

VALVE SIZE	BEARING AREA REQUIRED at TEST PRESSURE		
	700 KPa (100 psi)	1000 KPa (150 psi)	1400 KPa (200 psi)
100	0.2m <sup>2</sup>	0.3m <sup>2</sup>	0.4m <sup>2</sup>
150	0.3m <sup>2</sup>	0.45m <sup>2</sup>	0.6m <sup>2</sup>
200	0.6m <sup>2</sup>	0.9m <sup>2</sup>	1.2m <sup>2</sup>
250	0.9m <sup>2</sup>	1.35m <sup>2</sup>	1.8m <sup>2</sup>
300	1.2m <sup>2</sup>	1.8m <sup>2</sup>	2.4m <sup>2</sup>

NOTE:  
BEARING AREAS CALCULATED USING  
SOIL BEARING CAPACITY OF 50KPa  
(1000 PSF)(UNDISTURBED SAND)  
FOR SOFTER SOILS CONSULT ENGINEER

## KEMP LAKE WATERWORKS DISTRICT STANDARD LINE VALVE INSTALLATION

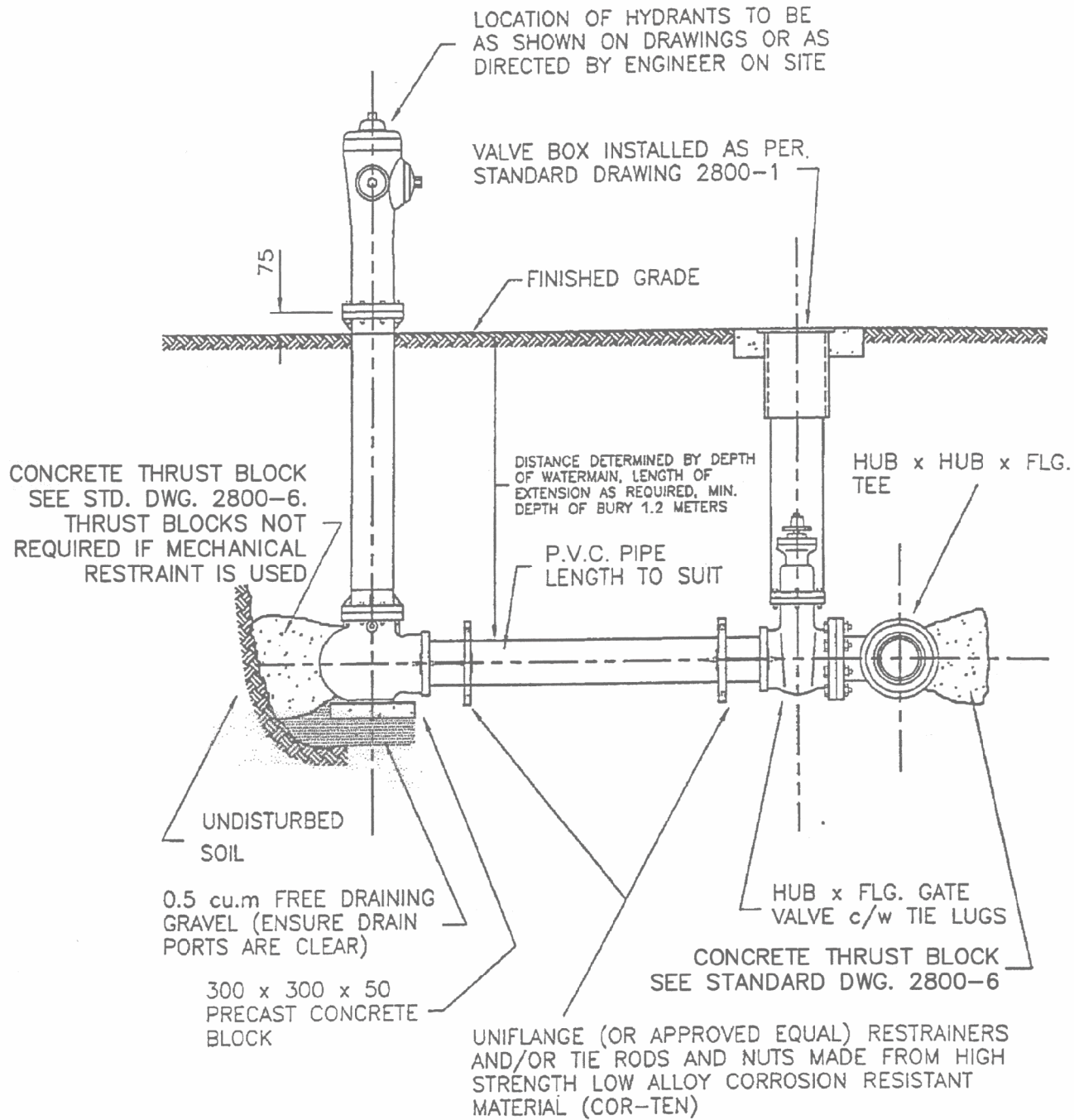
DATE: NOV. 2004

DRAWN BY:

SCALE: NTS

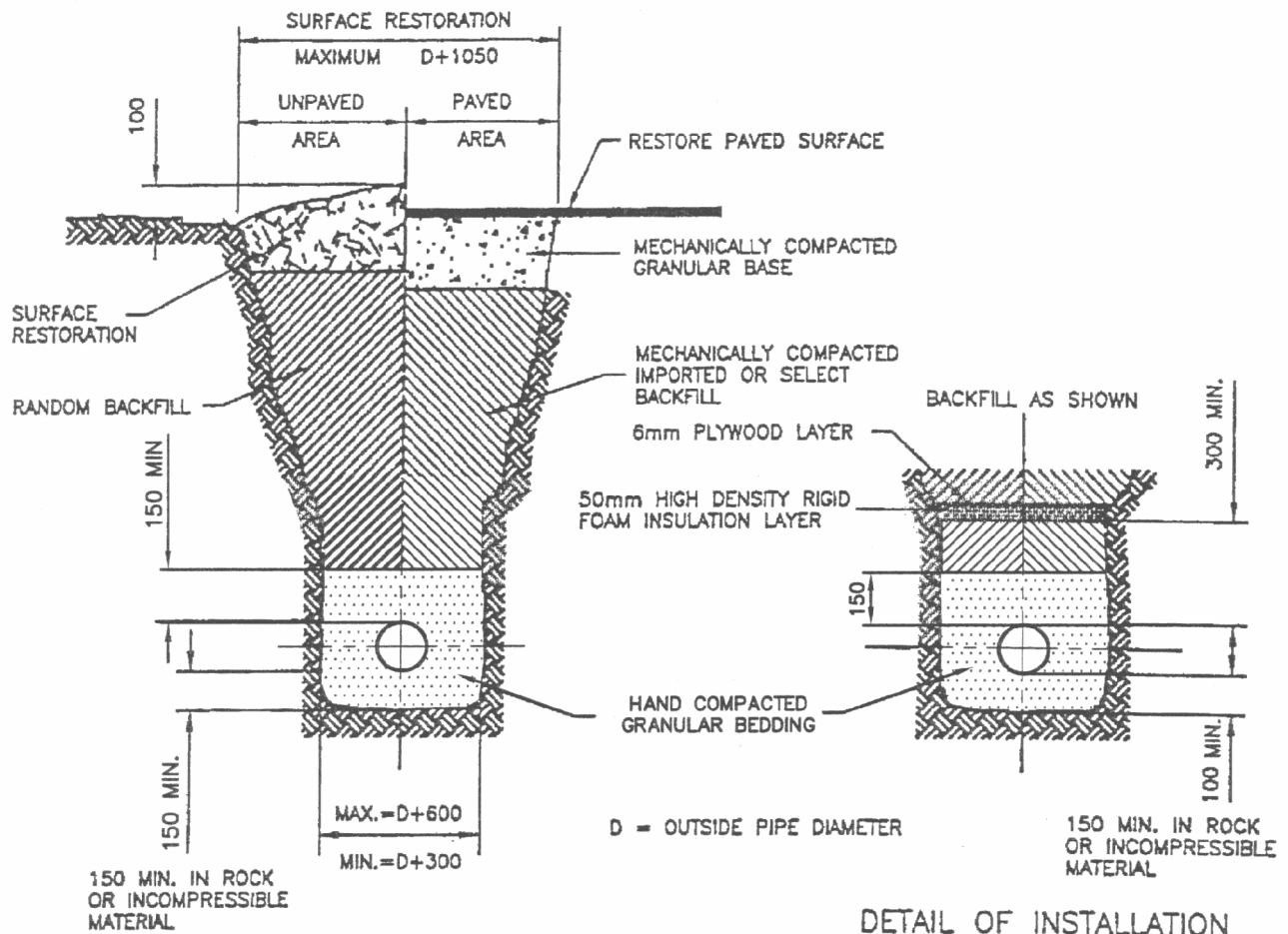
CHECKED BY:

DWG NO.:2800-1



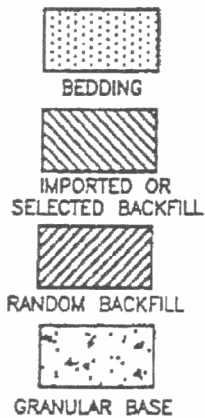
**KEMP LAKE WATERWORKS DISTRICT**  
**STANDARD FIRE HYDRANT ASSEMBLY**

DATE: NOV. 2004	DRAWN BY:	
SCALE: NTS	CHECKED BY:	DWG NO.:2800-2



ORDINARY BEDDING DETAIL

DETAIL OF INSTALLATION WHERE MINIMUM COVER CANNOT BE ATTAINED



PEA GRAVEL

GRANULAR MATERIAL CAPABLE OF BEING COMPACTED, CONTAINING NO STONES OR FRAGMENTS LARGER THAN 75mm. NO ROOTS, STUMPS OR OTHER ORGANIC MATERIAL.

ANY MATERIAL FREE OF STONES LARGER THAN 300mm. NO ROOTS, DEBRIS OR OTHER ORGANIC MATERIAL.

CRUSHED GRAVEL, 25mm MINUS, CAPABLE OF BEING COMPACTED OR APPROVED EQUAL

NOTES:

1. UNDER THE TRAVELLED PORTION OF ROADS AND DRIVEWAYS OR WITHIN 1.5M FROM THE EDGE OF TRAVELLED ROADWAY, THE TRENCH SHALL BE BACKFILLED WITH COMPACTED IMPORTED OR SELECT BACKFILL UP TO 300mm BELOW ROAD SURFACE. THE REMAINING TRENCH TO BE BACKFILLED WITH 25mm MINUS CRUSHED ROAD GRAVEL.
2. RANDOM BACKFILL SHALL BE COMPACTED TO A MINIMUM 90% STANDARD PROCTOR DENSITY.
3. IMPORTED OR SELECT BACKFILL SHALL BE COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY.
4. GRANULAR BEDDING SHALL BE COMPACTED TO A MINIMUM 95% STANDARD PROCTOR DENSITY.
5. CONTROLLED DENSITY BACKFILL MAY BE USED IN LIEU OF IMPORTED OR SELECT BACKFILL AND GRANULAR BASE.
6. THIS DRAWING REPRESENTS THE MINIMUM REQUIREMENTS. THE PIPE MANUFACTURER'S RECOMMENDED BEDDING AND BACKFILLING SPECIFICATION SHALL GOVERN.
7. REFER TO K.L.W.D. ENGINEERING SPECIFICATIONS FOR FURTHER DETAILS. DISCREPANCY BETWEEN THE PIPE MANUFACTURING RECOMMENDATION AND THIS DRAWING SHALL BE REFERRED TO THE K.L.W.D. ENGINEER.

# KEMP LAKE WATERWORKS DISTRICT

## STANDARD TRENCH PIPE BEDDING & BACKFILLING

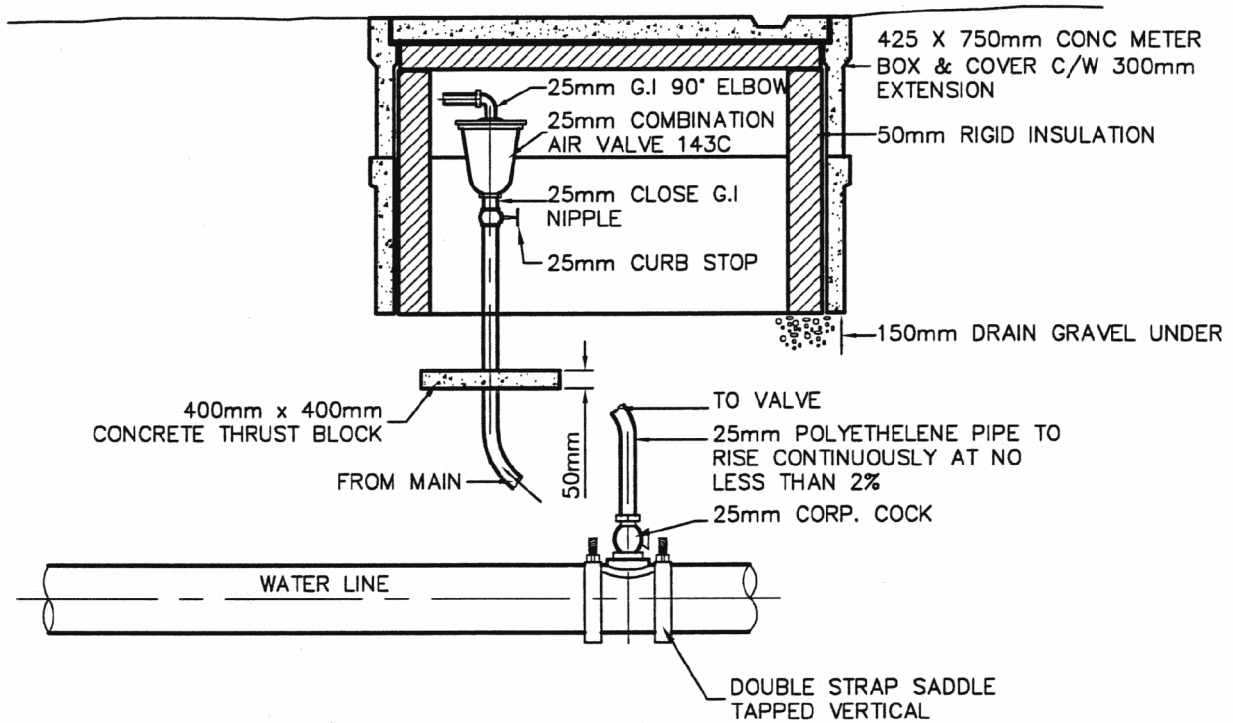
DATE: NOV. 2004

DRAWN BY:

SCALE: NTS

CHECKED BY:

DWG NO.:2800-4



# KEMP LAKE WATERWORKS DISTRICT

## STANDARD AIR VALVE INSTALLATION 100-300mm

DATE: NOV. 2004

DRAWN BY:

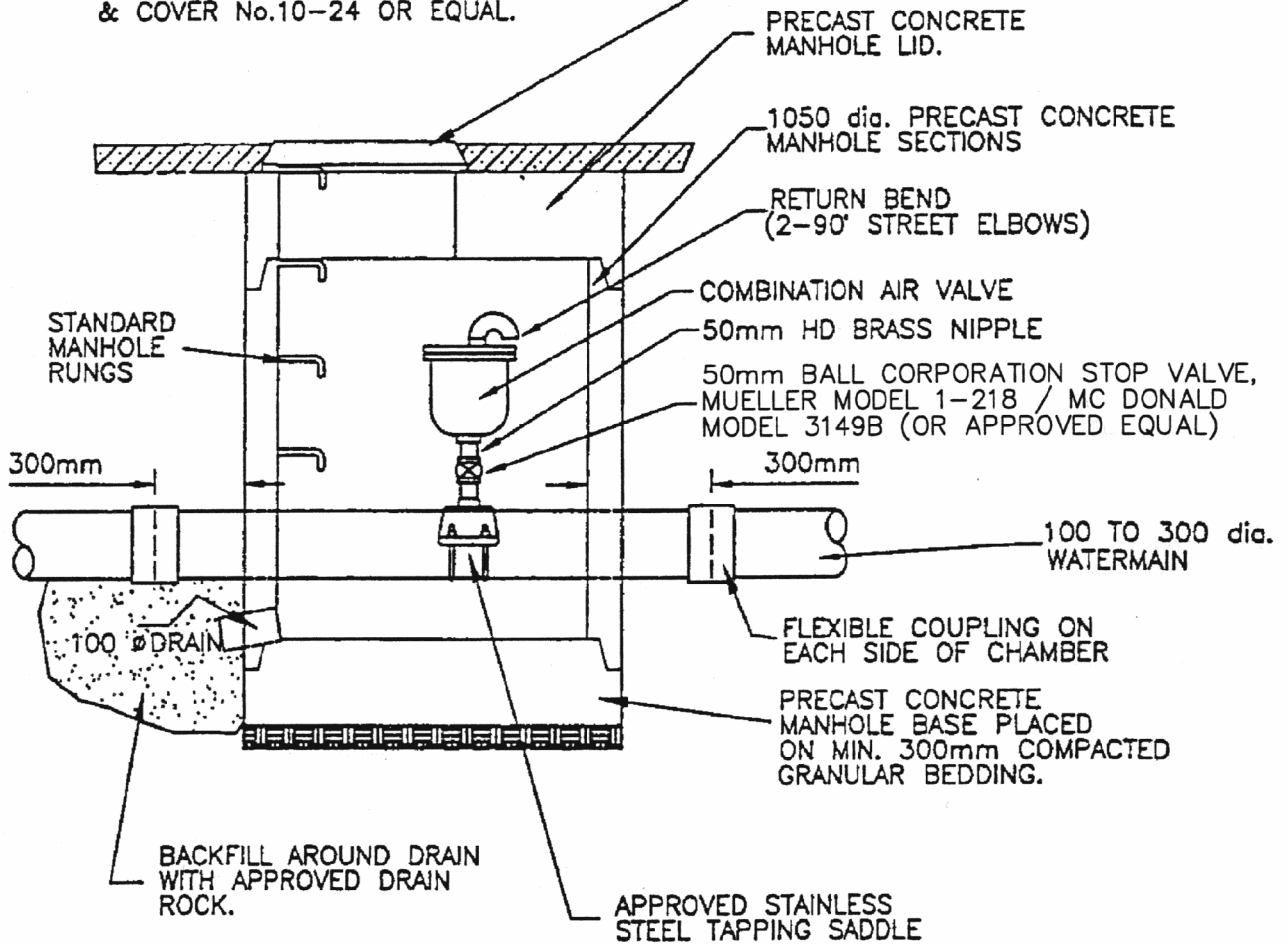
SCALE: NTS

CHECKED BY:

DWG NO.:2800-5A

WHERE INSTALLED IN AREAS SUBJECT TO VEHICULAR TRAFFIC USE VICTORIA FOUNDRIES MANHOLE FRAME & COVER No.10-264 OR EQUAL. RESTORE SURFACE TO ORIGINAL CONDITION.

WHERE INSTALLED IN NON TRAFFIC AREAS USE VICTORIA FOUNDRIES MANHOLE FRAME & COVER No.10-24 OR EQUAL.



## KEMP LAKE WATERWORKS DISTRICT

### STANDARD AIR VALVE INSTALLATION 100-300mm

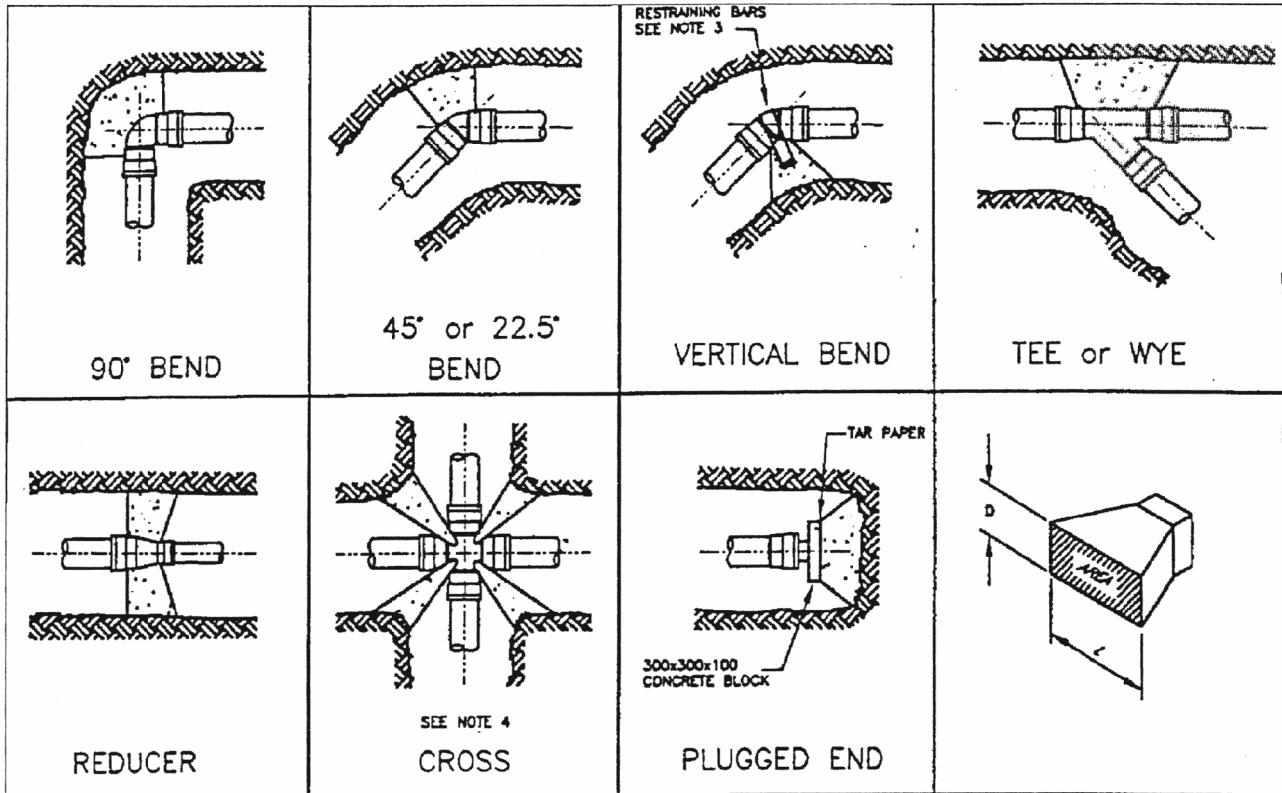
DATE: NOV. 2004

DRAWN BY:

SCALE: NTS

CHECKED BY:

DWG NO.:2800-5B



MINIMUM THRUST AREA BASED ON WATER PRESSURE OF – 1000KPa (150psi)  
& SOIL BEARING CAPACITY OF – 100KPa (2000psf)

FITTING	PIPE SIZE	AREA SQ. METERS	L x D AT FACE	FITTING	PIPE SIZE	AREA SQ. METERS	L x D AT FACE
90° BEND	100	0.2	0.7 x 0.3m	22.5° BEND	100	0.1	0.5 x 0.2m
	150	0.4	1.0 x 0.4m		150	0.2	0.7 x 0.3m
	200	0.7	1.2 x 0.6m		200	0.2	0.7 x 0.3m
	250	1.1	2.0 x 0.6m		250	0.3	0.8 x 0.4m
	300	1.6	2.0 x 0.8m		300	0.5	1.0 x 0.5m
45° BEND or WYE	100	0.2	0.7 x 0.3m	CAPPED END OR TEE	100	0.2	0.7 x 0.3m
	150	0.3	1.0 x 0.3m		150	0.3	0.8 x 0.4m
	200	0.4	1.0 x 0.4m		200	0.5	1.0 x 0.5m
	250	0.6	1.0 x 0.6m		250	0.8	1.2 x 0.7m
	300	0.9	1.5 x 0.6m		300	1.1	1.4 x 0.8m

- NOTES: 1. SOIL BEARING CAPACITY USED IS THAT FOR SOFT CLAY. FOR SOFTER SOILS THRUST BLOCKS SHALL BE DESIGNED BY THE ENGINEER.  
2. THRUST BLOCKING FOR FITTINGS LARGER THAN 300 DIA. SHALL BE DESIGNED BY THE ENGINEER.  
3. VOLUME OF CONCRETE IN VERTICAL BEND ANCHORS TO BE DETERMINED BY THE ENGINEER. USE 2-20M RETAINING BARS PER CUBIC METRE.

4. FOR CROSSES USE VALUE FOR 45° BEND IN EACH QUADRANT.  
5. WHERE PIPE SIZE DIFFERS IN ANY ONE FITTING USE VALUE FOR LARGEST SIZE.  
6. CONCRETE NOT TO ENCRUCH ON PIPE BARREL, BUT TO BEAR ON FITTING ONLY.  
7. CONCRETE TO BE 15MPa (2000psi) COMPRESSIVE STRENGTH.

# KEMP LAKE WATERWORKS DISTRICT

## STANDARD THRUST BLOCKS DETAIL

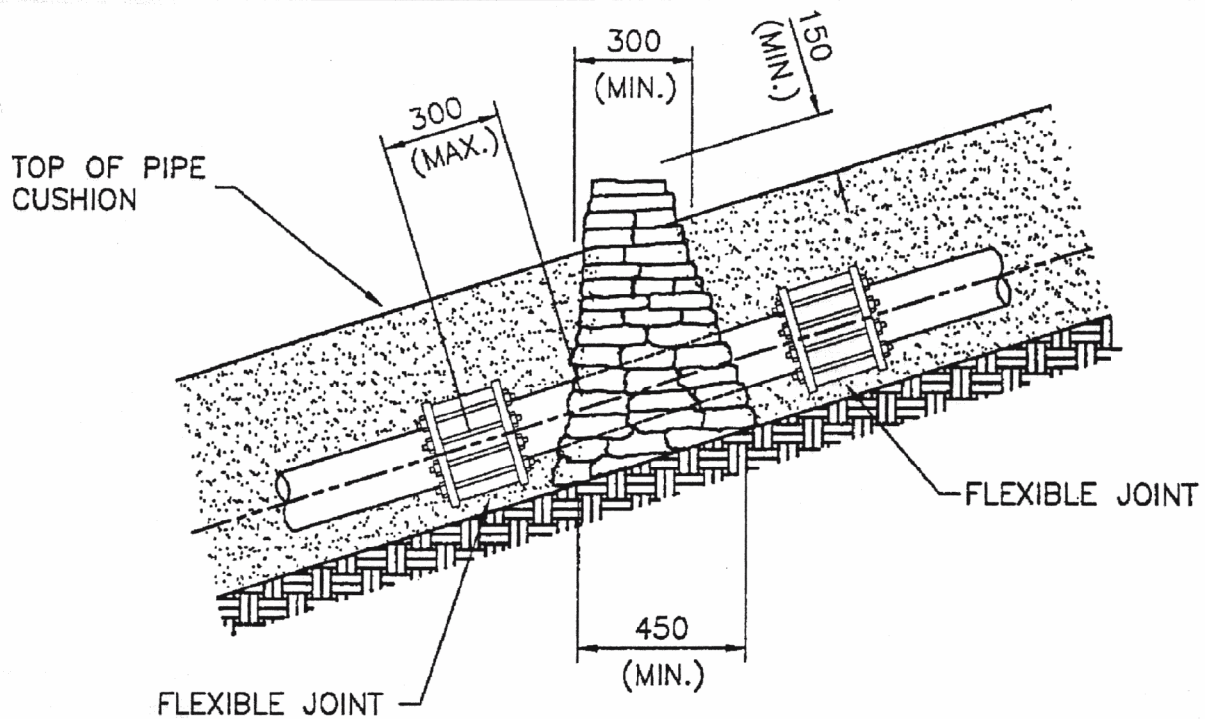
DATE: MARCH 1998

DRAWN BY:

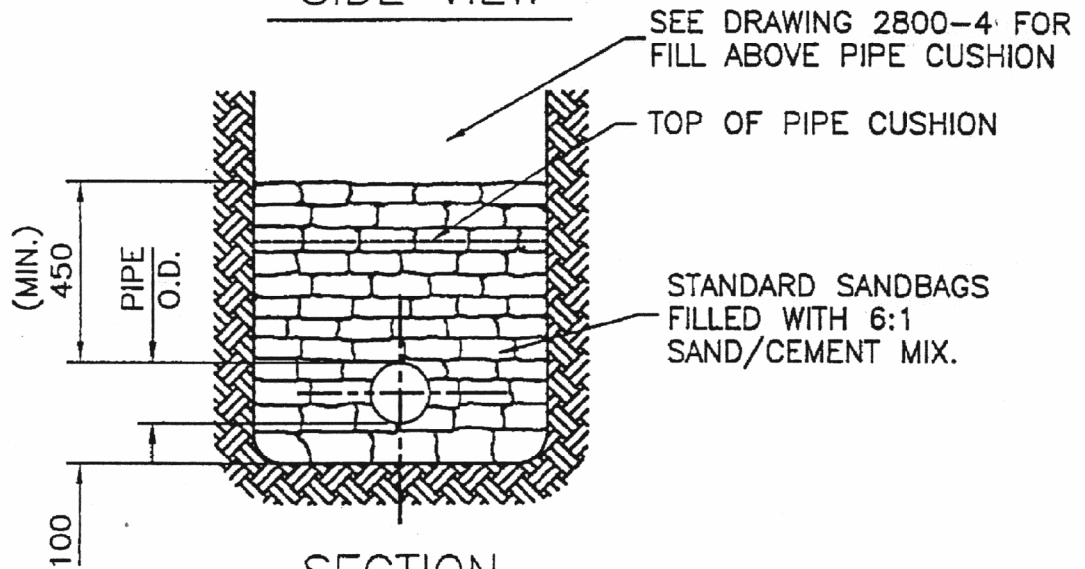
SCALE: NTS

CHECKED BY:

DWG NO.:2800-6



SIDE VIEW



SECTION

TRENCH DAMS TO BE CONSTRUCTED:

- (A) ON PIPE INSTALLATIONS WITH 10% to 15% SLOPE, NOT MORE THAN 30M APART
- (B) ON PIPE INSTALLATIONS WITH 15% to 30% SLOPE, NOT MORE THAN 15M APART
- (C) AS DIRECTED BY THE ENGINEER ON SITE

WHERE PIPE INSTALLATION EXCEEDS 30% REFER, TO DRAWING 2800-8

# KEMP LAKE WATERWORKS DISTRICT

## STANDARD TRENCH DAM FOR SLOPES TO 30 %

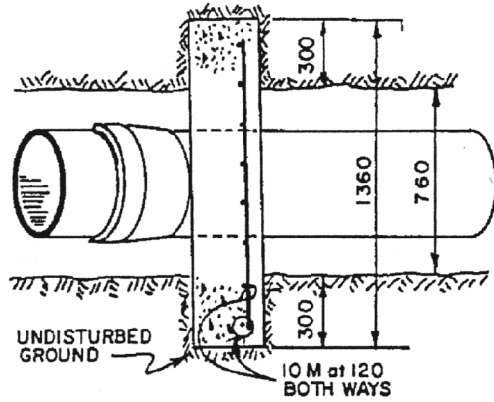
DATE: MARCH 1998

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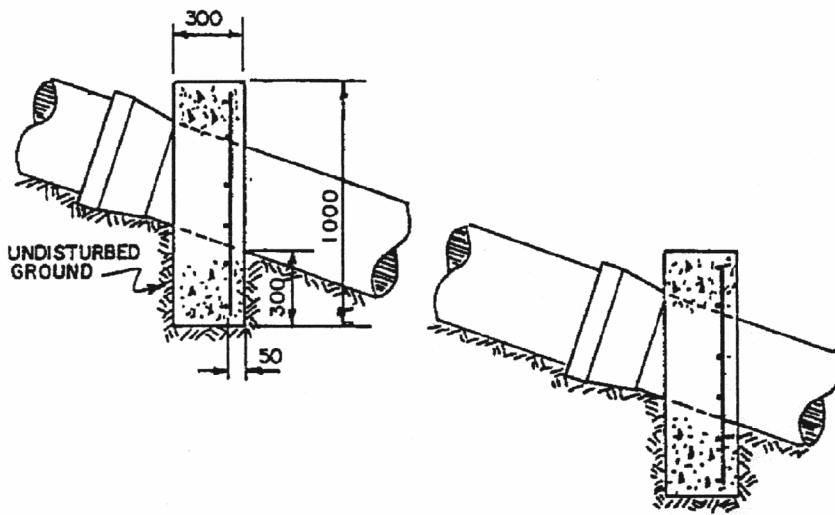
SCALE: NTS

CHECKED BY:

DWG NO.:2800-7



P L A N



S I D E V I E W

PLACE ANCHORS AT EVERY SECOND PIPE JOINT EXCEPT IN UNSTABLE GROUND WHERE ANCHORS SHALL PLACED AT EACH PIPE JOINT.

PLACE TWO PLYS 6mil POLYETHYLENE BETWEEN PIPE AND CONCRETE

CONCRETE TO HAVE A 28 DAY STRENGTH OF 20 MPa OR MORE AND A MAXIMUM SLUMP OF 75 mm

THIS TRENCH DAM FOR USE ON SLOPES GREATER THAN 30% AND PIPE SIZE NOT TO EXCEED 400mm DIA.

FOR SLOPES LESS THAN 30% SEE DRAWING 2800-7

FOR PIPES LARGER THAN 400 mm DIA. CONSULT THE ENGINEER

## KEMP LAKE WATERWORKS DISTRICT

### STANDARD TRENCH DAM FOR SLOPES OVER 30 %

DATE: MARCH 1998

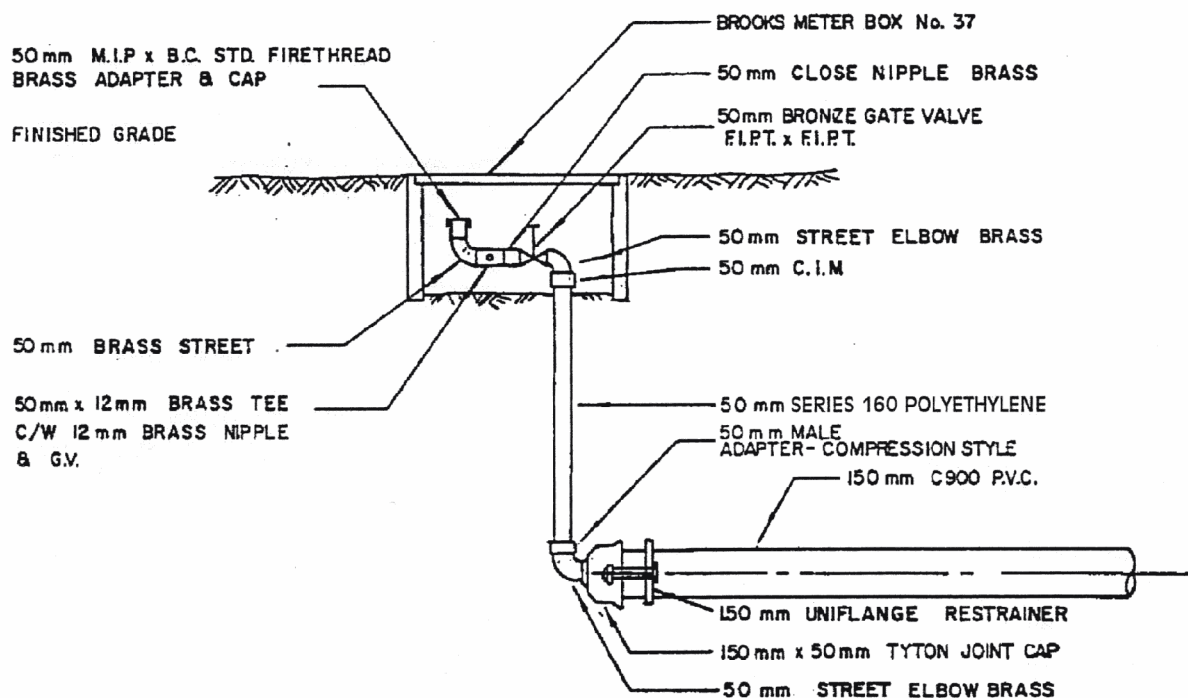
DRAWN BY:

SCALE: NTS

CHECKED BY:

DWG NO.:2800-8





# KEMP LAKE WATERWORKS DISTRICT

## STANDARD FLUSH VALVE INSTALLATION

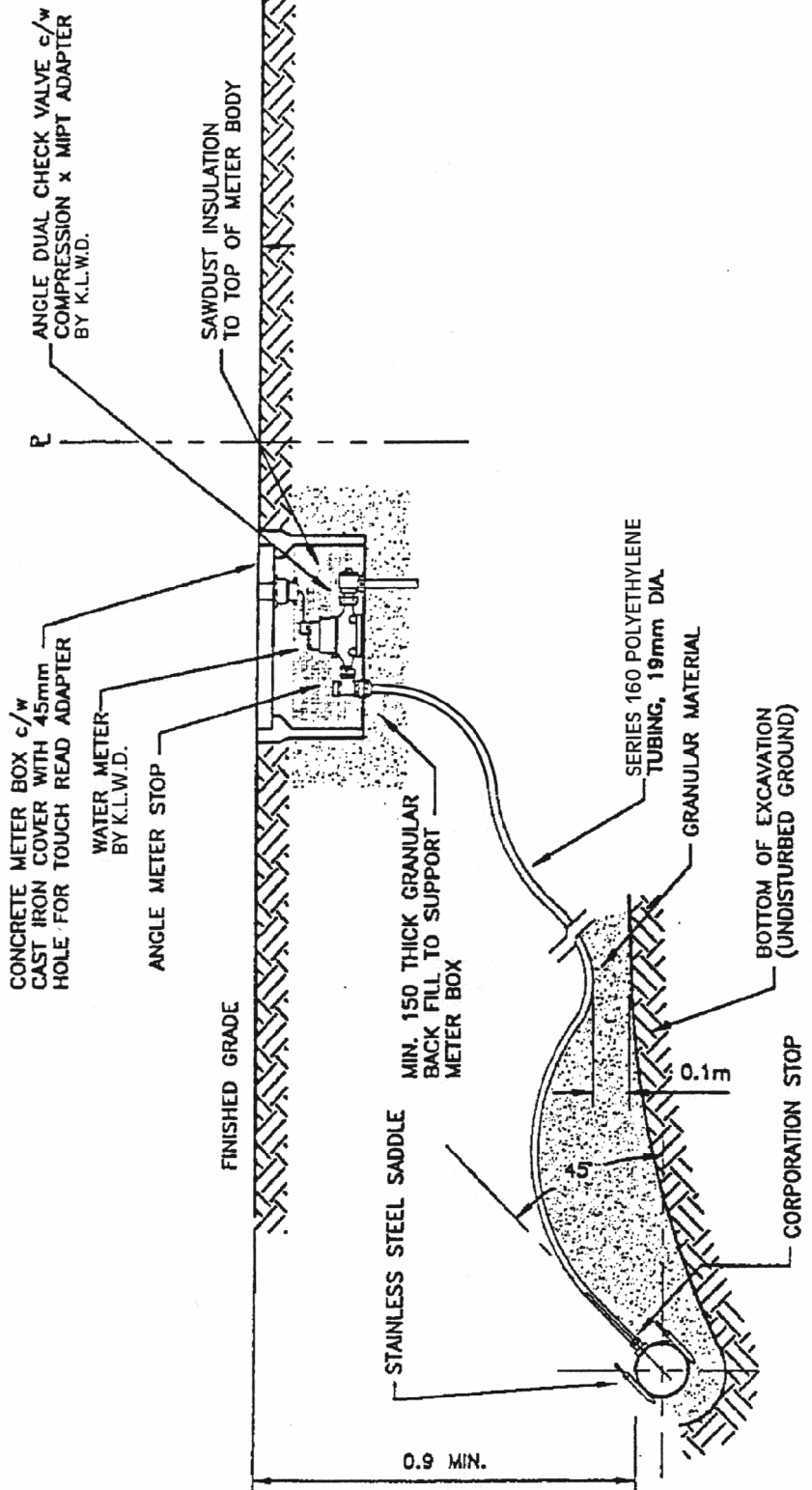
DATE: MARCH 1998

DRAWN BY:

SCALE: NTS

CHECKED BY:

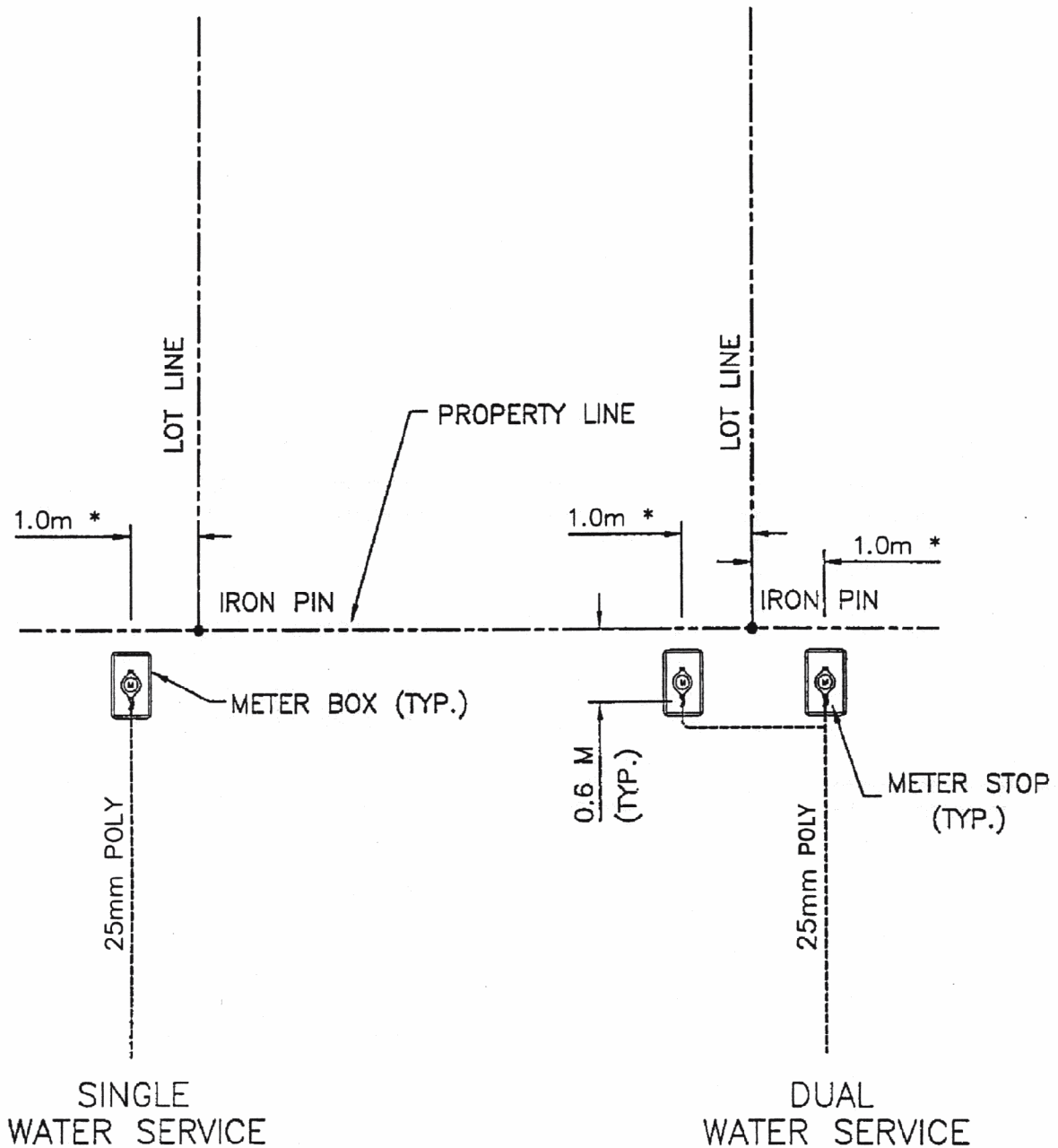
DWG NO.:2800-9



**NOTE:**  
 ALL MATERIALS MUST CONFORM TO  
 APPROVED K.L.W.D. ENGINEERING  
 SPECIFICATIONS

# KEMP LAKE WATERWORKS DISTRICT STANDARD WATER SERVICE CONNECTION

DATE: NOV. 2004	DRAWN BY:	
SCALE: NTS	CHECKED BY:	DWG NO.: 2800-10



\* SEE STD 4.02 OF W-2

# KEMP LAKE WATERWORKS DISTRICT

## STANDARD METER BOX & SERVICE LINE INSTALLATION

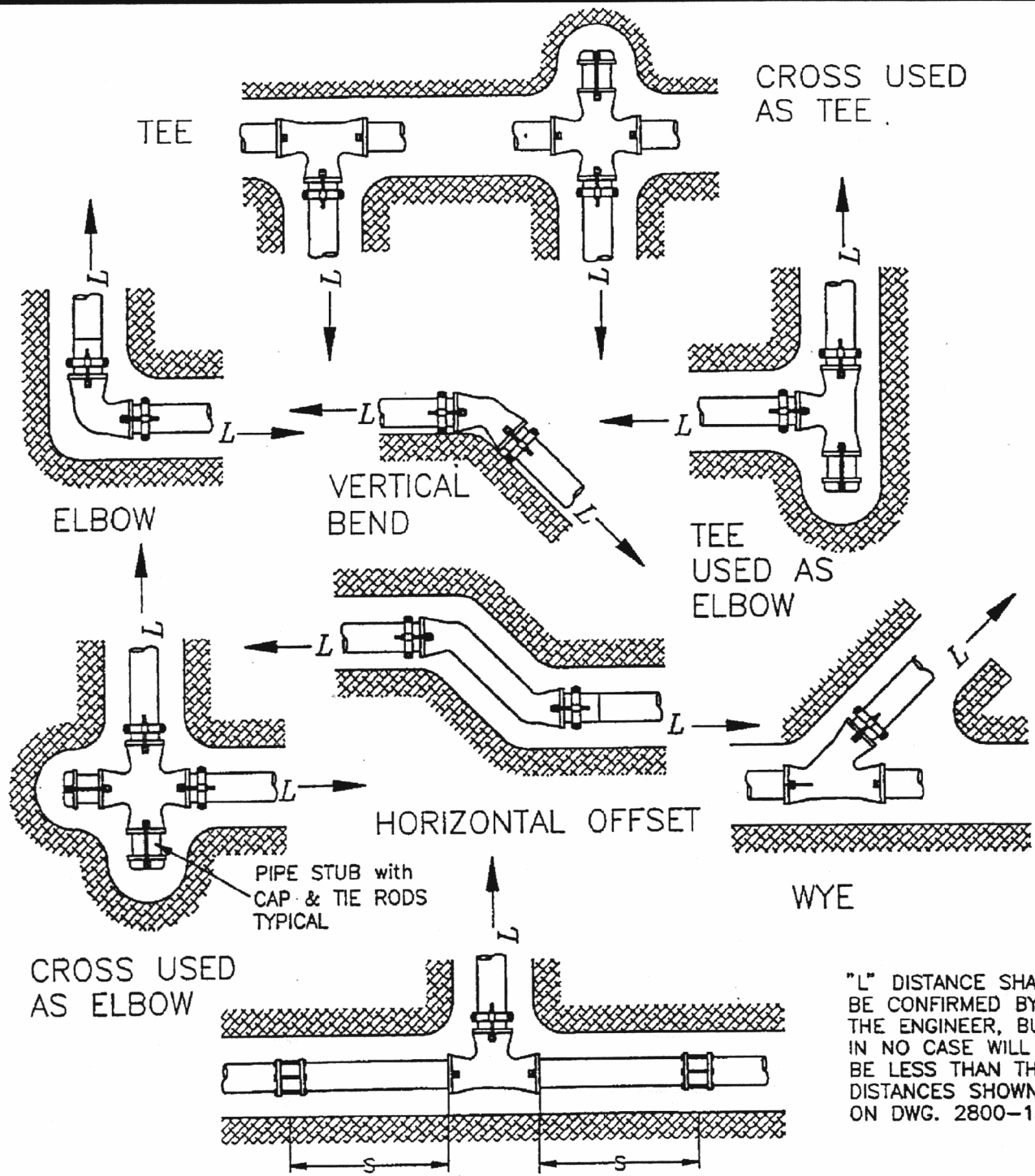
DATE: NOV. 2004

DRAWN BY:

SCALE: NTS

CHECKED BY:

DWG NO.:2800-11



SEE DWG. 2800-13 FOR "S" DISTANCE

# KEMP LAKE WATERWORKS DISTRICT

## MECHANICAL THRUST RESTRAINT APPLICATIONS

DATE: MARCH 1998

DRAWN BY:

SCALE: NTS

CHECKED BY:

DWG NO.:2800-12

## RECOMMENDED RESTRAINED LENGTHS OF PIPE

PIPE: PVC, AWWA C900, DR 18  
 DEPTH OF BURY ONE METRE  
 MAXIMUM PRESSURE 1035kPa (150 psi, includes surge allowance)  
 SAFETY FACTOR 2:1

This standard to be used in conjunction with standard drawing 2800-12. When depth of soil cover is less than 0.6m values for "L" must be increased by 30%.

When depth of soil cover is less than half pipe O.D. values for "L" must be increased by 100%.

When pipe is partially or fully exposed, all joints must be restrained.

When in doubt as to soil type depth or configuration, use next longest value of L.

$L$  = LENGTH OF RESTRAINED PIPE (in metres)

NOMINAL PIPE SIZE (mm)	SILT/SAND					WET CLAY					HARD PAN				
	ELBOWS				VALVE TEE END	ELBOWS				VALVE TEE END	ELBOWS				VALVE TEE END
	11	22	45	90		11	22	45	90		11	22	45	90	
100	.3	.3	1.8	4.3	12.8	.3	.9	1.8	4.6	12.5	.3	.6	1.5	3.4	10.4
150	.6	1.2	2.4	5.8	17.7	.6	1.2	2.7	6.4	18.9	.6	.9	1.8	4.6	14.6
200	.6	1.5	3.0	7.6	23.5	.9	1.8	3.7	8.5	24.7	.6	1.2	2.4	6.1	19.2
250	.9	1.8	3.7	9.1	28.0	.9	2.1	4.3	10.4	29.6	.9	1.5	3.1	7.0	22.9
300	.9	2.1	4.3	10.7	32.9	1.2	2.4	4.9	12.2	34.7	.9	1.5	3.7	8.2	26.8

$L$  = RESTRAINED LENGTH FOR BRANCH OUTLET OF DROP IN TEES. (in metres)

SOIL (SILT/SAND) NOMINAL TEE SIZE	S = LENGTH OF PIPE ON EACH SIDE OF TEE (in metres)			
	S = 6.1	S = 3.0	S=1.5	S=0.3
100x100	FIRST JOINT	FIRST JOINT	.3	6.4
150x150	FIRST JOINT	FIRST JOINT	3.4	9.8
200x200	FIRST JOINT	FIRST JOINT	7.0	13.4
250x250	FIRST JOINT	1.5	9.8	16.2
300x300	FIRST JOINT	4.6	12.8	19.5

## KEMP LAKE WATERWORKS DISTRICT

### THRUST RESTRAINT LENGTH / SOIL TYPE

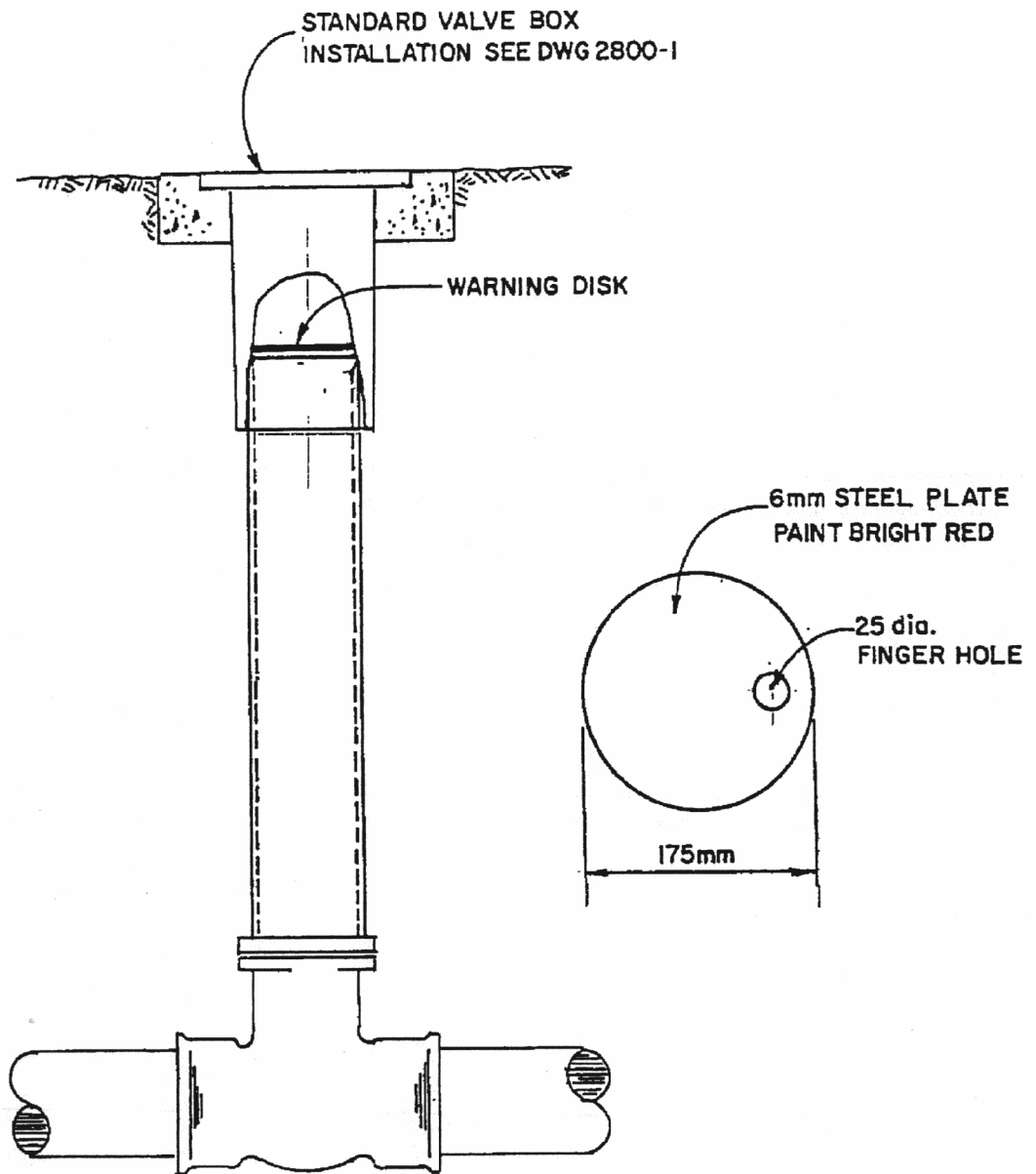
DATE: MARCH 1998

DRAWN BY:

SCALE: NTS

CHECKED BY:

DWG NO.: 2800-13



WARNING DISK TO BE PLACED IN VALVE BOXES OF CLOSED VALVES  
AT PRESSURE ZONE BOUNDARIES

## KEMP LAKE WATERWORKS DISTRICT

### VALVE BOX WARNING DISK

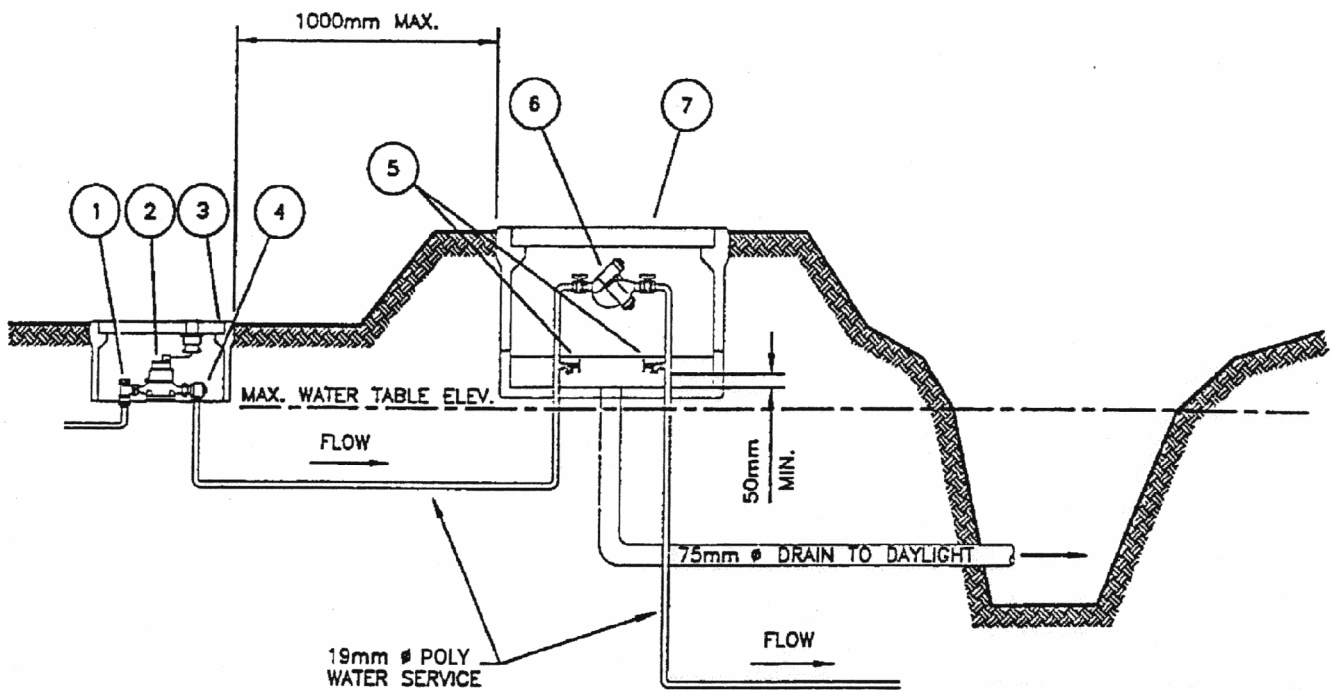
DATE: MARCH 1998

DRAWN BY:

SCALE: NTS

CHECKED BY:

DWG NO.:2800-14



**NOTES:**

1. INSTALLATION IS FOR A 19mm FEBCO MODEL 825Y REDUCED PRESSURE BACKFLOW PREVENTER. DIMENSIONS & CLEARANCES MAY VARY WITH DIFFERENT MANUFACTURES. INSTALLATION CLEARANCES MUST BE IN ACCORDANCE WITH THE MANUFACTURES RECOMMENDATIONS.
2. BOX MUST BE INSTALLED SUCH THAT ALL DRAIN VALVES ARE LOCATED A MINIMUM OF 50mm ABOVE MAXIMUM WATER TABLE.
3. INSTALLATION MUST BE APPROVED BY LOCAL PLUMBING INSPECTOR.
4. ALL MATERIALS TO BE IN ACCORDANCE WITH CURRENT B.C. PLUMBING CODES.
5. UTILITY BOX FOR BACKFLOW PREVENTER IS A BROOKS PRODUCTS BCT 66E.

**LIST OF MATERIALS:**

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1 ANGLE METER STOP</li> <li>2 METER</li> <li>3 METER BOX</li> <li>4 DUAL CHECK VALVE c/w C.I. FITTINGS</li> </ul> | <ul style="list-style-type: none"> <li>5 12mm HOSE BIBS (REMOVE THREADS FROM UPSTREAM VALVE).</li> <li>6 REDUCED PRESSURE BACKFLOW PREVENTER (SEE NOTE 1) PROVIDE SUPPORT FOR VALVES AS NECESSARY, ELEVATE VALVES (SEE NOTE 2).</li> <li>7 UTILITY BOX No.66 TOP SECTION &amp; BASE c/w DIAMOND PLATE ALUMINUM COVER WITH 50mm RIGID INSULATION.</li> </ul> |
|--|---|

# KEMP LAKE WATERWORKS DISTRICT

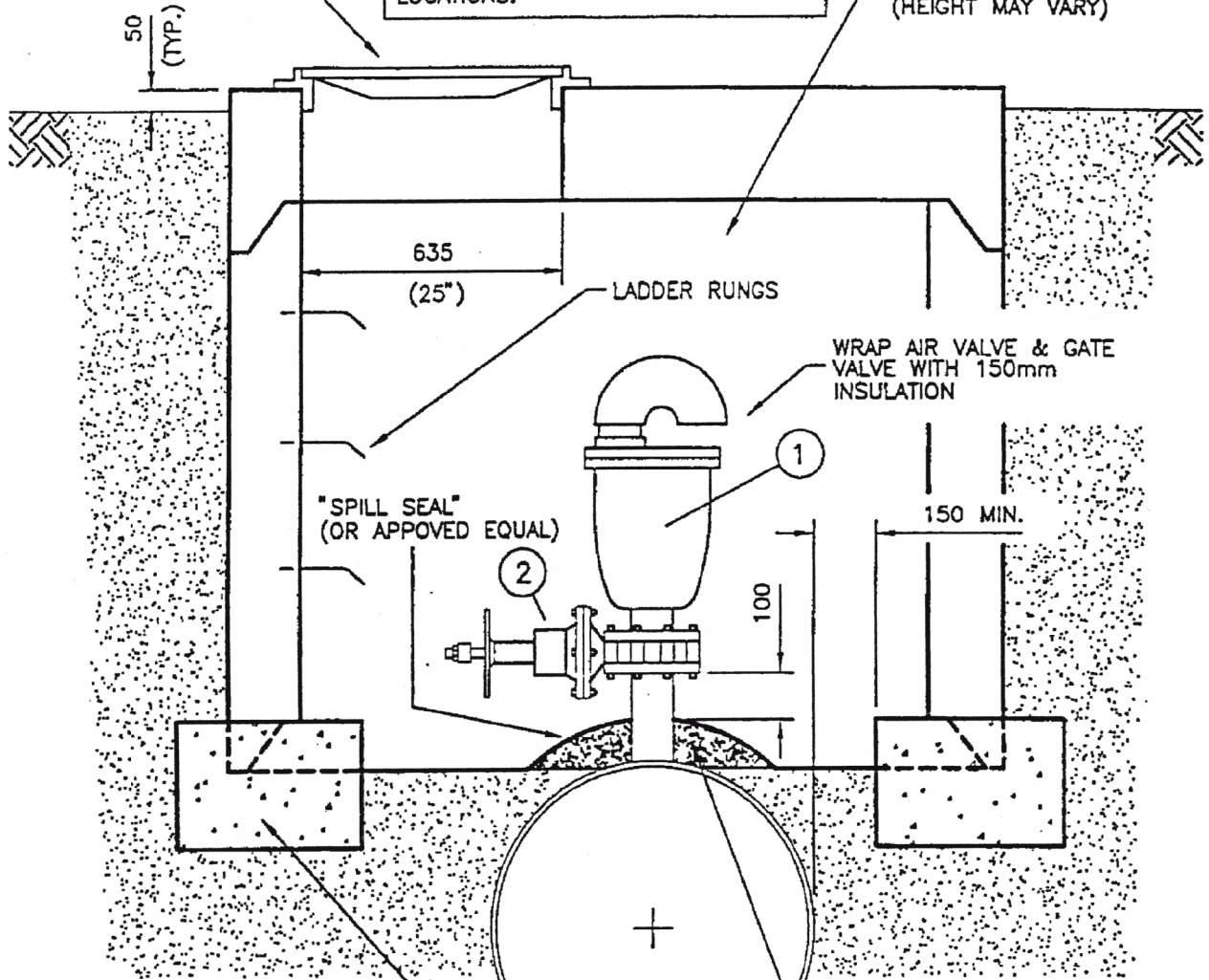
## REDUCED PRESSURE BACKFLOW PREVENTER INSTALLATION (BELOW GROUND)

DATE: MARCH 1998	DRAWN BY:	
SCALE: NTS	CHECKED BY:	DWG NO.:2800-19

FLUSH MOUNTING MANHOLE  
FRAME & COVER

1.8m x 100mm  $\phi$  SCH 40 PAINTED  
STEEL PIPE MARKER POST EMBEDDED  
0.6m IN CONCRETE, IN ISOLATED  
LOCATIONS.

1524mm  $\phi$  (60") CONCRETE  
MANHOLE BARREL c/w LID  
(HEIGHT MAY VARY)



300mm x 450mm x 1700mm  
CONCRETE FOOTING ON COMPACT  
GRANULAR BEDDING MIN. 300mm

① FOR NORMAL CLEARANCE USE :  
100mm OR 150mm  $\phi$  FLG. APCO COMBINATION  
AIR RELEASE VALVE c/w 180° RETURN (OR APPROVED EQUAL)  
FOR LOW CLEARANCE USE :  
GOLDEN ANDERSON (UPON K.L.W.D. APPROVAL)

② FOR NORMAL CLEARANCE USE :  
100mm OR 150mm  $\phi$  RESILIENT WEDGE GATE VALVE  
(OR APPROVED EQUAL)  
FOR LOW CLEARANCE USE :  
100mm OR 150mm  $\phi$  CAST S.S. FLG. KNIFE GATE  
VALVE GRINNELL MODEL GR-315 (OR APPROVED EQUAL)

TRIM MANHOLE BARREL  
OVER PIPE AS REQ'D  
TO MAINTAIN MIN. 100mm  
CLEARANCE OVER PIPE

LARGE  $\phi$  ST. WATERMAIN

# KEMP LAKE WATERWORKS DISTRICT

## STANDARD AIR VALVE INSTALLATION LARGE $\phi$ PIPE

DATE: MARCH 1998	DRAWN BY:	
SCALE: NTS	CHECKED BY:	DWG NO.:2800-24



SAMPLE POINT ENCLOSURE

SEE DRAWING No.2950

CONCRETE RESERVOIR WALL

12 $\phi$  "TYPE L" COPPER PIPE SECTION  
1250 LONG ANGLED SLIGHTLY DOWNWARD

9.5 $\phi$  x 9.5 $\phi$  150/600  
BRASS BALL VALVE x 9.5 O.D.  
COMPRESSION (USE REDUCER  
IF NECESSARY) x 7.9 O.D.  
COPPER WITH DOWN TURN.

DETAIL

9.5 $\phi$  "HILT" TYPE ANCHOR BOLT

20 $\phi$  STAINLESS STEEL PIPE COUPLING

12 $\phi$  COMPRESSION x 20 $\phi$  MALE PIPE  
THREAD FITTING, (MUELLER 110 or equal).  
FITTING TO BE REAMED OUT TO ALLOW  
12 $\phi$  COPPER PIPE TO PASS THROUGH

GASKET MATERIAL 6mm THICK

STAINLESS STEEL PLATE 6mm THICK

DRAIN RESERVOIR AND CORE 20 $\phi$  HOLE  
THROUGH WALL

PLATE

300 x 300 STAINLESS STEEL PLATE 6mm THICK  
BORE 20 $\phi$  HOLE IN CENTER AND WELD 20 $\phi$   
STAINLESS STEEL PIPE COUPLING CENTERED OVER  
HOLE.

BORE 12 $\phi$  HOLES AS SHOWN AT CORNERS  
FOR ANCHOR BOLTS

# KEMP LAKE WATERWORKS DISTRICT

## TYPICAL RESERVOIR SAMPLING STATION

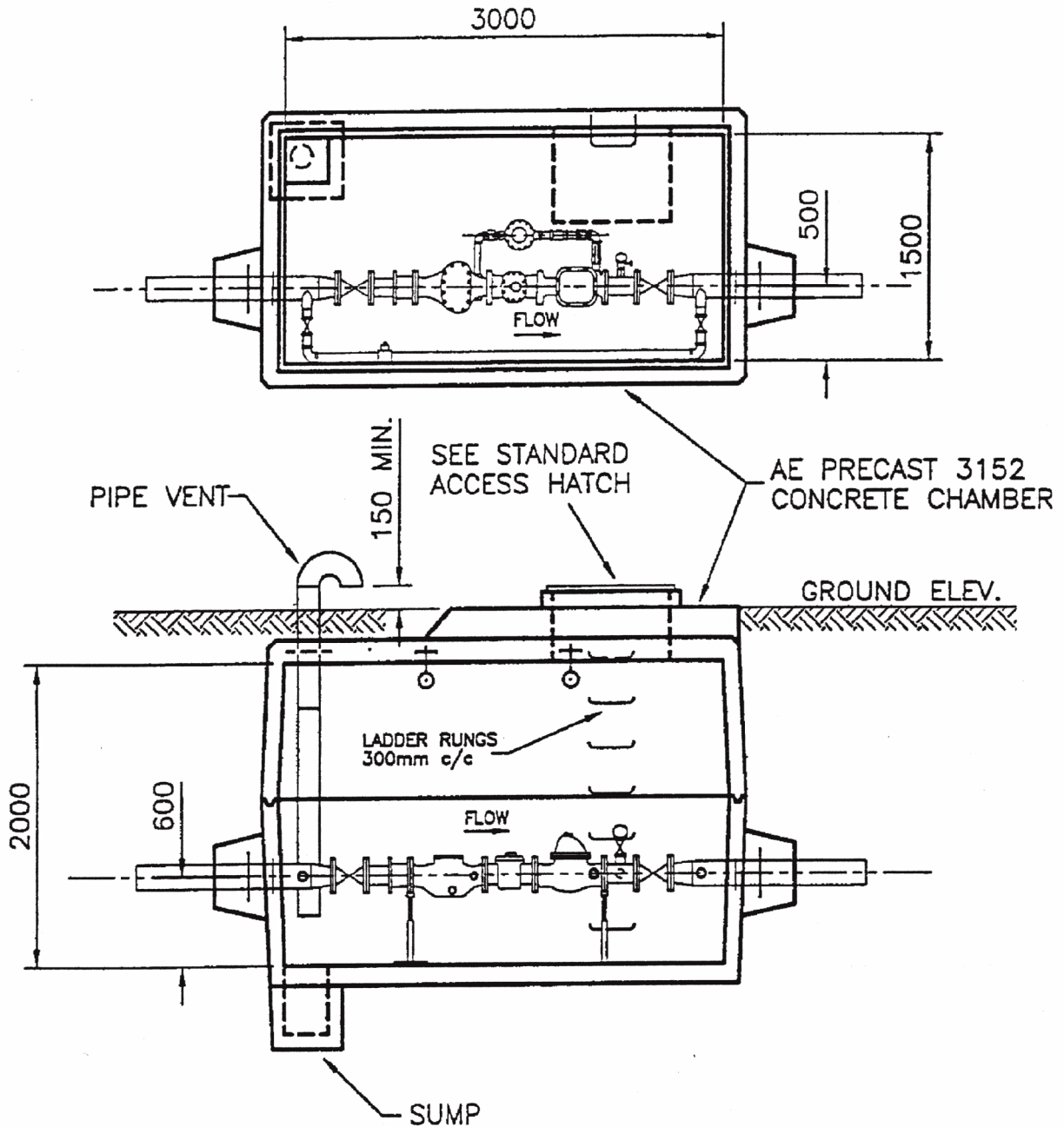
DATE: MARCH 1998

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SCALE: NTS

CHECKED BY:

DWG NO.:2800-29



# KEMP LAKE WATERWORKS DISTRICT

## PRECAST 100mm SENSUS FIRELINE METER VAULT

DATE: MARCH 1998

DRAWN BY:

SCALE: NTS

CHECKED BY:

DWG NO.:2800-31