FLOW LINE
12" TO 18" PIPE STUB OR FLEXIBLE JOINT CONNECTION AS DIRECTED BY PUBLIC WORKS DEPARTMENT

IRON OR APPROVED RING AND COVER - SEE MANHOLE RING AND COVER DETAIL (No. WW-4)

PAVEMENT

8" MIN.

PRECAST CONCRETE, PLASTIC ADJUSTING RINGS OR APPROVED EQUAL 8" MAXIMUM

#3 REBAR HOOP

24" - 36"

24" MIN

16" OC

60" MIN. DIA.

PRECAST CONCRETE MANHOLE SECTIONS CONFORMING TO ASTM C-478

ECCENTRIC CONE SECTION

WATERTIGHT JOINT

SWEPT TEE

SANITARY SEWER INLET

PVC DROP PIPE

STAINLESS STEEL STRAPS SECURED TO STRUCTURE WALL WITH STAINLESS STEEL FASTENERS AT 4' INTERVALS (MIN. OF 2)

RELINER DROP END OR APPROVED EQUAL

RELINER PLASTIC COMPOSITE MANHOLE INVERT REPLACEMENTS, OR APPROVED EQUAL, CAST INTO EXISTING BASE

MH DEPTH | A   | B
----------|-----|---
5' TO 15' | 3"  | 8"
OVER 15'  | 6"  | 10"

PRECAST OR CAST IN PLACE CONCRETE BASE

3000 psi CONCRETE

FLOW LINE

12" TO 18" PIPE STUB OR FLEXIBLE JOINT CONNECTION AS DIRECTED BY PUBLIC WORKS DEPARTMENT

1' MIN.

CONCRETE COLLAR (SEE NOTE 5)

UNPAVED AREA

NOTE:
1. NEW ASPHALT SHALL BE 1/4" ABOVE CONCRETE COLLAR AND EXISTING ASPHALT SHALL BE 1/4" ABOVE CONCRETE COLLAR

2. MANHOLE PLACED IN UNPAVED AREAS SHALL BE A MIN. 2 1/2" ABOVE FINAL GRADE

3. CEMENT GROUT SHALL BE PLACED BETWEEN ALL RISERS AND MANHOLE RING

4. THE FIRST STEP IN THE MANHOLE SHALL BE A MAXIMUM OF 24" BELOW FINISHED GRADE

5. CONCRETE COLLARS ONLY REQUIRED IN ROADWAYS WITHIN PUBLIC ROW.

DROP MANHOLE DETAIL
INSIDE DROP

Scale: N.T.S.          WW-1      AUGUST 2019
IRON OR APPROVED RING AND COVER - SEE MANHOLE RING AND COVER DETAIL (No. WW-4)

#3 REBAR HOOP

PAVEMENT 24" - 36"

8" MIN

PRECAST CONCRETE OR PLASTIC ADJUSTING RINGS - 8" MAXIMUM

1' MIN. CONCRETE COLLAR (SEE NOTE 5)

UNPAVED AREA

PRECAST CONCRETE MANHOLE SECTIONS CONFORMING TO ASTM C-478

ECCENTRIC CONE SECTION

WATERTIGHT JOINT

48" MIN. DIA.

16" OC

NOTE:

1. NEW ASPHALT SHALL BE 1/4" ABOVE CONCRETE COLLAR AND EXISTING ASPHALT SHALL BE 1/4" ABOVE CONCRETE COLLAR

2. MANHOLE PLACED IN UNPAVED AREAS SHALL BE A MIN. 21/4" ABOVE FINAL GRADE

3. CEMENT GROUT SHALL BE PLACED BETWEEN ALL RISERS AND MANHOLE RING

4. THE FIRST STEP IN THE MANHOLE SHALL BE A MAXIMUM OF 24" BELOW FINISHED GRADE

5. CONCRETE COLLARS ONLY REQUIRED IN ROADWAYS WITHIN PUBLIC ROW.

PRECAST OR CAST IN PLACE CONCRETE BASE

3000 psi CONCRETE

MH DEPTH | A | B
--- | --- | ---
5' TO 15' | 3" | 8"
OVER 15' | 6" | 10"

2' DIA. RADIUS MIN. D/2

#4 REBAR BOTH SIDES, DRILL & ANCHOR WITH NON-SHRINK GROUT INTO BASE & CONE SECTION, 3" PENETRATION, MAINTAIN 1/2" CONCRETE COVER

FLOW LINE

12" TO 18" PIPE STUB OR FLEXIBLE JOINT CONNECTION AS DIRECTED BY PUBLIC WORKS DEPARTMENT

DROP MANHOLE DETAIL
OUTSIDE DROP

City of Evans, Colorado
Public Works Department

Scale: N.T.S.
WW-2
August 2019
NOTES:

1. DIMENSIONS SHOWN ARE MINIMUM. PROPER SIZING TO BE DETERMINED BY CALCULATION, SUBJECT TO APPROVAL OF CITY ENGINEER.

2. RESPONSIBILITY FOR CLEANING & MAINTENANCE BELONGS TO THE PROPERTY OWNER.

3. AN ALTERNATE GREASE INTERCEPTOR DEVICE OF STANDARD MANUFACTURE MAY BE SUBSTITUTED FOR THAT SHOWN ABOVE, SUBJECT TO APPROVAL OF THE CITY CHIEF BUILDING OFFICIAL.

THIS STANDARD APPLIES TO:

1. RESTAURANTS

2. AUTOMOTIVE GARAGES

3. CAR WASHES

4. OTHER, AS DETERMINED BY THE CITY ENGINEER.
NOTES:
1. RING AND COVER SHALL BE IRON (AS MANUFACTURED FOR CURRENT AWWA STANDARD) AND AS APPROVED BY THE PUBLIC WORKS DEPARTMENT

2. COVER SHALL BE NON-PERFORATED WITH "SEWER" CAST ON THE TOP OF THE LID FOR SANITARY SEWER MANHOLES

3. COVER SHALL BE BOLTED, WATER RESISTANT IF LOCATED IN 100 YEAR FLOOD PLAIN
1. NEW ASPHALT SHALL BE 1/4" ABOVE CONCRETE COLLAR AND EXISTING ASPHALT SHALL BE 1/2" ABOVE CONCRETE COLLAR.
2. MANHOLE PLACED IN UNPAVED AREAS SHALL BE A MIN. OF 2 1/2" ABOVE FINAL GRADE, MANHOLE PLACED IN CULTIVATED AREAS SHALL BE A MIN. OF 3" BELOW GRADE WITH 6" BALLARD INDICATING OFFSET DISTANCE AND DIRECTION.
3. CEMENT GROUT SHALL BE PLACED BETWEEN ALL RISERS AND MANHOLE RING.
4. THE FIRST STEP IN THE MANHOLE SHALL BE A MAXIMUM OF 24" BELOW FINISHED GRADE.
5. BARREL JOINTS TO BE WRAPPED WITH A SELF STICK ALL WEATHER BUTYL SEALANT TO PROTECT FROM OUTSIDE FILTRATION. E-2 STIK OR SIMILAR.
6. CONCRETE COLLARS ONLY REQUIRED IN ROADWAYS WITHIN PUBLIC ROW.

NOTE:

IRON OR APPROVED RING AND COVER SEE MANHOLE RING AND COVER DETAIL (No. WW-4)

POURED IN PLACE MANHOLE

IRON OR APPROVED RING AND COVER SEE MANHOLE RING AND COVER DETAIL (No. WW-4)

PRECAST CONCRETE MANHOLE

PRECAST CONCRETE OR PLASTIC ADJUSTING RINGS - MAXIMUM 8"

PRECAST CONCRETE OR PLASTIC ADJUSTING RINGS - MAXIMUM 8"

ECCENTRIC CONE SECTION

ECCENTRIC CONE SECTION

WATERTIGHT JOINT

WATERTIGHT JOINT

PRECAST CONCRETE MANHOLE SECTIONS

PRECAST CONCRETE MANHOLE SECTIONS

8" MIN.

#3 REBAR HOOP

#3 REBAR HOOP

16" OC

16" OC

48" MIN. DIA.

48" MIN. DIA.

SLOPE 1" PER FOOT

2" MIN.

6" MIN.

6" MIN.

FLOW LINE

FLOW LINE

2' DIA RADIUS

MIN. D/2

MIN. D/2

VARIES

VARIES

8" MIN.

8" MIN.

MH DEPTH

MH DEPTH

A

5' TO 15'

3"

8"

B

OVER 15'

6"

10"

PAVEMENT

PAVEMENT

A

B

#3 REBAR HOOP

#3 REBAR HOOP

48" MIN. DIA.

48" MIN. DIA.

8" MIN.

8" MIN.

6" MIN.

6" MIN.

CONCRETE COLLAR (SEE NOTE 6)

CONCRETE COLLAR (SEE NOTE 6)
NOTES:

1. MINIMUM DENSITY FOR CAREFULLY COMPACTED SELECT BACKFILL SHALL BE 95% OF MAXIMUM OR AS SPECIFIED FOR THE TRENCH BACKFILL - WHICHER IS GREATER

2. COMPACT GRANULAR MATERIAL BY SLICING WITH A SHOVEL AROUND PIPE. WHEN BEDDING IS 6" OVER PIPE, COMPACT WITH VIBRATING COMPACTOR
45° MAXIMUM
2'-0" (APPROX.)
2'-0" (APPROX.)
FINISHED GRADE
MINIMUM SLOPE REFER TO TABLE 6.03-1 IN THE SPECIFICATIONS FOR WATER AND SANITARY SEWER SYSTEMS. (2) 45° BENDS MAX IN SERVICE LINE

PIPE SHALL BE LAID ON UNDISTURBED SOIL
ELBOW TO MAINTAIN COVER AND TRANSITION SLOPE
4" MIN. PVC SANITARY SEWER LATERAL OR AS OTHERWISE SHOWN

FLOW

MINIMUM SLOPE REFER TO TABLE 6.03-1 IN THE SPECIFICATIONS FOR WATER AND SANITARY SEWER SYSTEMS. (2) 45° BENDS MAX IN SERVICE LINE

4" MIN. PVC SANITARY SEWER LATERAL OR AS OTHERWISE SHOWN

PIPE SHALL BE LAID ON UNDISTURBED SOIL
DEPT 8' AND OVER

SCALE: N.T.S. WW-7 May 2019
SANITARY SEWER LINE & UNDERDRAIN TRENCH CROSS-SECTION
SHOWING HORIZONTAL AND VERTICAL OFFSETS

Scale: N.T.S.  WW-8  May 2019
NOTES:
1. FLOW LINE CHANNELS SHALL BE POURED CONCRETE AND SHALL BE TRAWL FINISHED
2. ALL BENCHES SHALL BE BROOM FINISHED
3. FLOW LINE CHANNELS SHALL BE CONSTRUCTED WITH A 0.10' FALL FOR STRAIGHT THROUGH MANHOLES AND 0.20' FOR MANHOLES WITH ALIGNMENT CHANGES

SANITARY SEWER FLOW LINE CHANNEL DETAIL

City of Evans, Colorado
Public Works Department

Scale: N.T.S. WW-9 May 2019
NOTES:
1. LOCATE UNDERDRAIN SERVICE 1' AWAY FROM SEWER SERVICE - ON FAR SIDE OF WATER SERVICE EACH LOCATION

NOTES:
1. SUBDRAIN SERVICE TO BE CLEARLY MARKED AND IDENTIFIED. CONNECTION TO RESIDENCE TO BE INSPECTED BY THE CITY ENGINEER

NOTES:
1. NO FILTER FABRIC WRAP REQUIRED FOR SERVICE LINES THAT HAVE NO PERFORATIONS
NOTES:
1. UNDERDRAIN CLEAN OUTS SHALL BE LOCATED AT EACH SANITARY SEWER MANHOLE

CAST IRON LID BOLTED TO THE RING

8" THICK, 1' WIDE CONCRETE COLLAR PLACED AROUND THE CLEAN OUT

4" PVC RISER

4" CLEAN OUT ADAPTER FITTING WITH THREADED PLUG

4" PVC RISER SHALL BE PLACED NEXT TO MANHOLE

COLLECTION SEWER

PVC Y, MAIN x 4"

FLOW

4" MIN. CLEARANCE

CONCRETE SUPPORT FOR Y AND BEND

UNDERDRAIN CLEANOUT DETAIL

Scale: N.T.S.  WW-11  May 2019
NOTES:
1. 1" AIR VALVE SHALL BE INSTALLED ON 6" - 10" MAINS AT HIGH POINTS
2. 2" AIR VALVE SHALL BE INSTALLED ON ALL WATER MAIN 12" AND LARGER EACH HIGH POINT ON THE MAIN
3. INSTALLATION SHALL INCLUDE 1" OR 2" BALL VALVE BETWEEN THE SADDLE AND AIR VALVE
4. AIR VALVE SHALL BE INSTALLED IN PRECAST CONCRETE MANHOLE OR A VAULT

CONCRETE MANHOLE BASE BEAMS 9"x 1'-0"x 8'-0" REINF. WITH BAR STEEL AS SHOWN IN THE FOOTING DETAIL

FOOTING DETAIL

FOOTING DETAIL

PLAN

1' MIN

CONCRETE MANHOLE BASE BEAMS 9"x 1'-0"x 8'-0" REINF. WITH BAR STEEL AS SHOWN IN THE FOOTING DETAIL

AIR & VACUUM RELIEF VALVE DETAIL

Scale: N.T.S. WA-1 May 2019
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

12" PIPE OR SMALLER.

PLUG WITH 2" TAP

BOND BREAKER

CONCRETE THRUST BLOCK, SEE THRUST BLOCK DETAIL (No. WA-14)

CONCRETE THRUST BLOCK, SEE THRUST BLOCK DETAIL (No. WA-14)

FLARED COPPER CONNECTION

BRASS STREET ELBOW

ELEVATION

2" TYPE "K" SOFT COPPER PIPE

2" DRAIN HOLE IN COPPER PIPE

1 CUBIC FEET GRAVEL

PLUG WITH 2" TAP

COMPLETE 4½" CURB STOP BOX
TYLER 6850 SERIES OR EQUAL

2" BALL VALVE: FEMALE I.P. THREAD X FLARE WITH 2" GATE VALVE OPERATING NUT

2" BALL VALVE IN A 4½" CURB STOP BOX

BOND BREAKER

CONCRETE THRUST BLOCK NOT SHOWN @ END OF PLUG

2" COPPER PIPE CAP IN A 6" VALVE BOX

2" SLIP x MALE THD. COPPER

6" FULL VALVE BOX (2 SECTIONS, TOP & CENTER FOR ADJUSTMENTS)

FINISH GRADE

4"-6"

2" COPPER PIPE, SEE THRUST BLOCK DETAIL (No. WA-14)

PLUG WITH 2" TAP

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

12" PIPE OR SMALLER.

PLUG WITH 2" TAP

BOND BREAKER

CONCRETE THRUST BLOCK, SEE THRUST BLOCK DETAIL (No. WA-14)

CONCRETE THRUST BLOCK, SEE THRUST BLOCK DETAIL (No. WA-14)

FLARED COPPER CONNECTION

BRASS STREET ELBOW

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2" TYPE "K" SOFT COPPER PIPE

2" DRAIN HOLE IN COPPER PIPE

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PLUG WITH 2" TAP

COMPLETE 4½" CURB STOP BOX
TYLER 6850 SERIES OR EQUAL

2" BALL VALVE: FEMALE I.P. THREAD X FLARE WITH 2" GATE VALVE OPERATING NUT

2" BALL VALVE IN A 4½" CURB STOP BOX

BOND BREAKER

CONCRETE THRUST BLOCK NOT SHOWN @ END OF PLUG

2" COPPER PIPE CAP IN A 6" VALVE BOX

2" SLIP x MALE THD. COPPER

6" FULL VALVE BOX (2 SECTIONS, TOP & CENTER FOR ADJUSTMENTS)

FINISH GRADE

4"-6"
NOTES:
1. REBAR & STIRRUPS SHALL BE EPOXY COATED IF THE ENCASEMENT IS UNDER A STREAM OR DRAINAGEWAY AND IF THE ENCASEMENT IS IN HIGH GROUND WATER
NOTES:

1. THE WATER LINE SHALL BE INSTALLED BELOW ANY SEWER UNDERDRAINS
2. LENGTH OF EXTENSION OF PIPE AND HARNESS RODS SHALL BE IN ACCORDANCE WITH THESE ENGINEERING STANDARDS. MEGA-LUG RESTRAINTS MAY BE USED FOR JOINT RESTRAINT IN PLACE OF HARNESS RODS
3. CATHODIC PROTECTION SHALL BE AS REQUIRED IN ACCORDANCE WITH THESE ENGINEERING STANDARDS
4. A BORED CROSSING MAY BE REQUIRED BY THE ENGINEER. TUNNELING UNDER EXISTING CURB GUTTER, SIDEWALK OR CROSS PANS WILL NOT BE ALLOWED
5. INSTALL THRUST BLOCKING AS PER THRUST BLOCK DETAIL (No. WA-14)
NOTE:
1. STRIP WIRE CASING TO EXPOSE WIRE FOR PROPER CONDUCTION
2. 12 GAUGE SOLID OR STRANDED WITH 3M DBY CONNECTORS
3. DAYLIGHT TRACER WIRE IN TEST BOXES BEHIND NEAREST FIRE HYDRANT (SEE DETAIL "A" THIS SHEET)
NOTES:
1. NOT FOR INSTALLATION IN ROADWAYS, DRIVEWAYS, OR PARKING AREAS
2. STANDARD COLOR WILL BE DES MOINES SAFETY YELLOW PRODUCT #6162
3. HEIGHT TO CENTER OF STEAMER - 21" MIN. to 25" MAX
4. PROVIDE 5' RADIUS CLEAR ZONE AROUND ALL HYDRANTS
5. DO NOT PLACE ANY HYDRANTS AT THE END OF CUL-DE-SACS
6. 4.5' MIN. DEPTH OF COVER FROM FINISHED GRADE TO TOP OF PIPE
7. ALL JOINTS FROM MAIN TO HYDRANT SHALL BE MECHANICALLY RESTRAINED
8. ALL PIPE AND FITTINGS FROM MAIN TO FIRE HYDRANT SHALL BE PVC PIPE
9. TRACER WIRE TO TERMINATE @ LOCATOR BOX LOCATED AT REAR OF HYDRANT
10. LOCATOR BOX TO BE SETBACK A MAX. OF 1' FROM THE REAR OF THE HYDRANT
11. ENSURE THAT THRUST BLOCK DOES NOT BLOCK WEEP HOLE FOR DRAINAGE
12. SEE THRUST BLOCK DETAIL (No. WA-14)

FIRE HYDRANT DETAIL
WATEROUS PACER 250
WITH NATIONAL STANDARD THREADS

Scale: N.T.S.  May 2019
NOTES:

1. NOT FOR INSTALLATION IN ROADWAYS, DRIVEWAYS, OR PARKING AREAS

2. IF SURFACE IS NOT TO FINAL GRADE AT TIME OF INSTALLATION METER LID SHALL BE 2" ABOVE GRADE

3. METER LID SHALL BE CAST IRON. IT SHALL HAVE A 1 7/8 INCH HOLE FOR ANTENNA ATTACHMENT AND LOCK WITH A PENTAGON BOLT WITH WORMLOCK. METER FROST PLATE SHALL BE RECESSED DISH TYPE

4. METER YOKE SHALL BE LOCATED NOT LOWER THAN 12" BELOW THE TOP LID. IN THE EVENT THE METER PIT IS ADJUSTED TO FINAL GRADE, OWNER SHALL ENSURE THAT THE YOKE BE RAISED/Lowered AS REQUIRED

5. METER TO BE LOCATED A MINIMUM OF 2' FROM THE CURB STOP AND WITHIN THE UTILITY EASEMENT ADJACENT TO FRONT SIDEWALK, UNLESS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS

6. METER PIT SHALL BE PLACED ON FREE-DRAINING GRAVEL BASE, CONCRETE SHALL NOT BE PERMITTED

7. METER PIT SHALL BE 20" INSIDE DIAMETER AND 48" DEEP DUROPIPE BITUMINIZED FIBER BY METRO-STATES PLASTICS OR APPROVED EQUAL

8. SPRINKLER SYSTEM CONNECTIONS SHALL BE LOCATED A MINIMUM OF 3' DOWNSTREAM FROM THE METER PIT. UNDER NO CIRCUMSTANCES ARE SPRINKLER CONNECTIONS PERMITTED IN THE METER PIT

9. NO STRUCTURES ARE TO BE LOCATED WITHIN 4' OF METER PIT. LANDSCAPING IS PERMITTED, HOWEVER ACCESS TO THE METER PIT MUST BE MAINTAINED

10. IF PRESSURE REDUCING VALVE IS REQUIRED BY THE PLUMBING CODE, IT SHALL BE INSTALLED INSIDE THE BUILDING IMMEDIATELY FOLLOWING THE MAIN SHUT-OFF VALVE

11. SERVICE BOX FOR CURB STOP SHALL BE OF THE MUELLER TYPE WITH A COMBINATION LID AND PENTAGON PLUG (MODEL JH-0334) AND AN EXTENSION TYPE CURB BOX WITH ARCH PATTERN BASE AND SHUT-OFF ROD

12. CURB STOPS SHALL BE STRAIGHT AND CLEAN OF ANY DEBRIS

METER SETTING DETAIL
FOR 3 4" AND 1" METERS

PUBLIC WORKS
City of Evans, Colorado
Department
Scale: N.T.S. WA-7 May 2019
ELEVATION DETAILS:
- CURB STOP
- TYPE K COPPER TUBING
- 12" COPPER SETTER/METER YOKE
- METER UNIT
- 3" NIPPLE BETWEEN COPPER SETTER AND CHECK VALVE
- MECH. IRON PIPE TO FLARE COUPLING FROM INLET SIDE OF COPPER SETTER AND OUTLET SIDE OF CHECK VALVE.
- BY-PASS WILL BE 1" FOR 1 1/2" COPPER SETTERS AND 1 1/4" OR 1 1/2" FOR 2" COPPER SETTERS.
- CHECK VALVE
- 48" CONE MANHOLE WITH 24" LID.
- CONCRETE BLOCK SUPPORTS 4" X 4" X 24"
- 24" STANDARD RING AND COVER

NOTES
1. MANHOLE BASE BEAMS SHALL BE REQUIRED
2. A 48" Ø MANHOLE PIT WILL ACCOMMODATE 1 1/2" AND 2" SPLIT CASE METERS
3. JOINTS INSIDE METER VAULT SHALL BE EITHER THREADED OR SOLDERED WITH 95-5 TIN-ANTIMONY SOLDER IN ACCORDANCE WITH ASTM B32
4. NO CONCRETE TO BE LAID IN FLOOR OF METER MANHOLE
5. NO CONNECTIONS OR CHANGES IN PIPE DIAMETER SHALL BE MADE IN THE METER PIT OR IN THE DISTANCE OF 5' BEYOND THE METER PIT ON THE OUTLET SIDE. OTHER THAN THE APPROPRIATE COPPER SETTER
6. THE DISTANCE BETWEEN RUNGS, CLEATS, AND STEPS SHALL NOT EXCEED 12" AND SHALL BE UNIFORM THROUGHOUT THE LENGTH OF THE LADDER
7. VAULT WALL PENETRATIONS MUST BE GROUTED WITH CONCRETE
8. COPPERSETTER OR COPPER METER YOKE FOR 1 1/2" AND 2" WILL BE NO HIGHER THAN 12" WITH A BY-PASS AND BOOT FOR BY-PASS PROVIDED WITH SETTER
9. THE SERVICE LINE THROUGH AND ON BOTH SIDES OF THE METER PIT MUST BE OF THE SAME MATERIAL
10. MANHOLE RING AND COVERS SHALL BE TO CITY OF EVANS STANDARDS
11. METER PITS AND COVERS SHALL BE TO CITY OF EVANS STANDARDS

City of Evans, Colorado
Public Works Department

METER SETTING DETAIL
FOR 1 1/2" & 2" METER
W/ CHECKING VALVE & BYPASS IN MANHOLE

Scale: N.T.S. WA-8 May 2019
1. THE ROOF SLAB MAY BE CAST IN SECTIONS FOR FUTURE ACCESS. THE SECTIONS SHALL BE CAST SUCH THAT THE INDIVIDUAL SECTION WEIGHT DOES NOT EXCEED 7,500 POUNDS.

2. BARS MM - BOTTOM ONLY & BARS LL - TOP AND BOTTOM
<table>
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<tr>
<th>METER SIZE</th>
<th>PIPE SIZE</th>
<th>VAULT DIMENSIONS</th>
<th>MANHOLE</th>
<th>SUMP</th>
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<td>USE 5/16&quot;x 7&quot; MIDDLE RING ON COUPLINGS.</td>
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<td>12&quot;</td>
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<td>8'-6&quot; 19'-10&quot; 6'-0&quot; 0'-10&quot; 9'-2&quot; 20'-6&quot; 2'-3&quot; 5'-0&quot; 2'-3&quot; 3'-0&quot; 3'-3&quot; 5'-3&quot; 2'-6&quot; 3'-0&quot; 2'-6&quot; 36&quot; 24&quot;x36&quot; 18&quot;</td>
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<td>Scale: N.T.S.</td>
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<tr>
<td>WA-9D</td>
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<td>May 2019</td>
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GENERAL NOTES
1. NOT FOR INSTALLATION IN ROADWAYS, DRIVEWAYS, OR PARKING AREAS
2. IF SURFACE IS NOT TO FINAL GRADE AT TIME OF INSTALLATION OF METER LID SHALL BE 2 INCHES ABOVE GRADE
3. METER YOKE SHALL BE LOCATED NOT LOWER THAN 12 INCHES BELOW THE TOP LID. IN THE EVENT THE METER PIT IS ADJUSTED TO FINAL GRADE, OWNER SHALL ENSURE THAT THE YOKE BE RAISED/LOWER AS REQUIRED
4. METER TO BE LOCATED A MINIMUM OF 2 FEET FROM THE CURB STOP AND WITHIN THE UTILITY EASEMENT ADJACENT TO FRONT SIDEWALK, UNLESS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS
5. METER PIT SHALL BE PLACED ON FREE-DRAINING GRAVEL BASE. CONCRETE SHALL NOT BE PERMITTED
6. METER PIT SHALL BE 20 INCH INSIDE DIAMETER DURPIPE MODIFIED POLYETHYLENE BY METRO-STATES PLASTICS OR APPROVED EQUAL
7. NO STRUCTURES ARE TO BE LOCATED WITHIN 4 FEET OF METER PIT. LANDSCAPING IS PERMITTED, HOWEVER ACCESS TO THE METER PIT MUST BE MAINTAINED
8. CURB STOPS SHALL BE STRAIGHT AND CLEAN OF ANY DEBRIS
9. DAYLIGHT RESIDENT STUB OUT AS SHOWN ON DETAIL. CAP OR CRIMP END OF PIPE

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<thead>
<tr>
<th>METER SIZE</th>
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<td>2 1/4-INCH</td>
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<td>2 3/4-INCH</td>
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<td>3 1/4-INCH</td>
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<td>3 1/2-INCH</td>
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<tr>
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<td>4 1/4-INCH</td>
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<td>4 1/2-INCH</td>
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<td>5 3/4-INCH</td>
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<tr>
<td>6-INCH</td>
<td></td>
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</tbody>
</table>
3. SEE BLOW-OFF ASSEMBLY INSTALLATION DETAIL (No. WA-2)

4. SEE THRUST BLOCK DETAIL (No. WA-14)

5. MECHANICALLY RESTRAIN STUB-OUT PIPE BACK TO NEAREST VALVE OR FITTING

NOTES:
1. INSTALL VALVES 5' FROM TEE/CROSS (TYP.)
2. A MINIMUM OF 20' OF PIPE, TRACER WIRE A VALVE, AND A TEMPORARY BLOW-OFF ASSEMBLY SHALL BE PLACED FOR FUTURE CONNECTIONS AND/OR AT THE EDGE OF A PHASE/FILING BOUNDARY IN A SUBDIVISION
3. SEE BLOW-OFF ASSEMBLY INSTALLATION DETAIL (No. WA-2)
4. SEE THRUST BLOCK DETAIL (No. WA-14)
5. MECHANICALLY RESTRAIN STUB-OUT PIPE BACK TO NEAREST VALVE OR FITTING

PIPE INTERSECTIONS & DEAD ENDS DETAIL
FOR FUTURE CONNECTIONS AND/OR PHASE/FILING BOUNDARY

Scale: N.T.S. WA-11 May 2019
WHEN INSTALLING AN 8" OR SMALLER PRV ON A 20" OR SMALLER MAIN, PIPING SHALL BE THE SAME SIZE AS THE PRV (LARGER SIZE CONDUITS AND PRV'S REQUIRE APPROVAL OF LINE SIZE.)

NOTES:

1. A RECTANGULAR VAULT IS REQUIRED
2. ACCESS STAIRS WITH DOOR OUTSIDE OF PAVEMENT MAY BE REQUIRED ON STREETS WITH HEAVY TRAFFIC
3. M.J. - MECHANICAL JOINT
4. THIS MANHOLE IS SUITABLE FOR CHECK VALVE INSTALLATIONS
5. THREADED FITTINGS ON LOW FLOW
6. COUPLING ON LOW FLOW
7. SADDLE FOR TAP FOR LOW FLOW
8. ALL PIPING 4" IN DIAMETER OR GREATER IS D.I.P.
9. NO PVC ALLOWED

PRESSURE RELIEF VALVE DETAIL
PLAN VIEW
SHEET 1 OF 2

Scale: N.T.S. WA-12A May 2019
NOTES:
1. VAULTS SHALL BE PRECAST CONCRETE
2. A PERMIT IS REQUIRED FOR SUMP PUMP DISCHARGE TO STORM SEWERS
STEEL REBAR SHALL BE EPOXY COATED
SLOPE PIPE AS SHOWN ON PROFILE ON PLANS
MIN. OF 4.5 FEET BELOW LOW POINT OF STREAM CHANNEL
ORIGINAL AND FINAL BOTTOM GRADE OF STREAM CHANNEL
REPLACE WITH ORIGINAL MATERIAL EXCAVATED FROM THE STREAM
CONCRETE ENCASEMENT, SEE CONCRETE ENCASEMENT DETAIL (No. WA-3)
REMOVE BEDROCK (IF NECESSARY) TO INSTALL NEW PIPE AND CONCRETE ENCASEMENT
PUBLIC WORKS
STREAM OR DRAINAGEWAY CROSSING DETAIL
Scale: N.T.S. WA-13 May 2019
TEE

BEND-HORIZONTAL OR BOTTOM OF VERTICAL

TEE W/DEAD END ON RUN

CROSS WITH DEAD END BRANCHES

VALVE (GATE OR BUTTERFLY)

PLUG OR LINE CAP SEE NOTE 1 ON SHEET 2

SEE TABLE FOR BEARING AREA EACH SIDE - SHEET 3

SEE TABLE ON SHEET 3 FOR AREA OF CONCRETE TO BEAR ON UNDISTURBED EARTH

#4 DIA. STEEL REINFORCED ANCHOR BAR BENT OVER VALVE - 2-REQ'D.

REBAR

TRENCH WIDTH AS SPECIFIED

MIN. THICKNESS EQUAL TO PIPE O.D.

AS REQ'D

SECTION (TYPICAL)

SEE NOTE 1 ON SHEET 2

DEAD END

DEAD END ON RUN

Y

1'-0"

VALVE

THRUPT BLOCK DETAIL

SHEET 1 OF 3

Scale: N.T.S. WA-14A May 2019
#4 STEEL REBAR ANCHOR BAR BENT OVER THE BEND - 2 REQUIRED

TRENCH BOTTOM

TOP OF VERT. BEND

BAR SIZES FOR 100 PSI

<table>
<thead>
<tr>
<th>LESS THAN</th>
<th>NO. OF BARS &amp; SIZE</th>
<th>MIN. LENGTH OF EMBEDMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 CUBIC FEET</td>
<td>TWO - #4</td>
<td>8&quot;</td>
</tr>
<tr>
<td>90 CUBIC FEET</td>
<td>TWO - #5</td>
<td>12&quot;</td>
</tr>
<tr>
<td>133 CUBIC FEET</td>
<td>TWO - #6</td>
<td>16&quot;</td>
</tr>
</tbody>
</table>

6" FROM BOTTOM OF ELBOW

3" MIN. OF EMBEDMENT

SECTION A-A'

TABLE OF VOLUMES OF CONCRETE (IN CU. FT.)

REQ'D FOR VERT. BEND ANCHOR BLOCKS FOR 100 P.S.I. PRESSURE

ADJUST VOLUMES BY MULTIPLYING TABULATED VALUES BY A CORRECTION FACTOR "F".

F= ACTUAL SPECIFIED TEST PRESSURE

<table>
<thead>
<tr>
<th>PIPE SIZE (INCHES)</th>
<th>BENDS</th>
<th>45°</th>
<th>22 1/2°</th>
<th>11 1/4°</th>
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</thead>
<tbody>
<tr>
<td>3</td>
<td>3.7</td>
<td>1.9</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>6.5</td>
<td>3.3</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>14.6</td>
<td>7.5</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>26.0</td>
<td>13.2</td>
<td>6.6</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>40.5</td>
<td>20.7</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>58.5</td>
<td>30.0</td>
<td>14.8</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>79.5</td>
<td>40.7</td>
<td>20.2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>91.0</td>
<td>46.6</td>
<td>23.2</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>104.0</td>
<td>53.0</td>
<td>26.5</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>67.3</td>
<td>33.4</td>
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<td></td>
</tr>
<tr>
<td>20</td>
<td>83.0</td>
<td>41.0</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>36</td>
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</tbody>
</table>

NOTES FOR DRAWINGS:

1. AT DEAD ENDS, WRAP FITTINGS WITH TAR PAPER, FELT, OR HEAVY KRAFT PAPER TO PROVIDE BOND BREAK BETWEEN CONCRETE AND FITTINGS

2. ALL THRUST BLOCKING SHALL BE CAST-IN-PLACE CONCRETE HAVING A MINIMUM YIELD STRENGTH OF 3000 P.S.I. NO HAND MIXING OF CONCRETE ALLOWED

3. THRUST BLOCKING SHALL BE CAST AGAINST UNDISTURBED EARTH. FORMS SHALL BE USED AS REQUIRED TO OBTAIN ADEQUATE BEARING AREA 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

4. MEGA-LUGS OR OTHER JOINT RESTRAINT MAY BE USED ALONG WITH OR IN PLACE OF CONCRETE THRUST BLOCKS WITH DESIGN SUBMITTED BY PROFESSIONAL ENGINEER AND APPROVED BY PUBLIC WORKS DEPARTMENT

5. PIPE INSTALLED UNDER CONDITIONS DIFFERENT FROM THOSE NORMALLY ENCOUNTERED SHALL REQUIRE THRUST BLOCKS DESIGNED FOR THOSE PARTICULAR CONDITIONS

THRUSS BLOCK DETAIL

SHEET 2 OF 3

Scale: N.T.S.

May 2019
TABLE OF BEARING AREAS IN SQ. FT. FOR CONCRETE
THRUST BLOCKING

FOR 100 P.S.I. INTERNAL STATIC PRESSURE AND 1000 LBS. PER SQ. FT. SOIL BEARING CAPACITY

<table>
<thead>
<tr>
<th>PIPE SIZE (INCHES)</th>
<th>BENDS</th>
<th>* GATE VALVES</th>
<th>DEADENDS AND CROSSES WITH ONE OR TWO BRANCHES PLUGGED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90°</td>
<td>45°</td>
<td>22 1/2°</td>
</tr>
<tr>
<td>3</td>
<td>1.0</td>
<td>0.6</td>
<td>0.3</td>
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<td>4</td>
<td>1.8</td>
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<td>6</td>
<td>4.0</td>
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<td>11.1</td>
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<td>3.0</td>
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<tr>
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<td>16.0</td>
<td>8.6</td>
<td>4.4</td>
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<tr>
<td>36</td>
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</tbody>
</table>

* PIPE SIZES ARE THE SIZE OF THE BRANCH SIZE

BEARING AREAS FOR ANY PRESSURE AND SOIL BEARING CAPACITY MAY BE OBTAINED BY MULTIPLYING THE TABULATED VALUES BY A CORRECTION FACTOR "F".

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

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 3000 LBS. PER SQ. FT.
- \(F = \frac{150}{3000} = 0.5\)
- TABULATED VALUE = 7.1 SQ. FT.
- 0.5 * 7.1 = 3.56 OR ~ 4 SQ. FT. OR 2 FT. LONG BY 2 FT. HIGH

IN THE ABSENCE OF SOIL BEARING CAPACITY INFORMATION, USE ABOVE TABLE
ENCASE PIPE AS PER CONCRETE ENCASEMENT DETAIL (No. WA-3)

10' MIN.

WATER LINE

SANITARY/STORM SEWER LINE

SEWER ABOVE WATER
ALWAYS PROVIDE PROTECTION AS NOTED

PROVIDE PROTECTION AS DETAILED IN THE NOTES IF THIS DIMENSION IS LESS THAN 24"

SANITARY/STORM SEWER LINE

WATERLINE

SANITARY/STORM SEWER LINE

WATER LINE

ENCASE Pipe AS PER CONCRETE ENCASEMENT DETAIL (No. WA-3)

10' MIN.

10' MIN.

PLAN

UTILITY CROSSING DETAIL
NOTES:
1. MINIMUM DENSITY FOR CAREFULLY COMPACTED SELECT BACKFILL SHALL BE 95% OF MAXIMUM OR AS SPECIFIED FOR THE TRENCH BACKFILL - WHICHER IS GREATER

2. COMPACT GRANULAR MATERIAL BY SLICING WITH A SHOVEL AROUND PIPE. WHEN BEDDING IS 6" OVER PIPE, COMPACT WITH VIBRATING COMPACTOR
NOTES:
1. SQUEEGEE SAND IS DEFINED AS MATERIAL IN WHICH 100% PASSES THROUGH A \( \frac{3}{8} \)" SIEVE AND ONLY 0% TO 5% PASSES THROUGH A #200 SIEVE
2. AN OVER-EXCAVATED TRENCH SHALL BE REFILLED AND THOROUGHLY COMPACTED UNDER THE DIRECTION OF THE PUBLIC WORKS DEPARTMENT
3. UNDER NO CIRCUMSTANCES WILL PIPE BE LAID IN A PROPOSED FILL AREA PRIOR TO IT BEING COMPLETELY FILLED. THE FILL WILL BE PLACED FIRST TO PROPOSED GRADE AND COMPACTED AS REQUIRED. A TRENCH THEN WILL BE EXCAVATED AND THE PIPE INSTALLED IN THE PER CITY OF EVANS STANDARDS

<table>
<thead>
<tr>
<th>PIPE DIAMETER</th>
<th>MINIMUM WIDTH</th>
<th>MAXIMUM WIDTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>1'-6&quot;</td>
<td>2'-6&quot;</td>
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<tr>
<td>8&quot;</td>
<td>1'-8&quot;</td>
<td>2'-8&quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>2'-0&quot;</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>2'-4&quot;</td>
<td>3'-4&quot;</td>
</tr>
<tr>
<td>20&quot;</td>
<td>2'-8&quot;</td>
<td>3'-8&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>3'-0&quot;</td>
<td>4'-0&quot;</td>
</tr>
<tr>
<td>30&quot;</td>
<td>3'-6&quot;</td>
<td>4'-6&quot;</td>
</tr>
</tbody>
</table>

WATER LINE TRENCH
CROSS-SECTION DETAIL

Scale: N.T.S.
PUBLIC WORKS DEPARTMENT

City of Evans, Colorado
May 2019
**Type of Main Line Pipe and Size of Tap**

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>3/4&quot;</th>
<th>1&quot;</th>
<th>1-1/2&quot;</th>
<th>2&quot;</th>
<th>3&quot; &amp; 4&quot;</th>
<th>3/4&quot;</th>
<th>1&quot;</th>
<th>1-1/2&quot;</th>
<th>2&quot;</th>
<th>3&quot; &amp; 4&quot;</th>
<th>&lt; 2&quot;</th>
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<tbody>
<tr>
<td>3&quot;</td>
<td>S</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>TSV</td>
<td>NO</td>
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<td>NO</td>
<td>TSV</td>
<td>S</td>
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<td>NO</td>
<td>NO</td>
<td>TSV</td>
<td>S</td>
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<td>TSV</td>
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<td>DT</td>
<td>S</td>
<td>S</td>
<td>TSV</td>
<td>S</td>
<td>S</td>
</tr>
</tbody>
</table>

"S" - Tapping Saddle Required, all saddles shall have the AWWA taper on it's threads.

"DT" - Direct Tap Required

"NO" - No tap permitted with or without a saddle, a tee connection may be permitted if specifically authorized by the water department

"TSV" - Tapping Sleeve and Valve Required

**Note:**

1. All tapping saddles 2" and smaller, shall consist of a bronze body with two (2) bronze straps
2. Existing steel mains 12" in diameter or less, shall be tapped using an approved tapping saddle
3. All taps shall be made with an approved tapping tool
4. No couplings are allowed between curb stop and meter setter. See standards for additional requirements
5. Service shall be Type K copper from main to meter

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**WATER SERVICE CONNECTION DETAIL**

City of Evans, Colorado

Public Works Department

Scale: N.T.S. WA-18 July 2019
WATER VALVE BOX DETAIL
NONPOTABLE WATER

City of Evans, Colorado
Public Works Department

Scale: N.T.S.
WA-20
AUGUST 2019
NOTES:

1. SAW CUT, REMOVABLE PLASTIC DUMMY JOINT STRIPS OR OTHER APPROVED JOINTS AT 10' ON CENTER.

2. EXPANSION JOINTS REQUIRED AT 400' SPACING. ADDITIONAL JOINTS MAY BE REQUIRED AT THE DISCRETION OF THE CITY. WHEN CONCRETE IS PLACED BY MACHINE, EXPANSION JOINTS ARE ONLY REQUIRED AT THE BEGINNING AND AT THE END OF THE POUR. ALL EXPANSION JOINTS TO BE CAULKED. SEE DETAIL S-4

3. CONCRETE SHALL BE 4500 PSI AND FIBER REINFORCED AS APPROVED BY THE CITY.

4. BIKE PATHS WITH GREATER THAN 5% SLOPE SHALL REQUIRE A SPECIAL DESIGN.
NOTES:

1. NO PARKING ZONES SHALL BE INDICATED WITH "NO PARKING AT ANYTIME" SIGNS AT THE BEGINNING AND AT THE END.

2. A CONCRETE PAD SHALL BE CONSTRUCTED AT THE BUS STOP LOCATION WITH THE DIMENSIONS OF 13.5' LONG PARALLEL TO THE SIDEWALK, 11' WIDE, AND A MINIMUM OF 6" THICK.
CRITERIA FOR REPAIR OF CURB, GUTTER, SIDEWALKS & DRIVEWAY APPROACHES IN THE PUBLIC RIGHT OF WAY:

A. TWO SECTIONS HAVING AN ELEVATION DIFFERENCE OF 3/4" OR GREATER, AT ANY LOCATION ALONG THE TOOLED JOINT OR CRACK.

B. ANY SECTION WITH CRACKS 1/2" IN WIDTH, OR GREATER.

C. SPALLING (CRUMBLING OF CONCRETE SURFACE) OF DEPTHS GREATER THAN 3/4", OR ENCOMPASSING MORE THAN 50% OF THE CONCRETE SECTION.

D. ANY PORTION OF A CONCRETE SECTION MISSING.

E. SECTIONS DISPLACED FROM ORIGINAL GRADE CAUSING MORE THAN 20:1 SLOPE.
NOTES FOR CONTRACTION JOINTS:

1. FORM WITH TOOL TEMPLATE OR SAW CUT JOINTS.
2. SAW CUT JOINTS, IF USED, SHALL BEGIN AS SOON AS CONCRETE IS HARDENED SUFFICIENTLY TO PERMIT SAWING WITHOUT EXCESSIVE RAVELING AND BEFORE UNCONTROLLED CRACKING OCCURS.
3. MAXIMUM DISTANCE BETWEEN JOINTS IS 10' AND THE MINIMUM DISTANCE IS 5'.

OUTDOOR INDUSTRIAL RATED SILICON CAULKING OR APPROVED EQUAL

JOINT FLUSH WITH SIDEWALK WITH JOINT MATERIAL AND APPROVED CAULKING

1/2" PREMOLDED NON-EXTRUDING EXPANSION JOINT MATERIAL

EXPANSION JOINT

NOTES FOR EXPANSION JOINTS:

EXPANSION JOINTS REQUIRED AT 400' SPACING. ADDITIONAL JOINTS MAY BE REQUIRED AT THE DISCRETION OF THE CITY. WHEN CONCRETE IS PLACED BY MACHINE, EXPANSION JOINTS ARE ONLY REQUIRED AT THE BEGINNING AND AT THE END OF THE POUR.

GROOVE JOINT

1/4" MAX.

CONTRACTION JOINT

NOTES FOR CONTRACTION JOINTS:

1. FORM WITH TOOL TEMPLATE OR SAW CUT JOINTS.
2. SAW CUT JOINTS, IF USED, SHALL BEGIN AS SOON AS CONCRETE IS HARDENED SUFFICIENTLY TO PERMIT SAWING WITHOUT EXCESSIVE RAVELING AND BEFORE UNCONTROLLED CRACKING OCCURS.
3. MAXIMUM DISTANCE BETWEEN JOINTS IS 10' AND THE MINIMUM DISTANCE IS 5'.
NOTES:
1. MINIMUM OF 0.6% LONGITUDINAL SLOPE FOR CROSS PANS.
2. MAXIMUM SPACING OF CONTRACTION JOINTS IS 10'.
3. CONCRETE APRON SHALL BE POURED MONOLITHICALLY WITH CURB/WALK AND SHALL BE 8" THICK (SEE DETAILS No. S-11 THROUGH S-14).
4. CROSS PAN AND APRON MAY BE POURED MONOLITHICALLY.
5. SEE THE SPECIFICATIONS FOR STREET DESIGN AND CONSTRUCTION FOR PERMISSIBLE LOCATIONS OF CROSS PANS.
6. MID-BLOCK CROSS PANS SHALL BE A MINIMUM OF 10' WIDE.
7. LARGER CROSS PAN WIDTH MAY BE REQUIRED BY THE CITY.
8. DOWELING MAY BE REQUIRED AT COLD JOINTS AT THE CITY'S DIRECTION.
9. CONCRETE SHALL BE 4500 PSI.
CUL-DE-SAC MAY HAVE A MAXIMUM LENGTH OF 500', MEASURED FROM INTERSECTION £ TO RADIUS POINT (TYP.)

LOCAL

STANDARD TYPE 2 SECTION II-B VERTICAL FACE CURB, GUTTER & SIDEWALK (SEE DETAIL No. S-7)

RURAL LOCAL

NOTE: THESE STANDARDS MAY BE APPLIED TO ASYMMETRICAL CUL-DE-SACS.
- DESIGN ENGINEER SHOW REFERENCE ELEVATIONS AT THESE POINTS
NOTES:
1. CONTRACTION JOINTS FOR CURB AND GUTTER SHALL MATCH SIDEWALKS MAXIMUM SPACING 10'.

2. EXPANSION JOINTS REQUIRED AT 400' SPACING. ADDITIONAL JOINTS MAY BE REQUIRED AT THE DISCRETION OF THE CITY. WHEN CONCRETE IS PLACED BY MACHINE, EXPANSION JOINTS ARE ONLY REQUIRED AT THE BEGINNING AND AT THE END OF THE POUR. SEE DETAIL No. S-4

3. AT ALLEYS, COMMERCIAL DRIVEWAYS AND GAS AND OIL ACCESSES, THE CURB & GUTTER THICKNESS SHALL BE INCREASED TO 8".

4. THE FOLLOWING SYMBOLS SHALL BE STAMPED ON THE FRONT OF THE CURB FACE TO INDICATE THE LOCATION OF SERVICE LINES INTO A LOT:

   I - IRRIGATION
   W - WATER
   S - SEWER
   NP - NONPOTABLE WATER
   G - GAS

5. CONCRETE SHALL BE 4500 PSI.
NOTES:
1. CONTRACTION JOINTS FOR CURB AND GUTTER SHALL MATCH SIDEWALKS. MAXIMUM SPACING 10'.

2. EXPANSION JOINTS REQUIRED AT 400' SPACING. ADDITIONAL JOINTS MAY BE REQUIRED AT THE DISCRETION OF THE CITY. WHEN CONCRETE IS PLACED BY MACHINE, EXPANSION JOINTS ARE ONLY REQUIRED AT THE BEGINNING AND AT THE END OF THE POUR. SEE DETAIL No. S-4

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   I - IRRIGATION
   W - WATER
   S - SEWER
   NP - NONPOTABLE WATER
   G - GAS

4. CONCRETE SHALL BE 4500 PSI.
NOTES:
1. MAXIMUM SPACING OF CONTRACTION JOINTS IS 10'.

2. EXPANSION JOINTS REQUIRED AT 400' SPACING. ADDITIONAL JOINTS MAY BE REQUIRED AT THE DISCRETION OF THE CITY. WHEN CONCRETE IS PLACED BY MACHINE, EXPANSION JOINTS ARE ONLY REQUIRED AT THE BEGINNING AND AT THE END OF THE POUR. SEE DETAIL NO. S-4

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   - I - IRRIGATION
   - W - WATER
   - S - SEWER
   - NP - NONPOTABLE WATER
   - G - GAS

4. CONCRETE SHALL BE 4500 PSI.
NOTES:
1. DETACHED SIDEWALK WHEN USED WITH THIS SECTION SHALL BE 6" MINIMUM THICKNESS.

2. MAXIMUM SPACING OF CONTRACTION JOINTS IS 10'.

3. EXPANSION JOINTS REQUIRED AT 400' SPACING. ADDITIONAL JOINTS MAY BE REQUIRED AT THE DISCRETION OF THE CITY. WHEN CONCRETE IS PLACED BY MACHINE, EXPANSION JOINTS ARE ONLY REQUIRED AT THE BEGINNING AND AT THE END OF THE POUR, SEE DETAIL NO. S-4

4. THE FOLLOWING SYMBOLS SHALL BE STAMPED ON THE FRONT OF THE CURB FACE TO INDICATE THE LOCATION OF SERVICE LINES INTO A LOT:
   - I - IRRIGATION
   - W - WATER
   - S - SEWER
   - NP - NONPOTABLE WATER
   - G - GAS

5. CONCRETE SHALL BE 4500 PSI.
1. THE RAMP AREA SHALL RECEIVE A COARSER SURFACE TREATMENT THAN THE SIDEWALK.
2. 6" CONCRETE THICKNESS APPLIES TO RAMP, SIDE SLOPES & WALK AREAS.
3. CONSTRUCT CURB RAMPS AT ALL INTERSECTIONS.
4. CONCRETE SHOWN (EXCEPT FOR RAMPS AND WALKS) SHALL BE POURED MONOLITHICALLY.
5. CONCRETE SHALL BE 4500 PSI.
3-D VIEW

PLAN VIEW

TRANSITION FROM C & G SECTION TO PAN SECTION (TYP.)

EXPANSION JOINT

CONTRACTION JOINT

LIMIT OF CONSTRUCTION FOR RADIUS W/O APRON & CROSS PAN

CONTRACTION JOINT

RADIUS

SECTION A-A'

SECTION A-B

SECTION C-C'

CONSTRUCTION JOINT

6'-0" MIN.

6'-0" MIN.

5'-0" MIN.

5'-0" MIN.

6'-0"

6'-0"

6" MIN.

CONCRETE THICKNESSES SHOWN ARE TYPICAL THROUGHOUT THE RADIUS

SLOPE 2% MAX.

1:12 SLOPE MAX.

1/8" RADIUS (TYP.)

8"

(WHEN APRON IS REQD FOR CROSS PAN)

NOTES:

1. THE RAMP AREA SHALL RECEIVE A COARSER SURFACE TREATMENT THAN THE SIDEWALK.

2. 6" CONCRETE THICKNESS APPLIES TO RAMP, SIDE SLOPES & WALK AREAS.

3. CONSTRUCT CURB RAMPS AT ALL INTERSECTIONS.

4. CONCRETE SHOWN (EXCEPT FOR RAMPS AND WALKS) SHALL BE POURED MONOLITHICALLY.

5. CONCRETE SHALL BE 4500 PSI.

CURB RAMP DETAIL
ATTACHED SIDEWALK

Scale: N.T.S
Detail No. S-13
May 2019
3-D VIEW

STANDARD TYPE 2 SECTION II-B
VERTICAL CURB REQ'D TO BEGINNING
OF SLOPE (TYP.)

EXPANSION JOINT

CONTRACTION JOINT

TRANSITION FROM C & G
SECTION TO PAN SECTION
(TYP.)

PLANT VIEW

SLOPE 2% MAX.

CONCRETE THICKNESSES SHOWN
ARE TYPICAL THROUGHOUT THE
RADIUS.

EXPANSION JOINT

CONSTRUCTION JOINT

SECTION A-A'

SECTION C-C'

SECTION A-B

CONSTRUCTION
JOINT

SECTION TO PAN SECTION
(TYP.)

NOTE:
1. THE RAMP AREA SHALL RECEIVE A
COARSER SURFACE TREATMENT
THAN THE SIDEWALK.

2. 6" CONCRETE THICKNESS APPLIES TO
RAMP AND SIDE SLOPE AREAS.

3. CONSTRUCT CURB RAMPS AT ALL
INTERSECTIONS.

4. CONCRETE SHOWN (EXCEPT FOR
RAMPS AND WALKS), SHALL BE
POURED MONOLITHICALLY.

5. CONCRETE SHALL BE 4500 PSI.
NOTES:
1. THE RAMP AREA SHALL RECEIVE A COARSER SURFACE TREATMENT THAN THE SIDEWALK.

CURB RAMP DETAIL
DETACHED SIDEWALK

Public Works Department
Scale: N.T.S Detail No. S-15 May 2019
NOTES:
1. EXPANSION JOINTS REQUIRED AT 400' SPACING. ADDITIONAL JOINTS MAY BE REQUIRED AT THE DISCRETION OF THE CITY. WHEN CONCRETE IS PLACED BY MACHINE, EXPANSION JOINTS ARE ONLY REQUIRED AT THE BEGINNING AND AT THE END OF THE POUR. SEE DETAIL No. S-4

2. MAXIMUM SPACING OF CONTRACTION JOINTS - 10'.

3. THE SIDEWALK THICKNESS SHALL BE A MINIMUM OF 6".

4. AT ALLEYS, COMMERCIAL DRIVEWAYS, AND OIL/GAS ACCESS POINTS, THE SIDEWALK THICKNESS SHALL BE INCREASED TO 8".

5. CONCRETE SHALL BE 4500 PSI.
NOTES:
1. CONTRACTION JOINTS ARE REQUIRED AT EACH END OF WARPED SECTION & SHOULD BE EVENLY SPACED.
2. APPLY BROOM FINISH TO SURFACE.
3. DRIVEWAY SECTION, INCLUDING TRANSITION, SHALL BE 6" THICK ON ALL RESIDENTIAL, MULTIFAMILY RESIDENTIAL, AND 8" THICK ON ALL COMMERCIAL, INDUSTRIAL, AND ALLEY DRIVEWAYS, AND OIL/GAS ACCESS POINTS.
4. DRIVEWAY WIDTHS: 10'(MIN.) & 20'(MAX.)
5. DRIVEWAY WIDTHS FOR COMMERCIAL/INDUSTRIAL AREAS AS APPROVED BY THE CITY.
6. SHOW DIMENSIONS OF DRIVEWAY ON DETAILED CONSTRUCTION PLANS.
7. RETROFIT DRIVE APPROACHES SHALL MATCH EXISTING CONDITIONS, EXCEPT CONCRETE THICKNESSES SHALL CONFORM TO THIS DETAIL.
4. DRIVEWAY WIDTHS:
   10' (MIN.) & 20' (MAX.)

5. DRIVEWAY WIDTHS FOR COMMERCIAL/INDUSTRIAL AREAS AS APPROVED BY THE CITY.

6. SHOW DIMENSIONS OF DRIVEWAY ON DETAILED CONSTRUCTION PLANS.

7. RETROFIT DRIVE APPROACHES SHALL MATCH EXISTING CONDITIONS EXCEPT CONCRETE THICKNESSES SHALL CONFORM TO THIS DETAIL.
NOTES:

1. A SEALER SHALL BE USED BETWEEN ALL ADJUSTING RINGS AS REQUIRED.
2. DROP-IN RISER RINGS NOT ALLOWED.
3. SET & TILT RING & COVER TO MATCH SLOPE OF FINISHED STREET.
4. ALL CONCRETE SHALL BE MIN. 4500 PSI.
NOTES:

1. CUT AND FILL SLOPES SHALL BE A MAXIMUM OF 4:1.
2. RIGHT OF WAY AND EASEMENT AREAS SHALL BE GRADED (CUT & FILL) TO SUBGRADE ± 6" AT UTILITY LOCATIONS, INCLUDING SERVICES, PRIOR TO UTILITY INSTALLATION.
3. STANDARD CROWN SLOPE IS 2%. WITH SPECIAL DESIGN REVIEW, 1% TO 4% IS ALLOWABLE AT TRANSITION AND OTHER ATYPICAL SECTIONS.
4. LANDSCAPED PARKWAY OF EITHER MAINTAINED TURF OR XERISCAPE IS REQUIRED.
5. NO PARKING SIGNS REQUIRED, BOTH SIDES OF STREET.
NOTES:
1. CUT AND FILL SLOPES SHALL BE A MAXIMUM OF 4:1.
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4. LANDSCAPED PARKWAY OF EITHER MAINTAINED TURF OR XERISCAPE IS REQUIRED.

5. NO PARKING SIGNS REQUIRED, BOTH SIDES OF STREET.

6. ALLOW FOR 6' BIKE LANE ON EACH SIDE WHERE APPROPRIATE.
ROADWAY SECTION DETAIL
COMMERCIAL COLLECTOR

NOTES:

1. CUT AND FILL SLOPES SHALL BE A MAXIMUM OF 4:1

2. RIGHT OF WAY AND EASEMENT AREAS SHALL BE GRADED (CUT & FILL) TO SUBGRADE ± 6" AT UTILITY LOCATIONS, INCLUDING SERVICES, PRIOR TO UTILITY INSTALLATION

3. STANDARD CROWN SLOPE IS 2%. WITH SPECIAL DESIGN REVIEW, 1% TO 4% IS ALLOWABLE AT TRANSITION AND OTHER ATYPICAL SECTIONS

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NOTES:

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4. LANDSCAPED PARKWAY OF EITHER MAINTAINED TURF OR XERISCAPE IS REQUIRED.

5. NO PARKING SIGNS REQUIRED, BOTH SIDES OF STREET.
NOTES:
1. CUT AND FILL SLOPES SHALL BE A MAXIMUM OF 4:1.
2. RIGHT-OF-WAY AND EASEMENT AREAS SHALL BE GRADED (CUT & FILL) TO SUBGRADE ± 6" AT UTILITY LOCATIONS, INCLUDING SERVICES, PRIOR TO UTILITY INSTALLATION.
3. STANDARD CROWN SLOPE IS 2%. WITH SPECIAL DESIGN REVIEW, 1% TO 4% IS ALLOWABLE AT TRANSITION AND OTHER ATYPICAL SECTIONS.

ROADWAY SECTION DETAIL
LOCAL

Scale: N.T.S
Detail No. S-26
May 2019
NOTES:

1. CUT AND FILL SLOPES SHALL BE A MAXIMUM OF 4:1.

2. RIGHT OF WAY AND EASEMENT AREAS SHALL BE GRADED (CUT & FILL) TO SUBGRADE ± 6" AT UTILITY LOCATIONS, INCLUDING SERVICES, PRIOR TO UTILITY INSTALLATION.

3. STANDARD CROWN SLOPE IS 2%. WITH SPECIAL DESIGN REVIEW, 1% TO 4% IS ALLOWABLE AT TRANSITION AND OTHER ATYPICAL SECTIONS.

4. DRAINAGE SWALES SHALL BE CONSTRUCTED ON EACH SIDE OF RIGHT OF WAY, AS SHOWN. MAXIMUM 5:1 SHOULDER SLOPE PERMITTED.

5. DRIVEWAY CROSSING PERMITTED AT APPROVED LOCATIONS ONLY. ALL CROSSINGS SHALL INCLUDE 12" CORRUGATED METAL PIPE (CMP) CULVERT WITH FLARED END SECTIONS ON EACH END. 12" MINIMUM COVER SHALL BE PLACED OVER CULVERT PIPE, AND DRIVEWAY SHALL BE GRADED TO PREVENT SURFACE FLOW DISCHARGE INTO THE STREET. ALL DRIVEWAYS AND CULVERTS ARE TO BE CONSTRUCTED AND MAINTAINED BY THE PROPERTY OWNER.

6. DRAINAGE EASEMENT REQUIRED, 10' MINIMUM.

7. UTILITY EASEMENT REQUIRED, 5' MINIMUM.

8. PERMITTED ONLY FOR RURAL AND LARGE LOT DEVELOPMENTS WITH LOT SIZES OF ONE ACRE OR GREATER.
NOTES:

1. CUT AND FILL SLOPES SHALL BE A MAXIMUM OF 4:1.

2. RIGHT OF WAY AND EASEMENT AREAS SHALL BE GRADED (CUT & FILL) TO SUBGRADE ±6" AT UTILITY LOCATIONS, INCLUDING SERVICES, PRIOR TO UTILITY INSTALLATION.

3. STANDARD CROWN SLOPE IS 2%. WITH SPECIAL DESIGN REVIEW, 1% TO 4% IS ALLOWABLE AT TRANSITION AND OTHER ATYPICAL SECTIONS. INVERTED CROWN WITH CENTRAL VALLEY PAN MAY BE ALLOWED IF APPROVED BY THE CITY ENGINEER.

4. NO PARKING PERMITTED.

5. BITUMINOUS SURFACE COURSE REQUIRED.
RAISED PATTERN
NON-SKID, GALVANIZED
STEEL PLATE (AASHTO
M-111)

PLACE FIRST SCREW 6" FROM
FRONT EDGE OF PLATE.
SCREWS ONE
SIDE ONLY

NOTE:
SLOPE CHANNEL 2% IN THE
DIRECTION OF THE FLOW

PLAN VIEW

SECTION A-A'

SLOPE PLATE TO
MATCH SIDEWALK

CAULK OVER
EXPANSION MATERIAL
(SEE DETAIL No. S-3)

SECTION B-B'

3/8" NON-CORROSIVE MACHINE SCREW
(TYP.) AT 12" O.C. - COUNTERSUNK
SCREWS ALONG ONE SIDE ONLY

NOTES:
1. FOR TYPE 2 SECTION MS MODIFIED, TRANSITION (3’ MIN.) TO
   TYPE 2 SECTION IIB FOR CHASE CONSTRUCTION.
2. WHEN THE CURB IS SEPARATED FROM THE SIDEWALK, THE
   STEEL PLATE SHALL BE PLACED ON THE SIDEWALK AND THE
   CONCRETE CHANNEL (WITH 6" THICK WALLS ON EACH SIDE)
   CONTINUED INTO THE CURB AND GUTTER.
3. NEENAH R-4999 SERIES BOLTED TRANSVERSE DRAINAGE
   STRUCTURE, SOLID CHECKERED TYPE D GRATE MAY BE
   SUBSTITUTED.

Public Works
Department

City of Evans, Colorado

SIDEWALK CHASE
DETAIL

Scale: N.T.S
Detail No. S-29
May 2019
BEGIN TRANSITION OF CROWN TO MAJOR STREET

DESIGN ENGINEER SHOW REFERENCE ELEVATIONS AT THESE POINTS

CURB, GUTTER AND SIDEWALK (TYP.)

ONLY REQ'D IF GRADE BREAKS (TYP.)

ARTERIAL OR COLLECTOR STREET CENTER LINE

4% MAX. 2% MIN. SLOPE

30' MIN. 50' MAX.

2% MIN. 4% MAX. SLOPE

ARTERIAL OR COLLECTOR STREET CENTER LINE

4% MAX. 2% MIN. SLOPE

30' MIN. 50' MAX.

2% MIN. 4% MAX. SLOPE

STREET INTERSECTION APPROACH DETAIL COLLECTOR & ARTERIAL
NOTES:
1. RIGHT OF WAY & EASEMENT AREAS SHALL BE GRADED (CUT & FILL) TO SUBGRADE AT UTILITY LOCATIONS INCLUDING SERVICES, PRIOR TO UTILITY INSTALLATION.

2. BACKFILL TO BE COMPACTED TO 95% WITH IN ±2% OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY A.S.T.M. D-698 DENSITY IN ALL AREAS UNLESS OTHERWISE NOTED. ALL TRENCHES SHALL BE COMPACTED BY A METHOD APPROVED BY THE CITY.

3. TRENCH EXCAVATION SHALL COMPLY WITH ALL OSHA STANDARDS.

4. FILTER FABRIC IS REQUIRED IF STABILIZATION MATERIAL IS USED. THE FABRIC SHALL BE INSTALLED AS SHOWN IN THE DETAIL.

5. IF NOT SPECIFIED BY APPLICABLE UTILITY, AN APPROVED GRADE OF SAND BEDDING SHALL BE INSTALLED TO SPRINGLINE.

6. A 1-FOOT CUT BACK IS NOT REQUIRED IF FLOW FILL IS USED FOR BACKFILL.

7. SEE WATER LINE TRENCH DETAIL CROSS-SECTION DETAIL IN THE SPECIFICATIONS FOR WATER AND SANITARY SEWER SYSTEMS FOR ADDITIONAL INFORMATION.
CONCRETE COLLARS IN LANDSCAPED AREAS

EXISTING ASPHALT

LID

12"

CONCRETE COLLAR - 8" MINIMUM THICKNESS IN LANDSCAPED AREAS

FINISHED GRADE

LIMITS OF EXCAVATION

1/4" TO 1/2"

#3 REBAR HOOP

NOTES:
1. VALVE BOX MUST BE PLUMB AND CENTERED OVER THE VALVE NUT
2. THIS DETAIL APPLIES TO BOTH ASPHALT AND CONCRETE STREETS
WATER VALVE RAISING DETAIL
NONPOTABLE WATER VALVE

NOTES:
1. VALVE BOX MUST BE PLUMB AND CENTERED OVER THE VALVE NUT
2. THIS DETAIL APPLIES TO BOTH ASPHALT AND CONCRETE STREETS
3. VALVE SHALL BE D&L SUPPLY MODEL M9009 OR APPROVED EQUAL
STREET WIDTH GREATER THAN OR EQUAL TO 34’

CENTERLINE

SEE PLAN AND PROFILE FOR
UTILITY DEPTHS

NOTES:

1. ALIGNMENTS MAY DEVIATE FROM WHAT IS SHOWN HERE WITH ROAD ALIGNMENT,
   BUT ALL UTILITIES SHOWN MUST BE WITHIN THE ROAD ROW.

2. SEE PLANS FOR FINAL ALIGNMENT.

TYPICAL UTILITY LOCATION
CROSS SECTION

Public Works
Department

Scale: N.T.S.  Detail No. S-35  May 2019
### Notes:

1. All "X" distances shall be 10 feet measured perpendicular from the projected flowline of the intersecting street as shown on this diagram.

2. These distances are typical sight distance triangles to be used under normal conditions and may be modified by the city engineer in order to protect the public safety and welfare in the event that exceptional site conditions necessitate such modification.

<table>
<thead>
<tr>
<th>Type of street</th>
<th>Speed of Major Street</th>
<th>Y distances (feet)</th>
<th>X distances (feet)</th>
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<tbody>
<tr>
<td>Arterial</td>
<td>35 - 50+</td>
<td>450</td>
<td>10</td>
</tr>
<tr>
<td>Collector</td>
<td>30 -35</td>
<td>350</td>
<td>10</td>
</tr>
<tr>
<td>Local</td>
<td>25 - 30</td>
<td>250</td>
<td>10</td>
</tr>
</tbody>
</table>

**Sight Distance Triangle Setbacks**

**Scale:** N.T.S.  
**Detail No:** S-36  
**May 2019**
NOTES:
1. 1" AIR VALVE SHALL BE INSTALLED ON 6" - 10" MAINS AT HIGH POINTS
2. 2" AIR VALVE SHALL BE INSTALLED ON ALL WATER MAIN 12" AND LARGER AT EACH HIGH POINT ON THE MAIN
3. INSTALLATION SHALL INCLUDE 3/4" OR 2" GATE VALVE BETWEEN THE SADDLE AND AIR VALVE
4. AIR VALVE SHALL BE INSTALLED IN PRECAST CONCRETE MANHOLE OR A VAULT

CONCRETE MANHOLE BASE BEAMS 9"x 1'-0"x 8'-0" REINF. WITH BAR STEEL AS SHOWN IN THE FOOTING DETAIL

THREE - #6 CONT. (TYP.)

#4 @ 18"

8' 4' 4' 1'

GROUND LINE

FRAME

FOOTING

3" TO 6" ABOVE PIPE

Q PIPE

3/4" ROCK

6" BALLARD COLUMN FULL OF CONCRETE AS REQUIRED BY THE CITY

FABRICATED SCREEN OR RESIDENTIAL VENT

4' TYP.

BREAK-AWAY COUPLING

1' MIN.

6" VENT

6" 90° BEND

Plan

Elevation

Footing Detail

City of Evans, Colorado
Public Works Department

AIR & VACUUM RELIEF VALVE DETAIL

Scale: N.T.S.
NP-1
May 2019
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

CONCRETE THRUST BLOCK, SEE THRUST BLOCK DETAIL (No. NP-15)

BOND BREAKER

PLUG WITH 2" TAP

12" PIPE OR SMALLER.

2" BALL VALVE IN A 4¾" CURB STOP BOX

FLARED COPPER CONNECTION

BRASS STREET ELBOW

FINISH GRADE

2" COPPER PIPE CAP IN A NONPOTABLE IRRIGATION VALVE BOX (DETAIL NP-12)

FLARED COPPER CONNECTION

PLUG WITH 2" TAP

BOND BREAKER

CONCRETE THRUST BLOCK, SEE THRUST BLOCK DETAIL (No. NP-15)

2" COPPER PIPE CAP IN A NONPOTABLE IRRIGATION VALVE BOX (DETAIL NP-12)

BOND BREAKER

CONCRETE THRUST BLOCK, SEE THRUST BLOCK DETAIL (No. NP-15)

1 CUBIC FEET GRAVEL

ELEVATION

THRUSET BLOCK, SEE THRUST BLOCK DETAIL (No. NP-15)

2" SLIP x MALE THD. COPPER

6" FULL VALVE BOX (2 SECTIONS, TOP & CENTER FOR ADJUSTMENTS)

COMPLETE 4¾" CURB STOP BOX TYLER 6850 SERIES OR EQUAL

2" BALL VALVE, FEMALE I.P. THREAD X FLARE WITH 2" GATE VALVE Operating NUT

2" TYPE "K" SOFT COPPER PIPE

2" THREADED BRASS PIPE

CONCRETE THRUST BLOCK NOT SHOWN

THRUSET BLOCK, SEE THRUST BLOCK DETAIL (No. NP-15)

½" DRAIN HOLE IN COPPER PIPE

1 CUBIC FEET GRAVEL

PLUG WITH 2" TAP

Scale: N.T.S.

NP-2

May 2019
1. REBAR & STIRRUPS SHALL BE EPOXY COATED IF THE ENCASEMENT IS UNDER A STREAM OR DRAINAGEWAY AND IF THE ENCASEMENT IS IN HIGH GROUND WATER

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>W</th>
<th>A</th>
</tr>
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<tbody>
<tr>
<td>6&quot;</td>
<td>4&quot;</td>
<td>4&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
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</tr>
<tr>
<td>21&quot;</td>
<td>5&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>24&quot; +</td>
<td>6&quot;</td>
<td>6&quot;</td>
</tr>
</tbody>
</table>
NOTES:

1. THE WATER LINE SHALL BE INSTALLED BELOW ANY SEWER UNDERDRAINS

2. LENGTH OF EXTENSION OF PIPE AND HARNESS RODS SHALL BE IN ACCORDANCE WITH THESE ENGINEERING STANDARDS. MEGA-LUG RESTRAINTS MAY BE USED FOR JOINT RESTRAINT IN PLACE OF HARNESS RODS

3. A BORED CROSSING MAY BE REQUIRED BY THE ENGINEER. TUNNELING UNDER EXISTING CURB GUTTER, SIDEWALK OR CROSS PANS WILL NOT BE ALLOWED

4. INSTALL THRUST BLOCKING AS PER THRUST BLOCK DETAIL (No. NP-15) IN SECTION 7

5. RESTRRAIN ALL JOINTS FROM BEGINNING TO END
NOTE:
1. STRIP WIRE CASING TO EXPOSE WIRE FOR PROPER CONDUCTION
2. 12 GAUGE SOLID OR STRANDED WITH 3M DBY CONNECTORS

COPPER TRACER WIRE DETAIL ON PVC PIPE

Scale: N.T.S. NP-5 May 2019
1. MAINTAIN 4.5' OF COVER ABOVE POTABLE AND NON-POTABLE WATER LINES.

2. ALL PIPE FROM THE TAPPING SADDLES AND WITHIN THE VAULT SHALL BE 6" DUCTILE IRON PIPE CLASS 52 DIP WITH PROPER CORROSION PROTECTION (POLYWRAP REQUIRED ONLY WHERE IN CONTACT WITH SOIL)
CONCRETE EXTENSION COLLARS TO BRING TO 3" ABOVE GRADE

#5 REBAR 12" ON CENTER

DOWELS

#4 REBAR 16" ON CENTER

#5 REBAR 12" ON CENTER

STEEL PIPE SUPPORTS (TYP)

LADDER RUNGS

#5 REBAR 12" ON CENTER

12" MIN

3" CLEAR

10" TOP

18" MIN

6" DRESSER COUPLING

6" PIPE SPOOL

6" TURBINE METER

DRAIN

2" CLEAR

10" BASE

2" X 4" KEYWAY (TYP)

#5 REBAR 12" ON CENTER

3" CLEAR

12" FLOOR DRAIN

FILL WELL WITH 3/4" CRUSHED ROCK

48" DIAMETER PERFORATED DRY WELL

2'-6"

3'-0"

42" ACCESS

#5 REBAR

#7 REBAR

#5 REBAR 12" ON CENTER

6" PIPE SPOOL

6" TURBINE METER

DRAIN

2" CLEAR

10" BASE

2" X 4" KEYWAY (TYP)

#5 REBAR 12" ON CENTER

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3" CLEAR

12" FLOOR DRAIN

FILL WELL WITH 3/4" CRUSHED ROCK

48" DIAMETER PERFORATED DRY WELL

2'-6"

3'-0"
GENERAL NOTES

1. NOT FOR INSTALLATION IN ROADWAYS, DRIVEWAYS, OR PARKING AREAS

2. IF SURFACE IS NOT TO FINAL GRADE AT TIME OF INSTALLATION OF METER LID SHALL BE 2 INCHES ABOVE GRADE

3. METER YOKE SHALL BE LOCATED NOT LOWER THAN 12 INCHES BELOW THE TOP LID. IN THE EVENT THE METER PIT IS ADJUSTED TO FINAL GRADE, OWNER SHALL ENSURE THAT THE YOKE BE RAISED/LOWER AS REQUIRED

4. METER TO BE LOCATED A MINIMUM OF 2 FEET FROM THE CURB STOP AND WITHIN THE UTILITY EASEMENT ADJACENT TO FRONT SIDEWALK, UNLESS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS

5. METER PIT SHALL BE PLACED ON FREE-DRAINING GRAVEL BASE. CONCRETE SHALL NOT BE PERMITTED

6. METER PIT SHALL BE 20 INCH INSIDE DIAMETER DUROPIPE MODIFIED POLYETHYLENE BY METRO-STATES PLASTICS OR APPROVED EQUAL

7. NO STRUCTURES ARE TO BE LOCATED WITHIN 4 FEET OF METER PIT. LANDSCAPING IS PERMITTED, HOWEVER ACCESS TO THE METER PIT MUST BE MAINTAINED

8. CURB STOPS SHALL BE STRAIGHT AND CLEAN OF ANY DEBRIS

9. DAYLIGHT RESIDENT STUB OUT AS SHOWN ON DETAIL. CAP OR CRIMP END OF PIPE

<table>
<thead>
<tr>
<th>METER SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<td>1-INCH</td>
<td>17\frac{1}{4}-INCH</td>
<td>10\frac{3}{4}-INCH</td>
<td>11\frac{1}{4}-INCH</td>
<td>6-INCH</td>
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City of Evans, Colorado

Public Works Department

Scale: N.T.S. NP-7 May 2019
ELEVATION

CONCRETE MANHOLE BASE BEAMS 9" x 1'-0" x 8'-0" REINFORCED WITH BAR STEEL AS SHOWN

CONCRETE FOOTINGS SHALL REST ON A 5" THICK LAYER OF 11/2" CRUSHED ROCK PLACED UNDER MANHOLE

DETAILS:
1. CURB STOP
2. TYPE K COPPER TUBING
3. 12" COPPER SETTER/METER YOKE
4. METER UNIT
5. 3" NIPPLE BETWEEN COPPER SETTER AND CHECK VALVE
6. PRESSURE TREATED WOOD BLOCKING 1" THICK
7. MECH. IRON PIPE TO FLARE COUPLING FROM INLET SIDE OF COPPER SETTER AND OUTLET SIDE OF CHECK VALVE.
8. BY-PASS WILL BE 1" FOR 11/2" COPPER SETTERS AND 11/2" OR 11/4" FOR 2" COPPER SETTERS.
9. CHECK VALVE
10. 48" CONE MANHOLE WITH 24" LID.
11. CONCRETE BLOCK SUPPORTS 4" X 4" X 24"
12. 24" STANDARD RING AND COVER

NOTES
1. MANHOLE BASE BEAMS SHALL BE REQUIRED
2. A 48" Ø MANHOLE PIT WILL ACCOMODATE 11/2" AND 2" SPLIT CASE METERS
3. JOINTS INSIDE METER VAULT SHALL BE EITHER THREADED OR SOLDERED WITH 95-5 TINANTIMONY SOLDER. IN ACCORDANCE WITH ASTM B32
4. NO CONCRETE TO BE LAID IN FLOOR OF METER MANHOLE
5. NO CONNECTIONS OR CHANGES IN PIPE DIAMETER SHALL BE MADE IN THE METER PIT OR IN THE DISTANCE OF 5' BEYOND THE METER PIT ON THE OUTLET SIDE. OTHER THAN THE APPROPRIATE COPPER SETTER
6. THE DISTANCE BETWEEN RUNGS, CLEATS, AND STEPS SHALL NOT EXCEED 12" AND SHALL BE UNIFORM THROUGHOUT THE LENGTH OF THE LADDER
7. VAULT WALL PENETRATIONS MUST BE GROUTED WITH CONCRETE
8. COPPERSETTER OR COPPER METER YOKE FOR 11/2" AND 2" WILL BE NO HIGHER THAN 12" WITH A BY-PASS AND BOOT FOR BY-PASS PROVIDED WITH SETTER
9. THE SERVICE LINE THROUGH AND ON BOTH SIDES OF THE METER PIT MUST BE OF THE SAME MATERIAL
10. MANHOLE RING AND COVERS SHALL BE TO CITY OF EVANS STANDARDS
11. METER PITS AND COVERS SHALL BE TO CITY OF EVANS STANDARDS

FOOTING DETAIL
39" THREE - #6 CONT. (TYP.)

METER SETTING DETAIL
FOR 11/2" & 2" METER
W/ CHECKING VALVE & BYPASS IN MANHOLE

Scale: N.T.S. NP-8 May 2019
NOTE:

1. THE ROOF SLAB MAY BE CAST IN SECTIONS FOR FUTURE ACCESS. THE SECTIONS SHALL BE CAST SUCH THAT THE INDIVIDUAL SECTION WEIGHT DOES NOT EXCEED 7,500 POUNDS.

2. BARS MM - BOTTOM ONLY & BARS LL - TOP AND BOTTOM
<table>
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<tr>
<th>METER SIZE</th>
<th>VAULT DIMENSIONS</th>
<th>MANHOLE</th>
<th>SUMP</th>
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<td>36&quot; 24&quot;x36&quot; 12&quot;</td>
<td>USE 5/16&quot;x 7&quot; MIDDLE RING ON COUPLINGS.</td>
<td></td>
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<tr>
<td>4&quot; 4&quot;</td>
<td>8'-6&quot; 11'-1&quot; 6'-0&quot; 0'-8&quot; 9'-2&quot; 12'-7&quot; 2'-3&quot; 5'-4&quot; 1'-9&quot; 3'-4&quot; 3'-3&quot; 5'-3&quot; 2'-6&quot; 1'-0&quot; 2'-6&quot;</td>
<td>36&quot; 24&quot;x36&quot; 12&quot;</td>
<td>USE 5/16&quot;x 7&quot; MIDDLE RING ON COUPLINGS.</td>
<td></td>
</tr>
<tr>
<td>6&quot; 6&quot;</td>
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<td>36&quot; 24&quot;x36&quot; 12&quot;</td>
<td>USE 5/16&quot;x 7&quot; MIDDLE RING ON COUPLINGS.</td>
<td></td>
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<td>8&quot; 8&quot;</td>
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<td>36&quot; 24&quot;x36&quot; 18&quot;</td>
<td>USE 3/8&quot;x 7&quot; MIDDLE RING ON COUPLINGS.</td>
<td></td>
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<td>36&quot; 24&quot;x36&quot; 18&quot;</td>
<td>USE 3/8&quot;x 7&quot; MIDDLE RING ON COUPLINGS.</td>
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<tr>
<th>METER SIZE</th>
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<td>No.5 12&quot;</td>
<td>No.7 12&quot;</td>
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</table>

Public Works Department

City of Evans, Colorado

Scale: N.T.S. NP-9D May 2019
NOTES:
1. MINIMUM DENSITY FOR CAREFULLY COMPACTED SELECT BACKFILL SHALL BE 95% OF MAXIMUM OR AS SPECIFIED FOR THE TRENCH BACKFILL - WHICHER IS GREATER

2. COMPACT GRANULAR MATERIAL BY SLICING WITH A SHOVEL AROUND PIPE. WHEN BEDDING IS 6" OVER PIPE, COMPACT WITH VIBRATING COMPACTOR
"S" - TAPPING SADDLE REQUIRED, ALL SADDLES SHALL HAVE THE AWWA TAPER ON IT'S THREADS.
"DT" - DIRECT TAP REQUIRED
"NO" - NO TAP PERMITTED WITH OR WITHOUT A SADDLE, A TEE CONNECTION MAY BE PERMITTED IF SPECIFICALLY AUTHORIZED BY THE WATER DEPARTMENT
"TSV" - TAPPING SLEEVE AND VALVE REQUIRED

NOTE:
1. ALL TAPPING SADDLES 2" AND SMALLER, SHALL CONSIST OF A BRONZE BODY WITH TWO (2) BRONZE STRAPS
2. EXISTING STEEL MAINS 12" IN DIAMETER OR LESS, SHALL BE TAPPED USING AN APPROVED TAPPING SADDLE
3. ALL TAPS SHALL BE MADE WITH AN APPROVED TAPPING TOOL
NONPOTABLE IRRIGATION
VALVE BOX DETAIL

Scale: N.T.S.
NP-12
May 2019
4. SEE BLOWOFF ASSEMBLY INSTALLATION DETAIL (No. NP-2)

5. SEE THRUST BLOCK DETAIL (No. NP-15)

6. MECHANICALLY RESTRAIN STUB-OUT PIPE BACK TO NEAREST VALVE OR FITTING

NOTES:

1. INSTALL VALVES 3’ FROM TEE/CROSS (TYP.)

2. INSTALL DUCTILE IRON PIPE BETWEEN THE TEE/CROSS AND THE VALVE

3. A MINIMUM OF 20’ OF PIPE, TRACER WIRE A VALVE, AND A TEMPOARY BLOWOFF ASSEMBLY SHALL BE PLACED FOR FUTURE CONNECTIONS AND/OR AT THE EDGE OF A PHASE/FILING BOUNDARY IN A SUBDIVISION

City of Evans, Colorado
Public Works Department

PIPE INTERSECTIONS & DEAD ENDS DETAIL
FOR FUTURE CONNECTIONS AND/OR PHASE/FILING BOUNDARY

Scale: N.T.S. NP-13 May 2019
STEEL REBAR SHALL BE EPOXY COATED

SLOPE PIPE AS SHOWN ON PROFILE ON PLANS

MIN. OF 4.5 FEET BELOW LOW POINT OF STREAM CHANNEL

ORIGINAL AND FINAL BOTTOM GRADE OF STREAM CHANNEL

REPLACE WITH ORIGINAL MATERIAL EXCAVATED FROM THE STREAM

CONCRETE ENCASEMENT, SEE CONCRETE ENCASEMENT DETAIL (No. NP-3)

REMOVE BEDROCK (IF NECESSARY) TO INSTALL NEW PIPE AND CONCRETE ENCASEMENT

PUBLIC WORKS DEPARTMENT

STREAM OR DRAINAGEWAY CROSSING DETAIL

Scale: N.T.S.

NP-14

May 2019
TEE

BEND-HORIZONTAL OR BOTTOM OF VERTICAL

Y

TEE W/DEAD END ON RUN

CROSS WITH DEAD END BRANCHES

PLUG OR LINE CAP SEE NOTE 1 ON SHEET 2

#4 DIA. STEEL REINFORCED ANCHOR BAR BENT OVER VALVE - 2-REQ'D.

SEE NOTE 1 ON SHEET 2

SEE TABLE FOR BEARING AREA EACH SIDE - SHEET 3

REBAR

VALVE (GATE OR BUTTERFLY)

SEE TABLE ON SHEET 3 FOR AREA OF CONCRETE TO BEAR ON UNDISTURBED EARTH

MIN. THICKNESS EQUAL TO PIPE O.D.

TRENCH WIDTH AS SPECIFIED

AS REQ'D

DEAD END

SECTION (TYPICAL)

THRUSS BLOCK DETAIL
SHEET 1 OF 3

Public Works Department

City of Evans, Colorado

Scale: N.T.S.
NP-15A
May 2019
TABLE OF VOLUMES OF CONCRETE (IN CU. FT.)

REQ'D FOR VERT. BEND ANCHOR BLOCKS FOR 100 P.S.I. PRESSURE
ADJUST VOLUMES BY MULTIPLYING TABULATED VALUES BY A CORRECTION FACTOR "F".

F= ACTUAL SPECIFIED TEST PRESSURE
100

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<tr>
<th>PIPE SIZE (INCHES)</th>
<th>BENDS</th>
<th>45°</th>
<th>22 1/2°</th>
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<td>36</td>
<td>360.0</td>
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NOTES FOR DRAWINGS:

1. AT DEAD ENDS, WRAP FITTINGS WITH TAR PAPER, FELT, OR HEAVY KRAFT PAPER TO PROVIDE BOND BREAK BETWEEN CONCRETE AND FITTINGS

2. ALL THRUST BLOCKING SHALL BE CAST-IN-PLACE CONCRETE HAVING A MINIMUM YIELD STRENGTH OF 3000 P.S.I. NO HAND MIXING OF CONCRETE ALLOWED

3. THRUST BLOCKING SHALL BE CAST AGAINST UNDISTURBED EARTH. FORMS SHALL BE USED AS REQUIRED TO OBTAIN ADEQUATE BEARING AREA 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

4. MEGA-LUGS OR OTHER JOINT RESTRAINT MAY BE USED ALONG WITH OR IN PLACE OF CONCRETE THRUST BLOCKS WITH DESIGN SUBMITTED BY PROFESSIONAL ENGINEER AND APPROVED BY PUBLIC WORKS DEPARTMENT

5. PIPE INSTALLED UNDER CONDITIONS DIFFERENT FROM THOSE NORMALLY ENCOUNTERED SHALL REQUIRE THRUST BLOCKS DESIGNED FOR THOSE PARTICULAR CONDITIONS
**TABLE OF BEARING AREAS IN SQ. FT. FOR CONCRETE THRUST BLOCKING**

FOR 100 P.S.I. INTERNAL STATIC PRESSURE AND 1000 LBS. PER SQ. FT. SOIL BEARING CAPACITY

<table>
<thead>
<tr>
<th>PIPE SIZE (INCHES)</th>
<th>BENDS</th>
<th>TEES</th>
<th>GATE VALVES</th>
<th>DEADENDS AND CROSSES WITH ONE OR TWO BRANCHES PLUGGED</th>
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<td>34.6</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>7.4</td>
<td>38.0</td>
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</tr>
<tr>
<td>24</td>
<td></td>
<td>8.8</td>
<td>45.0</td>
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<tr>
<td>36</td>
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</tbody>
</table>

* PIPE SIZES ARE THE SIZE OF THE BRANCH SIZE

BEARING AREAS FOR ANY PRESSURE AND SOIL BEARING CAPACITY MAY BE OBTAINED BY MULTIPLYING THE TABULATED VALUES BY A CORRECTION FACTOR "F"

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

**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 3000 LBS. PER SQ. FT.
  - \[ F = \frac{150}{3000} = 0.5 \]
  - TABULATED VALUE = 7.1 SQ. FT.
  - 0.5 * 7.1 = 3.56 OR ~ 4 SQ. FT. OR 2 FT. LONG BY 2 FT. HIGH

IN THE ABSENCE OF SOIL BEARING CAPACITY INFORMATION, USE ABOVE TABLE
NOTES:
1. SQUEEGEE SAND IS DEFINED AS MATERIAL IN WHICH 100% PASSES THROUGH A 3/8" SIEVE AND ONLY 0% TO 5% PASSES THROUGH A #200 SIEVE

2. AN OVER-EXCAVATED TRENCH SHALL BE REFILLED AND THOROUGHLY COMPACTED UNDER THE DIRECTION OF THE PUBLIC WORKS DEPARTMENT

3. UNDER NO CIRCUMSTANCES WILL PIPE BE LAID IN A PROPOSED FILL AREA PRIOR TO IT BEING COMPLETELY FILLED. THE FILL WILL BE PLACED FIRST TO PROPOSED GRADE AND COMPACTED AS REQUIRED. A TRENCH THEN WILL BE EXCAVATED AND THE PIPE INSTALLED IN THE USUAL MANNER

<table>
<thead>
<tr>
<th>PIPE DIAMETER</th>
<th>MINIMUM WIDTH</th>
<th>MAXIMUM WIDTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>1'-6&quot;</td>
<td>2'-6&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>1'-8&quot;</td>
<td>2'-8&quot;</td>
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<td>12&quot;</td>
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<tr>
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<td>3'-6&quot;</td>
<td>4'-6&quot;</td>
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</table>

TRENCH CROSS-SECTION DETAIL

Scale: N.T.S.
NP-16
May 2019
ENCASE PIPE AS PER CONCRETE ENCASMENT DETAIL (No. NP-3)

NOTES:
1. PROVIDE PROTECTION AS SPECIFIED IN SECTION 3.08 IN THE NONPOTABLE IRRIGATION SPECIFICATIONS

SANITARY/STORM SEWER LINE

SEWER ABOVE WATER
ALWAYS PROVIDE PROTECTION AS NOTED

PROVIDE PROTECTION AS DETAILED IN THE NOTES IF THIS DIMENSION IS LESS THAN 24"

WATERLINE

SANITARY/STORM SEWER LINE

SANITARY/STORM SEWER LINE

WATER LINE

ENCASE PIPE AS PER CONCRETE ENCASMENT DETAIL (No. NP-3)

PUBLIC WORKS

DEPARTMENT

UTILITY CROSSING DETAIL

Scale: N.T.S. NP-17 May 2019