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## CITY OF SPOKANE STANDARD PLANS – SECTION Z

**X-###** = Revised Standard Plan  
***X-###** = New Standard Plan

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NOTES:
1. SEE STANDARD PLANS A-12/A-13 FOR MANHOLE FRAME & COVER, AND Z-118 FOR BASE & FOUNDATION.
2. MANHOLE STEPS ARE REQUIRED, SEE Z-109.
3. FORM SHELF & SMOOTH CONTINUOUS CHANNEL WITH COMMERCIAL GRADE CONCRETE.
4. MANHOLES EXCEEDING A 20 FT DEPTH SHALL HAVE BARREL SECTIONS WITH MINIMUM 54" DIAMETER, SEE Z-102.
5. MAX PIPE Dia = 24". ANGULAR RUNS EXCEEDING 45' OR ADDITIONAL JUNCTIONS MAY REQUIRE LARGER MANHOLE. DESIGN VERIFICATION IS REQUIRED.
6. SEE STANDARD PLAN A-8 FOR ADJUSTMENT SECTION REQUIREMENTS.
NOTES:

1. SEE STANDARD PLANS A–12/A–13 FOR MANHOLE FRAME & COVER, AND Z–118 FOR BASE & FOUNDATION.
2. MANHOLE STEPS ARE REQUIRED, SEE Z–109.
3. FORM SHELF & SMOOTH CONTINUOUS CHANNEL WITH COMMERCIAL GRADE CONCRETE.
4. REDUCING SLAB SHALL BE INSTALLED WITH A 24" OPENING CENTERED ON THE SLAB.
5. MAX PIPE DIA. = 30" FOR 54" MANHOLE AND 36" FOR 60" MANHOLE. ANGULAR RUNS EXCEEDING 45° OR ADDITIONAL JUNCTIONS MAY REQUIRE LARGER MANHOLE. DESIGN VERIFICATION IS REQUIRED.
6. SEE STANDARD PLAN A–8 FOR ADJUSTMENT SECTION REQUIREMENTS.
NOTES:
1. SEE STANDARD PLANS A–12/A–13 FOR MANHOLE FRAME & COVER, AND Z–118 FOR BASE & FOUNDATION.
2. MANHOLE STEPS ARE REQUIRED, SEE Z–109.
3. ACCESS HOLE TO BE CENTERED OVER CHANNEL.
4. FORM SHELF & SMOOTH CONTINUOUS CHANNEL WITH COMMERCIAL GRADE CONCRETE.
5. MANHOLES EXCEEDING A 20 FT DEPTH SHALL HAVE BARREL SECTIONS 54" I.D. OR GREATER IN WHICH CASE A BARREL DIA X 24" REDUCING SLAB SHALL BE USED IN PLACE OF THE CONE, 24" OPENING CENTERED ON SLAB.
6. MAX PIPE DIA. = 48" ANGULAR RUNS EXCEEDING 45° OR ADDITIONAL JUNCTIONS MAY REQUIRE LARGER MANHOLE. DESIGN VERIFICATION IS REQUIRED.
7. SEE STANDARD PLAN A–B FOR ADJUSTMENT SECTION REQUIREMENTS.
NOTES:
1. SEE STD PLANS A—12/A—13 FOR MANHOLE FRAME & COVER, AND Z—118 FOR BASE & FOUNDATION.
2. MANHOLE STEPS ARE REQUIRED, SEE Z—109.
3. ACCESS HOLE TO BE CENTERED OVER CHANNEL.
4. FORM SHELF & SMOOTH CONTINUOUS CHANNEL WITH COMMERCIAL GRADE CONCRETE.
5. MANHOLES EXCEEDING A 20 FT DEPTH SHALL HAVE BARREL SECTIONS 54" I.D. OR GREATER.
6. MAX PIPE DIA. = 72" ANGULAR RUNS EXCEEDING 45° OR ADDITIONAL JUNCTIONS MAY REQUIRE LARGER MANHOLE. DESIGN VERIFICATION IS REQUIRED.
7. SEE STANDARD PLAN A—8 FOR ADJUSTMENT SECTION REQUIREMENTS.
NOTES:
1. SEE STANDARD PLANS A–12/A–13 FOR MANHOLE FRAME & COVER, AND Z–118 FOR BASE & FOUNDATION.
2. SEE Z–109 FOR MANHOLE STEP DETAILS IF REQUIRED.
3. FORM SHELF & SMOOTH CONTINUOUS CHANNEL WITH COMMERCIAL GRADE CONCRETE.
4. IN GENERAL, SHALLOW MANHOLES ARE NOT ALLOWED. THIS DETAIL MAY BE ALLOWED WITH PRIOR PERMISSION OF THE SEWER DEPARTMENT ENGINEER WHERE SUFFICIENT VERTICAL CLEARANCE DOES NOT EXIST TO CONSTRUCT THE MANHOLE SHOWN ON Z–101. THIS DETAIL WILL NOT BE PERMITTED IN NEW INSTALLATIONS.
5. IN EXTREME SITUATIONS AND WITH APPROVAL OF THE SEWER DEPARTMENT ENGINEER, THE PIPE MAY BE LOCATED IN THE CONE AND THE BASE SLAB Poured IN PLACE.
6. SEE STANDARD PLAN A–8 FOR ADJUSTMENT SECTION REQUIREMENTS.
NOTES:

1. SEE STANDARD PLANS A-12/A-13 FOR FRAME & COVER, AND Z-118 FOR BASE & FOUNDATION.

2. SEE Z-109 FOR MANHOLE STEP DETAILS IF REQUIRED.

3. REDUCING SLAB SHALL BE INSTALLED WITH 24" OPENING CENTERED ON THE SLAB.

4. FORM SHELF & SMOOTH CONTINUOUS CHANNEL WITH COMMERCIAL GRADE CONCRETE.

5. MAX PIPE DIA. = 48". ANGULAR RUNS EXCEEDING 45° OR ADDITIONAL JUNCTIONS MAY REQUIRE LARGER MANHOLE. DESIGN VERIFICATION IS REQUIRED.

6. SEE STANDARD PLAN A-8 FOR ADJUSTMENT SECTION REQUIREMENTS.
NOTES:

1. SEE STANDARD PLANS A–12/A–13 FOR FRAME & COVER, AND Z–118 FOR BASE & FOUNDATION.

2. SEE Z–109 FOR MANHOLE STEP DETAILS IF REQUIRED.

3. REDUCING SLAB SHALL BE INSTALLED WITH 24" OPENING CENTERED ON THE SLAB.

4. FORM SHELF & SMOOTH CONTINUOUS CHANNEL WITH COMMERCIAL GRADE CONCRETE.

5. MAX PIPE DIA. = 72". ANGULAR RUNS EXCEEDING 45° OR ADDITIONAL JUNCTIONS MAY REQUIRE LARGER MANHOLE. DESIGN VERIFICATION IS REQUIRED.

6. SEE STANDARD PLAN A–8 FOR ADJUSTMENT SECTION REQUIREMENTS.
NOTES:
1. SEE SECTIONS 7–05 & 9–12.4 FOR PRECAST CONCRETE MANHOLES.
2. SEE STANDARD PLANS A–12 & A–13 FOR MANHOLE FRAME & COVER.
3. SEE STANDARD PLAN Z–109 FOR M.H. STEP DETAILS.
4. CONE & BARREL JOINT(S) MAY BE EITHER TONGUE & GROOVE OR REVERSE TONGUE & GROOVE.
5. CONE ADJUSTMENT SECTION & BARREL JOINT(S) TO BE SEALED PER SECS 7–05 & 9–04.
6. ADDITIONAL REINFORCING AND/OR SPECIAL BEDDING FOR THE REINFORCED CONC PIPE SHALL BE AS SPECIFIED.
7. RISER DIA MAY BE 4'-0" FOR REINFORCED CONC PIPE SIZES 4'-0" & LARGER.
8. SEE STANDARD PLAN A–8 FOR ADJUSTMENT SECTION REQUIREMENTS.
NOTES:
1. PLACE REBAR NEAR BTM FACE OF SLAB AT INDICATED CLEARANCES.
2. REINFORCING STEEL SHALL BE STD DEFORMED BAR; YIELD STRESS, $F_y = 40$ KSI.
1. MANHOLE STEPS SHALL BE GROUTED INTO THE PRECAST CONCRETE WALL. STEPS SHALL BE UNIFORMLY SPACED AT 12" O.C. VERTICALLY, LEVELLED HORIZONTALLY, & ALIGNED ALONG THE MANHOLE'S C/L.

2. MANHOLES W/ OUT REDUCING SLABS SHALL HAVE THE STEPS LOCATED ABOVE THE SHELF. MANHOLES WITH REDUCING SLABS SHALL HAVE THE STEPS CENTERED BELOW THE SLAB ACCESS HOLE & THE UPSTREAM PIPE.

3. MANHOLE STEPS SHALL BE POLYPROPYLENE W/ANTI-SLIP TREAD DESIGN & TWO REFLECTORS PER STEP.
### Plan

**Manhole I.D. Inches** | **Max. Int'r Chnl. Drop Inches**
--- | ---
48 | 18
54 | 22
72 | 30
96 | 40

**Section A-A**

**Section B-B**

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**Back to Section Z - TOC**
NOTES:
1. SEE SECTIONS 7–05 & 9–12.4 FOR PRECAST CONCRETE MANHOLES.
2. SEE STD PLANS A–12 & A–13 FOR MANHOLE FRAME & COVER.
3. SEE STD PLAN Z–108 FOR MANHOLE REDUCING SLABS.
4. SEE STD PLAN Z–109 FOR MANHOLE STEP DETAILS.
5. SEE STD PLAN Z–118 FOR BASE & FOUNDATION DETAILS.
6. CONE, REDUCING SLAB & BARREL JOINTS MAY BE EITHER TONGUE & GROOVE OR REVERSE TONGUE & GROOVE.
7. ADJUSTMENT SECTION, CONE, REDUCING SLAB & BARREL JOINTS TO BE SEALED PER SEC 7–05.3.
8. ACCESS HOLES OF MANHOLE & REDUCING SLAB TO BE CENTERED OVER CHANNEL.
9. D.I. PIPE JOINTS SHALL BE FLANGE JOINTS, EXCEPT AS NOTED OTHERWISE.
10. INT’R DROPS SHALL REQ’D THE APPROVAL OF THE CITY ENG’R SERVICES DEPT. DROPS ARE UTILIZED WHERE BEDROCK PREVENTS FULL-DEPTH EXCAVATION.
11. SEE STANDARD PLAN A–8 FOR ADJUSTMENT SECTION REQUIREMENTS.

MANHOLE—INTERIOR D.I.P. DROP

ADOPTED: 10/2019
SUPERSEDES: 01/2017
CHECKED BY: JAG
SCALE: NTS
DWG/REV. BY: MDH/TSS
ENGINEERING SERVICES
CITY OF SPOKANE, WASHINGTON
STANDARD PLAN No. Z–111

MANHOLE FRAME & COVER
TOP OF PAVEMENT
PRECAST CONCENTRIC CONE
M.H.—PRECAST CONC, TYPE II 72 OR II 96
ROMAC COUPLER OR EQUAL, 1′–6″ MAX DIST FROM C/L OF COUPLER TO M.H. WALL
SEWER LINE, 12″ DIA. MAX
8′–6″ MIN DEPTH FOR M.H., TYPE II 72
10″ MIN DEPTH FOR M.H., TYPE II 96
D.I. PIPE SPOOL (CL 53) FLG X P.E.
GROUT & EMBED SPOOL BOLT HEADS FOR ATTACHMENT OF TEE/CROSS FLG
TEE OR CROSS D.I. PIPE
Joints per Note 9
D.I. PIPE (CL 53) FLG X P.E.
PIPE CLAMPS, STAINLESS STEEL, (2) EA MIN @ 5′–0″ MAX O.C. ATTACHED W/ S.S. EXPANSION ANCHORS & S.S. BOLTS
ELBOW, 45-DEG D.I. PIPE M.J. (TYTON) X P.E.
FORMED DROP CHANNEL

SECTION A–A

SECTION B–B
DROP CHANNEL TO BE
ALIGNED W/ DIRECTION OF SEWER
CHANNEL FLOW. SHAPE CHANNEL TO
PROVIDE SMOOTH SWEEPING TRANSITION.

NOTES:
1. SEE SECS 7-05 &
   9-12.4 FOR PRECAST
   CONCRETE MANHOLES.
2. SEE STD PLANS A-12
   & A-13 FOR
   MANHOLE FRAME &
   COVER.
3. SEE STD Z-109 FOR
   MANHOLE STEP DETAILS.
4. SEE STD PLAN Z-118
   FOR BASE & FOUND-
   DATION DETAILS.
5. CONE & BARREL JOINTS
   MAY BE EITHER TONGUE
   & GROOVE OR REVERSE
   TONGUE & GROOVE.
6. ADJUSTMENT SECTION,
   CONE & BARREL JOINTS
   TO BE SEALED PER
   SEC 7-05.3.
7. ACCESS HOLE TO BE
   CENTERED OVER
   CHANNEL.
8. D.I. PIPE JOINTS SHALL
   BE MECHANICAL JOINTS.
9. EXTR PIPE DROPS
   SHALL REQUIRE THE
   APPROVAL OF THE CITY
   ENGR SERVICES DEPT.
   DROPS ARE UTILIZED
   WHERE BEDROCK
   PREVENTS FULL-DEPTH
   EXCAVATION.
10. GROUT ENTIRE CIRCUM-
     FERENCE OF PIPE
     ANNULS AROUND PIPE
     PENETRATION.
11. SEE STANDARD PLAN
     A-8 FOR ADJUSTMENT
     SECTION REQUIREMENTS.

MANHOLE - EXTERIOR D.I.P. DROP

A DoCtED:
REVISED:
SUPERSESDES:
CHECKED BY:
SCALE:
DWG/REV. BY:
STANDARD
P L A N No.

ENGINEERING SERVICES
CITY OF SPOKANE, WASHINGTON

Z-112
NOTES:
1. ELEV 'A' IS THE INVERT ELEVATION OF THE ENTRY PIPE @ THE MANHOLE WALL ON GRADE S1.
2. ELEV'S 'B' & 'C' ARE THE DESIGN INVERT ELEVATIONS OF THE ENTRY/EXITPIPES @ THE MANHOLE C/L.
3. ELEV 'D' IS THE INVERT ELEVATION OF THE EXIT PIPE @ THE MANHOLE WALL ON GRADE S2.
4. DIMENSION 'd' IS THE REQ'D MIN CHANNEL DROP PER DESIGN STD 4.2-6.
5. SEE STD PLANS Z-110, Z-111, & Z-112 FOR CHANNEL DROPS IN EXCESS OF THE MIN DROP.
NOTES:

1. SEE STD PLANS A-12 & A-13 FOR MANHOLE FRAME & COVER.

2. ACCESS HOLE TO BE CENTERED OVER CLEANOUT.

3. TOP OF CLEANOUT SHALL EXTEND TO A POINT NOT LESS THAT 6" NOR MORE THAN 12" BELOW TOP OF MANHOLE COVER. CLEANOUTS SHALL BE PLUGGED W/ A REMOVABLE STOPPER WHICH SHALL PREVENT PASSAGE OF DIRT OR WATER.
1. For service and cleanout construction requirements, refer to the City of Spokane side sewer installation handbook.

2. 8" or larger service lines/laterals require a manhole.

3. Cleanout to be installed outside of building footprint. HDPE ring and cover with "sewer" allowed in non-traffic areas.
SEE STANDARD PLAN Z-116 FOR REQUIREMENTS FOR USE OR TEE OR WYE RISER CONNECTIONS.

NOTES:
1. SEE SEC 7-17 FOR SANITARY SEWER PIPE.
2. SEE DESIGN STANDARD 4.3 FOR SIDE-SEWERS.
3. CONCRETE SHALL BE CLASS 3000 PER SEC 6-02.
4. A MAX OF (2) SIDE-SEWER BRANCHES ARE ALLOWED OFF A VERTICAL RISER. SIDE-SEWER BRANCHES SHALL BE NO LARGER THAN THE SIZE OF THE VERTICAL RISER. VERTICAL RISER SHALL BE MAX 6" DIAMETER PIPE.
5. USE OF THIS RISER CONNECTION IS FOR SPECIAL CONDITIONS ONLY AND REQUIRES PRIOR APPROVAL OF THE CITY ENGINEER.
NOTES:
1. SEE DESIGN STANDARD 4.3 FOR SIDE-SEWERS.

2. RESIDENTIAL AREAS REQUIRE A 4" MIN SIDE-SEWER STUB. COMMERCIAL AREAS REQUIRE A 6" MIN SIDE-SEWER STUB.

3. DIMENSION 'S' MAY BE INCREASED TO PROVIDE A DESIRED SIDE-SEWER DEPTH @ PROPERTY LINE, IF APPROVED BY THE CITY ENGINEER.

4. THE FIRST SIDE SEWER CONNECTION OF ANY SIZE (4" OR 6") DOWNSTREAM OF AN END OF RUN MANHOLE SHALL BE A WYE CONNECTION.

5. FOR OTHER 4" SIDE SEWER CONNECTIONS, TEES OR WYES MAY BE USED TO CONSTRUCT SIDE SEWER CONNECTIONS.

6. ONLY WYE CONNECTIONS SHALL BE USED FOR 6" SIDE SEWERS CONNECTING TO SEWER MAINS UP TO AND INCLUDING 21" DIAMETER.

7. TEES OR WYES ARE ALLOWED FOR 6" SIDE SEWER CONNECTIONS TO SEWER MAINS LARGER THAN 21" DIAMETER.
GENERAL NOTES:
1. THE SHELF AND CHANNEL SHALL HAVE A SMOOTH FINISH
2. CONSTRUCT SHELF TO THE CROWN LINE OF PIPE
3. SLOPE BENCHES 1:24

QUADRANT NOTES:
1. NO SEWER PIPE (CENTERLINE) SHALL ENTER MANHOLE IN QUADRANT III & IV
2. EXCEPT FOR A MANHOLE INLET 180° FROM THE CENTERLINE OF ANY CHANNEL ENTERING IN QUADRANT I OR II SHALL BE A SMOOTH, CONTINUOUS ARC THAT IS A TANGENT TO THE CENTERLINE OF THE OUTLET PIPE AT OUTLET MANHOLE WALL
3. MINIMUM RADIUS OF ANY MANHOLE CHANNEL CENTERLINE SHALL BE EQUAL TO THE MANHOLE INSIDE DIAMETER
GENERAL NOTES:

1. 6" MINIMUM COMPACTED DEPTH OF BEDDING MATERIAL MEETING THE REQUIREMENTS OF THE SPECIAL PROVISIONS, OR 4" OF GROUT AS DIRECTED BY THE ENGINEER.
   COMPACT BEDDING MATERIAL TO 92% MINIMUM.

2. SEE SCHEDULE FOR BASE SLAB REINFORCEMENT.

3. SEE PLAN B-102C BASE DETAILS FOR DRYWELLS

BASE SLAB MINIMUM REINFORCEMENT SCHEDULE

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<th>PRECAST OR CAST-IN-PLACE</th>
<th>MONOLITHIC SLAB &amp; BARREL</th>
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<td>≤ 48&quot; 6&quot;</td>
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<td>#4 @ 10&quot; E.W.</td>
<td>#4 @ 10&quot; E.W.</td>
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<td>54&quot; 8&quot;</td>
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<td>#4 @ 12&quot; E.W.</td>
<td>#4 @ 12&quot; E.W.</td>
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<td>72&quot; 8&quot;</td>
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<td>#4 @ 6 1/2&quot; E.W.</td>
<td>#4 @ 10&quot; E.W.</td>
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<td>96&quot; 12&quot;</td>
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<td>#4 @ 6&quot; E.W.</td>
<td>#4 @ 8&quot; E.W.</td>
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CATCH BASIN, DRYWELL & MANHOLE BASE SLAB AND FOUNDATION DETAILS

ENGINEERING SERVICES
CITY OF SPOKANE, WASHINGTON

STANDARD PLAN No. Z-118