

GENERAL NOTES

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-HI-1(178)	1982	33	165

DRAINAGE NOTES:

- Existing drainage system will be functional at all times during construction. Contractor is to furnish materials, equipment, labor, tools and incidentals necessary to accomplish maintenance of flow, the cost of which shall be incidental to the various contract items.
- Demolishing and removing a portion or the entire existing structure shall not be paid for separately, but shall be considered incidental to the various contract items.
- Culverts within the catch basins, grated drop intakes and storm drain manholes shall be cut flush with the inside face of the wall. Above work shall be considered incidental to the various contract items.
- Manhole Rungs (12" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (16 inches from the bottom) is required if "H" is 4 feet 6 inches or less. Manhole Rungs may be placed at any location as ordered by the Engineer. Manhole Rungs shall be considered incidental to Class "A" Concrete.
- Location of C.I. Frame and Cover for drain manholes or catch basins shall be determined by the Engineer in the field.
- Contractor shall verify the locations of all culverts in the field. Any culvert damaged during construction shall be repaired or replaced by the Contractor at his expense.
- Only non-pneumatic type of drill as approved by the Engineer will be permitted for drilling holes in concrete. Where indicated on plans, the approximate diameter of drilled holes for installation of dowels shall be 1 1/2 inches, after installing dowels, the voids shall be filled with epoxy grout as directed by the Engineer. Above work shall be considered incidental to the various contract items.
- Concrete for grated drop intakes, drain manholes and catch basins shall be Class "A".
- Premolded joint filler shall be considered incidental to Class "A" Concrete.
- Quantities for concrete gutter aprons shall be considered as part of structure.
- Existing cast iron frame and covers shall be cleaned and painted before installation. Above work shall be considered incidental to the various contract items.
- Salvaged C.I. Frame and Covers shall be cleaned, painted and returned to 727 Kakoi St, Honolulu, Hawaii 96819.

SPRINKLER NOTES:

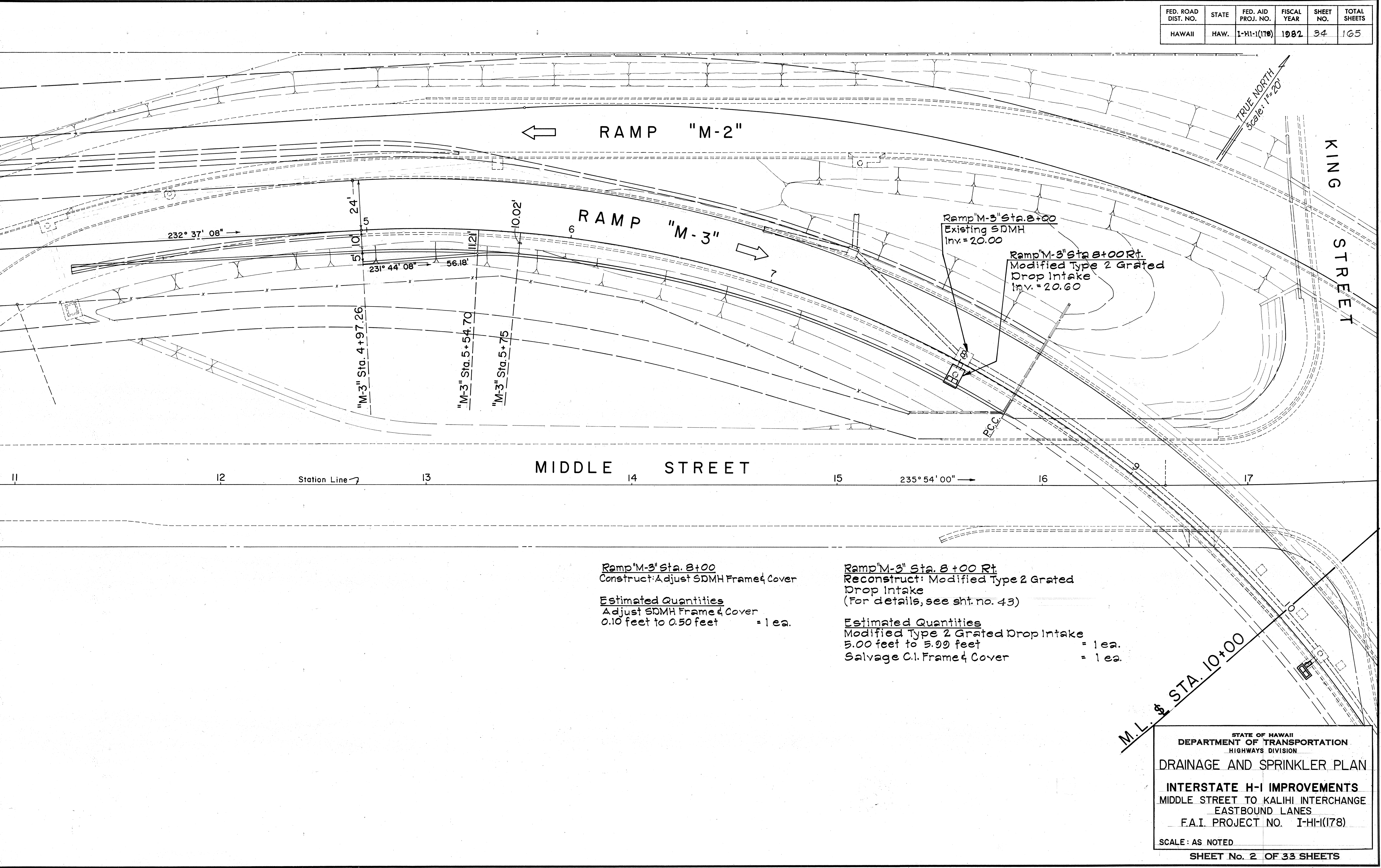
- Abandon sprinkler systems affected by the roadway construction and as noted on the plans shall be removed. Removal shall be incidental to Roadway Excavation.
- Excavation for cut and plug work shall not be paid for but shall be considered incidental to the various contract items.
- The removal of water meters shall be done by BWS. Contractor to notify BWS Customer Service at phone no. 548-6165, two weeks in advance for this work. Water Meter service numbers are as follows: 706-11753, 704-11602 and 704-11552.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE AND SPRINKLER PLAN
INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)

SHEET No. 1 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-HI-1(178)	1982	34	165



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

Ramp "M-3" Sta. 8+00
Construct: Adjust SDMH Frame & Cover

Estimated Quantities
Adjust SDMH Frame & Cover
0.10 feet to 0.50 feet = 1 ea.

Ramp "M-3" Sta. 8+00 Rt.
Reconstruct: Modified Type 2 Grated
Drop Intake
(For details, see sht. no. 43)

Estimated Quantities
Modified Type 2 Grated Drop Intake = 1 ea.
5.00 feet to 5.99 feet = 1 ea.
Salvage C.I. Frame & Cover = 1 ea.

M.L. STA. 10+00

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE AND SPRINKLER PLAN

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)

SCALE: AS NOTED

SHEET No. 2 OF 33 SHEETS

Sta. 0+00
Construct: Adjust Type "A-12"
Frames & Grates
(For details, see sht. no. 60)

Estimated Quantities
Adjust Type "A-12" Frames & Grates
0.10 feet to 0.50 feet = 2 ea.

Ramp "M-3" Sta. 10+25 Lt.
Construct: Adjust SDMH Frame & Cover

Estimated Quantities
Adjust SDMH Frame & Cover
0.10 feet to 0.50 feet = 1 ea.

Ramp "M-3" Sta. 12+62 Lt.
Construct: Adjust SDMH Frame & Cover

Estimated Quantities
Adjust SDMH Frame & Cover
0.10 feet to 0.50 feet = 1 ea.

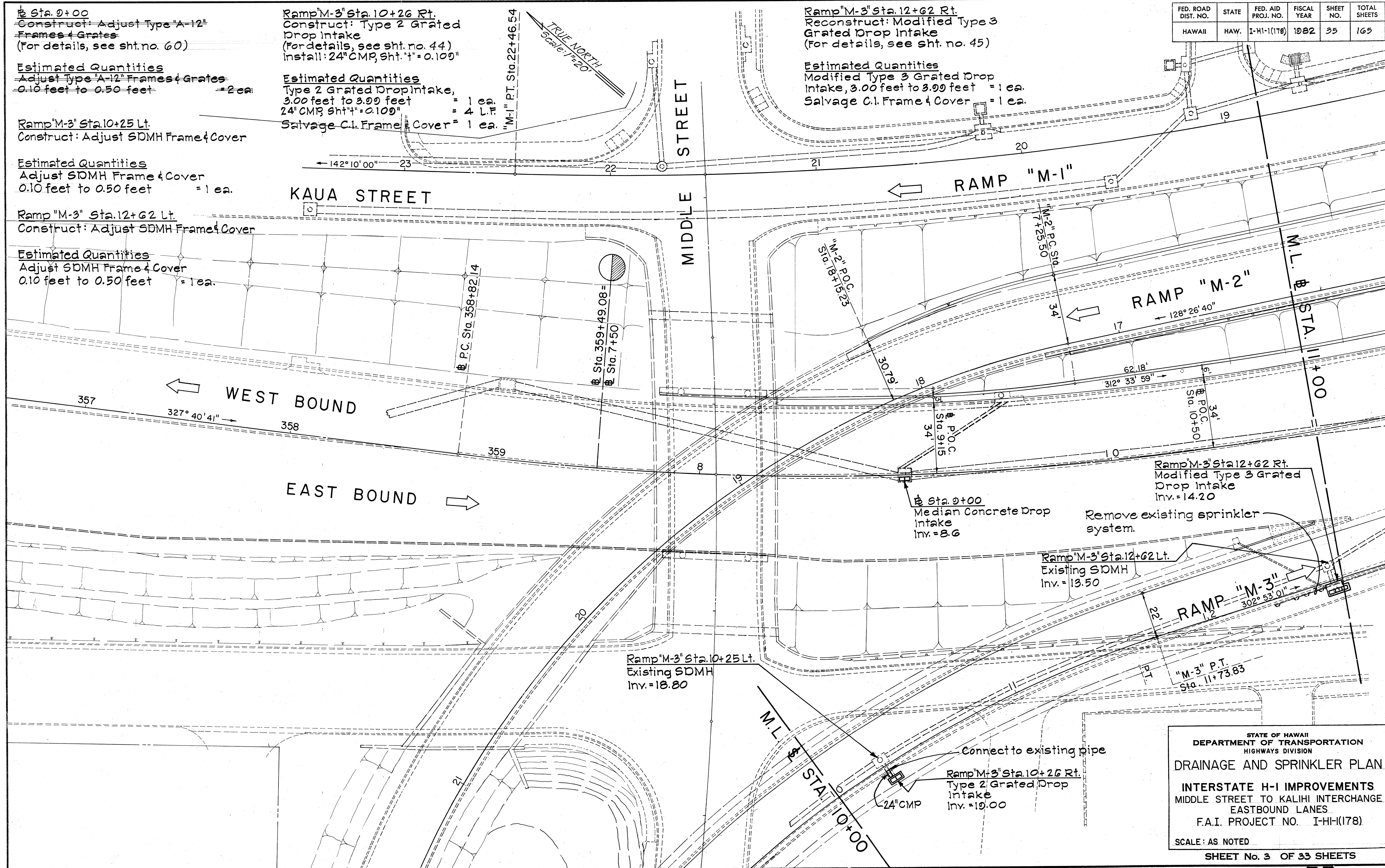
Ramp "M-3" Sta. 10+26 Rt.
Construct: Type 2 Grated
Drop Intake
(For details, see sht. no. 44)
Install: 24" CMP, sht. "t" = 0.100"

Estimated Quantities
Type 2 Grated Drop Intake,
3.00 feet to 3.00 feet = 1 ea.
24" CMP, sht. "t" = 0.100" = 4 L.F.
Salvage C.I. Frame & Cover = 1 ea.

Ramp "M-3" Sta. 12+62 Rt.
Reconstruct: Modified Type 3
Grated Drop Intake
(For details, see sht. no. 45)

Estimated Quantities
Modified Type 3 Grated Drop
Intake, 3.00 feet to 3.00 feet = 1 ea.
Salvage C.I. Frame & Cover = 1 ea.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	35	165



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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE AND SPRINKLER PLAN
INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)
SCALE: AS NOTED
SHEET No. 3 OF 33 SHEETS

Sta. 11+40
Construct: Adjust SDMH Frame & Cover

Estimated Quantities
Adjust SDMH Frame & Cover
0.10 feet to 0.50 feet = 1 ea.

Sta. 11+52 Rt.
Construct: Adjust SDMH Frame & Cover

Estimated Quantities
Adjust SDMH Frame & Cover
0.10 feet to 0.50 feet = 1 ea.

Sta. 13+50
Construct: Adjust Type "A-12"
Frames & Grates
(For details, see sht. no. 60)

Estimated Quantities
Adjust Type "A-12" Frames & Grates
0.10 feet to 0.50 feet = 2 ea.

DATE
11/14/83

REVISION
Plan revised to add new
Battery Control Valve & AVB

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	36	165

TRUE NORTH
Scale: 1" = 50'

"M-1" P.O.C.
Sta. 13+50

"M-1" P.O.C.
Sta. 14+42.33

RAMP "M-1"

RAMP "M-2"

WEST BOUND

EAST BOUND

RAMP "M-3"

OLA LANE

Sta. 11+40
Existing SDMH
Inv. = 11.00

Sta. 11+52 Rt.
Existing SDMH
Inv. = 13.10

Sta. 13+50
Median Concrete
Drop Intake
Inv. = 17.9

Remove existing sprinkler system

Abandon existing
sprinkler system

existing sprinkler
system

BWS to remove
existing water
meter

Cut & connect 1/2" Battery
Control Valve and 1/2" AVB
to existing sprinkler system

existing water
meter

2" AVB
1/2" Battery Control Valve
existing water meter

Connect to existing system.

Connect to existing system
existing sprinkler system

DATE	11/14/83
SURVEY PLOTTED BY	
DRAWN BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
QUANTITIES BY	
CHECKED BY	
No.	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE AND SPRINKLER PLAN
INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)
SCALE: AS NOTED

SHEET No. 4 OF 33 SHEETS

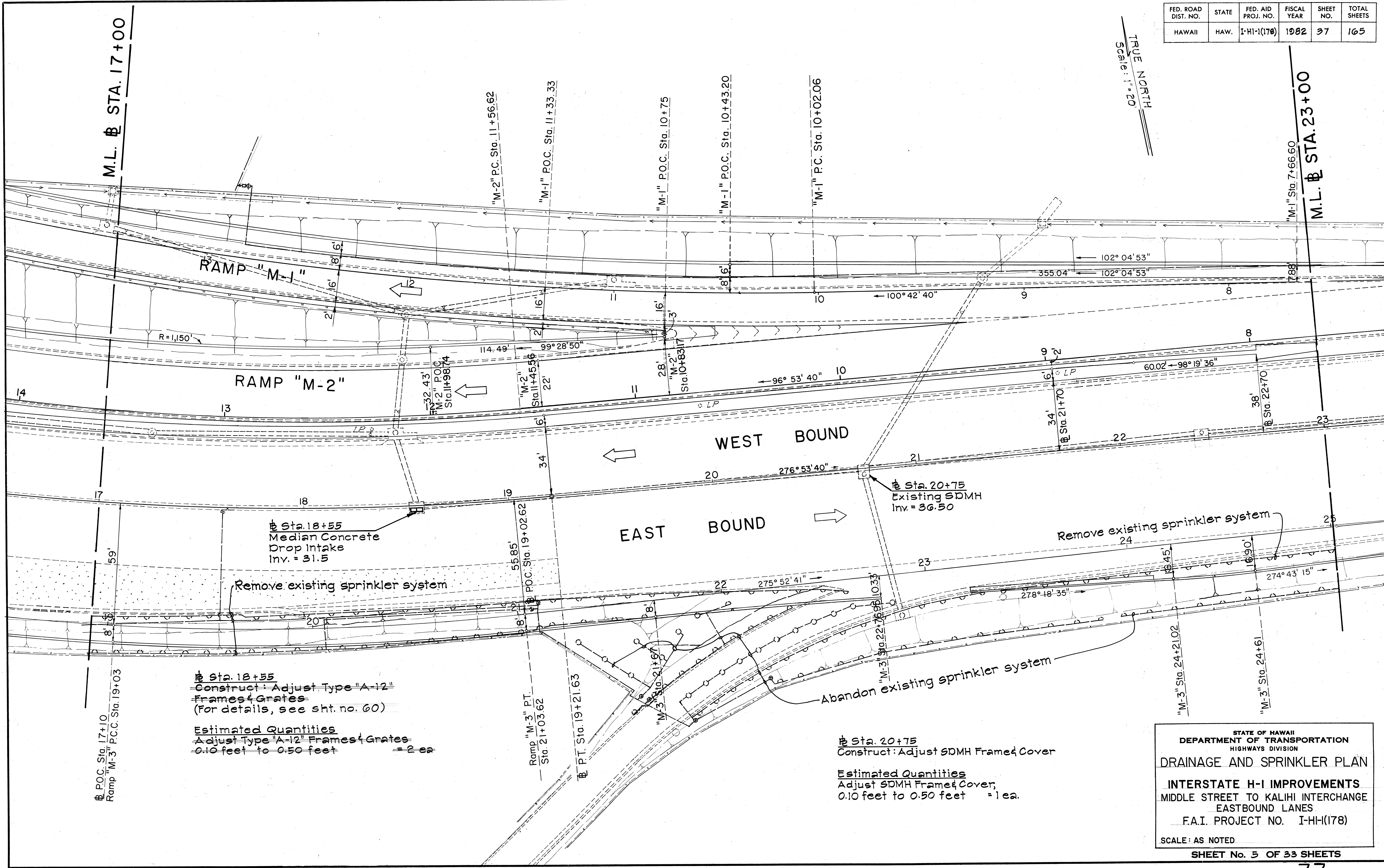
C.036

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	37	165

TRUE NORTH
Scale: 1"=20'

M.L. STA. 17+00

M.L. STA. 23+00



Sta. 18+55
Construct: Adjust Type "A-12"
Frames & Grates
(For details, see sht. no. 60)

Estimated Quantities
Adjust Type "A-12" Frames & Grates
0.10 feet to 0.50 feet = 2 ea

Sta. 20+75
Construct: Adjust SDMH Framed Cover

Estimated Quantities
Adjust SDMH Framed Cover,
0.10 feet to 0.50 feet = 1 ea.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE AND SPRINKLER PLAN

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI(178)
SCALE: AS NOTED
SHEET No. 37 OF 33 SHEETS

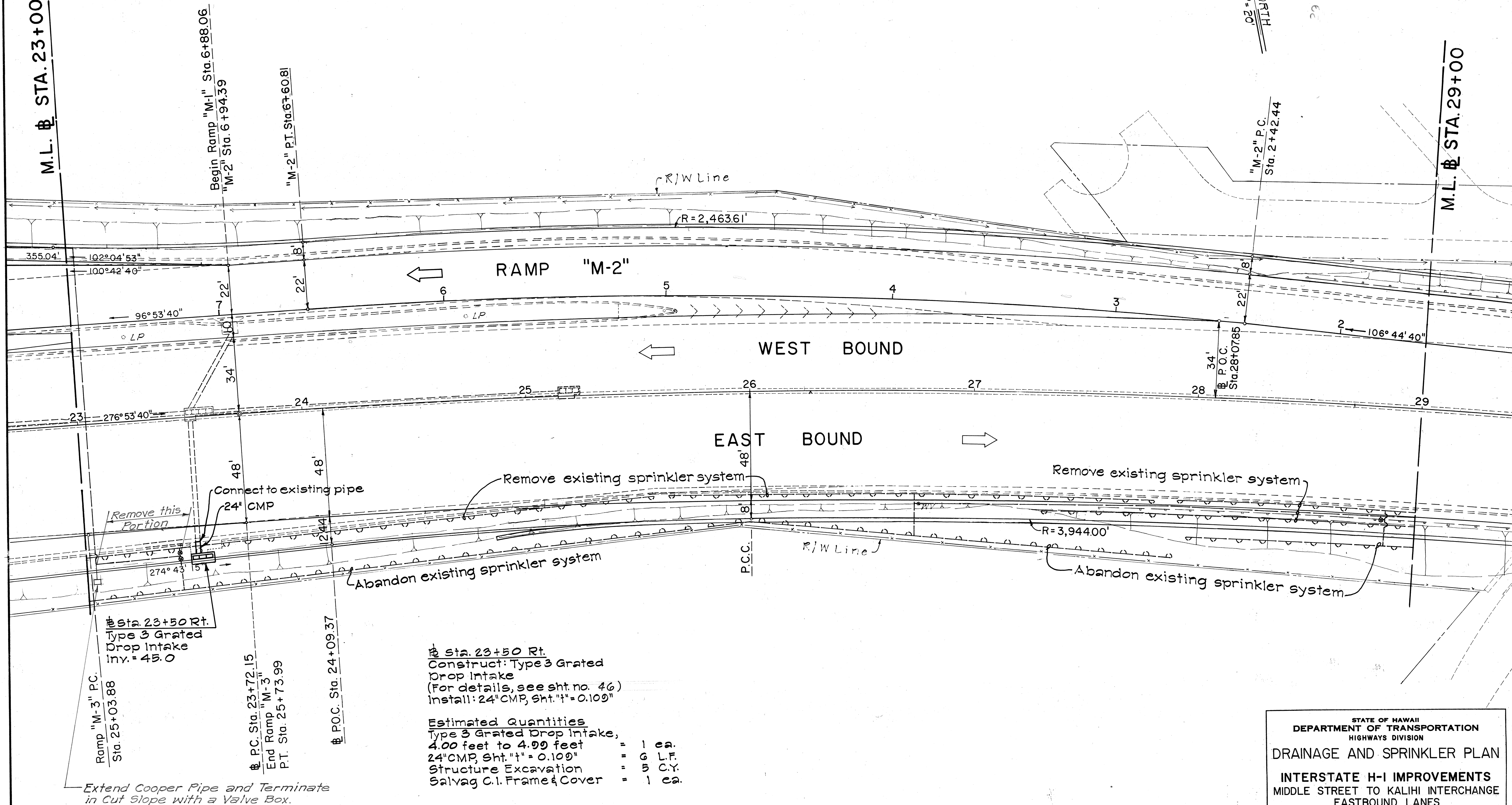
ORIGINAL PLAN	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
NO.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	38	165

TRUE NORTH
Scale: 1"=20'

M.L. STA. 23+00

M.L. STA. 29+00



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE AND SPRINKLER PLAN
INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI(178)
SCALE: AS NOTED
SHEET No. 6 OF 33 SHEETS

DATE	REVISION
11/14/83	Plan revised to add new sprinkler system.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-1(178)	1982	39	165

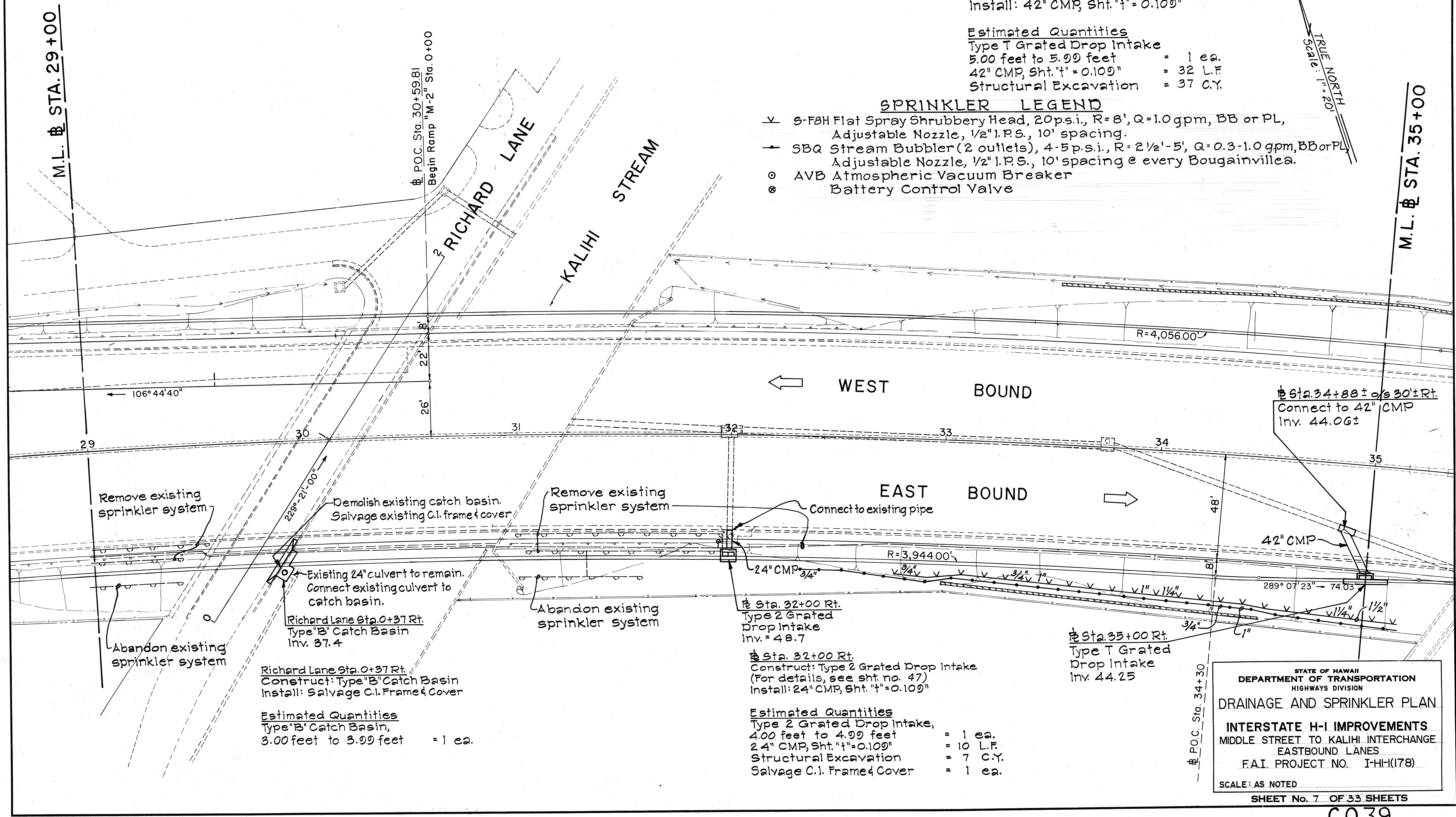
35+00 Rt.
 Construct: Type T Grated Drop Intake
 (For details, see Sht. nos. 48, 49 & 50)
 Install: 42" CMP, Sht. "t" = 0.109"

Estimated Quantities
 Type T Grated Drop Intake
 5.00 feet to 5.99 feet = 1 ea.
 42" CMP, Sht. "t" = 0.109" = 32 L.F.
 Structural Excavation = 37 C.Y.

SPRINKLER LEGEND

-  S-F8H Flat Spray Shrubbery Head, 20 p.s.i., R=8', Q=1.0 gpm, BB or PL, Adjustable Nozzle, 1/2" I.P.S., 10' spacing.
-  SBA Stream Bubbler (2 outlets), 4-5 p.s.i., R=2 1/2'-5', Q=0.3-1.0 gpm, BB or PL, Adjustable Nozzle, 1/2" I.P.S., 10' spacing @ every Bougainvillea.
-  AVB Atmospheric Vacuum Breaker
-  Battery Control Valve

TRUE NORTH
 Scale: 1"=20'



DATE	11/14/83
DRAWN BY	...
CHECKED BY	...
DESIGNED BY	...
NOTED BY	...
QUANTITIES BY	...
...	...

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
DRAINAGE AND SPRINKLER PLAN
INTERSTATE H-1 IMPROVEMENTS
 MIDDLE STREET TO KALIHI INTERCHANGE
 EASTBOUND LANES
 F.A.I. PROJECT NO. I-H-1(178)
 SCALE: AS NOTED
 SHEET No. 7 OF 33 SHEETS

DATE	REVISION
11/14/83	Plan revised to add new sprinkler system.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	40	165

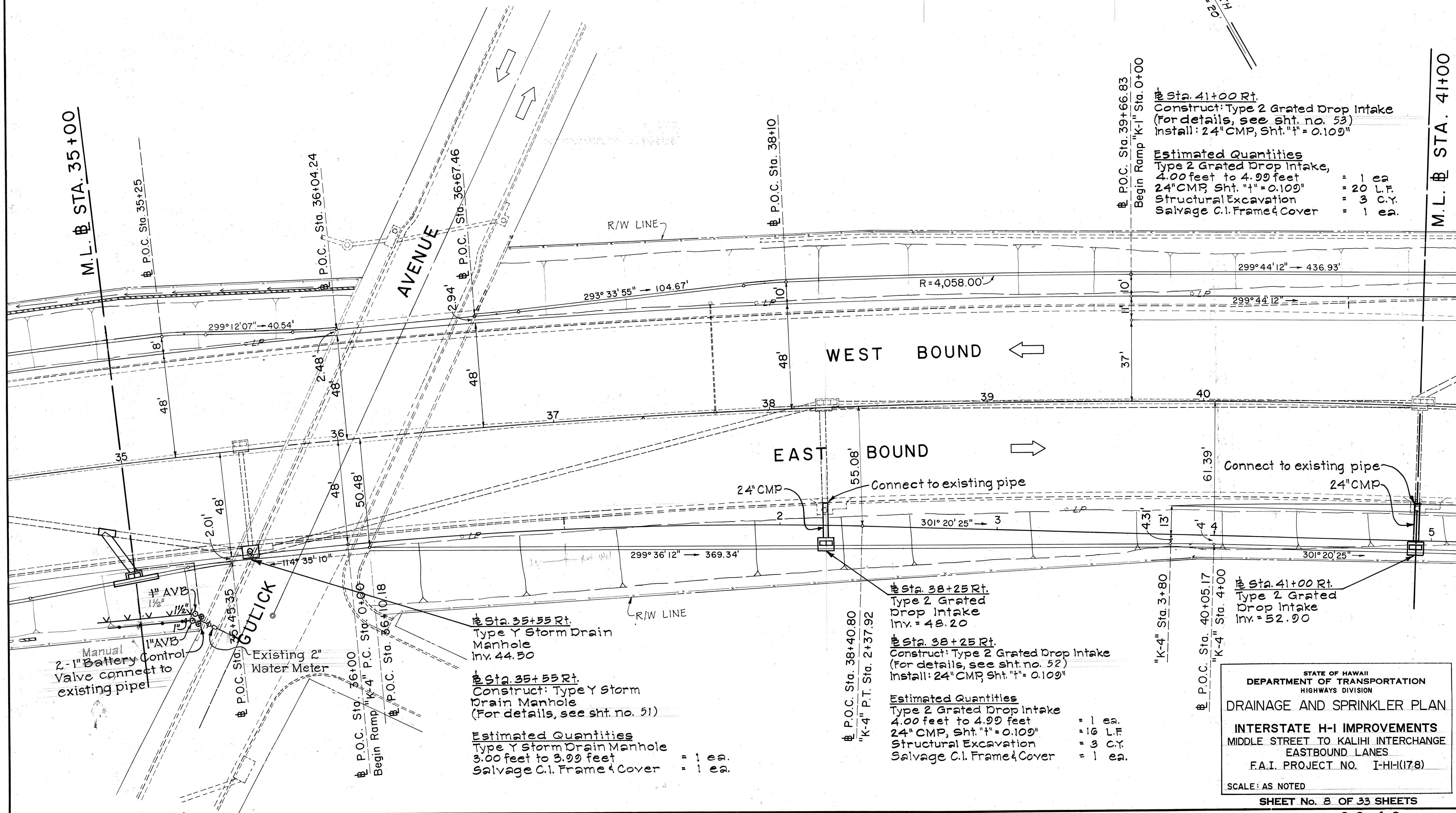
TRUE NORTH
Scale: 1" = 20'

P.O.C. Sta. 39+66.83
Begin Ramp "K-1" Sta. 0+00

Sta. 41+00 Rt.
Construct: Type 2 Grated Drop Intake
(For details, see sht. no. 53)
Install: 24" CMP, Sht. "t" = 0.109"

Estimated Quantities
Type 2 Grated Drop Intake, 4.00 feet to 4.99 feet = 1 ea.
24" CMP, Sht. "t" = 0.109" = 20 L.F.
Structural Excavation = 3 C.Y.
Salvage C.I. Frame & Cover = 1 ea.

M.L. STA. 41+00



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE AND SPRINKLER PLAN

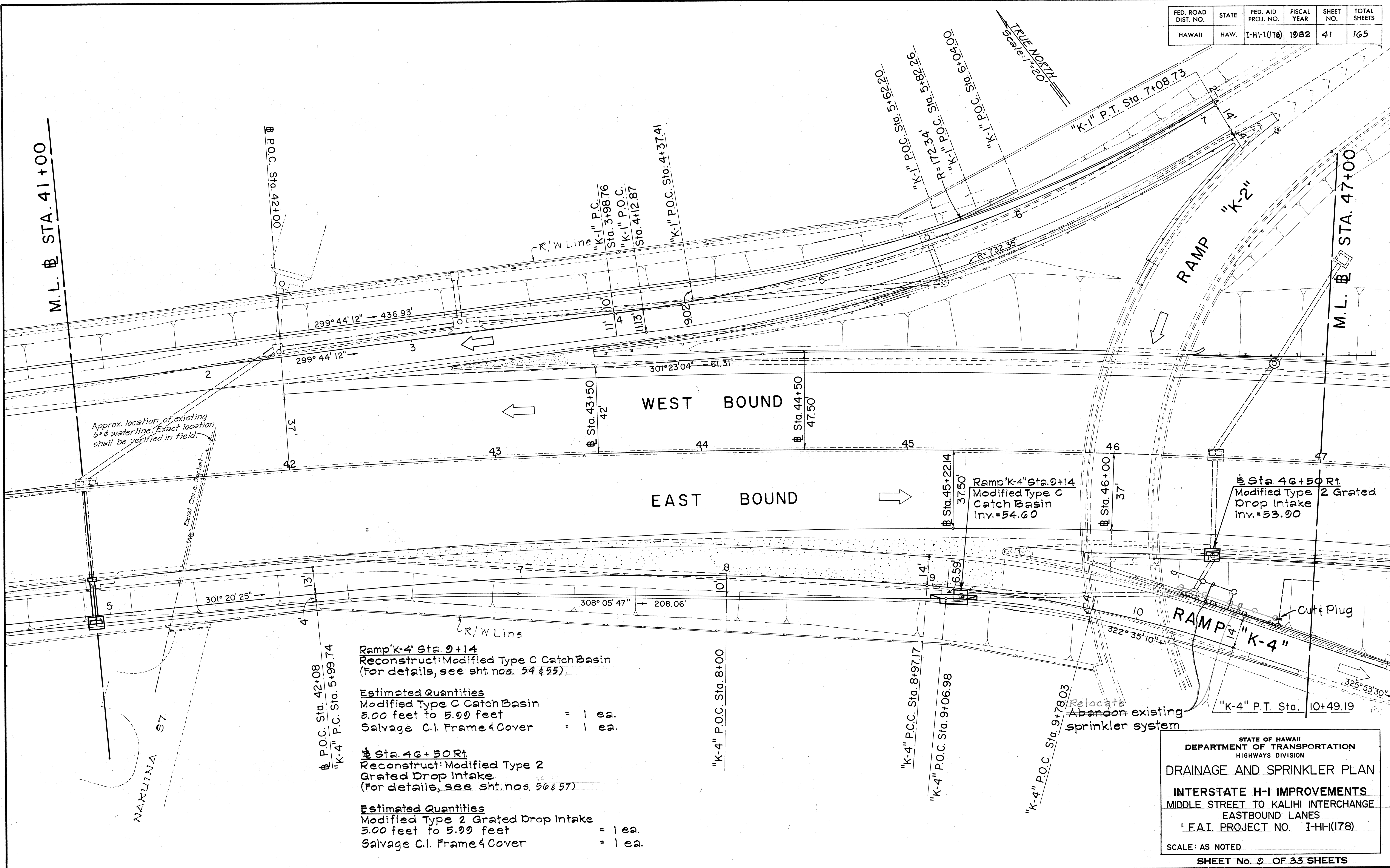
INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI(178)

SCALE: AS NOTED

SHEET No. 8 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-1(178)	1982	41	165

ORIGINAL PLAN	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
NO.	



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

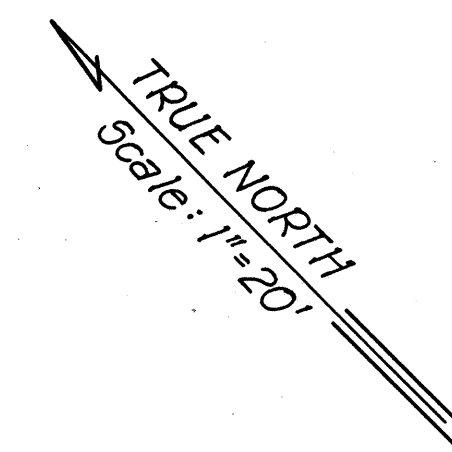
DRAINAGE AND SPRINKLER PLAN

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-H-1(178)

SCALE: AS NOTED

SHEET No. 9 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	42	165



Sta. 47+53.75 Rt.
Construct: Type Z Storm Drain Manhole
(For details, see sht. no. 58)

Estimated Quantities
Type Z Storm Drain Manhole,
5.00 feet to 5.00 feet = 1 ea.
Salvage C.I. Frame & Cover = 1 ea.

Sta. 48+55 Rt.
Reconstruct: Modified Type 3
Grated Drop Intake
(For details, see sht. no. 59)

Estimated Quantities
Modified Type 3 Grated Drop
Intake, 5.00 feet to 5.00 feet = 1 ea.
Salvage C.I. Frame & Cover = 1 ea.

M.L. Sta. 47+00

KALIHI STREET

P.O.C. Sta. 49+00

Sta. 50+80.31

RAMP "K-5"

WEST BOUND

EAST BOUND

RAMP "K-2"

RAMP "K-6"

RAMP "K-4"

Sta. 47+53.75 Rt.
Type Z Storm Drain
Manhole
Inv. = 53.4

Sta. 48+55 Rt.
Modified Type 3 Grated
Drop Intake
Inv. = 52.70

P.O.C. Sta. 49+00

P.O.C. Sta. 49+40.01

P.T. Sta. 50+32.42

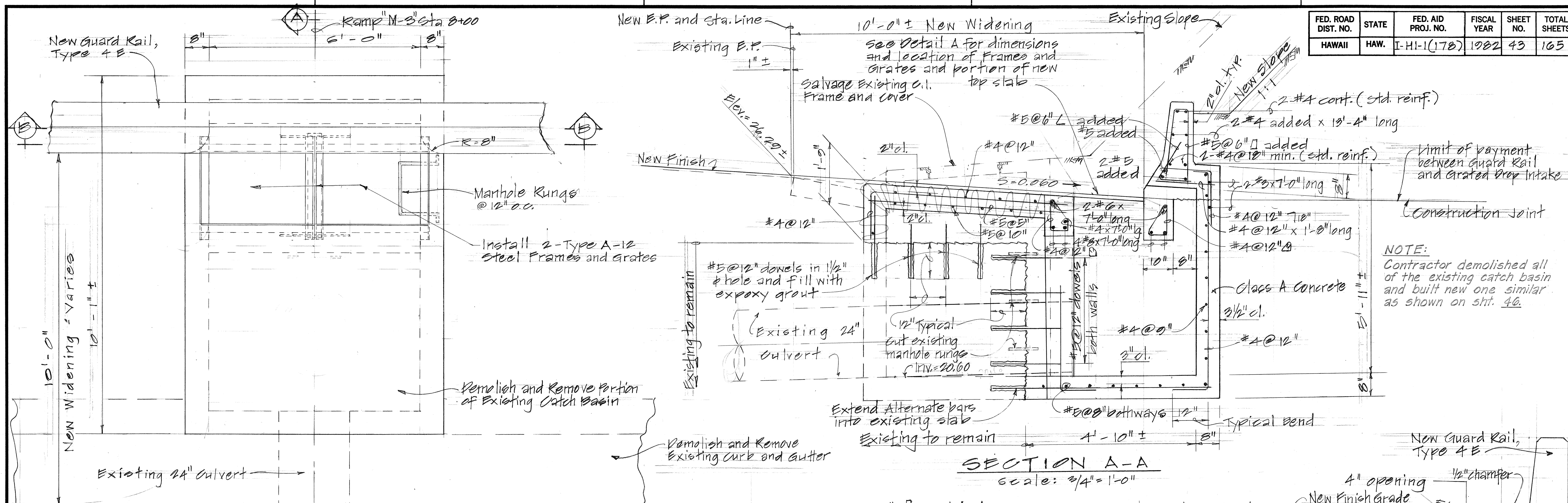
Sta. 50+65.42

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

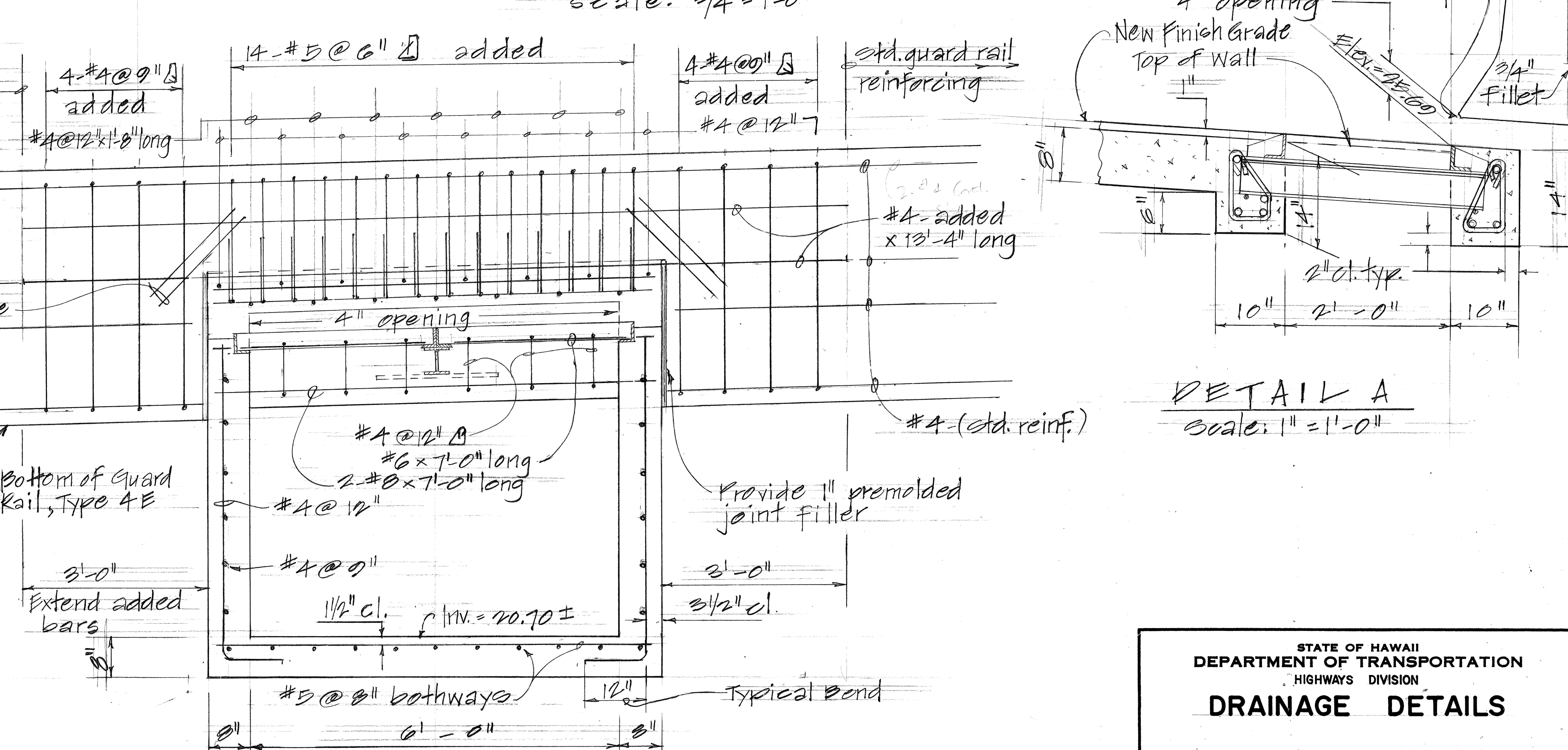
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE AND SPRINKLER PLAN
INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI(178)
SCALE: AS NOTED

SHEET No. 10 OF 33 SHEETS

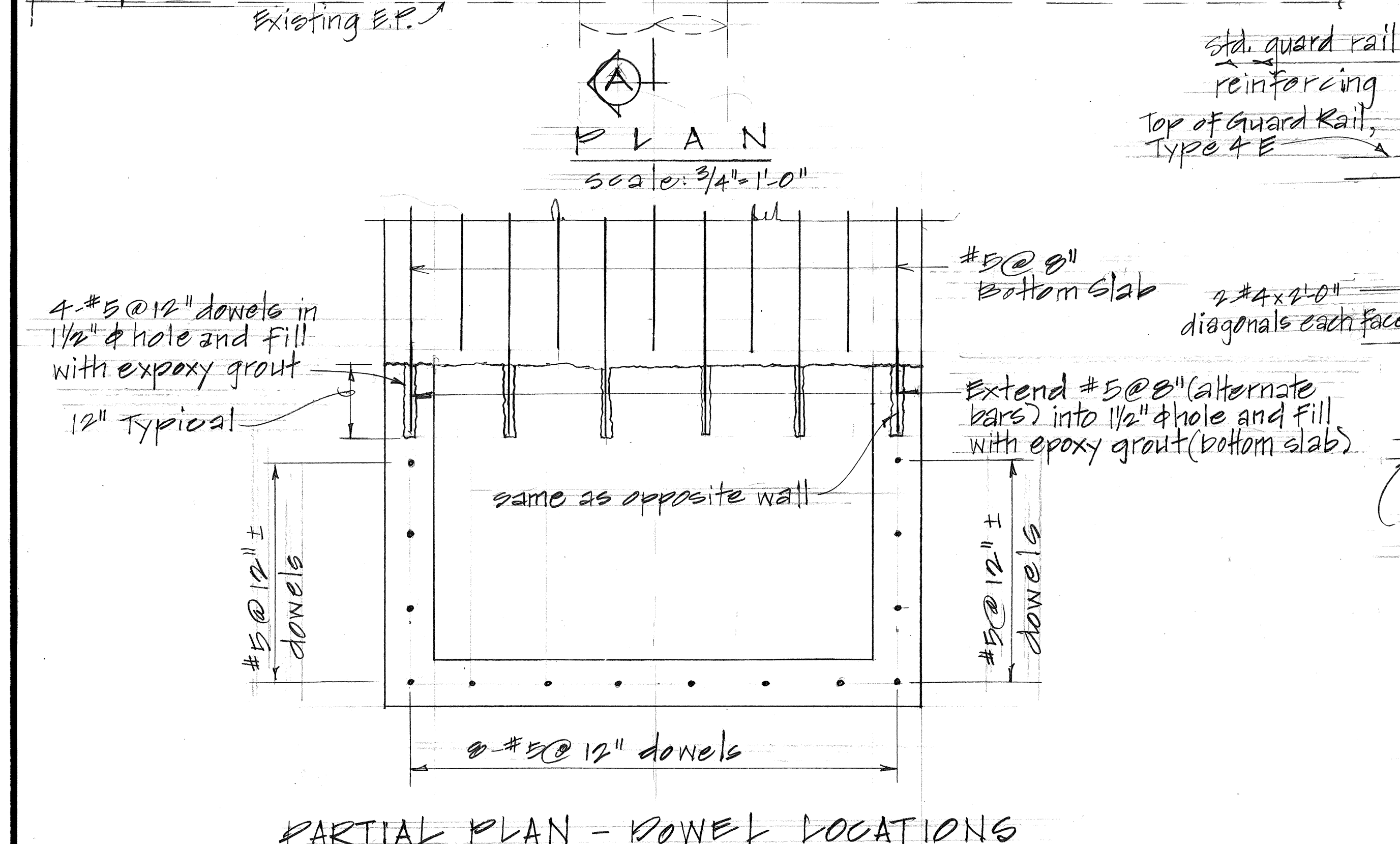
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	43	165



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



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



PARTIAL PLAN - DOWEL LOCATIONS
Scale: 3/4" = 1'-0"

DETAIL A
Scale: 1" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

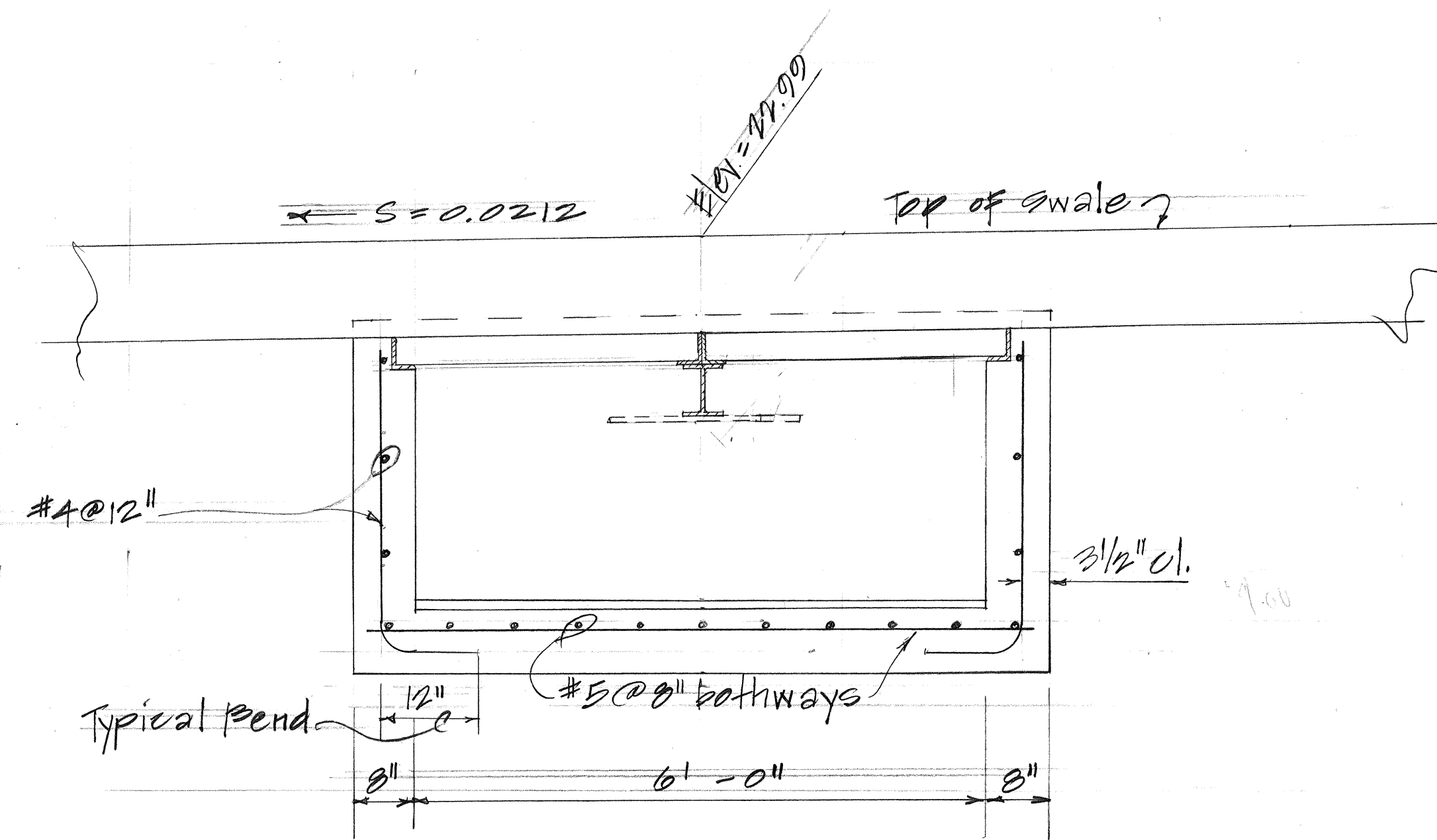
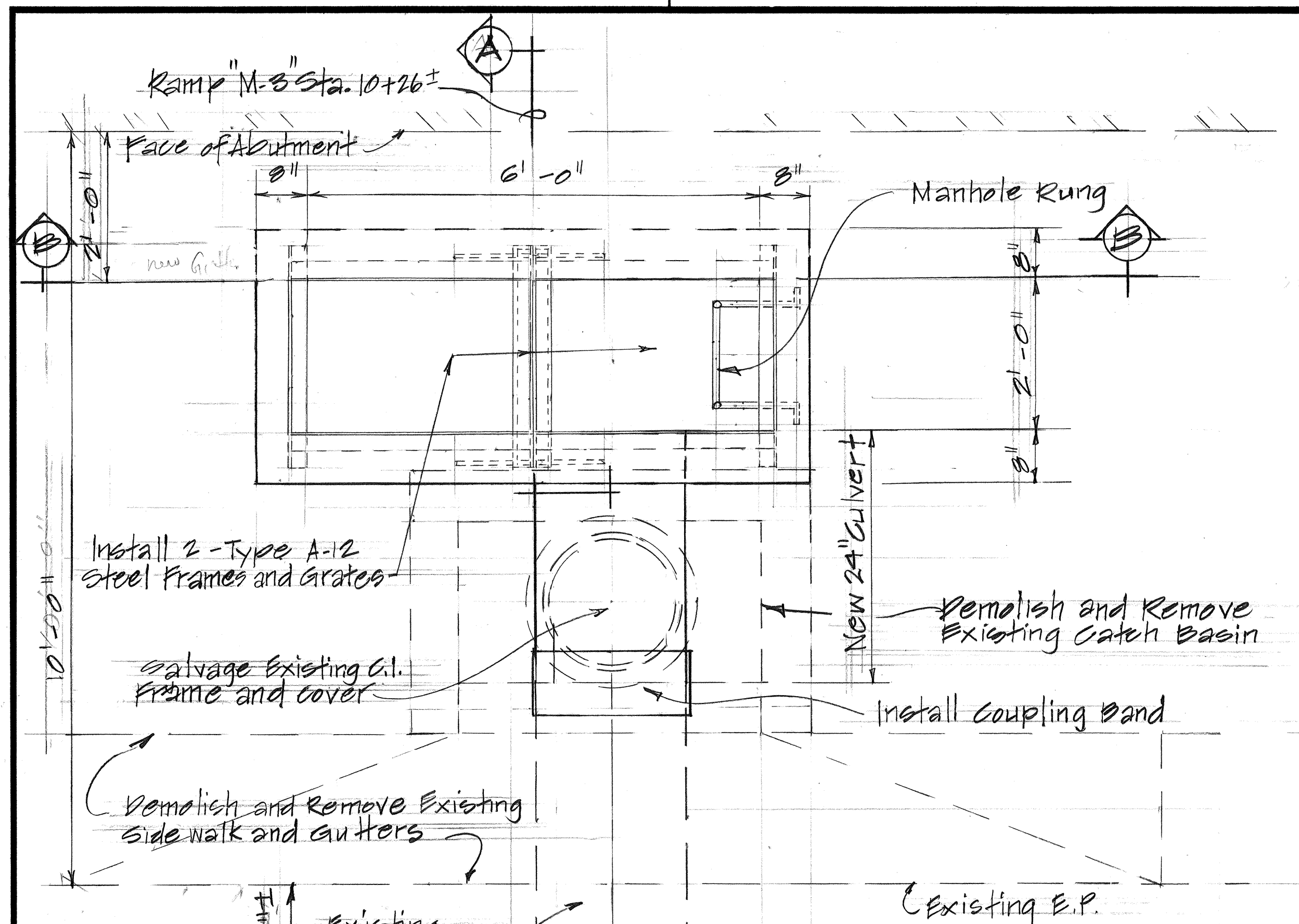
DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)
SCALE: AS NOTED

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

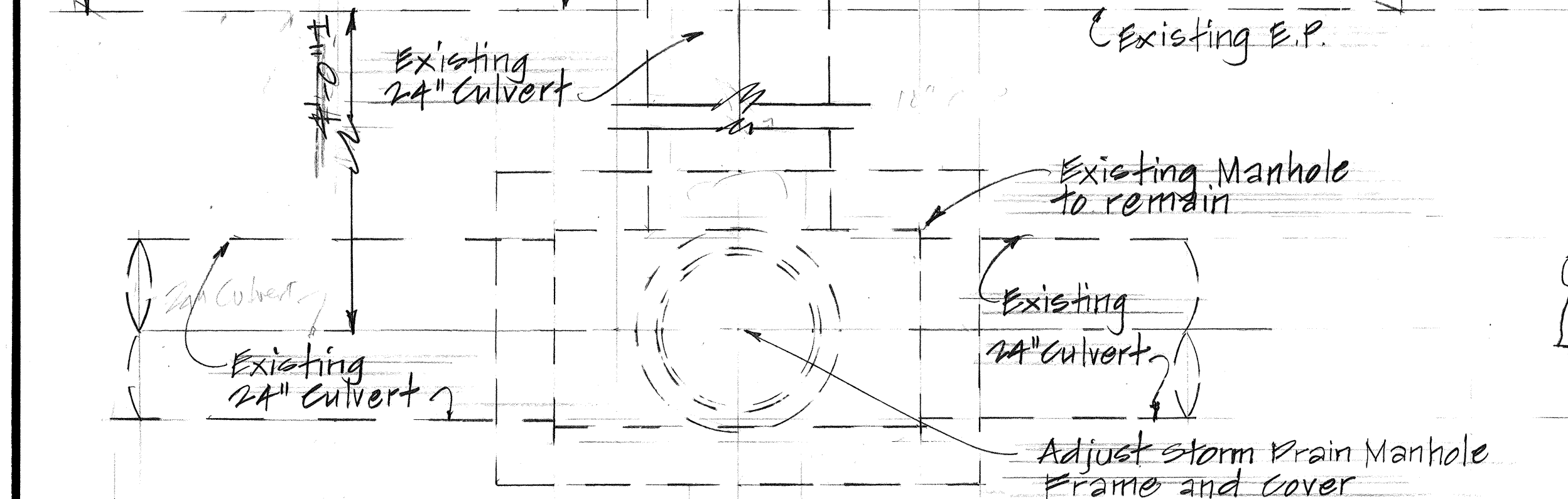
DETAILS OF MODIFIED TYPE 2 GRATED DROP INTAKE AT RAMP "M-3" STA. 8+00 RT.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-11-1 (178)	1982	44	165



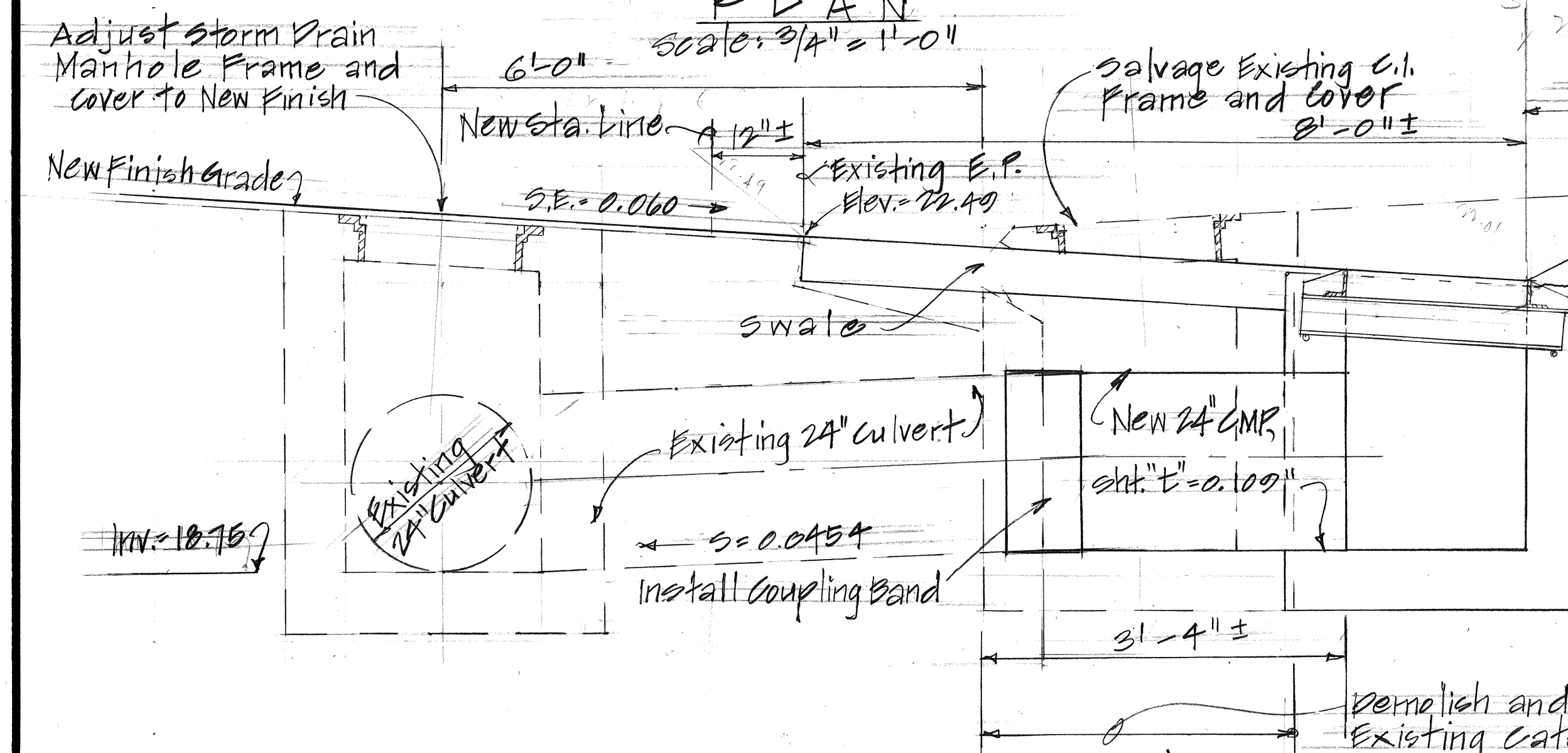
SECTION B-B

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



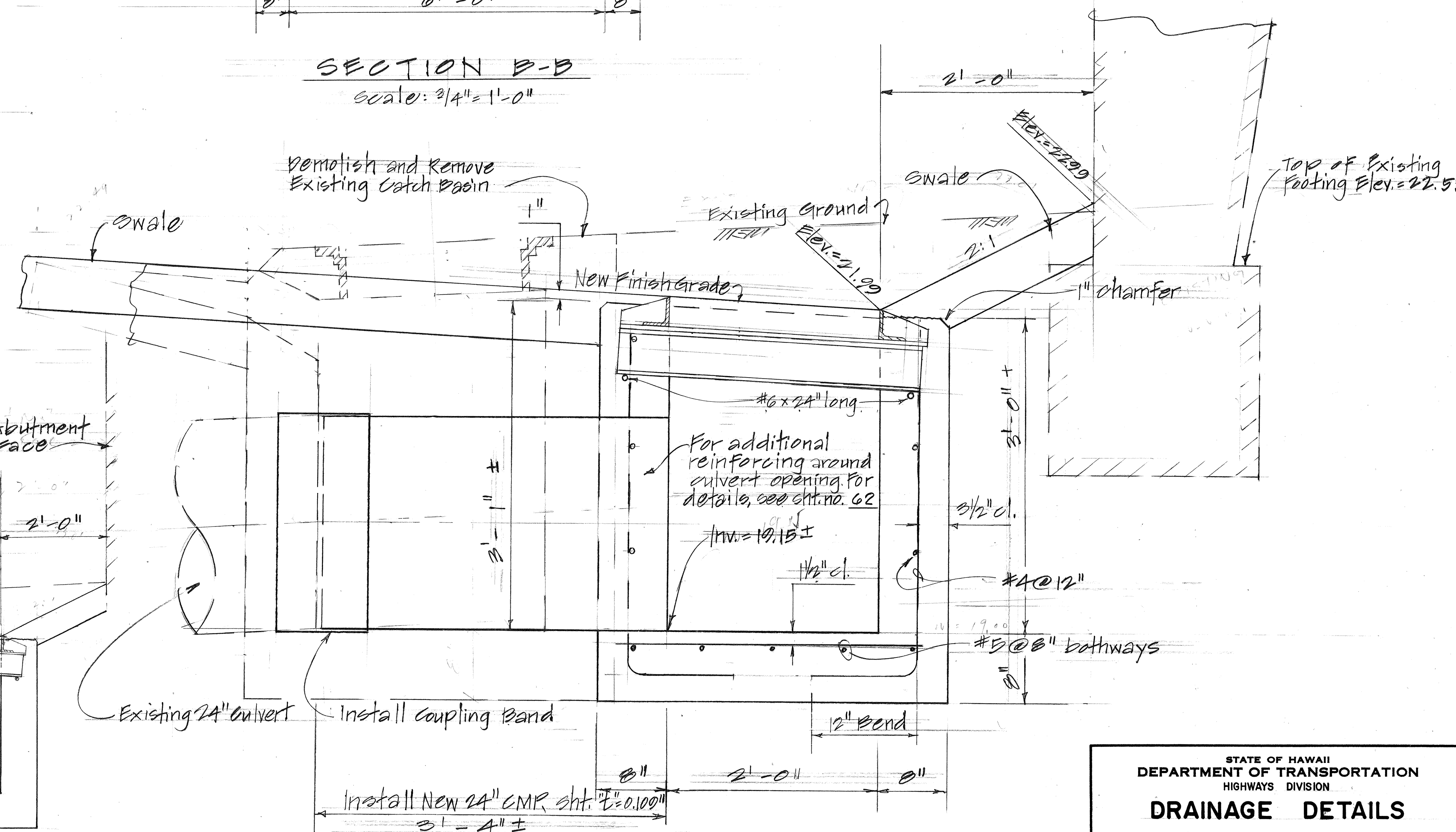
PLAN

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



SECTION A-A

Surje: $3/4'' = 1'' - 0''$



SECTION A-A

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

DETAILS OF TYPE 2 GRATED DROP INTAKE AT RAMP "M-3" STA. 10+26.4 RT.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

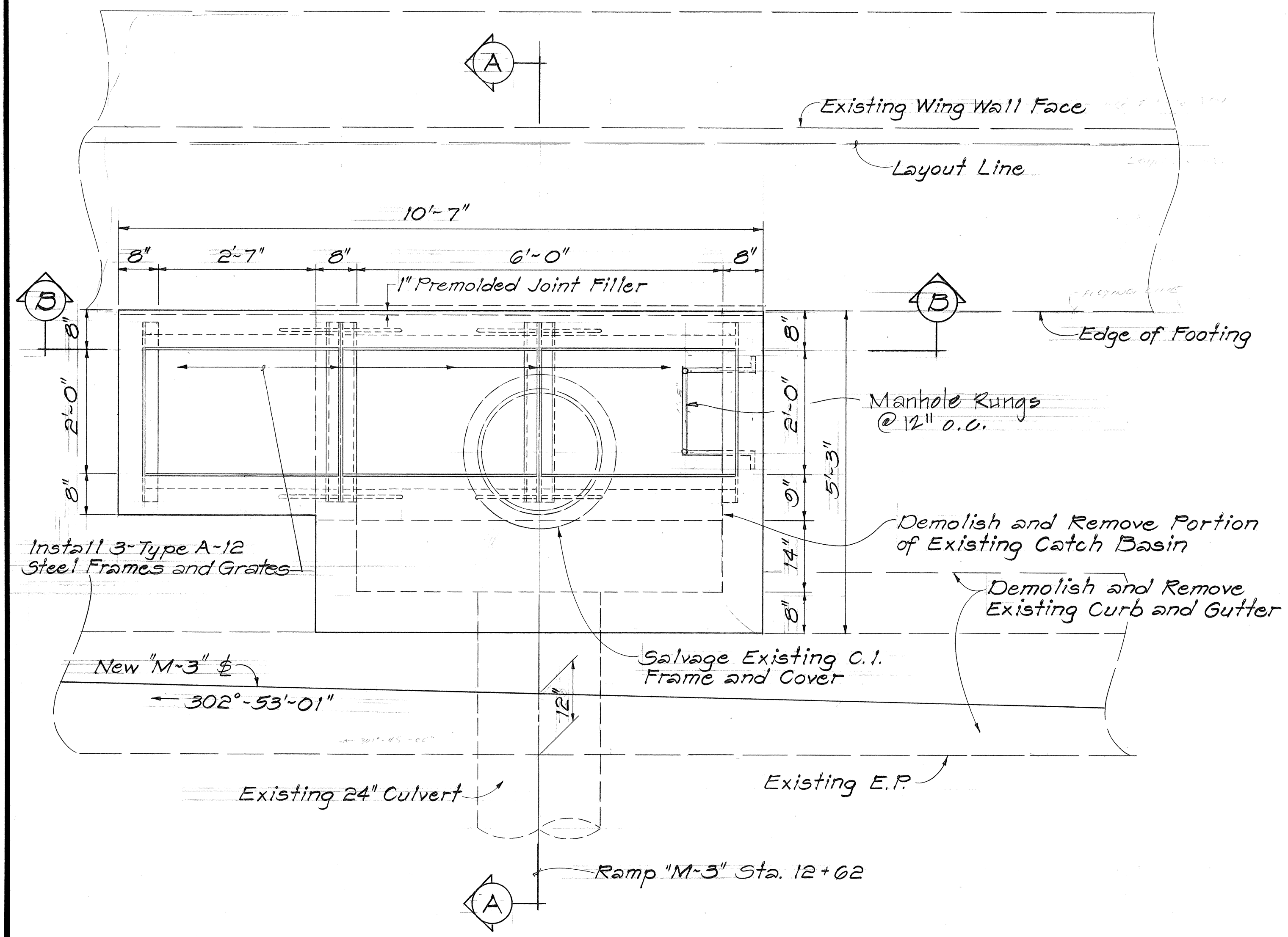
DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)

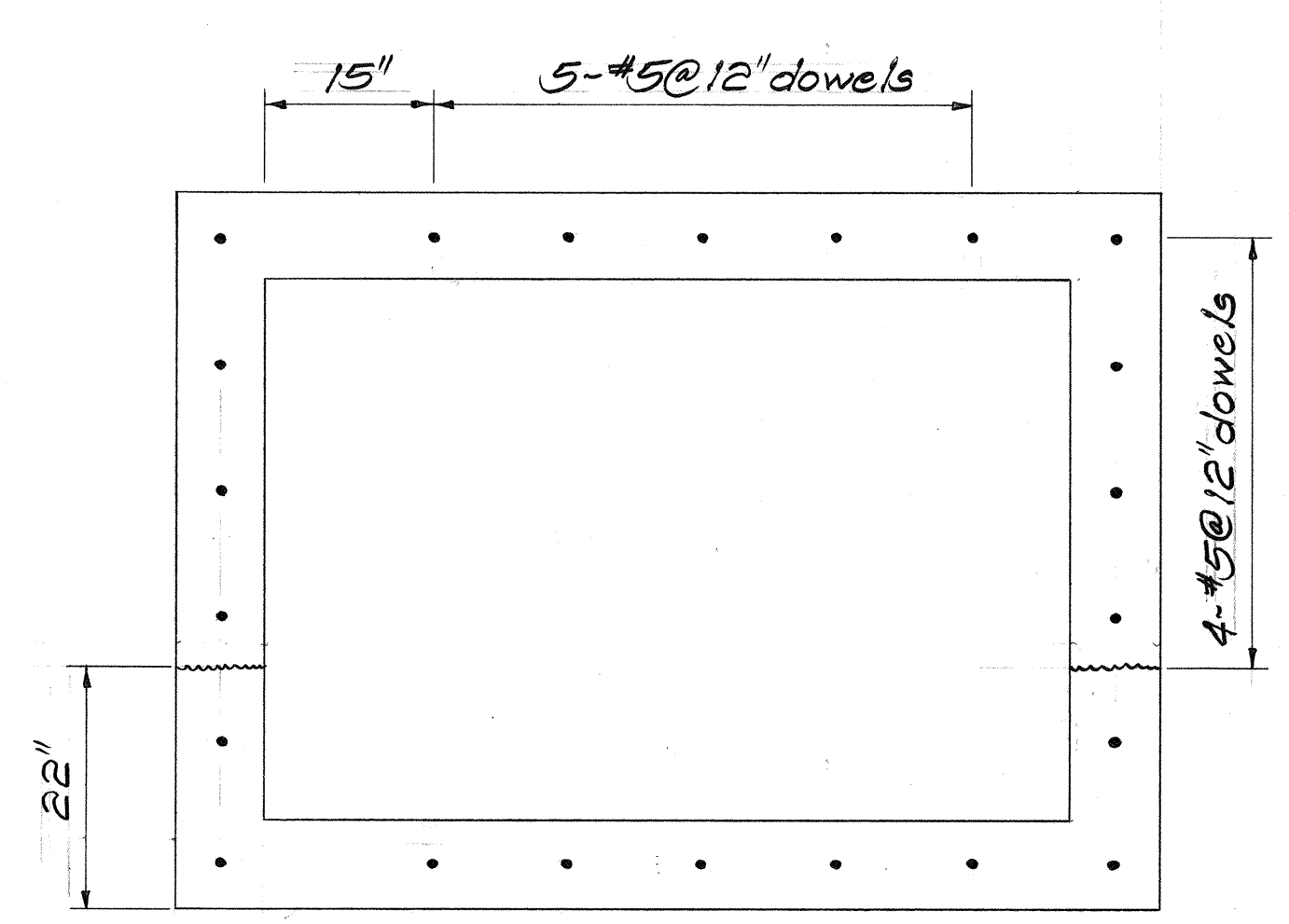
SCALE: AS NOTED

SHEET No. 12 OF 33 SHEETS

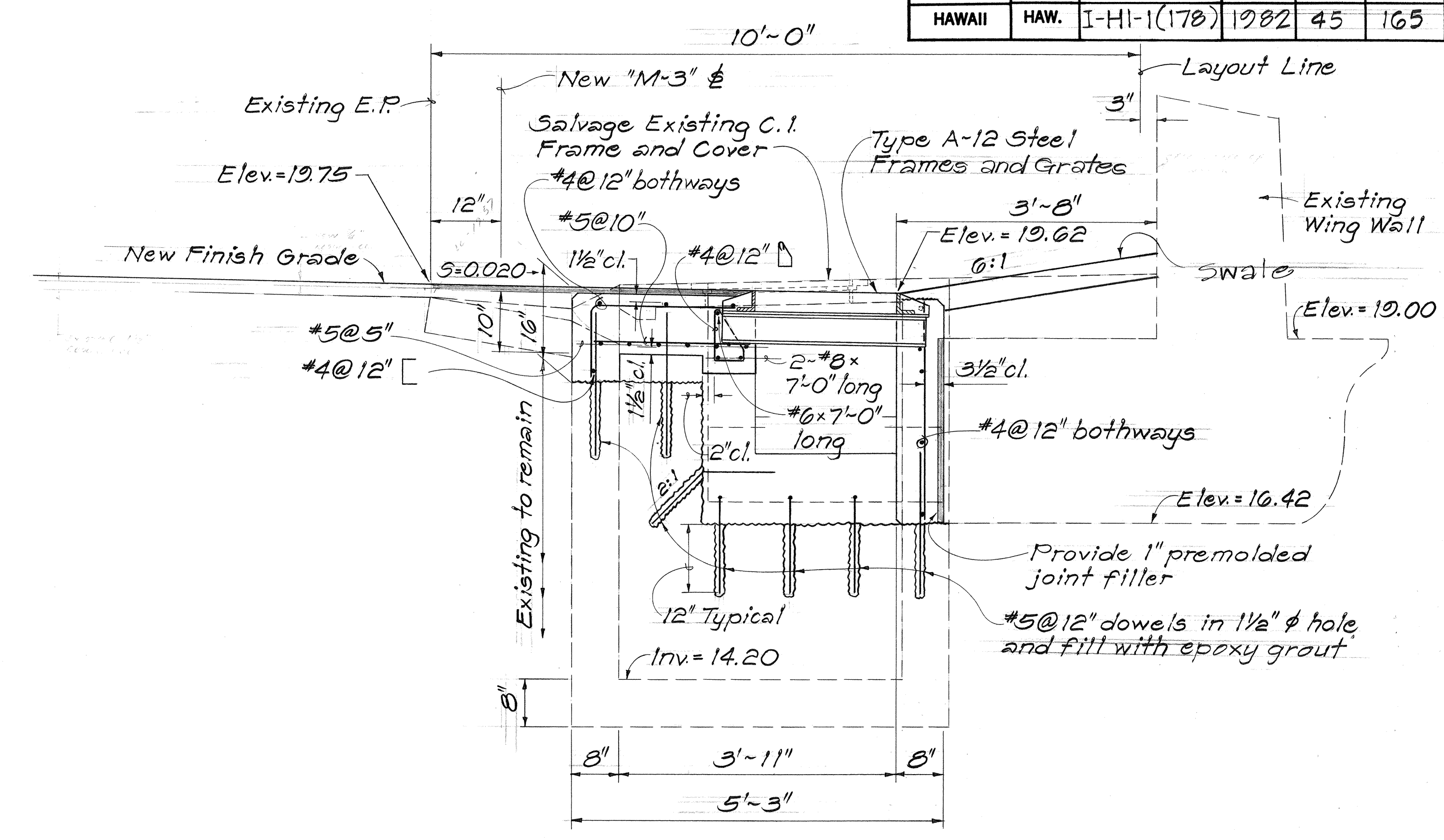
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	45	165



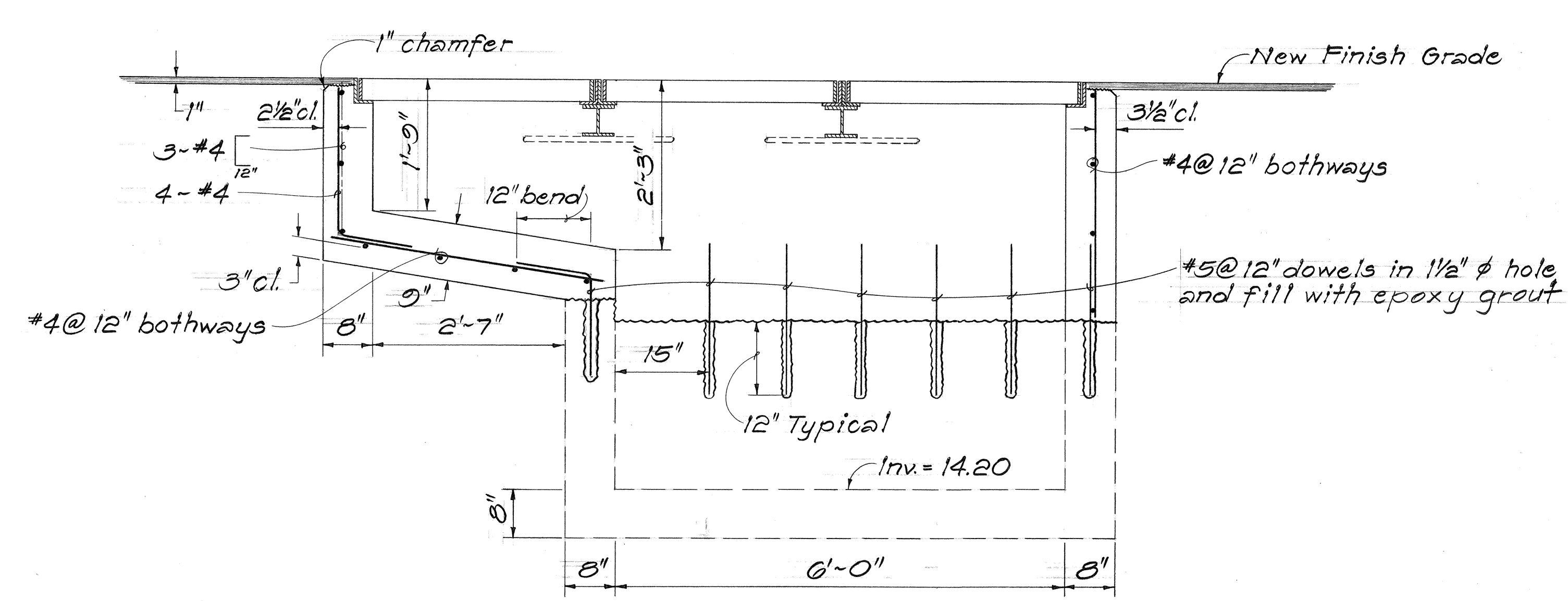
PLAN
Scale: 3/4" = 1'-0"



PARTIAL PLAN ~ DOWEL LOCATION
Scale: 3/4" = 1'-0"



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



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

DETAILS OF MODIFIED TYPE 3 GRATED DROP INTAKE AT RAMP "M-3" STA. 12+62 RT.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

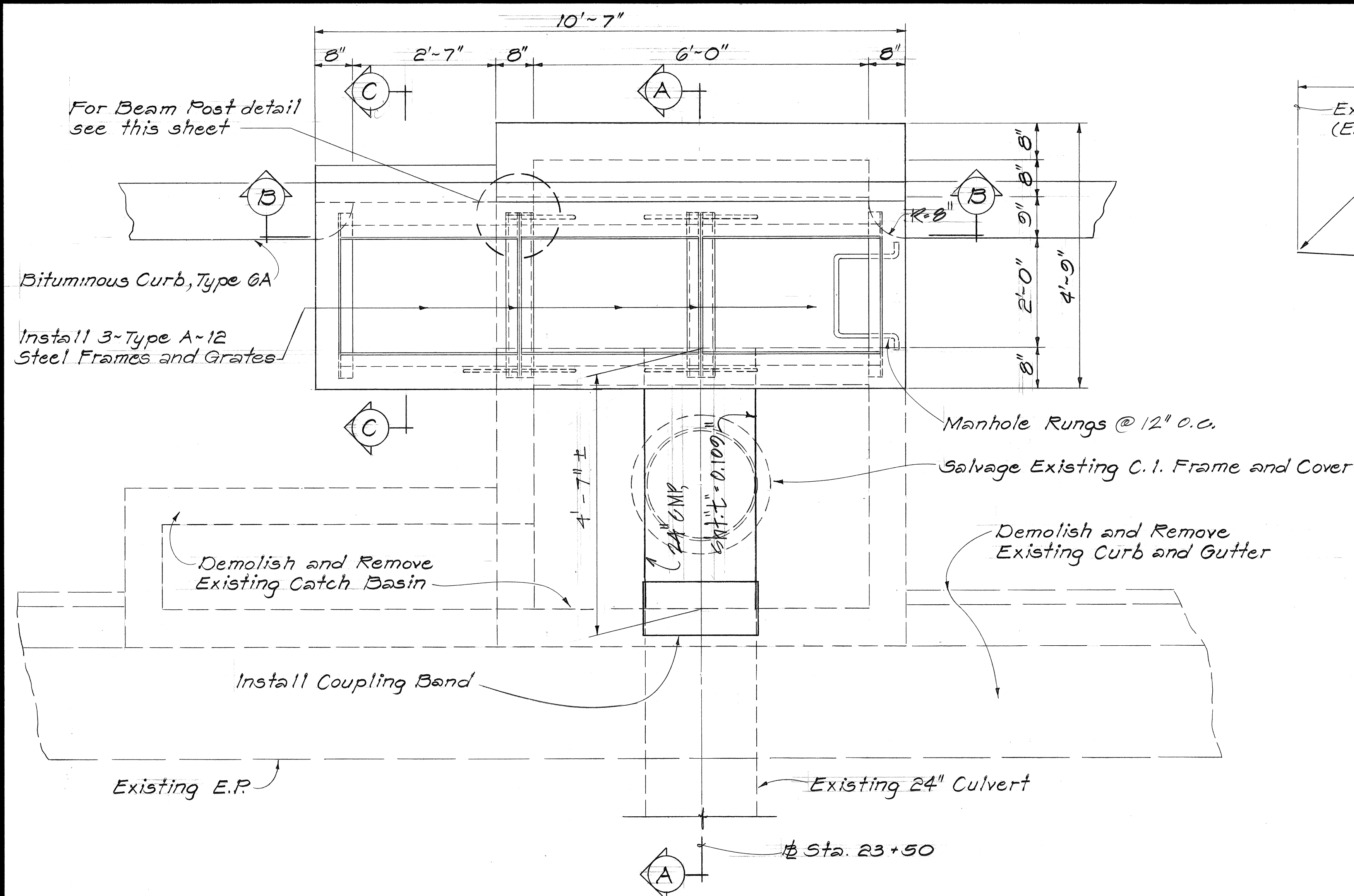
DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)

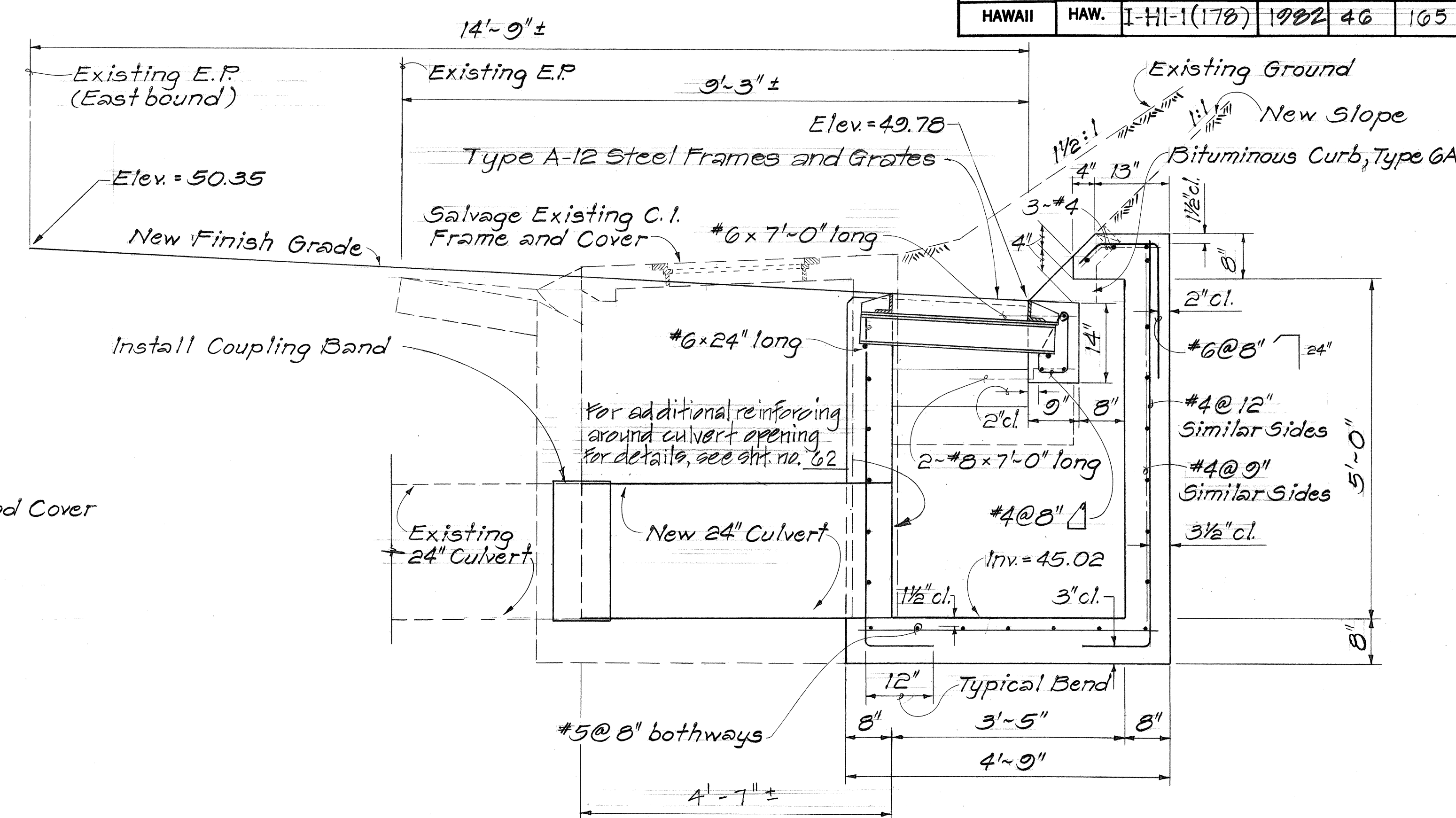
SCALE: AS NOTED
SHEET No. 13 OF 33 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
TRACED BY		
NOTED BY		
CHECKED BY		
No.		

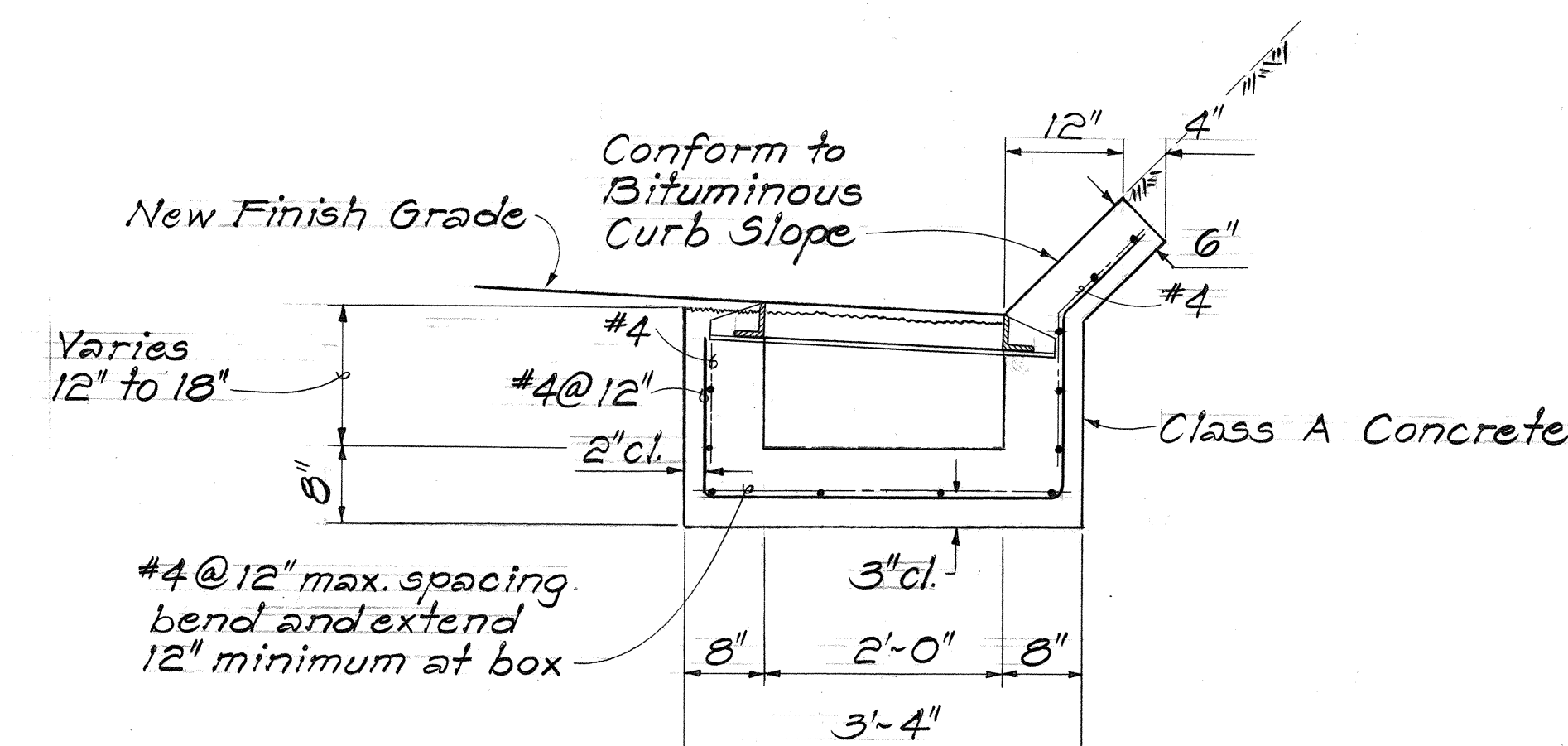
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	46	165



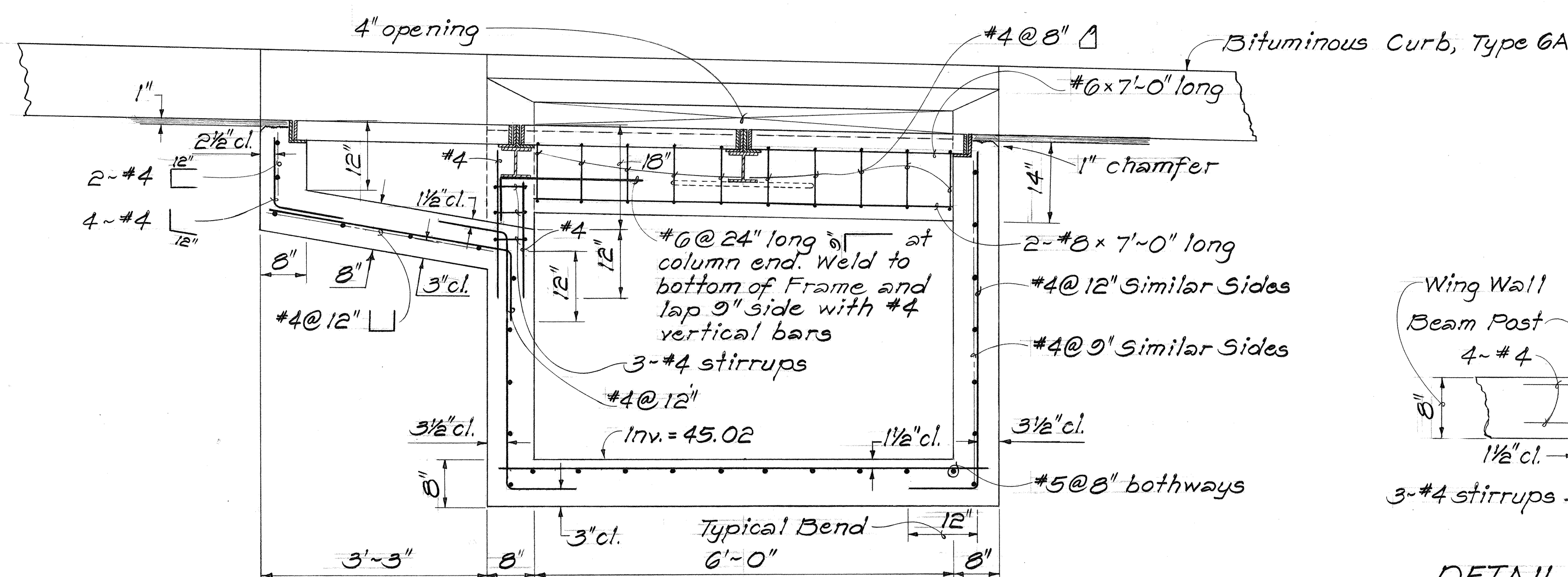
PLAN
Scale: $\frac{3}{4}" = 1'-0"$



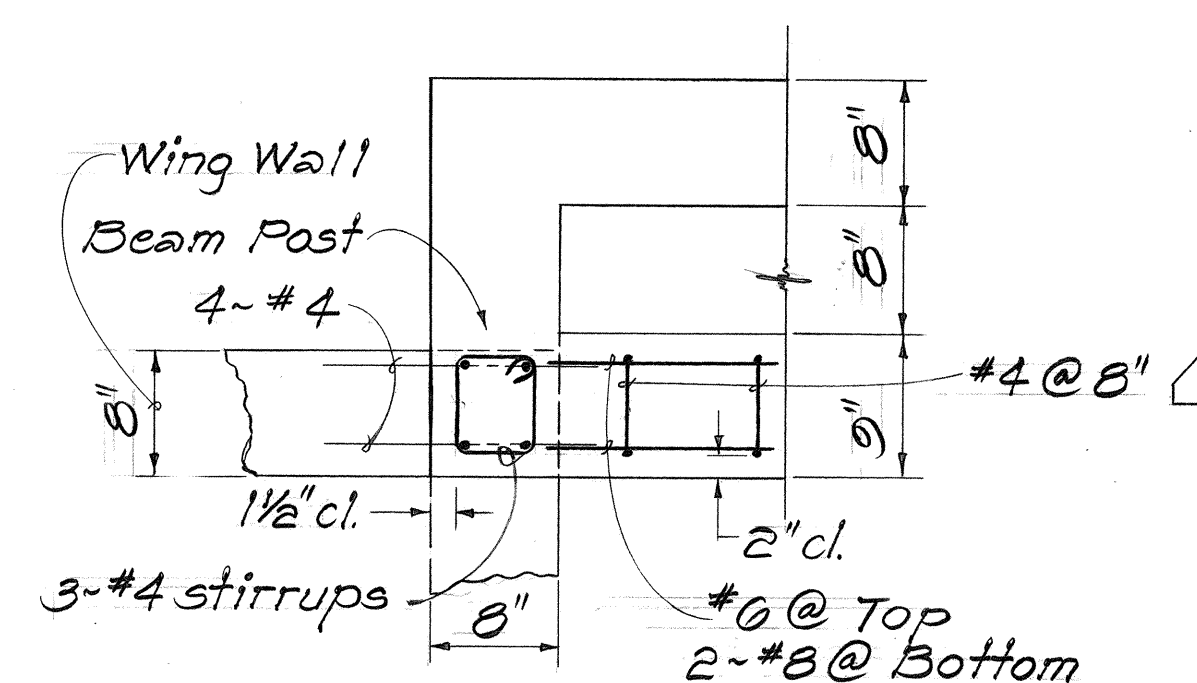
SECTION A~A
Scale: 3/4" = 1'-0"



SECTION C-C
(Scale: $\frac{3}{4}" = 1'-0"$)



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



DETAIL OF BEAM POST
Scale: 1" = 1'-0"

DETAILS OF TYPE 3 GRATED DROP INTAKE AT STA. 23+50 RT.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

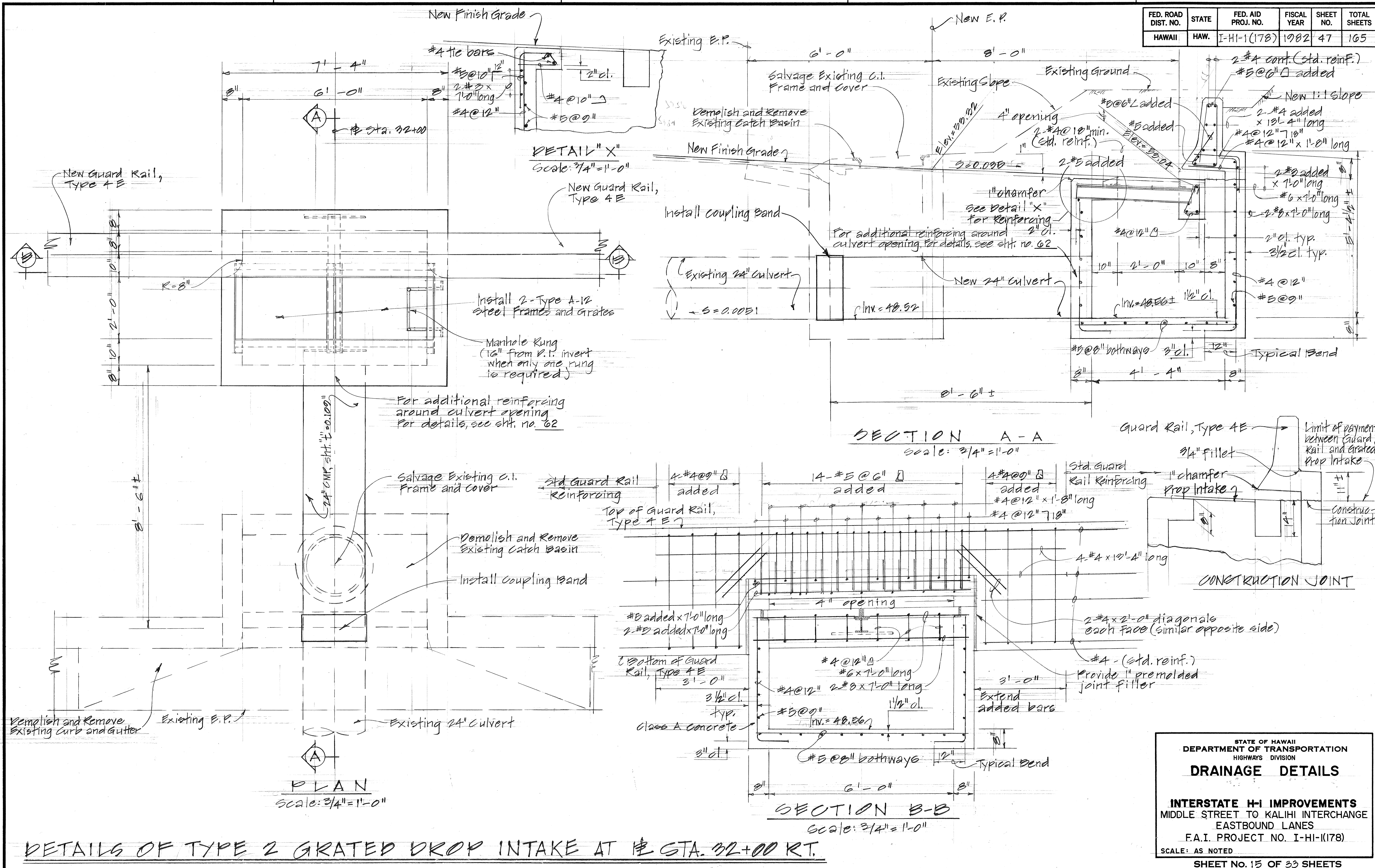
DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)

SCALE: AS NOTED

SHEET No. 14 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	47	105



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

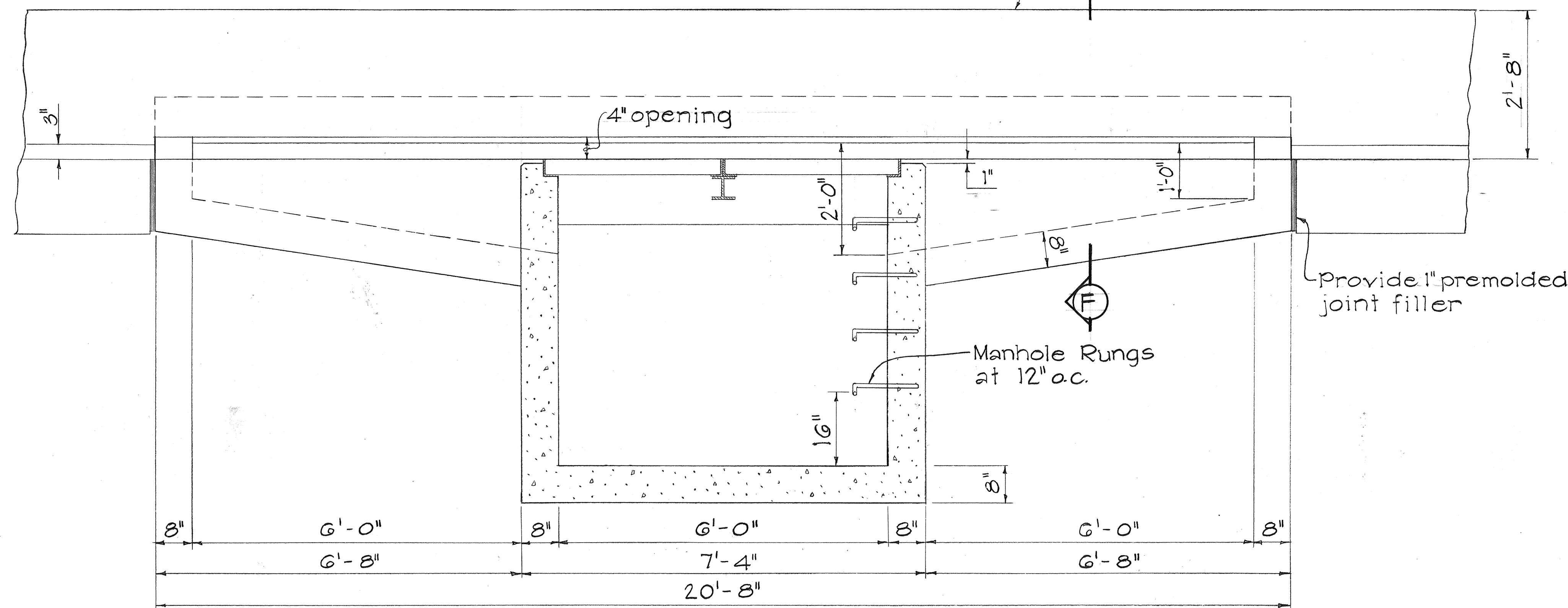
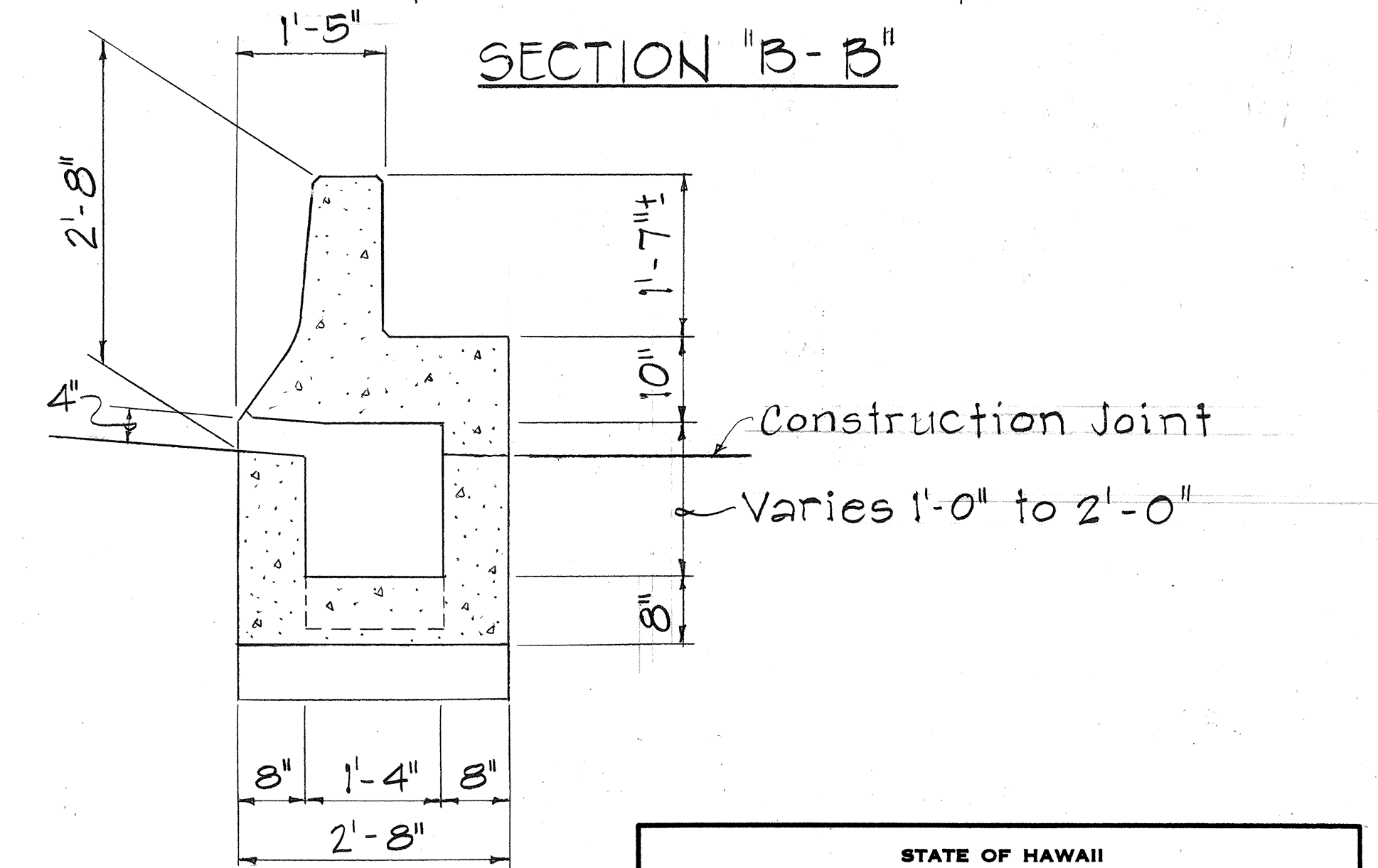
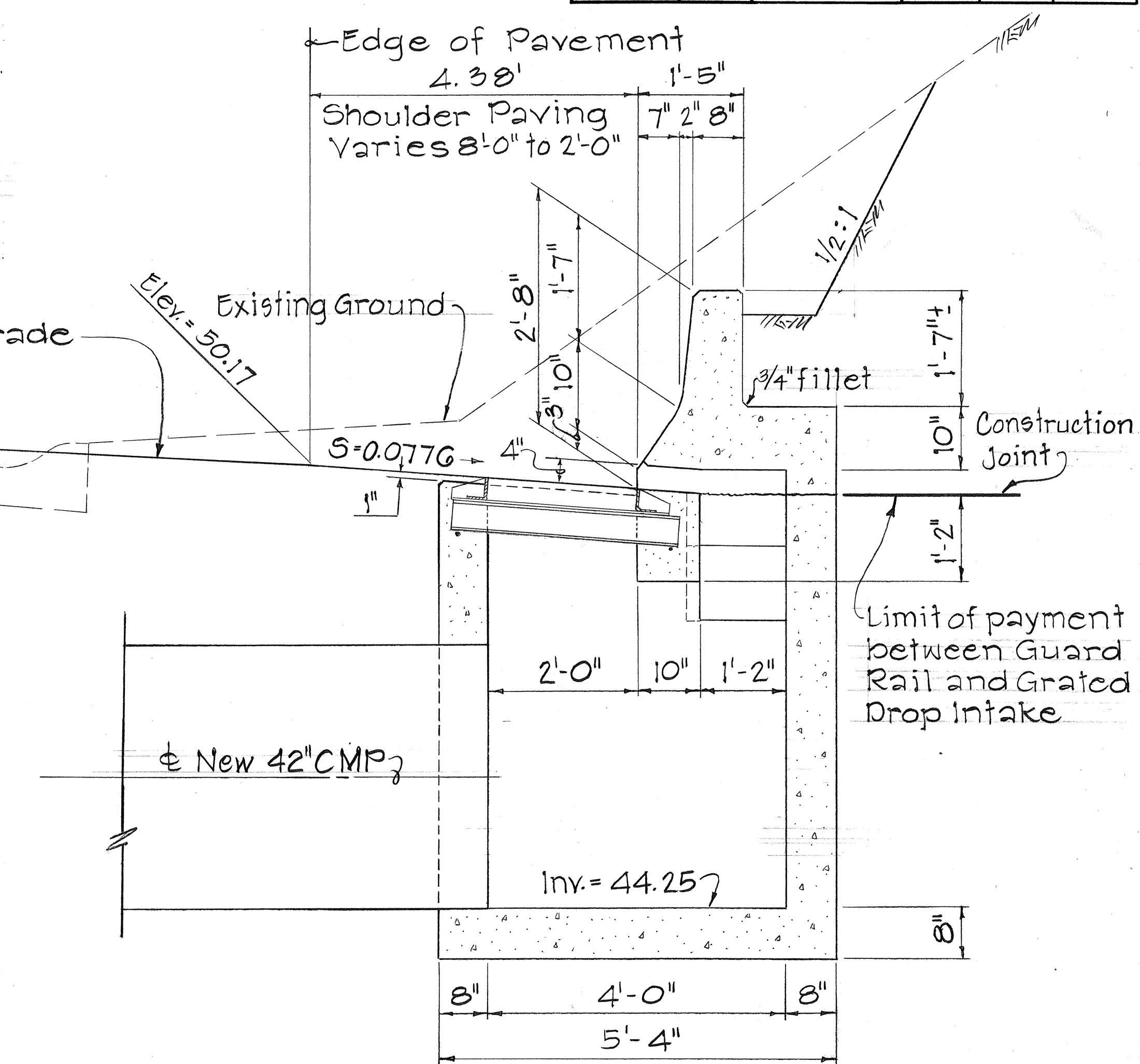
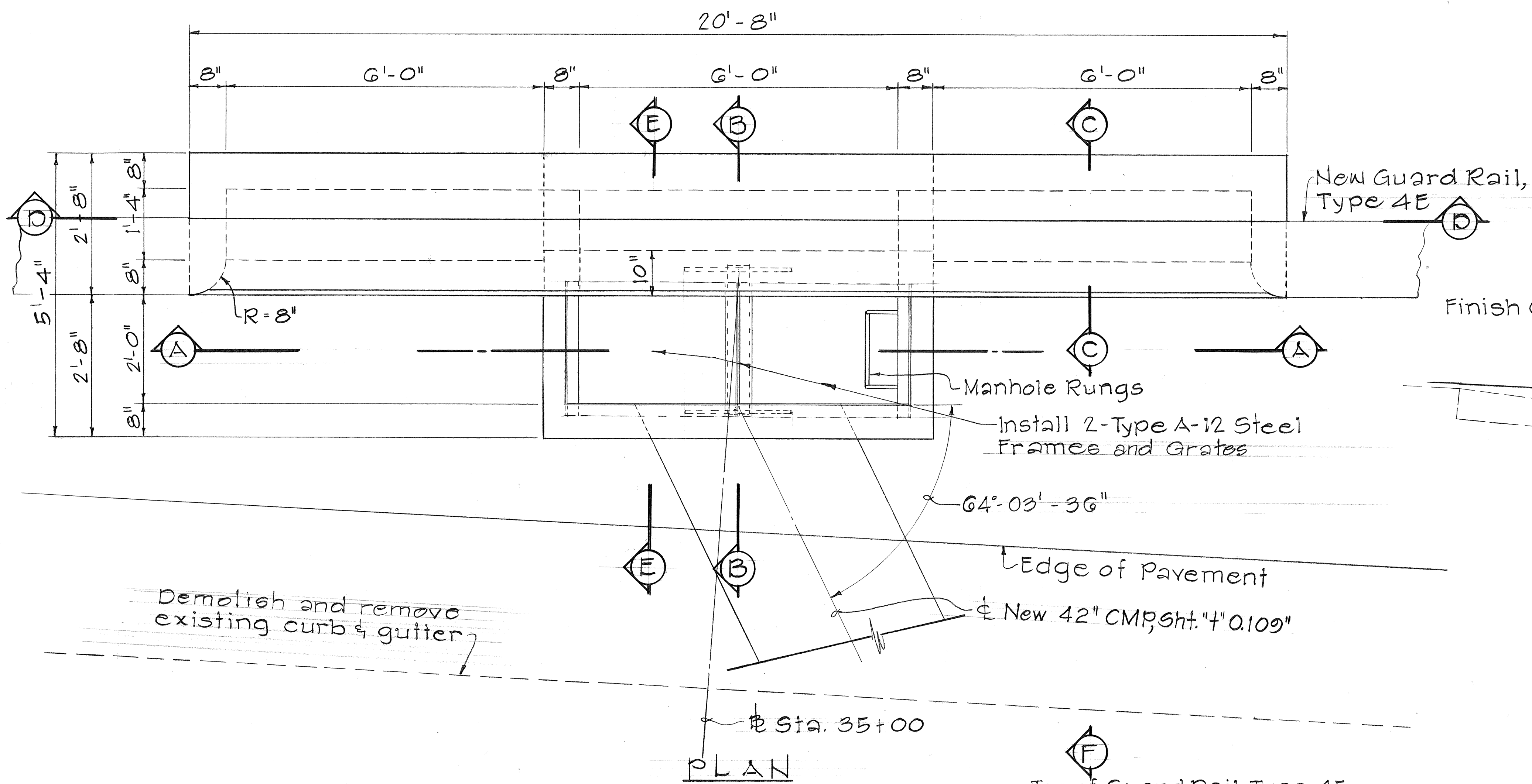
DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)
SCALE: AS NOTED

SHEET NO. 15 OF 33 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1 (178)	1982	48	165



SECTION "A-A"
DETAILS OF TYPE T GRATED DROP INTAKE AT STA. 35+00 RT.
Scale: 3/4" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)
SCALE: AS NOTED
SHEET NO. 16 OF 33 SHEETS

Hand-drawn structural reinforcement drawing of a foundation slab. The drawing shows a cross-section of a slab with various reinforcement bars and dimensions. Key features include:

- Top Reinforcement:** 7 - #4 @ 12" on the left and right, and 6 - #4 @ 12" in the center. Maximum spacing (Max.) is indicated for the top reinforcement.
- Bottom Reinforcement:** 3 - #4 on the left and right, and 1 - #4 in the center.
- Vertical Dimensions:** 12" for the top and bottom reinforcement layers, and 14" for the total slab thickness.
- Horizontal Dimensions:** 20' - 4" long for the main slab, and 8' - 0" long for the central section.
- Notes:** "1-#4, 1-#8 x 7'-0" long" indicates the length of the central section.

Hand-drawn structural reinforcement detail for a concrete wall with a culvert opening. The drawing shows a cross-section of a wall with a rectangular opening. Reinforcement bars are labeled with their size, spacing, and length. Key features include a construction joint, a 2-inch clear spacing around the opening, and a 1 1/2-inch clear spacing at the bottom. A note indicates that for additional reinforcement details, refer to sheet number 62.

Reinforcement details shown:

- #4 cont. (std. reinf.)
- #4 x 26'-8" long
- 3-#6 x 26'-8" long
- #5 @ 6" added
- #5 @ 6" added
- 2" cl. Typ.
- #4 @ 12"
- #4 #4 @ 12" x 1'-9" long
- 2-#3 @ 10" x 20'-4" long
- Construction Joint
- #6 x 7'-0" long
- #4 @ 8"
- #4 x 7'-0" long
- 2-#8 x 7'-0" long
- #4 @ 12"
- #4 @ 9"
- 3 1/2" cl.
- #5 @ 8" bothways
- 12" Typical
- 1 1/2" cl.
- 2" cl. Typ.
- For additional reinforcement around culvert opening, for details, see sht. no. 62
- NEW 42" CMP
- #4 @ 12"
- #4 @ 9"
- 2-#4
- #4

[illegible]

Reinf. same as in Section "E-E"

#4 @ 12" □

#4 @ 12" x 1'-0" long

2-#3 @ 10" x 20'-4" long

Construction Joint

#4 @ 9" (wall reinf. cont.)

3-#4

2-Equalspace

#4

2" cl.

3" cl.

SECTION "F-F"

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

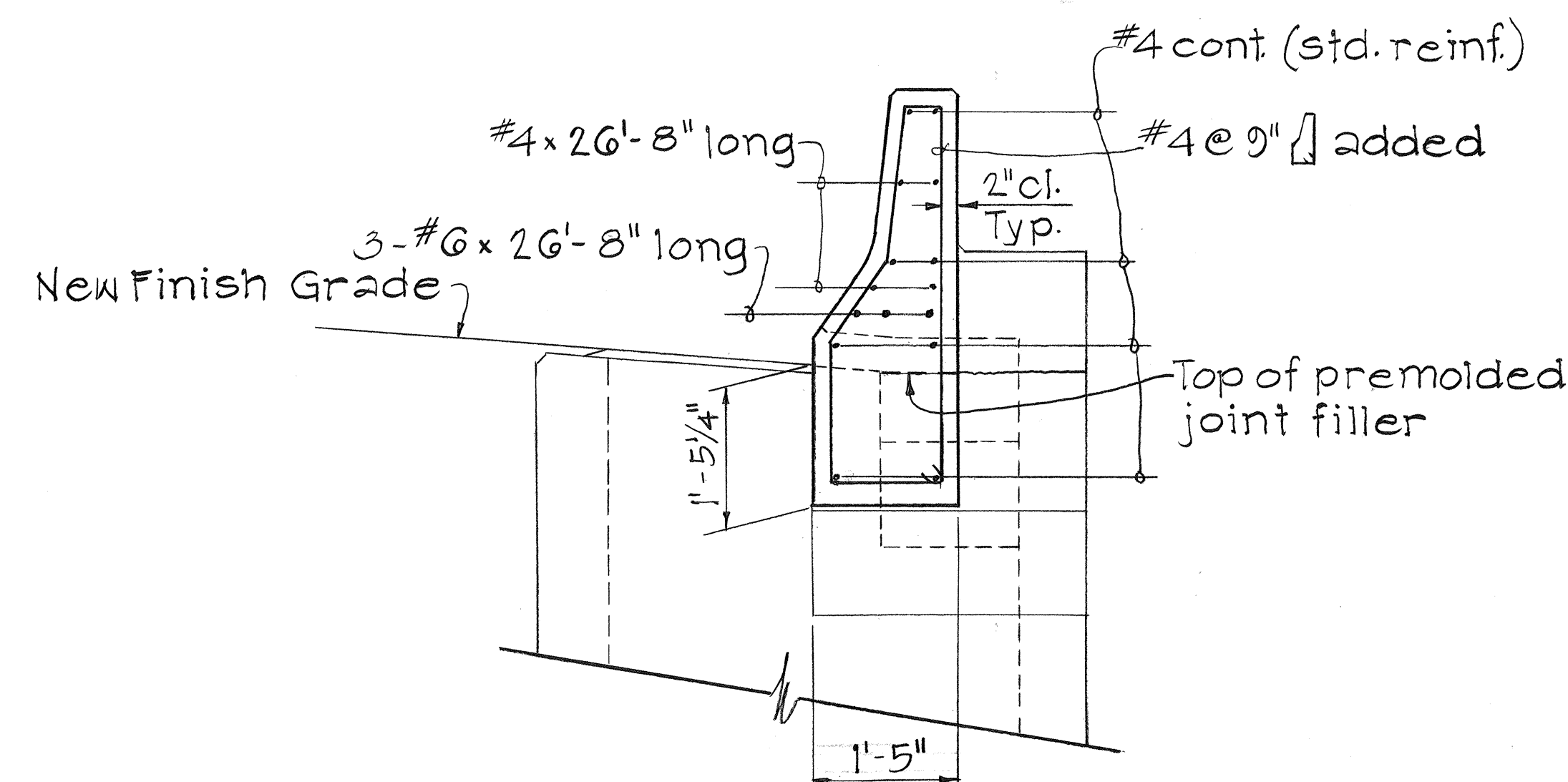
DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(I78)

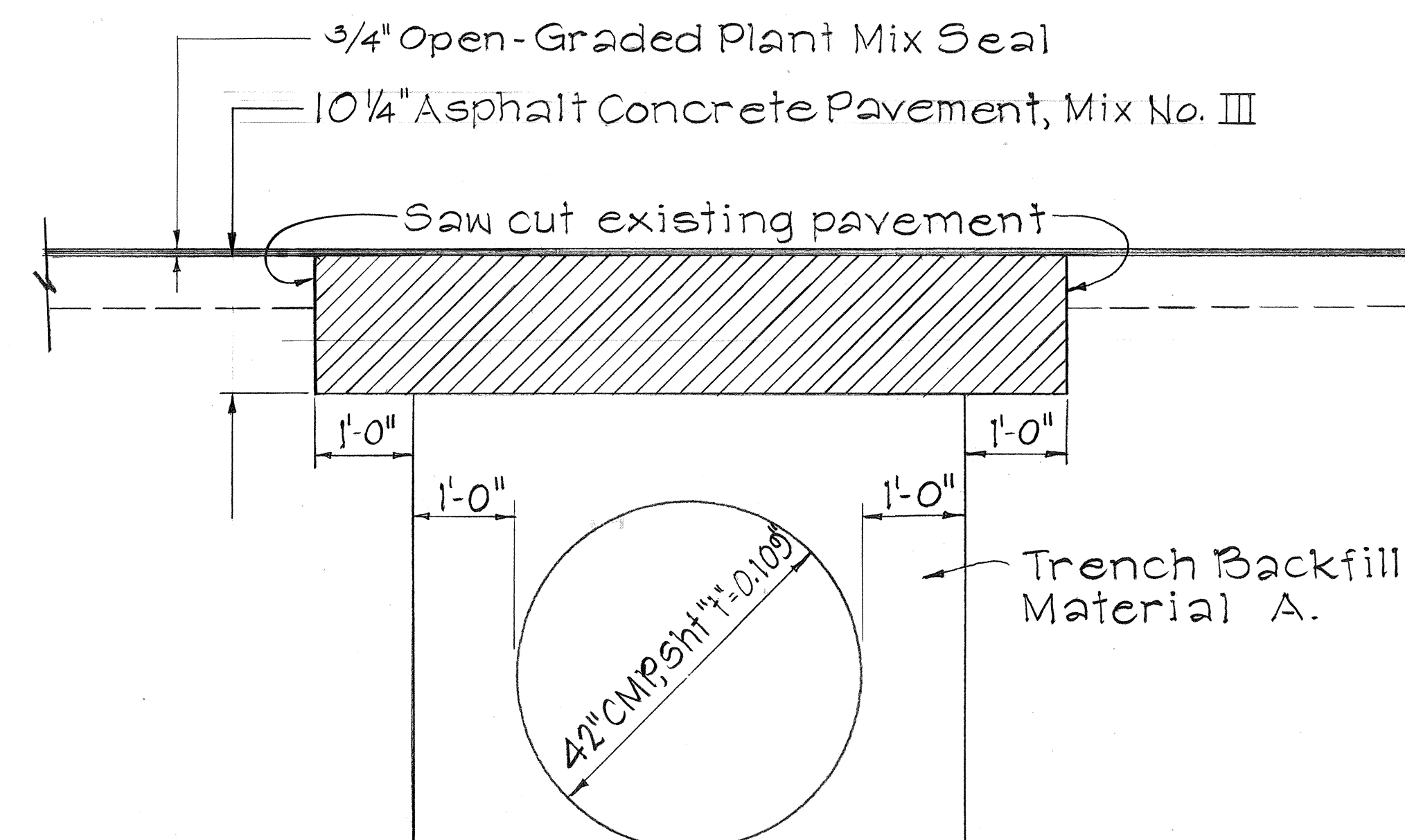
SCALE: AS NOTED

40

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1 (178)	1982	50	165

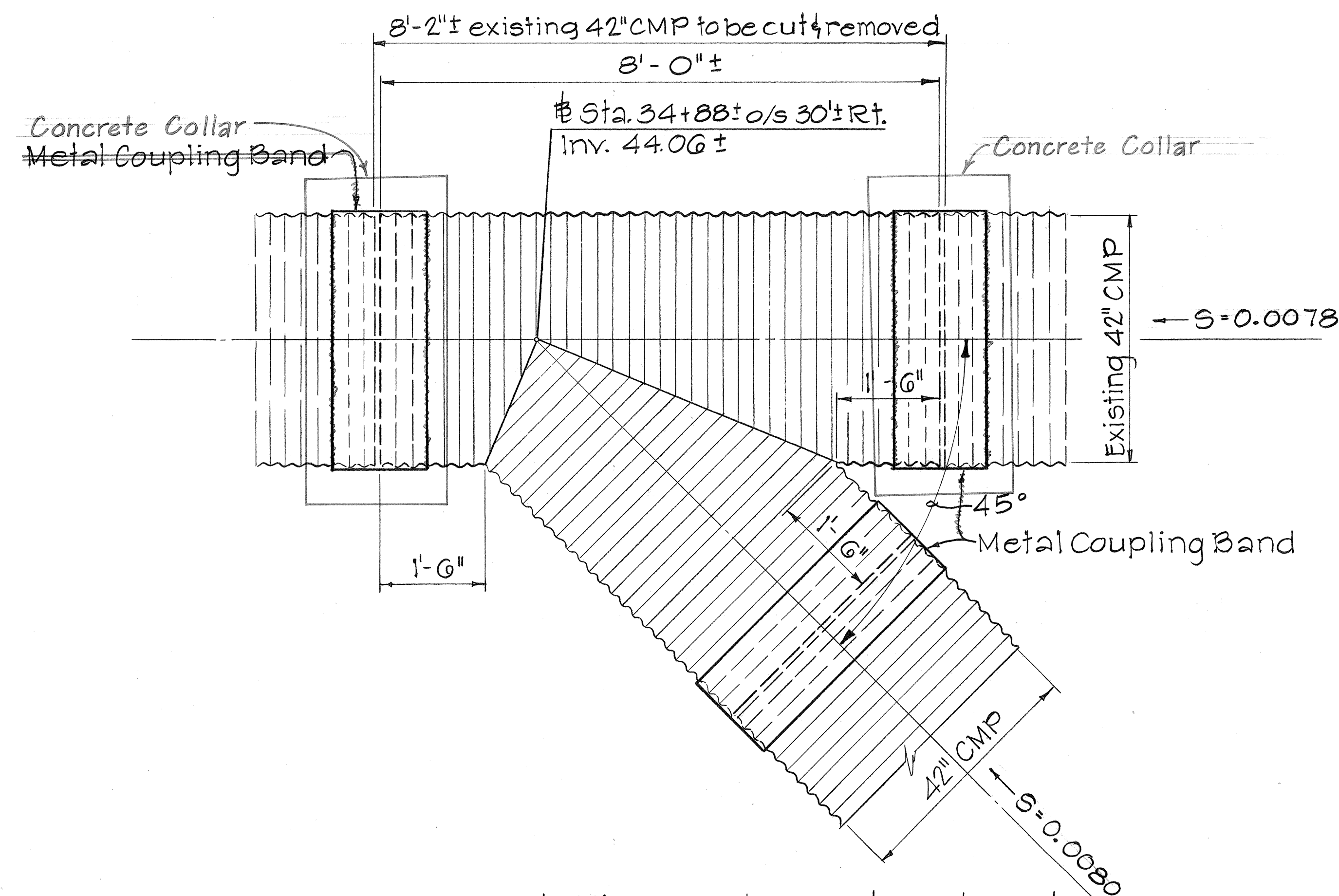


SECTION "G-G"



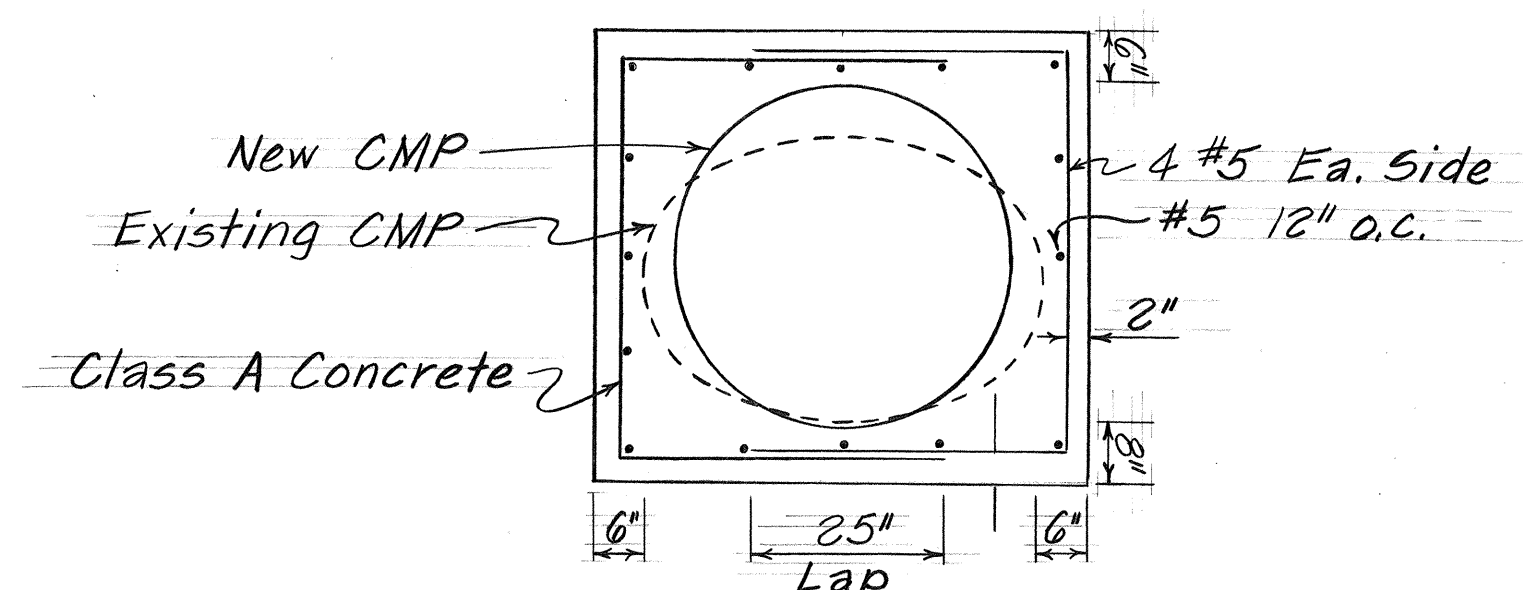
NOTE:
The materials and construction requirements for pavement restoration shall conform to the applicable sections of the Standard Specifications. Payment for pavement restoration and other improvements shall be considered incidental to the various contract items.

TRENCH DETAIL FOR 42" CULVERT

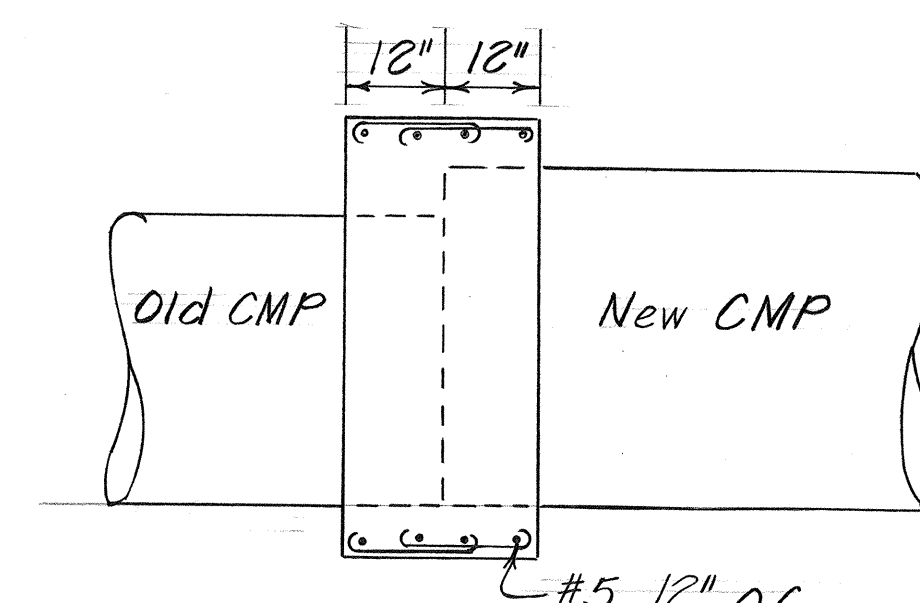


45° LATERAL-Y-FITTING 3.5' x 3.5' x 3.5'

CONCRETE COLLAR FOR 42" CMP AT STA. 34+88



CONCRETE COLLAR DETAIL
N.T.S.



DETAILS OF TYPE T GRATED DROP INTAKE AT STA. 35+00 RT.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DRAINAGE DETAILS

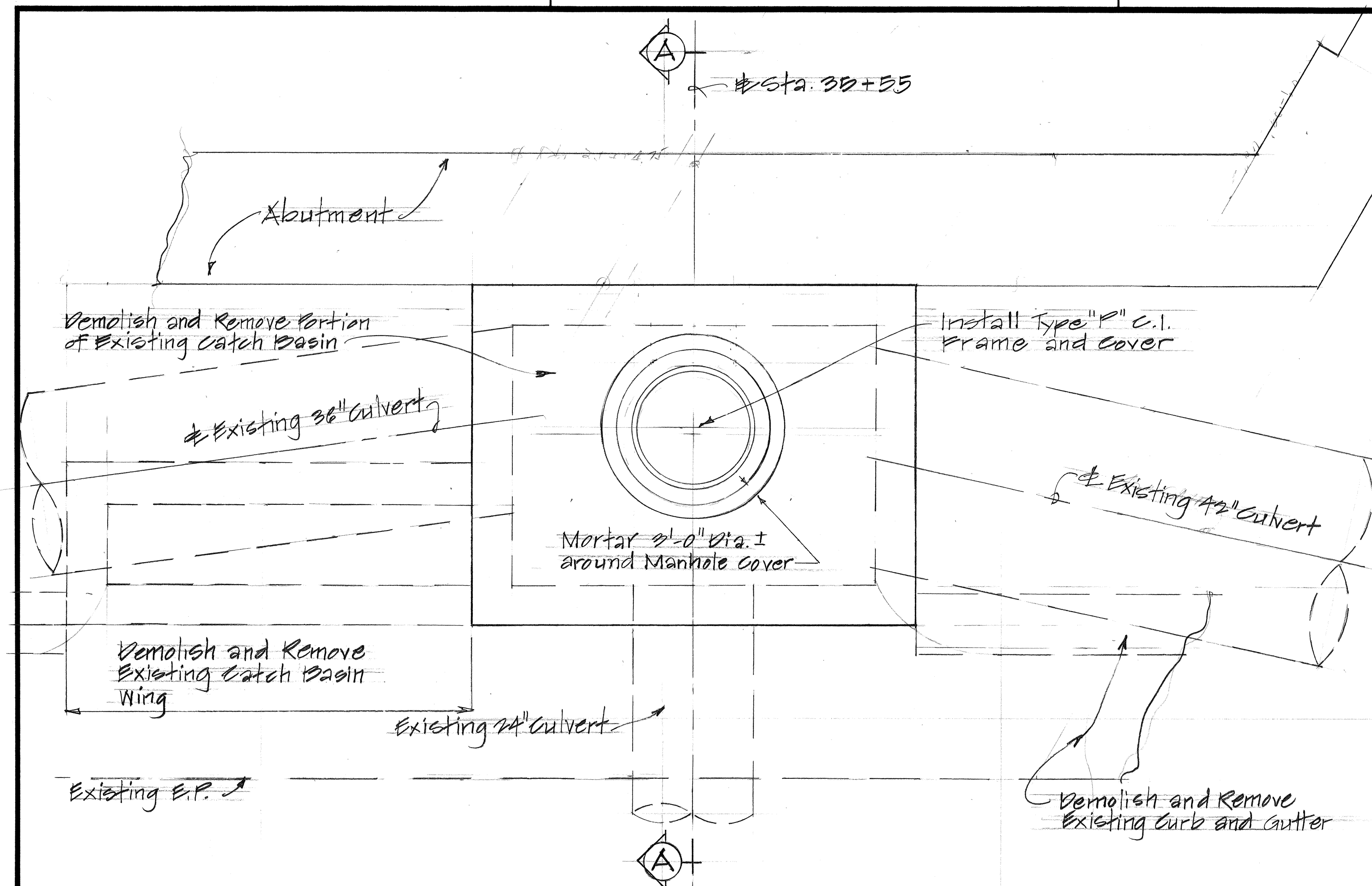
INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)

SCALE: AS NOTED

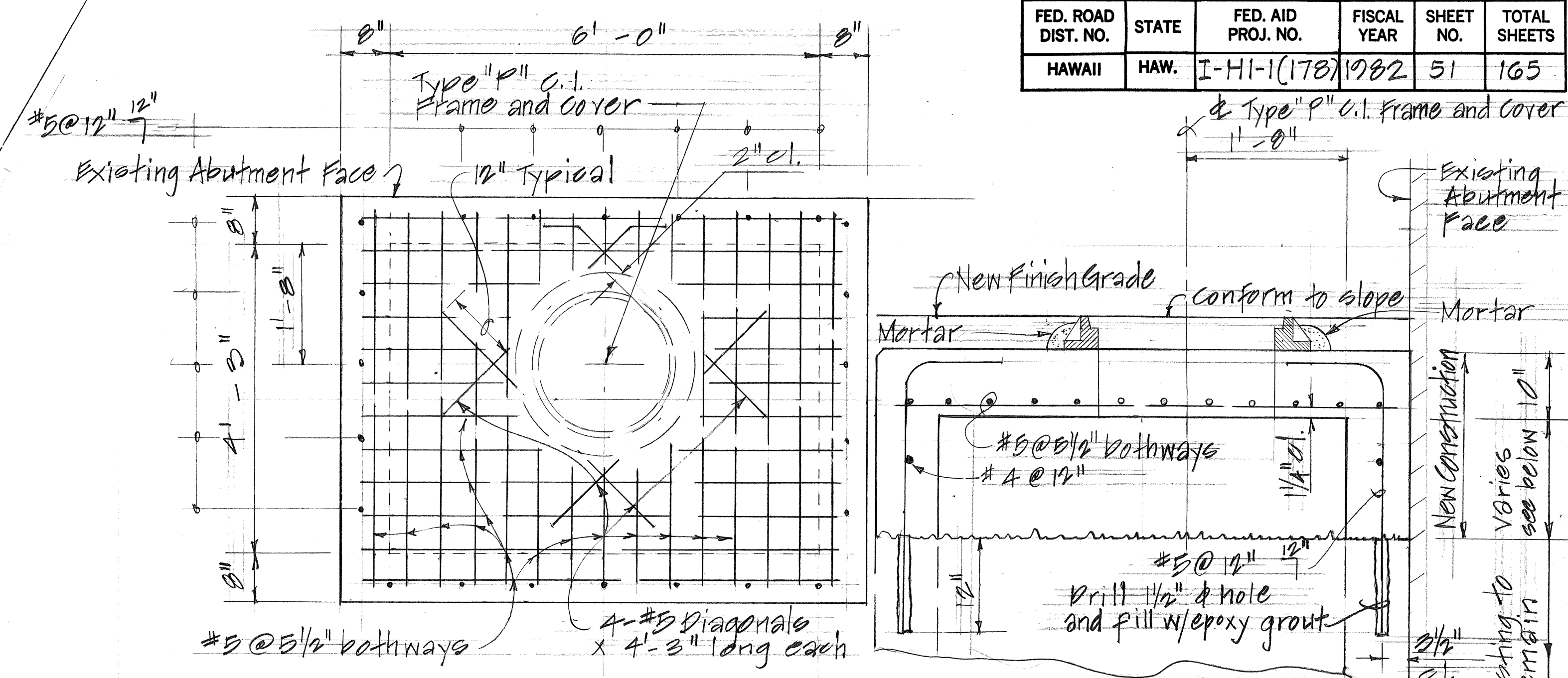
SHEET NO. 18 OF 33 SHEETS

ORIGINAL PLAN	DATE
DESIGNED BY	
NOTED BY	
CHECKED BY	
NO.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	51	165

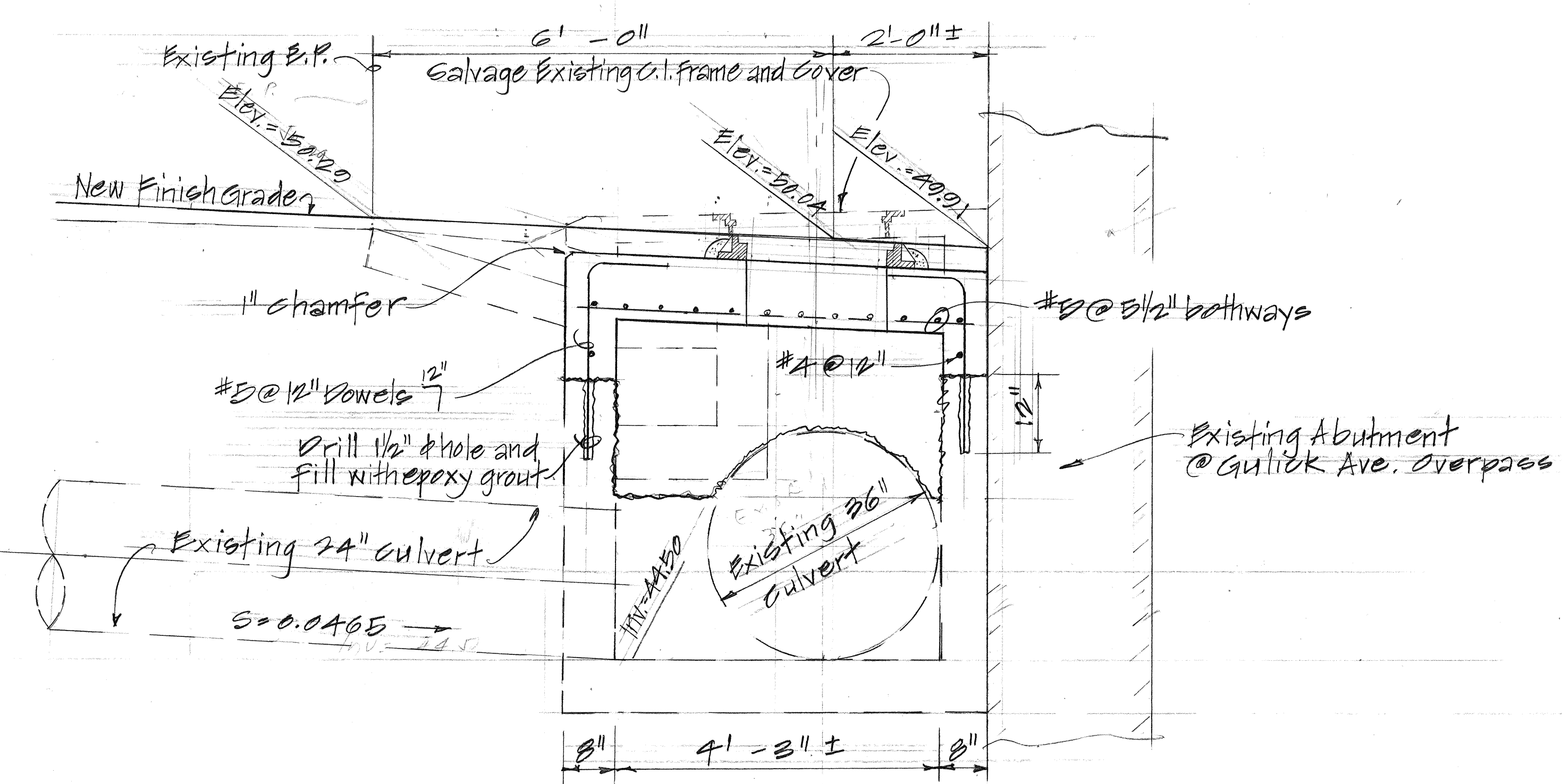


PLAN
Scale: 3/4" = 1'-0"

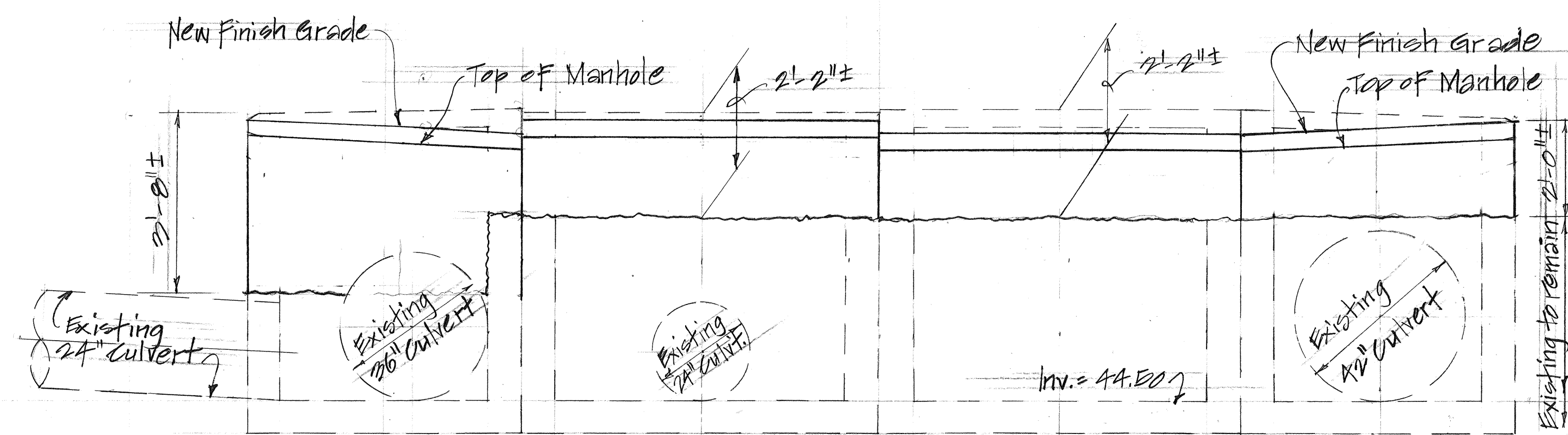


TOP SLAB REINFORCEMENT
Scale: 3/4" = 1'-0"

PARTIAL SECTION VIEW
(SHOWING MODIFICATIONS)
Scale: 1" = 1'-0"



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



LEFT SIDE FRONT SIDE BACK SIDE RIGHT SIDE
RECONSTRUCTED TOP SLAB AND SIDE WALLS
Scale: 1/2" = 1'-0"

DETAILS OF TYPE Y STORM DRAIN MANHOLE AT STA. 35+55 RT.

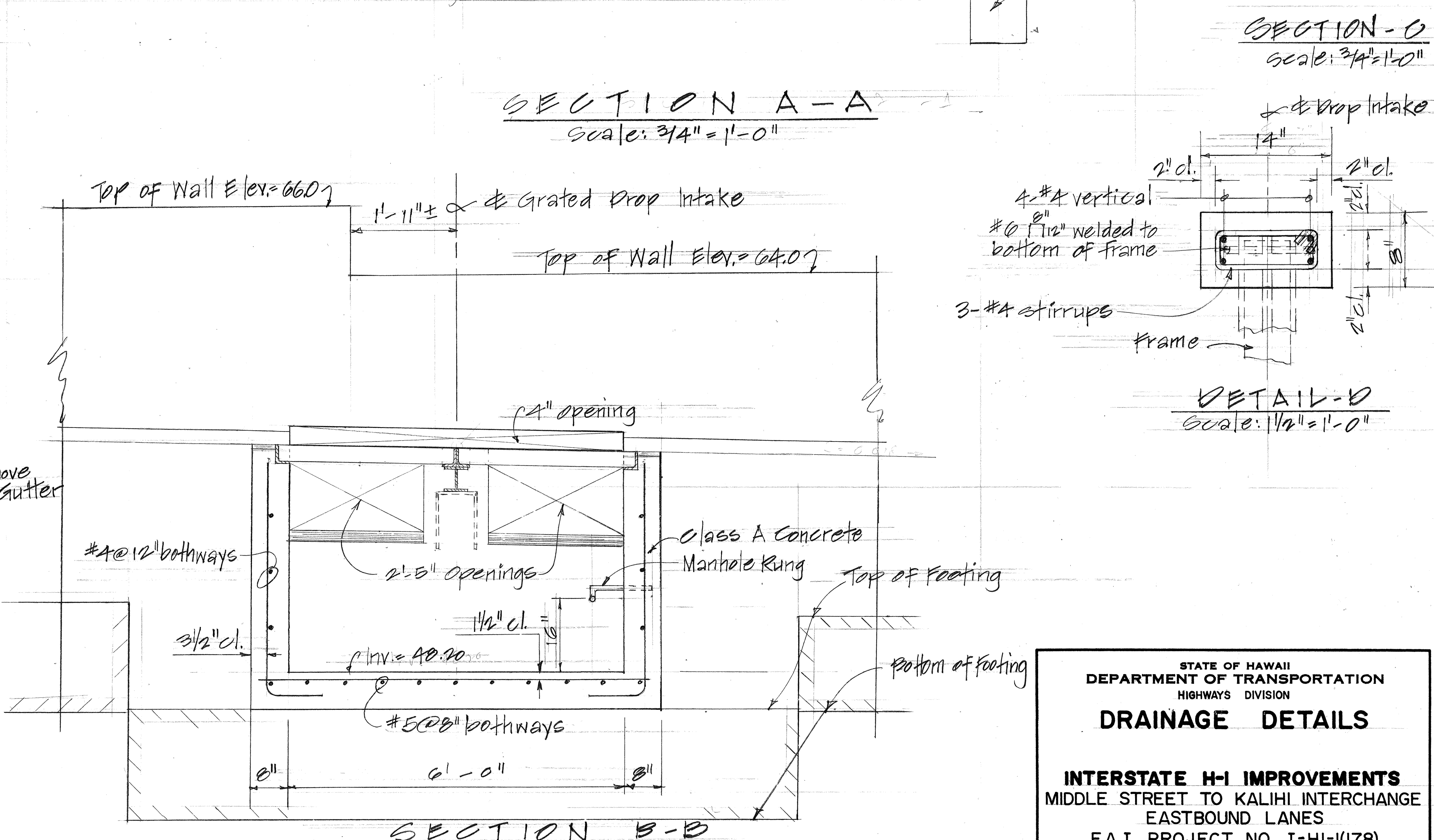
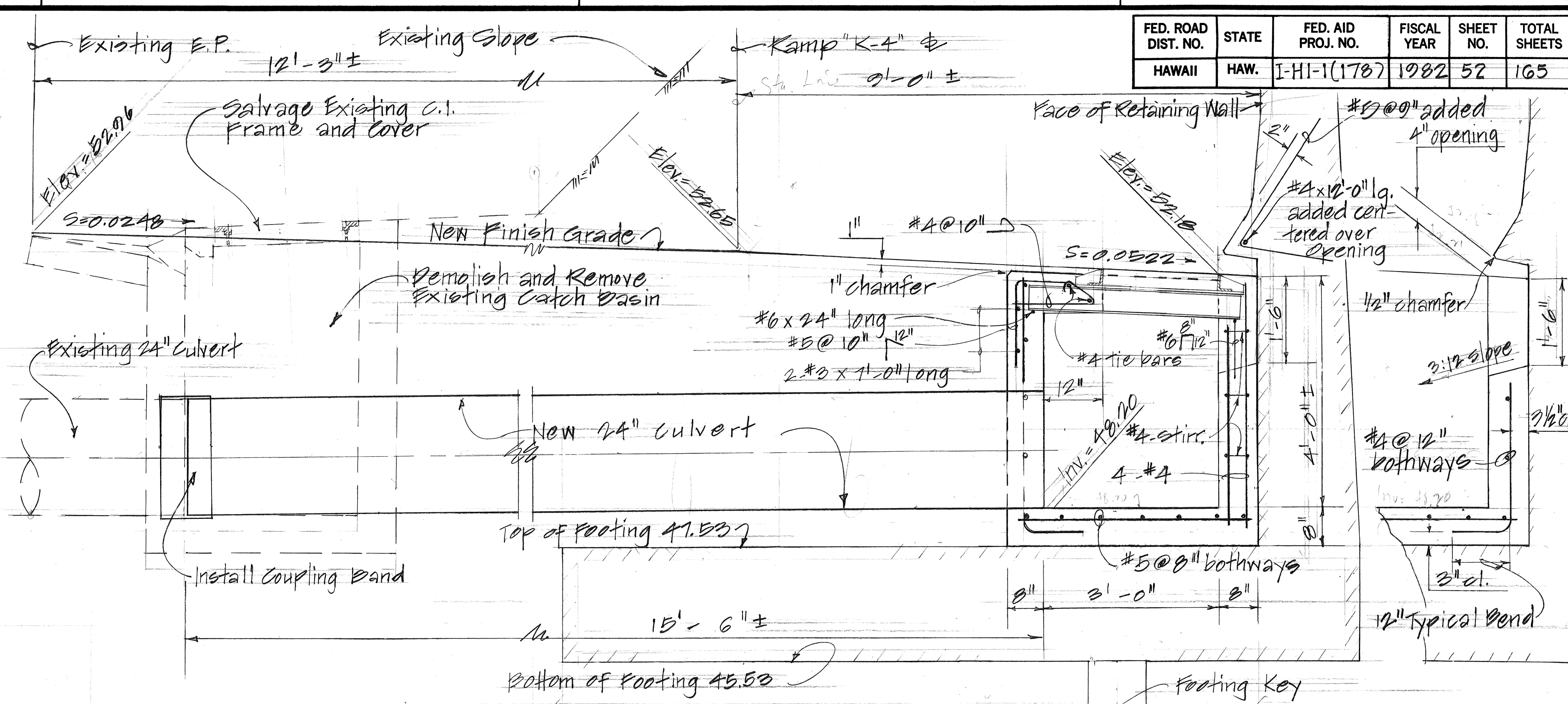
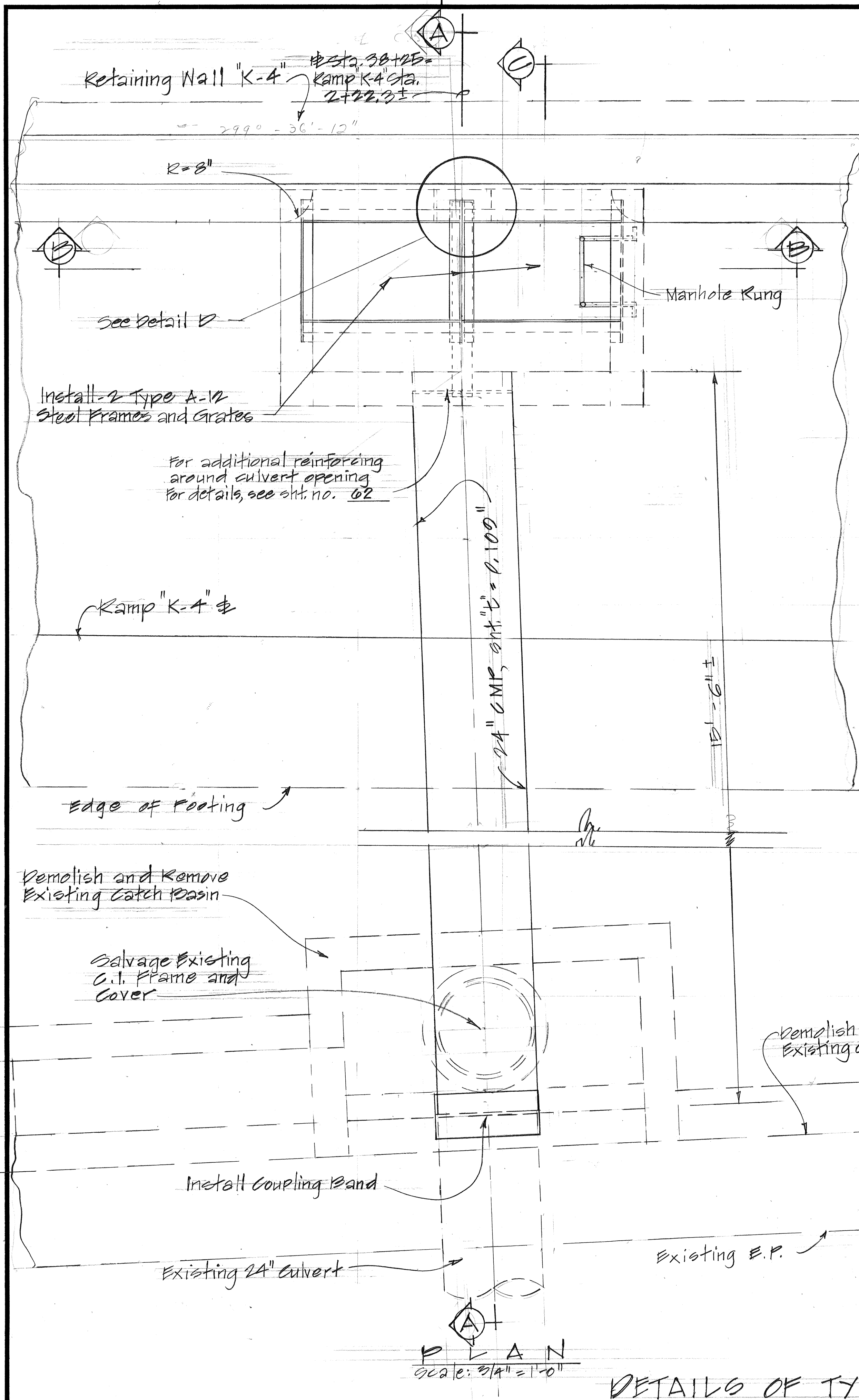
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)
SCALE: AS NOTED
SHEET NO. 19 OF 33 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	52	165



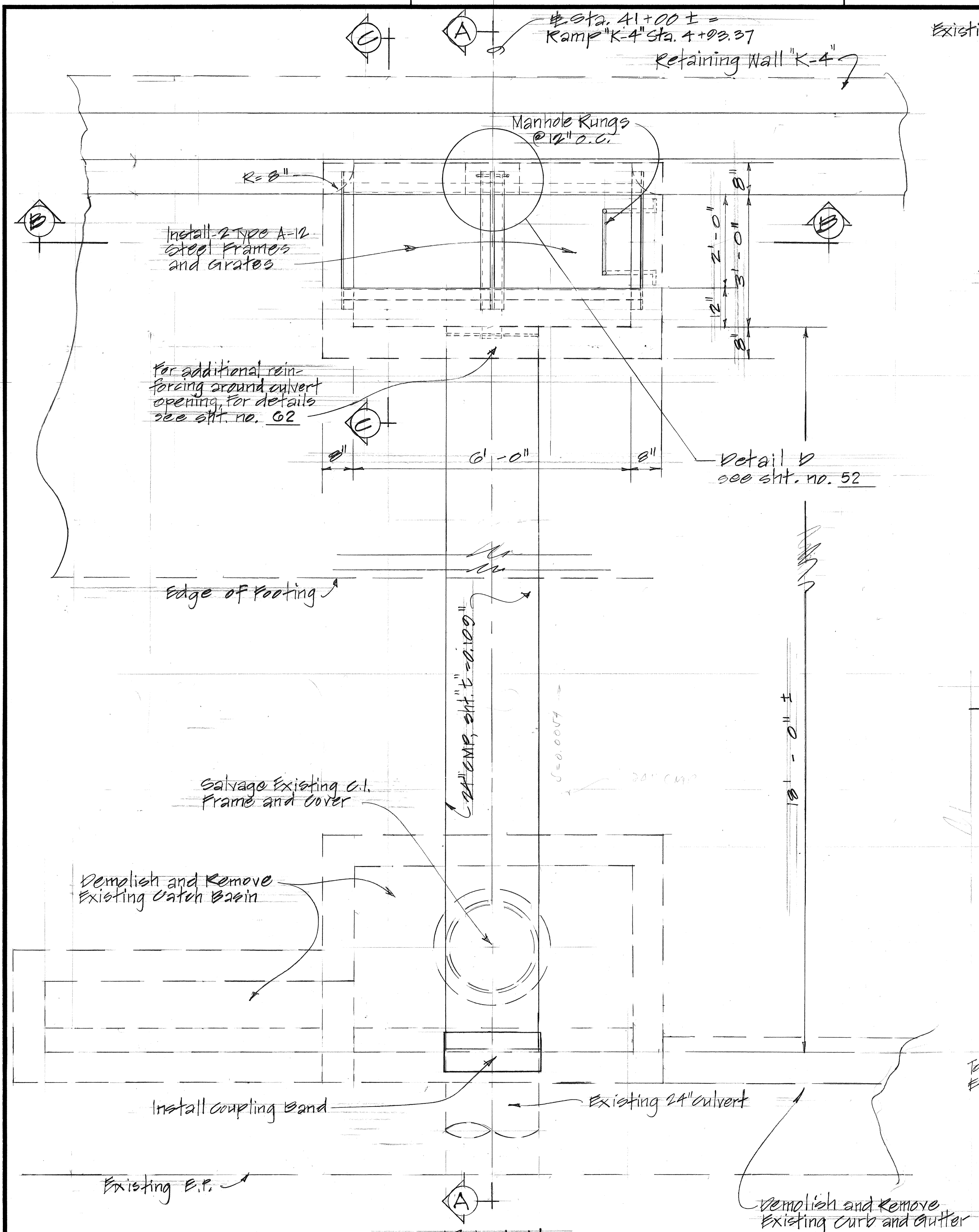
DETAILS OF TYPE 2 GRATED DROP INTAKE AT STA. 38+25 RT.

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

DRAINAGE DETAILS

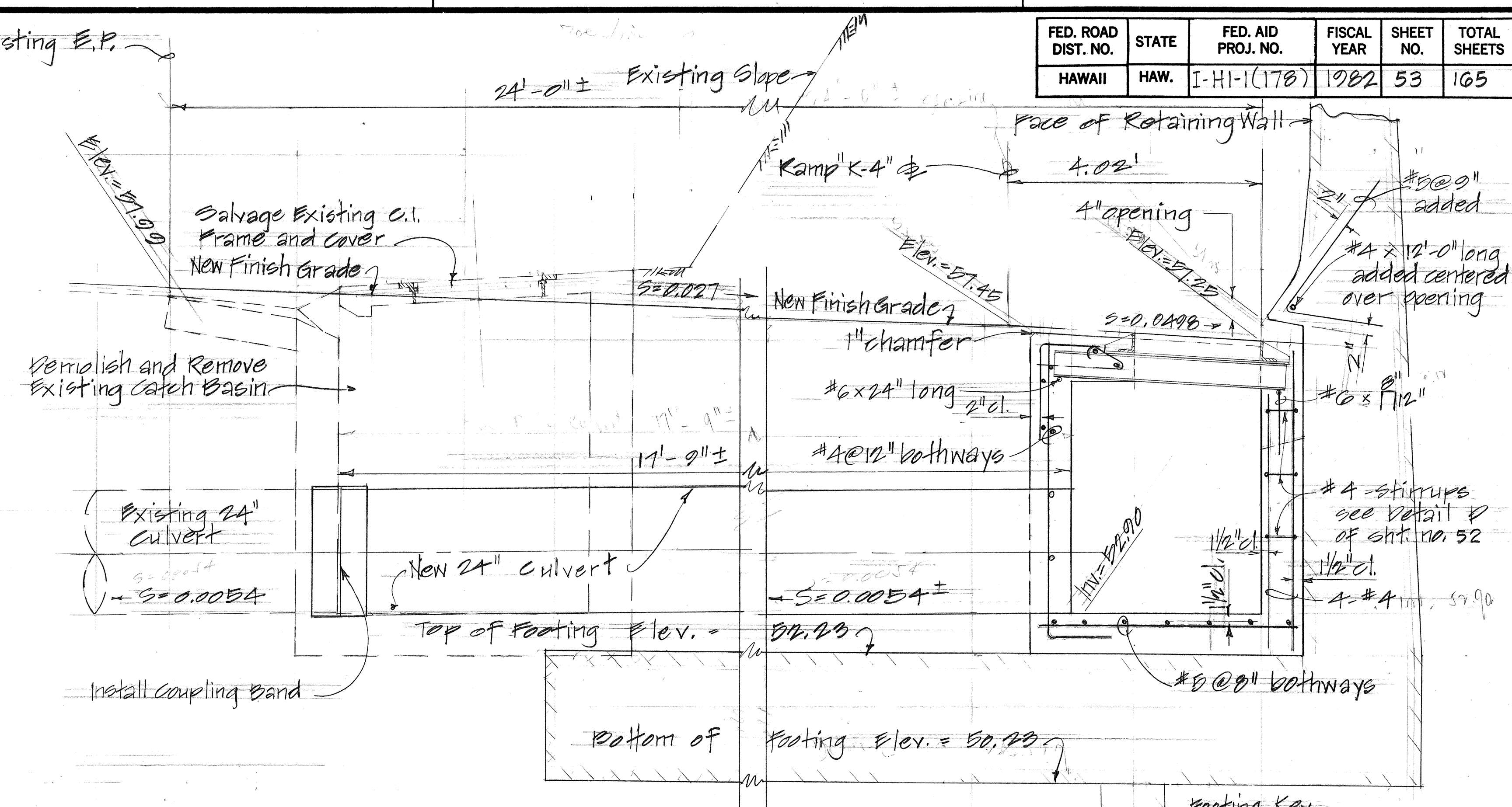
INTERSTATE H-1 IMPROVEMENTS
 MIDDLE STREET TO KALIHI INTERCHANGE
 EASTBOUND LANES
 F.A.I. PROJECT NO. I-HI-1(178)
 SCALE: AS NOTED
 SHEET NO. 20 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	53	165

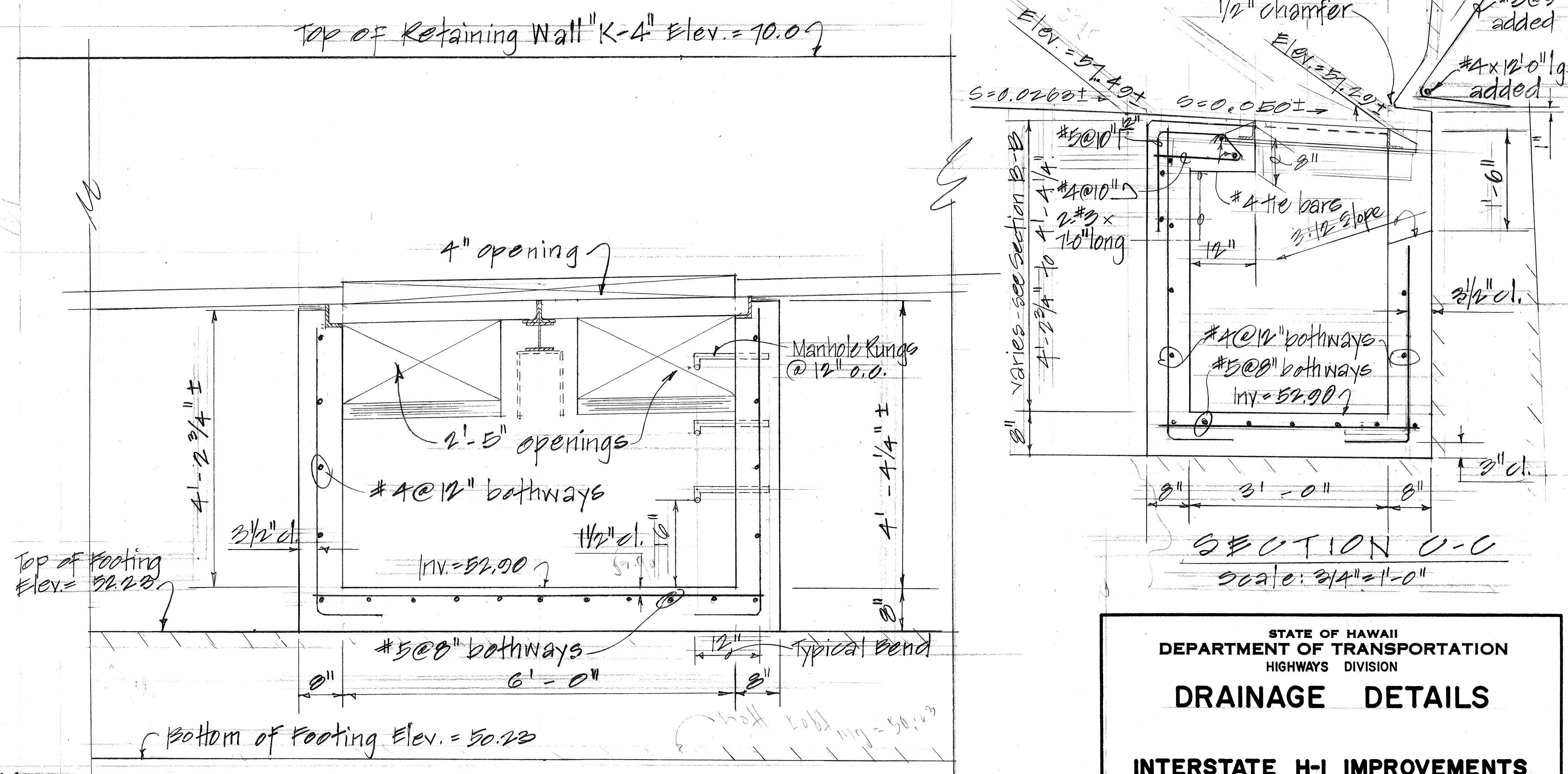


PLAN
Scale: 3/4" = 1'-0"

DETAILS OF TYPE 2 GRATED DROP INTAKE AT STA. 41+00 RT.



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



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

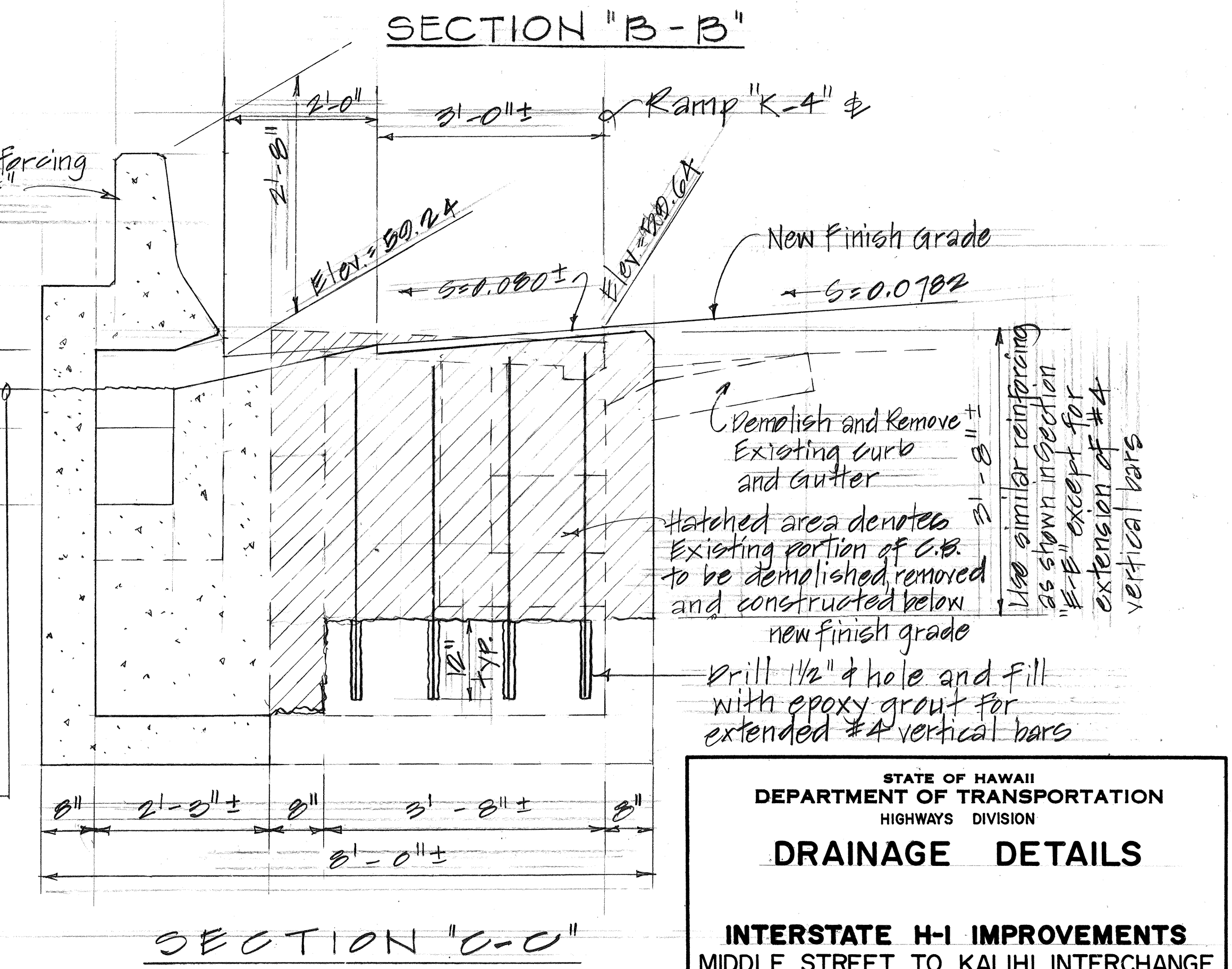
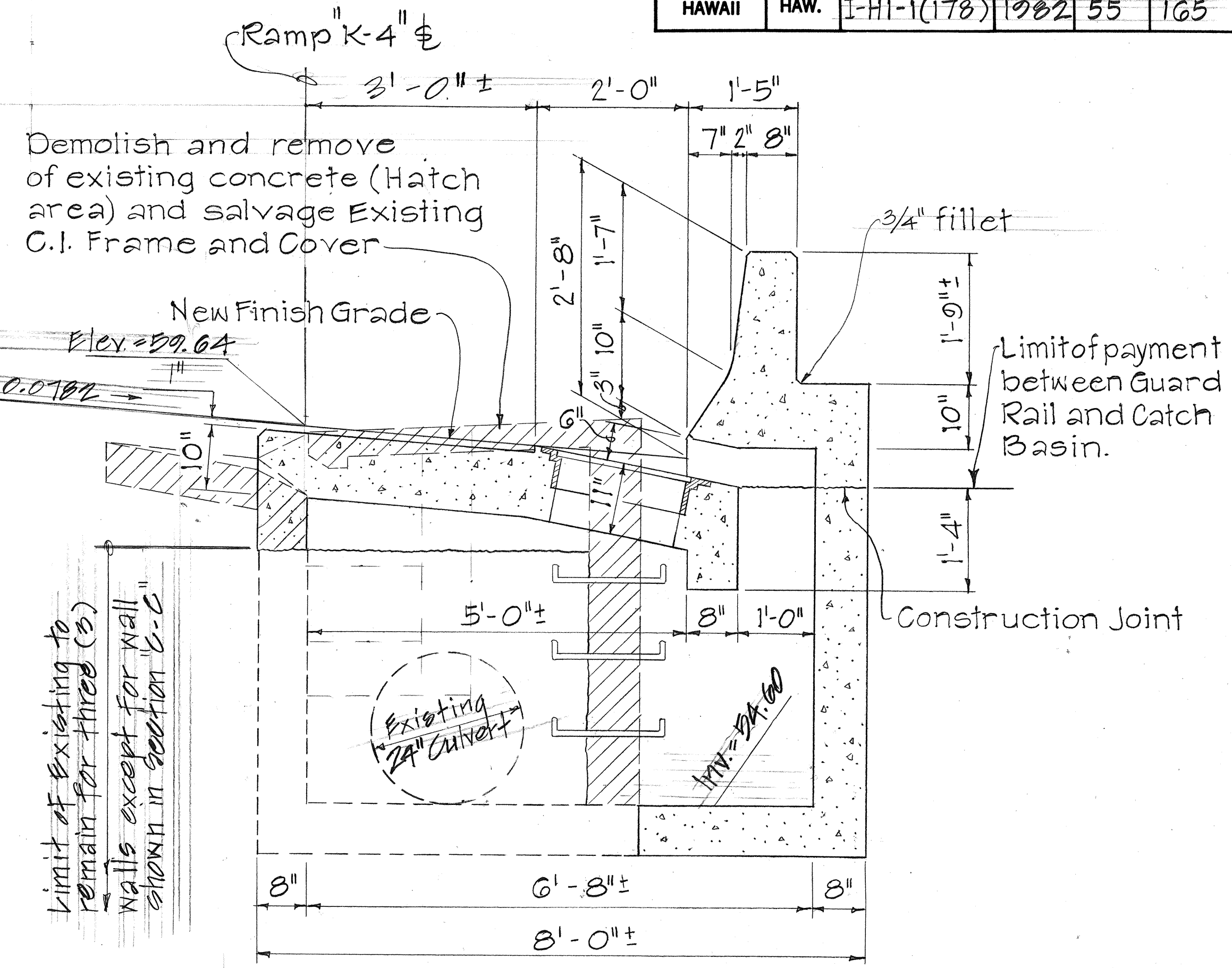
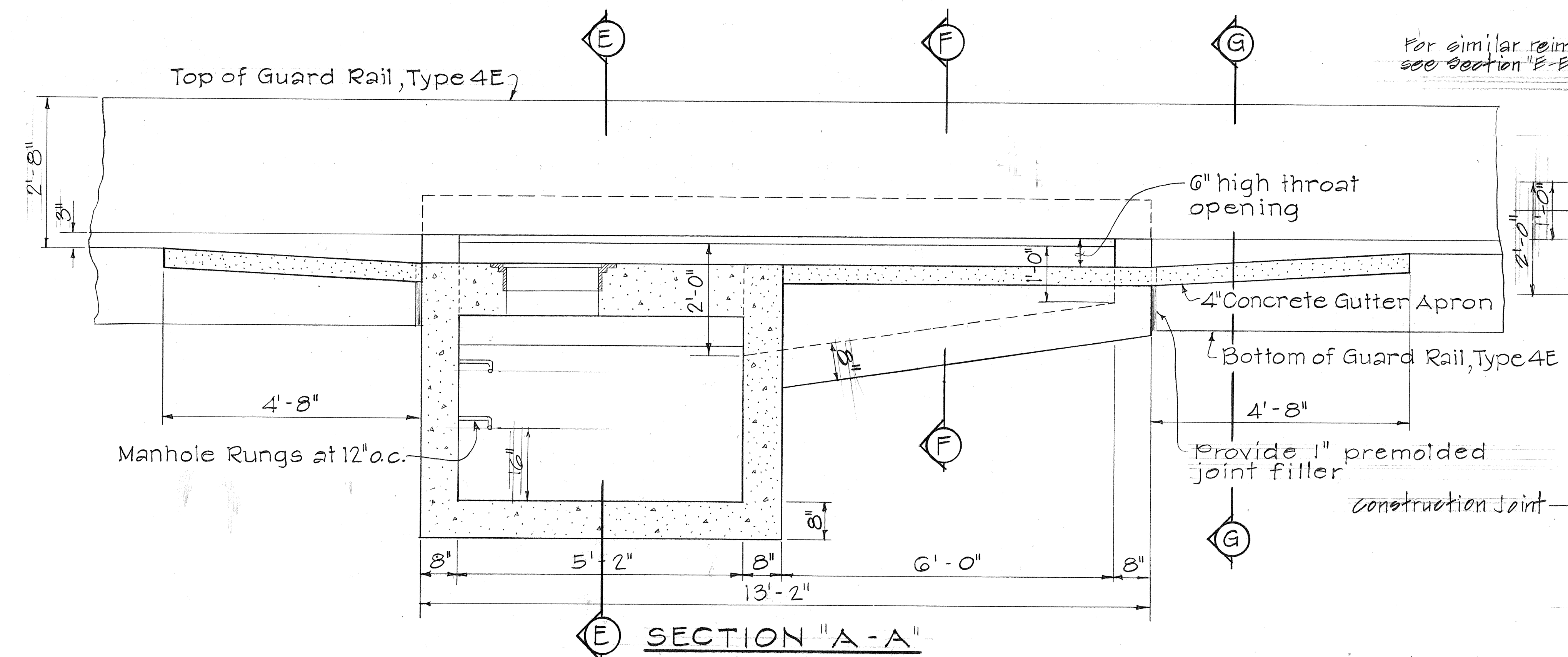
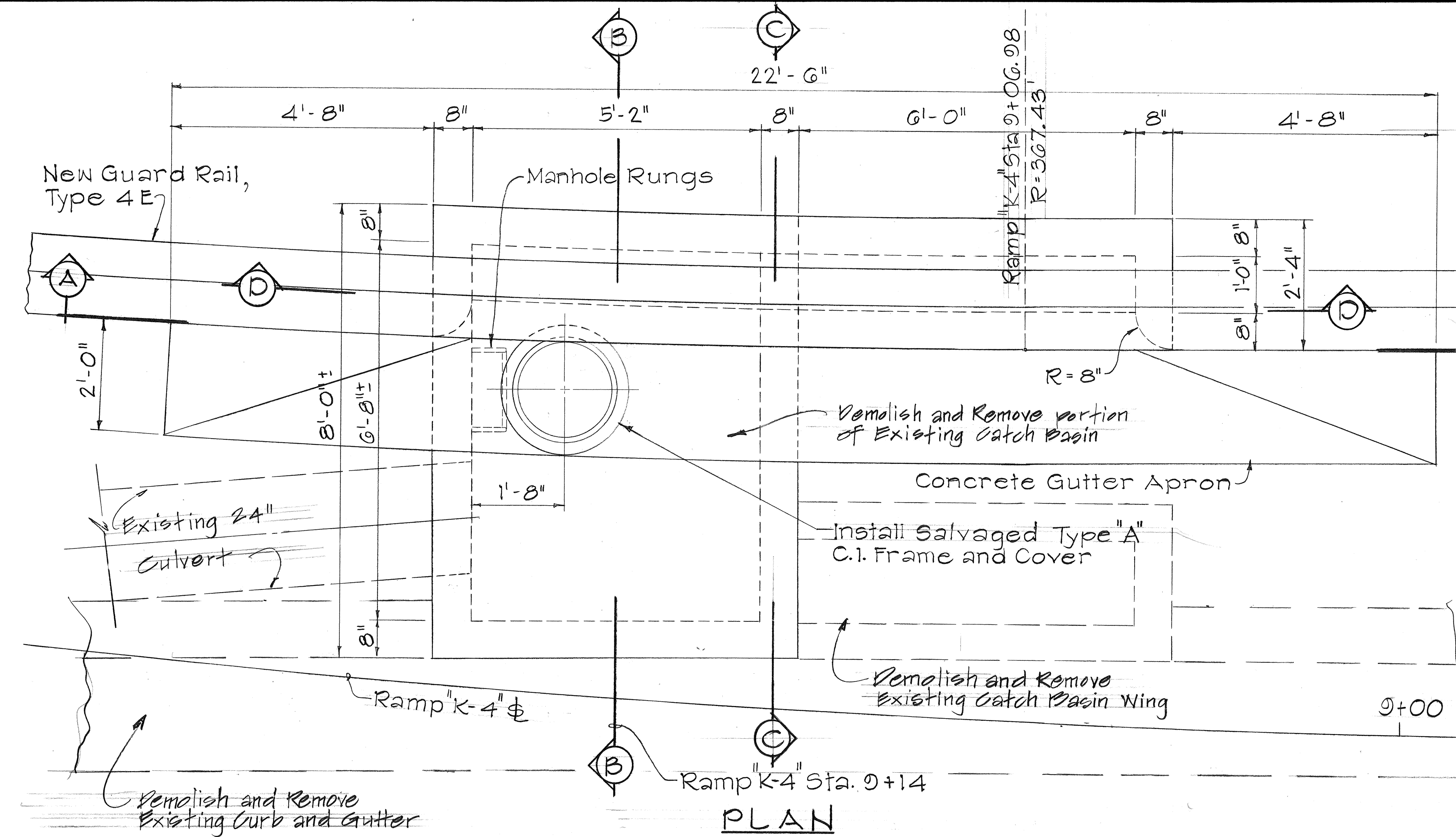
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)
SCALE: AS NOTED
SHEET NO. 21 OF 33 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	55	165



DETAILS OF MODIFIED TYPE "C" CATCH BASIN AT RAMP "K-4" STA. 9+14
 Scale: 3/4" = 1'-0"

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

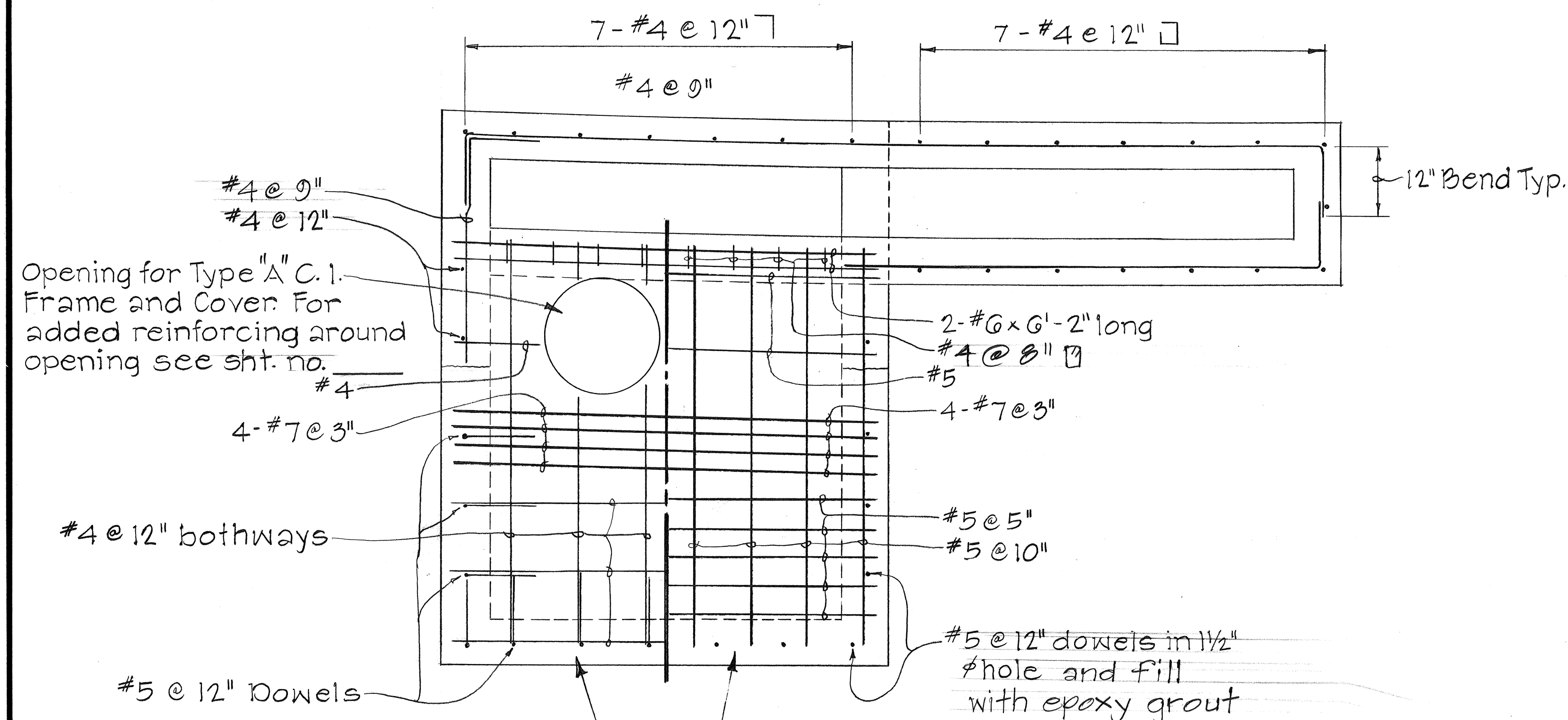
DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
 MIDDLE STREET TO KALIHI INTERCHANGE
 EASTBOUND LANES
 F.A.I. PROJECT NO. I-HI-1(178)

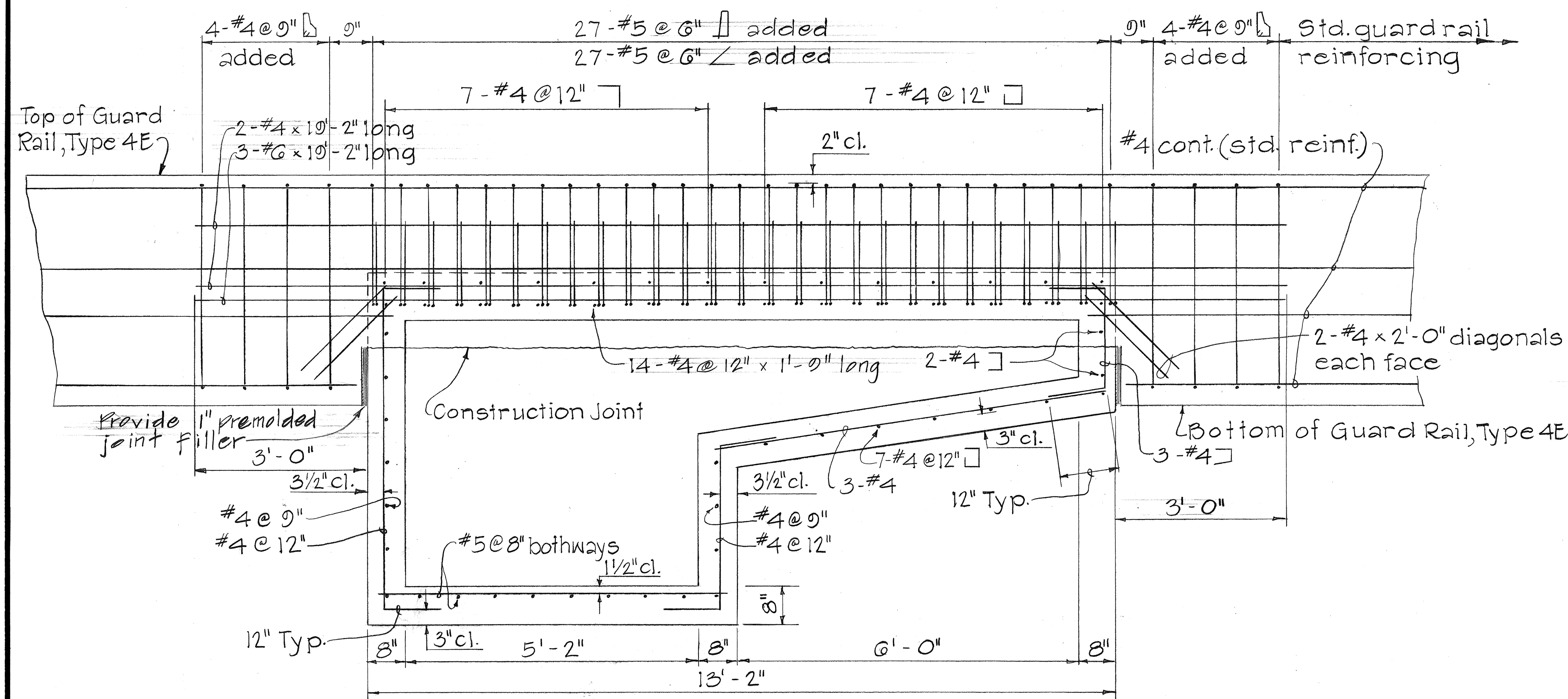
SCALE: AS NOTED
 SHEET NO. 22 OF 33 SHEETS

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

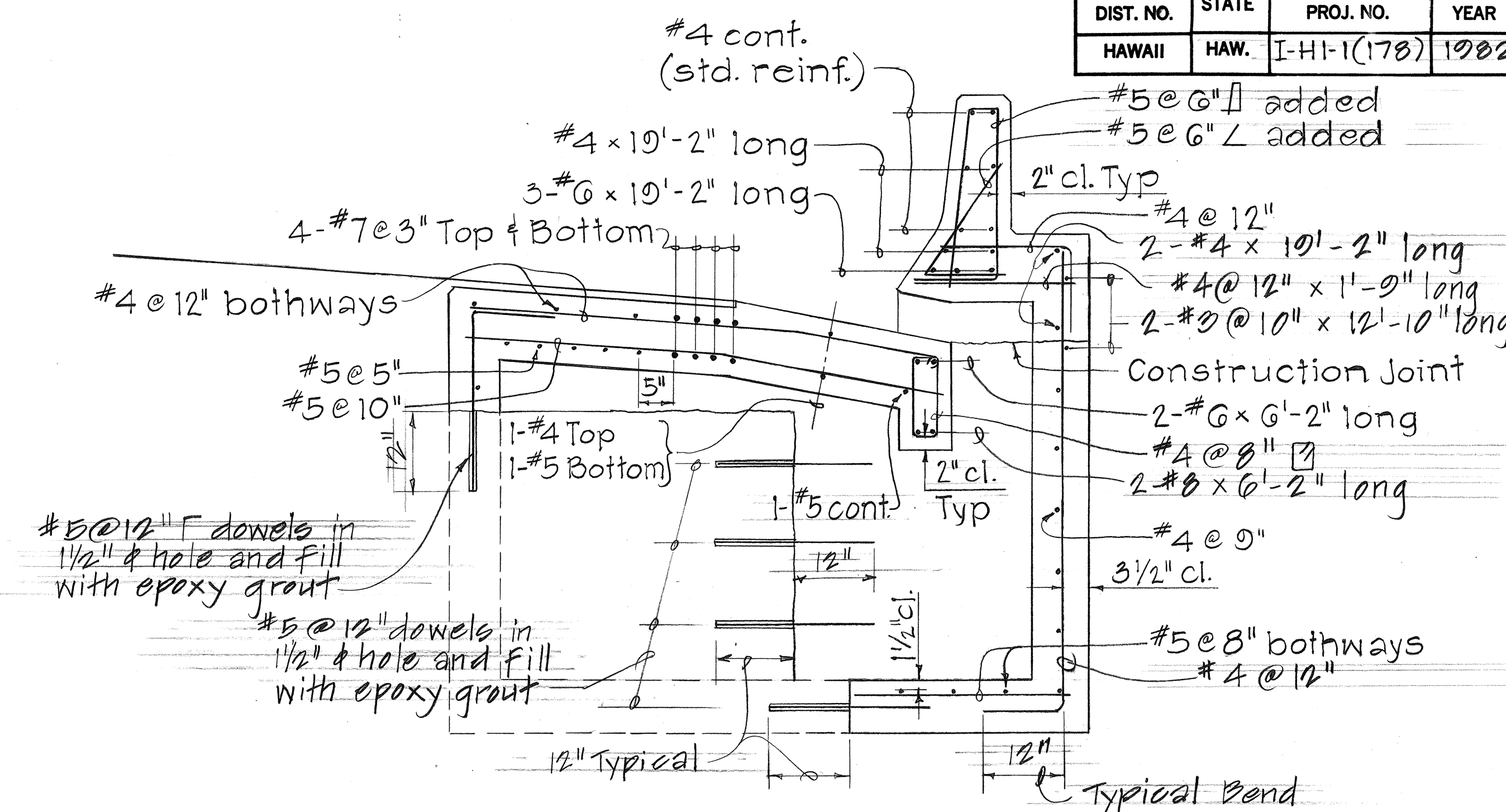
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	54	165



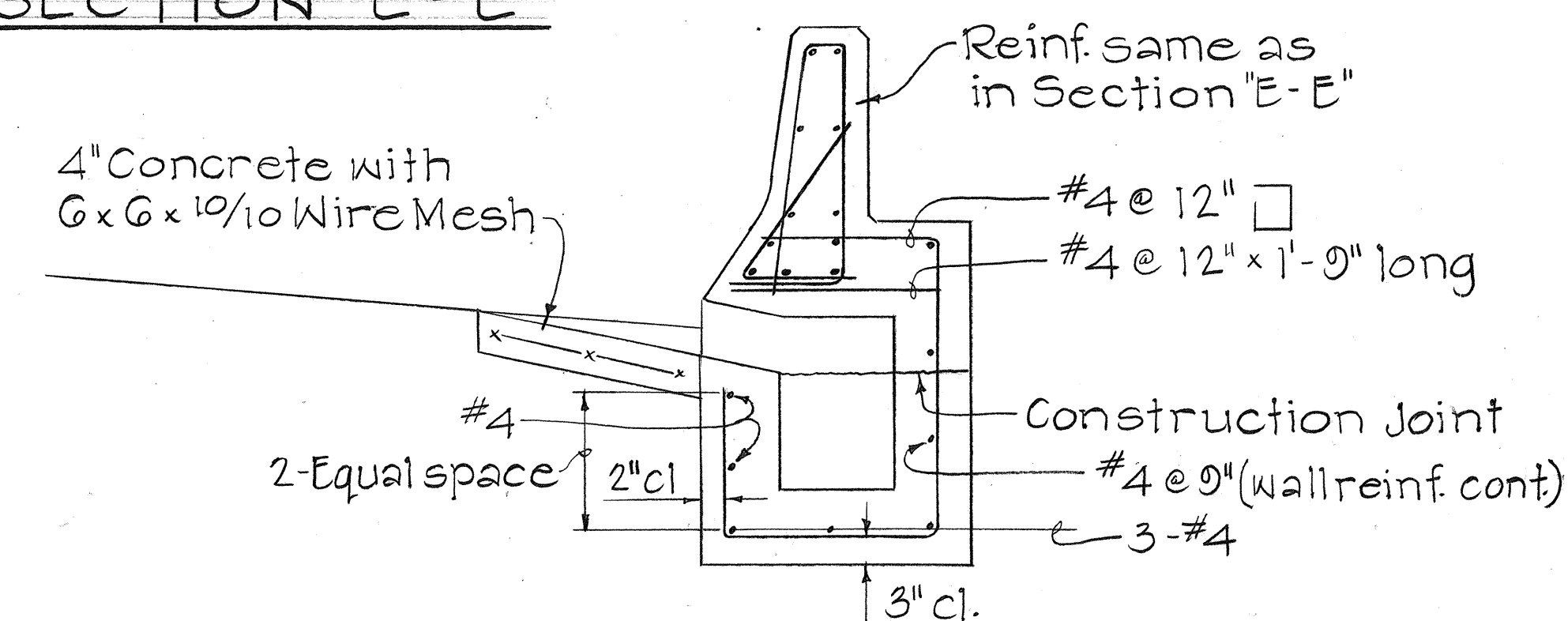
REINFORCING TOP LAYER
REINFORCING BOTTOM LAYER
PLAN VIEW OF REINFORCING STEEL



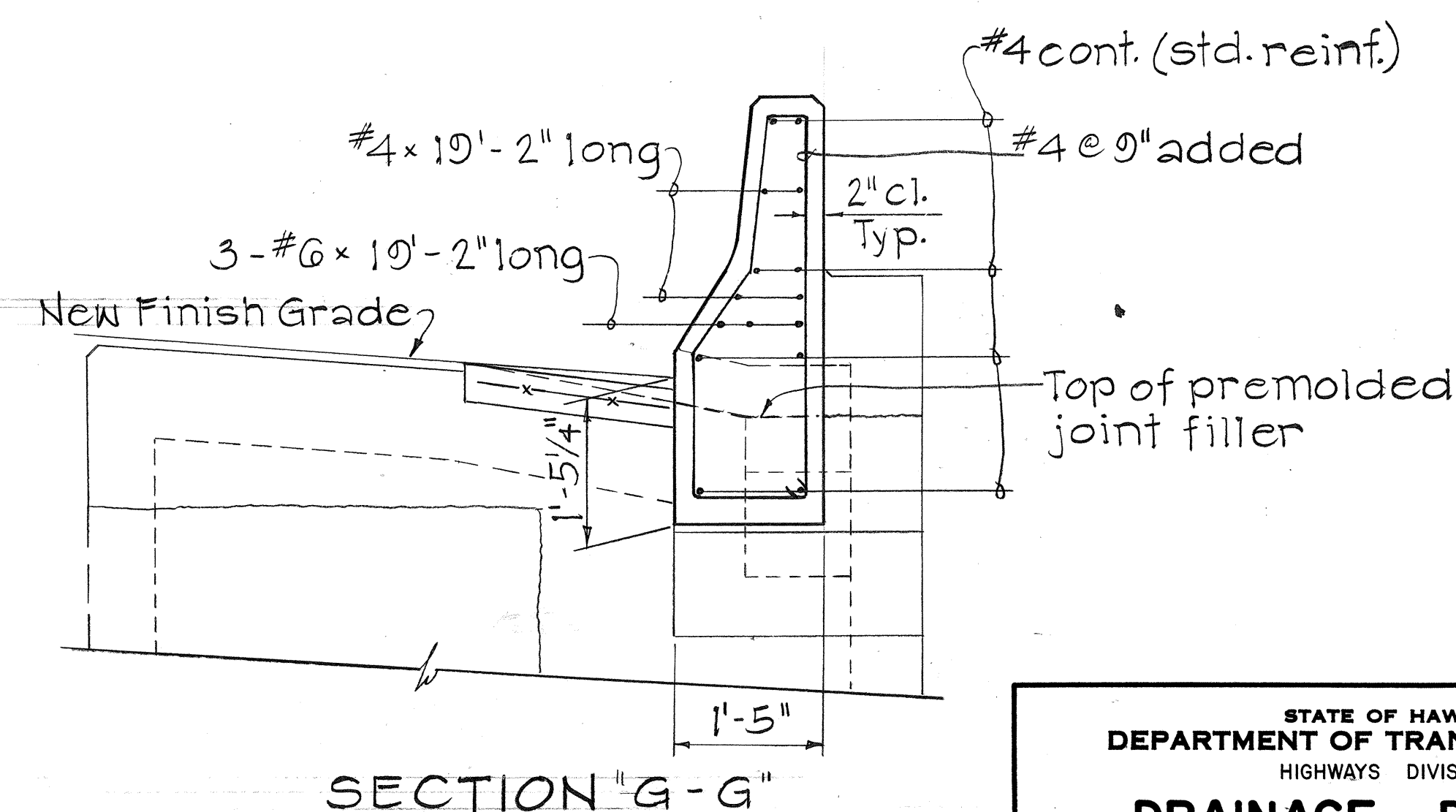
SECTION "D-D"



SECTION "E-E"



SECTION "F-F"



SECTION "G-G"

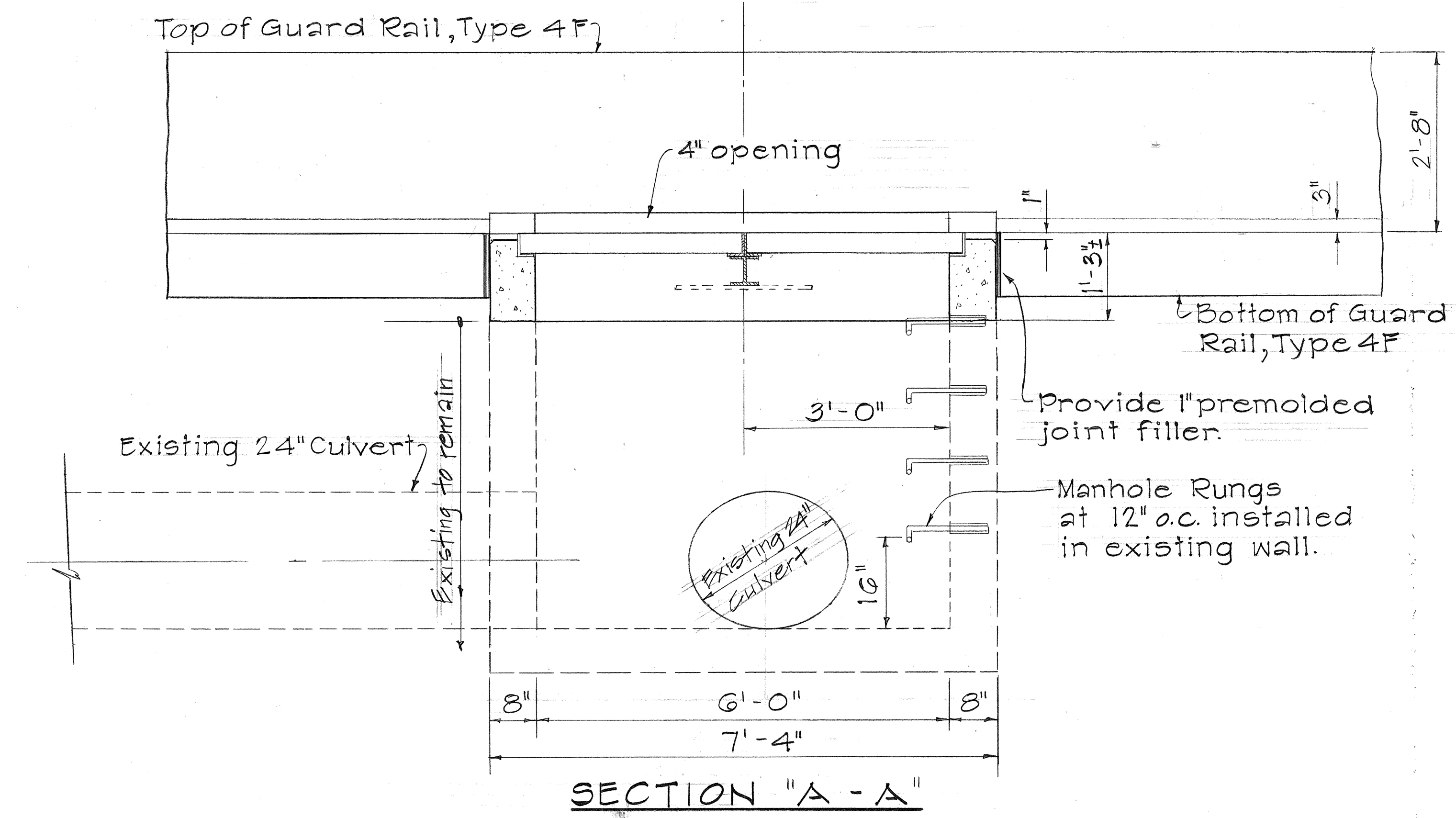
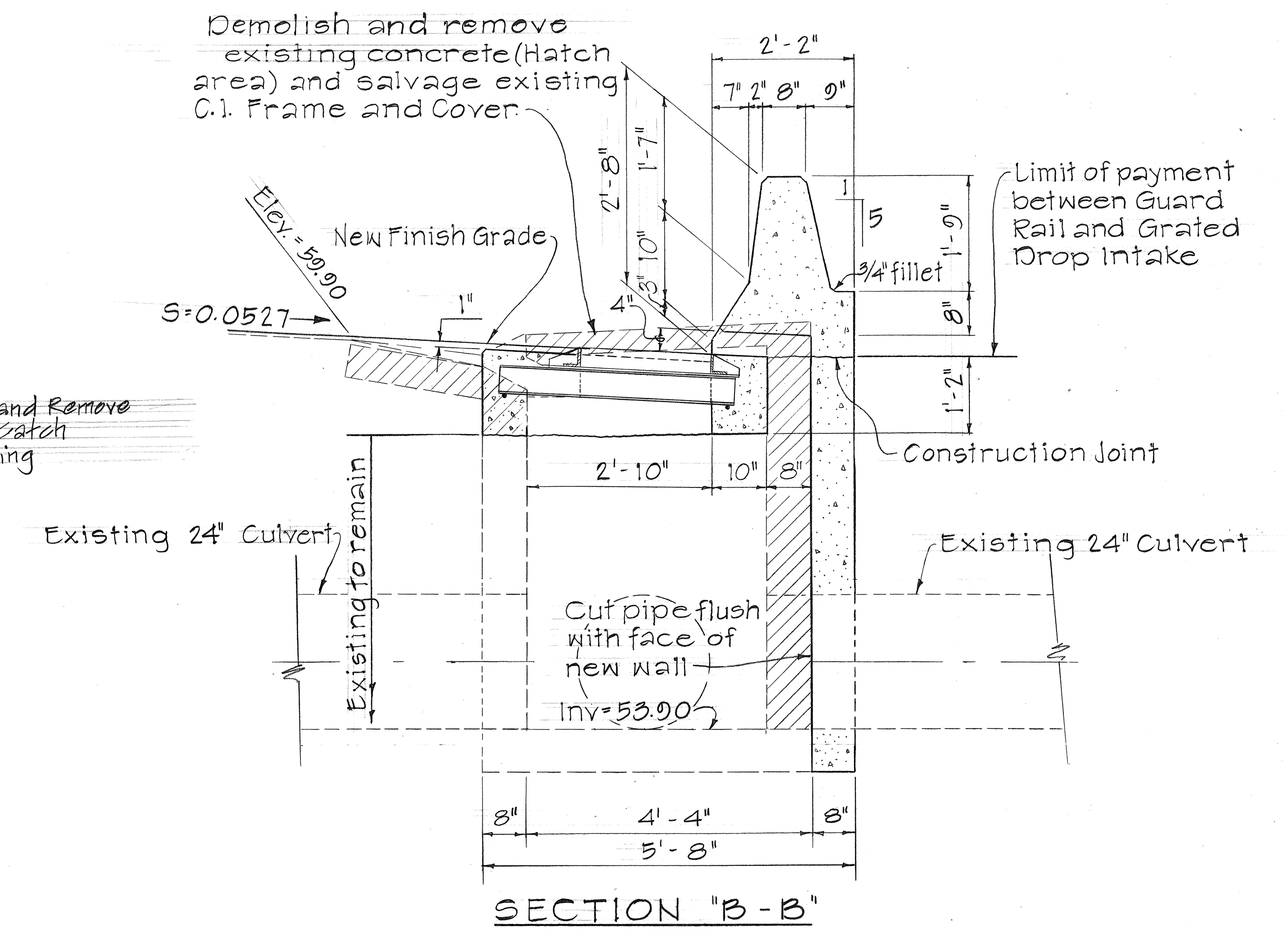
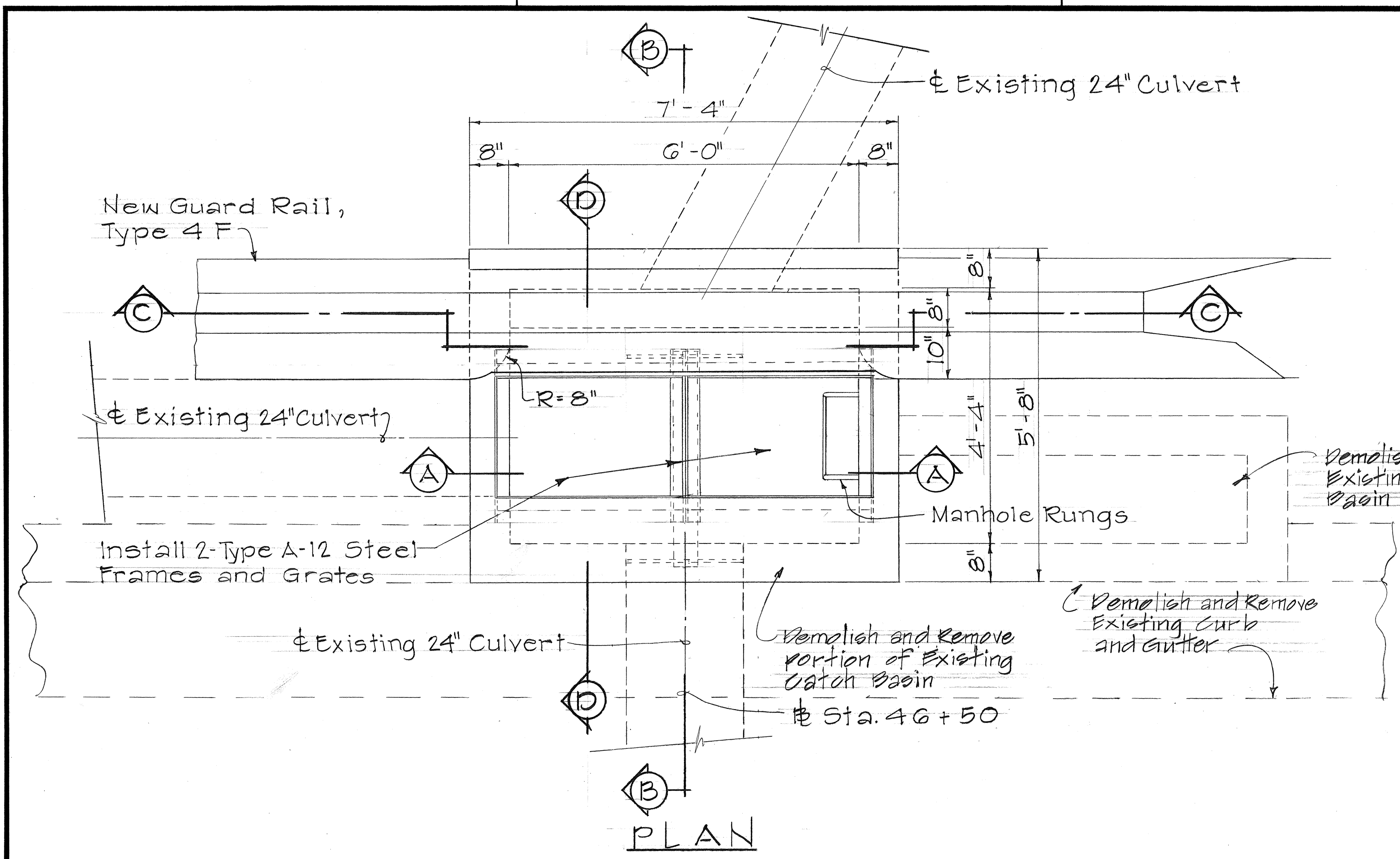
DETAILS OF MODIFIED TYPE "C" CATCH BASIN AT RAMP "K-4" STA. 0+14
Scale: 3/4" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)
SCALE: AS NOTED
SHEET NO. 23 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	56	105



DETAILS OF MODIFIED TYPE 2 GRATED DROP INTAKE AT STA. 46+50 RT.
 Scale: 3/4" = 1'-0"

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

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

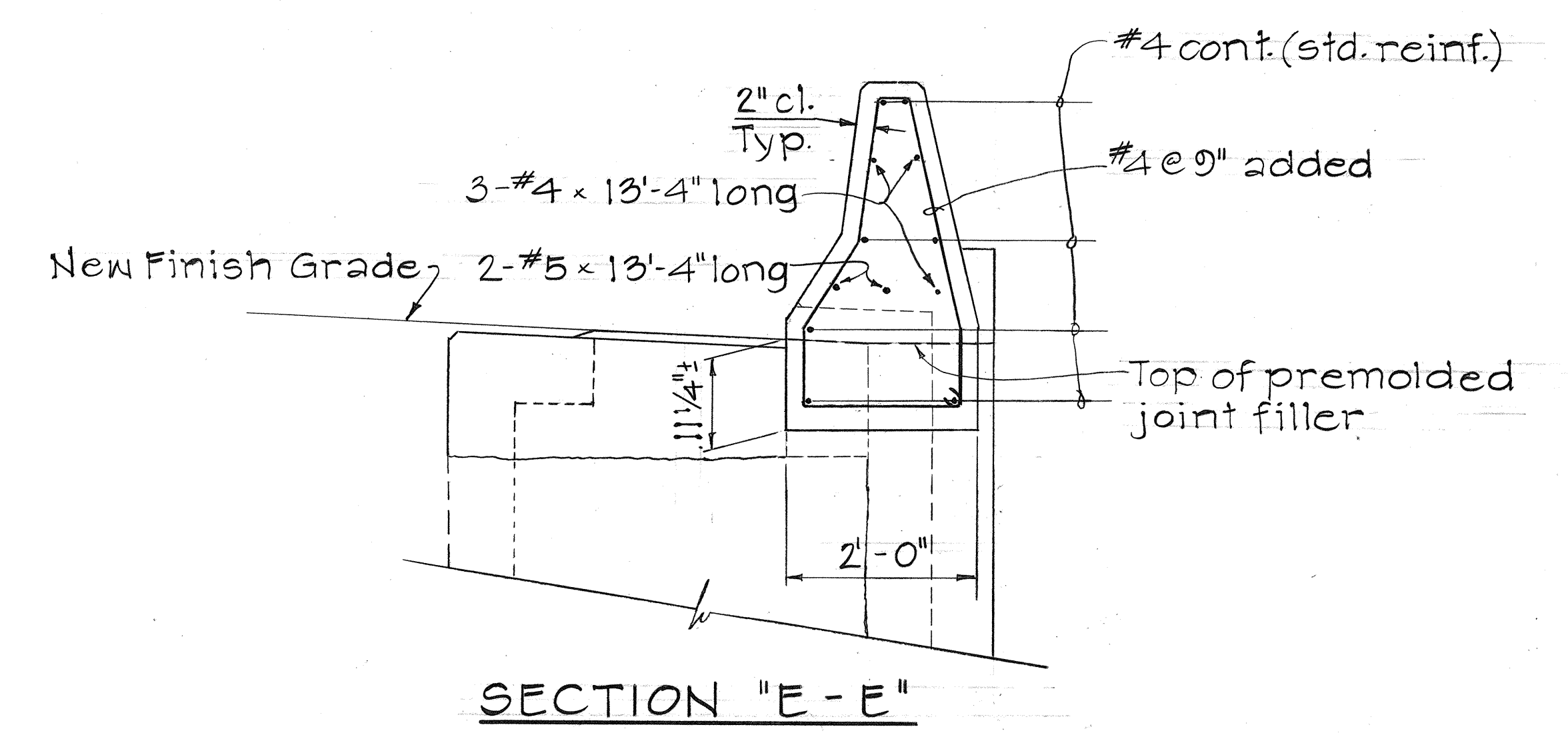
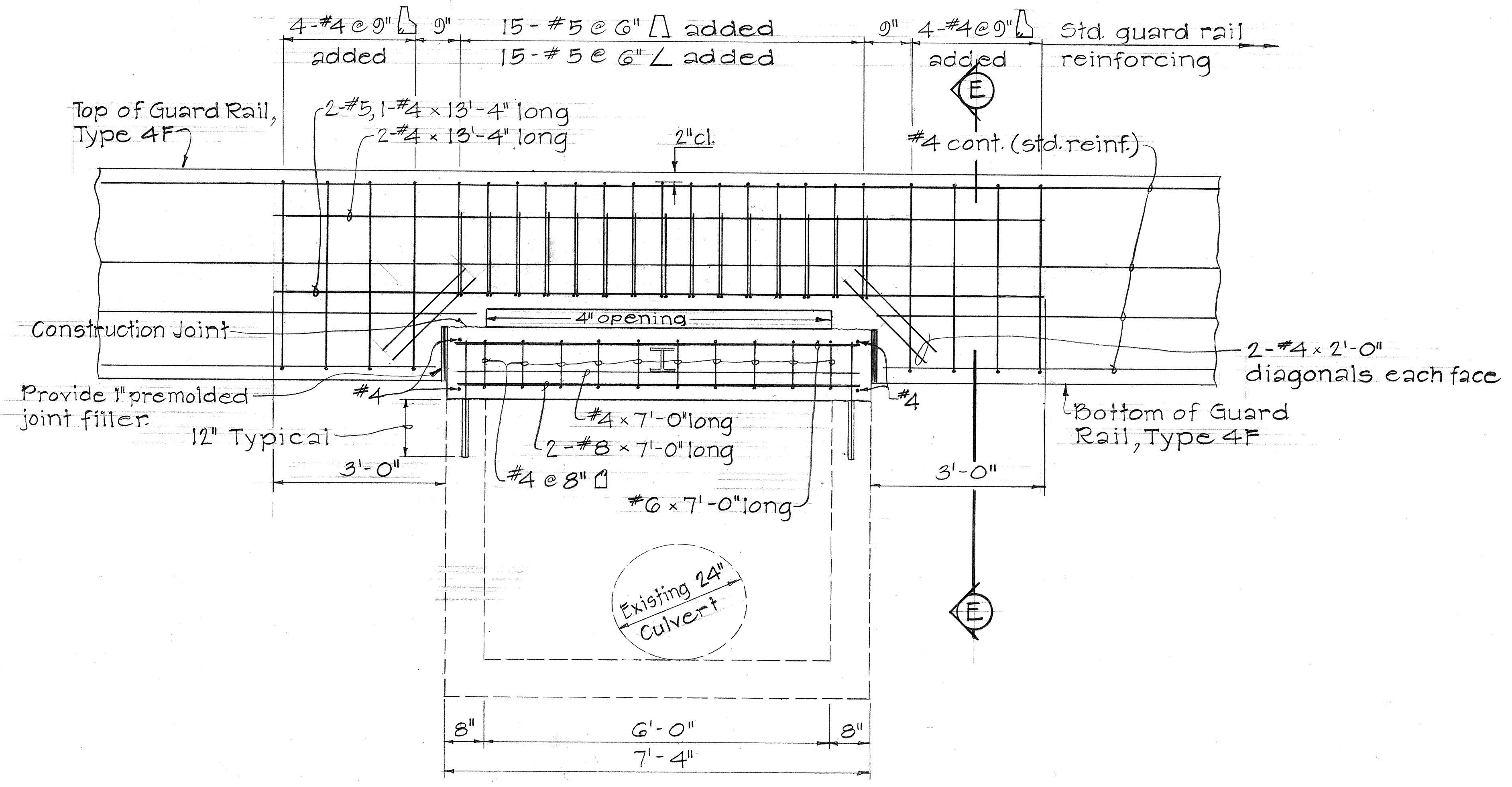
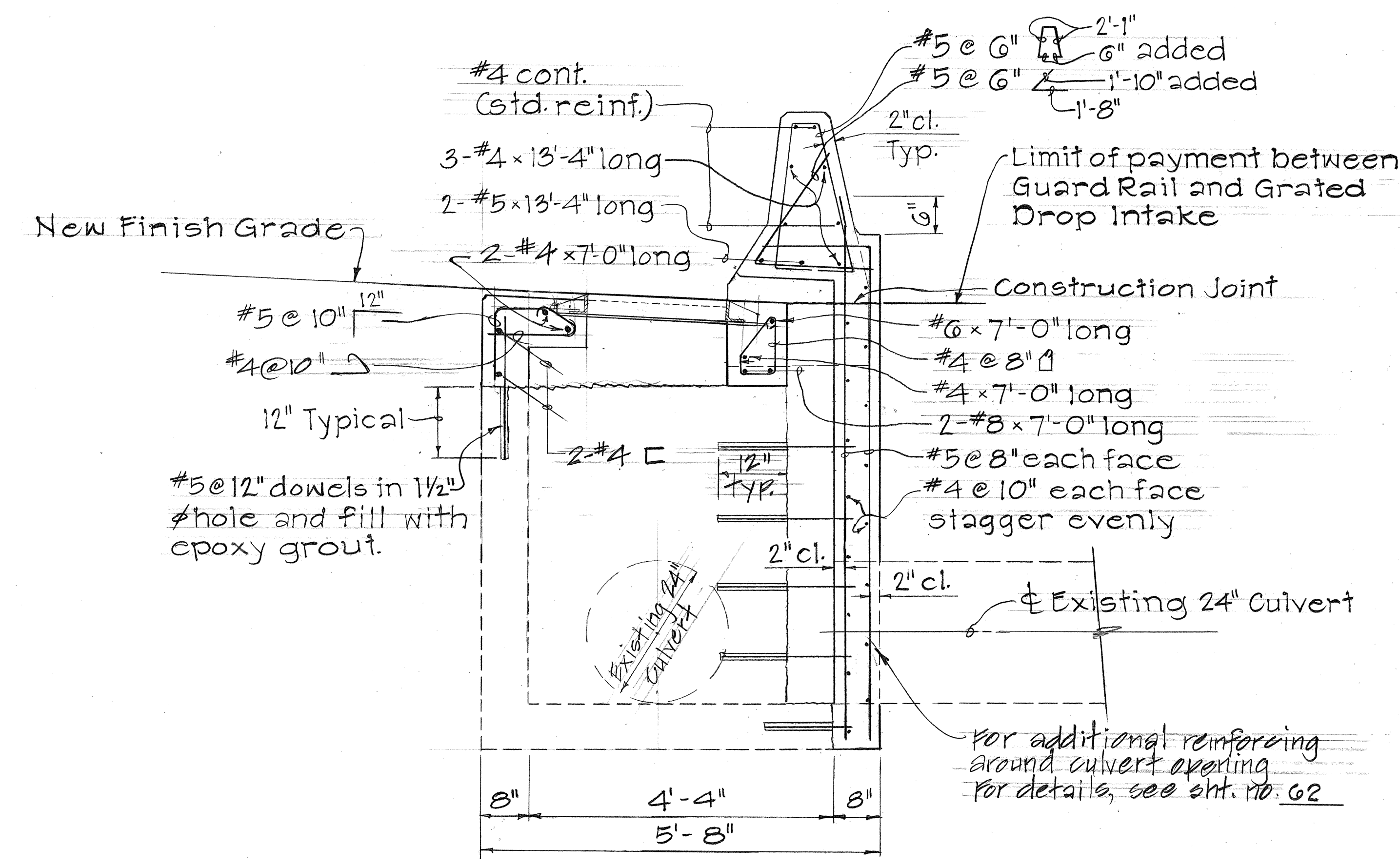
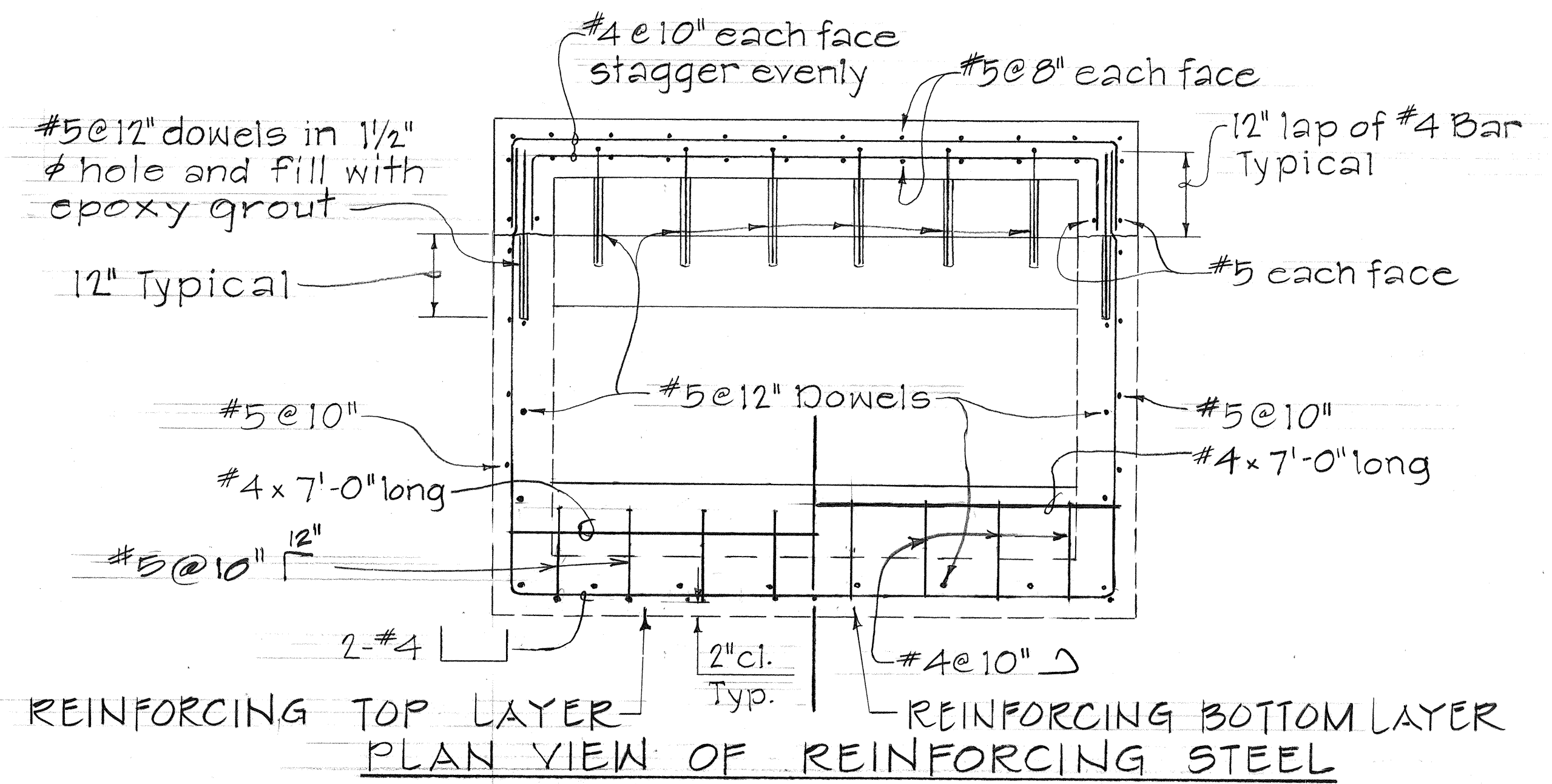
DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
 MIDDLE STREET TO KALIHI INTERCHANGE
 EASTBOUND LANES
 F.A.I. PROJECT NO. I-HI-1(178)

SCALE: AS NOTED

SHEET No. 24 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	57	165



DETAILS OF MODIFIED TYPE 2 GRATED DROP INTAKE AT STA. 46+50 RT.
Scale: 3/4" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

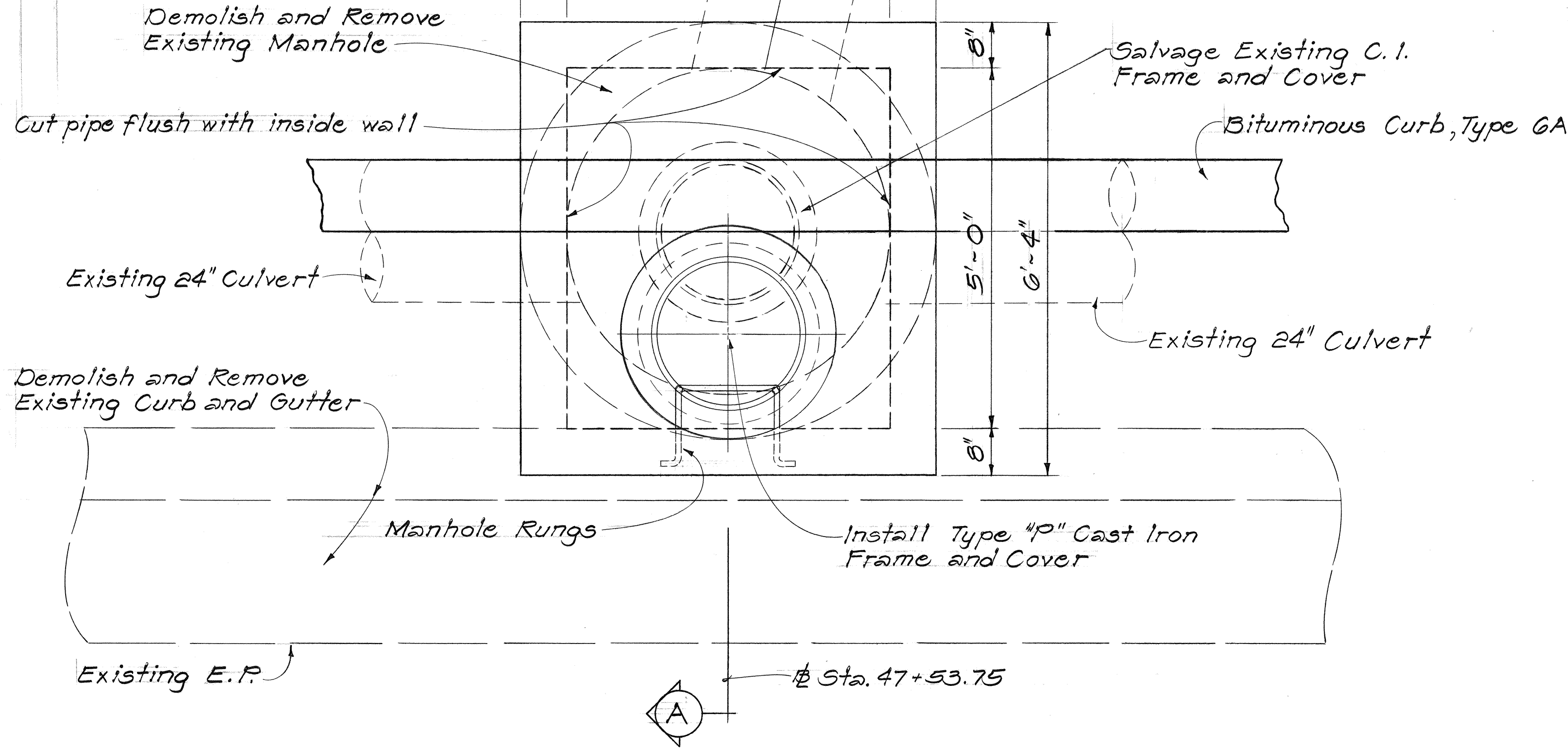
DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)
SCALE: AS NOTED
SHEET NO. 25 OF 33 SHEETS

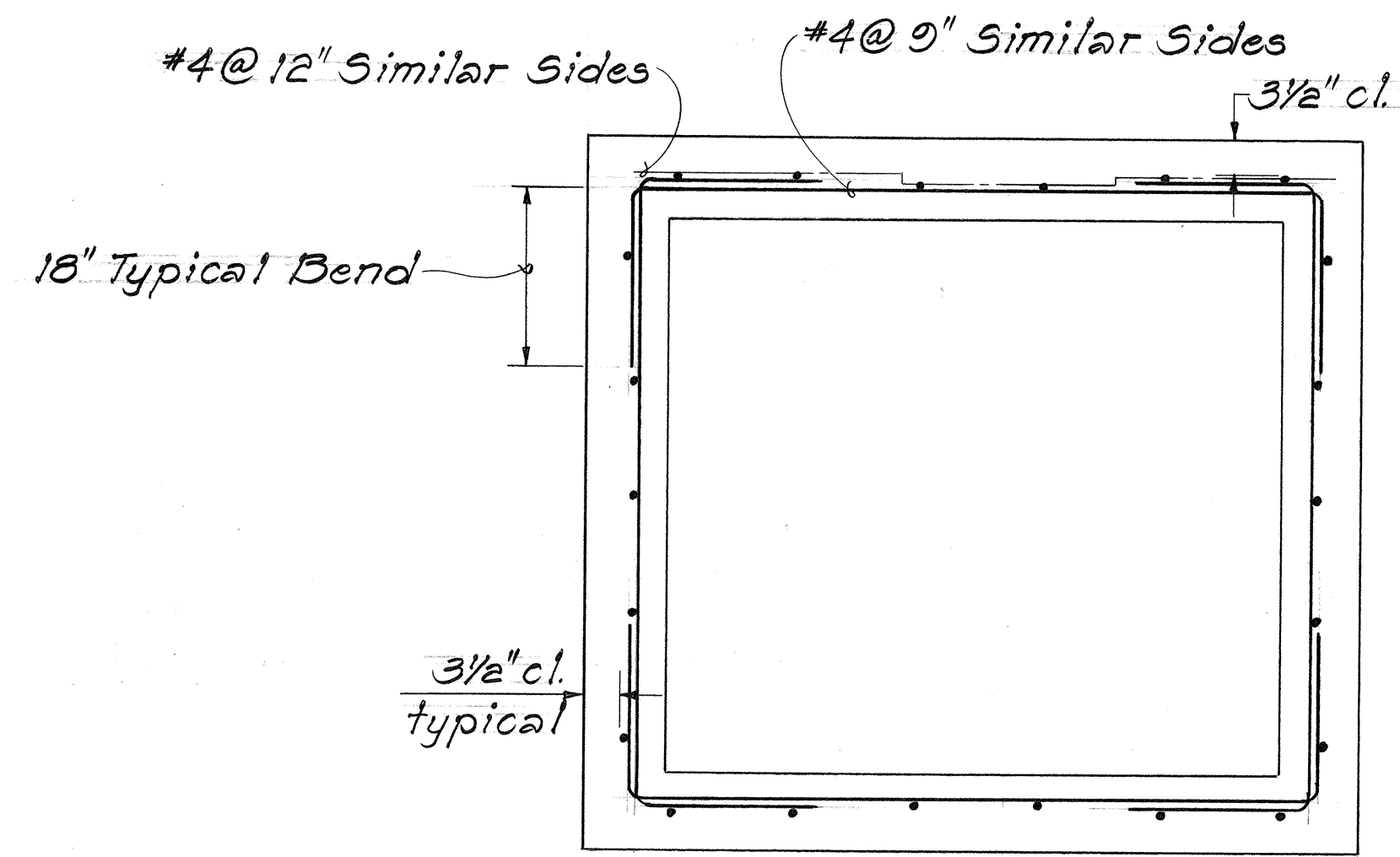
DATE	_____
SURVEY PLOTTED BY	_____
DRAWN BY	_____
DESIGNED BY	_____
QUANTITIES BY	_____
CHECKED BY	_____
ORIGINAL PLAN	_____
NOTE BOOK	_____
No.	_____

NOTE

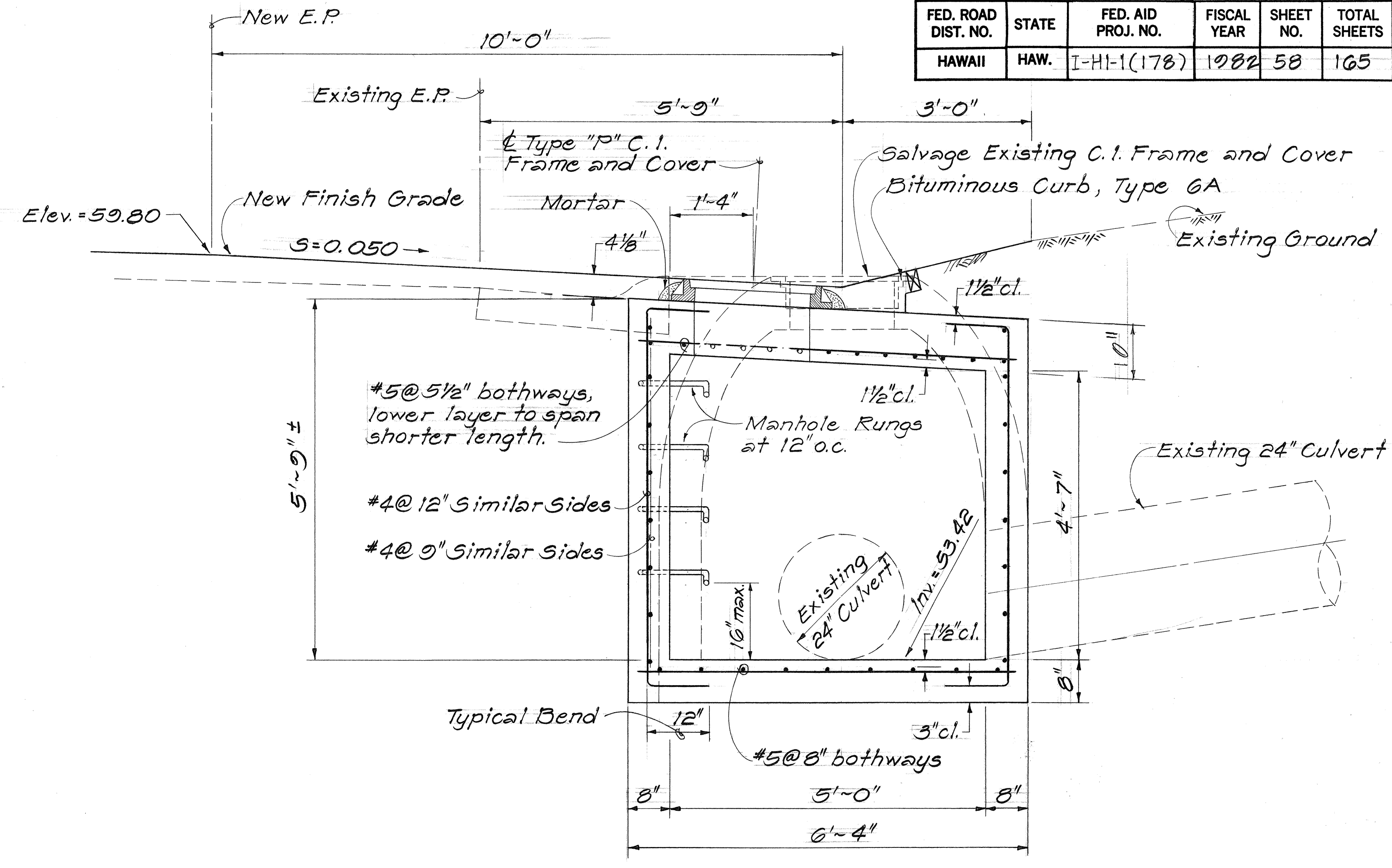
1. Provide additional reinforcing around manhole cover and culvert openings. For details, see sht. no. 62



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



PLAN VIEW OF WALL SECTION
Scale: 3/4" = 1'-0"



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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	58	165

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

DETAILS OF TYPE Z STORM DRAIN MANHOLE AT STA. 47+53.75 RT.

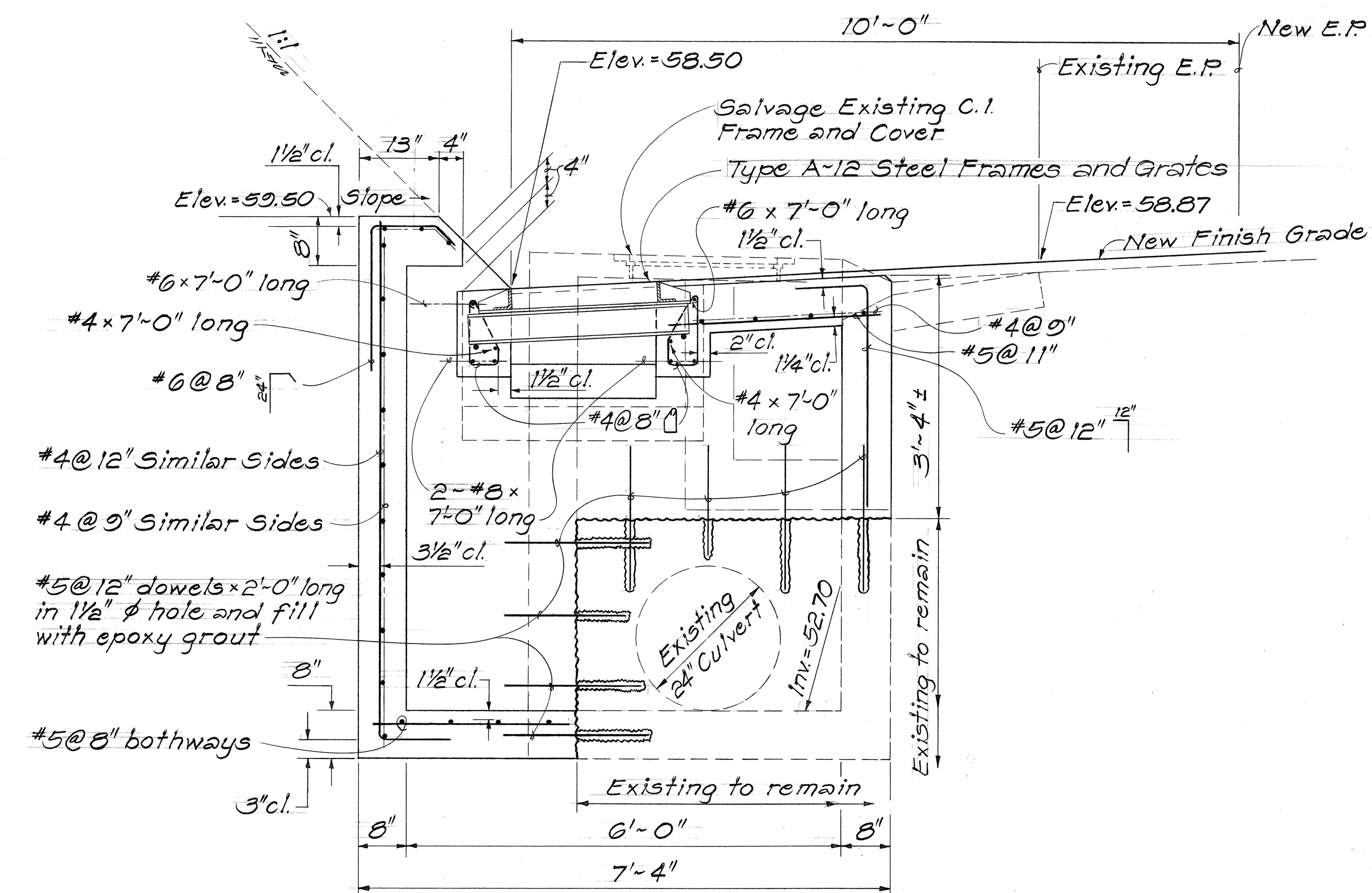
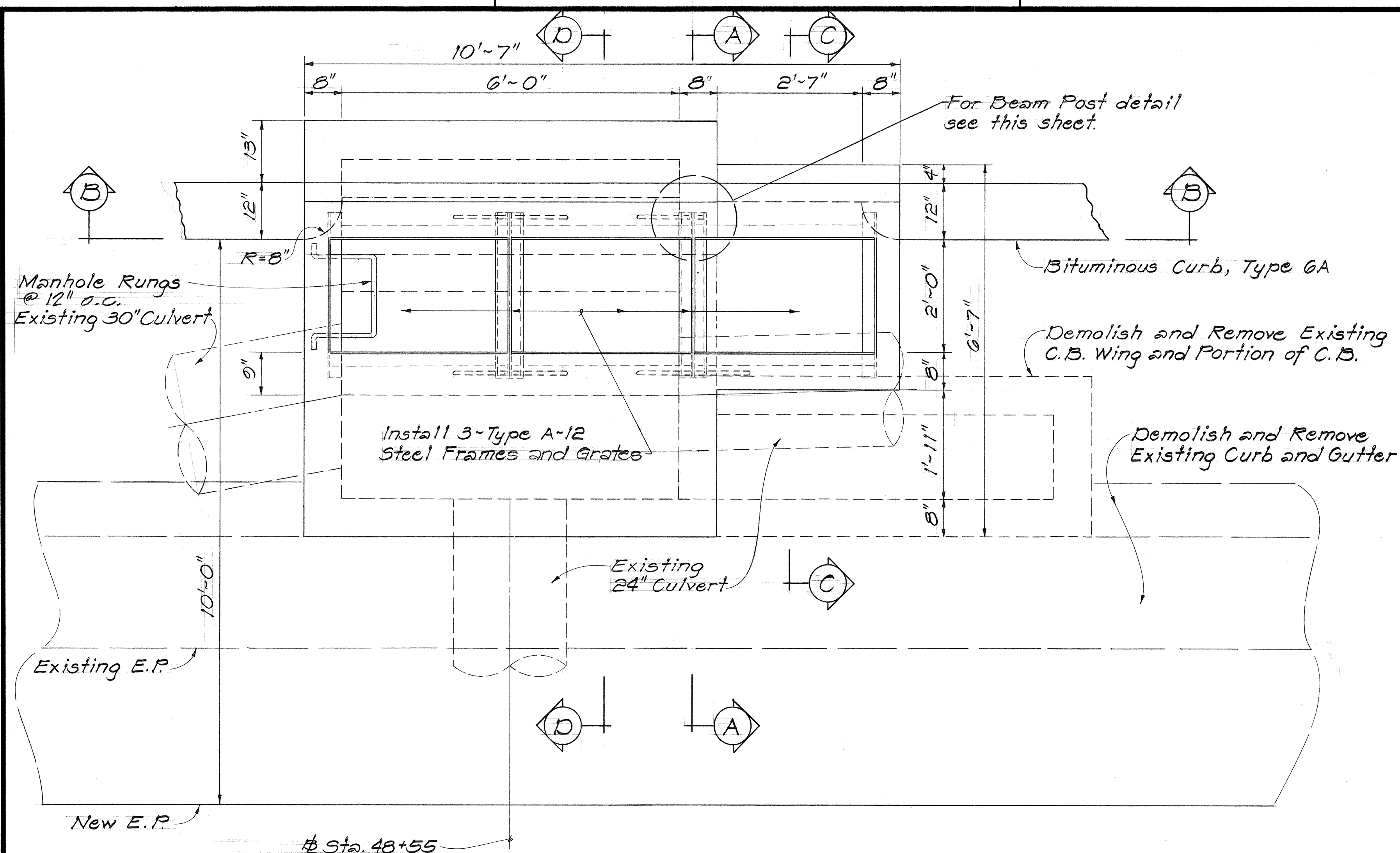
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

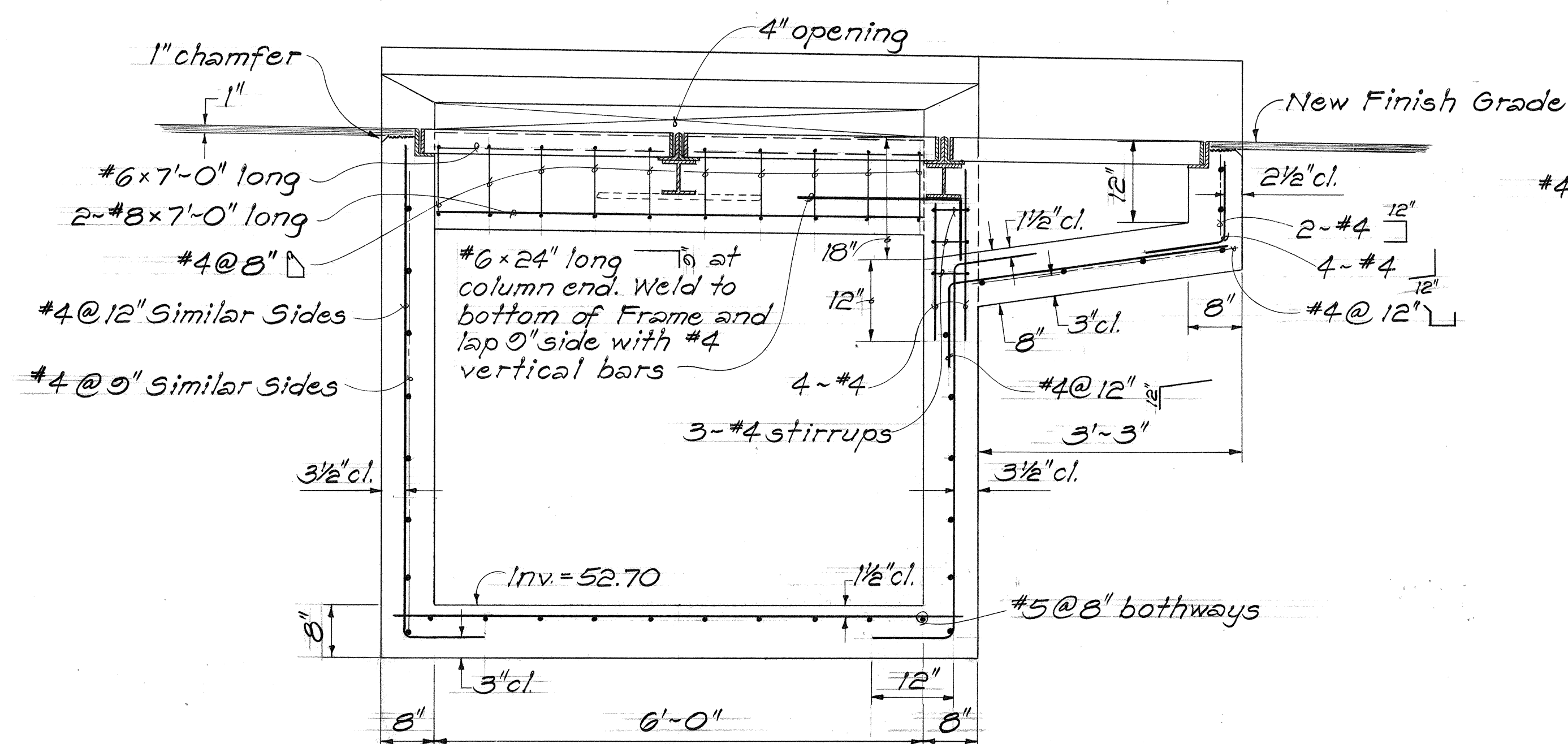
INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)
SCALE: AS NOTED

SHEET NO. 26 OF 33 SHEETS

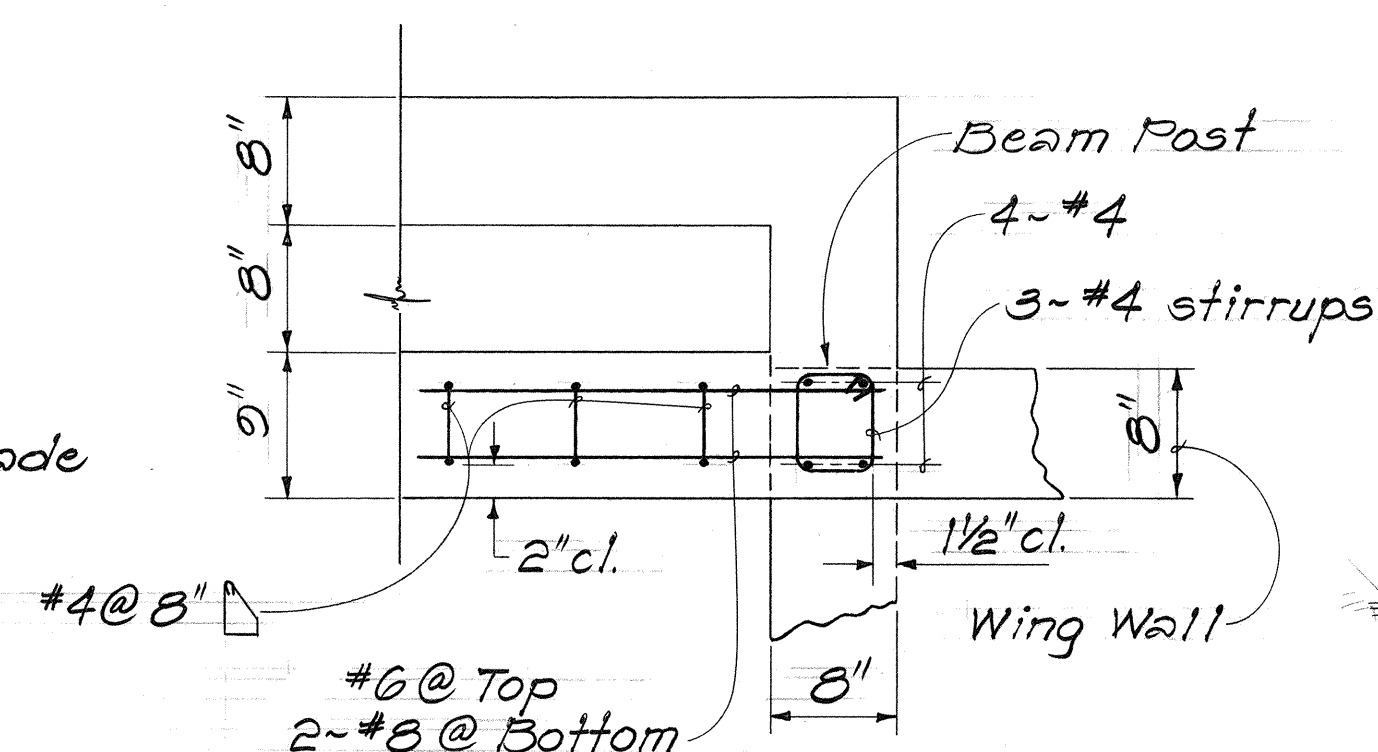
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	59	165



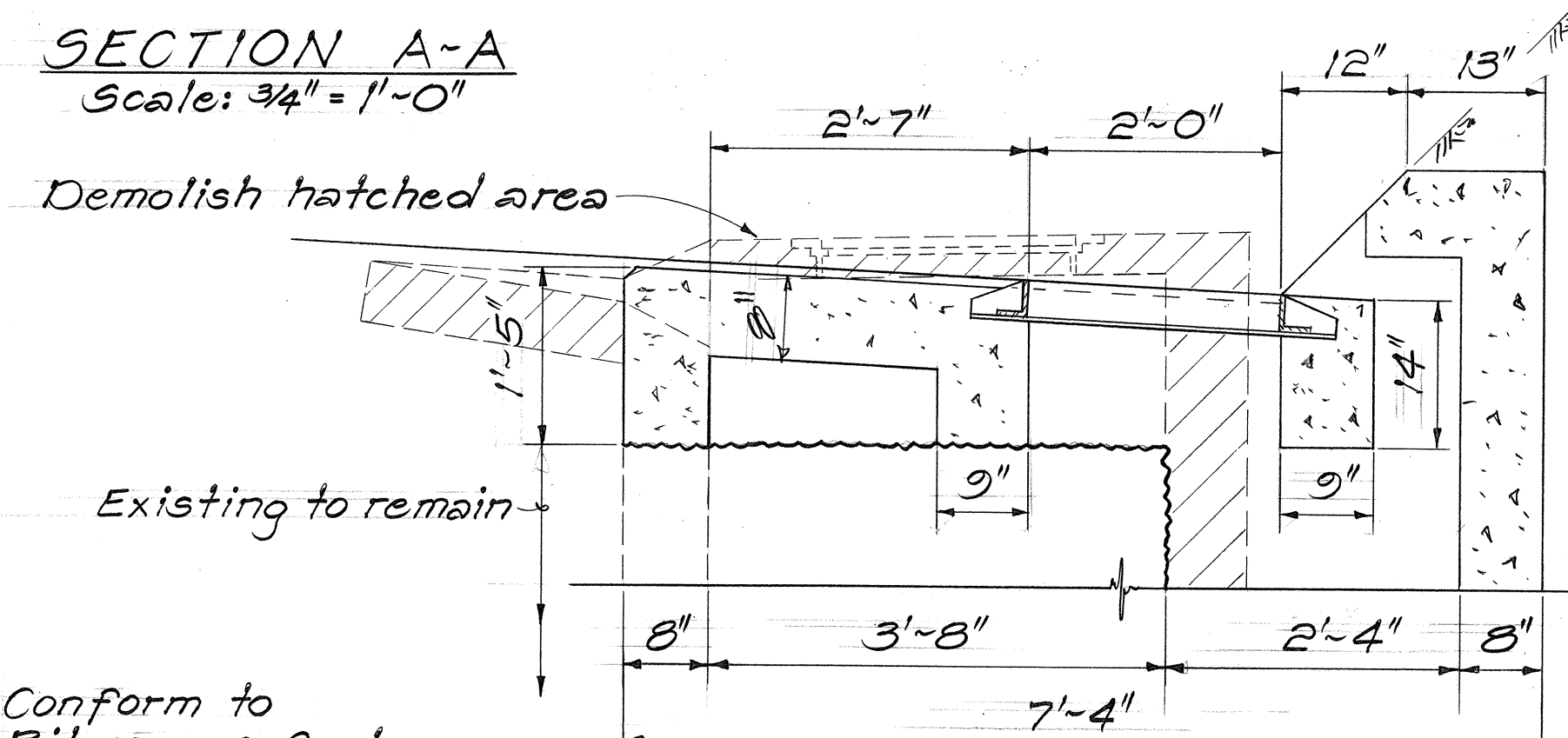
PLAN
Scale: $\frac{3}{4}" = 1'-0"$



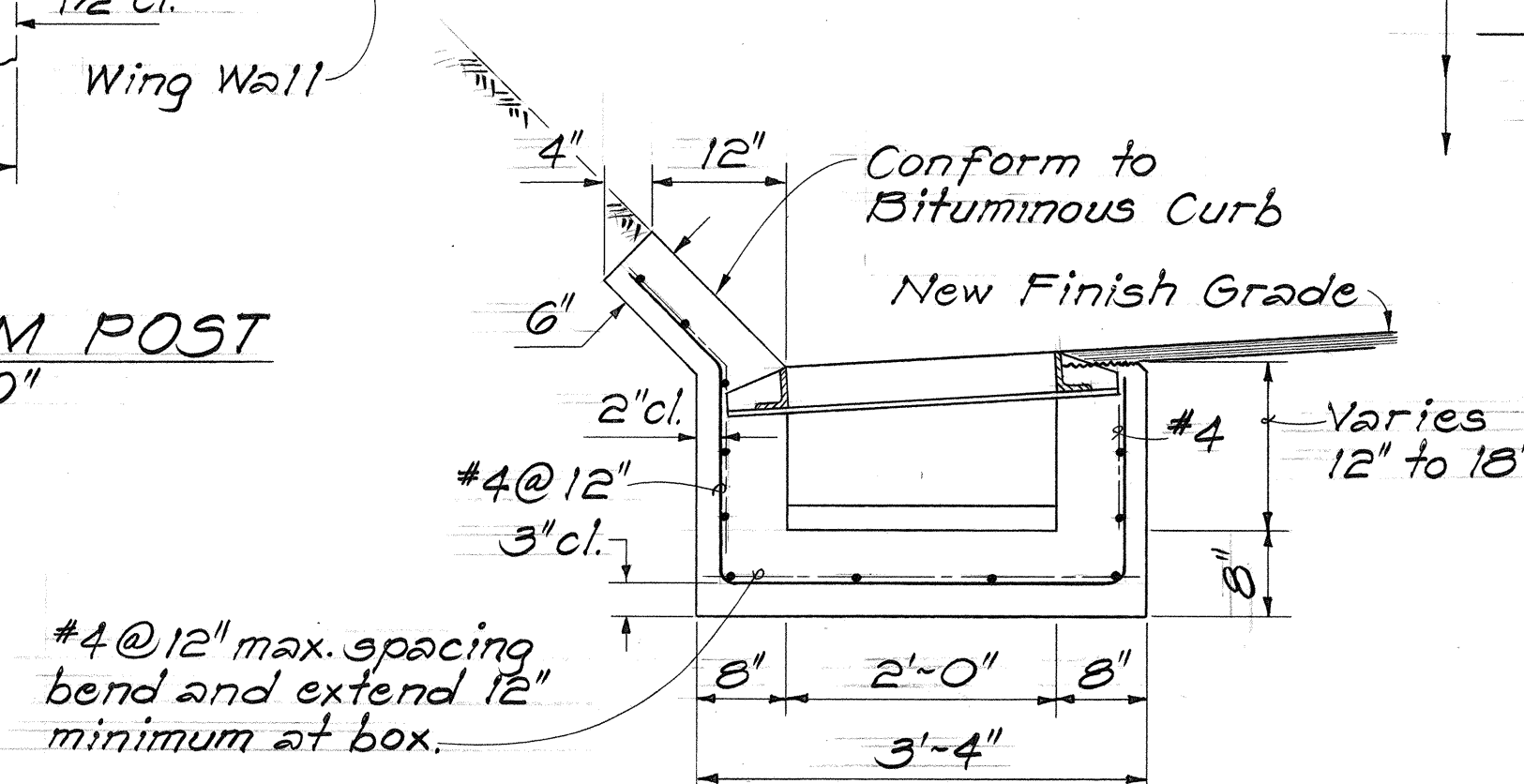
SECTION B-B
Scale: $\frac{3}{4}" = 1'-0"$



DETAIL OF BEAM POST
Scale: 1" = 1'-0"



SECTION D-D
(PARTIAL VIEW)
Scale: $\frac{3}{4}" = 1'-0"$



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

DETAILS OF MODIFIED TYPE 3 GRATED DROP INTAKE AT STA. 48+55 RT.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

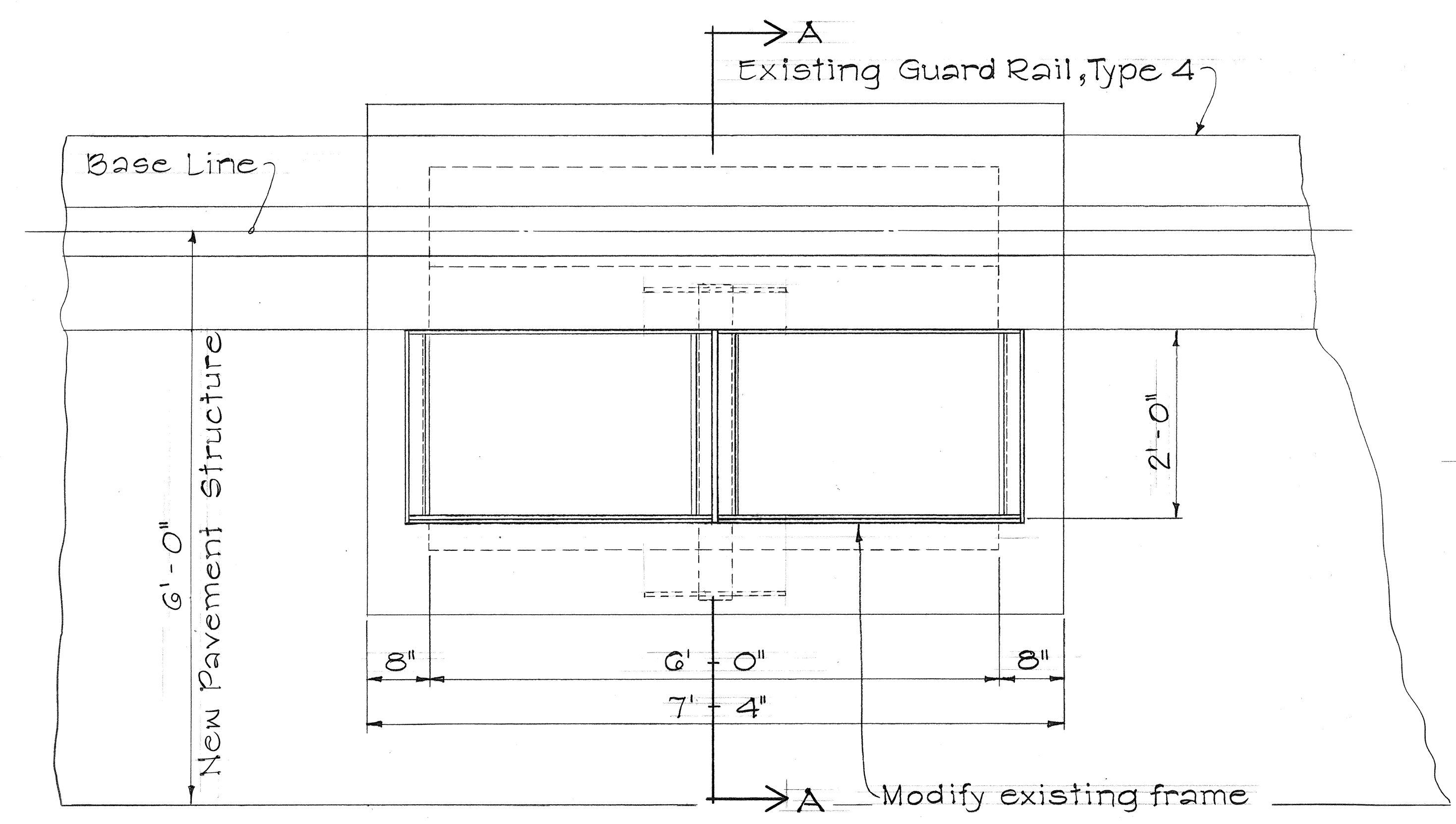
DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)

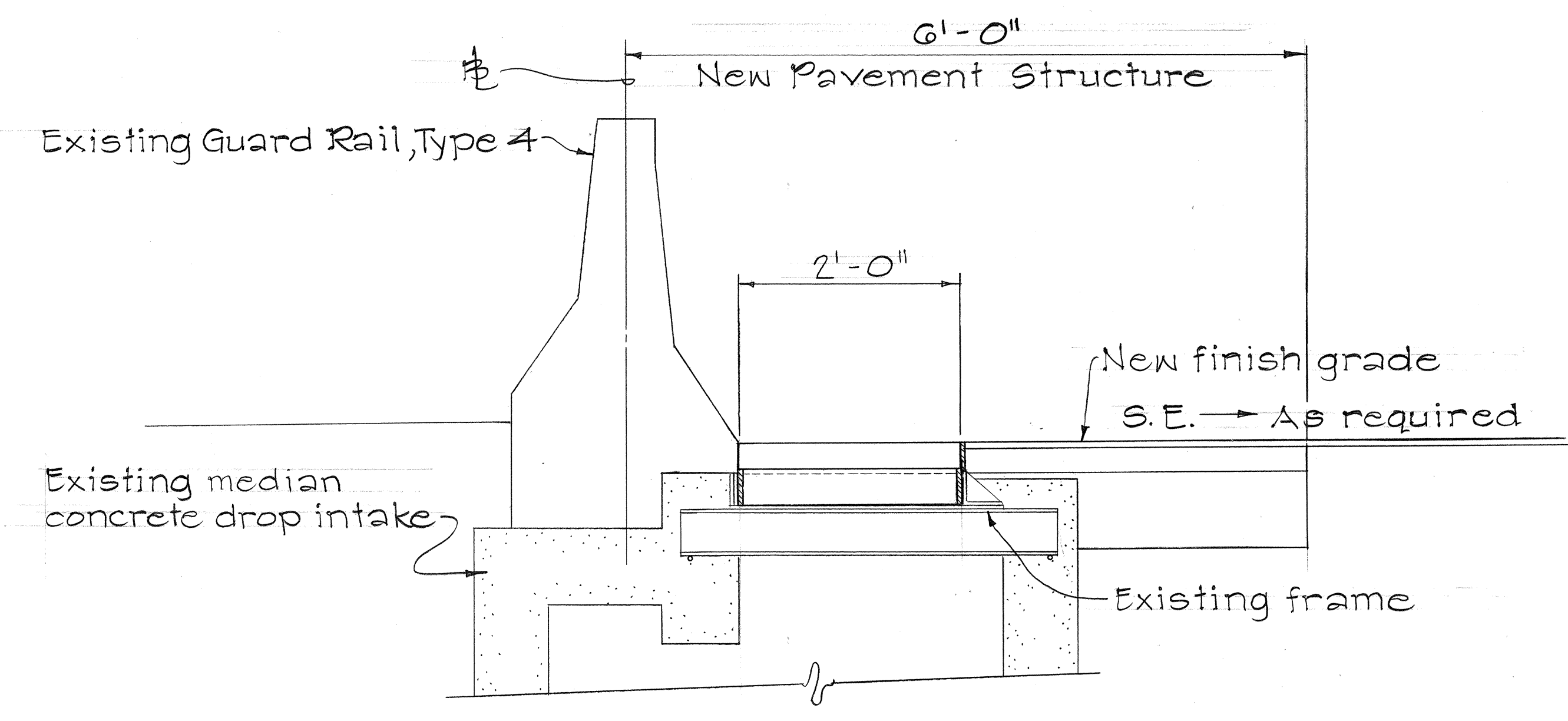
SCALE: AS NOTED

SHEET No. 27 OF 33 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(178)	1982	60	105

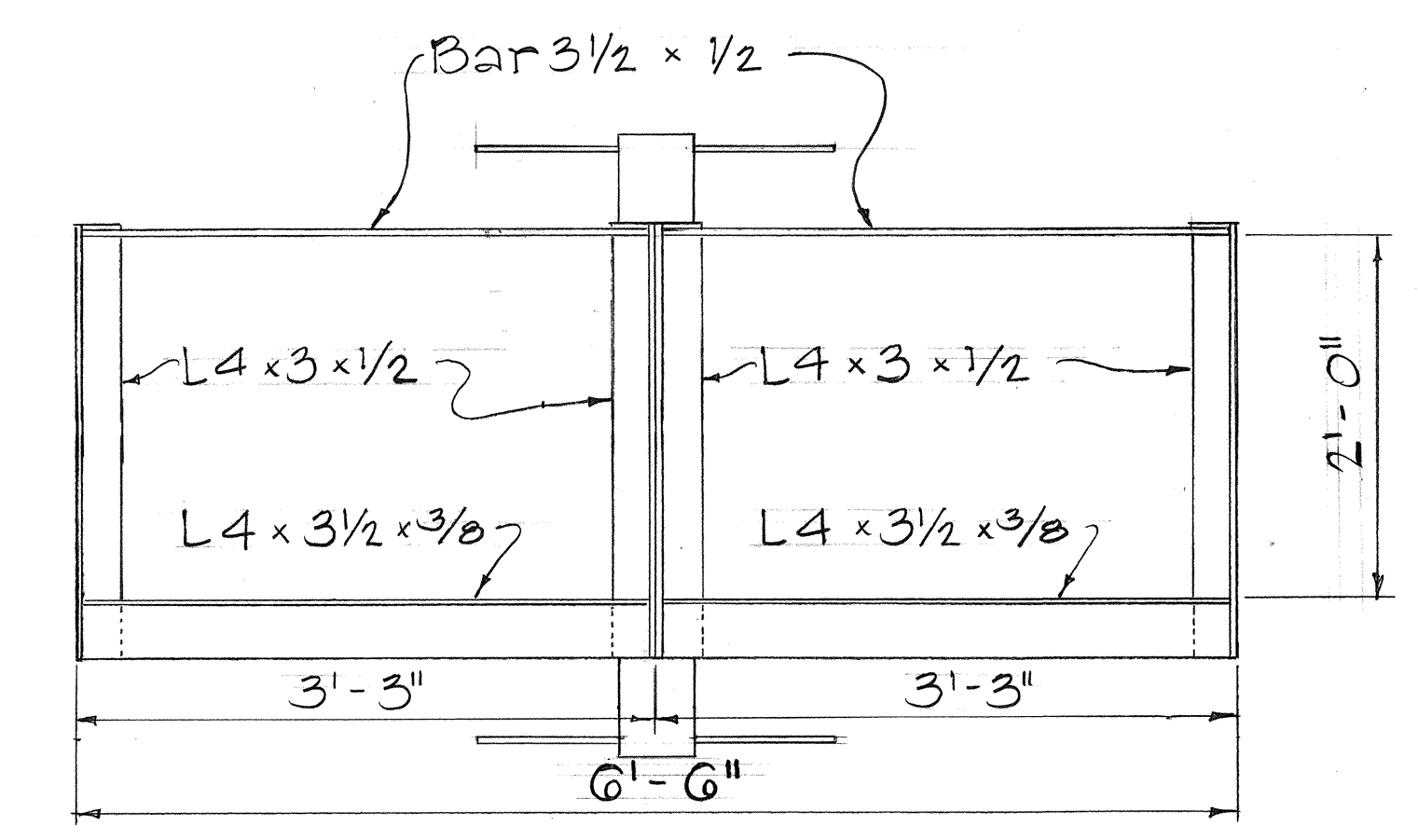


PLAN

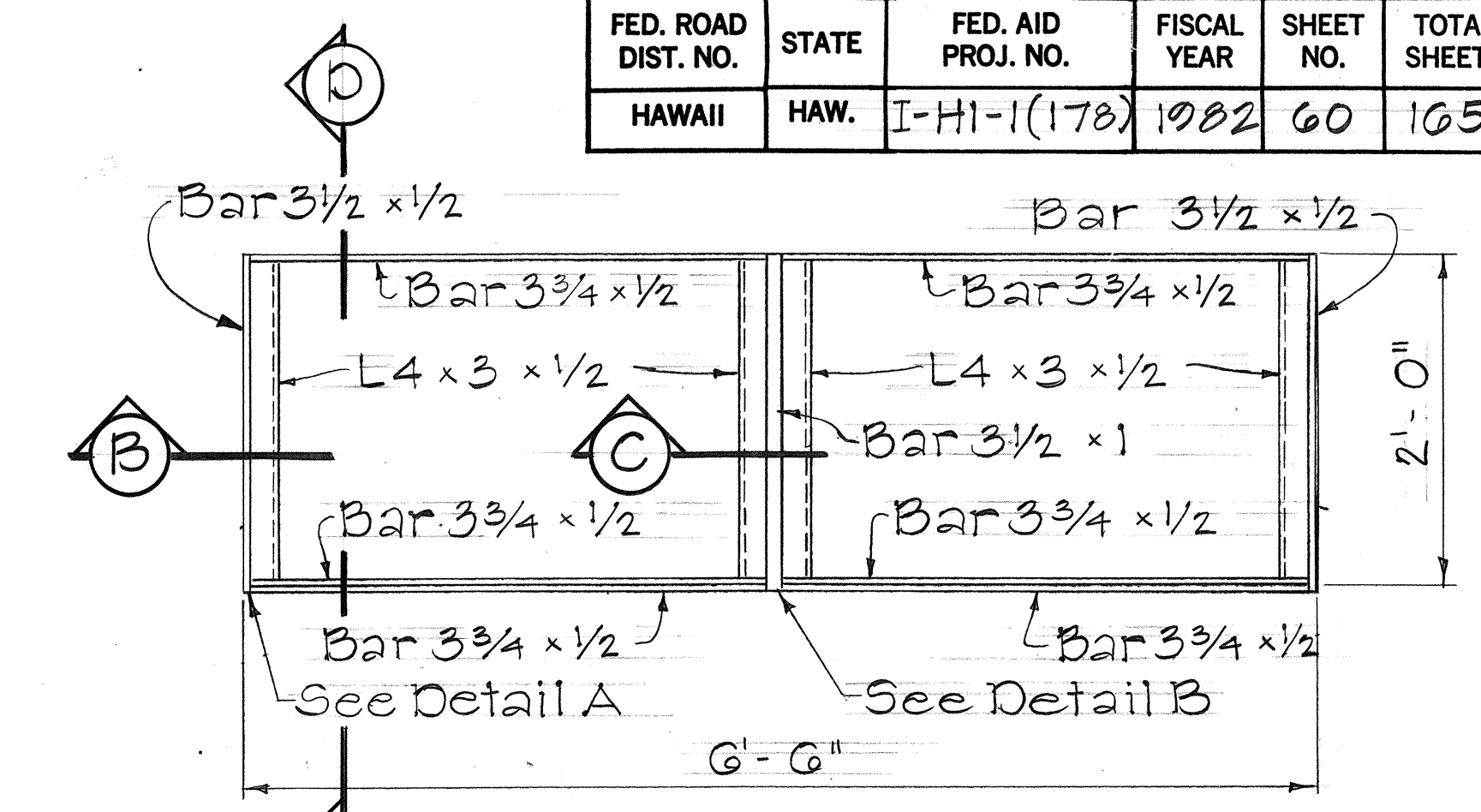


SECTION "A-A"

MEDIAN CONCRETE DROP INTAKE
Scale: 1" = 1'-0"

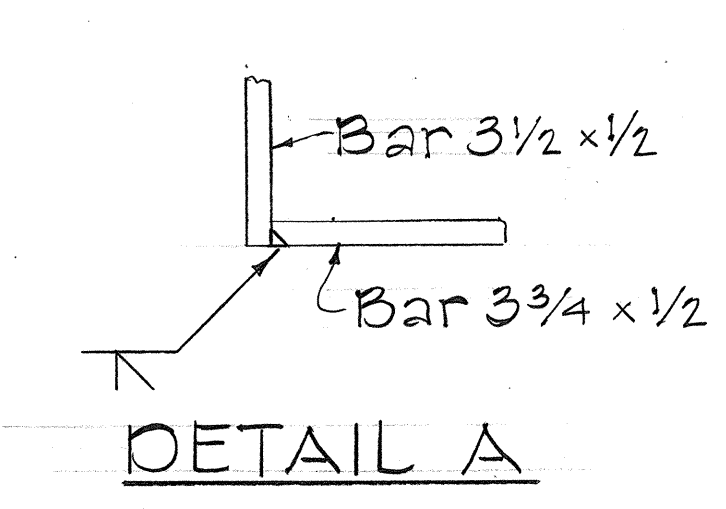


PLAN OF EXISTING FRAME

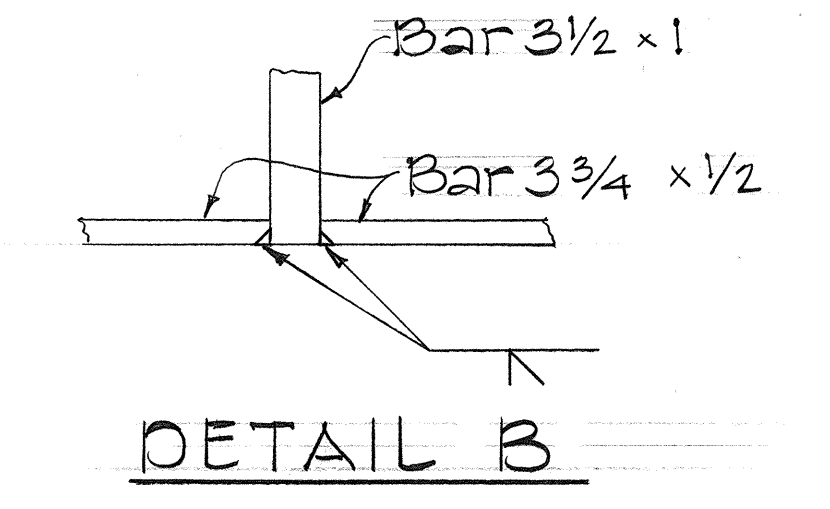


PLAN OF NEW FRAME

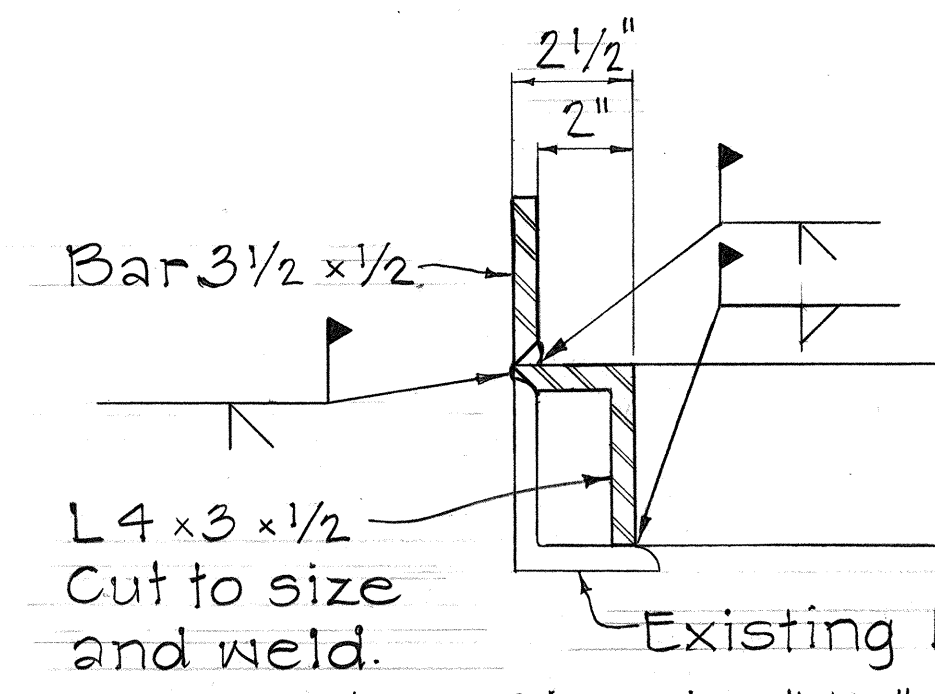
PLAN VIEW OF STEEL FRAME
Scale: 1" = 1'-0"



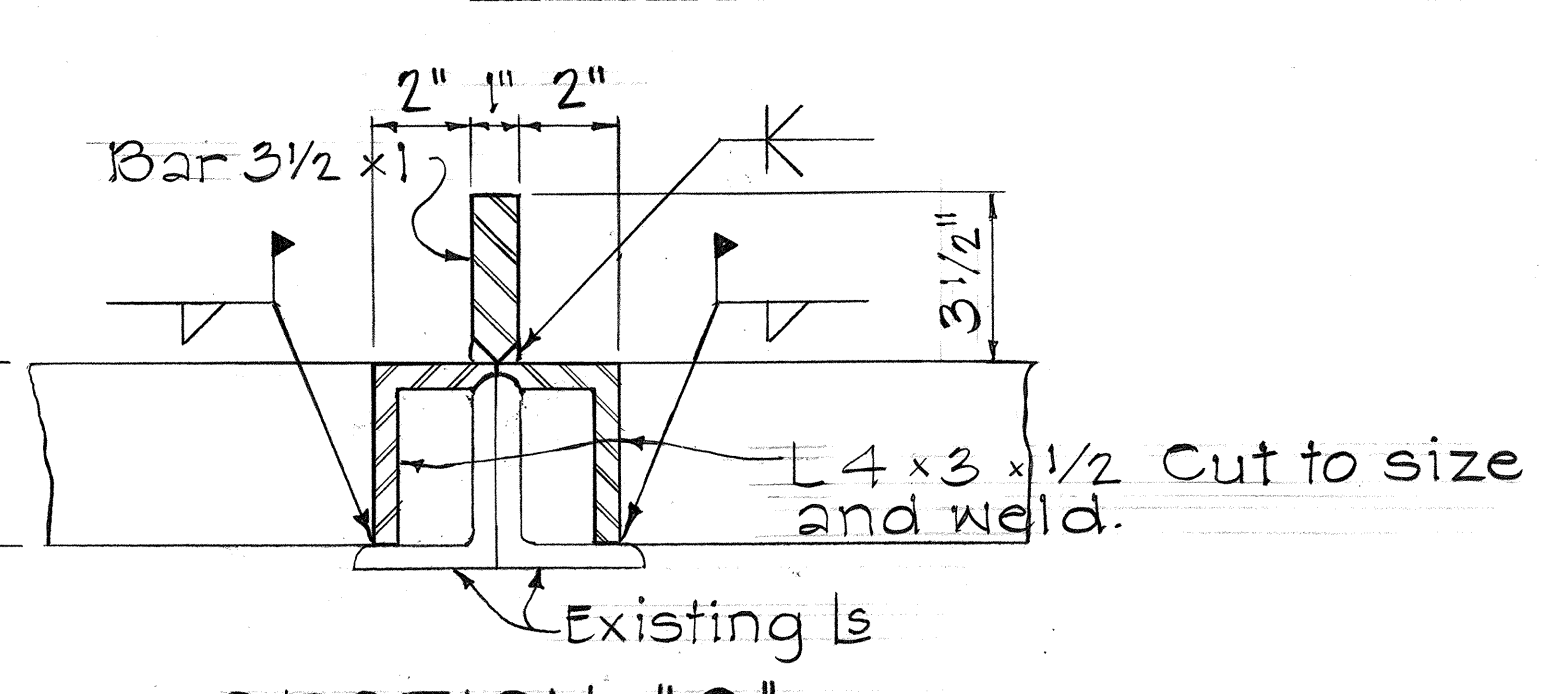
DETAIL A



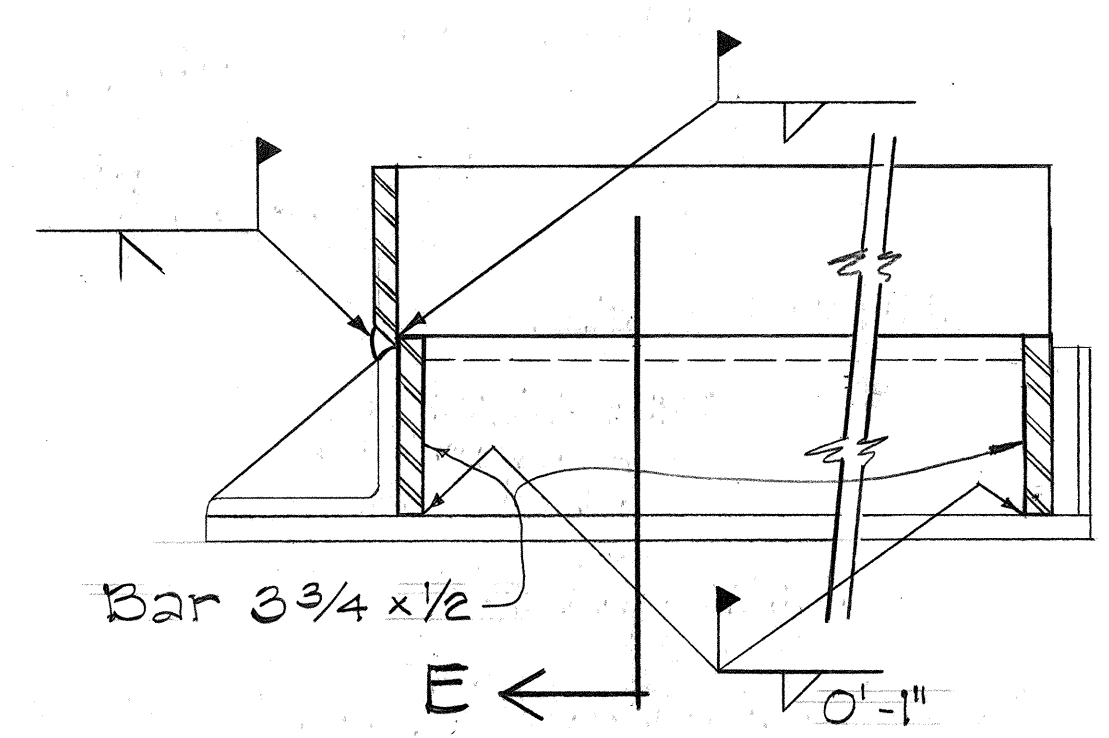
DETAIL B



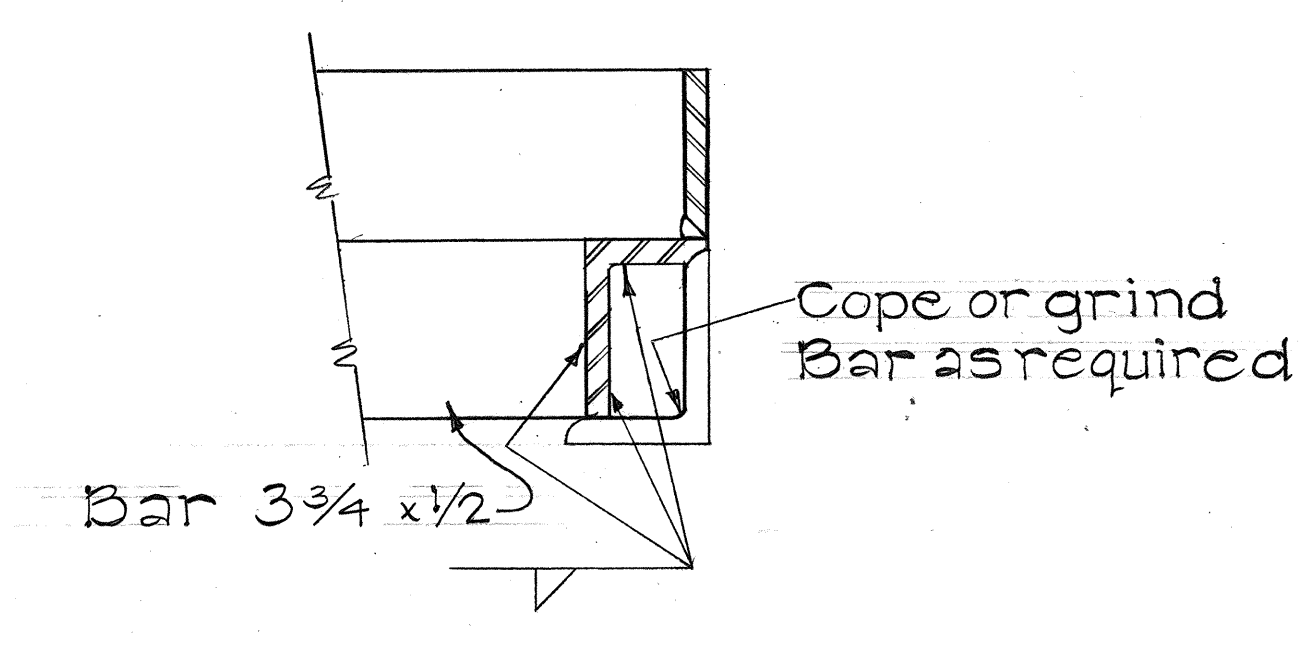
SECTION "B"



SECTION "C"



SECTION "D-D"



SECTION "E"

TYPICAL DETAILS AT ALL JOINTS
Note: All Fillet welds, 5/16"
Scale: 3" = 1'-0"

DETAILS TO ADJUST TYPE A-12 FRAMES AND GRATES

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

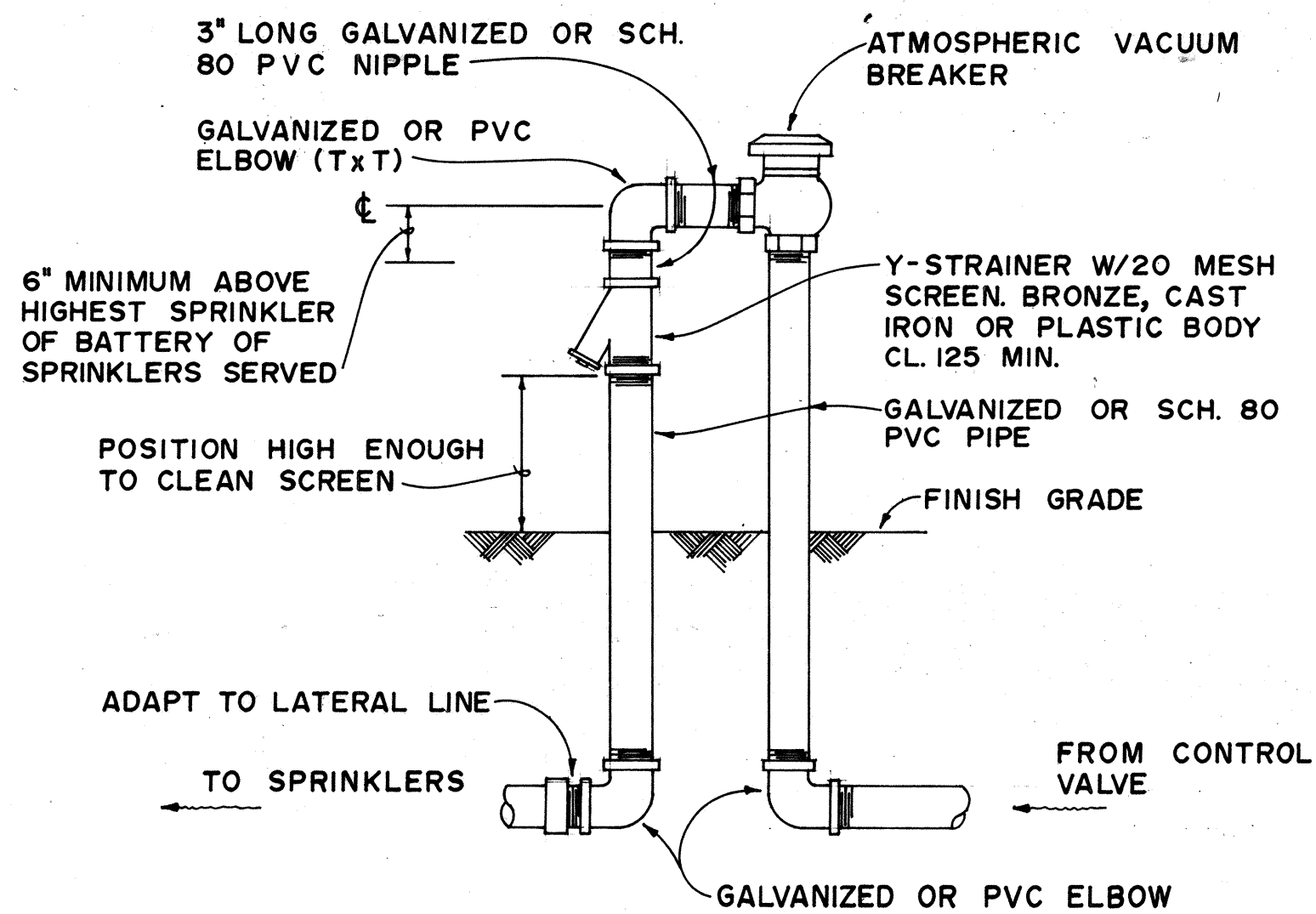
DRAINAGE DETAILS

INTERSTATE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
EASTBOUND LANES
F.A.I. PROJECT NO. I-HI-1(178)

SCALE: AS NOTED
SHEET NO. 28 OF 33 SHEETS

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

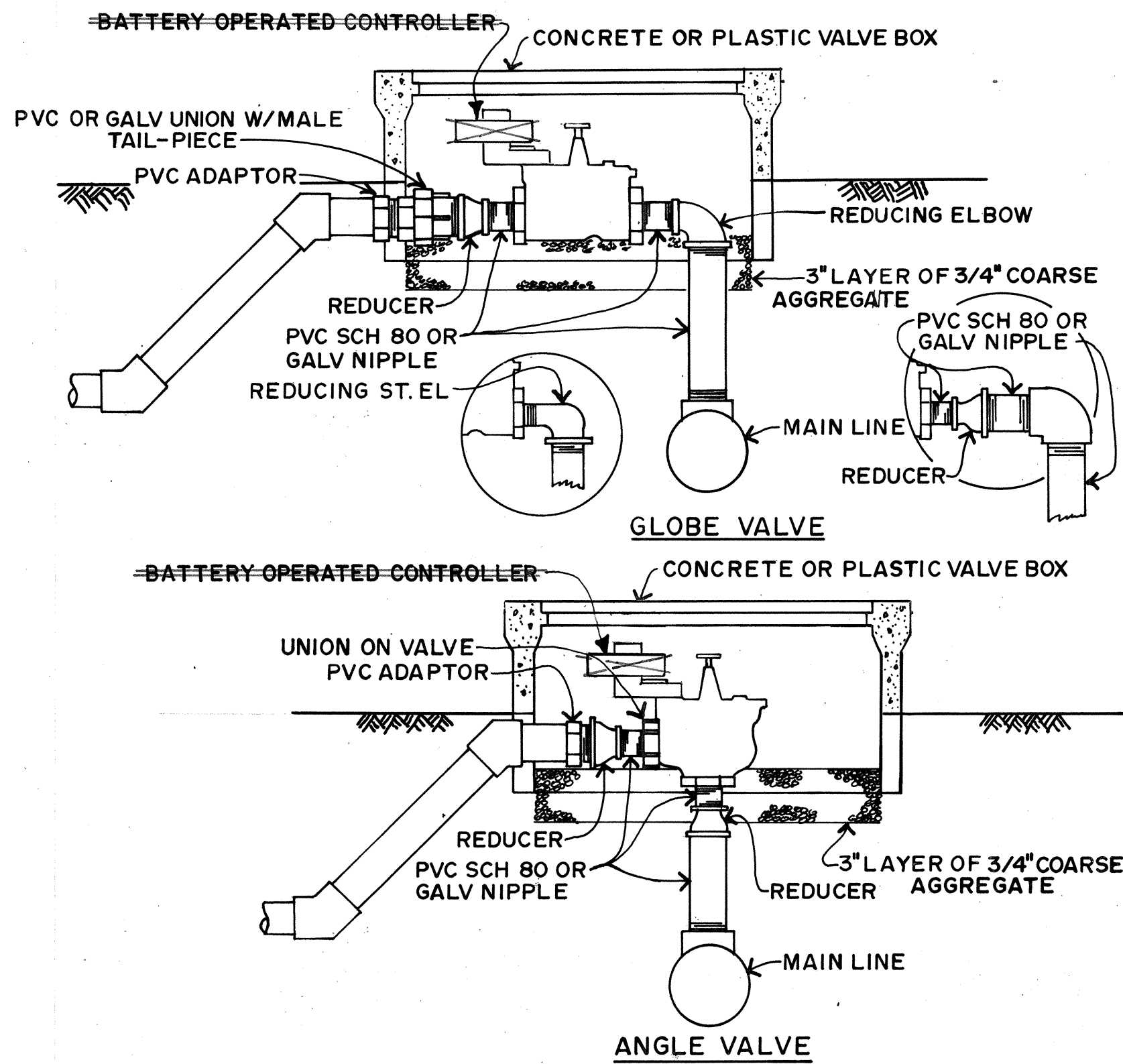
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(178)	1984	C.O.6051	165



ATMOSPHERIC VACUUM BREAKER UNIT DETAIL

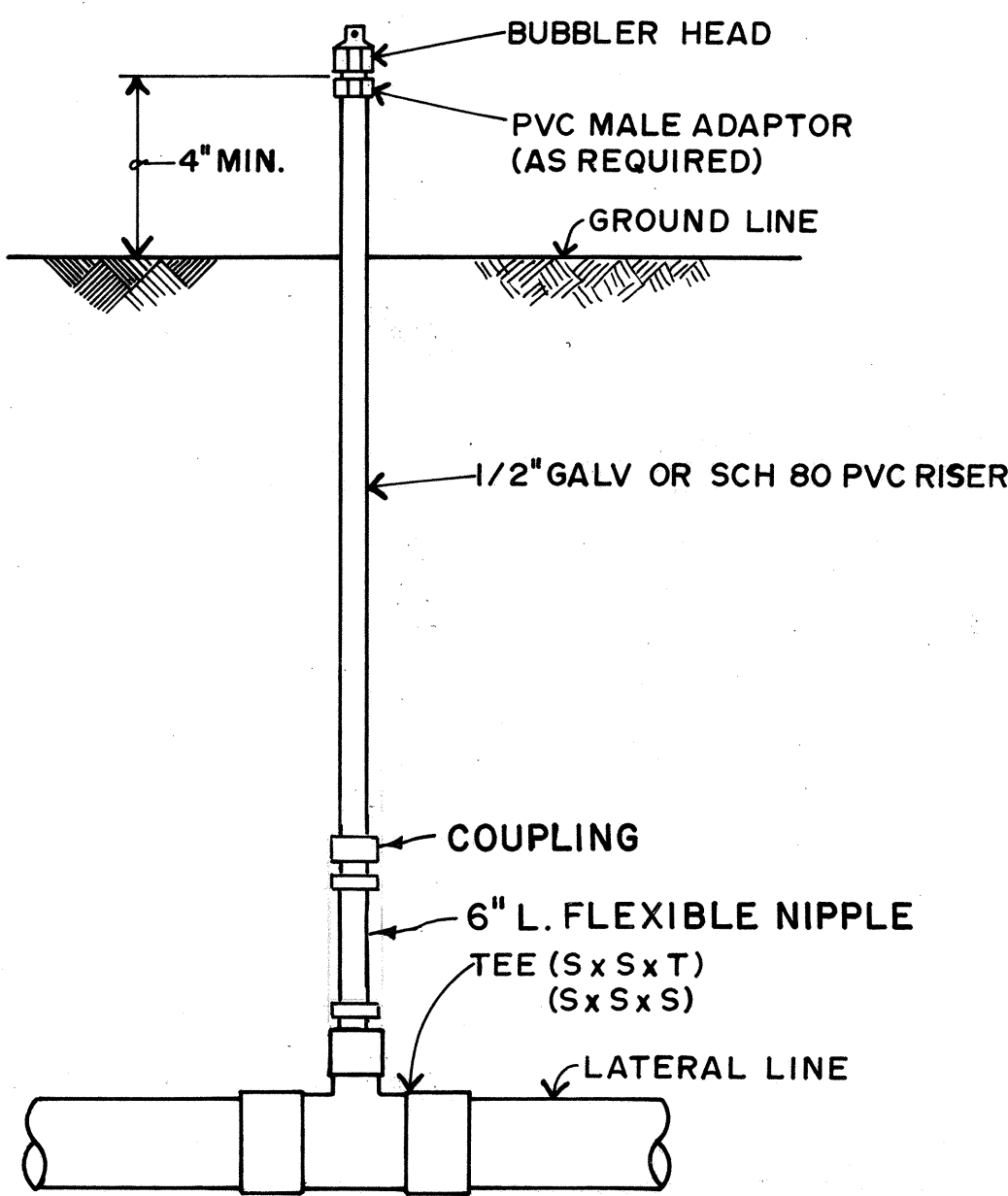
NOTES:

1. ATMOSPHERIC VACUUM BREAKER, Y-STRAINER AND PIPE ABOVE FINISH GRADE SHALL BE PRIME COATED AND PAINTED WITH TWO COATS OF DARK GREEN ENAMEL PAINT.
2. GALVANIZED PIPE BELOW FINISH GRADE SHALL BE PAINTED WITH TWO COATS OF ASPHALT PAINT.

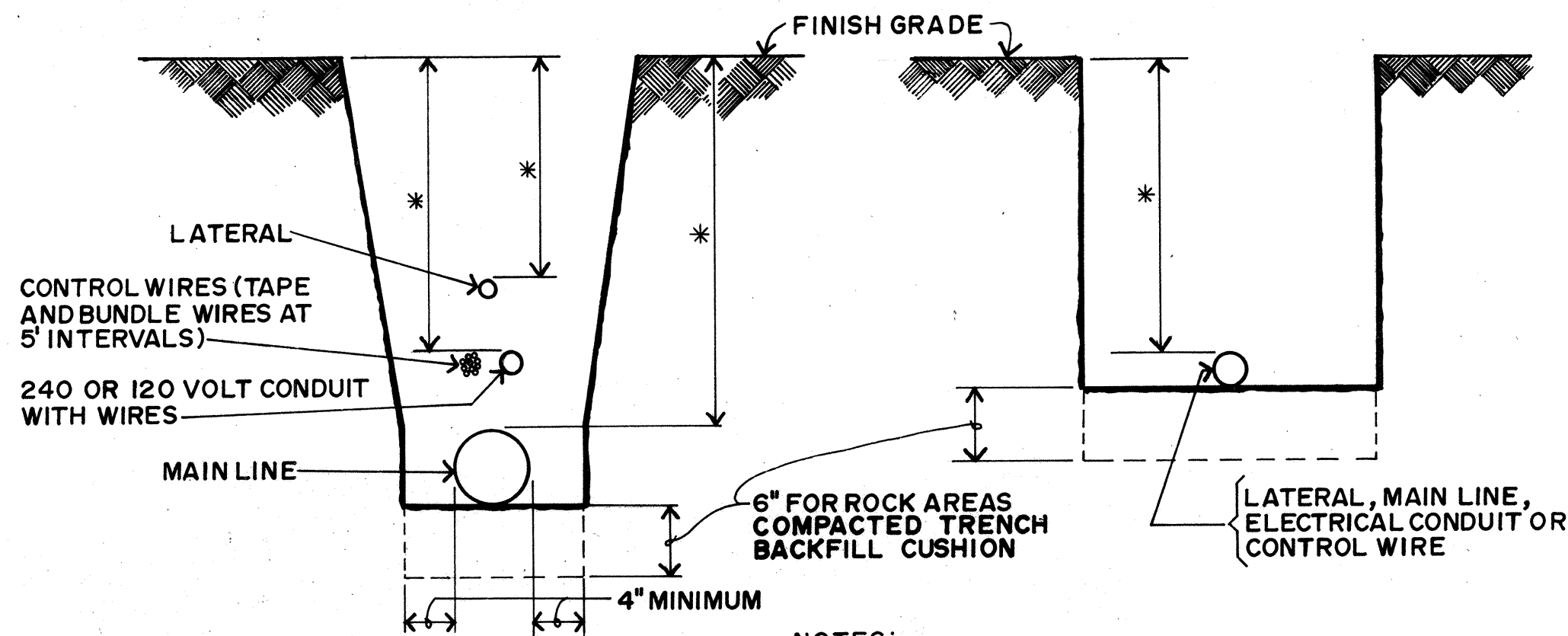


TYPICAL CONTROL VALVE DETAIL

NOTE: A 2" MINIMUM CLEARANCE SHALL BE REQUIRED ON ALL SIDES OF THE VALVE.



TYPICAL BUBBLER HEAD DETAIL

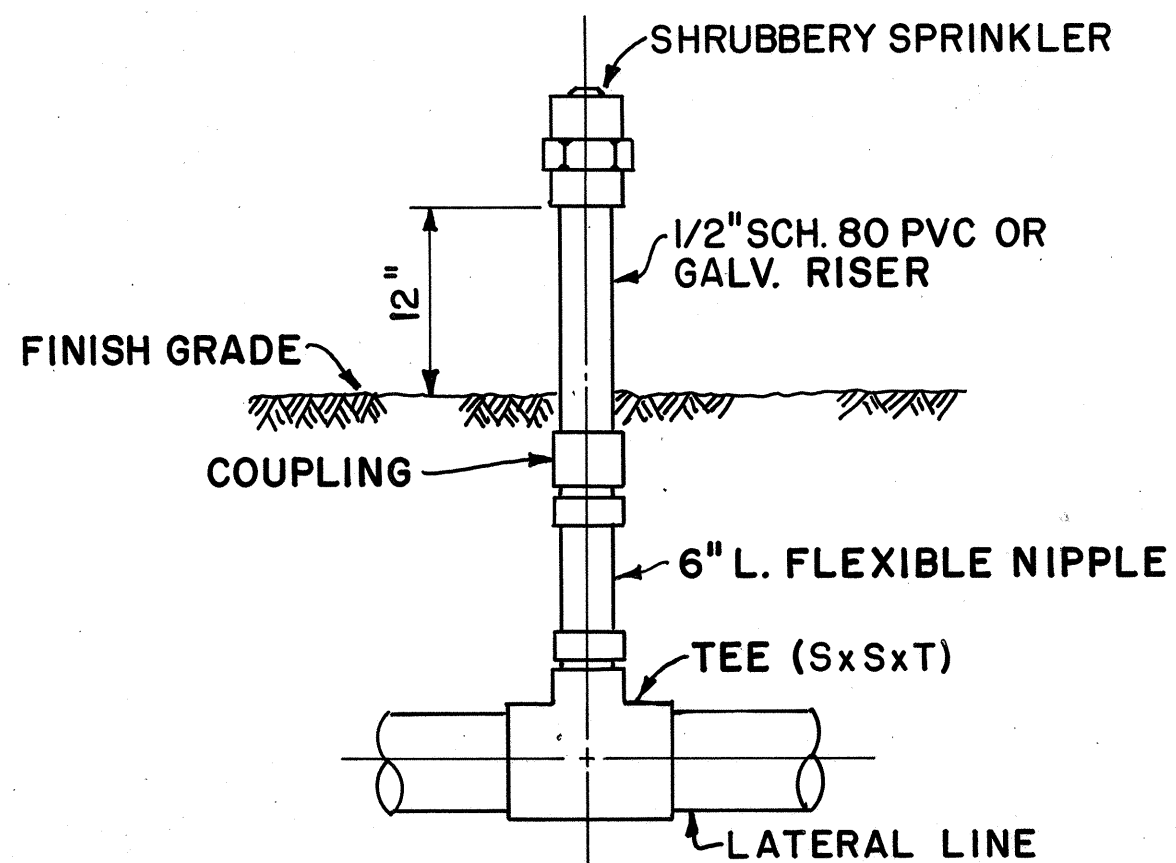


	MINIMUM * COVER	
SPRINKLER LATERALS	12"	
SPRINKLER MAINS		
1/2" TO 2 1/2"	18"	
3" OR 4"	24"	
OVER 4"	30"	
ELECTRICAL CONDUIT	24"	
CONTROL WIRES	18"	

TRENCH DETAIL

NOTES:

1. PIPES UNDER ROADWAY SHALL HAVE MINIMUM COVER OF 24 INCHES AND SHALL NOT BE IN THE ROADWAY STRUCTURE.
2. THERE SHALL BE A 3" MINIMUM CLEARANCE BETWEEN CONTROL WIRE BUNDLE, CONDUIT, MAIN AND LATERAL LINES.
3. THE WIDTH OF THE TRENCH SHALL BE AS NARROW AS PRACTICAL TO FACILITATE INSTALLATION. APPROXIMATELY TWICE THE OUTSIDE DIAMETER OF THE PIPE WITH A MINIMUM OF 8".



DETAIL OF SPRINKLER HEAD ON RISER

11/14/83 Sheet added to Contract Plans to show required sprinkler details.

DATE

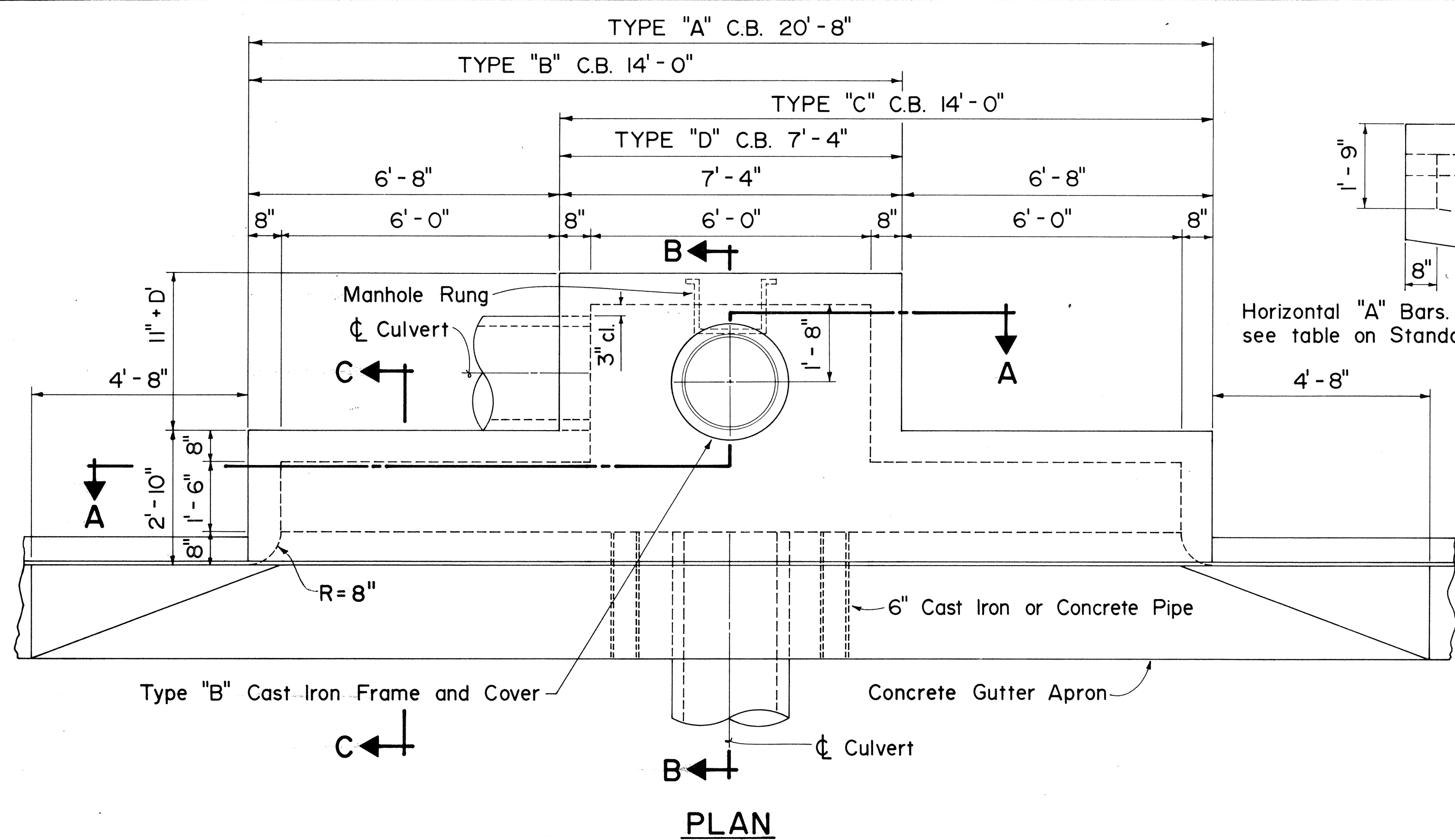
REVISION

NOT TO SCALE

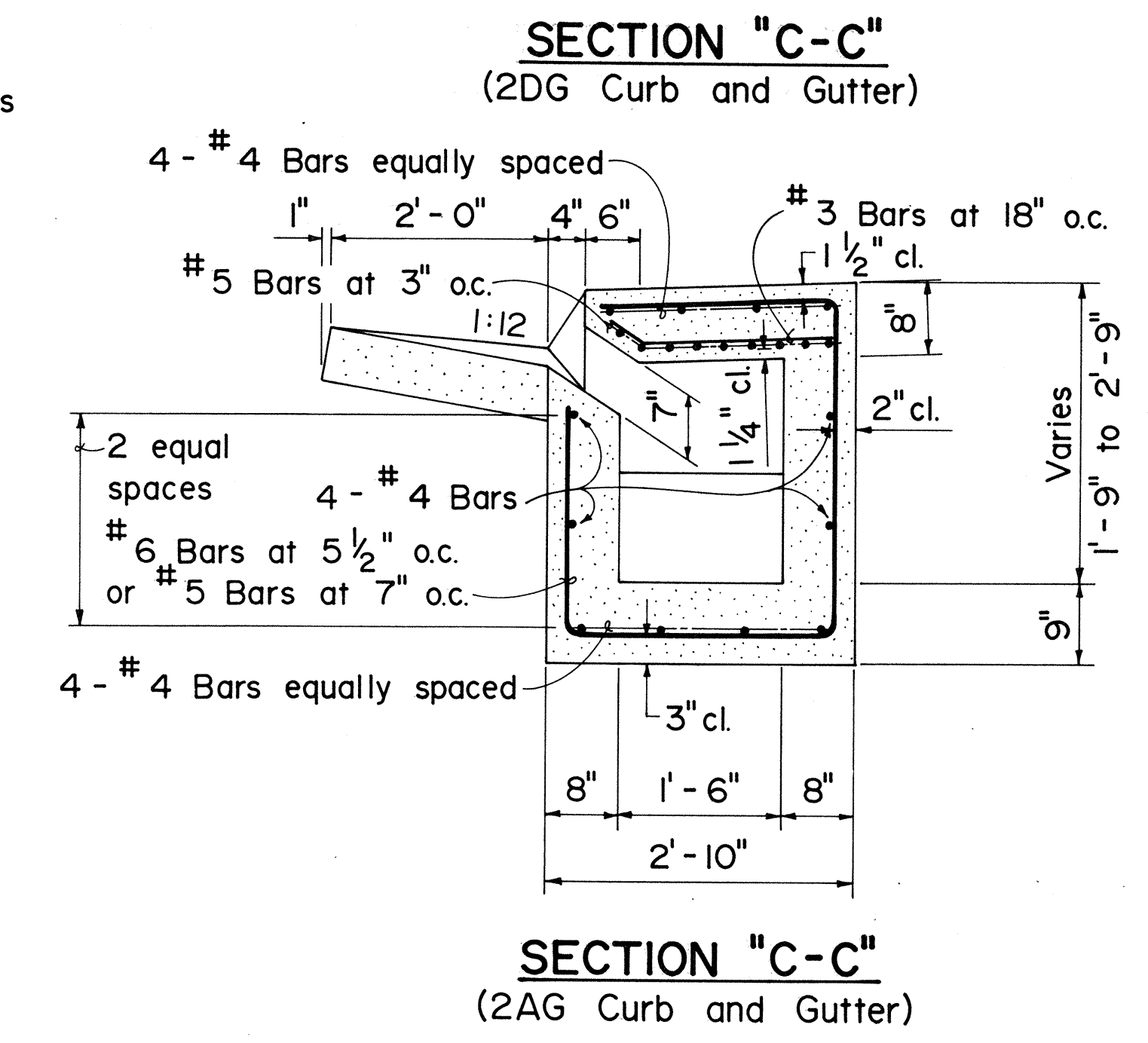
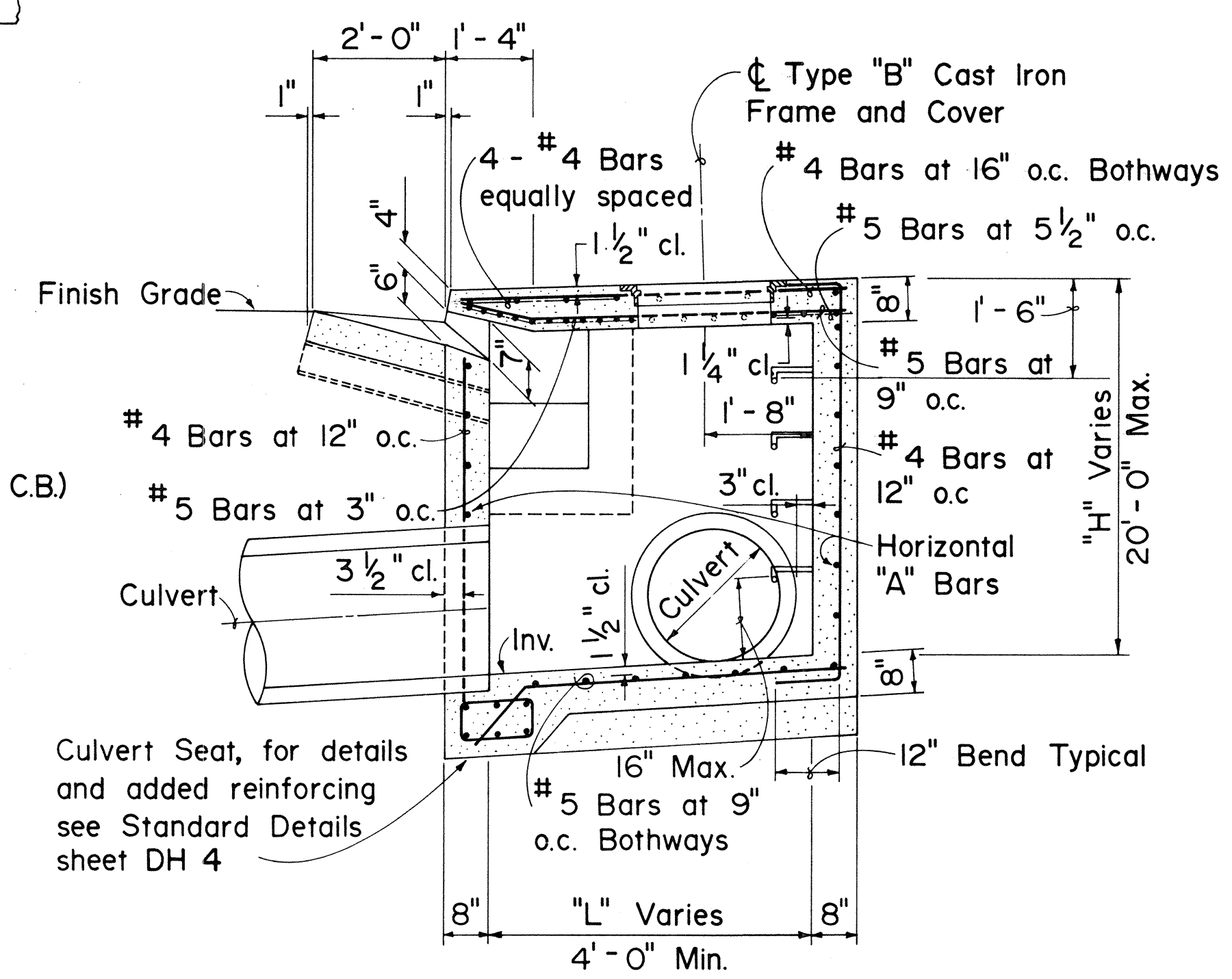
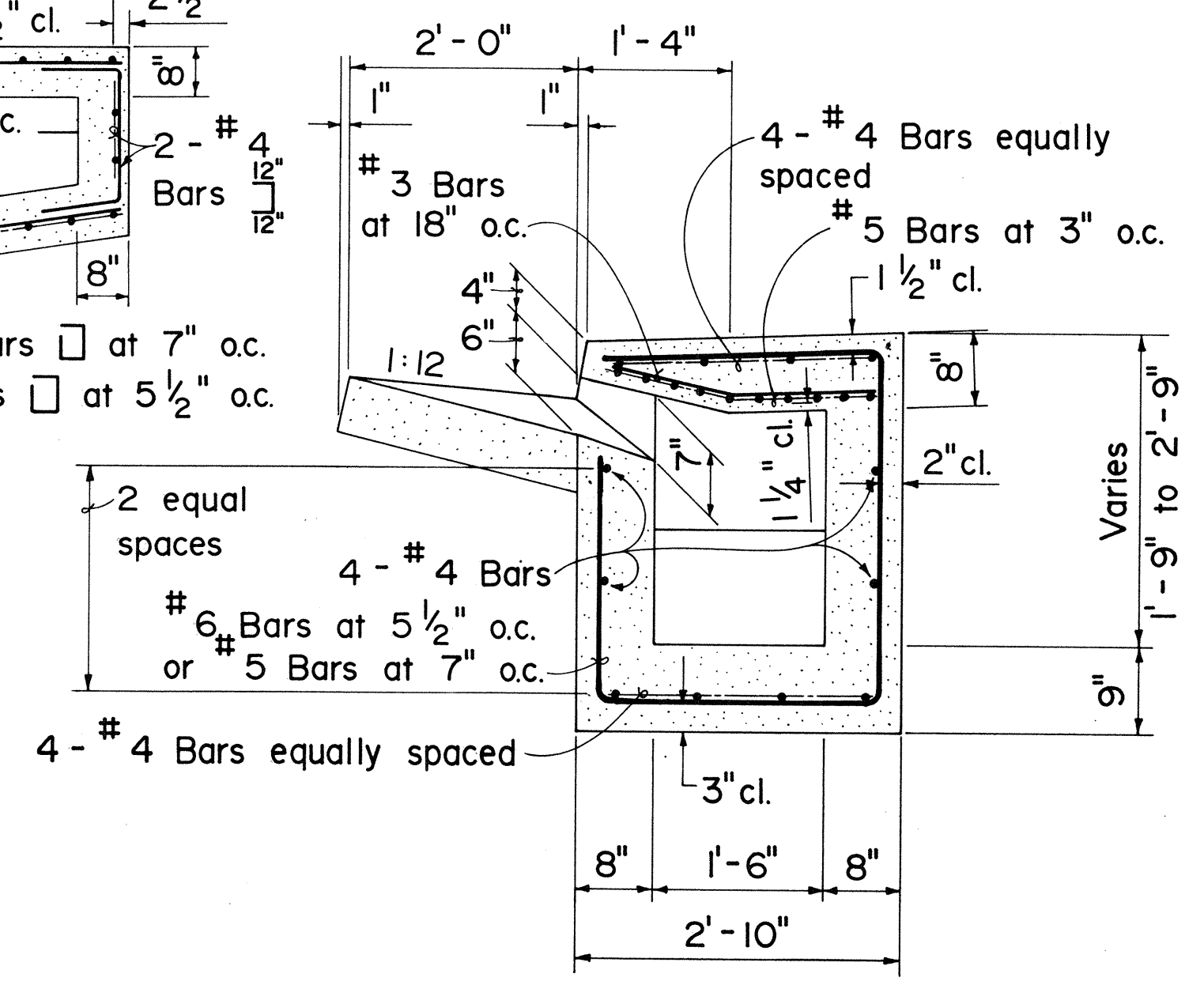
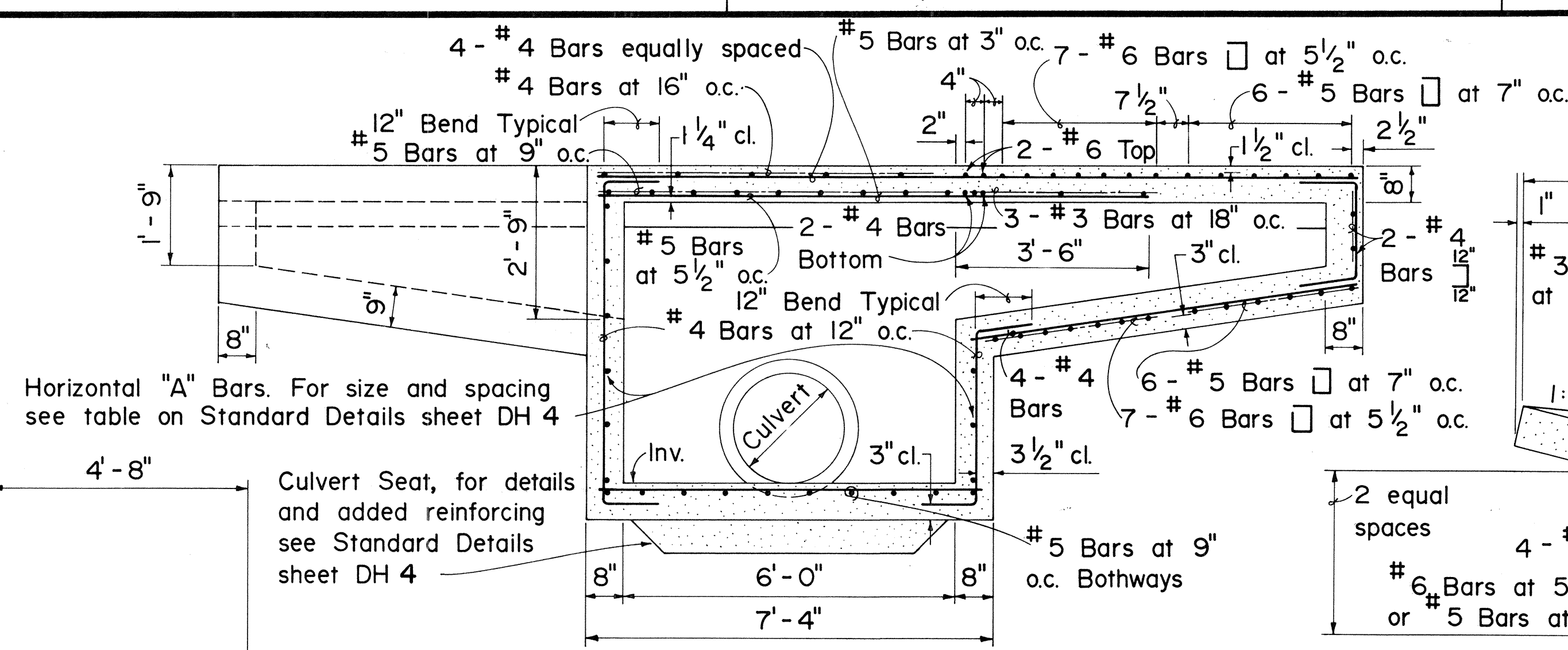
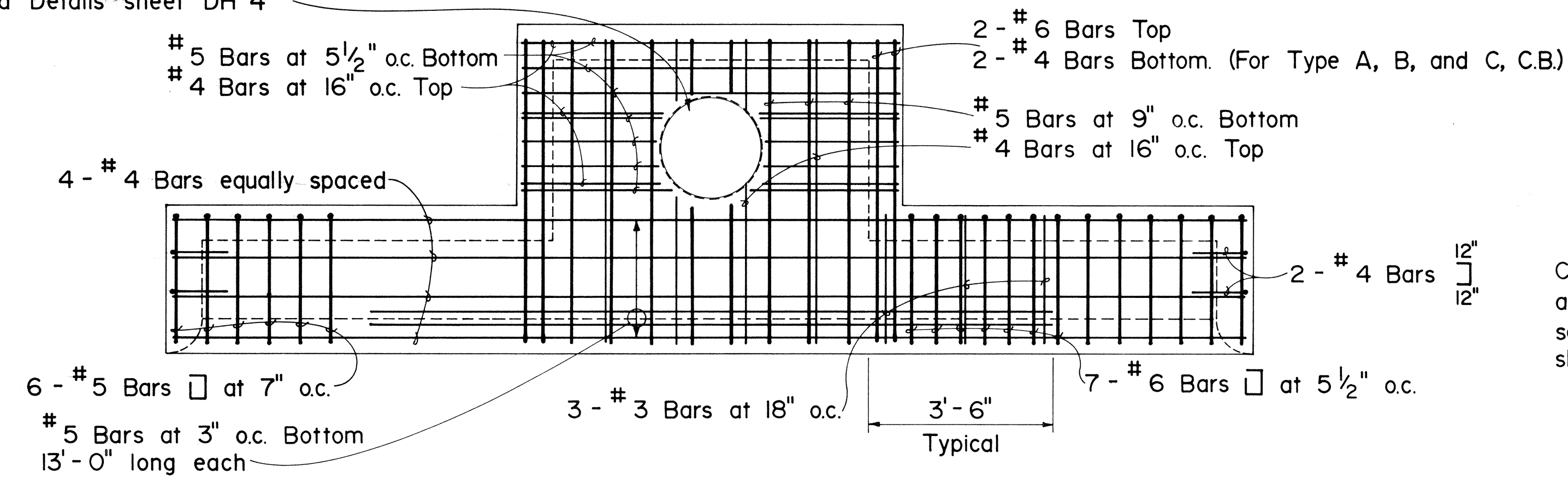
SHEET NO. OF SHEETS

C.O.60 S-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-1 (178)	1982	61	165



Opening for Type "B" Cast Iron Frame and Cover. For added reinforcing around hole see Standard Details sheet DH 4



TYPE "A", "B", "C" & "D" CATCH BASIN

APPROVAL RECOMMENDED:

Edward M. Lee 12/3/80

HYDRAULIC DESIGN ENGINEER DATE

APPROVED:

Harold S. Sakai 12/1/80

ASSISTANT CHIEF, ENGINEERING DATE

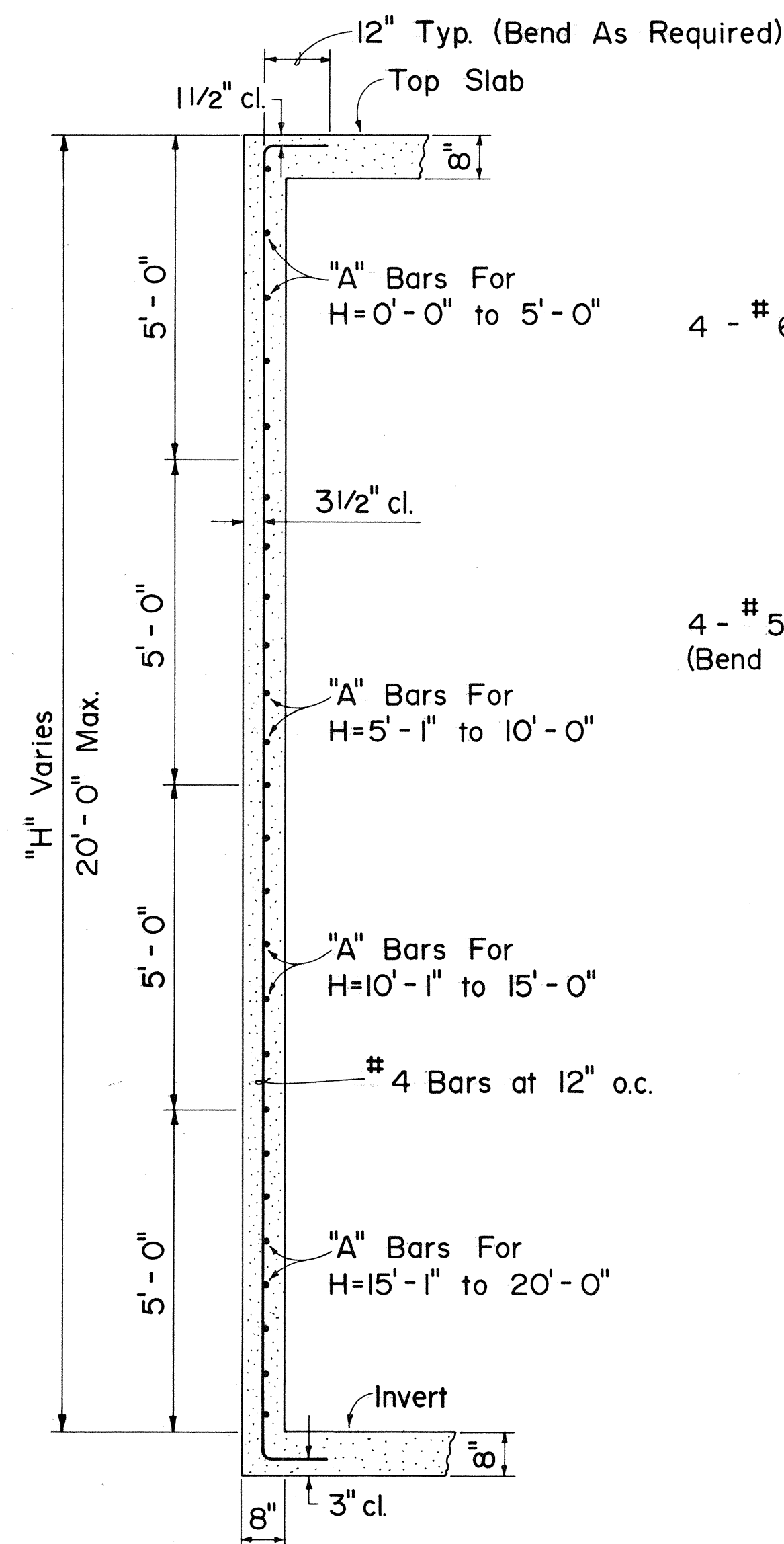
NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 1 approved 12/17/69	H.S.	12/4/80

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

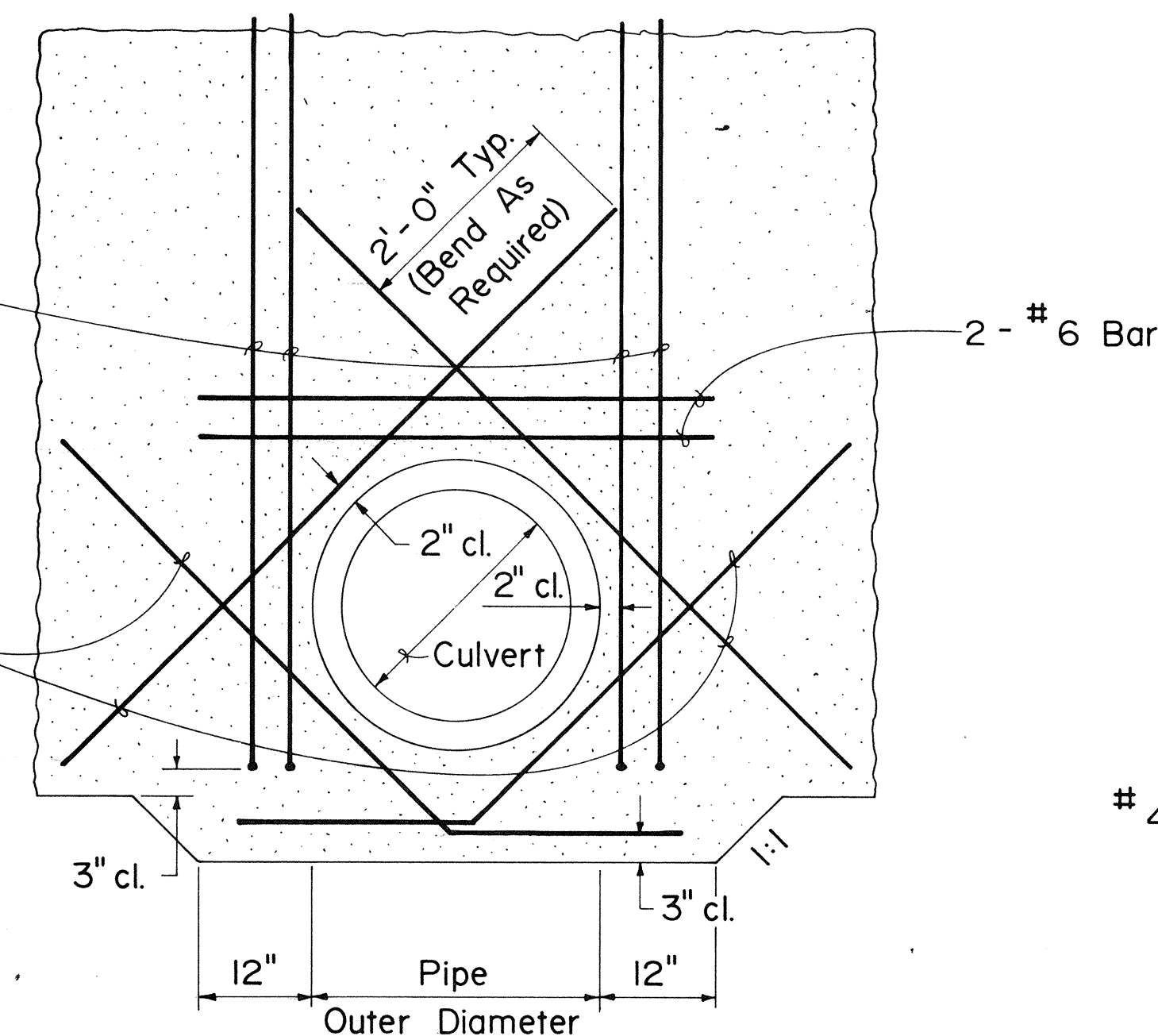
STANDARD DETAILS
TYPE A, B, C, & D
CATCH BASIN
Not To Scale
Date: Dec. 1980

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

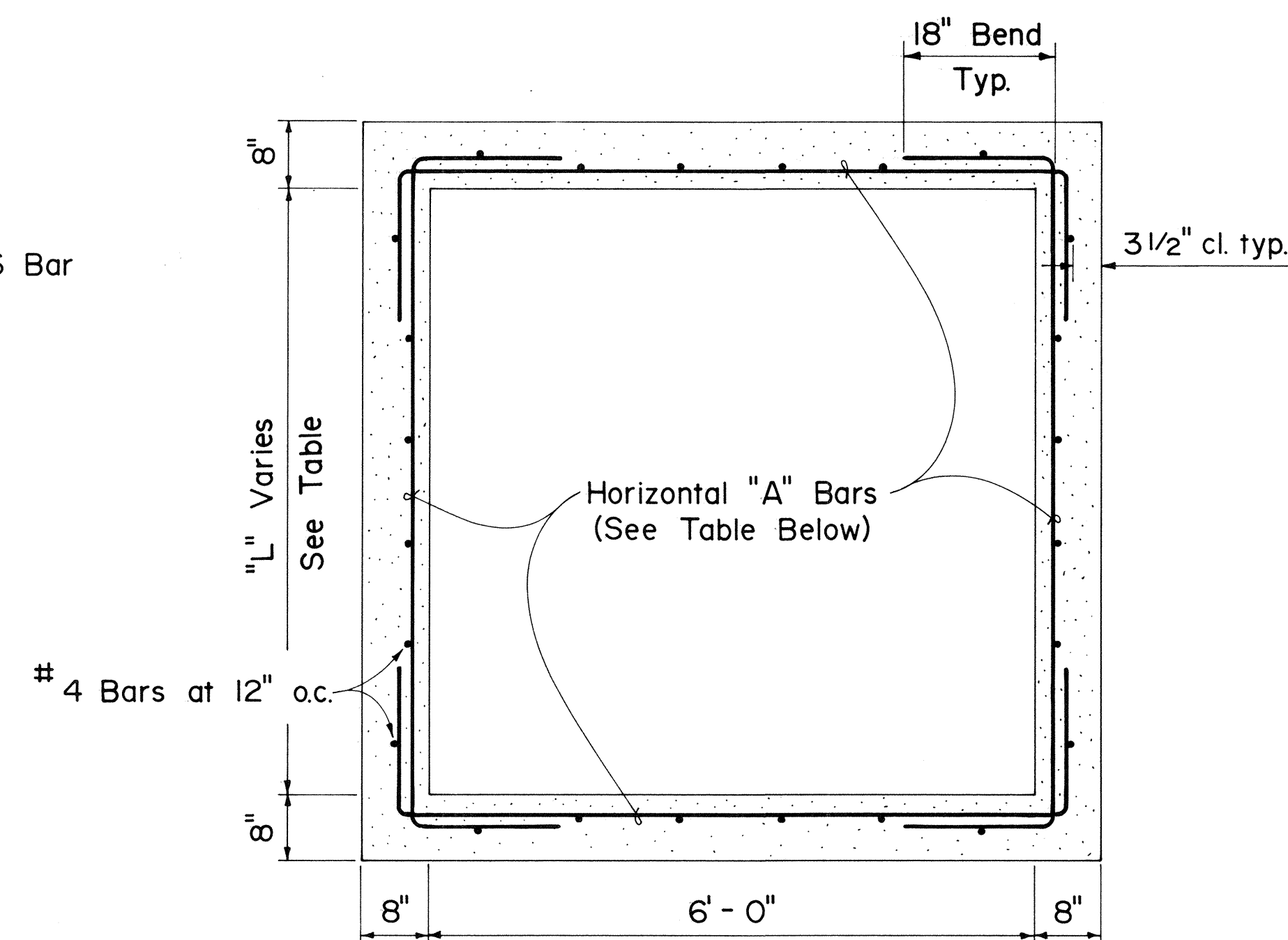
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1 (178)	1982	62	105



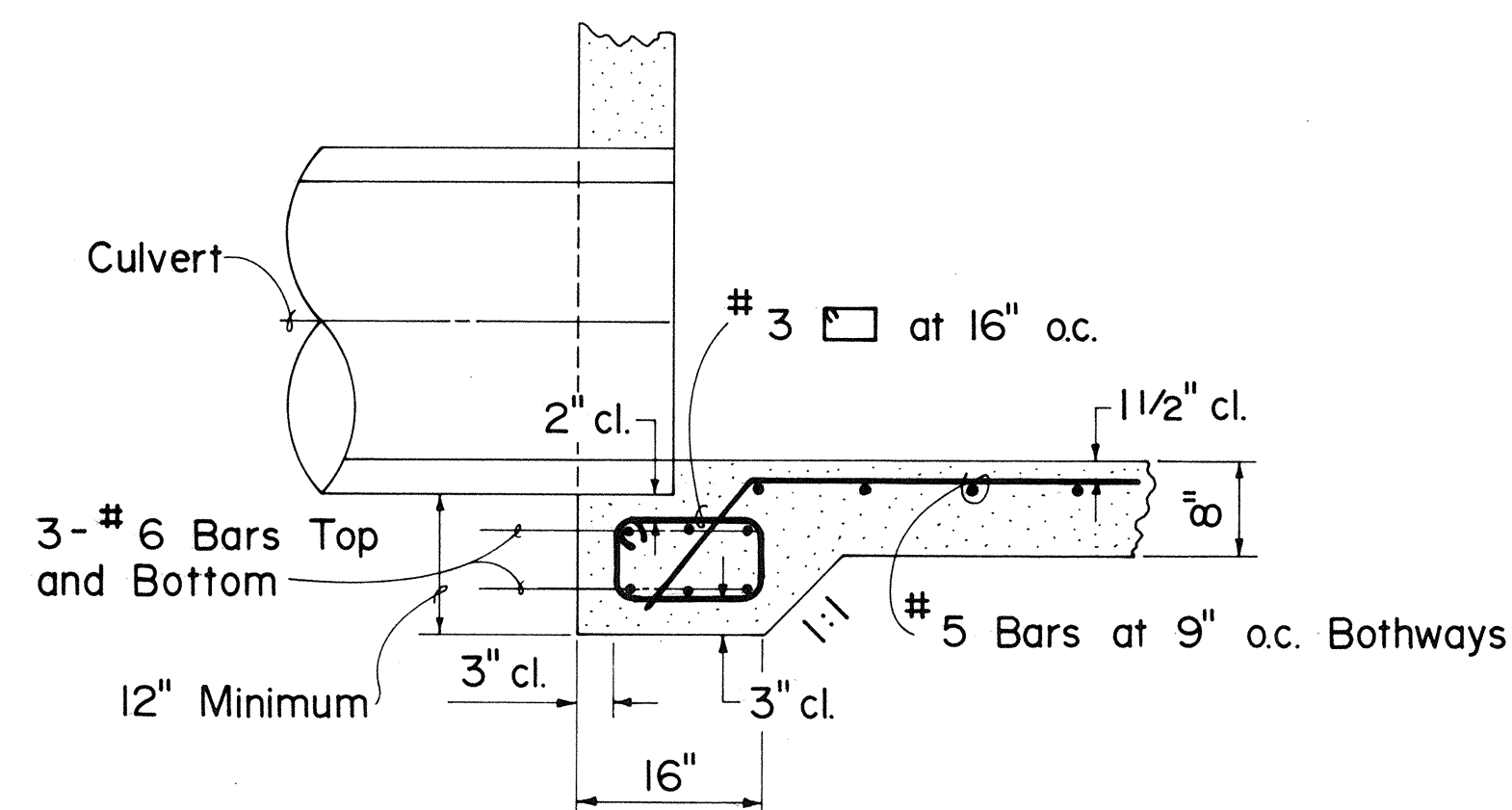
ELEVATION VIEW OF WALL SECTION



ADDED REINFORCING FOR CULVERT OPENINGS

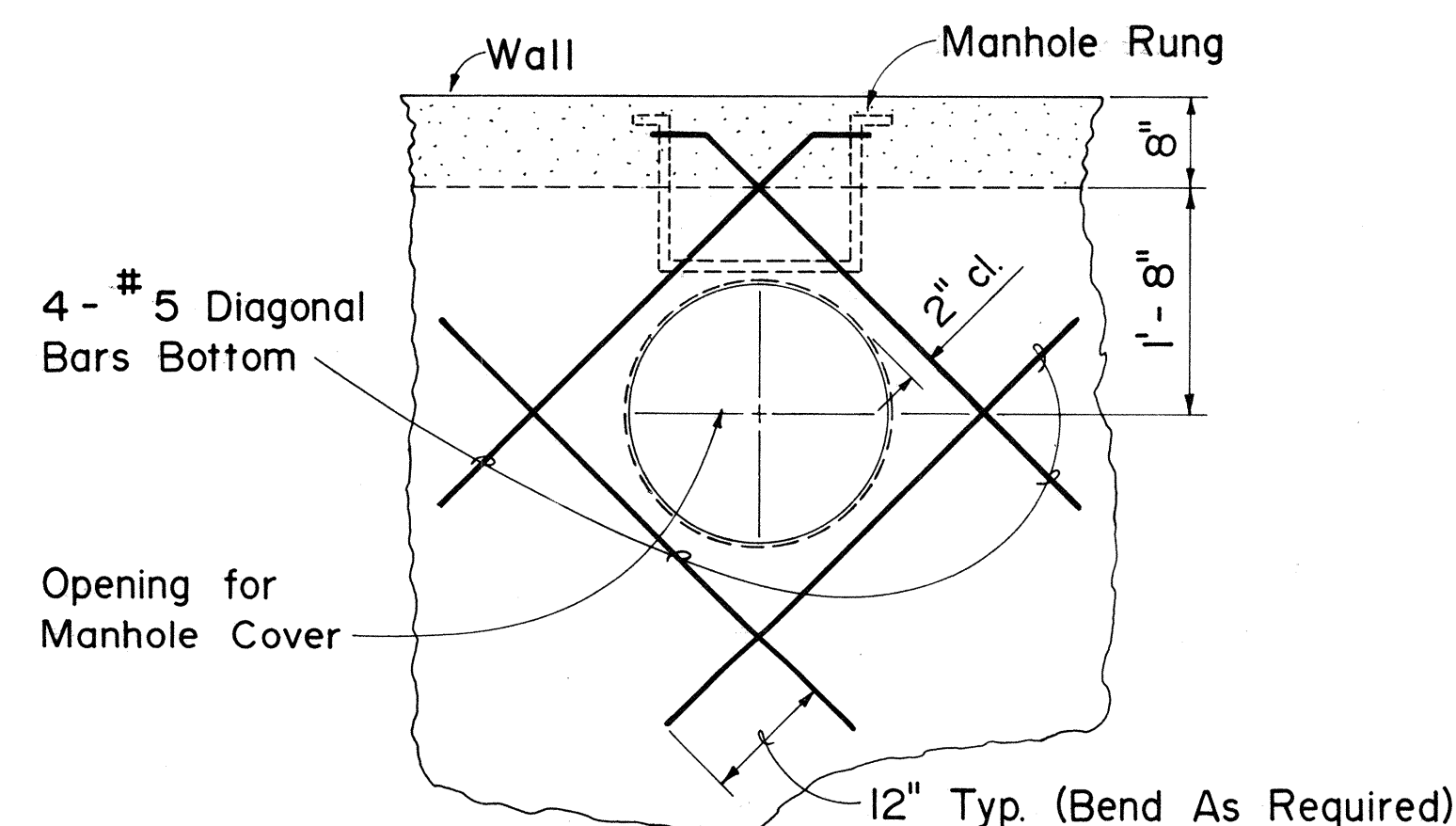


PLAN VIEW OF WALL SECTION



DETAIL OF CULVERT SEAT

HORIZONTAL "A" BARS					
"H" MAX. (FT.)	"L" MAX. (FT.)				
	4'-0"	6'-0"	7'-4"	8'-4"	9'-4"
0'-0" to 5'-0"	# 4 at 12" o.c.	# 4 at 10" o.c.	# 5 at 10" o.c.	# 5 at 8" o.c.	# 5 at 7" o.c.
5'-1" to 10'-0"	# 4 at 9" o.c.	# 5 at 9" o.c.	# 5 at 6" o.c.	N.A.	N.A.
10'-1" to 15'-0"	# 5 at 10" o.c.	# 5 at 6" o.c.	N.A.	N.A.	N.A.
15'-1" to 20'-0"	# 5 at 8" o.c.	N.A.	N.A.	N.A.	N.A.



ADDED REINFORCING FOR MANHOLE OPENING

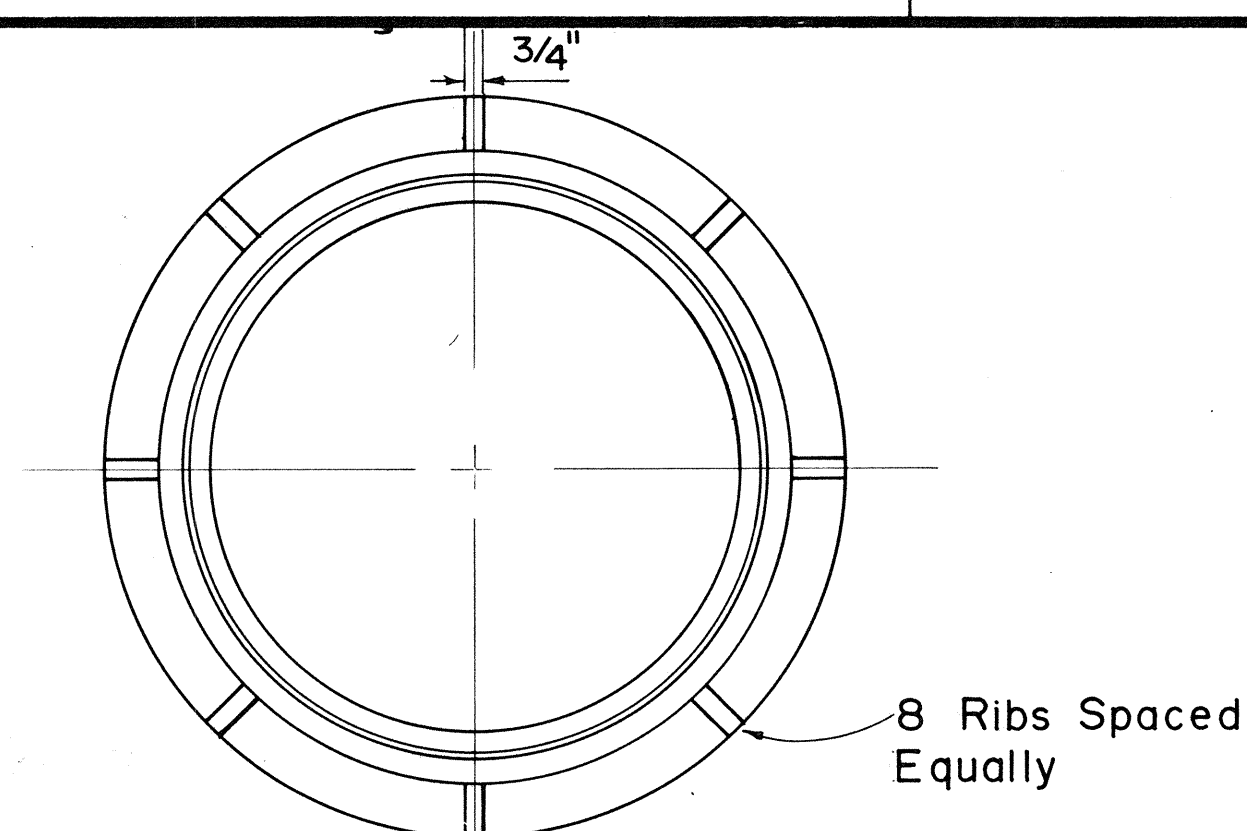
APPROVAL RECOMMENDED: *Shirley N. Lee* 12/3/80
HYDRAULIC DESIGN ENGINEER DATE
APPROVED: *Herbert Zafish* 12/4/80
ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE
1.	Replaces Sht. DH 4 approved 12-17-69	H.T.	12/4/80

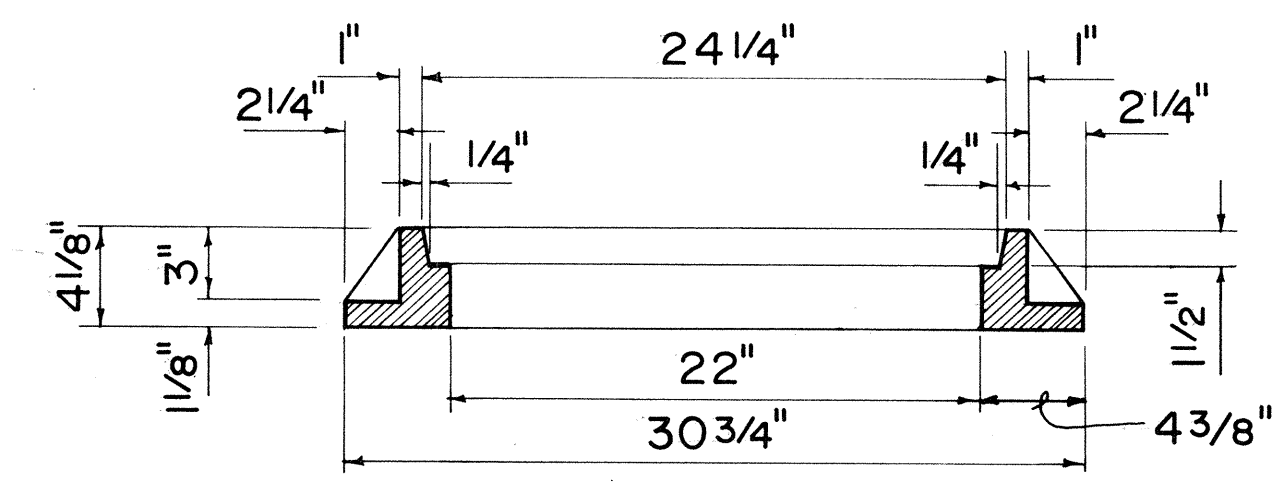
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
STANDARD DETAILS TYPICAL REINFORCING DETAILS FOR CATCH BASINS	
Not To Scale	Date: Dec. 1980

SHEET No. 30 OF 33 SHEETS DH 4

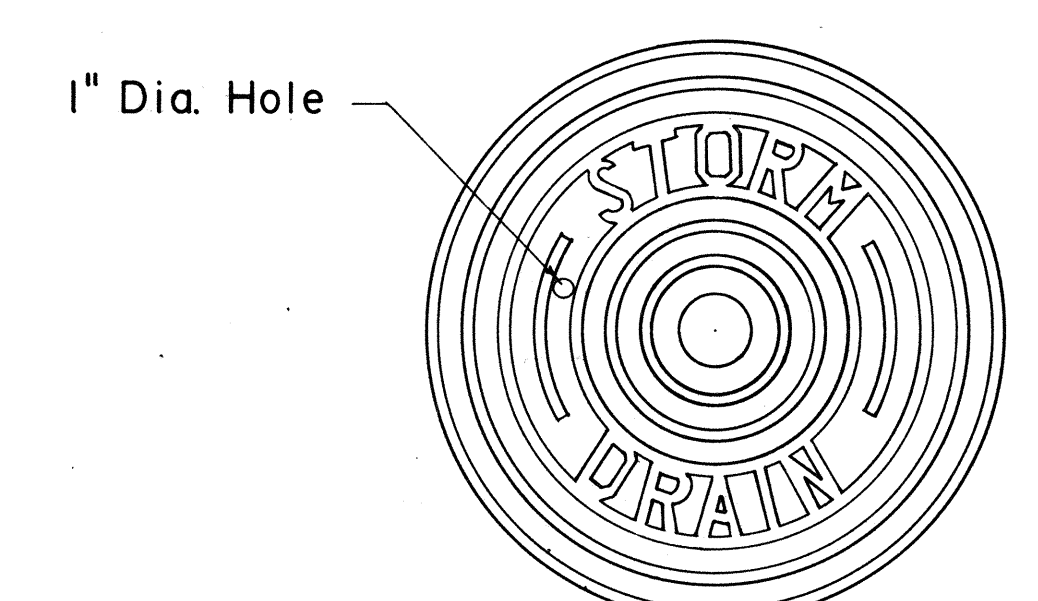
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H1-1 (178)	1982	63	165



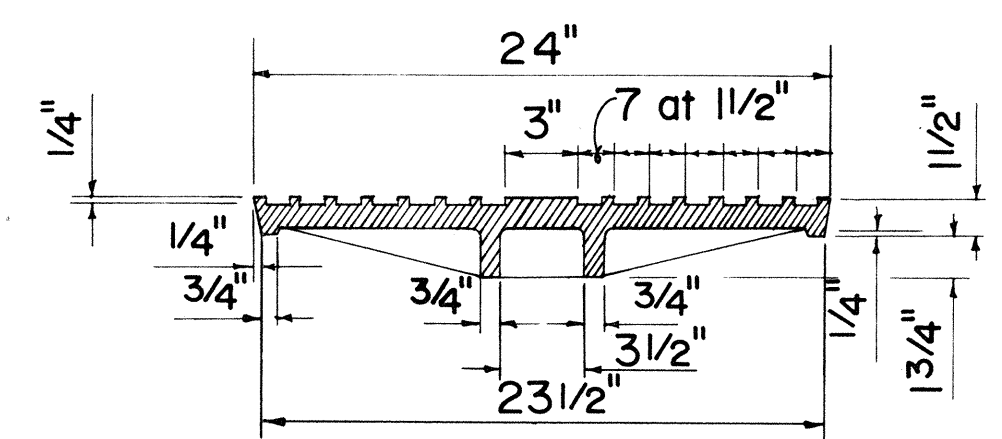
PLAN OF FRAME



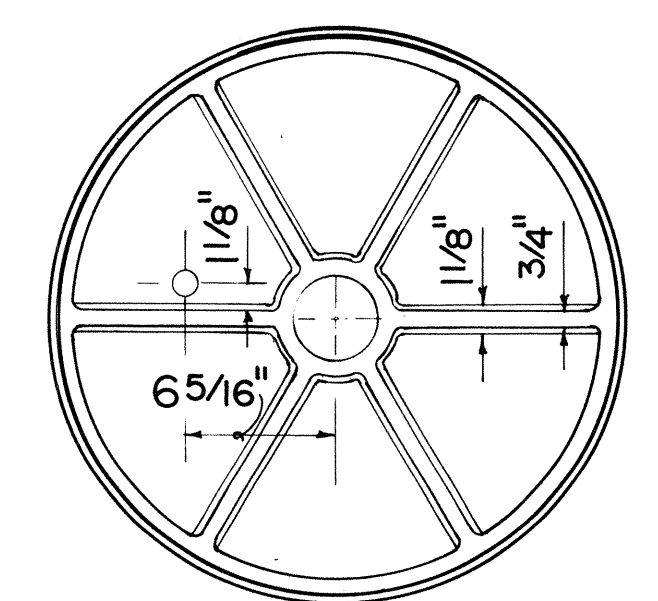
SECTION OF FRAME



TOP VIEW OF COVER

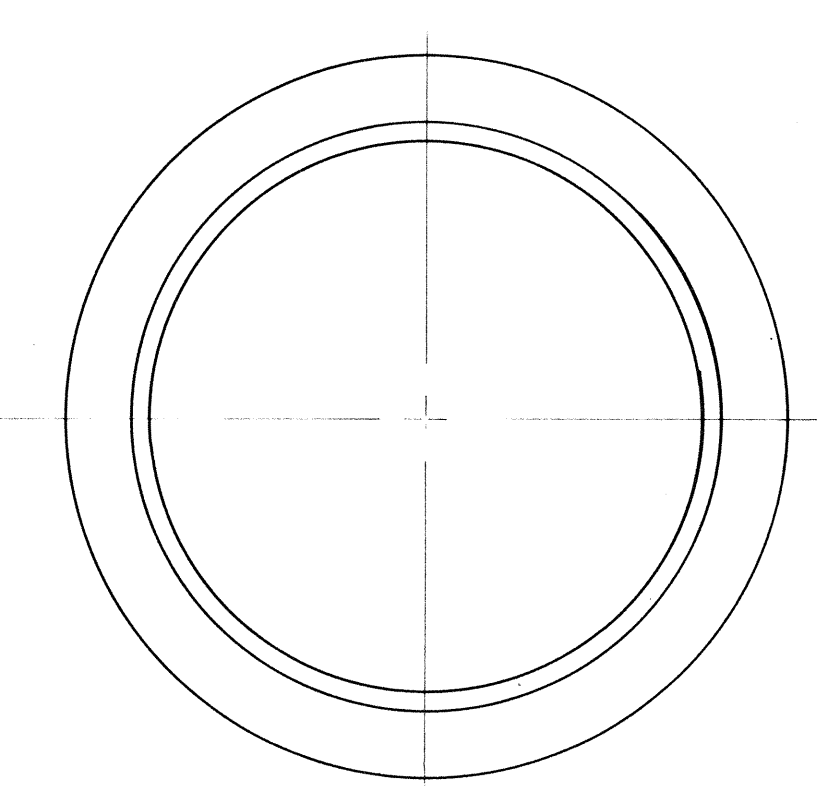


SECTION

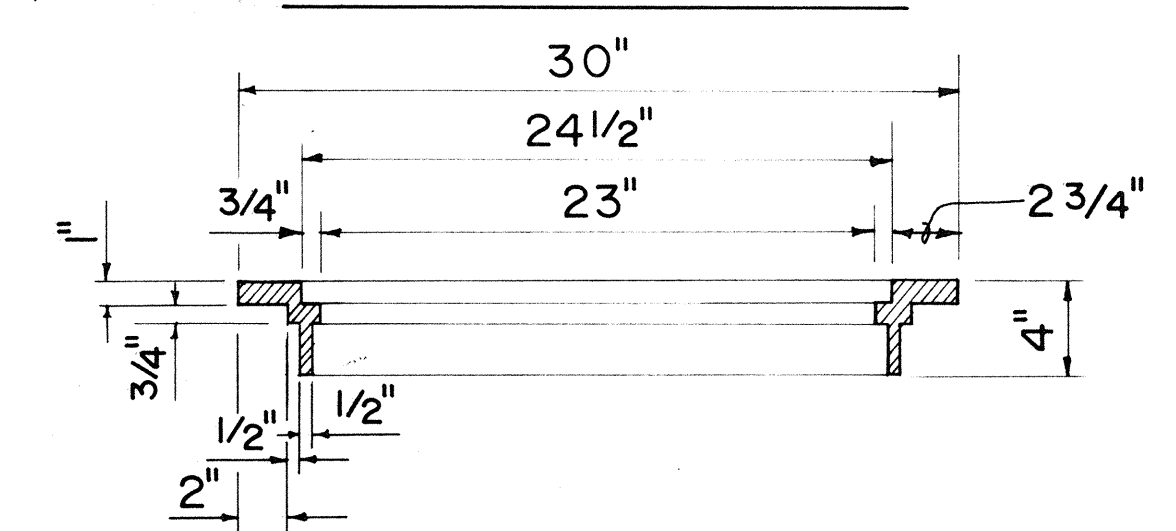


BOTTOM VIEW OF COVER

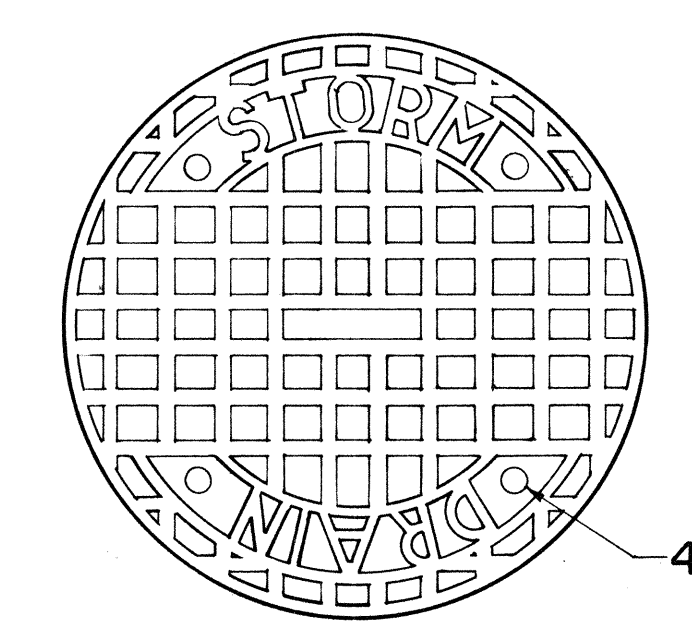
TYPE "P" CAST IRON FRAME AND COVER



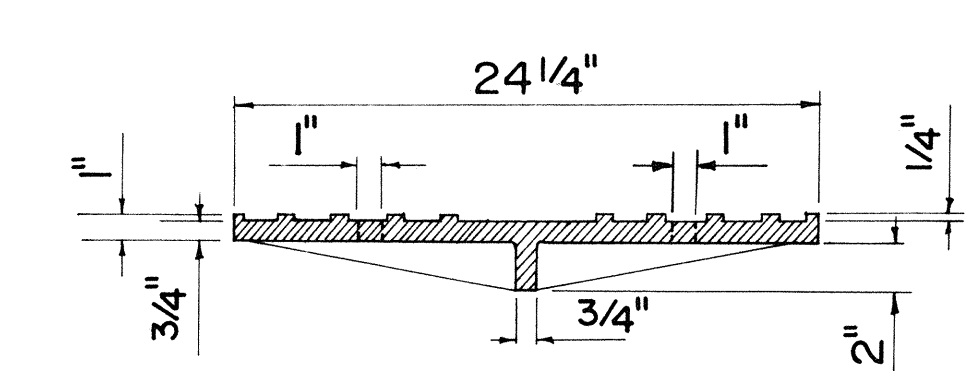
PLAN OF FRAME



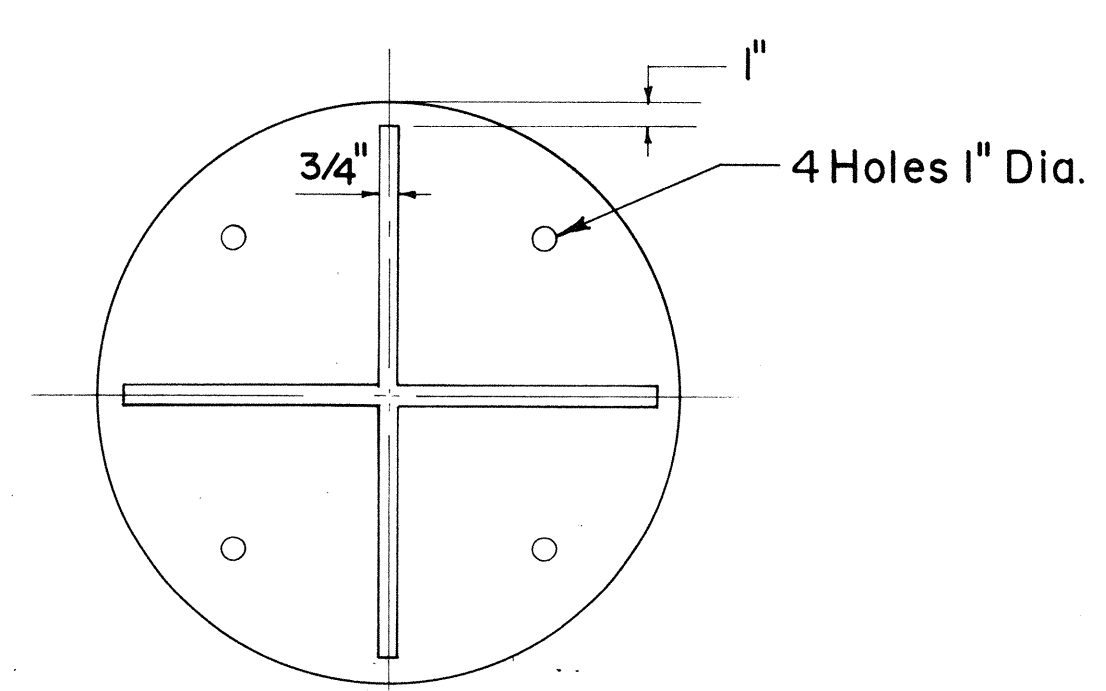
SECTION OF FRAME



TOP VIEW OF COVER

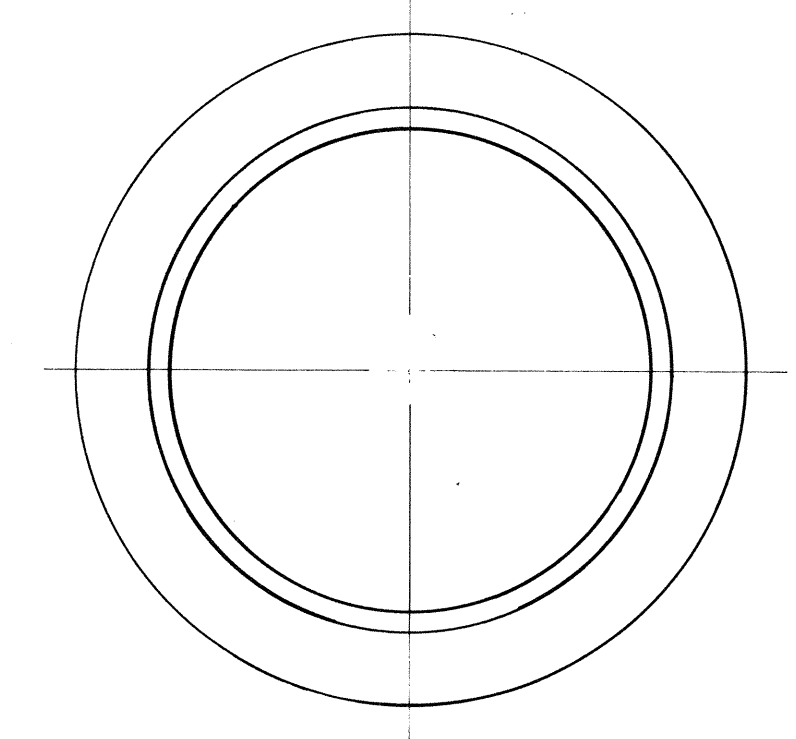


SECTION

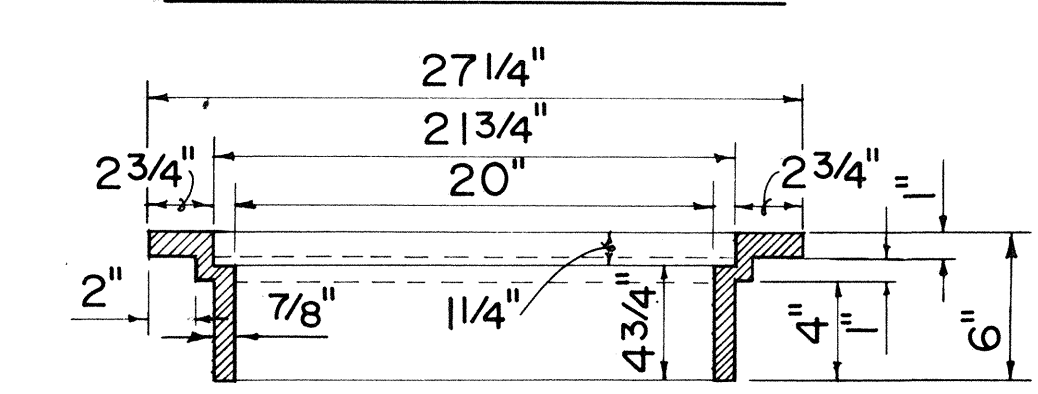


BOTTOM VIEW OF COVER

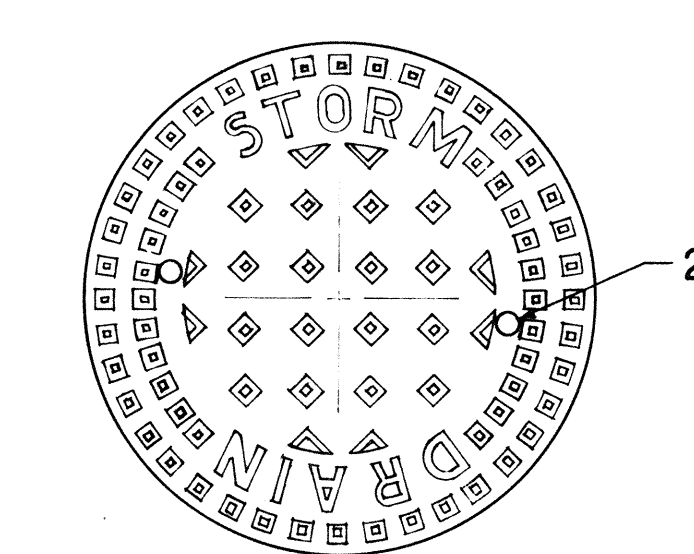
TYPE "B" CAST IRON FRAME AND COVER



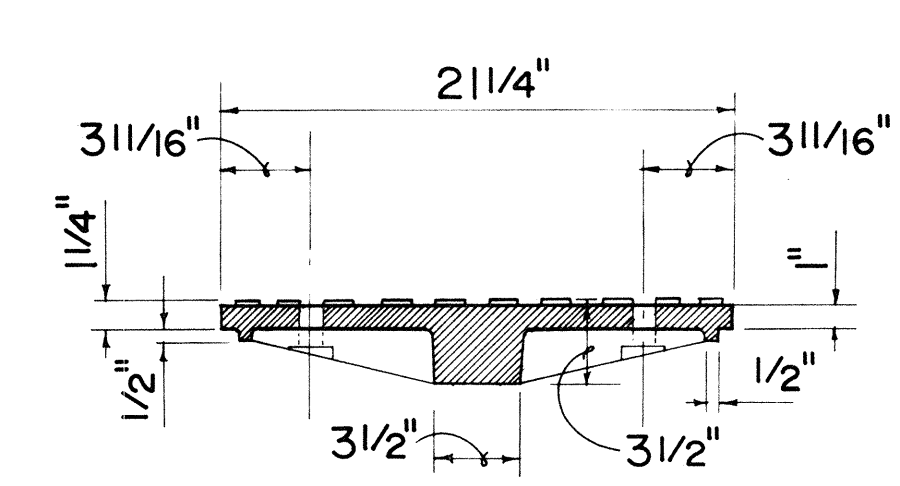
PLAN OF FRAME



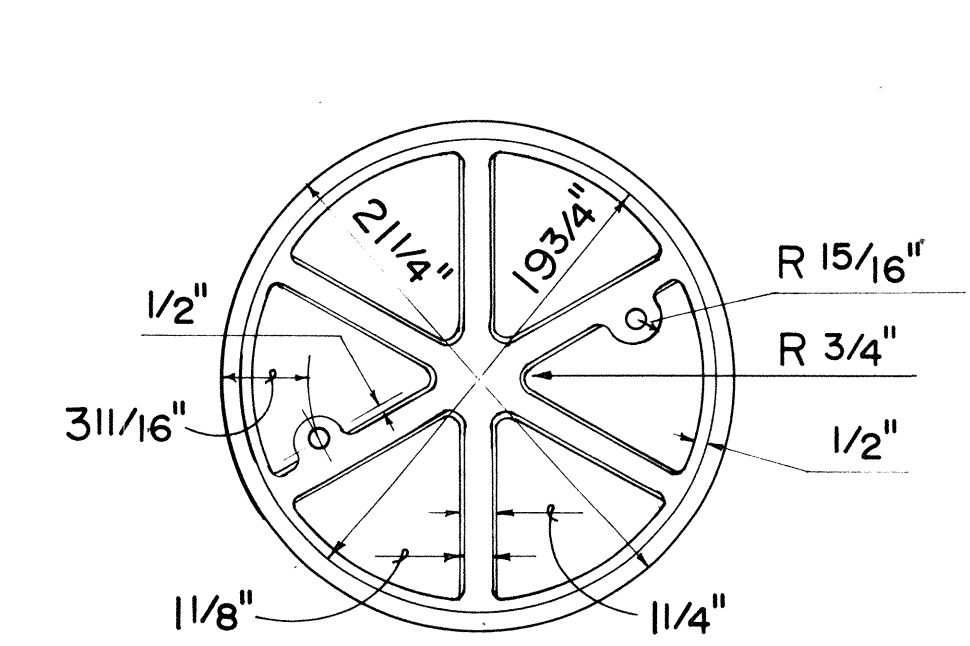
SECTION OF FRAME



TOP VIEW OF COVER

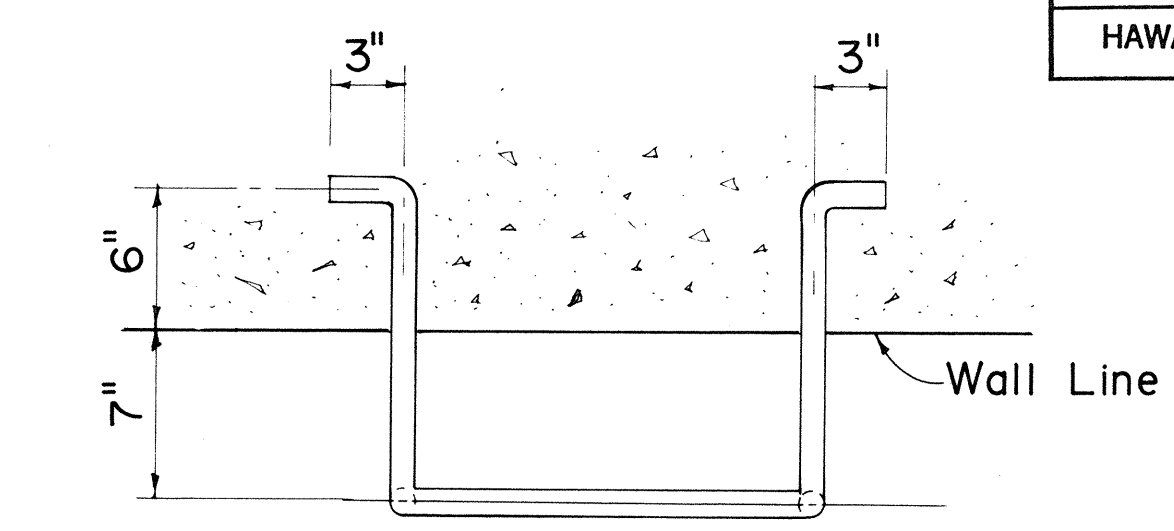


SECTION

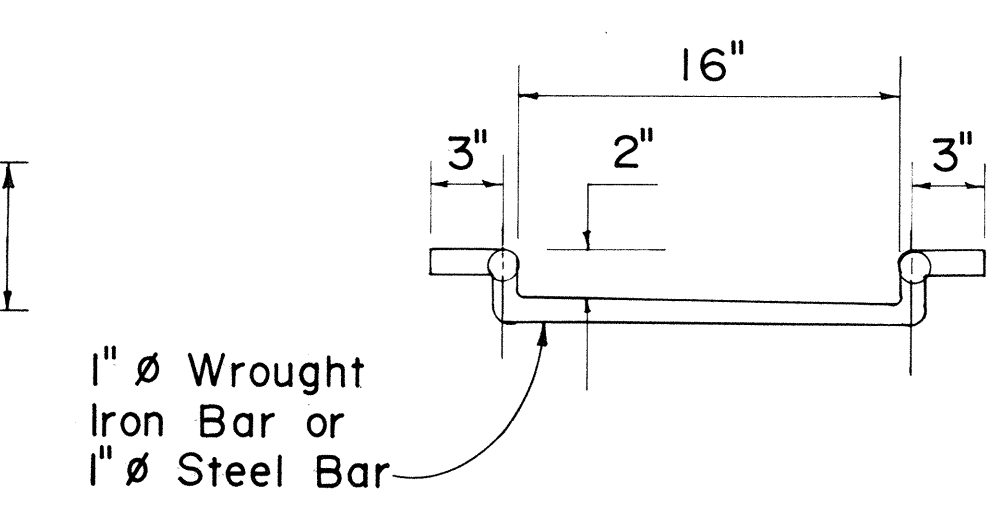


BOTTOM VIEW OF COVER

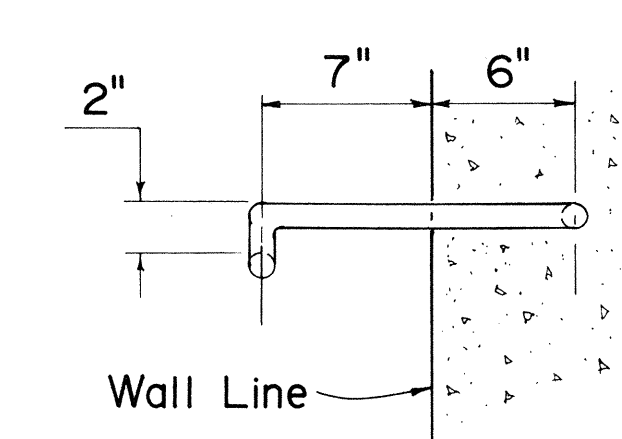
TYPE "A" CAST IRON FRAME AND COVER



PLAN



FRONT VIEW



SIDE VIEW

MANHOLE RUNG

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

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

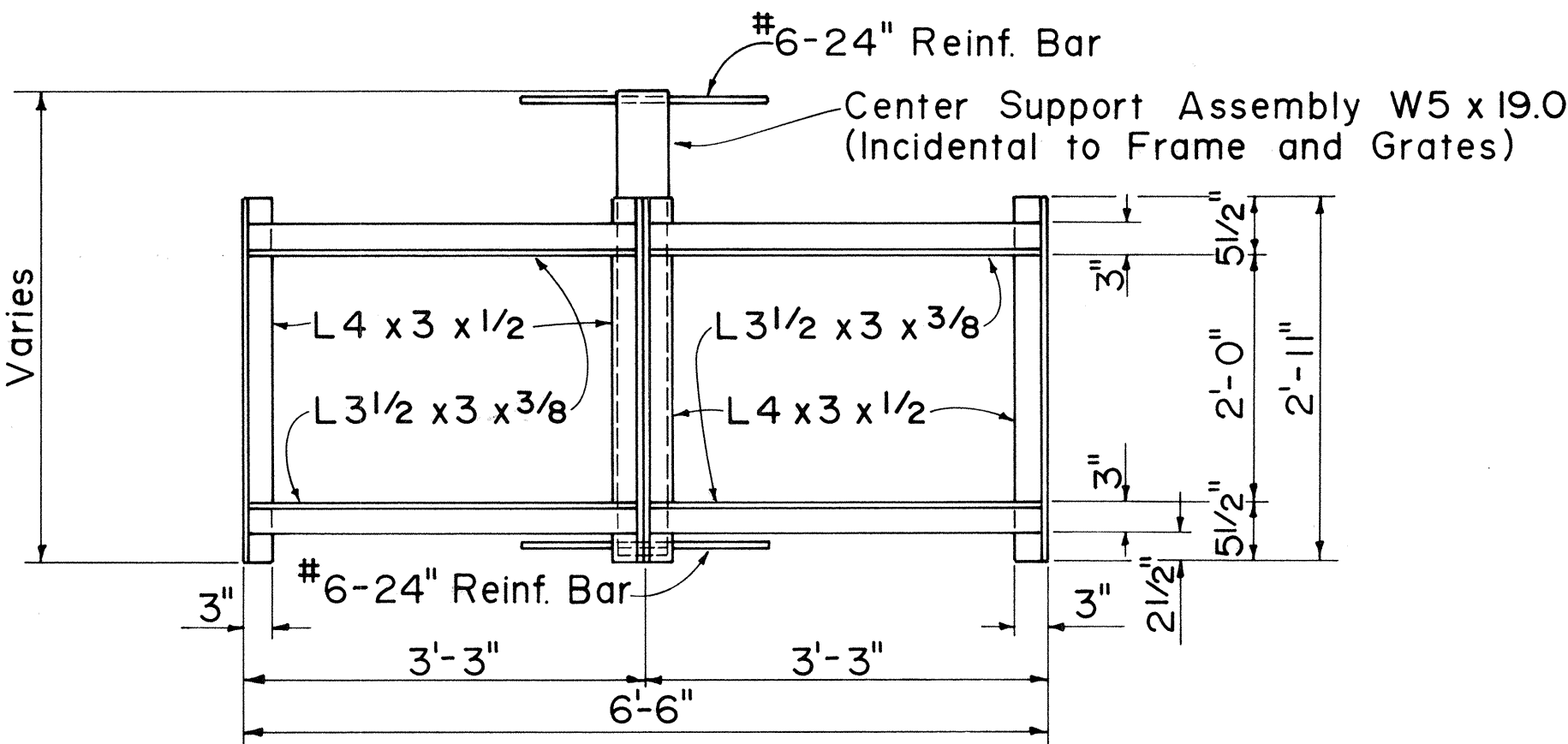
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

STANDARD DETAILS
 CATCH BASIN AND
 MANHOLE CASTINGS

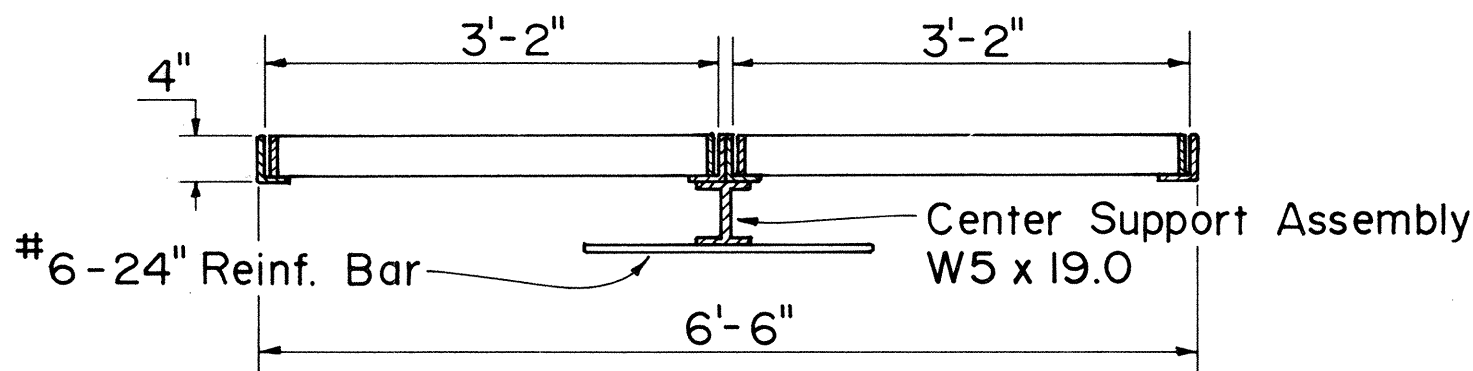
Not To Scale Date: Dec. 1977

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

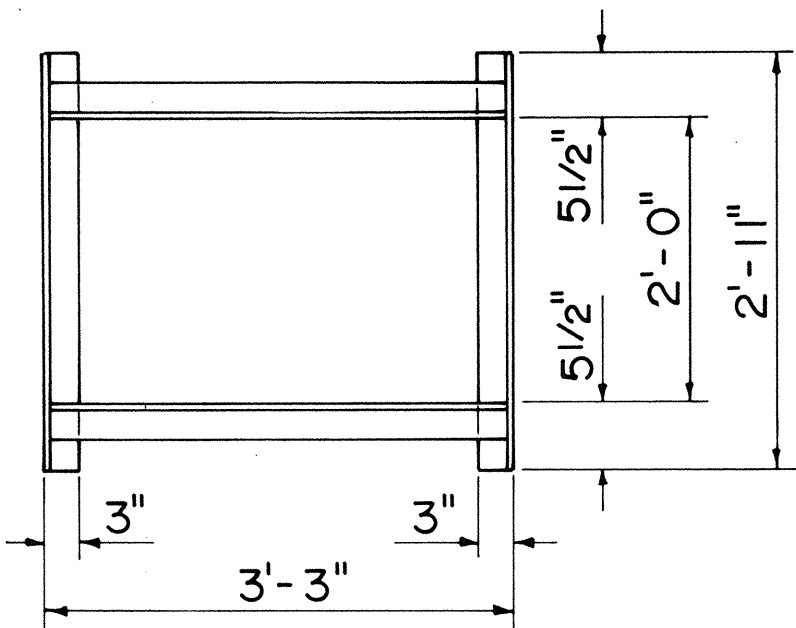
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H1-1 (178)	1982	64	165



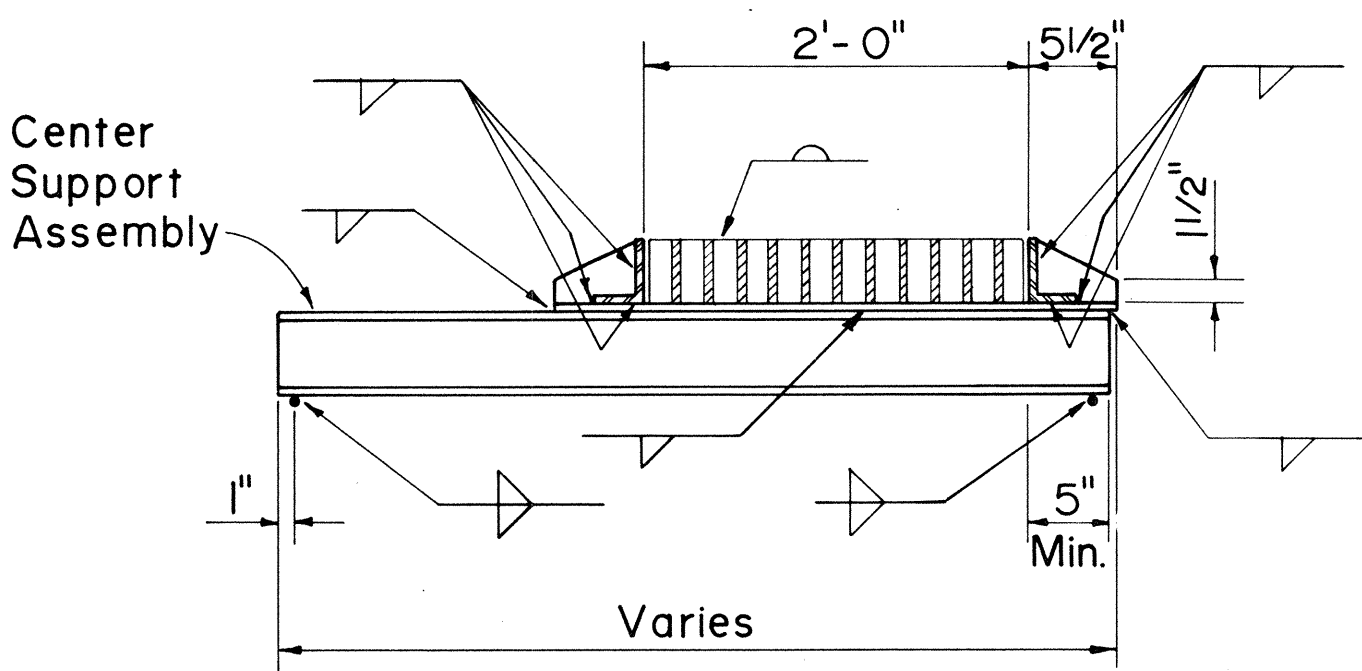
PLAN
(Two or More Grates)



LONGITUDINAL SECTION
(Thru Frame & Grate)

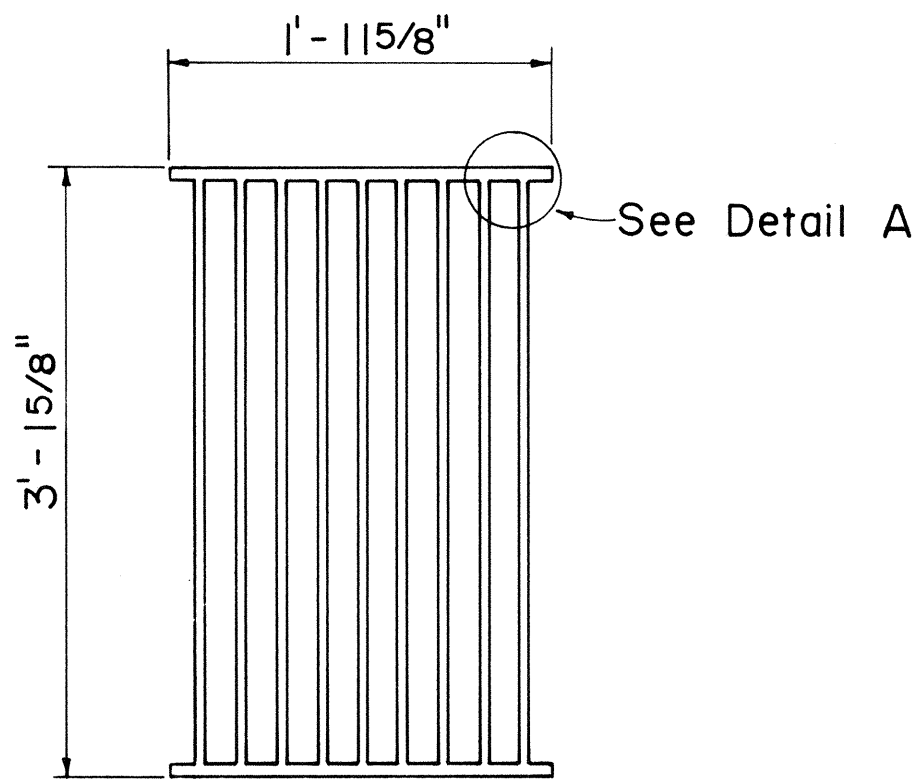


PLAN
(Single Grate)

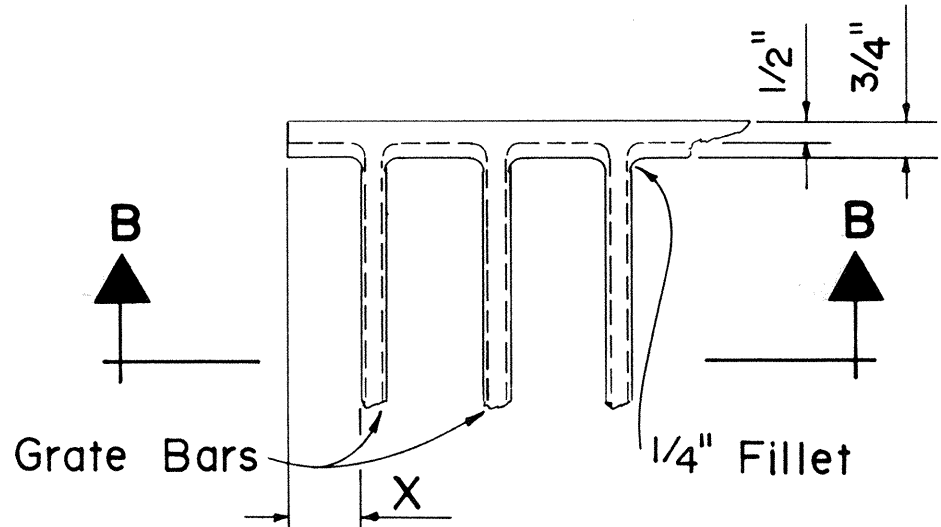


CROSS SECTION
(Thru Frame & Grate)

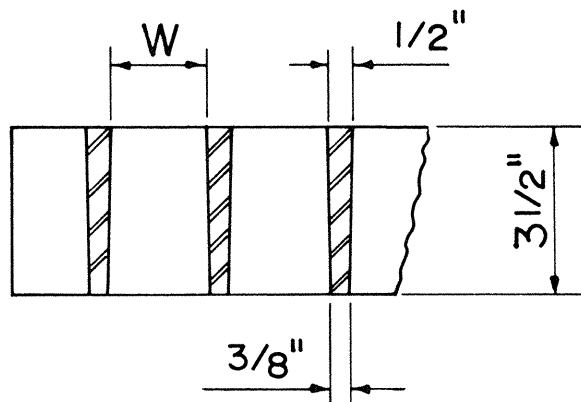
FRAME DETAILS



PLAN

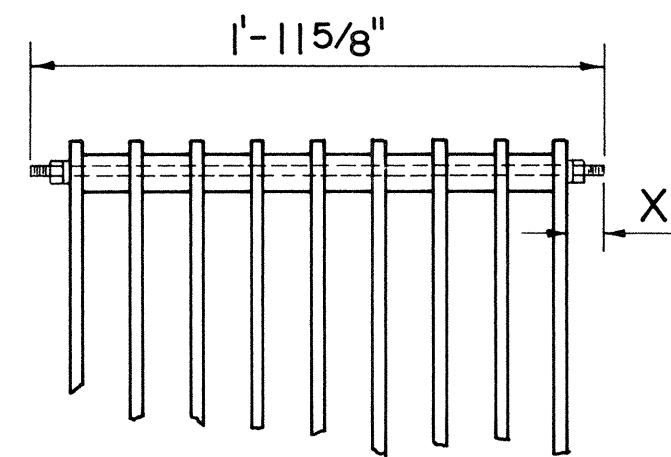


DETAIL A

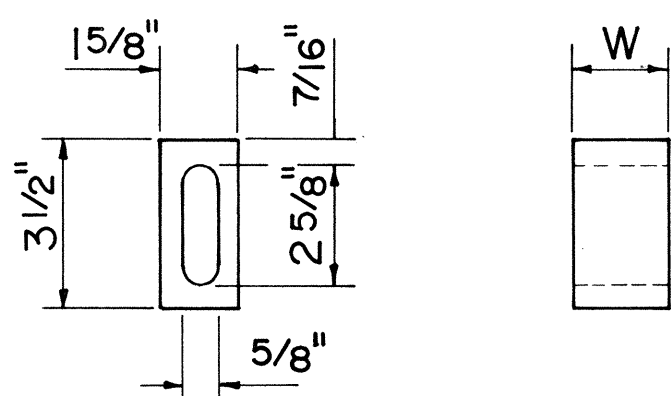


SECTION B-B

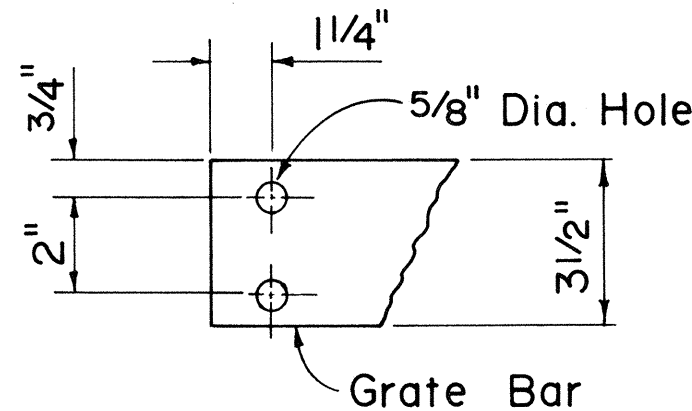
ALTERNATIVE CAST MALLEABLE IRON OR CAST STEEL GRATE



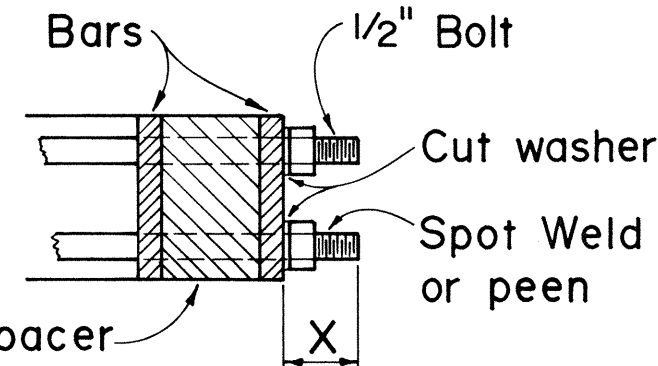
BOLTED END BLOCK



BAR SPACER

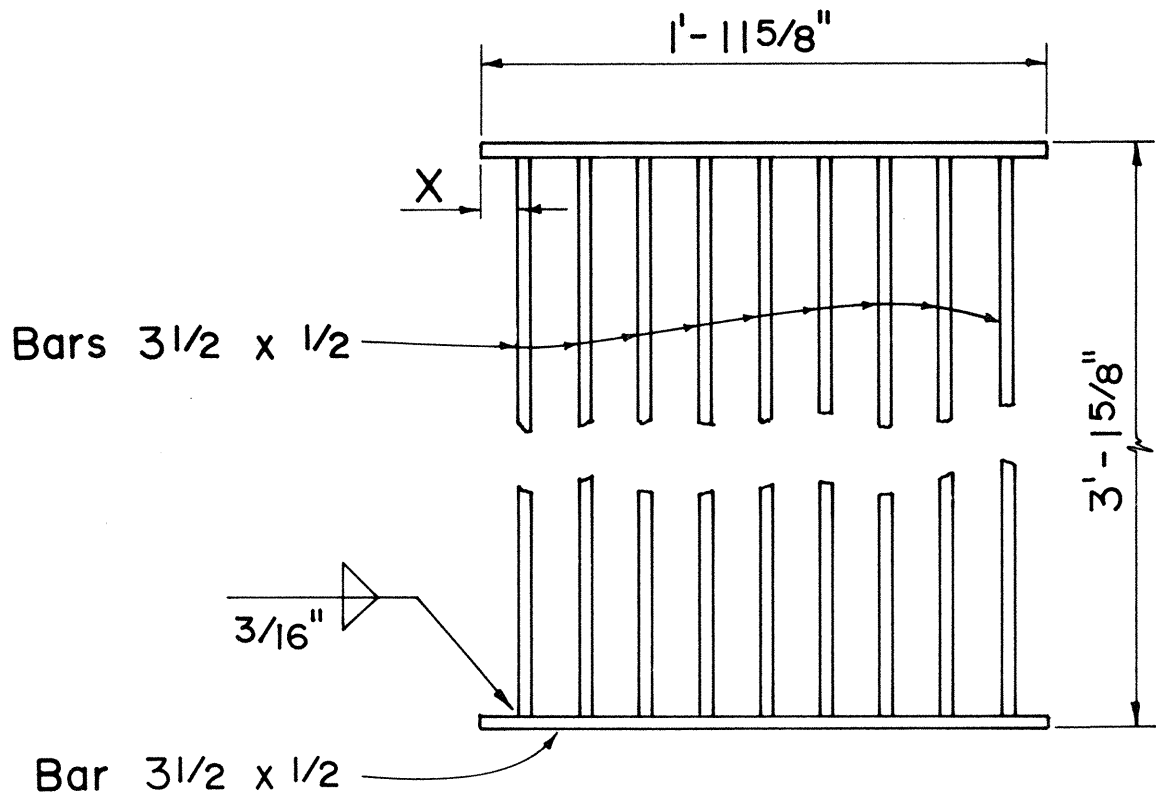


END OF BAR

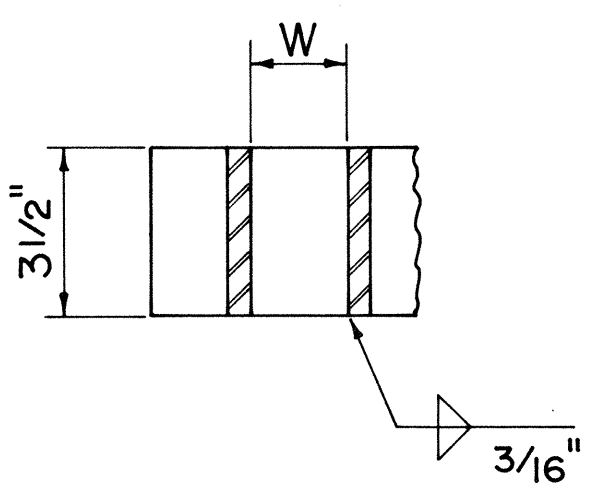


BOLTING DETAIL

ALTERNATIVE BOLTED GRATE



PLAN



SECTION

ALTERNATIVE WELDED GRATE

GRATE BAR SPACING TABLE			
TYPE	NO. BARS	CLEAR BAR SPACING-W	X
A-9	9	2"	19/16"
A-12	12	1 3/8"	1 1/4"

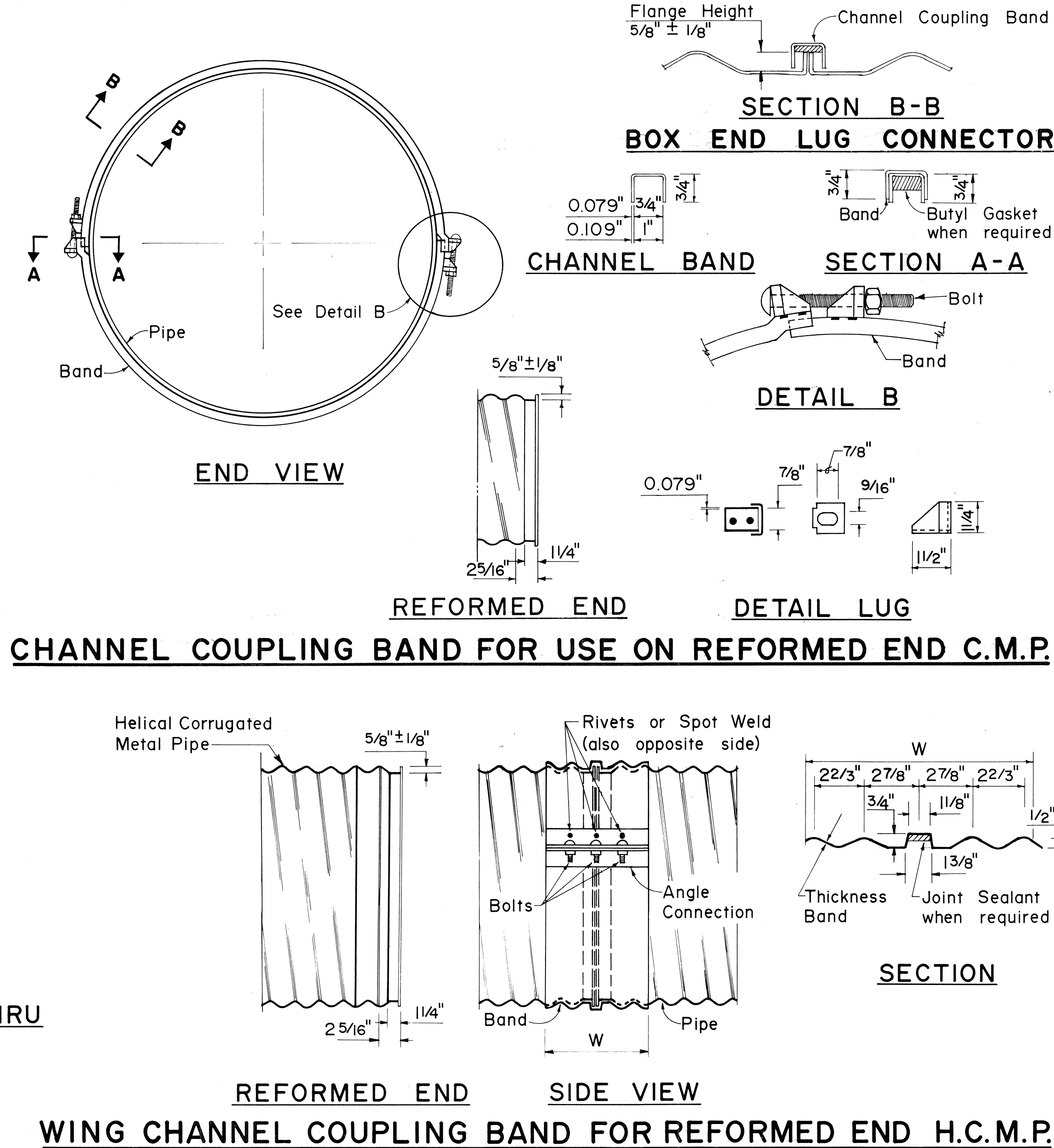
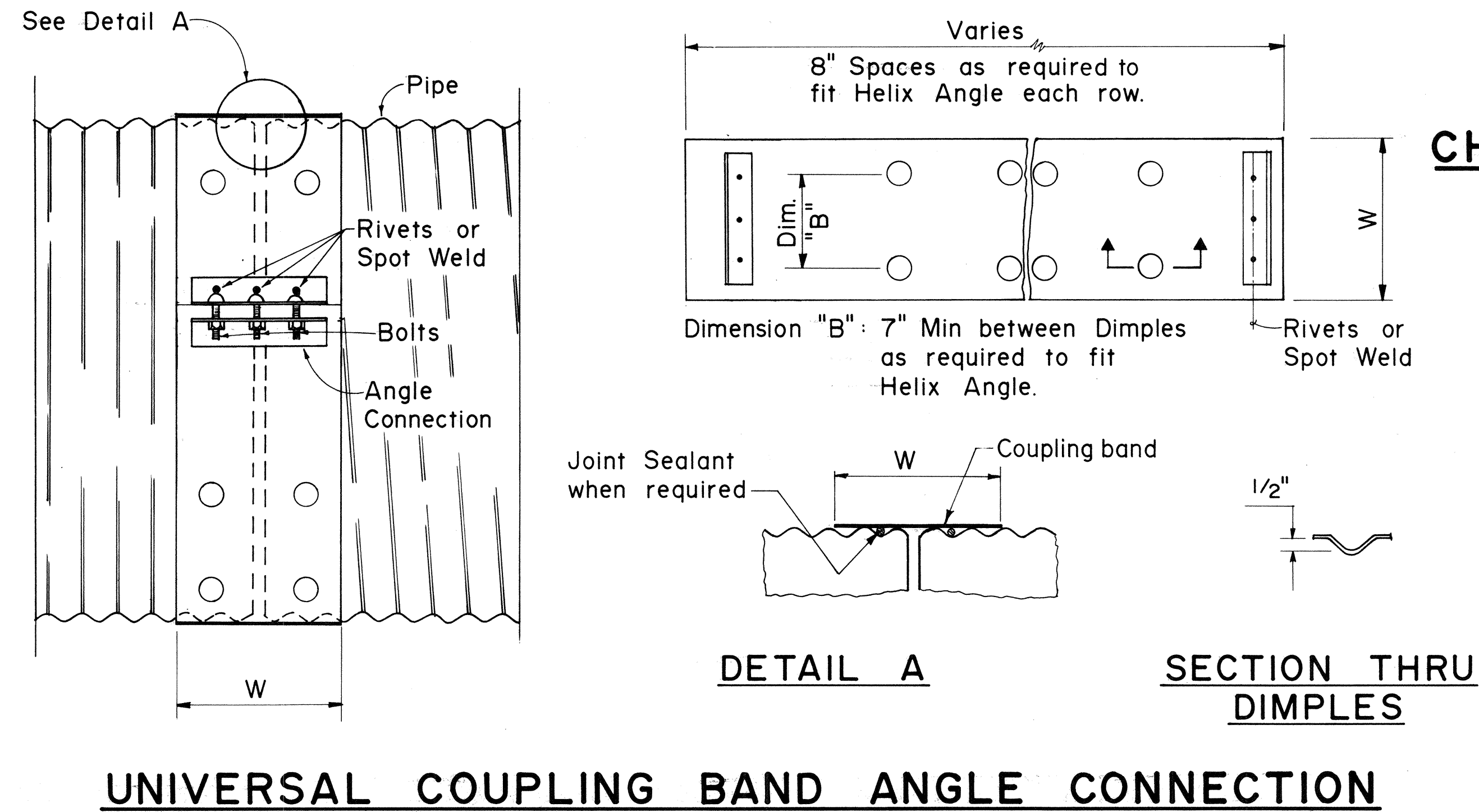
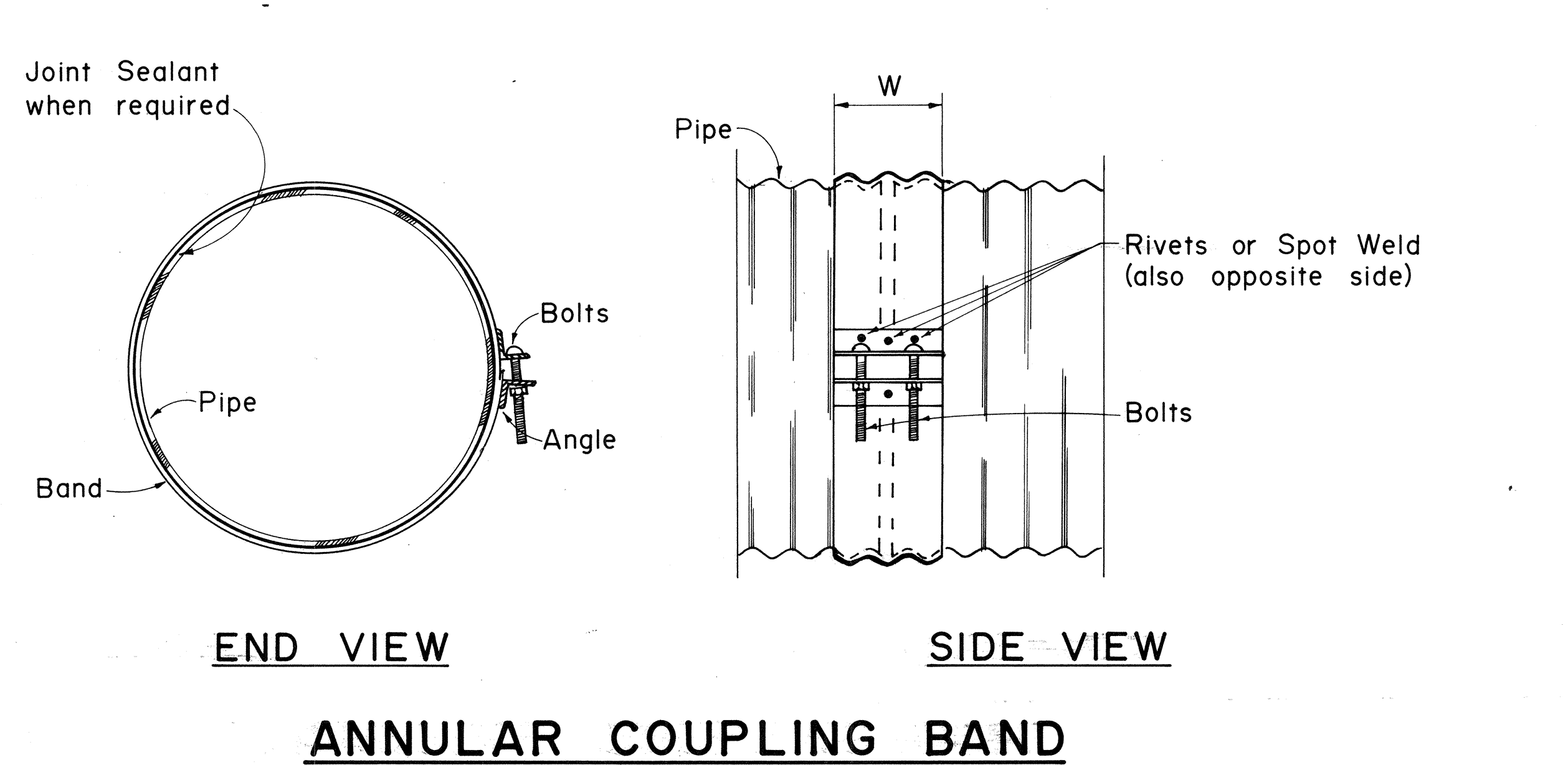
NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 7 approved 12-17-69	H.T.	6/22/79
2.	Revise standard nomenclature for rolled steel shapes.	H.T.	4/21/82

APPROVAL RECOMMENDED:
P. J. J. J. 6-19-79
 HYDRAULIC DESIGN ENGINEER DATE
 APPROVED:
Herbert J. J. J. 6-22-79
 ASSISTANT CHIEF, ENGINEERING 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. 32 OF 33 SHEETS DH 7

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-(178)	1982	65	165



GENERAL NOTES

1. All coupling band connection hardware shall be galvanized or electro plated in accordance with Standard Specifications.
2. For pipe arches use same width band as for round pipe of same periphery.
3. Two pieces band required for pipe greater than 48" diameter.
4. Fillet welds of equivalent strengths may be substituted for spot welds or rivets.
5. Dimensions and thickness shown are in inches and are nominal.
6. Band thickness shall be not more than 2 standard thicknesses lighter than the thickness of the pipe; and, in no case shall be lighter than 0.079 inch.

ORIGINAL PLAN	DATE
SURVEY PLOTTED BY	
DESIGNED BY	
NOTED BY	
CHECKED BY	

COUPLING TYPE	CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS	ANGLE CONNECTIONS-QUANTITIES PER CONNECTION	DIMENSIONS	BOLTS	RIVETS	SPOT WELD
UNIVERSAL	22/3 x 1/2	12 - 36	10 1/2	0.079-0.138	2ea 2x2x3/16 x 7	2 ea 1/2 x 6	3ea 3/8	3ea 1/2	
		42- 60	16 1/2	0.168	2ea 2x2x3/16 x 12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2	
		66-84	16 1/2	0.168	2ea 2x2x3/16 x 12	3 ea 1/2 x 6	4ea 3/8		
	3 x 1	36- 72	10 1/2	0.079-0.138	2ea 2x2x3/16 x 7	2 ea 1/2 x 6	3ea 3/8		
ANNULAR	22/3 x 1/2	78-120	16 1/2	0.079-0.138	2ea 2x2x3/16 x 12	3 ea 1/2 x 6	4ea 3/8		
		12 - 36	7	0.079-0.138	2ea 2x2x3/16 x 7	2 ea 1/2 x 6	3ea 3/8	3ea 1/2	
		42- 72	12	0.079-0.168	2ea 2x2x3/16 x 12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2	
	3 x 1	78- 84	12	0.168	2ea 2x2x3/16 x 12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2	
		36- 42	14	0.079-0.109	2ea 2x2x3/16 x 12	3 ea 1/2 x 6	4ea 3/8		
		48- 84	14	0.079-0.109	2ea 2x2x3/16 x 12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2	
		90-120	14	0.079-0.109	2ea 2x2x3/16 x 12	3 ea 1/2 x 6	4ea 3/8		

COUPLING TYPE	CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS	LUG TYPE CONNECTORS-QUANTITIES PER CONNECTION	DIMENSIONS	BOLTS	SPOT WELD
CHANNEL	22/3 x 1/2	12 - 72		0.079-0.138	2 ea Lugs	1 ea 1/2 x 6	4 ea 1/2	
	3 x 1	36- 72		0.079-0.138	2 ea Lugs	1 ea 1/2 x 6	4 ea 1/2	
WING	22/3 x 1/2	12 - 72	12	0.079-0.138	6 ea Lugs	3 ea 1/2 x 6	12 ea 1/2	
	3 x 1	78- 84	12	0.168	6 ea Lugs	3 ea 1/2 x 6	12 ea 1/2	
		36-120	12	0.079-0.109	6 ea Lugs	3 ea 1/2 x 6	12 ea 1/2	

APPROVAL RECOMMENDED:

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

APPROVED:

Richard S. P. P. 9-14-79
ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

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

Not To Scale Date: Sept. 1979

SHEET No. 33 OF 33 SHEETS DH 18