EXISTING PAVEMENT THICKNESS VARIES

WIDTH OF RESTORATION

1'-0" EDGE OF TRENCH 1'-0"

EDGE OF TRENCH

2" ASPHALT SURFACE COURSE 9.5M64 (SEE NOTE 1)

6" ASPHALT BASE COURSE 19M64 (SEE NOTE 1)

6" DENSE GRADE AGGREGATE

NOTE:
MAXIMUM WIDTH OF TRENCH SHALL NOT EXCEED THE DEPTH TO THE INVERT OF THE PROPOSED PIPELINE

PROVIDE TACK COAT & SEAL JOINT (SEE NOTE 2) (TYP)

SELECT BACKFILL, VIRGIN DENSE GRADED AGGREGATE COMPACTED IN 12" LIFTS (SEE NOTE 2)

EXCAVATED MATERIAL COMPACTED IN 12" LIFTS (SEE NOTE 3)

6" DENSE GRADE AGGREGATE

PIPE BEDDING SHALL BE 3/4" TYPE 57 CLEAN STONE

SPRING LINE

TRENCH STABILIZATION (USE ONLY IF AND AS DIRECTED BY THE ENGINEER)

NOTES:
1. 6-INCH BASE COURSE TO BE INSTALLED AT TIME OF TRENCH RESTORATION. AFTER ADEQUATE SETTLING PERIOD (60 DAYS OR PER CONTRACT), 2-INCHES OF BASE COURSE SHALL BE MILLED AND REPLACED WITH 2-INCHES OF SURFACE COURSE
2. TACK COAT TO BE APPLIED BETWEEN EXISTING AND NEW ASPHALT
3. IF EXCAVATED MATERIAL IS DEEMED UNACCEPTABLE BY THE BORDENTOWN CITY WATER DEPARTMENT OR ITS AUTHORIZED REPRESENTATIVE, BACKFILL MATERIAL SHALL BE DGA, RGA, OR AS APPROVED BY THE ENGINEER

EXCAVATED MATERIAL COMPACTED IN 12" LIFTS (SEE NOTE 3)

NOTE:
EXISTING PAVEMENT THICKNESS VARIES

PROVIDE TACK COAT & SEAL JOINT (SEE NOTE 2) (TYP)

SELECT BACKFILL, VIRGIN DENSE GRADED AGGREGATE COMPACTED IN 12" LIFTS (SEE NOTE 2)

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2. TACK COAT TO BE APPLIED BETWEEN EXISTING AND NEW ASPHALT
3. IF EXCAVATED MATERIAL IS DEEMED UNACCEPTABLE BY THE BORDENTOWN CITY WATER DEPARTMENT OR ITS AUTHORIZED REPRESENTATIVE, BACKFILL MATERIAL SHALL BE DGA, RGA, OR AS APPROVED BY THE ENGINEER
WORD "WATER" ON COVER, WITH ARROW AND WORD "OPEN"

3-PIECE BUFFALO-TYPE SLIDING TYPE VALVE BOX 5-1/4" BARREL AND WIDE OVAL BASE, AS MANUFACTURED BY BINGHAM & TAYLOR IN ACCORDANCE WITH FIGURE NO. 4908

VALVE STEM EXTENSION AS REQUIRED

GATE VALVE WITH 2-INCH OPERATING NUT ON NON-RISING STEM UNLESS OTHERWISE SPECIFIED

MECHANICAL JOINT FITTING (TYP)

WATER MAIN

CONCRETE BLOCK

NOTES:
1. ALL GATE VALVES SHALL BE A-2360 RESILIENT WEDGE GATE VALVE AS MANUFACTURED BY THE MUELLER CORP. GATE VALVES SHALL BE MANUFACTURED IN ACCORDANCE WITH AWWA C-500.
2. IF SPECIFIED ON THE DRAWINGS THE VALVE SHALL BE RESTRAINED TO FULL LENGTHS OF PIPE ON BOTH ENDS.
3. ALL VALVES ON STUB ENDS SHALL BE RESTRAINED TO A FULL LENGTH OF PIPE ON EACH SIDE OF THE VALVE UNLESS OTHERWISE SPECIFIED.
4. ALL VALVES SHALL BE "OPEN LET" (COUNTER-CLOCKWISE TO OPEN).
5. IF AN OPERATING NUT IS MORE THAN 4.5 FEET BELOW THE GROUND SURFACE A VALVE STEM EXTENSION MUST BE INSTALLED TO BRING IT BETWEEN 3.5 FEET AND 4.5 FEET FROM THE GROUND SURFACE.
6. VALVE STEM EXTENSIONS SHALL BE ATTACHED TO THE OPERATING NUT BY PIN CONNECTION AND HAVE A GUIDE RING. THEY SHALL BE AS MANUFACTURED BY BINGHAM AND TAYLOR.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>T</th>
<th>W</th>
<th>L</th>
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</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>8&quot;</td>
<td>16&quot;</td>
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<td>18&quot;</td>
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<td>12&quot;</td>
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<td>20&quot;</td>
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<td>16&quot;</td>
<td>12&quot;</td>
<td>26&quot;</td>
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<tr>
<td>20&quot;</td>
<td>14&quot;</td>
<td>28&quot;</td>
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</tbody>
</table>
NOTES:

1. FIRE HYDRANT SHALL BE "CENTURIAN" A423 WITH (2) 2 1/2" HOSE CONNECTIONS (NST) AND (1) 4 1/2" NST PUMPER CONNECTIONS WHICH OPENS LEFT. HYDRANTS SHALL BE 5 1/4" VALVE OPENING.

2. CONTRACTOR SHALL PAINT HYDRANT PER BORDENTOWN CITY STANDARD
NOTE:
1. CORPORATION STOP TO BE MUELLER #15000 OR #H-15008
2. CURB STOP TO BE MUELLER #H-10291 ORI-SEAL OR #H-1504-2 MARK III ORI-SEAL
3. CURB BOX TO BE BUFFALO-STYLE, 3-INCH SCREW TYPE
NOTES:
1. DETAIL IS FOR SYSTEMS AT 150PSI TEST PRESSURE OR LESS; ALTERNATE DESIGN SIGNED AND SEALED BY A PROFESSIONAL ENGINEER IS REQUIRED FOR SYSTEMS WITH TEST PRESSURE > 150PSI
2. THRUST BLOCKS TO BE USED FOR WATER MAIN AND FORCE MAINS AT ALL BENDS, TEES, REDUCERS AND PLUGS
3. BEARING AREAS FOR THRUST BLOCKS ARE BASED ON THE UNDISTURBED SOIL WITH BEARING CAPACITY OF 2000 POUNDS PER SQ. FT. FOR OTHER SOILS OF LESS BEARING CAPACITY, THE AREAS SHALL BE ADJUSTED ACCORDINGLY, (FIG. 14, ASCE "PIPELINE DESIGN FOR WATER AND WASTEWATER, 1975")
4. ALL CONCRETE FOR THRUST BLOCKS SHALL BE 3000 PSI COMPRESSIVE STRENGTH WITHIN 28 DAYS
5. THE THRUST BLOCKS SHALL BE POURED FROM FITTING SUCH THAT THEY BEAR ON THE UNDISTURBED WALL OF THE TRENCH
6. THE TABULATED CONTACT BEARING AREAS LISTED ARE FOR HORIZONTAL AND DOWNWARD THRUST ONLY AND ARE NOT APPLICABLE FOR UPWARD THRUST
### Length of Restrained Pipe Based on 150 PSI Internal Pressure

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>4''</th>
<th>6''</th>
<th>8''</th>
<th>12''</th>
<th>16''</th>
<th>20''</th>
<th>24''</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D</td>
<td>L</td>
<td>G</td>
<td>D</td>
<td>L</td>
<td>G</td>
<td>D</td>
</tr>
<tr>
<td>TEE OR VALVE</td>
<td>3/4''</td>
<td>6.0'</td>
<td>M.S.</td>
<td>3/4''</td>
<td>13.0'</td>
<td>M.S.</td>
<td>3/4''</td>
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<tr>
<td>PLUG OR 90° BEND</td>
<td>3/4''</td>
<td>6.0'</td>
<td>M.S.</td>
<td>3/4''</td>
<td>13.0'</td>
<td>M.S.</td>
<td>3/4''</td>
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<tr>
<td>45° BEND</td>
<td>3/4''</td>
<td>2.0'</td>
<td>M.S.</td>
<td>3/4''</td>
<td>4.0'</td>
<td>M.S.</td>
<td>3/4''</td>
</tr>
<tr>
<td>22 1/2° BEND</td>
<td>3/4''</td>
<td>1.0'</td>
<td>M.S.</td>
<td>3/4''</td>
<td>1.0'</td>
<td>M.S.</td>
<td>3/4''</td>
</tr>
<tr>
<td>11 1/4° BEND</td>
<td>3/4''</td>
<td>0.0'</td>
<td>M.S.</td>
<td>3/4''</td>
<td>0.0'</td>
<td>M.S.</td>
<td>3/4''</td>
</tr>
</tbody>
</table>

- **D**: Diameter
- **L**: Length
- **G**: Grade

**M.S.** = Mild Steel Rod A.S.T.M. Standard Designation A-36

**H.S.** = High Strength Rod A.S.T.M. Standard Designation 193, Grade B-7

### Notes:
1. Length measured each direction from the center of the valve or bend.
2. All rods and clamps must be coated with two coats of coal tar epoxy paint - 18 mil. min.
4. Rods may be connected to fittings by means of tie bolts such as the Super Star Tie Bolts as manufactured by Star National Products.
5. See tie rod clamp detail for information on clamps and washers.
**PIPE SIZE** | **ROD DIA.** | **D** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J**
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
6" | 3/4" | 7-1/16 | 1/2 | 1/2x3-1/2 | 2 | .75 | .660 | 3.1 | 1.13 | 10.64 | 18.34
8" | 3/4" | 9-3/16 | 1/2 | 1/2x3-1/2 | 2 | .75 | .660 | 3.1 | 1.13 | 12.78 | 20.48
10" | 3/4" | 11-3/8 | 1/2 | 1/2x3-1/2 | 2 | .75 | .660 | 3.1 | 1.13 | 14.96 | 22.66
12" | 3/4" | 13-1/2 | 1/2 | 1/2x3-1/2 | 2 | .75 | .660 | 3.1 | 1.13 | 17.08 | 24.78
16" | 1" | 17-7/8 | 3/4" | 5/8x4-1/2 | 4 | .938 | .780 | 4.14 | 1.69 | 22.80 | 32.96
18" | 1" | 20 | 3/4" | 3/4x5 | 4 | 1.125 | .950 | 4.14 | 1.69 | 25.28 | 35.81
20" | 1" | 22-1/8 | 3/4" | 3/4x5 | 4 | 1.125 | .950 | 4.14 | 1.69 | 27.40 | 37.93
24" | 1-1/4" | 26-3/8 | 3/4" | 3/4x5-1/2 | 5 | 1.125 | .950 | 5.18 | 1.69 | 31.66 | 42.19

**WASHERS**

<table>
<thead>
<tr>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>WIDTH</td>
<td>HOLE DIAMETER</td>
<td>LENGTH</td>
<td>THICKNESS</td>
</tr>
<tr>
<td>3&quot;</td>
<td>7/8&quot;</td>
<td>6&quot;</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>1 1/8&quot;</td>
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<td>1/2&quot;</td>
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<tr>
<td>4&quot;</td>
<td>1 3/8&quot;</td>
<td>7&quot;</td>
<td>5/8&quot;</td>
</tr>
</tbody>
</table>
NOTE:
1. MEGALUG RESTRAINTS (OR APPROVED EQUAL) SHALL BE USED AT ALL FITTING LOCATIONS
2. PIPE CROSSINGS OF SEWER UTILITIES SHALL BE PER BORDENTOWN CITY WATER DEPARTMENT STANDARDS AND/OR AS DIRECTED BY THE ENGINEER
NOTES:
1. TAPPED CONNECTIONS SHALL BE MADE ONLY IN THE PRESENCE OF WATER DEPARTMENT EMPLOYEES OR THEIR DESIGNATED REPRESENTATIVE
2. CONCRETE THRUST BLOCK UNDER VALVES SHALL HAVE A SOIL BEARING AREA EQUAL TO THAT OF A 45° ELBOW
3. CONCRETE THRUST BLOCK FOR TAPPING SLEEVE SHALL HAVE A SOIL BEARING AREA EQUAL TO THAT OF A TEE CONNECTION
FIELD INSTALLATION - POLYETHYLENE WRAP

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

STEP 2 - PULL THE TUBE OVER THE LENGTH OF PIPE. TAPE TUBE TO PIPE AT JOINT. FOLD MATERIAL AROUND THE ADJACENT SPIGOT END AND WRAP WITH TAPE TO HOLD THE PLASTIC TUBE IN PLACE.

STEP 3 - OVERLAP FIRST TUBE WITH ADJACENT TUBE AND SECURE WITH PLASTIC ADHESIVE TAPE. THE POLYETHYLENE TUBE MATERIAL COVERING THE PIPE SHALL BE LOOSE. EXCESS MATERIAL SHALL BE NEATLY DRAWN UP AROUND THE PIPE BARREL, FOLDED ON TOP OF PIPE AND TAPE IN PLACE.
CONCRETE SADDLE REQUIRED AT ALL CROSSINGS WITH LESS THAN 24" VERTICAL SEPARATION

MIDWAY POINT OF PIPE

CLASS "C" CONCRETE SADDLE TO VIRGIN GROUND

SECTION "A-A"
STEEL CASING BIT. COATED

FILL ALL VOIDS IN CASING WITH KILN DRIED SAND AS DESCRIBED IN NOTES

8" THICK BRICK WALL EACH END 1. TO 6. MORTER

STEEL CASING DETAIL

SPACERS

NOTES:

1. ALL JACK AND BORE OPERATIONS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE NJDOT STANDARDS

2. THE PROPOSED WATER MAIN SHALL BE SLDIP, CLASS 52, WITH MECHANICAL JOINTS

3. THE CASING SHALL BE SMOOTH STEEL PIPE AS REQUIRED BY NJDOT, THE INTERIOR SURFACES SHALL BE COATED WITH COAL-TAR EPOXY. THE EPOXY SHALL BE KOPPERS BITUMASTIC NO. 300-M AS PRODUCED BY KOPPERS COMPANY, INC. THE EPOXY SHALL BE APPLIED, AS RECOMMENDED BY THE MANUFACTURER, TO PROVIDE A FINAL, DRY FILM THICKNESS OF 20 MM.

4. SPACERS SHALL BE MADE OF HIGH DENSITY POLYETHYLENE MATERIAL (HDPE) AS MANUFACTURED BY RACI CORPORATION. SPACERS SHALL BE PROVIDED TO RESTRRAIN THE MAIN IN ALL DIRECTIONS. THE SPACERS SHALL BE HDPE, NON-CONDUCTIVE, HIGH COMPRESSION STRENGTH, AND PLACED LONGITUDINALLY IN THE CASING AT INTERVALS AS REQUIRED BY THE MANUFACTURER.


6. THE CASING SHALL BE CLOSED AT BOTH ENDS WITH CLASS "B" CONCRETE AND BRICK WALLS AS DETAILED. A ONE INCH GALVANIZED STEEL PIPE SHALL BE PROVIDED AT BOTH ENDS OF THE CASING AS A WEEP HOLE.
PLAN NOTES:
1. Marker to be aligned parallel to pipe along pipe centerline
2. ##(pressure (PSI))/##(depth (FT)); pipe working psi and depth shall be specific to application
3. DIA(size (IN))/MAT(material abbreviation)/CON (content); size, material, and content of pipe shall be specific to application

Concrete poured against undisturbed earth

Flush with grade 4" diameter domed bronze concrete marker with 3" anchor as manufactured by Berntsen, model C4DB, with stamping shown provided. Attach one CAPMAG to bottom of marker.

Plan:

Elevation:

- Grade: 0.72"
- CAPMAG: 1"
- 18"
- 6"Ø
- Concrete poured against undisturbed earth
CONCRETE ENCASEMENT DETAIL

<table>
<thead>
<tr>
<th>PIPE DIAMETER</th>
<th>A</th>
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<tbody>
<tr>
<td>4&quot; - 16&quot;</td>
<td>4&quot; MIN</td>
</tr>
<tr>
<td>18&quot; - 48&quot;</td>
<td>6&quot; MIN</td>
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</tbody>
</table>

TRENCH WIDTH

12" MIN

UNDISTURBED EARTH

CONCRETE CLASS "B"

BELL OF PIPE

BARREL OF PIPE