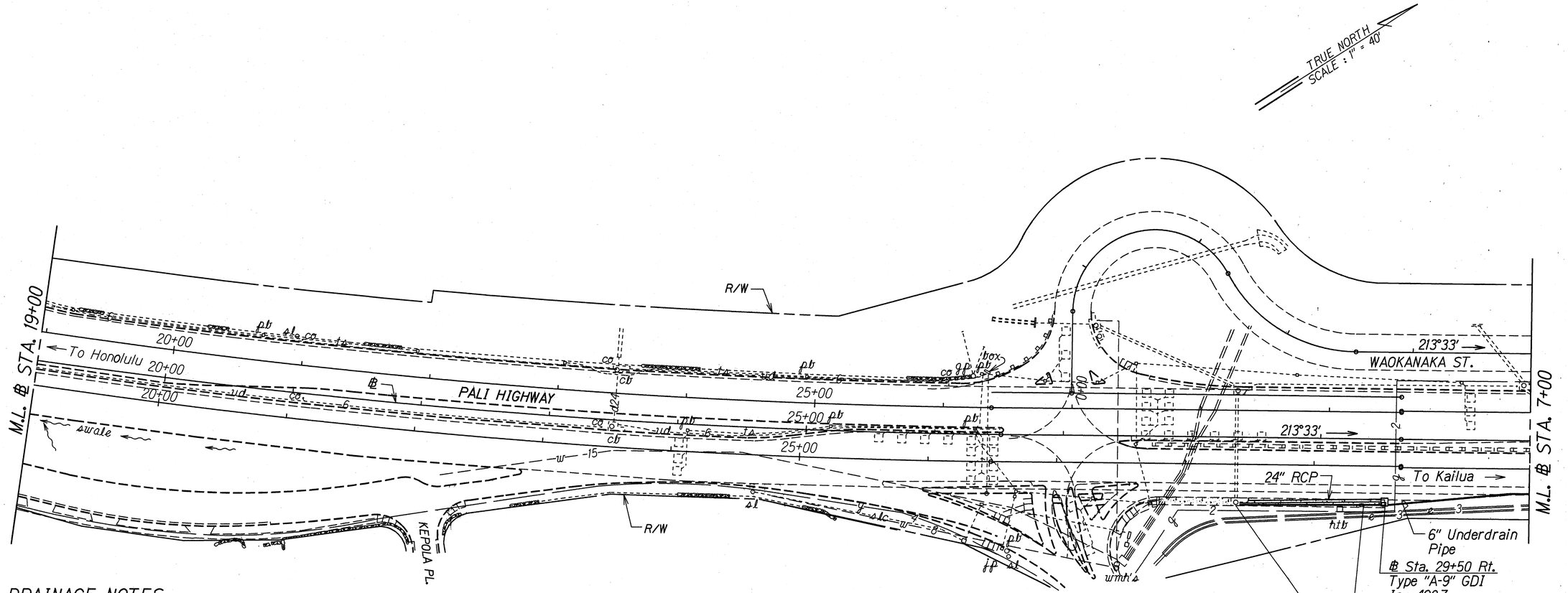
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	41	84



DRAINAGE NOTES:

1. Existing drainage systems will be functional at all times during construction. The Contractor is to furnish materials, equipment, labor, tools and incidentals necessary to accomplish maintenance of flow. The cost shall be incidental to the various Contract Items.
2. Existing culvert and spillway systems within the project limits may require removal of silt and debris material. The Engineer will pay for cleaning of existing culverts and spillways on a force account basis under Item No. 603.5001, "Clean Existing Culverts".
3. The Contractor shall verify the locations of all existing culverts and utilities in the field. Any existing culverts and utilities damaged during construction shall be repaired or replaced by the Contractor at his own expense.
4. 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 ¾", and voids after installing dowels shall be filled with epoxy grout as directed by the Engineer.
5. The following work shall not be paid for separately but shall be considered incidental to the various Contract Items:
   a. Demolishing, removing, and disposing existing concrete drainage structures, and portions of existing spillways.
   b. 6" Underdrain connections to: existing drainage structures and spillways, and new concrete drainage structures.
   c. 24" RCP connections to existing and new concrete drainage structures.
6. For details of 6" underdrain connections to concrete drainage structures and grouted rubble paving spillways, see Sheet No. H23.
7. For added reinforcing around culverts at new drainage structures, see Standard Plan H-04.
8. For Culvert Trench and Backfill Detail, see Sht. No. H23.
9. Concrete shall be Class A unless otherwise noted.
10. Chamfer all exposed concrete edges 1".

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 4/3/97
	DRAWN BY A. Nomura	
NOTE BOOK dh2curtis&jm	TRACED BY	
	DESIGNED BY C. Matsuda	
N:\pall\bl.dgn	QUANTITIES BY	
	CHECKED BY	

℄ Sta. 29+50 Rt.
Construct: Type "A-9" GDI
(For Typ. Details see Sht. No. H18)
Install: 24" RCP, Class III
(For Profile see Sht. No. H10)
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 124 C.Y.
Bedcourse Material	= 22 C.Y.
24" RCP, Cl. III	= 112 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 108 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

DATE	REVISION
6/13/97	Revised Drainage Plans.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

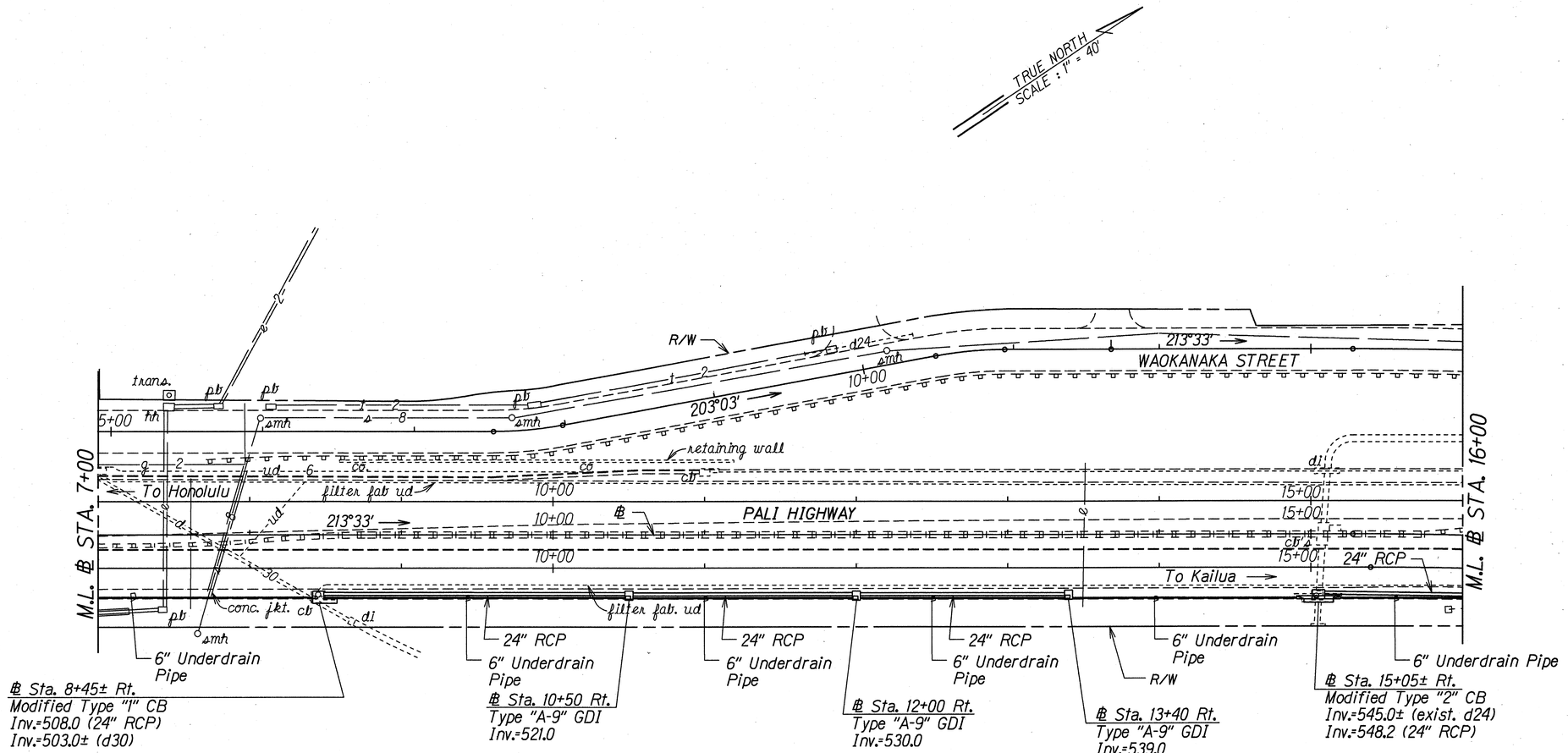
PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

Scale: 1"=40' Date: May 1997

SHEET No. H1 OF 24 SHEETS

ADD. 41

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	42	84



℄ Sta. 8+45± Rt.
Modified Type "I" CB
Inv.=508.0 (24" RCP)
Inv.=503.0± (d30)

℄ Sta. 10+50 Rt.
Type "A-9" GDI
Inv.=521.0

℄ Sta. 12+00 Rt.
Type "A-9" GDI
Inv.=530.0

℄ Sta. 13+40 Rt.
Type "A-9" GDI
Inv.=539.0

℄ Sta. 15+05± Rt.
Modified Type "2" CB
Inv.=545.0± (exist. d24)
Inv.=548.2 (24" RCP)

ORIGINAL PLAN	
SURVEY PLOTTED BY	
DRAWN BY	A. Nakata
TRACED BY	
DESIGNED BY	C. Matsuda
NOTE BOOK	dh02curt&pali
QUANTITIES BY	
CHECKED BY	
DATE	4/3/97

℄ Sta. 29+50 Rt. to
℄ Sta. 8+45± Rt.
Install: 6" Underdrain Pipe

Estimated Quantities
6" Perforated Underdrain Pipe = 248 L.F.
6" Nonperforated Underdrain Pipe = 4 L.F.

℄ Sta. 8+45± Rt.
Construct: Modified Type "I" CB
(For Details see Sht. Nos. H12 & H13)

Estimated Quantity
Modified Type "I" CB,
1.00 ft. to 1.99 ft. = 1 EA.

℄ Sta. 10+50 Rt.
Construct: Type "A-9" GDI
(For Typ. Details see Sht. No. H18)
Install: 24" RCP, Class III
(For Profile see Sht. No. H10)
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 206 C.Y.
Bedcourse Material	= 40 C.Y.
24" RCP, Cl. III	= 200 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 196 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 12+00 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 150 C.Y.
Bedcourse Material	= 29 C.Y.
24" RCP, Cl. III	= 146 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 142 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 13+40 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 140 C.Y.
Bedcourse Material	= 27 C.Y.
24" RCP, Cl. III	= 136 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 132 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 13+40 Rt. to
℄ Sta. 15+05± Rt.
Install: 6" Underdrain Pipe

Estimated Quantities
6" Perforated Underdrain Pipe = 159 L.F.
6" Nonperforated Underdrain Pipe = 4 L.F.

℄ Sta. 15+05± Rt.
Construct: Modified Type "2" CB
(For Details see Sht. No. H14)

Estimated Quantity
Modified Type "2" CB,
1.00 ft. to 1.99 ft. = 1 EA.

DATE	REVISION
6/13/97	Revised Drainage Plans.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance,
Including Both Rds. to Lookout
Project No. 61A-01-97M

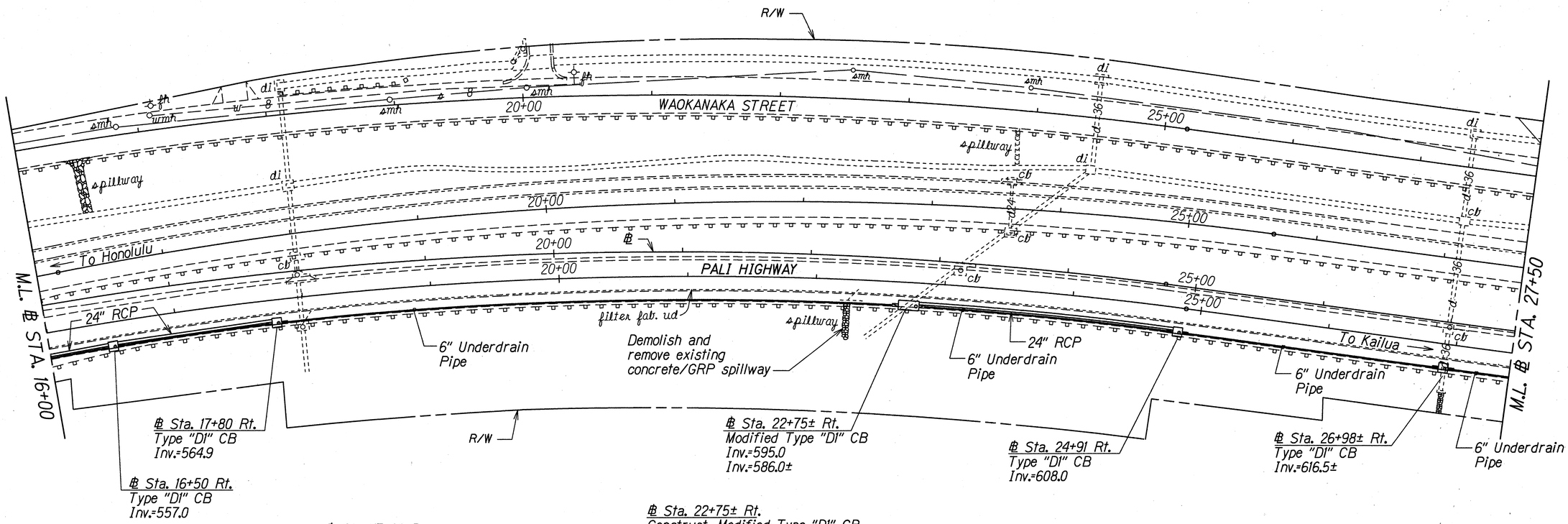
Scale: 1"=40' Date: May 1997

SHEET No. H2 OF 24 SHEETS

ADD. 42

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	43	84

TRUE NORTH
SCALE : 1" = 40'



℄ Sta. 16+50 Rt.
Construct: Type "DI" CB
Install: 24" RCP, Class III
(For Profile see Sht. No. H10)
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 153 C.Y.
Bedcourse Material	= 28 C.Y.
24" RCP, Cl. III	= 140 L.F.
Type "DI" CB, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 136 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 17+80 Rt.
Construct: Type "DI" CB
Install: 24" RCP, Class III
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 123 C.Y.
Bedcourse Material	= 25 C.Y.
24" RCP, Cl. III	= 126 L.F.
Type "DI" CB, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 122 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 17+80 Rt. to
℄ Sta. 22+75± Rt.
Install: 6" Underdrain Pipe

Estimated Quantities

6" Perforated Underdrain Pipe	= 483 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 22+75± Rt.
Construct: Modified Type "DI" CB
(For Details see Sht. Nos. H15 & H16)

Estimated Quantity
Modified Type "DI" CB,
14.00 ft. to 14.99 ft. = 1 EA.

℄ Sta. 24+91 Rt.
Construct: Type "DI" CB
Install: 24" RCP, Class III
(For Profile see Sht. No. H10)
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 223 C.Y.
Bedcourse Material	= 41 C.Y.
24" RCP, Class III	= 206 L.F.
Type "DI" CB, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 202 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 24+91 Rt. to
℄ Sta. 26+98± Rt.
Install: 6" Underdrain Pipe

Estimated Quantities

6" Perforated Underdrain Pipe	= 197 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 26+98± Rt.
Construct: Type "DI" CB

Estimated Quantity
Type "DI" CB,
9.00 ft. to 9.99 ft. = 1 EA.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 4/13/97
	DRAWN BY A. Nomura	
	TRACED BY	
	DESIGNED BY C. Matsuda	
	NOTE BOOK dh2cur16.dgn	QUANTITIES BY
	No. dgnlp03.dgn	CHECKED BY

DATE	REVISION
6/13/97	Revised Drainage Plans.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

Scale: 1"=40' Date: May 1997

SHEET No. H3 OF 24 SHEETS

ADD. 43

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	44	84

TRUE NORTH
SCALE : 1" = 40'

℄ Sta. 36+50 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
(For Profile see Sht. No. H11)
6" Underdrain Pipe

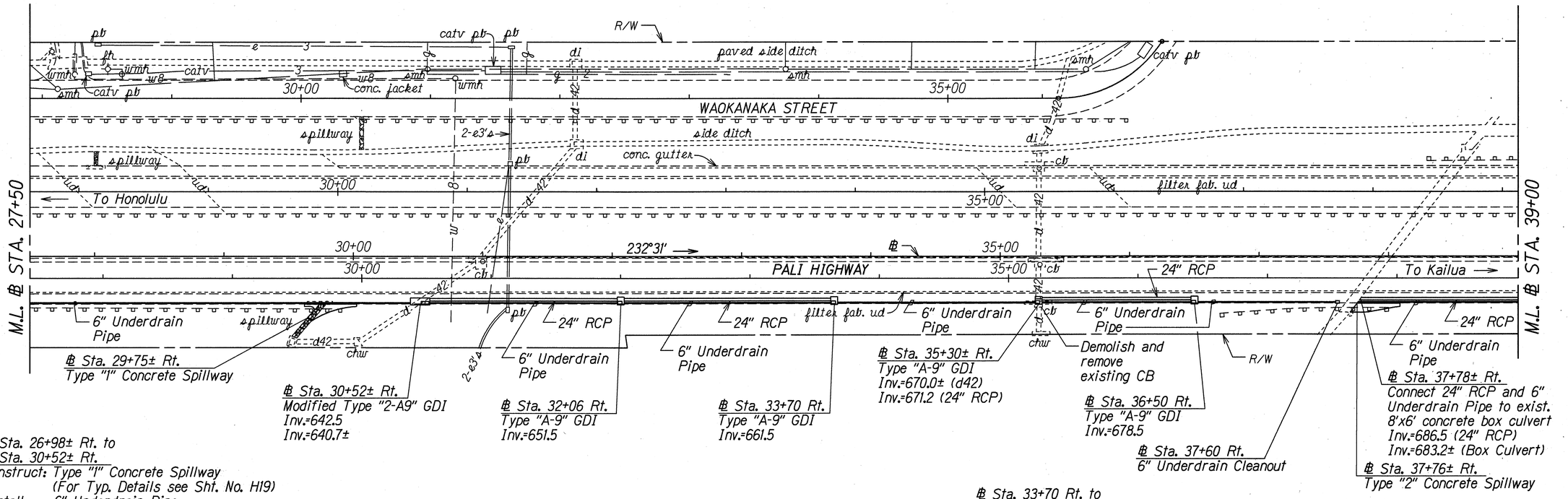
Estimated Quantities

Structure Excavation for Drainage System	= 124 C.Y.
Bedcourse Material	= 23 C.Y.
24" RCP, Cl. III	= 116 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 112 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 36+50 Rt. to
℄ Sta. 37+60 Rt.
Construct: Underdrain Cleanout
(For Typical Detail see Sht. No. H24)
Install: 6" Underdrain Pipe

Estimated Quantities

6" Perforated Underdrain Pipe	= 106 L.F.
6" Nonperforated Underdrain Pipe	= 5 L.F.
Cleanout	= 1 EA.



℄ Sta. 26+98± Rt. to
℄ Sta. 30+52± Rt.
Construct: Type "1" Concrete Spillway
(For Typ. Details see Sht. No. H19)
Install: 6" Underdrain Pipe

Estimated Quantities

Ditch and Channel Excavation	= 7 C.Y.
6" Perforated Underdrain Pipe	= 339 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.
Type "1" Concrete Spillway	= 35 L.F.

℄ Sta. 30+52± Rt.
Construct: Modified Type "2-A9" GDI
(For Details see Sht. No. H17)

Estimated Quantity

Modified Type "2-A9" GDI, 7.00 ft. to 7.99 ft.	= 1 EA.

℄ Sta. 32+06 Rt.
Construct: Type "A-9" GDI
(For Typ. Details see Sht. No. H18)
Install: 24" RCP, Class III
(For Profile see Sht. No. H11)
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 157 C.Y.
Bedcourse Material	= 29 C.Y.
24" RCP, Class III	= 145 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 141 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 33+70 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 172 C.Y.
Bedcourse Material	= 32 C.Y.
24" RCP, Class III	= 160 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 156 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 33+70 Rt. to
℄ Sta. 35+30± Rt.
Install: 6" Underdrain Pipe

Estimated Quantities

6" Perforated Underdrain Pipe	= 152 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 35+30± Rt.
Demolish and Remove: Existing catch basin
Construct: Type "A-9" GDI

Estimated Quantity

Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.

ORIGINAL PLAN
SURVEY PLOTTED BY
DRAWN BY A. Nomura
TRACED BY C. Matsuda
NOTE BOOK dh2cur15a
REVISED BY QUANTITIES BY
CHECKED BY
DATE 4/23/97

DATE	REVISION
6/13/97	Revised Drainage Plans.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

Scale: 1"=40' Date: May 1997

SHEET No. H4 OF 24 SHEETS

ADD. 44

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	45	84

℄ Sta. 45+00 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 102 C.Y.
Bedcourse Material	= 20 C.Y.
24" RCP, Cl. III	= 101 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 97 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 46+05 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 102 C.Y.
Bedcourse Material	= 20 C.Y.
24" RCP, Cl. III	= 101 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 97 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 47+10 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
6" Underdrain Pipe

Estimated Quantities

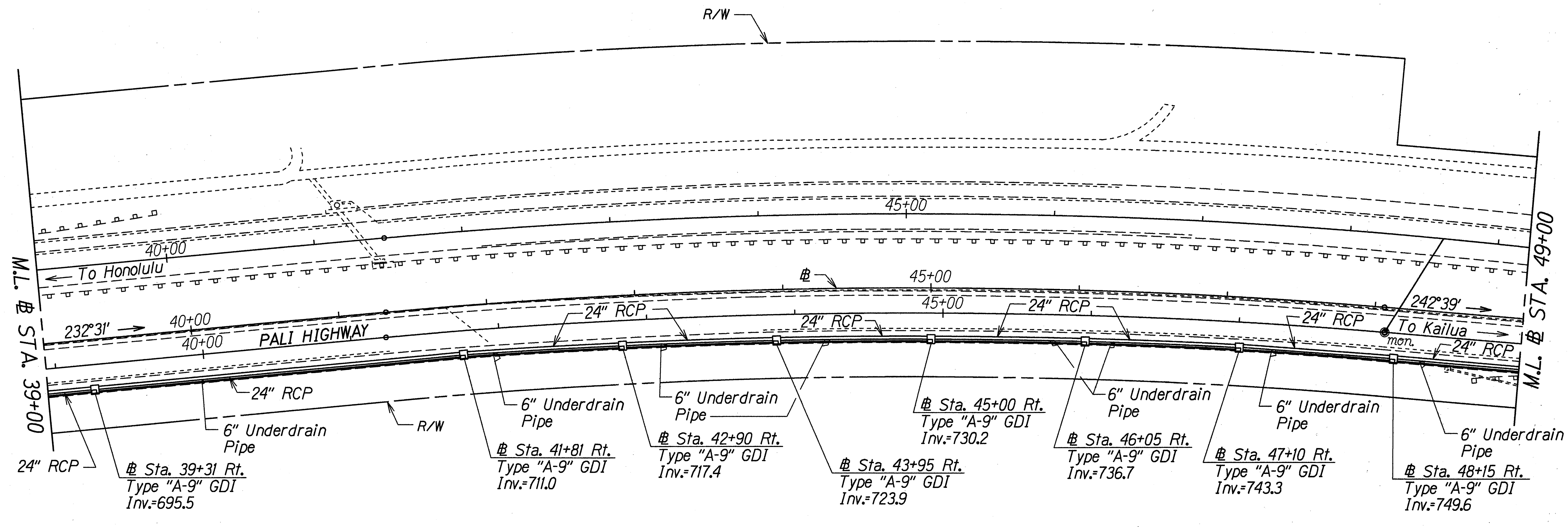
Structure Excavation for Drainage System	= 102 C.Y.
Bedcourse Material	= 20 C.Y.
24" RCP, Cl. III	= 101 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 97 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 48+15 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 102 C.Y.
Bedcourse Material	= 20 C.Y.
24" RCP, Cl. III	= 101 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 97 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

TRUE NORTH
SCALE: 1" = 40'



℄ Sta. 39+31 Rt.
Construct: Type "A-9" GDI
Type "2" Concrete Spillway
(For Details see Sht. No. H20)
Install: 24" RCP, Class III
(For Profile see Sht. No. H11A)
6" Underdrain Pipe

Estimated Quantities

Ditch and Channel Excavation	= 6 C.Y.
Structure Excavation for Drainage System	= 170 C.Y.
Bedcourse Material	= 30 C.Y.
24" RCP, Class III	= 151 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 147 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.
Type "2" Concrete Spillway	= 38 L.F.

℄ Sta. 41+81 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 267 C.Y.
Bedcourse Material	= 49 C.Y.
24" RCP, Class III	= 246 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 242 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 42+90 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 112 C.Y.
Bedcourse Material	= 21 C.Y.
24" RCP, Class III	= 105 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 101 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 43+95 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 102 C.Y.
Bedcourse Material	= 20 C.Y.
24" RCP, Class III	= 101 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 97 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY A. Nomura | TRACED BY | DESIGNED BY C. Matsuda | QUANTITIES BY | CHECKED BY | NOTE BOOK | DATE 4/3/97

DATE	REVISION
6/13/97	Revised Drainage Plans.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

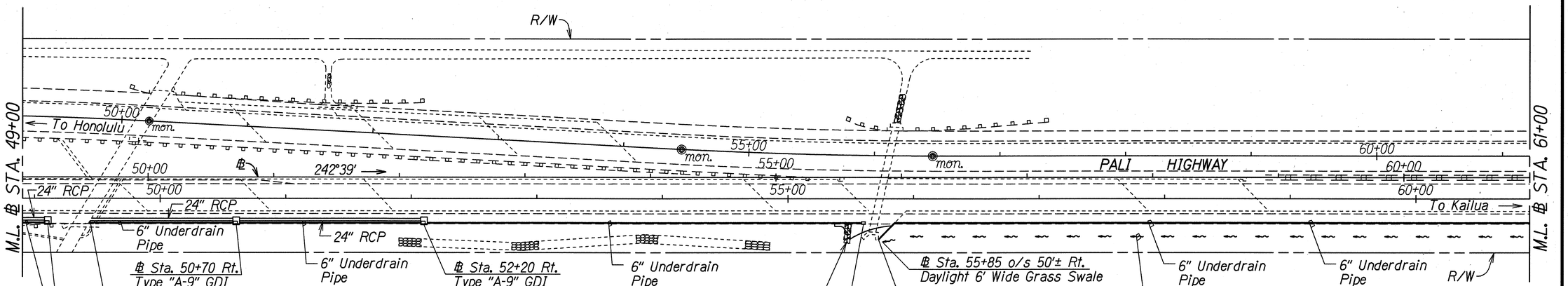
PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

Scale: 1"=40' Date: May 1997

SHEET No. H5 OF 24 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	46	84

TRUE NORTH
SCALE : 1" = 40'



℄ Sta. 50+70 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
(For Profile see Sht. No. H11)
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 130 C.Y.
Bedcourse Material	= 23 C.Y.
24" RCP. Class III	= 114 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 112 L.F.
6" Nonperforated Underdrain Pipe	= 2 L.F.

℄ Sta. 49+20 Rt.
Construct: Type "A-9" GDI
(For Typ. Details see Sht. No. H18)
Install: 24" RCP, Class III
(For Profile see Sht. No. H11A)
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 103 C.Y.
Bedcourse Material	= 21 C.Y.
24" RCP, Cl. III	= 101 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 97 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 52+20 Rt.
Construct: Type "A-9" GDI
Install: 24" RCP, Class III
6" Underdrain Pipe

Estimated Quantities

Structure Excavation for Drainage System	= 171 C.Y.
Bedcourse Material	= 29 C.Y.
24" RCP, Cl. III	= 146 L.F.
Type "A-9" GDI, 4.00 ft. to 4.99 ft.	= 1 EA.
6" Perforated Underdrain Pipe	= 142 L.F.
6" Nonperforated Underdrain Pipe	= 4 L.F.

℄ Sta. 52+20 Rt. to
℄ Sta. 55+69 Rt.
Construct: Type "I" Concrete Spillway
(For Typ. Details see Sht. No. H19)
Install: 6" Underdrain Pipe
Underdrain Cleanout

Estimated Quantities

Ditch and Channel Excavation	= 7 C.Y.
Type "I" Concrete Spillway	= 35 L.F.
6" Perforated Underdrain Pipe	= 342 L.F.
6" Nonperforated Underdrain Pipe	= 5 L.F.
Cleanout	= 1 EA.
Grouted Rubble Paving	= L.S. (0.5 C.Y.)

℄ Sta. 55+82± Rt. to
℄ Sta. 61+00 Rt.
Construct: Type "4" Concrete Spillway
(For Details see Sht. No. H22)
6' Wide Grass Swale
(For Typ. Detail see Sht. No. H23)
Install: 6" Underdrain Pipe

Estimated Quantities

6' Wide Grass Swale	= 515 L.F.
6" Perforated Underdrain Pipe	= 518 L.F.
6" Nonperforated Underdrain Pipe	= 2 L.F.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 4/23/97
	DRAWN BY A. Nomura	
	TRACED BY	
NOTE BOOK dh2curl15.dgn	DESIGNED BY C. Matsuda	
N:\plnhp06.dgn	QUANTITIES BY	
	CHECKED BY	

DATE	REVISION
6/13/97	Revised Drainage Plans.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

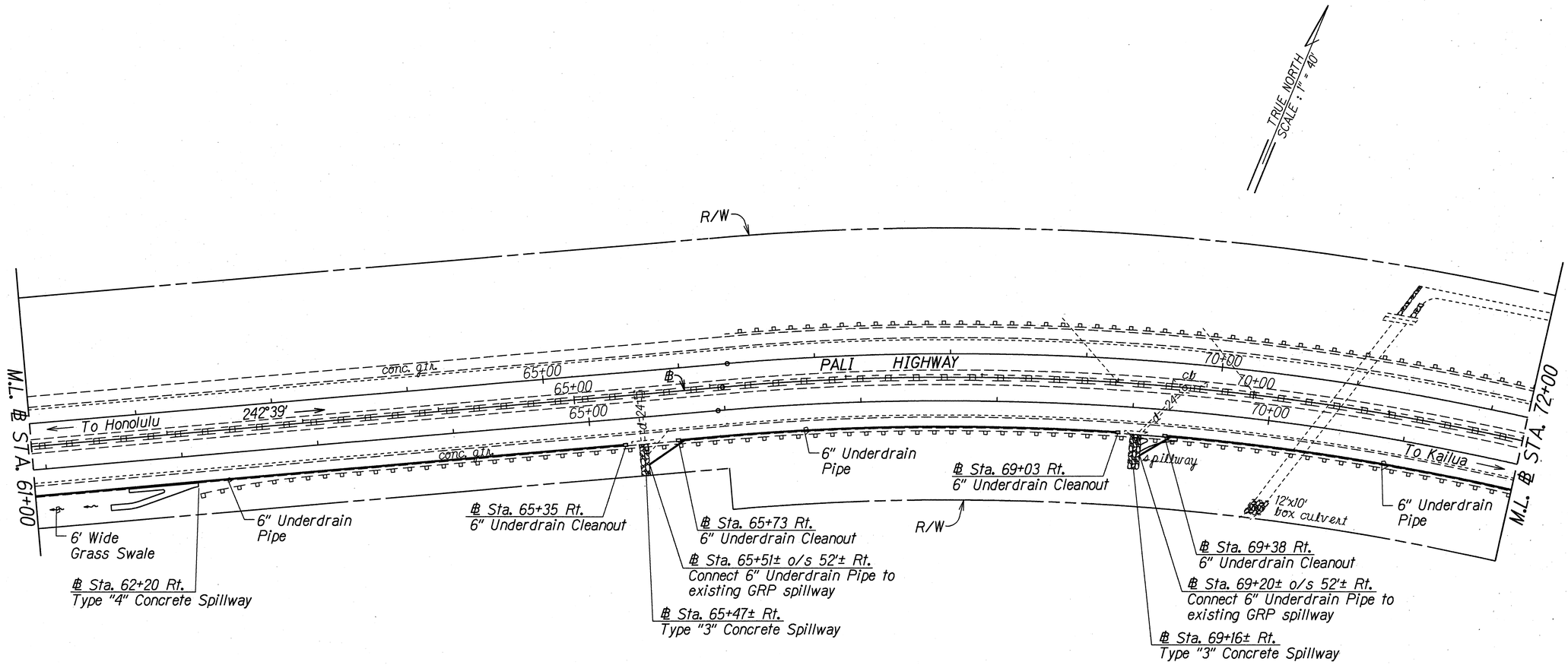
PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

Scale: 1"=40' Date: May 1997

SHEET No. H6 OF 24 SHEETS

ADD. 46

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	47	84



℄ Sta. 61+00 Rt. to
℄ Sta. 65+35 Rt.

Construct: Type "4" Concrete Spillway
(For Typ. Details see Sht. No. H22)
6' Wide Grass Swale
(For Typ. Detail see Sht. No. H23)
Underdrain Cleanout
(For Typ. Details see Sht. No. H24)
Install: 6" Underdrain Pipe

Estimated Quantities

Ditch and Channel Excavation	=	10 C.Y.
Type "4" Concrete Spillway	=	65 L.F.
6' Wide Grass Swale	=	100 L.F.
6" Perforated Underdrain Pipe	=	432 L.F.
6" Nonperforated Underdrain Pipe	=	3 L.F.
Cleanout	=	1 EA.

℄ Sta. 65+47± Rt. to
℄ Sta. 69+03 Rt.

Construct: Type "3" Concrete Spillway
(For Typ. Details see Sht. No. H21)
Underdrain Cleanout
Install: 6" Underdrain Pipe

Estimated Quantities

Ditch and Channel Excavation	=	10 C.Y.
Type "3" Concrete Spillway	=	30 L.F.
6" Perforated Underdrain Pipe	=	352 L.F.
6" Nonperforated Underdrain Pipe	=	8 L.F.
Cleanout	=	2 EA.
Grouted Rubble Paving	=	L.S. (0.5 CY)

℄ Sta. 69+16± Rt. to
℄ Sta. 72+00 Rt.

Construct: Type "3" Concrete Spillway
Underdrain Cleanout
Install: 6" Underdrain Pipe

Estimated Quantities

Ditch and Channel Excavation	=	10 C.Y.
Type "3" Concrete Spillway	=	30 L.F.
6" Perforated Underdrain Pipe	=	283 L.F.
6" Nonperforated Underdrain Pipe	=	5 L.F.
Cleanout	=	1 EA.
Grouted Rubble Paving	=	L.S. (0.5 CY)

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 4/13/97
	DRAWN BY A. Nomura	
	TRACED BY	
NOTE BOOK dh2curtis&p	DESIGNED BY C. Matsuda	
N:\php01\dgn	QUANTITIES BY	
	CHECKED BY	

DATE	REVISION
6/13/97	Revised Drainage Plans.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

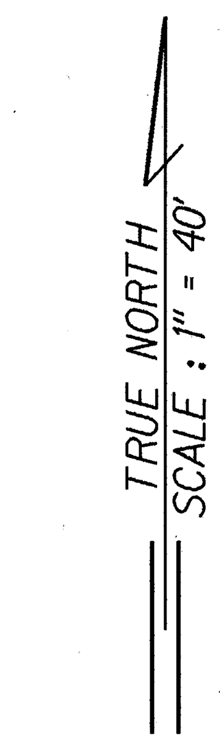
PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance,
Including Both Rds. to Lookout
Project No. 61A-01-97M

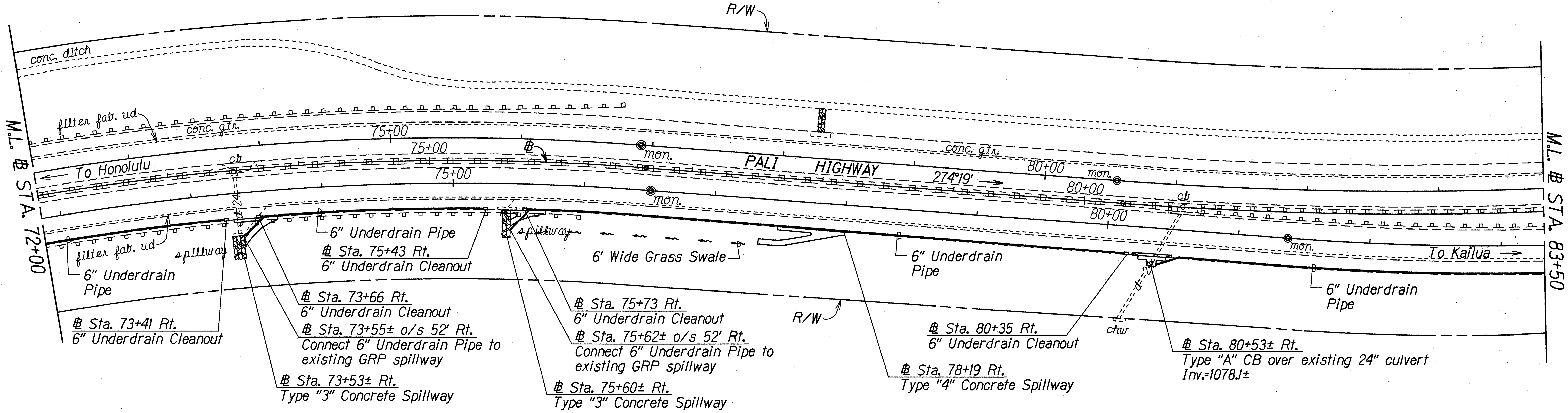
Scale: 1"=40' Date: May 1997

SHEET No. H7 OF 24 SHEETS

ADD. 47

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	48	84





℄ Sta. 72+00 Rt. to
℄ Sta. 73+41 Rt.
Construct: Underdrain Cleanout
(For Typ. Details see Sht. No. H24)
Install: 6" Underdrain Pipe

Estimated Quantities

6" Perforated Underdrain Pipe	=	122 L.F.
6" Nonperforated Underdrain Pipe	=	3 L.F.
Cleanout	=	1 EA.

℄ Sta. 73+53± Rt. to
℄ Sta. 75+43 Rt.
Construct: Type "3" Concrete Spillway
(For Typ. Details see Sht. No. H21)
Underdrain Cleanouts
Install: 6" Underdrain Pipe

Estimated Quantities

Ditch and Channel Excavation	=	10 C.Y.
Type "3" Concrete Spillway	=	30 L.F.
6" Perforated Underdrain Pipe	=	192 L.F.
6" Nonperforated Underdrain Pipe	=	8 L.F.
Cleanout	=	2 EA.
Grouted Rubble Paving	=	L.S. (0.5 CY)

℄ Sta. 75+60± Rt. to
℄ Sta. 80+35 Rt.
Construct: Type "3" Concrete Spillway
(For Typ. Details see Sht. No. H21)
Type "4" Concrete Spillway
(For Typical Detail see Sht. No. H22)
6' Wide Grass Swale
(For Typical Detail see Sht. No. H23)
Underdrain Cleanouts
Install: 6" Underdrain Pipe

Estimated Quantities

Ditch and Channel Excavation	=	20 C.Y.
Type "3" Concrete Spillway	=	30 L.F.
Type "4" Concrete Spillway	=	65 L.F.
6' Wide Grass Swale	=	225 L.F.
6" Perforated Underdrain Pipe	=	475 L.F.
6" Nonperforated Underdrain Pipe	=	6 L.F.
Cleanout	=	2 EA.
Grouted Rubble Paving	=	L.S. (0.5 CY)

℄ Sta. 80+53± Rt. to
℄ Sta. 83+50 Rt.
Construct: Type "A" Catch Basin
Install: 6" Underdrain Pipe

Estimated Quantities

Type "A" Catch Basin, 4.00 ft. to 4.99 ft.	=	1 EA.
6" Perforated Underdrain Pipe	=	292 L.F.
6" Nonperforated Underdrain Pipe	=	2 L.F.

DATE	REVISION
6/13/97	Revised Drainage Plans.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

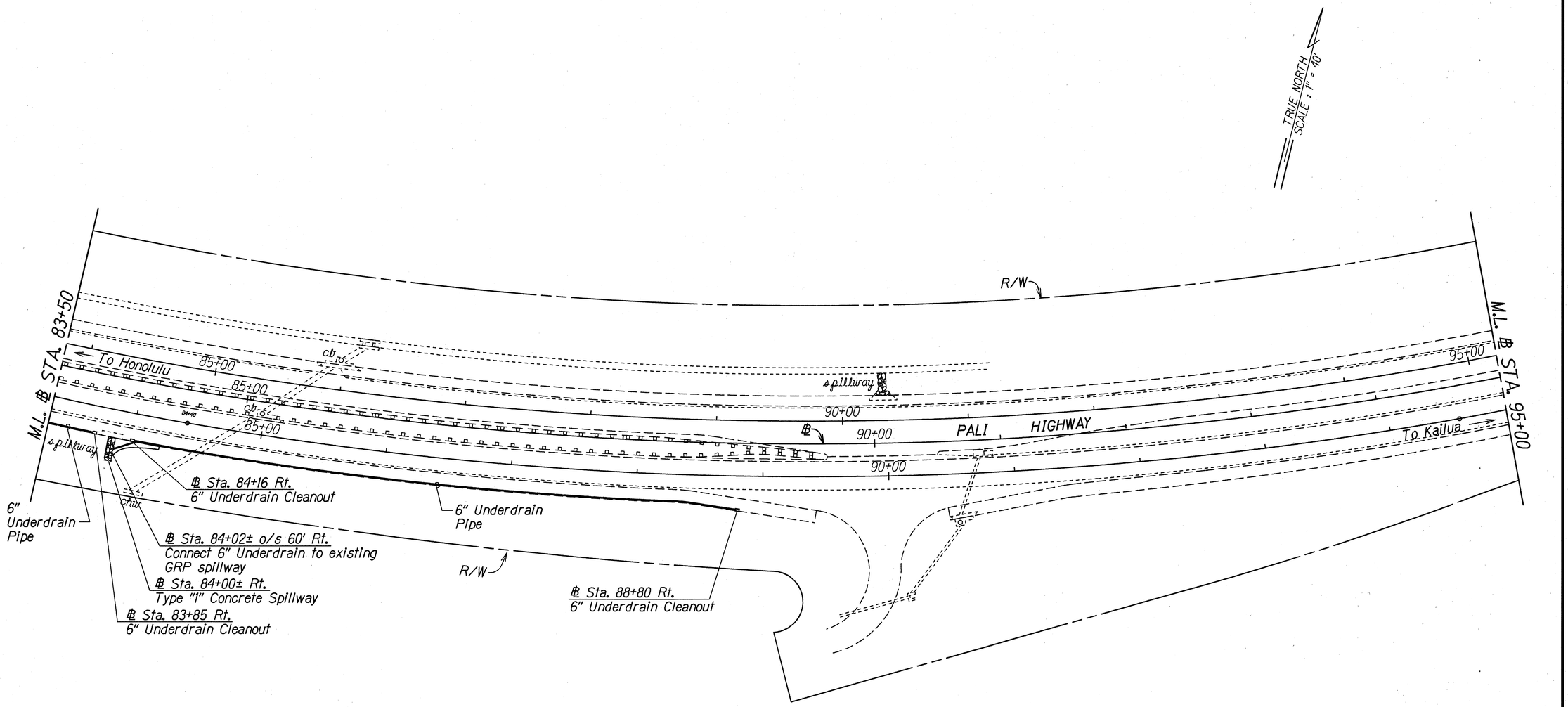
Scale: 1"=40' Date: May 1997

SHEET No. H8 OF 24 SHEETS

ADD. 48

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY A. Nomura	4/3/97
NOTE BOOK dh2.curtis.6pll	TRACED BY	
No. 6plihpl08.dgn	DESIGNED BY C. Matsuda	
	QUANTITIES BY	
	CHECKED BY	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	49	84



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY A. Nomura	4/3/97
	TRACED BY	
NOTE BOOK dh02curtis6	DESIGNED BY C. Hatsuda	
N:\pal\hp03.dgn	QUANTITIES BY	
	CHECKED BY	

℄ Sta. 83+50 Rt. to
℄ Sta. 83+85 Rt.
Construct: Underdrain Cleanout
(For Typ. Details see Sht. No. H24)
Install: 6" Underdrain Pipe

Estimated Quantities

6" Perforated Underdrain Pipe	= 32 L.F.
6" Nonperforated Underdrain Pipe	= 3 L.F.
Cleanout	= 1 EA.

℄ Sta. 84+00± Rt. to
℄ Sta. 88+80 Rt.
Construct: Type "I" Concrete Spillway
(For Typ. Details see Sht. No. H19)
Underdrain Cleanout
Install: 6" Underdrain Pipe

Estimated Quantities

Ditch and Channel Excavation	= 7 C.Y.
Type "I" Spillway	= 35 L.F.
6" Perforated Underdrain Pipe	= 476 L.F.
6" Nonperforated Underdrain Pipe	= 8 L.F.
Cleanout	= 2 EA.
Grouted Rubble Paving	= L.S. (0.5 C.Y.)

DATE	REVISION
6/13/97	Revised Drainage Plans.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

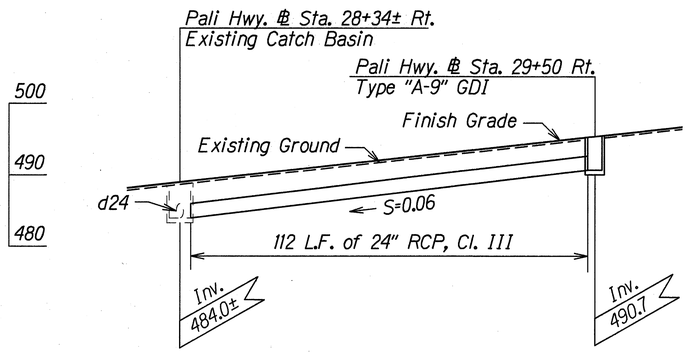
PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance,
Including Both Rds. to Lookout
Project No. 61A-01-97M

Scale: 1"=40' Date: May 1997

SHEET No. H9 OF 24 SHEETS

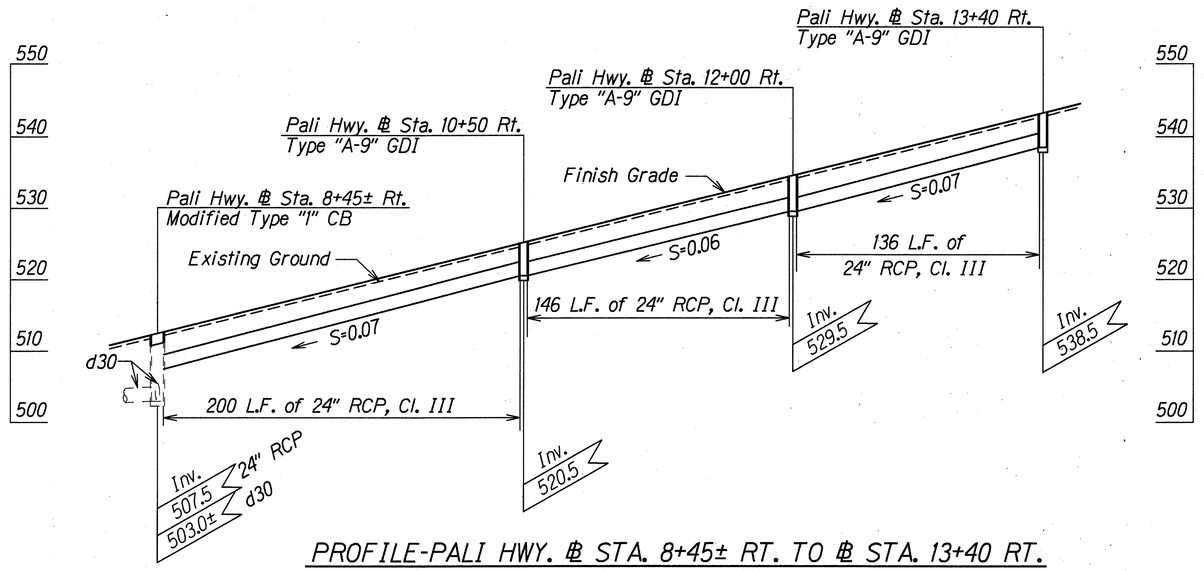
ADD. 49

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	50	84



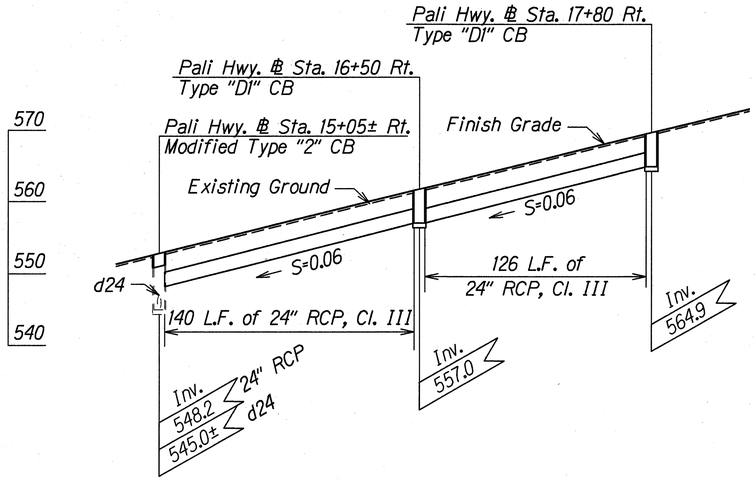
PROFILE-PALI HWY. ℄ STA. 28+34± RT. TO ℄ STA. 29+50 RT.

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



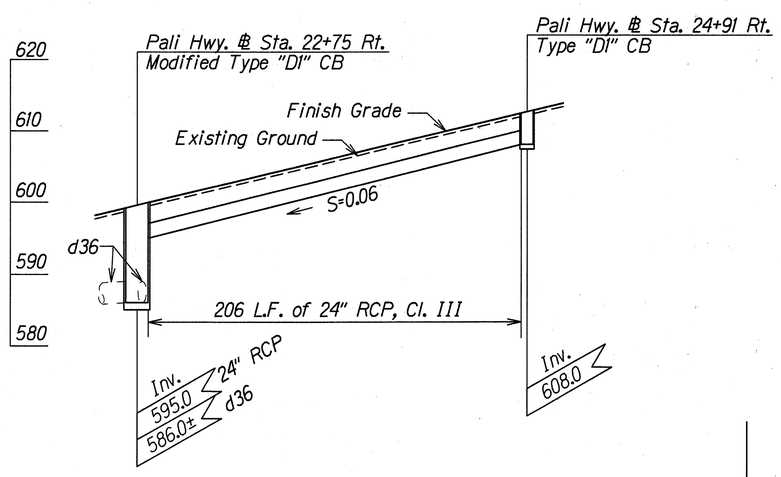
PROFILE-PALI HWY. ℄ STA. 8+45± RT. TO ℄ STA. 13+40 RT.

Scale: Horiz. 1"=40'
Vert. 1"=10'



PROFILE-PALI HWY. ℄ STA. 15+05± RT. TO ℄ STA. 17+80 RT.

Scale: Horiz. 1"=40'
Vert. 1"=10'



PROFILE-PALI HWY. ℄ STA. 22+75± RT. TO ℄ STA. 24+91 RT.

Scale: Horiz. 1"=40'
Vert. 1"=10'

NOTES

1. Existing ground and finish grade elevations shown were interpolated from as-built plans. The actual inverts of the 24-inch reinforced concrete pipe shall be located a minimum of 4'-3" below finish grade.
2. The Contractor shall verify the inverts of all proposed drainage structures shown on the profiles.

DATE	REVISION
6/13/97	Revised Drainage Profiles.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

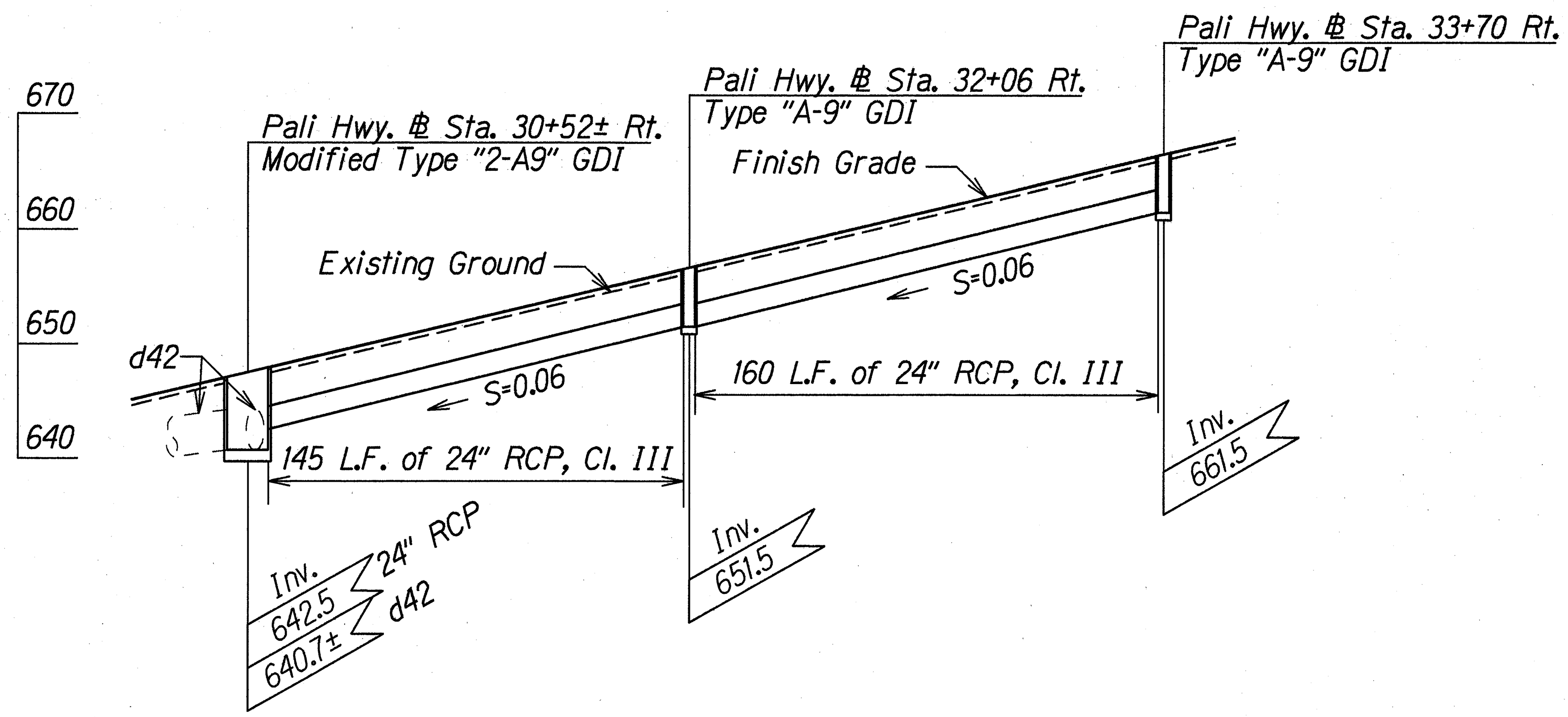
Scale: As Shown Date: May 1997

SHEET No. H10 OF 24 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 4/30/97
	DRAWN BY A. Nomura	
	TRACED BY	
NOTE BOOK	DESIGNED BY B. Tate	
dh2curtis6pl	QUANTITIES BY	
kellper01.dgn	CHECKED BY	

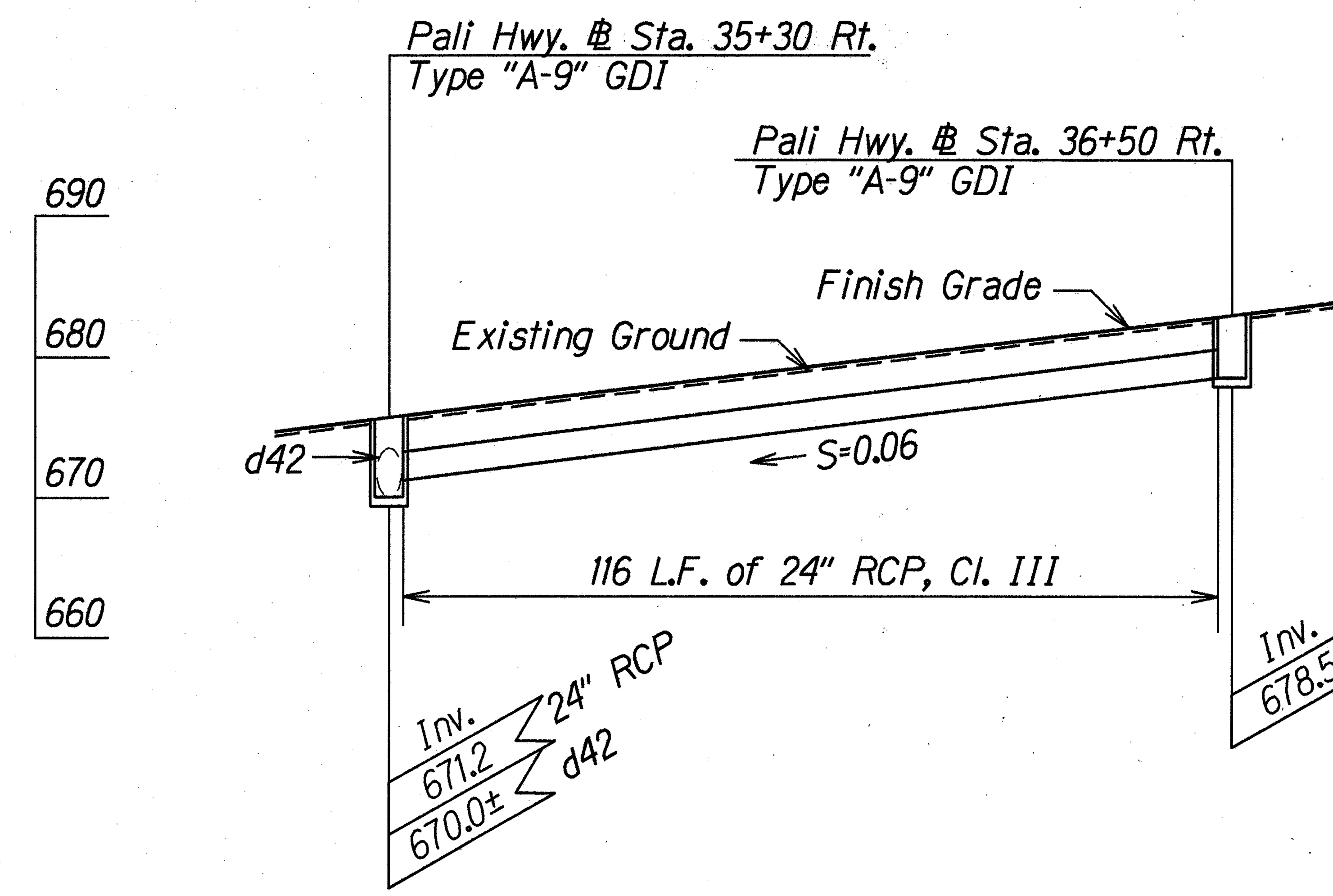
ADD. 50

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	51	84



PROFILE-PALI HWY. ℄ STA. 30+52± RT. TO ℄ STA. 33+70 RT.

Scale: Horiz. 1"=40'
Vert. 1"=10'



PROFILE-PALI HWY. ℄ STA. 35+30± RT. TO ℄ STA. 36+50 RT.

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

NOTES

1. Existing ground and finish grade elevations shown were interpolated from as-built plans. The actual inverts of the 24-inch reinforced concrete pipe shall be located a minimum of 4'-3" below finish grade.

2. The Contractor shall verify the inverts of all proposed drainage structures shown on the profiles.

DATE	REVISION
6/13/97	Revised Drainage Profiles.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

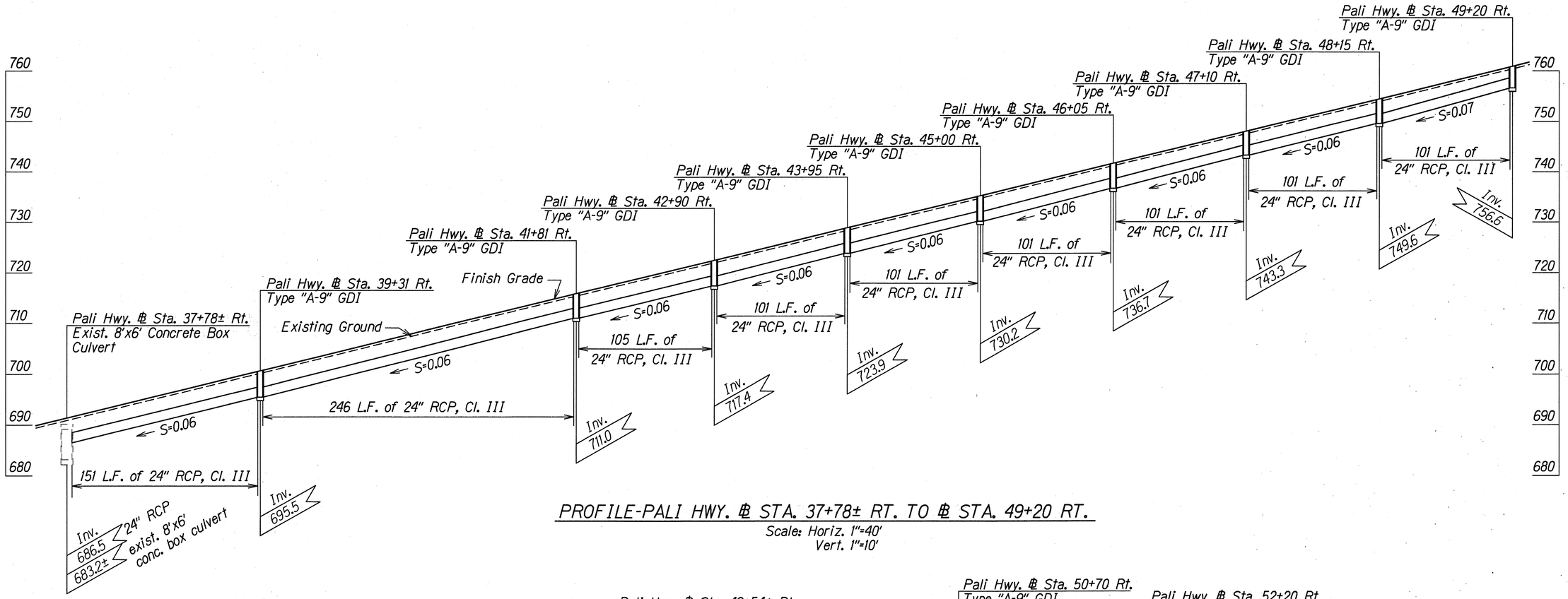
Scale: As Shown   Date: May 1997

SHEET No. H11 OF 24 SHEETS

ADD. 51

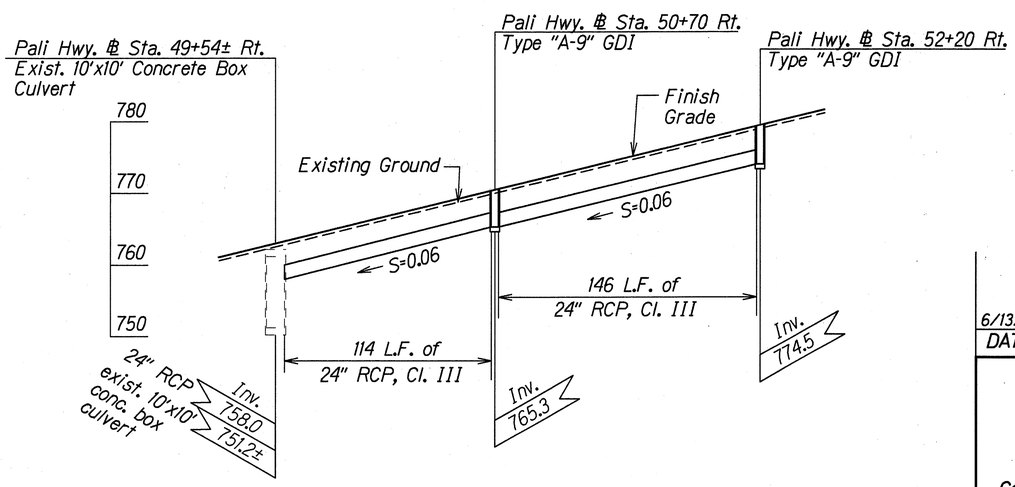
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY A. Nomura | TRACED BY | DESIGNED BY B. Toda | QUANTITIES BY | CHECKED BY | DATE 5/3/97 | NOTE BOOK

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	ADD. 51S-1	84



PROFILE-PALI HWY. ℄ STA. 37+78± RT. TO ℄ STA. 49+20 RT.

Scale: Horiz. 1"=40'
Vert. 1"=10'



PROFILE-PALI HWY. ℄ STA. 49+54± RT. TO ℄ STA. 52+20 RT.

Scale: Horiz. 1"=40'
Vert. 1"=10'

NOTES

1. Existing ground and finish grade elevations shown were interpolated from as-built plans. The actual inverts of the 24-inch reinforced concrete pipe shall be located a minimum of 4'-3" below finish grade.
2. The Contractor shall verify the inverts of all proposed drainage structures shown on the profiles.

DATE	REVISION
6/13/97	Added Drainage Profiles.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

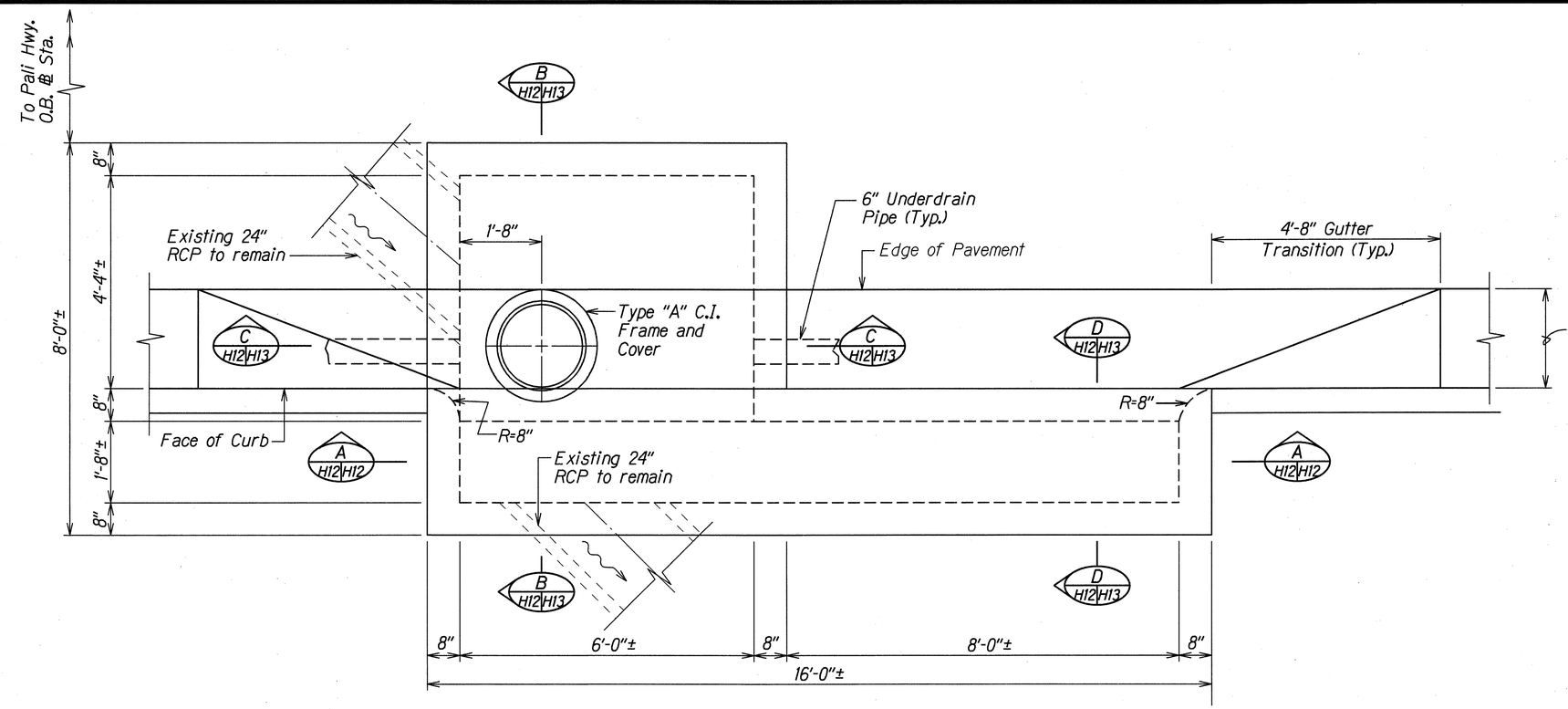
Scale: As Shown Date: May 1997

SHEET No. HIIA OF 24 SHEETS

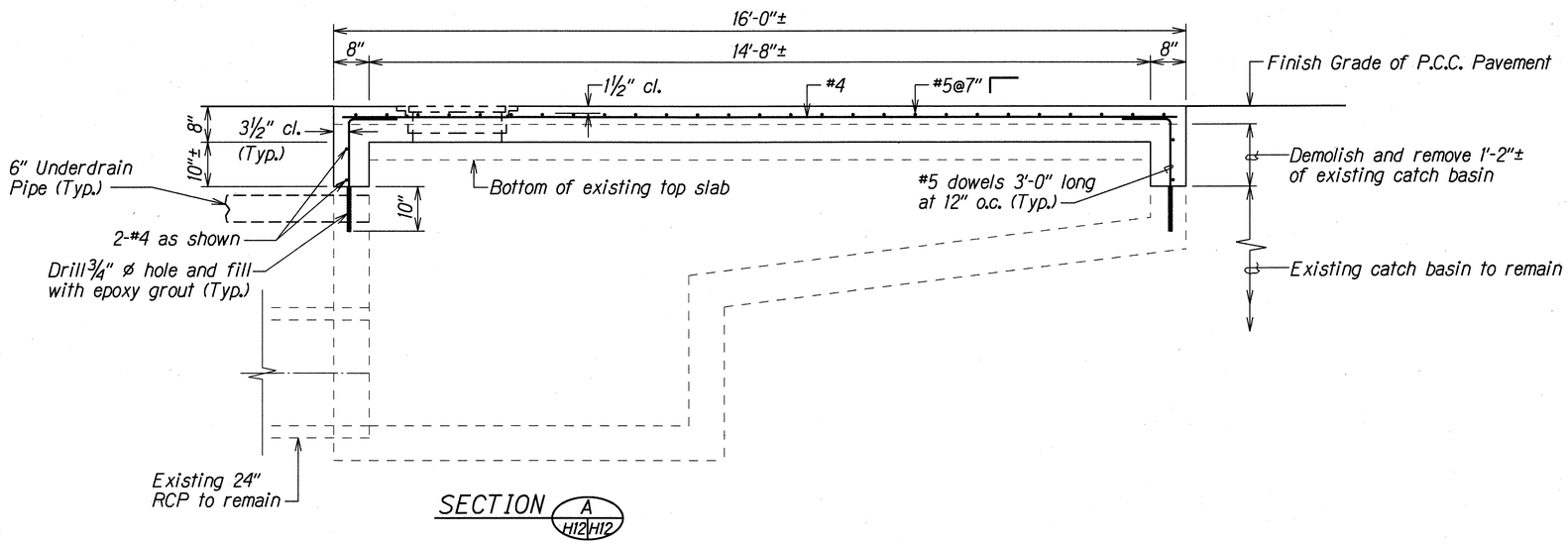
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 5/31/97
	DRAWN BY A. Nomura	
NOTE BOOK dh2curt15.dgn	TRACED BY B. Toda	
dh2curt16.dgn	DESIGNED BY	
dh2curt03.dgn	QUANTITIES BY	
	CHECKED BY	

ADD. 51 S-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	52	84



PLAN



SECTION A H12|H12

DETAILS OF MODIFIED TYPE "1" CATCH BASIN

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY Curtis Matsuda & Russell Sato	X
NOTE BOOK dir2/curtis/bp	TRACED BY Curtis Matsuda	
	DESIGNED BY	
Neil Lodge	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

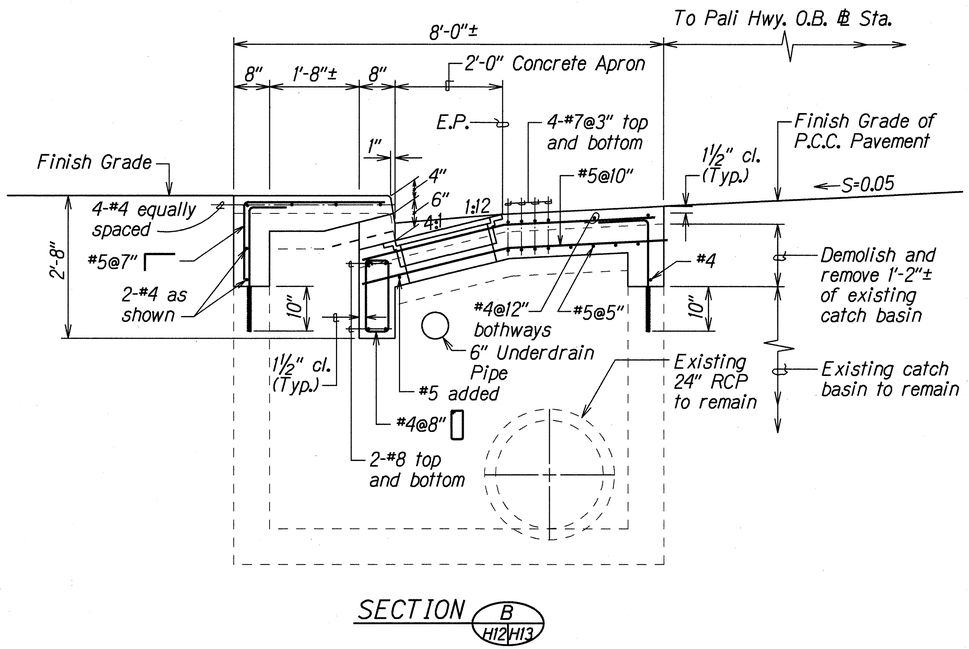
DRAINAGE DETAILS

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance
Including Both Rds. to Lookouts
Project. No. 61A-01-97M

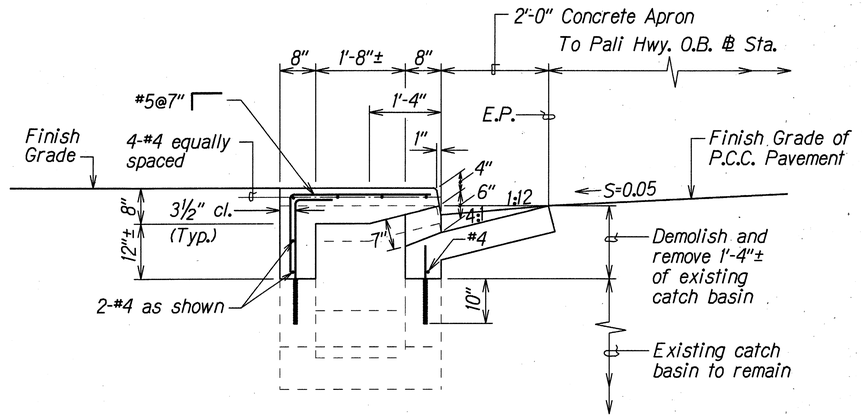
Scale: ¾"=1'-0" Date: May, 1997

SHEET No. H12 OF 24 SHEETS

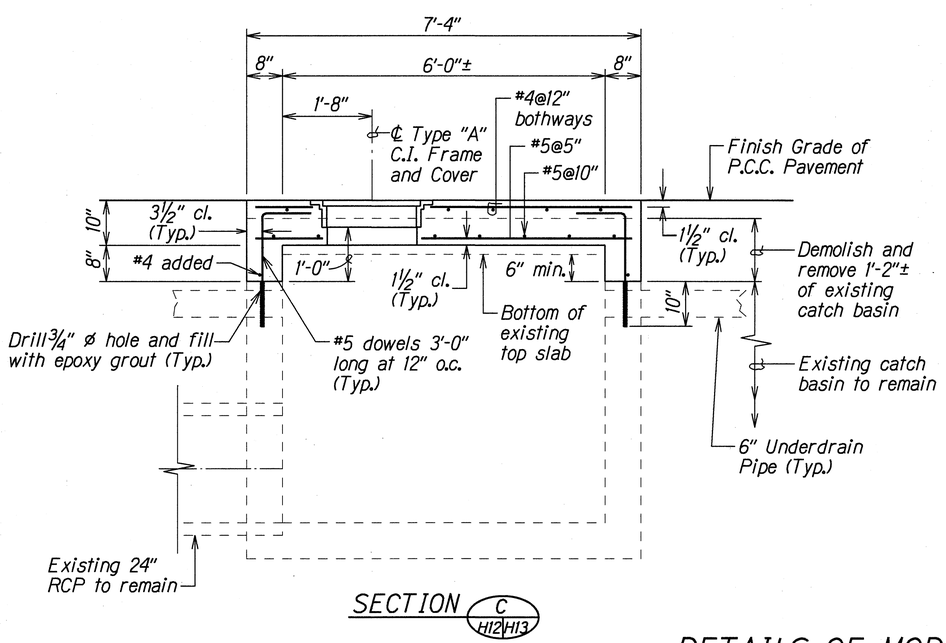
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	53	84



SECTION B H12|H13



SECTION D H12|H13



SECTION C H12|H13

ORIGINAL PLAN

SURVEY PLOTTED BY
DRAWN BY Curtis Matsuda & Russell Sato DATE X
TRACED BY
NOTE BOOK
CHECKED BY

DETAILS OF MODIFIED TYPE "1" CATCH BASIN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

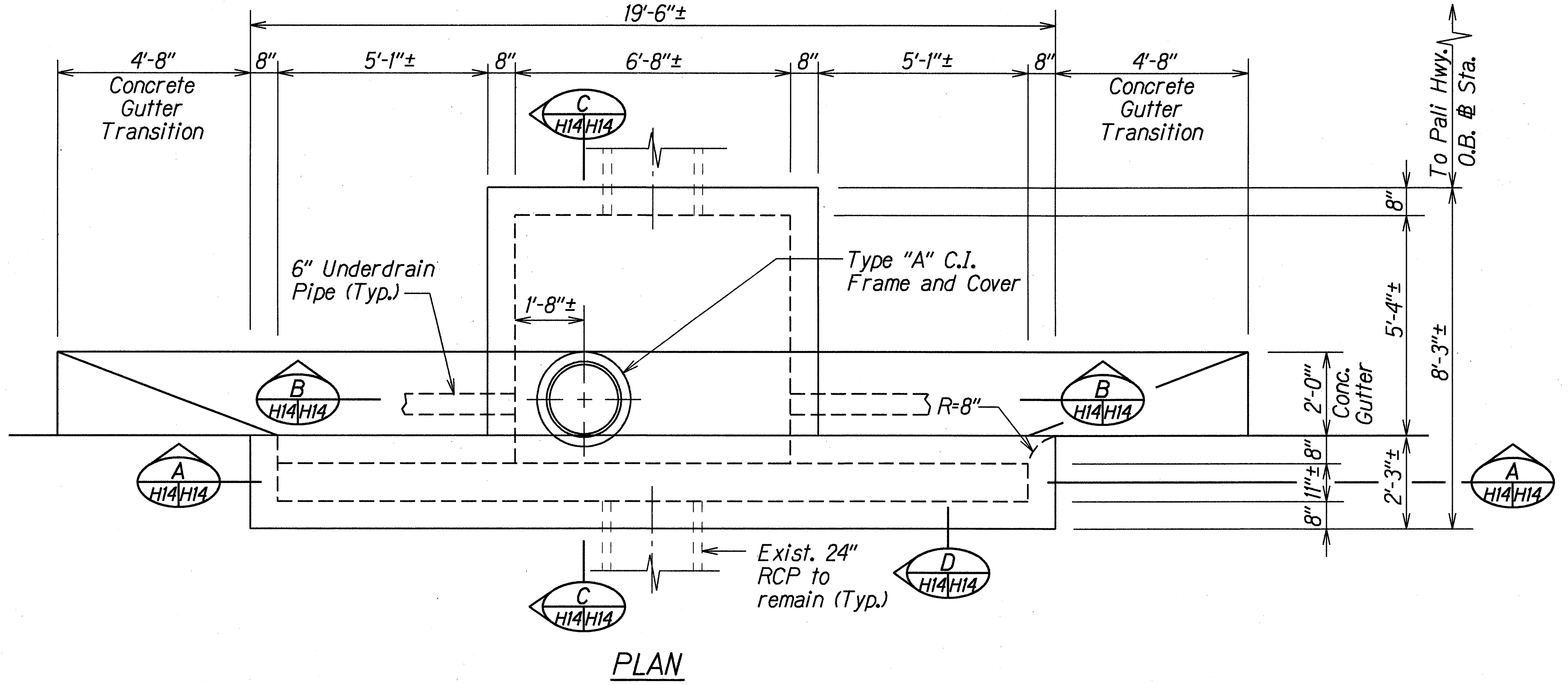
DRAINAGE DETAILS

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance
Including Both Rds. to Lookouts
Project. No. 61A-01-97M

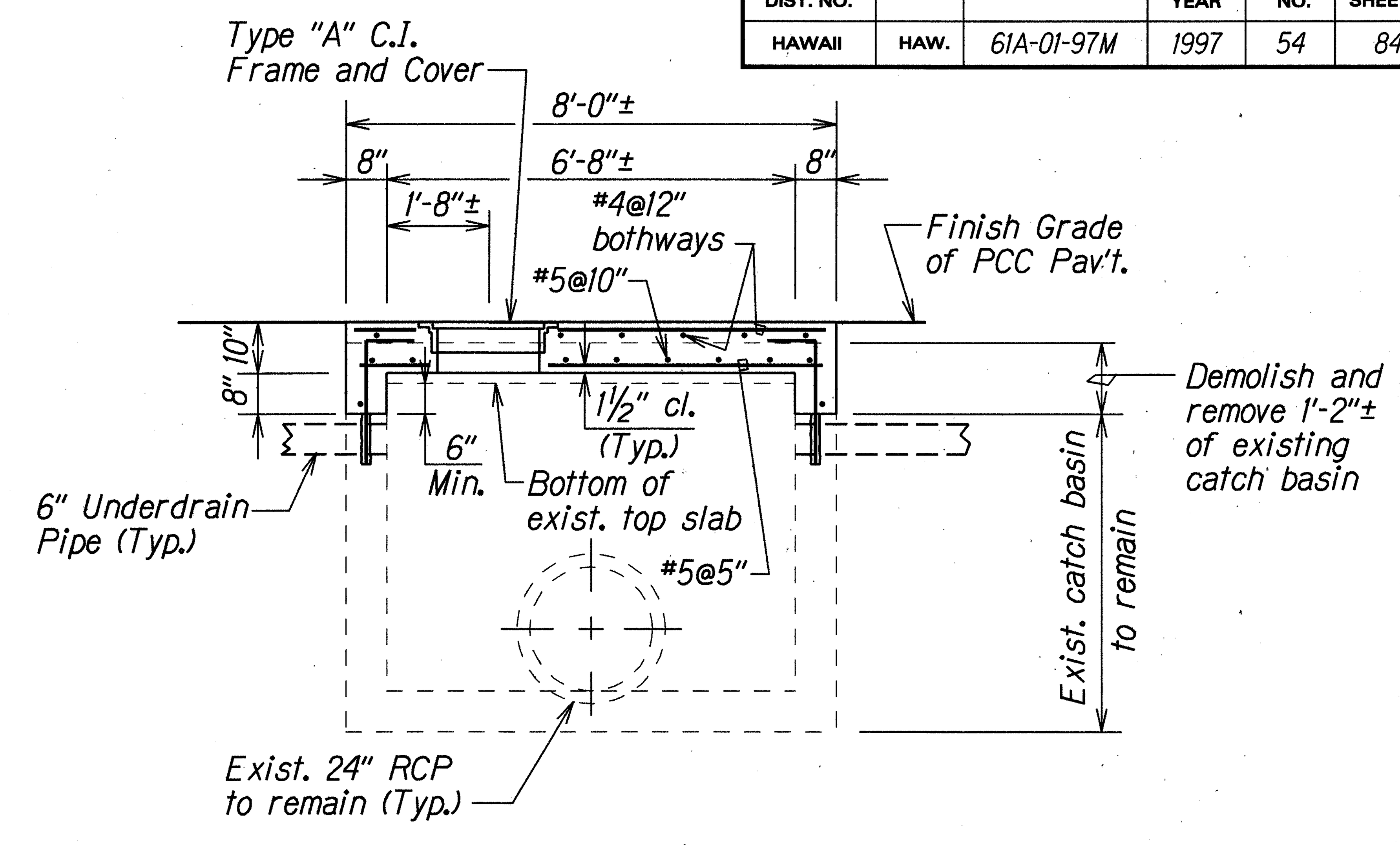
Scale: ¾"=1'-0" Date: May, 1997

SHEET No. H13 OF 24 SHEETS

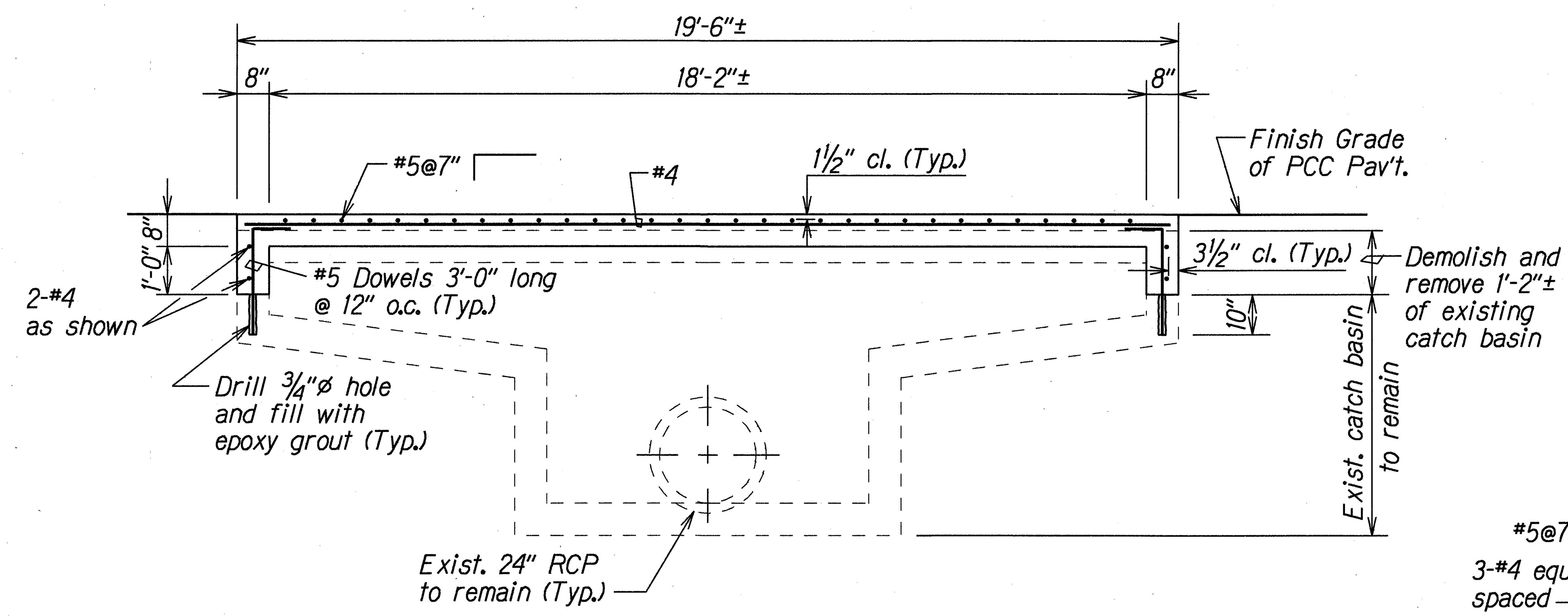
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	54	84



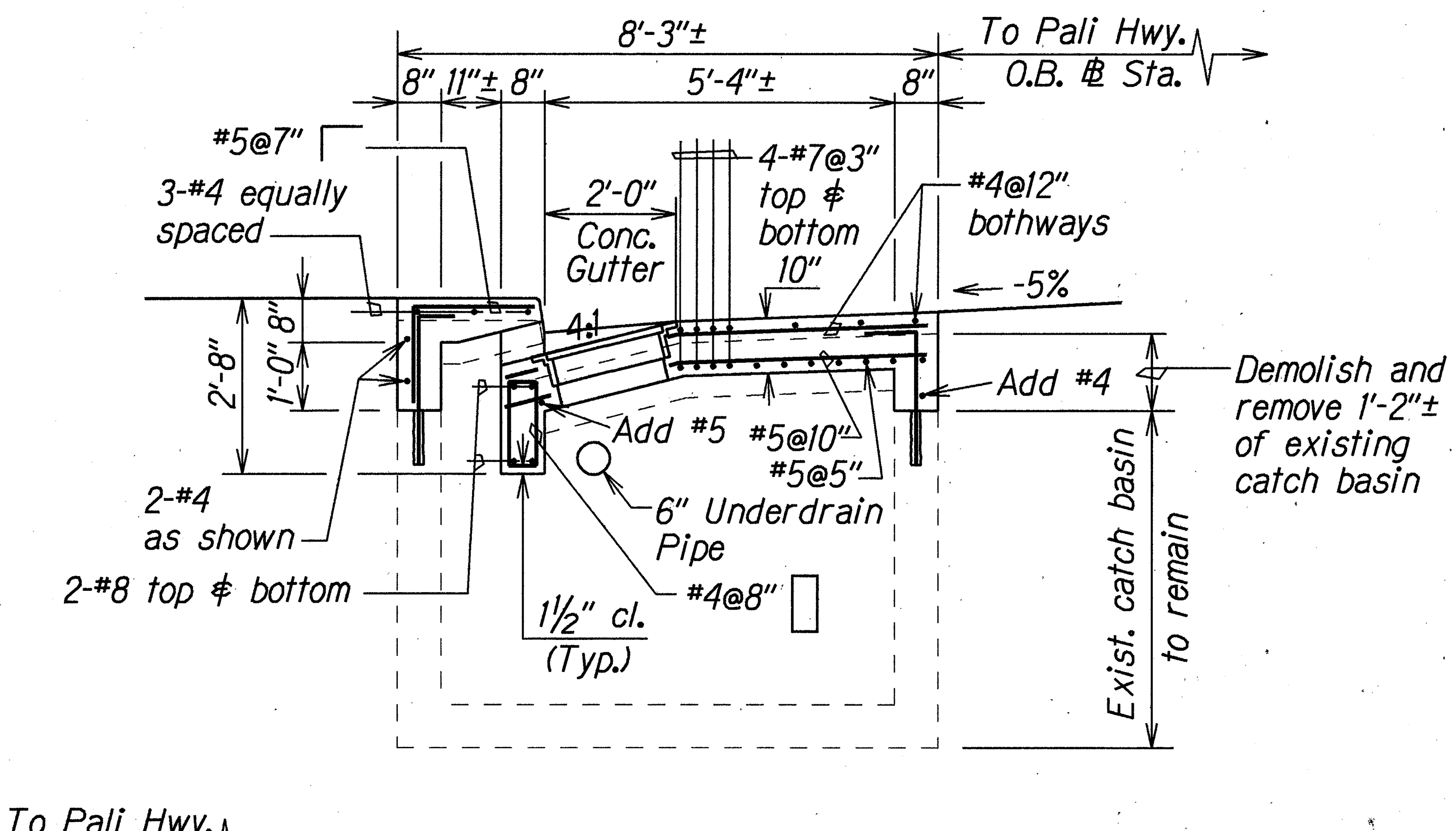
PLAN



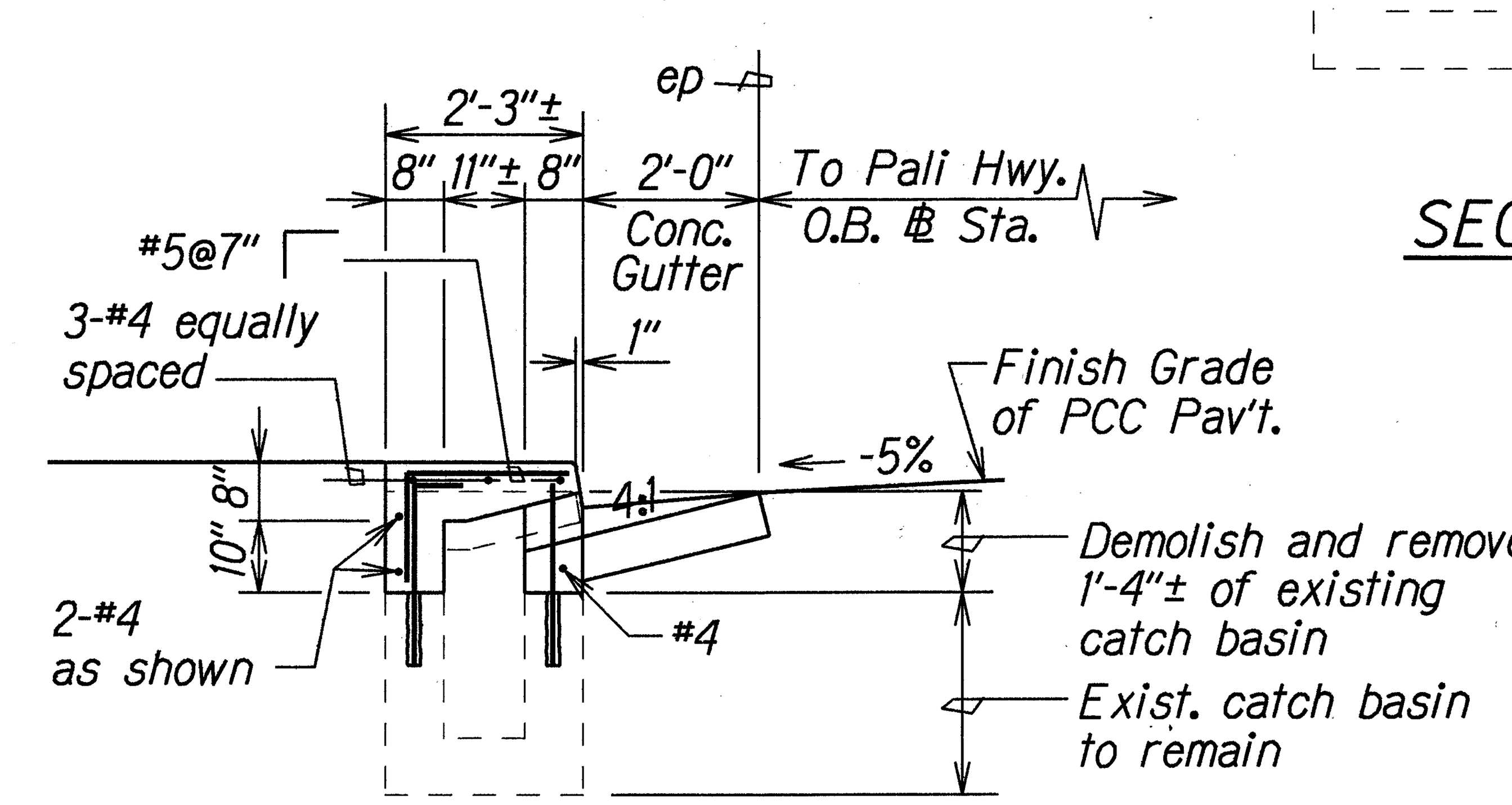
SECTION B



SECTION A



SECTION C



SECTION D

DETAILS OF MODIFIED TYPE "2" CATCH BASIN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

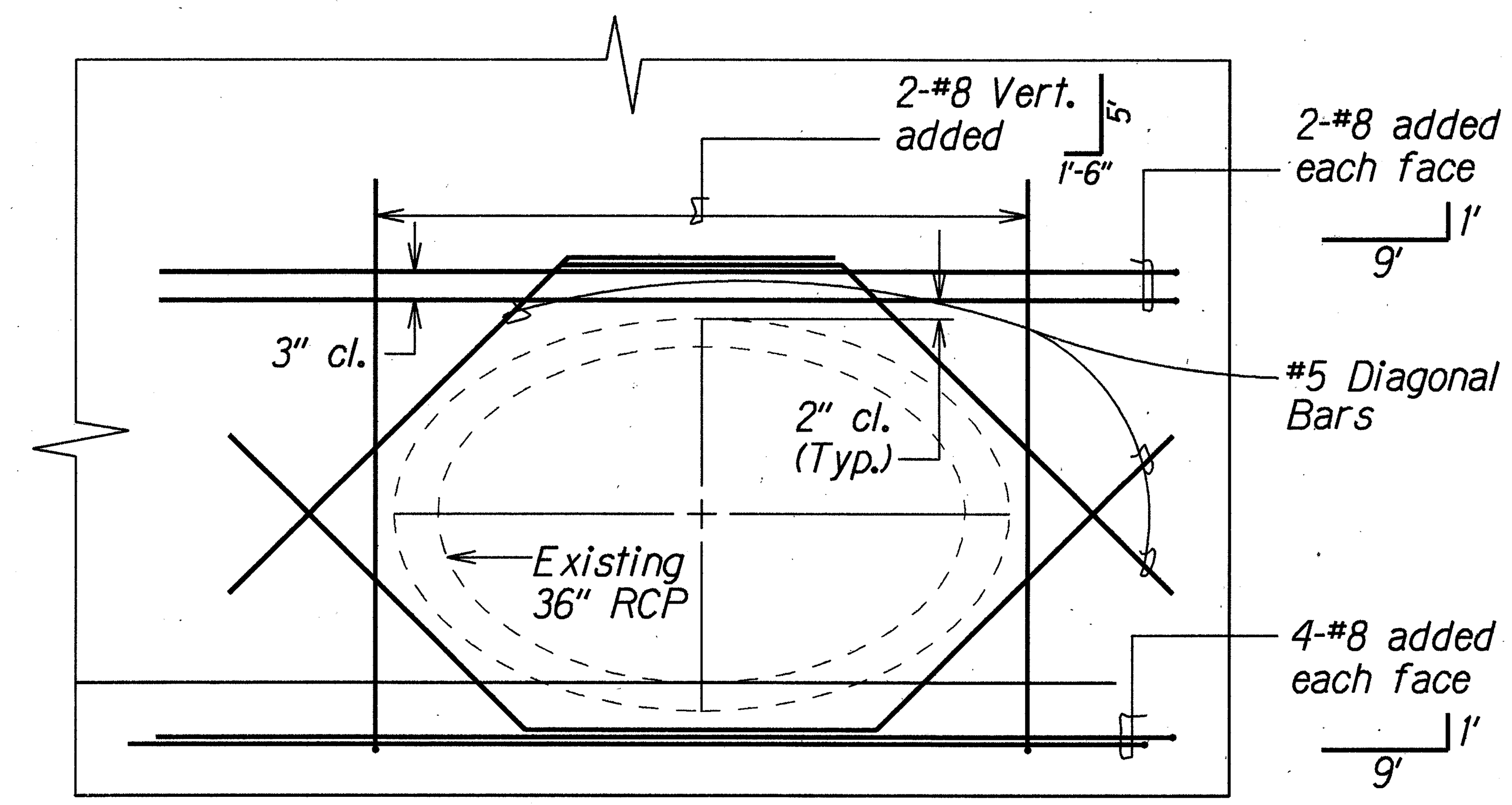
DRAINAGE DETAILS

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

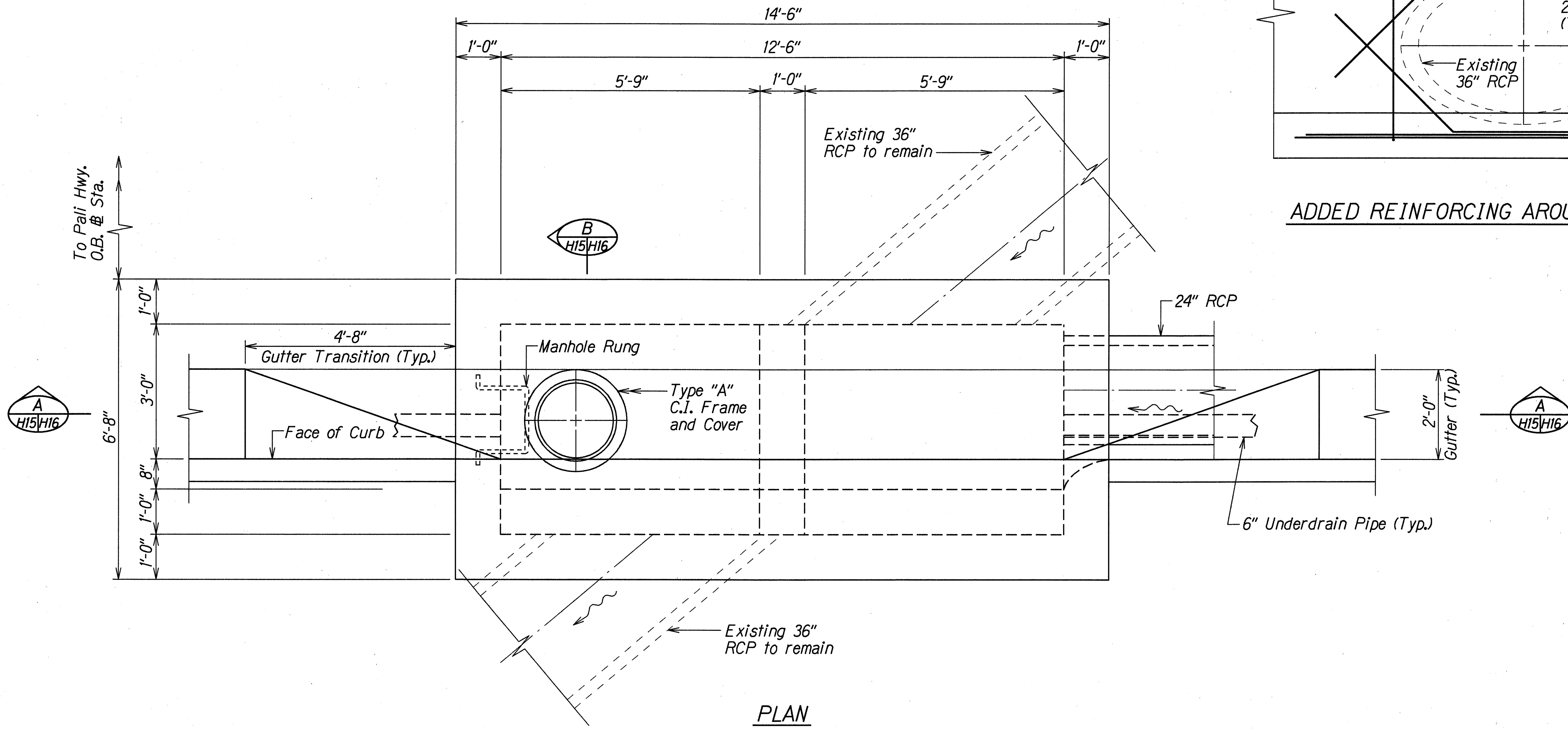
Scale: 1/2"=1'-0" Date: May 1997

SHEET No. H14 OF 24 SHEETS

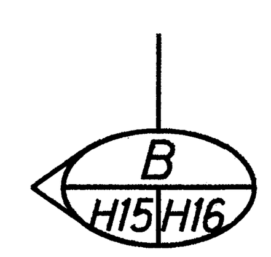
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	55	84



ADDED REINFORCING AROUND EXISTING CULVERT



PLAN



DETAILS OF MODIFIED TYPE "D1" CATCH BASIN

ORIGINAL PLAN	SURVEY PLOTTED BY	
	DRAWN BY Curtis Matsuda & Russell Sato	DATE May, 1997
	TRACED BY C. Matsuda	
NOTE BOOK dh:\curtis\pali mod_cb.dgn	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

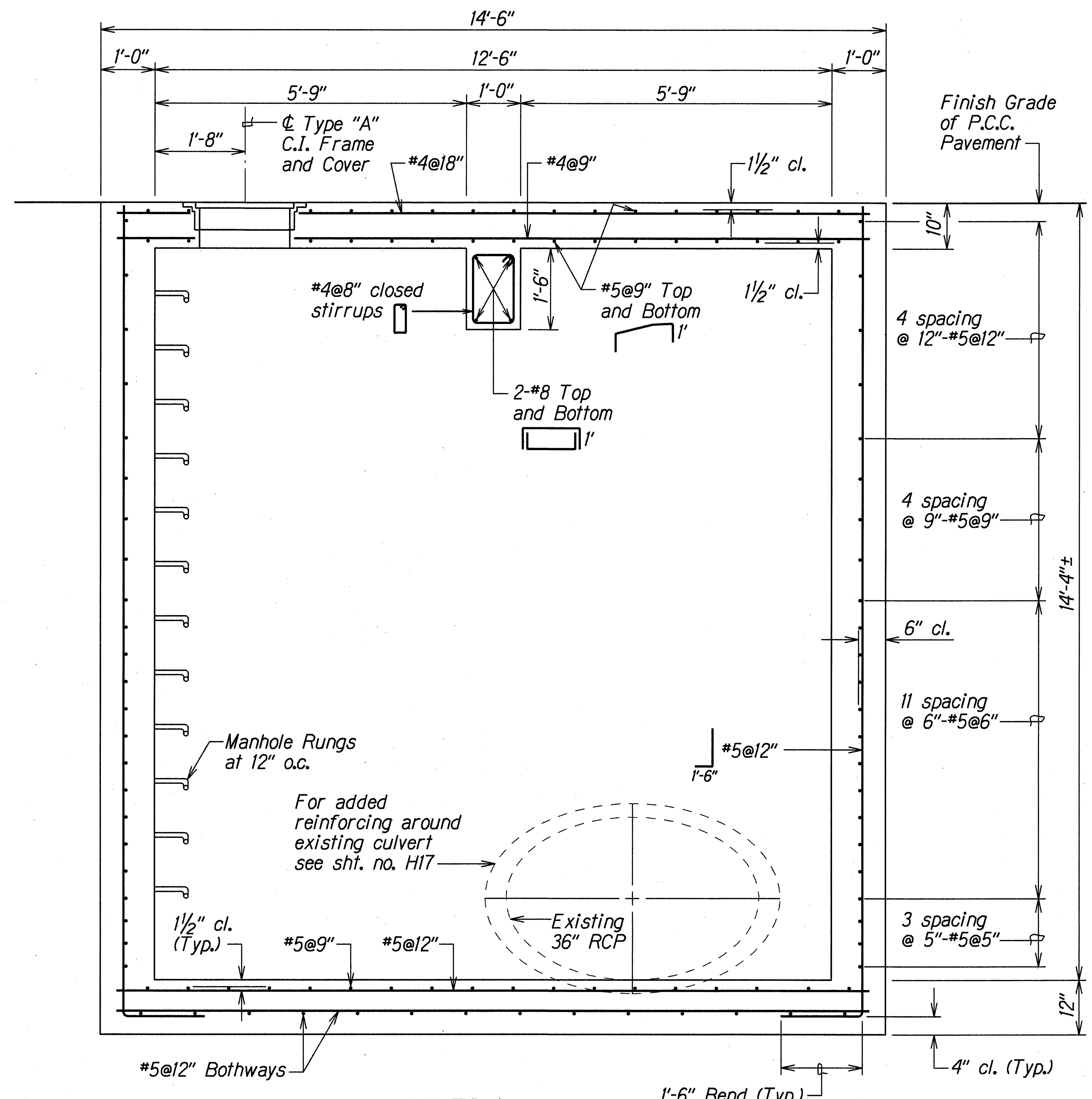
DRAINAGE DETAILS

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

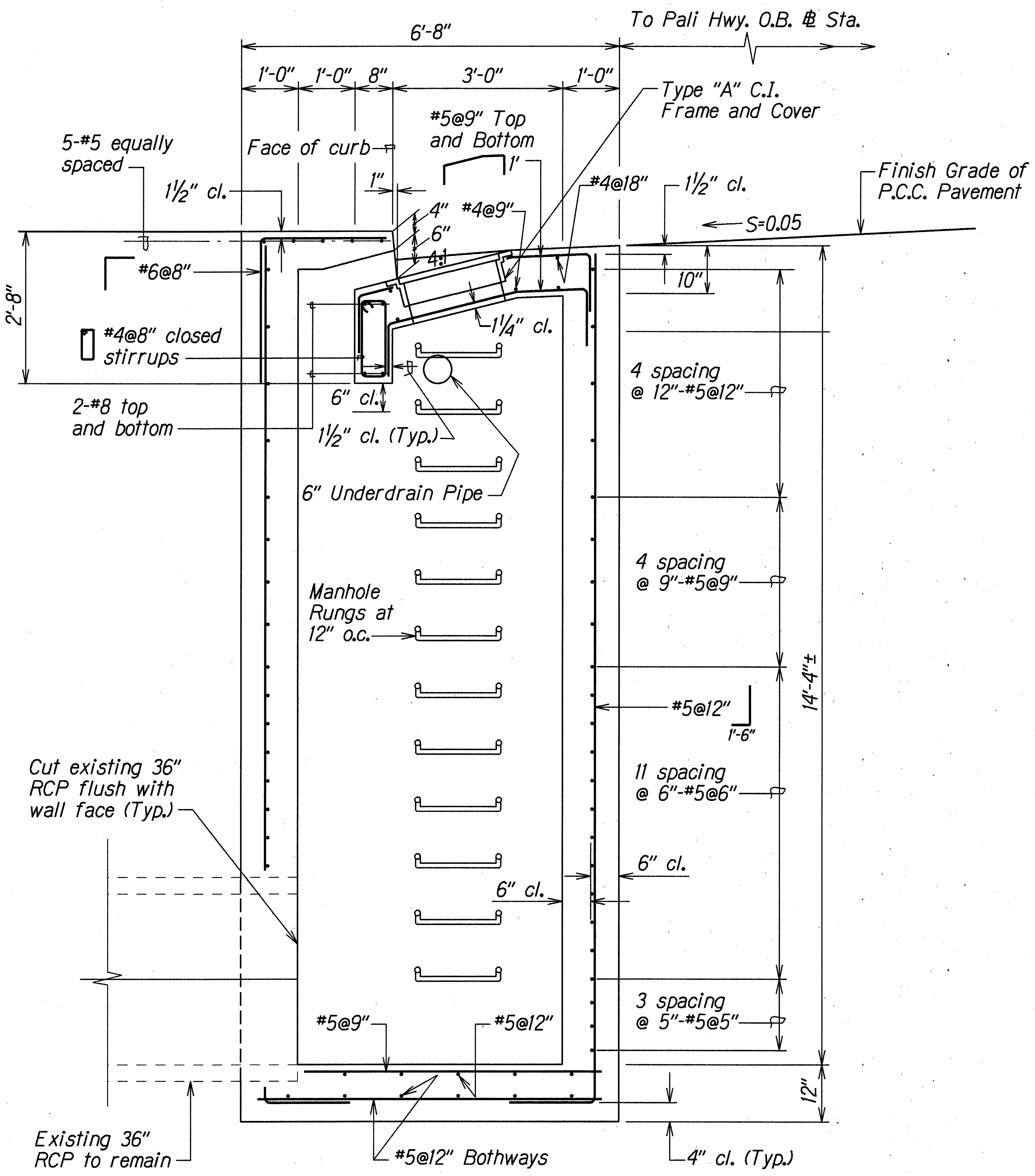
Scale: 3/4"=1'-0" Date: May 1997

SHEET No. H15 OF 24 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	56	84



SECTION A (H15 H16)



SECTION B (H15 H16)

DETAILS OF MODIFIED TYPE "D1" CATCH BASIN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

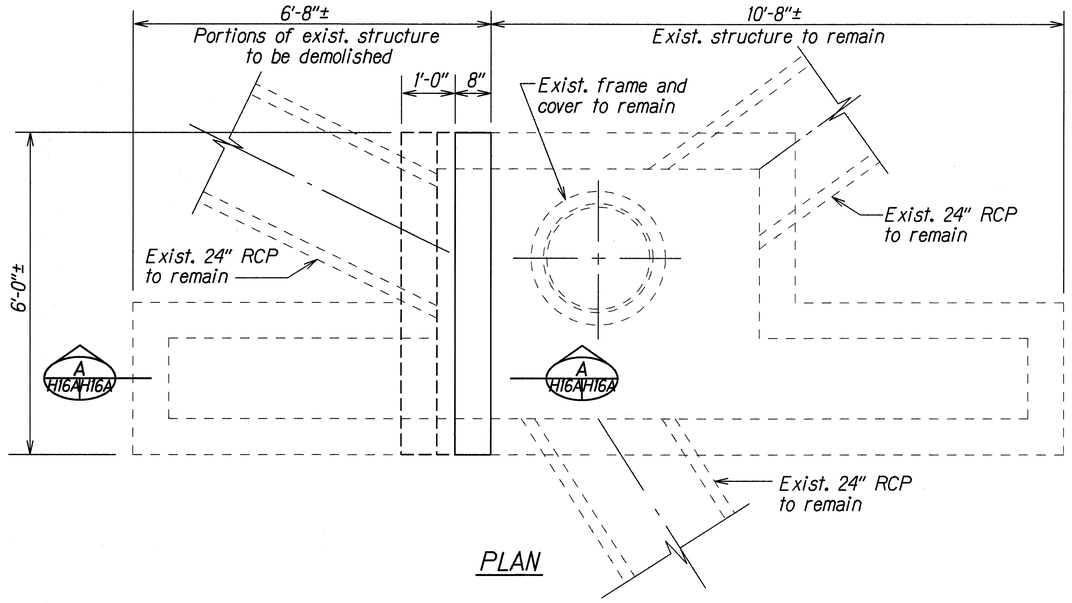
PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

Scale: ¾"=1'-0" Date: May 1997

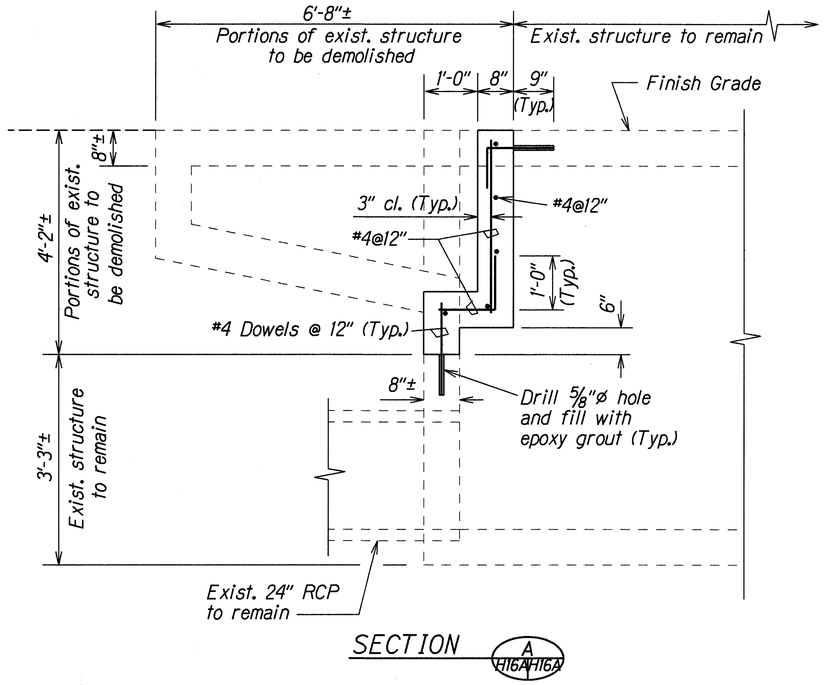
SHEET No. H16 OF 24 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	
	DRAWN BY Curtis Matsuda & Russell Sato	DATE May, 1997
NOTE BOOK	TRACED BY	
	DESIGNED BY C. Matsuda	
	QUANTITIES BY	
	CHECKED BY	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1999	C.O. 56S-1	84



PLAN



SECTION A H16A H16A

DETAILS OF MODIFIED TYPE "A" CATCH BASIN AT ℄ STA. 2+94± RT.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 1/19/99
	DRAWN BY A. Nomura	
	TRACED BY	
NOTE BOOK dh2curtis.6pl dh2hm03.06pl	DESIGNED BY C. Matsuda	
	QUANTITIES BY	
	CHECKED BY	

DATE	REVISION
1/27/99	Added Drainage Details Sheet

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

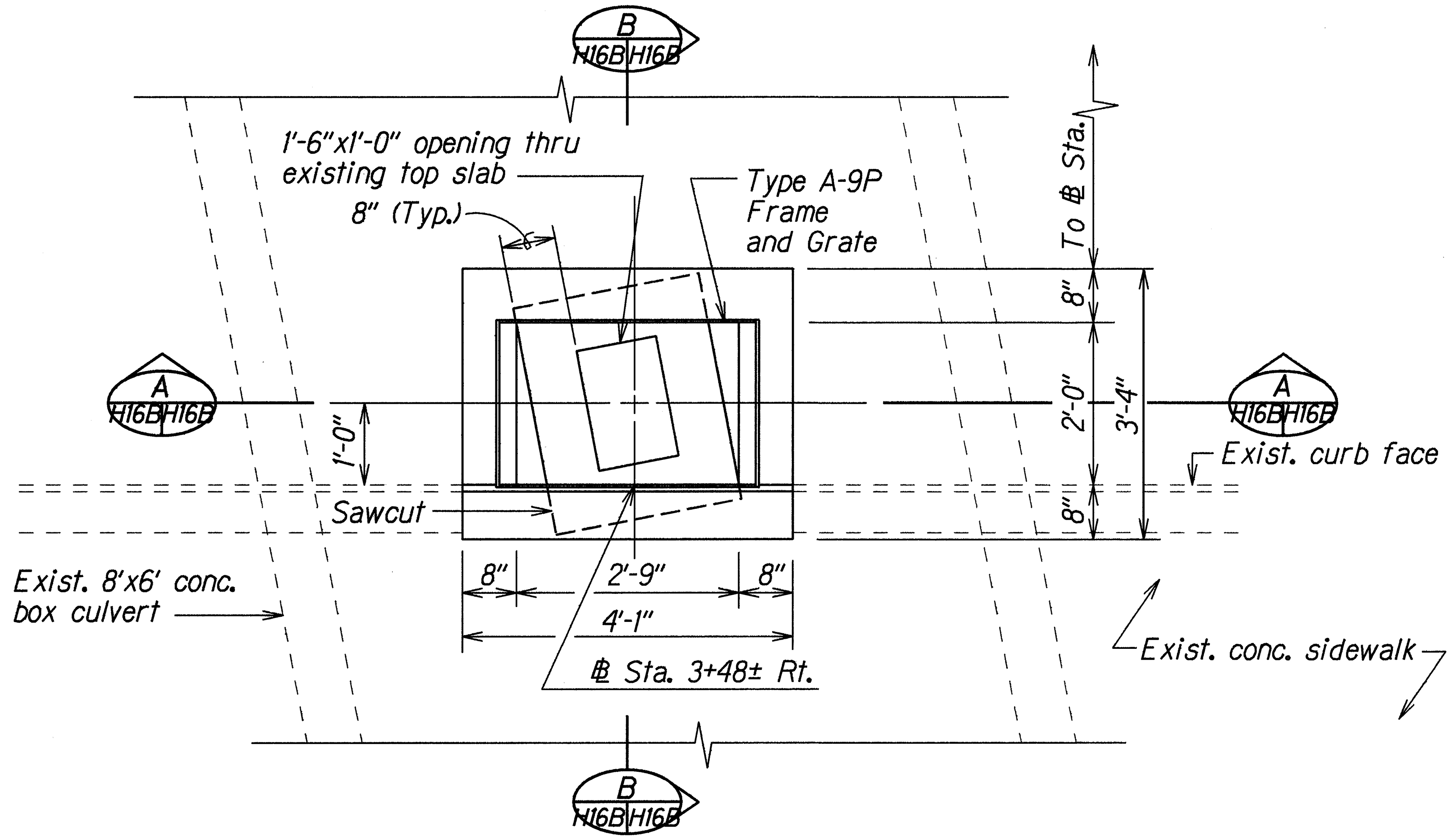
PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

Scale: 3/4"=1'-0" Date: Jan. 1999

SHEET No. H16A OF 24 SHEETS

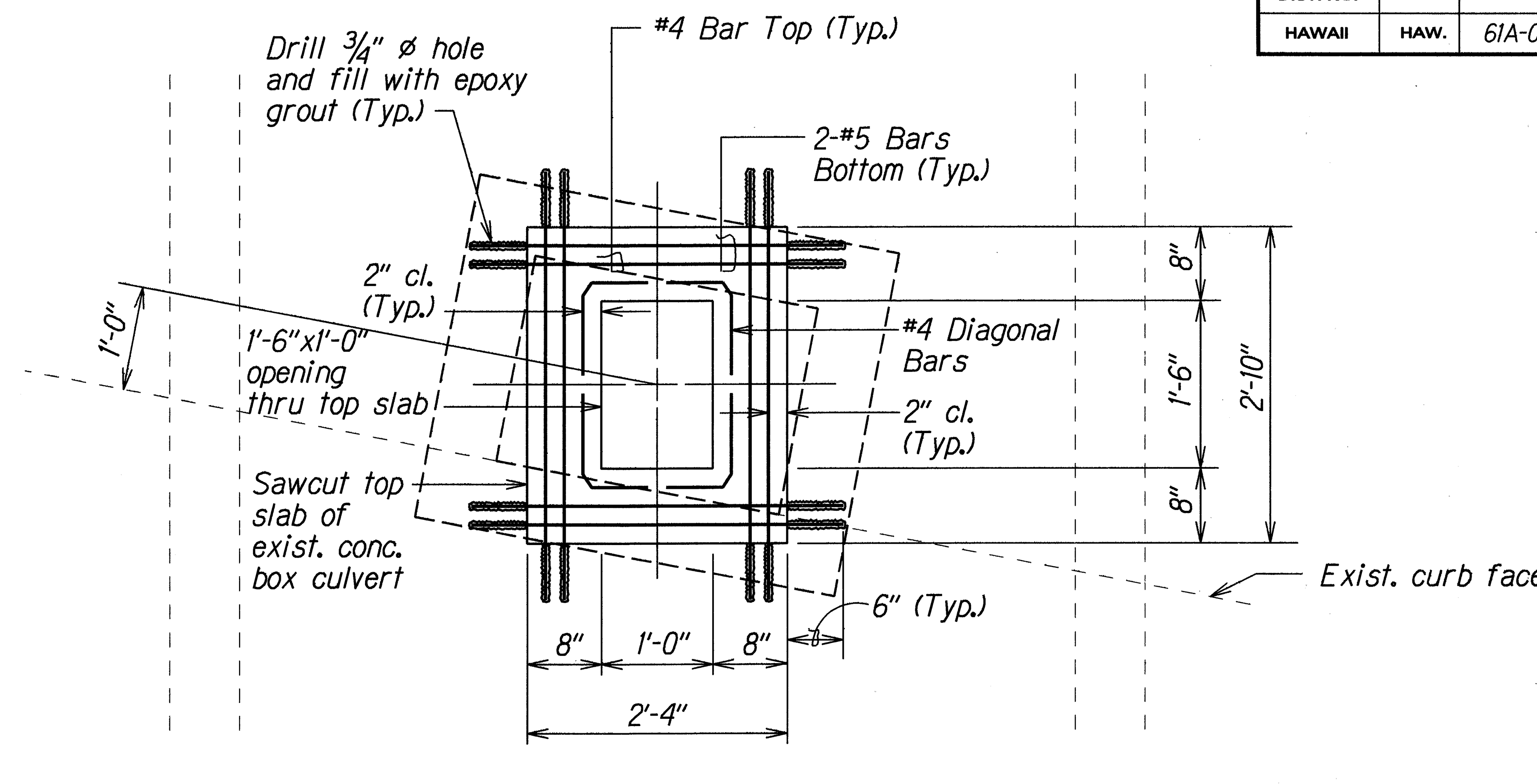
C.O. 56 S-1

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1999	C.O. 56S-2	84



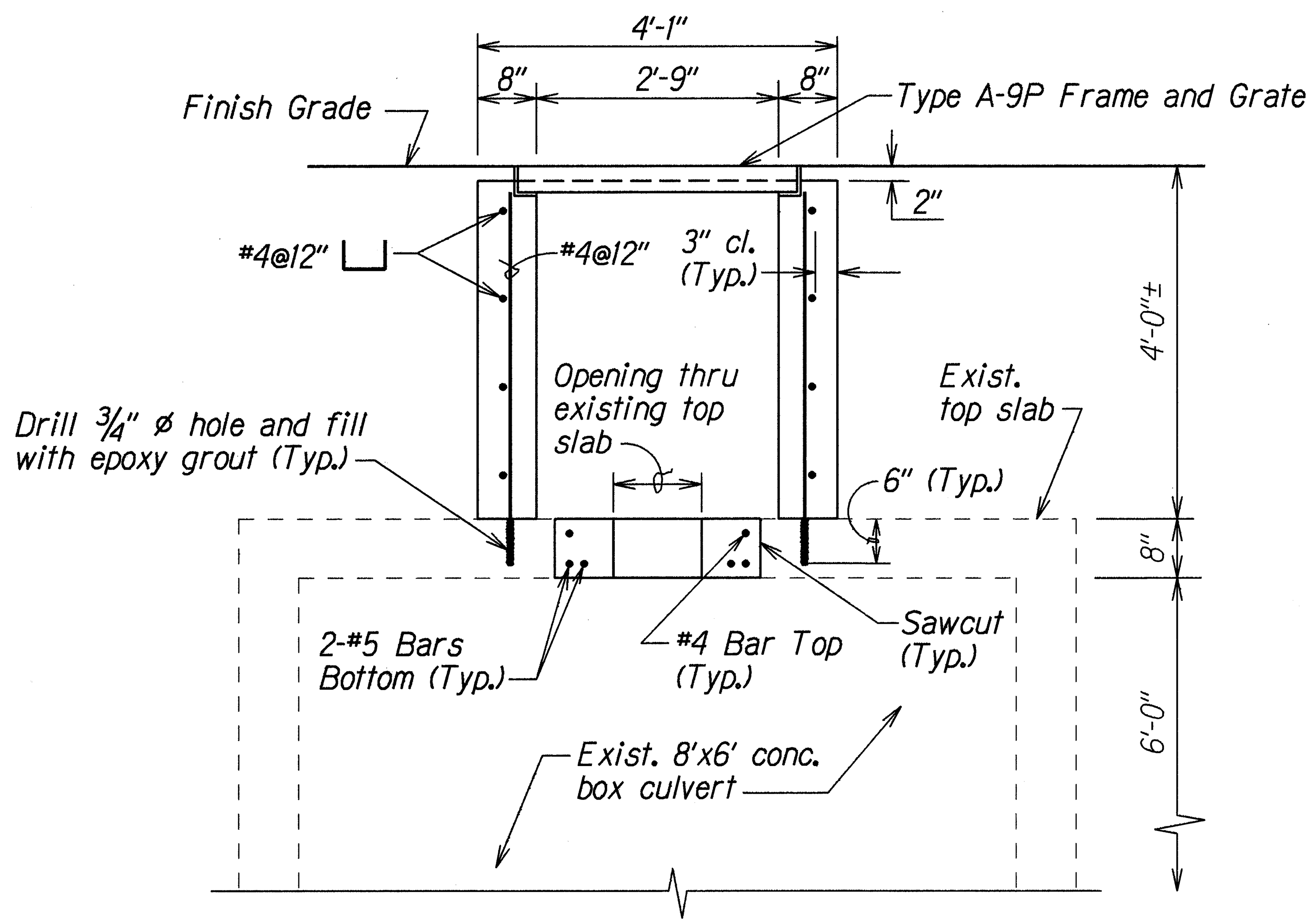
PLAN

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



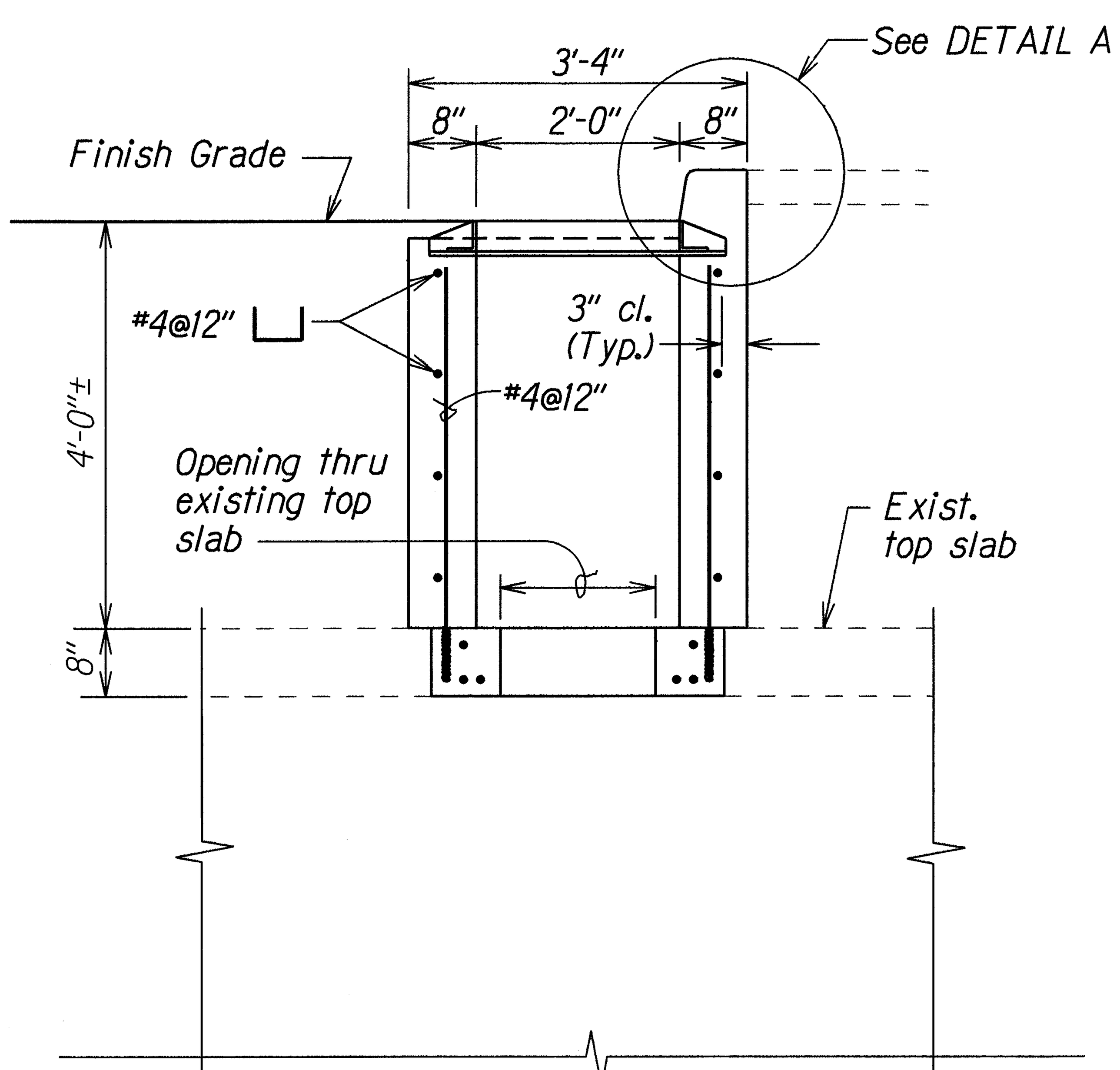
PLAN VIEW OF REINFORCING FOR TOP SLAB OPENING

Scale: 1"=1'-0"



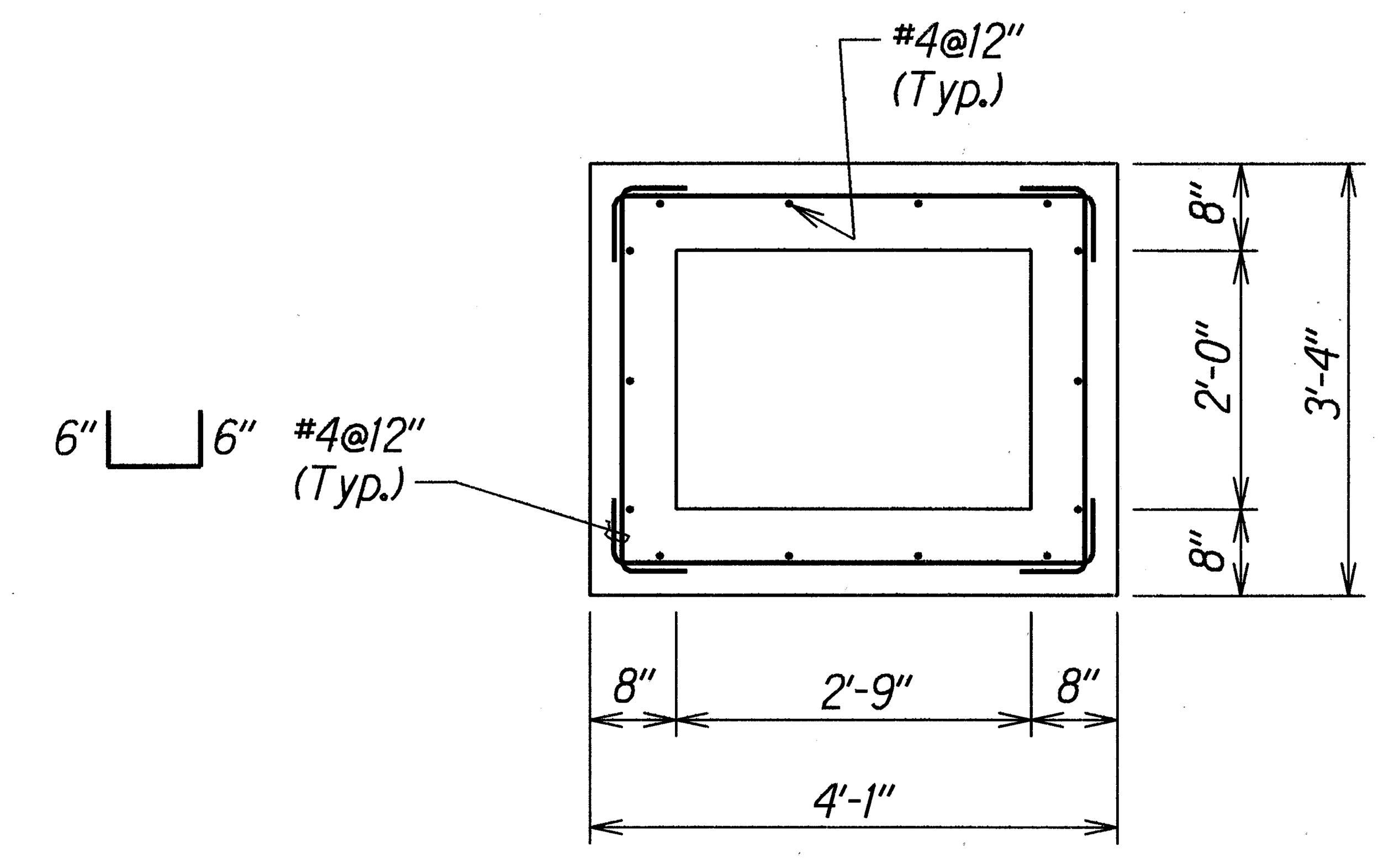
SECTION A H16B H16B

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



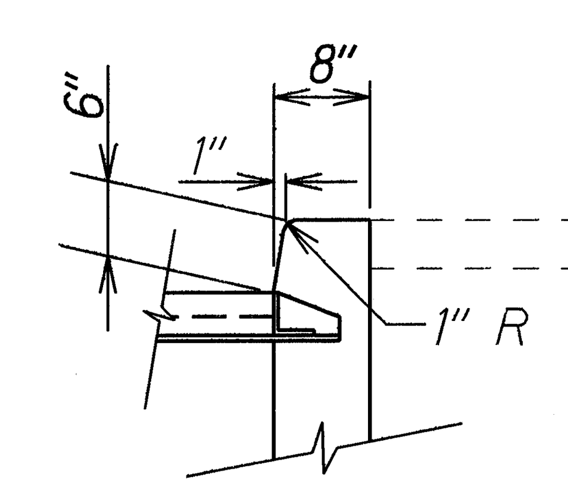
SECTION B H16B H16B

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



PLAN VIEW OF WALL REINFORCING

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



DETAIL A

DETAILS OF MODIFIED TYPE "A-9P" GDI AT ℄ STA. 3+48± RT.

ORIGINAL PLAN	
SURVEY PLOTTED BY	
DRAWN BY	A. Nomura & R. Sato
TRACED BY	
DESIGNED BY	C. Matsuda
QUANTITIES BY	
CHECKED BY	
NOTE BOOK	dh2curtis&pl
DATE	1/14/99

DATE	REVISION
1-27-99	Added Drainage Details Sheet

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

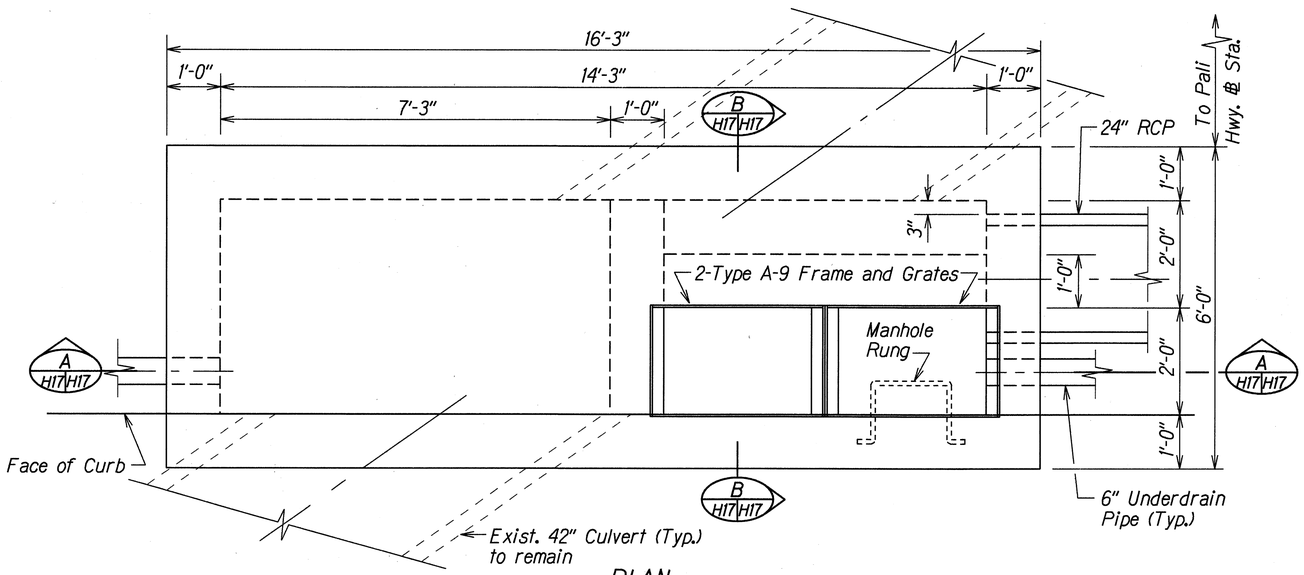
PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

Scale: As Noted   Date: Jan. 1999

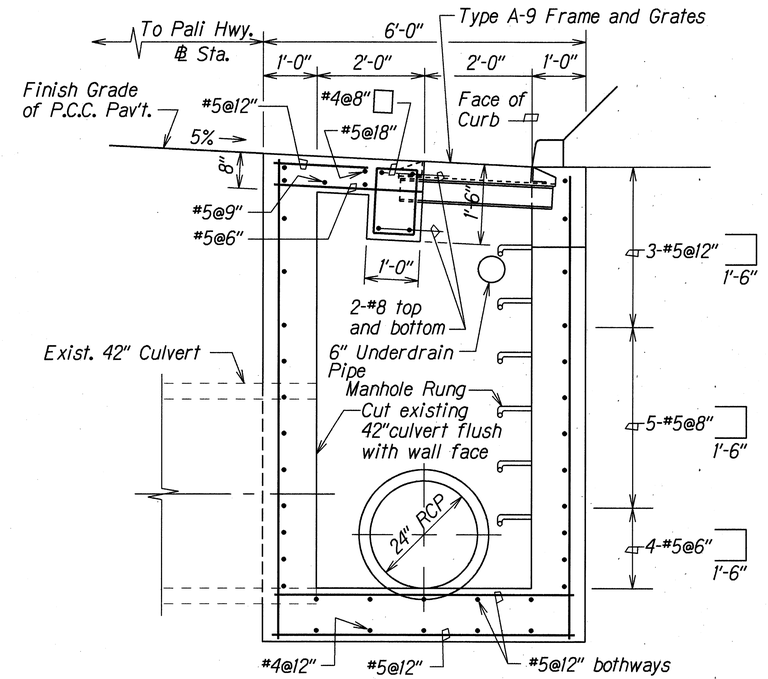
SHEET No. H16B OF 24 SHEETS

C.O. 56 S-2

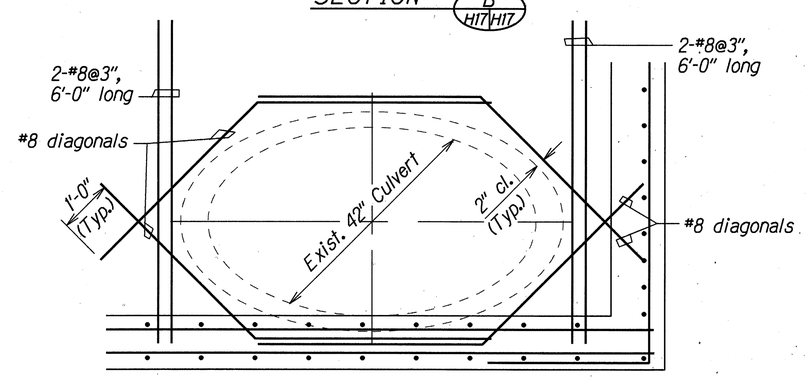
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	57	84



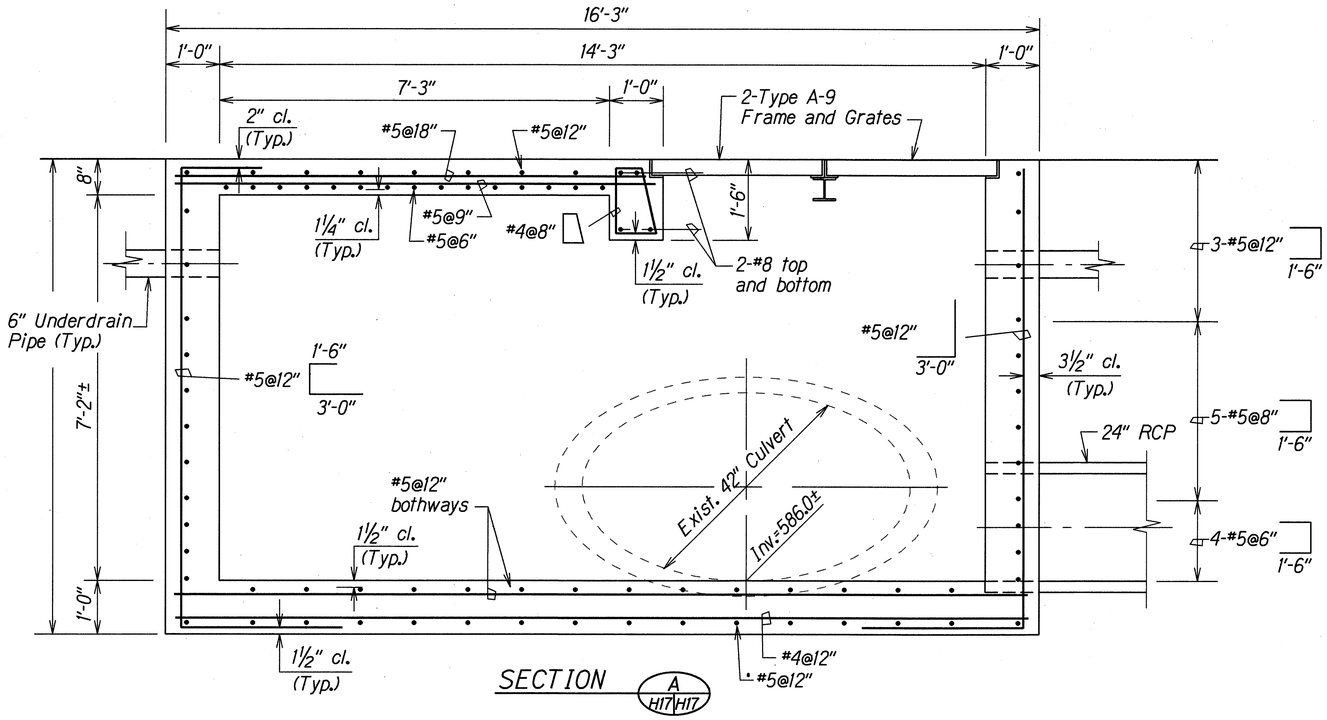
PLAN



SECTION B H17 H17



TYPICAL DETAIL OF ADDED REINFORCING AROUND EXISTING 42" CULVERT



SECTION A H17 H17

DETAILS OF MODIFIED TYPE "2-A9" GRATED DROP INLET

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 4/21/97
	DRAWN BY A. Nomura	
	NOTE BOOK	
	TRACED BY C. Matsuda	
	CHECKED BY	
	QUANTITIES BY	
	CHECKED BY	

dh12curl5.dgn
hfed_a9.dgn

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

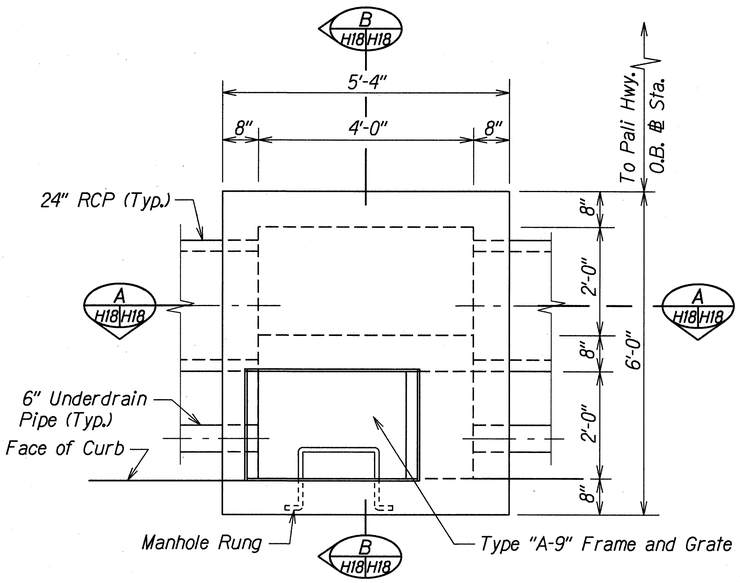
DRAINAGE DETAILS

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

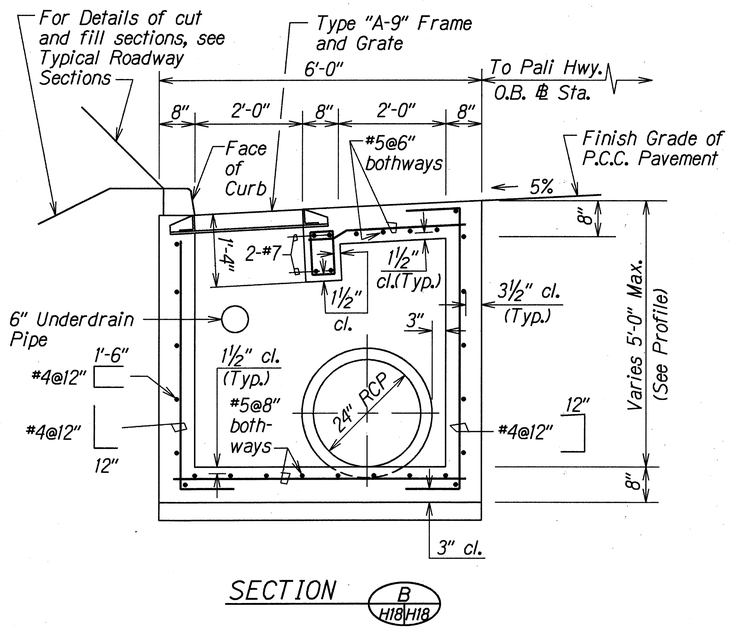
Scale: ¾"=1'-0" Date: May 1997

SHEET No. H17 OF 24 SHEETS

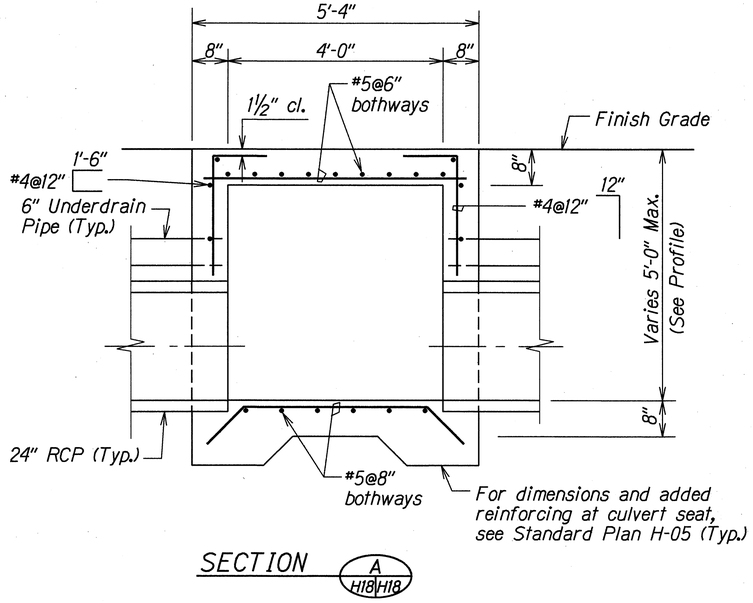
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	58	84



PLAN



SECTION B H18 H18



SECTION A H18 H18

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 4/19/97
	DRAWN BY A. Nomura	
	TRACED BY	
	NOTE BOOK	
	dh2curtis.6pl	
	XREFS	
	dh2e_a9.dgn	
	DESIGNED BY C. Matsuda	
	QUANTITIES BY	
	CHECKED BY	

TYPICAL DETAILS OF TYPE "A-9" GRATED DROP INLET

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

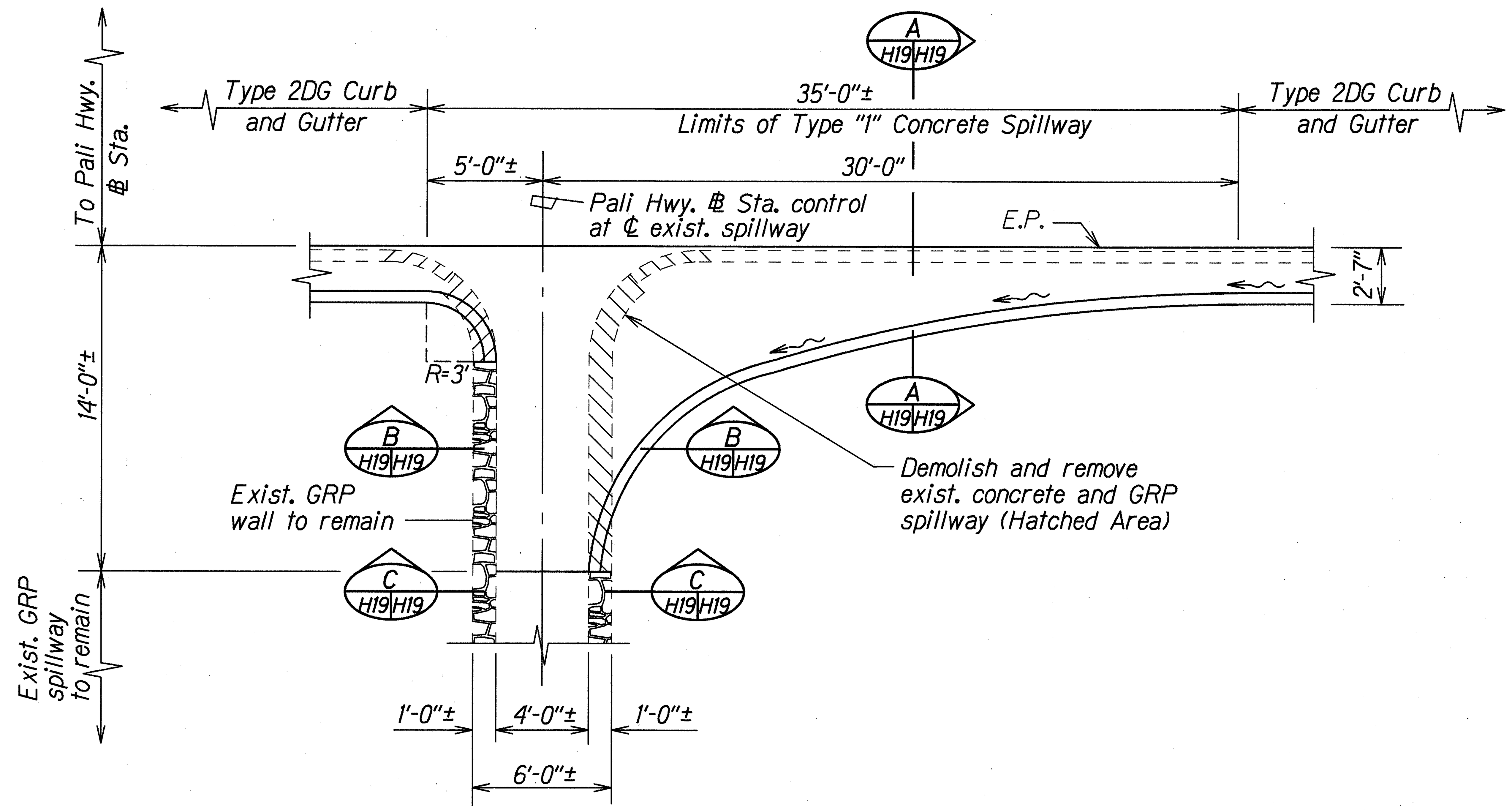
DRAINAGE DETAILS

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

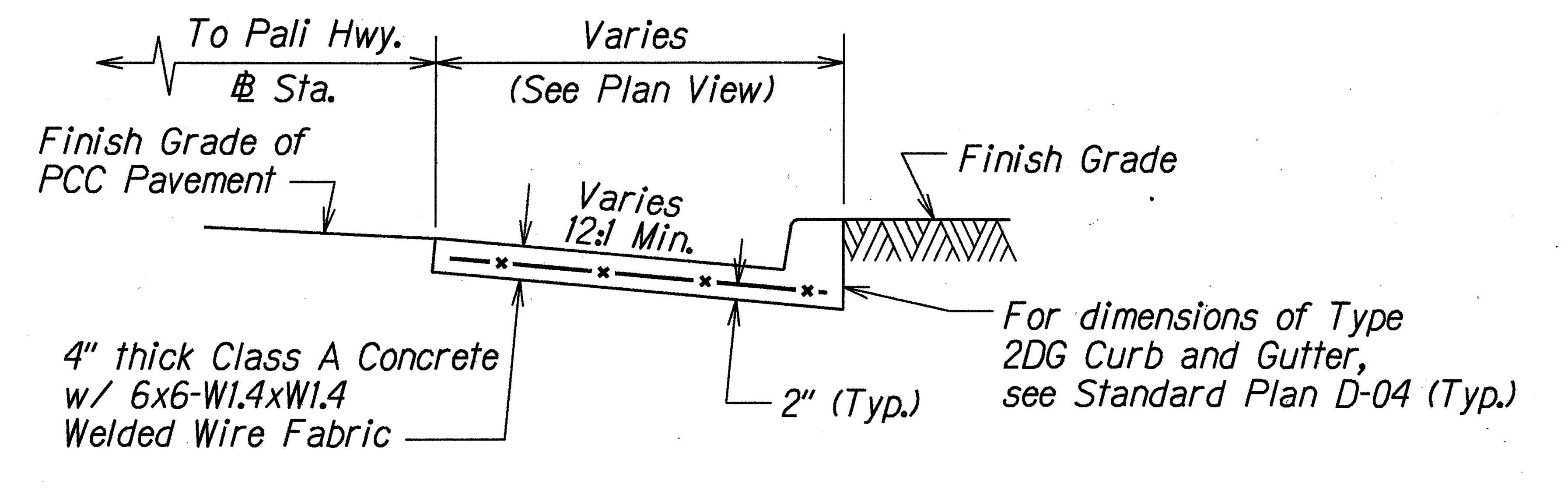
Scale: 3/4"=1'-0" Date: May 1997

SHEET No. H18 OF 24 SHEETS

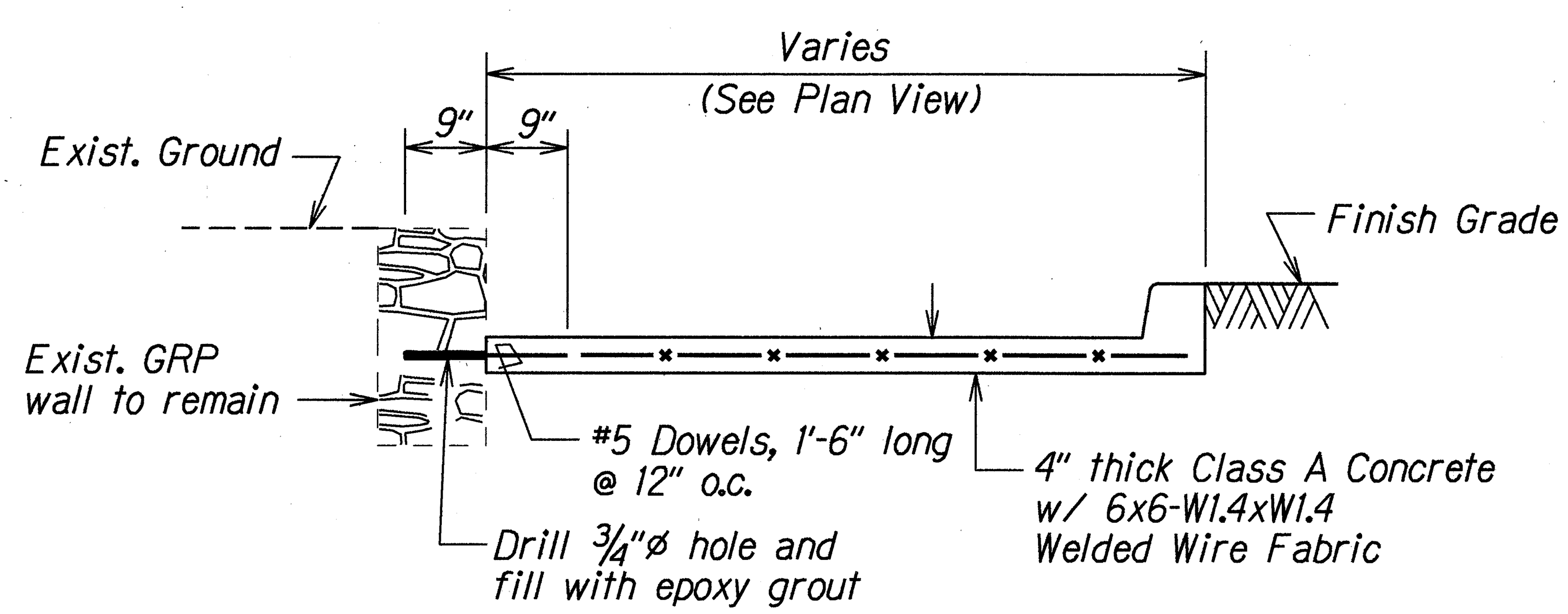
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	59	84



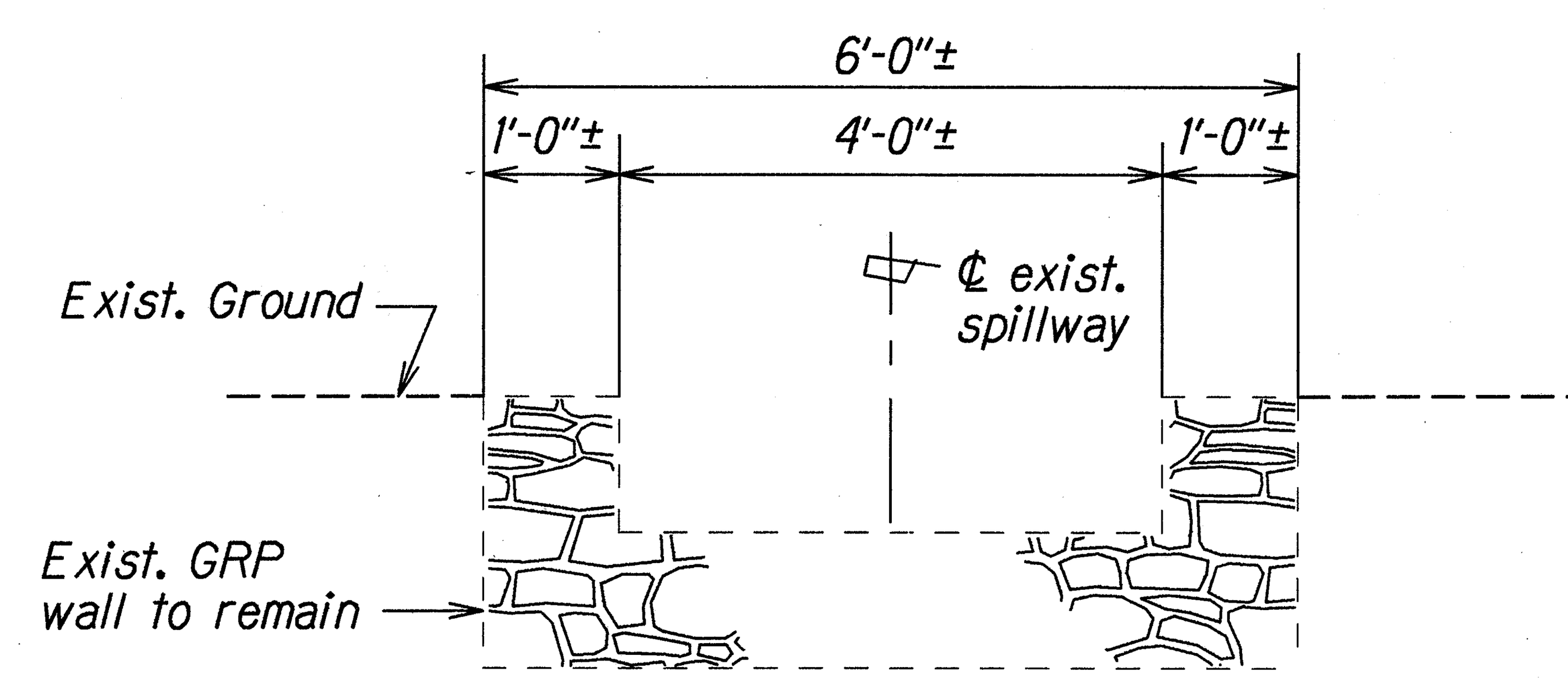
PLAN
Scale: 1/4"=1'-0"



SECTION A H19 H19



SECTION B H19 H19



SECTION C H19 H19

ORIGINAL PLAN — SURVEY PLOTTED BY / DRAWN BY A. Nomura / TRACED BY / DESIGNED BY C. Matsuda / QUANTITIES BY / CHECKED BY — DATE 4/19/97 — NOTE BOOK dh2curtis.Epl, spillway.dgn

TYPICAL DETAILS OF TYPE "1" CONCRETE SPILLWAY

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

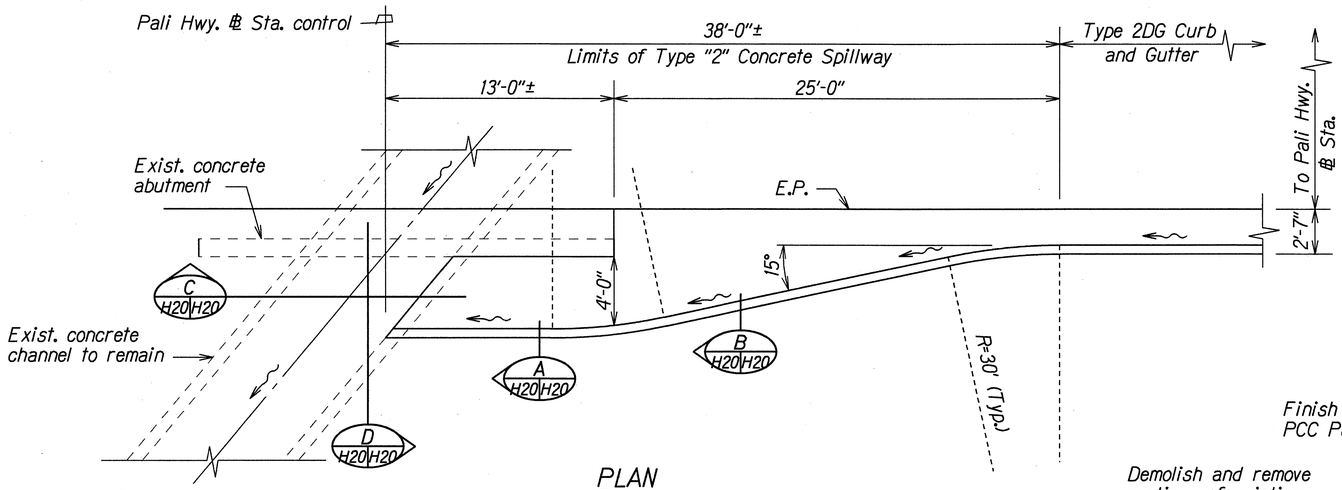
DRAINAGE DETAILS

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

Scale: 3/4"=1'-0" Date: May 1997

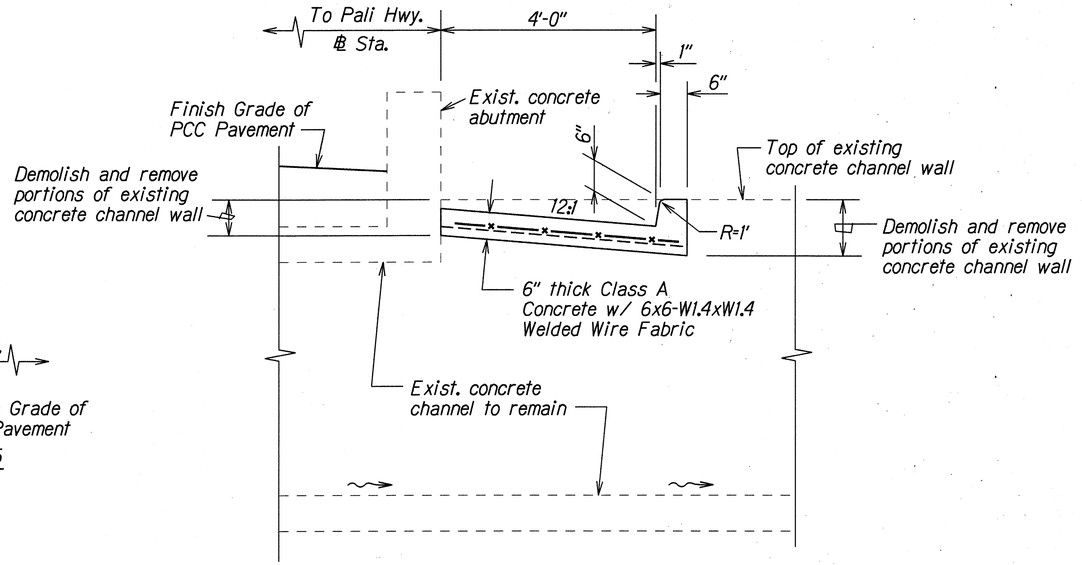
SHEET No. H19 OF 24 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	60	84

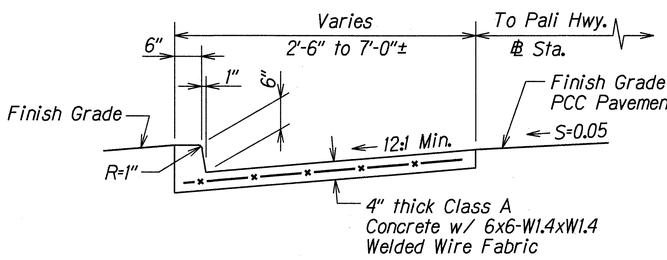


PLAN

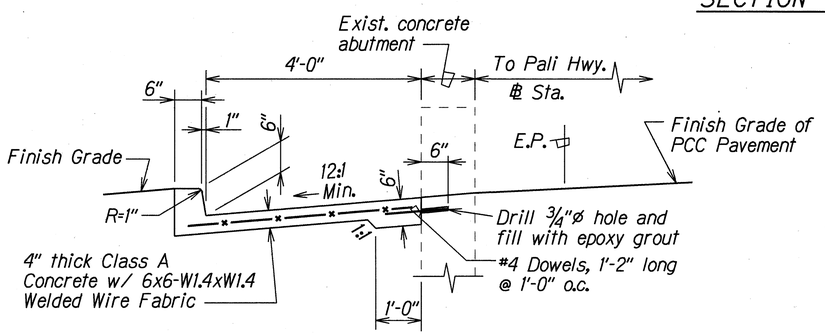
Scale: 1/4"=1'-0"



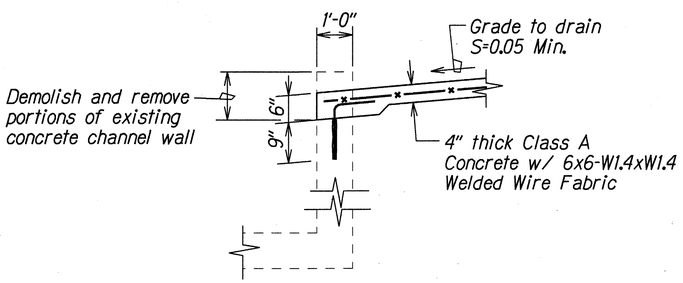
SECTION D H20|H20



SECTION B H20|H20



SECTION A H20|H20



SECTION C H20|H20

TYPICAL DETAILS OF TYPE "2" CONCRETE SPILLWAY

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 5/6/97
	DRAWN BY A. Nomura	
	TRACED BY	
	DESIGNED BY C. Matsuda	
	NOTE BOOK dh2curlsdgn	
	QUANTITIES BY	
	CHECKED BY	
	N:\Pillway2.dgn	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

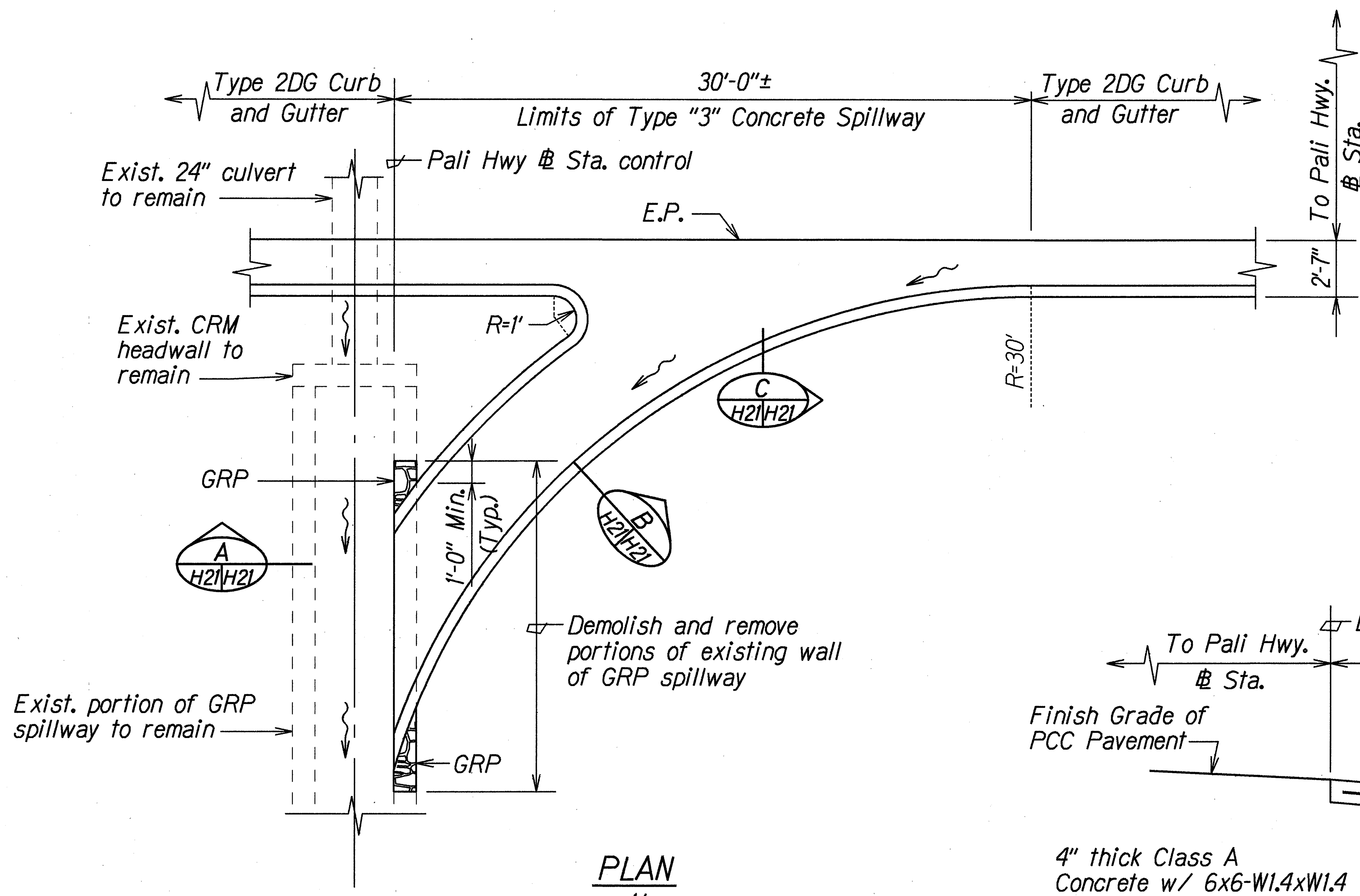
DRAINAGE DETAILS

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

Scale: 3/4"=1'-0" Date: May 1997

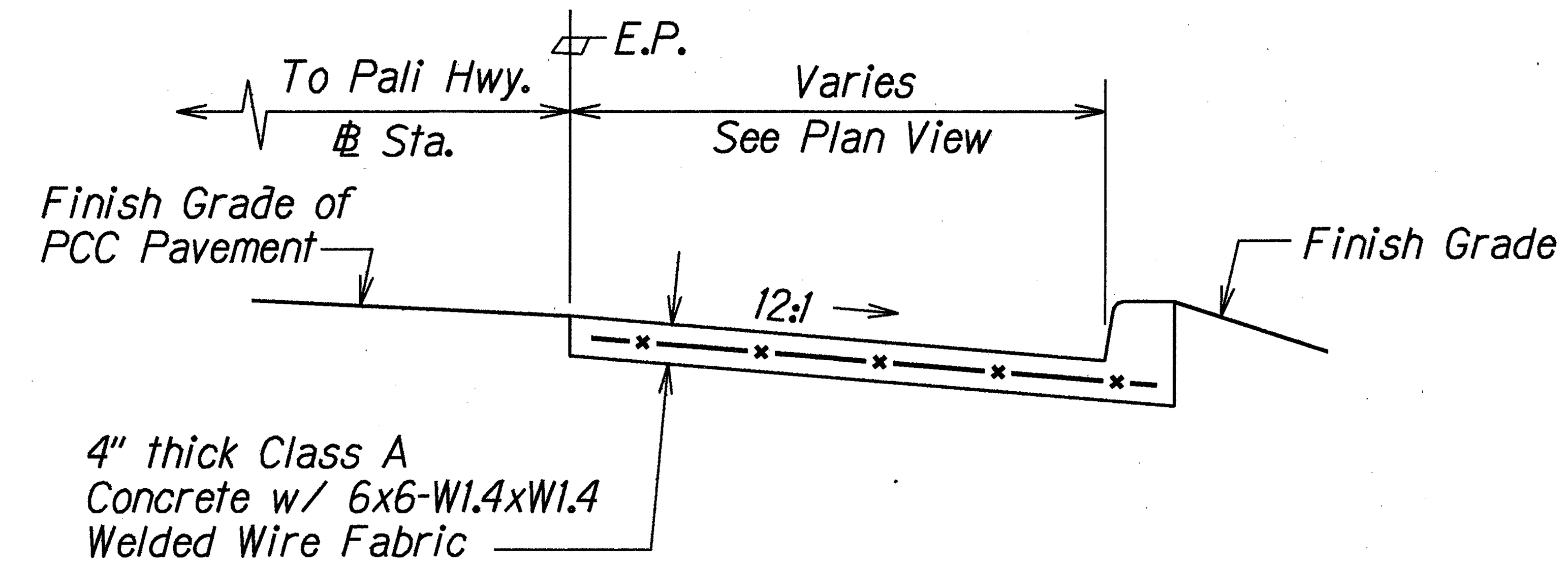
SHEET No. H20 OF 24 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	61	84

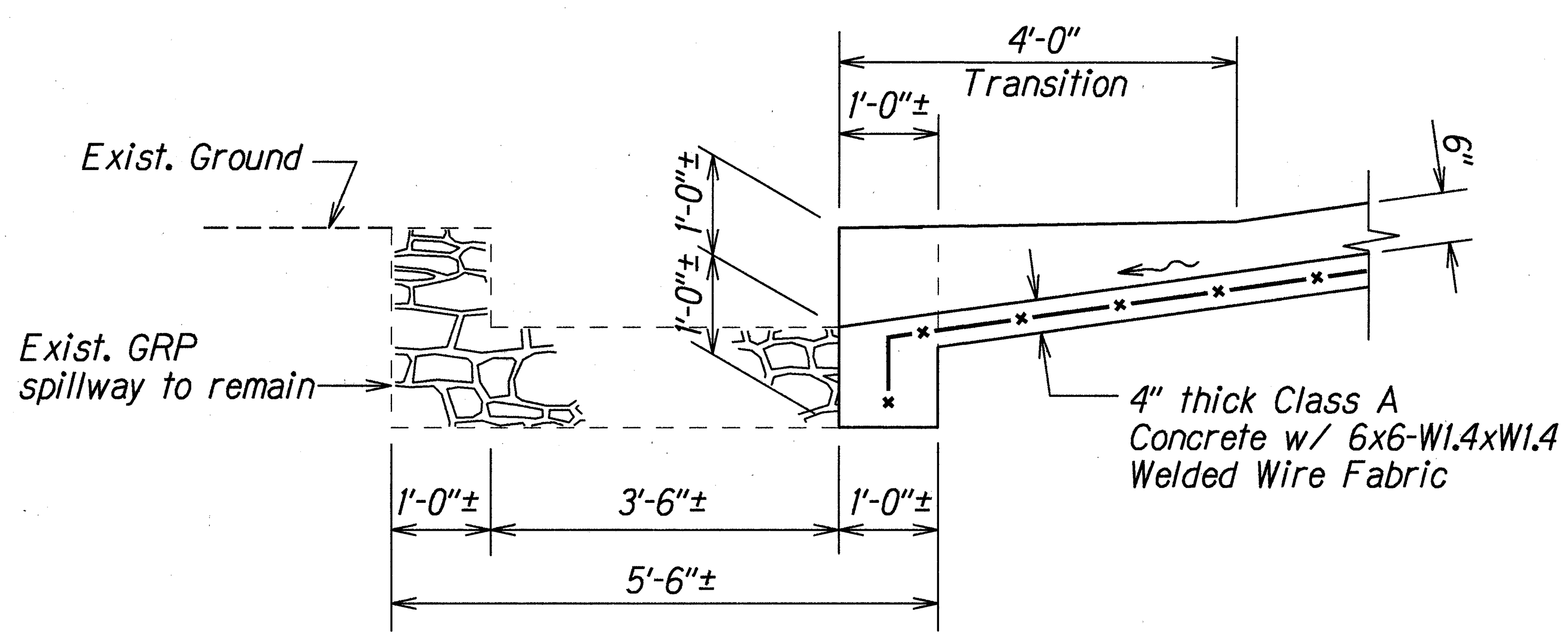


PLAN

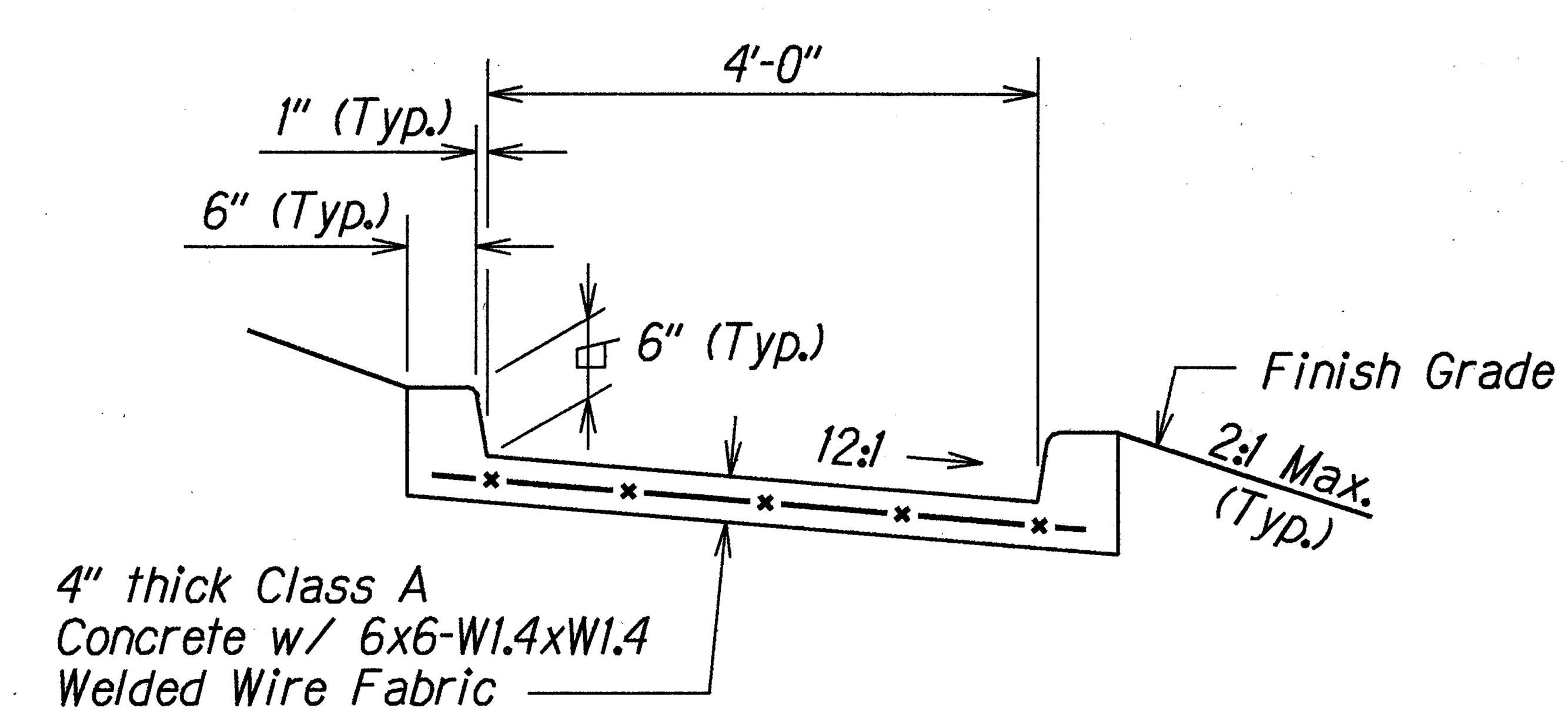
Scale: 1/4"=1'-0"



SECTION C H21 H21



SECTION A H21 H21



SECTION B H21 H21

TYPICAL DETAILS OF TYPE "3" CONCRETE SPILLWAY

ORIGINAL PLAN
NOTE BOOK dh2curtis&pl spillway3.dgn
SURVEY PLOTTED BY
DRAWN BY A. Nomura
TRACED BY
DESIGNED BY C. Matsuda
QUANTITIES BY
CHECKED BY
DATE 5/6/97

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

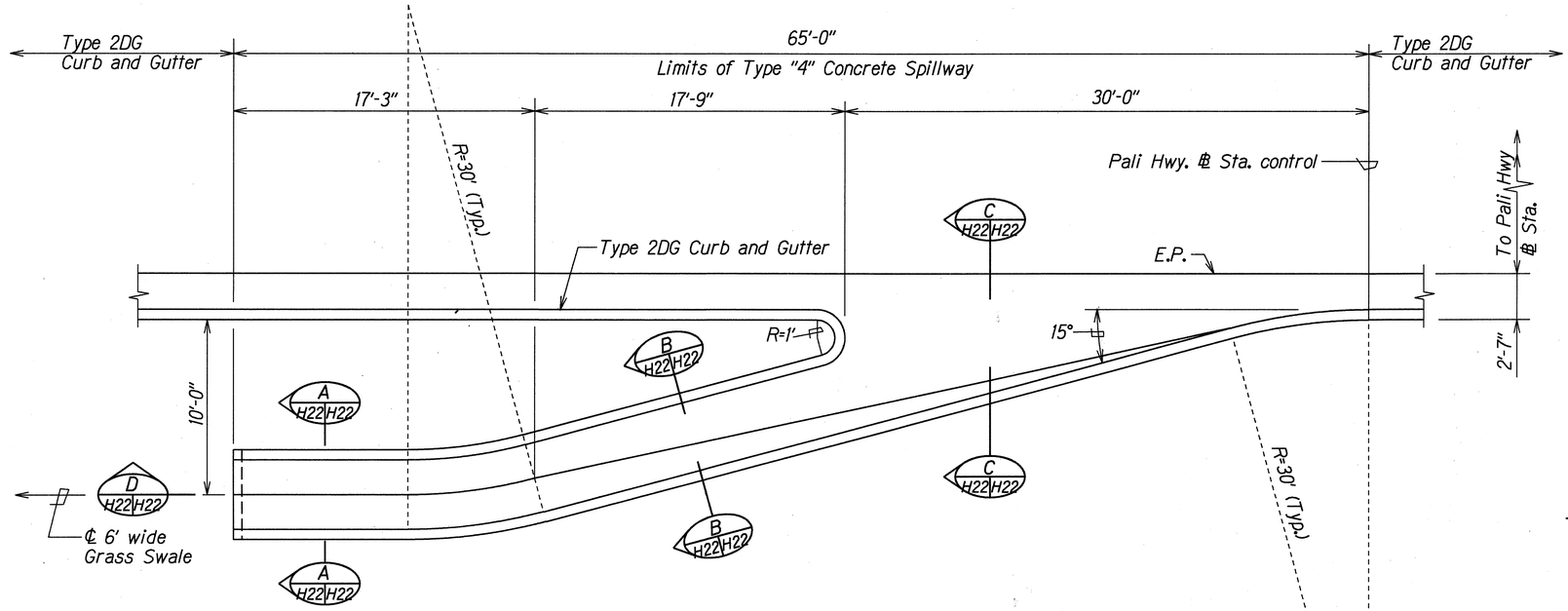
DRAINAGE DETAILS

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

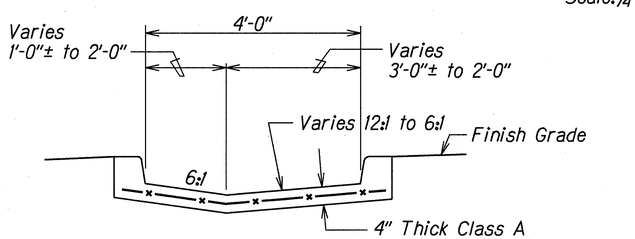
Scale: 3/4"=1'-0" Date: May 1997

SHEET No. H21 OF 24 SHEETS

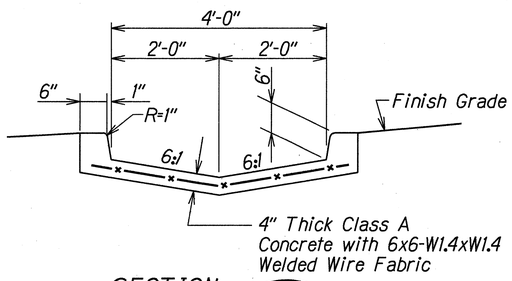
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	62	84



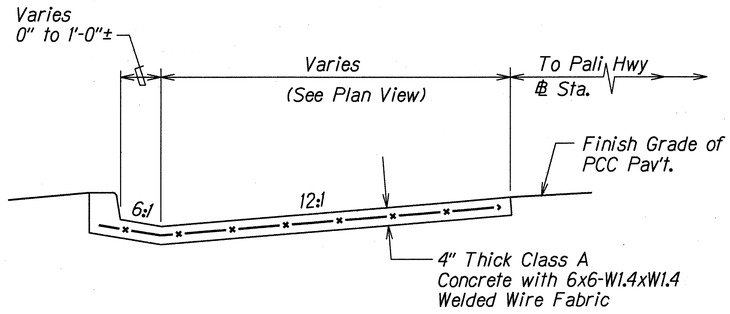
PLAN
Scale: 1/4"=1'-0"



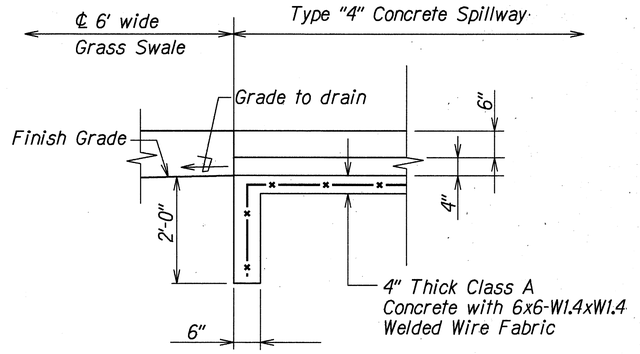
SECTION B H22 H22
Scale: 3/4"=1'-0"



SECTION A H22 H22
Scale: 3/4"=1'-0"



SECTION C H22 H22
Scale: 3/4"=1'-0"



SECTION D H22 H22
Scale: 3/4"=1'-0"

ORIGINAL PLAN
SURVEY PLOTTED BY
DRAWN BY A. Nomura
TRACED BY
DESIGNED BY C. Matsuda
NOTE BOOK dh2curlls6pl
QUANTITIES BY
CHECKED BY
DATE 4/19/97
dh2curlls6pl
H2highway4.dgn

DETAILS OF TYPE "4" CONCRETE SPILLWAY

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

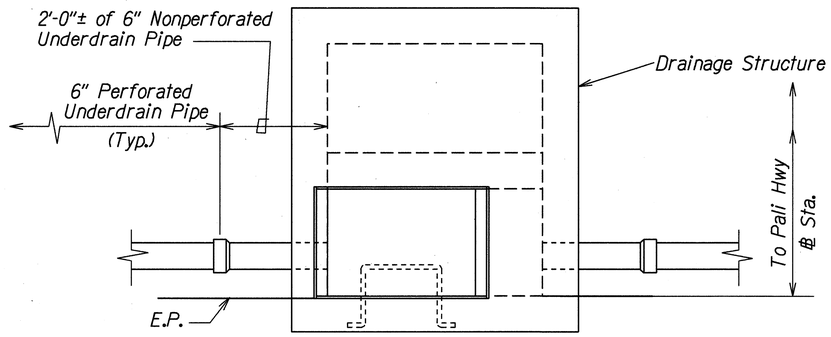
DRAINAGE DETAILS

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance,
Including Both Rds. to Lookout
Project No. 61A-01-97M

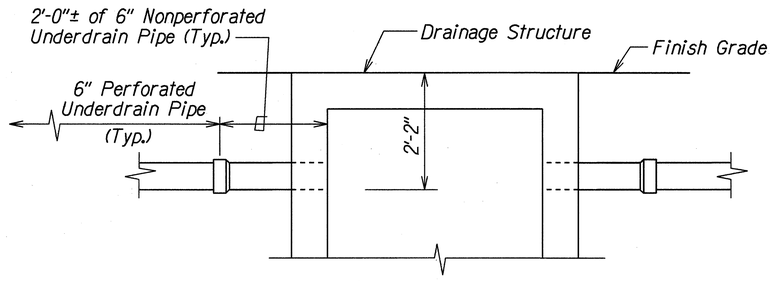
Scale: As Noted Date: May 1997

SHEET No. H22 OF 24 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	63	84



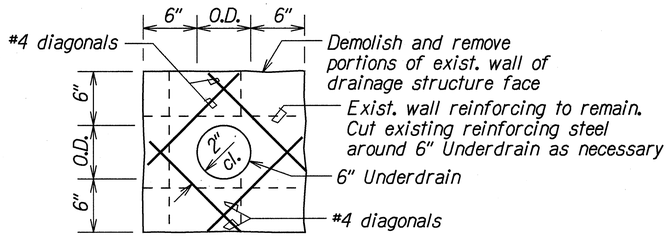
PLAN



ELEVATION

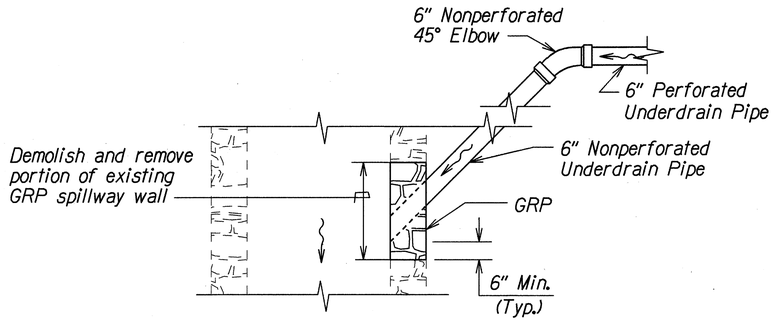
TYPICAL DETAILS OF 6" UNDERDRAIN CONNECTION TO NEW DRAINAGE STRUCTURES

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

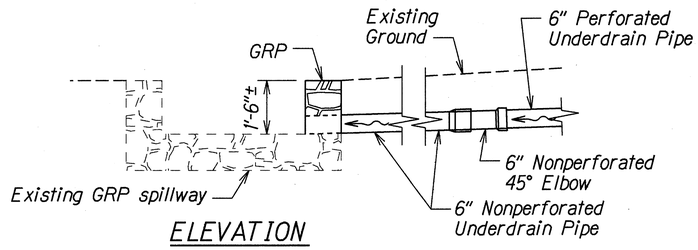


TYPICAL SECTION OF 6" UNDERDRAIN CONNECTION TO EXISTING DRAINAGE STRUCTURE

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



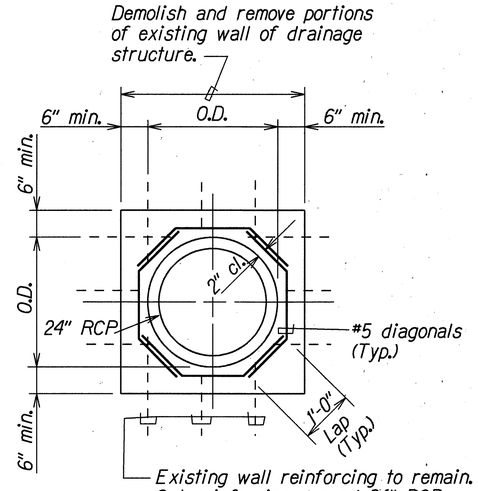
PLAN



ELEVATION

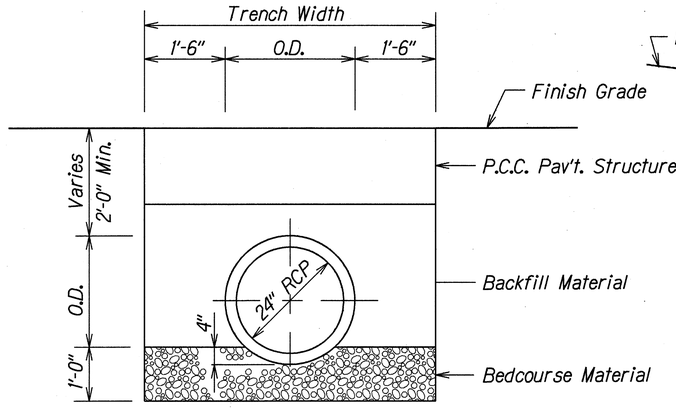
TYPICAL DETAILS OF 6" UNDERDRAIN CONNECTION TO EXISTING GRP SPILLWAY

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



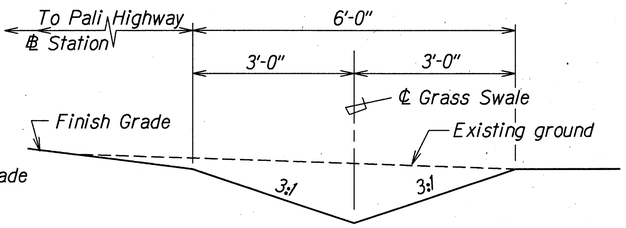
TYPICAL SECTION OF 24" RCP CONNECTION TO EXISTING STRUCTURE

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



TYPICAL DETAIL OF CULVERT TRENCH RESTORATION

Not to Scale



TYPICAL SECTION OF 6-FEET WIDE GRASS SWALE

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 4/23/97
	DRAWN BY A. Nomura	
	TRACED BY C. Matsuda	
NOTE BOOK dh2,curh36,bh	DESIGNED BY	
N. misdgn	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

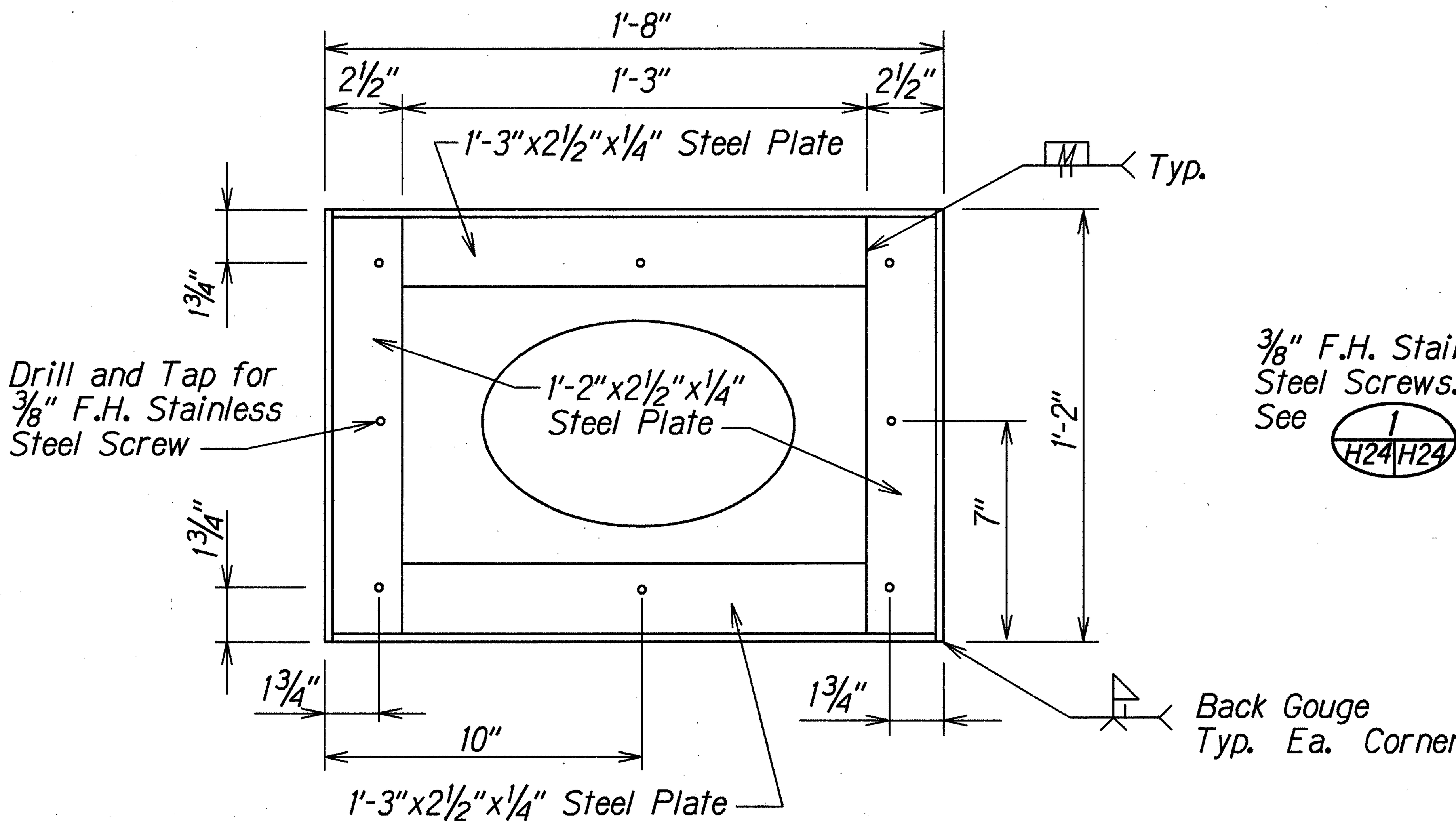
DRAINAGE DETAILS

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

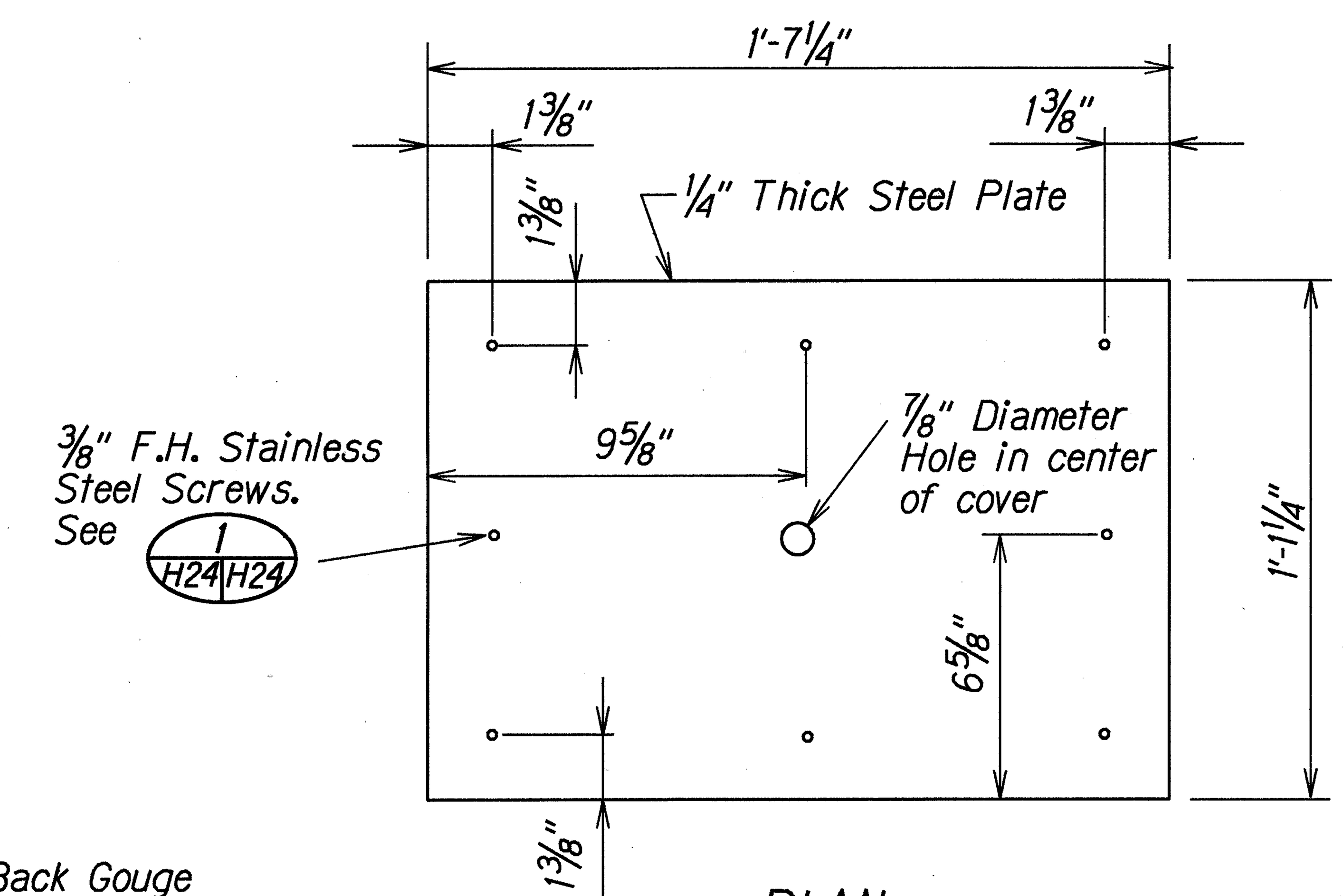
Scale: As Shown Date: May 1997

SHEET No. H23 OF 24 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1997	64	84

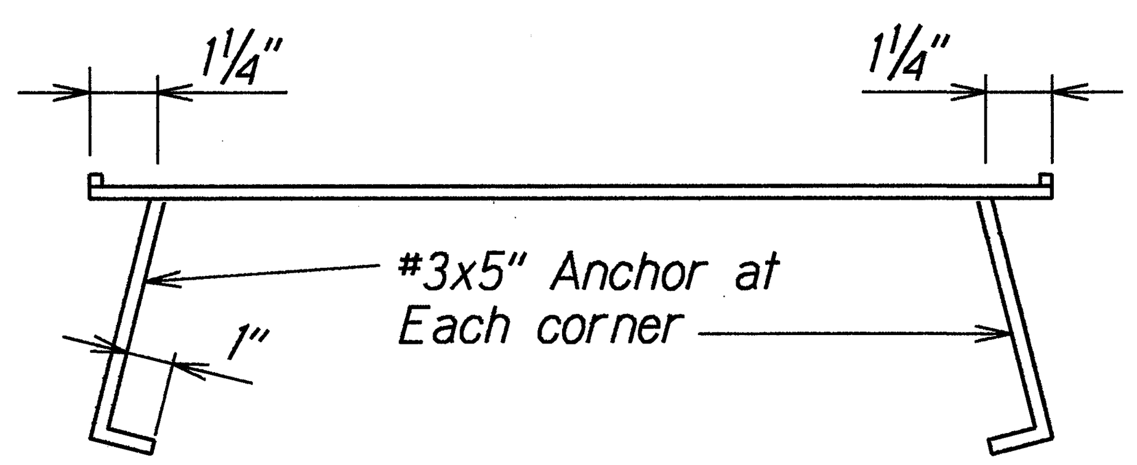


PLAN



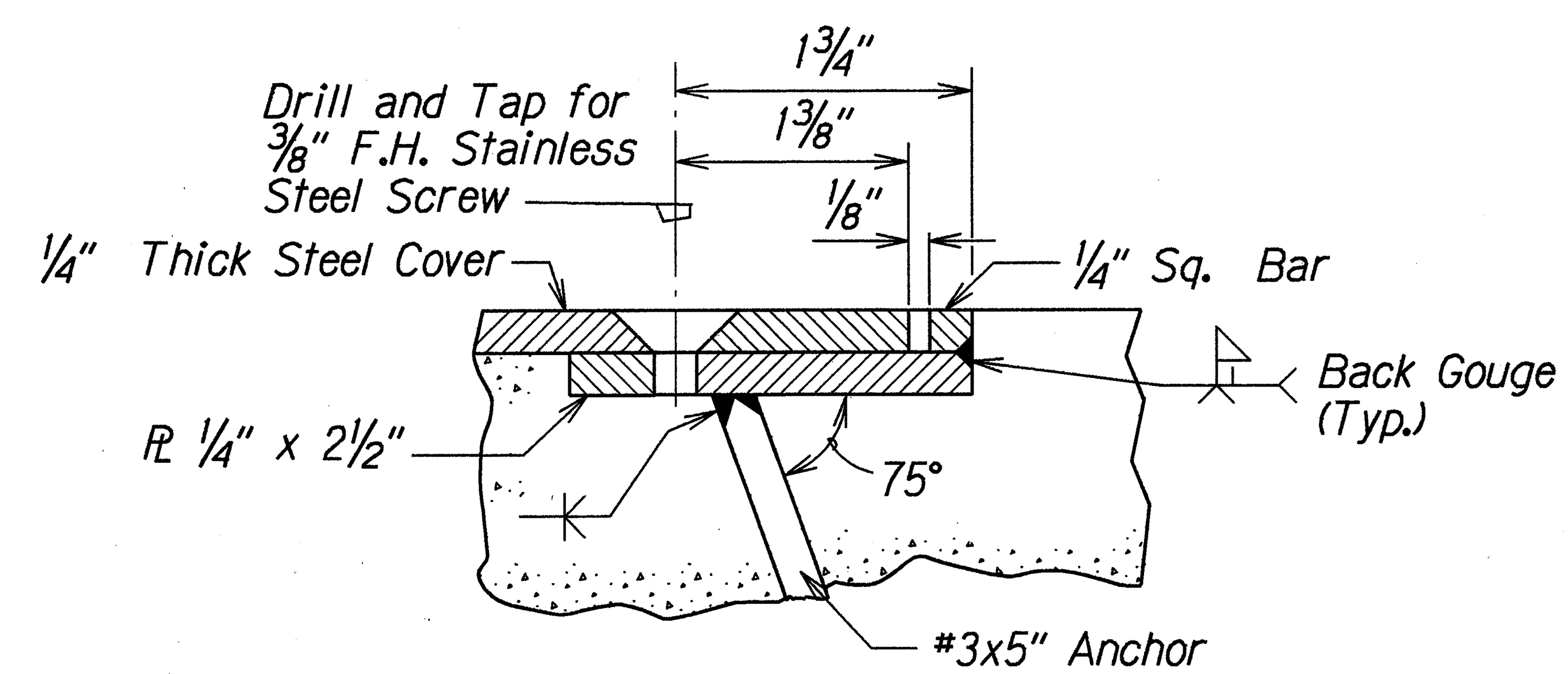
PLAN

DETAIL OF STEEL COVER



SECTION

DETAILS OF STEEL FRAME

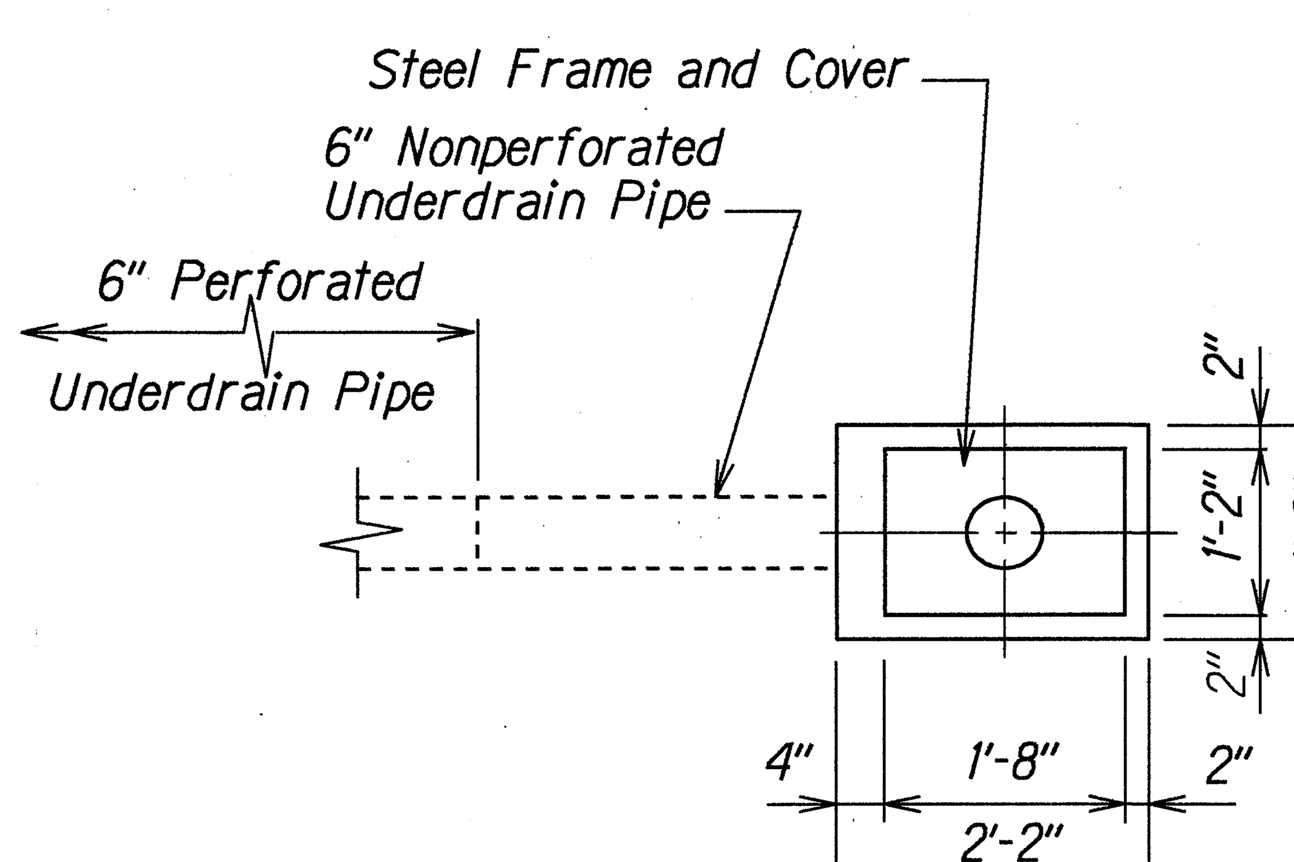


DETAIL 1 H24 H24
Full Size

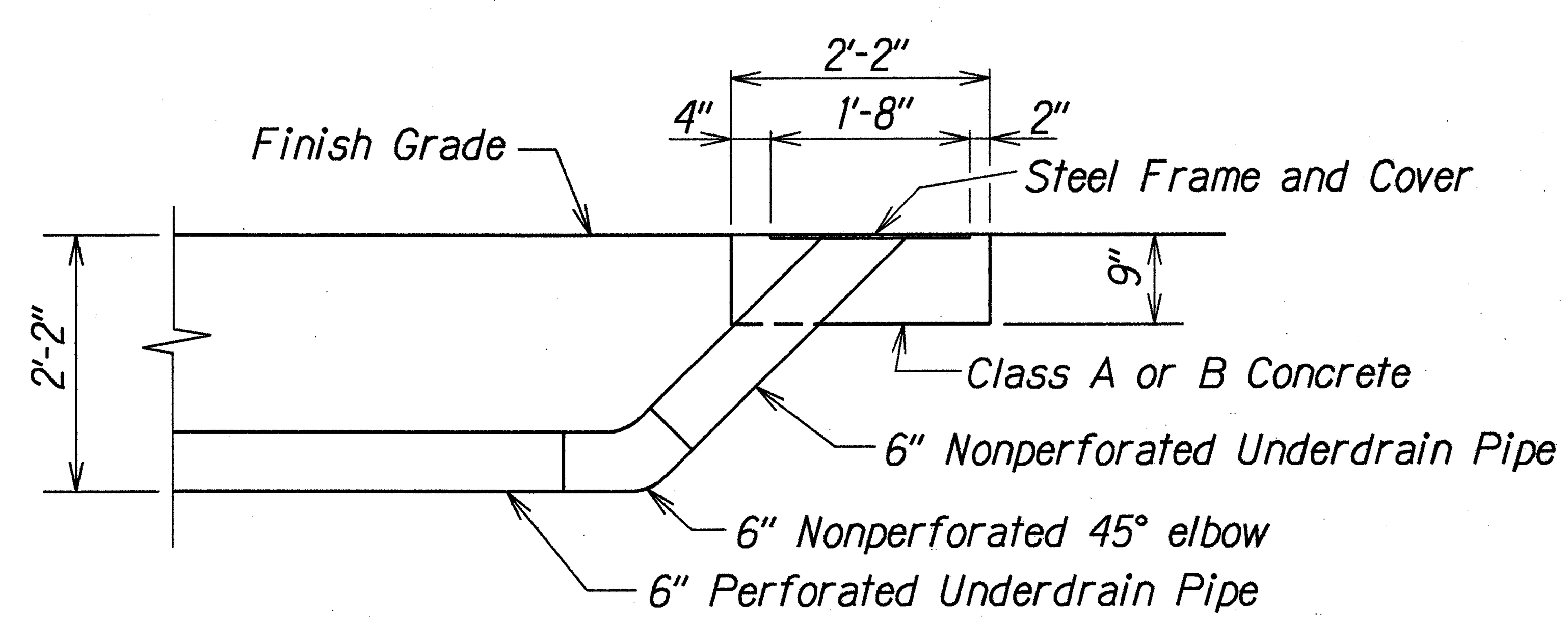
NOTE: All Steel Parts shall be galvanized in accordance with the requirements of ASTM A123.

DETAILS OF STEEL FRAME AND COVER FOR CLEANOUT

Scale: 3"=1'-0"



PLAN



ELEVATION

TYPICAL DETAILS OF CLEANOUT

Scale: ¾"=1'-0"

ORIGINAL PLAN
SURVEY PLOTTED BY
DRAWN BY A. Nomura
TRACED BY
DESIGNED BY C. Matsuda
QUANTITIES BY
CHECKED BY
DATE 4/29/97

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

PALI HIGHWAY RESURFACING
Country Club Rd. to Tunnel Entrance, Including Both Rds. to Lookout
Project No. 61A-01-97M

Scale: As Shown   Date: May 1997

SHEET No. H24 OF 24 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1998	C.O.64 S-1	84

GENERAL NOTES

GENERAL SPECIFICATIONS:

State of Hawaii, Department of Transportation Standard Specifications for Road and Bridge Construction, 1994 and Special Provisions

DESIGN SPECIFICATIONS:

1. AASHTO LRFD Bridge Design Specifications, First Edition including 1996 and 1997 Interim Revisions

MATERIALS:

A. Reinforced Concrete: Class A, unless otherwise noted
B. Reinforced Steel: ASTM A 615, Grade 60
C. Admixture in concrete: See Special Provisions
D. All expansion and premolded joint filler shall be incidental to concrete and will not be paid for separately.
E. All structural steel shall be ASTM A 36 hot-dip galvanized after fabrication.
F. All anchor bolts, washers and nuts shall be ASTM A 325 hot-dip galvanized after fabrication, unless noted otherwise.
G. All welding shall be in accordance with the current edition of Reinforcing Steel Welding Code AWS D 1.4. Welding electrodes for structural steel shall be E 70.

CONSTRUCTION METHODS:

A. Refer to Hawaii Standard Specifications for Road, Bridge and Public Works Construction, 1994 Edition and Special Provisions.
B. Except as noted otherwise, all vertical dimensions are measured plumb.
C. For concrete finish, see Standard Specifications and Special Provisions.
D. For steel reinforcing, stagger all splices where possible.
E. Steel reinforcing shall be supported, bent and placed as per the ACI Detailing Manual, 1994.
F. The minimum cover measured from the surface of the concrete to the face of any reinforcing bars shall be as follows, except as noted otherwise:
   a. Concrete cast against a smooth surface or finished to a smooth surface: 2"
   b. Concrete cast against and permanently exposed to earth: 3"
G. At time concrete is placed, reinforcing shall be free from mud, oil, laitance or other coatings adversely affecting bond capacity.
H. Reinforcement, dowels and other embedded items shall be positively secured before pouring.
I. All existing concrete face receiving new concrete in the finish product shall be roughened and cleaned prior to placement of new pour. See Special Provisions for additional requirements.
J. All footings shall bear on firm undisturbed natural soils or properly compacted structural fill.
K. All existing reinforcing and anchor bolts that can be incorporated in the new work shall be bent or cut as required and cleaned before being utilized in the new work.
L. All existing reinforcing and anchor bolts that cannot be incorporated in the new work shall be completely removed or removed to a minimum depth of one and one-half (1½) inches below finish grade and the area patched with mortar.
M. Existing structure shown by dotted lines. Removal of existing concrete shall be done in such a manner as to preclude any damage to the existing structures. Large vibratory type of equipment will not be permitted in the removal operation, nor for drilling of holes. Only small vibratory hand tools accepted by the Engineer will be allowed. Any damage to the exisiting structure due to the Contractor's operation or negligence shall be repaired at his expense with no cost to the State.
N. Epoxy anchors shall be "Double Cartridge" type. Epoxies that require manual measuring or mixing shall not be allowed. See Special Provisions for additional requirements.

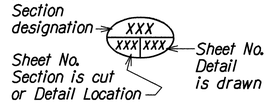
REFERENCE:

A. Refer to Standard Plans for additional details and notes not covered by details and typical drawings.

GENERAL:

A. All items noted incidental will not be paid for separately.
B. The Contractor shall verify the locations of all existing utility lines and notify their respective owners before commencing with any work.
C. The Contractor shall verify all grades and dimensions in the field before commencing with any work.
D. The Contractor shall be solely responsible for the protection of adjacent property, utilities and existing and new structures from damage due to construction. Repairing any damage shall be at the Contractor's own expense to the satisfaction of the Engineer at no cost to the State.
E. The Contractor shall conduct his work in such a manner and provide such temporary shoring or other measures as may be necessary to insure the saftey of all concerned and to protect existing structures.
F. Unless noted otherwise, chamfer all exposed concrete edges three-quarters (¾) of an inch.

SYMBOLS



ESTIMATED QUANTITIES

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
411.2116	Unreinforced Concrete Pavement Over Existing Culvert	L.S.	(5 C.Y.)
503.1400	Concrete for Culvert Railing and Endpost	L.S.	(10 C.Y.)
606.3110	Guardrail, Type 3, w/Steel Post	L.F.	65 Ft.
606.3501	Guardrail, Type 3, Thrie Beam w/Steel Post	L.S.	(25 Ft.)

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY KSS	AUG 1998
	TRACED BY	
	DESIGNED BY JWW	AUG 1998
	QUANTITIES BY JWW	AUG 1998
	CHECKED BY DDO	AUG 1998

DATE	REVISION
8-24-98 /1	Added Sheet

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

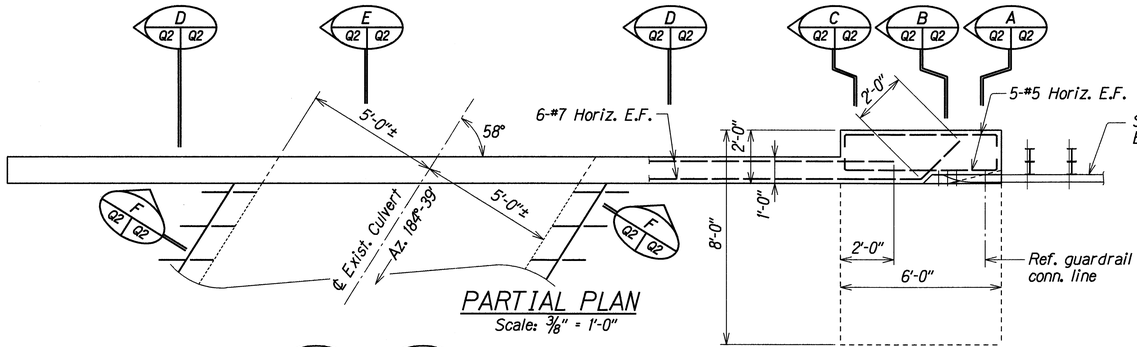
P.C. PAVEMENT RECONSTRUCTION at EXISTING 10'x10' BOX CULVERT at STA. 49+72
GENERAL NOTES and ESTIMATED QUANTITIES
PALI HIGHWAY RESURFACING
Country Club Road to Tunnel Entrance
Project No. 61A-01-97M

Scale: As Noted Date: Aug. 1998

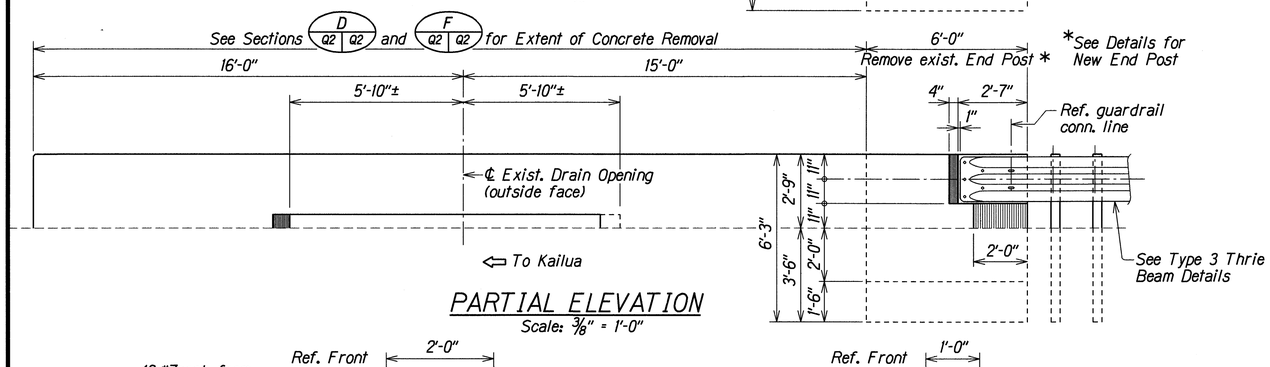
SHEET No. 01 OF 3 SHEETS

C.O. 64 S-1

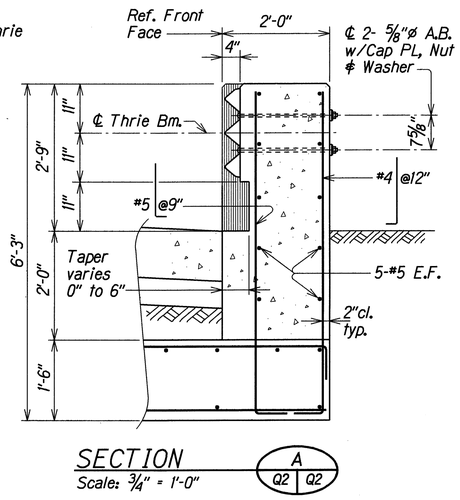
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1998	C.O.64 S-2	84



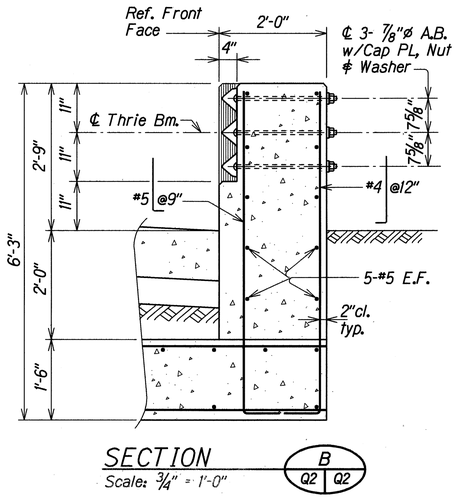
PARTIAL PLAN
Scale: 3/8" = 1'-0"



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



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



SECTION B
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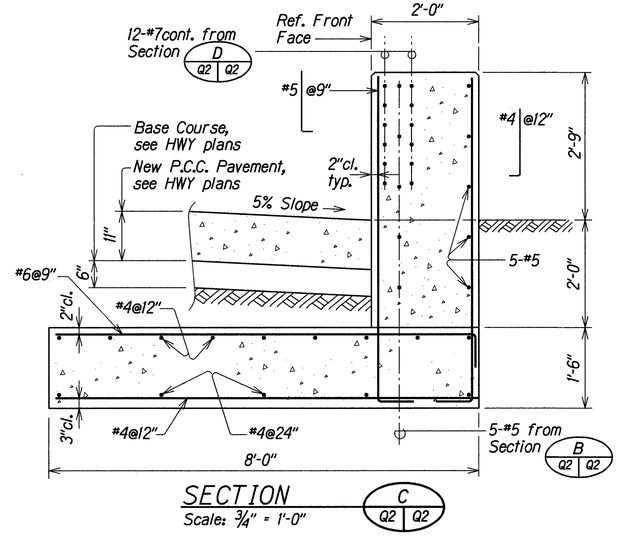
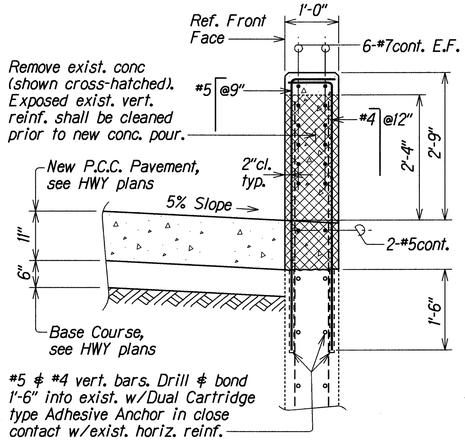
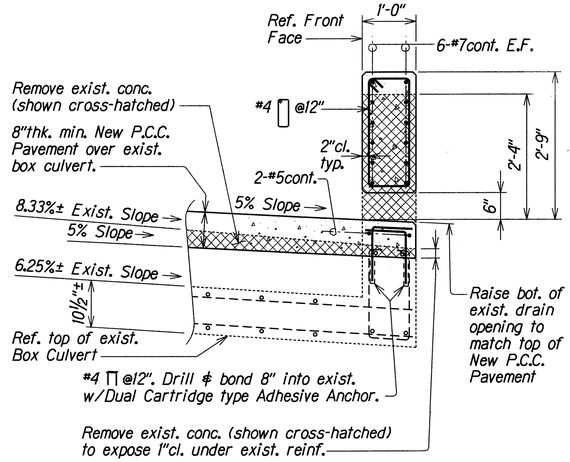


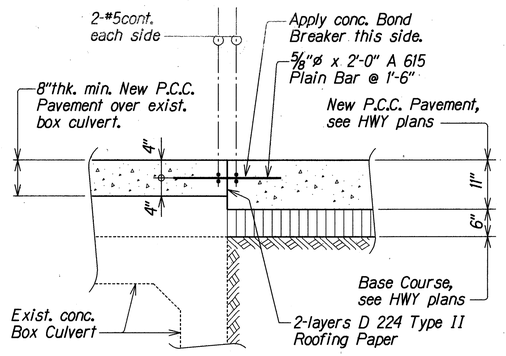
SECTION C
Scale: 3/4" = 1'-0"



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



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



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

DATE	REVISION
8-24-98 /1	Added Sheet

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY KSG	AUG 1998
	TRACED BY	AUG 1998
NOTE BOOK	DESIGNED BY JWW	AUG 1998
	QUANTITIES BY JWW	AUG 1998
	CHECKED BY DCO	AUG 1998

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

P.C.C. PAVEMENT RECONSTRUCTION AT EXISTING 10'x10' BOX CULVERT
PALI HIGHWAY ℄ STA. 49+72

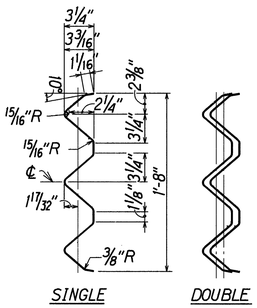
P.C.C. PAVEMENT RECONSTRUCTION at EXISTING 10'x10' BOX CULVERT at STA. 49+72
PARTIAL PLAN and ELEVATION and DETAILS
PALI HIGHWAY RESURFACING
Country Club Road to Tunnel Entrance
Project No. 61A-01-97M

Scale: As Noted Date: Aug. 1998

SHEET No. Q2 OF 3 SHEETS

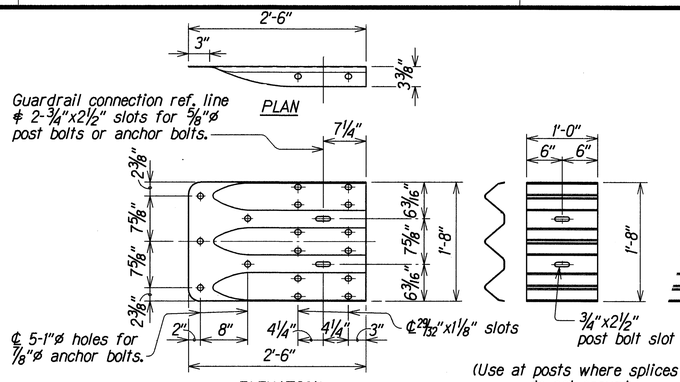
C.O. 64 S-2

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	61A-01-97M	1998	C.O.64 S-3	84



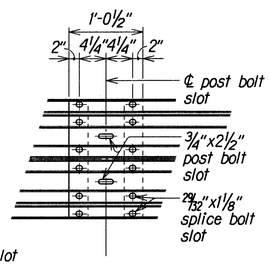
SECTION THRU RAIL ELEMENT

Scale: 1½" = 1'-0"



TERMINAL CONNECTOR

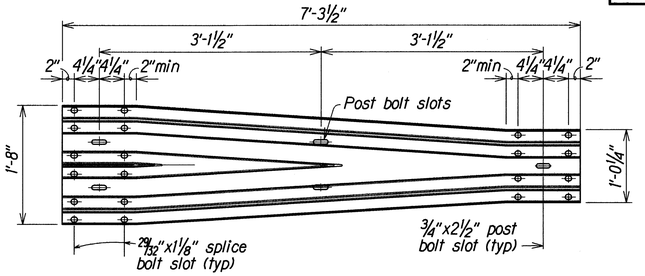
Scale: 1" = 1'-0"



(Use at posts where splices do not occur.)

BACKUP PLATE

Scale: 1" = 1'-0"

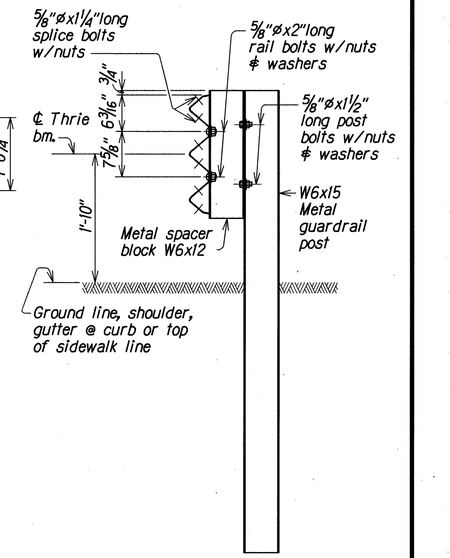


RAIL SPLICE

Scale: 1" = 1'-0"

TRANSITION SECTION

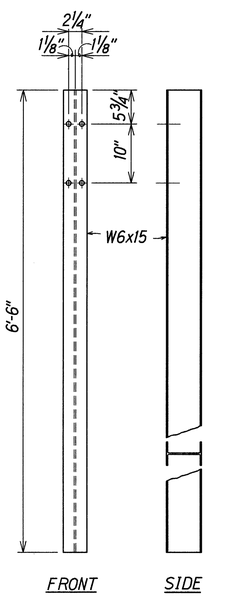
Scale: 1" = 1'-0"



TYPICAL SECTION

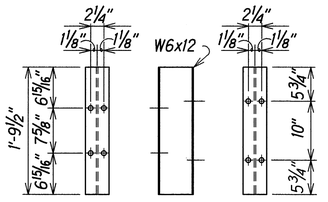
METAL GUARDRAIL ON METAL POST WITH METAL SPACER BLOCK

Scale: 1" = 1'-0"



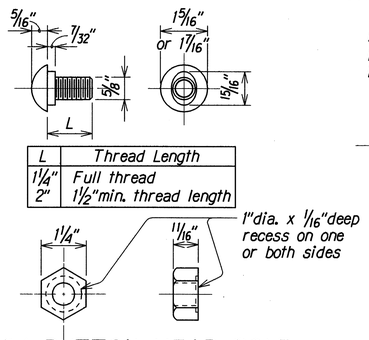
POST DETAILS

Scale: 1" = 1'-0"



SPACER BLOCK DETAILS

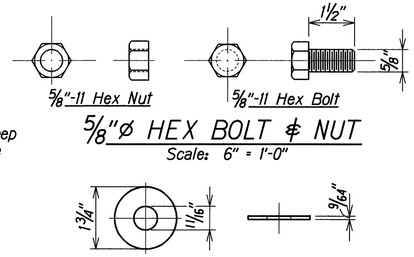
Scale: 1" = 1'-0"



⅝"ø BUTTON HEAD BOLT ℄ RECESS NUT

Scale: 6" = 1'-0"

NOTE:
Bolt lengths varies and shall be determined in the field. Dimensions shown are approximate.

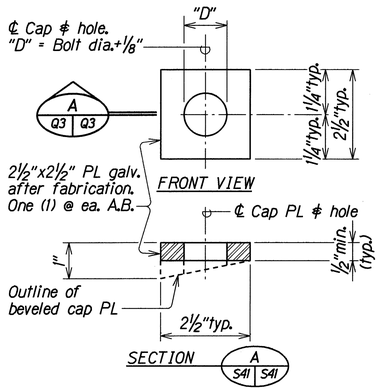


⅝"ø HEX BOLT ℄ NUT

Scale: 6" = 1'-0"

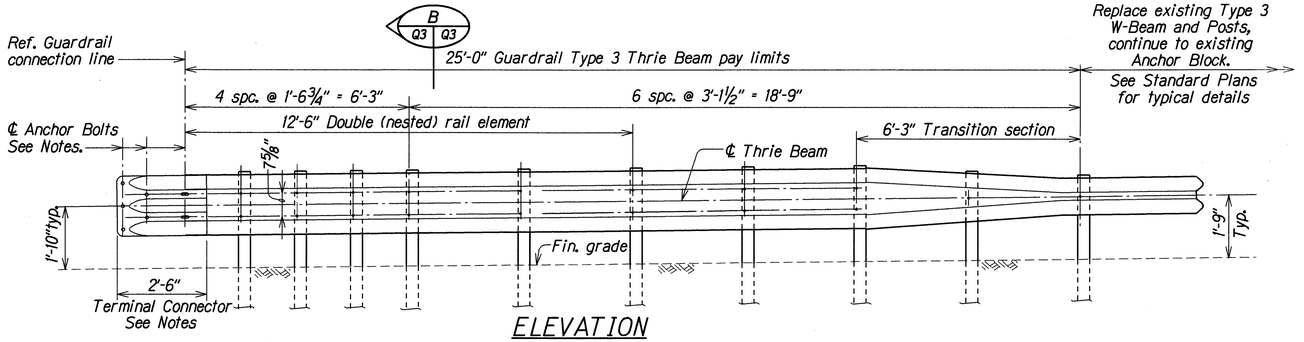
STEEL WASHER FOR ⅝"ø BOLT

Scale: 6" = 1'-0"

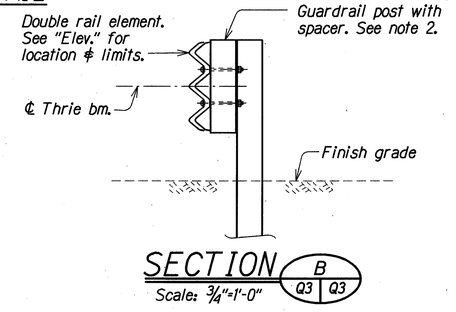


CAP (BEARING) PLATE DETAIL

Scale: 6" = 1'-0"



ELEVATION



SECTION

Scale: ¾"=1'-0"

NOTES:

A. All anchor bolts shall be high strength bolts conforming to the requirements of ASTM 325 and Standard Specification, Section 713.04.

B. Anchor bolt length shall be such that a snug fit of the elements and full thread engagement plus ¼" (max) is attained.

C. "Terminal Connector" shall be fabricated from 10 gauge steel conforming to the requirements of AASHTO M 180.

D. "Terminal Connector" and standard spacer, including all anchor bolts, cap PL, nuts and washers, shall be hot-dip galvanized after fabrication.

E. Cap PL shall be fabricated from ASTM A 36.

F. First 25'-0" of guardrail adjoining "Terminal Connector" shall be galvanized steel and supports spaced as shown on the detail drawings. This section of rail shall be placed on tangent to end post or parallel to roadway, unless conditions at site renders it impossible to do so. Flare point to be determined in field.

G. Double (nest 1st panel) thrie beam elements at all end post connections, except on highways with one-way traffic pattern, use single thrie beam elements at end post on trailing end only.

H. Where double (nested) beam occur, 12" "Back-up Plate" not required.

I. Heads of through anchor bolts shall be placed on the traffic side of the rail.

TYPE 3 THRIE BEAM METAL GUARDRAIL UPGRADE AND APPURTENANCES DETAILS

ORIGINAL PLAN	SURVEY PLOTTED BY	KSG	DATE	AUG 1998
	DRAWN BY			
NOTE BOOK	TRACED BY	JMW		AUG 1998
	DESIGNED BY	JMW		AUG 1998
	QUANTITIES BY	DCO		AUG 1998
	CHECKED BY			

DATE	REVISION
8-24-97 ⚠1	Added Sheet

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

P.C.C. PAVEMENT RECONSTRUCTION AT EXISTING 10'x10' BOX CULVERT at STA. 49+72

TYPE 3 THRIE BEAM METAL GUARDRAIL UPGRADE and APPURTENANCES DETAILS

PALI HIGHWAY RESURFACING
Country Club Road to Tunnel Entrance

Scale: As Noted | Proj. No. 61A-01-97M | Date: Jul. 1998

SHEET No. Q3 OF 3 SHEETS

C.O. 64 S-3