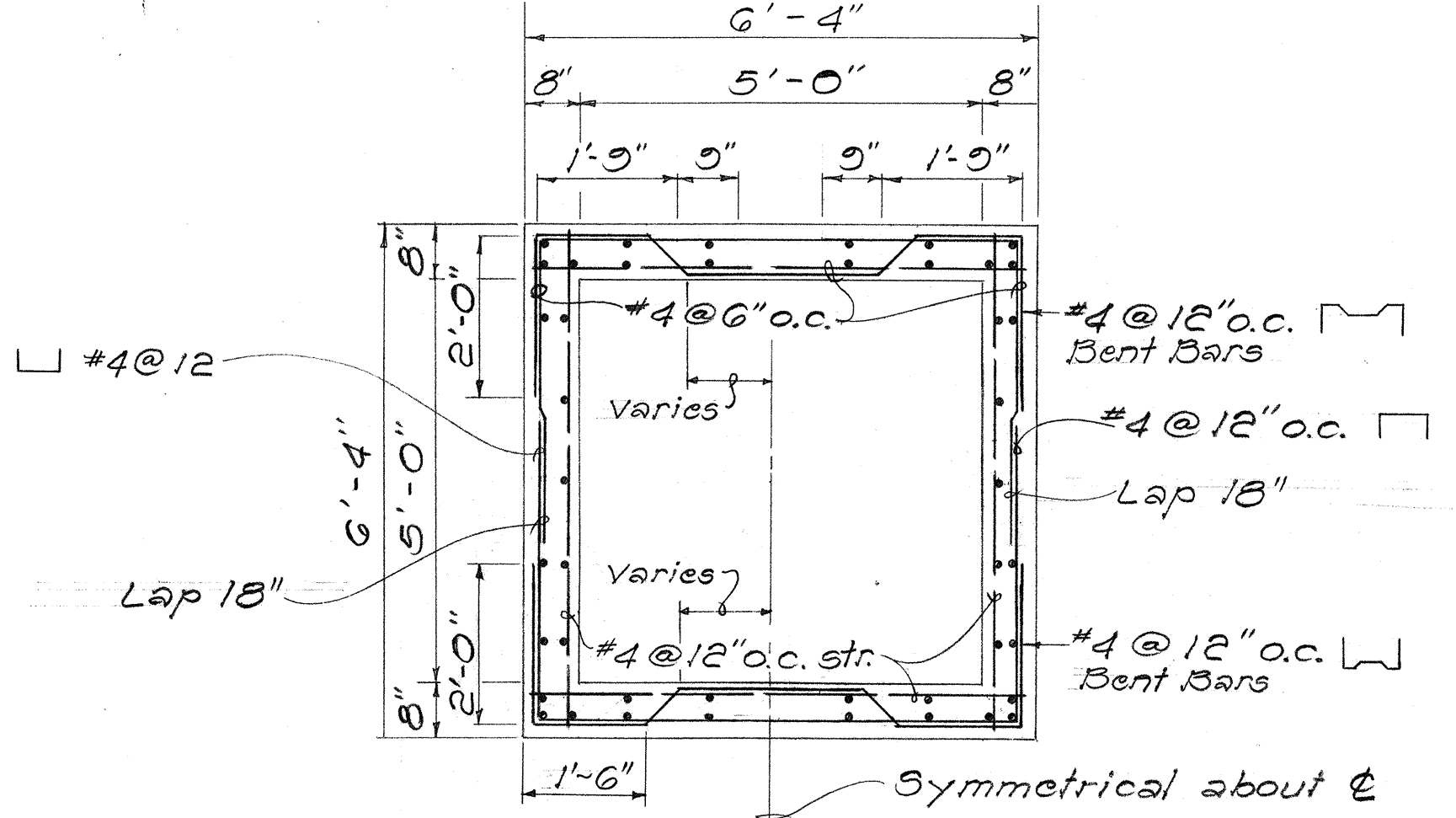
ELEVATION
Scale: 1/2" = 1'-0"



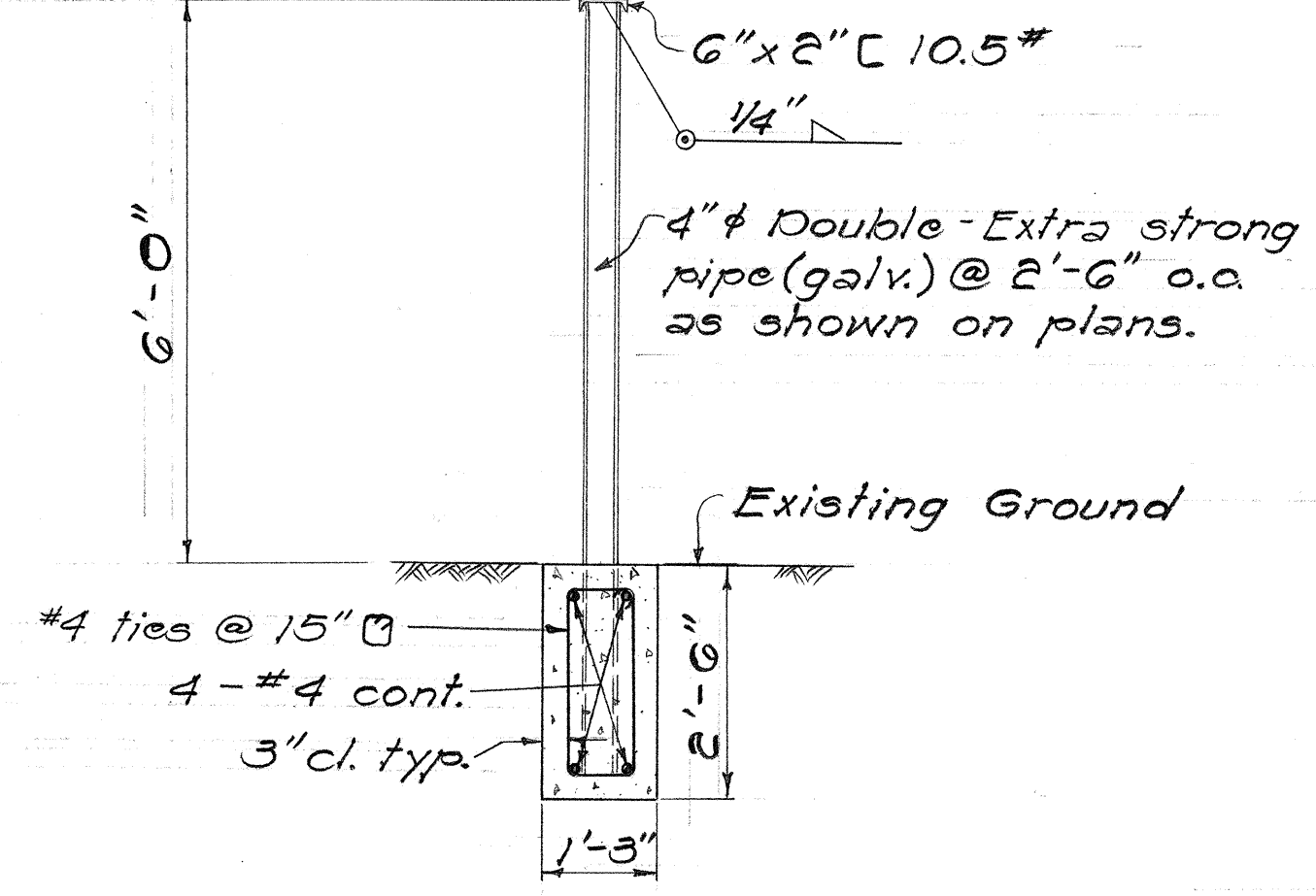
SECTION "B-B"
Scale: 1/2" = 1'-0"



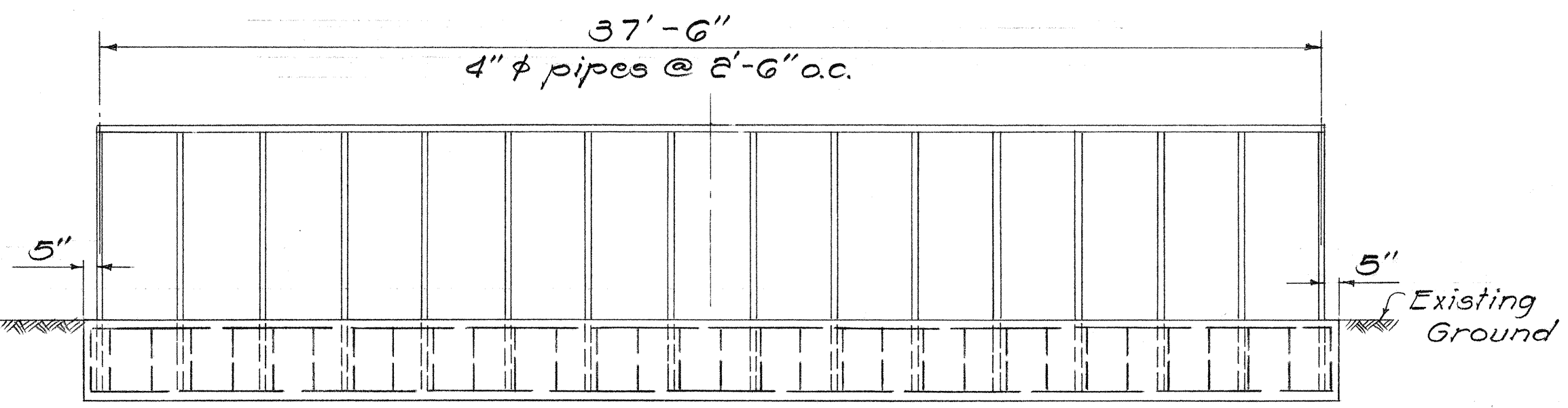
SECTION "C-C"
Scale: 1/4" = 1'-0"



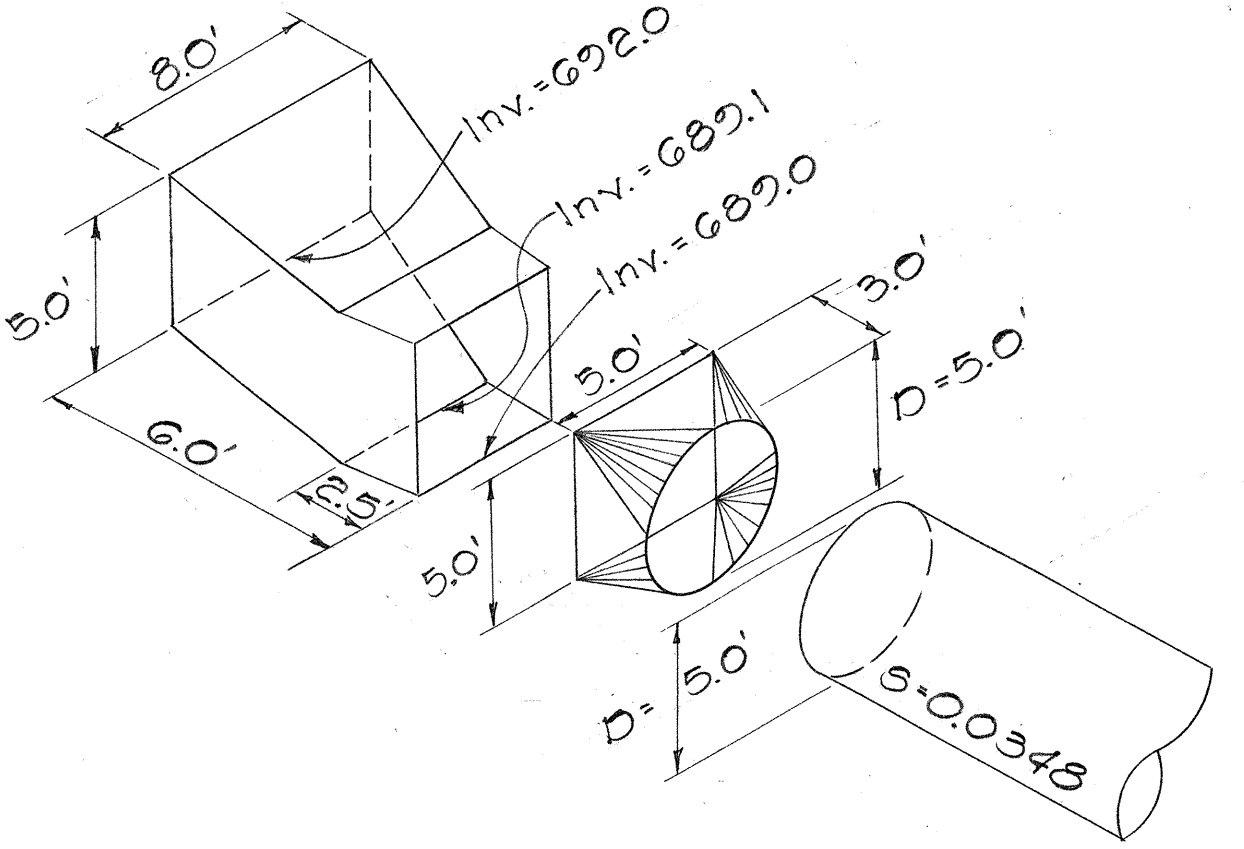
SECTION "A-A"
Scale: 1/2" = 1'-0"



TYPICAL SECTION OF
DEBRIS RACK
Scale: 1/2" = 1'-0"



ELEVATION OF DEBRIS RACK
Scale: 1/4" = 1'-0"



EXPANDED SCHEMATIC VIEW
OF TYPE VI INLET
Not to Scale

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

DRAINAGE DETAILS

INLET DETAILS FOR

60" CULVERT @ O.B. STA. 212+39±

INTERSTATE ROUTE H-2

MILILANI INTERCHANGE

F.A.I. PROJ. NO. I-H2-1(7):4

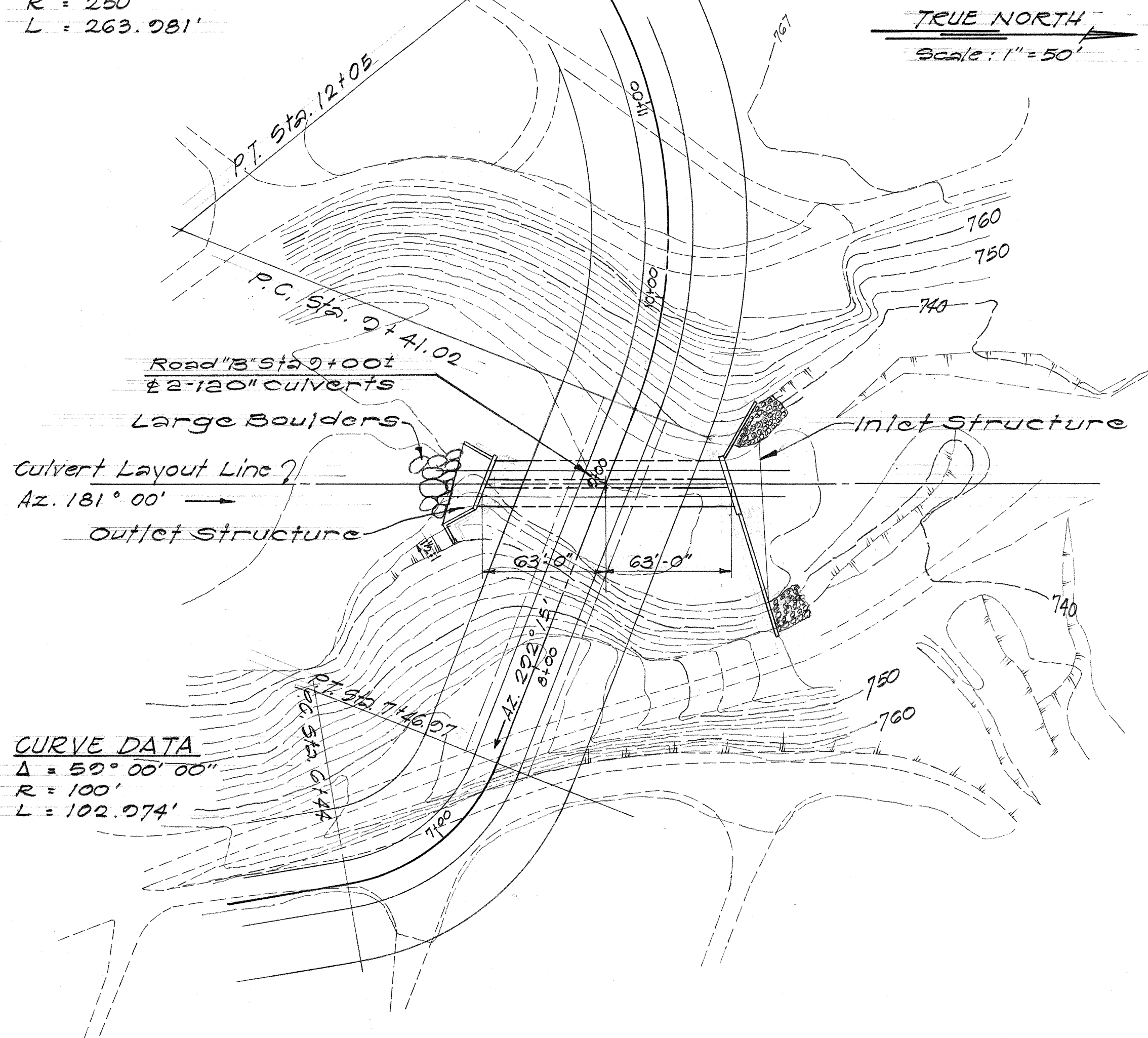
Scale: As Noted Date: Mar. 1973

SHEET No. 20 OF 40 SHEETS

DESIGNED BY	DATE
TRACED BY	
NOTED BY	
CHECKED BY	
ORIGINAL	
PLAN	
BOOK	
No.	

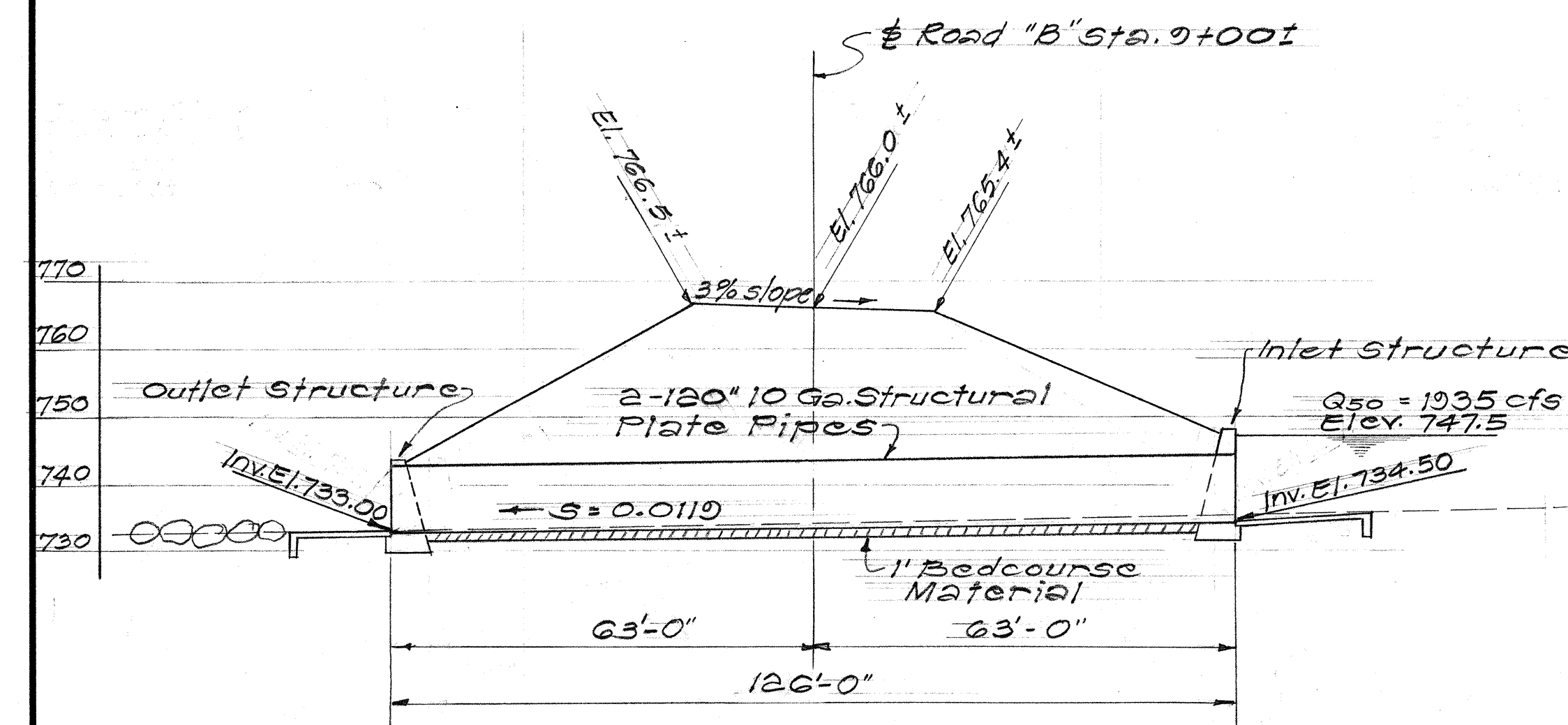
CURVE DATA

$\Delta = 60^{\circ} 30' 00''$
 $R = 250'$
 $L = 263.981'$



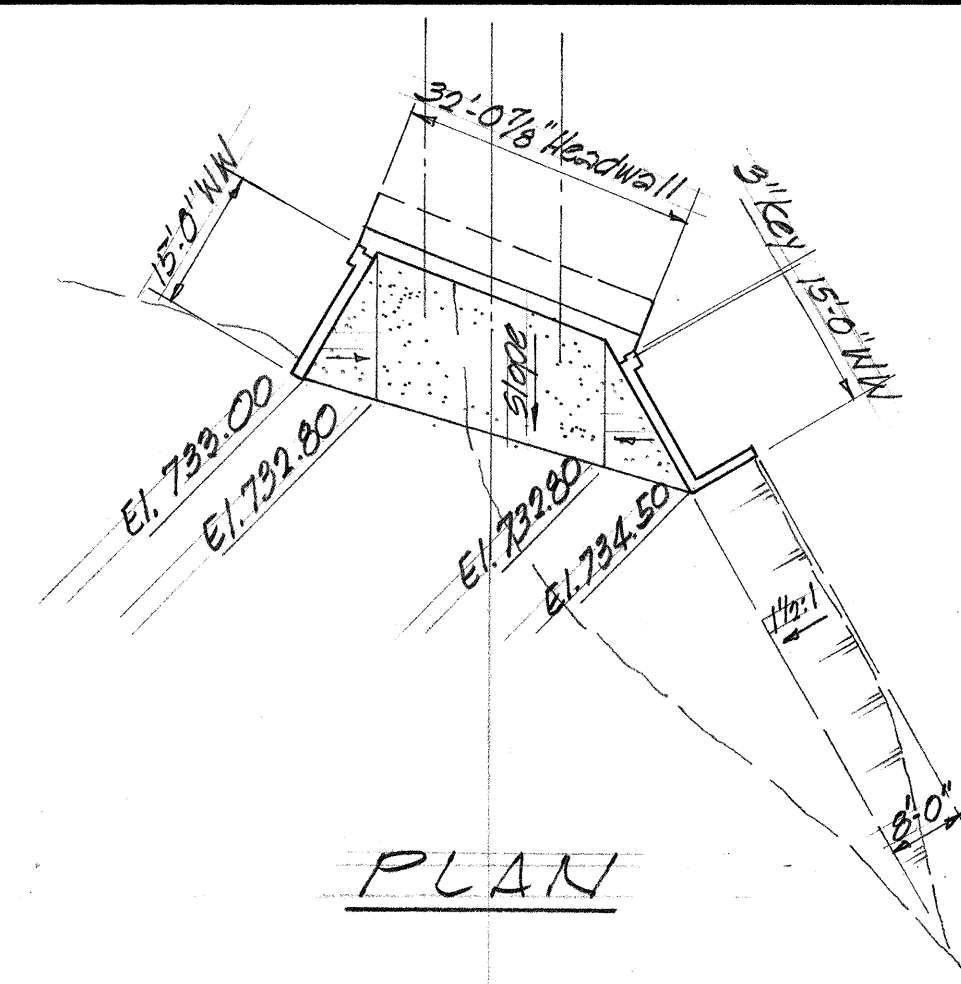
LAYOUT PLAN

Scale: 1" = 50'

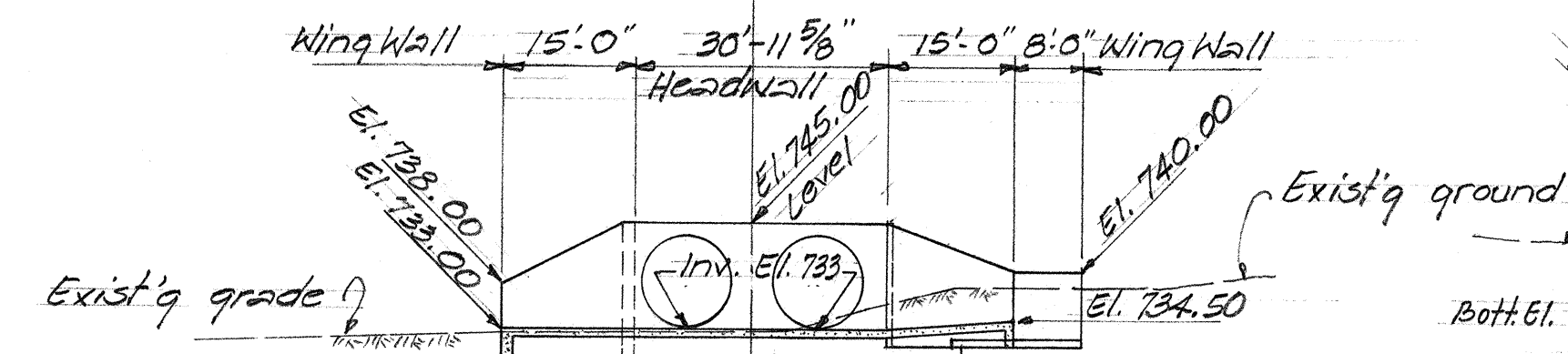


PROFILE ALONG CULVERT LAYOUT LINE

Scale: 1" = 20'



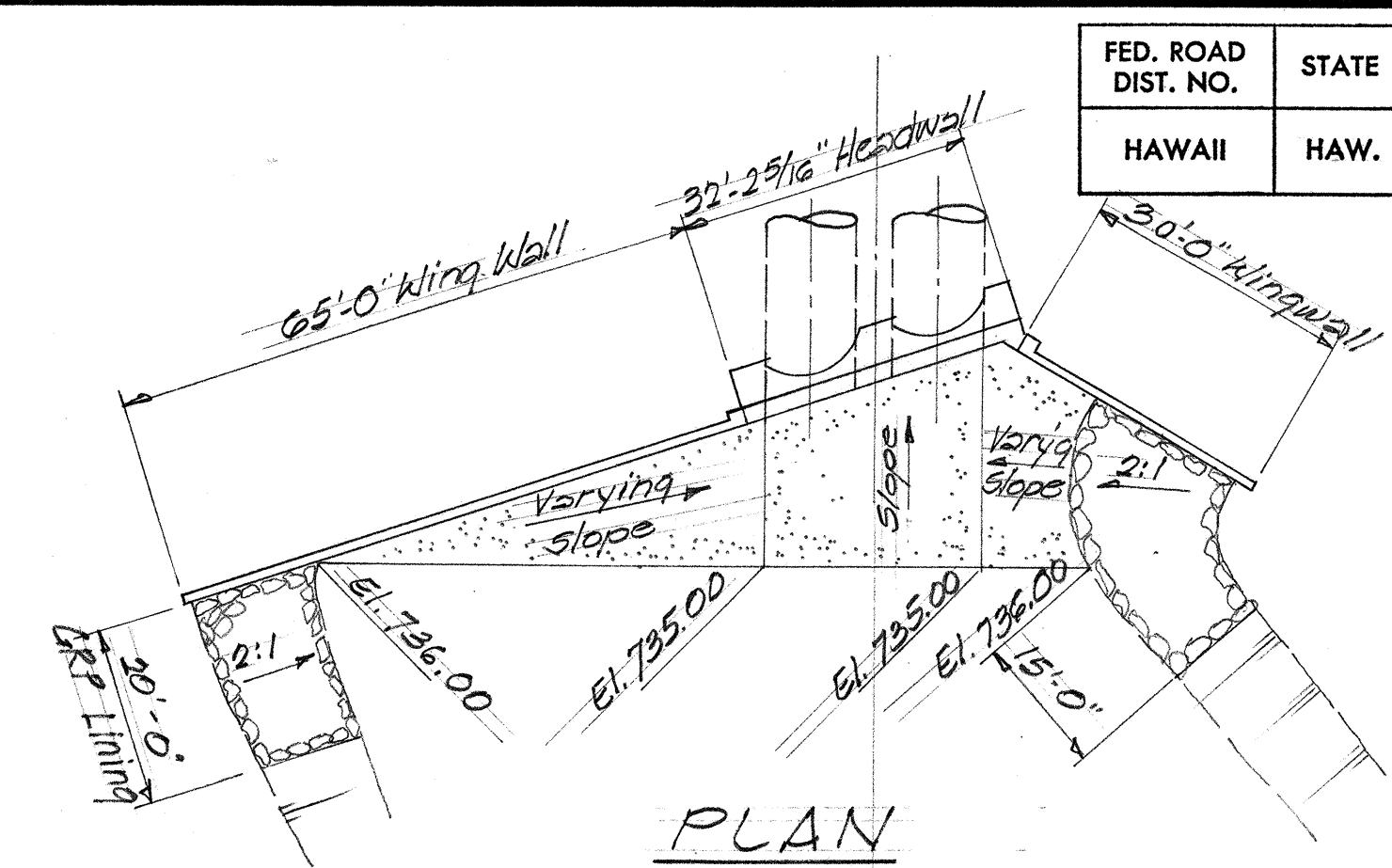
PLAN



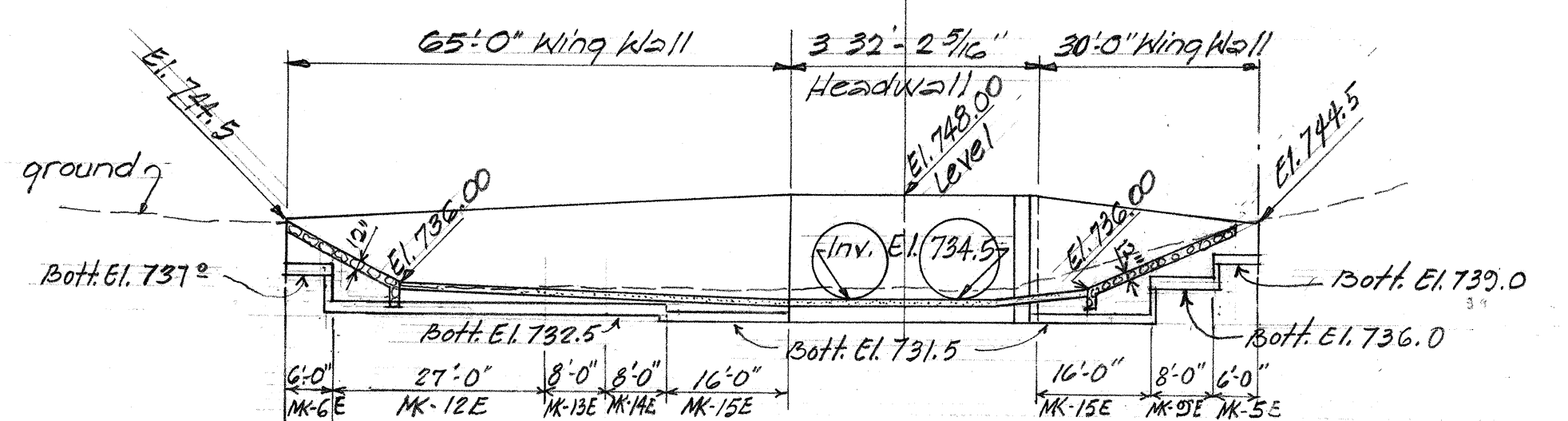
ELEVATION

OUTLET DETAILS

Scale: 1" = 20'-0"



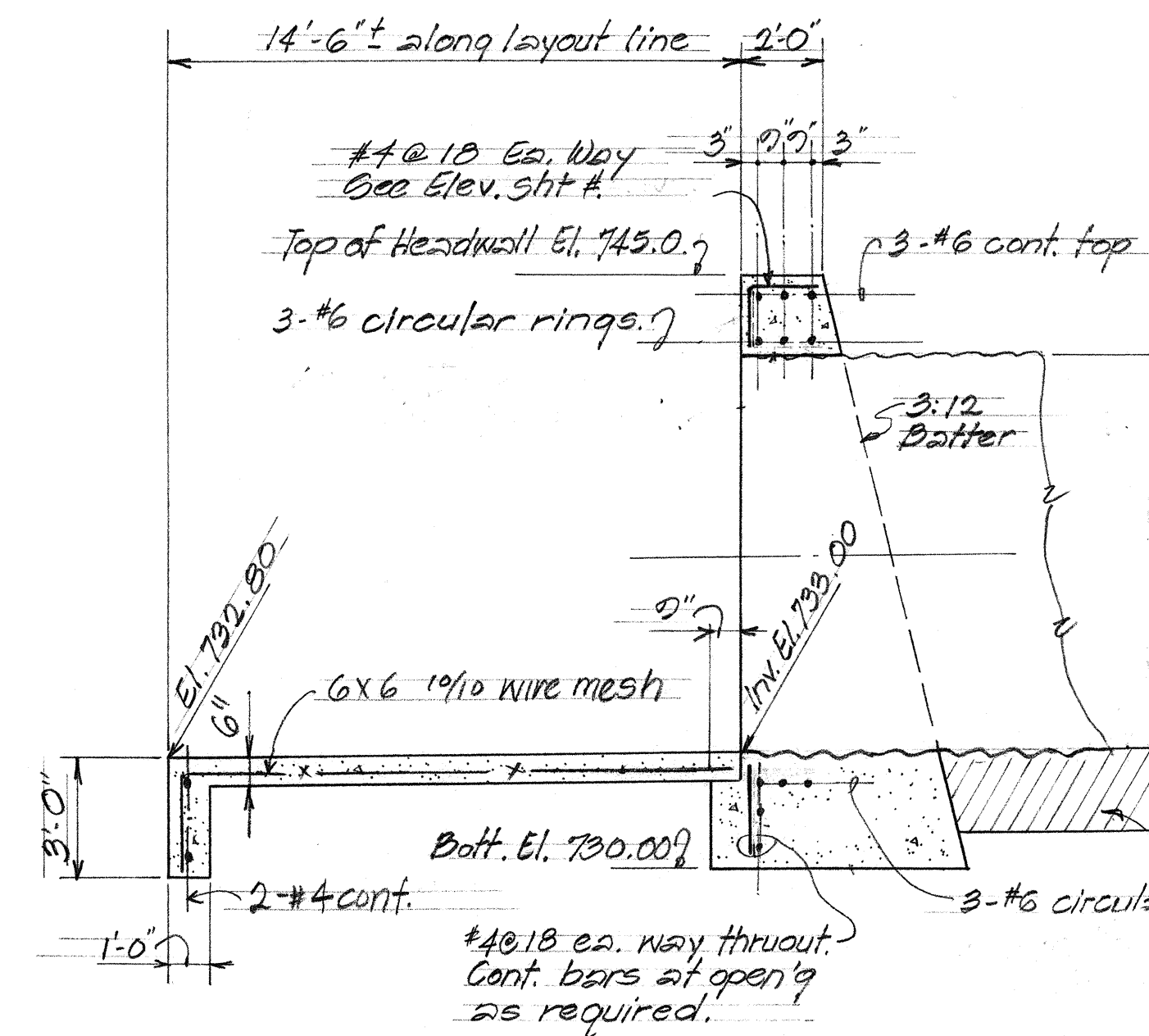
PLAN



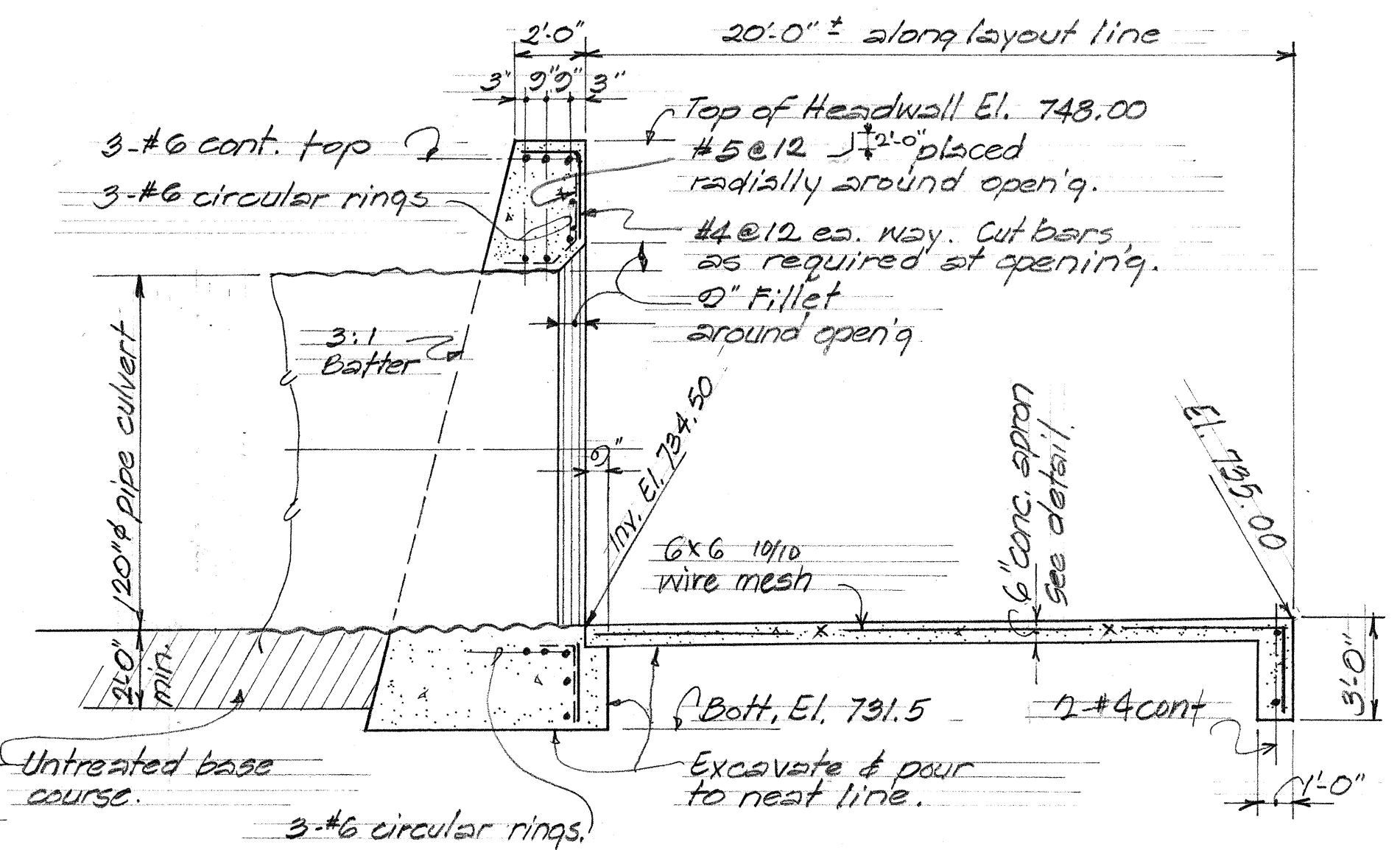
ELEVATION

INTAKE DETAILS

Scale: 1" = 20'-0"



OUTLET SECTION



INTAKE SECTION

TYPICAL HEADWALL SECTION

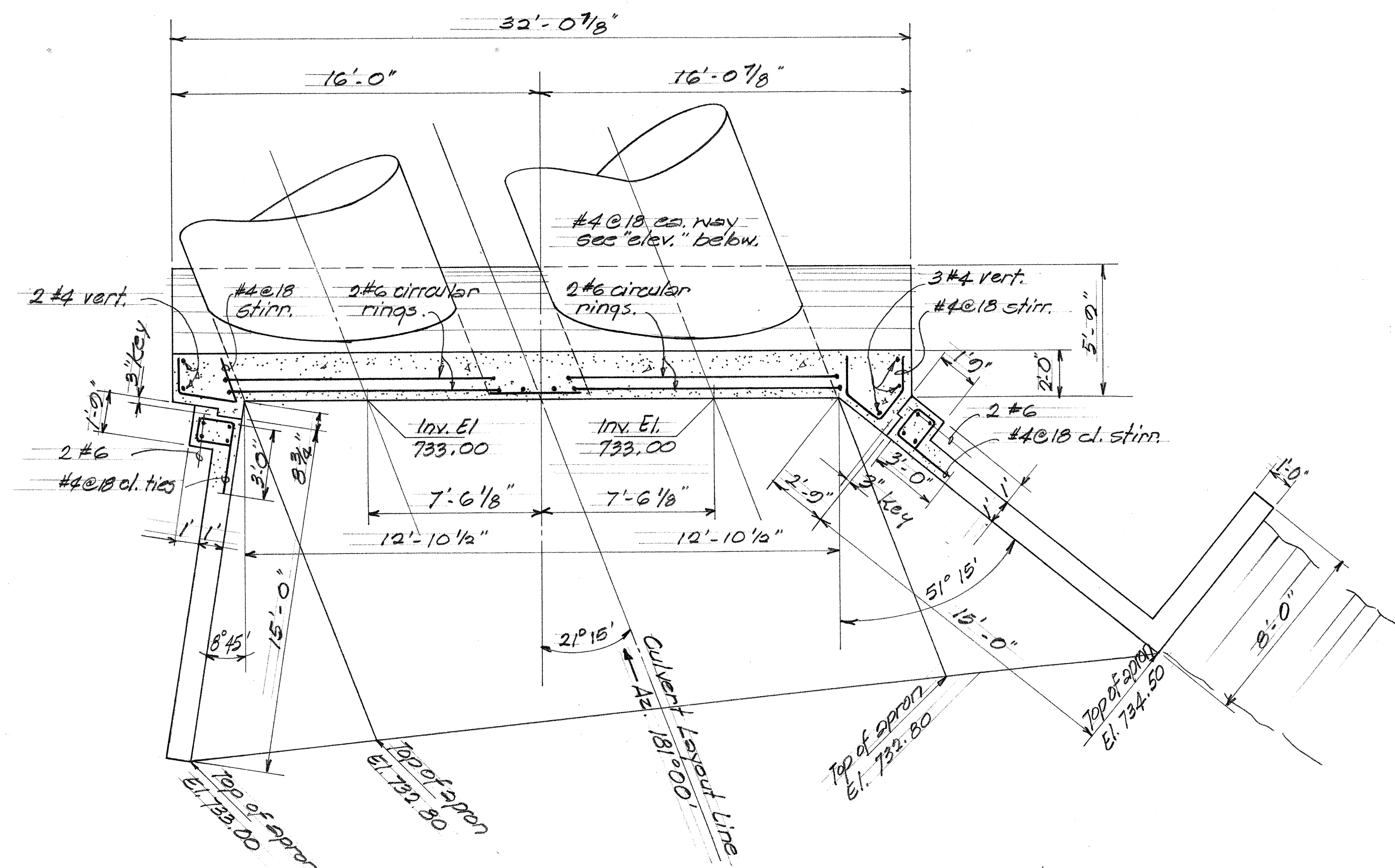
Scale: 1/4" = 1'-0"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-12-(7)-4	1973	107	220

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
 DRAINAGE DETAILS
 2-120" CULVERTS AT
 RD. 'B' STA. 9+00 ±
 INTERSTATE ROUTE H-2
 MILILANI INTERCHANGE
 F.A.I. PROJ. NO. I-12-(7)-4
 Scale: As Shown

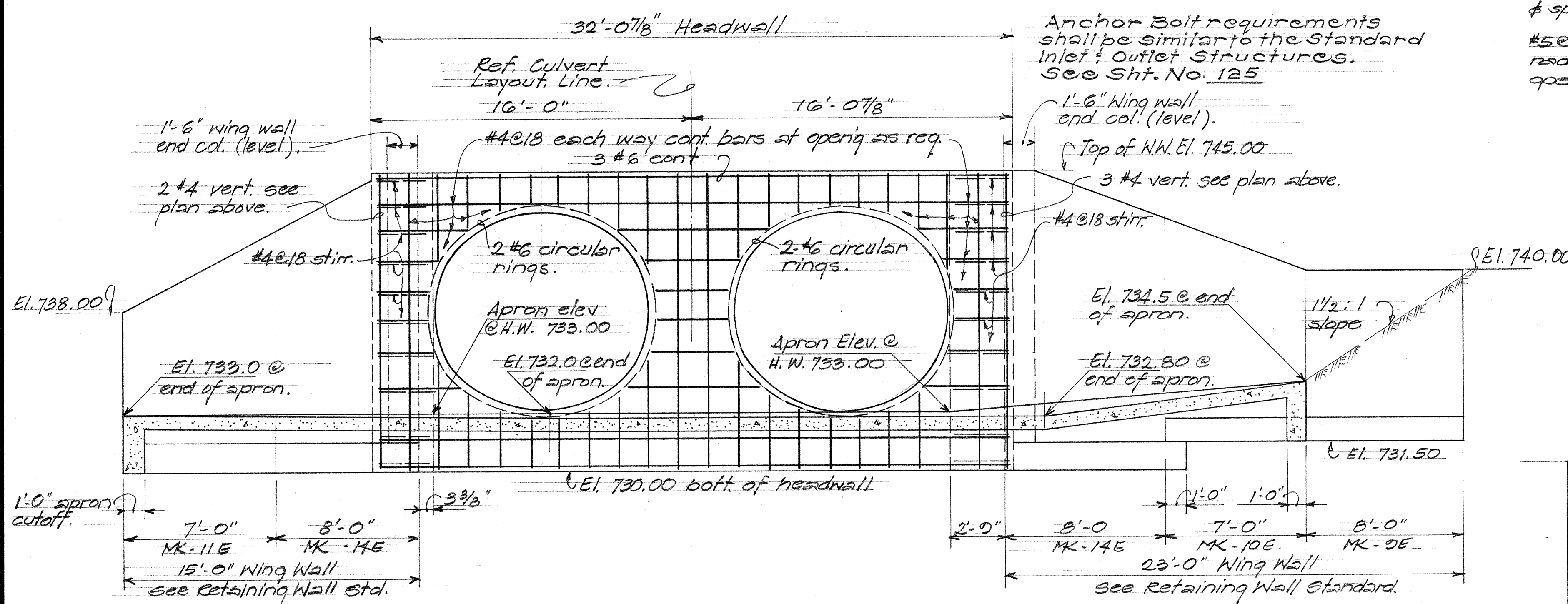
SHEET No. 21 OF 40 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-12-1(7)4	1973	108	220



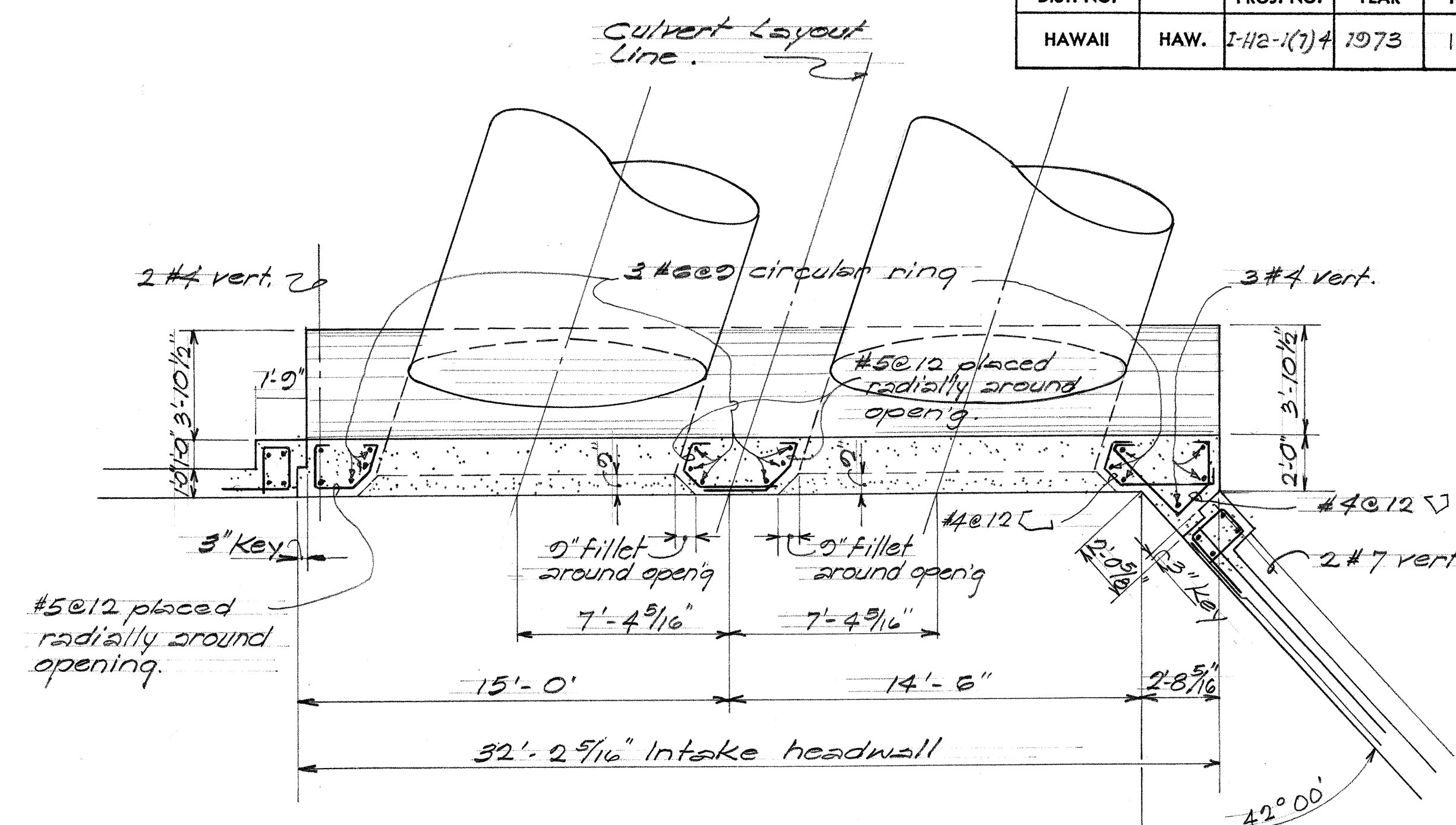
PLAN ~ OUTLET HEADWALL

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



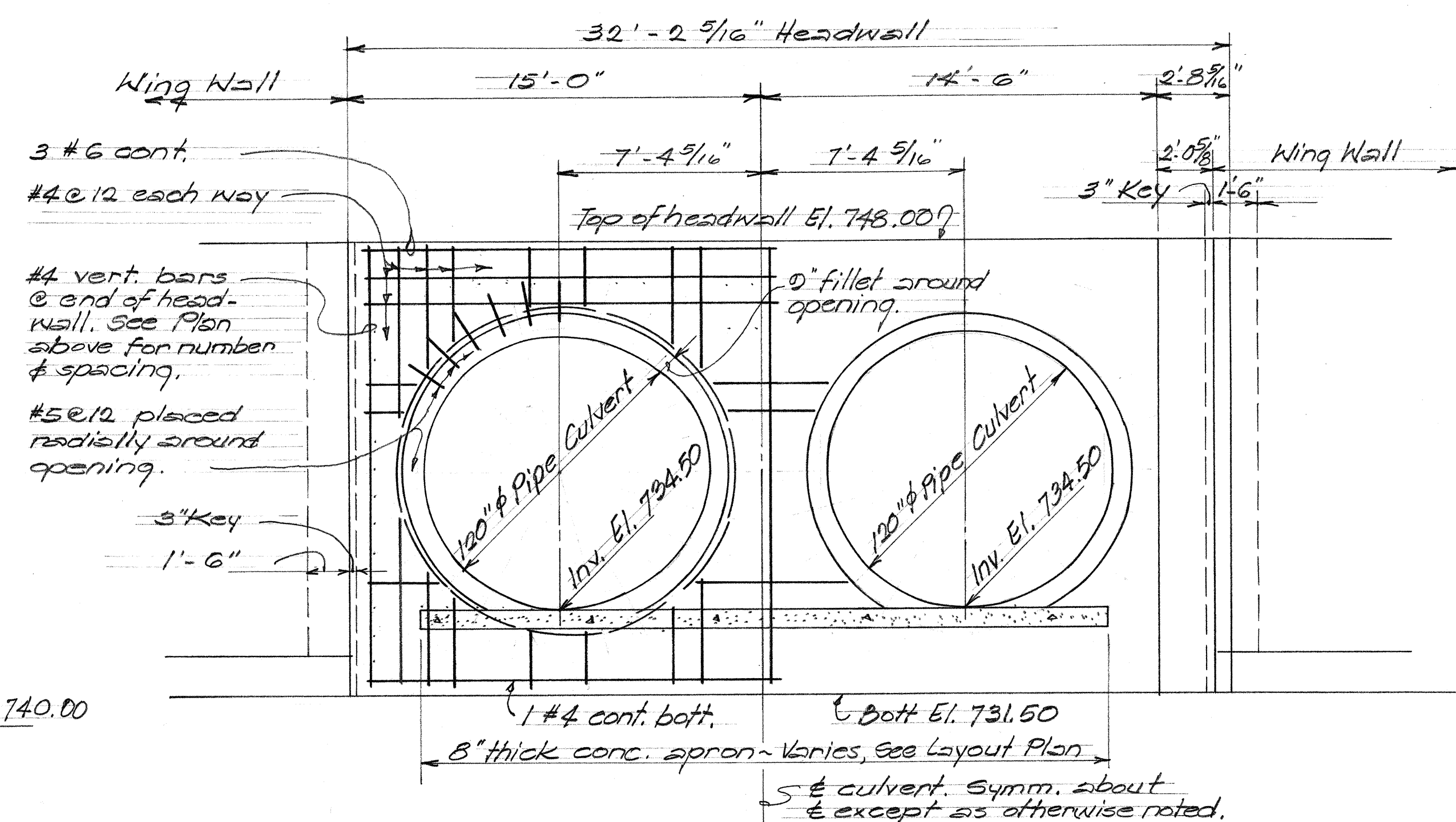
ELEVATION ~ OUTLET HEADWALL

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



PLAN ~ INTAKE HEADWALL

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



ELEVATION ~ INTAKE HEADWALL

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

ESTIMATED QUANTITIES

Class A-1 Concrete	285 cy
Reinforcing Steel	12,100 lbs
Structural Excavation	252 cy
G.R.P.	42 cy

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

DRAINAGE DETAILS 2-120" CULVERTS AT RD "B" Sta. 9+00 ±

INTERSTATE ROUTE 42
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-12-1(7)4

Scale: As Shown

SHEET No. 22 OF 40 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7)-4	1973	109	220

CURVE DATA (Tangent Method)

LEFT BRANCH	RIGHT BRANCH
$R_{eL} = 242.5$	$R_{eR} = 257.5$
$\Delta_{eL} = 41^{\circ}00'$	$\Delta_{eR} = 41^{\circ}00'$
$\Delta_{eL}/S = 13^{\circ}40'$	$\Delta_{eR}/S = 13^{\circ}40'$
$T_{eL} = 29.06'$	$T_{eR} = 30.86'$
$2T_{eL} = 58.12'$	$2T_{eR} = 61.72'$

CURVE DATA
(Tangent Method)

LEFT BRANCH	RIGHT BRANCH
$R_{iL} = 407.5$	$R_{iR} = 392.5$
$\Delta_{iL} = 43^{\circ}00'$	$\Delta_{iR} = 43^{\circ}00'$
$\Delta_{iL}/S = 14^{\circ}20'$	$\Delta_{iR}/S = 14^{\circ}20'$
$T_{iL} = 51.24'$	$T_{iR} = 49.35'$
$2T_{iL} = 102.48'$	$2T_{iR} = 98.70'$

PLAN

PROFILE

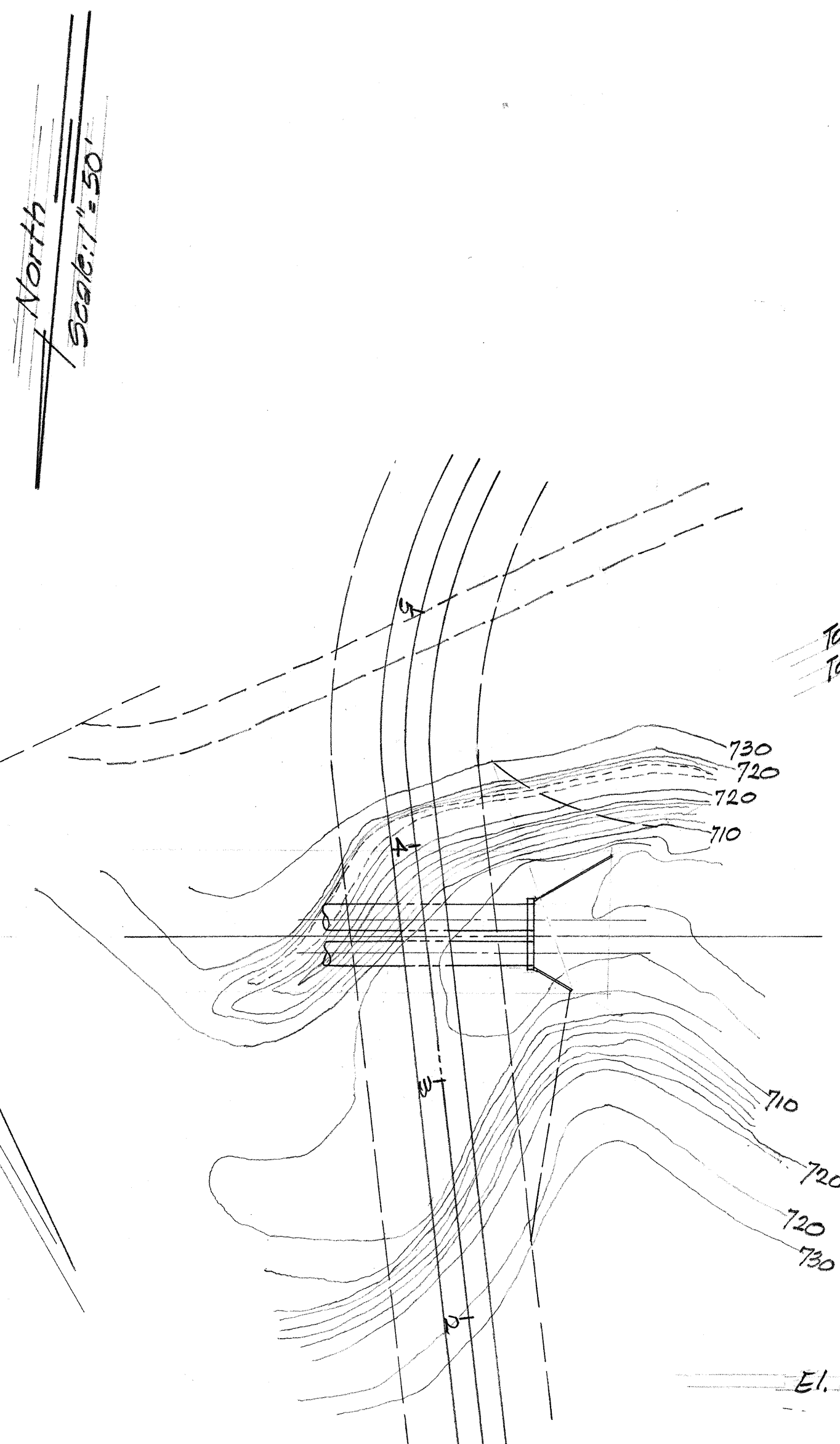
Scale: Vert: 1" = 10'
Horiz: 1" = 50'

2-132" CULVERT AT STA. 187+90 ±

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS
2-132" CULVERT AT STA. 187+90
INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-1(7)-4
Scale: As Noted Date: Mar. 1973

SHEET No. 23 OF 40 SHEETS

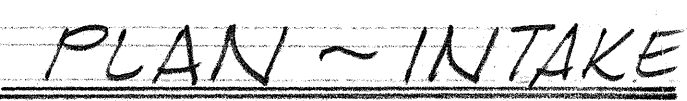
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS
INTAKE AND OUTLET STRUCTURES
FOR 2-132" CULVERTS AT
E STA. 187+00
INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-1(7):4
Scale: As Shown
SHEET No. 24 OF 40 SHEETS



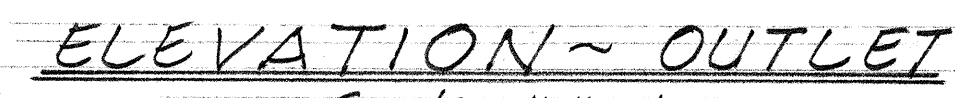
LAYOUT PLAN ~ OUTLET



PLAN ~ OUTLET



PLAN ~ INTAKE



ELEVATION ~ OUTLET



ELEVATION ~ INTAKE

K-E CRYSTALINE®
TRACING PAPER

16'-7"

7'-6"

7'-6"

15'-3 3/4"

6'-0"

2'-0"

3 #4 vert.

2 #6 vert.

#4 @ 18" d. stirr.

#4 @ 18" stirr.

#4 @ 18" es. way
see Elev. below.

3 #6 circular rings.

#4 @ 18" stirr.

2 #6 vert.

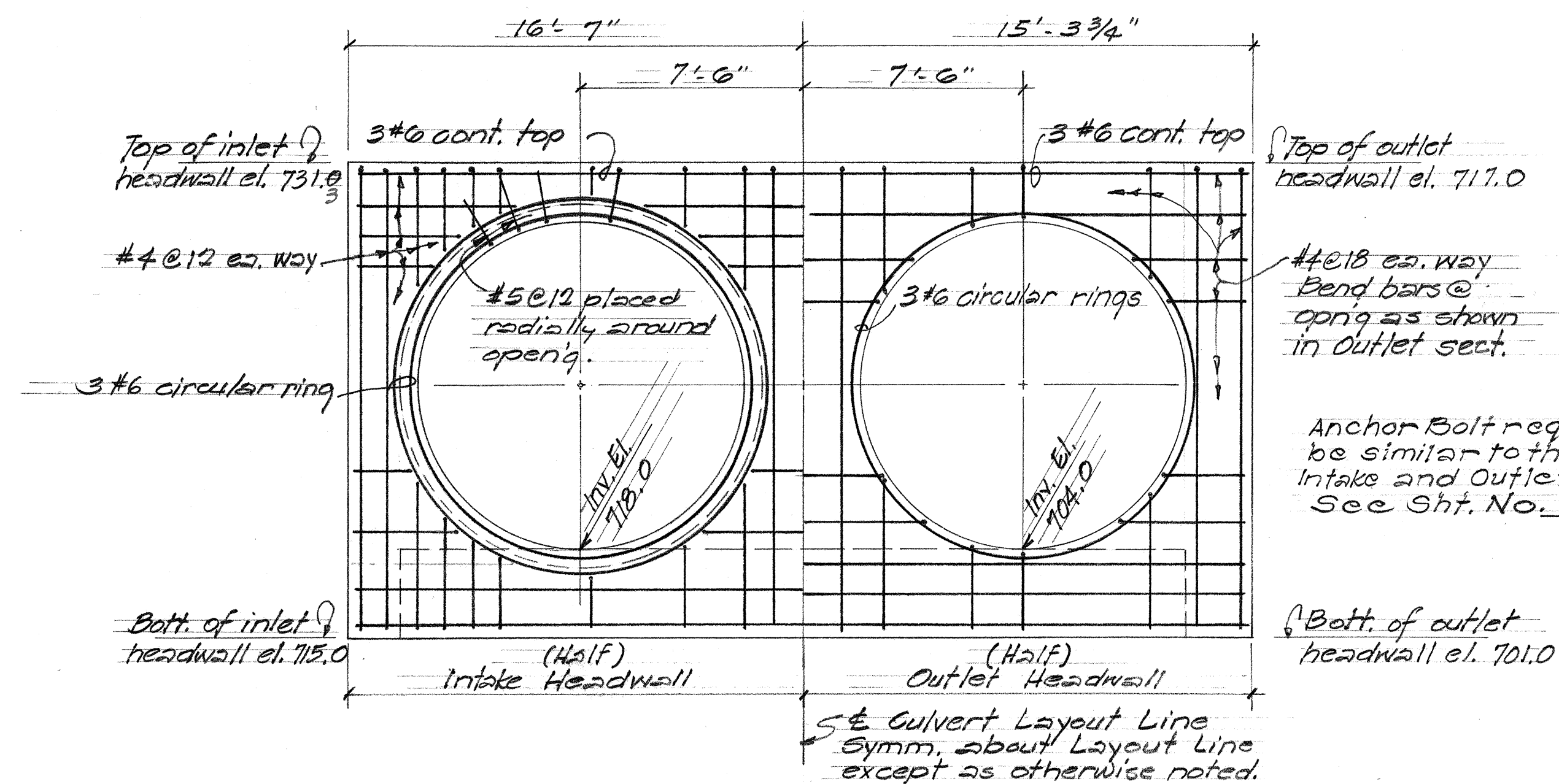
#4 @ 18" d. stirr.

(Half)
Intake Headwall

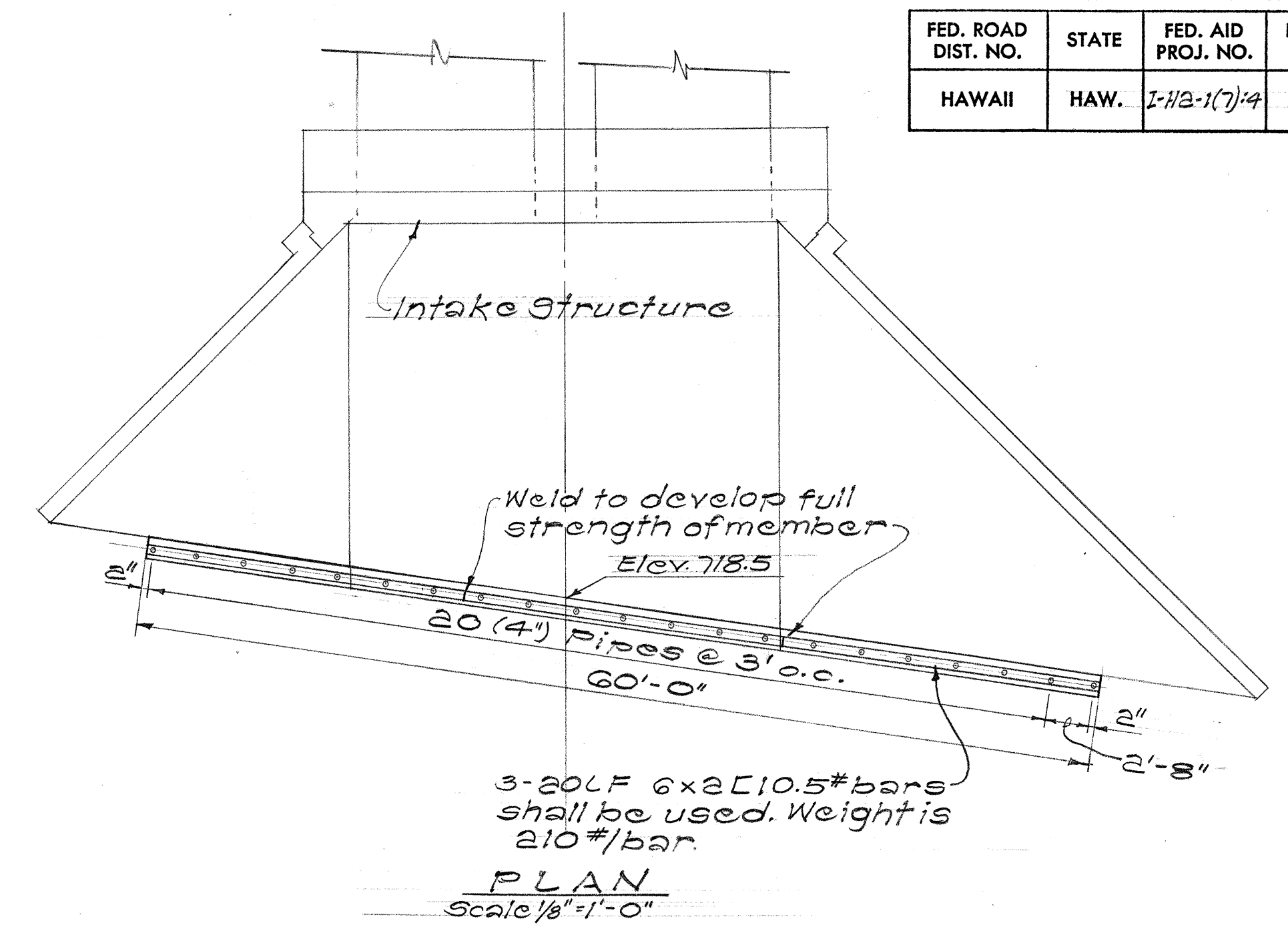
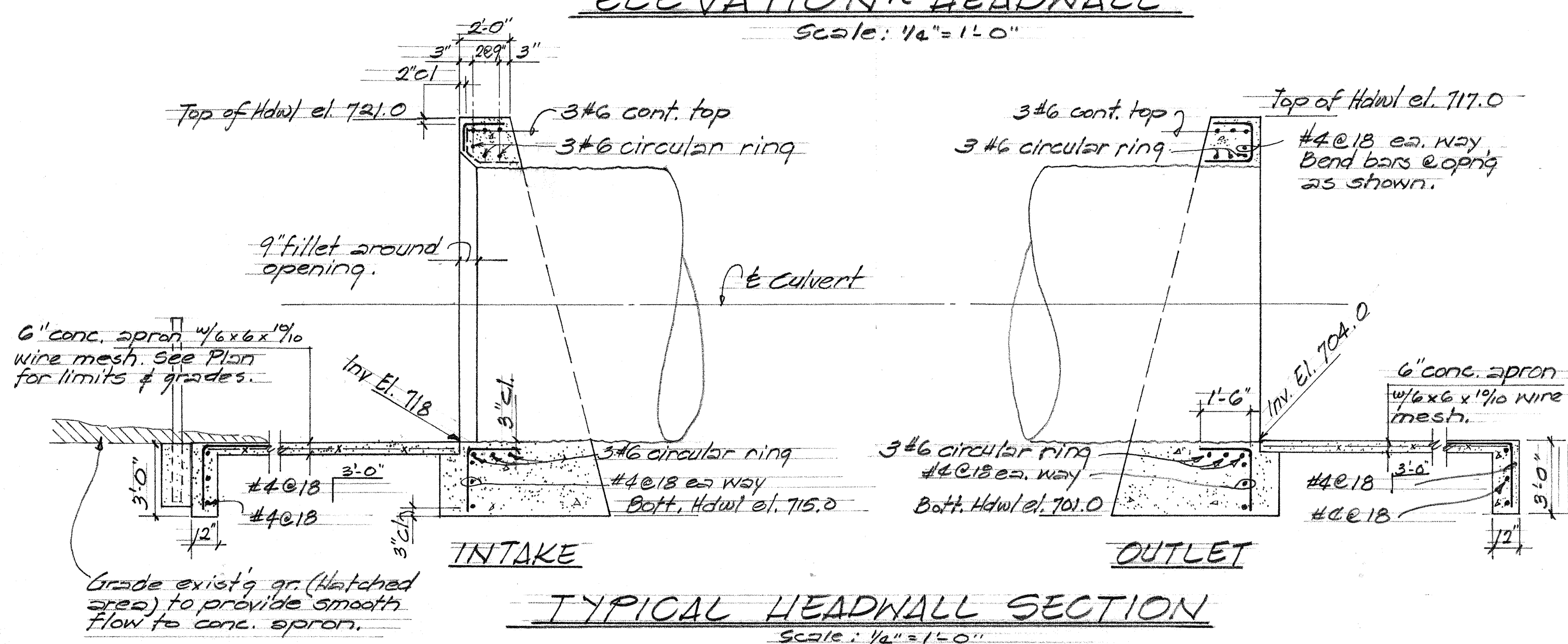
(Half)
Outlet Headwall

* Culvert Layout Line
Symm. about Layout Line
except as otherwise noted.

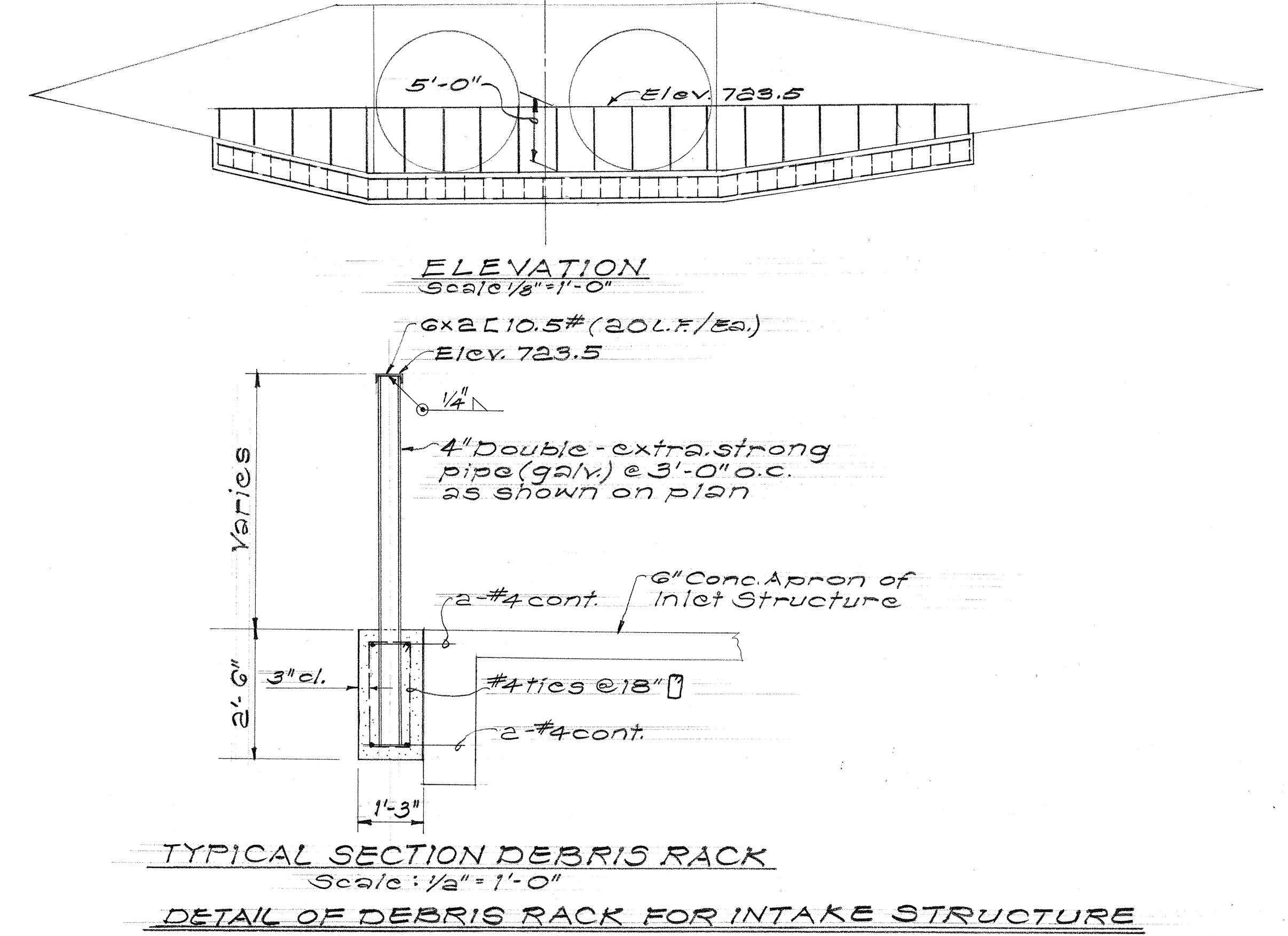
Scale: $\frac{1}{4}" = 1'-0"$



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



PLAN



ESTIMATED QUANTITIES	
Class A Concrete	252 cy
Reinforcing Steel	10,330 lbs
Structural Excavation	298 cy

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

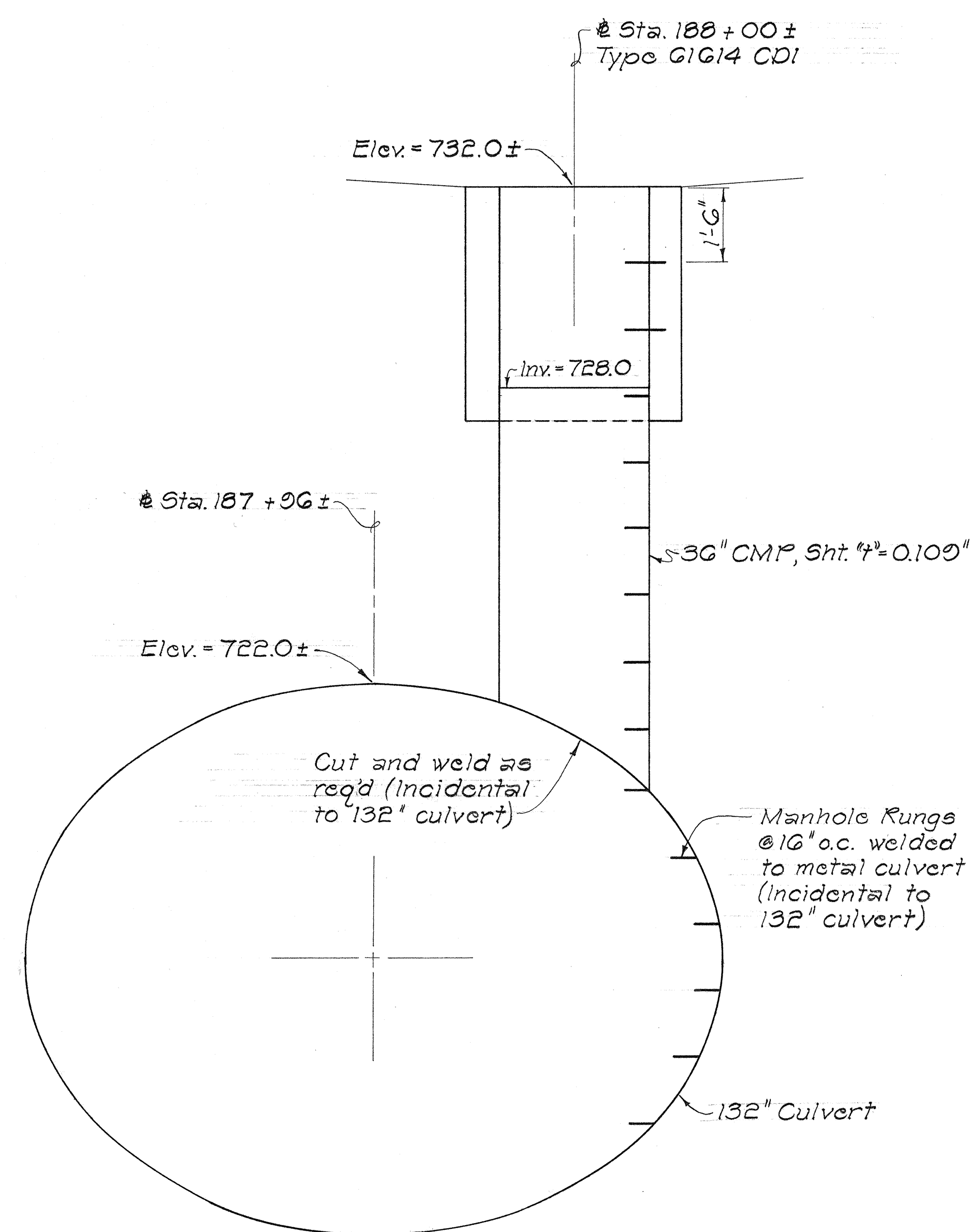
INTAKE AND OUTLET STRUCTURES AND
DEBRIS RACK FOR 2-132" CULVERTS
AT & STA. 187 + 90

INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-1(7):4

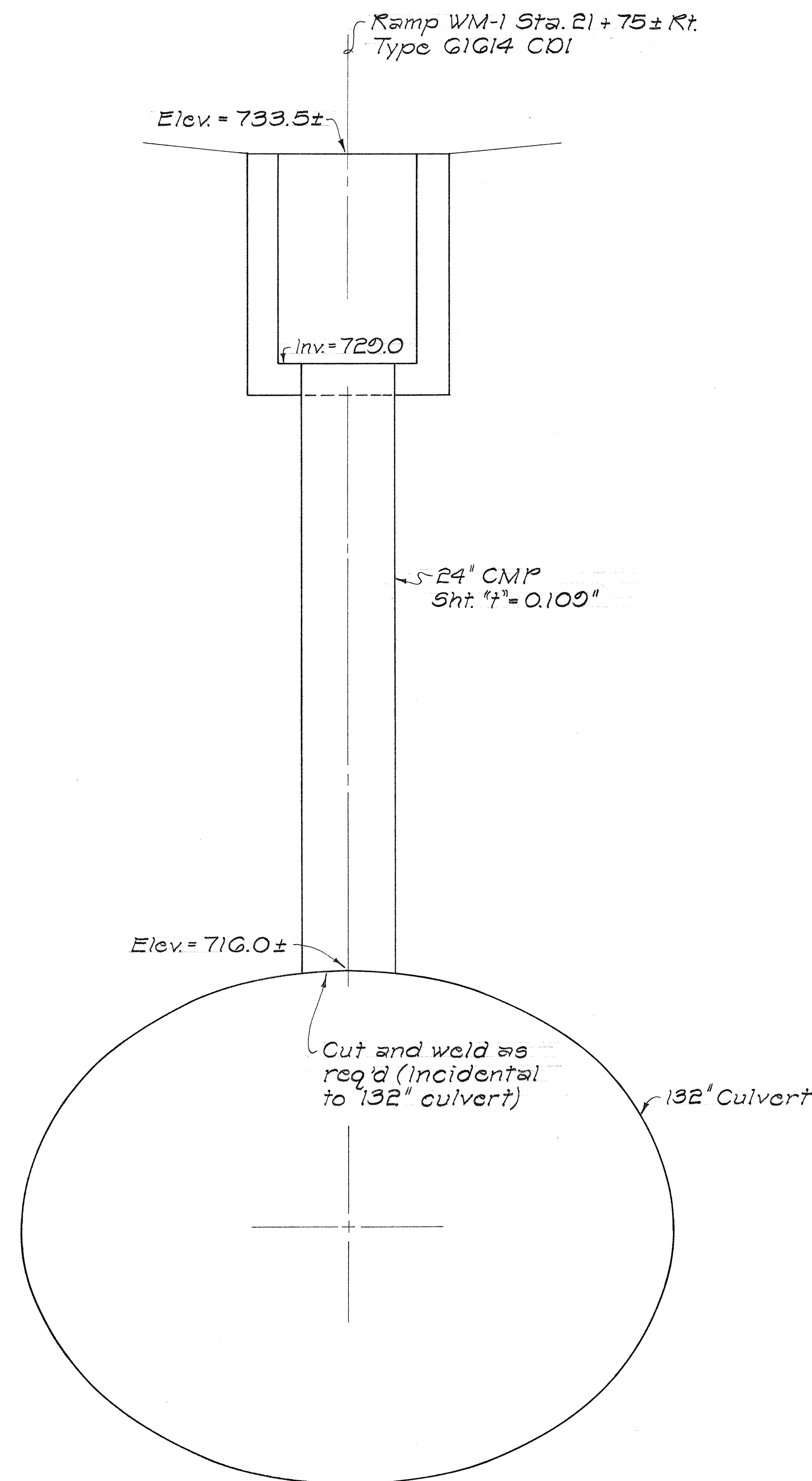
Scale: As Shown

SHEET No. 25 OF 40 SHEETS

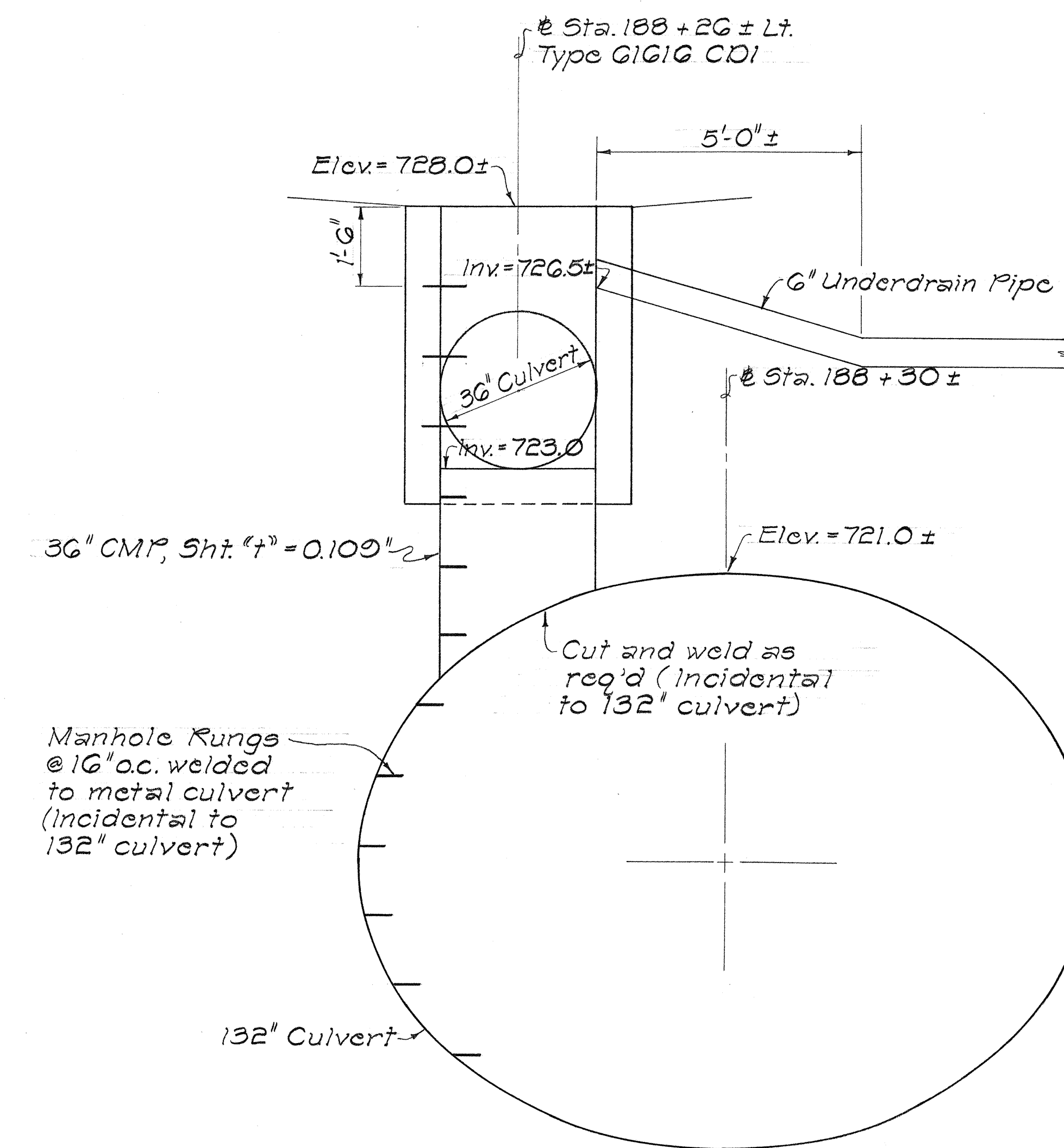
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7):4	1973	112	220



DETAIL OF TYPE G1G14 CDI
AT STA. 188 + 00 ±



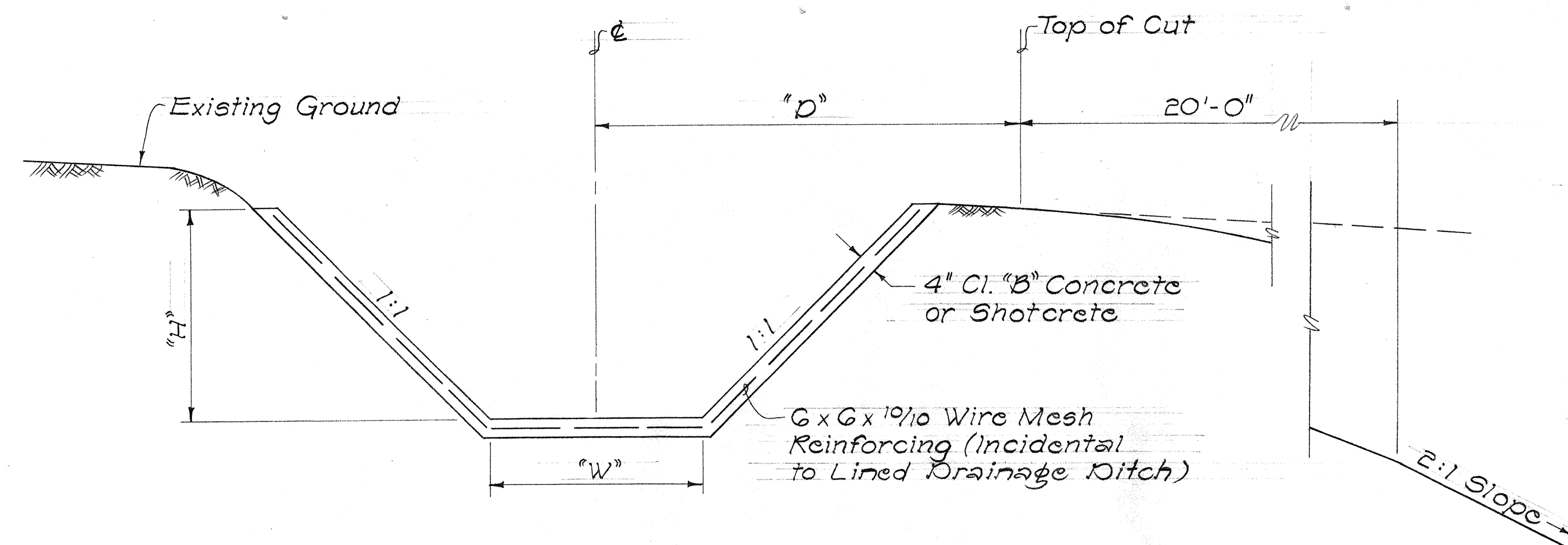
DETAIL OF TYPE G1G14 CDI
AT RAMP WM-1 STA. 21 + 75 ± RT.



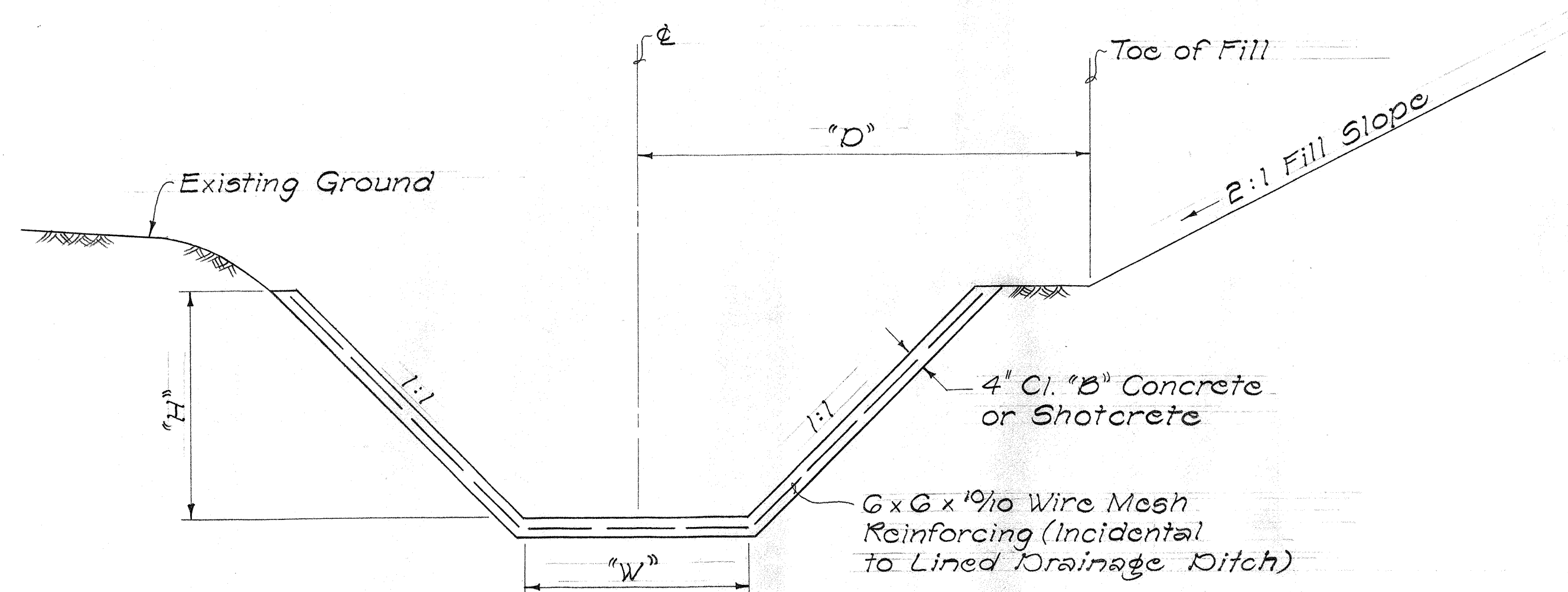
DETAIL OF TYPE G1G1G CDI
AT STA. 188 + 26 ± LT.

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES 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.	I-H2-(7):4	1973	113	229



LINED DRAINAGE DITCH @ TOP OF CUT

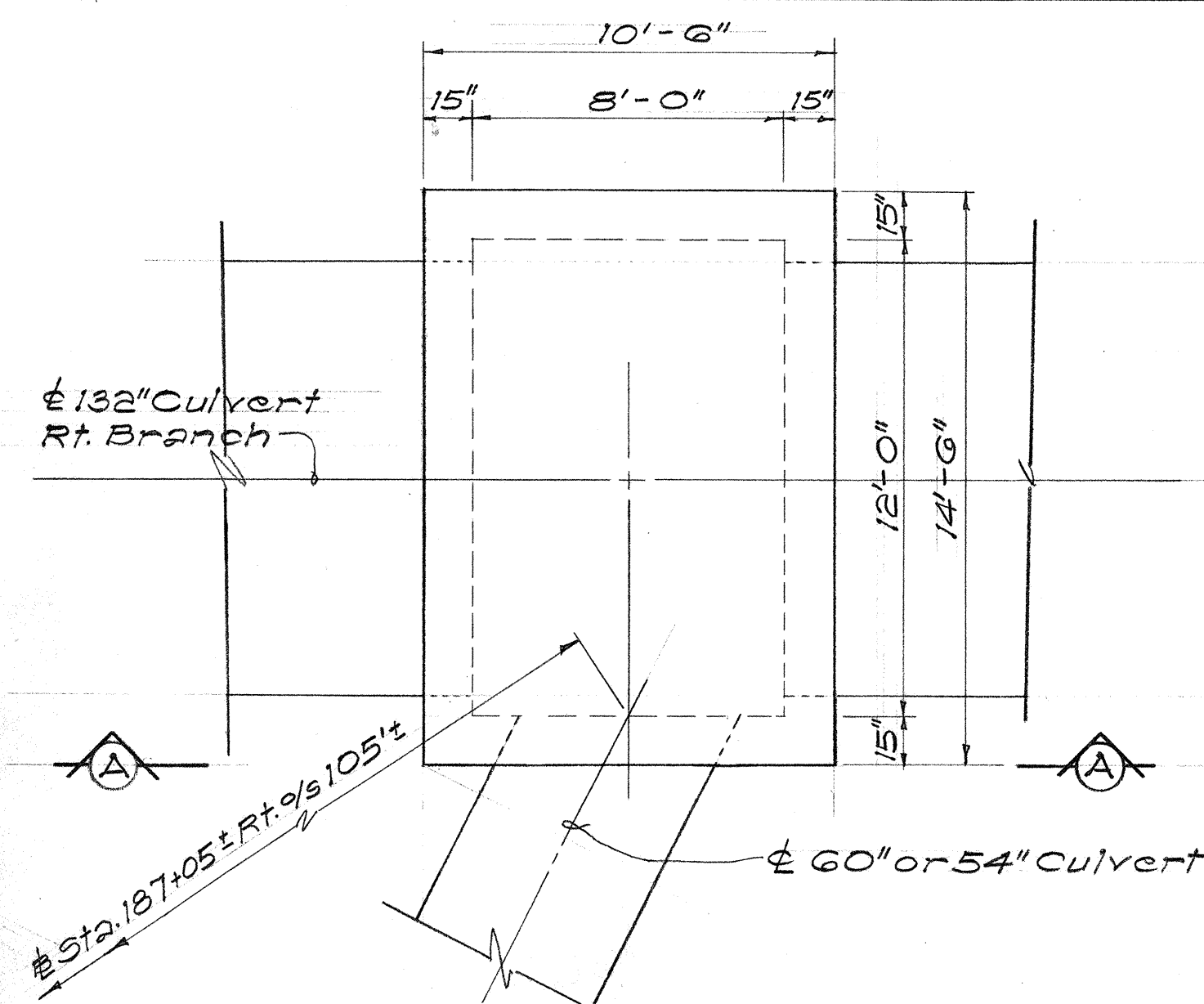


LINED DRAINAGE DITCH @ TOE OF FILL

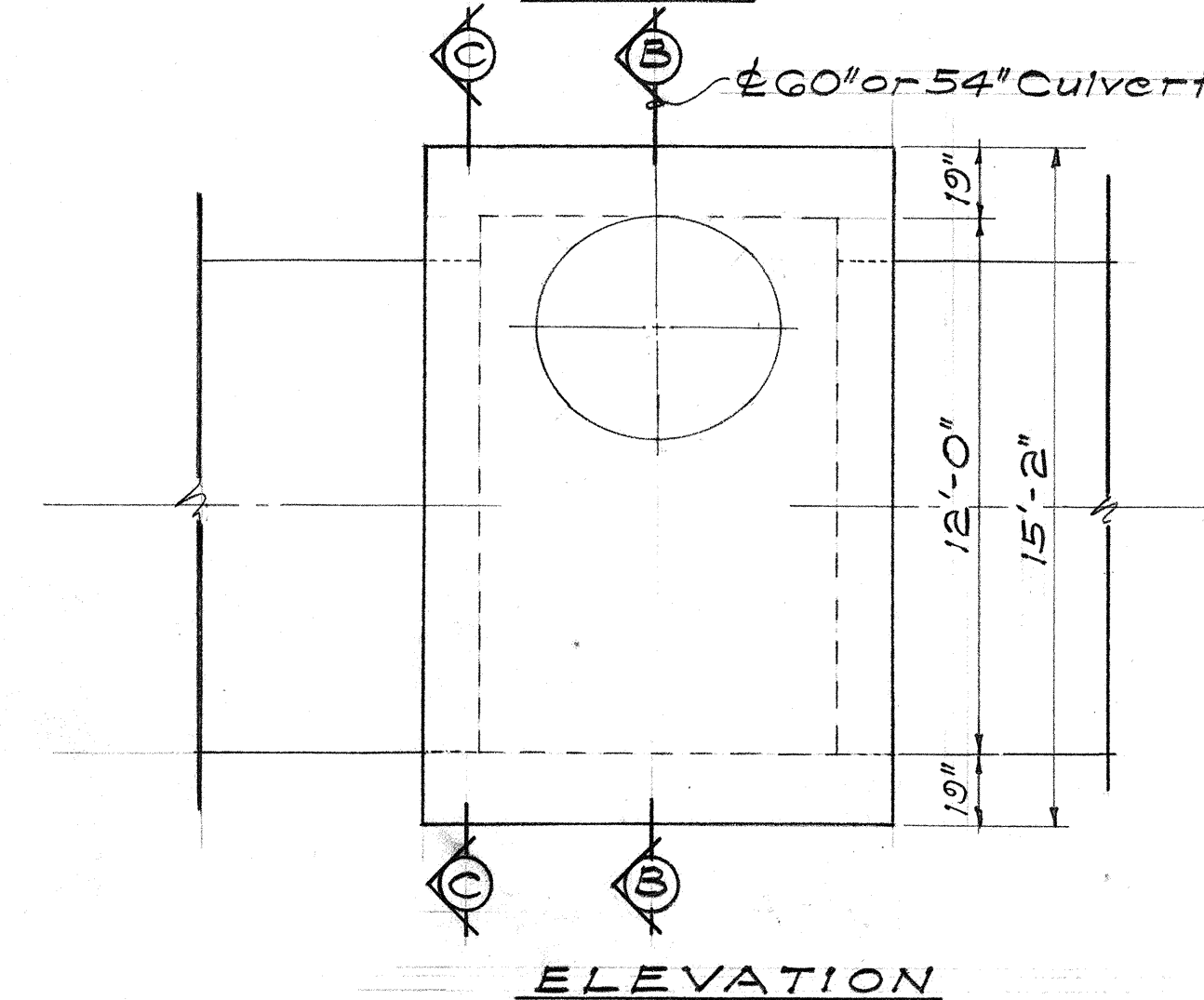
"H" (Ft.)	"W" (Ft.)	"D" (Ft.)
2	2	5
3	3	6
4	4	8

DETAIL OF LINED DRAINAGE DITCH

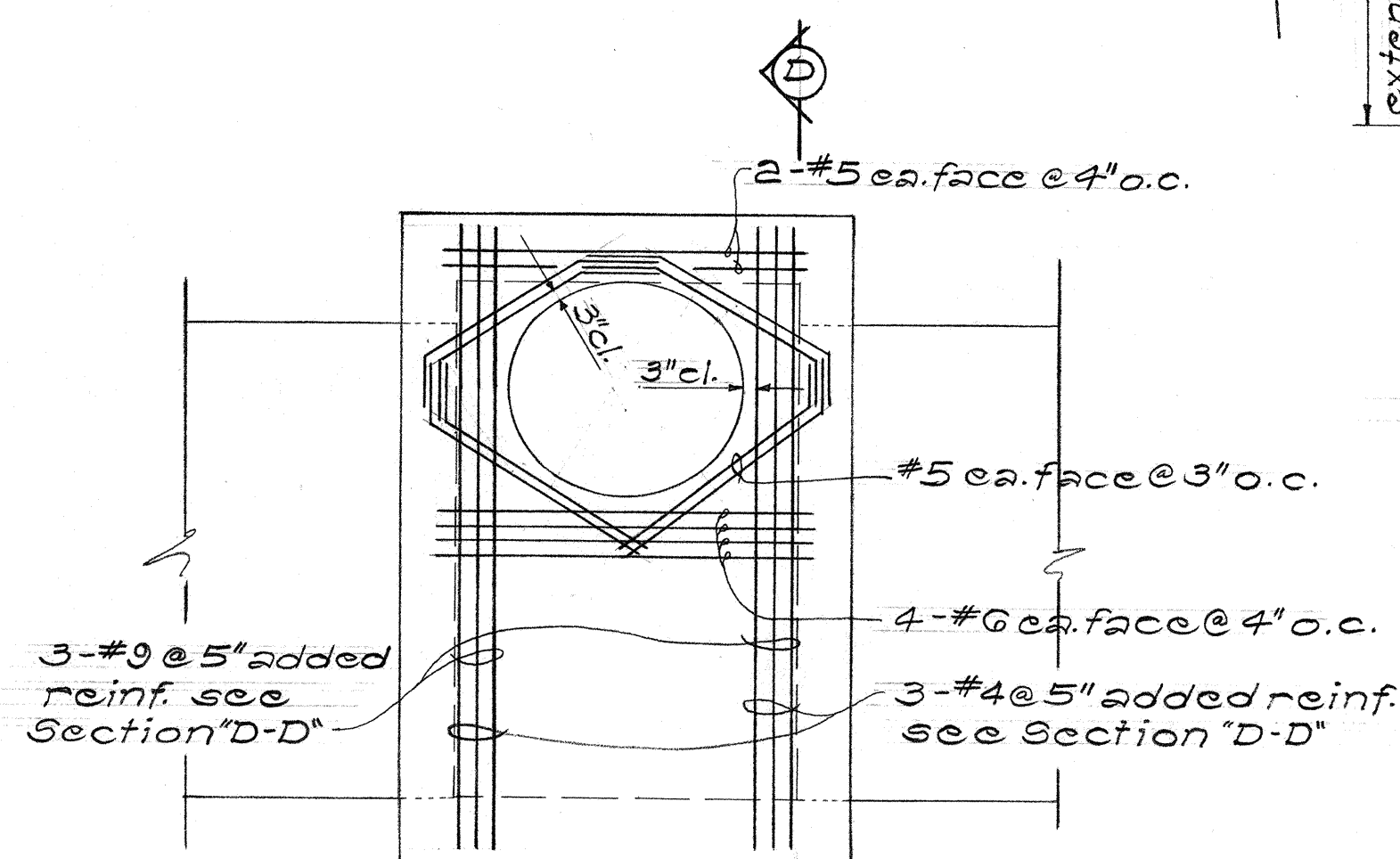
Scale: 1/2" = 1'-0"



PLAN



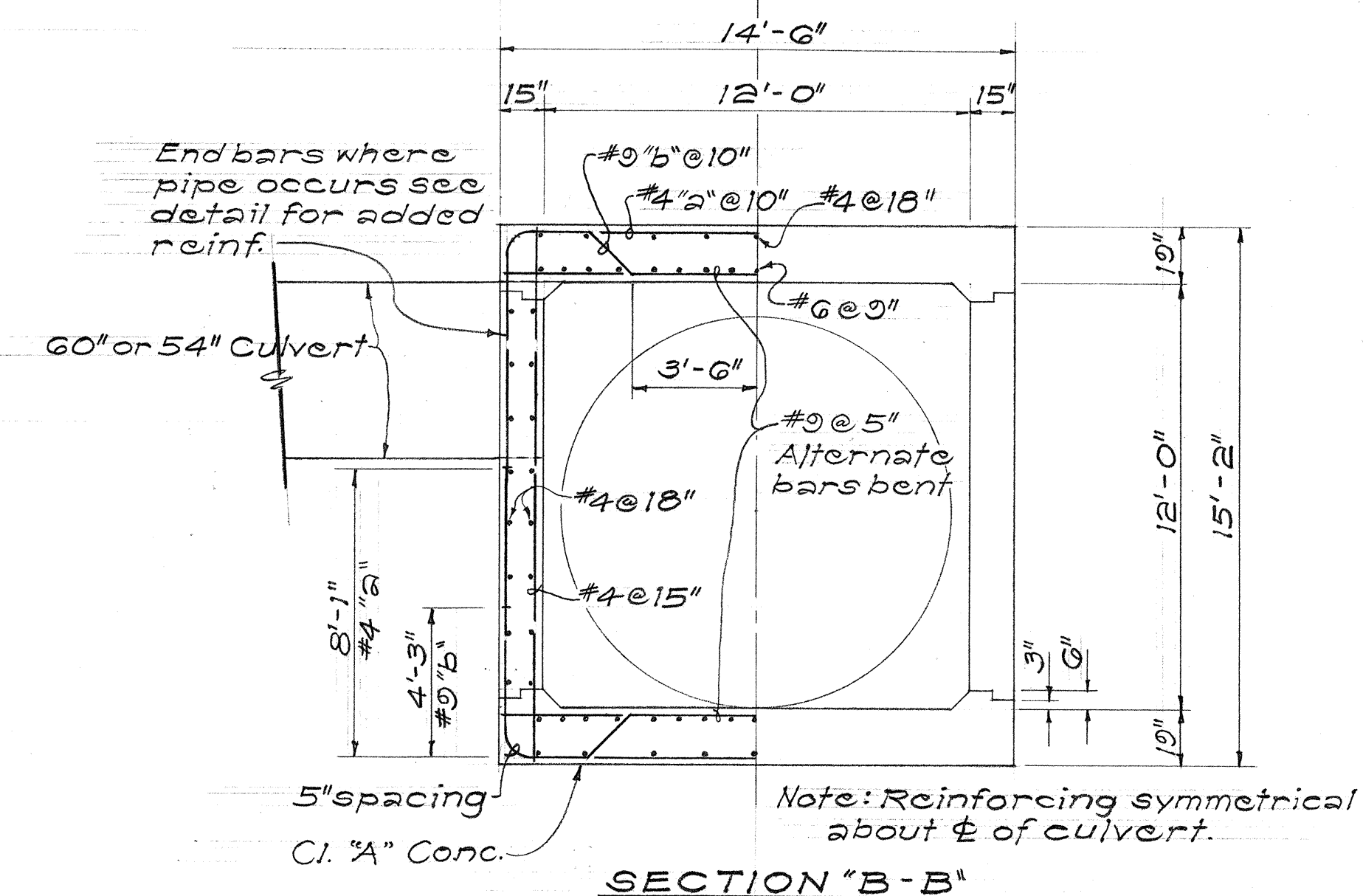
ELEVATION



SECTION "A-A"

DETAIL OF TYPE "MP" STRUCTURE AT STA. 187+05± RT 9%105±

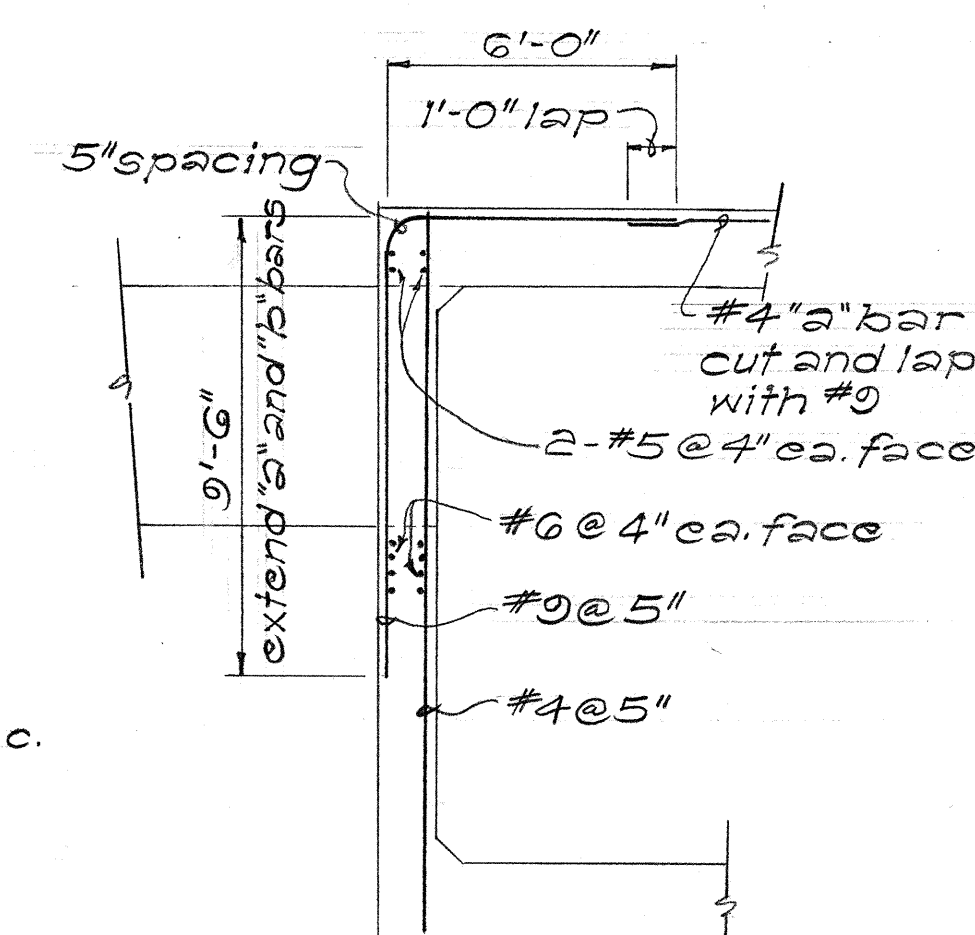
Scale: 1/4" = 1'-0"



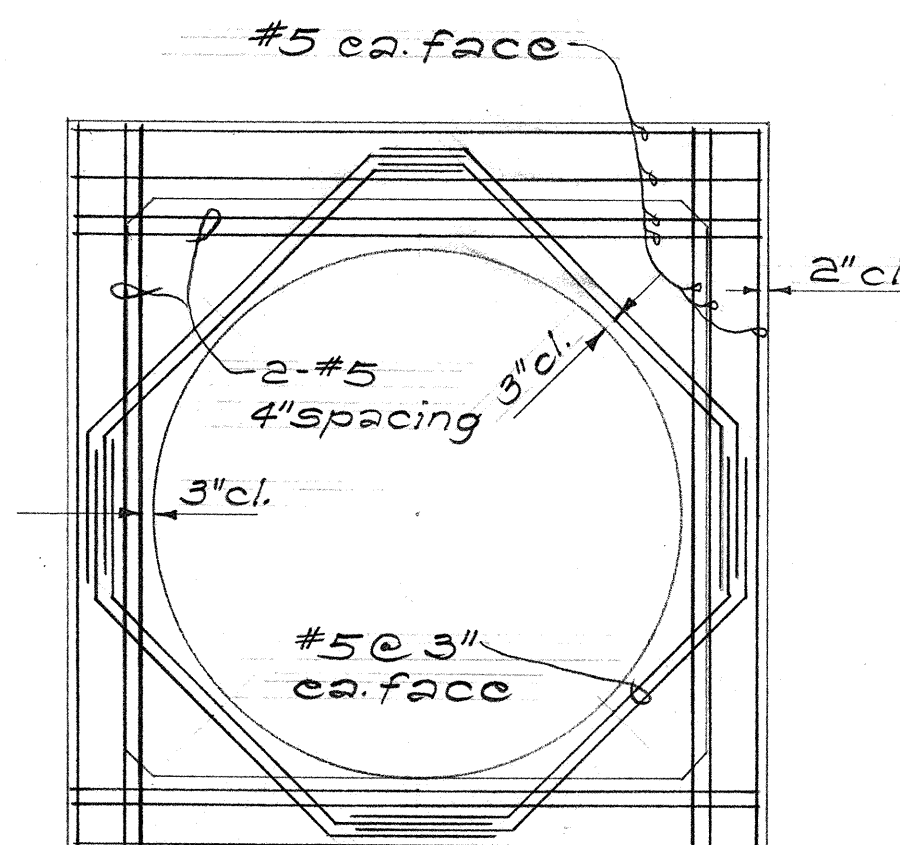
SECTION "B-B"

TYPE "a" BAR

TYPE "b" BAR



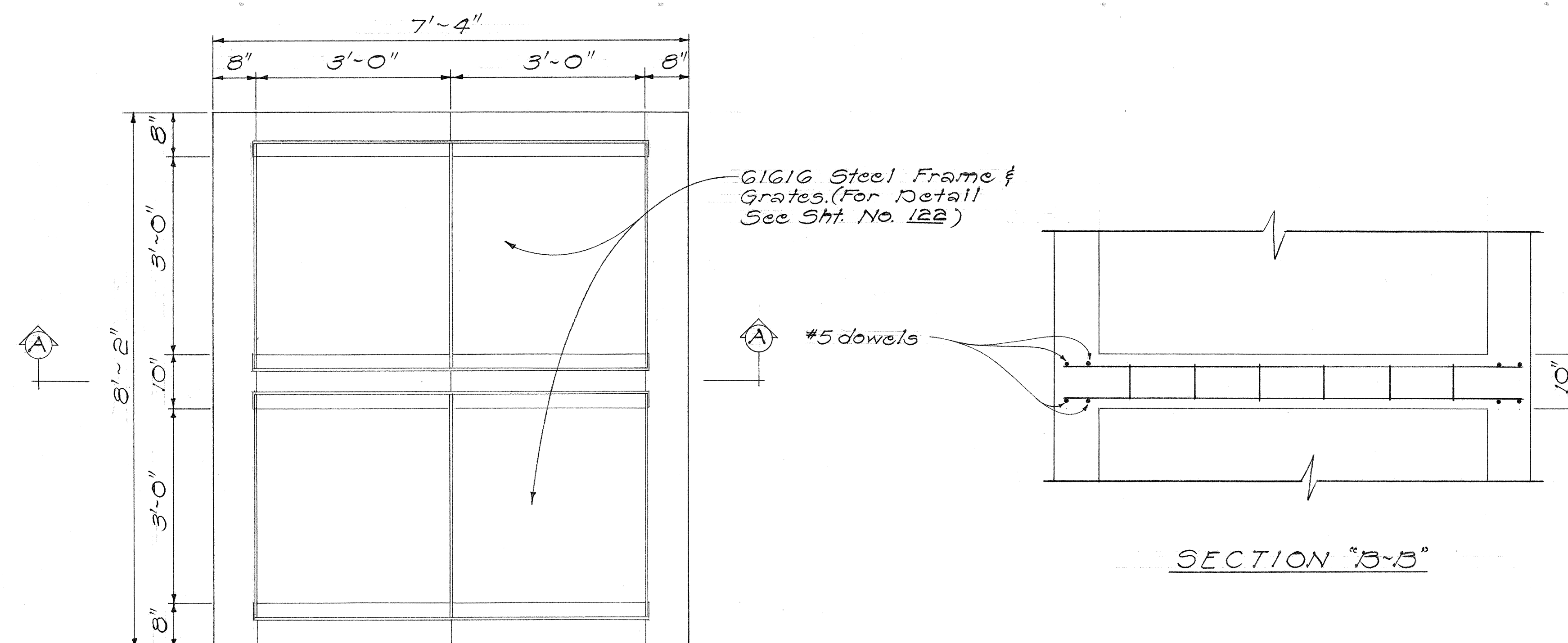
SECTION "D-D"



SECTION "C-C"

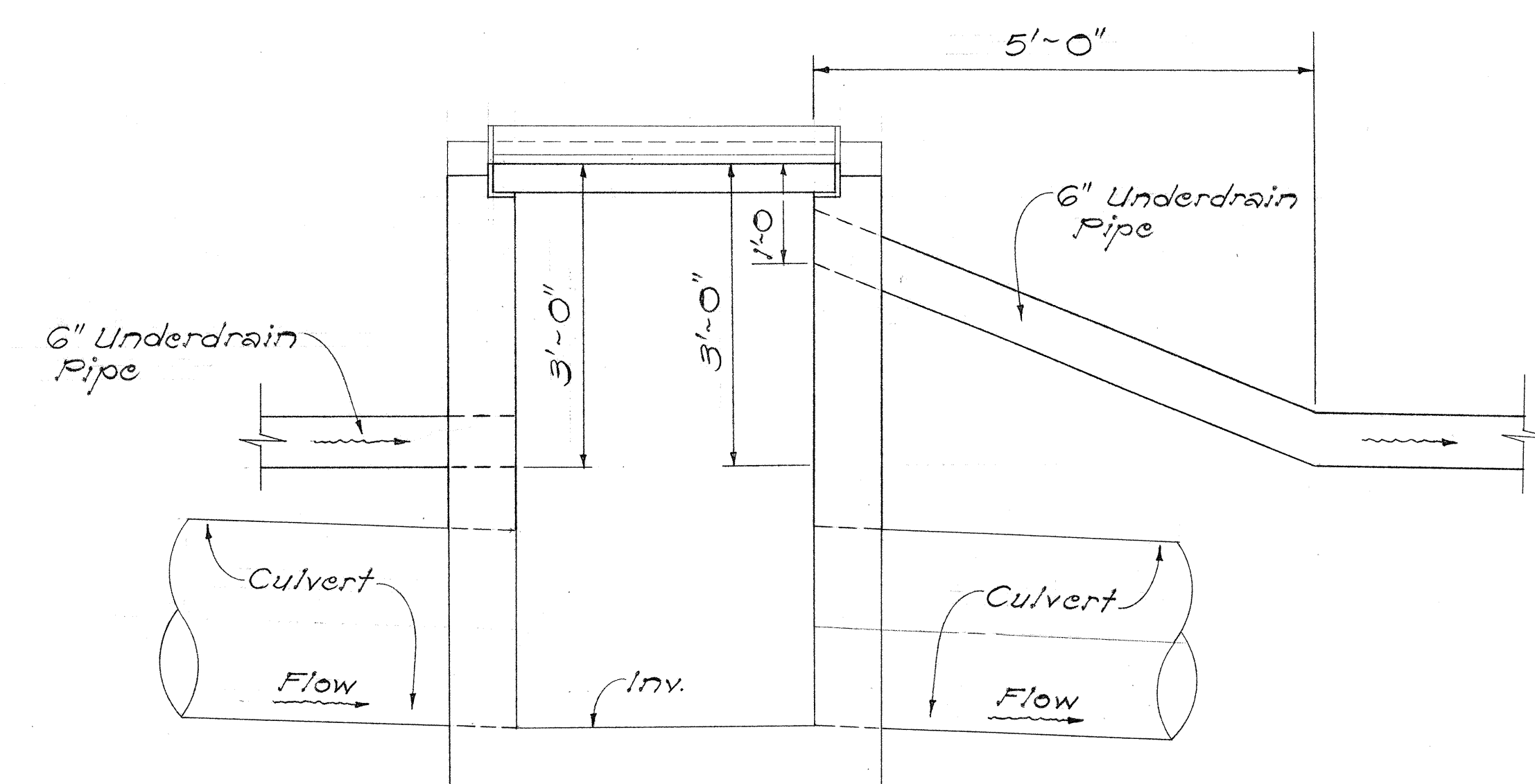
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS
TYPICAL DETAIL CUT-OFF DITCHES
TYPE "MP" STRUCT. @ STA. 187+05± RT 9%105±
INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-(7):4
Scale: As Noted Date: Mar. 1973
SHEET No. 27 OF 40 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H2-1(7):4	1973	114	220

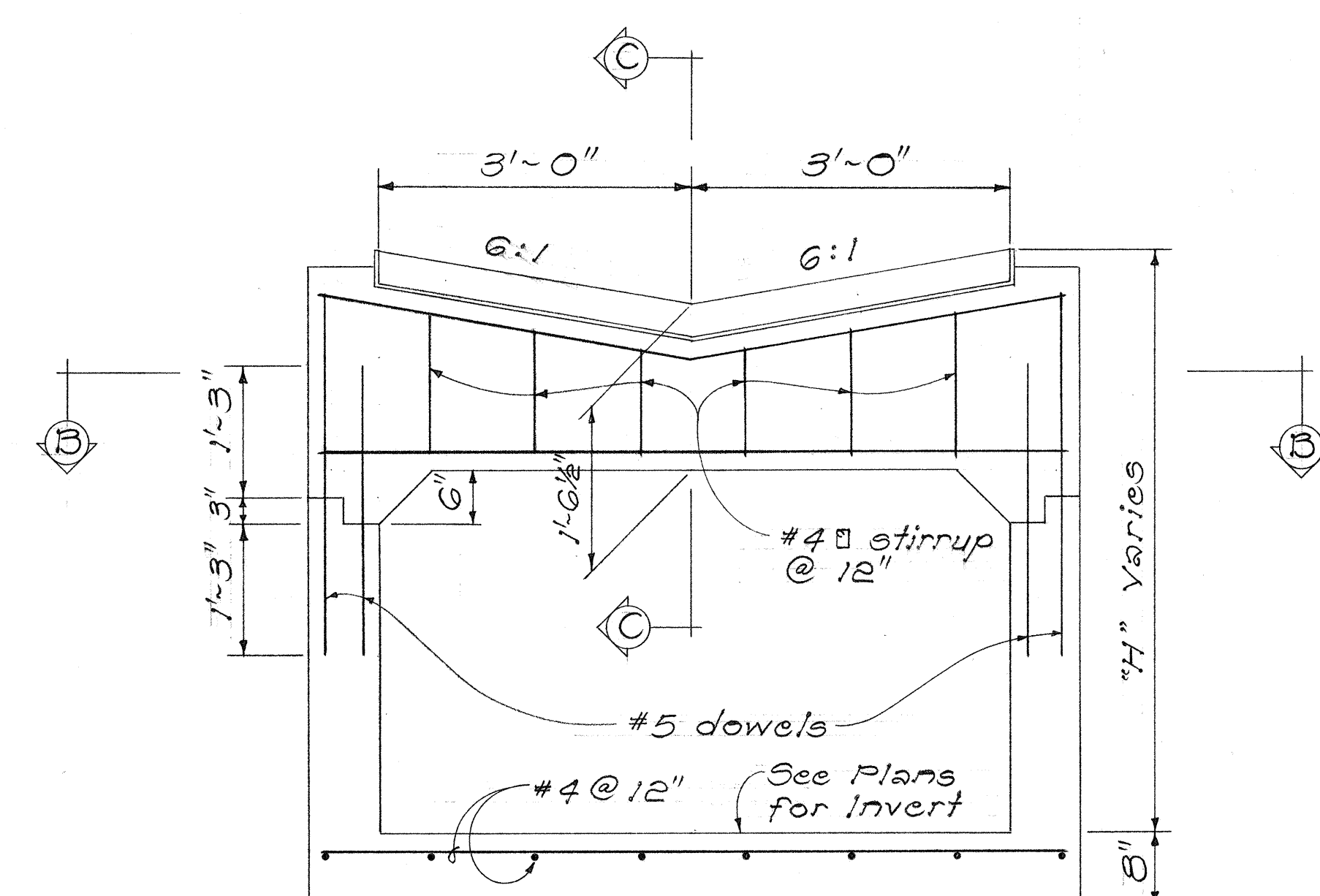


PLAN

SECTION "B-B"

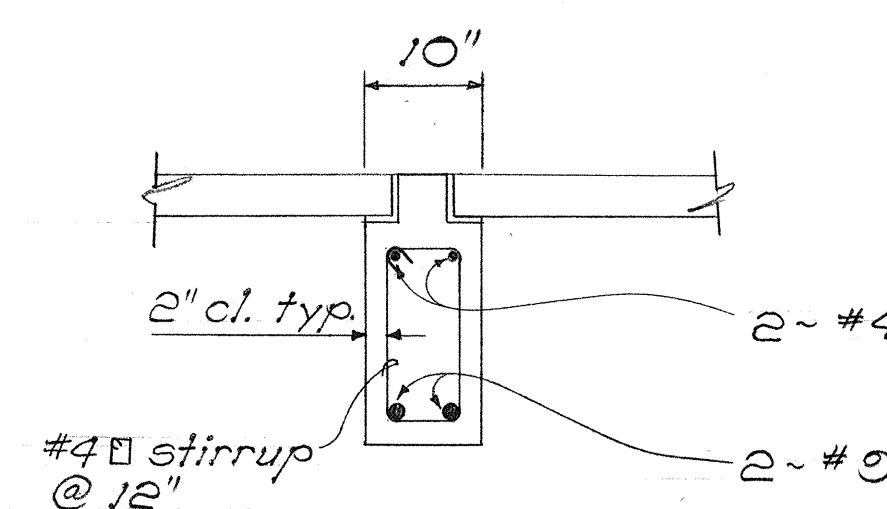


DETAILS OF 6" UNDERDRAIN PIPE AT CDI'S IN GIGI GUTTER SECTION

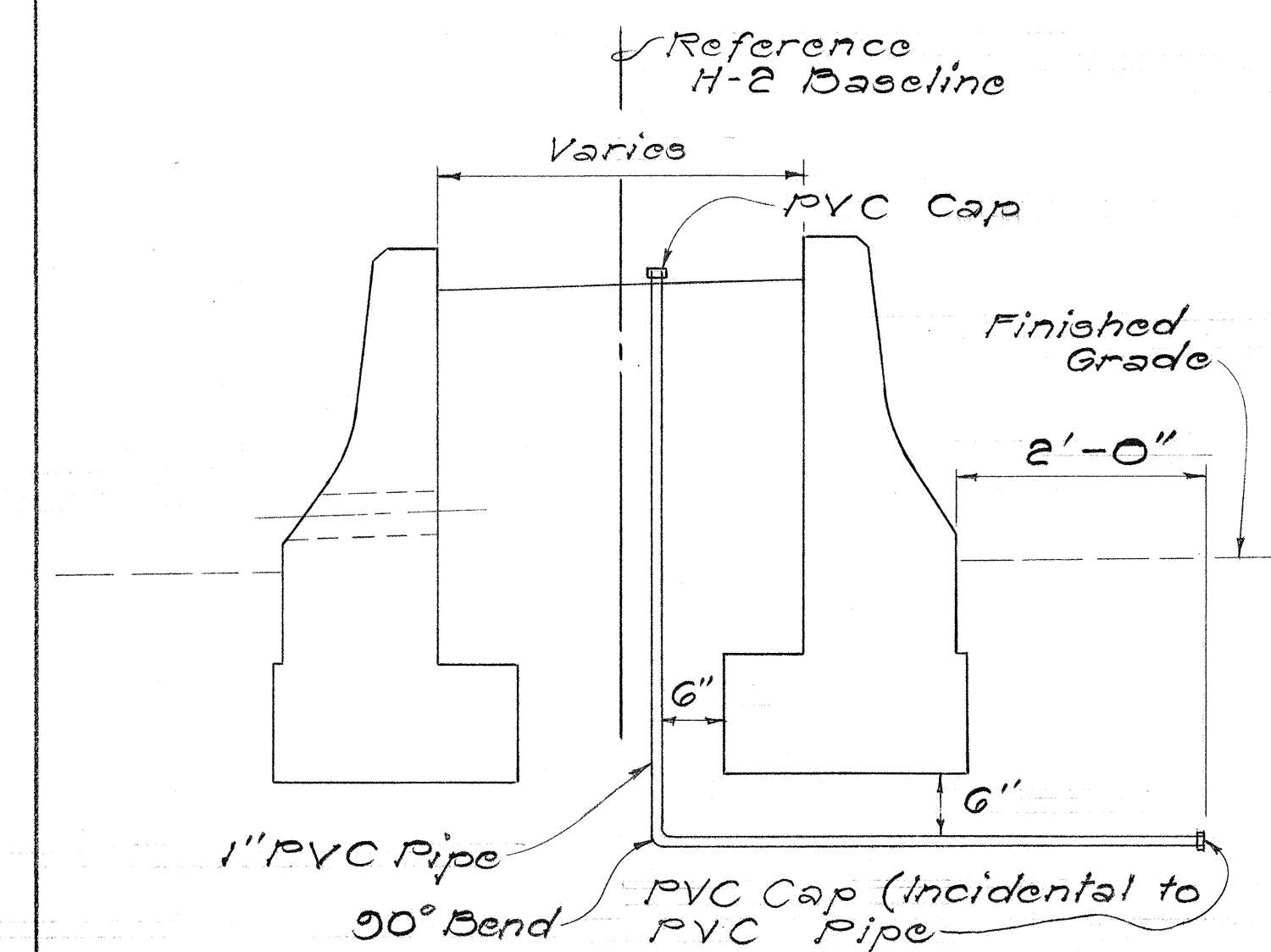


SECTION "A-A"

DETAILS OF GIGI-D CDI



SECTION "C-C"



DETAILS OF 1" PVC PIPE AT PLANTER BOXES
(# STA. 189+75 ± # STA. 190+55 ±)

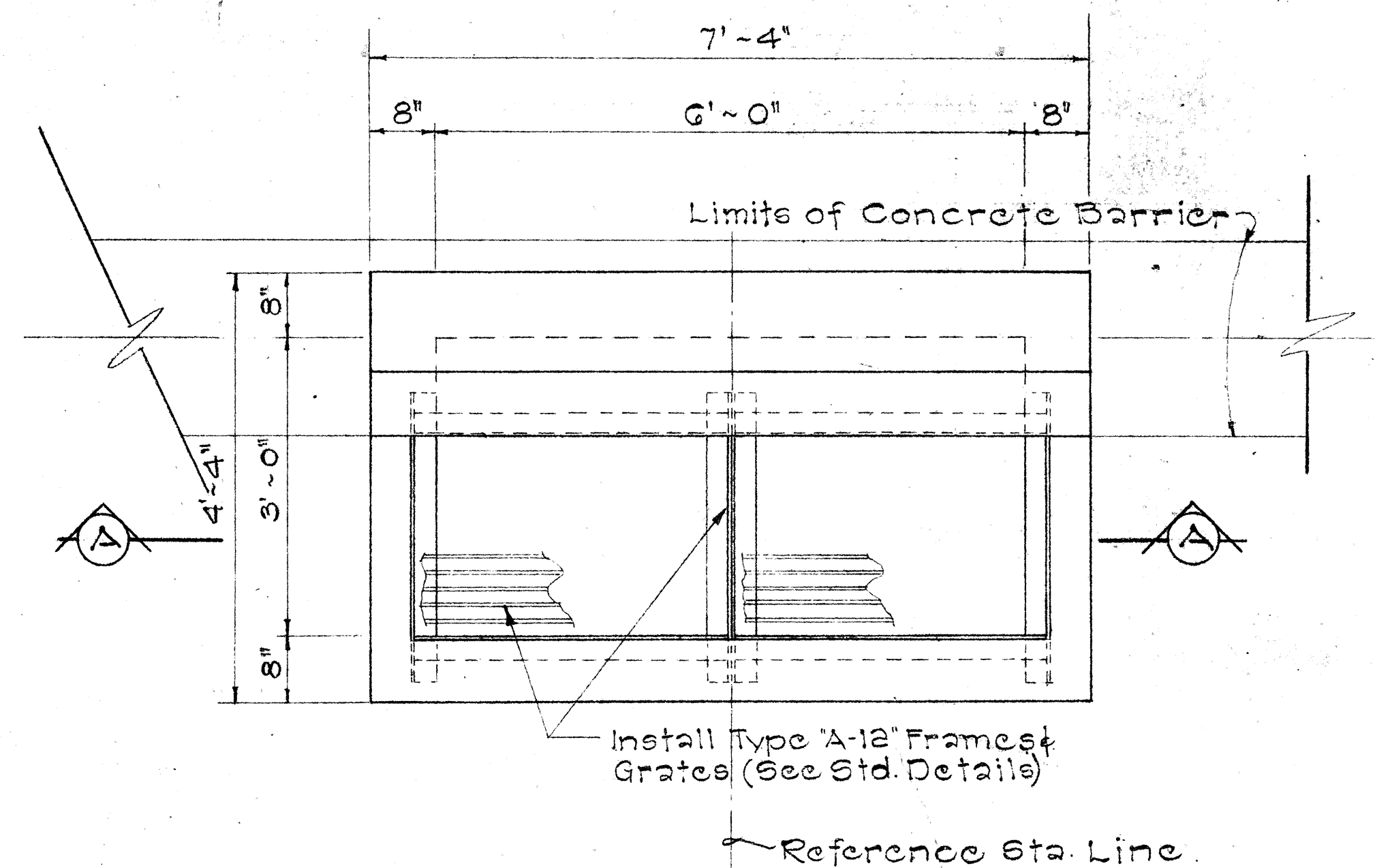
NOTE:
For Catch Basins, Underdrain Pipes shall enter and exit at 45° angle and the exact location shall be determined by the engineer in the field.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS
TYPE GIGI-D C.D.I.
6" UNDERDRAIN PIPE AT
GIGI TYPE C.D.I.
INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. I-H2-1(7):4
Scale: 3/4"=1'-0"

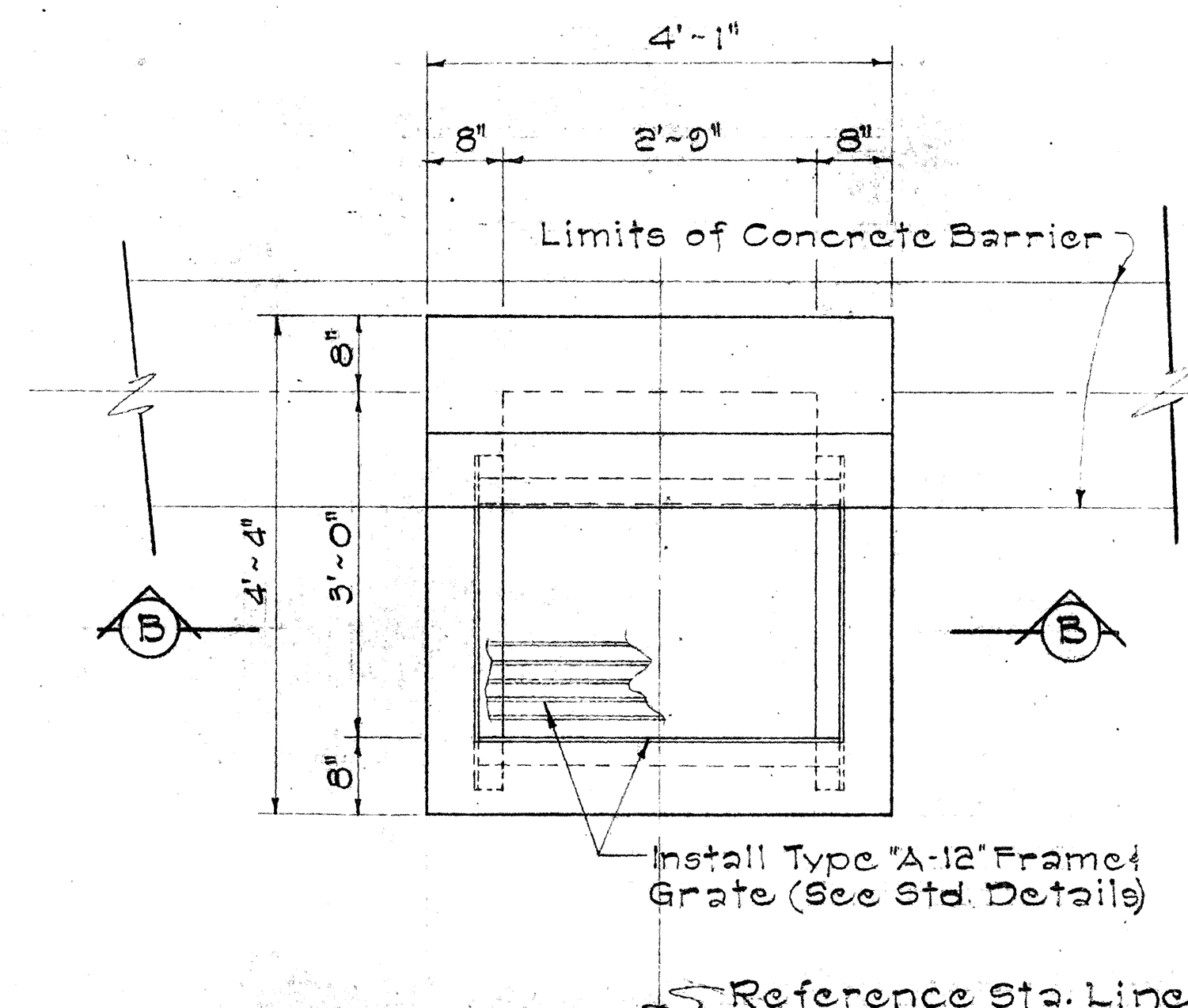
SHEET No. 28 OF 40 SHEETS

ORIGINAL PLAN	DATE
SURVEY PLATTED BY	
DRAWN BY	
DESIGNED BY	
NOTED BY	
CHECKED BY	
NO.	

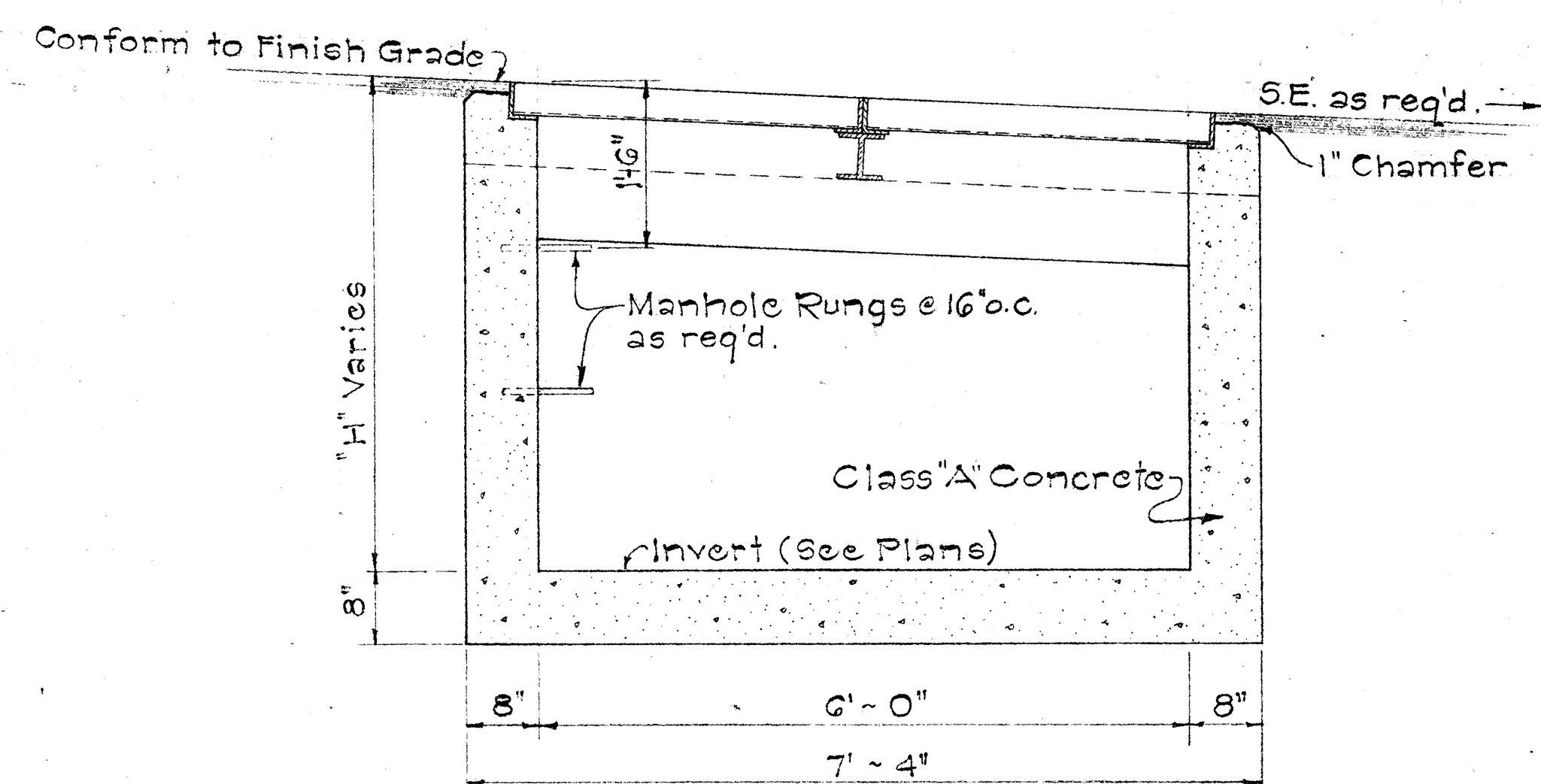
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-4E(7):14	1973	115	220



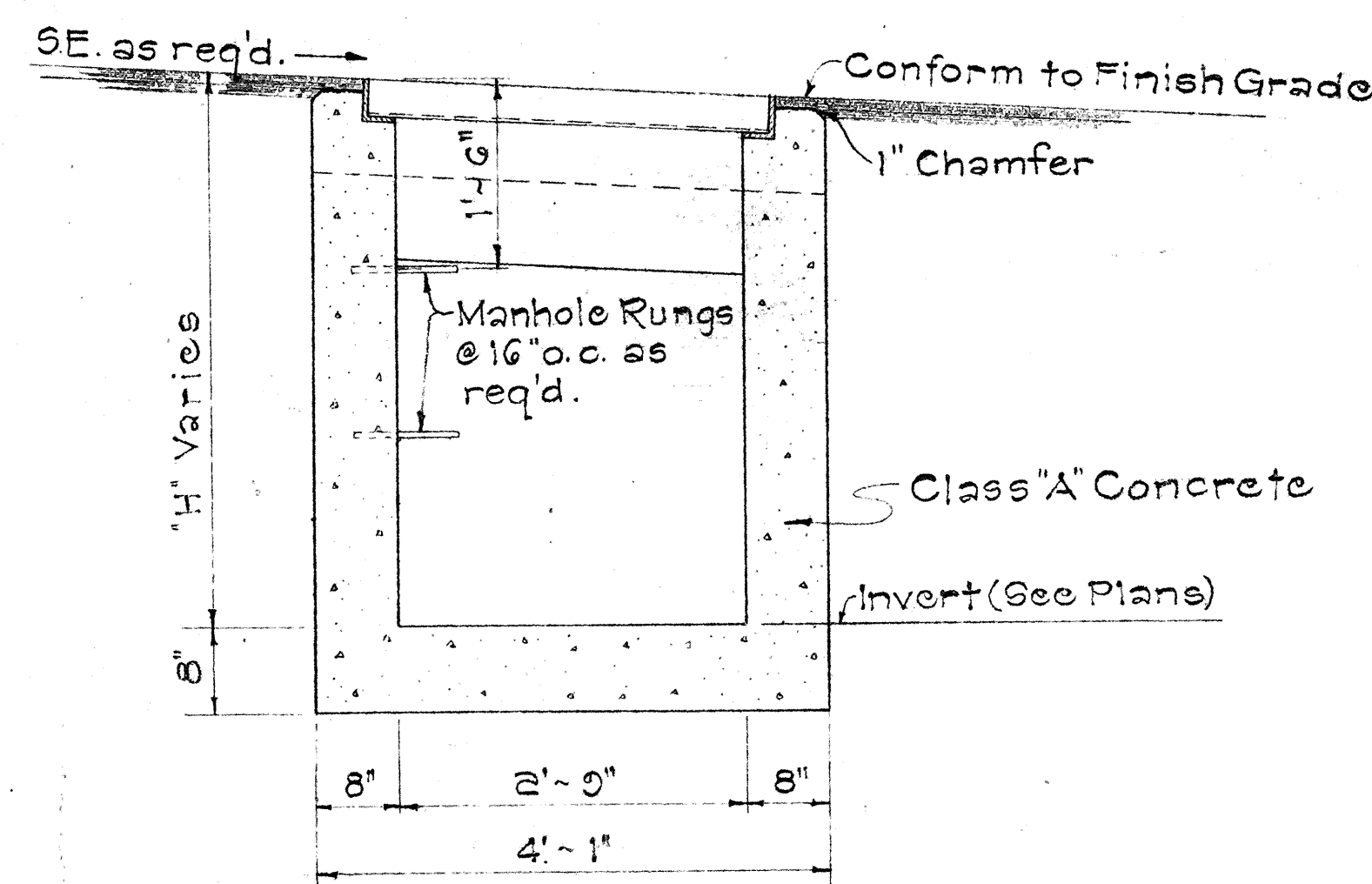
PLAN



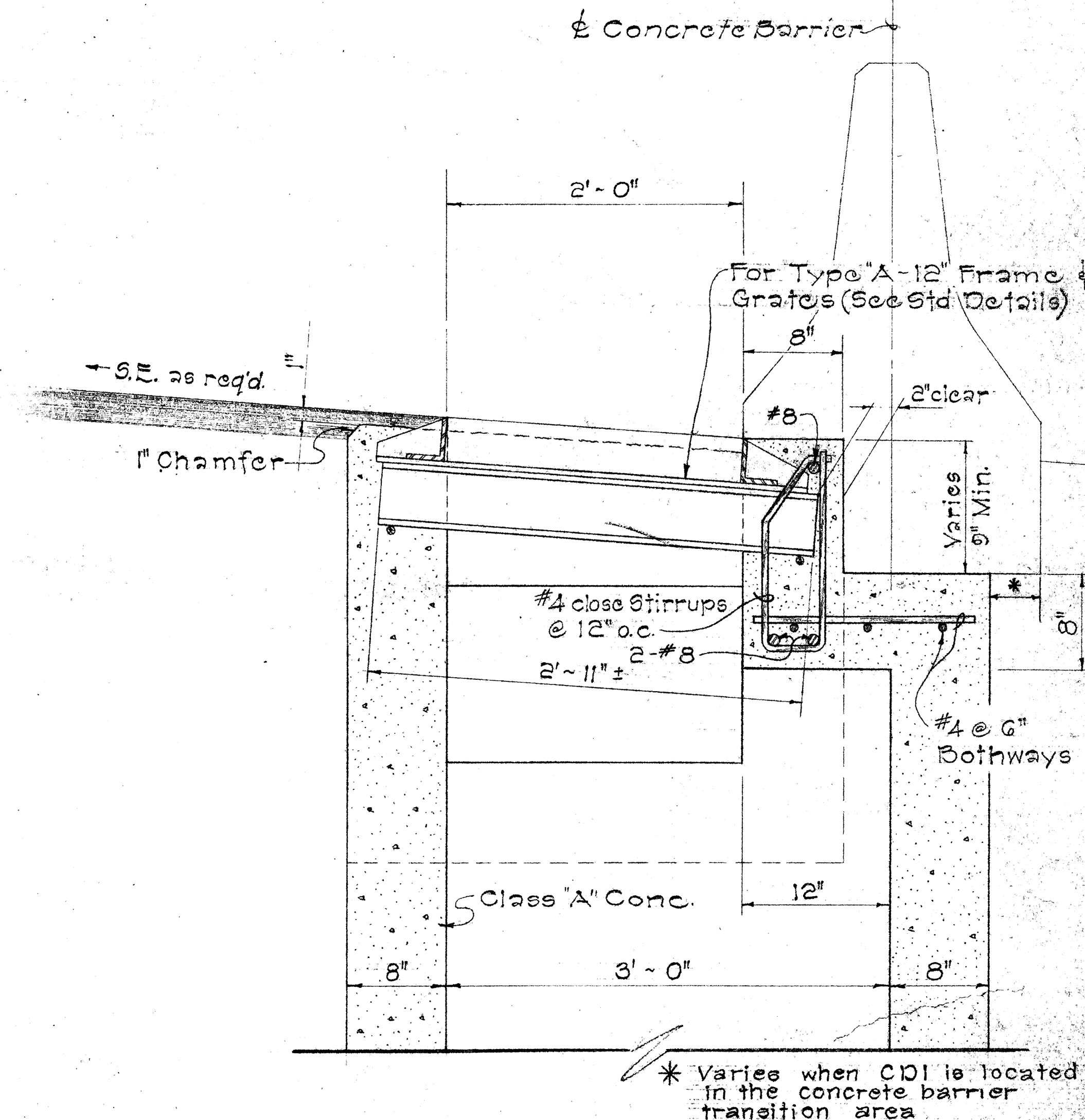
PLAN



SECTION A-A
DETAIL OF MEDIAN C.D.I.
WITH TWO (2) GRATES
Scale: 3/4" = 1'-0"



SECTION B-B
DETAIL OF MEDIAN C.D.I.
WITH ONE (1) GRATE
Scale: 3/4" = 1'-0"



TYPICAL SECTION FOR
MEDIAN C.D.I.
Scale: 1 1/2" = 1'-0"

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
NO.	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

INTERSTATE ROUTE H-2
MILLILANI INTERCHANGE
F.A.I. PROJ. NO. I-4E-1(7):14

Scale: As Shown Date: Mar. 1973

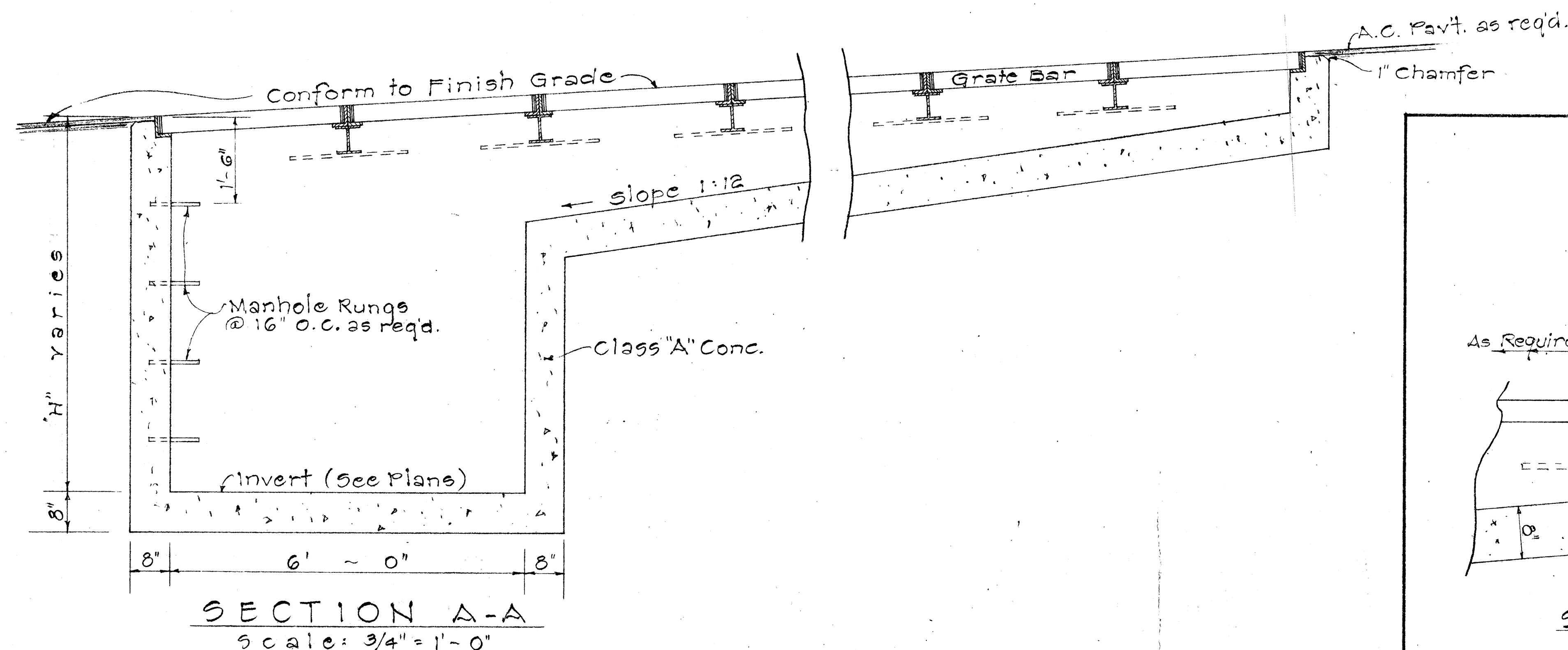
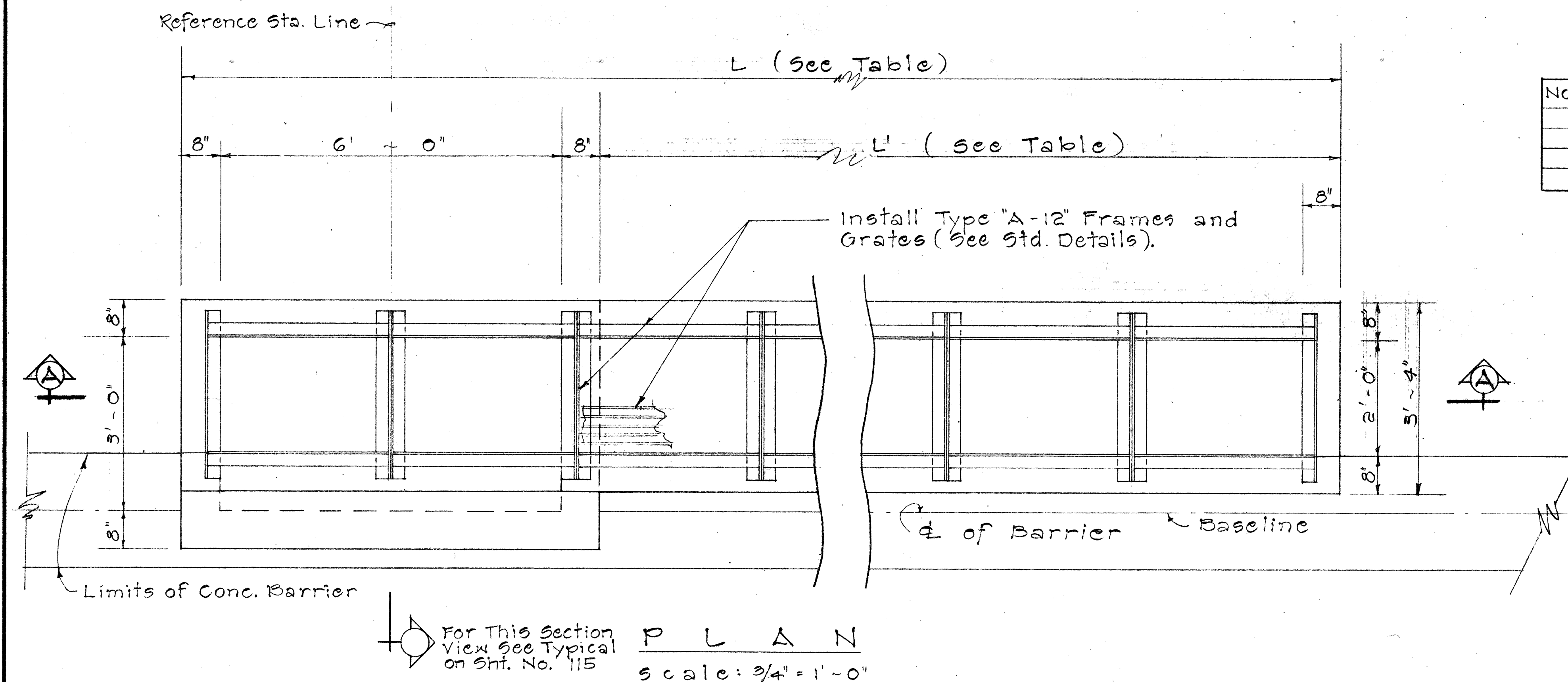
SHEET No. 29 OF 40 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HA21(7)14	1973	116	2293

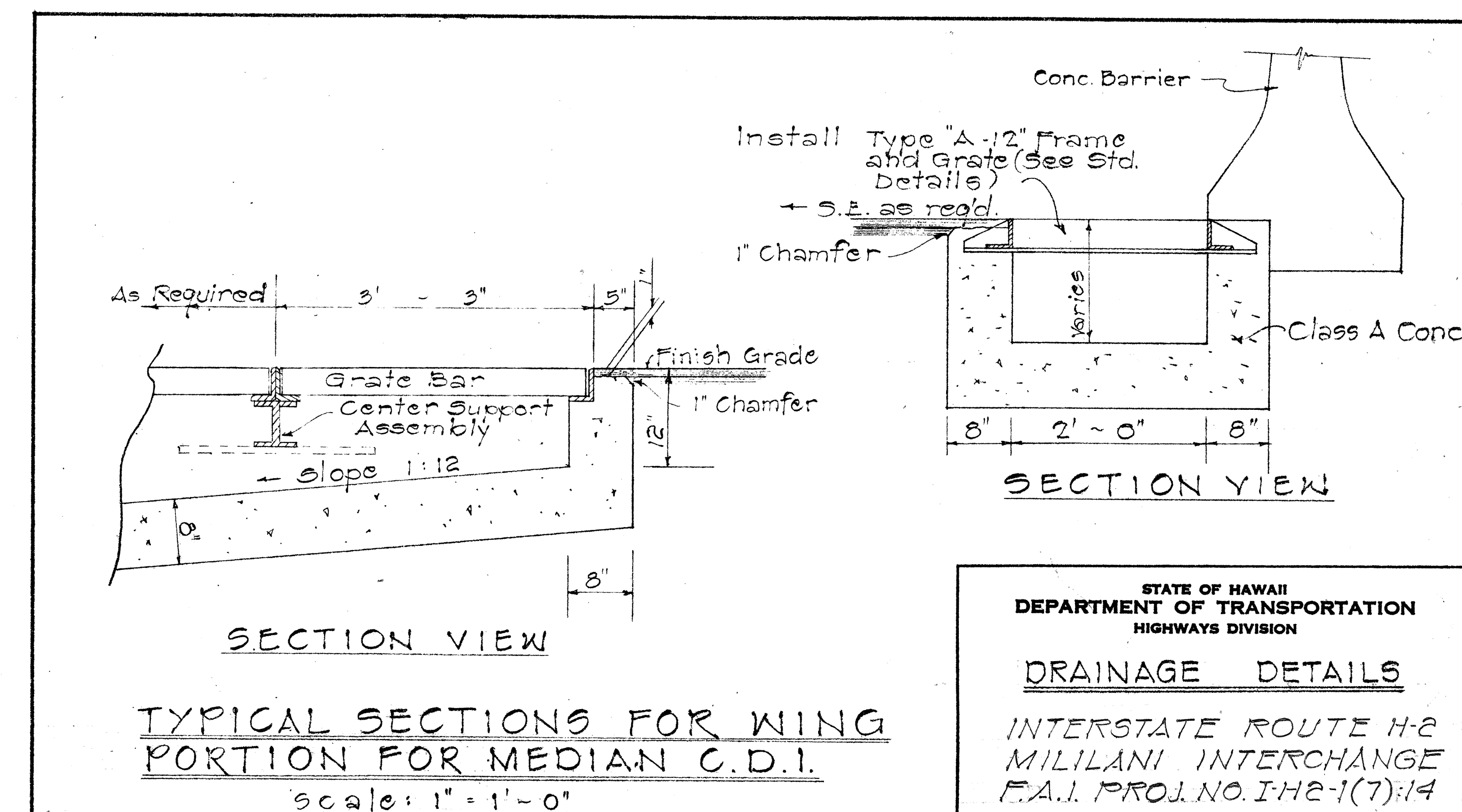
No. OF GRATES	L	L'
3	10' ~ 7"	3' ~ 3"
4	13' ~ 10"	6' ~ 6"
5	17' ~ 1"	9' ~ 9"
6	20' ~ 4"	13' ~ 0"

GENERAL NOTES

1. Culvert shall enter and leave Median C.D.I. from any position and in the direction indicated by the plans or ordered by the Engineer.
2. 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.
3. Center Support Assembly shall be used when two or more gratings are specified and it shall not be paid for separately, but shall be considered incidental to Type "A-12" Frames & Grates.
4. For Median Drop Intakes located in the Concrete Barrier Transition Area, the location shall be parallel to the transition. In all cases, the final location must permit removal of the grates.



TYPICAL ~ DETAILS FOR MEDIAN C.D.I. WITH THREE (3) OR MORE GRATES



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

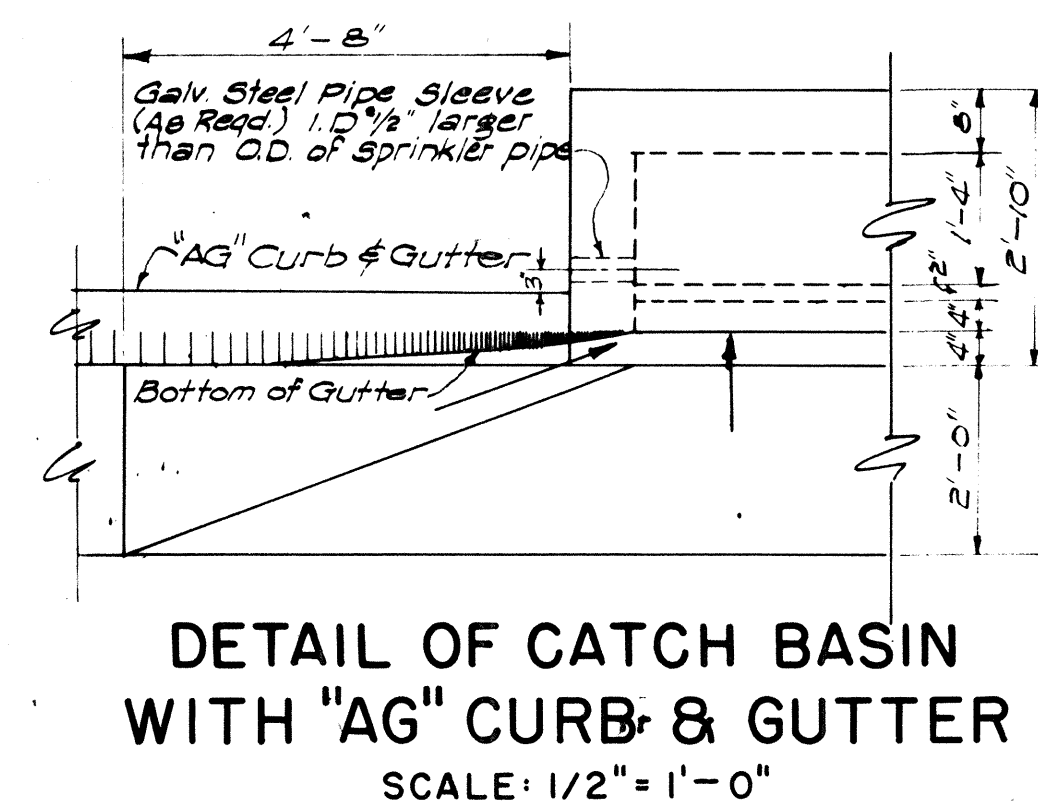
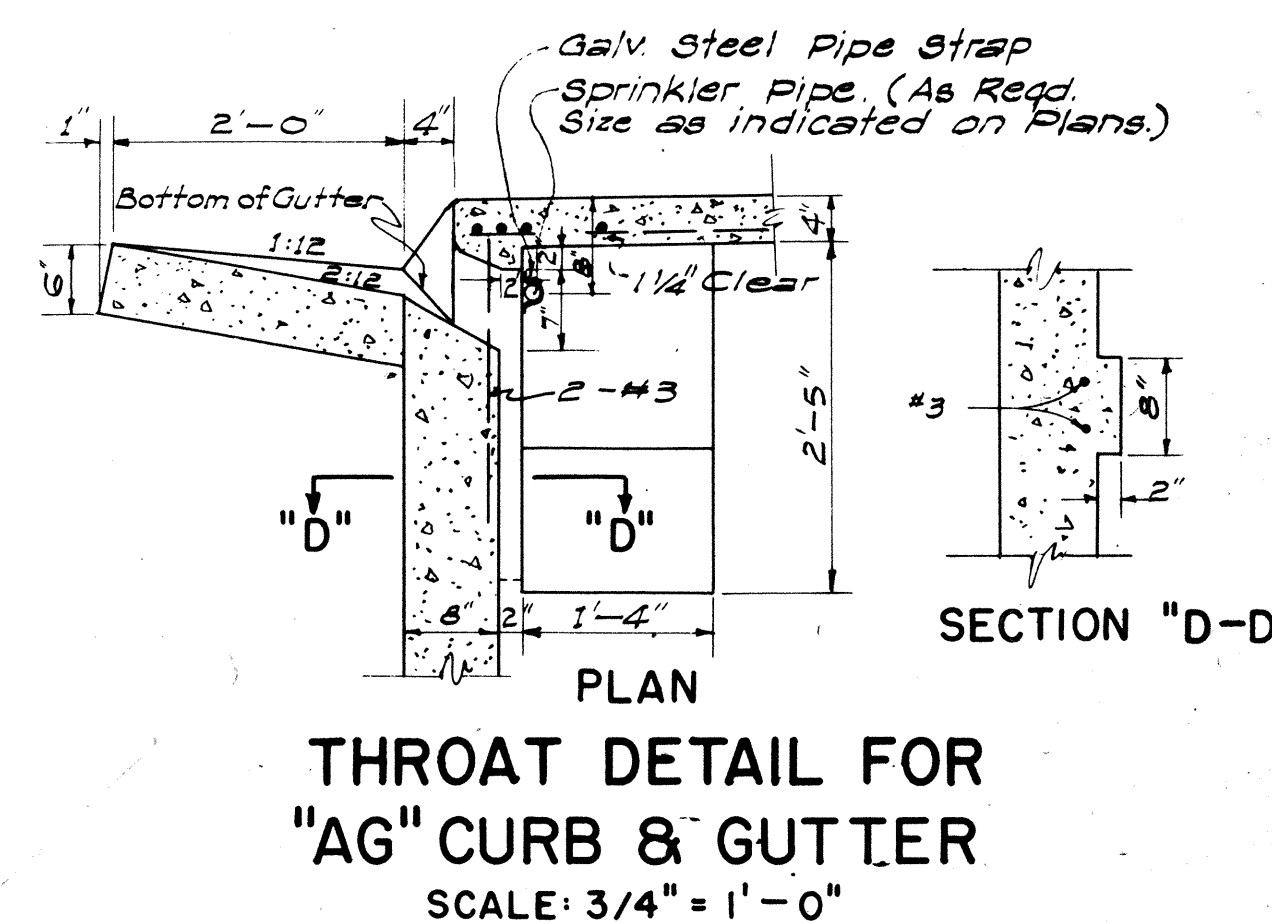
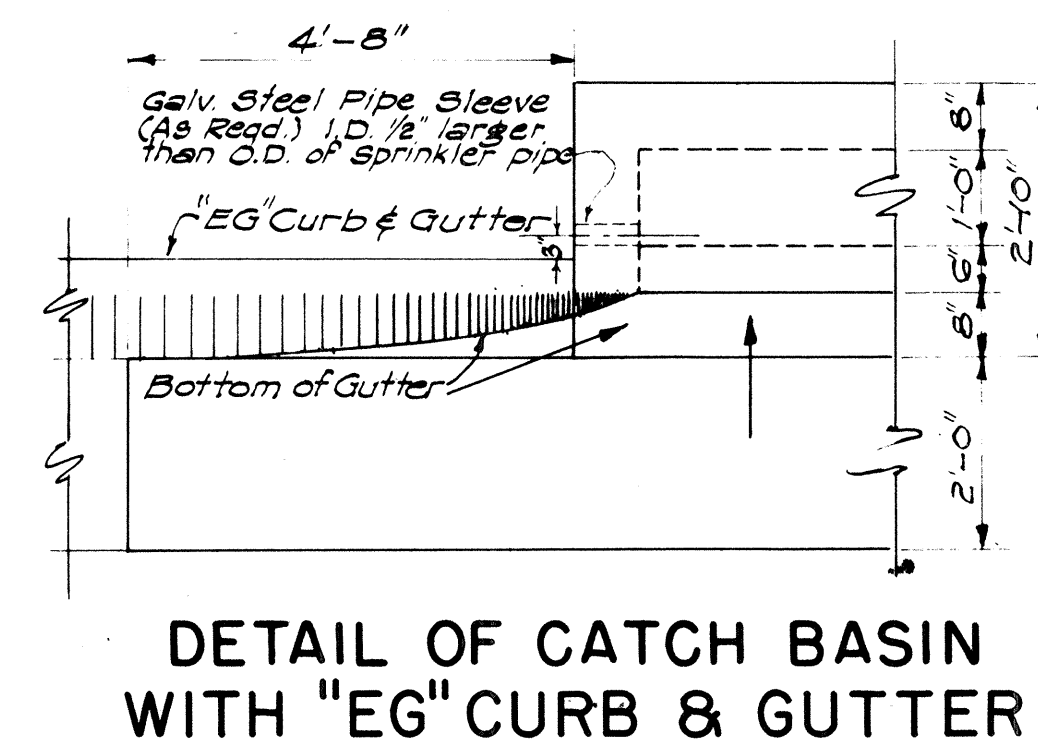
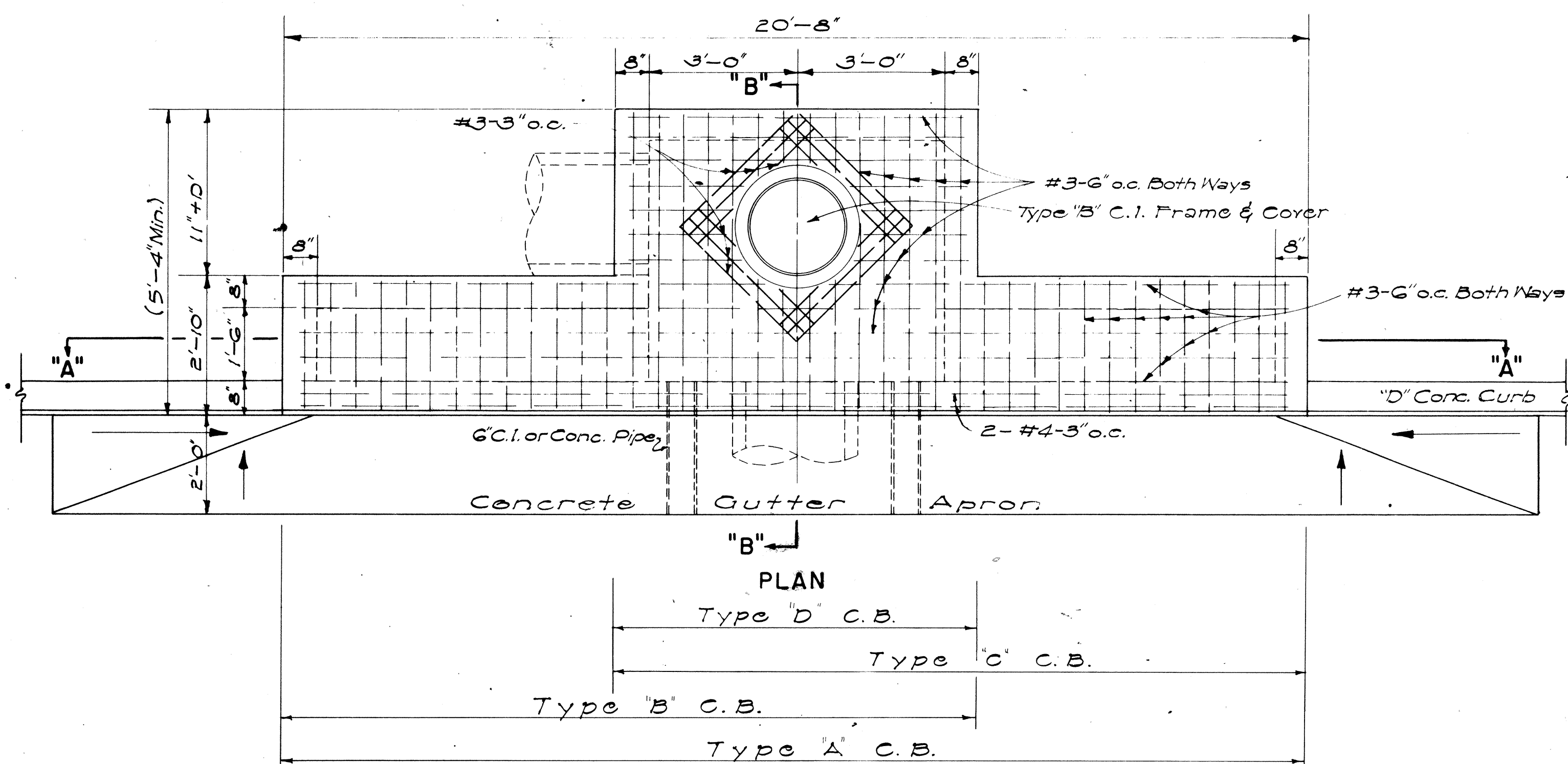
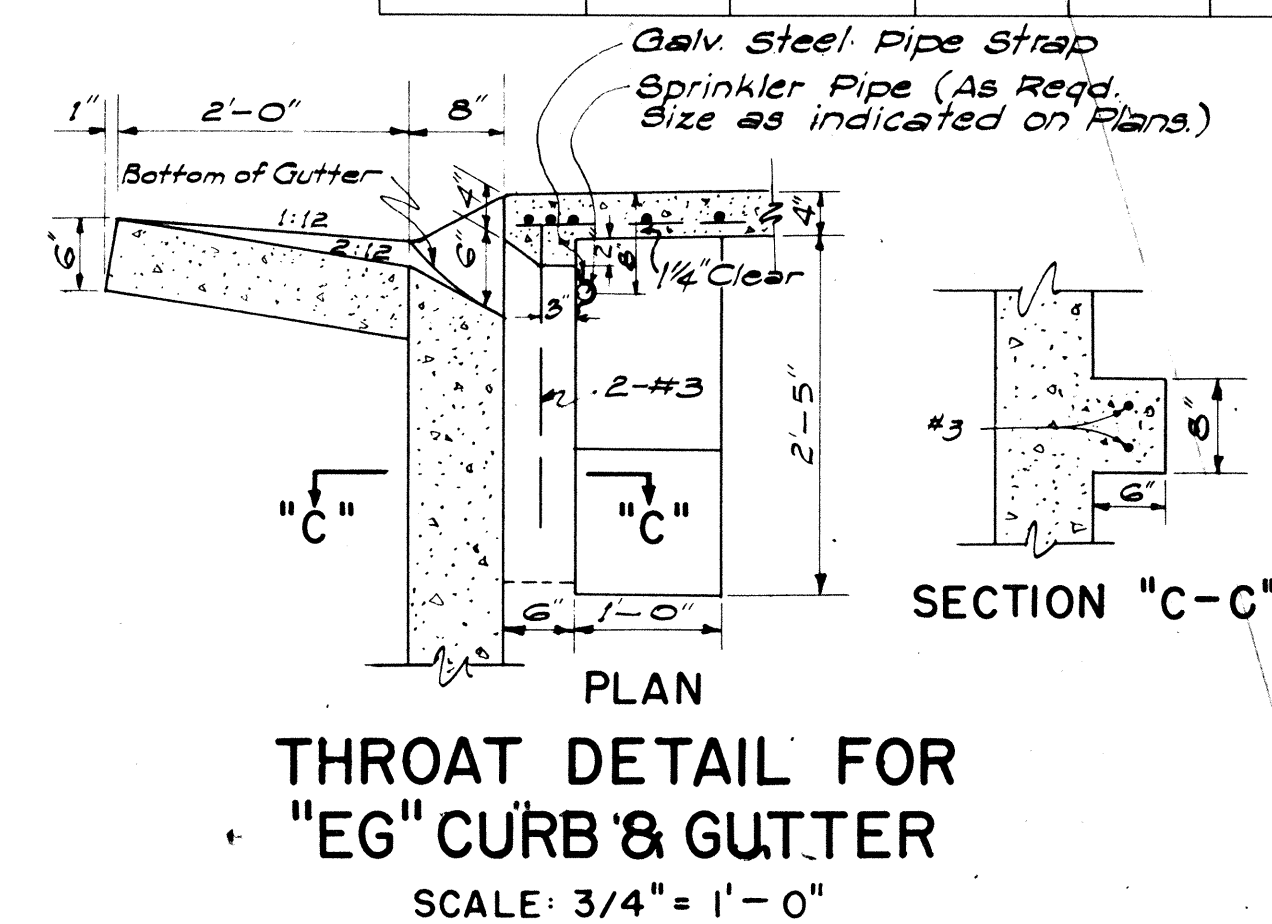
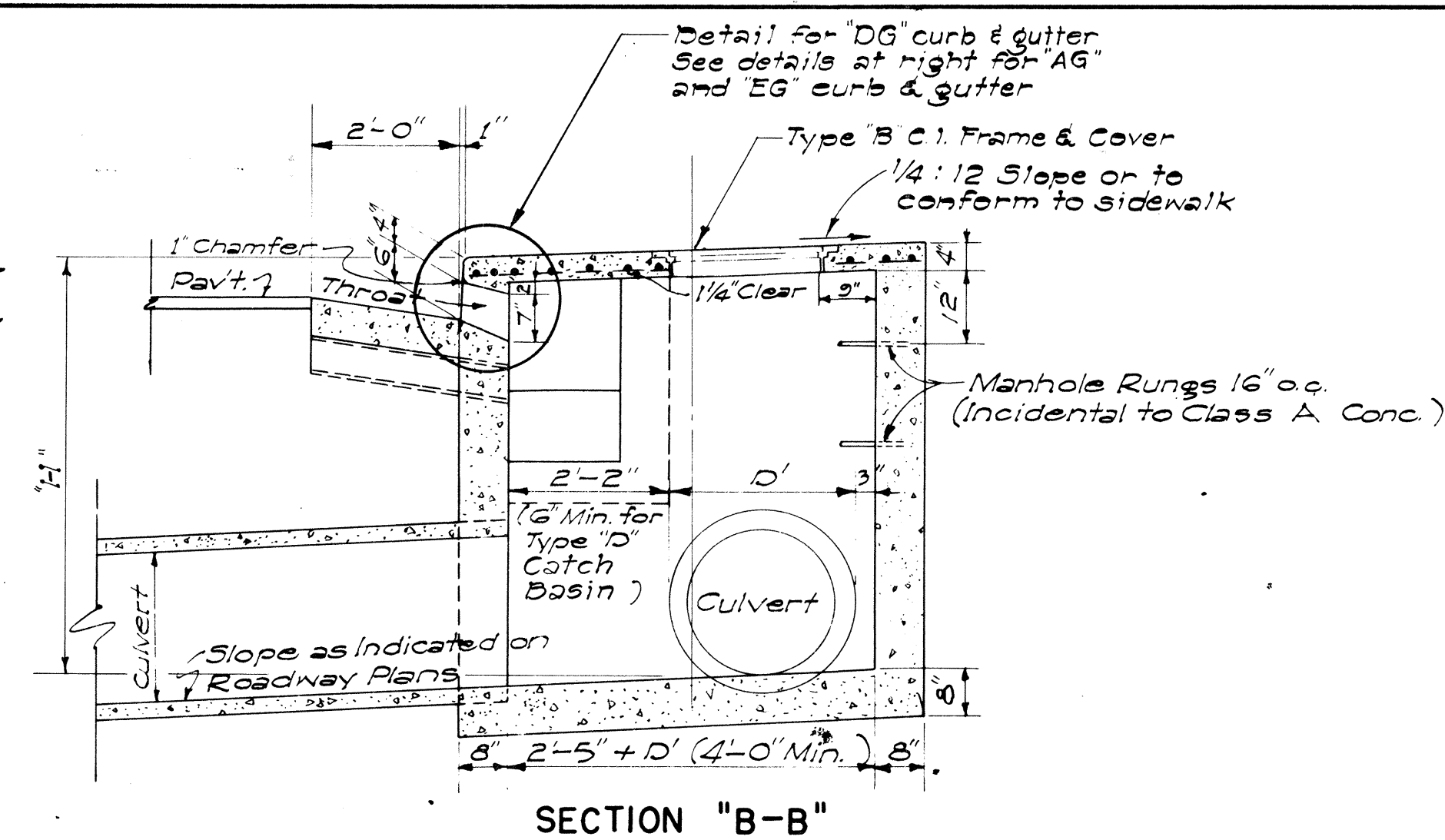
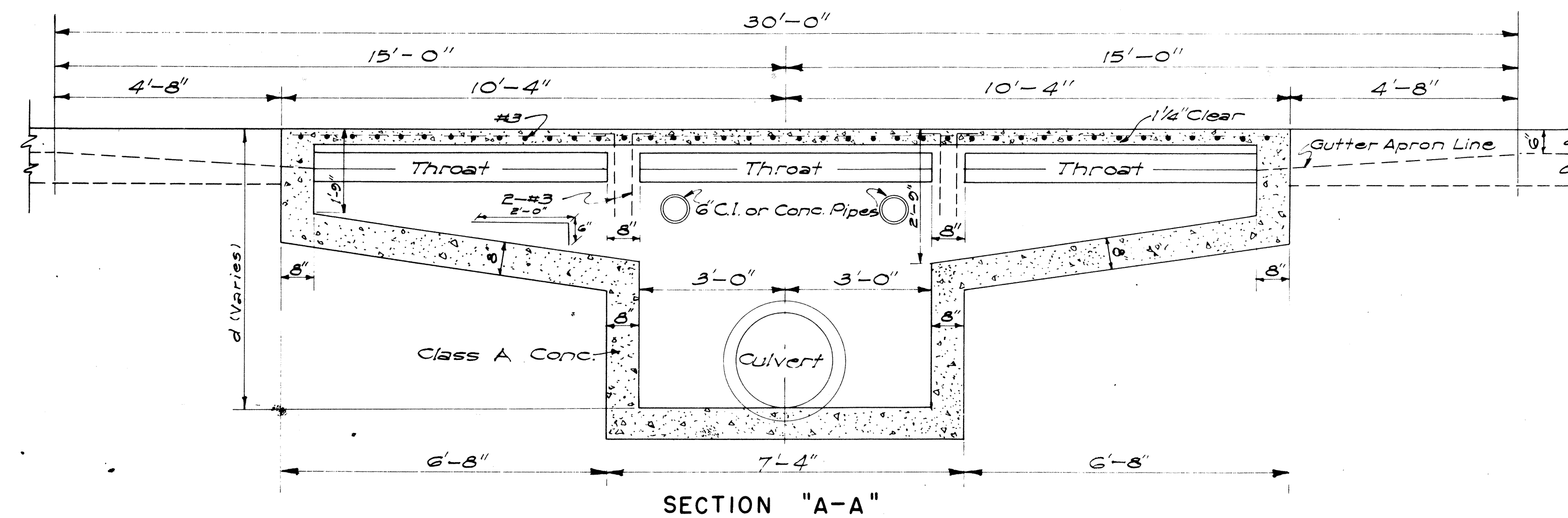
INTERSTATE ROUTE H-2
MILILANI INTERCHANGE
F.A.I. PROJ. NO. HA21(7)14

Scale: As Shown Date: Mar. 1973

SHEET No. 30 OF 40 SHEETS

SURVEY PLATTED BY	DATE
DRAWN BY	
DESIGNED BY	
NOTED 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.	142-1(7)-4	1973	117	229



DETAILS OF TYPES "A", "B", "C" AND "D" CATCH BASINS

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

GENERAL NOTES

- Quantities based on $d = 5.75'$ and $D' = 30"$.
- Quantities do not include concrete for Gutter Apron.
- The Contractor shall install two 6" Cast Iron or Concrete Pipes as incidental to Class A Concrete for Construction Drainage. The Engineer shall determine the exact location in the field.
- Culvert shall leave C.B. from any position and any direction indicated by plans or ordered by the Engineer. Culvert may both enter and leave C.B. so that C.B. will also act as Manhole.
- The Contractor shall install Galvanized Steel Pipe Sleeves and Straps as incidental to Sprinkler System.
- The type of curb and/or gutter (Type 1, 2, 3, etc.) shall conform to the type specified on the roadway plans.
- 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. Type "B" Cast Iron Frame and Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.

ESTIMATED QUANTITIES

Type	Class A Conc. Struct. Exc.	Reinf. Steel	Gutter Length
"A"	7.5 c.y.	24.7 c.y.	145 lb.
"B"	6.0 c.y.	21.5 c.y.	108 lb.
"C"	6.0 c.y.	21.5 c.y.	108 lb.
"D"	4.9 c.y.	16.5 c.y.	77 lb.

APPROVAL RECOMMENDED:

HYDRAULIC DESIGN ENGINEER

12-17-69
DATE

APPROVED:

ASSISTANT CHIEF, ENGINEERING

12-17-69
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
CATCH BASINS

Scale: As Noted

Date: July, 1969

SHEET NO. 31 OF 40 SHEETS DH 1

30' - 0"

4' - 8"

20' - 8"

4' - 8"

6' - 8"

8"

6' - 8"

1' - 8"

2' - 0"

1"

3"

Manhole Rungs

3 @ 3

5 @ 6 (Top Slab - Bottom Layer)

5 @ 9 (Top Slab - Bottom Layer)

4 @ 12 Both Ways (Top Slab - Top Layer)

Concrete Gutter Apron

2-#4

"D" Curb

Type "A" C.I. Frame and Cover

3 @ 6 Both Ways

Type "D" C.B.

Type "B" C.B.

Type "10" C.B.

Type "1A" C.B.

Hand-drawn structural drawing of a bridge deck section showing three spans. The drawing includes dimensions for spans (6'-8", 7'-4", 6'-8"), deck width (1'-6"), and various reinforcement details like #3 @ 6" Both Ways, #4 @ 12" Both Ways, and Class A Conc. The central pier is labeled "Varies".

Technical drawing of a manhole structure showing a cross-section and plan view.

Cross-Section Details:

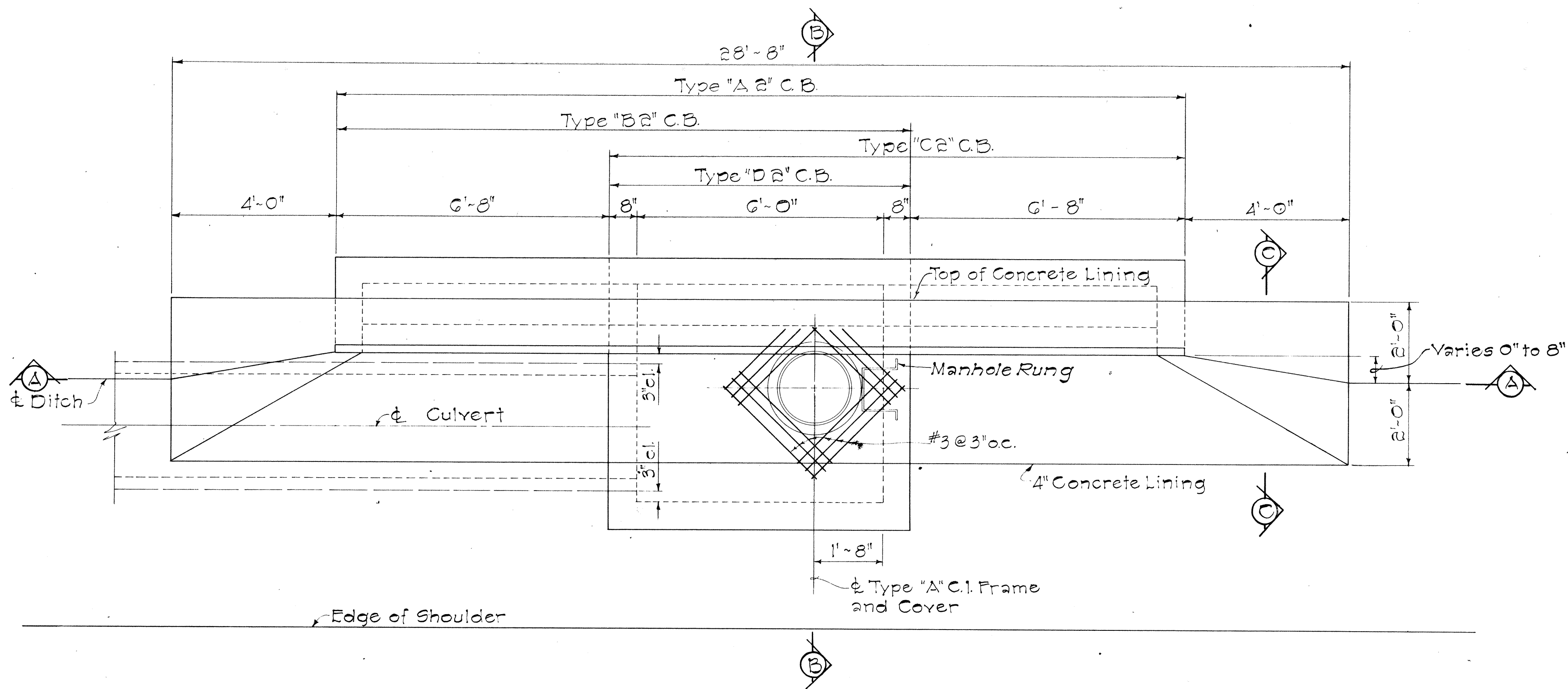
- Top section: 2' - 4" x 2' - 0"
- Main section: 2' - 1" - 5" x 2' - 0"
- Bottom section: 2' - 0" x 2' - 0"
- Reinforcement: #3 @ 6" Both Ways, #4 @ 12" Both Ways, #5 @ 6", #4 Closed Stirrup @ 12"
- Structure: Type "A" C.I. Frame and Cover
- Manhole Rungs @ 16" o.c. (Incidental to Cl. A Conc.)
- Class A Conc.
- H" Varies

Plan View Details:

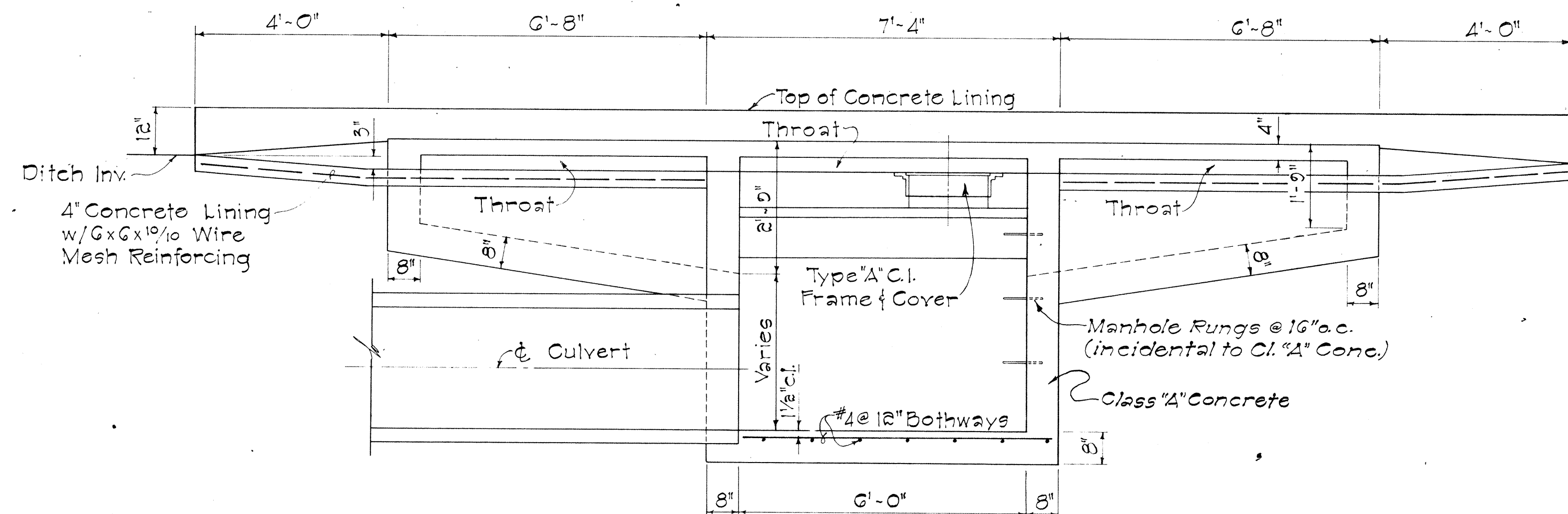
- Overall dimensions: 2' - 0" x 2' - 0"
- Internal dimensions: 2' - 1" - 5" x 2' - 0"
- Reinforcement: #4 @ 12" Bothways
- Clearance: 2" clear
- Finish Grade

DETAILS OF TYPE "IA", "IB", "IC" AND "ID" CATCH BASIN

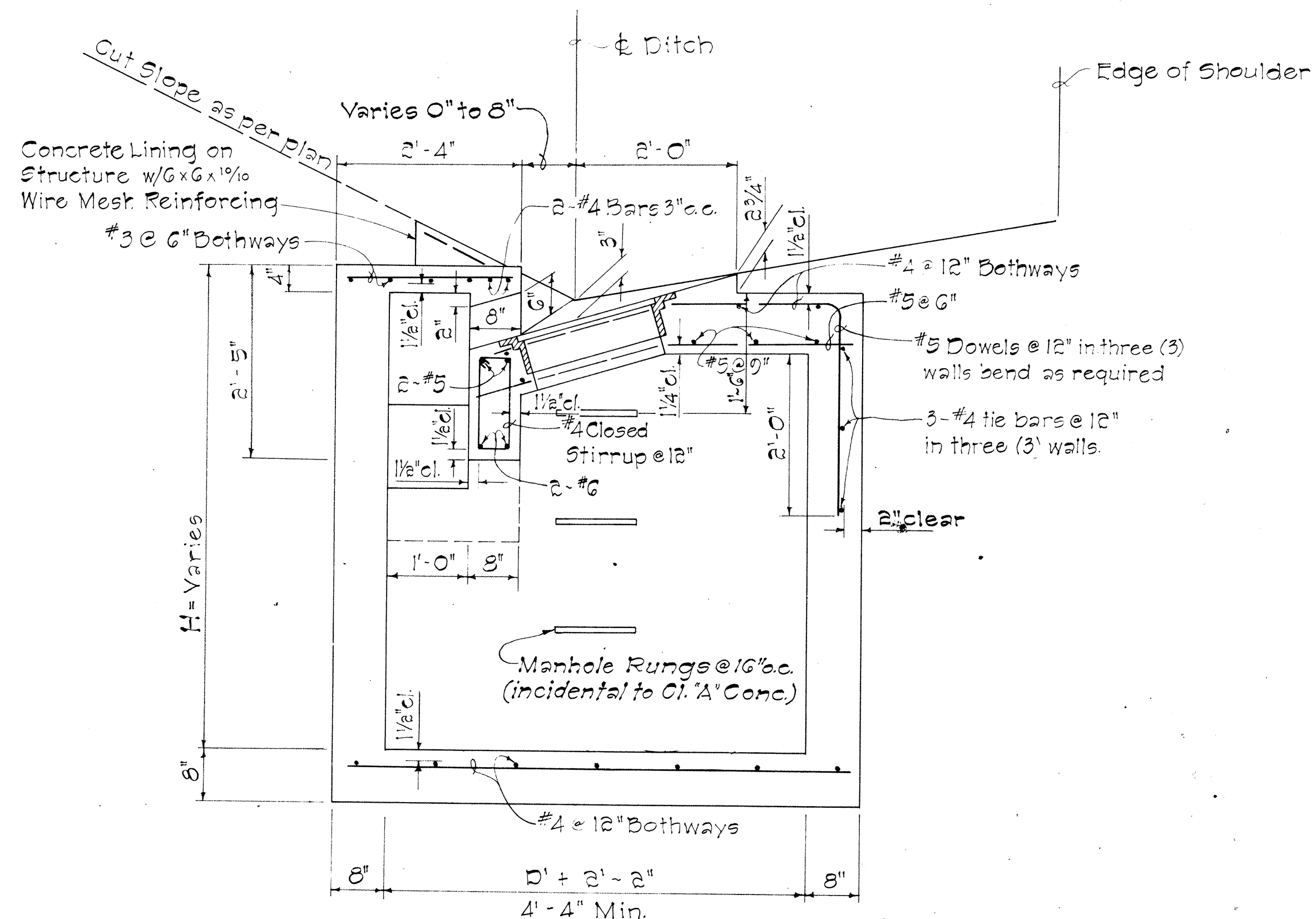
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1H21(7)-4	1973	119	220



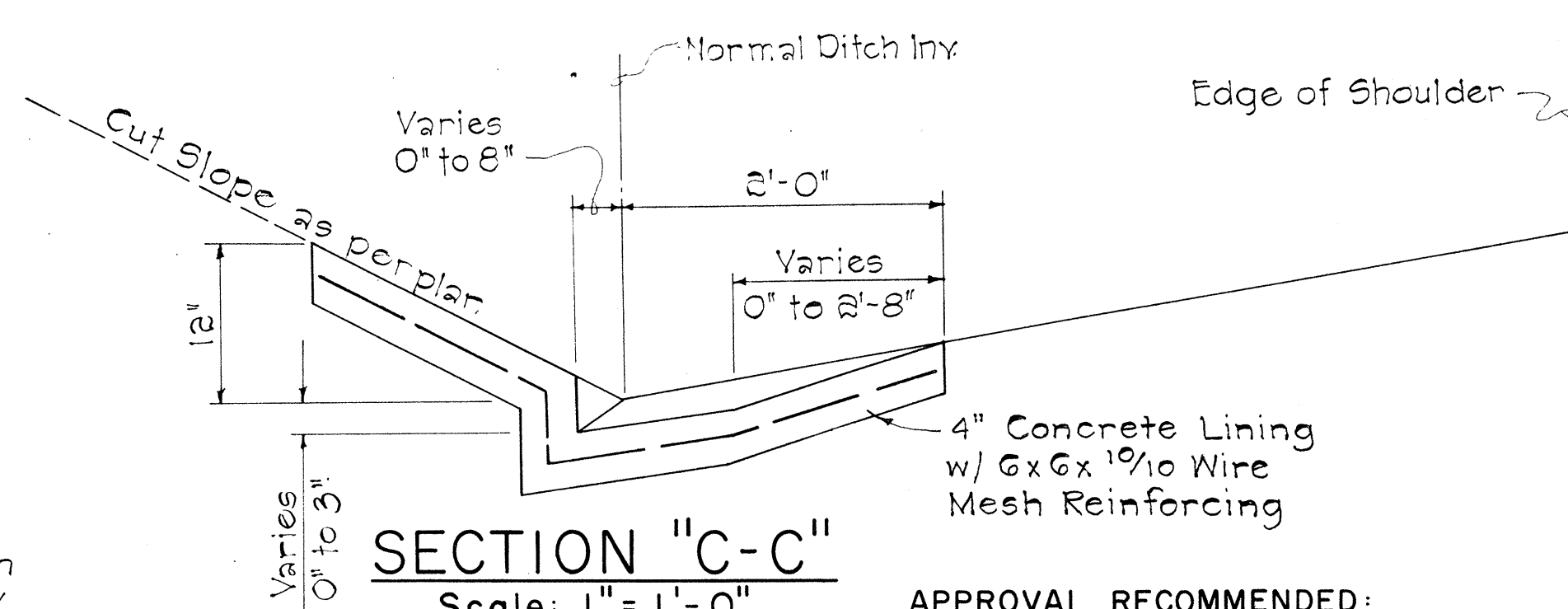
PLAN
Scale: 1/2" = 1' - 0"



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



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



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

- GENERAL NOTES**
- Culvert shall enter and leave C.B. 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 C.B. wall.
 - 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.
 - Type "A" C.I. Frame/Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.

APPROVAL RECOMMENDED:
P. Pakano
HYDRAULIC DESIGN ENGINEER 12-17-69
DATE

APPROVED:
W. J. Zaleski
ASSISTANT CHIEF, ENGINEERING 12-17-69
DATE

NO.	REVISION	APPROVED BY	DATE

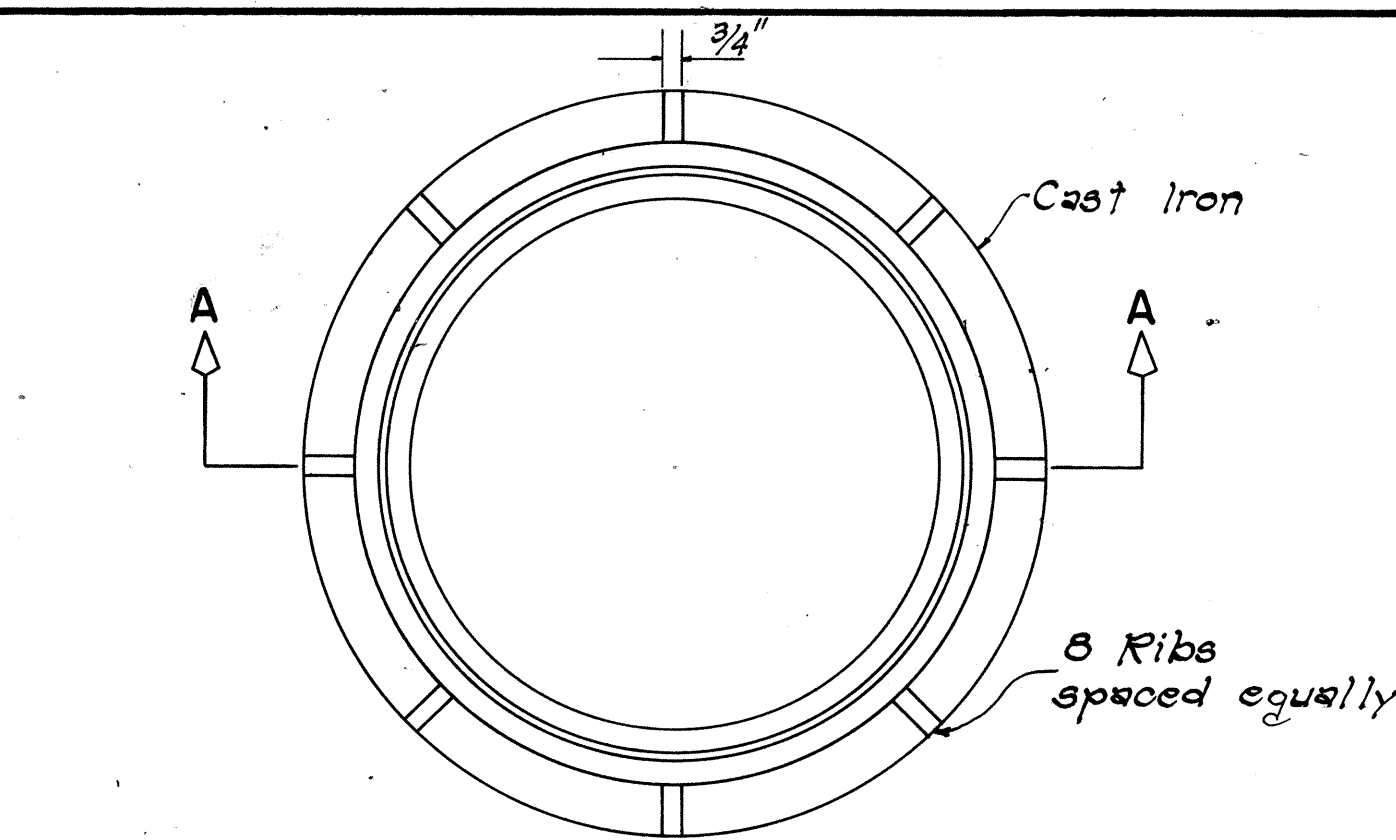
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
TYPE "A2", "B2", "C2", AND "D2"
CATCH BASINS

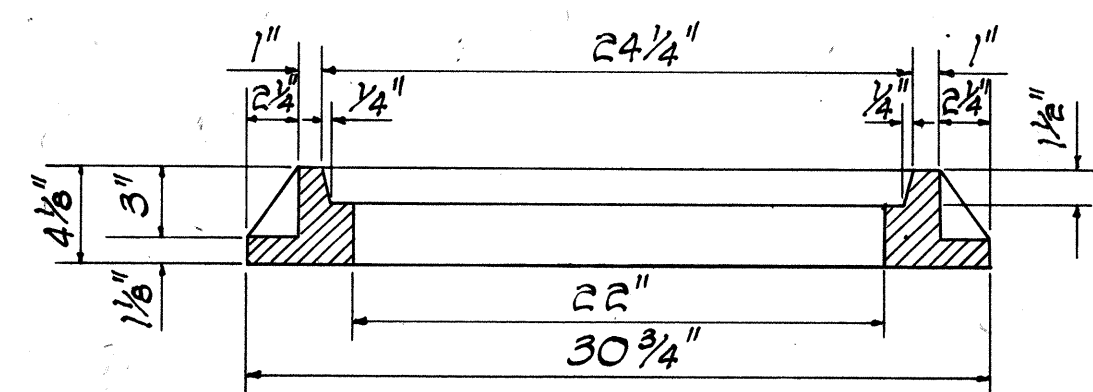
Scale: As Noted Date: July, 1969
SHEET No. 33 OF 40 SHEETS DH 4

DETAILS OF TYPE "A2", "B2", "C2" AND "D2" CATCH BASIN

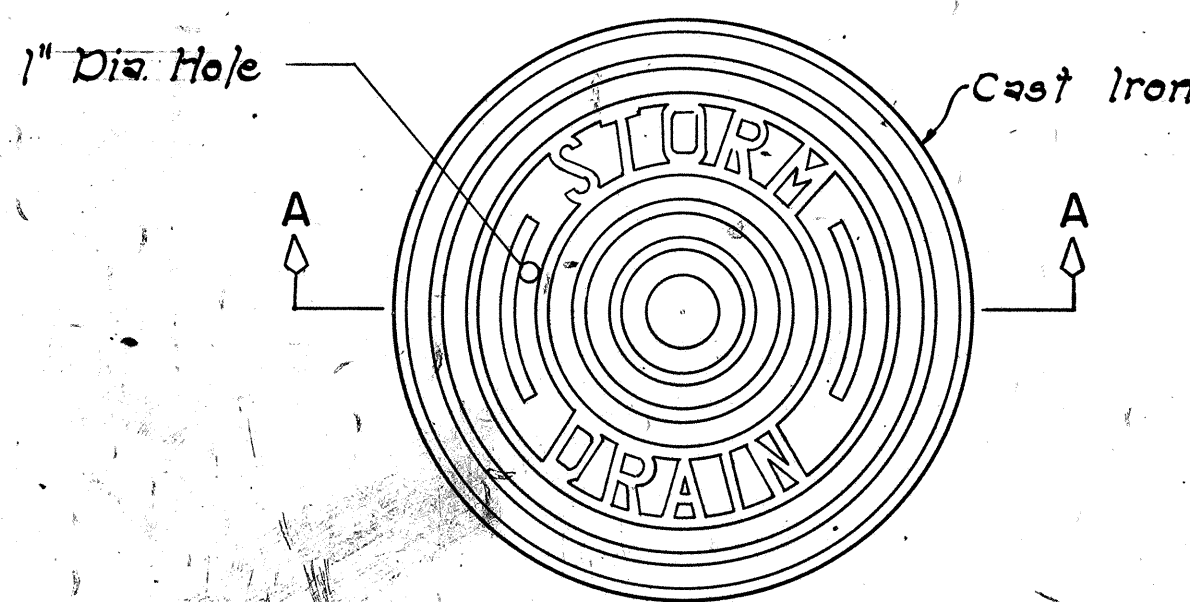
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HA2-1(7)-4	1973	120	220



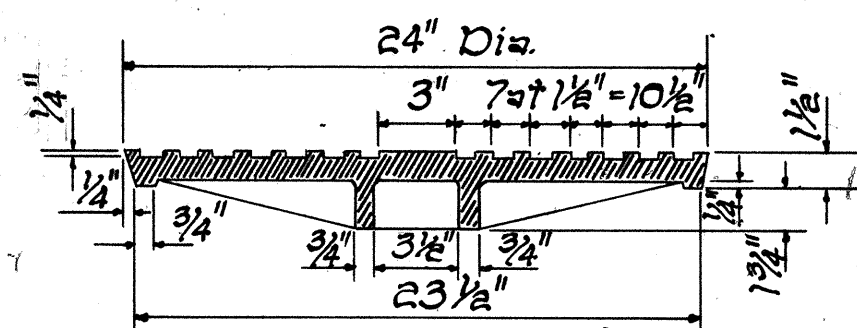
PLAN



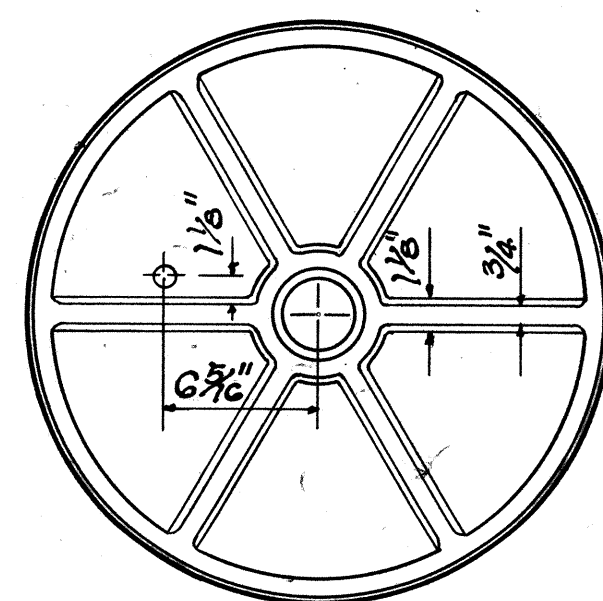
SECTION A-A



PLAN



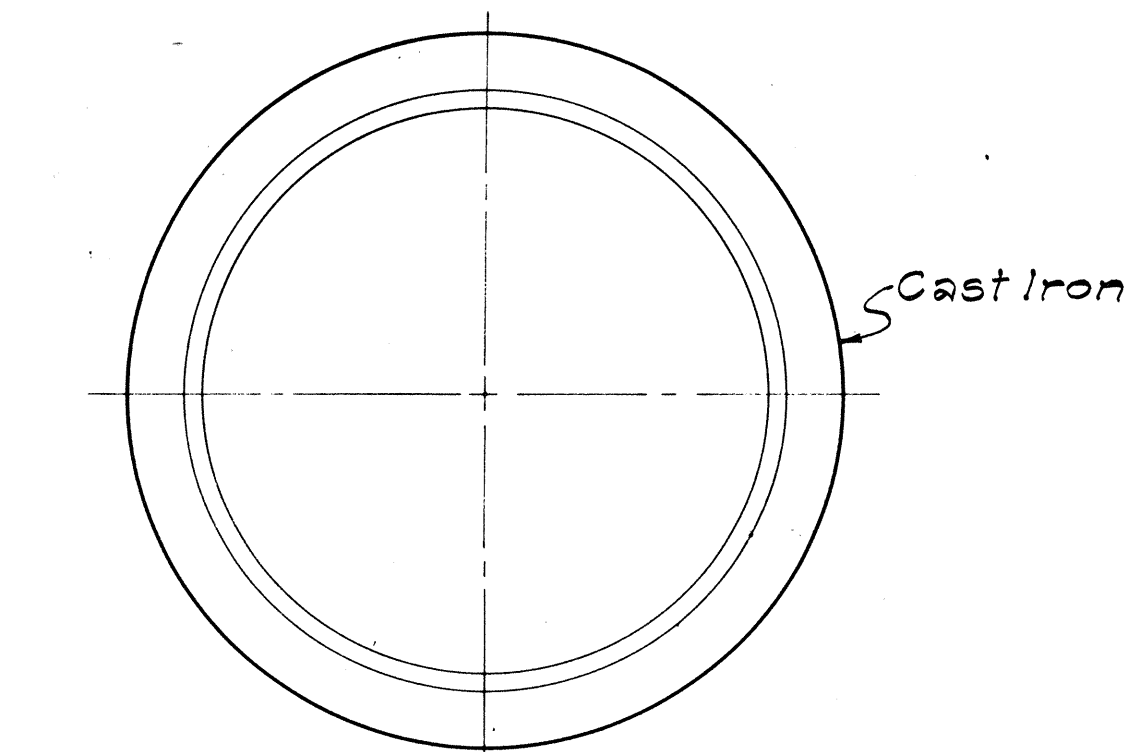
SECTION A-A



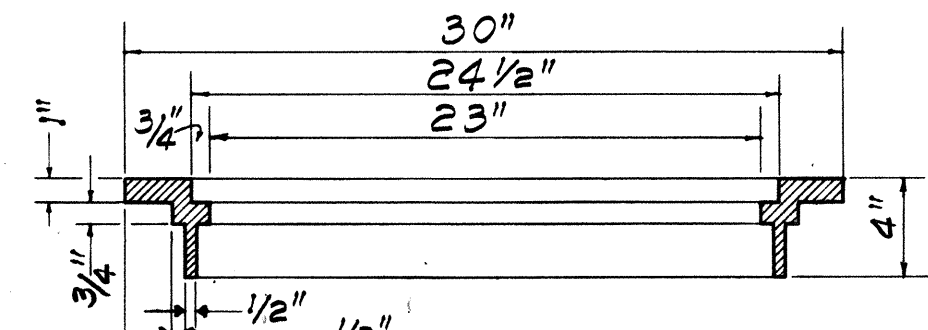
BOTTOM VIEW OF COVER

DETAILS OF TYPE "P"
CAST IRON FRAME AND COVER

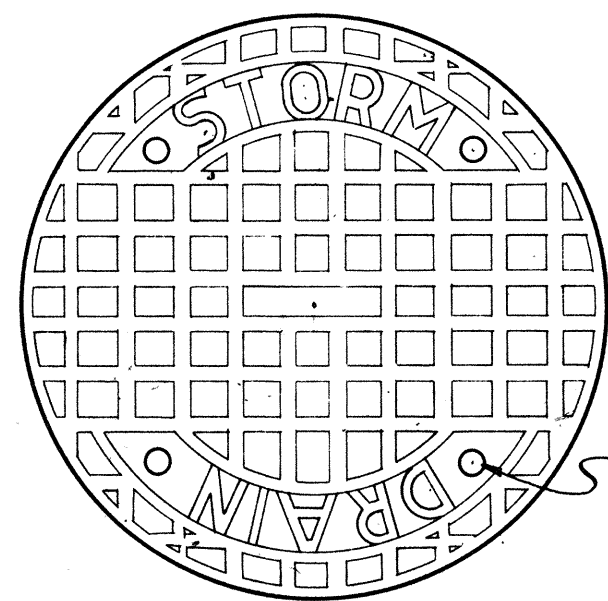
SCALE: 1-1/2" = 1'-0"



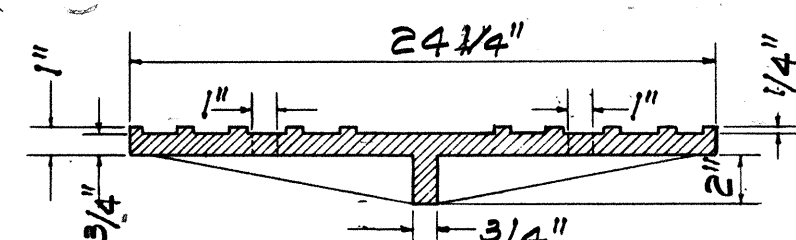
PLAN OF RIM



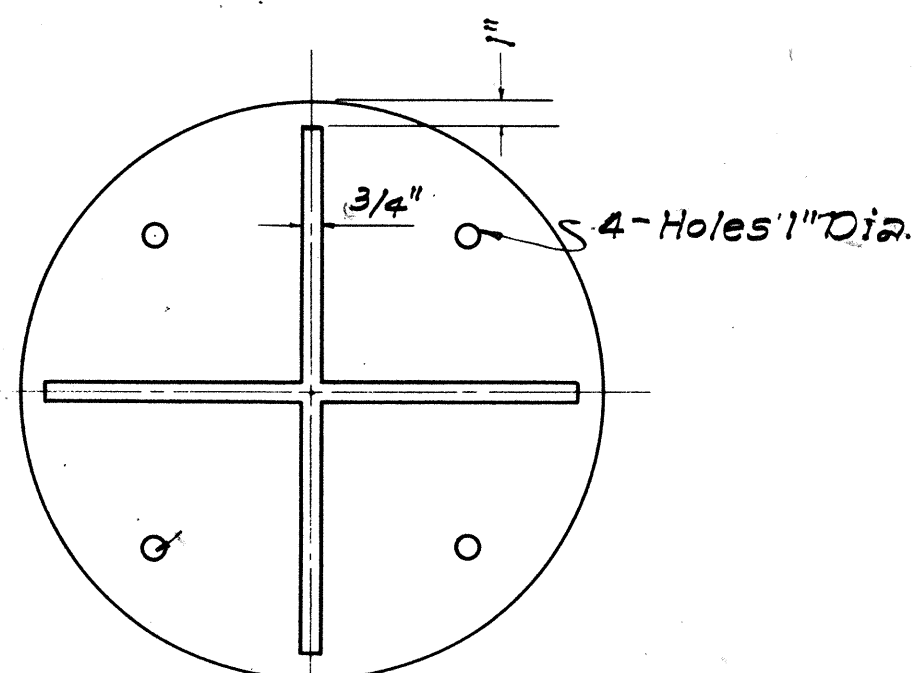
SECTION OF RIM



TOP VIEW OF COVER



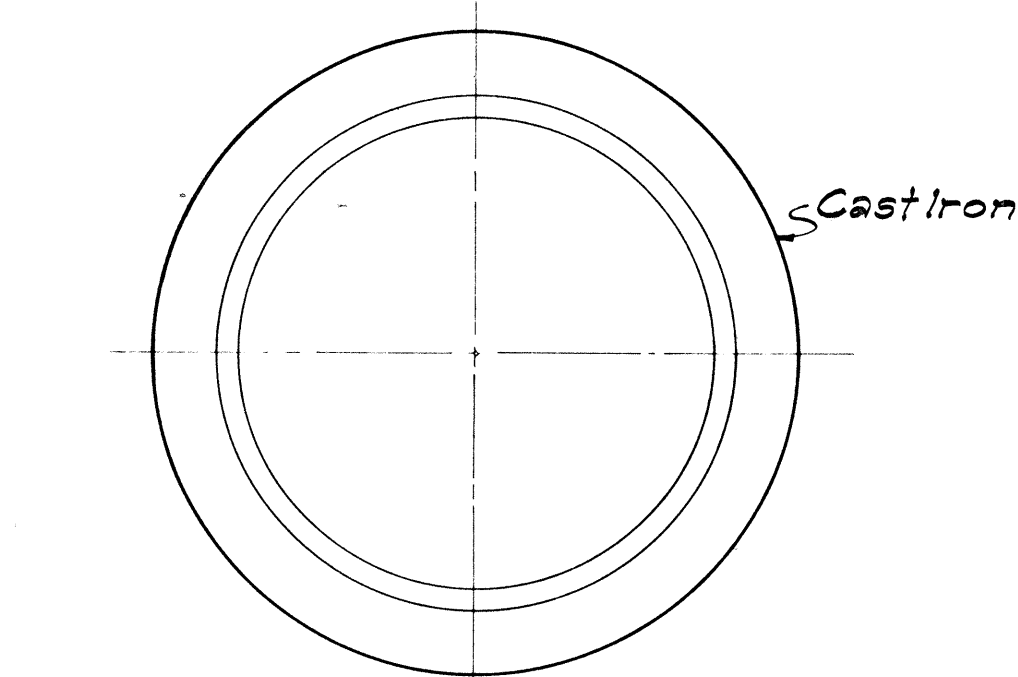
SECTION



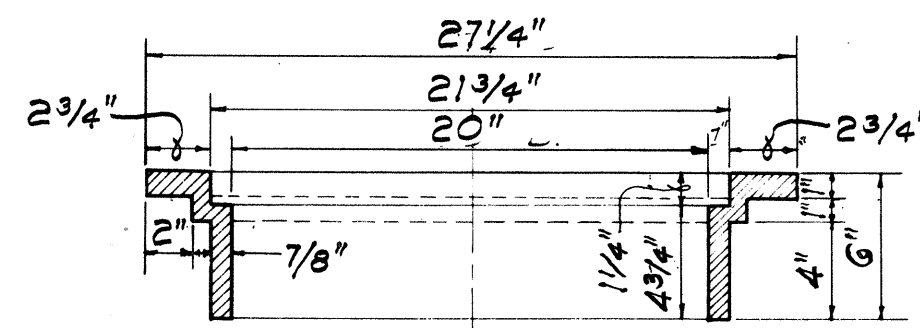
BOTTOM VIEW OF COVER

DETAILS OF TYPE "B"
CAST IRON FRAME AND COVER

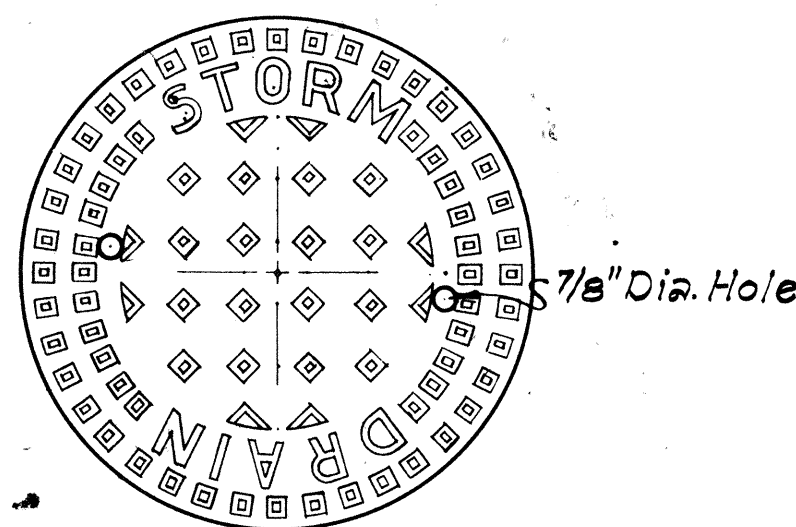
SCALE: 1-1/2" = 1'-0"



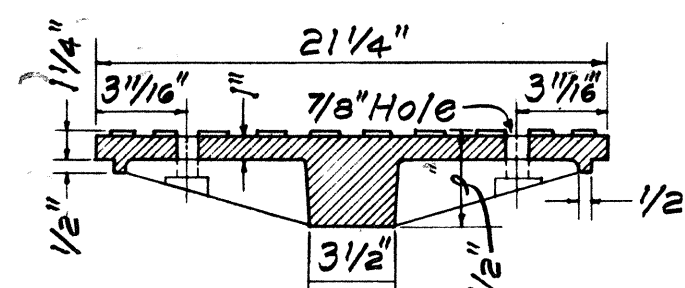
PLAN OF RIM



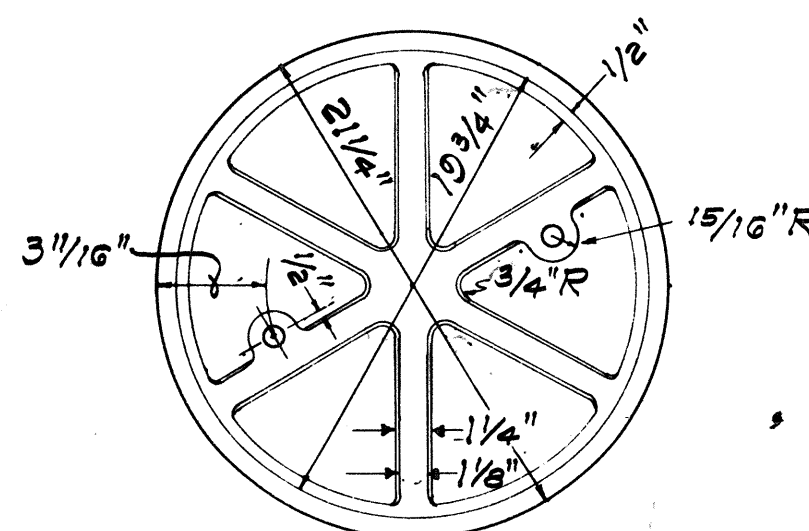
SECTION OF RIM



TOP VIEW OF COVER



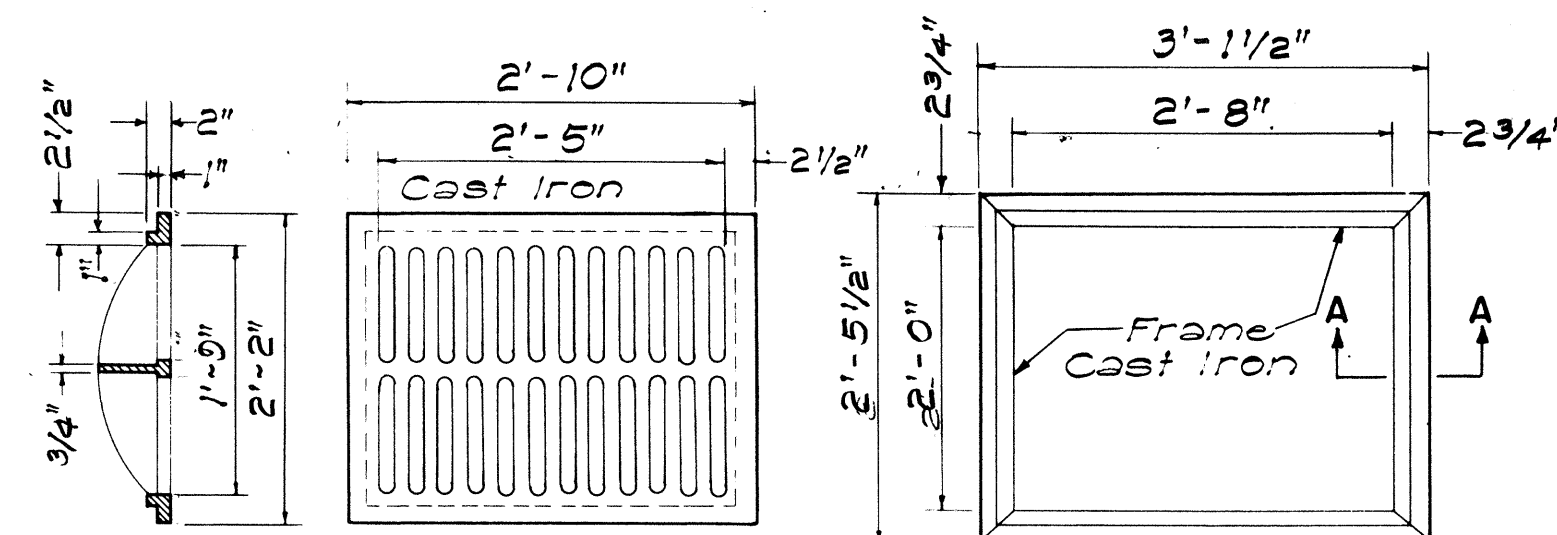
SECTION



BOTTOM VIEW OF COVER

DETAILS OF TYPE "A"
CAST IRON FRAME AND COVER

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



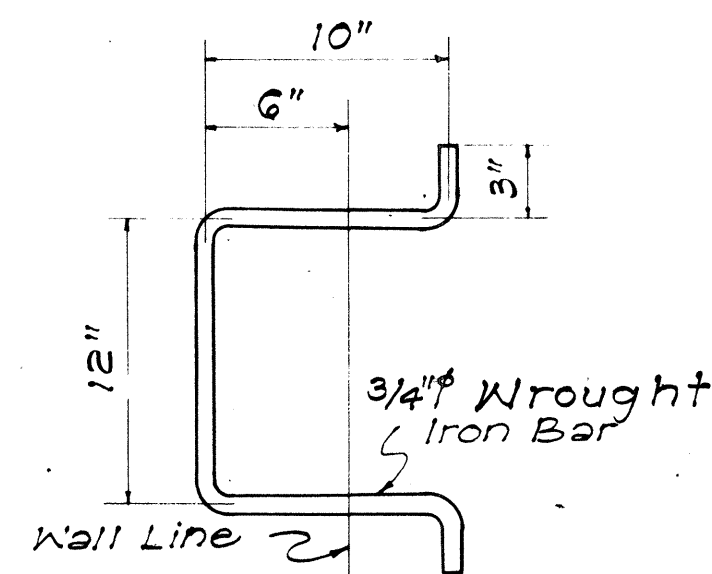
SECTION

TOP VIEW

TOP VIEW

TYPE C C.I. FRAME AND GRATE

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



MANHOLE RUNG

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

APPROVAL RECOMMENDED:

P. Takas
HYDRAULIC DESIGN ENGINEER 12-17-69
DATE

APPROVED:

John J. Schick
ASSISTANT CHIEF, ENGINEERING 12-17-69
DATE

NO.	REVISION	APPROVED BY	DATE
1.	Detail of Type "P" Cast Iron Frame and Cover	H.T.	1-6-71

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION STANDARD DETAILS CATCH BASIN AND MANHOLE CASTINGS Scale: As Noted Date: July, 1969 SHEET No 34 OF 40 SHEETS DH 6
--

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	112-1(7)-4	1973	121	220

GENERAL NOTES

- Contractor has the option of using cast malleable iron, cast steel, welded, bolted, cast malleable iron end block or cast steel end block grate.
- Grates and Frames shall be hot dip galvanized after fabrication, see specifications.
- All welds $\frac{3}{8}$ " unless otherwise noted.
- Center support assembly shall be used when two or more grates are specified. Incidental to Types A-9 or A-12 Frame and Grates.
- Refer to "Grate Bar Spacing Table" for Types A-9 and A-12 Grate dimensions.
- The various materials shall conform to the specifications of ASTM as listed in the following tabulation and the Std. Specifications.

Material	ASTM Designation
Structural Steel	A283, Grade D
Cast Steel	A27, Grade 65-35
Malleable Iron Casting	A47, Gr. No. 35018

GRATE BAR SPACING TABLE

TYPE	NO. BARS	CLEAR BAR SPACING - W	X
A-9	9	2"	$1\frac{9}{16}$ "
A-12	12	$1\frac{3}{8}$ "	$1\frac{1}{4}$ "

NOTE:

- Type A-9 - Use in locations off the roadbed on all types of highways.
- Type A-12 - Use within the roadbed on all types of highways.

APPROVAL RECOMMENDED:

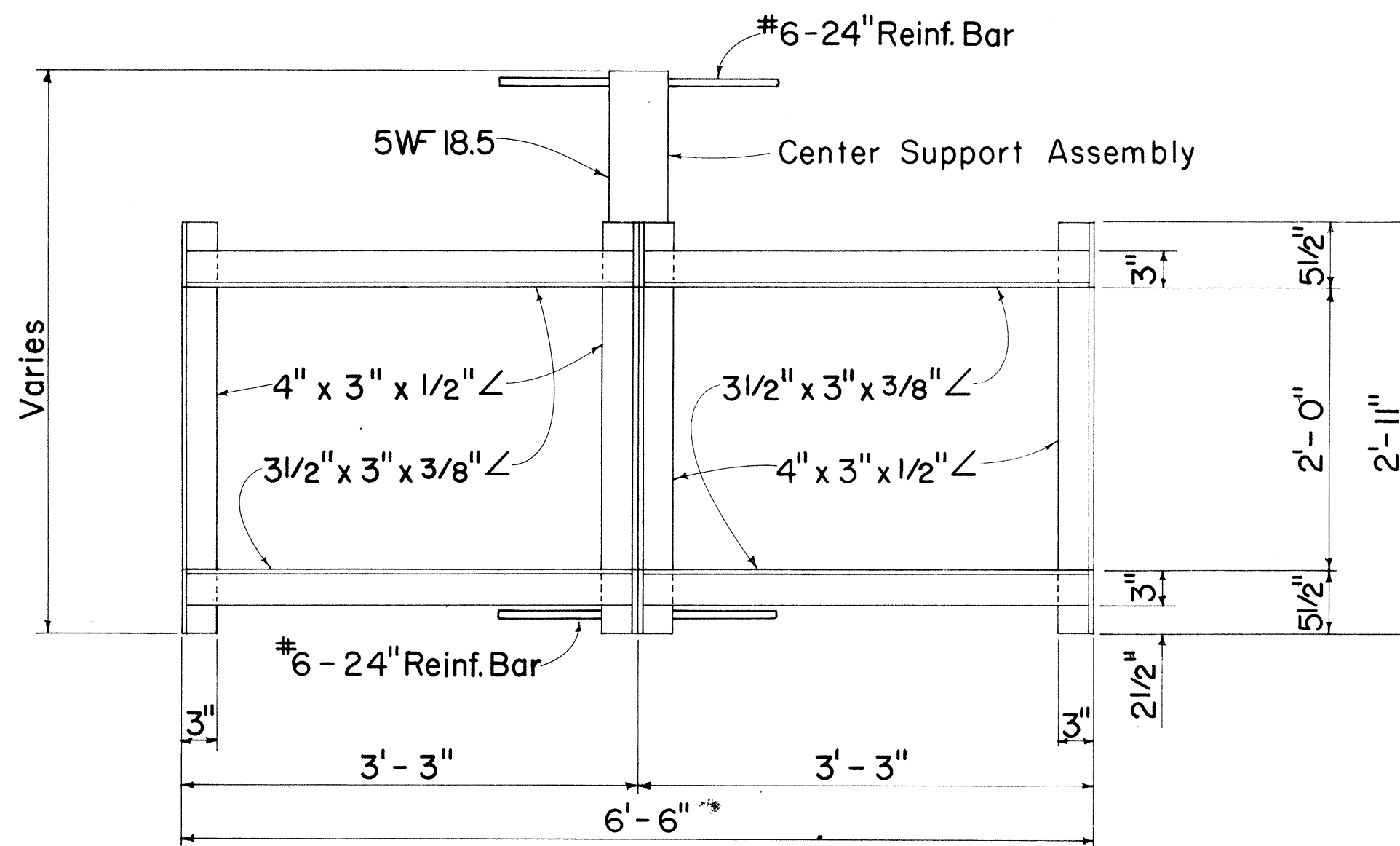
HYDRAULIC DESIGN ENGINEER *P. Yabara* 12-17-69
DATE

APPROVED:

ASSISTANT CHIEF, ENGINEERING *William S. Schaefer* 12-11-69
DATE

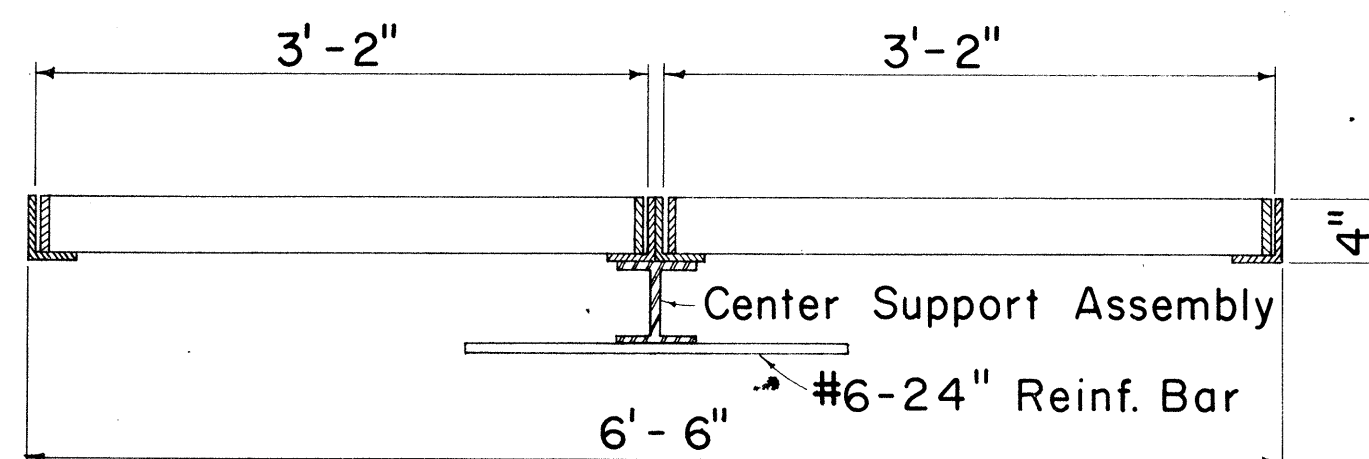
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION			
STANDARD DETAILS			
TYPE A-9 AND A-12 FRAMES AND GRATES			
Scales: As Noted		Date: Aug. 1968	
SHEET No. 35 OF 40 SHEETS DH 7			

NO.	REVISION	APPROVED BY	DATE



PLAN

(Two or More Grates)

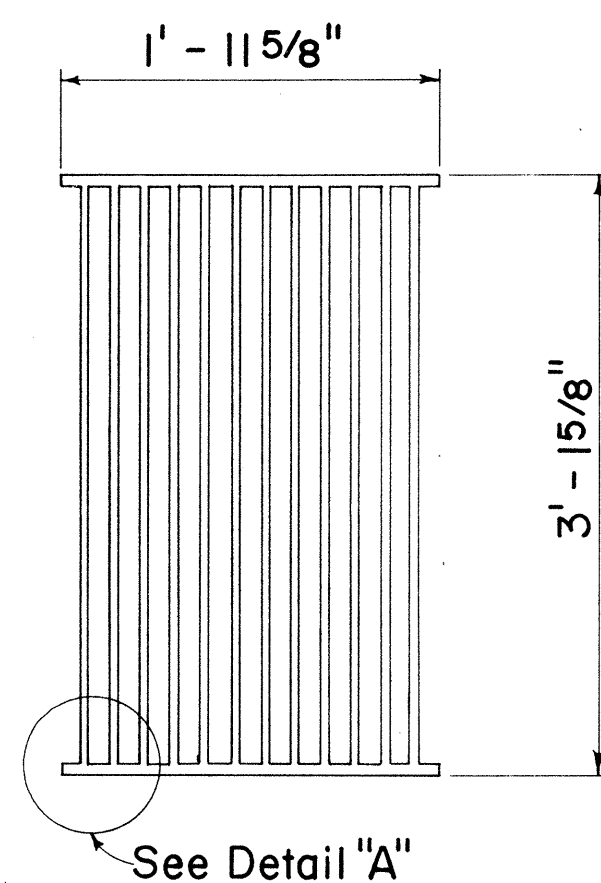


LONGITUDINAL SECTION

(Thru Frame & Grate)

FRAME DETAILS

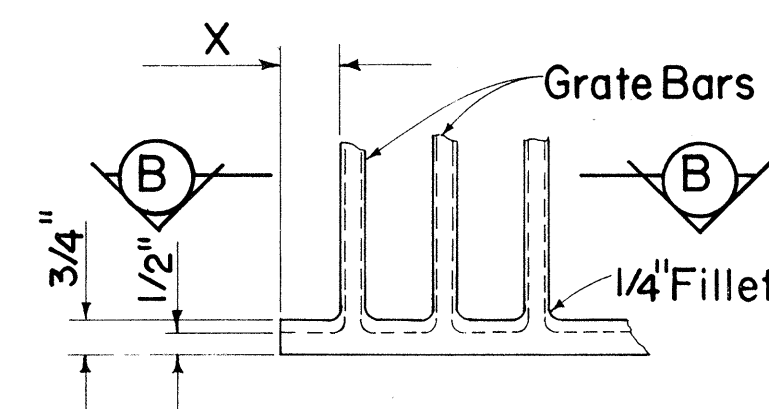
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PLAN

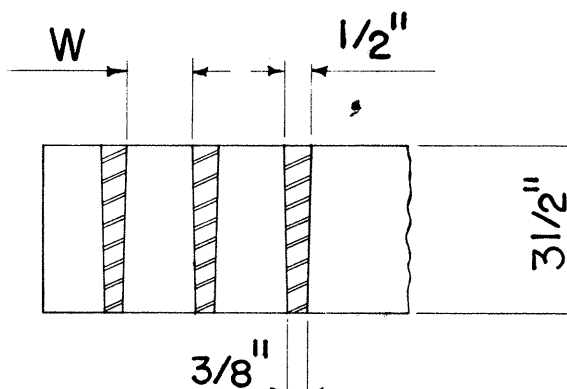
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ALTERNATIVE CAST MALLEABLE IRON OR CAST STEEL GRATE



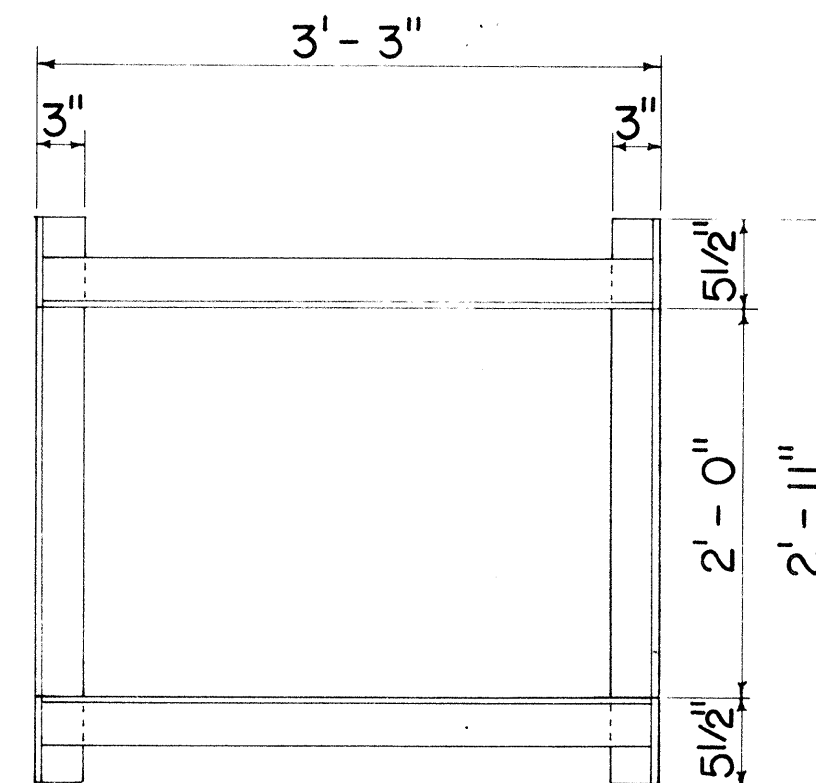
DETAIL "A"

Scale: 3" = 1' - 0"



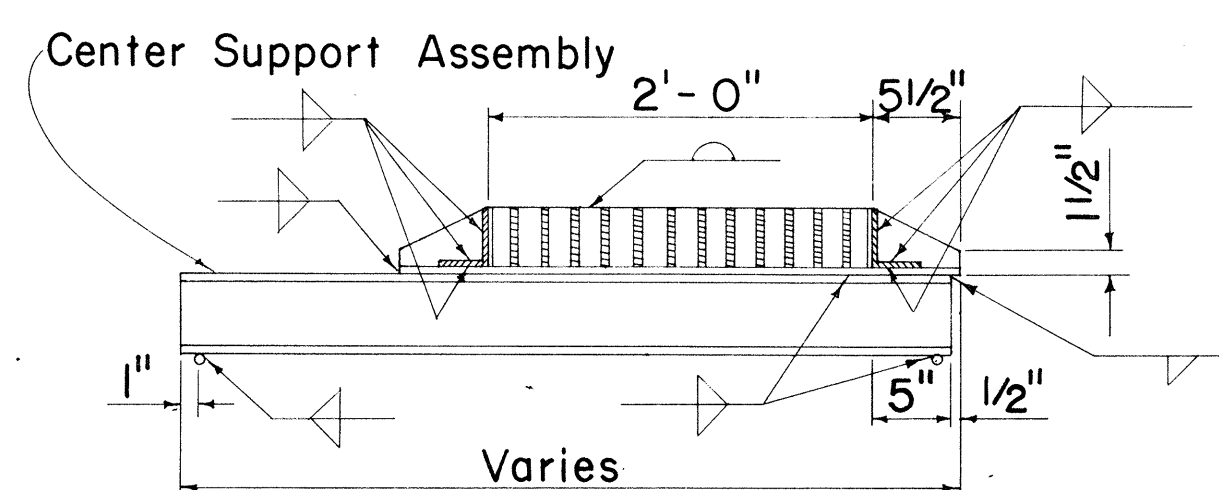
SECTION "B-B"

Scale: 3" = 1' - 0"



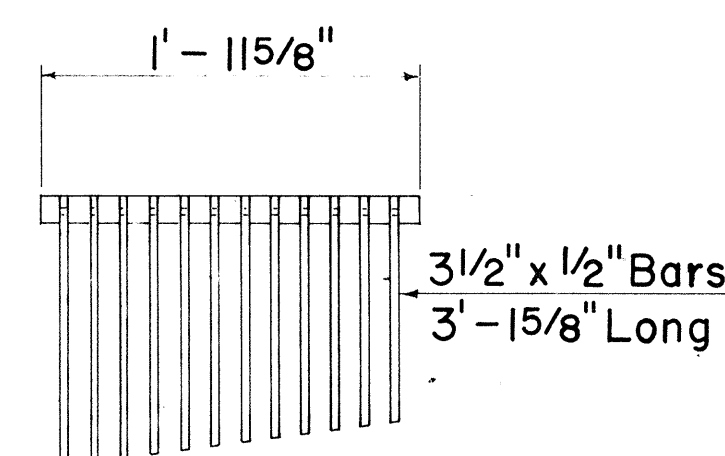
PLAN

(Single Grate)



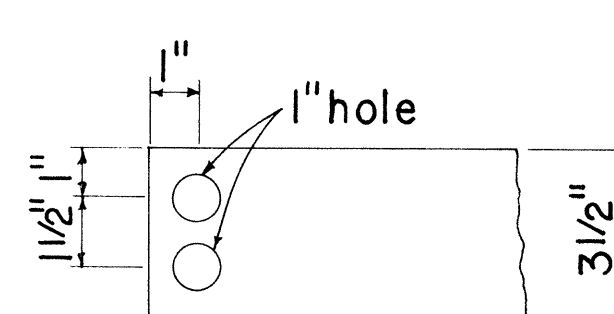
CROSS SECTION

(Thru Frame & Grate)



CAST END BLOCK

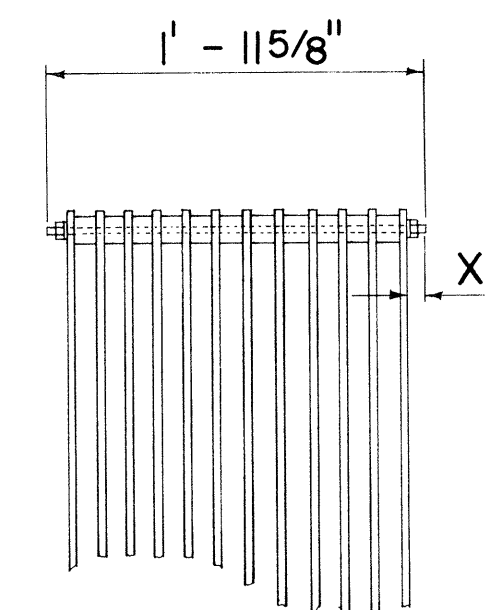
Scale: 1" = 1' - 0"



END OF BAR

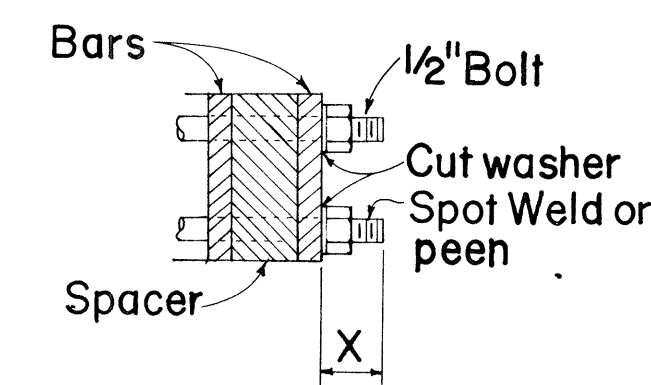
Scale: 3" = 1' - 0"

ALTERNATIVE CAST MALLEABLE IRON OR CAST STEEL END BLOCK GRATE



BOLTED END BLOCK

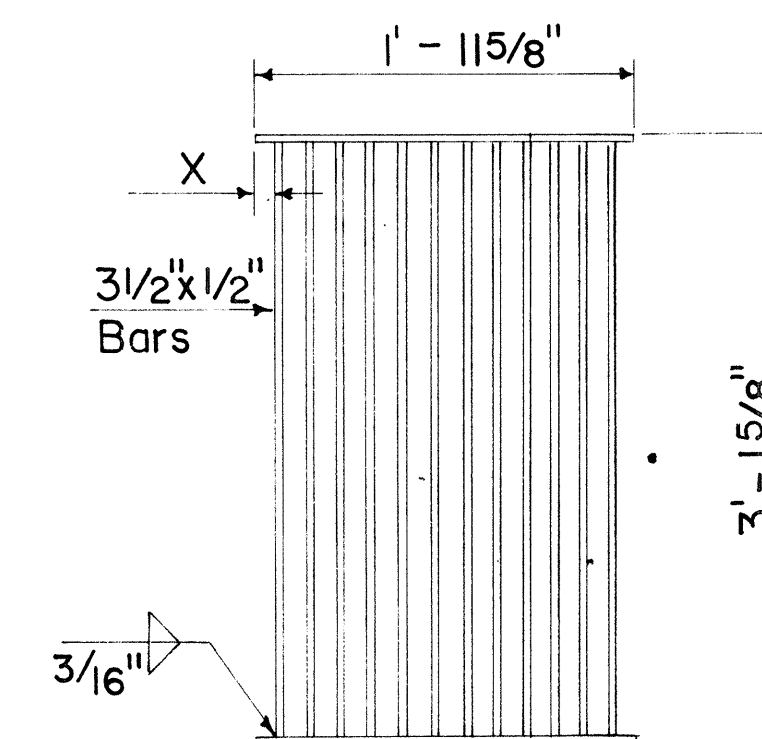
Scale: 1" = 1' - 0"



BOLTING DETAIL

Scale: 3" = 1' - 0"

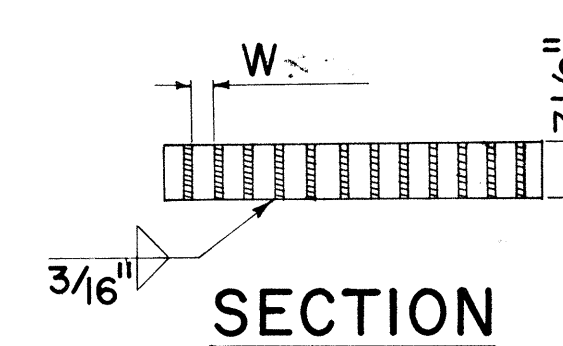
ALTERNATIVE BOLTED GRATE



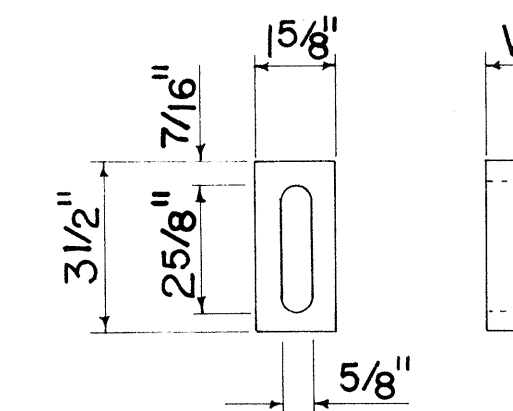
PLAN

ALTERNATIVE WELDED GRATE

Scale: 1" = 1' - 0"

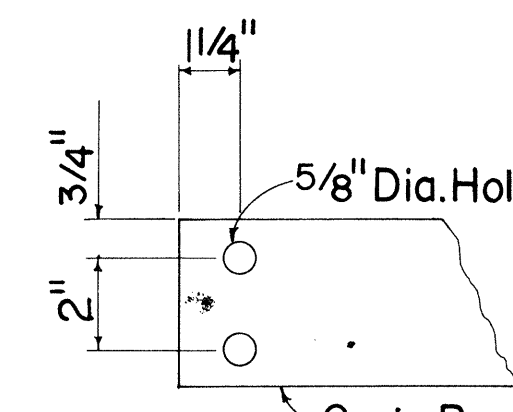


SECTION



BAR SPACER

Scale: 3" = 1' - 0"



END OF BAR

Scale: 3" = 1' - 0"

GENERAL NOTES

- ## SPACING TABLE

NO.	REVISION	APPROVED BY	DATE
1	Curb for Top of Fill Gutters	H.P.	6-5-11

12-11-59
DATE

Date: Feb. 1969

122



PLAN

SECTION

SECTION

FRAME

GRATE

PLAN



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

- *For Minimum size box of 3'-0", use 8" and eliminate reinforcing steel shown in the top portion.
- *For Culverts larger than 30", the minimum dimension shall be D'.

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

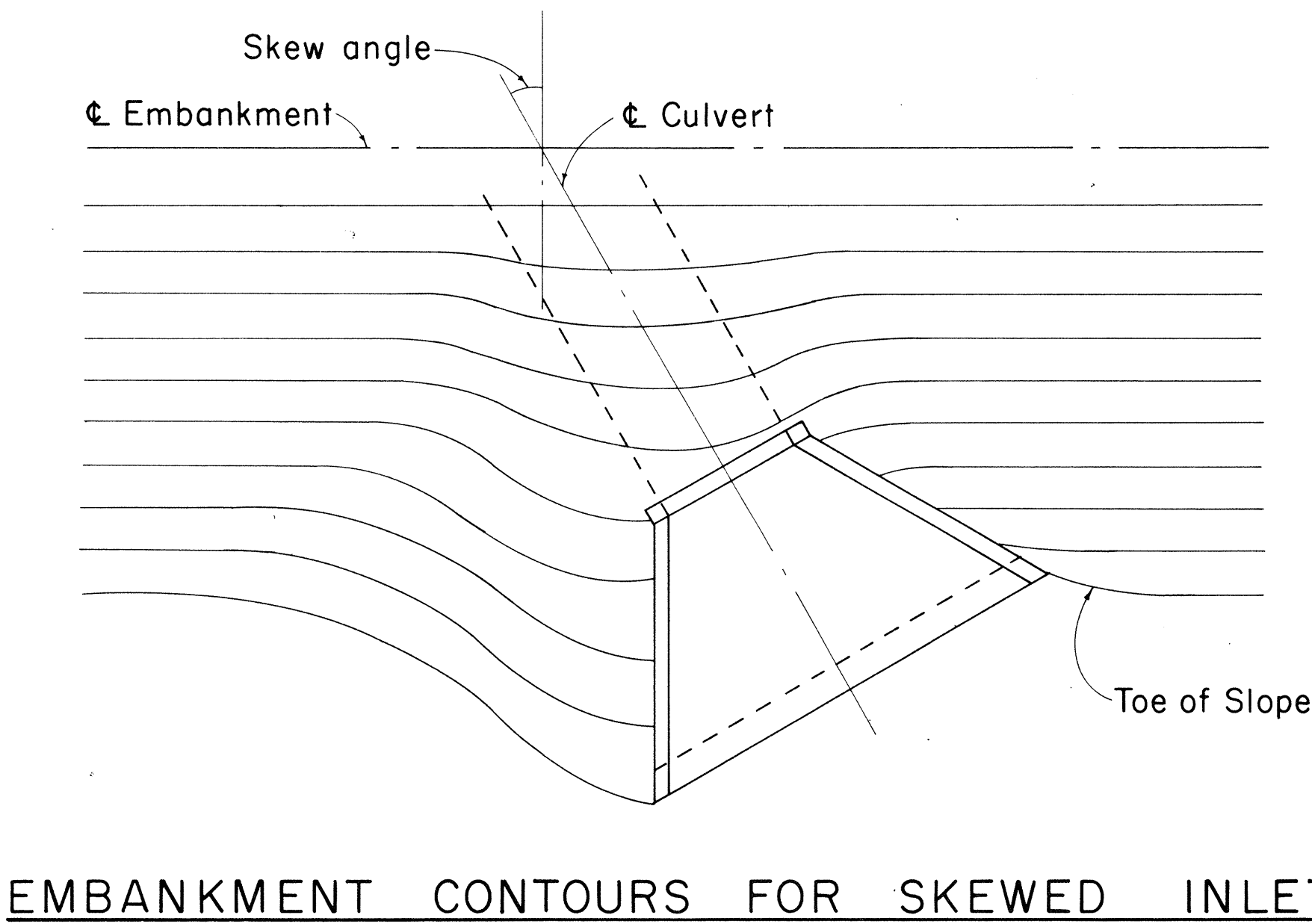
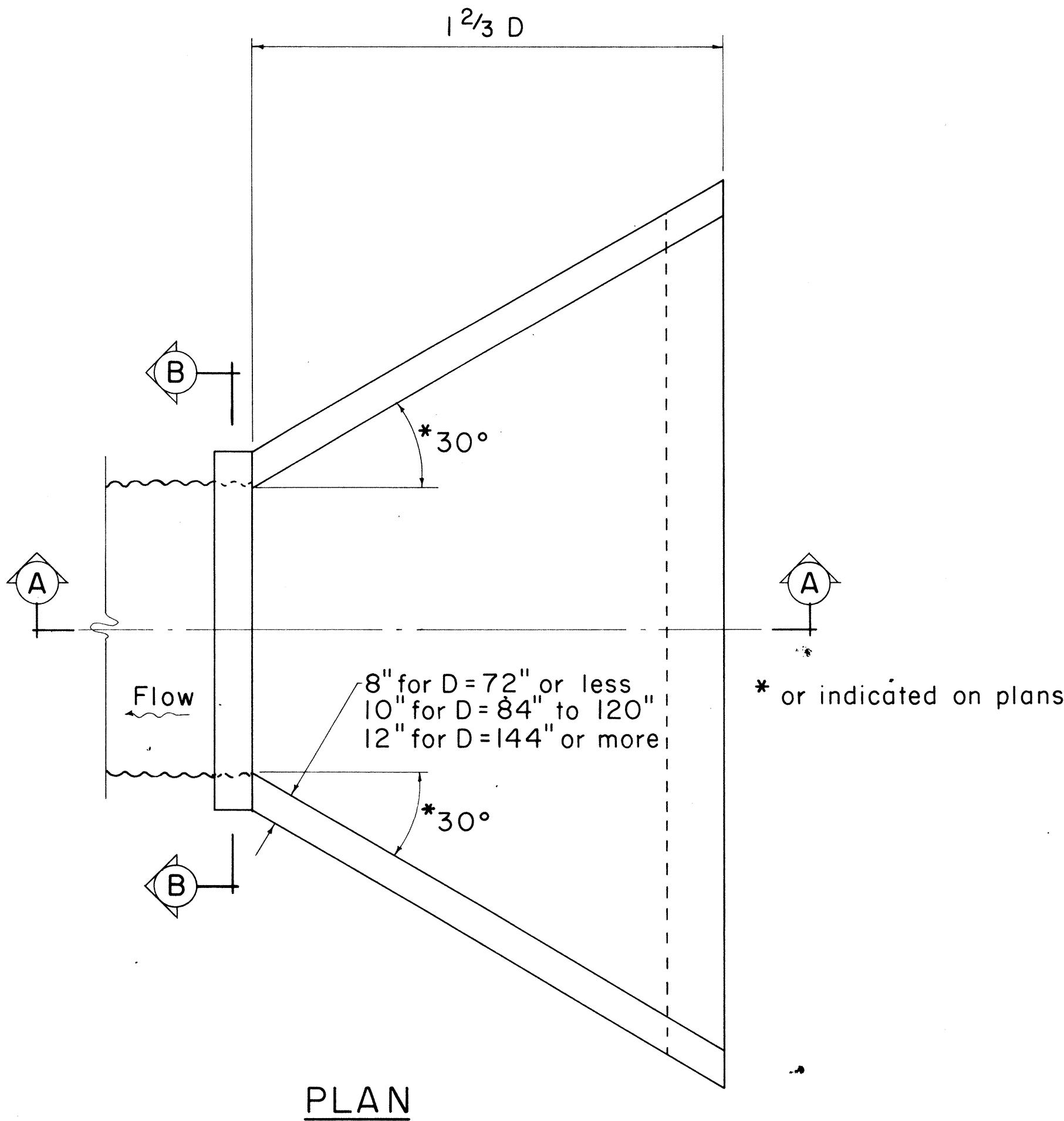
ORIGINAL PLAN	SURVEY PLOTTED BY _____	DATE _____
NOTE BOOK	DRAWN BY _____	4
	TRACED BY _____	4
	DESIGNED BY _____	4
	QUANTITIES BY _____	4
No. _____	CHECKED BY _____	4



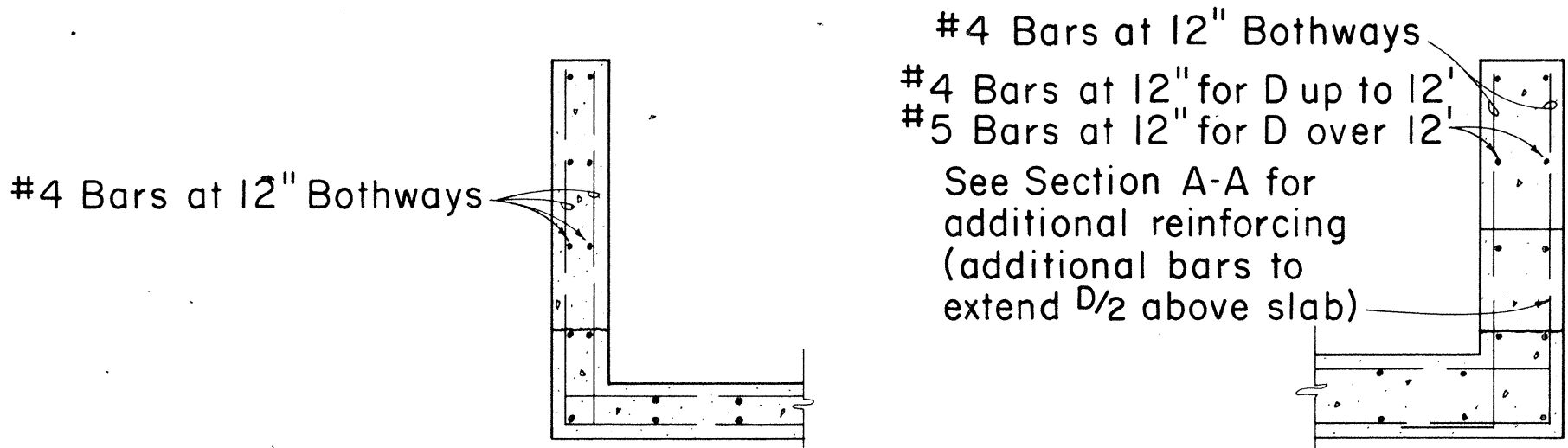
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HA-1(7)-4	1973	125	229

GENERAL NOTES

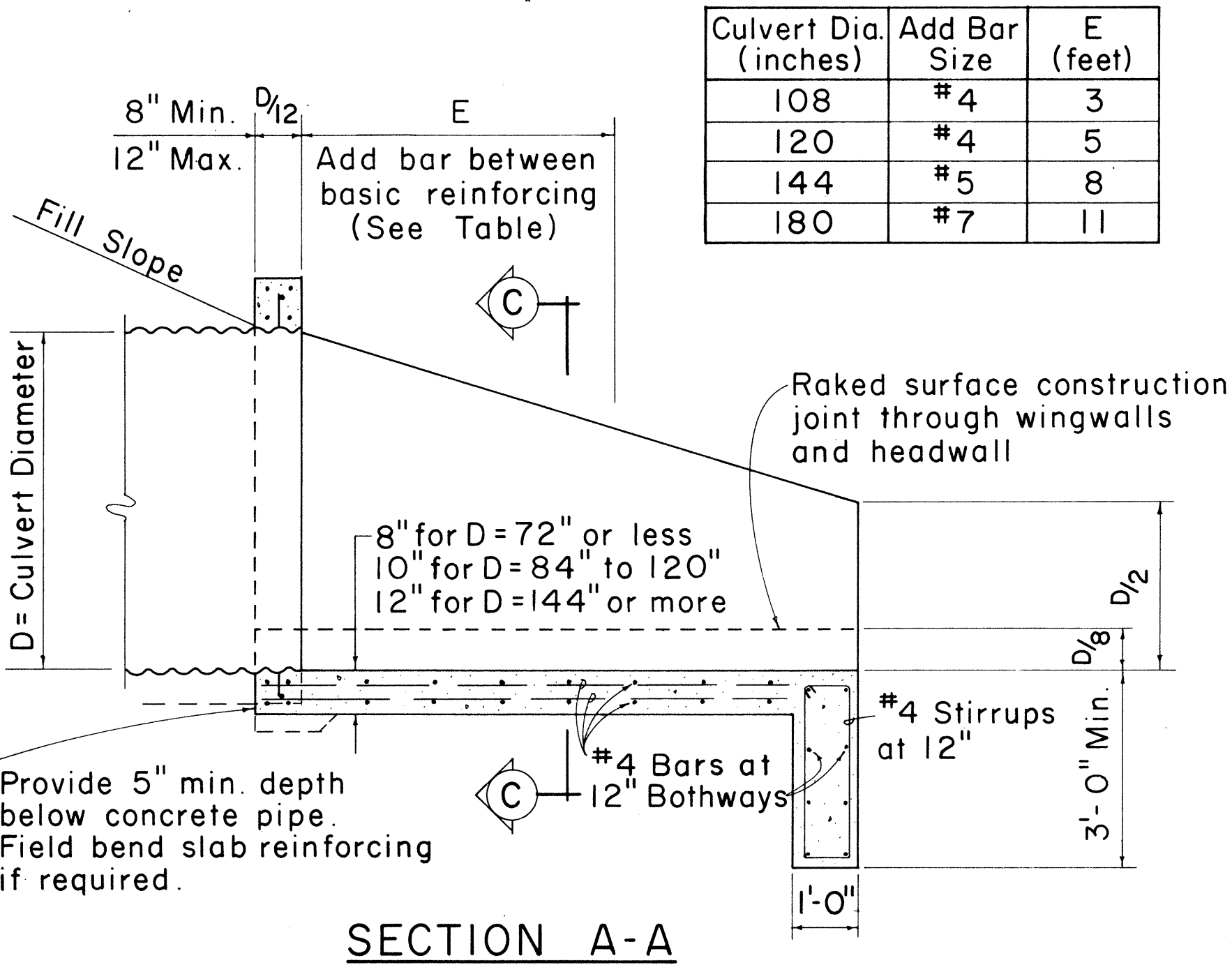
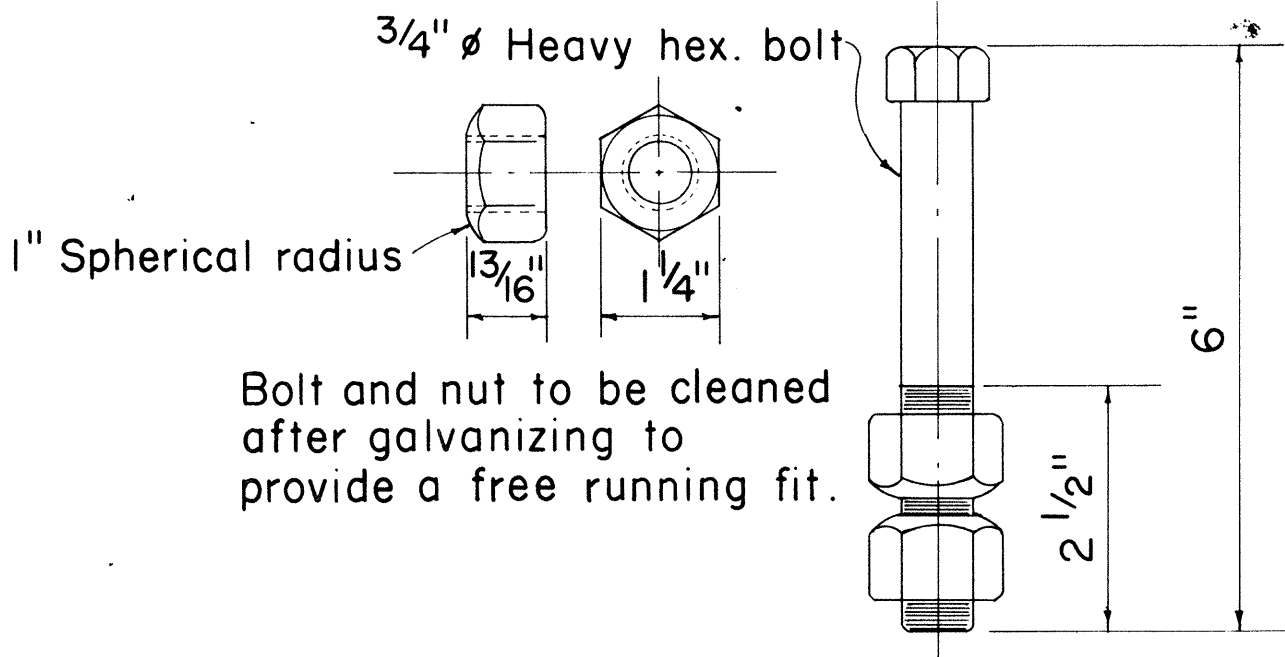
- Concrete: All concrete shall be Class A.
- Cut-off Wall: The depth of wall shown on the plan may be reduced if rock is encountered at a higher elevation.
- Multiple Pipe Installations: To permit careful placing and tamping of backfill material, clear spacing for multiple pipe installations shall be 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.



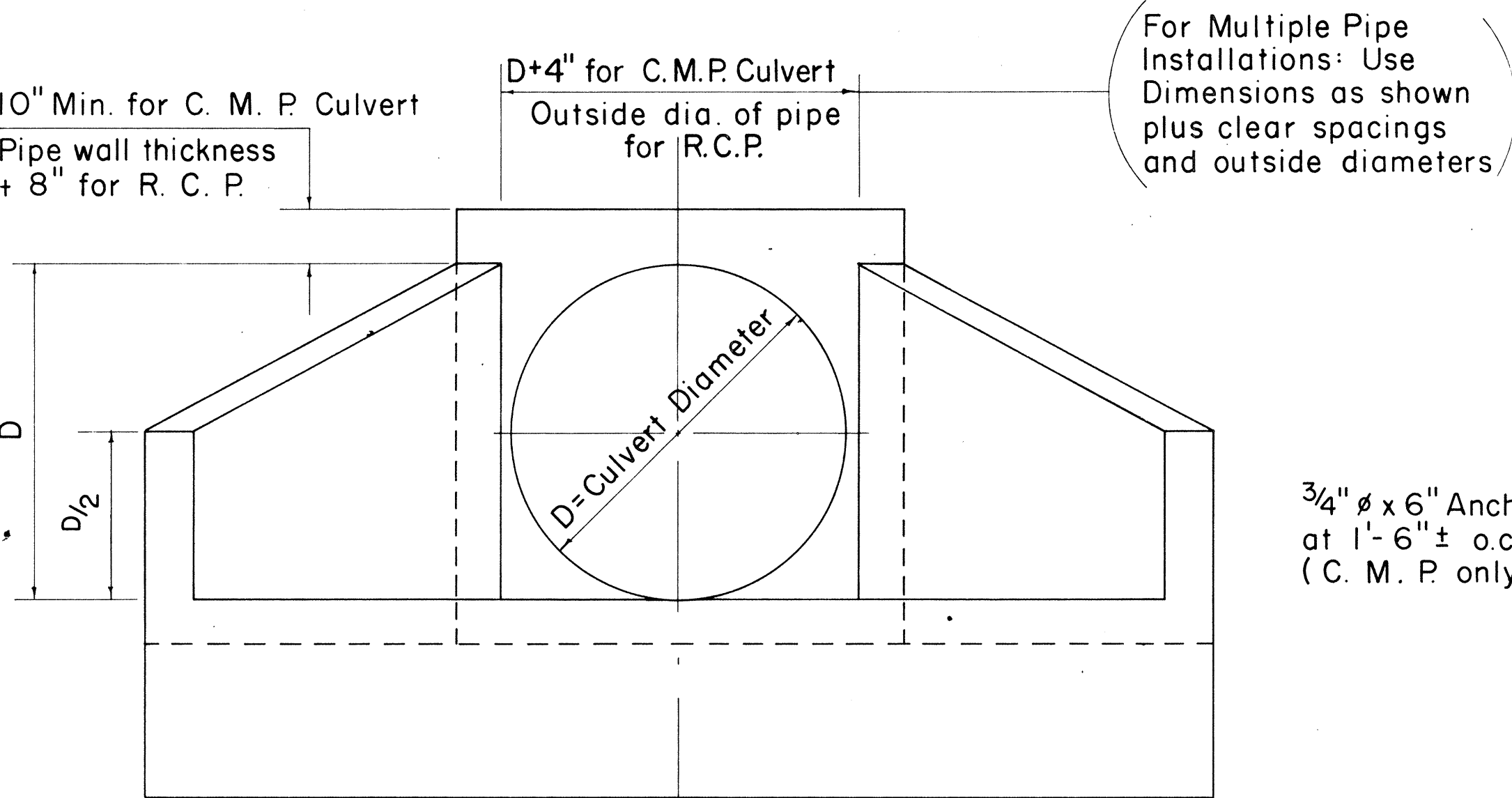
When Inlet is skewed to embankment slope, the embankment may be contoured to cover the exposed section of wall and pipe.



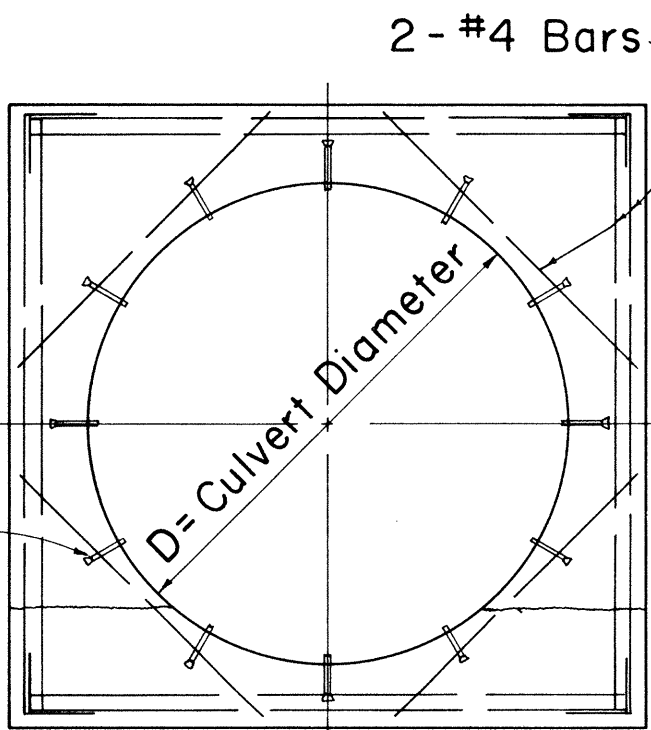
8" WING WALL 10" TO 12" WING WALLS



Culvert Dia. (inches)	Add Bar Size	E (feet)
108	#4	3
120	#4	5
144	#5	8
180	#7	11



3/4" x 6" Anchor Bolts at 1'-6" ± o.c. (C. M. P. only)



APPROVAL, RECOMMENDED: P. P. P. 12-17-69
HYDRAULIC DESIGN ENGINEER DATE

APPROVED: W. W. W. 12-17-69
ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
INLET STRUCTURES

Not to Scale Date: July, 1969

SHEET No. 39 OF 40 SHEETS DH 13

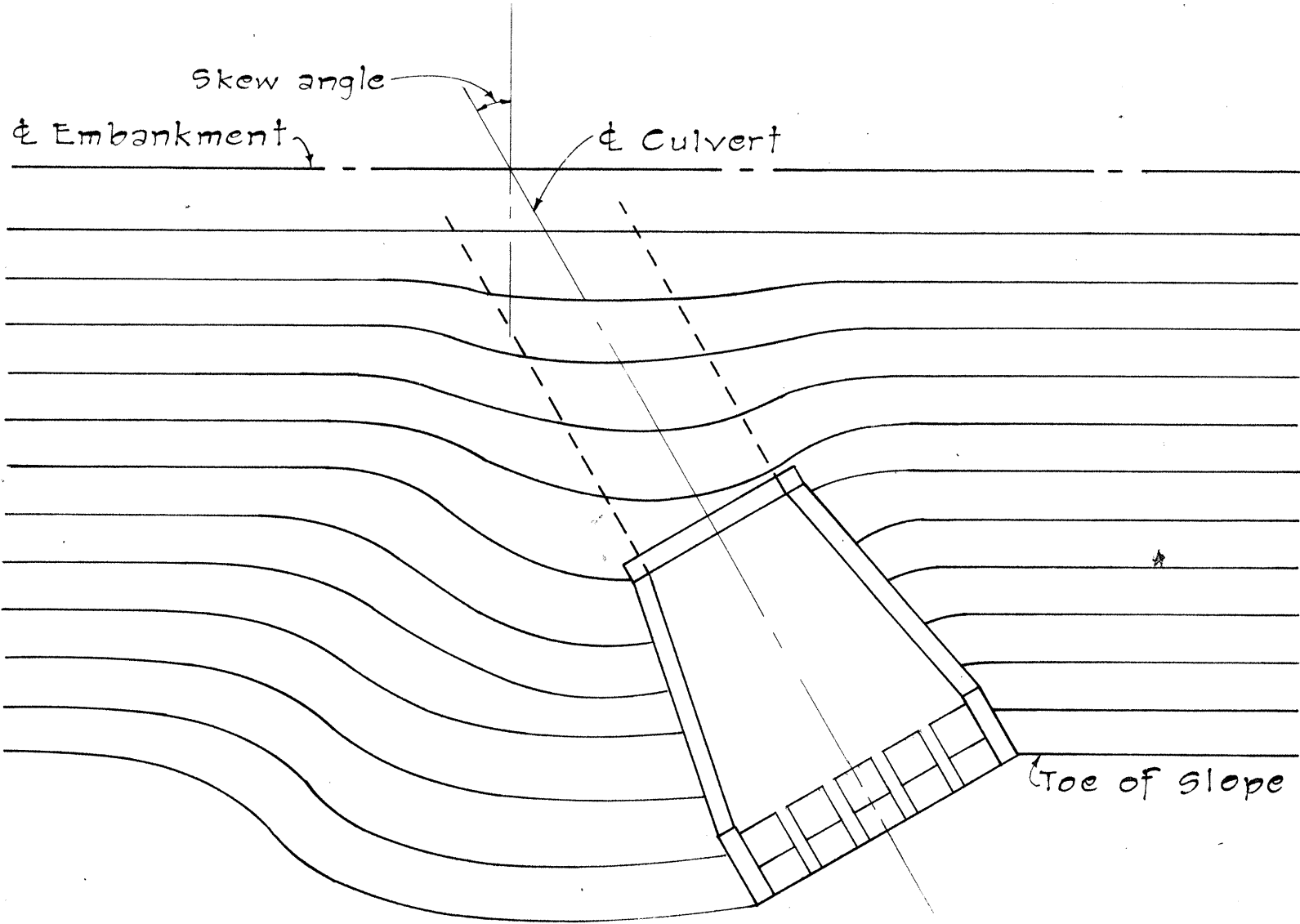
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HC-1(7)4	1973	126	229

GENERAL NOTES

- Concrete: All concrete shall be Class A.
- Cutoff Wall: The depth of wall shown on the plan may be reduced if rock is encountered at a higher elevation.
- Multiple Pipe Installations: To permit careful placing and tamping of back fill 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.

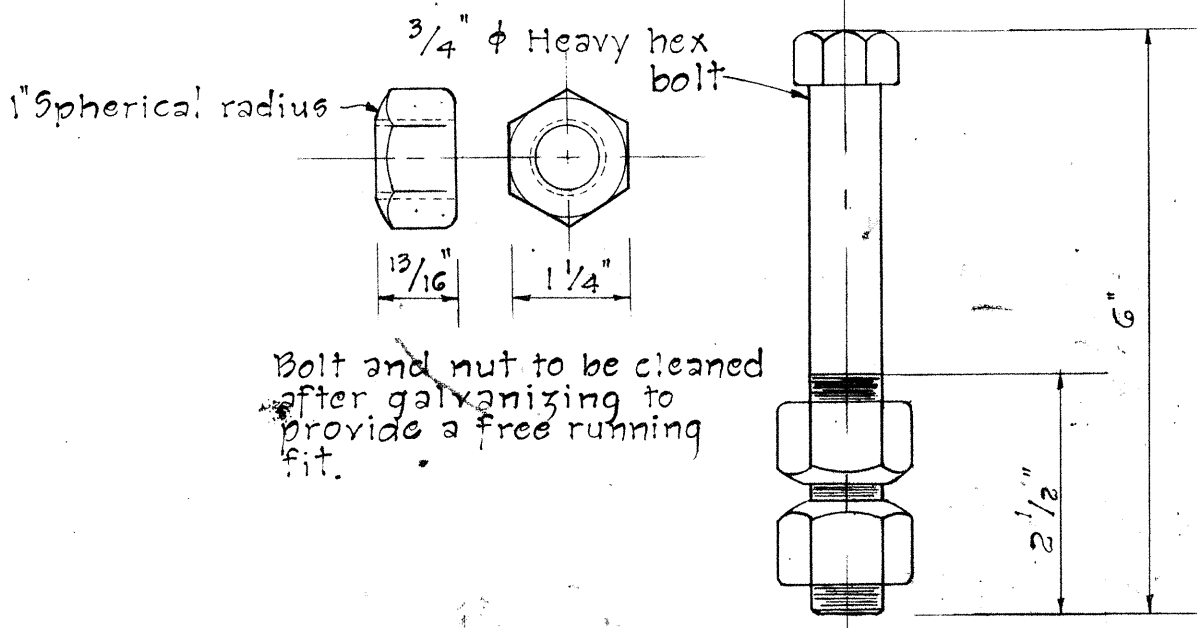
SUMMARY OF QUANTITIES		
Culvert Dia. (inches)	Concrete (Cu. Yd.)	Reinf. Steel (Lbs.)
48		
54		
60		
72		
84	12.7	1270
96	16.2	1570
108	20.3	2010
120	24.8	2460
144	41.8	3610
180	63.8	7090

Note: Quantities shown are for C.M.P. culvert.

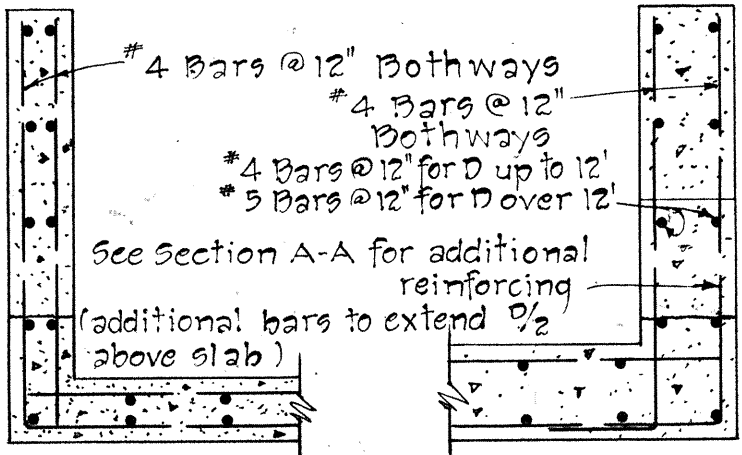


EMBANKMENT CONTOURS FOR SKEWED OUTLET

When outlet is skewed to embankment slope, the embankment may be contoured to cover the exposed section of wall and pipe.

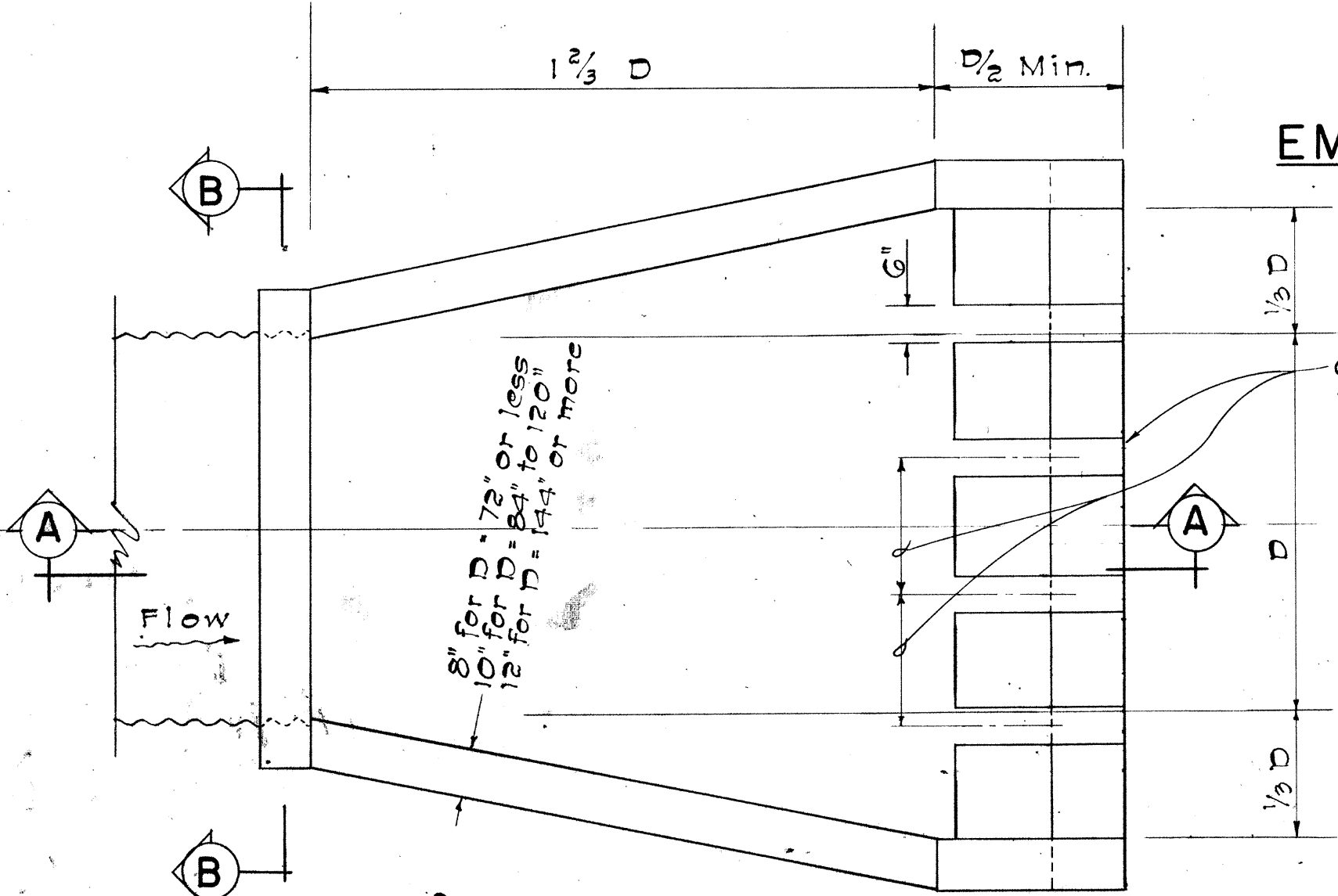


ANCHOR BOLT DETAIL

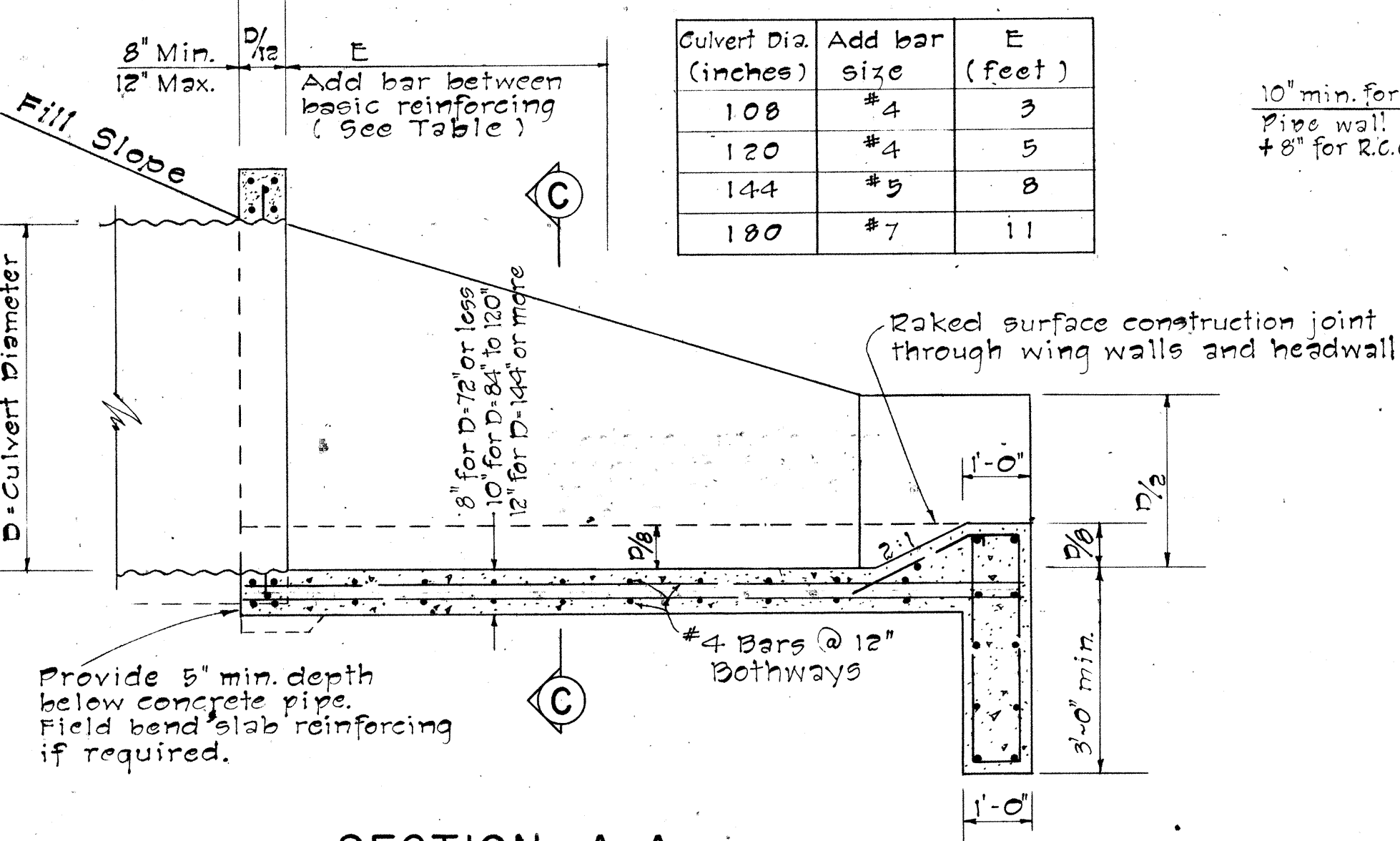


8" WING WALL 10" TO 12" WING WALLS

SECTION C-C

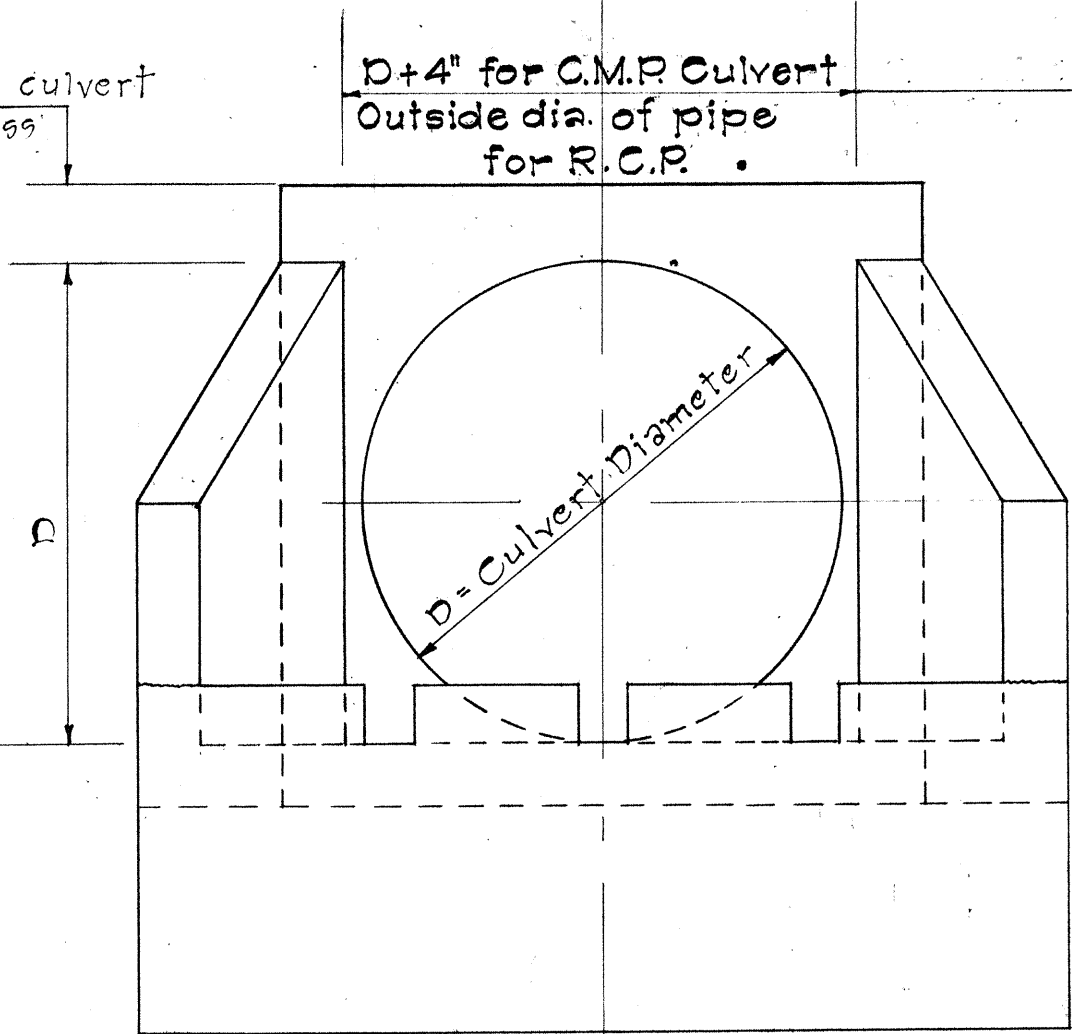


PLAN



SECTION A-A

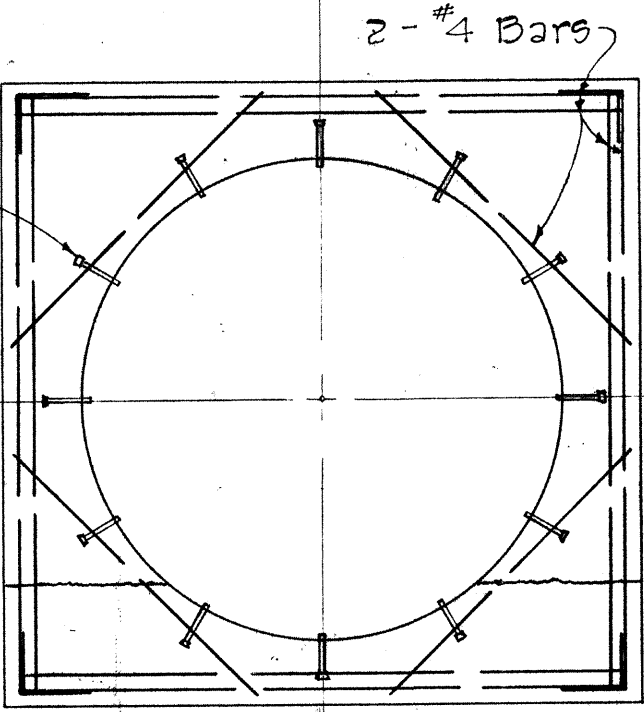
OUTLET STRUCTURE FOR CULVERT SIZES 48 IN. TO 180 IN. DIAMETER



FRONT ELEVATION

For Multiple Pipe Installations: Use Dimensions as shown plus clear spacings and outside diameters

3/4 inch x 6 inch Anchor Bolts @ 1'-6" o.c. (C. M. P. only)



SECTION B-B

APPROVAL RECOMMENDED: *[Signature]* 12-17-69
HYDRAULIC DESIGN ENGINEER DATE

APPROVED: *[Signature]* 12-17-69
ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
OUTLET STRUCTURES

Not To Scale Date: July, 1969
SHEET No. 40 OF 40 SHEETS DH 15