FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1 (131):17	1977	64	394

9" thick Grouted Rubble Paving, 10' Wide
El. 5.5
24" RCP
Finish Grade Line
El.-1.0
Rip Rap

DETAIL A
Not to Scale

TRUE NORTH SCALE: 1" = 50'

535,000 E | 535,250 E | 535,500 E | 535,750 E

62,500 N | 62,250 N | 62,000 N | 61,750 N | 61,500 N

MOANALUA STREAM

Exist. 12" Water Blowoff Line. Warp riprap at outfall for smooth transition

Sta. 18+00
N 62,422.07
E 535,322.54

Limit of Grading
End Riprap Moanalua Stream Sta. 17+55, 134' Rt.

(41) M.H. Type D
Ramp E Sta. 12+73, 13' Lt.
Inv. 3.1
Top 7.8

(67) D.I. Type Z
Ramp G Sta. 18+27, Rt.
Inv. 10.6

MH Type D
Ramp G Sta. 17+79, 16' Lt.
Inv. 3.3
Top 7.9
(40)

(68) D.I. Type A
Ramp E Sta. 12+98, 18' Lt.
Pipe Inv. 3.3
Ditch Inv. 7.5

DRAINLINE #23
24" RCP CL. III
24" ACP CL. III
w/Collar

Limit of Riprap Blanket

DRAINLINE #12
24" RCP CL. III
24" ACP CL. III

Outfall
Ramp D Sta. 16+22, 79' Rt.
Inv. 2.2
(50)
Provide Grouted Rubble as shown in Detail A

Moanalua Str. Sta. 14+70, 30' Lt.
Ditch Outfall, Inv. 2.2
2:1 Ditch Side Slopes

Exist. Bikeway/Watermain Bridge

℄ Ramp G
℄ Ramp D
℄ Ramp F
℄ HI(WB)

End Riprap Moanalua Stream Sta. 17+02, Lt.

Exist. CRM Wall

℄ Moanalua Stream ?
N 83°-58'-50" E

Sediment Basin A
See Detail Sht 105.
12" CMP Inv. +1.0
20 LF @ 1%

Begin Riprap Moanalua Stream Sta. 14+42, 74' Lt.

Limit of Rip-rap Blanket

Sta. 10+00
N. 61,624.00
E. 535,267.00

DRAINLINE #23
24" RCP CL. III
24" RCP CL. III

DRAINLINE #14
24" RCP CL. IV
24" ACP CL. IV

(47) C.B. Type D
Ramp E Sta. 13+60, Rt.
Inv. 9.4

Existing 24" Drain

(45) C.B. Type D
S.A.R. Sta. 23+30, Rt.
Inv. 6.7

D.I. Type C with A-3 Frame & Grate
S.A.R. Sta. 23+30, 29' Lt.
Inv. 6.5
Top 10.6
(39)

DRAINLINE #12
24" RCP CL. III
24" ACP CL. III

Existing Chain Link Fence

(44) C.B. Type D
S.A.R. Sta. 21+30, Rt.
Inv. 7.3

(46) C.B. Type 1D
S.A.R. Sta. 23+30, Lt.
Inv. 6.6

D.I. Type Z
Ramp G Sta. 21+10, Lt.
Inv. 16.4
(38)

DRAINLINE #13
24" RCP CL. III
24" ACP CL. III
(24" RCP CL. IV)
(24" ACP CL. IV)

(43) C.B. Type 1D
S.A.R. Sta. 21+30, Lt.
Inv. 7.4

(48) D.I. Type C with A-12 Frame & Grate
Rdwy. L Sta. 16+44, 35' Lt.
Top 11.8
Inv. 7.5

℄ State Access Rd.

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

Limit of Grading

MATCH LINE - SEE SHEET 65

STATE ACCESS RD.
RAMP G
RAMP F
RAMP D
RAMP E
℄ Ramp E
℄ Rdwy. L
ROADWAY L
ROADWAY N
℄ Rdwy. N
R=190'

(115) End Drainline #32
Rdwy. D Sta. 20+11, 55' Rt.
Inv. 4.0

(114) DI Type C with A-12 Frame & Grate
Rdwy. L Sta. 14+25, 11' Lt.
Top 9.0, Inv. 5.0

(51) End Drainline #15
Rdwy. L Sta. 16+20, 72' Rt.
Inv. 6.5

Vee Ditch with 2:1 Side Slopes

DRAINLINE #32
24" RCP CL. III
24" ACP CL. III
24" CMP .079" thick

DRAINLINE #15
24" RCP CL. III
24" ACP CL. III
24" CMP .079" thick

Limit of Grading

Begin Ditch, Type 3
Ramp E Sta. 14+00, 34' Lt.
Inv. 11.0

2' Trap. Ditch
Side Slopes 2:1

2' Trap. Ditch with 2:1 Side Slopes
To be constructed after traffic pattern has been changed.

2' Trap. Ditch
Side Slopes 2:1

Invert Elev.-2.8
Invert Elev.-2.5
Invert Elev.-2.3

MATCH LINE - SEE SHEET 67

Owner: State of Hawaii
Developer: State of Hawaii
Tax Map Key: 1-1-06

APPROVED FOR GRADING ONLY:

Wallace Miyahira 10/6/77
Director & Chief Engineer, DPW Date

Chief, Division of Engineering, DPW Date 10/6/77

WERNER BEUGGER
REGISTERED PROFESSIONAL ENGINEER
No. 3383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

LEGEND

- Drainline
- Underdrain Cleanout
- 6" Perforated Underdrain Pipe
- 6" Non-Perforated Underdrain Pipe
- Swale
- Lined Ditch or Bituminous Gutter
- Riprap
- Grouted Rubble Paving (GRP), 9" Thick
- Existing Drainline
- Filter Material in 2' Wide Trenches @ 50' Intervals
- Ground Protection (Crushed Rock, 6" Thick)
- Settlement Platform for Riprap

GENERAL NOTES

1. Removal of existing drainage structures, pipes, etc. shall be considered incidental to Roadway Excavation.
2. Concrete for the plugging of catch basin slots and ends of pipes shall be considered incidental to various contract items.
3. All graded areas, except areas which are subject to final landscaping work, shall be provided with temporary ground cover.
4. Construction of Ramp D Sta. 19+00 to 20+95, Rdwy. M Sta. 10+00 to 14+00, including grading, and Temporary Drainline #33 shall not proceed earlier than 45 calendar days prior to the traffic pattern change. "2' Trap. Ditch" across Kamehameha Hwy. shall be constructed within 20 calendar days after the traffic pattern change has been accomplished.
5. All grading work shall be done in accordance with Chapter 23, Grading, Soil Erosion and Sediment Control, of the Revised Ordinances of Honolulu, 1969, as amended (Ordinance Nos. 3968, 4294 and 4538).
6. Excavated material on Site exposed for more than 7 days shall be covered with plastic sheets within 2 days, or as directed by the Engineer.
7. Turbid water and sediment from runoff shall be filtered or removed by filters or sediment traps before water enters Drainage Inlets, or as directed by the Engineer.
8. All Sediment Basins, Sediment Traps, Filter Berms and other erosion control facilities shall be cleaned of sediment and maintained after each storm or as directed by the Engineer.
9. Location of Underdrains in H-1 median and Nimitz Connectors median shall be adjusted locally as necessary to prevent conflict with footings of highway lighting posts.
10. Pipes shall be mitered flush with finish grade at outfalls protected with Grouted Rubble Paving.
11. Revisions to drainline profiles shall be approved by the Engineer.

DATE	REVISION
5/2/78	Revised Drainline #32 alignment
9/15/78	Revised grading & drainage facilities affected by revision of Roadways L, M & N alignment. Revised General Note No. 4

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE AND GRADING PLAN

INTERSTATE ROUTE H-1
PROJECT NO. I-H1-1 (131):17

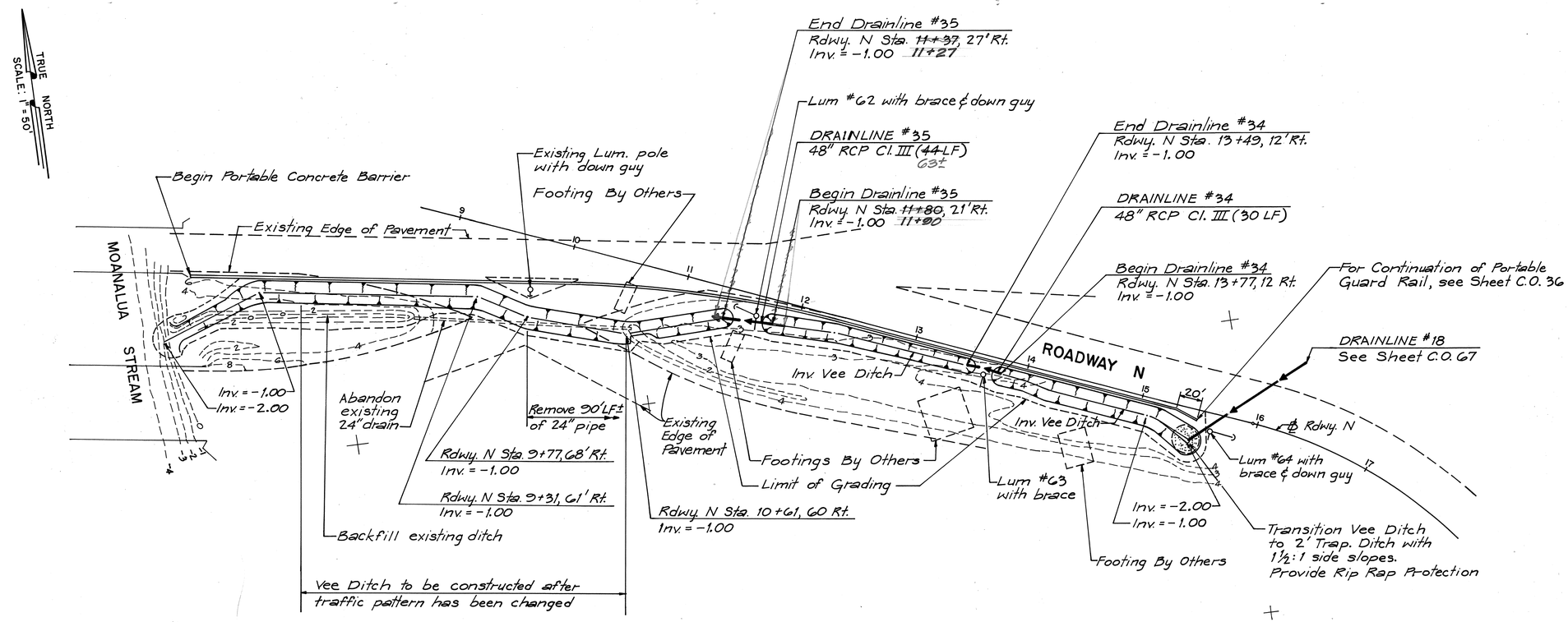
SCALE: 1" = 50' DATE: AUG. 31, 1977

SHEET No. D-1 OF 5 SHEETS

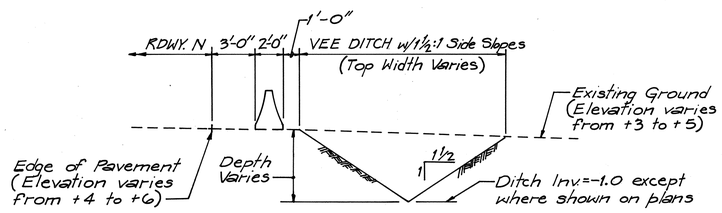
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | NOTE BOOK | No.

C.0.64

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(13)17	1983	C.O.64S-1	394



VEE DITCH ADJACENT TO RDWY. N
SCALE: 1" = 50'



TYPICAL SECTION OF VEE DITCH ADJACENT TO RDWY. N
SCALE: 1" = 5'

NOTES:

1. The Contractor shall provide a temporary brace for Lum. #62 Pole during pipe installation. Payment shall be considered incidental to 48" RCP.
2. Top of Vee Ditch slopes shall be 5' min. from Luminaire Post, brace or down guy. Except for pole #62, install 48" pipe as close to pole as practical.
3. Deflect Drainline #34 as needed to clear Lum. # 63 pole.
4. Information on this sheet supersedes that shown on Sheets C.O. 64 & C.O. 67.

DATE	REVISION
2/11/83	New Sheet added for Plan & Detail of Vee Ditch adjacent to Rdwy. N.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

VEE DITCH ADJACENT TO RDWY. N

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(131):17

SCALE: AS SHOWN DATE:

SHEET No. OF SHEETS

WERNER BEUGGERT
REGISTERED PROFESSIONAL ENGINEER
No. 3383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

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

C.O.64S-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	65	394

MATCH LINE - SEE SHEET C.0.64

MATCH LINE - SEE SHEET C.0.66

MATCH LINE SEE SHEET C.0.67

STATE ACCESS RD

ROADWAY L

ROADWAY M

ROADWAY 'R'

Exist. 24" Army SFM

Abandon Exist. Culvert

Limit of Grading

Center of Top Berm ℄ Rdwy. L Sta. 21+64, 67' Lt.

Vee Ditch with 2:1 Side Slope

Vee Ditch w/ 1½:1 Side Slope

Filter Material in 2' wide Trenches @ 50' Intervals, Typical

Ditch Transition See sheet C.0.65&1

DRAINLINE #8 Ditch Type 1

Bit. Gutter, Type 7A

TRUE NORTH SCALE: 1" = 50'

ABANDONED TRAIL

HURRICANE HILL

DENSE BRUSH

(35) CB Type D
S.A.R. Sta. 17+50, Rt.
Inv. 5.9

(37) Outfall
S.A.R. Sta. 15+91, 54' Lt.
Miter Pipe, Flush with Finish Grade
Inv. 5.0

CB Type D
S.A.R. Sta. 13+80, Rt.
Inv. 3.7 (32)

Curb Slot, Type I
S.A.R. Sta. 10+65, Lt.

Curb Slot, Type II
S.A.R. Sta. 10+45, Lt.

(12) Headwall
Mid. St. (SB) Sta. 16+25, 40' Lt.
Inv. 2.0

DRAINLINE #11
24" RCP CL. III
24" ACP CL. III

(36) CB Type D
S.A.R. Sta. 15+70, Rt.
Inv. 5.3

DRAINLINE #10
24" RCP CL. III
24" ACP CL. III

(34) Outfall
S.A.R. Sta. 14+05, 38' Lt.
Miter Pipe Flush with Finish Grade
Inv. 3.5

(33) CB Type D
S.A.R. Sta. 12+20, Lt.
Inv. 4.3

(33A) Outfall
S.A.R. Sta. 12+47, 40' Lt.
Miter Pipe Flush with Finish Grade
Inv. 4.0

DRAINLINE #10A
24" RCP CL. III
24" ACP CL. III

DRAINLINE #8
30" RCP CL. III with Conc.
30" ACP CL. III Protection

(30) Headwall
S.A.R. Sta. 10+97, 52' Lt.
Inv. 2.0

Curb Slot, Type II
S.A.R. Sta. 11+02, Lt.

DRAINLINE #4
24" RCP CL. IV
24" ACP CL. IV

DRAINLINE #8
30" RCP CL. III
30" ACP CL. III

(29) MH Type D
S.A.R. Sta. 10+91, 19' Rt.
Inv. 2.3, Top 7.8

Reconstructed 24" SFM
See Sheet No. 188

DRAINLINE #8
24" RCP CL. IV
24" ACP CL. IV

(28B) MH Type A-1
H-1 (WB) Sta. 258+42
95' Lt.
Inv. 5.2, Top 9.8

(24) D1 Type G1614
H-1 (WB) Sta. 260+50, Lt.
Inv. 24.3

DRAINLINE #7
24" RCP CL. III
24" ACP CL. III

(28A) Headwall
H-1 (WB) Sta. 259+36, 93' Lt.
Inv. 5.5

(23) DI Type E
H-1 (EB) Sta. 260+30, Lt.
Inv. 25.8

DRAINLINE #1
24" RCP CL. III
24" ACP CL. III

DI Type K
Mid. St. (SB) Sta. 20+50, Rt. (8)
Inv. 7.2

(9) D.I. Type K
Mid. St. (NB) Sta. 18+55, Rt., Inv. 3.0

(28) D.I. Type C with A-9 Frame & Grate
S.A.R. Sta. 10+89.46' Rt., Top 8.2, Inv. 4.7 (in), Inv. 2.4 (out)

(117) End Drainline #33
Rdwy. M Sta. 11+48, 31' Rt.
Inv. 0.7

TEMPORARY DRAINLINE #33
See Note 4, Sheet C.0.64
Provide and maintain open ditch of equal capacity as adjacent ditch until 24" culvert is installed.
24" RCP CL. III
~~24" ACP CL. III~~
~~24" CMP, 0.079" thick~~

(116) Begin Drainline #33
Rdwy. M Sta. 12+21, 110' Lt
Inv. 0.9

Rdwy. M Sta. 12+23, 115' Lt.
Inv. 0.8

End Drainline #16
Rdwy. L Sta. 21+89.55' Rt.
Inv. 1.0

(53)

(52) Begin Drainline #16
Rdwy. L Sta. 21+89, 45' Lt.
Inv. 1.5

DRAINLINE #16
42" RCP CL. III
48" CMP, .079" Thick
Sediment Basin 'B' Berm
Top Berm Elev. +5.5
See Detail Sheet 105

15 LF. 12" CMP @ 1% Slope, Inv. +3.5

DRAINLINE #6
24" RCP CL. IV
24" ACP CL. IV

DRAINLINE #6
24" RCP CL. III

DRAINLINE #1
42" RCP with Conc. CL. III Protection

(10) MH Type F
Mid. St. (SB) Sta. 16+90
Inv. 2.3

DRAINLINE #5
24" RCP CL. III
24" ACP CL. III

DRAINLINE #1
36" RCP CL. III with Conc.
36" ACP CL. III Protection

Delete Top Slab and Wing Section of D.I. Type K (22)
Mid. St. (NB) Sta. 14+40, 14' Rt.
Inv. 3.2, Inv. Grate 8.3

(21) D.I. Type K
Mid. St. (NB) Sta. 15+20, 14' Rt.
Inv. 3.0, Inv. Grate 7.9
(To be done by others)

(20) D.I. Type K
Mid. St. (NB) Sta. 16+50, Rt.
Inv. 2.6

(19) D.I. Type K
Mid. St. (NB) Sta. 17+25, Rt.
Inv. 2.9

(18) D.I. Type K
Mid. St. (NB) Sta. 17+50, Rt.
Inv. 3.0

DRAINLINE #5
24" RCP CL. IV
24" ACP CL. IV

(17) CB Type D
S.A.R. Sta. 10+15, Rt.
Inv. 2.6

(31) CB Type D
S.A.R. Sta. 10+50, Rt.
Inv. 4.3

DRAINLINE #9
24" RCP CL. III
24" ACP CL. III

Owner: State of Hawaii
Developer: State of Hawaii
Tax Map Key: 1-1-06

APPROVED FOR GRADING ONLY:

Chief, Division of Engineering, DPW — Date 10/4/77

DATE	REVISION
12/18/78	Revised grading & alignment of Drainline #8 in vicinity of H-1 (WB) Abutment
5/2/81	Revised Ditch Downstream of Drainline #16. Revised Drainline #33.
10/6/80	Revised Drainline #8
9/15/78	Revised grading & drainage facilities affected by revision of Rdwys L, M & N alignment

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE AND GRADING PLAN

INTERSTATE ROUTE H-1
PROJECT NO. I-H1-1 (131):17

SCALE: 1" = 50' DATE: AUG. 31, 1977

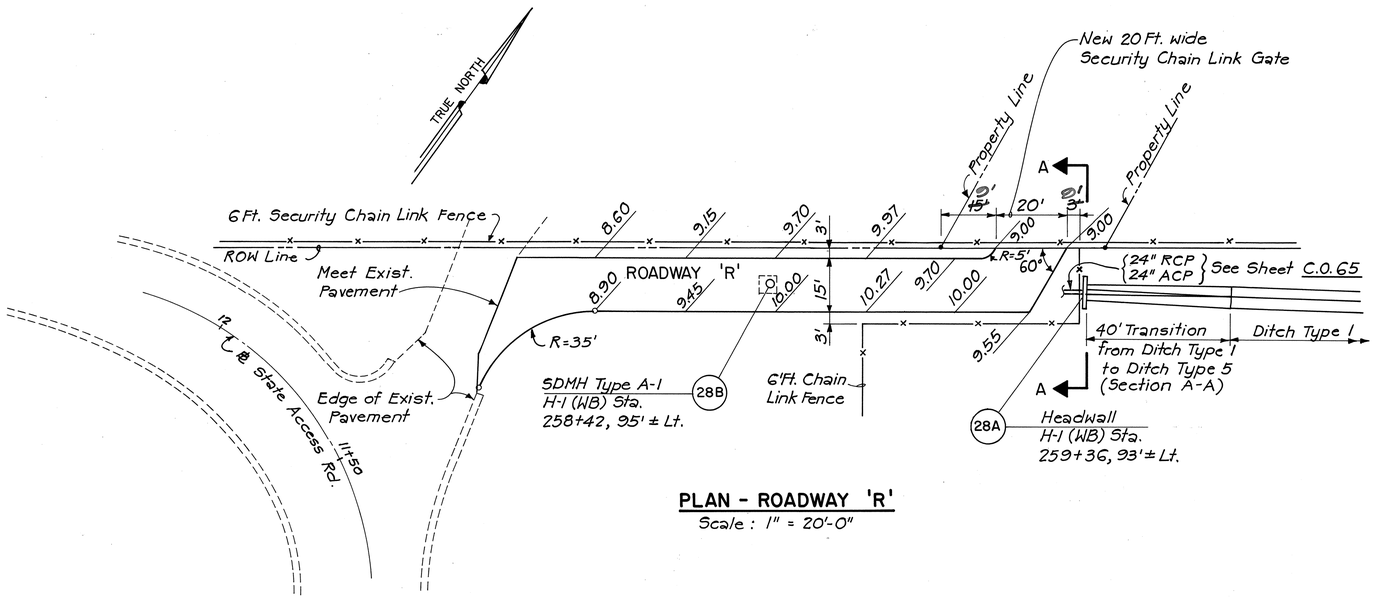
WEINER BEUGGERT REGISTERED PROFESSIONAL ENGINEER No. 3383-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

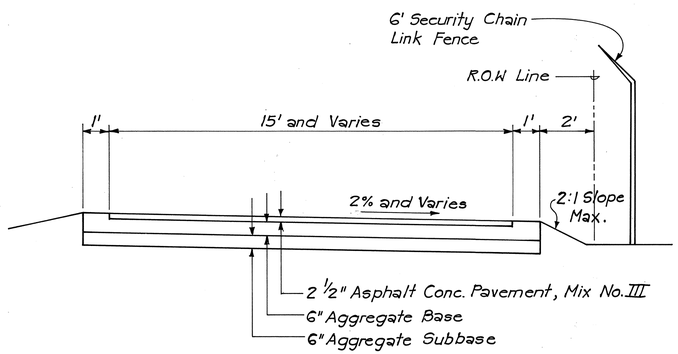
SHEET No. D-2 OF 5 SHEETS

C.0.65

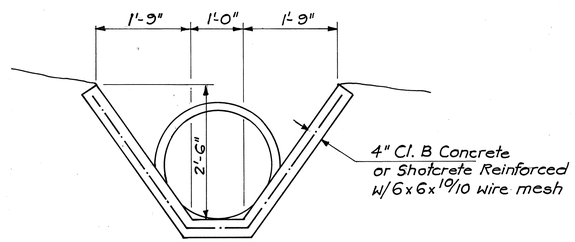
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-I(131)17	1977	65S-1	394



PLAN - ROADWAY 'R'
Scale : 1" = 20'-0"



TYPICAL SECTION – ROADWAY 'R'
Scale : 3/8" = 1'-0"



DITCH TYPE 5
SECTION A-A
Scale : 3/4" = 1'-0"

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

DATE	REVISION
10/6/80	Sheet added for details required for Roadway 'R' on Sheet No. 34 & 65

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY 'R' DETAILS

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1 (131):17

SCALE : AS SHOWN DATE : 10/6/80

SHEET No. OF SHEETS

C.O.65 S-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	66	394

DI Type G16/4
H-1(WB) Sta. 263+25, Lt.
Inv. 23.2
(26)

(27A) Outfall
H-1(WB) Sta. 263+28, 56' Lt.
Inv. 19.3
See Detail Sheet 101

DRAINLINE #7
24" RCP CL. III
~~24" ACP CL. III~~

Filter Material in
2' Wide Trenches @
50' Intervals, Typical

DI Type G16/4
H-1(WB) Sta. 262+25, Lt.
Inv. 23.5
(25)

DRAINLINE #7
24" RCP CL. III
~~24" ACP CL. III~~

Bit. Gutter, Type 7A

DRAINLINE #8
Ditch Type 1

DRAINLINE #8
Begin Ditch Type 1
H-1(WB) Sta. 263+50, 56' Lt.
Inv. 19.5

DRAINLINE #7
24" RCP CL. III
~~24" ACP CL. III~~

(27) DI Type G16/4
H-1(WB) Sta. 263+50, Lt.
Inv. 23.1

CB Type 1C
H-1(WB) Sta. 269+77, Rt.
Inv. 26.0
(16)

DRAINLINE #19
24" RCP CL. III
~~24" ACP CL. III~~

Existing Manhole
Reconstruct Manhole Roof Slab
Connect new 24" Pipe to M.H.
Inv. new 24" Pipe = 25.5
Inv. exist. M.H. = 21.4±
See Detail Sheet 104.
(60)

(58) DI Type C w/A-9 Frame & Grate
H-1(WB) Sta. 271+22, 36' Rt.
Top 28.8, Inv. 24.5

DRAINLINE #20
24" RCP CL. III
~~24" ACP CL. III~~
110 L.F. ±
No Profile

Transition from Ditch
Type 4 to Apron Flush with
Top of D.I. (10 L.F.)

(59) M.H. Type E (Connect to exist. 24" Pipe)
H-1(WB) Sta. 271+20, 49'± Rt.
Inv. new 24" Pipe = 24.0
Inv. exist. 24" Pipe = 20.9±
Top 29.0±

Existing Catch Basin to remain
Plug existing Catch Basin Throat
Slots with Class B Concrete

Limit of Grading (at ROW Line)

INTERSTATE ROUTE H-1 (WESTBOUND)

℄ H-1 (WB)

℄ H-1 (EB)

H-1 (EASTBOUND)

Bit. Gutter, Type 7A

Bit. Gutter, Type 7A

18" Slotted CMP Drain at invert of Gutter

DI Type L
H-1(EB) Sta. 263+70, Rt.
Inv. 22.8
(15)

Exist. Drainage Facilities
To Remain

Remove exist. Drainage
Structures and Pipes.

Existing Manhole
Reconstruct Manhole Roof Slab
See Detail Sheet
(61)

Limit of
Grading

Tunnel
Portal

Ditch Inv. 30.60

MATCH LINE -- SEE SHEET 65

DRAINLINE #3
24" HIDE GRATED VEE CHANNEL
For Details See Std. 103.5-1

℄ Middle St. (Southbound)

MIDDLE STREET

DRAINLINE #2
24" RCP CL. III with Collar
~~24" ACP CL. III with Collar~~

Begin Ditch Type 4
Inv. 30.7 20.0

End Ditch Type 4
Inv. 30.0 30.4

(62) Ditch Outfall: 2-8" C.I.P.
Inv. Ditch = 29.5
~~Inv. 24" Pipe = 22.6~~
For Details See Sheet 32.

DRAINLINE #1
24" RCP CL. III
~~24" ACP CL. III~~

DRAINLINE #3
24" RCP CL. III with Collar
~~24" ACP CL. III with Collar~~

DI Type Z
H-1(EB) Sta. 263+25, Rt.
Inv. 23.0
(14)

(13) DI Type G16/4
H-1(EB) Sta. 264+50, Rt.
Inv. 23.6

DRAINLINE #1
24" RCP CL. III
~~24" ACP CL. III~~

(1) CB Type C
Mid. St. (SB) Sta. 30+37, Lt.
Inv. 31.8

Guard Rail
Type 4-A

(2) CB Type C
Mid. St. (SB) Sta. 29+00, Lt.
Inv. 27.0

DRAINLINE #1
24" RCP CL. III
~~24" ACP CL. III~~

DRAINLINE #21
24" RCP CL. III } 28 L.F.±
24" ACP CL. III }

12" RCP CL. III
~~12" ACP CL. III~~
with Conc. Protection

(4) DI Type C with A-9 Frame & Grate
Mid. St. (SB) Sta. 23+65, 18' Lt.
Inv. 15.0, Top 20.9

(3) CB Type C
Mid. St. (SB) Sta. 25+60, Lt.
Inv. 19.4

(3A) CB Type D
Mid. St. (SB) Sta. 27+60, Lt.
Inv. 23.7

Existing Manhole
Connect new 24" Pipe to M.H.
Inv. new 24" Pipe = 21.5
Inv. exist. M.H. = 20.0±
(63)

DRAINLINE #1
24" RCP CL. III
~~24" ACP CL. III~~

DI Type K P
Mid. St. (SB) Sta. 22+55, Rt.
Inv. 8.3
(7)

CB Type D
Mid. St. (SB) Sta. 22+98, Lt.
Inv. 14.8
(5)

DI Type P
Mid. St. (SB) Sta. 22+98, Rt.
Inv. 18.0
For Detail See Sheet 103.
(6)

(6A) MH Type A-1
Mid. St. (SB) Sta. 22+98, 29' Rt.
Inv. 12" Pipe = 17.9±
Inv. 9.0
See Detail Sheet 103

~~(6A) MH Type A-1~~
~~Mid. St. (SB) Sta. 22+55~~
~~Inv. 8.2~~
~~Inv. 16.8 (12")~~

Owner: State of Hawaii
Developer: State of Hawaii
Tax Map Key: 1-1-06

APPROVED FOR GRADING ONLY:

Chief, Division of Engineering, DPW — 10/4/77 Date

WERNER BEUGGERT
REGISTERED PROFESSIONAL ENGINEER
No. 2383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

DATE	REVISION
9/15/78	Revised grading for area between H-1(EB) & Middle St. to maintain existing road.
9/6/78	Revised grading for cut slope on north side of H-1 (WB).

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE AND GRADING PLAN

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(131):17

SCALE: 1" = 50' DATE: AUG. 31, 1977

SHEET No. D-3 OF 5 SHEETS

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

C.O. 66

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)-17	1977	67	394

MATCH LINE SEE SHEET G5

MATCH LINE SEE SHEET G4

Vee Ditch w/ 1:2:1 Side Slope

Top of Ditch Slope

Rdwy M Sta. 131+05, 108' Lt.
Inv. 0.8

Begin Drainline #22
Rdwy M Sta. 131+48, 72' Lt.
Inv. ± 1.0 ±

Finish Grade to be approx. same as exist. ground.

Sta. 18+80
N 61539.41
E 536926.65

End Riprap
Kalihi Stream
Sta. 18+66, 19' Lt.

Az. 229° 29' 25.9"

Remove both abutments of old Railway Bridge & cut all piles at 1 foot below finish grade. (Payment will be made under "Removal of Railroad Bridge in Kalihi Stream")

Limit of Riprap Blanket

Grade to Drain

DRAINLINE #22
42" RCP Cl. III
48" CMP, .079" thick

(65) End Drainline #22
Rdwy. M Sta. 14+00, 94' Rt.
Inv. = 1.5

(56) Begin Drainline #18
Rdwy N Sta. 16+22, 63' Lt.
Pipe Inv. -1.6
Ditch Inv. -2.0

DRAINLINE #18
48" RCP Cl III
54" CMP, .079" thick

ROADWAY N

℄ Rdwy. N

ROADWAY M

℄ Rdwy. M

Grade to Drain

2' Trap Ditch
Side Slopes 2:1

Limit of Grading

See Std. No. C.O.CA 6-1

Existing Soil Consolidation Test Area

(57) End Drainline #18
Rdwy N Sta. 15+45, 29' Rt.
Inv. -2.0

Sta. 14+80
N 61279.58
E 536622.53

9" thick Grouted Rubble Paving, 10' Wide

El. 5.0

30" Drain

Finish Grade Line

El. -1.0

Rip Rap

DETAIL A
Not to Scale

Finish Grade to be approx. same as exist. ground

Sta. 10+00
N 60925.00
E 536299.00

Begin Riprap
Kalihi Stream
Sta. 9+88, 58' Lt.

Owner: State of Hawaii
Developer: State of Hawaii
Tax Map Key: 1-1-06

APPROVED FOR GRADING ONLY:

Chief, Division of Engineering, DPW — Date 10/4/77

Kalihi Stream
Az 222° 22' 41.9"

Limit of Riprap Blanket

Finish Grade to be approx. same as exist. ground.

Begin Riprap
Kalihi Stream
Sta. 10+18, 112' Rt.

(109) MH Type A-1
NC(EB) Sta. 42+98, 41' Rt.
Inv. 2.0
See Sheet 189 for Plan Detail

(110) Outfall
NC(EB) Sta. 42+24, 77' Rt.
Inv. 1.0
Provide GRP as shown in Detail A, this sheet

DRAINLINE #29
30" RCP Cl III
30" ACP Cl III

DRAINLINE #29
24" RCP Cl III
24" ACP Cl III

(69) DI Type Z
NC(EB) Sta. 43+40, Rt.
Inv. 2.1

(70) DI Type Z
NC(EB) Sta. 43+90, Rt.
Inv. 2.2

(71) Modified DI Type Z K
NC(EB) Sta. 44+40, Rt.
Inv. 2.3

(72) Modified DI Type Z K
NC(EB) Sta. 45+25, Rt.
Inv. 2.6

DRAINLINE #29
24" RCP Cl IV
24" ACP Cl IV

(73) Modified DI Type Z K
NC(EB) Sta. 46+10, Rt.
Inv. 2.9

(74) Modified DI Type Z
NC(EB) Sta. 46+95, Rt.
Inv. 1.3

(75) Modified DI Type Z
NC(EB) Sta. 47+80, Rt.
Inv. 1.1

(76) Modified DI Type Z
NC(EB) Sta. 48+65, Rt.
Inv. 0.8

(112) Pipe Outfall
NC(EB) Sta. 49+27±, 46' Rt.
Inv. 0.6

(107) Outfall
NC(EB) Sta. 49+46±, 65' Rt.
Inv. -1.2

(108) Outlet Structure
NC(EB) Sta. 49+32.59± Rt.
Inv. -1.2

DRAINLINE #29
36" RCP Cl III
36" ACP Cl III

Exist. 30" Culvert to be Removed

FOR DETAILS OF 8'x5' BOX CULVERT SEE SHEET 98, 99, 100

End Riprap
Kalihi Stream
Sta. 18+44, 82' Rt.

(88) DI Type Z
NC(WB) Sta. 49+25, Rt.
Inv. 3.2

(87) DI Type Z
NC(WB) Sta. 48+55, Rt.
Inv. 3.0

DRAINLINE #30
24" RCP Cl IV
24" ACP Cl IV

(86) DI Type Z
NC(WB) Sta. 47+85, Rt.
Inv. 2.8

Limit of Riprap Blanket

Exist. 27" Sewer Main

24" RCP Cl III with Conc. 24" ACP Cl III Protection

Exist. Gasco Block Valve Structure to be reconstructed See Sheet 190 for Details

New Reinf. Conc. Jacket for exist. 27" Sewer Main, 6 LF ± See Sheet 102 for Detail

℄ NC(EB)

℄ NC(WB)

DRAINLINE #26
8'x5' Box Culvert
w/ Manhole Type C-1

(106) Manhole Type C-1
Inv. -0.1

(106A) Manhole Type C-1
Inv. -0.1

DRAINLINE #26
36" CL III

Exist. 4'x3' Box Culvert

(89) DI Type Z
NC(WB) Sta. 49+95, Rt.
Inv. 1.4

DRAINLINE #24
24" RCP Cl III
24" ACP Cl III

(90) DI Type Z
NC(WB) Sta. 50+65, Rt.
Inv. 1.1

(111B) Modified Type F SDMH
NC(EB) Sta. 52+05, 120' Lt.

(111) Inlet Structure
NC(WB) Sta. 52+03, 54.33' Lt.
Inv. -0.7

DRAINLINE #26A
30" RCP Cl. III

(92) DI Type R
NC(WB) Sta. 51+98, Rt.

(91) DI Type Z
NC(WB) Sta. 51+35, Rt.
Inv. 0.9

(77) DI Type R
NC(EB) Sta. 49+30, Rt.

(12A) Pipe Outfall
NC(WB) Sta. 51+95±, 2' Lt.
Inv. 0.7

(111A) Headwall (For details, see Sht. 100)

TRUE NORTH
SCALE: 1" = 50'

BM. "Q" CUT ON EXIST DITCH WALL ELEV. 6.83

MATCH LINE - SEE SHEET G8

DATE	REVISION
5/2/81	Revised Drainline #22 alignment. Revised Ditch upstream of Drainline #22
9/15/78	Revised grading and drainage facilities affected by revision of Rdwys M & N alignment.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE AND GRADING PLAN

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1 (131):17

SCALE 1" = 50' DATE: AUG. 31, 1977

REGISTERED PROFESSIONAL ENGINEER No. 3383-E Hawaii, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SHEET No. D-4 OF 5 SHEETS

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

2578-V683

C.O.67

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	68	394

TRUE NORTH
SCALE: 1" = 50'

98 DI Type Z
NC(WB) Sta. 54+63, Rt.
Inv. 0.1 1.3

97 DI Type Z
NC(WB) Sta. 54+33, Rt.
Inv. 0.0 1.2

96 DI Type Z
NC(WB) Sta. 54+08, Rt.
Inv. -0.1 1.1

95 DI Type Z
NC(WB) Sta. 53+85, Rt.
Inv. -0.3 0.9

94 DI Type Z
NC(WB) Sta. 53+38, Rt.
Inv. -0.5 0.7

93 DI Type Z
NC(WB) Sta. 52+70, Rt.
Inv. -0.8 0.4

DRAINLINE #28
36" RCP Cl III
36" ACP Cl III
with Concrete Protection

MATCH LINE - SEE SHEET 67

DRAINLINE #28
30" RCP Cl III with Conc.
30" ACP Cl III Protection

DRAINLINE #27
30" RCP Cl III
30" ACP Cl III

DRAINLINE #27
36" RCP Cl III
36" ACP Cl III

106 Manhole Type C-1
NC(EB) Sta. 49+80, 38' Rt.
Inv. -1.0

78 Modified DI Type Z
NC(EB) Sta. 50+20, Rt.
Inv. -0.8

79 Modified DI Type Z
NC(EB) Sta. 51+05, Rt.
Inv. -0.5

99 DI Type Z
NC(WB) Sta. 55+30, Rt.
Inv. 0.4 1.6
~~Inv. 2.3 (24")~~

113 DI Type C w/A-9 Frame & Grate
NC(WB) Sta. 55+40, 55' Lt.
Top 6.0
Inv. 2.5

100 DI Type Z
NC(WB) Sta. 56+10, Rt.
~~Inv. 1.0 2.8~~
~~Inv. 3.0 (24")~~

101 DI Type Z
NC(WB) Sta. 57+00, Rt.
Inv. 3.2

101A MH Type A-1
NC(WB) Sta. 57+40, 5' Lt.
Inv. 3.3

DRAINLINE #28
24" RCP Cl III
~~24" ACP Cl III~~

DRAINLINE #31
~~24" RCP CL. III~~ with Conc.
~~24" ACP CL. III~~ Protection

DRAINLINE #28
24" RCP Cl III
~~24" ACP Cl III~~

New Reinf. Concrete Jacket for 24" Sewer Force Main 18 LF ± See Sheet 102 for Detail

New Reinf. Conc. Jacket for 24" Sewer Force Main 8 LF ± See Sheet 188 for Detail

Remove exist. Drainage Structures and Pipes

℄ NC (WB)

℄ NC (EB)

DRAINLINE #28
24" RCP CL. III with Conc.
~~24" ACP CL. III~~ Protection

DRAINLINE #27
24" RCP Cl III
~~24" ACP Cl III~~

Exist. 24" Sewer Force Main

Modified DI Type Z
NC(EB) Sta. 53+20, Rt.
Inv. 0.5

84

Modified DI Type Z
NC(EB) Sta. 52+45, Rt.
Inv. 0.1

83

Modified DI Type Z
NC(EB) Sta. 51+95, Rt.
Inv. -0.1

82

Modified DI Type Z
NC(EB) Sta. 51+77, Rt.
Inv. -0.2

81

Modified DI Type Z
NC(EB) Sta. 51+60, Rt.
Inv. -0.3

80

Modified DI Type Z-1
NC(EB) Sta. 54+80, Rt.
Inv. ~~2.0~~ 3.3

85

103 DI Type Z
NC(WB) Sta. 58+45, Lt.
Inv. 3.8

104 DI Type Z
NC(WB) Sta. 58+80, Lt.
Inv. 4.0

105 DI Type Z
NC(WB) Sta. 59+50, Lt.
Inv. 4.6

102 DI Type Z
NC(WB) Sta. 58+00, Rt.
Inv. 3.5

NIMITZ HWY.

ALAHAO PL.

SAND ISLAND ACCESS ROAD

Y A R D

GRADING QUANTITIES

168,000 C.Y. = Excavation
58,000 C.Y. = Embankment
23 ± Acres = Area to be graded.

NOTE:
Grading will be in increments of 8, 12, and 2.5 acres to total 23± acres in order to conform to grading ordinance.

APPROVED FOR GRADING ONLY:

10/4/77
Chief, Division of Engineering, DPW — Date

WERNER BEUGGERT
REGISTERED PROFESSIONAL ENGINEER
No. 3383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

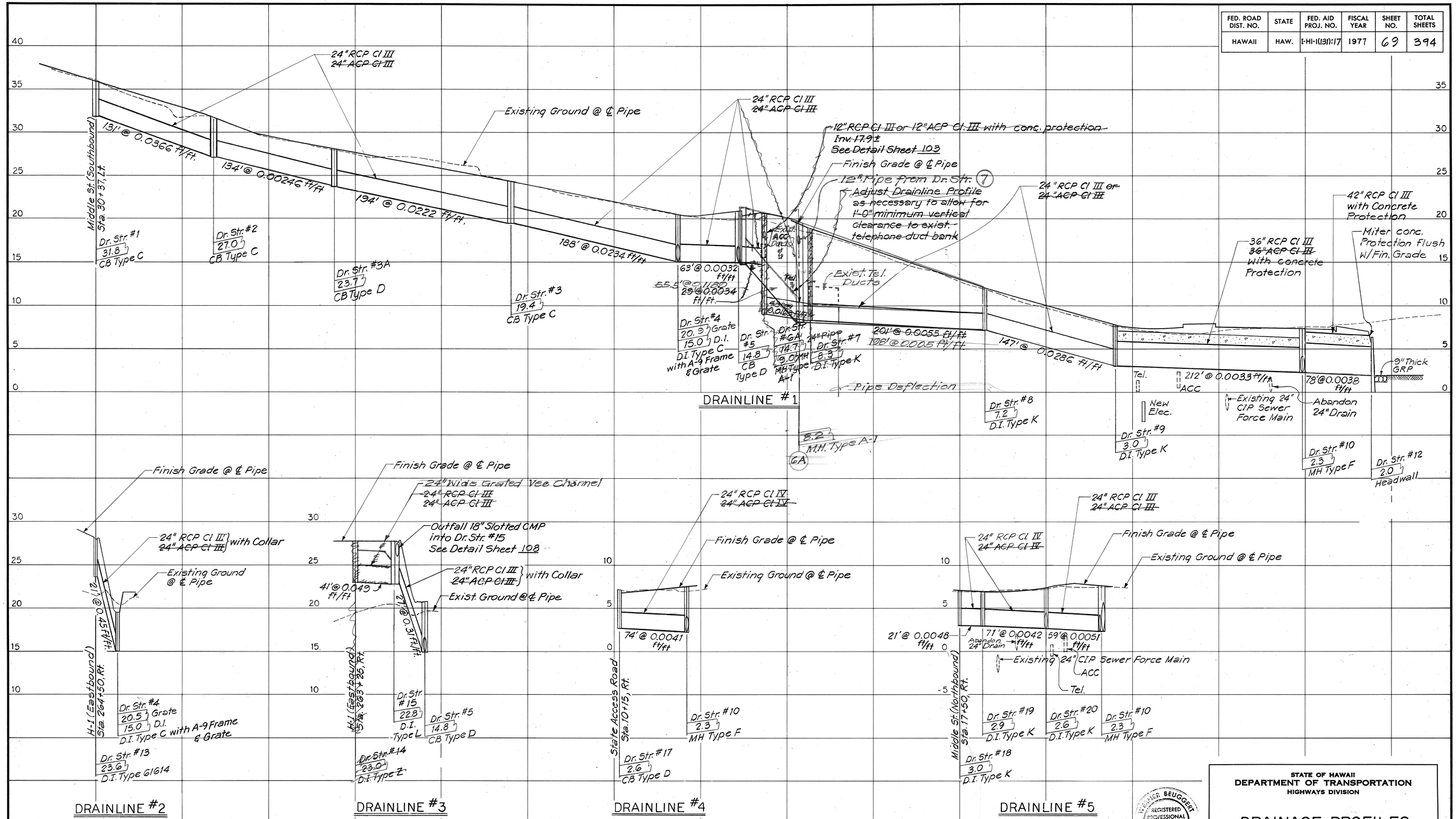
DRAINAGE AND GRADING PLAN

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1 (131):17

SCALE: 1" = 50' DATE: AUG. 31, 1977

SHEET No. D-5 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	69	394



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

WALTER BEUGGERT
REGISTERED PROFESSIONAL ENGINEER
No. 3383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES

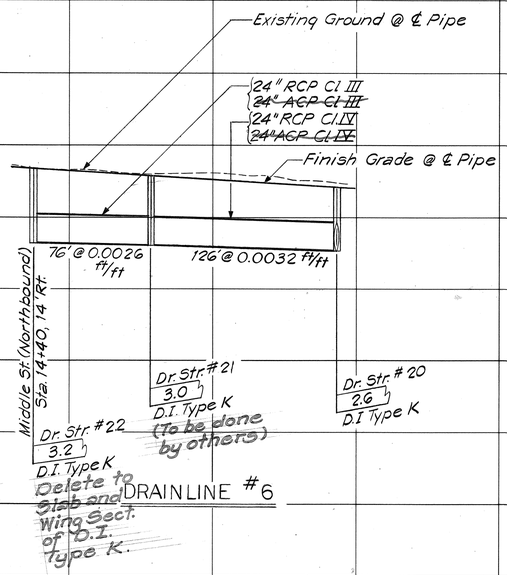
INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(131):17

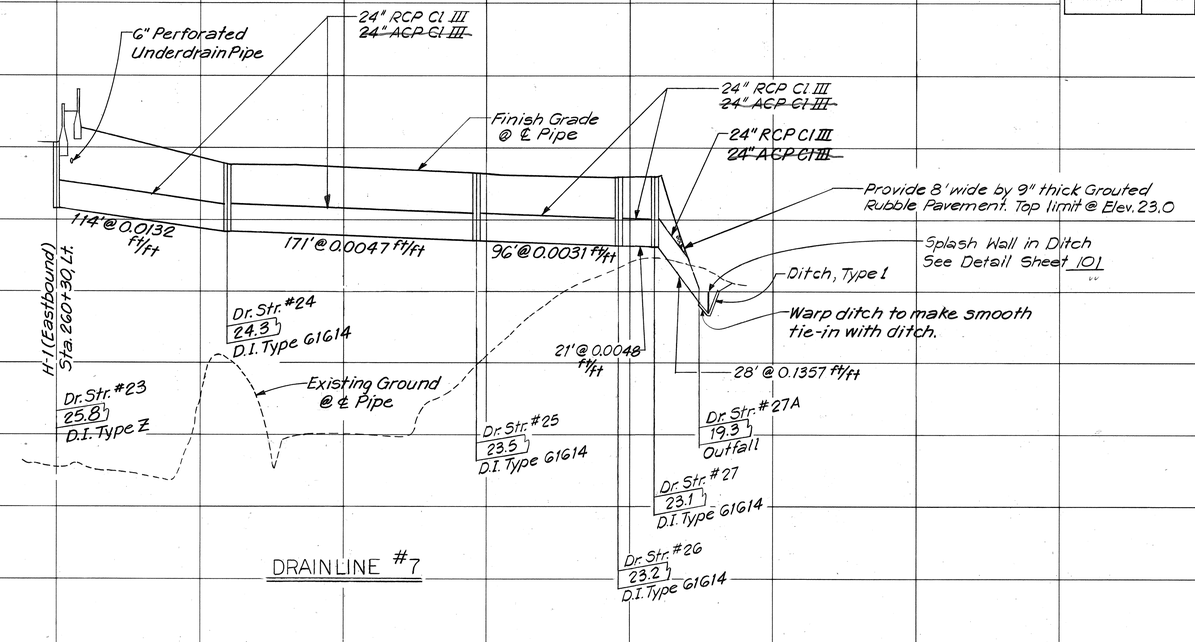
SCALE: HORIZ.: 1"=50'
VERTICAL: 1"=5'

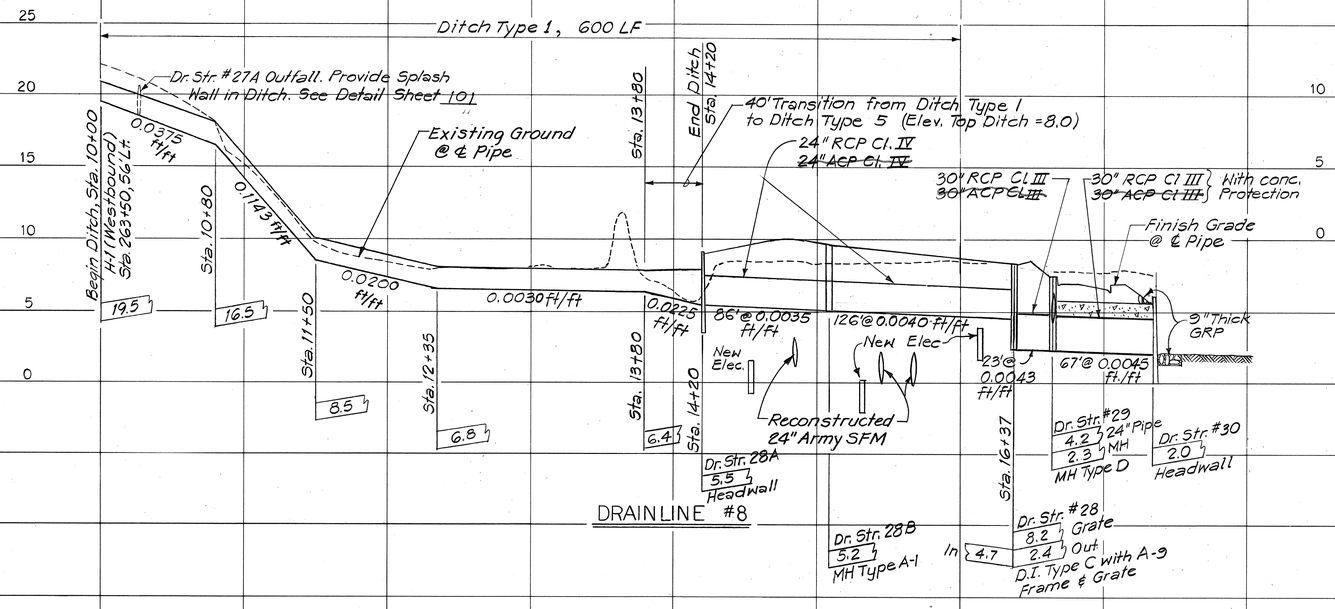
DATE: AUG. 31, 1977

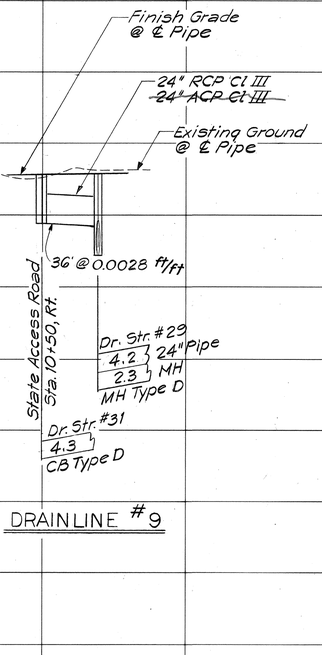
SHEET No. 1 OF 6 SHEETS

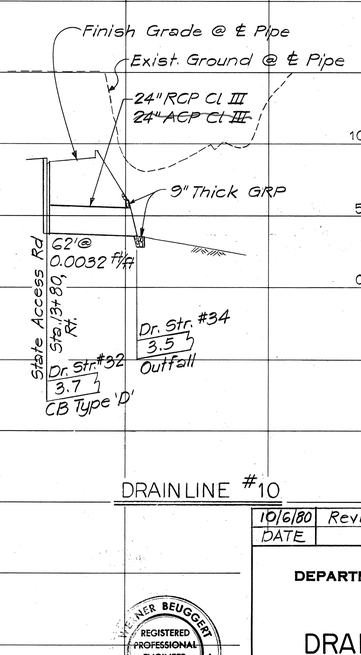
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	70	394

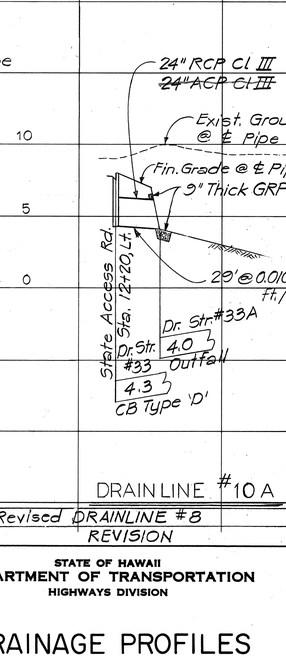












ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
No.	QUANTITIES BY	
	CHECKED BY	

DATE	REVISION
10/6/80	Revised DRAINLINE #8

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(131):17

SCALE: HORIZ.: 1"=50'
VERTICAL: 1"=5'

DATE: AUG. 31, 1977

SHEET No. 2 OF 6 SHEETS

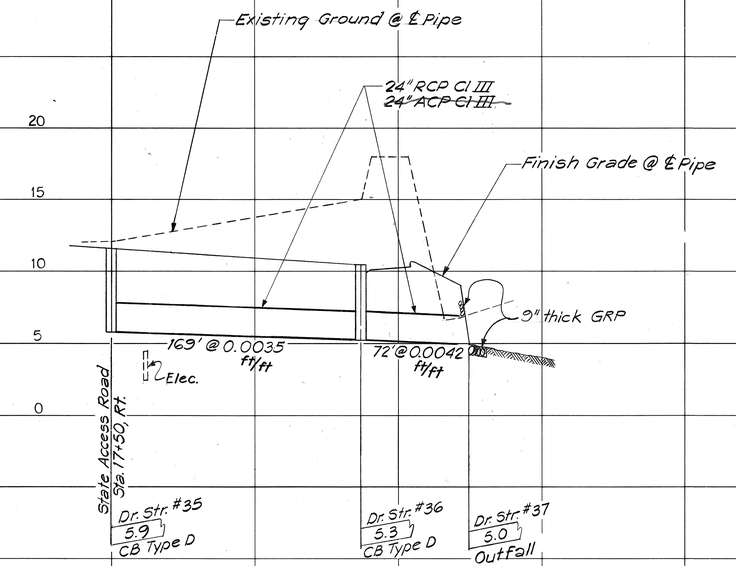
WERNER BEUGGERT
REGISTERED PROFESSIONAL ENGINEER
No. 3383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

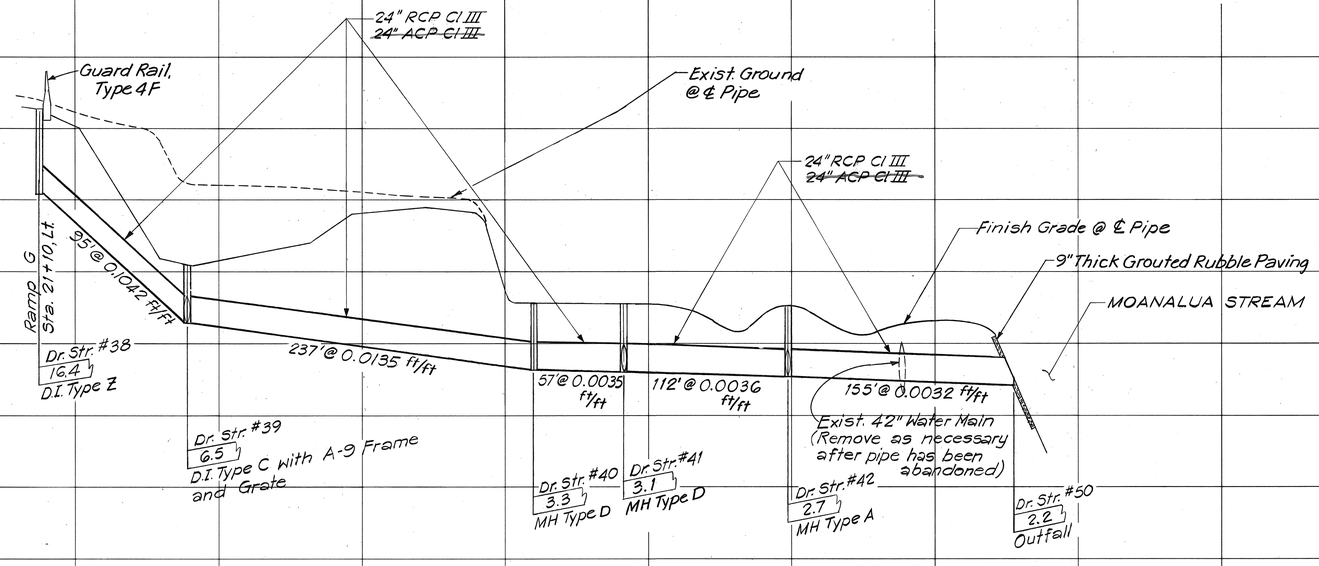
Werner Beuggert

C.O. 70

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	71	394



DRAINLINE #11



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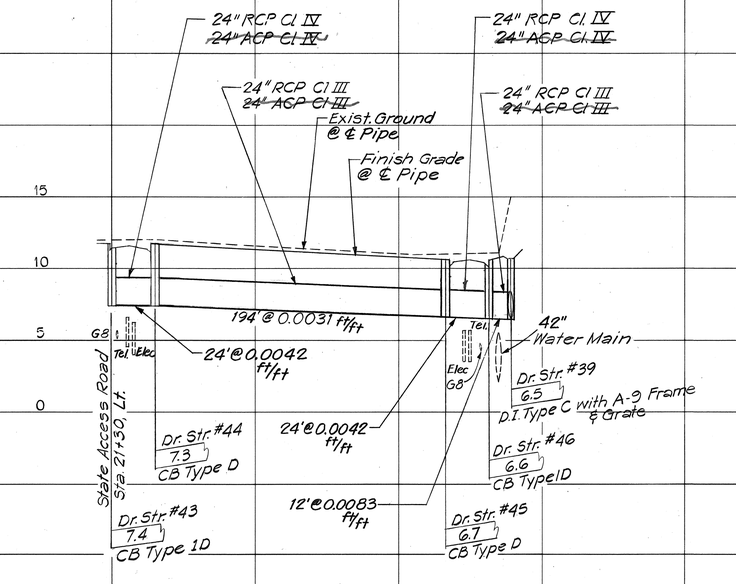

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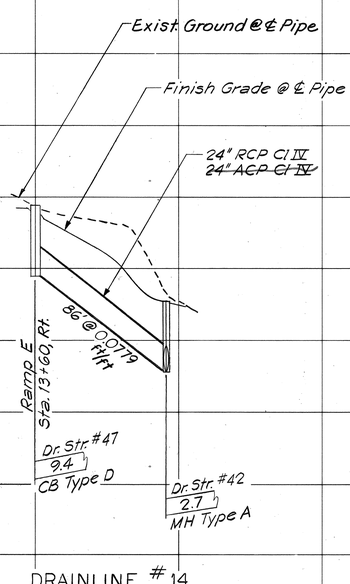

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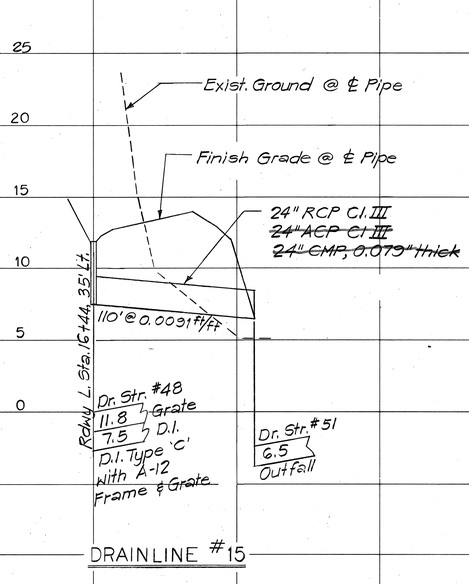

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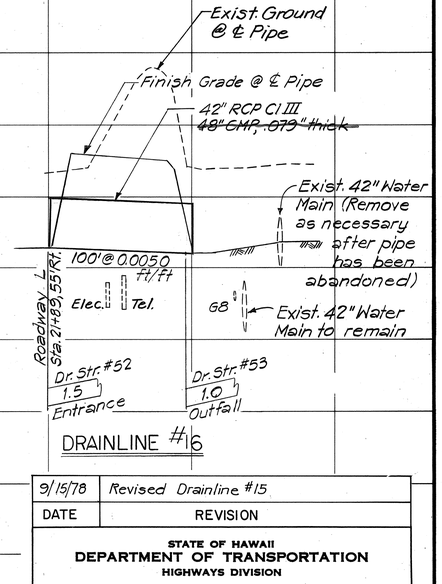


DRAINLINE #16

DATE	REVISION
9/15/78	Revised Drainline #15

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(131):17

SCALE: HORIZ.: 1"=50'
VERTICAL: 1"=5'

DATE: AUG. 31, 1977

SHEET No. 3 OF 6 SHEETS

C.O. 71

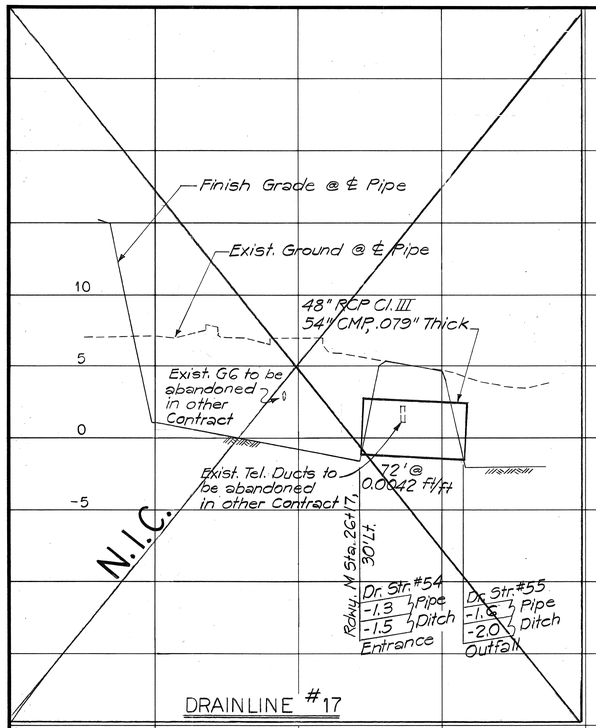
ORIGINAL PLAN
NOTE BOOK No.
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

JAMES R. BEUGGERT
REGISTERED PROFESSIONAL ENGINEER
No. 3383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

RD Backcheck 9-22-78

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	72	394



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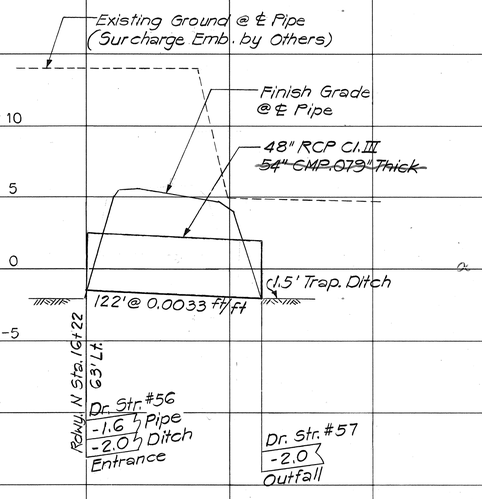

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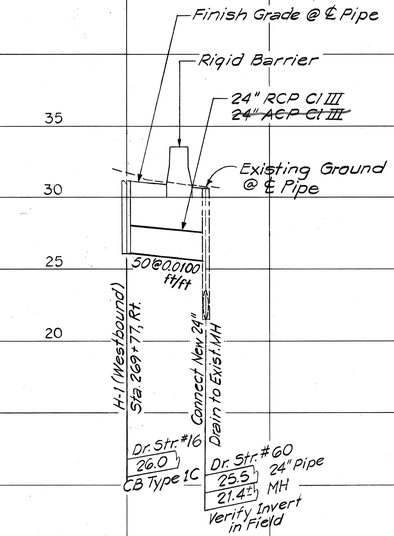

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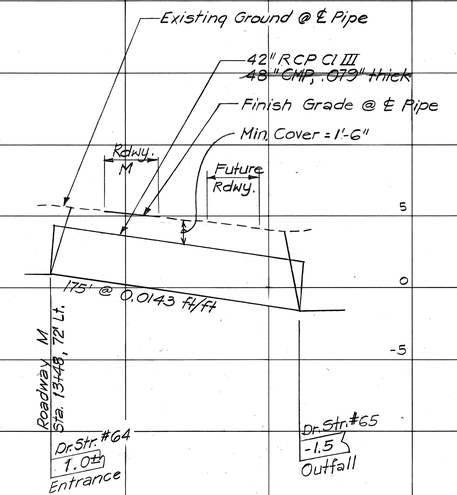
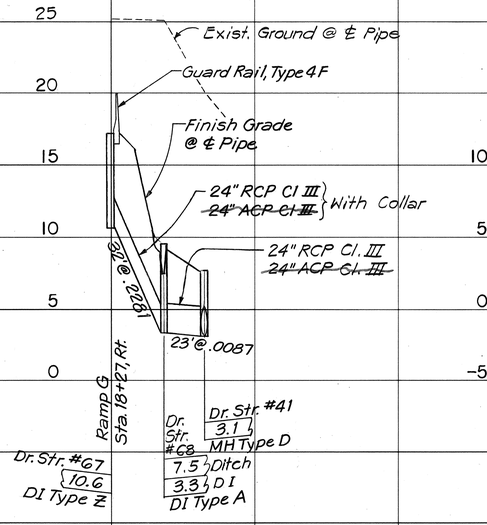
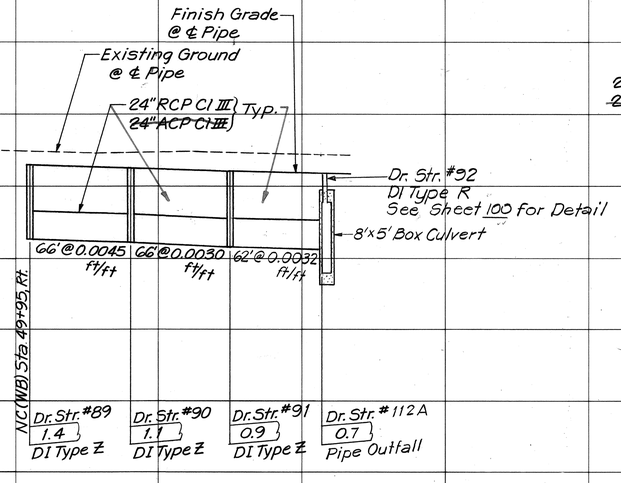


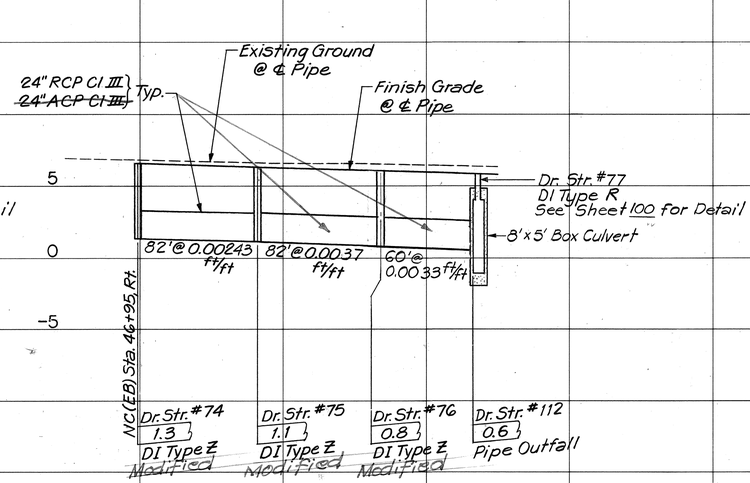
DRAINLINE #22



DRAINLINE #23



DRAINLINE #24



DRAINLINE #25

5/12/81	Revised Drainline #22
9/15/78	Deleted Drainline #17; Revised Drainline #18 & #22
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(131):17

SCALE: HORIZ.: 1"=50' VERTICAL: 1"=5' DATE: AUG. 31, 1977

SHEET No. 4 OF 6 SHEETS

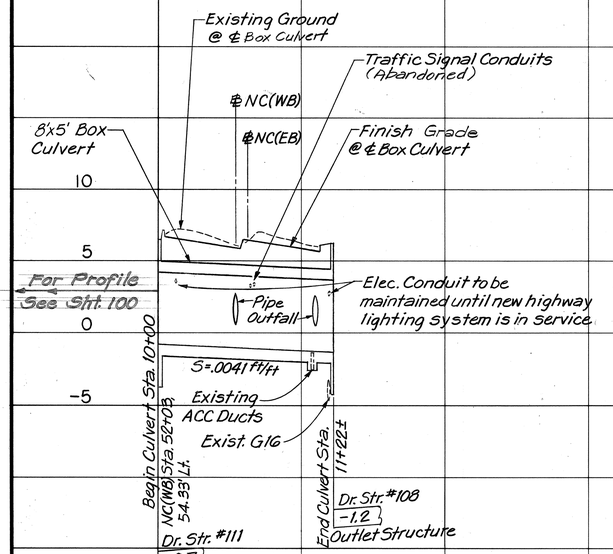
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | NOTE BOOK | QUANTITIES BY | CHECKED BY | DATE | No.

OLIVER BEUGGER REGISTERED PROFESSIONAL ENGINEER No. 3383-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

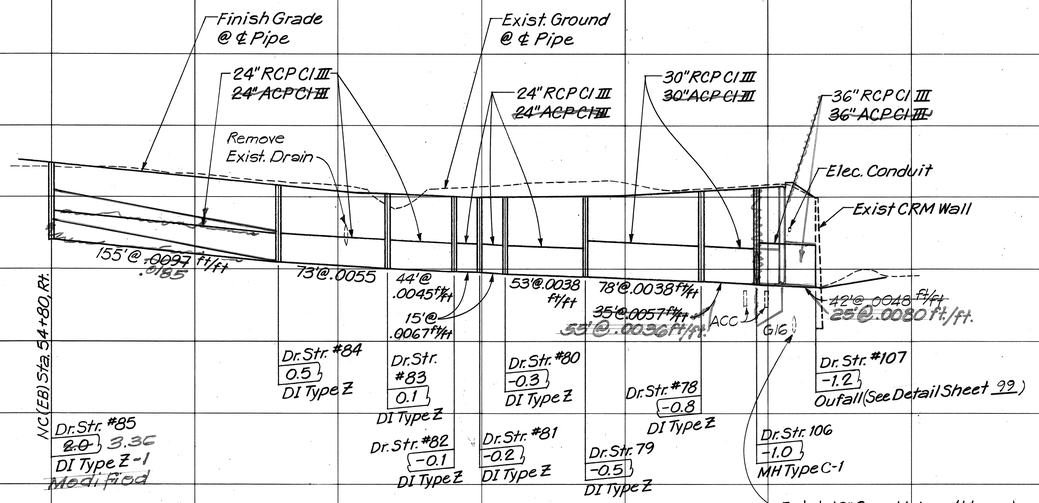
RD MACKCHK 8/31/77 C.O. 72

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	73	394



DRAINLINE #26

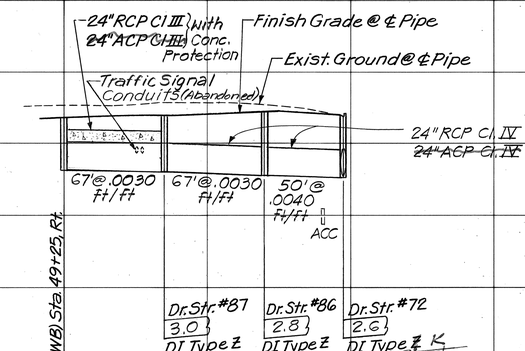
(8'x5' Box Culvert, See Sheets 98 thru 100)



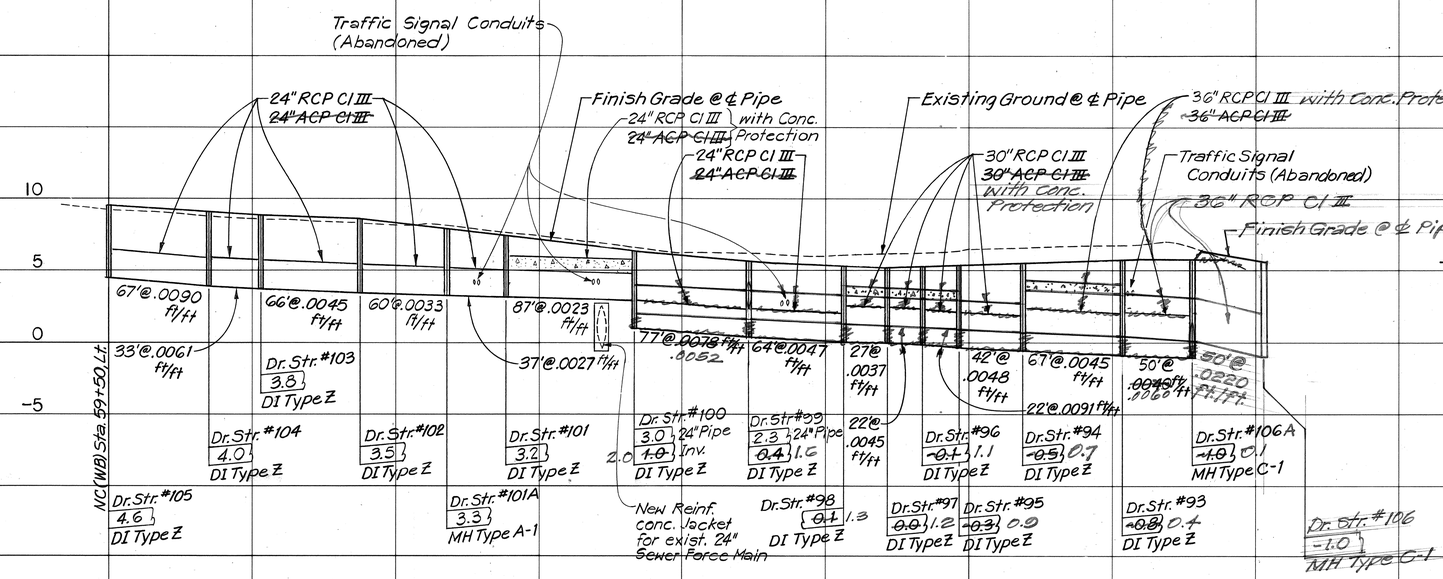
DRAINLINE #27

(Drainage Str. Nos. 78 thru 84 Are All Modified D.I. Type Z)
See Plan Sht. 1035-1

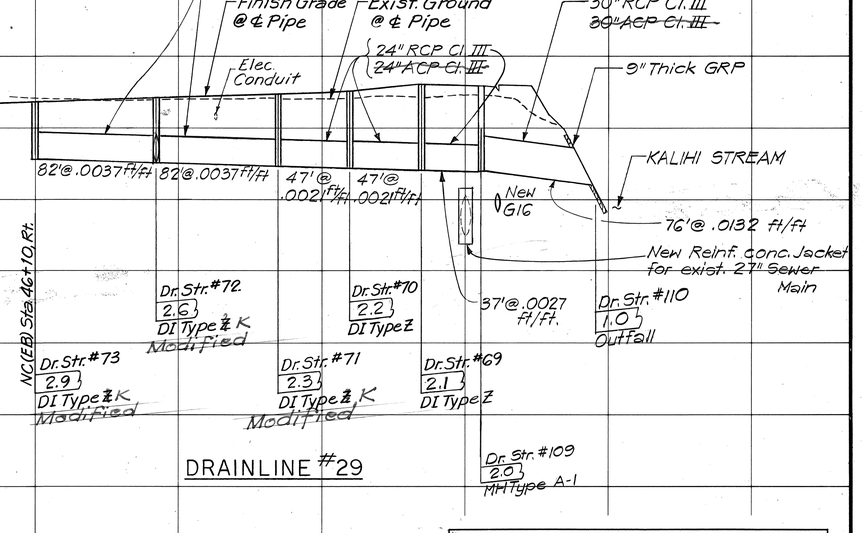
Exist. 16" Gas Main w/Wrapping (CAUTION: 450psi gasline Hand dig to expose gasline before excavating with machinery)



DRAINLINE #30

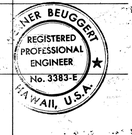


DRAINLINE #28



DRAINLINE #29

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



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES

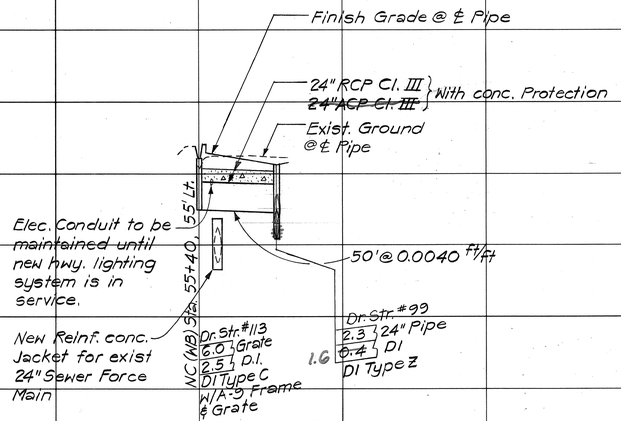
INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(131):17

SCALE: HORIZ.: 1"=50' VERTICAL: 1"=5'

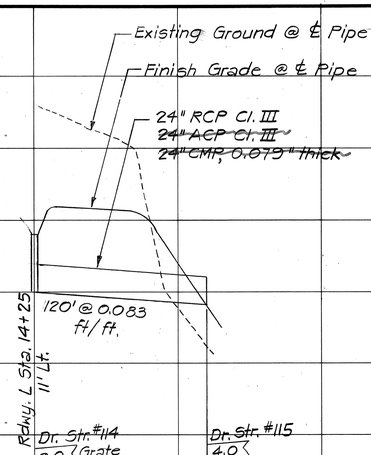
DATE: AUG. 31, 1977

SHEET No. 5 OF 6 SHEETS

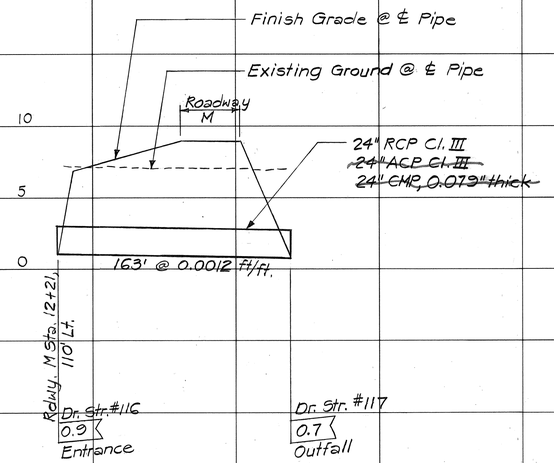
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(13)17	1977	74	394



DRAINLINE # 31



DRAINLINE # 32



TEMPORARY DRAINLINE # 33

DATE	REVISION
5/12/81	Revised Drainlines #32 & #33 Profiles
9/15/78	Deleted Temporary Drainline #32 & #33 Profiles and Added New Drainline #32 & #33 Profiles

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PROFILES

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(13)17

SCALE: HORIZ.: 1"=50'
VERTICAL: 1"=5'

DATE: AUG. 31, 1977

SHEET No. 6 OF 6 SHEETS

WERNER BEUGGERT
REGISTERED PROFESSIONAL ENGINEER
No. 3383-E
HAWAII, U.S.A.

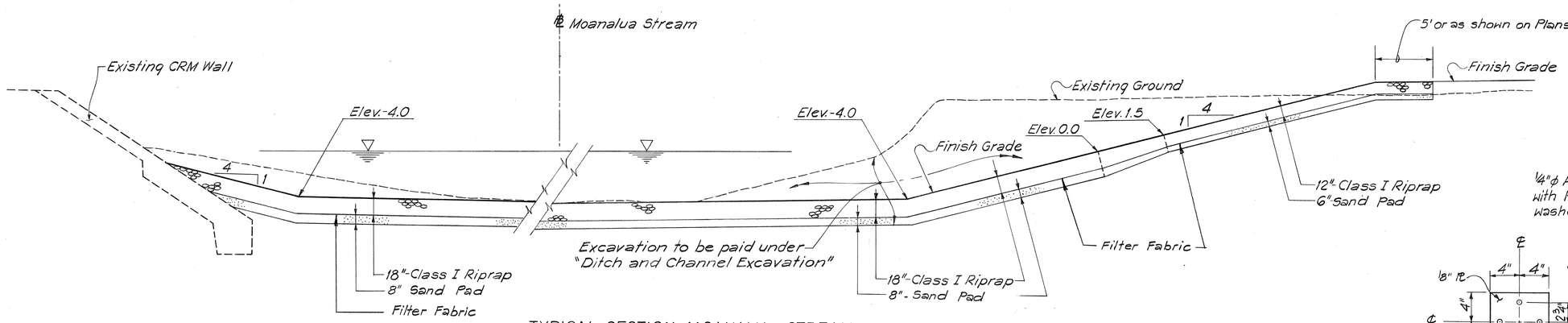
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Werner Beuggert

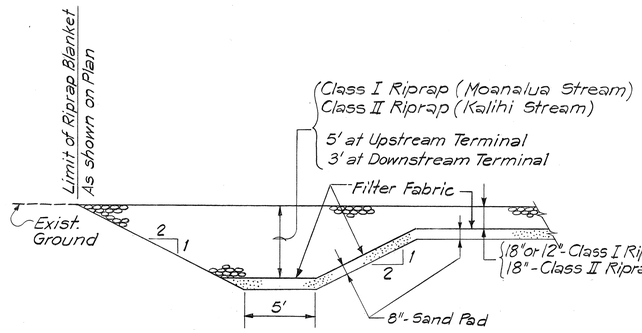
ORIGINAL PLAN
NOTE BOOK No.
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

C.O. 74

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HH(131):17	1977	75	394

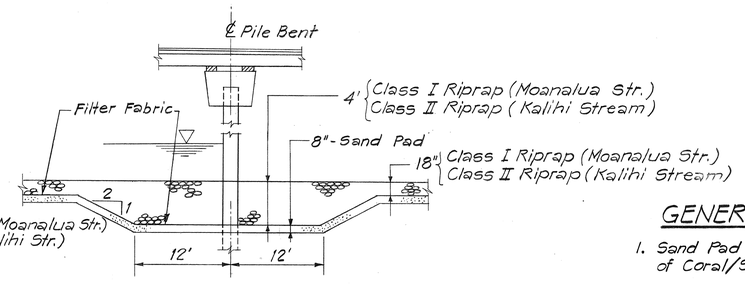


TYPICAL SECTION-MOANALUA STREAM
N.T.S.
(Looking Upstation)



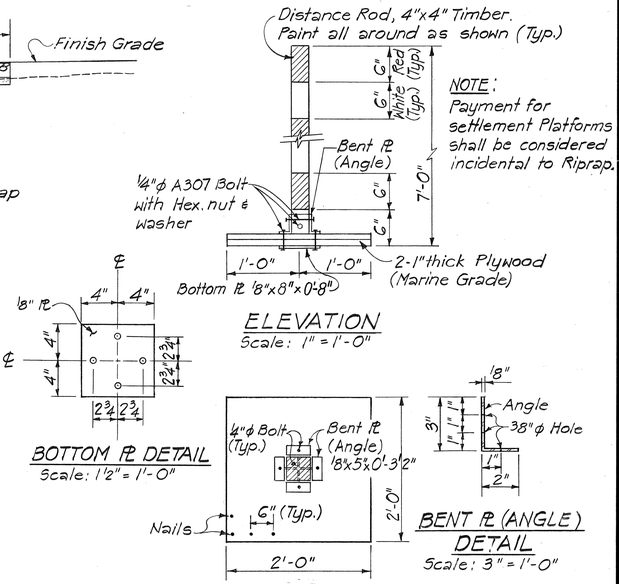
NOTE: Shown excavation slopes may be flattened as required by soil conditions. They shall be steepened up to 1½H:1V where possible.

CUTOFF DETAIL AT UPSTREAM AND DOWNSTREAM TERMINALS
N.T.S.



NOTE: 4' thick Riprap shall be extended min. 12' upstream and downstream from pile bent ends.

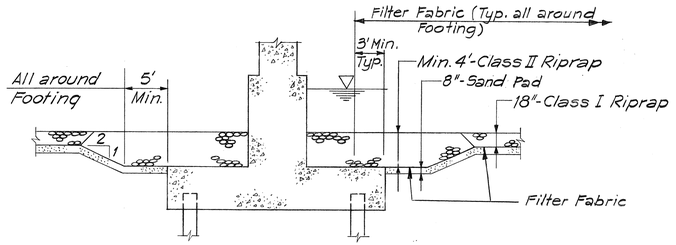
DETAIL AT PILE BENTS FOR TRESTLE STRUCTURE
N.T.S.



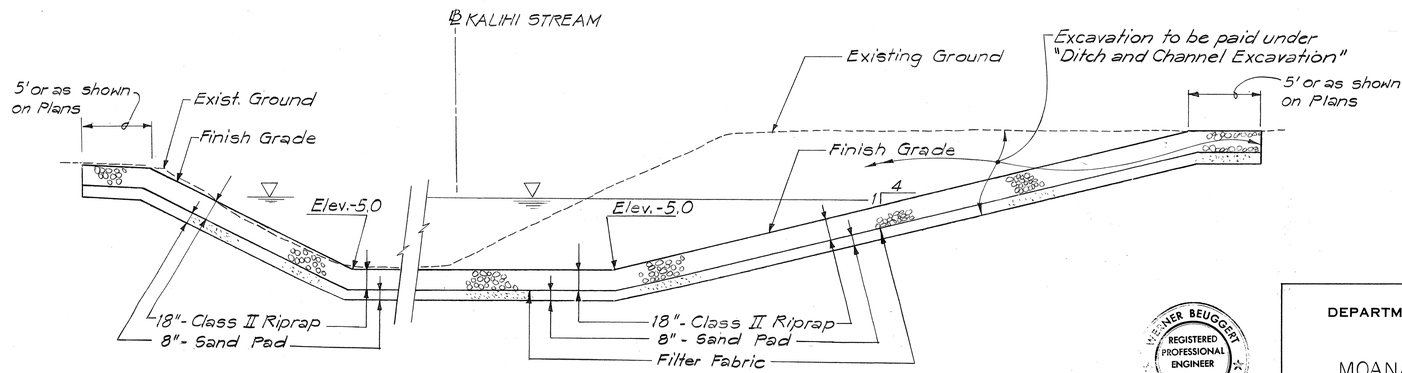
SETTLEMENT PLATFORM FOR RIPRAP

GENERAL NOTES:

1. Sand Pad is not required where subsoil consists of Coral/Sand material.
2. Subject to the approval of the Engineer, gradual and uniform overexcavation of less than 6 inches below the excavation line need not be backfilled. The finish grade line may be lowered by the approved amount of overexcavation. Overexcavation will not be paid.
3. The finish grade may be lowered by the amount of settlement of subsoil occurred during placing operations of sand pad and riprap. The Engineer will determine the amount of settlement.



DETAIL AT STRUCTURE FOOTINGS IN MOANALUA STREAM
N.T.S.



TYPICAL SECTION-KALIHI STREAM
N.T.S.
(Looking Upstation)

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

WERNER BEUGGERT
REGISTERED PROFESSIONAL ENGINEER
No. 3383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Werner Beuggert

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MOANALUA STREAM AND KALIHI STREAM WIDENING DETAILS

INTERSTATE ROUTE H-1
PROJECT NO. I-H1-1(131):17

SCALE: AS SHOWN DATE: AUG. 31, 1977

SHEET No. 1 OF 1 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(13)17	1977	76	394

DRAINAGE SUMMARY

| STRUCTURES | | | CULVERTS | | ESTIMATED QUANTITIES | | |

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-I(131)17	1977	77	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																			
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.	604 .2150	604 .2160	604 .2300	604 .2310	604 .2321	604 .2330	604 .3010	604 .3011		605 .0006	605 .0106	605 .2000		609 .2120			612 .0100		637 .1000		640 .0101	640 .0102	640 .0103	640 .0104			650 .1000	650 .2000	650 .3000	650 .3001	650 .3002			655 .1000		625 .3640	625 .2701
					DRAINLINE NO.	TYPE A CAST IRON FRAME AND COVER	TYPE B CAST IRON FRAME AND COVER	TYPE X STEEL FRAME AND GRATE	TYPE A-9 STEEL FRAME AND GRATE	TYPE A-12 STEEL FRAME AND GRATE FOR DROP INTAKES	TYPE GI6I4 STEEL FRAME AND GRATE	REMOVING, CLEANING, PAINTING, & REINSTALLING TYPE A CAST IRON FRAME & COVER FOR DRAIN MANHOLE	REMOVING, CLEANING AND REINSTALLING TYPE X STEEL FRAME AND GRATE		6-INCH PERFORATED UNDERDRAIN PIPE	6-INCH NONPERFORATED UNDERDRAIN PIPE	CLEANOUT		GUTTERS, TYPE TA			GROUTED RUBBLE PAVING		18-INCH SLOTTED DRAIN PIPE		LINED DRAINAGE DITCH, TYPE 1	LINED DRAINAGE DITCH TYPE 2	LINED DRAINAGE DITCH, TYPE 3	LINED DRAINAGE DITCH, TYPE 4			FILTER MATERIAL FOR RIPRAP	FILTER MATERIAL FOR RIPRAP UNDER EXIST. NIMITZ HIGHWAY BRIDGE	RIPRAP, CLASS I	RIPRAP, CLASS II	RIPRAP, CLASS II, UNDER EXIST. NIMITZ HIGHWAY BRIDGE			GROUND PROTECTION MATERIAL		REINFORCED CONCRETE JACKET FOR 27-INCH REINFORCED CONCRETE SEWER PIPE	REINFORCED CONCRETE JACKET FOR 24-INCH CAST IRON SEWER PIPE
					UNIT	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH		LIN.FT.	LIN.FT.	EACH		LIN.FT.			CU.YD.		LIN.FT.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.			CU.YD.	CU.YD.	CU.YD.	CU.YD.	CU.YD.			CU.YD.		LIN.FT.	LIN.FT.
D-1	38	DI TYPE Z			12					1																															
		24" PIPE	38	39																																					
	39	DI TYPE C							1																																
		24" PIPE	39	40																																					
	40	MH TYPE D				1																																			
		24" PIPE	40	41																																					
	41	MH TYPE D				1																																			
		24" PIPE	41	42																																					
	42	MH TYPE A				1																																			
		24" PIPE	42	50																																					
	50	OUTFALL			↓																	7.4																			
	43	CB TYPE ID			13	1																																			
		24" PIPE	43	44																																					
	44	CB TYPE D					1																																		
		24" PIPE	44	45																																					
	45	CB TYPE D					1																																		
		24" PIPE	45	46																																					
	46	CB TYPE 1D				1																																			
		24" PIPE	46	39	↓																																				
	47	CB TYPE D			14		1																																		
		24" PIPE	47	42	↓																																				
	48	DI TYPE C			15					1																															
		24" PIPE	48	51																																					
↓	51	OUTFALL			↓																																12				
		SUB-TOTAL →				5	3		1	2												7.4														12				

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

ORIGINAL - DO NOT USE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	78	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																		
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.		202			206	206	206		207		503	503	503		508		602	602		603	603		603	603	603	603	603	603	603	603	603	603	603		
					DRAINLINE NO.		.0440			.2020	.4100	.8400		.0100		.0020	.1021	.2020		.0100		.0021	.1020		.0010	.0011		.1016	.2060	.5010	.5040	.5044	.5045	.5050	.5060	.6540	.6541	.7020	.7200	.9000		
					UNIT		L.S.			CU.YD.	CU.YD.	CU.YD.		CU.YD.		CU.YD.	CU.YD.	CU.YD.		CU.YD.		LB.	LB.		CU.YD.	CU.YD.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.		
							REMOVAL OF RAILROAD BRIDGE IN KALIHI STREAM			STRUCTURE EXCAVATION FOR DRAINAGE SYSTEM	STRUCTURE EXCAVATION FOR 8'x5' BOX CULVERT	FILTER MATERIAL FOR UNDERDRAINS		DITCH AND CHANNEL EXCAVATION		CLASS A CONCRETE FOR DRAINAGE SYSTEM	CONCRETE IN 8'x5' BOX CULVERT	CLASS B CONCRETE FOR DRAINAGE SYSTEM		CEMENT RUBBLE MASONRY		REINFORCING STEEL IN 8'x5' BOX CULVERT	REINFORCING STEEL FOR DRAINAGE SYSTEM		BED COURSE MATERIAL FOR CULVERT	BED COURSE MATERIAL FOR 8'x5' BOX CULVERT		42-INCH RCP, CLASS III	12-INCH CMP, SHEET THICKNESS, 0.079 INCH	12-INCH ACP, CLASS III OR 12-INCH RCP, CLASS III	24-INCH ACP, CLASS III OR 24-INCH RCP, CLASS III	24-INCH ACP, CLASS IV OR 24-INCH RCP, CLASS III	24-INCH ACP WITH CONCRETE COLLARS, CLASS III OR 24-INCH RCP WITH CONCRETE COLLARS, CLASS III	30-INCH ACP, CLASS III OR 30-INCH RCP, CLASS III	36-INCH ACP, CLASS III OR 36-INCH RCP, CLASS III	48-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 42-INCH RCP, CLASS III	54-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 48-INCH RCP, CLASS III	18-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 18-INCH ACP, CLASS III	24-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 24-INCH RCP, CLASS III OR 24-INCH ACP, CLASS III	8-INCH CAST IRON PIPE, CLASS 150		
D-1	67	DI TYPE Z			23					8						2.9							403																		
		24" PIPE	67	68						35															1.1								32								
	68	DI TYPE A								11								3.1					424																		
		24" PIPE	68	41						21															0.8						23										
		18" PIPE	114	115	32					21								14.2							2.4													110			
		24" PIPE	116	117	33					89															4.4														130		
		DITCH TYPE 3	—	68																								20												
		SEDIMENT BASIN 'A'												13,757																										
		MOANALUA STREAM																																						
		EXIST. BIKEWAY WATERMAIN BRIDGE																																						
		RAMP D								25		23																												
		RAMP E								15		14																												
		RAMP F								20		18																												
		RAMP G																																						
		STATE ACCESS ROAD								63		58																												
D-2	8	DI TYPE K			1					5						3.9							491																		
		24" PIPE	8	9						63															5.0						147										
	9	DI TYPE K								5						3.7							473																		
		36" PIPE	9	10						121								75.7							12.6														212			
	10	MH TYPE F								11						4.2							639																		
		42" PIPE	10	12						49								33.6							5.7			78													
	12	HEADWALL								5								4.2					78																		
D-1	114	~~Type C D.I.~~			~~32~~																												120±								
D-1	115	~~Outfall~~			~~32~~																																				
		SUB-TOTAL →								567		113		13,757		14.7		130.8					2,508		32.0			78	20		170		32		212			110	130		

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

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(131)17	1977	79	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.	604 .2150	604 .2160	604 .2300	604 .2310	604 .2321	604 .2330	604 .3010	604 .3011		605 .0006	605 .0106	605 .2000		609 .2120			612 .0100		637 .1000		640 .0101	640 .0102	640 .0103	640 .0104		650 .1000	650 .2000	650 .2500	650 .3000	650 .3001	650 .3002			655 .1000		625 .3640	625 .2701
					DRAINLINE NO.	TYPE A CAST IRON FRAME AND COVER	TYPE B CAST IRON FRAME AND COVER	TYPE X STEEL FRAME AND GRATE	TYPE A-9 STEEL FRAME AND GRATE	TYPE A-12 STEEL FRAME AND GRATE FOR DROP INTAKES	TYPE G1G14 STEEL FRAME AND GRATE	REMOVING, CLEANING, PAINTING, & REINSTALLING TYPE A CAST IRON FRAME & COVER FOR DRAIN MANHOLE	REMOVING, CLEANING AND REINSTALLING TYPE X STEEL FRAME AND GRATE		6-INCH PERFORATED UNDERDRAIN PIPE	6INCH NONPERFORATED UNDERDRAIN PIPE	CLEANOUT		GUTTERS, TYPE 7A			GROUTED RUBBLE PAVING		18-INCH SLOTTED DRAIN PIPE		LINED DRAINAGE DITCH, TYPE 1	LINED DRAINAGE DITCH TYPE 2	LINED DRAINAGE DITCH, TYPE 3	LINED DRAINAGE DITCH, TYPE 4		SAND PAD	SAND PAD UNDER EXIST. NIMITZ HIGHWAY BRIDGE	FILTER FABRIC	RIPRAP, CLASS I	RIPRAP, CLASS II	RIPRAP, CLASS II UNDER EXIST. NIMITZ HIGHWAY BRIDGE			GROUND PROTECTION MATERIAL		REINFORCED CONCRETE JACKET FOR 27-INCH REINFORCED CONCRETE SEWER PIPE	REINFORCED CONCRETE JACKET FOR 24-INCH CAST IRON SEWER PIPE
					UNIT	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH		LIN.FT.	LIN.FT.	EACH		LIN.FT.			CU.YD.		LIN.FT.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.		CU.YD.	CU.YD.	SQ.YD.	CU.YD.	CU.YD.	CU.YD.			CU.YD.		LIN.FT.	LIN.FT.
D-1	67	DI TYPE Z			23					1																														
		24" PIPE	67	68	↓																																			
	68	DI TYPE A																																						
		24" PIPE	68	41																			1																	
		18" PIPE	114	115	32																																			
		24" PIPE	116	117	33																																			
		DITCH TYPE 3	—	68																							105													
		SEDIMENT BASIN 'A'																															61							
		MOANALUA STREAM																												1,936		8,711	6,795							
		EXIST. BIKEWAY WATERMAIN BRIDGE																				15.5																		
		RAMP D													290	10	1																					457			
		RAMP E													180		1																								
		RAMP F													210	25	1																								
		RAMP G																																				268			
		STATE ACCESS ROAD													790		5																								
D-2	8	DI TYPE K			1	1		1																																
		24" PIPE	8	9																																				
	9	DI TYPE K				1		1																																
		36" PIPE	9	10																																				
	10	MH TYPE F				1																																		
		42" PIPE	10	12																																				
	12	HEADWALL			↓																	14.0																		
D-1	114	~~Type C D.I.~~			~~32~~																																			
D-1	115	~~Outfall~~			~~32~~																																			
		SUB-TOTAL →				3		2		1					1470	35	8					29.5						105			1936		8711	6856				725			

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	80	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.		202			206	206	206		207		503	503	503		508		602	602		603	603		603	603	603	603	603	603	603	603	603	603	603	603	
							.0440			.2020	.4100	.8400		.0100		.0020	.1021	.2020		.0100		.0021	.1020		.0010	.0011		.1016	.2060	.5010	.5040	.5044	.5045	.5050	.5060	.6540	.6541	.7020	.7200	.9000	
					DRAINLINE NO.		REMOVAL OF RAILROAD BRIDGE IN KALIHI STREAM			STRUCTURE EXCAVATION FOR DRAINAGE SYSTEM	STRUCTURE EXCAVATION FOR 8'x5' BOX CULVERT	FILTER MATERIAL FOR UNDERDRAINS		DITCH AND CHANNEL EXCAVATION		CLASS A CONCRETE FOR DRAINAGE SYSTEM	CONCRETE IN 8'x5' BOX CULVERT	CLASS B CONCRETE FOR DRAINAGE SYSTEM		CEMENT RUBBLE MASONRY		REINFORCING STEEL IN 8'x5' BOX CULVERT	REINFORCING STEEL FOR DRAINAGE SYSTEM		BED COURSE MATERIAL FOR CULVERT	BED COURSE MATERIAL FOR 8'x5' BOX CULVERT		42-INCH RCP, CLASS III	12-INCH CMP, SHEET THICKNESS, 0.079 INCH	12-INCH ACP, CLASS III OR 12-INCH RCP, CLASS III	24-INCH ACP CLASS III OR 24-INCH RCP, CLASS III	24-INCH ACP CLASS II OR 24-INCH RCP, CLASS II	24-INCH ACP WITH CONCRETE COLLARS, CLASS III OR 24-INCH RCP WITH CONCRETE COLLARS CLASS III	30-INCH ACP, CLASS III OR 30-INCH RCP, CLASS III	36-INCH ACP, CLASS III OR 36-INCH RCP, CLASS III	48-INCH CMP, SHEET THICKNESS 0.079 INCH OR 42-INCH RCP, CLASS III	54-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 48-INCH RCP, CLASS III	18-INCH CMP SHEET THICKNESS, 0.079 INCH OR 18-INCH RCP, CLASS III	24-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 24-INCH RCP, CLASS III	8-INCH CAST IRON PIPE, CLASS 150	
					UNIT		L.S.			CU.YD.	CU.YD.	CU.YD.		CU.YD.		CU.YD.	CU.YD.	CU.YD.		CU.YD.		LB.	LB.		CU.YD.	CU.YD.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	
D-2	17	CB TYPE D			4					13						4.0							100																
		24" PIPE	17	10	↓					31															2.5						74								
	18	DI TYPE K			5					4						3.7							469																
		24" PIPE	18	19	↓					6															0.7						21								
	19	DI TYPE K								6						3.5							450																
		24" PIPE	19	20	↓					24															2.4						71								
	20	DI TYPE K								5						3.7							466																
		24" PIPE	20	10	↓					30															2.0							59								
	22	DI TYPE K (Delete Top Slab & Wing Sect.)			6					10						4.2							530																
		24" PIPE	22	21	↓					65															2.6							76								
	21	DI TYPE K (To be done by others)								9						3.9							491																
		24" PIPE	21	20	↓					82															4.3								126							
	23	DI TYPE Z			7					5						2.1							304																
		24" PIPE	23	24	↓					107															3.9							114								
	24	DI TYPE G (G1, G4)			↓					8						2.7							192																
		DITCH TYPE 1	-	-	8																																		
		DITCH TYPE 2	-	28	↓																																		
	28	DI TYPE C								5								1.5					35																
		30" PIPE	28	29	↓					22															1.0										23					
	29	MH TYPE D								11								2.2					57																
		30" PIPE	29	30	↓					45								18.8							3.0										67					
	30	HEADWALL			↓					3								2.4					60																
		SUB-TOTAL →								491						27.8		24.9					3,154		22.4						249	292		90					

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	81	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																	
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.	604 .2150	604 .2160	604 .2300	604 .2310	604 .2321	604 .2330	604 .3010	604 .3011		605 .0006	605 .0106	605 .2000		609 .2120			612 .0100		637 .1000		640 .0101	640 .0102	640 .0103	640 .0104			650 .1000	650 .2000	650 .3000	650 .3001	650 .3002			655 .1000		625 .3640	625 .2701
					DRAINLINE NO.	TYPE A CAST IRON FRAME AND COVER	TYPE B CAST IRON FRAME AND COVER	TYPE X STEEL FRAME AND GRATE	TYPE A-9 STEEL FRAME AND GRATE	TYPE A-12 STEEL FRAME AND GRATE FOR DROP INTAKES	TYPE G1G14 STEEL FRAME AND GRATE	REMOVING, CLEANING, PAINTING, & REINSTALLING TYPE A CAST IRON FRAME & COVER FOR DRAIN MANHOLE	REMOVING, CLEANING AND REINSTALLING TYPE X STEEL FRAME AND GRATE		6-INCH PERFORATED UNDERDRAIN PIPE	6-INCH NONPERFORATED UNDERDRAIN PIPE	CLEANOUT		GUTTERS, TYPE 7A			GROUTED RUBBLE PAVING		18-INCH SLOTTED DRAIN PIPE		LINED DRAINAGE DITCH, TYPE 1	LINED DRAINAGE DITCH TYPE 2	LINED DRAINAGE DITCH, TYPE 3	LINED DRAINAGE DITCH, TYPE 4			~~FILTER MATERIAL FOR RIPRAP~~	FILTER MATERIAL FOR RIPRAP UNDER EXIST. NIMITZ HIGHWAY BRIDGE	RIPRAP, CLASS I	RIPRAP, CLASS II	RIPRAP CLASS II, UNDER EXIST. NIMITZ HIGHWAY BRIDGE			GROUND PROTECTION MATERIAL		REINFORCED CONCRETE JACKET FOR 27-INCH REINFORCED CONCRETE SEWER PIPE	REINFORCED CONCRETE JACKET FOR 24-INCH CAST IRON SEWER PIPE
					UNIT	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH		LIN.FT.	LIN.FT.	EACH		LIN.FT.			CU.YD.		LIN.FT.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.			CU.YD.	CU.YD.	CU.YD.	CU.YD.	CU.YD.			CU.YD.		LIN.FT.	LIN.FT.
D-2	17	CB TYPE D			4		1																																	
		24" PIPE	17	10	↓																																			
	18	DI TYPE K			5	1		1																																
		24" PIPE	18	19																																				
	19	DI TYPE K				1		1																																
		24" PIPE	19	20																																				
	20	DI TYPE K				1		1																																
		24" PIPE	20	10	↓																																			
	22	DI TYPE K			6	1		1																																
		Delete Top Slab & Wing Sect.																																						
		24" PIPE	22	21																																				
	21	DI TYPE K				1		1																																
		(To be done by others)																																						
		24" PIPE	21	20																																				
	23	DI TYPE Z			7					1																														
		24" PIPE	23	24																																				
	24	DI TYPE G1G14									1																														
		DITCH TYPE 1	–	–	8																				315															
		DITCH TYPE 2	–	28																						41														
	28	DI TYPE C							1																																
		30" PIPE	28	29																																				
	29	MH TYPE D				1																																		
		30" PIPE	29	30																																				
	30	HEADWALL																																						
		SUB-TOTAL →				6	1	5	1	1	1											14				315	41													

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

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(131)17	1977	82	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																	
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.		202			206	206	206		207		503	503	503		508		602	602		603	603		603	603	603	603	603	603	603	603	603	603	603	603	603
							.0440			.2020	.4100	.8400		.0100		.0020	.1021	.2020		.0100		.0021	.1020		.0010	.0011		.1016	.2060	.5010	.5040	.5044	.5045	.5050	.5060	.6540	.6541	.7020	.7200	.9000
					DRAINLINE NO.		REMOVAL OF RAILROAD BRIDGE IN KALIHI STREAM			STRUCTURE EXCAVATION FOR DRAINAGE SYSTEM	STRUCTURE EXCAVATION FOR 8'x5' BOX CULVERT	FILTER MATERIAL FOR UNDERDRAINS		DITCH AND CHANNEL EXCAVATION		CLASS A CONCRETE FOR DRAINAGE SYSTEM	CONCRETE IN 8'x5' BOX CULVERT	CLASS B CONCRETE FOR DRAINAGE SYSTEM		CEMENT RUBBLE MASONRY		REINFORCING STEEL IN 8'x5' BOX CULVERT	REINFORCING STEEL FOR DRAINAGE SYSTEM		BED COURSE MATERIAL FOR CULVERT	BED COURSE MATERIAL FOR 8'x5' BOX CULVERT		42-INCH RCP, CLASS III	12-INCH CMP, SHEET THICKNESS, 0.079 INCH	12-INCH ACP, CLASS III OR 12-INCH RCP, CLASS III	24-INCH ACP, CLASS III OR 24-INCH RCP, CLASS III	24-INCH ACP, CLASS II OR 24-INCH RCP, CLASS II	24-INCH ACP WITH CONCRETE COLLARS, CLASS III OR 24-INCH RCP WITH CONCRETE COLLARS, CLASS III	30-INCH ACP, CLASS III OR 30-INCH RCP, CLASS III	36-INCH ACP, CLASS III OR 36-INCH RCP, CLASS III	48-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 42-INCH RCP, CLASS III	54-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 48-INCH RCP, CLASS III	18-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 18-INCH RCP, CLASS III	24-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 24-INCH RCP, CLASS III	8-INCH CAST IRON PIPE, CLASS 150
					UNIT		L.S.			CU.YD.	CU.YD.	CU.YD.		CU.YD.		CU.YD.	CU.YD.	CU.YD.		CU.YD.		LB.	LB.		CU.YD.	CU.YD.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.
D-2	31	CB TYPE D			9					11						3.4							85																	
		24" PIPE	31	29	↓					21															1.2						36									
	33	CB TYPE D			10A					10						3.3							82																	
		24" PIPE	33	33A	↓					17															1.0						29									
	33A	OUTFALL			↓																																		
	32	CB TYPE D			10					15						4.4							109																	
		24" PIPE	32	34	↓					41															2.1						62									
	34	OUTFALL			↓																																		
	35	CB TYPE D			11					17						4.8							119																	
		24" PIPE	35	36	↓					158															5.8						169									
	36	CB TYPE D								15						4.4							111																	
		24" PIPE	36	37	↓					50															2.5						72									
	37	OUTFALL			↓																																		
	52	ENTRANCE			16																																		
		42"/48" PIPE	52	53	↓					112															8.9														100	
	53	OUTFALL			↓																																		
		SEDIMENT BASIN 'B'																											15											
		SWALE UNDER H-1 VIADUCT																																						
		H-1 EMBANKMENT								17		15																												
↓		STATE ACCESS ROAD								41		37																												
		SUB-TOTAL →								525		52				20.3							506		21.5				15		368						100		

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	83	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																					
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.	604 .2150	604 .2160	604 .2300	604 .2310	604 .2321	604 .2330	604 .3010	604 .3011		605 .0006	605 .0106	605 .2000		609 .2120			612 .0100		637 .1000		640 .0101	640 .0102	640 .0103	640 .0104			650 .1000	650 .2000	650 .3000	650 .3001	650 .3002			655 .1000		625 .3640	625 .2701
					DRAINLINE NO.	TYPE A CAST IRON FRAME AND COVER	TYPE B CAST IRON FRAME AND COVER	TYPE X STEEL FRAME AND GRATE	TYPE A-9 STEEL FRAME AND GRATE	TYPE A-12 STEEL FRAME AND GRATE FOR DROP INTAKES	TYPE G1G14 STEEL FRAME AND GRATE	REMOVING, CLEANING, PAINTING, & REINSTALLING TYPE A CAST IRON FRAME & COVER FOR DRAIN MANHOLE	REMOVING, CLEANING AND REINSTALLING TYPE X STEEL FRAME AND GRATE		6-INCH PERFORATED UNDERDRAIN PIPE	6-INCH NONPERFORATED UNDERDRAIN PIPE	CLEANOUT		GUTTERS, TYPE 7A			GROUTED RUBBLE PAVING		18-INCH SLOTTED DRAIN PIPE		LINED DRAINAGE DITCH, TYPE 1	LINED DRAINAGE DITCH TYPE 2	LINED DRAINAGE DITCH, TYPE 3	LINED DRAINAGE DITCH, TYPE 4			FILTER MATERIAL FOR RIPRAP	FILTER MATERIAL FOR RIPRAP UNDER EXIST. NIMITZ HIGHWAY BRIDGE	RIPRAP, CLASS I	RIPRAP, CLASS II	RIPRAP, CLASS II, UNDER EXIST. NIMITZ HIGHWAY BRIDGE			GROUND PROTECTION MATERIAL		REINFORCED CONCRETE JACKET FOR 21-INCH REINFORCED CONCRETE SEWER PIPE	REINFORCED CONCRETE JACKET FOR 24-INCH CAST IRON SEWER PIPE
					UNIT	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH		LIN.FT.	LIN.FT.	EACH		LIN.FT.			CU.YD.		LIN.FT.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.			CU.YD.	CU.YD.	CU.YD.	CU.YD.	CU.YD.			CU.YD.		LIN.FT.	LIN.FT.
D-2	31	CB TYPE D			9		1																																			
		24" PIPE	31	29	↓																																					
	33	CB TYPE D			10A		1																																			
		24" PIPE	33	33A	↓																																					
	33A	OUTFALL																				4.3																				
	32	CB TYPE D			10		1																																			
		24" PIPE	32	34	↓																																					
	34	OUTFALL																				3.8																				
	35	CB TYPE D			11		1																																			
		24" PIPE	35	36	↓																																					
	36	CB TYPE D					1																																			
		24" PIPE	36	37	↓																																					
	37	OUTFALL																				9.3																				
	52	ENTRANCE			16																																13					
		42"/48" PIPE	52	53	↓																																					
	53	OUTFALL																																		20					
		SEDIMENT BASIN 'B'																																		38					
		SWALE UNDER H-1 VIADUCT																																						428			
		H-1 EMBANKMENT													278		1		203																								
↓		STATE ACCESS ROAD													510		2																										
		SUB-TOTAL →					5								788		3		203			17.4														71				428		

ORIGINAL PLAN

NOTE BOOK No.

SURVEY PLOTTED BY: DATE
DRAWN BY:
TRACED BY:
DESIGNED BY:
QUANTITIES BY:
CHECKED BY:

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	84	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																			
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.		202			206	206	206		207		503	503	503		508		602	602		603	603		603	603	603	603	603	603	603	603	603	603	603	603		
					DRAINLINE NO.		.0440			.2020	.4100	.8400		.0100		.0020	.1021	.2020		.0100		.0021	.1020		.0010	.0011		.1016	.2060	.5010	.5040	.5044	.5045	.5050	.5060	.6540	.6541	.7020	.7200	.9000		
					UNIT		L.S.			CU.YD.	CU.YD.	CU.YD.		CU.YD.		CU.YD.	CU.YD.	CU.YD.		CU.YD.		LB.	LB.		CU.YD.	CU.YD.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.		
							REMOVAL OF RAILROAD BRIDGE IN KALIHI STREAM			STRUCTURE EXCAVATION FOR DRAINAGE SYSTEM	STRUCTURE EXCAVATION FOR 8'x5' BOX CULVERT	FILTER MATERIAL FOR UNDERDRAINS		DITCH AND CHANNEL EXCAVATION		CLASS A CONCRETE FOR DRAINAGE SYSTEM	CONCRETE IN 8'x5' BOX CULVERT	CLASS B CONCRETE FOR DRAINAGE SYSTEM		CEMENT RUBBLE MASONRY		REINFORCING STEEL IN 8'x5' BOX CULVERT	REINFORCING STEEL FOR DRAINAGE SYSTEM		BED COURSE MATERIAL FOR CULVERT	BED COURSE MATERIAL FOR 8'x5' BOX CULVERT		42-INCH RCP, CLASS III	12-INCH CMP, SHEET THICKNESS, 0.079 INCH	12-INCH ACP, CLASS III OR 12-INCH RCP, CLASS III	24-INCH ACP, CLASS III OR 24-INCH RCP, CLASS III	24-INCH ACP, CLASS III OR 24-INCH RCP, CLASS IV	24-INCH ACP WITH CONCRETE COLLARS, CLASS III OR 24-INCH RCP WITH CONCRETE COLLARS, CLASS III	30-INCH ACP, CLASS III OR 30-INCH RCP, CLASS III	36-INCH ACP, CLASS III OR 36-INCH RCP, CLASS III	48-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 42-INCH RCP, CLASS III	54-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 48-INCH RCP, CLASS III	18-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 18-INCH RCP, CLASS III	24-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 24-INCH RCP, CLASS III	24-INCH ACP, CLASS III	8-INCH CAST IRON PIPE, CLASS 150		
D-3	1	CB TYPE C			1					17						5.2							125																		
		24" PIPE	1	2						89															4.5																	
	2	CB TYPE C								18						5.2							132																		
		24" PIPE	2	3A						103															4.6																	
	3A	CB TYPE D								12						3.7							94																		
		24" PIPE	3A	3						157															6.6																	
	3	CB TYPE C								15						5.4							142																		
		24" PIPE	3	4						168															6.4																	
	4	DI TYPE C								10								2.3					35																		
		24" RCP	4	5						56															2.1																	
	5	CB TYPE D								17						4.9							273																		
		24" PIPE	5	6A						17															1.0																	
	6A	MH TYPE A-1								18						5.5							729																		
		12" PIPE	6A	6						1								1.8							0.2																	
	6	DI TYPE P														1.1							115																		
		24" PIPE	6A	7						66															1.5																	
	7	DI TYPE ~~K~~								15						6.3							779																		
		24" PIPE	7	8						188															6.8																	
	13	DI TYPE G1G14			2					7						2.7							182																		
		24" PIPE	13	4						16															0.7										21						
	~~14~~	~~Deleted DI TYPE Z~~			~~3~~					~~5~~						~~2.1~~							~~307~~																		
		~~Deleted 24" PIPE~~	~~14~~	~~15~~						~~19~~															~~1.4~~																	
	15	DI TYPE L								8						3.7							524																		
		24" PIPE	15	5						21															0.9										27						
		SUB-TOTAL →								1,043						45.8		4.1					3,437		36.7						17	1,024		48							

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	85	394

DRAINAGE SUMMARY

| STRUCTURES | | | CULVERTS | | ESTIMATED QUANTITIES | | |

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	86	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																		
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.		202			206	206	206		207		503	503	503		508		602	602		603	603		603	603	603	603	603	603	603	603	603	603	603	603	603	
					DRAINLINE NO.		.0440			.2020	.4100	.8400		.0100		.0020	.1021	.2020		.0100		.0021	.1020		.0010	.0011		.1016	.2060	.5010	.5040	.5044	.5045	.5050	.5060	.6540	.6541	.7020	.7200	.9000	
					UNIT		L.S.			CU.YD.	CU.YD.	CU.YD.		CU.YD.		CU.YD.	CU.YD.	CU.YD.		CU.YD.		LB.	LB.		CU.YD.	CU.YD.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	
D-3		24" PIPE	24	25	7					131															5.8						171										
	25	DI TYPE G1614								8						2.8							192																	
		24" PIPE	25	26						78															3.3						96										
	26	DI TYPE G1614								8						2.8							192																	
		24" PIPE	26	27						18															0.7						21										
	27	DI TYPE G1614								9						2.8							192																	
		24" PIPE	27	27A						14															1.0						28										
	27A	OUTFALL			↓																																			
		DITCH TYPE 1			8																																			
	16	CB TYPE 1C			19					9						6.1							427																	
		24" PIPE	16	60	↓					43															1.7						50										
	60	RECONSTRUCT EXIST. MH ROOF SLAB														0.6							109																	
	58	DI TYPE C			20					7								2.0					35																	
		24" PIPE	58	59	↓					8															0.3						10										
	59	MH TYPE E								16								3.3					324																	
	62	~~Deleted 2-8" PIPES~~			~~21~~																																		~~10~~	
		~~Deleted 24" PIPE~~	~~62~~	~~63~~	↓					~~30~~															~~1.0~~						~~28~~									
	61	RECONSTRUCT EXIST. MH ROOF SLAB														0.7							109																	
		PLUG EXIST. CATCH BASIN THROAT SLOTS																0.2																						
		DITCH TYPE 4	—	62																																				
		H-1								98		178																												
		MIDDLE STREET								75		69																												
		SUB-TOTAL →								552		247				15.8		5.5					1580		13.8						404									10	

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

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(131)17	1977	87	394

DRAINAGE SUMMARY

| STRUCTURES | | | CULVERTS | | ESTIMATED QUANTITIES | | |

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	88	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																			
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.		202			206	206	206		207		503	503	503		508		602	602		603	603		603	603	603	603	603	603	603	603	603	603	603	603	603	603	
							.0440			.2020	.4100	.8400		.0100		.0020	.1021	.2020		.0100		.0021	.1020		.0010	.0011		.1016	.2060	.5010	.5040	.5044	.5045	.5050	.5060	.6540	.6541	.7020	.7200	.9000		
					DRAINLINE NO.		REMOVAL OF RAILROAD BRIDGE IN KALIHI STREAM			STRUCTURE EXCAVATION FOR DRAINAGE SYSTEM	STRUCTURE EXCAVATION FOR 8'x5' BOX CULVERT	FILTER MATERIAL FOR UNDERDRAINS		DITCH AND CHANNEL EXCAVATION		CLASS A CONCRETE FOR DRAINAGE SYSTEM	CONCRETE IN 8'x5' BOX CULVERT	CLASS B CONCRETE FOR DRAINAGE SYSTEM		CEMENT RUBBLE MASONRY		REINFORCING STEEL IN 8'x5' BOX CULVERT	REINFORCING STEEL FOR DRAINAGE SYSTEM		BED COURSE MATERIAL FOR CULVERT	BED COURSE MATERIAL FOR 8'x5' BOX CULVERT		42-INCH RCP, CLASS III	12-INCH CMP, SHEET THICKNESS, 0.079 INCH	12-INCH ACP, CLASS III OR 12-INCH RCP, CLASS III	24-INCH ACP, CLASS III OR 24-INCH RCP, CLASS III	24-INCH ACP, CLASS II OR 24-INCH RCP, CLASS III	24-INCH ACP WITH CONCRETE COLLARS, CLASS III OR 24-INCH RCP WITH CONCRETE COLLARS, CLASS III	30-INCH ACP, CLASS III OR 30-INCH RCP, CLASS III	36-INCH ACP, CLASS III OR 36-INCH RCP, CLASS III	48-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 42-INCH RCP, CLASS III	54-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 48-INCH RCP, CLASS III	18-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 18-INCH RCP, CLASS III	24-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 24-INCH RCP, CLASS III	24-INCH ACP, CLASS III	8-INCH CAST IRON PIPE, CLASS 150		
					UNIT		L.S.			CU.YD.	CU.YD.	CU.YD.		CU.YD.		CU.YD.	CU.YD.	CU.YD.		CU.YD.		LB.	LB.		CU.YD.	CU.YD.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.		
D-4	54	ENTRANCE			17																																				
		48"/54" PIPE	54	55	↓					89															6.4													72				
	55	OUTFALL			↓																																				
	56	ENTRANCE			18																																				
		48"/54" PIPE	56	57	↓					135															9.4													105				
	57	OUTFALL			↓																																				
	64	ENTRANCE			22																																				
		24" PIPE	64	65	↓					42															2.7																80	
	65	OUTFALL			↓																																				
	89	DI TYPE Z			24					5						2.3						332																			
		24" PIPE	89	90	↓					28															2.2													66				
	90	DI TYPE Z			↓					5						2.2						316																			
		24" PIPE	90	91	↓					28															2.2													66				
	91	DI TYPE Z			↓					5						2.2						316																			
		24" PIPE	91	112A	↓					26															2.1													62				
	74	~~Modified~~ DI TYPE Z			25					5						2.3						333																			
		24" PIPE	74	75	↓					35															2.8													82				
	75	~~Modified~~ DI TYPE Z			↓					5						2.2						316																			
		24" PIPE	75	76	↓					35															2.8													82				
	76	~~Modified~~ DI TYPE Z			↓					5						2.2						316																			
		24" PIPE	76	112	↓					28															2.0													60				
	~~111A~~	~~Headwall~~	~~111A~~	~~111~~	~~26A~~																																				
	~~111B~~	~~Modified Type F SDMH~~	~~111B~~	~~111A~~	↓																																				
		~~36" RCP~~	~~111B~~	~~111A~~	↓																																				
		SUB-TOTAL →								476						13.4						1,929			32.6													418				177		80

ORIGINAL PLAN

NOTE BOOK No.

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	89	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.	604 .2150	604 .2160	604 .2300	604 .2310	604 .2321	604 .2330	604 .3010	604 .3011		605 .0006	605 .0106	605 .2000		609 .2120			612 .0100		637 .1000		640 .0101	640 .0102	640 .0103	640 .0104			650 .1000	650 .2000	650 .3000	650 .3001	650 .3002			655 .1000		625 .3640	625 .2701
					DRAINLINE NO.	TYPE A CAST IRON FRAME AND COVER	TYPE B CAST IRON FRAME AND COVER	TYPE X STEEL FRAME AND GRATE	TYPE A-9 STEEL FRAME AND GRATE	TYPE A-12 STEEL FRAME AND GRATE FOR DROP INTAKES	TYPE G1G14 STEEL FRAME AND GRATE	REMOVING, CLEANING, PAINTING, & REINSTALLING TYPE A CAST IRON FRAME & COVER FOR DRAIN MANHOLE	REMOVING, CLEANING AND REINSTALLING TYPE X STEEL FRAME AND GRATE		6-INCH PERFORATED UNDERDRAIN PIPE	6-INCH NONPERFORATED UNDERDRAIN PIPE	CLEANOUT		GUTTERS, TYPE 7A			GROUTED RUBBLE PAVING		18-INCH SLOTTED DRAIN PIPE		LINED DRAINAGE DITCH, TYPE 1	LINED DRAINAGE DITCH TYPE 2	LINED DRAINAGE DITCH, TYPE 3	LINED DRAINAGE DITCH, TYPE 4			FILTER MATERIAL FOR RIPRAP	FILTER MATERIAL FOR RIPRAP UNDER EXIST. NIMITZ HIGHWAY BRIDGE	RIPRAP, CLASS I	RIPRAP, CLASS II	RIPRAP, CLASS II UNDER EXIST. NIMITZ HIGHWAY BRIDGE			GROUND PROTECTION MATERIAL		REINFORCED CONCRETE JACKET FOR 27-INCH REINFORCED CONCRETE SEWER PIPE	REINFORCED CONCRETE JACKET FOR 24-INCH CAST IRON SEWER PIPE
					UNIT	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH		LIN.FT.	LIN.FT.	EACH		LIN.FT.			CU.YD.		LIN.FT.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.			CU.YD.	CU.YD.	CU.YD.	CU.YD.	CU.YD.			CU.YD.		LIN.FT.	LIN.FT.
D-4	54	ENTRANCE			17																											22								
		48"/54" PIPE	54	55	↓																																			
	55	OUTFALL			↓																											25								
	56	ENTRANCE			18																											26								
		48"/54" PIPE	56	57	↓																																			
	57	OUTFALL			↓																											26								
	64	ENTRANCE			22																											39								
		24" PIPE	64	65	↓																																			
	65	OUTFALL			↓																											14								
	89	DI TYPE Z			24					1																														
		24" PIPE	89	90	↓																																			
	90	DI TYPE Z			↓					1																														
		24" PIPE	90	91	↓																																			
	91	DI TYPE Z			↓					1																														
		24" PIPE	91	112A	↓																																			
	74	~~Modified~~ DI TYPE Z			25					1																														
		24" PIPE	74	75	↓																																			
	75	~~Modified~~ DI TYPE Z			↓					1																														
		24" PIPE	75	76	↓																																			
	76	~~Modified~~ DI TYPE Z			↓					1																														
		24" PIPE	76	112	↓																																			
	~~111B~~	~~Modified Type SDMH~~	~~111B~~	111A	26A																																			
	111A	Headwall	111A	111	↓																																			
		36" RCP	111B	111A	↓																																			
		SUB-TOTAL →								6																						152								

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	90	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																		
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.		202			206	206	206		207		503	503	503		508		602	602		603	603		603	603	603	603	603	603	603	603	603	603	603	603	603
							.0440			.2020	.4100	.8400		.0100		.0020	.1021	.2020		.0100		.0021	.1020		.0010	.0011		.1016	.2060	.5010	.5040	.5044	.5045	.5050	.5060	.6540	.6541	.7020	.7200	.9000
					DRAINLINE NO.		REMOVAL OF RAILROAD BRIDGE IN KALIHI STREAM			STRUCTURE EXCAVATION FOR DRAINAGE SYSTEM	STRUCTURE EXCAVATION FOR 8'x5' BOX CULVERT	FILTER MATERIAL FOR UNDERDRAINS		DITCH AND CHANNEL EXCAVATION		CLASS A CONCRETE FOR DRAINAGE SYSTEM	CONCRETE IN 8'x5' BOX CULVERT	CLASS B CONCRETE FOR DRAINAGE SYSTEM		CEMENT RUBBLE MASONRY		REINFORCING STEEL IN 8'x5' BOX CULVERT	REINFORCING STEEL FOR DRAINAGE SYSTEM		BED COURSE MATERIAL FOR CULVERT	BED COURSE MATERIAL FOR 8'x5' BOX CULVERT		42-INCH RCP, CLASS III	12-INCH CMP, SHEET THICKNESS, 0.079 INCH	12-INCH ACP, CLASS III OR 12-INCH RCP, CLASS III	24-INCH ACP, CLASS III OR 24-INCH RCP, CLASS III	24-INCH ACP CLASS IV OR 24-INCH RCP, CLASS IV	24-INCH ACP WITH CONCRETE COLLARS, CLASS III OR 24-INCH RCP WITH CONCRETE COLLARS, CLASS III	30-INCH ACP, CLASS III OR 30-INCH RCP, CLASS III	36-INCH ACP, CLASS III OR 36-INCH RCP, CLASS III	48-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 42-INCH RCP, CLASS III	54-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 48-INCH RCP, CLASS III	18-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 18-INCH RCP, CLASS III OR 48-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 24-INCH RCP, CLASS III OR 24-INCH ACP, CLASS III	8-INCH CAST IRON PIPE, CLASS 150
					UNIT		L.S.			CU.YD.	CU.YD.	CU.YD.		CU.YD.		CU.YD.	CU.YD.	CU.YD.		CU.YD.		LB.	LB.		CU.YD.	CU.YD.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.
D-4	111	INLET STRUCTURE			26						8						5.5					587																		
		8'x5' BOX CULVERT	111	108							321						104					20,826				25														
	108	OUTLET STRUCTURE									9						5.5					587																		
	92	DI TYPE R														0.3							48																	
	77	DI TYPE R														0.3							48																	
	107	OUTFALL			27																																			
	73	~~Modified~~ DI TYPE Z K			29					3						1.9							274																	
		24" PIPE	73	72						38															2.8							82								
	72	~~Modified~~ DI TYPE Z K								4						1.8							265																	
		24" PIPE	72	71						38															2.8							82								
	71	~~Modified~~ DI TYPE Z K								4						2.1							306																	
		24" PIPE	71	70						22															1.6						47								
	70	DI TYPE Z								5						2.3							322																	
		24" PIPE	70	69						22															1.6						47								
	69	DI TYPE Z								6						2.5							355																	
		24" PIPE	69	109						17															1.3						37								
	109	MH TYPE A-1								7						3.0							302																	
		30" PIPE	109	110						65															3.4										76					
	110	OUTFALL																																						
	88	DI TYPE Z			30					2						1.8							257																	
		24" PIPE	88	87						14								14.9							2.3						67								
	87	DI TYPE Z								3						1.8							257																	
		24" PIPE	87	86						14															2.3							67								
		SUB-TOTAL →								264	338					17.8	11.5	14.9				22,000	2,434		18.1	25					198	231		76					

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	91	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																														
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.	604 .2150	604 .2160	604 .2300	604 .2310	604 .2321	604 .2330	604 .3010	604 .3011		605 .0006	605 .0106	605 .2000		609 .2120		612 .0100		637 .1000		640 .0101	640 .0102	640 .0103	640 .0104			650 .1000	650 .2000	650 .3000	650 .3001	650 .3002			655 .1000		625 .3640	625 .2701
					DRAINLINE NO.	TYPE A CAST IRON FRAME AND COVER	TYPE B CAST IRON FRAME AND COVER	TYPE X STEEL FRAME AND GRATE	TYPE A-9 STEEL FRAME AND GRATE	TYPE A-12 STEEL FRAME AND GRATE FOR DROP INTAKES	TYPE GI6A STEEL FRAME AND GRATE	REMOVING, CLEANING, PAINTING, & REINSTALLING TYPE A CAST IRON FRAME & COVER FOR DRAIN MANHOLE	REMOVING, CLEANING AND REINSTALLING TYPE X STEEL FRAME AND GRATE		6-INCH PERFORATED UNDERDRAIN PIPE	6-INCH NONPERFORATED UNDERDRAIN PIPE	CLEANOUT		GUTTERS, TYPE 7A		GROUTED RUBBLE PAVING		18-INCH SLOTTED DRAIN PIPE		LINED DRAINAGE DITCH, TYPE 1	LINED DRAINAGE DITCH TYPE 2	LINED DRAINAGE DITCH, TYPE 3	LINED DRAINAGE DITCH, TYPE 4			FILTER MATERIAL FOR RIPRAP	FILTER MATERIAL FOR RIPRAP UNDER EXIST. NIMITZ HIGHWAY BRIDGE	RIPRAP, CLASS I	RIPRAP, CLASS II	RIPRAP, CLASS II, UNDER EXIST. NIMITZ HIGHWAY BRIDGE			GROUND PROTECTION MATERIAL		REINFORCED CONCRETE JACKET FOR 27-INCH REINFORCED CONCRETE SEWER PIPE	REINFORCED CONCRETE JACKET FOR 24-INCH CAST IRON SEWER PIPE
					UNIT	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH		LIN.FT.	LIN.FT.	EACH		LIN.FT.		CU.YD.		LIN.FT.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.			CU.YD.	CU.YD.	CU.YD.	CU.YD.	CU.YD.			CU.YD.		LIN.FT.	LIN.FT.
D-4	111	INLET STRUCTURE			26																6.8																		
		8x5' BOX CULVERT	111	108																																				
	108	OUTLET STRUCTURE																			12.7																			
	92	DI TYPE R								1																														
	77	DI TYPE R			↓					1																														
	107	OUTFALL			27																																			
	73	~~Modified~~ DI TYPE Z K			29					1																														
		24" PIPE	73	72																																				
	72	~~Modified~~ DI TYPE Z K								1																														
		24" PIPE	72	71																																				
	71	~~Modified~~ DI TYPE Z K								1																														
		24" PIPE	71	70																																				
	70	DI TYPE Z								1																														
		24" PIPE	70	69																																				
	69	DI TYPE Z								1																														
		24" PIPE	69	109																																			8	
	109	MH TYPE A-1				1																																	
		30" PIPE	109	110																																				
	110	OUTFALL			↓																8.9																		
	88	DI TYPE Z			30					1																														
		24" PIPE	88	87																																				
	87	DI TYPE Z								1																														
↓		24" PIPE	87	86	↓																																			
		SUB-TOTAL →				1				9											28.4																	8	

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

SHEET No. 16 OF 22 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	92	394

DRAINAGE SUMMARY

| STRUCTURES | | | CULVERTS | | ESTIMATED QUANTITIES | | |

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(13)17	1977	93	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.	604 .2150	604 .2160	604 .2300	604 .2310	604 .2321	604 .2330	604 .3010	604 .3011		605 .0006	605 .0106	605 .2000		609 .2120			612 .0100		637 .1000		640 .0101	640 .0102	640 .0103	640 .0104		650 .1000	650 .2000	650 .2500	650 .3000	650 .3001	650 .3002			655 .1000		625 .3640	625 .2701
					DRAINLINE NO.	TYPE A CAST IRON FRAME AND COVER	TYPE B CAST IRON FRAME AND COVER	TYPE X STEEL FRAME AND GRATE	TYPE A-9 STEEL FRAME AND GRATE	TYPE A-12 STEEL FRAME AND GRATE FOR DROP INTAKES	TYPE G1G14 STEEL FRAME AND GRATE	REMOVING, CLEANING, PAINTING & REINSTALLING TYPE A CAST IRON FRAME & COVER FOR DRAIN MANHOLE	REMOVING, CLEANING AND REINSTALLING TYPE X STEEL FRAME AND GRATE		6-INCH PERFORATED UNDERDRAIN PIPE	6-INCH NONPERFORATED UNDERDRAIN PIPE	CLEANOUT		GUTTERS, TYPE 7A			GROUTED RUBBLE PAVING		18-INCH SLOTTED DRAIN PIPE		LINED DRAINAGE DITCH, TYPE 1	LINED DRAINAGE DITCH TYPE 2	LINED DRAINAGE DITCH, TYPE 3	LINED DRAINAGE DITCH, TYPE 4		SAND PAD	SAND PAD UNDER EXIST. NIMITZ HIGHWAY BRIDGE	FILTER FABRIC	RIPRAP, CLASS I	RIPRAP, CLASS II	RIPRAP CLASS II, UNDER EXIST. NIMITZ HIGHWAY BRIDGE			GROUND PROTECTION MATERIAL		REINFORCED CONCRETE JACKET FOR 27-INCH REINFORCED CONCRETE SEWER PIPE	REINFORCED CONCRETE JACKET FOR 24-INCH CAST IRON SEWER PIPE
					UNIT	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH		LIN.FT.	LIN.FT.	EACH		LIN.FT.			CU.YD.		LIN.FT.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.		CU.YD.	CU.YD.	SQ.YD.	CU.YD.	CU.YD.	CU.YD.			CU.YD.		LIN.FT.	LIN.FT.
D-4	86	DI TYPE Z			30					1																													
		24" PIPE	86	72	↓																																		
		CRM WALL																																					
		KALIHI STREAM																												3,050	400	15,104		7,540	835				
		NIMITZ CONN.													260		1																						
D-5	85	~~Modified~~ DI TYPE Z-1			27					1																													
		24" PIPE	85	84																																			
	84	~~Modified~~ DI TYPE Z								1																													
		24" PIPE	84	83																																			
	83	~~Modified~~ DI TYPE Z								1																													
		24" PIPE	83	82																																			
	82	~~Modified~~ DI TYPE Z								1																													
		24" PIPE	82	81																																			
	81	~~Modified~~ DI TYPE Z								1																													
		24" PIPE	81	80																																			
	80	~~Modified~~ DI TYPE Z								1																													
		24" PIPE	80	79																																			
	79	~~Modified~~ DI TYPE Z								1																													
		30" PIPE	79	78																																			
	78	~~Modified~~ DI TYPE Z								1																													
		30" PIPE	78	106																																			
	106	MH TYPE C-1				1																																	
		36" PIPE	106	107	↓																																		
	~~106A~~	~~MH Type C-1~~	~~106A~~	~~106~~	~~28~~																																		
	105	DI TYPE Z			28					1																													
		24" PIPE	105	104	↓																																		
		SUB-TOTAL →				1				10					260		1													3,050	400	15,104		7540	835				

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	94	394

DRAINAGE SUMMARY

| STRUCTURES | | | CULVERTS | | ESTIMATED QUANTITIES | | |

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	95	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.	604 .2150	604 .2160	604 .2300	604 .2310	604 .2321	604 .2330	604 .3010	604 .3011		605 .0006	605 .0106	605 .2000		609 .2120			612 .0100		637 .1000		640 .0101	640 .0102	640 .0103	640 .0104			650 .1000	650 .2000	650 .3000	650 .3001	650 .3002			655 .1000		625 .3640	625 .2701
					DRAINLINE NO.	TYPE A CAST IRON FRAME AND COVER	TYPE B CAST IRON FRAME AND COVER	TYPE X STEEL FRAME AND GRATE	TYPE A-9 STEEL FRAME AND GRATE	TYPE A-12 STEEL FRAME AND GRATE FOR DROP INTAKES	TYPE G1G14 STEEL FRAME AND GRATE	REMOVING, CLEANING, PAINTING, & REINSTALLING TYPE A CAST IRON FRAME & COVER FOR DRAIN MANHOLE	REMOVING, CLEANING AND REINSTALLING TYPE X STEEL FRAME AND GRATE		6-INCH PERFORATED UNDERDRAIN PIPE	6-INCH NONPERFORATED UNDERDRAIN PIPE	CLEANOUT		GUTTERS, TYPE 7A			GROUTED RUBBLE PAVING		18-INCH SLOTTED DRAIN PIPE		LINED DRAINAGE DITCH, TYPE 1	LINED DRAINAGE DITCH TYPE 2	LINED DRAINAGE DITCH, TYPE 3	LINED DRAINAGE DITCH, TYPE 4			FILTER MATERIAL FOR RIPRAP	FILTER MATERIAL FOR RIPRAP UNDER EXIST. NIMITZ HIGHWAY BRIDGE	RIPRAP, CLASS I	RIPRAP, CLASS II	RIPRAP, CLASS II UNDER EXIST NIMITZ HIGHWAY BRIDGE			GROUND PROTECTION MATERIAL		REINFORCED CONCRETE JACKET FOR 27-INCH REINFORCED CONCRETE SEWER PIPE	REINFORCED CONCRETE JACKET FOR 24-INCH CAST IRON SEWER PIPE
					UNIT	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH		LIN.FT.	LIN.FT.	EACH		LIN.FT.			CU.YD.		LIN.FT.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.			CU.YD.	CU.YD.	CU.YD.	CU.YD.	CU.YD.			CU.YD.		LIN.FT.	LIN.FT.
D-5	104	DI TYPE Z			28					1																														
		24" PIPE	104	103																																				
	103	DI TYPE Z								1																														
		24" PIPE	103	102																																				
	102	DI TYPE Z								1																														
		24" PIPE	102	101A																																				
	101A	MH TYPE A-1				1																																		
		24" PIPE	101A	101																																				
	101	DI TYPE Z								1																														
		24" PIPE	101	100																																				18
	100	DI TYPE Z								1																														
		24" PIPE	100	99																																				
	99	DI TYPE Z								1																														
		24" PIPE	99	98																																				
	98	DI TYPE Z								1																														
		30" PIPE	98	97																																				
	97	DI TYPE Z								1																														
		30" PIPE	97	96																																				
	96	DI TYPE Z								1																														
		30" PIPE	96	95																																				
	95	DI TYPE Z								1																														
		30" PIPE	95	94																																				
	94	DI TYPE Z								1																														
		36" PIPE	94	93																																				
	93	DI TYPE Z								1																														
		36" PIPE	93	106A																																				
		SUB-TOTAL →				1				12																														18

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	96	394

DRAINAGE SUMMARY

STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																				
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.		202			206	206	206		207		503	503	503		508		602	602		603	603		603	603	603	603	603	603	603	603	603	603	603	603		
					DRAINLINE NO.		.0440			.2020	.4100	.8400		.0100		.0020	.1021	.2020		.0100		.0021	.1020		.0010	.0011		.1016	.2060	.5010	.5040	.5044	.5045	.5050	.5060	.6540	.6541	.7020	.7200	.9000		
					UNIT		L.S.			CU.YD.	CU.YD.	CU.YD.		CU.YD.		CU.YD.	CU.YD.	CU.YD.		CU.YD.		LB.	LB.		CU.YD.	CU.YD.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.		
		REMOVAL OF RAILROAD BRIDGE IN KALIHI STREAM								STRUCTURE EXCAVATION FOR DRAINAGE SYSTEM	STRUCTURE EXCAVATION FOR 8'x5' BOX CULVERT	FILTER MATERIAL FOR UNDERDRAINS		DITCH AND CHANNEL EXCAVATION		CLASS A CONCRETE FOR DRAINAGE SYSTEM	CONCRETE IN 8'x5' BOX CULVERT	CLASS B CONCRETE FOR DRAINAGE SYSTEM		CEMENT RUBBLE MASONRY		REINFORCING STEEL IN 8'x5' BOX CULVERT	REINFORCING STEEL FOR DRAINAGE SYSTEM		BED COURSE MATERIAL FOR CULVERT	BED COURSE MATERIAL FOR 8'x5' BOX CULVERT		42-INCH RCP, CLASS III	12-INCH CMP, SHEET THICKNESS, 0.079 INCH	12-INCH ACP, CLASS III OR 12-INCH RCP, CLASS III	24-INCH ACP, CLASS III OR 24-INCH RCP, CLASS III	24-INCH ACP, CLASS II OR 24-INCH RCP, CLASS III	24-INCH ACP WITH CONCRETE COLLARS, CLASS II OR 24-INCH RCP WITH CONCRETE COLLARS, CLASS III	30-INCH ACP, CLASS III OR 30-INCH RCP, CLASS III	36-INCH ACP, CLASS III OR 36-INCH RCP, CLASS III	48-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 42-INCH RCP, CLASS III	54-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 48-INCH RCP, CLASS III	18-INCH CMP, SHEET THICKNESS, 0.079 INCH OR 18-INCH RCP, CLASS III	18-INCH CAST IRON PIPE, 7 THICKNESS, 0.075 INCH OR 24-INCH RCP, CLASS III	24-INCH ACP, CLASS III	8-INCH CAST IRON PIPE, CLASS 150		
D-5	113	DI TYPE 'C'			31					8								2.1					35																		
↓		24" PIPE	113	99						8								11.2							1.7						50											
		NIMITZ CONN.(EB)								10		9																														
		NIMITZ CONN. DETOURS :																																								
		DI TYPE 'P'								6						2							133																			
		12" PIPE								9															0.2					18												
		DI TYPE 'P'								6						2							133																			
		SUBTOTAL →								47		9				4		13.3					301		1.9					18	50											
		TOTAL →					L.S.			5,755	338	440		42,066		240.6	115	220.2		22		22,000	24,969		266	25		78	35	35	4,589	707	80	392	371	100	177	110	298	10		
		ROUNDED TOTAL →					L.S.			5,760	338	440		42,100		245	115	220		22		22,000	25,000		265	25		78	35	35	4,589	707	80	392	371	100	177	110	298	10		

ORIGINAL PLAN

NOTE BOOK No.

SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

SHEET No. 21 OF 22 SHEETS

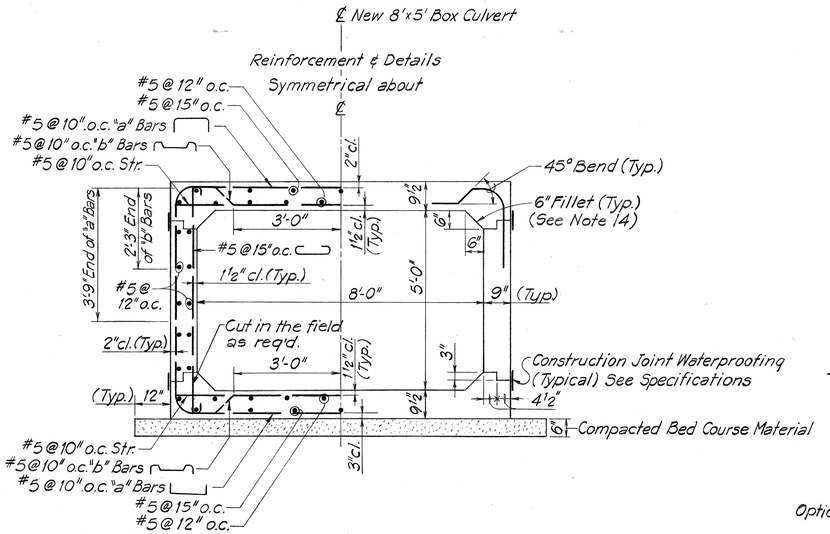
96

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131)17	1977	97	394

DRAINAGE SUMMARY

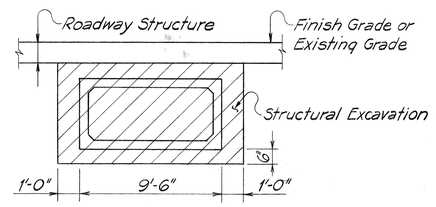
STRUCTURES			CULVERTS		ESTIMATED QUANTITIES																																		
DRAINAGE SHEET	STRUCTURE NUMBER	TYPE	FROM STRUCTURE NO.	TO STRUCTURE NO.	ITEM NO.	604 .2150	604 .2160	604 .2300	604 .2310	604 .2321	604 .2330	604 .3010	604 .3011		605 .0006	605 .0106	605 .2000		609 .2120			612 .0100		637 .1000		640 .0101	640 .0102	640 .0103	640 .0104		650 .1000	650 .2000	650 .2500	650 .3000	650 .3001	650 .3002			655 .1000		625 .3640	625 .2701
					DRAINLINE NO.	TYPE A CAST IRON FRAME AND COVER	TYPE B CAST IRON FRAME AND COVER	TYPE X STEEL FRAME AND GRATE	TYPE A-9 STEEL FRAME AND GRATE	TYPE A-12 STEEL FRAME AND GRATE FOR DROP INTAKES	TYPE G1G14 STEEL FRAME AND GRATE	REMOVING, CLEANING, PAINTING, & REINSTALLING TYPE A CAST IRON FRAME & COVER FOR DRAIN MANHOLE	REMOVING, CLEANING AND REINSTALLING TYPE X STEEL FRAME AND GRATE		6-INCH PERFORATED UNDERDRAIN PIPE	6-INCH NONPERFORATED UNDERDRAIN PIPE	CLEANOUT		GUTTERS, TYPE 7A			GROUTED RUBBLE PAVING		18-INCH SLOTTED DRAIN PIPE		LINED DRAINAGE DITCH, TYPE 1	LINED DRAINAGE DITCH TYPE 2	LINED DRAINAGE DITCH, TYPE 3	LINED DRAINAGE DITCH, TYPE 4		SAND PAD	SAND PAD UNDER EXIST. NIMITZ HIGHWAY BRIDGE	FILTER FABRIC	RIPRAP, CLASS I	RIPRAP, CLASS II	RIPRAP, CLASS II UNDER EXIST. NIMITZ HIGHWAY BRIDGE			GROUND PROTECTION MATERIAL		REINFORCED CONCRETE JACKET FOR 27-INCH REINFORCED CONCRETE SEWER PIPE	REINFORCED CONCRETE JACKET FOR 24-INCH CAST IRON SEWER PIPE
					UNIT	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH		LIN.FT.	LIN.FT.	EACH		LIN.FT.			CU.YD.		LIN.FT.		LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.		CU.YD	CU.YD.	SQ.YD.	CU.YD.	CU.YD.	CU.YD.			CU.YD.		LIN.FT.	LIN.FT.
D-5	113	DI TYPE C			31				1																															
↓		24"PIPE	113	99																																				8
		NIMITZ CONN.(EB)													105		1																								
		NIMITZ CONN. DETOURS:																																							
		DI TYPE 'P'											1																												
		12" PIPE																																							
		DI TYPE 'P'											1																												
		SUB-TOTAL→							1				2		105		1																								8
		TOTAL →				21	14	9	5	42	6	2	2		5160	175	23		799			100		20		602	41	105	100		4986	400	23815	7091	7540	835			1153		8	26
		ROUNDED TOTAL →				21	14	9	5	42	6	2	2		5160	175	23		800			100		20		600	41	105	100		5000	400	24000	7090	7540	835			1150		8	26

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



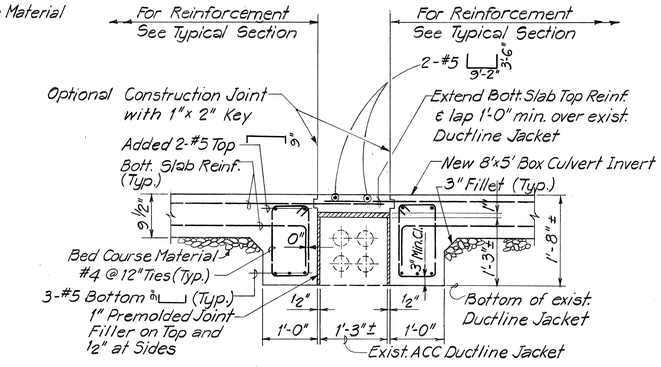
TYPICAL SECTION - 8'x5' BOX CULVERT

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



EXCAVATION PAYMENT LIMITS

N.T.S.



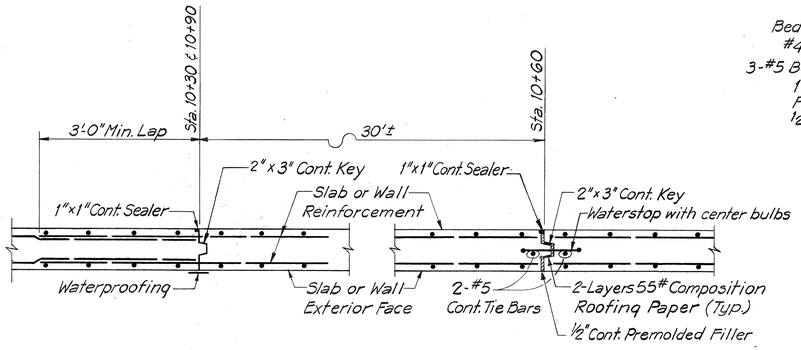
NOTE:

All adjustment work on existing Hawaiian Telephone Company cables and Signal Corps. ductlines shall be performed and paid for by the Contractor. All work shall be done in accordance with the standards and requirements of Hawaiian Telephone Company.

INVERT MODIFICATION AT EXISTING ACC DUCTLINE CROSSING

DETAIL J

N.T.S.

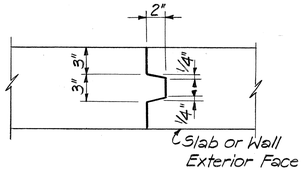


TYP. CONSTRUCTION JOINT

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

TYP. EXPANSION JOINT

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



TYPICAL KEY DETAIL

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	98	394

GENERAL NOTES:

1. For profile of box culvert (Drainline #26) see Sheet No. 73.
2. Payment for adjustment of existing Highway Lighting shall be considered incidental to various contract items.
3. Payment for weepholes and filter material shall be considered incidental to Grouted Rubble Pavement.
4. Payment for Brickwall shall be considered incidental to Class 'A' Concrete.
5. All concrete shall be Class 'A' unless otherwise noted.
6. Design Stresses:
   f'_c = 3,000 psi, n = 10
   fc = 1,200 psi, f_s = 20,000 psi
   All reinforcing steel to be ASTM A-615, Grade 40.
7. Roofing paper, waterproofing, joint sealer and waterstop etc., incidental to Class 'A' Concrete.
8. Provide construction joints at 30' and 90' from mauka headwall. Provide expansion joint at 60' from mauka headwall.
9. For splices not detailed; overlap = 2'-0" min. Stagger all splices as approved by the Engineer.
10. Headwalls reinforcing bars will be #5@12" o.c. both directions each face.
11. Reinforcing steel for Headwalls is to be 2" clear from forms.
12. Provide 1" chamfer for all exposed edges of Headwalls.
13. Contractor shall verify location and elevation of existing 16-inch gas main (GASCO) and existing Army communication cable prior to construction of 8'x5' Box Culvert.
14. The bottom fillets of concrete box culvert are optional.
15. The Contractor shall provide and maintain, as is necessary, temporary water diversion facilities with equal or larger capacity than the existing culvert. Payment shall be considered incidental to various contract items.

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

WERNER BEUGGERT REGISTERED PROFESSIONAL ENGINEER No. 3383-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Werner Beuggert

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

8'x5' BOX CULVERT

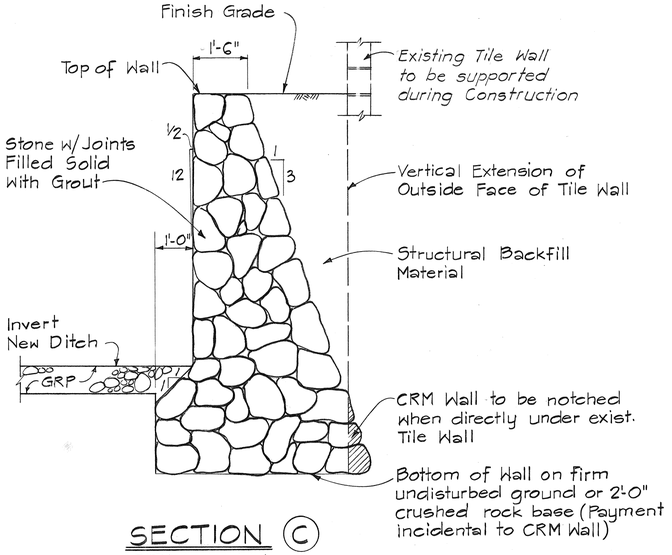
(DRAINLINE #26; AT NC (WB) STA. 52+03)

INTERSTATE ROUTE H-1
PROJECT NO. I-H1-1(131):17

SCALE: AS SHOWN DATE: AUG. 31, 1977

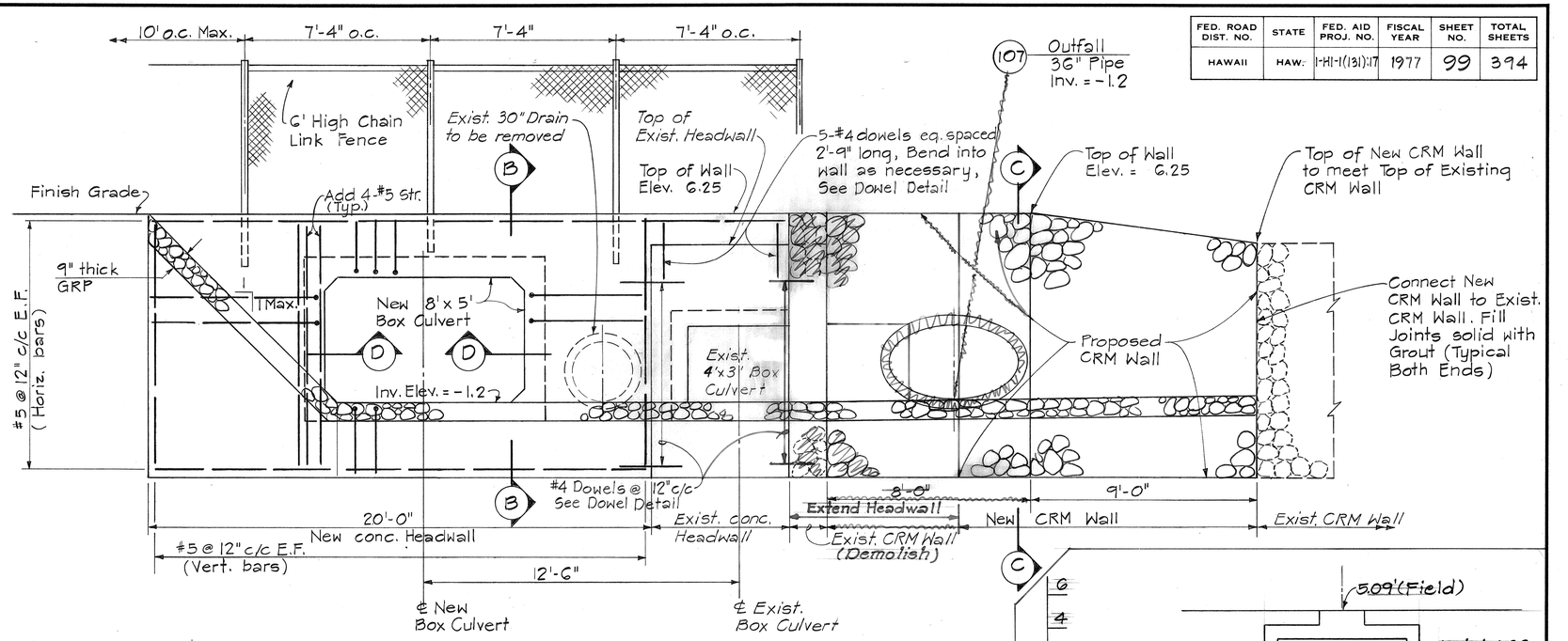
SHEET No. 1 OF 17 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(13I):17	1977	99	394



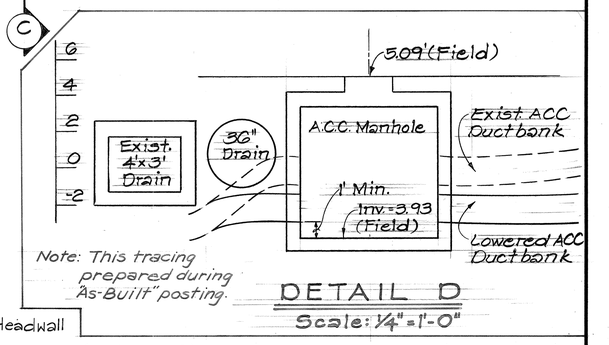
SECTION (C) CRM WALL

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



ELEVATION (A) DRAINAGE STRUCTURES #107 & #108

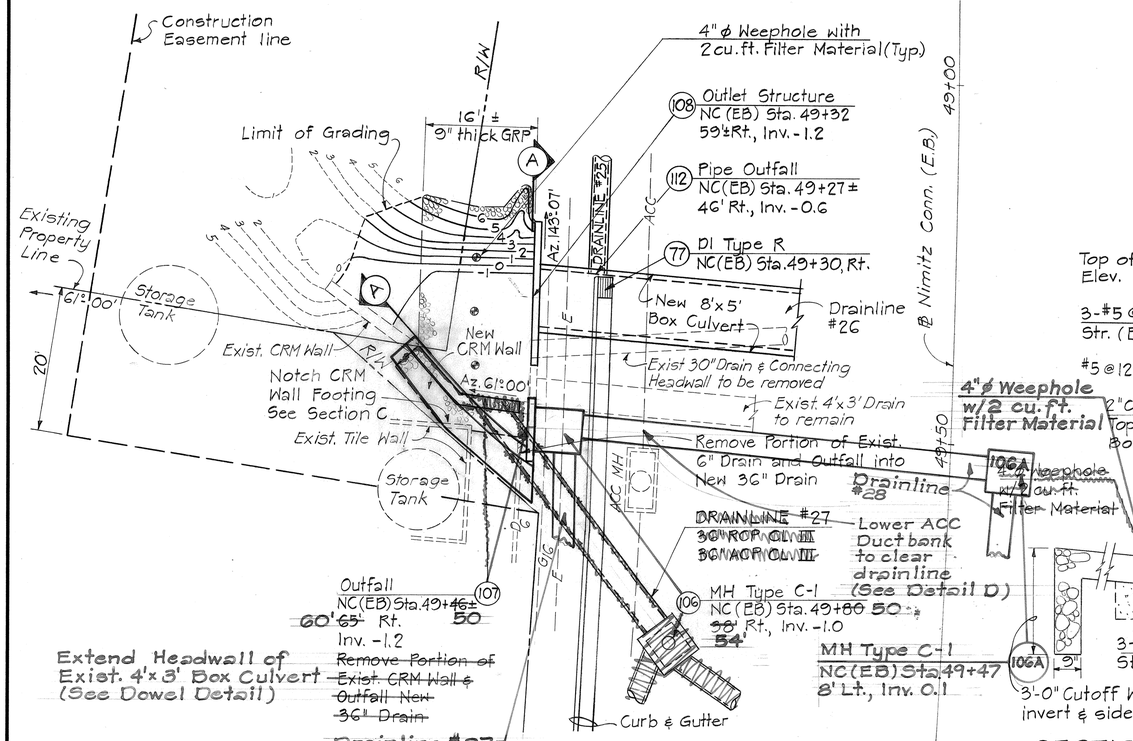
Scale: 3/8" = 1'-0"



Note: This tracing prepared during As-Built" posting.

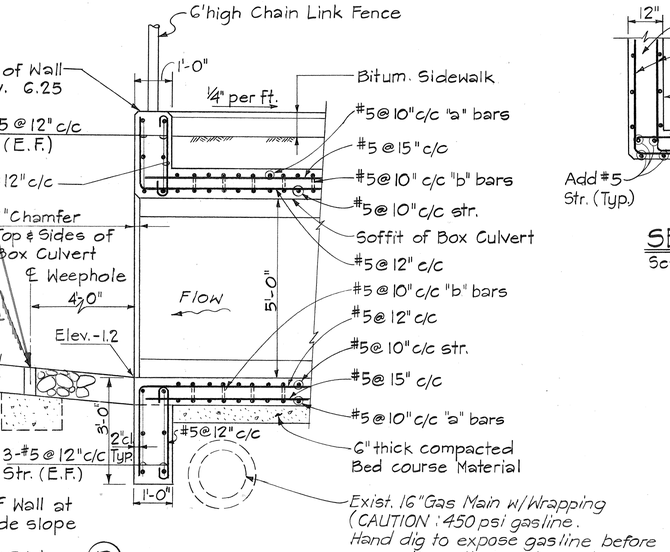
DETAIL D

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



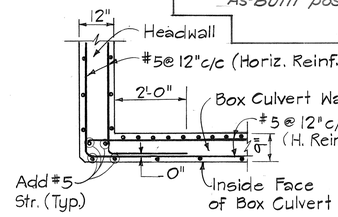
PLAN - DRAINAGE STRUCTURES #107 & #108

Scale: 1" = 10'-0"



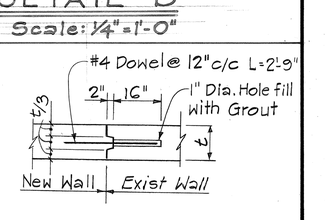
SECTION (B) DRAINAGE STRUCTURE #108

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



SECTION (D)

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



DOWEL DETAIL

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

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

WERNER BEUGGERT REGISTERED PROFESSIONAL ENGINEER No. 3383-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

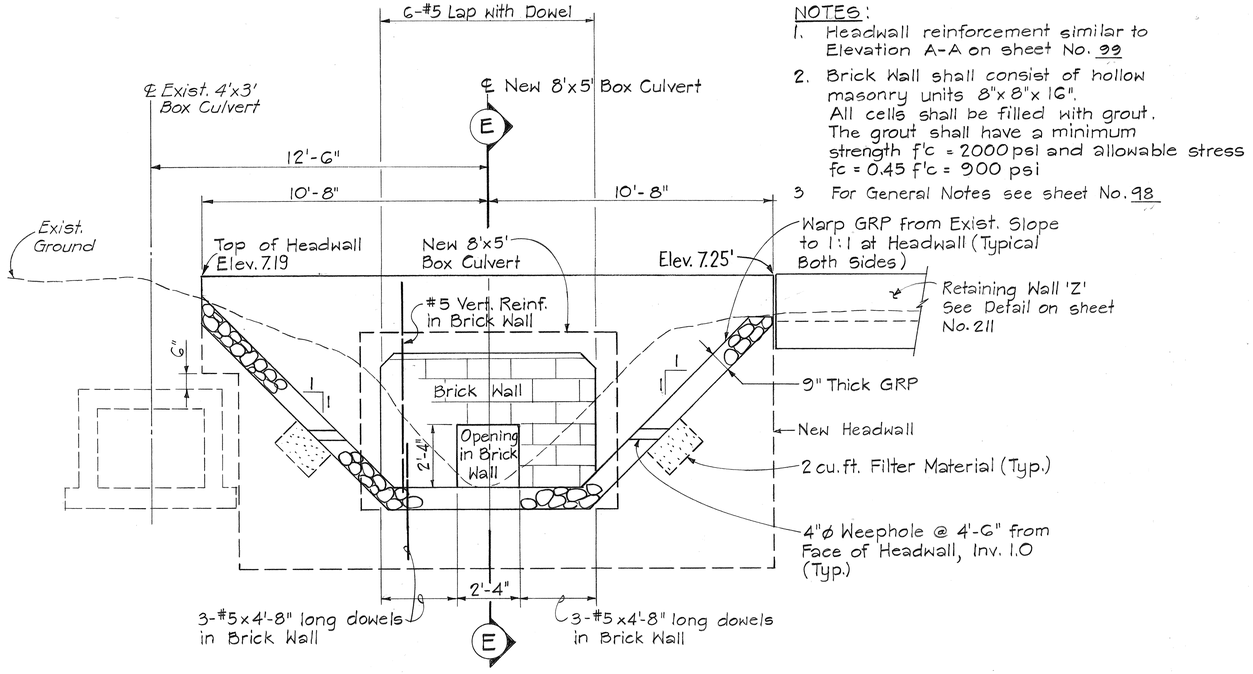
8' x 5' BOX CULVERT
(DRAINLINE #26, AT N.C.(WB) STA. 52+03)

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(131):17

SCALE: AS SHOWN DATE: AUG. 31, 1977

SHEET No. 2 OF 17 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1((13)):17	1977	100	394

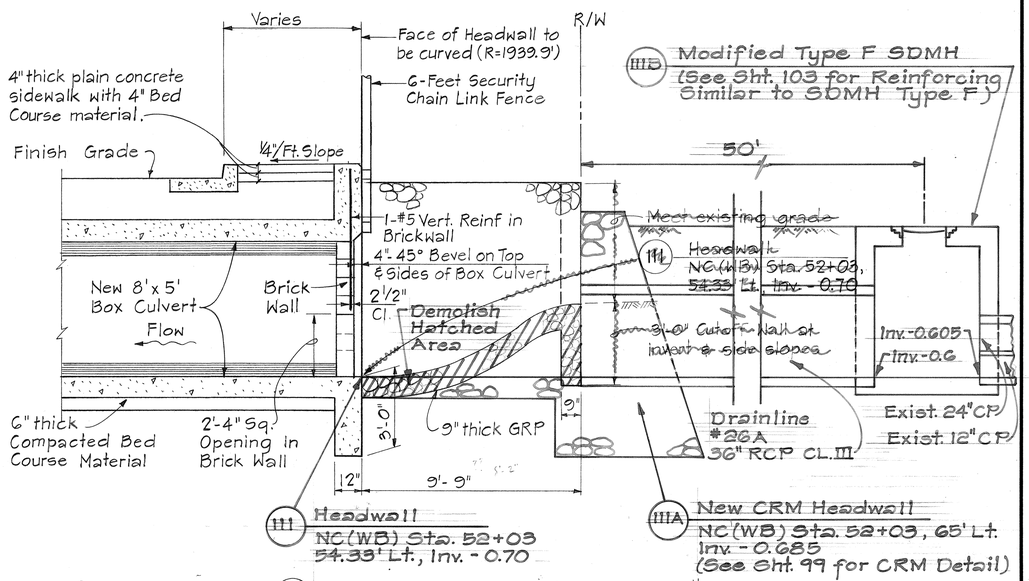


NOTES:

1. Headwall reinforcement similar to Elevation A-A on sheet No. 99
2. Brick Wall shall consist of hollow masonry units 8"x8"x16". All cells shall be filled with grout. The grout shall have a minimum strength f'c = 2000 psi and allowable stress fc = 0.45 f'c = 900 psi
3. For General Notes see sheet No. 98

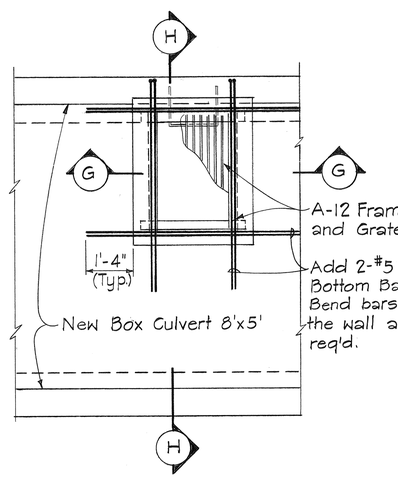
ELEVATION - DRAINAGE STRUCTURE #111

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

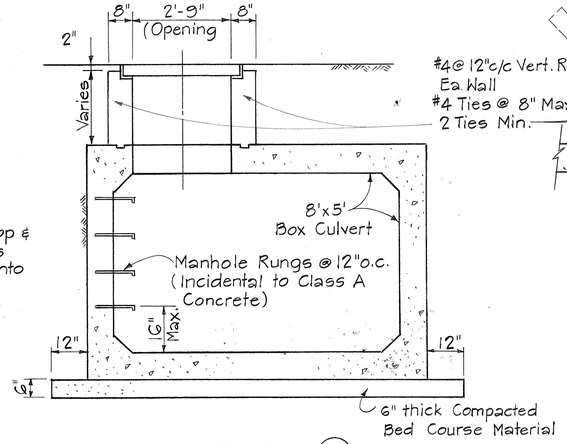


SECTION (E) DRAINAGE STRUCTURE #111 AND #111B

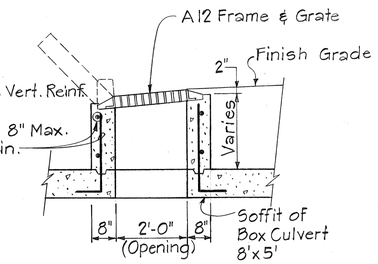
Scale : 3/8" = 1'-0"



PLAN



SECTION (H)

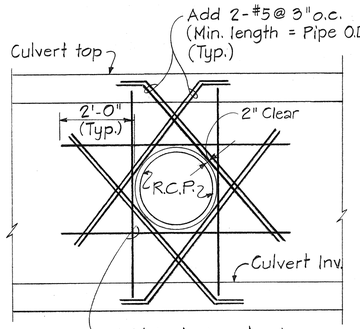


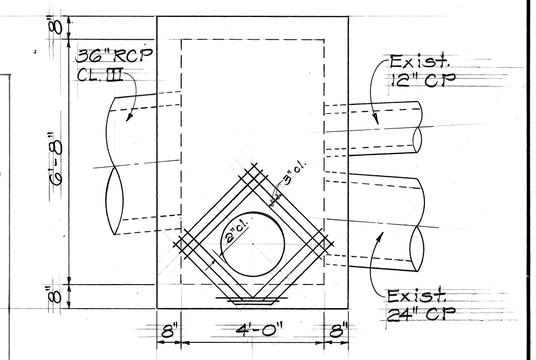
SECTION (G)

DROP INTAKE TYPE R

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

Note: This tracing prepared during "As-Built posting.





PLAN - DRAINAGE STR. #111B

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

PIPE OUTFALL No. 112 & 112A

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

WERNER BEUGGERT REGISTERED PROFESSIONAL ENGINEER No. 3383-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Werner Beuggert

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

8' x 5' BOX CULVERT
(DRAINLINE #26, AT N.C.(WB) STA.52+03)

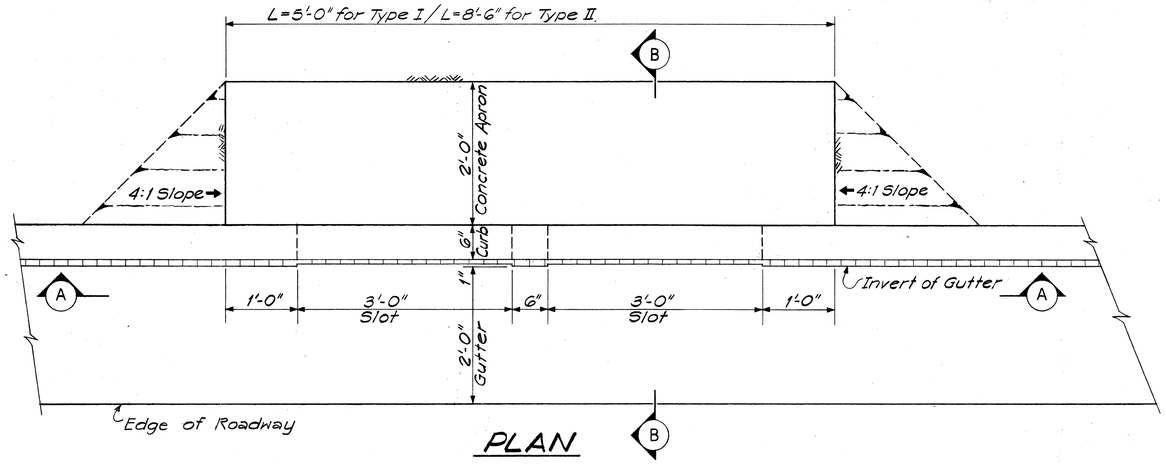
INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1 (131):17

SCALE: AS SHOWN DATE: AUG. 31, 1977

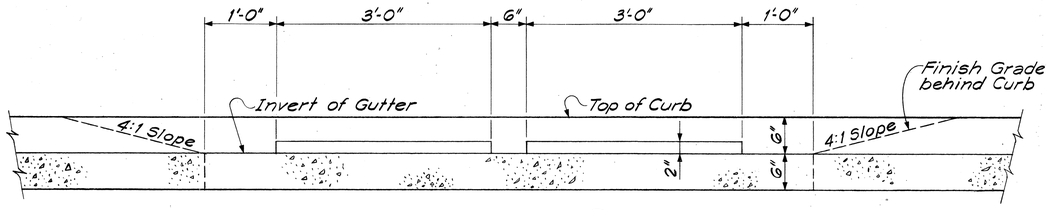
SHEET No. 3 OF 17 SHEETS

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

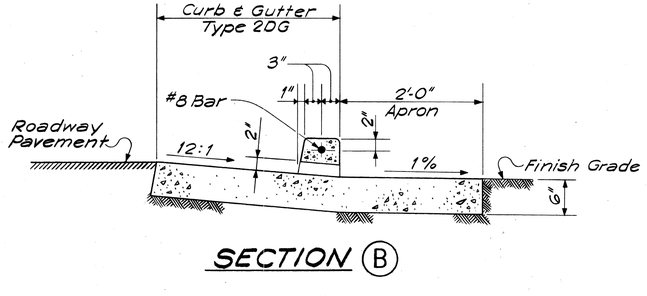
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(13I):17	1977	101	394



PLAN



SECTION (A)



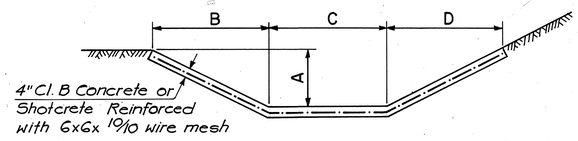
SECTION (B)

NOTES:

1. Curb Slot Type II is shown. Other type shall be the same except Type I shall have one slot.
2. Concrete shall be Class A.
3. #8 Bar shall be continuous over all slots. Embedment at each end shall be 2'-0".
4. Payment for Curb Slot, including apron and #8 bar, shall be considered incidental to "Curb & Gutter, Type 2DG"

CURB SLOT

SCALE: 1"=1'-0"

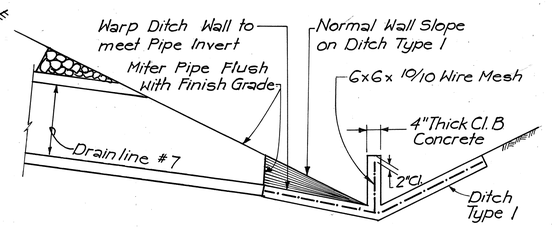


TYPE	A	B	C	D
1	1.5'	3.0'	0'	3.0'
2	1.5'	3.0'	2.5'	3.0'
3	1.5'	1.5'	1.5'	1.5'
4	0.5'	0.5'	0.5'	0

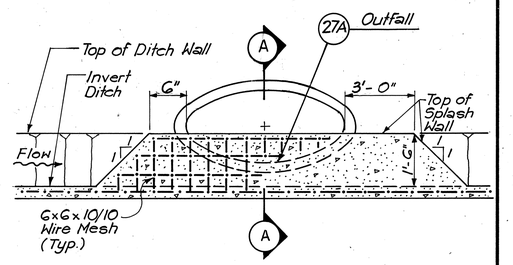
LINED DITCHES

NOTES:

1. Contractor may substitute Lined Ditches of other shapes and of equal or greater capacity if approved by the Engineer. Payment will be on the original Ditch as shown on the Plans.
2. Ditch Transitions shall be paid under the adjacent downstream Ditch Type.
3. Excavation for Ditches shall be paid under Roadway Excavation.
4. Payment for splash wall shall be considered incidental to ditch.



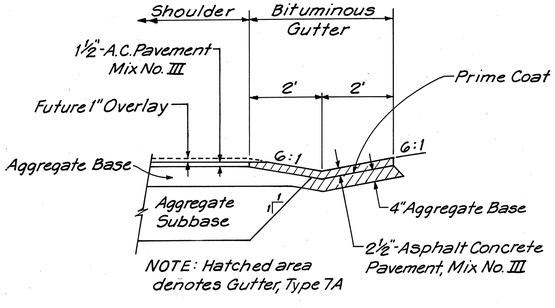
SECTION (A)



PROFILE ALONG DITCH INVERT

SPLASH WALL IN DITCH

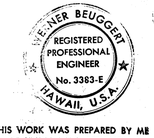
(DRAINLINE #8)
Scale: 1/2" = 1'-0"



GUTTER TYPE 7A

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

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



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Werner Beuggert

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

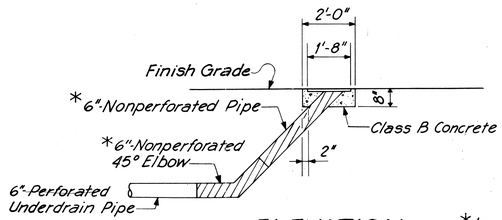
INTERSTATE ROUTE H-1
PROJECT NO. I-H1-1(131):17

SCALE: As shown DATE: AUG. 31, 1977

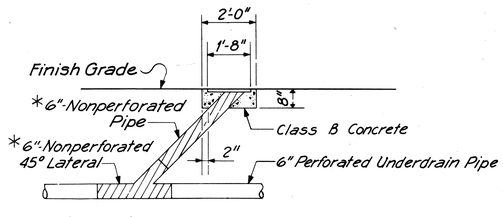
SHEET No. 4 OF 17 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	102	394

NOTE:
Steel plate cover shall be fastened to the concrete with two 1/4" F.H. Galvanized Machine Screws in diagonally opposite corners of the plate. Holes in plate are to be countersunk and the anchors in the concrete maybe insert-type or metal drilled-in type.

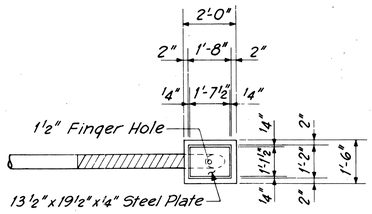


ELEVATION

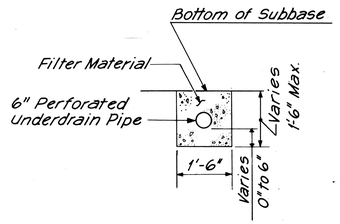


*Incidental to Cleanout

ELEVATION



PLAN

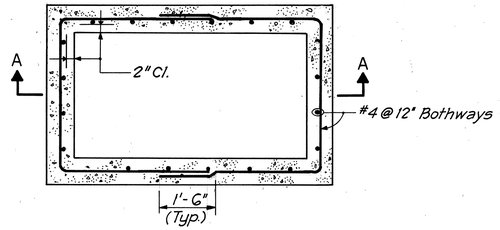


TYPICAL UNDERDRAIN SECTION

UNDERDRAIN CLEANOUT DETAILS

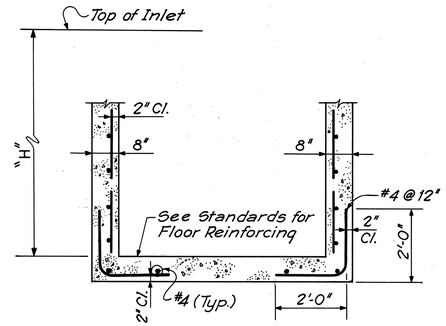
Scale: 3/8" = 1'-0"

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



PLAN SECTION

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

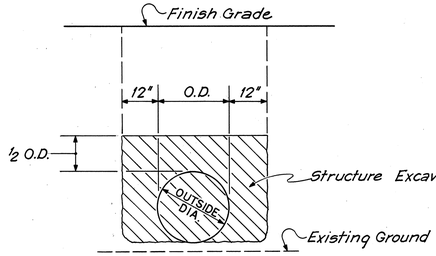


SECTION A-A

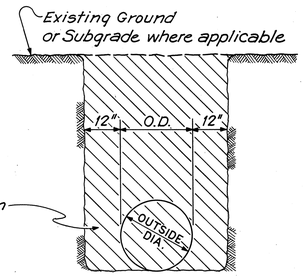
Scale: 1/2" = 1'-0"

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

(Applies only to Structures shown on Standard Detail Drawings and Drop Intake Type A, B, C & D)



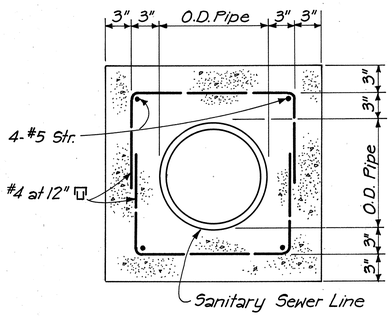
FILL SECTION



CUT SECTION

TRENCH EXCAVATION PAY LIMIT

N.T.S.

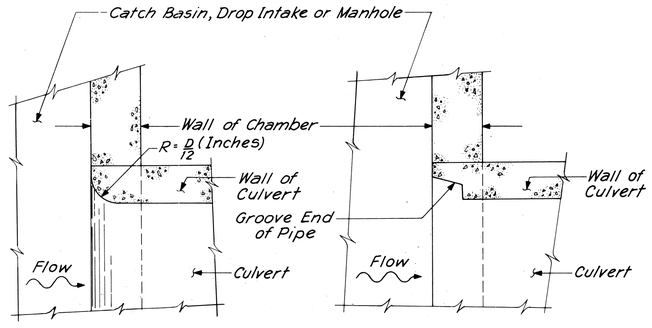


CROSS-SECTION OF SEWER LINE

NOTE:
Where drain line crosses sewer line, cover sewer line with concrete jacket where shown on Plans.

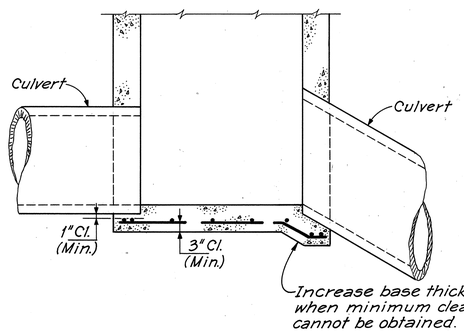
REINFORCED CONCRETE JACKET DETAIL FOR SEWER MAIN

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



TYPICAL DETAILS FOR CULVERTS EXITING A CATCH BASIN, DROP INTAKE OR MANHOLE

N.T.S.



SECTION

TYPICAL DETAIL FOR MINIMUM INLET BASE THICKNESS

N.T.S.

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

WERNER BEUGGERT
REGISTERED PROFESSIONAL ENGINEER
No. 3383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

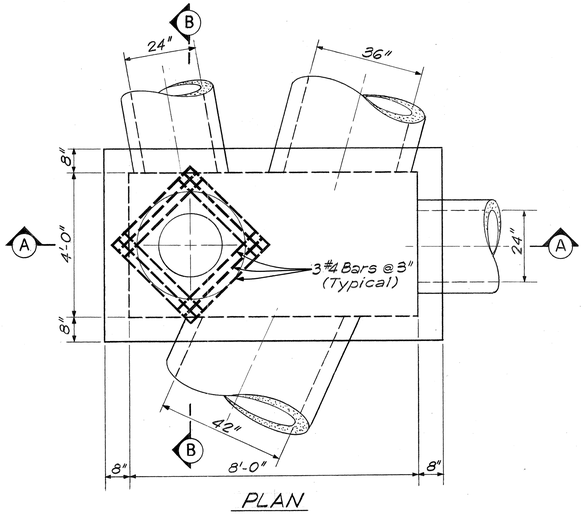
DRAINAGE DETAILS

INTERSTATE ROUTE H-1
PROJECT NO. I-H1-1(131):17

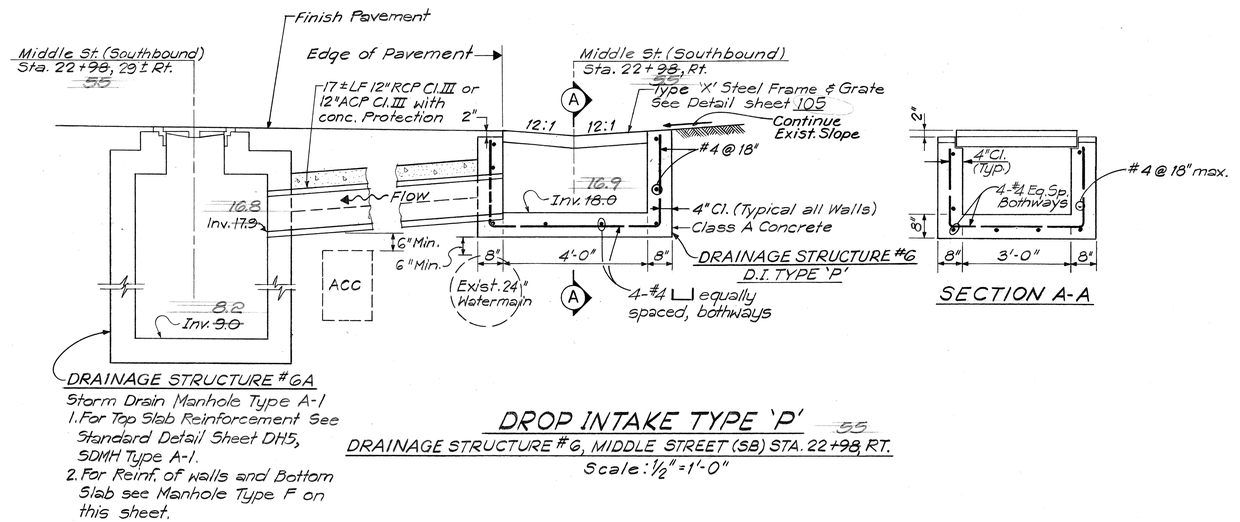
SCALE: AS SHOWN DATE: AUG 31, 1977

SHEET NO. 5 OF 17 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	103	394



PLAN



Storm Drain Manhole Type A-1

1. For Top Slab Reinforcement See Standard Detail Sheet DH5, SDMH Type A-1.
2. For Reinf. of Walls and Bottom Slab see Manhole Type F on this sheet.

DROP INTAKE TYPE 'P'

55

DRAINAGE STRUCTURE #6, MIDDLE STREET (SB) STA. 22+98, RT.

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

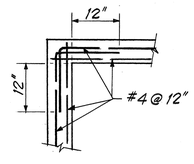
SECTION A-A

NOTES

1. For General Notes see Standard Detail Sheet DH8.
2. Reinforced Concrete Design Data :
   f'c = 3000 psi (28 days)
   fs = 20,000 psi
   Deformed Bars
3. For Splices not detailed, overlap bars 24 Bar Diameter or 12" minimum; Stagger all Splices as approved by the Engineer.
4. Reinforcing Steel for Beams are to be 1 1/2" clear from Forms.
5. Provide 2-#4 bent bars ⌒ top & bottom around pipe openings.
6. All Concrete shall be Class "A" unless otherwise noted.

SECTION A-A

SECTION B-B

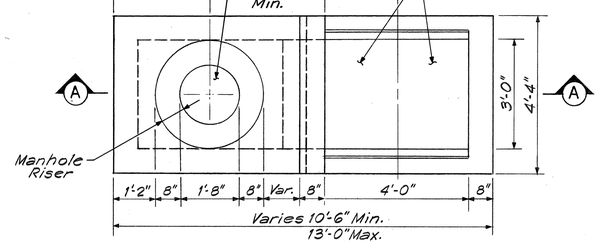


PLAN VIEW
TYPICAL CORNER DETAIL
N.T.S.

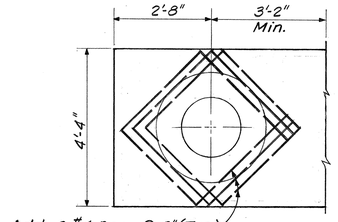
STORM DRAIN MANHOLE TYPE 'F'

DRAINAGE STRUCTURE #10, MIDDLE STREET (SB) STA. 16+90

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



PLAN



PLAN OF REINFORCEMENT OF ROOF SLAB AT MANHOLE RISER
(For Slab Reinforcement, See Section A-A)

SECTION A-A

DROP INTAKE TYPE 'K'

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

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

WERNER BEUGGERT
REGISTERED PROFESSIONAL ENGINEER
No. 3383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Werner Beuggert

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

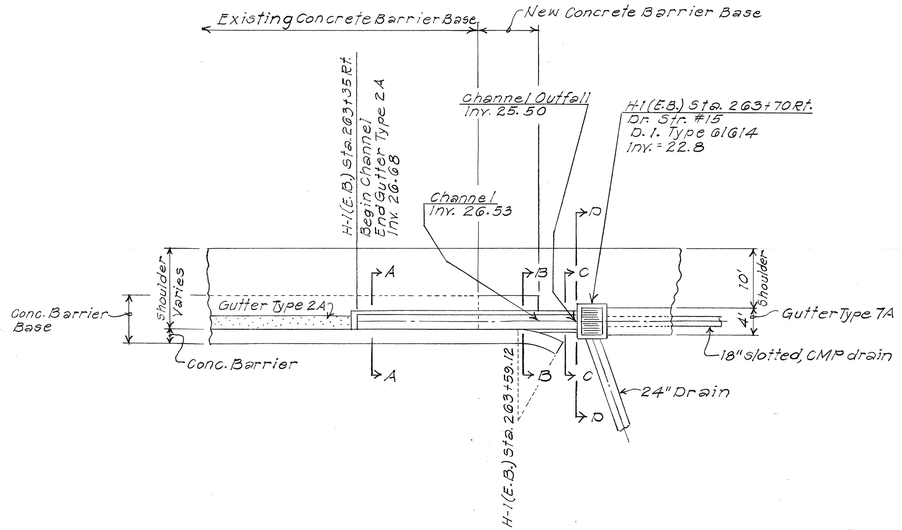
DRAINAGE DETAILS

INTERSTATE ROUTE H-1
PROJECT NO. I-H1-1(131):17

SCALE: AS SHOWN DATE: AUG. 31, 1977

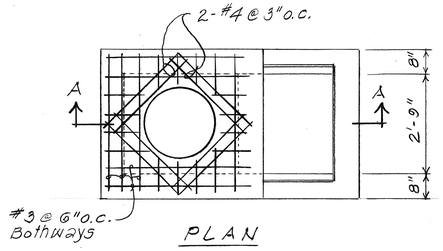
SHEET No. 6 OF 17 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1971	103 S-1	394

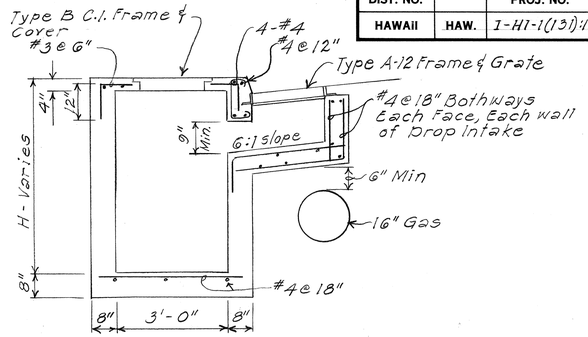


PLAN - DRAINAGE CHANNEL NEAR DR. STR. #15

Scale: 3/32" = 1'-0"



PLAN

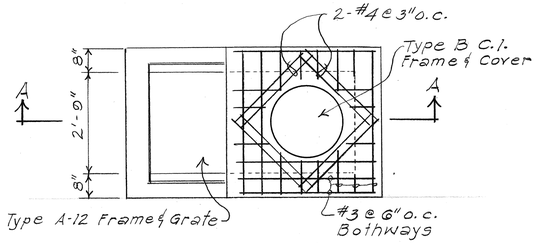


SECTION A - A

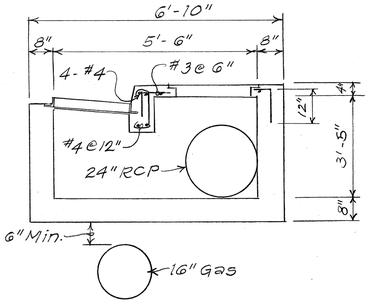
MODIFIED DROP INTAKE TYPE Z

For Drainage Str. Nos. 74 to 76, 78 to 84

N. T. S.



PLAN

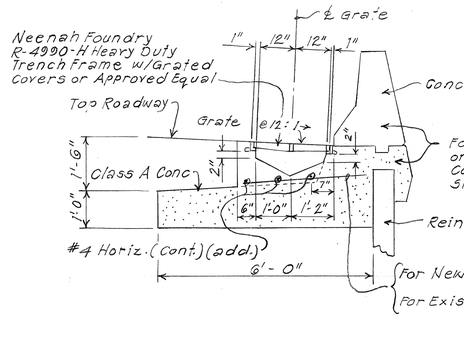


SECTION A-A

MODIFIED DROP INTAKE TYPE Z-1

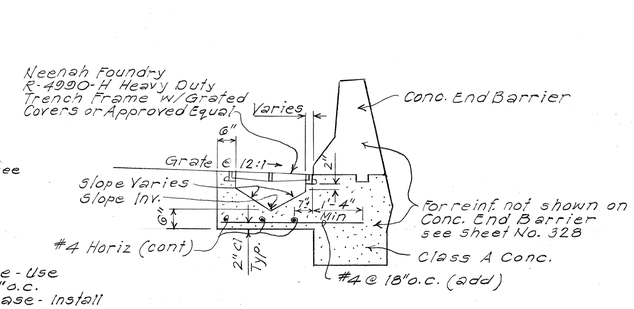
Drainage Str. #85

N. T. S.



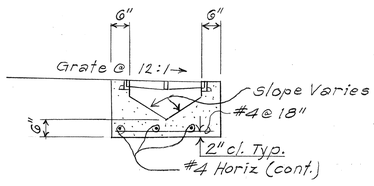
SECTION A-A

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



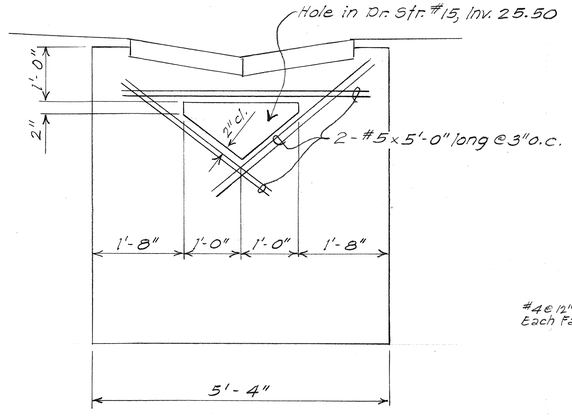
SECTION B-B

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



SECTION C-C

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

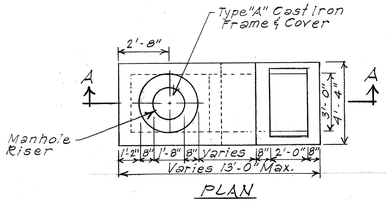


SECTION D-D

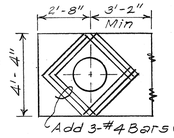
Scale: 3/4" = 1'-0"

DRAINLINE #3 24" WIDE GRATED VEE CHANNEL

H-1 (E.B.) STA. 263 + 25

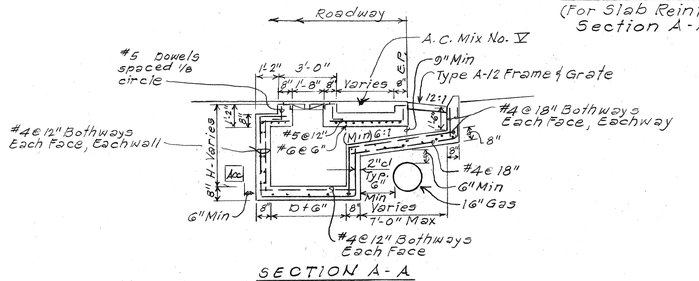


PLAN



PLAN OF REINFORCEMENT OF ROOF SLAB AT MANHOLE RISER

(For Slab Reinforcement, See Section A-A)



SECTION A-A

MODIFIED DROP INTAKE TYPE K

For Drainage Str Nos. 71, 72 & 73

N. T. S.

NOTE: This Sheet added in As-Built Plans by Resident Engineer.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

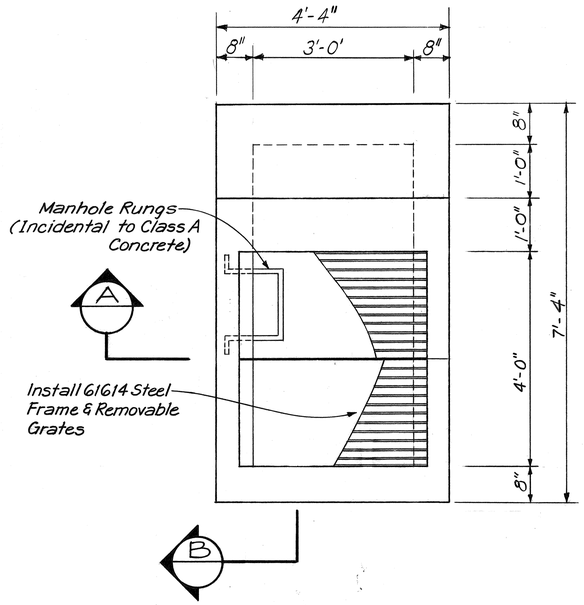
INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1 (131):17

SCALE: AS SHOWN DATE: 10/6/80

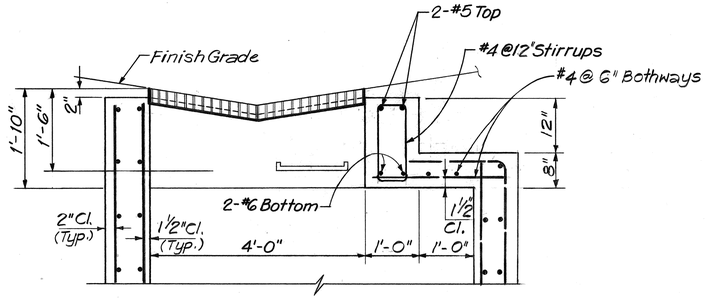
SHEET No. 6A OF 17 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	104	394



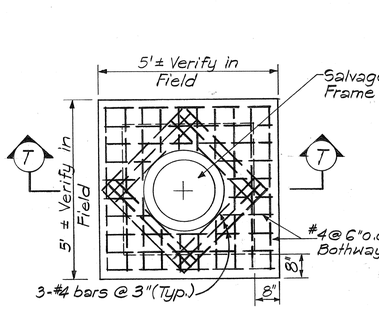
PLAN
Scale: 3/4"=1'-0"



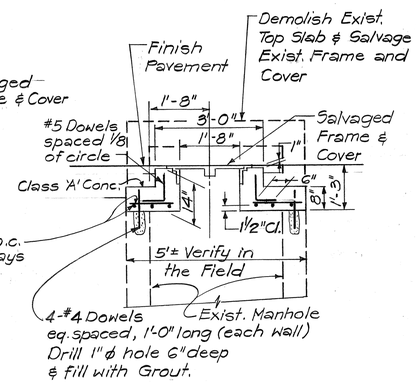
SECTION (B)
Scale: 3/4"=1'-0"

NOTES:

1. For General Notes see Standard Detail Sheet DH8
2. Reinforced Concrete Design Data : f'c = 3000 psi (28 days)
   fs = 20,000 psi
   Deformed Bars
3. For Splices not detailed, Overlap Bars 24 Bar Diameter or 12" Minimum ; Stagger all Splices as approved by the Engineer
4. Reinforcing Steel for Beams are to be 1½" clear from Forms.
5. Provide 2-#4 bent bars ⌒ Top and Bottom ~~Ground~~ Around Pipe Openings.
6. All concrete shall be class "A", unless otherwise noted.



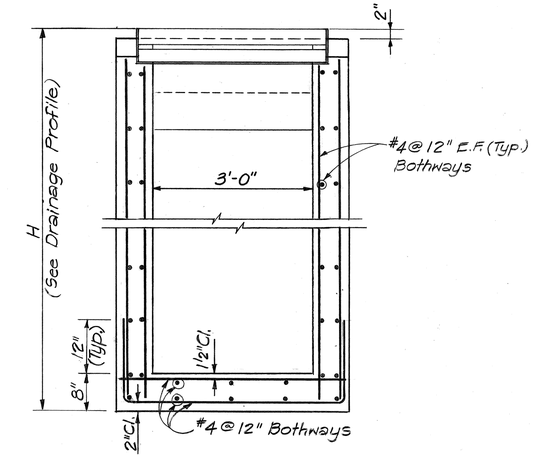
PLAN



SECTION T-T

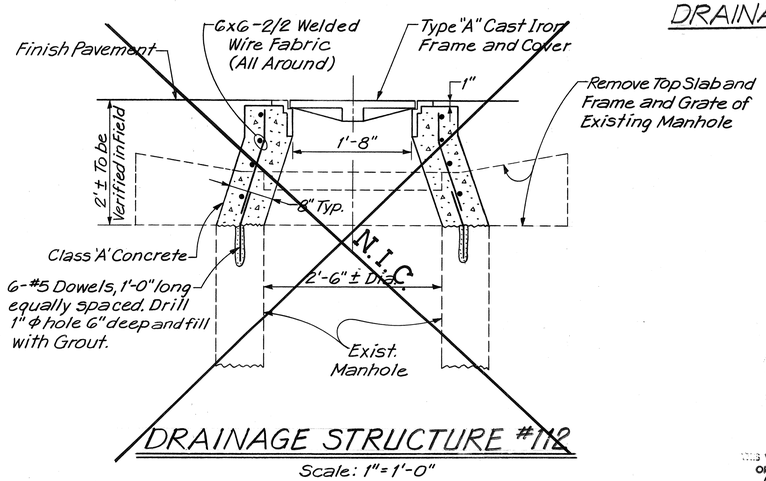
DRAINAGE STRUCTURES #60 & #61

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



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

DETAILS OF D.I. TYPE L



DRAINAGE STRUCTURE #118

Scale: 1"=1'-0"

REINER BEUGGERT
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No. 3383-E
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THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Reiner Beuggert

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

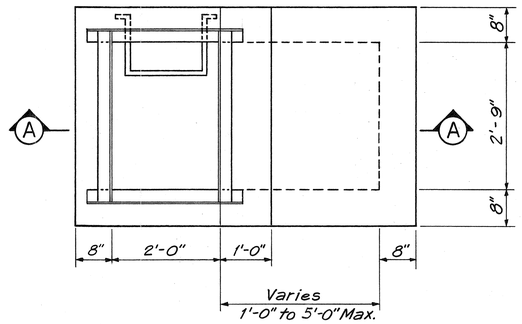
KEEHI INTERCHANGE
PROJECT NO. I-HI-1(131):17

Scale: As Shown Date: Aug. 31, 1977

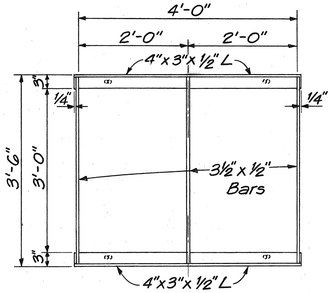
SHEET No. 7 OF 17 SHEETS

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

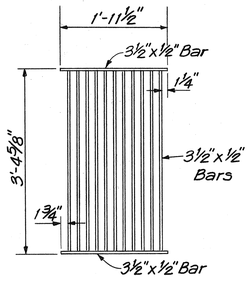
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(130):17	1977	105	394



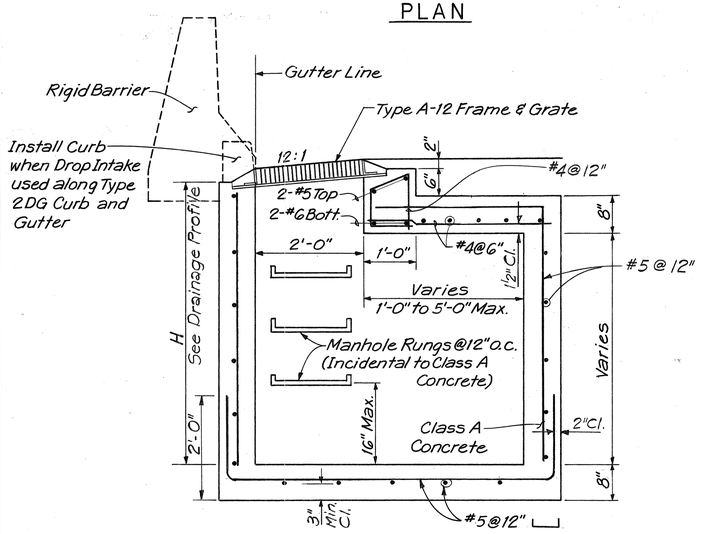
PLAN



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



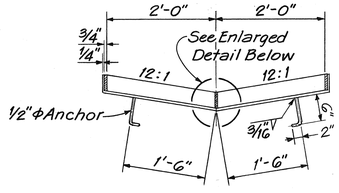
PLAN
SCALE: 3/4"=1'-0"



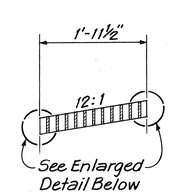
SECTION A-A

DETAILS OF DROP INTAKE TYPE Z

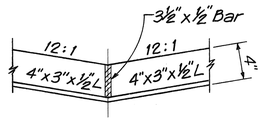
SCALE: 3/4"=1'-0"



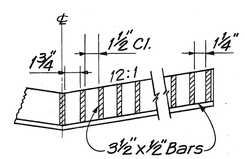
SECTION
SCALE: 3/4"=1'-0"



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



FRAME
SCALE: 1½"=1'-0"

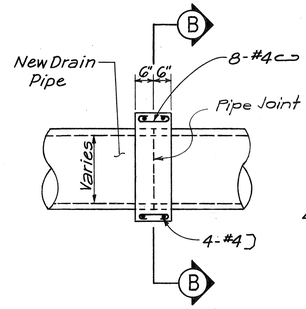


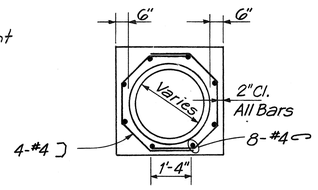
GRATE
SCALE: 1½"=1'-0"

TYPE 'X' FRAME AND GRATE

GENERAL NOTES:

1. Grates and Frames shall be hot dip galvanized after fabrication. See specifications.
2. All welds 3/8" unless otherwise noted.
3. The Frame and Grate materials shall conform to the specifications of ASTM Designation Structural Steel A283, Grade D and the Standard Specifications.
4. Culvert shall leave Drop Intake from any position and any direction indicated by plans or ordered by the Engineer. Culverts may both enter and leave Drop Intake so that Drop Intake will act as Manhole.
5. Manhole Rungs (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.
6. For General Notes of Concrete and Reinforcing Steel, See Sheet No. ~~114~~ 104

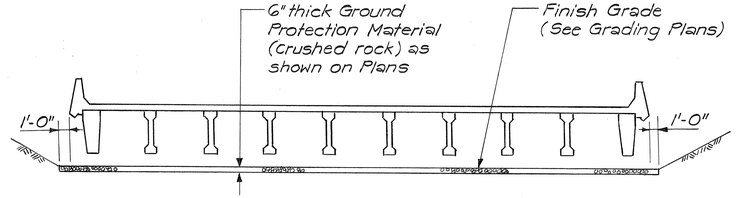




SECTION B-B

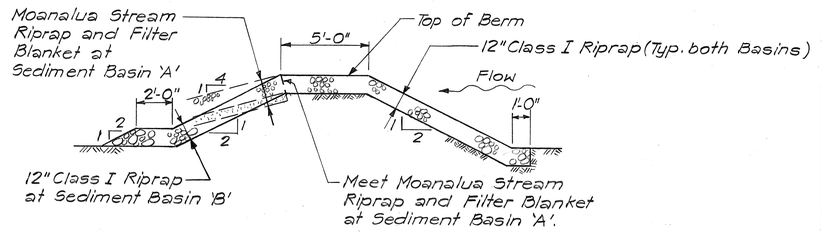
CONCRETE COLLAR

N.T.S.



GROUND PROTECTION UNDER STRUCTURES

N.T.S.



RIPRAP FOR SEDIMENT BASINS

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

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

WERNER BEUGGERT
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No. 3383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Werner Beuggert

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

KEEHI INTERCHANGE
PROJECT NO. I-HI-1(131):17

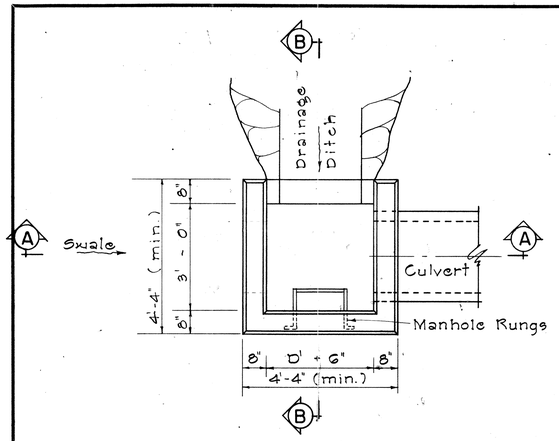
Scale: As Shown Date: Aug. 31, 1977

SHEET No. 8 OF 17 SHEETS

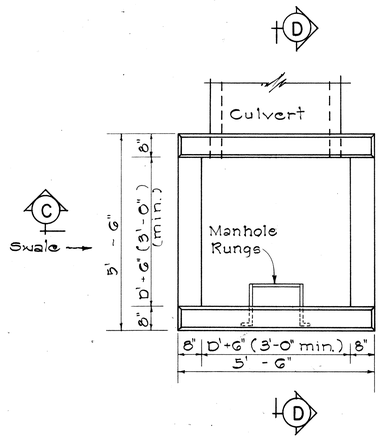
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	106	394

GENERAL NOTES

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



PLAN



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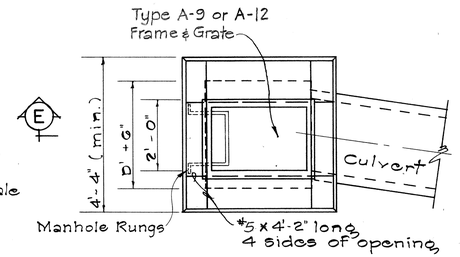

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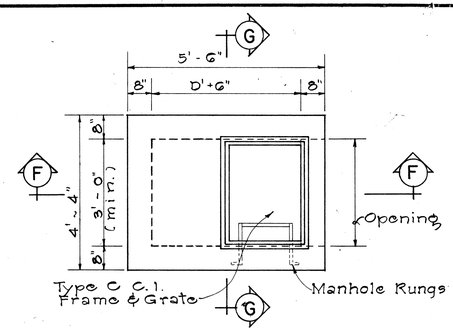
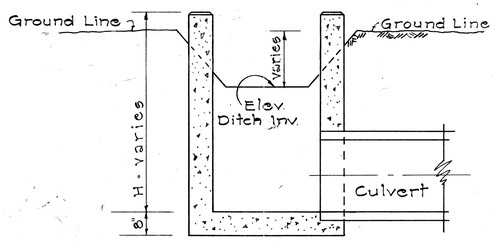
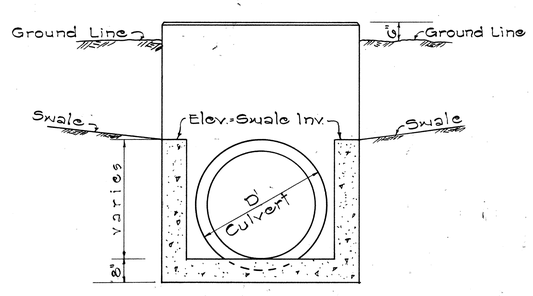


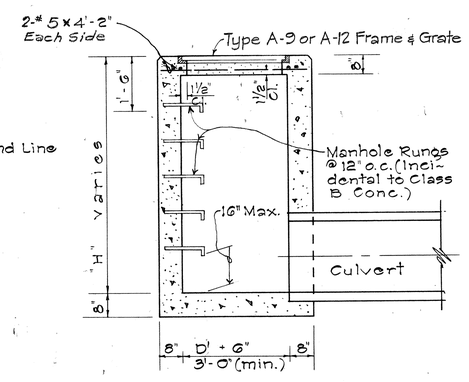
PLAN



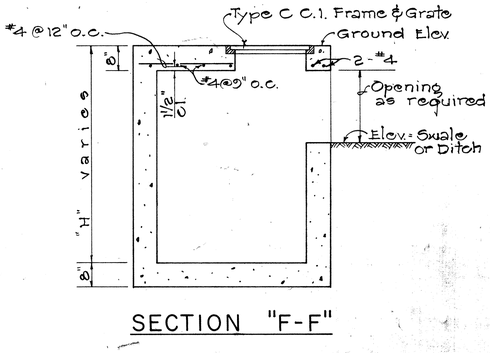
SECTION "A-A"



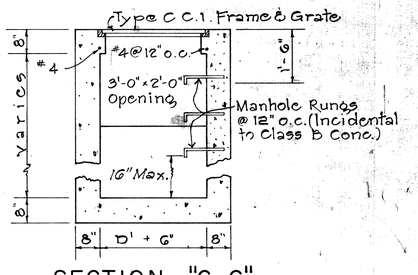
SECTION "C-C"



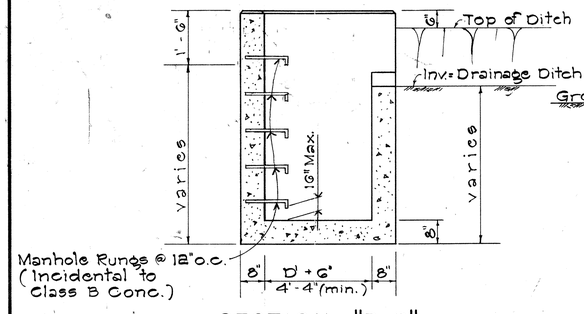
SECTION "E-E"



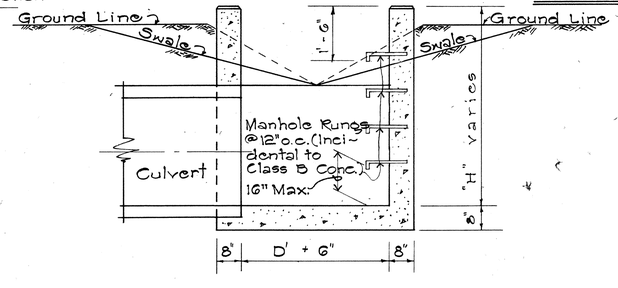
SECTION "F-F"



SECTION "G-G"



SECTION "B-B"



SECTION "D-D"

TYPE "A" CONCRETE DROP INTAKE

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

TYPE "B" CONCRETE DROP INTAKE

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

TYPE "C" GRATED CONCRETE DROP INTAKE

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

TYPE "D" GRATED CONCRETE DROP INTAKE

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

NO.	REVISION	APPROVED BY	DATE

WERNER BEUGGERT
REGISTERED PROFESSIONAL ENGINEER
No. 3383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "A", "B", "C", AND "D" CONCRETE DROP INTAKE

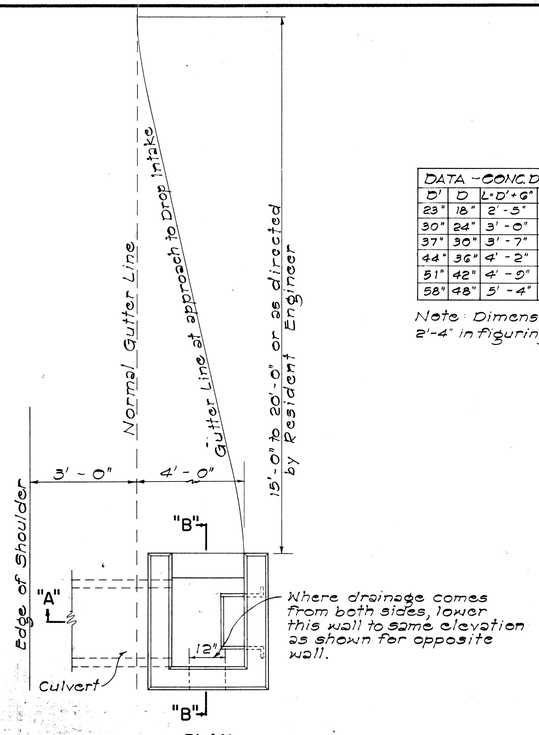
INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(131):17

Scale: As Noted Date: Aug. 31, 77

SHEET No. 9 OF 17 SHEETS

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

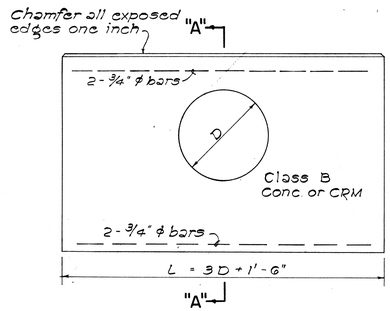
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	107	394



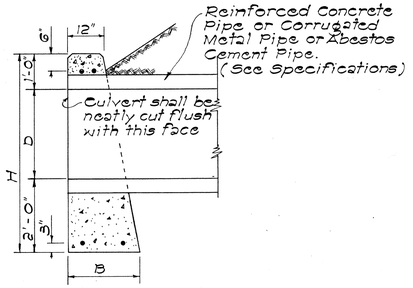
PLAN

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

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

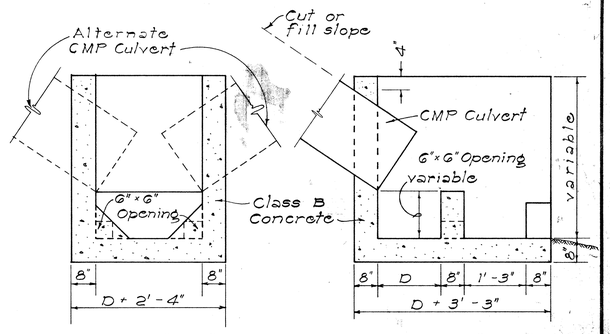


ELEVATION



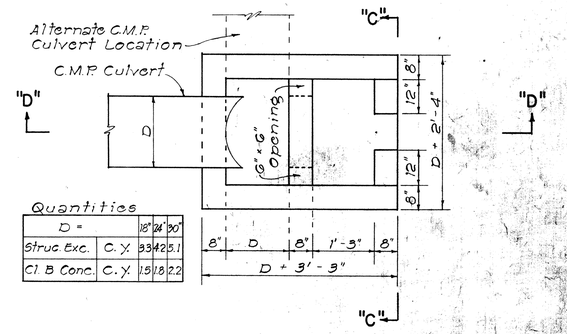
SECTION "A-A"

DATA FOR CONC. HEADWALL				Cl B CONC FOR R C P	Cl B CONC FOR C M P	Steel For One Headwall			
D	B	L	H	Cu. Yd.	Cu. Yd.	No. of Bars	Size	Length	Lbs.
18"	1'-6"	6'-0"	4'-6"	1.12	1.17	4	¾" ϕ	5'-6"	33
24"	1'-6"	7'-6"	5'-0"	1.52	1.60	4	¾" ϕ	7'-0"	42
30"	2'-0"	9'-0"	5'-6"	2.36	2.49	4	¾" ϕ	8'-6"	51
36"	2'-0"	10'-6"	6'-0"	2.94	3.13	4	¾" ϕ	10'-0"	60
42"	2'-6"	12'-0"	6'-6"	4.19	4.47	4	¾" ϕ	11'-6"	69
48"	2'-6"	13'-6"	7'-0"	5.01	5.36	4	¾" ϕ	13'-0"	78



SECTION "C-C"

SECTION "D-D"



Quantities

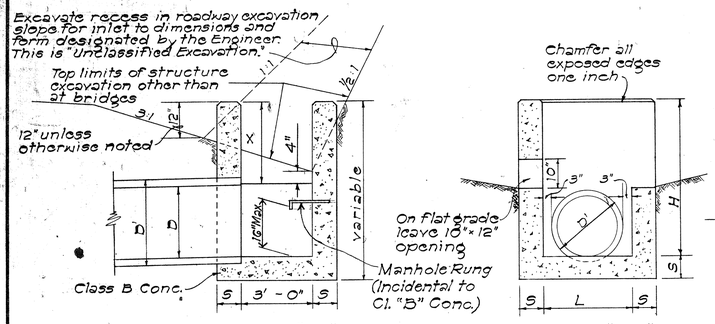
D =		18"	24"	30"
Struc Exc.	C.Y.	33	42	51
Cl B Conc.	C.Y.	15	18	22

PLAN

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

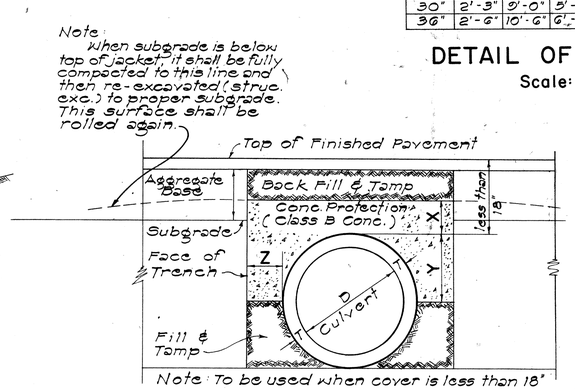
DETAIL OF HEADWALL

Scale: ½" = 1'-0"



SECTION "A-A"

SECTION "B-B"



DETAIL OF CONCRETE DROP INTAKE

Scale: ½" = 1'-0"

GENERAL NOTES

1. Culvert shall enter and leave Drop Intake from any position and in the direction indicated by the plans or ordered by the Engineer.
2. D' shall be the maximum outside dimension of the culvert at the Drop Intake wall.
3. Manhole Rungs (12"o.c.) are required when "H" is greater than 4 feet 6inches. Only one rung (16 inches from the bottom) is required if "H" is 4 feet 6inches or less. Manhole Rungs maybe placed at any location as ordered by the Engineer.

DATA FOR CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18" D	½D + T	Z must be from pipe to face of trench
7" for 24" D		
8" for 30" D		Minimum = X
9" for 36" D		
10" for 42" D		Maximum pay quantity will be Z = 12"
11" for 48" D		
12" for 54" D		
5" for 12" D		

SECT. OF CULVERT WITH CONC. PROTECTION

Scale: 1" = 1'-0"

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

WERNER BEUGGERT REGISTERED PROFESSIONAL ENGINEER No. 3383-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Werner Beuggert

DATE

NO.	REVISION	APPROVED BY	DATE

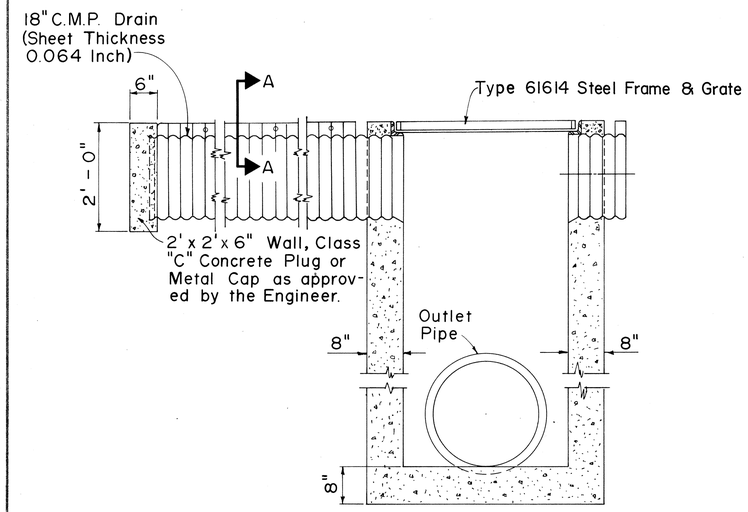
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DROP INTAKE, HEADWALL & CONCRETE PROTECTION

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1 (131)::17
Scale: As Noted. Date: Aug. 31, 1977

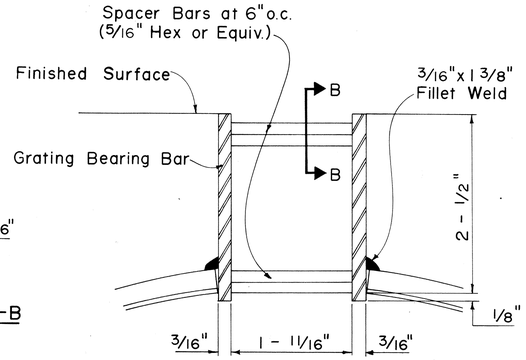
SHEET No. 10 OF 17 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	108	394



MEDIAN DRAIN INLET STRUCTURE

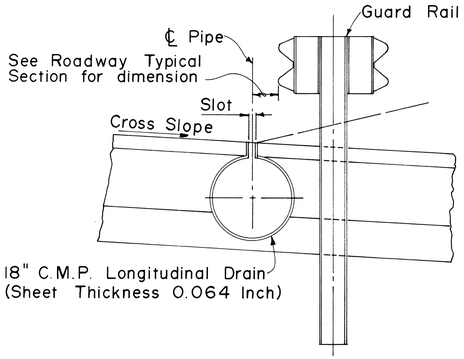
SECTION B-B



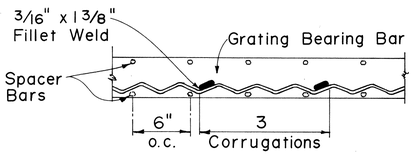
SECTION A-A

GENERAL NOTES

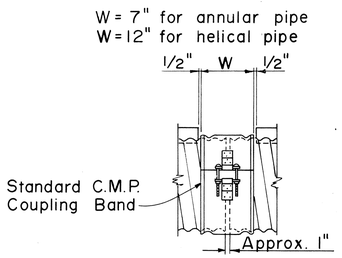
1. All bolts, nuts, angles, grate slots, coupling bands and welded connections shall be galvanized.
2. Drain seams may be riveted or resistance spotwelded at equal centers, continuous helical lock seam or continuous helical welded seam.
3. The slot shall be covered during backfilling operations to prevent infiltration of material into the pipe.
4. The slotted C.M.P. shall not be installed until after any P.C.C. pavement has been completed.
5. Cross bar spacer (Section B-B) may differ from 5/16" Hex Bar provided area is equal or greater. It shall be pressure or fusion welded to bearing bars.



TYPICAL CROSS SECTION



WELDING DETAIL



JOINT DETAIL

DETAILS OF 18" SLOTTED DRAIN

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

NO.	REVISION	APPROVED BY	DATE

WERNER BEUGGER
REGISTERED PROFESSIONAL ENGINEER
No. 3383-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

18" SLOTTED C.M.P. DRAIN

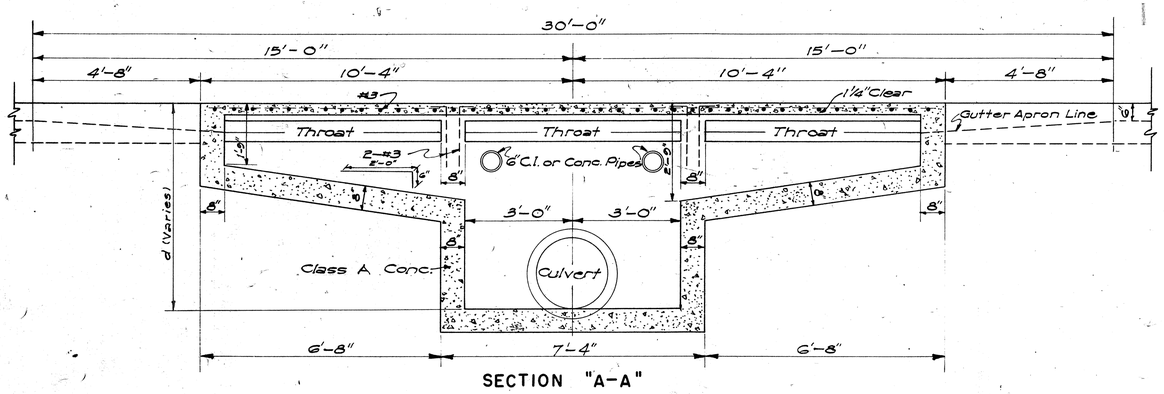
INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(131):17

Not To Scale Date: Aug. 31, 1977

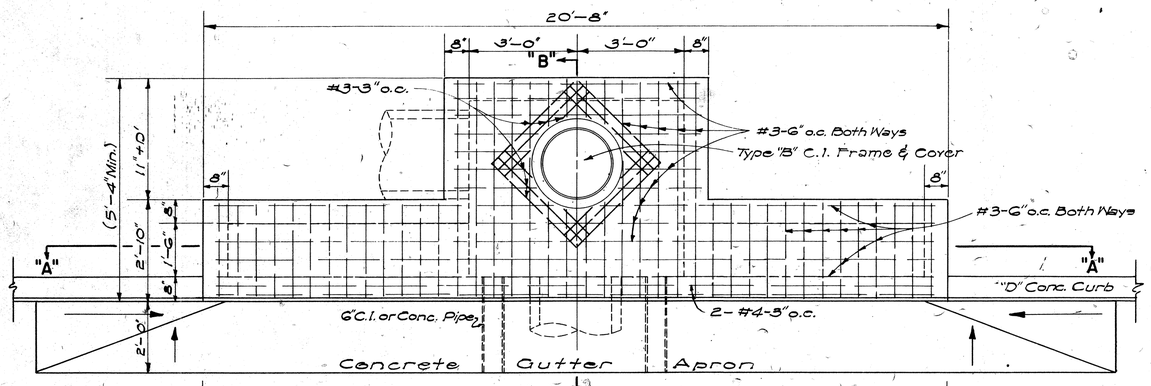
SHEET No. 11 OF 17 SHEETS

2/17/69

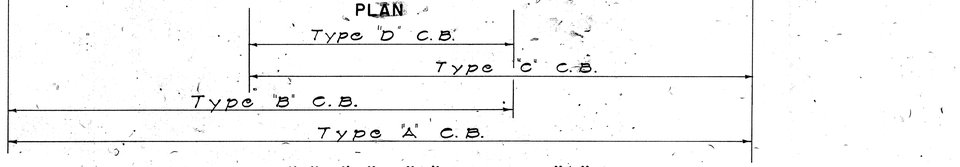
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(13)17	1977	109	394



SECTION "A-A"

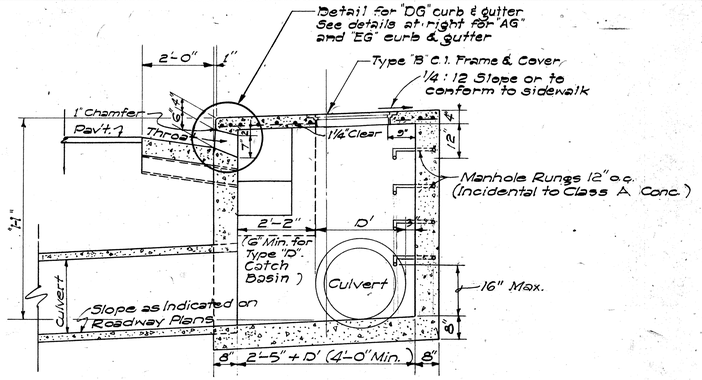


PLAN

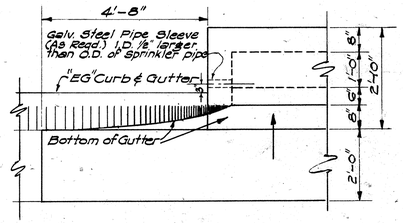


DETAILS OF TYPES "A", "B", "C" AND "D" CATCH BASINS

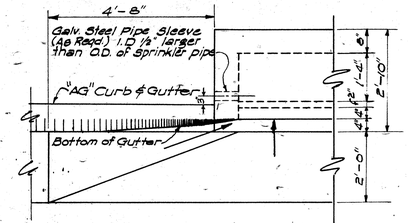
SCALE: 1/2"= 1'-0"



SECTION "B-B"

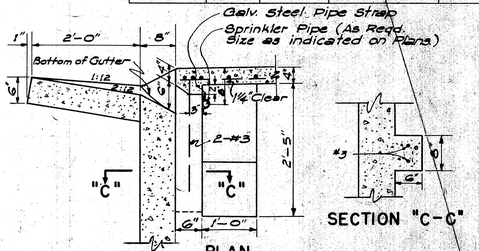


DETAIL OF CATCH BASIN WITH "EG" CURB & GUTTER



DETAIL OF CATCH BASIN WITH "AG" CURB & GUTTER

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

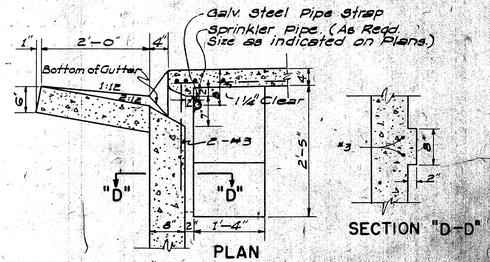


PLAN

SECTION "C-C"

THROAT DETAIL FOR "EG" CURB & GUTTER

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



PLAN

SECTION "D-D"

THROAT DETAIL FOR "AG" CURB & GUTTER

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

ESTIMATED QUANTITIES

Type	Class A Conc	Struct. Exc.	Reinf Steel	Gutter Length
"A"	7.5 c.y.	24.7 c.y.	145 lb.	30'-0"
"B"	6.0 c.y.	21.5 c.y.	108 lb.	23'-4"
"C"	6.0 c.y.	21.5 c.y.	108 lb.	23'-4"
"D"	4.9 c.y.	16.5 c.y.	77 lb.	16'-8"

GENERAL NOTES

1. Quantities based on d = 5.75' and D' = 30".
2. Quantities do not include concrete for Gutter Apron.
3. The Contractor shall install two 6" Cast Iron or Concrete Pipes as incidental to Class A Concrete for Construction Drainage. The Engineer shall determine the exact location in the field.
4. Culvert shall leave C.B. from any position and any direction indicated by plans or ordered by the Engineer. Culvert may both enter and leave C.B. so that C.B. will also act as Manhole.
5. The Contractor shall install Galvanized Steel Pipe Sleeves and Straps as incidental to Sprinkler System.
6. The type of curb and/or gutter (Type 1, 2, 3, etc.) shall conform to the type specified on the roadway plans.
7. Manhole Rungs (12" o.c.) are required when "H" is greater than 4 Feet 6 inches. Only one rung (16 inches from the bottom) is required if "H" is 4 Feet 6 inches or less. Type "B" Cast Iron Frame and Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.

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

APPROVAL RECOMMENDED:
G. Yahara — HYDRAULIC DESIGN ENGINEER — 12-17-69 DATE

APPROVED:
Shelton Q. Yuen — ASSISTANT CHIEF, ENGINEERING — 12-17-69 DATE

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

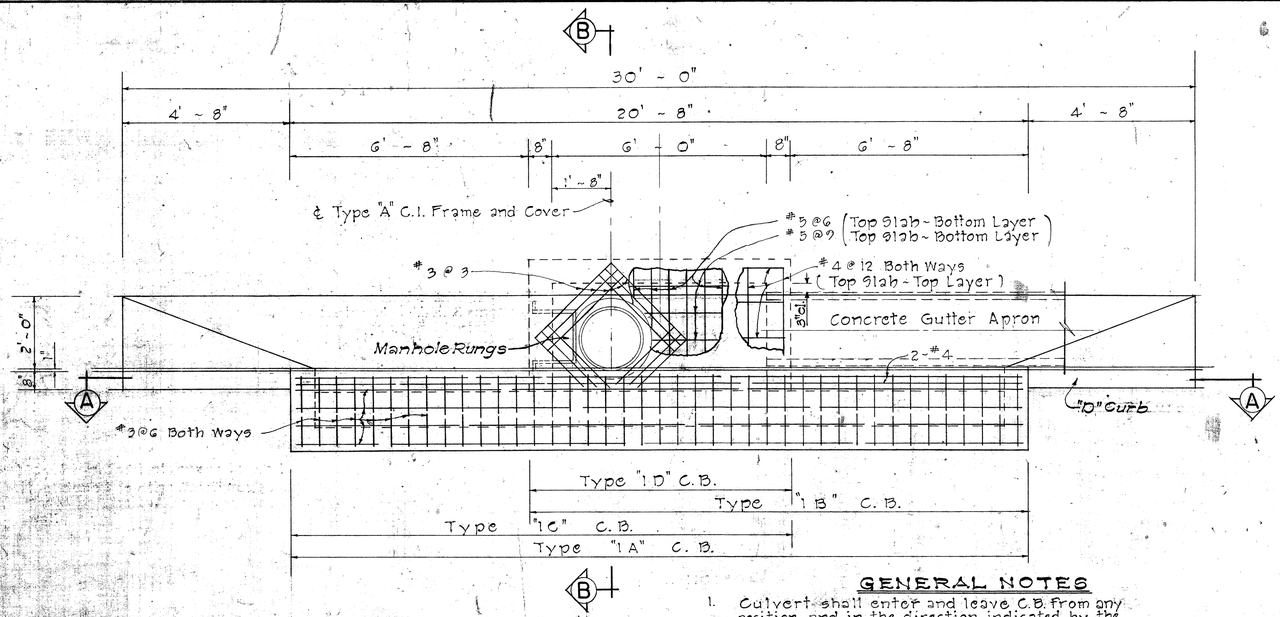
Scale: As Noted — Date: July, 1969

SHEET No 12 OF 17 SHEETS DH-1

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

109

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-I(131)17	1977	110	394

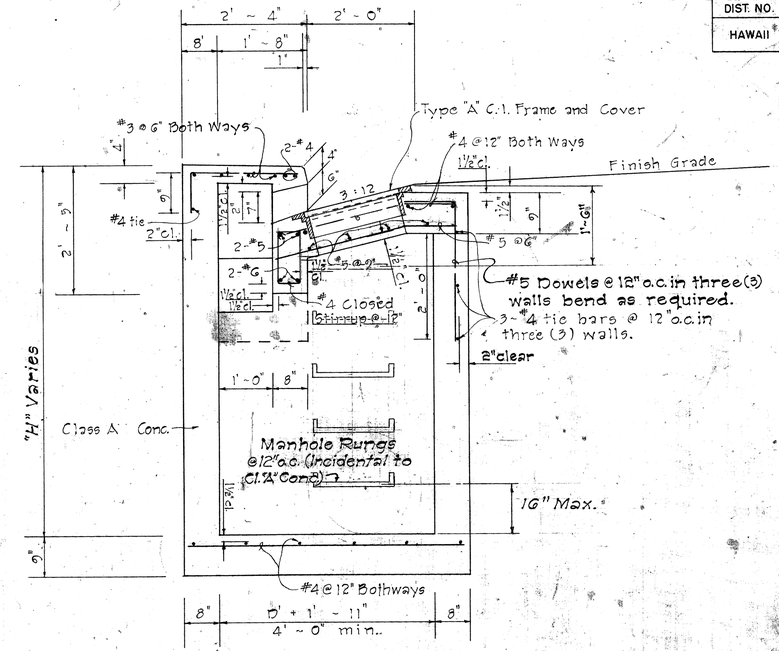


GENERAL NOTES

1. Culvert shall enter and leave C.B. from any position and in the direction indicated by the plans or ordered by the Engineer.
2. D' shall be the maximum outside dimension of the culvert at the C.B. wall.
3. The type of curb and/or gutter (Type 1, 2, 3, etc.) shall conform to the type specified on the roadway plans.
4. Manhole Rungs (12"o.c) are required when "H" is greater than 4 feet 6 inches. Only one rung (16 inches from the bottom) is required if "H" is 4 feet 6 inches or less. Type "A" C.I. Frame & Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.

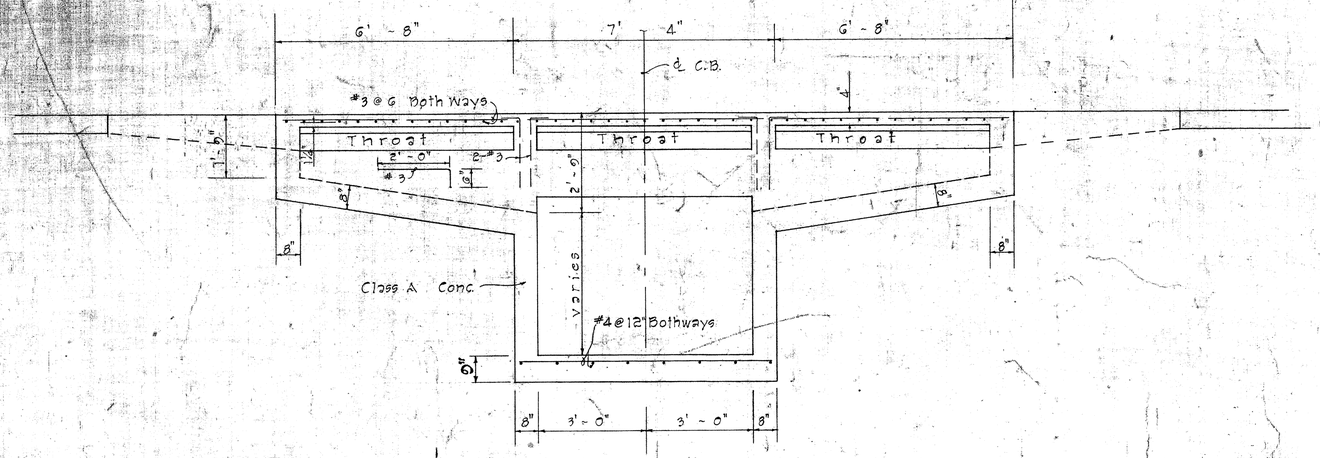
PLAN

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



SECTION "B-B"

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



SECTION "A-A"

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

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

APPROVAL RECOMMENDED:
G. Takano — HYDRAULIC DESIGN ENGINEER — DATE 12-17-69

APPROVED:
Stanley D. Deal — ASSISTANT CHIEF, ENGINEERING — DATE 12-17-69

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

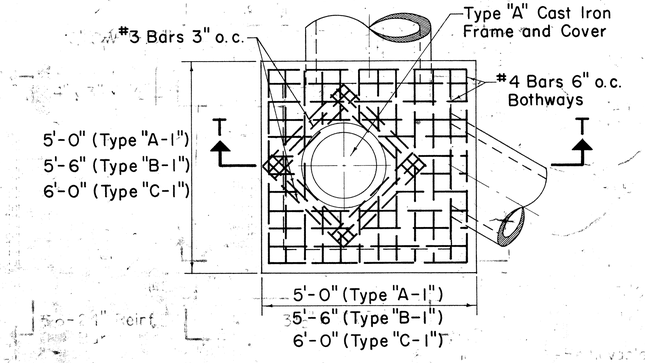
TYPE "IA", "IB", "IC", AND "ID" CATCH BASINS

Scale: As Noted — Date: July 1969

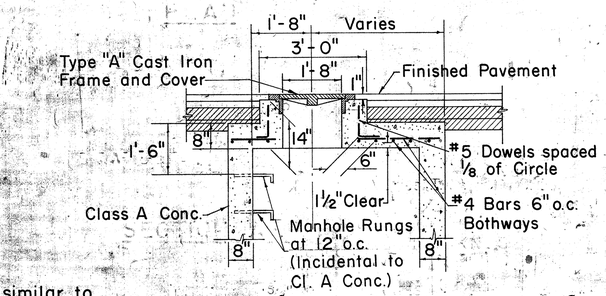
SHEET No. 13 OF 17 SHEETS — DH 3

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-I(131):17	1977	111	394



PLAN

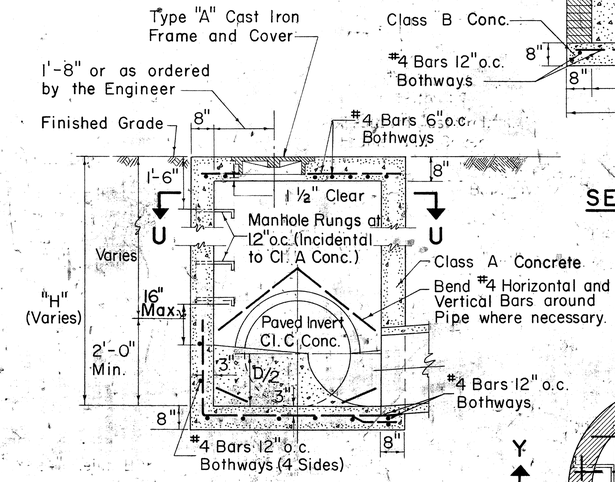


Note
Bottom detail similar to Type "A", "B", & "C"

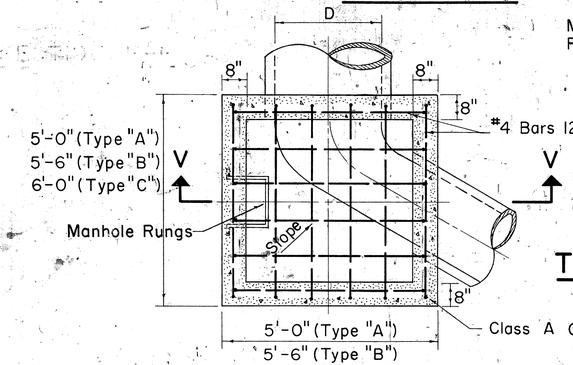
SECTION T-T

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

Scale: ½" = 1'-0"



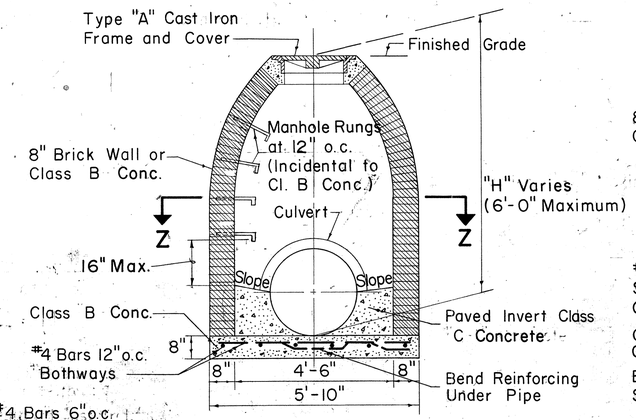
SECTION V-V



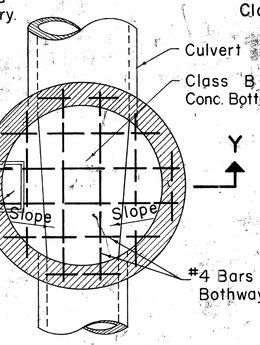
SECTION U-U

TYPE "A", "B", & "C" S.D.M.H.

Scale: ½" = 1'-0"



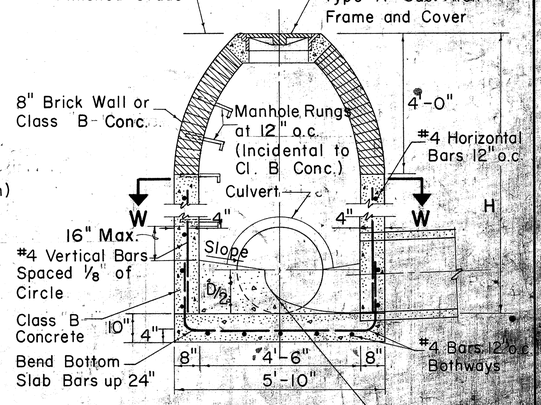
SECTION Y-Y



SECTION Z-Z

TYPE "D" STORM DRAIN MANHOLE

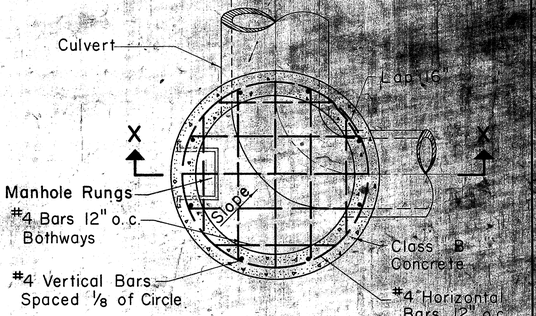
Scale: ½" = 1'-0"



SECTION X-X

NOTE:

1. Exterior surface of brick wall shall be plastered with 1" thickness of 1:2 Cement Mortar.
2. Number, size and direction of culvert at manhole to be as shown on plans.
3. Paved invert not required at drop manholes.
4. All Class C Concrete to be incidental to Class B Concrete.



SECTION W-W

TYPE "E" STORM DRAIN MANHOLE

Scale: ½" = 1'-0"

GENERAL NOTES

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

APPROVAL RECOMMENDED:
G. Takano — HYDRAULIC DESIGN ENGINEER — DATE 12-17-69

APPROVED:
ASS'T. CHIEF, ENGINEERING — DATE 12-17-69

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

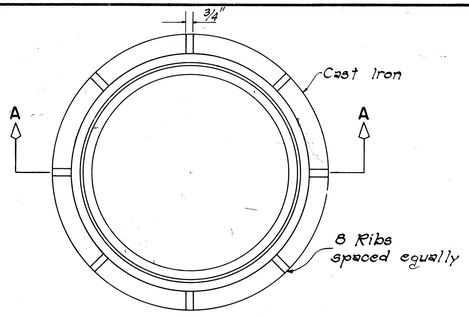
STANDARD DETAILS

STORM DRAIN MANHOLES

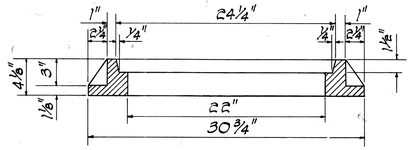
Scales: As Noted — Date: July, 1969

SHEET NO. 12 OF 17 SHEETS DHS

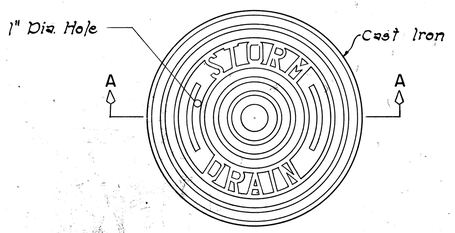
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(13I):17	1977	112	394



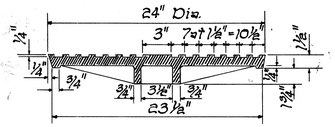
PLAN



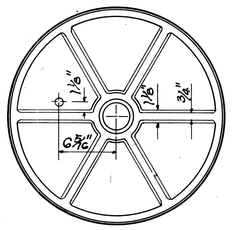
SECTION A-A



PLAN



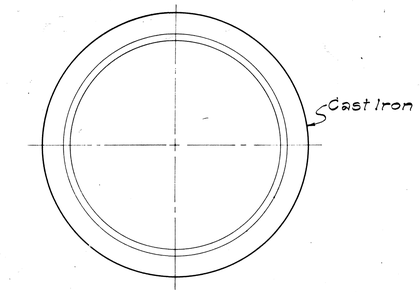
SECTION A-A



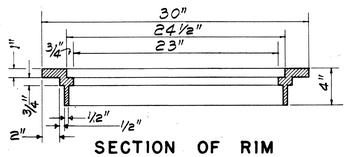
BOTTOM VIEW OF COVER

DETAILS OF TYPE "P" CAST IRON FRAME AND COVER

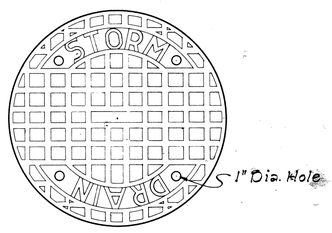
SCALE: 1-1/2" = 1'-0"



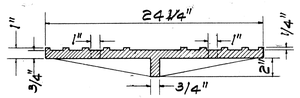
PLAN OF RIM



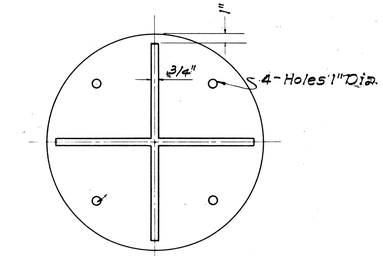
SECTION OF RIM



TOP VIEW OF COVER



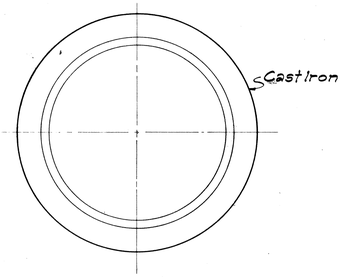
SECTION



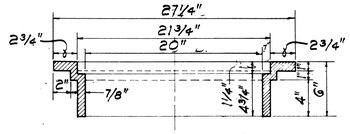
BOTTOM VIEW OF COVER

DETAILS OF TYPE "B" CAST IRON FRAME AND COVER

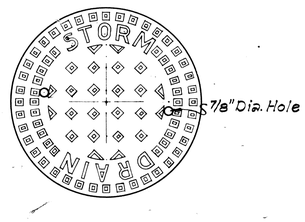
SCALE: 1-1/2" = 1'-0"



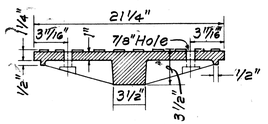
PLAN OF RIM



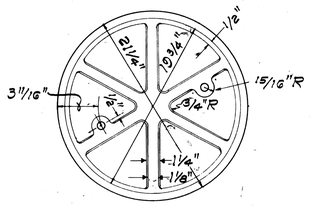
SECTION OF RIM



TOP VIEW OF COVER



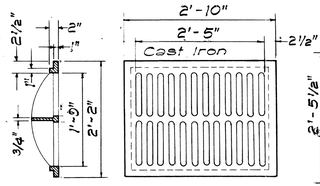
SECTION



BOTTOM VIEW OF COVER

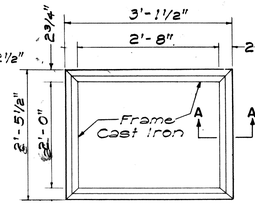
DETAILS OF TYPE "A" CAST IRON FRAME AND COVER

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

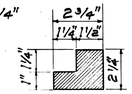


SECTION

TOP VIEW



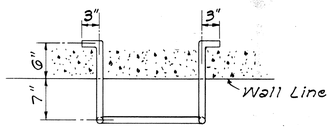
TOP VIEW



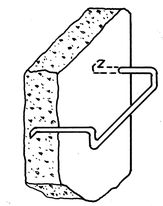
SECTION "A-A"
SCALE 3" = 1'-0"

TYPE C C.I. FRAME AND GRATE

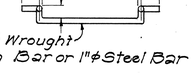
SCALE: 3/4" = 1'-0"



PLAN



PICTORIAL VIEW
NOT TO SCALE



FRONT VIEW

SIDE VIEW

DETAILS OF MANHOLE RUNG

SCALE: 1" = 1'-0"

APPROVAL RECOMMENDED:
G. Takano — HYDRAULIC DESIGN ENGINEER — 12-17-69 DATE

APPROVED:
Richard R. Robert — ASSISTANT CHIEF, ENGINEERING — 12-17-69 DATE

NO.	REVISION	APPROVED BY	DATE
1.	Detail of Type "P" Cast Iron Frame and Cover	H.T.	1-6-71
2	Details of Manhole Rungs to conform to O.S.H.A.	H.T.	1-21-75
3	Option for Manhole Rungs	H.T.	1-13-76

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CATCH BASIN AND MANHOLE CASTINGS

Scale: As Noted — Date: July, 1969

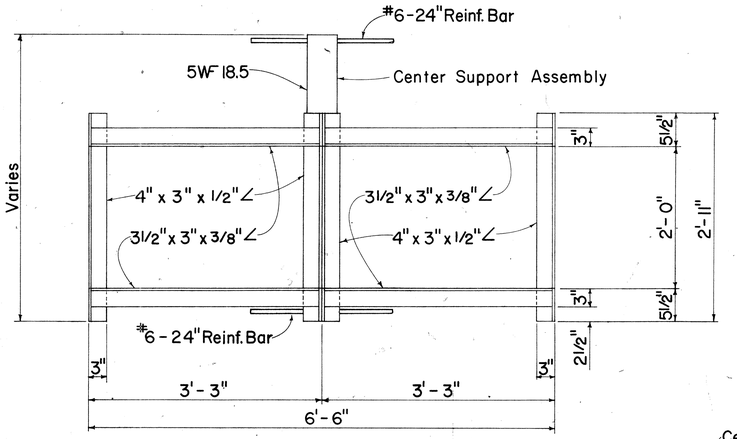
SHEET Nº 15 OF 17 SHEETS DH 6

112

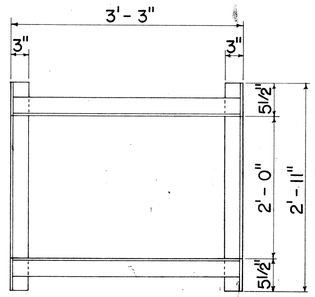
ORIGINAL PLAN	SURVEY PLOTTED BY:	DATE:
	DESIGNED BY:	
	DRAWN BY:	
NOTE BOOK	TRACED BY: Calistro	
	QUANTITIES BY:	
No.	CHECKED BY:	

TRACING CLOTH

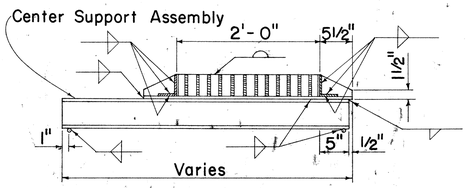
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(131):17	1977	113	394



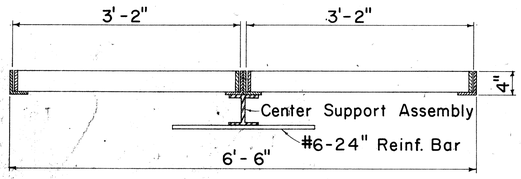
PLAN
(Two or More Grates)



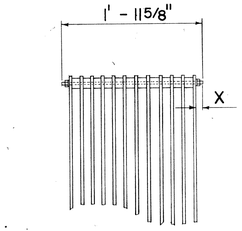
PLAN
(Single Grate)



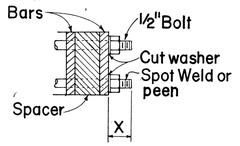
CROSS SECTION
(Thru Frame & Grate)



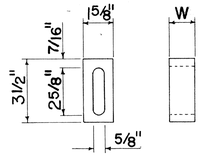
LONGITUDINAL SECTION
(Thru Frame & Grate)



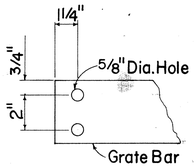
BOLTED END BLOCK
Scale: 1"=1'-0"



BOLTING DETAIL
Scale: 3"=1'-0"

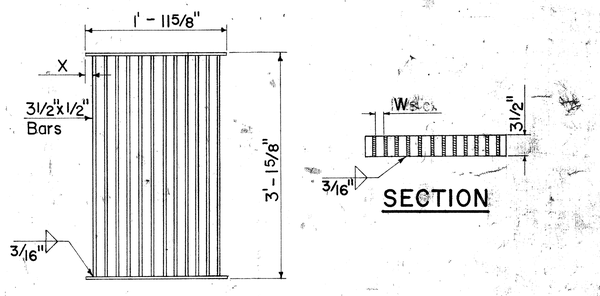


BAR SPACER
Scale: 3"=1'-0"



END OF BAR
Scale: 3"=1'-0"

ALTERNATIVE BOLTED GRATE



PLAN

SECTION

ALTERNATIVE WELDED GRATE

Scale: 1"=1'-0"

GENERAL NOTES

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

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

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

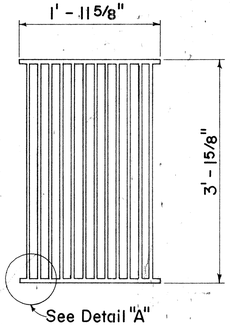
NOTE:
1. Type A-9 – Use in locations off the roadbed on all types of highways.
2. Type A-12 – Use within the roadbed on all types of highways.

APPROVAL RECOMMENDED:
O. Takaoka 12-17-69
HYDRAULIC DESIGN ENGINEER DATE

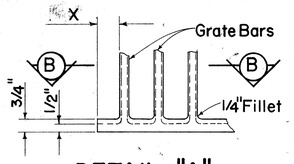
APPROVED:
Rudy B. Rodrigues 12-17-69
ASSISTANT CHIEF, ENGINEERING DATE

FRAME DETAILS

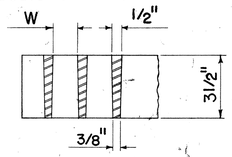
Scale: 1"=1'-0"



PLAN
Scale: 1"=1'-0"

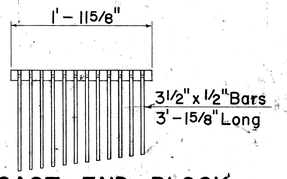


DETAIL "A"
Scale: 3"=1'-0"

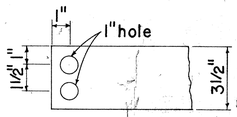


SECTION "B-B"
Scale: 3"=1'-0"

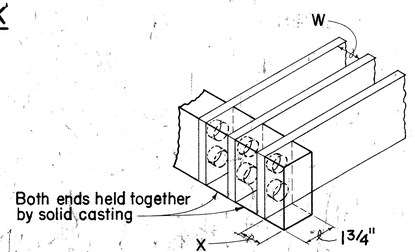
ALTERNATIVE CAST MALLEABLE IRON OR CAST STEEL GRATE



CAST END BLOCK
Scale: 1"=1'-0"



END OF BAR
Scale: 3"=1'-0"



ALTERNATIVE CAST MALLEABLE IRON OR CAST STEEL END BLOCK GRATE

NO.	REVISION	APPROVED BY	DATE

Scale: 1"=1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

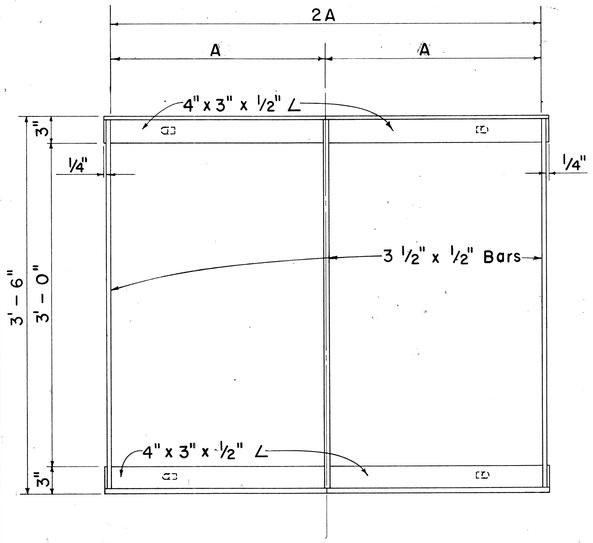
TYPE A-9 AND A-12 FRAMES AND GRATES

Scales: As Noted Date: Aug. 1968

SHEET No. 16 OF 17 SHEETS

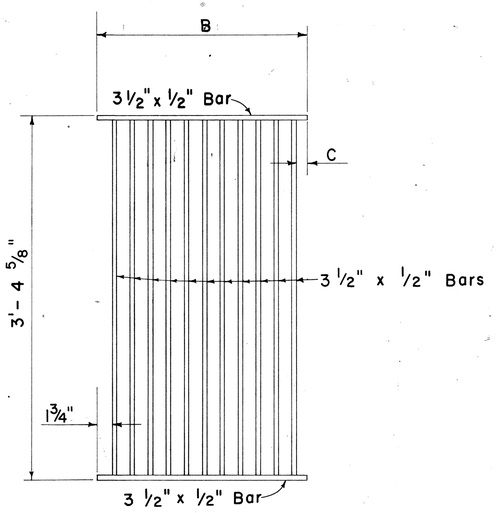
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 7/68
	DRAWN BY L.C.A.M.	" 8/68
NOTE BOOK	TRACED BY L.C.A.M.	" 7/68
	DESIGNED BY H.K.M.	
No.	QUANTITIES BY H.K.M.	8/68
	CHECKED BY H.K.M.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-I(131):17	1977	114	394



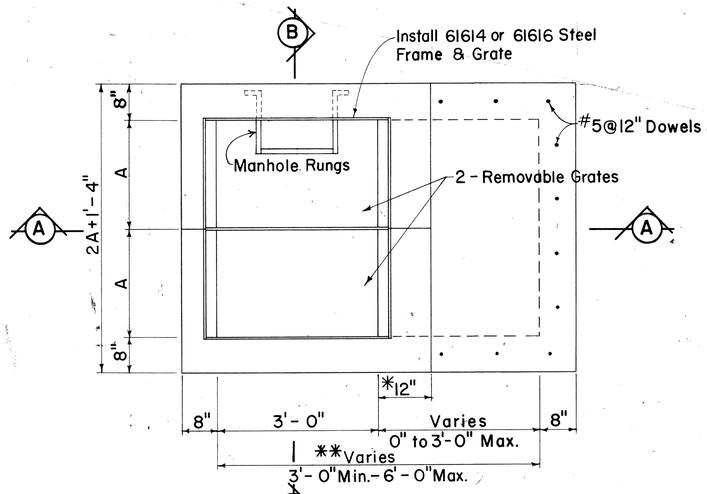
PLAN

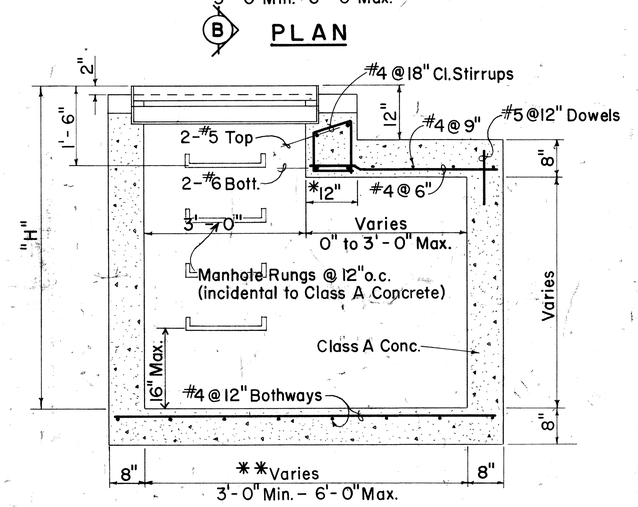
Scale: 1 1/2" = 1'-0"



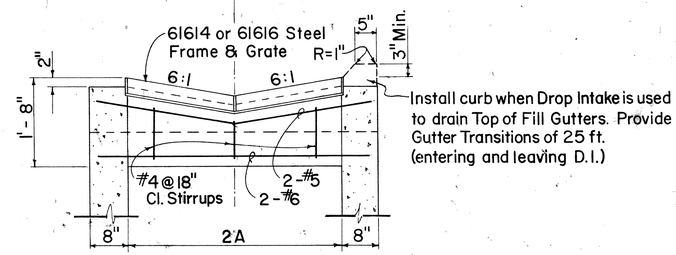
PLAN

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





SECTION A-A



Install curb when Drop Intake is used to drain Top of Fill Gutters. Provide Gutter Transitions of 25 ft. (entering and leaving D.I.)

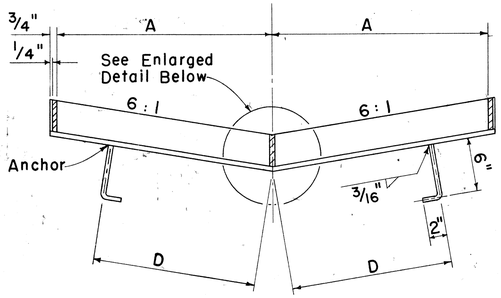
SECTION B-B

DETAILS OF 61614 OR 61616 DROP INTAKE

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

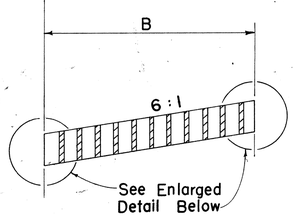
*For Minimum size box of 3'-0", use 8" and eliminate reinforcing steel shown in the top portion.

**For Culverts larger than 30", the minimum dimension shall be D'.



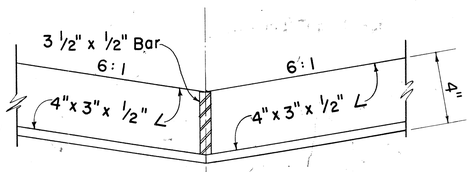
SECTION

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



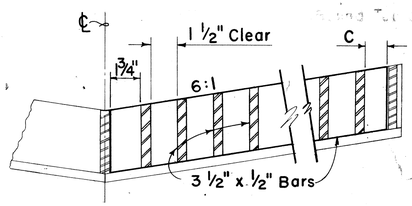
SECTION

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



FRAME

Scale: 3" = 1'-0"



GRATE

Scale: 3" = 1'-0"

DETAILS OF TYPE 61614 OR 61616 STEEL FRAME AND GRATE

GENERAL NOTES

1. Grates and Frames shall be hot dip galvanized after fabrication, see specifications.
2. All welds 3/8" unless otherwise noted.
3. Refer to "Spacing Table" for Types 61614 & 61616 Drop Intake and Frame & Grates dimensions.
4. The Frame & Grate materials shall conform to the specifications of ASTM Designation Structural Steel A283, Grade D and the Standard Specifications.
5. Culvert shall leave Drop Intake from any position and any direction indicated by plans or ordered by the Engineer. Culverts may both enter and leave Drop Intake so that Drop Intake will act as manhole.
6. 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.

SPACING TABLE

TYPE	NO. BARS	A	B	C	D
61614	11	2'-0"	1'-11 1/2"	1 1/4"	1'-6"
61616	17	3'-0"	2'-11 5/8"	1 1/8"	2'-0"

NO.	REVISION	APPROVED BY	DATE
1	Curb for Top of Fill Gutters	H.Y.	6-5-71
2	Spacing on manhole rungs to conform to OSHA.	H.Y.	12-15

APPROVAL RECOMMENDED:

T. Takano — HYDRAULIC DESIGN ENGINEER — 12-17-69 DATE

APPROVED:

ASSISTANT CHIEF, ENGINEERING — 12-17-69 DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

TYPE 61614 & 61616 GRATED DROP INTAKES

Scales: As Noted — Date: Feb 1969

SHEET No. 17 OF 17 SHEETS DH 8

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