
STANDARD DETAILS

FOR PUBLIC WORKS CONSTRUCTION

DEPARTMENTS OF PUBLIC WORKS

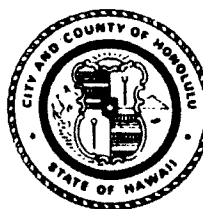
COUNTY OF KAUAI
CITY AND COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

OF THE STATE OF HAWAII



A handwritten signature in black ink, appearing to read "Lawrence Kitamura".

LAWRENCE KITAMURA
COUNTY ENGINEER
COUNTY OF KAUAI



A handwritten signature in black ink, appearing to read "Michael J. Chun".

MICHAEL J. CHUN
DIRECTOR AND CHIEF ENGINEER
CITY AND COUNTY OF HONOLULU



A handwritten signature in black ink, appearing to read "Ralph Hayashi".

RALPH HAYASHI
DIRECTOR
COUNTY OF MAUI



A handwritten signature in black ink, appearing to read "Edward Harada".

EDWARD HARADA
CHIEF ENGINEER
COUNTY OF HAWAII

Standard Details for Public Works Construction dated September 1984 - Sheet Descriptions for County of Hawai'i	Sheet No.	Date Revised
Integral Curb and Gutter Integral Driveway Curb and Gutter	R-4 Revised	January 1995
Rolled Curb	R-5 Revised	December 2001
Curb Ramp	R-25A	April 2000
Reinforced Concrete Drop Driveway Details	R-29 Revised	September 2002
Road Pavement and Shoulders	R-34 Revised	May 2001
Typical Roadway Utility Location with Sidewalk	R-35 Revised	June 2002
Typical Roadway Utility Location without Sidewalk	R-36 Revised	June 2002
Driveway Layout	R-38 Revised	February 2003

Revised: 04/30/2018

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R-2	Pre-cast Concrete Driveway Curb	•	•	•	•
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R-4	Integral Curb and Gutter, Integral Driveway Curb and Gutter	•	•	•	•
R-5	Rolled Curb	•	•	•	•
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R-13	Street Survey Monument Castings	•	•	•	•
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COUNTY OF KAUAI
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STANDARD
DETAILS

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S-14	Pre-cast Concrete Plain Manhole - Section and Alternate Base	•	•	•	•
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S-19	Pre-cast Concrete Plain Manhole for 27" to 48" R.C. Pipe	•	•	•	•
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Part 3 - Sewers (cont'd.)

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Part 4 - Sewer Pump Stations & Treatment Plants

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CITY & COUNTY OF HONOLULU
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COUNTY OF HAWAII

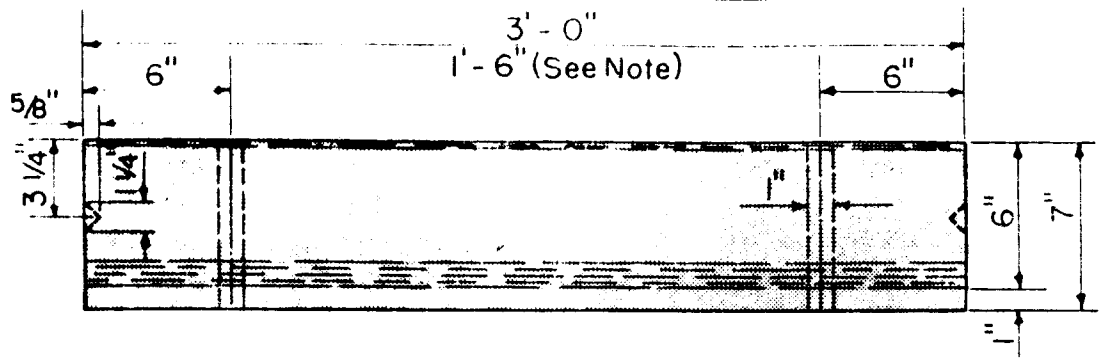
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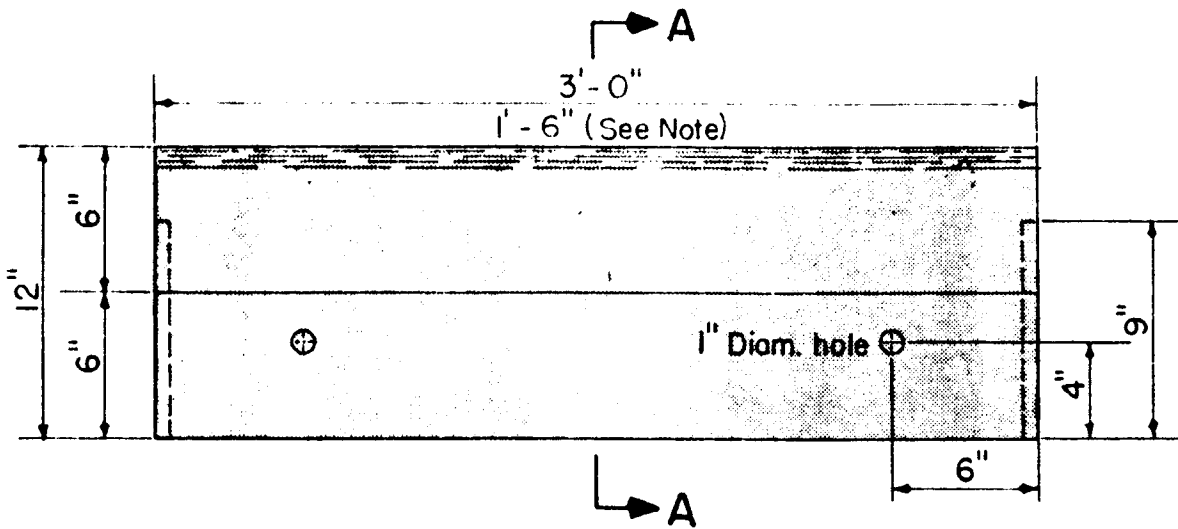
Roads & Streets

PART

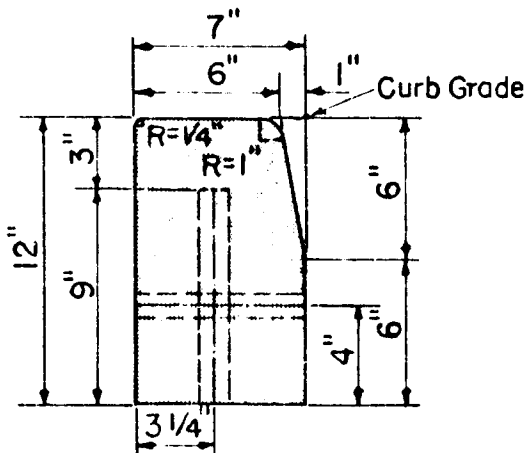
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PLAN



ELEVATION



SECTION A - A

NOTE:

For curb returns use 1'-6" pre-cast concrete curbs.

PRE-CAST CONCRETE CURB

COUNTY OF KAUAI
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COUNTY OF HAWAII

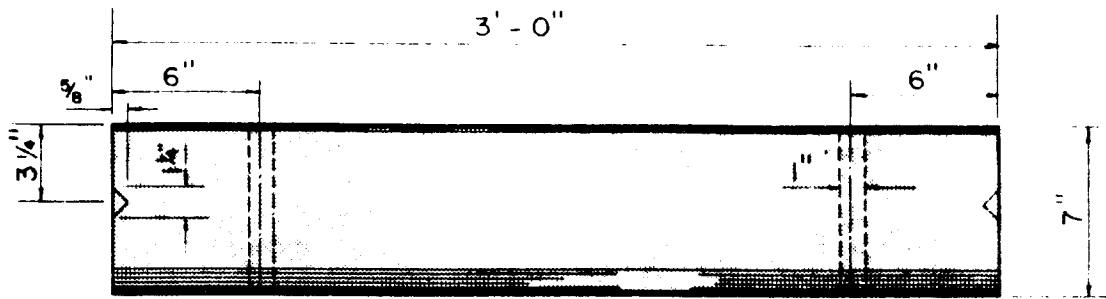
PRE-CAST CONCRETE CURB

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

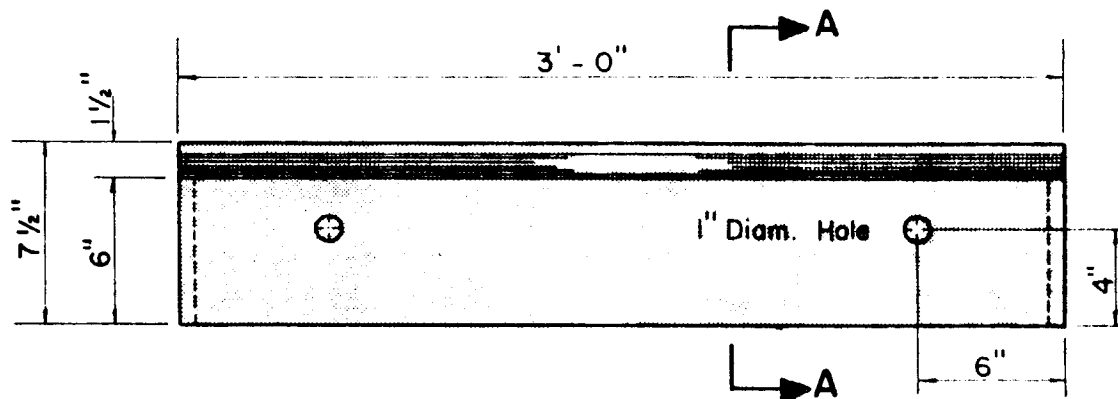
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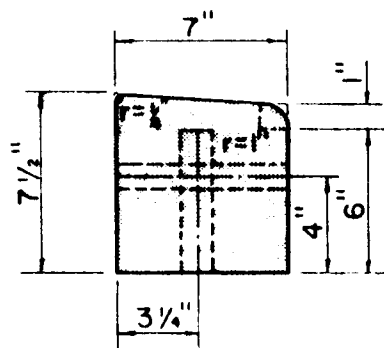
R-1



PLAN



ELEVATION



SECTION A-A

PRE-CAST CONCRETE DRIVEWAY CURB

R-2

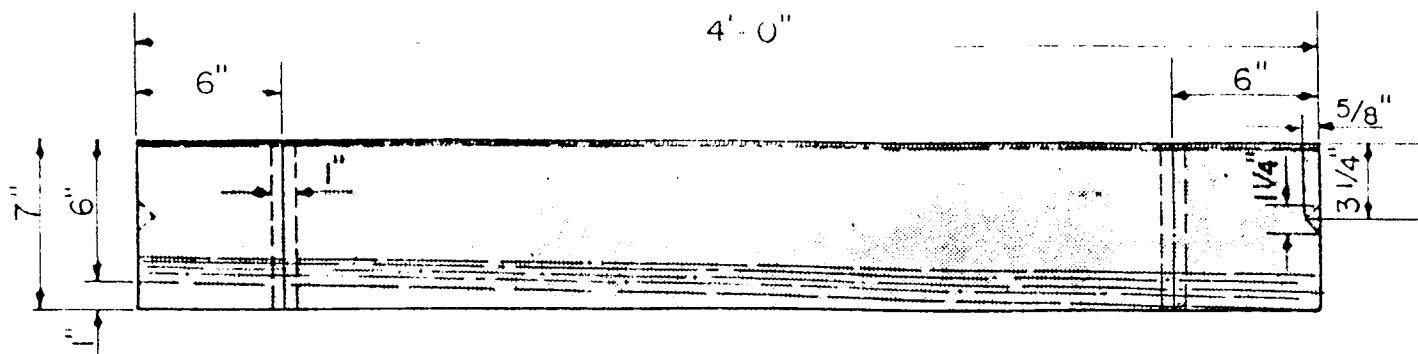
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PRE-CAST CONCRETE DRIVEWAY CURB

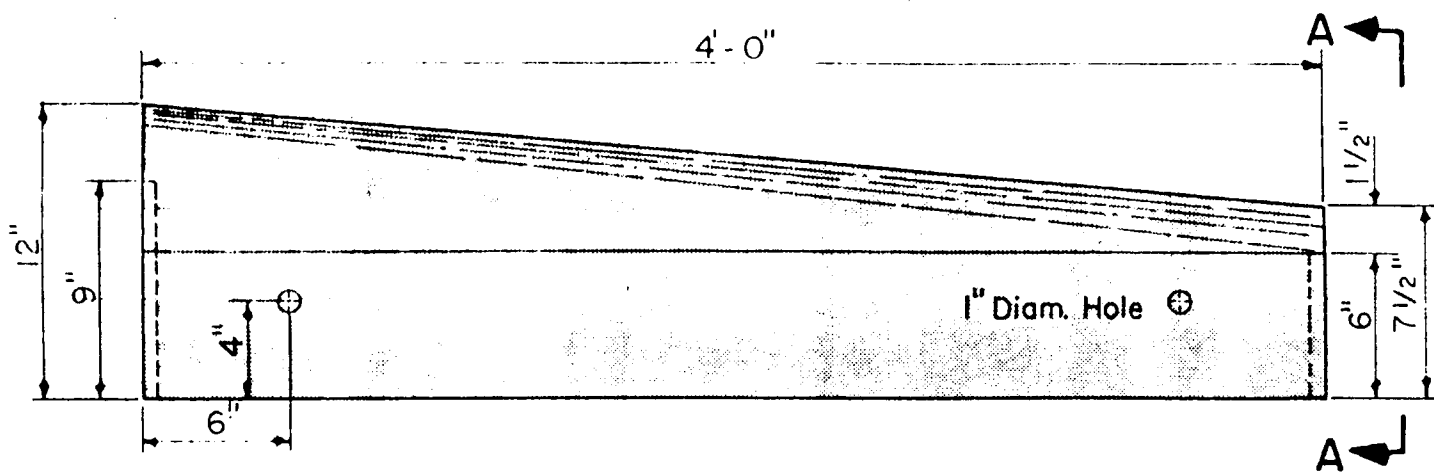
SEPTEMBER 1984

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

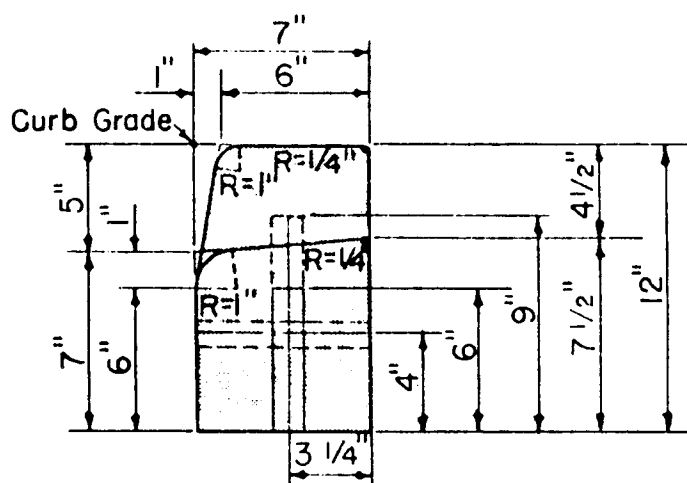
COUNTY OF KAUAI
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PLAN



ELEVATION



SECTION A - A

PRE - CAST CONCRETE DROP CURB BLOCK

COUNTY OF KAUAI
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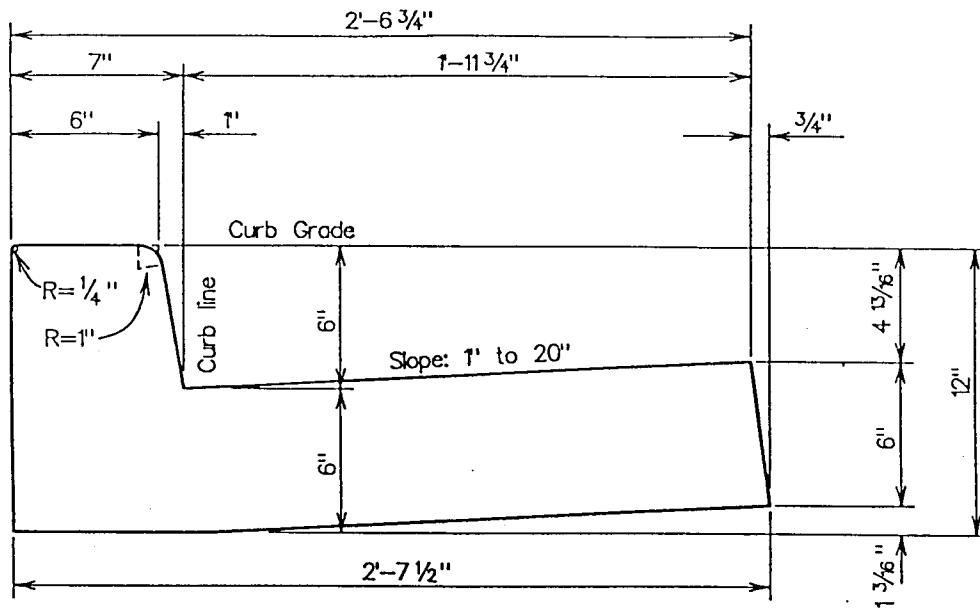
PRE-CAST CONCRETE DROP CURB BLOCK

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

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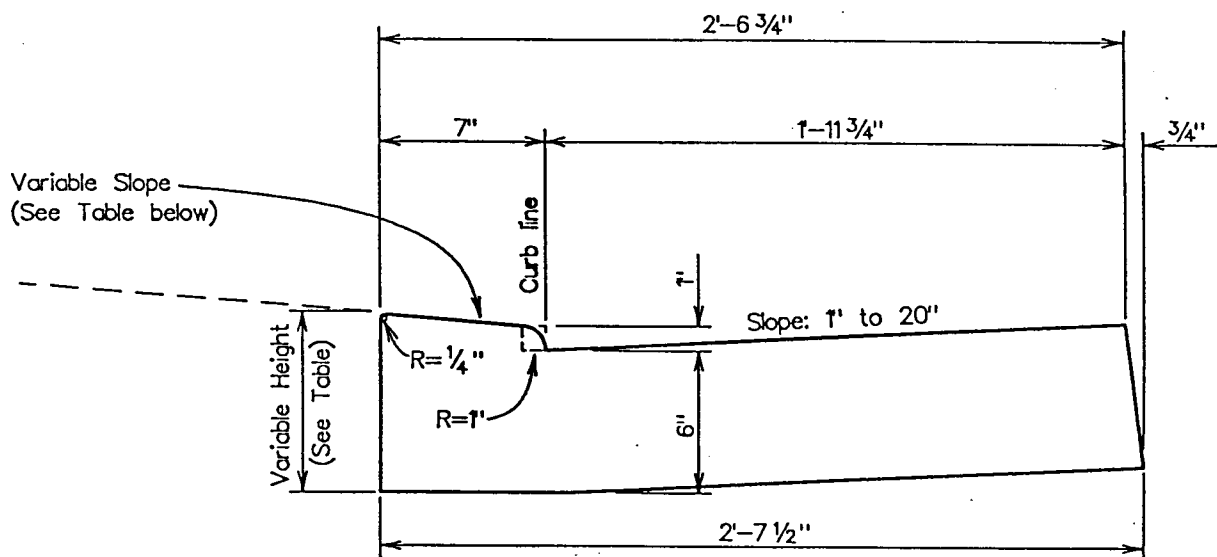
R-3



Class "A" Concrete quantity = 0.0584 cu. yd./lin. ft.

CAST IN PLACE INTEGRAL CURB AND GUTTER

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



TABLE

DIST. CURB LINE TO P.C.	SLOPE	HEIGHT
12'	1 1/8" to 12"	7 3/8"
10'	3/4" to 12"	7 7/8"
8'	7/8" to 12"	7 1/2"
7'	15/16" to 12"	7 9/16"
6'	1 1/16" to 12"	7 5/8"
3'	1 15/16" to 12"	8 1/8"

Class "A" Concrete quantity = 0.0506 cu. yd./lin. ft.

CAST IN PLACE INTEGRAL DRIVEWAY CURB AND GUTTER

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

R-4
REVISED

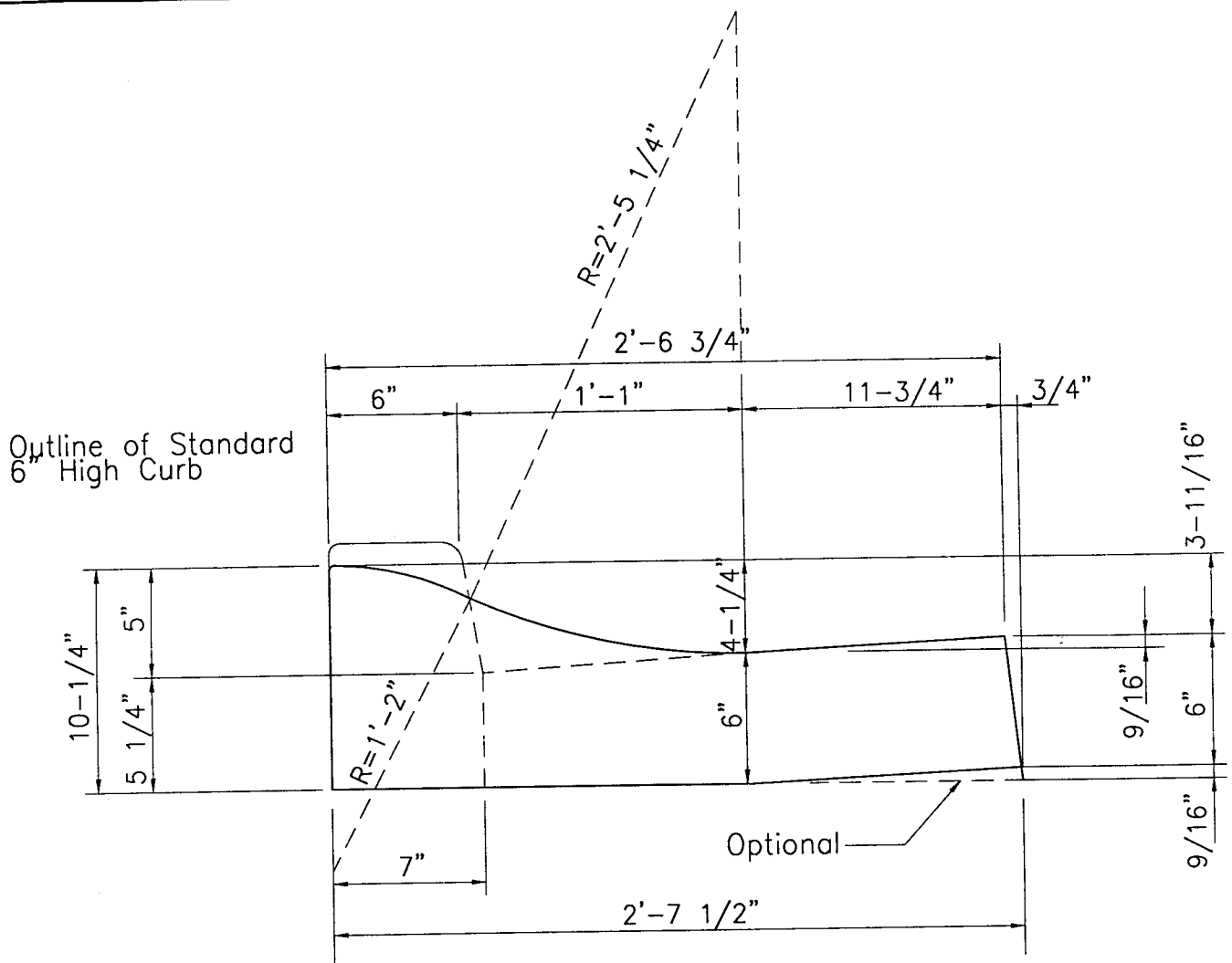
STANDARD
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INTEGRAL CURB AND GUTTER
INTEGRAL DRIVEWAY CURB AND GUTTER

JANUARY 1995

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

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Class "A" Concrete quantity = 0.0565 cu. yd./lin. ft.

CAST IN PLACE ROLLED CURB

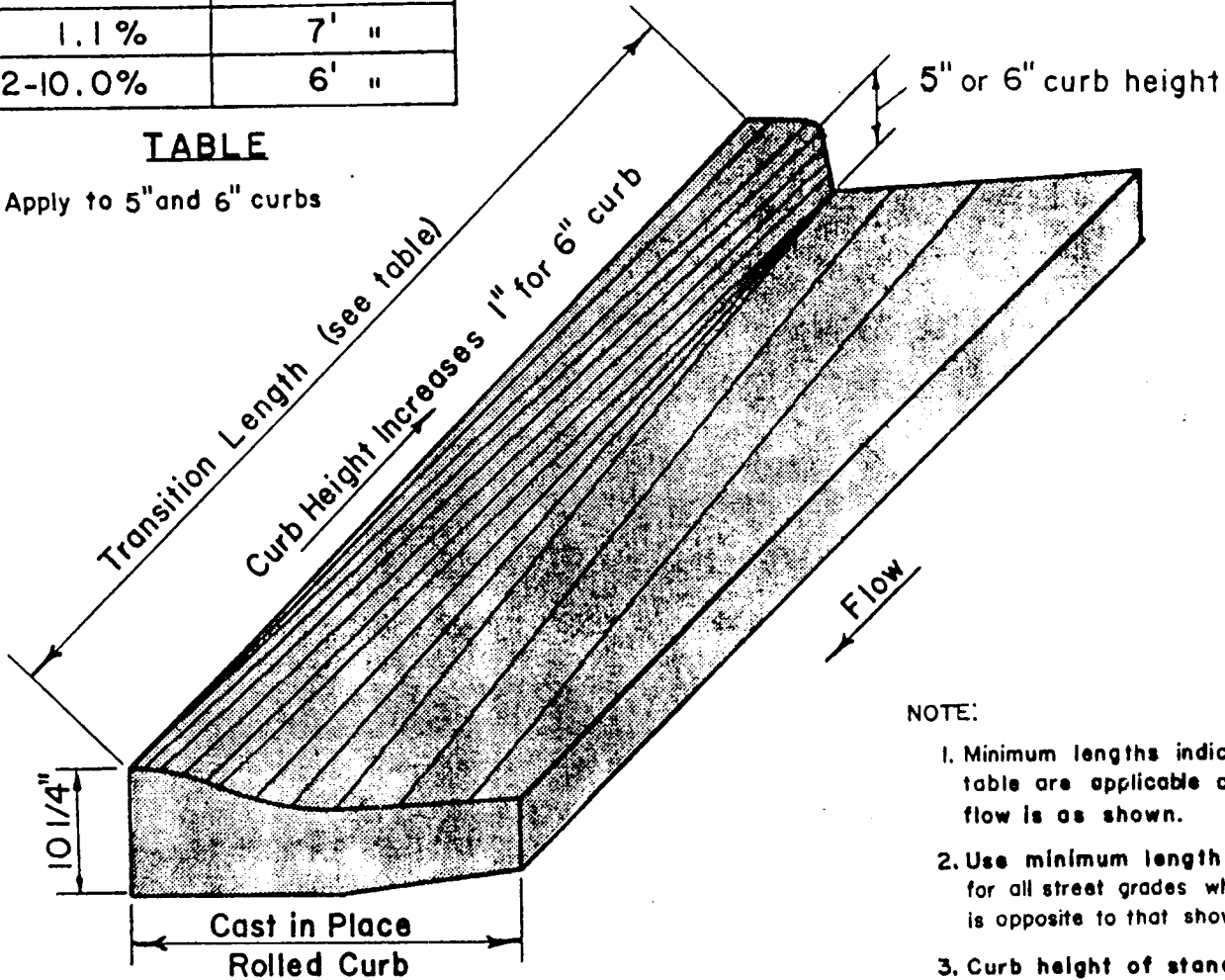
Scale: $1'-\frac{1}{2}"=1'-0"$

1. Rolled curb shall not be permitted:
 - a. Where road gradients are greater than 10 percent.
 - b. On other than minor streets in residential zones.
 - c. At major intersections, bridges and approaches.
2. For transition lengths to standard vertical curb, see R-6.

STREET GRADE	TRANSITION LENGTH*
0.6 %	16' Min.
0.7 %	12' "
0.8 %	10' "
0.9 %	9' "
1.0 %	8' "
1.1 %	7' "
1.2-10.0 %	6' "

TABLE

* Apply to 5" and 6" curbs



NOTE:

1. Minimum lengths indicated in table are applicable only when flow is as shown.
2. Use minimum length of 6' for all street grades when flow is opposite to that shown.
3. Curb height of standard curb is 1" higher than rolled curb.
4. Use 8' at upstream side and 4' at downstream side for transition to catchbasin with 5' curb height.

ROLLED CURB TRANSITION

NOT TO SCALE

R-6

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**ROLLED CURB TRANSITION TO
CURBS AND CATCH BASINS**

SEPTEMBER 1984

NOT TO SCALE

**COUNTY OF KAUAI
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COUNTY OF MAUI
COUNTY OF HAWAII**

6" thick concrete
reinforced with 6x6-6/6
galvanized welded wire
fabric.

Warp this return gutter to
meet thru gutter grades

Construction Joints

Flow Line

A

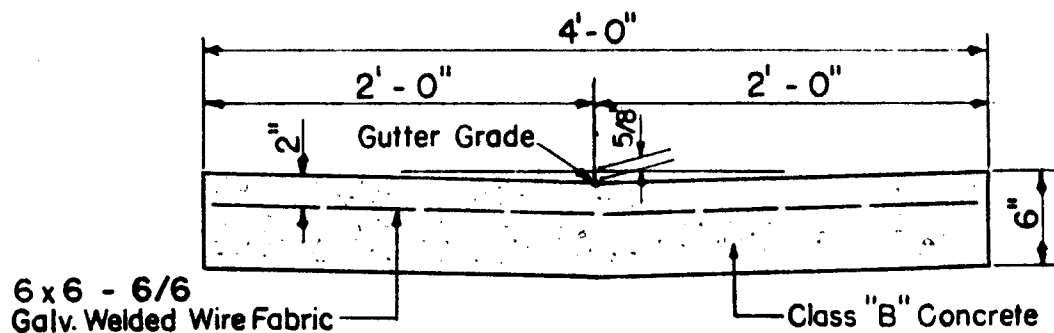
A

PLAN

SCALE: 1" = 20'

NOTE:

Construction joints shall be keyed
construction joints with tie bars per
detail on sheet R-11



SECTION A - A

SCALE: 1" = 1'-0"

THRU GUTTER

R-8

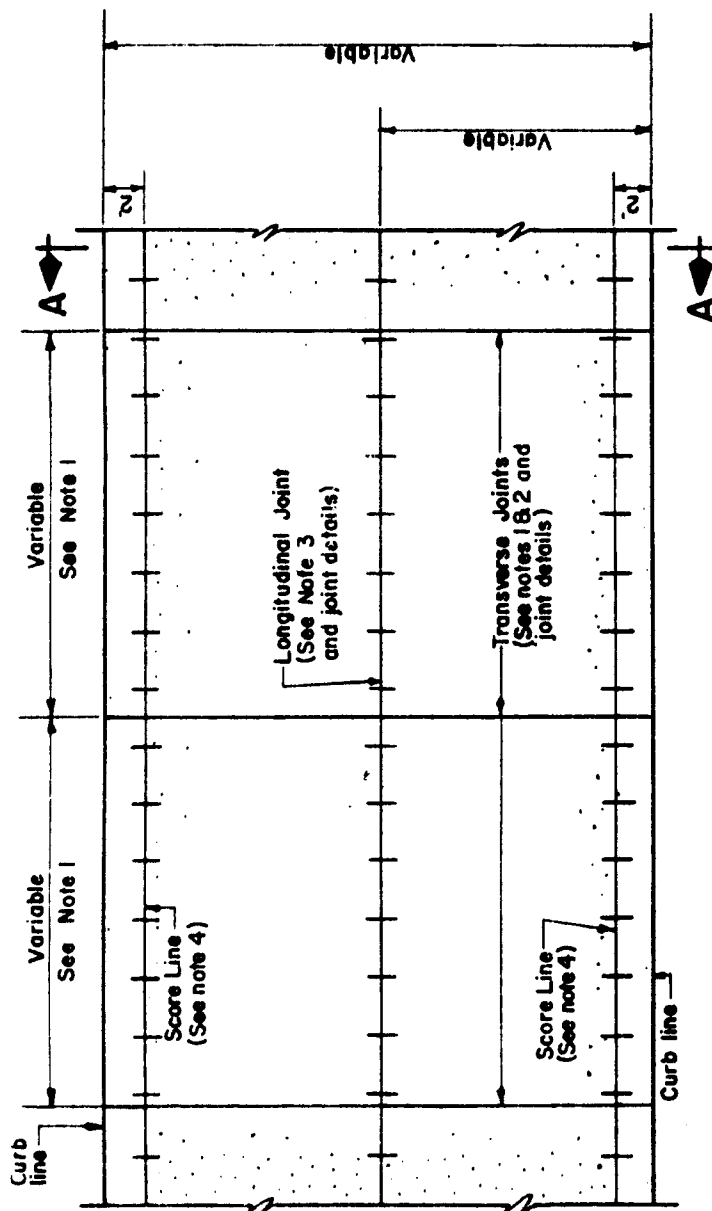
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THRU GUTTER

SEPTEMBER 1984

SCALE: AS NOTED

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
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COUNTY OF HAWAII

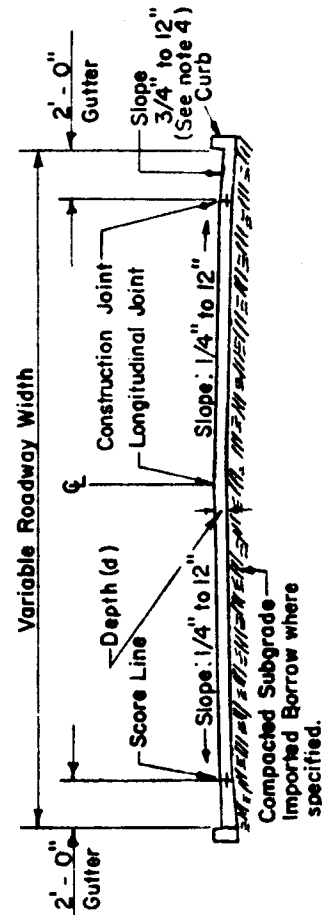


PLAN

SCALE: 1" = 1'-0"

CONSTRUCTION NOTES

1. Transverse joints shall be either weakened plane contraction joints or construction joints with dowels and shall be evenly spaced approximately 15 feet apart.
2. Expansion joints with dowels shall be located at intersections only.
3. Longitudinal joints shall be either weakened plane joints or keyed construction joints with tie bars. Maximum spacing between joints shall be as provided in the Standard Specifications.
4. Gutters constructed monolithically with the pavement shall be delineated with a score line. Gutters constructed separately shall have a longitudinal keyed construction joint with tie bars. Tie bars shall also be provided where gutters are constructed monolithically. For monolithic gutters, slope shall be 1/4" to 12".
5. Gutters on grades at 12% or less shall be steel trowel finished and gutters on grades greater than 12% shall be broom finished longitudinally.
6. Pavement on grades at 12% or less shall be broom finished transversely and pavement on grades greater than 12% shall be bristle brush finished.



SECTION A-A

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

CONCRETE PAVEMENT

COUNTY OF KAUAI
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COUNTY OF HAWAII

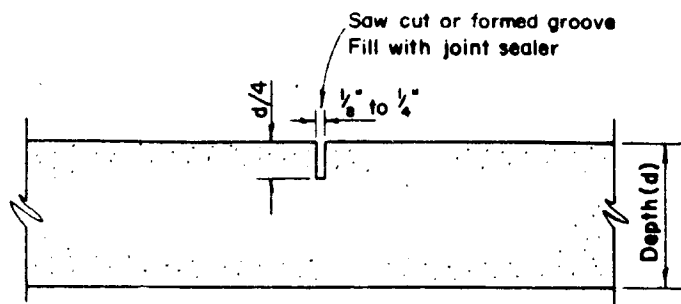
CONCRETE PAVEMENT

SCALE: AS NOTED

SEPTEMBER 1984

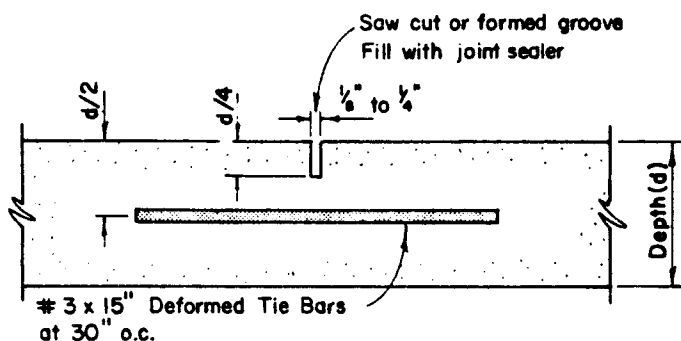
STANDARD
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R-9



TRANSVERSE CONTRACTION JOINT

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

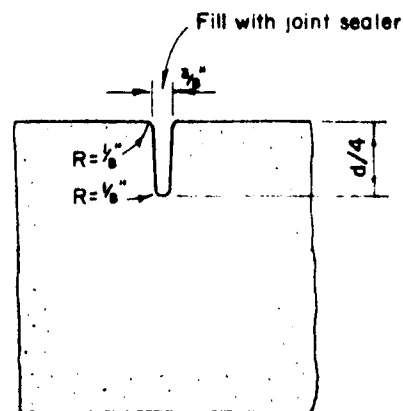


LONGITUDINAL JOINT

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

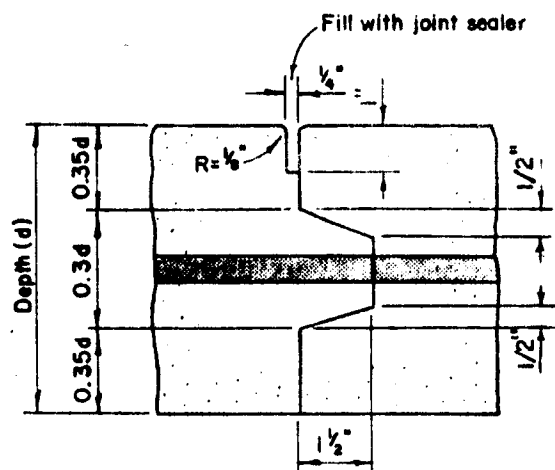
CONSTRUCTION NOTES

1. Weakened plane joints may be constructed by sawing, forming dummy groove (see Detail "A") or inserting ribbon or premolded strip.
2. All joints shall be slightly under filled with joint sealer paving asphalt, grade 85-100, AASHTO Designation: M-20
3. All dowels shall be paint and greased. Expansion joint dowels shall be equipped with metal caps.
4. Expansion joints without dowels shall be constructed at junctions of concrete pavement and rectangular structure.
5. Construction joints at unplanned locations shall be keyed joints with tie bars (Detail "B").



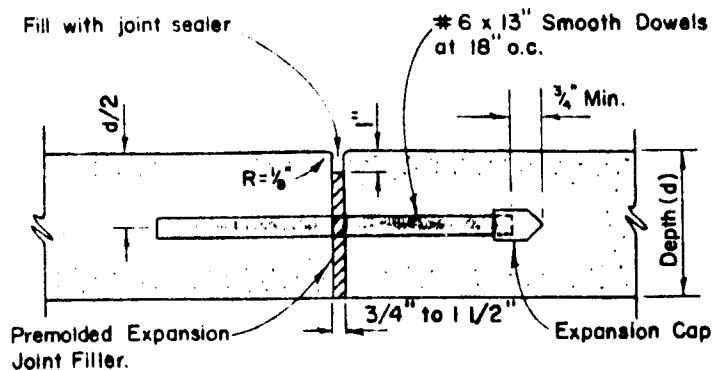
DUMMY GROOVE JOINT DETAIL "A"

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

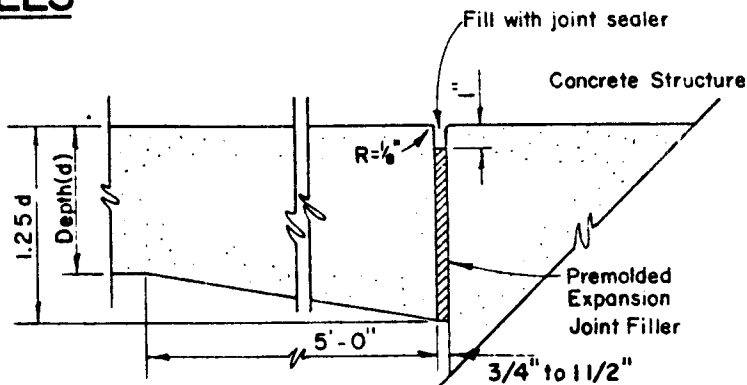


DETAIL "B"

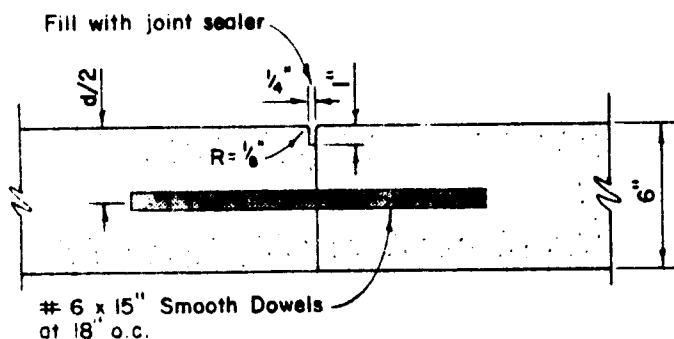
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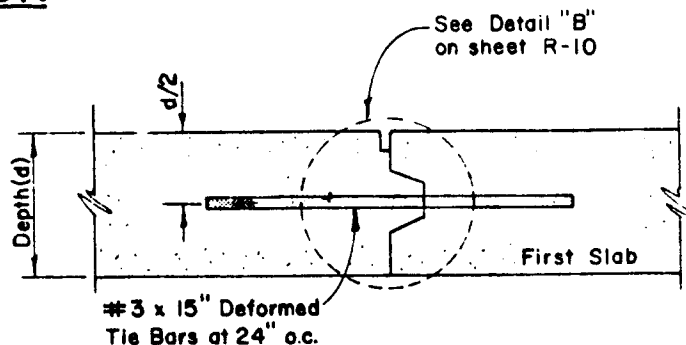
EXPANSION JOINT WITH DOWELS



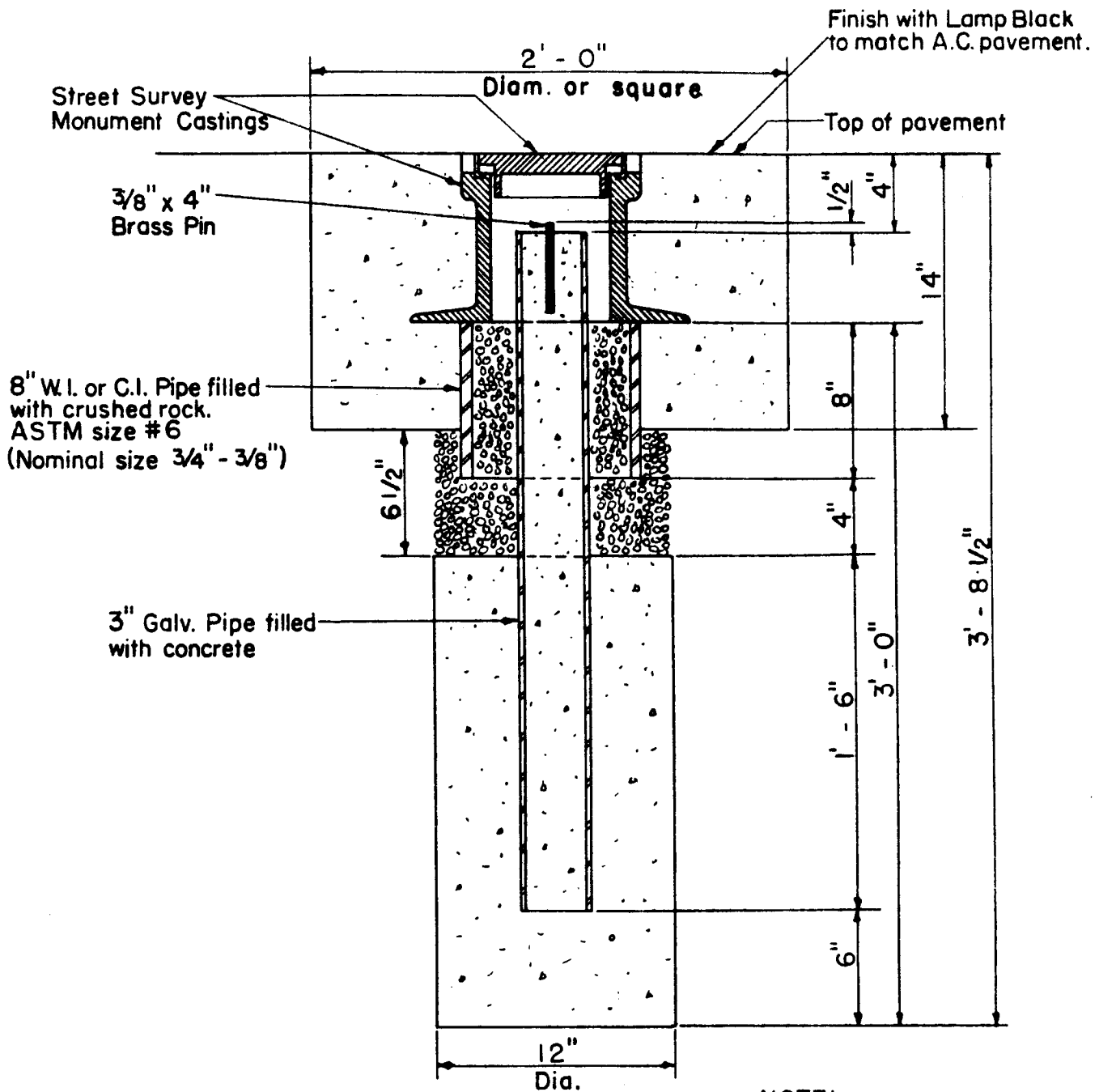
EXPANSION JOINT



TRANSVERSE CONSTRUCTION JOINT WITH DOWELS



LONGITUDINAL AND TRANSVERSE KEYED CONSTRUCTION JOINT WITH TIE BARS



NOTE:

Where the excavation extends into solid rock the depth may be decreased if approved by the Engineer.

STREET SURVEY MONUMENT

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

R-12

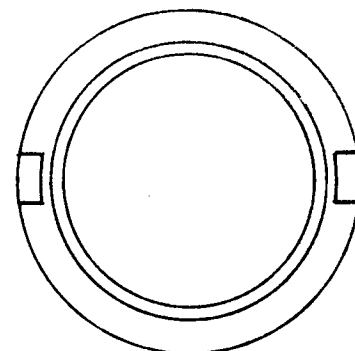
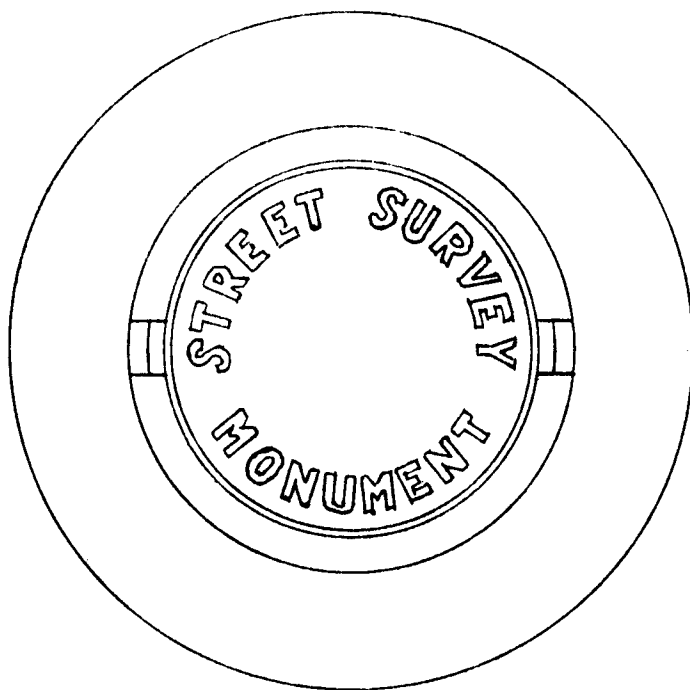
**STANDARD
DETAILS**

STREET SURVEY MONUMENT

SEPTEMBER 1984

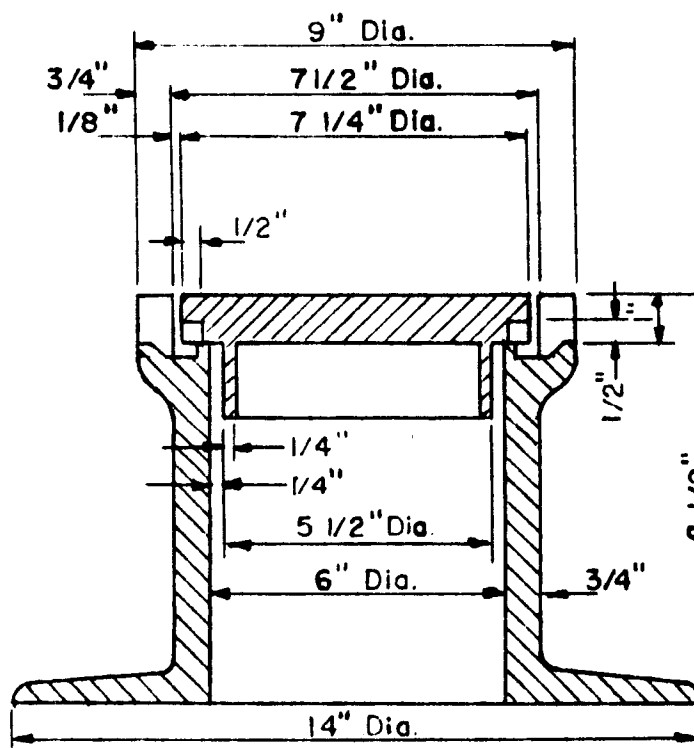
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**COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
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COUNTY OF HAWAII**

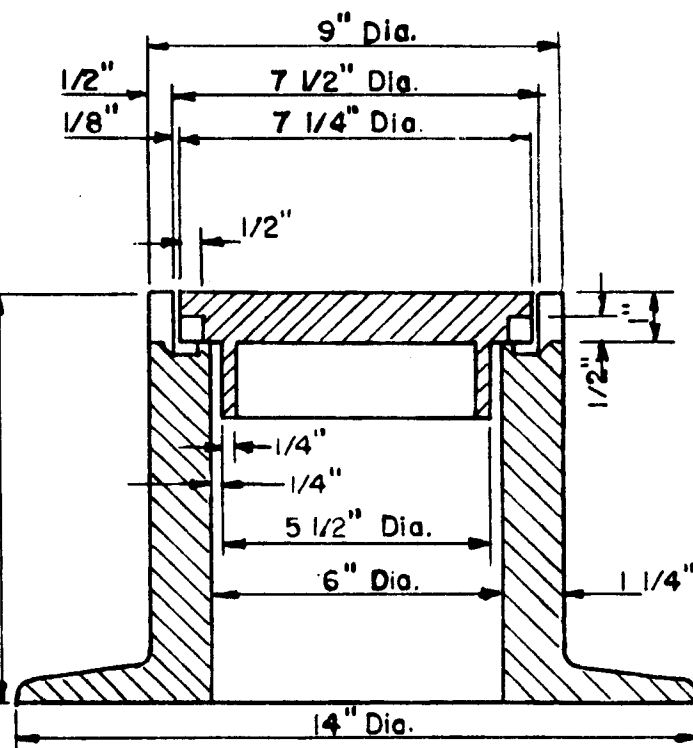


BOTTOM VIEW OF COVER

TOP VIEW - STREET SURVEY
MONUMENT FRAME AND COVER



SECTIONAL VIEW OF FRAME AND COVER



SECTIONAL VIEW OF ALTERNATE FRAME & COVER

STREET SURVEY MONUMENT CASTINGS

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
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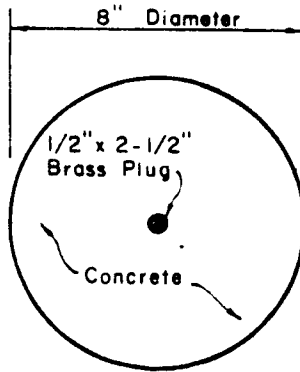
STREET SURVEY MONUMENT CASTINGS

SCALE: 3" = 1'-0"

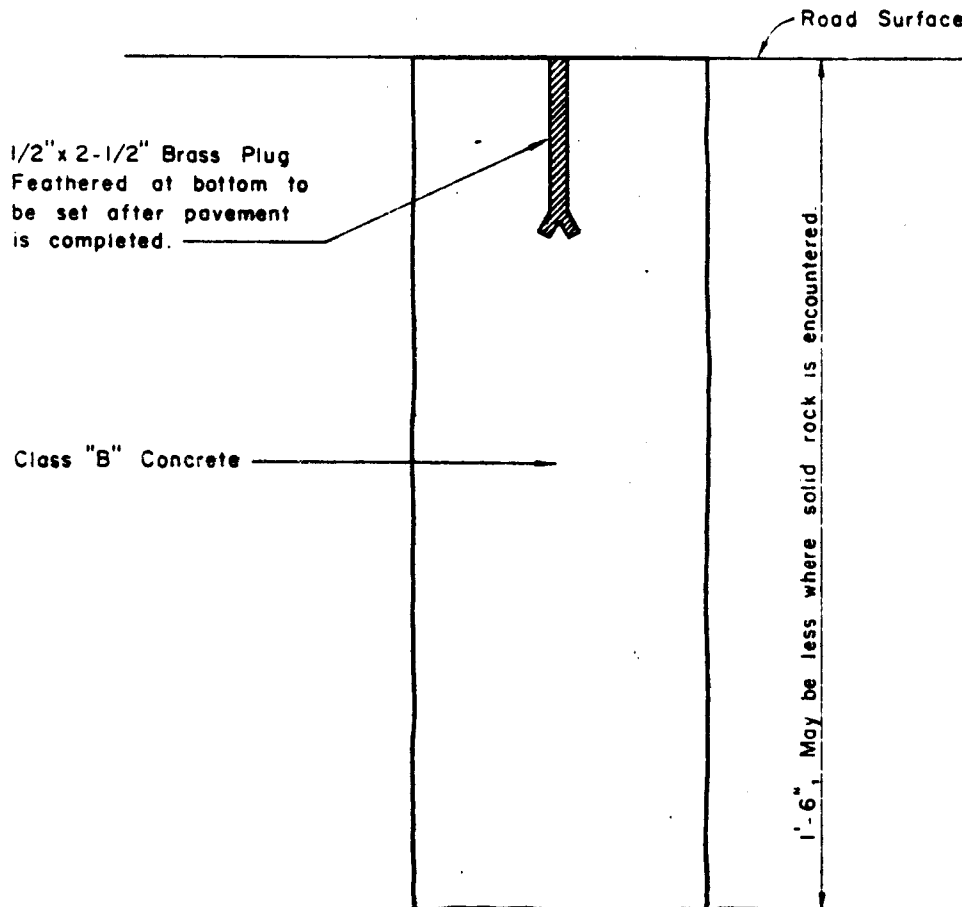
SEPTEMBER 1984

STANDARD DETAILS

R-13



PLAN



ELEVATION

CENTERLINE MONUMENT

R-14

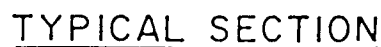
STANDARD
DETAILS

CENTERLINE MONUMENT

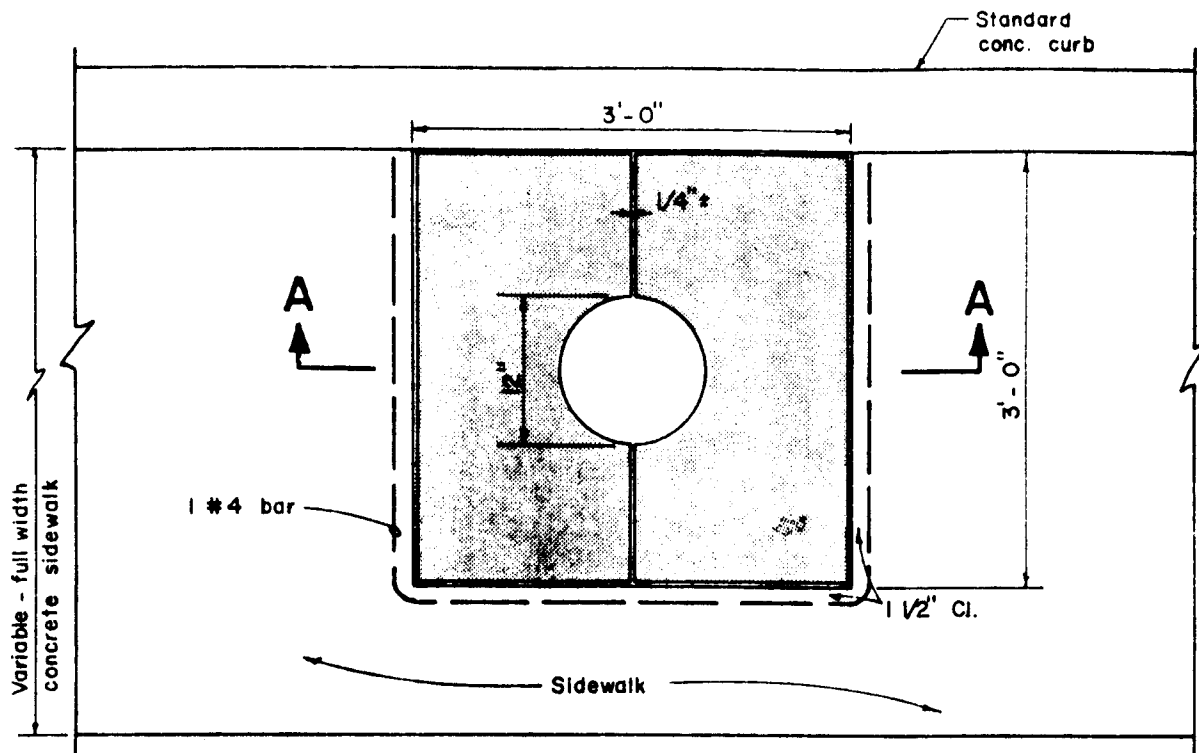
SEPTEMBER 1984

NOT TO SCALE

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

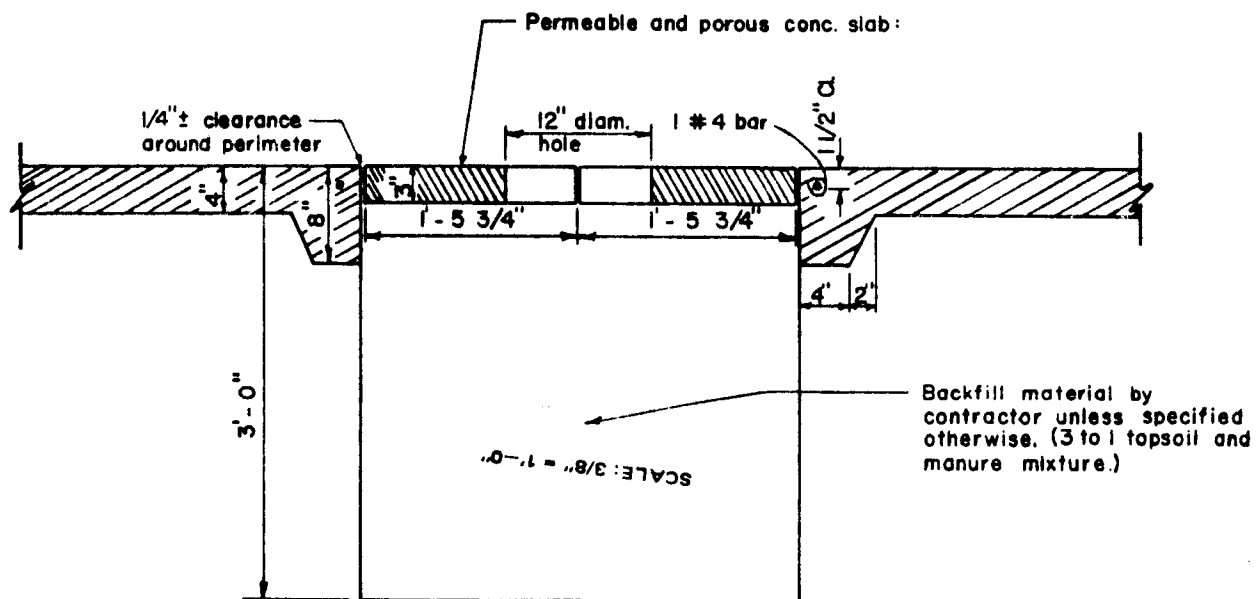


COUNTY OF KAUAI CITY & COUNTY OF HONOLULU COUNTY OF MAUI COUNTY OF HAWAII	END OF ROAD BARRICADE SCALE: 1/4" = 1'-0"	STANDARD DETAILS	R-15
--	--	---------------------	------



PLAN

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



SECTION A-A

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

TREE WELL WITH CONCRETE COVER

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

TREE WELL WITH CONCRETE COVER

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

SEPTEMBER 1984

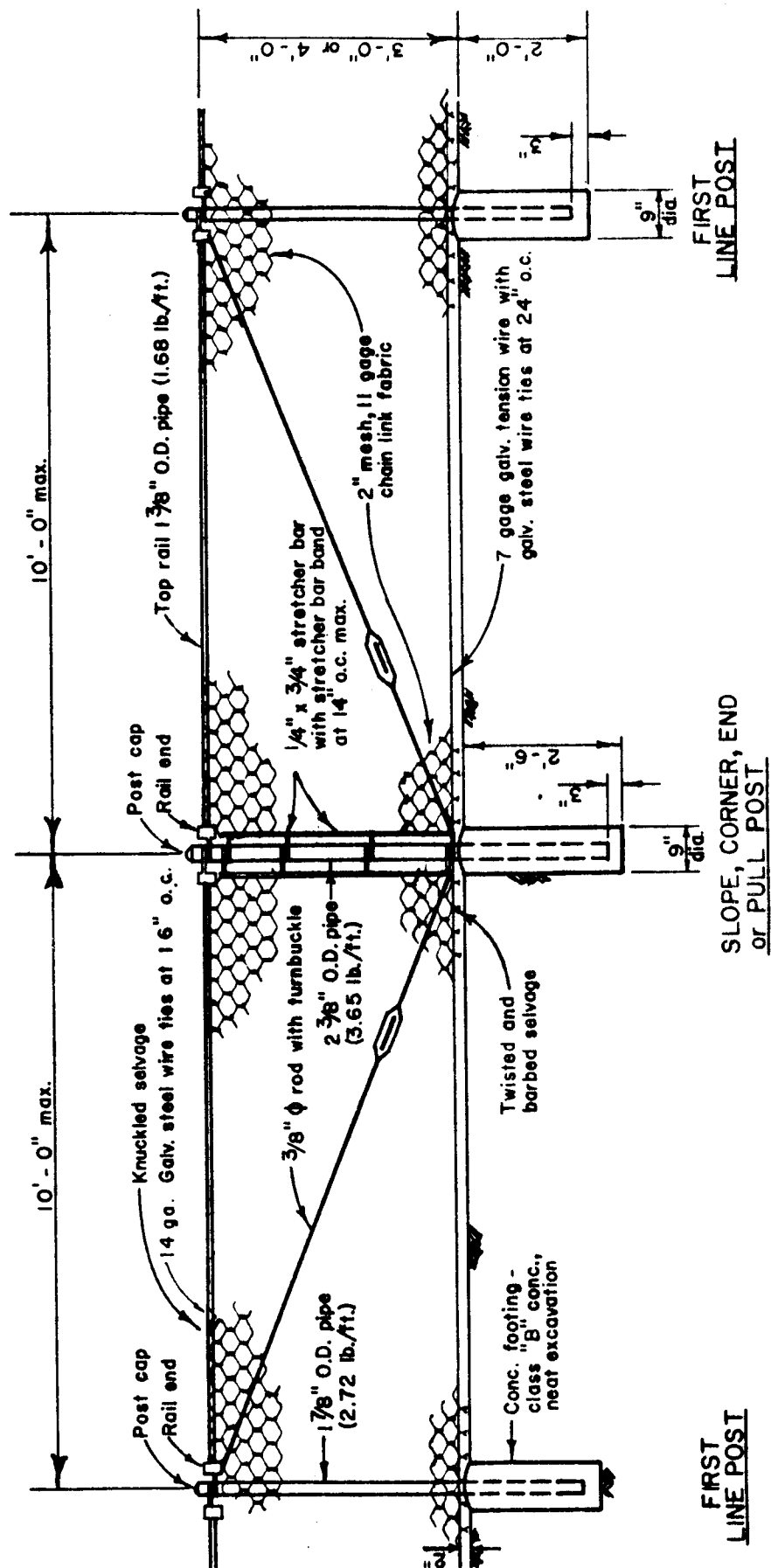
STANDARD
DETAILS

R-17

STANDARD DETAILS

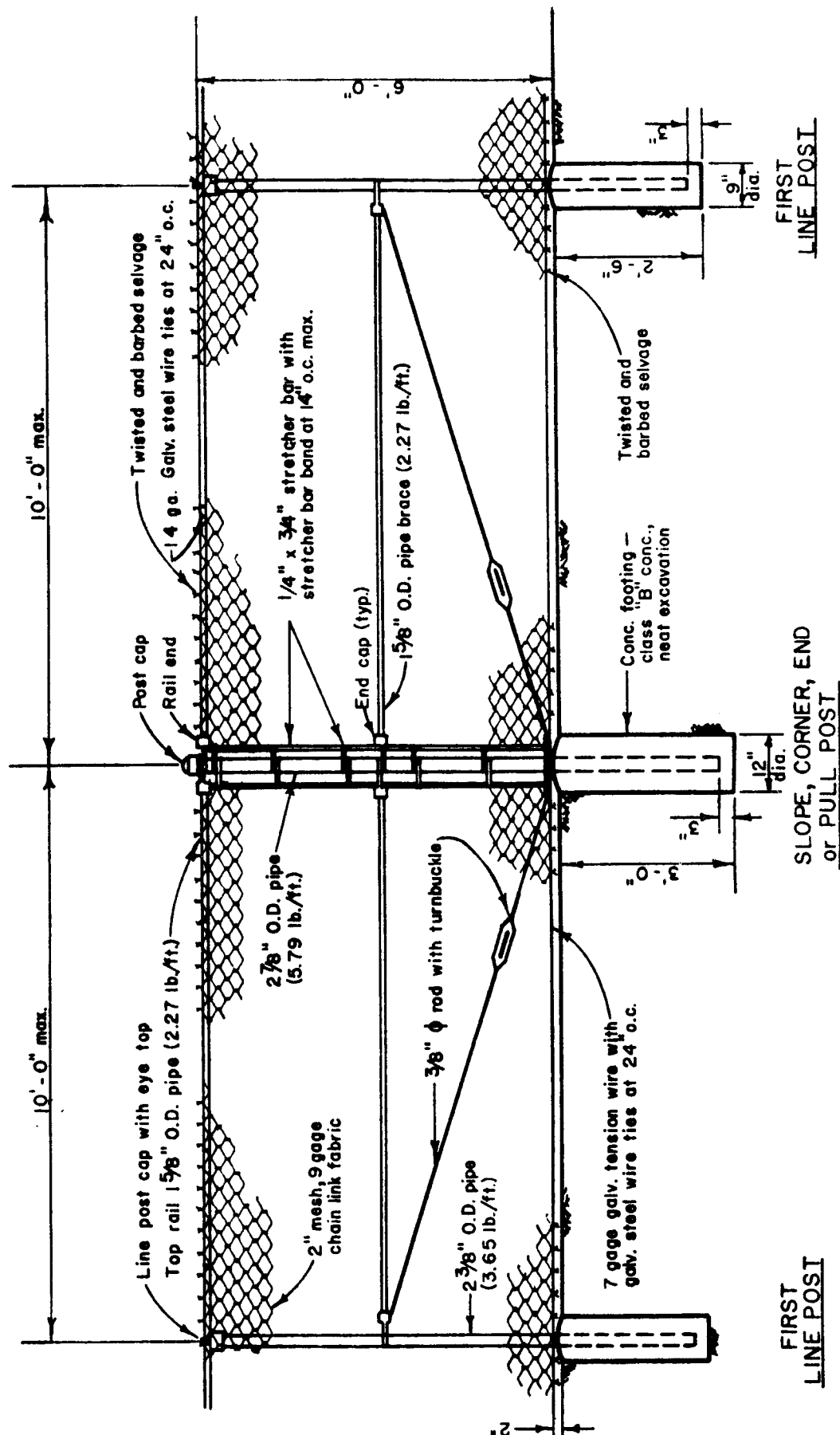
SEPTEMBER 1984

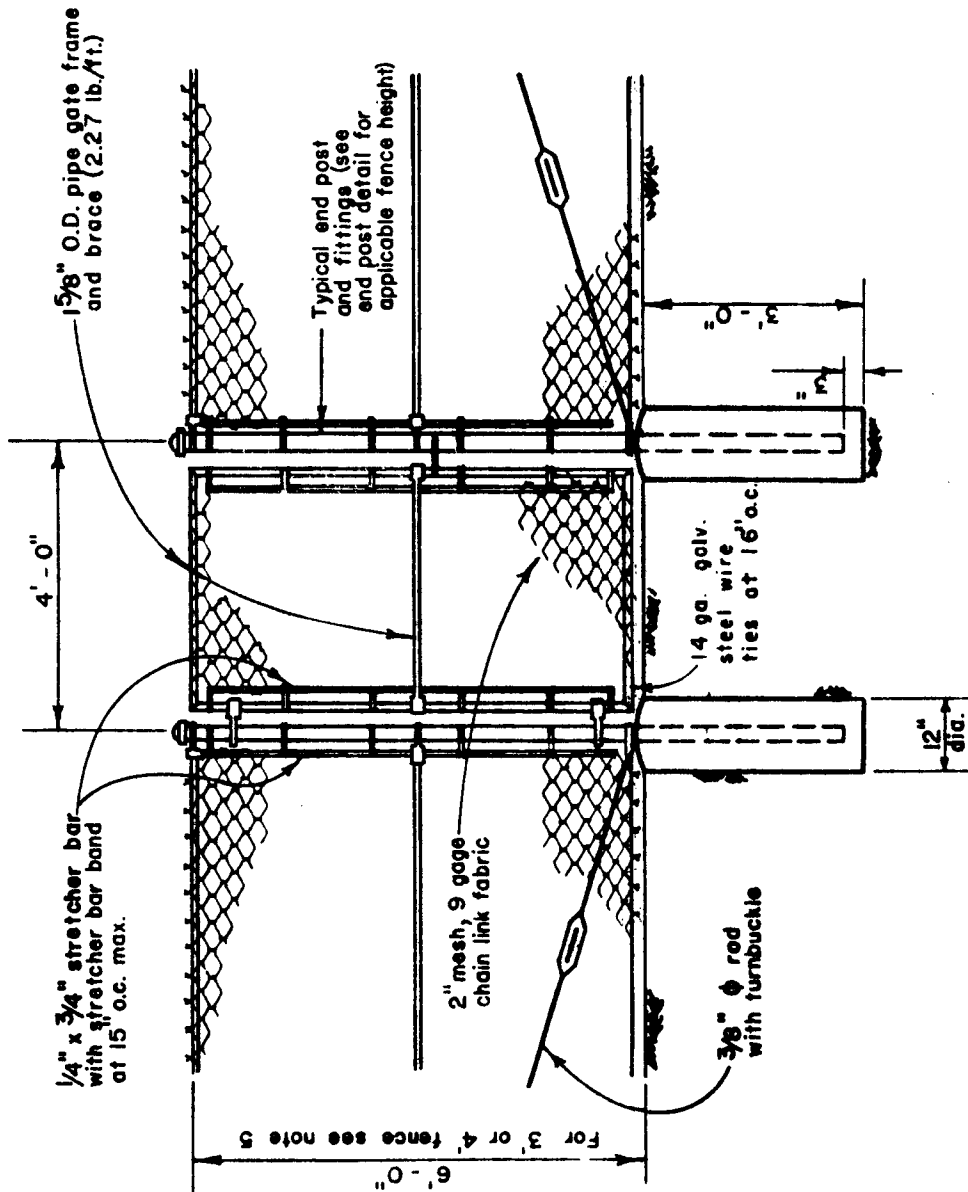
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



NOTES:

1. Posts and braces shall be Schedule 40 (standard weight) pipe. Sizes specified are outside diameter.
2. All fencing material shall be galvanized steel.
3. Top rail couplings shall be located within 6" of line posts.
4. Top of concrete footing shall be crowned to shed water.





TYPICAL PERSONNEL GATE

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

R-20

STANDARD
DETAILS

TYPICAL SINGLE GATE

SEPTEMBER 1984

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

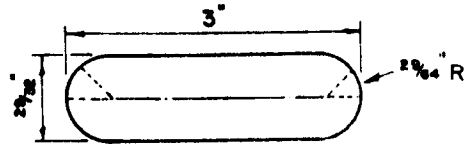
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

[illegible]

TYPE B BOLT

HEXAGON NUT

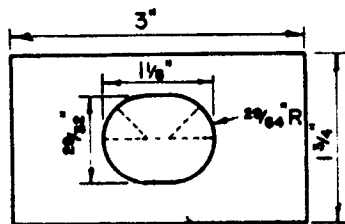
Scale: $\frac{1}{2}$ Size



SPlice Bolt Slot
FOR SPECIAL END SHOE

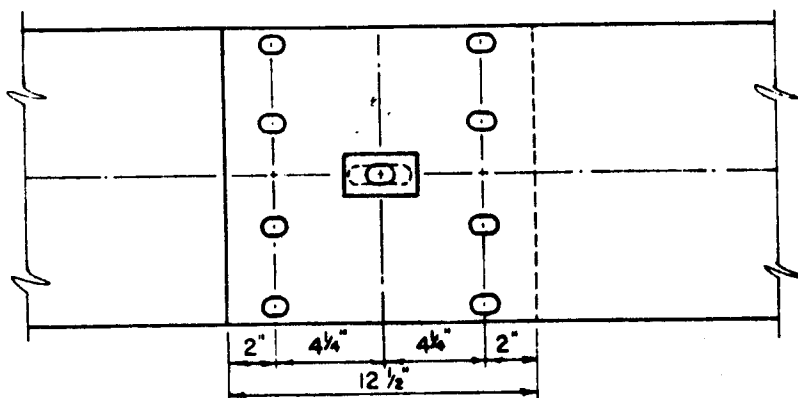
Scale: $\frac{1}{2}$ Size

Scale: $\frac{1}{2}$ Size



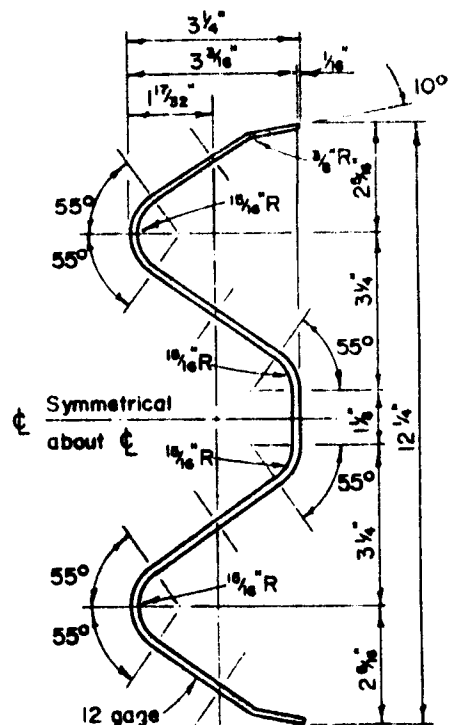
RAIL WASHER

Scale : $\frac{1}{2}$ Size



RAIL SPLICE

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



RAIL ELEMENT SECTION

Scale: 3" = 1'-0"

Metal spacer
block W6 x 8.5

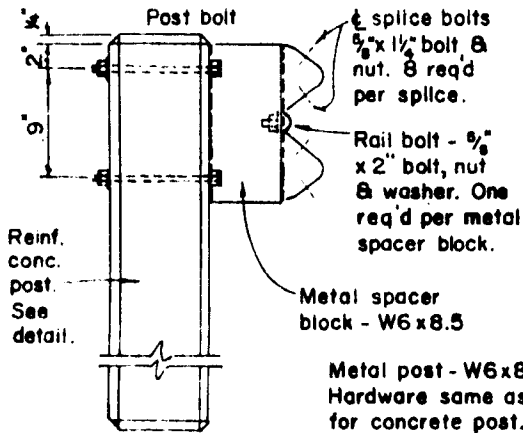
Post bolt Galv.
 $\frac{5}{8}$ " x $1\frac{3}{4}$ " bolt, nut &
washer. Two req'd
per post.

PLAN

Post bolt Galv.
 $\frac{5}{8}$ " x $1\frac{3}{4}$ " bolt, nut &
washer. Two req'd
per block at alt. side
of web.

Metal spacer
block W6x8.5

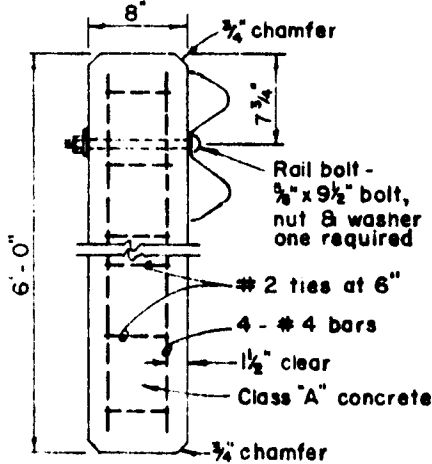
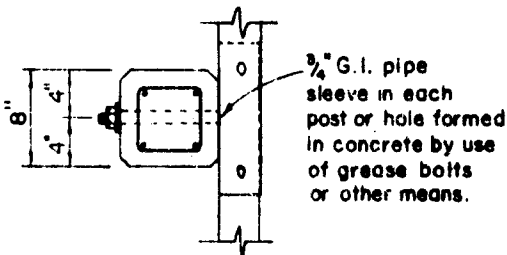
PLAN



ELEVATION

CONC. POST
WITH SPACER BLOCK

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



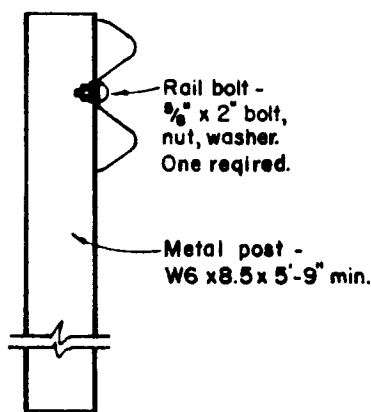
ELEVATION

CONC. POST
WITHOUT SPACER BLOCK

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

METAL POST
WITH SPACER BLOCK

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

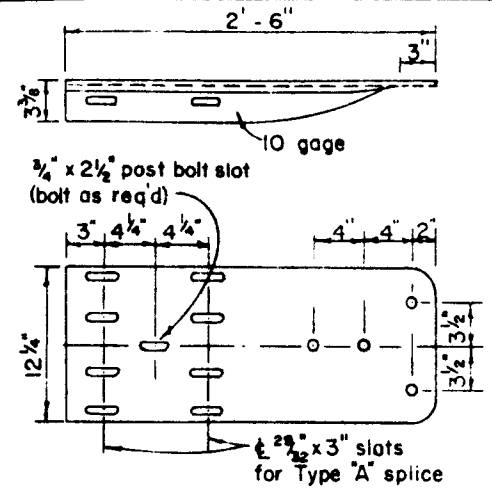


ELEVATION

METAL POST
WITHOUT SPACER BLOCK

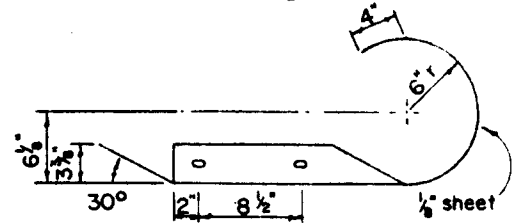
Scale: $\frac{3}{4}$ " = 1' - 0"

Note: All metal
shall be galvanized



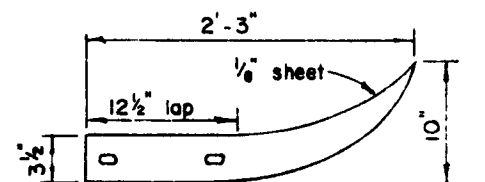
SPECIAL END SHOE

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



CURVED END

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



FLARED END

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

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

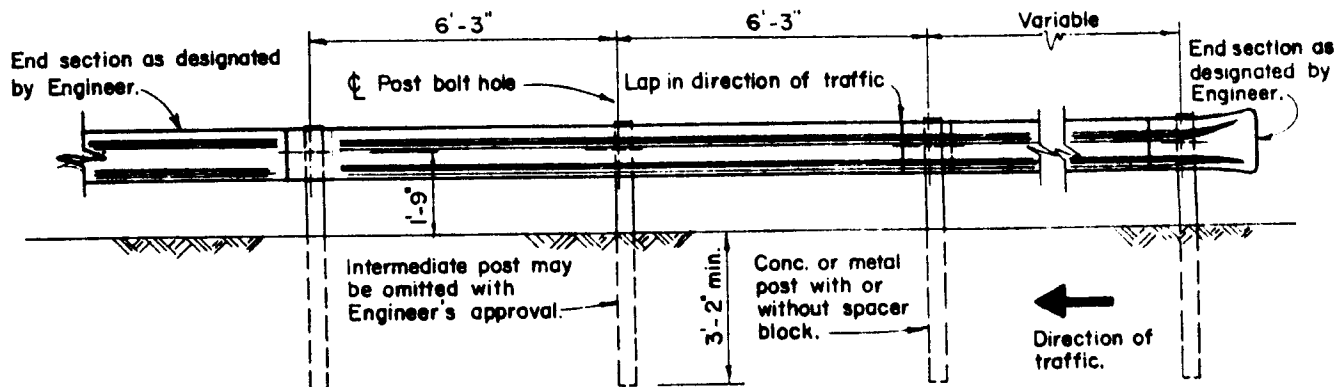
METAL GUARDRAIL DETAILS

SCALE: AS NOTED

SEPTEMBER 1984

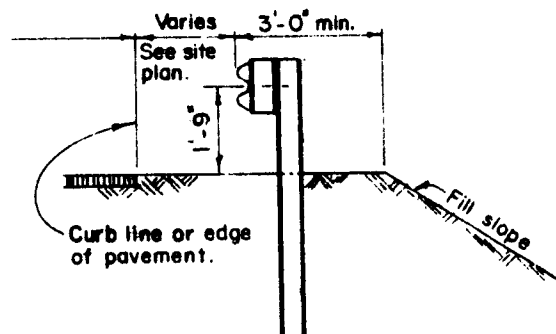
STANDARD
DETAILS

R-23



TYPICAL ELEVATION

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



TYPICAL SECTION

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

R-24

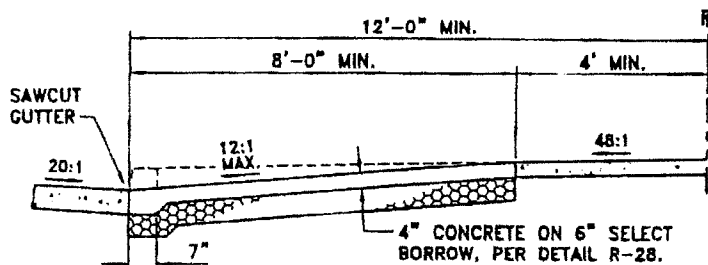
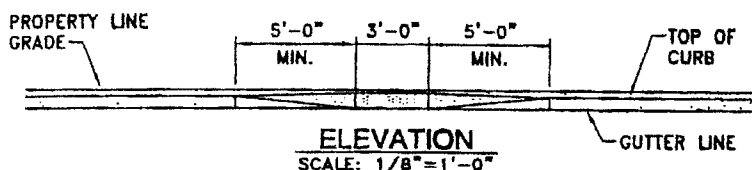
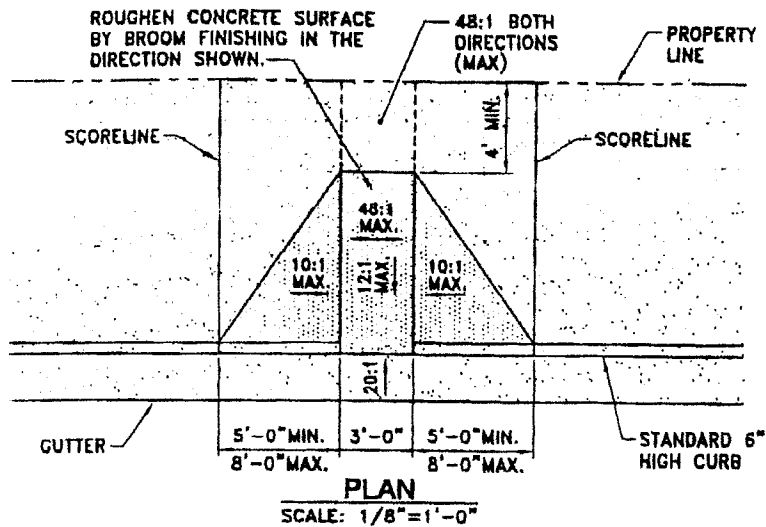
STANDARD
DETAILS

METAL GUARDRAIL DETAILS

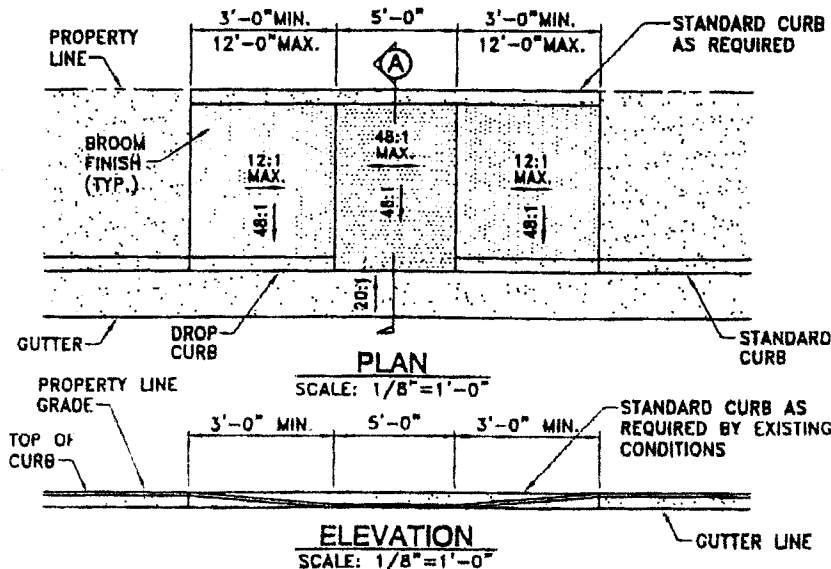
SEPTEMBER 1984

SCALE: $\frac{1}{4}" = 1' - 0"$

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



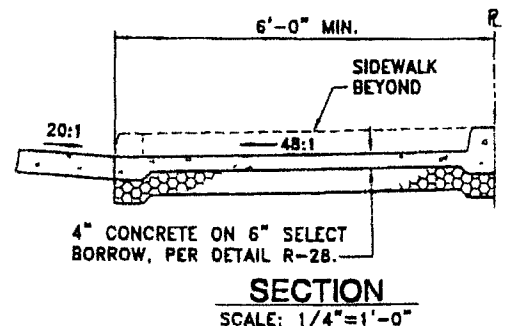
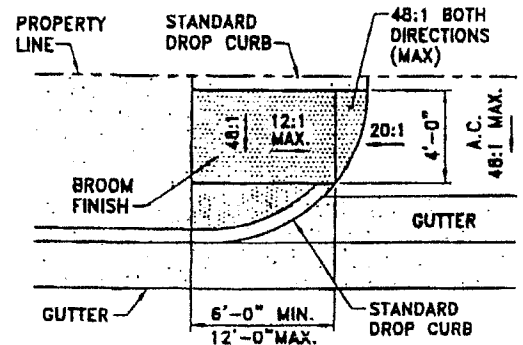
RAMP FOR 12' MIN. SIDEWALK (TYPE A)
SEE NOTE 5 & 6



RAMP AT NARROW SIDEWALK- UNDER 12' (TYPE B)

NOTES

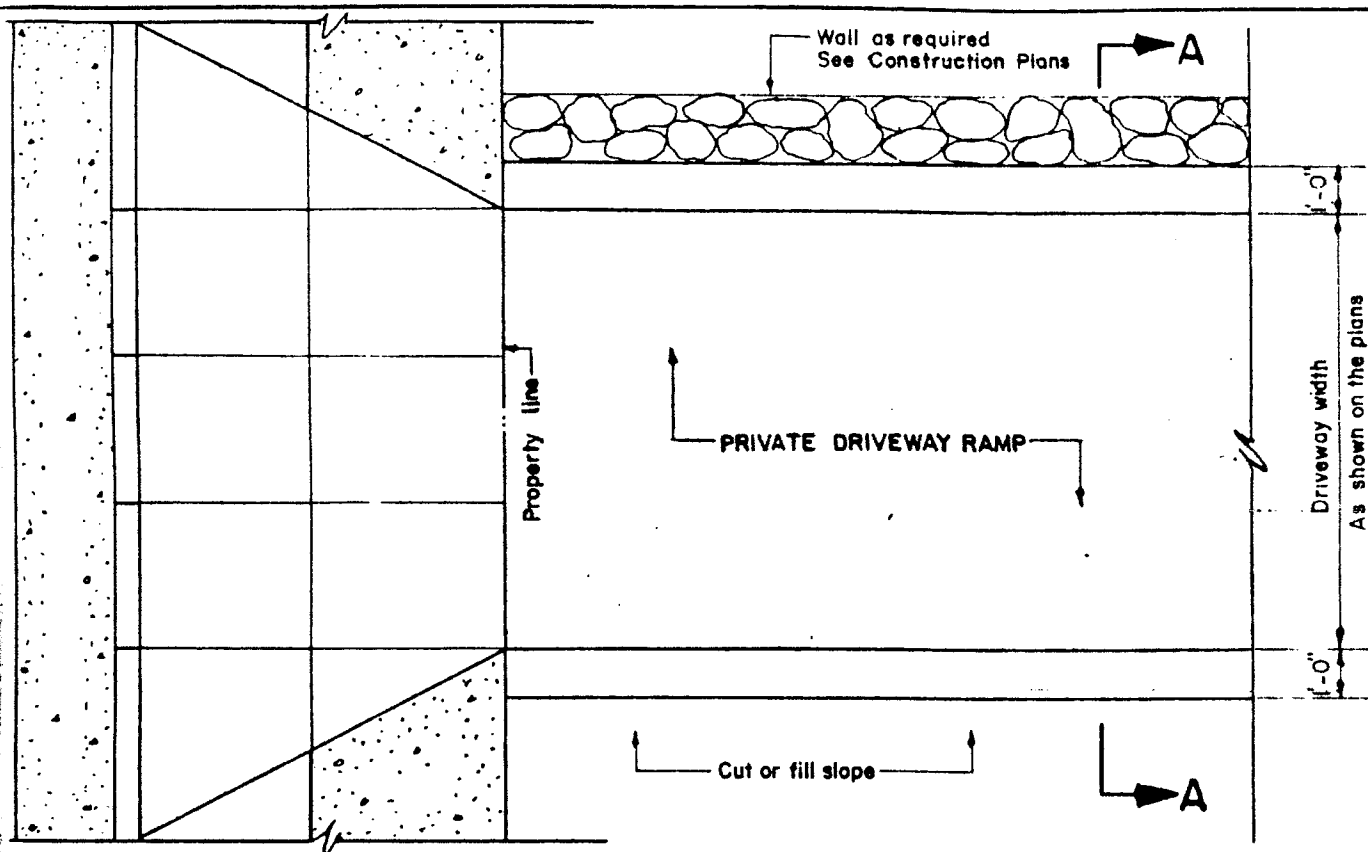
1. WHEN NECESSITATED BY EXISTING PHYSICAL CONDITIONS, CUSTOM-DESIGNED CURB RAMPs SHOULD BE USED SUBJECT TO CITY'S APPROVAL.
2. SUBJECT TO FIELD CONDITIONS, THE CITY SHALL DETERMINE THE FINAL LOCATION OF THE CURB RAMP.
3. AT INTERSECTIONS CURB RAMPs FOR EACH CROSSWALK ARE PREFERRED AND SHALL BE IN LINE AND WITHIN THE CROSSWALK. HOWEVER A SINGLE CURB RAMP FOR DIAGONAL CROSSWALKS CAN BE APPROVED IF THE DESIGN DETAIL IS ACCEPTABLE BY THE CITY.
4. FOR AN EXISTING SIDEWALK, ENTIRE SIDEWALK BETWEEN NEAREST SCORE LINES SHALL BE REMOVED.
5. FOR SIDEWALK WIDTHS LESS THAN 12', USE DETAIL FOR RAMP AT NARROW SIDEWALKS.
6. THIS DETAIL IS INTENDED AS A GUIDELINE FOR NEW CURB RAMP CONSTRUCTION. A SITE SPECIFIC DETAIL THAT MEETS THESE REQUIREMENTS SHALL BE SHOWN ON THE PLANS.
7. IN ADDITION, PASSING SPACES ALONG NEW SIDEWALKS SHALL BE PROVIDED AT MAXIMUM 200' INTERVALS AS REQUIRED BY ADA GUIDELINES. THE PASSING AREA SHALL BE A MINIMUM 5' WIDE BY 5' LONG AS FEASIBLE.
8. NO PULLBOXES, HANDHOLES, MANHOLES, ETC. SHALL BE ALLOWED IF THEY CONTAIN ANY OPENINGS > 1/2" AND ARE OF A POTENTIALLY SLIPPERY SURFACE.
9. TRANSITIONS FROM RAMPs TO GUTTERS AND STREETS SHALL BE FLUSH AND FREE OF ABRUPT CHANGES IN LEVEL. THE CHANGES IN LEVEL. THE MAXIMUM SLOPES OF ADJOINING GUTTERS, ROAD SURFACE IMMEDIATELY ADJACENT TO THE CURB RAMP, OR ACCESSIBLE ROUTE SHALL NOT EXCEED 20:1.



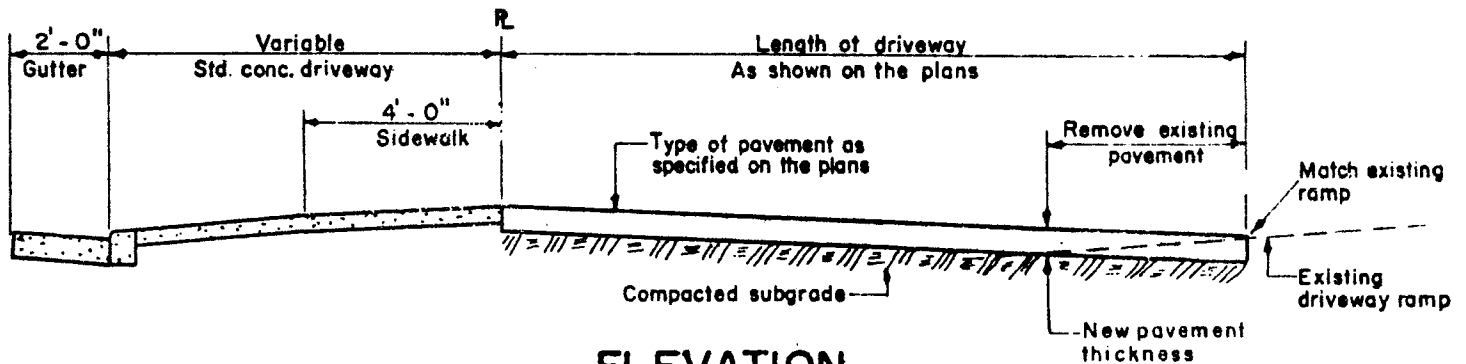
CURB RAMP

STANDARD
DETAILS

R-25A



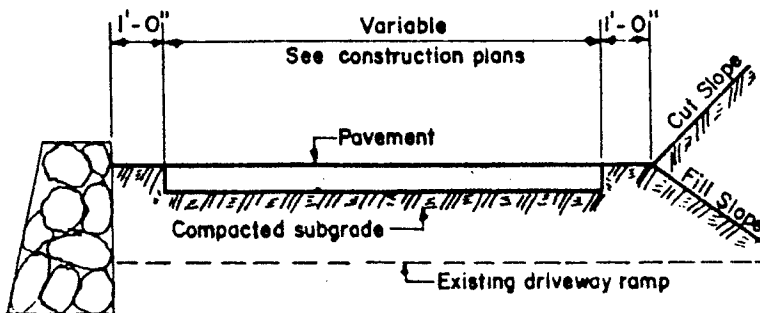
PLAN



ELEVATION

CONSTRUCTION NOTES

1. Asphaltic concrete pavement shall be 1 1/2" thick min. and constructed over a 4" thick base course.
2. Reinforced concrete pavement shall be 4" thick min., reinforced with 6 x 6 - 6/6 galvanized welded wire fabric and constructed on compacted subgrade.
3. Rolled coral driveway ramp shall be 3" thick min.
4. For all fill slopes use 4" top soil on fill material.



SECTION A - A

PRIVATE DRIVEWAY RAMP

R-26

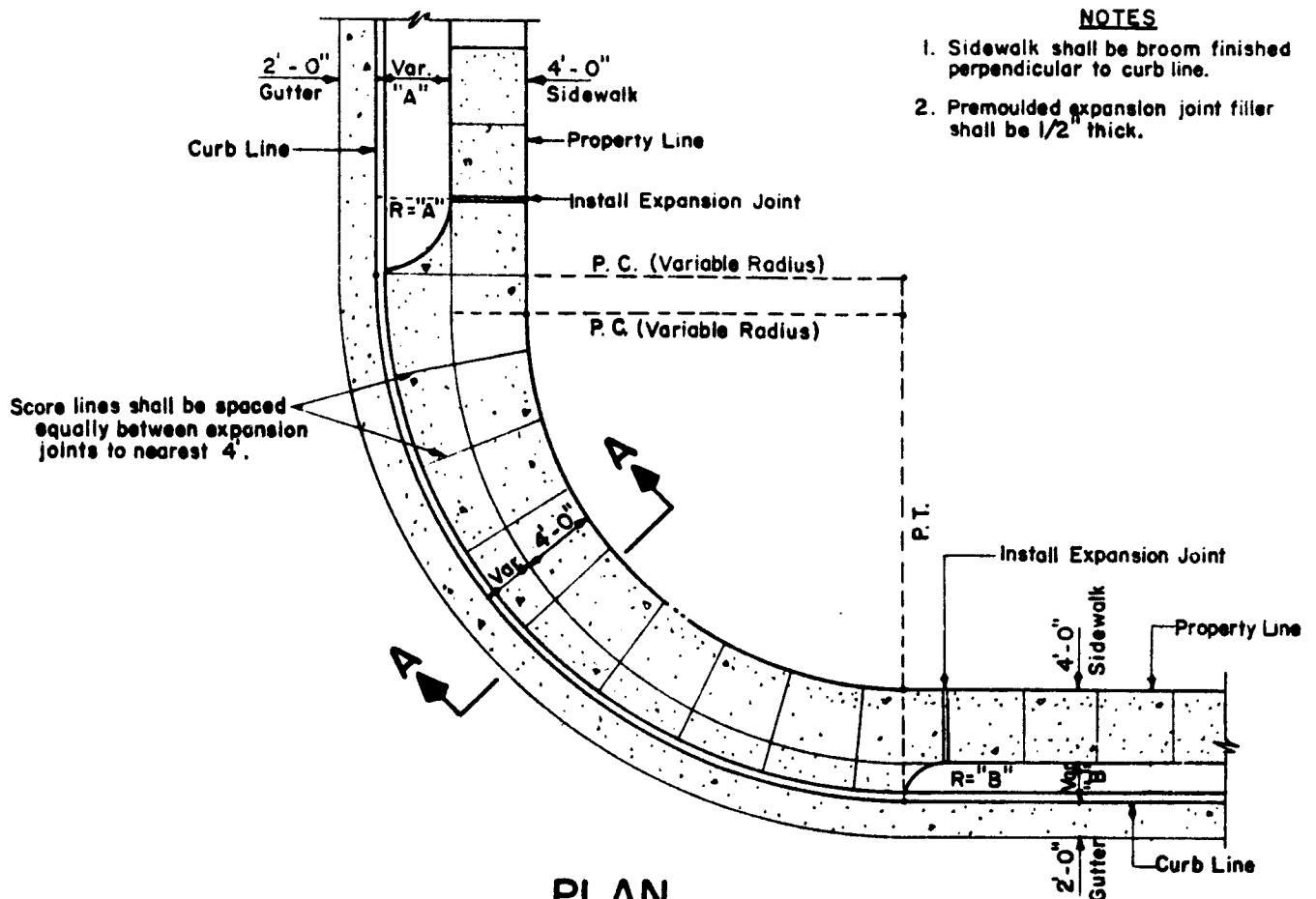
STANDARD
DETAILS

PRIVATE DRIVEWAY RAMP

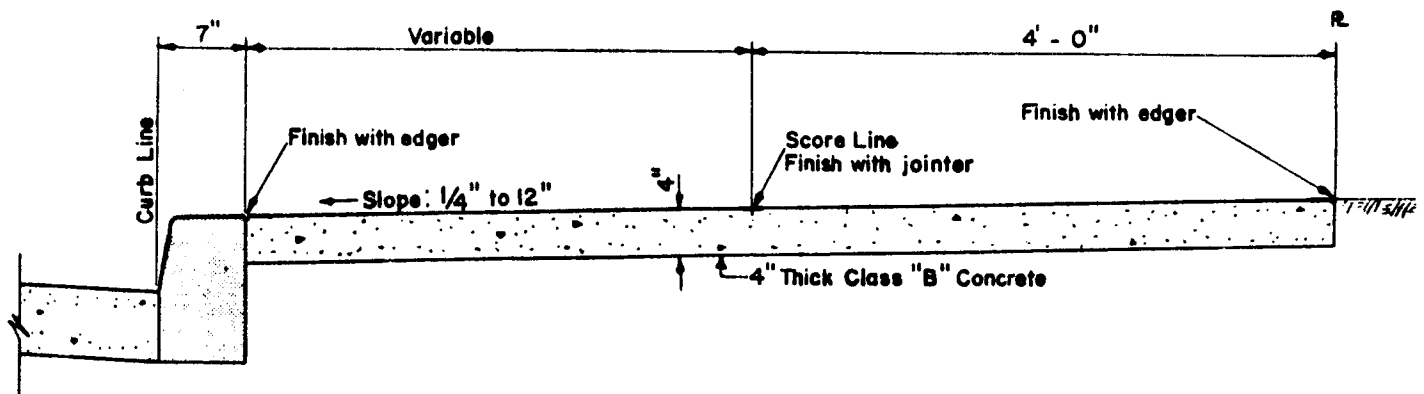
SEPTEMBER 1984

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

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



PLAN
SCALE: 1" = 10'-0"



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

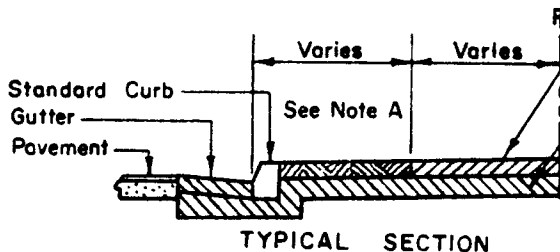
FULL WIDTH SIDEWALK AT CURB RETURN

STANDARD SIDEWALK WIDTHS

Sidewalk widths for sidewalks in districts described in the Comprehensive Zoning Code for the City and County of Honolulu shall conform to the following:

District	Paved Sidewalk Width
All Residential	4 feet minimum
A-1, A-2, and A-3 Apartment	4 feet minimum
A-4 and A-5 Apartment	6 feet minimum
H-1 Resort Hotel	4 feet minimum; required width for each location shall be determined by the Chief Engineer.
H-2 Hotel	Full width unless determined otherwise by the Chief Engineer.
B-1 Business	4 feet minimum
B-2, B-3, and B-5 Business	6 feet minimum
B-4 Business	Full width
All Industrial	4 feet minimum
All Planned Development (For streets to be dedicated to the City)	4 feet minimum

SIDEWALK WITH STANDARD CURB & GUTTER



4" Class B concrete, broom finish perpendicular to curb. Standard slope $\frac{1}{4}$ " per L.F. Chief Engineer may authorize different slope to suit special conditions.

6" select borrow under sidewalk, curb and gutter wherever expansion value of subgrade exceeds 3%.

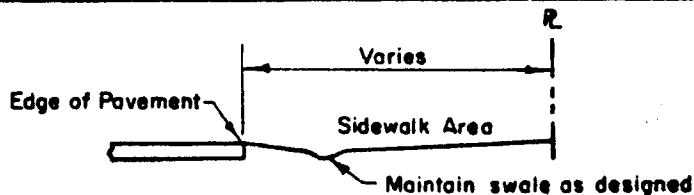
All utility installations shall be identified with the name of the utility company on the frame or cover. Checkered metal covers installed in sidewalks with slopes exceeding 10% shall be painted with non-skid paint.

Where concrete curb or sidewalk exists or is to be constructed, driveways shall be of concrete.

NOTE A:

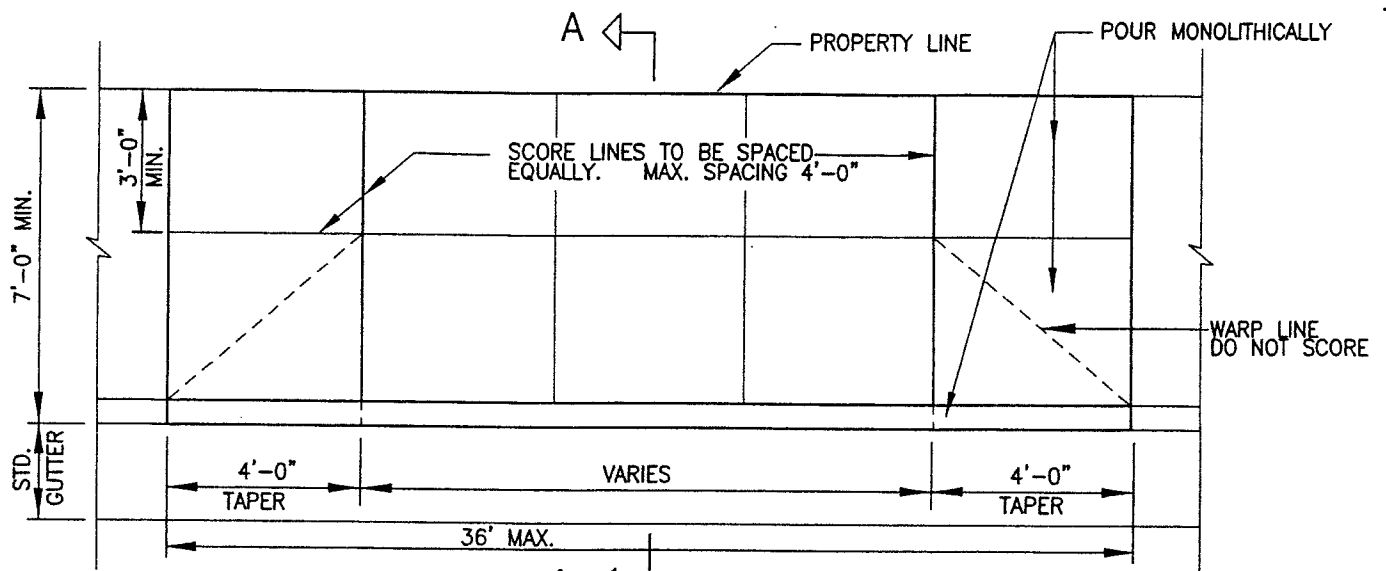
- Full-width concrete sidewalks may be permitted when constructed for the entire block.
- Lawn grass or vegetative ground cover of a type with a maximum growth height of 4" or of a type that will grow at a trimmed height of 4" except vines or other planting which may be a tripping hazard. 4" topsoil required.
- In lieu of lawn grass the Chief Engineer may authorize:
 - Acceptable artificial turf, with proper bases,
 - Precast masonry units laid closely in a uniform pattern (bricks, tile caps, etc.) with proper base,
 - Asphalt concrete on proper base,
 - Concrete - poured separately from the concrete sidewalk, and of similar thickness, and
 - Loose aggregates, such as basaltic, coral or limestone chips.
- Street trees including existing trees may be permitted in sidewalk areas subject to the approval of the Department of Parks and Recreation.
- Sprinklers, set flush with the surface, may be permitted by the Chief Engineer.
- In areas where curbs exist with unpaved sidewalks, temporary asphalt concrete walkways may be installed, if authorized by the Chief Engineer.

SIDEWALK AREA WITHOUT CURB OR GUTTER

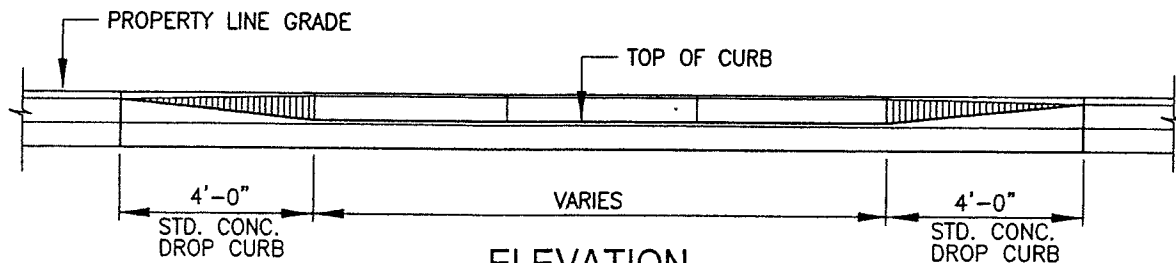


GENERAL NOTE:

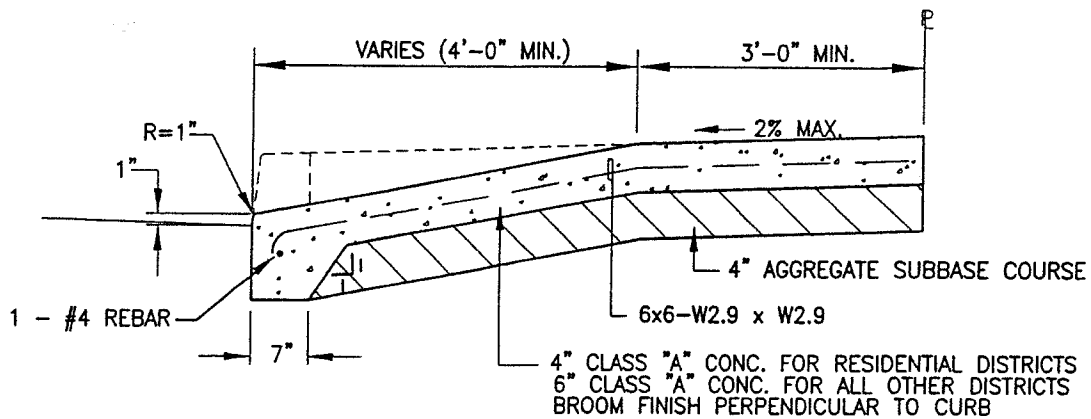
Mailbox support shall be of a type which causes minimal obstruction to traffic.



DRIVEWAY PLAN
N.T.S.



ELEVATION
N.T.S.

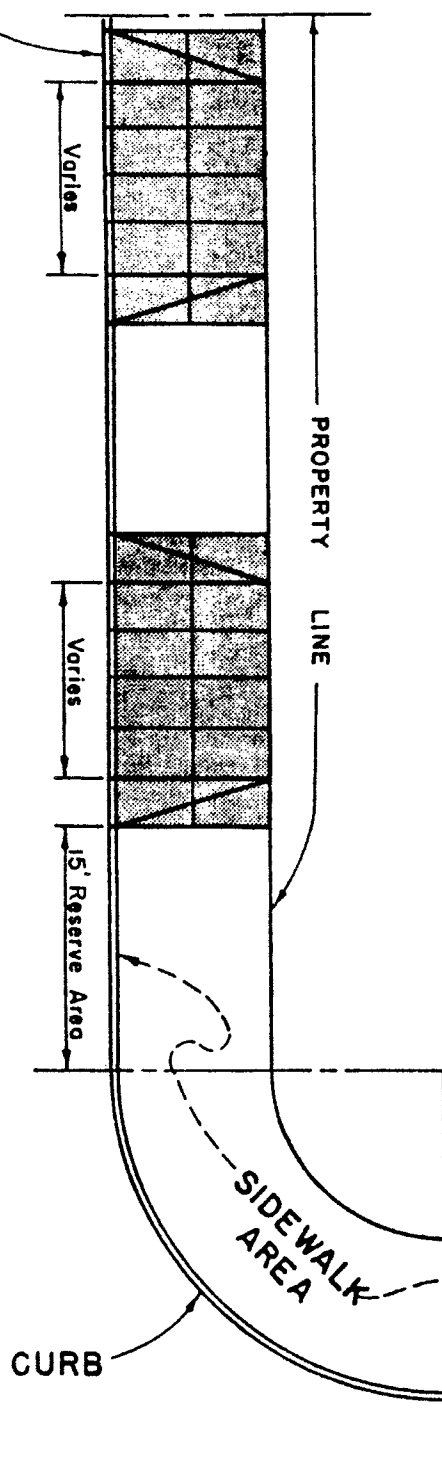


SECTION "A-A"
N.T.S.

NOTES:

1. THICKNESS OF AGGREGATE SUBBASE COURSE BENEATH CONCRETE PAVEMENT MAY BE REVISED IF DEEMED NECESSARY BY THE ENGINEER.
2. THE TOP OF ALL TYPES OF CONCRETE CURB, INCLUDING DRIVEWAY CURBS SHALL BE LONGITUDINALLY BROOM FINISHED.

Driveway flare not to extend beyond property line extension except where property frontage is less than 15 feet.



ALL RESIDENTIAL DISTRICTS

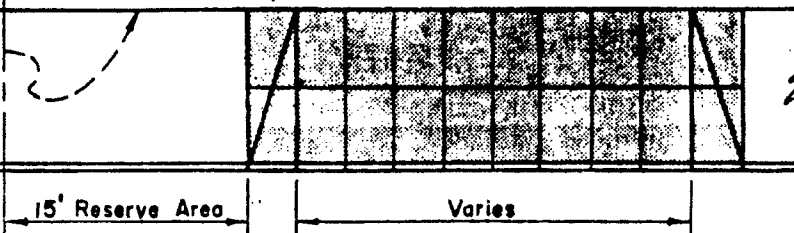
Single driveway width: maximum 25 feet, minimum 12 feet. Two driveways may be constructed per parcel per property frontage provided total width does not exceed 25 feet per frontage. Schools, churches, hospitals and fire stations are exempted. Driveways serving abutting properties may be combined upon the mutual consent of the property owners.

BUSINESS, INDUSTRIAL, HOTEL & APARTMENT DISTRICTS

1. Total driveway width excluding flares on any street shall not exceed 30 feet or 45 per cent of the property frontage on that street, whichever is greater.
2. No driveway excluding flares shall be less than 12 feet or exceed 50 feet in width. Minimum width for two way traffic shall be 20 feet.
3. No limit on number of driveways provided total width excluding flares does not exceed limit provided in "Note 1" above.

GENERAL NOTES :

1. Deviation from this standard and other driveway standards may be permitted upon approval of the Chief Engineer.
2. Upon approval by the Joint Pole Committee, the City Traffic Engineer, and the Chief Engineer, driveways may encroach into the 15 foot reserve area.
3. No portion of the driveway or flare shall encroach into the curved portion of the curb return except that on government initiated widening or improvement of streets where an existing driveway is located on the return and it is physically impossible to relocate the driveway away from the return, such driveway may be reconstructed on the return.
4. 2" Asphalt Concrete on 6" base course may be used in place of reinforced concrete in unimproved areas or where installation of concrete sidewalks are pending. The grade of driveways in unimproved areas shall follow the typical planned section of the sidewalk area.
5. No driveway shall interfere with or be constructed within 2 feet of any utility installation, catch basin, fire hydrant, or other government installation.
6. Where property frontage is less than 15 feet, flares may extend beyond the projection of property lines.
7. Fire stations exempt from width requirements.



STANDARD DRIVEWAY LAYOUT

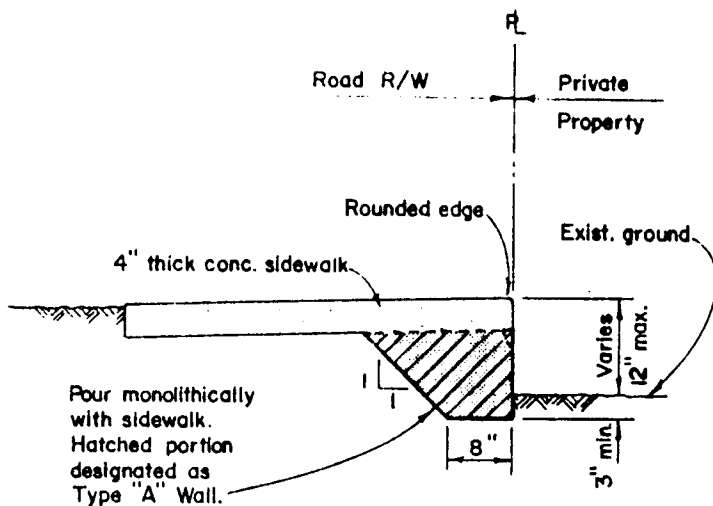
R-30

STANDARD
DETAILS

DRIVEWAY LAYOUT

CITY & COUNTY OF HONOLULU

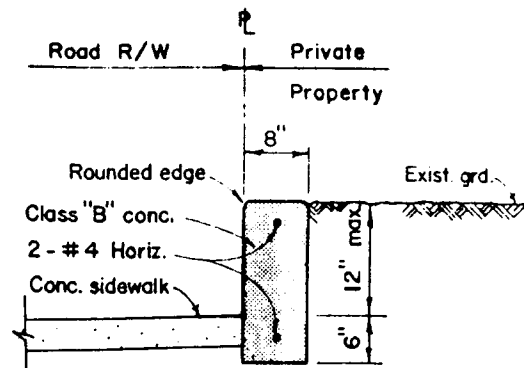
SEPTEMBER 1984



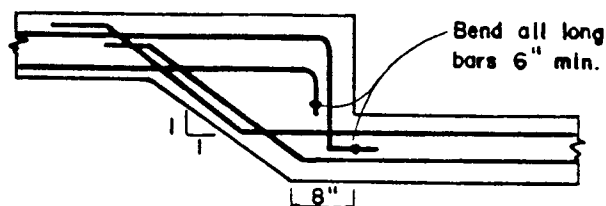
TYPE "A" WALL

Note: For conditions w/o conc. sidewalk, use top of wall detail as shown on Type "D" wall.

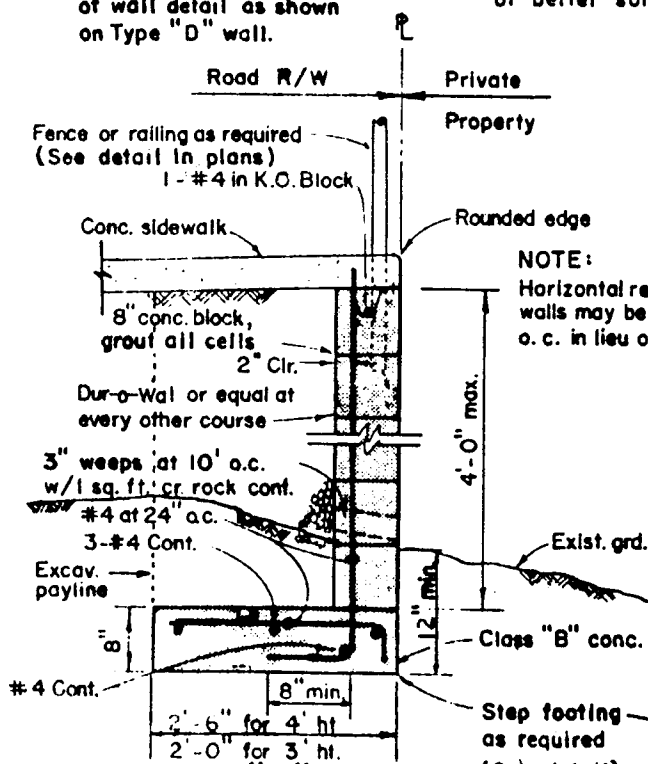
Note: Details applicable only for areas with granular soil containing some silt sized material or better soils.



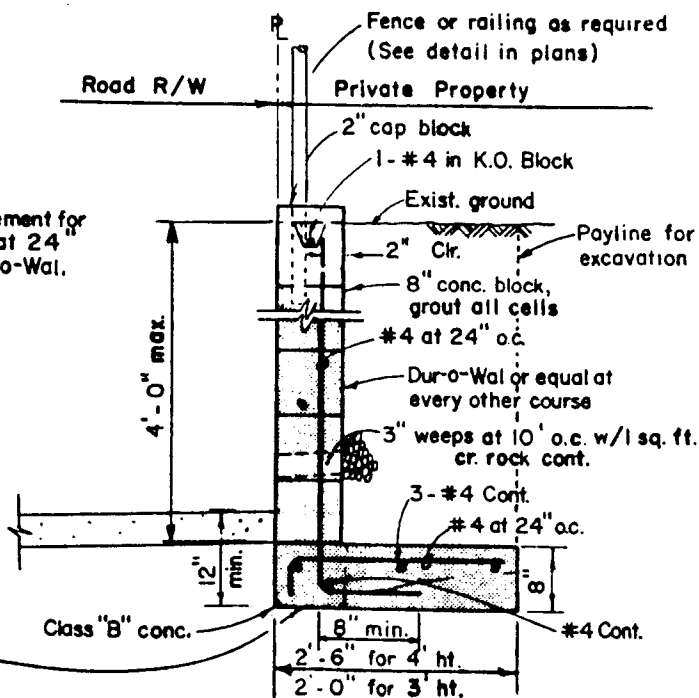
TYPE "B" WALL



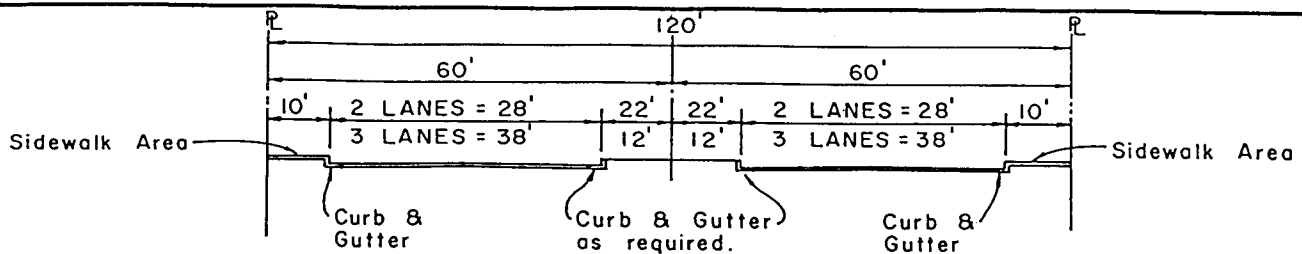
STEP FOOTING DETAIL



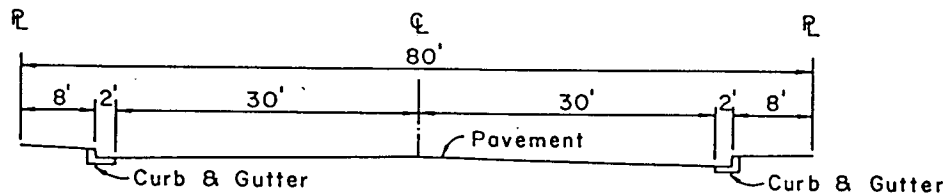
TYPE "C" WALL



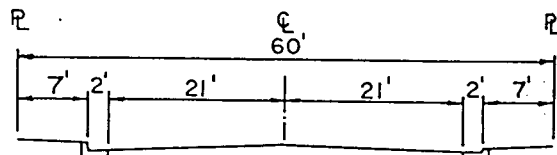
TYPE "D" WALL



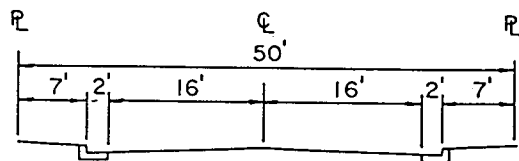
PRIMARY ARTERIALS



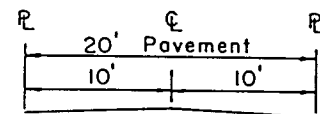
SECONDARY ARTERIALS



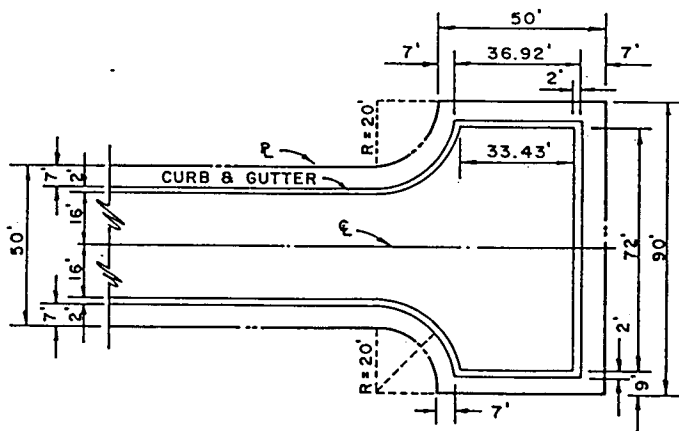
COLLECTOR STREETS
BUSINESS & INDUSTRIAL STREETS



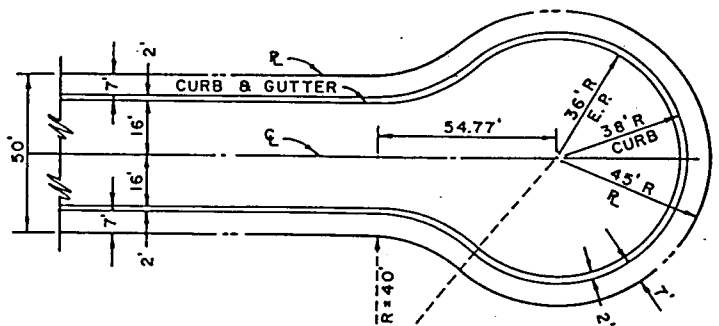
MINOR STS. & CUL-DE-SAC



ALLEY



"T" TURNAROUND



CIRCULAR TURNAROUND

NOTE:

All R/W widths shown hereon are minimum.
See R-34 for Road Pavement and Sidewalk Detail.

CUL-DE-SAC

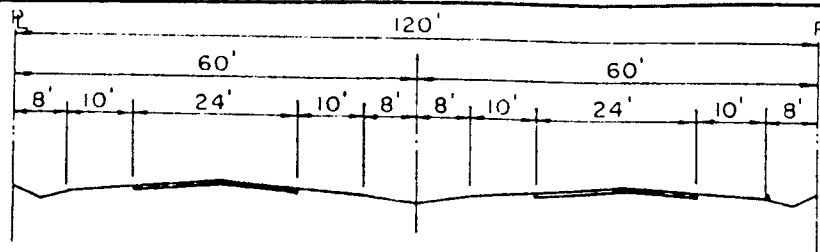
R-32

STANDARD
DETAILS

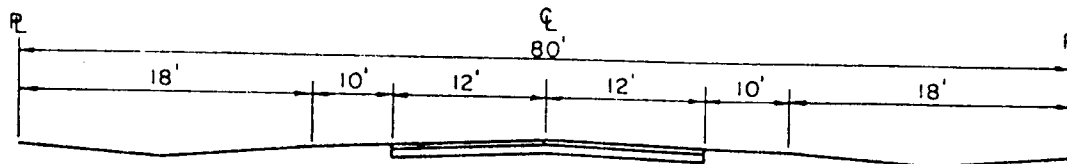
STREET CROSS SECTION
WITH SIDEWALK

NOT TO SCALE

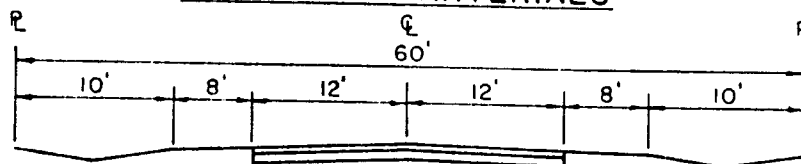
COUNTY OF HAWAII



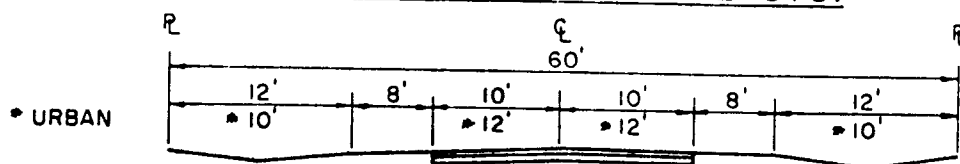
PRIMARY ARTERIALS



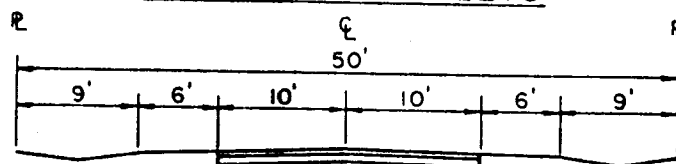
SECONDARY ARTERIALS



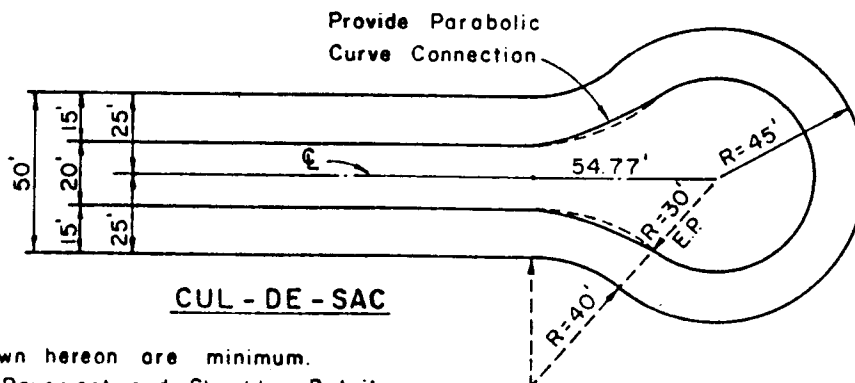
BUSINESS & INDUSTRIAL STS.



COLLECTOR STREETS



MINOR STREETS & CUL-DE-SAC



CUL-DE-SAC

NOTE:

All R/W widths shown hereon are minimum.
See R-34 for Road Pavement and Shoulder Detail.

STREET CROSS SECTIONS
WITHOUT SIDEWALK

COUNTY OF HAWAII

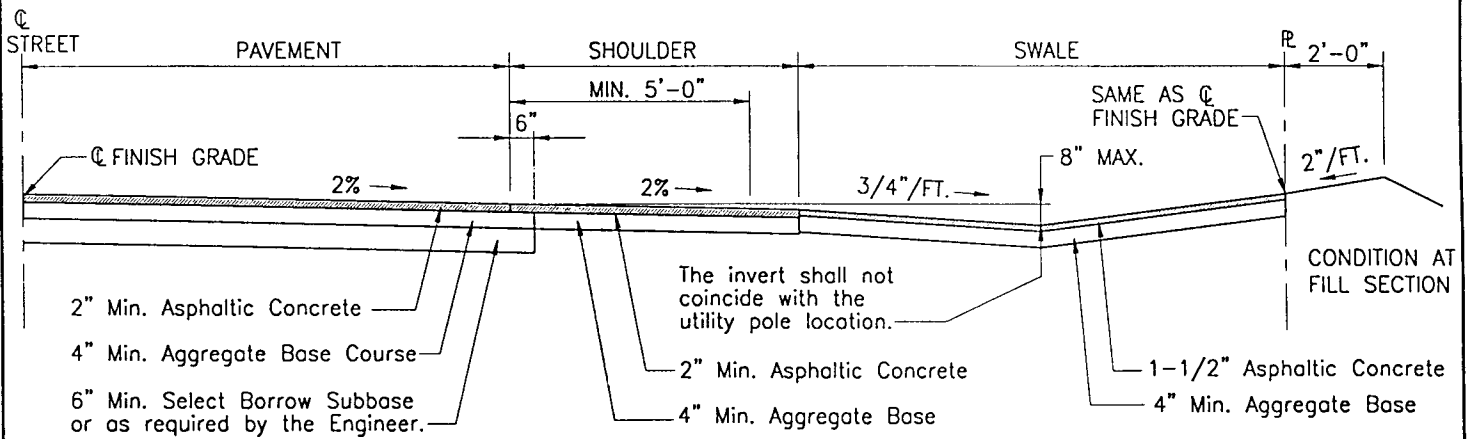
STREET CROSS-SECTIONS
WITHOUT SIDEWALK

STANDARD
DETAILS

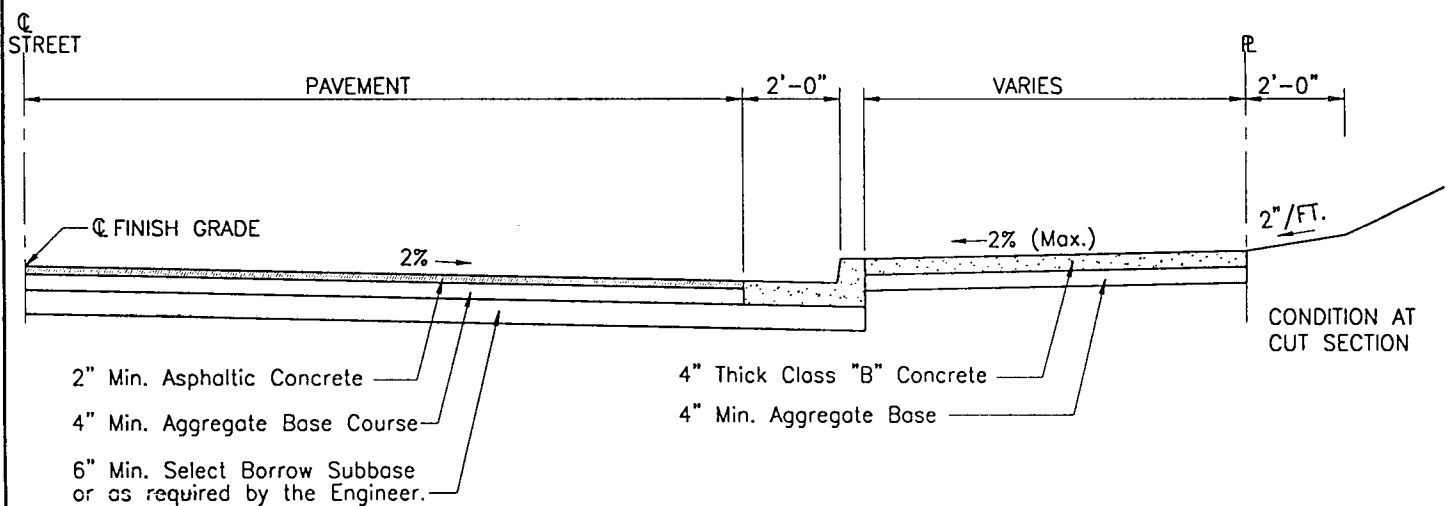
R-33

NOT TO SCALE

SEPTEMBER 1984



HALF SECTION OF STREET WITH SHOULDER



HALF SECTION OF STREET WITH SIDEWALK

ROAD PAVEMENTS AND SHOULDERS

R-34
REVISED

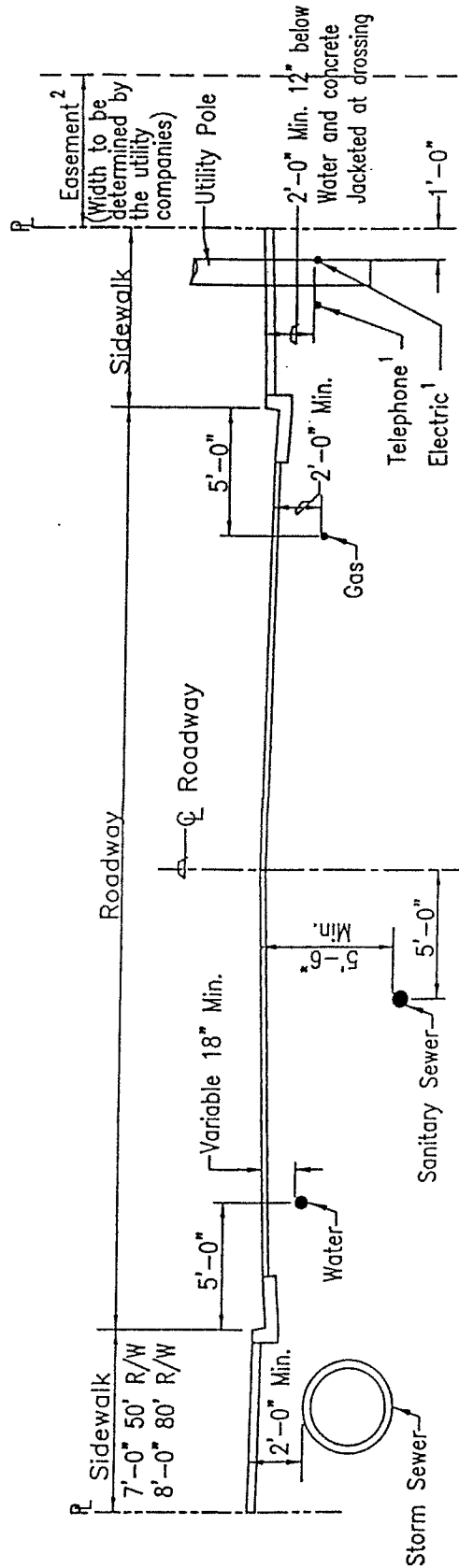
STANDARD
DETAILS

ROAD PAVEMENT AND SHOULDERS

COUNTY OF HAWAII

MAY 2001

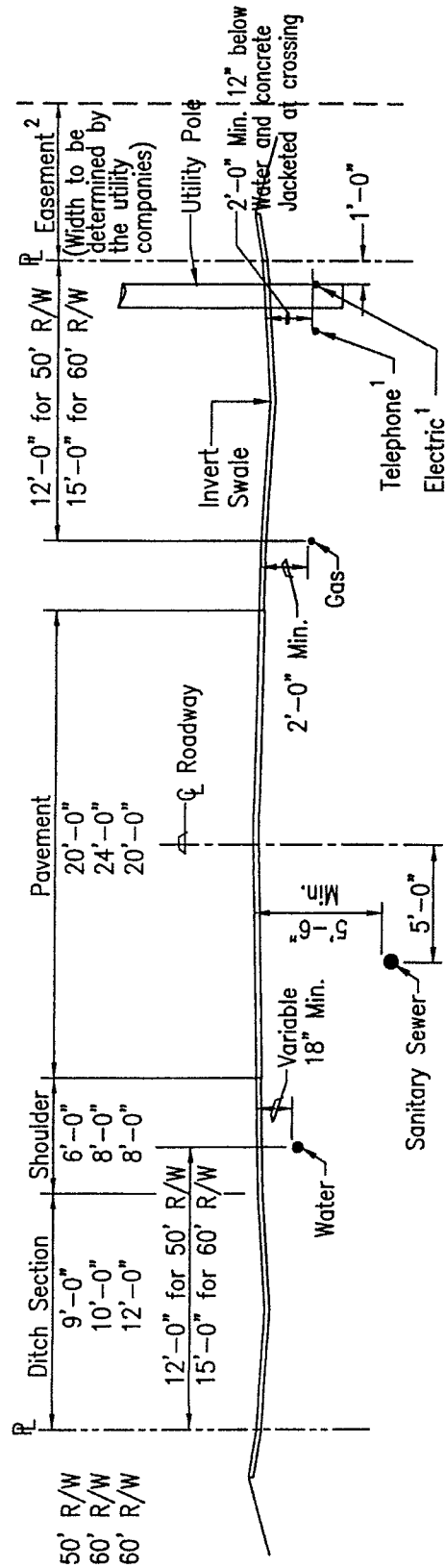
SCALE : NOT TO SCALE



- 1 Condition where utilities are underground.
- 2 Easement maybe omitted where utilities are installed underground.

TYPICAL ROADWAY UTILITY LOCATION WITH SIDEWALK

NOTE:
Utility boxes shall be constructed
Flush with the finished grade of
The swale.



- 1 Condition where utilities are underground.
- 2 Easement maybe omitted where utilities are installed underground.

TYPICAL ROADWAY UTILITY LOCATION WITHOUT SIDEWALK

COUNTY OF HAWAII

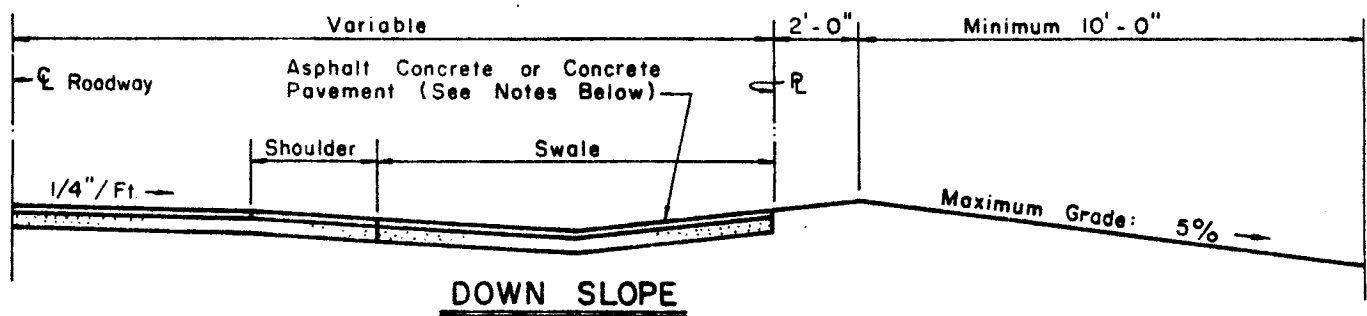
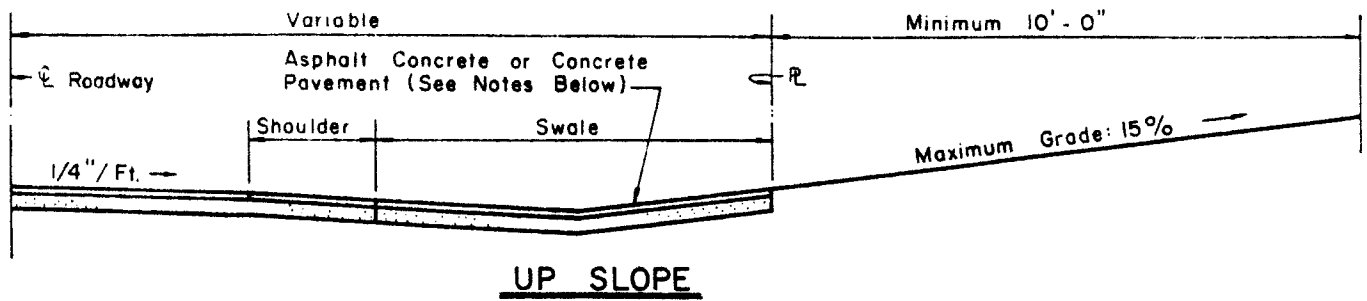
TYPICAL ROADWAY UTILITY
LOCATION WITHOUT SIDEWALK

SCALE: NOT TO SCALE

JUNE 2002

STANDARD
DETAILS

R-36
REVISED



NOTES:

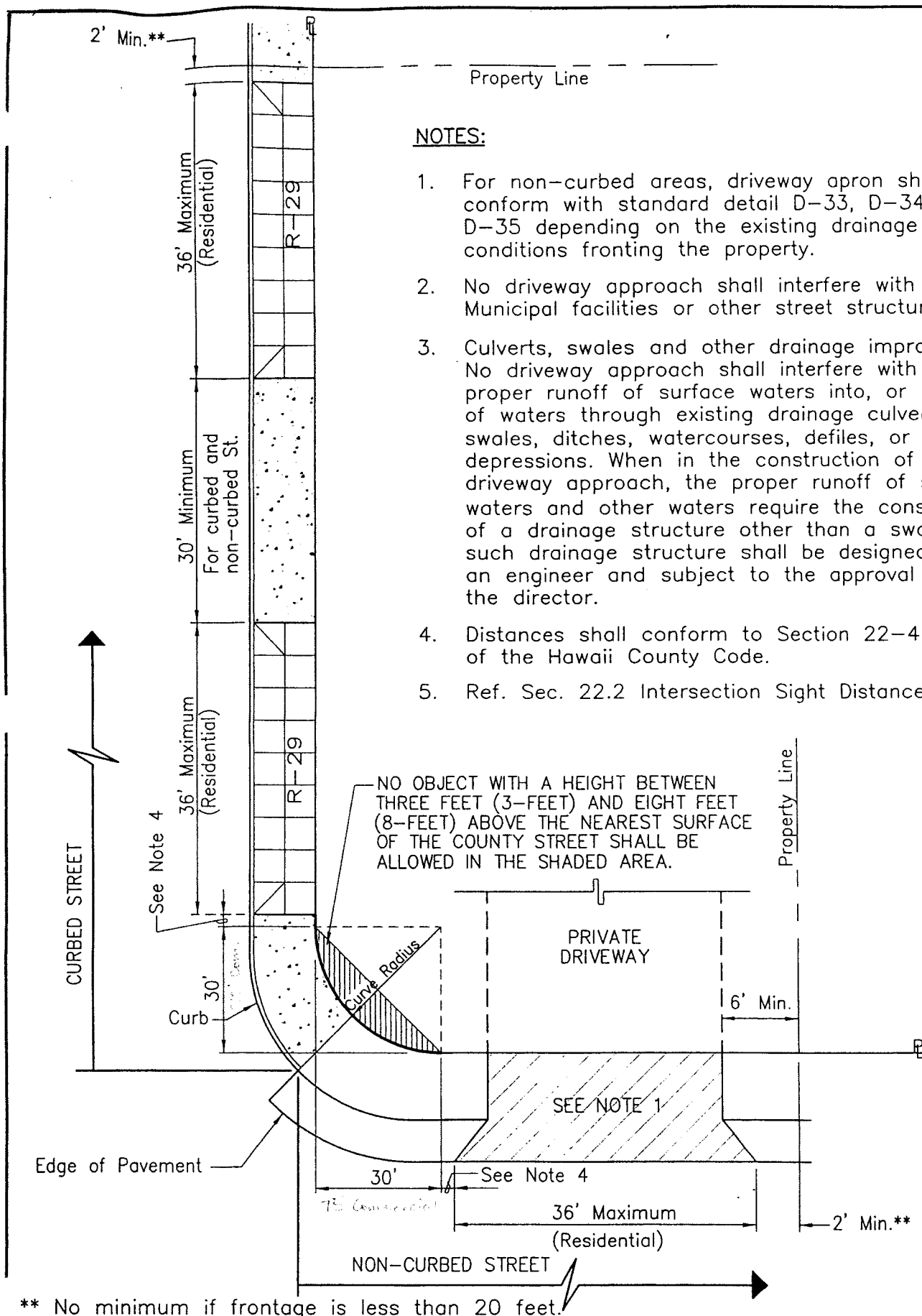
Concrete Pavement

1. 4" (Residential)-reinforced with 6 x 6-10/10 wire fabric, 6" (Commercial)-reinforced with 6 x 6-6/6 wire fabric, shall be constructed with 4" (min.) base course.
2. Provide construction joint at property line.

Asphalt Concrete Pavement

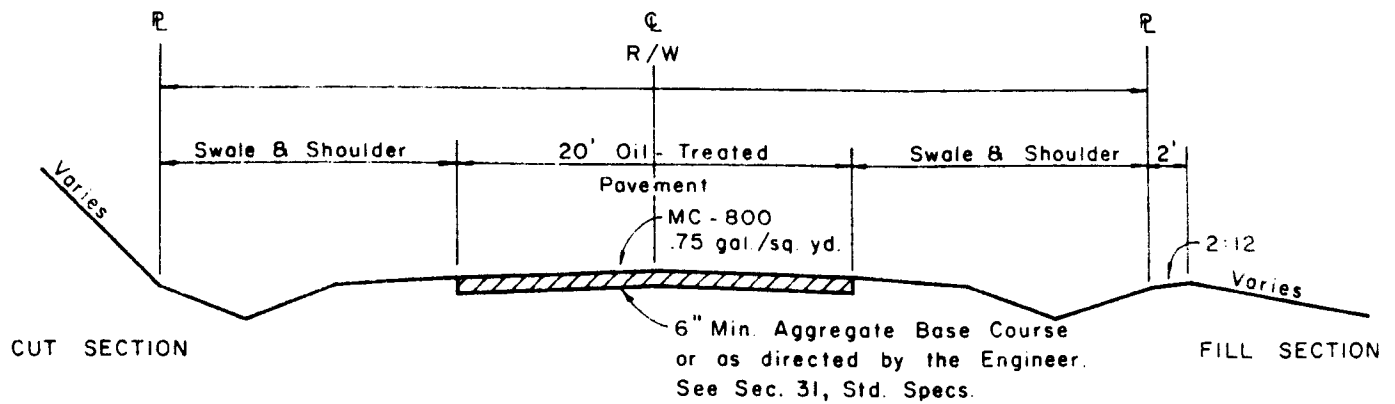
1. The structural section shall consist of 2" a. c. with 4" min. base course.

RESIDENTIAL DRIVEWAY WITHOUT CURB & GUTTER



** No minimum if frontage is less than 20 feet.

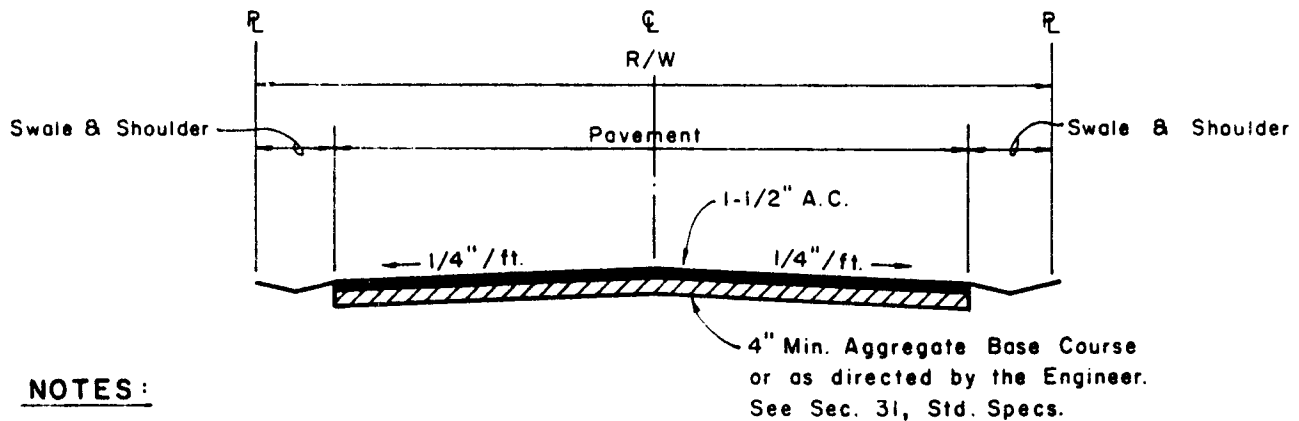
COUNTY OF HAWAII	DRIVEWAY LAYOUT	STANDARD DETAILS	R-38 REVISED
SCALE: NOT TO SCALE		FEBRUARY 2003	



NOTES:

1. This street is only for areas zoned A-3 and over.
2. The oil-treatment shall conform to Section 409 - Seal Coat Type 3 of the Dept. of Transportation Std. Specs. for Road & Bridge Construction, except that .4 gal./sq. yd. shall be used for the first application and .35 gal./sq. yd. shall be used for the second application.
3. Where grades are 8% or greater, the roadway section shall be paved as shown in Detail R-34.
4. See Std. Detail R-33 for applicable minimum R/W and pavement widths.

AGRICULTURAL STREET



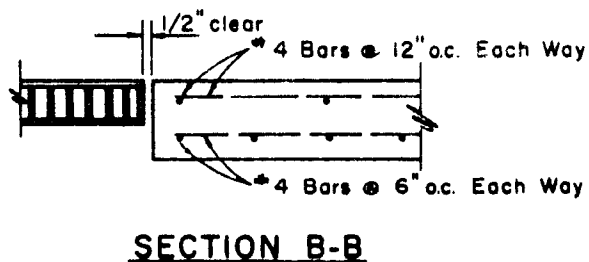
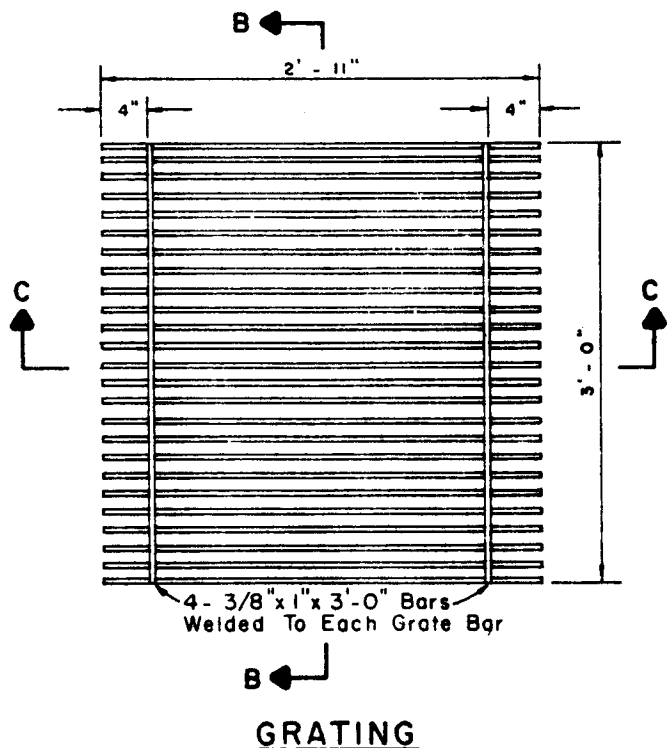
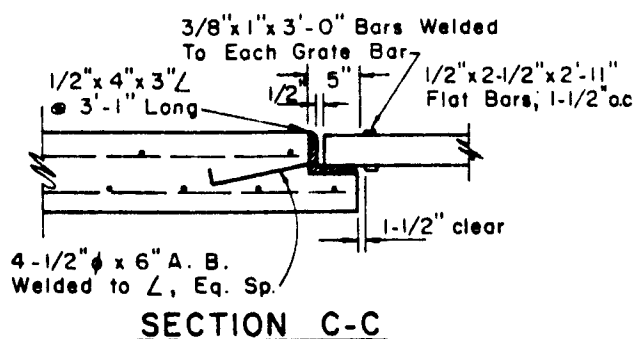
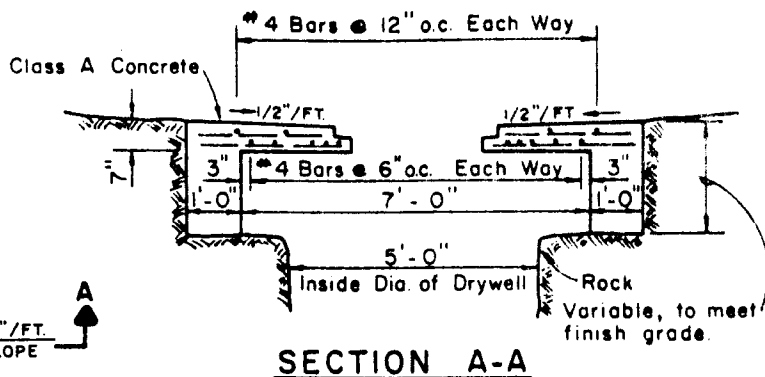
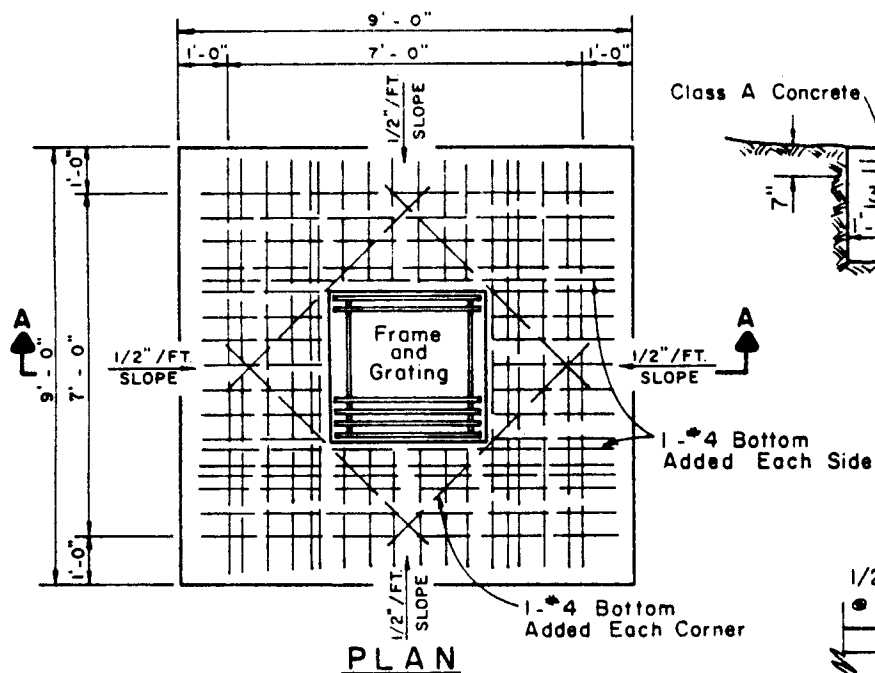
NOTES:

1. This street is for residential and Ag-1 lots and shall not provide access to more than six (6) lots.
2. Minimum pavement and R/W widths shall be as follows:

Access (Lots)	Pavement Width	R/W Width
1	8'	12'
2	12'	16'
3	14'	18'
4 to 6	16'	20'
3. Maximum grade = 20%.
4. 4" thick concrete reinforced by 6x6-10/10 WWM on 4" min. Aggregate Base Course may be used in lieu of the above section.
5. The existing drainage pattern shall not be altered with respect to adjoining properties.

PRIVATE DEAD-END STREET

NON-DEDICABLE STREETS



NOTES:

1. All weld 5/16".
2. All steel shall be structural grade.
3. Grates and frame Ls shall be hot dip galvanized after fabrication in accordance with ASTM A 123.
4. Minimum depth shall be 20'-0" or as directed by the Engineer.
5. RM-1 Delineator shall be placed as directed by the Engineer.

DRY WELL COVER

R-40

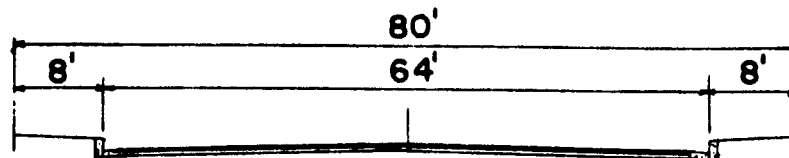
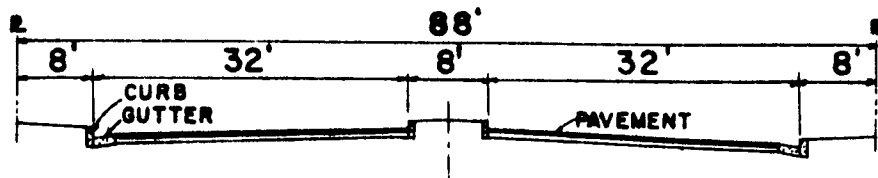
STANDARD
DETAILS

DRY WELL COVER

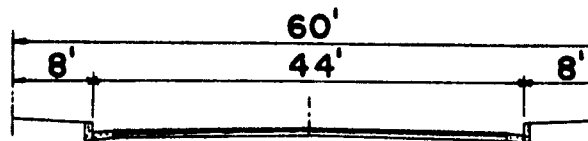
COUNTY OF HAWAII

SEPTEMBER 1984

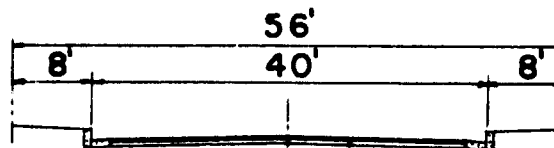
NOT TO SCALE



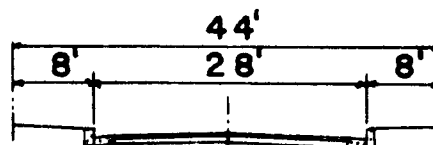
MAJOR THOROUGHFARES



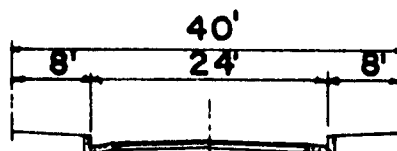
MAJOR STREET



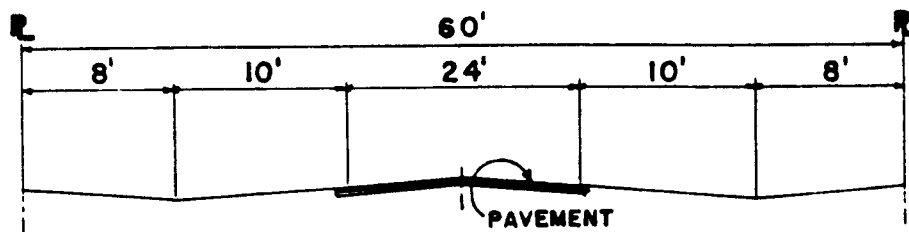
COLLECTOR STREET



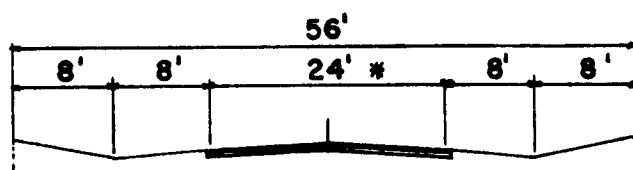
MINOR STREET



DEAD END STREET

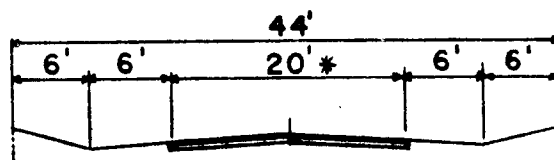


MAJOR STREET

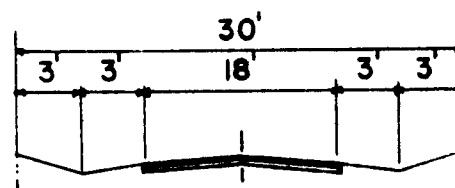
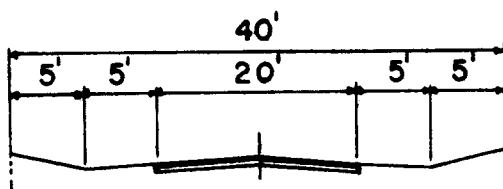


* MINIMUM PAVEMENT WIDTH
FOR AGRICULTURAL
ROADWAYS IS 16 FEET.

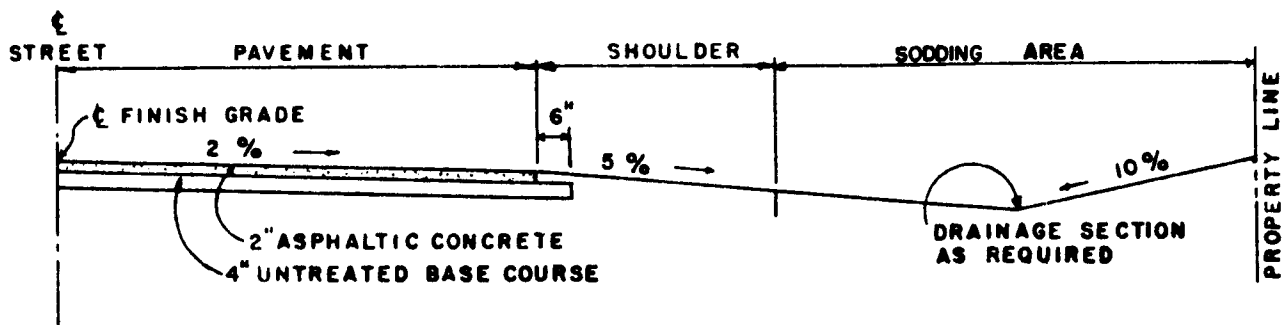
COLLECTOR STREET



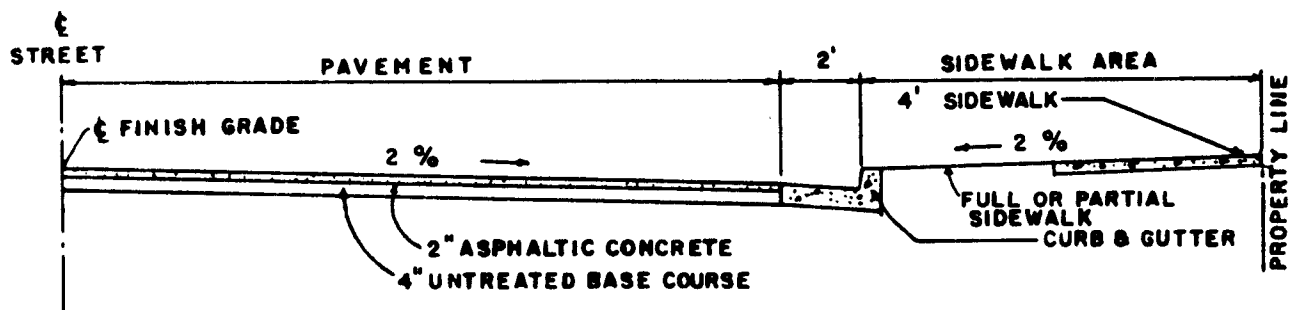
MINOR STREET



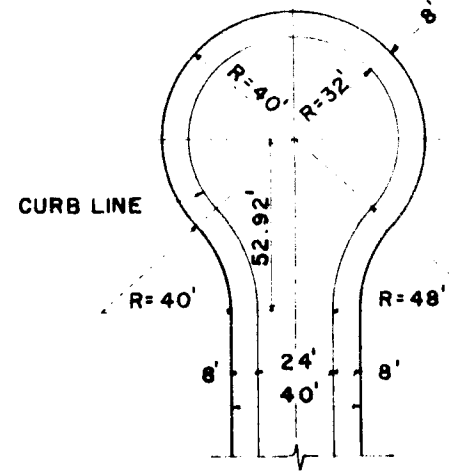
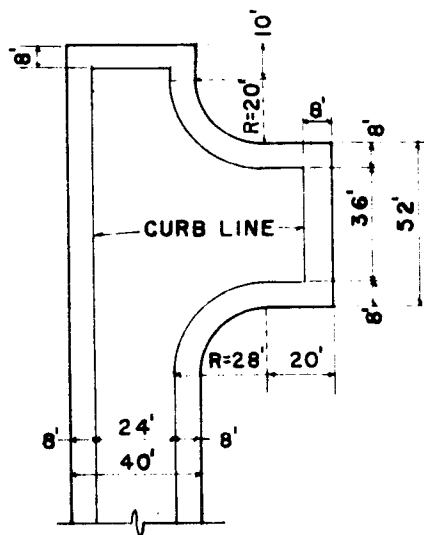
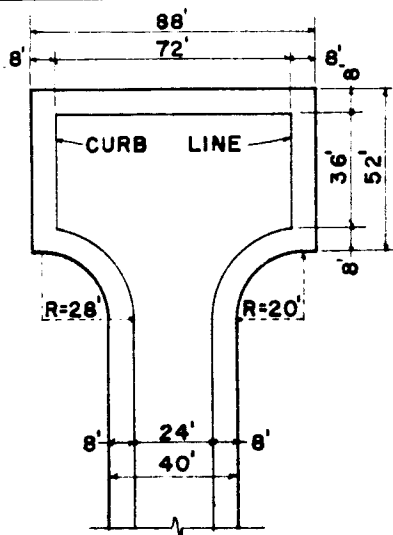
DEAD END STREETS



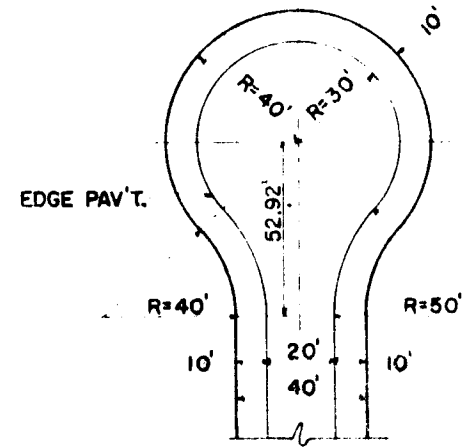
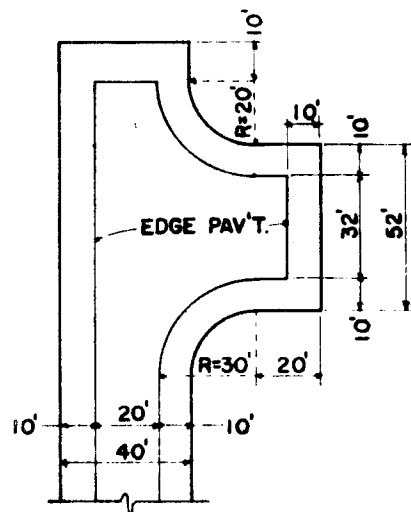
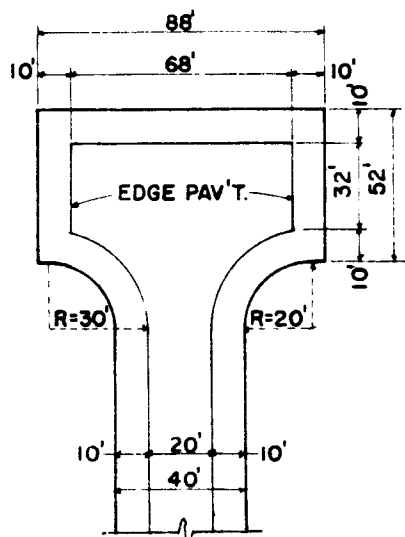
HALF SECTION OF STREET WITH SHOULDER



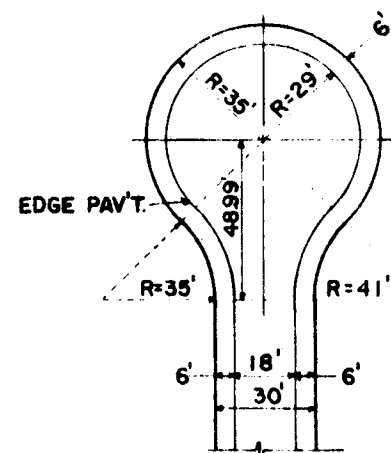
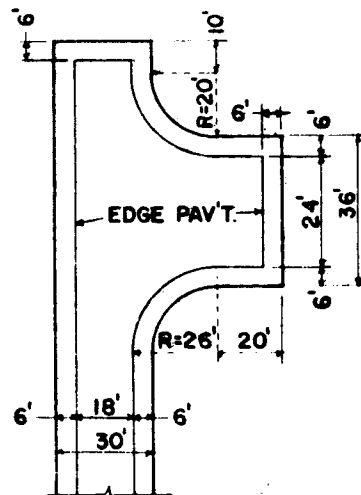
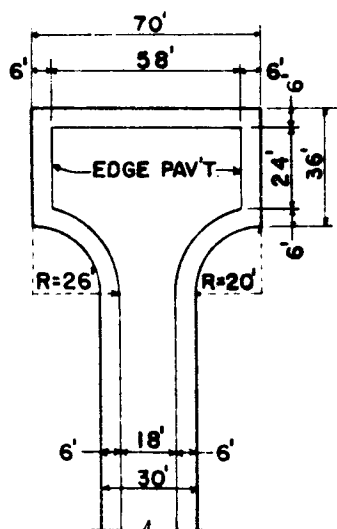
HALF SECTION OF STREET WITH SIDEWALK



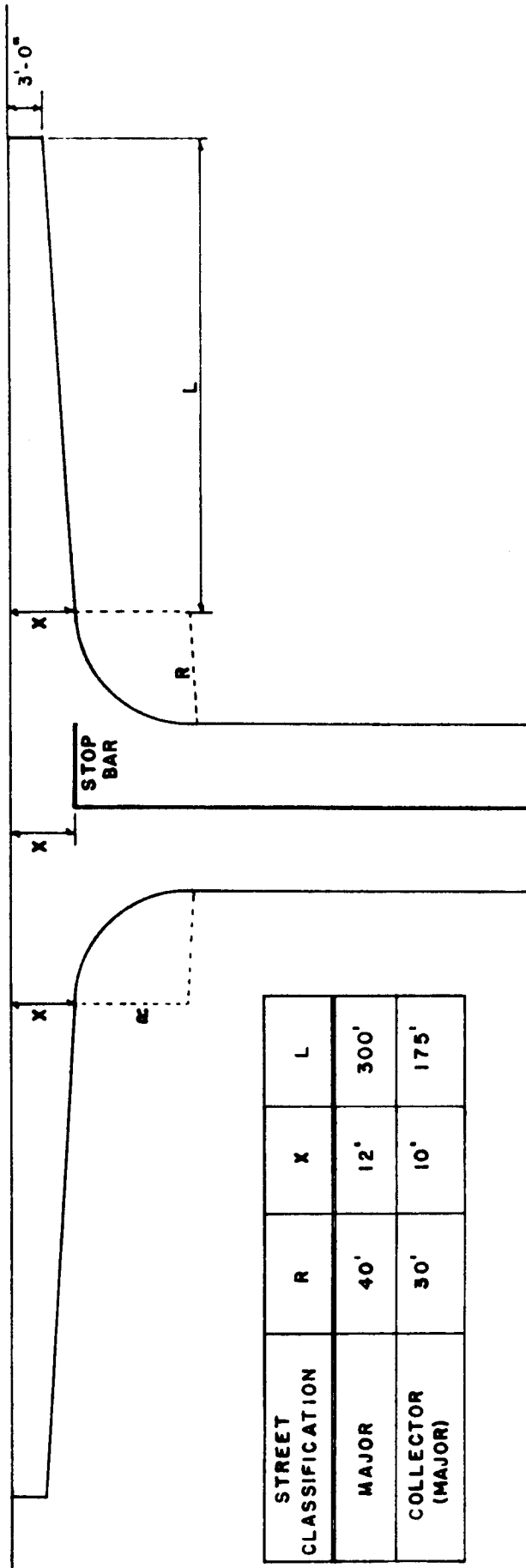
40 FT. RIGHT OF WAY — WITH CURB & GUTTER



40 FT. RIGHT OF WAY — WITHOUT CURB & GUTTER



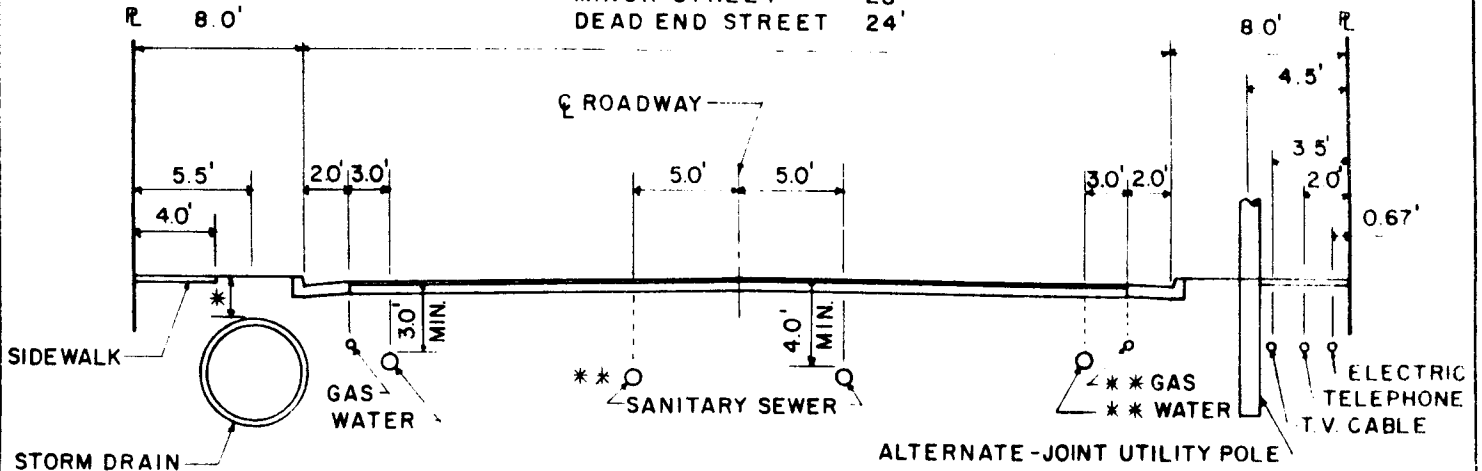
30 FT. RIGHT OF WAY — WITHOUT CURB & GUTTER



STREET CLASSIFICATION	R	X	L
MAJOR	40'	12'	300'
COLLECTOR (MAJOR)	30'	10'	175'

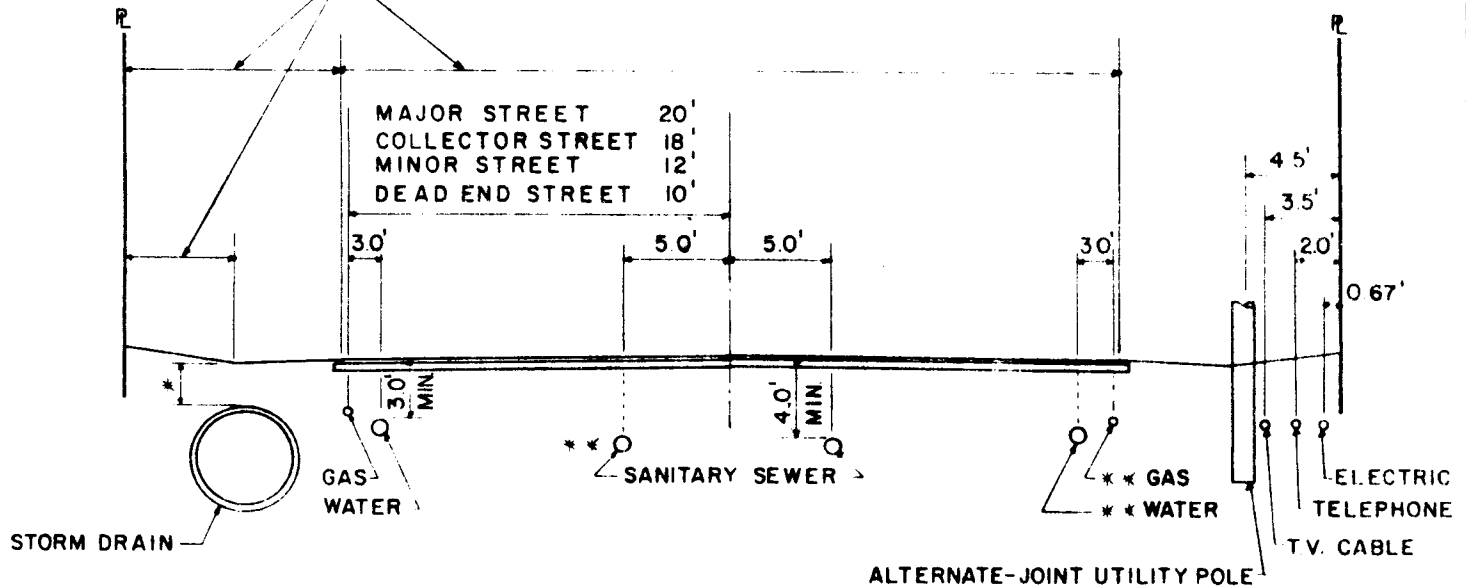
COLLECTOR RD. (MAJOR)-NORMALLY OUTSIDE SUBDIVISION AREA

MAJOR STREET 44'
 COLLECTOR STREET 40'
 MINOR STREET 28'
 DEAD END STREET 24'



WITH CURB & GUTTER

REFER TO STREETS
 WITHOUT CURB & GUTTER



WITHOUT CURB & GUTTER

NOTES:

1. MAINLINE UTILITIES SHALL HAVE A MINIMUM COVER OF 2.5' UNLESS OTHERWISE SPECIFIED.
2. * WHEREVER POSSIBLE THE STORM DRAIN SHALL HAVE A MINIMUM COVER OF 3.0'.
3. ** ALTERNATE LOCATION OF UTILITIES.

R-46

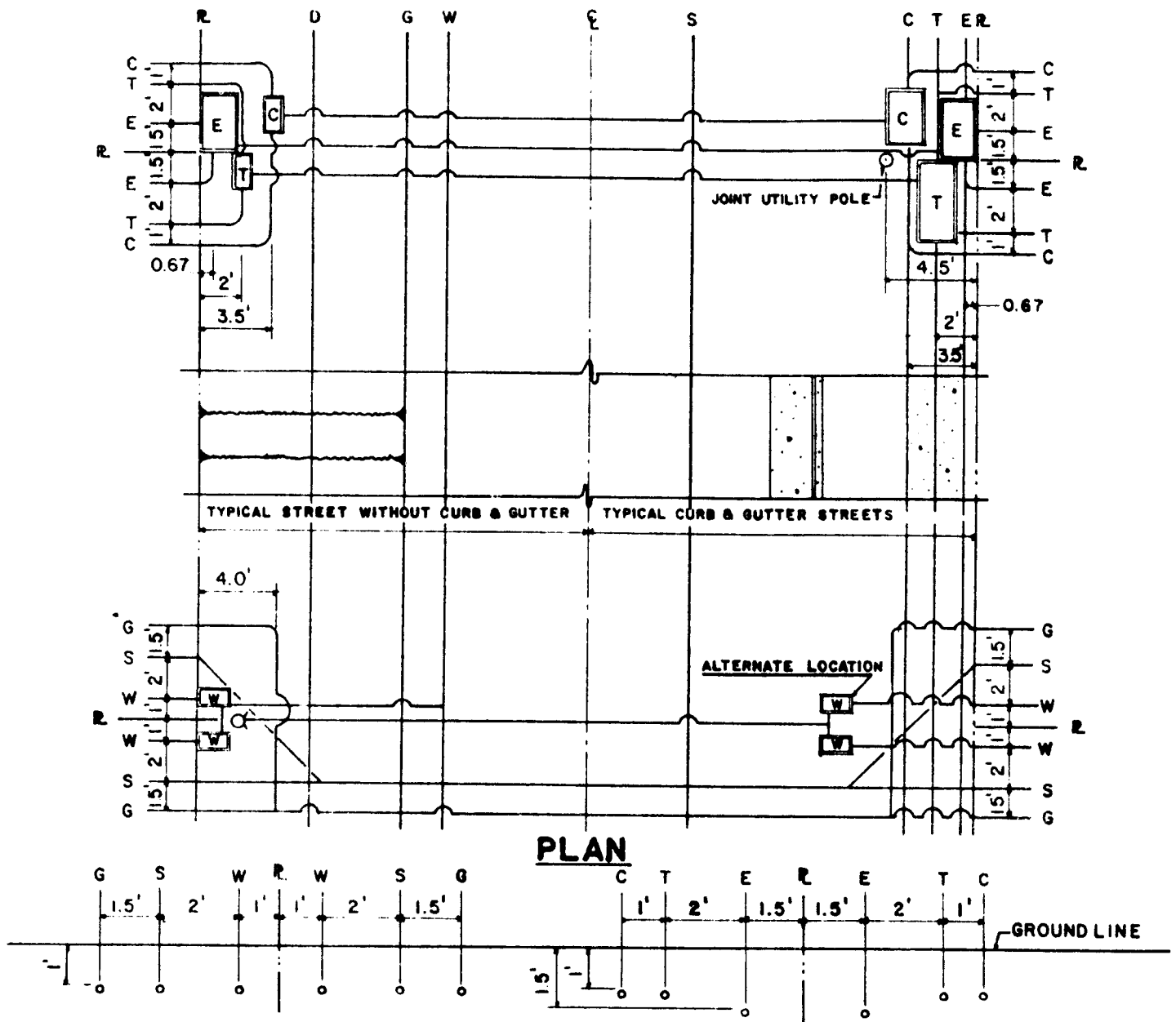
STANDARD
 DETAILS

TYPICAL ROADWAY UTILITY LOCATION

COUNTY OF KAUAI

SEPTEMBER 1984

NOT TO SCALE

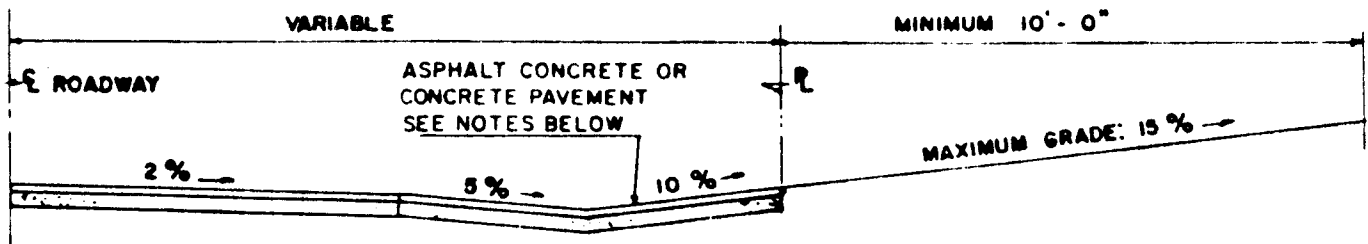


NOTES

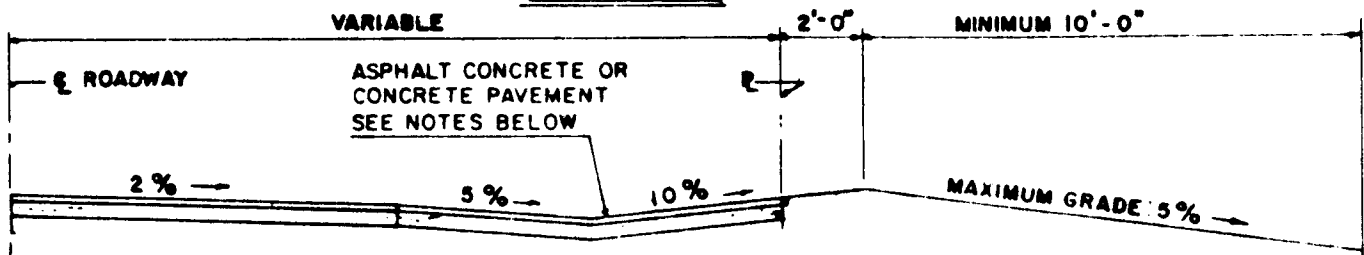
1. WHEN ELECTRICAL TRANSFORMERS INTERFERES WITH LOCATION THE UTILITIES SHALL BE PLACED OUTSIDE THE TRANSFORMER AT THE DISTANCES NOTED ON THE PLANS.
2. WHENEVER POSSIBLE STORM DRAIN INLETS AND MAN-HOLES SHALL BE LOCATED AWAY FROM THE COMMON PROPERTY BOUNDARY LINES.

LEGEND

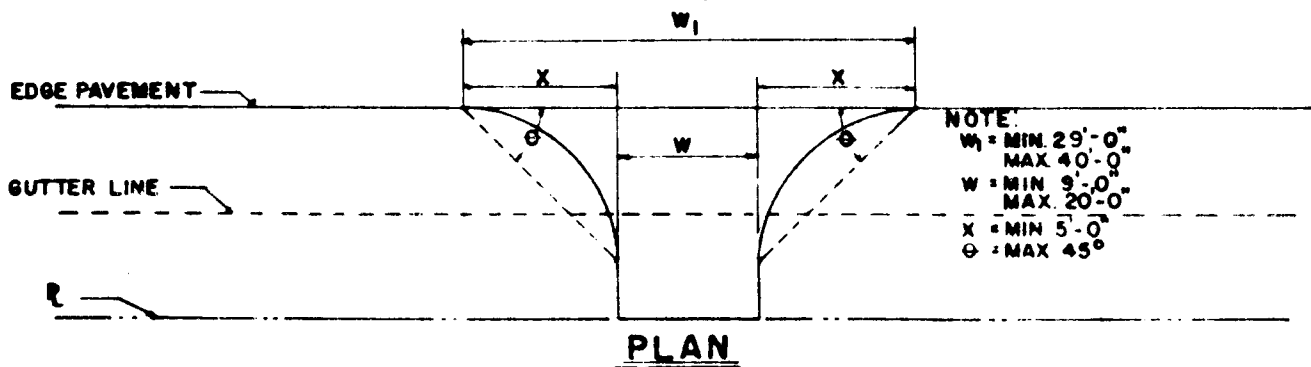
C	TV CABLE
D	STORM DRAIN
E	ELECTRIC (UNDERGROUND)
G	GAS
S	SANITARY SEWER
T	TELEPHONE (UNDERGROUND)
W	WATER
R	PROPERTY LINE
⊕	FIRE HYDRANT



UP SLOPE



DOWN SLOPE



NOTES

CONCRETE PAVEMENT

1. 4" (RESIDENTIAL), 6" (COMMERCIAL) - REINFORCED WITH 6X6-6/6 WIRE FABRIC SHALL BE CONSTRUCTED.
2. PROVIDE CONSTRUCTION JOINTS AT EDGE PAVEMENT AND PROPERTY LINE.
3. THE MINIMUM WIDTH (W_1) AT THE EDGE OF PAVEMENT FOR ANY WIDTH OF DRIVEWAY SHALL BE NOT LESS THAN 29 FEET NOR MORE THAN 40 FEET.

ASPHALT CONCRETE PAVEMENT

1. THE STRUCTURAL SECTION SHALL CONSIST OF 2" A C WITH 4" BASE COURSE

R-48

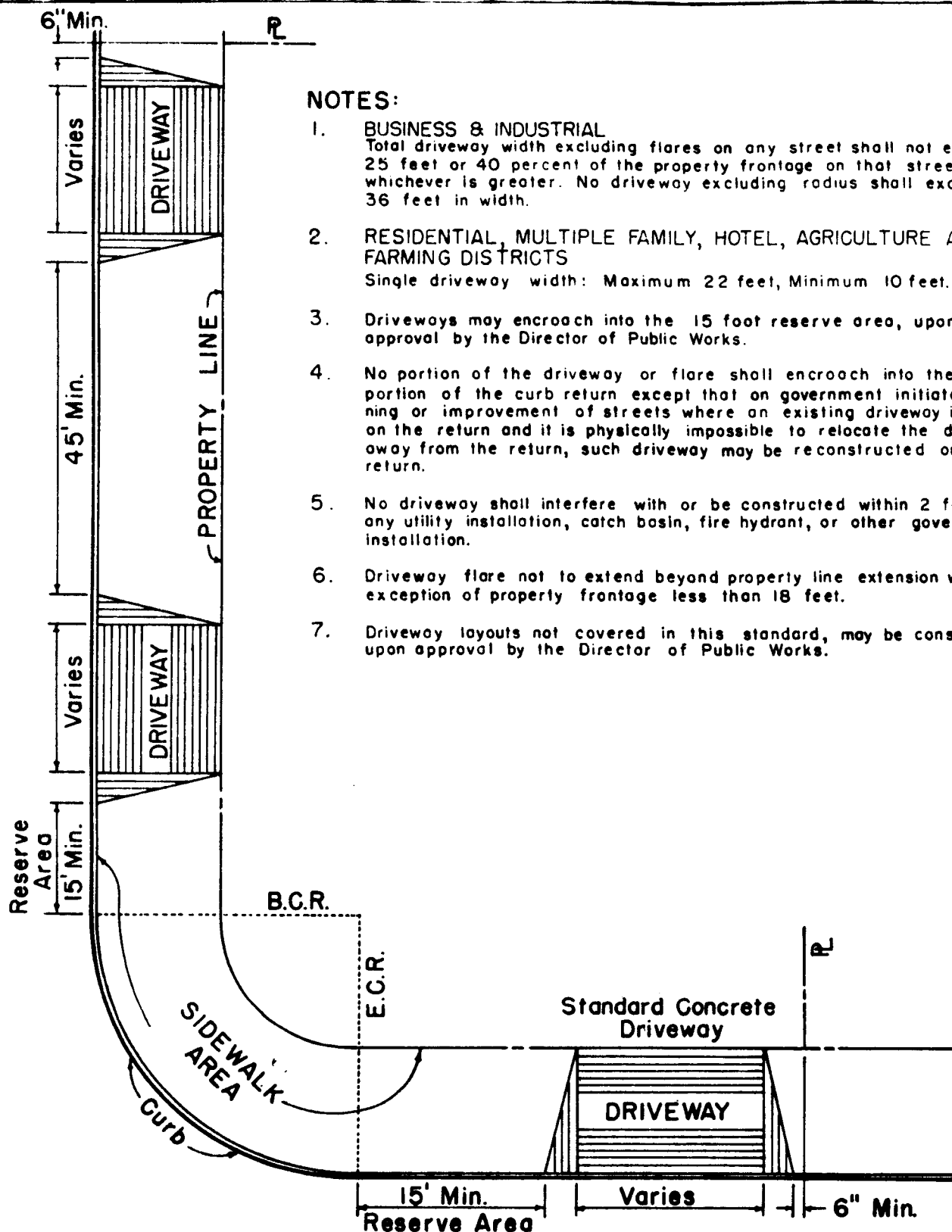
STANDARD
DETAILS

RESIDENTIAL DRIVEWAY
WITHOUT CURB AND GUTTER

SEPTEMBER 1984

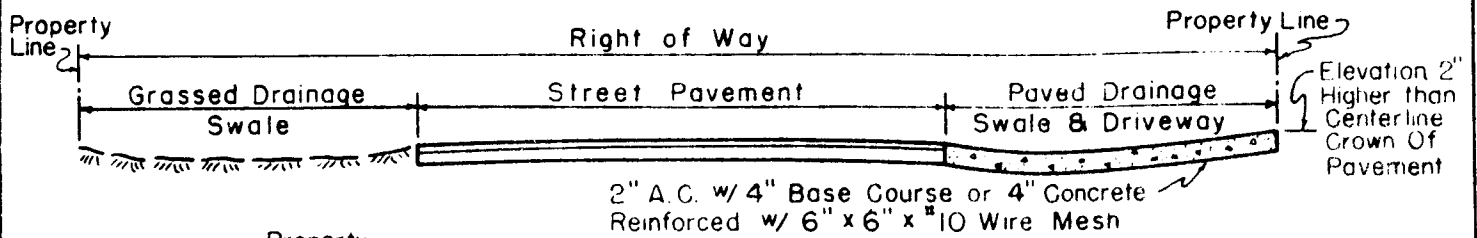
NOT TO SCALE

COUNTY OF KAUAI



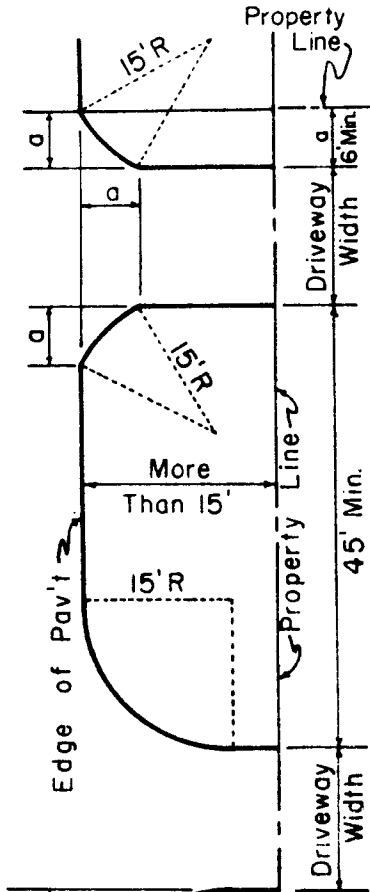
STANDARD DRIVEWAY LAYOUTS FOR CONCRETE CURB STREETS

TYPICAL SECTION OF DRIVEWAYS

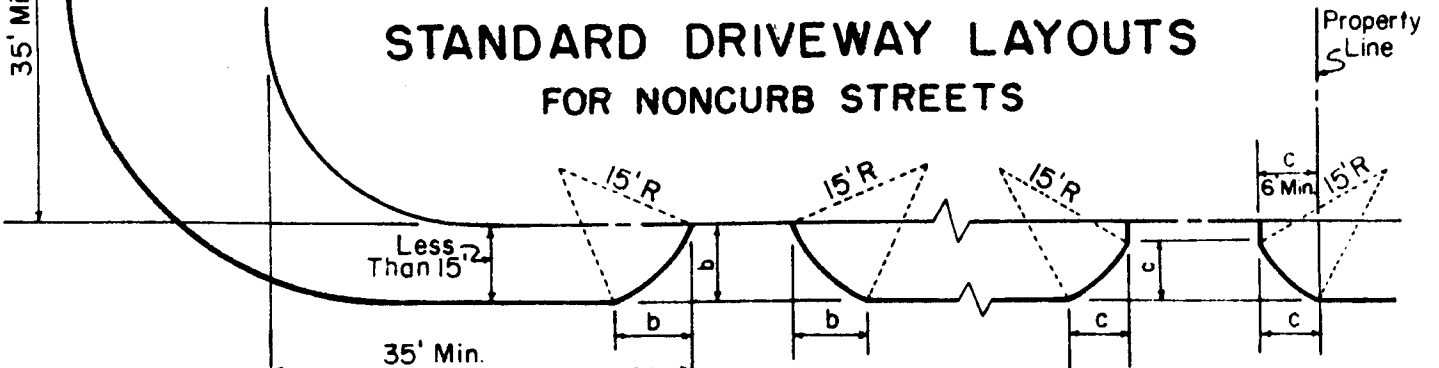


NOTES:

- BUSINESS & INDUSTRIAL**
Total driveway width excluding flares on any street shall not exceed 25 feet or 40 percent of the property frontage on that street, whichever is greater. No driveway excluding radius shall exceed 36 feet in width.
- RESIDENTIAL, MULTIPLE FAMILY, HOTEL, AGRICULTURE AND FARMING DISTRICTS**
Single driveway width: Maximum 22 feet, Minimum 10 feet.
- Driveways may encroach into the 35 foot reserve area, upon approval by the Director of Public Works.
- No portion of the driveway or flare shall encroach into the curved portion of the curb return except that on government initiated widening or improvement of streets where an existing driveway is located on the return and it is physically impossible to relocate the driveway away from the return, such driveway may be reconstructed on the return.
- No driveway shall interfere with or be constructed within 2 feet of any utility installation, catch basin, fire hydrant, or other government installation.
- Driveway flare not to extend beyond property line extension with the exception of property frontage less than 22 feet.
- Driveway layouts not covered in this standard, may be constructed upon approval by the Director of Public Works.



STANDARD DRIVEWAY LAYOUTS FOR NONCURB STREETS



R-50

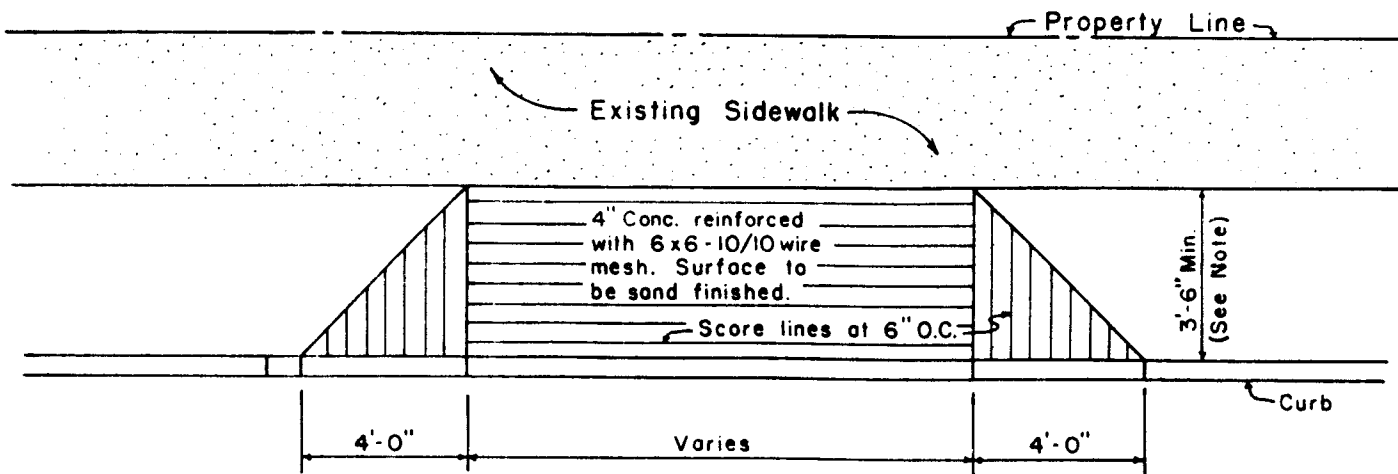
STANDARD
DETAILS

DRIVEWAY LAYOUTS FOR
NON-CURB STREETS

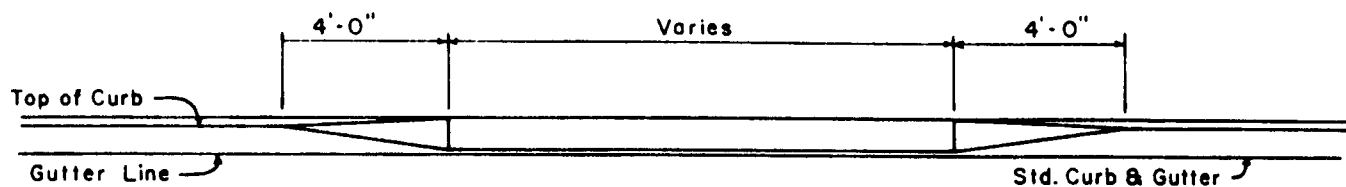
COUNTY OF MAUI

SEPTEMBER 1984

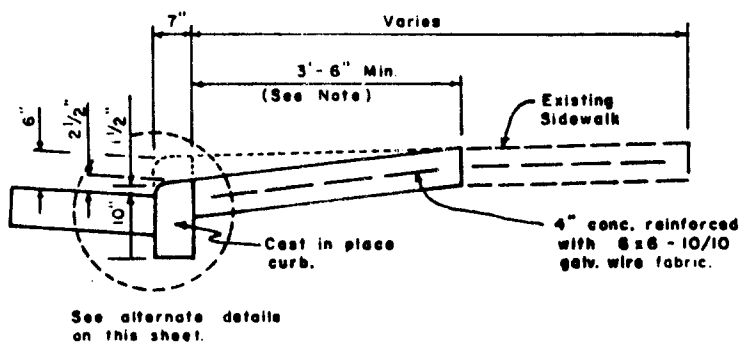
NOT TO SCALE



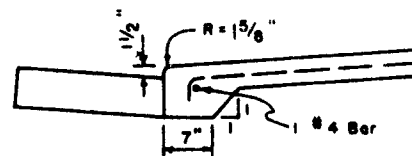
PLAN



ELEVATION



SECTION A-A



ALTERNATE DETAIL

NOTES:

1. For length less than 3'-6", remove existing sidewalk and construct standard concrete driveway. See sheet R-3.
2. Broom finish may be permitted.

STANDARD CONCRETE DRIVEWAY
WITH EXISTING SIDEWALK

COUNTY OF MAUI

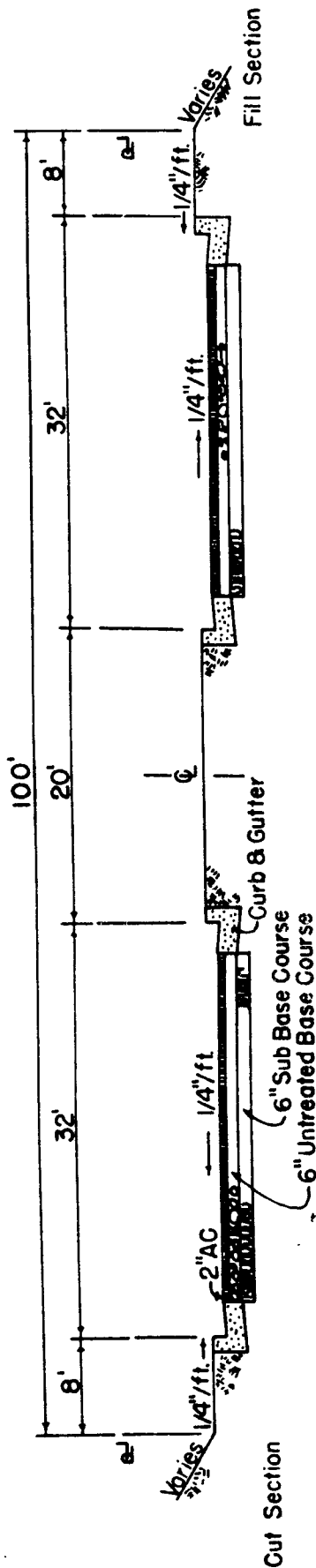
CONCRETE DRIVEWAY WITH
EXISTING SIDEWALK

STANDARD
DETAILS

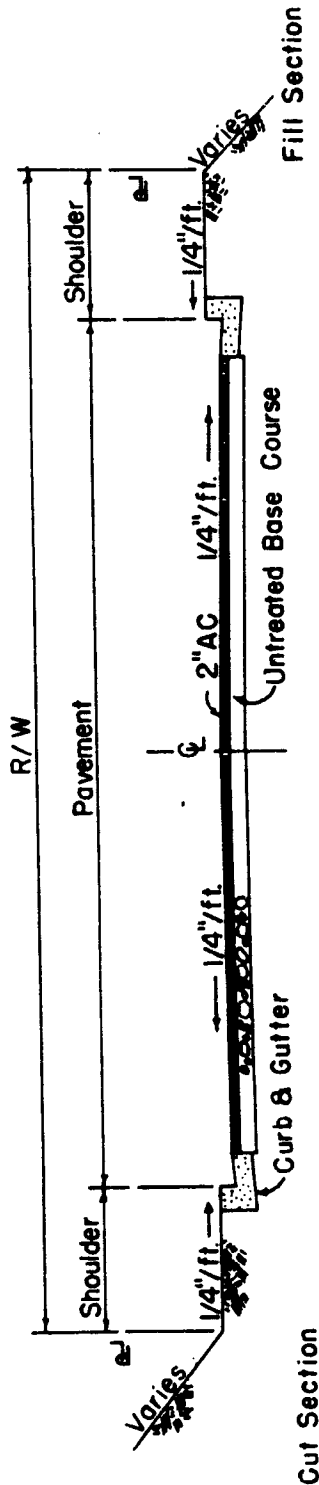
R-51

NOT TO SCALE

SEPTEMBER 1984



PARKWAY



STREETS W/ CURBS

ROADWAY TYPICAL SECTIONS

Scale None

R-52

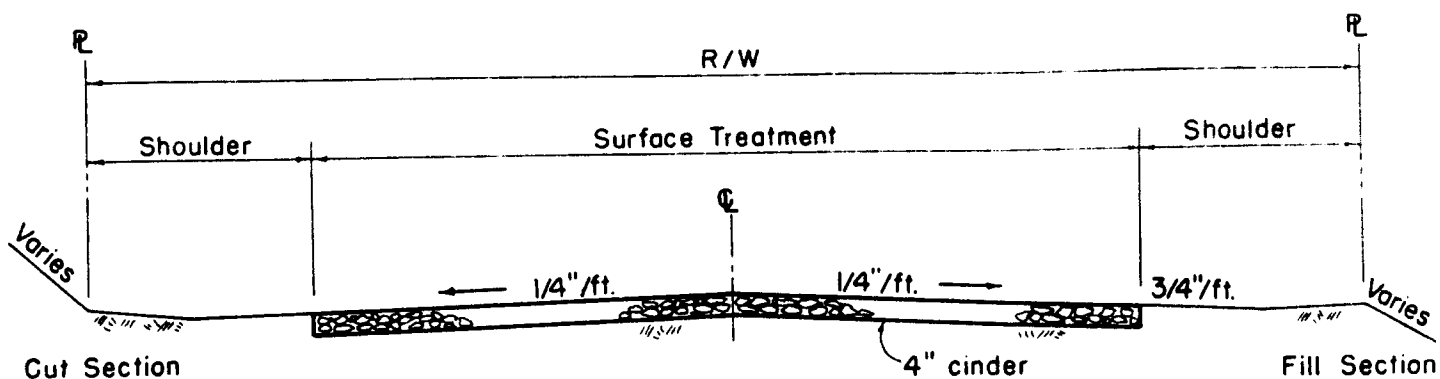
STANDARD
DETAILS

ROADWAY TYPICAL SECTIONS

SEPTEMBER 1984

NOT TO SCALE

COUNTY OF MAUI



TYPICAL SECTION GRAVEL ROAD - AGRICULTURAL

NOTES:

1. Prime coat (SS-1) shall be applied at the rate of approximately 0.35 gal. per sq. yd. after basecourse has been compacted.
2. After the bituminous material has been absorbed, RS-1 shall be applied at the rate of 0.35 gal. per sq. yd.
3. Size 8 rocks (chips) shall then be spread in a uniform layer at the rate of approximately 20 lbs. per sq. yd. and rolled.

ROADWAY TYPICAL SECTIONS

Not to Scale

R-54

STANDARD
DETAILS

ROADWAY TYPICAL SECTIONS

COUNTY OF MAUI

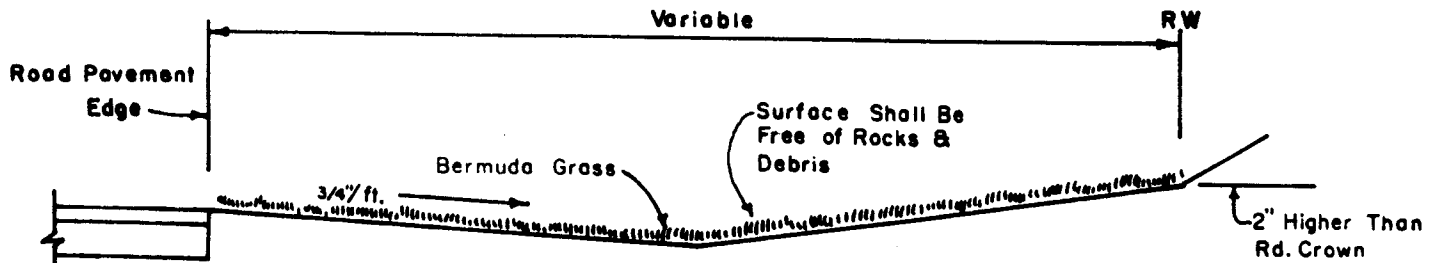
SEPTEMBER 1984

NOT TO SCALE

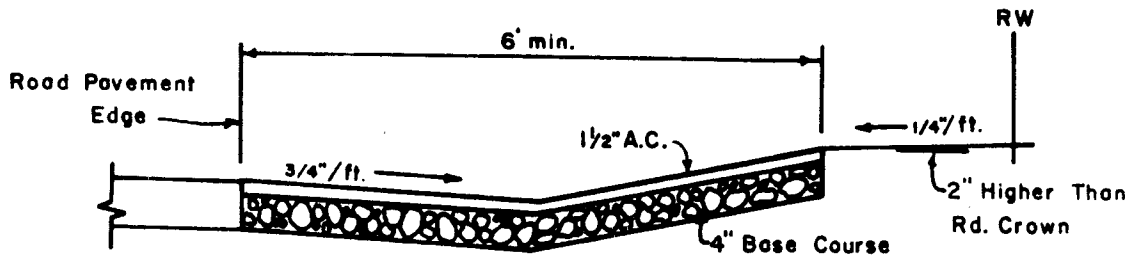
Swale - Design & Construction Standards

(Areas w/o Curb & Gutters)

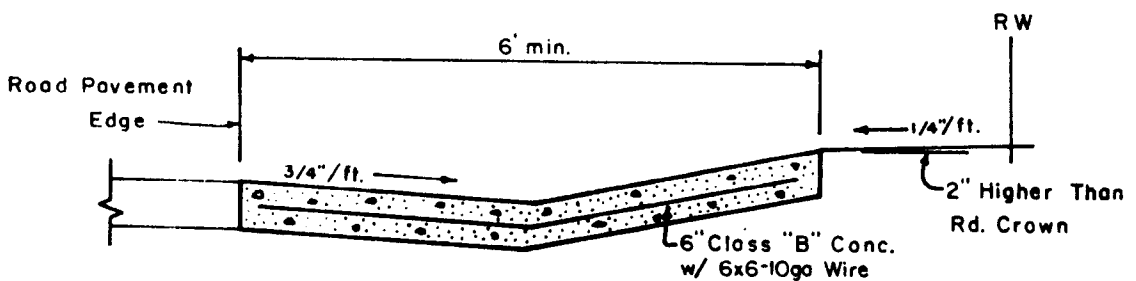
Scale: 1/2"=1'-0"



GRASSED SWALE

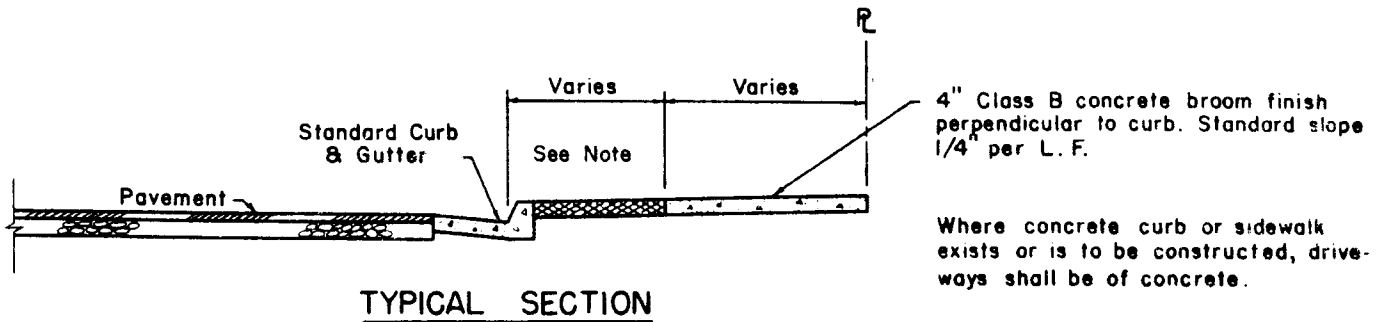


ASPHALTIC CONC. SWALE



REINF. CONC. SWALE

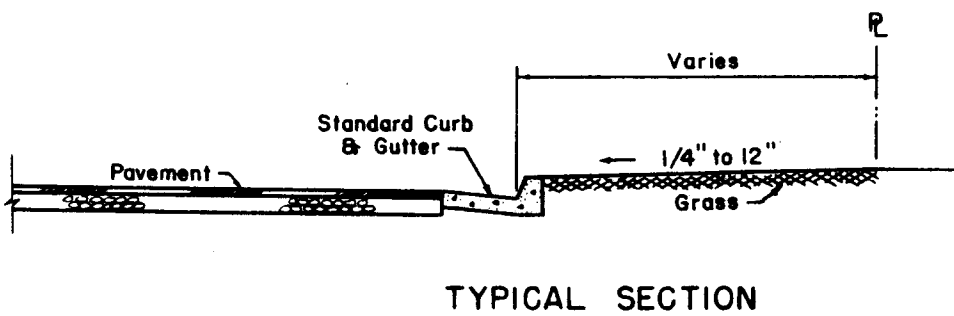
ROADWAY SWALES



NOTE:

1. Lawn grass or vegetative ground cover of a type with a maximum growth height of 4" or of a type that will grow at a trim height of 4" except vines or other planting which may be a tripping hazard. 4" topsoil required.
2. In lieu of lawn grass, Director of Public Works may authorize:
 - (a) Acceptable artificial turf, with proper bases.
 - (b) Precast masonry units laid closely in a uniform pattern (bricks, tile caps, etc.) with proper base.
 - (c) Asphalt concrete on proper base.
 - (d) Concrete poured separately from the concrete sidewalk, and of similar thickness.
 - (e) Loose aggregates, such as basaltic, coral or limestone chips.
3. Street tree including existing trees may be permitted in sidewalk areas subject to the approval of the Department of Public Works.
4. Sprinklers, set flush with the surface, may be permitted by the Director of Public Works.

SIDEWALK WITH STANDARD CURB & GUTTER



SIDEWALK WITH CURBS ONLY

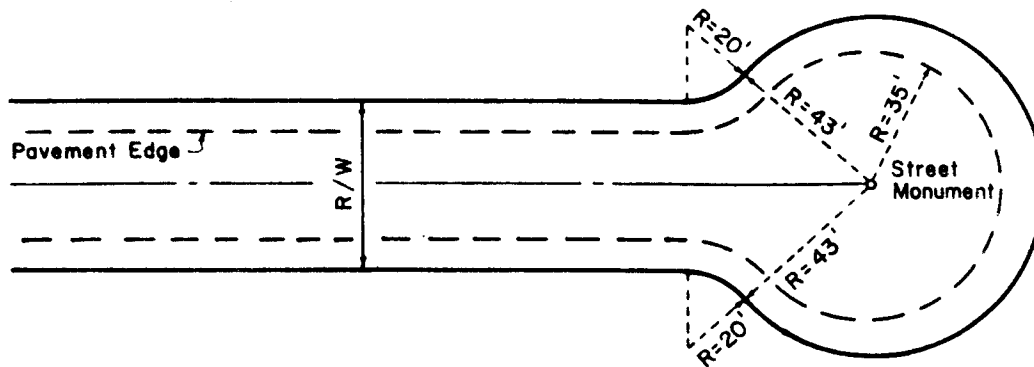
R-56

STANDARD
DETAILS

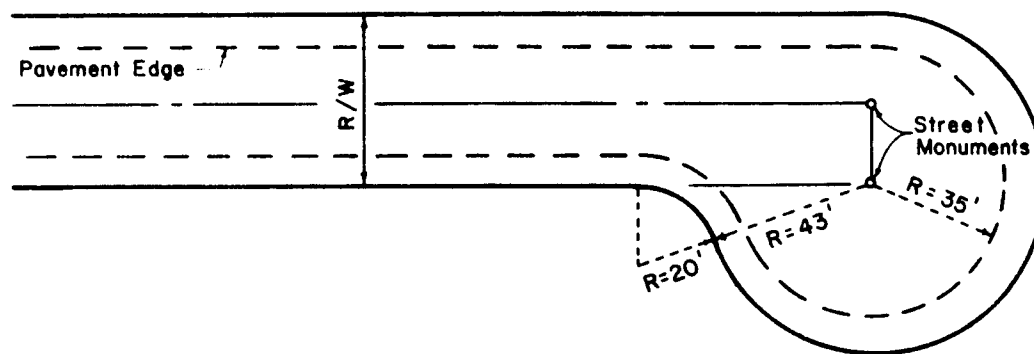
SIDEWALK DETAILS

COUNTY OF MAUI

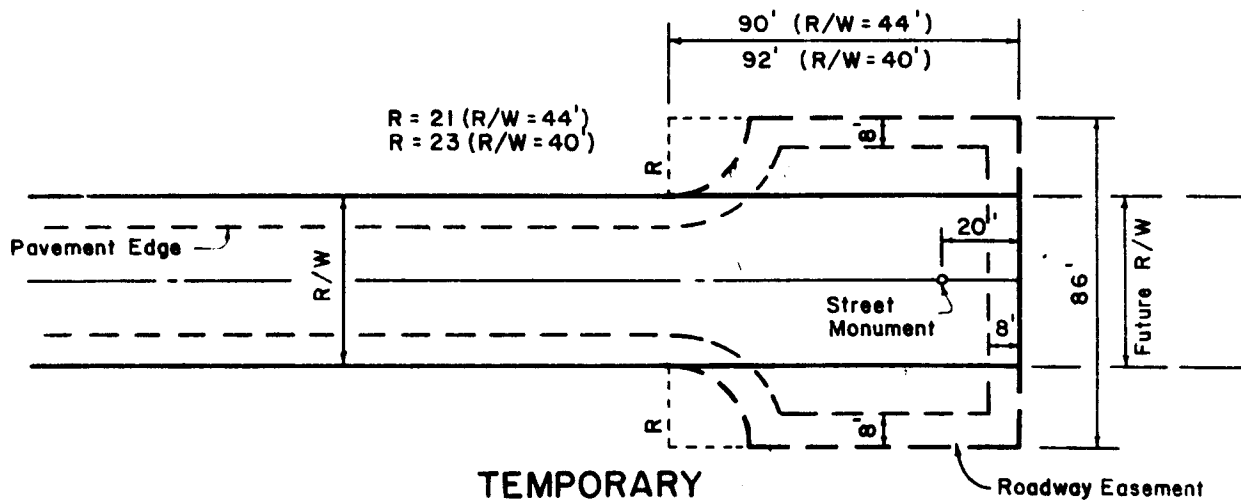
SEPTEMBER 1984



TYPICAL



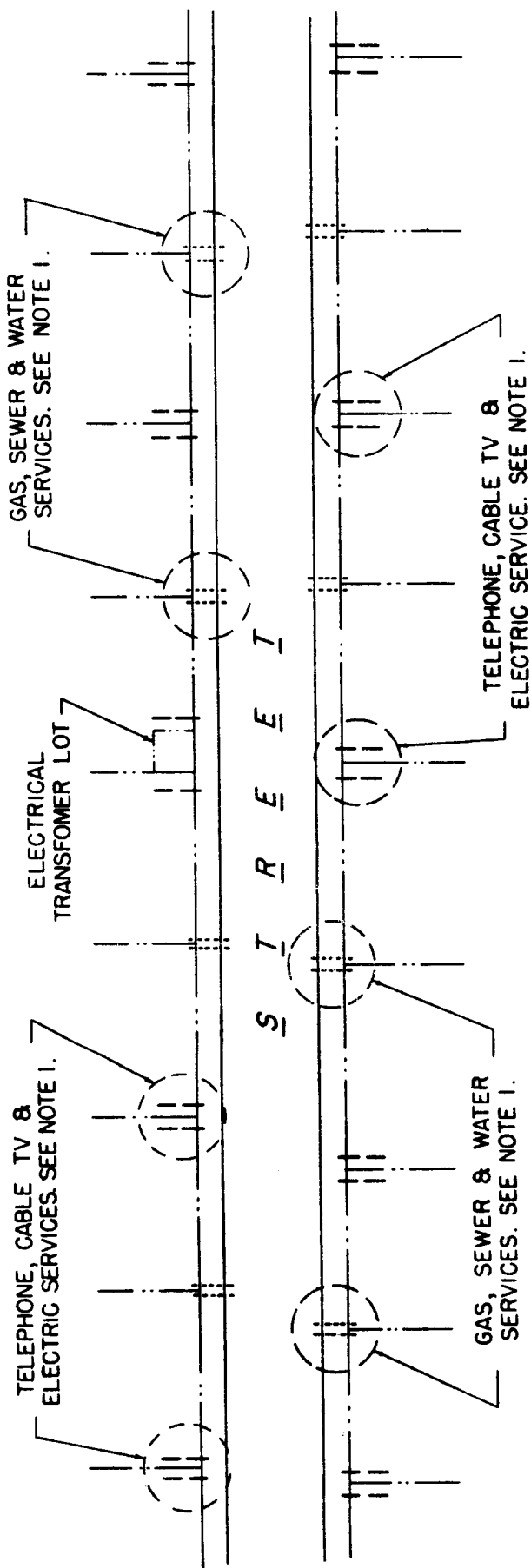
OFFSET



TEMPORARY

CUL-DE-SAC

SCALE: 1 INCH = 50 FEET



TYPICAL LOCATION PLAN

NOTES:

1. THE TELEPHONE, CABLE TV AND ELECTRIC SERVICES ARE TO BE LOCATED AT ONE PROPERTY LINE WITH THE GAS, SEWER AND WATER OCCUPYING AN ALTERNATE PROPERTY LINE AS INDICATED ON THE "TYPICAL LOCATION PLAN" WHENEVER POSSIBLE. THE RELATIVE LOCATIONS OF THE SERVICES WITH RESPECT TO THE PROPERTY LINES SHALL CONFORM TO THE DIMENSIONS INDICATED ON THE "PLAN VIEW"
2. FOR CASES WHERE ALL THE UTILITIES ARE TO BE LOCATED AT THE COMMON PROPERTY LINES, THE RELATIVE LOCATIONS OF THE SERVICES TO THE PROPERTY LINES SHALL ALSO CONFORM TO THE DIMENSIONS INDICATED ON THE "PLAN VIEW"

**SPACE ALLOCATION FOR UNDERGROUND SERVICES
AT PROPERTY LINES IN NEW SUBDIVISION AREAS**

R-58

**STANDARD
DETAILS**

**SPACE ALLOCATION FOR
UNDERGROUND UTILITIES**

SEPTEMBER 1984

COUNTY OF MAUI

COUNTY OF MAUI	SPACE ALLOCATION FOR UNDERGROUND UTILITIES SEPTEMBER 1984	STANDARD DETAILS	R-59
	S T R E E T PLAN VIEW	SECTION A-A ELEVATION OF SERVICES AT PROPERTY LINE	SPACE ALLOCATION FOR UNDERGROUND SERVICES AT PROPERTY LINES IN NEW SUBDIVISION AREAS NOTE: FOR RURAL AREAS, DEPTH OF WATER, ELECTRIC & TELEPHONE SHALL BE INCREASED 6".

Storm Drains

PART

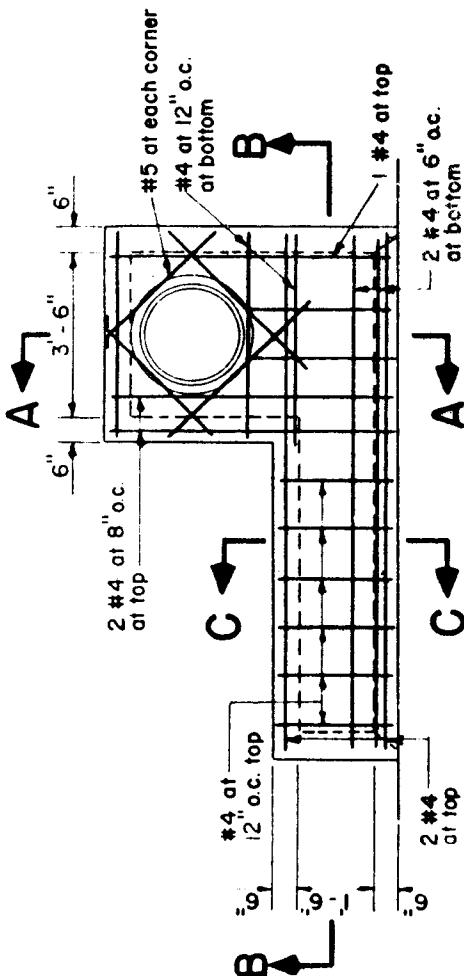
2

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

1. Provide 2 cu. ft. of crushed rock, ASTM size #9 Rock Sand, at weep hole.
2. C. B. wing shall be installed to favor upstream of gutter flow
3. See sheet D-2 for reinforcement details.
4. Rungs shall not be installed over a pipe connection and the lowest rung shall be not more than 2'-0" above the invert



SECTION A-A



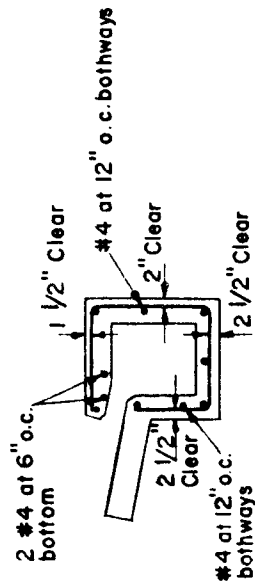
NOTES:

1. See sheet D-13 for reinforcement at pipes and corners.
2. Spliced reinforcing bars shall be lapped at least 30 diameters.

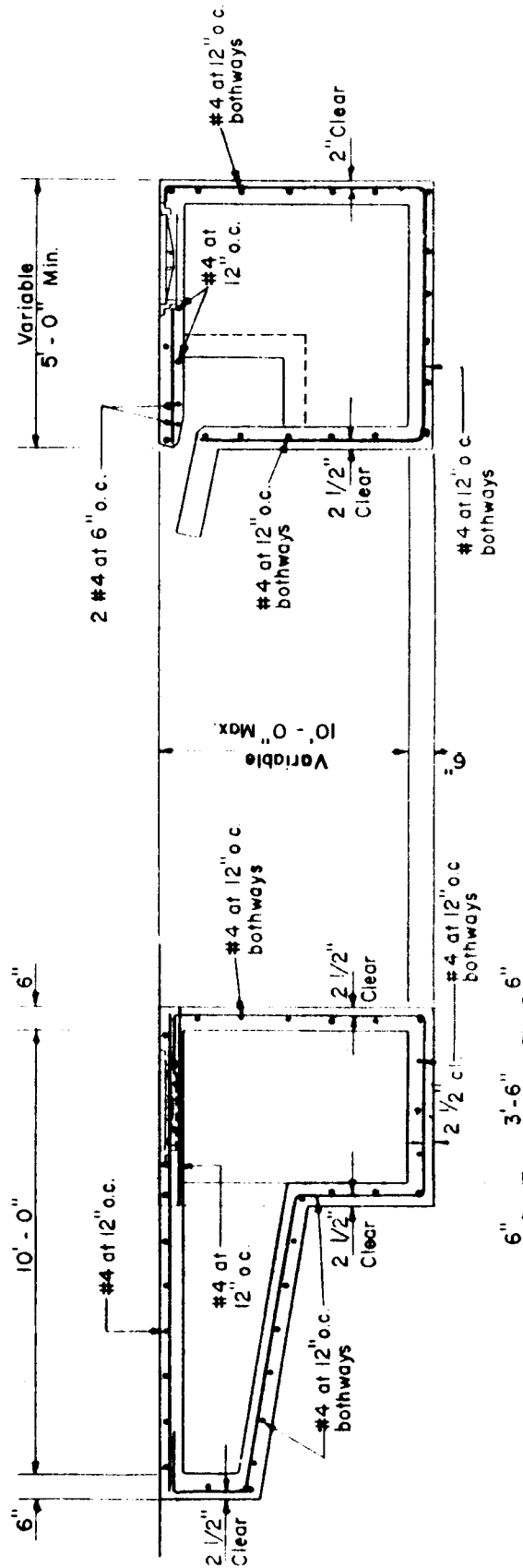
PLAN

TYPE "A" CATCH BASIN REINFORCEMENT DETAILS

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



SECTION C-C



SECTION B-B

SECTION A-A

D-2

STANDARD
DETAILS

TYPE "A" CATCH BASIN
REINFORCEMENT DETAILS

SEPTEMBER 1984

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

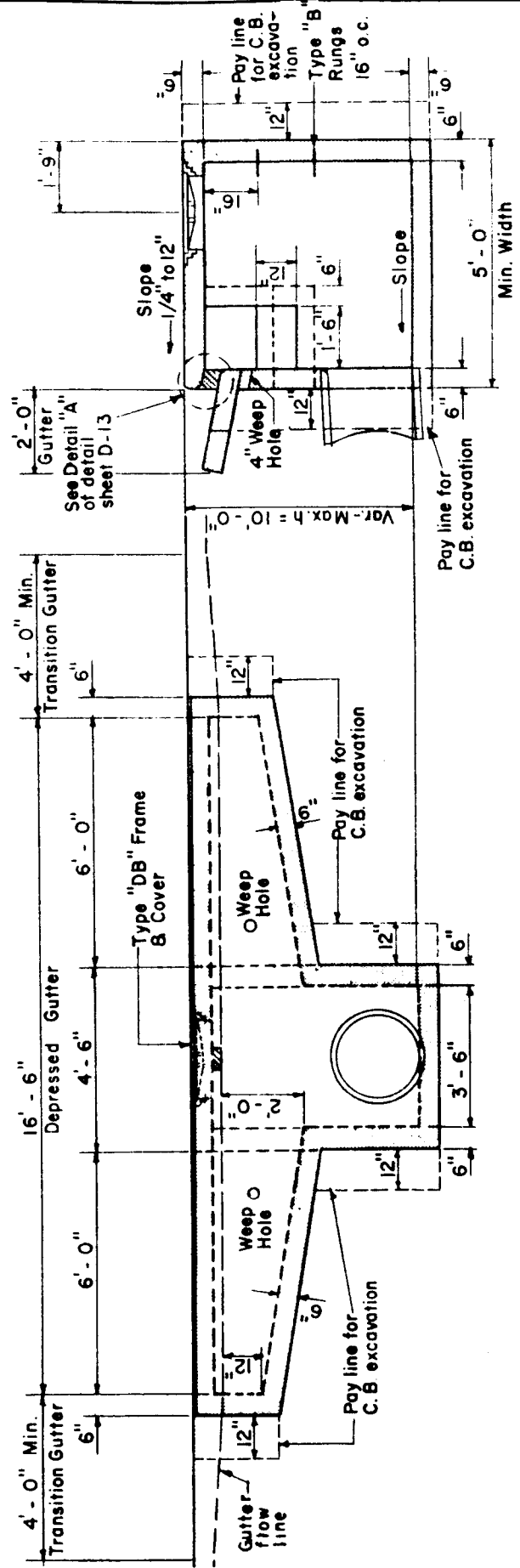
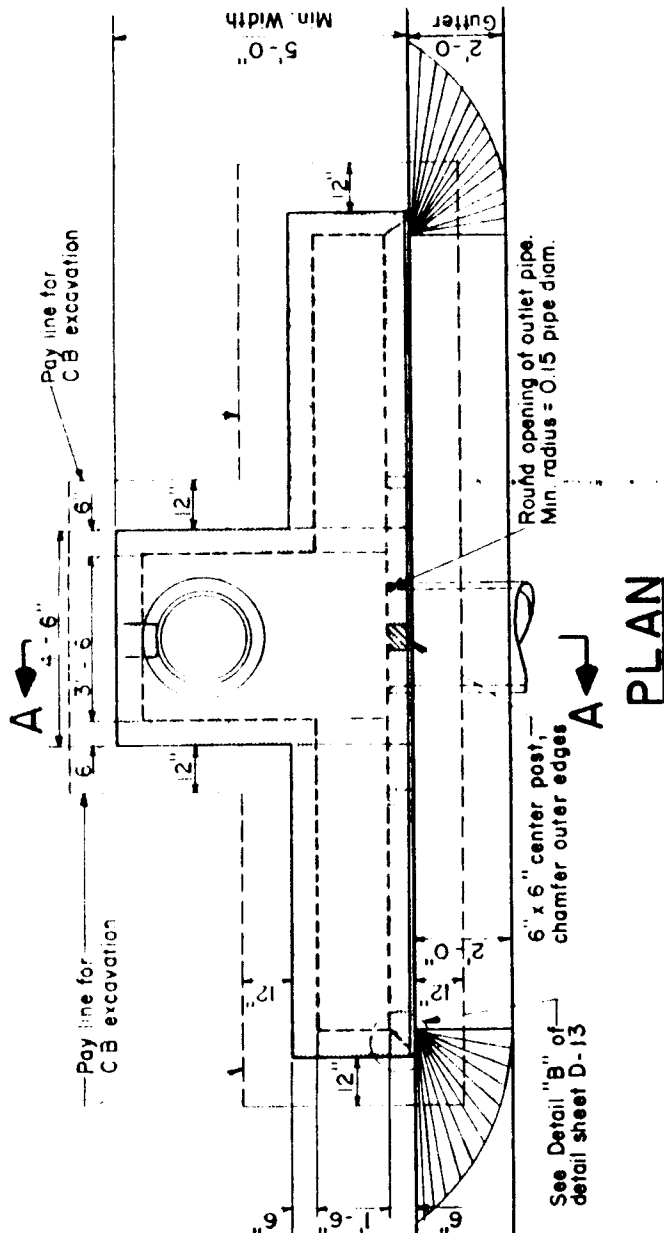
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

TYPE "E" CATCH BASIN

SCALE: 1/4" = 1' 0"

NOTES

1. Provide 2 cu ft of crushed rock (Rock Sand), ASTM size #9, at weep holes.
2. See sheet D-4 for reinforcement details
3. Rungs shall not be installed over a pipe connection and the lowest rung shall be not more than 2'-0" above the invert.
4. This catch basin shall be used with drain pipes 60 inches or less in diameter.



ELEVATION

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

TYPE "E" CATCH BASIN

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

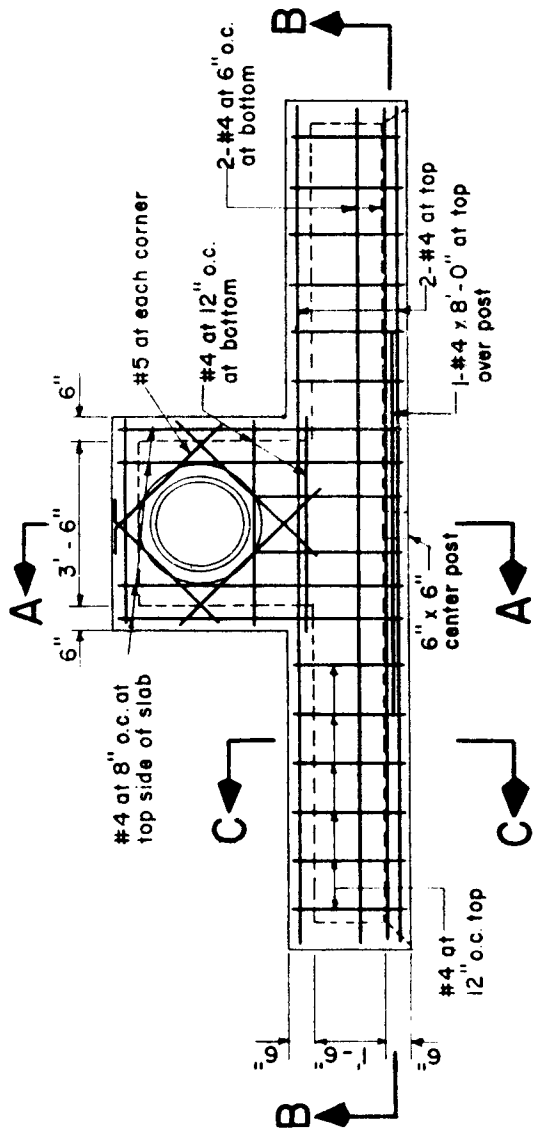
SEPTEMBER 1984

STANDARD
DETAILS

D-3

TYPE "E" CATCH BASIN REINFORCEMENT DETAILS

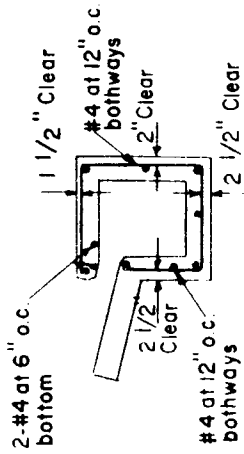
SCALE: 1/4" = 1' - 0"



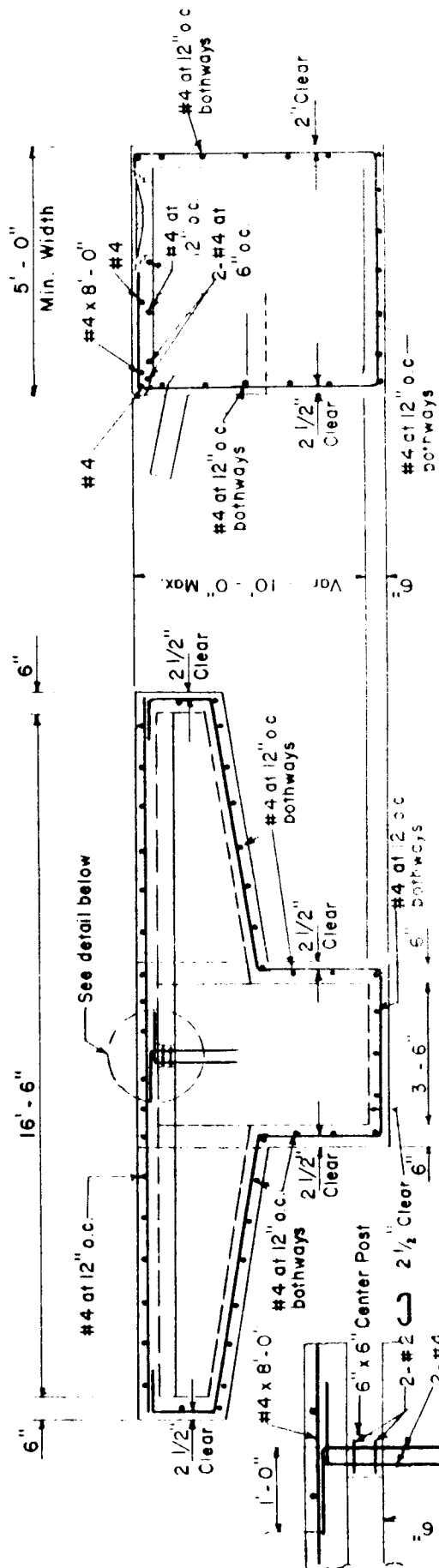
PLAN

NOTES:

1. See sheet D-13 for reinforcement at pipes and corners.
2. Spliced reinforcing bars shall be lapped at least 30 diameters.



SECTION C-C



DETAIL

SECTION B-B

SECTION A-A

D-4

STANDARD
DETAILS

TYPE "E" CATCH BASIN
REINFORCEMENT DETAILS

SEPTEMBER 1984

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

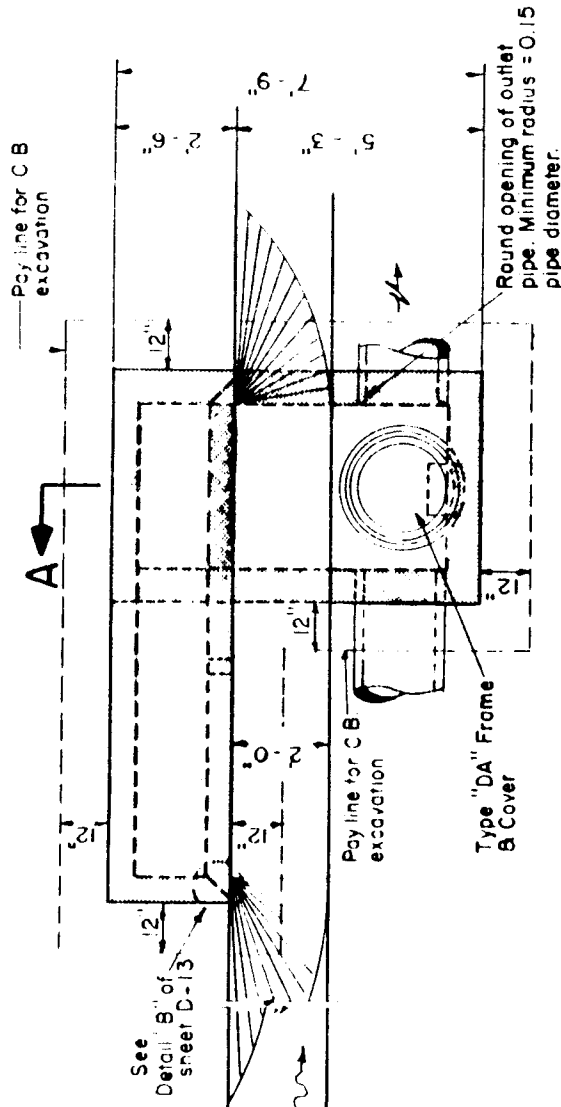
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

TYPE "B" CATCH BASIN

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

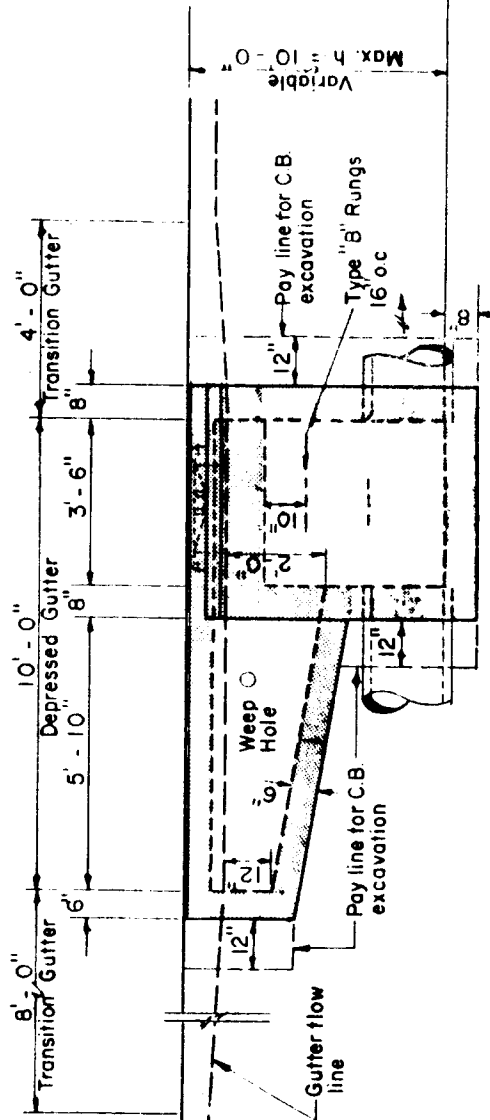
NOTES

1. Provide 2 cu. ft. of crushed rock, ASTM size #9 Rock Sand, at weep hole.
2. C.B. wing shall be installed to favor upstream of gutter flow.
3. See sheet D-6 for reinforcement details.
4. Rungs shall not be installed over a pipe connection and the lowest rung shall be not more than 2'-0" above the invert.

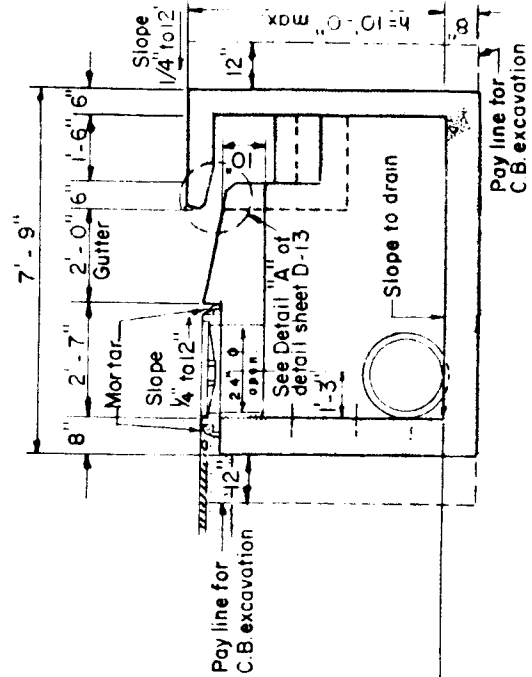


A

PLAN



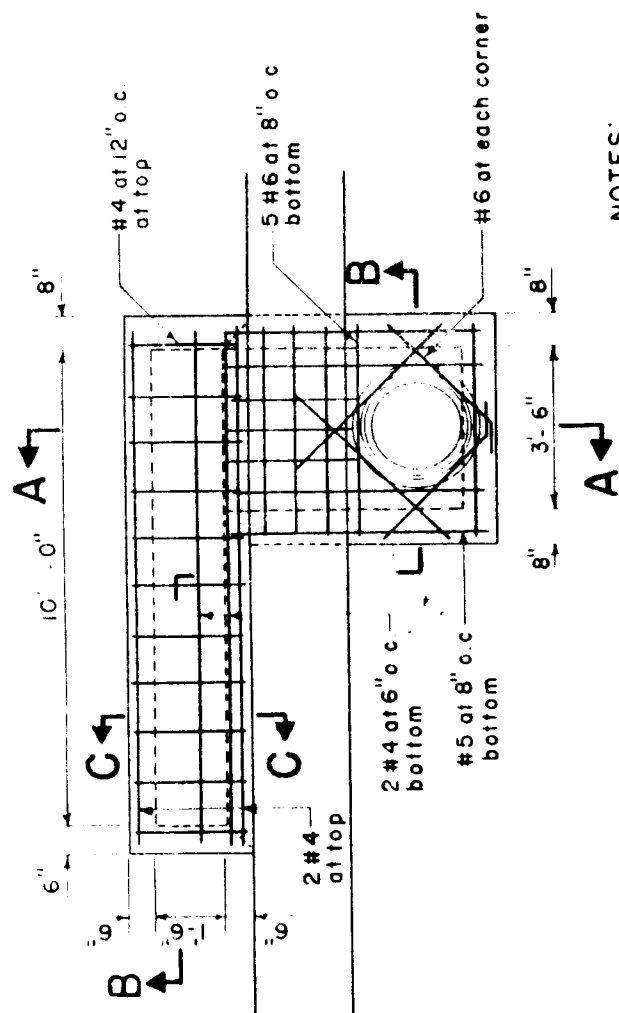
ELEVATION



SECTION A-A

TYPE "B" CATCH BASIN REINFORCEMENT DETAILS

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

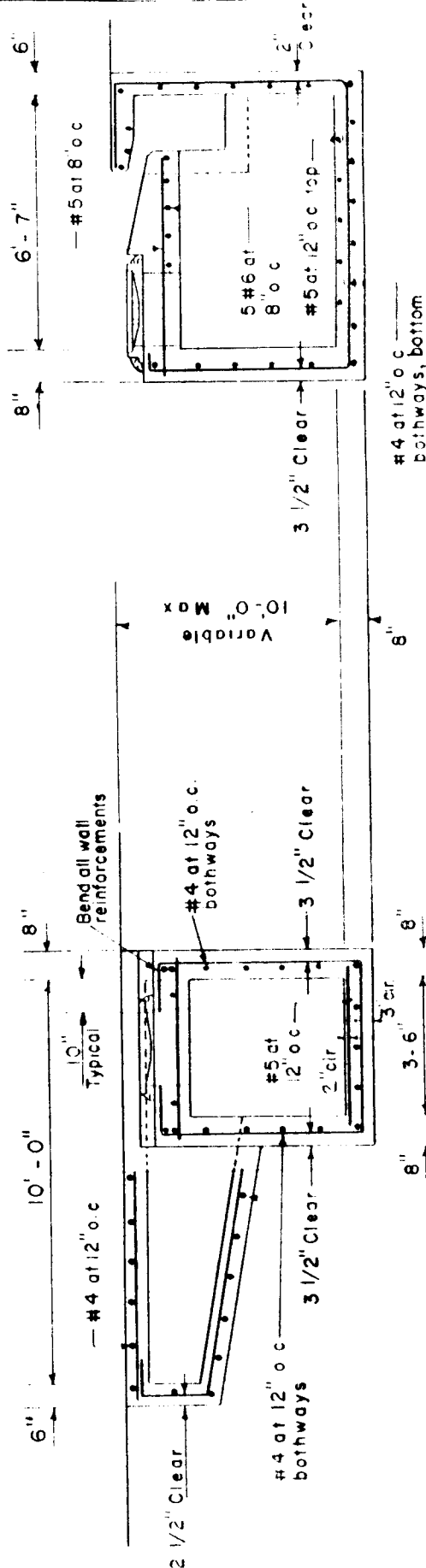
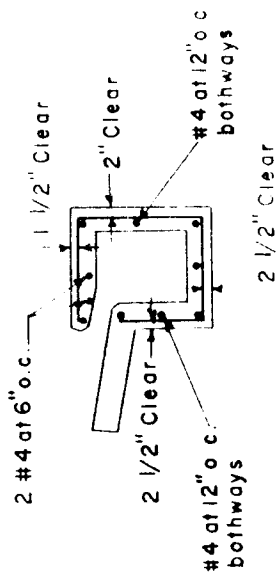


PLAN

NOTES:

1. See sheet D-13 for reinforcement at pipes and corners.
2. Spliced reinforcing bars shall be lapped at least 30 diameters.

SECTION C-C



SECTION B-B

SECTION A-A

D-6

STANDARD
DETAILS

TYPE "B" CATCH BASIN
REINFORCEMENT DETAILS

SEPTEMBER 1984

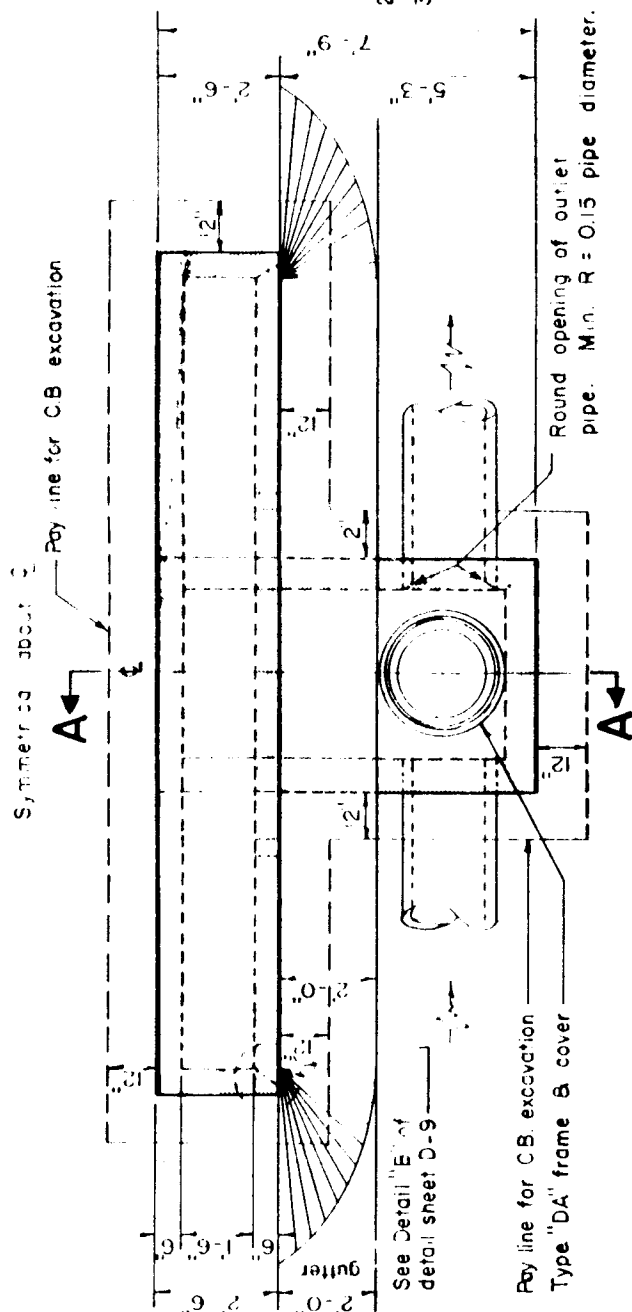
SCALE: 1/4" = 1' - 0"

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

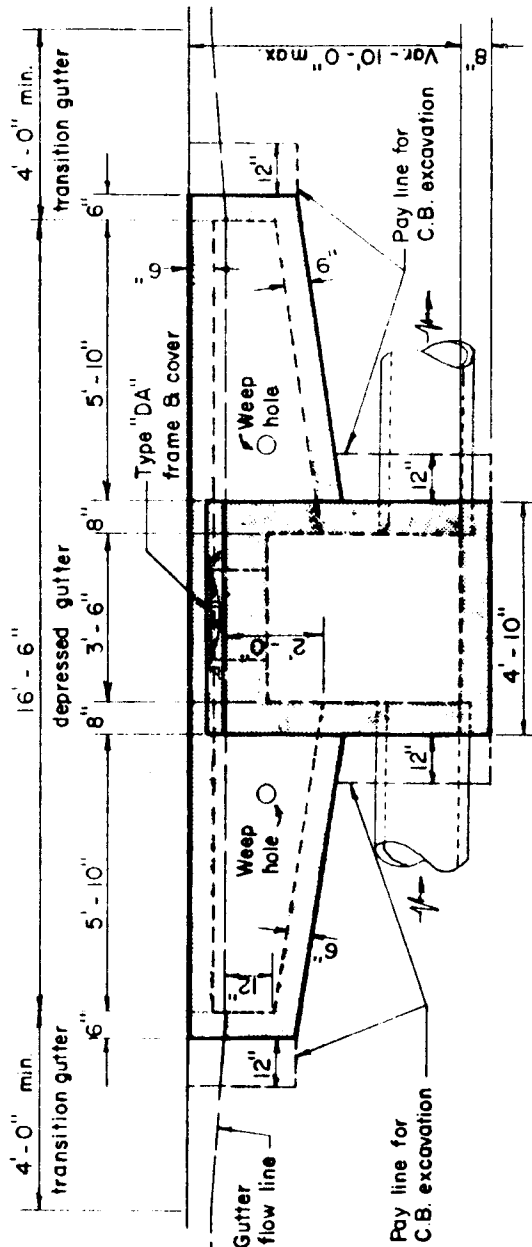
SCALE: 1/4" = 1'-0"

NOTES

1. Provide 2 cu yd of crushed rock (Rock Sand) ASTM size #9, at weep holes
2. See sheet D-3 for reinforcement details
3. Rungs shall not be installed over a pipe connection and the lowest rung shall be not more than 2'-0" above the invert.



PLAN

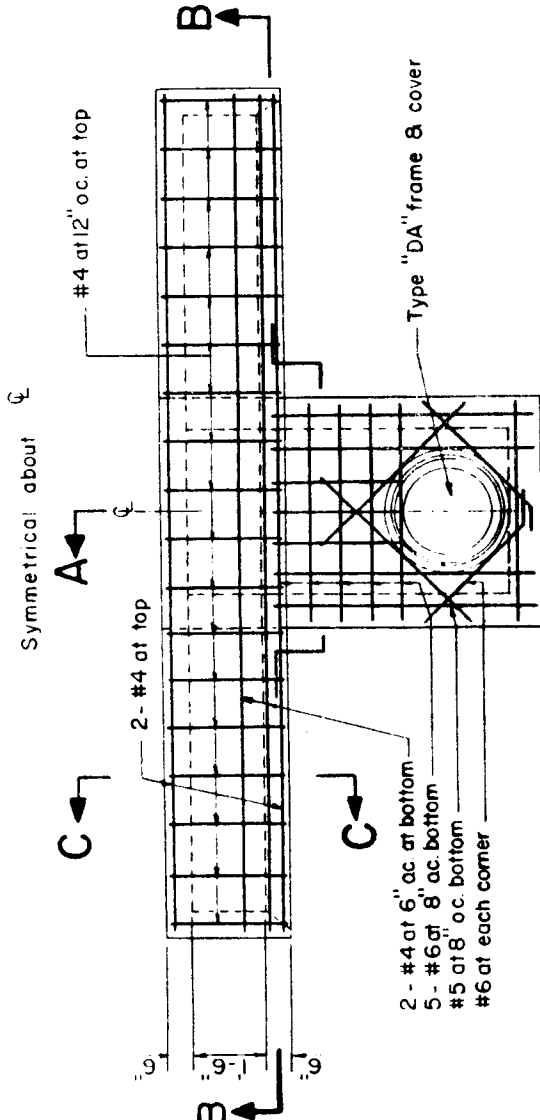


SECTION A-A

ELEVATION

TYPE "F" CATCH BASIN REINFORCEMENT DETAILS

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



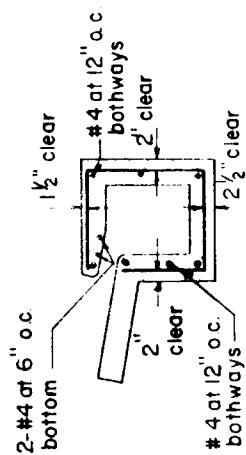
2 - #4 at 6" o.c. at bottom
5 - #6 at 8" o.c. bottom
#5 at 8" o.c. bottom
#6 at each corner

Type "DA" frame & cover

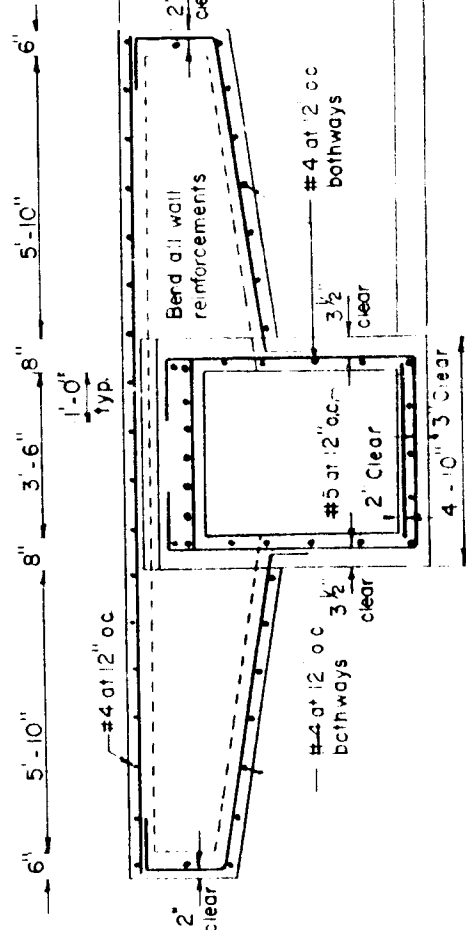
NOTES:

1. See sheet D-13 for reinforcement at pipes and corners.
2. Spliced reinforcing bars shall be lapped at least 30 diameters.

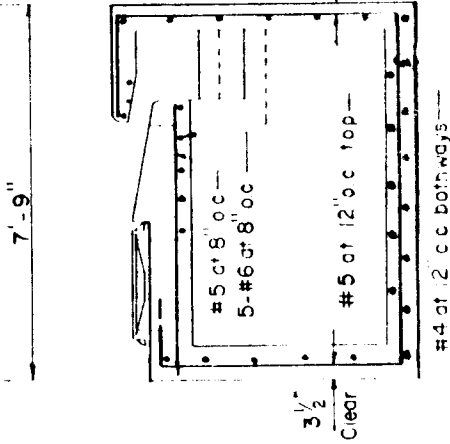
PLAN



SECTION C-C



SECTION B-B



SECTION A-A

D-8

STANDARD
DETAILS

TYPE "F" CATCH BASIN
REINFORCEMENT DETAILS

SEPTEMBER 1984

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

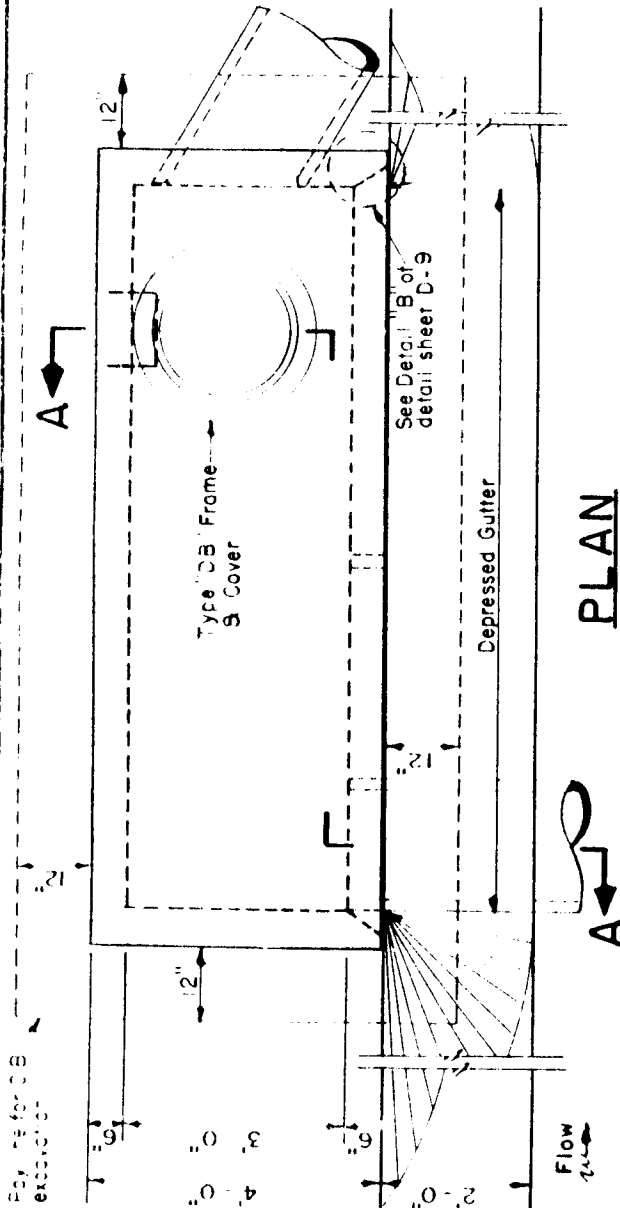
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

TYPE "C" CATCH BASIN

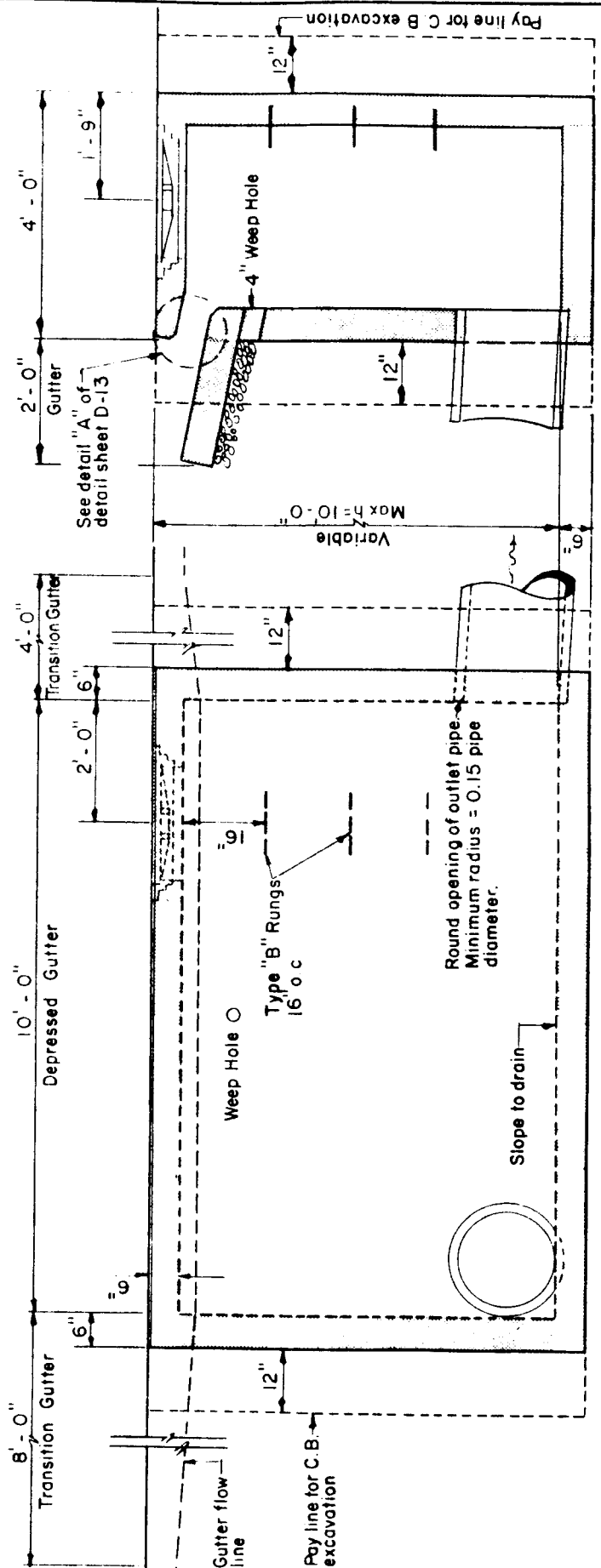
SCALE 3/8" = 1'-0"

NOTES:

1. Provide 2 cu ft of crushed rock, ASTM size #9 Rock Sand, at weep hole.
2. See sheet D-10 for reinforcement details.
3. Rungs shall not be installed over a pipe connection and the lowest rung shall be not more than 2'-0" above the invert.



PLAN



ELEVATION

SECTION A-A

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

TYPE "C" CATCH BASIN

SCALE 3/8" = 1'-0"

SEPTEMBER 1984

STANDARD
DETAILS

D-9

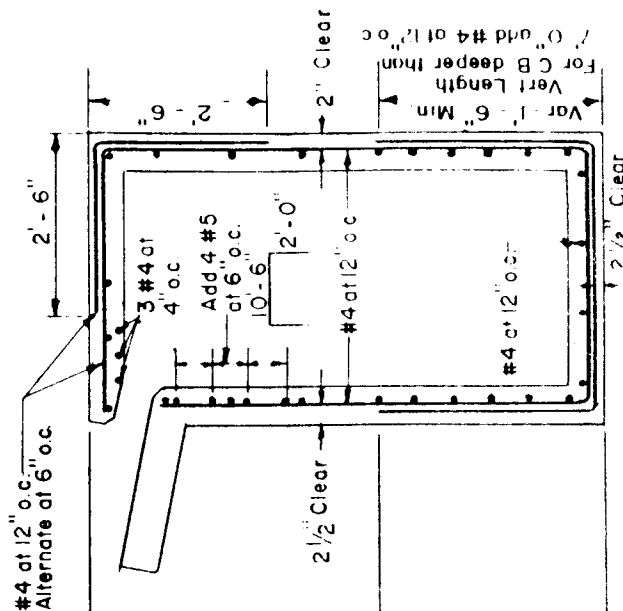
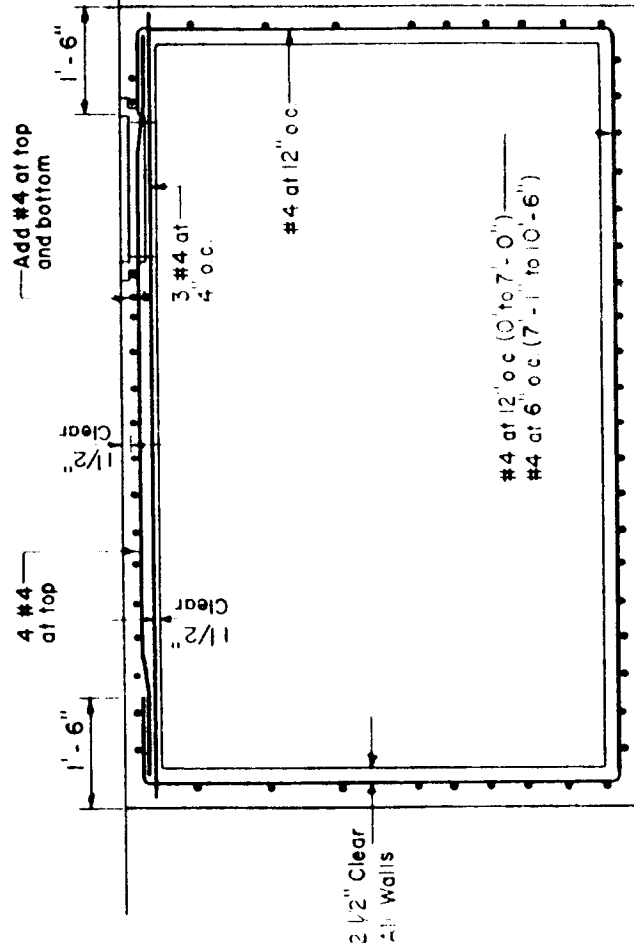
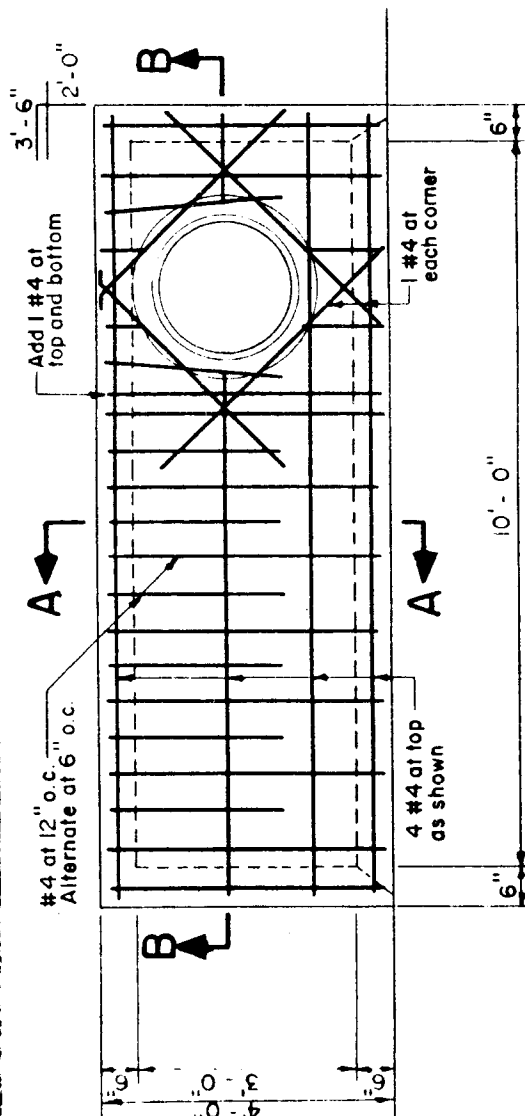
TYPE "C" CATCH BASIN REINFORCEMENT DETAILS

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

NOTES:

1. See sheet D-13 for reinforcement at pipes and corners.
2. Spliced reinforcing bars shall be lapped at least 30 diameters.

PLAN



D-10

STANDARD
DETAILS

TYPE "C" CATCH BASIN
REINFORCEMENT DETAILS

SEPTEMBER 1984

SCALE: 3/8" 1' 0"

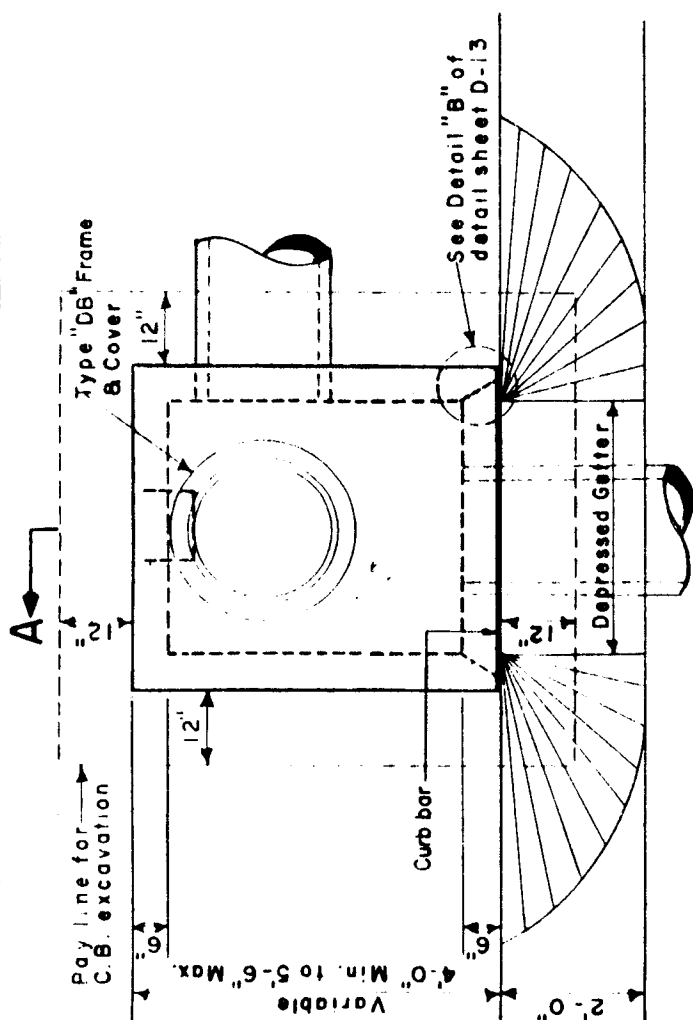
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

TYPE "D" CATCH BASIN

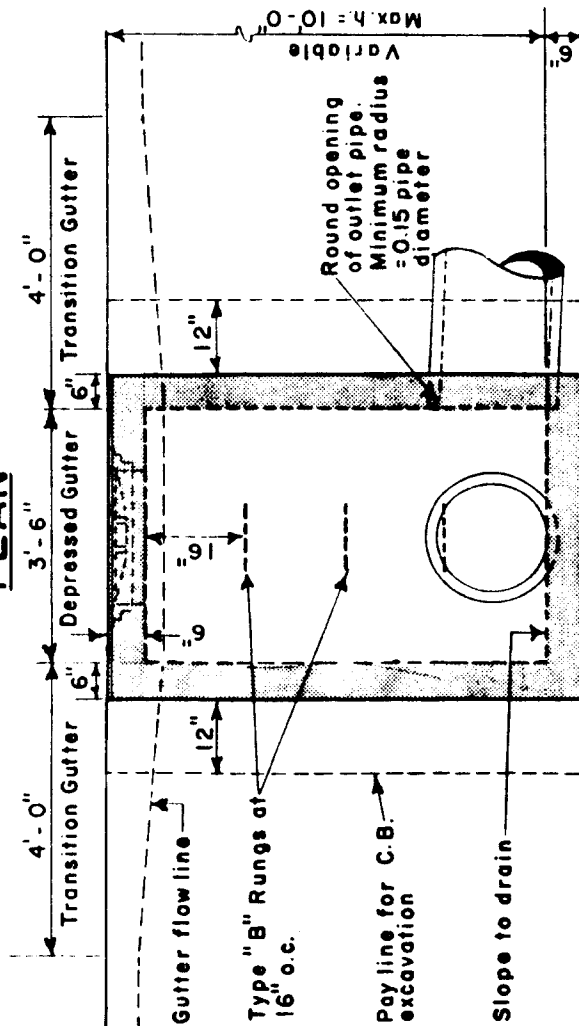
SCALE: 3/8" = 1' - 0"

NOTES:

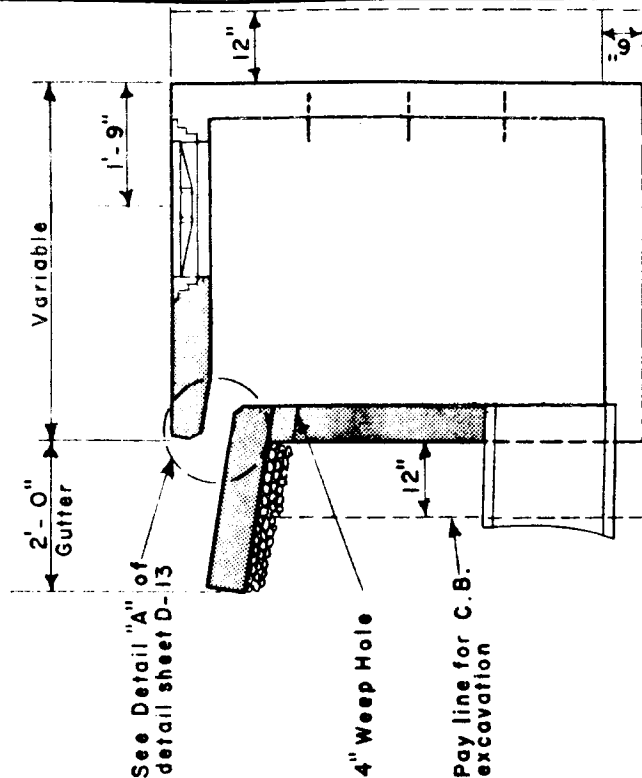
1. Provide 2 cu. ft. of crushed rock, ASTM size #9 Rock Sand, at weep hole.
2. See sheet D-12 for reinforcement details.
3. Rungs shall not be installed over a pipe connection and the lowest rung shall be not more than 2'-0" above the invert.



PLAN



ELEVATION



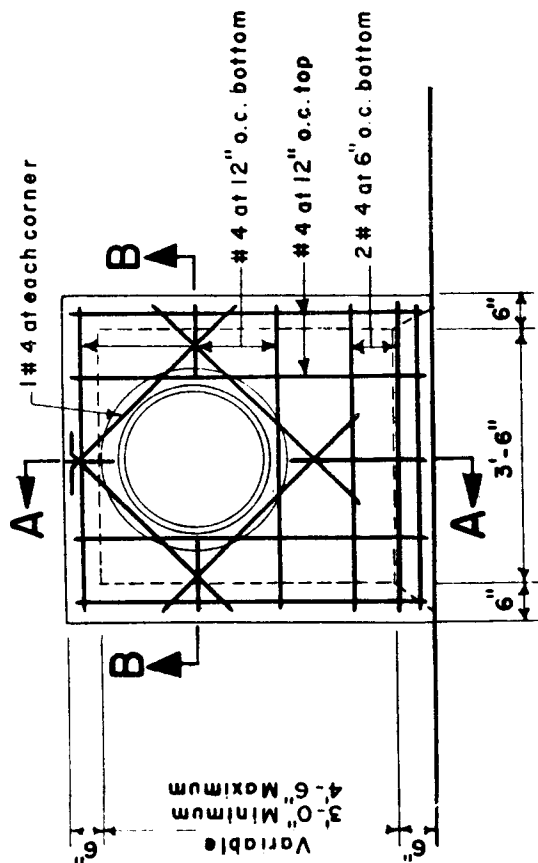
SECTION A-A

TYPE "D" CATCH BASIN REINFORCEMENT DETAILS

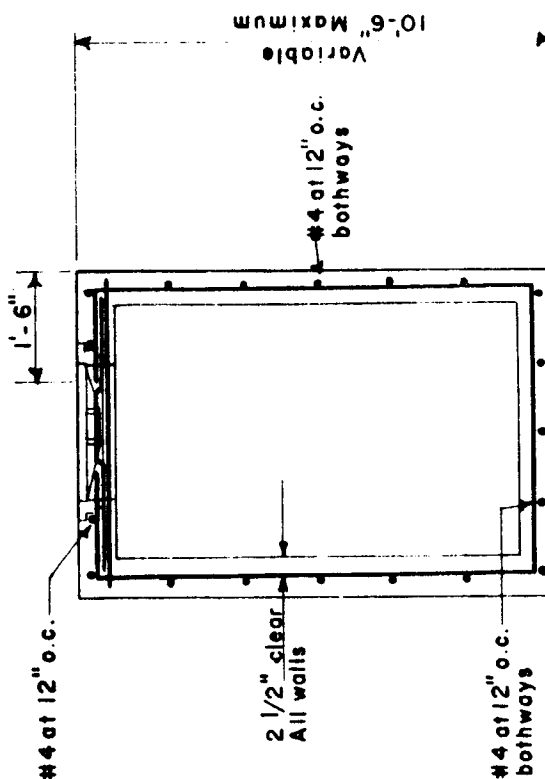
SCALE: 3/8" = 1' - 0"

NOTES:

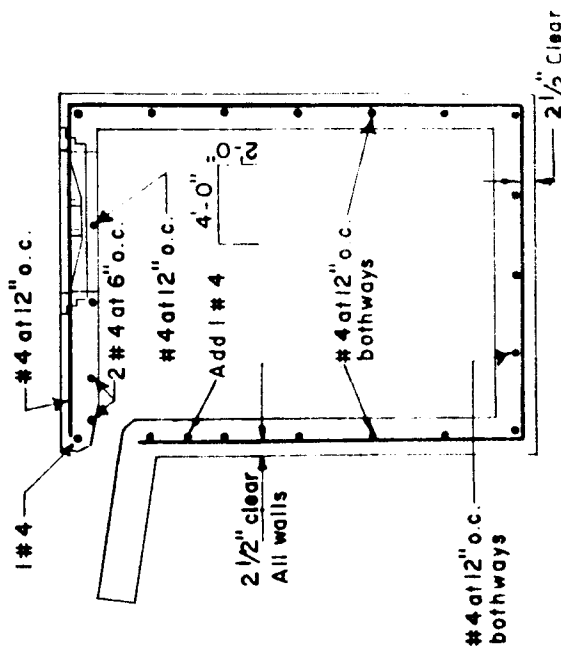
1. See sheet D-13 for reinforcement at pipes and corners.
2. Spliced reinforcing bars shall be lapped at least 30 diameters.



PLAN



SECTION B-B



SECTION A-A

D-12

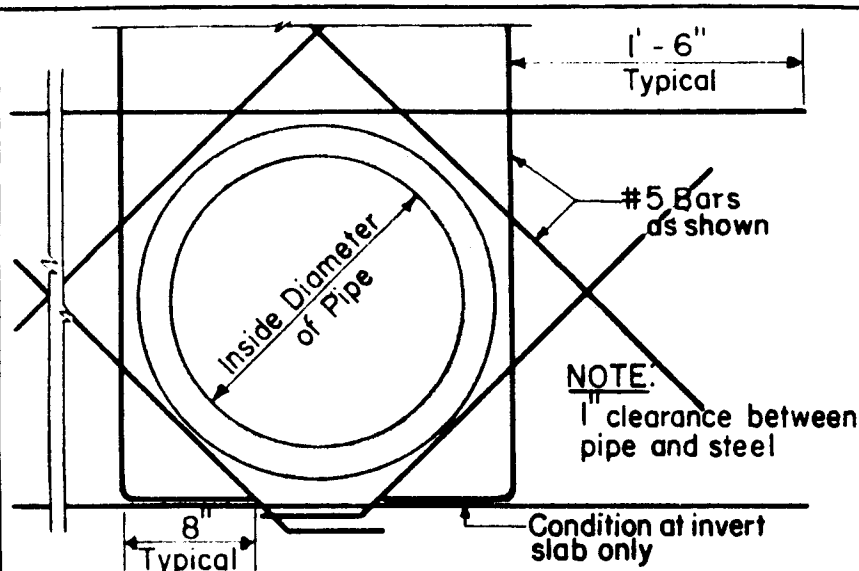
STANDARD
DETAILS

TYPE "D" CATCH BASIN
REINFORCEMENT DETAILS

SEPTEMBER 1984

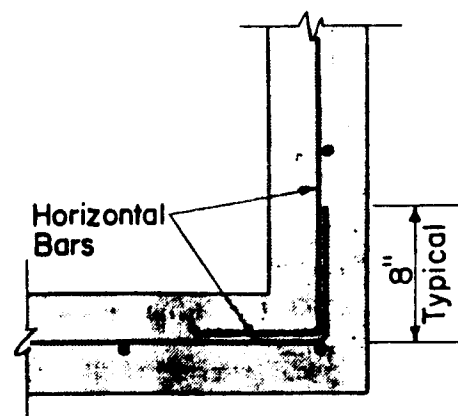
SCALE: 3/8" = 1'-0"

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



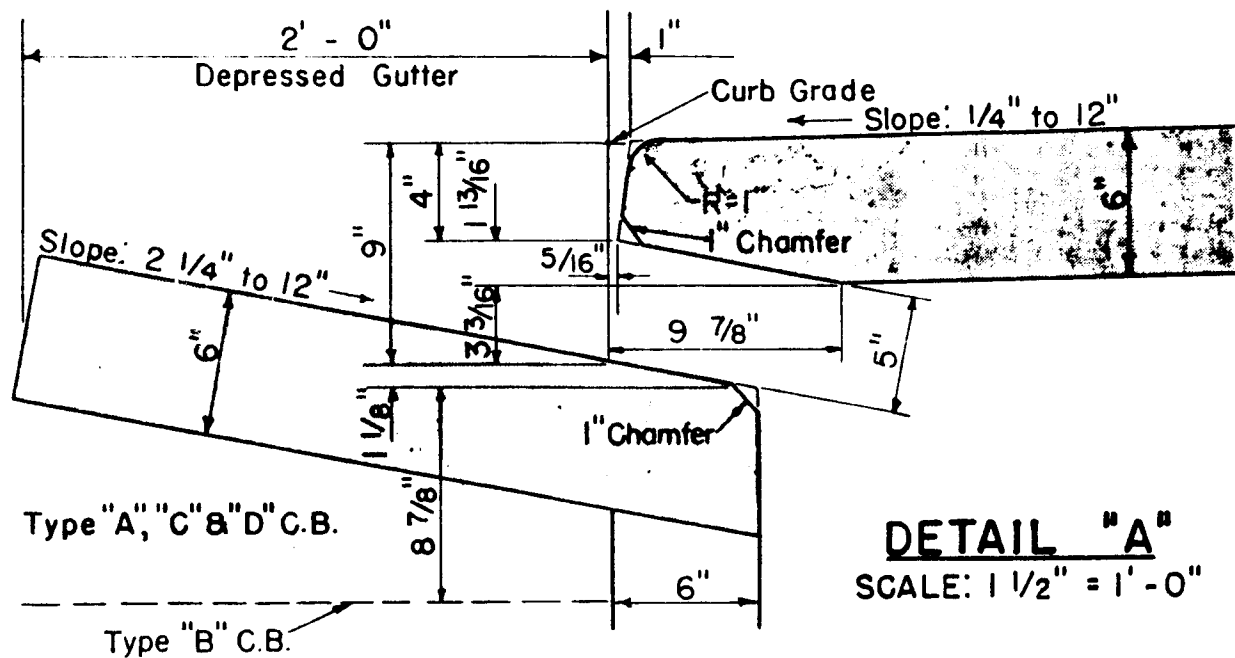
TYPICAL REINFORCEMENT AT PIPES

SCALE: 1" = 1'-0"

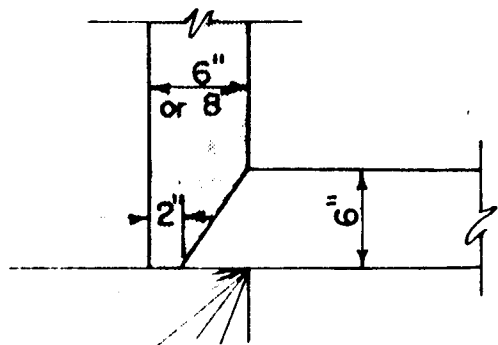


TYPICAL CORNER REINFORCEMENT LAPPING

SCALE: 1" = 1'-0"



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



DETAIL "B" SCALE: 1" = 1'-0"

CATCH BASIN DETAILS

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

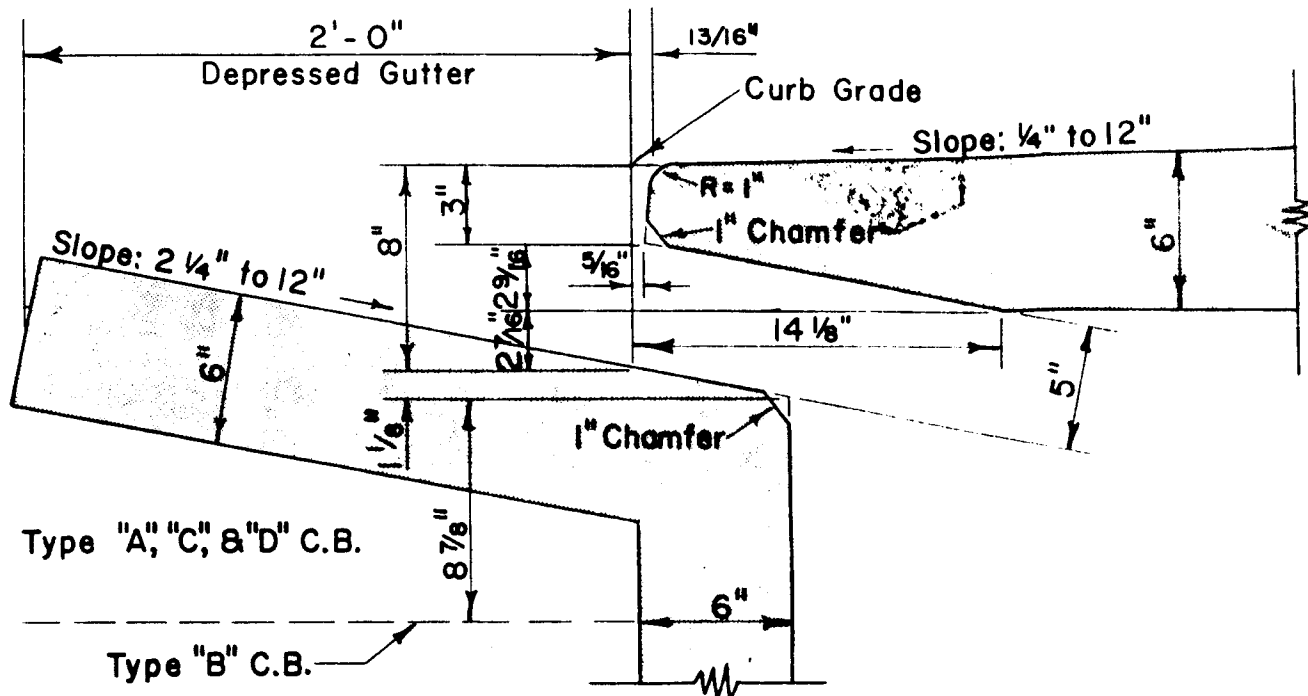
CATCH BASIN DETAILS

SCALE: AS NOTED

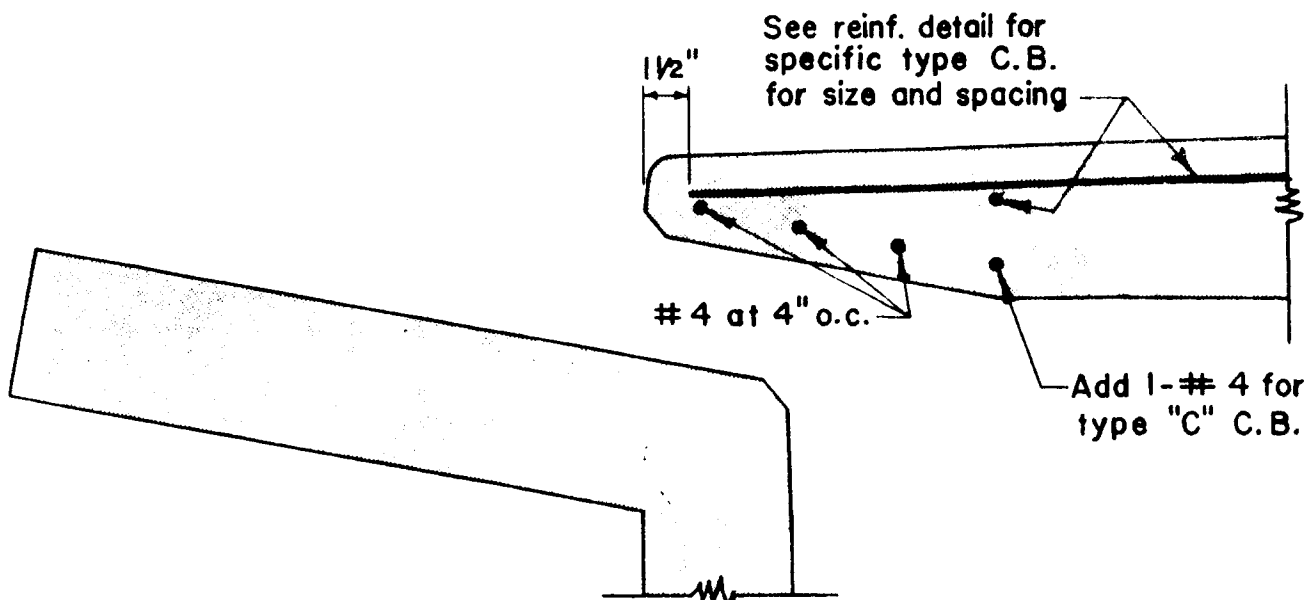
SEPTEMBER 1984

STANDARD
DETAILS

D-13

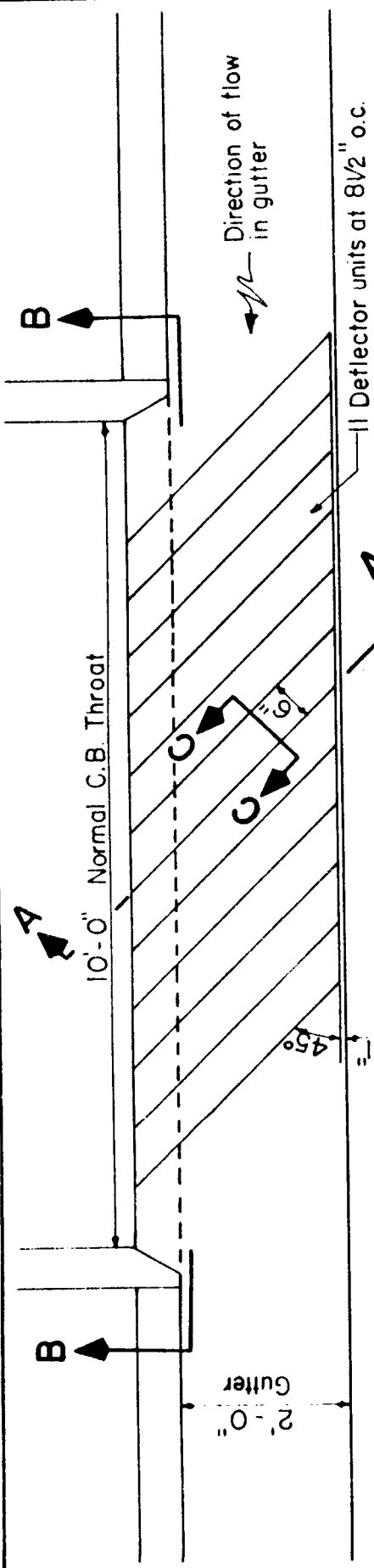


DETAIL "A₁"
 SCALE: 1 1/2" = 1'-0"

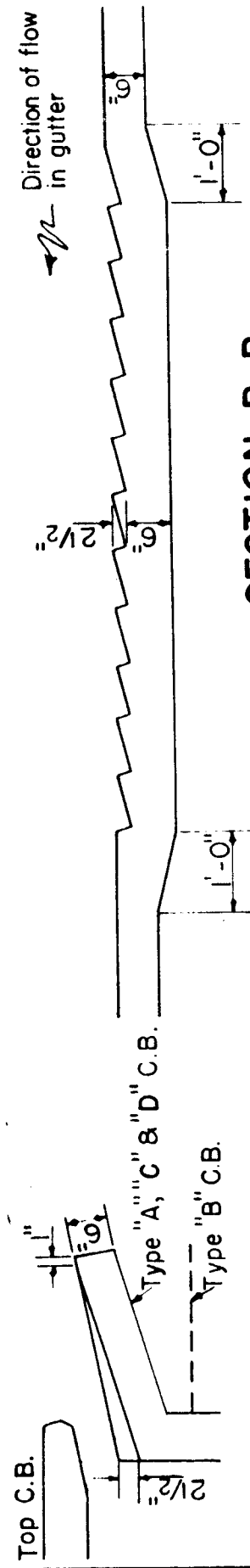


REINFORCEMENT FOR DETAIL "A₁"
 SCALE: 1 1/2" = 1'-0"

DETAILS FOR CATCH BASIN WITH 5" CURB



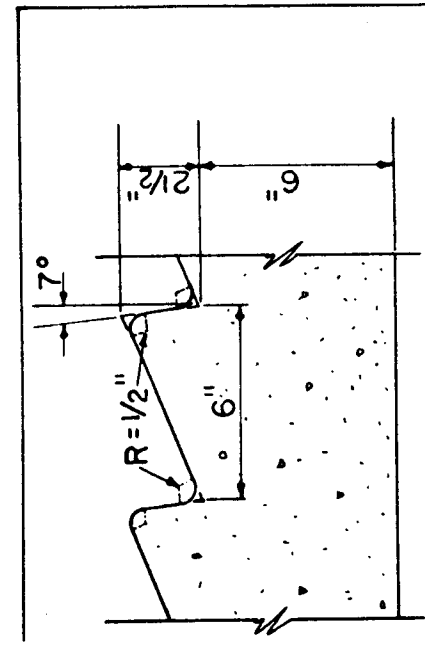
PLAN



SECTION A-A

NOTE:

For 3' - 6" C.B. throat construct 3 deflector units at 8 1/2" o.c.

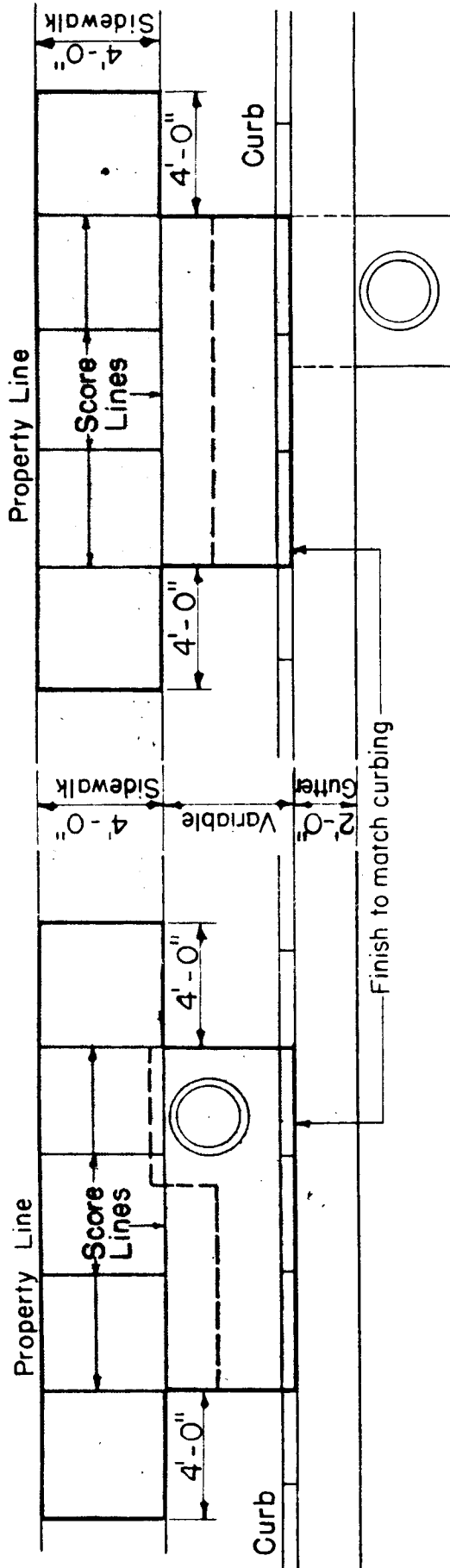


SECTION C-C

SCALE: 2" = 1'-0"

DEFLECTOR INLET FOR CATCH BASIN

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



TYPE "A" CATCH BASIN

TYPE "B" CATCH BASIN

NOTES

1. A four foot section of sidewalk, on both sides of the catch basin, shall be poured monolithically with the top deck of the catch basin.
2. Pour top deck of catch basin after the curb and gutter are installed.
3. Scoring shall be done according to the drawing.
4. Monolithic construction of types "C" and "D" catch basins and sidewalk shall be similar to detail for type "B" catch basin.

**MONOLITHIC CONSTRUCTION OF CATCH BASIN
TOP SLAB AND SIDEWALK**

D-16

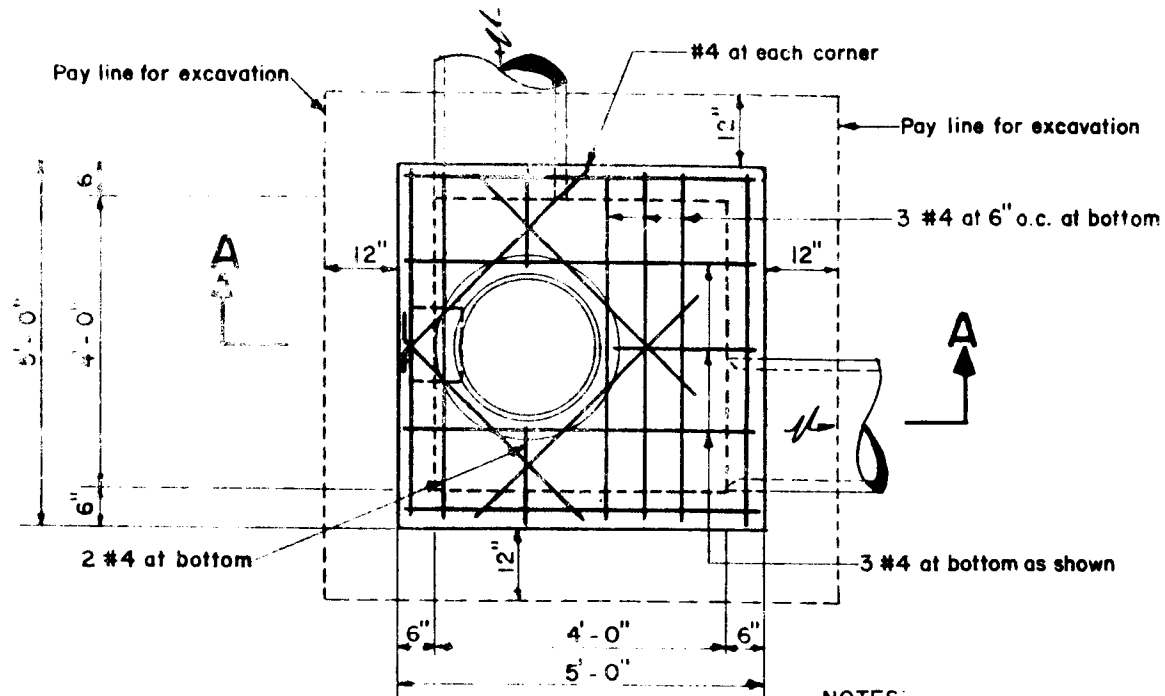
STANDARD
DETAILS

MONOLITHIC CONSTRUCTION OF CATCH
BASIN TOP SLAB AND SIDEWALK

SEPTEMBER 1984

SCALE: 3/16" = 1'-0"

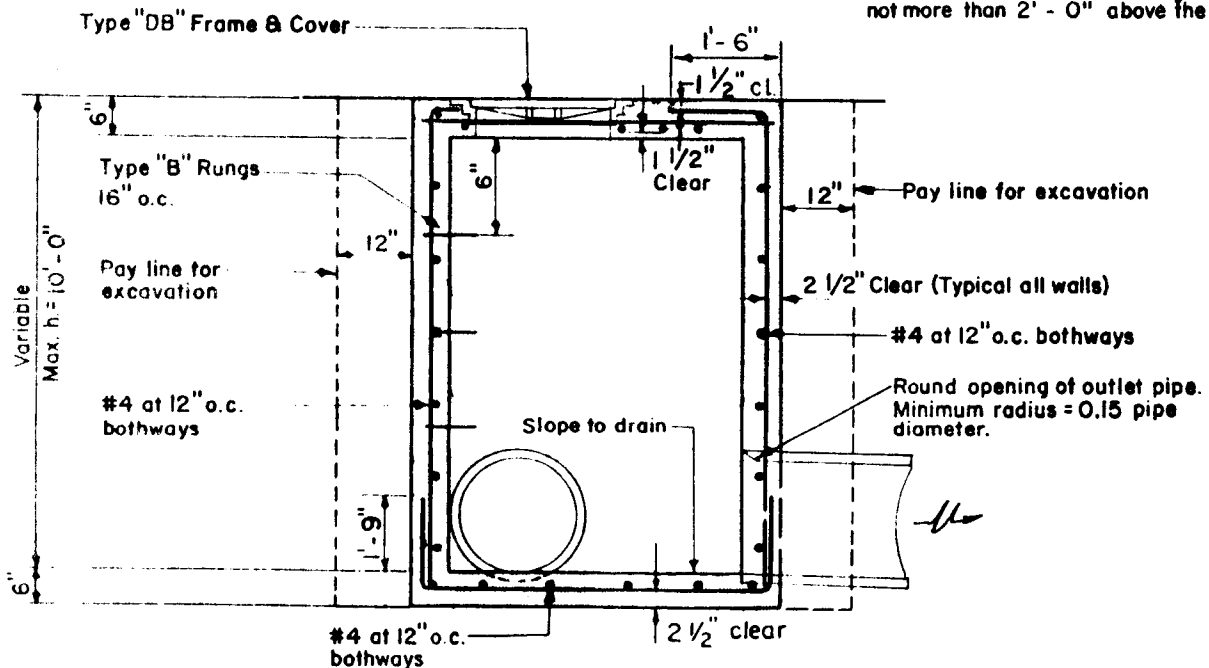
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



PLAN

NOTES:

1. See sheet D-26 for channelizing detail.
2. See sheet D-13 for reinforcement at pipes and at corners.
3. Rungs shall not be installed over a pipe connection and the lowest rung shall be not more than 2' - 0" above the invert.



SECTION A - A

SHALLOW DRAIN MANHOLE FOR SIDEWALK AREA

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

SHALLOW DRAIN MANHOLE
FOR SIDEWALK AREA

STANDARD
DETAILS

D-17

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

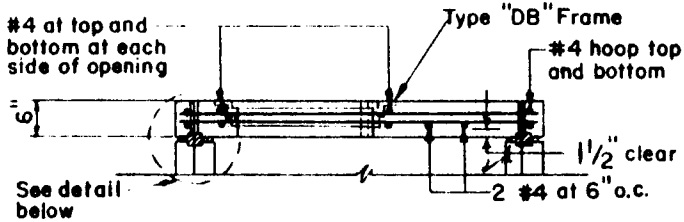
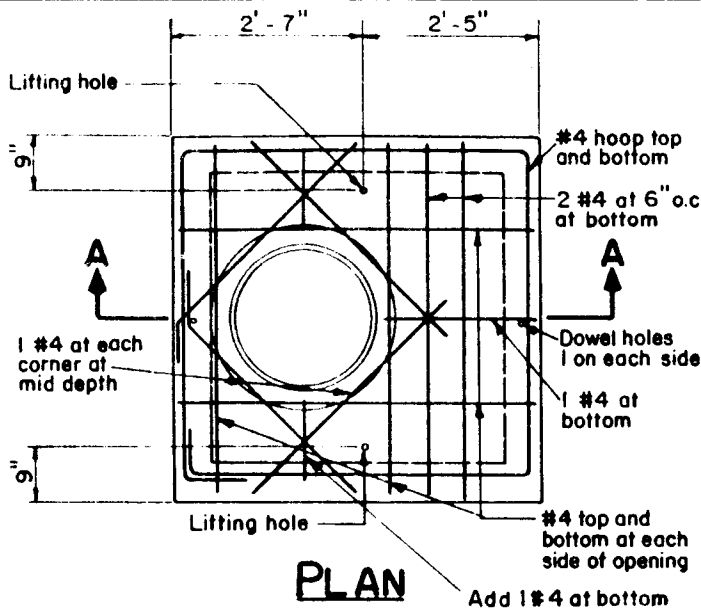
SEPTEMBER 1984



1. See sheet D-26 for channelizing detail.
2. See sheet D-13 for reinforcement at pipes and corners.
3. Rungs shall not be installed over a pipe connection and the lowest rung shall be not more than 2' - 0" above the invert.



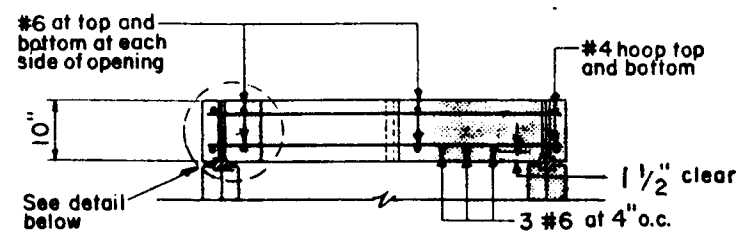
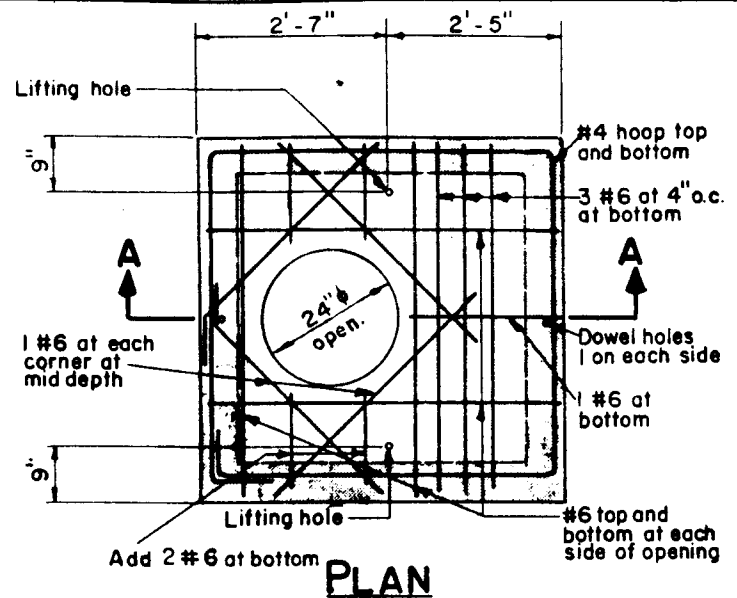
SHALLOW DRAIN MANHOLE FOR PAVEMENT AREA



SECTION A-A

FOR SIDEWALK AREA

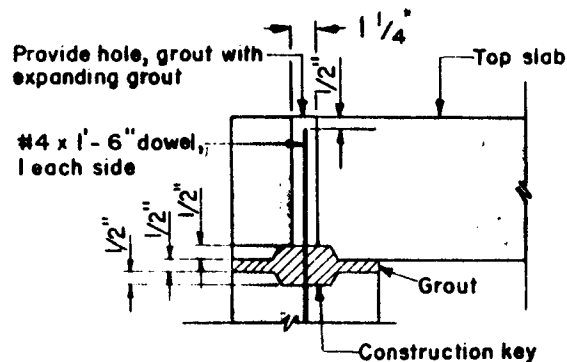
SCALE: 3/8" = 1'-0"



SECTION A-A

FOR PAVEMENT AREA

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



DETAIL

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

PRE-CAST TOP SLAB FOR SHALLOW DRAIN MANHOLE

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

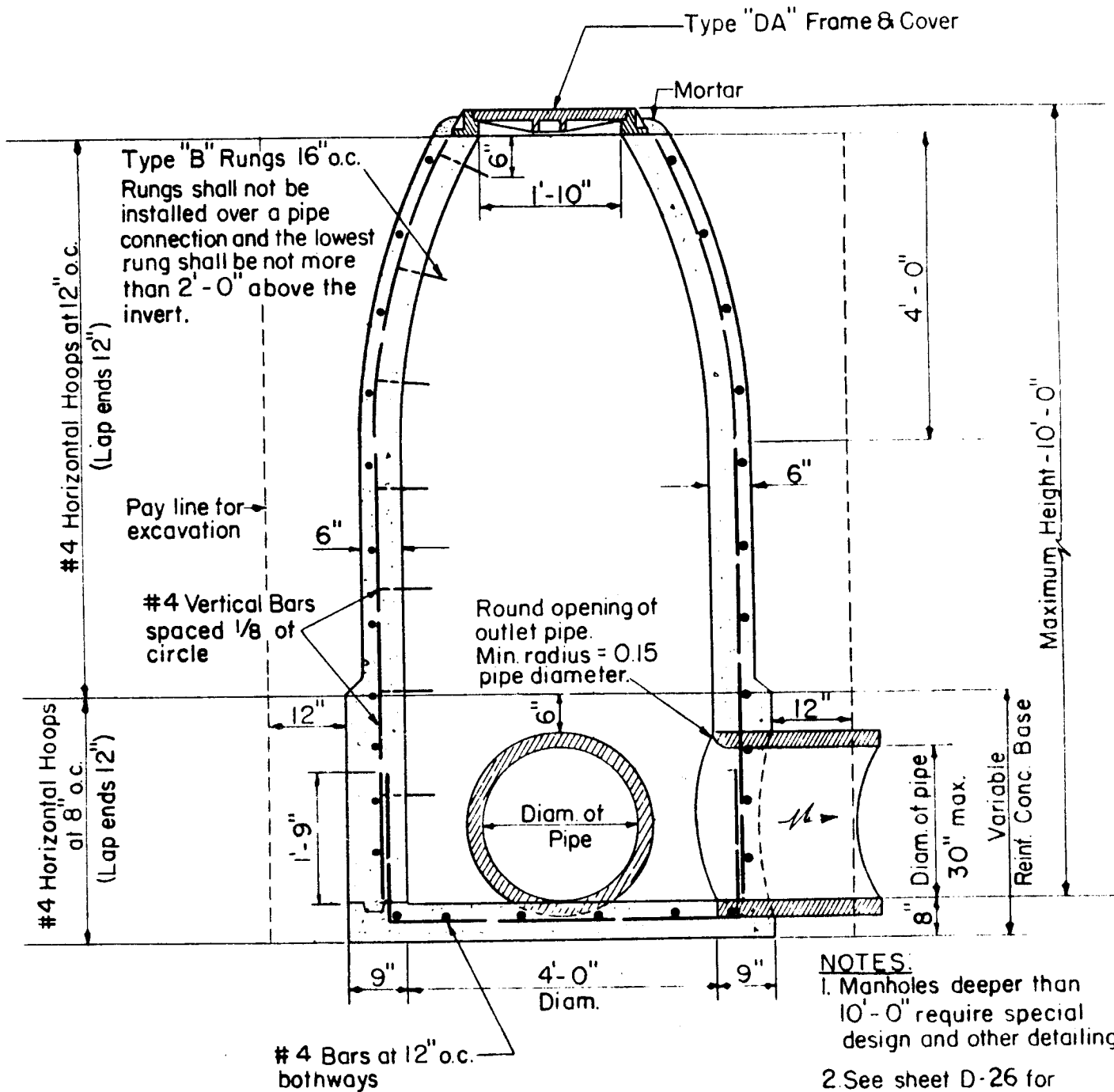
PRE-CAST TOP SLAB
FOR SHALLOW DRAIN MANHOLE

SCALE: AS NOTED

SEPTEMBER 1984

STANDARD
DETAILS

D-19



NOTES:

1. Manholes deeper than 10' - 0" require special design and other detailing
2. See sheet D-26 for "Channelizing Details for Drain Manhole"

CONCRETE WALL DRAIN MANHOLE

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

D-20

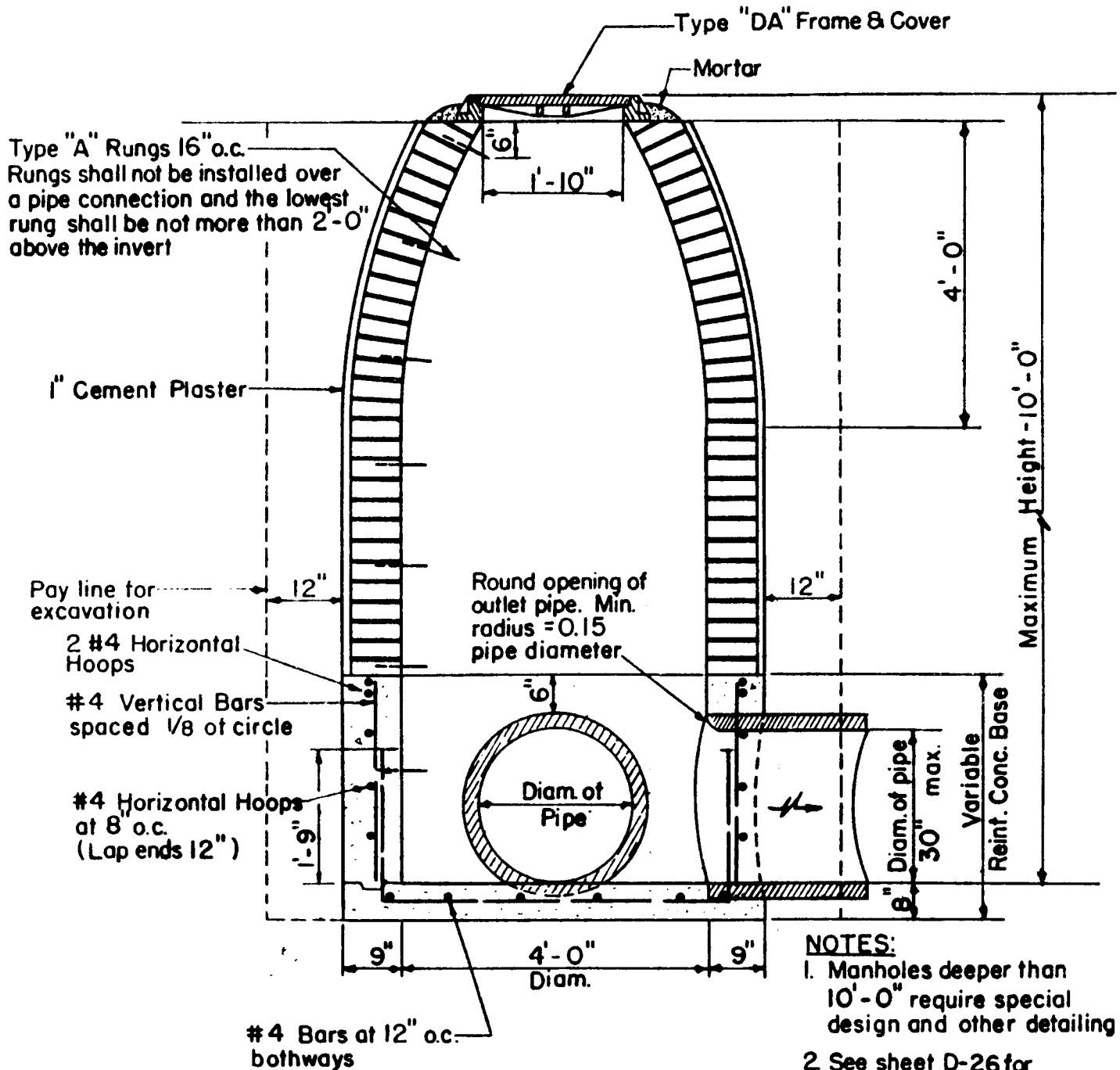
STANDARD
DETAILS

CONCRETE WALL DRAIN MANHOLE

SEPTEMBER 1984

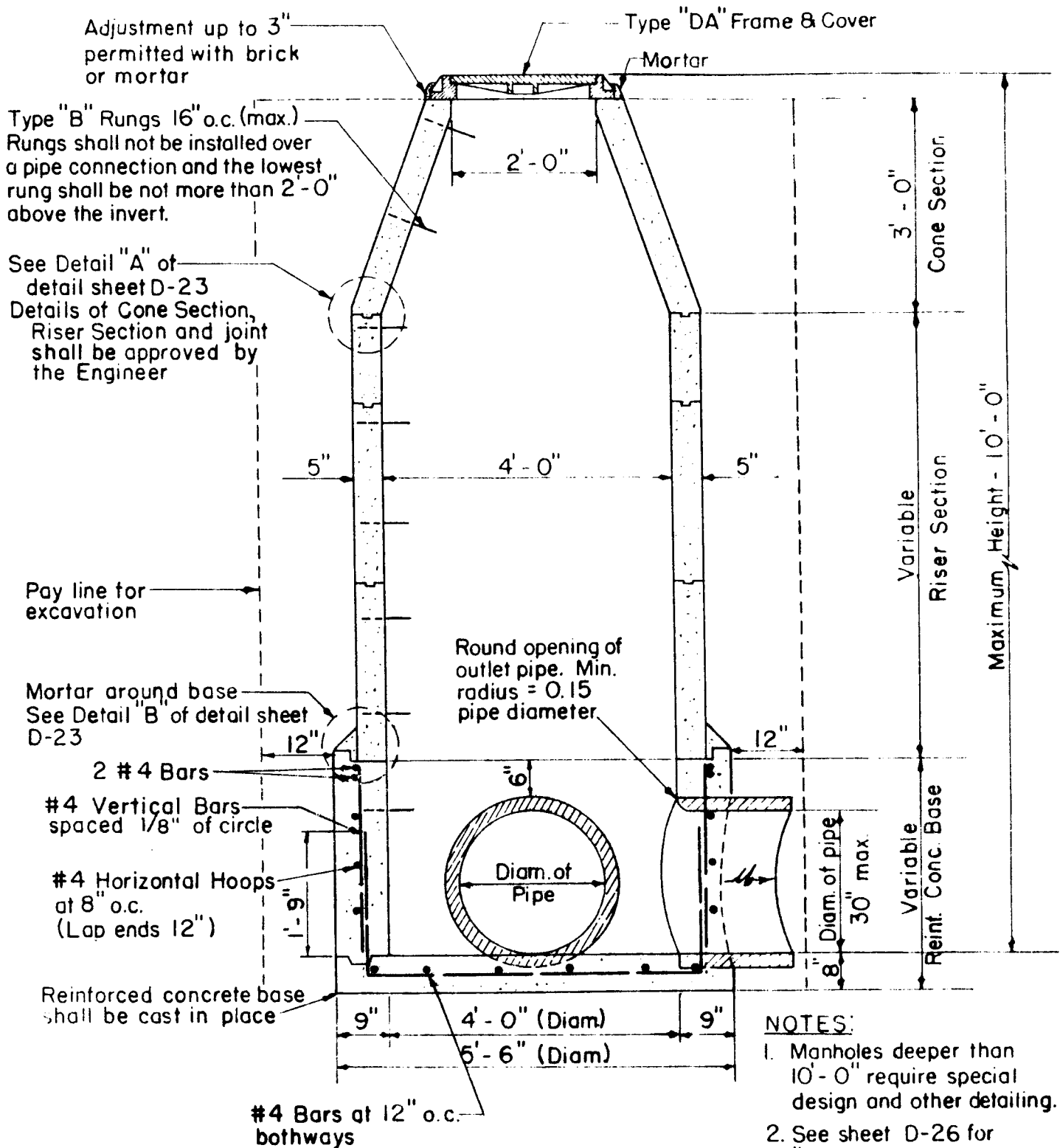
SCALE: 1/2" = 1' - 0"

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



BRICK WALL DRAIN MANHOLE

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



PRE-CAST CONCRETE DRAIN MANHOLE

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

D-22

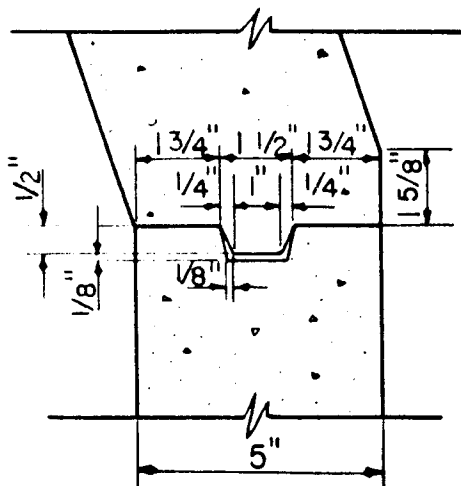
STANDARD
DETAILS

PRE-CAST CONCRETE DRAIN MANHOLE

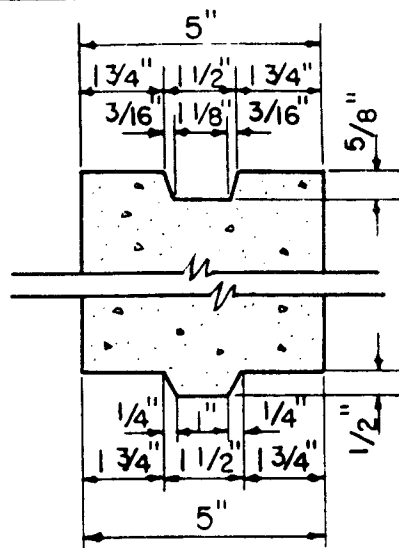
SEPTEMBER 1984

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

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

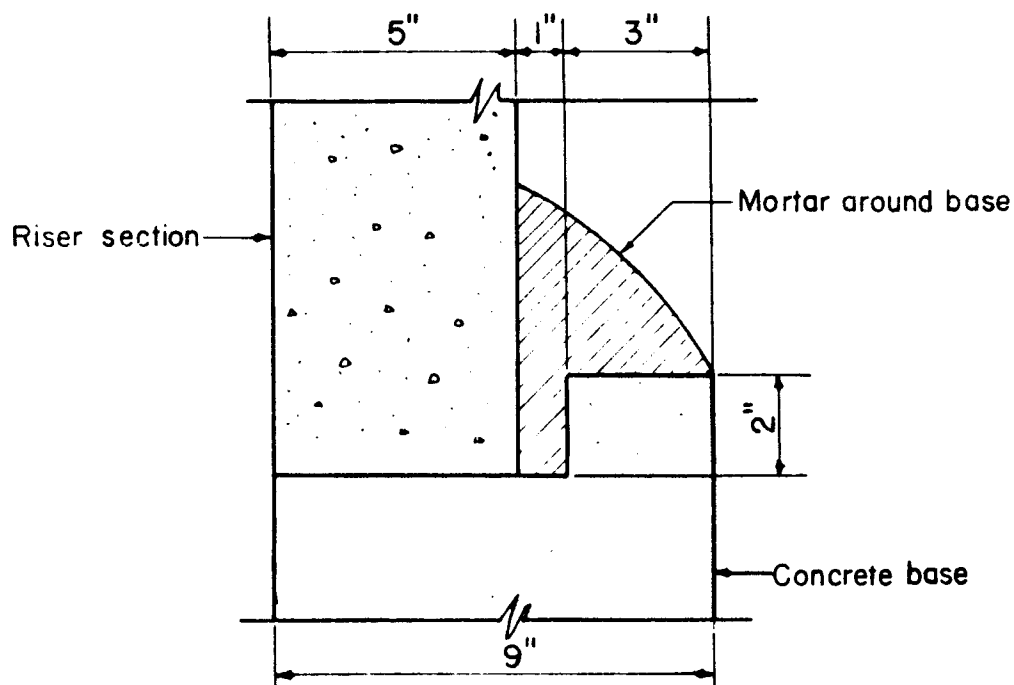


CONE SECTION



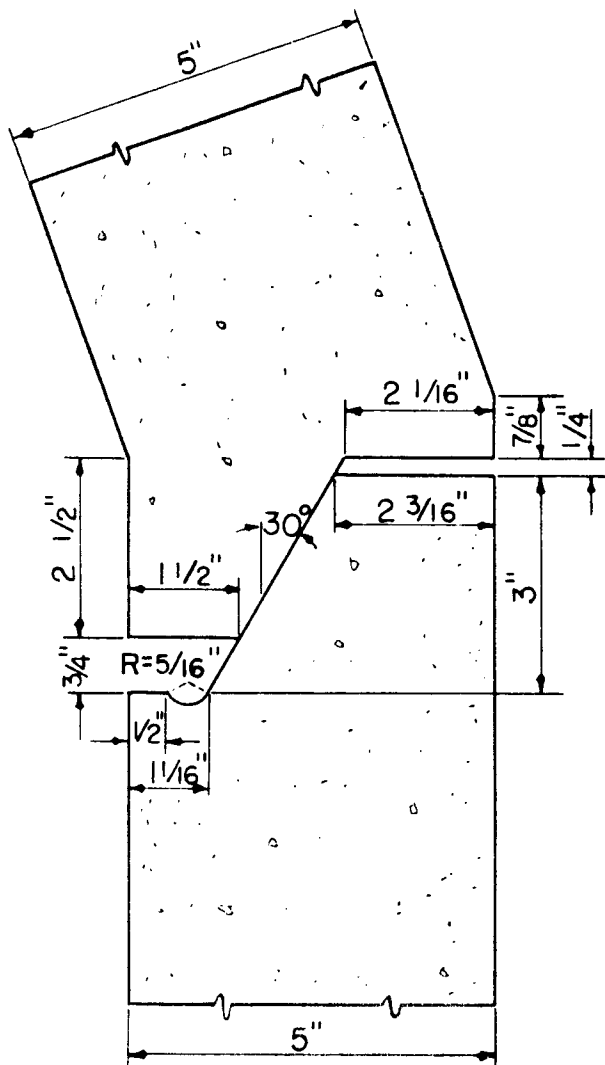
RISER SECTION

DETAIL "A"

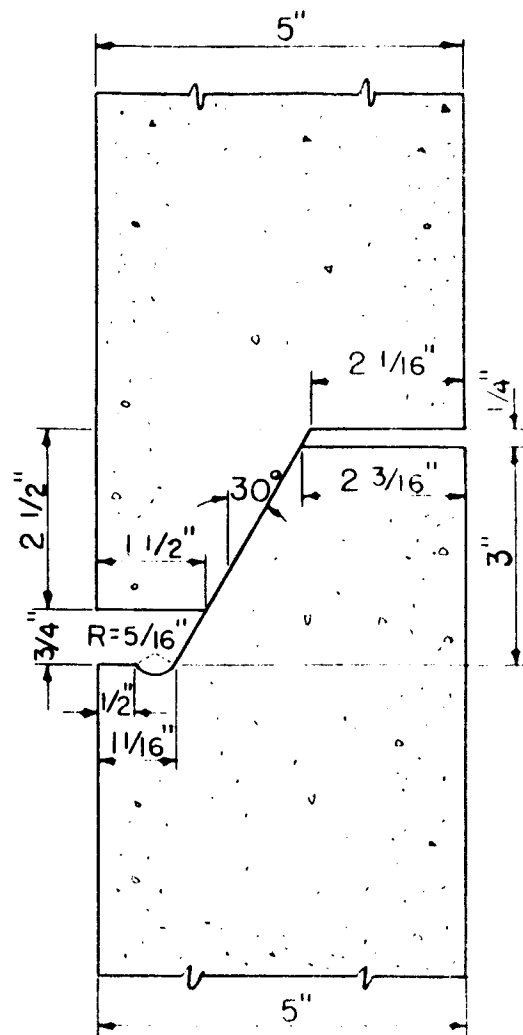


DETAIL "B"

PRE-CAST CONCRETE DRAIN
MANHOLE DETAILS



CONE SECTION

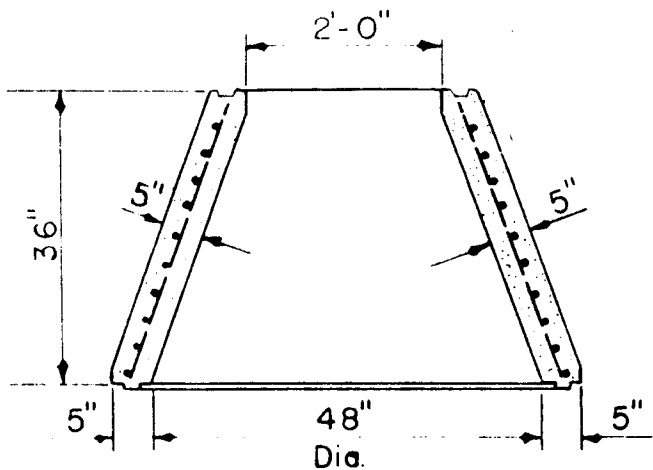


RISER SECTION

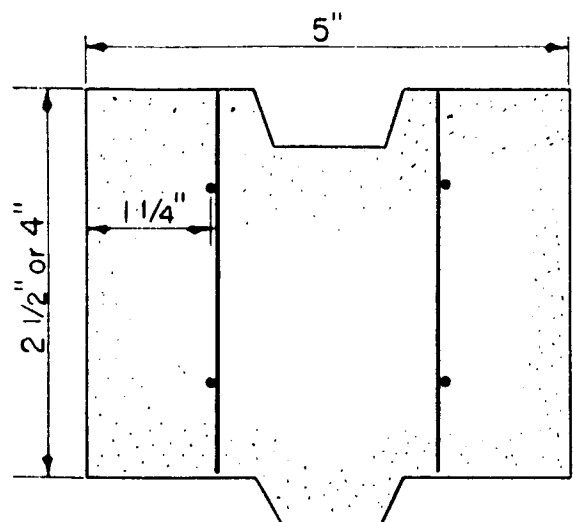
ALTERNATE DETAIL "A"

**PRE-CAST CONCRETE DRAIN
MANHOLE DETAILS**

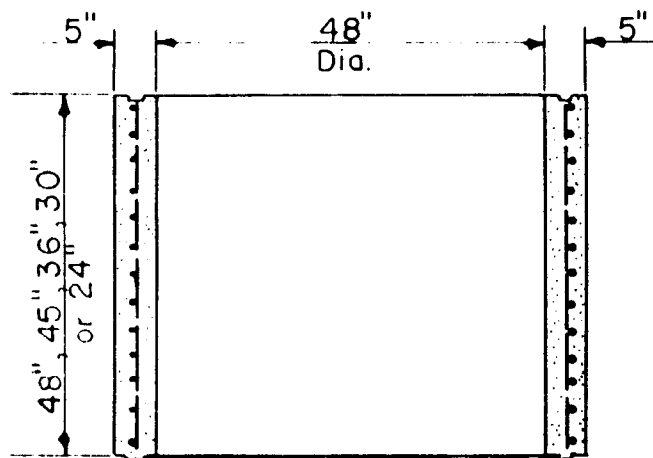
SCALE: 4 1/2" = 1' - 0"



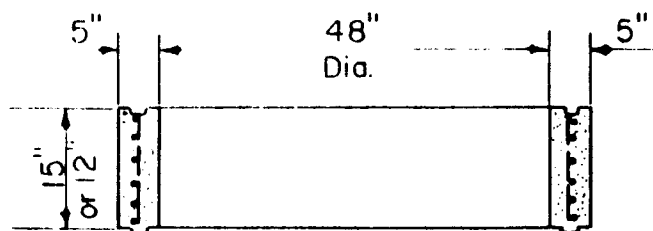
36" CONE
SCALE: 1/2" = 1' - 0"



GRADE RING
SCALE: 1/2" = 1'



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

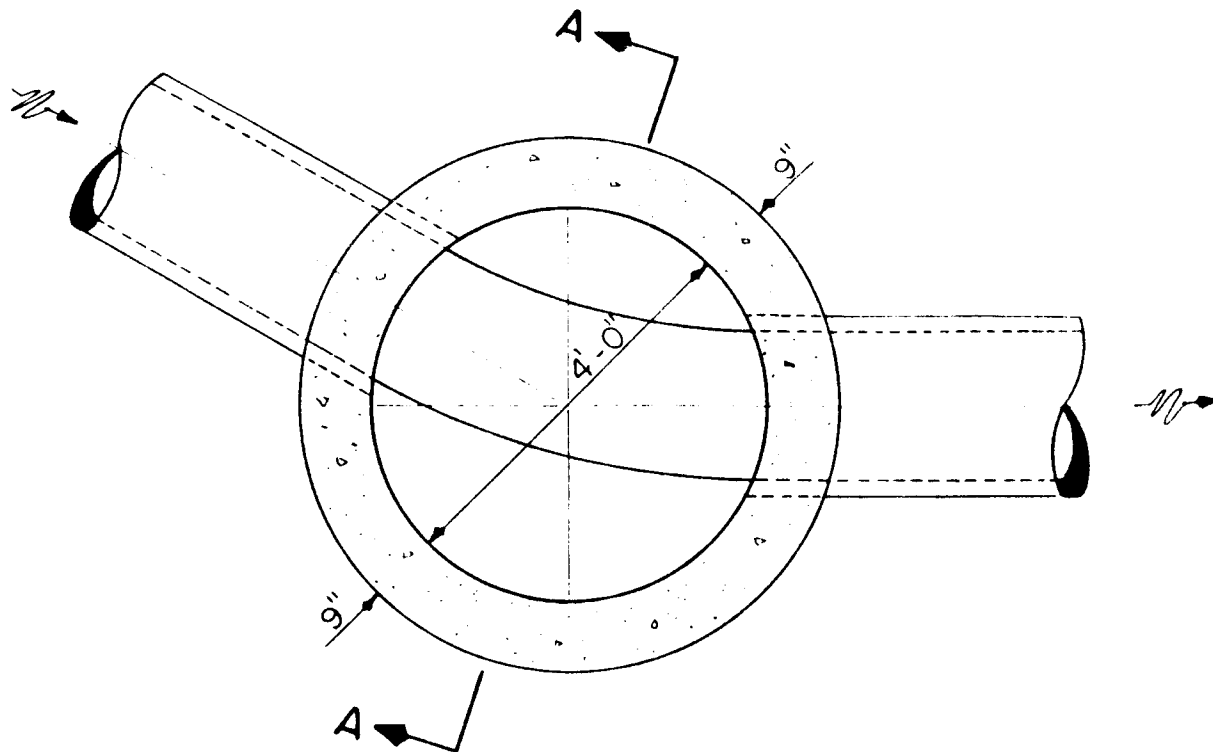


RISER
SCALE: 1/2" = 1' - 0"

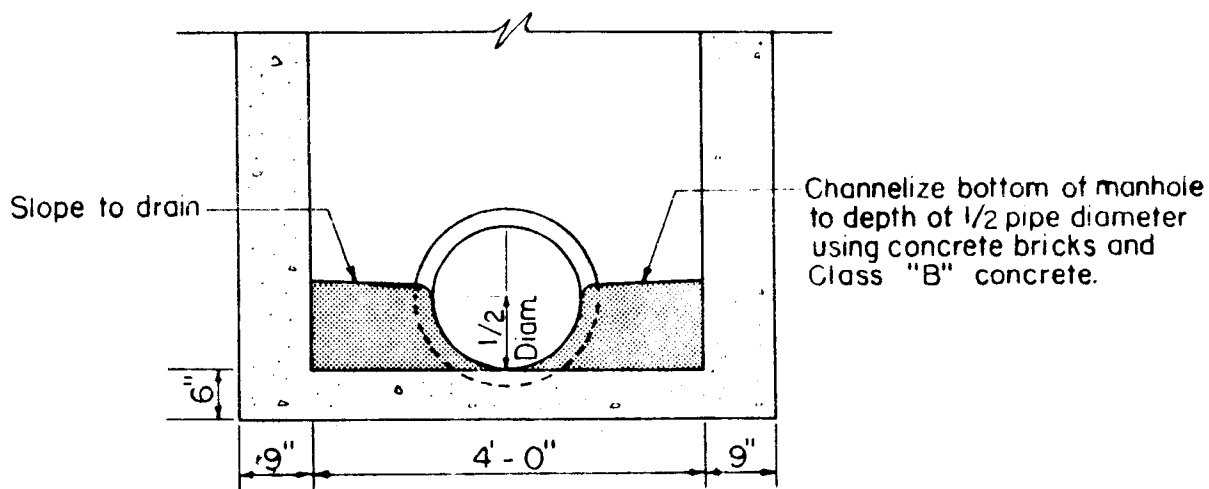
SECTION	A _s /L.F.	TOTAL WT., LB.
48" x 48" Riser	0.15	2,752
48" x 45" Riser	0.15	2,580
48" x 36" Riser	0.15	2,064
48" x 30" Riser	0.15	1,720
48" x 24" Riser	0.15	1,376
48" x 15" Riser	0.15	860
48" x 12" Riser	0.15	688
48" x 24" x 36" Cone	0.16	2,100
22" x 4" Grade Ring	0.12	200
22" x 2 1/2" Grade Ring	0.12	95
48" x 32" Riser	0.15	2,691
48" x 16" Riser	0.15	1,345

NOTES

1. Pre-cast sections shall conform to ASTM C 478 - 61T.
2. Manufacturers may submit to the Engineer for approval, prior to manufacturing, designs other than those shown on this sheet.



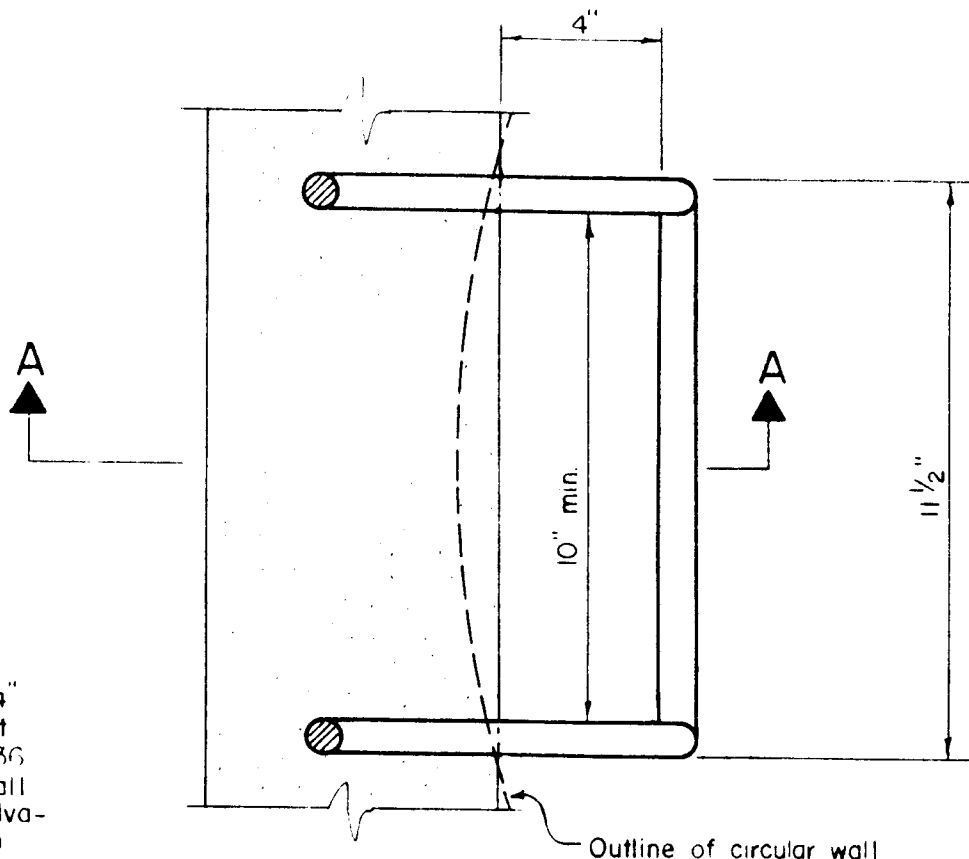
PLAN



SECTION A - A

CHANNELIZING DETAILS FOR DRAIN MANHOLE

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



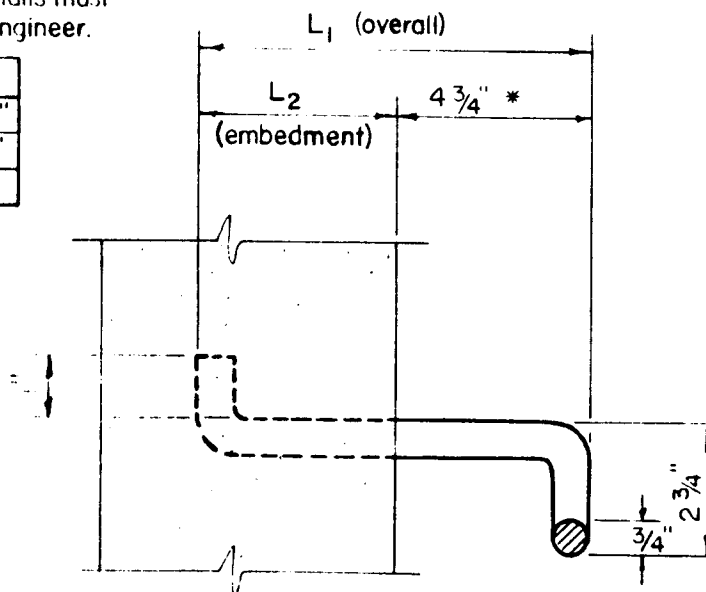
SECTION

NOTES:

1. Rungs shall be $\frac{3}{4}$ " diameter wrought iron or ASTM A36 steel rods and shall be hot-dipped galvanized or cadmium plated after bending.

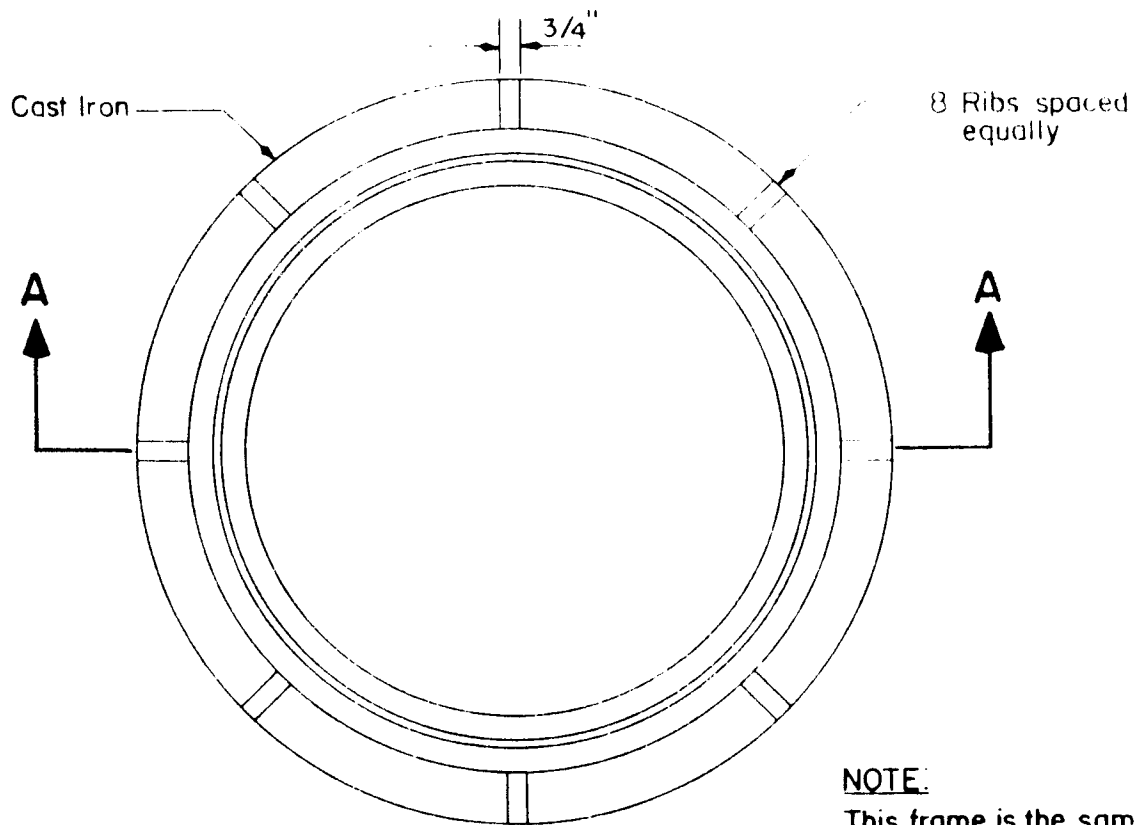
2. Any deviation from these details must be approved by the Chief Engineer.

TYPE	WALLS	L ₁	L ₂
Type A	Brick	13 $\frac{1}{8}$ "	7 $\frac{5}{8}$ "
Type B	Concrete	9"	4 $\frac{1}{4}$ "
Type C	Precast	7 $\frac{3}{4}$ "	3"



* 3" for one rung at top of opening.

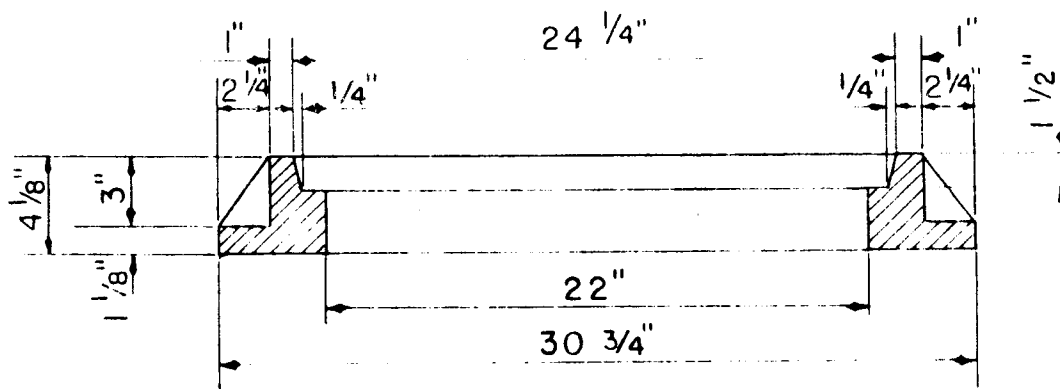
SECTION A-A



PLAN

NOTE:

This frame is the same as sewer manhole frame Type "SA".



SECTION A-A

**TYPE "DA" FRAME
FOR CATCH BASIN AND MANHOLE**

D-28

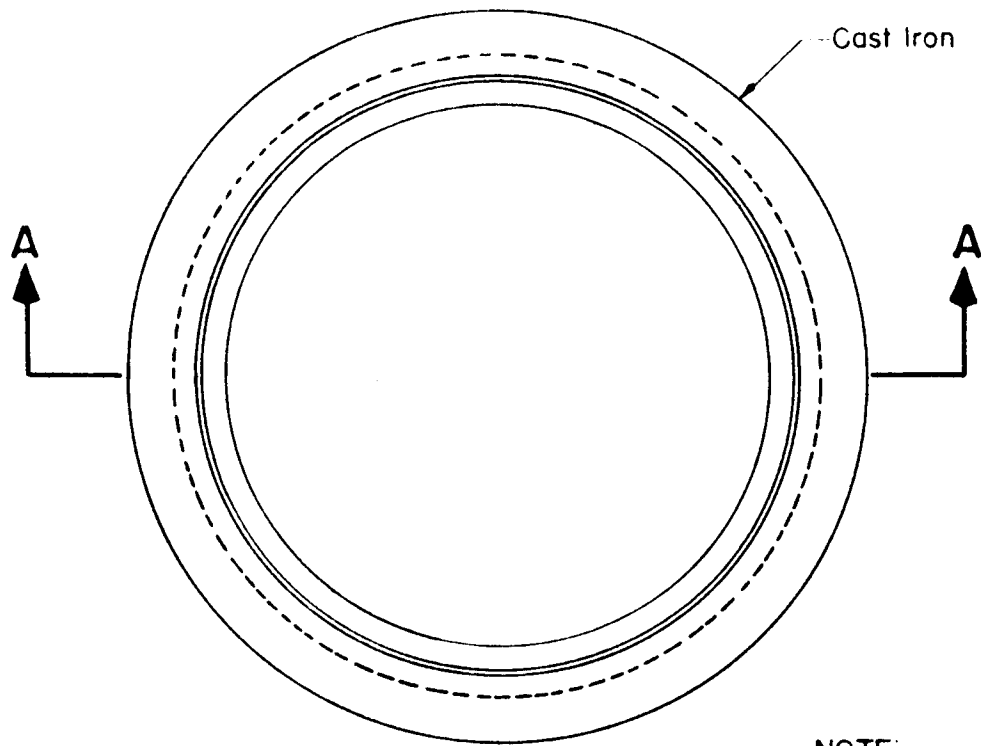
STANDARD
DETAILS

TYPE "DA" FRAME
FOR CATCH BASIN AND MANHOLE

SEPTEMBER 1984

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

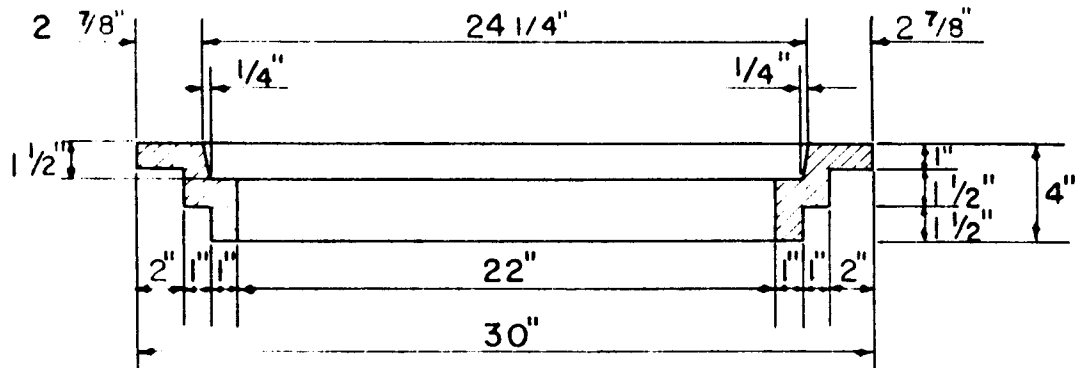
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



PLAN

NOTE:

This frame is the same as sewer manhole frame Type 'SD'.

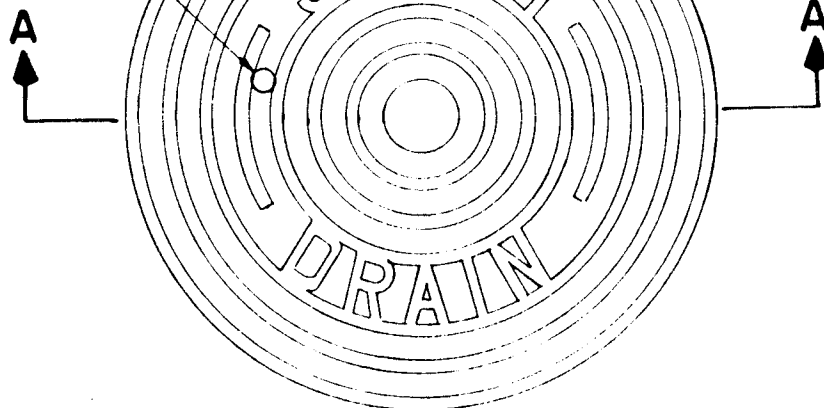


SECTION A - A

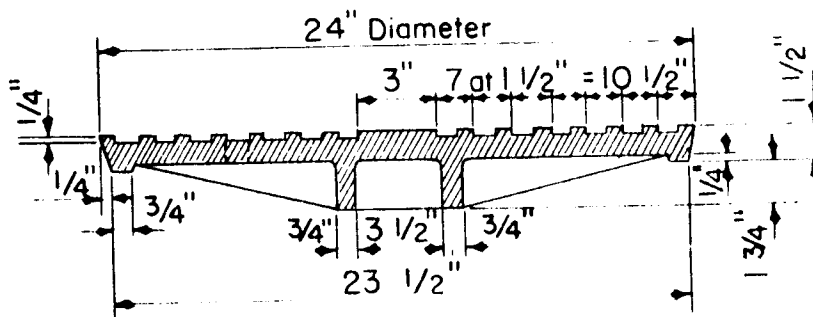
TYPE "DB" FRAME
FOR CATCH BASIN AND MANHOLE

1" Diameter hole

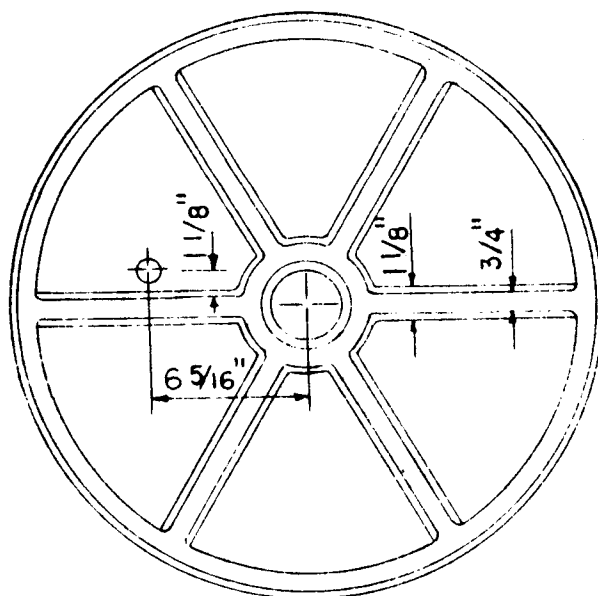
Cast Iron



PLAN



SECTION A - A



BOTTOM VIEW OF COVER

CATCH BASIN AND MANHOLE COVER

D-30

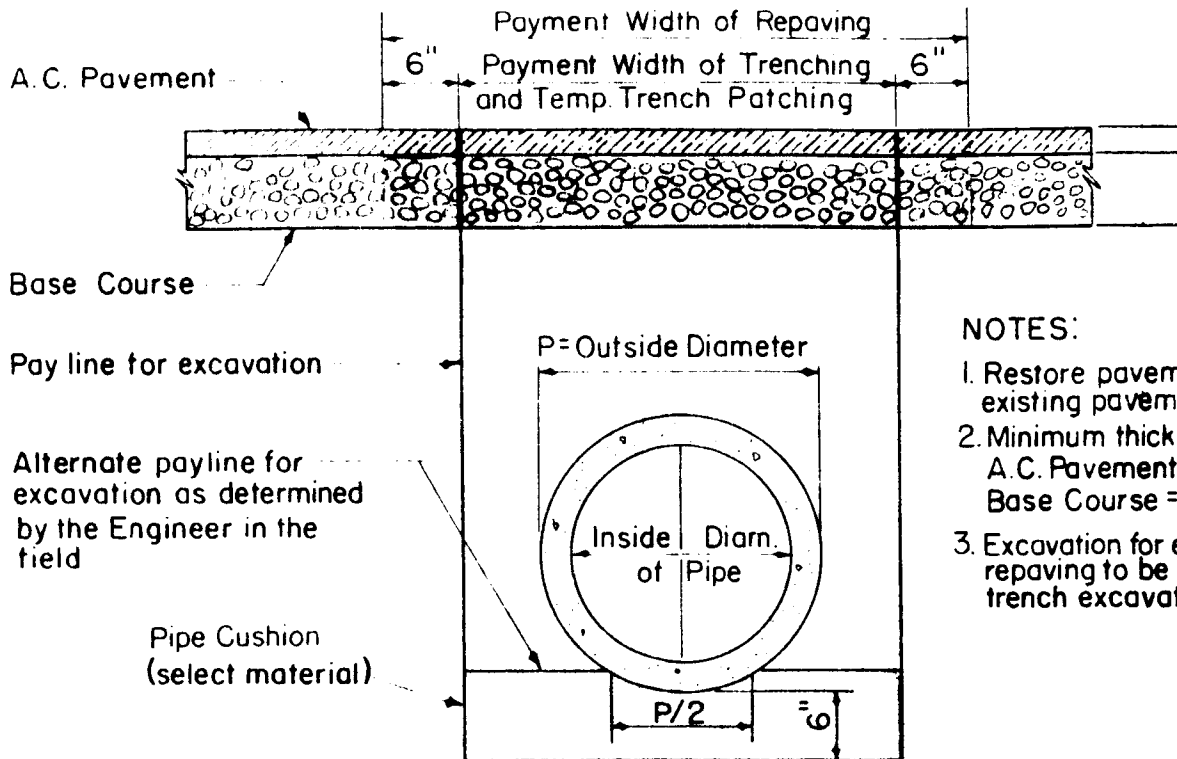
STANDARD
DETAILS

CATCH BASIN AND MANHOLE COVER

SEPTEMBER 1984

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

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



NOTES:

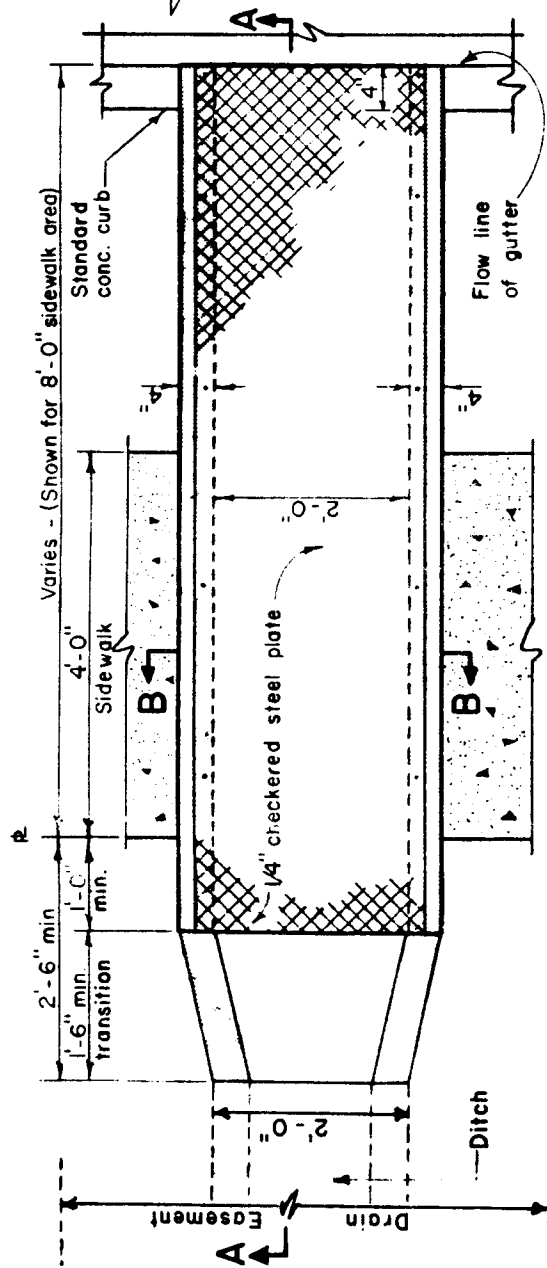
1. Restore pavement to match existing pavement.
2. Minimum thickness of pavement:
A.C. Pavement = 2"
Base Course = 6"
3. Excavation for extra 6" width of repaving to be included with trench excavation.

ELEVATION

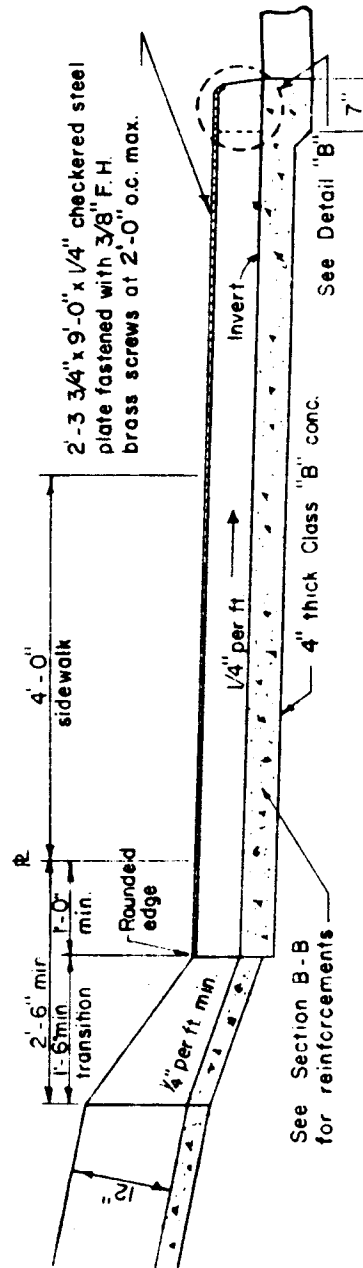
SCALE: 3/4" = 1'-0"

DRAIN PIPE SIZE	PAYMENT WIDTH OF TRENCHING	WIDTH OF REPAVING
18"	36"	48"
24"	48"	60"
30"	56"	68"
36"	64"	76"
42"	72"	84"
48"	80"	92"
54"	88"	100"
60"	96"	108"

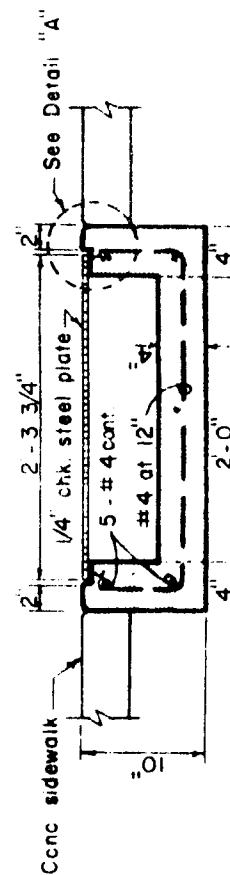
**PAYMENT TRENCH WIDTH AND REPAVING
FOR DRAIN PIPES**



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

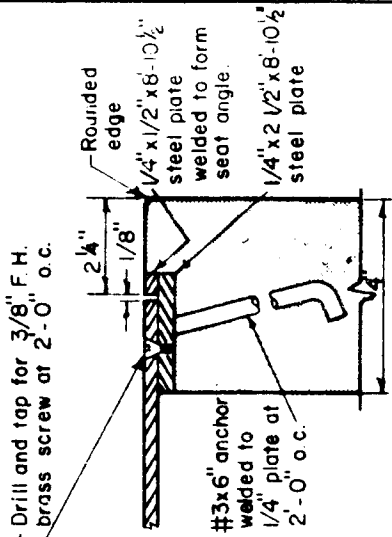


SECTION A-A
SCALE: 1/2" = 1'-0"

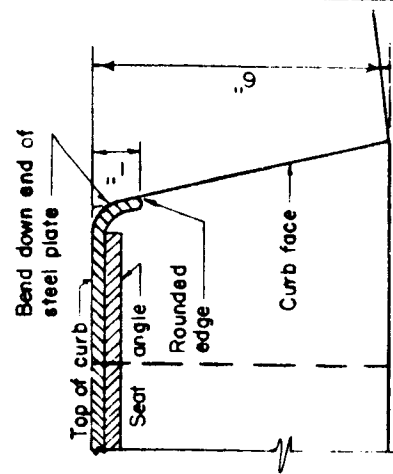


SECTION B-B
SCALE: 3/4" = 1'-0"

NOTE:
All steel parts to be galvanized.

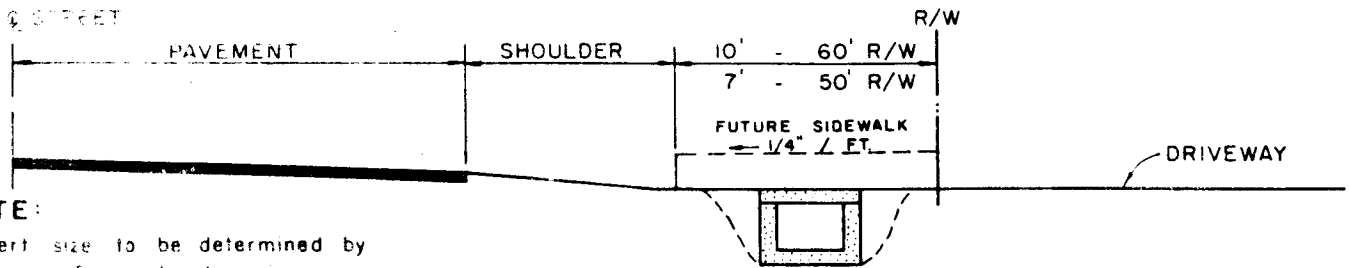


DETAIL "A"
SCALE: 3" = 1'-0"



DETAIL "B"
SCALE: 3" = 1'-0"

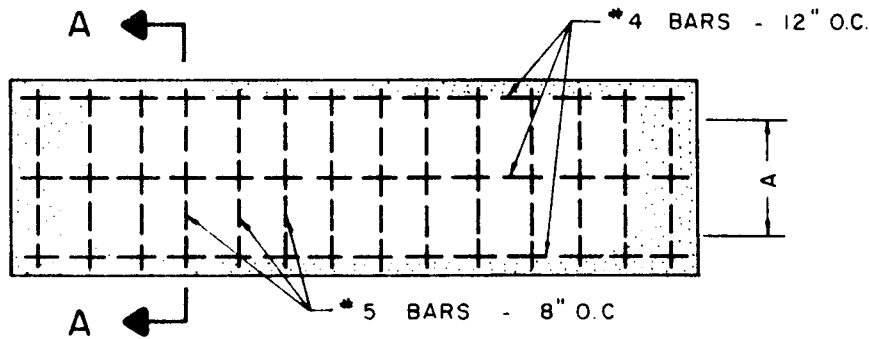
SIDEWALK CULVERT



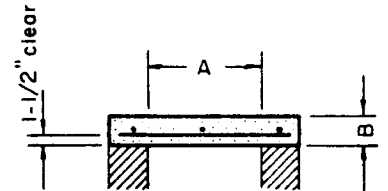
NOTE:

Culvert size to be determined by Engineer. Box culvert minimum inside dimensions 16" deep x 24" wide. All form material to be removed upon completion of construction.

SECTION



DETAIL

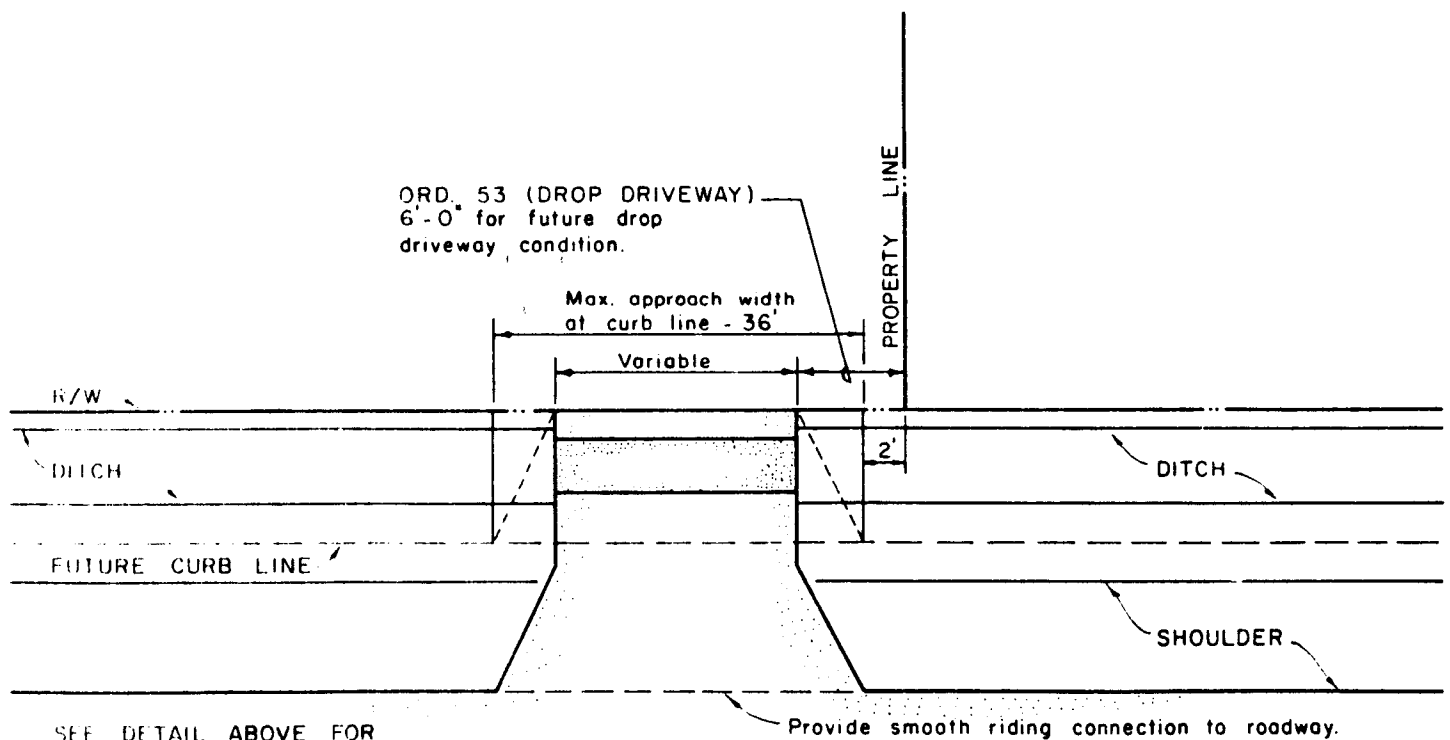


SECTION A-A

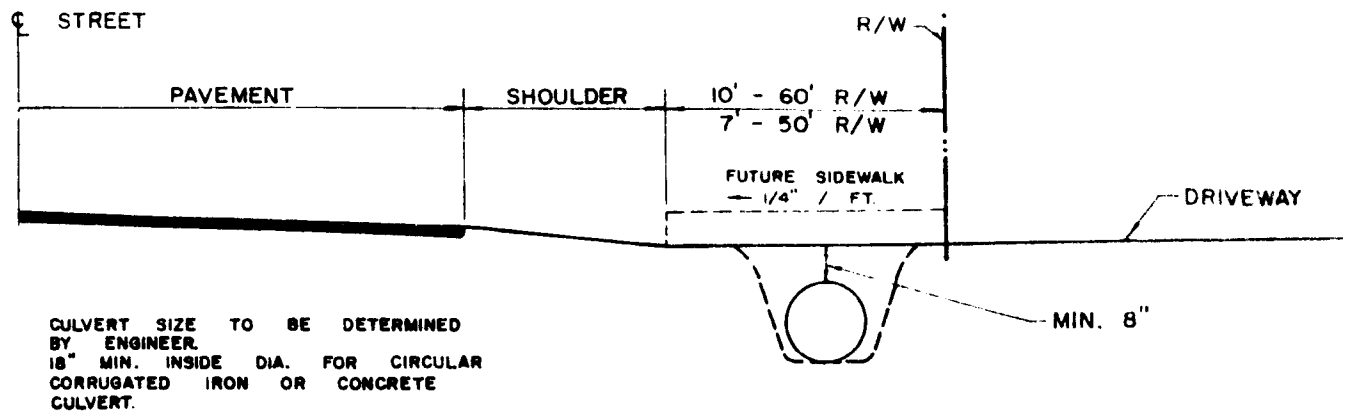
A	B
2'	4"
3'	5"
4'	6"
5'	6"

*4 BAR = 1/2" DIA

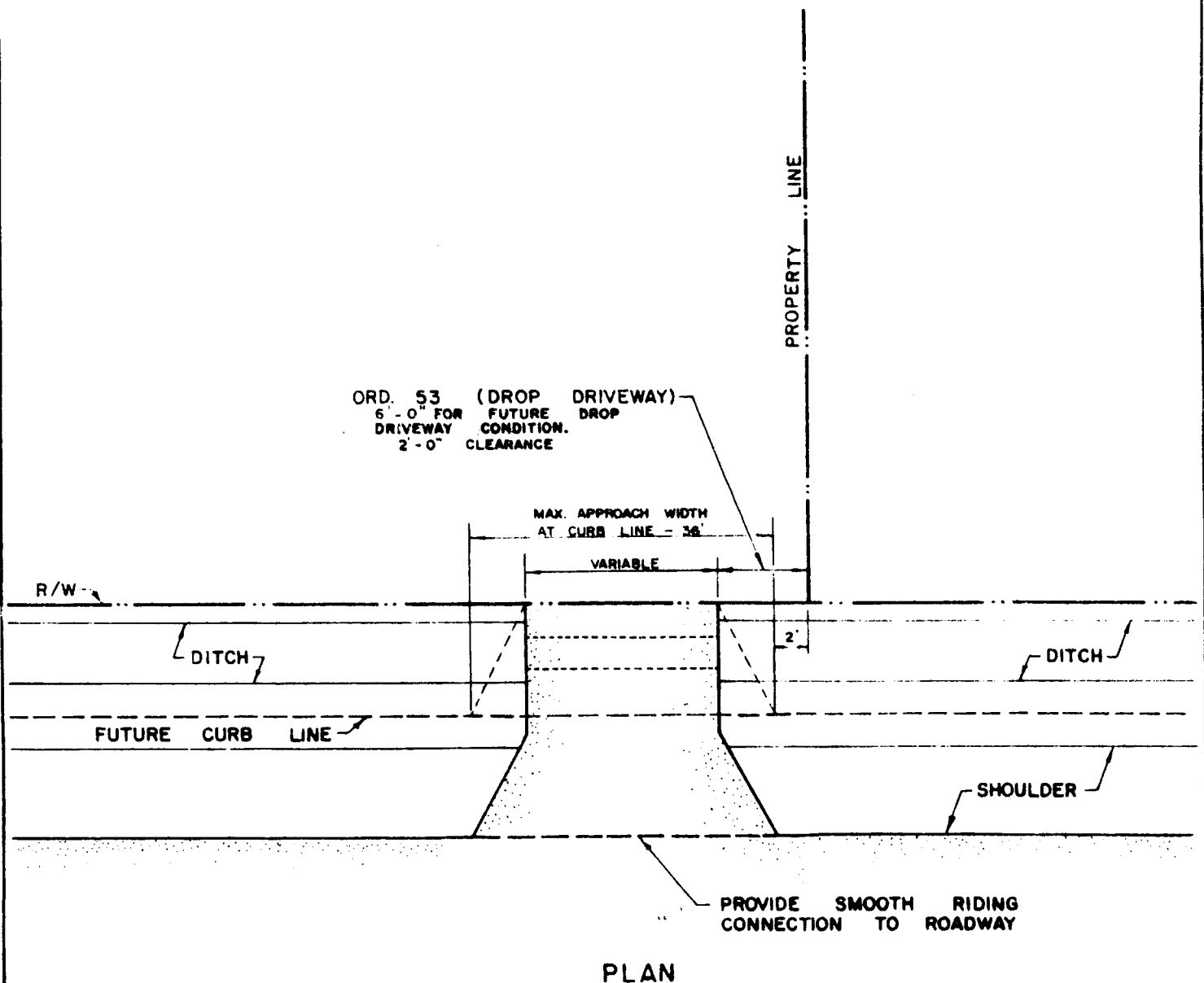
*5 BAR = 5/8" DIA



PLAN



SECTION



D-34

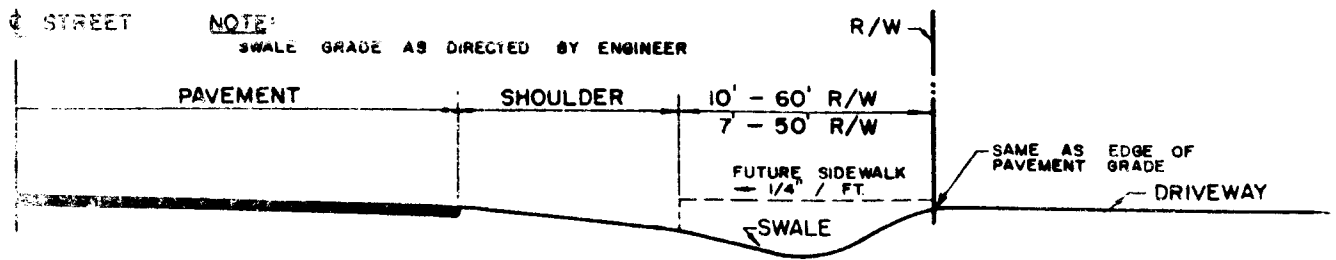
STANDARD
DETAILS

DRIVEWAY DRAINAGE - PIPE CULVERT

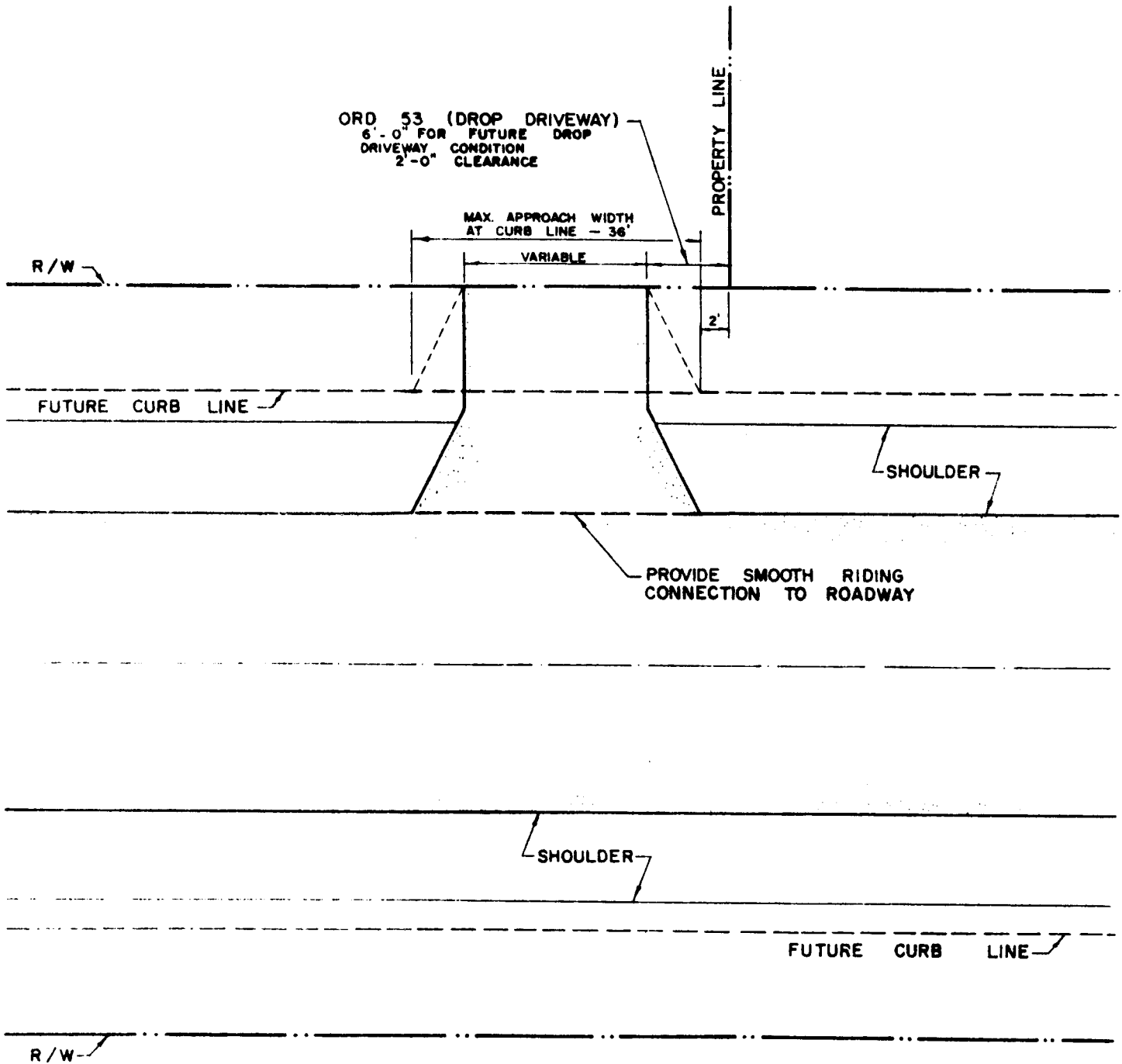
COUNTY OF HAWAII

SEPTEMBER 1984

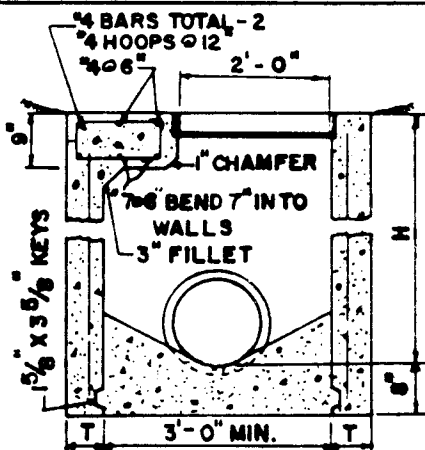
NOT TO SCALE



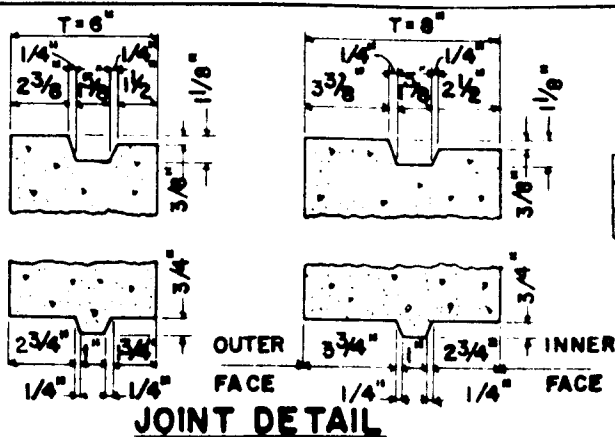
SECTION



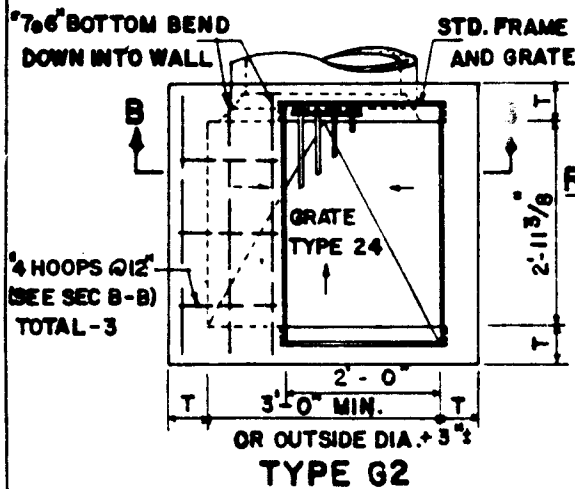
PLAN



(SHOWING SMALL PIPE)
SECTION B-B

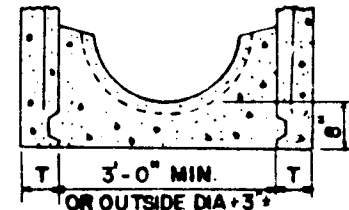


H	T
0'-0" OR LESS	6"
0'-1" TO 20'-0"	8"

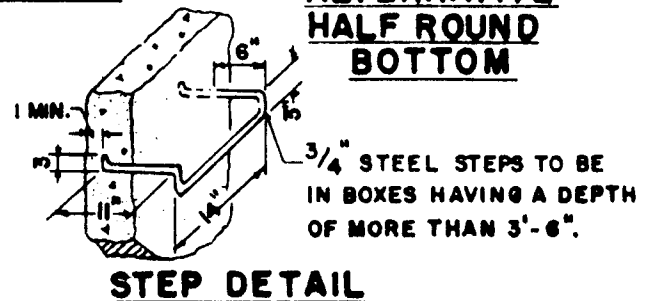


TYPE G2

**ALTERNATIVE
REINFORCED BOTTOM**



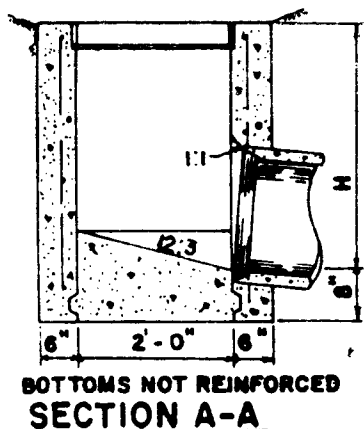
**ALTERNATIVE
HALF ROUND
BOTTOM**



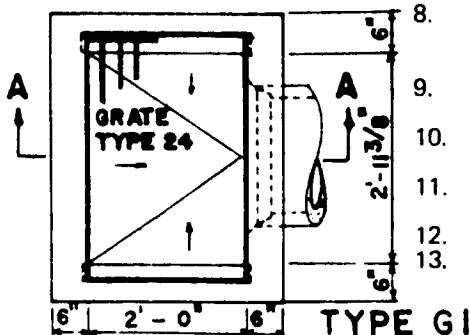
STEP DETAIL

GENERAL NOTES

1. "H" IS THE DIFF. IN ELEV. BETWEEN THE OUTLET PIPE FLOW LINE AND THE NORMAL GUTTER GRADE LINE UNDERPRESSED AT THE CURB FACE.
2. FOR "T" WALL THICKNESS, SEE TABLE.
3. REINFORCING STEEL IN WALLS SHALL BE #4 BARS @ 18" CENTERS, PLACED 1 1/2" CLEAR TO INSIDE OF BOX UNLESS OTHERWISE SHOWN.
4. STEPS - NONE REQUIRED WHERE "H" IS 3'-6" OR LESS. INSTALL ONE STEP 16" ± ABOVE FLOOR WHEN "H" IS MORE THAN 3'-6" AND LESS THAN 5'-0". WHERE "H" IS MORE THAN 5'-0", STEPS SHALL BE EVENLY SPACED @ 12" ± INTERVALS FROM 16" ± ABOVE FLOOR TO WITHIN 12" OF THE TOP OF THE BOX. PLACE STEPS IN WALL WITHOUT PIPE OPENING.
5. DETAILS SHOWN APPLY TO BOTH METAL AND CONCRETE PIPE.
6. PIPE(S) CAN BE PLACED IN ANY WALL.
7. CURB SECTIONS SHALL MATCH ADJACENT CURB.
8. BASIN FLOORS SHALL HAVE WOOD TROWEL FINISH AND A MINIMUM SLOPE OF 12:3 FROM ALL DIRECTIONS TOWARD OUTLET PIPE.
9. GALVANIZING - SEE STANDARD SPECIFICATIONS OR SPECIAL PROVISIONS.
10. CAST-IN-PLACE OR PRECAST ALTERNATIVE IS OPTIONAL WITH CONTRACTOR.
11. SET INLET SO THAT GRATE BARS ARE PARALLEL TO DIRECTION OF PRINCIPAL SURFACE FLOW.
12. SEE "STANDARD GRATE DETAIL" FOR GRATE AND FRAME DETAILS.
13. USE G1 WHEN H ≤ 4'-0".



**BOTTOMS NOT REINFORCED
SECTION A-A**



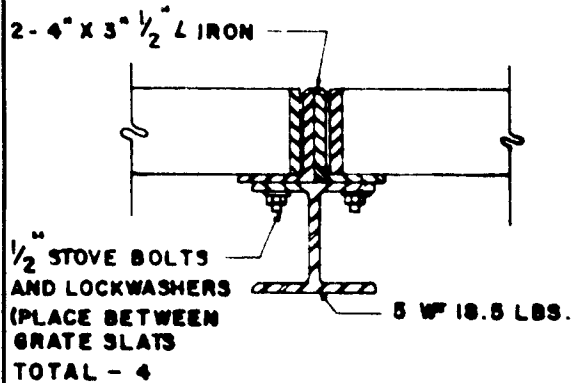
TYPE G1

TABLE A

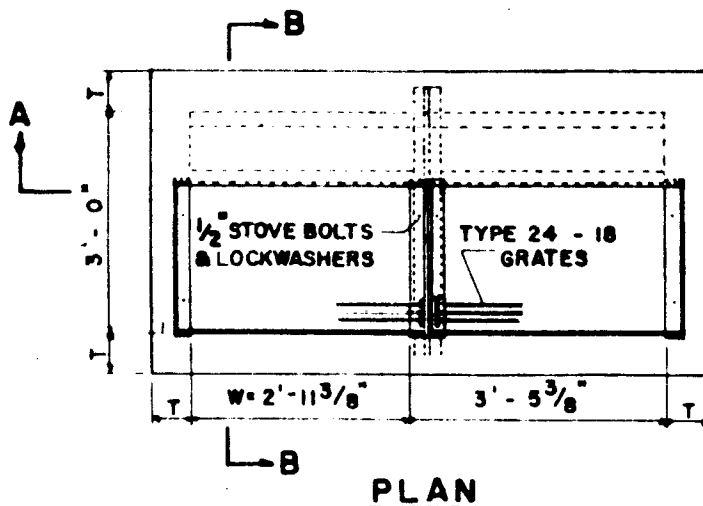
N	T
8' - 0" OR LESS	6"
8' - 1" TO 20' - 0"	8"

GENERAL NOTES

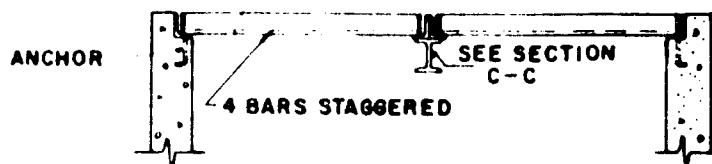
1. "H" IS THE DIFF. IN ELEV. BETWEEN THE OUTLET PIPE FLOW LINE AND THE NORMAL GUTTER GRADE LINE UNDEPRESSED.
2. FOR "T" WALL THICKNESS, SEE TABLE A.
3. REINFORCING STEEL IN WALLS SHALL BE #4 BARS @ 18"± CENTERS PLACED 1½" CLEAR TO INSIDE OF BOX UNLESS OTHERWISE SHOWN.
4. STEPS - NONE REQUIRED WHERE "H" IS 3'-6" OR LESS. INSTALL ONE STEP "H" ABOVE FLOOR WHEN 16"± IS MORE THAN 3'-6" AND LESS THAN 5'-0". WHERE "H" IS MORE THAN 5'-0", STEPS SHALL BE EVENLY SPACED @ 12"± INTERVALS FROM 16"± ABOVE FLOOR TO WITHIN 12"± OF THE TOP OF THE BOX. PLACE STEPS IN WALL WITHOUT PIPE OPENINGS.
5. WHEN SHOWN ON THE PROJECT PLANS, PLACE A #6 PROTECTION BAR HORIZONTALLY ACROSS THE LENGTH OF THE OPENING AND BEND BACK 4" INTO THE INLET WALL ON EACH SIDE.
6. PIPE(S) CAN BE PLACED IN ANY WALL.
7. BASIN FLOORS SHALL HAVE WOOD TROWEL FINISH AND A MINIMUM SLOPE OF 12:1 FROM ALL DIRECTIONS TOWARDS OUTLET PIPE.
8. GALVANIZING - SEE STANDARD SPECIFICATIONS OR SPECIAL PROVISIONS.
9. W=2'-11 3/8" FOR ONE GRATE, ADD 3'-5 3/8" FOR ADDITIONAL GRATES IN TANDEM.
10. FULL PENETRATION BUTT WELDS MAY BE SUBSTITUTED FOR THE FILLET WELDS ON ALL ANCHORS.
11. STANDARD SQUARE, HEXAGON, ROUND OR EQUIVALENT HEADED ANCHORS MAY BE SUBSTITUTED FOR THE RIGHT ANGLE HOOKS ON THE ANCHORS SHOWN ON THIS PLAN.



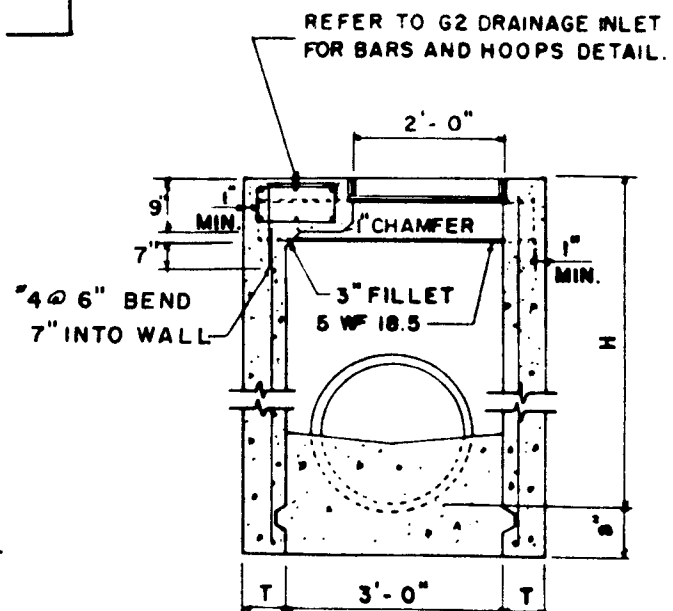
SECTION C-C



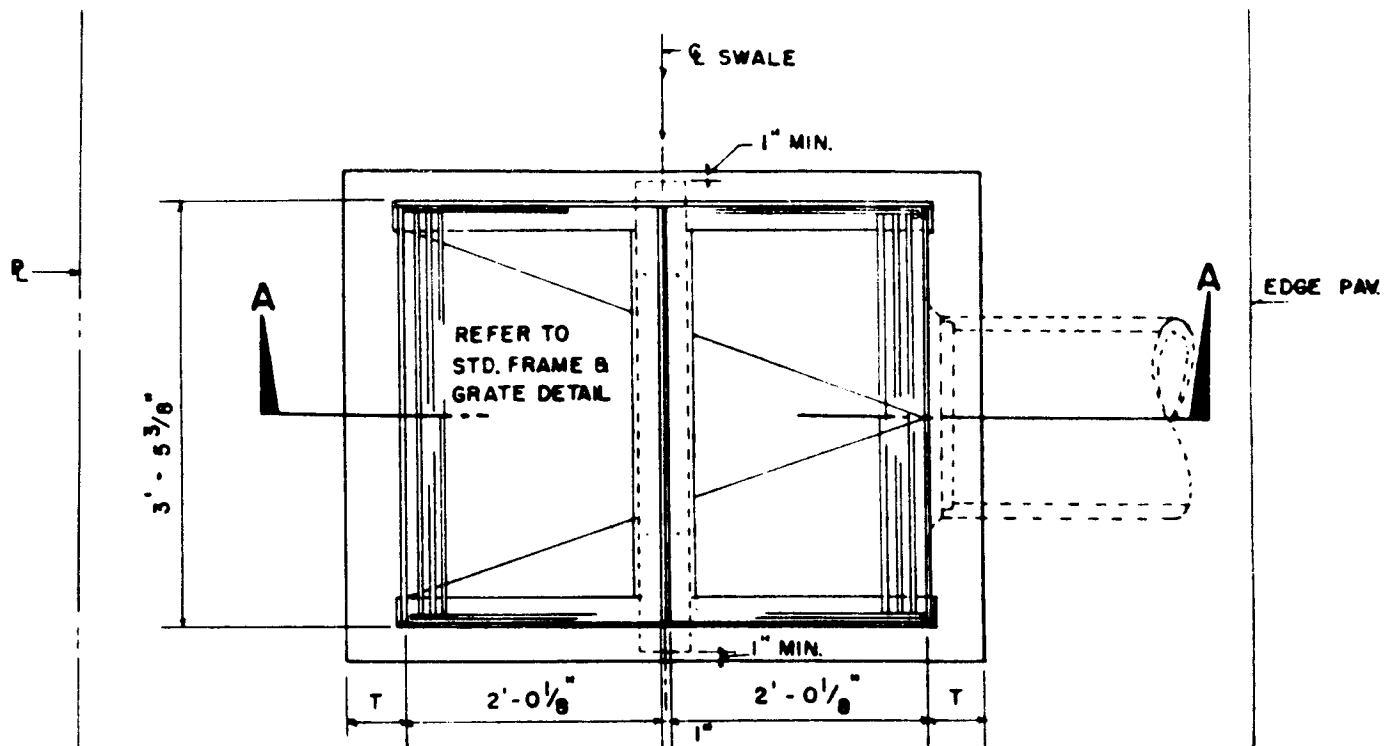
PLAN



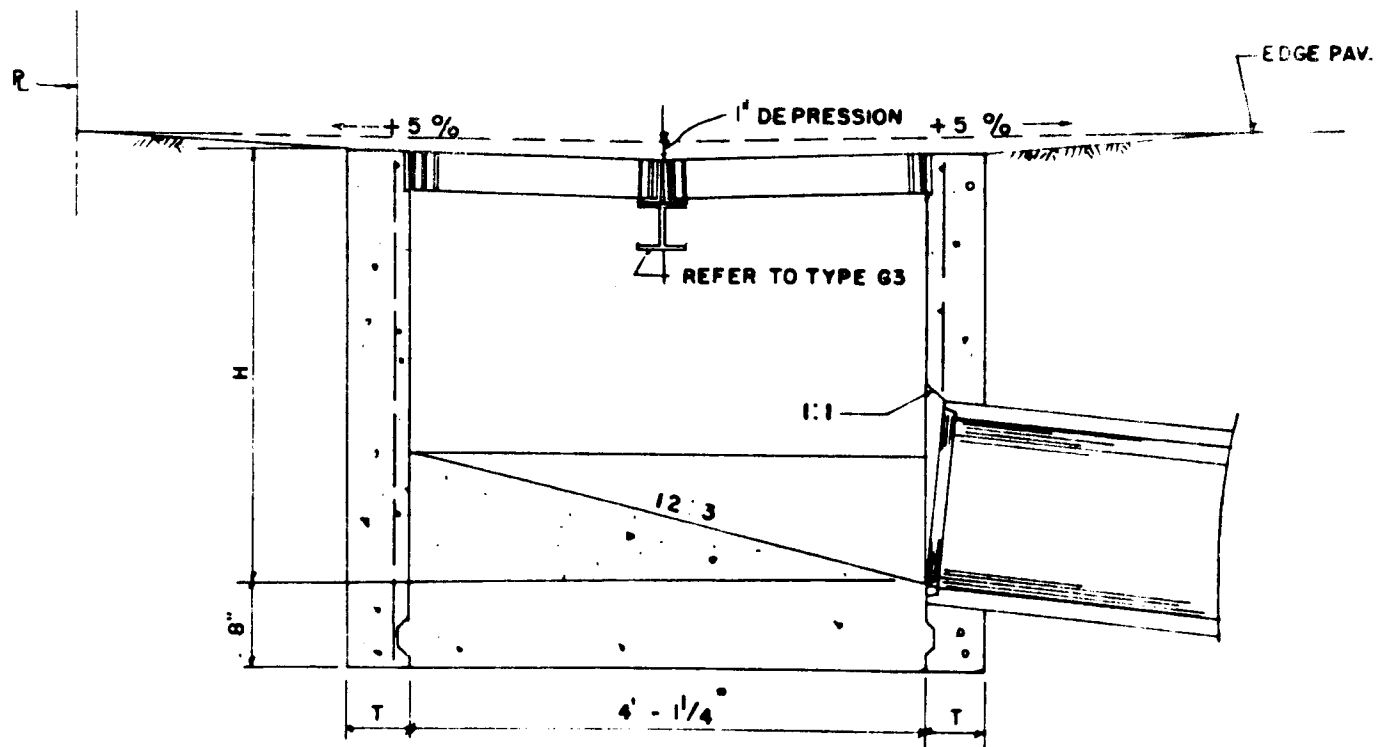
SECTION A-A



SECTION B-B



REFER TO TYPES G1, G2 & G3 DRAINAGE INLET NOTES, TABLES, SECTIONS & DETAILS



D-38

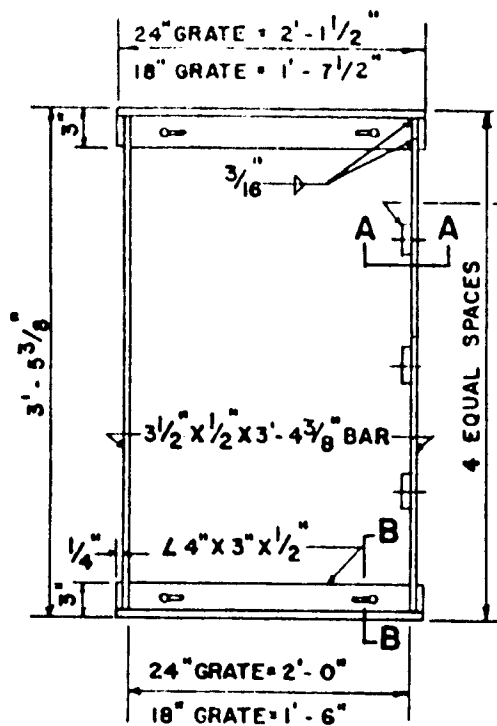
STANDARD
DETAILS

TYPE G4 DRAINAGE INLET

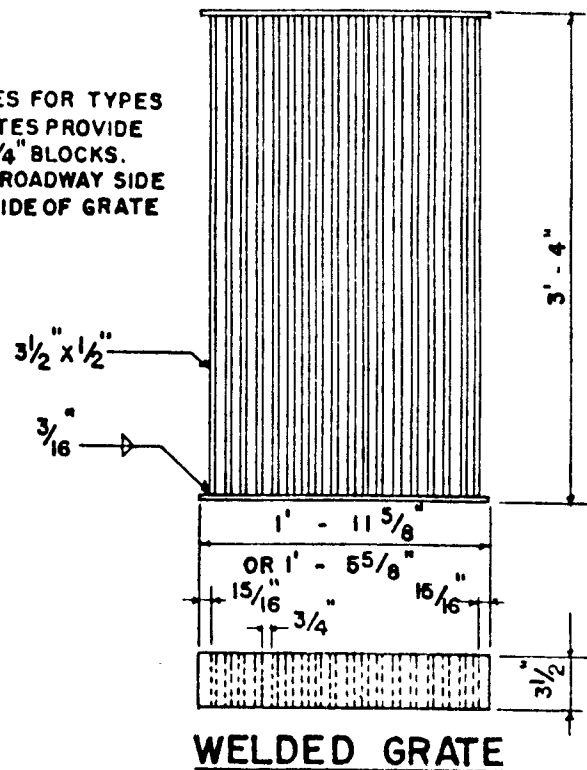
COUNTY OF KAUAI

SEPTEMBER 1984

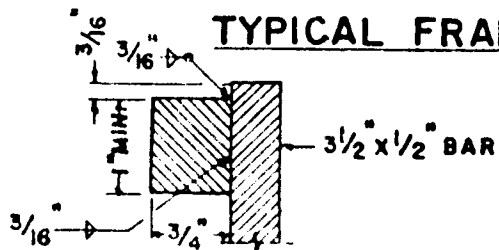
SCALE: 5/8" = 1'-0"



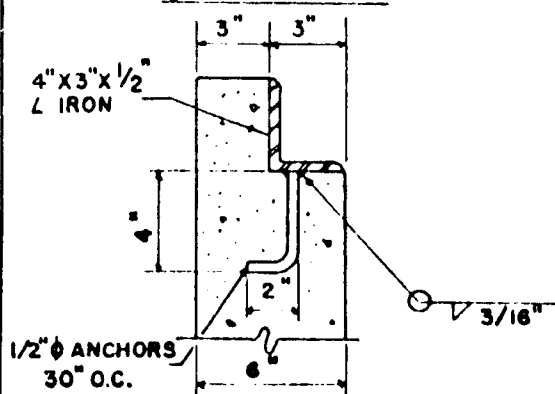
ON FRAMES FOR TYPES 24-18 GRATES PROVIDE 3-3" X 1" X 3/4" BLOCKS. PLACE ON ROADWAY SIDE OR HIGH SIDE OF GRATE OPENING.



TYPICAL FRAME



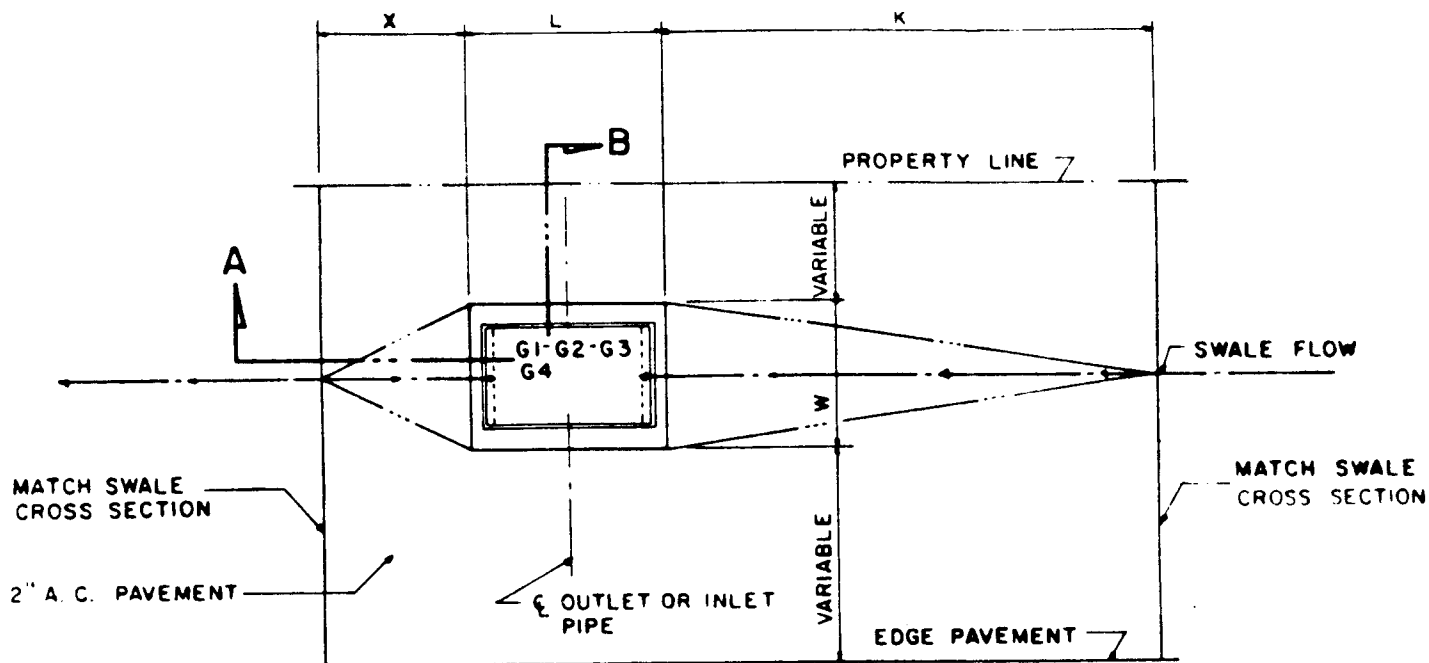
SECTION A-A



SECTION B-B

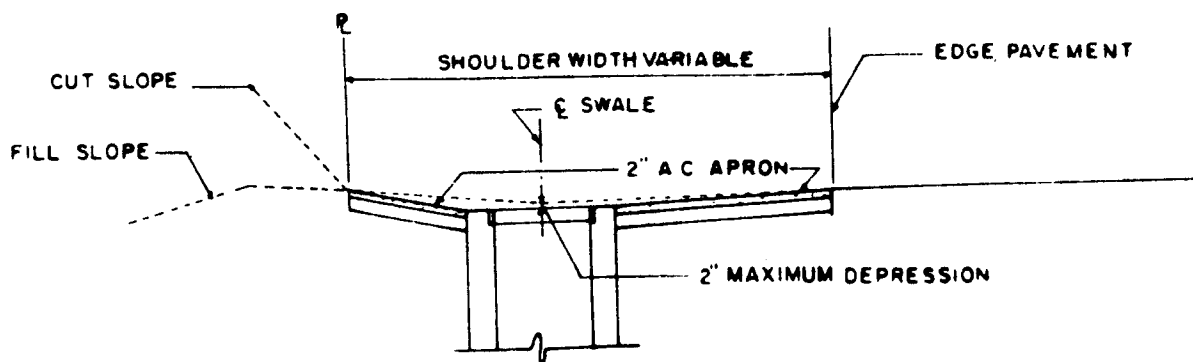
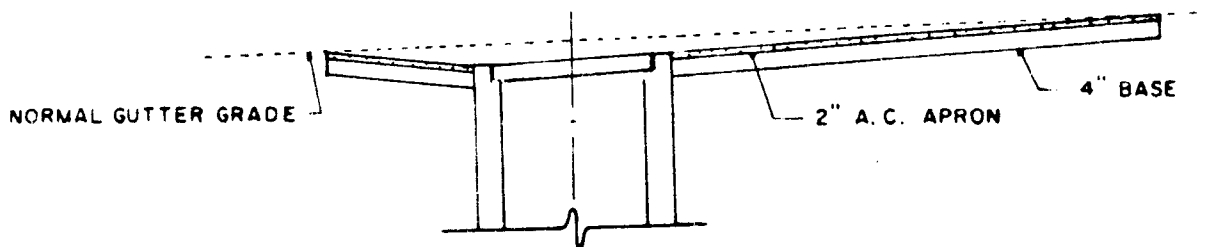
GENERAL NOTES

1. CONTRACTOR HAS THE OPTION OF USING CAST NODULAR IRON, CAST STEEL, WELDED, BOLTED, OR CAST END BLOCK GRATE.
2. GRATES AND FRAMES SHALL BE GALVANIZED.
3. ROUNDED TOP OF BARS OPTIONAL ON ALL GRATES.
4. PIPE DROP INLETS WITH A GRATE SHALL BE PLACED SO THAT BARS PARALLEL DIRECTION OF PRINCIPLE SURFACE FLOW.



1. W = WIDTH OF CATCH BASIN
2. L = LENGTH OF CATCH BASIN
3. K = 6'-0" MIN. UNLESS OTHERWISE SPECIFIED
4. X = 3'-0" MIN. UNLESS OTHERWISE SPECIFIED
5. IN SUMP CONDITIONS K = X = 6'-0" MIN.

PLAN



D-40

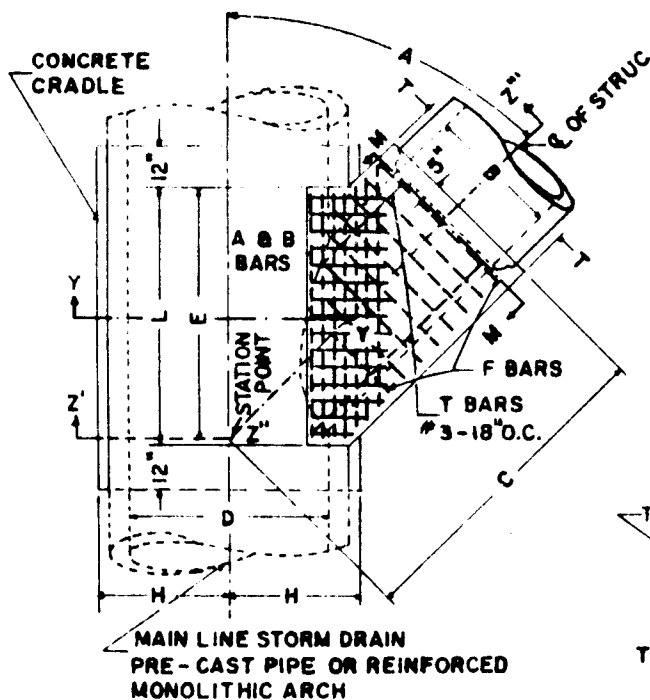
STANDARD
DETAILS

LOCAL DEPRESSION WITHOUT
CURB AND GUTTER

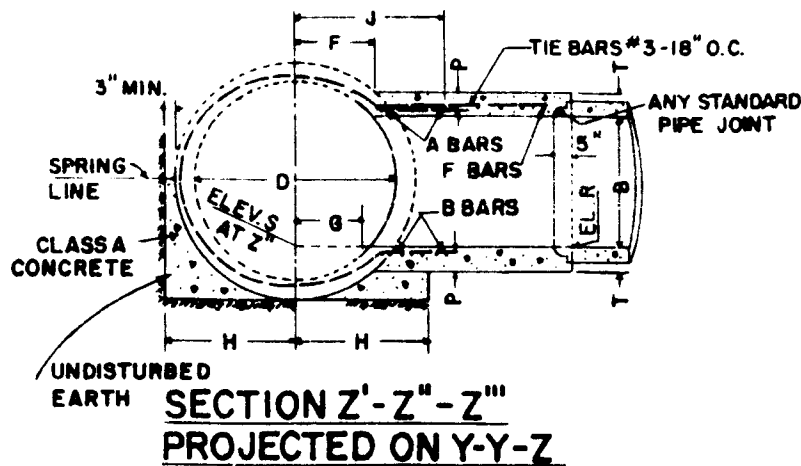
COUNTY OF KAUAI

SEPTEMBER 1984

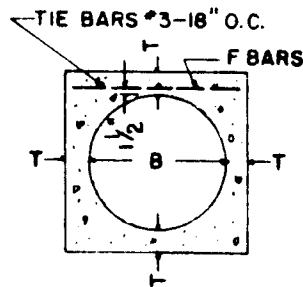
SCALE: 1/4" = 1'-0"



PLAN



**SECTION Z'-Z''-Z'''
PROJECTED ON Y-Y-Z**



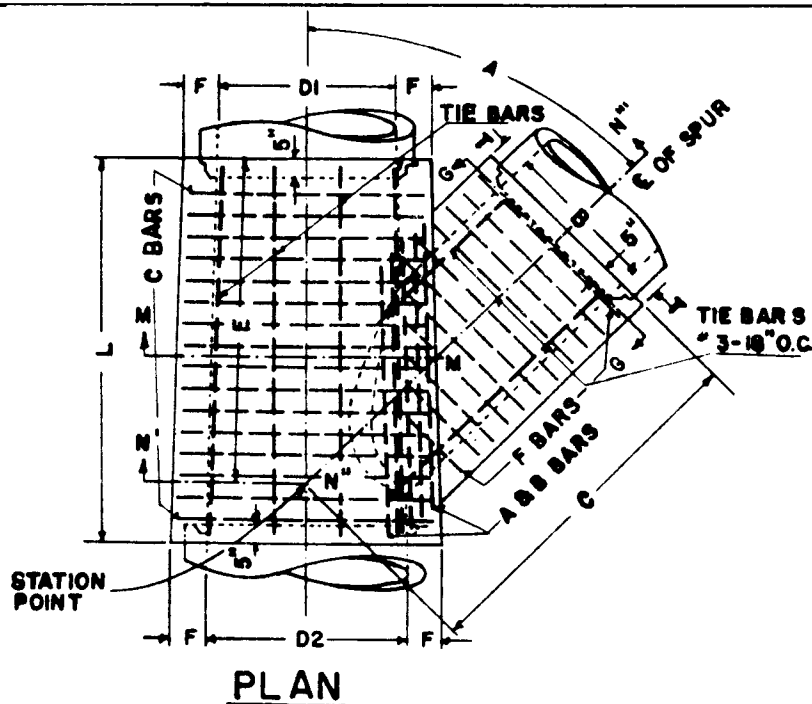
SECTION M-M

TABLE OF VALUES FOR T	
8	T
12"	4"
15"	4 1/4"
18"	4 1/2"
21"	5"
24"	5 1/4"
27"	5 1/2"
30"	6"
33"	6 1/4"
36"	6 1/2"
39"	7"

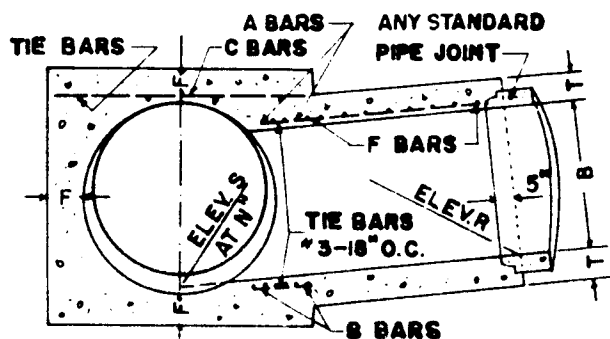
MINIMUM DEPTH OF TOP AND BOTTOM
SLABS SHALL BE $\frac{D}{12} + 2"$

NOTES

- H: VALUES FOR A, B, C, D, E, F, G, L, ELEV. R AND ELEV. S SHOWN ON IMPROVEMENT PLAN.
- H: PIPE SHALL BE CRADLED IN CLASS A CONCRETE EXTENDING LONGITUDINALLY TO POINT 1 FT. BEYOND THE LIMITS OF L. H = 1/2 OUTSIDE DIA. OF PIPE + 3" AS A MIN. CRADLE MAY BE OMITTED ON SIDE OPPOSITE LATERAL INLET WHEN CONSTRUCTED IN CONNECTION WITH EXISTING PIPE STORM DRAIN.
- J: A AND B BARS SHALL BE CARRIED TO POINT NOT LESS THAN J DIST. FROM $\phi = 7D/12 + 6"$.
- L: RECTANGULAR OPENING IN MAIN LINE PIPE SHALL BE CUT IN WITHIN THESE LIMITS NORMAL TO PIPE SURFACE WITHOUT DAMAGING STEEL. VALUES FOR F, G, AND L ON IMPROVEMENT PLAN.
- P: TRANSVERSE REINFORCEMENT IN PIPE SHALL BE CUT IN CENTER OF OPENING AND BENT TO UNIFORM DISTANCE FROM TOP AND BOTTOM OF JUNCTION STRUCTURE.
- T: TABLE OF VALUES FOR T SHOWN ON THIS PLAN.
1. OPTIONAL CONSTRUCTION: WHEN JUNCTION STRUCTURE B IS SPECIFIED ON IMPROVEMENT PLAN, THE CONTRACTOR SHALL HAVE THE OPTION OF CONSTRUCTING JUNCTION C, IN WHICH CASE CONSTRUCTION DATA WILL BE FURNISHED BY THE ENGINEER.
2. CONCRETE SHALL BE CLASS A.
3. REINFORCING STEEL SHALL BE ROUND, DEFORMED, STRAIGHT BARS 1 1/2" CLEAR FROM FACE OF CONCRETE UNLESS OTHERWISE SHOWN.
4. STEEL SCHEDULE: A & B BARS - #5 @ 3" O.C.
F BARS - #4 @ 6" O.C.
5. MONOLITHIC ARCH: WHEN JUNCTION STRUCTURE B IS SPECIFIED WITH REINFORCED MONOLITHIC ARCH STORM DRAIN, VALUE D SHALL REFER TO THE CLEAR SPAN OF ARCH, REINFORCING STEEL SHALL BE CUT AND BENT INTO JUNCTION STRUCTURE THE SAME AS FOR PIPE. CONCRETE CRADLE UNDER REINFORCED MONOLITHIC ARCH IS NOT REQUIRED.
6. FLOOR OF STRUCTURE SHALL BE STEEL-TROWELED TO SPRING LINE.
7. ELEVATION S APPLIES AT CENTER OF MAIN LINE ON PROLOGATION OF INVERT OF SPUR.

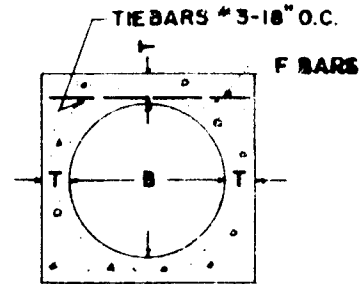


PLAN



**SECTION N'-N''-N'''
PROJECTED ON M-M-N**

DIAM. B OR D2	A OR B-BARS	C OR F-BARS
12" TO 39"	#5 @ 3"	#4 @ 6"
42" TO 84"	#6 @ 3"	#5 @ 6"



SECTION G-G

TABLE OF VALUES FOR F AND T

D2	F	B	T
12"	4"	12"	4"
15"	4 1/4"	15"	4 1/4"
18"	4 1/2"	18"	4 1/2"
21"	5"	21"	5"
24"	5 1/4"	24"	5 1/4"
27"	5 1/2"	27"	5 1/2"
30"	6"	30"	6"
33"	6 1/4"	33"	6 1/4"
36"	6 1/2"	36"	6 1/2"
39"	7"	39"	7"
42"	7 1/2"	42"	7 1/2"
45"	7 3/4"	45"	7 3/4"
48"	8"	48"	8"
51"	8 1/2"	51"	8 1/2"
54"	9"	54"	9"
57"	9 1/4"	57"	9 1/4"
60"	9 1/2"	60"	9 1/2"
63"	10"	63"	10"
66"	10 1/4"	66"	10 1/4"
69"	10 3/4"	69"	10 3/4"
72"	11"	72"	11"
75"	11 3/4"		
78"	12 1/2"		
81"	13 1/4"		
84"	14"		

NOTES

- VALUES FOR A, B, C, D₁, D₂, E, L, ELEV. R AND ELEV. S ARE SHOWN ON IMPROVEMENT PLAN. TABLE OF VALUES FOR F AND T SHOWN ON THIS PLAN.
- OPTIONAL CONSTRUCTION: WHEN JUNCTION STRUCTURE B IS SPECIFIED ON IMPROVEMENT PLAN, THE CONTRACTOR SHALL HAVE THE OPTION OF CONSTRUCTING JUNCTION STRUCTURE C, IN WHICH CASE CONSTRUCTION DATA WILL BE FURNISHED BY THE ENGINEER.
- CONCRETE SHALL BE CLASS A.
- FLOOR OF STRUCTURE SHALL BE STEEL-TROWELED TO SPRING LINE.
- REINFORCING STEEL SHALL BE ROUND, DEFORMED, STRAIGHT BARS, 1 1/2" CLEAR FROM FACE OF CONCRETE UNLESS OTHERWISE SHOWN. TIE BARS SHALL BE 3/8" Ø AND SPACED 18" O.C. OR CLOSER. A AND B BARS NEED NOT BE LONGER THAN THE OUTSIDE DIAGONAL WIDTH OF LATERAL SPUR.
- STEEL SCHEDULE DETAILED ON IMPROVEMENT PLAN.
- ELEVATION S APPLIES AT CENTER OF MAIN LINE ON PROLONGATION OF INVERT OF SPUR.
- JUNCTION STRUCTURE SHALL BE POURED IN ONE CONTINUOUS OPERATION, EXCEPT THAT THE CONTRACTOR SHALL HAVE THE OPTION OF PLACING AT THE SPRING LINE A CONSTRUCTION JOINT WITH A LONGITUDINAL KEYWAY.
- LENGTH L SHOWN ON IMPROVEMENT PLAN.
- STATIONS OF MANHOLES SHOWN ON IMPROVEMENT PLAN APPLY AT INTERSECTION OF MAIN LINE AND SPUR. ELEV. SHOWN AT THIS POINT REFER TO PROLONGED INVERT GRADE LINES, EXCEPT THAT WHEN INTERSECTION OF CENTER LINES FALLS OUTSIDE OF STRUCTURE, THE ELEV. ARE SHOWN AND APPLY AT EXTREME LOWER END OF THE STRUCTURE.
- LATERALS - WHERE LATERALS ENTER ON BOTH SIDES OF STRUCTURE, THEY SHALL BE DESIGNATED ON THE IMPROVEMENT PLAN AS RIGHT OR LEFT, FACING IN THE DIRECTION OF STATIONING.

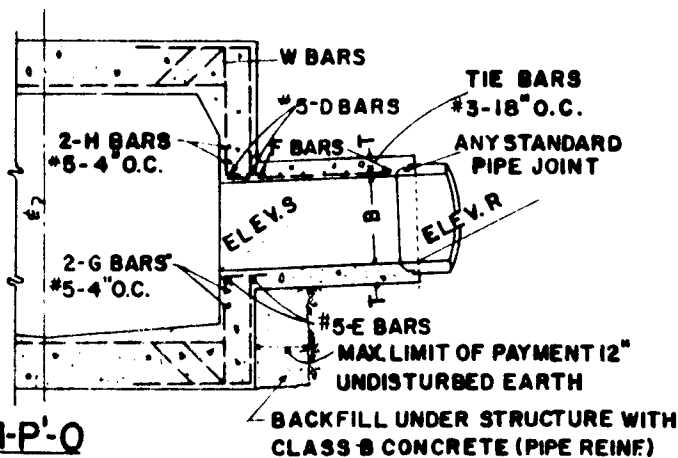
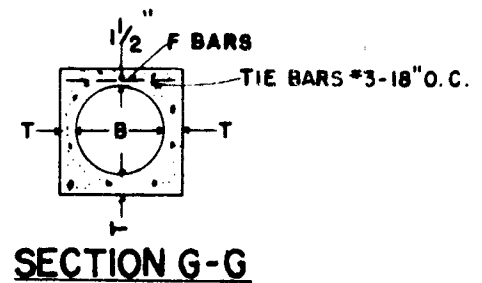
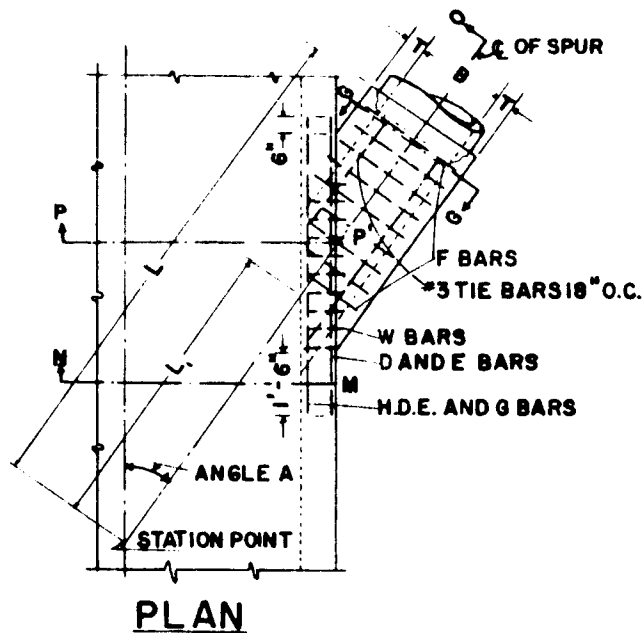


TABLE
OF
VALUES FOR T

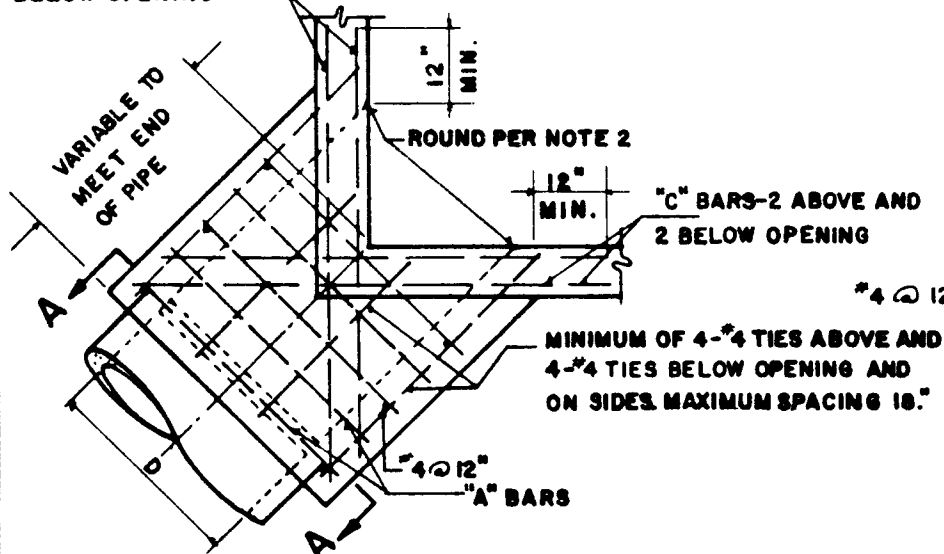
B	T
12"	4"
15"	4 1/4"
18"	4 1/2"
21"	5"
24"	5 1/4"
27"	5 1/2"
30"	6"
33"	6 1/4"
36"	6 1/2"
39"	7"
42"	7 1/2"
45"	7 3/4"
48"	8"
51"	8 1/2"
54"	9"
57"	9 1/4"
60"	9 1/2"
63"	10"
66"	10 1/4"
69"	10 3/4"
72"	11"

SECTION N-M-P'-O PROJECTED ON P-P'-O

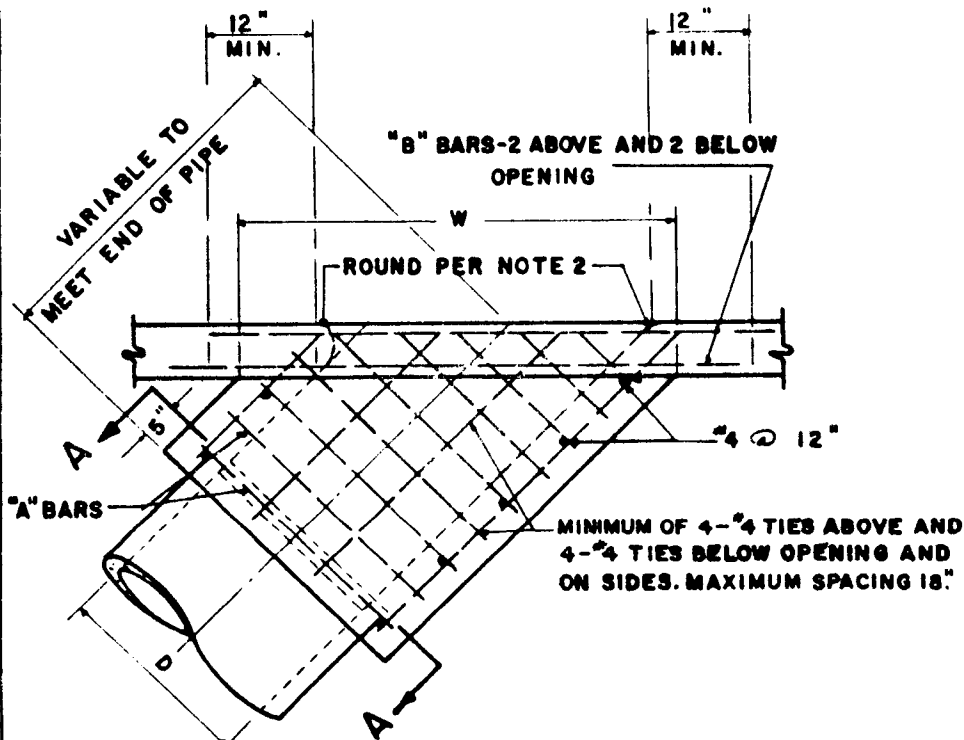
NOTES

- VALUES FOR A, B, L, L₁, ELEVATION R AND ELEVATION S ARE SHOWN ON IMPROVEMENT PLAN. TABLE OF VALUES FOR T SHOWN ON THIS PLAN.
- STATIONS SPECIFIED ON IMPROVEMENT PLAN APPLY AT INTERSECTION OF CENTER LINES OF MAIN LINE AND LATERAL, EXCEPT THAT STATIONS FOR CATCH BASIN CONNECTIONS APPLY AT INSIDE WALL OF STRUCTURE.
- CONCRETE SHALL BE CLASS A EXCEPT AS OTHERWISE NOTED.
- REINFORCING STEEL SHALL BE ROUND, DEFORMED, STRAIGHT BARS 1 1/2" CLEAR FROM FACE OF CONCRETE UNLESS OTHERWISE SHOWN.
W BARS ARE OF SIZE AND SPACING SPECIFIED FOR WALL STEEL ON IMPROVEMENT PLAN, AND SHALL BE CUT IN CENTER OF OPENING AND BENT INTO TOP AND BOTTOM OF JUNCTION STRUCTURE.
OMIT H BARS WHEN SOFFIT OF SPUR IS 1 FT. OR LESS BELOW SOFFIT OF MAIN LINE, AND OMIT G BARS WHEN INVERT OF SPUR IS 1 FT. OR LESS ABOVE FLOOR OF MAIN LINE.
OMIT ALL STEEL EXCEPT F BARS AND TIE BARS WHEN JUNCTION STRUCTURE IS SPECIFIED WITH MANHOLE, UNLESS OTHERWISE SHOWN ON IMPROVEMENT PLAN.
STEEL SCHEDULE DETAILED ON IMPROVEMENT PLAN.
- JUNCTION STRUCTURE SHALL BE POURED MONOLITHIC WITH MAIN LINE STORM DRAIN OR MANHOLE.
- FLOOR OF STRUCTURE SHALL BE STEEL-TROWELED TO SPRING LINE.

"C" BARS-2 ABOVE AND 2 BELOW OPENING



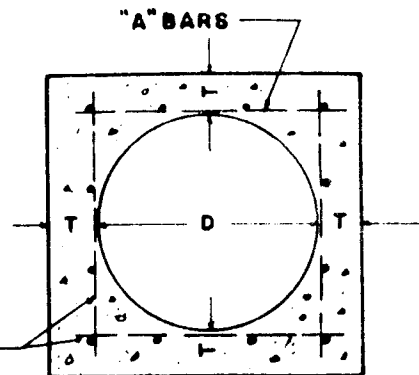
PLAN OF CORNER CONNECTION



PLAN OF SIDE CONNECTION

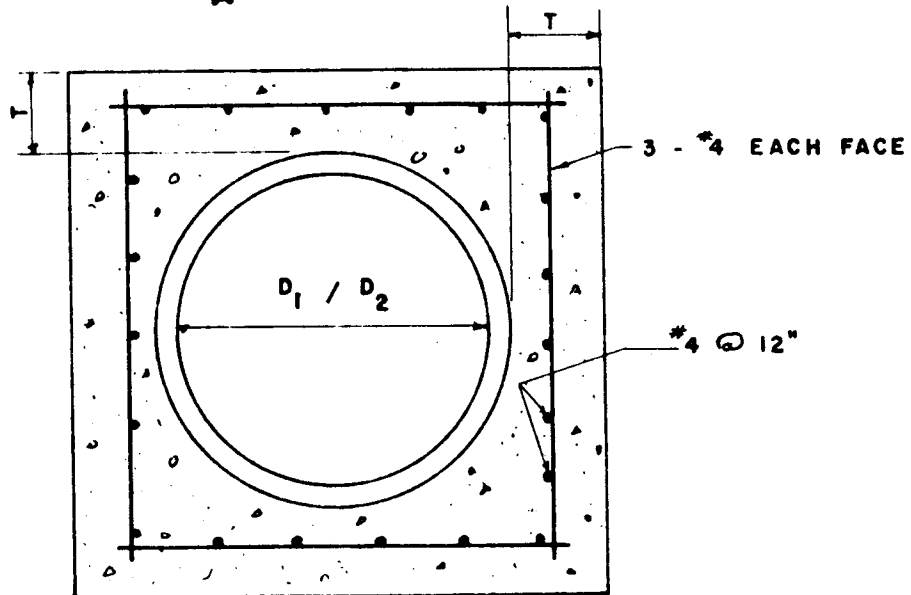
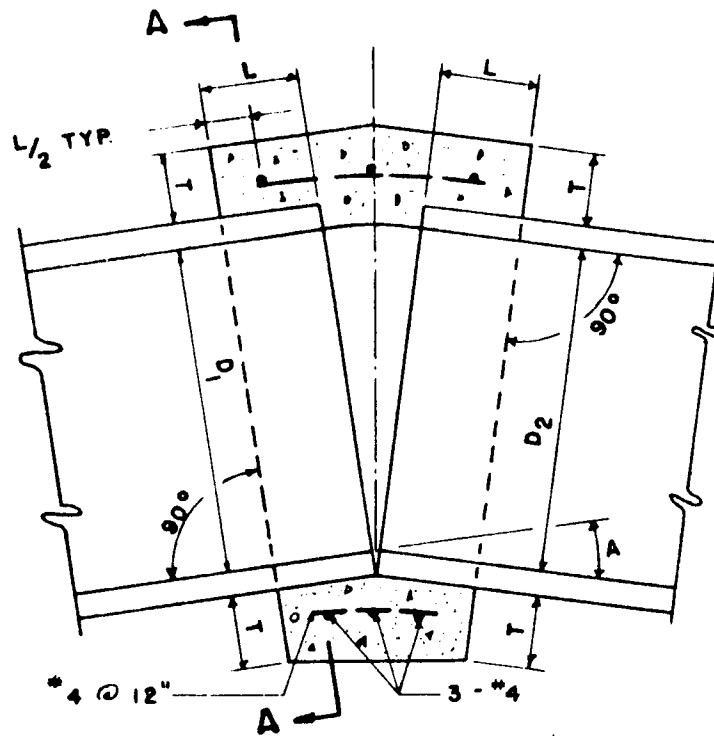
NOTES

1. ROUND EDGE OF OUTLET 3" RADIUS.
2. REINFORCEMENT SHALL BE 1 1/2" INCHES CLEAR FROM THE FACE OF CONCRETE.
3. IN CONNECTING TO AN EXISTING STRUCTURE BREAK OUT PORTIONS OF THE EXISTING STRUCTURE 6 INCHES OUTSIDE ITS INTERSECTION WITH THE NEW CONNECTION. BEND ENDS OF #4 BARS OVER CONNECTION OPENING AS REQUIRED.



SECTION A-A

D	T	"A"	"B"- "C"
12 "	4-1/2 "	#4 @ 6"	#5
15 "	4-1/2 "		
18 "	5 "		
21 "	5-1/2 "		
24 "	6 "		
27 "	6-1/2 "		
30 "	7 "		
33 "	7 "		
36 "	7-1/2 "		
39 "	8 "		
42 "	8 "	#5 @ 6"	#6
45 "	8 "		
48 "	8 "		
51 "	8 "		
54 "	8 "		
57 "	10 "		
60 "	10 "		
63 "	10 "		
66 "	11 "		
69 "	11 "		
72 "	11 "		



SECTION A-A

D	L	T
12"	1.0'	4"
18"	1.0'	5"
24"	1.0'	6"
36"	1.5'	8"
48"	1.5'	10"
54"	1.5'	10"
60"	1.75'	11"
66"	1.75'	11"
72"	2.0'	12"

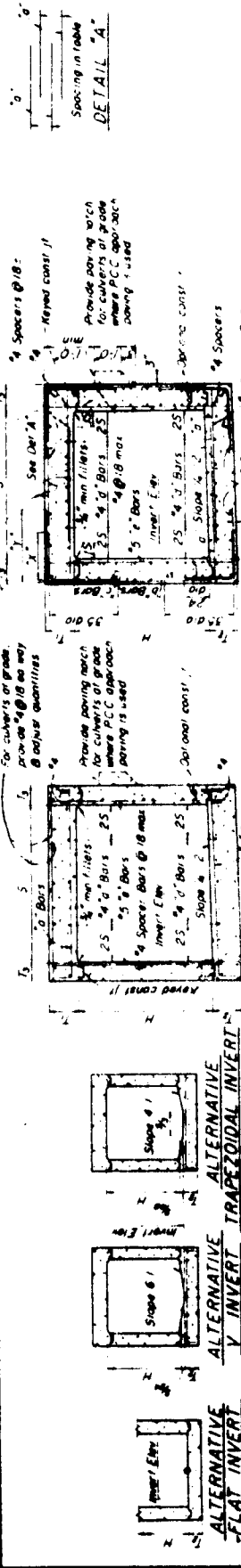
NOTES

1. WHERE PIPES OF DIFFERENT DIAMETERS ARE JOINED WITH A CONCRETE COLLAR, L AND T SHALL BE THOSE OF THE LARGER PIPE $D = D_1$ OR D_2 WHICHEVER IS GREATER.
2. FOR PIPES SIZE NOT LISTED USE NEXT LARGER SIZE.
3. OMIT REINFORCING ON PIPES 24" AND LESS IN DIAMETER AND ON ALL PIPES WHERE ANGLE A IS LESS THAN 10° .
4. JOIN PIPES AT INVERTS.
5. REINFORCEMENT SHALL BE PLACED $1\frac{1}{2}"$ CLEAR FROM OUTSIDE DIAMETER OF PIPE.

Table with 12 columns (SPAN 2' to 12') and 10 rows (STRENGTH CLASSIFICATION, MAX FILL OVER TOP, Top Soil, Bottom Soil, etc.).

Note:
For boxes of height less than that shown in table, use next greater table height; slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

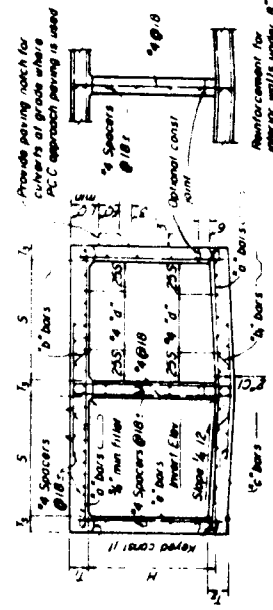
Table with 12 columns (SPAN 2' to 12') and 10 rows (STRENGTH CLASSIFICATION, MAX FILL OVER TOP, Top Soil, Bottom Soil, etc.).



SINGLE BOX CULVERTS

SPAN HEIGHT	4'		5'		6'		7'		8'	
	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'
STRENGTH CLASSIFICATION	A	B	C	D	E	F	G	H	I	J
MAX. FULL OVER TOP	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Concrete	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Reinforcing Steel	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Hydrostatic Pressure	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Earth Pressure	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Wind Pressure	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Temperature	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Seismic	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Other	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2

For culverts at grade, extend
"c" bars full length, top slab
only, provide additional spacers
@ 18" and adjust quantities



TYPICAL SECTION
(Showing reinforcement for interior walls 8' and over)

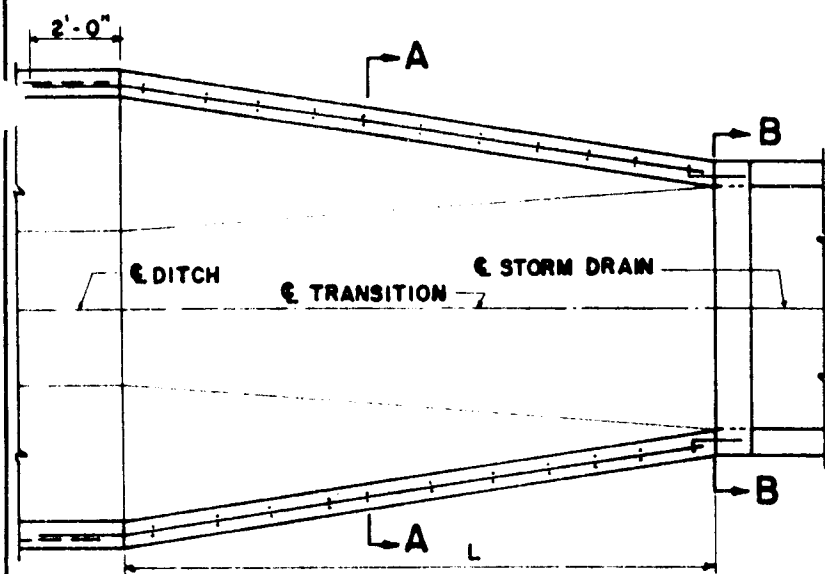
SPAN HEIGHT	5'		6'		7'		8'		9'		10'		11'		12'	
	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'
STRENGTH CLASSIFICATION	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MAX. FULL OVER TOP	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Concrete	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Reinforcing Steel	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Hydrostatic Pressure	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Earth Pressure	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Wind Pressure	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Temperature	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Seismic	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Other	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2

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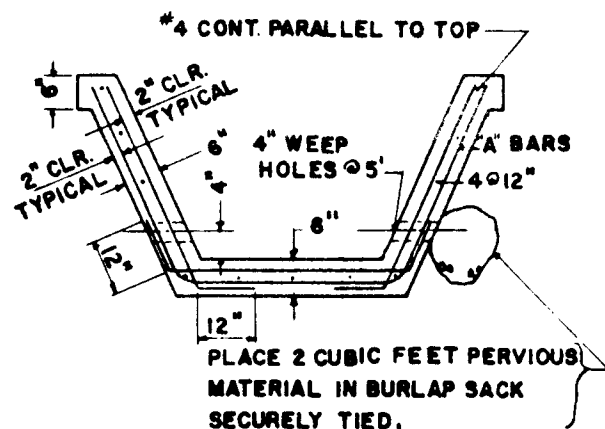
For culverts at grade, extend "B" bars full length, provide additional spacers @ 18" and adjust quantities -



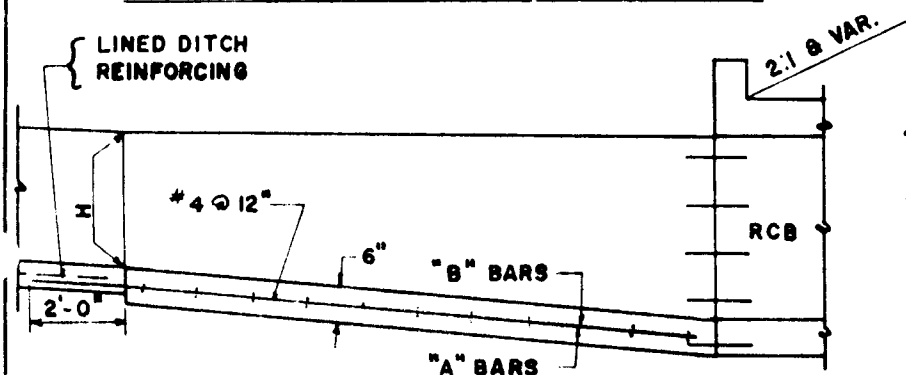
TRIPLE BOX CULVERTS



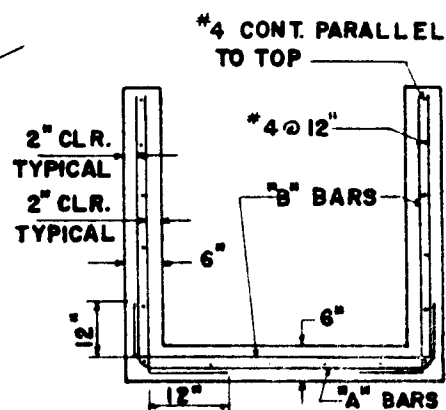
PLAN
TRANSITION TO RECTANGULAR STORM DRAIN



SECTION A-A



PROFILE

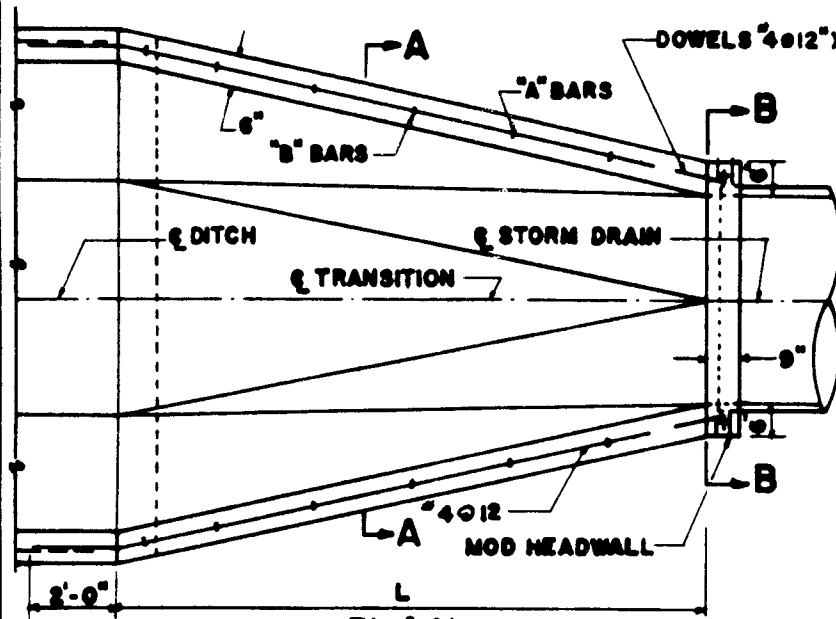


SECTION B-B

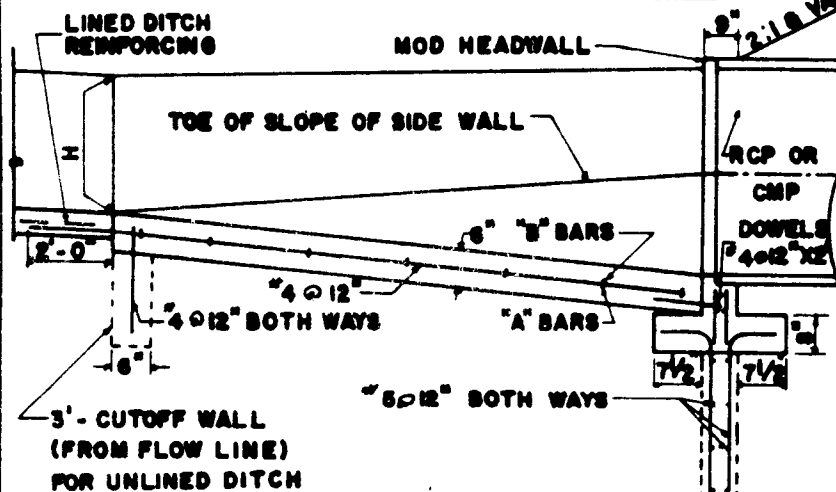
H	TRANSITION REINFORCEMENT	H.W. REINFORCEMENT
0' - 4"	#4 @ 12" BOTH WAYS CENTERED	#4 @ 18"
OVER 4' - 6"	"A" BARS #5 @ 24" "B" BARS #5 @ 24"	#4 @ 18"
OVER 6' - 6"	"A" BARS #5 @ 12" "B" BARS #5 @ 12"	#5 @ 12"

NOTES

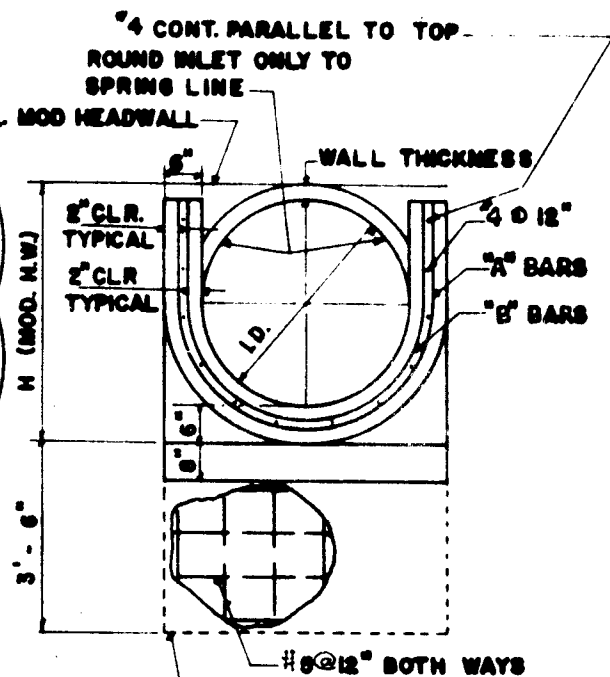
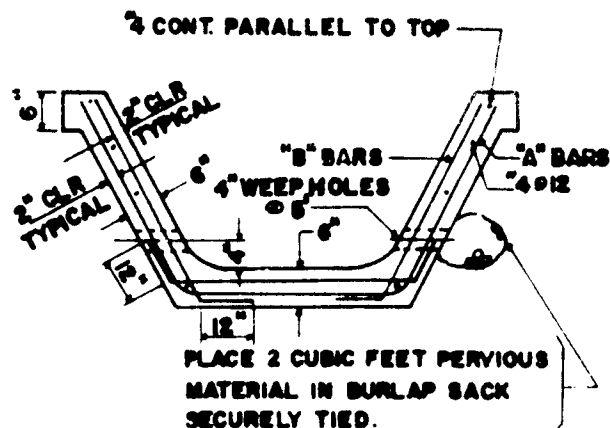
1. PROVIDE A CONSTRUCTION JOINT BETWEEN THE TRANSITION AND THE STORM DRAIN.
2. EXTEND THE LONGITUDINAL REINFORCING STEEL OF THE TRANSITION 2' INTO THE CHANNEL.
3. IN LIEU OF PLACING THE DOWELS BETWEEN THE TRANSITION AND THE RECTANGULAR STORM DRAIN THE LONGITUDINAL REINFORCING STEEL OF THE STORM DRAIN MAY BE EXTENDED 2' INTO THE TRANSITION STRUCTURE.



TRANSITION TO CIRCULAR STORM DRAIN

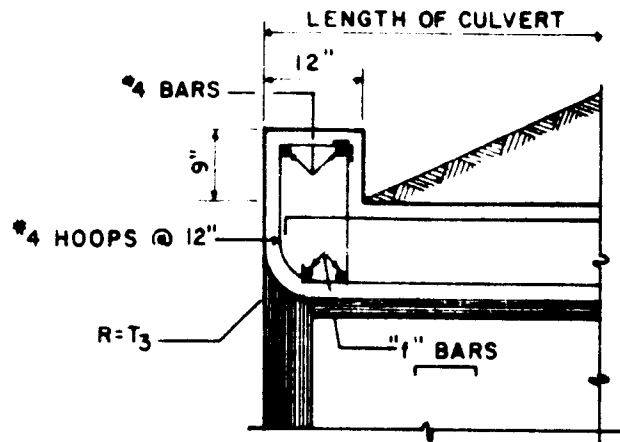


PROFILE

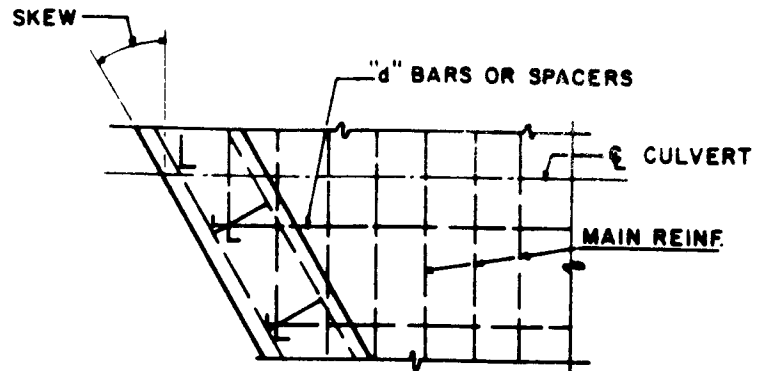


NOTE

SEE RECTANGULAR TRANSITION FOR GENERAL NOTES & STEEL TABLE

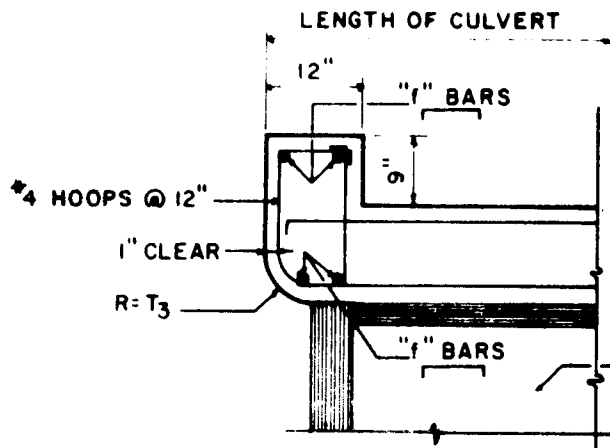


PARTIAL SECTION

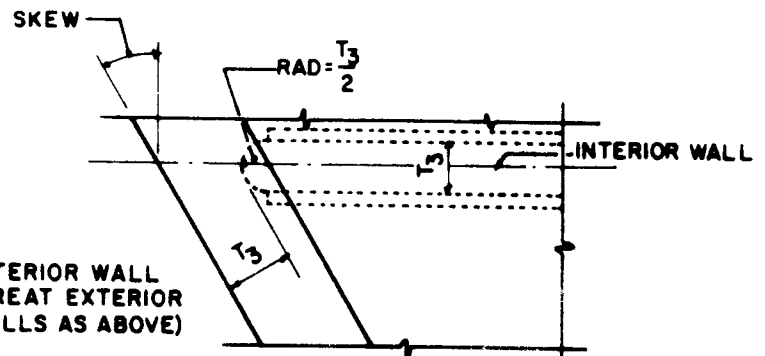


PARTIAL PLAN - SKEWED

PARAPET DETAILS FOR SINGLE SPAN CULVERTS



PARTIAL SECTION



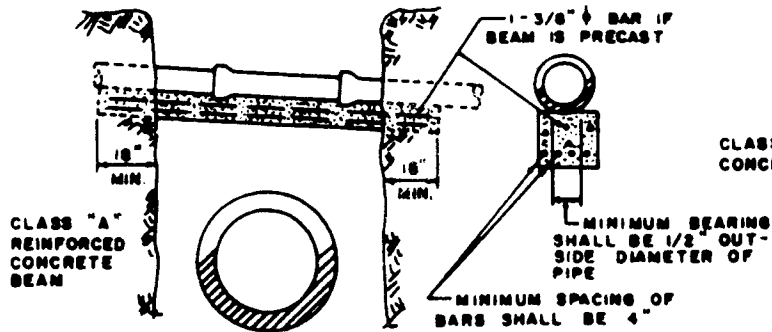
PARTIAL PLAN - SKEWED

PARAPET DETAILS FOR MULTIPLE SPAN CULVERTS

PARAPET "f" BAR NOS.			
SPAN \ SKEW ANGLE	0°	16°	31°
	TO	TO	TO
	15°	30°	45°
3'	#4	#4	#5
4'	#4	#5	#6
5'	#5	#6	#7
6'	#6	#8	#8
8'	#8	#9	#9
10'	#9	#10	#10
12'	#10	#10	#10

"d" BARS SHALL BE AS NOTED IN THE SINGLE, DOUBLE AND TRIPLE BOX CULVERT DETAILS.

CASE - 1 REINFORCED CONCRETE BEAM

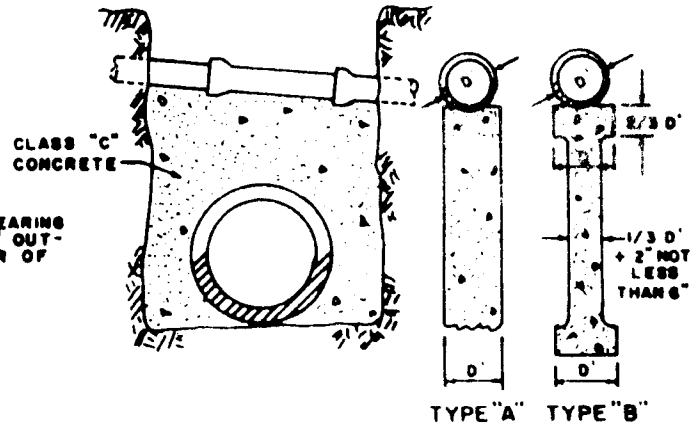


DIMENSIONS OF REINFORCED CONCRETE BEAMS:

TRENCH WIDTH	DEPTH OF BEAM	BAR SIZE	BEAM LENGTH
4'-0" or less	8"	3/8" ϕ	7'-0"
4'-0"	9"	3/4" ϕ	7'-6"
5'-0"	9-1/2"	3/4" ϕ	8'-0"
6'-0"	10-1/8"	3/4" ϕ	9'-0"
7'-0"	12"	7/8" ϕ	10'-0"
8'-0"	13"	7/8" ϕ	11'-0"

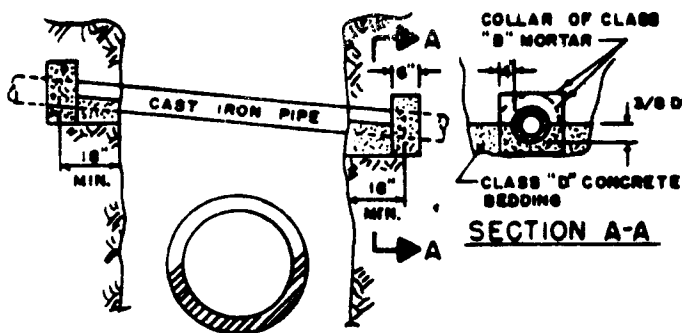
1. WIDTH OF BEAMS SHALL BE NOMINAL DIAMETER OF PIPE PLUS 2".
2. LENGTH OF BEAMS SHALL BE THE WIDTH OF TRENCH PLUS 3'-0".
3. REINFORCING STEEL SHALL BE PLACED 1-1/2" CLEAR FROM THE SIDE AND BOTTOM OF BEAMS.
4. IF BEAMS ARE PRECAST, 18" AT ENDS OF BEAMS SHALL BE BEDDED IN CLASS "D" CONCRETE.
5. CLASS "B" MORTAR SHALL BE PLACED BETWEEN TOP OF BEAMS AND BOTTOM OF PIPE TO GIVE BEARING.

CASE - 2 CONCRETE SUPPORT WALL



1. SUPPORTING WALL SHALL HAVE A FIRM BEARING ON THE SUBGRADE AND AGAINST THE SIDES OF THE EXCAVATION.
2. WALL SHALL BE AT LEAST 2-INCHES FREE AND CLEAR OF ANY GAS OR WATER OR OTHER CONDUIT OR DUCT.
3. EITHER TYPE "A" OR TYPE "B" CROSS SECTION MAY BE USED AT THE CONTRACTOR'S OPTION.
4. WHENEVER SO DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL PIERCE THE WALL WITH SUITABLE OPENINGS TO PREVENT UNEQUAL PRESSURE RESULTING FROM FLOODING THE BACKFILL. THE VOLUME OF THE PIERCED OPENING SHALL NOT EXCEED 1/2 THE VOLUME OF THE SUPPORTING WALL.

CASE - 3 CAST IRON PIPE

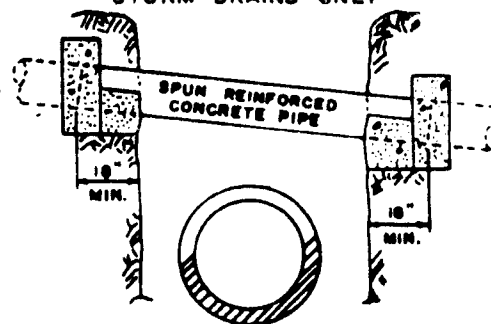


INSIDE OF CAST IRON PIPE:

	CLASS 150 PIPE			CLASS 250 PIPE		
INSIDE DIAMETER	6"	8"	10"	6"	8"	10"
MAXIMUM TRENCH WD.	4'-6"	5'-6"	7'-0"	5'-0"	6'-0"	8'-0"

NOTE: PIPE SHALL BE BEDDED IN 18" OF CONCRETE BEYOND EDGE OF TRENCH.

CASE - 4 SPUN REINFORCED CONCRETE PIPE STORM DRAINS ONLY



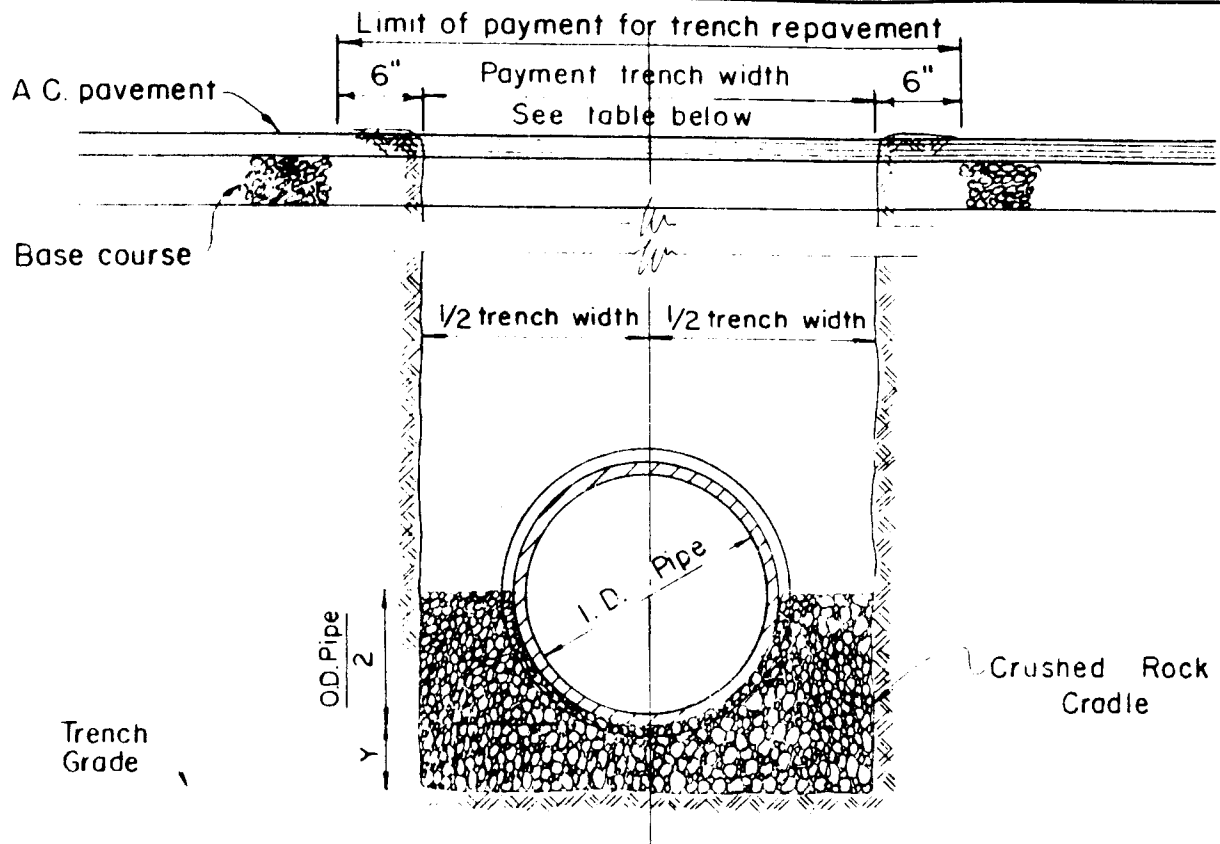
1. CLASS 2000-D SPUN REINFORCED CONCRETE PIPE OF THE SAME DIAMETER AS STORM MAY BE USED FOR STORM DRAINS ONLY WHERE WIDTH OF TRENCH IS 5'-0" OR LESS.
2. BEARING OF THE PIPE ENDS AND JOINT CLOSURE SHALL BE THE SAME AS FOR CASE 3.

METHODS OF SUPPORTING STORM DRAIN AND SEWER PIPES ACROSS TRENCHES

Sewers

PART

3



NOTE:

Payment width of cradle shall be payment trench width.

PIPE SIZE	PAYMENT TRENCH WIDTH	CRUSHED ROCK CRADLE	
		"Y" Min.	CY/LF
6"	24"	4"	.042
8"	24"	4"	.045
10"	24"	4"	.047
12"	30"	5"	.073
15"	38"	6"	.114
18"	41"	6"	.130
21"	45"	7"	.163
24"	50"	8"	.204
27"	53"	9"	.238
30"	57"	10"	.280
36"	69"	11"	.390
42"	76"	12"	.457
48"	84"	12"	.546
54"	91"	12"	.615

ROCK CRADLE FOR SEWER PIPE

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

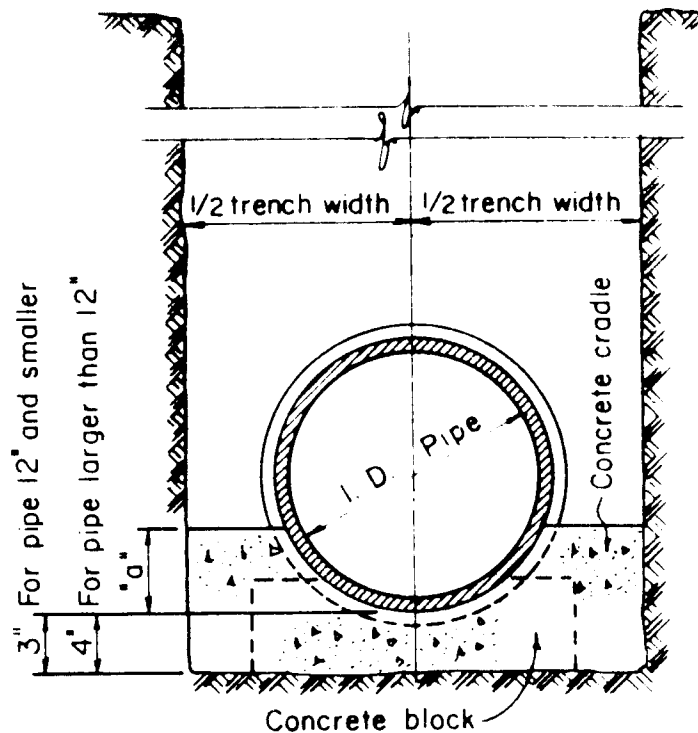
ROCK CRADLE FOR SEWER PIPE

NOT TO SCALE

SEPTEMBER 1984

STANDARD
DETAILS

S-1



NOTE:

Payment width of cradle
shall be payment trench width

DIMENSIONS OF CONCRETE CRADLE		
Pipe Size	"a"	Width
6"	3"	24"
8"	3"	24"
10"	3"	24"
12"	3"	30"
15"	4"	38"
18"	5"	41"
21"	5"	45"
24"	6"	50"
27"	7"	53"
30"	7"	57"

S-2

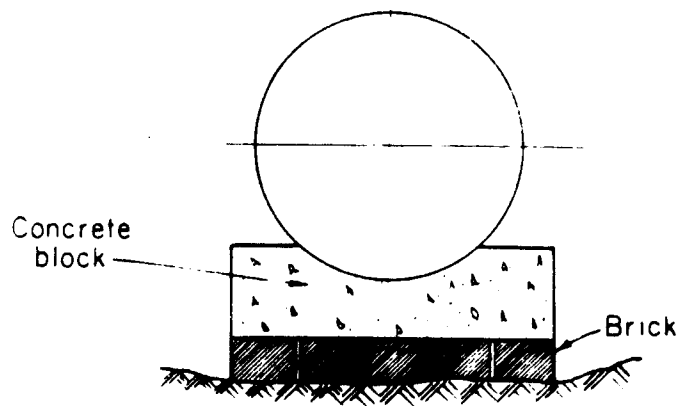
STANDARD
DETAILS

CONCRETE CRADLE
FOR VITRIFIED CLAY PIPE

SEPTEMBER 1984

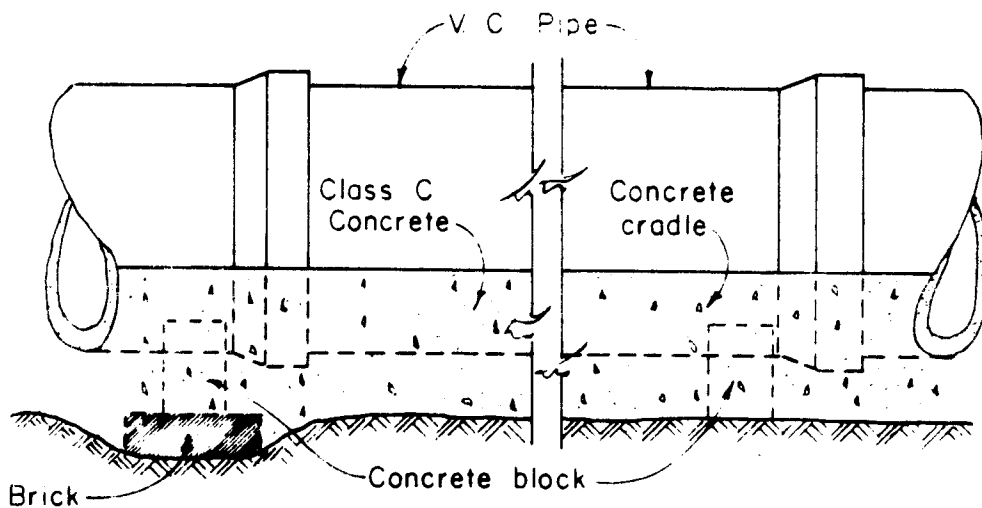
NOT TO SCALE

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



**METHOD OF USING BRICKS
UNDER CONCRETE BLOCKS**

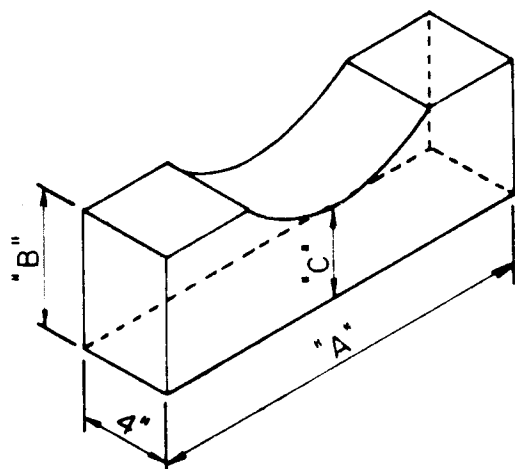
Not to Scale



**ELEVATION SHOWING
METHOD OF LAYING PIPE**

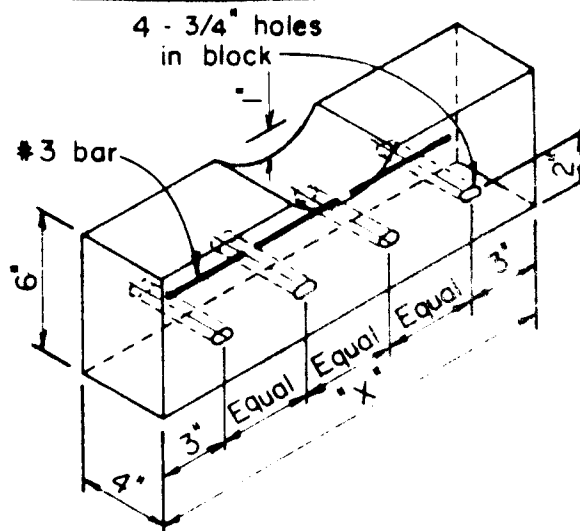
Not to Scale

Contractor shall set Concrete Blocks on undisturbed ground. Where ground is too low, the contractor shall not heap up dirt under the Concrete Block but use Concrete Bricks to take up the deficiency, scraping away beneath Concrete Block to give sufficient room for Brick.



**DETAIL OF PRECAST
CONCRETE PIPE BLOCK**

Not to Scale

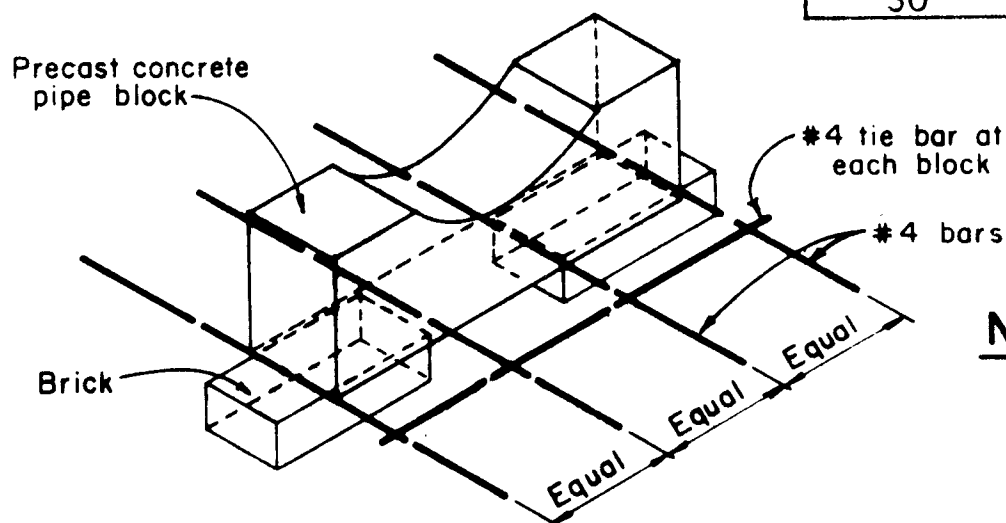


**DETAIL OF CONCRETE PIPE
BLOCK FOR REINF. CRADLE**

Not to Scale

CONCRETE BLOCK DIMENSIONS			
Pipe Size	"A"	"B"	"C"
6"	1' - 2"	6"	3"
8"	1' - 5"	6"	3"
10"	1' - 7"	6"	3"
12"	1' - 7"	6"	3"
15"	1' - 8"	6"	4"
18"	1' - 9"	6"	4"
21"	1' - 10"	6"	4"
24"	1' - 11"	6"	4"
27"	2' - 0"	6"	4"
30"	2' - 3"	6"	4"

DIM. OF REINF. CONCRETE BLOCK	
Pipe Size	"X"
6"	1' - 6"
8"	1' - 6"
10"	1' - 8"
12"	1' - 8"
15"	1' - 10"
18"	1' - 10"
21"	1' - 10"
24"	2' - 0"
27"	2' - 0"
30"	2' - 0"



**ALTERNATE DETAIL OF CONC.
PIPE BLOCK FOR REINF. CRADLE**

Not to Scale

NOTE:

Add brick for
larger size pipe

S-4

STANDARD
DETAILS

PRE-CAST CONCRETE PIPE BLOCK

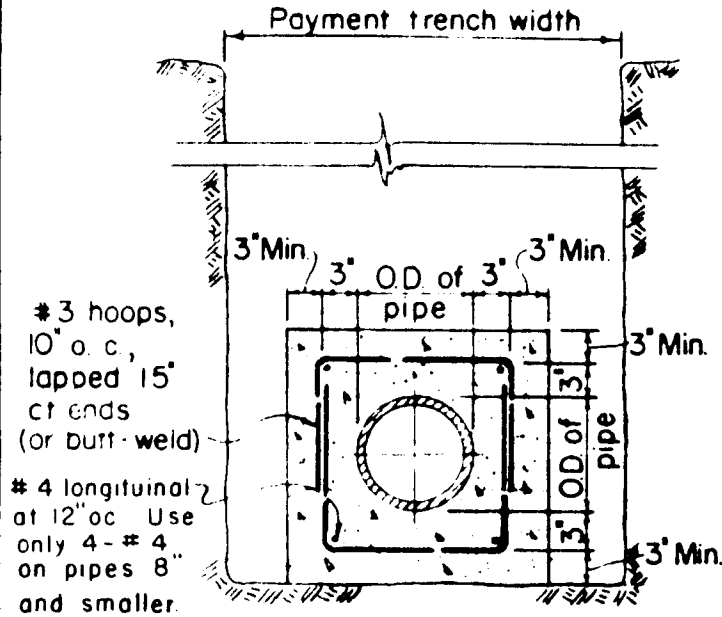
SEPTEMBER 1984

NOT TO SCALE

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

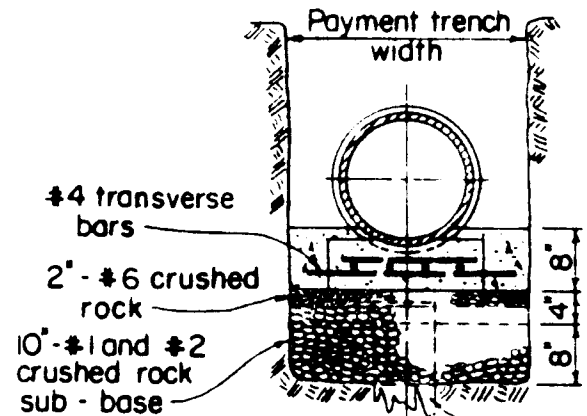
NOTE:

Reinforcing bars of laterals shall be lapped 40 dia. to reinforcing bars of mains.



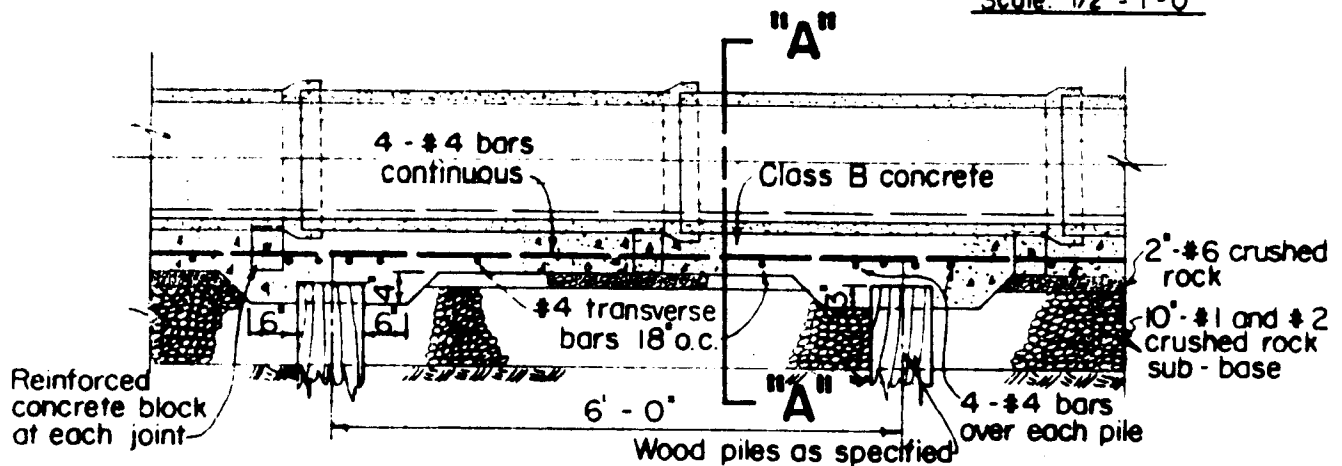
DETAIL OF CONCRETE JACKET FOR PIPES 12" AND SMALLER

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



SECTION "A-A"

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



DETAIL OF REINFORCED CONCRETE CRADLE ON WOOD PILES

(FOR 6, 8, 10, AND 12 IN. V. C. PIPE)

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

DETAIL OF REINFORCED CONCRETE CRADLE WITHOUT PILES
SIMILAR EXCEPT FOR WOOD PILES AND PILE CAPS

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

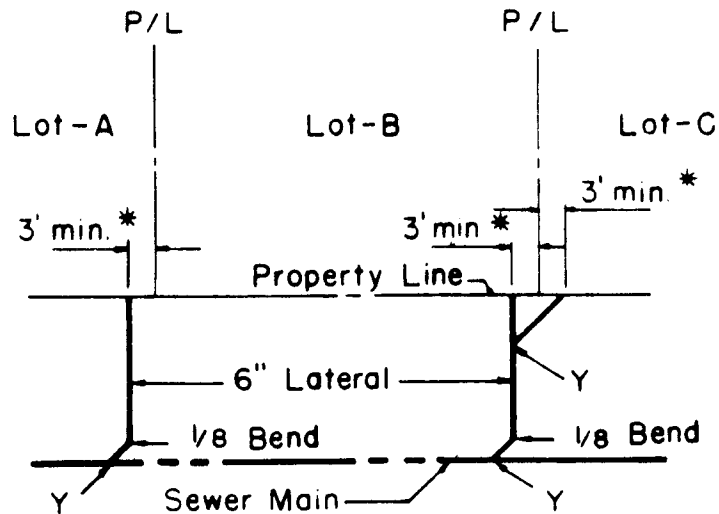
CONCRETE JACKET,
REINFORCED CONCRETE CRADLE

SCALE: AS NOTED

SEPTEMBER 1984

STANDARD
DETAILS

S-5

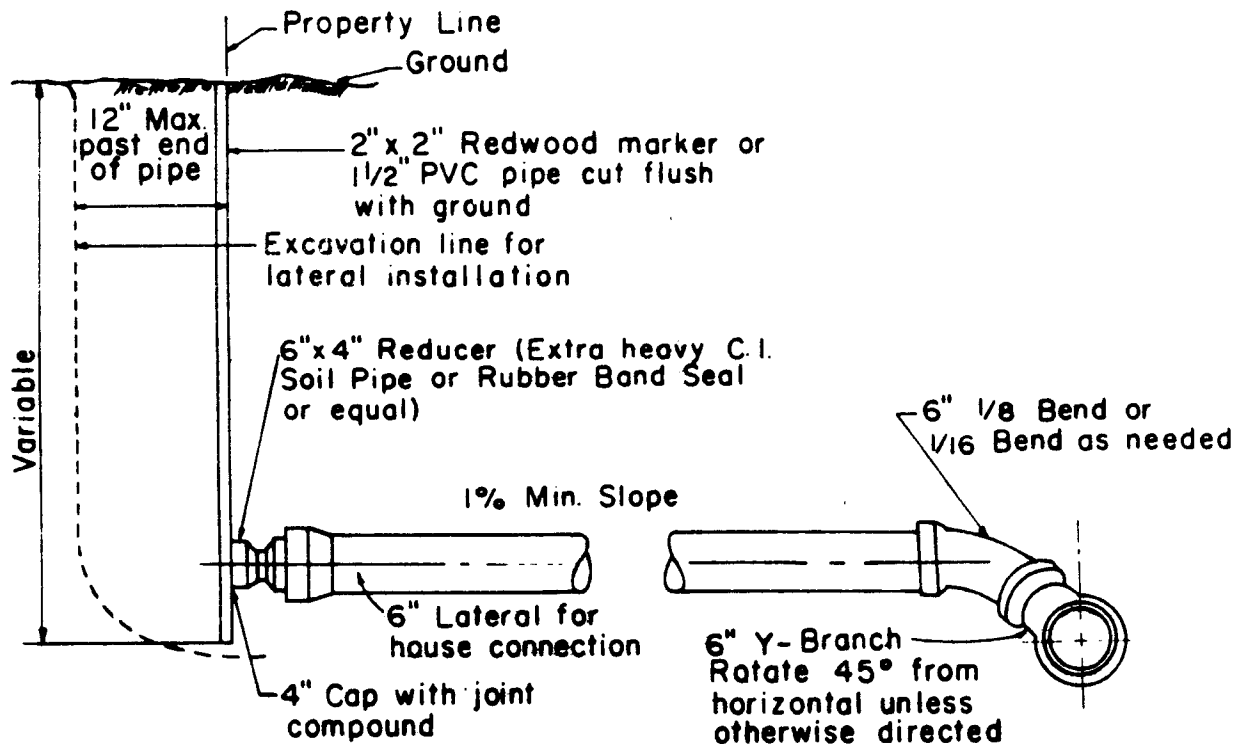


LAYOUT

NOTE :

Permission is to be secured from property owner before construction at property line is started.

* 4' for Maui only



DETAIL AT PROPERTY LINE AND AT MAIN LINE

S-6

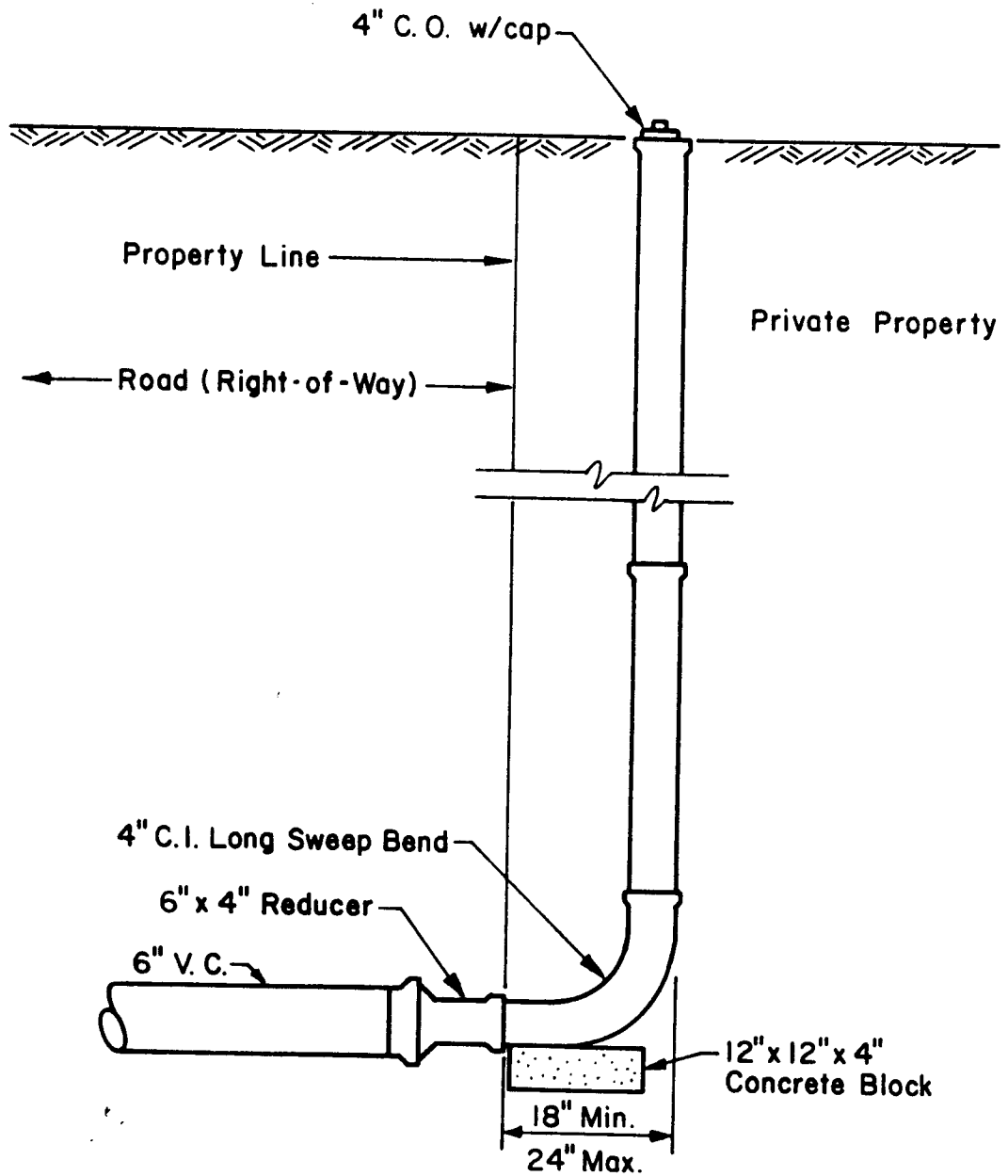
STANDARD
DETAILS

LATERALS

SEPTEMBER 1984

NOT TO SCALE

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



ADVANCE RISER CONNECTION

Not to Scale

Stone or broken pavement in street areas
(See Specs.)

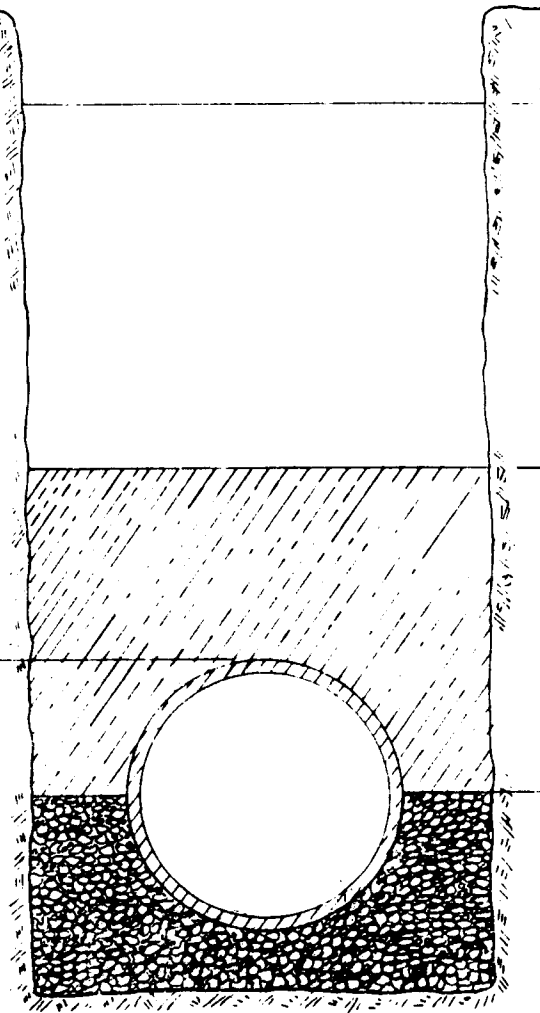
Top soil in lawn areas
(See Specs.)

Variable

Suitable excavated materials
(See Specs.)

12"

Select material hand shoveled into trench
(See Specs.)



NOT TO SCALE

S-8

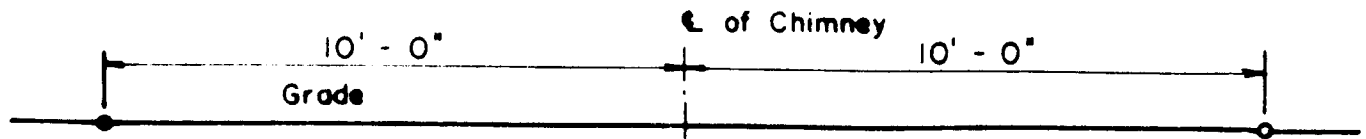
STANDARD
DETAILS

METHOD OF BACKFILL

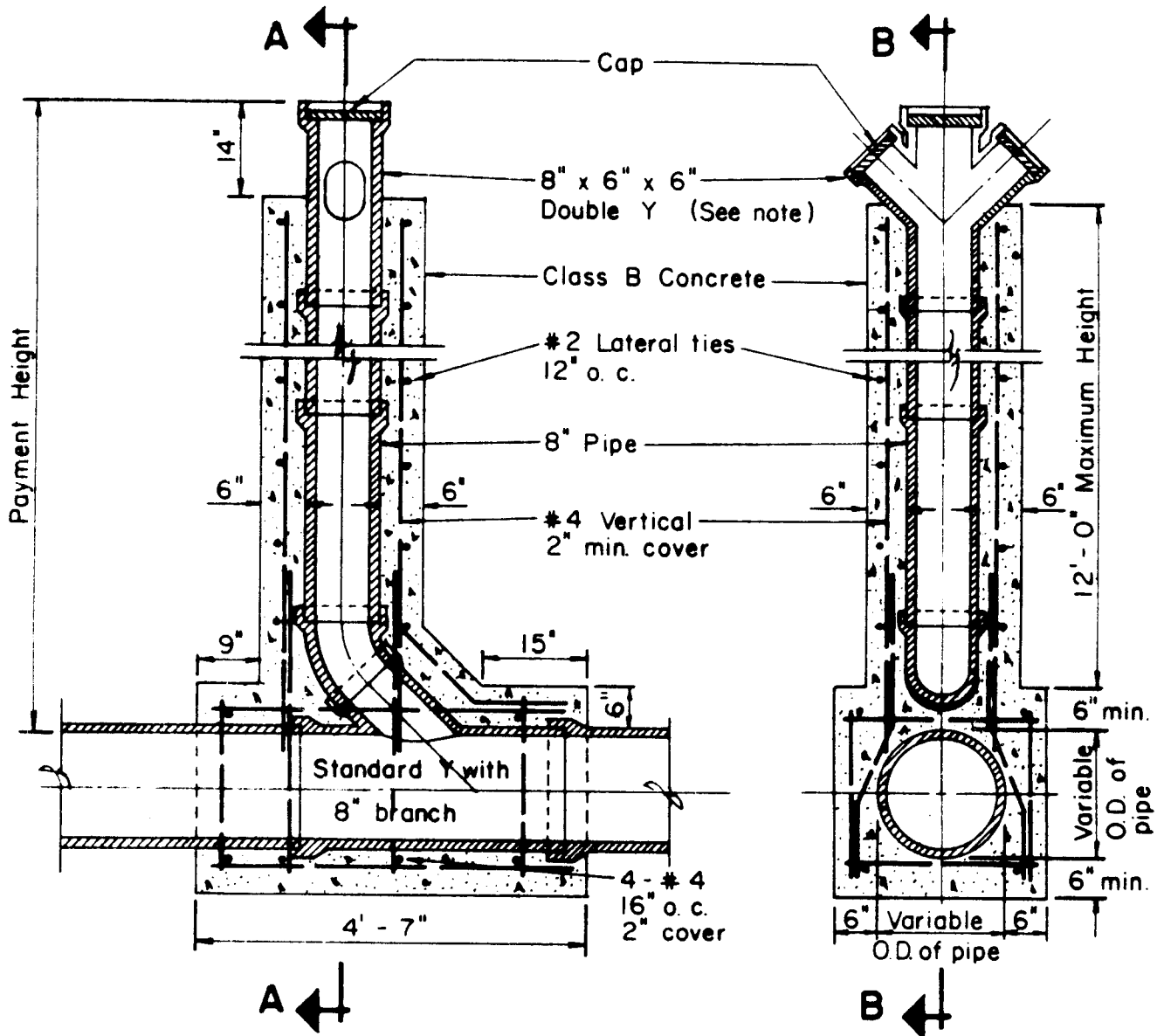
SEPTEMBER 1984

NOT TO SCALE

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



No machine backfilling between these points. Backfill to be brought up evenly on each side of chimney by hand shoveling.



SECTION B-B

SECTION A-A

DETAILS OF CHIMNEY

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

Double "Y" may be replaced by one or two single wyes with inverts as noted on the plans.

NOTE:

All reinforcing rods #4 except lateral ties. Laps - 40 diameters.

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

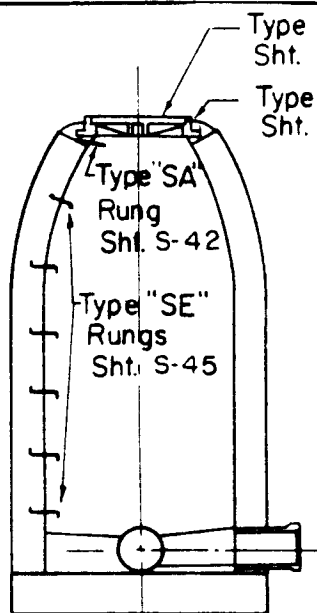
CHIMNEY

STANDARD
DETAILS

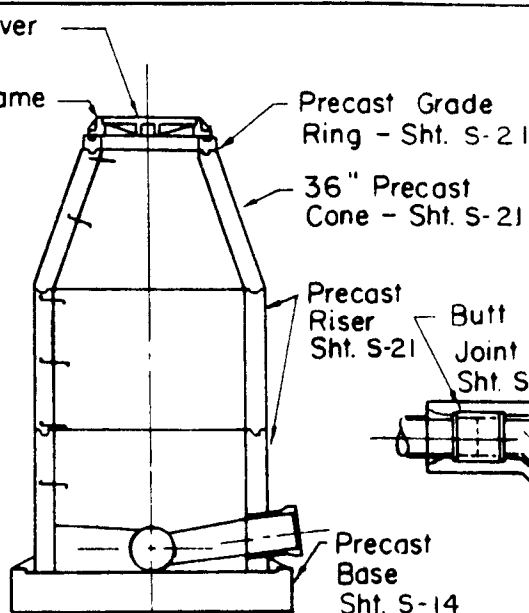
S-9

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

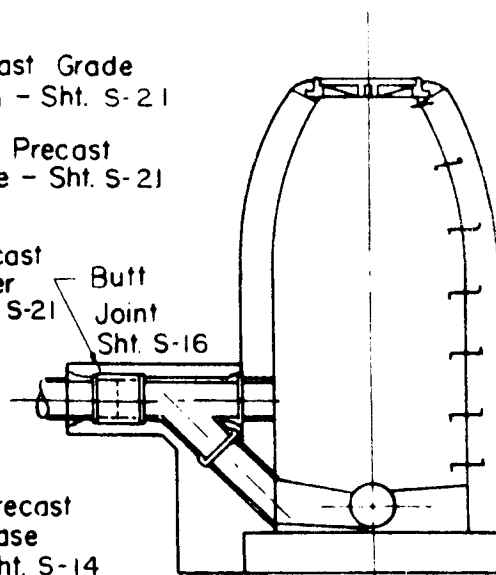
SEPTEMBER 1984



PLAIN M.H.
(BRICK & CAST-IN-PLACE)
SHTS. S-26, S-27

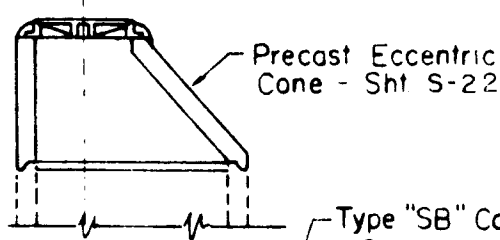
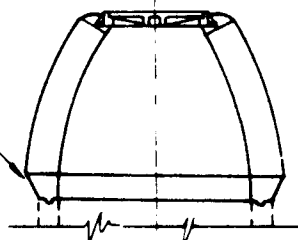


PLAIN M.H.
(PRECAST) SHT. S-13

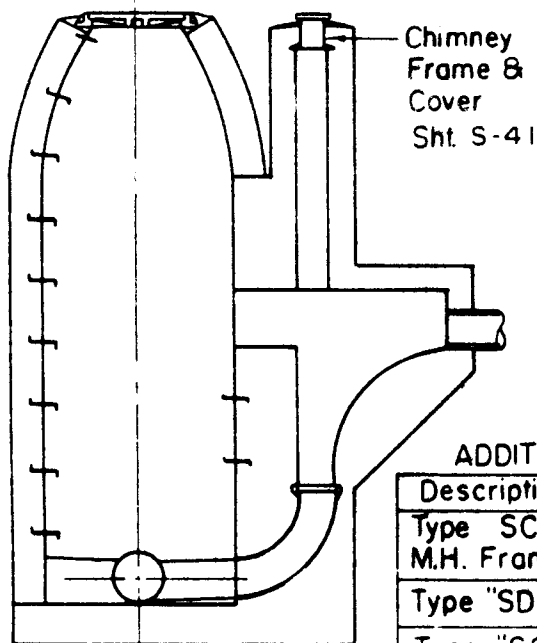


SHALLOW DROP M.H.
SHTS. S-15, S-28

Precast Wall to
Brickwall Adapter
Ring - Sht. S-23



Precast Eccentric
Cone - Sht. S-22



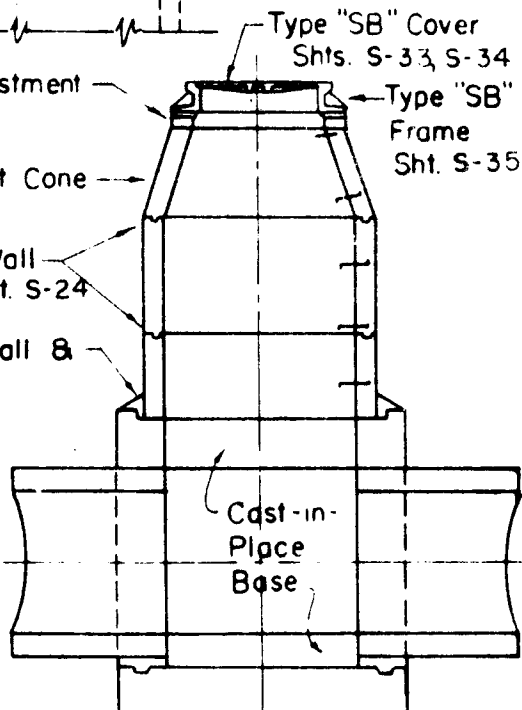
DROP M.H.
SHTS. S-17, S-18,
S-29, S-30

Brick Adjustment
Sht. S-25

22" Precast Cone
Sht. S-21

Precast Wall
Joints - Sht. S-24

Precast Wall &
Ball Joint
Sht. S-24



PLAIN M.H.
36" TO 48" DIA. PIPES
SHTS. S-19, S-20

ADDITIONAL DETAILS

Description	Sht. No.
Type SC Pressure M.H. Frame & Cover	S-37 S-38 S-39
Type "SD" Frame	S-40
Type "SC" Rung	S-43
Type "SD" Rung	S-44
Modified "SB" (Press) Frame & Cover	S-36

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

S-10

**STANDARD
DETAILS**

INDEX TO SEWER MANHOLE DETAILS

SEPTEMBER 1984

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

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

MANHOLE NOTES

BASES

1. When precast concrete bases are used, a leveling concrete grout of 2" minimum thickness shall be placed.

WALLS

1. When precast walls are used, the height adjustment shall be in the bottom section.
2. The precast manhole riser section shall be cast with openings whenever sewer pipes must pass thru.
3. Openings in manhole walls shall be patched with epoxy grout when required.
4. Precast cones shall not be used in easement areas unless approved by the Engineer.
5. Manhole walls of reinforced concrete shall be to a height 1' above normal ground water table.

FRAMES AND COVERS

1. Generally type "SA" is used. Type "SD" frame is used in sidewalk or slab areas. Types "SB" and "SC" shall be used only when indicated.

RUNGS

1. Rungs shall be placed in all manholes unless otherwise indicated.
2. One type "SA" rung is used as a grab bar at the top of the manhole.
3. Type "SE" rungs are generally used unless otherwise indicated.
4. Type "SC" rungs shall be used in corrosive conditions in lieu of "SE" when specified.
5. Rungs shall not be aligned above any flow line except in drop manholes, where two rungs are located below the drop pipe opening and level with the rungs on the opposite wall.
6. Rungs shall not be placed in manholes less than 3' high.
7. Type "SE" or designated rungs shall be evenly spaced. Maximum spacing shall be 16" on center.

DROP CONNECTIONS

1. Pipe shall be of vitrified clay or cast iron except PVC may be used if PVC pipeline is permitted.

MANHOLE CHIMNEYS

1. Pipe shall be vitrified clay except PVC may be used if PVC pipeline is permitted.

STUBS AND ENTRY PIPE

1. All pipes entering or leaving a manhole shall have joints within 2' of the manhole wall. Joints within 2' of the manhole wall may be omitted when approved resilient manhole connectors are used.
2. When providing for future alignment, the bell of the stub shall be flush with the outside of the manhole wall and capped.
3. Where the sewer pipe runs straight thru the manhole, the Contractor may lay the pipe thru the manhole with the manhole invert and base poured together. After the concrete has hardened, the upper portion of the pipe within the manhole shall be carefully broken out and any unevenness shall be patched with mortar.
4. Drop manholes shall have a bell joint flush with the exterior wall of the drop.
5. When not otherwise noted, manhole stubs shall be sloped as follows:

<u>Pipe Size</u>	<u>Rise Per Foot</u>
6"	1/8"
8"	3/32"
10"	1/16"
12"	1/16"

TRANSITION RING

1. A transition ring shall be used whenever a brick wall or cone is placed above a precast concrete wall.

REINFORCING STEEL

1. All reinforcing bars interfering with pipes shall be bent to clear them.

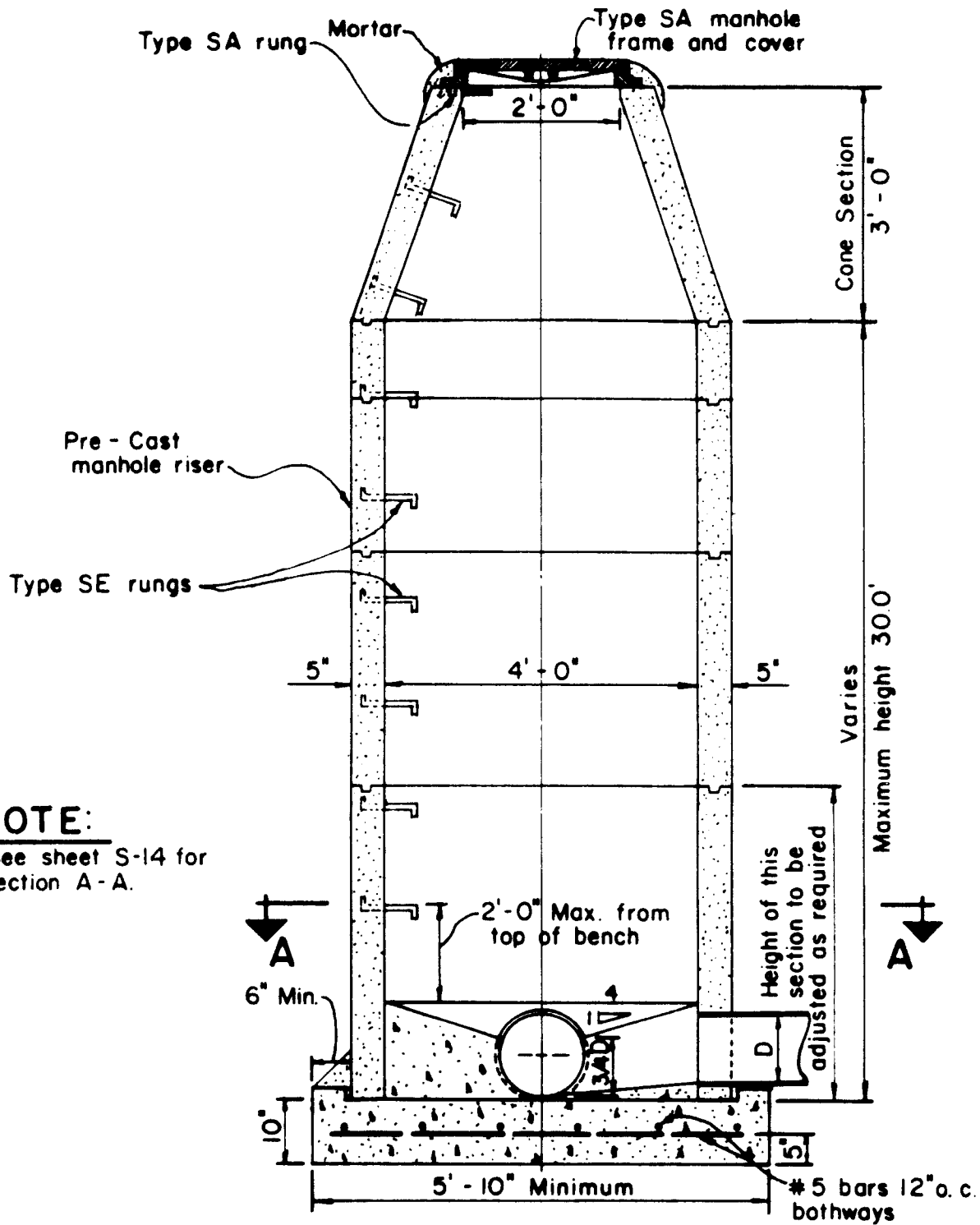
S-12

STANDARD
DETAILS

MANHOLE NOTES

SEPTEMBER 1984

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



PLAIN MANHOLE **PRE - CAST CONCRETE**

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

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

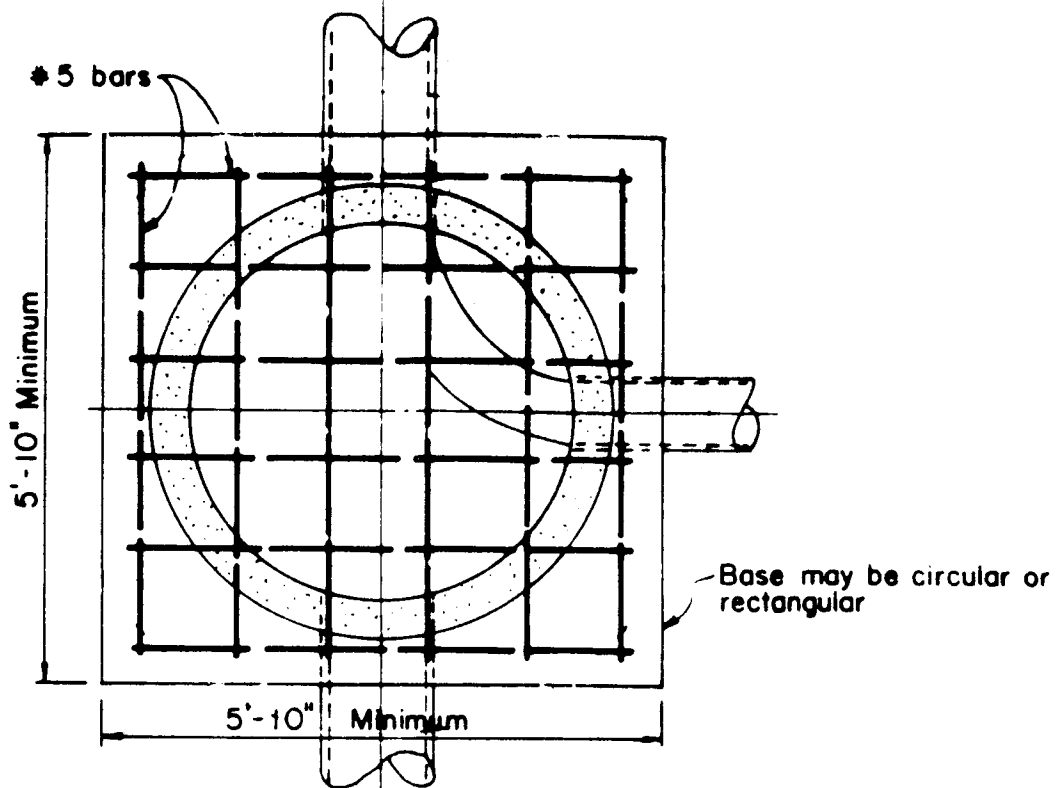
PRE-CAST CONCRETE PLAIN MANHOLE

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

SEPTEMBER 1984

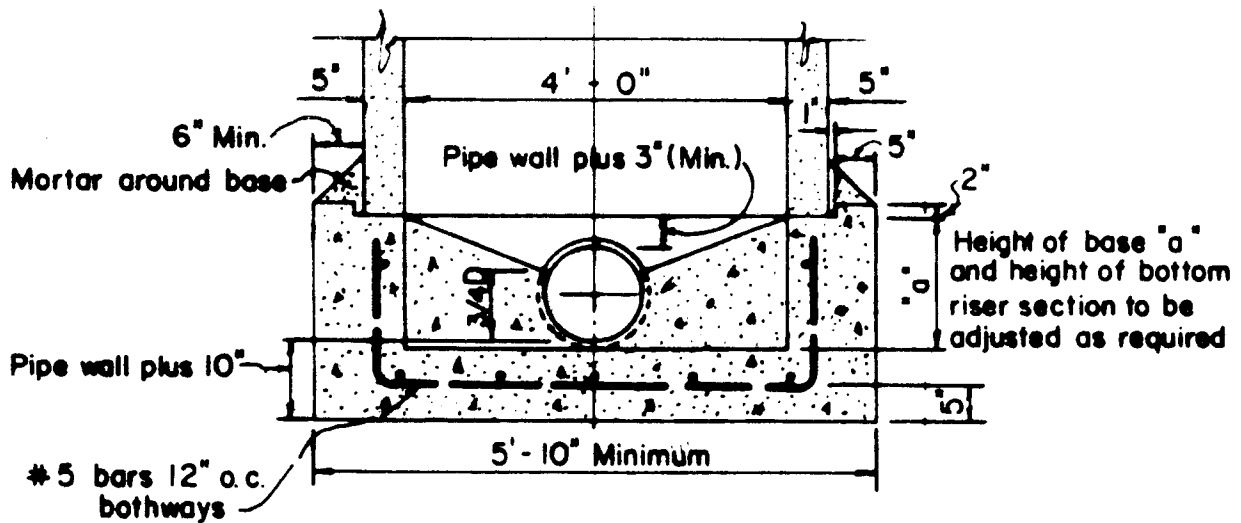
STANDARD
DETAILS

S-13



SECTION A - A

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



ALTERNATE BASE PRE - CAST CONCRETE M. H.

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

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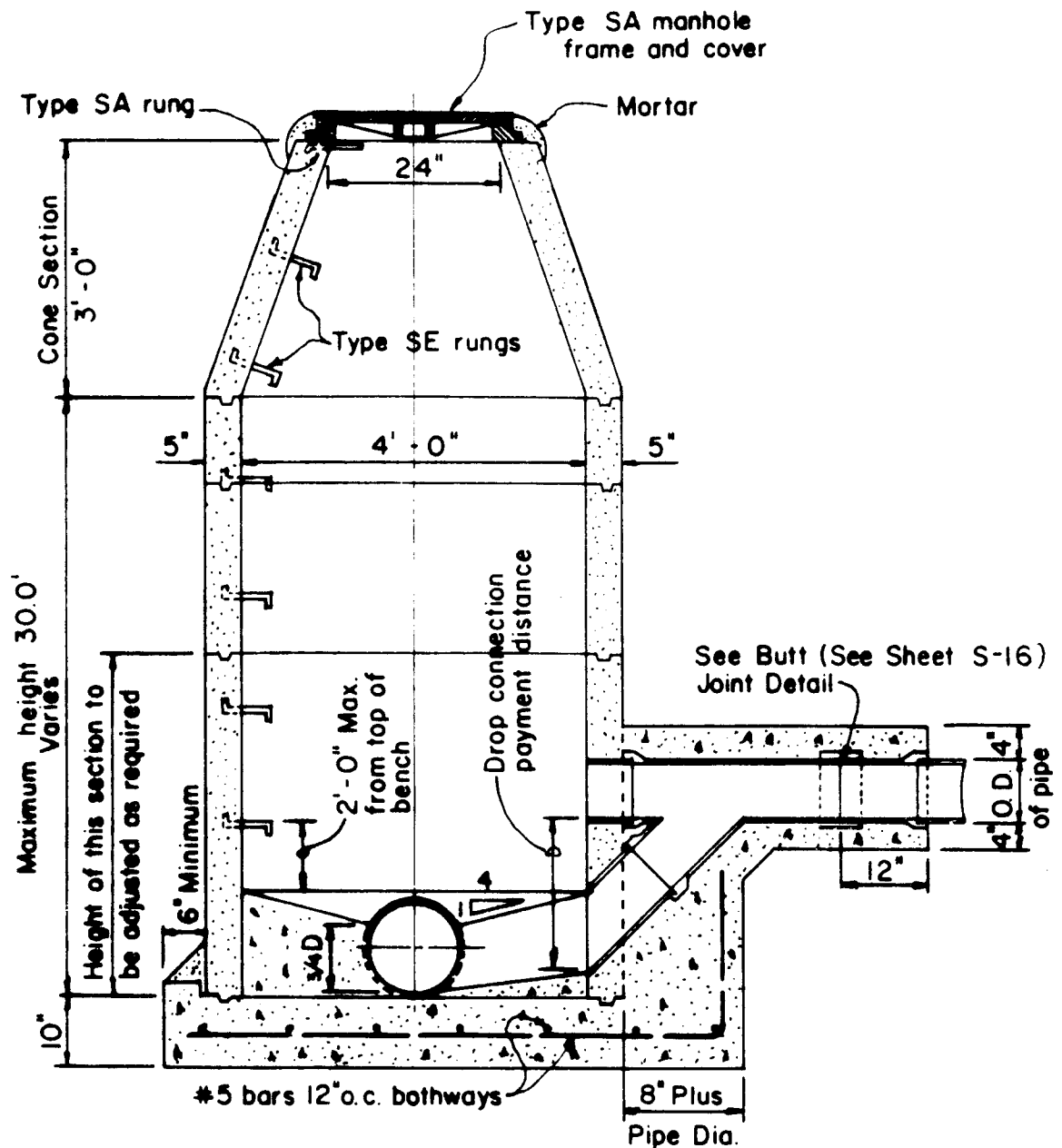
STANDARD
DETAILS

PRE-CAST CONCRETE PLAIN MANHOLE -
SECTION AND ALTERNATE BASE

SEPTEMBER 1984

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

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



SHALLOW DROP MANHOLE
FOR DROP UNDER 5.0 FEET
PRE - CAST CONCRETE

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

COUNTY OF KAUAI
 CITY & COUNTY OF HONOLULU
 COUNTY OF MAUI
 COUNTY OF HAWAII

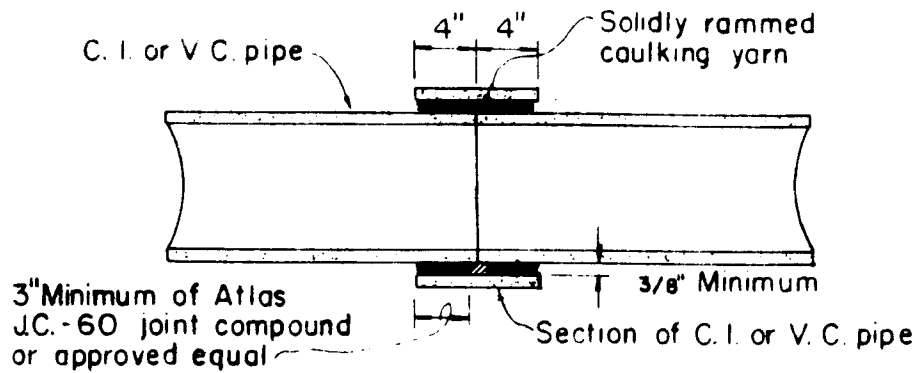
PRE-CAST CONCRETE
 SHALLOW DROP MANHOLE

STANDARD
 DETAILS

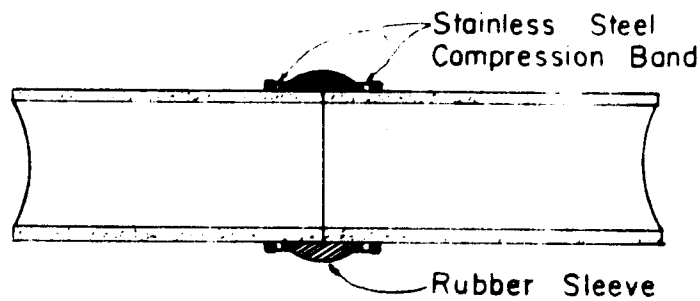
S-15

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

SEPTEMBER 1984



CAULKED JOINT



RUBBER COMPRESSION JOINT

BUTT JOINT DETAILS

Scale: 1" = 1'-0"

S-16

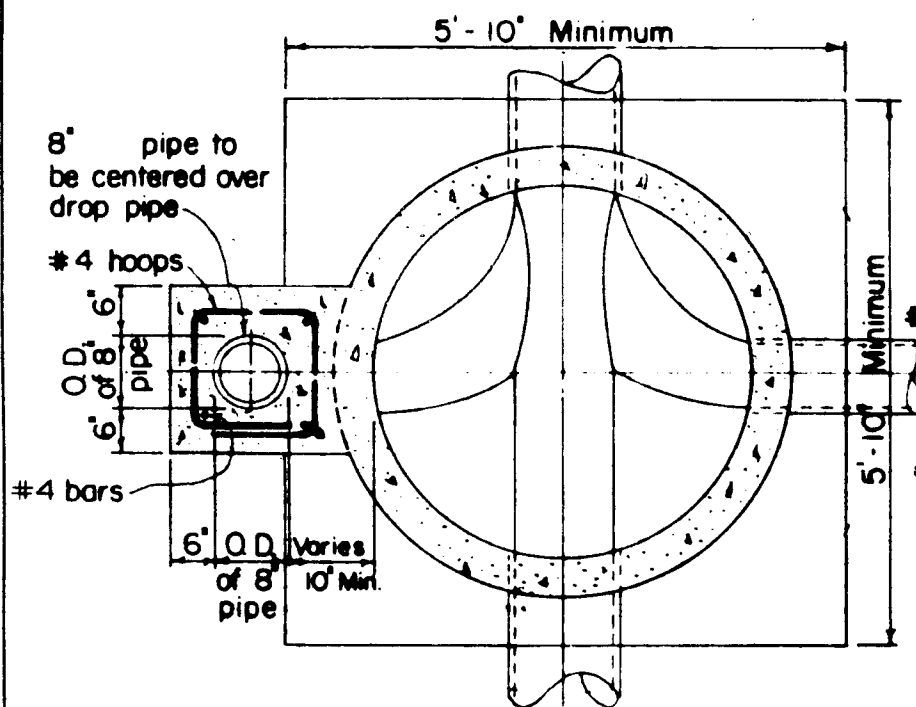
STANDARD
DETAILS

PRE-CAST CONCRETE SHALLOW DROP
MANHOLE - BUTT JOINT DETAILS

SEPTEMBER 1984

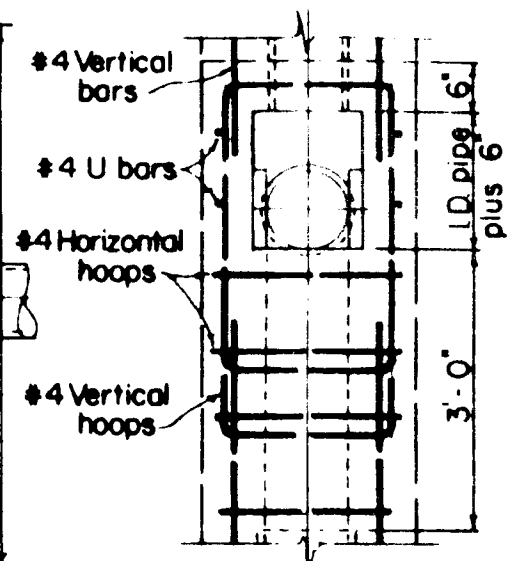
SCALE: 1" = 1'-0"

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



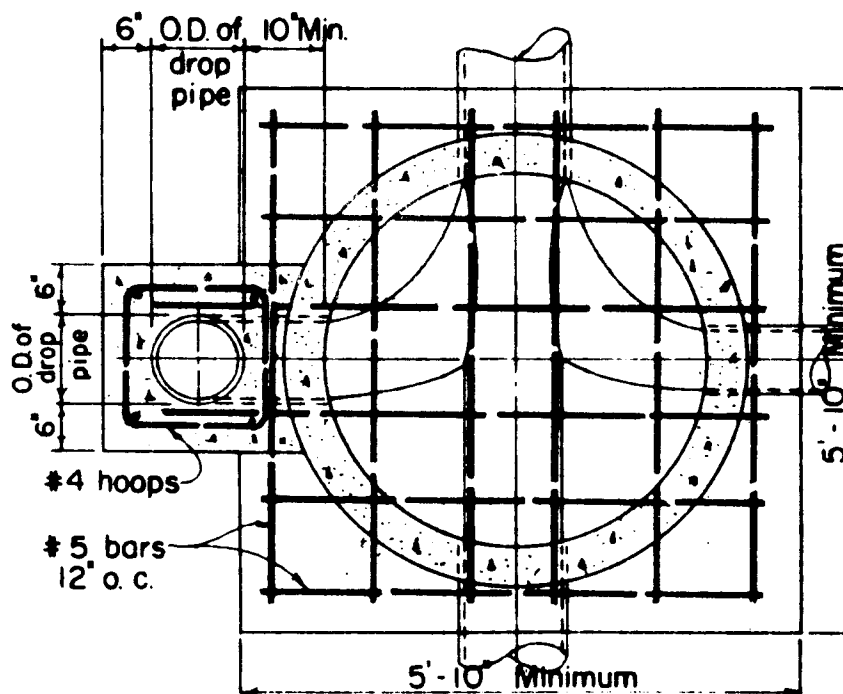
SECTION A - A

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



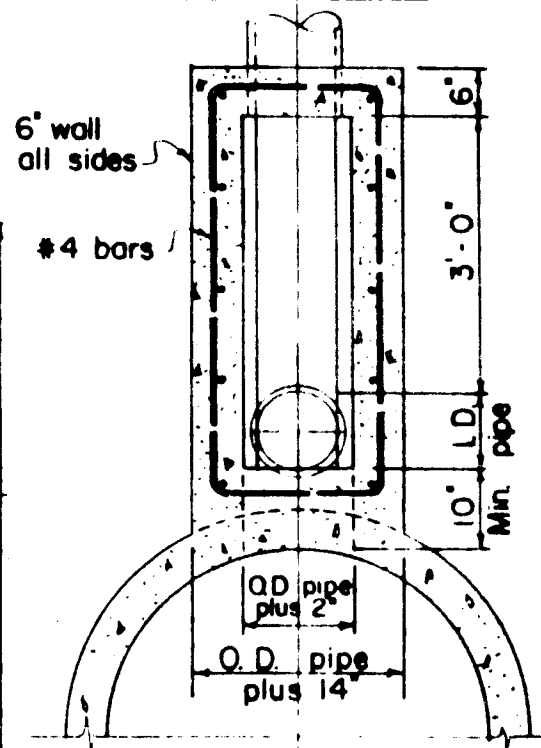
SECTION C - C

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



SECTION B - B

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



SECTION D - D

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

S-18

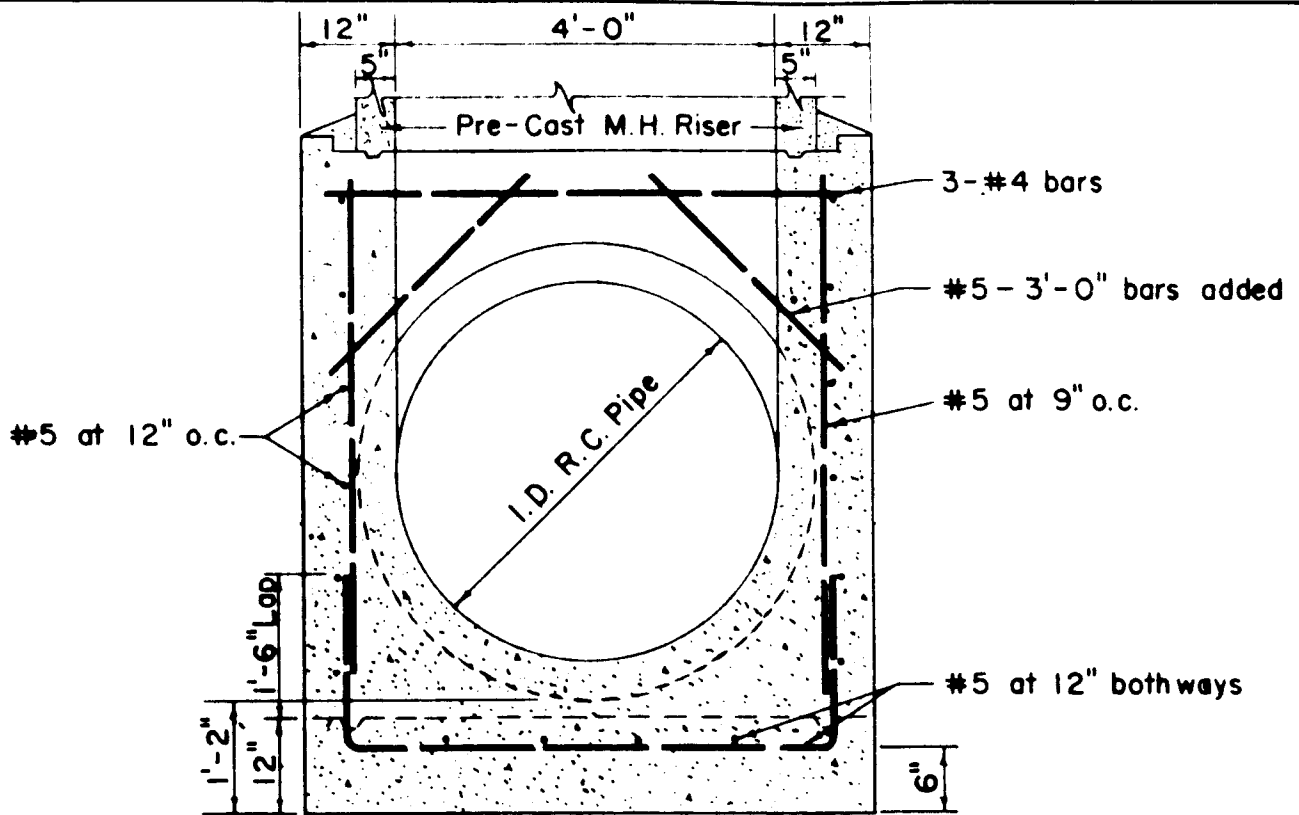
STANDARD
DETAILS

PRE-CAST CONCRETE
DROP MANHOLE - SECTIONS

SEPTEMBER 1984

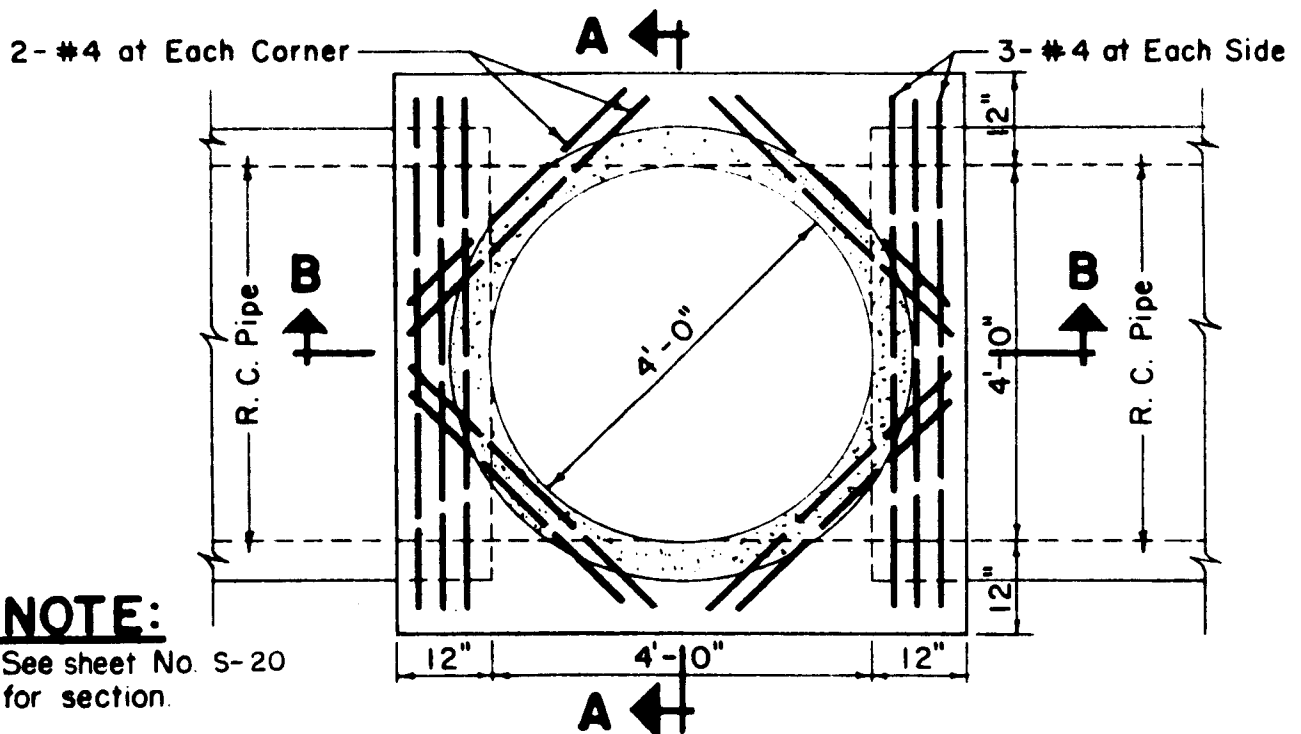
SCALE: $1/2" = 1' - 0"$

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



SECTION A-A

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



NOTE:

See sheet No. S-20
for section.

PLAN

PLAIN MANHOLE FOR R.C. PIPE (PRE-CAST CONC.)
27" TO 48"

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

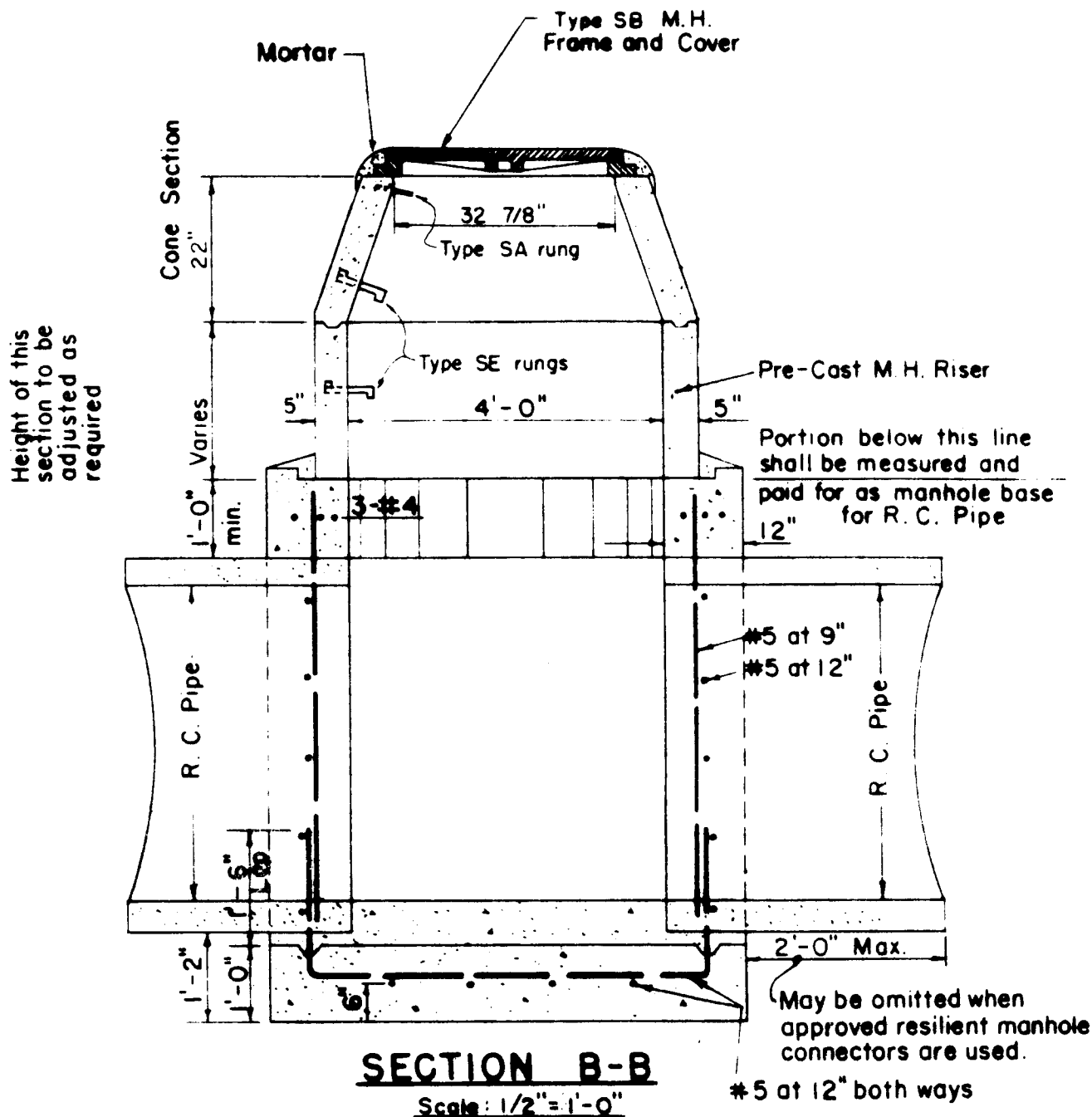
PRE-CAST CONCRETE PLAIN MANHOLE
FOR 27" TO 48" R.C. PIPE

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

SEPTEMBER 1984

STANDARD
DETAILS

S-19



PLAIN MANHOLE FOR R.C. PIPE

(PRE-CAST CONCRETE)
27" TO 48" DIA. INCLUSIVE

S-20

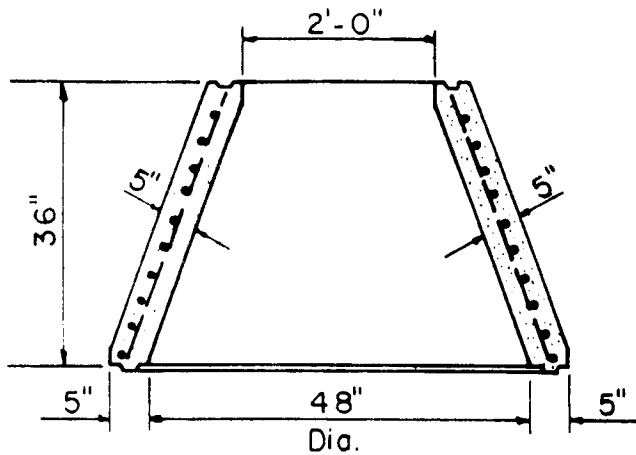
STANDARD
DETAILS

PRE-CAST CONCRETE PLAIN MANHOLE
FOR 27" TO 48" R.C. PIPE - SECTION

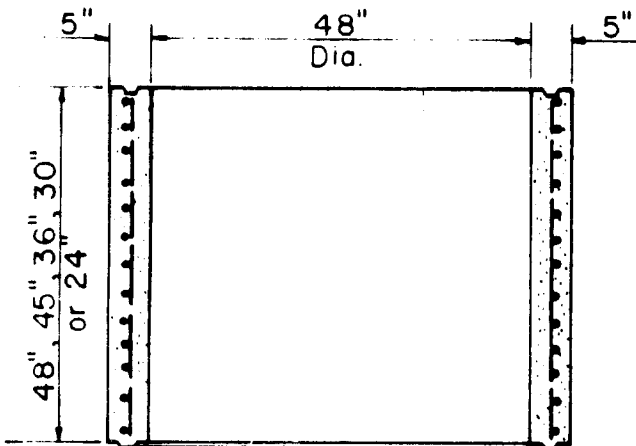
SEPTEMBER 1984

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

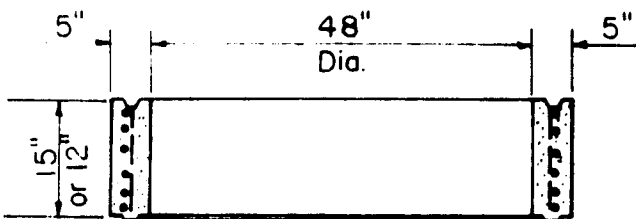
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



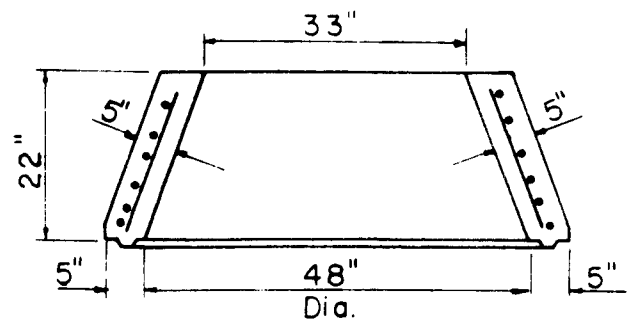
36" CONE
SCALE: $\frac{1}{2}" = 1' - 0"$



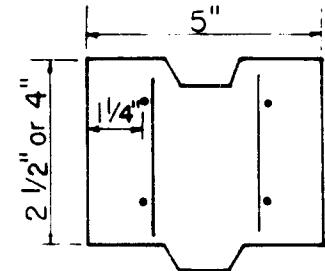
RISER
SCALE: $\frac{1}{2}" = 1' - 0"$



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



22" CONE
SCALE: $\frac{1}{2}" = 1' - 0"$

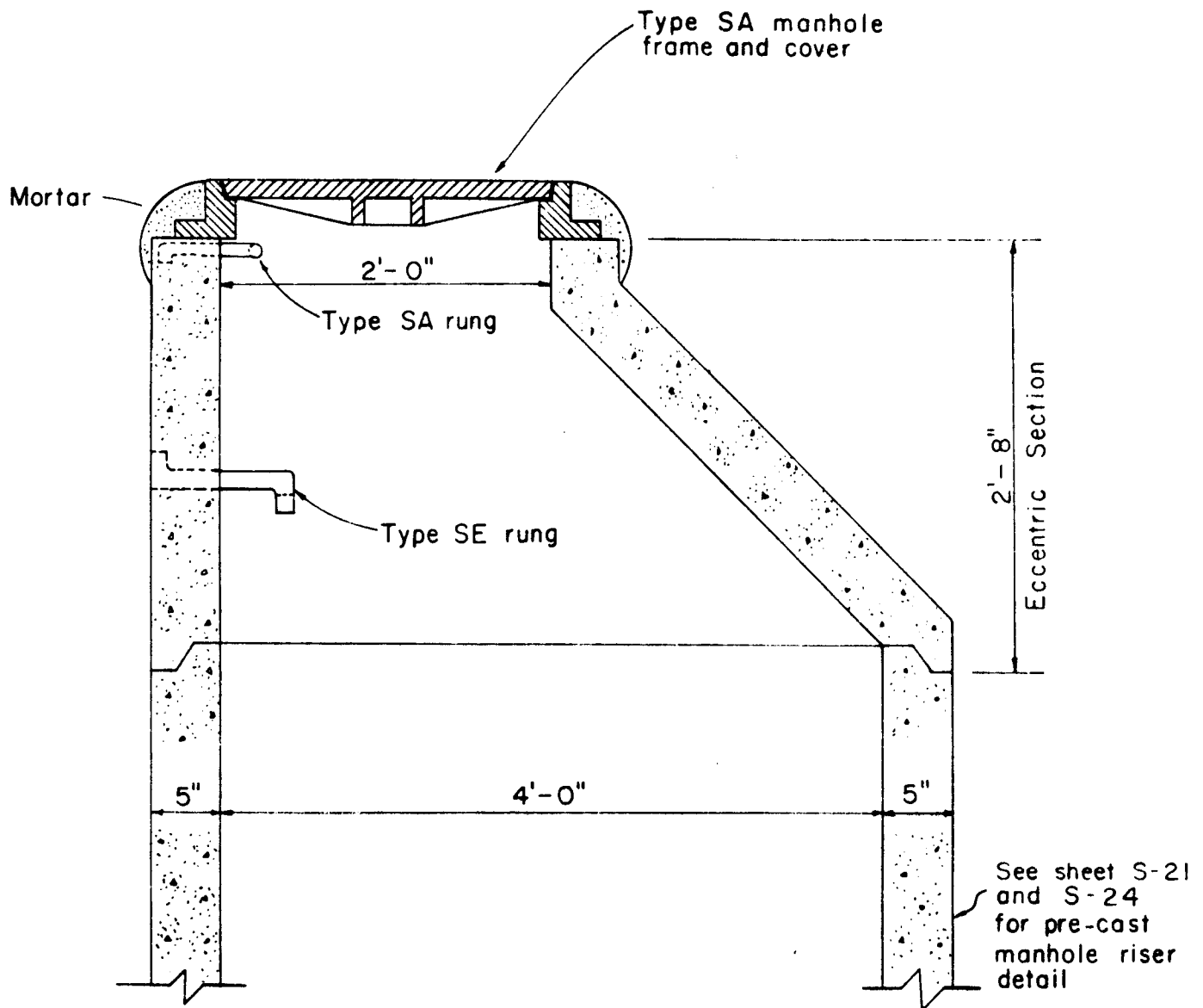


GRADE RING
SCALE: $3" = 1' - 0"$

SECTION	$A_s / L.F.$
48" x 48" Riser	0.15
48" x 45" Riser	0.15
48" x 36" Riser	0.15
48" x 30" Riser	0.15
48" x 24" Riser	0.15
48" x 15" Riser	0.15
48" x 12" Riser	0.15
48" x 24" x 36" Cone	0.16
48" x 33" x 22" Cone	0.16
22" x 4" Grade Ring	0.12
22" x 2 1/2" Grade Ring	0.12

NOTES

1. Pre-cast sections shall conform to ASTM C478
2. Manufacturers may submit to the Engineer for approval, prior to manufacturing, designs other than those shown on this sheet.



Scale: 1" = 1'-0"

S-22

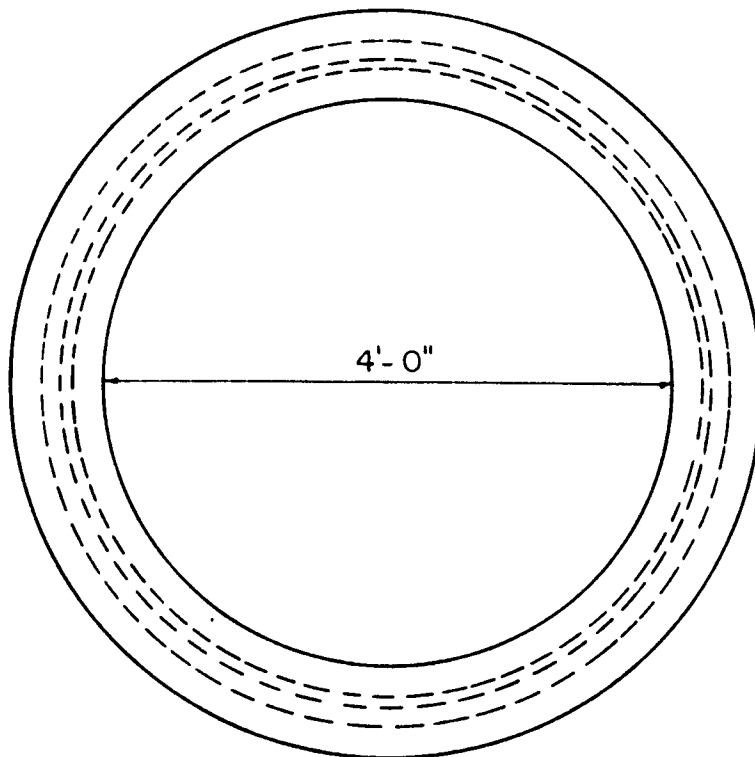
STANDARD
DETAILS

PRE-CAST CONCRETE ECCENTRIC
MANHOLE CONE

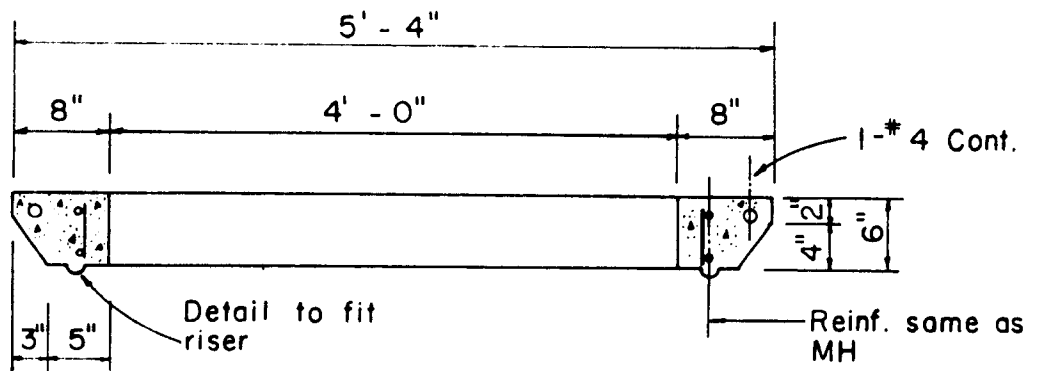
SEPTEMBER 1984

SCALE: 1" = 1'-0"

COUNTY OF KAUAI
COUNTY OF MAUI
COUNTY OF HAWAII

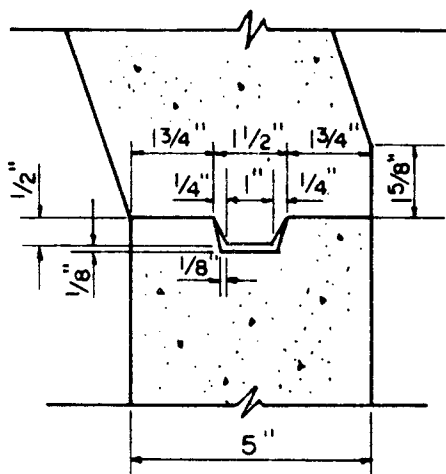


PLAN

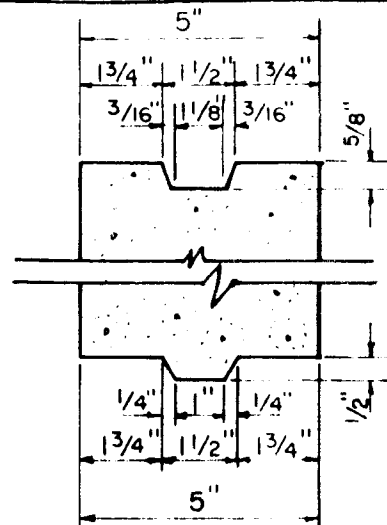


SECTION

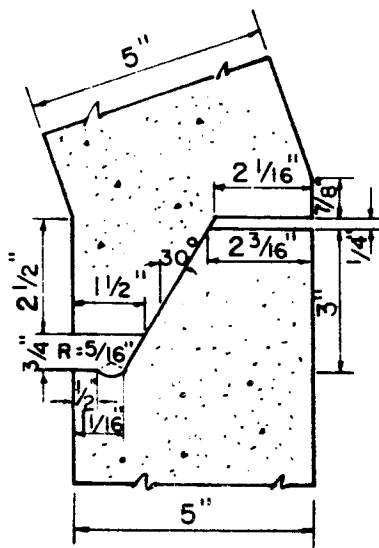
Scale: $\frac{3}{4}" = 1'-0"$



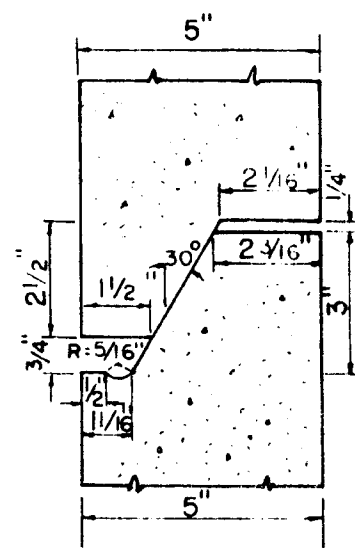
CONE SECTION



RISER SECTION

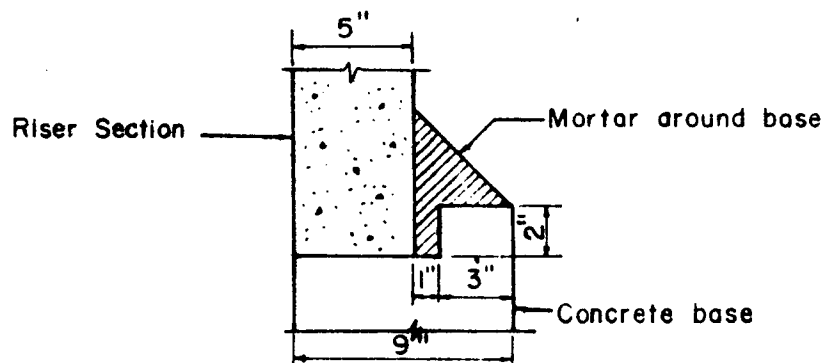


CONE SECTION
(Alternate Detail)



RISER SECTION
(Alternate Detail)

Scale : 3" = 1'-0"



RISER AND MANHOLE BASE JOINT

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

S-24

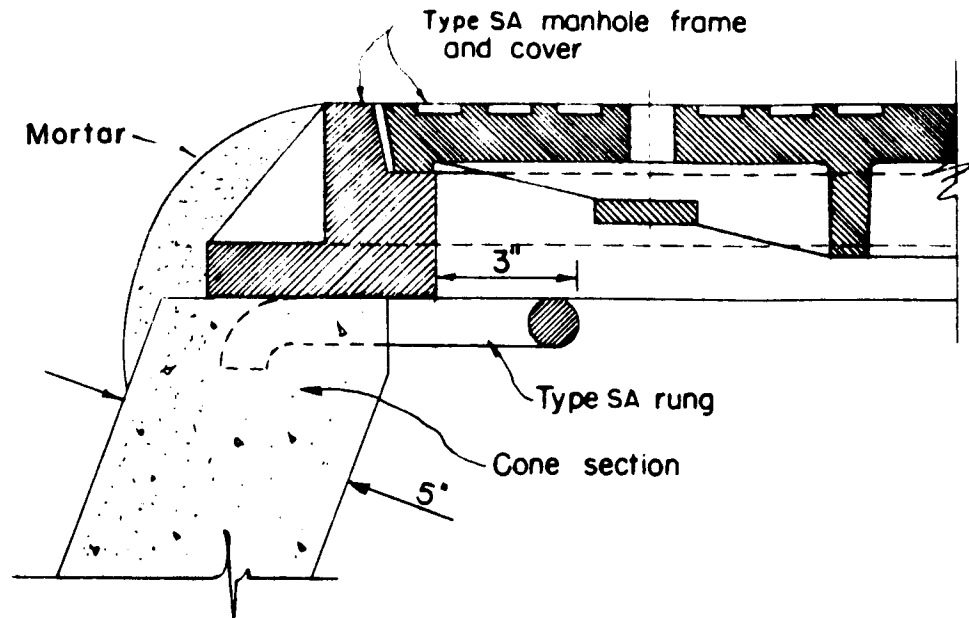
**STANDARD
DETAILS**

**PRE-CAST CONCRETE MANHOLE
WALL JOINTS**

SEPTEMBER 1984

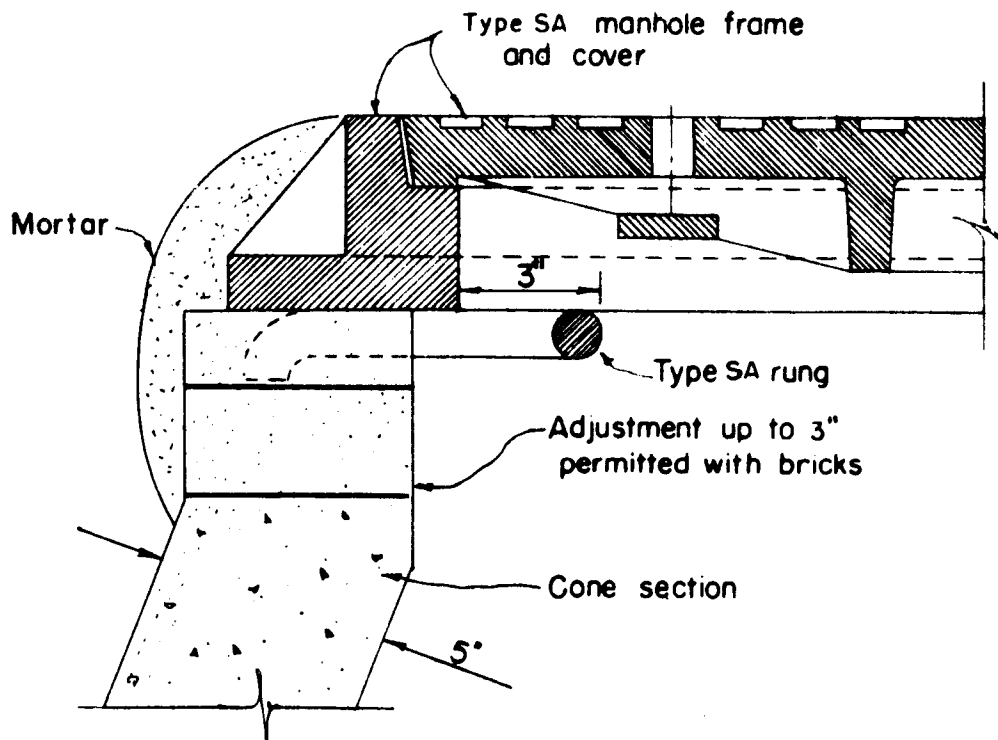
SCALE: AS NOTED

**COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII**



SHOWN WITHOUT GRADE RING

Scale: 3" = 1' - 0"



SHOWN WITH GRADE RING
PRE - CAST MANHOLE
DETAIL AT TOP RUNG

COUNTY OF KAUAI
 CITY & COUNTY OF HONOLULU
 COUNTY OF MAUI
 COUNTY OF HAWAII

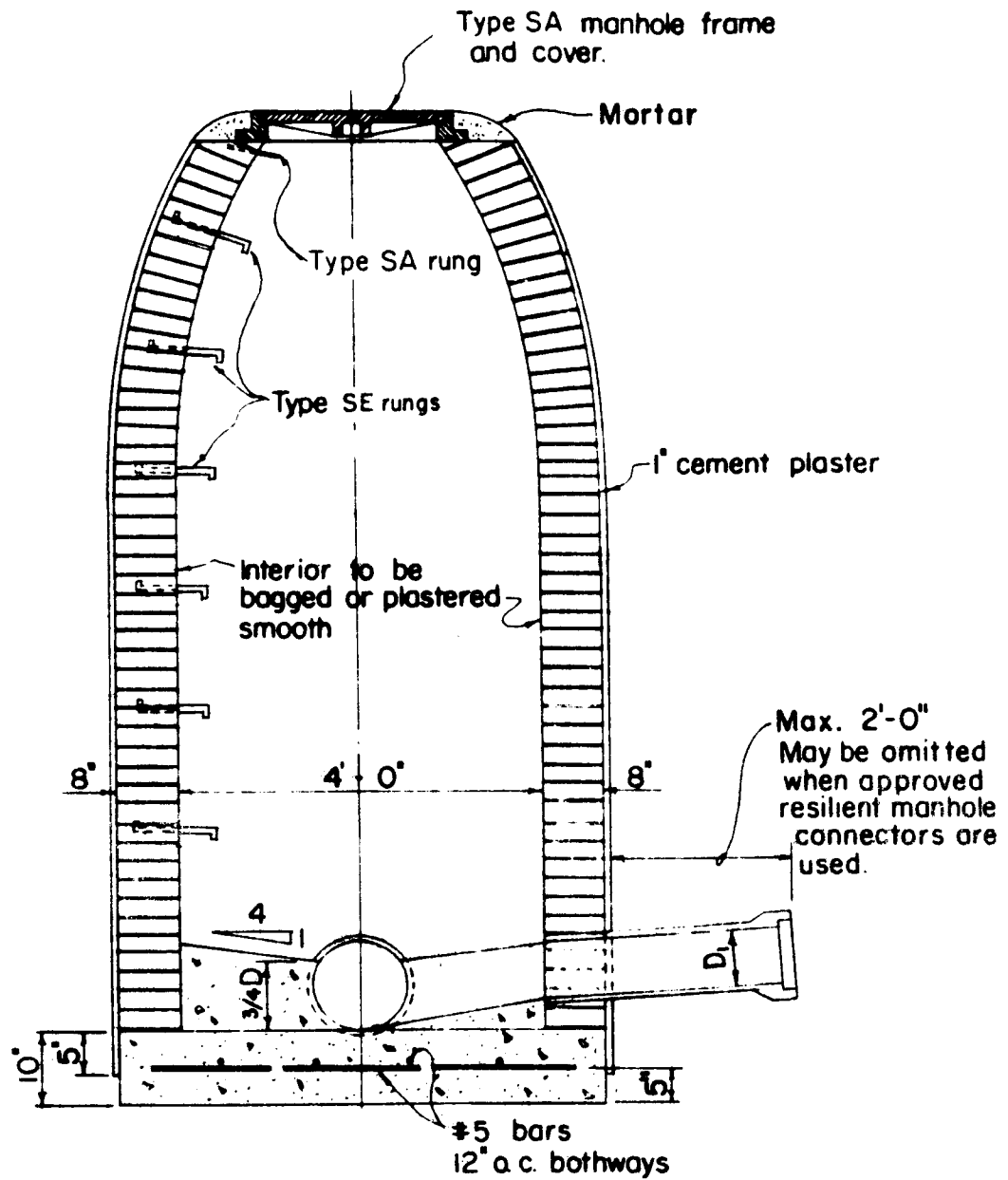
PRE-CAST CONCRETE MANHOLE -
 DETAIL AT TOP RUNG

SCALE: 3" = 1' - 0"

SEPTEMBER 1984

STANDARD
 DETAILS

S-25



(MAXIMUM HEIGHT - 10.0 FEET)

PLAIN MANHOLE (BRICK)

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

S-26

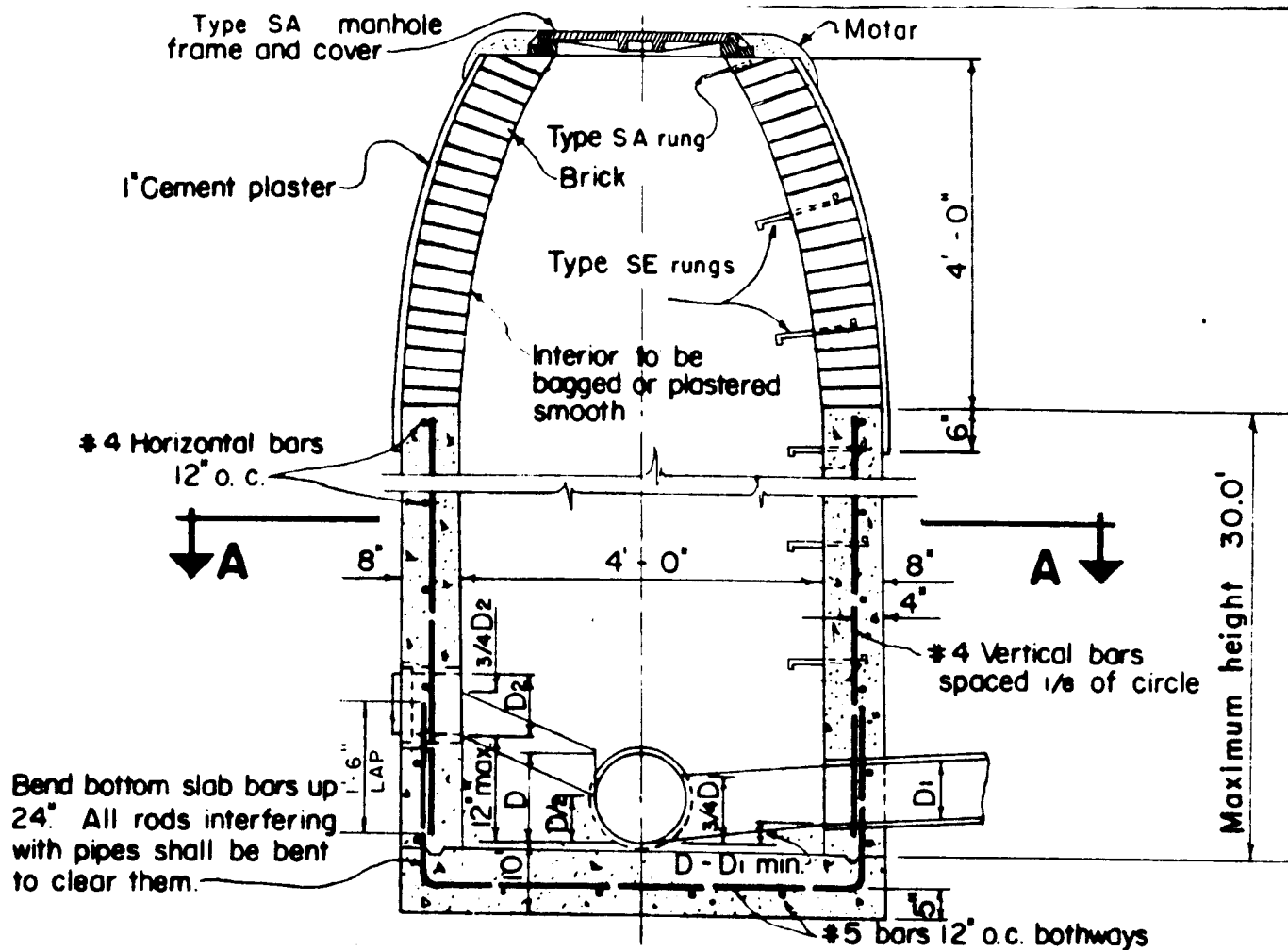
STANDARD
DETAILS

BRICK MANHOLE

SEPTEMBER 1984

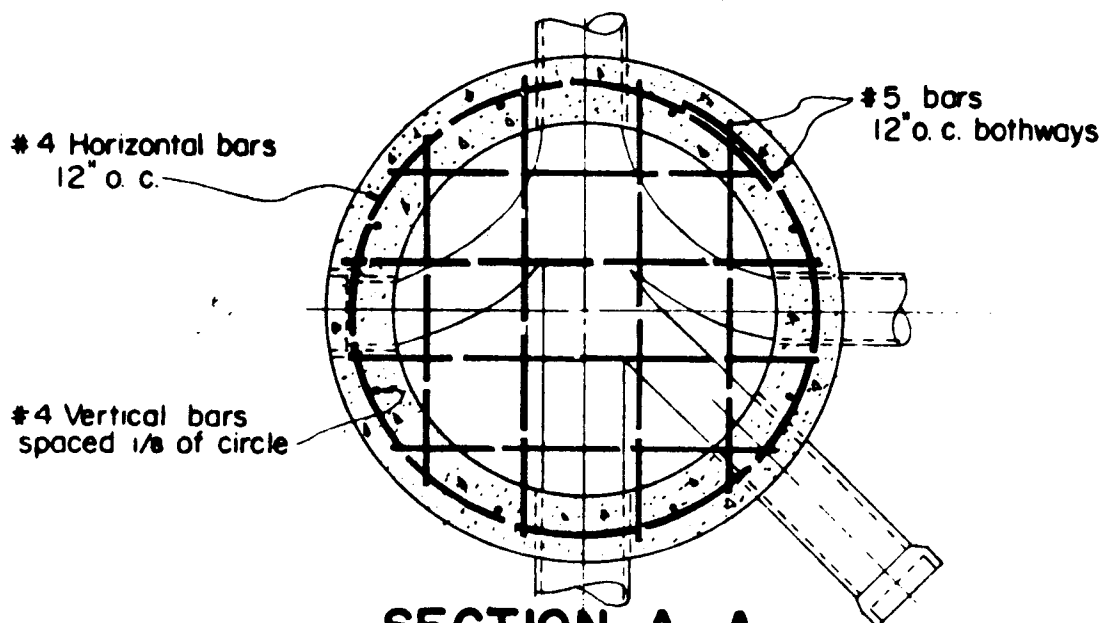
SCALE: 1/2" = 1'-0"

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



PLAIN MANHOLE (CAST-IN-PLACE)

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



SECTION A-A

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

COUNTY OF KAUAI
 CITY & COUNTY OF HONOLULU
 COUNTY OF MAUI
 COUNTY OF HAWAII

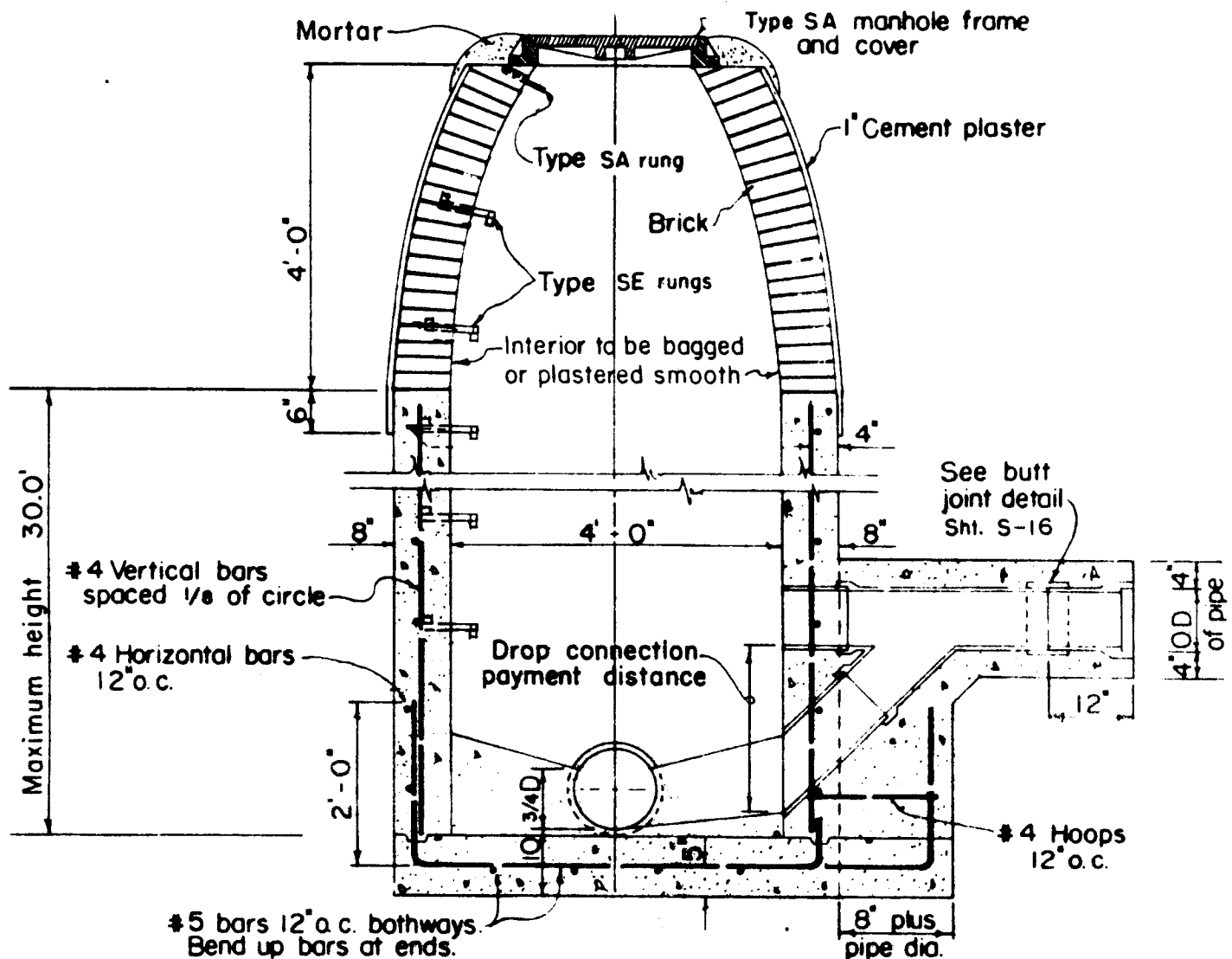
PLAIN MANHOLE

STANDARD
 DETAILS

S-27

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

SEPTEMBER 1984



**FOR DROPS UNDER 5.0 FEET
(SHALLOW) DROP MANHOLE (CAST-IN-PLACE)**

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

NOTES:

Manhole wall to be of reinforced concrete to height 1' above normal ground water table.

S-28

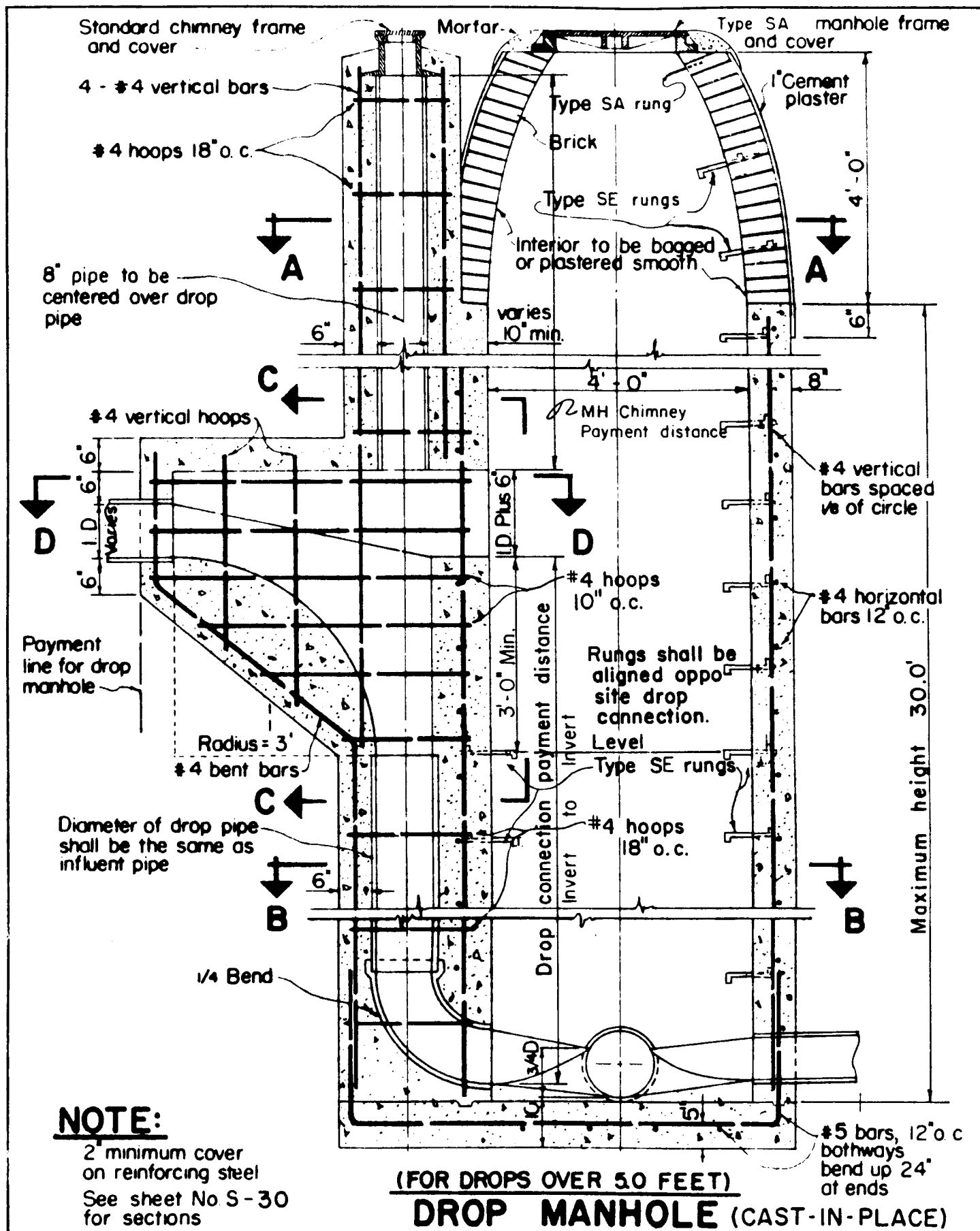
**STANDARD
DETAILS**

SHALLOW DROP MANHOLE

SEPTEMBER 1984

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

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

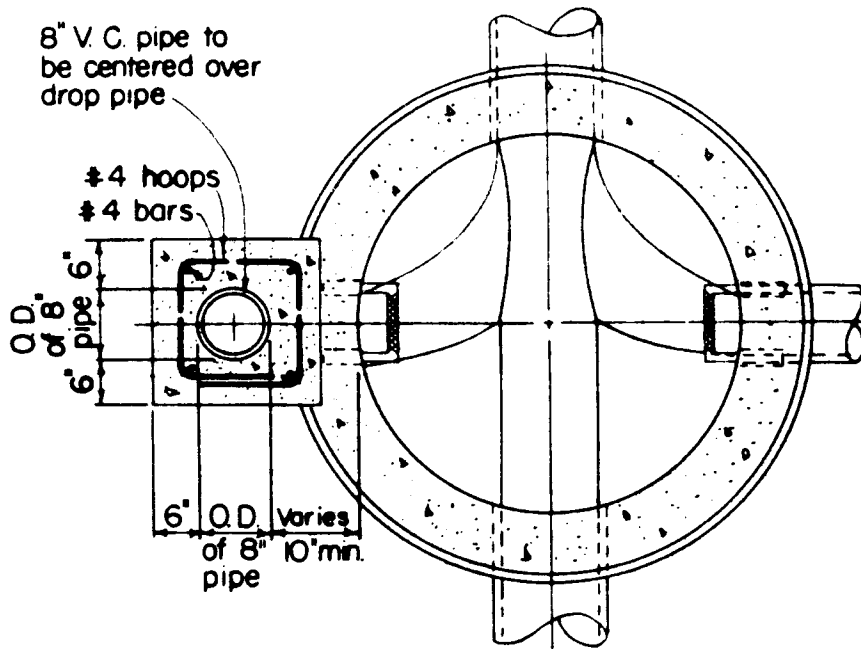
DROP MANHOLE

STANDARD
DETAILS

S-29

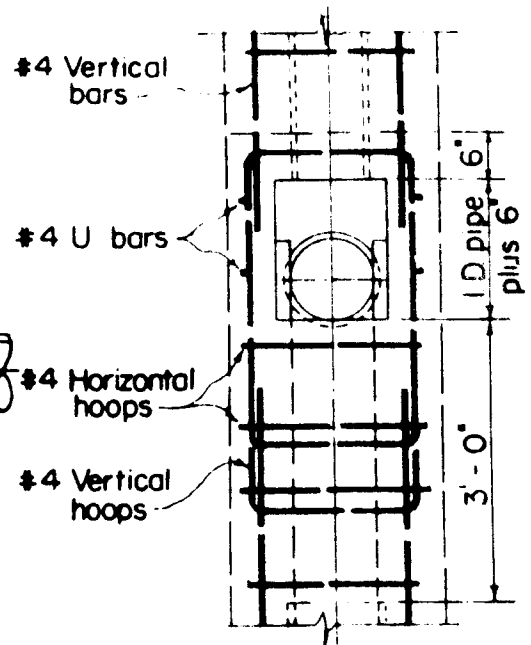
SCALE: 1/2" = 1'-0"

SEPTEMBER 1984



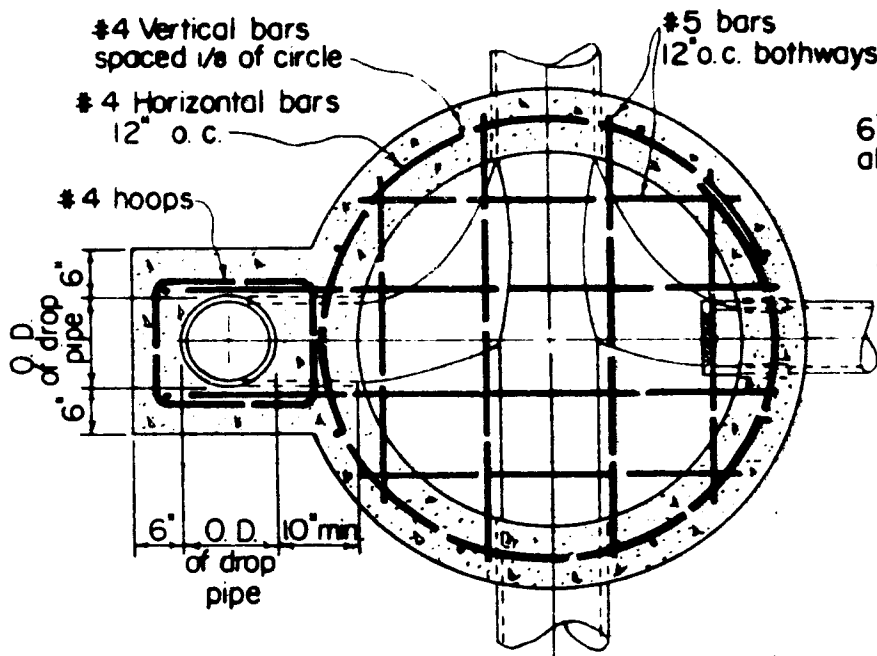
SECTION A-A

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



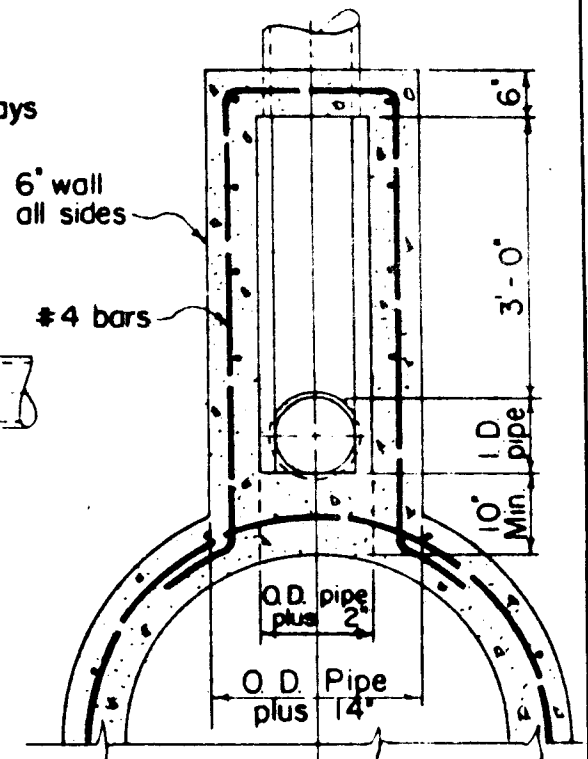
SECTION C-C

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



SECTION B-B

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



SECTION D-D

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

DROP MANHOLE

S-30

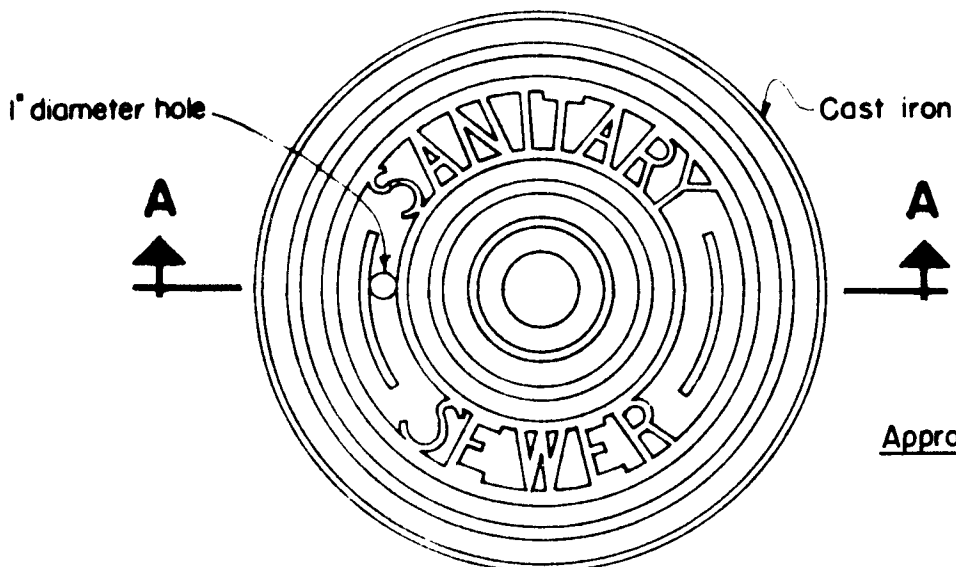
STANDARD
DETAILS

DROP MANHOLE - SECTIONS

SEPTEMBER 1984

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

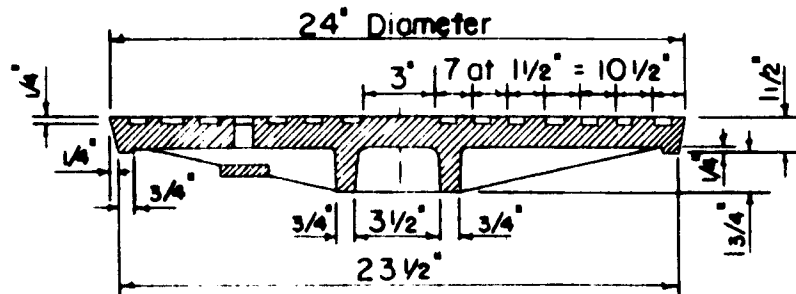
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



Approx. weight 158 pounds

PLAN OF MANHOLE COVER

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

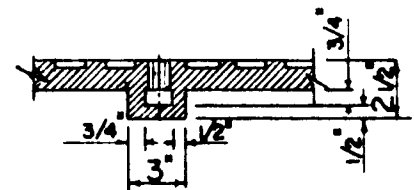
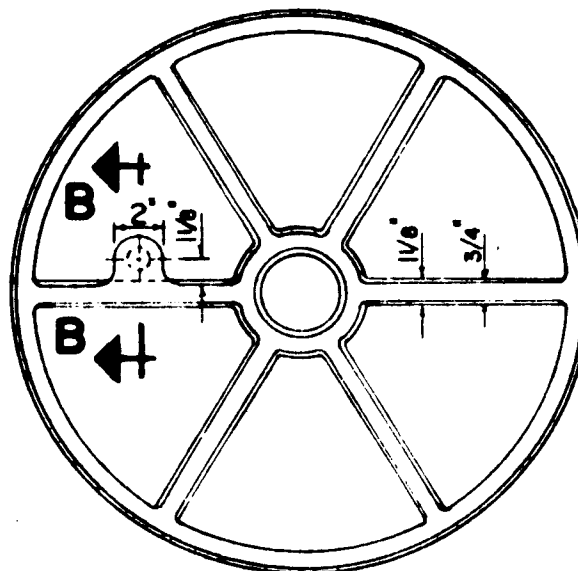


SECTION A-A

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

NOTE:

This cover is used with the SA or SD frame.



SECTION B-B

BOTTOM VIEW OF COVER

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

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

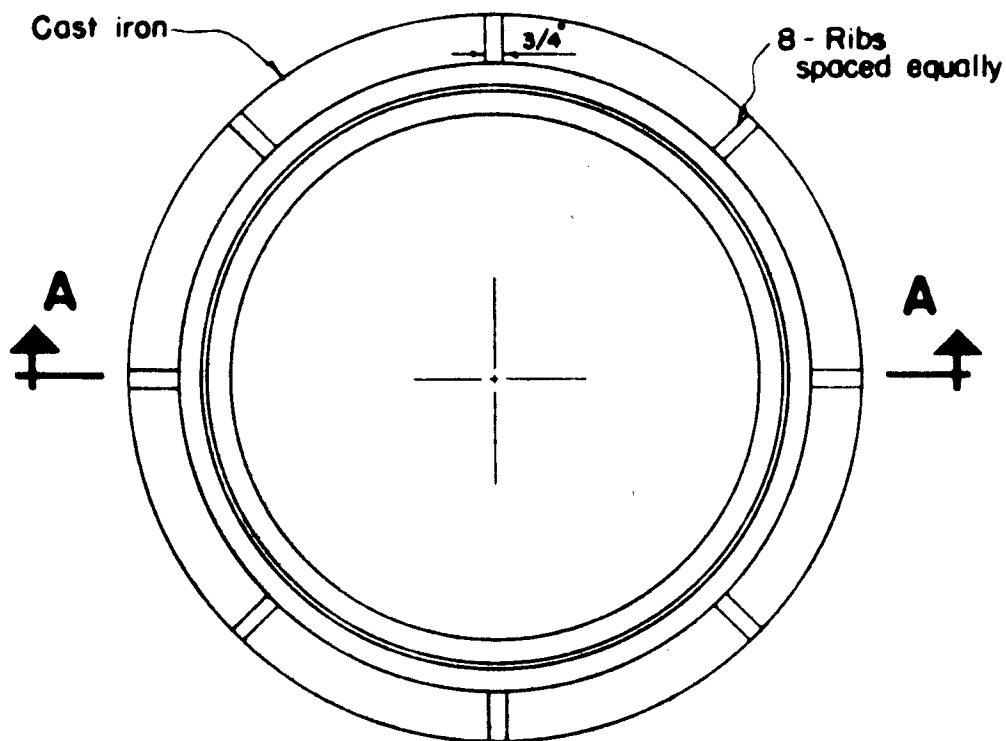
MANHOLE COVER - TYPE SA

STANDARD
DETAILS

S-31

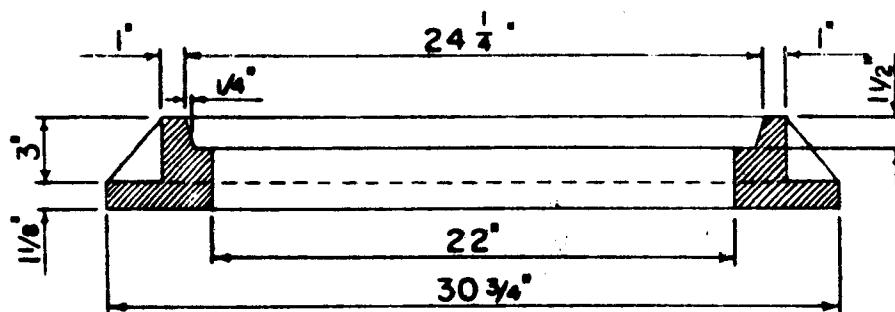
SCALE: $1\frac{1}{2}" = 1' - 0"$

SEPTEMBER 1984



PLAN OF MANHOLE FRAME

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



SECTION A - A

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

Approx. weight 156 pounds

S-32

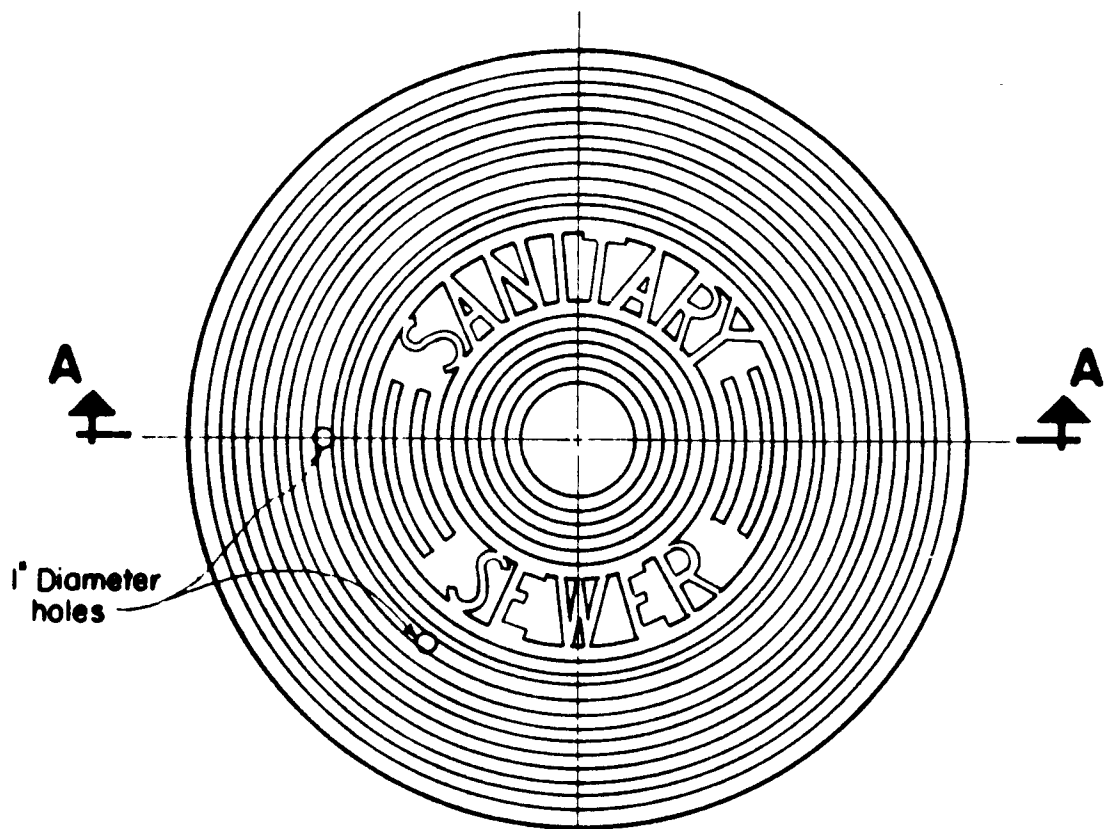
STANDARD
DETAILS

MANHOLE FRAME - TYPE SA

SEPTEMBER 1984

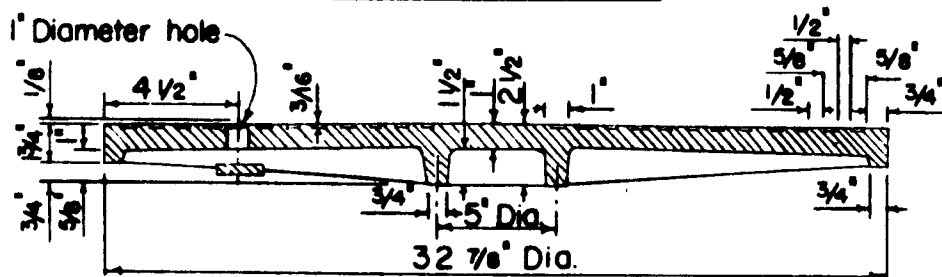
SCALE: $1\frac{1}{2}'' = 1'-0''$

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



PLAN SPECIAL MANHOLE COVER

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



SECTION A - A

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

Approx. Weight 260 Pounds

COUNTY OF KAUAI
 CITY & COUNTY OF HONOLULU
 COUNTY OF MAUI
 COUNTY OF HAWAII

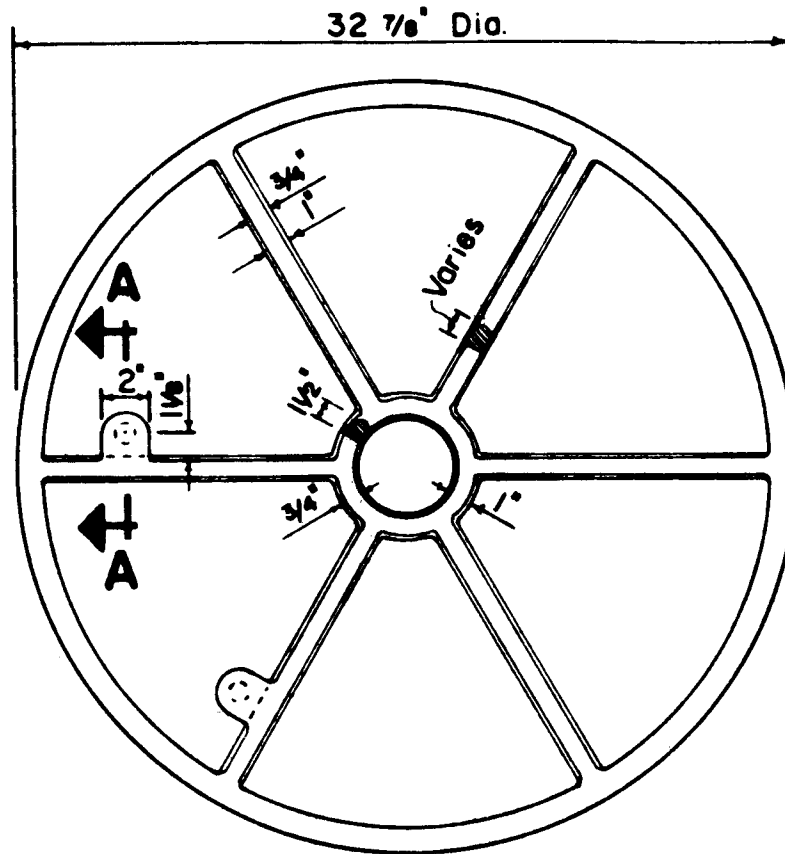
MANHOLE COVER - TYPE SB, TOP VIEW

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

SEPTEMBER 1984

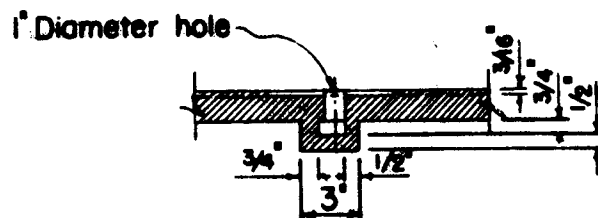
STANDARD
 DETAILS

S-33



BOTTOM VIEW OF COVER

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



SECTION A - A

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

S-34

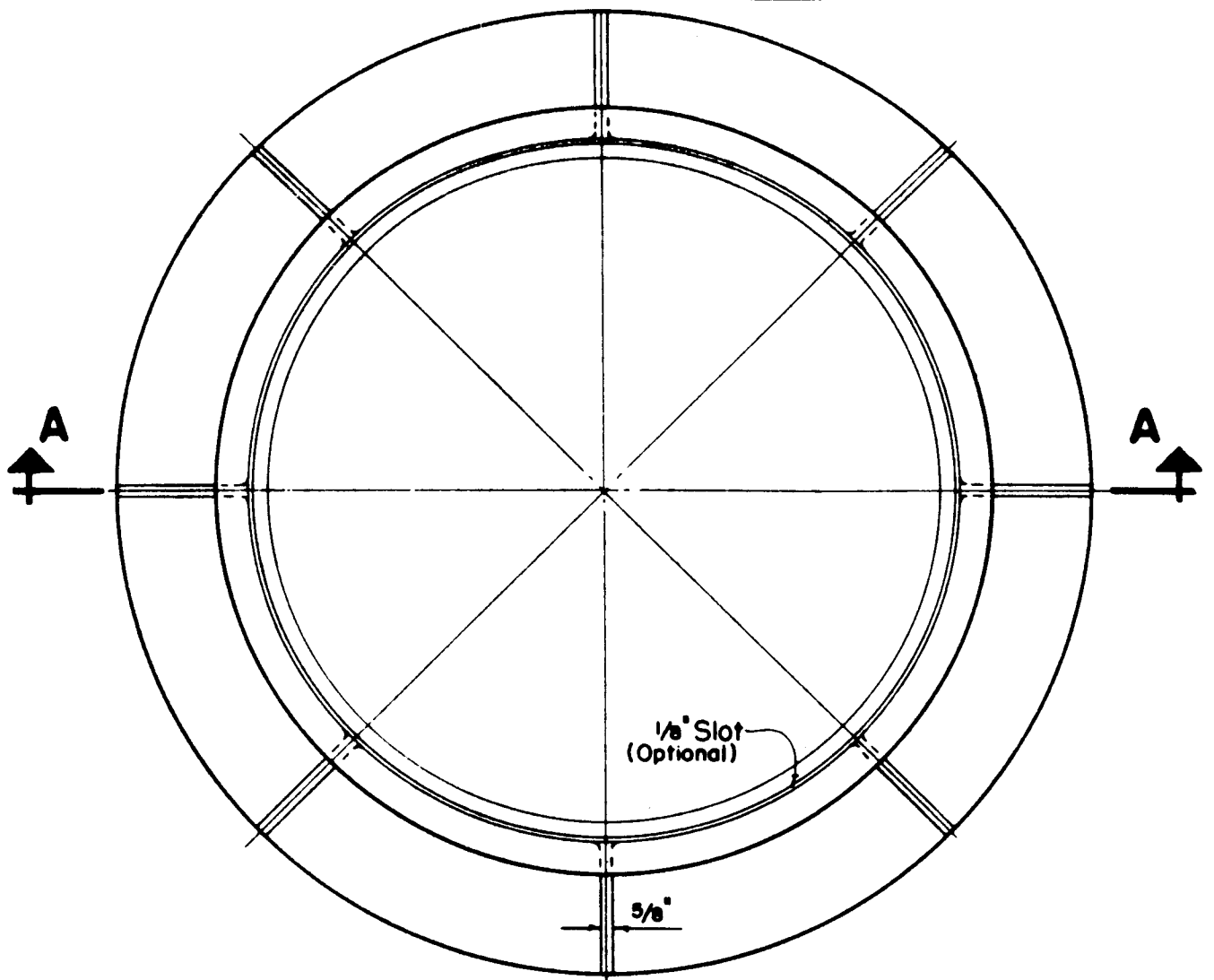
STANDARD
DETAILS

MANHOLE COVER - TYPE SB, BOTTOM VIEW

SEPTEMBER 1984

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

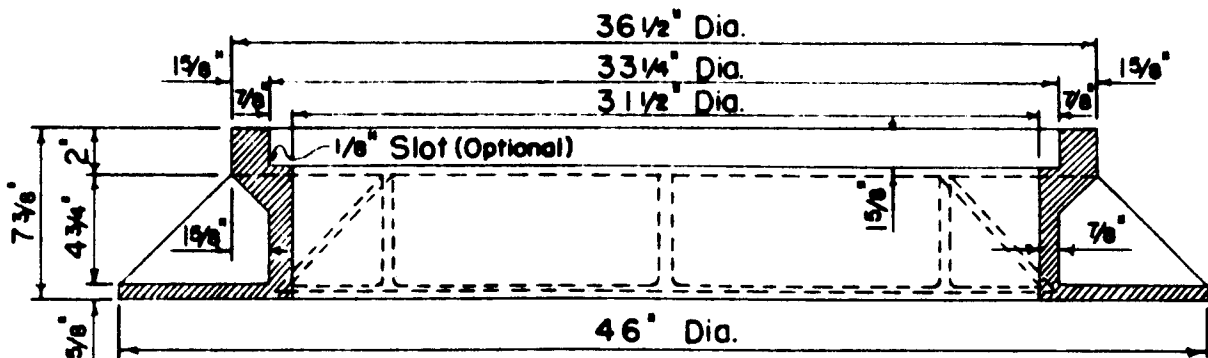
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



PLAN
SPECIAL MANHOLE FRAME

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

Approx. Weight 480 Pounds



SECTION A - A

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

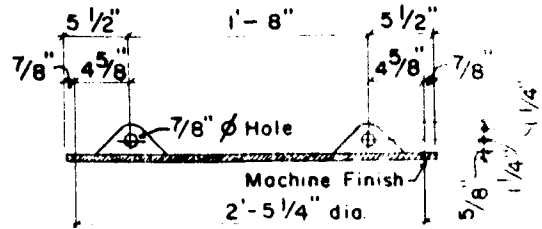
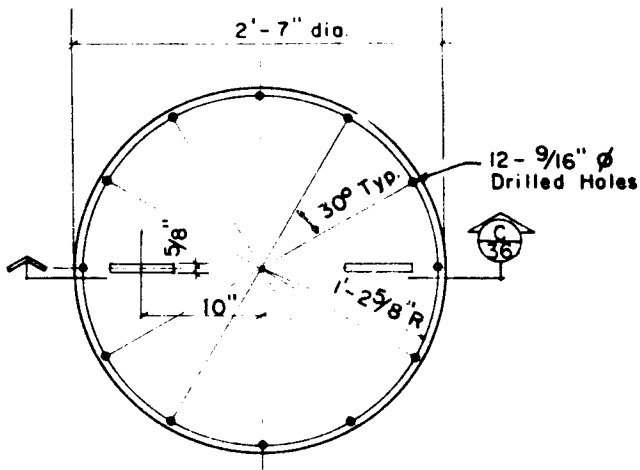
MANHOLE FRAME - TYPE SB

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

SEPTEMBER 1984

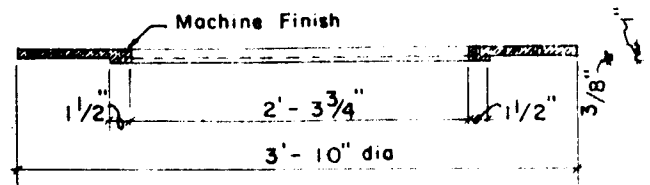
STANDARD
DETAILS

S-35

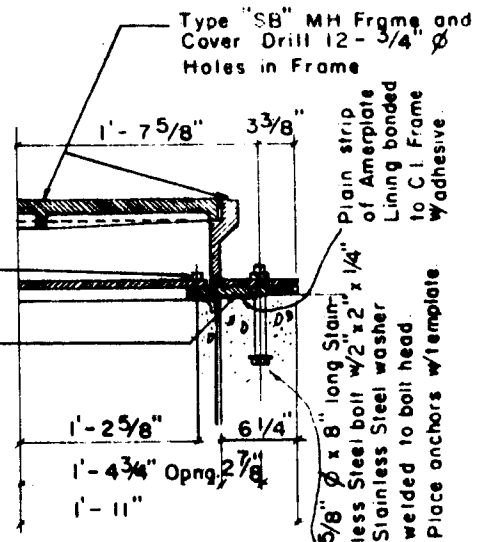
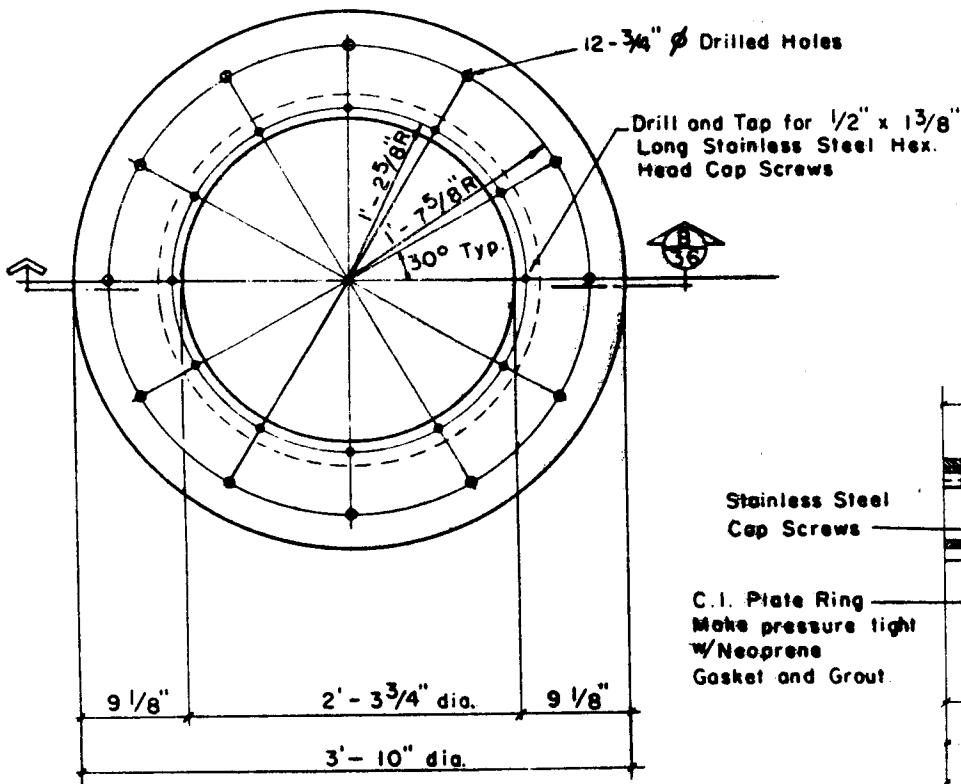


SECTION C
36

5/8" C.I. PRESSURE PLATE COVER



SECTION B
36



C.I. PRESSURE PLATE COVER RING

HALF SECTION-MODIFIED
TYPE "SB" MH FRAME & COVER

S-36

STANDARD
DETAILS

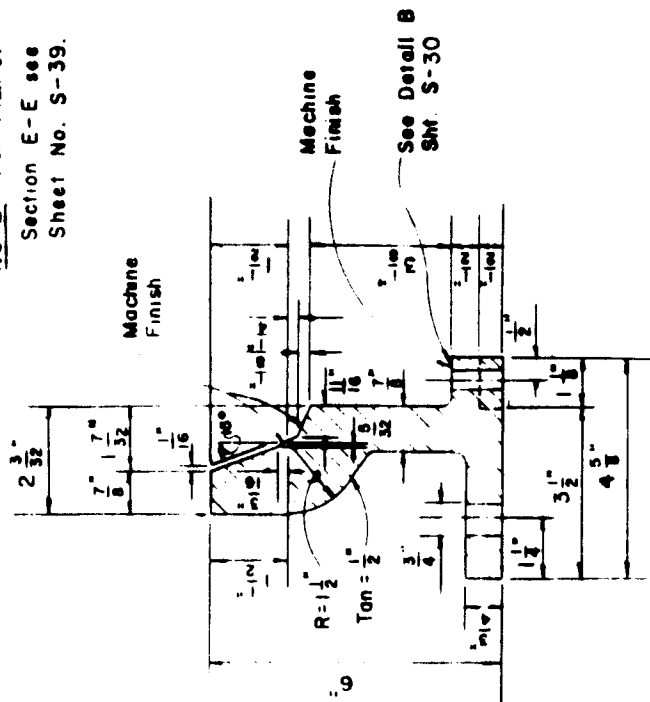
MODIFIED TYPE SB PRESSURE MANHOLE
FRAME AND COVER

SEPTEMBER 1984

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

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

NOTE: For Plan of
Section E-E see
Sheet No. S-39.

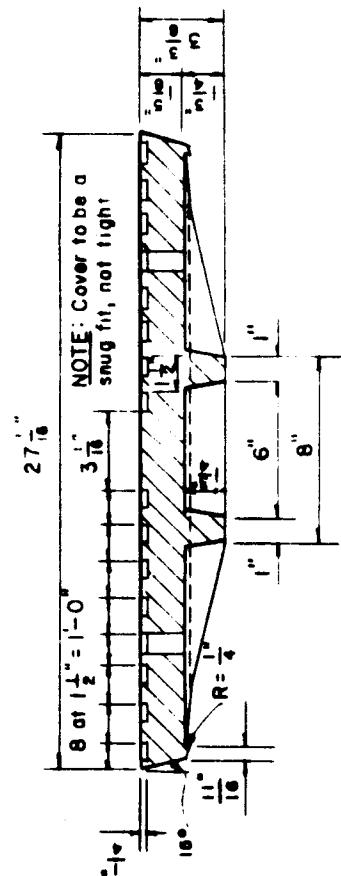
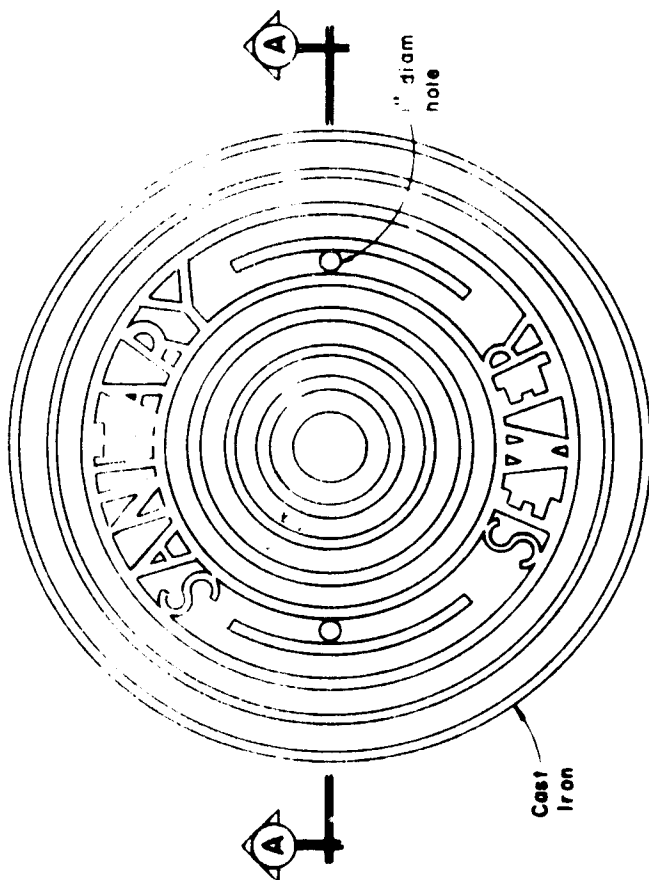


SECTION E-E

NOTES:

1. Gaskets shall be from $\frac{1}{16}$ inch thick Crandall No. 1906 or Garlock No. 19.
2. The Pressure Plate and Cap Screws shall be stainless steel ASTM Designation A 240 or A 167, AISI type 316 or 321.
3. Anchor Bolts shall be Silicon Bronze ASTM Designation B 98-52.
4. All parts of the manhole frame and cover and the pressure plate shall be coated with Inertol No. 49.
5. Maximum Allowable Pressure - 25' Head of water

PLAN OF PRESSURE MANHOLE COVER



SECTION A-A

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

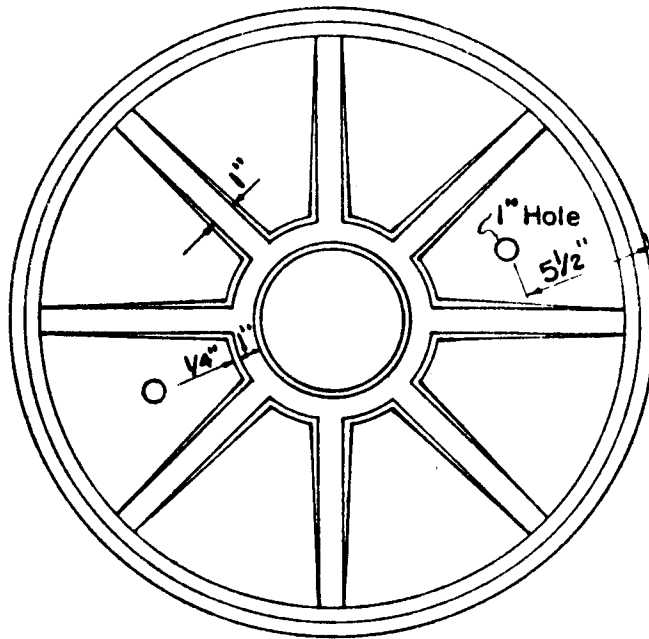
PRESSURE MANHOLE COVER - TYPE SC

NOT TO SCALE

SEPTEMBER 1984

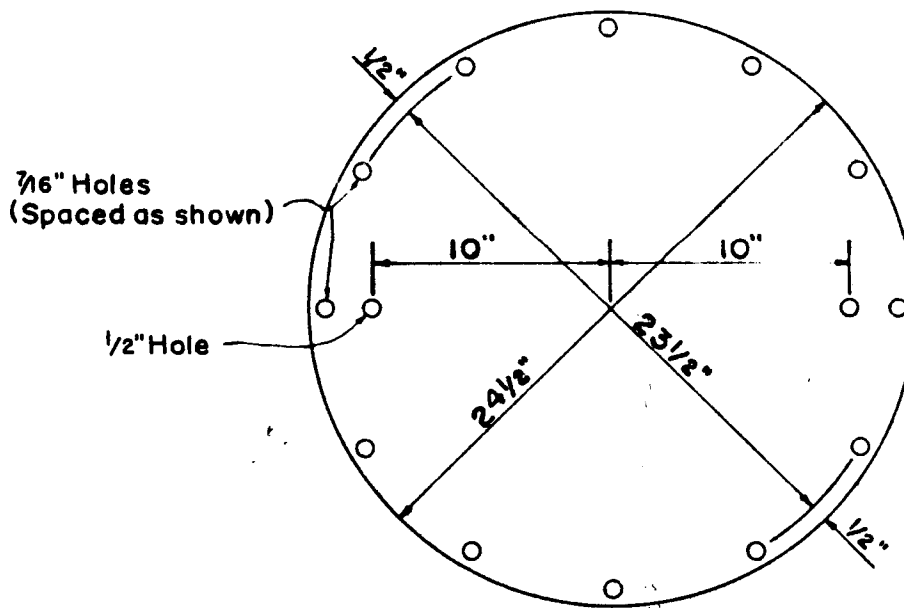
STANDARD
DETAILS

S-37



BOTTOM VIEW OF PRESSURE MANHOLE COVER

Not to Scale



PLAN OF PRESSURE PLATE

Not to Scale

S-38

STANDARD
DETAILS

PRESSURE MANHOLE COVER - TYPE SC

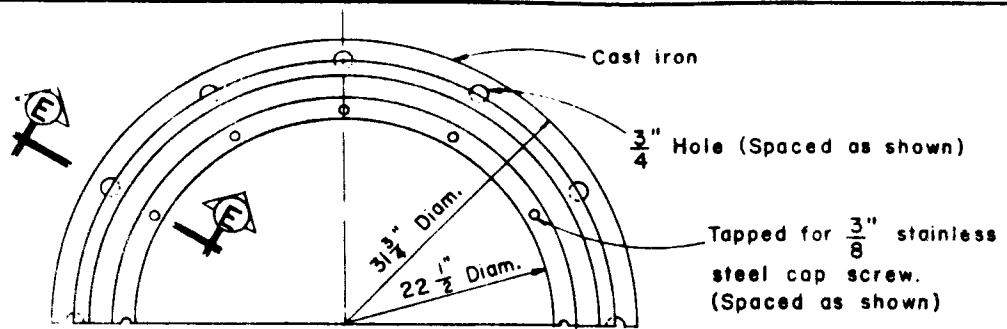
SEPTEMBER 1984

NOT TO SCALE

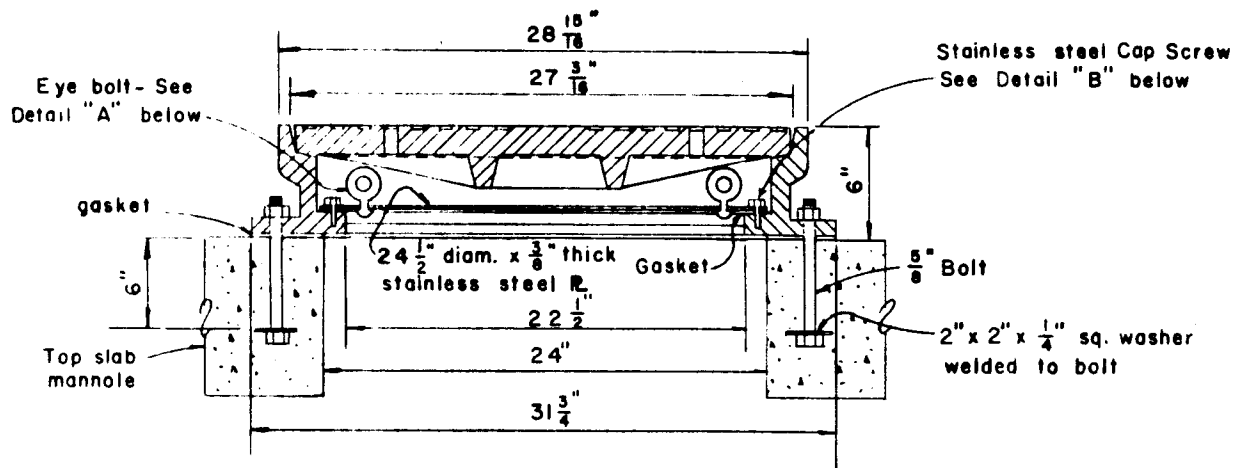
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

NOTE:

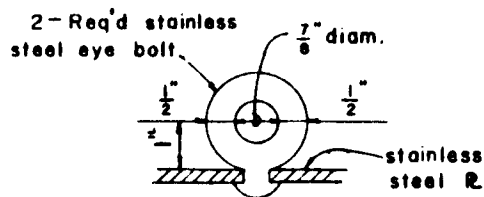
For details of
Section E-E see
Sheet No. S-37



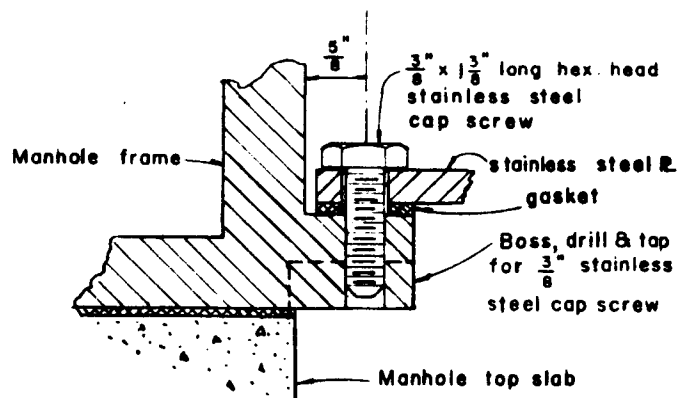
HALF PLAN-MANHOLE FRAME



SECTION-MANHOLE FRAME & COVER



DETAIL "A"



DETAIL "B"

PRESSURE MANHOLE FRAME & COVER

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

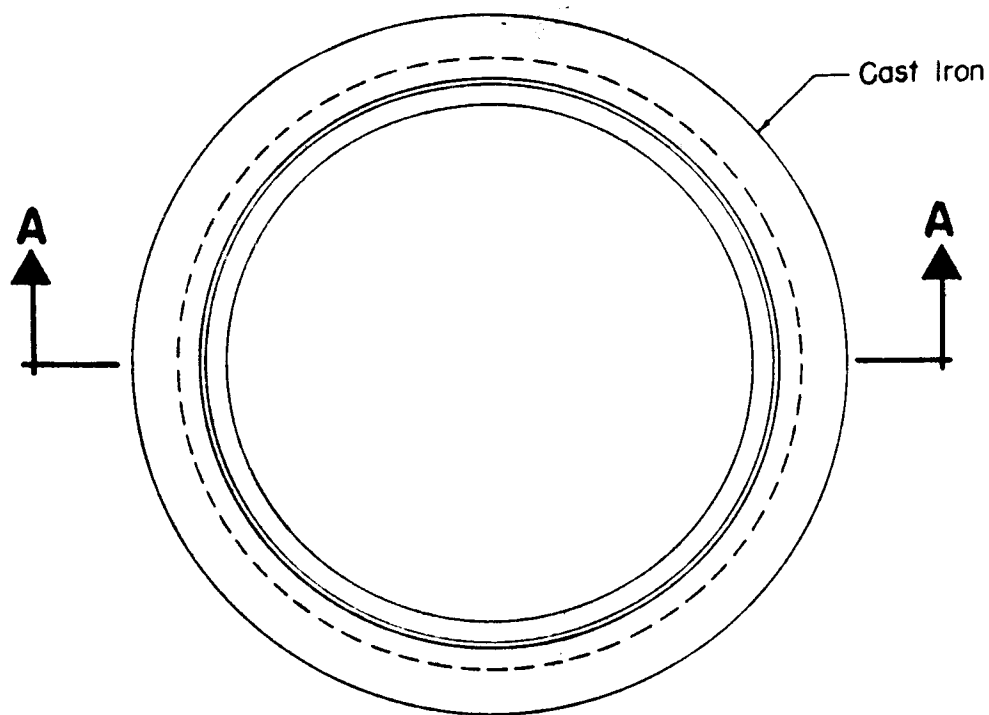
PRESSURE MANHOLE FRAME AND COVER -
TYPE SC

NOT TO SCALE

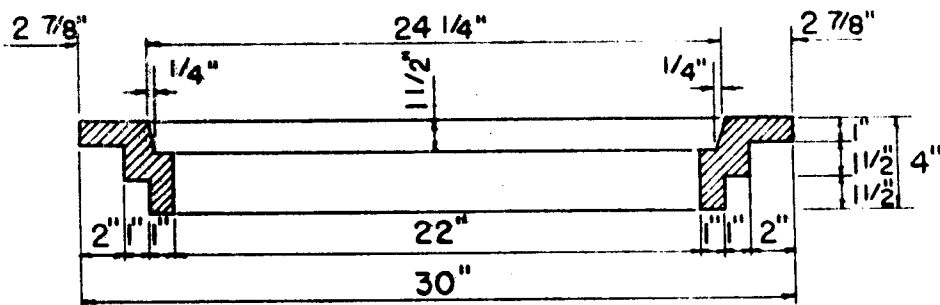
SEPTEMBER 1984

STANDARD
DETAILS

S-39



PLAN



SECTION A-A

TYPE SD FRAME

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

NOTE:

Type SA Cover is used with this frame.

Approx. weight 156 pounds

S-40

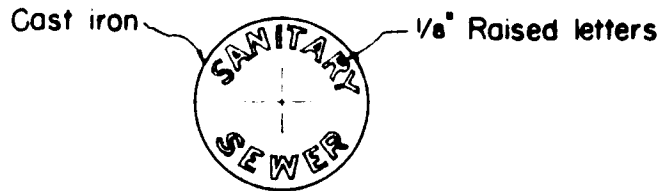
STANDARD
DETAILS

MANHOLE FRAME - TYPE SD

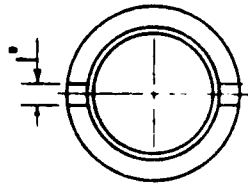
SEPTEMBER 1984

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

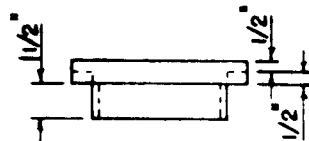
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



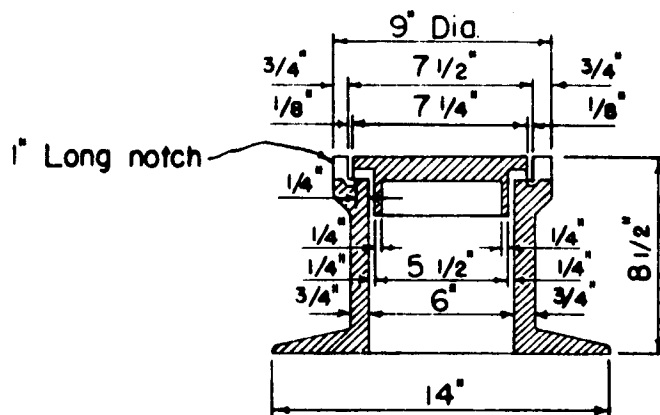
PLAN OF COVER



BOTTOM OF COVER



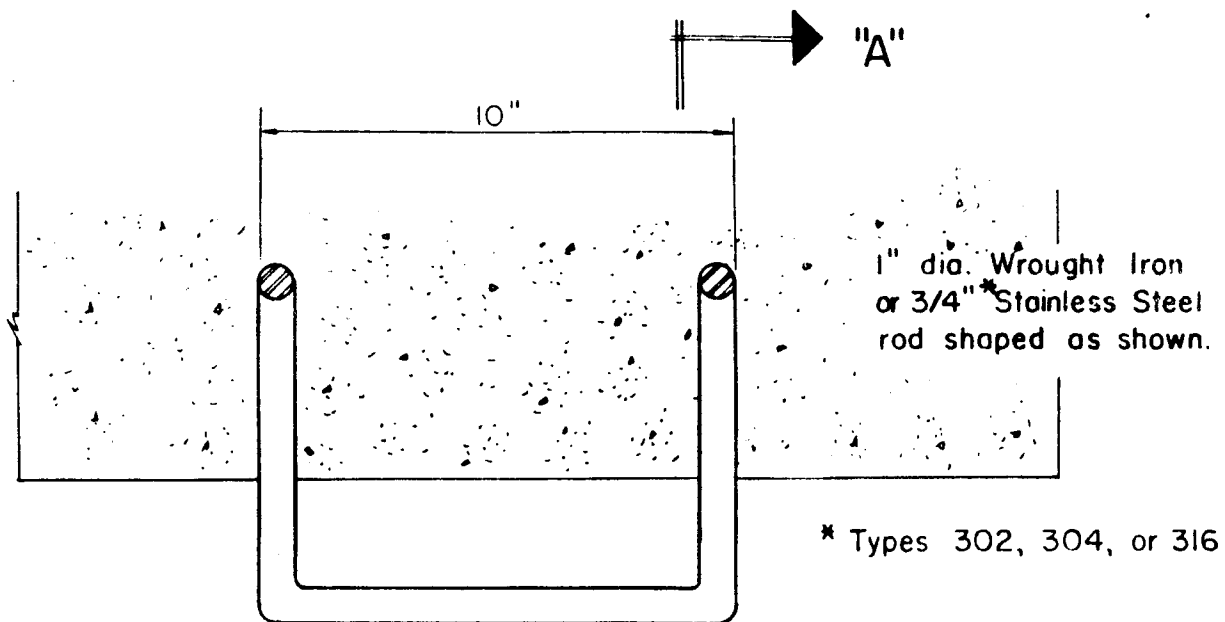
ELEVATION



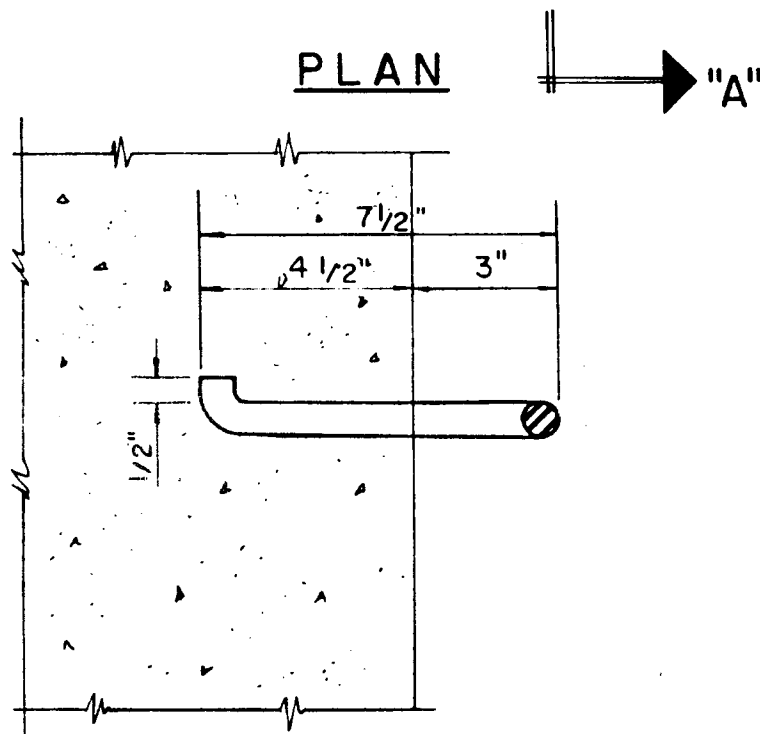
SECTION

**DROP MANHOLE
CHIMNEY CASTINGS**

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



* Types 302, 304, or 316



SECTION "AA"

Scale: 3" = 1'-0"

S-42

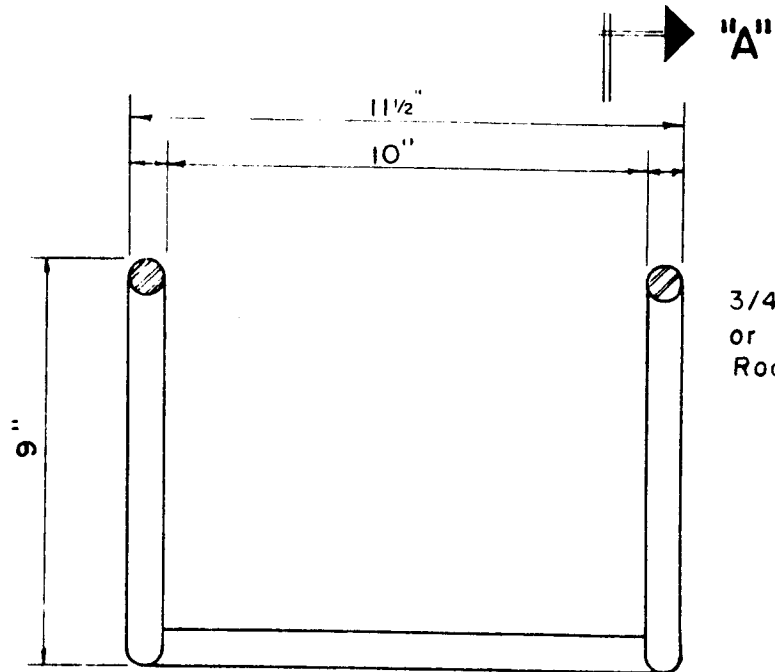
STANDARD
DETAILS

MANHOLE RUNG DETAILS - TYPE SA

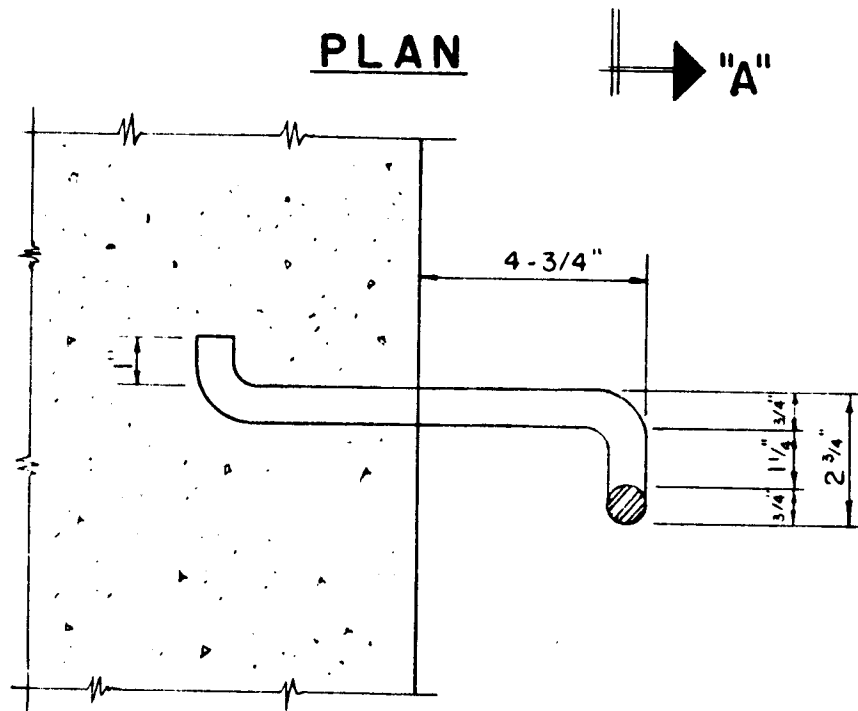
SEPTEMBER 1984

SCALE: 3" = 1'-0"

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



PLAN



SECTION "AA"

TYPE SC MANHOLE RUNG DETAILS

(STAINLESS STEEL)

Scale: 3" = 1'-0"

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII

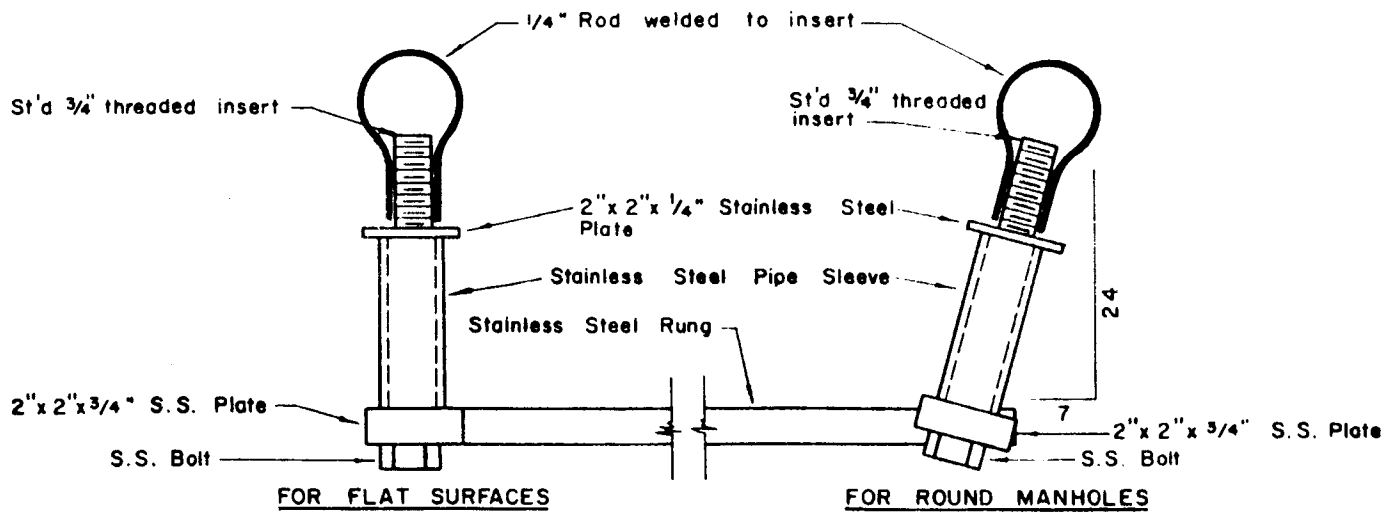
MANHOLE RUNG DETAILS - TYPE SC

SCALE: 3" = 1'-0"

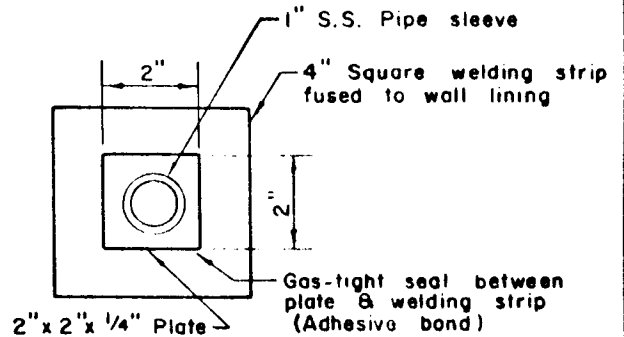
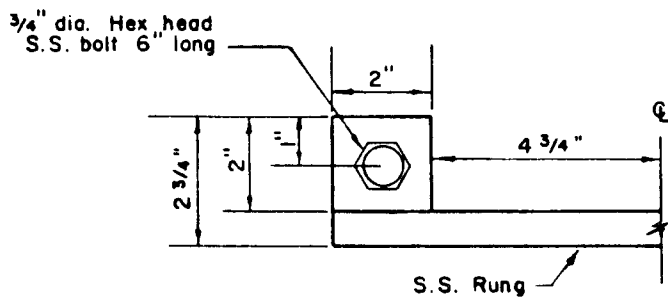
SEPTEMBER 1984

STANDARD
DETAILS

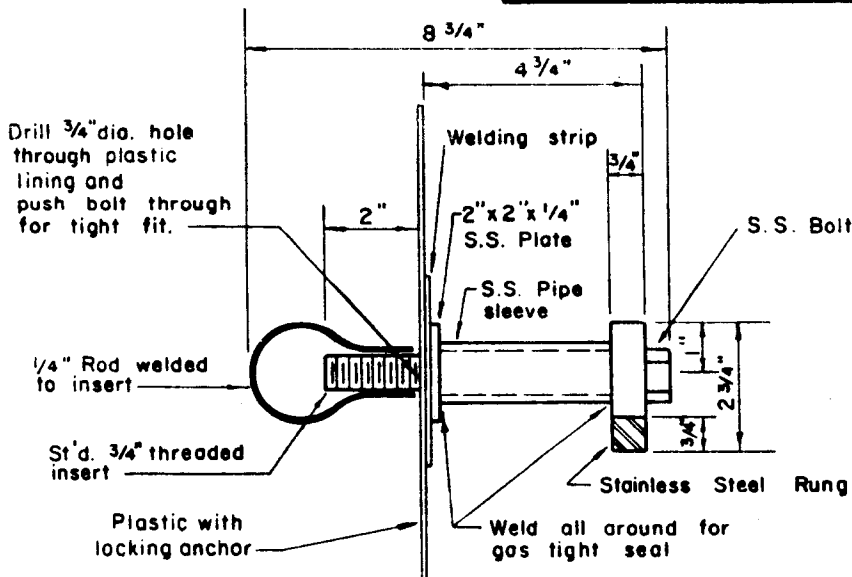
S-43



PLAN



FRONT ELEVATION



NOTES:

1. All items exclusive of insert to be stainless steel Type 316, 304 or equal.
2. Welding of plate & bar to fabricate rung shall result in joints with equal strength & corrosion resistance as the S.S. materials being welded.
3. Grind all sharp edges.

SIDE ELEVATION

TYPE SD MANHOLE RUNG DETAILS

S-44

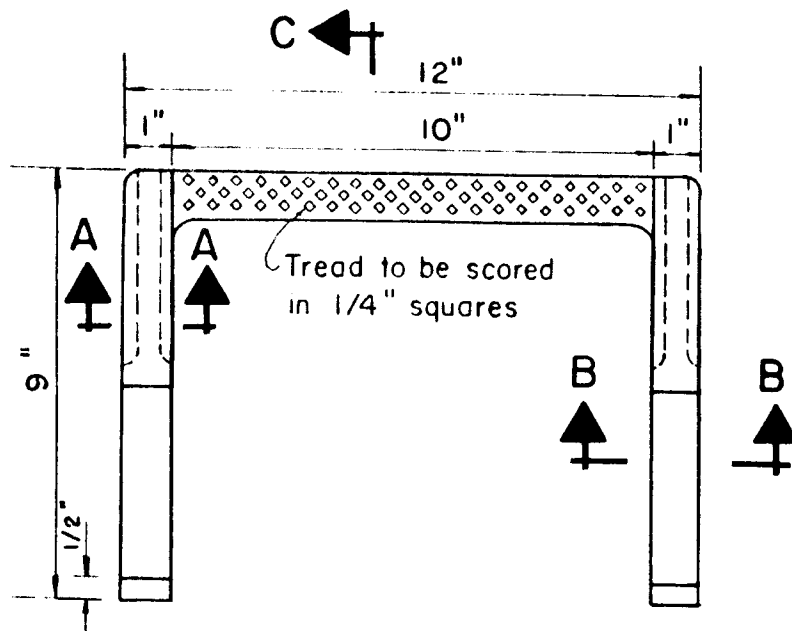
STANDARD
DETAILS

MANHOLE RUNG DETAILS - TYPE SD

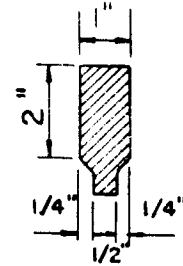
SEPTEMBER 1984

SCALE: 3" = 1'-0"

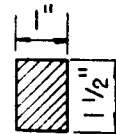
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



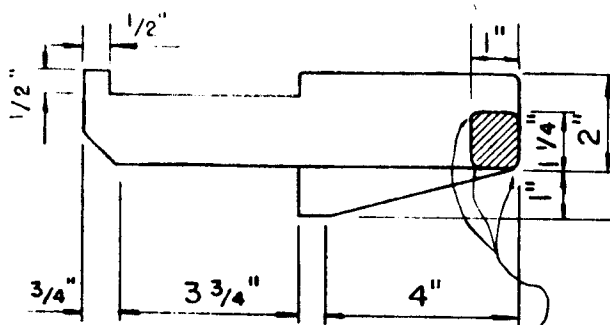
PLAN



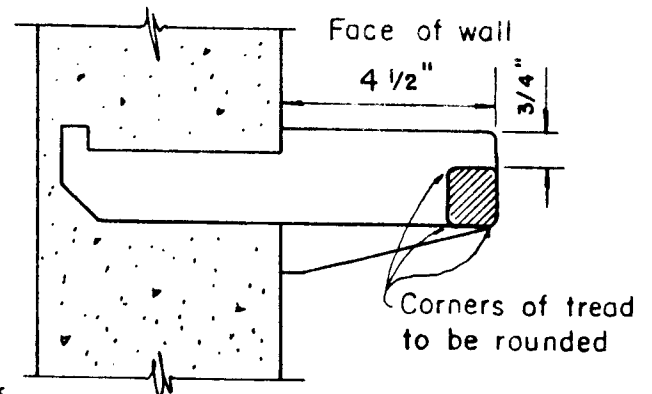
SECTION A-A



SECTION B-B



SECTION C-C



METHOD OF INSTALLATION

TYPE SE MANHOLE RUNGS **CAST IRON OR DUCTILE IRON**

Scale: 3" = 1'-0"

COUNTY OF KAUAI
 CITY & COUNTY OF HONOLULU
 COUNTY OF MAUI
 COUNTY OF HAWAII

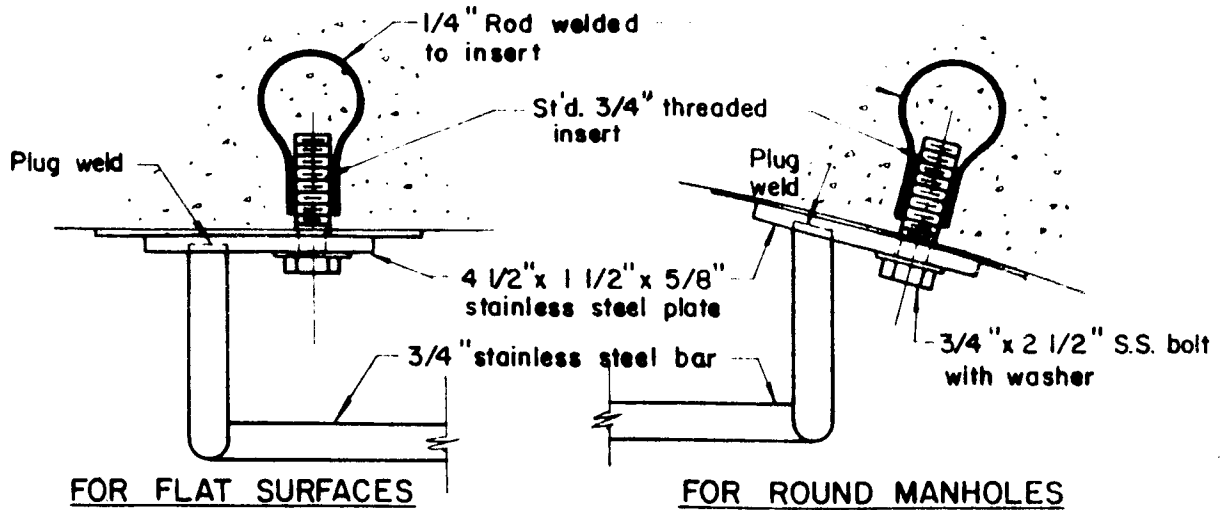
MANHOLE RUNG DETAILS - TYPE SE

SCALE: 3" = 1'-0"

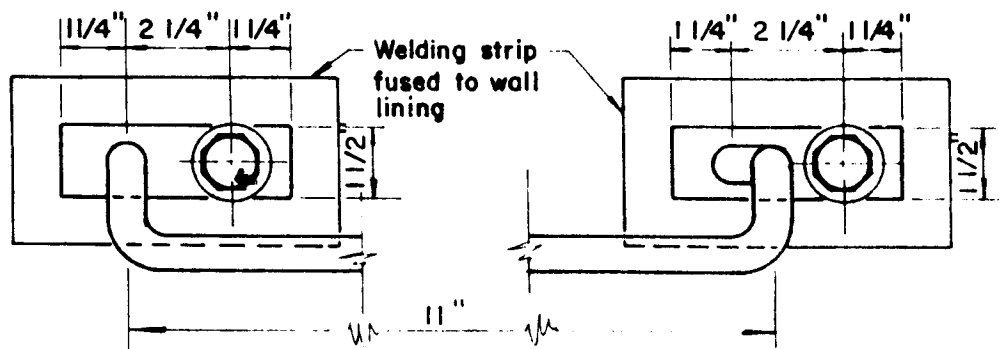
SEPTEMBER 1984

STANDARD
 DETAILS

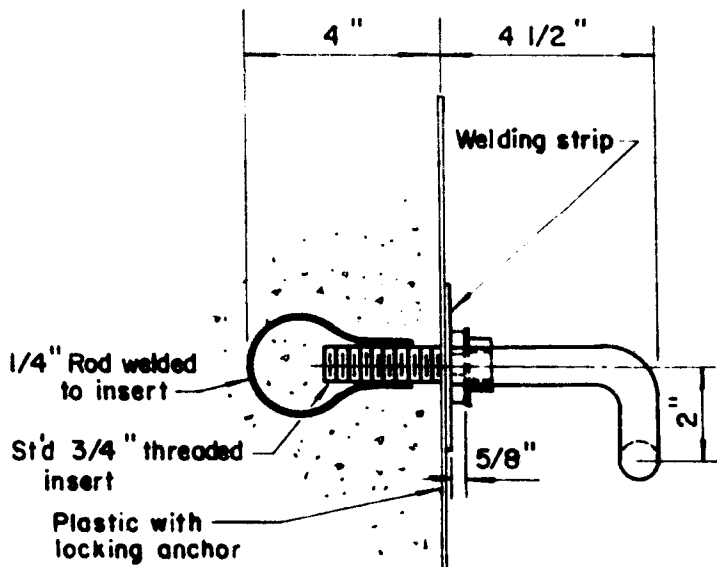
S-45



PLAN



FRONT ELEVATION



SIDE ELEVATION

NOTES:

1. All items exclusive of insert to be stainless steel Type 316, 304 or equal.
2. Welding of plate and bar to fabricate rung shall result in joints with equal strength and corrosion resistance as the S.S. materials being welded.

TYPE SF MANHOLE RUNG DETAILS

Scale: 3" = 1' - 0"

S-46

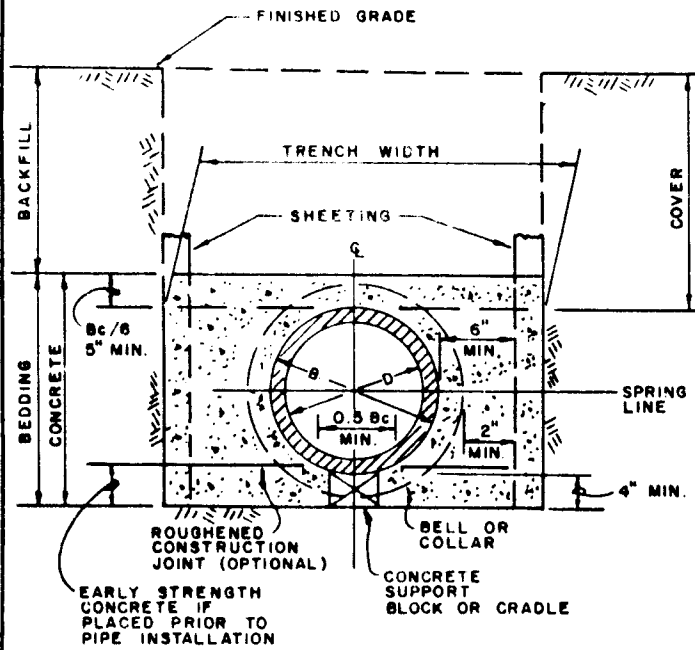
STANDARD
DETAILS

MANHOLE RUNG DETAILS - TYPE SF

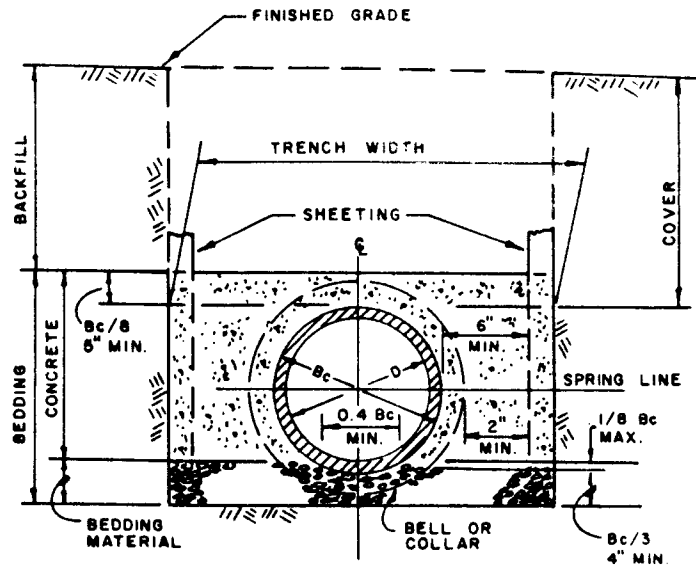
SEPTEMBER 1984

SCALE: 3" = 1' - 0"

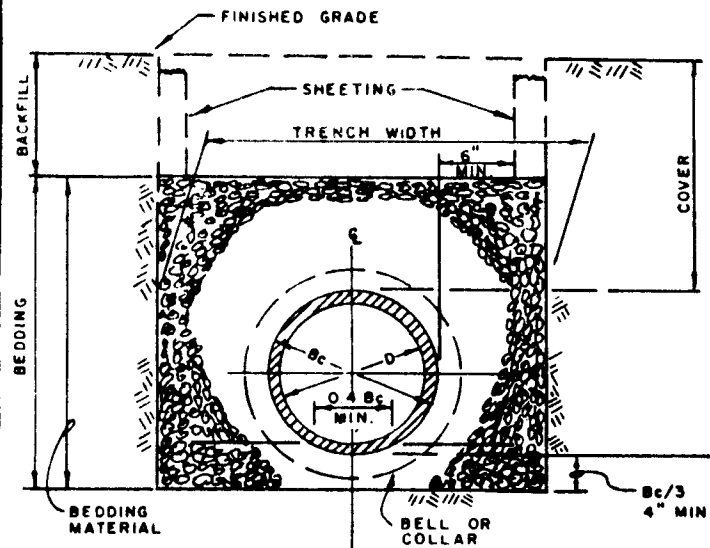
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII



CLASS A BEDDING
NOT TO SCALE



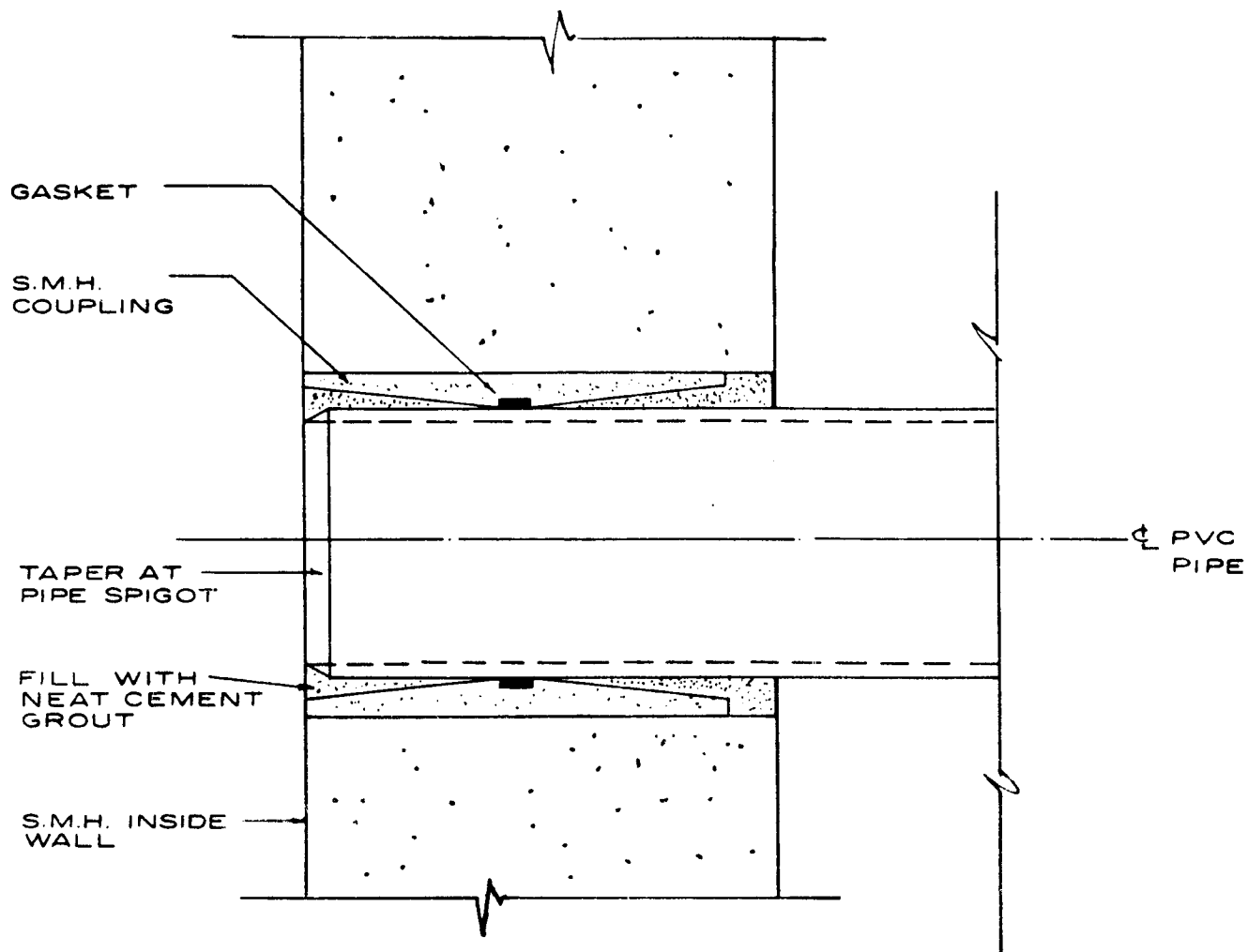
CLASS C BEDDING
NOT TO SCALE



CLASS B BEDDING
NOT TO SCALE

BEDDING REQUIREMENTS
(6" to 12" I.D. PIPES)

DEPTH OF COVER, C IN FEET	BEDDING CLASS
$C \leq 4$	A
$4 < C \leq 17$	B
$17 < C \leq 30$	C
$C > 30$	Special Design



SECTION THRU MANHOLE WALL

S-48

**STANDARD
DETAILS**

**PVC PIPE - RESILIENT
MANHOLE CONNECTION**

SEPTEMBER 1984

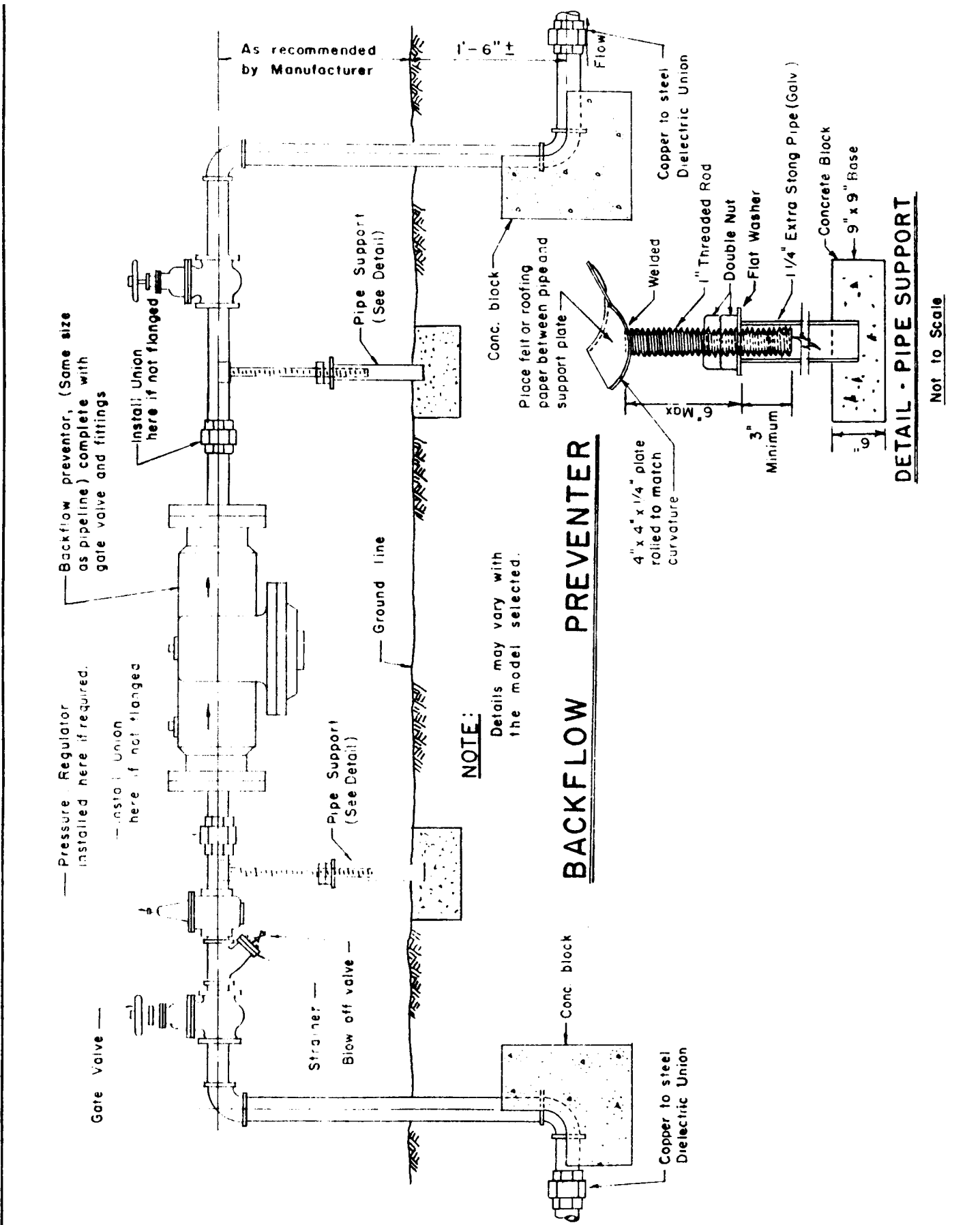
NOT TO SCALE

**COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU
COUNTY OF MAUI
COUNTY OF HAWAII**

Sewage Pump Stations & Treatment Plants

PART

4



Backflow preventer, (Same size as pipeline) complete with gate valve and fittings

Pressure Regulator installed here if required.

Install Union here if not flanged

Gate Valve



Strainer
Blow off valve

Pipe Support (See Detail)

Ground line

Pipe Support (See Detail)

NOTE:

Details may vary with the model selected.

BACKFLOW PREVENTER

Conc. block
Place felt or roofing paper between pipe and support plate

4" x 4" x 1/4" plate rolled to match curvature

6" Max

3" Minimum

Copper to steel Dielectric Union

Conc. block

Copper to steel Dielectric Union

1 1/4" Extra Strong Pipe (Galv)

Concrete Block 9" x 9" Base

DETAIL - PIPE SUPPORT

Not to Scale



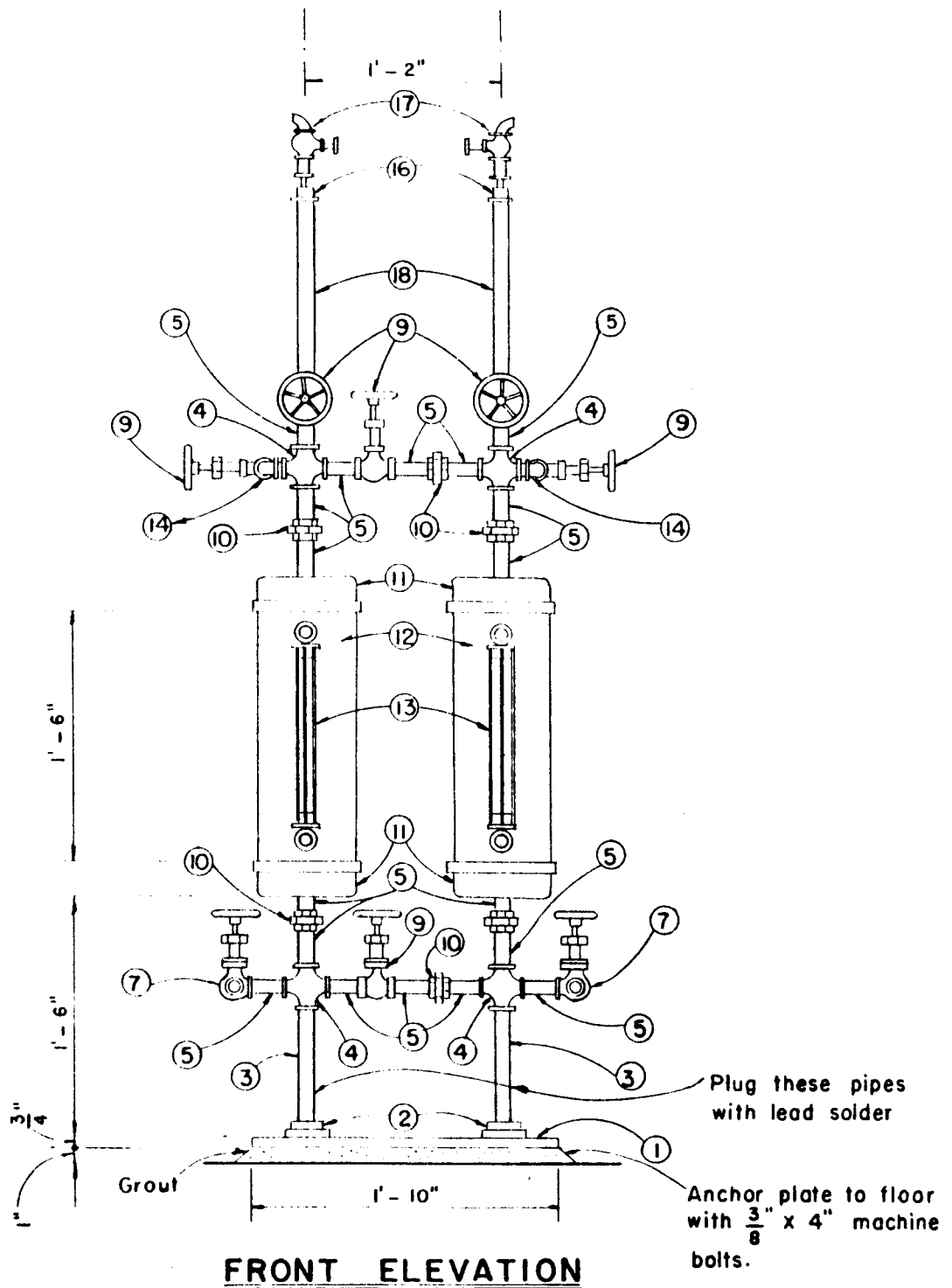
WALKWAY
GATE

<u>LINE</u>	<u>POST</u>
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100	

1. **Fencing materials shall be of aluminum or galvanized steel as called for in the specifications.**
2. **Posts, braces, and gate frames shall be schedule 40 (standard weight) pipe. Sizes specified are nominal diameter.**
3. **Double Swing Gate shall be provided with Tubular Plunger Bar, 1 Lock Keeper, Lock Keeper Guide, 2 Water Forks, 2 Fork Guides, 1 Lock Plunger Bar, and 2 Gate Stops located as directed by the Engineer.**
4. **Walkway Gate shall be provided with Fork Water Assemblies with provisions for padlocking.**

- 5 Padlocks of the approved type keyed to the Division of Sewers master key system shall be provided for gate locks.
- 6 Posts, caps and other necessary fence fittings shall be as manufactured by the fence manufacturer or equal except hinges shall be of galvanized steel.
- 7 Posts shall be spaced equal to or but not more than 10 feet.
- 8 Aluminum posts embedded in concrete shall be coated inside and outside to depth of embedment plus 4" with zinc chromate primer and aluminum pigmented bituminous paint.
- 9 Where galvanized steel hinges are used on aluminum posts they shall be insulated to prevent galvanic action.

FENCE DETAILS



OIL SEALS & RELATED PIPING

NOTES:

All piping on the oil seals shall be tested before the sealing units are installed. All leaks shall be repaired by the Contractor before the tanks are filled with oil.

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU

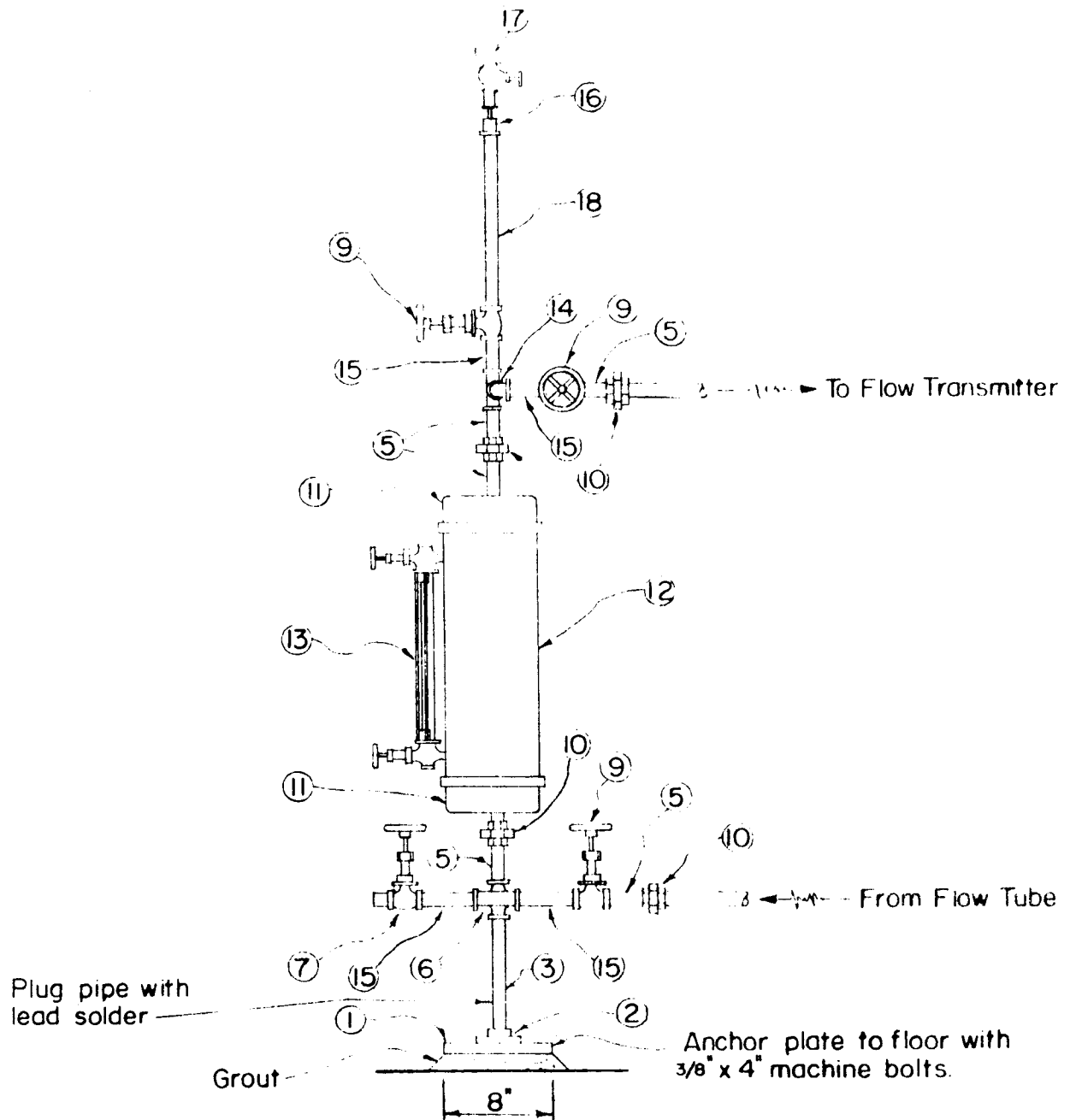
OIL SEALS AND RELATED PIPING

NOT TO SCALE

SEPTEMBER 1984

STANDARD
DETAILS

P-3



SIDE ELEVATION **OIL SEALS & RELATED PIPINGS**

Scale: 1" = 1' - 0"

NOTE:

All piping on the oil seals shall be tested before the sealing units are installed.
 All leaks shall be repaired by the Contractor before the tanks are filled with oil.

P-4

STANDARD
DETAILS

OIL SEALS AND RELATED PIPING

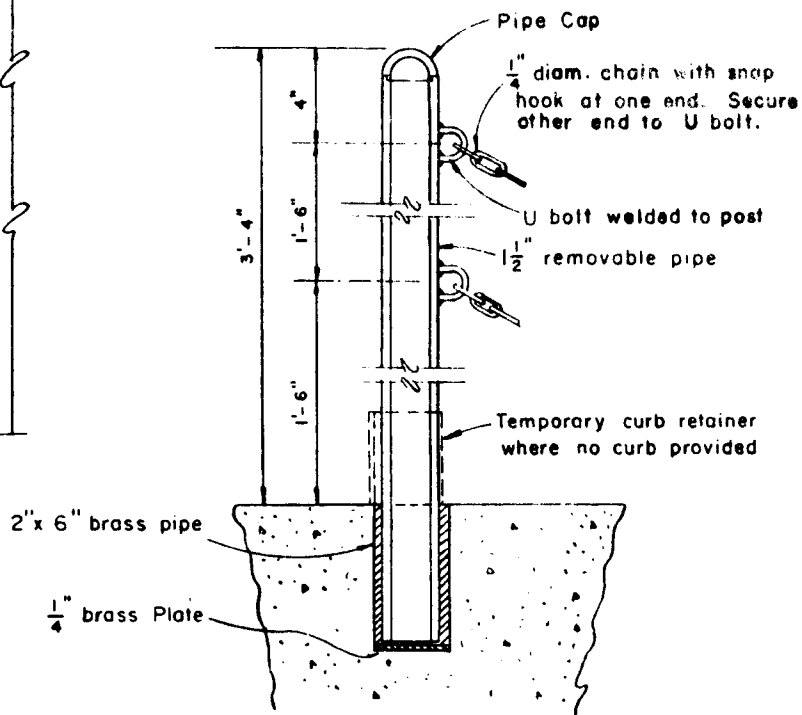
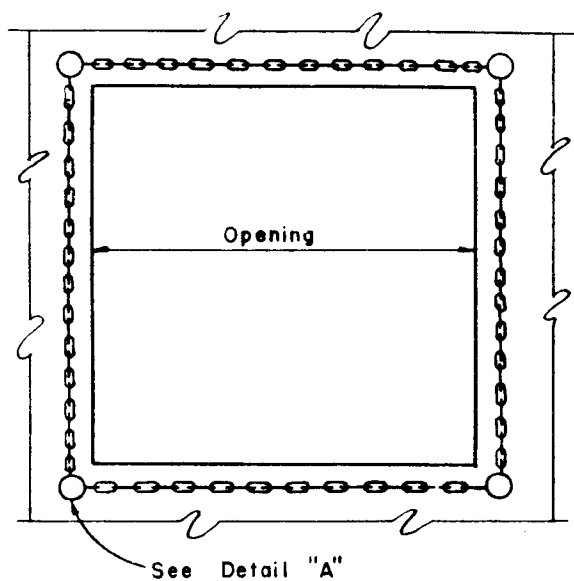
SEPTEMBER 1984

SCALE: 1" = 1' - 0"

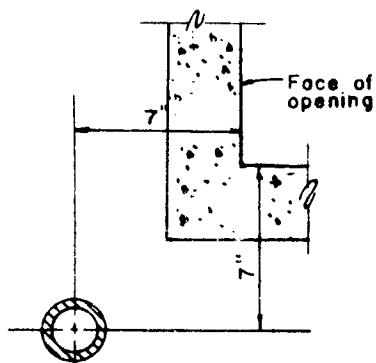
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU

ITEMS FOR OIL SEALS & RELATED PIPINGS

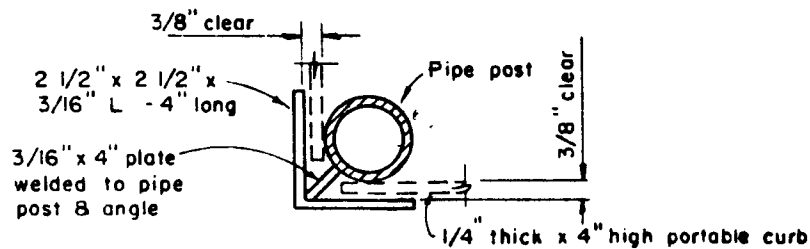
ITEM NO.	ITEM	QUANT.
1	3/4" galv. steel plate 8" x 22"	1
2	Floor flange, Brass 1"	2
3	Pipe, 8 1/2" long, Brass 1" (Plugged)	2
4	Cross, Brass 1"	4
5	Nipple, 3" long, Brass 1"	22
6	Tee, Brass 1"	2
7	1" gate valves, OIC, Bronze with 3/4" hose nipple	2
9	Gate valve, screwed ends, Brass 1"	8
10	Union, Brass 1"	10
11	Pipe cap, Galv. Malleable Iron 6"	4
12	Pipe, 19" long, Wrought Iron 6"	2
13	Lunkenheimer gauge glass Fig. No. 460 bronze 3 rods with 3/8" pipe threads and 1/2" x 12" long glass.	2
14	Elbow, 90° 1" brass with 1" nipple	2
15	Pipe, 5" long, brass 1"	8
16	Cap, brass, 1"	2
17	Aircock, Tee handle, brass 1/4" with male end bibb hose or 90° elbow	2
18	Pipe, 12" long, brass 1"	2



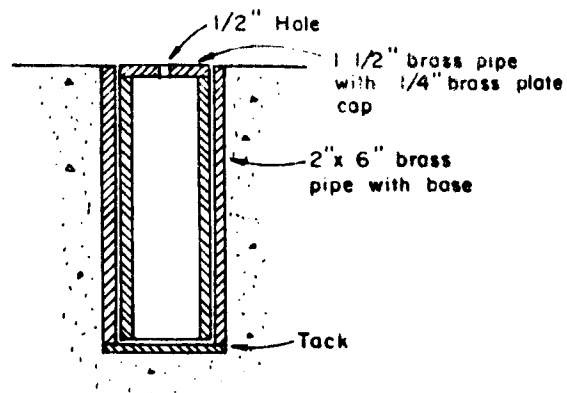
SECTION



DETAIL "A"



TEMPORARY CURB RETAINER



DETAIL

COVER PLATE

REMOVABLE POST & CHAIN DETAILS

P-6

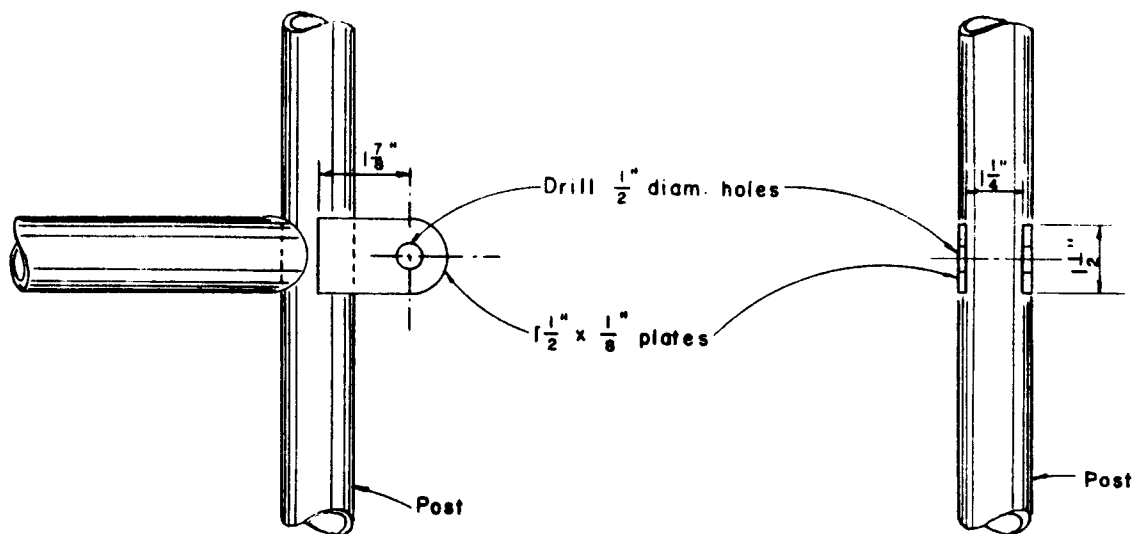
STANDARD
DETAILS

REMOVABLE POST AND CHAIN DETAILS

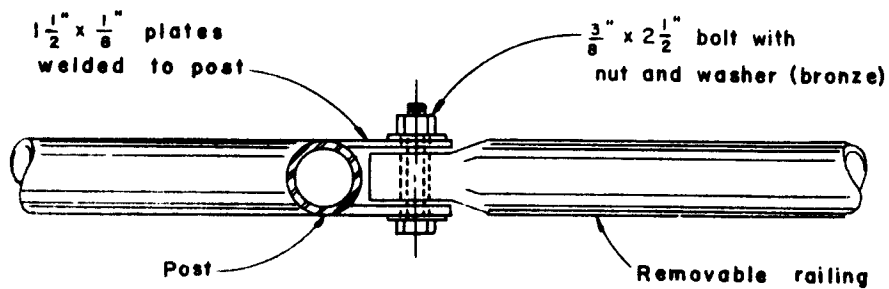
SEPTEMBER 1984

NOT TO SCALE

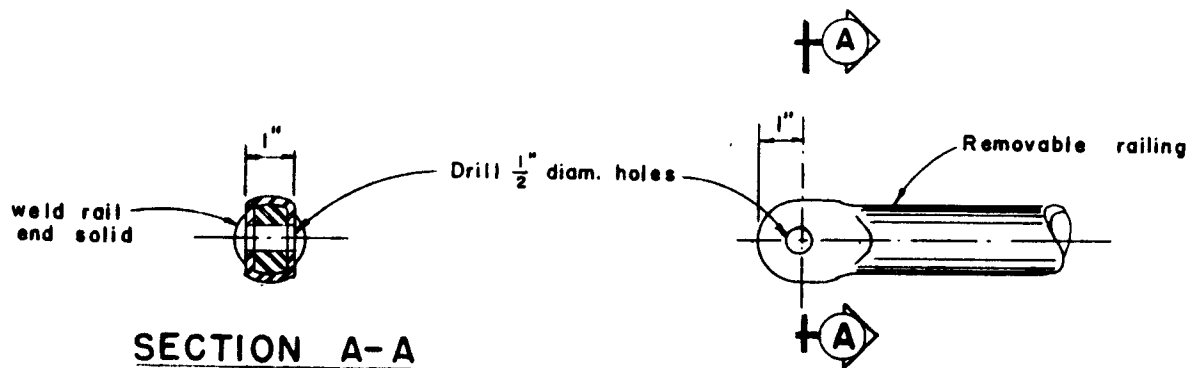
COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU



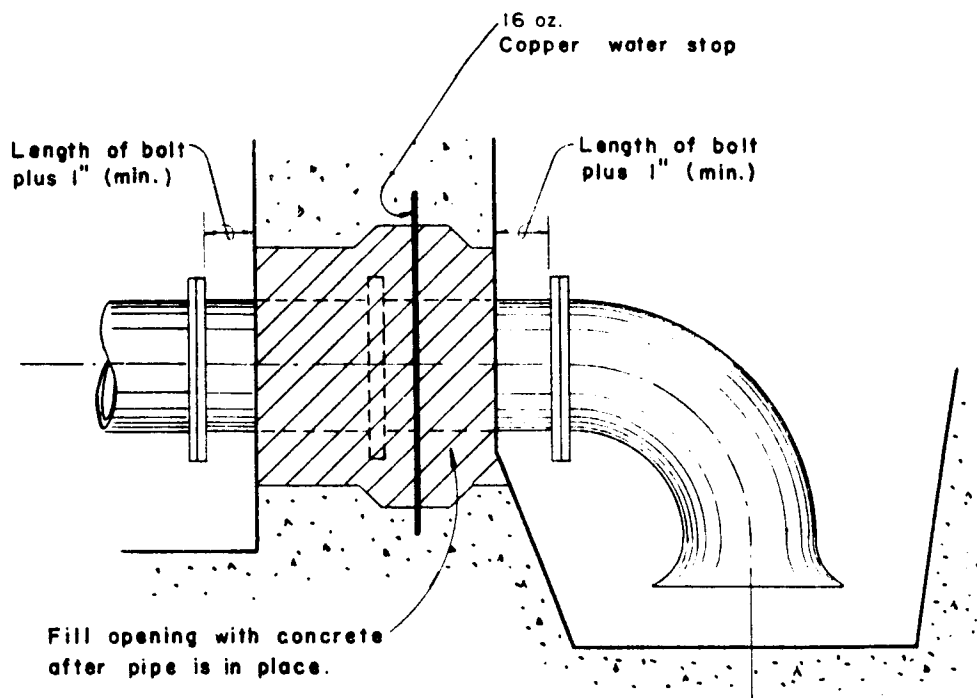
ELEVATIONS



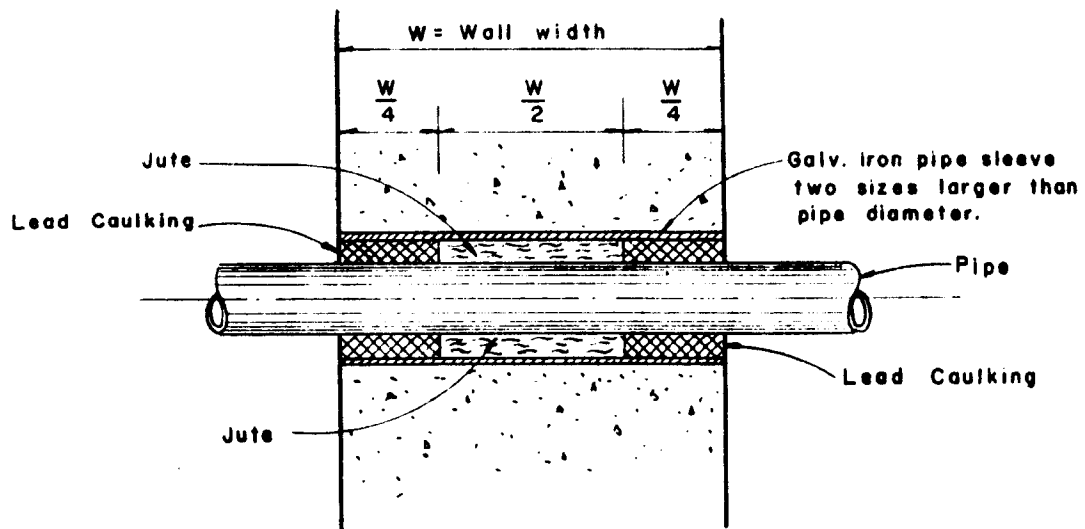
PLAN



REMOVABLE RAILING DETAILS



INTAKE PIPE THROUGH WALL DETAILS



TYPICAL WALL SLEEVE DETAILS

P-8

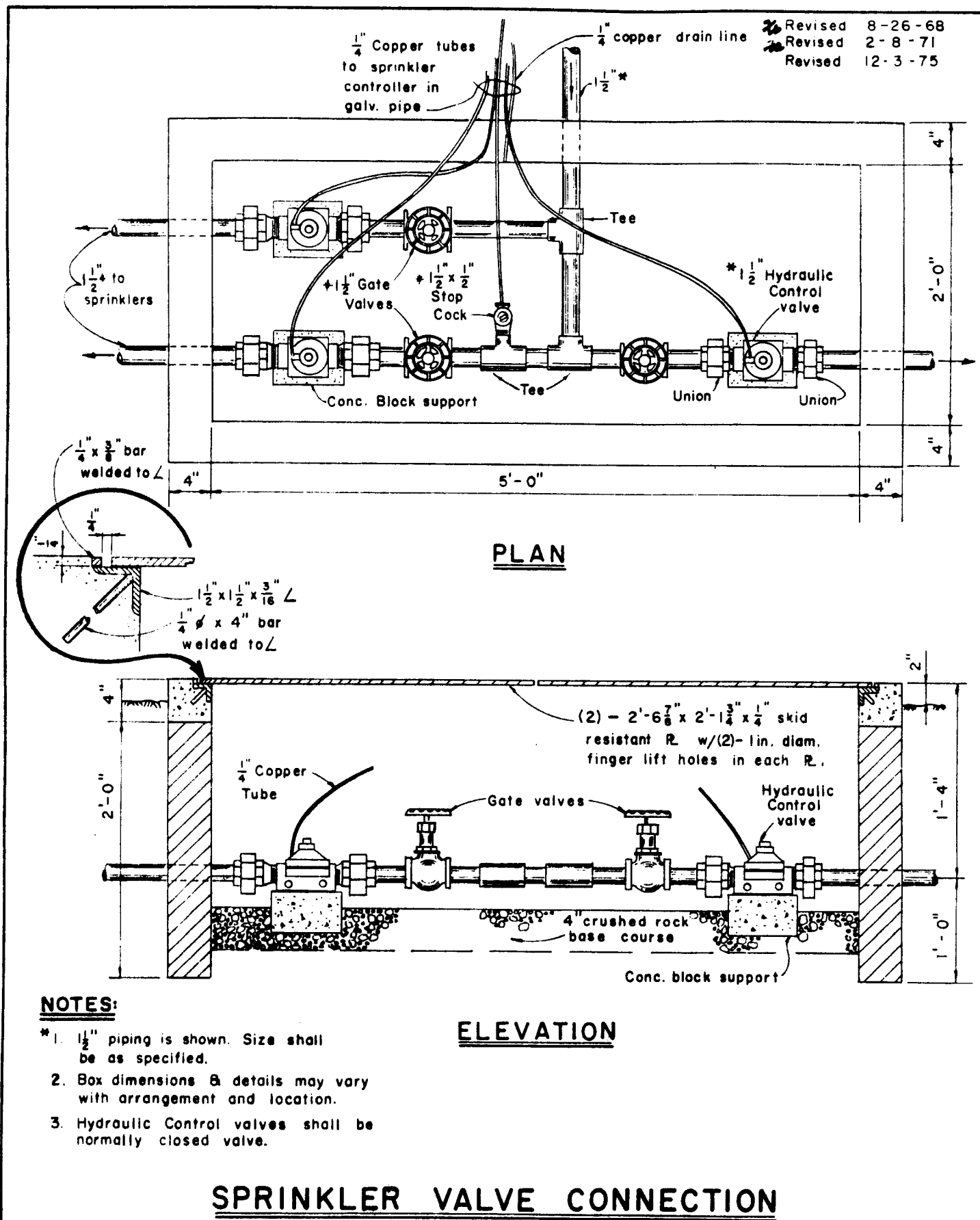
STANDARD
DETAILS

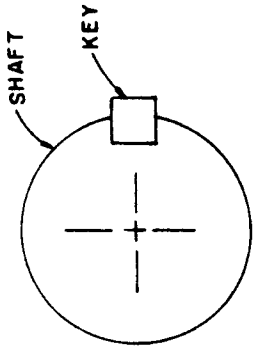
TYPICAL WALL SLEEVE

SEPTEMBER 1984

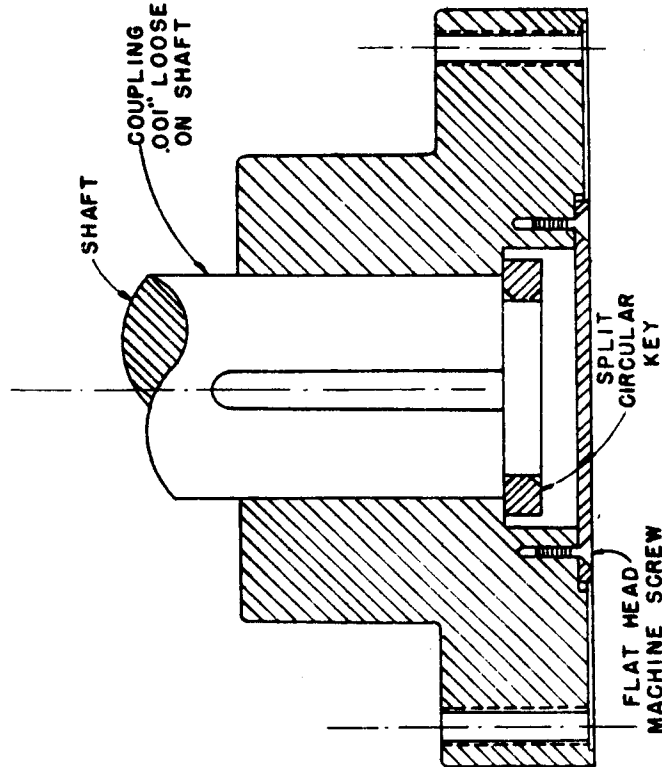
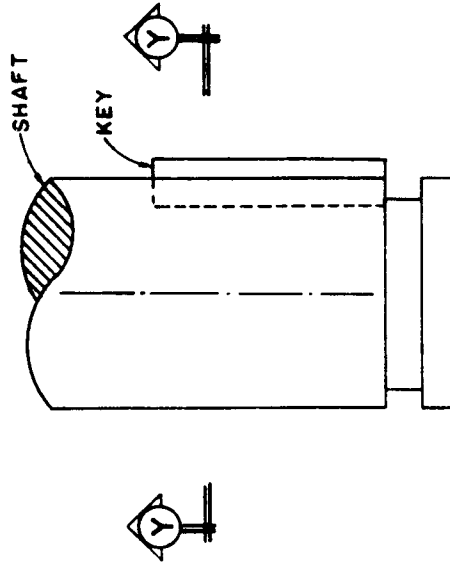
NOT TO SCALE

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU





SECTION Y-Y



DETAIL
VERTICAL MOTOR SHAFT

DETAIL
MOTOR SHAFT COUPLING

VERTICAL MOTOR SHAFT & COUPLING

P-10

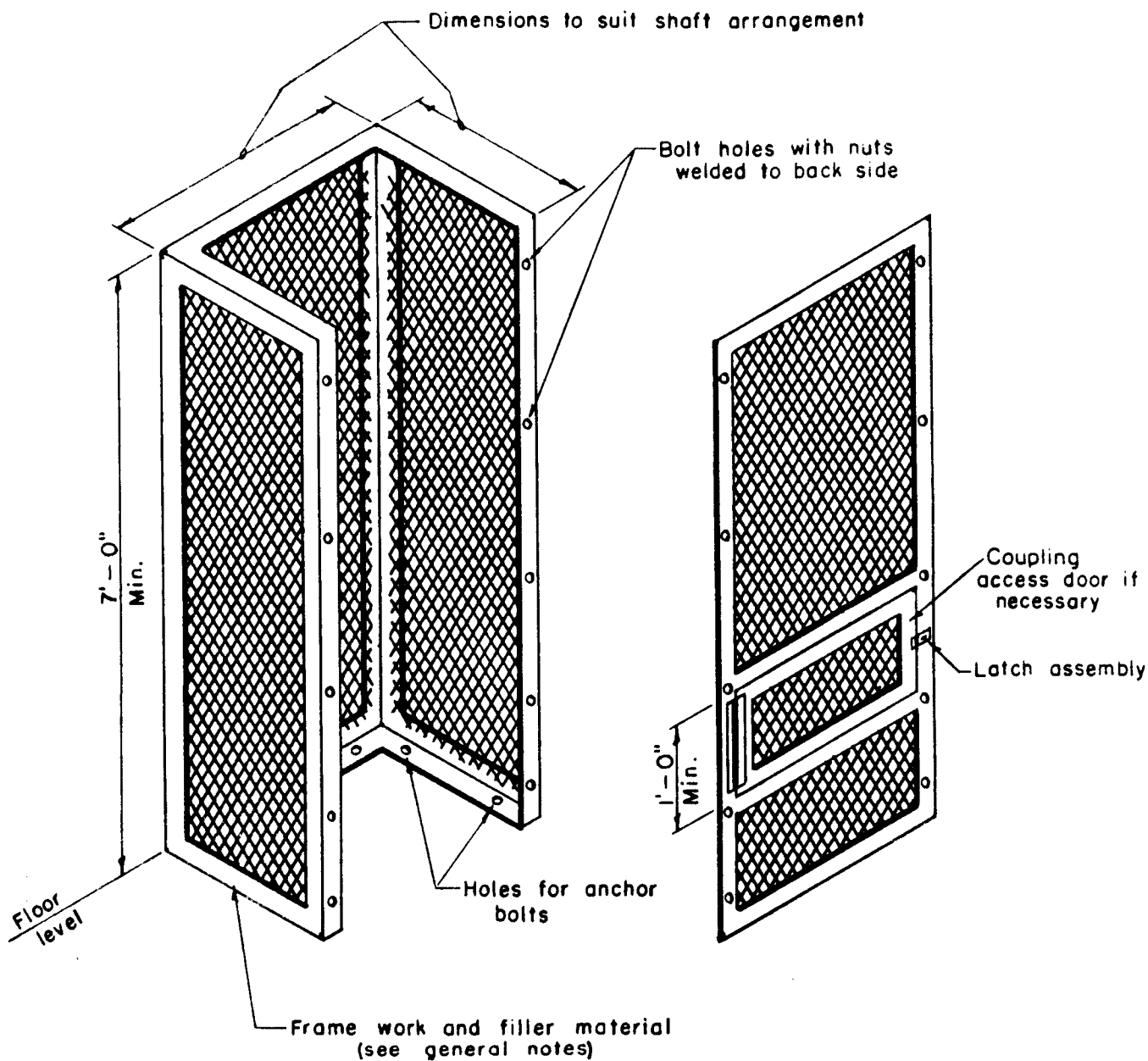
STANDARD
DETAILS

MOTOR SHAFT AND COUPLING

SEPTEMBER 1984

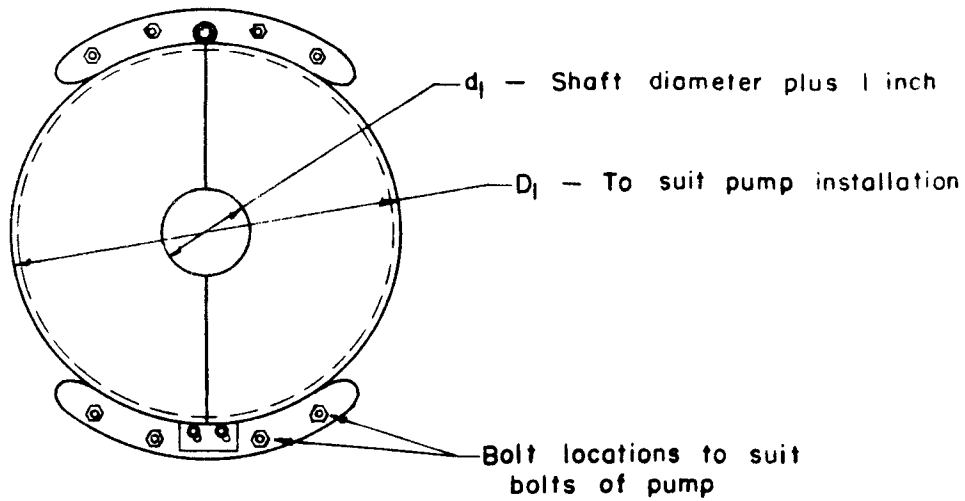
NOT TO SCALE

COUNTY OF KAUAI
CITY & COUNTY OF HONOLULU

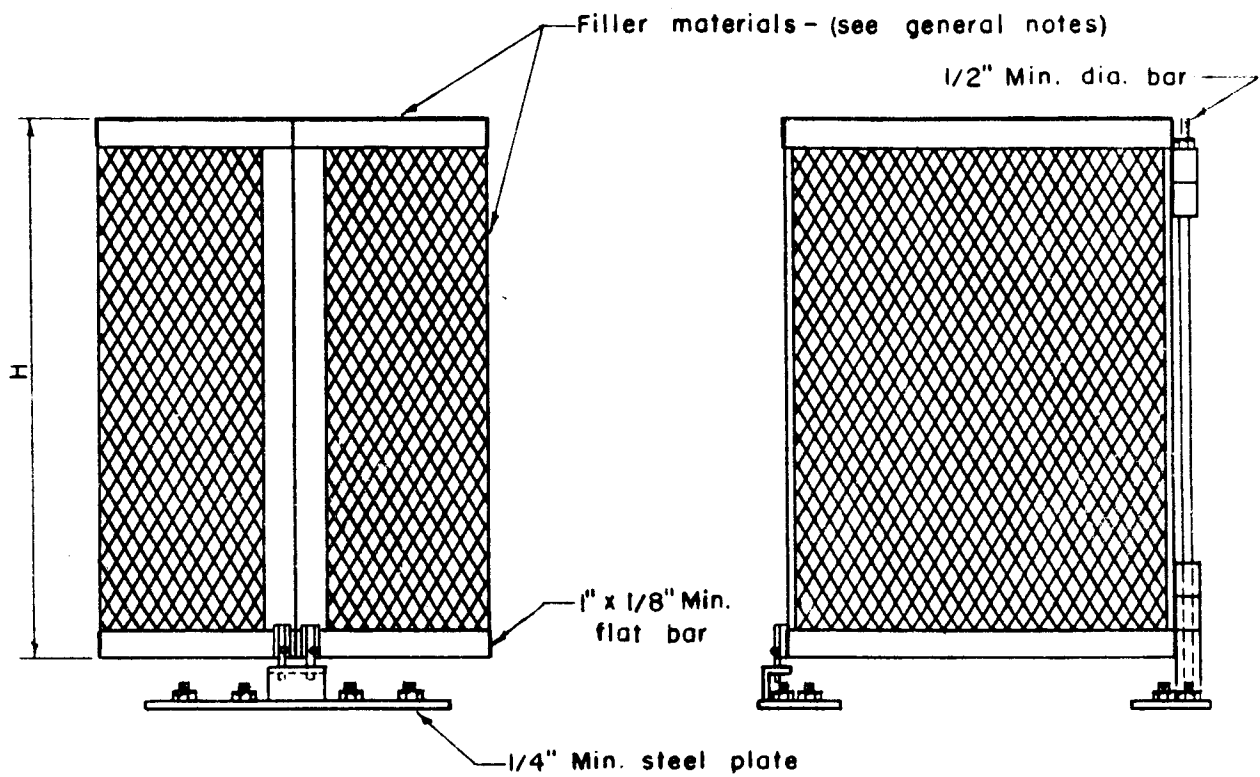


TYPICAL PUMP MOTOR DRIVE SHAFT GUARD

No Scale



PLAN VIEW



FRONT VIEW

SIDE VIEW

TYPICAL PUMP COUPLING GUARD

No Scale

P-12

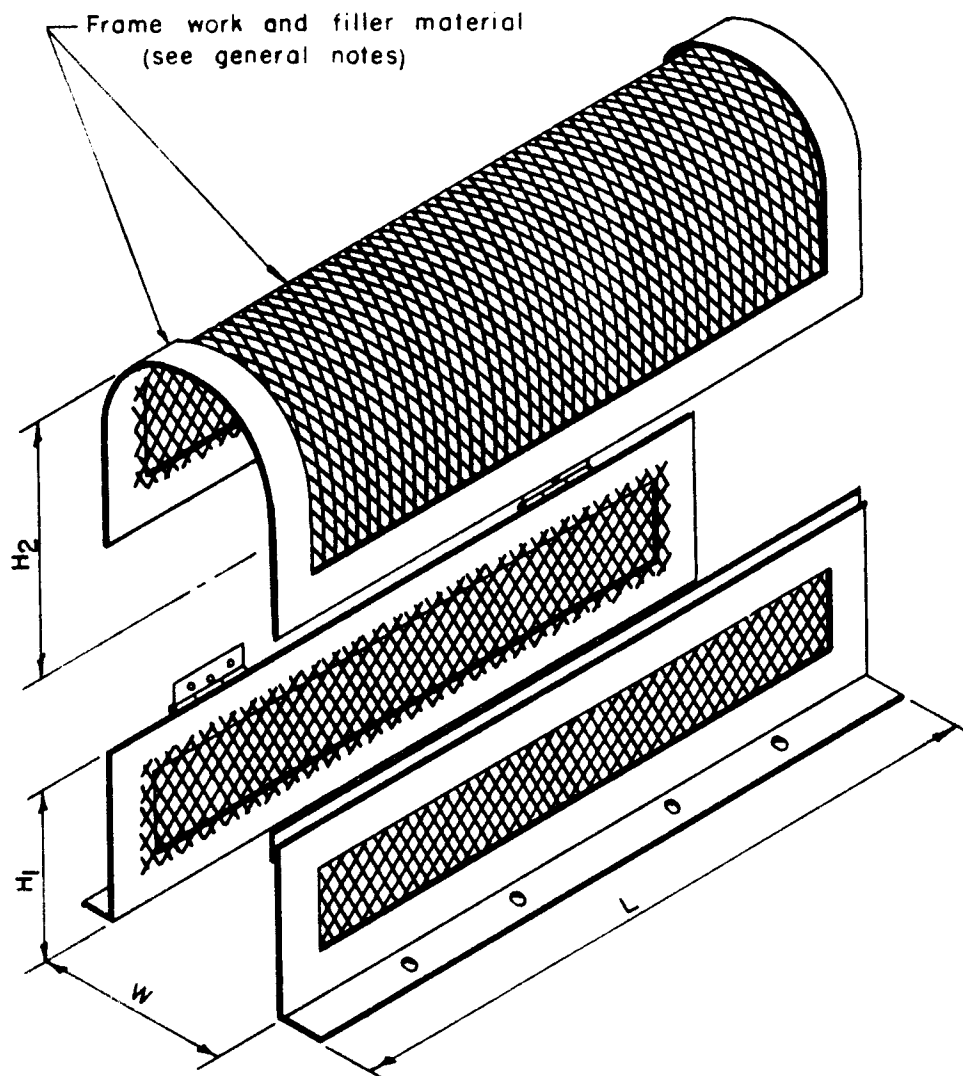
STANDARD
DETAILS

TYPICAL PUMP COUPLING GUARD

SEPTEMBER 1984

NOT TO SCALE

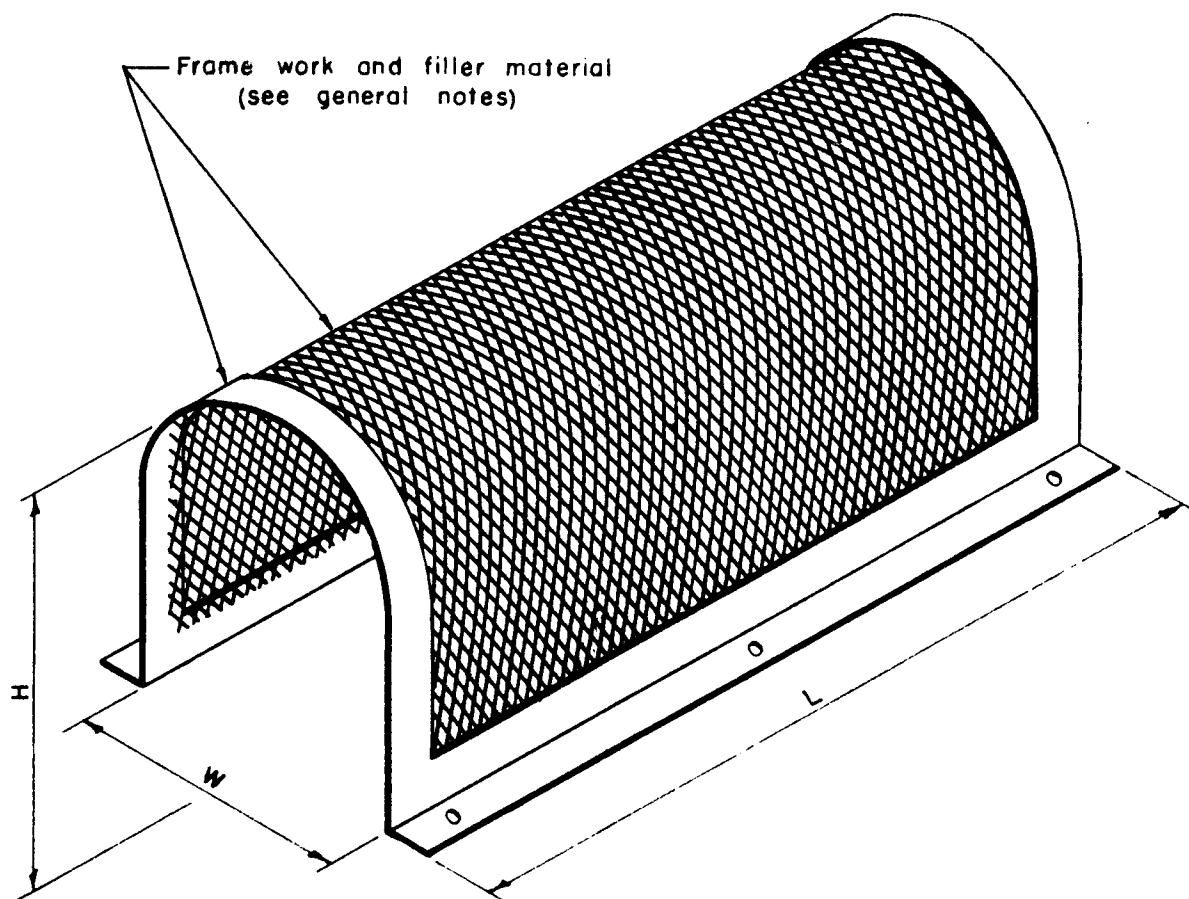
CITY & COUNTY OF HONOLULU



Note: All dimensions to suit
shaft arrangement

TYPICAL HORIZONTAL PUMP SHAFT GUARD No.1

No Scale



Note: All dimensions to suit
shaft arrangement

TYPICAL HORIZONTAL PUMP SHAFT GUARD No. 2

No Scale

P-14

STANDARD
DETAILS

TYPICAL HORIZONTAL SHAFT GUARD NO. 2

SEPTEMBER 1984

NOT TO SCALE

CITY & COUNTY OF HONOLULU

SAFETY GUARDS

GENERAL NOTES

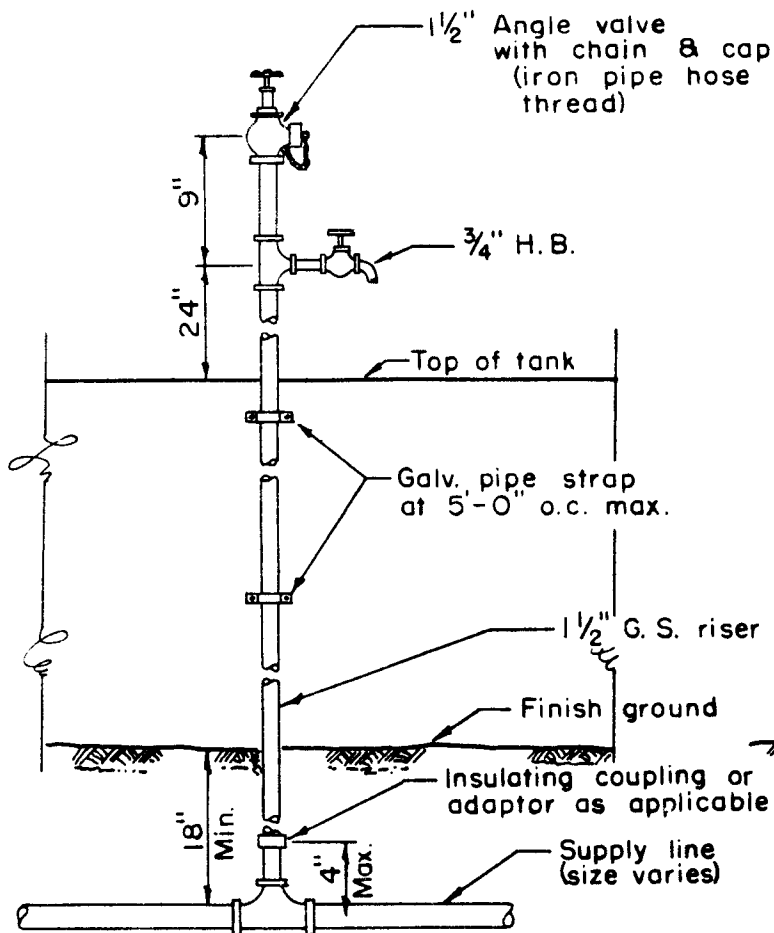
A. Framework

1. Guards thirty (30) inches or less in height and with a total surface area not in excess of ten (10) square feet may have a frame work of 3/8 in. solid rod, 3/4 in. x 3/4 in. x 1/8 in. angle iron, or metal construction of equivalent strength.
2. Minimum dimensions of materials of all guards except as noted in paragraph 1 shall be angle iron 1 in. x 1 in. x 1/8 in., metal pipe of 3/4 in. inside diameter, or metal construction of equivalent strength.
3. The frame work for all guards fastened to the floor or working platform and without other support or bracing shall consist of 1½ in. x 1½ in. x 1/8 in. angle iron, metal pipe of 1½ in. inside diameter, or metal construction of equivalent strength. All rectangular guards shall have at least four upright frame members each of which shall be carried to the floor and be securely fastened. Cylindrical guards shall have at least three supporting members carried to the floor.

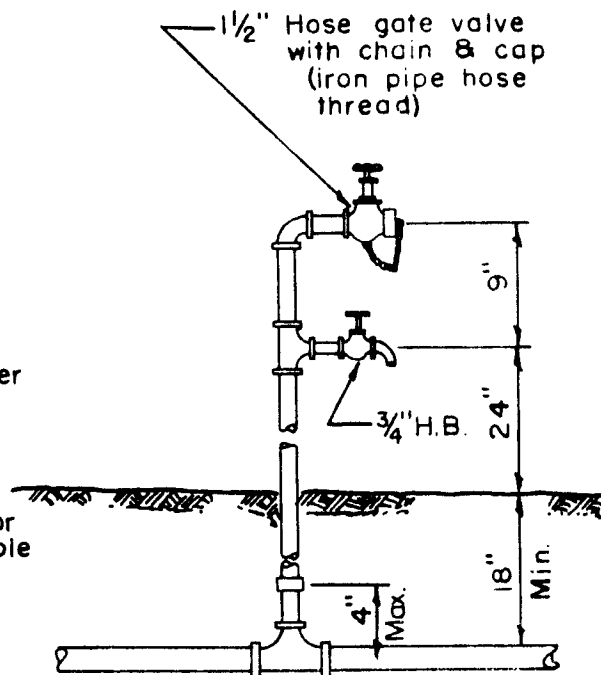
B. Filler Material

Size of Filler Materials			
Material	Clearance from moving part at all points	Largest mesh or opening allowable	Minimum gauge or thickness
	(Inches)	(Inches)	(U.S. STD)
Woven wire	Under 2	3/8	No. 16
	2-4	½	No. 16
	4-15	2	No. 12
Expanded metal	Under 4	½	No. 18
	4-15	2	No. 13
Perforated metal	Under 4	½	No. 20
	4-15	2	No. 14
Sheet metal	Under 4		No. 22
	4-15		No. 22

Note: Materials to be steel.
For additional requirements refer to project plans and specifications.



**TYPICAL VALVE
INSTALLATION
ON TANKS**



**TYPICAL VALVE
INSTALLATION
ON GROUND**

NOTES

- 1- Gate valves or angle valves with bronze discs or plugs shall be used.
- 2- Valves shall be rising or non rising stem design.
- 3- 3/4" H.B. and 1 1/2" gate valve shall be 90° apart.

1 1/2" STAND PIPE DETAIL

No Scale

P-16

STANDARD
DETAILS

1-1/2" STAND PIPE DETAIL

SEPTEMBER 1984

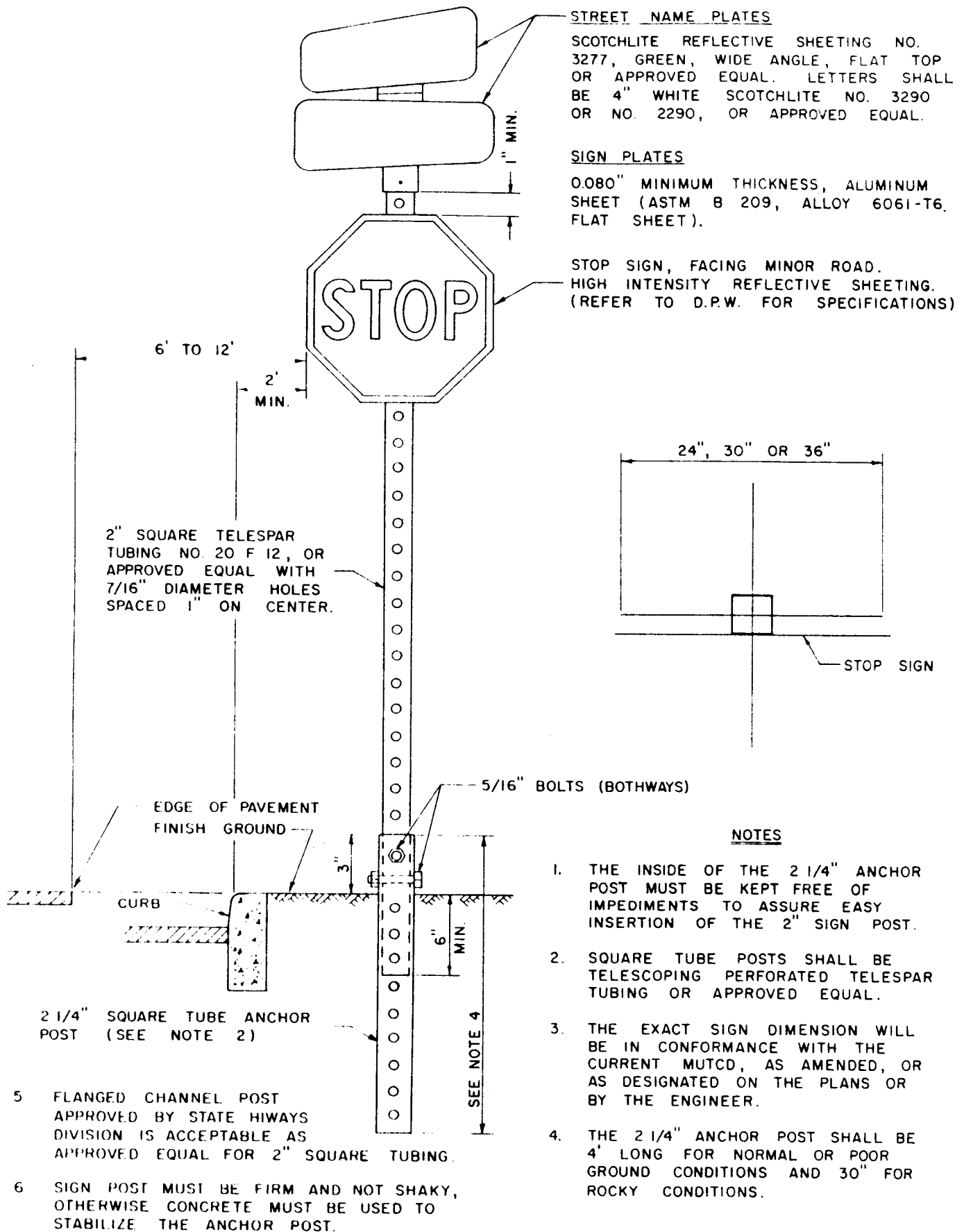
NOT TO SCALE

CITY & COUNTY OF HONOLULU

Traffic

PART

5



COUNTY OF MAUI
 COUNTY OF HAWAII

STREET NAME AND STOP SIGN DETAILS

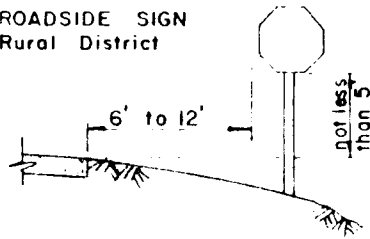
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SEPTEMBER 1984

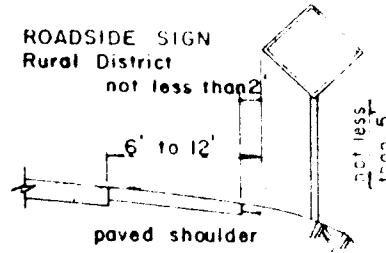
STANDARD
 DETAILS

T-1

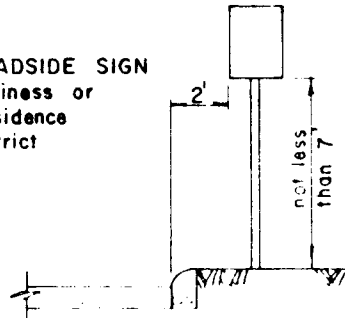
ROADSIDE SIGN
Rural District



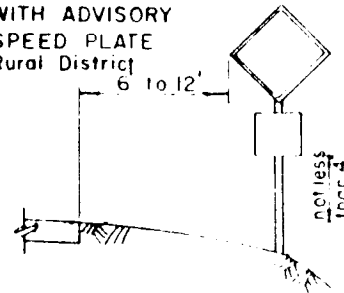
ROADSIDE SIGN
Rural District



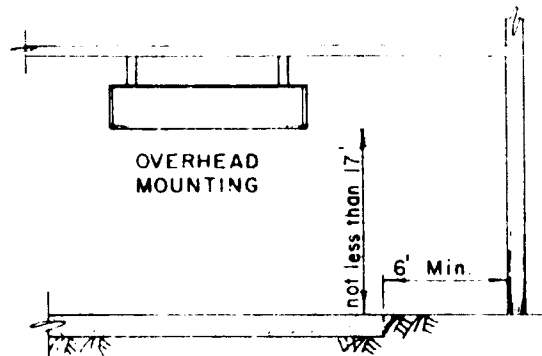
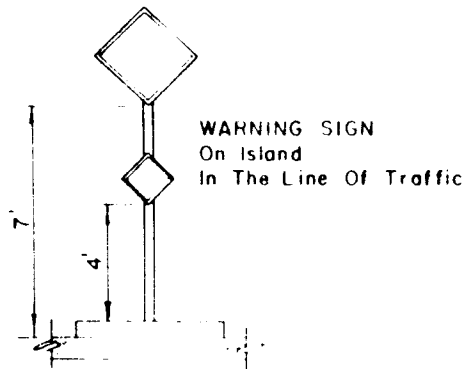
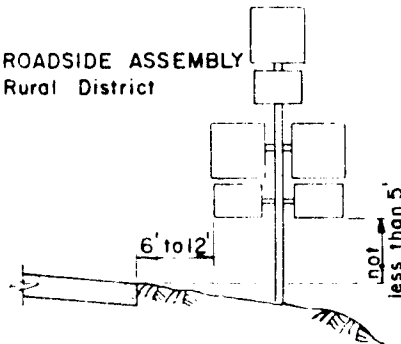
ROADSIDE SIGN
Business or
Residence
District



WARNING SIGN
WITH ADVISORY
SPEED PLATE
Rural District



ROADSIDE ASSEMBLY
Rural District



HEIGHT AND LATERAL LOCATION OF SIGNS (TYPICAL INSTALLATIONS)

T-2

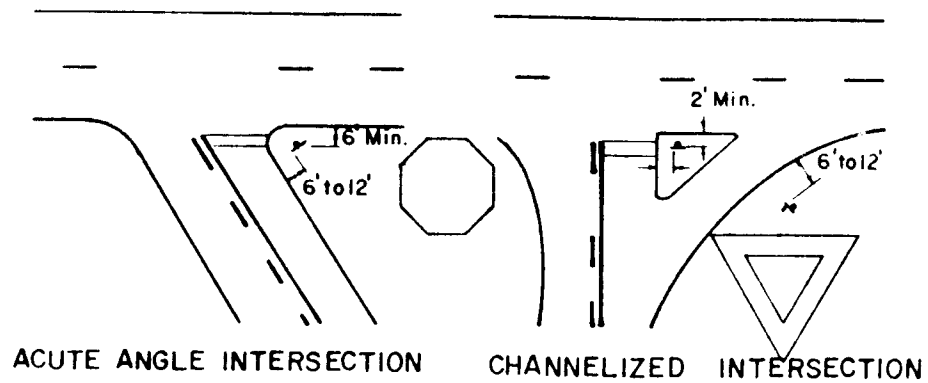
STANDARD
DETAILS

HEIGHT AND LATERAL LOCATION OF SIGN

SEPTEMBER 1984

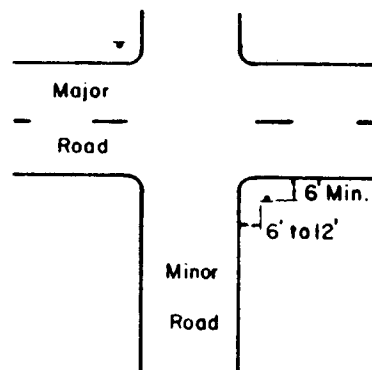
NOT TO SCALE

COUNTY OF KAUAI
COUNTY OF MAUI
COUNTY OF HAWAII

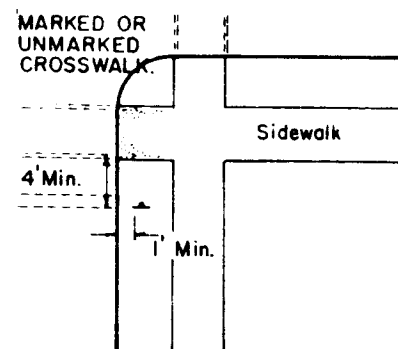


ACUTE ANGLE INTERSECTION

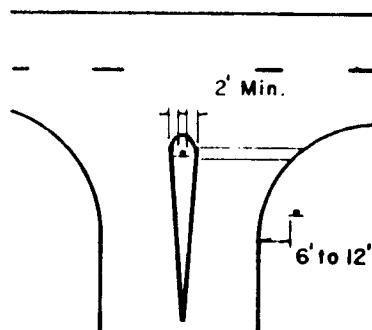
CHANNELIZED INTERSECTION



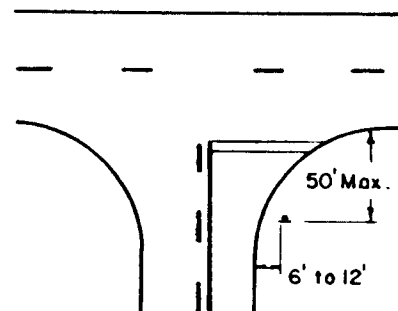
MINOR CROSSROAD



URBAN INTERSECTION



DIVISIONAL ISLAND



WIDE THROAT INTERSECTION

TYPICAL LOCATIONS FOR STOP SIGNS AND YIELD SIGNS (TYPICAL INSTALLATIONS)

COUNTY OF KAUAI
COUNTY OF MAUI
COUNTY OF HAWAII

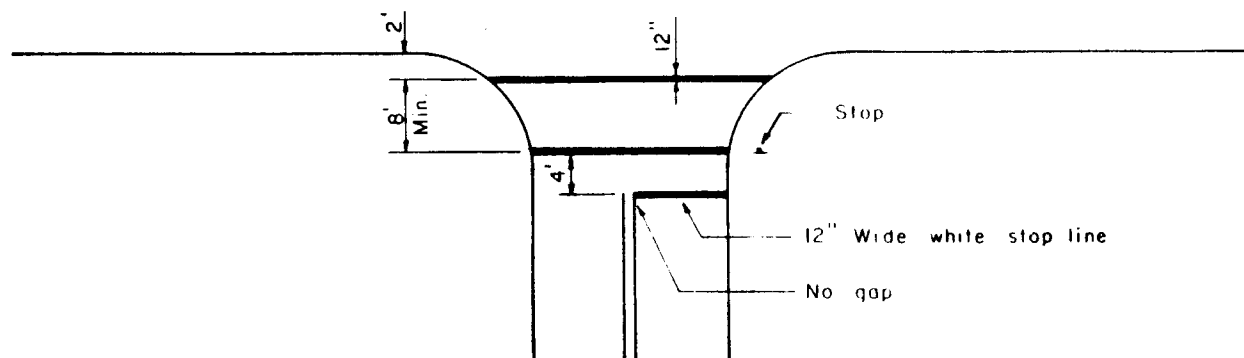
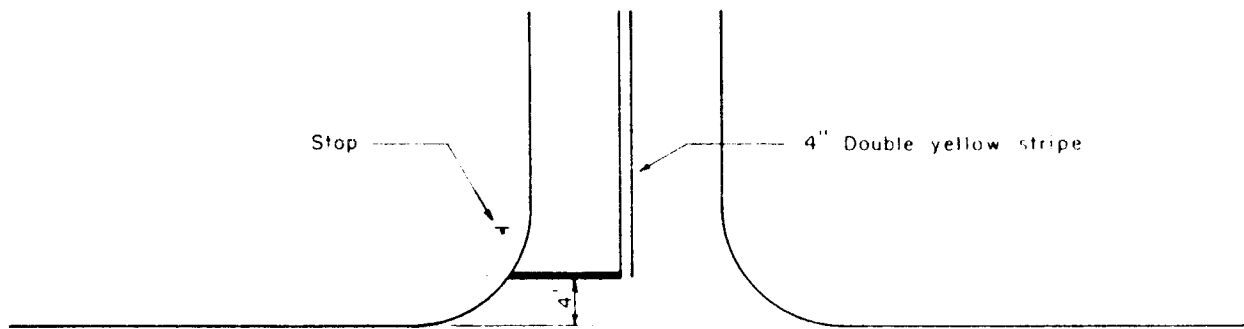
TYPICAL LOCATIONS FOR STOP SIGNS

NOT TO SCALE

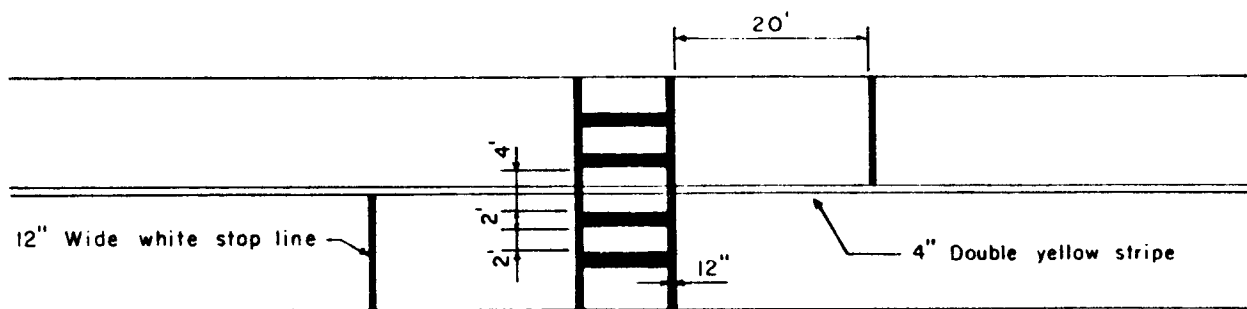
SEPTEMBER 1984

STANDARD
DETAILS

T-3



AT INTERSECTION



MIDBLOCK

T-4

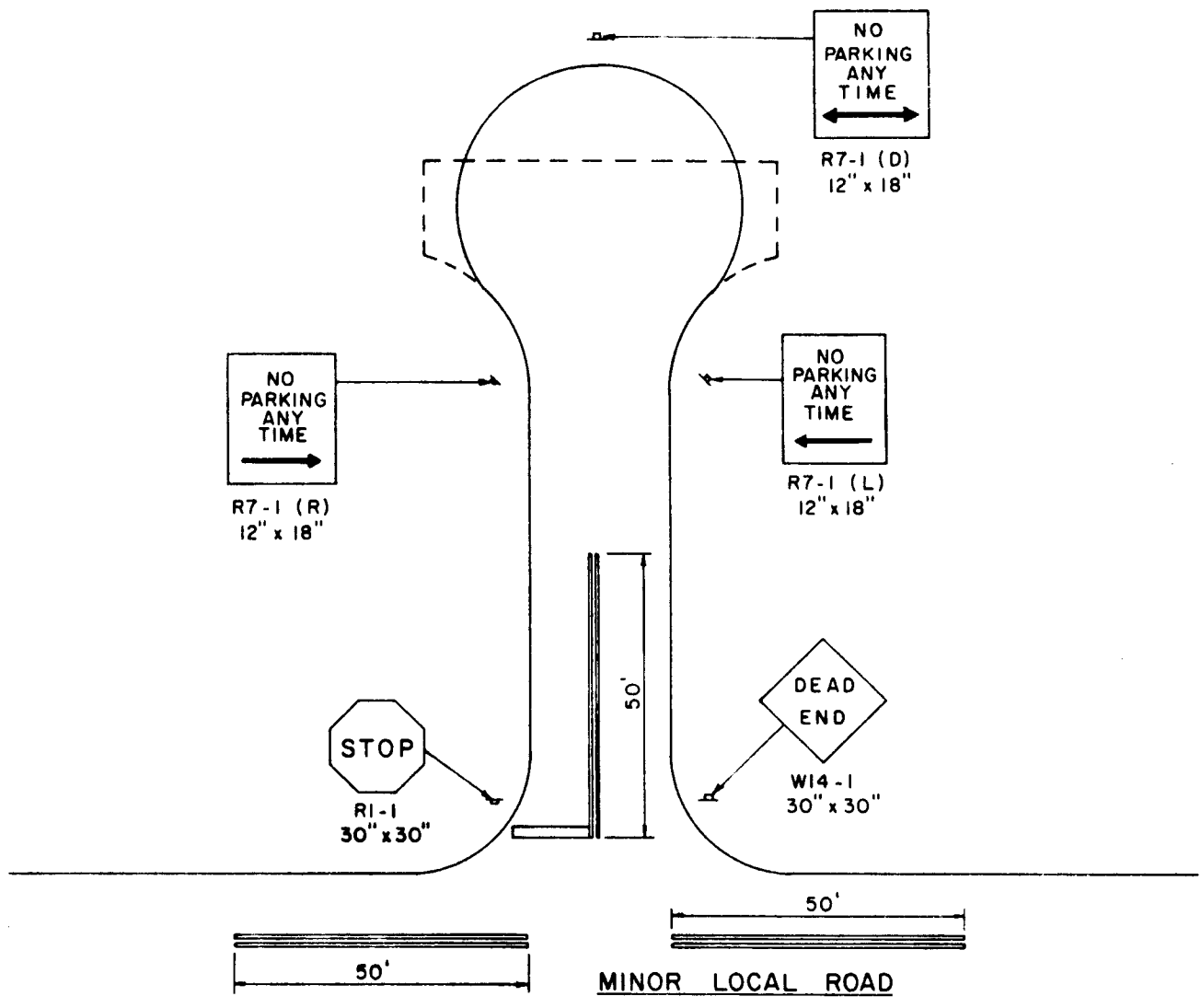
STANDARD
DETAILS

TYPICAL DETAIL FOR CROSSWALK
AND STOP LINES

SEPTEMBER 1984

NOT TO SCALE

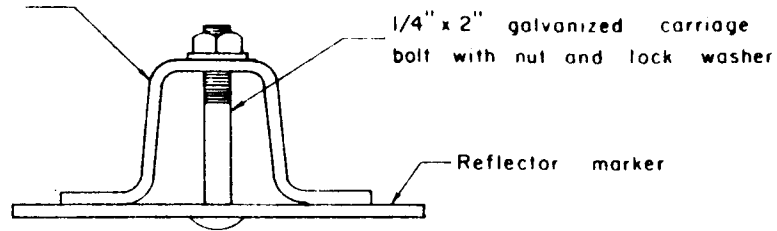
COUNTY OF HAWAII



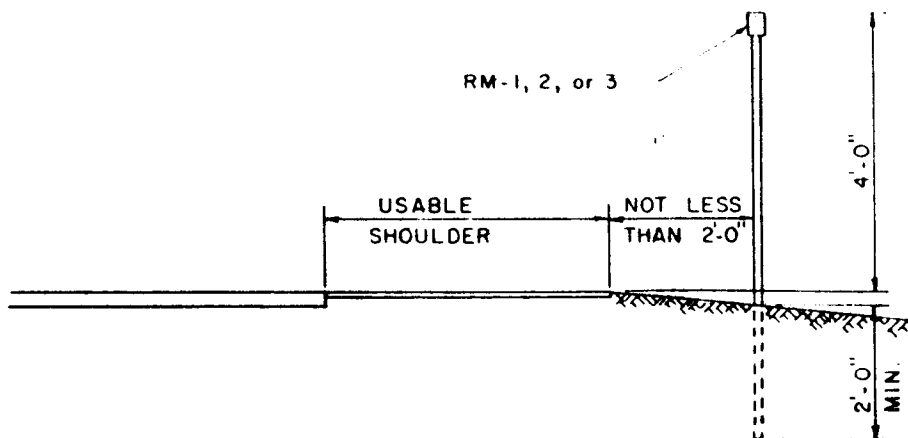
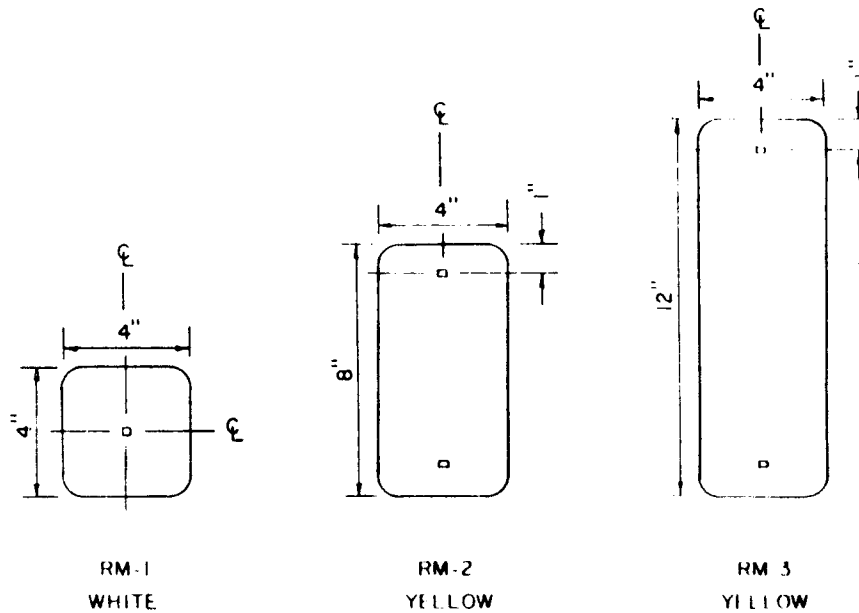
NOTES:

1. Three R7-1 signs required. Location of signs dependent on lot frontages onto the cul-de-sac.
2. Where a system of streets has only a single access, a "NO OUTLET" (W14-2, 30" x 30") sign must be installed at the access intersection in a similar location as sign W14-1 shown in this drawing.
3. Sign W14-1 (or W14-2) to be located so as to be easily visible from the thru-street.
4. Refer to sheets T-1, T-2, and T-3 for height and lateral clearance for signs.

Galvanized flange channel
1/8" x 5/16" rolled section
post with a minimum wt.
of 2 lbs. per ft. or
approved substitute.



TYPICAL SECTION



SECTION

T-6

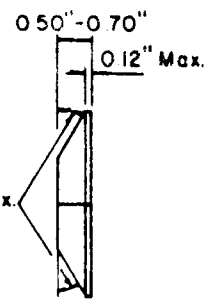
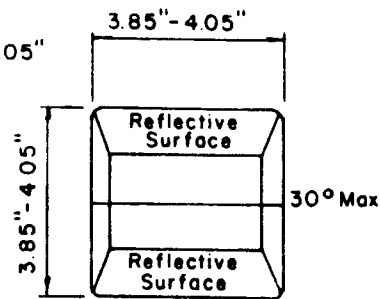
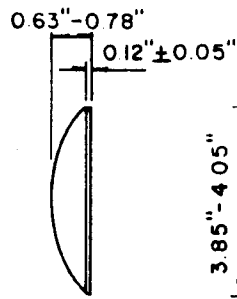
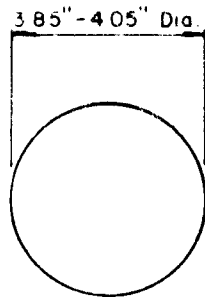
**STANDARD
DETAILS**

ROAD MARKER

SEPTEMBER 1984

NOT TO SCALE

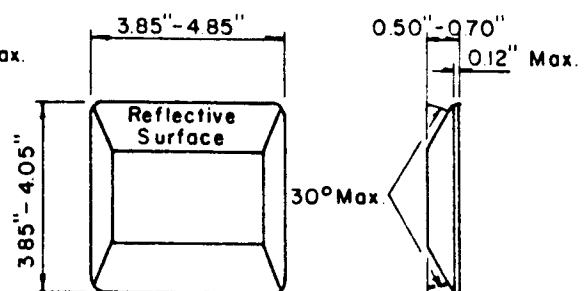
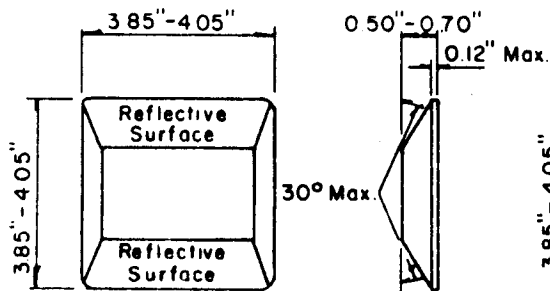
COUNTY OF KAUAI
COUNTY OF MAUI
COUNTY OF HAWAII



TYPE A
NON-REFLECTIVE WHITE MARKER

TYPE C
RED-CLEAR REFLECTIVE MARKER

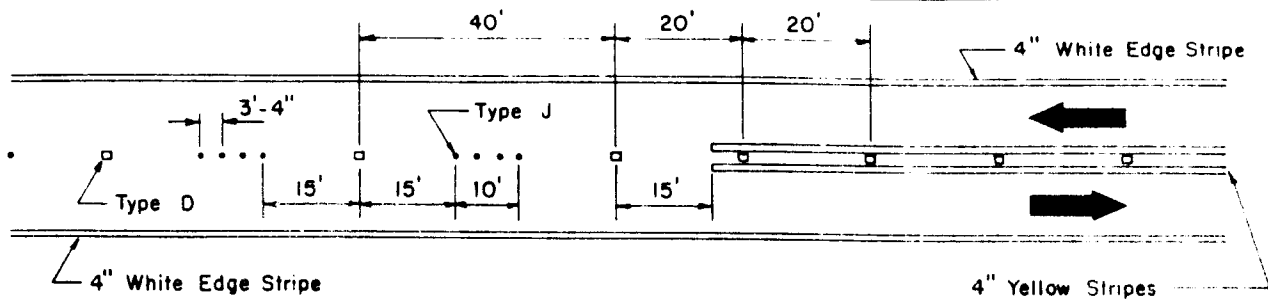
TYPE J
NON-REFLECTIVE YELLOW MARKER



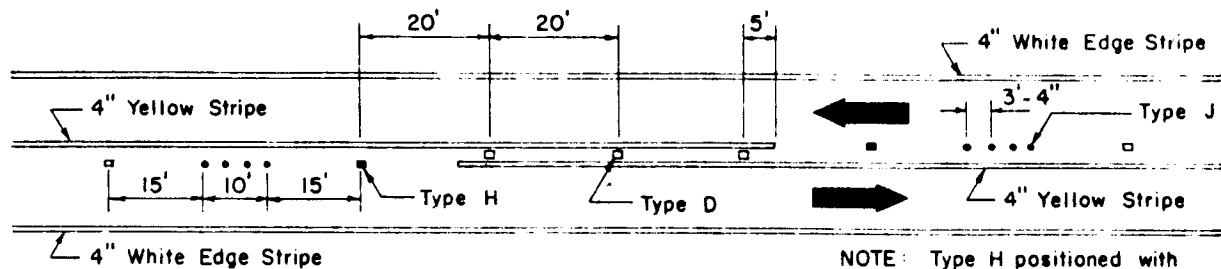
TYPE D
TWO-WAY YELLOW REFLECTIVE MARKER

TYPE H
ONE-WAY YELLOW REFLECTIVE MARKER

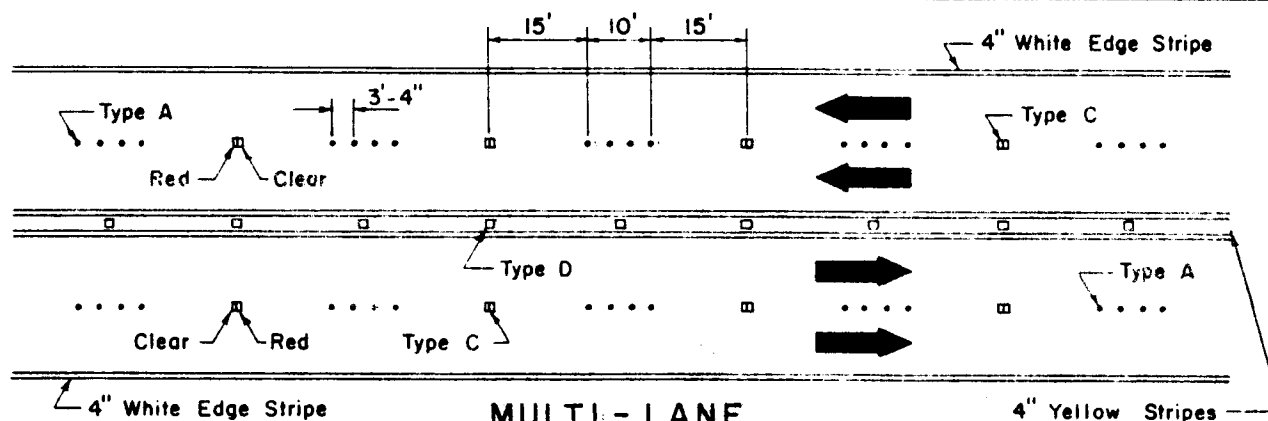
RAISED PAVEMENT MARKERS



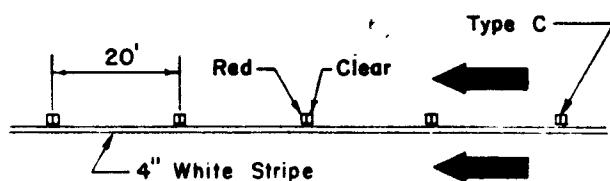
TWO-LANE PASSING PERMITTED AND PASSING PROHIBITED



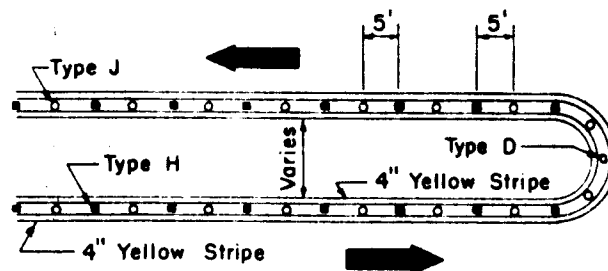
TWO-LANE PASSING PROHIBITED ZONES



MULTI-LANE LANE LINES AND CENTER LINE



CHANNELIZING LINES OR SOLID LANE LINES



MEDIAN NOSE DELINEATION

T-8

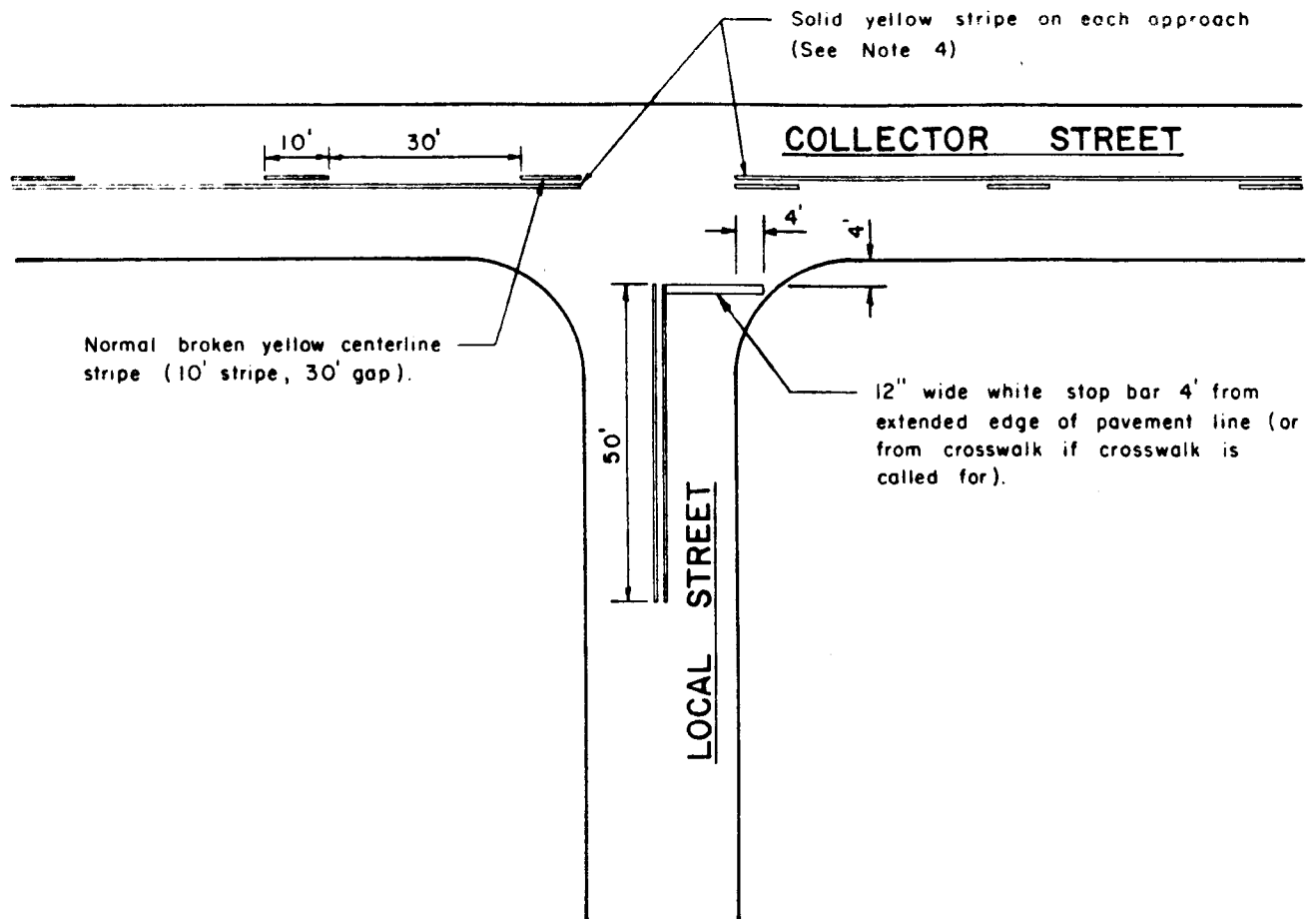
STANDARD
DETAILS

TYPICAL INSTALLATION OF RAISED
PAVEMENT MARKERS

SEPTEMBER 1984

NOT TO SCALE

COUNTY OF KAUAI
COUNTY OF MAUI
COUNTY OF HAWAII



STRIPING NOTES:

1. All striping shall conform to the latest edition of the "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES for Streets and Highways" (MUTCD).
2. Yellow centerlines shall be striped on all two-way collector or higher streets.
3. 12" white "STOP" lines shall be striped in conjunction with each "STOP" sign.
4. Appropriate "NO PASSING" markings shall be striped for 130' when collector speed limit is 30 mph or less and 170' when collector speed limit is 35 mph or more on each approach to an intersection and or as otherwise called for and at other locations designated in the MUTCD.
5. All traffic paint shall be reflectorized and shall be approved by the Engineer.

COUNTY OF KAUAI
COUNTY OF MAUI
COUNTY OF HAWAII

TYPICAL INTERSECTION DETAIL FOR STRIPING

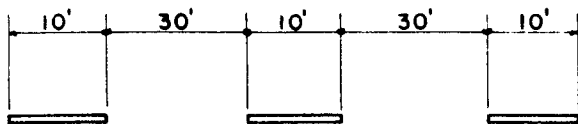
NOT TO SCALE

SEPTEMBER 1984

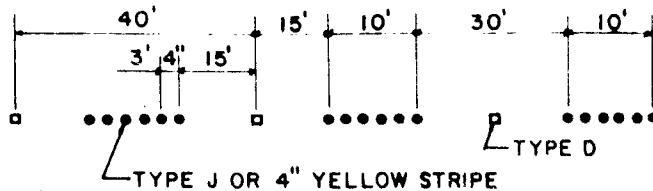
STANDARD
DETAILS

T-9

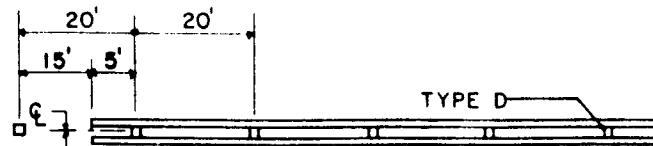
4" YELLOW STRIPING



RAISED PAVEMENT MARKING

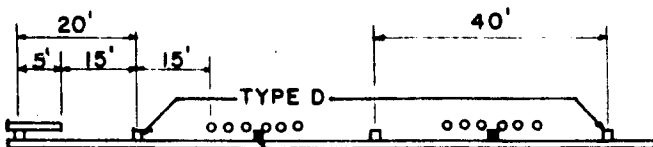
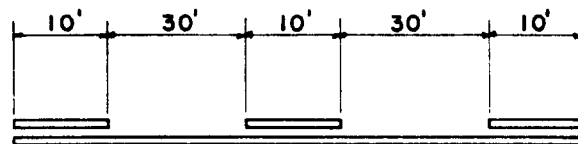


TWO - LANE PASSING PERMITTED



TWO - LANE PASSING PROHIBITED

FOR NO PASSING IN EITHER DIRECTION



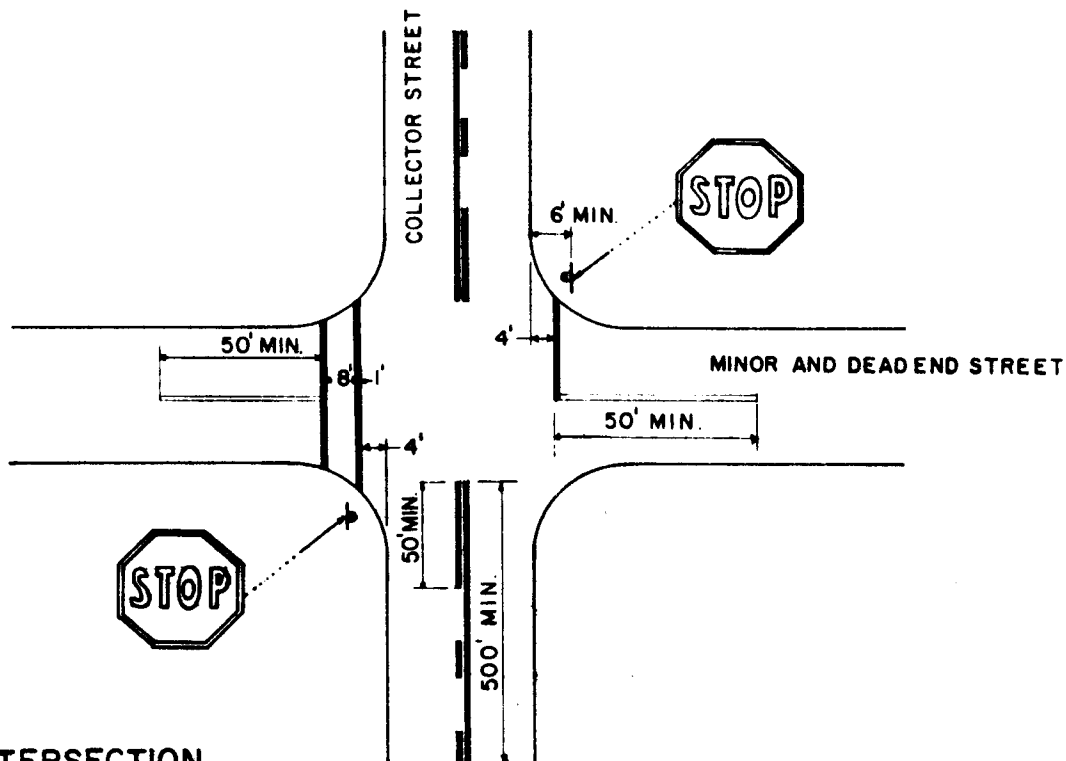
ONE - LANE PASSING PROHIBITED

FOR PASSING WHEN DASHED
LINE IS IN DRIVERS LANE

STANDARD TRAFFIC STRIPES

TYPE H (REFLECTIVE
SURFACE FACING NO-
PASSING DIRECTION)

INTERSECTION OF TWO-LANE ROADS



T-10

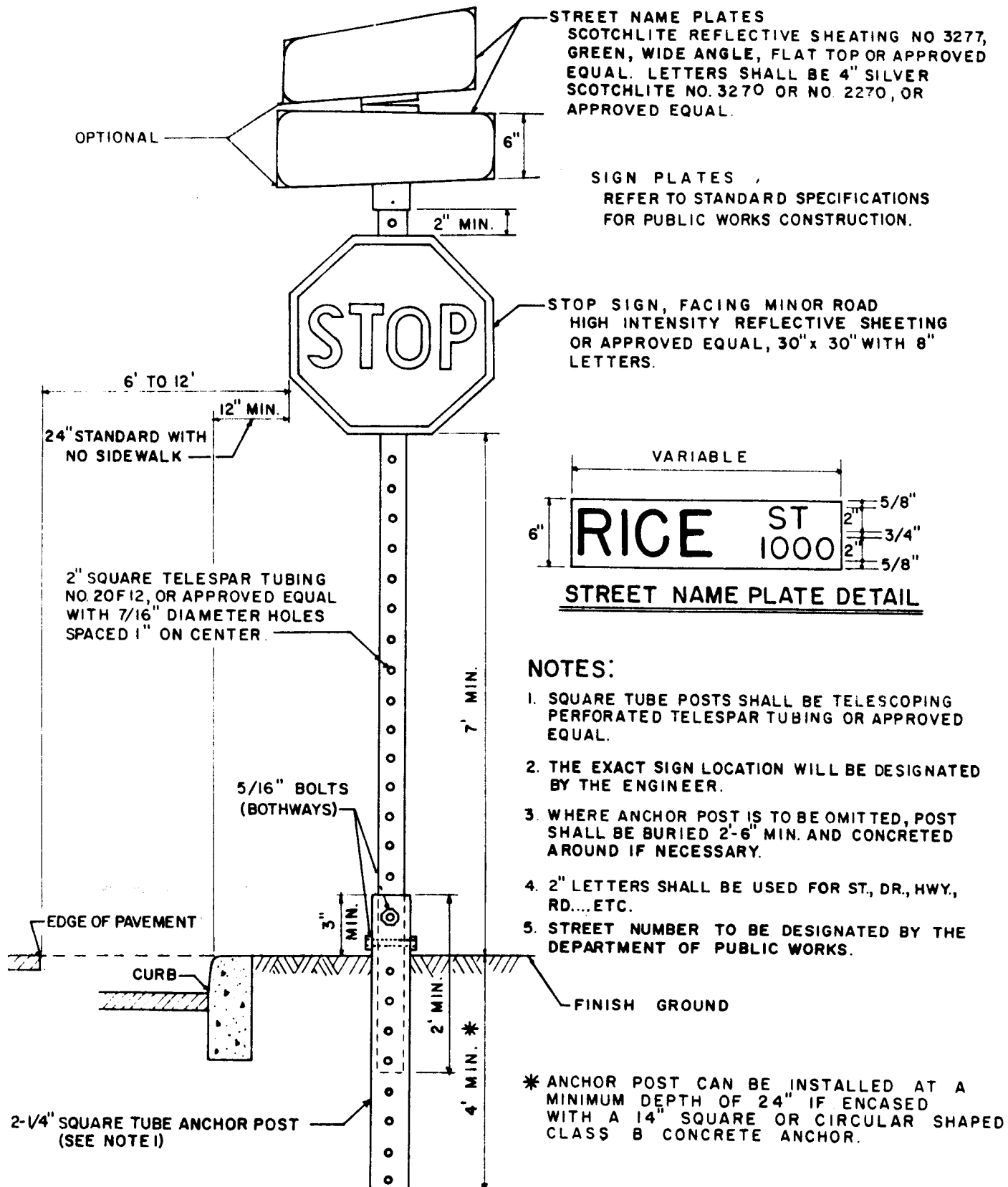
STANDARD
DETAILS

STRIPING DETAILS

COUNTY OF KAUAI

SEPTEMBER 1984

NOT TO SCALE



COUNTY OF KAUAI

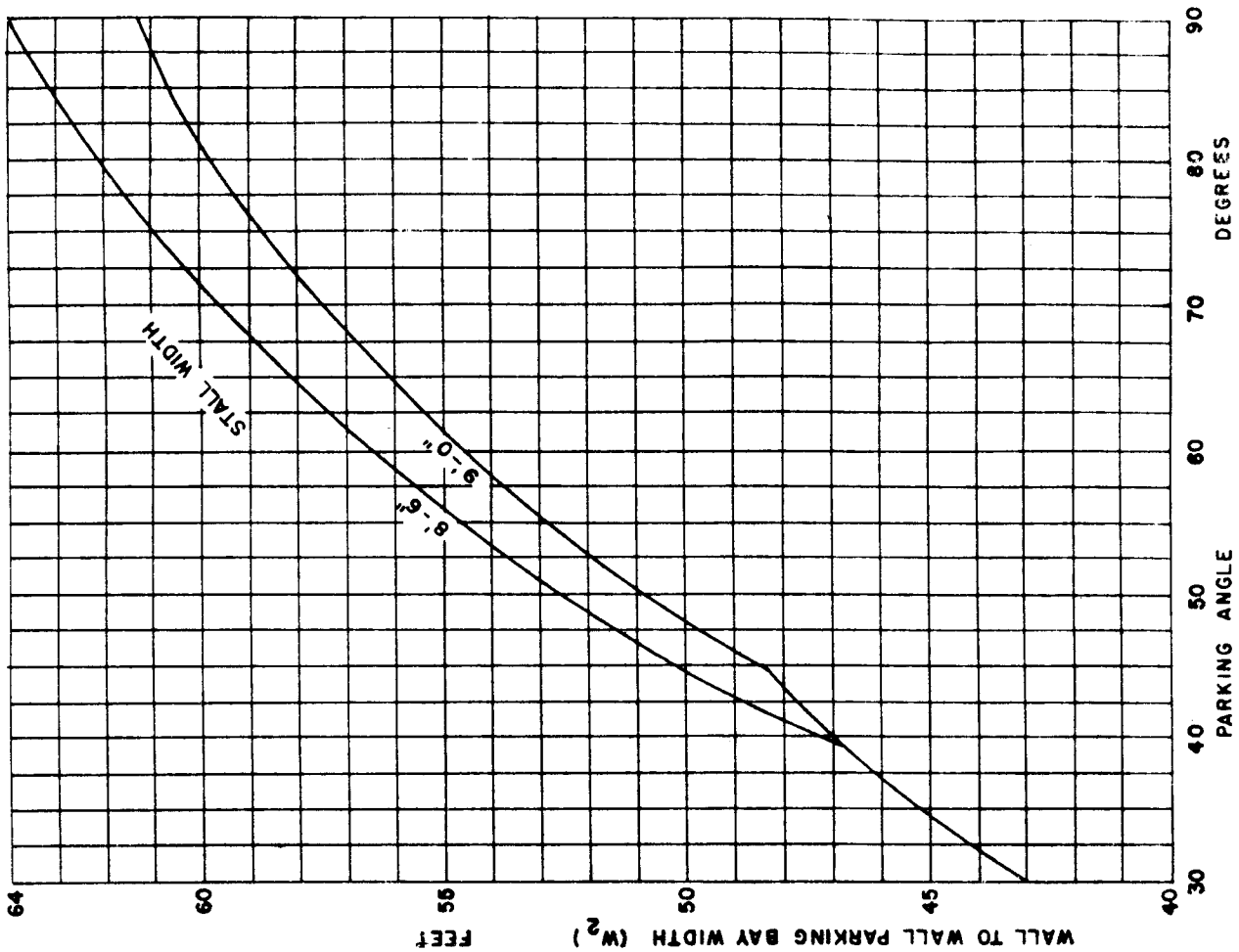
STREET NAME AND STOP SIGN DETAILS

STANDARD
DETAILS

T-11

NOT TO SCALE

SEPTEMBER 1984



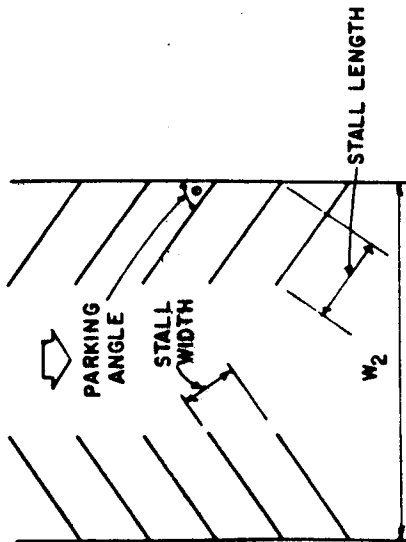
Notes:

STANDARD VEHICLE

1. MINIMUM STALL WIDTH = 8'-6"
2. MINIMUM STALL LENGTH = 19'-0"

COMPACT VEHICLE

1. MINIMUM STALL WIDTH = 7'-6"
2. MINIMUM STALL LENGTH = 16'-0"



T-12

STANDARD
DETAILS

PARKING DESIGN STANDARD,
ONE-WAY TRAFFIC

SEPTEMBER 1984

NOT TO SCALE

COUNTY OF KAUAI

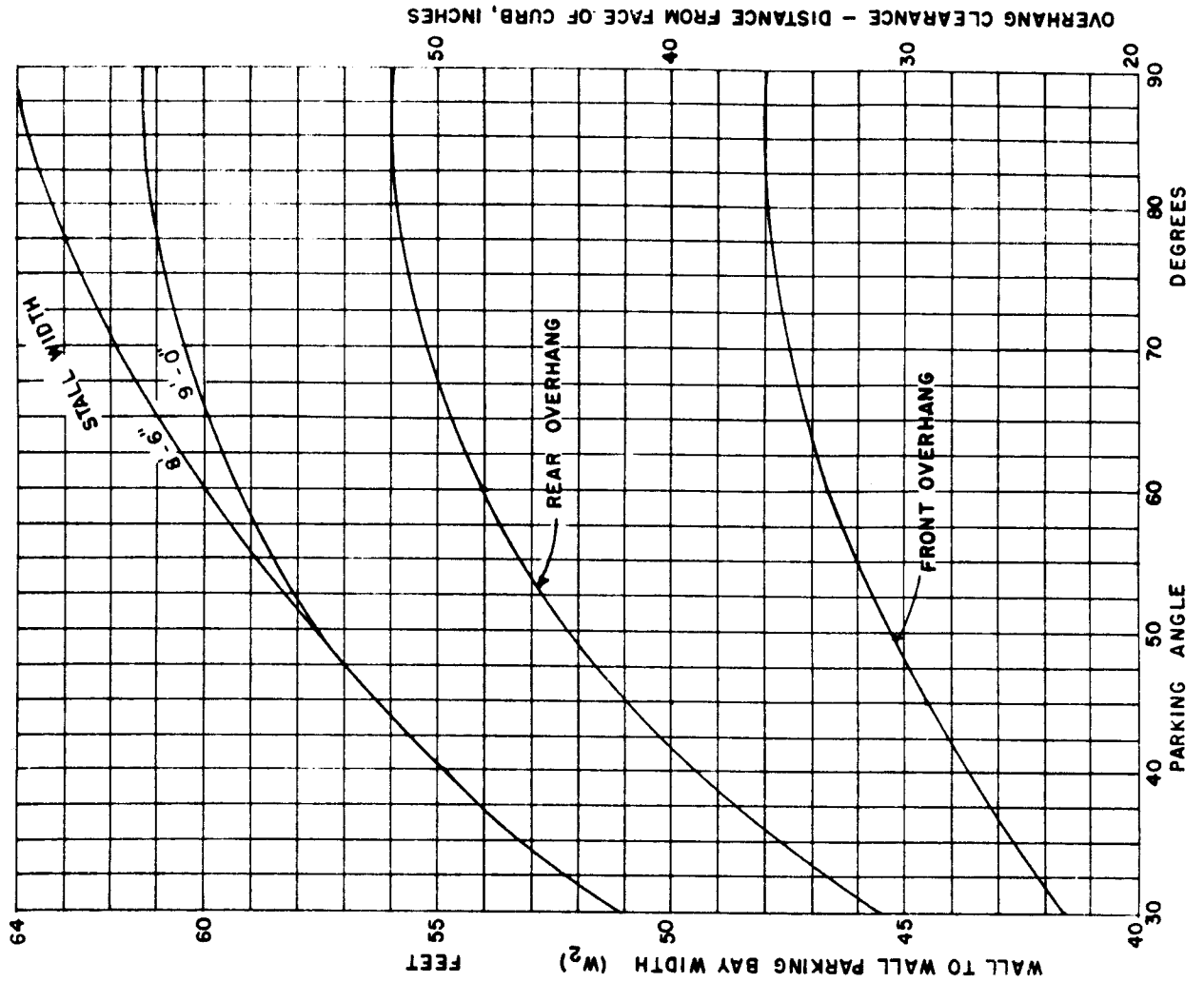
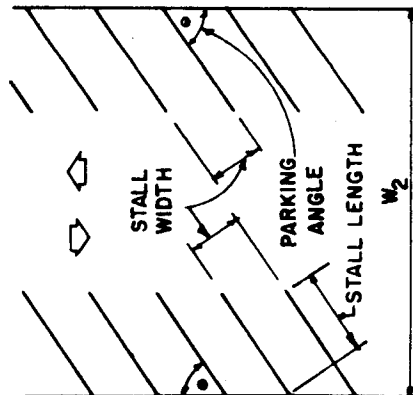
Notes:

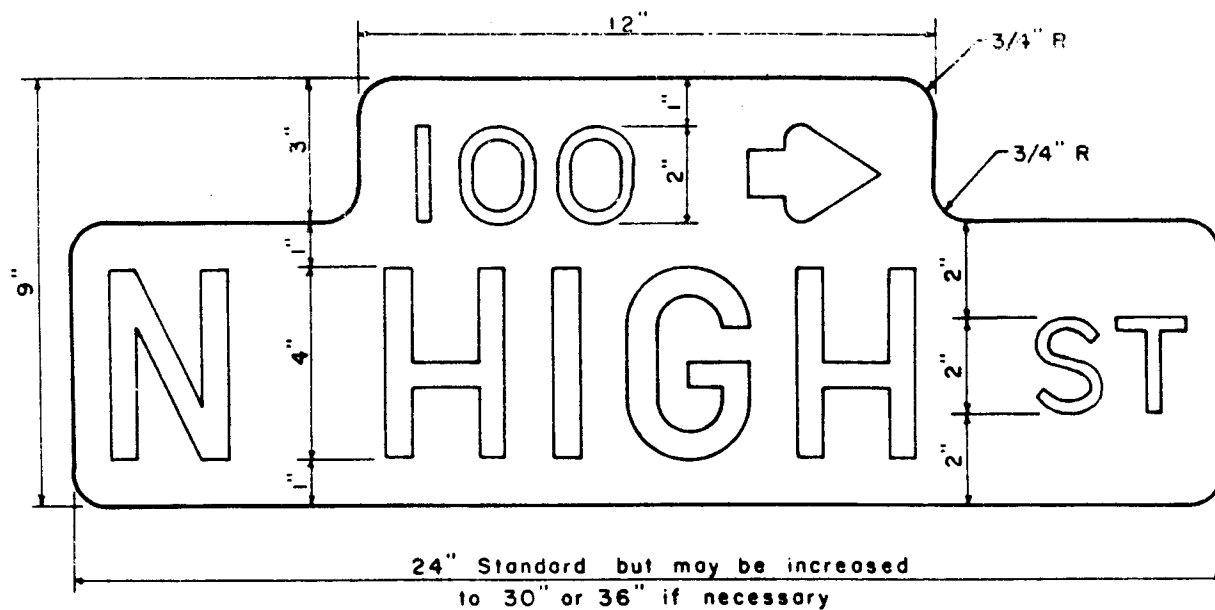
STANDARD VEHICLE

1. MINIMUM STALL WIDTH = 8'-6"
2. MINIMUM STALL LENGTH = 19'-0"
3. IN CURBED ISLAND DESIGN, DEDUCT OVERHANG CLEARANCE FROM W_2 .

COMPACT VEHICLE

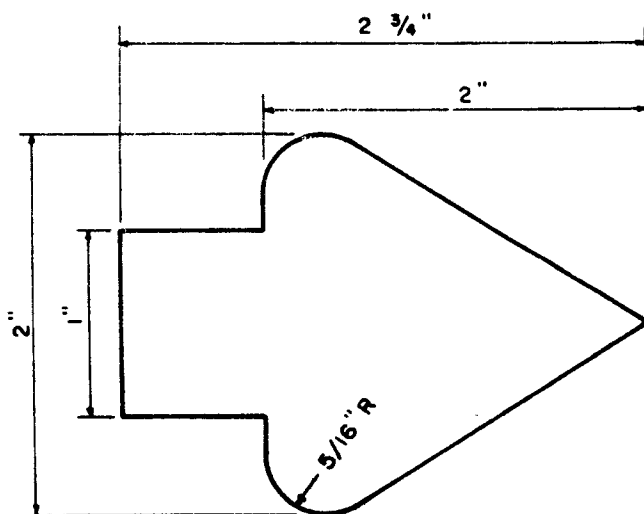
1. MINIMUM STALL WIDTH = 7'-6"
2. MINIMUM STALL LENGTH = 16'-0"
3. IN CURBED ISLAND DESIGN, DEDUCT OVERHANG CLEARANCE FROM W_2 .





NOTES

1. Sign shall be 0.080" min. thickness alum. sheet (ASTM: B-209 alloy 6061-T6 as amended flatsheet).
2. Reflective sheets shall be scotchlite sheeting *3277 green for face and scotchlite *2270 silver for letters and numbers or equal.



STANDARD STREET NAME SIGN

T-14

STANDARD
DETAILS

STANDARD STREET NAME SIGN

COUNTY OF MAUI

SEPTEMBER 1984

NOT TO SCALE