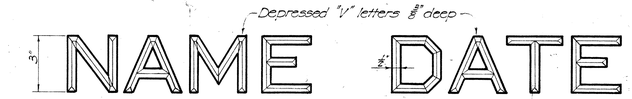
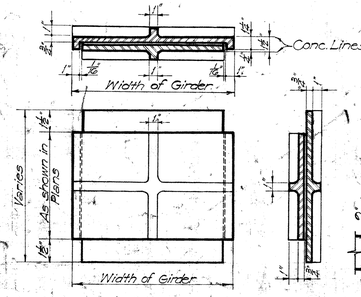
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FG (18)	1954	51	79



DETAIL OF LETTERS AND FIGURES AT BOTH APPROACHES

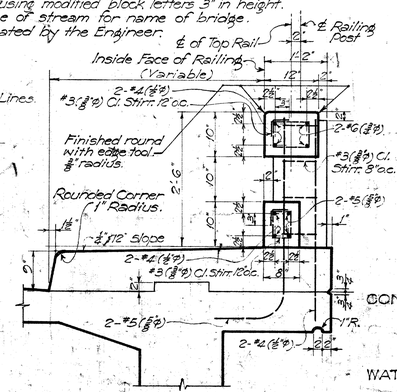
NOTE: Name of bridge to be placed in left end post panels and date in right post panels on entering bridge using modified block letters 3" in height. In case of stream crossings use name of stream for name of bridge. For all others use name as designated by the Engineer.



EXPANSION PLATES

Scale: 1½" = 1'-0"

NOTE: Plates to be made of A. Bronze conforming to A.S.T.M., B22, Class C. Contact areas to have medium planed finish with finishing strokes parallel to longitudinal direction of bridge.



SECTION "B-B"
RAILING DETAIL

Scale: ¾" = 1'-0"

NOTE: Sidewalk, curb and railing to be poured after release of falsework. Forms for railing and endpost to be made of plywood.
SURFACE FINISH: The surface of the concrete railings shall be given a Class 2 Rubbed Finish, as specified under Subarticle 51.3 (C) (2) of Section 51 Concrete of the Standard Specifications.

GENERAL NOTES

CONCRETE: Class of concrete to be used in different parts of the structure are as noted on the plans.

REINFORCING STEEL: All reinforcing steel shall be Billet Steel Bars A.S.T.M. A 15 intermediate grade, or Rail Steel Bars A.S.T.M. A 16. Steel shall be made by the open-hearth process. Deformations shall conform to A.S.T.M.-A 305.

Splicing of reinforcing other than in main deck slab, girder and frame bars shall be done as shown in above sketch except where shown otherwise. Splices are to be staggered. Splices in main girder and frame bars are permitted only in bars exceeding 60'-0" in length at points to be indicated by the Engineer. These splices to be electrically arc welded according to detail and specifications. No allowance will be made in the quantities for extra weight of steel required for splices not shown on the plans.

Minimum spacing between parallel bars shall be 2½ times the diameter of round or 3 times the side dimension of square bars, but in no case shall the clear distance between the bars be less than 1½ times the maximum size of the coarse aggregate.

Minimum covering, measured from the surface of the concrete to the face of any reinforcing bar, shall be not less than 2 inches except in slabs where the minimum covering shall be 1 inch. In the footings of abutments and retaining walls and in piers the minimum covering shall be 3 inches. In work exposed to the action of sea water the minimum covering shall be 4 inches except in precast concrete piles where a minimum of 3" may be used.

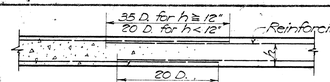
All dimensions relating to reinforcing are to centers of bars unless otherwise noted.

CONSTRUCTION JOINTS: All construction joints to have surface roughened and 1:2 cement grout applied immediately before the second pour. Construction joints to be located at places indicated in the plans.

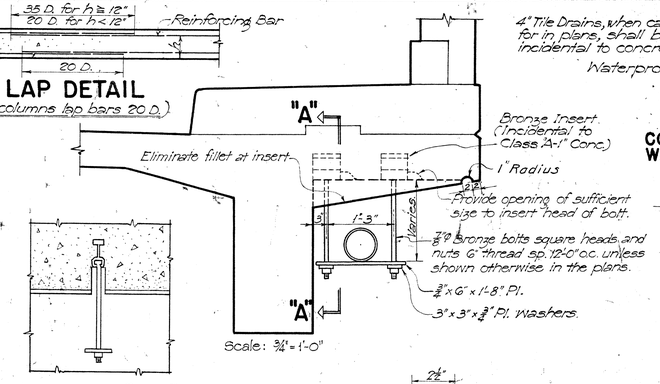
WATERPROOFING:
(1). Mop surface either side of joint as required with asphalt 50-100 penetration (A.S.T.M. Desig. D 5-25) applied at 200°F.
(2). Apply one layer of 55# Composition Roofing to hot asphalt.
(3) Mop surface of composition roofing and 3" beyond all around with thick coat of asphalt as specified under (1).

The above work is incidental to concrete and will not be paid for separately.

DAMP PROOFING: Apply damp proofing as specified in Section 66 of the Standard Specifications.



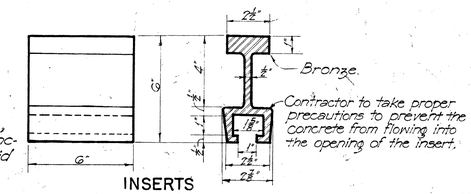
LAP DETAIL
(In columns lap bars 20 D.)



SECTION "A-A"

Scale: ¾" = 1'-0"

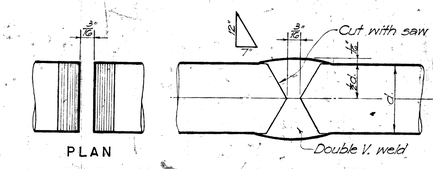
JOINT FILLER: Joint filler, when called for in plans, shall be incidental to concrete and will not be paid for separately.



INSERTS
Scale: ¾" = 1'-0"

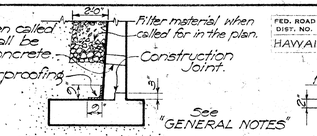
DETAIL OF PIPE HANGERS AND INSERTS

NOTE: Inserts, bolts, plates, nuts & washers to be Bronze conforming to A.S.T.M. Designation B 22 and shall be Class "D" grade.

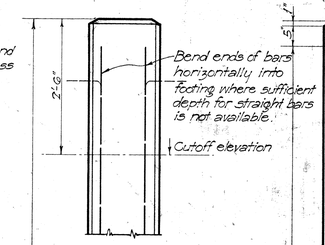


REINFORCING BAR SPLICE

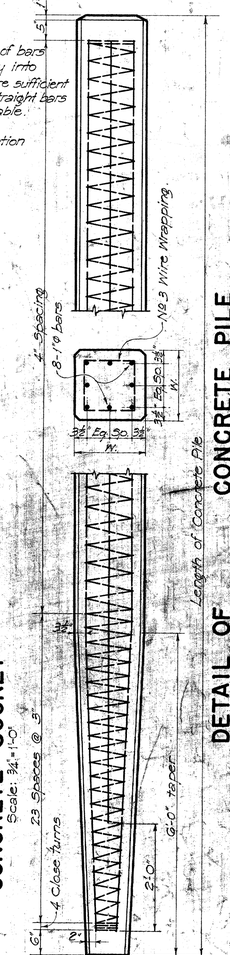
Scale: Full Size



CONSTRUCTION JOINT, WATERPROOFING AND WEEPHOLES.



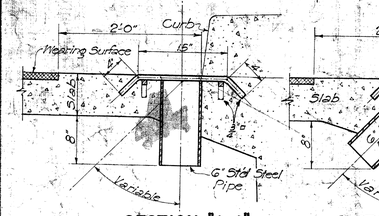
PILE CUTOFF

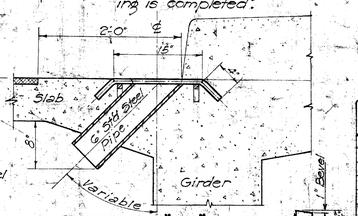


DETAIL OF CONCRETE PILE

NOTE: Metal drains shall be considered incidental to Class A-1 Concrete in both concrete and steel bridges and will not be paid for separately.

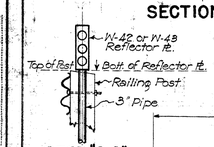
Assemblage of grillage and pipe shall be hot-dip galvanized after all welding is completed.





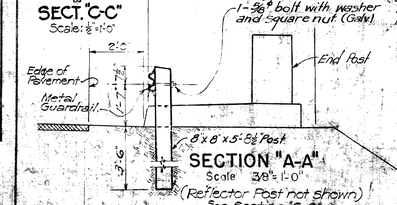
DRAINAGE DETAIL

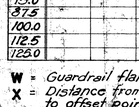
Scale: 1" = 1'-0"



SECT. "C-C"

Scale: ½" = 1'-0"



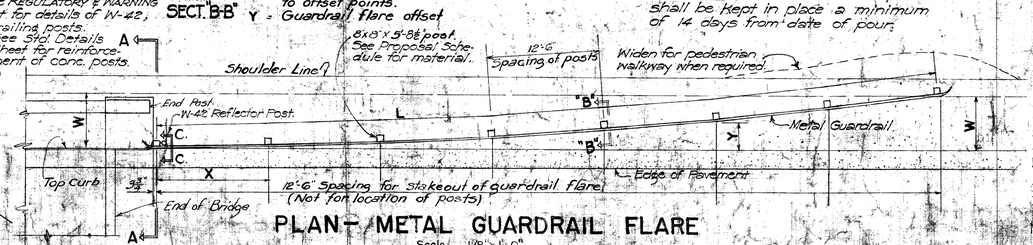


NOTE: See REGULATORY & WARNING SIGNS Sheet for details of W-42, W-43, and railing posts. See Std. Details Sheet for reinforcement of conc. posts.

8"x8"x5'-8½" post. See Proposal Schedule for material.

12'-6" Spacing of posts

Widen for pedestrian walkway when required.



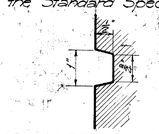
PLAN - METAL GUARDRAIL FLARE

Scale 1/8" = 1'-0"

GUARDRAIL OFFSET

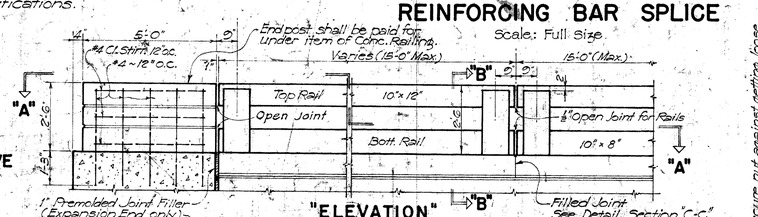
X	Y W=3'	W=4'	W=5'	W=6'	W=7'	W=8'
12.5	0.19	0.16	0.14	0.12	0.09	0.08
25.0	0.75	0.64	0.55	0.49	0.35	0.32
37.5	1.69	1.44	1.25	1.10	0.78	0.72
50.0	3.00	2.56	2.22	1.96	1.38	1.28
62.5		4.00	3.47	3.06	2.16	2.00
75.0			5.00	4.41	3.11	2.88
87.5				6.00	4.23	3.92
100.0					5.53	5.12
112.5					7.00	6.48
125.0						8.00

W = Guardrail flare
X = Distance from post at bridge to offset points.
Y = Guardrail flare offset



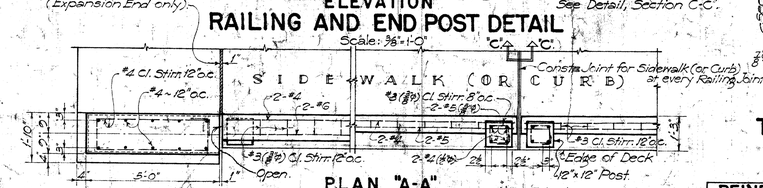
DETAIL OF END POST GROOVE

Scale: 3" = 1'-0"



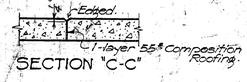
"ELEVATION" RAILING AND END POST DETAIL

Scale: ⅜" = 1'-0"

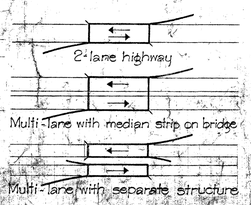


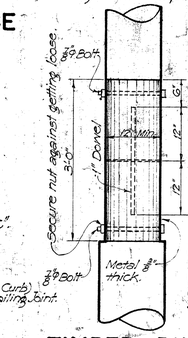
PLAN "A-A"

TOP RAIL ~ Bottom forms for top rails shall be kept in place a minimum of 14 days from date of pour.



SECTION "C-C"





NOTE: Sleeve may be pipe or formed from steel plate with arc welded butt joint.

TIMBER PILE SPLICE

Scale: ⅜" = 1'-0"

REINF. BAR DESIGNATION

BAR NO.	FORMER DESIG.	LBS. / FT.	DIAM. IN.	AREA IN²
2	¼-in. ϕ	0.167	0.250	0.05
3	⅜-in. ϕ	0.376	0.375	0.11
4	½-in. ϕ	0.668	0.500	0.20
5	⅝-in. ϕ	1.043	0.625	0.31
6	¾-in. ϕ	1.502	0.750	0.44
7	⅞-in. ϕ	2.044	0.875	0.60
8	1-in. ϕ	2.670	1.000	0.79
9	1-in. □	3.400	1.128	1.00
10	1⅛-in. □	4.303	1.270	1.27
11	1¼-in. □	5.313	1.410	1.56

BEND DETAIL

TERRITORIAL HIGHWAY DEPARTMENT
TERRITORY OF HAWAII

STANDARD BRIDGE DETAILS

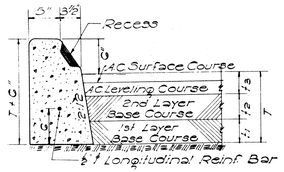
Scales as Noted

APPROVED BY: _____ TERRITORIAL HIGHWAY ENGINEER

SHEET No. 5686.51 OF SHEETS

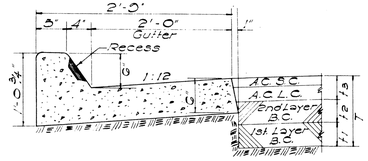
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	Mar. 1952
	REVISED BY	
	QUANTITIES BY	
	CHECKED BY	
NOTE BOOK No.		

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F G (18)	1964	52	79

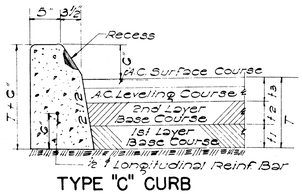


TYPE "A" & "B" CURB
SCALE: 1" = 1'-0"

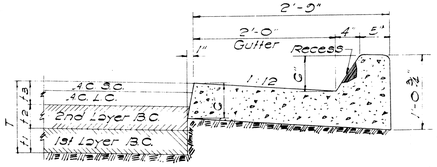
General Note Covering All Types of Curbs:
Occasionally curb rests on first layer of base course. See typical sections.



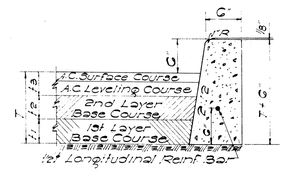
TYPE "AG" & "BG" CURB & GUTTER
SCALE: 1" = 1'-0"



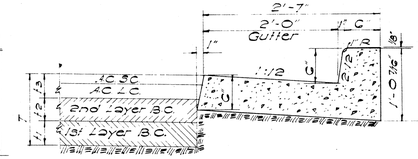
TYPE "C" CURB
SCALE: 1" = 1'-0"



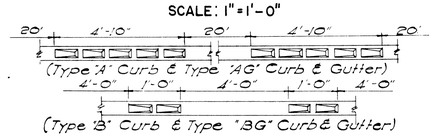
TYPE "CG" CURB & GUTTER
SCALE: 1" = 1'-0"



TYPE "D" CURB
SCALE: 1" = 1'-0"

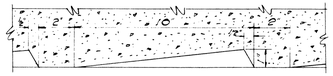


TYPE "DG" CURB & GUTTER
SCALE: 1" = 1'-0"

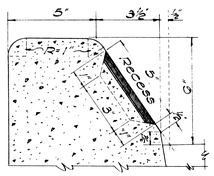


TYPE AND SPACING OF RECESSES

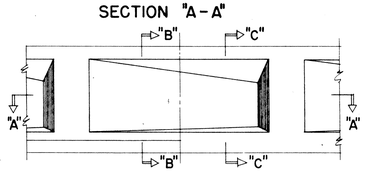
NOTES:
1.) Types 'AG', 'BG', 'CG', 'DG' and 'EG' Concrete Curbs and Gutters are to be poured monolithically.
2) Types 'A', 'B', and 'C' Curbs and Types 'AG', 'BG' and 'CG' Curbs and Gutters occur at Median Strips and Traffic Islands.
3) Shaded area in Curbs are to be painted with an approved white lacquer. (One Coat)
4) All Conc. Curbs and Gutters shown herein are to be of Class 'A-1' Conc. and Cast-in-Place.



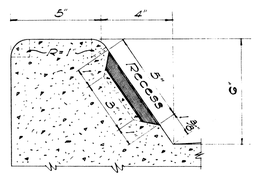
SECTION "A-A"



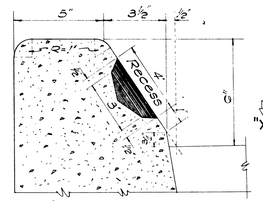
SECTION "B-B"
TYPE "A" & "B" CURB



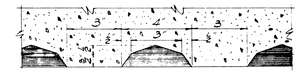
ELEVATION
SCALE: 3" = 1'-0"



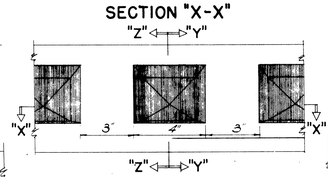
SECTION "C-C"
TYPE "AG" & "BG" CURB



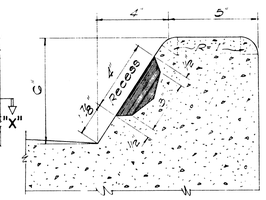
SECTION "Y-Y"
TYPE "C" CURB



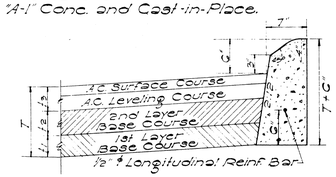
SECTION "X-X"



ELEVATION
SCALE: 3" = 1'-0"

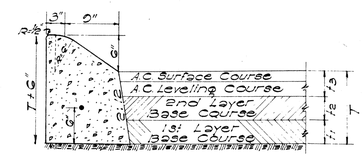


SECTION "Z-Z"
TYPE "CG" CURB

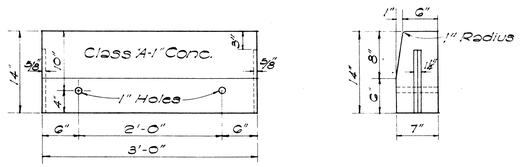


TYPE "F" CURB
SCALE: 1" = 1'-0"

DETAILS OF CAST-IN-PLACE CONC. CURBS AND GUTTERS

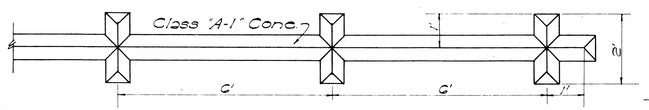


TYPE "E" CAST-IN-PLACE CONCRETE CURB
SCALE: 1" = 1'-0"

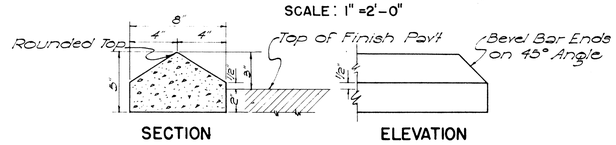


FRONT ELEV. END ELEV.

PRECAST CONC. CURB
SCALE: 1" = 1'-0"

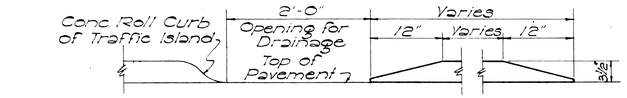


PLAN
SCALE: 1" = 2'-0"

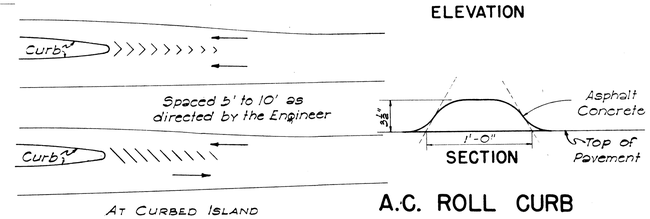


SECTION ELEVATION

RAISED TRAFFIC BARS
SCALE: 1" = 6"



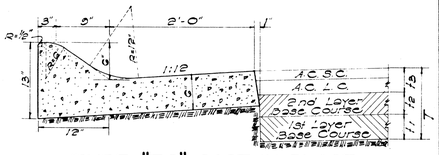
ELEVATION



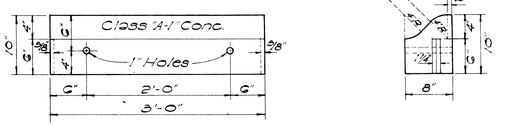
SECTION

AT CURBED ISLAND

A.C. ROLL CURB
NOT TO SCALE

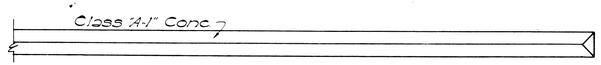


TYPE "EG" CAST-IN-PLACE CONC. CURB & GUTTER
SCALE: 1" = 1'-0"



FRONT ELEV. END ELEV.

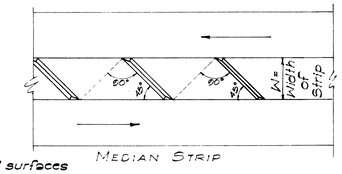
PRECAST CONC. ROLL CURB
SCALE: 1" = 1'-0"



PLAN

NOTE:
Section and Elevation for Jiggle Bars are same as the Traffic Bars.

RAISED JIGGLE BARS
SCALE: 1" = 2'-0"



MEDIAN STRIP

NOTE:
Paint all exposed surfaces of bars with beaded white traffic lacquer.

LAYOUT OF JIGGLE BARS
NOT TO SCALE

APPROVED: DATE 6-23-53

Ben E. Nutter
TERRITORIAL HIGHWAY ENGINEER

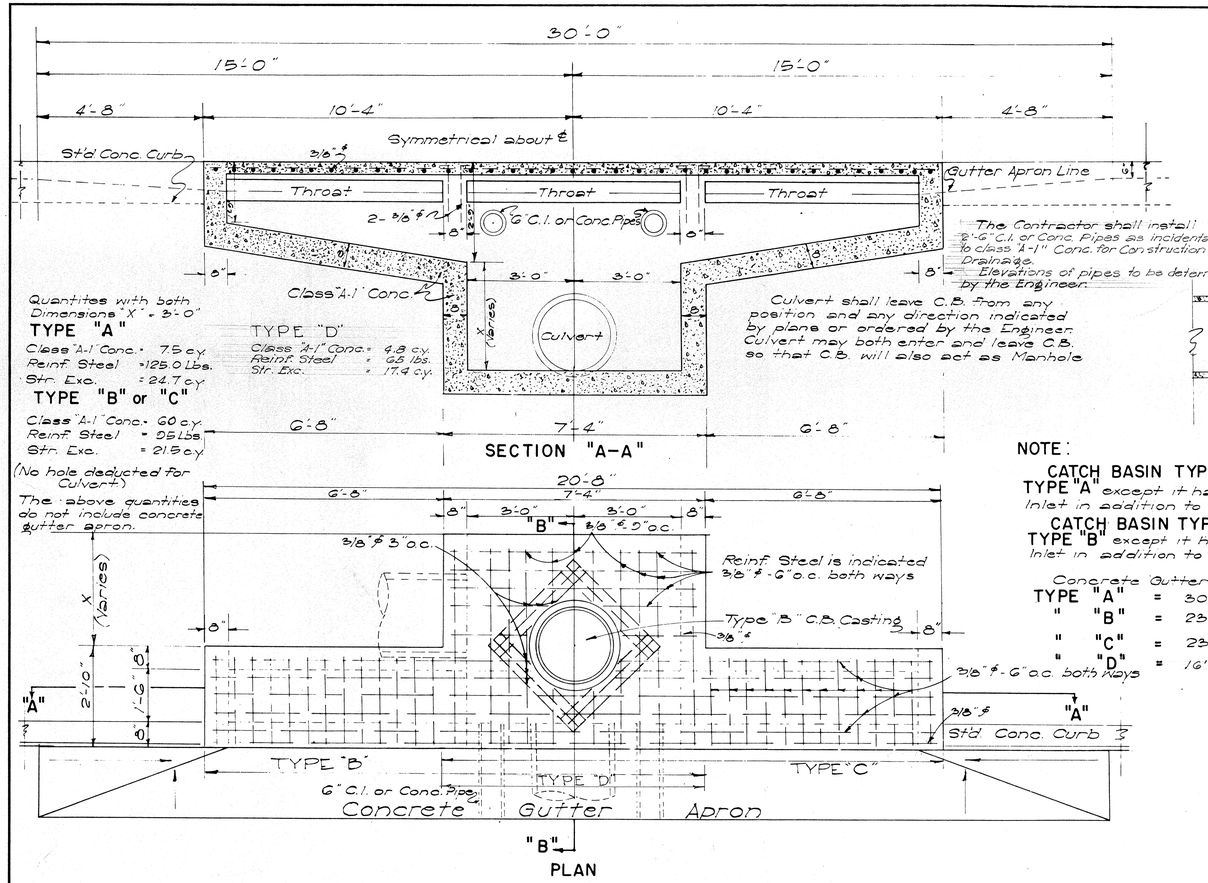
TERRITORIAL HIGHWAY DEPARTMENT
TERRITORY OF HAWAII
STANDARD DETAILS
CONCRETE CURBS,
CONCRETE CURBS & GUTTERS
SCALES AS NOTED

SHEET Nº 1 OF 6 SHEETS

5686.52

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	FG(18)	1954	58	70



Quantities with both Dimensions "X" = 3'-0"

TYPE "A"

Class "A-1" Conc. = 7.5 c.y.
Reinf. Steel = 125.0 Lbs.
Str. Exc. = 24.7 c.y.

TYPE "B" or "C"

Class "A-1" Conc. = 6.0 c.y.
Reinf. Steel = 95 Lbs.
Str. Exc. = 21.5 c.y.

(No hole deducted for Culvert)

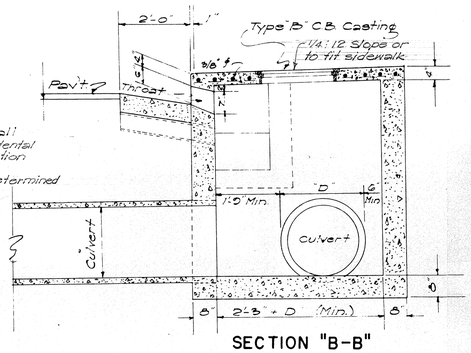
The above quantities do not include concrete gutter apron.

TYPE "D"
Class "A-1" Conc. = 4.8 c.y.
Reinf. Steel = 65 lbs.
Str. Exc. = 17.4 c.y.

The Contractor shall install 2-6" C.I. or Conc. Pipes as incidental to class "A-1" Conc. for Construction Drainage. Elevations of pipes to be determined by the Engineer.

Culvert shall leave C.B. from any position and any direction indicated by plans or ordered by the Engineer. Culvert may both enter and leave C.B. so that C.B. will also act as Manhole

NOTE:
Provide Manhole Rungs where necessary.



SECTION "B-B"

NOTE:

CATCH BASIN TYPE "B" similar to **TYPE "A"** except it has only Left Side Inlet in addition to the Main Box.

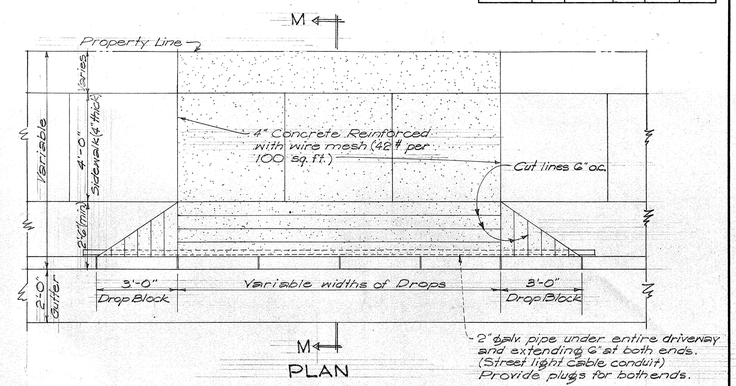
CATCH BASIN TYPE "C" similar to **TYPE "B"** except it has only Right Side Inlet in addition to the Main Box.

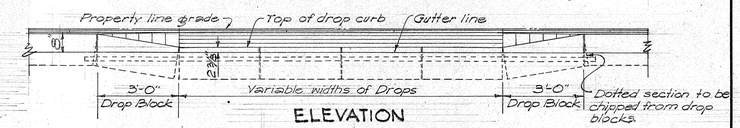
Concrete Gutter Length:

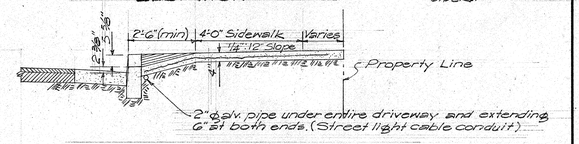
TYPE "A"	=	30'-0"
" "B"	=	23'-4"
" "C"	=	23'-4"
" "D"	=	16'-8"

CATCH BASIN TYPE "D" has only the Main Box.

In all Standard Concrete Catch Basins, the locations of Type "B" C.B. Casting shall be determined by the Resident Engineer.

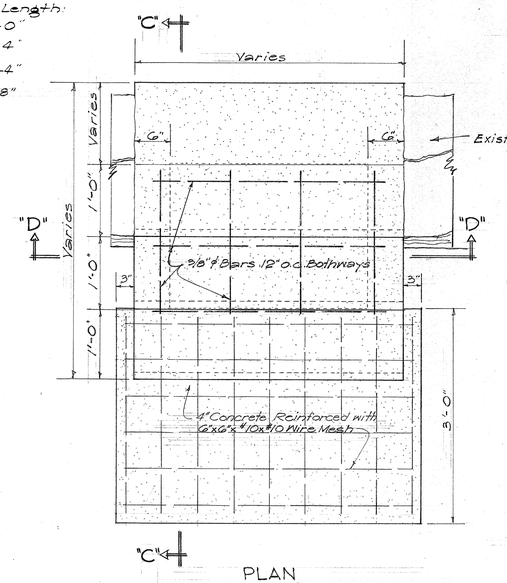


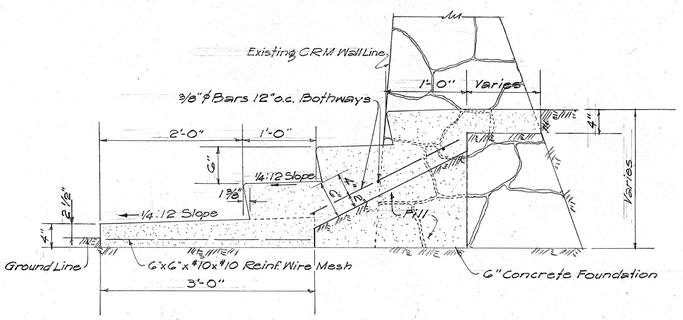




DETAIL OF DROP DRIVEWAYS

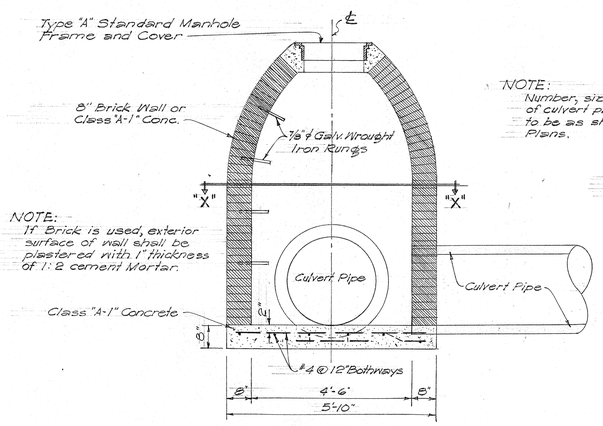
SCALE: 3/8" = 1'-0"





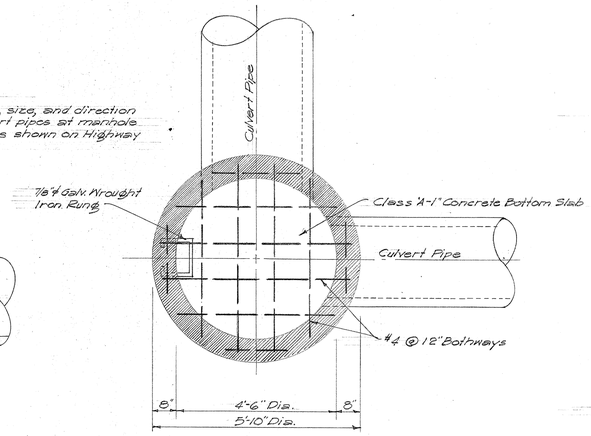
DETAIL OF CONCRETE CATCH BASIN TYPE "A"

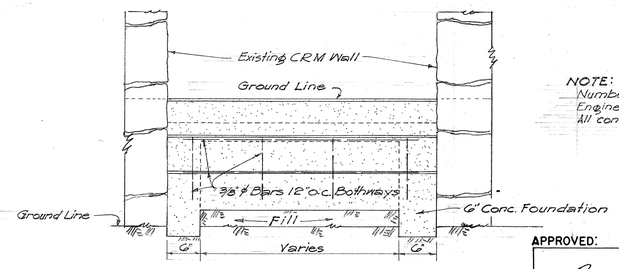
SCALE: 1/2 = 1'-0"



NOTE:
If Brick is used, exterior surface of wall shall be plastered with 1" thickness of 1:2 cement Mortar.

NOTE:
Number, size, and direction of culvert pipes at manhole to be as shown on Highway Plans.





DETAIL OF CONCRETE STEPS

NOTE:
Number of risers and width of Concrete Steps shall be determined by the Engineer on the job.
All concrete shall be Class "A-1."

APPROVED: DATE 6-23-53

Bw. E. Rutter
TERRITORIAL HIGHWAY ENGINEER

TERRITORIAL HIGHWAY DEPARTMENT
TERRITORY OF HAWAII

STANDARD DETAILS
CATCH BASINS

SCALES AS NOTED

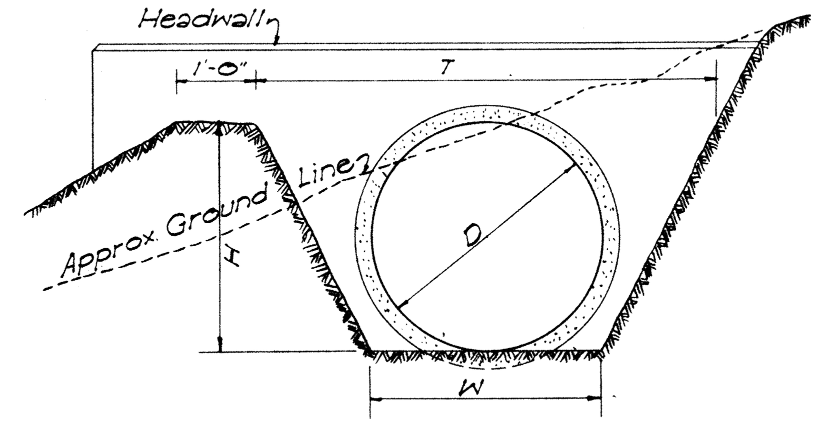
SHEET Nº 2 OF 6 SHEETS

5686.53

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

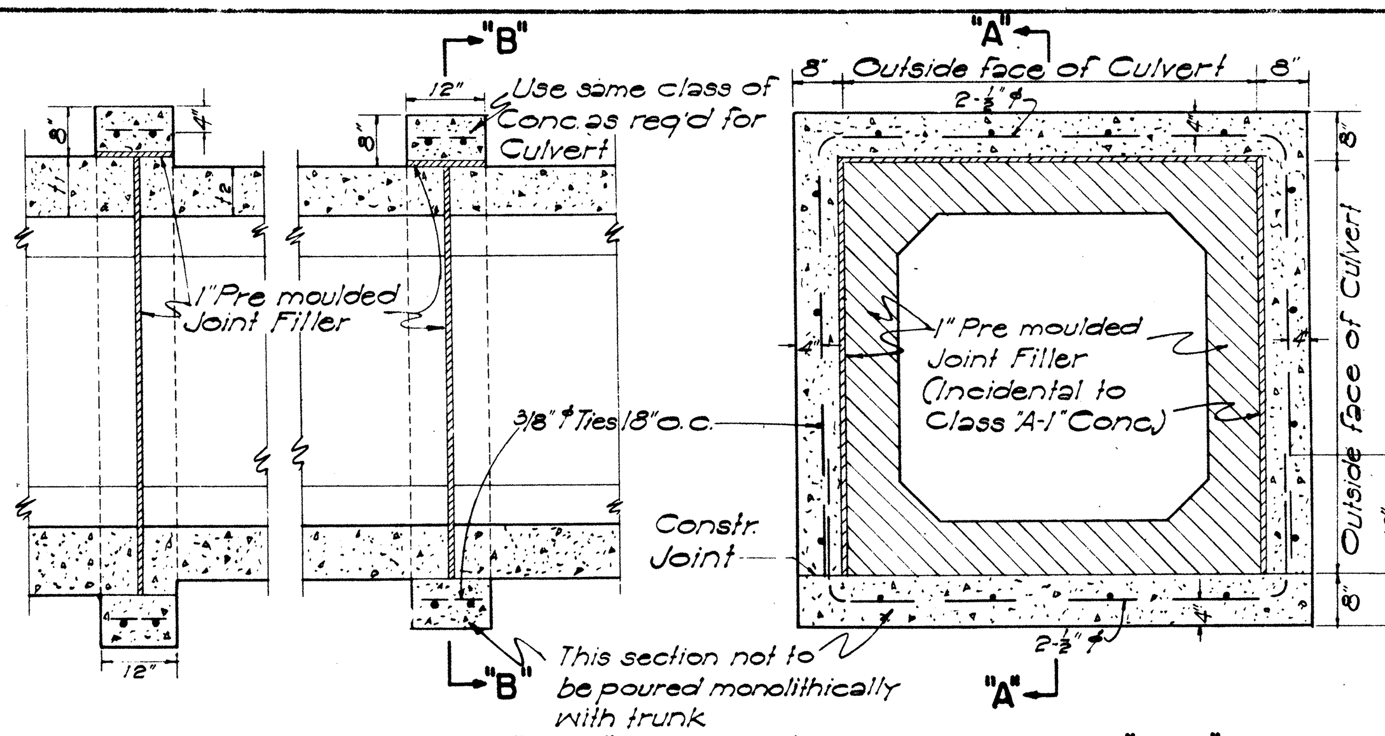
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FG (18)	1954	54	79

DATA FOR OUTLET DITCH			
D	W	H	T=W+H
18"	24"	2'-0"	4'-0"
24"	30"	2'-0"	4'-6"
30"	30"	2'-6"	5'-0"
36"	36"	3'-0"	6'-0"



DETAIL OF OUTLET DITCH

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

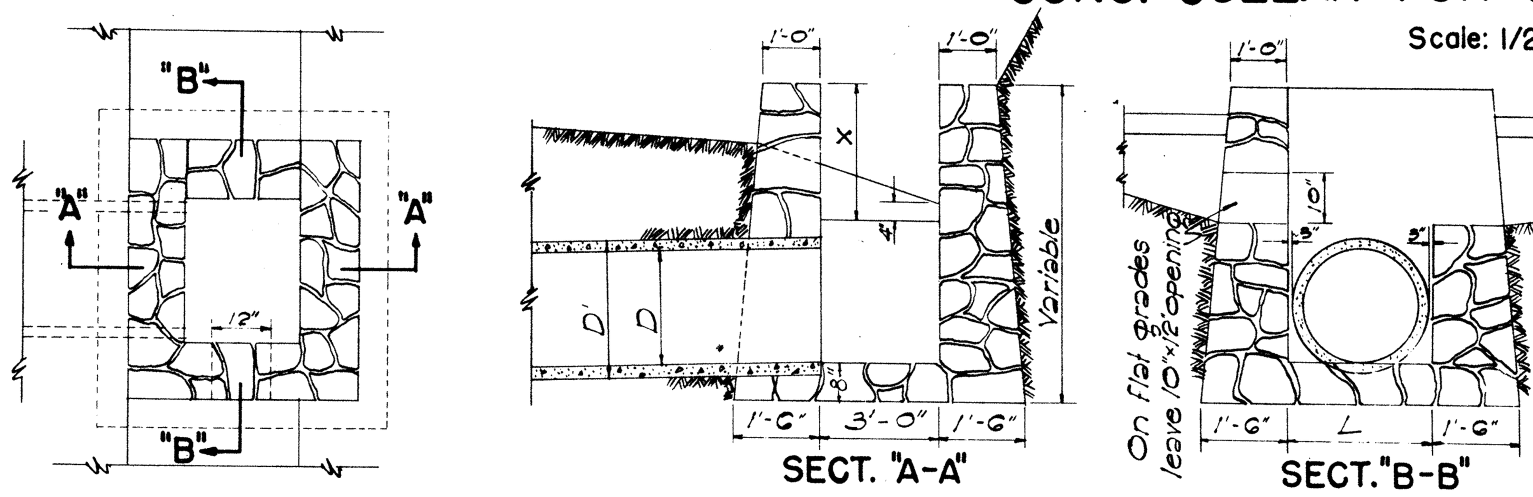


CONC. COLLAR FOR CONC. BOX CULVERT

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

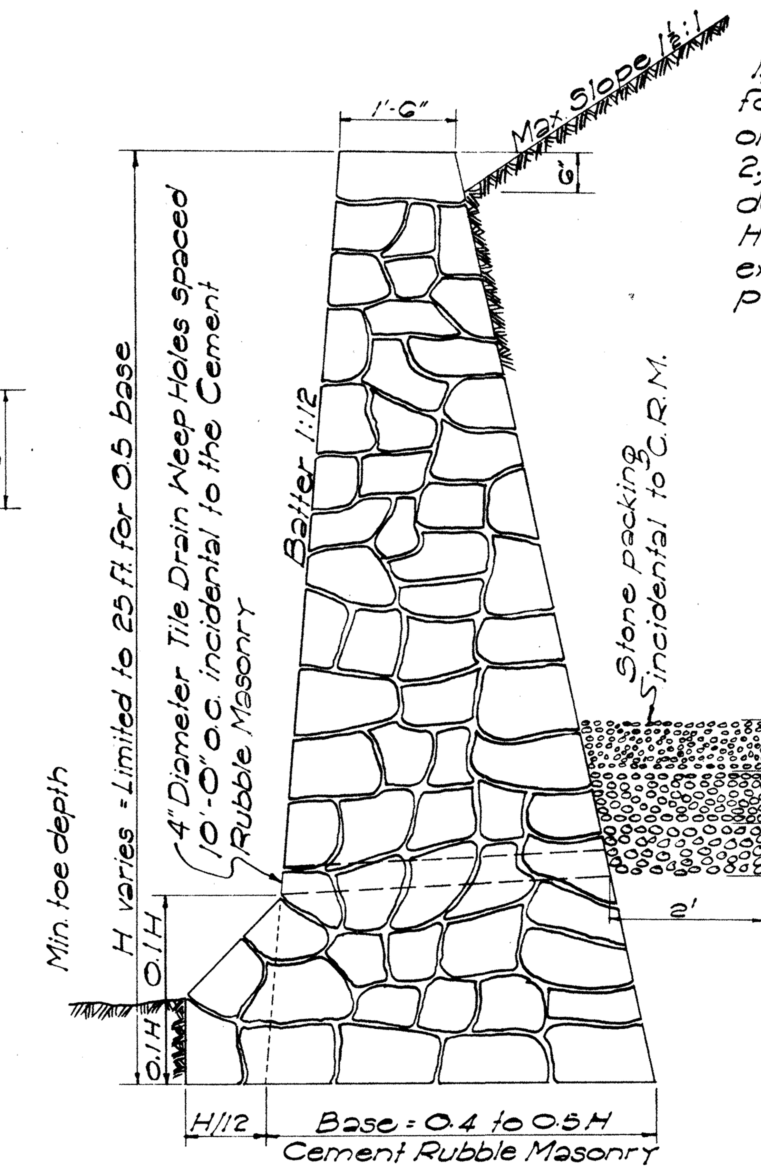
DATA FOR MASONRY DROP INTAKE				Where Variables Equal
D'	D	L=D'+6"	Cu.Yds.	
23"	18"	2'-5"	3.02	4'-6"
30"	24"	3'-0"	3.61	5'-0"
37"	30"	3'-7"	4.21	5'-6"
44"	36"	4'-2"	4.85	6'-0"

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



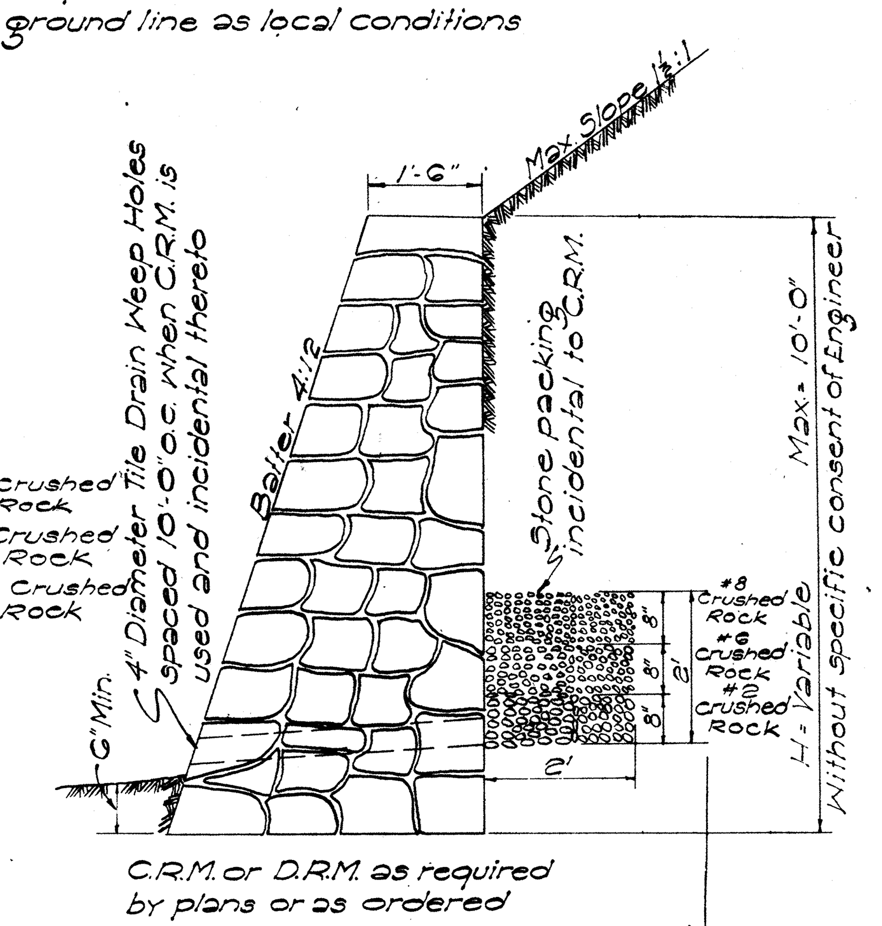
DETAIL OF MASONRY DROP INTAKE

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



SECTION OF HIGH CEMENT RUBBLE MASONRY RETAINING WALL OR SEAWALL

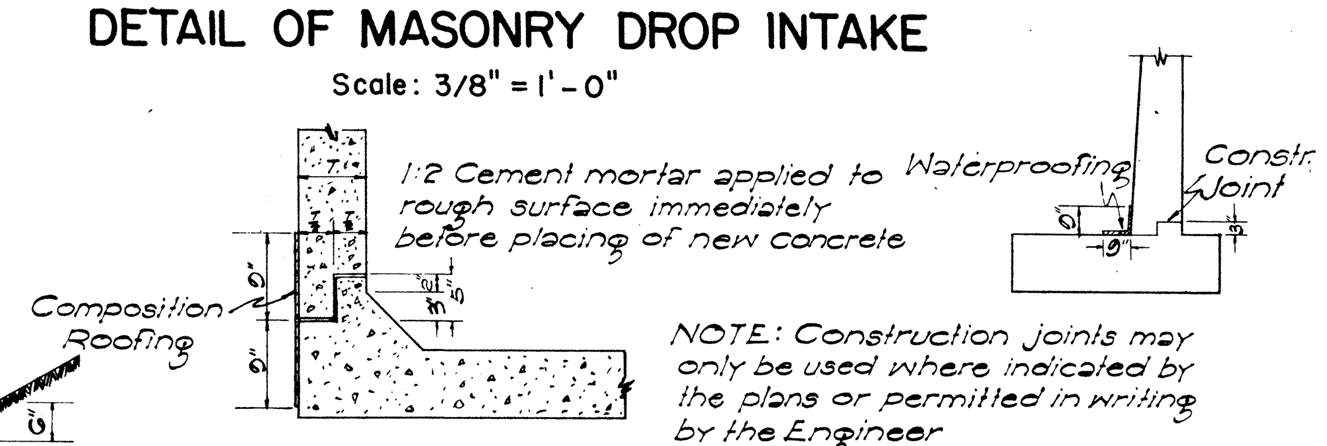
Note: To Resident Engineer
1.) Consider economy of reinf. conc. for high retaining walls which did not originate on plan layout.
2.) Elevation of weep holes to be determined by Resident Engineer. Holes to be placed as close to the existing ground line as local conditions permit.



C.R.M. or D.R.M. as required by plans or as ordered

SECTION OF LOW MASONRY RETAINING WALL OR SEAWALL

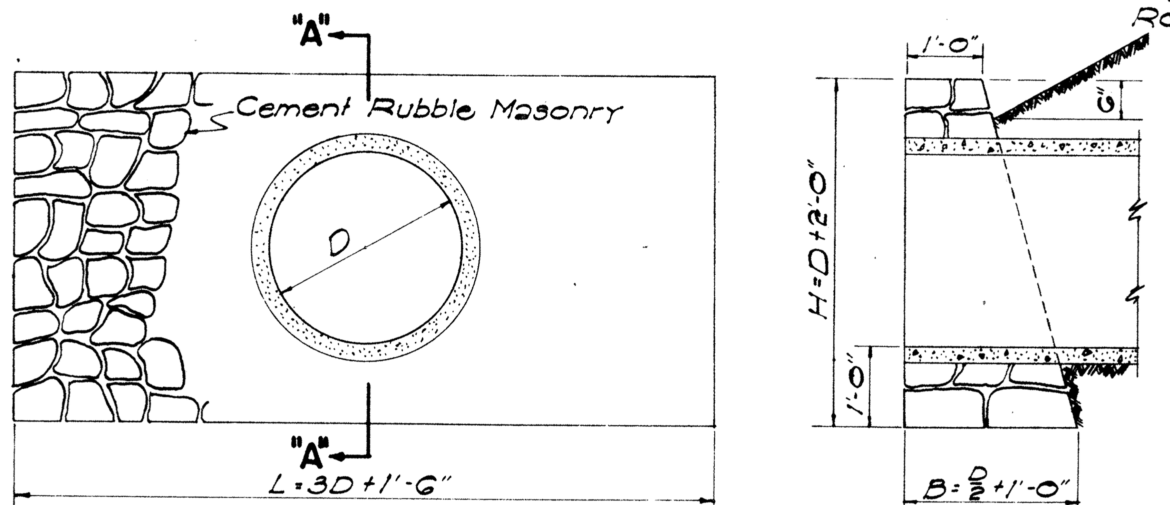
DATA—MASONRY HEADWALL				Cast-in-Place Conc. Culv't	Conc. Pipe Culvert	Corrugated Pipe Culv't
D	H	B	L	Cu. Yds.	Cu. Yds.	Cu. Yds.
18"	3'-6"	1'-9"	6'-0"	0.85	0.95	0.93
24"	4'-0"	2'-0"	7'-6"	1.28	1.45	1.41
30"	4'-6"	2'-3"	9'-0"	1.83	2.06	2.00
36"	5'-0"	2'-6"	10'-6"	2.49	2.84	2.72



NOTE: Construction joints may only be used where indicated by the plans or permitted in writing by the Engineer

CONSTR. JOINT DETAILS

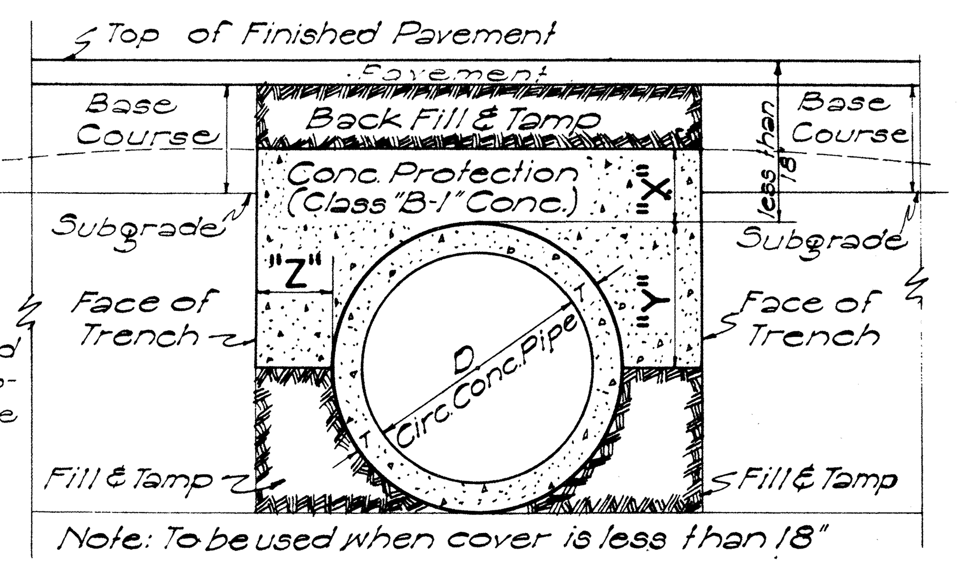
METHOD OF APPLYING CONSTR. JOINT WATERPROOFING
(1.) Mop surface either side of joint as required with asphalt 50-100 penetration (A.S.T.M. Desig. D 5-25) applied at 200°F.
(2.) Apply one layer of 55-lb composition roofing to hot asphalt.
(3.) Mop surface of composition roofing and 3" beyond all around with thick coat of asphalt as specified under (1.)
The above work is incidental to concrete and will not be paid for separately.



DETAIL OF MASONRY HEADWALL

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

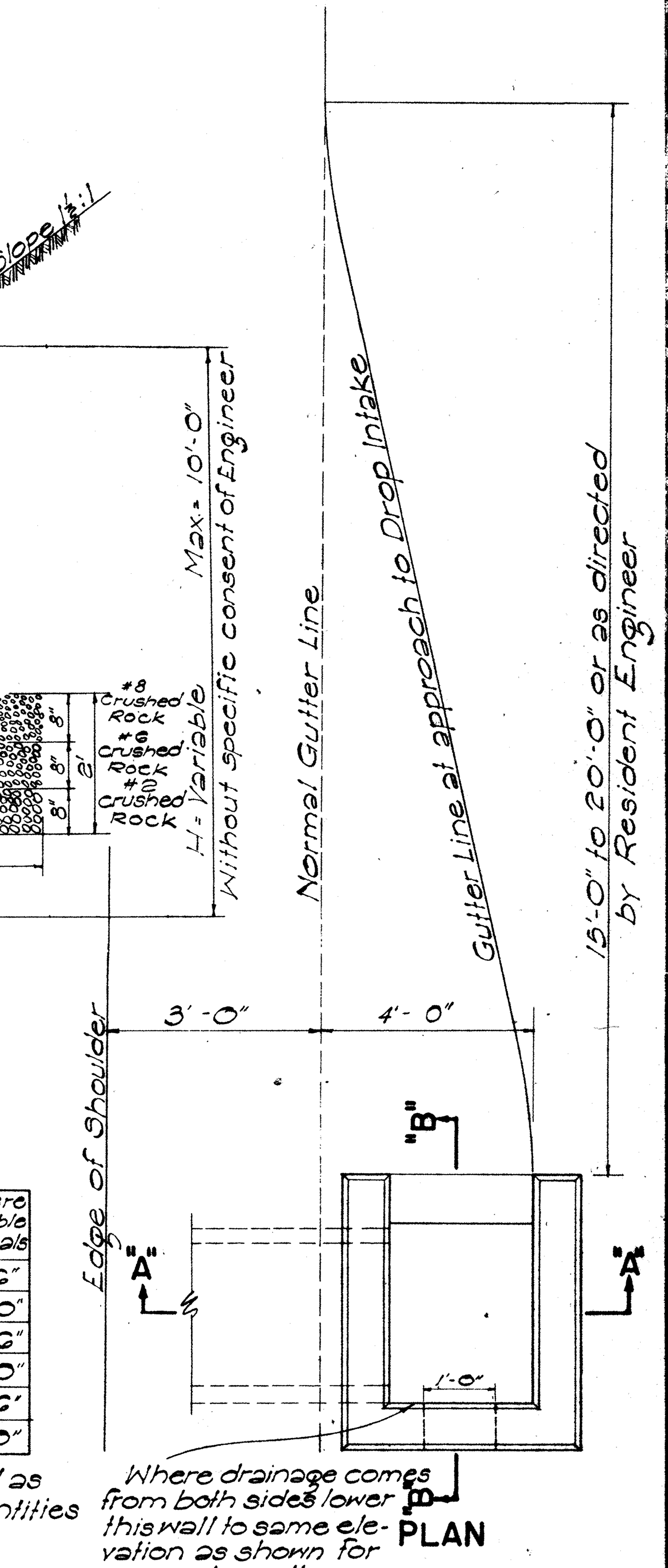
Note:
When subgrade is below top of jacket, it shall be fully compacted to this line and then re-excavated (struc. exc.) to proper subgrade. This surface shall be rolled again.



DATA FOR CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18"D	D/2 + T	Z must be from pipe to face of trench Minimum = X Maximum pay quantity will be Z = 12"
7" " 24"D		
8" " 30"D		
9" " 36"D		
10" " 42"D		
11" " 48"D		
12" " 54"D		

SECT. OF CULVERT WITH CONC. PROTECTION

Scale: 1" = 1'-0"



Where drainage comes from both sides lower this wall to same elevation as shown for opposite wall.

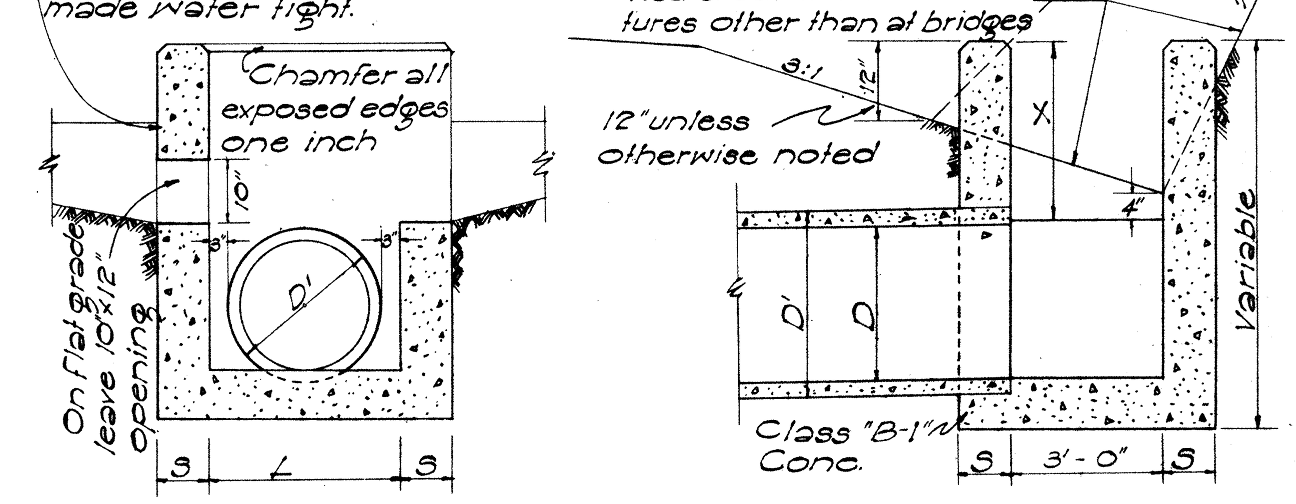
DATA—CONC. DROP INTAKE					Where Variable Equals
D'	D	L=D'+6"	S	Cu.Yds.	
23"	18"	2'-5"	8"	1.41	4'-6"
30"	24"	3'-0"	8"	1.72	5'-0"
37"	30"	3'-7"	9"	2.32	5'-6"
44"	36"	4'-2"	9"	2.73	6'-0"
51"	42"	4'-9"	10"	3.54	6'-6"
58"	48"	5'-4"	10"	4.01	7'-0"

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

Note: This type of structure shall also be used for the Drop Intakes of Syphons connected with Irrigation Ditches or Flumes with appropriate changes to dimensions. In this case all joints must be made water tight.

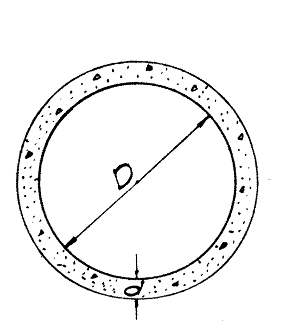
Excavate recess in roadway excavation slope for inlet to dimensions and form designated by Engineer. This is "Unclassified Excavation."

Top limits of unclassified excavation for structures other than at bridges



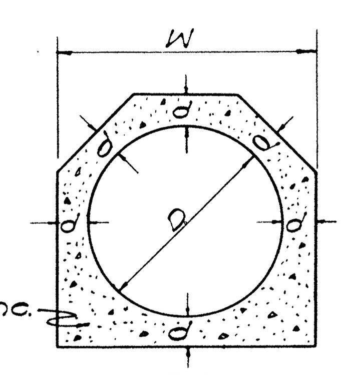
DETAIL OF CONCRETE DROP INTAKE

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



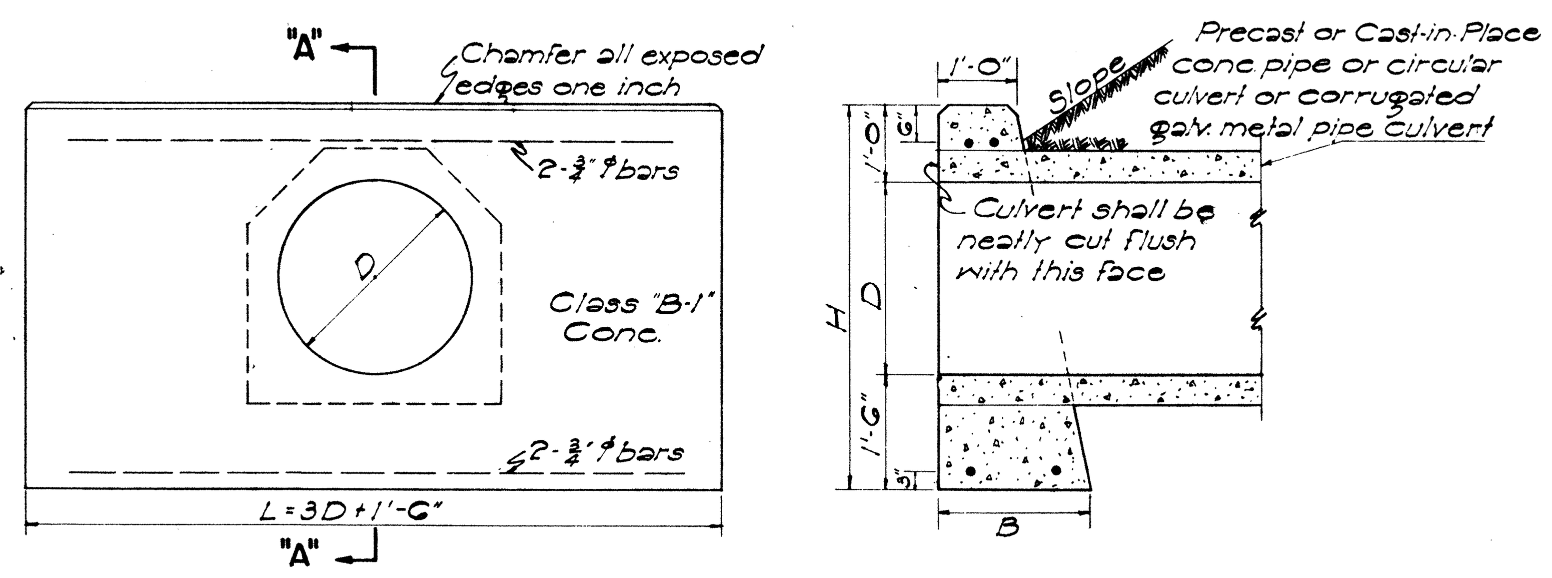
CONC. PIPE CULVERT

NOTE:
Thickness "d", reinforcing, and Concrete used, are to conform with the approved design as provided by the Specifications.



DATA- CAST-IN-PLACE CONC. CULV'T			
D	d	W	Cu.Yd. per Ft.
18"	4"	2'-2"	0.11
24"	4½"	2'-9"	0.14
30"	5"	3'-4"	0.19
36"	5½"	3'-11"	0.26

CAST-IN-PLACE CONC. CULVERT



DATA FOR CONC. HEADWALL				Cast-in-Place Conc. Culvert	Conc. Pipe Culvert	Steel For One Headwall			
D	B	L	H	Cu. Yd.	Cu. Yd.	No. of Bars	Size	Length	Lbs.
18"	1'-6"	6'-0"	4'-0"	0.92	1.00	4	¾" φ	5'-6"	33
24"	1'-6"	7'-6"	4'-6"	1.25	1.38	4	¾" φ	7'-0"	42
30"	2'-0"	9'-0"	5'-0"	1.95	2.17	4	¾" φ	8'-6"	51
36"	2'-0"	10'-6"	5'-6"	2.45	2.74	4	¾" φ	10'-0"	60
42"	2'-6"	12'-0"	6'-0		3.87	4	¾" φ	11'-6"	69
48"	2'-6"	13'-6"	6'-6"		4.66	4	¾" φ	13'-0"	78

DETAIL OF CONCRETE HEADWALL

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

APPROVED: DATE 6-23-53

Ben E. Nutter
TERRITORIAL HIGHWAY ENGINEER

TERRITORIAL HIGHWAY DEPARTMENT
TERRITORY OF HAWAII

STANDARD DETAILS

DROP INTAKES, RETAINING WALLS, HEADWALLS, CONSTRUCTION JOINTS

SCALES AS NOTED

SHEET No 3 OF 6 SHEETS

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

5686.54

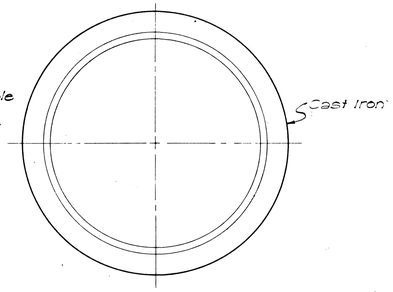
ARKWRIGHT TRACING CLOTH K & E CO., N. Y.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FG(18)	1954	55	79

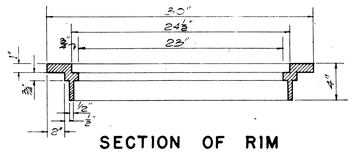
NOTE: Stock Pattern From Novelty Foundry ~ Honolulu

TOP VIEW OF COVER

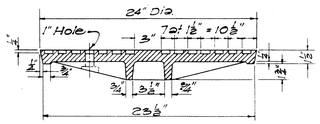
NOTE:
The Cover for Water Manhole shall be the same as for Sanitary Sewer except that the word "WATER" shall be substituted for "SANITARY SEWER". The frames for Sanitary Sewer and Water Covers shall be the same.



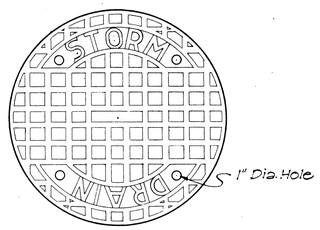
PLAN OF RIM



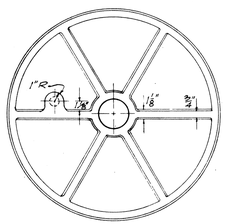
SECTION OF RIM



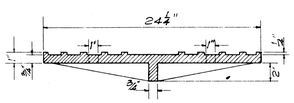
SECTION



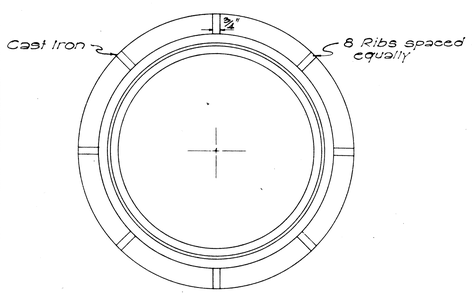
TOP VIEW OF COVER



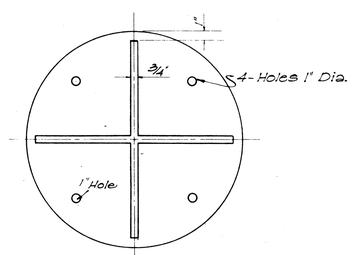
BOTTOM VIEW OF COVER



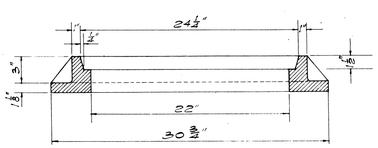
SECTION



PLAN OF RIM



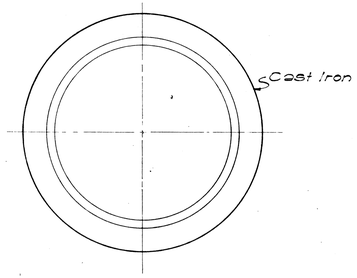
BOTTOM VIEW OF COVER



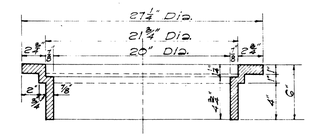
SECTION OF RIM

DETAILS OF TYPE "C"
MANHOLE CASTINGS
SCALE: 1-1/2" = 1'-0"

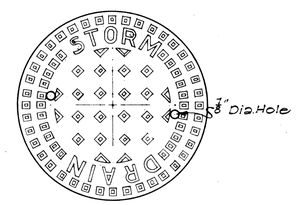
DETAILS OF TYPE "B"
CATCH BASIN CASTINGS
SCALE: 1-1/2" = 1'-0"



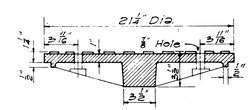
PLAN OF RIM



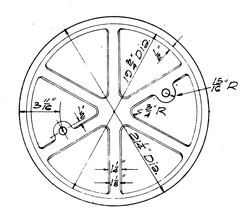
SECTION OF RIM



TOP VIEW OF COVER

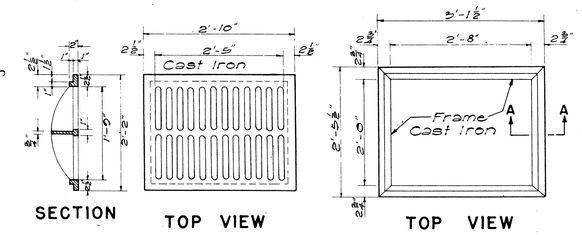


SECTION

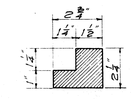


BOTTOM VIEW OF COVER

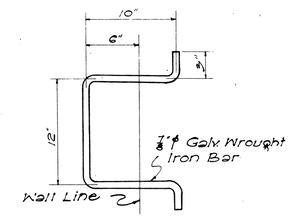
DETAILS OF TYPE "A"
MANHOLE CASTINGS
SCALE: 1-1/2" = 1'-0"



TYPE C C.I. FRAME AND GRATING
SCALE: 3/4" = 1'-0"



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



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

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

APPROVED: DATE 6-23-53

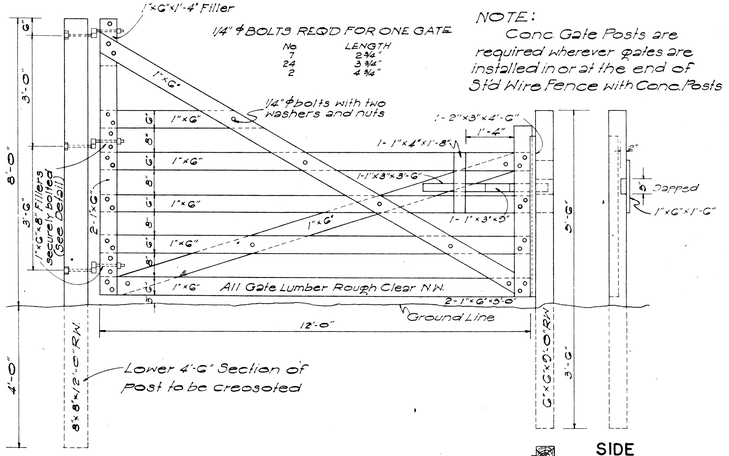
Ben E. Hutter
TERRITORIAL HIGHWAY ENGINEER

TERRITORIAL HIGHWAY DEPARTMENT
TERRITORY OF HAWAII
STANDARD DETAILS
CATCH BASIN AND
MANHOLE CASTINGS
SCALES AS NOTED

SHEET Nº 4 OF 6 SHEETS

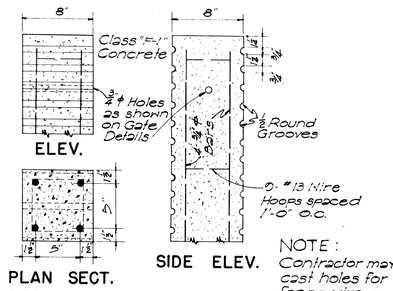
56S6.55

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	FG(18)	1954	56	79



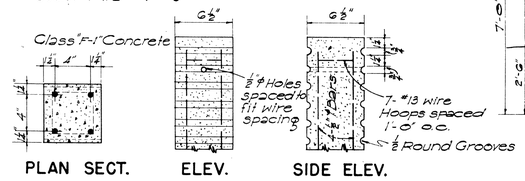
NOTE:
Conc Gate Posts are required wherever gates are installed in or at the end of Std Wire Fence with Conc. Posts

DETAIL OF CATTLE GATE
Scale: 1/2" = 1'-0"



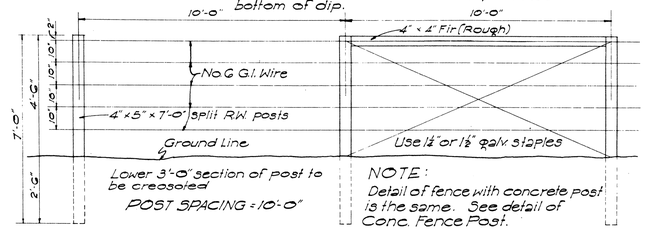
CONC. GATE POST
Scale: 1-1/2" = 1'-0"

NOTE:
Contractor may either cast holes for fastening fence wire or cast post with 3/4" - 1/2" round grooves on 2 sides.

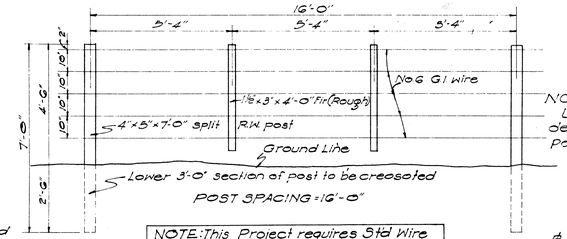


CONC. FENCE POST
Scale: 1-1/2" = 1'-0"

Note: Fence must be anchored against pull at least every 500 ft and also at top of rise and bottom of dip.



NOTE:
Detail of fence with concrete post is the same. See detail of Conc. Fence Post.



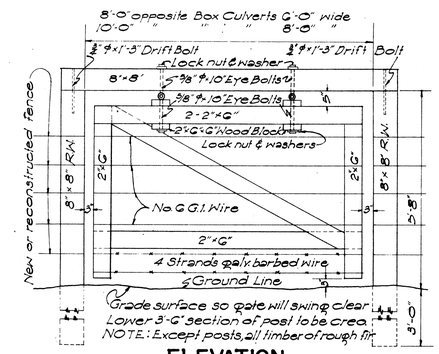
NOTE: Use above detail for end post.

NOTE: This Project requires Std Wire Fence with ft. post spacing
(If spacing is not indicated above use 10 ft)

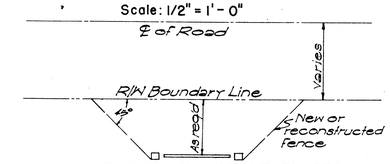
DETAILS OF STANDARD WIRE FENCE WITH WOOD POSTS
Scale: 3/8" = 1'-0"

Position in relation to ℄ in front of each separate property must be secured from the Engineer.

Note to Engineer: Fence must be on Road R/W to participate in Federal Aid. Consult office if uncertain what to do.

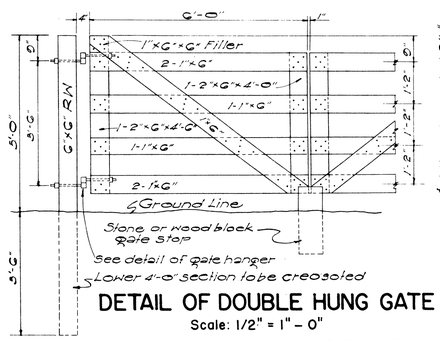


ELEVATION
Scale: 1/2" = 1'-0"



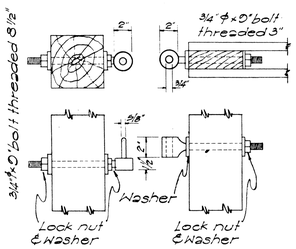
LAYOUT SHOWING HURDLE PLACED BELOW CULVERT IN A POSITION WHICH WILL BE CATTLE TIGHT

DETAILS OF HURDLE



DETAIL OF DOUBLE HUNG GATE
Scale: 1/2" = 1'-0"

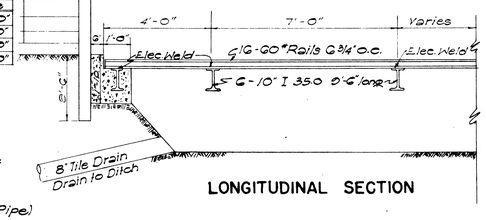
See note regarding use of Conc. Posts



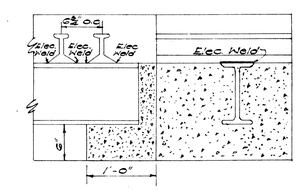
DETAIL OF GATE HANGER
Scale: 1-1/2" = 1'-0"

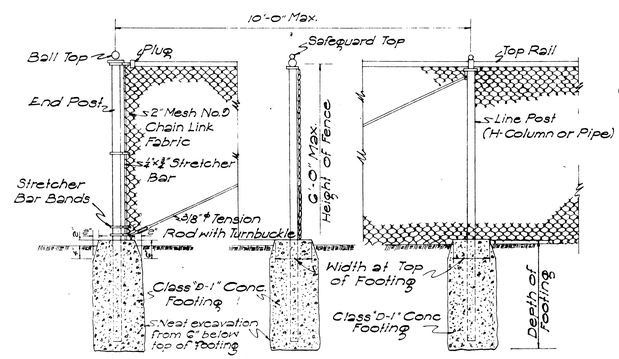
Note: Use 3/4" ϕ × 11" bolts for Cattle Gate

SCHEDULE FOR CHAIN LINK FENCE									
Height of fence	Line Post		End Post	Top Rail	Depth of Footing	Top of Footing	Length of Posts	
	ft column	Pipe	Pipe	Pipe	End	Line	Size	End	Line
3'	2.8 #/ft	1 1/8" O.D.	2" O.D.	1 1/8" O.D.	30"	24"	8" sq.	5'-6"	5'-0"
4'	2.8 #/ft	1 1/8" O.D.	2" O.D.	1 1/8" O.D.	30"	24"	10" sq.	6'-6"	6'-0"
5'	2.8 #/ft	1 1/8" O.D.	2½" O.D.	1 1/8" O.D.	36"	36"	12" sq.	8'-0"	8'-0"
6'	4.1 #/ft	2½" O.D.	3" O.D.	1 1/8" O.D.	36"	36"	12" sq.	9'-0"	9'-0"

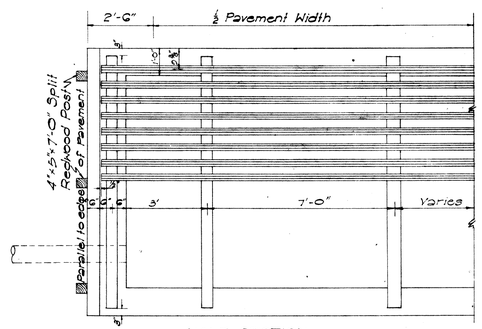


LONGITUDINAL SECTION

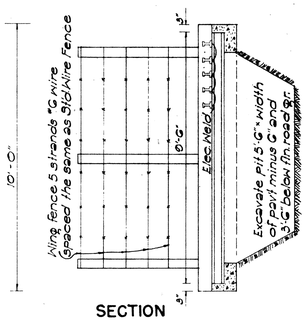




DETAIL OF CHAIN LINK FENCE
Scale: 1/2" = 1'-0"

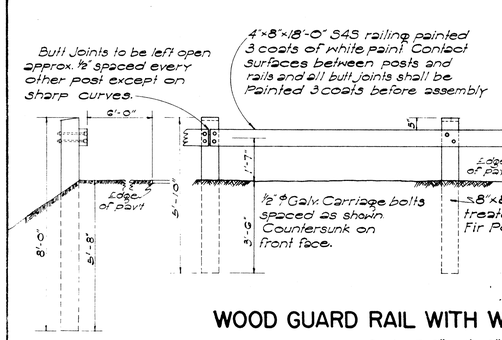


HALF SECTION



SECTION

DETAIL OF CATTLE GUARD
Scale: 3/8" = 1'-0"



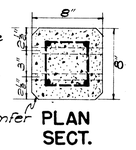
WOOD GUARD RAIL WITH WOOD POSTS
Scale: 3/8" = 1'-0"

NOTE: For Conc. Post see detail at right

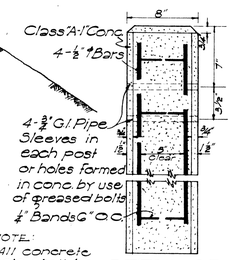
8"×8"×8'-0" S4S salt treated Douglas Fir or 8"×8"×8'-0" precast Concrete Posts shall be used where shoulders are less than 8'-0" wide.

GUIDE POSTS:
Wood or Conc. Guide Posts are the same as those used for Wood Guard Rail spaced as shown on plans.

NOTES:
All bolt holes in posts shall be drilled before being salt treated
Posts shall be painted the same as called for in the railing.

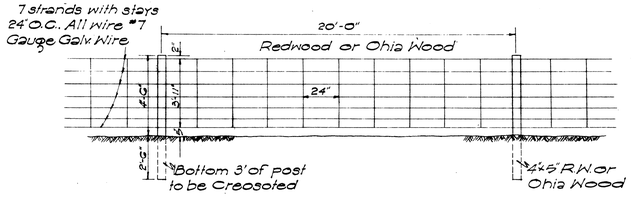


PLAN SECT.



NOTE:
All concrete posts shall be precast

DETAIL OF CONC. POST
Scale: 1-1/2" = 1'-0"



DETAIL OF WOVEN WIRE FENCE
Scale: 1/4" = 1'-0"

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

APPROVED: DATE 6-23-53

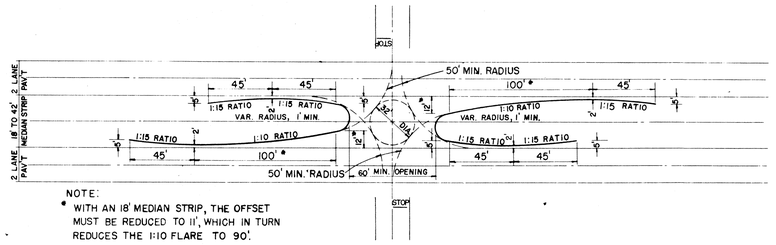
Ralph E. Vantilburg
TERRITORIAL HIGHWAY ENGINEER

TERRITORIAL HIGHWAY DEPARTMENT
TERRITORY OF HAWAII
STANDARD DETAILS
FENCES, GATES, GUARD RAILS, GUIDE POSTS, CATTLE GUARD
SCALES AS NOTED

SHEET No 5 OF 6 SHEETS

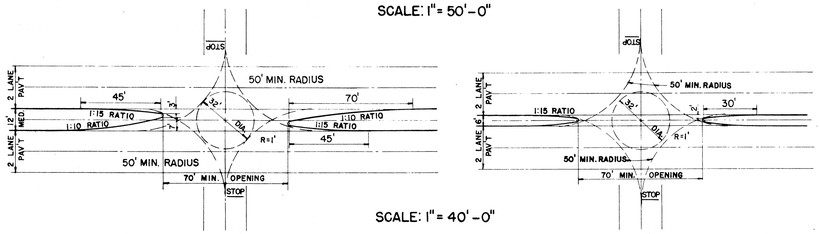
5686.56

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FG(18)	1954	57	70



NOTE:
* WITH AN 18' MEDIAN STRIP, THE OFFSET MUST BE REDUCED TO 11', WHICH IN TURN REDUCES THE 1:10 FLARE TO 90'.

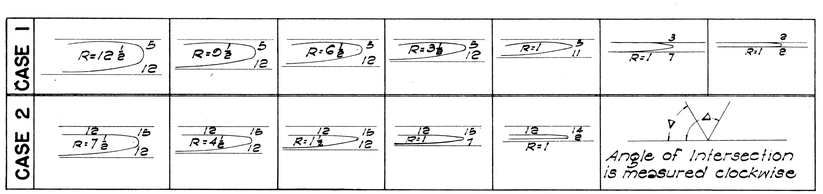
SCALE: 1" = 50'-0"



SCALE: 1" = 40'-0"

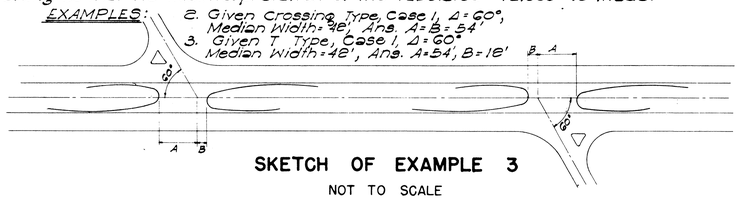
DETAILS OF MEDIAN STRIP OPENINGS

Δ ANGLE OF INTERS.	WIDTH OF MEDIAN STRIP 42' Case 1 A	42' Case 1 B	42' Case 2 A	42' Case 2 B	36' Case 1 A	36' Case 1 B	36' Case 2 A	36' Case 2 B	30' Case 1 A	30' Case 1 B	30' Case 2 A	30' Case 2 B	24' Case 1 A	24' Case 1 B	24' Case 2 A	24' Case 2 B	18' Case 1 A	18' Case 1 B	18' Case 2 A	18' Case 2 B	12' Case 1 A	12' Case 1 B	6' Case 2 A	6' Case 2 B
60°	54	12	58	14	58	14	62	14	64	14	66	14	68	14	70	16	70	16	70	16	64	18	70	18
65°	48	14	52	16	52	16	56	16	56	16	60	16	60	16	62	18	62	18	62	18	58	20	62	20
70°	42	18	46	18	46	18	50	18	50	18	54	18	54	18	56	20	54	20	56	20	52	22	56	22
75°	36	24	40	20	40	20	44	20	44	20	48	22	48	20	50	24	48	24	50	24	46	26	50	26
80°	32	28	36	24	36	24	38	24	38	22	42	26	42	24	44	28	42	28	44	28	40	30	44	30
85°	30	30	32	28	32	28	34	28	34	26	38	30	36	26	38	30	36	30	38	34	36	34	38	32
90°	30	30	30	30	30	30	30	30	30	30	34	34	30	30	32	32	30	30	36	36	35	35	35	35
95°	30	30	28	32	30	30	28	34	30	30	30	38	28	32	30	38	30	32	34	38	34	36	32	38
100°	30	30	24	36	30	30	24	38	28	32	26	42	24	36	28	44	28	36	28	44	30	40	30	44
105°	30	30	20	40	28	32	20	44	24	36	22	48	20	42	24	50	24	40	24	50	26	46	26	50
110°	28	32	18	46	24	36	18	50	20	40	18	54	18	46	20	56	20	46	20	56	22	52	22	56
115°	22	38	16	52	18	42	14	56	16	46	16	60	16	52	18	62	18	52	18	62	20	58	20	62
120°	16	44	14	58	12	48	12	62	14	54	14	66	14	58	16	70	16	60	16	70	18	64	18	70



NOTES:
1.) A & B = Distance in feet from Island Nose to Centerline of Intersection.
2.) In a Crossing Intersection A & B are both equal to the larger distance.
3.) In a T Intersection A & B must be measured as shown below. The larger distance is always on the same side with the acute angle.
4.) The minimum radius of 50 ft. should always be scribed on a large scale drawing so that no misinterpretation of the tabulated values is made.

EXAMPLES:
2. Given Crossing Type, Case 1, Δ = 60°, Median Width = 42', Ans. A = B = 54'
3. Given T Type, Case 1, Δ = 60° Median Width = 42', Ans. A = 54', B = 18'



SKETCH OF EXAMPLE 3

NOT TO SCALE

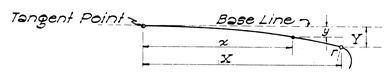
SURVEY PLOTTED BY	
DESIGNED BY	
DRAWN BY	
TRACED BY	J. Calisto
QUANTITIES BY	
QUANTITIES CHECKED BY	
CHECKED BY	
DATE	

ORIGINAL PLAN	
NOTE BOOK No.	

These Curves are based upon the following formula:

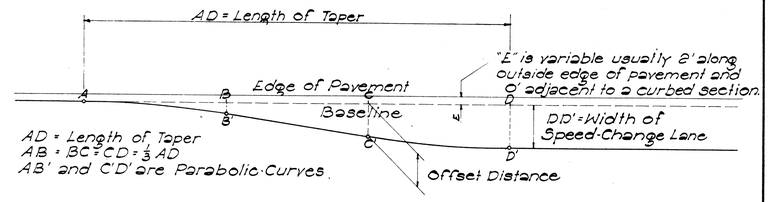
$$y = \frac{Y x^2}{X^2}$$

Where: y = any offset, x = its tangent dist
X = maximum tangent distance
Y = maximum offset



RATIO CURVE DATA					
Dist. in ft. (x)	Offset in Feet (y) 2:30	3:45	5:60	7:70	9:90	10:00
10	0.22	0.15	0.60	0.14	0.11	0.10
20	0.80	0.59	0.80	0.57	0.44	0.40
30	2.00	1.33	1.80	1.20	1.00	0.90
40		2.37	3.20	2.20	1.78	1.60
50			5.00	3.57	2.78	2.50
60				5.14	4.00	3.60
70				7.00	5.44	4.90
80					7.11	6.40
90					9.00	8.10
100						10.00

NOTE: Any ratio curve in this tabulation is designated by the maximum offset and its tangent distance.



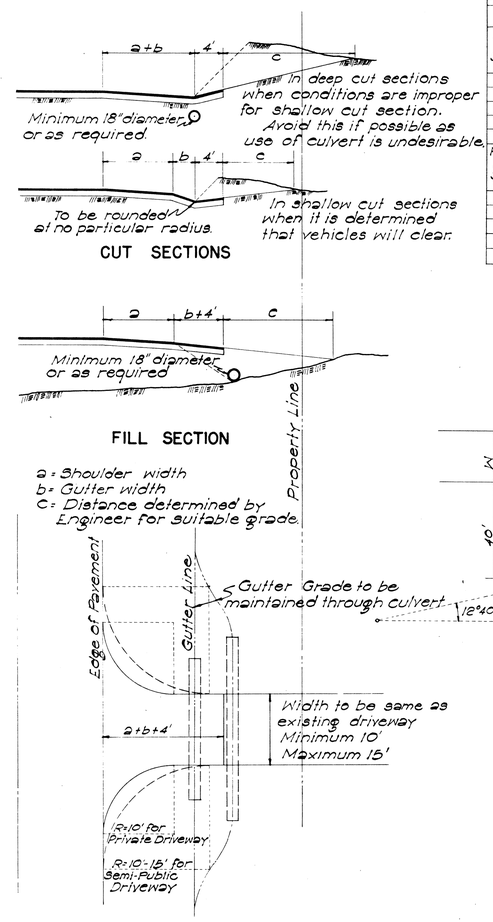
TAPER FOR SPEED-CHANGE LANES

SCALE: 1" = 20'-0"

MINIMUM LENGTHS OF SPEED-CHANGE LANES & TAPER						
RAMP DESIGN SPEED (MPH)		20	30	40	50	
MIN. CURVE RADIUS (Ft.)		50	180	250	500	
HIGHWAY DESIGN SPEED(V) (MPH)	AVE. SPEED OF TRAVEL (0.7V) (MPH)	LENGTH OF TAPER (FEET)	TOTAL LENGTH OF DECELERATION LANE INCLUDING TAPER (Feet)			
30	21	90	90	90		
40	28	120	140	120	120	
50	35	150	225	150	150	150
60	42	180	205	235	180	180
70 -	49	210	370	315	240	210
HIGHWAY DESIGN SPEED(V) (MPH)	AVE. SPEED OF TRAVEL (0.7V) (MPH)	LENGTH OF TAPER (FEET)	TOTAL LENGTH OF ACCELERATION LANE INCLUDING TAPER (Feet)			
30	21	150	150	150		
40	28	180	180	180	180	
50	35	240	410	240	240	240
60	42	270	750	510	270	270
70	49	300	1180	850	550	300

FOLLOWING TABLE GIVES OFFSETS FROM BASELINE PARALLEL TO EDGE OF PAVEMENT AT INTERVALS MEASURED FROM POINT "A". ADD "E" FOR MEASUREMENT FROM EDGE OF PAV'T									
OFFSET FROM BASELINE (Ft.)	LENGTH OF TAPER (Feet) = AD								
	90	120	150	180	210	240	270	300	
DD:10	DD:11'	DD:12	DISTANCE FROM POINT "A" (Feet)						
0	0	0	0	0	0	0	0	0	0
0.16	0.17	0.19	7.5	10	12.5	15	17.5	20	22.5	25
0.62	0.69	0.75	15	20	25	30	35	40	45	50
1.41	1.55	1.69	22.5	30	37.5	45	52.5	60	67.5	75
*2.50	*2.75	*3.00	30	40	50	60	70	80	90	100
*3.90	*4.30	*4.69	45	60	75	90	105	120	135	150
*5.60	*6.19	*6.75	60	80	100	120	140	160	180	200
7.62	8.42	9.19	67.5	90	112.5	135	157.5	180	202.5	225
9.94	10.99	11.99	75	100	125	150	175	200	225	250
12.56	13.88	15.13	82.5	110	137.5	165	192.5	220	247.5	275
15.50	17.13	18.69	90	120	150	180	210	240	270	300

* Where edge of pavement is a curve, neither Baseline nor Taper between B' and C' will be a tangent. Use proportional offset from B' to C'.



PRIVATE AND SEMI-PUBLIC DRIVEWAYS

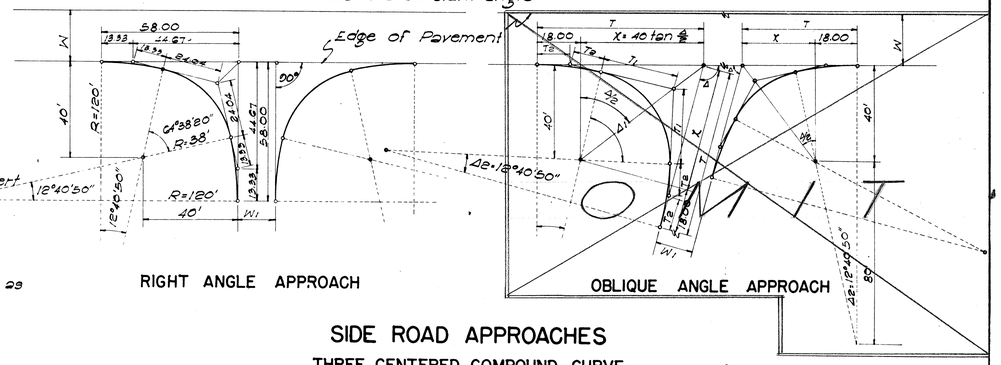
SCALE: 1" = 10'-0"

$\Delta_1 = \Delta - 2\Delta_2$

Distance $a = 80 \tan 12°40'50'' = 18.00'$ (Constant)

Distance $"T" = 18.00' + 40 \tan \frac{\Delta_1}{2}$

Δ_2 is a constant angle



SIDE ROAD APPROACHES

THREE CENTERED COMPOUND CURVE

SCALE: 1" = 30'-0"

APPROVED: DATE 6-23-53

Ben E. Hustler
TERRITORIAL HIGHWAY ENGINEER

TERRITORIAL HIGHWAY DEPARTMENT
TERRITORY OF HAWAII
STANDARD DETAILS
DRIVEWAYS, SPEED-CHANGE LANES, MEDIAN STRIPS & APPROACHES
SCALES AS NOTED

SHEET № 6 OF 6 SHEETS

5656.57