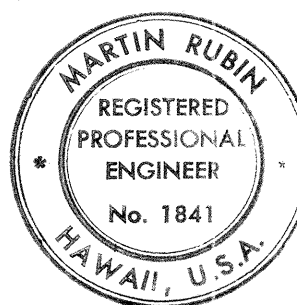


SUMMARY

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(91):13	1972	44	228

STRUCTURES			PIPE CULVERTS		ESTIMATED																	QUANTITIES																REMARKS
INLET NUMBER	TYPE	STATION	ITEM	N.O.	206.01	206.80	206.83	207.01	503.001		503.201	602.101	603.7200		604.201	604.216	604.230		604.236	605.006	605.106		605.200	609.706	609.704		609.709	624.1002	640.010		640.020	640.021	640.030					
			FROM	TO	STRUCTURE EXCAVATION OTHER THAN AT BRIDGES	FILTER MATERIAL	FILTER MATERIAL FOR UNDERDRAINS	DITCH AND CHANNEL EXCAVATION	CONCRETE OTHER THAN IN BRIDGES		CLASS B CONCRETE OTHER THAN IN BRIDGES	REINFORCING STEEL OTHER THAN IN BRIDGES	24" CMP 0.079" THICK 24" RCP CL. III 24" ACP CL. III		TYPE A CAST IRON FRAME AND COVER	TYPE B CAST IRON FRAME AND COVER FOR CATCH BASIN	TYPE G1214 STEEL FRAME AND GRATE		TYPE G1614 STEEL FRAME AND GRATE	6" PERFORATED UNDERDRAIN PIPE	6" NONPERFORATED UNDERDRAIN PIPE		CLEANOUTS	BITUMINOUS GUTTER TYPE 7B	BITUMINOUS GUTTER TYPE 7A		BITUMINOUS GUTTER TYPE 7C	FURNISHING AND INSTALLING 6" CAST IRON PIPE	LINED DRAINAGE DITCH TYPE 1, 2, 3, 4 & 9		LINED DRAINAGE DITCH TYPE 5	LINED DRAINAGE DITCH TYPE 8	LINED DRAINAGE DITCH TYPE 6					
			UNIT	USE	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.		C.Y.	L.B.	L.F.		E.A.	E.A.	E.A.		E.A.	L.F.	L.F.		E.A.	L.F.	L.F.		L.F.	L.F.	L.F.		L.F.	L.F.	L.F.					
1	CB Type 1A	C Sta.13+35,10' RT.	C Sta.13+35,10' RT.	SC Sta.16+22	135				6.9			145	185		1																							
2	CB Type 1B	SC Sta.16+22	SC Sta.16+22	C Sta.17+22,14 RT.	155				6.0			110	200		1																							
3	CB Type 1B	C Sta.17+22,14 RT.	C Sta.17+22,14' RT.	C Sta.19+32,16' RT.	145				6.0			110	210		1																							
4	DI Type G1214	C Sta.19+32,16' RT.	C Sta.19+32,16' RT.	C Sta.19+48,45' LT.	50				2.2			35	60				1																					
5	HEADWALL	C Sta.19+48,45' LT.									2	45																										
6	DI Type G1G14	ES 37+00, 6' RT.	ES 37+00, 6' RT.	ES 37+50, 6' RT.	46				2.5			35	50						1																			
7	DI Type G1G14	ES 37+50, 6' RT.	ES 37+50, 6' RT.	ES 37+50, 16' RT.	10				2.0			35	10						1																			
8	HALF HEADWALL	ES 37+50, 16' RT.			1				.3			20																										
9	DI Type G1G14	ES 24+73, 6' RT.	ES 24+73, 6' RT.	ES 24+73,21' RT.	20				3.3			250	16						1																			
10	HALF HEADWALL	ES 24+73, 21' RT.			1				.3			20																										
11	DI Type G1G14	ES 34+05, 6' RT.	ES 34+05, 6' RT.	ES 34+00, 26' RT.	20				3.3			250	18						1																			
12	HALF HEADWALL	ES 34+00, 26' RT.			1				.3			20																										
13	DI Type G1G14	ES 21+00, 6' RT.	ES 21+00, 6' RT.	ES 20+55.3, 6' RT.	55				2.9			220	44						1																			
14	DI Type G1G14	ES 20+55.3, 6' RT.	ES 20+55.3, 6' RT.	ES 20+05, 20' RT.	55				3.0			225	52						1																			
15	DI Type G1G14	C 22+00, 12' RT.	C 22+00, 12' RT.	C 22+54, 12' RT.	45				2.1			35	54						1																			
16	DI Type G1G14	C 22+54, 12' RT.	C 22+54, 12' RT.	C 23+00, 12' RT.	40				2.2			35	46						1																			
			SUBTOTAL	(THIS SHEET)	779				43.3		2	1590	945		3		1		8																			
			SUBTOTAL	(SHEETS 20 & 3D)	1015	60	371	351	54.7		6.5	1885	525			2			3	3970			15	1,241	1,831		560		1,500		40	15	351					
			TOTAL		1794	60	371		98.0		8.5	3475	1470		3	2	1		11	3970			15	1,241	1,831				1,500		40	15	351					
			ROUND TOTAL		1795	60	370	350	98		9	3480	1470		3	2	1		11	3970			15	1,245	1,835		560		1,500		40	15	355		SUB-TOTAL EXCLUDING STADIUM RAMP			

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



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE ESTIMATED QUANTITIES

INTERSTATE ROUTE H-1
PROJECT NO. I-H-1(91):13

DATE: MAR. 15, 1972

SHEET No. 10 OF 19 SHEETS

4 4

DRAINAGE SUMMARY

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(91):13	1972	45	228

STRUCTURES			PIPE CULVERTS		ESTIMATED QUANTITIES																						REMARKS										
INLET NUMBER	TYPE	STATION	ITEM	NO.	206.01	206.80	206.83	207.01	503.001		503.201	602.101	603.7200		604.201	604.216	604.230		604.236	605.006	605.106		605.200	609.706	609.704		609.709	624.1002	640.010		640.020	640.021	640.030				
			FROM	TO	STRUCTURE EXCAVATION OTHER THAN AT BRIDGES	FILTER MATERIAL	FILTER MATERIAL FOR UNDERDRAINS	DITCH AND CHANNEL EXCAVATION	CONCRETE OTHER THAN IN BRIDGES		CLASS B CONCRETE OTHER THAN IN BRIDGES	REINFORCING STEEL OTHER THAN IN BRIDGES	24" CMP 0.079" THICK 24" RCP CL. III 24" ACP CL. III		TYPE A CAST IRON FRAME AND COVER	TYPE B CAST IRON FRAME AND COVER FOR CATCH BASIN	TYPE G1214 STEEL FRAME AND GRATE		TYPE G1214 STEEL FRAME AND GRATE	6" PERFORATED UNDERDRAIN PIPE	6" NONPERFORATED UNDERDRAIN PIPE		CLEANOUTS	BITUMINOUS GUTTER TYPE 7B	BITUMINOUS GUTTER TYPE 7A		BITUMINOUS GUTTER TYPE 7C	FURNISHING & INSTALLING 6" CAST IRON PIPE	LINED DRAINAGE DITCH TYPE 1, 2, 3, 4 & 9		LINED DRAINAGE DITCH TYPE 5	LINED DRAINAGE DITCH TYPE 8	LINED DRAINAGE DITCH TYPE G				
			UNIT	USE	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.		C.Y.	LB.	L.F.		E.A.	E.A.	E.A.		E.A.	L.F.	L.F.		E.A.	L.F.	L.F.		L.F.	L.F.	L.F.		L.F.	L.F.	L.F.				
17	DI Type G1614	C 23+00, 12' RT.	C 23+00, 12' RT.	C 25+00, 12' RT.	210				2.4			35	200						1																		
18	MH Type E	C 25+00, 12' RT.	C 25+00, 12' RT.	C 26+20, 32' RT.	135						4.3	325	120			1																					
19	DI Type G1614	WE 237+10, 18' LT.	WE 237+10, 18' LT.	WE 236+00, 18' LT.	110				2.3			35	110						1																		
20	DI Type G1614	WE 236+00, 18' LT.	WE 236+00, 18' LT.	WE 236+06, 52' LT.	40				3.0			225	35						1																		
21	MH Type D	WE 236+06, 52' LT.	WE 236+06, 52' LT.	SE 236+00, 33' RT.	45						2.2	35	60			1																					
22 *	CB Type 1B	SC 10+50, RT.	SC 10+50, RT.	SC 10+12, RT.	45				5.3			110	40		1																						
23 *	CB Type 1D	SC 10+12, RT.	SC 10+12, RT.	SCR 16+78, 25' LT.	55				4.4			80	65		1																						
24 *	CB Type 1B	SWE 2+72, RT.	SWE 2+72, RT.	SCR 22+20, 25' LT.	56				5.3			110	60		1																						
25 *	MH Type B	SCR 22+20, 25' LT.	SCR 22+20, 25' LT.	SCR 22+80, 25' LT.	52						3.0	30	50		1																						
22A	MH Type D	SC 10+60, 65' RT.																																			
	UNDERDRAINS	INTERSTATE H-1				78		56												500			2														
	"	ES RAMP				100		85												925			4														
	"	SE RAMP				132		120												1500			5														
	"	WE RAMP				50		45												275			2														
	"	RAMP C				75		65												770			2														
	DRAINS FOR DRAINAGE OF STRUCTURE #3				40																							165									
	DRAINS FOR DRAINAGE OF STRUCTURE #3A *																			50																	
	HALAWA STREAM CHANNEL						60		47			1230																									
	UNDERDRAINS	SC & SWE RAMPS *			10		10													80			1														
			SUBTOTAL STADIUM RAMPS *		218		10		15.0		3.0	330	215		4					80	50		1														
	SUBTOTAL EXCLUDING STADIUM RAMPS				1015	60	371		54.7		6.5	1885	525			2			3	3970			15					165									

* STADIUM RAMPS



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Martin Rubin

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE ESTIMATED
QUANTITIES

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(91):13

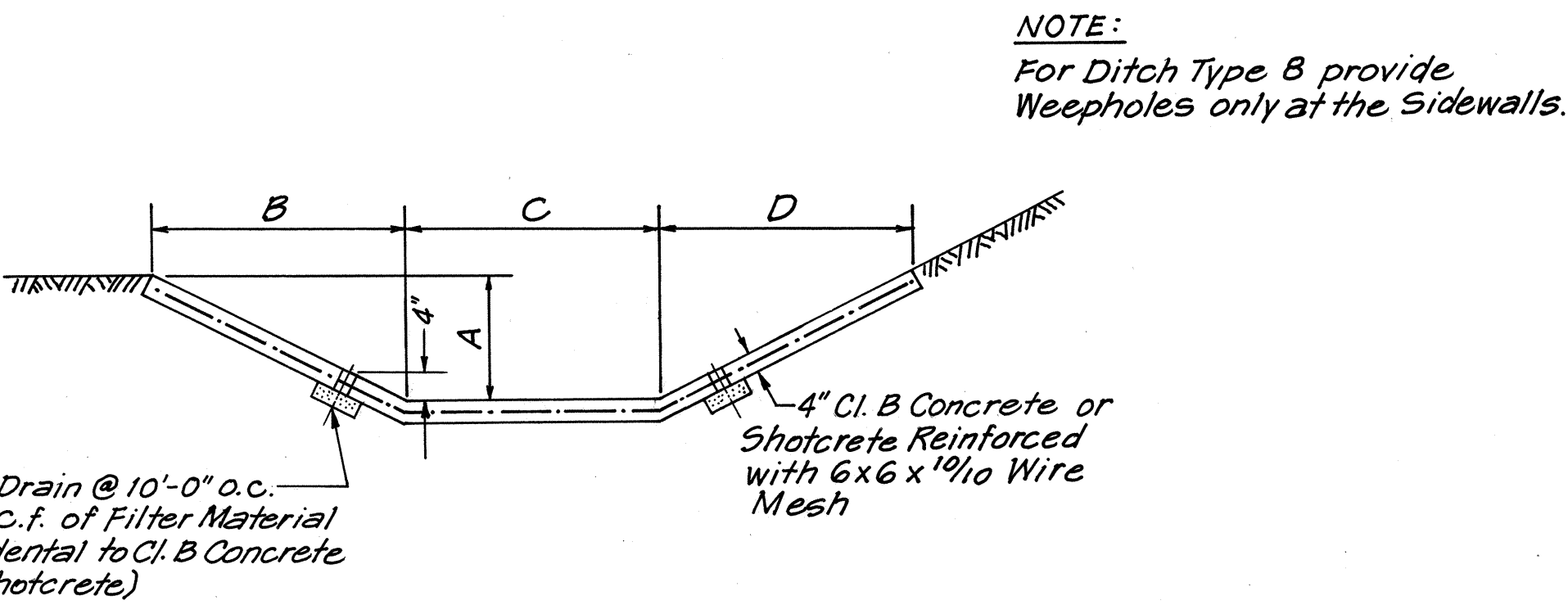
DATE: MAR. 15, 1972

SHEET No. 20 OF 19 SHEETS

41 5

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(91)-13	1972	46	228

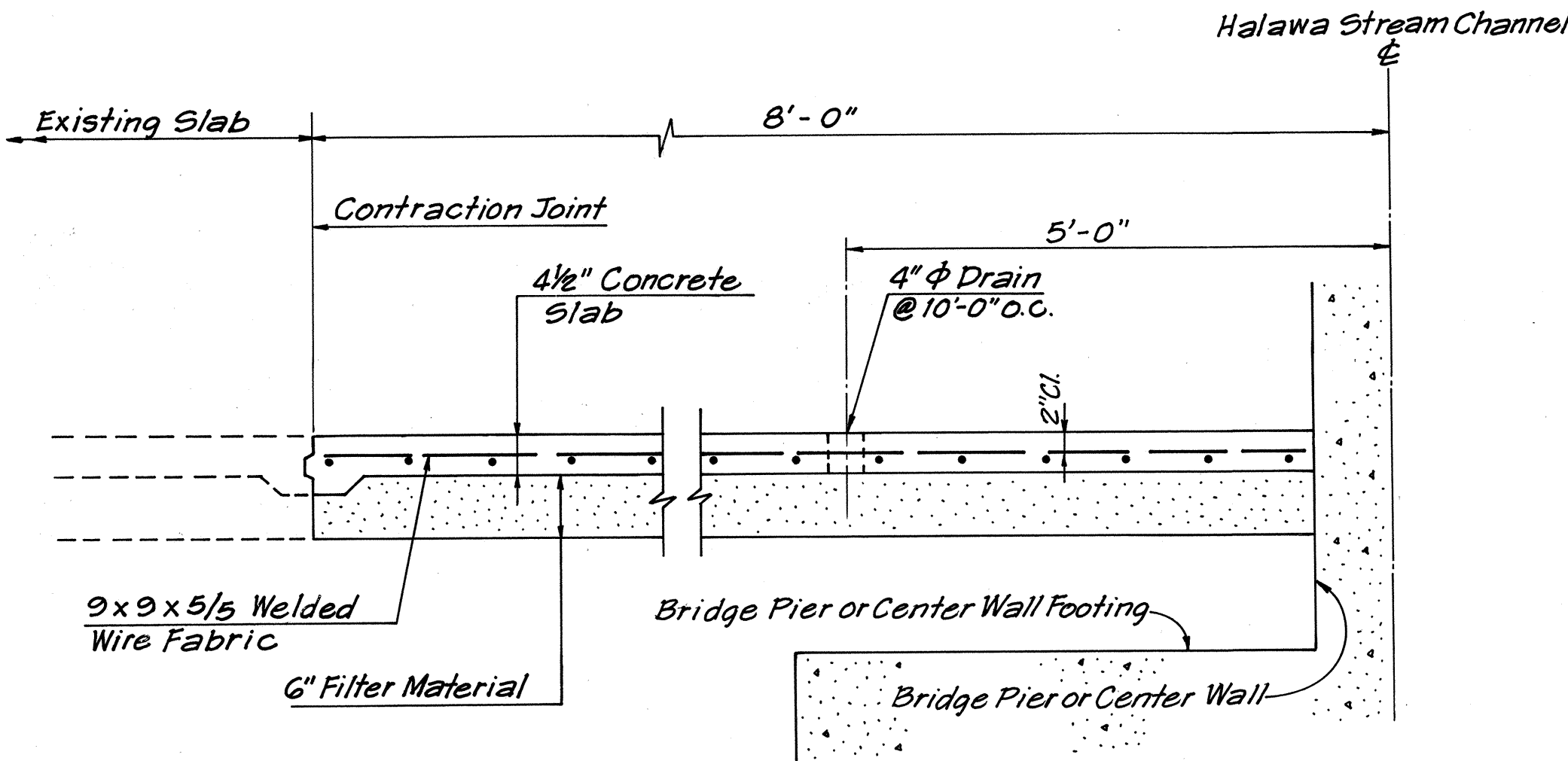
SCHEDULE OF ROADWAY LINED GUTTERS & DITCHES									
LOCATION	DITCH & CHANNEL EXCAVATION	BITUMINOUS GUTTER TYPE 7A	BITUMINOUS GUTTER TYPE 7B	BITUMINOUS GUTTER TYPE 7C		LINED DRAIN-AGE DITCH TYPE 1,2,3,4,8,9	LINED DRAIN-AGE DITCH TYPE 5	LINED DRAIN-AGE DITCH TYPE 6	LINED DRAIN-AGE DITCH TYPE 8
	CY	LF	LF	LF		LF	LF	LF	LF
C Sta. 17+90, 16' Rt. To C Sta. 19+35, 16' Rt.			145						
C Sta. 19+48, 45' Lt. To C Sta. 19+52, 85' Lt.	11					40			
C Sta. 12+00, 25' Lt. To C Sta. 18+30, 25' Lt.			630						
* C Sta. 18+30, 25' Lt. To C Sta. 18+88, 37' Lt.	13					60			
C Sta. 18+88, 37' Lt. To H-I Sta. 226+95, 115' Rt.	112					497			
* C Sta. 19+35, 16' Rt. To C Sta. 19+85, 12' Rt.		50							
C Sta. 19+85, 12' Rt. To C Sta. 24+75, 12' Rt.		490							
ES Sta. 24+73, 24' Rt. To H-I Sta. 229+27, 130' Rt.	9							112	
ES Sta. 25+10, 6' Rt. To ES Sta. 20+32, 6' Rt.		478							
ES Sta. 33+50, 6' Rt. To ES Sta. 37+54, 6' Rt.		404							
ES Sta. 34+00, 26' Rt. To HS Sta. 23+56, 146' Lt.	13							154	
* HS Sta. 23+56, 146' Lt. To HS Sta. 23+51, 132' Lt.	1					15			
HS Sta. 23+51, 132' Lt. To HS Sta. 23+28, 73' Lt.	7					63			
* HS Sta. 23+28, 73' Lt. To HS Sta. 23+28, 58' Lt.	16							15	
ES Sta. 37+50, 16' Rt. To ES Sta. 37+50, 105' Rt.	7							85	
* ES Sta. 37+50, 105' Rt. To ES Sta. 37+50, 120' Rt.	1					15			
ES Sta. 37+50, 120' Rt. To ES Sta. 37+50, 208' Rt.	9					88			
* ES Sta. 37+50, 208' Rt. To HS Sta. 27+00, 45' Lt.	4					15			
SE Sta. 234+00, 16' Rt. To SE Sta. 231+30, 16' Rt.			270						
* SE Sta. 231+30, 16' Rt. To SE Sta. 230+50, 25' Rt.	13					80			
SE Sta. 230+50, 25' Rt. To SE Sta. 229+05, 33' Rt.	16					140			
WE Sta. 214+00, 12' Rt. To WE Sta. 214+45, 12' Rt.		45							
WE Sta. 233+50, 18' Lt. To WE Sta. 237+14, 18' Lt.		364							
SE Sta. 221+62, 16' Rt. To SE Sta. 223+58, 16' Rt.			196						
* SE Sta. 223+58, 16' Rt. To SE Sta. 224+15, 25' Rt.	13					59			
SE Sta. 224+15, 25' Rt. To SE Sta. 228+95, 33' Rt.	106					468			
Gutters for Drainage of Structure #3				560					
SHEET TOTAL	351	1831	1241	560		1500	40	351	15
* Ditch Transition	Item No.	207.01	609.704	609.704	609.709	640.010	640.020	640.030	640.021



TYPE	A	B	C	D	CONCRETE	REINFORCING	EXCAVATION
1	1	2	0	2	0.061 CY/LF	1.021 #/LF	0.115 CY/LF
2	1.5	3	0	3	0.088 CY/LF	1.485 #/LF	0.226 CY/LF
3	.5	3	0	3	0.081 CY/LF	1.356 #/LF	0.105 CY/LF
4	1	6	0	2	0.108 CY/LF	1.812 #/LF	0.214 CY/LF
5	1.5	1.5	1	1.5	0.071 CY/LF	1.185 #/LF	0.264 CY/LF
6	1	0	1	0	0.045 CY/LF	0.760 #/LF	0.082 CY/LF
8	3	6	10	6	0.295 CY/LF	4.962 #/LF	2.047 CY/LF
9	1.5	9	0	9	0.229 CY/LF	3.847 #/LF	0.487 CY/LF

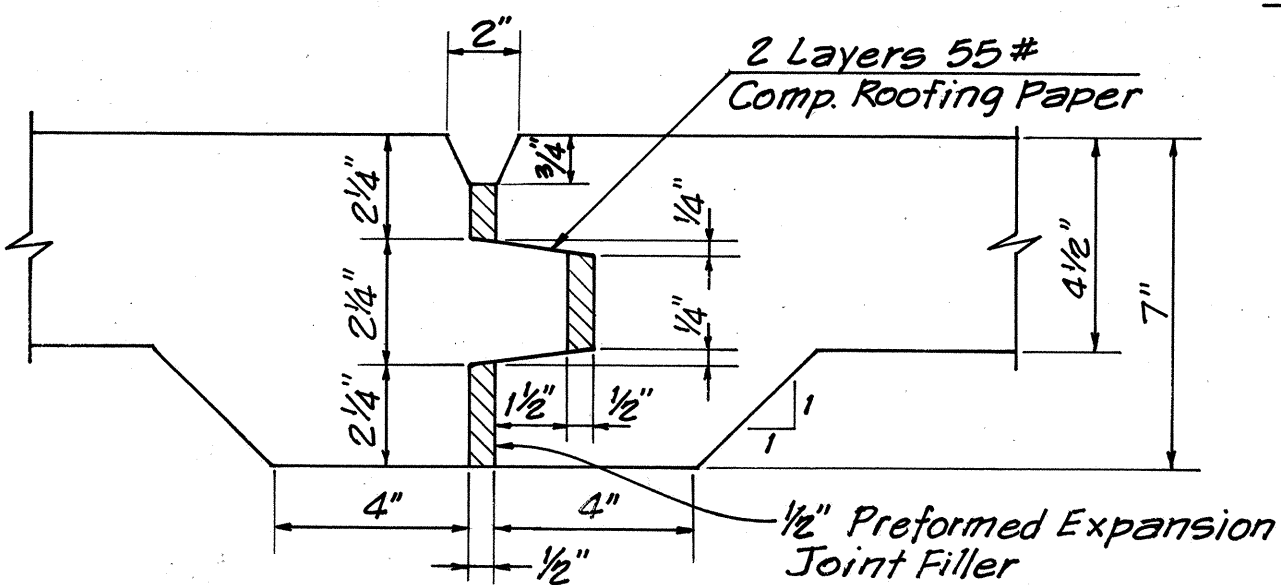
- NOTES:
- Contractor may substitute Lined Ditches of other Shapes and of equal or greater Capacity if approved by the Engineer. Payment will be on the original Ditch as shown on the Plans.
 - Ditch Transitions shall be paid under the adjacent downstream Ditch Type.

LINED DITCHES



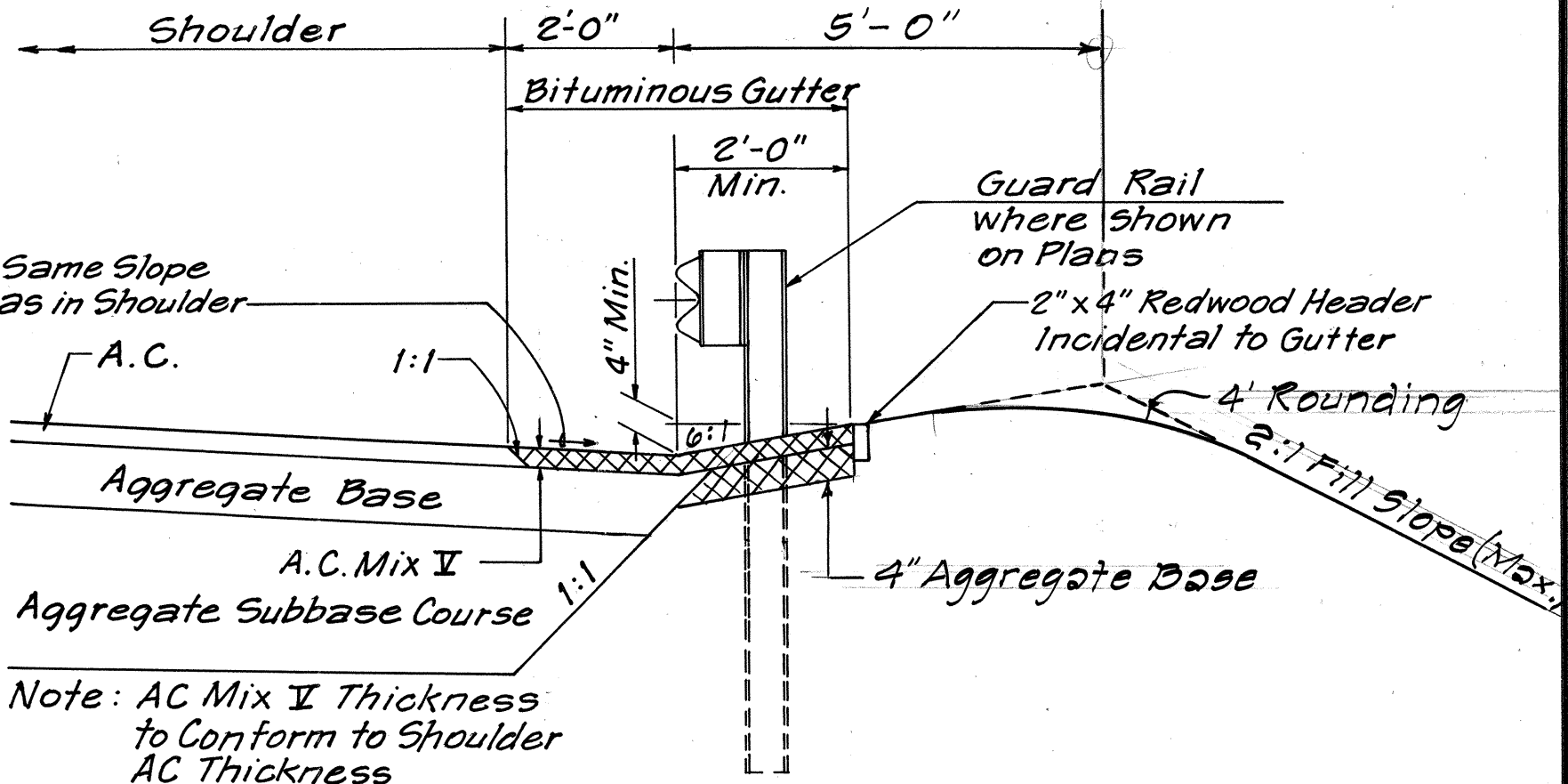
TYPICAL SECTION OF SLAB IN EXISTING HALAWA STREAM

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



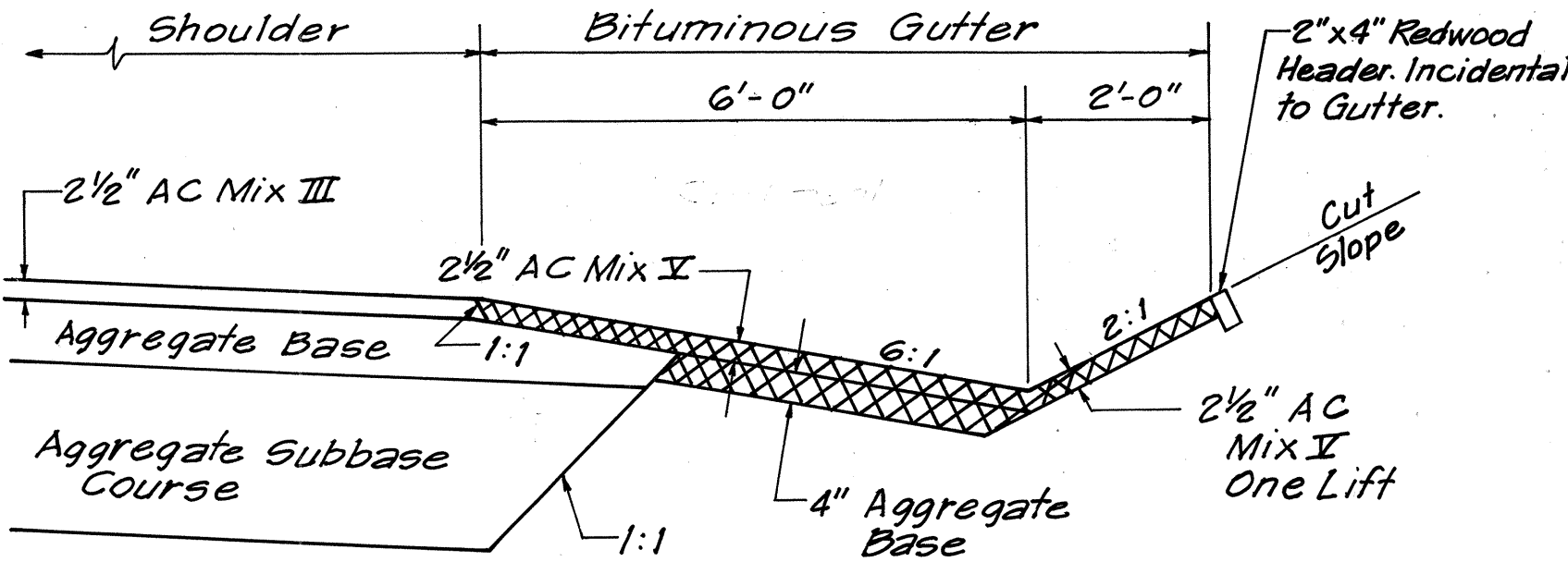
JOINT DETAIL OF SLAB IN EXISTING HALAWA STREAM

Detail Shows Expansion Joint; Contraction Joint Similar Except For Preformed Joint Filler and Roofing Paper.



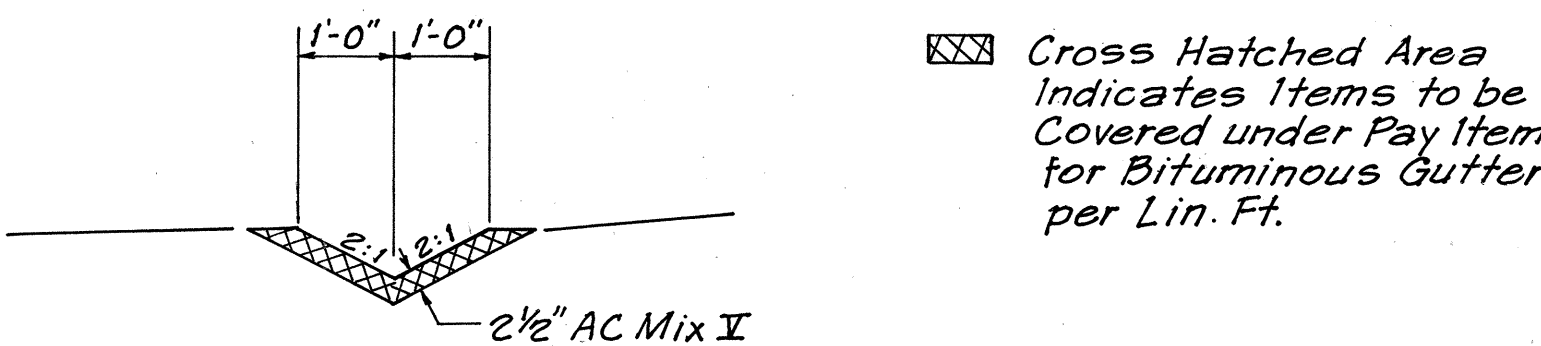
BITUMINOUS GUTTER TYPE 7A

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



BITUMINOUS GUTTER TYPE 7B

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



BITUMINOUS GUTTER TYPE 7C

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

NOTES FOR HALAWA STREAM CHANNEL

- All Concrete shall be Class A.
- Stop Reinforcement at All Joints As Shown.
- Match Existing Joints of Existing Slab.
- Removal of Asphalt Pavement and Excavation Shall be Paid Under Structure Excavation for Bridges.



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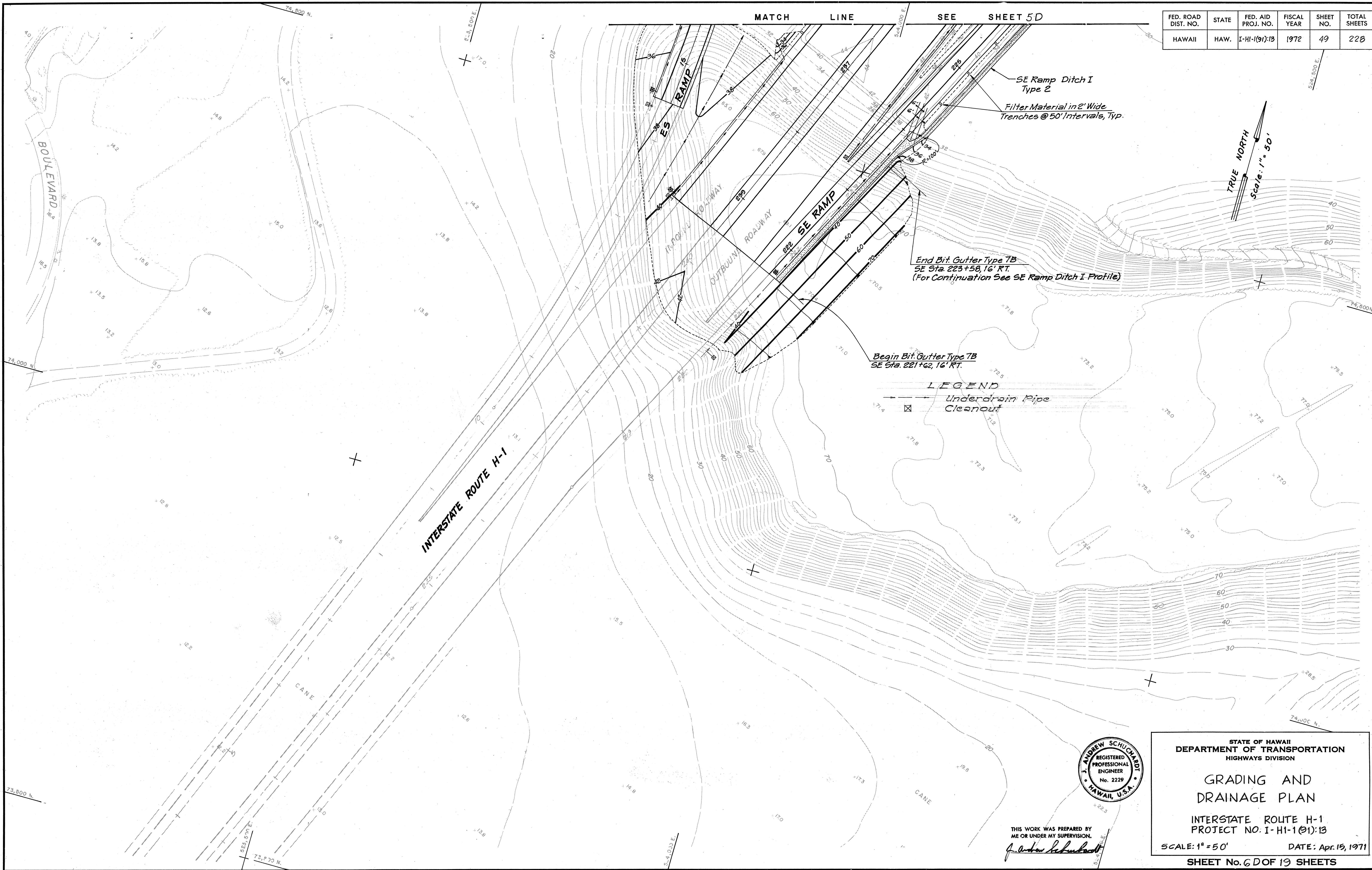
DRAINAGE DETAILS AND ESTIMATED QUANTITIES

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(91)-13

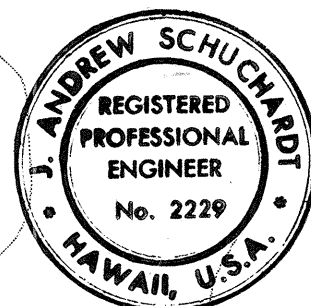
SCALE: As Shown DATE: Apr. 15, 1971

SHEET No. 3D OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(91):13	1972	49	228



DATE	BY
DESIGNED BY	
CHECKED BY	
NOTED BY	
PLANNED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	



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Andrew Schuchman

STATE OF HAWAII
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 HIGHWAYS DIVISION

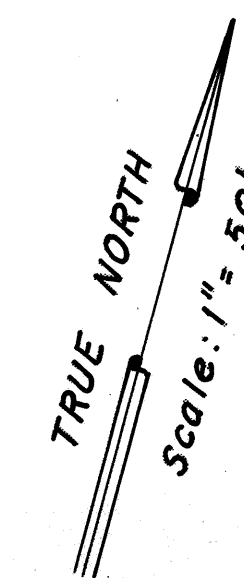
GRADING AND DRAINAGE PLAN

INTERSTATE ROUTE H-1
 PROJECT NO: I-HI-1(91):13

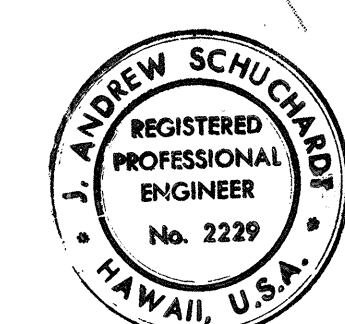
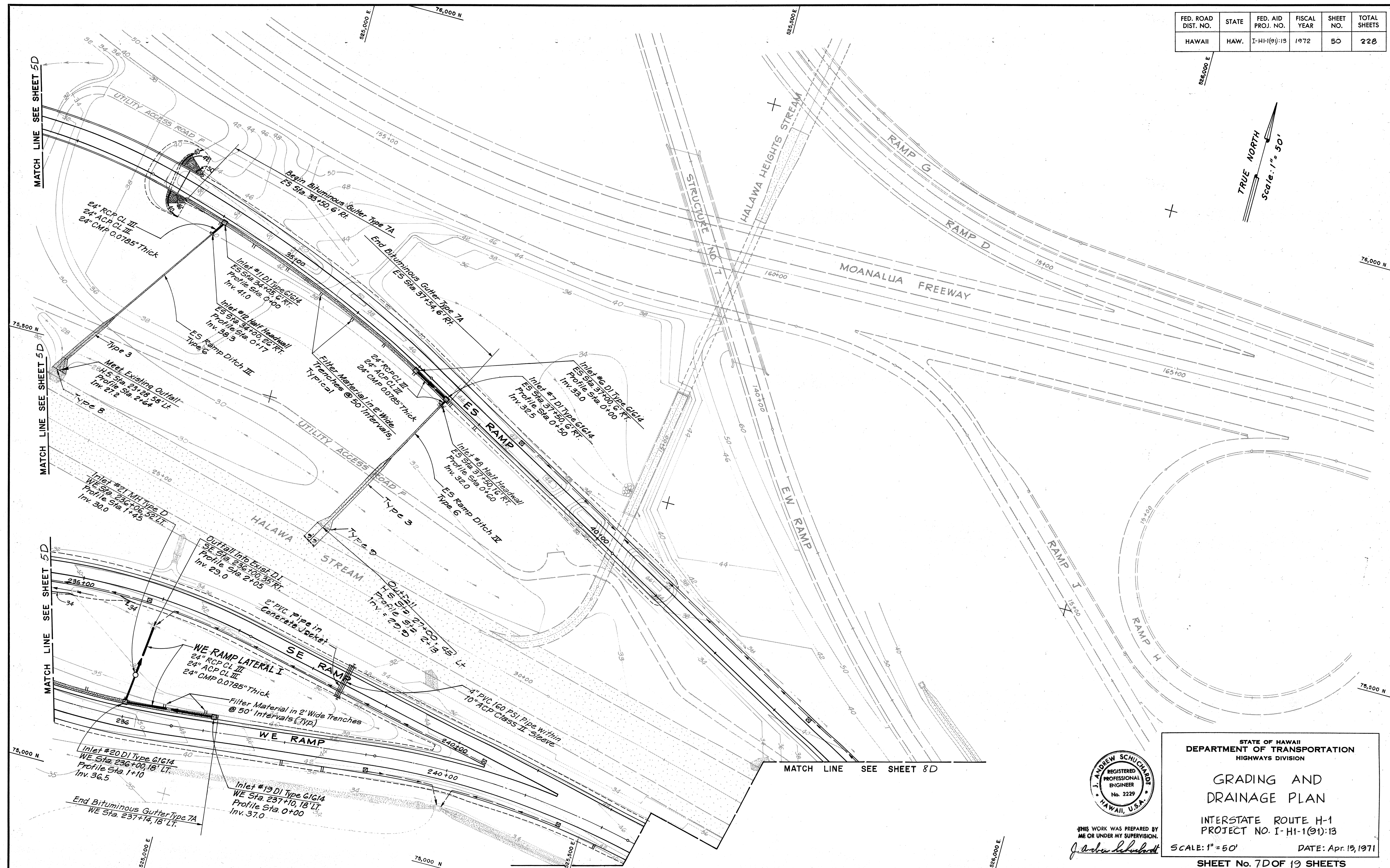
SCALE: 1" = 50' DATE: Apr. 15, 1971

SHEET No. 6 OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-1(91):13	1972	50	228



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



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GRADING AND DRAINAGE PLAN

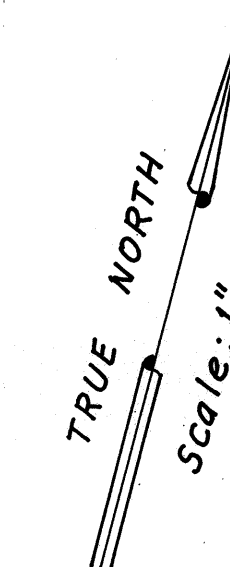
INTERSTATE ROUTE H-1
PROJECT NO. I-H-1(91):13

SCALE: 1" = 50' DATE: Apr. 15, 1971

SHEET No. 7D OF 19 SHEETS

50

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-1(91):13	1972	51	228



Filter Material in 2' Wide
Trenches @ 50' Intervals, Typ.

Reinforced Concrete Slab

MATCH LINE SEE SHEET 7D

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	TRACED BY	
	QUANTITIES BY	
	CHECKED BY	



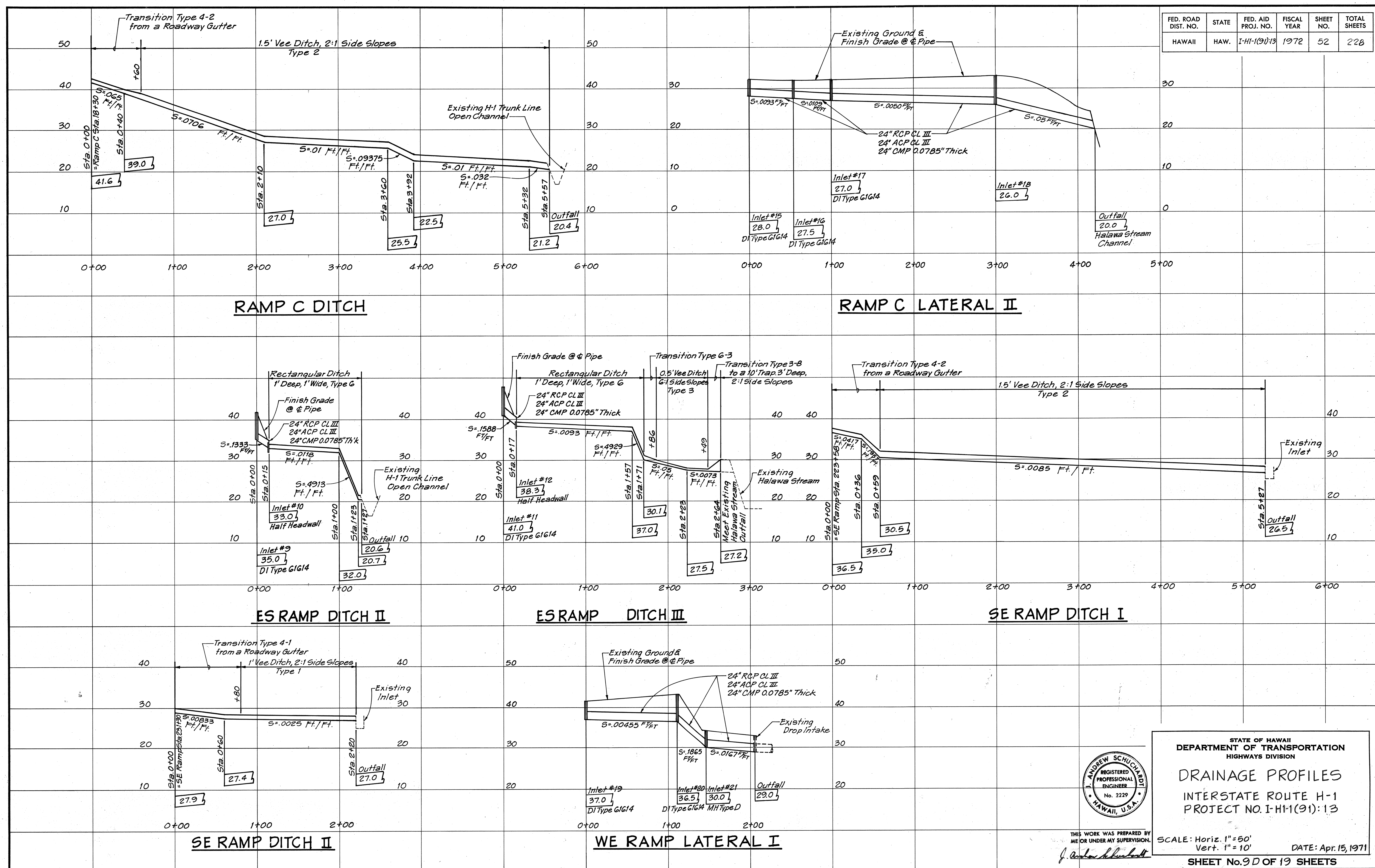
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J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

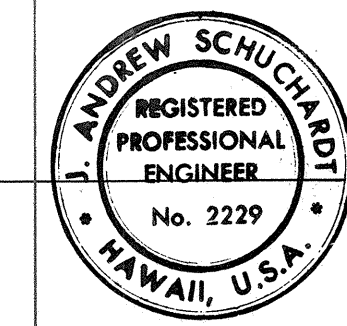
**GRADING AND
DRAINAGE PLAN**

INTERSTATE ROUTE H-1
PROJECT NO. I-H-1(91):13
SCALE: 1" = 50' DATE: Apr. 15, 1971
SHEET No. 8D OF 19 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(91):13	1972	52	228



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



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES
INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(91):13

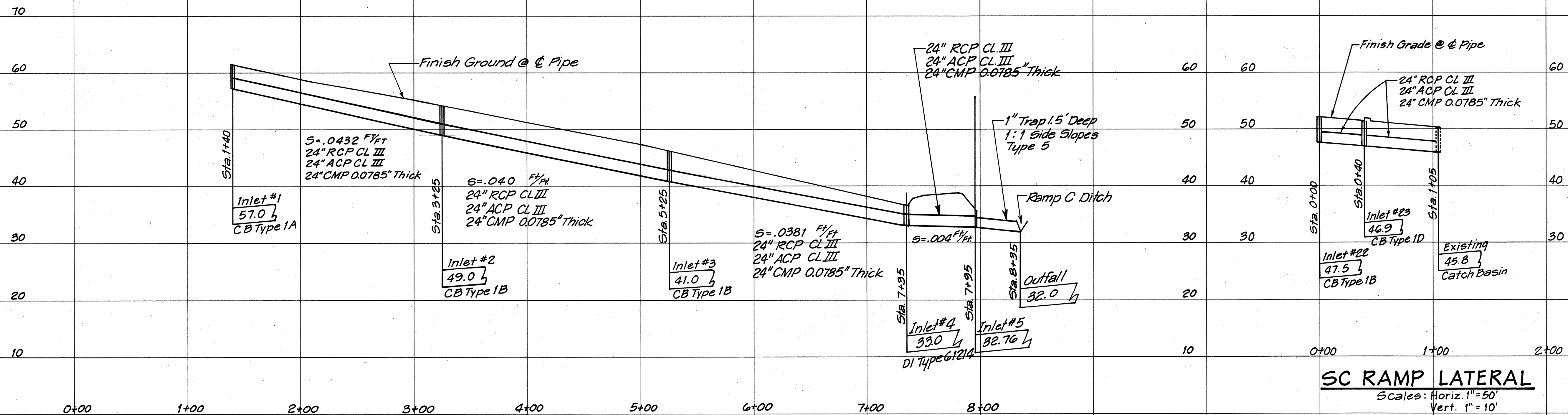
SCALE: Horiz. 1"=50'
Vert. 1"=10'

DATE: Apr. 15, 1971

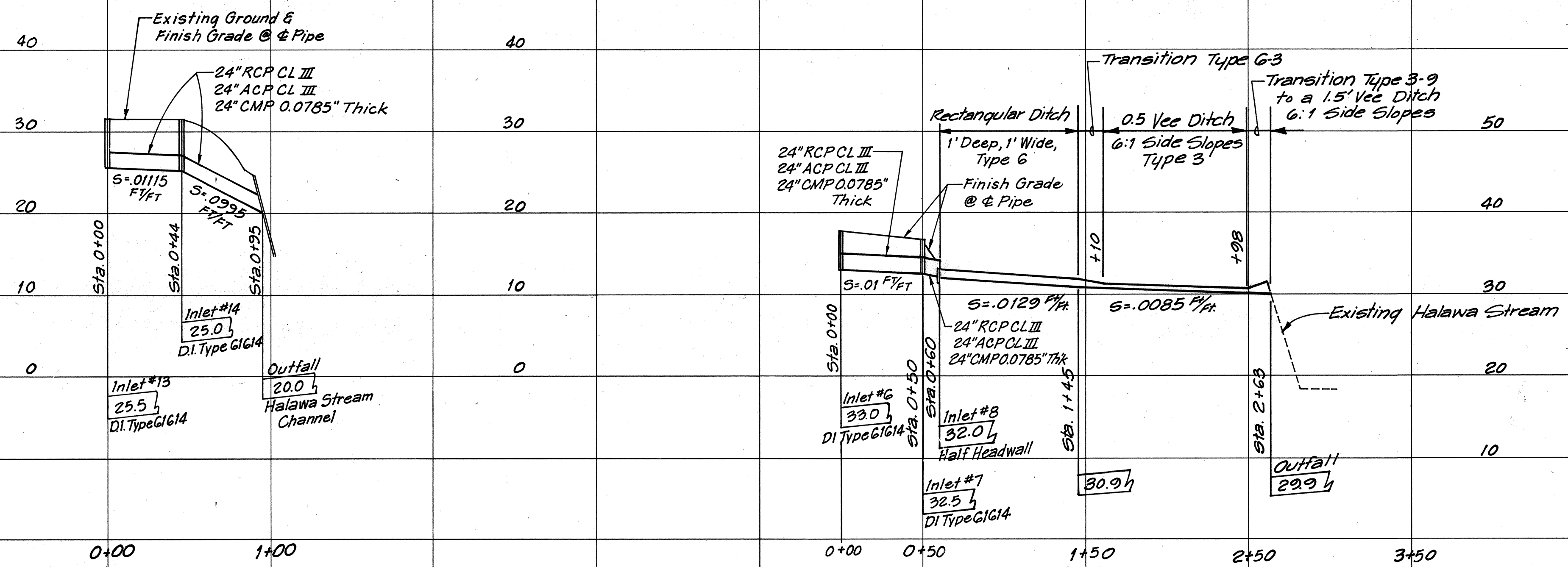
SHEET No. 9 D OF 19 SHEETS

52

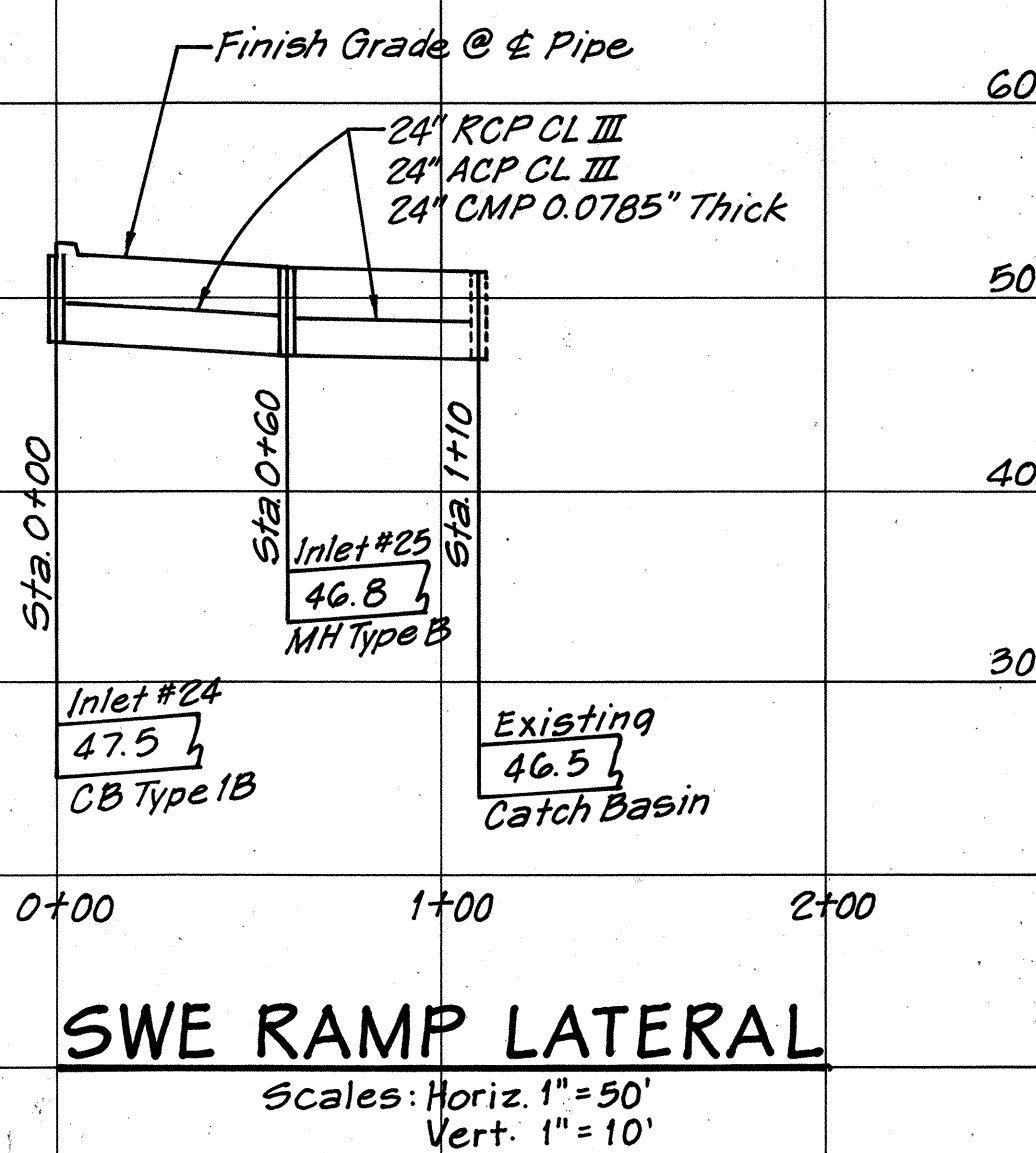
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(01)-13	1972	53	228



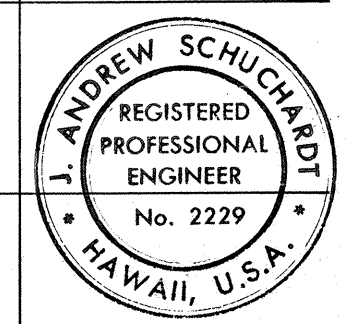
RAMP C LATERAL I
 Scales: Horiz. 1" = 50'
 Vert. 1" = 10'



ES RAMP DITCH IV
 Scales: Horiz. 1" = 50'
 Vert. 1" = 10'



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



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
J. Andrew Schuchardt

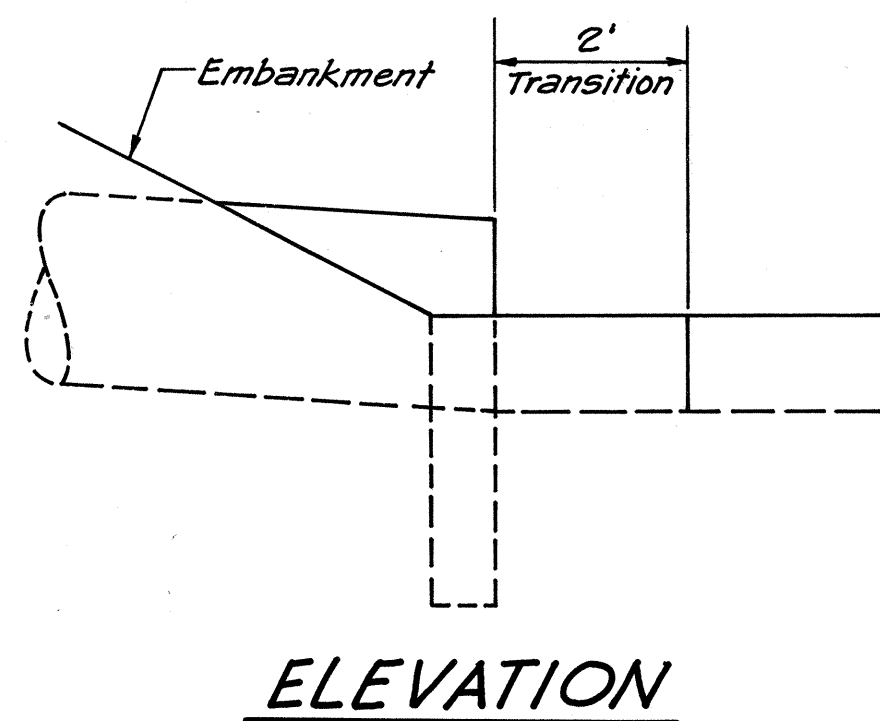
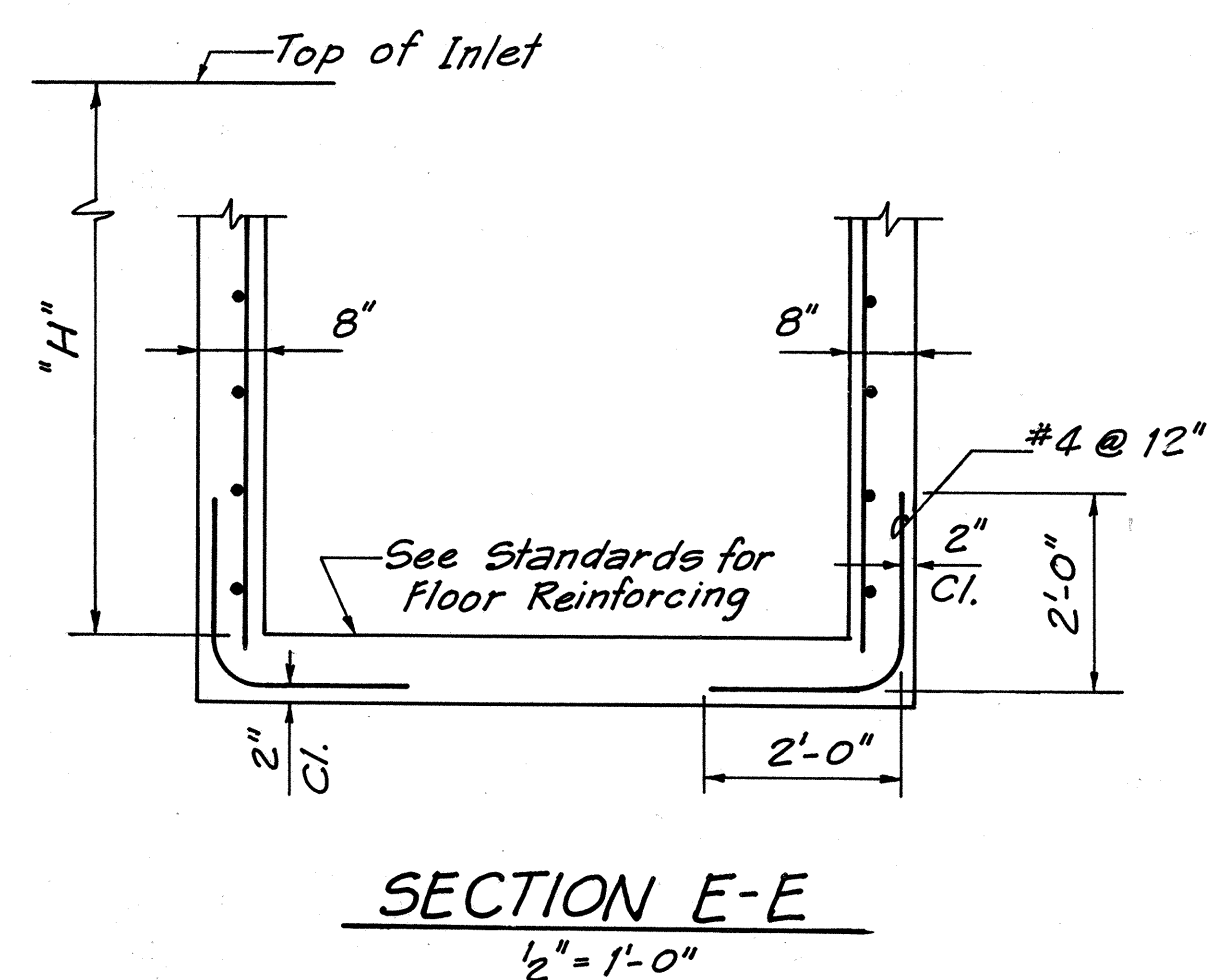
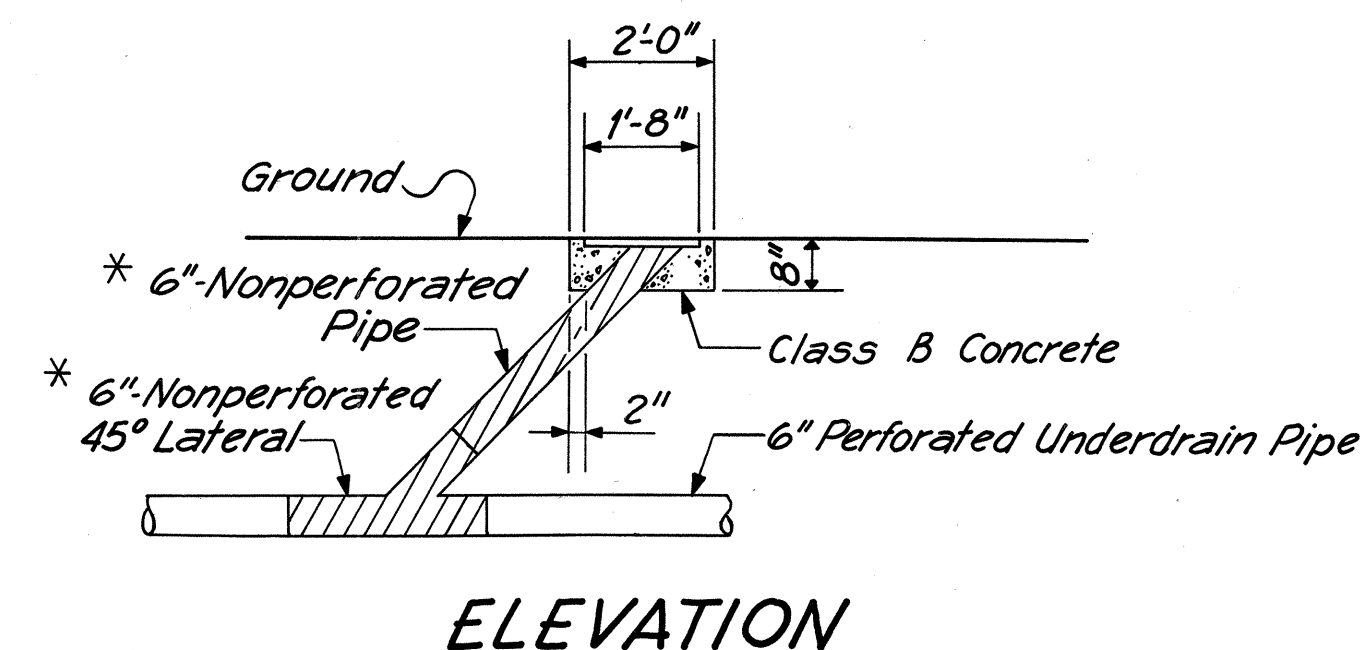
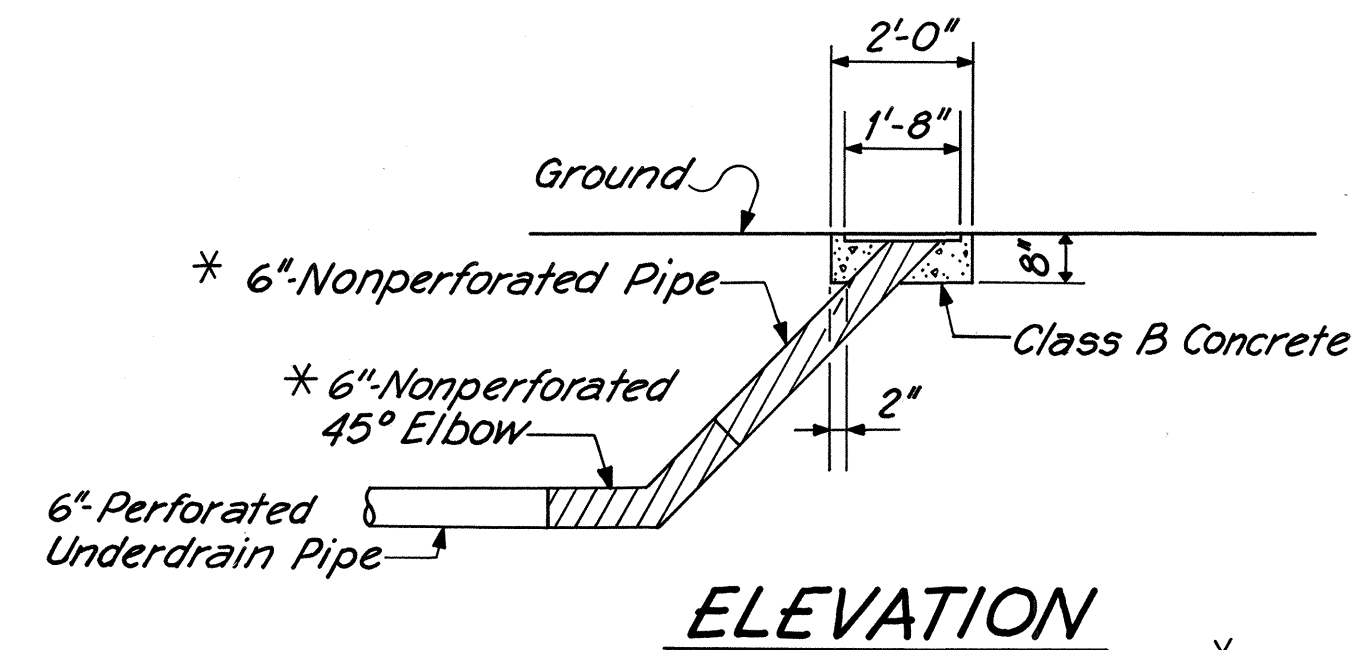
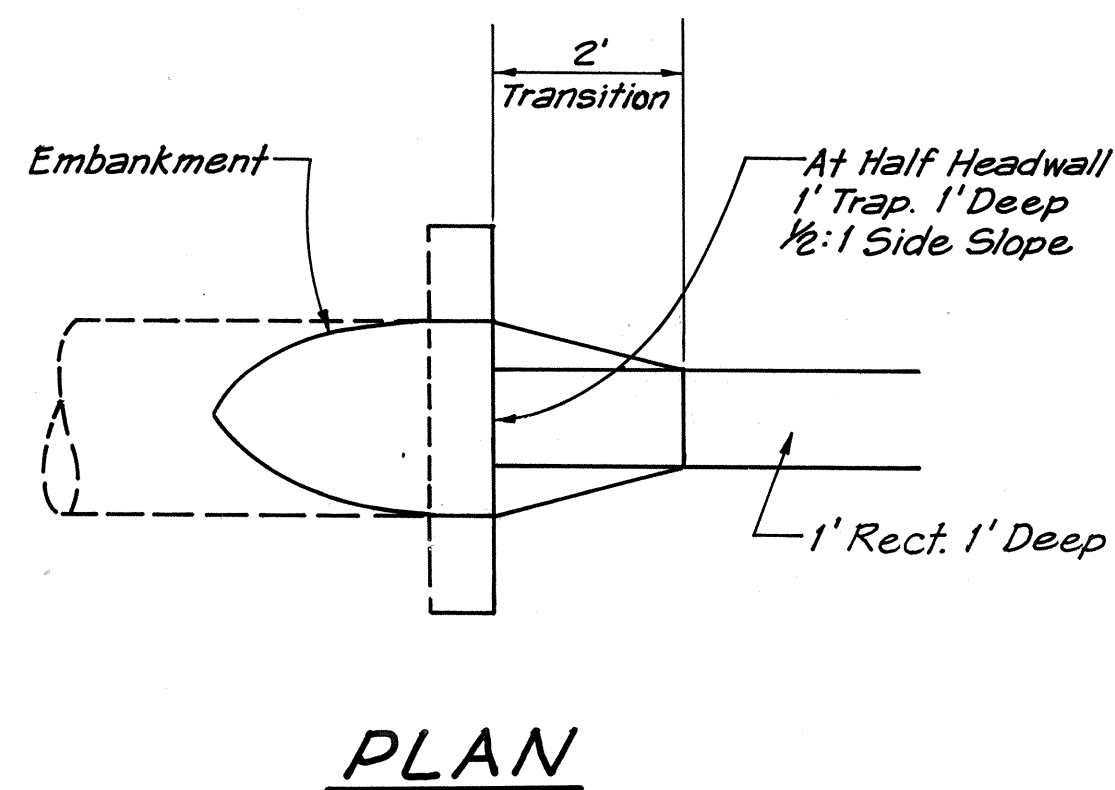
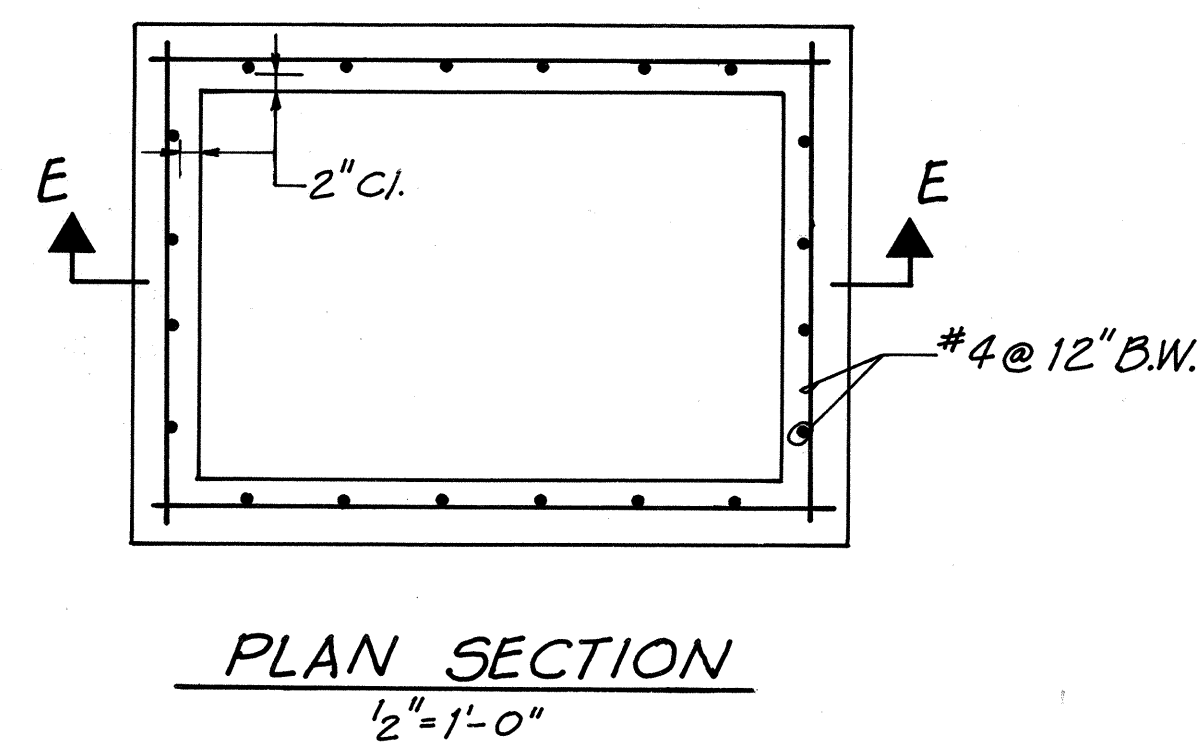
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

DRAINAGE PROFILES

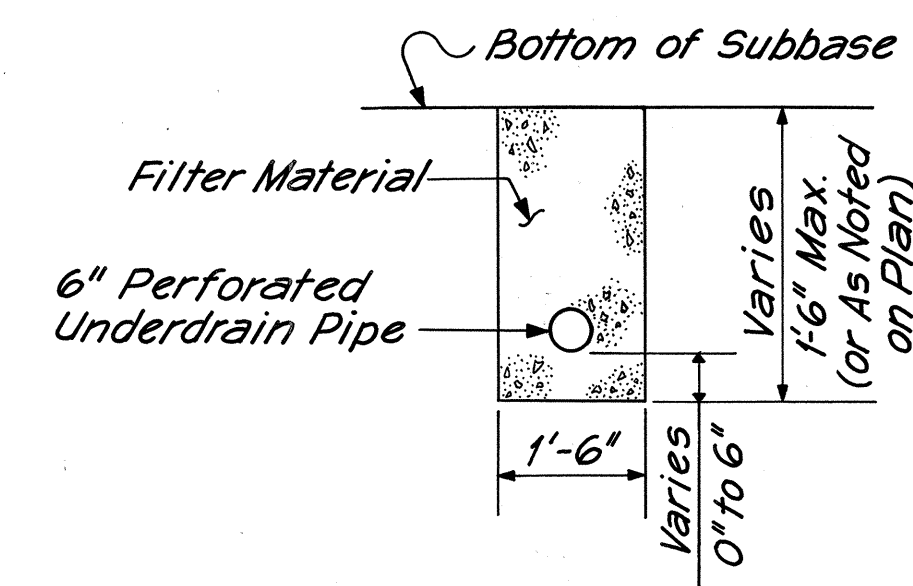
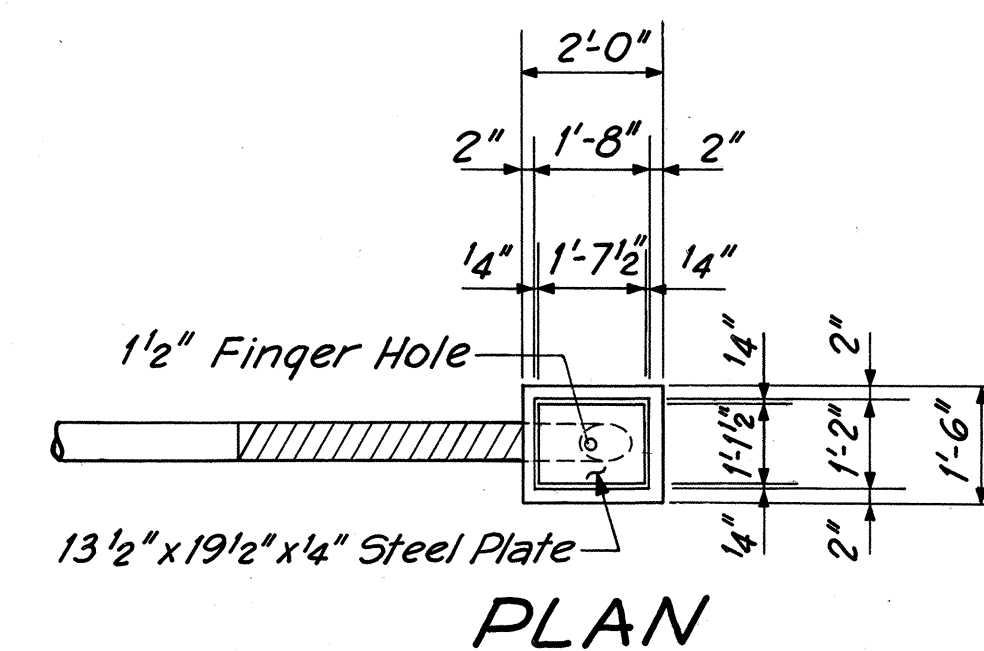
INTERSTATE ROUTE H-1
 PROJECT NO I-HI-1(01)-13

SCALE: AS SHOWN DATE: APR. 15, 1971
 SHEET No. 100 OF 19 SHEETS

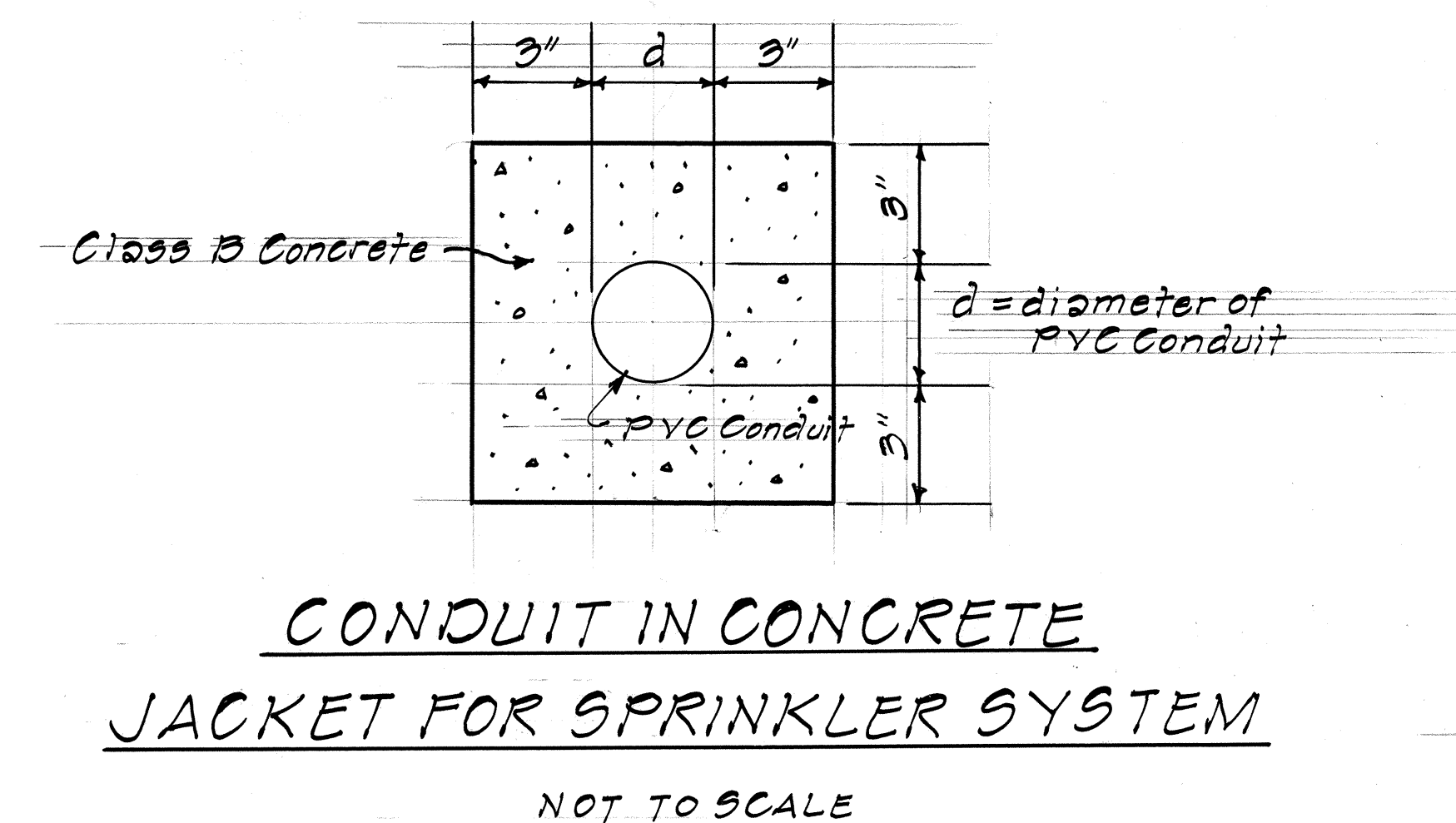
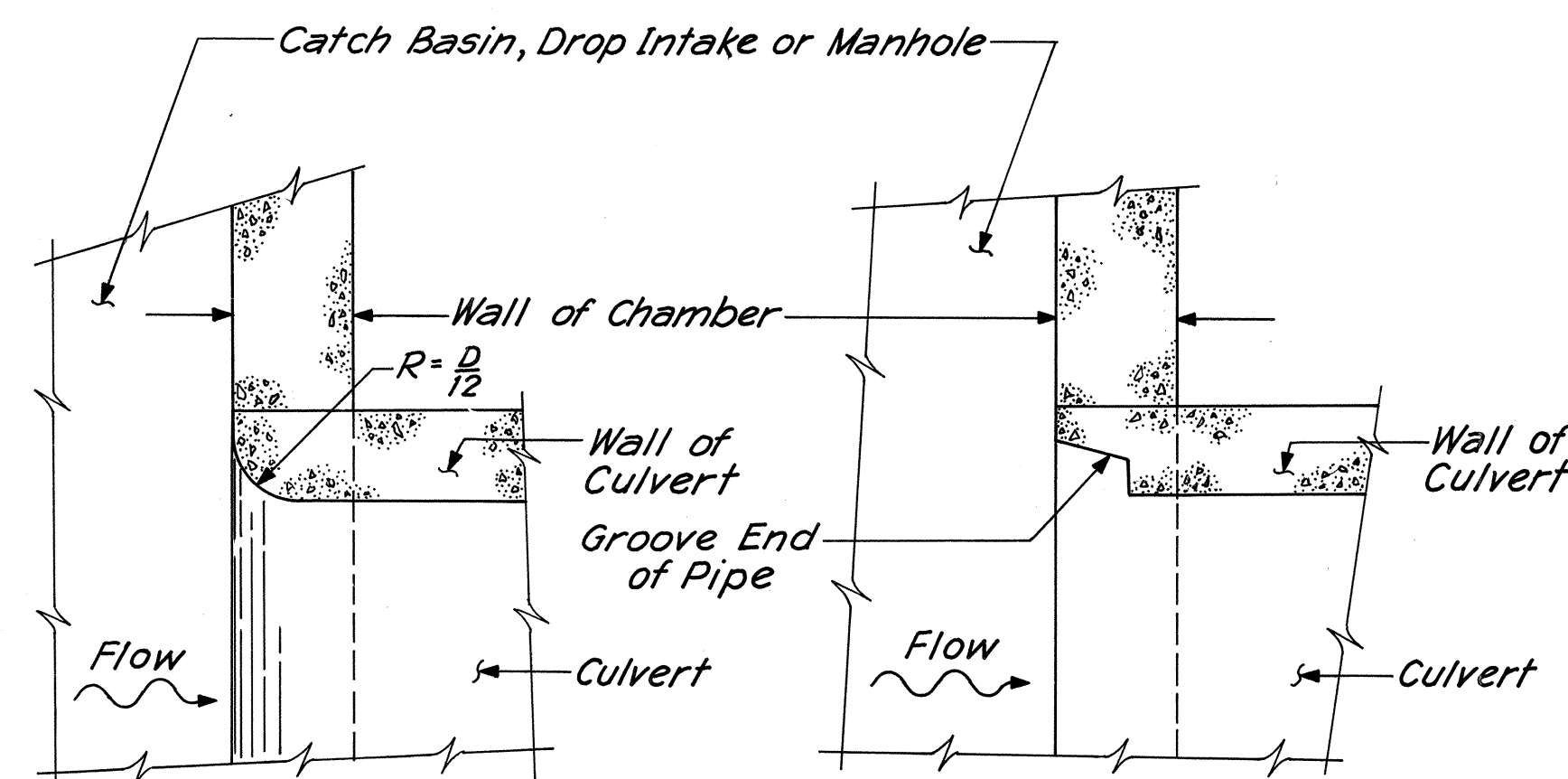
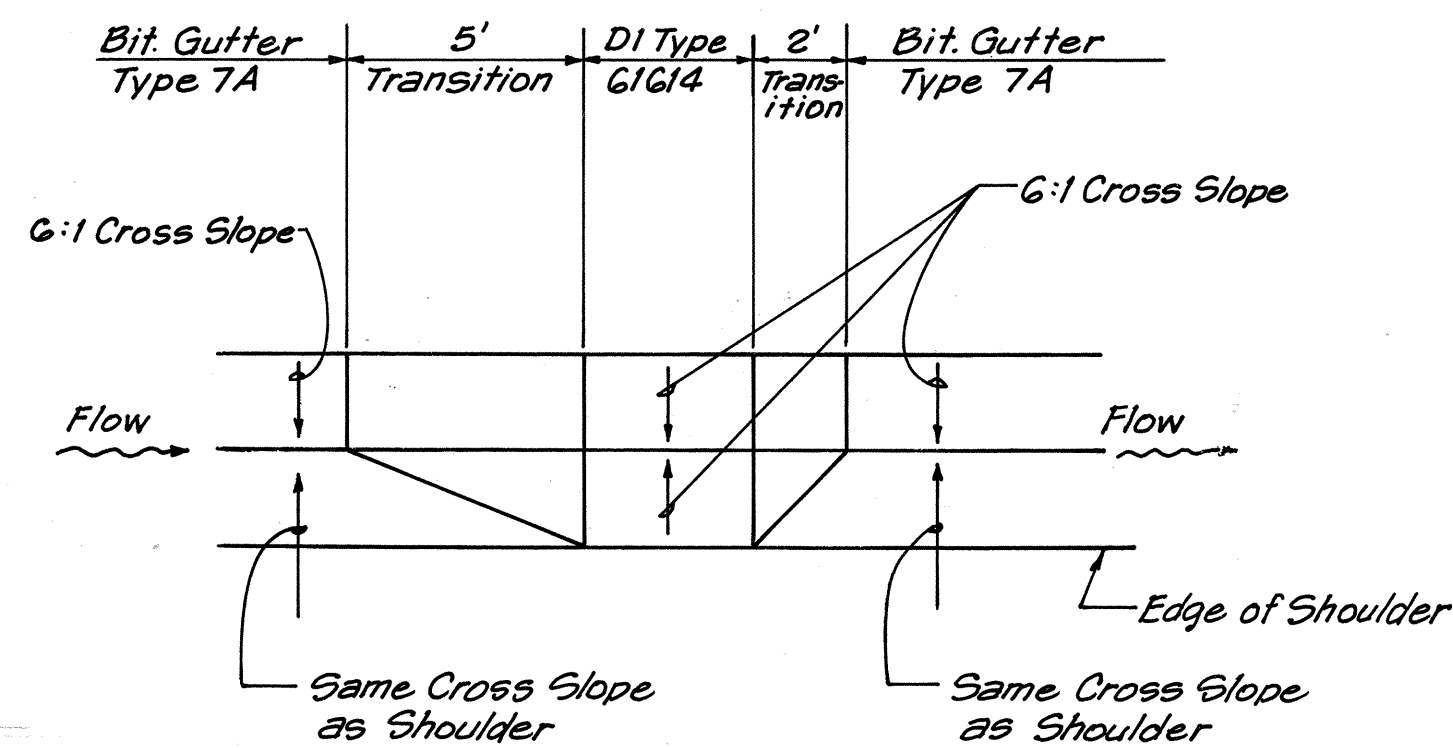
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-1(91):13	1972	54	228



**DETAIL OF DITCH TRANSITION
AT HALF HEADWALL**
Scale: 1" = 2'-0"



**TYPICAL WALL REINFORCING FOR CATCH BASINS
AND DROP INTAKES WHEN "H" EXCEEDS 6'-0"**



**TYPICAL DETAILS FOR CULVERTS EXITING
A CATCH BASIN, DROP INTAKE OR MANHOLE**
N.T.S.



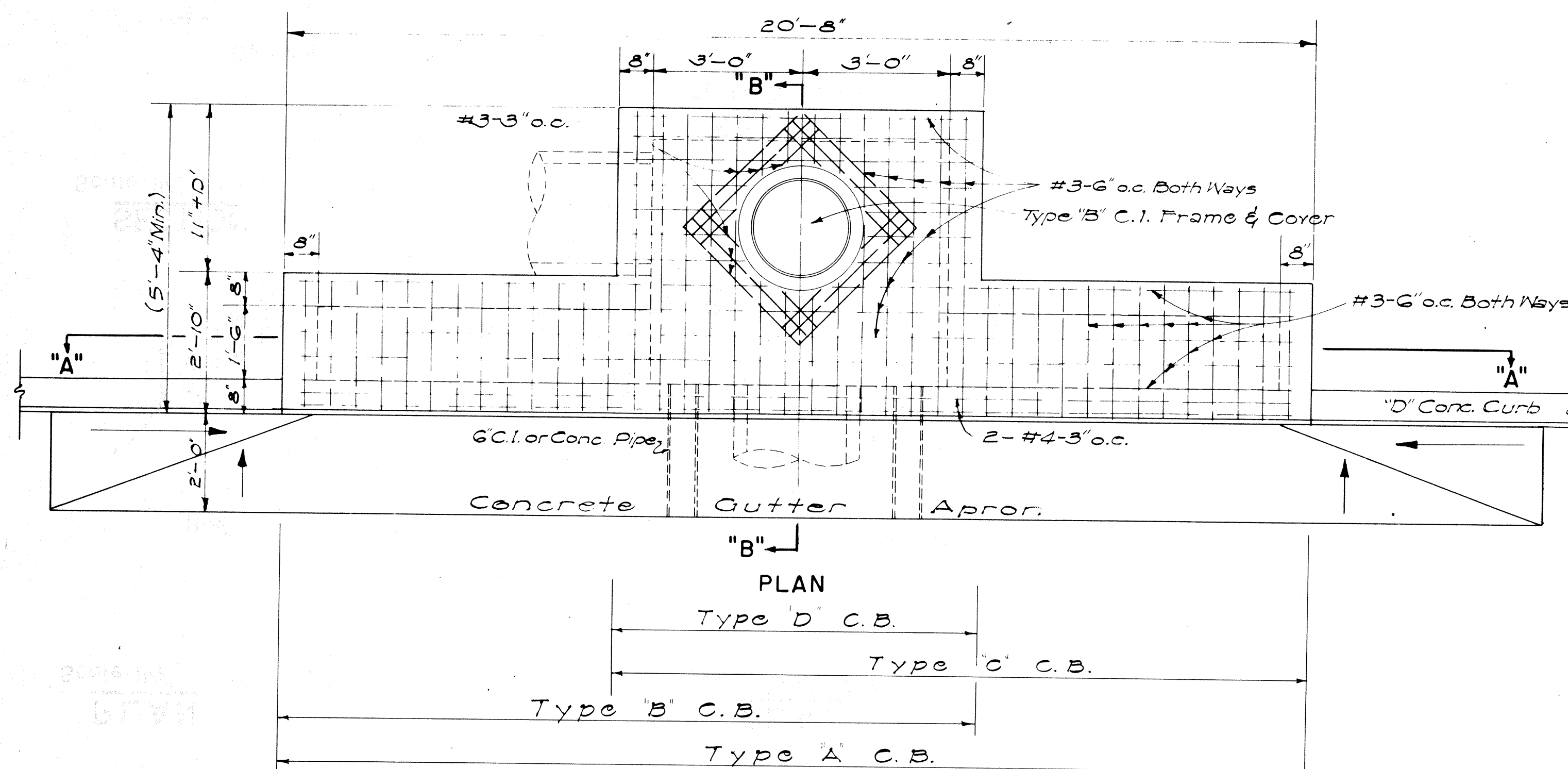
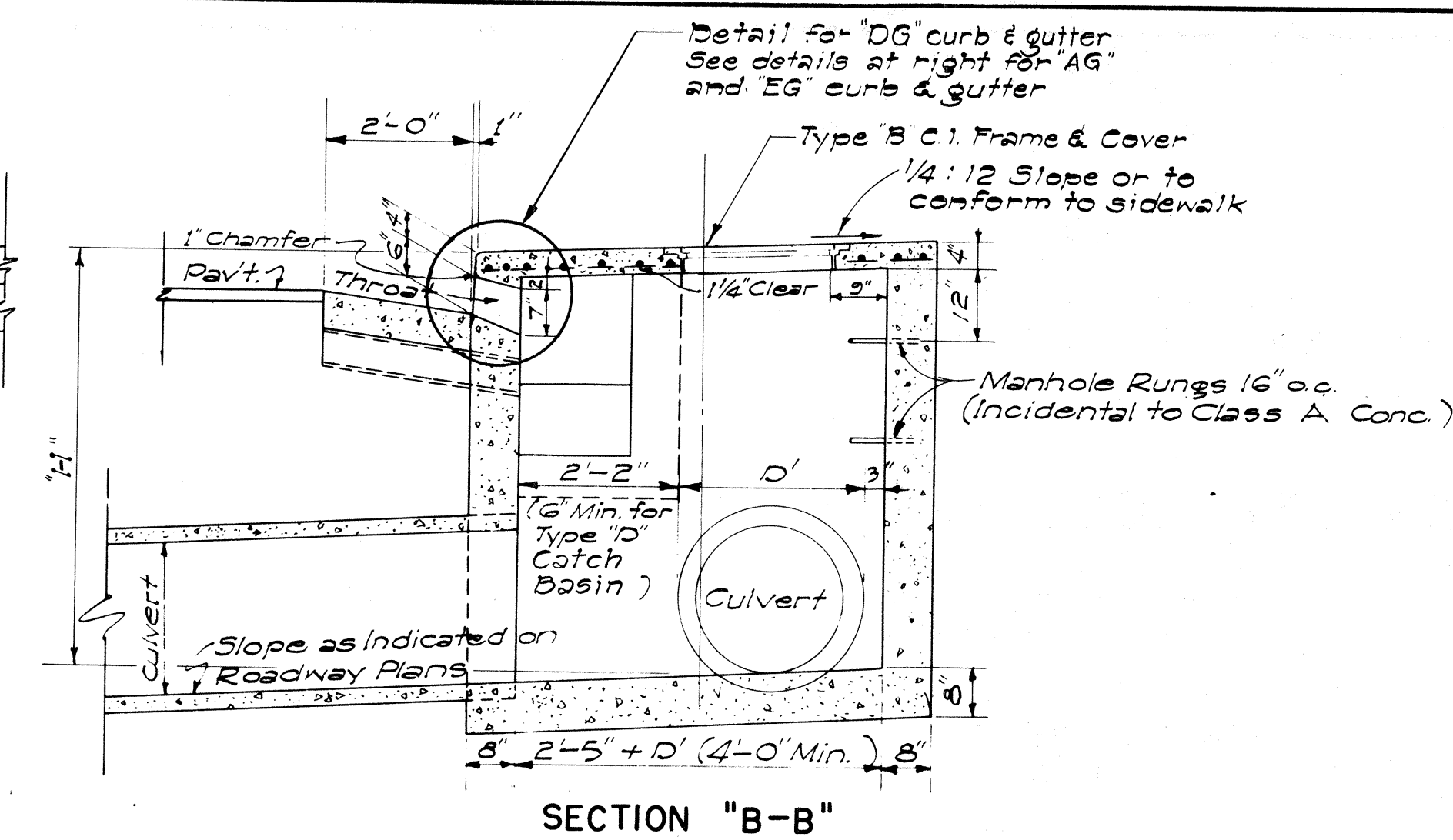
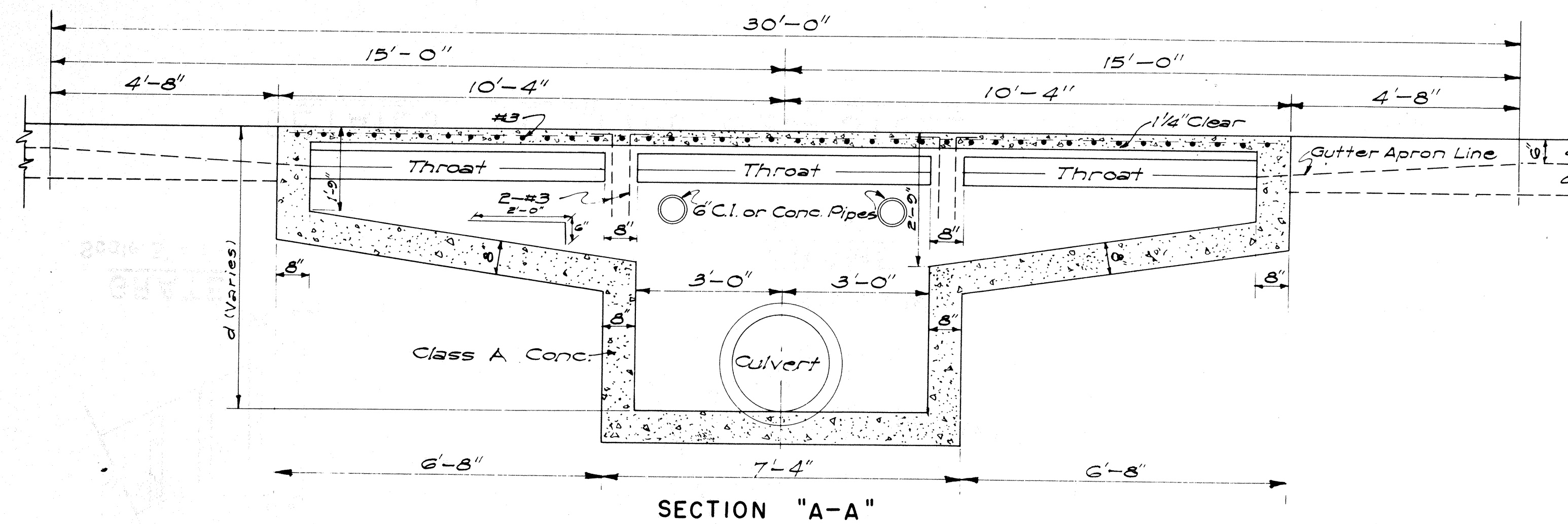
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

INTERSTATE ROUTE H-1
PROJ. NO. I-H-1(91):13

SCALE: AS SHOWN DATE: APR 15, 1971
SHEET No. 112 OF 19 SHEETS

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



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

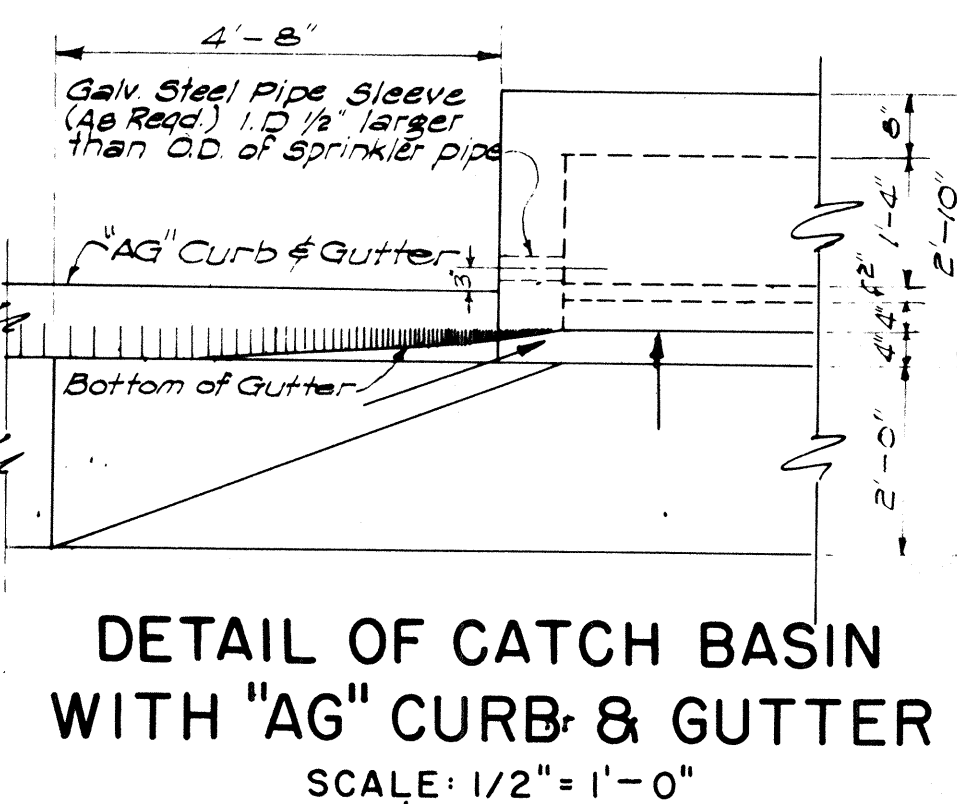
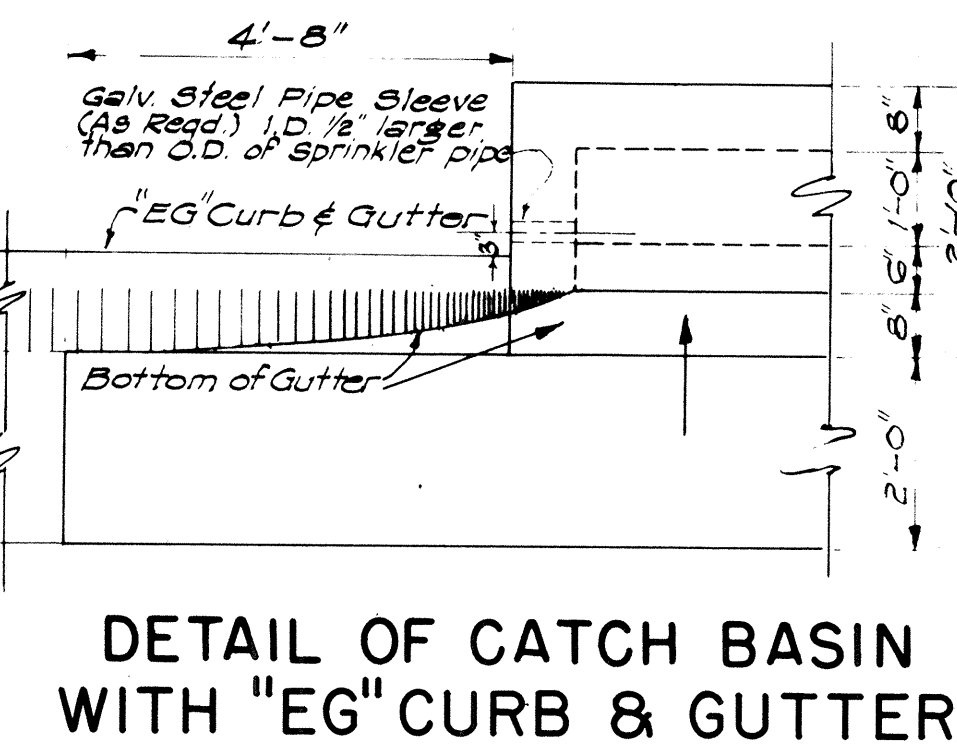
SCALE: 1/2" = 1'-0"

GENERAL NOTES

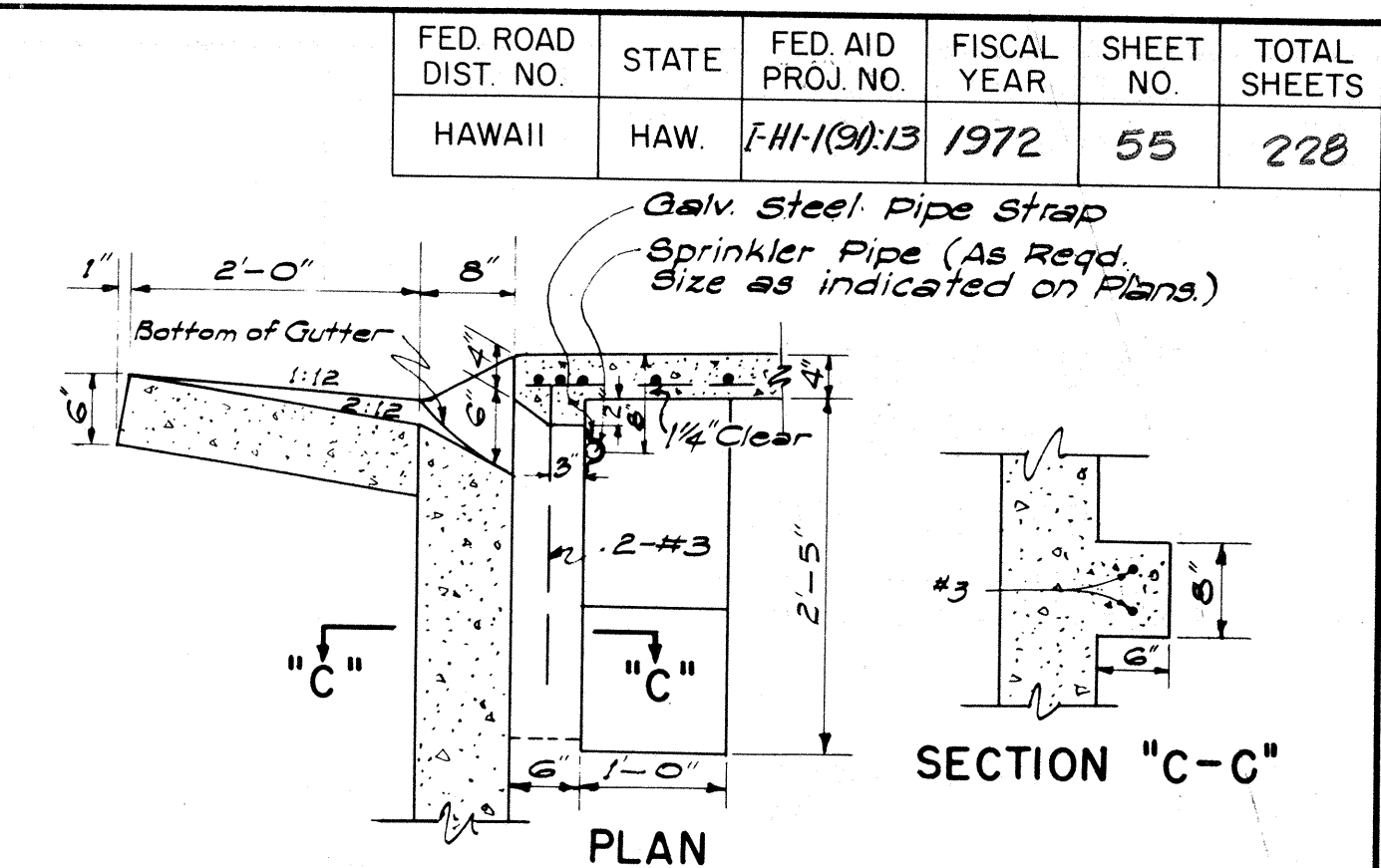
- Quantities based on $d = 5.75'$ and $D = 30"$.
- Quantities do not include concrete for gutter apron.
- The Contractor shall install two 6" Cast Iron or Concrete Pipes as incidental to Class A Concrete for Construction Drainage. The Engineer shall determine the exact location in the field.
- Culvert 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

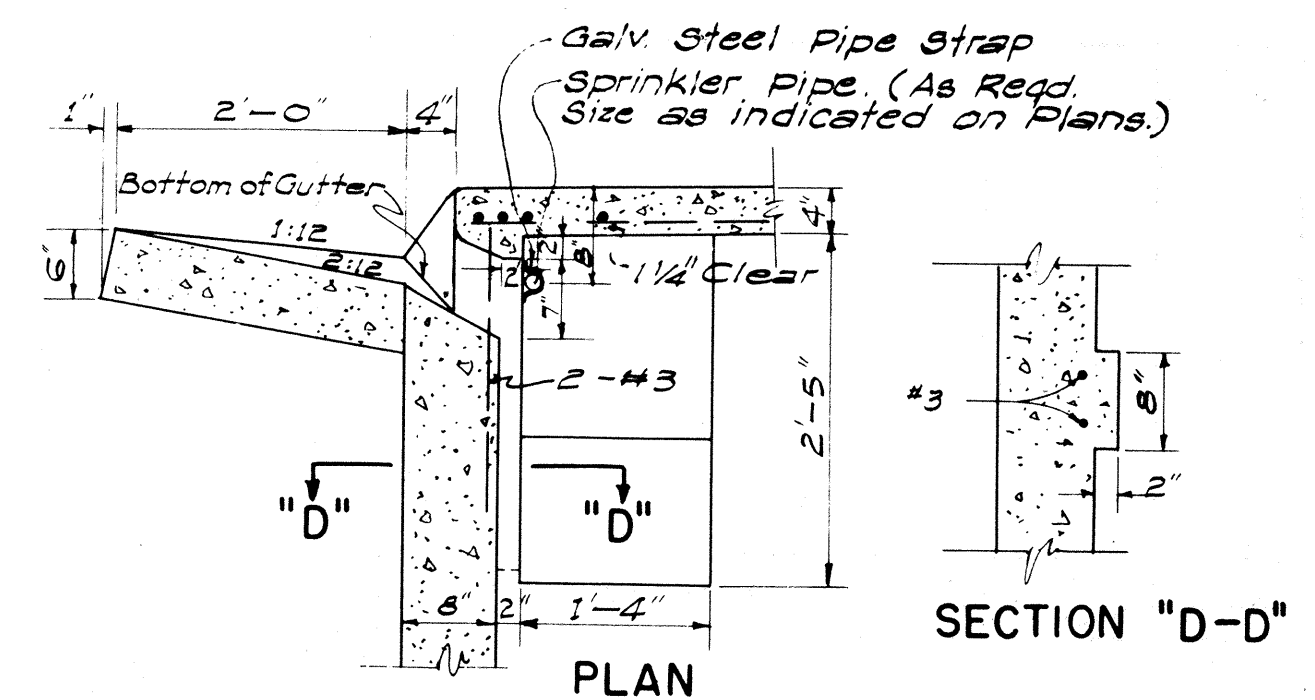
Type	Class A Conc.	Struct. Exc.	Reinf. Steel	Gutter Length
"A"	7.5 c.y.	24.7 c.y.	145 lb.	30'-0"
"B"	6.0 c.y.	21.5 c.y.	108 lb.	23'-4"
"C"	6.0 c.y.	21.5 c.y.	108 lb.	23'-4"
"D"	4.0 c.y.	16.5 c.y.	77 lb.	16'-8"



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



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



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

APPROVAL RECOMMENDED:

HYDRAULIC DESIGN ENGINEER

12-17-69
DATE

APPROVED:

ASSISTANT CHIEF, ENGINEERING

12-17-69
DATE

NO.	REVISION	APPROVED BY	DATE

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

Scale: As Noted

Date: July, 1969

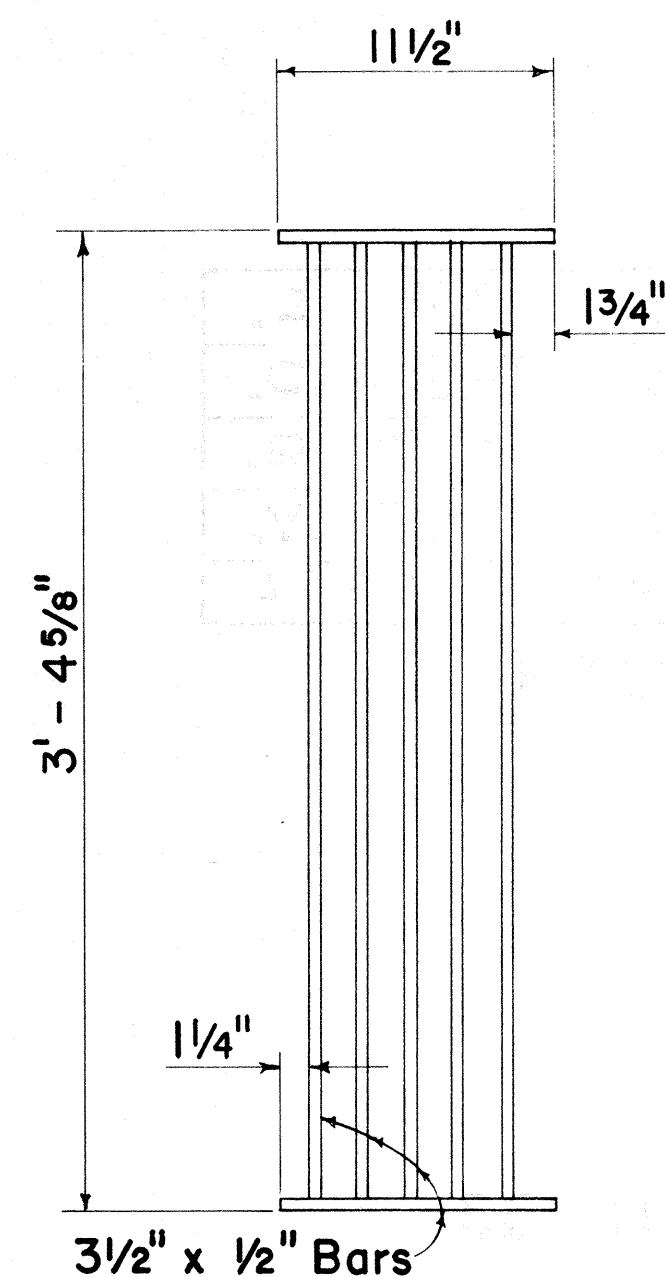
SHEET No. 12D OF 19 SHEETS DH 1

55

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H-1(90)13	1972	56	228

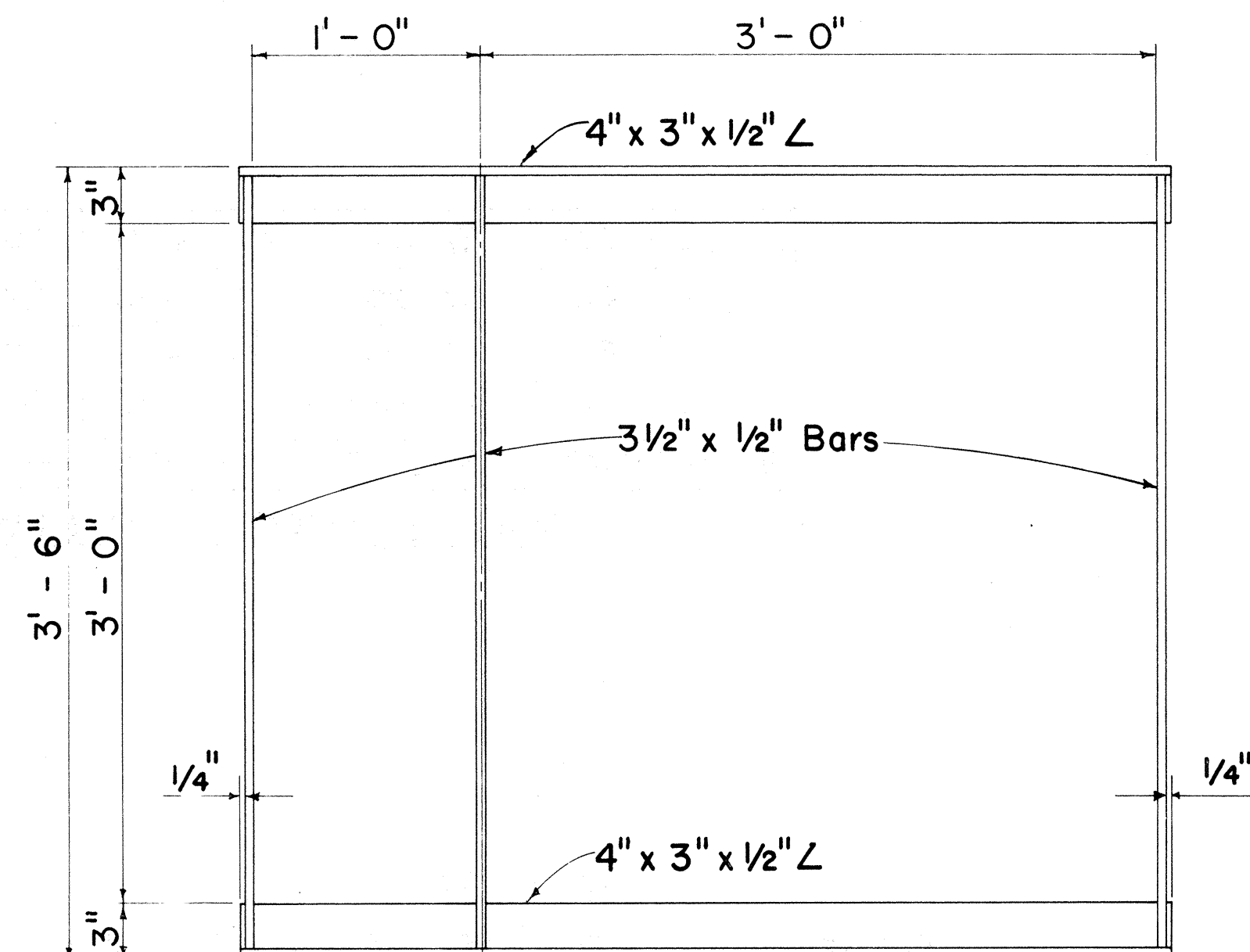
GENERAL NOTES

1. Grates and Frames shall be hot dip galvanized after fabrication, see specifications.
2. All welds $\frac{3}{8}$ " unless otherwise noted.
3. The Frame & Grate materials shall conform to the specifications of ASTM Designation Structural Steel A283, Grade D and the Standard Specifications.
4. 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.
5. 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. The Manhole Rungs may be placed at any location as ordered by the Engineer.



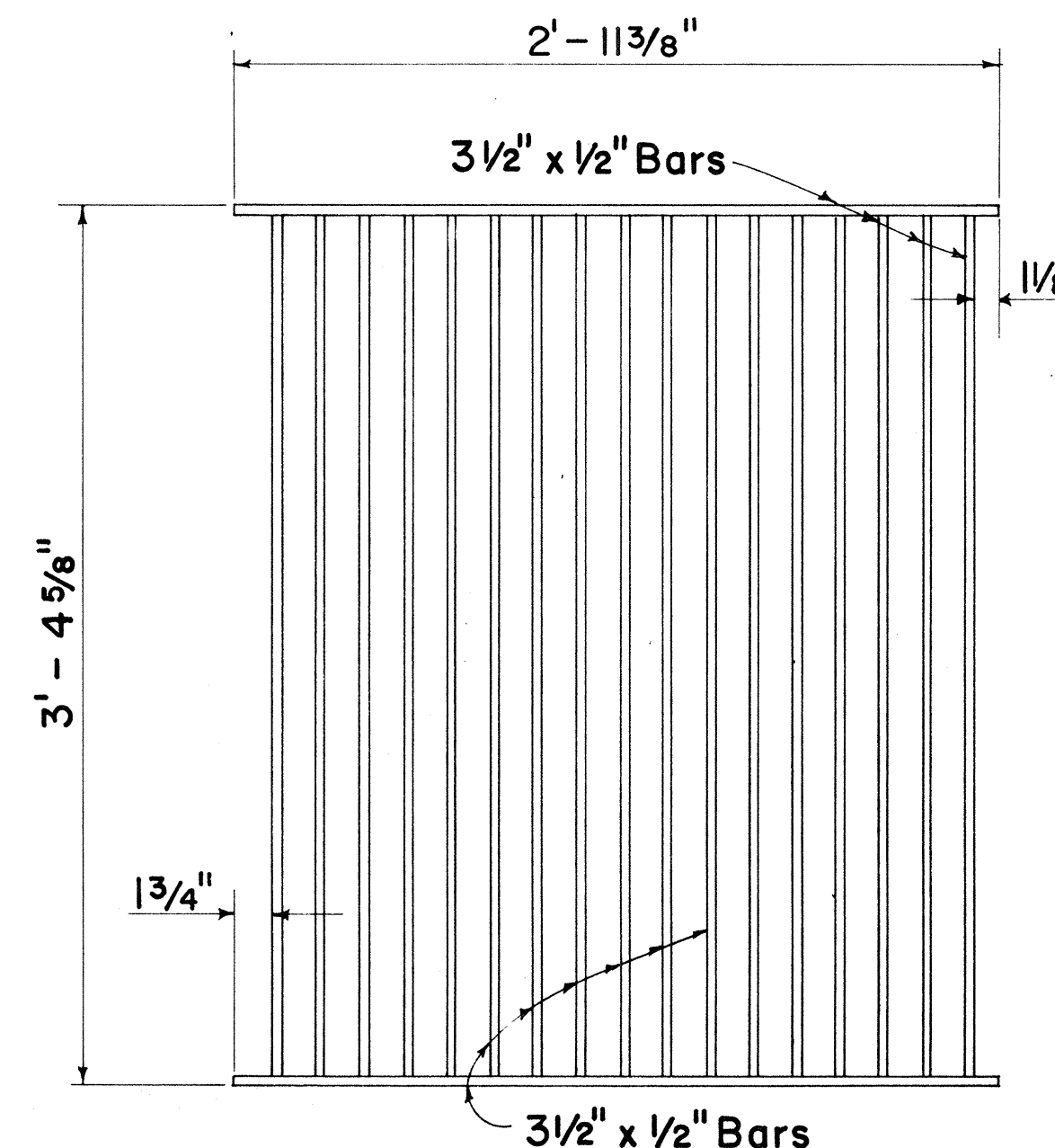
PLAN

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



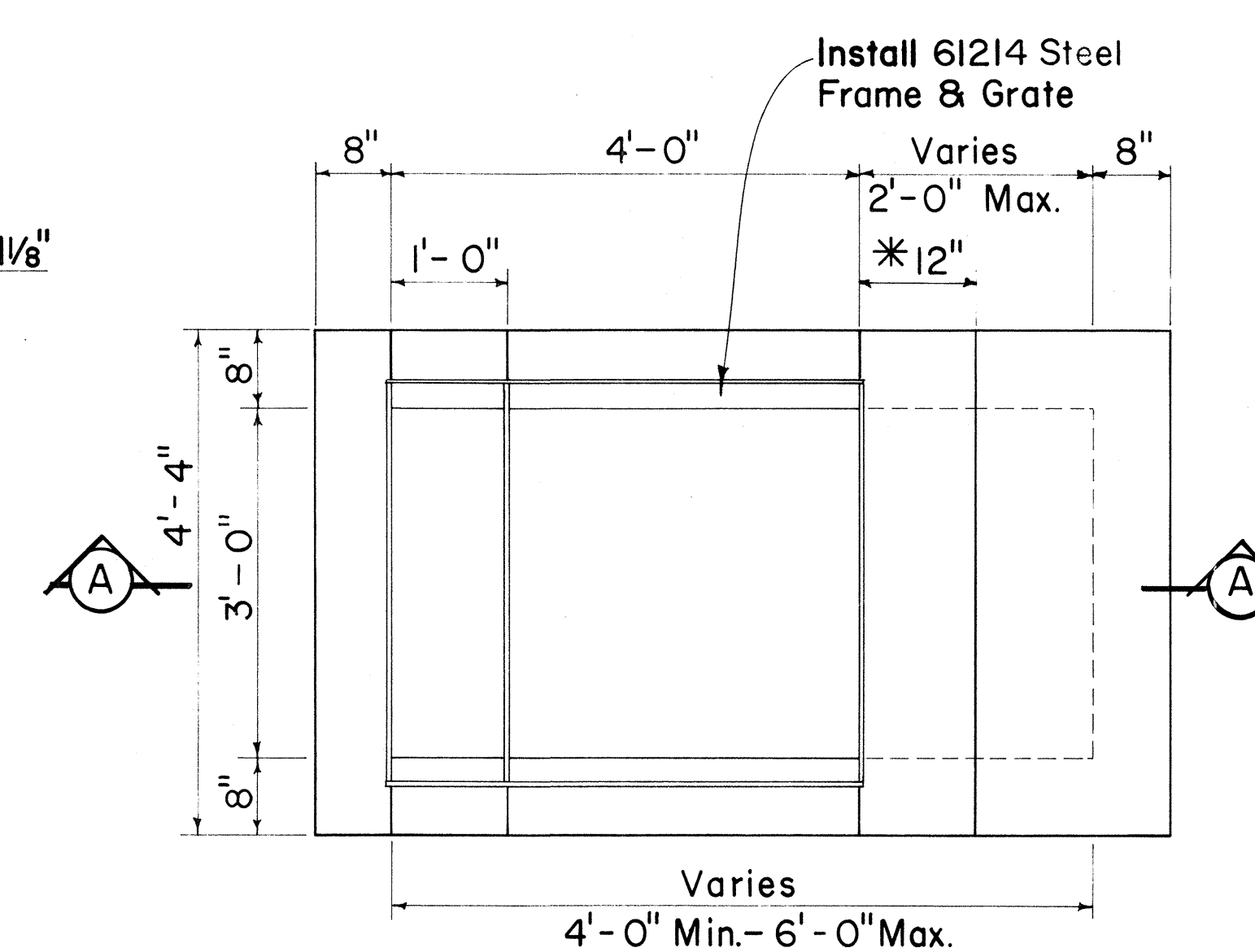
PLAN

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

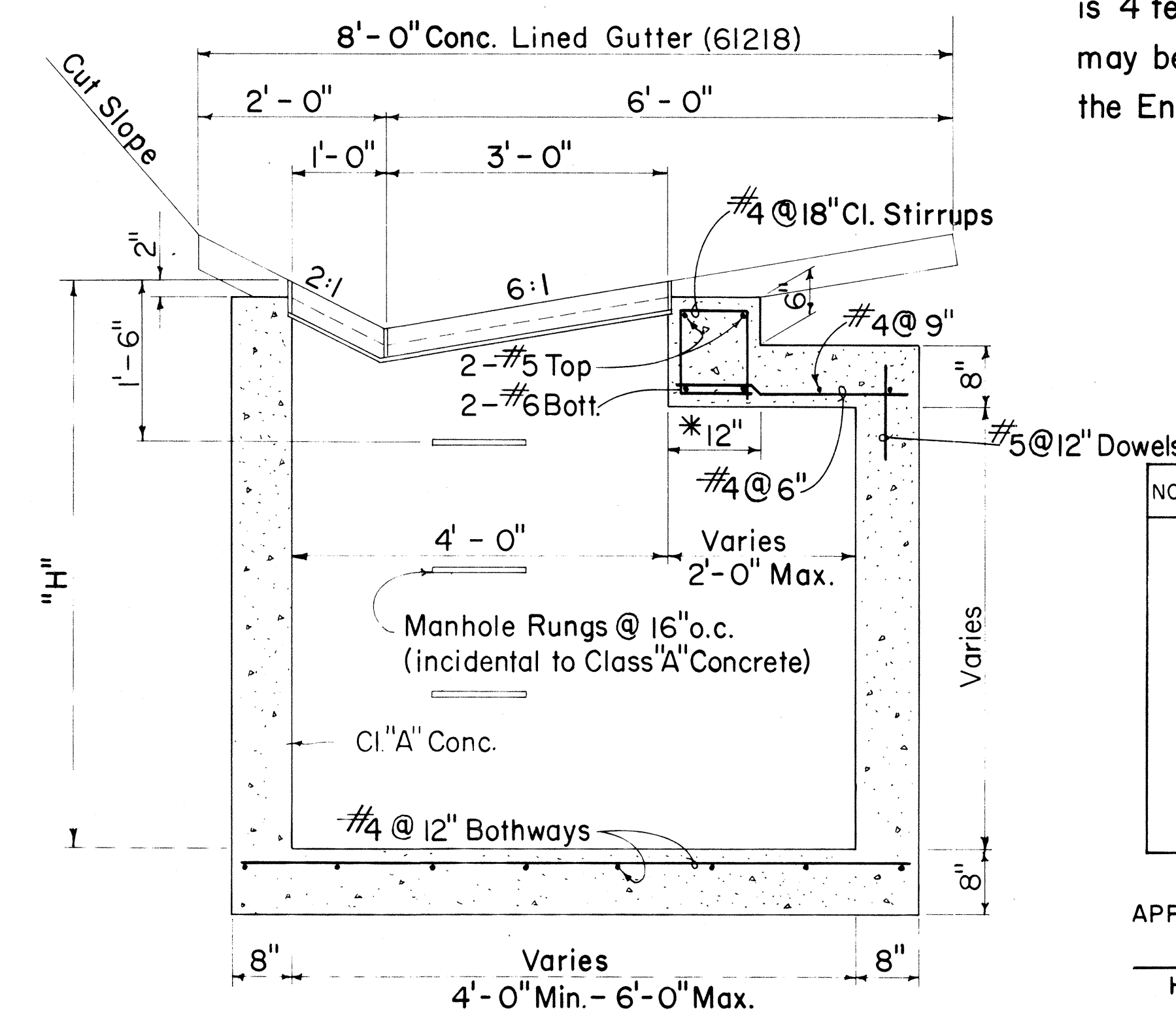


PLAN

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



PLAN

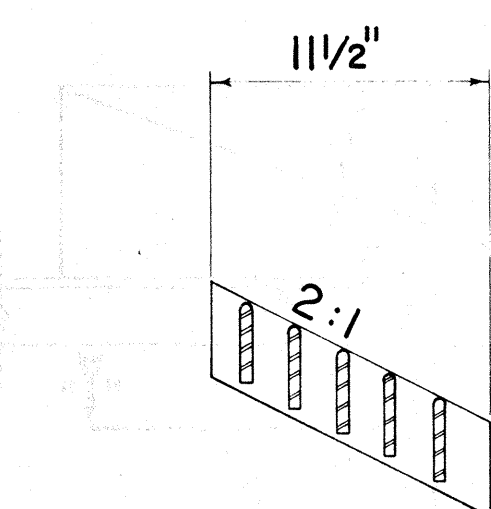


SECTION A - A

DETAIL OF 61214 DROP INTAKE

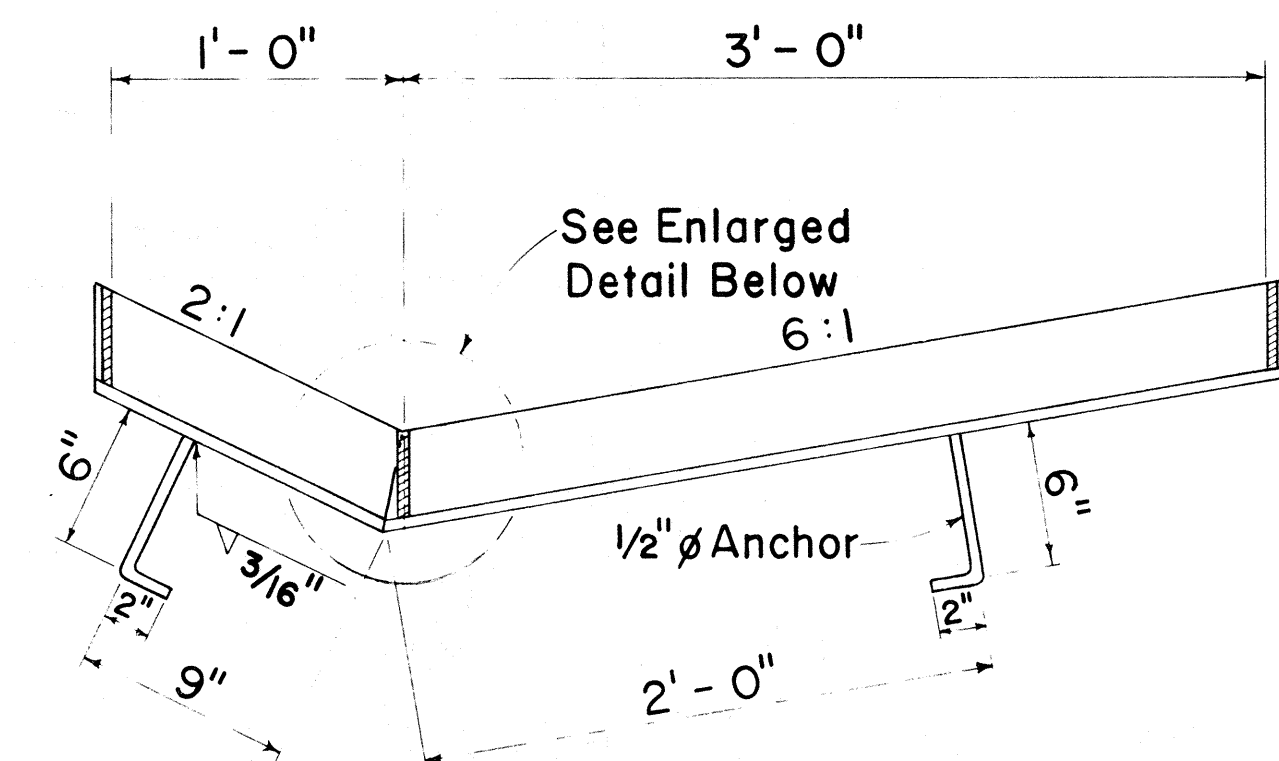
Scale: 3/4" = 1' - 0"

*For Minimum size box of 4'-0" only, use 8" and eliminate reinforcing steel shown in top portion.



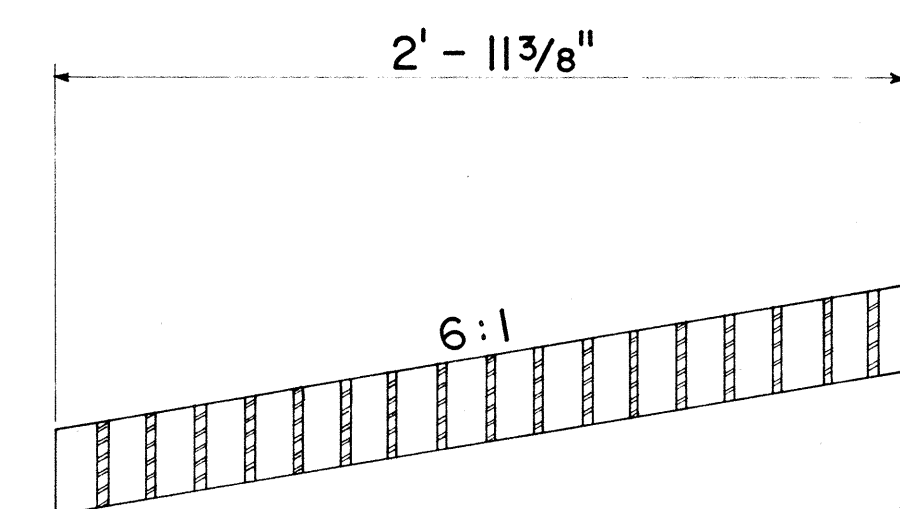
SECTION

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



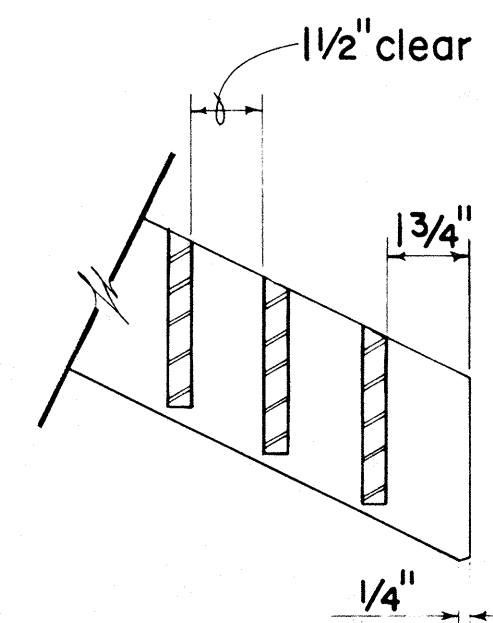
SECTION

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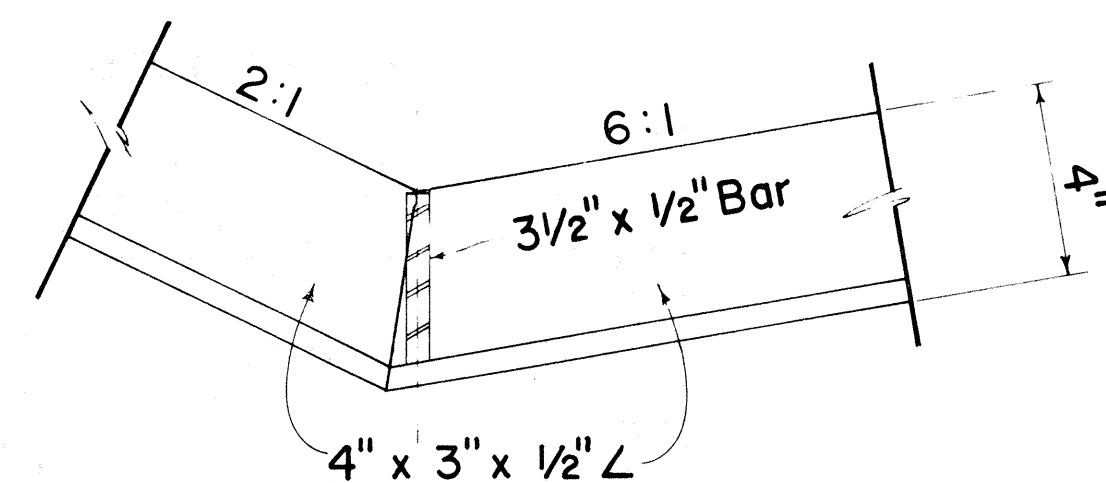
SECTION

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



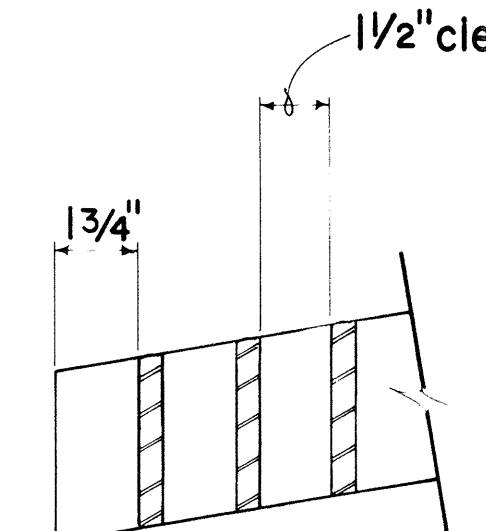
GRATE

Scale: 3" = 1' - 0"



FRAME

Scale: 3" = 1' - 0"



GRATE

Scale: 3" = 1' - 0"

DETAILS OF TYPE 61214 STEEL FRAME AND GRATES

NO.	REVISION	APPROVED BY	DATE

APPROVAL RECOMMENDED:

HYDRAULIC DESIGN ENGINEER

12-17-69
DATE

APPROVED:

ASSISTANT CHIEF, ENGINEERING

12-17-69
DATE

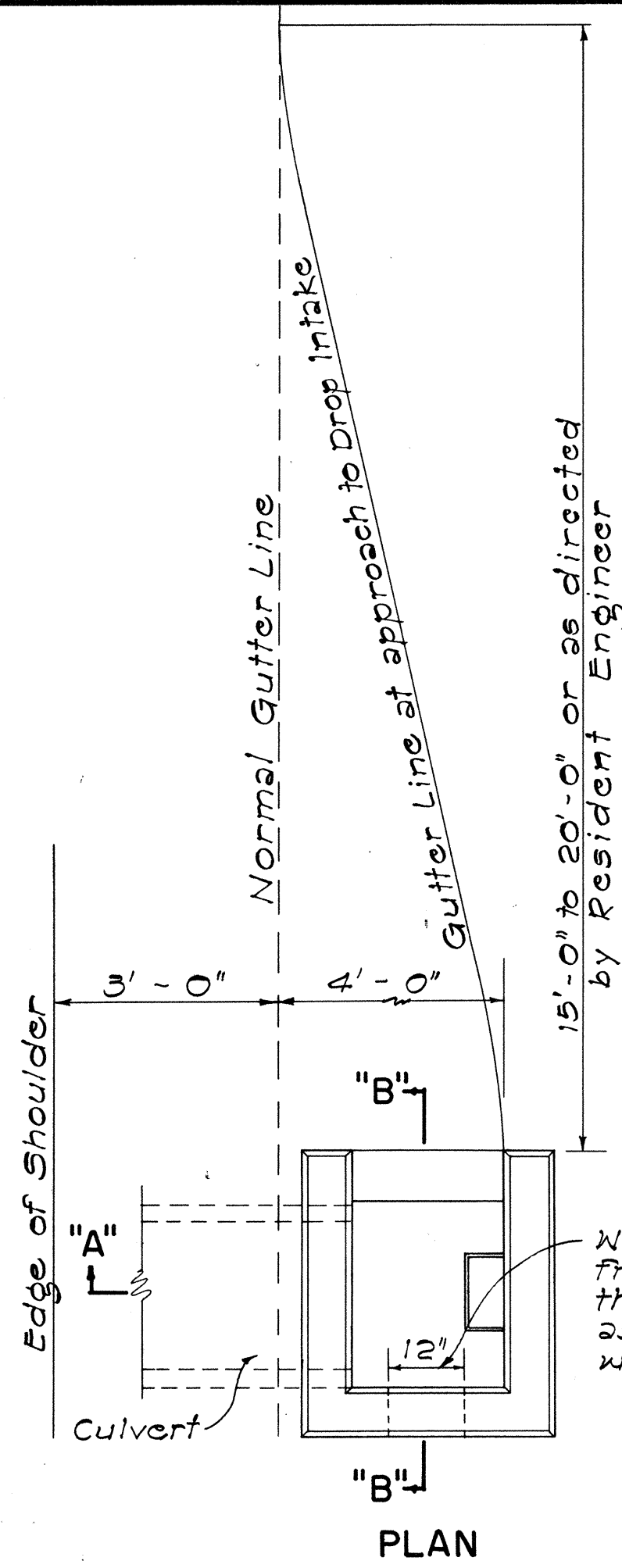
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
TYPE 61214
GRATED DROP INTAKE

Scales: As Noted

Date: July 1969

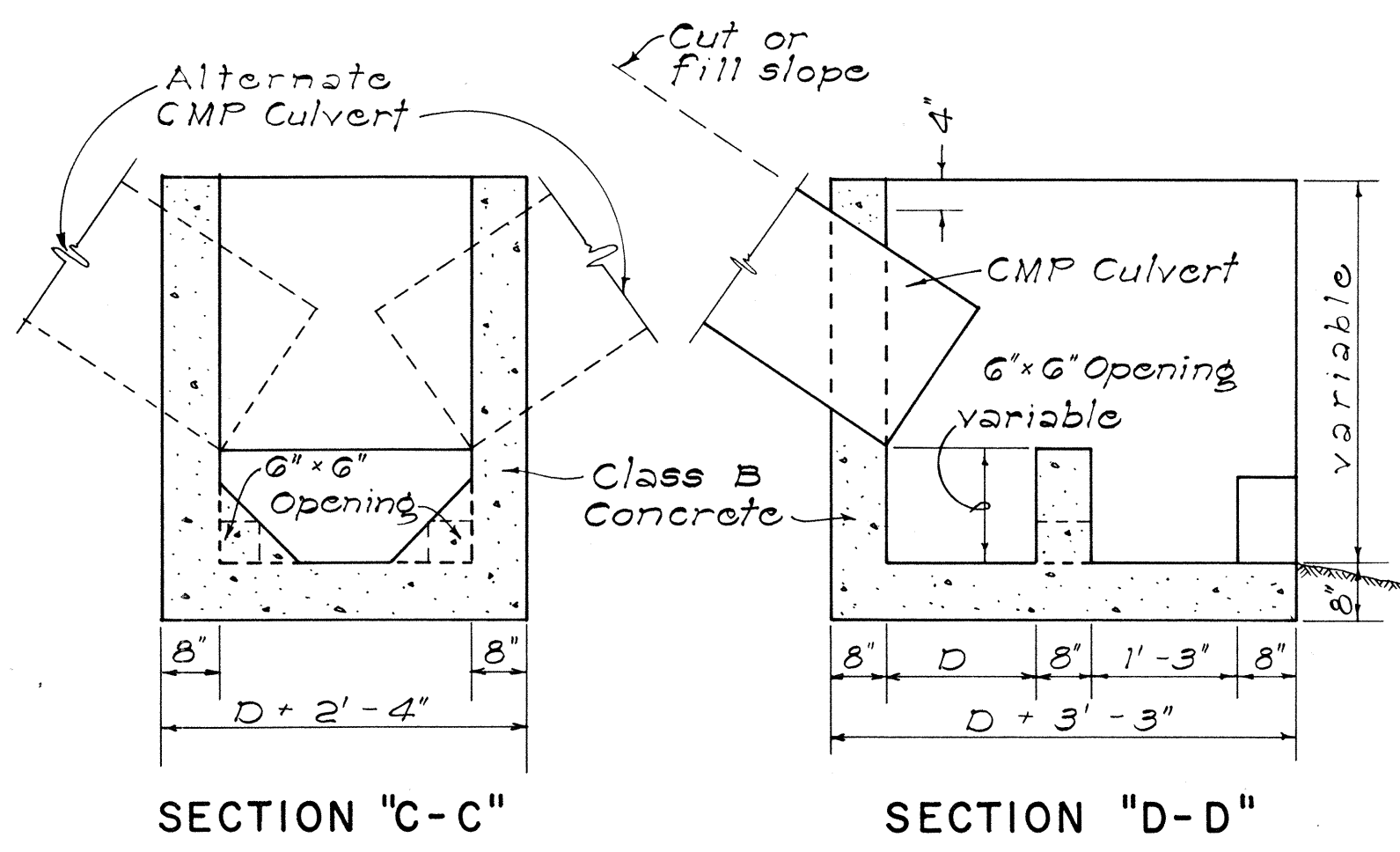
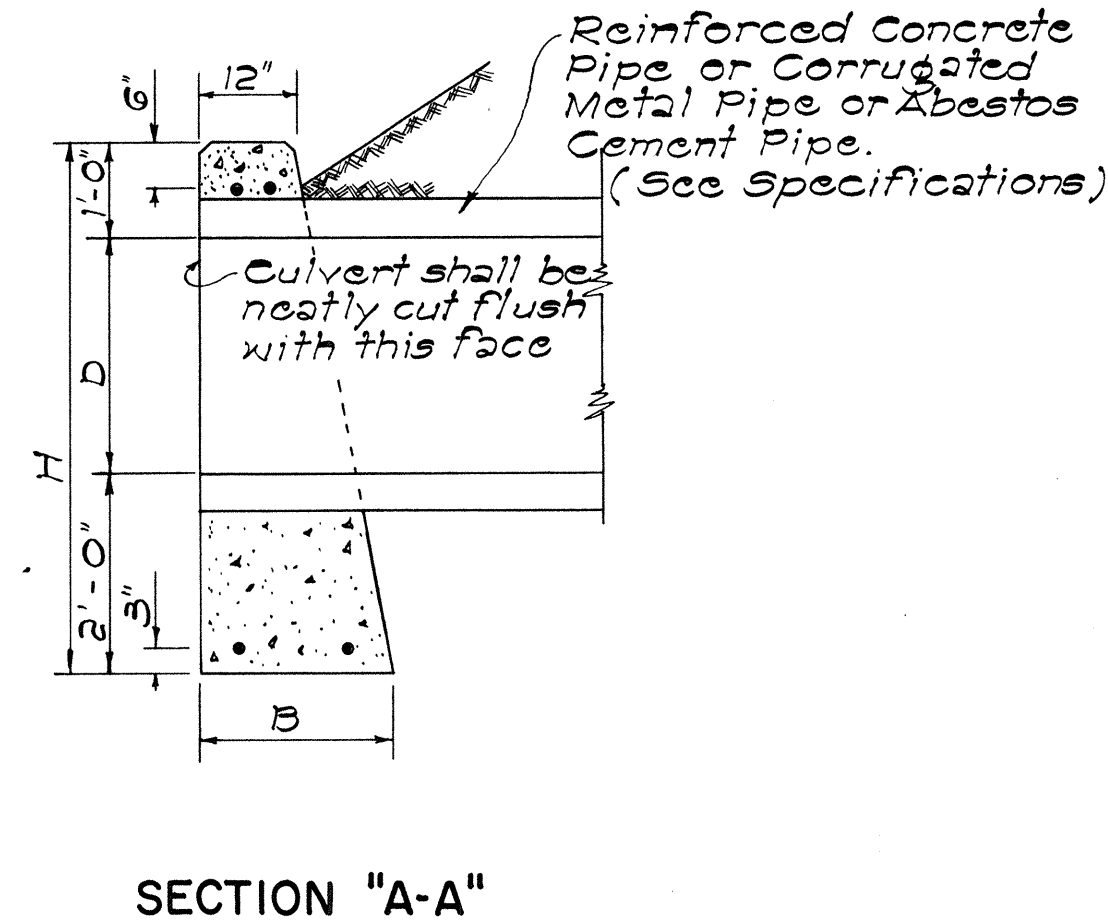
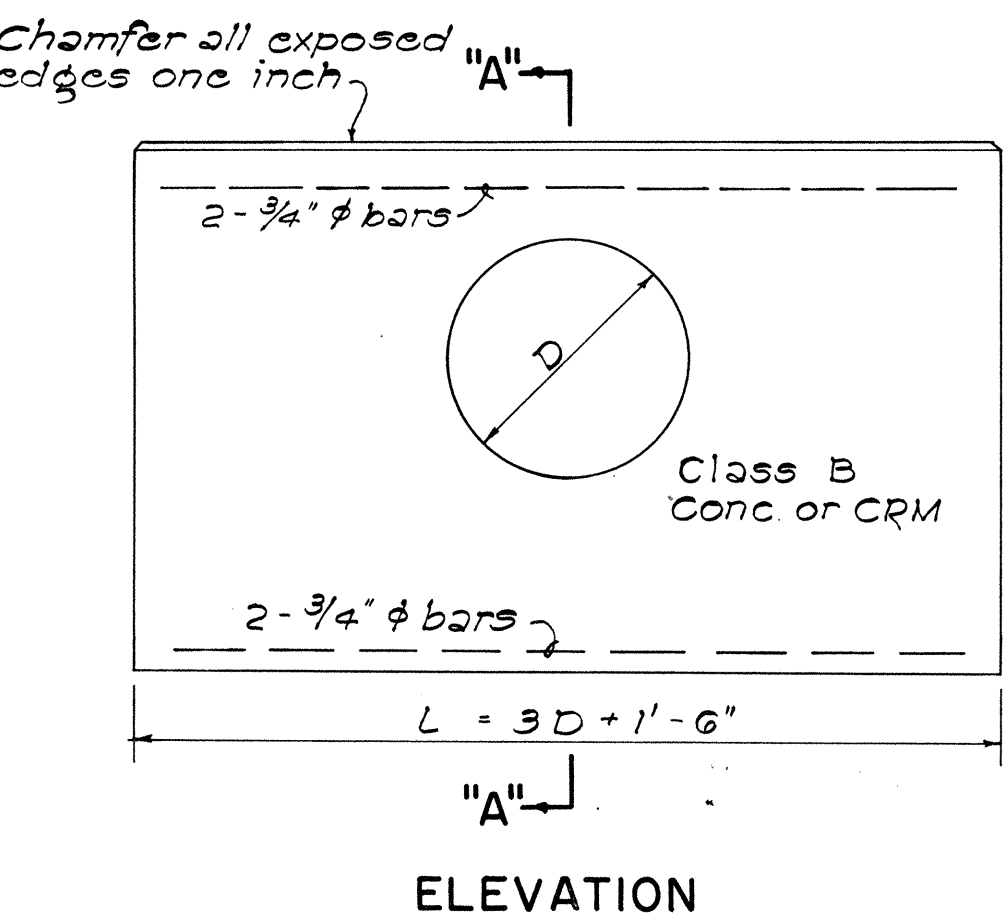
SHEET No. 13 OF 19 SHEETS DH 9

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-41-(91)13	1972	57	228



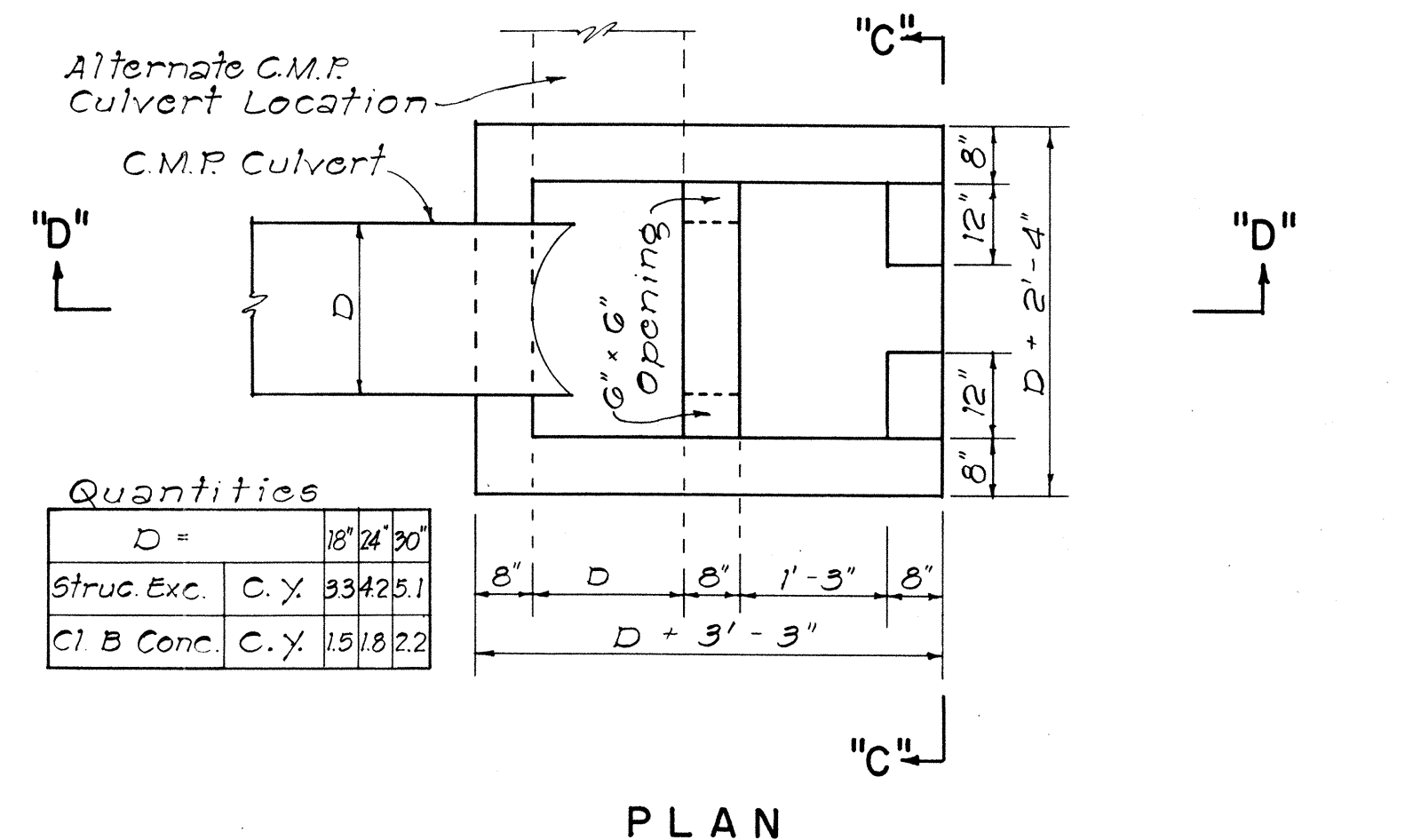
DATA - CONC. DROP INTAKE					Where Variable Equals
D'	D	L-D'+6"	S	Cu. Yds.	
23"	18"	2'-5"	8"	1.41	4'-0"
30"	24"	3'-0"	8"	1.72	5'-0"
37"	30"	3'-7"	9"	2.32	5'-6"
44"	36"	4'-2"	9"	2.73	6'-0"
51"	42"	4'-9"	10"	3.54	6'-6"
58"	48"	5'-4"	10"	4.01	7'-0"

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

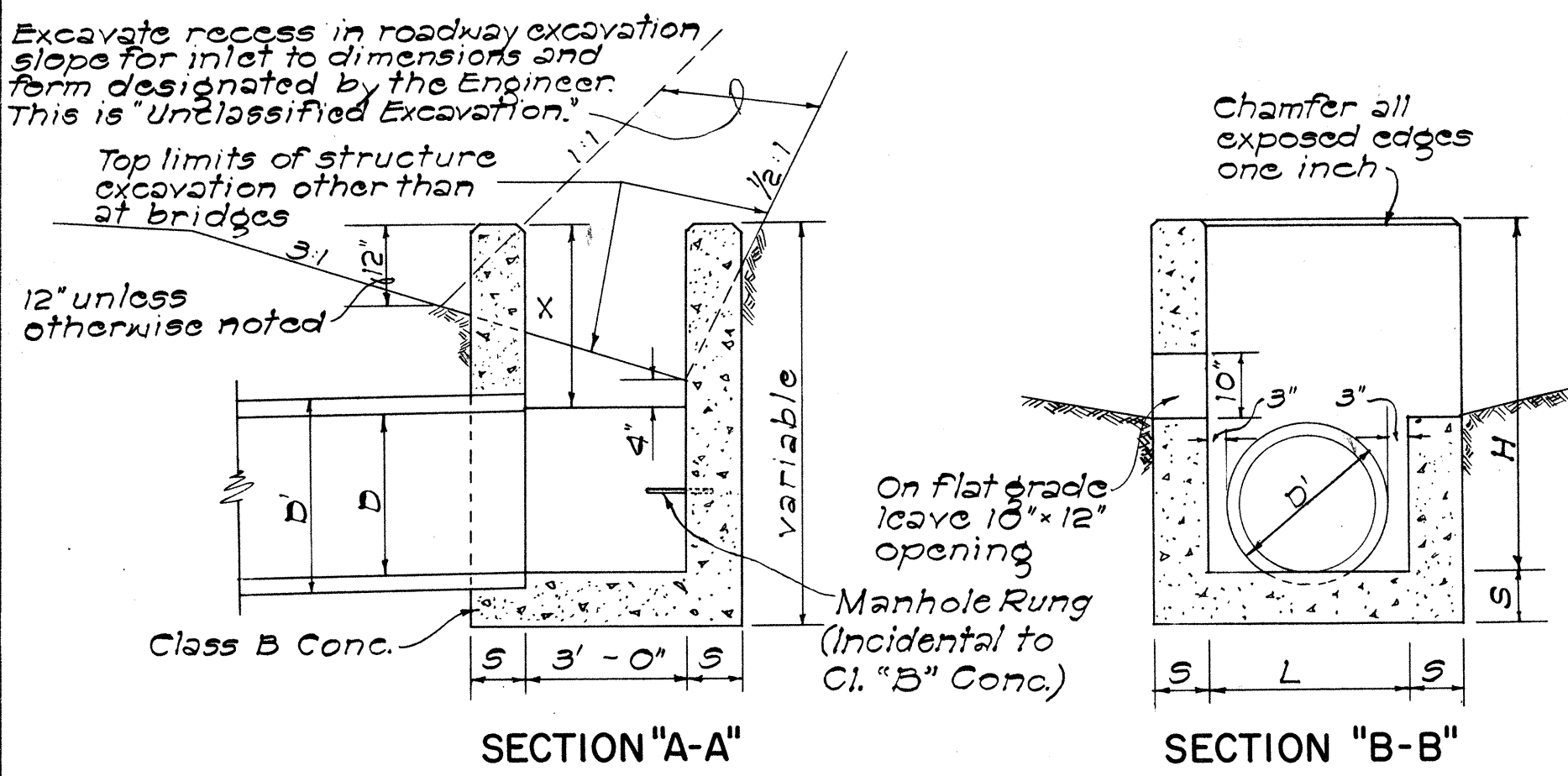


DATA FOR CONC. HEADWALL				CRM FOR R.C.P.	CRM FOR C.M.P.	Steel For One Headwall	
D	B	L	H	Cu. Yd.	Cu. Yd.	No. of Bars	Length Lbs.
18"	1'-0"	6'-0"	4'-6"	1.12	1.17	4	34
24"	1'-6"	7'-0"	5'-0"	1.52	1.60	4	42
30"	2'-0"	9'-0"	5'-6"	2.36	2.40	4	51
36"	2'-0"	10'-0"	6'-0"	2.94	3.13	4	60
42"	2'-6"	12'-0"	6'-6"	4.19	4.47	4	69
48"	2'-6"	13'-0"	7'-0"	5.01	5.36	4	78

DATA - MASONRY HEADWALL				CRM FOR R.C.P.	CRM FOR C.M.P.
D	B	L	H	Cu. Yd.	Cu. Yd.
18"	1'-0"	6'-0"	4'-6"	1.24	1.29
24"	2'-0"	7'-0"	5'-0"	1.83	1.92
30"	2'-3"	9'-0"	5'-6"	2.56	2.70
36"	2'-6"	10'-0"	6'-0"	3.45	3.66



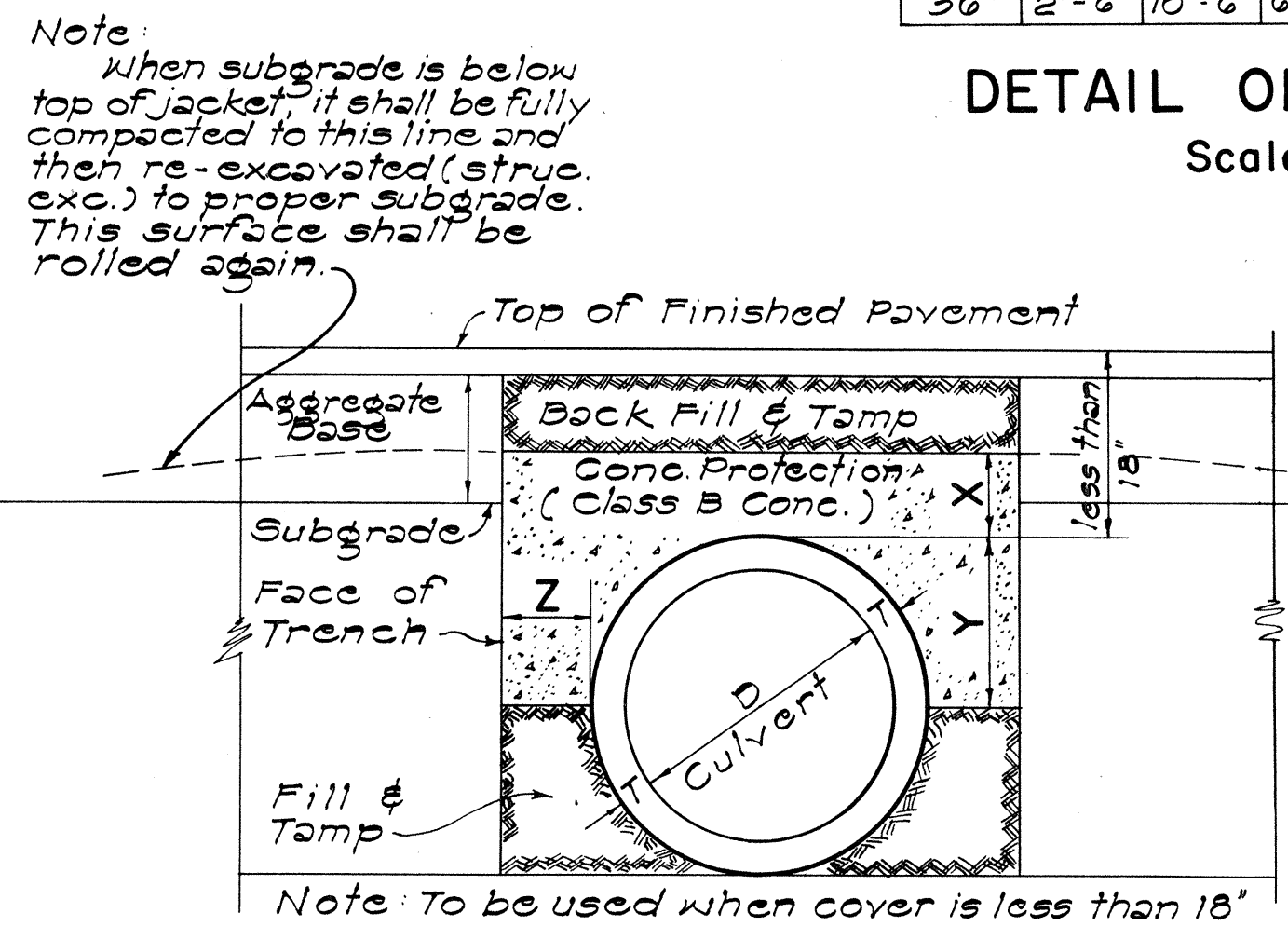
DETAILS OF CONC. DROP BOX AT OUTLET OF CULVERT PIPE
NOT TO SCALE



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 (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.



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

DATA FOR CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18" D		Z must be from pipe to face of trench
7" for 24" D		
8" for 30" D		
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"

APPROVAL RECOMMENDED:
HYDRAULIC DESIGN ENGINEER
DATE: 12-17-67

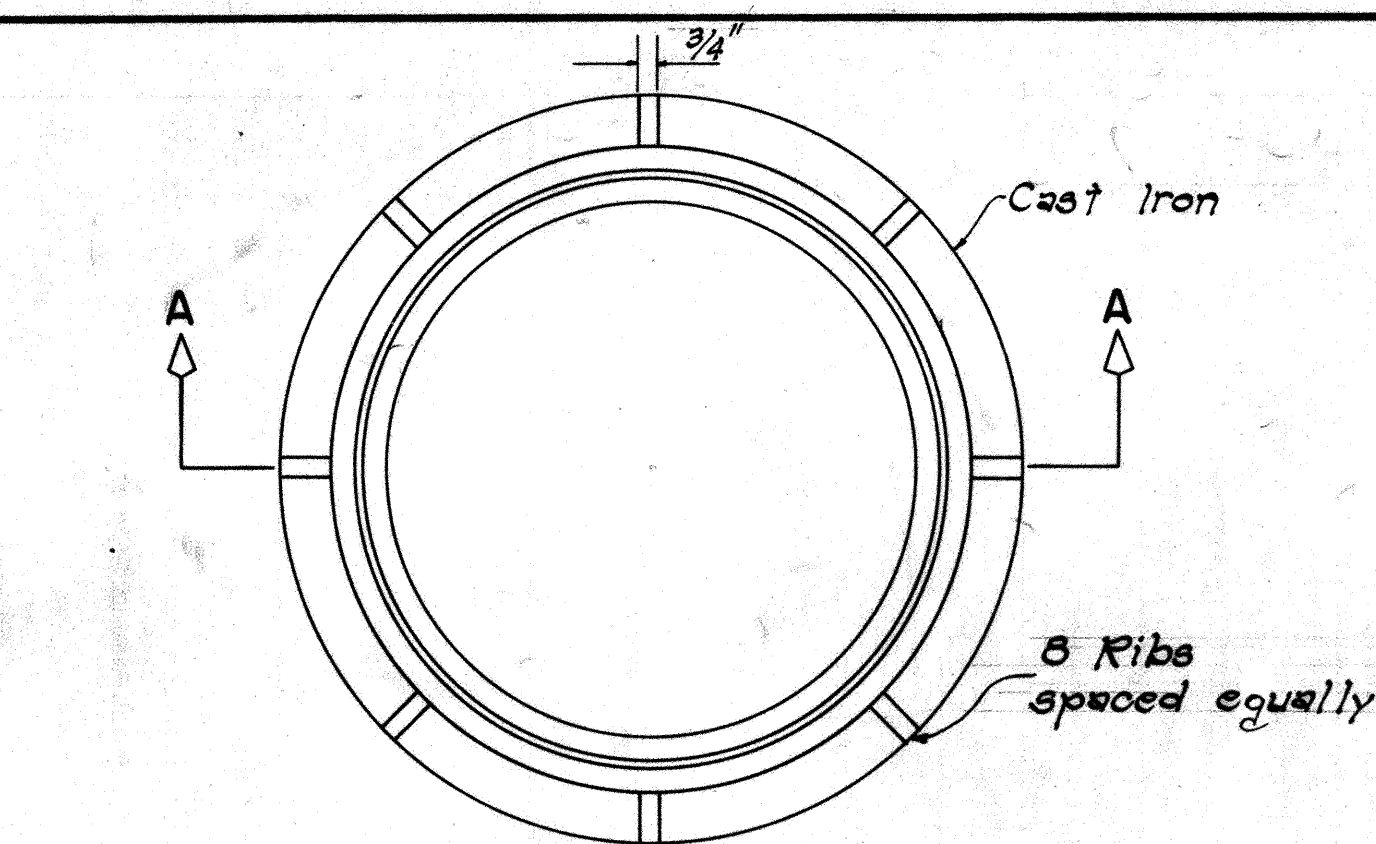
APPROVED:
ASSISTANT CHIEF, ENGINEERING
DATE: 12-17-69

NO.	REVISION	APPROVED BY	DATE

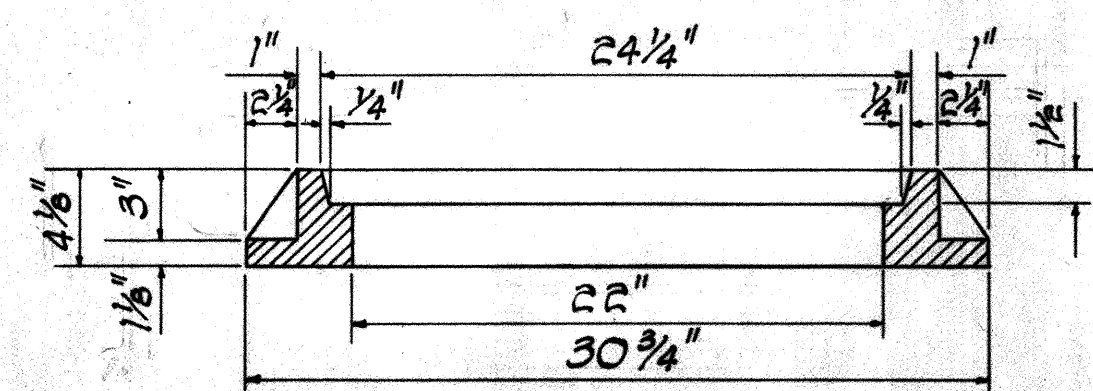
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
DROP INTAKE, HEADWALL & CONCRETE PROTECTION

Scale: As Noted
Date: Aug. 1967
SHEET No. 140 OF 19 SHEETS DH 10

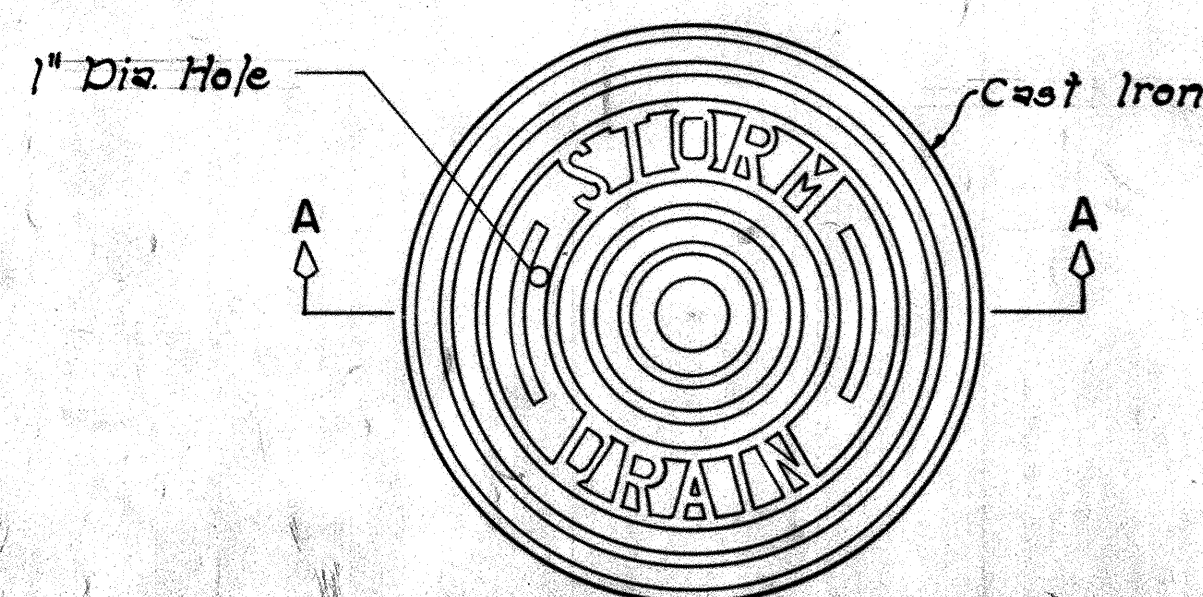
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(9)13	1972	58	228



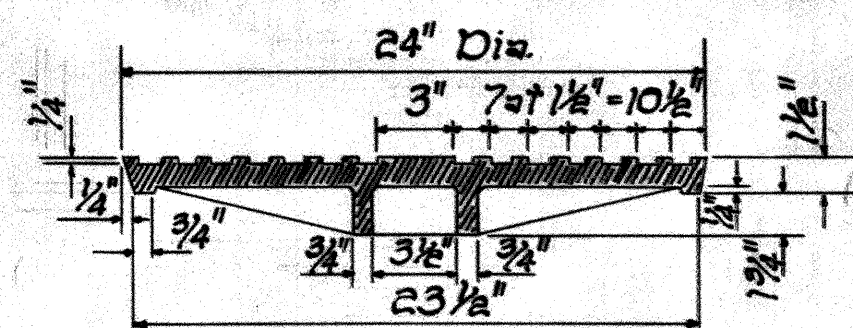
PLAN



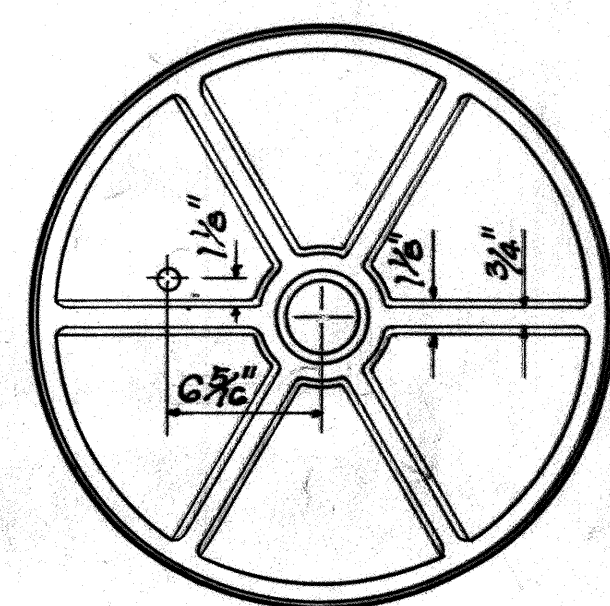
SECTION A-A



PLAN



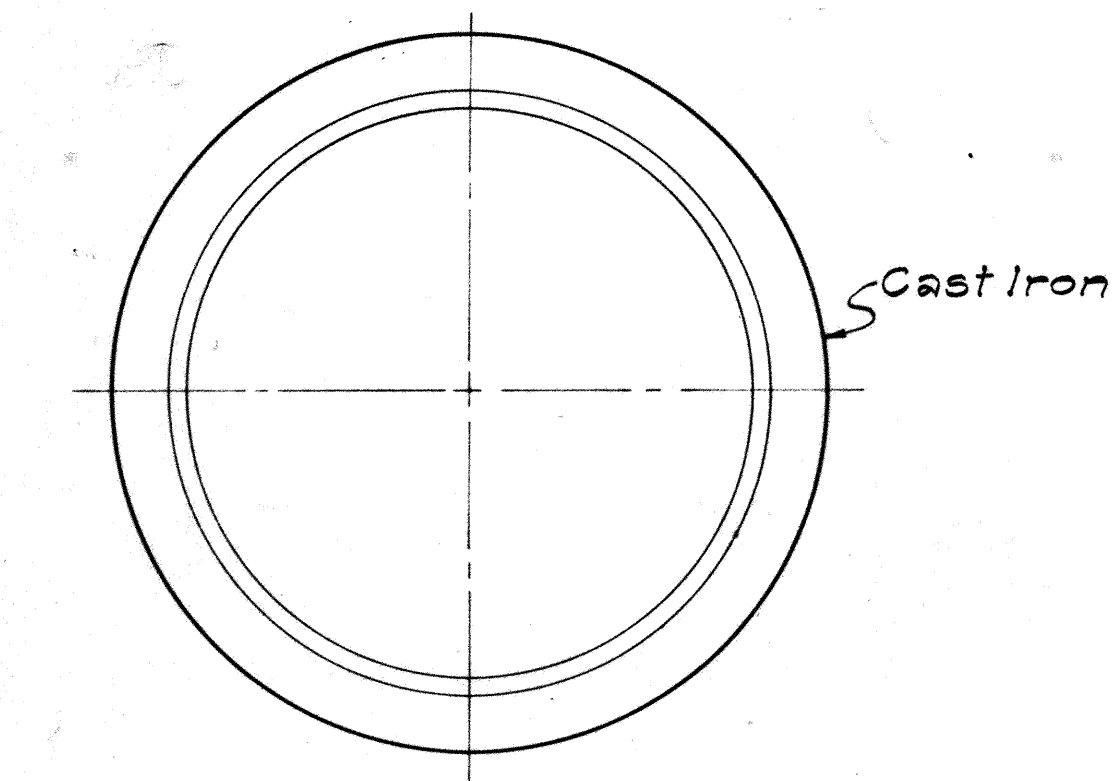
SECTION A-A



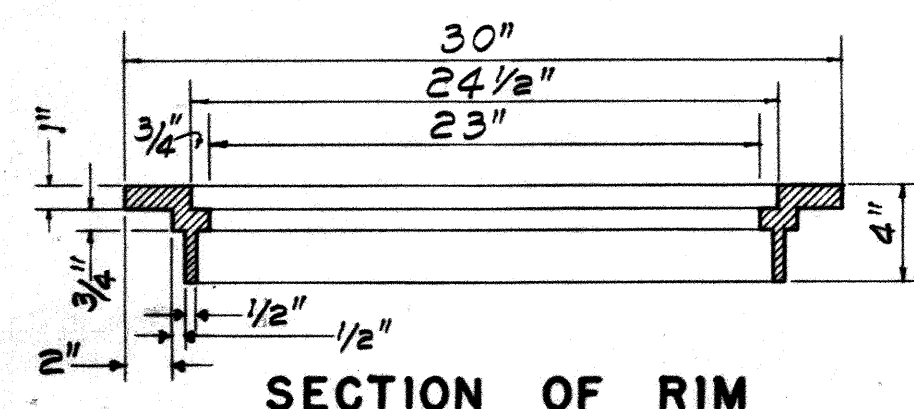
BOTTOM VIEW OF COVER

DETAILS OF TYPE "P"
CAST IRON FRAME AND COVER

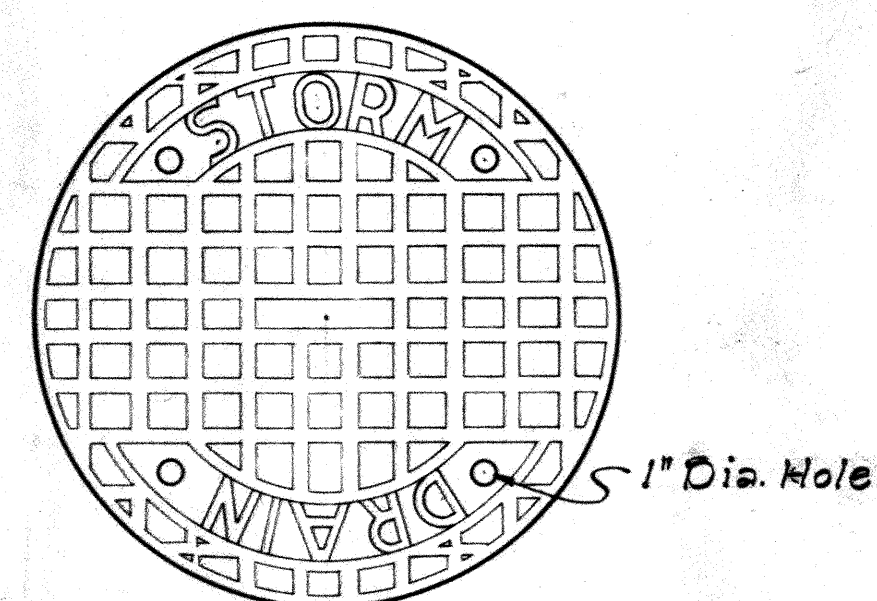
SCALE: 1-1/2" = 1'-0"



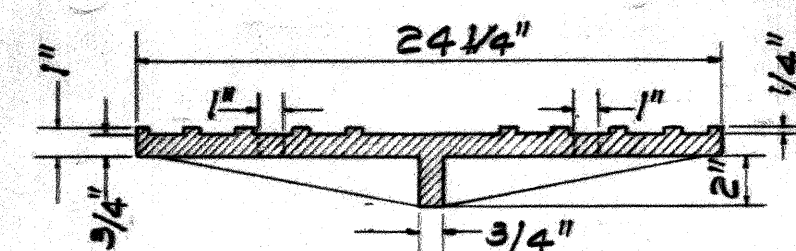
PLAN OF RIM



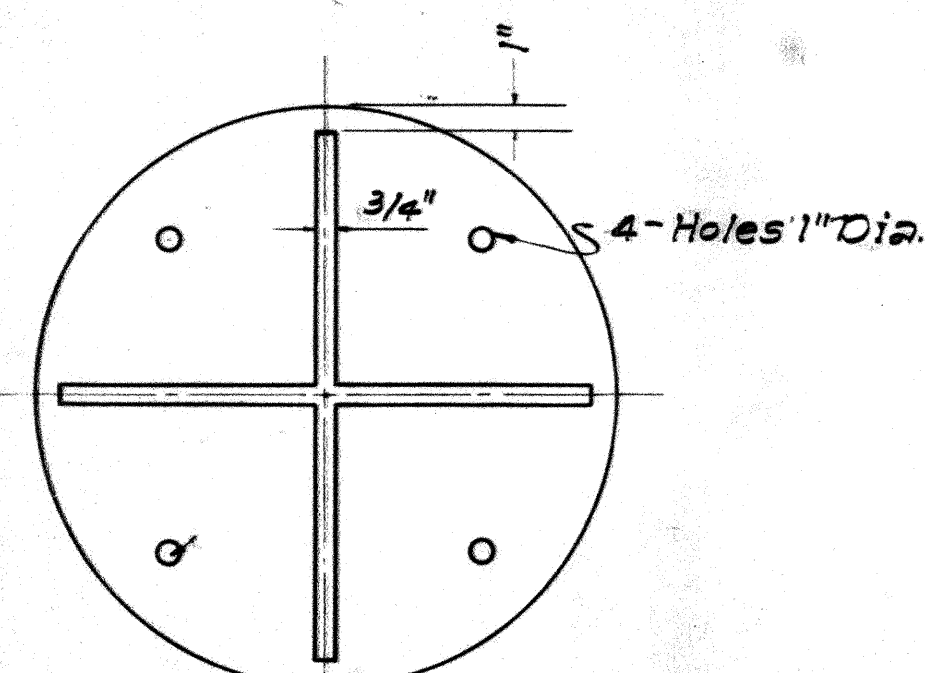
SECTION OF RIM



TOP VIEW OF COVER



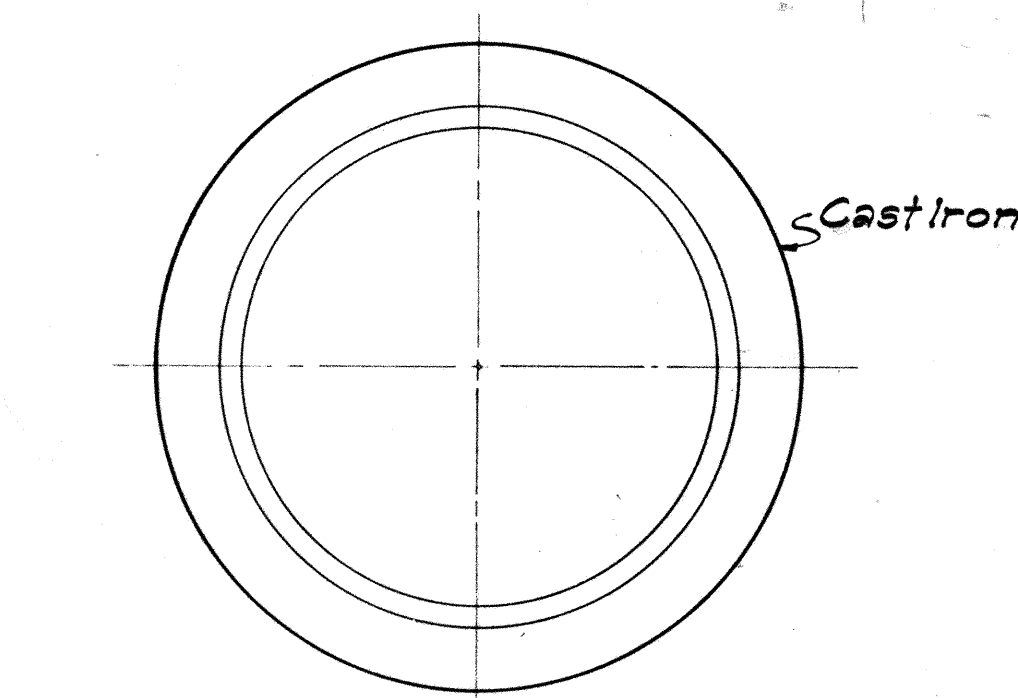
SECTION



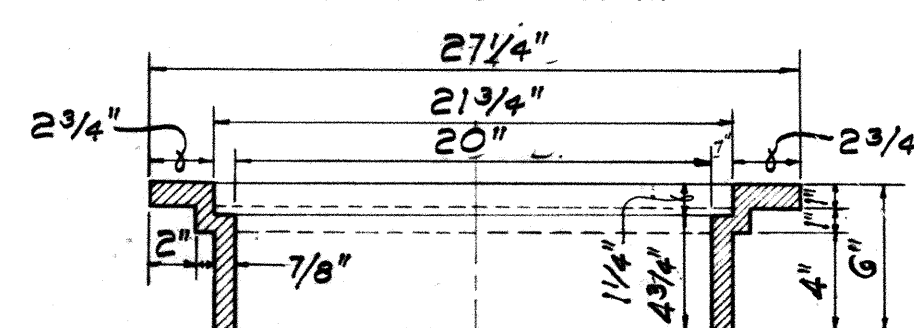
BOTTOM VIEW OF COVER

DETAILS OF TYPE "B"
CAST IRON FRAME AND COVER

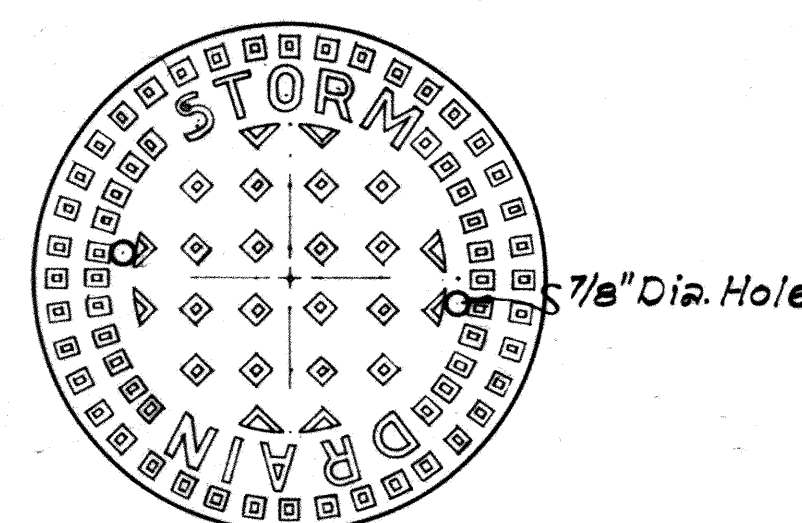
SCALE: 1-1/2" = 1'-0"



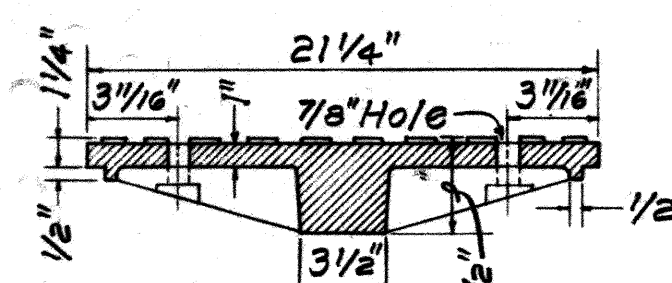
PLAN OF RIM



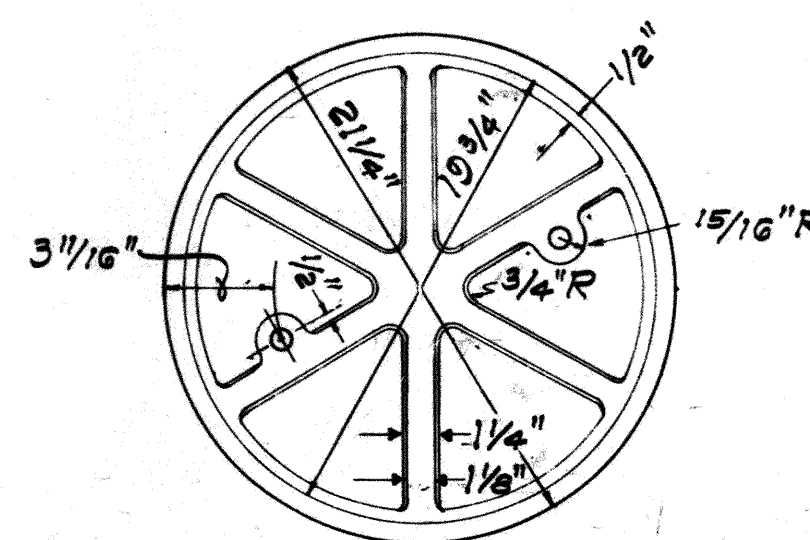
SECTION OF RIM



TOP VIEW OF COVER



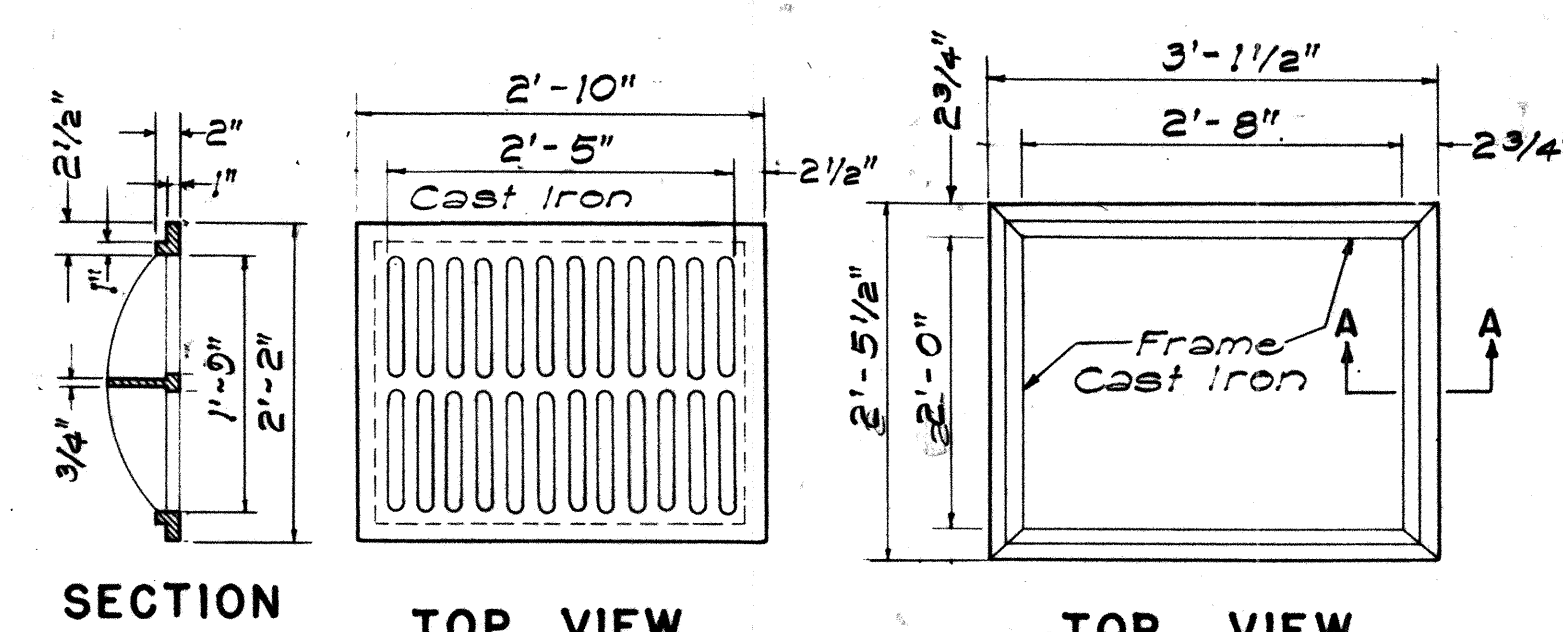
SECTION



BOTTOM VIEW OF COVER

DETAILS OF TYPE "A"
CAST IRON FRAME AND COVER

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



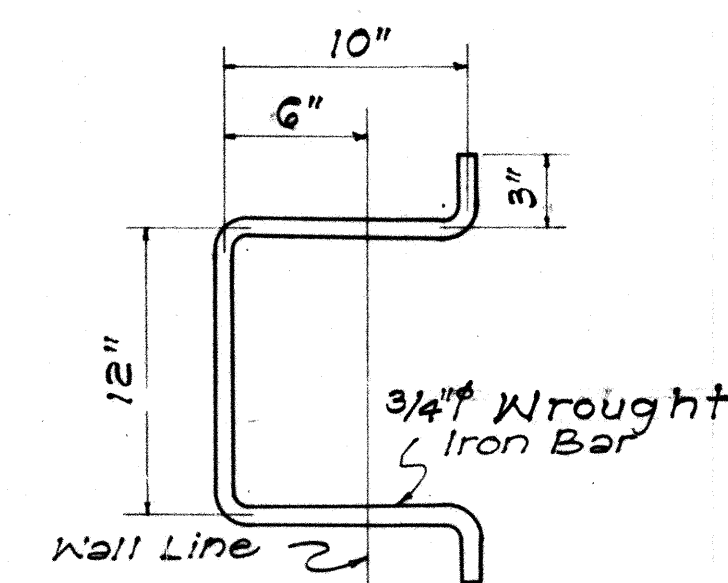
SECTION

TOP VIEW

TOP VIEW

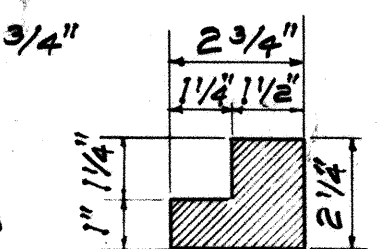
TYPE C C.I. FRAME AND GRATE

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



MANHOLE RUNG

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



SECTION "A-A"
SCALE 3" = 1'-0"

APPROVAL RECOMMENDED:

G. Nakano
HYDRAULIC DESIGN ENGINEER

12-17-69
DATE

APPROVED:

Robert Z. Zolner
ASSISTANT CHIEF, ENGINEERING

12-11-69
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 15 OF 19 SHEETS DH 6

58

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(90)13	1972	60	228

GENERAL NOTES

- Grates and Frames shall be hot dip galvanized after fabrication, see specifications.
- All welds $\frac{3}{8}$ " unless otherwise noted.
- Refer to "Spacing Table" for Types 61614 & 61616 Drop Intake and Frame & Grates dimensions.
- The Frame & 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.

SPACING TABLE

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

NO.	REVISION	APPROVED BY	DATE
1	Curb for Top of Fill Gutters	H.L.	6-5-71

APPROVAL RECOMMENDED:

HYDRAULIC DESIGN ENGINEER

5-2-77-69
DATE

APPROVED:

ASSISTANT CHIEF, ENGINEERING

12-11-69
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

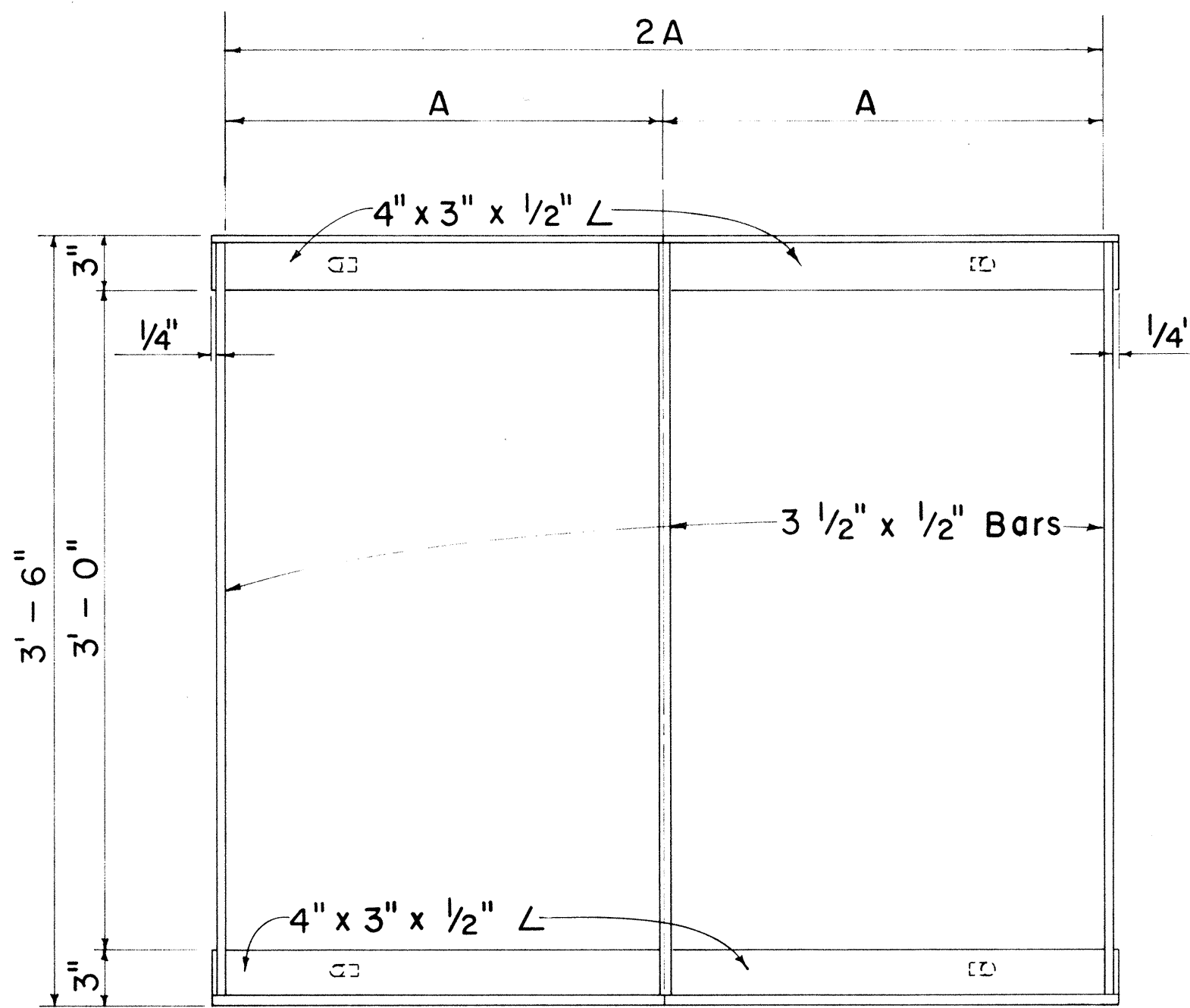
STANDARD DETAILS

TYPE 61614 & 61616
GRADED DROP INTAKES

Scales: As Noted

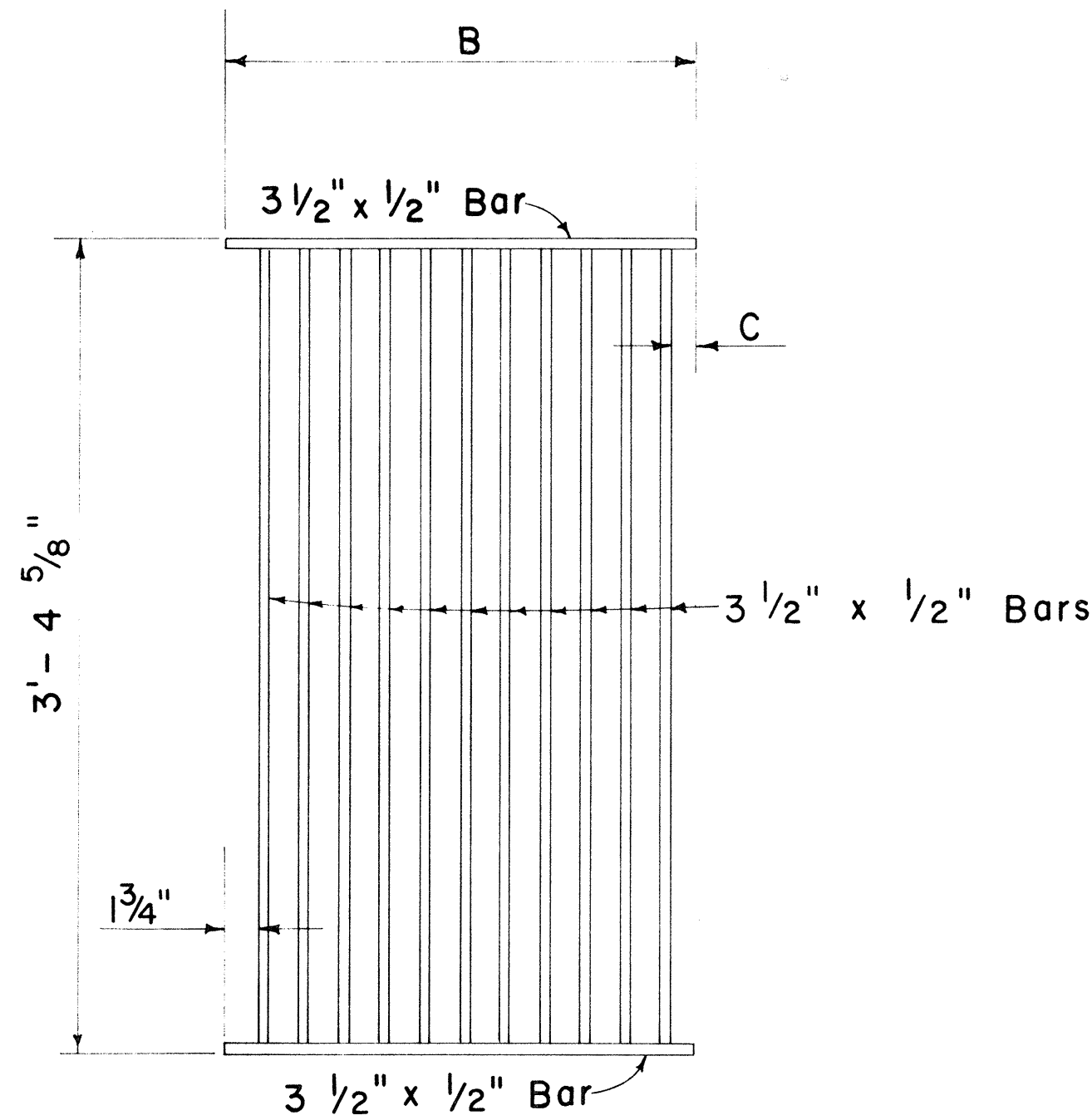
Date: Feb. 1969

SHEET No. 17D OF 19D SHEETS DH 8



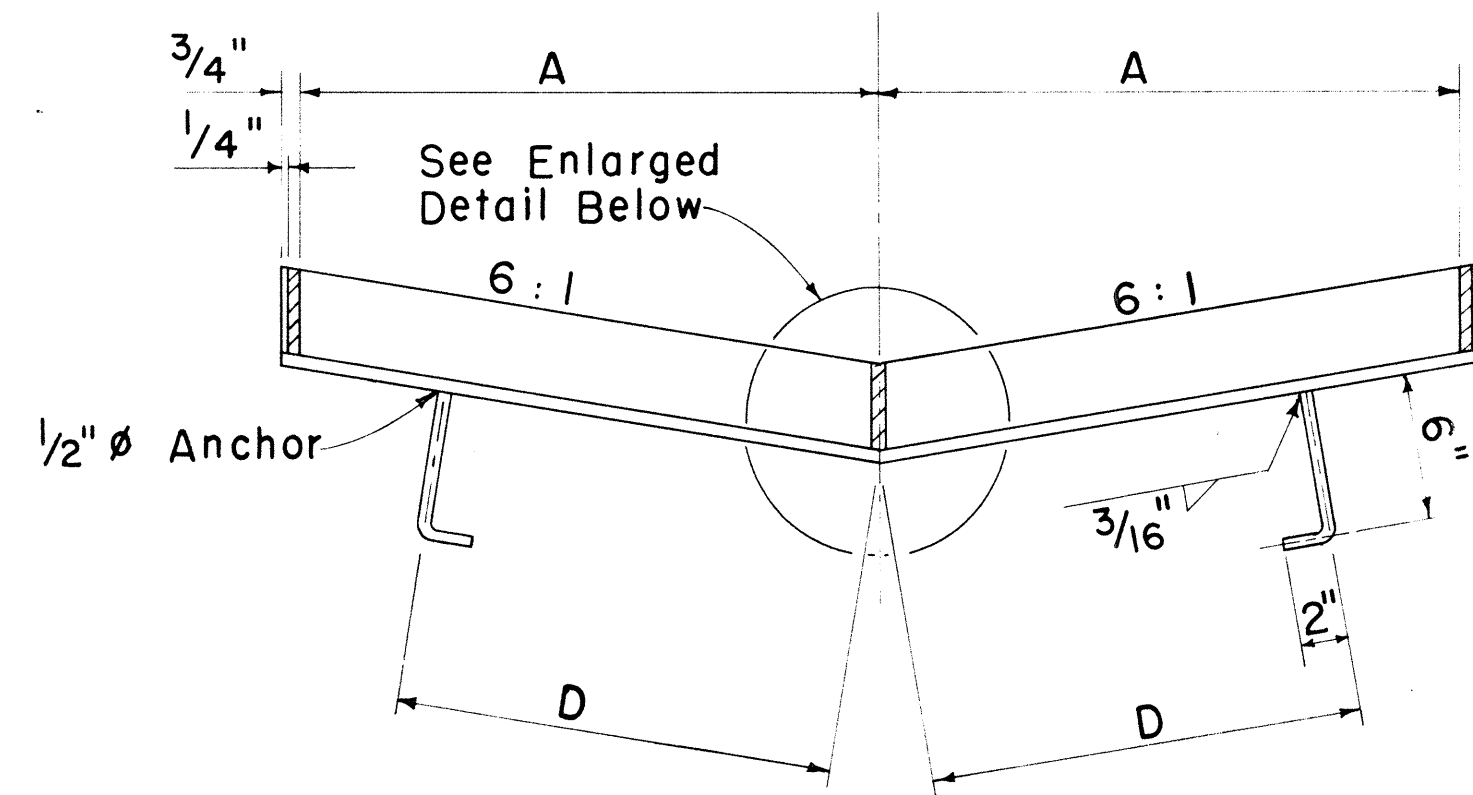
PLAN

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



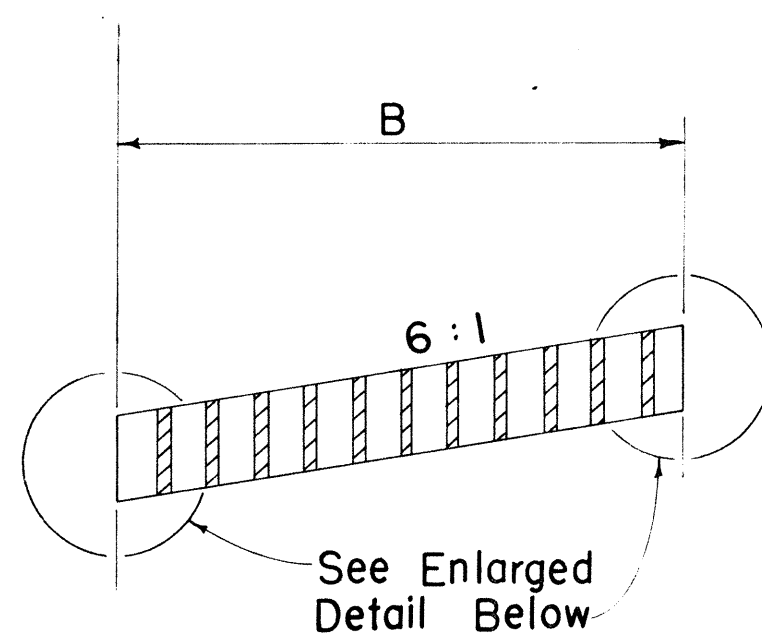
PLAN

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



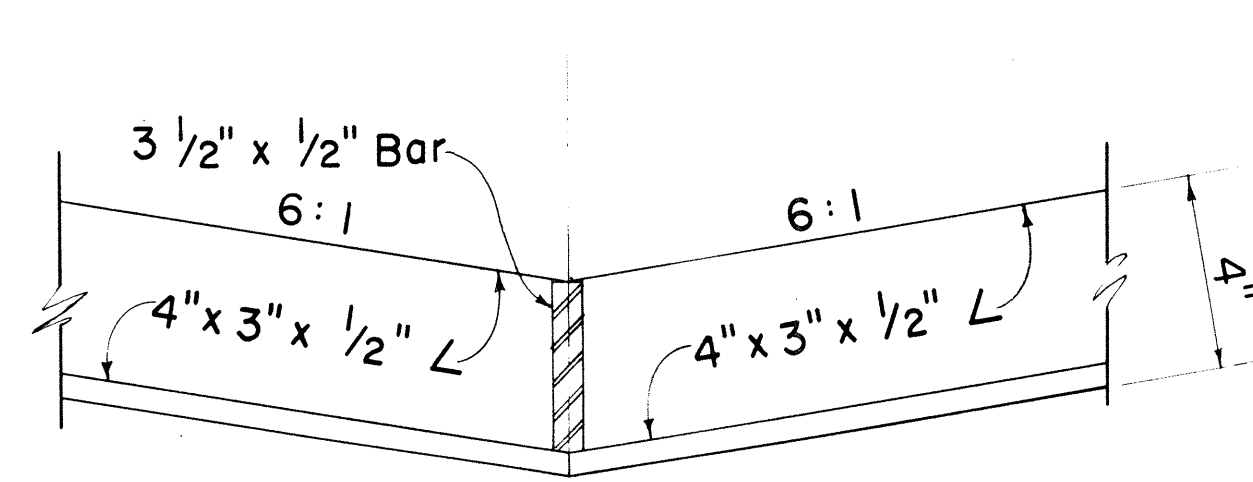
SECTION

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



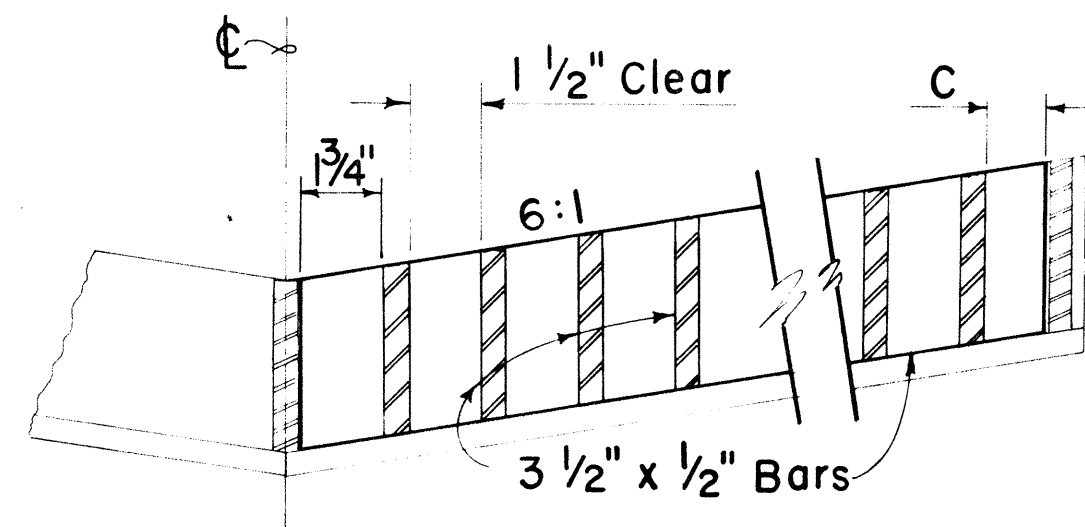
SECTION

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



FRAME

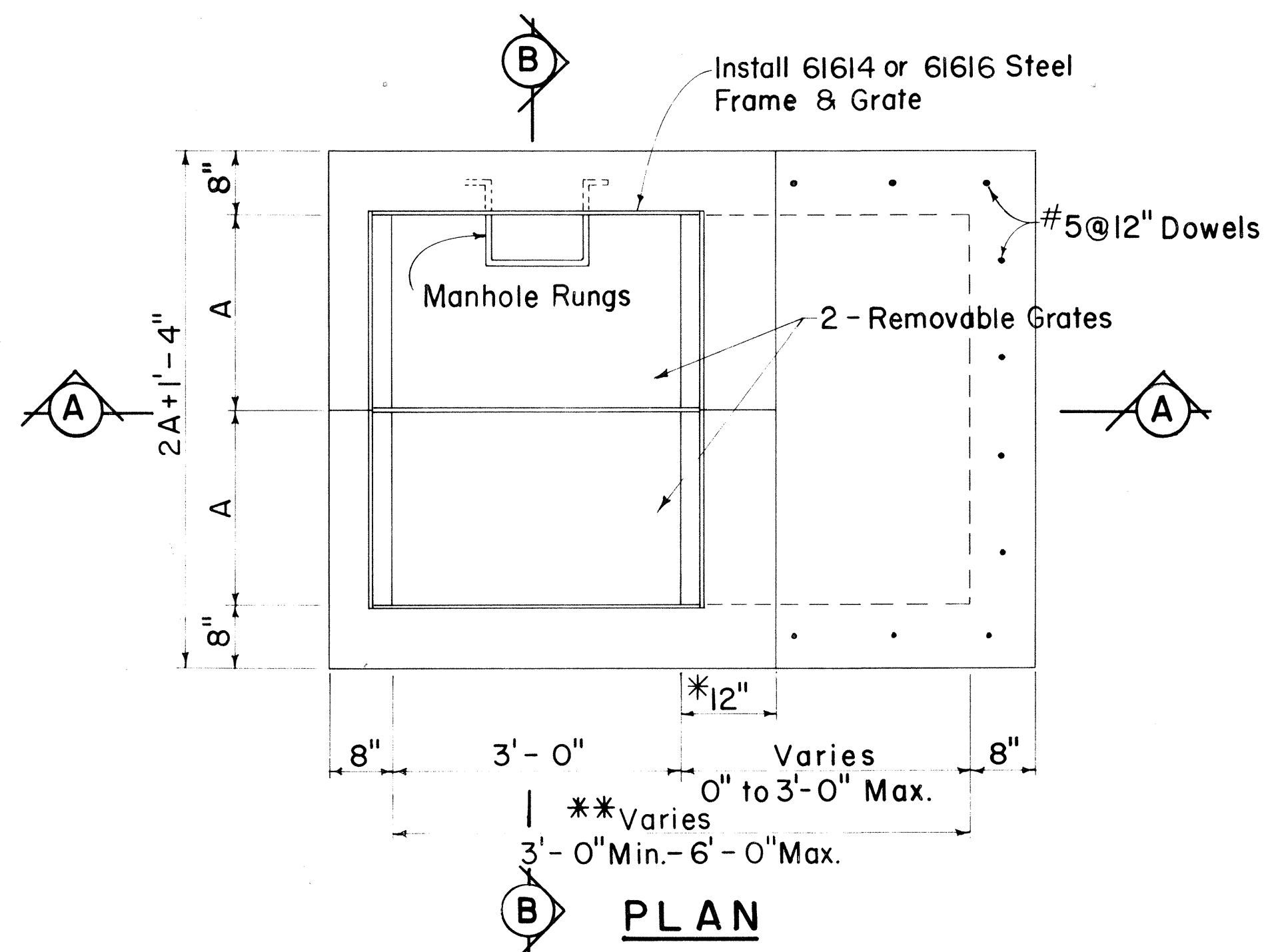
Scale: 3" = 1'-0"



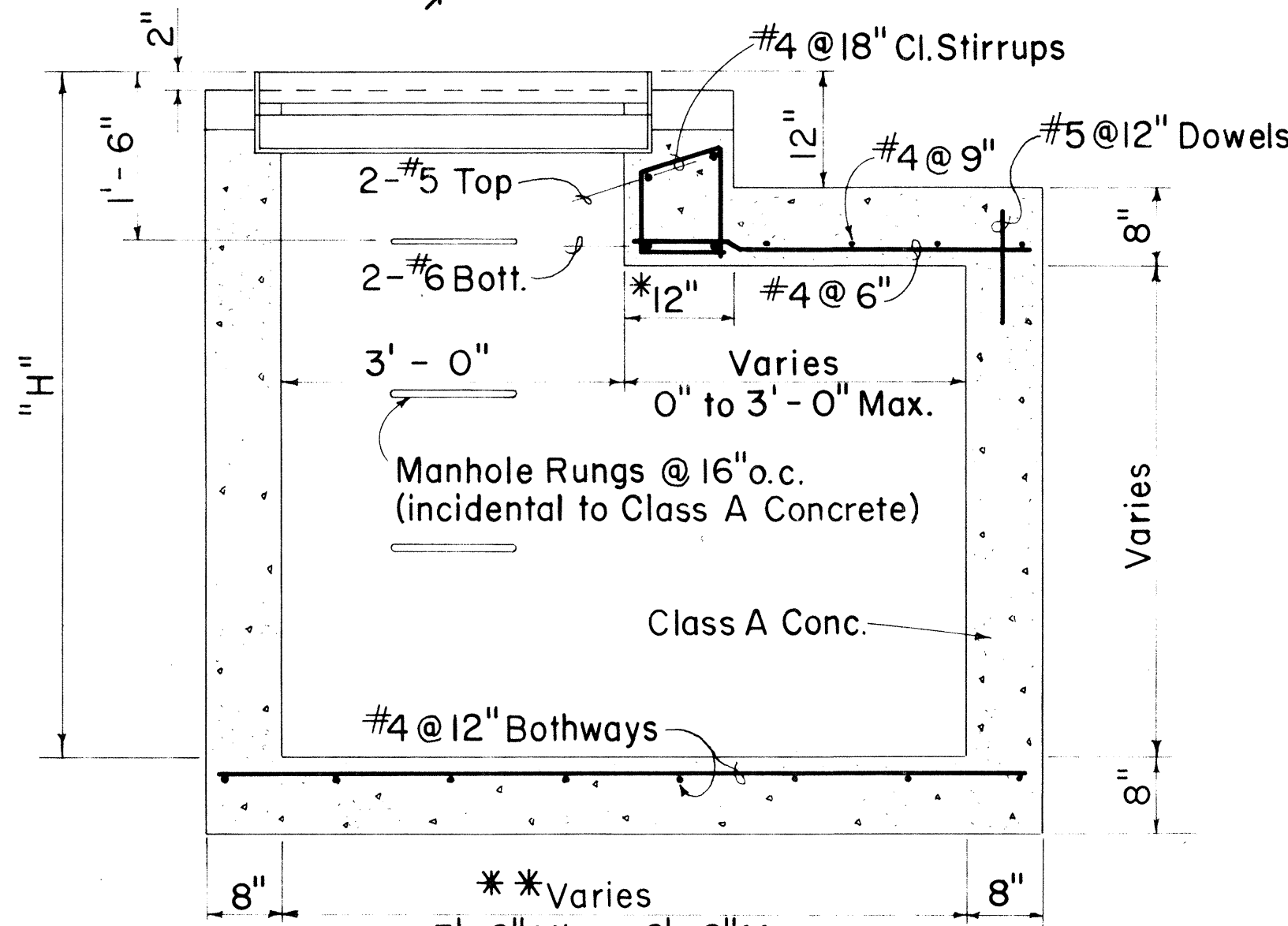
GRATE

Scale: 3" = 1'-0"

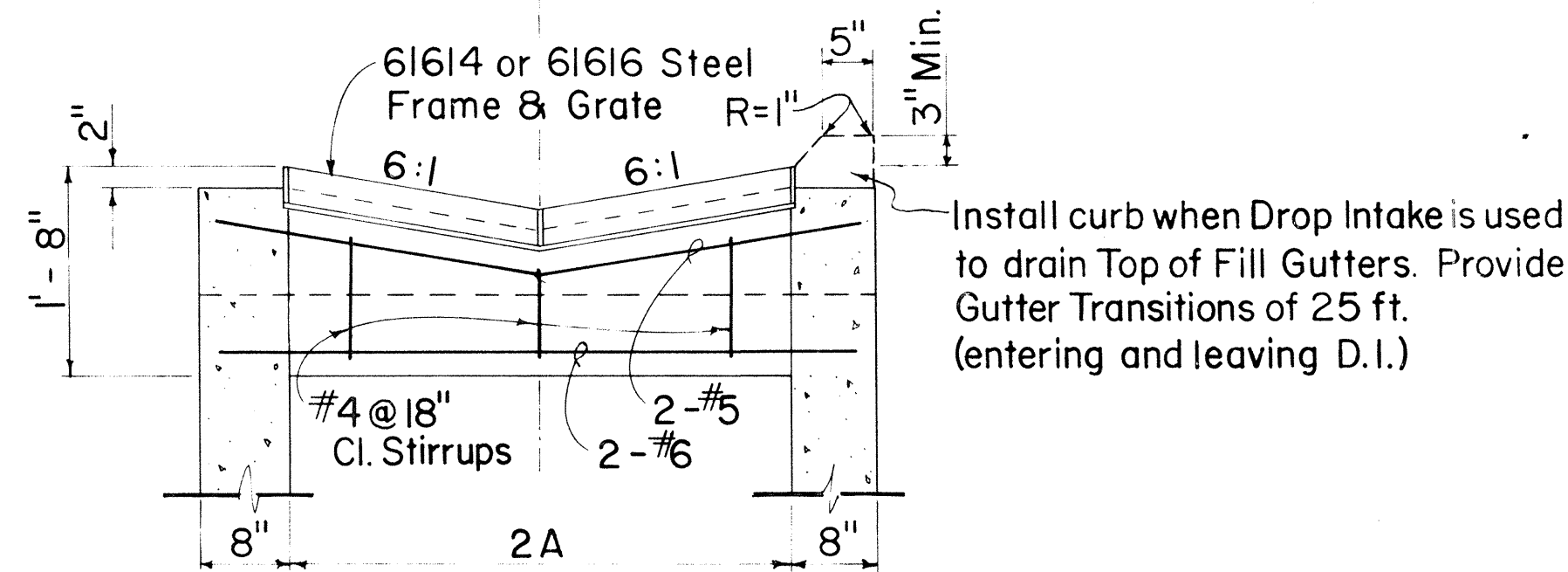
DETAILS OF TYPE 61614 OR 61616 STEEL FRAME AND GRATE



PLAN



SECTION A - A



SECTION B - B

DETAILS OF 61614 OR 61616 DROP INTAKE

Scale: 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.

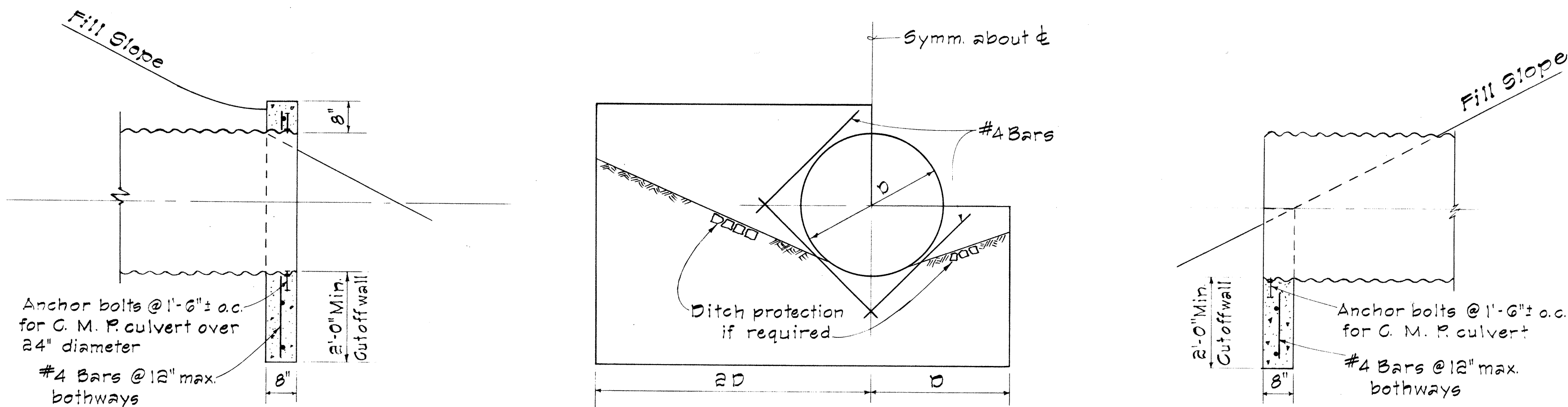
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(20)13	1972	61	220

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, and in no case less than one foot.
- Anchor Bolts: Anchor Bolts are not required for concrete pipe.

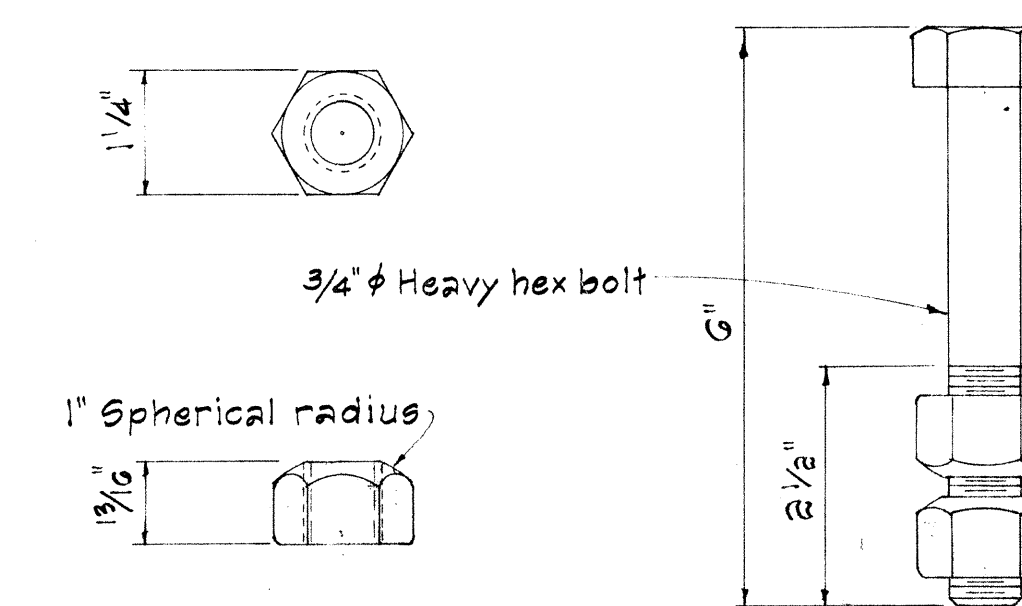
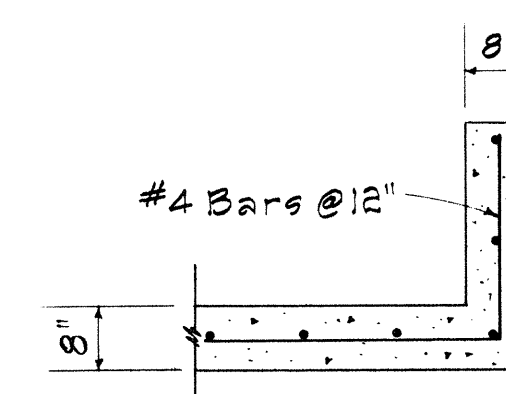
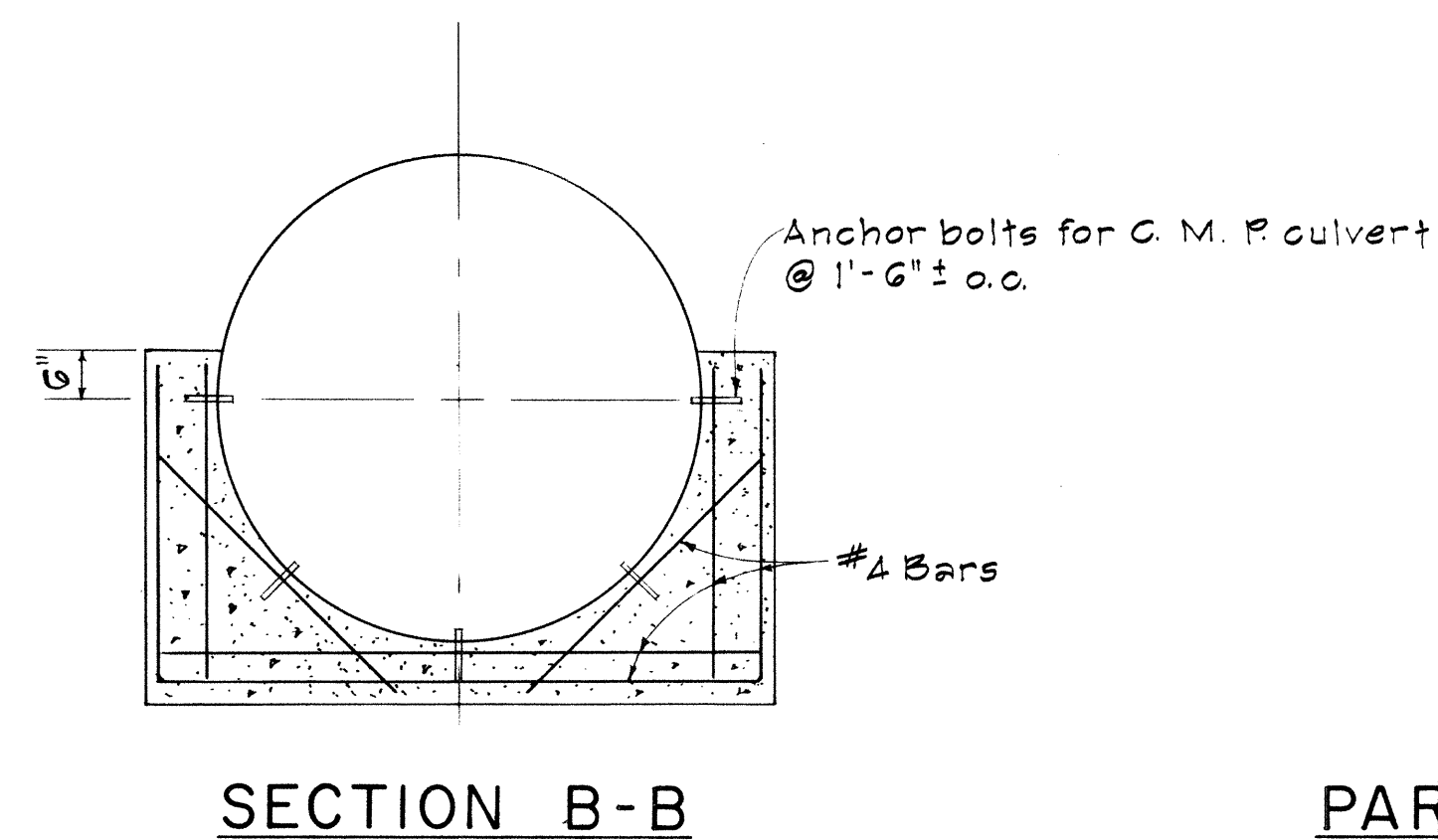
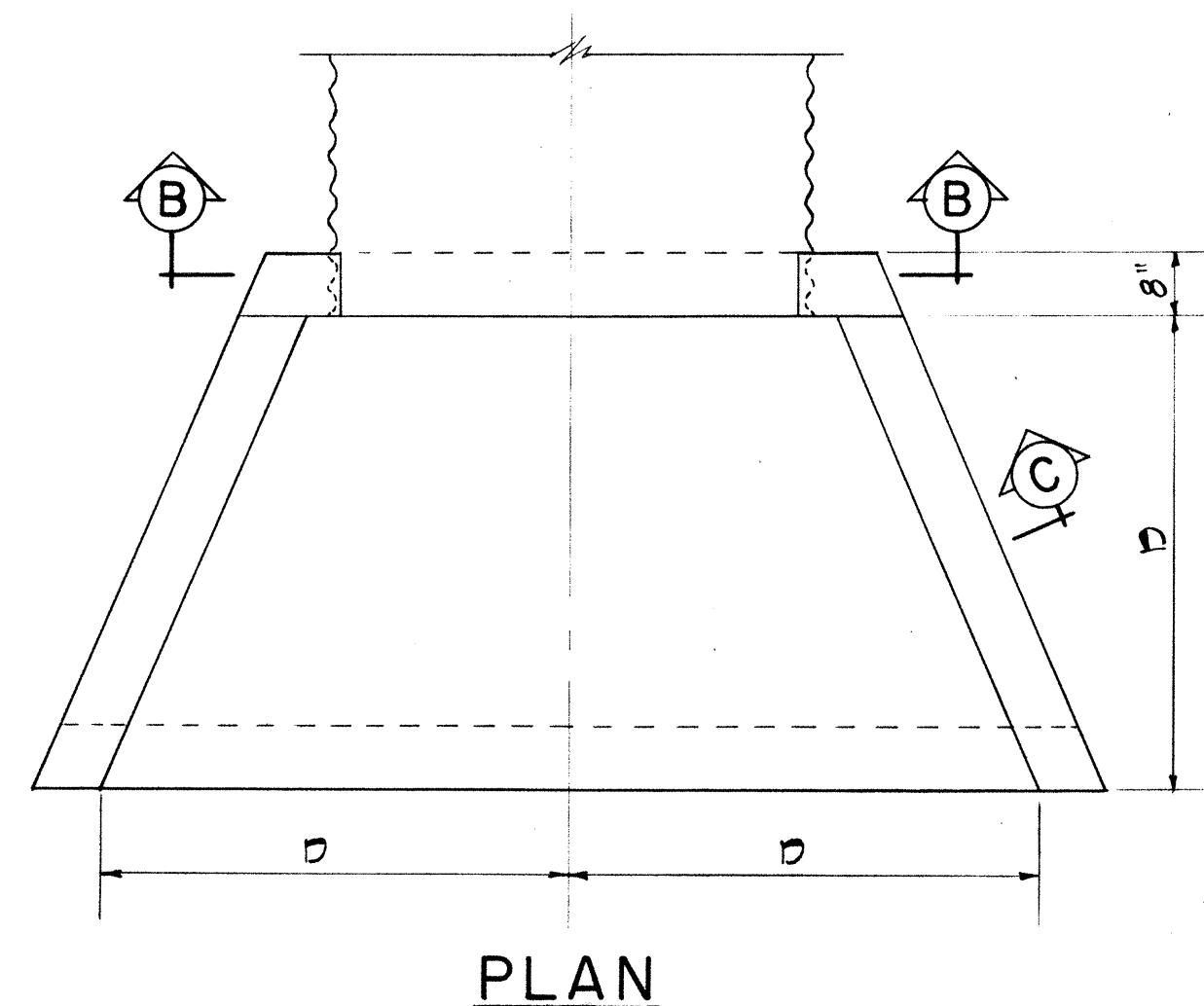
Culvert Dia. (inches)	Full Headwall		Half Headwall	
	Concrete (Cu. Yd)	Reinf. Steel (Lbs)	Concrete (Cu. Yd)	Reinf. Steel (Lbs)
18	0.57	45	0.18	15
24	0.85	65	0.26	20
30	1.15	85	0.34	25
36	1.50	115	0.43	35

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

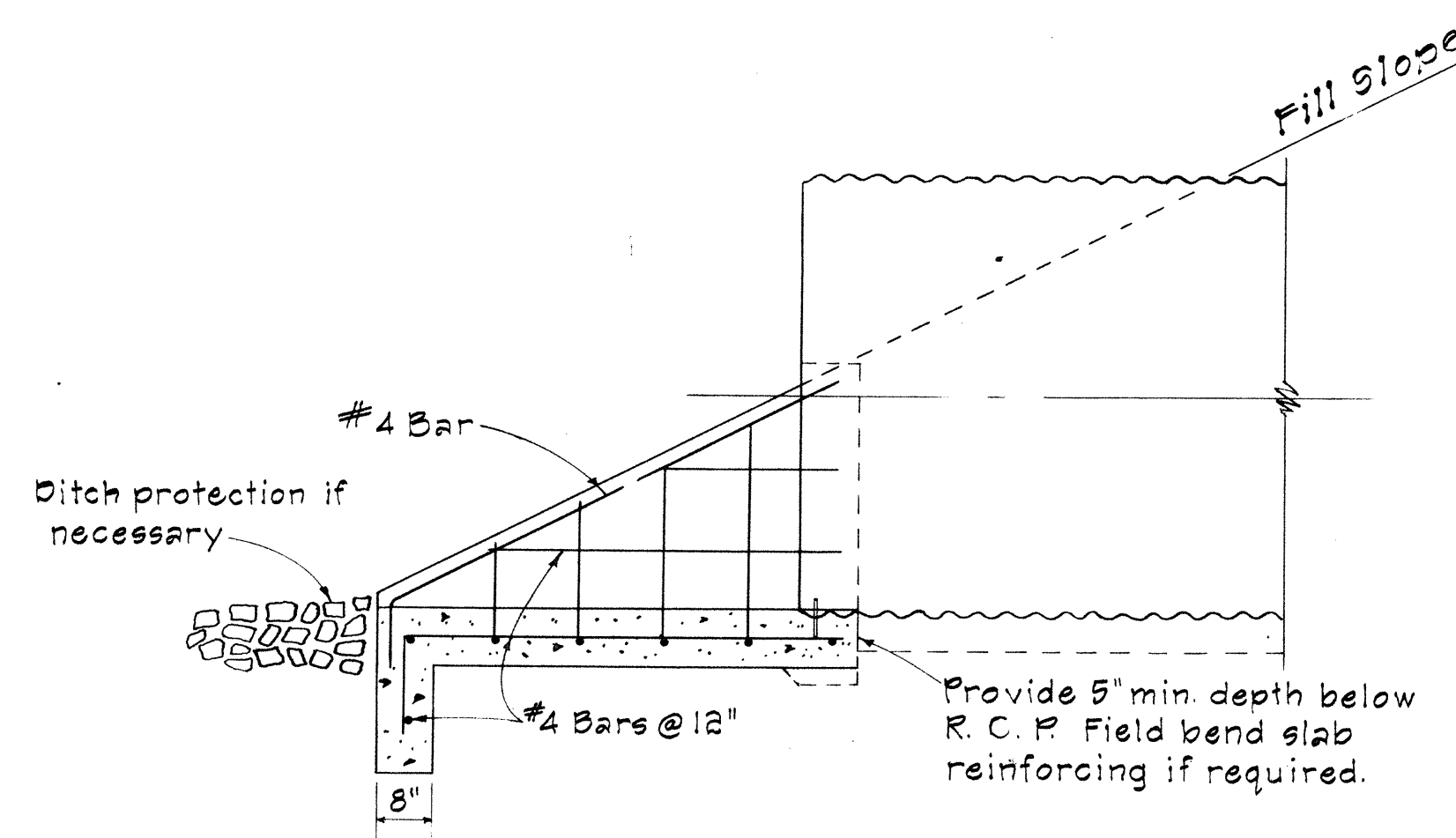
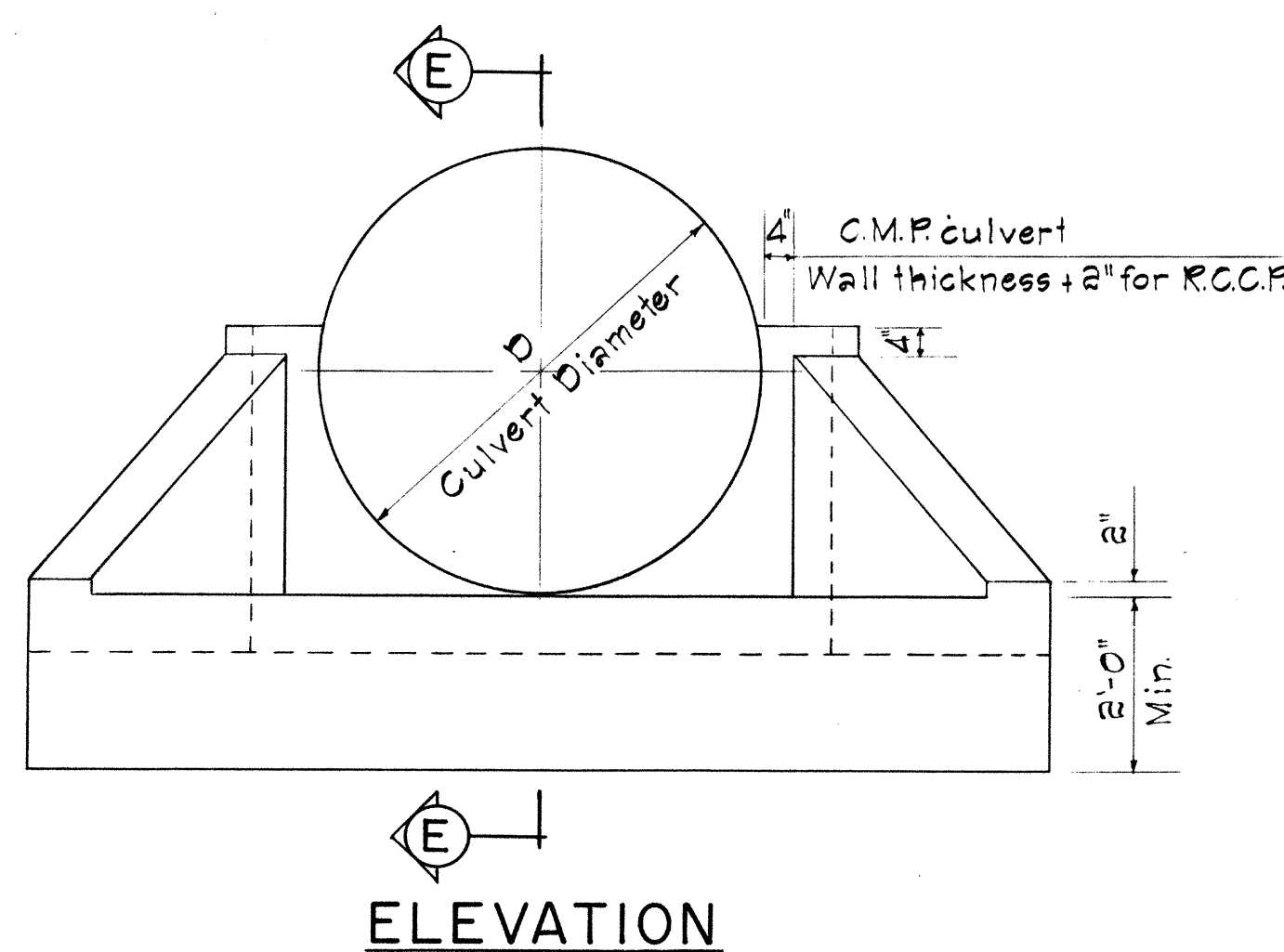


SECTION HALF ELEVATION HALF ELEVATION SECTION
FULL HEADWALL HALF HEADWALL

OUTLET STRUCTURE FOR CULVERT SIZES 18 IN. TO 36 IN. DIAMETER



ANCHOR BOLT DETAIL



SUMMARY OF QUANTITIES		
Culvert Dia. (inches)	Concrete (Cu. Yd)	Reinf. Steel (Lbs)
36	1.0	70
42	1.2	90
48	1.5	100
54	1.7	125
60	2.1	140

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

OUTLET STRUCTURE FOR CULVERT SIZES 36 IN. TO 60 IN. DIAMETER

APPROVAL RECOMMENDED:

HYDRAULIC DESIGN ENGINEER

APPROVED:

ASSISTANT CHIEF, ENGINEERING

12-17-69
DATE

12-17-69
DATE

NO.	REVISION	APPROVED BY	DATE

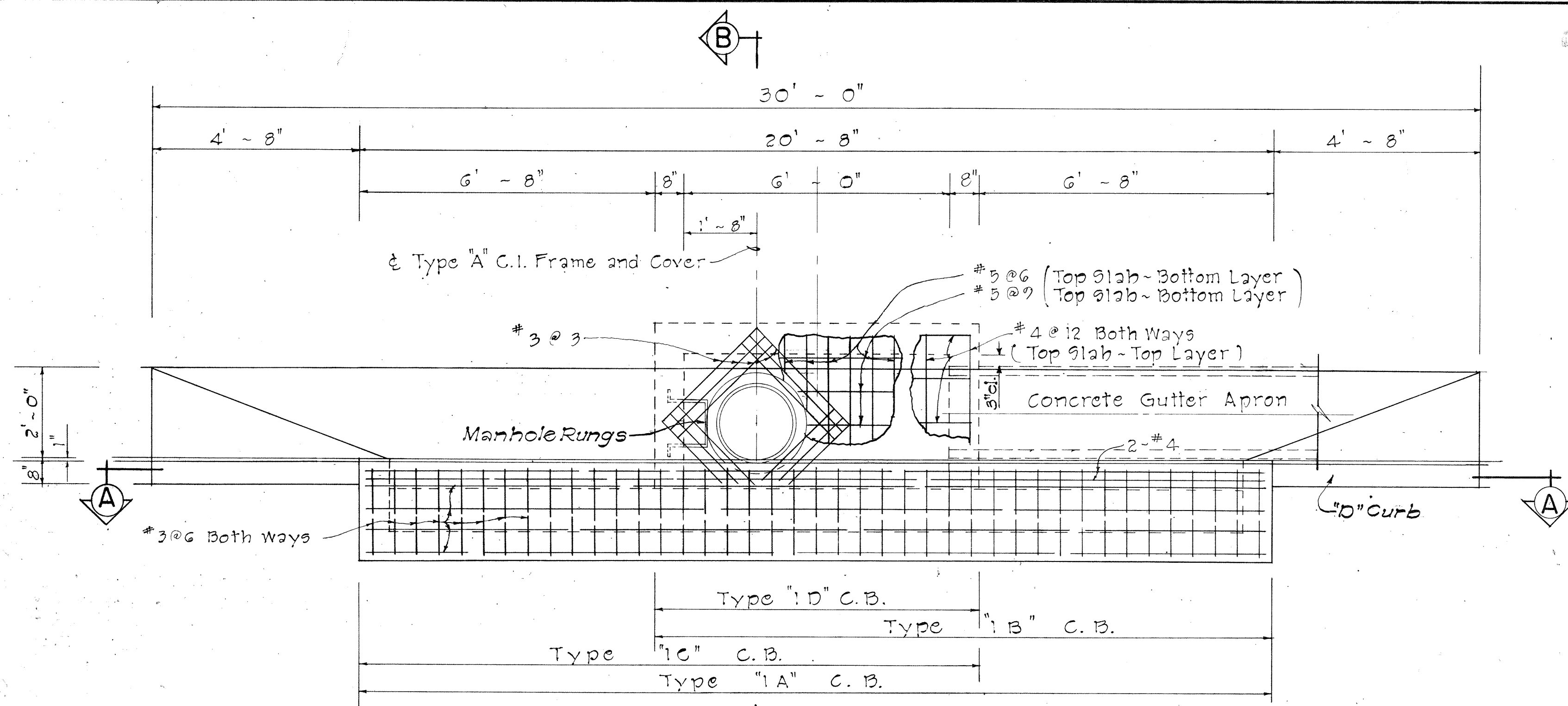
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
OUTLET STRUCTURES

Not To Scale

Date: July, 1969

SHEET No. 180 OF 190 SHEETS DH 14

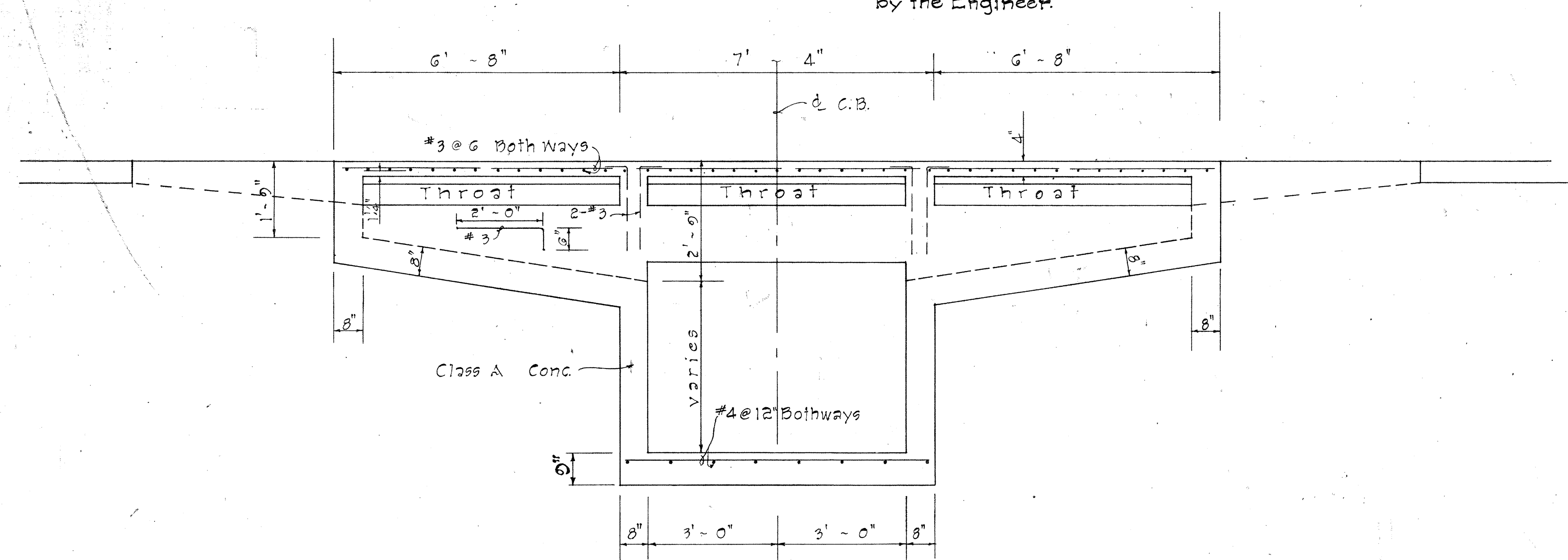
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-11-10-13	1971	62	225



- 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.
 - 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 "A" C.I. Frame & Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.

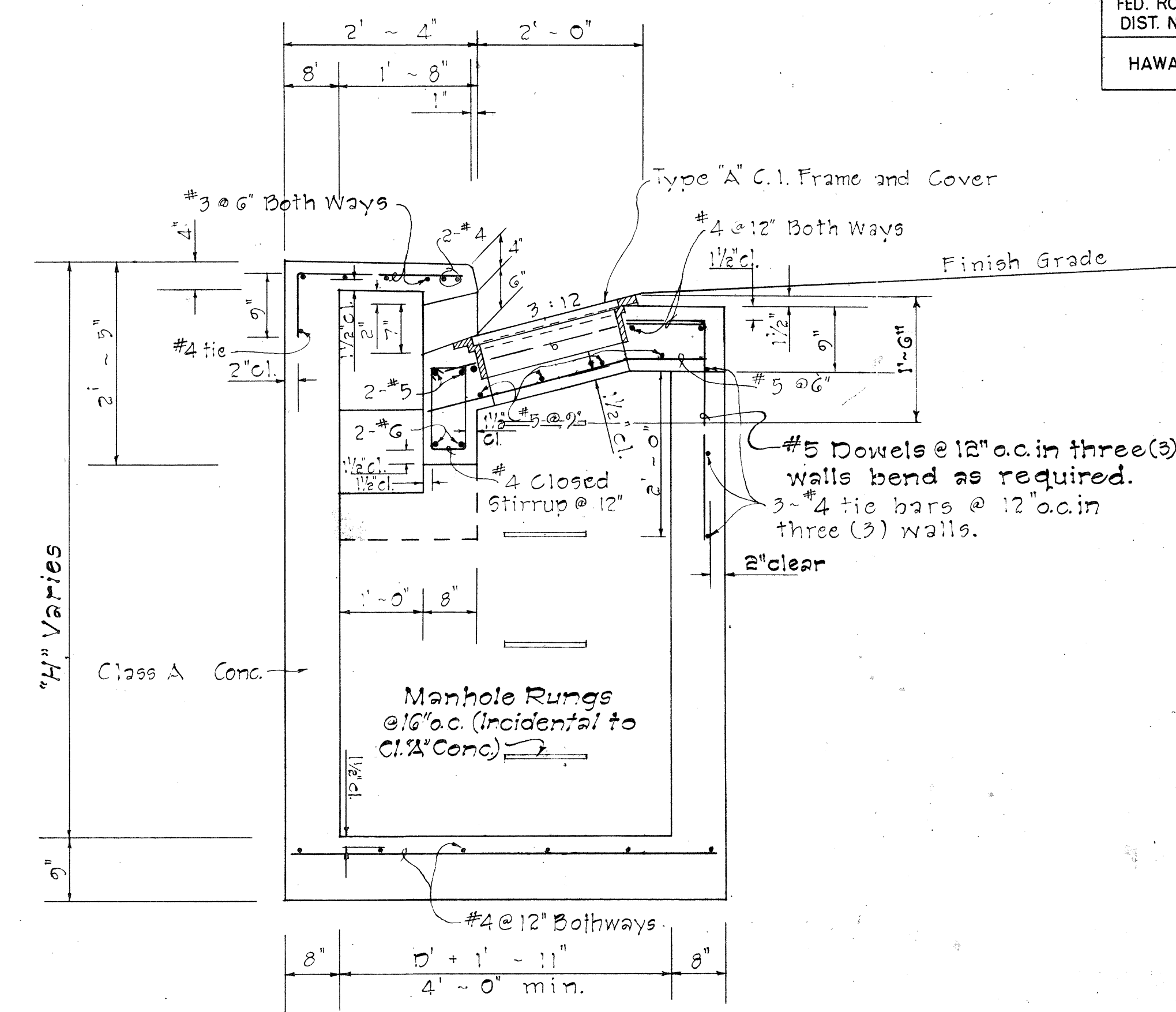
PLAN

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



SECTION "A-A"

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



SECTION "B-B"

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

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

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

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

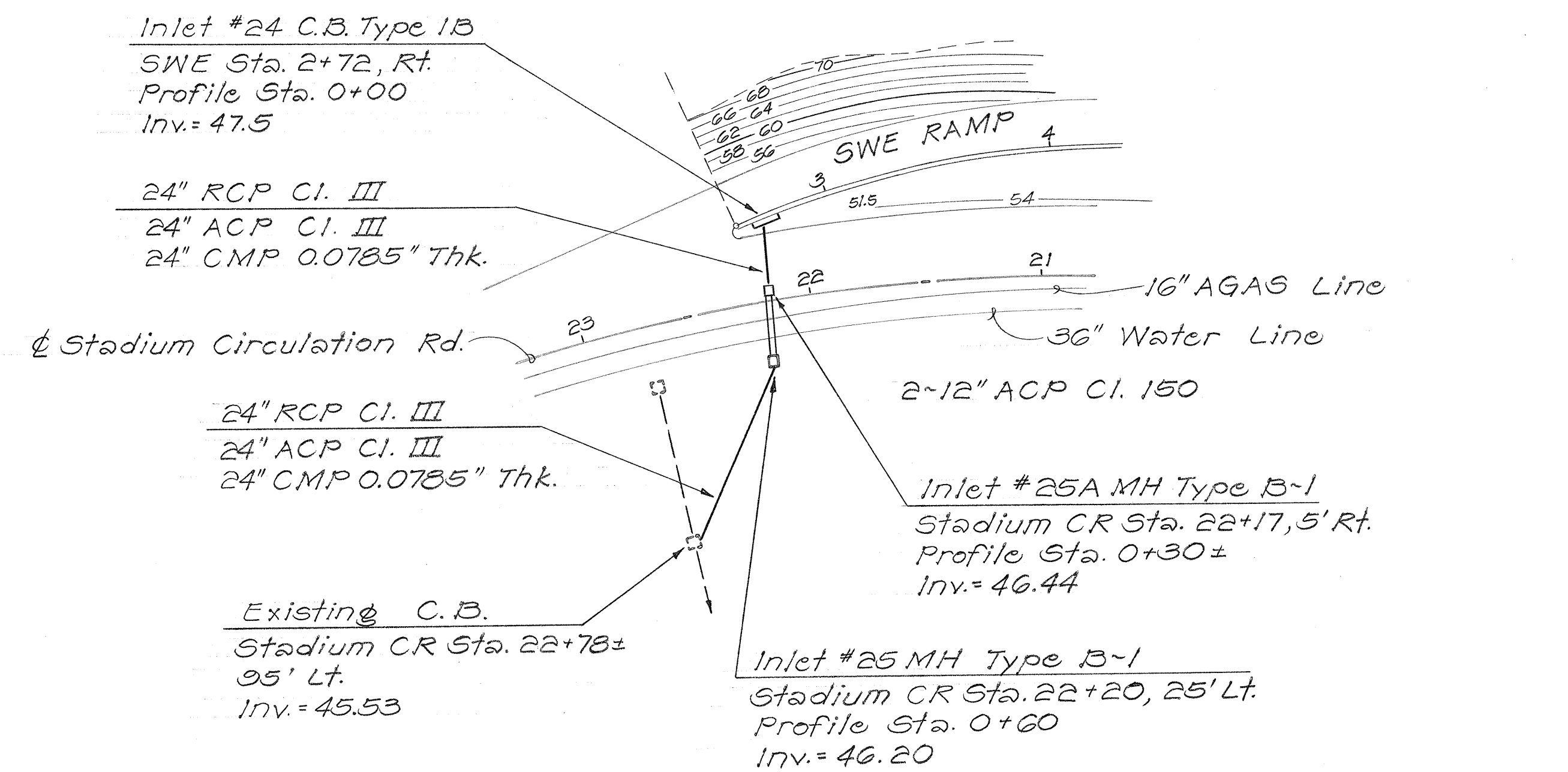
APPROVED:
 S. S. S. S.
 ASSISTANT CHIEF, ENGINEERING 12-11-69
 DATE

NO.	REVISION	APPROVED BY	DATE

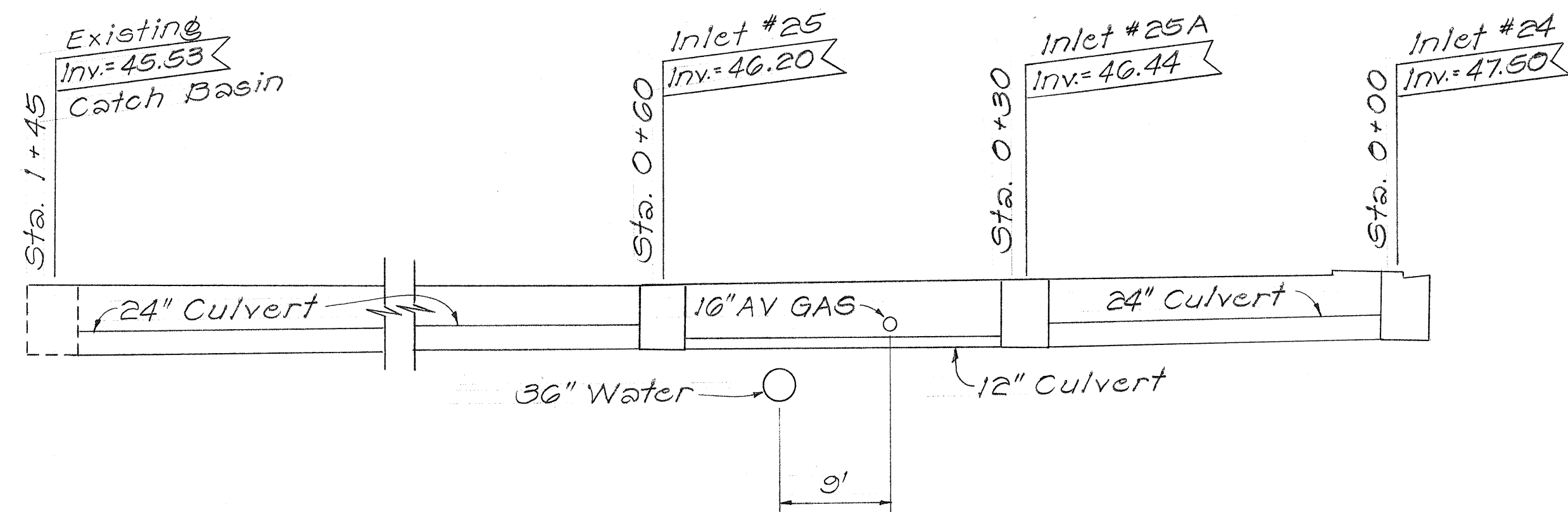
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
 STANDARD DETAILS
 TYPE "IA", "IB", "IC", AND "ID"
 CATCH BASINS

Scale: As Noted Date: July, 1969
 SHEET No. OF SHEETS DH 3

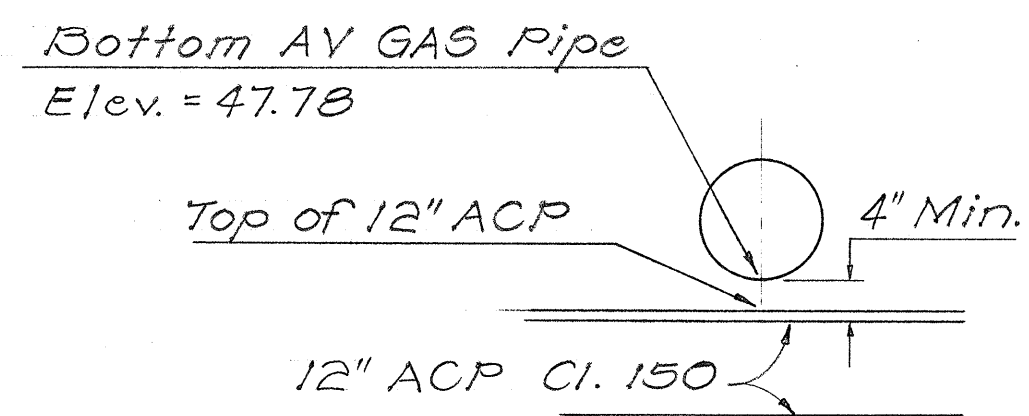
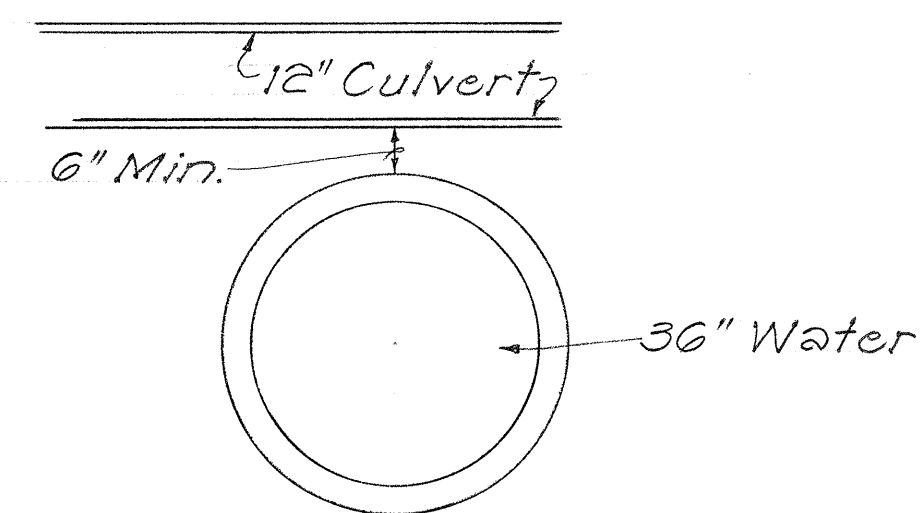
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(91):13	1976	00625-1	228



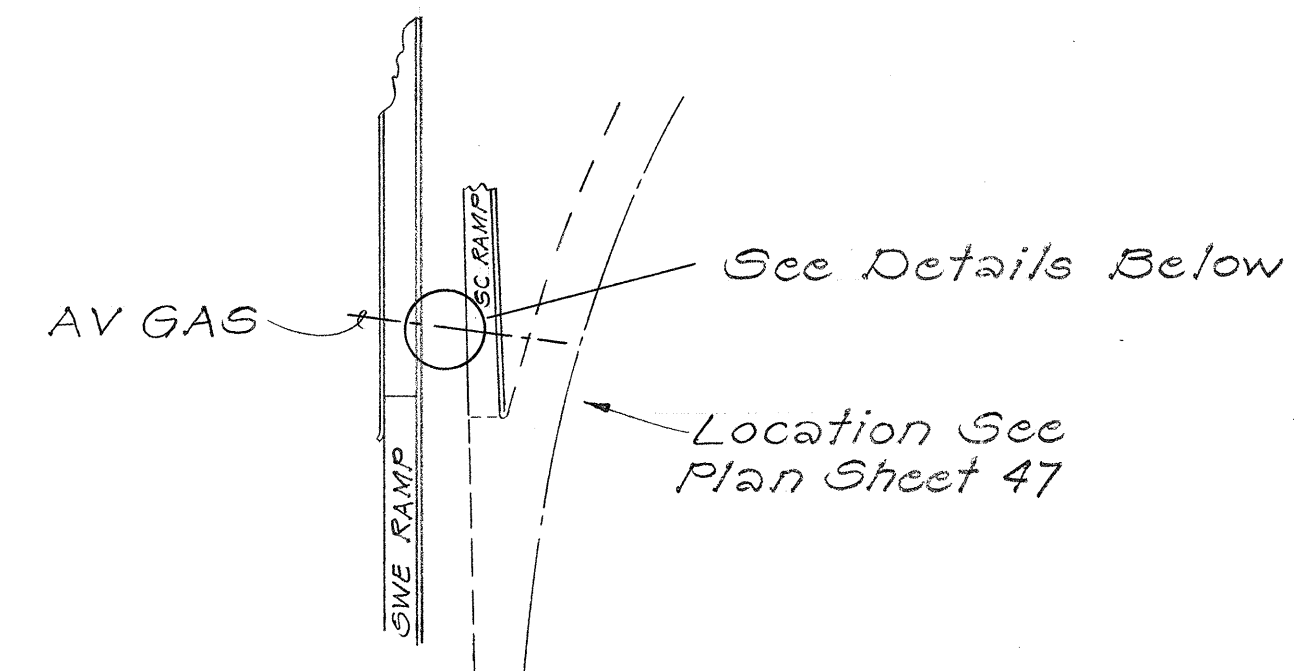
P L A N
Scale: 1" = 50'



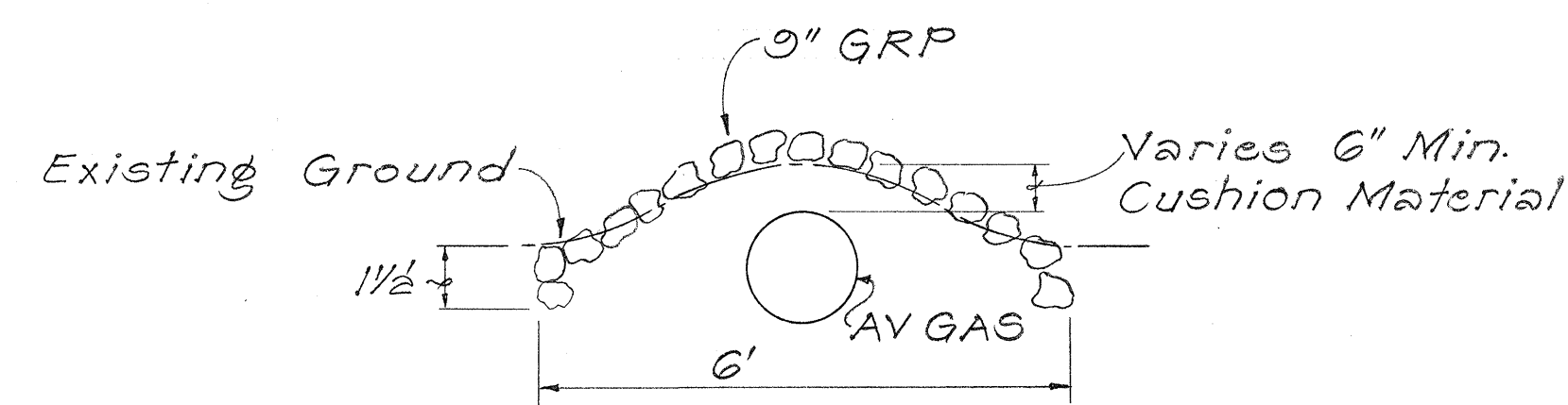
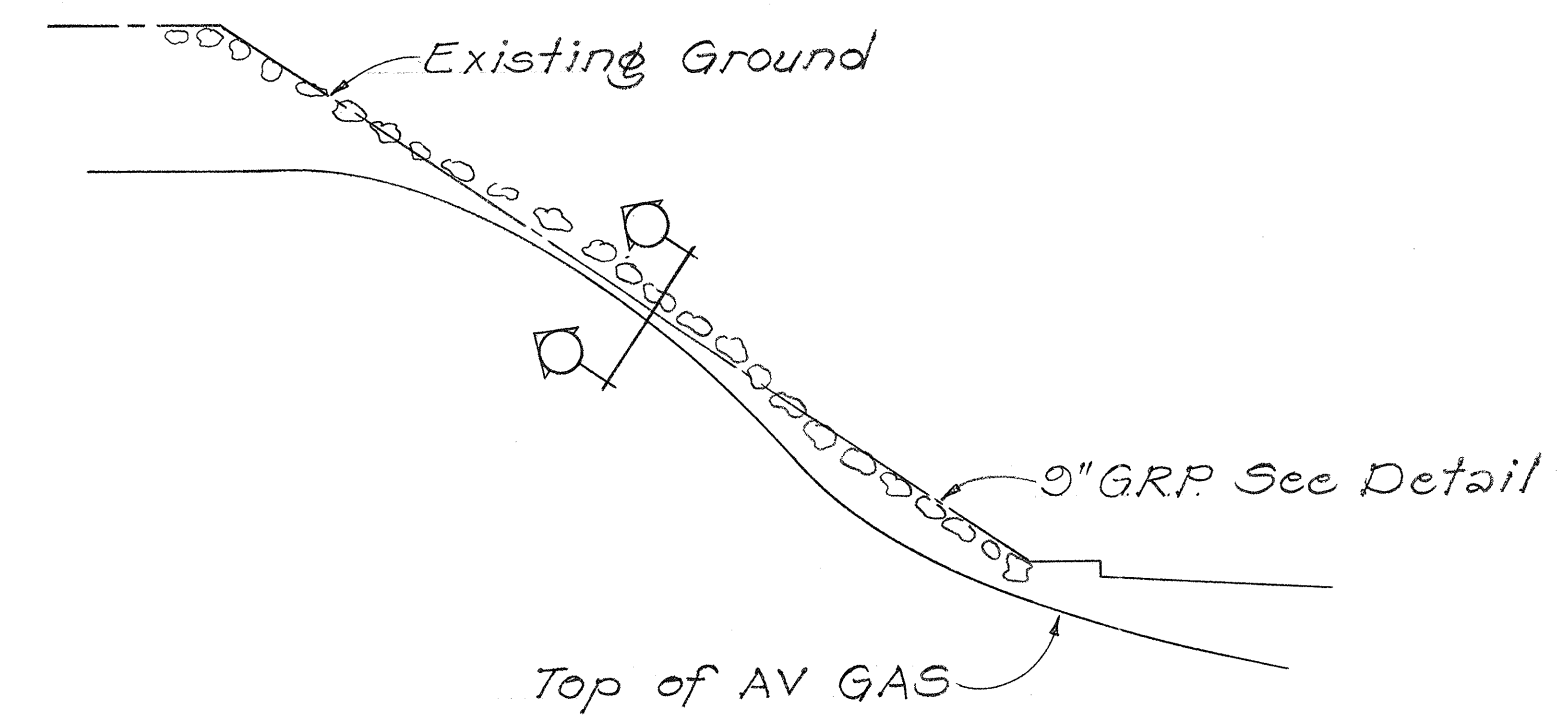
P R O F I L E
Scale: 1" = 10'



D E T A I L S
Not to Scale



P L A N
Scale: 1" = 100'



GROUTED RUBBLE
PAYING DETAIL
Not to Scale

NOTES:

1. Provide smooth transition between GRP and existing ground.
2. Check condition of AV GAS Protective coating and inform the Engineer of results.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

Halawa Interchange
SWE Ramp Lateral
Proj. No. I-HI-1(91):13

Scale: As Shown Date: May 1976

SHEET NO. OF SHEETS

00625-1

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	TRACED BY	
	DESIGNED BY	
	CHECKED BY	