

**NOTE:**  
 REFER TO DETAILS B3, B4 & B5 FOR THE  
 SIZE OF REACTION BLOCKS. REACTION  
 BLOCKS SHALL BEAR AGAINST UNDISTURBED  
 SOIL. CONCRETE SHALL BE DWS 2500.

2002
REVISION

KAUAI MAUI	HORIZONTAL REACTION BLOCK FOR WATER MAINS SCALE: NTS	STANDARD DETAILS	B2
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KAUAI  
OAHU  
MAUI  
HAWAII

**HORIZONTAL THRUST BLOCK**  
MINIMUM BEARING AREAS  
SCALE: NTS

STANDARD  
DETAILS

2002  
REVISION

B3

MINIMUM BEARING AREAS (SQ. FT.) FOR HORIZONTAL THRUST BLOCKS

PIPE SIZE	BEND	PRESSURE 250 PSI										PRESSURE 200 PSI										PRESSURE 150 PSI									
		TYPE OF SOIL CONDITION										TYPE OF SOIL CONDITION										TYPE OF SOIL CONDITION									
		A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G									
4"	TEES, CAPS	6.5	3.5	2.0	1.5	1.0	1.0	1.0																							
	1/4	9.0	4.5	3.0	2.5	1.5	1.0	1.0																							
	1/8	5.0	2.5	1.5	1.5	1.0	1.0	1.0																							
	1/16	2.5	1.5	1.0	1.0	1.0	1.0	1.0																							
	1/32	1.5	1.0	1.0	1.0	1.0	1.0	1.0																							
6"	TEES, CAPS	14.0	7.0	5.0	3.5	2.5	2.0	1.5																							
	1/4	20.0	10.0	7.0	5.0	3.5	2.5	2.0																							
	1/8	11.0	5.5	3.5	3.0	2.0	1.5	1.0																							
	1/16	5.5	3.0	2.0	1.5	1.0	1.0	1.0																							
	1/32	3.0	1.5	1.0	1.0	1.0	1.0	1.0																							
8"	TEES, CAPS	25.0	12.5	8.5	6.5	4.0	3.0	2.5																							
	1/4	35.0	18.0	12.0	9.0	6.0	4.5	3.5																							
	1/8	20.0	9.5	6.5	5.0	3.0	2.5	2.0																							
	1/16	10.0	5.0	3.5	2.5	1.5	1.0	1.0																							
	1/32	5.0	2.5	1.5	1.5	1.0	1.0	1.0																							
12"	TEES, CAPS	56.5	28.5	19.0	14.0	9.5	7.0	5.5	45.5	22.5	15.0	11.5	7.5	5.5	4.5	34.0	17.0	11.5	8.5	5.5	4.5	3.5									
	1/4	80.0	40.0	26.5	20.0	13.5	10.0	8.0	64.0	32.0	21.5	16.0	11.0	8.0	6.5	48.0	24.0	16.0	12.0	8.0	6.0	5.0									
	1/8	43.5	21.5	14.5	11.0	7.0	5.5	4.5	35.0	17.5	11.5	9.0	6.0	4.5	3.5	26.0	13.0	8.5	6.5	4.5	3.5	2.5									
	1/16	22.0	11.0	7.5	5.5	3.5	3.0	2.5	17.5	9.0	6.0	4.5	3.0	2.5	2.0	13.0	6.5	4.5	3.5	2.0	1.5	1.5									
	1/32	11.5	5.5	4.0	3.0	2.0	1.5	1.0	9.0	4.5	3.0	2.5	1.5	1.0	1.0	7.0	3.5	2.5	2.0	1.0	1.0	1.0									

TYPE OF SOIL CONDITION										LATERAL BEARING PRESSURE									
A.	SOFT CLAY; FINE LOOSE SAND.....	500	LBS.	PER	SQ.	FT.													
B.	SAND & CLAY; MIXED OR IN LAYERS; FINE CONFINED SAND.....	1000	LBS.	PER	SQ.	FT.													
C.	HARD DRY CLAY.....	1500	LBS.	PER	SQ.	FT.													
D.	COARSE SAND.....	2000	LBS.	PER	SQ.	FT.													
E.	GRAVEL.....	3000	LBS.	PER	SQ.	FT.													
F.	SOFT ROCK.....	4000	LBS.	PER	SQ.	FT.													
G.	HARDPAN.....	5000	LBS.	PER	SQ.	FT.													

NOTE:  
1. ACTUAL FIELD CONDITIONS AND SOIL TYPE SHALL BE VERIFIED IN THE FIELD. THE SCHEDULE, DIMENSIONS AND DETAILS AS SHOWN ARE PROVIDED AS A GUIDE ONLY. THE CONTRACTOR OR ENGINEER WHO PREPARED THE PLANS SHALL SUBMIT THE FINAL DESIGN AND DETAILS TO THE MANAGER FOR REVIEW AND APPROVAL AFTER FIELD VERIFICATION AND PRIOR TO INSTALLATION. FOR OAHU ONLY, THE DEPARTMENT WILL FURNISH THE FINAL DESIGN AND DETAILS FOR PROJECTS AWARDED BY THE MANAGER.  
2. FOR KAUAI AND MAUI, SEE PLATE B2 FOR ADDITIONAL NOTES.

**HORIZONTAL THRUST BLOCK**  
**MINIMUM BEARING AREAS**  
SCALE: NTS

STANDARD  
DETAILS

2002  
REVISION

B4

MINIMUM BEARING AREAS (SQ. FT.) FOR HORIZONTAL THRUST BLOCKS																						
PIPE SIZE	BEND	PRESSURE 250 PSI						PRESSURE 200 PSI						PRESSURE 150 PSI								
		TYPE OF SOIL CONDITION						TYPE OF SOIL CONDITION						TYPE OF SOIL CONDITION								
		A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G
16"	TEES, CAPS	101.0	50.5	34.0	25.5	17.0	13.0	10.5	80.5	40.5	27.0	20.5	13.5	10.5	8.5	60.5	30.5	20.5	15.5	10.5	8.0	6.5
	1/4	142.5	71.5	47.5	35.5	24.0	18.0	14.5	114.0	57.0	38.0	28.5	19.0	14.5	11.5	85.5	43.0	28.4	21.5	14.5	11.0	8.5
	1/8	77.0	38.5	26.0	19.5	13.0	10.0	8.0	62.0	31.0	20.5	15.5	10.5	8.0	6.5	46.5	23.5	15.5	11.5	8.0	6.0	5.0
	1/16	39.5	20.0	13.5	10.0	6.5	5.0	4.0	31.5	16.0	10.5	8.0	5.5	4.0	3.5	23.5	12.0	8.0	6.0	4.0	3.0	2.5
	1/32	20.0	10.0	7.0	5.0	3.5	2.5	2.0	16.0	8.0	5.5	4.0	3.0	2.0	2.0	12.0	6.0	4.0	3.0	2.0	1.5	1.5
18"	TEES, CAPS	127.5	64.0	42.5	32.0	21.5	16.0	13.0	102.0	51.0	34.0	25.5	17.0	13.0	10.5	76.5	38.5	25.5	19.5	13.0	10.0	8.0
	1/4	180.0	90.0	60.0	45.0	30.0	22.5	18.0	144.0	72.0	48.0	36.0	24.0	18.0	14.5	108.0	54.0	36.0	27.0	18.0	13.5	11.0
	1/8	97.5	49.0	32.5	24.5	16.5	12.5	10.0	78.0	39.0	26.0	19.5	13.0	10.0	8.0	58.5	29.5	19.5	15.0	10.0	7.5	6.0
	1/16	50.0	25.0	16.5	12.5	8.5	6.5	5.0	40.0	20.0	13.5	10.0	7.0	5.0	4.0	30.0	15.0	10.0	7.5	5.0	4.0	3.0
	1/32	25.0	12.5	8.5	6.5	4.5	3.5	2.5	20.0	10.0	7.0	5.0	3.5	2.5	2.0	15.0	7.5	5.0	4.0	2.5	2.0	2.0
20"	TEES, CAPS	157.5	79.0	52.5	39.5	26.5	20.0	16.0	126.0	63.0	42.0	31.5	21.0	16.0	13.0	94.5	47.5	31.5	24.0	16.0	12.0	9.5
	1/4	222.5	111.5	74.0	55.5	37.0	28.0	22.5	178.0	89.0	59.5	44.5	30.0	22.5	18.0	133.5	67.0	44.5	33.5	22.5	17.0	13.5
	1/8	120.5	60.5	40.5	30.5	20.0	15.0	12.0	96.5	48.5	32.5	24.0	16.0	12.0	10.0	72.5	36.5	24.0	18.0	12.0	9.0	7.5
	1/16	61.5	31.0	20.5	15.5	10.5	8.0	6.5	49.0	24.5	16.5	12.5	8.5	6.5	5.0	37.0	18.5	12.5	9.5	6.5	5.0	4.0
	1/32	31.0	15.5	10.5	8.0	5.5	4.0	3.5	25.0	12.5	8.5	6.5	4.5	3.5	2.5	18.5	9.5	6.5	4.5	3.5	2.5	2.0
24"	TEES, CAPS	226.5	113.5	75.5	57.0	38.0	28.5	23.0	181.0	90.5	60.5	45.5	30.5	23.0	18.5	136.0	68.0	45.5	34.0	23.0	17.0	14.0
	1/4	320.0	160.0	107.0	80.0	53.5	40.0	32.0	256.0	128.0	85.5	64.0	43.0	32.0	26.0	192.0	96.0	64.0	48.0	32.0	24.0	19.5
	1/8	173.5	87.0	58.0	43.5	29.0	22.0	17.5	138.5	69.5	46.5	35.0	23.5	17.5	14.0	104.0	52.0	35.0	26.0	17.5	13.0	10.5
	1/16	88.5	44.5	29.5	22.5	15.0	11.0	9.0	71.0	35.5	24.0	18.0	12.0	9.0	7.5	53.0	26.5	18.0	13.5	15.0	7.0	5.5
	1/32	44.5	22.5	15.0	11.5	7.5	5.5	4.5	35.5	18.0	12.0	9.0	6.0	4.5	3.5	27.0	13.5	9.0	7.0	4.5	3.5	3.0

TYPE OF SOIL CONDITION

- A. SOFT CLAY; FINE LOOSE SAND.....500 LBS. PER SQ. FT.  
B. SAND & CLAY; MIXED OR IN LAYERS; FINE CONFINED SAND.....1000 LBS. PER SQ. FT.  
C. HARD DRY CLAY.....1500 LBS. PER SQ. FT.  
D. COARSE SAND.....2000 LBS. PER SQ. FT.  
E. GRAVEL.....3000 LBS. PER SQ. FT.  
F. SOFT ROCK.....4000 LBS. PER SQ. FT.  
G. HARDPAN.....5000 LBS. PER SQ. FT.

NOTE:

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2. FOR KAUAI AND MAUI, SEE PLATE B2 FOR ADDITIONAL NOTES.

MINIMUM BEARING AREAS (SQ. FT.) FOR HORIZONTAL THRUST BLOCKS																									
PIPE SIZE	BEND	PRESSURE 250 PSI						PRESSURE 200 PSI						PRESSURE 150 PSI											
		TYPE OF SOIL CONDITION						TYPE OF SOIL CONDITION						TYPE OF SOIL CONDITION											
		A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G			
	TEES, CAPS	353.5	177.0	118.0	88.5	59.0	44.5	35.5	283.0	141.5	94.5	71.0	47.5	35.5	28.5	212.5	106.5	71.0	53.5	35.5	27.0	21.5			
30"	1/4	500.0	250.0	167.0	125.0	83.5	62.5	50.0	400.0	200.0	133.5	100.0	67.0	50.0	40.0	300.0	150.0	100.0	75.0	50.0	37.5	30.0			
	1/8	270.5	135.5	90.5	68.0	45.5	34.0	27.5	216.5	108.5	72.5	54.5	36.5	27.5	22.0	162.5	81.5	54.5	41.0	27.5	20.5	16.5			
	1/16	138.0	69.0	46.0	34.5	23.0	17.5	14.0	110.5	55.5	37.0	28.0	18.5	14.0	11.0	83.0	41.5	28.0	21.0	14.0	10.5	8.5			
	1/32	69.5	35.0	23.5	17.5	11.5	9.0	7.0	55.5	28.0	18.5	14.0	9.5	7.0	5.5	42.0	21.0	14.0	10.5	7.0	5.5	4.5			
	TEES, CAPS	509.0	254.5	170.0	127.5	85.0	64.0	51.0	407.5	204.0	136.0	102.0	68.0	51.0	41.0	305.5	153.0	102.0	76.5	51.0	38.5	31.0			
	1/4	720.0	360.0	240.0	180.0	120.0	90.0	72.0	576.0	288.0	192.0	144.0	96.0	72.0	58.0	432.0	216.0	144.0	108.0	72.0	54.0	43.5			
36"	1/8	390.0	195.0	130.0	97.5	65.0	49.0	39.0	312.0	156.0	104.0	78.0	52.0	39.0	31.5	234.0	117.0	78.0	58.4	39.0	29.5	23.5			
	1/16	199.0	99.5	66.5	50.0	33.5	25.0	20.0	159.0	79.5	53.0	40.0	26.5	20.0	16.0	119.5	60.0	40.0	30.0	20.0	15.0	12.0			
	1/32	100.0	50.0	33.5	25.0	17.0	12.5	10.0	80.0	40.0	27.0	20.0	13.5	10.0	8.0	60.0	30.0	20.0	15.0	10.0	7.5	6.0			
	TEES, CAPS	693.0	346.5	231.0	173.5	115.5	87.0	69.5	554.5	277.5	185.0	139.0	92.5	69.5	55.5	416.0	208.0	139.0	104.0	69.5	52.0	42.0			
	1/4	980.0	490.0	327.0	245.0	163.5	122.5	98.0	784.0	392.0	261.5	196.0	131.0	98.0	78.5	588.0	294.0	196.0	147.0	98.0	74.0	59.0			
	1/8	530.5	265.5	177.0	132.5	88.5	66.5	53.0	424.5	212.5	141.5	106.0	71.0	53.0	42.5	319.5	159.5	106.0	79.5	53.0	40.0	32.0			
42"	1/16	270.5	135.5	90.5	68.0	45.0	34.0	27.0	216.5	108.5	72.5	54.5	36.0	27.0	22.0	162.5	81.5	54.1	40.5	27.0	20.5	16.5			
	1/32	136.0	68.0	45.5	34.0	23.0	17.0	14.0	109.0	54.5	36.5	27.5	18.5	14.0	11.0	81.5	41.0	27.5	20.5	14.0	10.5	8.5			
TYPE OF SOIL CONDITION																									
LATERAL BEARING PRESSURE																									
A. SOFT CLAY; FINE LOOSE SAND.....500 LBS. PER SQ. FT.																									
B. SAND & CLAY; MIXED OR IN LAYERS; FINE CONFINED SAND.....1000 LBS. PER SQ. FT.																									
C. HARD DRY CLAY.....1500 LBS. PER SQ. FT.																									
D. COARSE SAND.....2000 LBS. PER SQ. FT.																									
E. GRAVEL.....3000 LBS. PER SQ. FT.																									
F. SOFT ROCK.....4000 LBS. PER SQ. FT.																									
G. HARDPAN.....5000 LBS. PER SQ. FT.																									
NOTE:																									
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2. FOR KAUAI AND MAUI, SEE PLATE B2 FOR ADDITIONAL NOTES.																									
KAUAI OAHU MAUI HAWAII		HORIZONTAL THRUST BLOCK MINIMUM BEARING AREAS SCALE: NTS																		STANDARD DETAILS		2002 REVISION		B5	

TOP VERTICAL  
THRUST BLOCK SCHEDULE  
SCALE: NTSSTANDARD  
DETAILS2002  
REVISION

B6

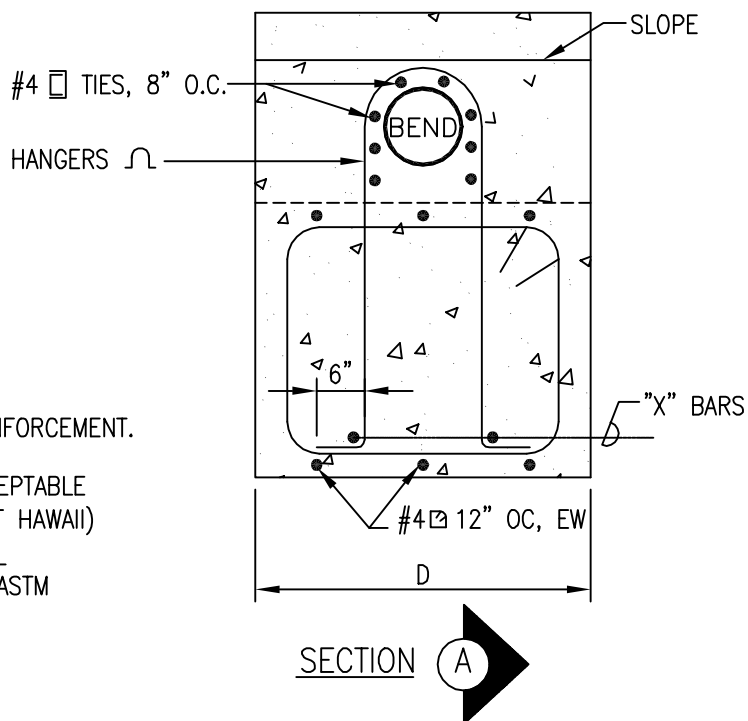
## TOP VERTICAL THRUST BLOCK SCHEDULE

PIPE SIZE	PRESSURE 250 PSI						PRESSURE 200 PSI						PRESSURE 150 PSI					
	CONCRETE BLOCK			HANGER "X" BAR			CONCRETE BLOCK			HANGER "X" BAR			CONCRETE BLOCK			HANGER "X" BAR		
	A	B	C	D			A	B	C	D			A	B	C	D		
4"	1/4 4'-6"	4'-0"	4'-0"	2'-6"	(2)#4	(2)#4												
	1/8 3'-9"	3'-0"	1'-6"	2'-6"	(2)#3	(2)#3												
	1/16 2'-6"	2'-3"	1'-9"	2'-6"	(2)#3	(2)#3												
	1/32 2'-3"	1'-6"	1'-3"	2'-6"	(2)#3	(2)#3												
6"	1/4 4'-6"	4'-3"	4'-3"	4'-6"	(2)#5	(2)#5												
	1/8 5'-0"	3'-9"	1'-6"	3'-0"	(2)#4	(2)#4												
	1/16 3'-9"	3'-3"	2'-6"	2'-6"	(2)#3	(2)#3												
	1/32 3'-0"	2'-3"	2'-0"	2'-6"	(2)#3	(2)#3												
8"	1/4 5'-3"	5'-0"	5'-0"	5'-3"	(2)#6	(2)#6												
	1/8 5'-3"	4'-9"	2'-3"	4'-0"	(2)#5	(2)#5												
	1/16 5'-9"	3'-6"	2'-6"	2'-6"	(2)#4	(2)#4												
	1/32 3'-6"	2'-9"	2'-6"	2'-6"	(2)#3	(2)#3												
12"	1/4 6'-6"	7'-0"	7'-0"	6'-6"	(3)#7	(2)#7	6'-3"	6'-3"	6'-3"	5'-6"	(3)#7	6'-0"	6'-0"	6'-0"	6'-0"	4'-6"	(2)#7	(2)#7
	1/8 6'-3"	5'-9"	2'-9"	5'-6"	(2)#7	(2)#7	5'-6"	5'-6"	2'-9"	4'-6"	(2)#6	5'-0"	5'-0"	5'-3"	2'-9"	3'-9"	(2)#6	(2)#6
	1/16 5'-6"	4'-6"	3'-6"	4'-0"	(2)#5	(2)#5	5'-8"	4'-6"	3'-4"	2'-6"	(3)#4	6'-0"	6'-0"	4'-0"	2'-9"	2'-0"	(2)#4	(2)#4
	1/32 5'-3"	4'-3"	3'-9"	2'-6"	(2)#4	(2)#4	4'-3"	3'-9"	3'-3"	2'-0"	(2)#3	4'-0"	4'-0"	3'-0"	2'-6"	2'-0"	(2)#3	(2)#3

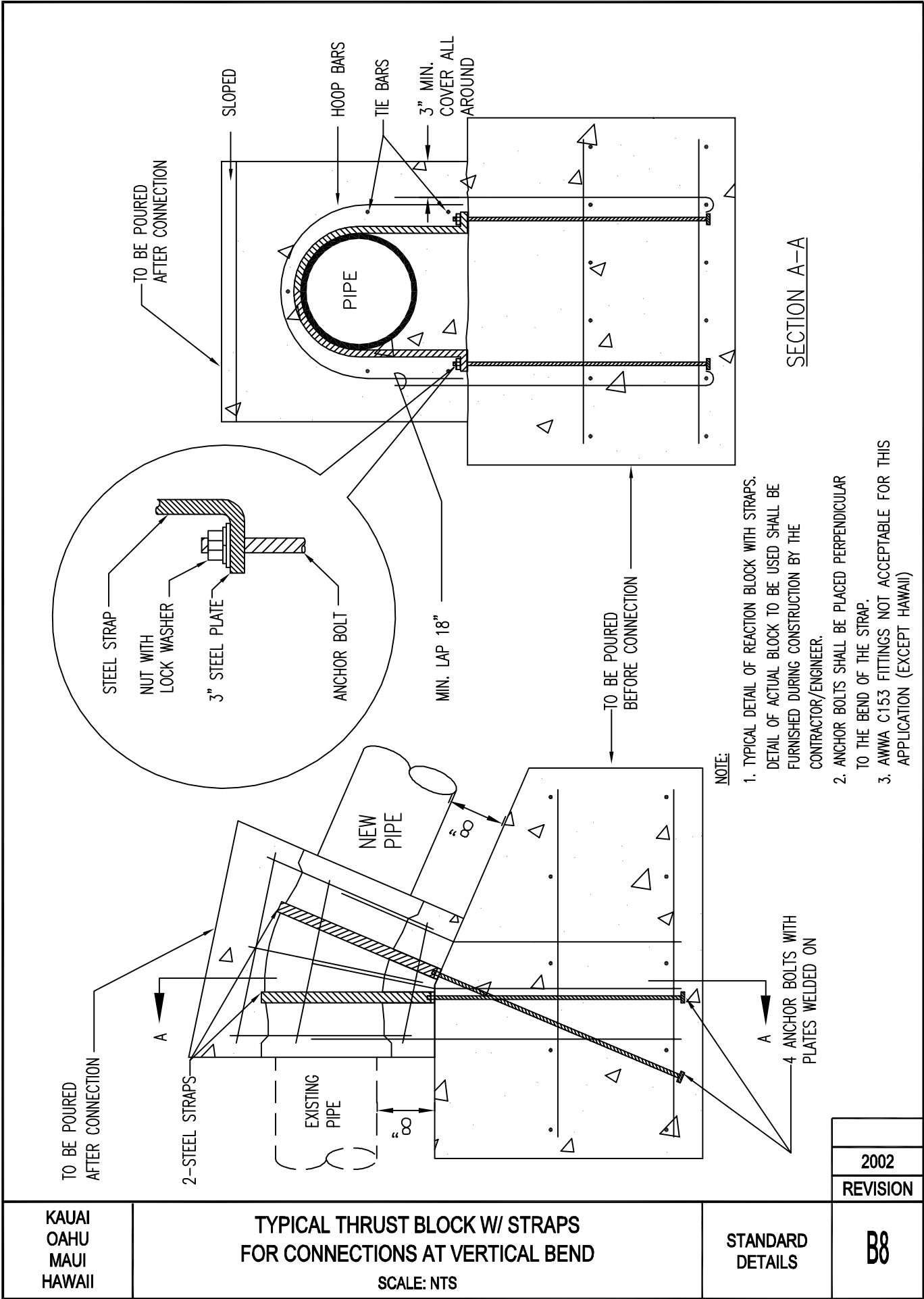
USE FIGURES UNDER  
250 PSI

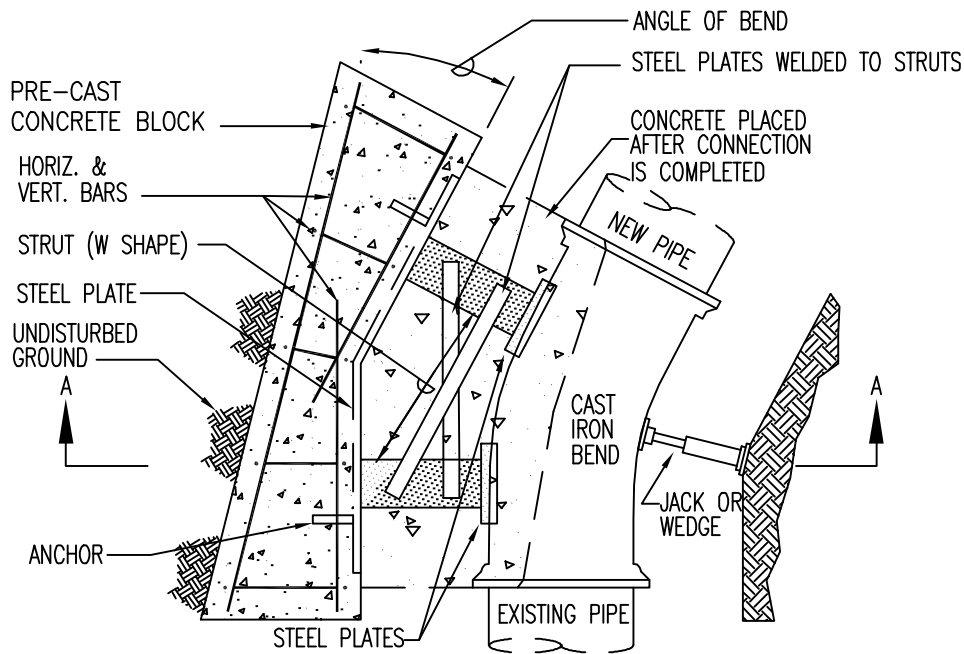
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2. DIMENSIONS IN SCHEDULE REFER TO B7.
3. SCHEDULE IS NOT APPLICABLE TO BLOCKS FULLY OR PARTLY SUBMERGED IN WATER.
4. SAFETY FACTOR 1.5 BASED ON PIPE LOCATION MINIMUM 2' BELOW GROUND.



**B7**

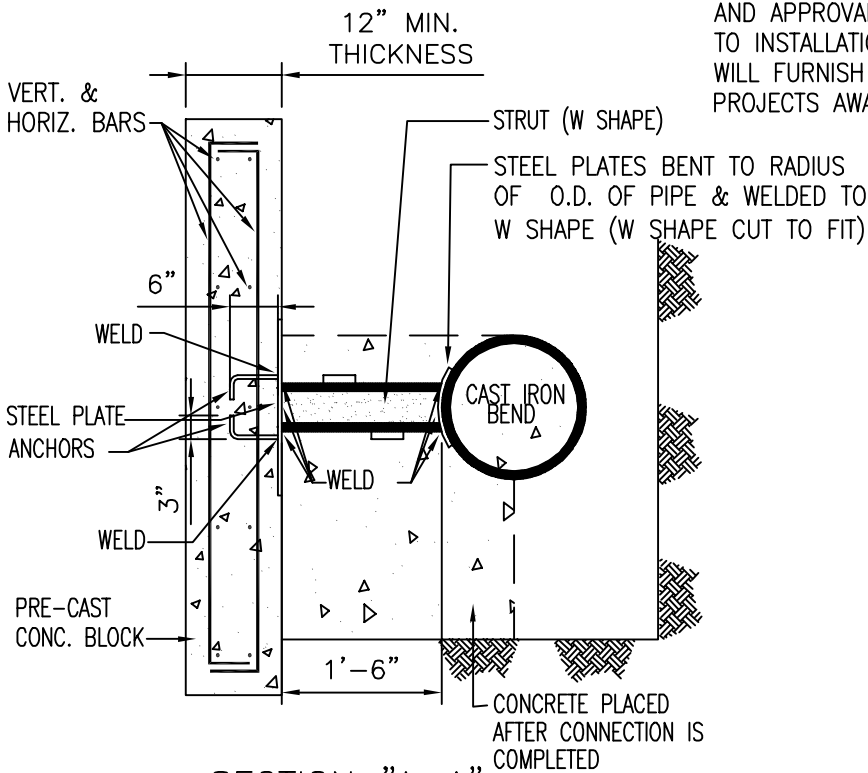




PLAN

NOTE:

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SECTION "A-A"

2002
REVISION

KAUAI  
OAHU  
MAUI  
HAWAII

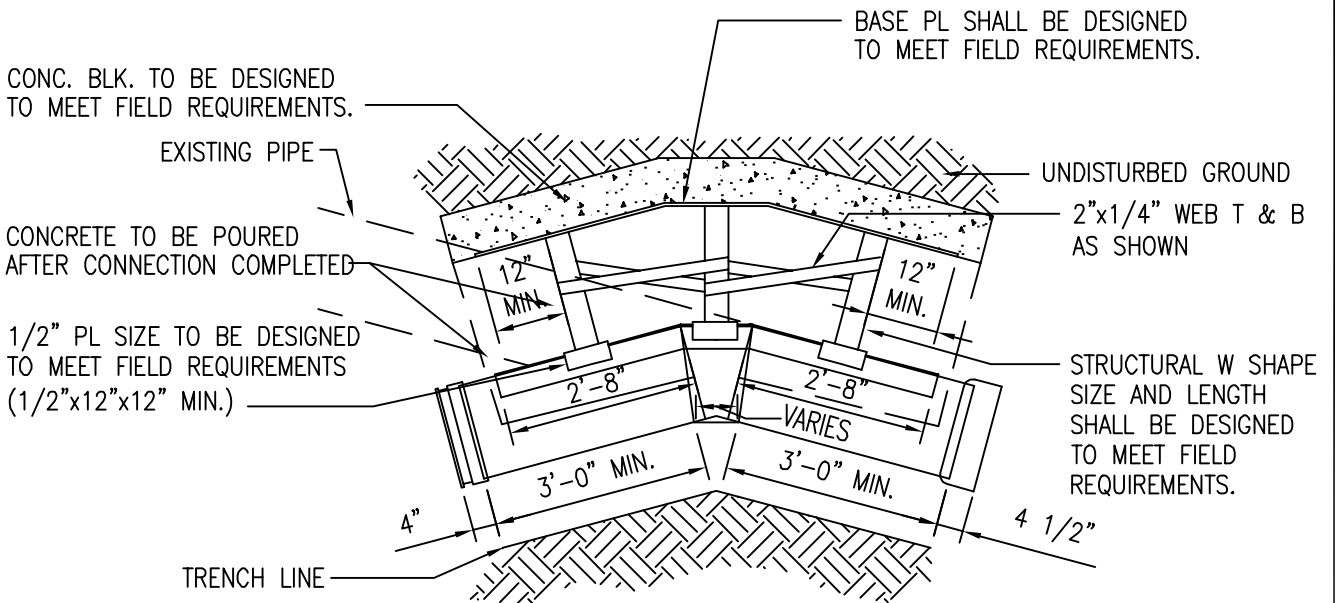
**TYPICAL THRUST BLOCK**  
**WITH STRUCTURAL STRUT FOR CONNECTIONS**  
SCALE: NTS

STANDARD  
DETAILS

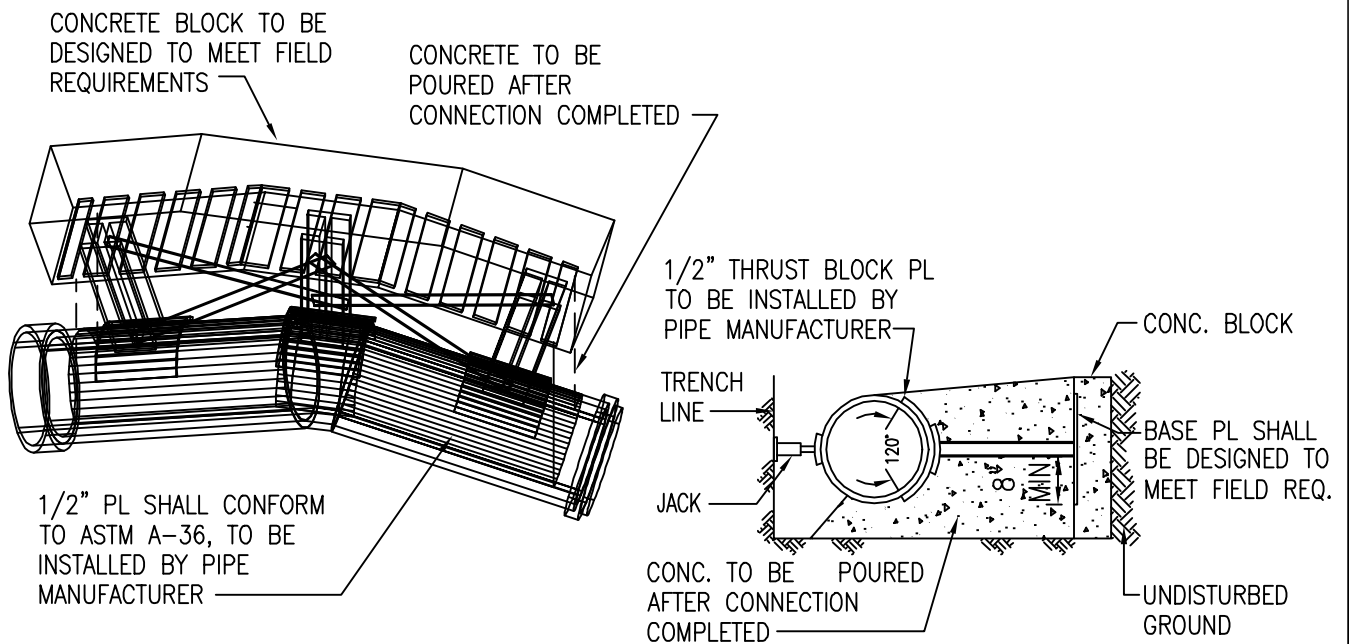
**B9**







PLAN



ISOMETRIC

SECTION

NOTES:

1. ALL WELDS SHALL CONFORM TO AWS STANDARDS.
2. PL SHALL BE UNCOATED READY TO RECEIVE THRUST STRUTS AND APPURTENANCES.
3. DELIVER AT REQUEST.
4. NUMBER OF STRUTS TO BE USED MAY VARY ACCORDING TO THE WORKING PRESSURE.

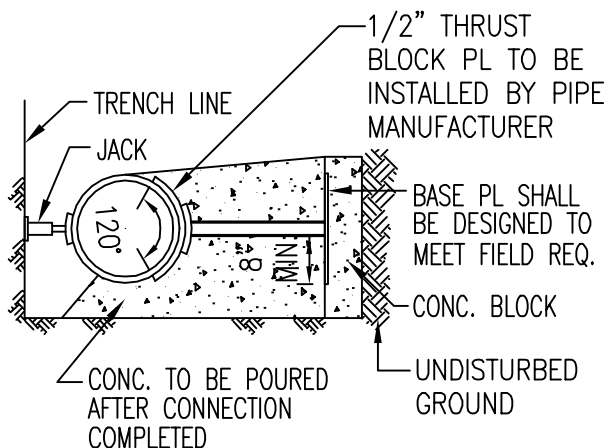
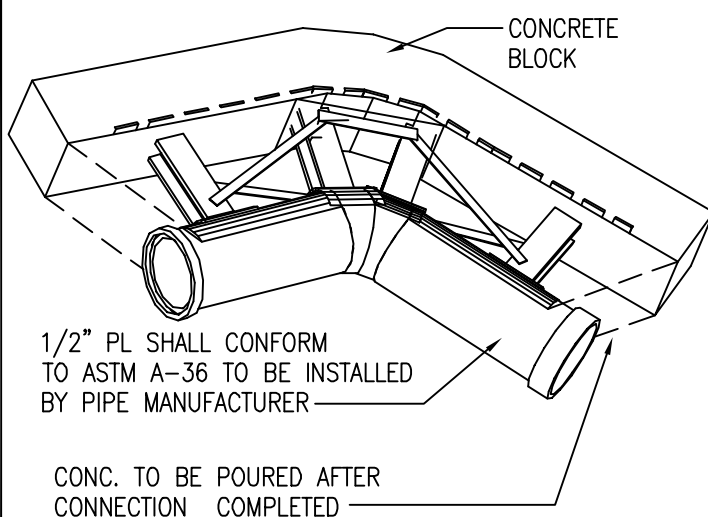
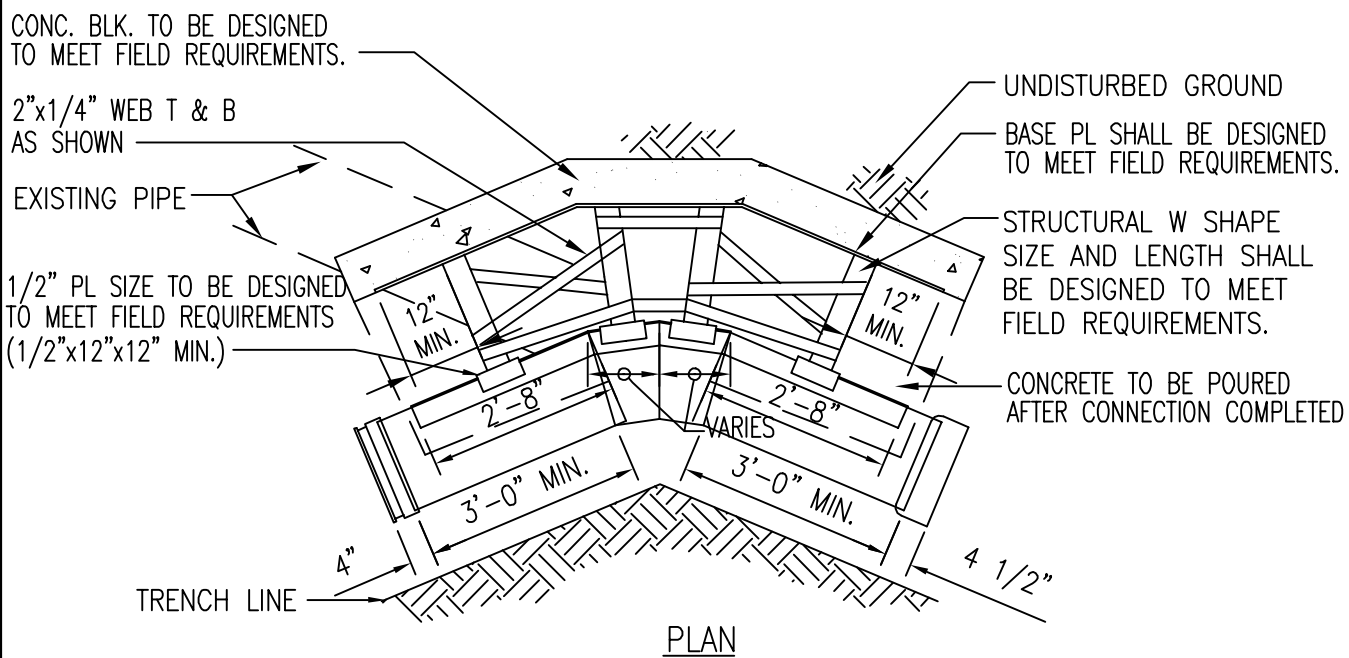
2002  
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KAUAI  
OAHU  
MAUI

TYPICAL THRUST BLOCK  
22 1/2° TO 45° CONCRETE CYLINDER BEND  
FOR 16" TO 42" CONNECTIONS ONLY  
SCALE: NTS

STANDARD  
DETAILS

B11



NOTES:

1. ALL WELDS SHALL CONFORM TO AWS STANDARDS.
2. PL SHALL BE UNCOATED READY TO RECEIVE THRUST STRUTS AND APPURTENANCES.
3. DELIVER AT REQUEST.
4. NUMBER OF STRUTS TO BE USED MAY VARY ACCORDING TO THE WORKING PRESSURE.

2002

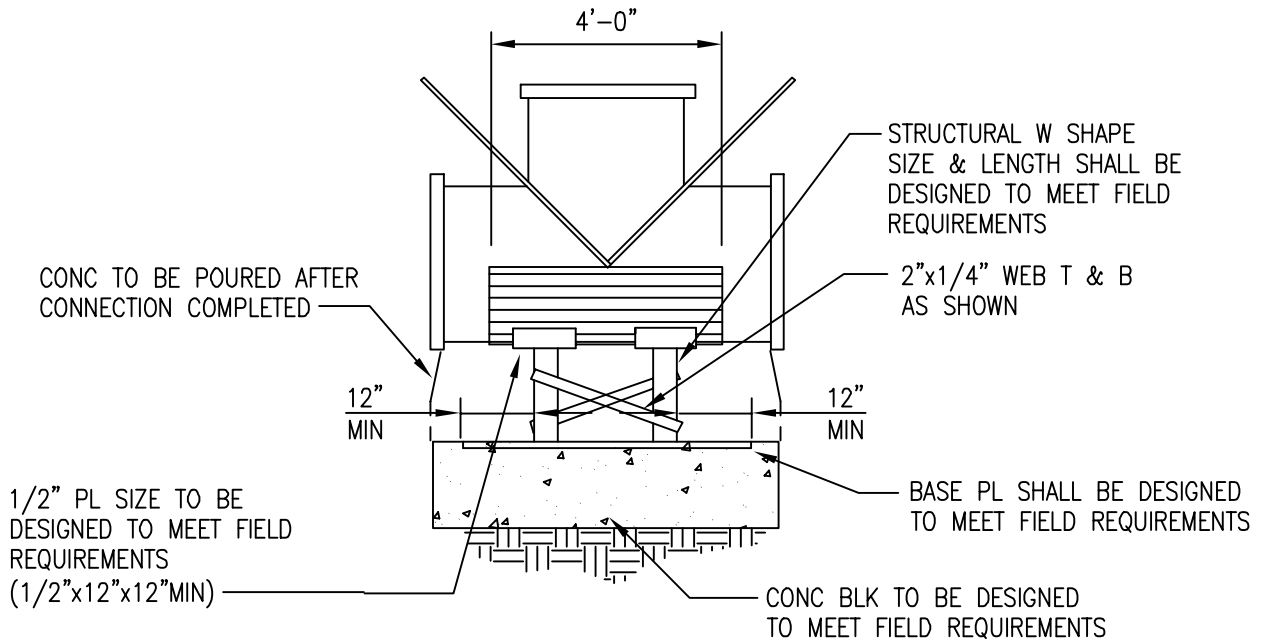
REVISION

KAUAI  
OAHU  
MAUI

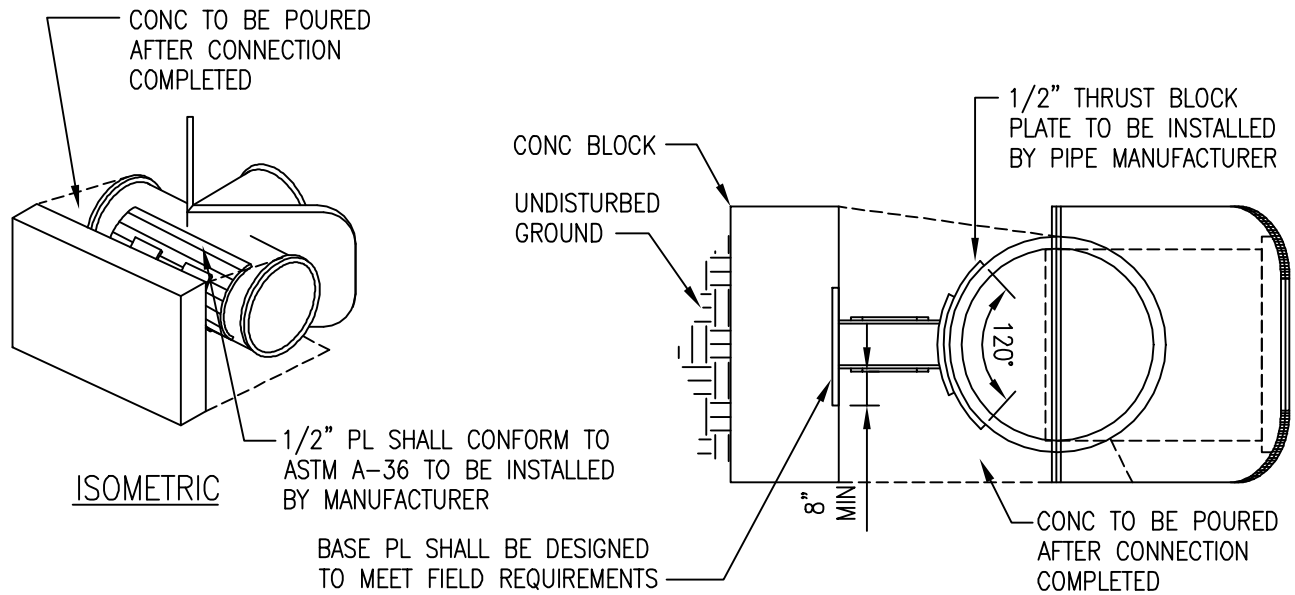
**TYPICAL THRUST BLOCK**  
**45° TO 67 1/2° CONCRETE CYLINDER BEND**  
**FOR 16" TO 42" CONNECTIONS ONLY**  
SCALE: NTS

STANDARD  
DETAILS

**B12**



PLAN



SECTION

NOTES:

1. ALL WELDS SHALL CONFORM TO AWS STANDARDS.
2. PL SHALL BE UNCOATED READY TO RECEIVE THRUST STRUTS AND APPURTENANCES.
3. DELIVER AT REQUEST.
4. NUMBER OF STRUTS TO BE USED MAY VARY ACCORDING TO THE WORKING PRESSURE.

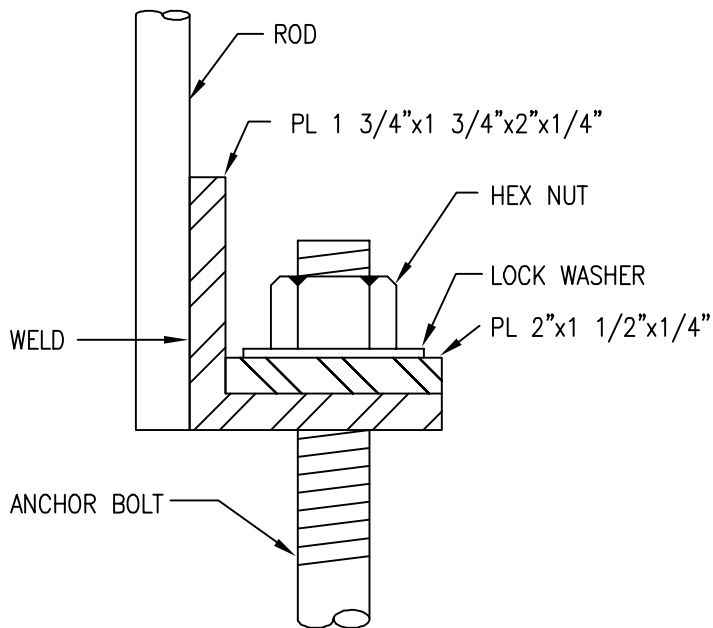
2002  
REVISION

KAUAI  
OAHU  
MAUI

**TYPICAL THRUST BLOCK**  
**CONCRETE CYLINDER TEE CONNECTION (16" - 42")**  
SCALE: NTS

STANDARD  
DETAILS

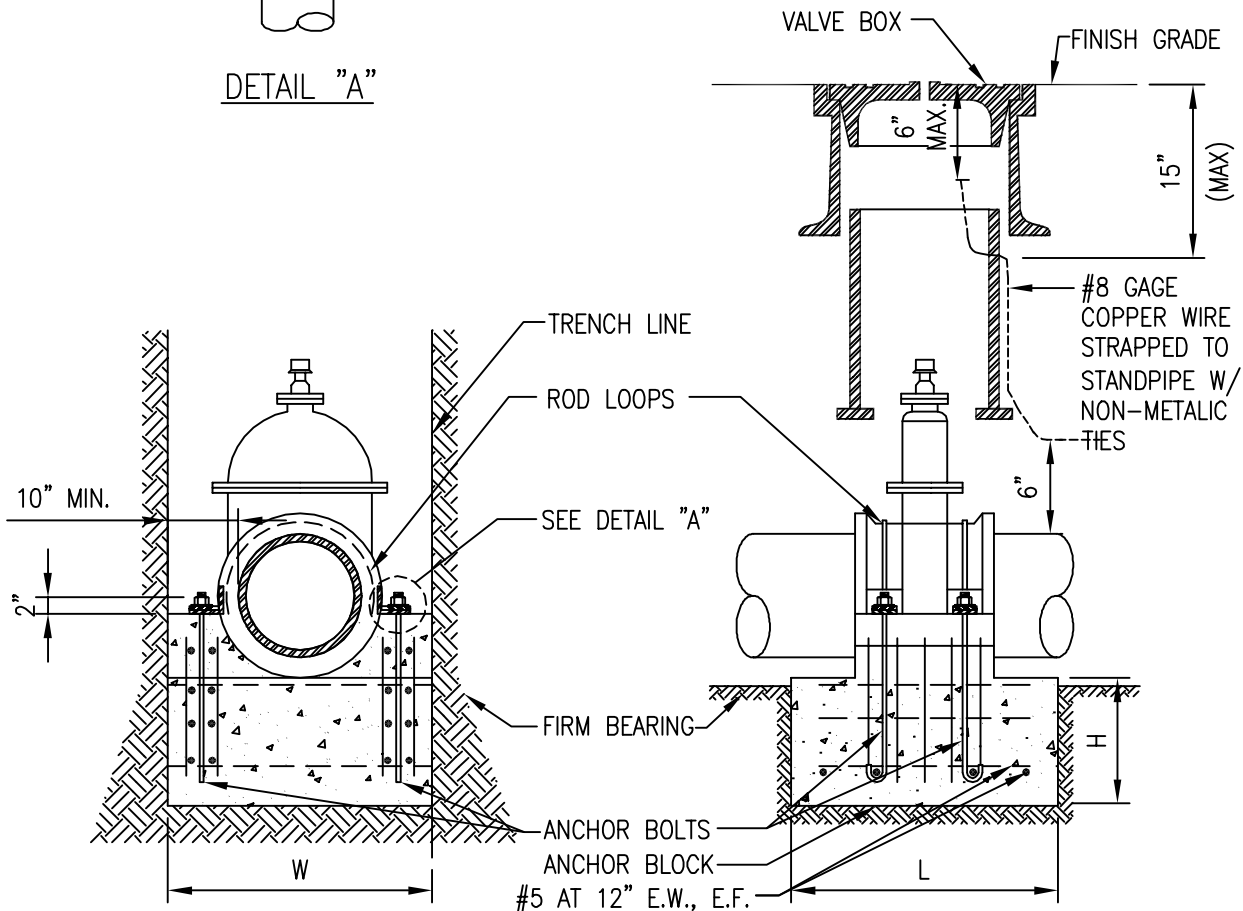
B13



DETAIL "A"

NOTES:

1. APPLY BOND BREAKER BETWEEN GATE VALVE AND CONCRETE.
2. ALL ANCHOR MATERIALS SHALL BE HOT DIPPED GALVANIZED STEEL, AND COATED WITH ASPHALTIC MATERIAL AFTER INSTALLATION.
3. 3" CLEARANCE FOR ALL REINFORCING STEEL.
4. FOR MANHOLES, ANCHOR BLOCKS CAN BE MADE AS PART OF FLOOR SLAB. SUBMIT STRUCTURAL DESIGN FOR MANAGER'S APPROVAL.
5. (ADDITIONAL FOR MAUI) A SEGMENT OF AC PIPE SHALL BE REMOVED AND THE VALVE INSTALLED WITH D.I.P. NIPPLES.
6. ANCHOR BLOCK DESIGNED FOR VERTICAL LOAD ONLY. FOR BLOCK SCHEDULE, SEE DETAIL B15.
7. STANDPIPE SHALL BE PVC C-900.



TYPICAL DETAIL

2002

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OAHU  
MAUI

**GATE VALVE ANCHOR BLOCK**  
NON-METALIC PIPES  
SCALE: NTS

STANDARD  
DETAILS

**B14**

TYPE OF SOIL CONDITION			A	B	C	D	E	F	G
PIPE SIZE (in)	WIDTH, W (in)	HEIGHT, H (in)	LENGTH OF ANCHOR BLOCK, L (in)						
4	24	12	24	24	24	24	24	24	24
6	26	12	26	26	26	26	26	26	26
8	28	15	28	28	28	28	28	28	28
12	32	15	32	32	32	32	32	32	32
16	36	18	36	36	36	36	36	36	36
18	38	18	38	38	38	38	38	38	38
20	40	18	40	40	40	40	40	40	40
24	44	18	44	44	44	44	44	44	44
30	50	18	50	50	50	50	50	50	50

#### TYPE OF SOIL CONDITION

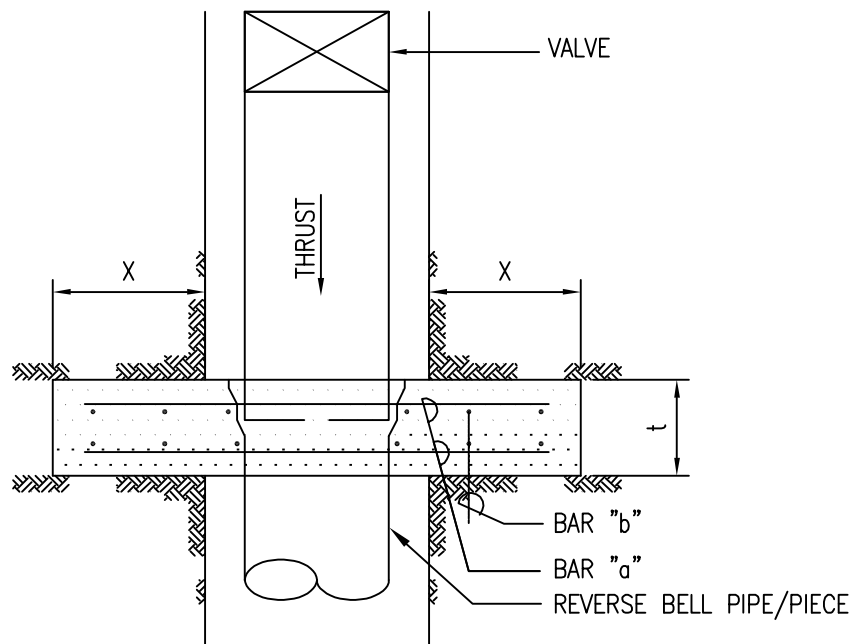
#### LATERAL BEARING PRESSURE

- A. SOFT CLAY: FINE LOOSE SAND.....500 LBS. PER SQ. FT.  
 B. SAND AND CLAY; MIXED OR IN LAYERS; FINE CONFINED SAND.....1000 LBS. PER SQ. FT.  
 C. HARD DRY CLAY.....1500 LBS. PER SQ. FT.  
 D. COARSE SAND.....2000 LBS. PER SQ. FT.  
 E. GRAVEL.....3000 LBS. PER SQ. FT.  
 F. SOFT ROCK.....4000 LBS. PER SQ. FT.  
 G. HARDPAN.....5000 LBS. PER SQ. FT.

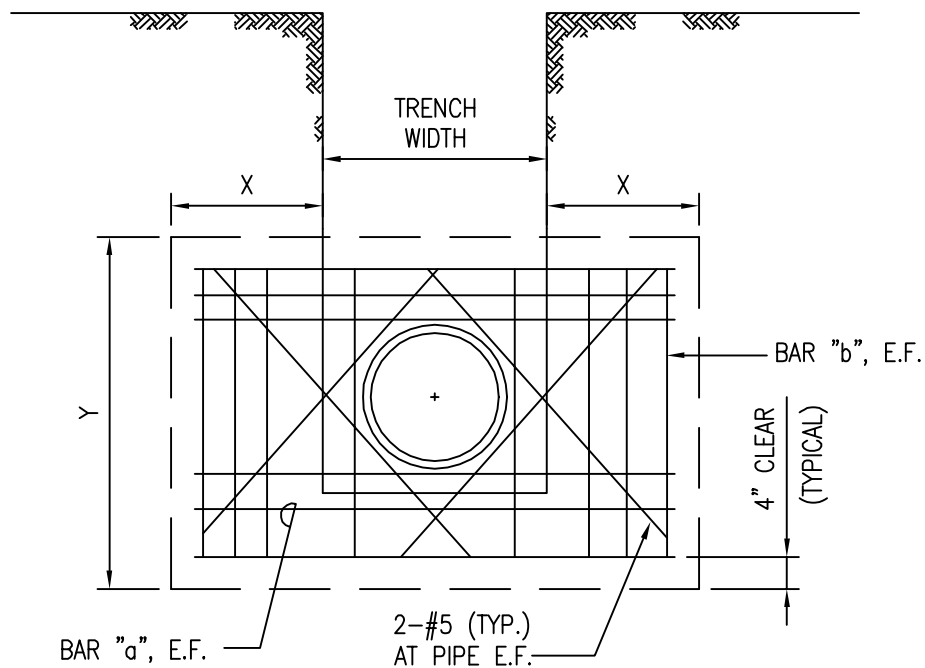
#### NOTE:

1. ACTUAL FIELD CONDITIONS AND SOIL TYPE SHALL BE VERIFIED IN THE FIELD. THE SCHEDULE, DIMENSIONS AND DETAILS AS SHOWN ARE PROVIDED AS A GUIDE ONLY. THE CONTRACTOR OR ENGINEER WHO PREPARED THE PLANS SHALL SUBMIT THE FINAL DESIGN AND DETAILS TO THE MANAGER FOR REVIEW AND APPROVAL AFTER FIELD VERIFICATION AND PRIOR TO INSTALLATION. FOR OAHU ONLY, THE DEPARTMENT WILL FURNISH THE FINAL DESIGN AND DETAILS FOR PROJECTS AWARDED BY THE MANAGER.
2. ENGINEER SHALL EVALUATE SOIL CONDITIONS AND VERIFY THAT THE ALLOWABLE PRESSURE PROVIDED IS APPLICABLE

PRESSURE PROVIDED IS APPLICABLE			
			2002
			REVISION
KAUAI OAHU MAUI	GATE VALVE ANCHOR BLOCK SCHEDULE	STANDARD DETAILS	B15
SCALE: NTS			



PLAN



ELEVATION

SEE TABLE ON PLATES B17 AND B18 FOR DIMENSION. FOR TRENCH WIDTH REFER TO TABLE 300-1 IN DIVISION 300 OF THE WATER SYSTEM STANDARDS.

FOR MAUI: SEE TABLE ON PLATES B20 AND B21 WHEN BEAM IS REQUIRED FOR RESTRAINT OF A REDUCER.

2002
REVISION

KAUAI  
OAHU  
MAUI  
HAWAII

# **CONCRETE THRUST BEAM** TYPICAL DETAIL SCALE: NTS

STANDARD  
DETAILS

**B16**

KAUAI  
OAHU  
MAUI  
HAWAII

CONCRETE THRUST BEAM  
SCHEDULE  
SCALE: NTS

STANDARD  
DETAILS

REVISION

2002

B17

KAUAI  
OAHU  
MAUI  
HAWAII

WATER PRESSURE 250 PSI  
TYPE OF SOIL CONDITION

PIPE SIZE (in)	A		B		C		D		E		F		G		Bar "a" Min.	Bar "b" Min.
	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	t (in)	
4	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	12.00	#4@12" #4@12"
6	3.00	4.00	3.00	3.75	3.00	3.75	3.00	3.75	3.00	3.75	3.00	4.00	3.00	4.00	12.00	#4@12" #4@12"
8	3.50	4.75	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	12.00	#4@6" #4@12"
12	5.00	6.50	3.50	4.50	3.50	4.50	3.50	4.50	3.50	4.50	3.50	4.50	3.50	4.50	18.00	#4@6" #5@12"
16	6.75	8.75	4.75	6.00	4.00	5.25	3.75	4.75	3.75	4.75	3.75	5.00	3.75	4.75	18.00	#5@6" #5@12"
18	7.50	9.75	5.25	6.75	4.50	5.75	4.00	5.25	4.00	5.25	4.00	5.25	4.25	5.50	18.00	#6@6" #5@12"
20	8.25	10.75	5.75	7.25	4.75	6.00	4.25	5.50	4.25	5.50	4.50	5.75	4.50	5.75	24.00	#6@6" #6@12"
24	10.00	12.75	6.75	8.50	5.75	7.25	5.00	6.25	4.50	5.75	4.75	6.00	4.75	6.00	24.00	#6@6" #6@12"
30	12.25	15.75	8.75	11.00	7.25	9.25	6.25	8.00	6.00	7.50	6.00	7.50	6.00	7.50	24.00	#8@6" #6@12"
36	14.75	18.75	10.50	13.25	8.50	10.75	7.50	9.50	7.00	9.00	7.00	9.00	7.00	9.00	30.00	#9@6" #6@8"
42	17.00	21.75	12.00	15.25	10.00	12.75	8.75	11.25	7.75	9.75	7.75	9.75	7.75	9.75	36.00	#10@6" #6@6"

WATER PRESSURE 200 PSI  
TYPE OF SOIL CONDITION

PIPE SIZE (in)	A		B		C		D		E		F		G		Bar "a" Min.	Bar "b" Min.
	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	t (in)	
4	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	12.00	#4@12" #4@10"
6	3.00	4.00	3.00	3.75	3.00	3.75	3.00	3.75	3.00	3.75	3.00	3.75	3.00	3.75	12.00	#4@12" #4@10"
8	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	12.00	#4@12" #4@10"
12	4.50	5.75	3.50	4.50	3.50	4.50	3.50	4.50	3.50	4.50	3.50	4.50	3.50	4.50	18.00	#4@12" #5@10"
16	6.00	7.75	4.50	5.75	3.75	4.75	3.75	4.75	3.75	4.75	3.75	4.75	3.75	4.75	18.00	#4@6" #5@10"
18	6.75	8.75	5.00	6.50	4.00	5.25	4.00	5.25	4.25	5.50	4.00	5.25	4.25	5.50	18.00	#5@6" #5@10"
20	7.50	9.75	5.25	6.75	4.25	5.50	4.25	5.50	4.50	5.75	4.50	5.75	4.50	5.75	24.00	#5@6" #6@10"
24	8.75	11.50	6.25	8.00	5.25	6.75	4.50	5.75	4.75	6.00	4.75	6.00	4.75	6.00	24.00	#6@6" #6@10"
30	11.00	14.25	7.75	10.00	6.50	8.50	5.75	7.50	5.25	6.75	5.25	6.75	5.25	6.75	24.00	#7@6" #6@10"
36	13.25	17.00	9.50	12.00	7.75	10.00	6.75	8.75	6.00	7.50	6.00	7.50	6.00	7.50	30.00	#8@6" #6@8"
42	15.50	19.50	11.00	14.25	9.00	11.25	8.00	10.25	7.00	8.75	7.00	8.75	7.00	8.75	36.00	#9@6" #6@6"

NOTE:

REFER TO DETAIL B18 FOR ADDITIONAL INFORMATION



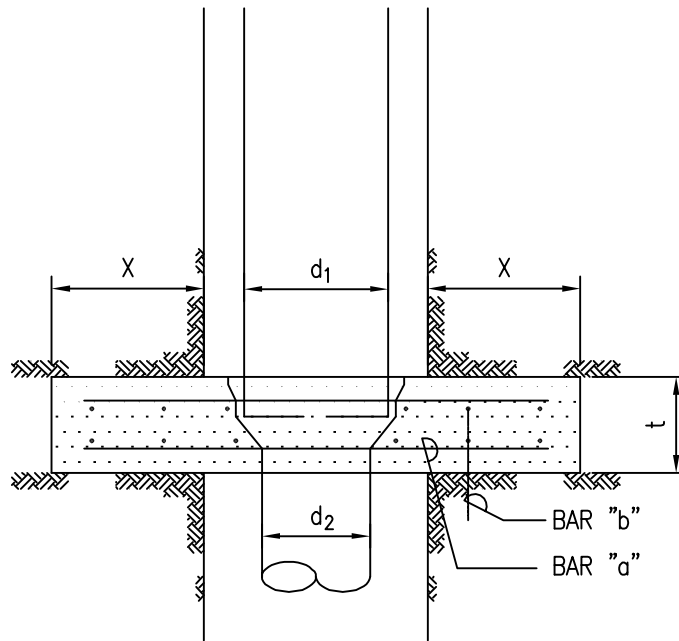
PIPE SIZE (in)	A		B		C		D		E		F		G		Bar "a" Min.	Bar "b" Min.
	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)		
4	2.75	3.25	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	#4@12"	#4@10"
6	3.00	3.25	3.00	3.75	3.00	3.75	3.00	3.75	3.00	3.75	3.00	3.75	3.00	3.75	#4@12"	#4@10"
8	3.50	3.75	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	#4@12"	#4@10"
12	4.00	5.25	3.50	4.50	3.50	4.50	3.50	4.50	3.50	4.50	3.50	4.50	3.50	4.50	#4@12"	#5@10"
16	5.25	6.75	3.75	4.75	3.75	4.75	3.75	4.75	3.75	4.75	3.75	4.75	3.75	4.75	#4@6"	#5@10"
18	6.00	7.75	4.25	5.50	4.00	5.50	4.00	5.25	4.25	5.50	4.25	5.50	4.25	5.50	#5@6"	#5@10"
20	6.50	8.25	4.50	5.75	4.25	5.75	4.50	5.75	4.50	5.75	4.50	5.75	4.50	5.75	#5@6"	#6@10"
24	7.75	10.00	5.50	7.00	4.75	6.00	4.75	6.00	4.75	6.00	4.75	6.00	4.75	6.00	#5@6"	#6@10"
30	9.50	12.25	6.75	8.50	5.75	7.25	5.25	6.75	5.25	6.75	5.25	6.75	5.25	6.75	#6@6"	#6@10"
36	11.25	14.25	8.00	10.25	6.75	8.50	5.75	7.25	5.75	7.25	5.75	7.25	5.75	7.25	#7@6"	#6@8"
42	13.25	16.75	9.50	12.25	7.75	9.75	6.75	8.50	6.25	8.00	6.25	8.00	6.25	8.00	#8@6"	#6@6"

## LATERAL BEARING PRESSURE

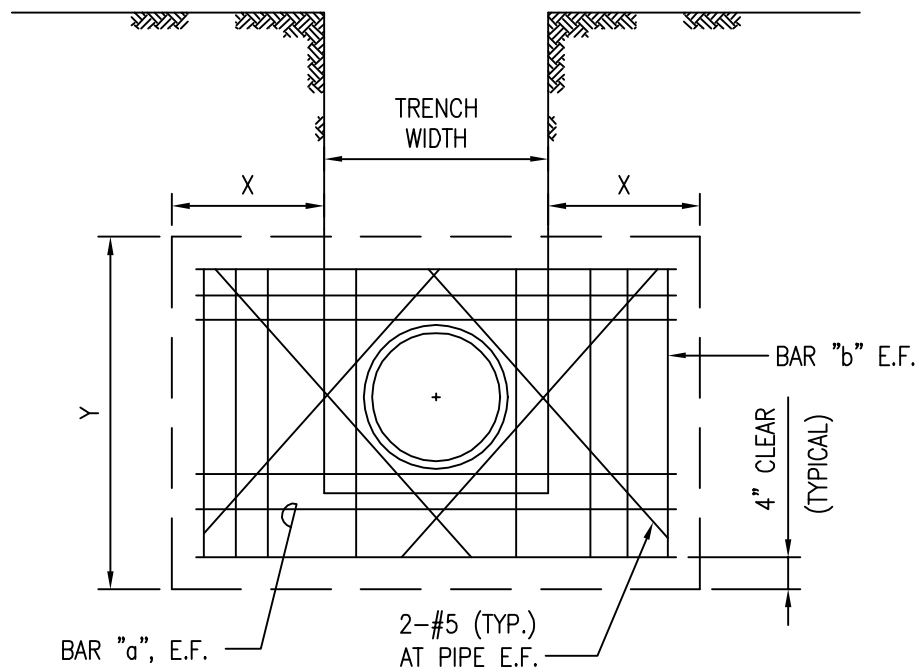
- |    |  |      |      |     |     |     |
|----|--|------|------|-----|-----|-----|
| A. | SOFT CLAY; FINE LOOSE SAND.....                            | 500  | LBS. | PER | SQ. | FT. |
| B. | SAND AND CLAY; MIXED OR IN LAYERS; FINE CONFINED SAND..... | 1000 | LBS. | PER | SQ. | FT. |
| C. | HARD DRY CLAY.....   | 1500 | LBS. | PER | SQ. | FT. |
| D. | COARSE SAND.....   | 2000 | LBS. | PER | SQ. | FT. |
| E. | GRAVEL.....  | 3000 | LBS. | PER | SQ. | FT. |
| F. | SOFT ROCK.....   | 4000 | LBS. | PER | SQ. | FT. |
| G. | HARDPAN.....   | 5000 | LBS. | PER | SQ. | FT. |

1. ACTUAL FIELD CONDITIONS AND SOIL TYPE SHALL BE VERIFIED IN THE FIELD. THE SCHEDULE, DIMENSIONS AND DETAILS AS SHOWN ARE PROVIDED AS A GUIDE ONLY. THE CONTRACTOR OR ENGINEER WHO PREPARED THE PLANS SHALL SUBMIT THE FINAL DESIGN AND DETAILS TO THE MANAGER FOR REVIEW AND APPROVAL AFTER FIELD VERIFICATION AND PRIOR TO INSTALLATION. FOR OAHU ONLY, THE DEPARTMENT WILL FURNISH THE FINAL DESIGN AND DETAILS FOR PROJECTS AWARDED BY THE MANAGER.

2. ENGINEER SHALL EVALUATE SOIL CONDITIONS AND VERIFY THAT THE ALLOWABLE PRESSURE PROVIDED IS APPLICABLE



PLAN



ELEVATION

SEE TABLE ON PLATES B20 AND B21 FOR  
DIMENSION. FOR TRENCH WIDTH REFER TO  
TABLE 300-1 IN DIVISION 300 OF THE  
WATER SYSTEM STANDARDS.

2002
REVISION

KAUAI OAHU HAWAII	<b>CONCRETE THRUST BEAM</b> FOR REDUCER - TYPICAL DETAIL SCALE: NTS	STANDARD DETAILS	<b>B19</b>
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KAUAI  
OAHU  
MAUI  
HAWAII

# CONCRETE THRUST BEAM REDUCER - SCHEDULE SCALE: NTS

STANDARD  
DETAILS

B20

NOTE:

REFER TO PLATE B21 FOR ADDITIONAL INFORMATION

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## WATER PRESSURE 250 PSI TYPE OF SOIL CONDITION

D1 PIPE SIZE (in)	D2 PIPE SIZE (in)	A		B		C		D		E		F		G		Bar "a" Min.	Bar "b" Min.
		Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	t (in)	
4	3	2.00	2.50	2.00	2.50	2.00	2.50	2.00	2.50	2.00	2.50	2.00	2.50	2.00	2.50	5.00	#4@6" #4@12"
6	4	2.25	3.00	2.25	3.00	2.25	3.00	2.25	3.00	2.25	3.00	2.25	3.00	2.25	3.00	7.00	#4@6" #4@12"
8	6	2.75	3.50	2.50	3.50	2.50	3.25	2.50	3.25	2.50	3.25	2.50	3.25	2.50	3.25	9.00	#4@6" #4@12"
12	10	4.75	6.25	3.50	4.00	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	12.00	#4@6" #5@12"
16	12	6.00	7.75	4.25	5.25	3.50	4.50	3.00	3.75	2.75	3.50	3.00	3.75	3.00	3.75	16.00	#5@6" #5@12"
18	16	6.50	8.25	4.75	5.75	3.75	4.75	3.25	4.25	2.75	3.50	3.25	4.25	3.25	4.25	17.00	#5@6" #5@8"
20	18	7.00	8.75	5.00	6.25	4.00	5.25	3.50	4.50	3.00	3.75	3.25	4.25	3.25	4.25	18.00	#5@6" #5@8"
24	20	8.50	10.75	6.00	7.75	5.00	6.50	4.25	5.50	3.50	4.50	3.75	4.75	3.75	4.75	22.00	#6@6" #5@8"
30	24	9.75	12.25	7.00	9.50	5.75	7.25	5.00	6.25	4.00	5.25	4.25	5.50	4.25	5.50	24.00	#7@6" #5@8"
36	30	12.00	15.00	8.50	11.75	7.00	8.75	6.00	7.75	5.00	6.25	4.75	6.00	4.75	6.00	30.00	#8@6" #5@6"
42	30	14.75	18.50	10.50	13.50	8.50	10.75	7.50	9.50	6.00	7.50	5.25	6.75	5.25	6.75	36.00	#9@6" #6@6"

## WATER PRESSURE 200 PSI TYPE OF SOIL CONDITION

D1 PIPE SIZE (in)	D2 PIPE SIZE (in)	A		B		C		D		E		F		G		Bar "a" Min.	Bar "b" Min.
		Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	t (in)	
4	3	2.00	2.50	2.00	2.50	2.00	2.50	2.00	2.50	2.00	2.50	2.00	2.50	2.00	2.50	5.00	#4@12" #4@12"
6	4	2.25	3.00	2.25	3.00	2.25	3.00	2.25	3.00	2.25	3.00	2.25	3.00	2.25	3.00	7.00	#4@12" #4@12"
8	6	2.50	3.25	2.50	3.25	2.50	3.25	2.50	3.25	2.50	3.25	2.50	3.25	2.50	3.25	9.00	#4@12" #4@12"
12	10	4.25	5.50	3.00	3.75	2.75	3.75	2.75	3.75	2.75	3.50	2.75	3.50	2.75	3.50	12.00	#4@6" #5@12"
16	12	5.25	6.75	3.75	4.75	3.25	4.25	3.00	4.00	3.00	3.75	3.00	3.75	3.00	3.75	16.00	#4@6" #5@12"
18	16	5.75	7.25	4.25	5.50	3.50	4.50	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	17.00	#5@6" #5@8"
20	18	6.25	8.00	4.50	5.75	3.75	4.75	3.50	4.50	3.50	4.50	3.50	4.50	3.50	4.50	18.00	#5@6" #5@8"
24	20	7.50	9.50	5.25	6.75	4.25	5.50	3.75	4.75	3.75	4.75	3.75	4.75	3.75	4.75	22.00	#5@6" #5@8"
30	24	8.50	10.75	6.00	7.75	5.00	6.25	4.50	5.75	4.25	5.75	4.25	5.75	4.25	5.75	24.00	#6@6" #5@8"
36	30	10.75	13.50	7.75	9.75	6.25	8.00	5.50	7.00	4.75	6.00	4.75	6.00	4.75	6.00	30.00	#7@6" #5@6"
42	30	13.25	16.75	9.25	11.75	7.75	9.75	6.75	8.50	5.50	7.00	5.25	7.00	5.25	7.00	36.00	#8@6" #6@6"

WATER PRESSURE 150 PSI TYPE OF SOIL CONDITION																			
D1	D2	A		B		C		D		E		F		G		Bar "a"	Bar "b"		
PIPE	PIPE	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	t (in)	Min.		
SIZE (in)	SIZE (in)																		
4	3	2.00	2.50	2.00	2.75	2.00	2.75	2.00	2.75	2.00	2.75	2.00	2.75	2.00	2.75	5.00	#4@12"		
6	4	2.25	3.00	2.25	3.00	2.25	3.00	2.25	3.00	2.25	3.00	2.25	3.00	2.25	3.00	7.00	#4@12"		
8	6	2.50	3.25	2.50	3.25	2.50	3.25	2.50	3.25	2.50	3.25	2.50	3.25	2.50	3.25	9.00	#4@12"		
12	10	3.50	4.75	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	2.75	3.50	12.00	#4@12"		
16	12	4.75	6.00	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	16.00	#5@12"		
18	16	5.00	6.25	3.50	4.50	3.50	4.50	3.25	4.25	3.25	4.25	3.25	4.25	3.25	4.25	17.00	#5@8"		
20	18	5.50	7.00	3.75	4.75	3.50	4.50	3.50	4.50	3.50	4.50	3.50	4.50	3.50	4.50	18.00	#5@8"		
24	20	6.50	8.25	4.50	5.75	3.75	4.75	3.75	4.75	3.75	4.75	3.75	4.75	3.75	4.75	22.00	#5@8"		
30	24	7.50	9.50	5.25	6.75	4.50	5.75	4.25	5.75	4.25	5.75	4.25	5.75	4.25	5.75	24.00	#5@8"		
36	30	9.25	11.75	6.50	8.25	5.50	7.00	4.75	6.00	4.75	6.00	4.75	6.00	4.75	6.00	30.00	#6@6"		
42	30	11.50	14.25	8.00	10.25	6.75	8.50	5.25	6.75	5.25	6.75	5.25	6.75	5.25	6.75	36.00	#6@6"		

TYPE OF SOIL CONDITION

LATERAL BEARING PRESSURE

A. SOFT CLAY: FINE LOOSE SAND.....500 LBS. PER SQ. FT.

B. SAND AND CLAY; MIXED OR IN LAYERS; FINE CONFINED SAND.....1000 LBS. PER SQ. FT.

C. HARD DRY CLAY.....1500 LBS. PER SQ. FT.

D. COARSE SAND.....2000 LBS. PER SQ. FT.

E. GRAVEL.....3000 LBS. PER SQ. FT.

F. SOFT ROCK.....4000 LBS. PER SQ. FT.

G. HARDPAN.....5000 LBS. PER SQ. FT.

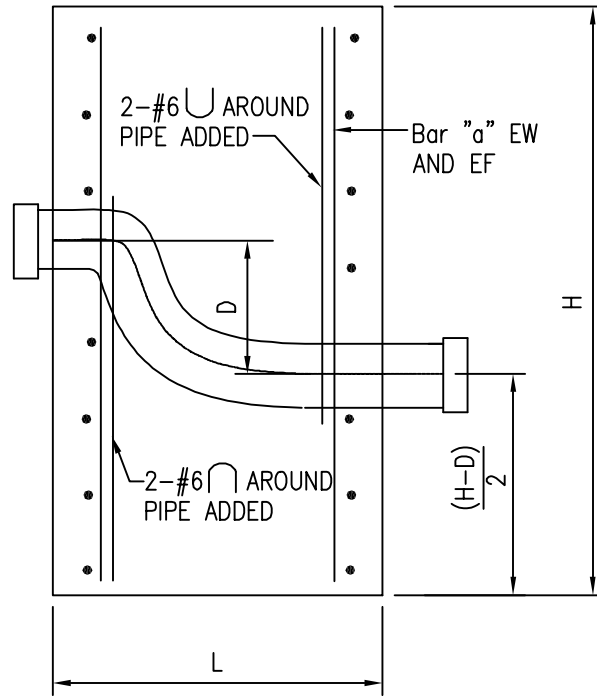
NOTE:

1. ACTUAL FIELD CONDITIONS AND SOIL TYPE SHALL BE VERIFIED IN THE FIELD. THE SCHEDULE, DIMENSIONS AND DETAILS AS SHOWN ARE PROVIDED AS A GUIDE ONLY. THE CONTRACTOR OR ENGINEER WHO PREPARED THE PLANS SHALL SUBMIT THE FINAL DESIGN AND DETAILS TO THE MANAGER FOR REVIEW AND APPROVAL AFTER FIELD VERIFICATION AND PRIOR TO INSTALLATION. FOR OAHU ONLY, THE DEPARTMENT WILL FURNISH THE FINAL DESIGN AND DETAILS FOR PROJECTS AWARDED BY THE MANAGER.

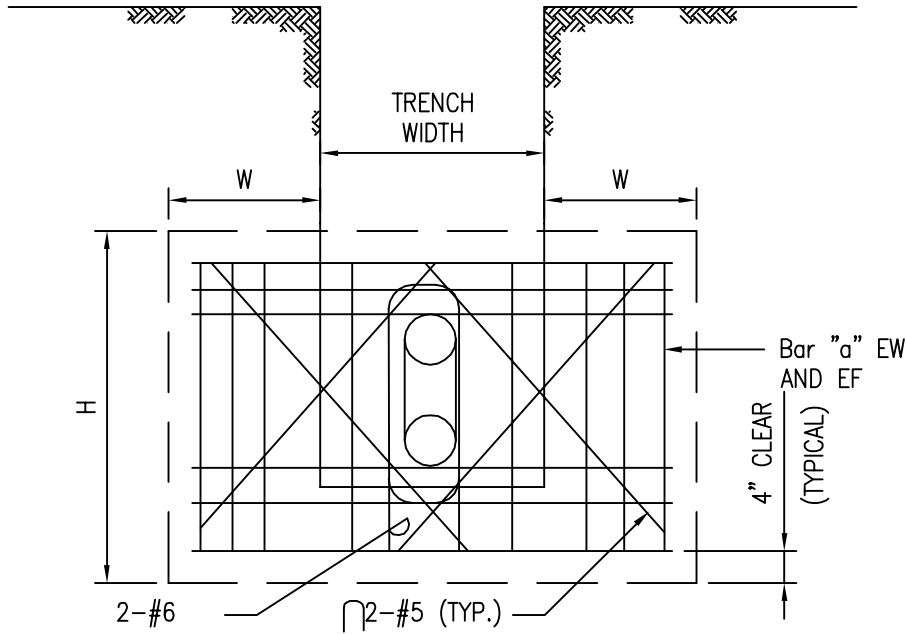
2. ENGINEER SHALL EVALUATE SOIL CONDITIONS AND VERIFY THAT THE ALLOWABLE PRESSURE PROVIDED IS APPLICABLE BEFORE USING TABLES ABOVE

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KAUAI OAHU MAUI HAWAII	CONCRETE THRUST BEAM FOR REDUCER - SCHEDULE SCALE: NTS	STANDARD DETAILS	B21
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SECTION



ELEVATION

SEE PLATE B23 FOR TABLE. FOR TRENCH WIDTH REFER TO TABLE 300-1 IN WATER DIVISION 300 OF THE SYSTEM STANDARDS.

2002
REVISION

KAUAI  
OAHU  
MAUI  
HAWAII

**CONCRETE THRUST BEAM**  
FOR OFFSET - TYPICAL DETAIL  
SCALE: NTS

STANDARD  
DETAILS

**B22**

TYPE OF SOIL CONDITION					A	B	C	D	E	F	Bar "a" Min.
SIZE (in)	D (in)	PRESSURE (psi)	L (in)	H (ft)	W (ft)	W (ft)	W (ft)	W (ft)	W (ft)	W (ft)	
3	6	250	15	3.25	1.50	1.50	1.50	1.50	1.50	1.50	#4@6"
3	12	250	18	3.25	1.50	1.50	1.50	1.50	1.50	1.50	#4@6"
3	18	250	27	3.75	1.50	1.50	1.50	1.50	1.50	1.50	#5@6"
4	6	250	15	3.25	1.50	1.50	1.50	1.50	1.50	1.50	#4@6"
4	12	250	18	3.25	1.50	1.50	1.50	1.50	1.50	1.50	#4@6"
4	18	250	27	3.75	2.00	1.50	1.50	1.50	1.50	1.50	#5@6"
6	6	250	18	3.25	1.75	1.50	1.50	1.50	1.50	1.50	#4@6"
6	12	250	21	3.50	2.25	1.50	1.50	1.50	1.50	1.50	#4@6"
6	18	250	30	4.00	2.50	2.00	1.50	1.50	1.50	1.50	#5@6"
8	6	250	18	3.50	2.00	1.50	1.50	1.50	1.50	1.50	#4@6"
8	12	250	24	3.75	4.00	2.00	1.50	1.50	1.50	1.50	#5@6"
8	18	250	30	4.25	4.00	2.00	2.00	1.50	1.50	1.50	#5@6"
12	6	250	21	3.75	3.75	2.00	1.50	1.50	1.50	1.50	#4@6"
12	12	250	33	4.75	4.75	2.50	1.75	2.00	1.50	1.50	#6@8"
12	18	250	45	5.25	5.75	5.00	2.00	3.00	2.00	1.50	#7@8"
16	6	150	24	4.25	3.75	2.00	1.50	1.50	1.50	1.50	#5@8"
16	6	250	24	4.50	4.75	3.00	2.00	1.50	1.50	1.50	#5@8"
16	12	150	36	5.00	5.00	3.75	2.50	2.00	1.50	1.50	#6@6"
16	12	250	36	5.25	7.00	4.75	4.00	3.00	2.00	1.50	#6@6"
16	18	150	45	5.50	5.75	3.75	3.75	2.75	2.00	1.50	#7@8"
16	18	250	45	6.25	7.25	5.75	4.75	4.50	3.00	2.00	#7@8"

NOTE:

FOR 12-INCH AND SMALLER OFFSETS WITH TEST PRESSURE OF 150 OR 200 PSI, USE SCHEDULE FOR 250 PSI TEST PRESSURE.

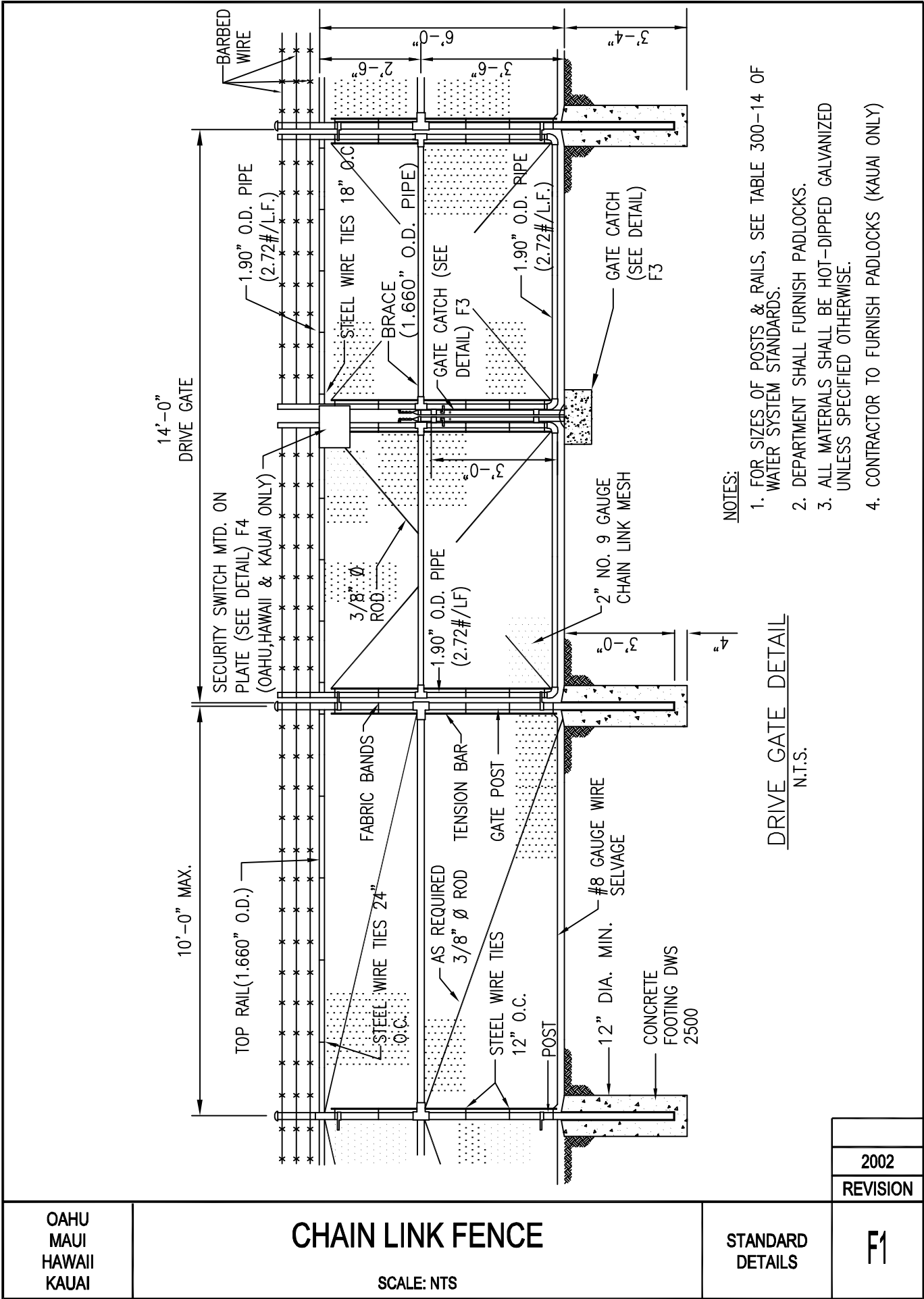
TYPE OF SOIL CONDITION LATERAL BEARING PRESSURE

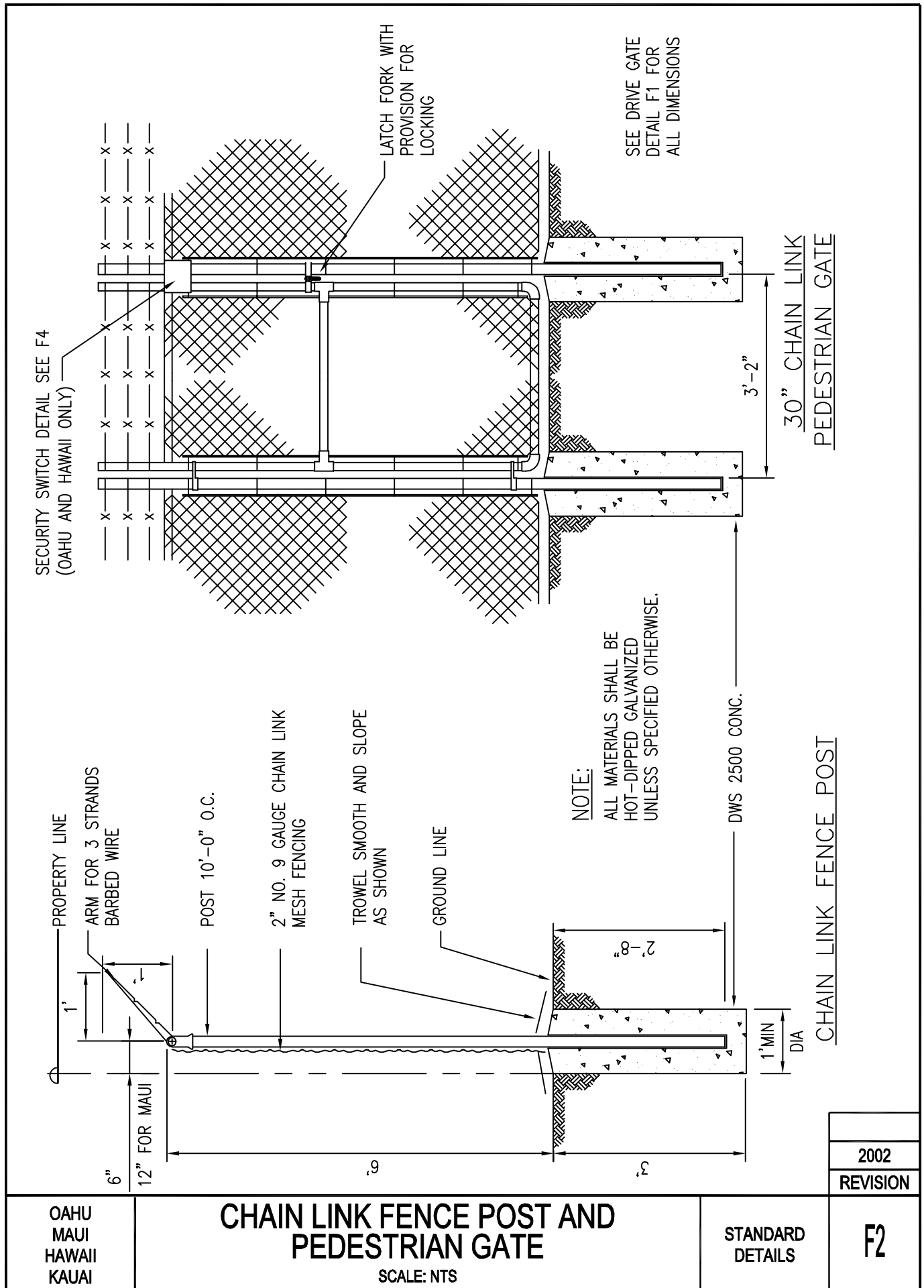
- A. SOFT CLAY; FINE LOOSE SAND.....500 LBS. PER SQ. FT.  
 B. SAND AND CLAY; MIXED OR IN LAYERS; FINE CONFINED SAND.....1000 LBS. PER SQ. FT.  
 C. HARD DRY CLAY.....1500 LBS. PER SQ. FT.  
 D. COARSE SAND.....2000 LBS. PER SQ. FT.  
 E. GRAVEL.....3000 LBS. PER SQ. FT.  
 F. SOFT ROCK.....4000 LBS. PER SQ. FT.  
 G. HARDPAN.....5000 LBS. PER SQ. FT.

NOTE:

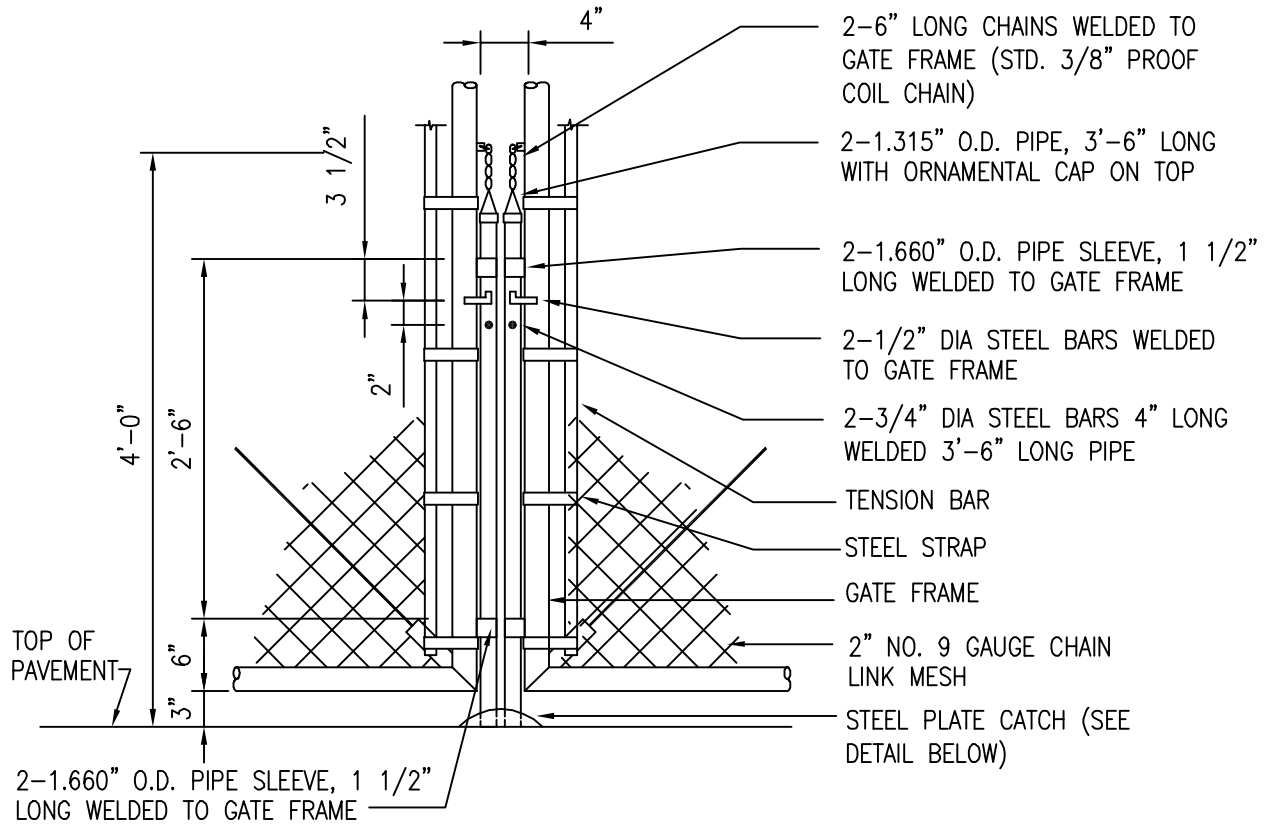
1. ACTUAL FIELD CONDITIONS AND SOIL TYPE SHALL BE VERIFIED IN THE FIELD. THE SCHEDULE, DIMENSIONS AND DETAILS AS SHOWN ARE PROVIDED AS A GUIDE ONLY. THE CONTRACTOR OR ENGINEER WHO PREPARED THE PLANS SHALL SUBMIT THE FINAL DESIGN AND DETAILS TO THE MANAGER FOR REVIEW AND APPROVAL AFTER FIELD VERIFICATION AND PRIOR TO INSTALLATION. FOR OAHU ONLY, THE DEPARTMENT WILL FURNISH THE FINAL DESIGN AND DETAILS FOR PROJECTS AWARDED BY THE MANAGER.
2. ENGINEER SHALL EVALUATE SOIL CONDITIONS AND VERIFY THAT THE ALLOWABLE PRESSURE PROVIDED IS APPLICABLE.

KAUAI OAHU MAUI HAWAII	CONCRETE THRUST BEAM FOR OFFSET - SCHEDULE SCALE: NTS	STANDARD DETAILS	
			2002
			REVISION
			B23

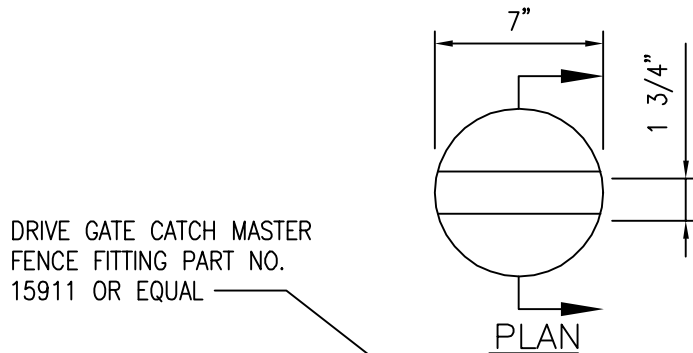






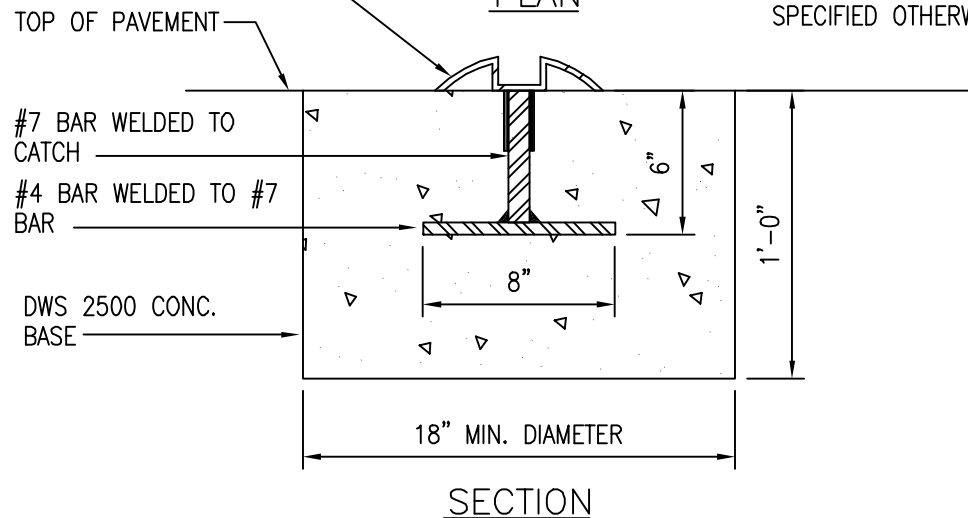


DETAIL AT CATCH GATE



NOTES:

- 1 PROVIDE 2 GATE STOPS, SIMILAR IN CONSTRUCTION AS GATE CATCH FOR DRIVE GATES WHEN FULLY OPEN.
- 2 ALL MATERIALS SHALL BE HOT-DIPPED GALVANIZED UNLESS SPECIFIED OTHERWISE.



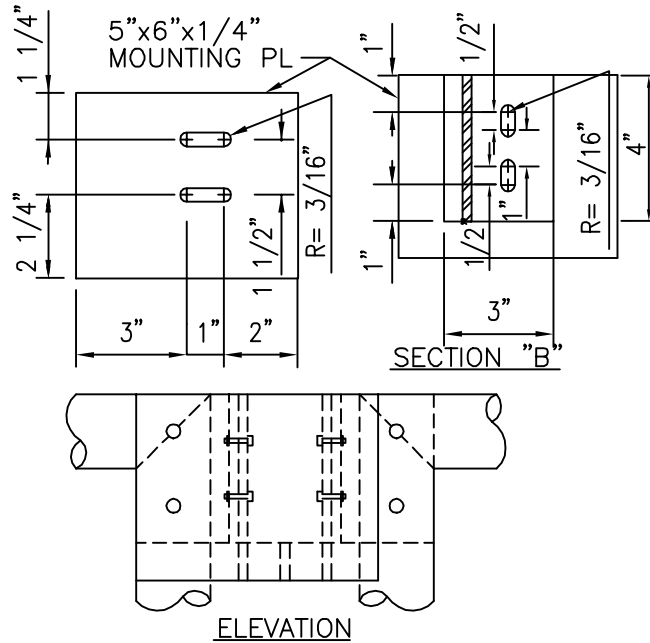
2002
REVISION

OAHU  
 MAUI  
 HAWAII  
 KAUAI

CHAIN LINK FENCE  
 MISCELLANEOUS DETAILS  
 SCALE: NTS

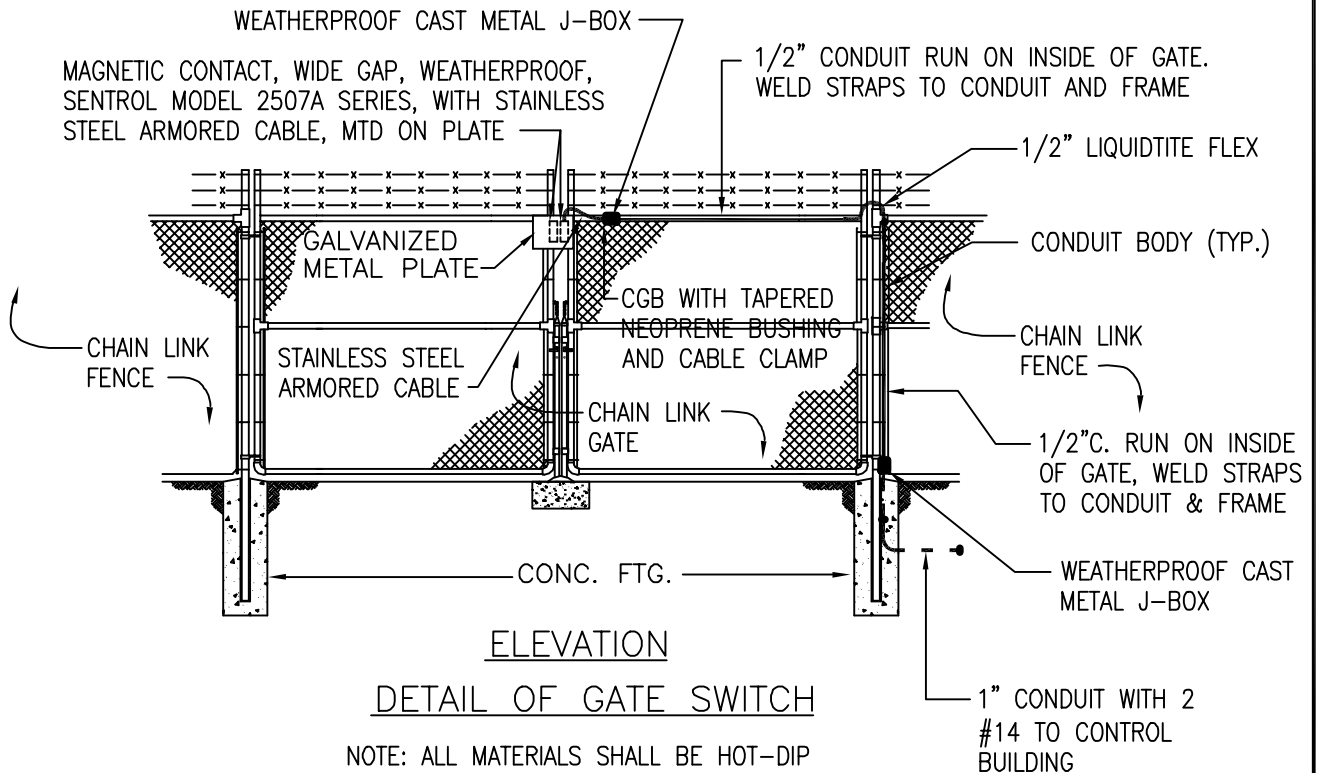
STANDARD  
 DETAILS

F3



(A)  
F4

**SECURITY SWITCH DETAIL  
FOR INSWINGING DOUBLE  
LEAF CHAIN LINK FENCE**  
(OPPOSITE HAND FOR OUTSWINGING)  
N.T.S.



SEE OTHER PLATES FOR DETAILS NOT SHOWN.

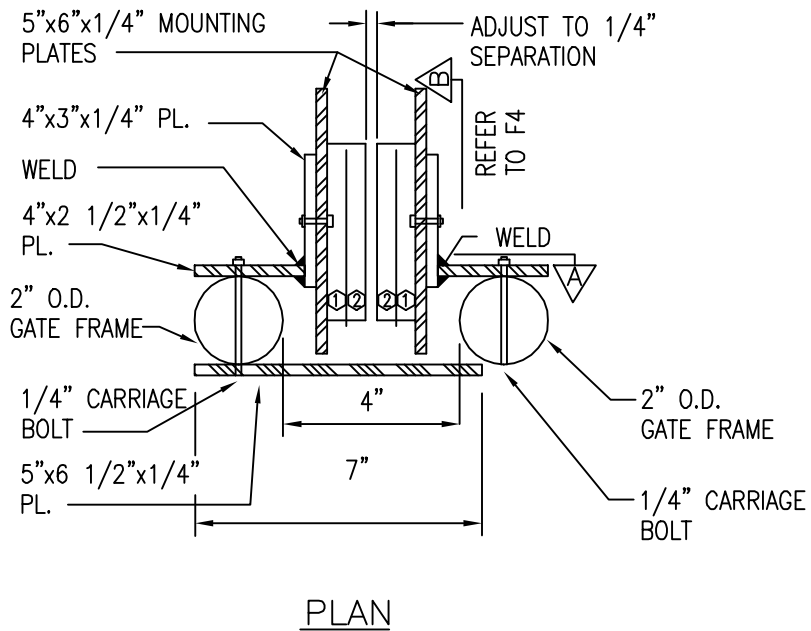
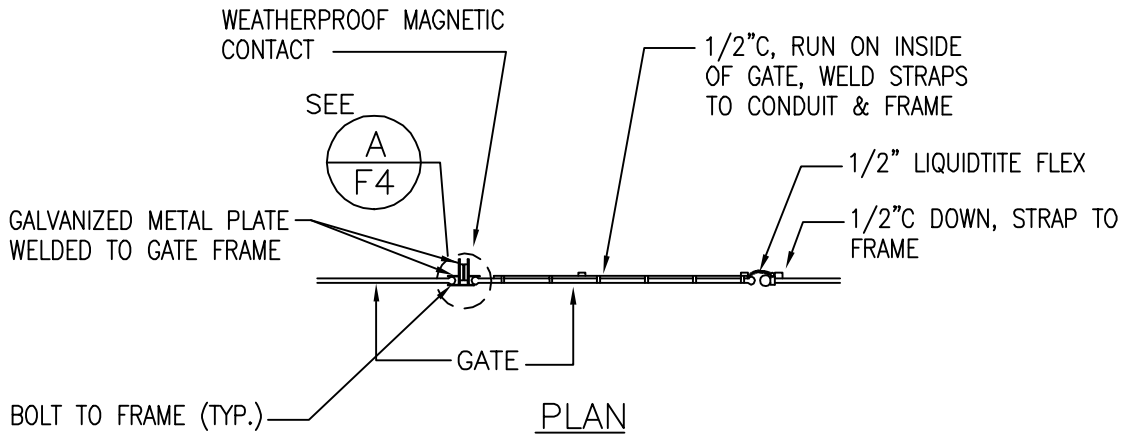
2002
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OAHU  
HAWAII  
KAUAI

**CHAIN LINK FENCE**  
**SECURITY SWITCH DETAIL**  
SCALE: NTS

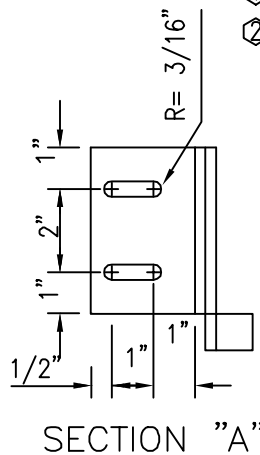
STANDARD  
DETAILS

**F4**



#### SWITCH ASSEMBLY DESCRIPTION

- ① SPACER—SENTROL #1913 OR EQUAL
- ② MAGNETIC SWITCH—SENTROL #2507 AH BIASED MAGNETIC SWITCH OR APPROVED EQUAL



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OAHU  
HAWAII  
KAUAI

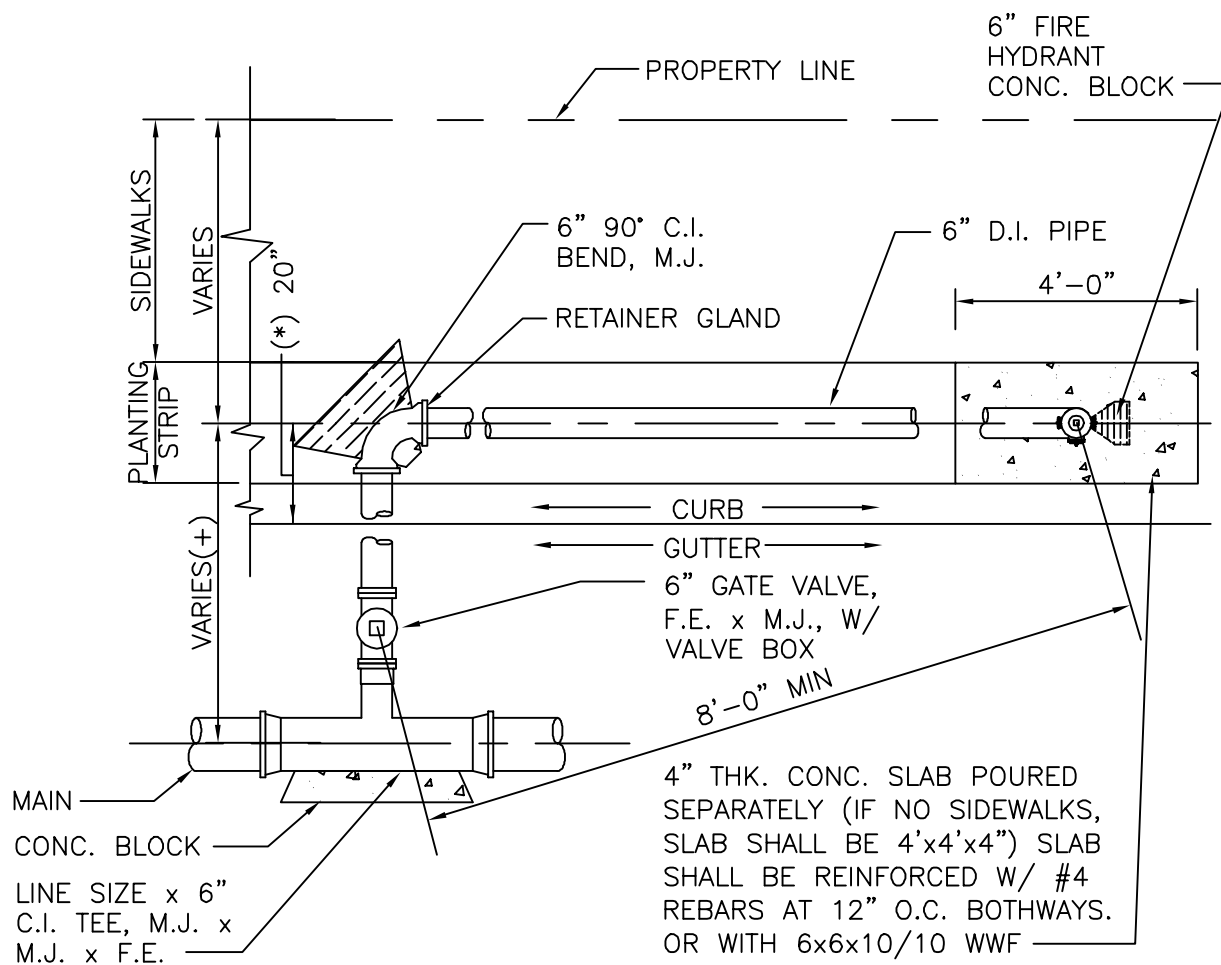
## CHAIN LINK FENCE SECURITY SWITCH DETAIL

SCALE: NTS

STANDARD  
DETAILS

F5





#### NOTES:

1. GASKETS FOR FLANGED JOINTS SHALL BE 1/8" DUCK-INSERTED RUBBER PACKING GARLOCK NO. 19.
2. BOLTS SHALL BE BREAK-OFF TYPE, 5/8" DIA. X 3" LONG MACHINE BOLTS WITH CUT THREADS, AMERICAN STANDARD HEAVY HEXAGON HEADS, STAINLESS STEEL OR SILICON BRONZE.
3. NUTS SHALL BE AMERICAN STANDARD HEAVY COLD PUNCHED HEXAGON NUTS, STAINLESS STEEL OR SILICON BRONZE. (DOES NOT APPLY TO BREAK AWAY BOLTS)
4. CONCRETE SHALL BE DWS 2500.
5. FOR AREAS WITHOUT SIDEWALKS A CONCRETE CURB OR 4" D.I. PIPE SHALL BE INSTALLED IF CALLED FOR IN THE PLANS AND AS SHOWN IN THESE DETAILS.
6. REFER TO DETAIL FH3 FOR ADDITIONAL DETAILS.

+ IF SPACE IS AVAILABLE, TAPPING VALVE/ TAPPING SLEEVE ASSEMBLY MAY BE USED WHEN APPROVED BY MANAGER.

\* FOR AREAS WITH ROLLED CURB THE FIRE HYDRANT CENTERLINE SHALL BE 24" FROM THE EDGE OF THE ROLLED CURB.

2002

REVISION

HAWAII

## HYDRANT CONNECTION LAYOUT "A"

(WITH ELBOW)

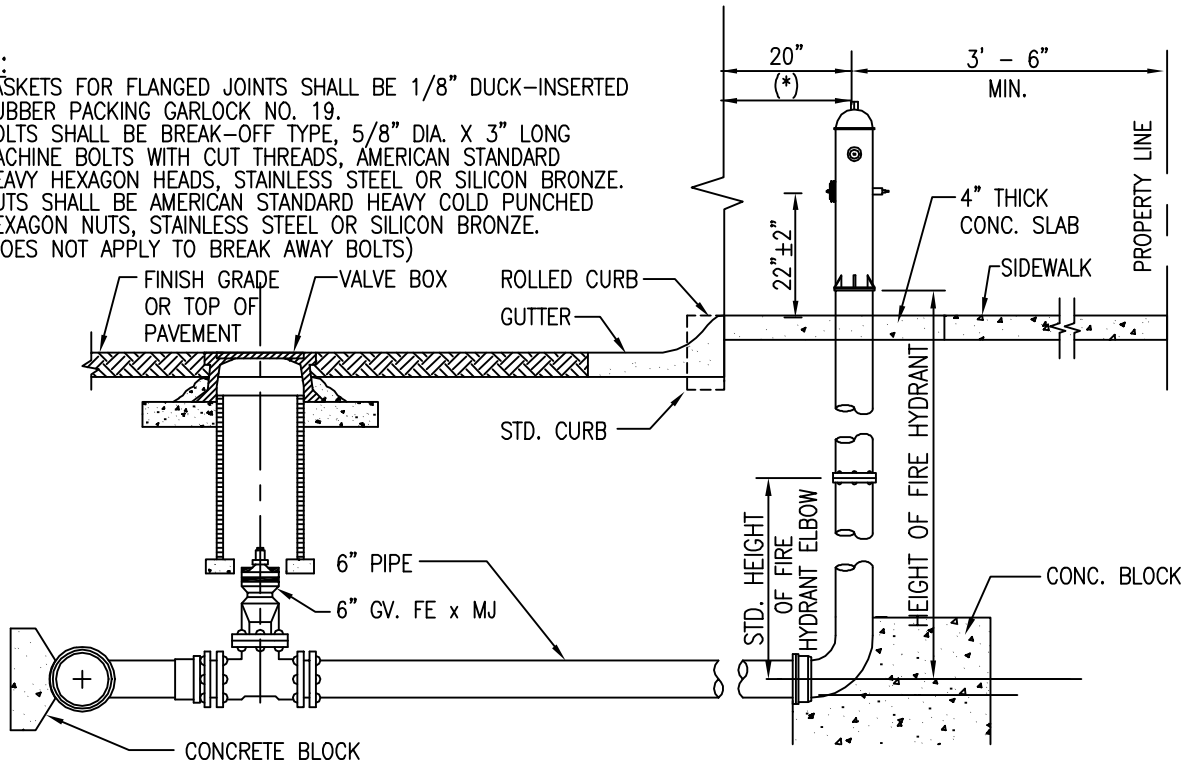
SCALE: NTS

STANDARD  
DETAILS

FH2

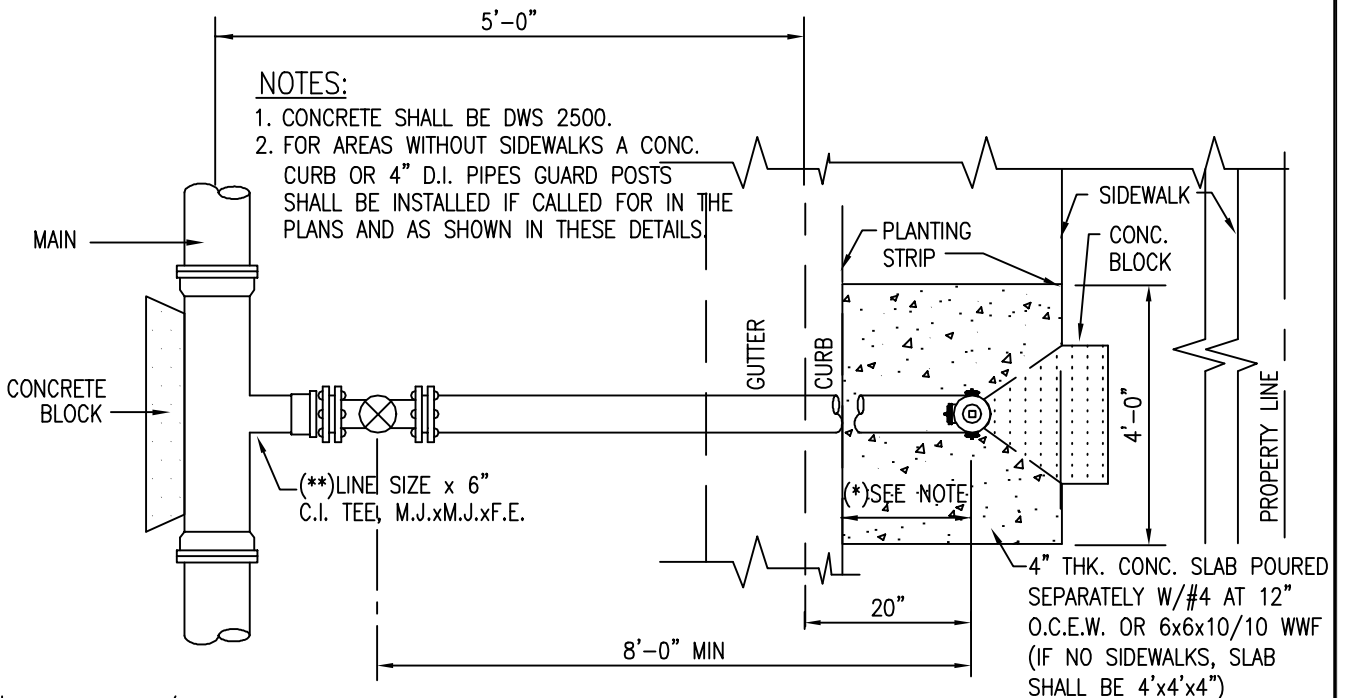
**NOTE:**

1. GASKETS FOR FLANGED JOINTS SHALL BE 1/8" DUCK-INSERTED RUBBER PACKING GARLOCK NO. 19.
2. BOLTS SHALL BE BREAK-OFF TYPE, 5/8" DIA. X 3" LONG MACHINE BOLTS WITH CUT THREADS, AMERICAN STANDARD HEAVY HEXAGON HEADS, STAINLESS STEEL OR SILICON BRONZE.
3. NUTS SHALL BE AMERICAN STANDARD HEAVY COLD PUNCHED HEXAGON NUTS, STAINLESS STEEL OR SILICON BRONZE. (DOES NOT APPLY TO BREAK AWAY BOLTS)



**SECTION**

STANDARD HYDRANT EXTENSIONS ARE AVAILABLE IN THE FOLLOWING LENGTHS: 6 TO 30 INCHES LONG IN INCREMENTS OF 6 INCHES.



**NOTES:**

1. CONCRETE SHALL BE DWS 2500.
2. FOR AREAS WITHOUT SIDEWALKS A CONC. CURB OR 4" D.I. PIPES GUARD POSTS SHALL BE INSTALLED IF CALLED FOR IN THE PLANS AND AS SHOWN IN THESE DETAILS

\* FOR AREAS W/ ROLLED CURBS THE F.H. CENTER LINE SHALL BE 24" FROM THE EDGE OF THE ROLLED CURB.

\*\* TAPPING SLEEVE/TAPPING VALVE ASSEMBLY MAY BE USED WHEN APPROVED BY MANAGER.

**PLAN**

2002

REVISION

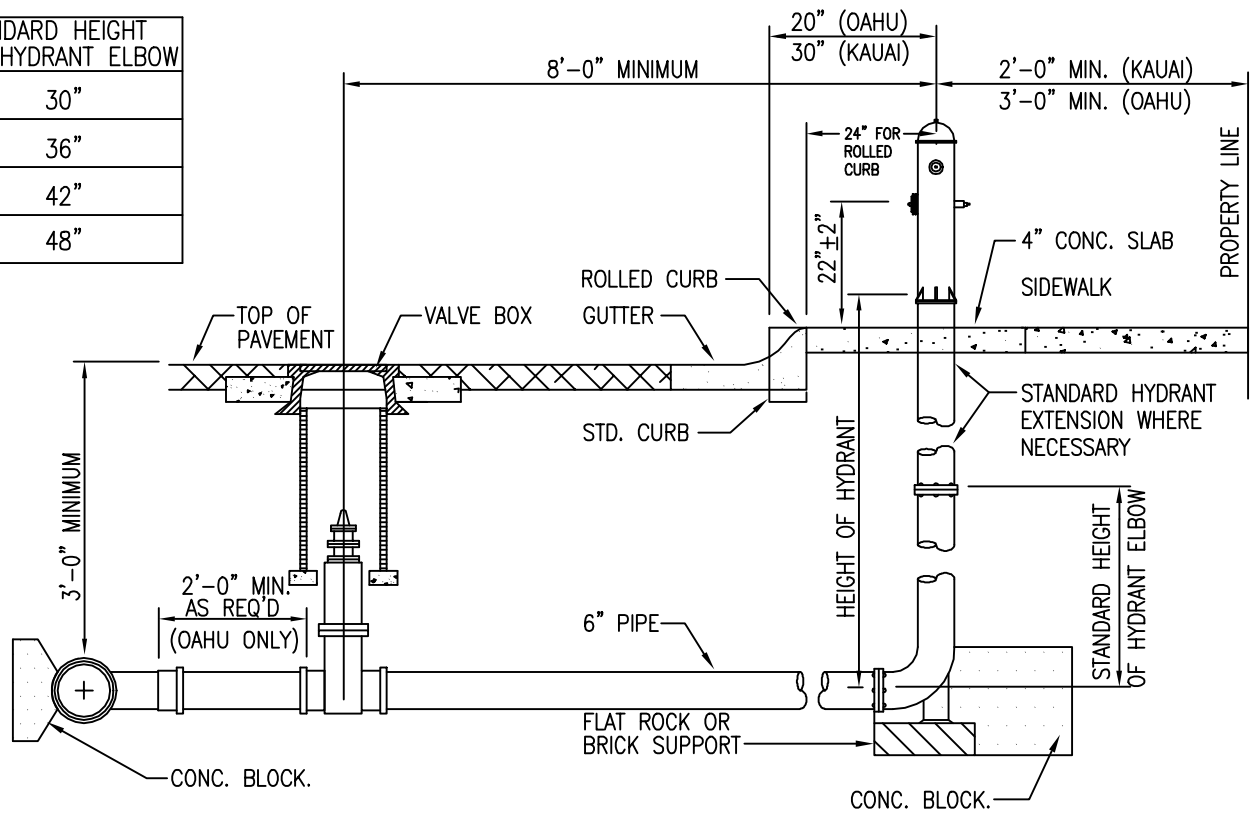
HAWAII

**HYDRANT CONNECTION LAYOUT "B"**  
(STRAIGHT RUN)  
SCALE: NTS

STANDARD  
DETAILS

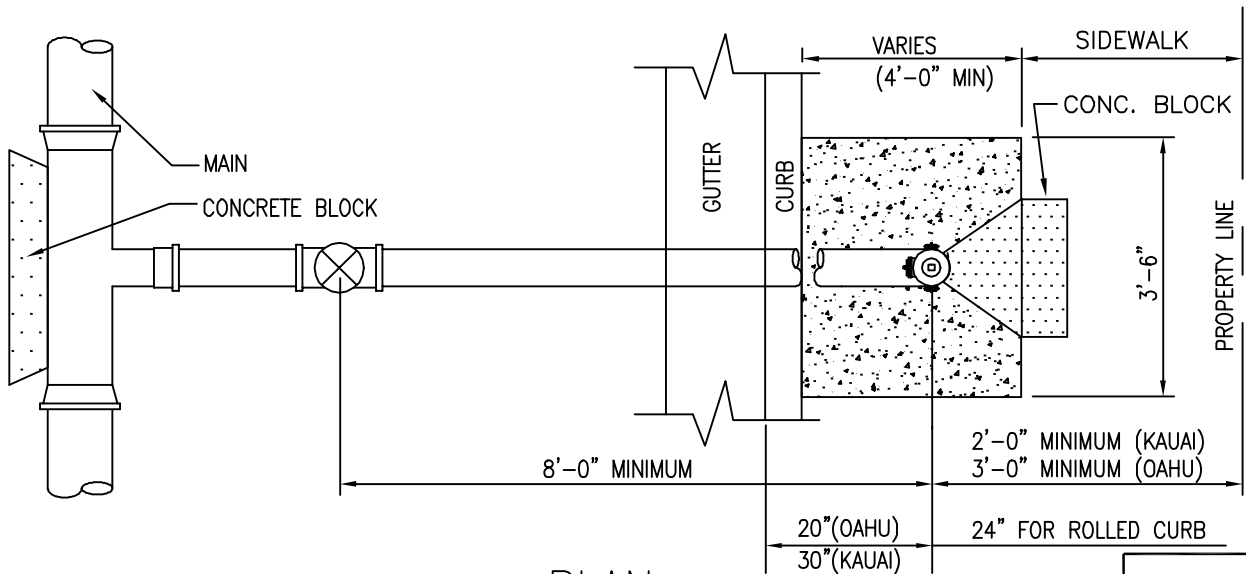
FH3

STANDARD HEIGHT FOR HYDRANT ELBOW	
30"	
36"	
42"	
48"	



## SECTION

STANDARD HYDRANT EXTENSIONS ARE AVAILABLE IN THE FOLLOWING LENGTHS: 6 TO 30 INCHES LONG IN INCREMENTS OF 6 INCHES.



## PLAN

\* SEE NOTES ON PLATE FH8

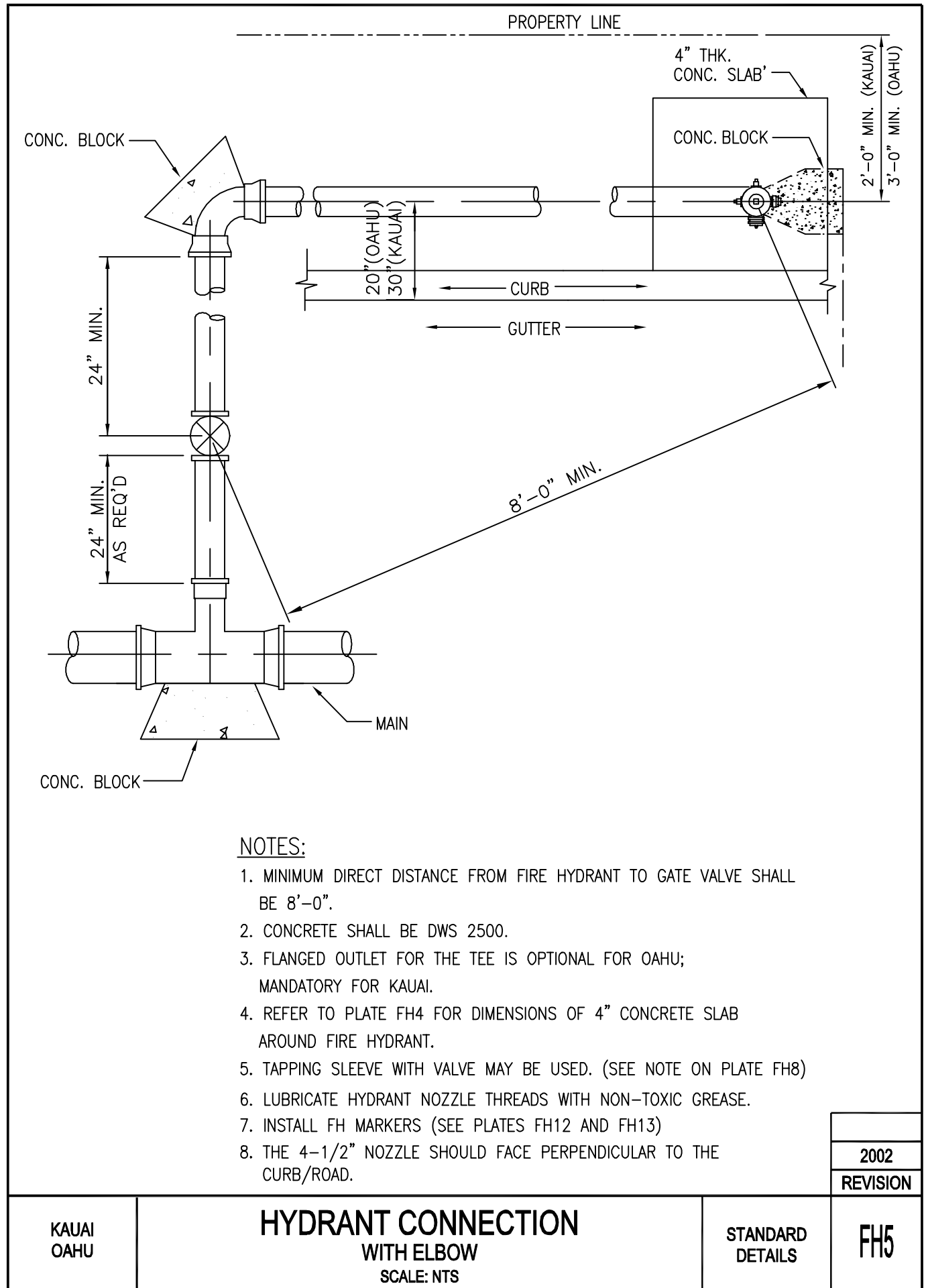
2002  
REVISION

KAUAI  
OAHU

# HYDRANT CONNECTION STRAIGHT RUN SCALE: NTS

STANDARD  
DETAILS

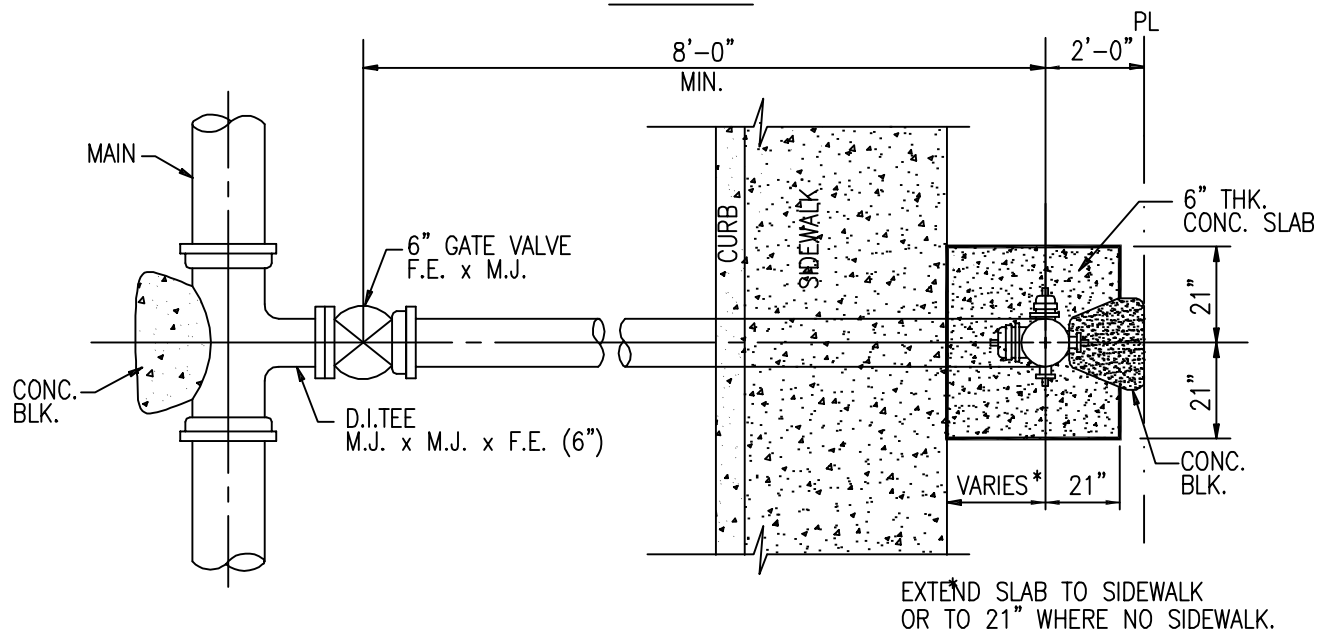
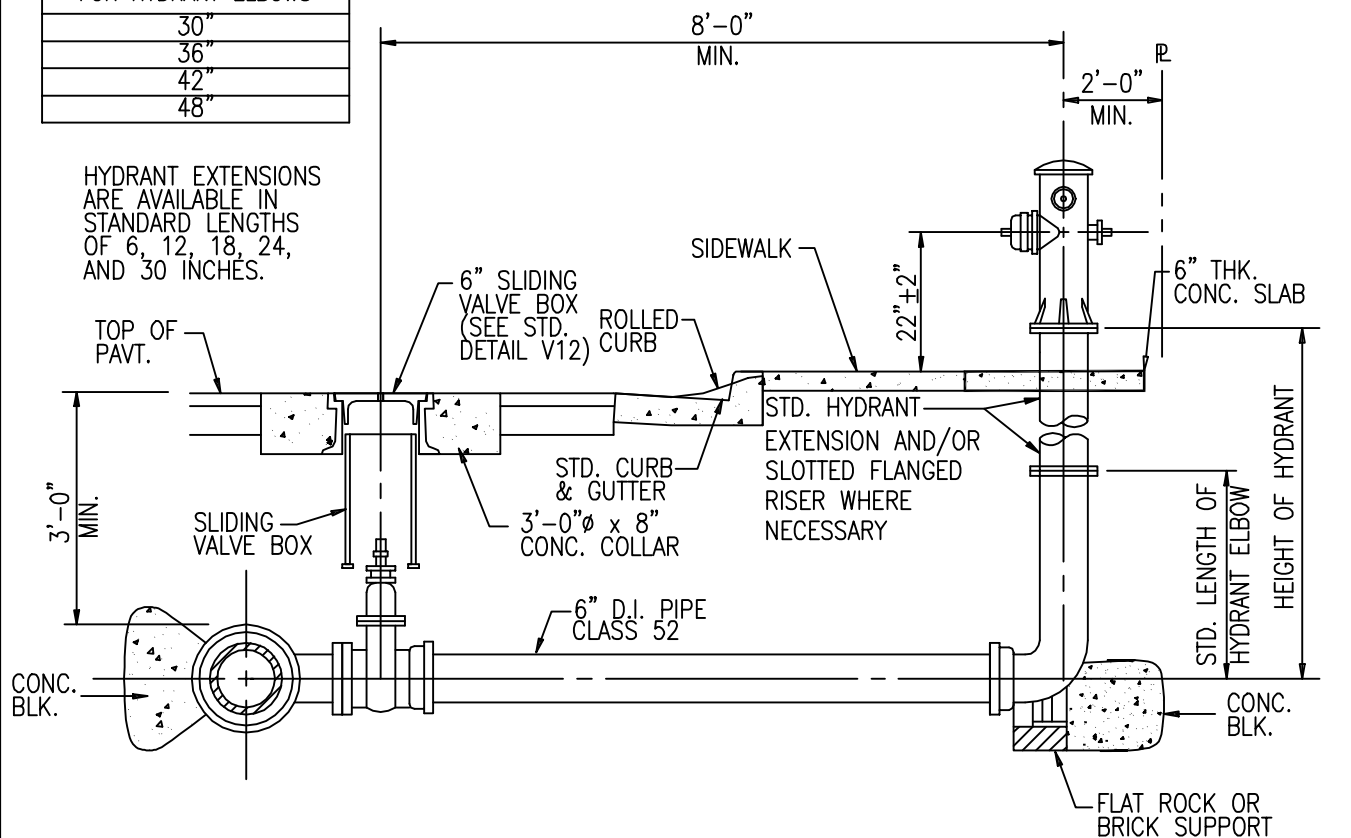
FH4





STANDARD LENGTHS FOR HYDRANT ELBOWS	
30"	
36"	
42"	
48"	

HYDRANT EXTENSIONS  
ARE AVAILABLE IN  
STANDARD LENGTHS  
OF 6, 12, 18, 24,  
AND 30 INCHES.



REFER TO STANDARD DETAIL FH8 FOR NOTES.

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REVISION

MAUI

## HYDRANT CONNECTION

### STRAIGHT RUN

SCALE: NTS

STANDARD  
DETAILS

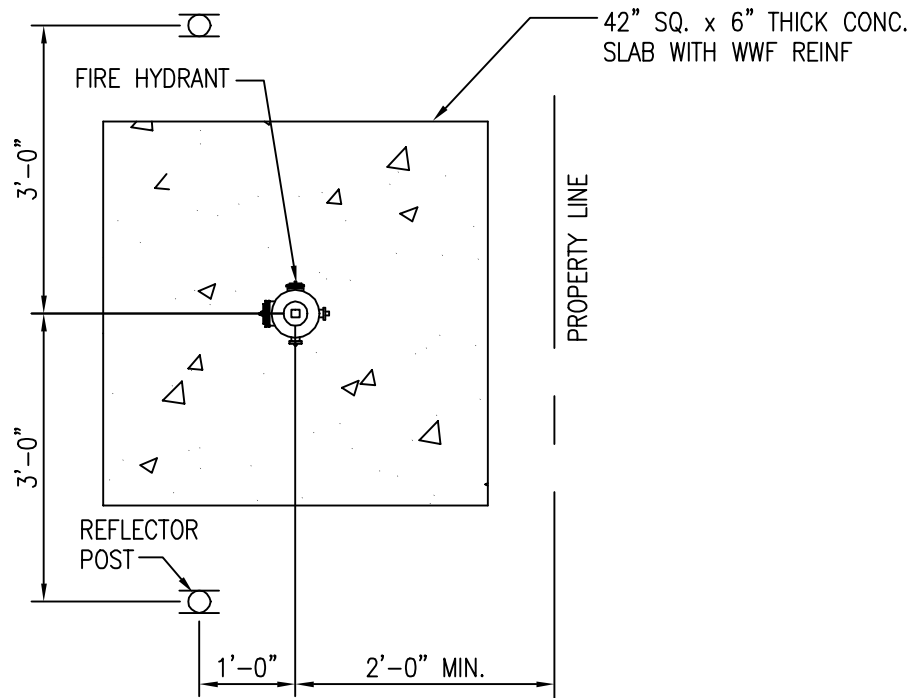
FH6



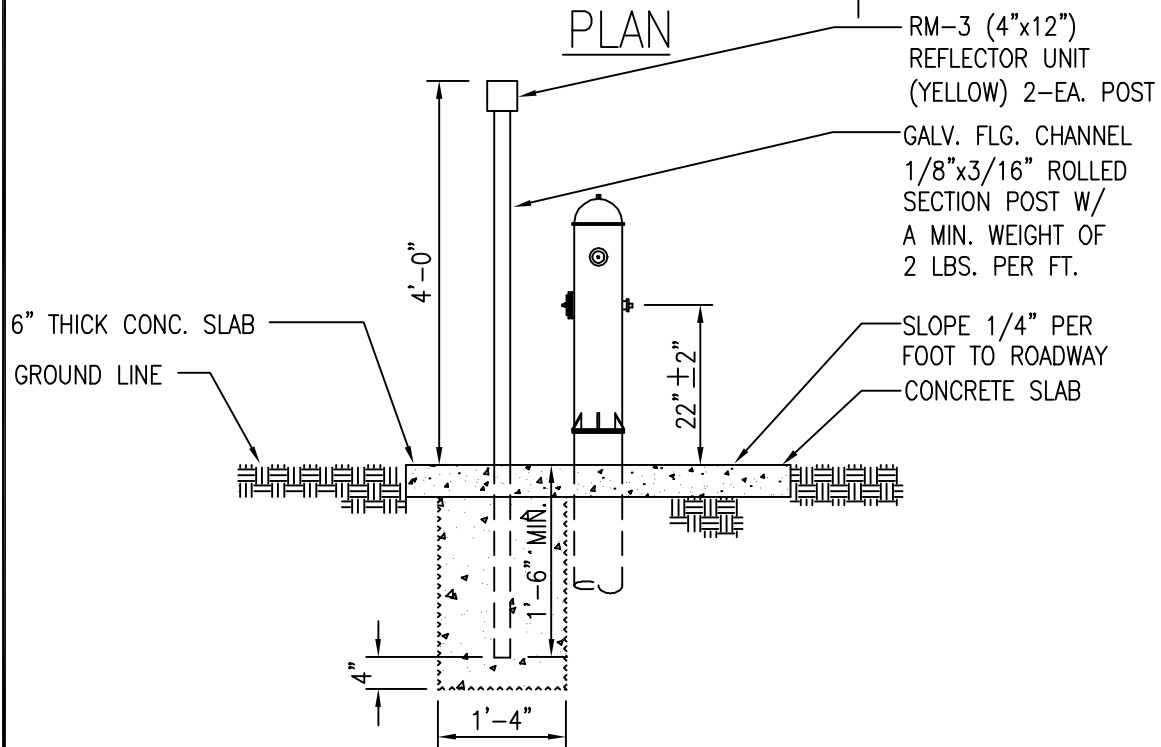
NOTE:

1. GASKETS FOR FLANGED JOINTS SHALL BE 1/8" DUCK-INSERTED RUBBER PACKING GARLOCK NO. 19.
2. BOLTS SHALL BE BREAK-OFF TYPE, 5/8" DIA. x 3" LONG MACHINE BOLTS WITH CUT THREADS, AMERICAN STANDARD COARSE HEXAGON HEADS, STAINLESS STEEL OR SILICON BRONZE. INSTALL BOLT WITH THREADS FACING DOWN.
3. NUTS SHALL BE AMERICAN STANDARD HEAVY COLD PUNCHED HEXAGON NUTS, STAINLESS STEEL OR SILICON BRONZE.
4. CONCRETE SHALL BE DWS 2500.
5. REFER TO PLATE FH11 FOR FIRE HYDRANT INSTALLATION WITH CURB GUARD. (OAHU & KAUAI ONLY). FOR MAUI, REFER TO PLATE FH9 WHERE NO STREET CURBING.
6. FLANGED OUTLET FOR THE TEE IS OPTIONAL FOR OAHU; MANDATORY FOR KAUAI AND MAUI.
7. TAPPING SLEEVE WITH TAPPING VALVE ASSEMBLY MAY BE USED FOR CONNECTION TO EXIST MAIN.
8. LUBRICATE HYDRANT NOZZLE THREADS WITH NON-TOXIC GREASE.
9. PROVIDE SLOTTED FLANGED RISER FOR HYDRANT AS NEEDED TO ALIGN 4-1/2" NOZZLE PERPENDICULAR TO CURB. (FOR MAUI ONLY)
10. INSTALL HYDRANT MARKERS. (SEE PLATES FH12 AND FH13)

			2002
			REVISION
KAUAI OAHU MAUI	<b>HYDRANT CONNECTION</b> NOTES SCALE: NTS	STANDARD DETAILS	<b>FH8</b>



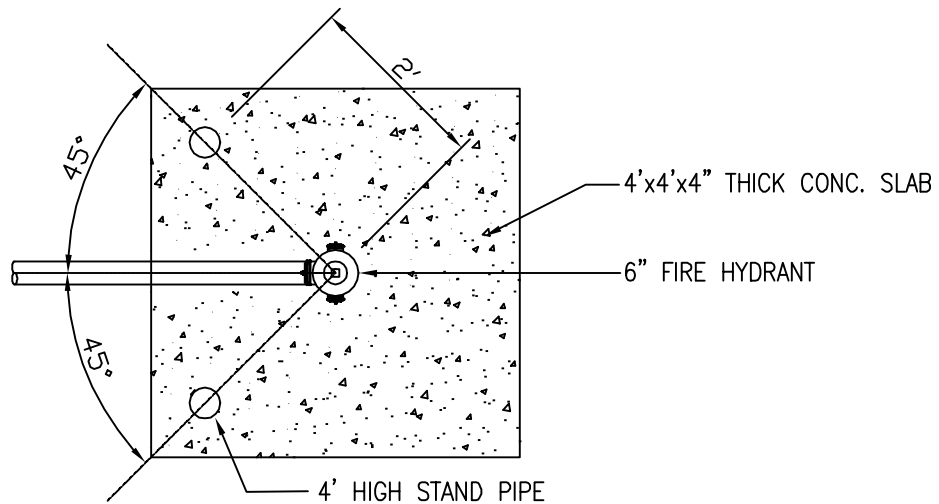
### PLAN



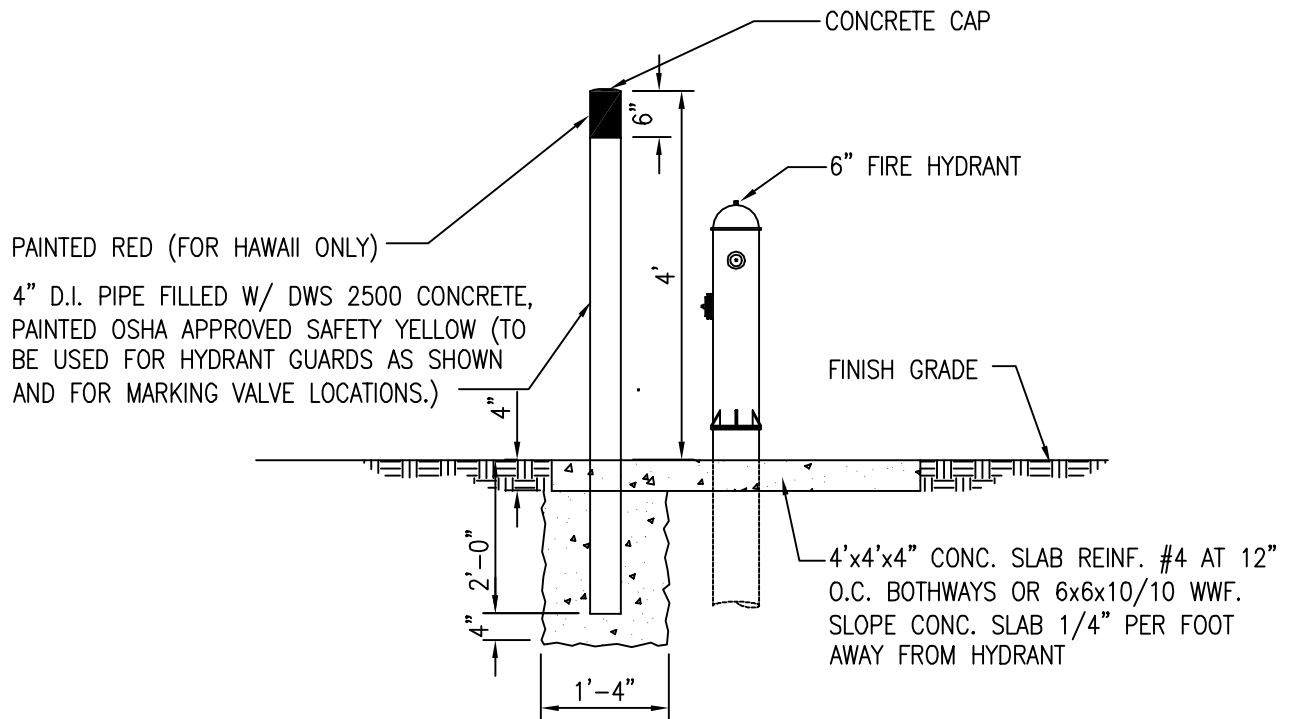
### ELEVATION (REFLECTOR POST DETAIL FOR MARKING HYDRANTS WITHOUT STREET CURBING)

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MAUI	<b>HYDRANT CONCRETE SLAB &amp; REFLECTOR POST</b> SCALE: NTS	STANDARD DETAILS	<b>FH9</b>
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PLAN



2002

REVISION

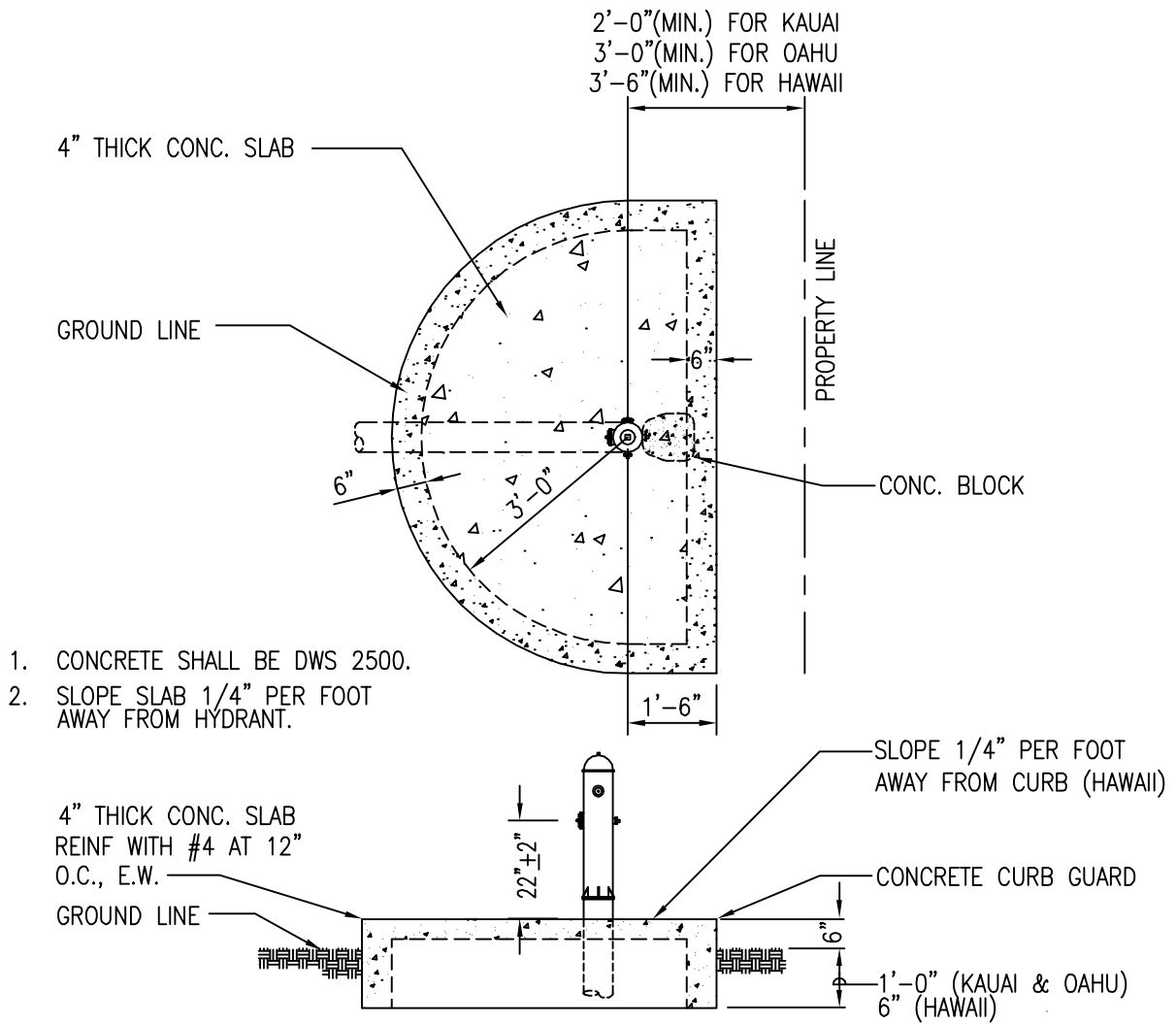
OAHU  
HAWAII

# HYDRANT CONCRETE SLAB AND GUARD POSTS

SCALE: NTS

STANDARD  
DETAILS

FH10



DETAIL OF CURB GUARD  
AT HYDRANT WHERE REQUIRED

KAUAI OAHU HAWAII	HYDRANT CURB GUARD  SCALE: NTS	STANDARD DETAILS	
			2002
			REVISION
			FH11

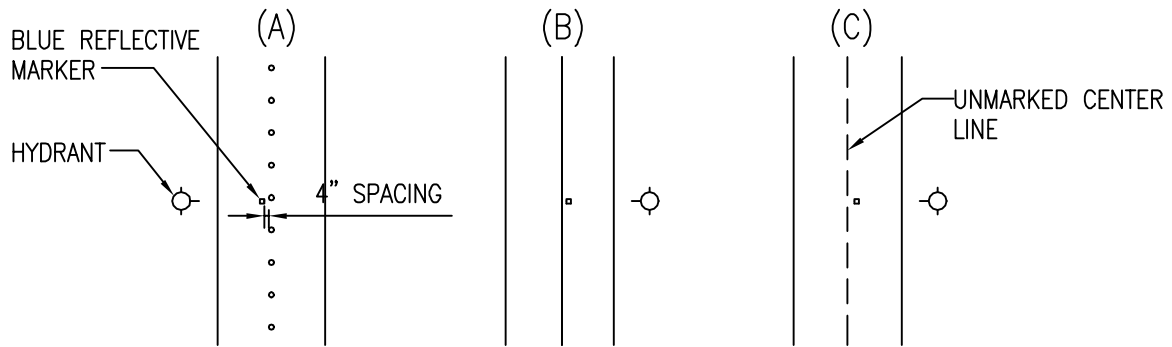


FIGURE 1  
TWO LANE STREET

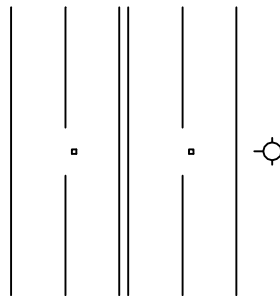


FIGURE 2  
DIVIDED STREET

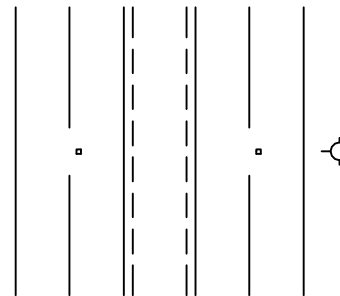


FIGURE 3  
MULTI-LANE STREET W/  
TURN LANE

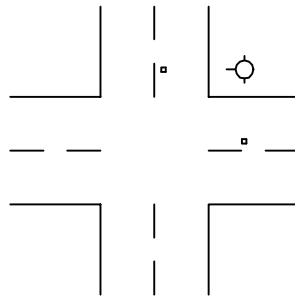


FIGURE 4  
TWO LANE STREET  
@ INTERSECTION

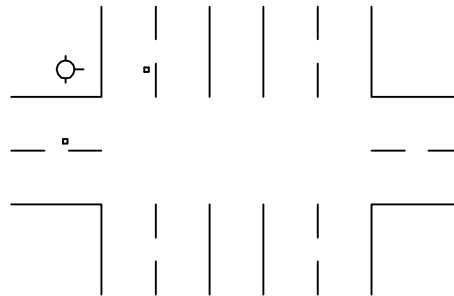


FIGURE 5  
FOUR LANE STREET W/ TURN  
LANE @ INTERSECTION

## HYDRANT MARKER LOCATION

2002
REVISION

KAUAI  
OAHU  
MAUI

**HYDRANT MARKER**  
LOCATION FOR STREETS  
SCALE: NTS

STANDARD  
DETAILS

**FH12**

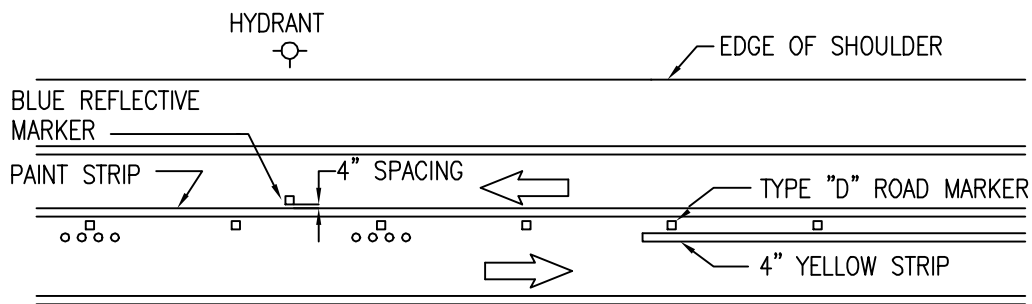


DIAGRAM A: TWO LANE HIGHWAY

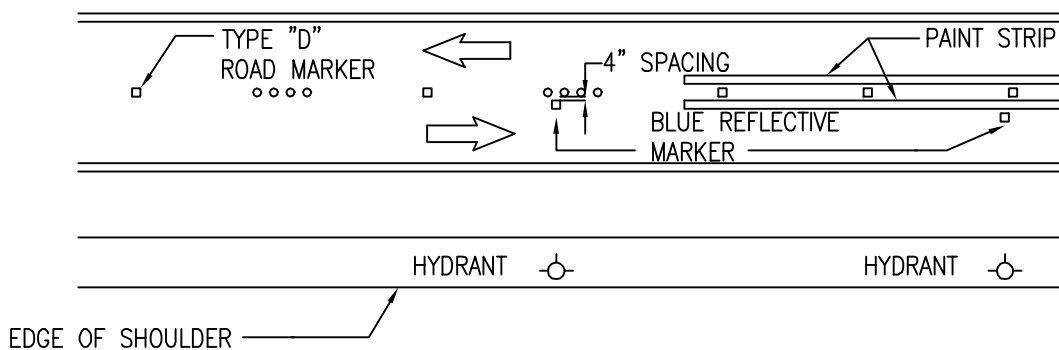


DIAGRAM B: TWO LANE HIGHWAY

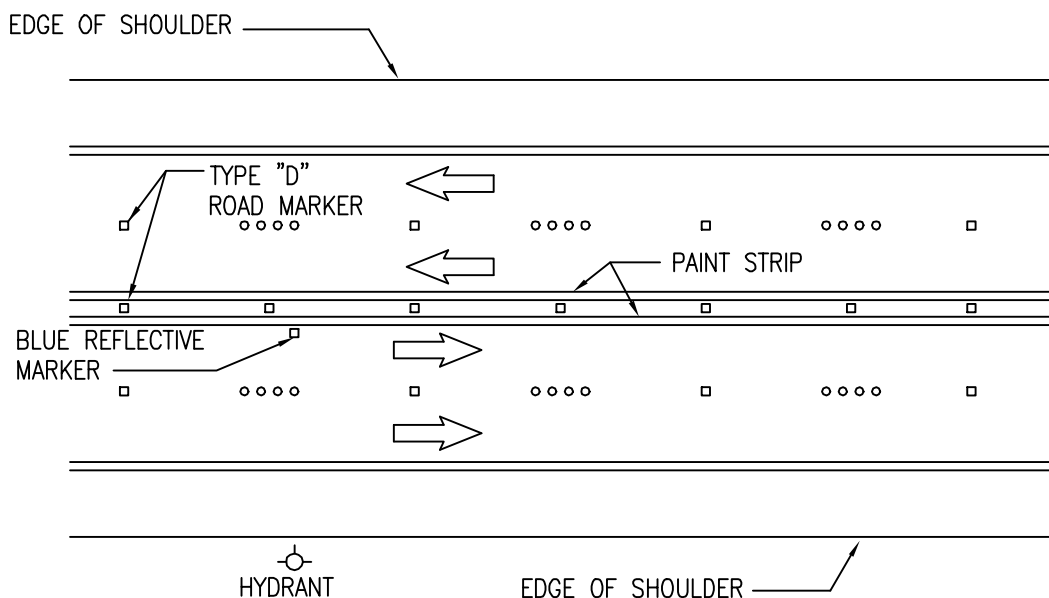


DIAGRAM C: MULTI-LANE HIGHWAY

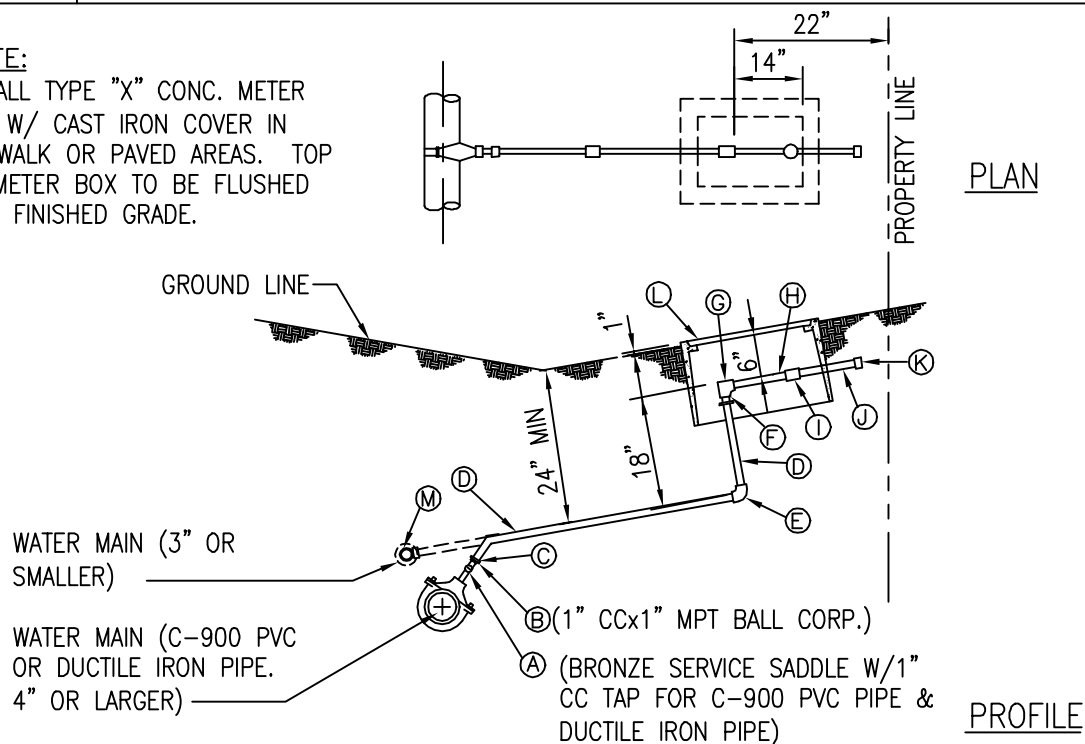
<div>DIAGRAM C: MULTI-LANE HIGHWAY</div>			
			2002
			REVISION
KAUAI OAHU MAUI	<div>HYDRANT MARKER</div> <div>LOCATION FOR HIGHWAYS</div> <div>SCALE: NTS</div>	STANDARD DETAILS	FH13



SCHEDULE OF FITTINGS		
ITEM	DESCRIPTION	SINGLE SERVICE
A	BRONZE SERVICE SADDLE W/ 1" CC TAP FOR C-900 PVC PIPE & D.I. PIPE	1
B	1" CC x 1" MPT BALL CORPORATION	1
C	PACK JOINT COUPLINGS (FORD C14-44 OR APPROVED EQUAL)	1
D	1" COPPER TUBE, TYPE "K" SOFT	1
E	1" 90° COPPER ELBOW, S x S	1
F	1" COPPER MALE ADAPTER, SXT	1
G	ANGLE BALL VALVE, 1" FEMALE IPT INLET x 3/4" METER COUPLING NUT OUTLET (FORD BA13-342W OR APPROVED EQUAL)	1
H	METER SPACER, SUPPLIED BY DEPT. OF WATER & INSTALLED BY CONTRACTOR	1
I	BALL VALVE W/ HANDLE, 3/4" METER COUPLING NUT INLET x 1" FEMALE IPT OUTLET (FORD B13-342 W/ HT-34 HANDLE OR APPROVED EQUAL)	1
J	LINESETTER, 1" COPPER TUBE, TYPE "K" SOFT, 12" LONG (SEE STD. DET. L3)	1
K	1" PLASTIC THREAD PROTECTOR	1
L	TYPE "B" CONCRETE METER BOX W/ CAST IRON COVER	1
M	TEE W/ 1" BUSHING (WHEN CONNECTING TO 3" OR SMALLER PIPE)	1

**NOTE:**

INSTALL TYPE "X" CONC. METER BOX W/ CAST IRON COVER IN SIDEWALK OR PAVED AREAS. TOP OF METER BOX TO BE FLUSHED WITH FINISHED GRADE.



2002

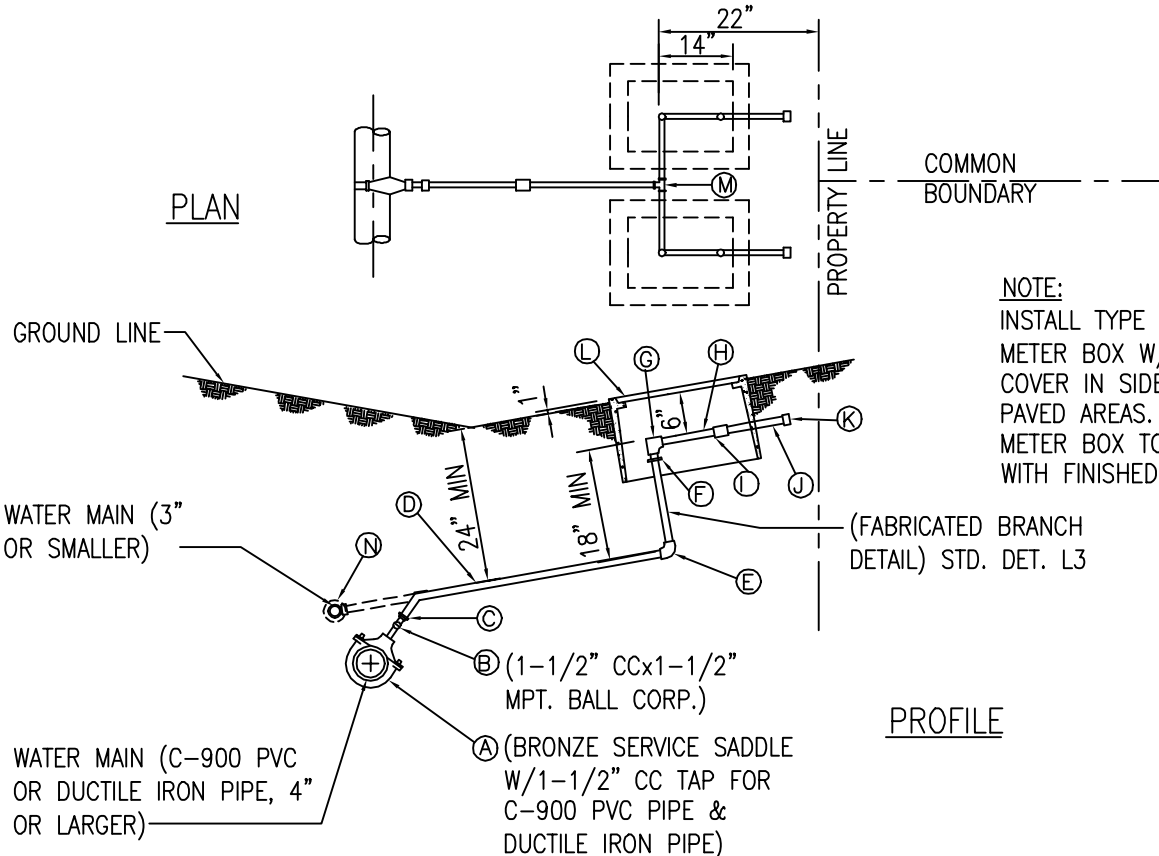
REVISION

KAUAI

**SINGLE SERVICE LATERAL**  
**PLAN, PROFILE & MATERIAL LIST**  
 SCALE: NTS

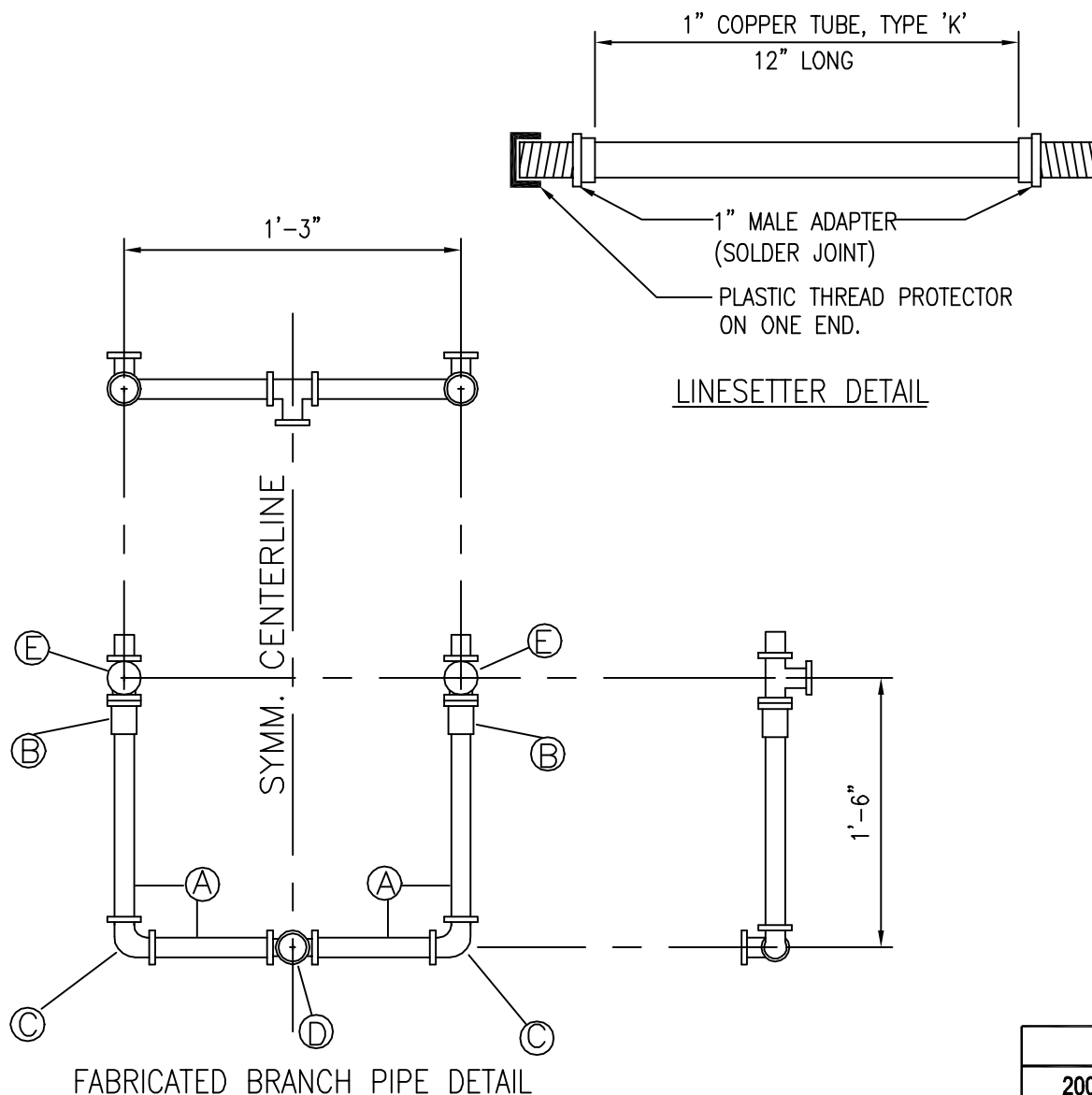
STANDARD  
 DETAILS

L1

SCHEDULE OF FITTINGS			
ITEM	DESCRIPTION	DOUBLE SERVICE	
A	BRONZE SERVICE SADDLE W/ 1-1/2" CC TAP FOR C-900 PVC PIPE AND DUCTILE IRON PIPE	1	
B	1-1/2" CC x 1-1/2" MPT BALL CORPORATION	1	
C	PACK JOINT COUPLING (FORD C14-66 OR APPROVED EQUAL)	1	
D	1-1/2" COPPER TUBE, TYPE "K" SOFT	2	
E	1" 90° COPPER ELBOW, S x S	2	
F	1" COPPER MALE ADAPTER, S x T	2	
G	ANGLE BALL VALVE, 1" FEMALE IPT INLET x 3/4" METER COUPLING NUT OUTLET (FORD BA13-342W OR APPROVED EQUAL)	2	
H	METER SPACER, SUPPLIED BY DEPT. OF WATER & INSTALLED BY CONTRACTOR	2	
I	BALL VALVE W/ HANDLE, 3/4" METER COUPLING NUT INLET x 1" FEMALE IPT OUTLET (FORD B13-342 W/ HT-34 HANDLE OR APPROVED EQUAL)	2	
J	LINESETTER, 1" COPPER TUBE, TYPE "K" SOFT, 12" LONG (SEE STD. DET. L3)	2	
K	1" PLASTIC THREAD PROTECTOR	2	
L	TYPE "B" CONCRETE METER BOX WITH CAST IRON COVER	2	
M	1" x 1" x 1-1/2" COPPER TEE, S x S x S	1	
N	TEE W/ 1-1/2" BUSHING (WHEN CONNECTING TO 3" OR SMALLER PIPE)	1	
 <p>PLAN</p> <p>GROUND LINE</p> <p>WATER MAIN (3" OR SMALLER)</p> <p>WATER MAIN (C-900 PVC OR DUCTILE IRON PIPE, 4" OR LARGER)</p> <p>(FABRICATED BRANCH DETAIL) STD. DET. L3</p> <p>NOTE: INSTALL TYPE "X" CONCRETE METER BOX W/ CAST IRON COVER IN SIDEWALK OR PAVED AREAS. TOP OF METER BOX TO BE FLUSHED WITH FINISHED GRADE.</p> <p>COMMON BOUNDARY</p> <p>PROFILE</p>			
KAUAI			
DOUBLE SERVICE LATERAL PLAN, PROFILE & MATERIAL LIST SCALE: NTS			
STANDARD DETAILS			
2002 REVISION			
L2			

# SCHEDULE OF COPPER FITTINGS

NO.	DESCRIPTION	SINGLE SERVICE	DOUBLE SERVICE
A	1" COPPER TUBE, TYPE 'K'	1	1
B	1" COPPER MALE ADAPTER	1	2
C	1" X 90° ELBOW (CAST SOLDER)	1	2
D	1" X 1" X 1 1/2" TEE, (CAST SOLDER)		1
E	ANGLE VALVE, 1" FEMALE IPT, INLET 3/4" METER COUPLING NUT OUTLET (FORD KV13-342W OR APPROVED EQUAL)	1	2



2002
REVISION

KAUAI

## FABRICATED BRANCH PIPE AND LINESETTER DETAIL

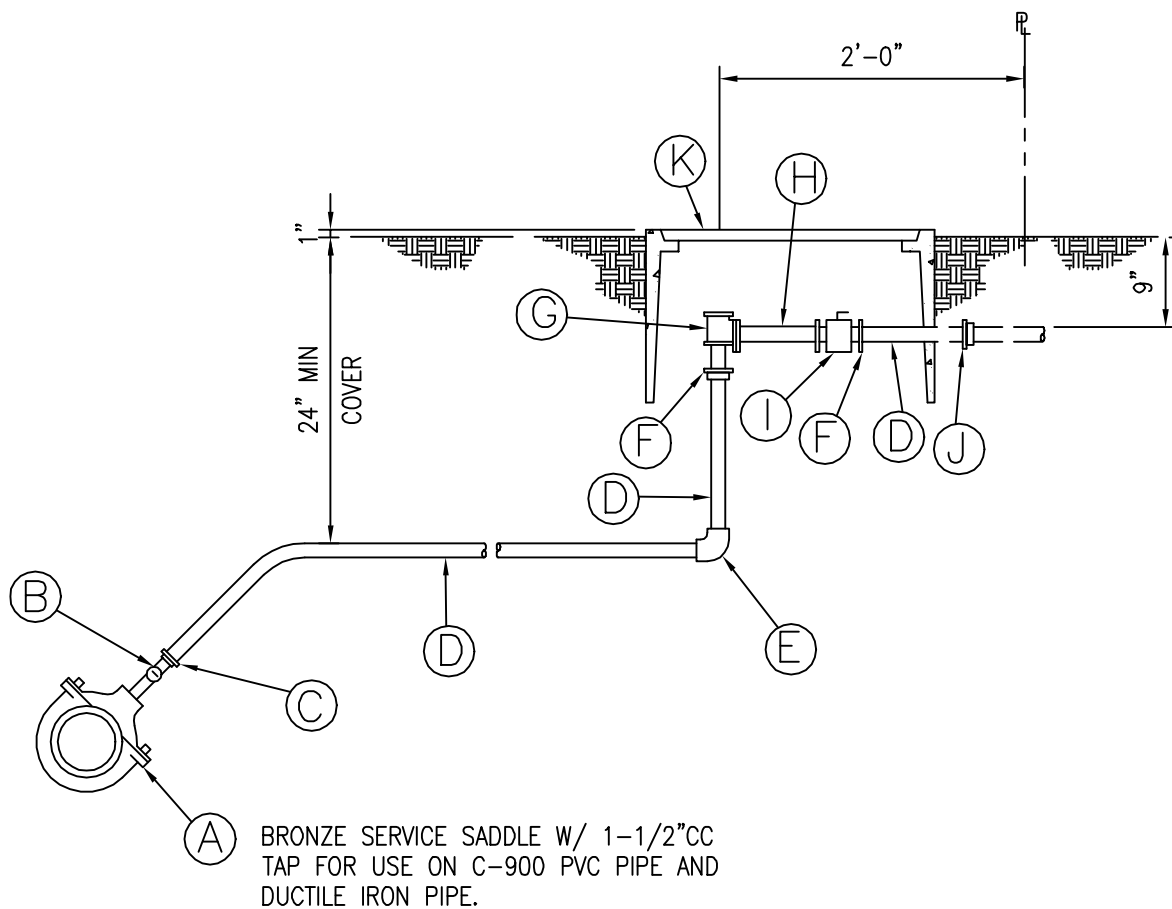
SCALE: NTS

STANDARD  
DETAILS

L3

ITEM	DESCRIPTION	SIZE
A	SERVICE SADDLE (SIZE DEPENDS UPON MAIN)	1 1/2" CC TAP
B	BALL CORPORATION (FORD FB 400 OR APPROVED EQUAL)	1 1/2" CC X 1 1/2" MPT
C	PACK JOINT COUPLING (FORD C14-66 OR APPROVED EQUAL)	1 1/2"
D	COPPER TUBE TYPE "K" SOFT	1 1/2"
E	90° COPPER ELBOW	1 1/2"
F	COPPER MALE ADAPTER	1 1/2" X 1"
G	ANGLE BALL VALVE (FORD BA13-444W OR APPROVED EQUAL)	1"
H	METER SPACER (TO BE SUPPLIED BY THE DEPT. OF WATER & INSTALLED BY CONTRACTOR)	1"
I	BALL VALVE(FORD B13-444W W/HT 34 OR APPROVED EQUAL)	1"
J	COPPER MALE ADAPTER	1 1/2"
K	TYPE "X" CONC. METER BOX W/ C.I. COVER	---

### SCHEDULE OF FITTINGS



PROFILE

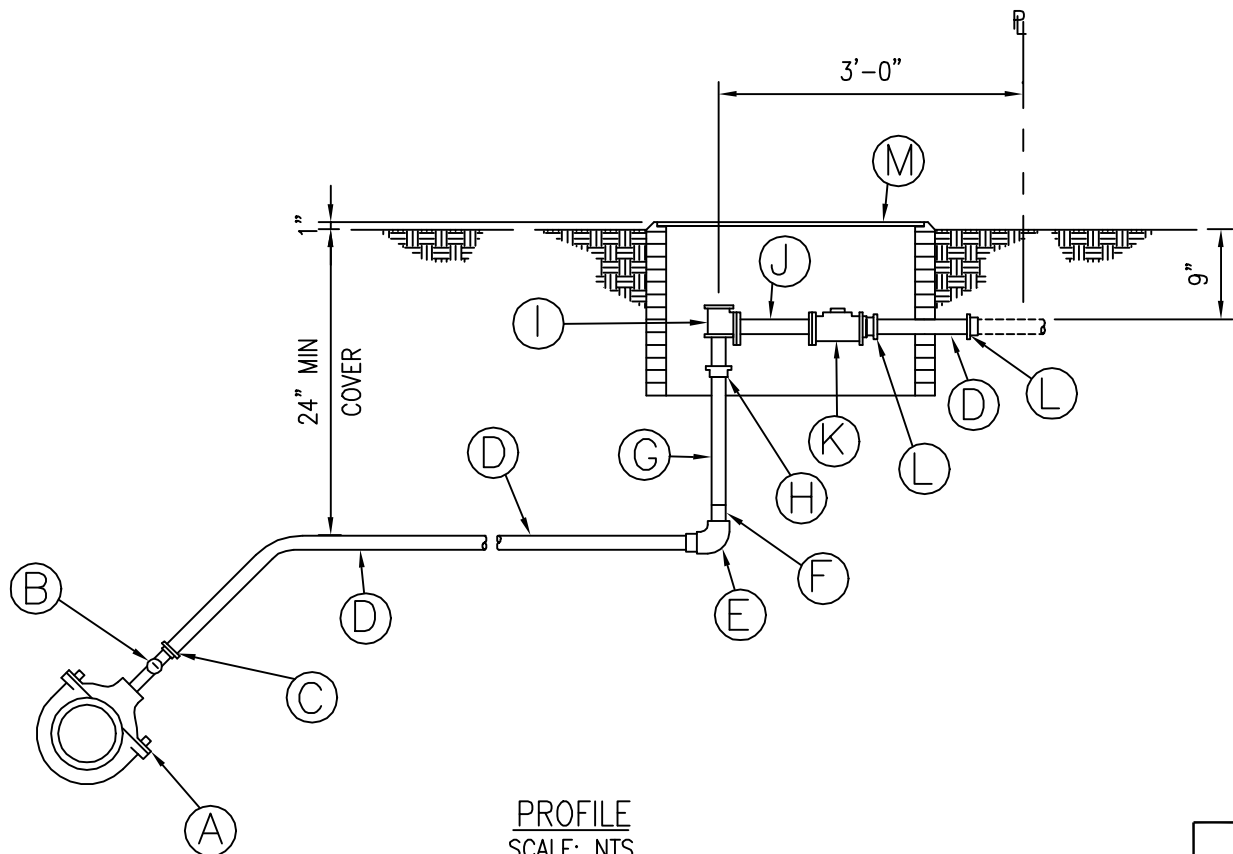
2002
REVISION

KAUAI	<b>ONE INCH METER</b> PROFILE & MATERIAL LIST SCALE: NTS	STANDARD DETAILS	<b>L4</b>
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ITEM	DESCRIPTION	SIZE
A	SERVICE SADDLE (SIZE DEPENDS UPON MAIN)	2" CC TAP
B	BALL CORPORATION (FORD FB 800 OR APPROVED EQUAL)	2" CC X 2 1/2" MPT
C	PACK JOINT COUPLING (FORD C14-88 OR APPROVED EQUAL)	2 1/2"
D	COPPER TUBE TYPE "K" SOFT	2 1/2"
E	90° COPPER ELBOW	2 1/2"
F	COPPER FLUSH BUSHING	2 1/2" C X 2" FTG.
G	COPPER TUBE TYPE "K" SOFT	2"
H	COPPER MALE ADAPTER	2"
I	ANGLE BALL VALVE (FORD BFA13-777W OR APPROVED EQUAL)	2"
J	METER SPACER (TO BE SUPPLIED BY THE DEPT. OF WATER & INSTALLED BY CONTRACTOR)	2"
K	BALL VALVE (FORD BF13-787W W/ HB 67S OR APPROVED EQUAL)	2"
L	COPPER MALE ADAPTER	2 1/2"
M	TYPE III METER BOX FRAME AND COVER	—

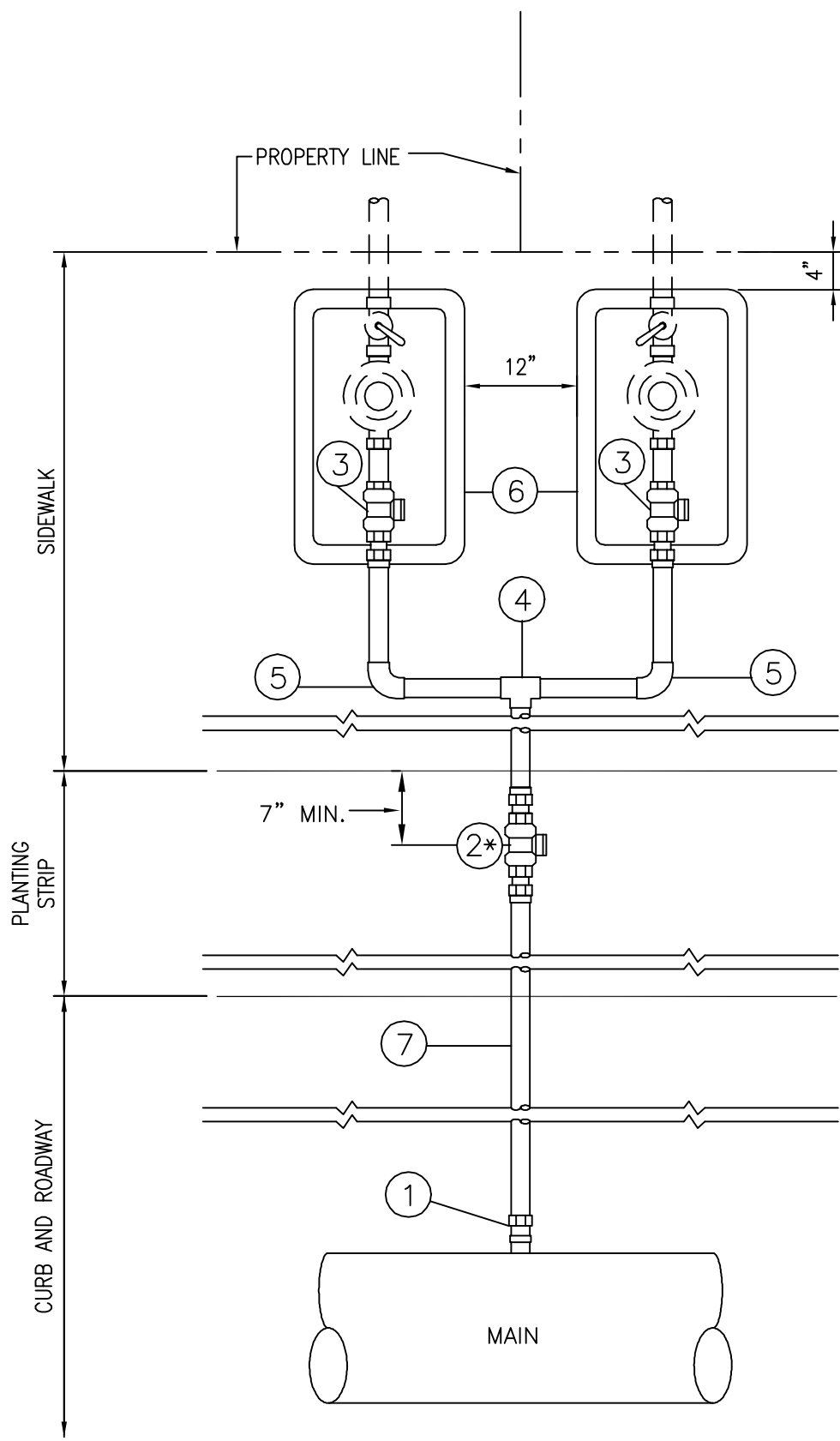
### SCHEDULE OF FITTINGS



BRONZE SERVICE SADDLE W/ 2" CC TAP FOR  
USE C-900 PVC PIPE AND DUCTILE IRON PIPE

PROFILE  
SCALE: NTS

KAUAI	<b>TWO-INCH METER</b> <b>PROFILE &amp; MATERIAL LIST</b> SCALE: NTS	STANDARD DETAILS	
			2002
			REVISION
			<b>L6</b>

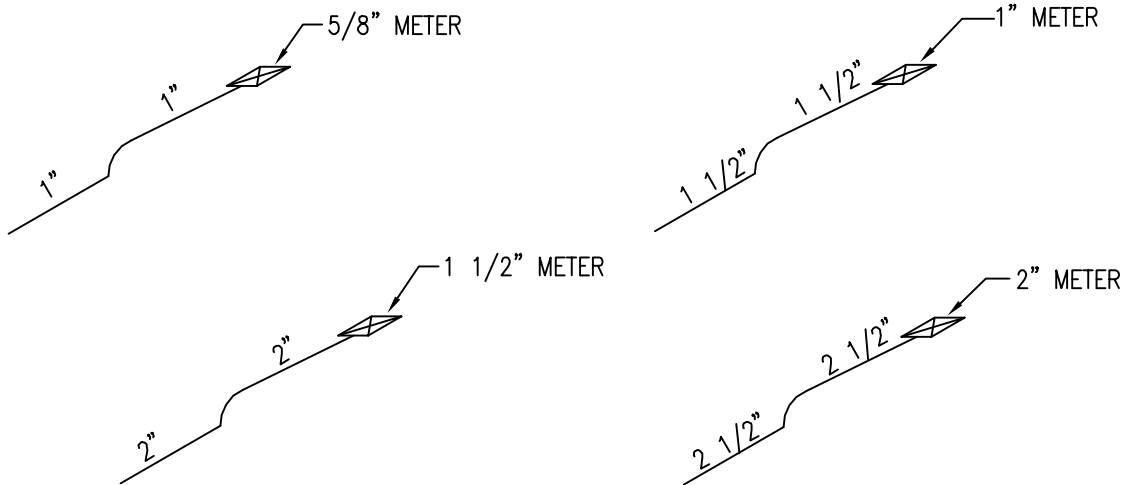


METER BOX EXCEPTION – FOR 1 1/2" TYPE "B", 1 1/2" TYPE "C", AND 1 1/2" TYPE "D" SERVICE LATERALS, INSTALL TYPE "X" METER BOXES IN A.C. AND CONCRETE PAVED AREAS. INSTALL TYPE "B" METER BOXES IN UNPAVED AREAS. CURB STOP TO BE LOCATED BELOW PLANTING STRIP. FOR CONC. SIDEWALKS W/O PLANTING STRIP, CURB STOP SHALL BE LOCATED 12" ON CENTERLINE SIDE OF CURB FACE. FOR A.C. PAVED AND STABILIZED SHOULDERS, CURB STOP SHALL BE LOCATED NEXT TO COPPER TEE, MIN. 7".

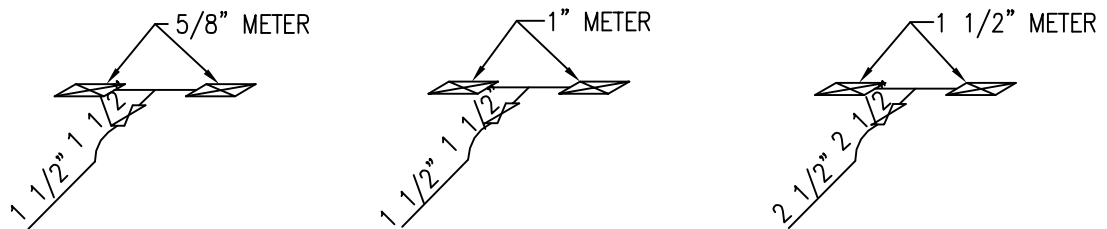
NOTE:  
REFER TO L10 FOR SCHEDULE OF  
COPPER FITTINGS.

2002
REVISION

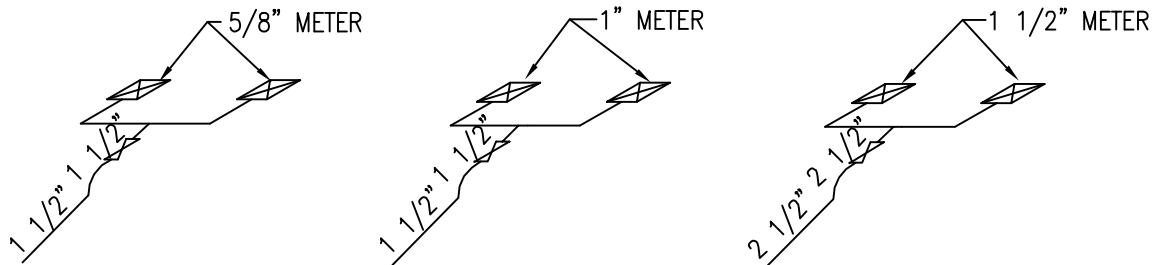
HAWAII	<b>COPPER SERVICE LATERAL FOR MULTIPLE METERS</b> SCALE: NTS	STANDARD DETAILS	<b>L7</b>
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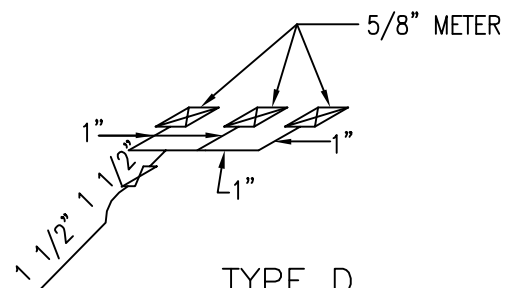
TYPE A



TYPE B



TYPE C



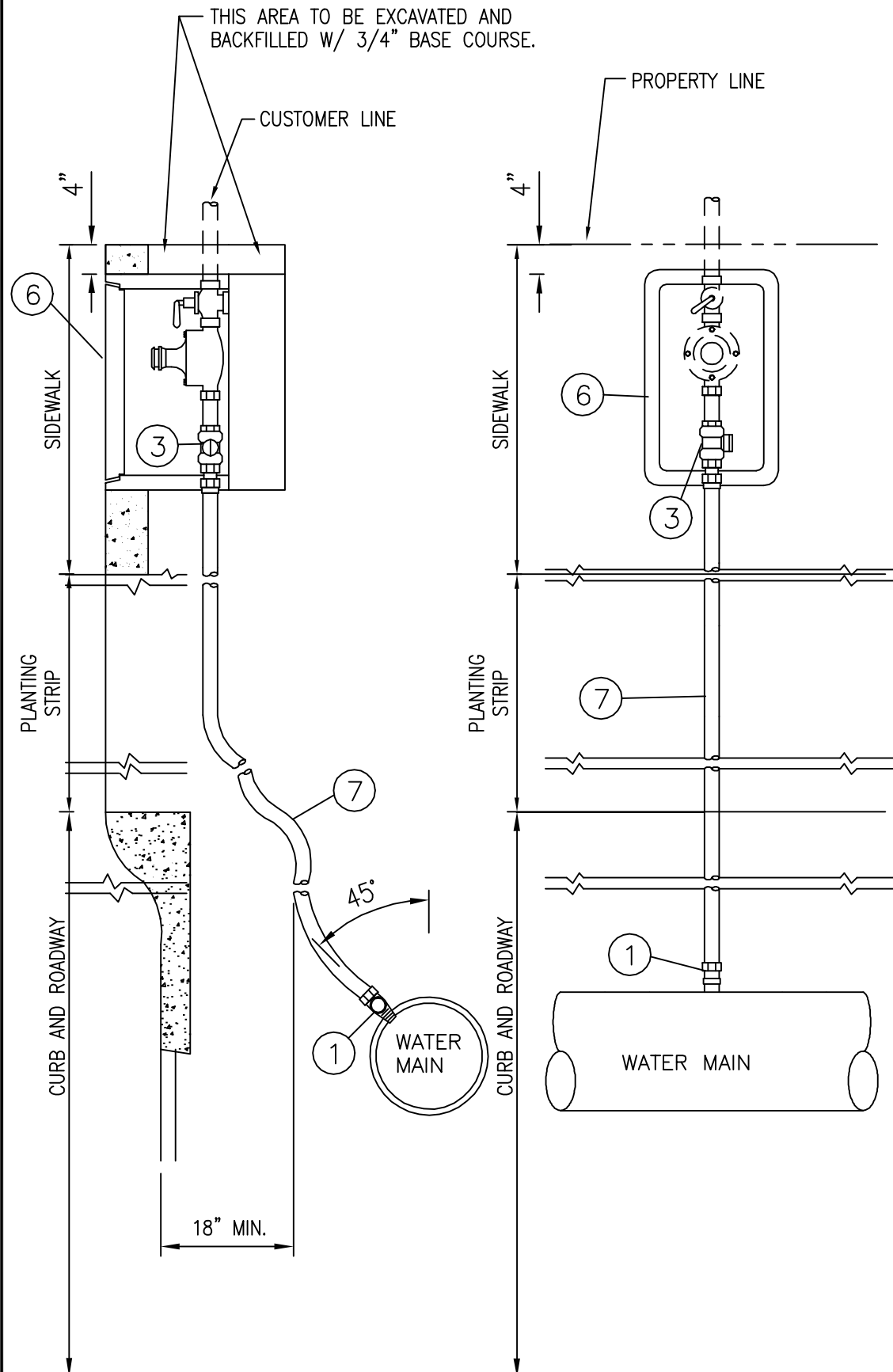
TYPE D

NOTE:

THE SIZE COMBINATIONS SHOWN ARE THOSE MOST COMMONLY USED, BUT THIS FIGURE IS NOT INTENDED TO LIMIT THE COMBINATIONS WHICH MAY BE USED. HOWEVER, COMBINATIONS OTHER THAN THESE SHOWN ABOVE MAY BE INSTALLED ONLY WITH THE APPROVAL OF THE MANAGER.

HAWAII	<b>SERVICE LATERALS AND CONNECTIONS</b>  SCALE: NTS	STANDARD DETAILS	
			2002
			REVISION
			L8



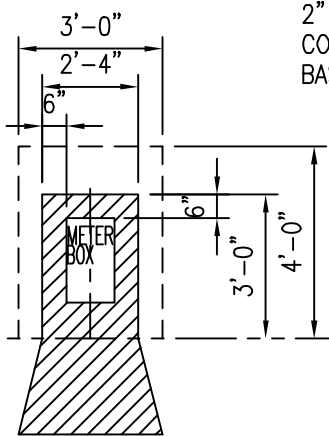
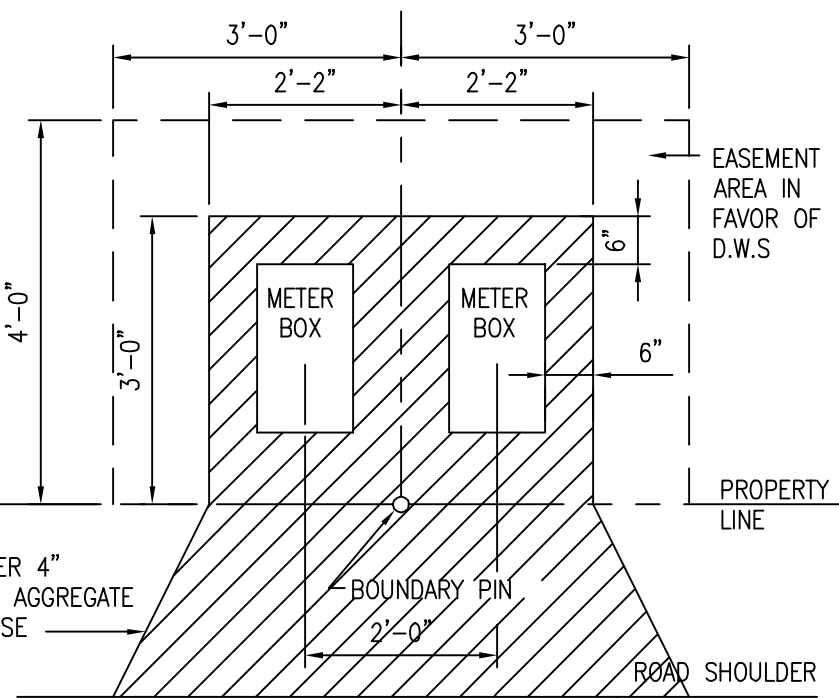
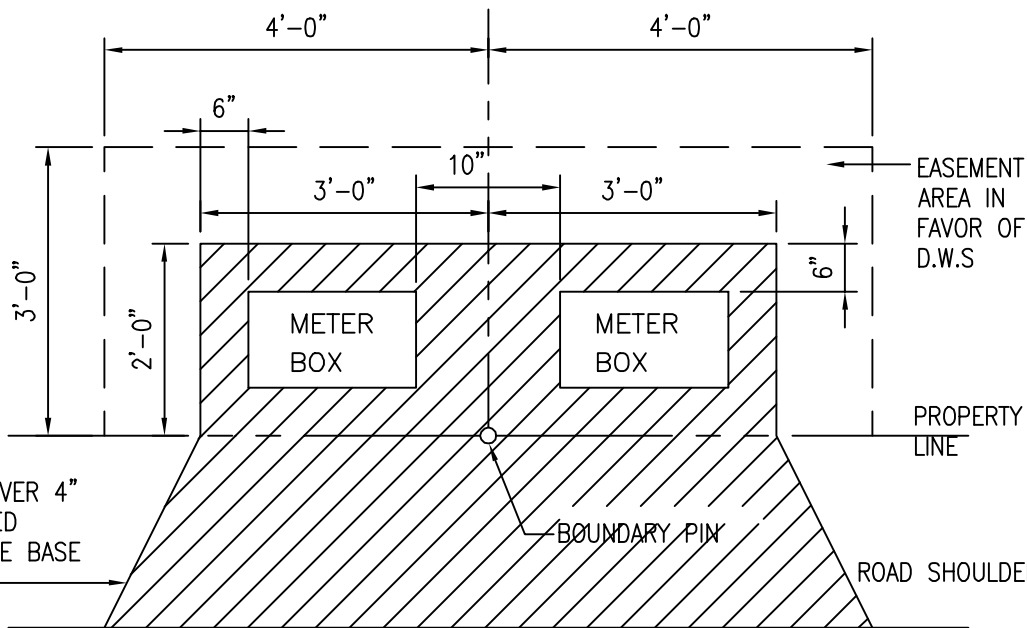


METER BOX EXCEPTION - FOR 1" TYPE "A" SERVICE LATERALS, INSTALL TYPE "X" METER BOX IN A.C. AND CONCRETE PAVED AREAS. INSTALL TYPE "B" METER BOXES IN UNPAVED AREAS.

NOTE: REFER TO L10 FOR SCHEDULE OF COPPER FITTINGS. FOR MULTIPLE CONNECTION, SEE L8. FOR ASPHALTIC CONCRETE PAVED AREAS, METER BOX SHALL BE LOCATED 4" FROM THE PROPERTY LINE. FOR NON-SIDEWALK AREAS, METER BOX SHALL BE LOCATED 12" FROM PROPERTY LINE. FOR SERVICE SADDLE REQUIREMENTS SEE TABLE 100-15 OF THE WATER SYSTEM STANDARDS.

HAWAII	<b>COPPER SERVICE LATERAL</b> FOR 5/8" & 1" METERS SCALE: NTS	STANDARD DETAILS	
			2002
			REVISION
			L9

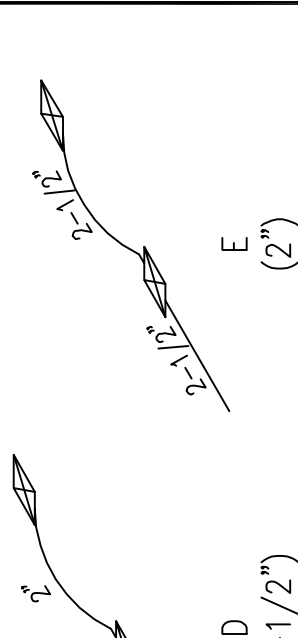
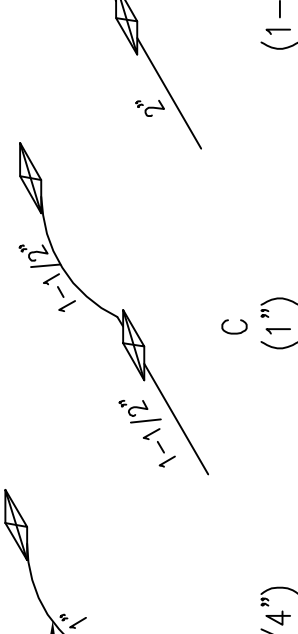
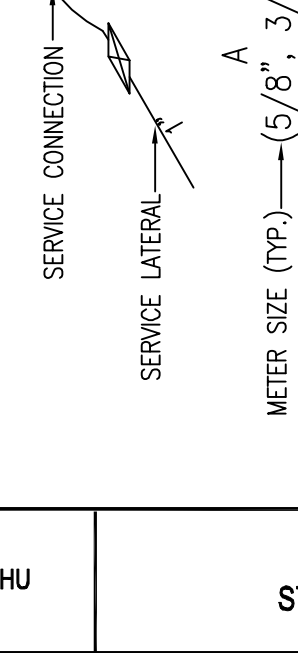

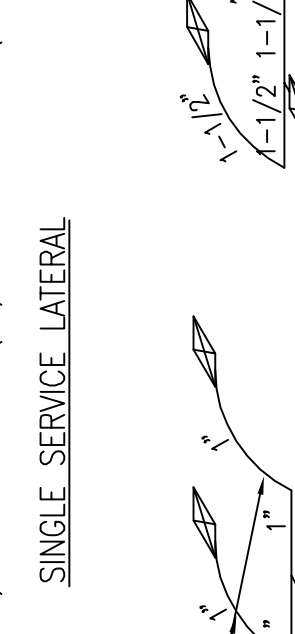
SERVICE LATERAL AND CONNECTION MATERIAL SCHEDULE																			
SERVICE CONNECTION MATERIAL																			
SERVICE LATERAL MATERIAL																			
TYPE	SIZE	BRONZE BALL CORP. (a)		BRONZE CURB STOP (b)		BRONZE CURB STOP (c)		TEE CxCxC STYLE		90° ELBOW CxC STYLE		METER BOX		COPPER TUBING TYPE K		METER		CUSTOMER VALVE (d)	
		SIZE	QNT.	SIZE	QNT.	SIZE	QNT.	SIZE	QNT.	SIZE	QNT.	SIZE	QNT.	SIZE	QNT.	SIZE	QNT.	SIZE	QNT.
A	1	1X1	1			1*	1					1	1	5/8	1	3/4	1		
	1- 1/2	1-1/2X1-1/2	1			1-1/2	1					1	1- 1/2	1	1	1	1	1	
	2	2X2	1			2	1					1	2	1- 1/2	1	1-1/2	1	1	
	2- 1/2	2X2	1			2	1					1	2- 1/2	2	1	2	1	1	
B	1- 1/2	1-1/2X1-1/2	1	1-1/2	1	1*	2	1 x 1 x 1-1/2	1			2	1- 1/2	5/8	2	3/4	2		
	1- 1/2	1-1/2X1-1/2	1	1-1/2	1	1-1/2"	2	1-1/2X1-1/2X1-1/2	1			2	1- 1/2	1	2	1	2		
	2- 1/2	2X2	1	2-1/2	1	2	2	2 X 2 X 2- 1/2	1			2	2- 1/2	1- 1/2	2	1-1/2	2		
C	1- 1/2	1-1/2X1-1/2	1	1-1/2	1	1*	2	1 X 1 X 1- 1/2	1	1	2	2	1- 1/2	5/8	2	3/4	2		
	1- 1/2	1-1/2X1-1/2	1	1-1/2	1	1-1/2"	2	1-1/2X1-1/2X1-1/2	1	1- 1/2	2	2	1- 1/2	1	2	1	2		
	2- 1/2	2X2	1	2-1/2	1	2	2	2 X 2 X 2- 1/2	1	2	2	2	2- 1/2	1-1/2	2	1-1/2	2		
D	1- 1/2	1-1/2X1-1/2	1	1-1/2	1	1*	3	1-1/2x1x1-1/2	1	1	2	3	1- 1/2	5/8	3	3/4	3		
								1- 1/2 X 1 X 1	1										
ITEM NO.		(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	

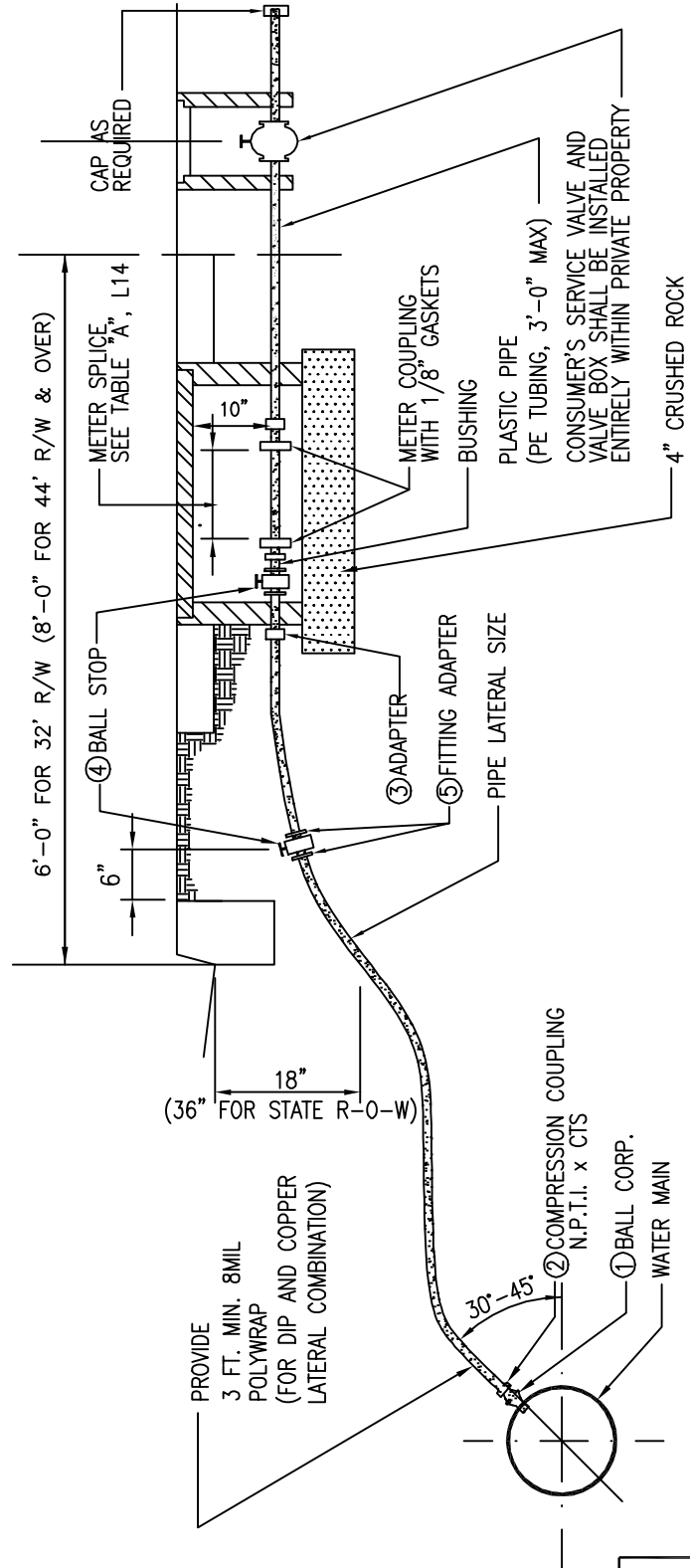
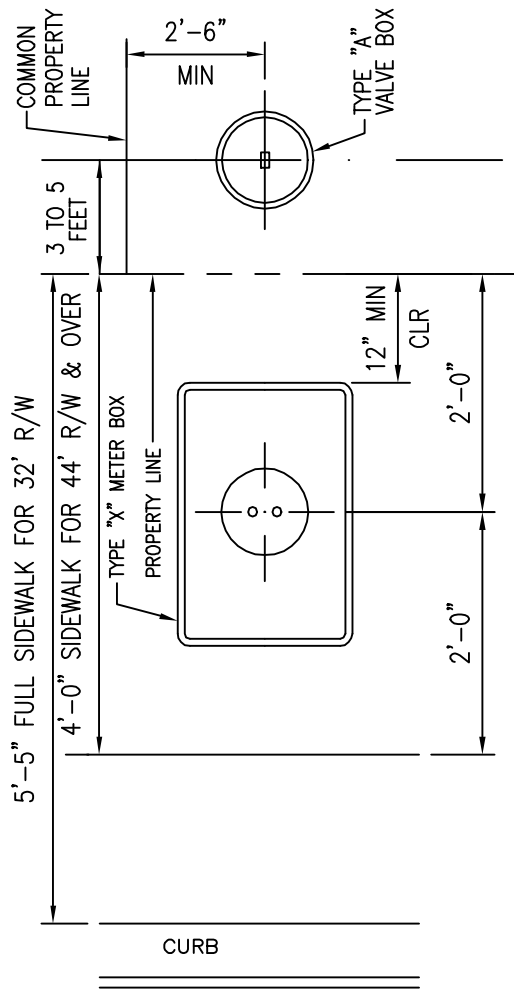


TYPE "X" METER BOXES SHALL BE  
INSTALLED

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HAWAII	<b>STABILIZATION OF 5/8 INCH METER EASEMENTS</b> SCALE: NTS	STANDARD DETAILS	L11
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OAHU	<div data-bbox="548 1871 1024 2013"> <p>SERVICE LATERALS AND CONNECTIONS STANDARD SIZING ARRANGEMENTS</p> <p>SCALE: NTS</p> </div>	STANDARD DETAILS	L12
		2002 REVISION	
	<div data-bbox="272 102 1047 1745">  <p>A METER SIZE (TYP.) → (5/8", 3/4")</p> <p>SERVICE CONNECTION</p> <p>SERVICE LATERAL</p> <p>SINGLE SERVICE LATERAL</p>  <p>B METER SIZE (TYP.) → (1", 1")</p> <p>SERVICE CONNECTION</p> <p>SERVICE LATERAL</p> <p>DOUBLE SERVICE LATERAL</p>  <p>C METER SIZE (TYP.) → (1", 1")</p> <p>SERVICE CONNECTION</p> <p>SERVICE LATERAL</p>  <p>D METER SIZE (TYP.) → (1-1/2", 1-1/2")</p> <p>SERVICE CONNECTION</p> <p>SERVICE LATERAL</p>  <p>E METER SIZE (TYP.) → (2", 2")</p> <p>SERVICE CONNECTION</p> <p>SERVICE LATERAL</p> </div>	<p>THE PURPOSE OF THIS FIGURE IS TO SIMPLIFY THE DESIGNATION OF SERVICE LATERALS AND CONNECTIONS ON CONSTRUCTION PLANS. THE SIZE COMBINATIONS SHOWN HEREON ARE THOSE MOST COMMONLY USED, BUT THIS FIGURE IS NOT INTENDED TO LIMIT THE COMBINATIONS WHICH MAY BE USED.</p>	



2002

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OAHU

**COPPER SERVICE LATERAL  
FOR CONNECTION TYPE "X" METER BOX**  
5/8", 3/4", & 1" METERS  
SCALE: NTS

STANDARD  
DETAILS

L13

NOTES:

1. SEE M3 FOR DETAILS OF TYPE "X" METER BOX.
2. IF THE CONSUMER'S SERVICE VALVE CANNOT BE INSTALLED 3-5 FEET FROM THE PROPERTY LINE, THE VALVE SHALL BE INSTALLED AS DIRECTED BY THE MANAGER, OR INSTALL BALL CORP. WITHIN METER BOX AFTER METER.
3. SEE PLATE M43 FOR METER INSTALLATION IN NON-SIDEWALK AREA.

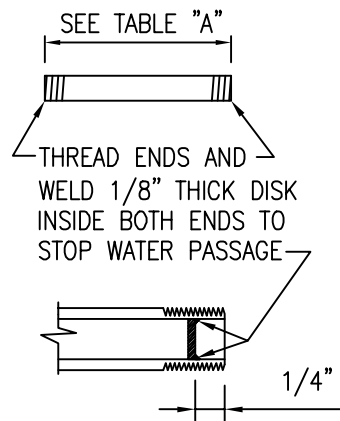
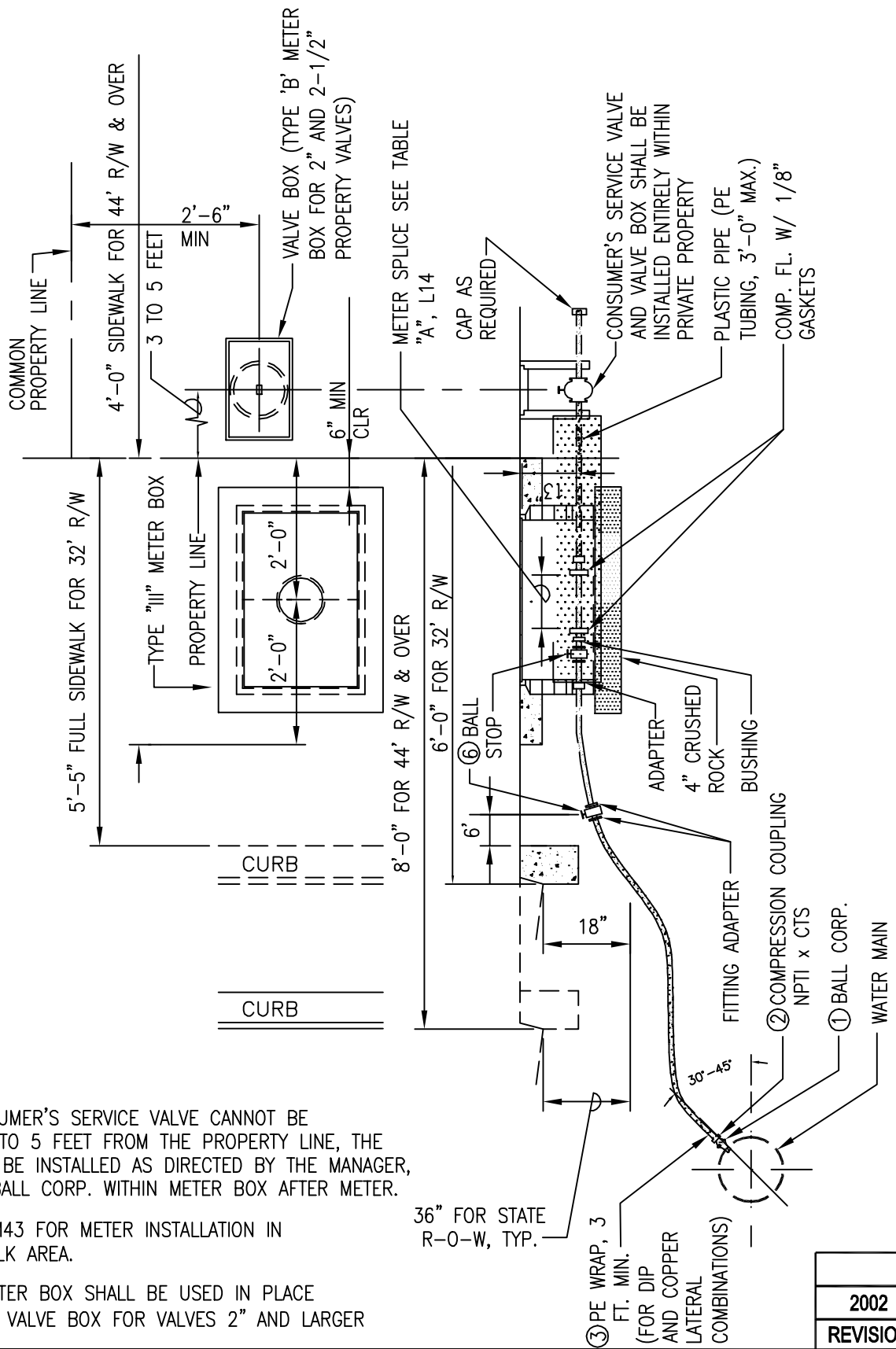


TABLE "A"		
METER SIZE	SPLICE SIZE	SPLICE LENGTH
5/8"	1" DIA.	7 1/2"
3/4"	1" DIA.	9"
1"	1 1/4" DIA.	10 3/4"

METER SPLICE DETAIL

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REVISION

OAHU	<p><b>COPPER SERVICE LATERAL FOR CONNECTION TYPE "X" METER BOX 5/8", 3/4", &amp; 1" METERS</b></p> <p>SCALE: NTS</p>	STANDARD DETAILS	L14
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**NOTES:**

1. IF THE CONSUMER'S SERVICE VALVE CANNOT BE INSTALLED 3 TO 5 FEET FROM THE PROPERTY LINE, THE VALVE SHALL BE INSTALLED AS DIRECTED BY THE MANAGER, OR INSTALL BALL CORP. WITHIN METER BOX AFTER METER.
2. SEE PLATE M43 FOR METER INSTALLATION IN NON-SIDEWALK AREA.
3. TYPE "B" METER BOX SHALL BE USED IN PLACE OF TYPE "A" VALVE BOX FOR VALVES 2" AND LARGER

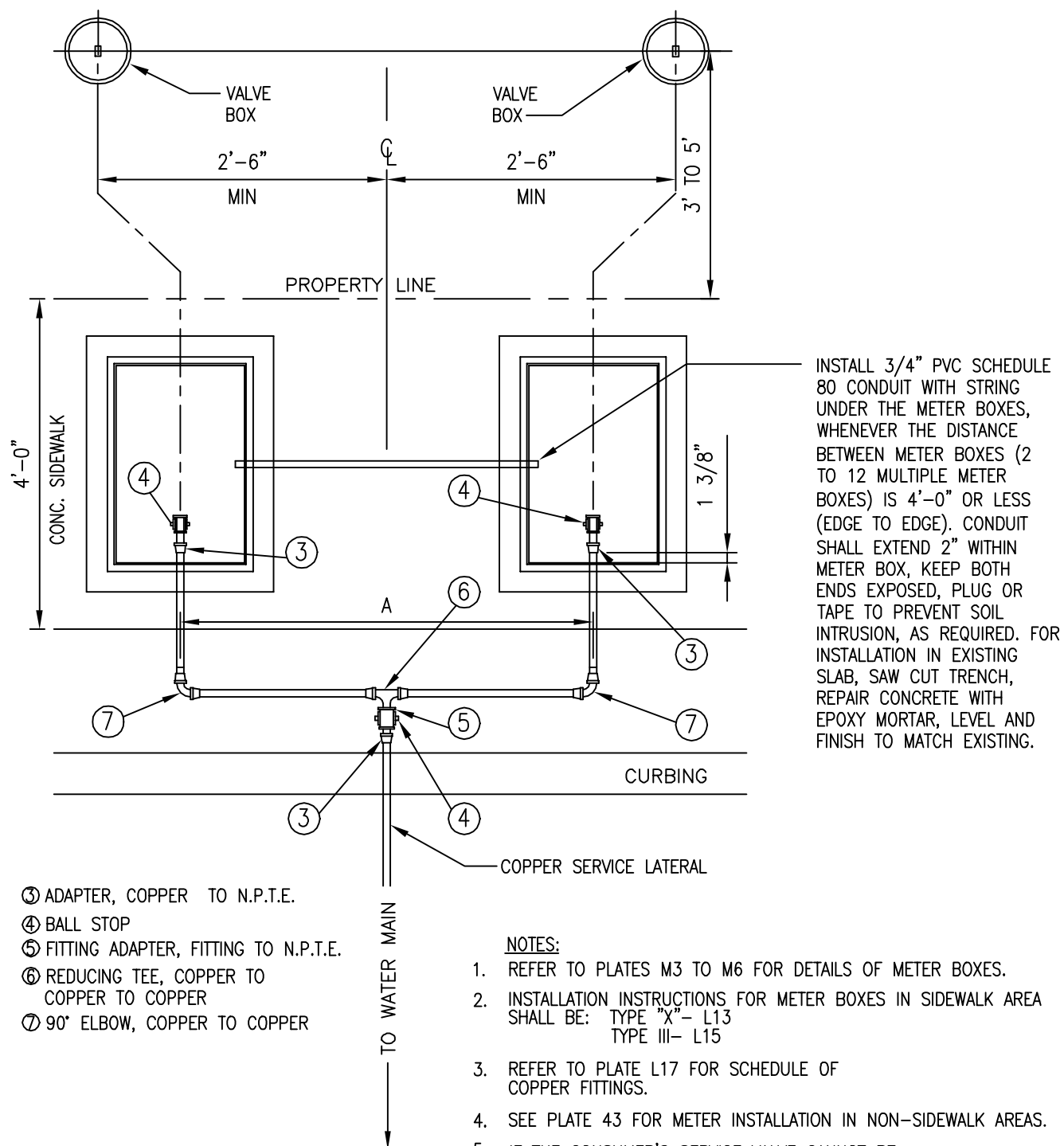
**COPPER SERVICE LATERAL  
FOR CONNECTION TYPE III METER BOX  
1 1/2" AND 2" METERS  
SCALE: NTS**

OAHU

STANDARD  
DETAILS

2002  
REVISION

L15



TYPE OF METER BOX	MIN. DIMENSION "A"
TYPE "X"	25"
TYPE III	29"

2002
REVISION

OAHU	<b>COPPER SERVICE LATERAL FOR CONNECTION (MULTIPLE SERVICE)</b> SCALE: NTS	STANDARD DETAILS	<b>L16</b>
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ITEM NO.	DESCRIPTION	SINGLE SERVICE CONN.	CONNECTION FOR TWO SERVICES
1	BALL CORPORATION, BRONZE	1	1
2	GROUND JOINT UNION, COPPER TO N.P.T.I.	1	1
3	ADAPTER, COPPER TO N.P.T.E.	1	3
4	BALL STOP	2	3
5	FITTING ADAPTER, FITTING TO N.P.T.E	2	1
6	REDUCING TEE, COPPER TO COPPER TO COPPER	—	1
7	90° ELBOW, COPPER TO COPPER	—	2

NPTI= NATIONAL PIPE THREAD, INTERNAL  
NPTE= NATIONAL PIPE THREAD, EXTERNAL  
CTS= COPPER TUBING SIZE

SCHEDULE OF COPPER FITTINGS

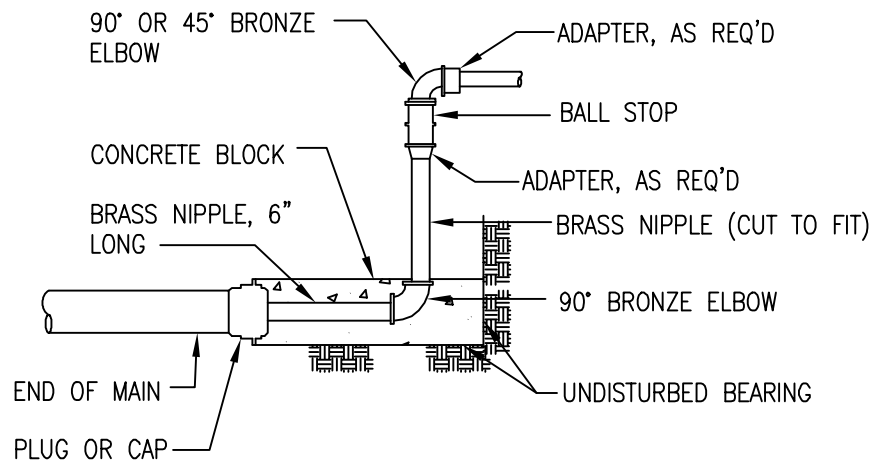
OAHU	<b>SPECIAL LATERAL AND CONNECTION</b> FITTING SCHEDULE SCALE: NTS	STANDARD DETAILS	
			2002
			REVISION
			L17

OAHU	TABLE A (COPPER)												STANDARD DETAILS	L18
MATERIAL LIST FOR COPPER LATERALS SCALE: NTS														
2002														
REVISION														

METER CODE	METER SIZE	LOW RANGE FOR METER SIZING (GPM)	LATERAL TYPE	LATERAL SIZE	SPICE SIZE	SPICE LENGTH	METER COUPL'G	BRASS REDUC.	SERVICE VALVE	BRASS PIPE	CAP	METER BOX
02	5/8"	20	"A"	1"	1" DIA.	7 1/2"	3/4"	1"x3/4"	1"	1"x10"	1"	TYPE X
03	3/4"	30	"A"	1"	1" DIA.	9"	3/4"	1"x3/4"	1"	1"x10"	1"	TYPE X
04	1"	50	"C"	1-1/2"	1" DIA.*	10 3/4"	1"	1 1/2"x1"	1 1/2"	1 1/2"x10"	1 1/2"	TYPE X
06	1 1/2"	100	"D"	2"	1 1/2" DIA.	13" R.E.	1 1/2 FL.	NONE	1 1/2"	1 1/2"x10"	1 1/2"	TYPE III
07	2"	160	"E"	2-1/2"	2" DIA.**	17" R.E.	2" FL.	NONE	2"	2"x10"	2"	TYPE III

\* INCLUDES 2-1 1/4"x 1" BUSHINGS  
\* \* INCLUDES 2-2"x2 1/2" BUSHINGS

MAXIMUM METER SIZES FOR DOMESTIC SERVICE LATERALS		
LATERAL TYPE	MAXIMUM METER SIZE FOR SINGLE SERVICE LATERAL	MAXIMUM METER SIZES FOR COMMON SERVICE LATERAL
"A"	3/4"	NA
"C"	1"	3/4" & 3/4"
"D"	1-1/2"	1" & 1"
"E"	2"	1-1/2" & 1"

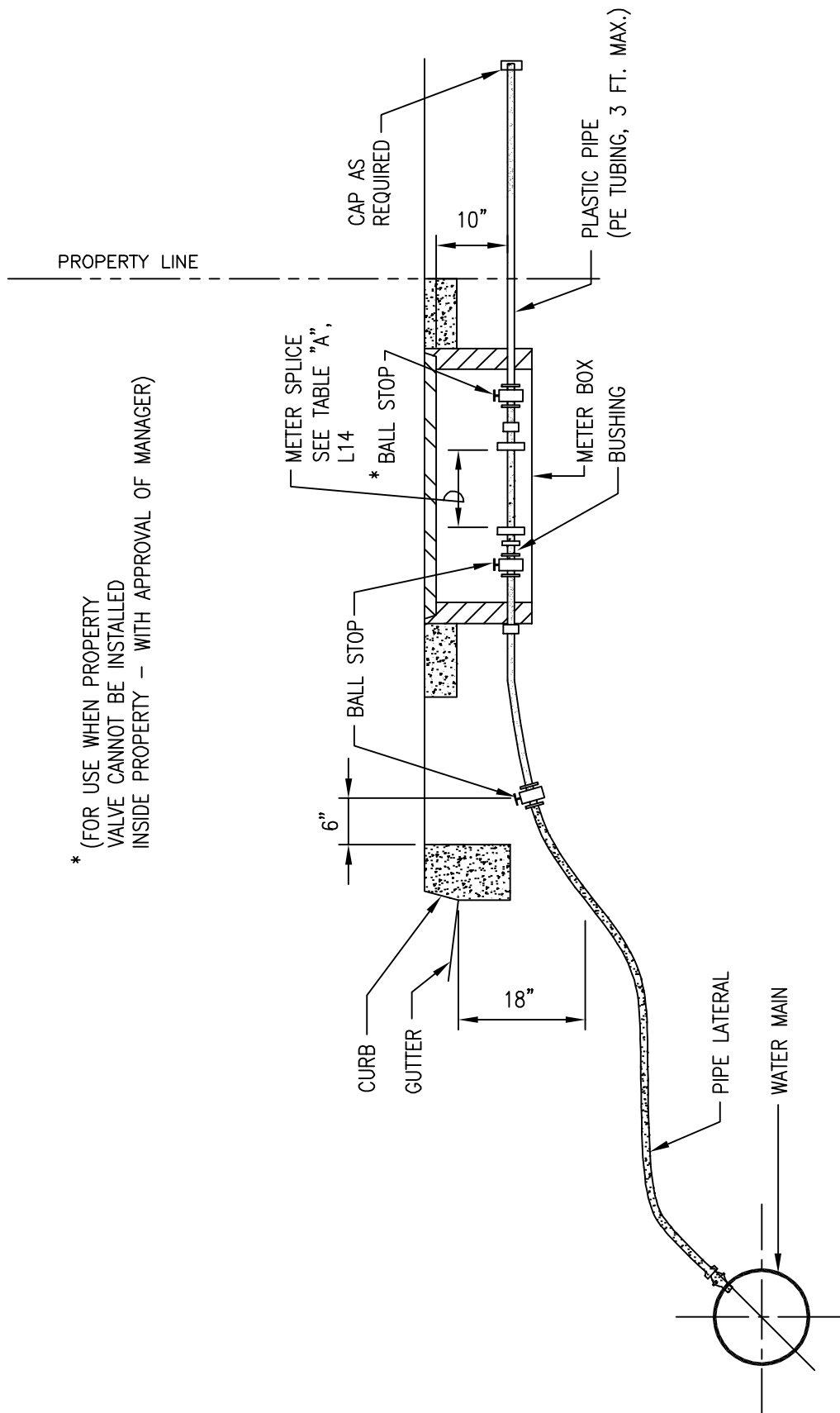


SERVICE LATERAL CONNECTION AT END OF LINE

2002
REVISION

OA HU	<b>END OF LINE CONNECTION</b> SCALE: NTS	STANDARD DETAILS	L19
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\* (FOR USE WHEN PROPERTY VALVE CANNOT BE INSTALLED INSIDE PROPERTY - WITH APPROVAL OF MANAGER)



TYPICAL DETAIL FOR INSTALLATION  
OF BALL STOP AFTER METER

OAHU	<b>TYPICAL DETAIL FOR INSTALLATION OF BALL STOP AFTER METER</b> SCALE: NTS	STANDARD DETAILS	<div> <div>2002</div> <div>REVISION</div> </div> <div>L20</div>
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