

GENERAL NOTES:

- ALL GRADING AND WORK SHALL BE DONE IN ACCORDANCE WITH CHAPTER 23, GRADING SOIL EROSION AND SEDIMENT CONTROL OF THE REVISED ORDINANCES OF HONOLULU, 1969, AS AMENDED (ORDINANCE NUMBERS 3968, 4294 & 4538) AND ALL GRADING WORK SHALL BE DONE IN ACCORDANCE WITH "SOIL ENGINEERING REPORT, MOANALUA ROAD, PUULOA ROAD TO MIDDLE STREET, PROJECT NO. U-078-1(14) DEPARTMENT OF TRANSPORTATION, HIGHWAYS DIVISION, MATERIALS TESTING & RESEARCH BRANCH" OCTOBER 1976.
- ABANDONED DRAINAGE STRUCTURES: SALVAGE FRAME & COVER; DEMOLISH 3' BELOW FINISH GRADE; PLUG ALL PIPES WITH CLASS D CONCRETE; DEMOLISH BOTTOM; FILL AND COMPACT. ALL WORK TO BE CONSIDERED AS PART OF CONTRACT ITEM NO. 604.1430 "EXIST. DRAIN. STRUCT. TO BE COMPLETELY DEMOLISH."
- ELEVATIONS ARE BASED ON MEAN SEA LEVEL (MSL=0). LOCATION AND BENCH MARK DATA IS SHOWN ON SHEET D-5
- ESTIMATED GRADING STARTING DATE: JAN. 1981 COMPLETION DATE: FEB. 1983
- REMOVE PLUG AND CONNECT TO EXISTING DRAINAGE STRUCTURE WORK SHALL BE INCIDENTAL TO VARIOUS CONTRACT ITEMS.
- THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS RESULTING FROM HIS WORK AND DEPOSITED IN DRAINAGE FACILITIES, ROADWAYS AND OTHER AREAS. THE COSTS INCURRED FOR ANY NECESSARY REMEDIAL ACTION BY THE CHIEF ENGINEER SHALL BE PAYABLE BY THE CONTRACTOR.
- THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL KEEP THE PROJECT AREA AND SURROUNDING AREA FREE FROM DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH THE AIR POLLUTION CONTROL STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH.
- ALL SLOPES AND EXPOSED AREAS SHALL BE SODDED OR PLANTED IMMEDIATELY AFTER THE GRADING WORK HAS BEEN COMPLETED.
- NO GRADING WORK SHALL BE DONE ON SATURDAYS, SUNDAYS AND HOLIDAYS AT ANYTIME WITHOUT PRIOR NOTICE TO THE CHIEF ENGINEER.
- LIMITS OF GRADED AREA SHALL BE FLAGGED BEFORE THE COMMENCEMENT OF THE GRADING WORK.
- ALL GRADING OPERATIONS SHALL BE PERFORMED IN CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE WATER POLLUTION CONTROL AND WATER QUALITY STANDARDS CONTAINED IN THE PUBLIC HEALTH REGULATIONS, STATE DEPARTMENT OF HEALTH, ON WATER POLLUTION CONTROL AND WATER QUALITY STANDARDS.
- TEMPORARY EROSION CONTROL PROCEDURES SHALL BE SUBMITTED FOR APPROVAL PRIOR TO APPLICATION FOR A GRADING PERMIT.
- THE CITY SHALL BE INFORMED OF THE LOCATION OF THE BORROW/DISPOSAL SITE FOR THE PROJECT WHEN THE APPLICATION FOR A GRADING PERMIT IS MADE. THE BORROW/DISPOSAL SITE MUST ALSO FULFILL THE REQUIREMENTS OF THE GRADING ORDINANCE.
- MISCELLANEOUS DRAINAGE ITEMS (WATERSTOPS SEALERS, CUT & PLUG ETC.) SHALL BE INCIDENTAL TO RELATED CONTRACT ITEM.

TOTAL EARTHWORK QUANTITIES

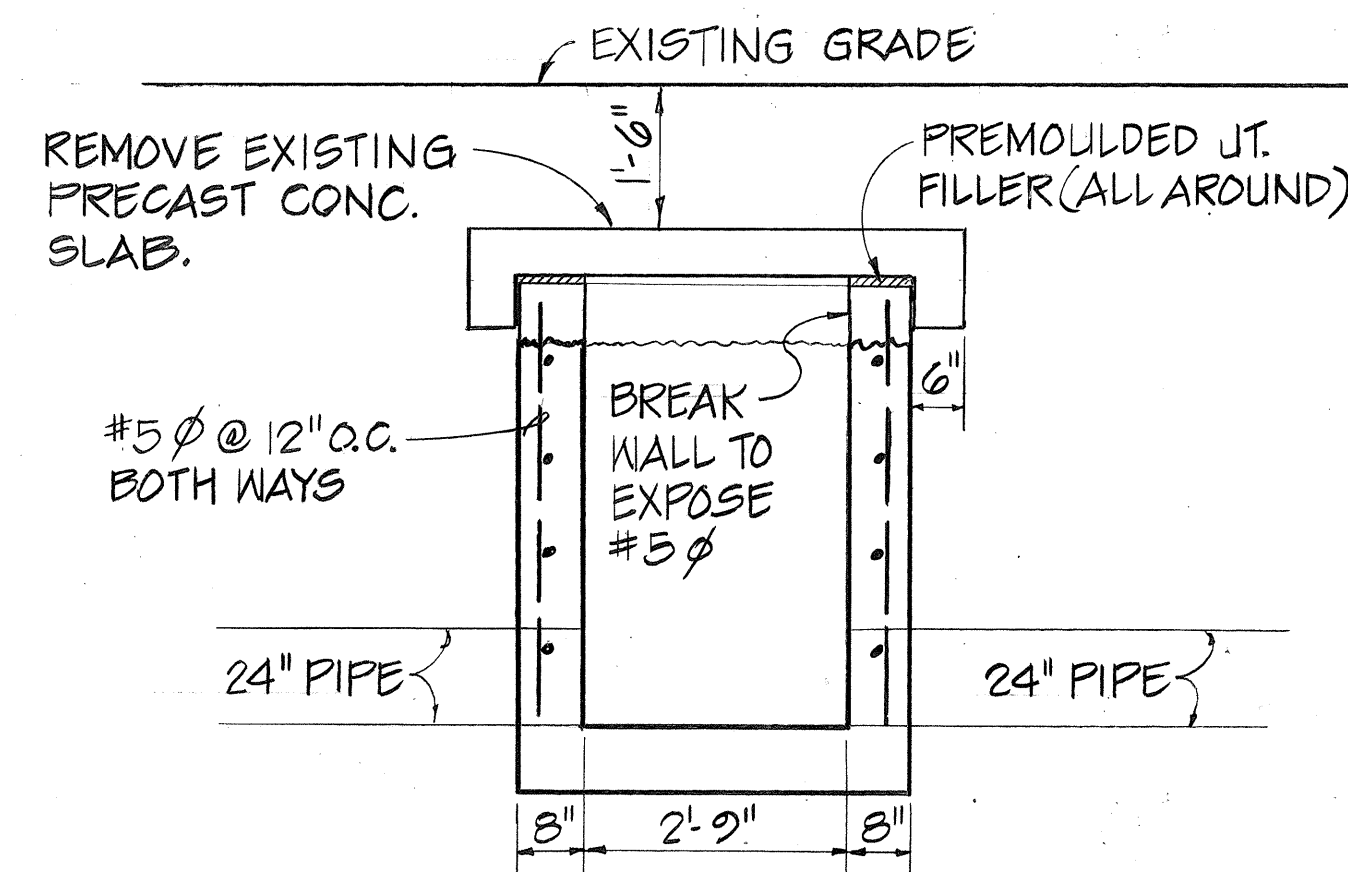
	UNIT 3B
GRADED AREA	12.41 AC
EXCAVATION	40,235 C.Y.
EMBANKMENT	13,105 C.Y.

OWNER & DEVELOPER : STATE OF HAWAII
TAX MAP KEY: 1-1-35

AREA TO BE GRADED = 0.80 ACRES

APPROVED FOR GRADING ONLY

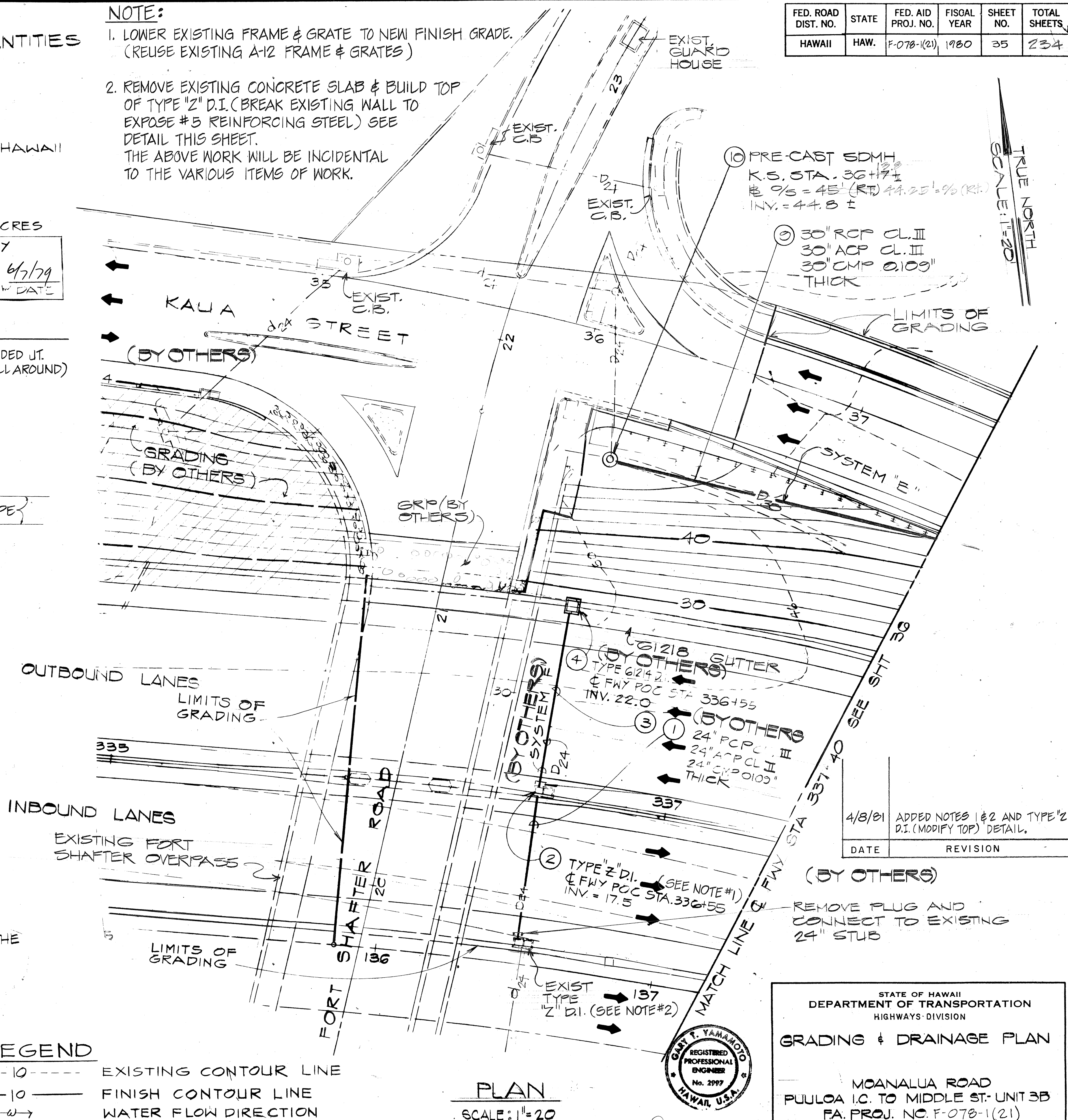
[Signature] 6/7/79
CHIEF, DIVISION OF ENGINEERING DATE



TYPE "Z" DROP INTAKE
MODIFY TOP
N.T.S.

NOTE:

- LOWER EXISTING FRAME & GRATE TO NEW FINISH GRADE. (REUSE EXISTING A-12 FRAME & GRATES)
- REMOVE EXISTING CONCRETE SLAB & BUILD TOP OF TYPE "Z" D.I. (BREAK EXISTING WALL TO EXPOSE #5 REINFORCING STEEL) SEE DETAIL THIS SHEET. THE ABOVE WORK WILL BE INCIDENTAL TO THE VARIOUS ITEMS OF WORK.



LEGEND

- 10 --- EXISTING CONTOUR LINE
- 10 — FINISH CONTOUR LINE
- > WATER FLOW DIRECTION
- EXISTING DRAIN TO BE REMOVED OR ABANDONED WITH PLUG

PLAN
SCALE: 1"=20'



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GRADING & DRAINAGE PLAN

MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST. UNIT 3B
FA. PROJ. NO. F-078-1(21)

SCALE: AS SHOWN DATE: AUG. 1, 1979
SHEET NO. D-1 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-078-1(21)	1980	35	234

DATE	REVISION
4/8/81	ADDED NOTES 1 & 2 AND TYPE "Z" D.I. (MODIFY TOP) DETAIL.

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

AREA TO BE GRADED = 2.79 ACRES

APPROVED FOR GRADING ONLY:

JR. Young ^{6/1/74}
~~DATE~~

CHIEF, DIVISION OF ENGINEERING

THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GRADING & DRAINAGE PLAN

MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST. - UNIT 3B
F.A. Proj. No. F-078-1(21)

SCALE: AS SHOWN DATE: AUG 1, 1970

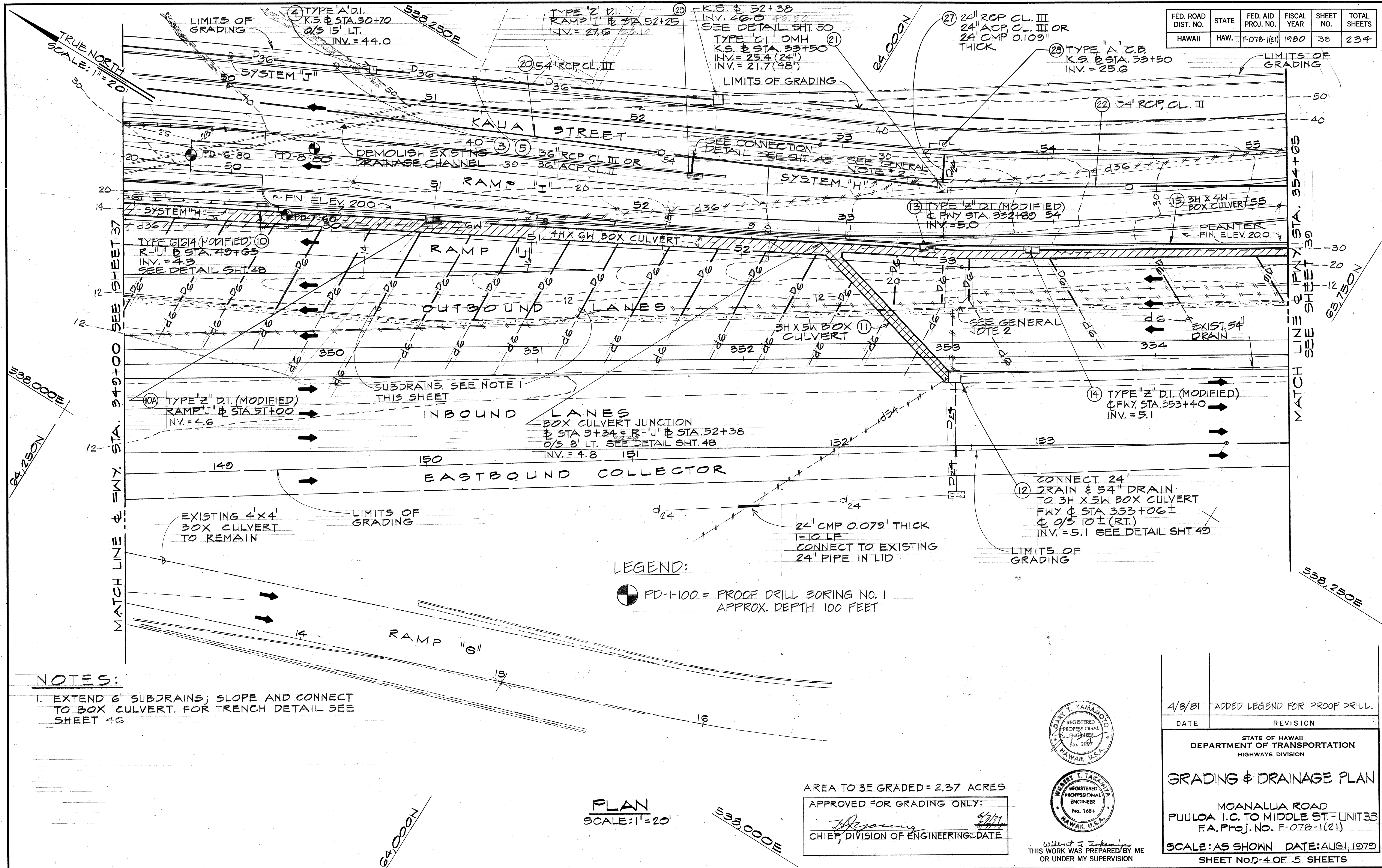
SHEET No. D-2 OF 5 SHEETS

ADD 36

← EXISTING 24" DRAIN CONNECT
TO DRAINAGE STRUCTURE



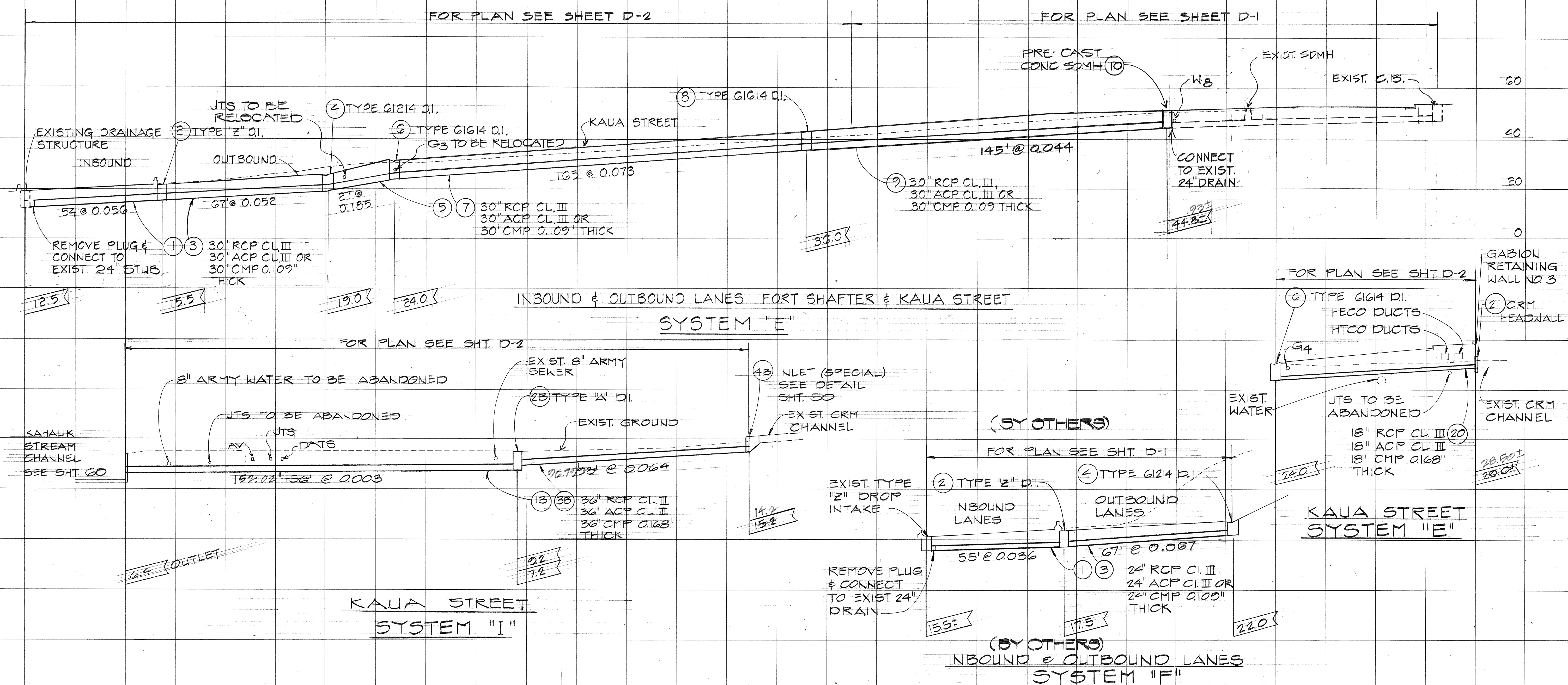
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-078-1(21)	1980	38	234



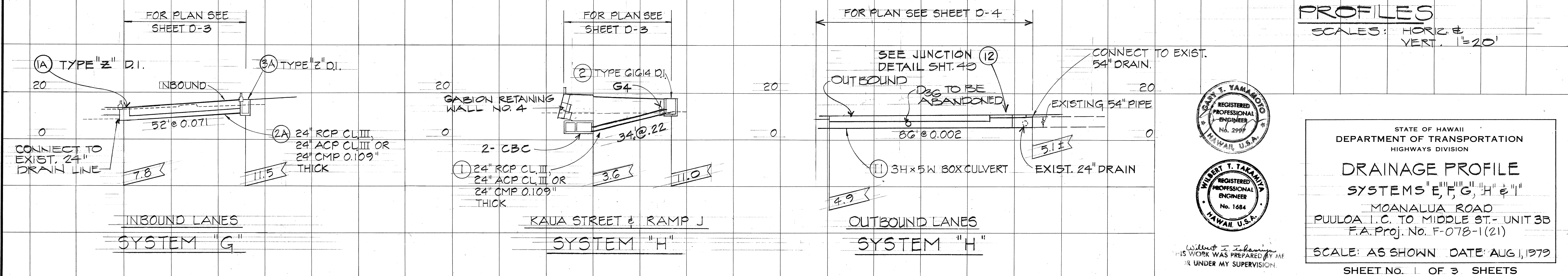
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

1. EXTEND 6" SUBDRAINS; SLOPE AND CONNECT TO BOX CULVERT. FOR TRENCH DET. SEE SHEET 40

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-078-1(21)	1980	40	234



DATE: _____
 SURVEY PLOTTED BY: _____
 DRAWN BY: _____
 DESIGNED BY: _____
 CHECKED BY: _____
 NO. _____



CARY T. YAMAMOTO
 REGISTERED PROFESSIONAL ENGINEER
 No. 2999
 HAWAII, U.S.A.

WILBERT T. YAMAMOTO
 REGISTERED PROFESSIONAL ENGINEER
 No. 1684
 HAWAII, U.S.A.

Witness: I, *William J. T. Yamamoto*
 HIS WORK WAS PREPARED BY ME
 OR UNDER MY SUPERVISION.

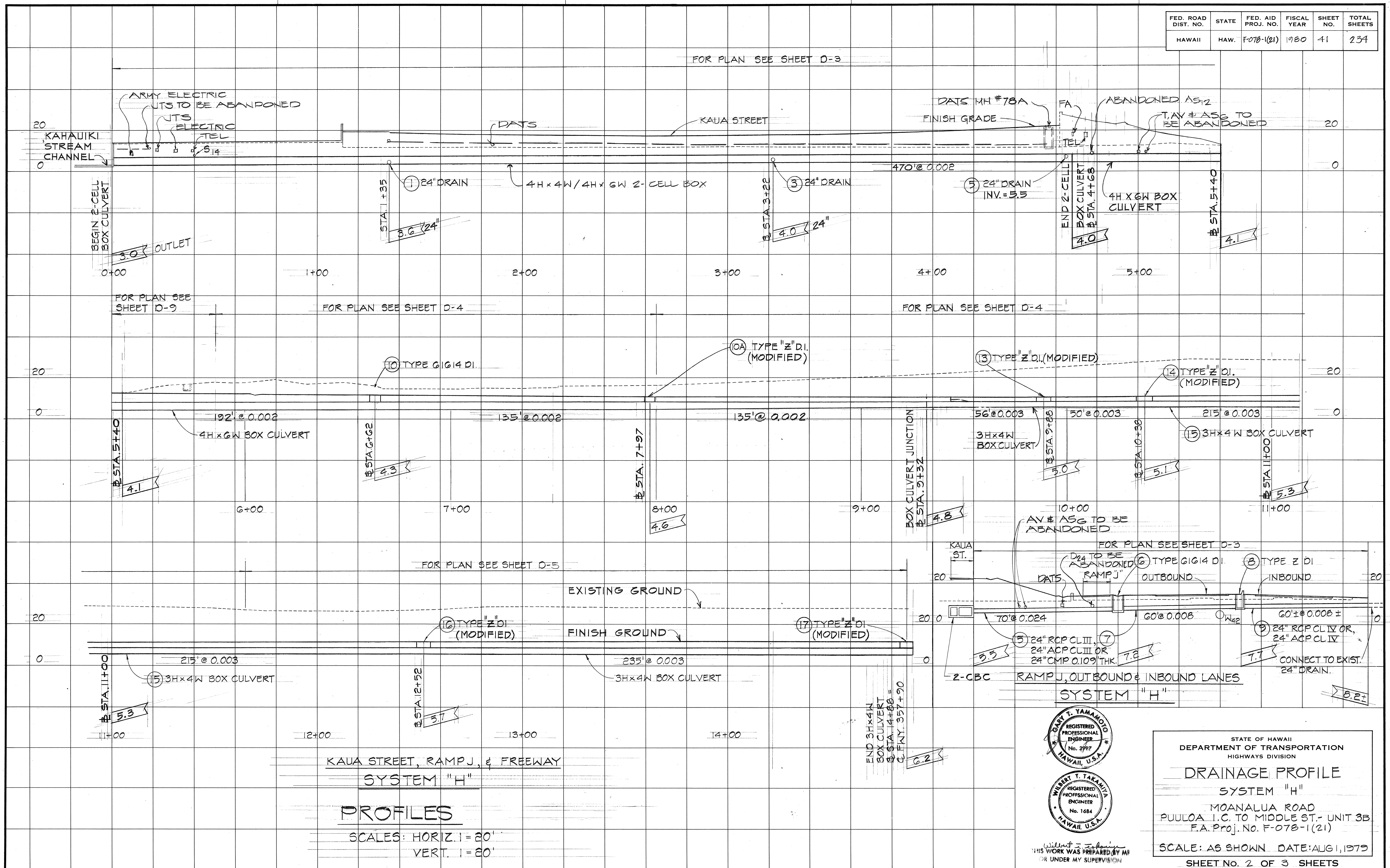
PROFILES
 SCALES: HORIZ. & VERT. 1"=20'

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

DRAINAGE PROFILE
 SYSTEMS "E", "F", "G", "H" & "I"
 MOANALUA ROAD
 PUULOA I.C. TO MIDDLE ST. UNIT 3B
 F.A. Proj. No. F-078-1(21)

SCALE: AS SHOWN DATE: AUG. 1, 1979
 SHEET NO. 1 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-078-1(21)	1980	41	234



DATE _____

SURVEY PLOTTED BY _____

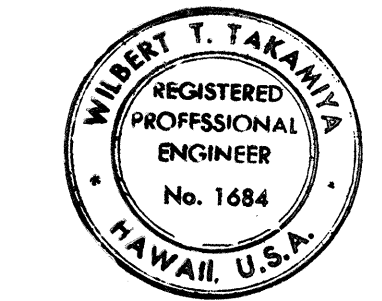
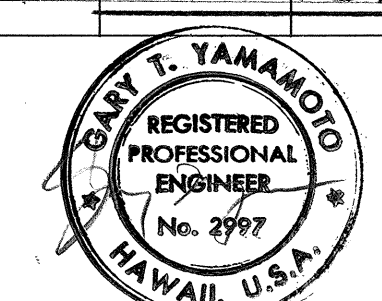
ORIGINAL DRAWN BY _____

DESIGNED BY _____

NOTE BOOK _____

CHECKED BY _____

NO. _____



Without T. Yamamoto
THIS WORK WAS PREPARED BY ME
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

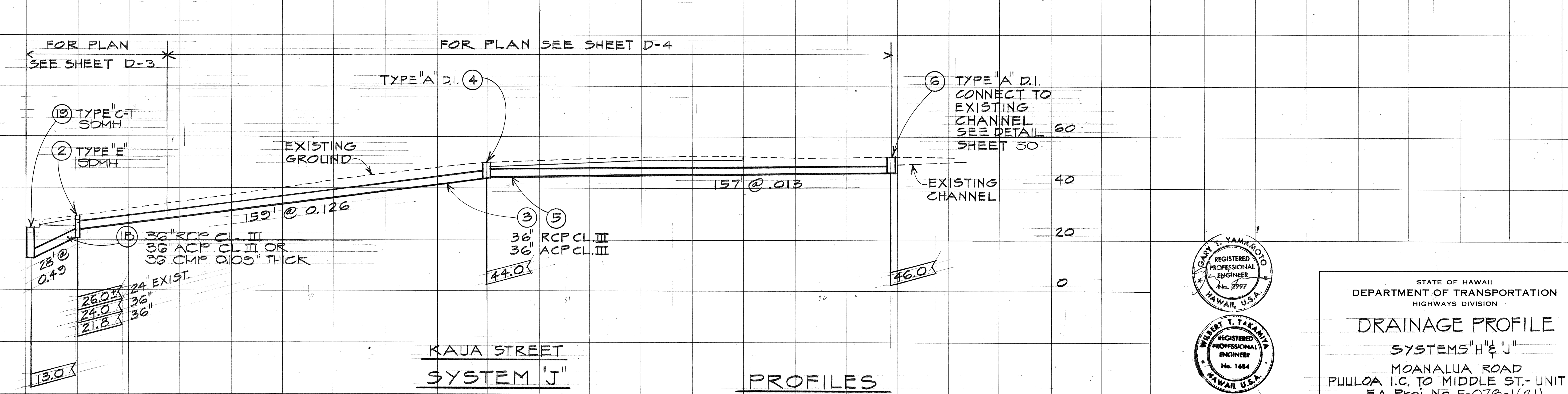
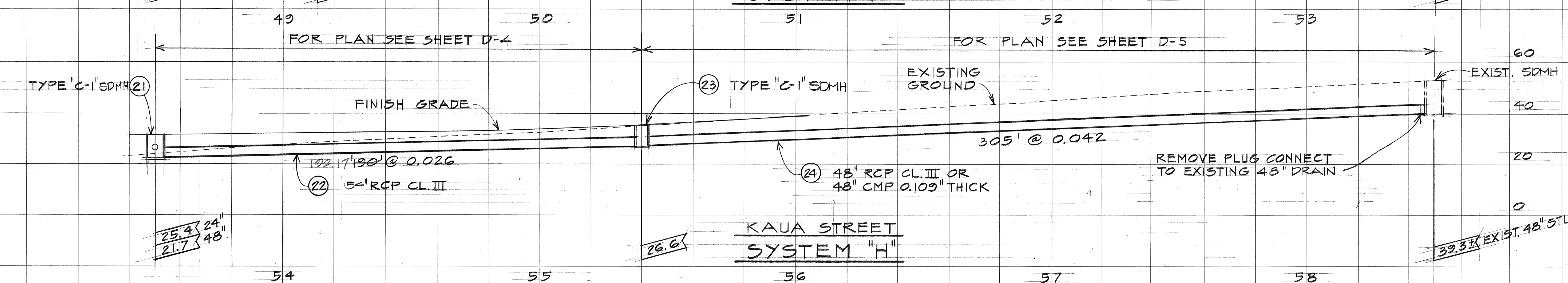
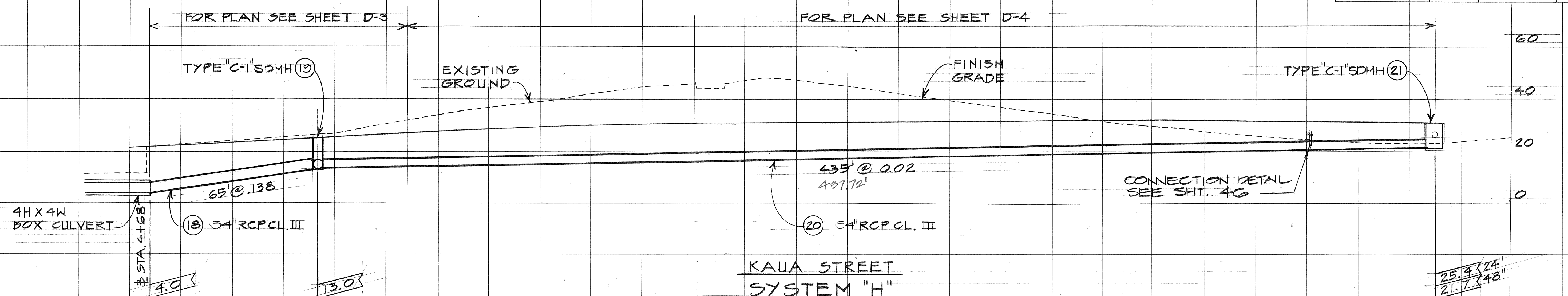
DRAINAGE PROFILE
SYSTEM "H"

MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST.- UNIT 3B
F.A. Proj. No. F-078-1(21)

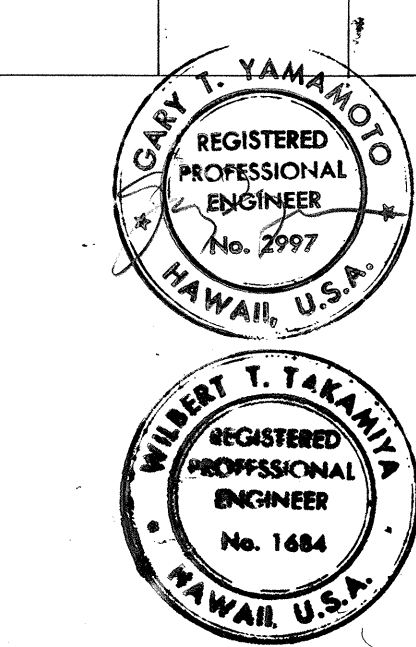
SCALE: AS SHOWN DATE: AUG 1, 1979

SHEET NO. 2 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-070-1(21)	1980	42	234



PROFILES
 SCALES: HORIZ. 1" = 20'
 VERT. 1" = 20'



STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
DRAINAGE PROFILE
 SYSTEMS "H" & "J"
 MOANALUA ROAD
 PUULOA I.C. TO MIDDLE ST.- UNIT 3B
 F.A. Proj. No. F-070-1(21)
 SCALE: AS SHOWN DATE: AUG 1, 1979
 SHEET NO. 3 OF 3 SHEETS

SURVEY PLOTTED BY: _____
 DATE: _____
 DRAWN BY: _____
 TRACED BY: _____
 NOTE BOOK: _____
 QUANTITIES BY: _____
 CHECKED BY: _____
 NO. _____

S U M M A R Y

[illegible]

THIS WORK WAS PREPARED BY Wilbert T. Takemura M
OR UNDER MY SUPERVISION

S U M M A R Y

[illegible]

ADD 44

S U M M A R Y

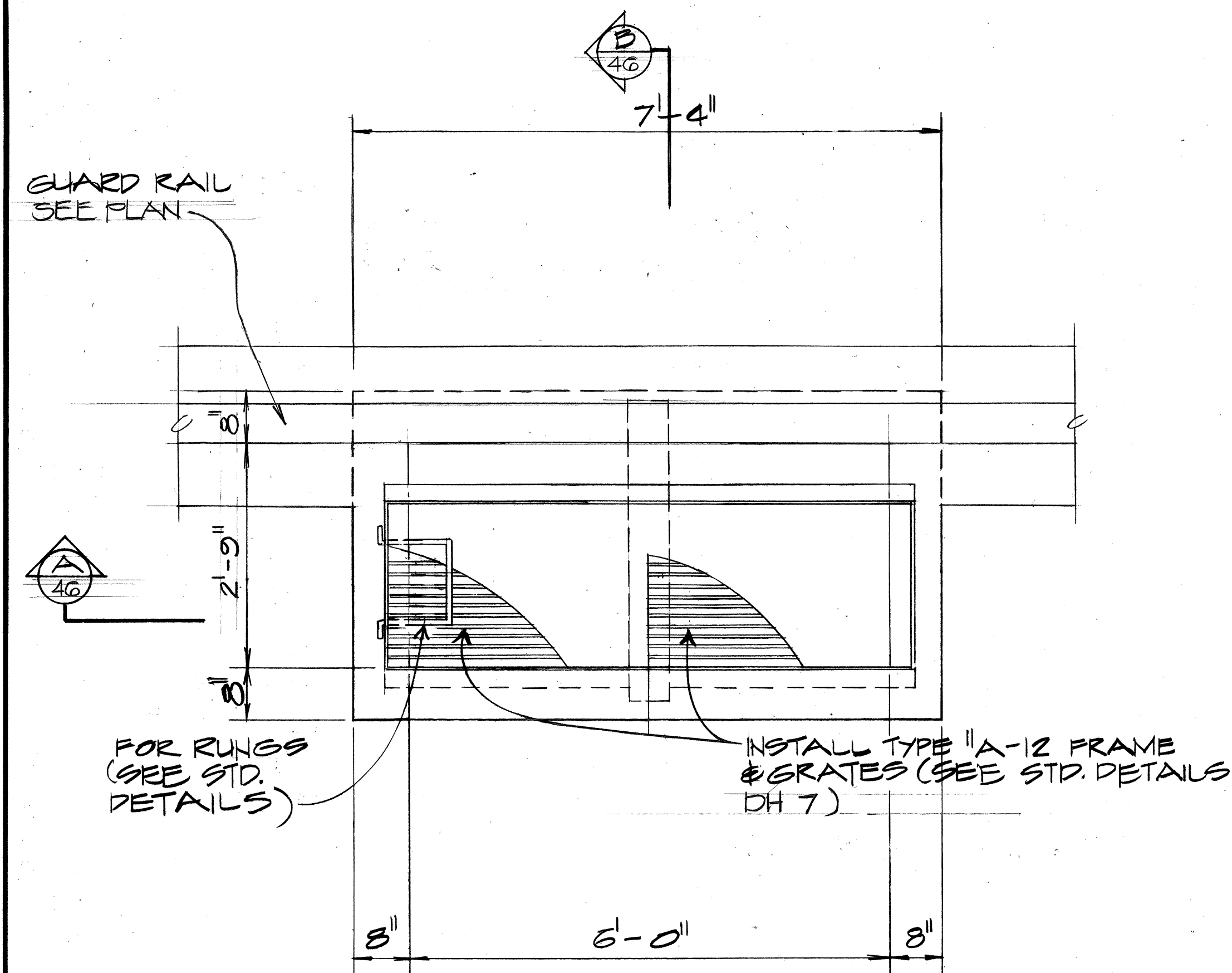
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F078-1(21)	1980	45	234

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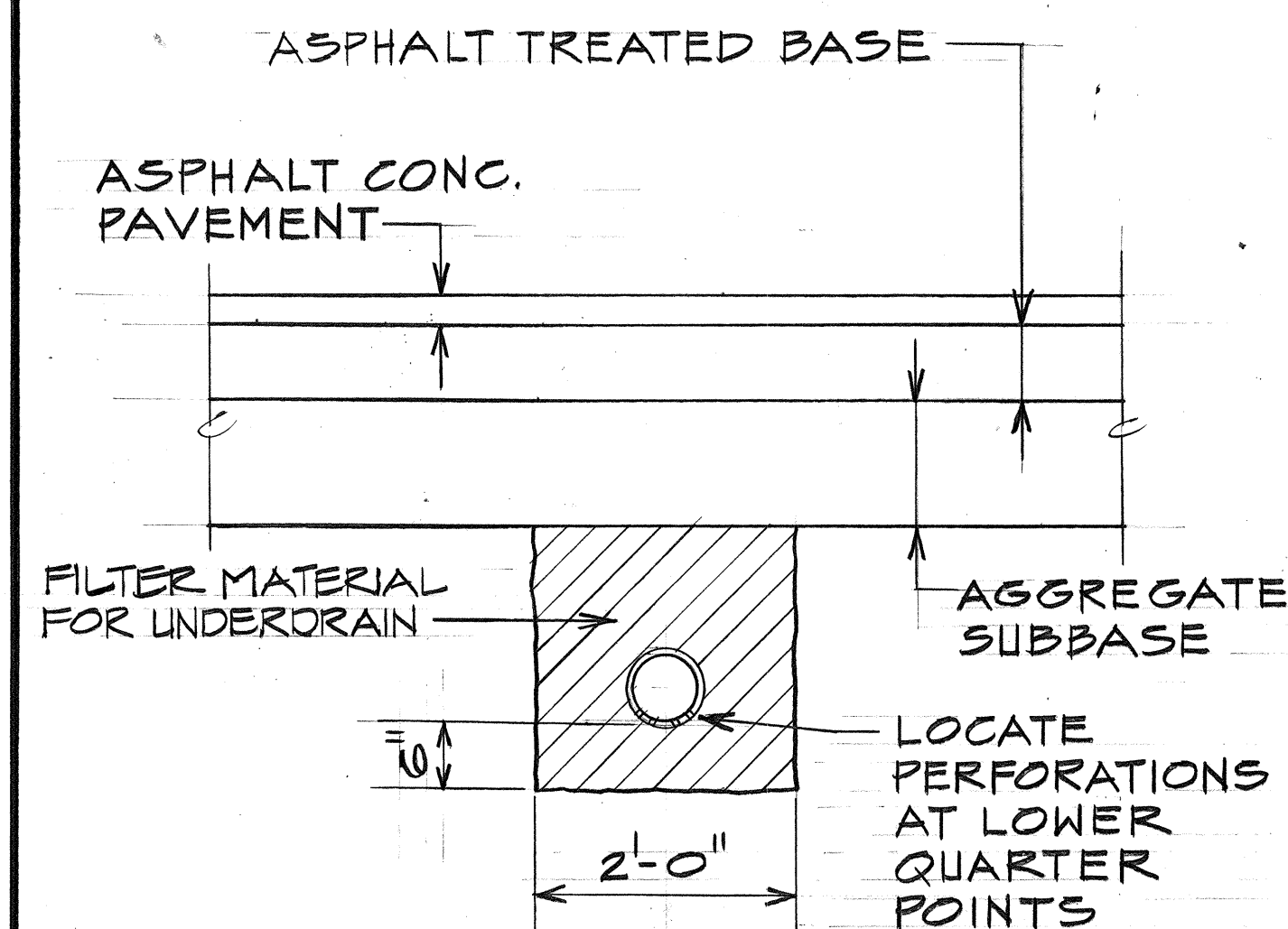
WILBERT T. TOKIMURA
REGISTERED
PROFESSIONAL
ENGINEER
No. 1694
HAWAII, U.S.A.

Wilbert T. Tokimura
THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION

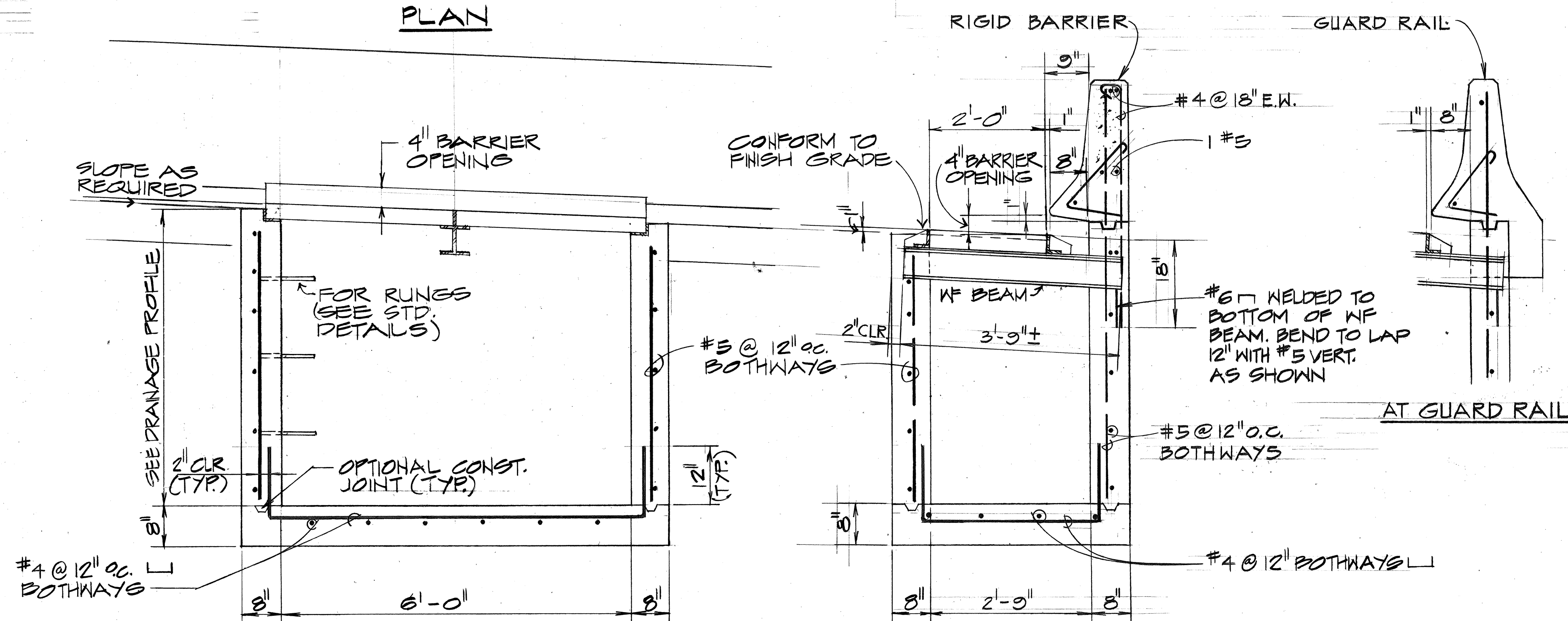
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-078-1(21)	1980	46	234



PLAN



TYP. TRENCH DET.
OF 6" PERFORATED
CMP SUBDRAIN
NOT TO SCALE



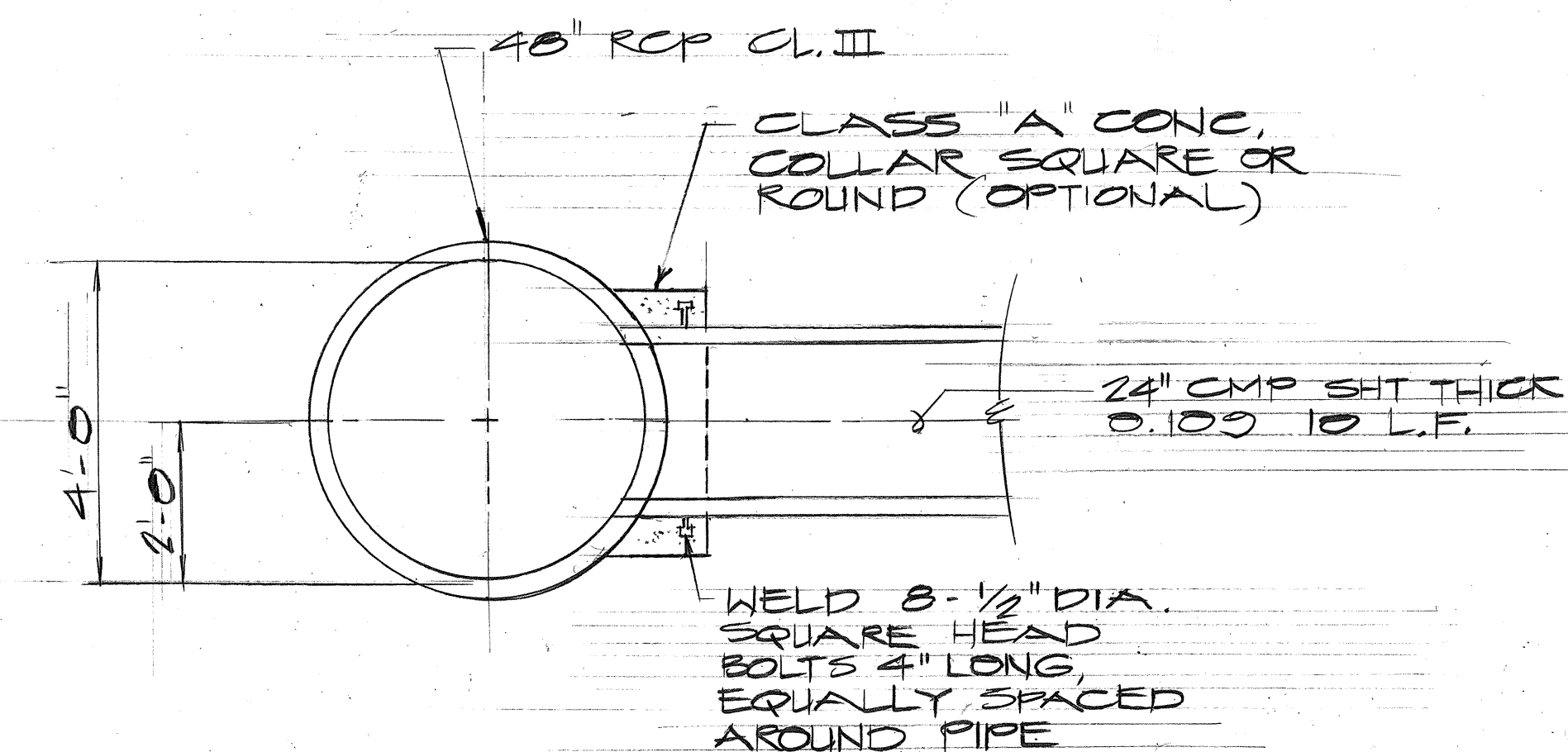
SECTION A
46

SECTION B
46

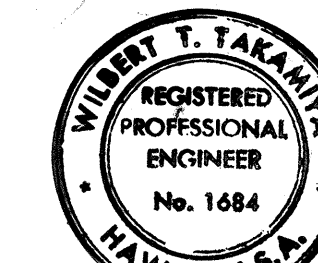
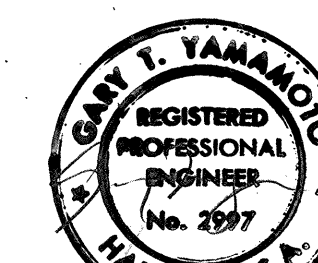
DROP INTAKE TYPE "Z"
SCALE: 3/4" = 1' = 0"

GENERAL NOTES:

- PAYMENT FOR MISCELLANEOUS ITEMS SUCH AS ROCK SAND RUNGS ETC. IS TO BE INCIDENTAL TO CONCRETE FOR DRAINAGE SYSTEM.
- RUNGS SHALL NOT BE INSTALLED OVER PIPE CONNECTIONS AND THE LOWEST RUNG SHALL NOT BE MORE THAN 24" ABOVE THE INVERT.
- REINFORCED CONCRETE DESIGN DATA: $f'_c = 3,000$ PSI (28 DAYS)
 $f_y = 40,000$ PSI
DEFORMED BARS
- FOR SPLICES NOT DETAILED, OVERLAP BARS 24 BAR DIAMETER OR 12" MINIMUM; STAGGER ALL SPLICES AS APPROVED BY THE ENGINEER.
- UNLESS SHOWN OTHERWISE WALL REINFORCING BARS WILL BE #5 @ 12" O.C. MINIMUM BOTH DIRECTIONS CENTERED IN SLAB AND BENT INTO TOP SLAB WHERE APPLICABLE.
- ALL VERTICAL WALL REINFORCING BARS TO BE BENT INTO TOP SLAB A MINIMUM OF 12".
- BEND WALL REINFORCEMENT AROUND PIPE CULVERT WHERE APPLICABLE.
- SLAB REINFORCEMENT TO BE CENTERED.
- ALL CONCRETE SHALL BE CLASS "A" UNLESS OTHERWISE NOTED.



24" DRAIN LINE CONN.
NO SCALE



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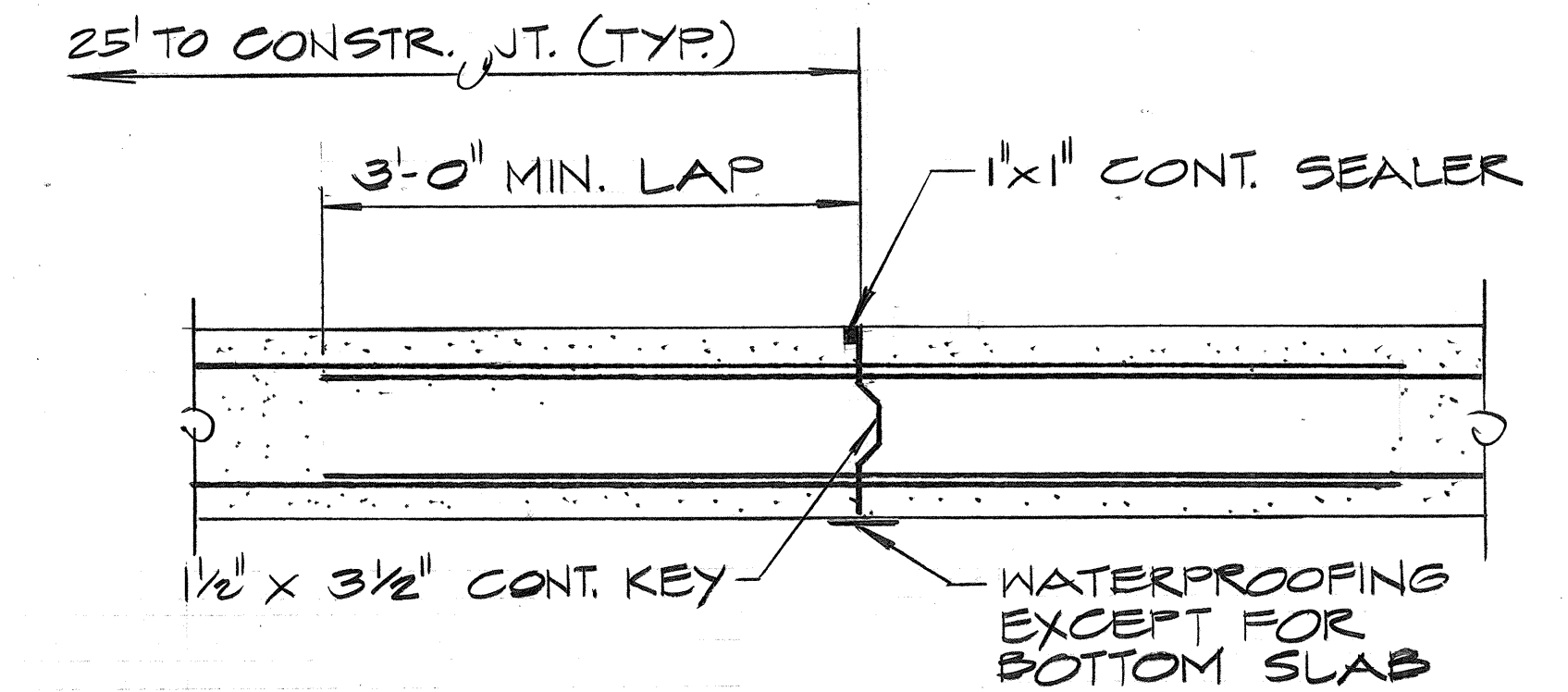
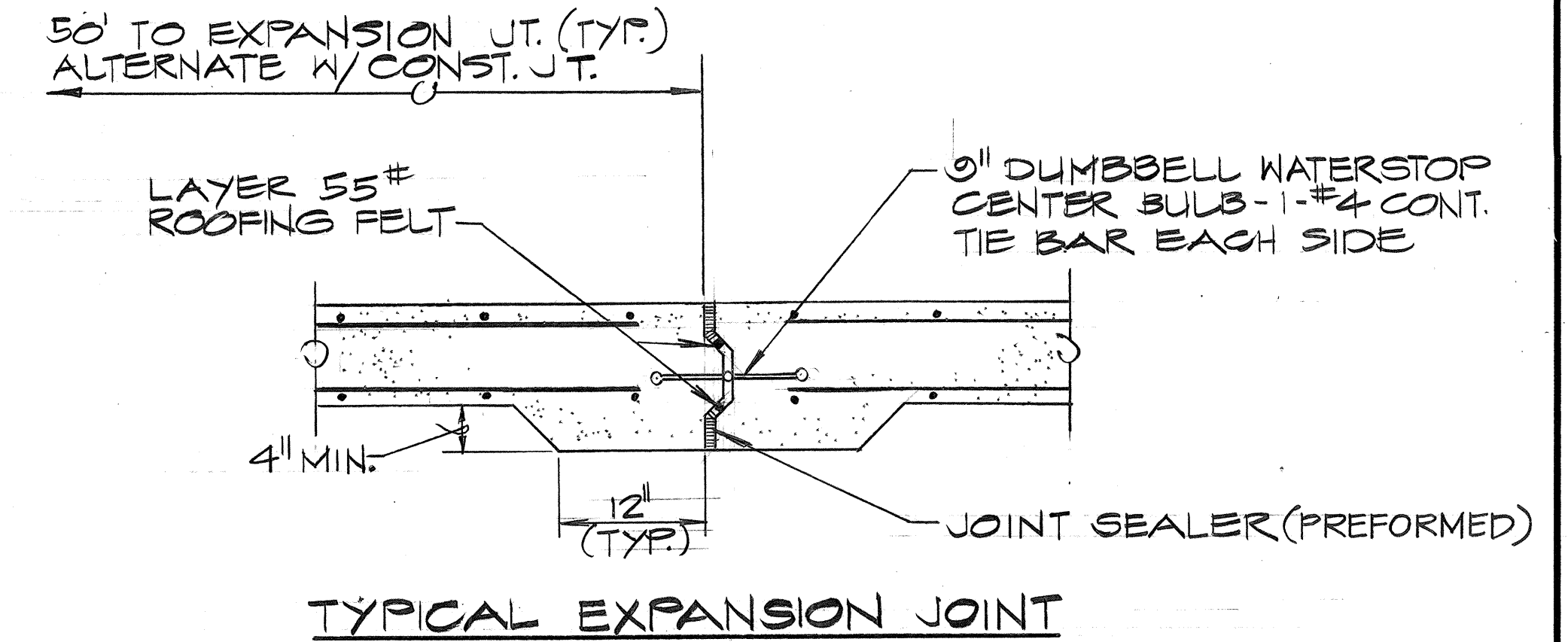
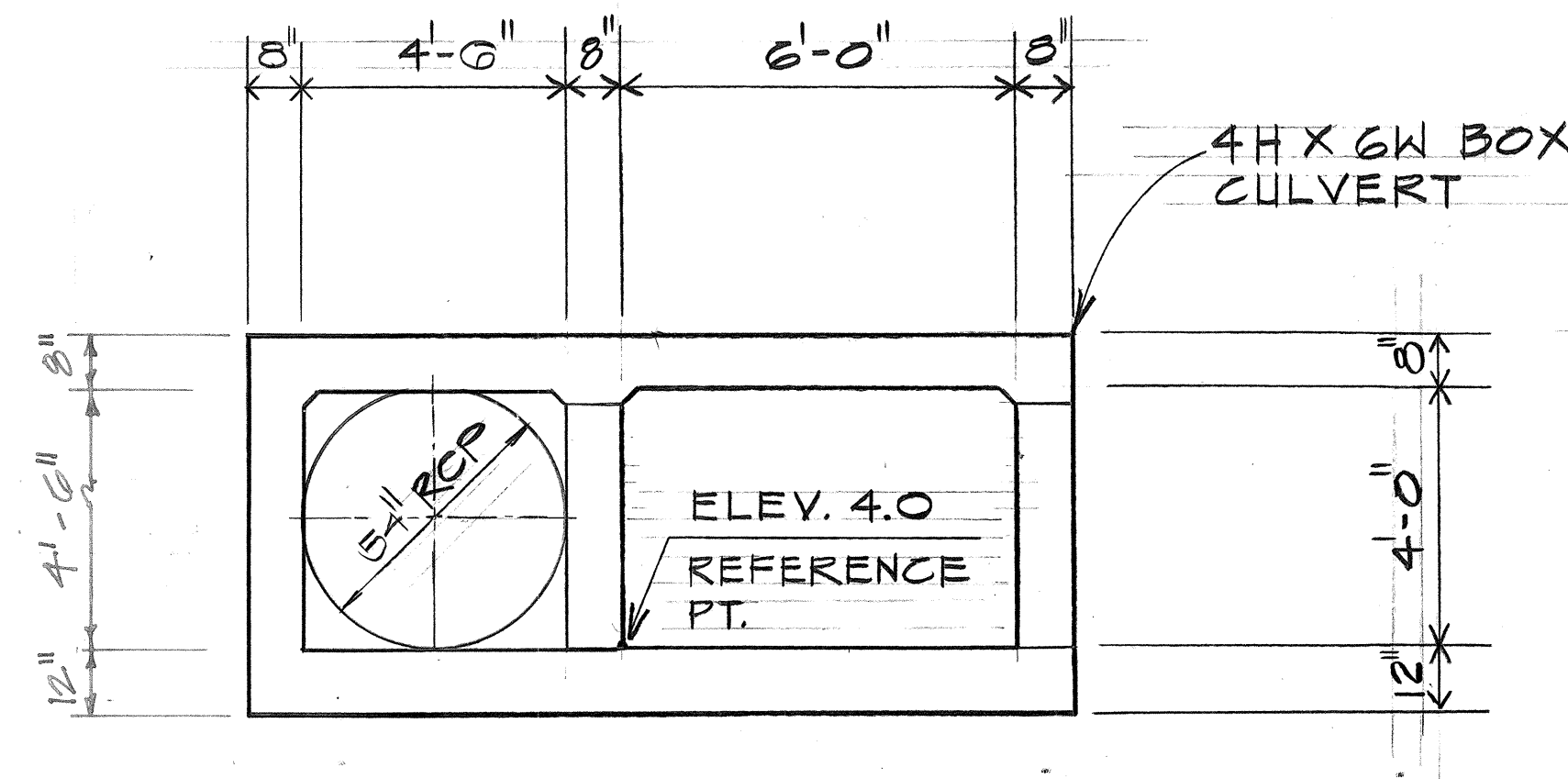
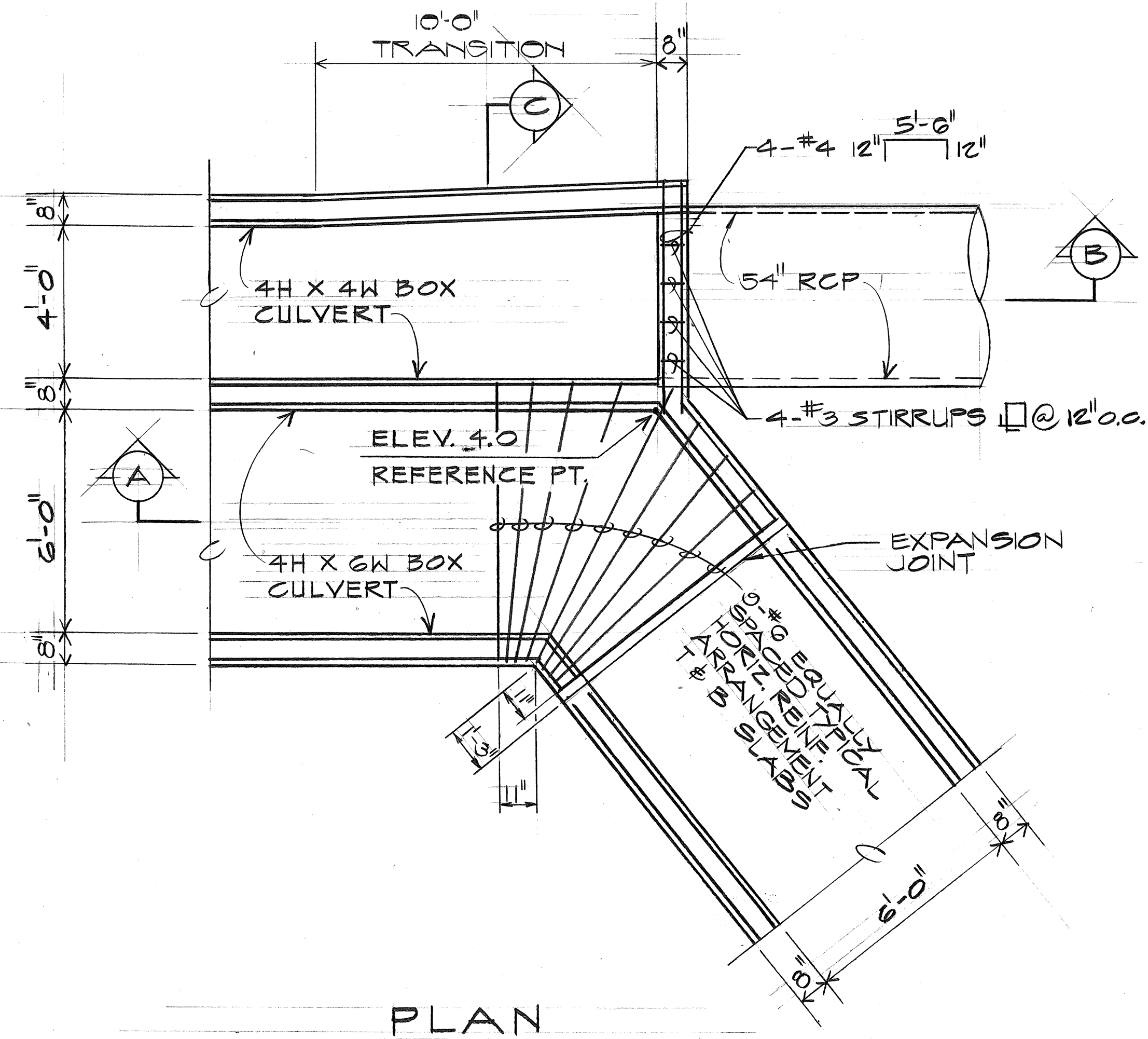
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

MOANALUA ROAD
PUULO A I.C. TO MIDDLE ST. - UNIT 3B
F.A. PROJ. NO. F-078-1(21)

SCALE: AS SHOWN DATE: AUG 1, 1979
SHEET NO. 1 OF SHEETS

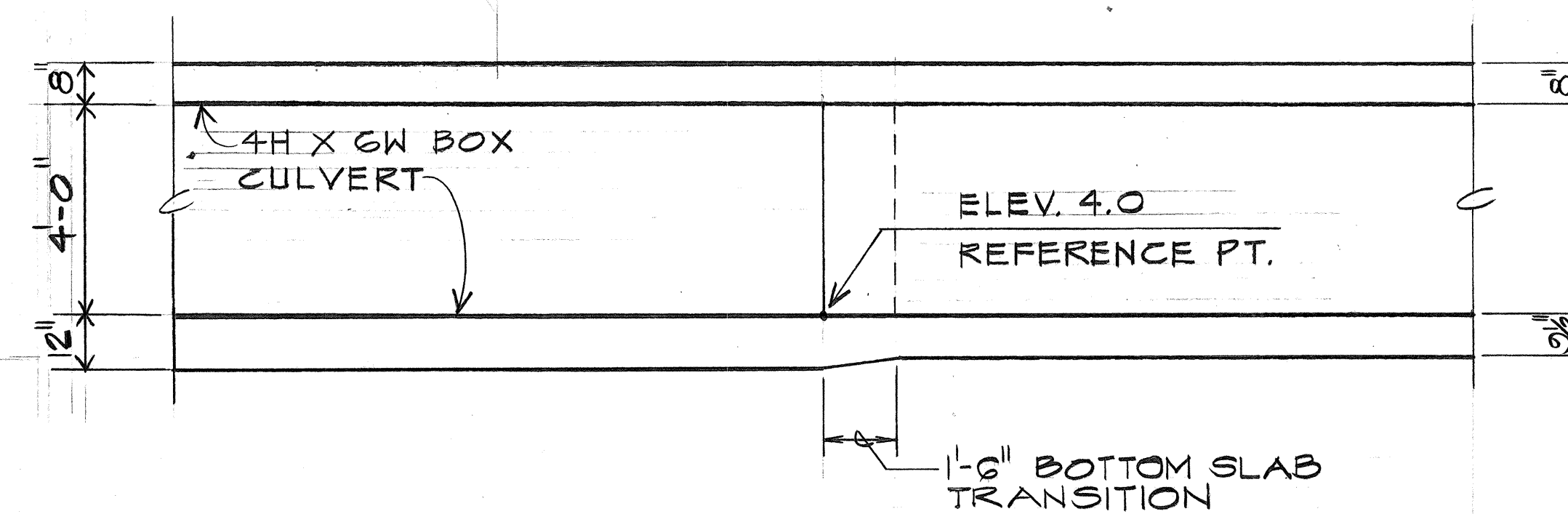
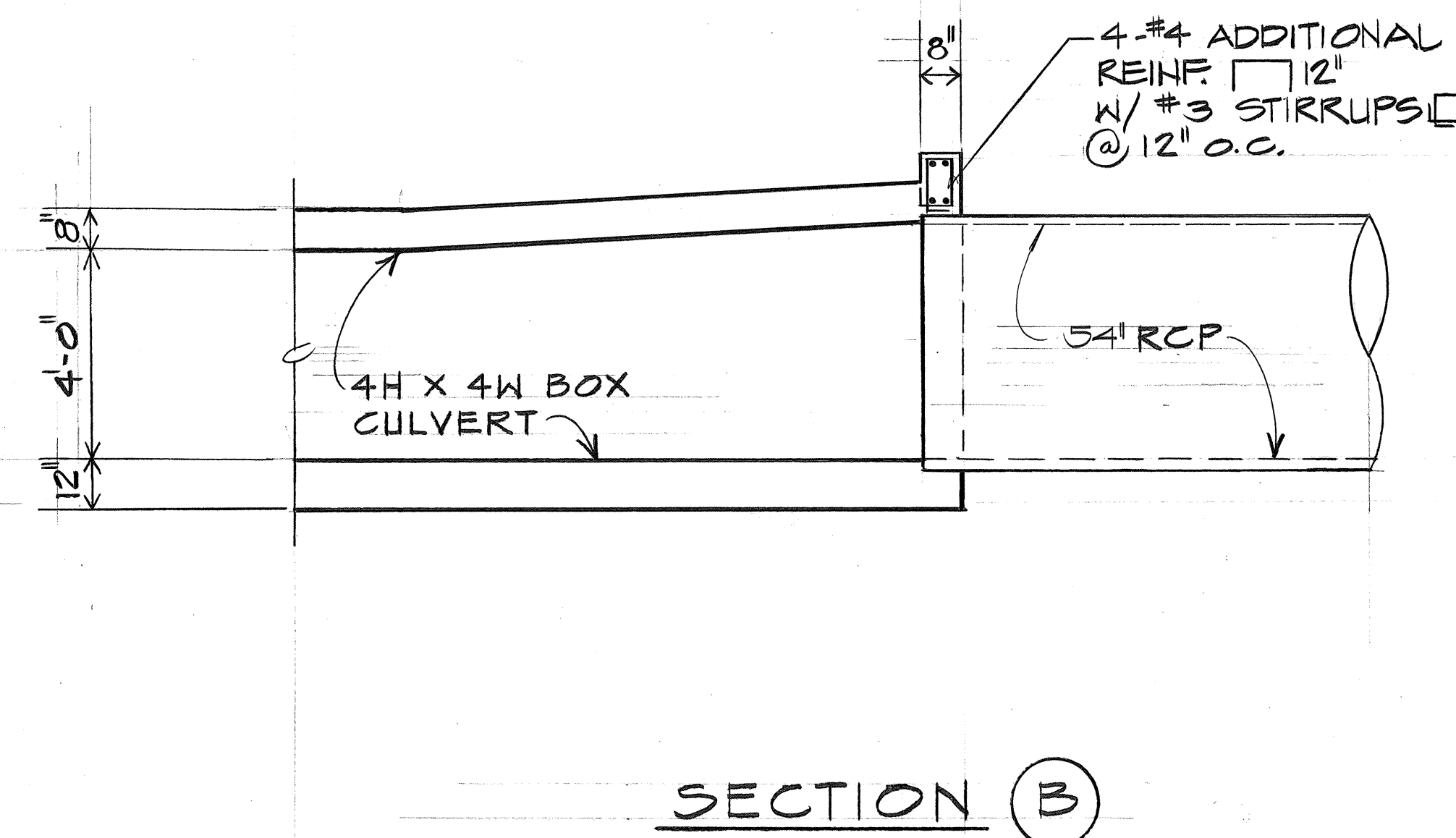
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-078-1(2)	1980	47	234



JOINT DETAILS FOR CHANNEL AND BOX CULVERT (B) NO SCALE

NOTES:

- SEE SHEET 51 FOR TYPICAL BOX CULVERT REINFORCING.
- FOR GRADING & DRAINAGE PLAN SEE SHT. 37
- PAYMENT FOR MISCELLANEOUS APPURTENANCES SHALL BE CONSIDERED INCIDENTAL TO THE MAJOR STRUCTURES.



JUNCTION STRUCTURE DETAILS (A) # STA. 4+68 (FOR LOCATION SEE SHT. 37) SCALE: 3/8" = 1'-0"

4/8/81
DATE
REVISION

REGISTERED PROFESSIONAL ENGINEER
No. 2097
HAWAII, U.S.A.

REGISTERED PROFESSIONAL ENGINEER
No. 1684
HAWAII, U.S.A.

Without a Seal
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

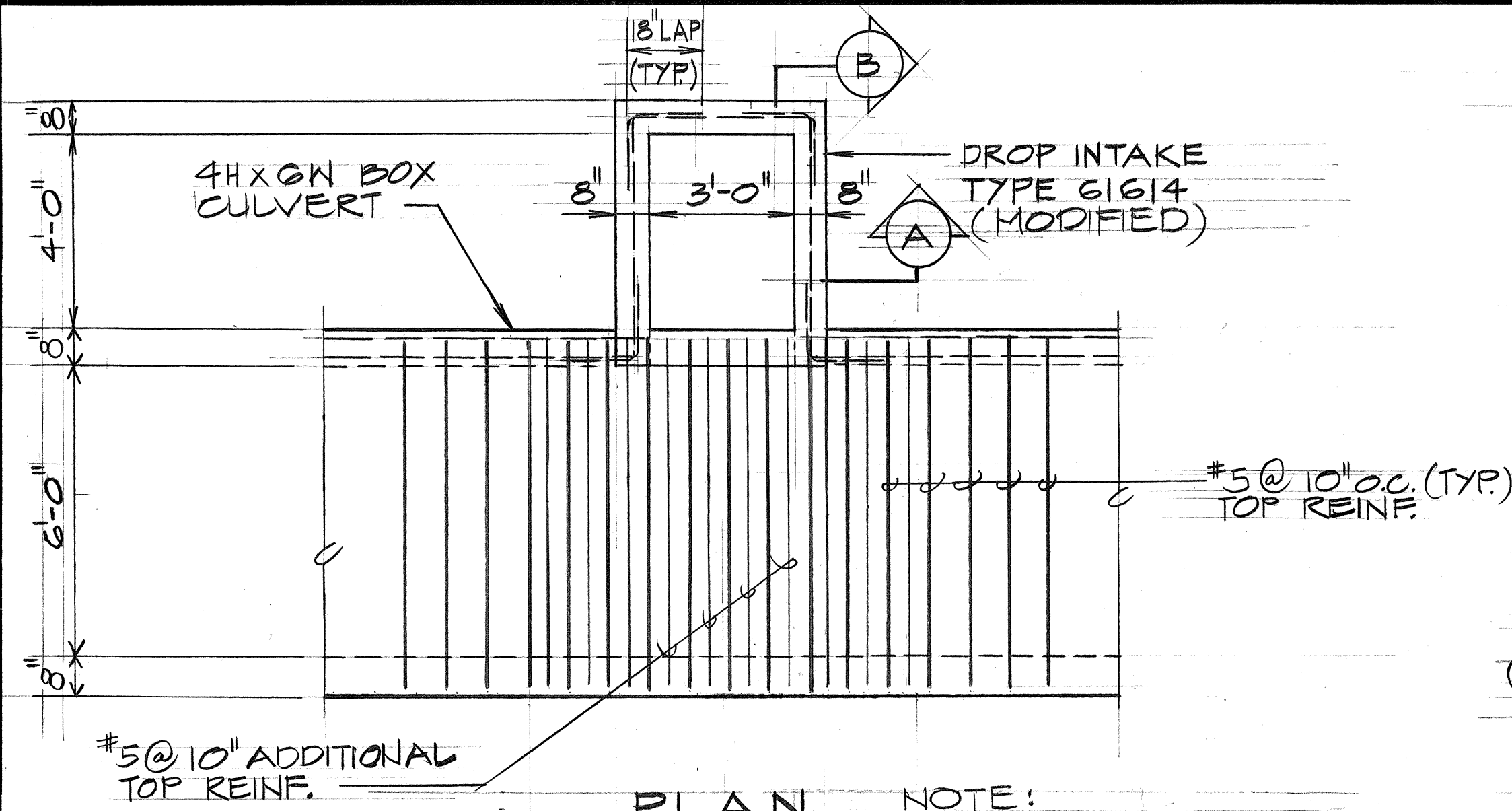
DRAINAGE DETAILS

MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST. - UNIT 3B
F.A. PROJ. NO. F-078-1(21)

SCALE: AS SHOWN DATE: AUG. 1, 1979

SHEET NO. 2 OF 14 SHEETS

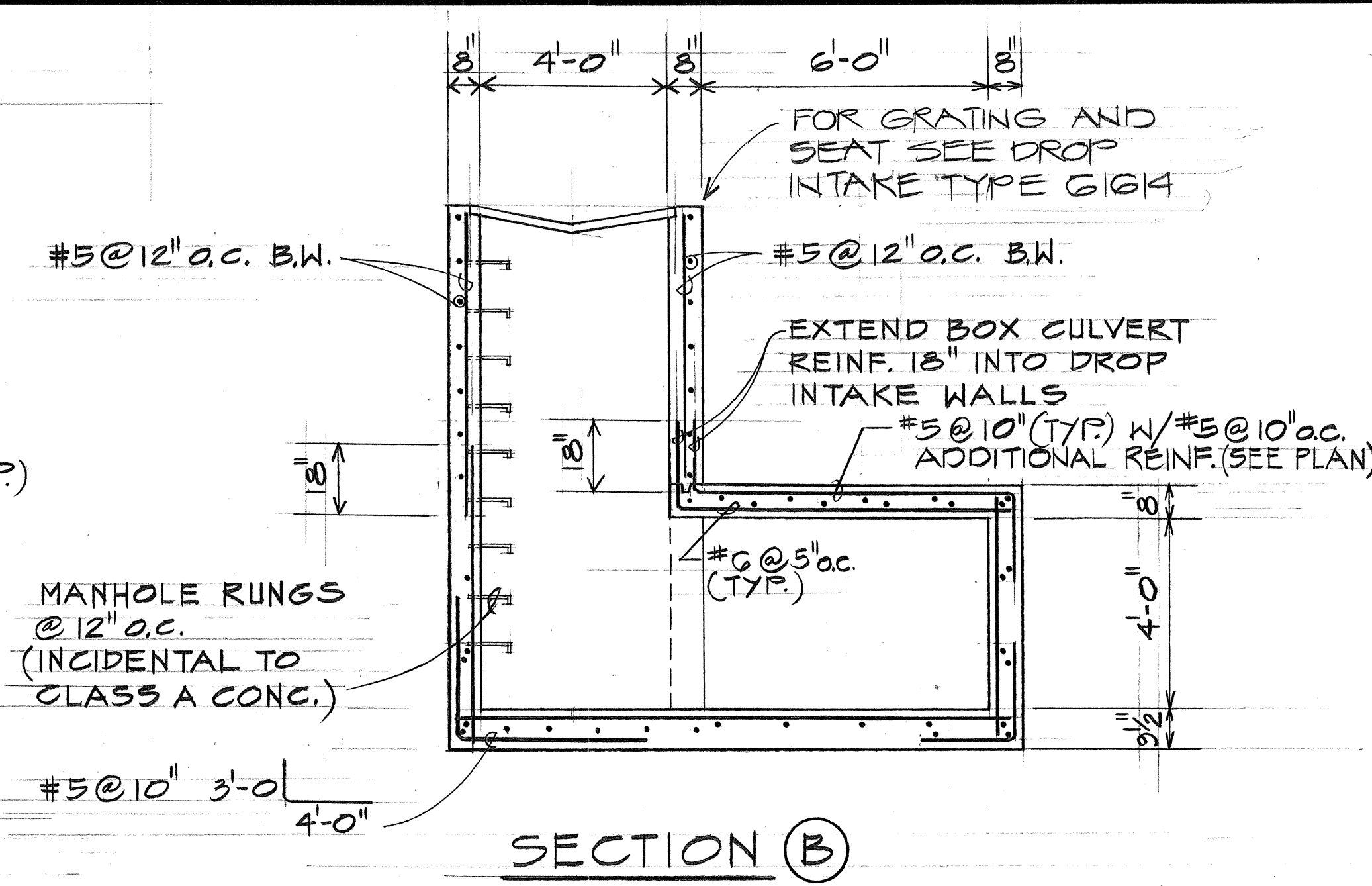
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HAWAII	HAW.	F-078-1(21)	1980	48	234



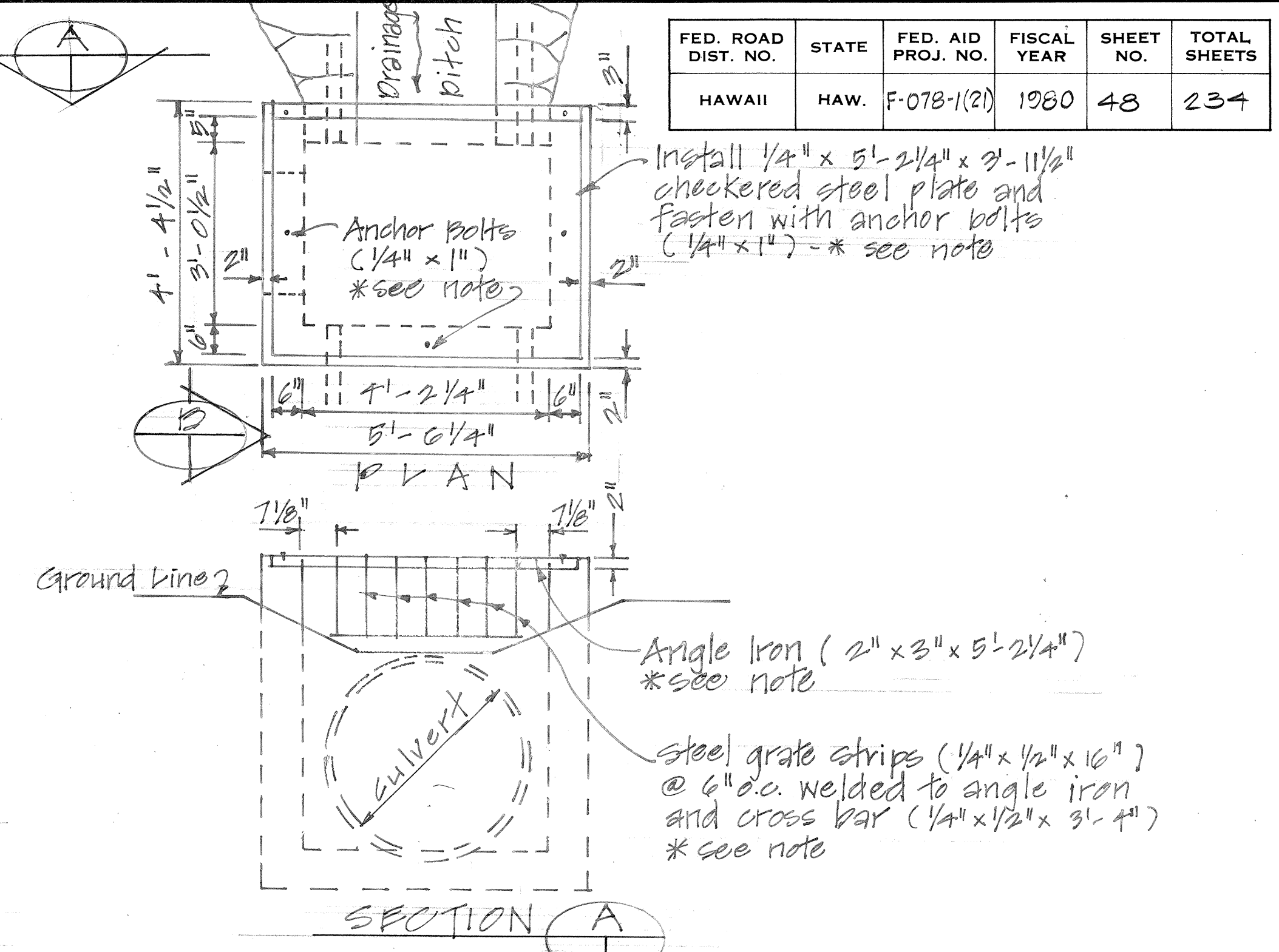
PLAN

NOTE:

FOR PLAN SEE SHT. 38

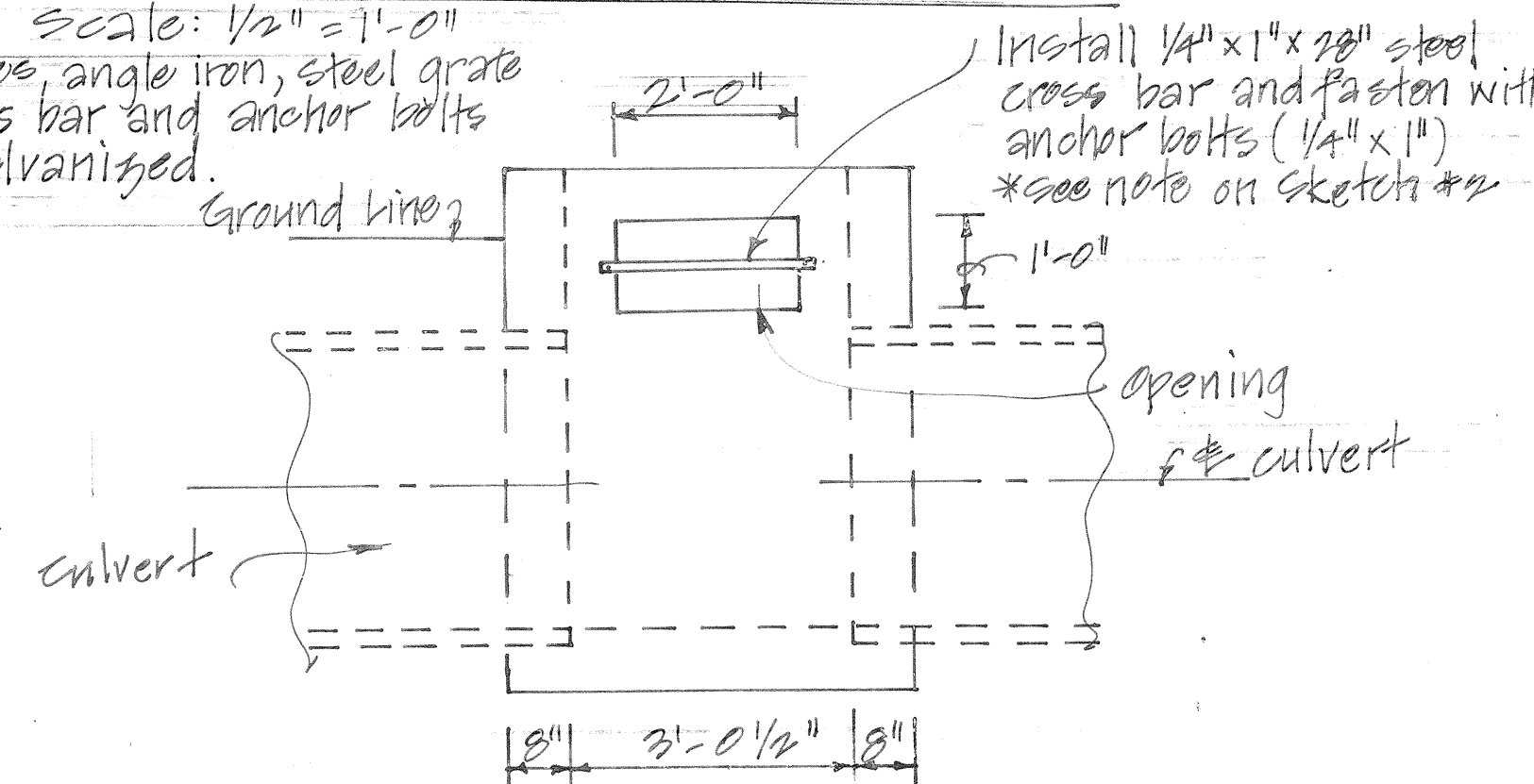


SECTION B



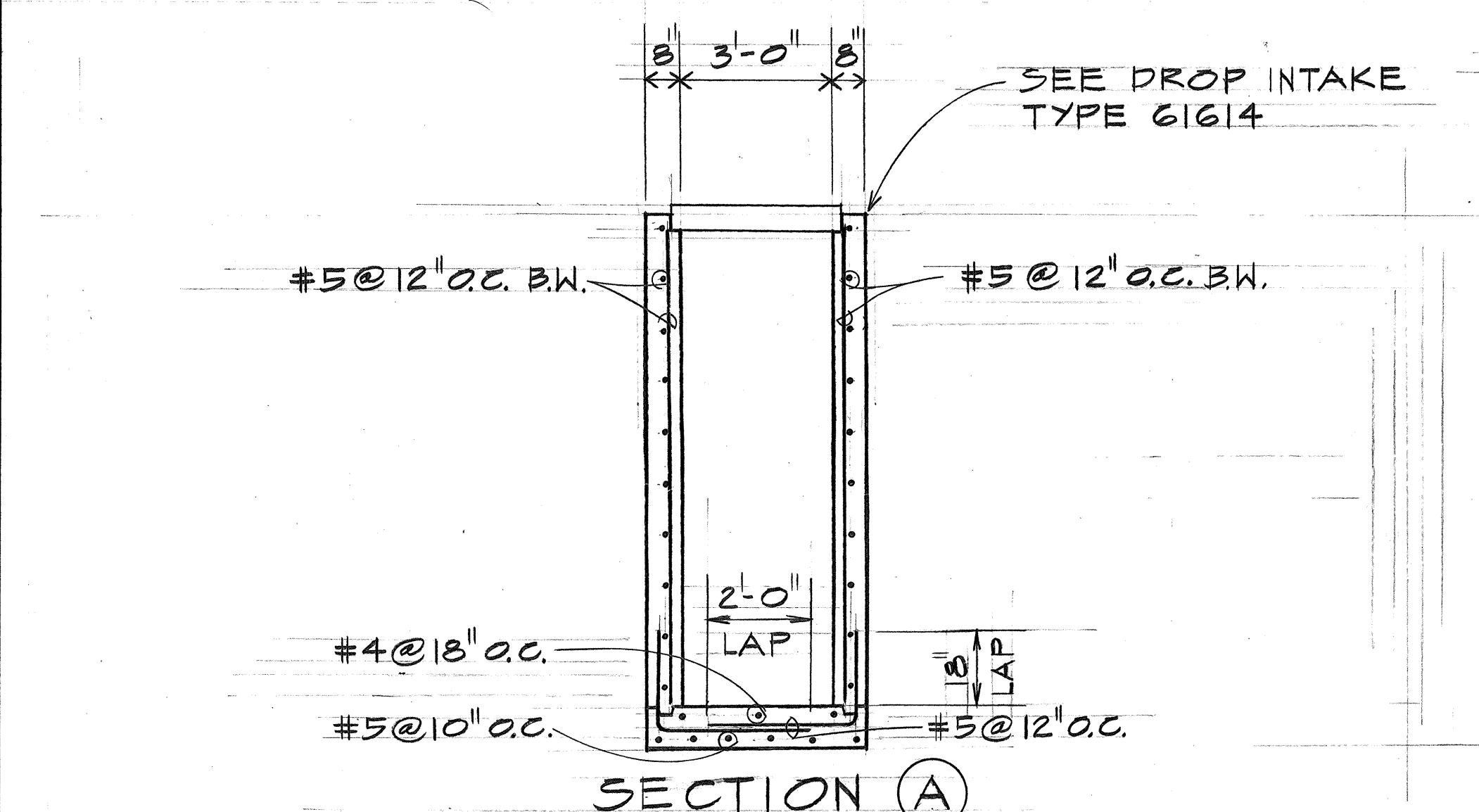
SECTION A

TYPE "A" D.I. (KAUAI ST. STA. 50+70±)



NOTES:

- SEE SHEET 51 FOR TYPICAL BOX CULVERT REINFORCING.
- FOR GRADING AND DRAINAGE PLAN SEE SHT 38

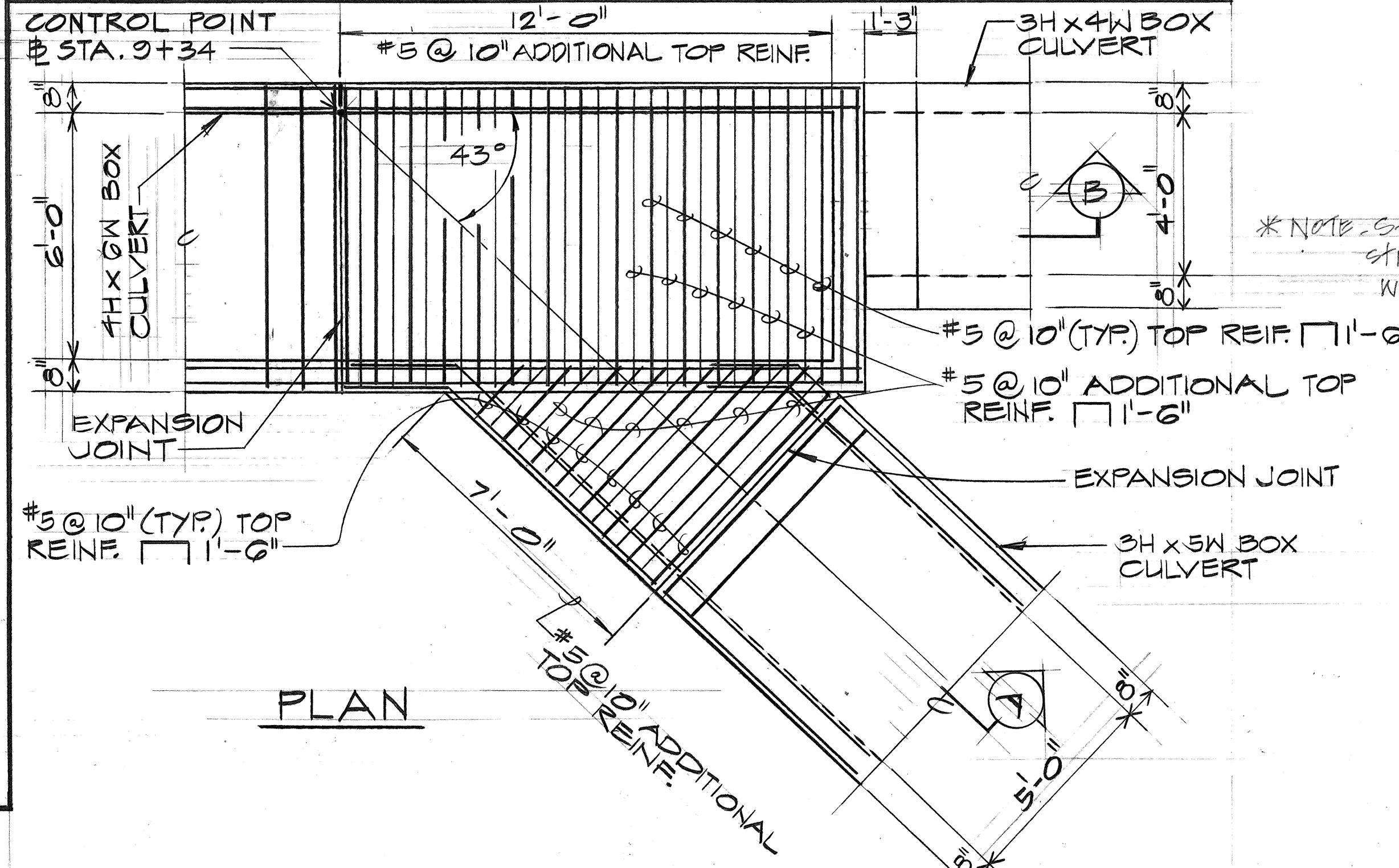


SECTION A

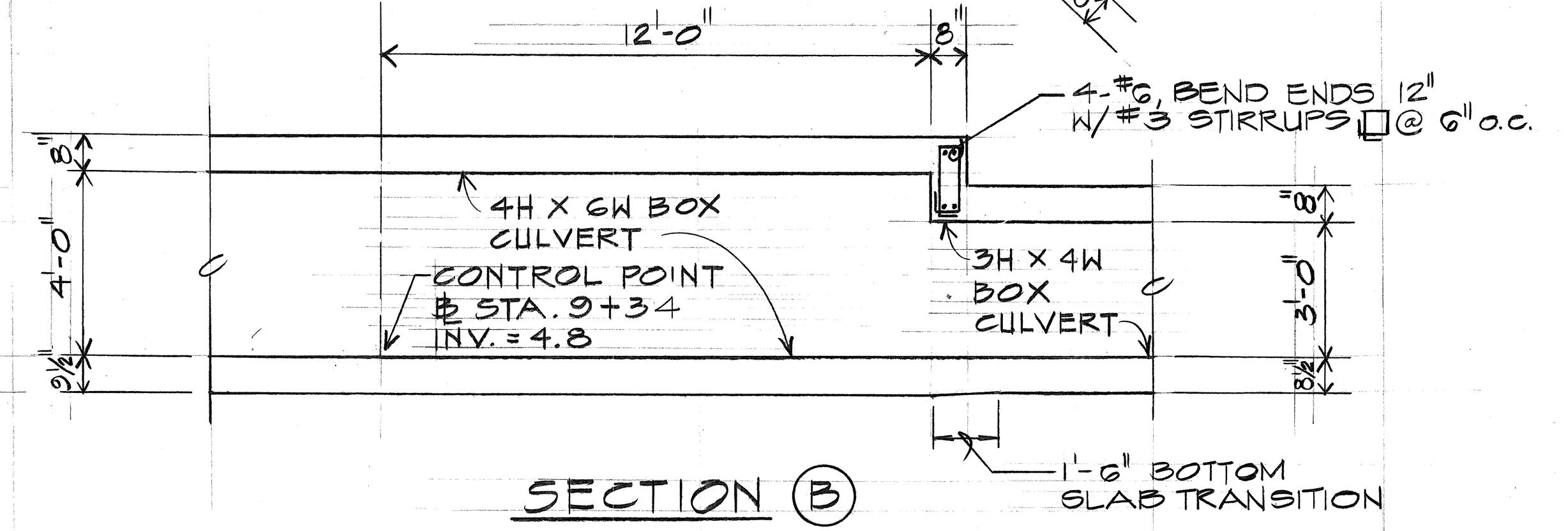
TYPE G1614 D.I. (MODIFIED) DETAILS

RAMP J. STA. 49+65

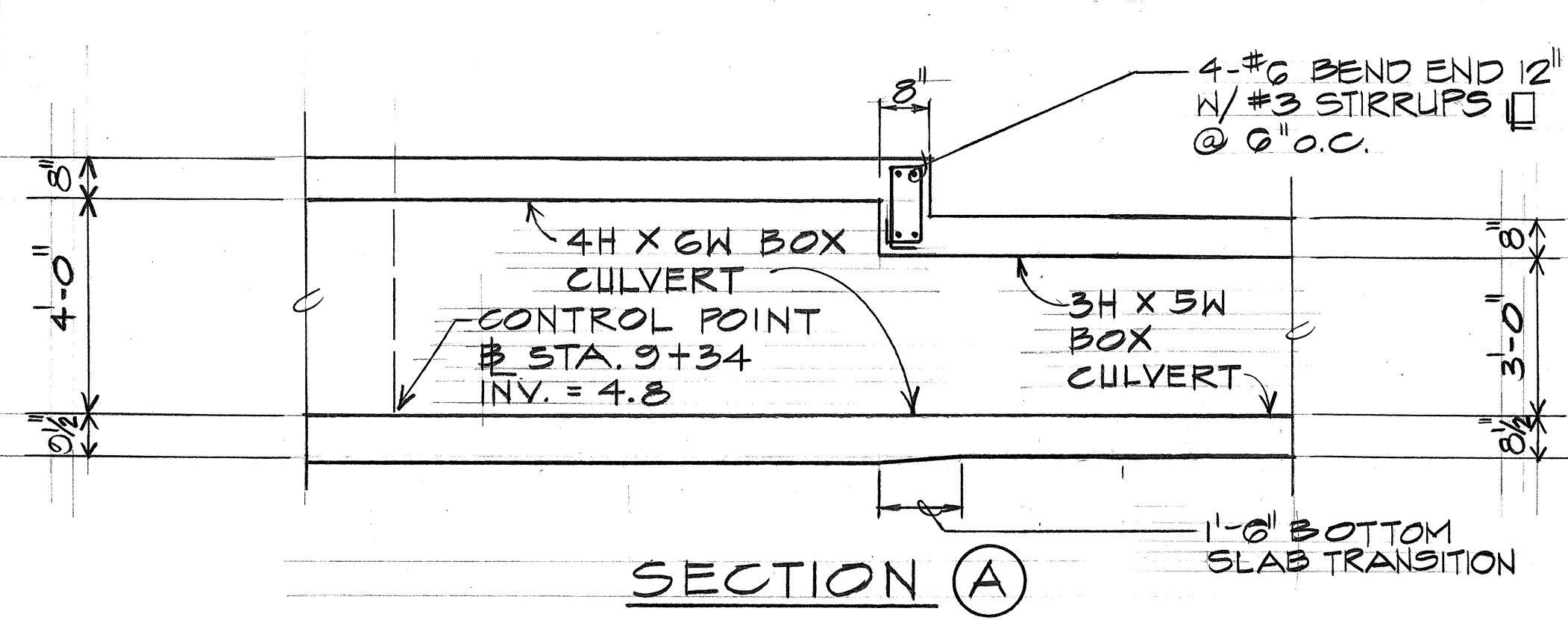
SCALE: 3/8" = 1'-0"



PLAN



SECTION B

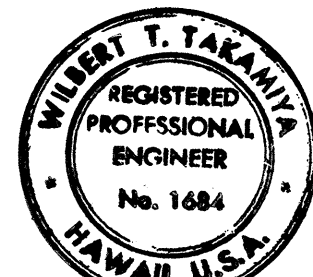


SECTION A

JUNCTION STRUCTURE DETAILS

STA. 9+34 = R-1J STA. 52+38

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



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

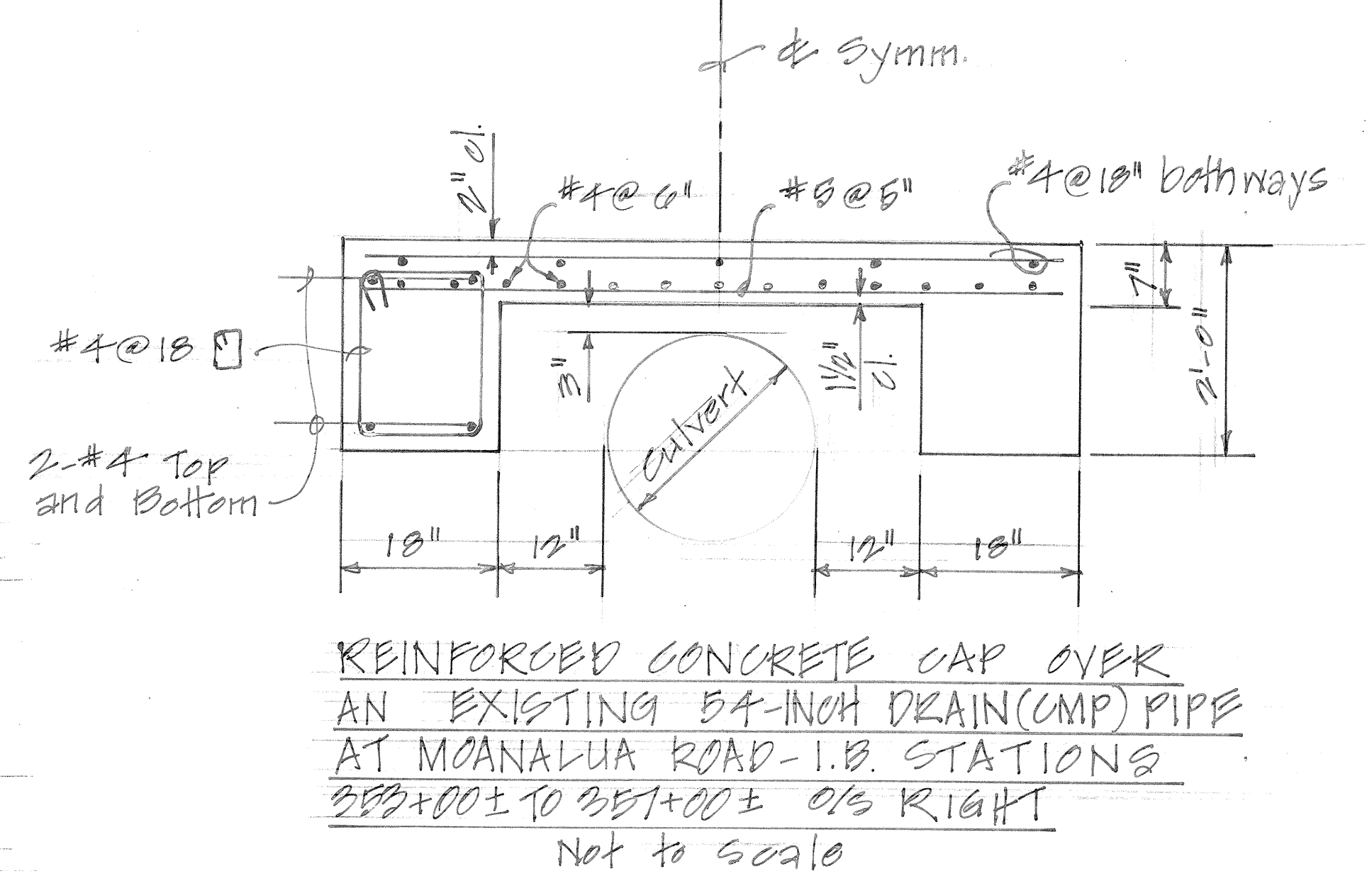
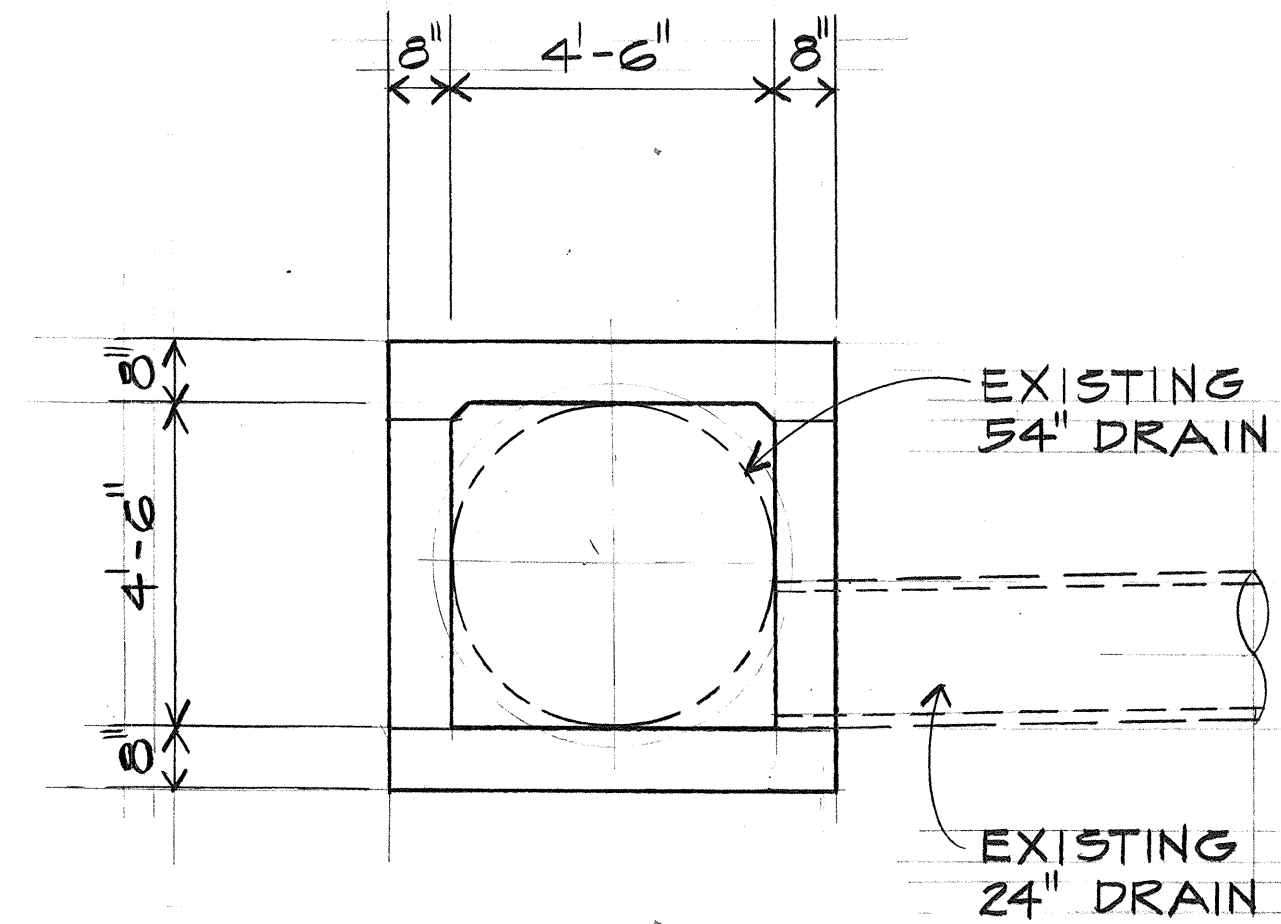
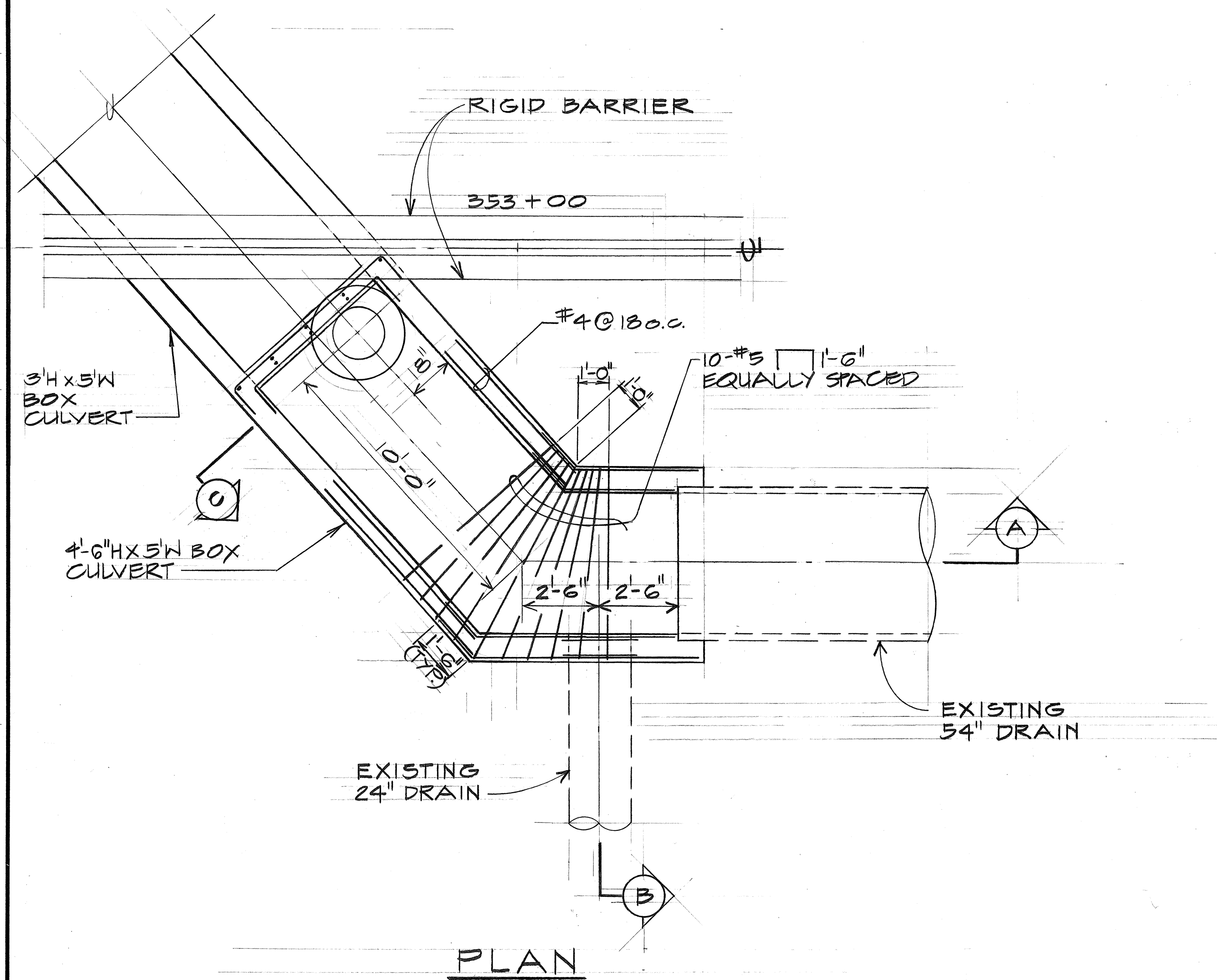
MOANALUA ROAD
PUULOLOA I.C. TO MIDDLE ST - UNIT 3B
F.A. PROJ. NO. F-078-1(21)

SCALE: AS SHOWN DATE: AUG 1, 1979

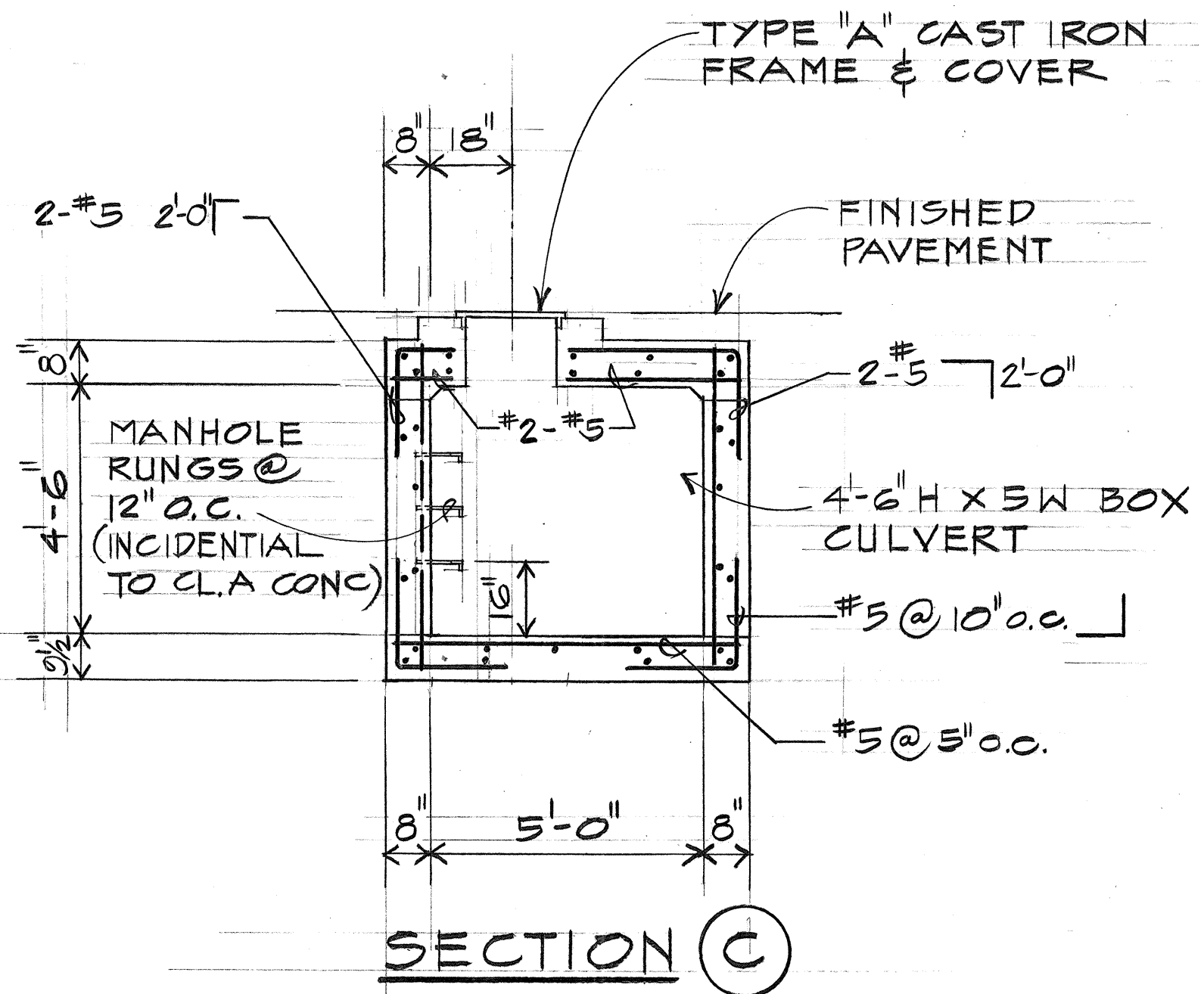
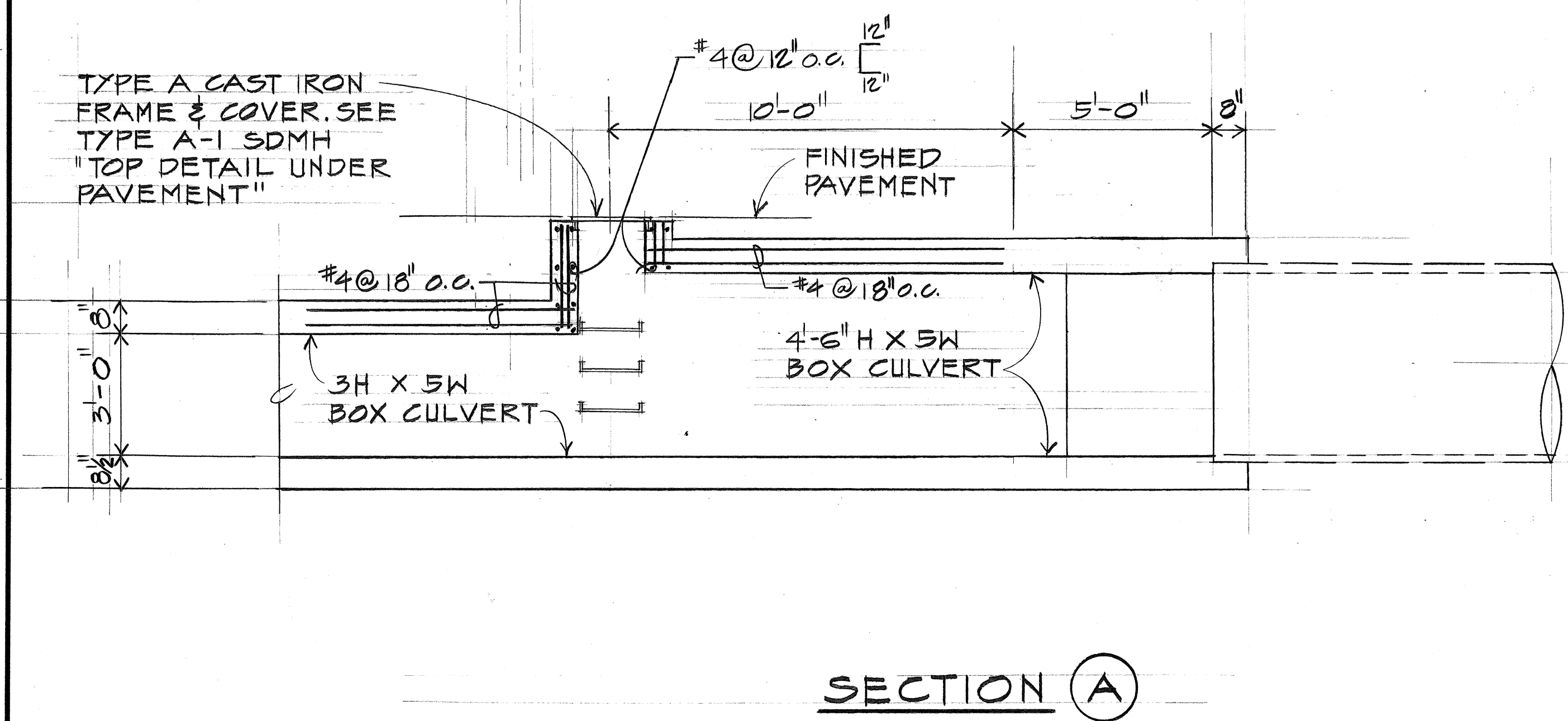
SHEET NO. 3 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-07B-1(21)	1980	49	234

NOTE:
Control Joints at 30'-0" o.c. Expansion Joints at 80'-0" o.c.



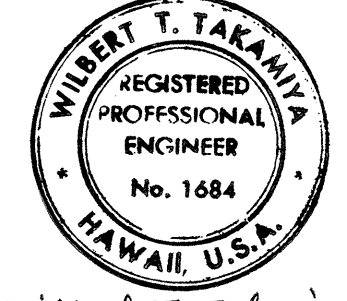
REINFORCED CONCRETE CAP OVER AN EXISTING 54-INCH DRAIN (CMP) PIPE AT MOANALUA ROAD - I.B. STATIONS 353+00 ± TO 351+00 ± O/S RIGHT
Not to scale



NOTE:
SEE SHEET 51 FOR TYPICAL BOX CULVERT REINFORCING.

DATE	_____
SURVEY PLOTTED BY	_____
DESIGNED BY	_____
CHECKED BY	_____
NO.	_____

JUNCTION STRUCTURE DETAILS (A)
FWY @ STA. 353+06
SCALE: 3/8" = 1'-0"



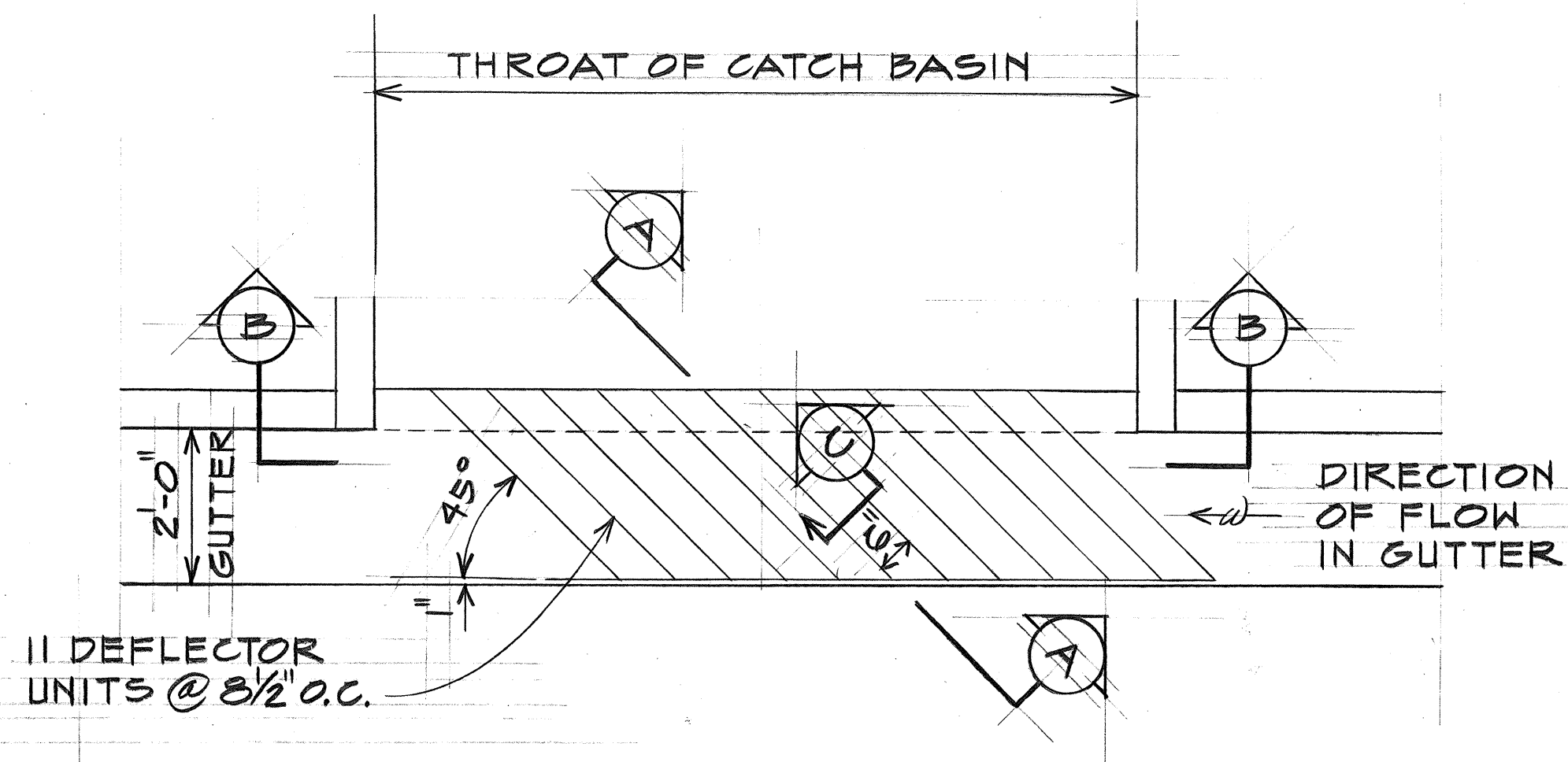
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

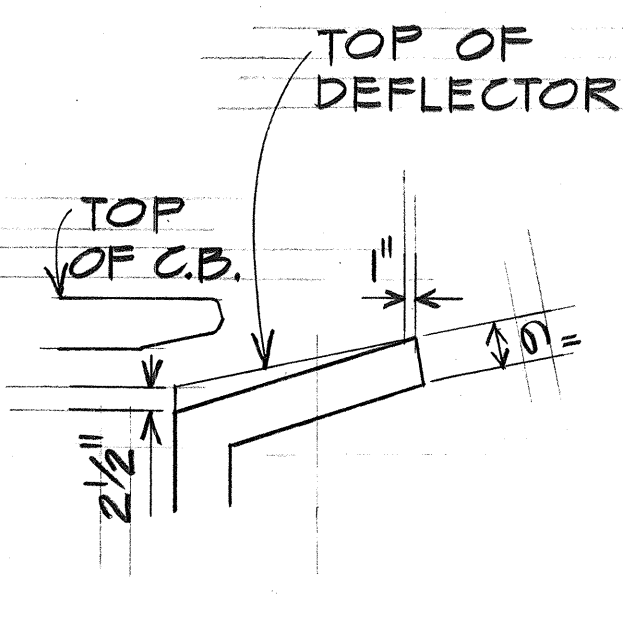
DRAINAGE DETAILS

MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST. - UNIT 3B
F.A. PROJ. NO. F-07B-1(21)
SCALE: AS SHOWN DATE AUG 1, 1979
SHEET NO. 4 OF 14 SHEETS

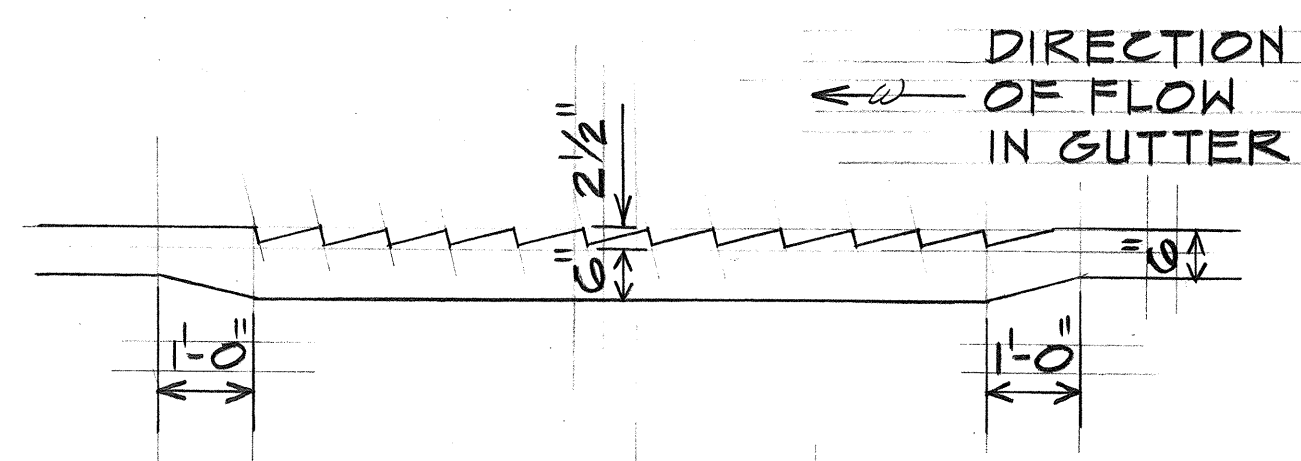
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-07B-1(21)	1980	50	234



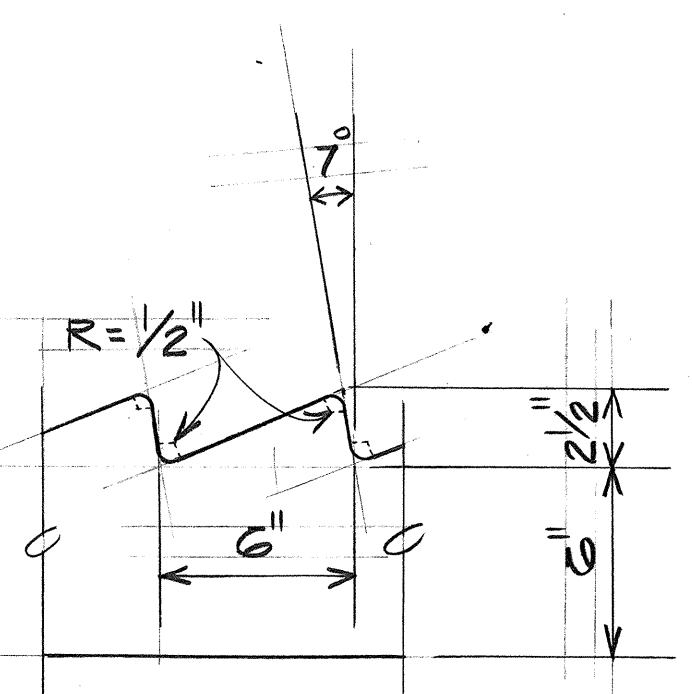
PLAN



SECTION A

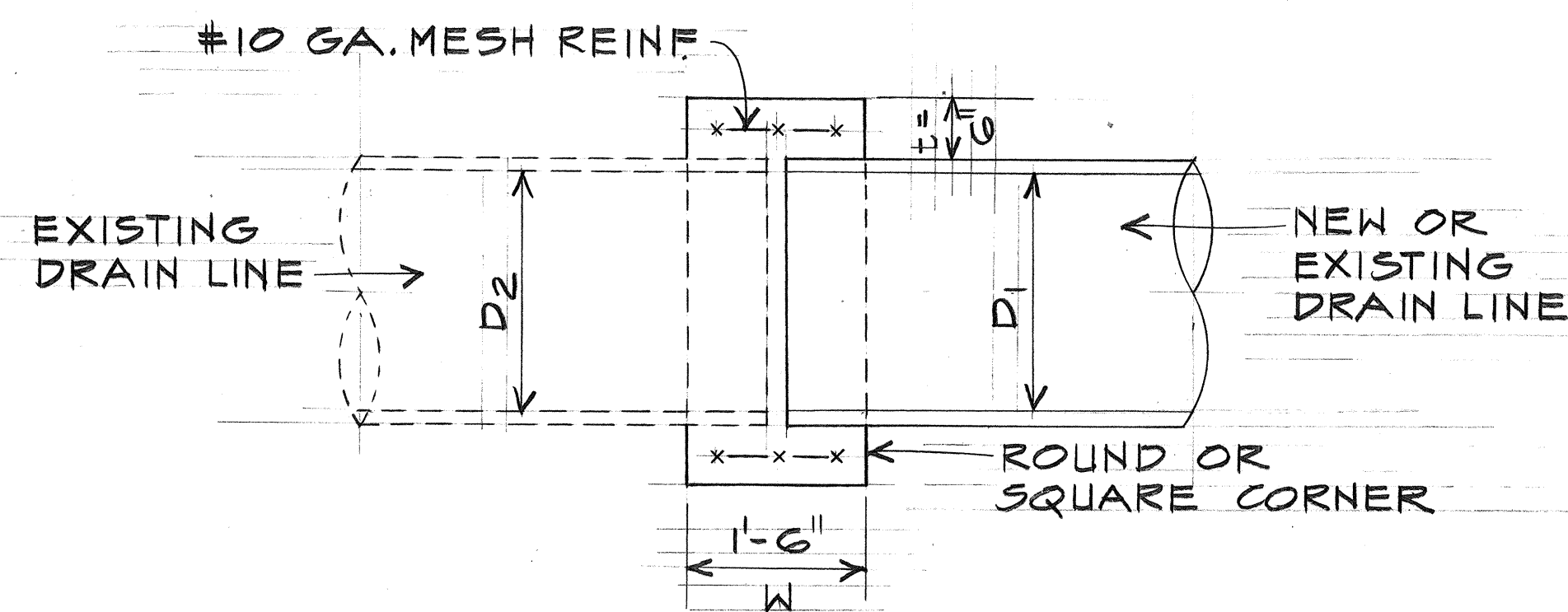


SECTION B



SECTION C

CATCH BASIN DEFLECTOR DETAILS
NOT TO SCALE

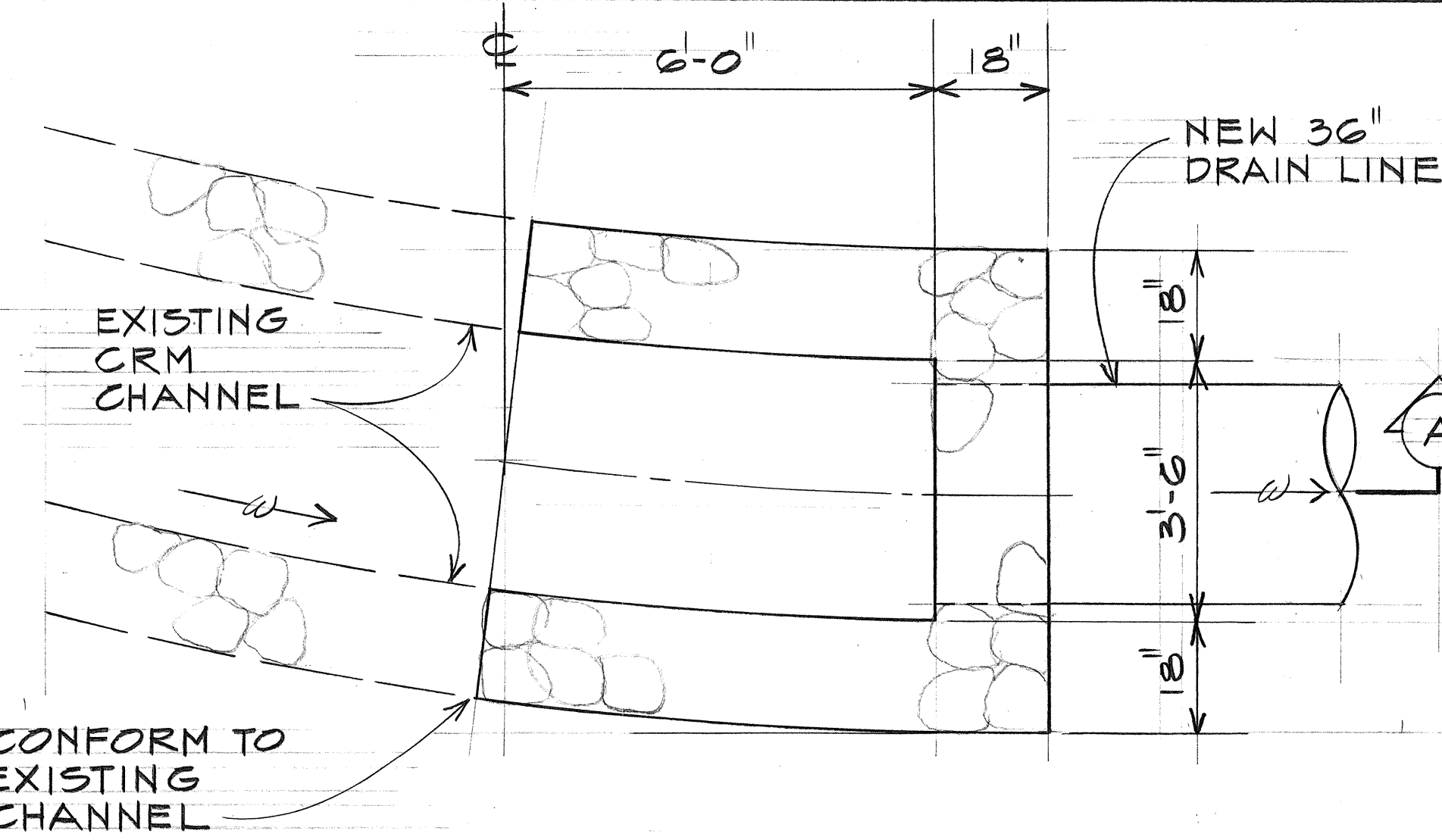


NOTES:

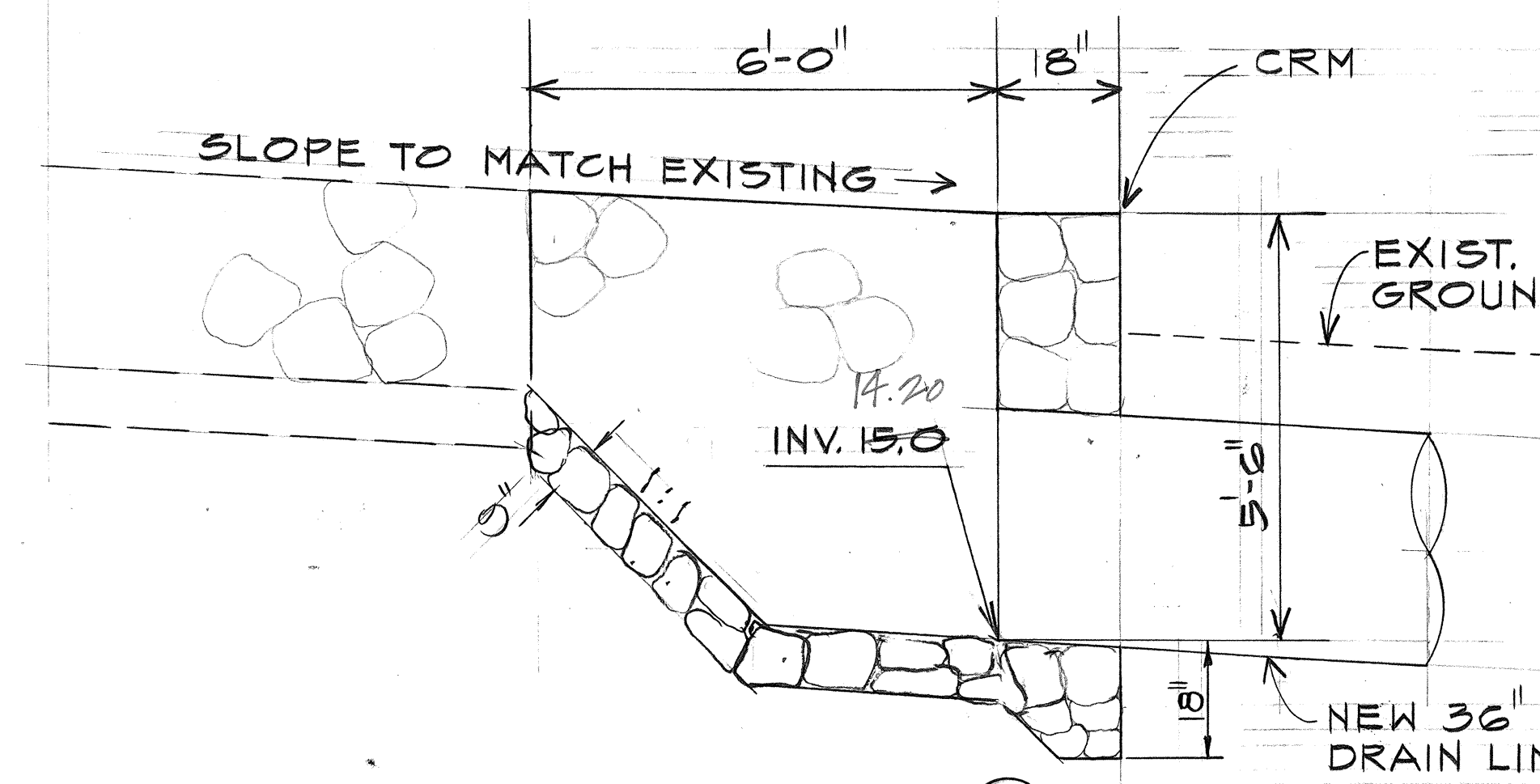
1. DRAIN LINE D1 AND D2 MAY BE OF DIFFERENT SIZE AND TYPE.
2. COLLAR INSTALLATION TO BE INCIDENTAL TO PIPE COST.
3. FOR DRAIN LINE CONNECTION TO EXISTING DRAIN BOX MAKE CONCRETE COLLAR $t=6"$, $w=6"$ WITH MESH REINFORCING.

CONCRETE COLLAR CONNECTION

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



PLAN

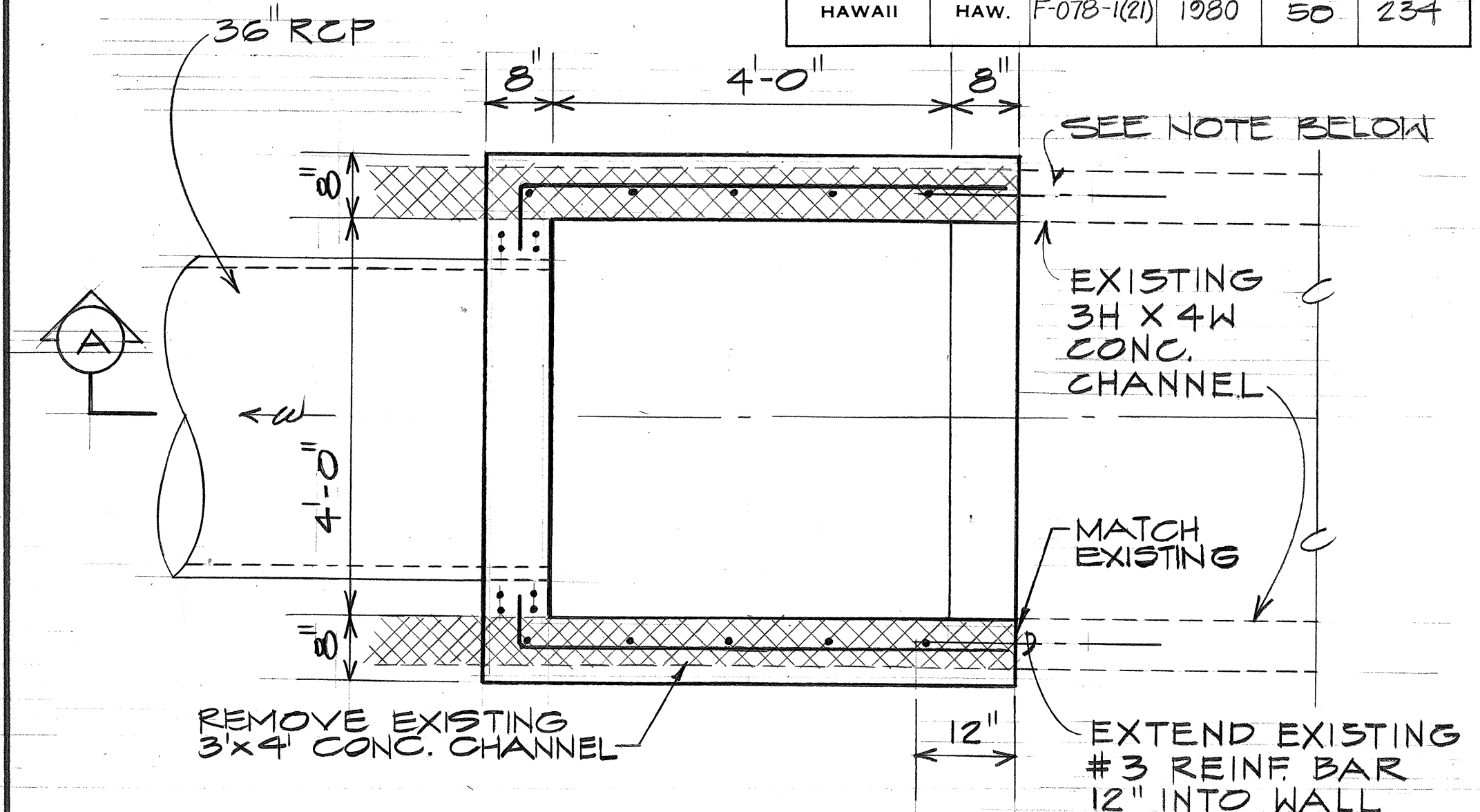


SECTION A

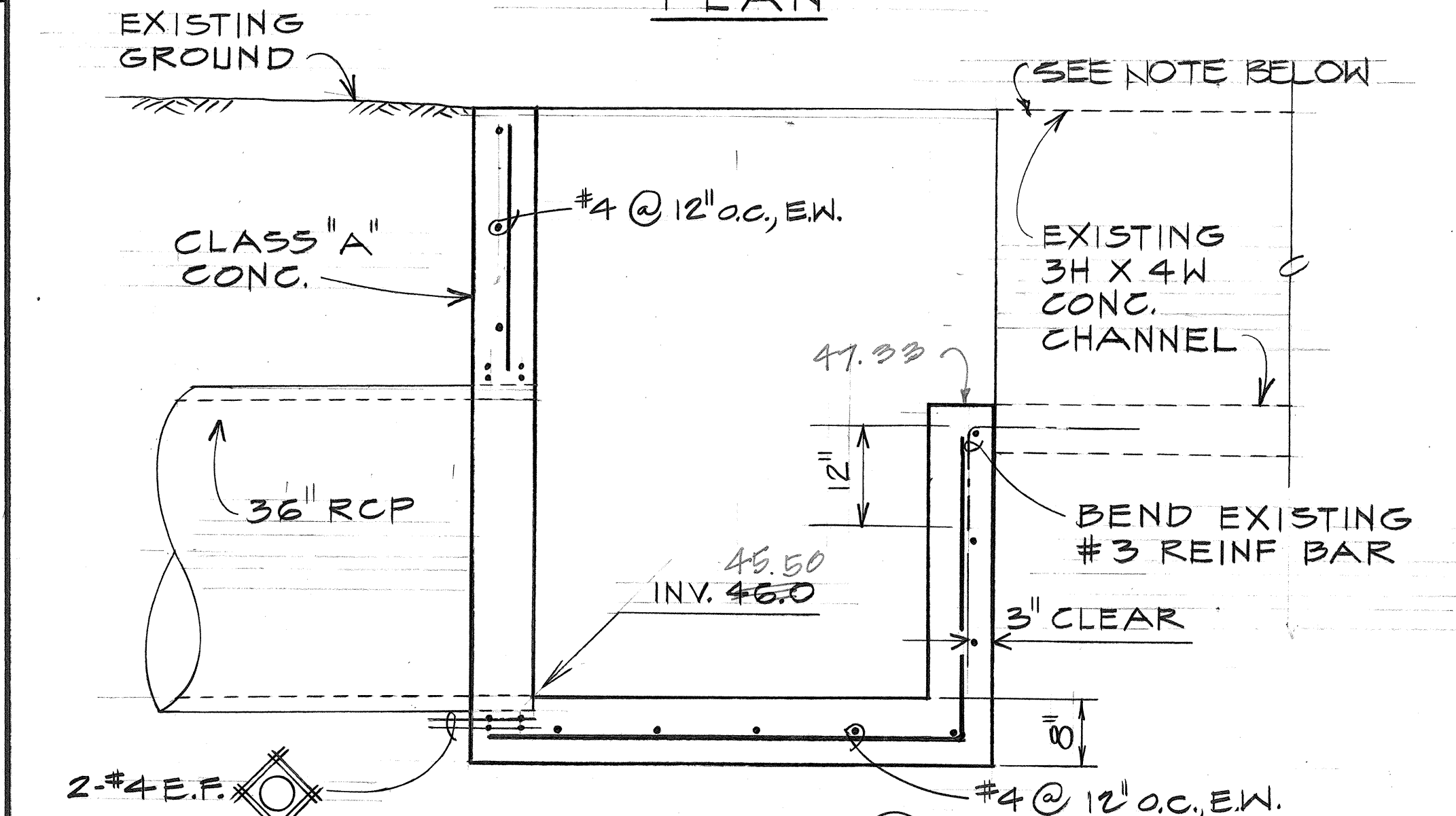
INLET 4B (SYSTEM I)

FOR LOCATION SEE SHEET 36

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



PLAN



SECTION A

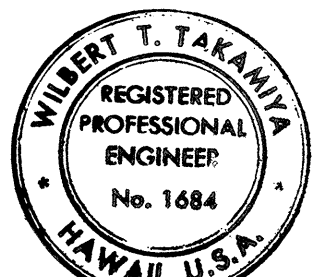
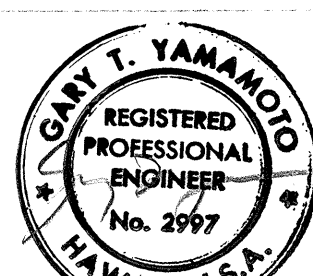
INLET SYSTEM "J"

FOR LOCATION SEE SHEET 38

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

NOTE:

EXISTING 3H x 4W CONC. CHANNEL REMOVE AS REQUIRED FOR WALL CONSTRUCTION. REPLACE CONC. CHANNEL TO MATCH EXISTING. THIS WORK TO BE INCIDENTAL TO VARIOUS CONTRACT ITEMS.



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

MOANALUA ROAD
PUULOA I.C. TO MIDDLE ST.-UNIT 38
F.A.Proj.No. F-07B-1(21)

SCALE: AS SHOWN DATE: AUG. 1, 1979

SHEET NO. 5 OF 14 SHEETS

Hand-drawn structural drawing of a rectangular frame, likely a foundation or wall section, showing reinforcement details. The drawing includes dimensions and reinforcement specifications:

- Overall Dimensions:**
 - Top: 8" (left), 5'-0" OR 6'-0" (center), 8" (right)
 - Right: 8" (top), 4'-0" OR 4'-6" (center), 9 1/2" (bottom)
- Reinforcement Details:**
 - Top: #6 @ 5" o.c., 2" CLEAR; #5 @ 10" o.c. (11'-6" span)
 - Bottom: #4 @ 18" o.c. (left), #6 @ 5" o.c. (right); #5 @ 10" o.c. (2'-0" span); #6 @ 12" o.c. E.F. *
 - Left: #4 @ 18" o.c. (top), #6 @ 12" o.c. E.F. *
 - Right: #4 @ 18" o.c. (top), #6 @ 12" o.c. E.F. *
- Clearances and Fillets:**
 - Top: 1/2" CLEAR
 - Bottom: 1/2" CLEAR
 - Left: 1/2" CLEAR
 - Right: 1/2" CLEAR
 - Top Left: 3" MIN. FILLET
 - Bottom Left: 3" CLEAR
 - Bottom Right: 2'-0" (span), 2" CLEAR
- Other Labels:**
 - CONST. J.T. (Construction Joint)
 - 0" (left margin)
 - 2" CLEAR (left margin)
 - F. (bottom left)

Hand-drawn structural reinforcement detail for a rectangular column. The column has a width of 8 inches and a height of 8 1/2 inches, with an overall height of 3'-0" or 4'-6". The reinforcement consists of #5 bars at 10 inches on center (O.C.) for the top and bottom, and #4 bars at 5 inches O.C. for the sides. A 3-inch minimum fillet is shown at the corner. The detail includes various clearances (CLR.) and a construction joint (CONSTR. JT.) indicated on the right side.

NOTE: FOR CLARITY OF REINF INFORMATION, ONLY DROP INTAKE TYPE "Z" MODIFIED WALLS ARE SHOWN.

FOR STRUCTURAL DETAILS SEE SHT 5-48

FOR RUNGS SEE STD DETAILS

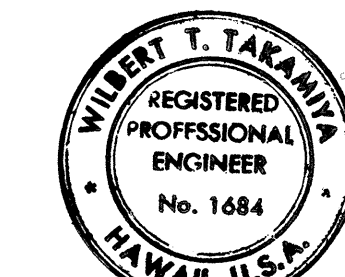
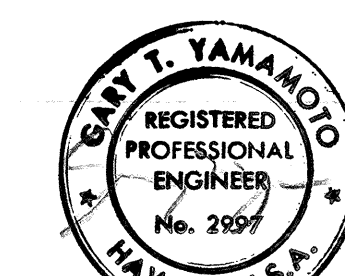
INSTALL TYPE A-12 FRAME & GRATES. (SEE STD. DETAILS)

NOTE: LOCATION OF DROP INTAKE TYPE "Z" MODIFIED A3 FOLLOWS:

STATION	ELEVATION
RAMP "J" @ STA. 51+00	INV. = 4.6
FWY @ STA. 352+89	INV. = 5.0
FWY @ STA. 353+40	INV. = 5.1
FWY @ STA. 355+35	INV. = 5.7
FWY @ STA. 357+90	INV. = 6.2

[illegible]

TYPE "A" D.I. (Kaua St. to Sta 41+70+)



THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION.

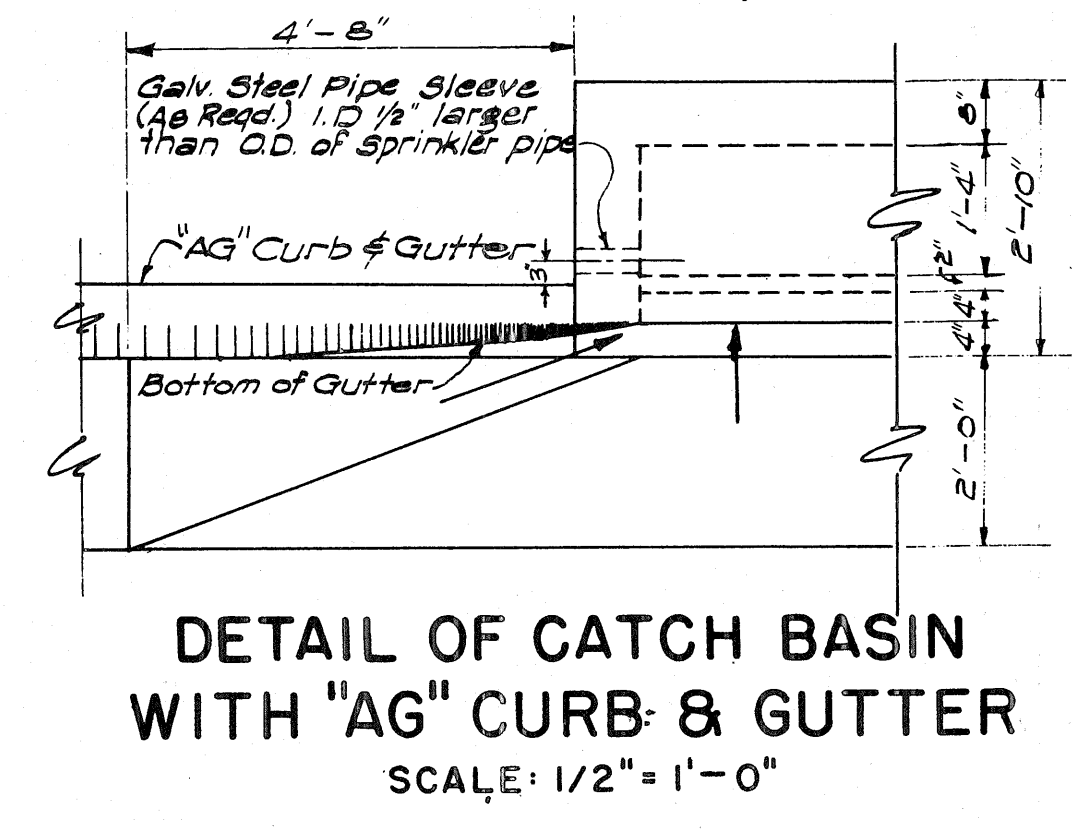
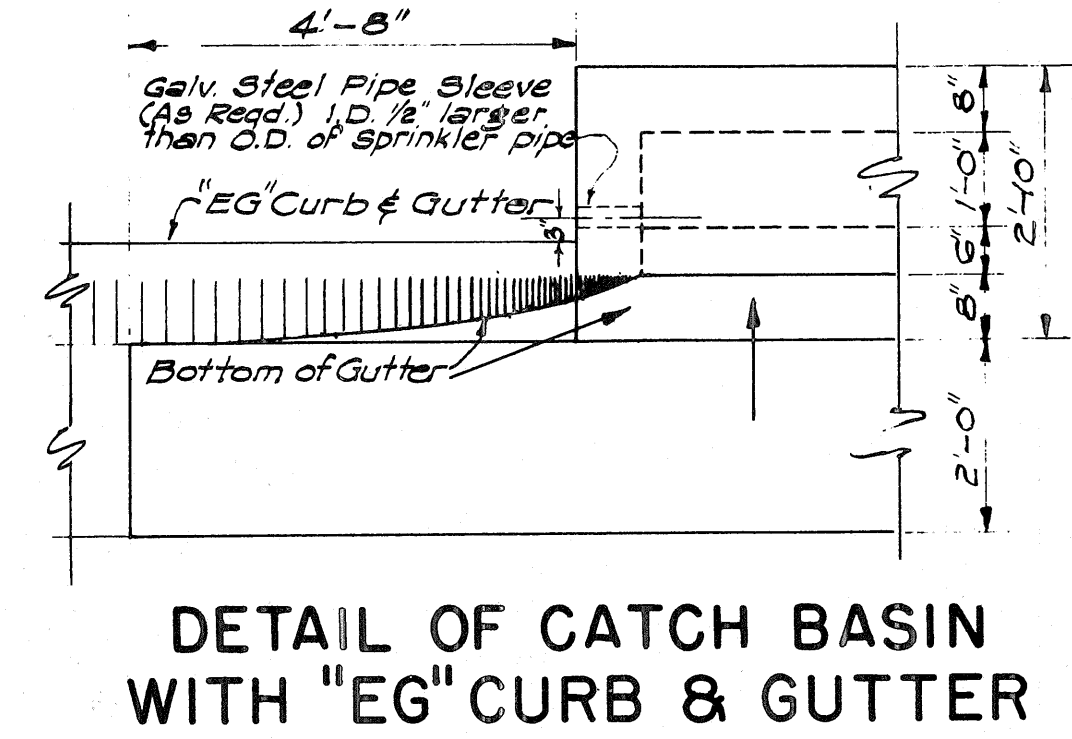
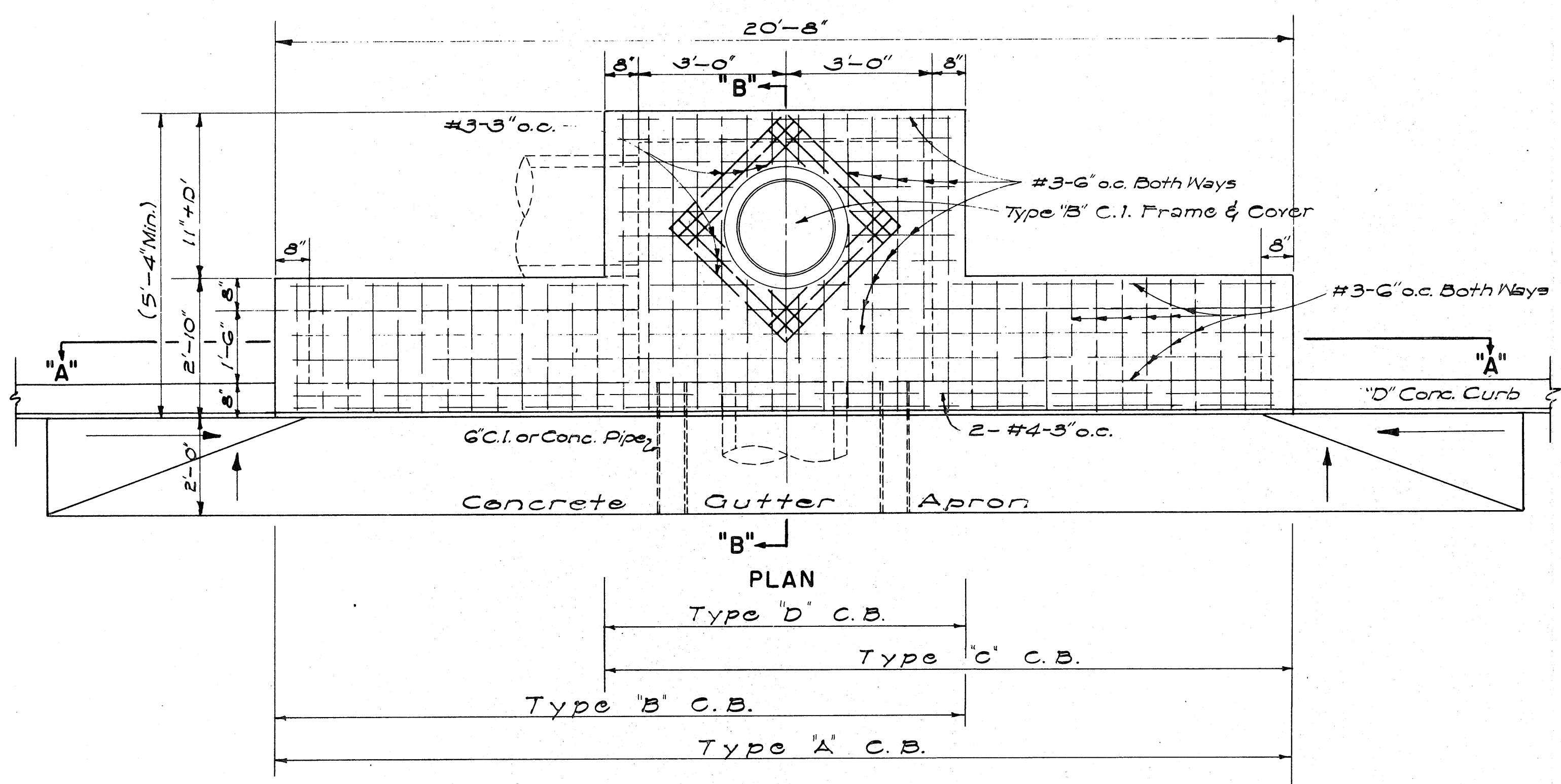
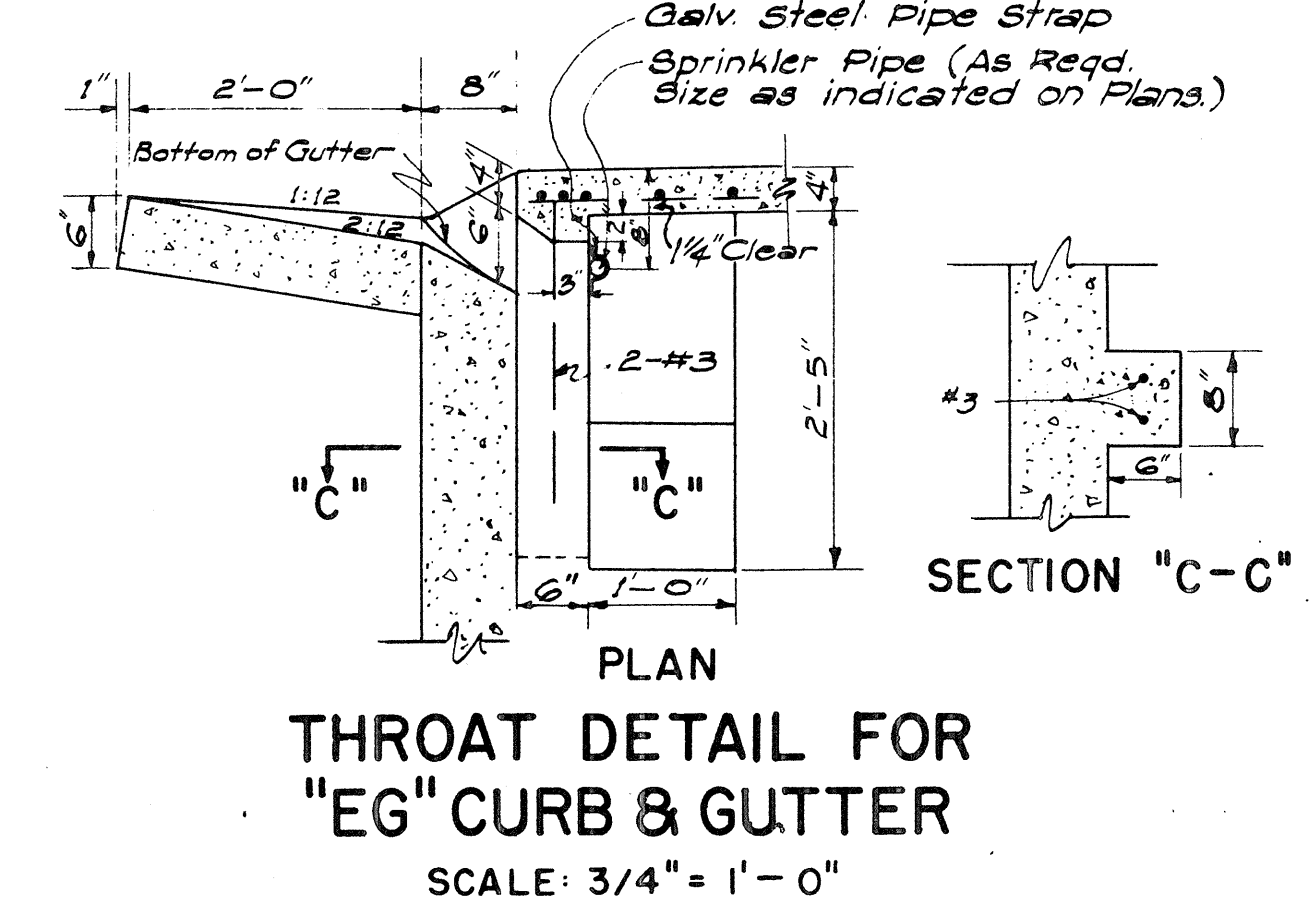
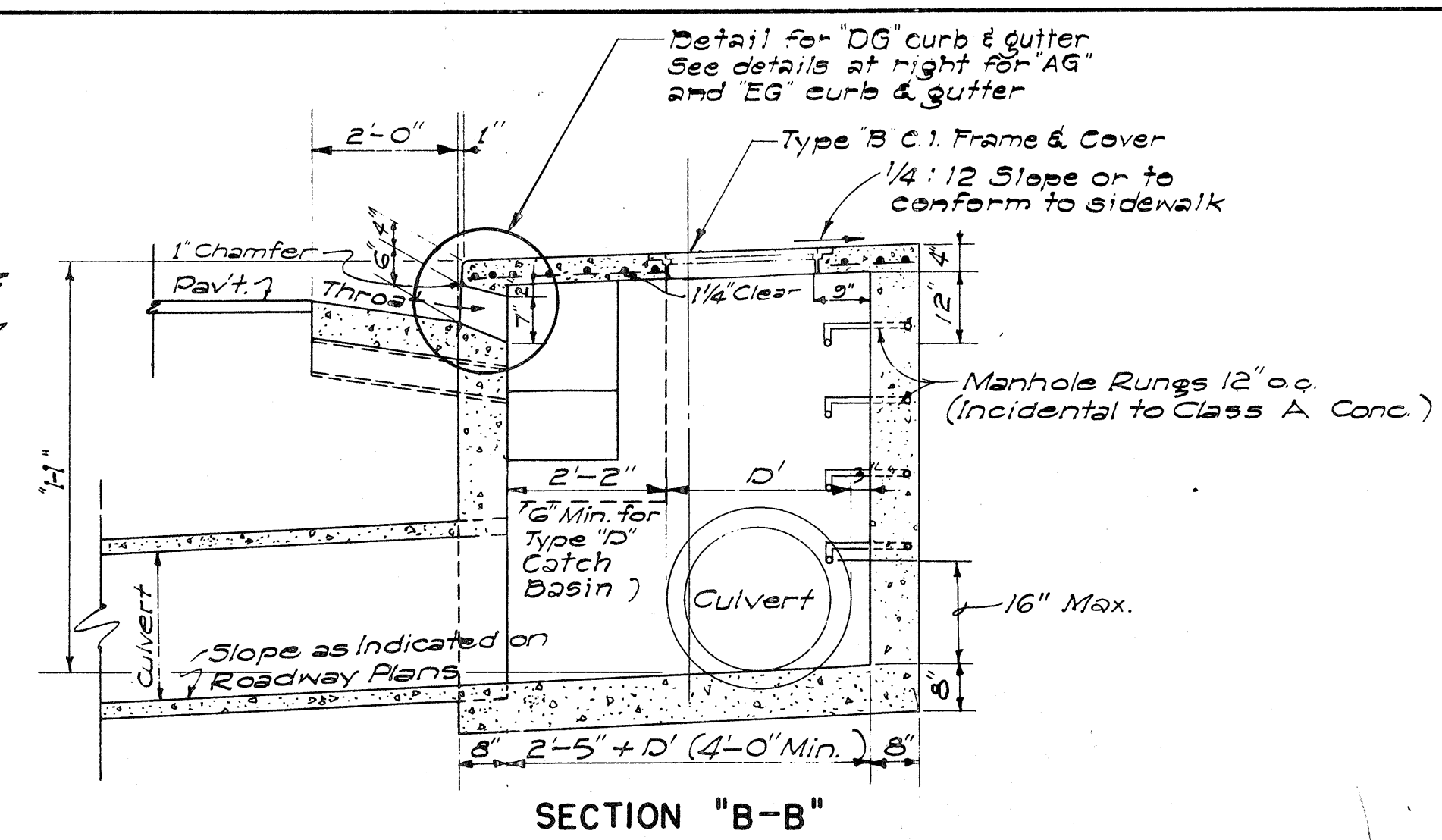
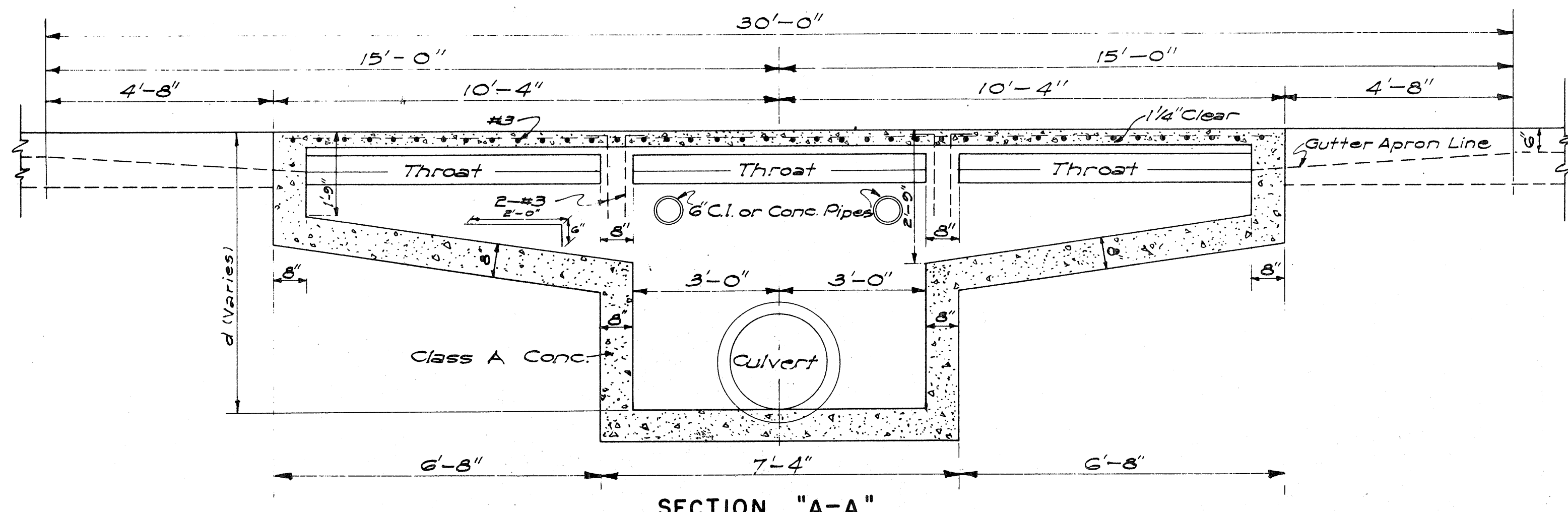
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MOANALUA ROAD..
PUULO A I.C. TO MIDDLE ST. - UNIT 3B
F.A. PROJ. NO. F-078-1(21)

SCALE: AS SHOWN DATE: AUG 1, 1979
SHEET No. 6 OF 14 SHEETS

2/17/59

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-078-K(2)	1960	52	234



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 (12" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (16 inches from the bottom) is required if "H" is 4 feet 6 inches or less. 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 lb.	30'-0"
"B"	6.0 c.y.	21.5 lb.	23'-4"
"C"	6.0 c.y.	21.5 lb.	23'-4"
"D"	4.9 c.y.	16.5 lb.	16'-8"

APPROVAL RECOMMENDED:
HYDRAULIC DESIGN ENGINEER
12-17-69
DATE

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

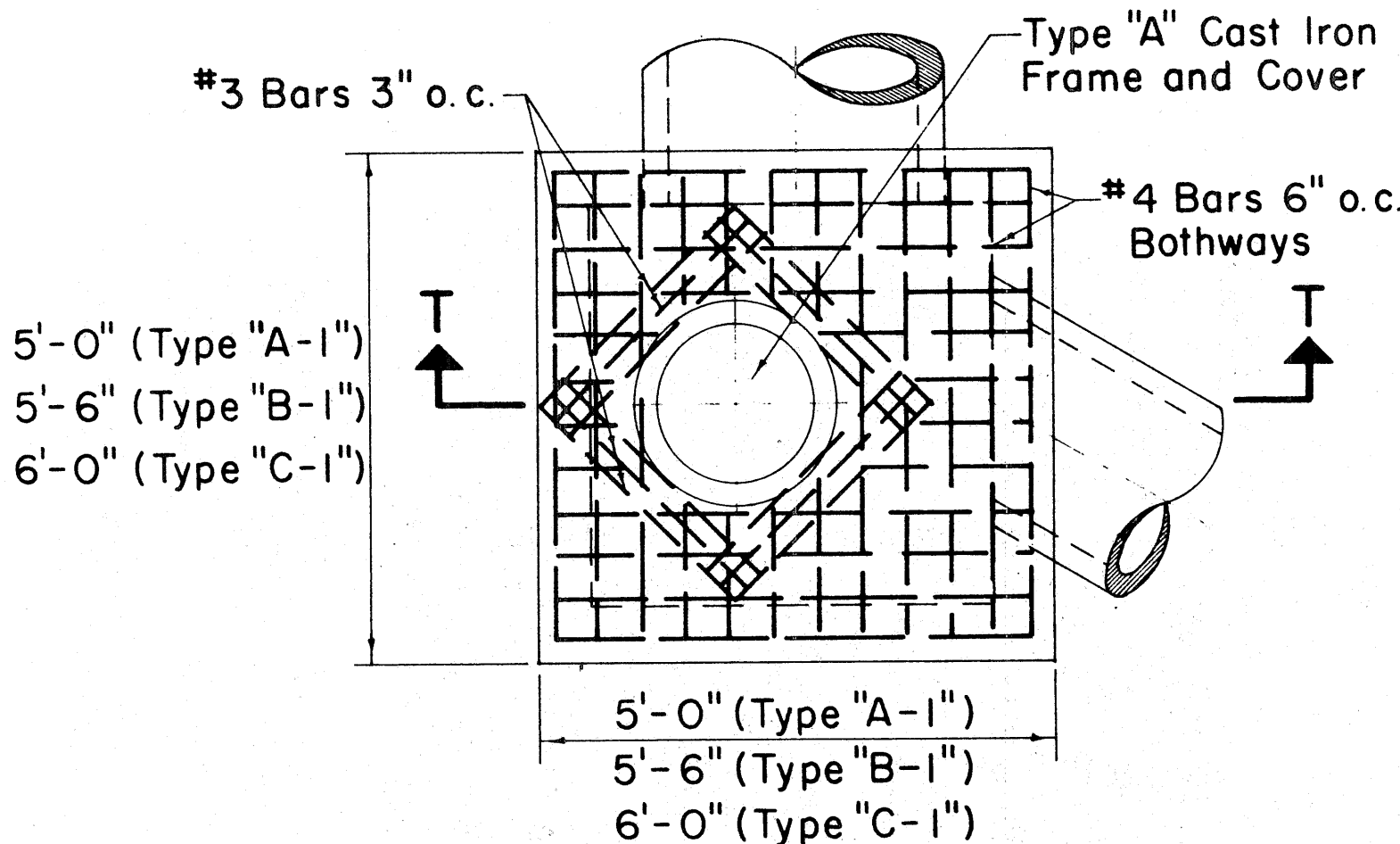
NO.	REVISION	APPROVED BY	DATE
1	Spacing on Manhole Rungs to conform to OSHA.	H.T.	1-21-75

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

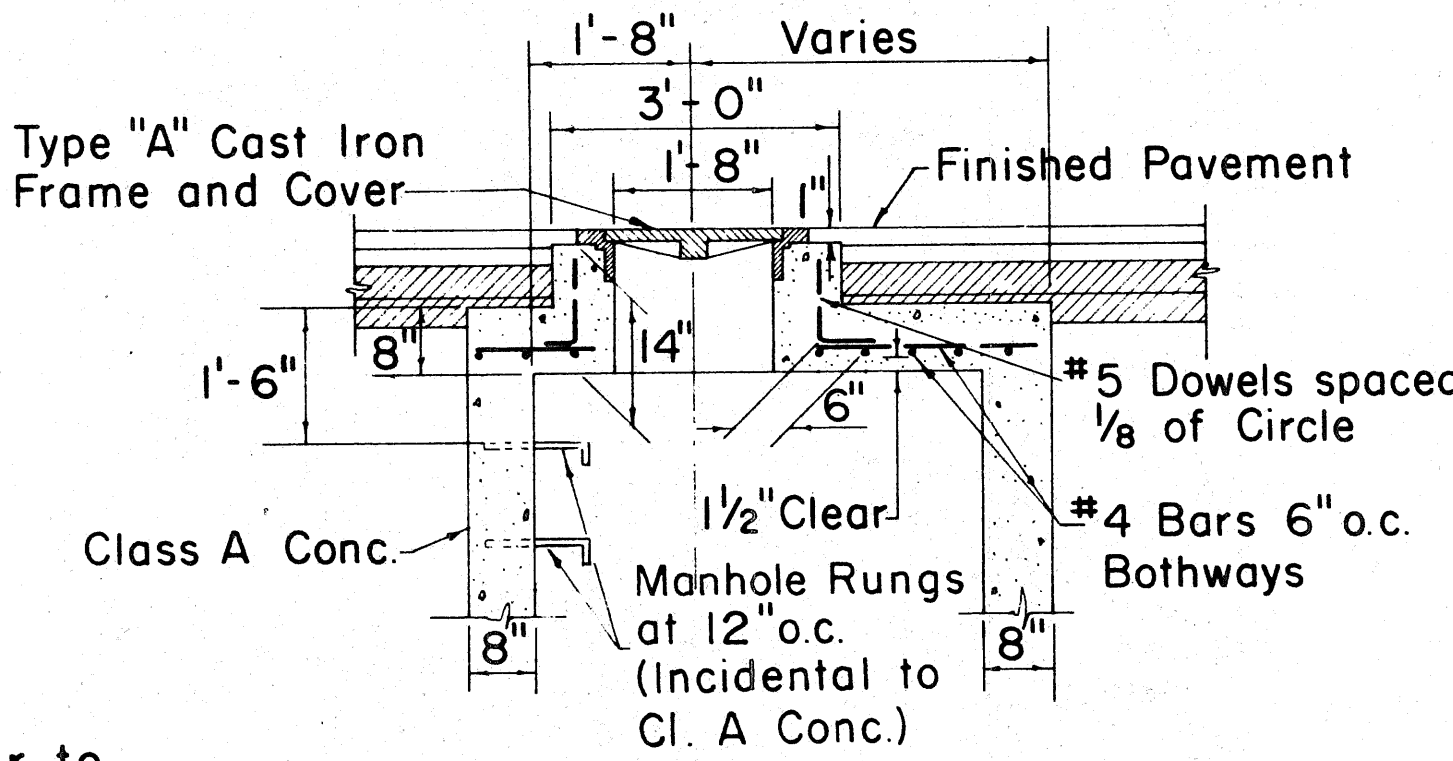
Scale: As Noted Date: July, 1969
SHEET NO 7 OF 14 SHEETS DH 1

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	F-078-1(21)	1980	53	234



PLAN



SECTION T-T

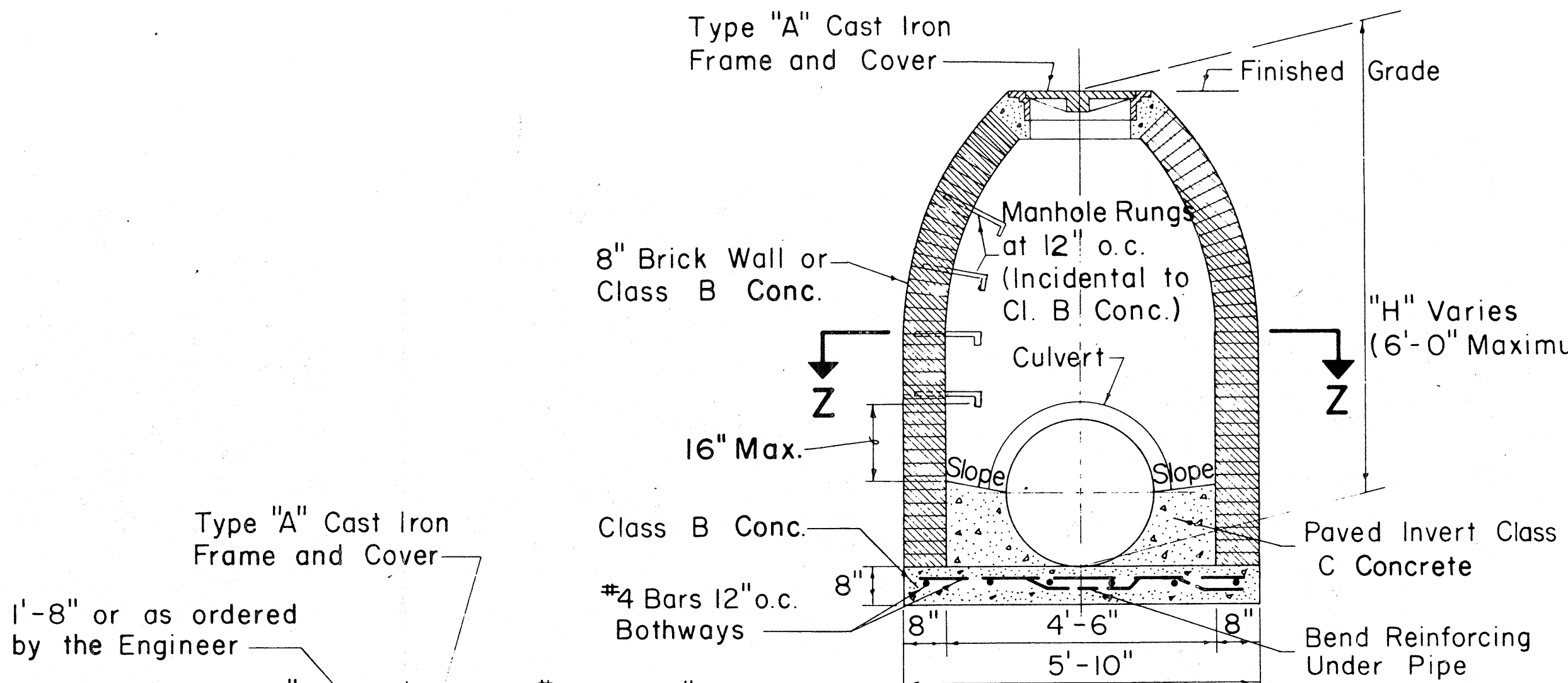
TYPE "A-1", "B-1", & "C-1"
STORM DRAIN MANHOLE
TOP DETAIL UNDER PAVEMENT

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

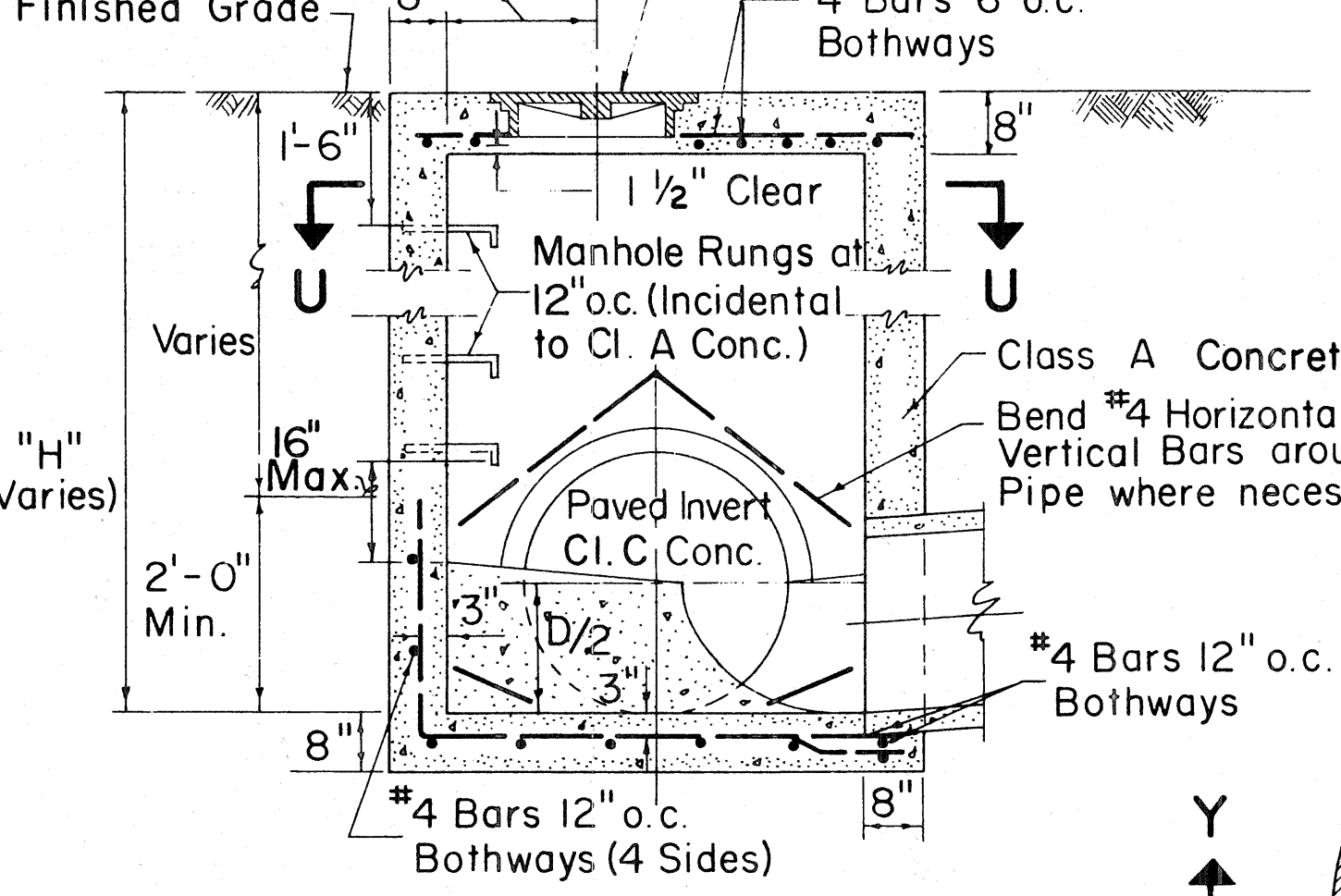
Note:
Bottom detail similar to
Type "A", "B", & "C".

GENERAL NOTES

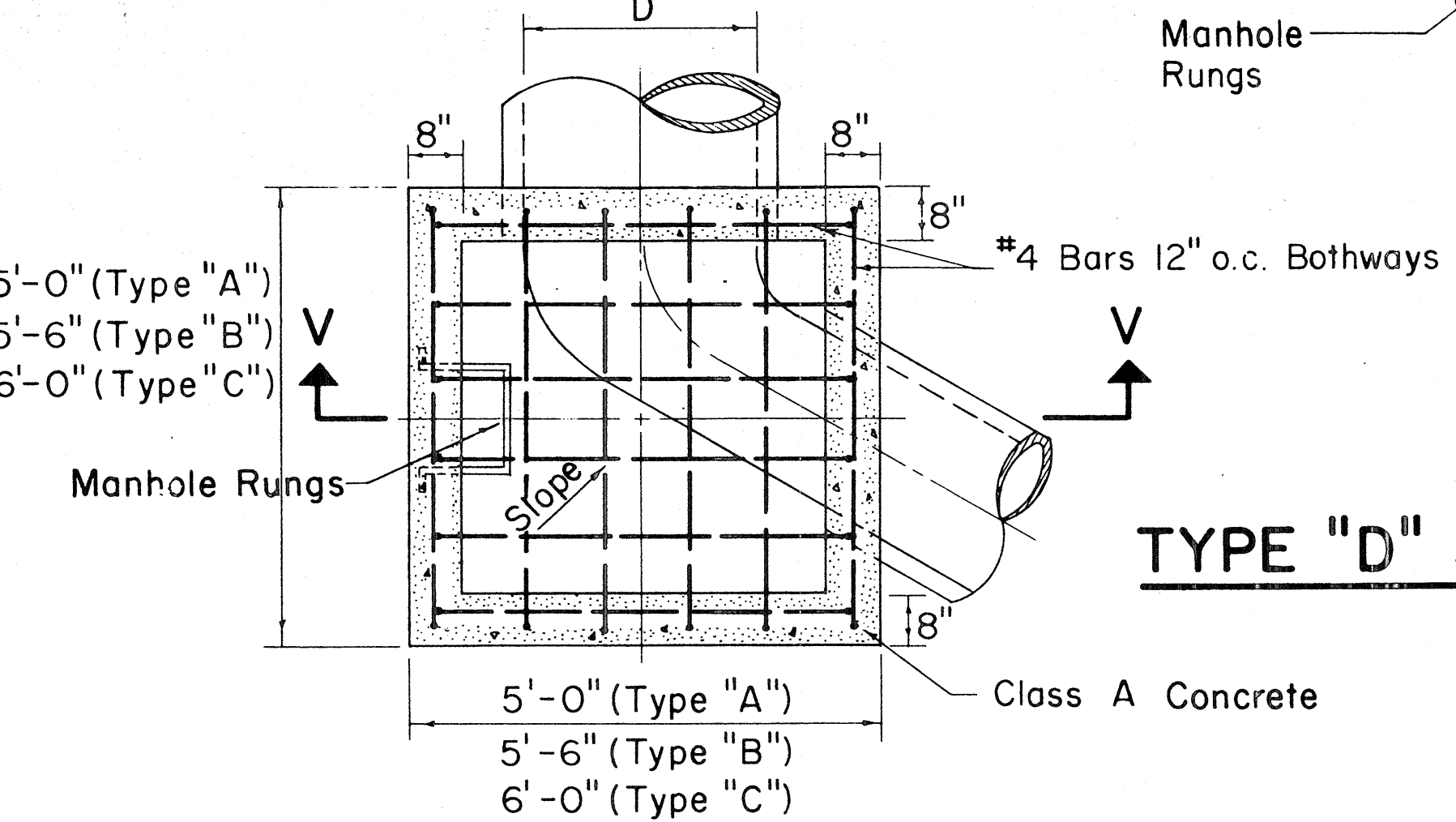
1. Culvert shall enter and leave S.D.M.H. from any position and in the direction indicated by the plans or ordered by the Engineer.
2. Manhole Rungs (12" o.c.) are required when "H" is greater than 4'-6". Only one rung (16" from the bottom) is required if "H" is 4'-6" or less. Type "A" C.I. Frame and Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.



SECTION Y-Y

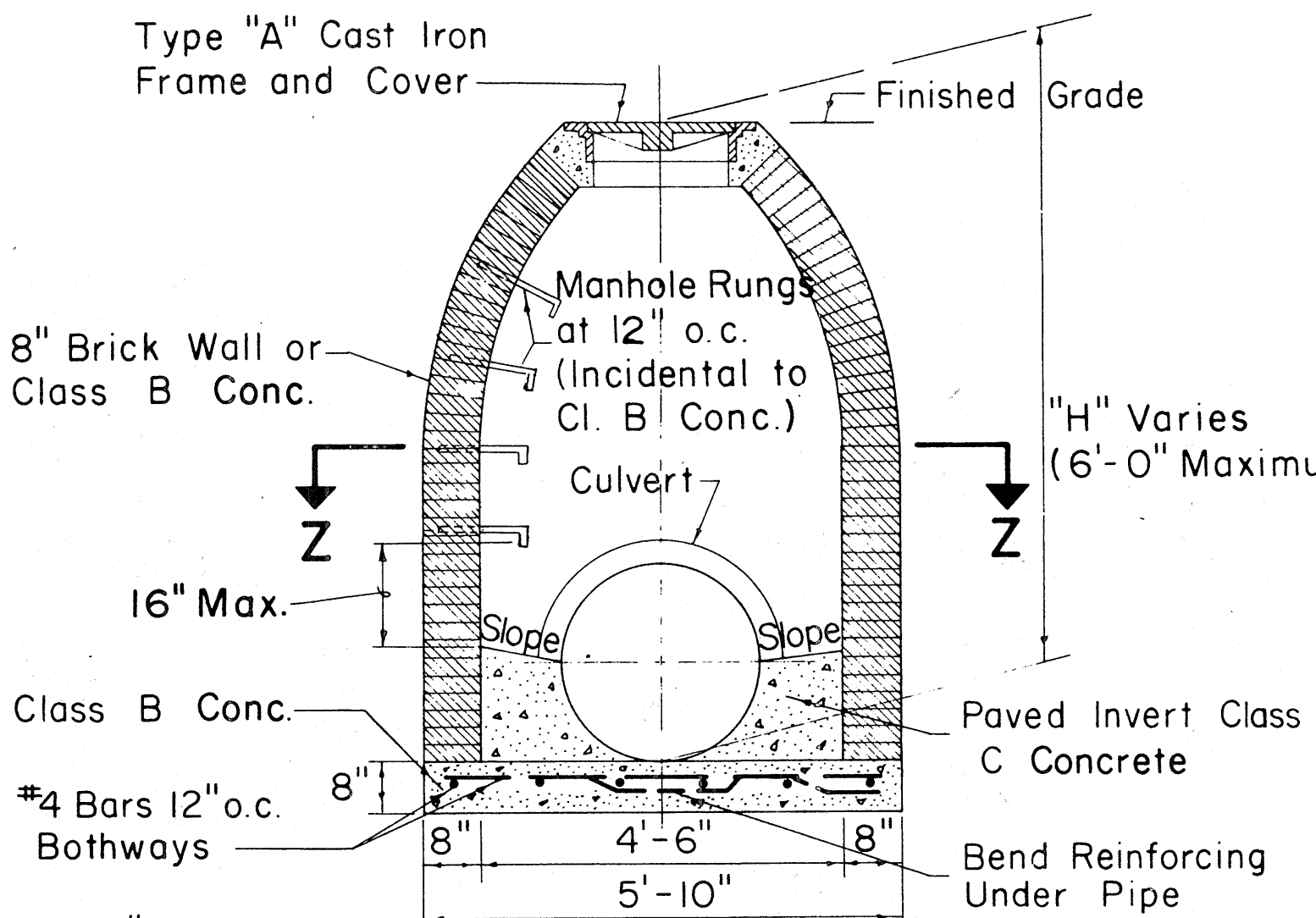


SECTION V-V



SECTION U-U

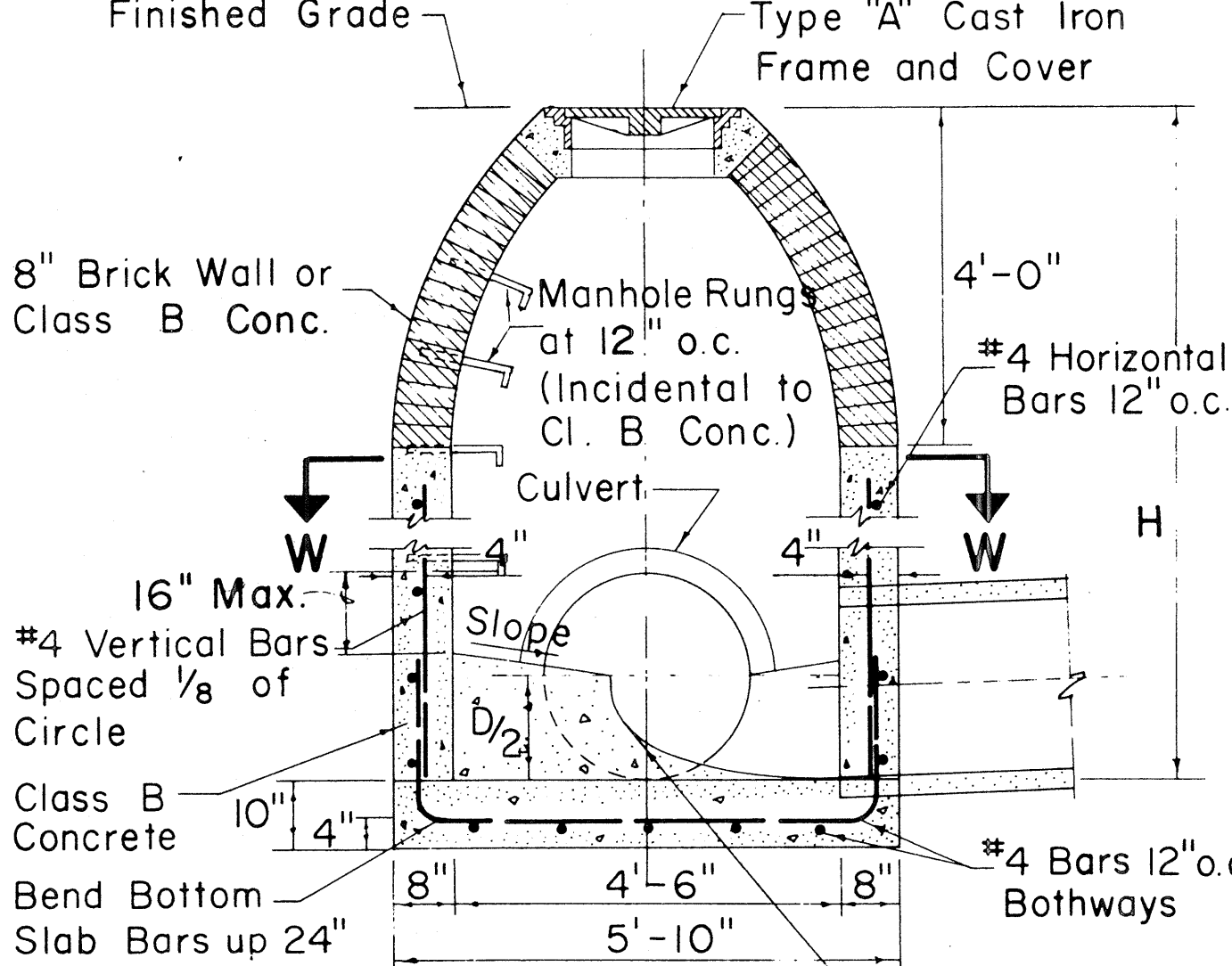
TYPE "A", "B", & "C"
S.D.M.H.
Scale: 1/2" = 1'-0"



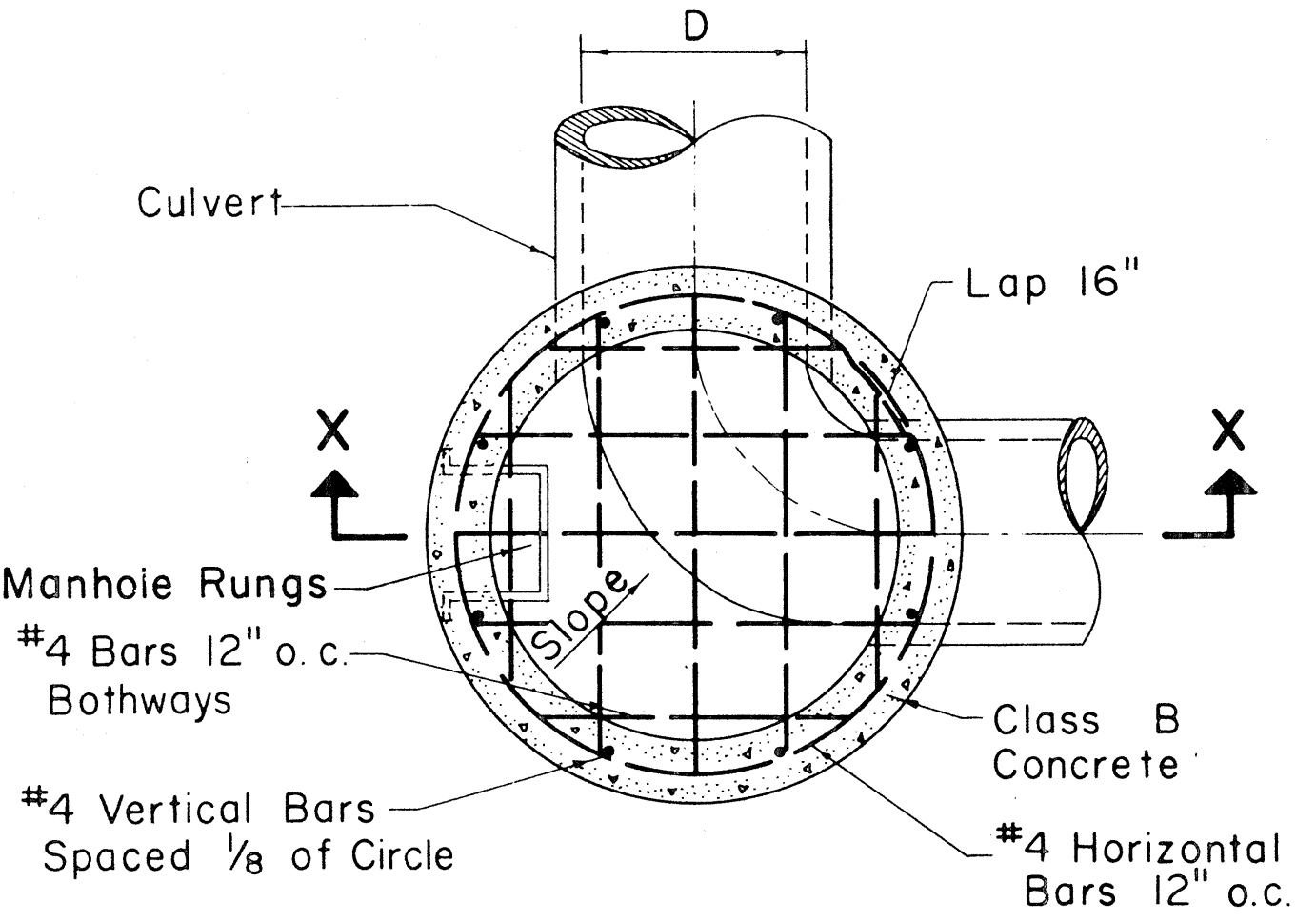
SECTION Z-Z

TYPE "D" STORM DRAIN MANHOLE

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



SECTION X-X



SECTION W-W

TYPE "E" STORM DRAIN MANHOLE

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

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

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

APPROVED:
[Signature] 12-17-69
ASS'T. CHIEF, ENGINEERING DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

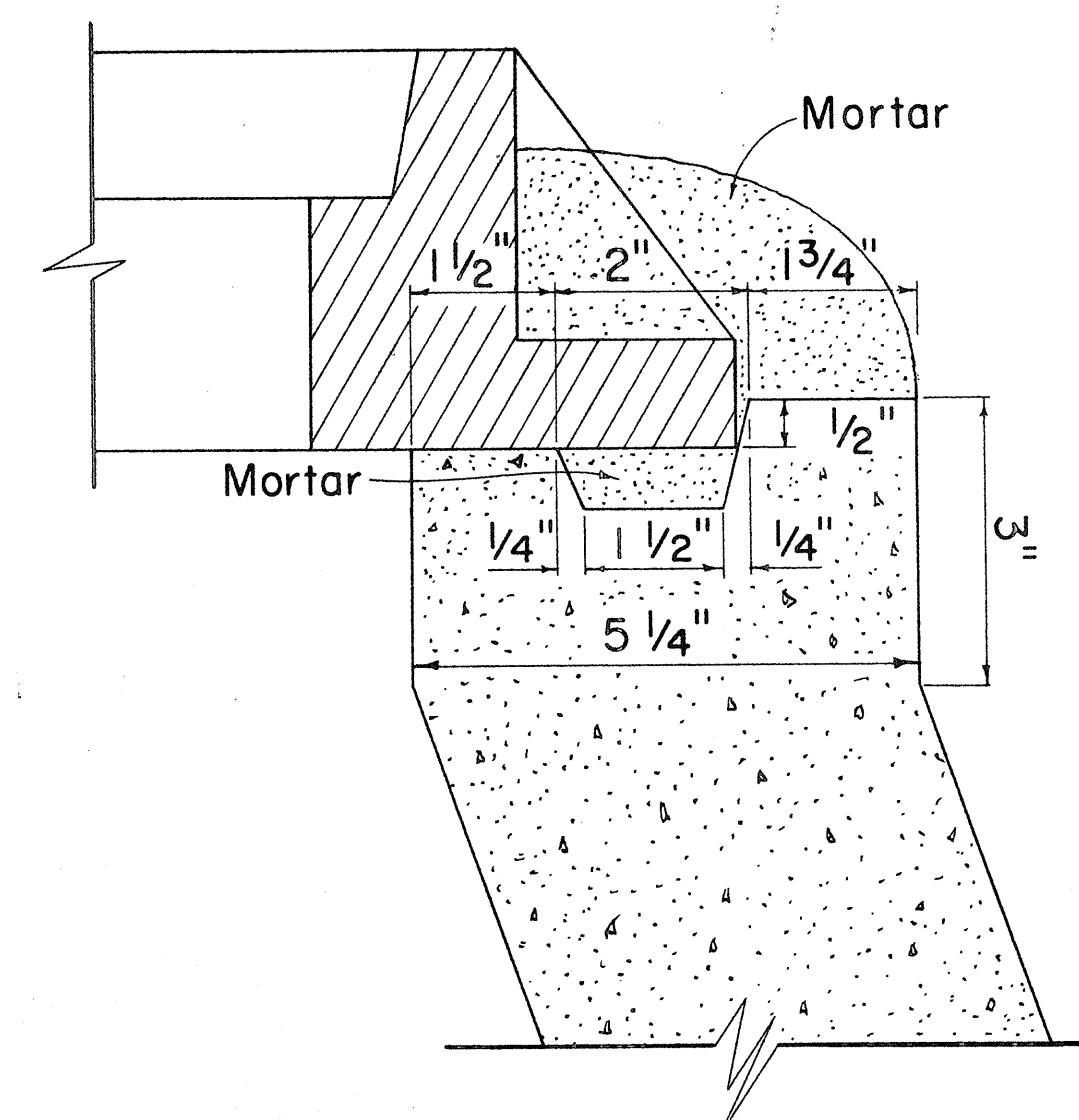
STANDARD DETAILS
STORM DRAIN MANHOLES

Scales: As Noted Date: July, 1969
SHEET NO. 8 OF 14 SHEETS DH 5

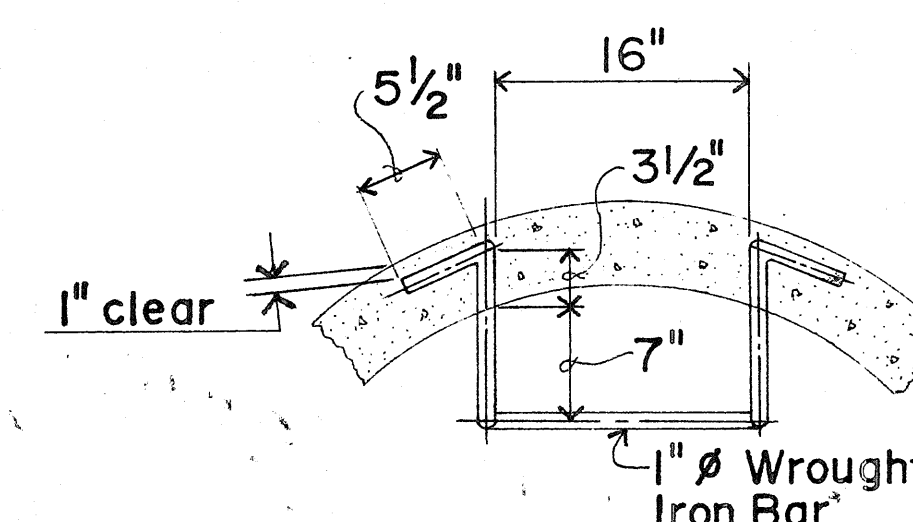
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-078-1(2)	1980	54	234

GENERAL NOTES

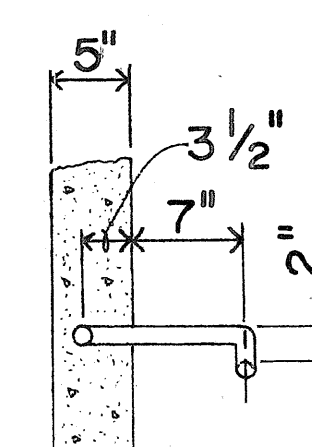
- Manhole Rungs to be placed at 12" o.c. (Manhole Rungs incidental to Class B Concrete)
- Select appropriate combination of risers and grade rings for required height.
- All joints to be grouted as set.
- The precast sections shall be constructed in accordance with the details shown on the plans and to the requirements of ASTM C 478
- Manufacturers may submit to the Engineer for approval, prior to manufacturing, designs other than those shown on this sheet.
- Reinforcing steel for precast sections shall be placed in accordance with the requirements of ASTM C 478
- All Class C Concrete to be incidental to Class B Concrete.



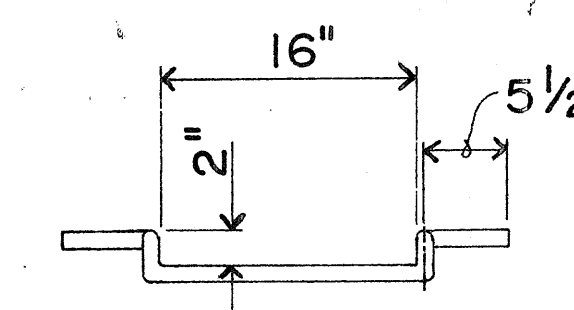
DETAIL "B"
Not to Scale



PLAN VIEW

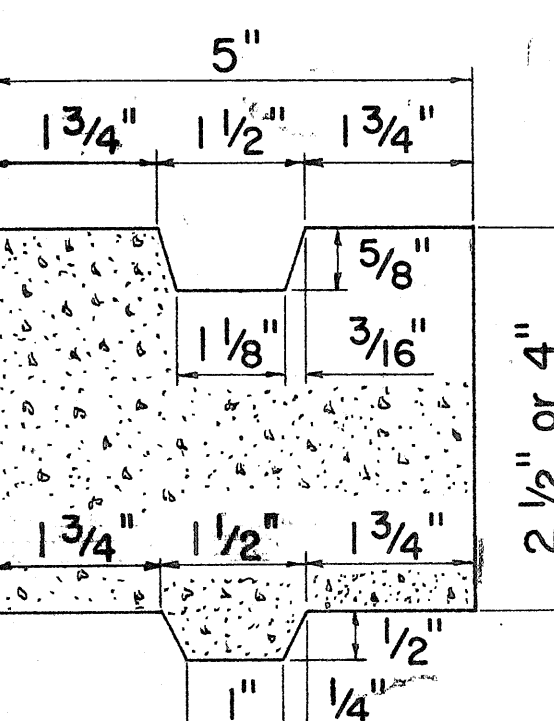


SIDE VIEW

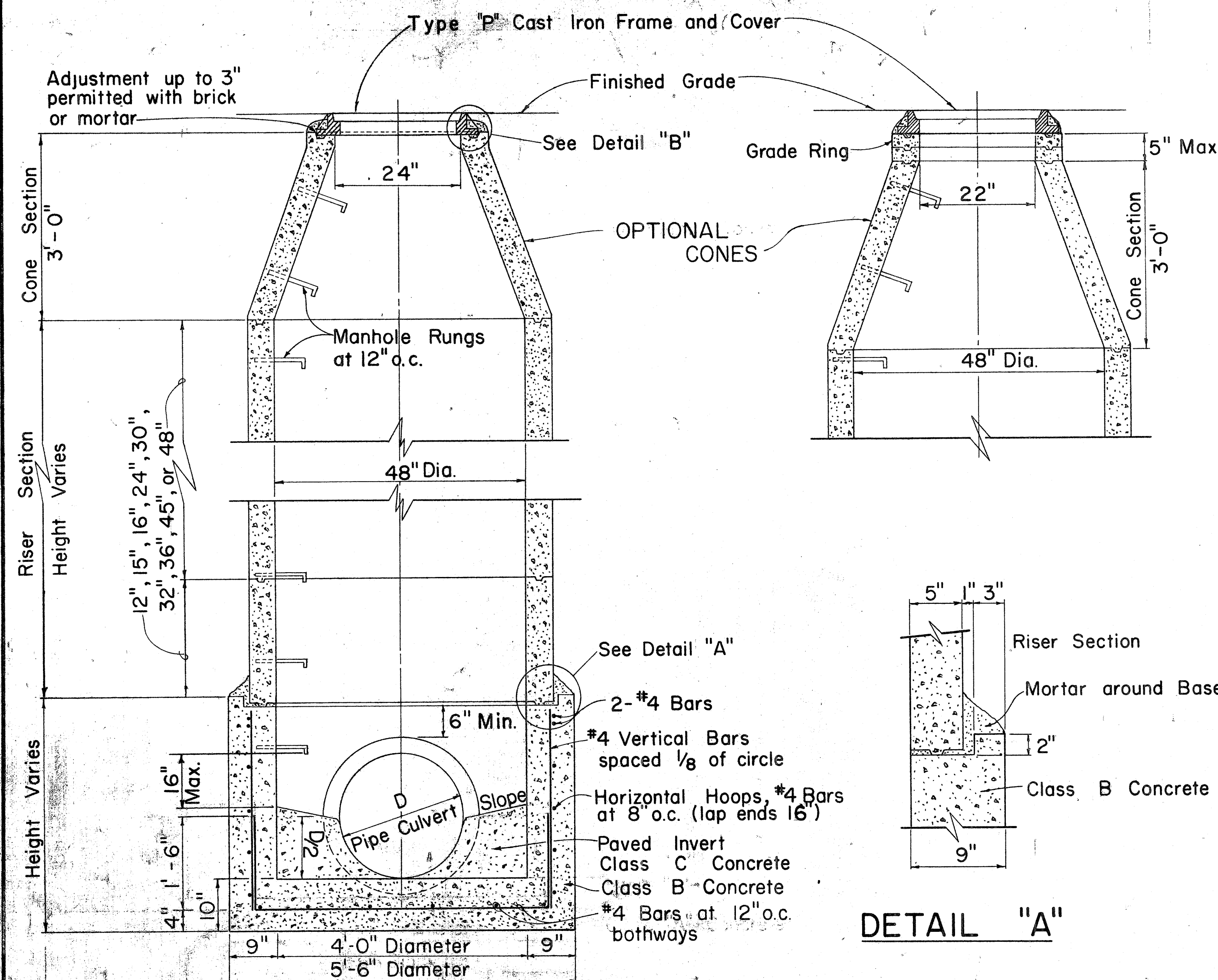


FRONT VIEW

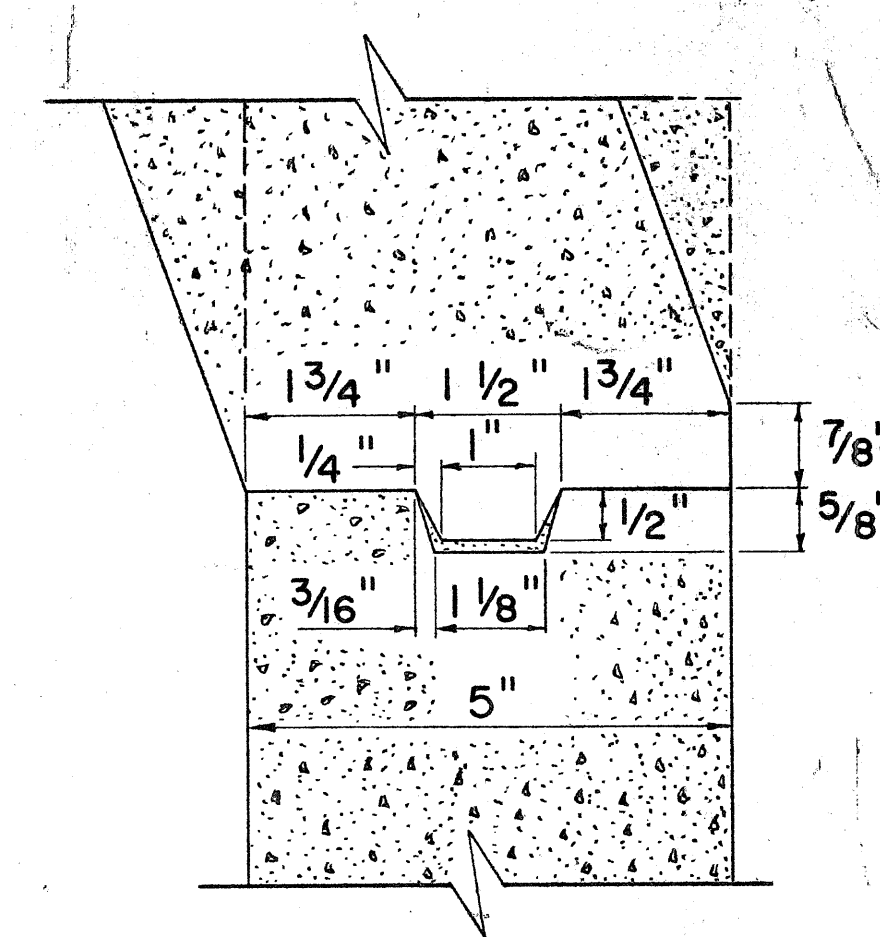
DETAIL OF MANHOLE RUNGS
Not to Scale



GRADE RING DETAIL
Not to Scale



TYPICAL SECTIONS PRECAST CONCRETE MANHOLE
Not to Scale



DETAIL FOR RISER JOINTS
Not to Scale

APPROVAL RECOMMENDED:

G. J. J. J.
HYDRAULIC DESIGN ENGINEER

2-2-71
DATE

APPROVED:

A. J. J. J.
ASSISTANT CHIEF, ENGINEERING

2-23-71
DATE

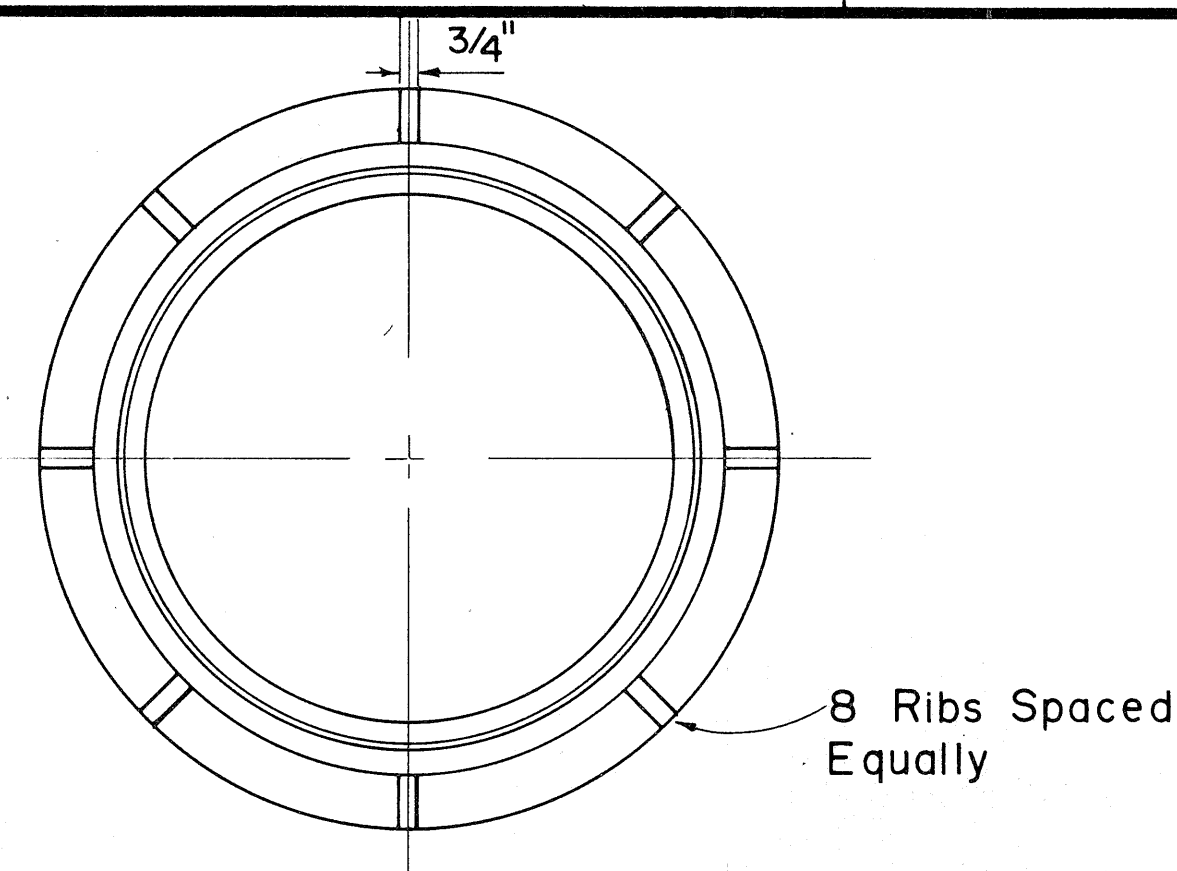
NO.	REVISION	APPROVED BY	DATE
1	Spacing and details of Manhole Rungs to conform to OSHA	H.T.	2/23/71

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
PRECAST CONCRETE
STORM DRAIN MANHOLES

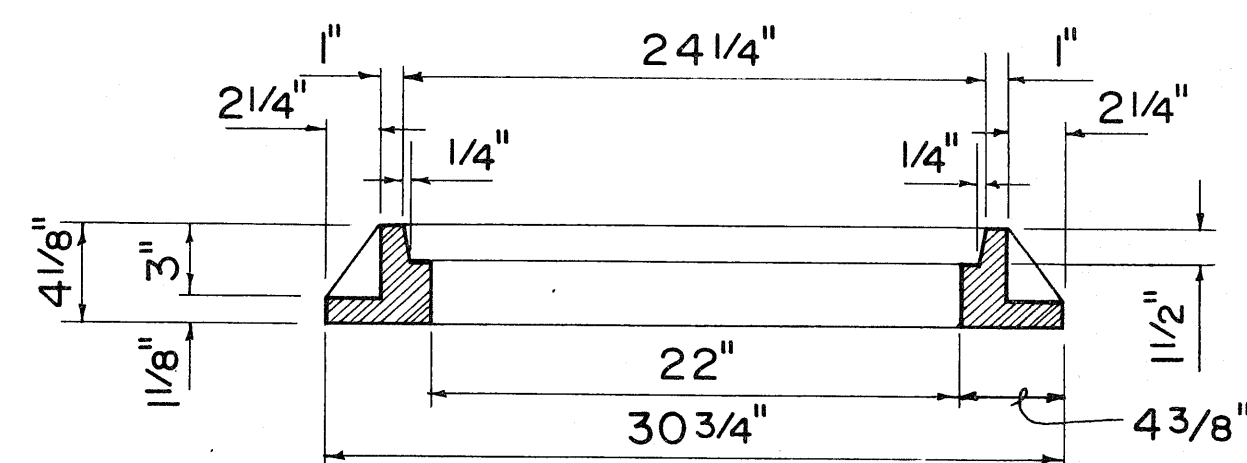
Not to Scale Date: Nov. 1970

SHEET No. 54 OF 14 SHEETS DH 5A

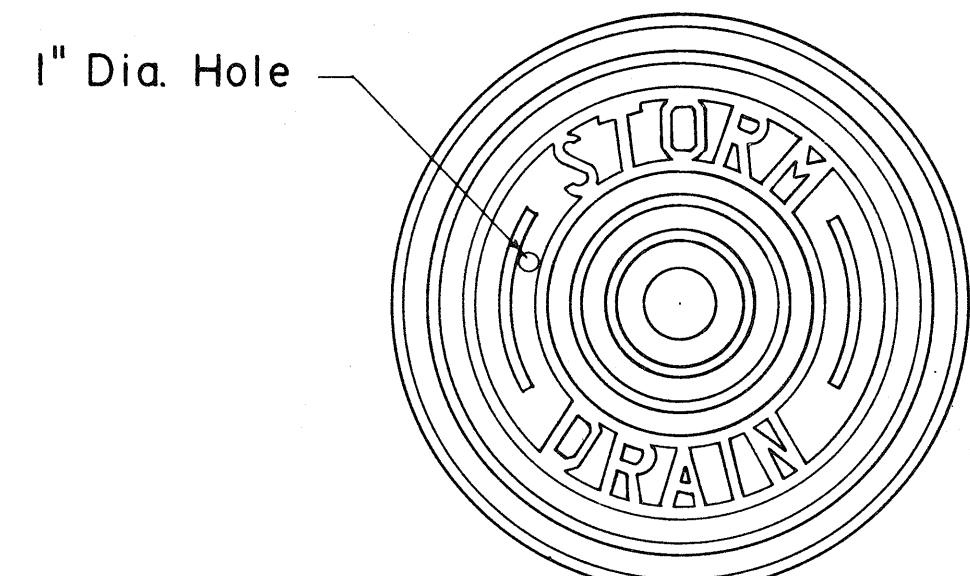
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-079-101	1980	55	234



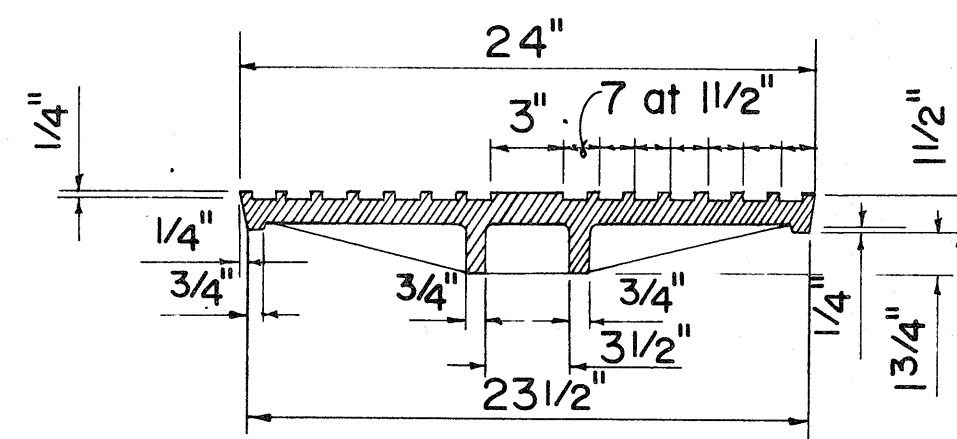
PLAN OF FRAME



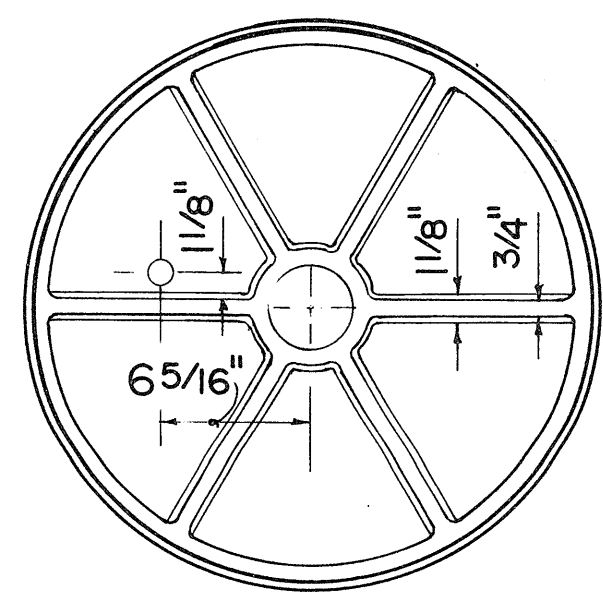
SECTION OF FRAME



TOP VIEW OF COVER

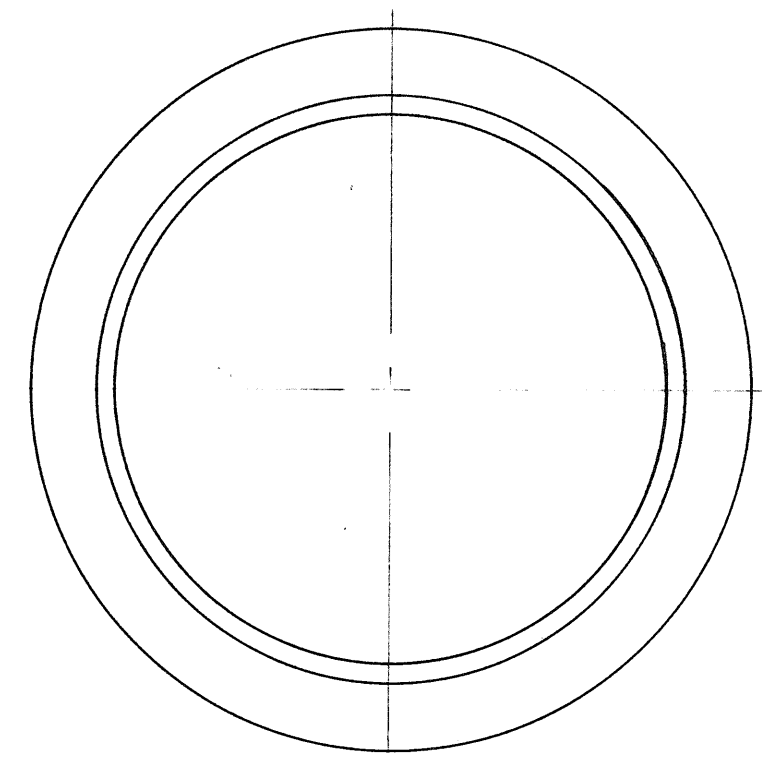


SECTION

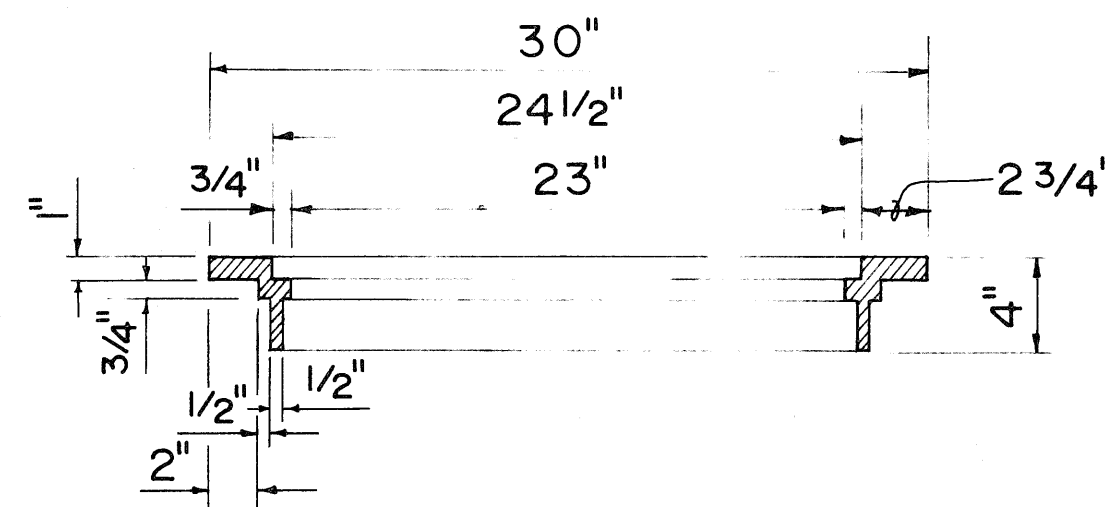


BOTTOM VIEW OF COVER

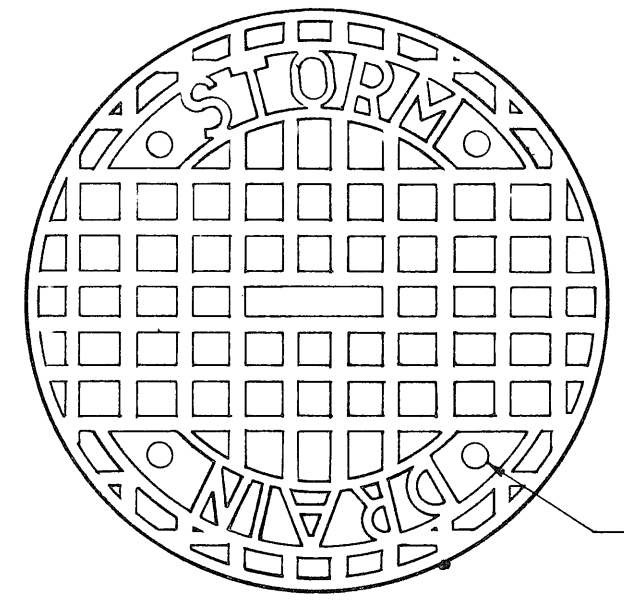
TYPE "P" CAST IRON
FRAME AND COVER



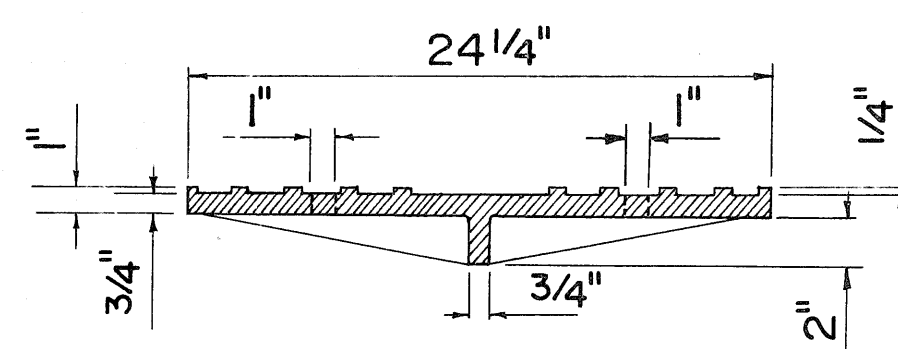
PLAN OF FRAME



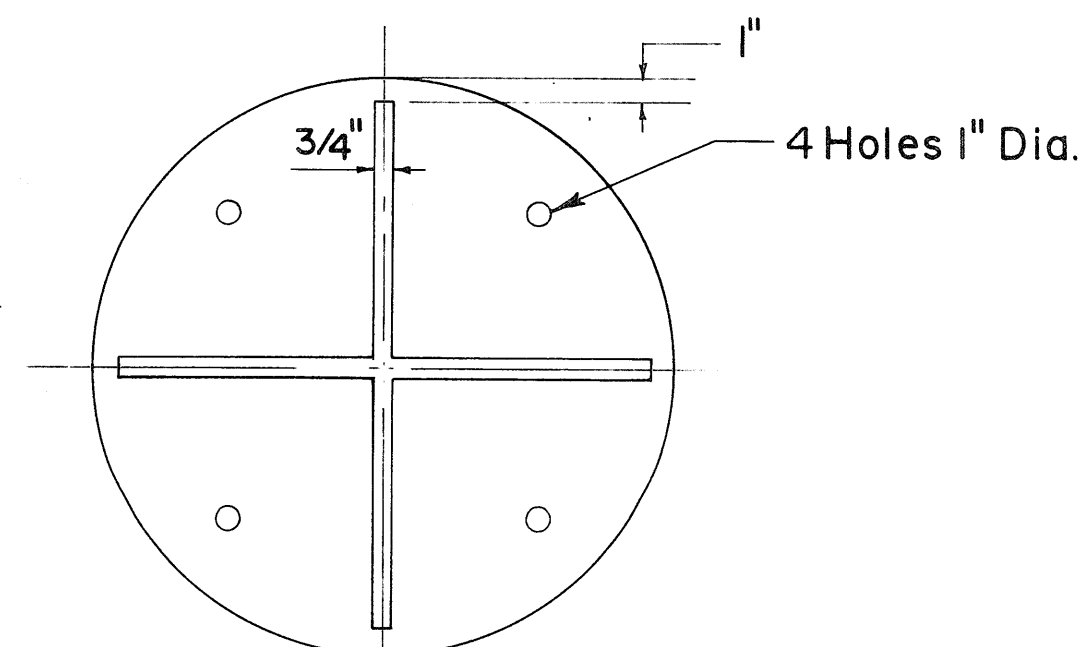
SECTION OF FRAME



TOP VIEW OF COVER

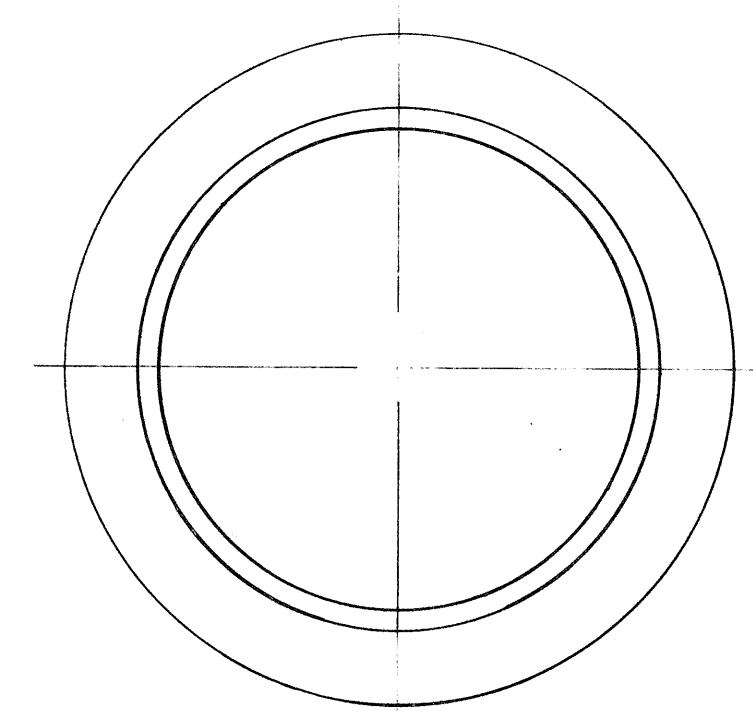


SECTION

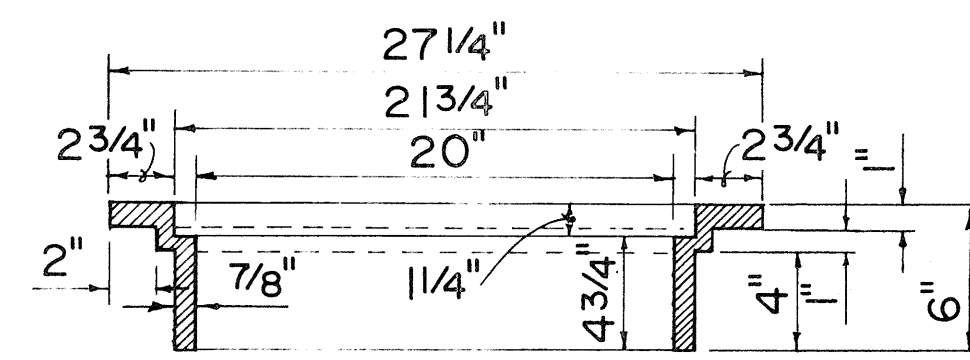


BOTTOM VIEW OF COVER

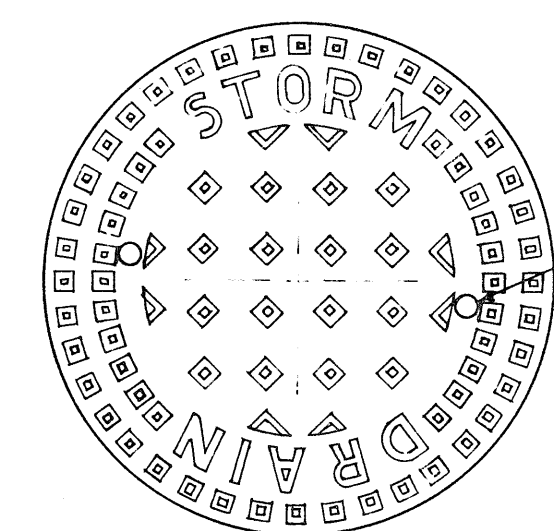
TYPE "B" CAST IRON
FRAME AND COVER



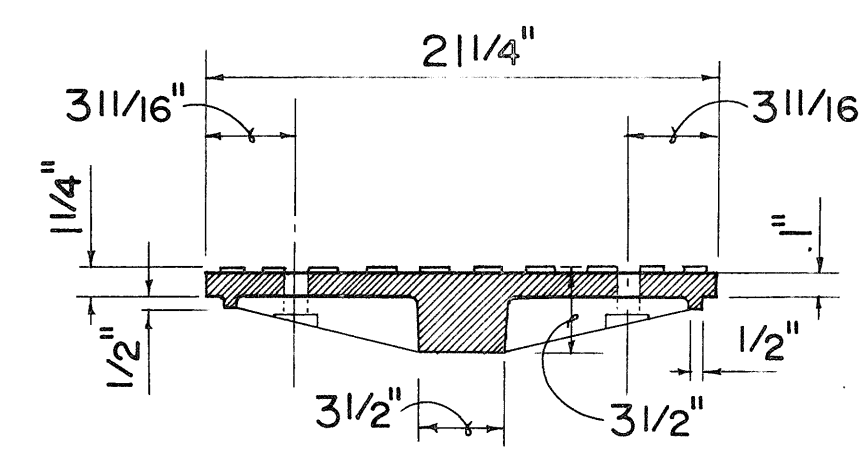
PLAN OF FRAME



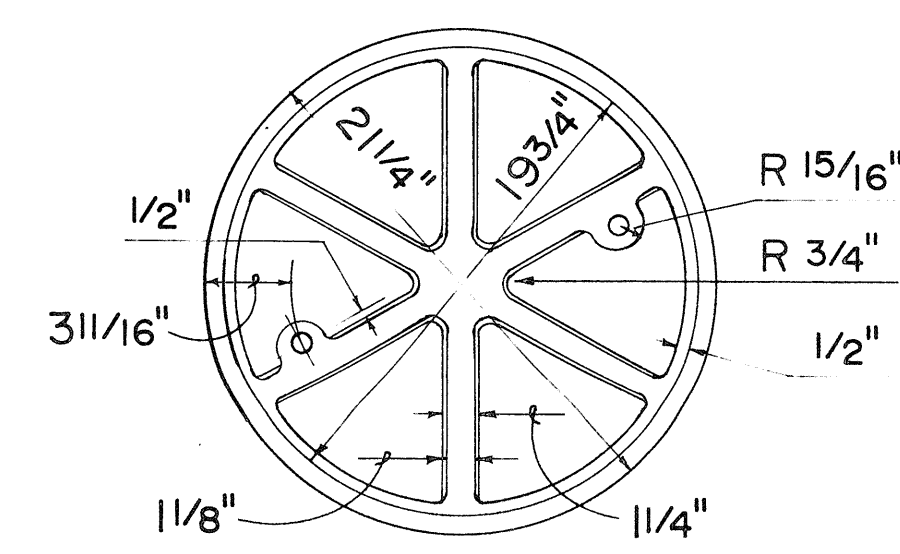
SECTION OF FRAME



TOP VIEW OF COVER

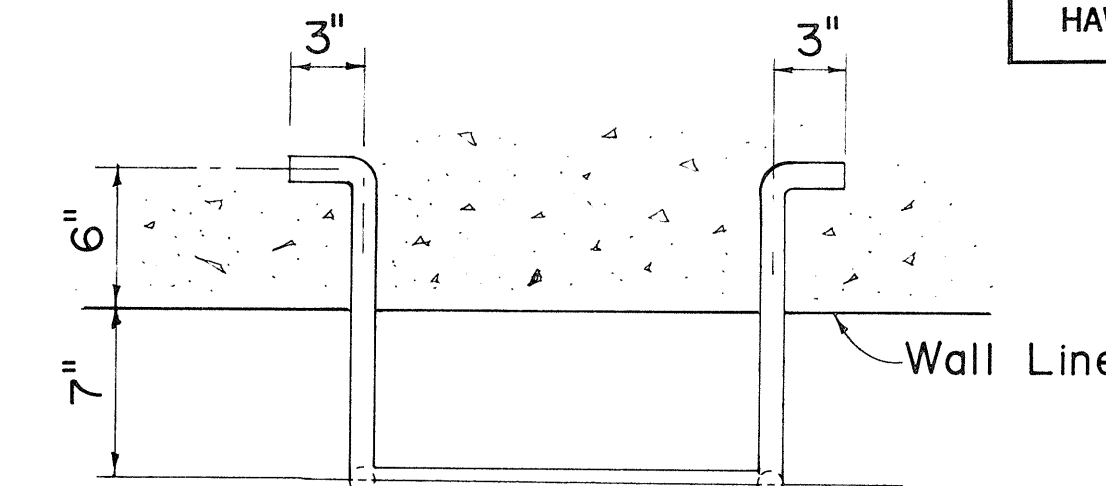


SECTION

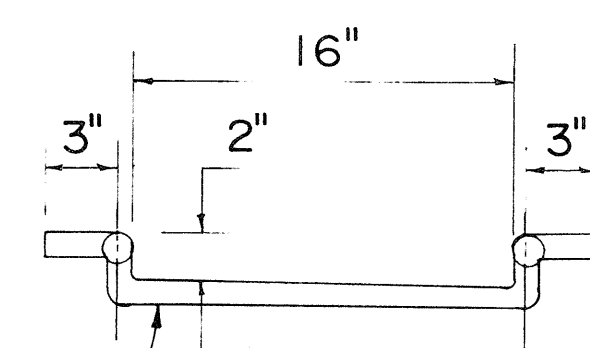


BOTTOM VIEW OF COVER

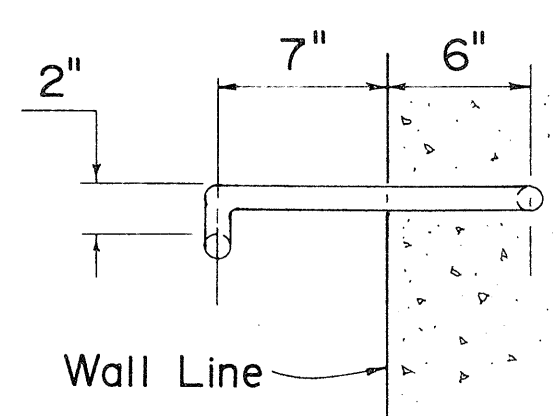
TYPE "A" CAST IRON
FRAME AND COVER



PLAN



FRONT VIEW



SIDE VIEW

MANHOLE RUNG

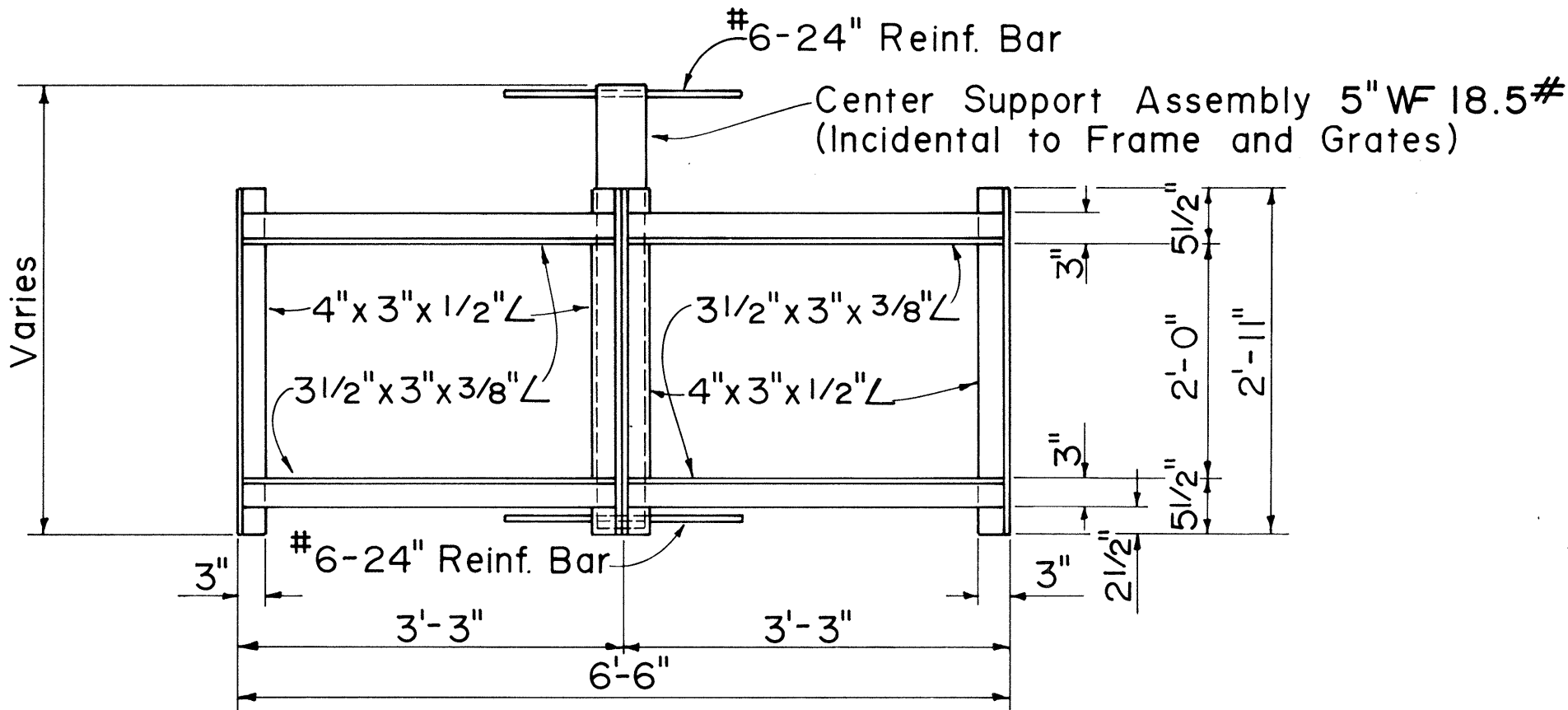
APPROVAL RECOMMENDED:
G. Takano 6-19-79
HYDRAULIC DESIGN ENGINEER DATE
APPROVED:
Herbert Zaleishi 6-22-79
ASSISTANT CHIEF, ENGINEERING DATE

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

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

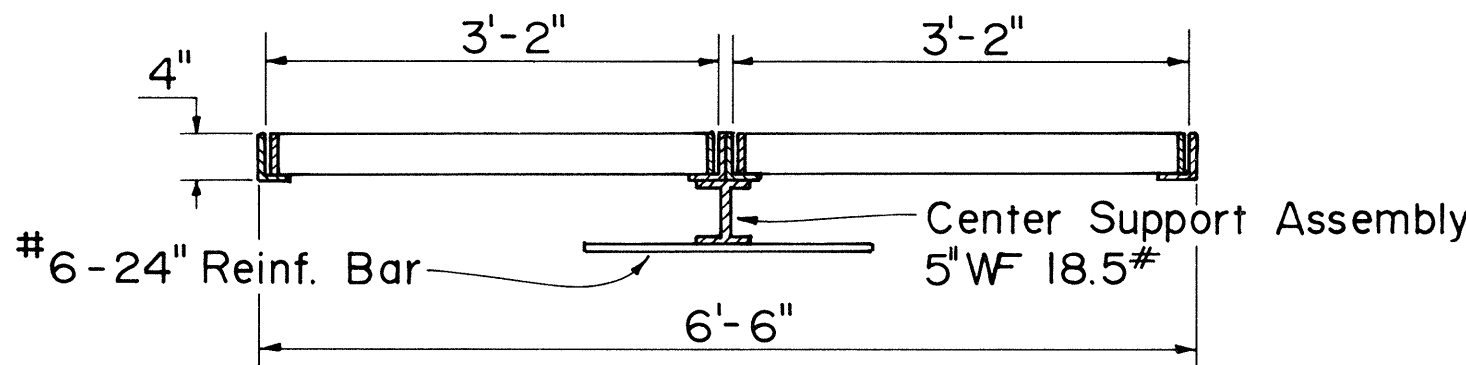
SHEET NO. 10 OF 14 SHEETS DH 6

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F078-1(2)	1980	56	234



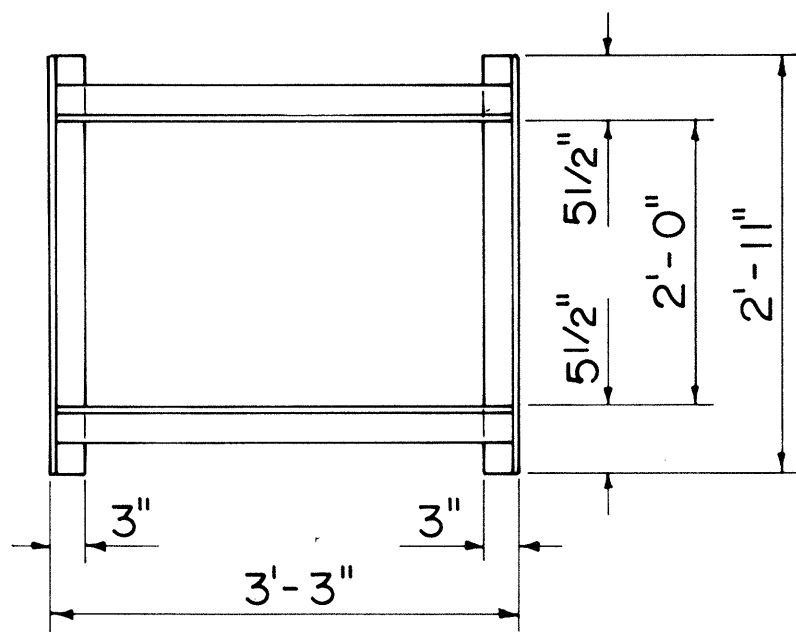
PLAN

(Two or More Grates)



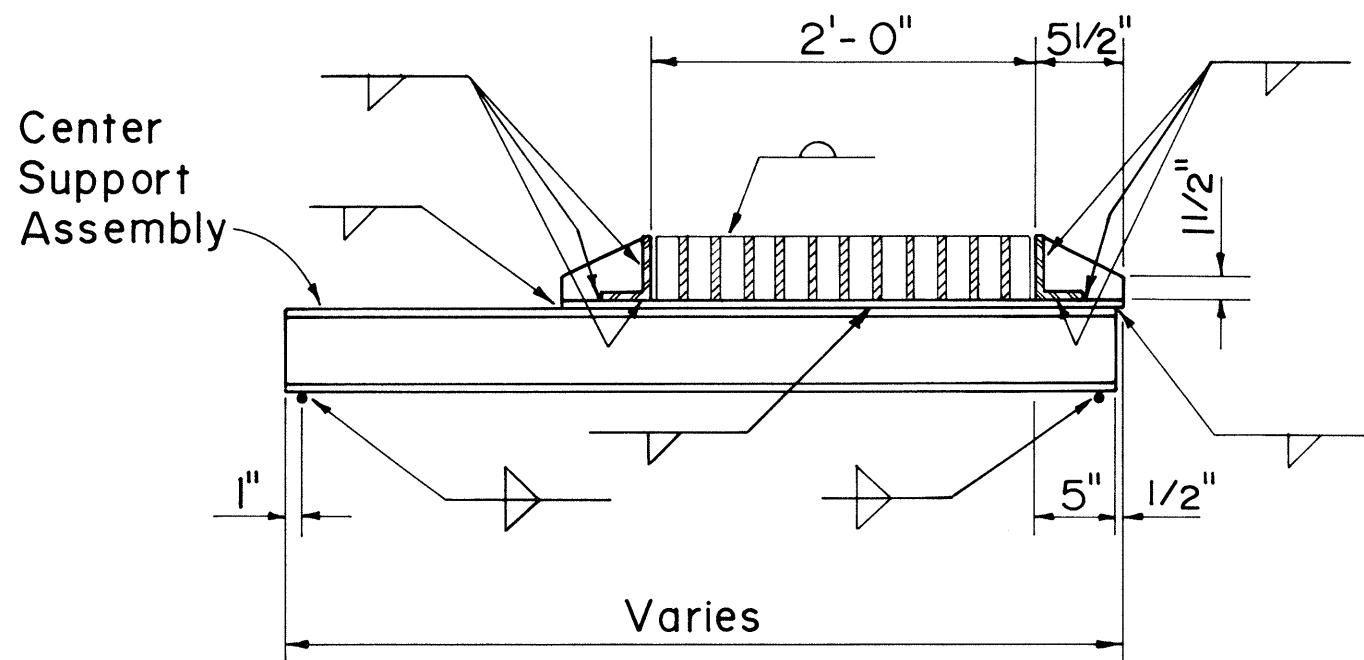
LONGITUDINAL SECTION

(Thru Frame & Gate)



PLAN

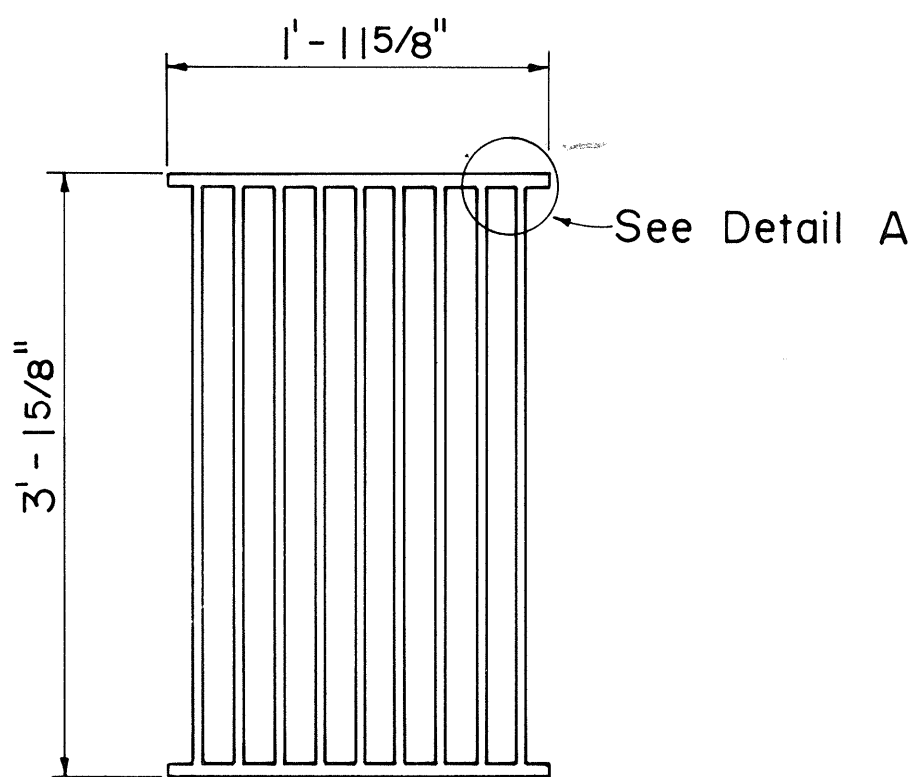
(Single Gate)



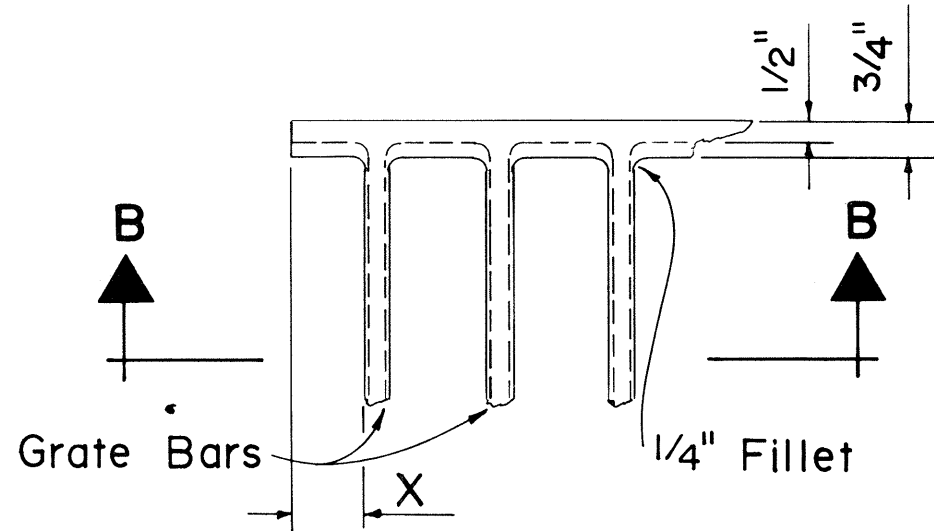
CROSS SECTION

(Thru Frame & Gate)

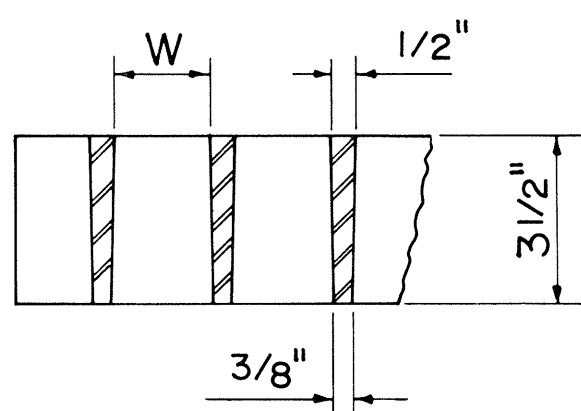
FRAME DETAILS



PLAN

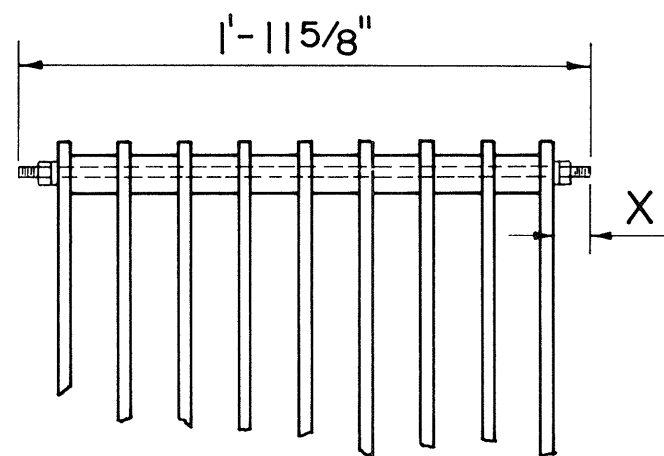


DETAIL A

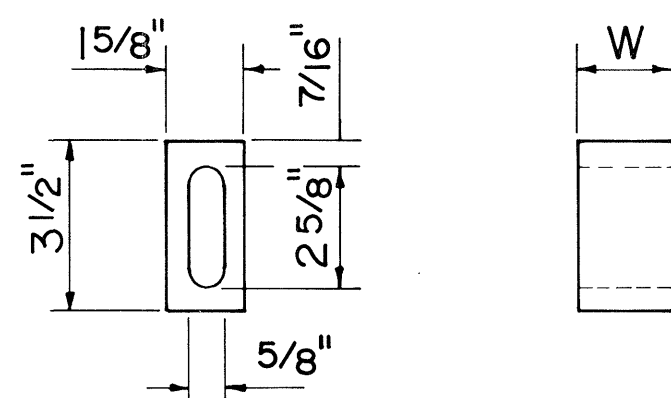


SECTION B-B

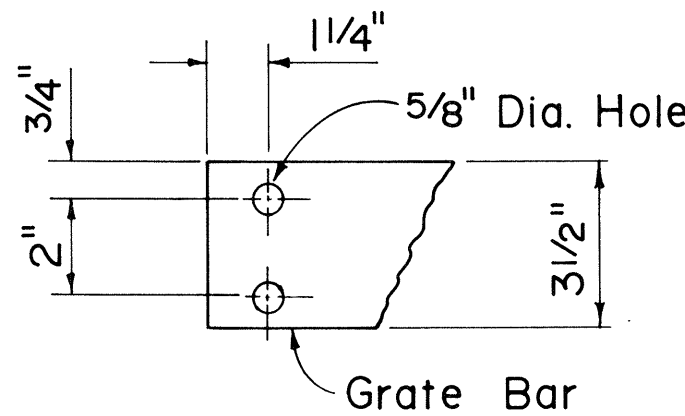
ALTERNATIVE CAST MALLEABLE IRON OR CAST STEEL GRATE



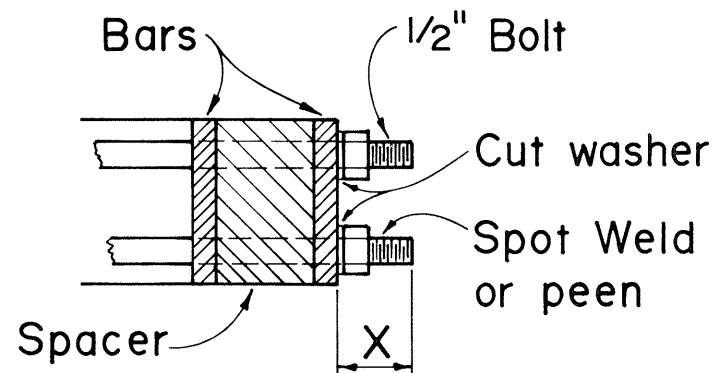
BOLTED END BLOCK



BAR SPACER

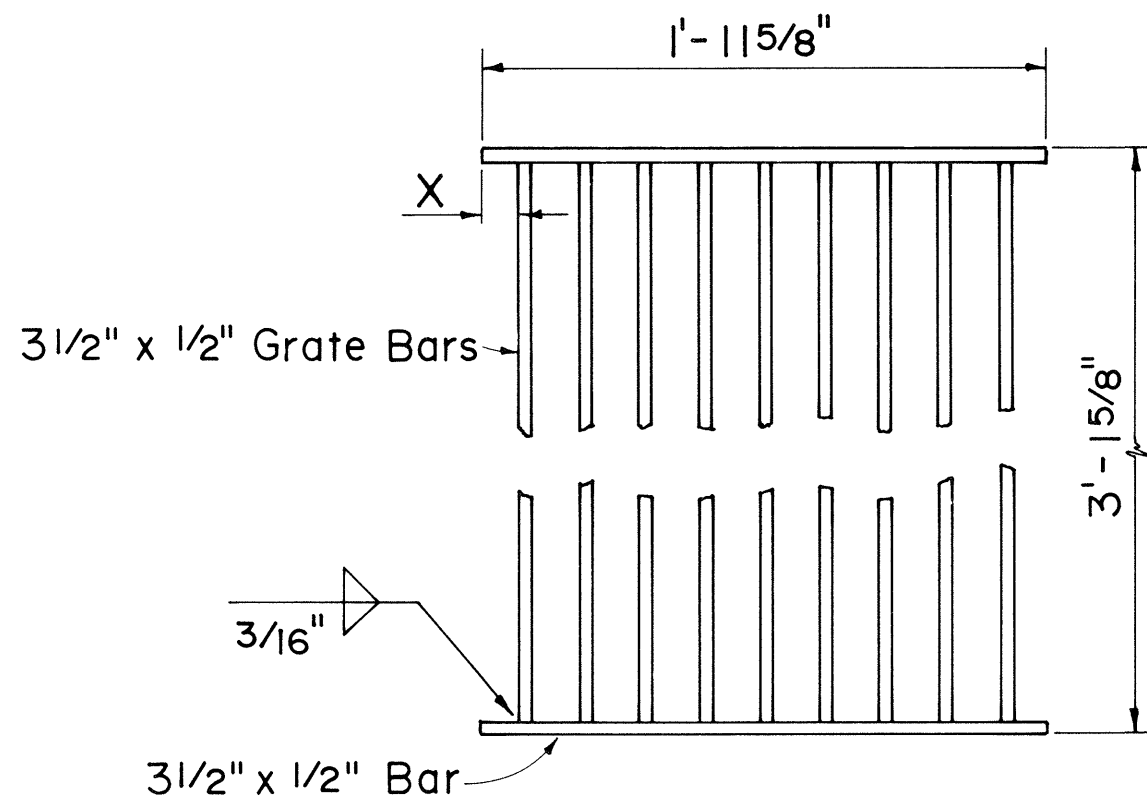


END OF BAR

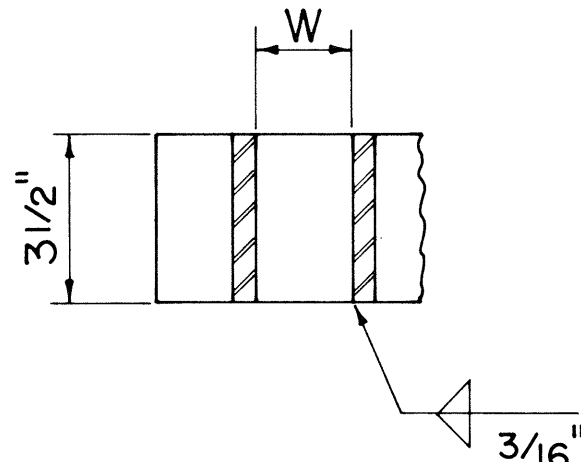


BOLTING DETAIL

ALTERNATIVE BOLTED GRATE



PLAN



SECTION

ALTERNATIVE WELDED GRATE

GRATE BAR SPACING TABLE			
TYPE	NO. BARS	CLEAR BAR SPACING-W	X
A-9	9	2"	1 9/16"
A-12	12	1 3/8"	1 1/4"

NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 7 approved 12-17-69	H.I.	6/22/79

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

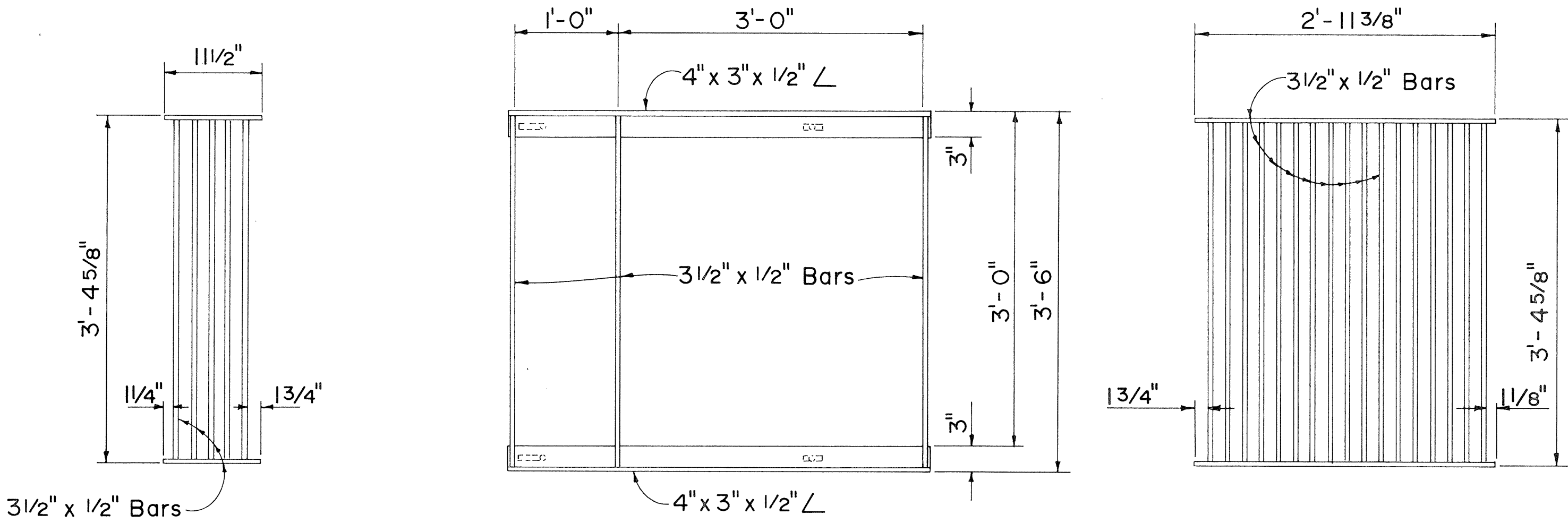
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
 STANDARD DETAILS
 TYPE A-9 AND A-12
 FRAMES AND GRATES
 Not To Scale Date: Dec. 1977

SHEET NO. 11 OF 14 SHEETS DH 7

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F073-1(21)	1980	57	234

GENERAL NOTE

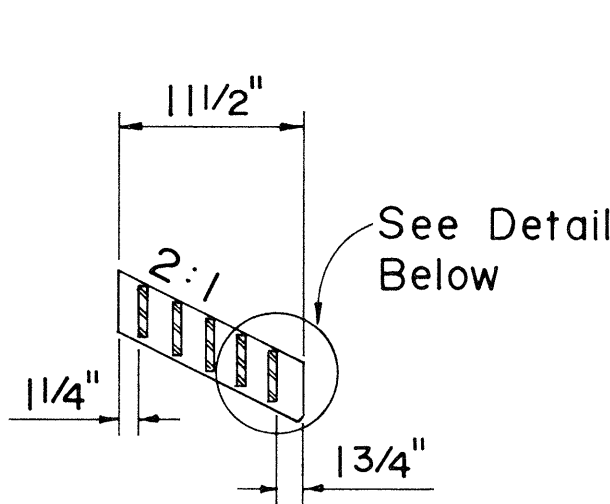
I. All welds 3/8" unless otherwise noted.



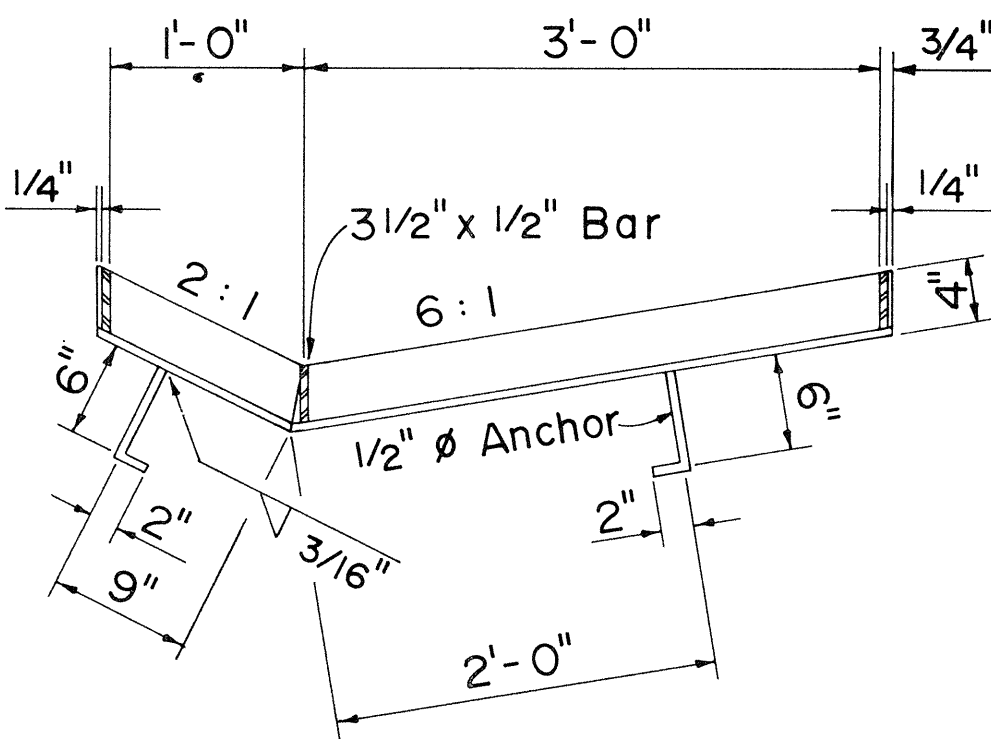
PLAN

PLAN

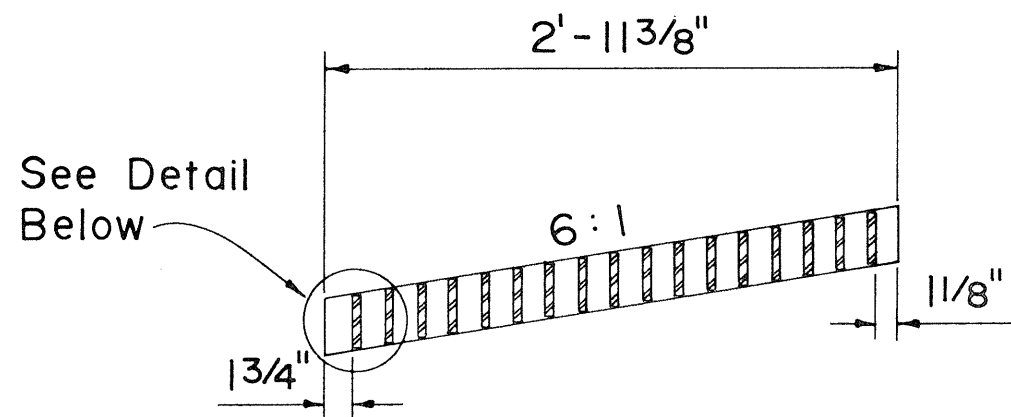
PLAN



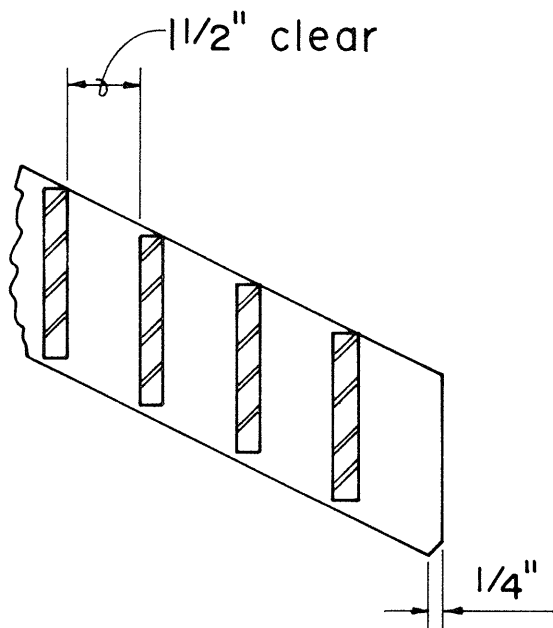
SECTION



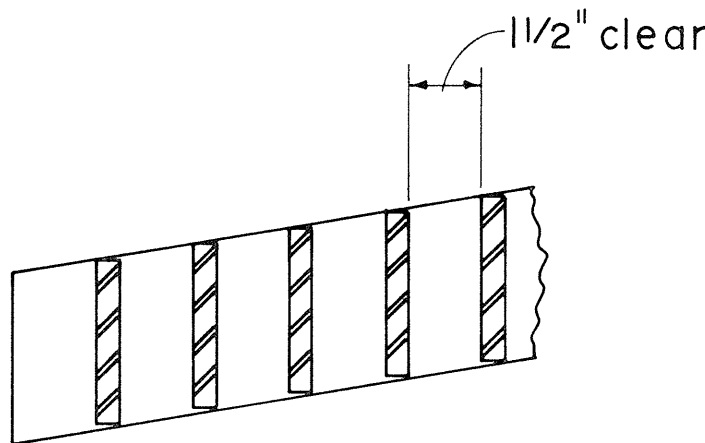
SECTION



SECTION

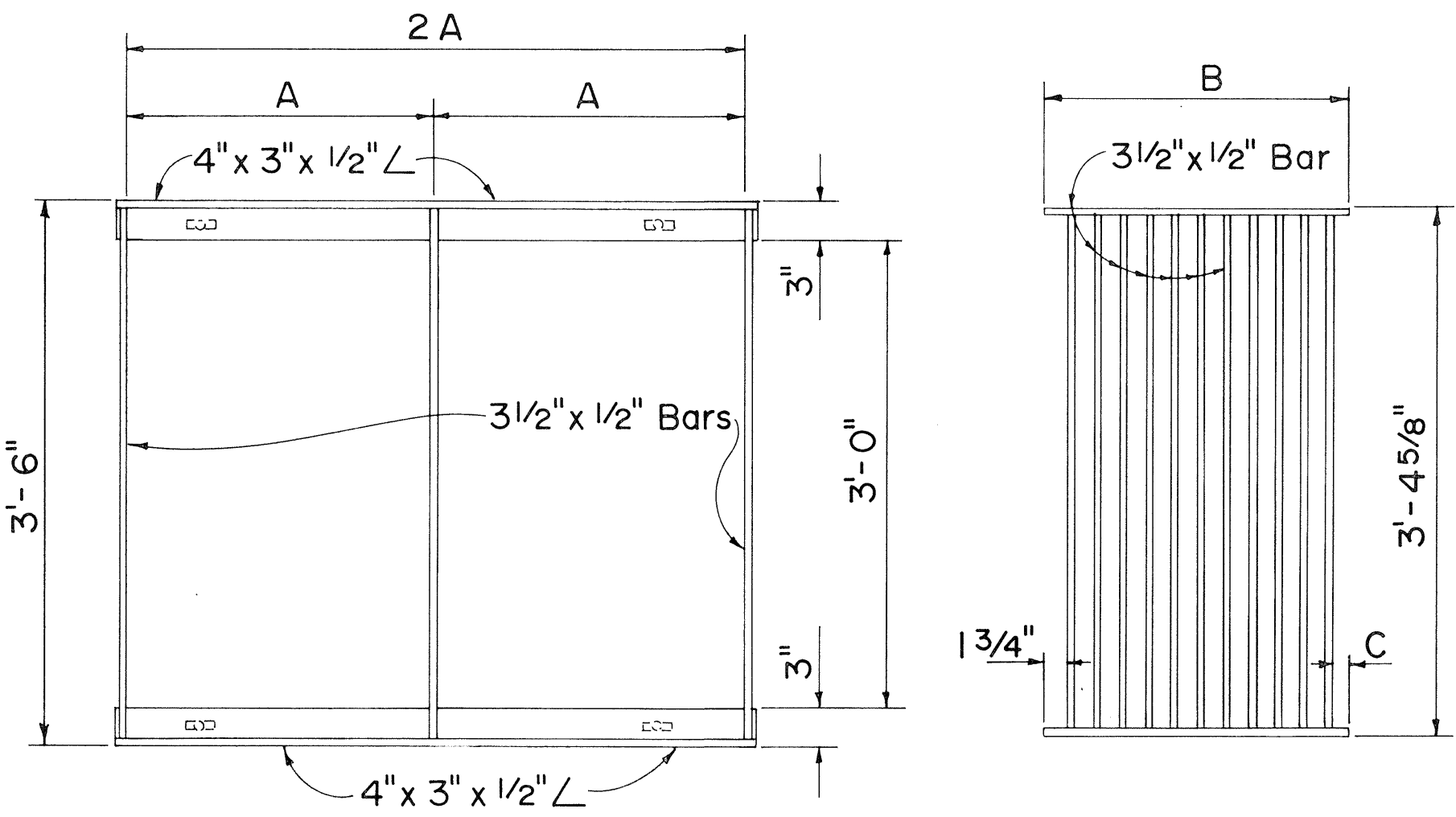


GRATE



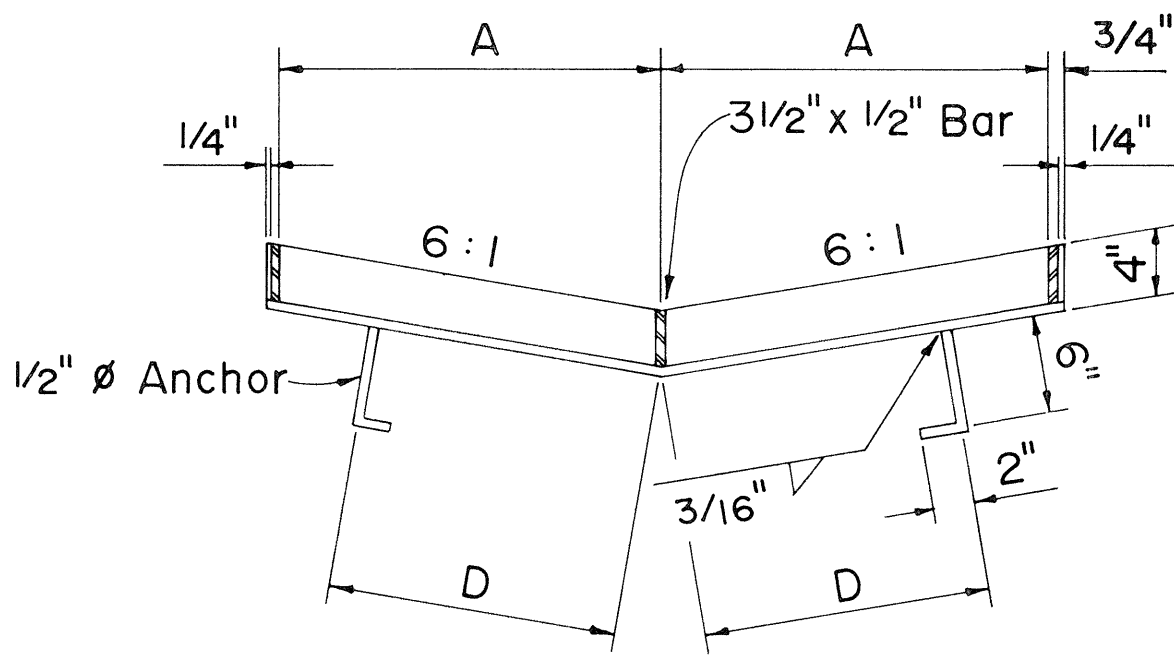
GRATE

61214 STEEL FRAME AND GRATES

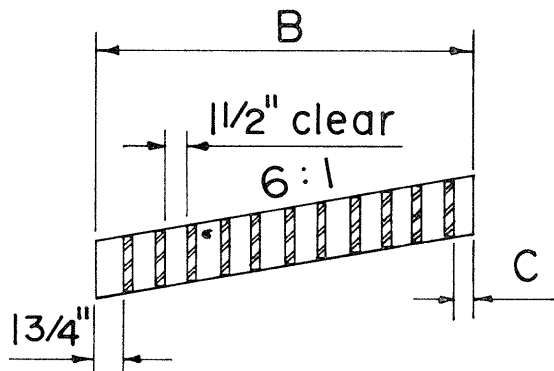


PLAN

PLAN



SECTION



SECTION

GRATE

FRAME

61614 OR 61616 STEEL FRAME AND GRATE

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

APPROVAL RECOMMENDED:
 P. Takano 6-19-79
 HYDRAULIC DESIGN ENGINEER DATE
 APPROVED:
 Herbert Takano 6-22-79
 ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE
I.	Supersedes Sht. DH 8 & DH 9 approved 12-17-69	H.T.	6-22-79

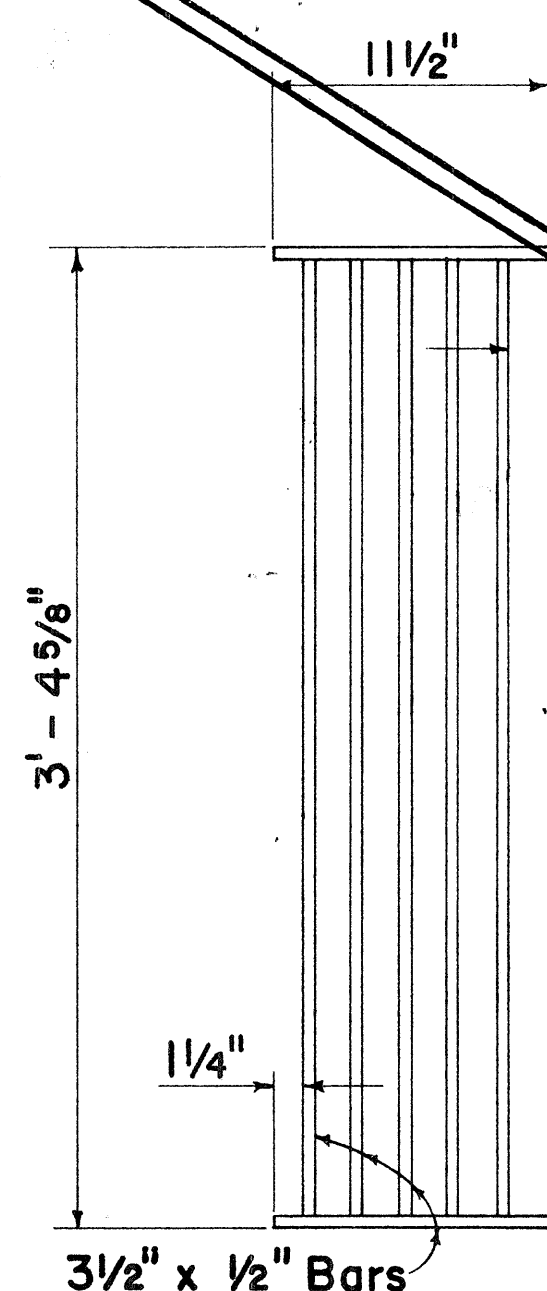
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
STANDARD DETAILS
61214, 61614 & 61616 STEEL FRAMES AND GRATES
Not To Scale Date: Dec. 1977

SHEET No. 12 OF 14 SHEETS DH 8

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-078-1(2)	1980	55	234

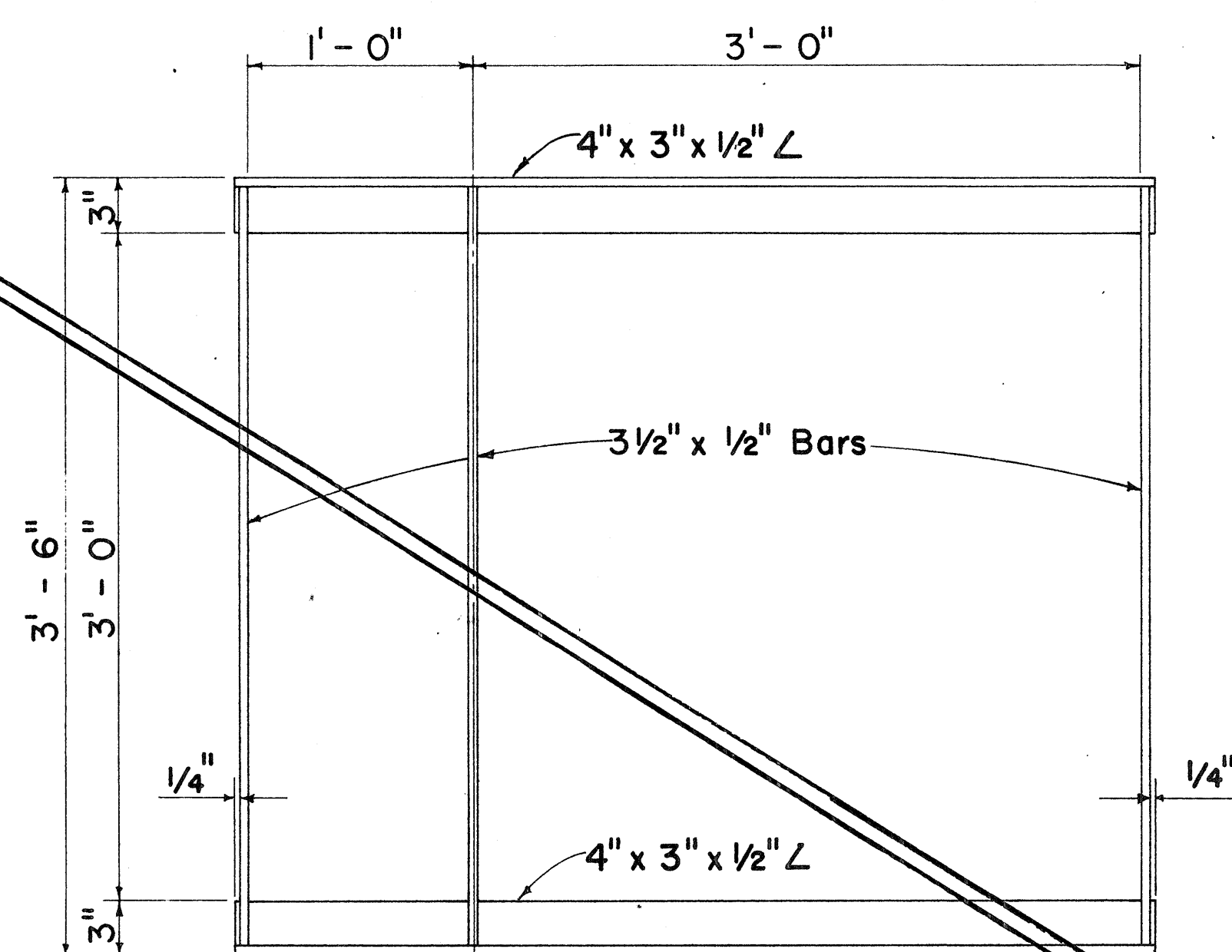
GENERAL NOTES

- Grates and Frames shall be hot dip galvanized after fabrication, see specifications.
- All welds $\frac{7}{8}$ " unless otherwise noted.
- 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 (12" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (16 inches from the bottom) is required if "H" is 4 feet 6 inches or less. The Manhole Rungs may be placed at any location as ordered by the Engineer.



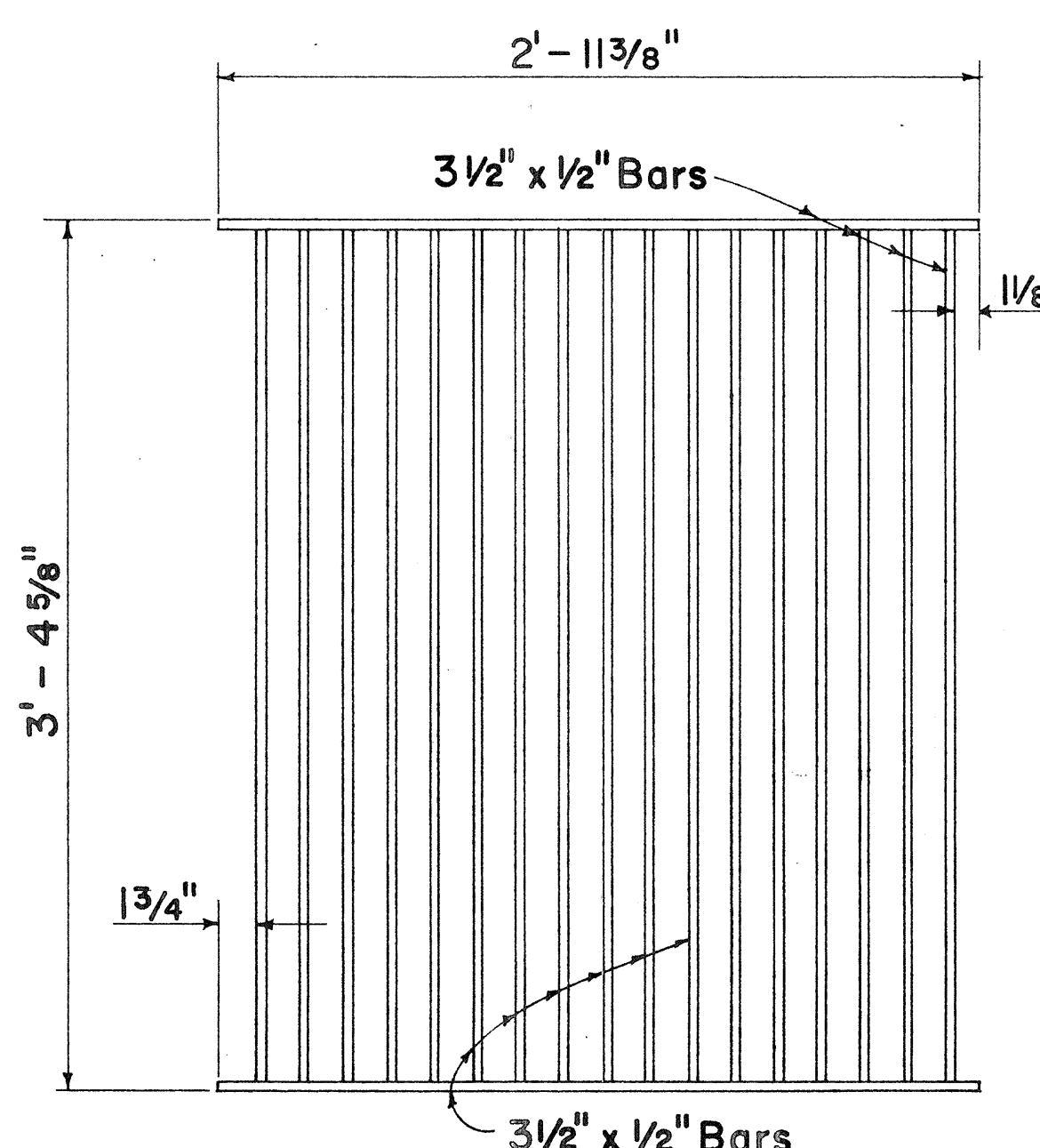
PLAN

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



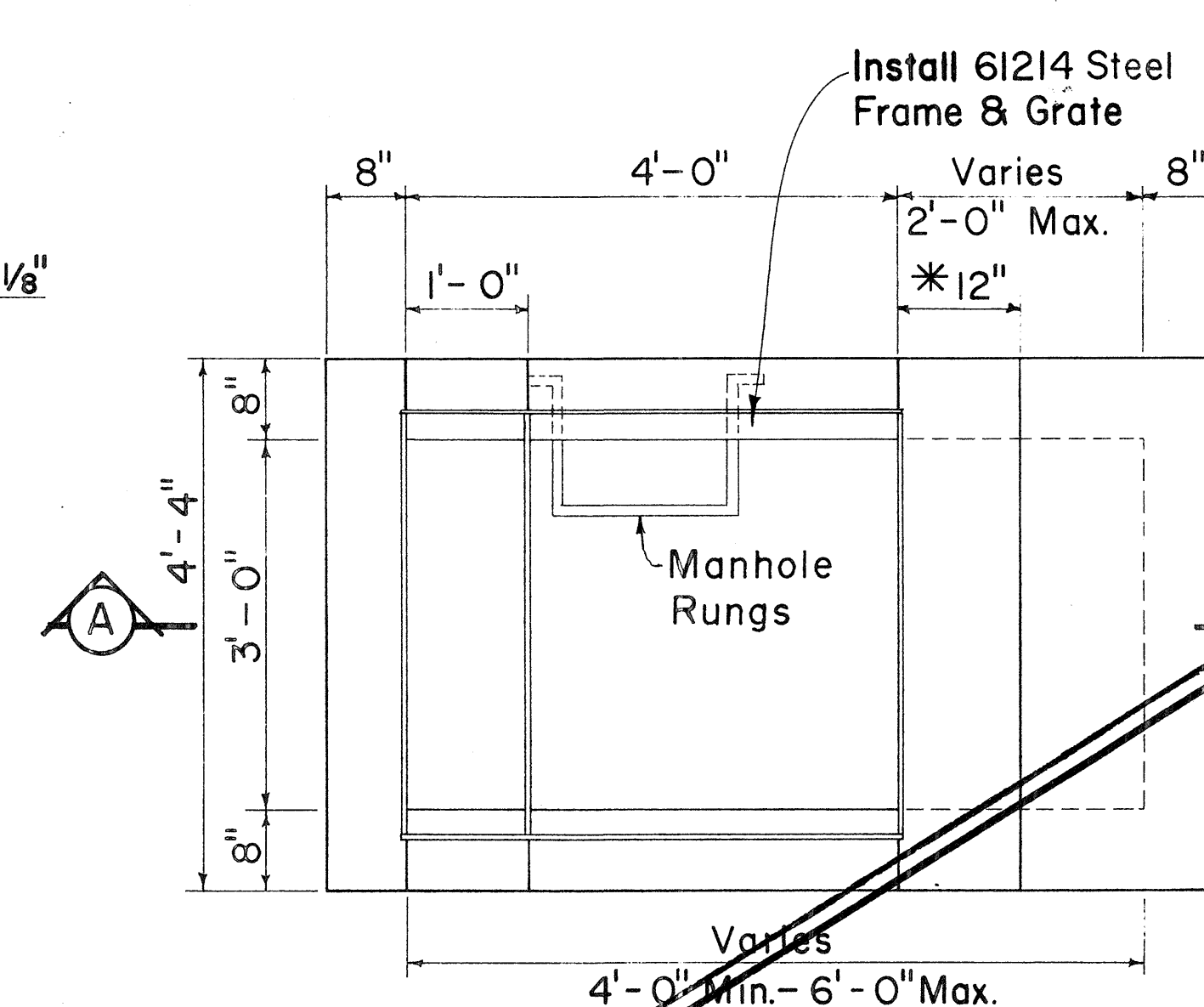
PLAN

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

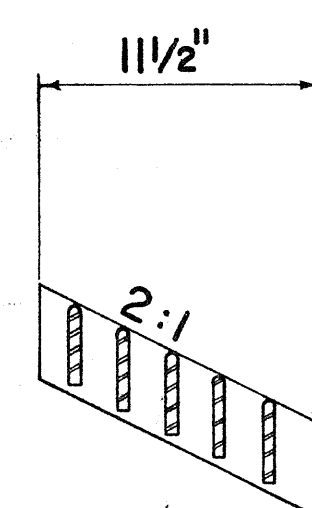


PLAN

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

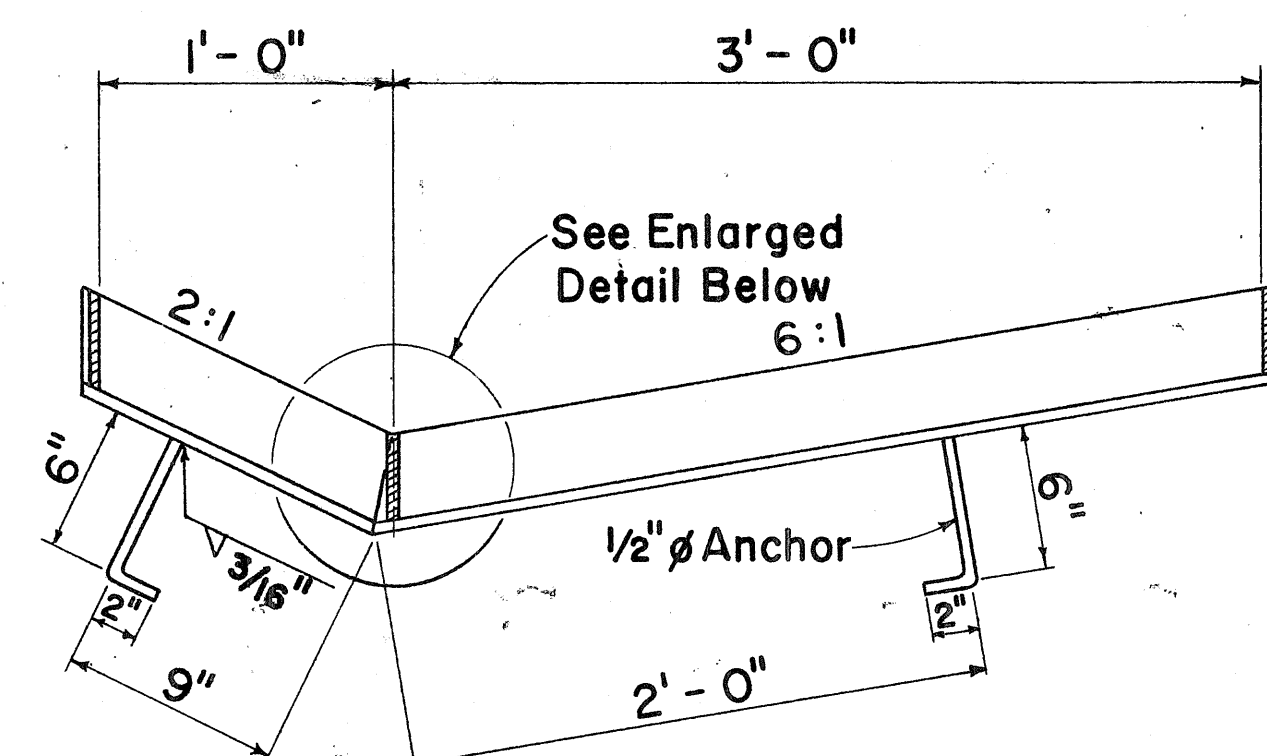


PLAN



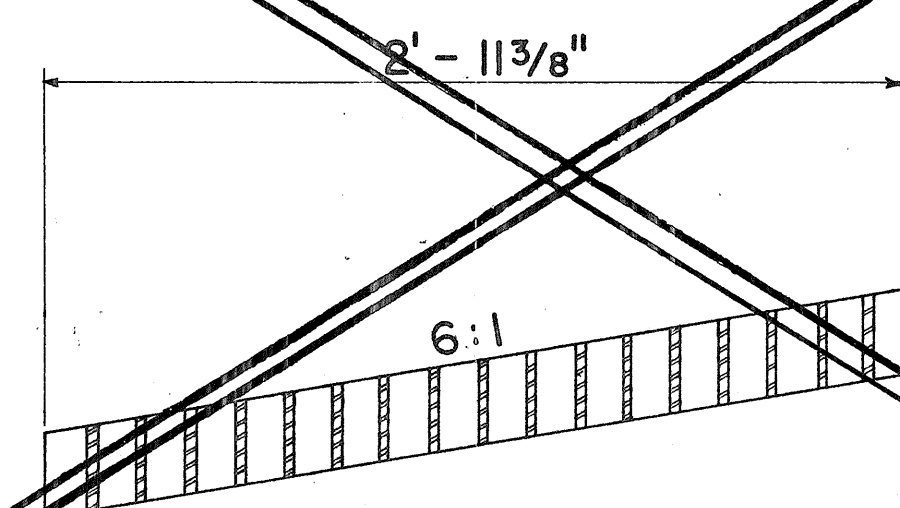
SECTION

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



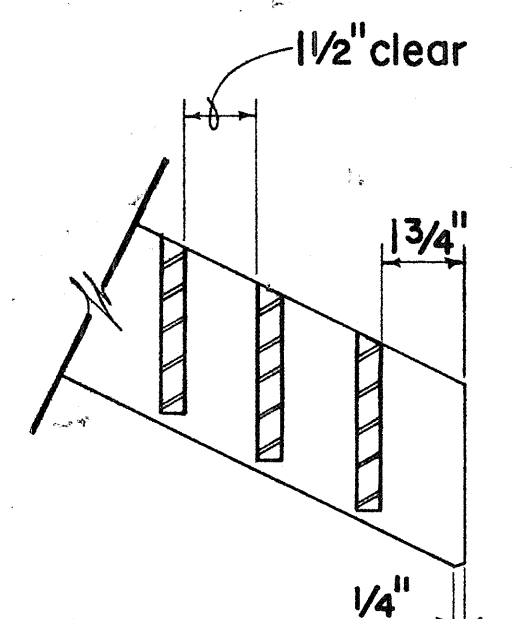
SECTION

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



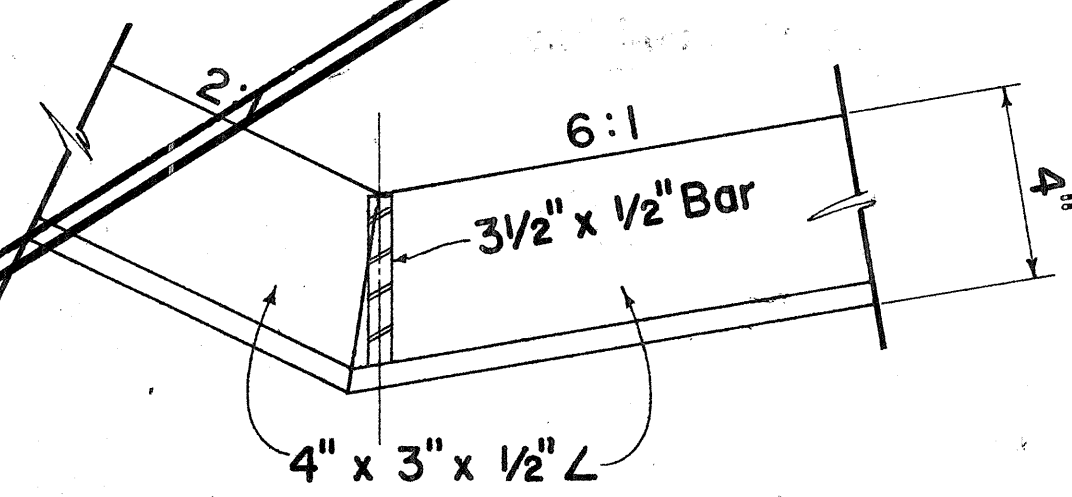
SECTION

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



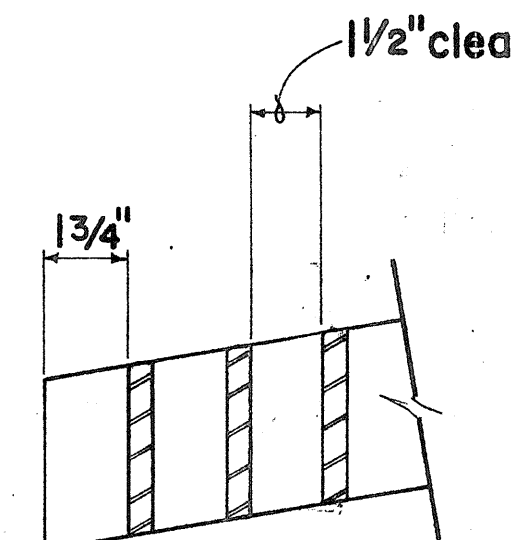
GRATE

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



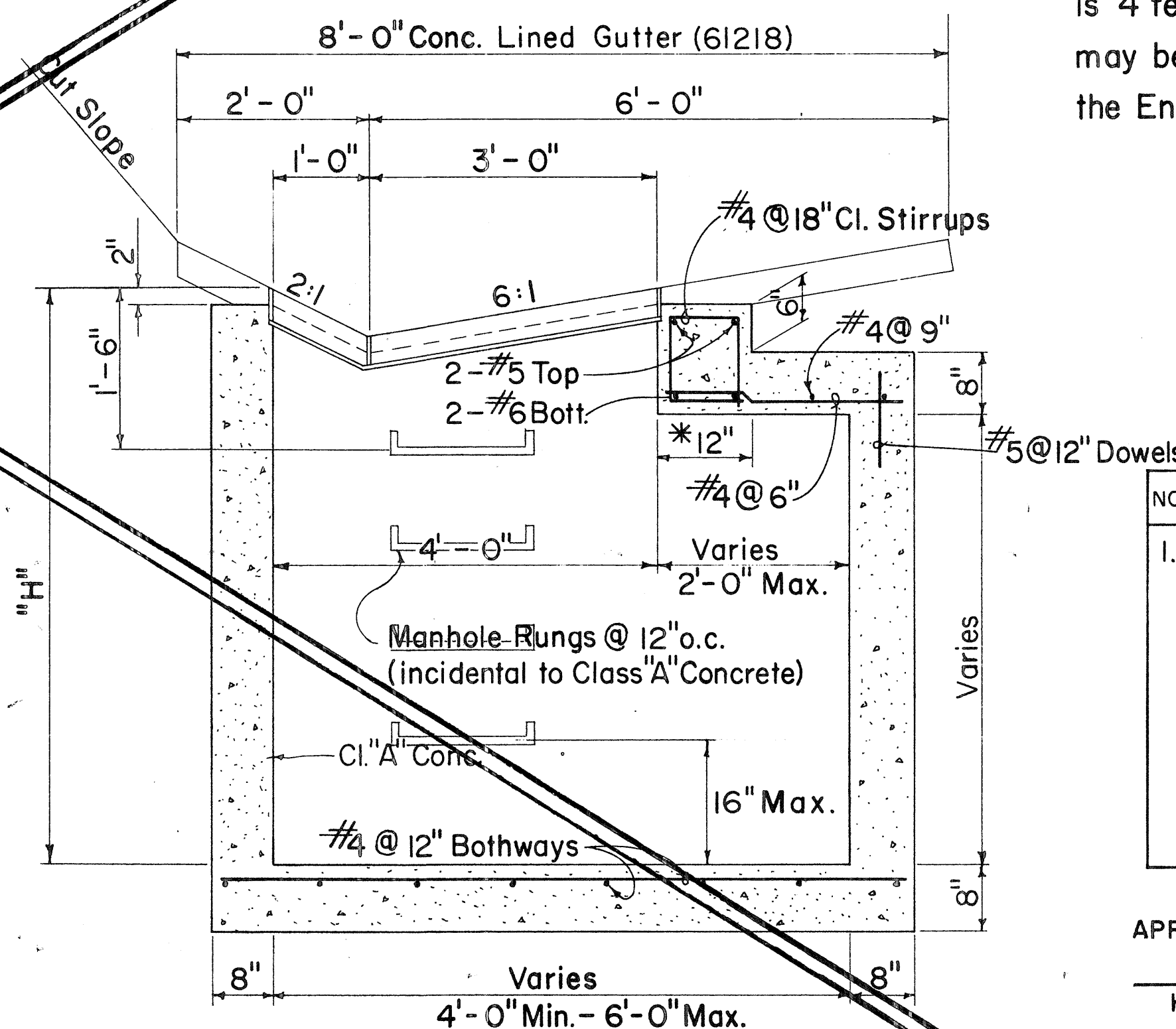
FRAME

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



GRATE

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



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.

NO.	REVISION	APPROVED BY	DATE
1.	Spacing on Manhole Rungs to conform to OSHA.	H.T.	1-21-15

APPROVAL RECOMMENDED:

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

APPROVED:

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

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

Scales: As Noted Date: July 1968

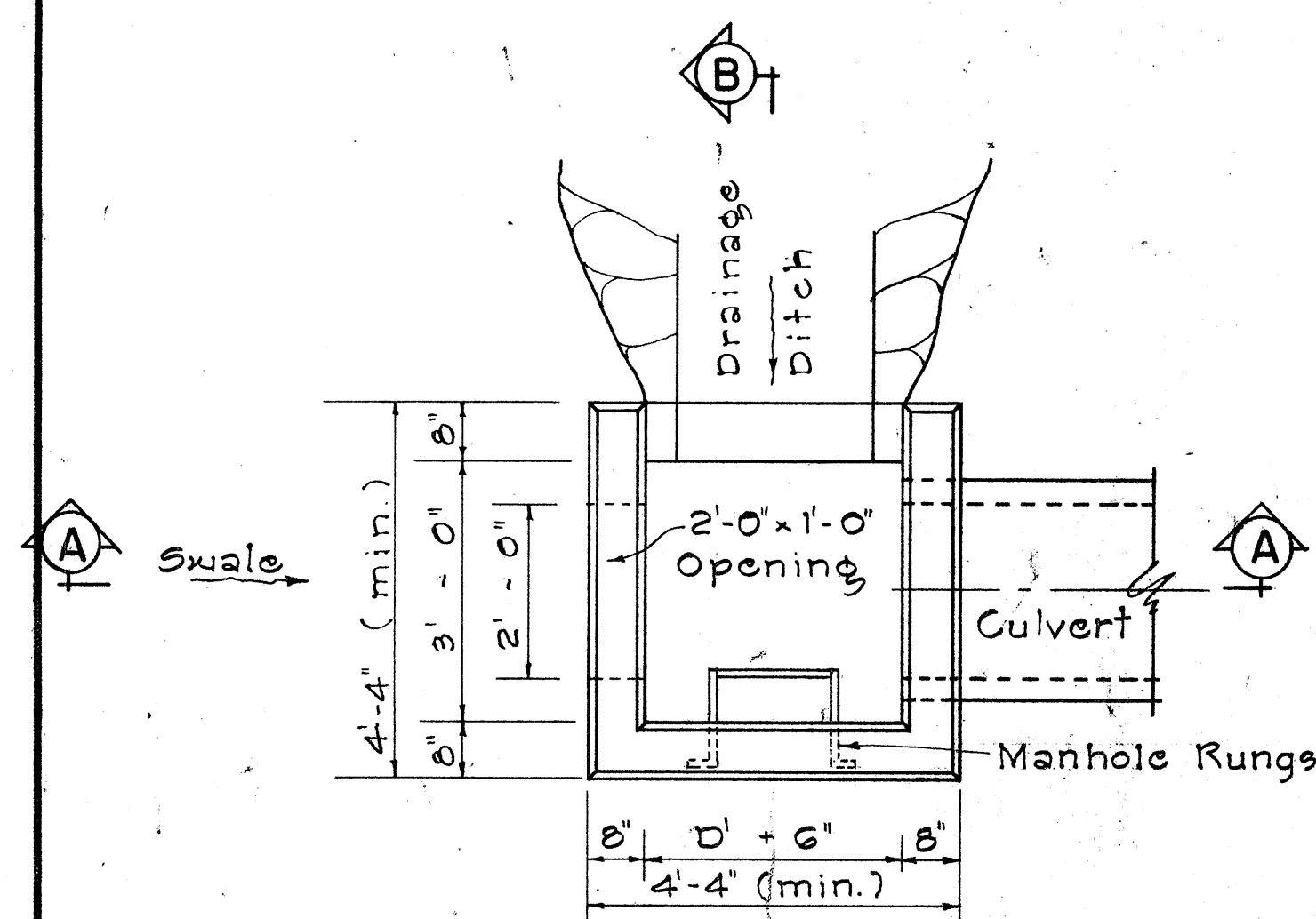
SHEET No. 12 OF 14 SHEETS DN 8

DETAILS OF TYPE 61214 STEEL FRAME AND GRATES

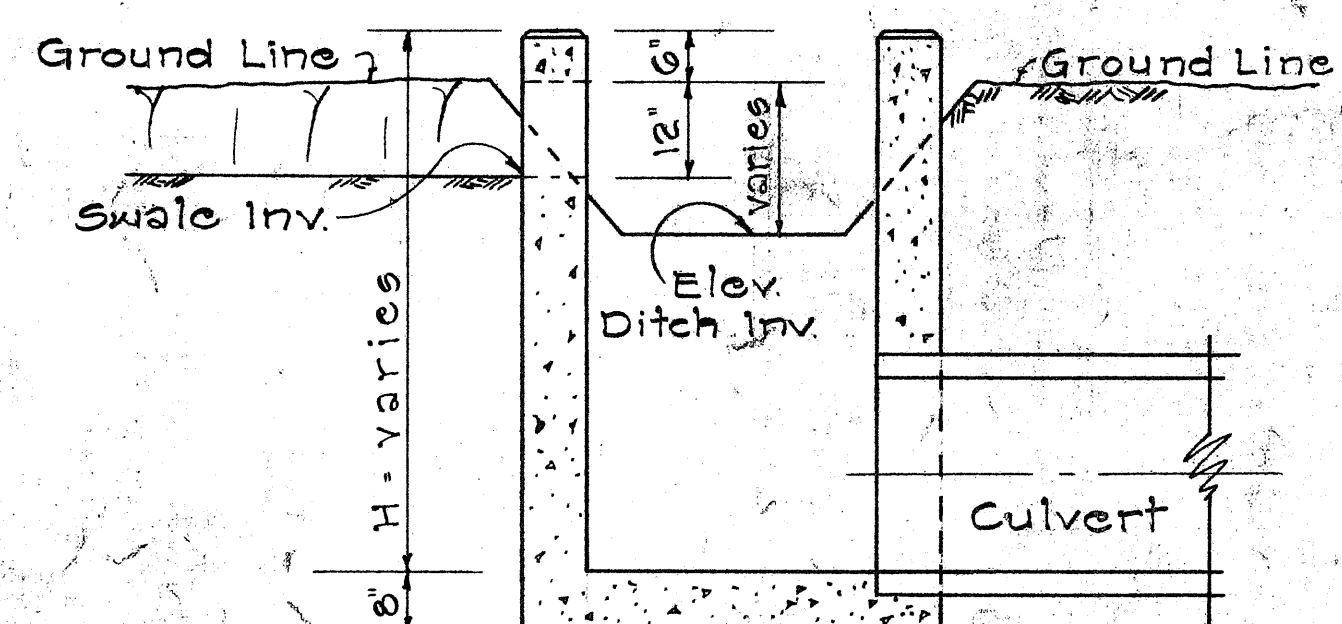
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-078-1(21)	1980	59	234

GENERAL NOTES

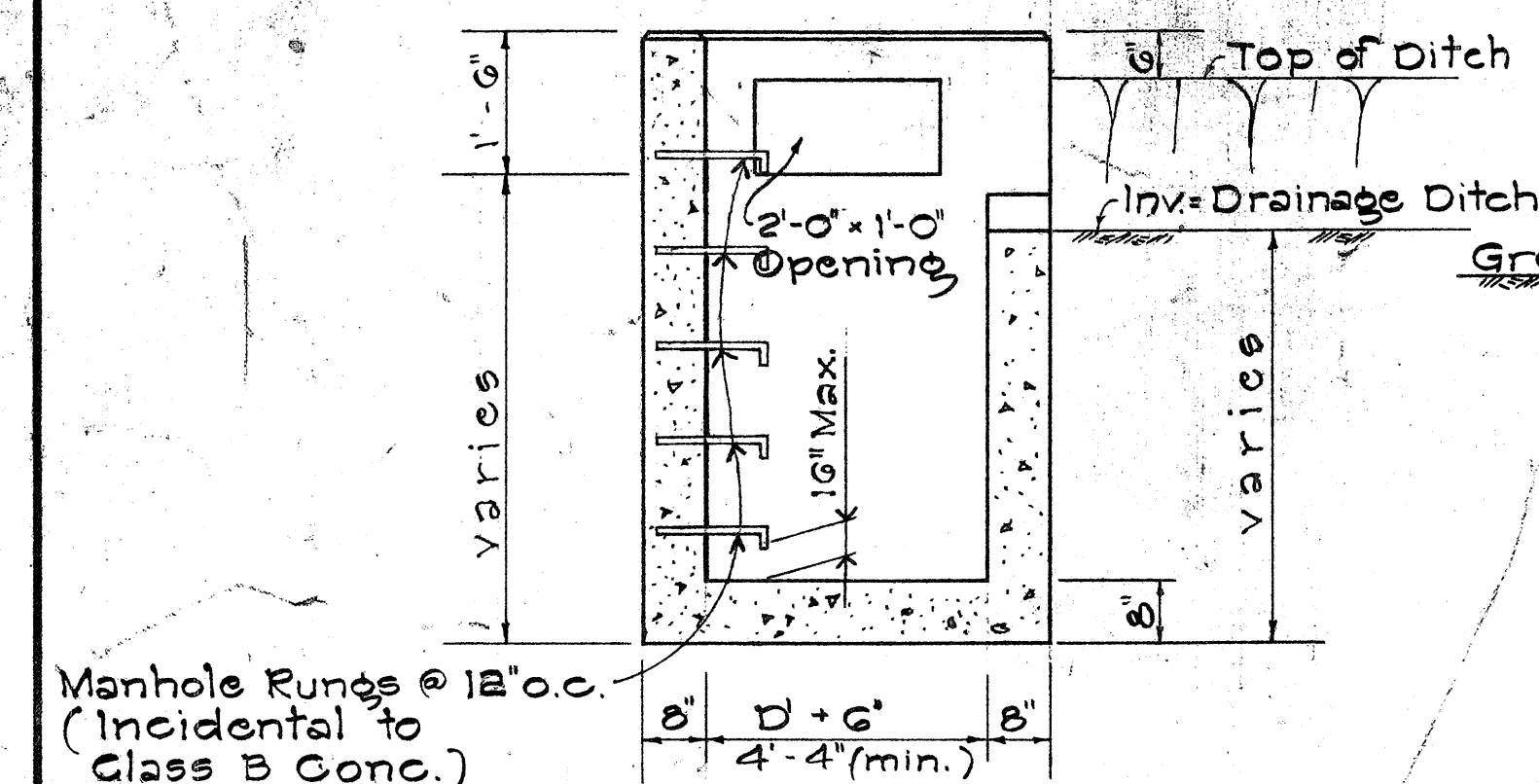
1. All concrete shall be Class "B" unless otherwise noted.
2. Exposed edges of all drainage structures shall be chamfered one inch.
3. Culvert shall enter and leave Drop Intake from any position and in the direction indicated by the plans or ordered by the Engineer.
4. Manhole Rungs (12" o.c.) are req'd.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



PLAN



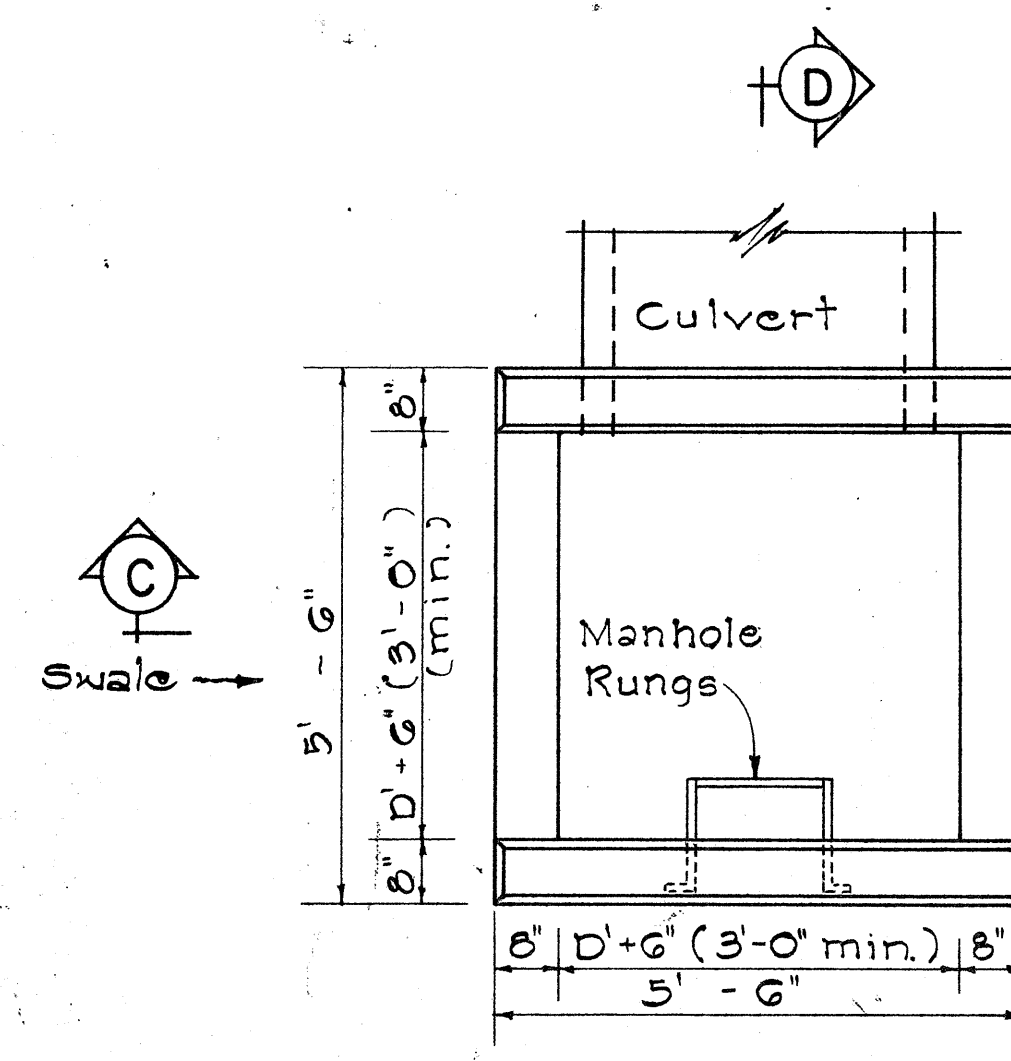
SECTION "A-A"



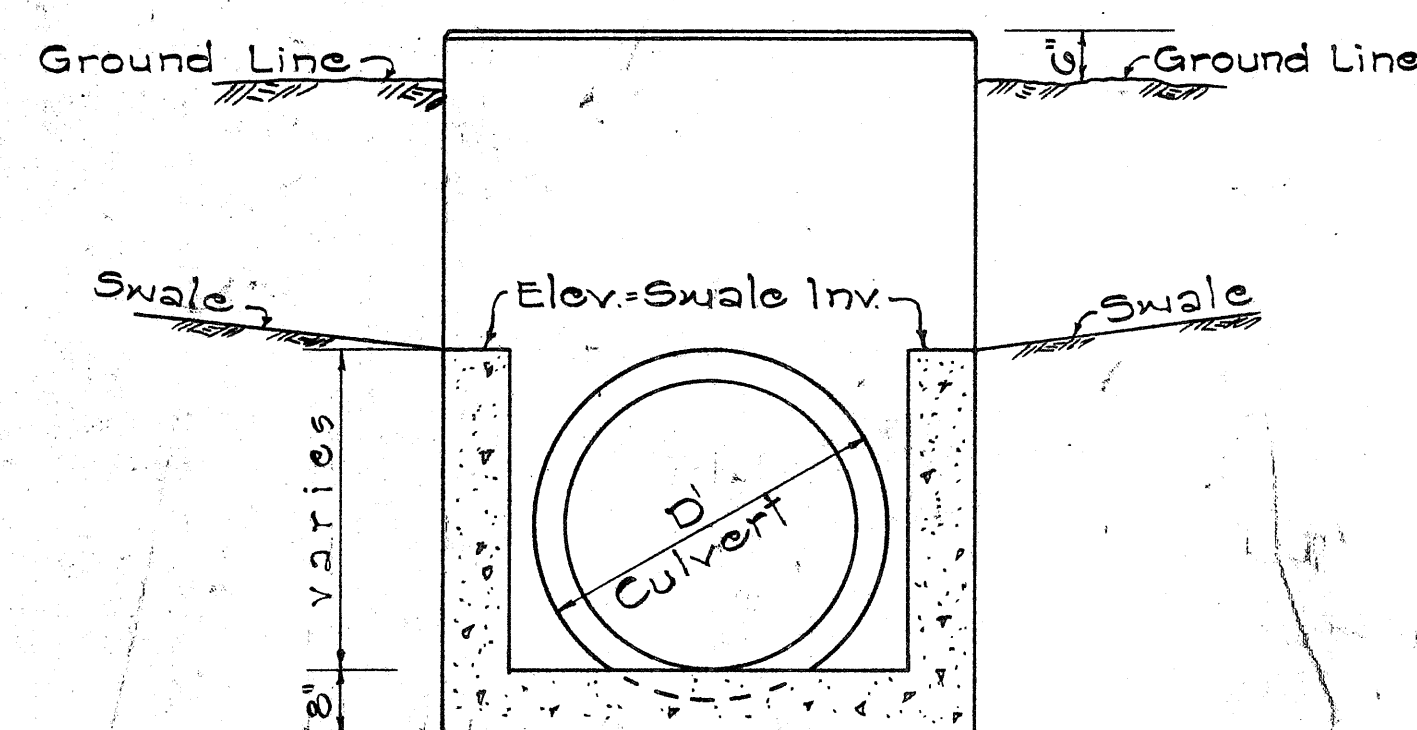
SECTION "B-B"

TYPE "A" CONCRETE DROP INTAKE

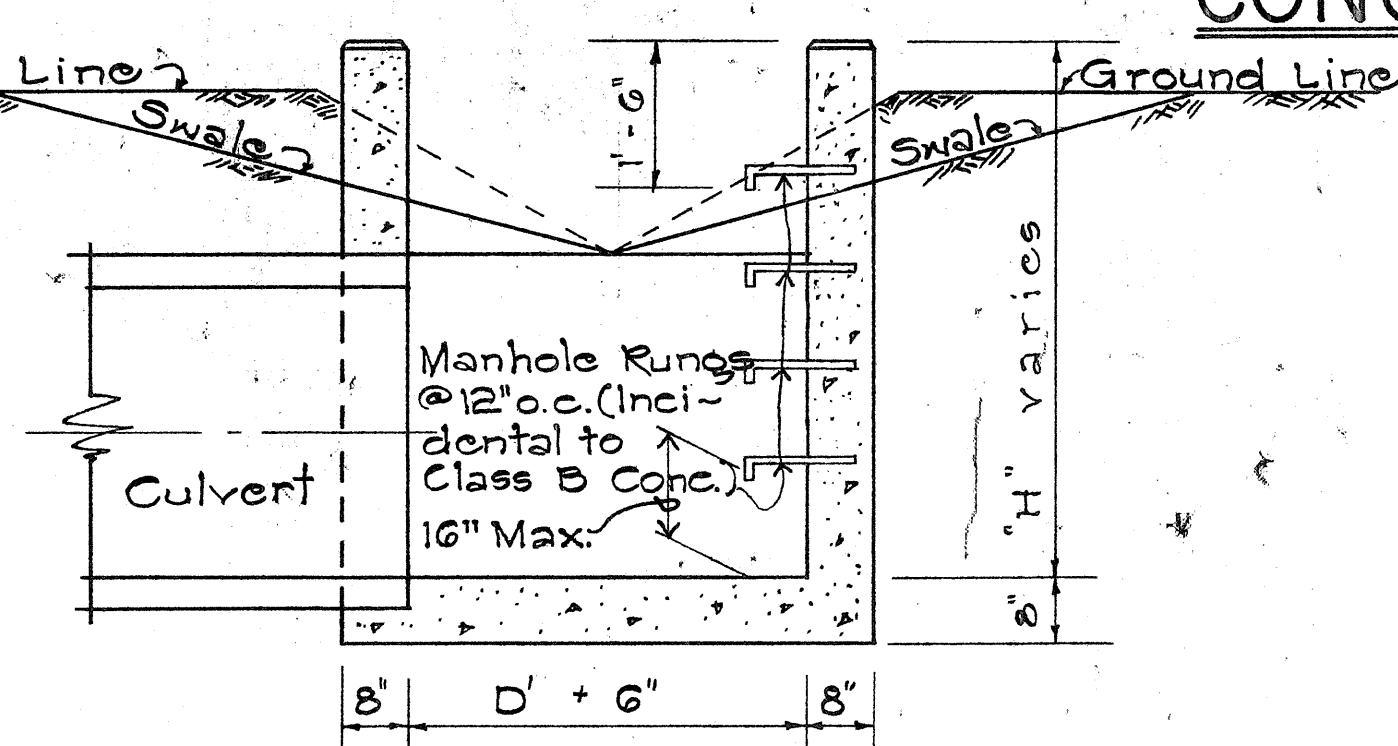
Scale: 1/2" = 1'-0"



PLAN



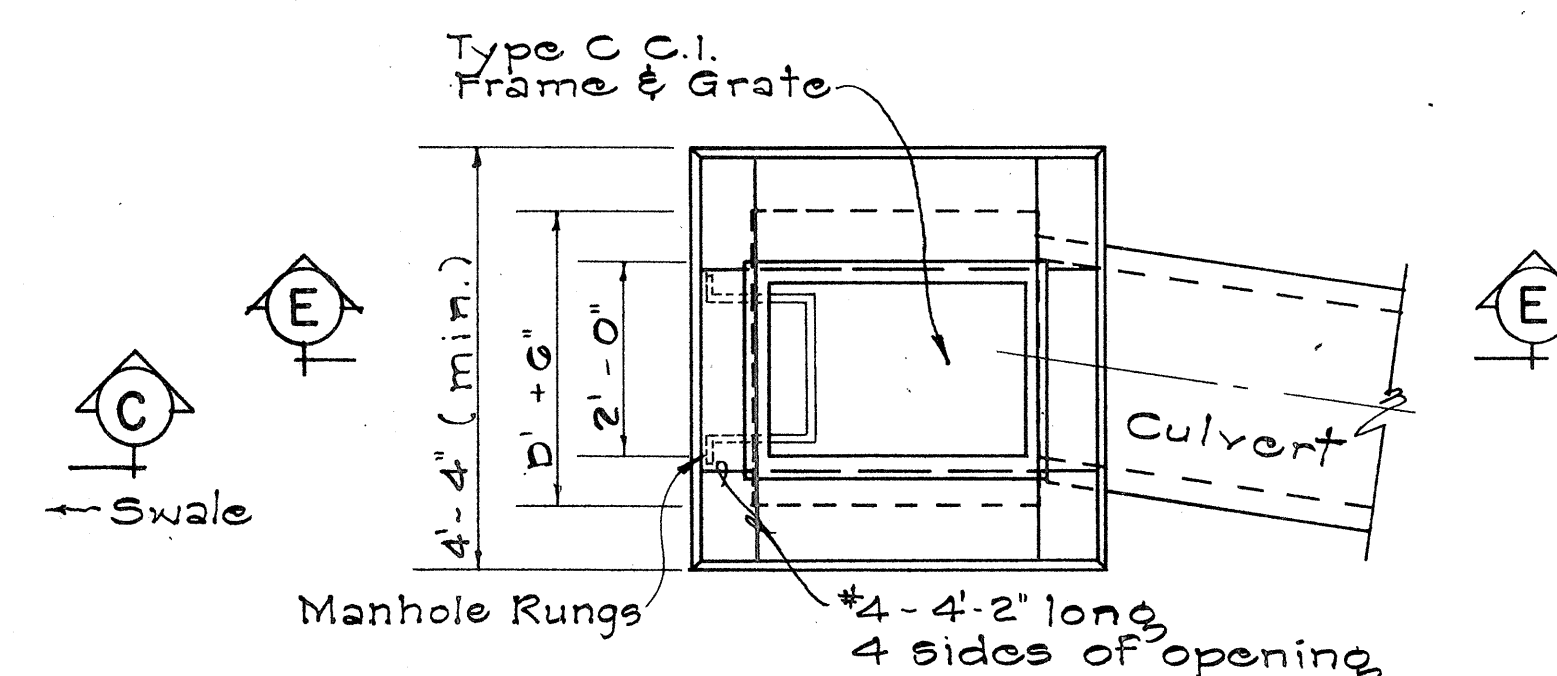
SECTION "C-C"



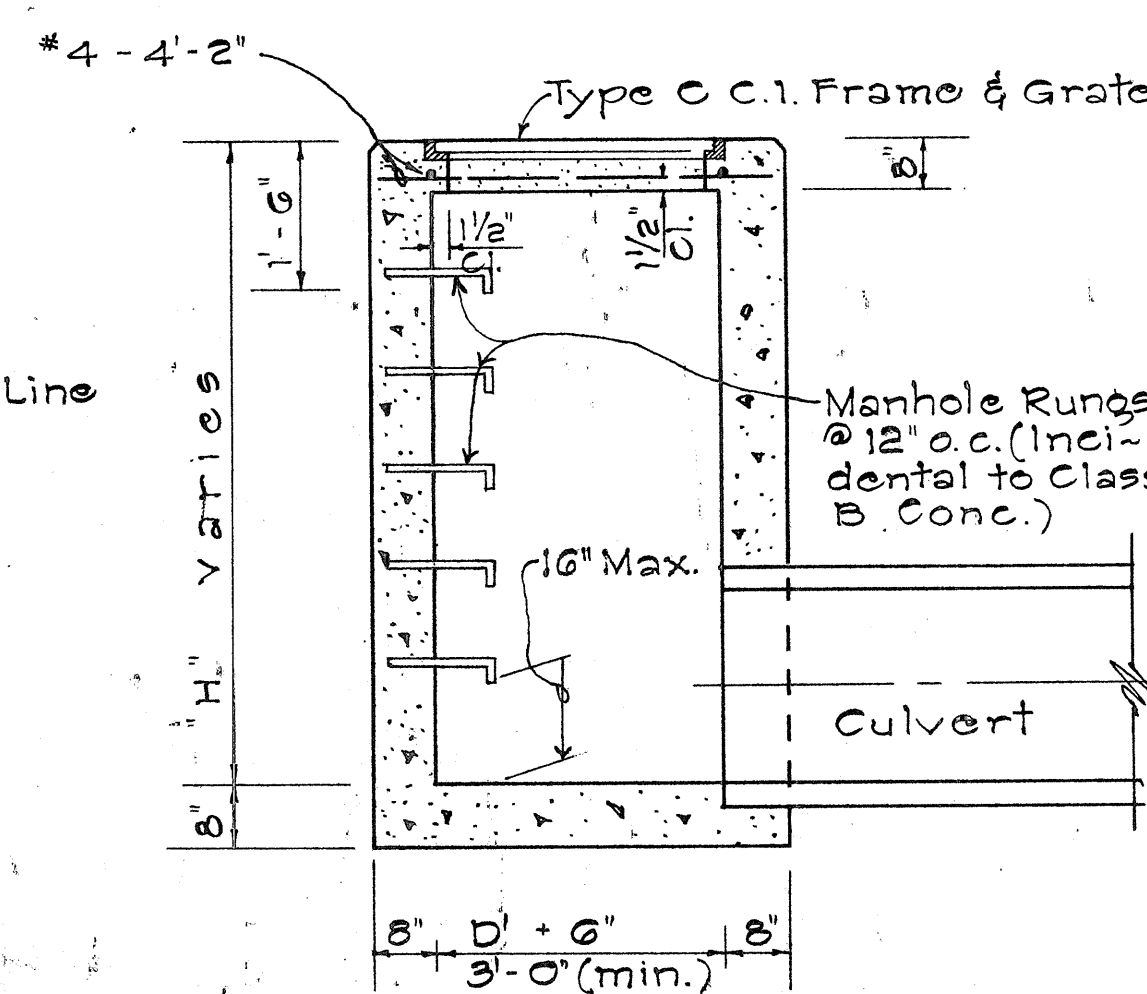
SECTION "D-D"

TYPE "B" CONCRETE DROP INTAKE

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



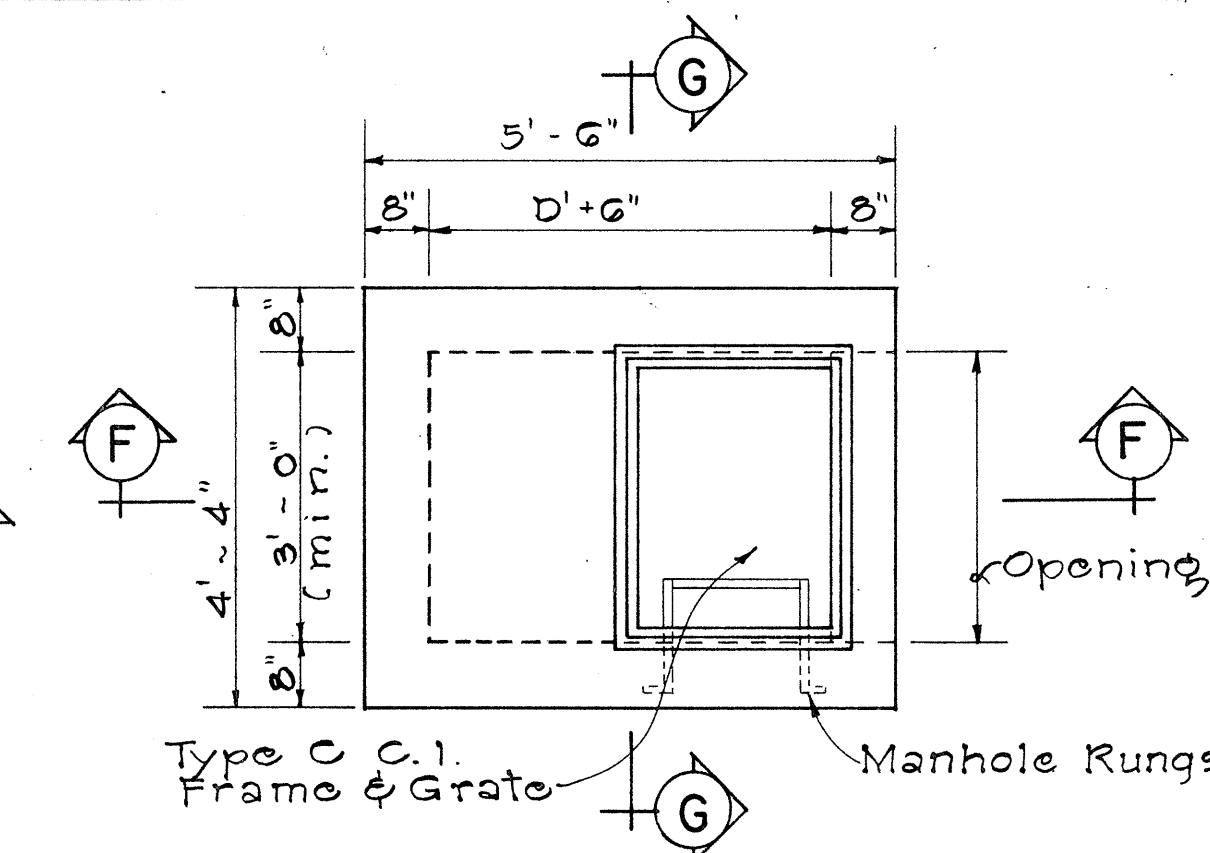
PLAN



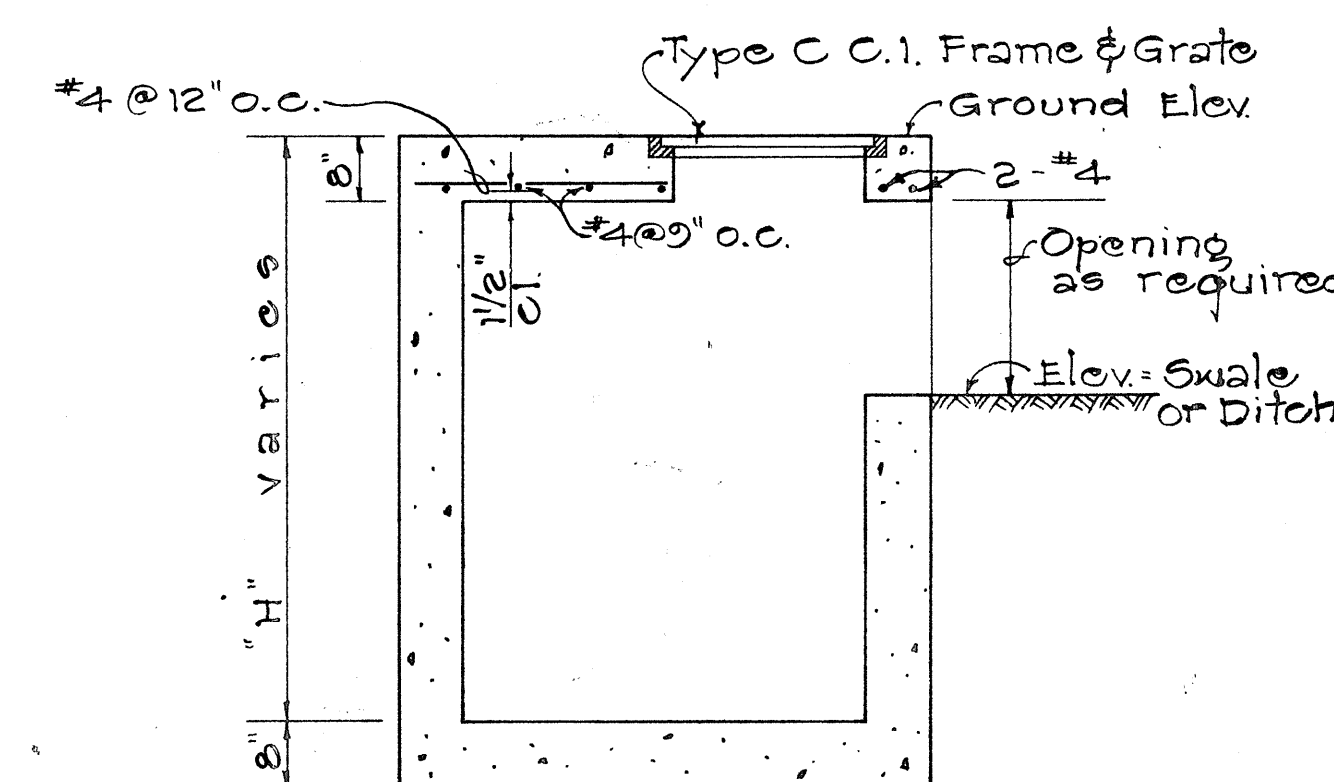
SECTION "E-E"

TYPE "C" GRATED CONCRETE DROP INTAKE

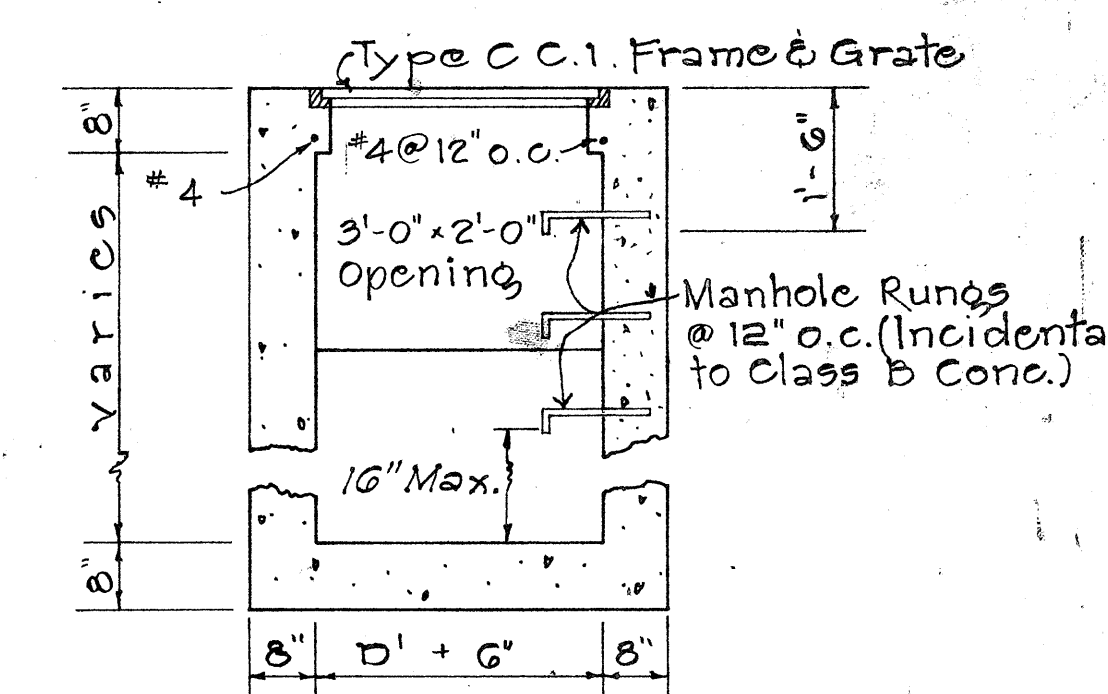
Scale: 1/2" = 1'-0"



PLAN



SECTION "F-F"



SECTION "G-G"

TYPE "D" GRATED CONCRETE DROP INTAKE

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

APPROVAL RECOMMENDED:

HYDRAULIC DESIGN ENGINEER

12-17-69
DATE

APPROVED:

ASSISTANT CHIEF, ENGINEERING

12-17-69
DATE

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
TYPE "A", "B", "C", AND "D"
CONCRETE DROP INTAKE

Scale: As Noted

Date: July, 1969

SHEET No. 14 OF 14 SHEETS DH19