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<td>W3</td>
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<td>W13</td>
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<td>W14A</td>
<td>THRUST BLOCK</td>
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<td>W14B</td>
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<td>W15</td>
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<td>W18</td>
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<td>W20</td>
<td>FIRE HYDRANT GUARDS</td>
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<td>W21</td>
<td>TAPPING TEE AND VALVE</td>
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<tr>
<td>W22</td>
<td>DOMESTIC WATER TAPPING DETAIL</td>
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<tr>
<td>W23</td>
<td>CONCRETE ENCASEMENT DETAIL</td>
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<td>W24</td>
<td>CASING PIPE DETAIL</td>
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<td>W25</td>
<td>CROSSING STORM AND SANITARY SEWERS</td>
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<tr>
<td>W26</td>
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<td>W27</td>
<td>12” OR SMALLER WATERLINE LOWERING FOR UTILITY CROSSINGS</td>
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<tr>
<td>W28</td>
<td>STEEL MARKER POST</td>
</tr>
<tr>
<td>W29</td>
<td>FIBERGLASS MARKER POST</td>
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<tr>
<td>W30</td>
<td>TYPICAL CUTOFF WALL FOR DITCH CROSSING</td>
</tr>
<tr>
<td>W31</td>
<td>2” AND LARGER DOMESTIC AND FIRELINE CONNECTIONS</td>
</tr>
<tr>
<td>W32A</td>
<td>TRACER WIRE (1 OF 2)</td>
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<tr>
<td>W32B</td>
<td>TRACER WIRE (2 OF 2)</td>
</tr>
<tr>
<td>W33</td>
<td>CONCRETE METER SUPPORTS</td>
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<tr>
<td>W34</td>
<td>PLASTIC STEP</td>
</tr>
<tr>
<td>W35</td>
<td>WATER TRENCH DETAIL</td>
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<tr>
<td>W36</td>
<td>PIPE CROSSING SUPPORT PAD</td>
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<tr>
<td>W37</td>
<td>CLAY OR CONCRETE CUT—OFF WALL</td>
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<tr>
<td>W38</td>
<td>STANDARD VALVE AND BOX</td>
</tr>
<tr>
<td>W39A</td>
<td>STANDARD IRRIGATION METER VAULT 3”—6” METER (PLAN VIEW)</td>
</tr>
<tr>
<td>W39B</td>
<td>STANDARD IRRIGATION METER VAULT 3”—6” METER (SECTION VIEW)</td>
</tr>
</tbody>
</table>
NOTE:
NORMAL VALVES WITH A BLACK OPERATING NUT INDICATE A STANDARD ERIE VALVE. (OPEN LEFT)

VALVE OPENING & CLOSING PROCEDURE
ELEVATION

PLAN

FOOTING DETAIL

CONCRETE EXTENSION COLLARS
GROUND LINE

24" Ø MANHOLE RING & COVER

60" Ø PRECAST CONC. FLAT M.H. COVER (ASTM C-478)
BRACE < 2" x 2" x 1/4"

60" Ø PRECAST CONC. M.H. (ASTM C-478)

2-2" x 90° BRASS STREET ELLS
2-2" THD'D AIR AND VACUUM VALVES
2-2" I.P. THD'D BRASS NIPPLES
2-2" THD'D BALL VALVES
2-2" CORP. STOPS THD'D
2-2" I.P. THD'D OUTLETS

ROMAC 2026 DOUBLE STRAP BRASS TAP SADDLE

ELEVATION

NOTE:
USE 2" AIR VALVE ASSEMBLY ON 30" OR SMALLER PIPE.

PLAN

60" Ø MANHOLE

2-2" AIR VALVES

FOOTING DETAIL

#4 Ø 18"
1'-0"
3- Ø6 CONT. (TYP.)

The Town of ERIE COLORADO
DRAWING TITLE: AIR RELIEF VALVE
DRAWING NUMBER: W2
DRAWN BY: D. JENKINS APPROVED BY: G. BEHLEN DATE: 06/2004
VENT PIPE INSTALLATION

NOTES:
VENT PIPES TO BE LOCATED IN THE FIELD AT THE NEAREST INTERSECTION OF THE STREET PROPERTY LINE AND SIDE LOT LINE.
PAINT PIPE AND LOCATE M.H. WITH DISTANCE AND DIRECTION SIMILAR TO MARKER POST.
WRAP BURIED VENT PIPE WITH 8 MIL POLY-ETHYLENE.
1. CASTING SPECIFICATIONS: ASTM A-48 WITH A MINIMUM TENSILE STRENGTH OF 25 KSI (CLASS 25)
2. ALL CASTINGS TO BE DIPPED IN ASPHALT BASE PAINT (OR APPROVED EQUAL)
3. CASTINGS SHALL BE AS SPECIFIED BELOW OR APPROVED EQUAL:

<table>
<thead>
<tr>
<th>MANUFACTURERS</th>
<th>CAT. #</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEENAH</td>
<td>R-1706</td>
</tr>
<tr>
<td>CASTINGS, INC.</td>
<td>MH-400-24 C.I.</td>
</tr>
<tr>
<td>HUTCHINSON FDRY. &amp; STL, INC.</td>
<td>MH-400</td>
</tr>
</tbody>
</table>

4. ALL NEW MANHOLES MUST INCLUDE A PLASTIC OR VINYL TAG ATTACHED TO THE TOP STEP STATING THE FOLLOWING "CAUTION CONFINED SPACE; ENTRY PERMIT REQUIRED".
NOTE:
PLUG SHALL BE MECHANICALLY RESTRAINED:
A - FOR SLEEVE TYPE MACHINED COUPLING PIPE, TIE BACK TO NEXT COUPLING.
B - FOR BELL AND SPIGOT PIPE, TIE TO BELL.

2" BALL VALVE STOP BOX

FLARED COPPER CONNECTION

PLAN

GROUND LINE

NOTE: PLACE LOOSE FITTING CAP OVER END

2" MALE IP THREAD X SOLDER ADAPTER

TOP SECTION, 5 1/4" VALVE BOX

1 CU. FT. BEDDING MATERIAL

NOTE: VALVE BOX SHALL NOT BE SUPPORTED BY THE WATER LINE

2" TYPE K SOFT COPPER PIPE

1 CU. FT. BEDDING MATERIAL

ELEVATION

12" PIPE OR SMALLER

BOND BREAKER

PLUG WITH 2" TAP

CONCRETE KICKBLOCK

12"+/-

2'+/-

BRASS STREET ELBOW

90'

COMPLETE 5 1/4" CURB STOP BOX, TYLER SERIES OR EQUAL

2" STOP AND WASTE VALVE, FEMALE IP THREAD, WITH 2" GATE VALVE OPERATING NUT

MECHANICALLY RESTRrain WITH MEGALUG

PLUG WITH 2" TAP

2" THREADED BRASS OR COPPER PIPE

The Town of
ERIE
COLORADO

DRAWING TITLE: BLOW-OFF INSTALLATION FOR 12" AND SMALLER PIPE

DRAWING NUMBER: W5

DRAWN BY: J. ASCUNCE

APPROVED BY: R. PENNINGTON

DATE: 09/2017
2" TEMPORARY BLOW-OFF

VALVE WITH 2" TEMPORARY BLOW-OFF SHALL HAVE RESTRAINED JOINTS BACK TO TEE.

PROPERTY LINE

20’ MAX.

2’ MIN.

EASEMENT LINE

30’

PROPERTY LINE

2' MIN

EASEMENT LINE

VALVE SHALL HAVE RESTRAINED JOINTS BACK TO TEE AND AHEAD TO 2" TEMPORARY BLOW-OFF

TEE

TEE
TAPPING SLEEVE AND TAPPING VALVE

VALVE WITH 2" TEMPORARY BLOW-OFF SHALL HAVE RESTRAINED JOINTS BACK TO TAPPING VALVE

2" TEMPORARY BLOW-OFF

TEE, ANCHOR COUPLING AND VALVE

PLUG WITH 2" TEMPORARY BLOW-OFF SHALL HAVE RESTRAINED JOINTS BACK TO VALVE

PROPERTY LINE

20' MAX.

EASEMENT LINE

2' MIN.

5'

5'
NOTES:

1. ALTERNATE TO THE ABOVE:
   FASTEN M.J. VALVE DIRECTLY TO A M.J. ANCHOR TEE
   (ALSO CALLED SWIVEL TEE)
2. NO HORIZONTAL OR VERTICAL BENDS ARE ALLOWED
   IN FIRE HYDRANT BRANCH OR SPRINKLER LINES
3. MAXIMUM OF ONE FIRE HYDRANT EXTENSION
4. CONTRACTOR TO TAKE CARE NOT TO BLOCK WEEP HOLES
5. ALL DUCTILE IRON PIPE TO BE POLYETHYLENE WRAPPED

VARIABLES

6" FIRE HYDRANT
BACK OF CURB & GUTTER OR BACK OF CURB/WALK
PROPERTY LINE

GROUND LINE
6" ANCHOR COUPLING OR 6" SWIVEL ADAPTER

M.J. TEE SEE NOTE BELOW

LOCATE WIRE & LOCATE BOX
6" M.J. GATE VALVE & 6" VALVE BOX, 2-PIECE
6" DI. OR PVC PIPE

PROPERTY LINE

HYDRANT BASE AND DRAINAGE ROCK TO BE COVERED WITH LOOSE SHEET OF POLYETHYLENE TO EXCLUDE BACK-FILL MATERIAL FROM VOIDS IN ROCK.
1/3 CU. YD. MIN. WELL GRADED GRAVEL, COBBLESTONE, OR "BRICK SIZED" CRUSHED ROCK FOR DRAINAGE

CONCRETE KICKBLOCK
DO NOT COVER OR PLUG DRAIN LINES WITH CONCRETE

MECHANICAL RESTRAINT JOINTS OR 3/4" RODS AND CLAMPS
NOTES:

1. A RECTANGLE VAULT IS REQUIRED. SIZE TO BE DESIGNED TO ACCOMMADATE REQUIRED EQUIPMENT WITH ADEQUATE WORKING SPACE. SHOP DRAWING APPROVAL REQUIRED PRIOR TO CONSTRUCTION.

2. ACCESS STAIRS WITH DOOR OUTSIDE OF PAVEMENT MAY BE REQUIRED ON STREETS WITH HEAVY TRAFFIC.

3. FOR ELEVATION VIEW SEE CROSS SECTION DRAWING SHEET 2 OF 2.

4. SUMP PUMP AND VENT FAN REQUIRED IN VAULTS WITH ELECTRICAL OR TELEMETRY EQUIPMENT.

5. THIS MANHOLE IS SUITABLE FOR CHECK VALVE INSTALLATION.

6. THREADED FITTINGS ON LOW FLOW

7. COUPLING ON LOW FLOW

8. SADDLE FOR TAP FOR LOW FLOW

9. ALL PIPING 4" IN DIAMETER OR GREATER IS D.I.P.

10. NO PVC ALLOWED
NOTES:

1. A PERMIT IS REQUIRED FOR SUMP PUMP DISCHARGE TO STORM SEWERS.

2. FOR PLAN VIEW AND ADDITIONAL NOTES SEE SHEET 1 OF 2.
FIELD INSTALLATION—POLYETHYLENE WRAP

STEP-1 PLACE TUBE OF POLYETHYLENE MATERIAL AROUND PIPE PRIOR TO LOWERING PIPE INTO TRENCH.

STEP-2 PULL THE TUBE OVER THE LENGTH OF THE PIPE. TAPE TUBE TO PIPE AT JOINT. FOLD MATERIAL AROUND THE ADJACENT SPIGOT END AND WRAP WITH THREE CIRCUMFERENTIAL TURNS OF TWO-INCH WIDE PLASTIC TAPE TO HOLD PLASTIC TUBE AROUND SPIGOT END.

STEP-3 ADJACENT TUBE OVERLAPS FIRST TUBE AND IS SECURED WITH PLASTIC ADHESIVE TAPE. THE POLYETHYLENE TUBE MATERIAL COVERING THE PIPE WILL BE LOOSE. EXCESS MATERIAL AND SHOULD BE NEATLY DRAWN UP AROUND THE PIPE BARREL, FOLDED INTO AN OVERLAP ON TOP OF THE PIPE AND HELD IN PLACE BY MEANS OF PIECES OF THE PLASTIC TAPE AT APPROXIMATELY THREE TO FIVE FOOT INTERVALS.

NOTE: ALL RODDING TO BE ENCASED IN POLYETHYLENE SEPARATED FROM THE PIPE
FIELD COAT WITH PROTECTO WRAP NO. 1170 PRIMER AND WITH NO. 310 TAPE AS PER SPECIFICATIONS, OR EQUAL.

INSULATING GASKET

OPTIONAL WASHER

NUT

FLANGED JOINT

ONE PIECE INSULATING SLEEVE & WASHER

STEEL WASHER (A-325)

BOLT

FLANGED JOINT

INSULATING JOINT

INSULATED ROD

FIELD COAT WITH PROTECTO WRAP NO. 1170 PRIMER AND WRAP WITH NO. 310 TAPE AS PER SPECIFICATIONS, OR EQUAL.

MECHANICAL COUPLING

BOLTS TO BE STAGGERED

RUBBER BOOT

INSULATED MECHANICAL COUPLING
NOTE:

1. ALL SERVICE LINE WORK FROM THE WATER MAIN TO THE METER PIT SHALL BE INSTALLED BY THE CONTRACTOR AND INSPECTED BY A TOWN OF ERIE CONSTRUCTION INSPECTOR PRIOR TO BACKFILLING. ALL PORTIONS OF THE SERVICE LINE TRENCH SHALL BE FILLED WITH SQUEEZE TO A DEPTH OF 6" OVER THE TOP OF THE SERVICE LINE.

2. COVER FOR METER PIT SHALL BE INSTALLED & MAINTAINED AT A MIN. 2"/MAX. 4" ABOVE BACK OF SIDEWALK. STOP BOX SHALL BE INSTALLED & MAINTAINED AT MIN. 1"/MAX. 2" ABOVE BACK OF SIDEWALK.

3. CURB STOP SERVICE BOXES SHALL BE CAST IRON, SCREW ADJUSTABLE, AND HAVE A TWO AND THREE QUARTERS (2-3/4) INCH OD.
NOTE:

1. ALL SERVICE LINE WORK FROM THE WATER MAIN TO THE METER PIT SHALL BE INSTALLED BY THE CONTRACTOR AND INSPECTED BY A TOWN OF ERIE CONSTRUCTION INSPECTOR PRIOR TO BACKFILLING. ALL PORTIONS OF THE SERVICE LINE TRENCH SHALL BE FILLED WITH SQUEEGEE TO A DEPTH OF 6" OVER THE TOP OF THE SERVICE LINE.

2. COVER FOR METER PIT SHALL BE INSTALLED & MAINTAINED AT A MIN. 2"/MAX. 4" ABOVE BACK OF CURB. STOP BOX SHALL BE INSTALLED & MAINTAINED AT A MIN. 1"/MAX. 2" ABOVE BACK OF CURB.

3. CURB STOP SERVICE BOXES SHALL BE CAST IRON, SCREW ADJUSTABLE, AND HAVE A TWO AND THREE QUARTERS (2-3/4) INCH OD.
**FORGED BRASS PENTAGON BOLT**  

**RECESSED COMPOSITE/POLYMER CAP TYPE LID WITH 1-7/8" DIA HOLE. INSTALL LID AT 2" MIN, 4" MAX ABOVE TOP BACK OF CURB FOR DETACHED SIDEWALK OR TOP BACK OF SIDEWALK FOR ATTACHED SIDEWALK.**

**DISHED FROST PROOF METER LID—ARMORCAST 12" DIAMETER, PART NUMBER 111953 OR APPROVED EQUAL**

**METER PIT RING CAST IRON**

**LOCKING SCREW**

**CURB STOP VALVE & STOP BOX**

**CURB STOP SERVICE BOX SHALL BE CAST IRON, SCREW ADJUSTABLE AND HAVE A 2-3/4 INCH OD**

**INSTALL CURB STOP BOX AT 1" MIN, 2" MAX ABOVE TOP BACK OF CURB FOR DETACHED SIDEWALK OR TOP BACK OF SIDEWALK FOR ATTACHED SIDEWALK.**

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**GENERAL NOTES**

1. POLYMER CONCRETE RING & LID ALLOWABLE.

2. METER PIT SHALL BE CONSTRUCTED OF MODIFIED POLYETHYLENE WITH MINIMUM WALL THICKNESS OF 0.50".

3. EXTENSIONS AND OFF GRADE EXTENSIONS SHALL BE INSERTED BETWEEN THE DOME AND TOP RING TO PUT LID TO GRADE.

4. NO CONNECTIONS OR CHANGES IN PIPE DIAMETER SHALL BE MADE IN THE METER PIT OR IN THE DISTANCE OF FIVE FEET BEYOND THE METER PIT WALL ON THE OUTLET SIDE.

5. LAWN SPRINKLER CONNECTIONS SHALL BE A MINIMUM OF FIVE FEET FROM THE METER PIT WALL ON THE OUTLET SIDE.

6. ANY VARIATION OR DEVIATION FROM THIS STANDARD REQUIRES PREVIOUS APPROVAL PRIOR TO INSTALLATION FROM THE PUBLIC WORKS DEPT.

7. METER PIT MUST BE INSTALLED IN LANDSCAPED AREA, PRIOR APPROVAL FROM PUBLIC WORKS DEPT. REQUIRED FOR ANY DEVIATION FROM THIS REQUIREMENT.

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**METER SIZE | LAYING LENGTH (A)**

<table>
<thead>
<tr>
<th>5/8&quot; x 3/4&quot;</th>
<th>7-1/2&quot;</th>
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<tbody>
<tr>
<td>1&quot;</td>
<td>10-3/4&quot;</td>
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</tbody>
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**DRAWING TITLE: POTABLE WATER METER PIT**

**3/4" & 1" METER**

**DRAWING NUMBER: W12A**

**DRAWN BY: J. ASCUNCE**

**APPROVED BY: J. SMITH**

**REV. DATE: 05/2019**
**PRECAST VAULT TO BE DESIGNED AND SIZED BY ENGINEER. DESIGN IS REQUIRED TO BE APPROVED BY TOWN'S ENGINEERING DIVISION**

**TYPE K COPPER (TYP) CURB STOPS REQUIRED ON ALL SERVICE LINES**

**3/4"-1" MULTIPLE METER (TYP.) 8" (TYP.)**

**TRACER WIRE TIED TO STEPS**

**PER PLAN**

**CURB STOP - SIZE TO BE DETERMINED BY ENGINEER**

**FROM WATER MAIN**

**R.O.W., B.O.C., OR B.O.W.**

**ADDITIONAL EASEMENT AS REQUIRED**

**PAVEMENT**

**TAP SADDLE (ROMAC 2029) TO BE USED ON PVC AND DIP MAINS**

**WATER MAIN**

**COPORATION STOP @ 10:00 OR 2:00 POSITION**

**INSULATED COUPLING TO BE USED ON STEEL OR IRON MAINS**

**CURB STOP WITH BOX**

**TRACER WIRE**

**24" DIA. ALUMINUM MANHOLE FRAME AND FLAT COVER ADJUSTED TO FINISHED GRADE.**

**16" MAX.**

**24" TALL X 6" WIDE KNOCKOUTS (TYP)**

**METE R AND PIPE SUPPORTS (SHALL BE EITHER CONCRETE OR ADJUSTABLE STEEL PIPE)**

**TRANSPOUNDER BRACKET 3"x3" ANGLE IRON WITH 2" HOLES**

**TYPE K COPPER**

**MIN. 6" OF 3/4" CRUSHED ROCK UNDER FOOTINGS**

**8" x 12" CONCRETE FOOTING**

**NOTES:**

1. METER VAULT SHALL BE DESIGNED FOR AASHTO HS-20 LOADING AND IN ACCORDANCE WITH ASTM C858. CONCRETE FC=4000 PSI
2. BURY VAULT 18" MAX BELOW SURFACE. ADJUST MANHOLE COVER TO GRADE WITH CONCRETE GRADE RINGS WITH RAMMEX.
3. ENGINEER DESIGN OF VAULT IS REQUIRED.
4. ANY VARIATION OF THIS DETAIL SHALL BE APPROVED BY THE TOWN OF ERIE ENGINEERING DIVISION.
5. TRANSPOUNDER BRACKET TO BE MOUNTED INSIDE NEAR UD.
NOTE:
ALL METER PITS AND CURB STOPS SHALL BE PROTECTED AT THE TIME OF INSTALLATION WITH A MINIMUM OF 3 T-POSTS AND ORANGE SAFETY FENCE. THE T-POSTS AND SAFETY FENCE SHALL REMAIN IN PLACE AND IN GOOD CONDITION UNTIL THE LANDSCAPING IS INSTALLED.
OPTIONAL CONCRETE MANHOLE BASE BEAMS
IF CONCRETE BEAMS ARE NOT USED, USE
1/2" ROCK, 6" DEEP MINIMUM

PLAN

24" DIAMETER OPENING

ELEVATION

FOR IRRIGATION METER PIT REQUIREMENTS
SEE PARKS STANDARD DETAILS

The Town of
ERIE
COLORADO

DRAWING TITLE: 1-1/2" & 2" METER MANHOLE
METER PIT

DRAWING NUMBER: W13
DRAWN BY: J. ASCUNCE APPROVED BY: R. PENNINGTON REV. DATE: 08/2018
NOTES:

1. SEE THRUST BLOCKING CHART FOR MINIMUM BEARING SURFACE AREAS

2. BASED ON 150 PSI INTERNAL PIPE PRESSURE PLUS WATER HAMMER

4", 6", 8" AND 12" WATER HAMMER = 110 P.S.I.
16", 20" AND 24" WATER HAMMER = 70 P.S.I.

3. BASED ON 3,000 pfs SOIL BEARING CAPACITY

4. THRUST BLOCKING SHALL BE CAST AGAINST UNDISTURBED EARTH. FORMS SHALL BE USED AS REQUIRED TO OBTAIN ADEQUATE BEARING AND TO CONFINING THE CONCRETE. THRUST BLOCKING SHALL BEAR ON THE FITTING OR END CAP ONLY AND SHOULD NOT BE ALLOWED TO SPILL OVER THE JOINT OR AGAINST THE PIPE.
TABLE OF BEARING AREAS IN SQ. FT. FOR CONCRETE THRUST BLOCKING
FOR 100 P.S.I. INTERNAL STATIC PRESSURE AND 1,000 LBS. PER SQUARE FOOT SOIL BEARING CAPACITY.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>BENDS</th>
<th>TEES *</th>
<th>GATE VALVES</th>
<th>DEAD ENDS</th>
<th>CROSS W/ 1 BRANCH PLUGGED</th>
<th>CROSS W/ 2 BRANCHES PLUGGED</th>
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<tbody>
<tr>
<td></td>
<td>90'</td>
<td>45'</td>
<td>22-1/2'</td>
<td>11-1/4'</td>
<td></td>
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<tr>
<td>3</td>
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<td>0.6</td>
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<tr>
<td>21</td>
<td>49.0</td>
<td>26.5</td>
<td>13.5</td>
<td>6.8</td>
<td>34.6</td>
<td>34.6</td>
</tr>
<tr>
<td>22</td>
<td>54.0</td>
<td>29.0</td>
<td>14.8</td>
<td>7.4</td>
<td>38.0</td>
<td>38.0</td>
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<tr>
<td>24</td>
<td>64.0</td>
<td>34.5</td>
<td>17.7</td>
<td>8.8</td>
<td>45.0</td>
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<tr>
<td>30</td>
<td>100.0</td>
<td>54.0</td>
<td>27.6</td>
<td>13.8</td>
<td>71.0</td>
<td>71.0</td>
</tr>
<tr>
<td>36</td>
<td>144.0</td>
<td>78.0</td>
<td>40.0</td>
<td>20.0</td>
<td>102.0</td>
<td>102.0</td>
</tr>
</tbody>
</table>

* SIZE IS BRANCH SIZE

AREAS GIVEN IN TABLE ARE BASED UPON AN INTERNAL STATIC PRESSURE OF 100 P.S.I. AND A SOIL BEARING CAPACITY OF 1,000 LBS. PER SQUARE FOOT. BEARING AREAS FOR ANY PRESSURE AND SOIL BEARING CAPACITY MAY BE OBTAINED BY MULTIPLYING THE TABULATED VALUES BY A CORRECTION FACTOR “F”.

\[
F = \frac{\text{ACTUAL SPECIFIED TEST PRESSURE IN HUNDREDS OF LBS.}}{\text{ACTUAL SOIL BEARING CAPACITY IN THOUSANDS OF LBS.}}
\]

EXAMPLE: TO FIND BEARING AREA FOR 8" - 90° BEND WITH A STATIC INTERNAL PRESSURE OF 150 P.S.I. AND WITH A SOIL BEARING CAPACITY OF 3,000 LBS. PER SQUARE FOOT.

\[
F = \frac{1.5}{3} = 0.5 \quad \text{TABULATED VALUE} = 7.1 \quad \text{SQUARE FOOT.}
\]

\[
0.5 \times 7.1 = 3.56 \quad \text{SAY 4 SQUARE FEET OF 2 FOOT LONG BY 2 FOOT HIGH.}
\]
#5 rebars looped over bend. Embedment length in concrete is equal to (e) in table below.

Plan

Bond breaker (typical)

Rebars exposed to earth shall be coated with bituminous paint.

Profile

<table>
<thead>
<tr>
<th>Size of pipe (D)</th>
<th>11 1/4 deg.</th>
<th>22 1/2 deg.</th>
<th>45 deg.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L&quot; W&quot; H&quot; E&quot; VOL</td>
<td>L&quot; W&quot; H&quot; E&quot; VOL</td>
<td>L&quot; W&quot; H&quot; E&quot; VOL</td>
</tr>
<tr>
<td>4&quot;</td>
<td>12 24 24 12 4 12 34 34 12 8 22 37 32 22 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>18 32 27 18 9 15 52 40 15 18 28 64 32 28 33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td>21 40 33 21 16 22 61 40 22 31 35 64 45 35 58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10&quot;</td>
<td>24 50 36 24 25 30 59 48 30 49 42 72 52 42 90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12&quot;</td>
<td>31 56 36 31 36 36 70 48 36 70 45 80 62 45 129</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:

1. Thrust blocking shall be cast against undisturbed earth. Forms shall be used as required to obtain adequate bearing and to confine the concrete. Thrust blocking shall bear on the fitting or end cap only and should not be allowed to spill over the joint or against the pipe.

2. Volume is in cubic feet.

3. All concrete to be 4000 P.S.I. Min.

4. Blocks to be centered horizontally on the bend.

5. Design based on a test pressure of 150 P.S.I. and safety factor (Sf) of 1.5

6. \( V_g = \frac{S_f \cdot P \cdot A \cdot \sin \theta}{W_m} \)

7. \( W_m = 140 \text{ #} / \text{FT}^3 \)

8. The design engineer is responsible for verifying the actual site conditions with respect to the assumptions listed above.
### Rod Diameter, Grade & Length of Restrained Pipe

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>4&quot;</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>10&quot;</th>
<th>12&quot;</th>
<th>16&quot;</th>
<th>20&quot;</th>
<th>24&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fitting</td>
<td>D</td>
<td>L</td>
<td>G</td>
<td>D</td>
<td>L</td>
<td>G</td>
<td>D</td>
<td>L</td>
</tr>
<tr>
<td>90° Bend, Tee, Plug</td>
<td>3/4&quot;</td>
<td>30°</td>
<td>MS</td>
<td>3/4&quot;</td>
<td>45°</td>
<td>MS</td>
<td>3/4&quot;</td>
<td>60°</td>
</tr>
<tr>
<td>Valve</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>45° Bend</td>
<td>3/4&quot;</td>
<td>9°</td>
<td>MS</td>
<td>3/4&quot;</td>
<td>13°</td>
<td>MS</td>
<td>3/4&quot;</td>
<td>18°</td>
</tr>
<tr>
<td>22 1/2° Bend</td>
<td>3/4&quot;</td>
<td>1°</td>
<td>MS</td>
<td>3/4&quot;</td>
<td>4°</td>
<td>MS</td>
<td>3/4&quot;</td>
<td>5°</td>
</tr>
<tr>
<td>11 1/4° Bend</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3/4&quot;</td>
</tr>
</tbody>
</table>

**Notes:**
1. Length of restrained pipe measured each way from valves and bends.
2. Clamps and rods not allowed for 24" & larger pipes.
3. D = Diameter, L = Length, G = Grade, MS = Mild Steel, HS = High Strength.
4. Min. 4.5" ground cover reqd.
5. Based on 150 psi internal pressure.
6. MS = Mild Steel Rod ASTM A 36.
7. HS = High Strength Rod ASTM A 193 Grade B7.
8. Nuts shall be ASTM A 307 Grade A or B hexagon heavy series. HS nuts shall conform to MS-22.
9. Length refers to the amount of pipe which must be restrained together.
10. Length of restrained pipe chart is also for the length of joint restraint for megalugs.
11. Tees & crosses must be restrained in all applicable directions.
12. 12" and smaller in line valves and tees shall have a mechanical joint restraint device on each side of the fitting or valve.
13. A second valve will be reqd to be closed when excavating next to a exist valve.
14. When reducers are used on valve installations the length of restraint shall be based on the size of the pipe not the size of the valve.
15. All reducers/increasers shall have mechanical restraint devices on each side of fitting.
16. Pipe joint restraint may be accomplished using harness rods, mechanical joint restraint or restrained joint pipe and fittings.
17. An analysis of the necessary restraint length for pipe larger than 24" shall be submitted to the public works dept for review and approval on a case by case basis.
WEDGE DETAIL

BOLT HOLE DETAIL

MECHANICAL JOINT RERAINT

DIMENSIONS

<table>
<thead>
<tr>
<th>NOMINAL PIPE SIZE</th>
<th>NO. OF BOLTS</th>
<th>NO. OF WEDGES</th>
<th>K2 INCHES</th>
<th>J INCHES</th>
<th>F INCHES</th>
<th>M INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>6</td>
<td>3</td>
<td>11.12</td>
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<td>0.88</td>
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<td>6</td>
<td>4</td>
<td>13.37</td>
<td>11.75</td>
<td>9.15</td>
<td>1.00</td>
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<tr>
<td>10&quot;</td>
<td>8</td>
<td>6</td>
<td>15.62</td>
<td>14.00</td>
<td>11.20</td>
<td>1.00</td>
</tr>
<tr>
<td>12&quot;</td>
<td>8</td>
<td>8</td>
<td>17.88</td>
<td>16.25</td>
<td>13.30</td>
<td>1.25</td>
</tr>
<tr>
<td>4&quot;</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>6</td>
<td>3</td>
<td>11.12</td>
<td>9.50</td>
<td>7.00</td>
<td>0.88</td>
</tr>
<tr>
<td>8&quot;</td>
<td>6</td>
<td>4</td>
<td>13.37</td>
<td>11.75</td>
<td>9.15</td>
<td>1.00</td>
</tr>
<tr>
<td>10&quot;</td>
<td>8</td>
<td>6</td>
<td>15.62</td>
<td>14.00</td>
<td>11.20</td>
<td>1.00</td>
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<td>8</td>
<td>8</td>
<td>17.88</td>
<td>16.25</td>
<td>13.30</td>
<td>1.25</td>
</tr>
</tbody>
</table>

NOTES:
1. DIMENSIONS FOR 16" AND 20"
   D.I. PIPE NOT SHOWN.
2. OTHER MECHANICAL JOINT RERAINT
   DEVICES MUST BE APPROVED BEFORE
   INSTALLATION.
NOTES:

1. USE TWO HIGH STRENGTH STEEL TIE RODS AT END OF CASING.

2. TIE ROD HOLE DIAMETER 1/8" LARGER THAN STUD DIAMETER.

3. BOTTOM EDGE OF ALL PLATES SHAPED TO FIT O.D. OF PIPE.

4. HARNESS LUGS AS PER AWWA MANUAL M-II.
NOTES:

1. The bolt shall be manufactured of "COR-TEN" or approved equal.
2. The bolt may be heat treated.

<table>
<thead>
<tr>
<th>ALLOWABLE PIPE DIAMETER INCHES</th>
<th>BOLT SIZE</th>
<th>NO. OF BOLTS REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3/4&quot;</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>3/4&quot;</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>3/4&quot;</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>3/4&quot;</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>3/4&quot;</td>
<td>6</td>
</tr>
</tbody>
</table>
LOCATE WIRE BOX

6" STEEL POST FILLED WITH CONC. AND PAINTED YELLOW.

GROUND LINE

CONCRETE

NOTES:

TO BE USED IN COMMERCIAL OR INDUSTRIAL AREAS WHERE HYDRANTS ARE UNPROTECTED FROM THE MAINFLOW OF TRAFFIC. STEAMER CONNECTION ON FIRE HYDRANT SHOULD FACE THE STREET.
NOTES:

1. FABRICATED STEEL TAPPING SLEEVE SHALL BE:

   ROMAC FTS419 OR APPROVED EQUAL TO BE USED FOR PVC UP TO 75% OF EXISTING MAIN
   ROMAC FTS420 OR APPROVED EQUAL TO BE USED FOR DIP UP TO 75% OF EXISTING MAIN
   ROMAC FTS425 OR APPROVED EQUAL TO BE USED ON ALL AC PIPE AND ANYTIME
   BRANCH LINE IS GREATER THAN 75% OF EXISTING MAIN
NOTE: TAPS IN STAGGERED CONFIGURATION AT 10 O’CLOCK AND 2 O’CLOCK.

NOTE:
2500 P.S.I. TYPE V CEMENT, CONCRETE VIBRATED IN PLACE

VARIABLE

#4 Ø 18" TRANSVERSE

3" CLEAR MIN. (TYP.)

6" MIN.

PIPE I.D.

SEE BAR SIZING AND LOCATION TABLE

6" MIN.

PIPE BELL O.D.

6" MIN.

SEE BAR SIZING AND LOCATION TABLE

3" CLEAR MIN. (TYP.)

REINFORCEMENT STEEL

<table>
<thead>
<tr>
<th>PIPE I.D.</th>
<th>LONGITUDINAL BARS – LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 IN.</td>
<td>4–NO. 4 BARS 1 EACH CORNER</td>
</tr>
<tr>
<td>8 IN.</td>
<td>4–NO. 4 BARS 1 EACH CORNER</td>
</tr>
<tr>
<td>10 IN.</td>
<td>8–NO. 4 BARS 3 EACH SIDE</td>
</tr>
<tr>
<td>12 IN.</td>
<td>8–NO. 4 BARS 3 EACH SIDE</td>
</tr>
<tr>
<td>15 IN.</td>
<td>8–NO. 4 BARS 3 EACH SIDE</td>
</tr>
<tr>
<td>18 IN.</td>
<td>8–NO. 4 BARS 3 EACH SIDE</td>
</tr>
<tr>
<td>21 IN.</td>
<td>12–NO. 4 BARS 4 EACH SIDE</td>
</tr>
<tr>
<td>24 IN.</td>
<td>12–NO. 4 BARS 4 EACH SIDE</td>
</tr>
<tr>
<td>27 IN.</td>
<td>12–NO. 4 BARS 4 EACH SIDE</td>
</tr>
<tr>
<td>30 IN.</td>
<td>12–NO. 4 BARS 4 EACH SIDE</td>
</tr>
<tr>
<td>33 IN.</td>
<td>12–NO. 4 BARS 4 EACH SIDE</td>
</tr>
<tr>
<td>36 IN.</td>
<td>16–NO. 4 BARS 5 EACH SIDE</td>
</tr>
</tbody>
</table>

NOTE:
THE DISTRICT SHALL REVIEW THIS DETAIL FOR USE ON A CASE BY CASE BASIS. SPECIAL ENCASEMENTS MAY BE REQUIRED AT CREEK CROSSINGS AND CONDUIT CROSSINGS.
1. Each section of pipe within casing shall have a minimum of (3) casing spacers/skids. The middle spacer/skid shall be centered between pipe joints.

2. Water & sanitary sewer pipe joints shall be restrained.

3. Extend tracing wire through casing (water applications only).

4. Minimum runner size & distance between spacers shall be in accordance with manufacturers specifications.

<table>
<thead>
<tr>
<th>Carrier Pipe Nominal Dia</th>
<th>Casing Pipe Min. Wall Thick</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>0.25&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>0.3125&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>0.3125&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>0.375&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>0.500&quot;</td>
</tr>
<tr>
<td>20&quot;</td>
<td>0.500&quot;</td>
</tr>
</tbody>
</table>
SEWER CROSSING UNDER
WITH "D" LESS THAN 2'

NOTE:
ALL EXISTING SEWER DAMAGED DURING INSTALLATION
MUST BE REPLACED WITH PVC PIPE.
**SECTION**

- Existing Pipe or Open Ditch
- Top of Bank
- Concrete Cap
- Clay Backfill 95% Compaction
- Bedding
- Stabilization Rock if required to establish a solid base
- Undisturbed Soil
- Limit of Excavation
- Proposed Pipeline
- Filter Fabric (if stabilization material is used) as required by Engineer.

**PROFILE**

- Existing Pipe or Open Ditch
- Top of Bank
- Clay Backfill 95% Compaction
- Proposed Pipeline
- Center one full pipe length under
- Center of Ditch

* Use Clay Backfill only when crossing open ditch. Use bedding material to spring line of existing pipe when crossing pipe.
NOTES:

1. LOWERING OF THIS TYPE WILL BE RESTRAINED BY MEANS OF THRUST BLOCKING AND MEGALUGS OR RODDING.

2. FOR SIZING INFORMATION OF THRUST BLOCKS REFER TO THRUST BLOCK DETAILS.


4. FOR FURTHER INFORMATION ON RODDING OF JOINTS REFER TO TABLE 1.

5. ALL METALLIC PIPE, FITTINGS, AND APPURTEANCES WILL BE WRAPPED IN POLYETHYLENE.

6. REQUIREMENTS FOR LARGER THAN 12" DIAMETER PIPE WILL BE DETERMINED ON A CASE BY CASE BASIS.

7. LENGTH OF EXTENSION OF PIPE AND RESTRAINED JOINTS SHALL BE IN ACCORDANCE WITH THE ENGINEERING STANDARDS.

8. CATHODIC PROTECTION SHALL BE AS REQUIRED IN ACCORDANCE WITH THE ENGINEERING STANDARDS.

9. A BORED CROSSING MAY BE REQUIRED BY THE ENGINEER.

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Test Pressure</th>
<th>Minimum number of Tie Rods</th>
</tr>
</thead>
<tbody>
<tr>
<td>10&quot; and less</td>
<td>150</td>
<td>2</td>
</tr>
<tr>
<td>12&quot;</td>
<td>150</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>4</td>
</tr>
</tbody>
</table>

TABLE 1
4" DIA. STEEL POST PAINTED BLUE, FILLED WITH CONCRETE

12" SIZE (12 INCHES)

G.V. OBJECT (GATE VALVE)

10’ DISTANCE TO OBJECT

2” HIGH STENCILED BLACK CAPITAL LETTERS TO FACE OBJECT.

GROUND LINE

CONCRETE

UNDISTURBED GROUND

4'-0"±

2'-0"±
NOTES:

1. UTILITY MARKER POST SHALL BE CARSONITE CUM-375 OR EQUAL WITH ANCHORS AND APPROPRIATE DECALS FOR WATER.

2. COLOR FOR WATER—BLUE.
   COLOR FOR NON POTABLE—PURPLE
NOTE:
The location relative to the canal, height and length of the cut-off wall will be determined by the design engineer, or ditch owner.

SIDE VIEW

UNDISTURBED SOIL

CUTOFF WALL

TOP VIEW

NOTE:
REINFORCEMENT NOT SHOWN.

FRONT VIEW
**FIRELINE OR DOMESTIC CONNECTION WITH MAIN EXTENSION**

24" MIN.

**FIRELINE OR DOMESTIC CONNECTION**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EXISTING MAIN</td>
</tr>
<tr>
<td>2</td>
<td>TAPPING SLEEVE</td>
</tr>
<tr>
<td>3</td>
<td>TAPPING VALVE</td>
</tr>
<tr>
<td>4</td>
<td>DOUBLE SPIGOT PIPE</td>
</tr>
<tr>
<td>5</td>
<td>PROPERTY LINE VALVE</td>
</tr>
<tr>
<td>6</td>
<td>TIE RODS (MEGALUGS MAY BE USED IN PLACE OF RODDING)</td>
</tr>
<tr>
<td>7</td>
<td>PIPE CLAMP</td>
</tr>
<tr>
<td>8</td>
<td>CONCRETE KICKBLOCK</td>
</tr>
<tr>
<td>9</td>
<td>M.J. ANCHORING TEE (SWIVEL TEE WHERE APPLICABLE)</td>
</tr>
<tr>
<td>10</td>
<td>M.J. VALVE</td>
</tr>
<tr>
<td>11</td>
<td>POLYETHYLENE WRAPPED</td>
</tr>
</tbody>
</table>

**DRAWING TITLE:** 2" AND LARGER DOMESTIC AND FIRELINE CONNECTIONS

**DRAWING NUMBER:** W31

**DRAWN BY:** D. JENKINS  **APPROVED BY:** G. BEHLEN  **REV. DATE:** 01/2009
TRACER WIRE BOX AT FIRE HYDRANT

TRACER WIRE BOX TO BE LOCATED BEHIND FIRE HYDRANTS. TRACER WIRE BOX SHALL NOT BE PLACED UNDER A FIRE HYDRANT NOZZLE.

TRACER WIRE BOX FOR AREA WITH NO FIRE HYDRANT

TRACER WIRE BOX TO BE INSTALLED IN A SEPARATE WATER VALVE BOX. IF TRACER WIRE BOX IS NOT PLACED IN A PAVED AREA, A 2'x2'x6" CONCRETE PAD SHALL BE POURED AROUND THE TRACER WIRE BOX.
TYPICAL CONCRETE METER SUPPORTS FOR 2", 3", 4", 6", 8", & 10" METERS

TYPICAL CONCRETE METER SUPPORTS FOR F.M.—C.T. METERS

NOTE:
SOLID CONCRETE BASE EXTENDS UNDER THE FM—CT METER BY PASS FOR 6", 8", AND 10".

SIZE OF CONCRETE SUPPORT
6" FM—CT W=3'—9" L=3'—0"
8" FM—CT W=4'—5" L=3'—8"
10" FM—CT W=5'—8" L=4'—8"
COPOLYMER POLYPROPYLENE PLASTIC

SECTION A–A

1/2" GRADE 60 STEEL REINFORCEMENT
NOTES:

1. Compaction shall be as follows: Pipe zone bedding 6" under and 12" over pipe will require 90% S.P.D. Trench zone above bedding materials, full trench section in roadway or street R.O.W. Limits will require 95% S.P.D. Trench zone above bedding materials, outside of street R.O.W. will require 90% S.P.D.

2. 12 AWG, single strand insulated copper wire shall be installed as tracing wire above all potable water pipes. The wire shall be connected and come to the surface behind the fire hydrants in a test box.

3. Filter fabric is required if stabilization material is used. The fabric shall be installed as shown in the detail.

4. Trench to be braced or sheeted as necessary for the safety of the workmen and protection of other utilities in accordance with applicable local, state and federal safety regulations.

5. Pipe shall be bedded from 6" below the bottom of the pipe to 12" above the top of the pipe.

6. Trench width shall not be more than 24" nor less than 12" wider than the largest outside diameter of the pipe.
NOTES:
1. PIPE SECTIONS SHALL BE CENTERED OVER THE PIPE BEING CROSSED.
2. SIZES ABOVE 24" WILL BE DETERMINED BY THE ENGINEER.
3. A BOND BREAKER SHOULD BE PLACED BETWEEN THE CONCRETE AND THE PIPE BEING SUPPORTED.
4. IF THE CROSSING INVOLVES A WATER LINE AND THERE IS 6" OF CLEARANCE, OR THERE IS LESS THAN 4' OF COVER OVER THE UPPER PIPE, A FIBER BOARD INSULATION (DOW 2" EXTRUDED POLYSTYRENE IN ACCORDANCE WITH ASTM-C578 OR APPROVED EQUAL) MUST BE INSTALLED BETWEEN THE PIPES. THE BOARD SHOULD EXTEND 2' BEYOND THE OUTSIDE EDGES OF BOTH PIPES.
The Town of ERIE
COLORADO

DRAWING TITLE: CLAY OR CONCRETE CUT-OFF WALL
DRAWING NUMBER: W37
DRAWN BY: D. JENKINS APPROVED BY: G. BEHLEN REV. DATE: 01/2015

PLAN

SECTION

NOTES:

1. CLAY OR CONCRETE WALL EXTENDS A MINIMUM OF 12" INTO UNDISTURBED SOIL ON EACH SIDE AND ON BOTTOM OF TRENCH.

2. CLAY MATERIAL TO BE CLASSIFIED AS CL, CH, OR OH.

3. APPROVED FLOW-FILL MATERIAL MAY BE USED INSTEAD OF CLAY MATERIAL.
NOTES:
1. POTABLE & FIRE VALVE BOX LID RESTS INSIDE THE UPPER VALVE BOX SECTION.
2. NON-POTABLE VALVE BOX LID SLIDES OVER THE TOP OF THE UPPER VALVE BOX SECTION.
3. NON-POTABLE, WATER OR FIRE CAST IN TOP OF APPROPRIATE VALVE BOX COVER.
4. VALVE BOX SHALL NOT BE SUPPORTED BY WATER LINE.
5. VALVE BOX TO BE PLUMB AND CENTERED OVER NUT.
6. UTILIZING A VALVE BOX ALIGNMENT DEVICE IS OPTIONAL.
7. IF 2" OPERATING NUT IS MORE THAN 6" BELOW FINISHED GRADE, A VAULT NUT EXTENDER SHALL BE INSTALLED TO PUT THE VALVE NUT AT AN ELEVATION OF 4" BELOW FINISHED GRADE.
24" DIAMETER CI FRAME & COVER DRILLED FOR AMP DEVICE; "IRRIGATION" CAST IN COVER

GROUND LINE

ACCESS HATCH (BEYOND)

GRADE RINGS

2" CONDUIT FOR ELECT AND TELEMETRY

MAG METER DISPLAY PANEL MOUNTED 5" ABOVE FLOOR

CONDUIT

FLOW CONTROL VALVE

DISMANTLING JOINT

MAGNETIC FLOW METER PROVIDED BY TOWN

METER VAULT SECTION

*NOT DRAWN TO SCALE