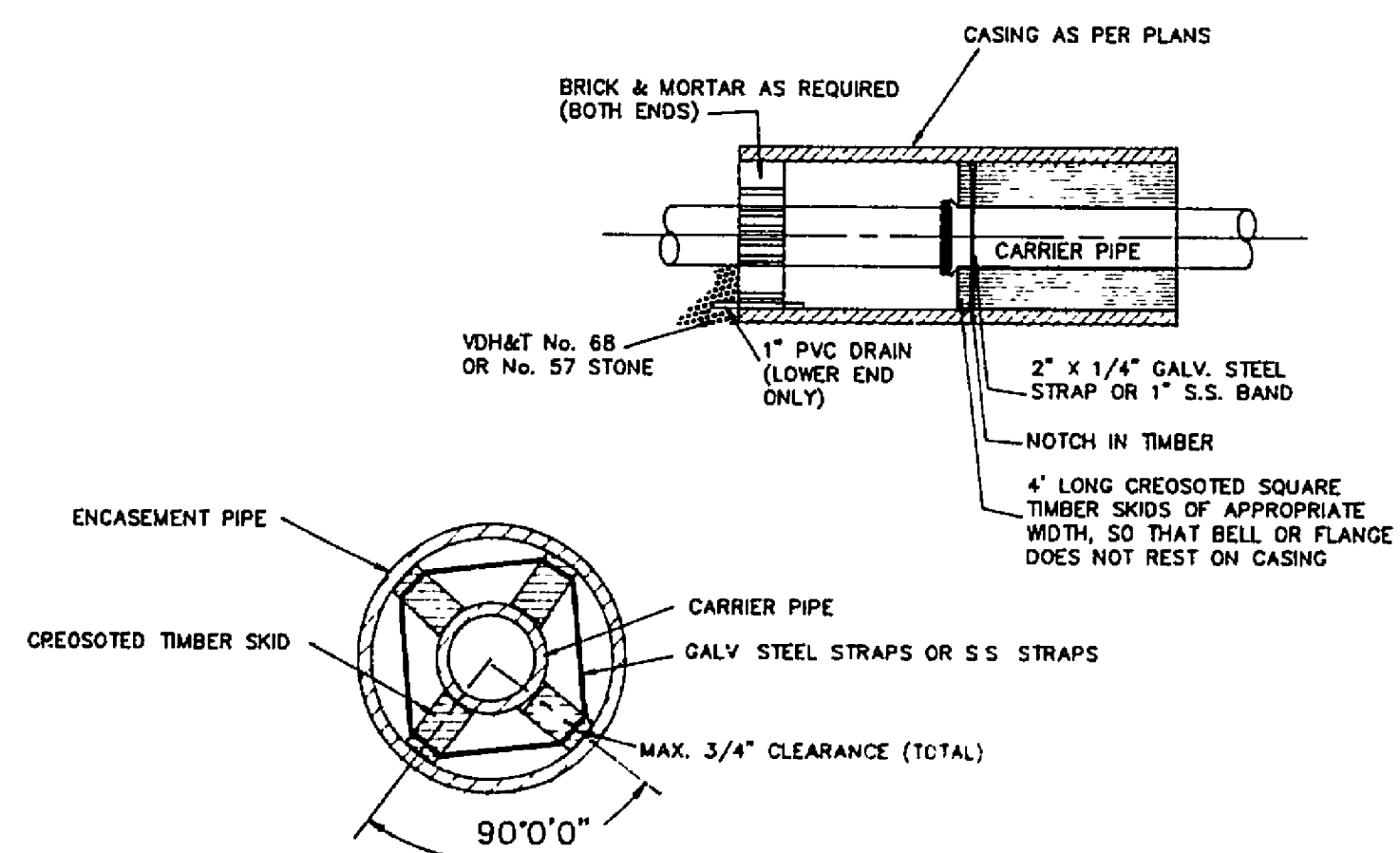


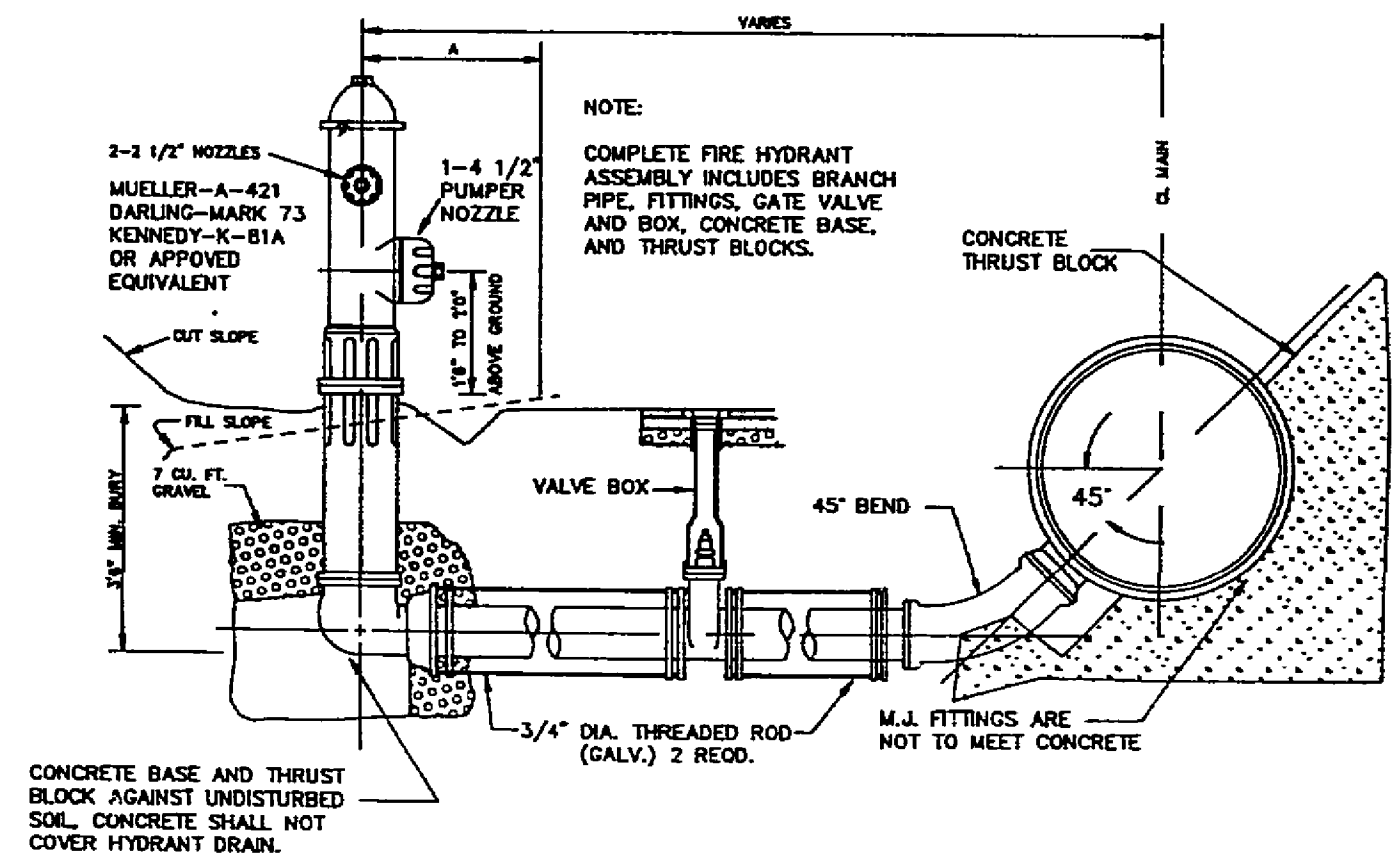
ALTERNATE VALVE VAULT (MANHOLE)



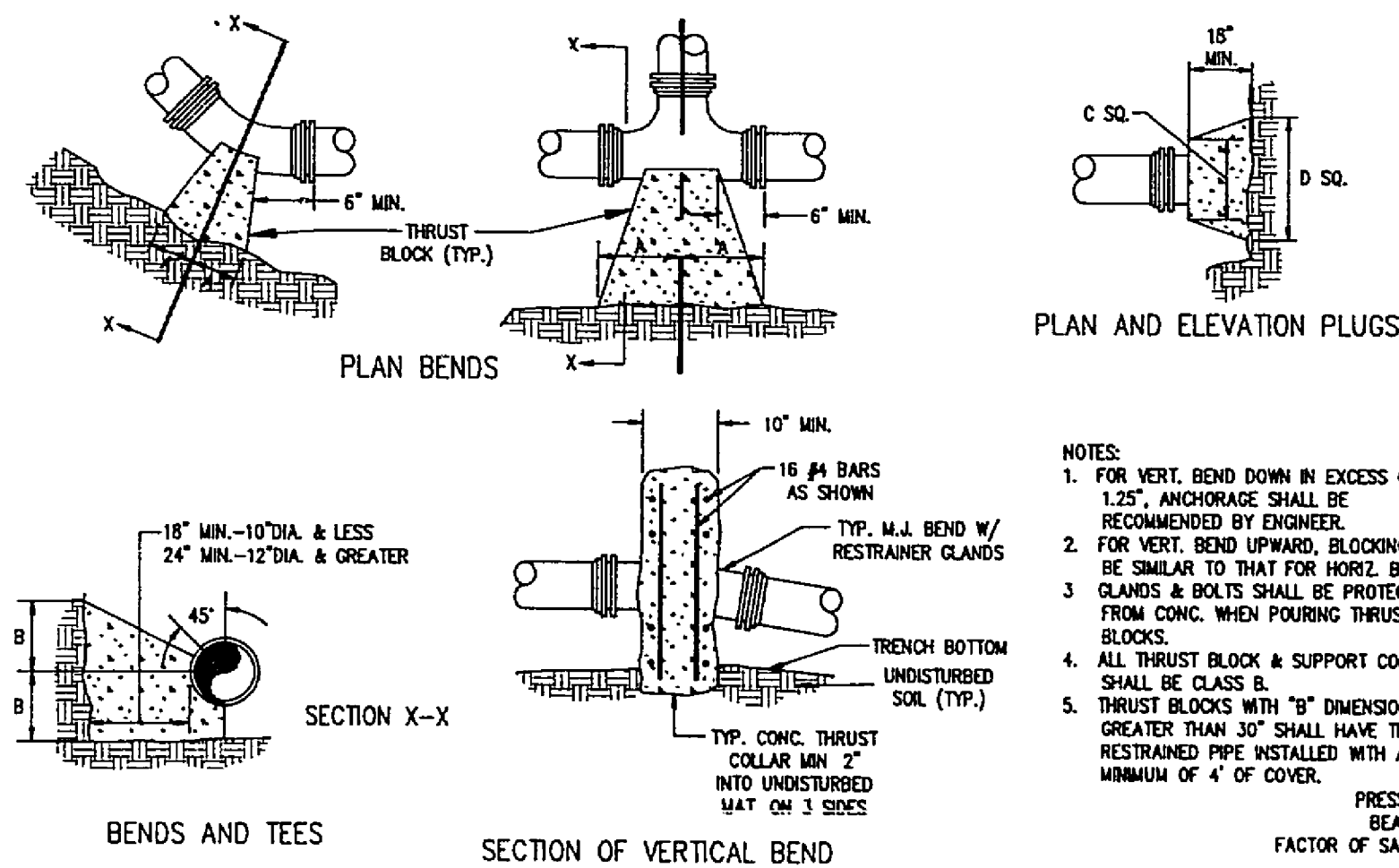
FOR DUCTILE IRON PIPE, SOAP-BASED LUBRICANT MAY BE USED TO EASE SLOWING OF SKID. FOR PVC PIPE, FLAX SOAP OR DRILLING MUD SHOULD BE UTILIZED FOR LUBRICATION.

PIPE SUPPORT IN CASING PIPE

- NOTES:
- (1) MAIN BODY OF HYDRANT MUST BE SILVER AND HAVE RED CAPS AND BONNET.
  - (2) DISTANCE "A" WITH CURB AND GUTTER, 2' MIN., 4' MAX. FROM BACK OF CURB.
  - (3) DISTANCE "A" WITHOUT CURB AND GUTTER, 6' MIN., 12' MAX. FROM EDGE OF PAVEMENT.
  - (4) AREA AROUND HYDRANT AT A RADIUS OF 4' TO BE APPROXIMATELY LEVEL AND UNOBSTRUCTED FOR ROAD CONSTRUCTION.



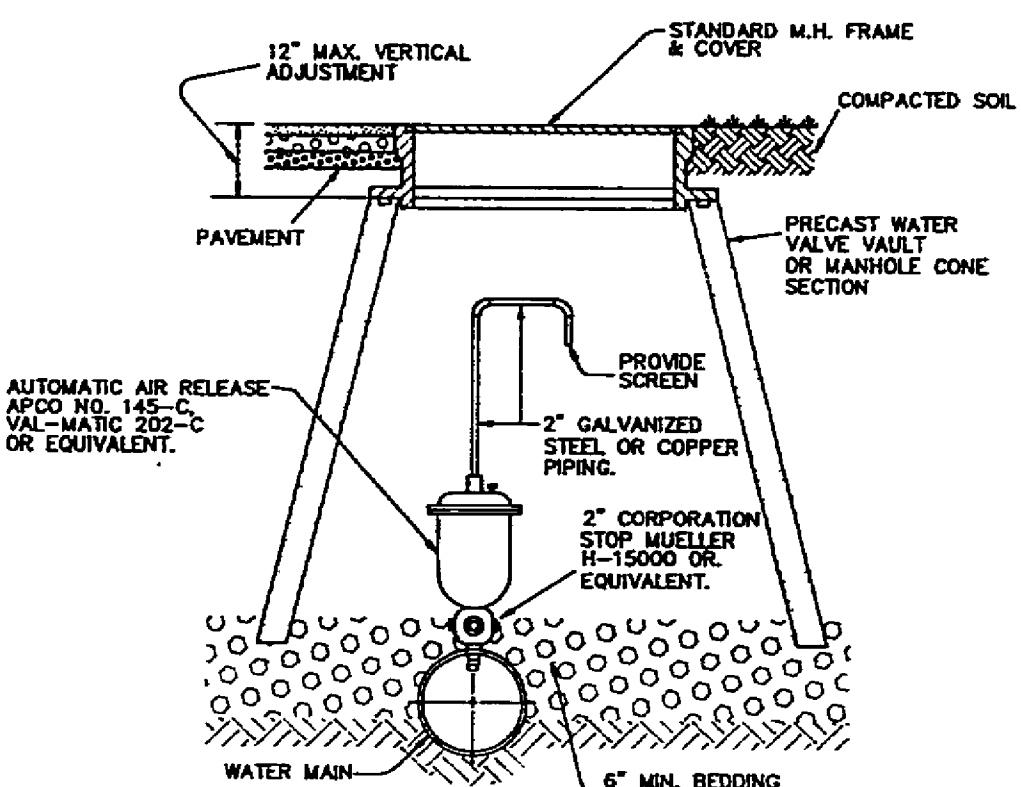
BLOW OFF ASSEMBLY



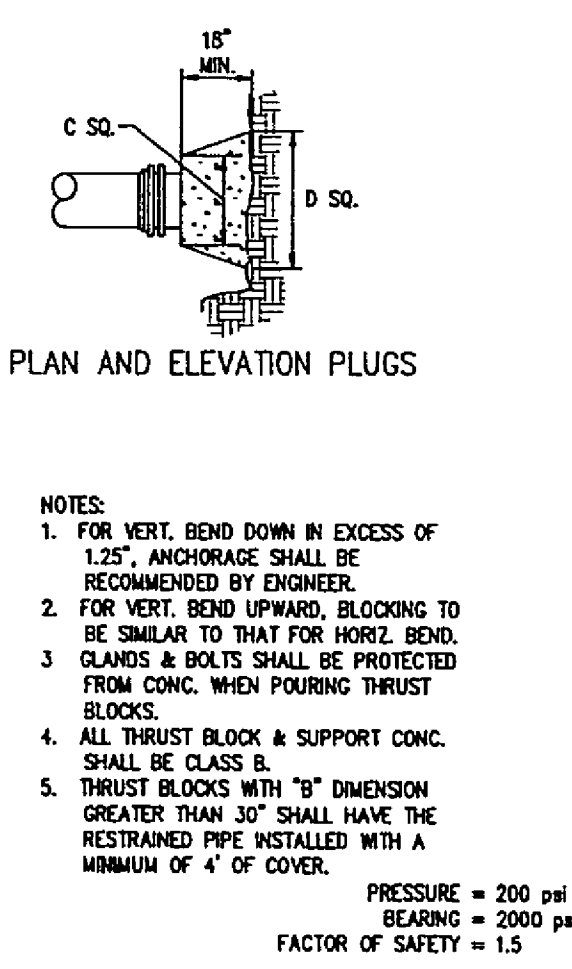
PIPE SIZE	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	TEE	PLUG
4"	8"	8"	8"	8"	11"	10"
6"	12"	12"	12"	12"	15"	14"
8"	16"	16"	16"	16"	19"	18"
10"	20"	20"	20"	20"	23"	22"
12"	24"	24"	24"	24"	27"	26"
14"	28"	28"	28"	28"	31"	30"
16"	32"	32"	32"	32"	35"	34"
18"	36"	36"	36"	36"	39"	38"
20"	40"	40"	40"	40"	43"	42"
22"	44"	44"	44"	44"	47"	46"
24"	48"	48"	48"	48"	51"	50"
26"	52"	52"	52"	52"	55"	54"
28"	56"	56"	56"	56"	59"	58"
30"	60"	60"	60"	60"	63"	62"

THRUST BLOCK CONSTRUCTION

- VAULT AND WATER STANDARDS FOR CONSTRUCTION
1. VAULTS, MANHOLE BASES, RISERS, TAPERS AND GRADE RINGS SHALL BE PRECAST REINFORCED CONCRETE MANUFACTURED IN ACCORDANCE WITH VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, SECTION 503.
  2. MANHOLE BASE AND RISER SECTIONS CONSTRUCTION SHALL BE VERTICAL WITH MAXIMUM 1" IN 4' TILT.
  3. A MAXIMUM OF 2 CONSTRUCTION GRADE RINGS OR MAXIMUM OF 1' OF GRADE RINGS AND FRAME AND COVER ADJUSTMENT ARE ALLOWABLE.
  4. FINAL ADJUSTMENT OF FRAME AND COVER SHALL BE IN ACCORDANCE TO FRAME AND COVER ADJUSTMENT DETAIL USING NON SHRINK CONCRETE WITH MAXIMUM OF 4 BRICKS OR CONCRETE BLOCKS FOR GRADE CONTROL. FRAME AND COVER ARE TO BE SET AT FINISH GRADE OR 1/4" ABOVE FINISH GRADE IN PAVEMENT AND YARD AREAS AND MINIMUM 6" ABOVE FINISH GRADE IN OTHER AREAS. MANHOLE FRAMES AND COVERS ARE NOT TO BE SET IN DRAINAGE SWALE, VALLEY CUTTER, ETC.
  5. JOINTS AND OPENINGS IN MANHOLE UNITS SHALL BE MADE WATER TIGHT BY USING BUTYL SEALANTS, "O" RING GASKETS OR MASTIC. THE CONCRETE SURFACE SHALL BE CLEANED PRIOR TO USE OF SEALANT.
  6. FRAME AND COVERS
    - A) DEWEY BROTHERS INC. MH - RCR - 58
    - B) APPROVED EQUAL.
  7. ALL LIFT HOLES, OPENINGS AROUND PIPE, ETC. SHALL BE FILLED FROM INSIDE AND OUTSIDE TO THICKNESS OF STRUCTURE.
  8. ALL UNITS USED IN MANHOLE AND VAULT CONSTRUCTION SHALL BE SECURELY CONNECTED BY INTERLOCKING BETWEEN UNITS, CONCRETE COLLARS OR OTHER APPROVED METHODS.
  9. AREA AROUND METER BOX AT A RADIUS OF 4' TO BE ON FINISH GRADE AND UNOBSTRUCTED EXCEPT FOR ROAD CONSTRUCTION.



AUTOMATIC AIR RELEASE ASSEMBLY

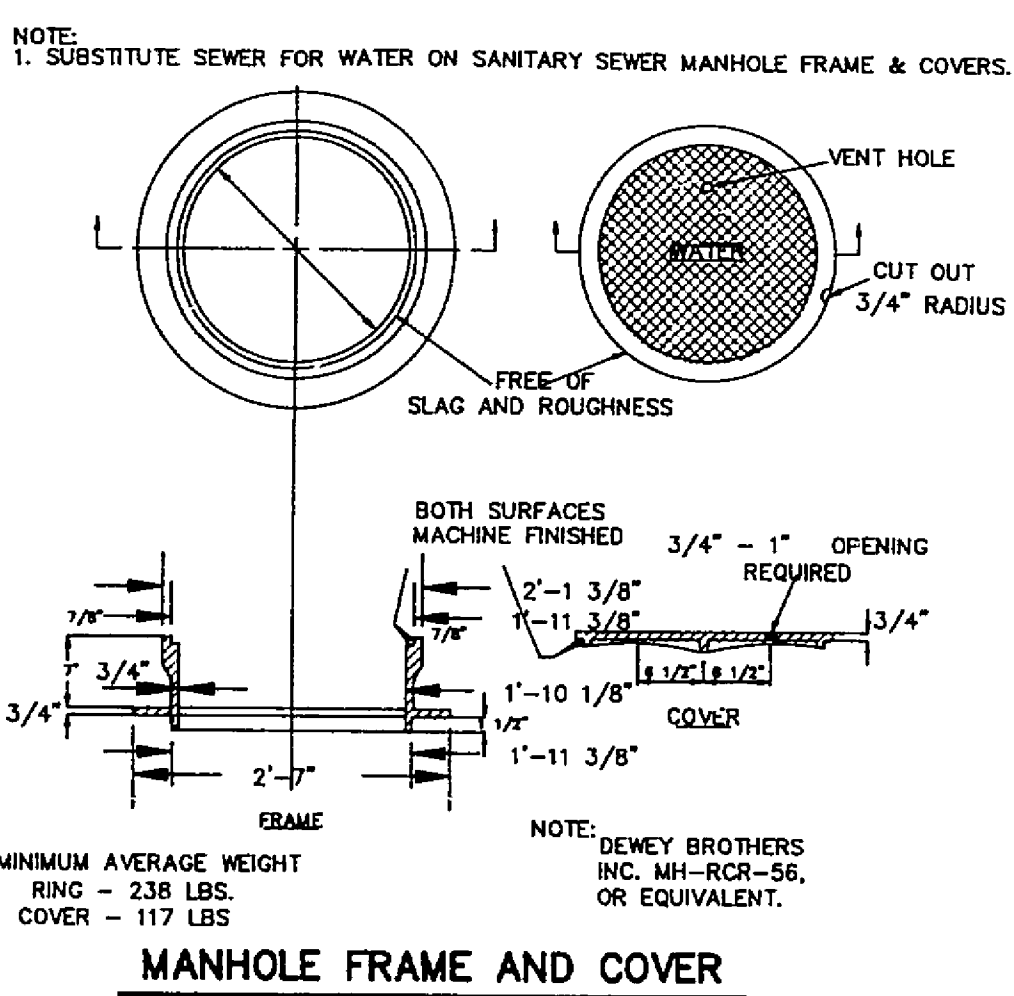
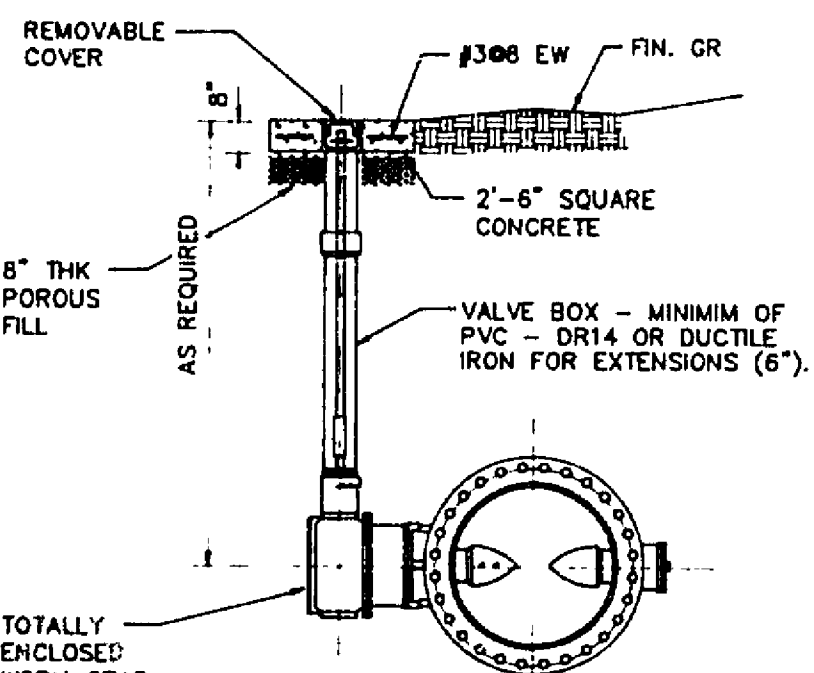


NOTES:

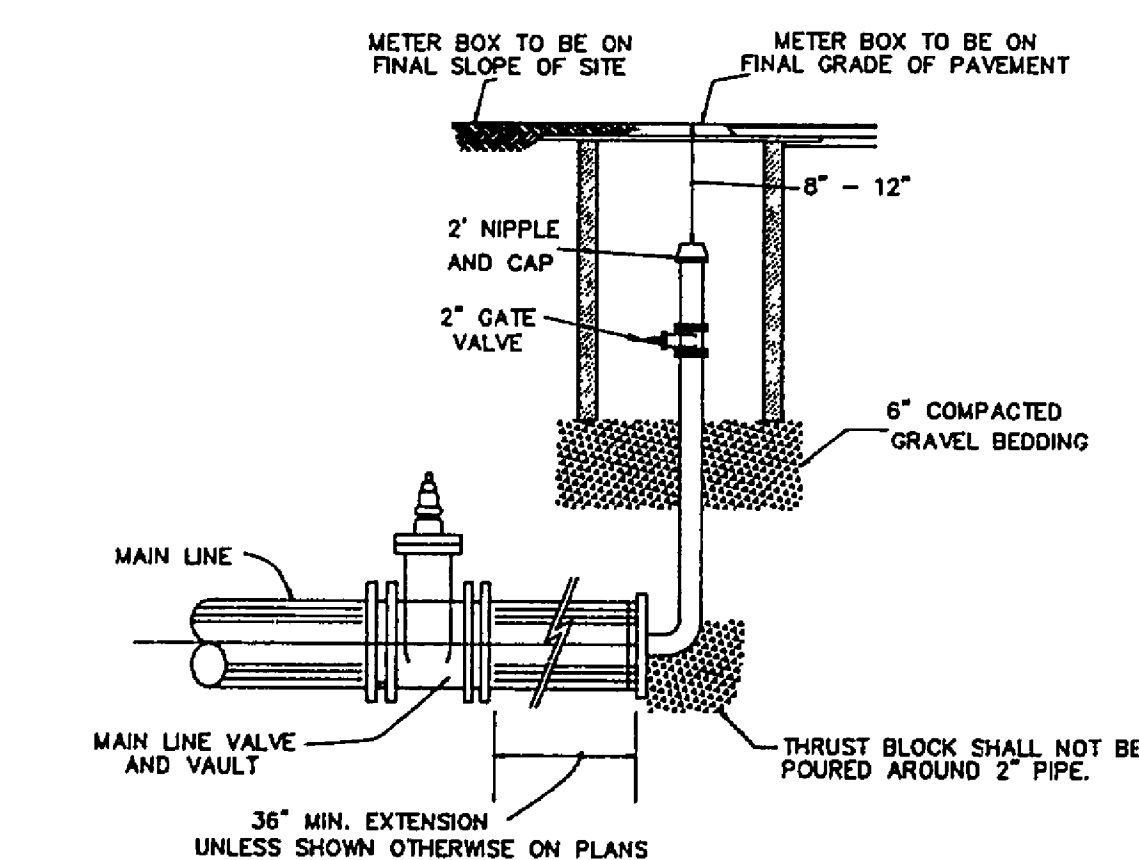
1. FOR VERT. BEND DOWN IN EXCESS OF 125', ANCHORAGE SHALL BE RECOMMENDED BY ENGINEER.
2. FOR VERT. BEND UPWARD, BLOCKING TO BE SIMILAR TO THAT FOR HORIZ. BEND.
3. CLAMPS & BOLTS SHALL BE PROTECTED FROM CONC. WHEN POURING THRUST BLOCKS.
4. ALL THRUST BLOCK & SUPPORT CONC. SHALL BE CLASS B.
5. THRUST BLOCKS WITH "B" DIMENSION GREATER THAN 30" SHALL HAVE THE RESTRAINED PIPE INSTALLED WITH A MINIMUM OF 4' OF COVER.

PRESSURE = 200 psi  
LEAKAGE = 2000 psi  
FACTOR OF SAFETY = 1.5

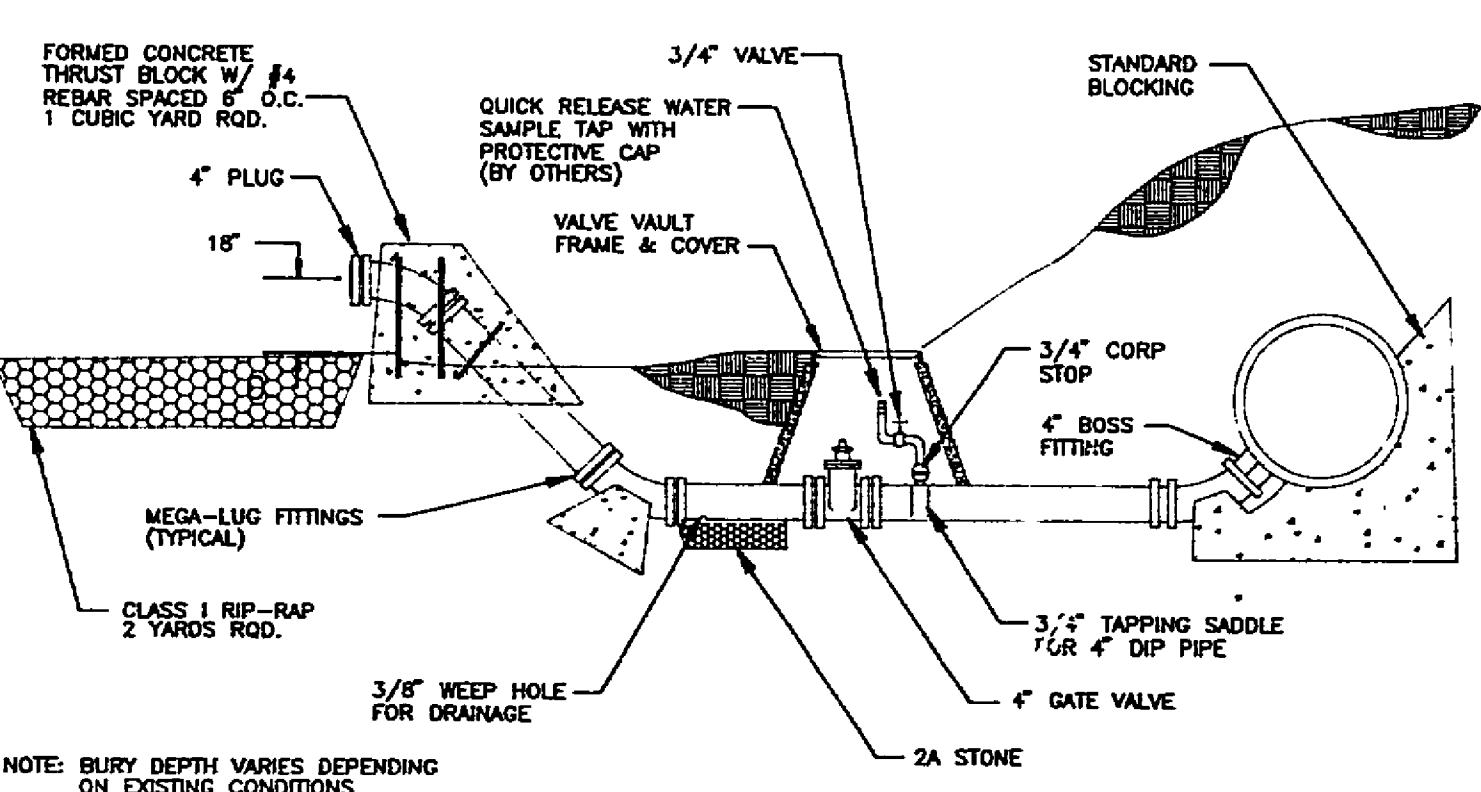
BURIED BUTTERFLY VALVE (BFV)



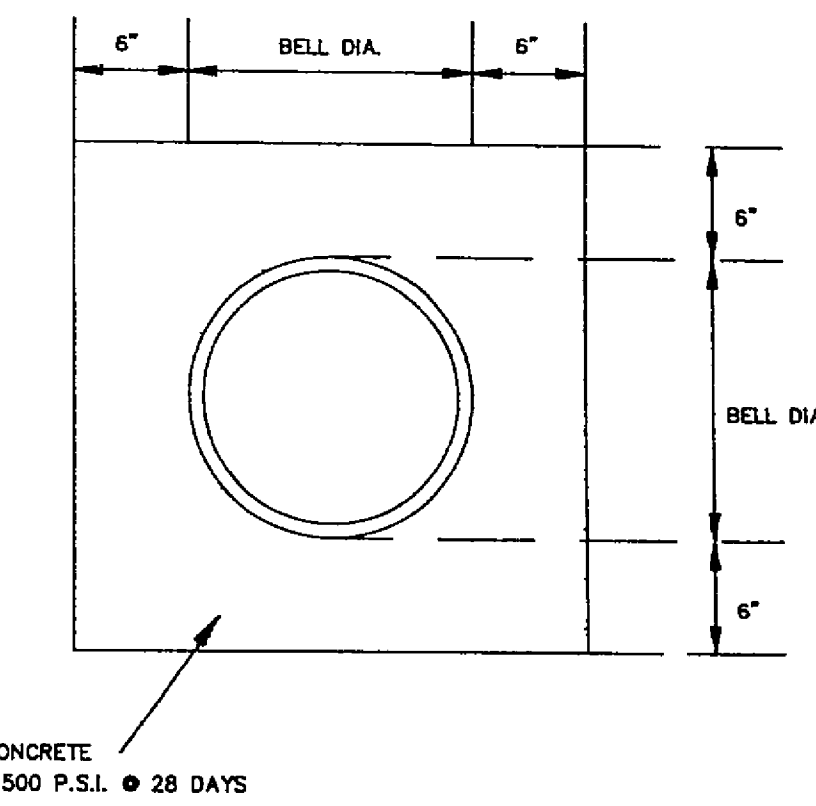
MANHOLE FRAME AND COVER



BLOW OFF ASSEMBLY

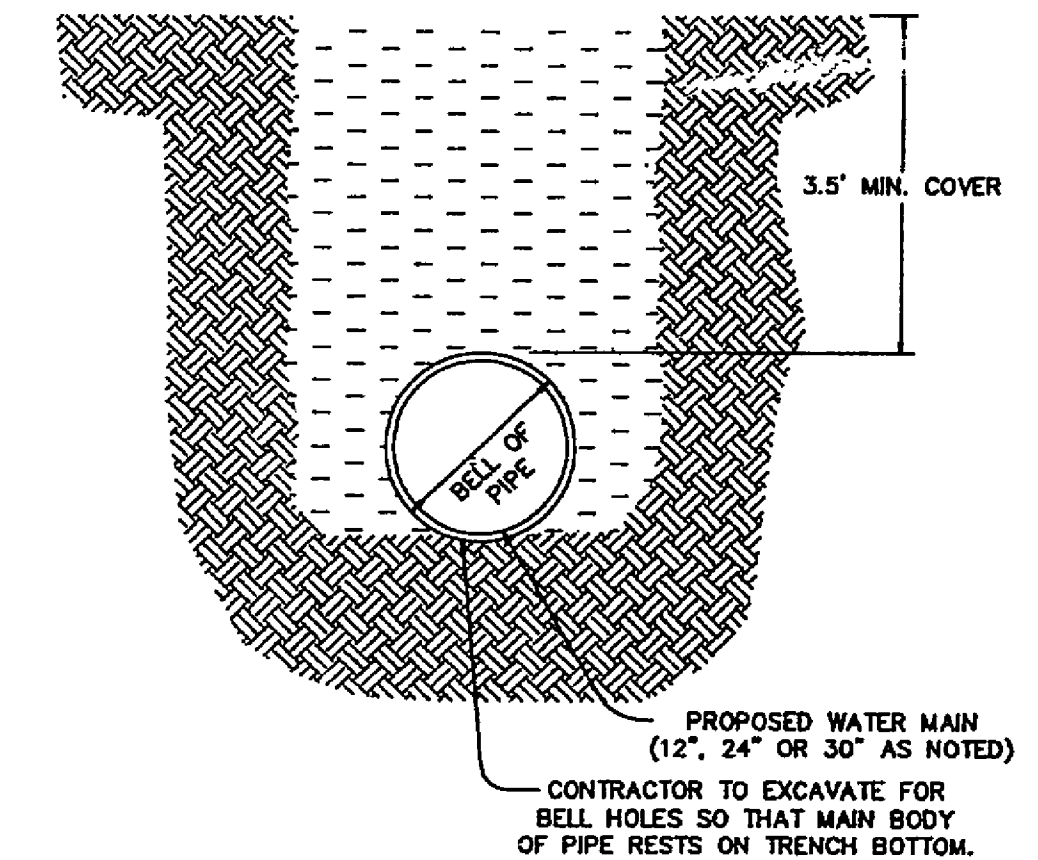


FLUSH TYPE BLOW OFF



CONCRETE ENCASED PIPE

- APPROVED MATERIALS
1. METER BOXES
    - A) FORD IRONCRETE METER BOX WITH NO. 2 IRONCRETE TOP OR APPROVED EQUAL.
    - B) SOUTHEASTERN DISTRIBUTOR MODEL MD-5 PLASTIC BOX WITH FORD OR CHARLOTTE MODEL C-32 CAST IRON BASE AND COVER (NOT APPROVED FOR ROADWAY AREA).
    - C) APPROVED EQUAL.
  2. METER SETTER (INCLUDING INLET RISER VALVE AND DOUBLE CHECK VALVE ON OUTLET)
    - A) FORD 700H 72-15-WO.
    - B) APPROVED EQUAL.
  3. METER SETTER EXTENDER OR RISER
    - A) NOT ALLOWED UNLESS APPROVED BY THE UTILITY DIRECTOR.
  4. CORPORATION STOP
    - A) MUELLER MODEL H-1500
    - B) FORD MODEL F-600
    - C) APPROVED EQUAL.
  5. U-BRANCH
    - A) FORD MODEL U28-43
    - B) MUELLER MODEL H 15362
    - C) APPROVED EQUAL.
  6. SERVICE SADDLES (FOR PVC PIPE)
    - A) FORD MODEL FS 202 AND FC 202 WITH STAINLESS STEEL BAND AND BOLTS.
    - B) APPROVED EQUAL.



WATER MAIN INSTALLATION

REVISION	DATE	DESCRIPTION
DESIGNED - GLR		WATER DETAILS FOR PHASE 7 SOUTH LOOP TRANSMISSION MAIN
DRAWN - MDH		PREPARED FOR ROANOKE COUNTY UTILITY DEPARTMENT
CHECKED - MSW		CAVE SPRING, WINDSOR HILLS, & CATAWBA MAGISTERIAL DISTRICTS ROANOKE COUNTY, VIRGINIA
LUMSDEN ASSOCIATES, P.C. ENGINEERS-SURVEYORS-PLANNERS ROANOKE, VIRGINIA		SCALE: NONE COMM: 91-376
DATE: 4/20/95		SHEET 10 of 11

