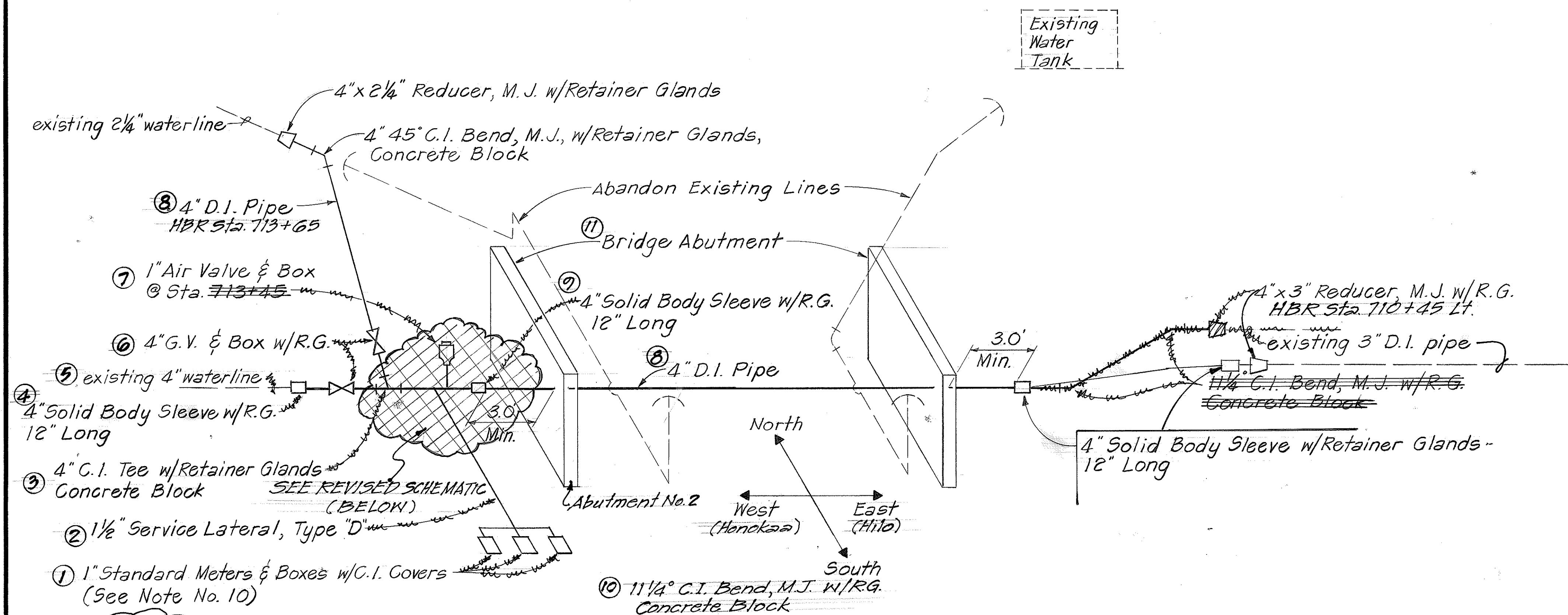
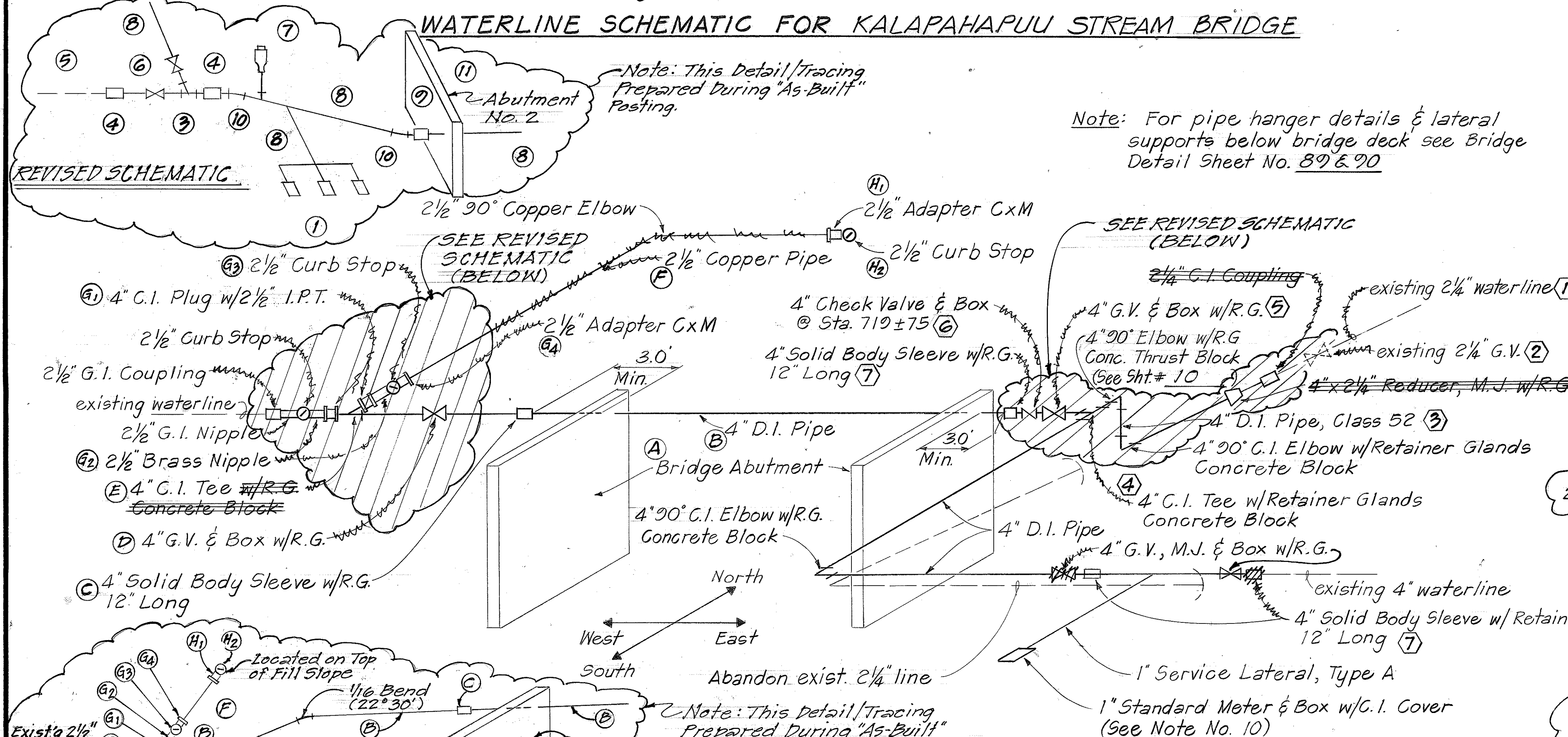


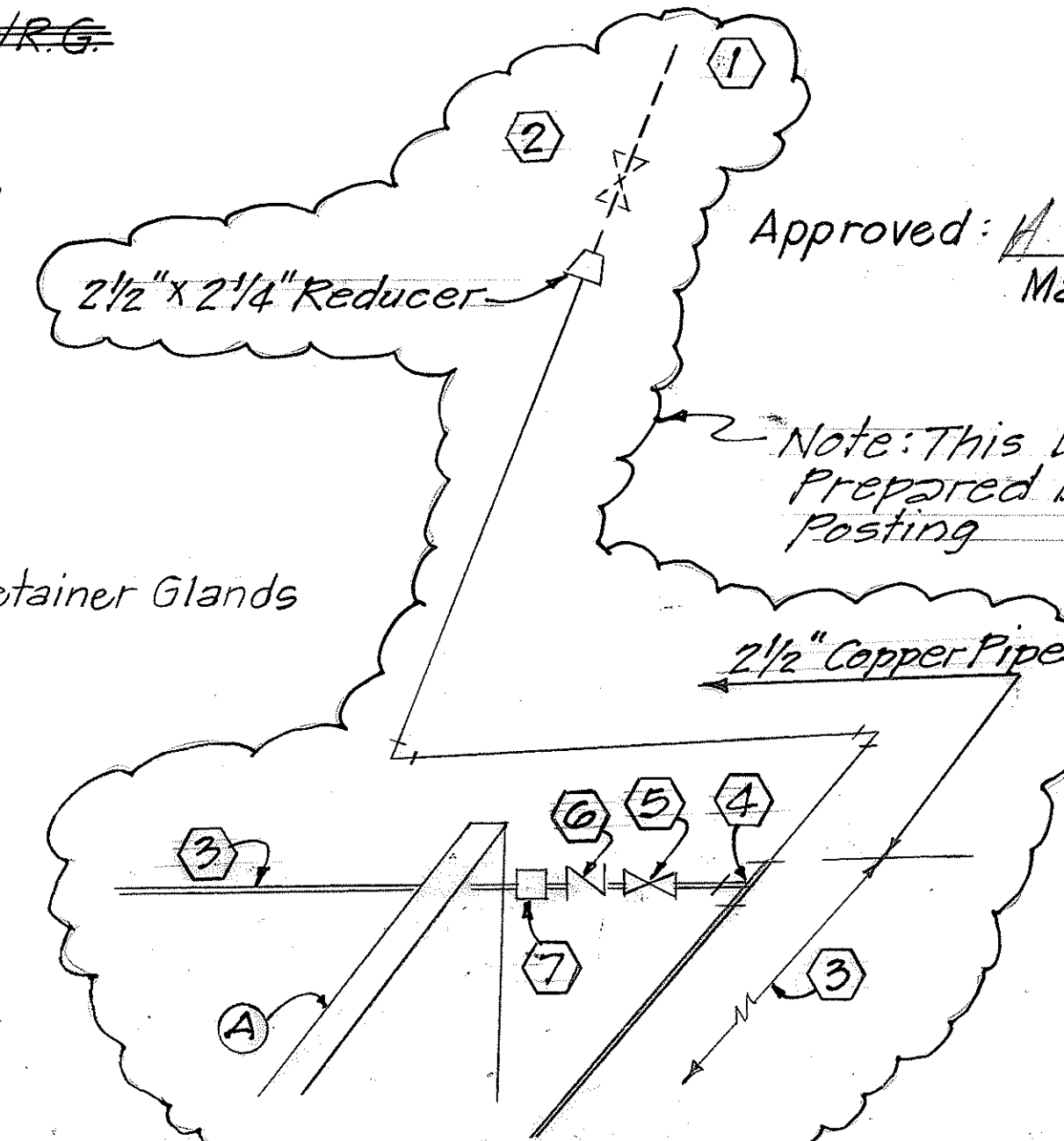
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(20)	1984	8	126



WATERLINE SCHEMATIC FOR KALAPAHAPUU STREAM BRIDGE



WATERLINE SCHEMATIC FOR KAINEHE STREAM BRIDGE



WATERLINE NOTES

1. All work shall conform to the Department of Water Supply "Standards for Water System" dated March 1965, as amended.
2. The contractor shall inform the D.W.S. Engineer 72 hours prior to the beginning of any waterline work and one week prior to any connection, chlorination, shut-off or relocation work.
3. All work and material furnished by the D.W.S. shall be paid for in accordance with Utility Agreement No. 327.
4. All existing waterline, waterline appurtenances and other utility locations shown on the plans are obtained from the latest reliable sources. The contractor shall be responsible to verify the exact location of all utilities in the field and shall bear all cost for damages done unto them during the contract period.
5. All hookups to existing waterlines shall be done by D.W.S. personnel. The contractor shall provide all material, excavation, backfill, road repair, traffic control and equipment to lift materials.
6. Where water shut-off of more than 3 hours becomes necessary, the contractor, at his own cost, shall provide temporary bypass line, size of which shall be determined by the D.W.S. Engineer. The D.W.S. Engineer also reserves the right to require bypass lines regardless of the expected water shut-off period, if it is deemed necessary.
7. Minimum horizontal clearance between waterlines and other utilities shall be 8 feet for road rights-of-way of 50' or less and 10' for road rights-of-way of more than 50'; minimum vertical clearance between waterline and other utilities shall be 6," provided concrete jackets are used and 1' if concrete jackets are not used. In all applicable instances, the waterline shall be at a grade higher than other utilities.
8. The waterline shall be tested at a minimum of 225 PSI at the low point by the contractor under D.W.S. supervision.
9. The contractor shall be responsible for the chlorination of the water system and shall bear all cost. The persons engaged to do the chlorination work must be licensed by the State of Hawaii and approved by the Department of Health.
10. The DWS shall relocate water meters. The Contractor shall reconnect customer line to new meter location. Materials used for connection shall be of same kind as existing.

Approved: H. Wilkins Sevuk Date: 6/20/83
Manager, D.W.S.

2 Note: This Detail / Tracing
Prepared During "As-Built"
Posting

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATERLINE SCHEMATIC AND NOTES

HAWAII BELT ROAD
Kalapahapuu Strm. and Kainehe Strm.
Bridge Replacements
Fed. Aid Proj. No. BRF-019-8(20)
Scale: Not To Scale Date: May 1983

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BRF-019-2(20)	1984	9	126

KALAPAHAPUU STREAM BRIDGE
ESTIMATED QUANTITIES

DESCRIPTION	UNIT	QUANTITY
ITEM NO. 624.1900		
4" 1 1/4" C.I. Bend, M.J. w/ Retainer Glands	Each	1 2
4" Gate Valve w/Retainer Glands	Each	2
4" Solid Body Sleeve, 12" Long	Each	4 3
4"x4"x4" C.I. Tee w/Retainer Glands	Each	1
4"x3" Reducer, M.J. w/Retainer Glands	Each	1
4"x 2 1/4" Reducer, M.J. w/Retainer Glands	Each	1
4" 45° C.I. Elbow w/Retainer Glands	Each	1
1" Air Valve & Box	Each	1
Water Valve Box	Each	2
1 1/2" Service Lateral, Type D	Each	1
1" Standard Meter & Box Installation	Each	3
ITEM NO. 206.1000		
Structure Excavation	Cu.Yd.	44 78
ITEM NO. 503.2010		
Class B Concrete	Cu.Yd.	1/2
ITEM NO. 624.9010		
Furnishing & Installing 4-Inch Ductile Iron Pipe (Cl. 50)	L.F.	367 425
ITEM NO. 624.1815		
Furnishing and Installing Pipe Hangers, Lateral Bracing and all Appurtenances for 4-Inch Ductile Iron Pipe	Each	17

KAINEHE STREAM BRIDGE
ESTIMATED QUANTITIES

DESCRIPTION	UNIT	QUANTITY
ITEM NO. 624.1920		
4" Solid Body Sleeve, 12" Long	Each	3
4" 90° C.I. Elbow w/Retainer Glands	Each	1 3
4" Check Valve & Box	Each	1
4" Gate Valve w/Retainer Glands	Each	3
4"x4"x4" C.I. Tee w/Retainer Glands	Each	2
4" C.I. Plug w/2 1/2" I.P.T.	Each	1 2
4"x 2 1/4" Reducer, M.J. w/Retainer Glands	Each	1
2 1/2" Copper Pipe	Lin.Ft.	10
2 1/2" 90° Copper Elbow	Each	2 3
2 1/2" Transition Coupling, C x M	Each	1 2
2 1/2" Curb Stop	Each	2 3
Water Valve Box	Each	3
1" Service Lateral, Type A	Each	1
1" Standard Meter & Box Installation	Each	1
2 1/2" G.I. Nipple	Each	1
2 1/2" Brass Nipple	Each	2
2 1/2" G.I. Coupling	Each	1
2 1/4" C.I. Coupling	Each	1
4" 22 1/2° Bend, M.J. w/Retainer Glands	Each	1
4" 1 1/4" Bend, M.J. w/Retainer Glands	Each	1
ITEM NO. 206.1000		
Structure Excavation	Cu.Yd.	31 70
ITEM NO. 503.2010		
Class B Concrete	Cu.Yd.	1.5
ITEM NO. 624.9005		
Furnishing & Installing 24-Inch Ductile Iron Pipe (Cl. 50)	L.F.	10
ITEM NO. 624.9010		
Furnishing & Installing 4-Inch Ductile Iron Pipe (Cl. 50)	L.F.	494 560
ITEM NO. 624.1815		
Furnishing and Installing Pipe Hangers, Lateral Bracing and all Appurtenances for 4-Inch Ductile Iron Pipe	Each	34 33

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

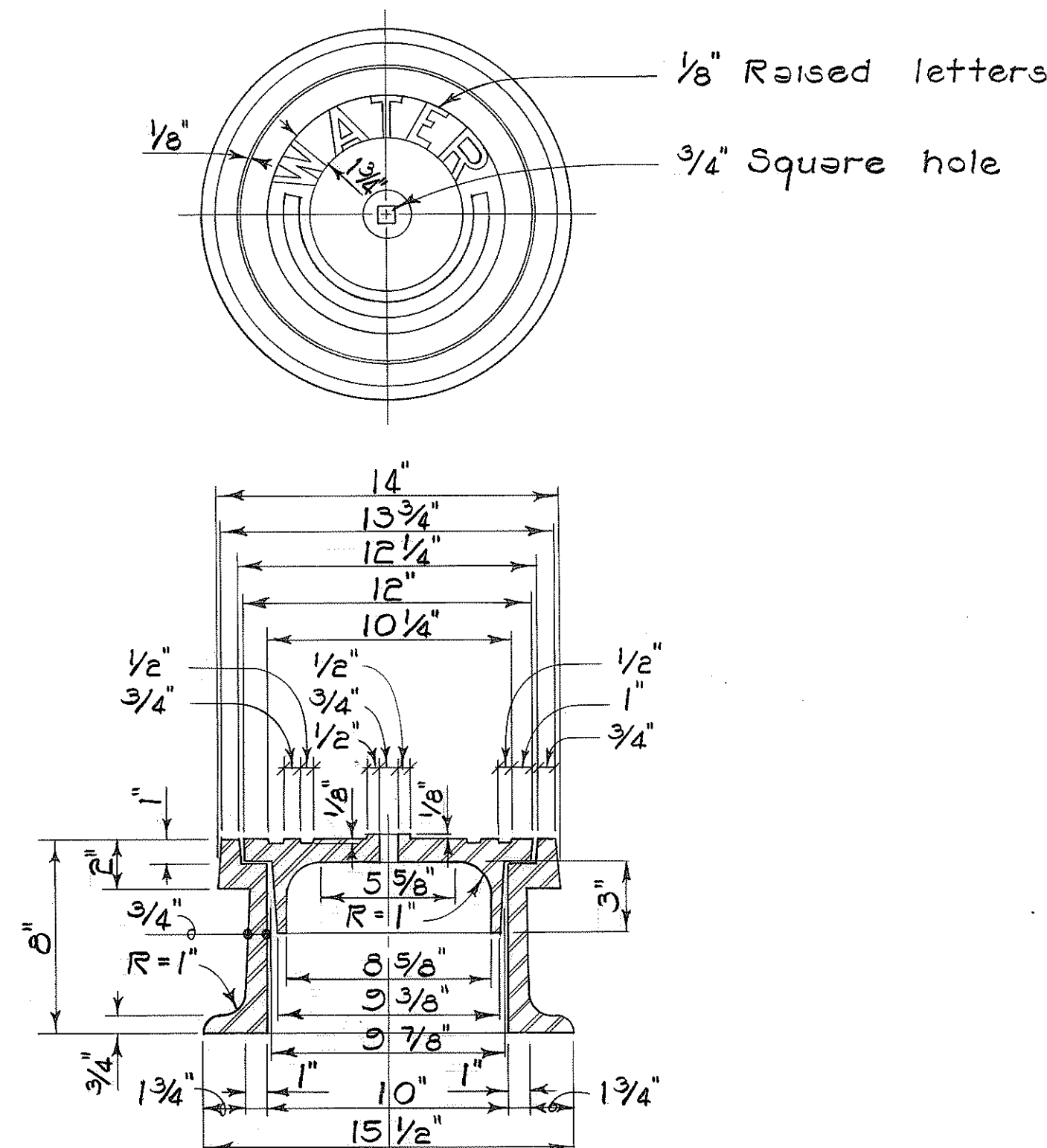
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ESTIMATED QUANTITIES

HAWAII BELT ROAD
Kalapahapuu Strm. and Kainehe Strm.
Bridge Replacements
Fed. Aid Proj. No. BRF-019-2(20)
Scale: Not To Scale Date: May 1983
SHEET NO. 2 OF 3 SHEETS

NOTE :

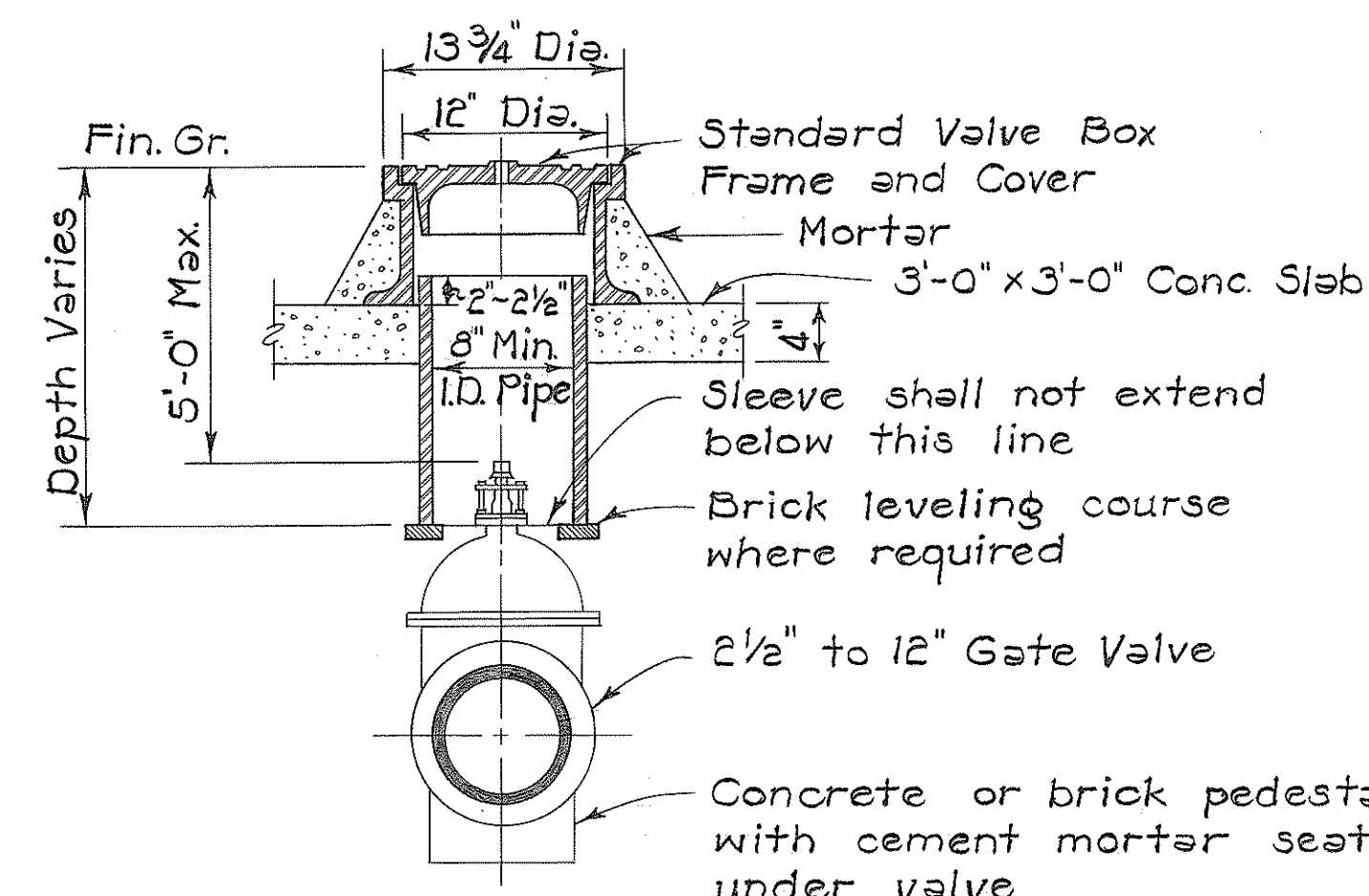
All casting shall be made accurately to the dimensions shown. Seat and cover shall be machined, not ground to secure flat and true surfaces. The cover shall not rattle in any position. Minor changes in dimensions may be made to suit foundry conditions provided such changes are approved by the Dept. of Water Supply.



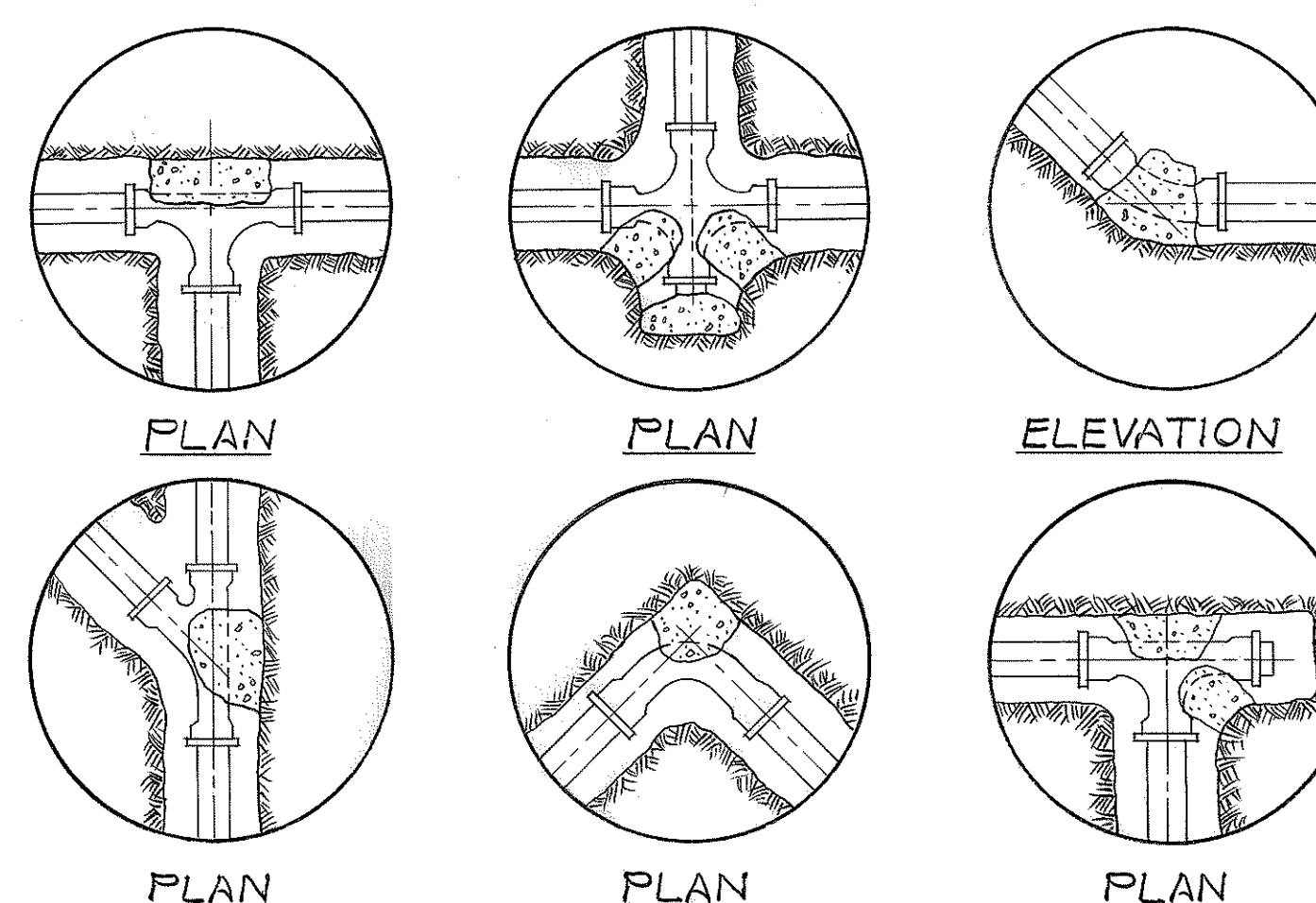
CAST IRON FRAME AND COVER
Scale : 2" = 1'-0"

NOTE :

The limit of pipe cushion backfill around the valve shall be the trench width x 4 ft. on each side of valve and fill to 8" below finish grade. Payment for pipe cushion backfill shall be incidental to installing valve box.



CAST IRON VALVE FRAME AND COVER
Not to scale



CONCRETE THRUST BLOCKS FOR WATER MAINS

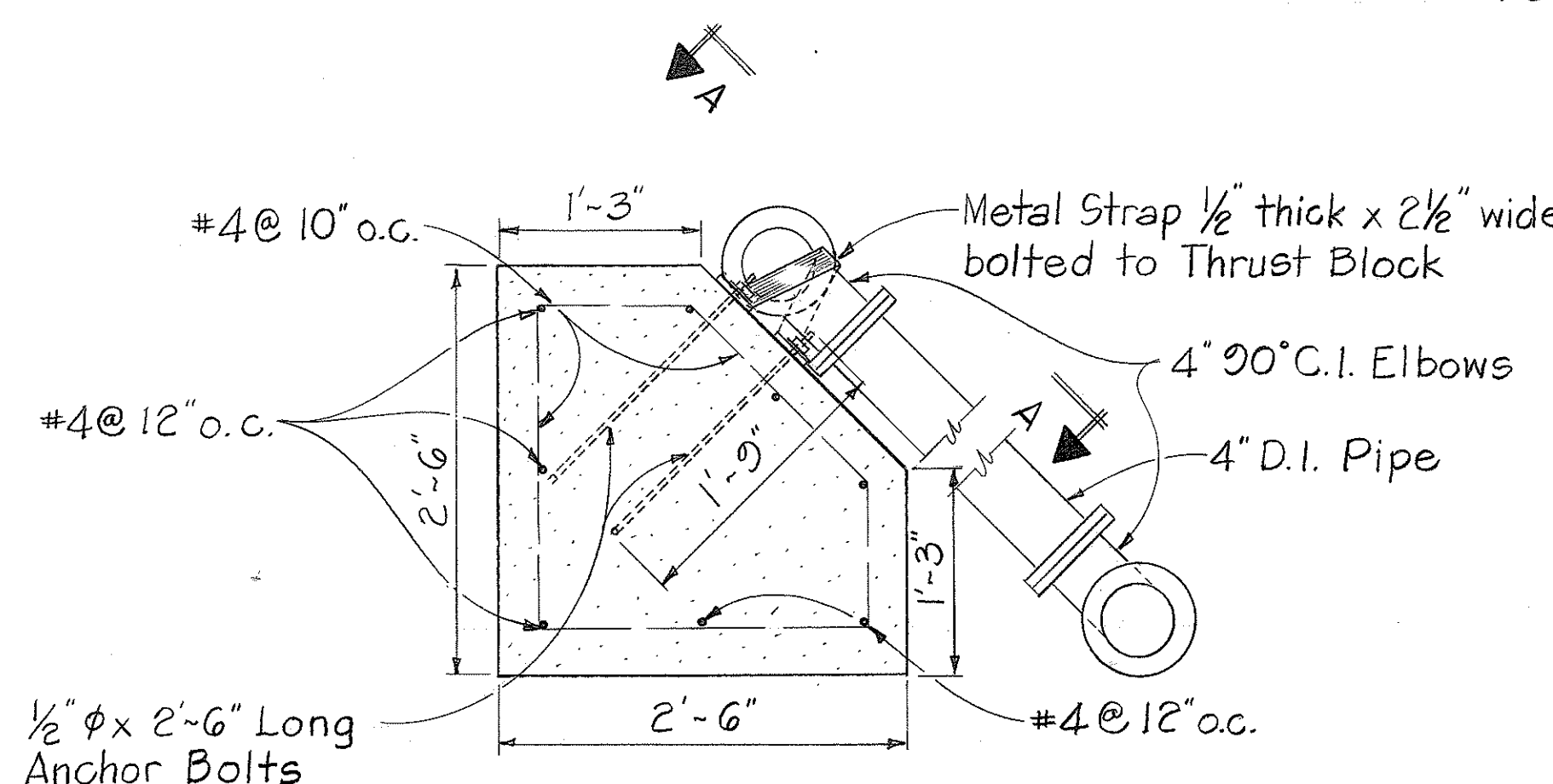
Class "B" Concrete

Table of areas in square feet at thrust block in vertical contact with soil of varying bearing values, water pressure 225 pounds per square inch.

Pipe Size	Tees, Bend Ends				90° Bend				45° Bend				22 1/2° Bend			
	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d
4"	2.5	1.5	1.0	1.0	3.5	2.0	1.5	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6"	5.0	2.5	2.0	1.5	7.0	3.5	2.5	2.0	4.0	2.0	1.5	1.0	2.0	1.0	1.0	1.0
8"	9.0	4.5	3.5	2.0	12.0	6.0	4.5	3.0	7.0	3.5	2.5	1.5	4.0	2.0	1.5	1.0
10"	14.0	7.0	5.5	3.5	20.0	10.0	7.5	5.0	11.0	5.5	4.0	3.0	6.0	3.0	2.0	1.5

CONDITION OF SOIL

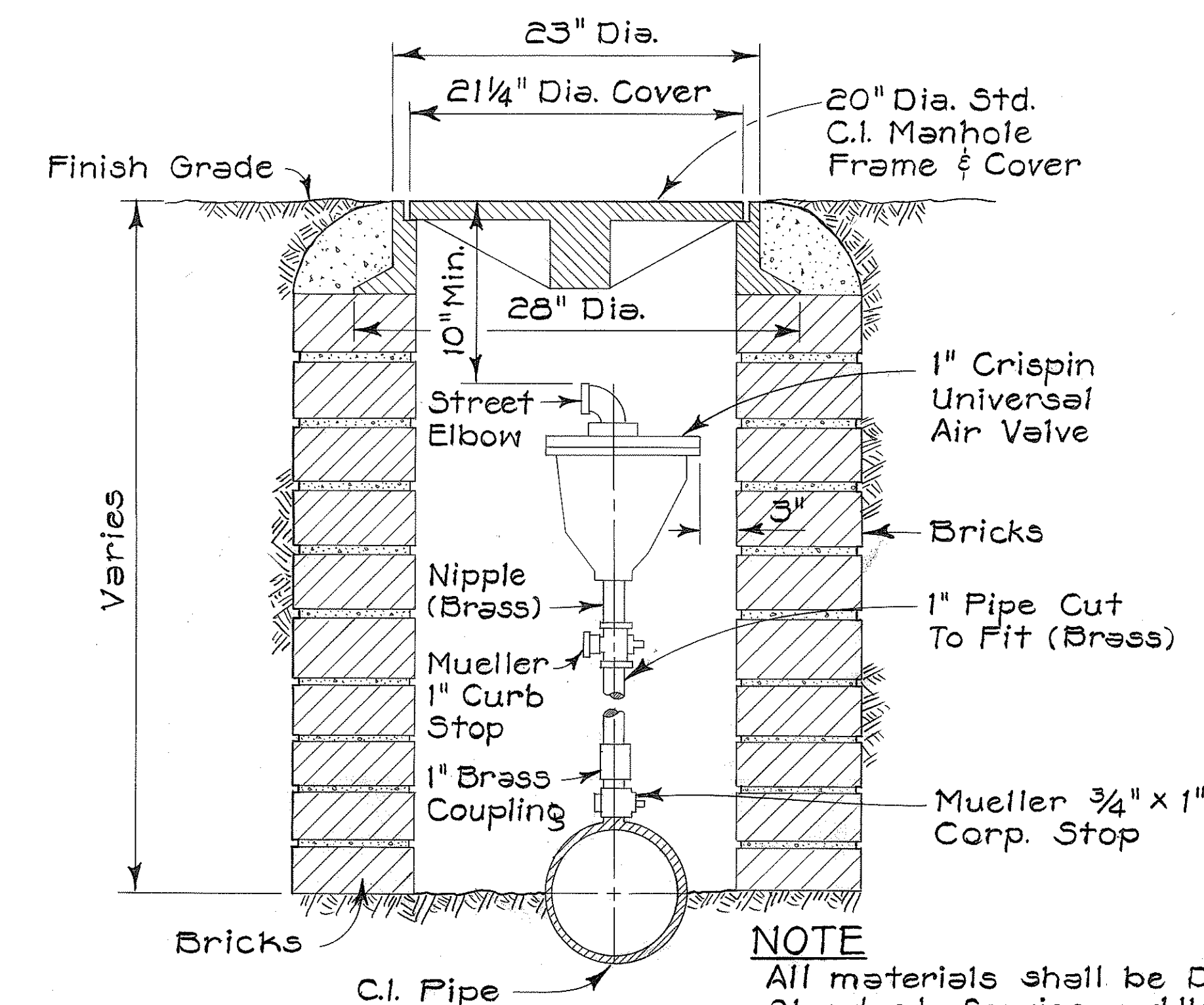
a - Sand	1,500 Lbs. Per. Sq. Ft.
b - Sand & Gravel	2,000 Lbs. Per. Sq. Ft.
c - Sand Gravel & Cemented Clay	5,000 Lbs. Per. Sq. Ft.
d - Shale	6,000 Lbs. Per. Sq. Ft.



MAKAI ELEVATION

CONCRETE THRUST BLOCK DETAILS

Scale: 1" = 1'-0"

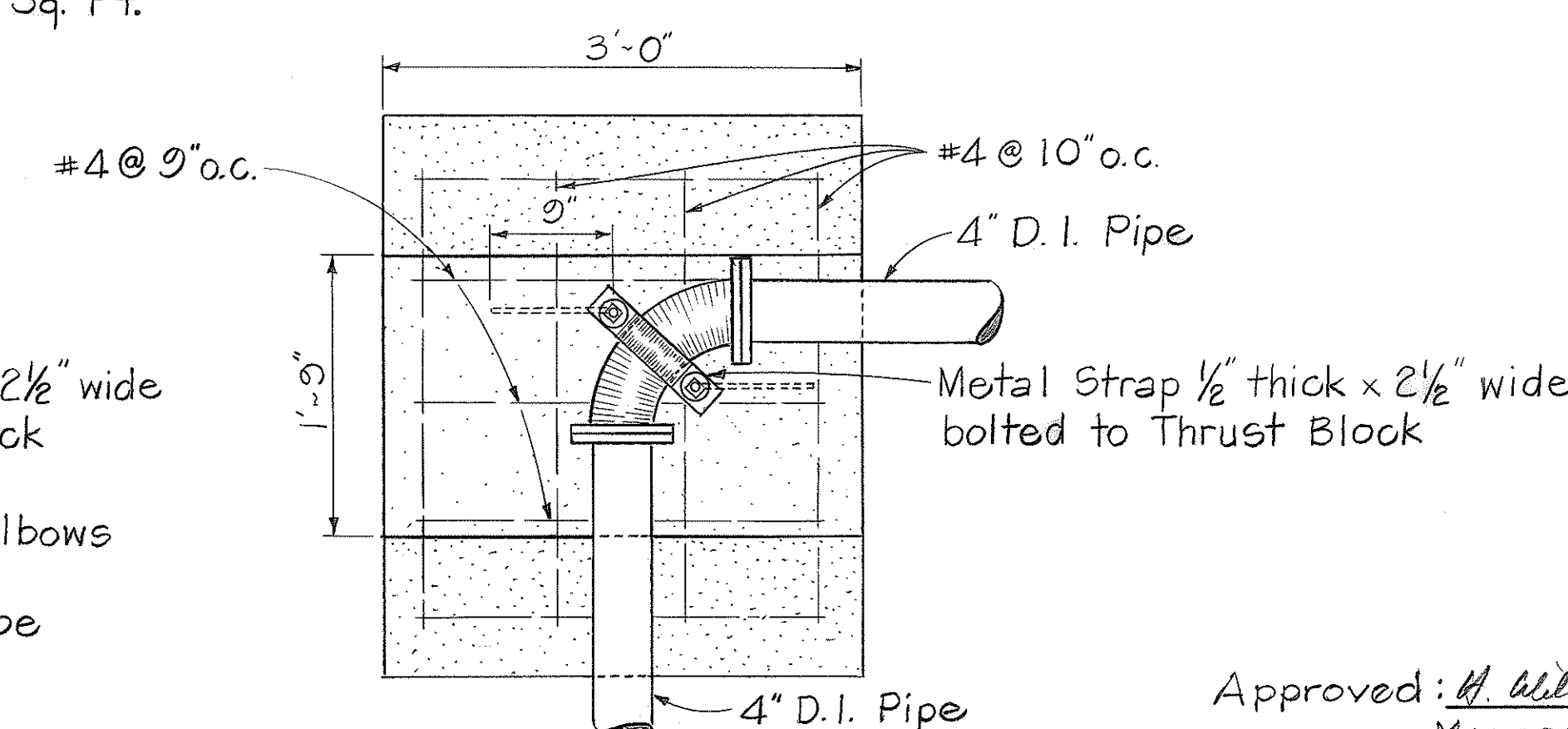


NOTE

All materials shall be D.W.S. Standard. Service saddles required for 4", 3" & 2 1/4" C.I. pipe and for all sizes of asbestos cement pipe.

AIR VALVE AND BOX

Not to scale



SECTION "A-A"

Approved: *H. Wilson* Date: *6/2/83*
Manager, D.W.S.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MISC WATERLINE DETAILS
HAWAII BELT ROAD
Kalapahau Strm and Kainehe Strm
Bridge Replacements
Fed. Aid Proj. No. BRF-010-2(20)
Scale: As Shown Date: June 1983
SHEET NO. 3 OF 3 SHEETS