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SANITARY SEWER

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**CAST-IN-PLACE MANHOLE CONNECTION DETAILS FOR PLASTIC PIPE**

**NOTES:**
1. PLACE STOP ON PIPE NEAR CENTER OF MANHOLE WALL.
2. TIGHTEN STEEL BAND TO ASSURE POSITIVE SEAL AGAINST PIPE OUTSIDE.
   A SCREWDRIVER MAY BE USED TO TAKE UP INITIAL SLACK BUT A SOCKET WRENCH (3/16") IS PREFERRED TO ENSURE PROPER TIGHTNESS.

**PRECAST MANHOLE CONNECTION DETAILS FOR ANY TYPE OF PIPE**

**NOTE:**
1. ALL MATERIAL SPECIFICATIONS AND INSTALLATION REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS APPLICABLE TO THE PROJECT.
NOTES:
1. FINAL GRADE OF MANHOLE COVERS SHALL BE 1/4" LOWER THAN FINAL STREET.
2. ALL CHANNELS FLOWING INTO THE MAIN STREAM OF THE SEWER SHALL BE HAND FORMED INTO THE FLOW.
3. STEPS SHOULD BE PLACED OVER THE SHELF, NOT OVER THE FLOW. NO STEPS ALLOWED IN THE ADJUSTING RING AREA.
4. PRECAST CONCRETE SECTIONS SHALL CONFORM TO ASTM C-478.
5. BLOCK-OUTS, WHEN APPROVED, SHALL EXTEND A MAX. OF 6" PAST MANHOLE O.D. AND BE SATISFACtorily PLUGGED AND SEALED.
6. BENCH MUST HAVE A BRUSHED, NON-SKID SURFACE.
7. BENCH IS TO BE EVEN WITH TOP OF PIPES.
8. A MINIMUM OF 0.2' AND MAXIMUM OF 2' FALL REQUIRED FROM INLET TO OUTLET.
9. MANHOLES NOT IN ASPHALT OR CONCRETE SHALL BE RAISED 6" ABOVE FINAL GRADE AND A CONCRETE COLLAR INSTALLED WITH A GREEN CARBONITE POST.

SECTION B-B

The Town of
ERIE
COLORADO

DRAWING TITLE: STANDARD MANHOLE
DRAWING NUMBER: SS3A (1 OF 2)
DRAWN BY: D. JENKINS APPROVED BY: G. BEHLEN
REV. DATE: 01/2010
### ECCENTRIC CONE PLAN VIEW

![Diagram of an eccentric cone plan view]

### BASE PLAN VIEW

![Diagram of a base plan view]

<table>
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<th>PIPE I.D.</th>
<th>MANHOLE I.D.</th>
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<tr>
<td>18&quot; &amp; SMALLER</td>
<td>4'-0&quot;▲</td>
<td>24&quot;</td>
</tr>
<tr>
<td>21&quot; TO 48&quot;</td>
<td>5'-0&quot;</td>
<td>30&quot;</td>
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<td>54&quot;</td>
<td>6'-0&quot;</td>
<td>30&quot;, 36&quot; W/ 24&quot;</td>
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<tr>
<td>60&quot; &amp; LARGER</td>
<td>SPECIAL DESIGN</td>
<td>INNER COVER</td>
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▲ WHenever more than a two way manhole of max. pipe i.d. is required, the manhole should be increased to larger dia., eg. 18"x18"x18", requires 5'-0" i.d.
NOTES:

1. ALL UNDERDRAIN SYSTEMS SHALL BE PRIVATE AND NOT MAINTAINED BY THE TOWN OF ERIE

2. PLACE UNDERDRAIN COLLECTOR PIPE AROUND CONCRETE MANHOLE BASE

3. CLEANOUT TO BE PLACED UPSTREAM/DOWNSSTREAM OF SANITARY MANHOLE AS DETERMINED BY DESIGN ENGINEER

4. SEE "TRENCH DETAIL WITH PRIVATE UNDERDRAIN" DETAIL FOR VERTICAL LOCATION OF UNDERDRAIN
DIFFERENT CARTA MANHOLE LID AND COVER SEE DETAIL SS5

PRECAST CONCRETE OR HDP ADJUSTING RINGS

PRECAST TOP

CEMENT GROUT

CEMENT GROUT JOINT AND RAMNECK SEALANT

VARIABLE NOT TO EXCEED 5'-0"

WATER STOP—SEE DETAIL SS1

INVERT TO BE FORMED OR CHISSLED OUT.

CAST IRON MANHOLE LID AND COVER SEE DETAIL SS5

PRECAST CONCRETE MANHOLE SECTIONS CONFORMING TO SPEC. ASTM C-478

MANHOLE STEPS SEE DETAIL SS12

CEMENT GROUT AND RAMNECK SEALANT

SLOPE 2" PER FOOT

FILL WITH GROUT

D = 48" MIN.

24" MIN.

3" MIN.

8" MIN.

FLOWLINE

D/2

8" MIN.
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:
   MANUFACTURERS          CAT. #
   NEENAH           R-1706
   CASTINGS, INC.   MH-400-24 C.I.
   HUTCHINSON FDRY. & STL. INC.   MH-400

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."
RESERVED FOR FUTURE DETAIL
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. Filter fabric is required if stabilization material is used. The fabric shall be installed as shown in the detail.

3. 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.

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

5. Trench width shall not be more than 24" nor less than 12" wider than the largest outside diameter of the pipe.

6. Should the trench be excavated wider than allowed, a concrete cradle shall be placed with 2500 P.S.I. concrete from trench bottom to pipe springline.
1. BACKFILL TO BE COMPACTED TO 95% ASTM D-698, OR 70% OF ASTM D-4253 AND 4254 RELATIVE DENSITY, IN ALL AREAS UNLESS OTHERWISE NOTED.

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

3. 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.

4. PIPE SHALL BE BEDDED FROM 6" BELOW THE BOTTOM OF THE PIPE TO 12" ABOVE THE TOP OF THE PIPE.

5. TRENCH WIDTH SHALL NOT BE MORE THAN 18" NOR LESS THAN 12" WIDER THAN THE LARGEST OUTSIDE DIAMETER OF THE PIPE.

6. 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.

7. ALL UNDERDRAIN SYSTEMS SHALL BE PRIVATE AND WILL NOT BE MAINTAINED BY THE TOWN OF ERIE.
NOTE: CLEAN OUTS AS REQUIRED PER UNIFORM BUILDING CODES

PROPERTY LINE

FINISHED GRADE

DISTANCE VARIES

SIDEWALK

PAVEMENT

"X" OR "S" TO BE PLACED ON CURB DIRECTLY ABOVE SERVICE LINE TO RESIDENCE

SERVICE LINE TO BE SDR 35 PVC @ 2% MINIMUM GRADE

OWNER'S RESPONSIBILITY TO INCLUDE SERVICE LINE FROM RESIDENCE TO SEWER MAIN AND THE CONNECTION TO THE MAIN
NOTES:
1. DETAILS SHOWN ARE TYPICAL ONLY FOR INSTALLATIONS WITH ALL INVERTS AT SAME RELATIVE ELEVATION.
2. FOR EXCESSIVE ELEVATION DIFFERENCE BETWEEN INVERTS, ETC. SPECIAL BASE/CHANNEL DETAILS SHALL BE SHOWN ON PLANS.
3. CHANNELIZATION DETAILS & STEP PLACEMENT TYPICAL FOR BOTH STORM AND SANITARY SEWER MH’S.
4. THE MINIMUM VERTICAL DROP THRU MANHOLE BASE SHALL BE 0.20 FOOT.
5. FOR VERTICAL DROPS IN EXCESS OF 1.5 FEET AN OUTSIDE DROP MANHOLE IS REQUIRED.
NOTES:
1. DETAILS SHOWN ARE TYPICAL ONLY FOR InstallATIONS WITH ALL INVERTS AT SAME RELATIVE ELEVATION.
2. FOR EXCESSIVE ELEVATION DIFFERENCE BETWEEN INVERTS, ETC. SPECIAL BASE/CHANNEL DETAILS SHALL BE SHOWN ON PLANS.
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5. FOR VERTICAL DROPS IN EXCESS OF 1.5 FEET AN OUTSIDE DROP MANHOLE IS REQUIRED.
POLYPROPYLENE REINFORCED PLASTIC STEP

NOTES:
1. ASTM SPECIFICATIONS:
   A. ASTM C-478
   B. ASTM A-615 GRADE 60 (STEEL REBAR)
   C. ASTM 2146-69, TYPE II, GRADE 18906 (POLYPROPYLENE)
2. STEPS INSTALLED IN MANHOLE BARREL SECTIONS OR VERTICAL WALLS OF STRUCTURES SHALL HAVE A 9 3/8 INCH LEG AND SHALL PROJECT FROM THE WALL 6 INCHES.
3. STEPS INSTALLED IN MANHOLE CONE SECTIONS SHALL HAVE AN 8 1/4 INCH LEG AND SHALL PROJECT FROM THE WALL 4 7/8 INCHES.
4. ALL STEPS SHALL HAVE A PENETRATION DEPTH INTO THE WALL OF 3 3/8 INCHES.
5. STEPS SHALL BE INSTALLED BY THE "PRESS-FIT" METHOD UTILIZING A SPECIALLY TAPERED PIN TO FORM THE INSERT HOLE AS SHOWN, FOLLOWING MANUFACTURER'S RECOMMENDED PROCEDURE AND SHALL NOT BE GROUTED IN PLACE.
6. INSTALLED STEPS SHALL BE CAPABLE OF WITHSTANDING A PULL OUT FORCE OF 2500 LB. PER LEG FOR A MINIMUM PERIOD OF TWO MINUTES.
7. PINS MUST BE SMOOTH AND CONTINUOUSLY TAPERED. DIMENSIONS OF THE PIN AND THE INSERTED PORTION OF THE MANHOLE STEP ARE TYPICAL ONLY. W.A.M.O. INSTALLATIONS REQUIRE A MATCHED COMBINATION OF TAPERED INSERT PIN AND MANHOLE STEP, AS RECOMMENDED OR REQUIRED BY SPECIFIC MANUFACTURER OF THE STEP TO BE USED.
8. THIS STEP CAN ALSO BE USED IN TOE POCKET INSTALLATIONS PROVIDED 5" TOE CLEARANCE IS ALLOWED.
NOTES:
1. UTILITY MARKER POST SHALL BE CARSONITE CUM-375 OR EQUAL WITH ANCHORS AND APPROPRIATE DECALS FOR SANITARY SEWER AND WATER.

2. COLOR FOR SANITARY SEWER—GREEN.
4" DIA. STEEL POST PAINTED GREEN, FILLED WITH CONCRETE

MH OBJECT (MANHOLE)

10’ DISTANCE TO OBJECT

2” HIGH STENCILED BLACK CAPITAL LETTERS TO FACE OBJECT.

GROUND LINE

CONCRETE

UNDISTURBED GROUND

M.H. 10’

4'-0" ±

2'-0" ±

6”
NOTES:

1. SEWER SERVICE CONNECTIONS SHALL BE POSITIONED AT EITHER THE 2 O’CLOCK OR THE 10 O’CLOCK POSITION ON THE CIRCUMFERENCE OF THE SEWER MAIN.

2. ON NEW INSTALLATIONS, EITHER WYE OR TEE FITTINGS SHALL BE USED. WHEN TAPPING INTO AN EXISTING SEWER MAIN, A SADDLE CONNECTION AND APPROVED CORING METHOD SHALL BE USED.


4. A MAXIMUM OF 4 SEWER SERVICE CONNECTIONS SHALL BE ALLOWED PER 20–FEET LENGTH OF PIPE. A SPECIFIC SOILS INVESTIGATIONS SHOULD BE CONDUCTED TO ASSURE THAT THE EXTERNAL LOADING WILL BE WITHIN ALLOWABLE LIMITS REGARDLESS OF THE NUMBER OF TAPS INVOLVED.
ALIGN STEPS ABOVE AND BELOW PLATFORM OPENING AS SHOWN.

FIBERGLASS OR ALUMINUM GRATING, 3/16" x 1-1/4" BEARING BARS. SERRATED GRATING OPTIONAL.

NOTE: IF MANHOLE IS DEEPER THAN 20' AN INTERMEDIATE PLATFORM IS REQUIRED WITH MAXIMUM VERTICAL SPACING OF 20'

STANDARD PRECAST FLAT TOP AND 24" OPENING

SET IN FULL BED OF BITUMINOUS MASTIC (RAMNECK) OR PLASTIC SEALING COMPOUND.

24" x 18" GRATE ON HINGES PLACED SO THAT IT CLEAR THE STEP ABOVE.
OUTSIDE DROP—DEEP: FOR PVC

OUTSIDE DROP—SHALLOW: FOR PVC

NOTE:
SEE DRAWING SS19 FOR DIMENSION TABLE AND GENERAL NOTES.
OUTSIDE DROP—DEEP: DUCTILE IRON

REINFORCED MANHOLE BASE (EXTENDED)

OUTSIDE DROP—SHALLOW: DUCTILE IRON

NOTE:
SEE DRAWING SS19 FOR DIMENSION TABLE AND GENERAL NOTES.
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<th>B (INCHES)</th>
<th>Ψ (INCHES)</th>
<th>Ψ (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIPE DIAMETER (INCHES)</td>
<td>8 10 12 15</td>
<td>8 10 12 15</td>
<td>8 10 12 15</td>
<td>8 10 12 15</td>
</tr>
<tr>
<td>DUCTILE IRON PIPE (DIP)</td>
<td>32 37 39 44</td>
<td>36 39 42 50</td>
<td>30 33 39 44</td>
<td>18 18 18 24</td>
</tr>
<tr>
<td>POLYVINYL CHLORIDE (PVC)</td>
<td>42 47 49 65</td>
<td>41 43 51 61</td>
<td>31 37 39 55</td>
<td>18 18 22 28</td>
</tr>
</tbody>
</table>

A MANHOLE OUTSIDE DROP IS NOT FEASIBLE FOR A DROP OF LESS THAN 18”. THE ABOVE DIMENSIONS INDICATE ONLY THE MINIMUM DROP OBTAINABLE WITH AVAILABLE FITTINGS AND MATERIAL. GREATER DROPS THAN THIS ARE POSSIBLE BY ADDITION OF THE APPROPRIATE PIPE LENGTH AT DIMENSION E.

GENERAL NOTES:
1. ALL PIPE AND FITTINGS TO BE ASTM AND TOWN APPROVED.
2. FOR PAYMENT PURPOSES, ALL FITTINGS, PIPE, CONCRETE ENCASEMENT SHALL BE INCLUDED IN THE UNIT PRICE.
3. DIAMETER OF THE PIPE SHALL NOT BE LESS THAN MAIN LINE PIPE DIAMETER.
4. FOR 18” DIAMETER AND LARGER, OUTSIDE DROP SHALL BE A SPECIAL DESIGN.
5. THE APPROPRIATE MH SEAL, ADAPTOR OR CONNECTOR SHALL BE USED FOR THE SPECIFIED PIPE MATERIAL.
6. OUTSIDE DROP SHALL BE ALL OF ONE MATERIAL.
7. CONCRETE ENCASEMENT SHALL BE A MINIMUM OF 8” THICK ALL AROUND. CLASS II TYPE III – VIBRATED AND Poured MONOLITHIC WITH BASE.
8. PIPE DIMENSIONS ARE APPROXIMATE AND MAY VARY FROM ONE MANUFACTURER TO ANOTHER.
9. ALL REQUIRED WALL OPENINGS SHALL BE PRECAST BLOCK--OUTS OR CORE DRILLED. JACK HAMMERING OF OPENINGS IS NOT ALLOWED.
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.
**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.
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.

PIPE O.D. + 24" MAXIMUM

SECTION

* BEDDING TO SPRING LINE OF EXISTING PIPE

EXISTING PIPE OR OPEN DITCH

CLAY CUT-OFF WALL (2 EA.)

CONCRETE CAP (SEE PLAN & PROFILE FOR LENGTH)

TOP OF BANK

* CLAY BACKFILL 95% COMPACTION

PROPOSED PIPELINE

CENTER ONE FULL PIPE LENGTH UNDER

CENTER OF DITCH

PROFILE

* USE CLAY BACKFILL ONLY WHEN CROSSING OPEN DITCH. USE BEDDING MATERIAL TO SPRING LINE OF EXISTING PIPE WHEN CROSSING PIPE.
TYPICAL GREASE INTERCEPTOR

NOTE:
1. SECONDARY OUTLET COMPARTMENT HAS VOLUME EQUAL TO 1/3 OF TOTAL CAPACITY.
2. CHECK WITH SUPPLIER FOR EXACT DIMENSIONS.
3. INTERCEPTORS TO BE SIZED BY DESIGN ENGINEER, SUBJECT TO DISTRICT APPROVAL.
4. GREASE INTERCEPTORS SHALL BE LOCATED ON PRIVATE PROPERTY AND SHALL BE EASILY ACCESSIBLE AT ALL TIMES, FOR MAINTENANCE AND INSPECTION.
5. INLET AND OUTLET SHALL HAVE SANITARY TEES; CENTER BAFFLE MAY HAVE TEE OR ELBOW.
6. INTERIOR PIPING TO BE SCHEDULED 40 PVC WITH STAINLESS STRAP, ANCHORING STRAP TO PIPE & WALL.