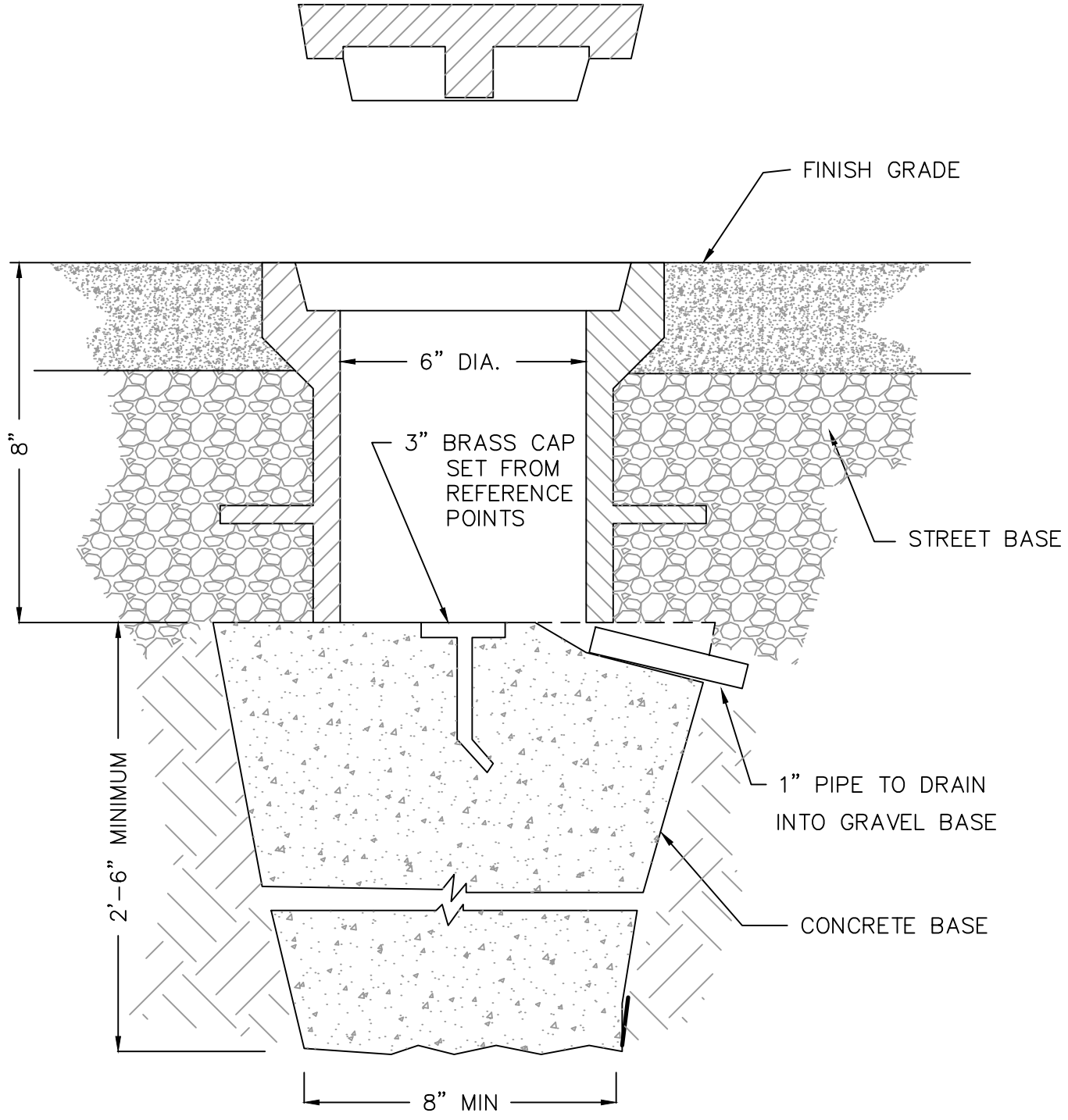
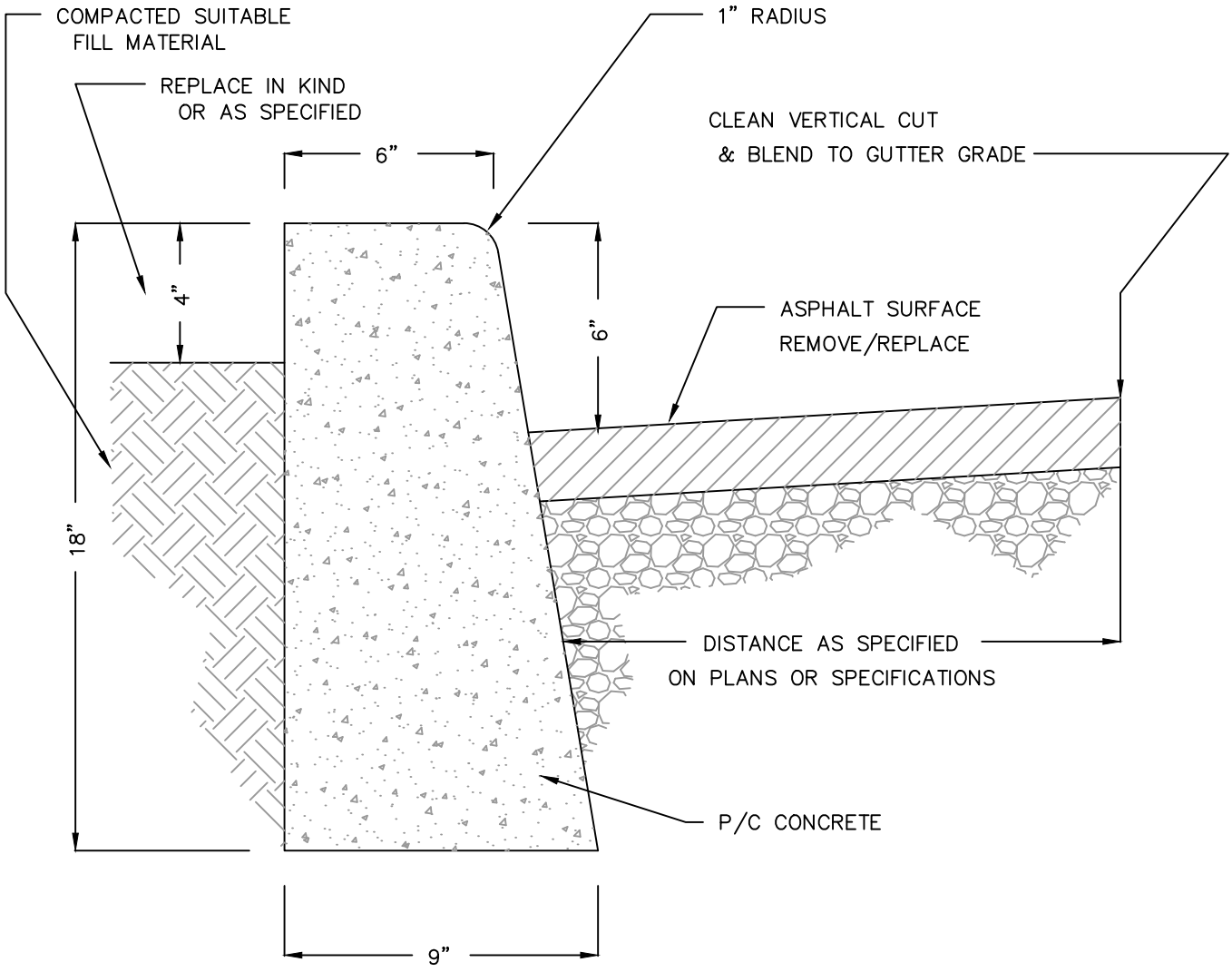
OLYMPIC NO. 5680 MONUMENT BOX



TYPICAL MONUMENT INSTALLATION

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 REVISED	5 – 01



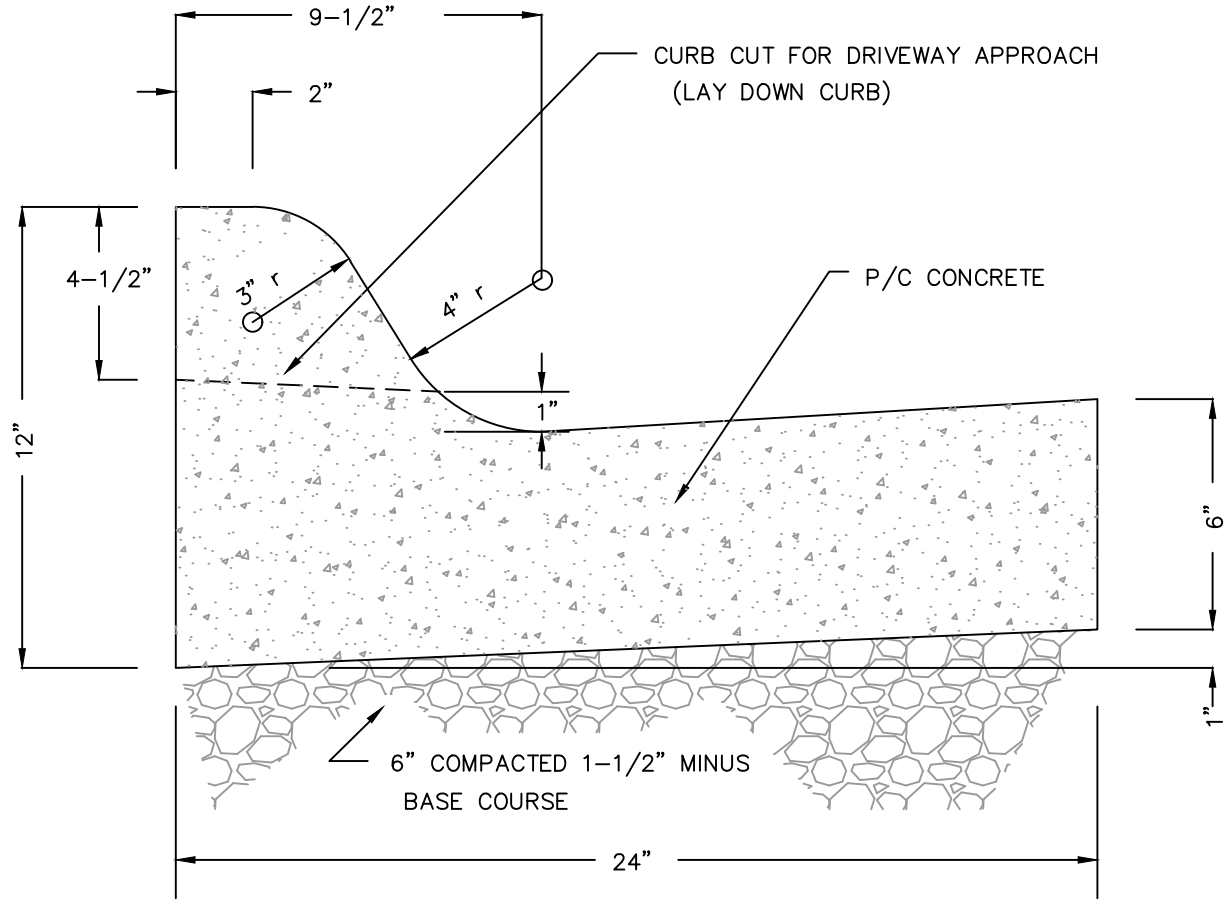
NOTE :

1. THE FACE OF THE CURB, WHERE CONTACTED BY PAVING SHALL BE THOROUGHLY PAINTED WITH BITUMINOUS MATERIAL ACCEPTABLE TO THE ENGINEER.

2. PLACE COMPACTED GRAVEL UNDER CURB AS REQUIRED ON PLANS OR IN SPECIFICATIONS.

STANDARD STRAIGHT CURB

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 REVISED	5 – 03

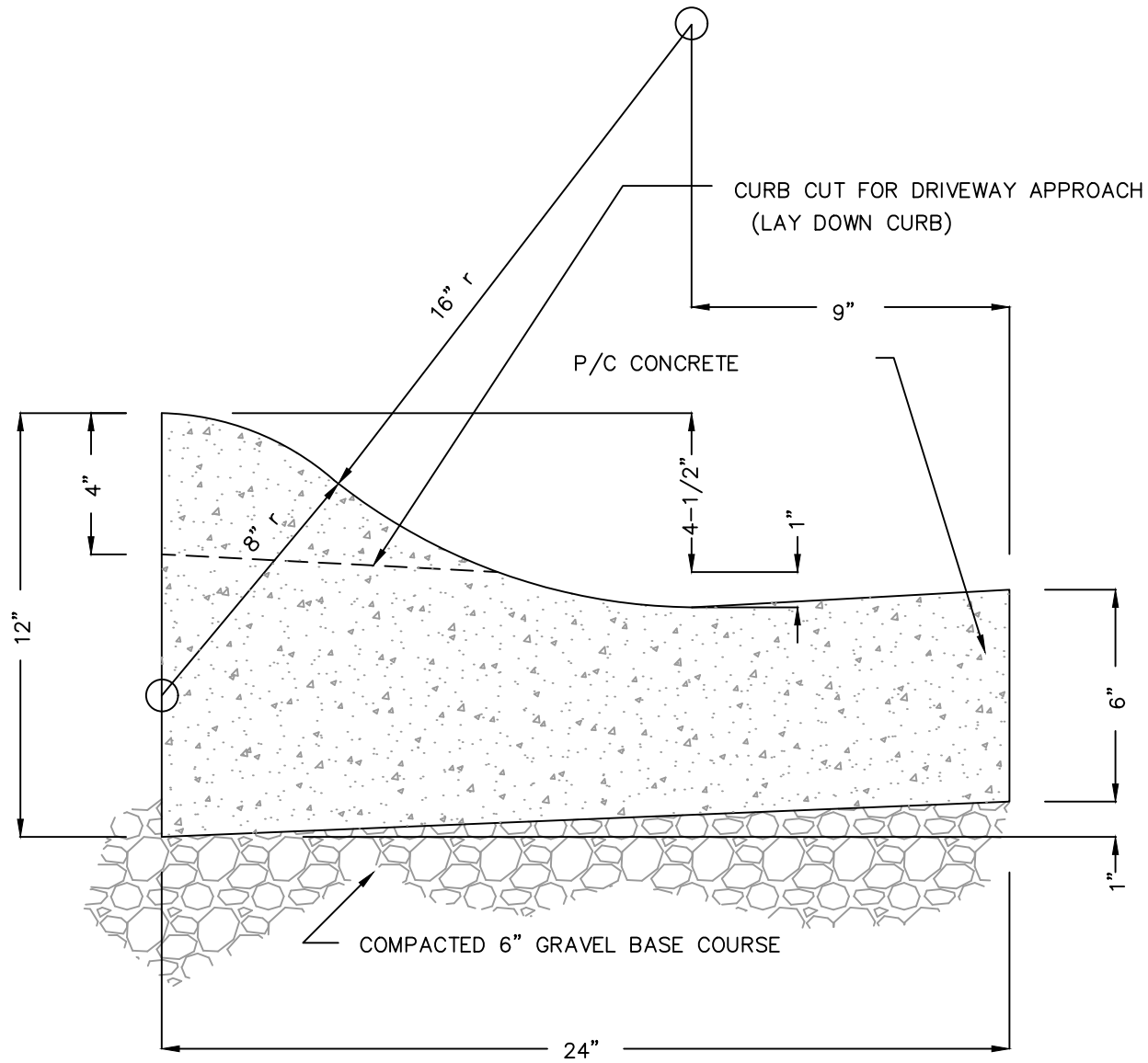


NOTES:

1. CURB & GUTTER SHALL HAVE A TOOLED CONTRACTION JOINT EVERY 10' AND BE SCORED A MIN. DEPTH OF 3/4"
2. CURB & GUTTER SHALL HAVE 1/2" EXPANSION JOINT AT P.C.'s, P.T.'s, CURB RETURNS, VERTICAL AND HORIZONTAL POINTS OF CURVATURE AND AT MAXIMUM OF 300' INTERVALS.
3. PLACE GRAVEL BASE COURSE AS REQUIRED IN SPECIFICATIONS.

TYPICAL BARRIER INTEGRAL CURB & GUTTER

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED MARCH 2018	5 – 04



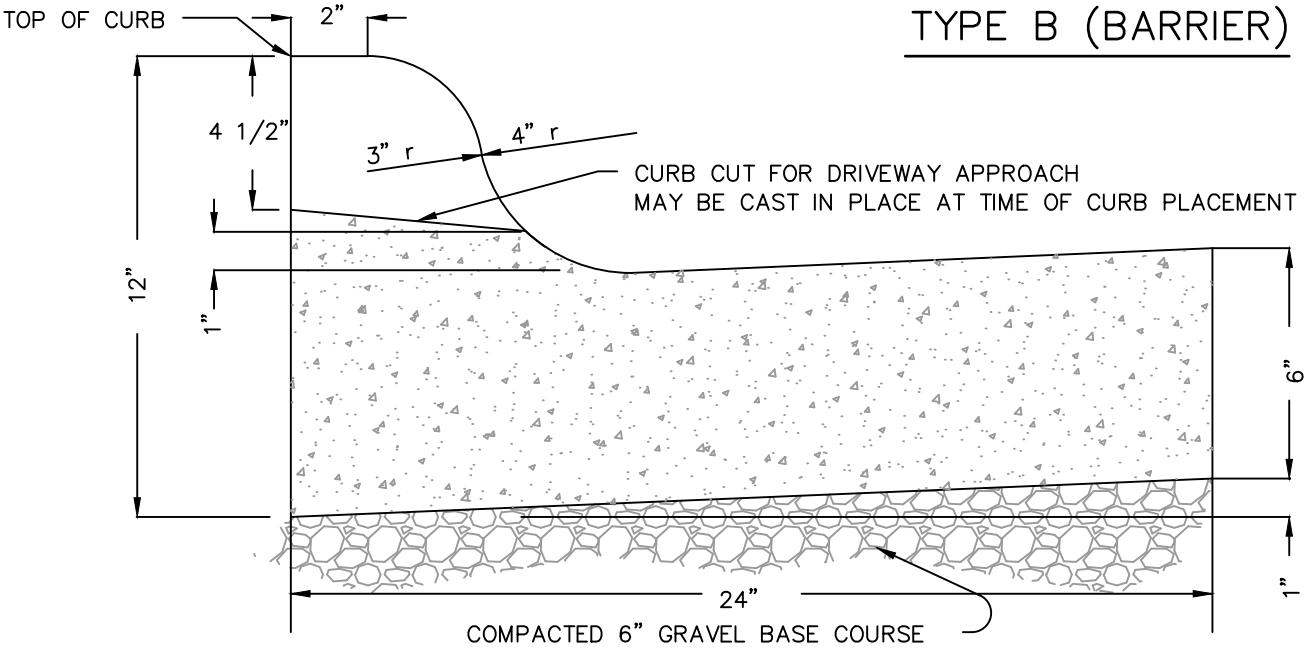
NOTES:

1. CURB & GUTTER SHALL HAVE A TOOLED CONTRACTION JOINT EVERY 10' AND BE SCORED A MIN. DEPTH OF 3/4"
2. CURB & GUTTER SHALL HAVE 1/2" EXPANSION JOINT AT P.C.'s, P.T.'s, CURB RETURNS, VERTICAL AND HORIZONTAL POINTS OF CURVATURE AND AT MAXIMUM OF 300' INTERVALS.
3. PLACE GRAVEL BASE COURSE AS REQUIRED IN SPECIFICATIONS.

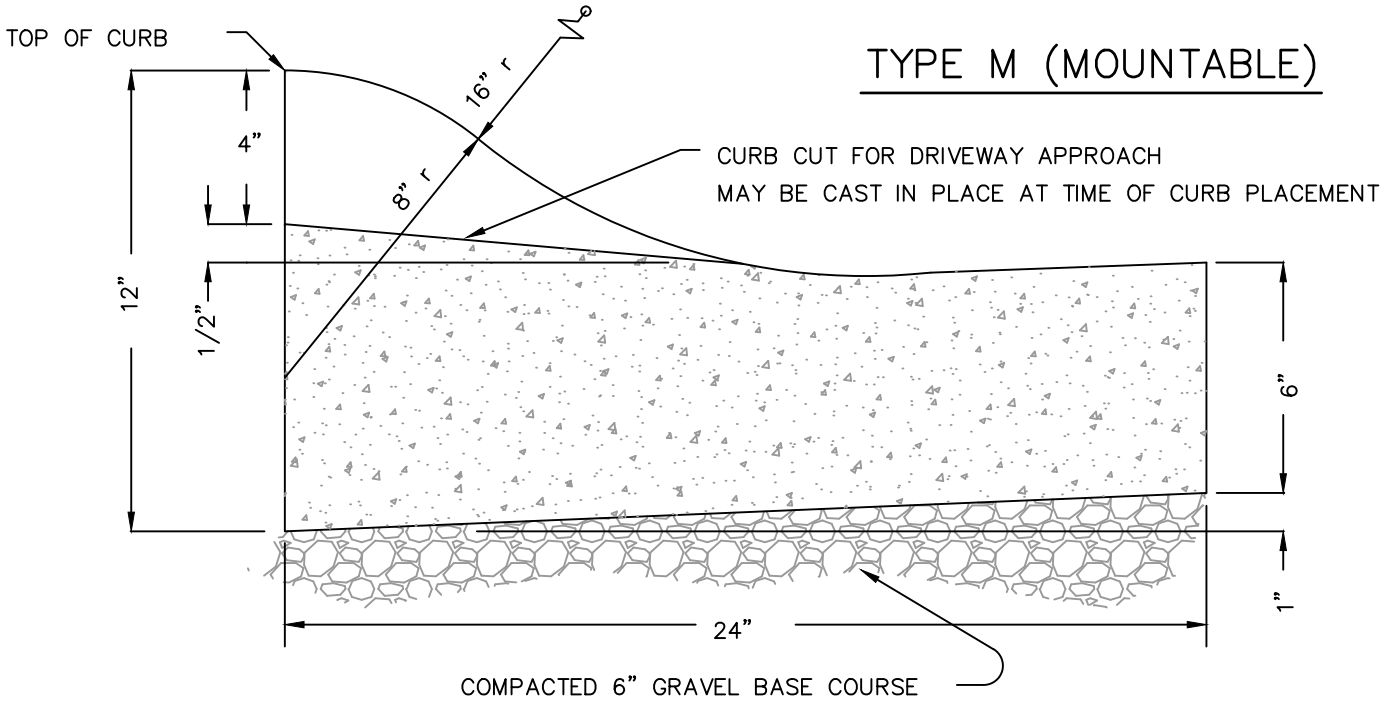
TYPICAL MOUNTABLE INTEGRAL CURB & GUTTER

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 REVISED MARCH 2018	5 – 05

TYPE B (BARRIER)



TYPE M (MOUNTABLE)

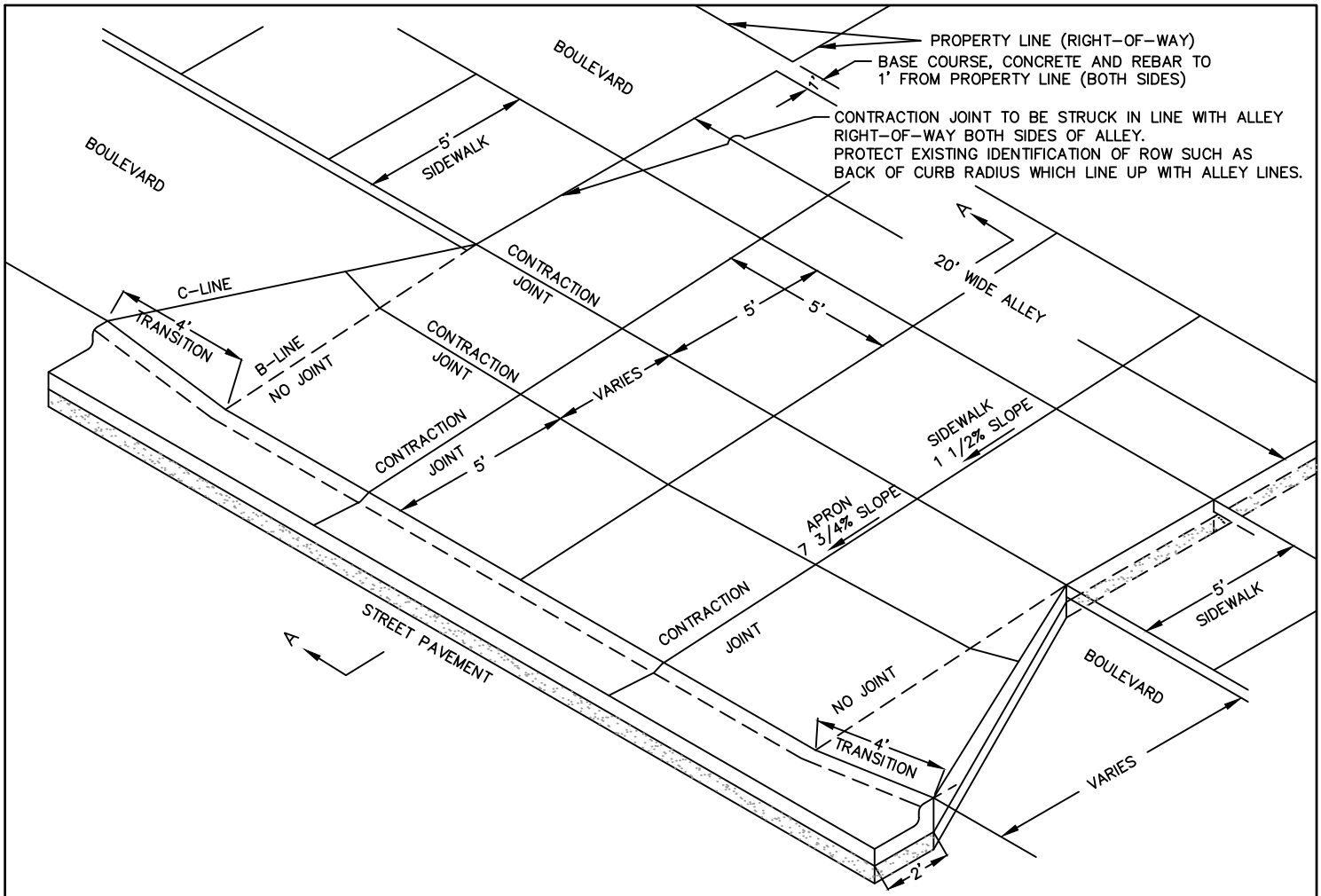


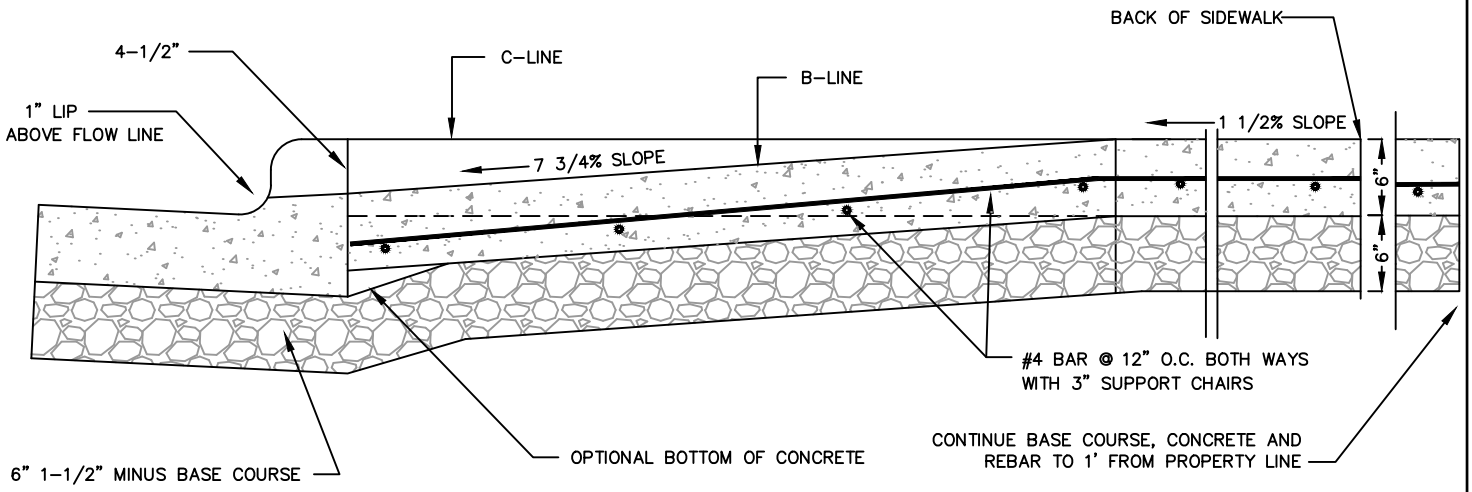
NOTES:

1. CURB & GUTTER SHALL HAVE A TOOLED CONTRACTION JOINT EVERY 10' AND BE SCORED A MIN. DEPTH OF 3/4"
2. CURB & GUTTER SHALL HAVE 1/2" EXPANSION JOINT AT P.C.'s, P.T.'s, CURB RETURNS, VERTICAL AND HORIZONTAL POINTS OF CURVATURE AND AT MAXIMUM OF 300' INTERVALS.
3. PLACE GRAVEL BASE COURSE AS REQUIRED IN SPECIFICATIONS.

INTEGRAL CURB AND GUTTER DETAILS

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED: MARCH 2018	5 – 06





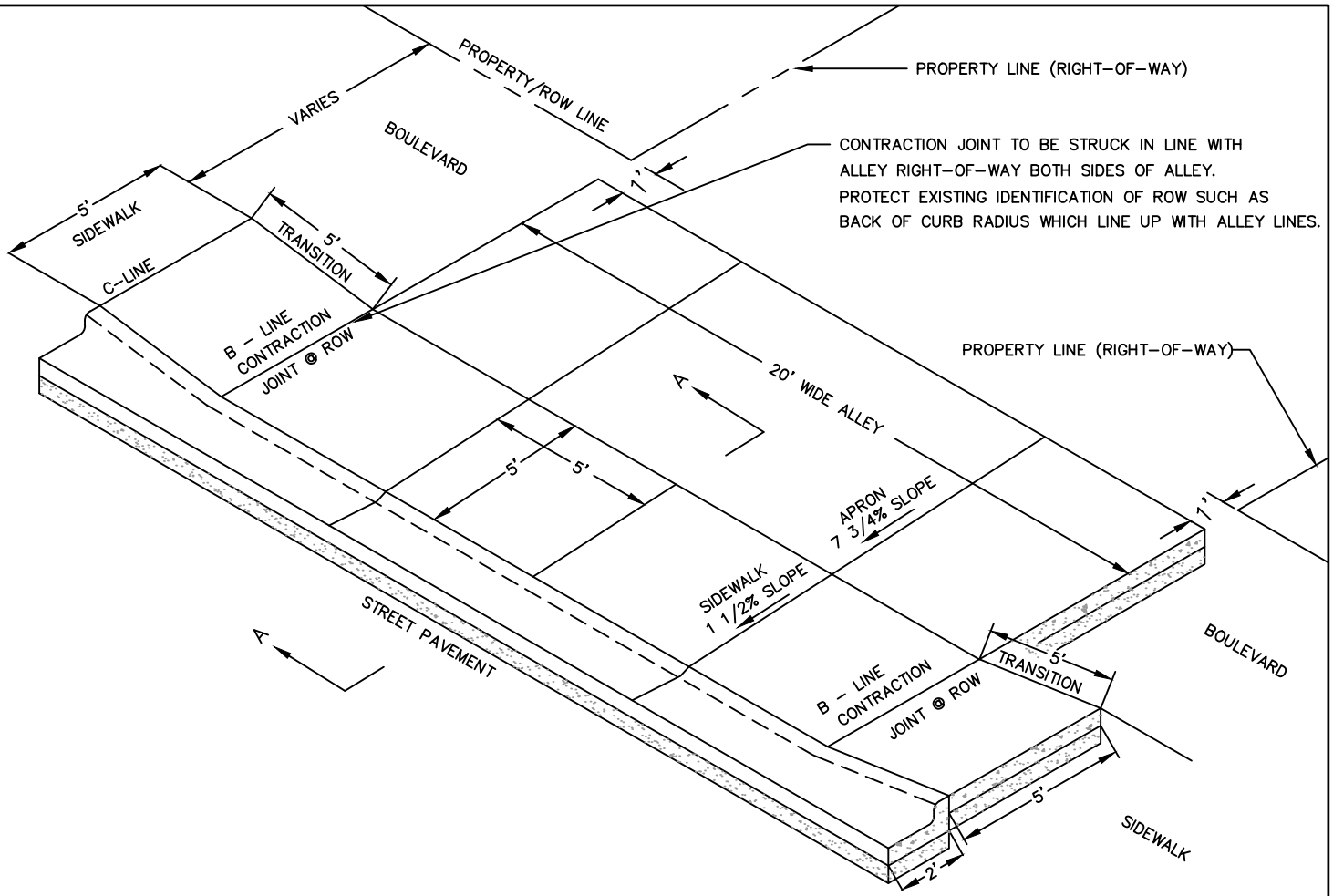
SECTION A-A

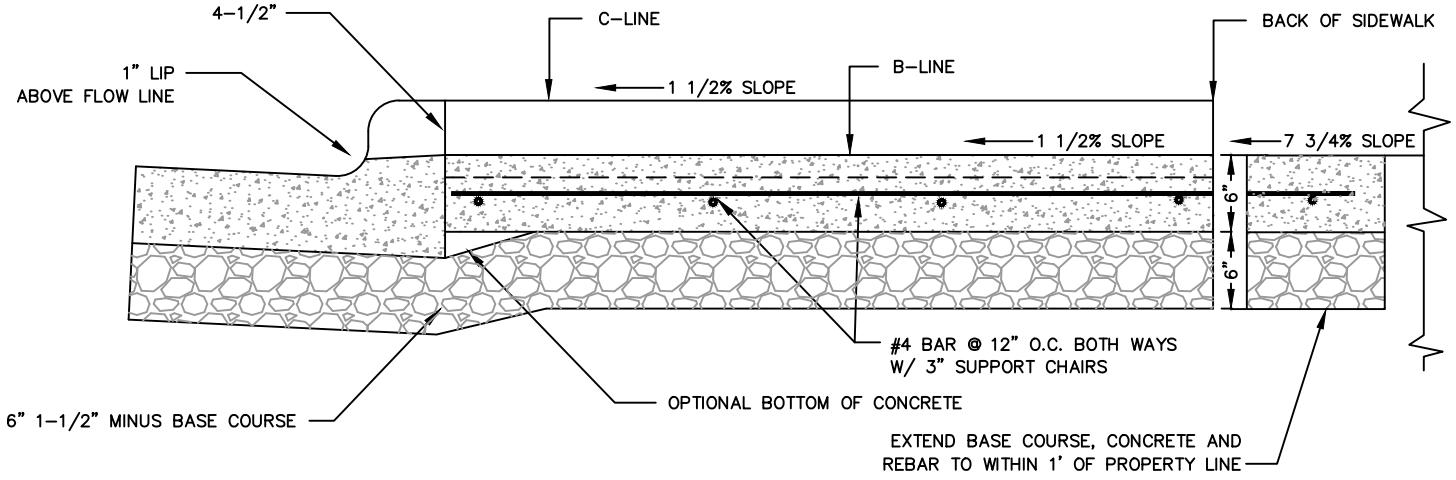
NOTE: ALLEY APPROACH WILL BE PLACED MONOLITHICALLY. P/C CONCRETE SHALL BE 4000 P.S.I. AND 6.5 SACK

NO SCALE

STANDARD DETAIL FOR CONCRETE ALLEY APRON WHERE SIDEWALK NOT AT BACK OF CURB – TYPE 1

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED: MARCH 2018	5 – 08A





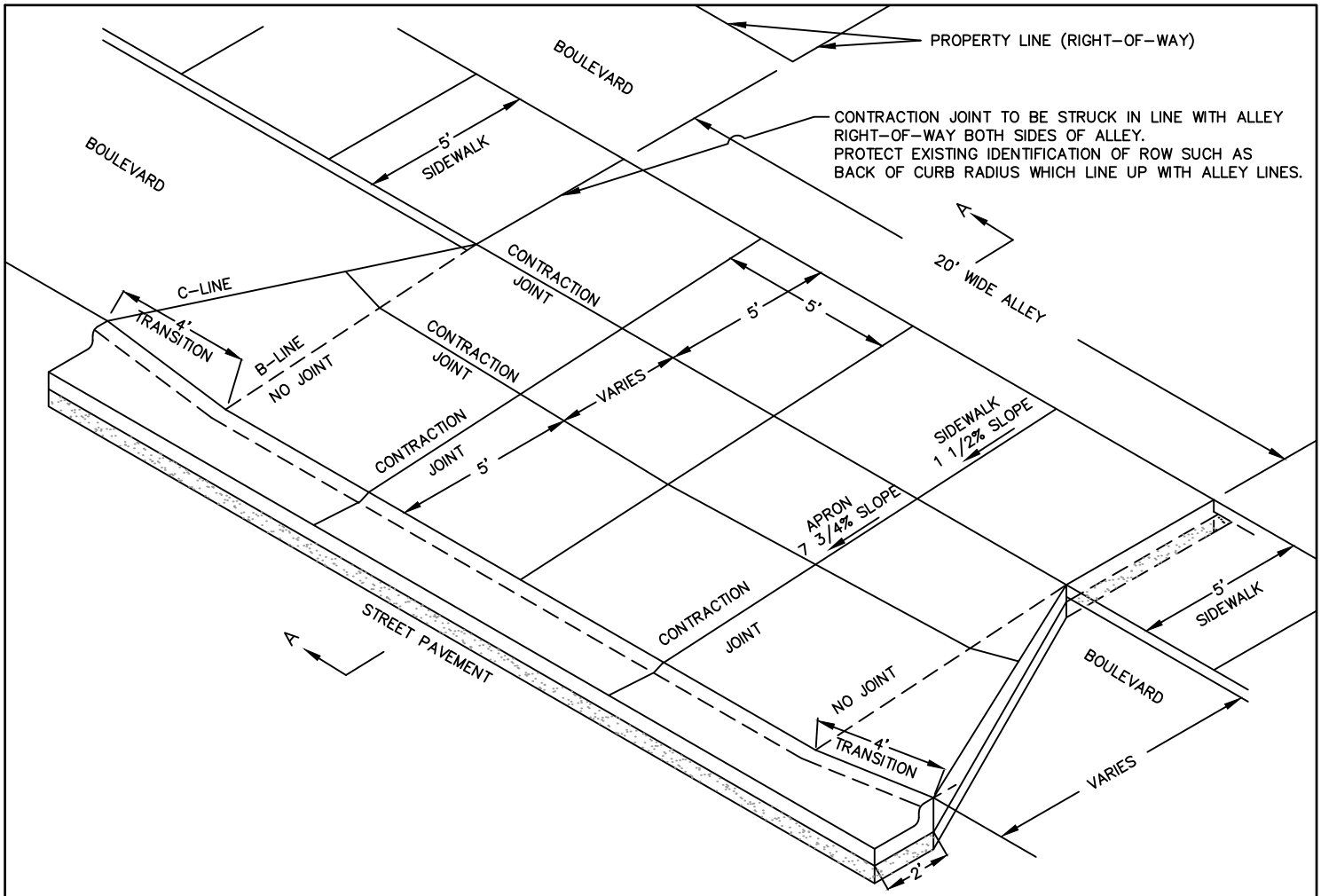
SECTION A-A

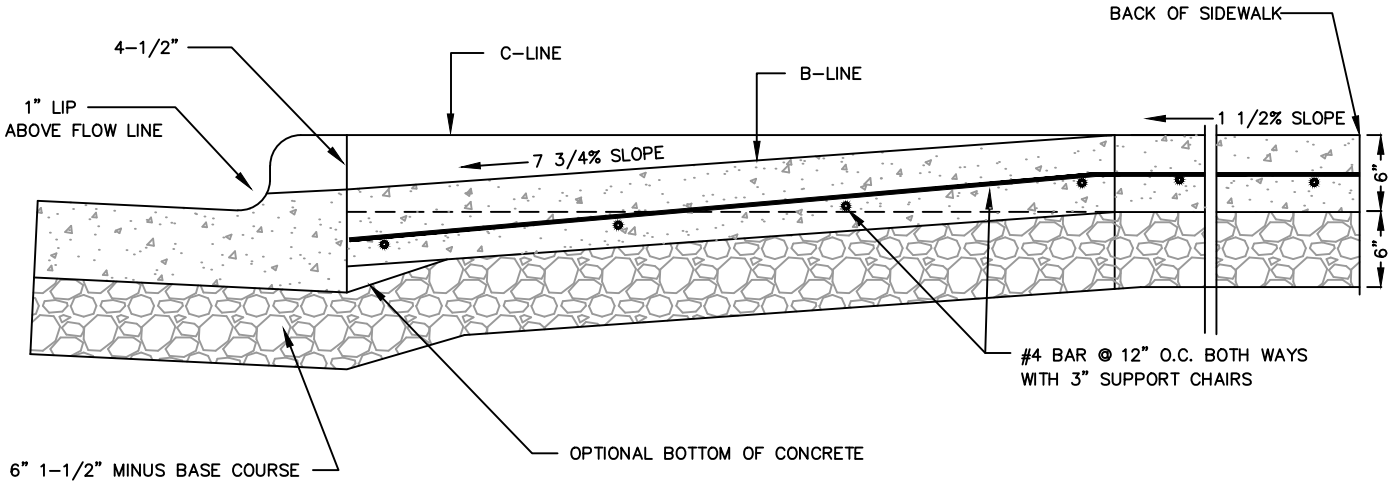
NOTE: ALLEY APPROACH WILL BE PLACED MONOLITHICALLY. P/C CONC. SHALL BE 4000 P.S.I. AND 6.5 SACK

NO SCALE

STANDARD DETAIL FOR CONCRETE ALLEY APRON WITH SIDEWALK AT CURB - TYPE 2

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED: MARCH 2018	5 - 08B





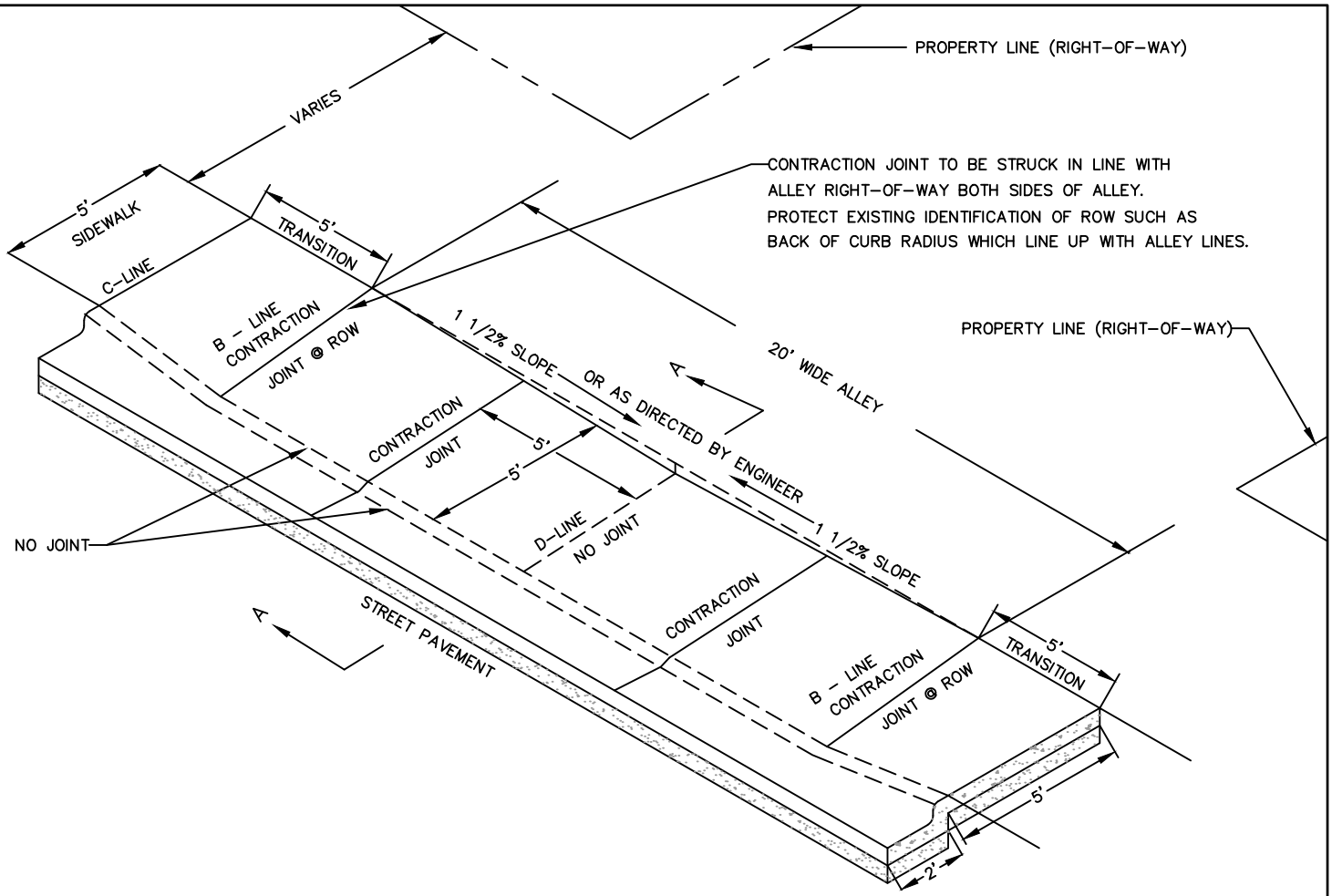
SECTION A-A

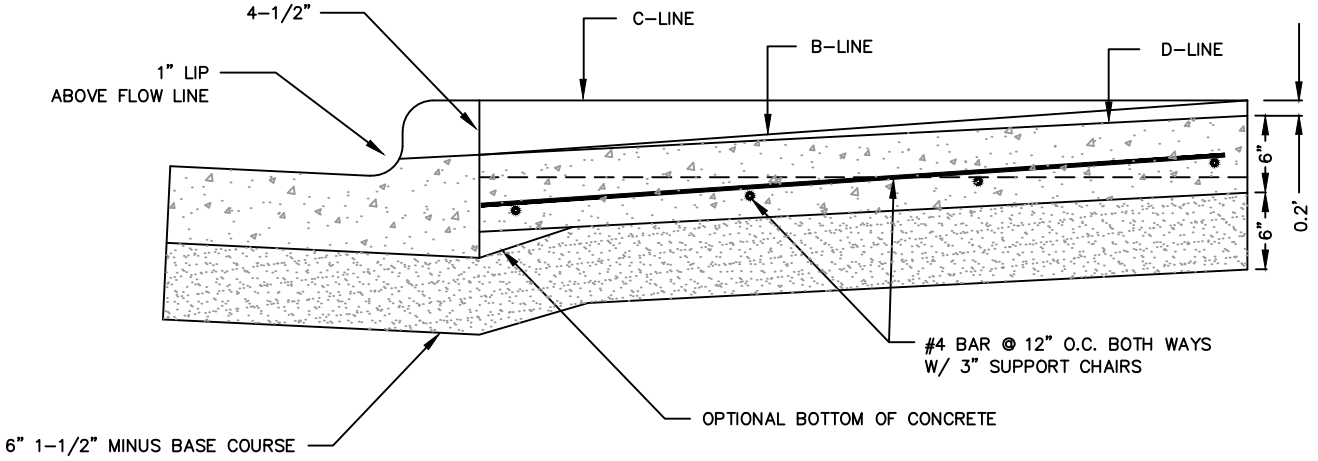
NOTE: ALLEY APPROACH WILL BE PLACED MONOLITHICALLY. P/C CONCRETE SHALL BE 4000 P.S.I. AND 6.5 SACK

NO SCALE

STANDARD DETAIL FOR CONCRETE ALLEY APRON WHERE SIDEWALK NOT AT BACK OF CURB – TYPE 3

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED: MARCH 2018	5 – 08C





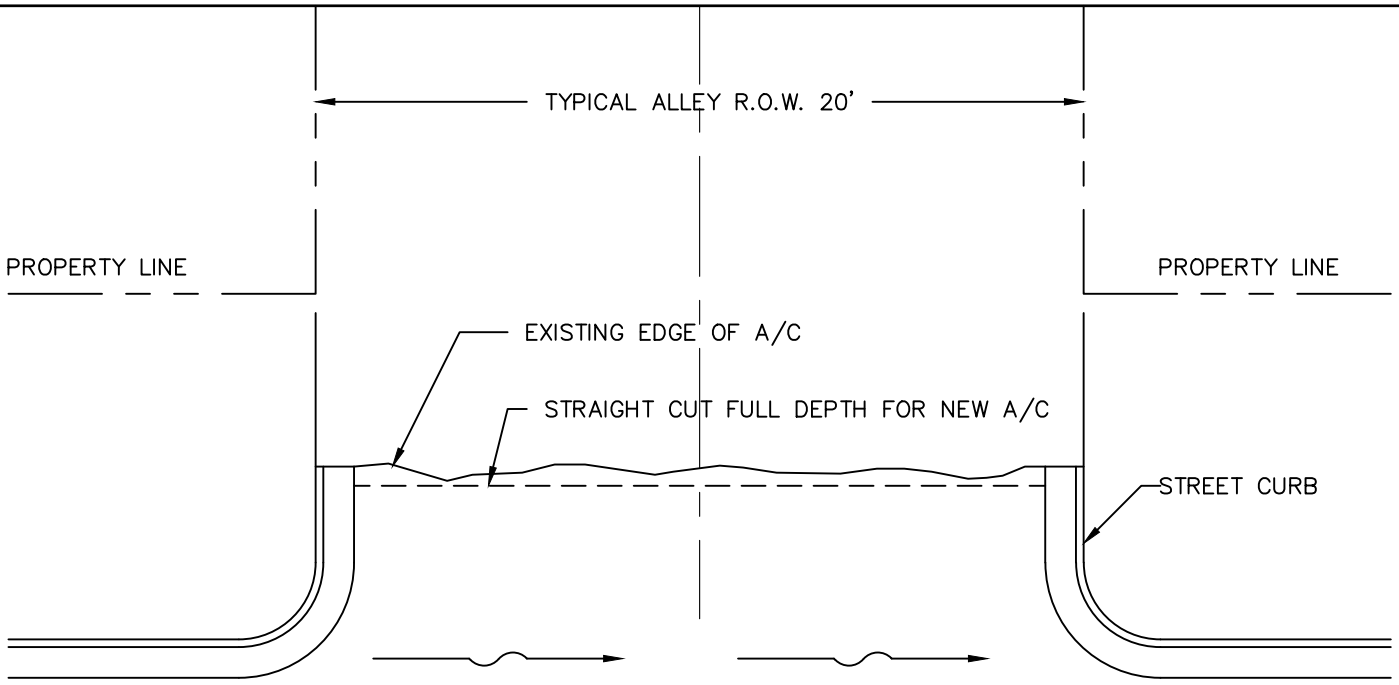
SECTION A-A

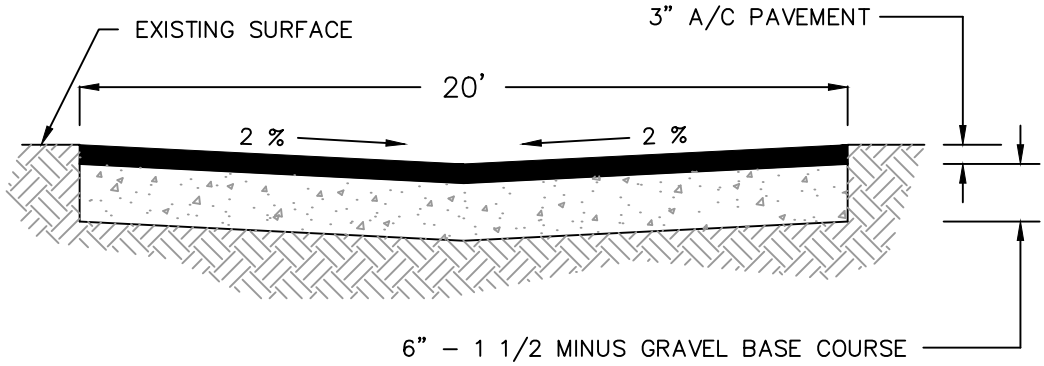
NOTE: ALLEY APPROACH WILL BE PLACED MONOLITHICALLY. P/C CONC. SHALL BE 4000 P.S.I.

NO SCALE

STANDARD DETAIL FOR CONCRETE ALLEY APRON WITH SIDEWALK AT CURB - TYPE 4

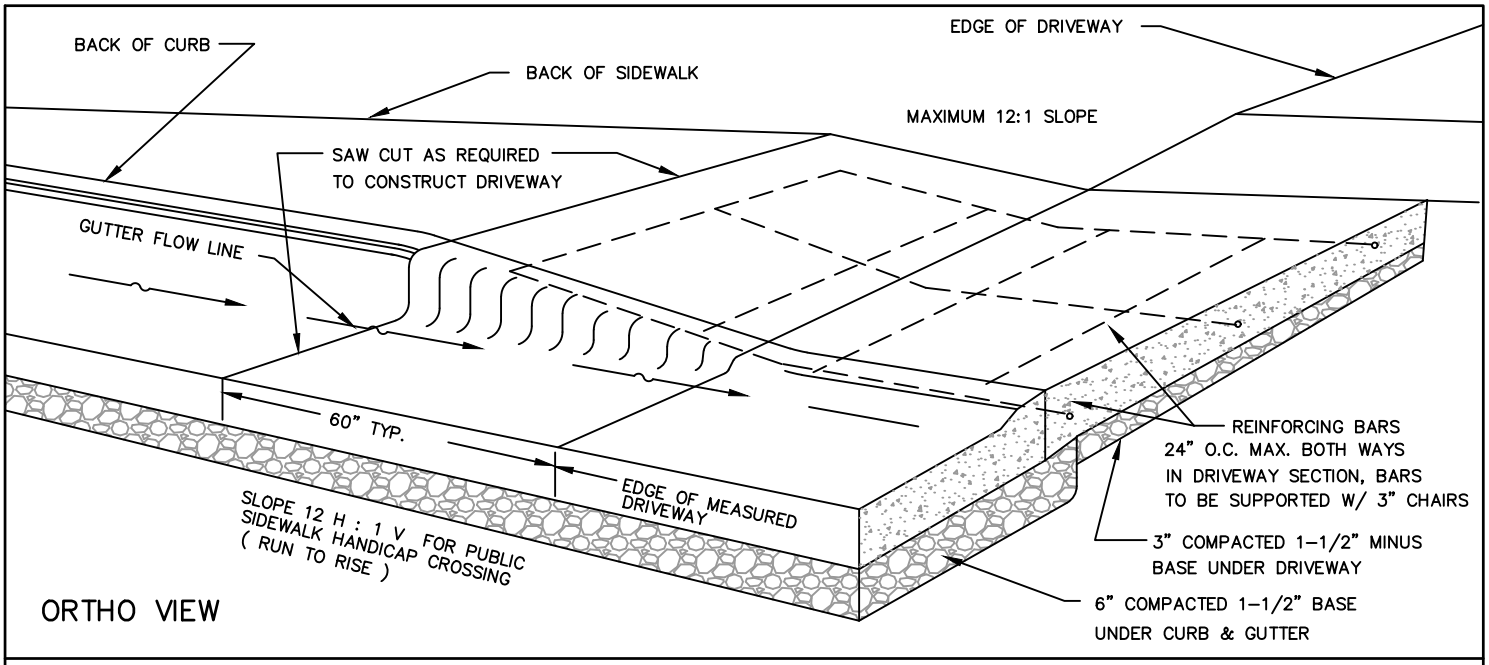
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED APRIL 2012	5 - 08D

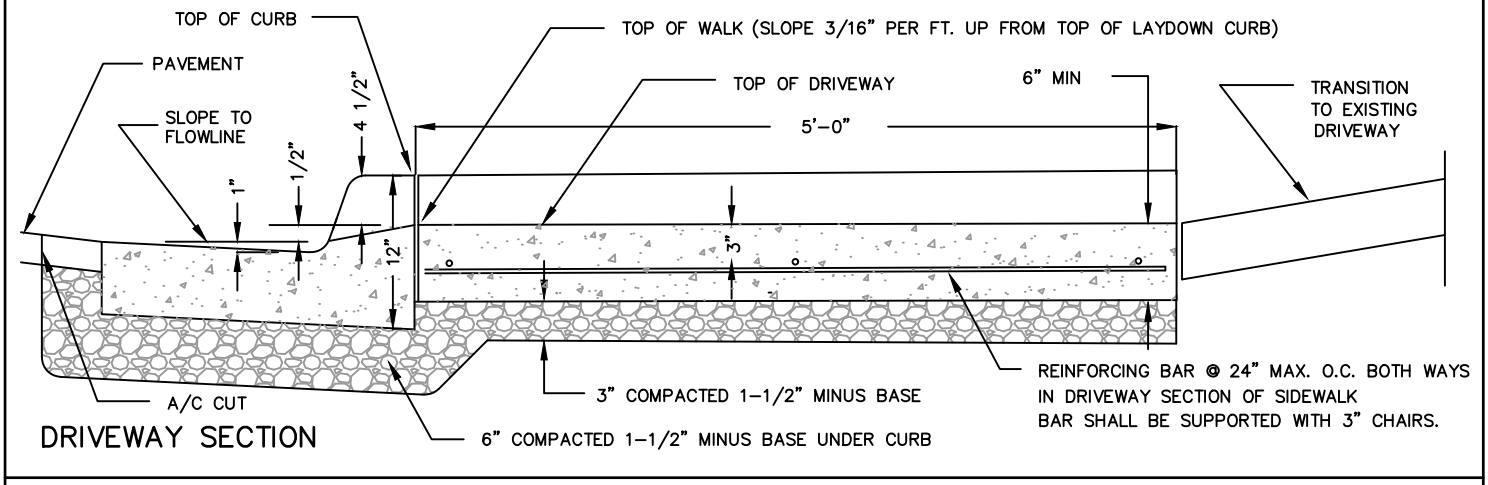


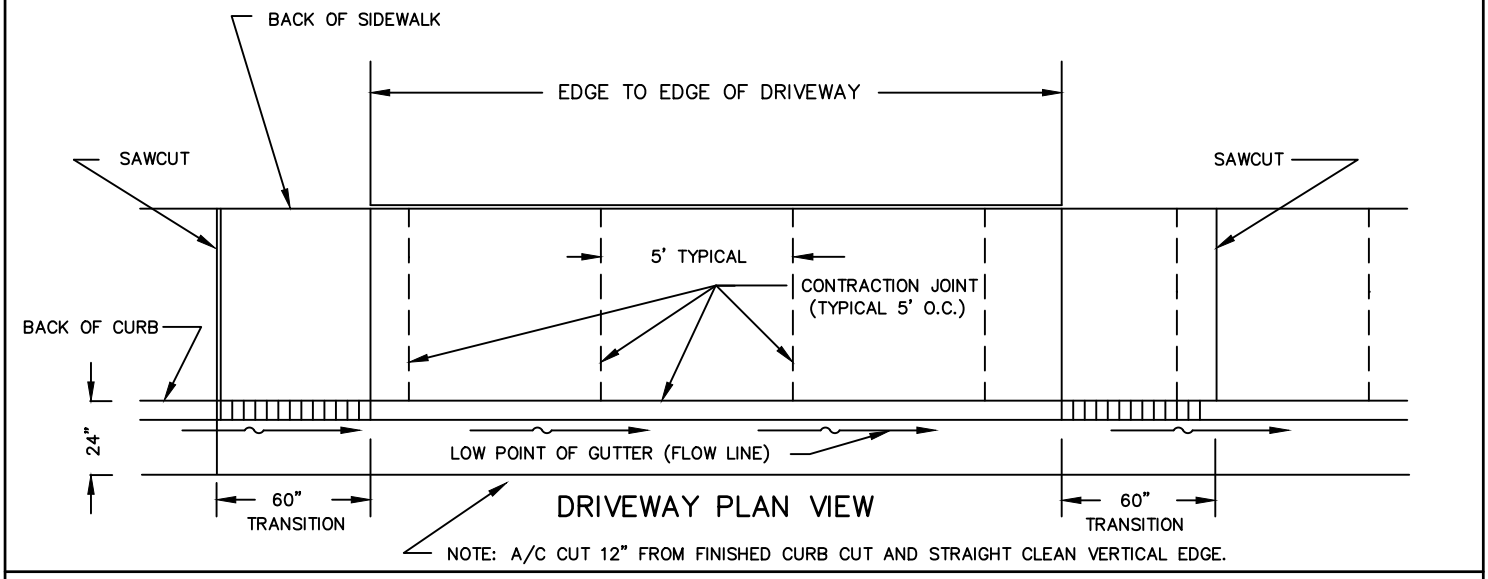


STANDARD DETAIL FOR ASPHALT PAVING OF PUBLIC ALLEY

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	APRIL 1994 REVISED	5 – 09

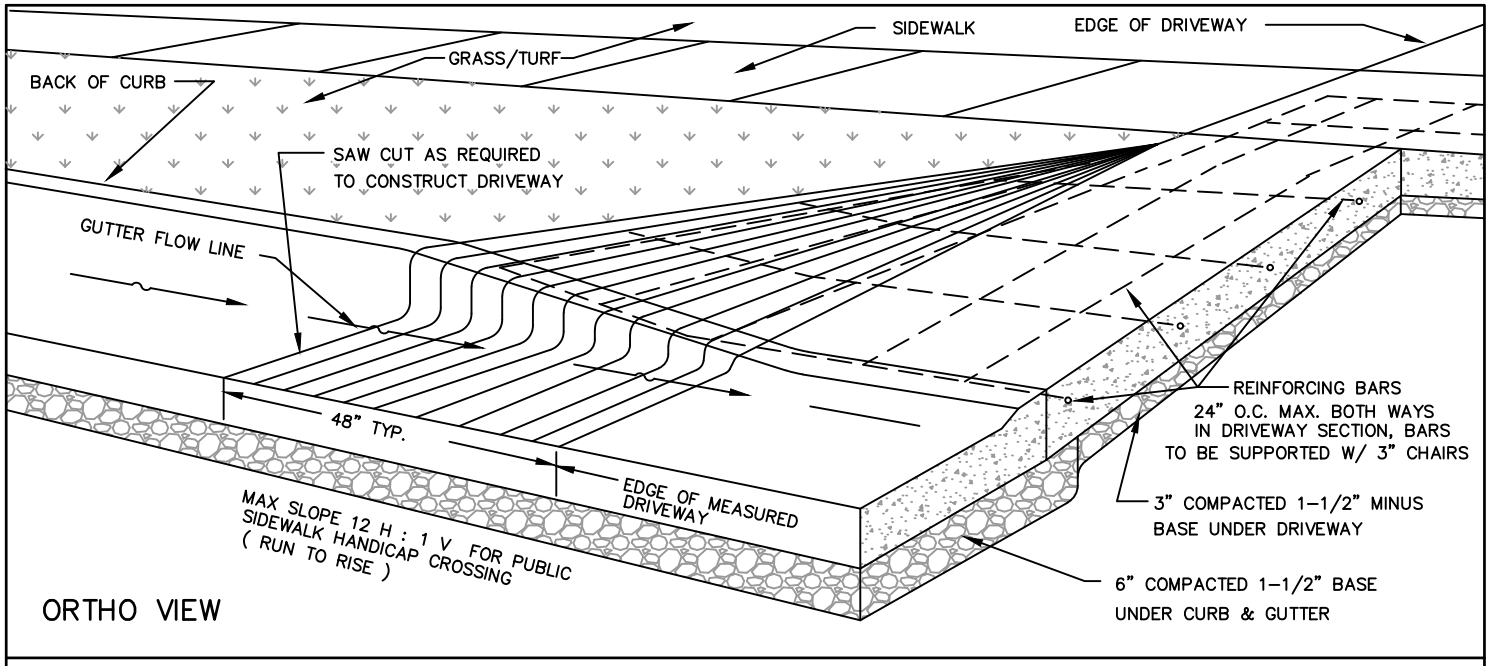


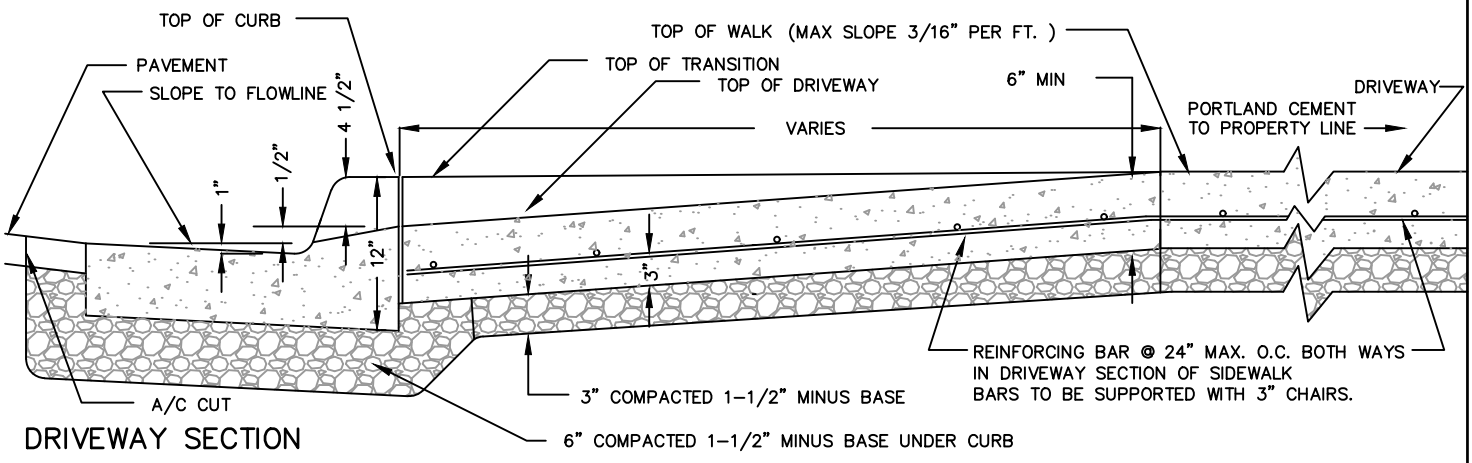


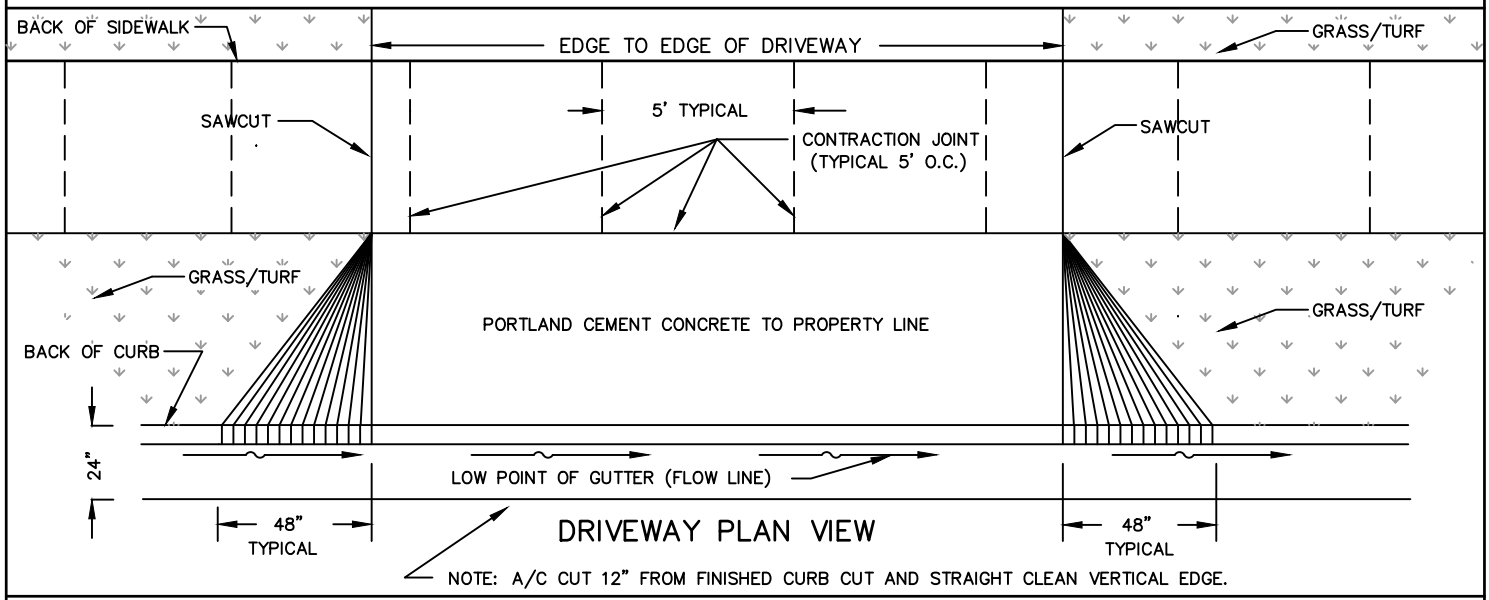


CURB AND SIDEWALK SECTION FOR DRIVEWAYS WITH SIDEWALK AT CURB

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED JAN 2019	5 – 10A

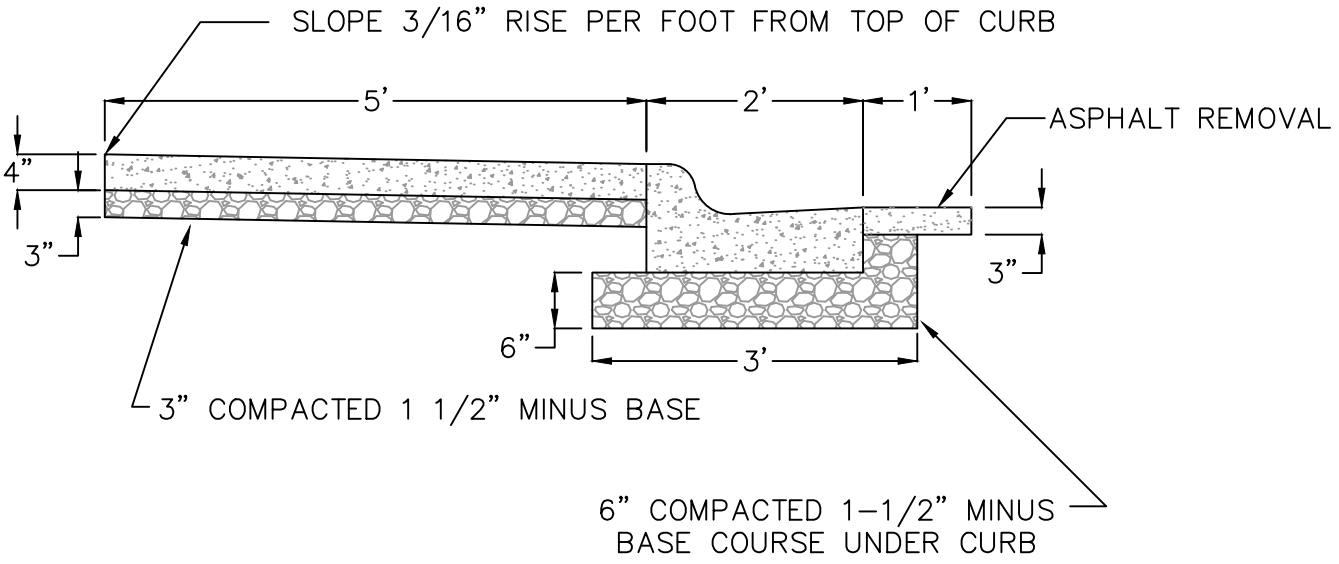






CURB AND SIDEWALK SECTION FOR DRIVEWAYS WITH GRASS BOULEVARD BETWEEN CURB AND WALK

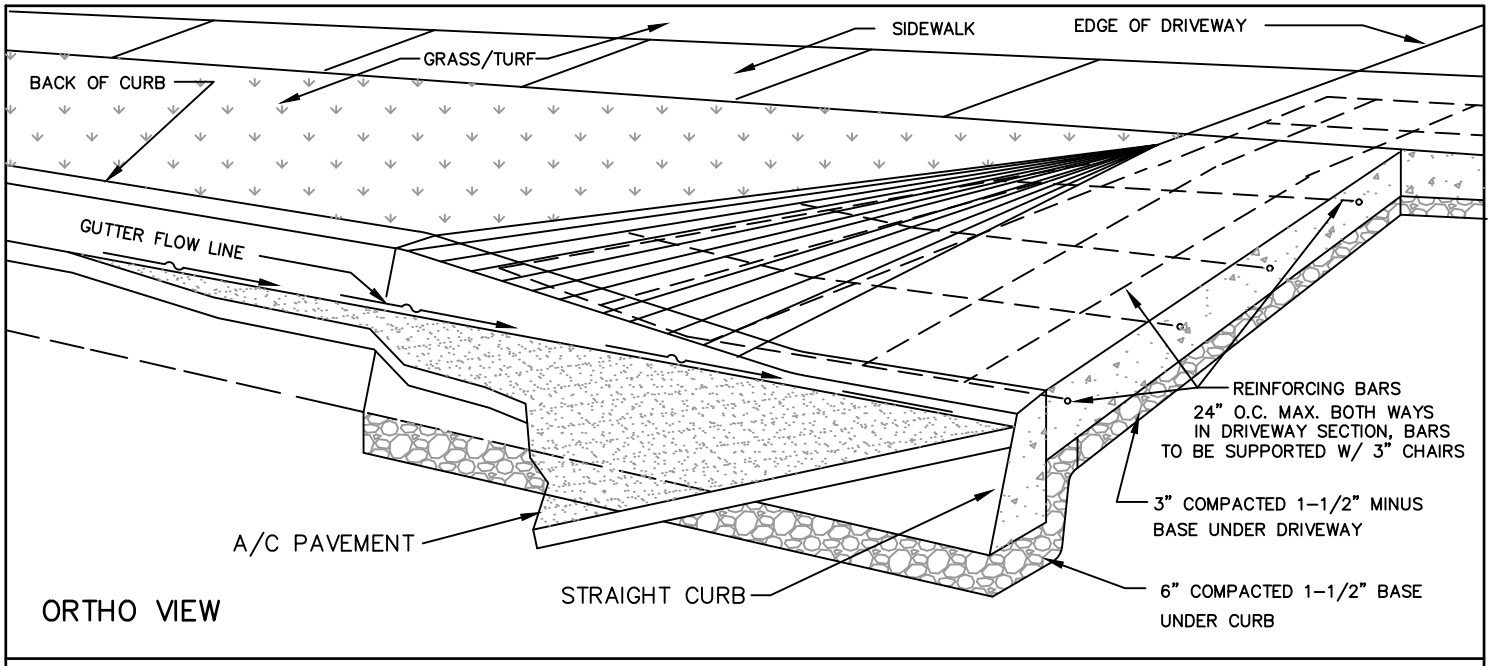
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED JAN 2019	5 – 10B

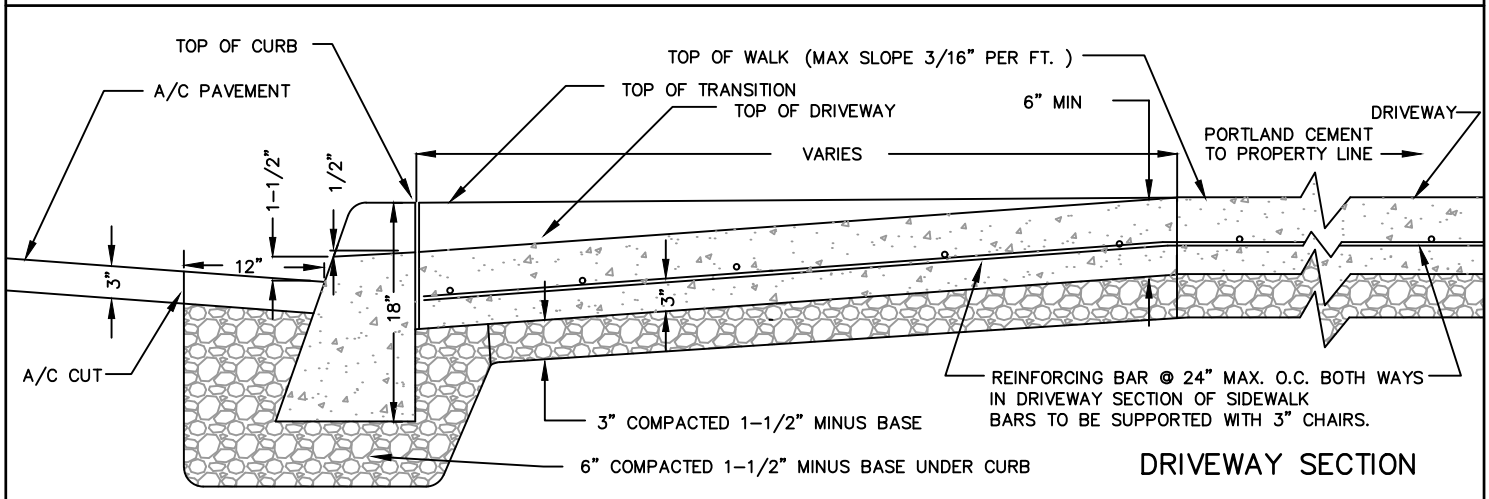


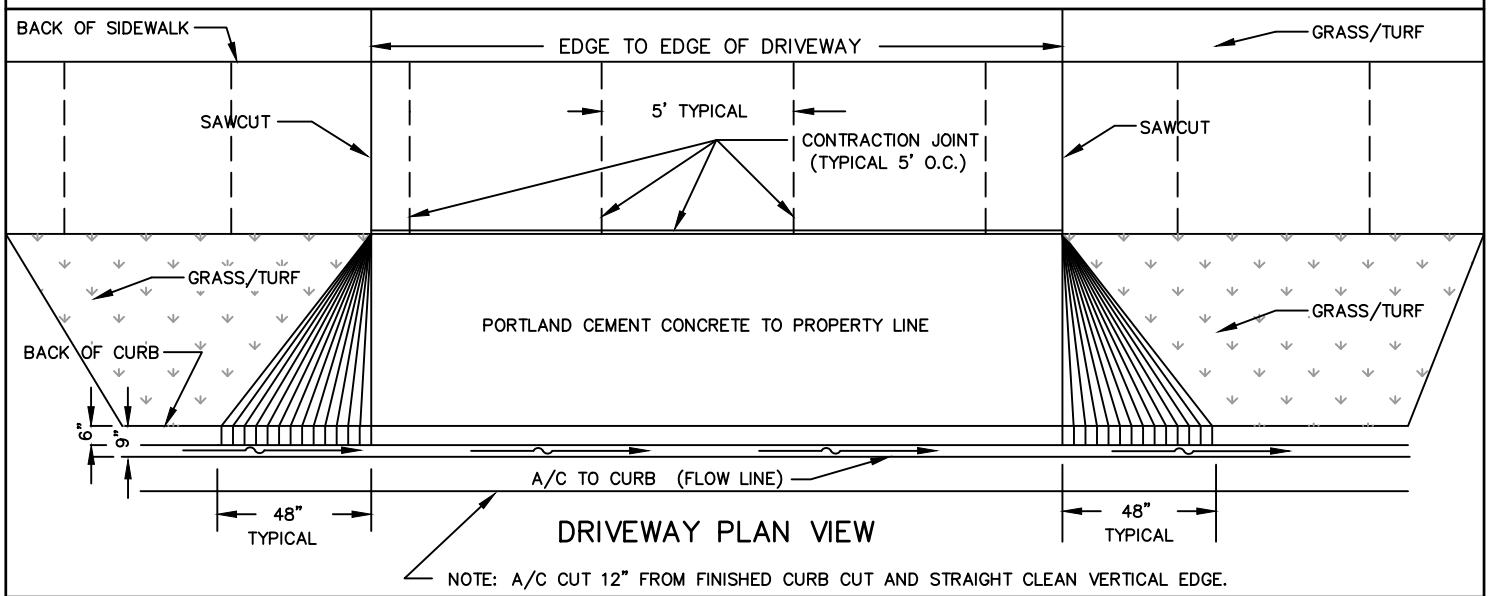
1. CURB & GUTTER SHALL HAVE A TOOLED CONTRACTION JOINT EVERY 10' AND BE SCORED A MIN. DEPTH OF 3\4"
2. CURB & GUTTER AND SIDEWALK SHALL HAVE 1\2" EXPANSION JOINT AT PC's, D.T's AND CURB TURNS
3. SIDEWALK SHALL HAVE A TOOLED CONTRACTION JOINT EVERY 5' AND BE SCORED A MIN. DEPTH OF 3\4"
4. ALL CONCRETE POURED INSIDE CITY R.O.W. SHALL BE 6 1\2 SACK AND 4000 PSI MIX DESIGN
5. PLACE GRAVEL BASE COURSE AS REQUIRED IN SPECIFICATIONS

CURB AND SIDEWALK SECTION

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	APRIL 2000 REVISED SEPT 2015	5 – 10C

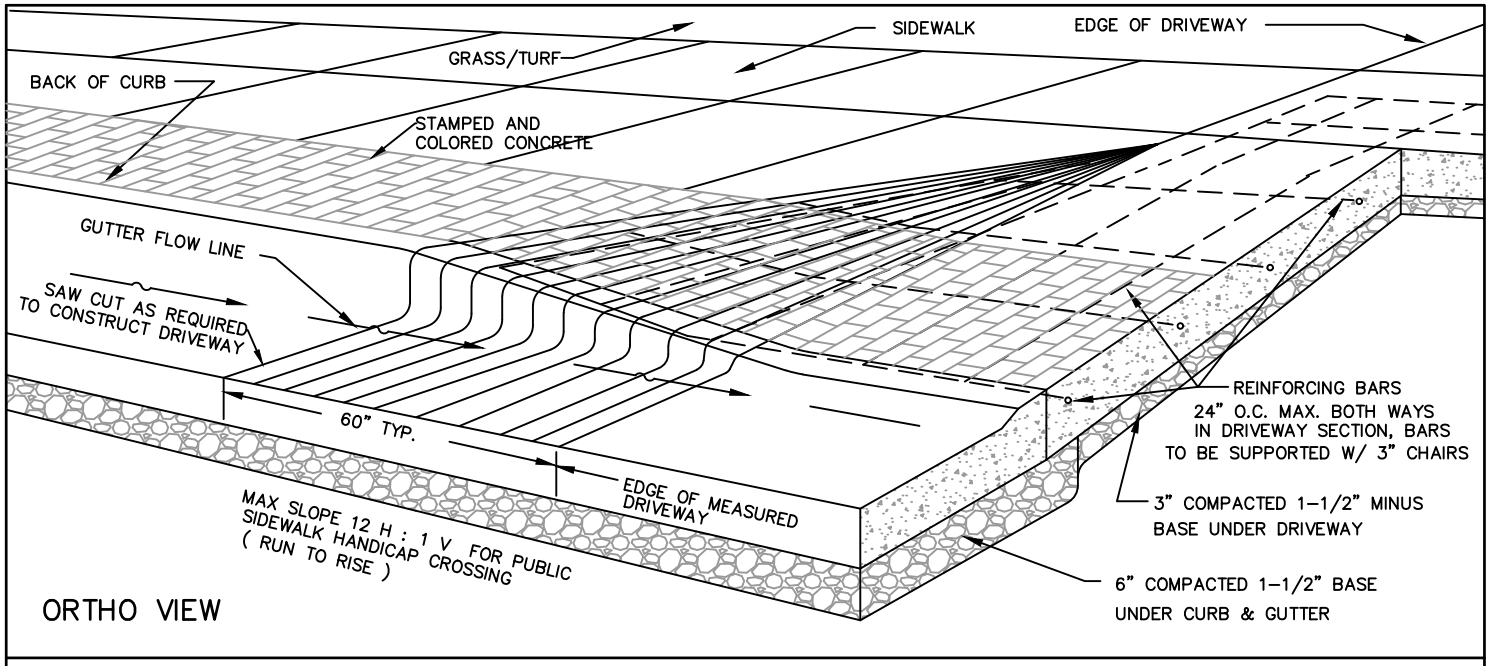


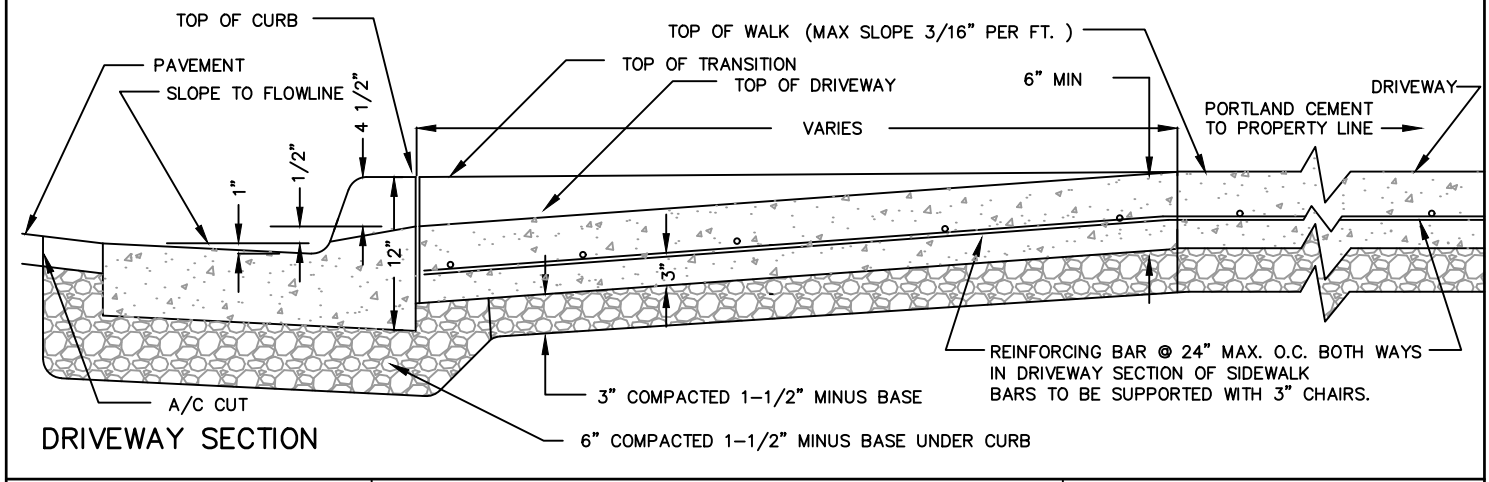


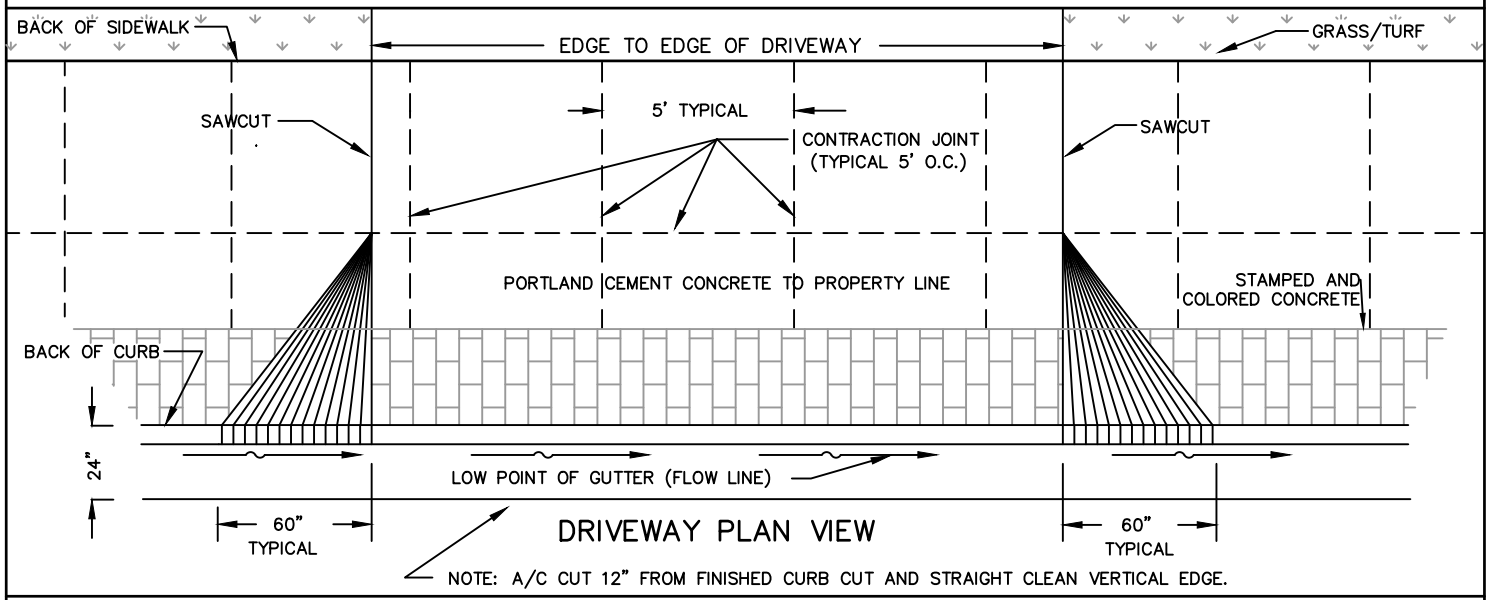


STRAIGHT CURB AND SIDEWALK SECTION FOR DRIVEWAYS WITH GRASS BOULEVARD BETWEEN CURB AND SIDEWALK

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED APRIL 2015	5 – 10 D

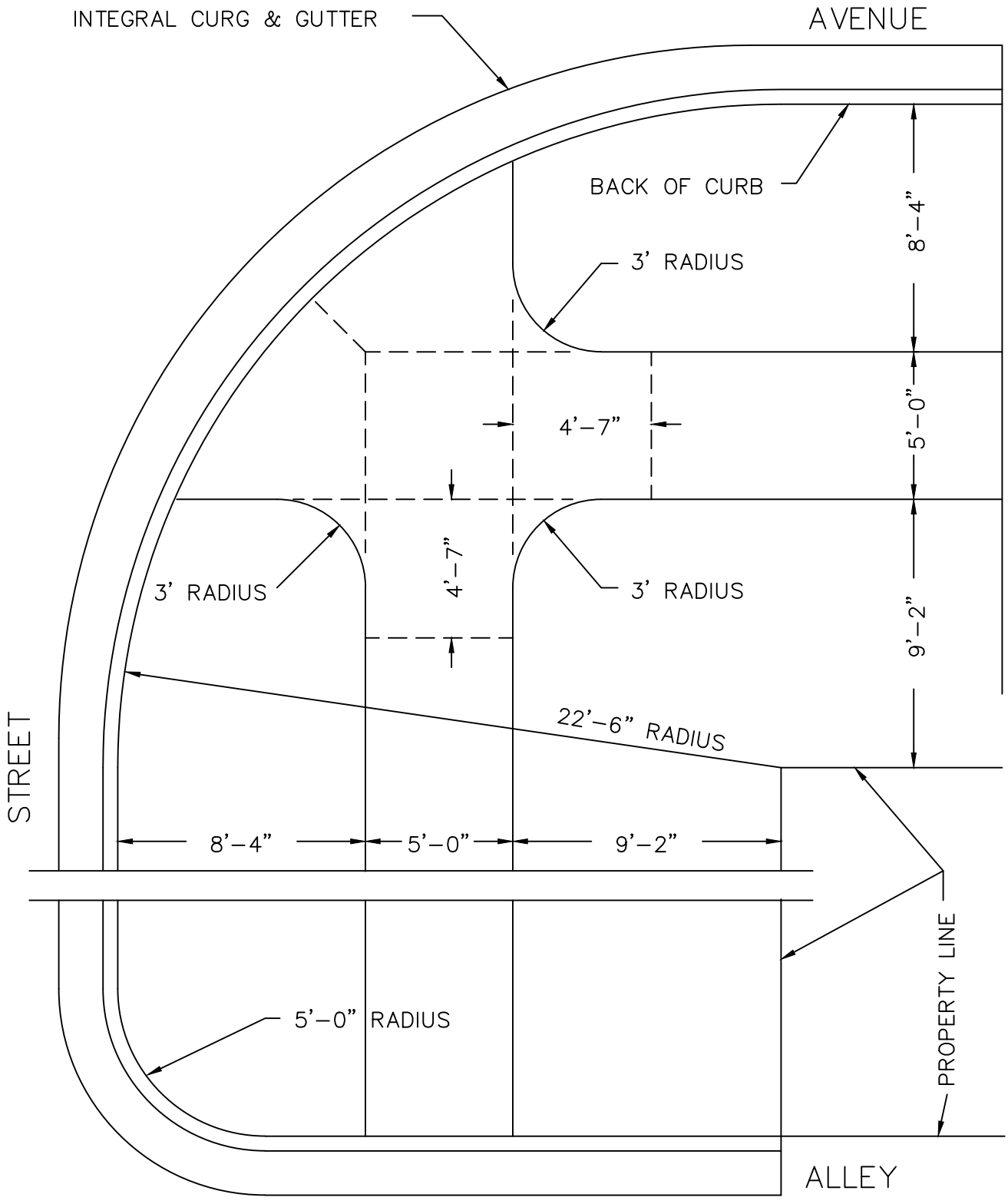






CURB AND SIDEWALK SECTION FOR DRIVEWAYS DOWNTOWN WITH STAMPED DECORATIVE BRICK PATTERN

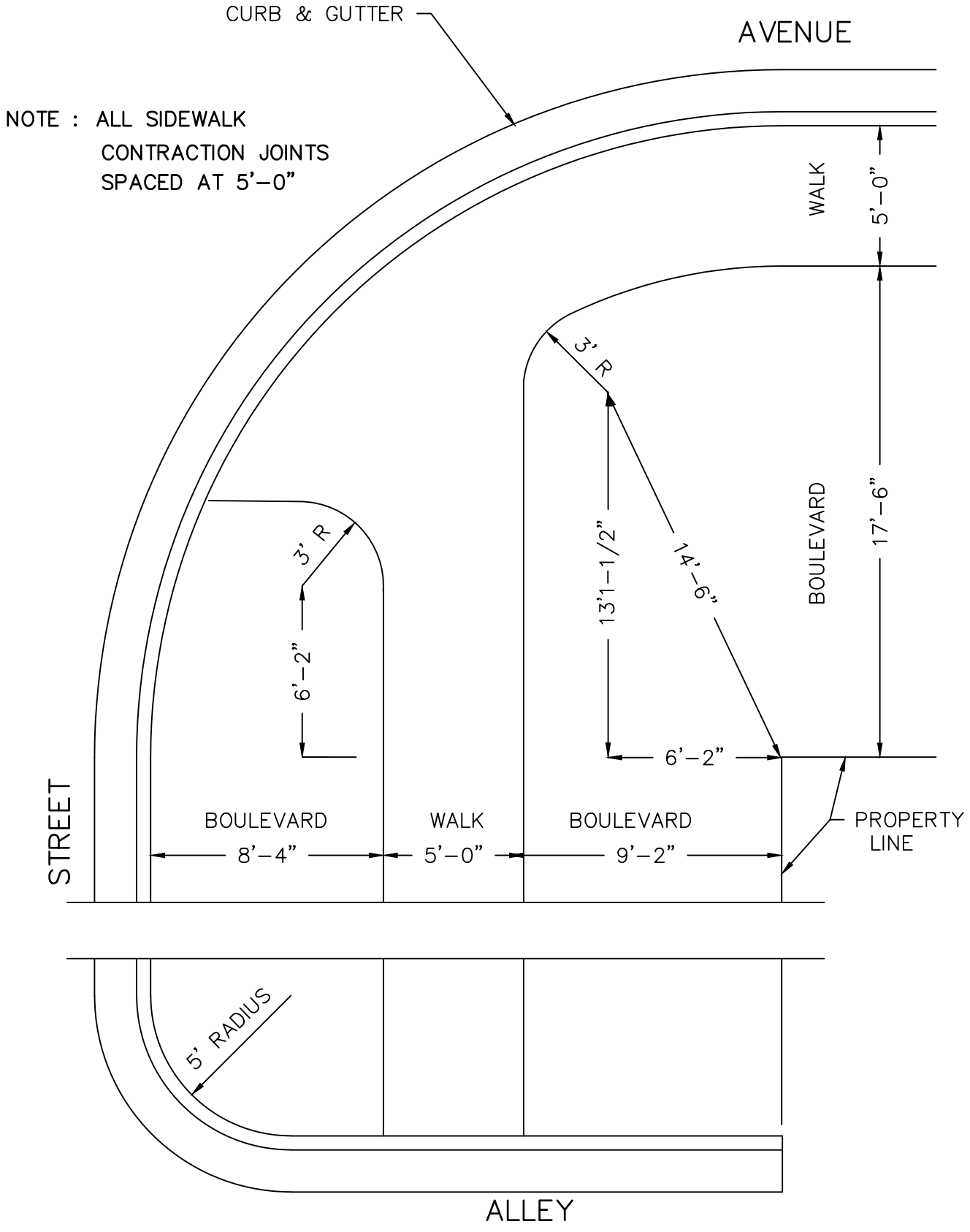
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED JAN 2019	5 – 10E



NOTE : ALL WALK CONTRACTION JOINTS SPACED AT 5'-0" EXCEPT WHERE NOTED. EXPANSION JOINTS AT 25' INTERVALS.

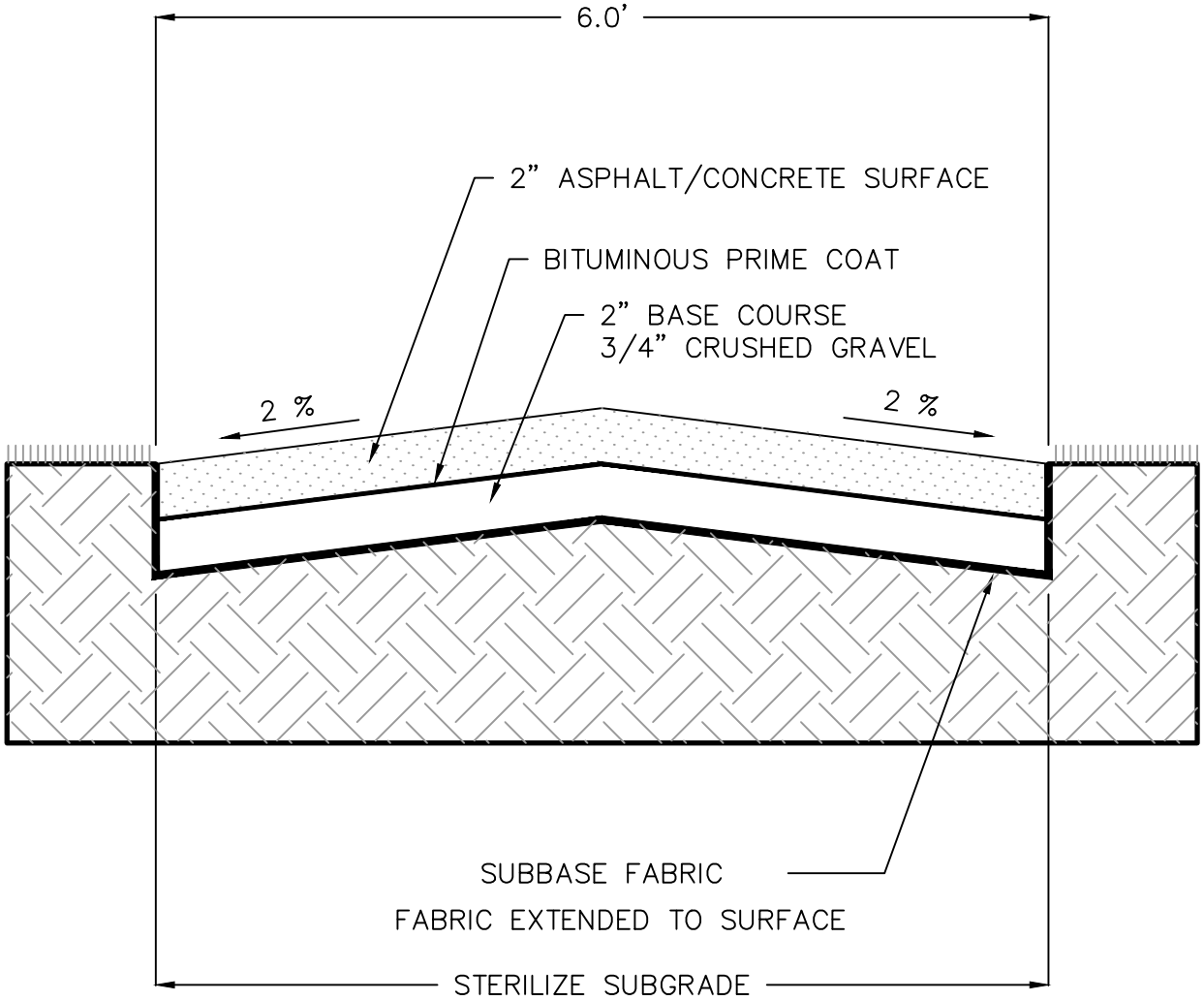
TYPICAL OLD TYPE SIDEWALK AND INTEGRAL CURB & GUTTER

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 (ORG. 1950) REVISED	5 – 11



TRANSITIONAL SIDEWALK INTERSECTION – OLD STYLE TO NEW

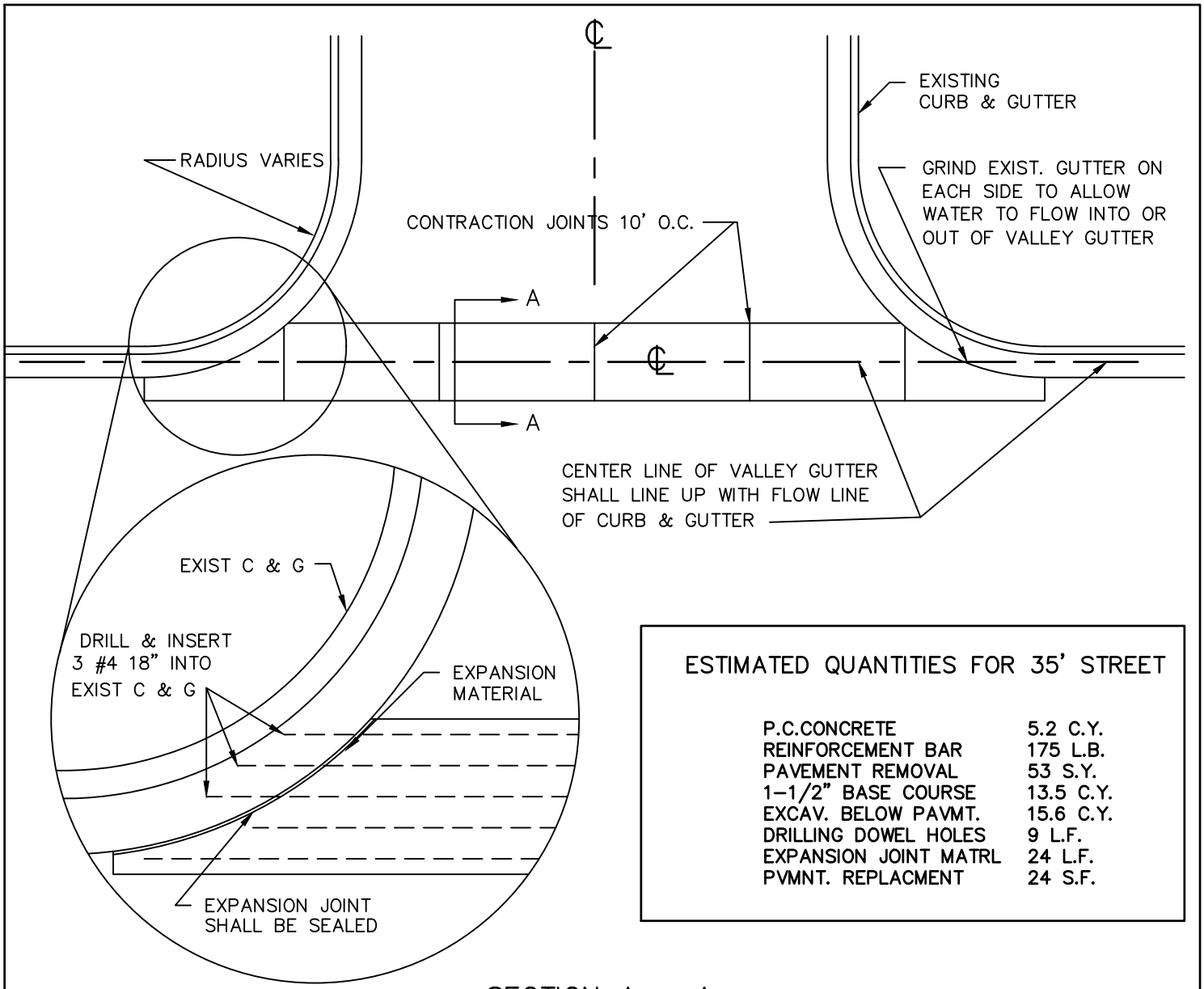
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 (ORG. 1950) REVISED	5 – 13



NOTE: 2% GRADE IS EQUAL TO 1/4" PER FOOT.

TYPICAL PARK PATH CROSS-SECTION

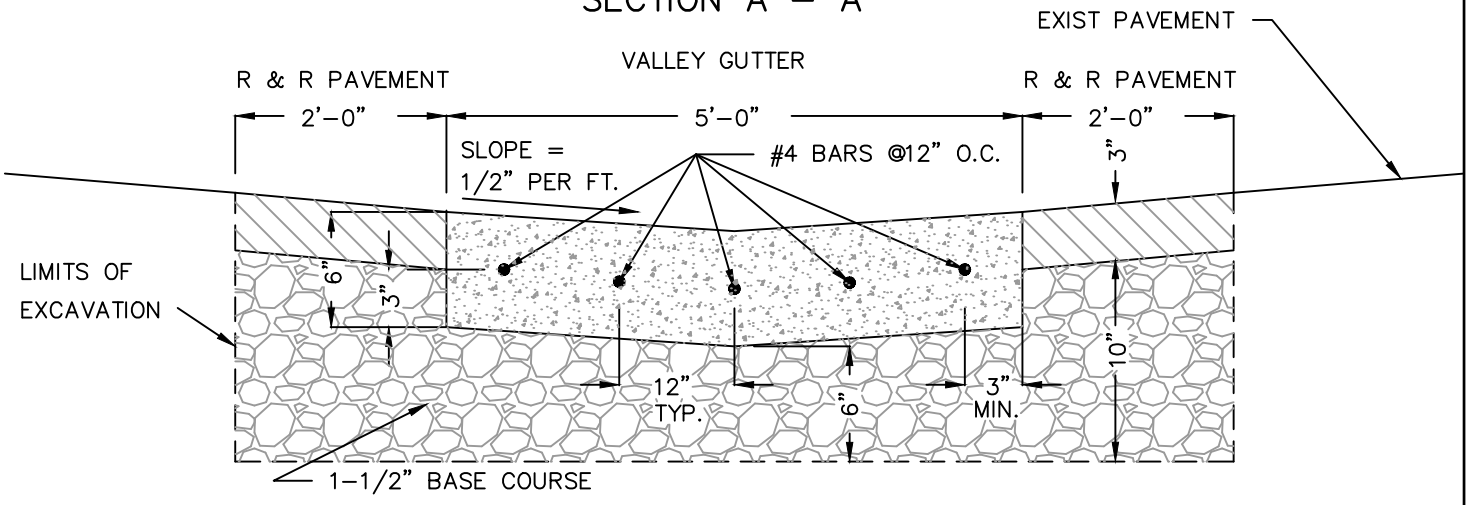
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	JANUARY 1988 REVISED	5 – 14



ESTIMATED QUANTITIES FOR 35' STREET

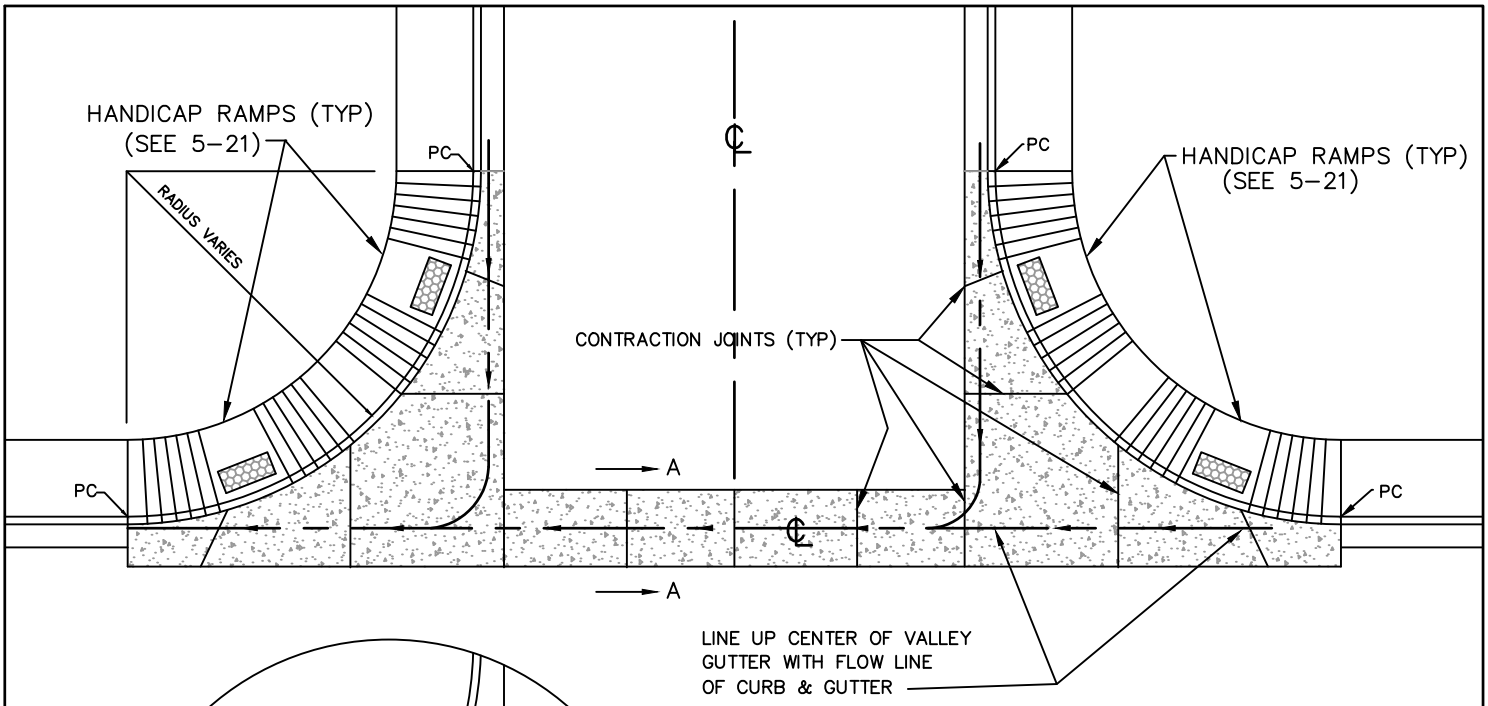
P.C.CONCRETE	5.2 C.Y.
REINFORCEMENT BAR	175 L.B.
PAVEMENT REMOVAL	53 S.Y.
1–1/2" BASE COURSE	13.5 C.Y.
EXCAV. BELOW PAVMT.	15.6 C.Y.
DRILLING DOWEL HOLES	9 L.F.
EXPANSION JOINT MATRL	24 L.F.
PVMNT. REPLACMENT	24 S.F.

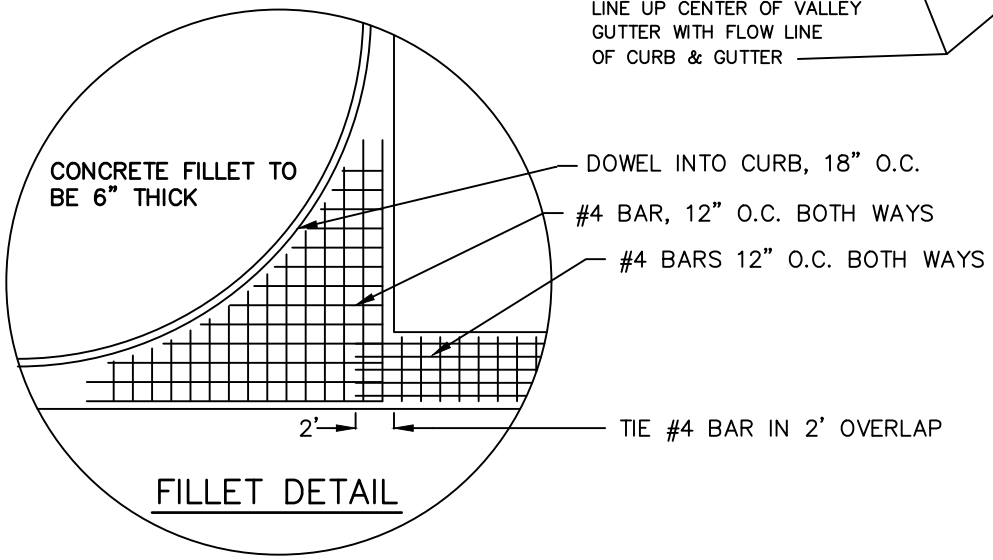
SECTION A – A



TYPICAL VALLEY GUTTER INSTALLATION WITH EXISTING CURBS

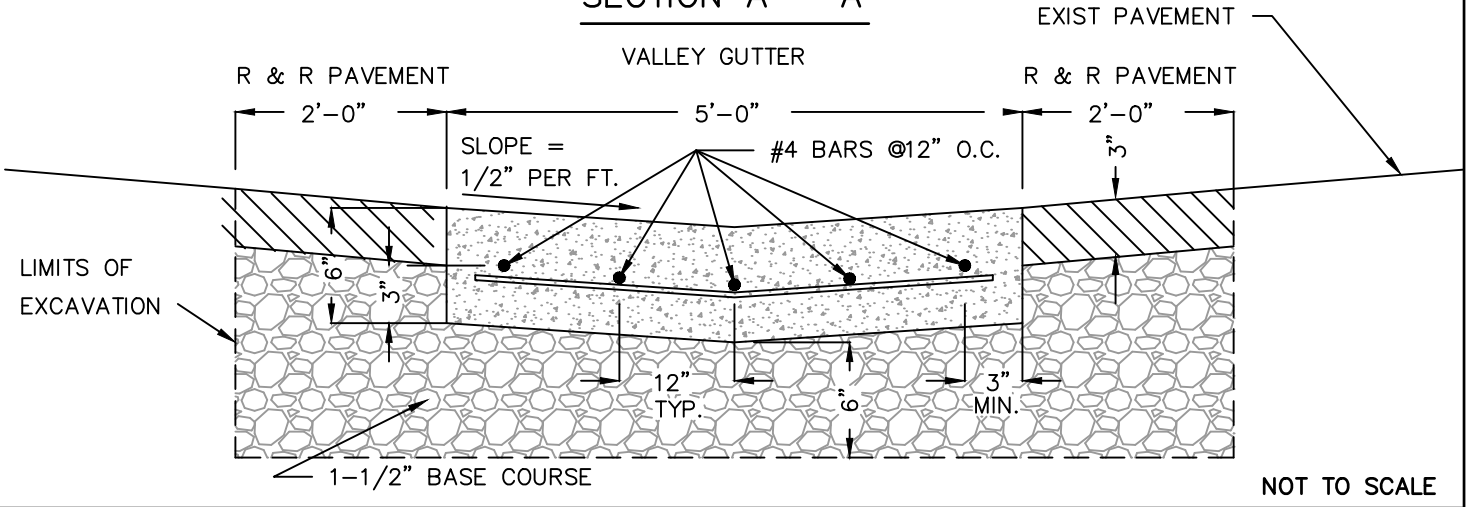
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	MAY 1991 REVISED	5 – 15





FILLET DETAIL

SECTION A – A

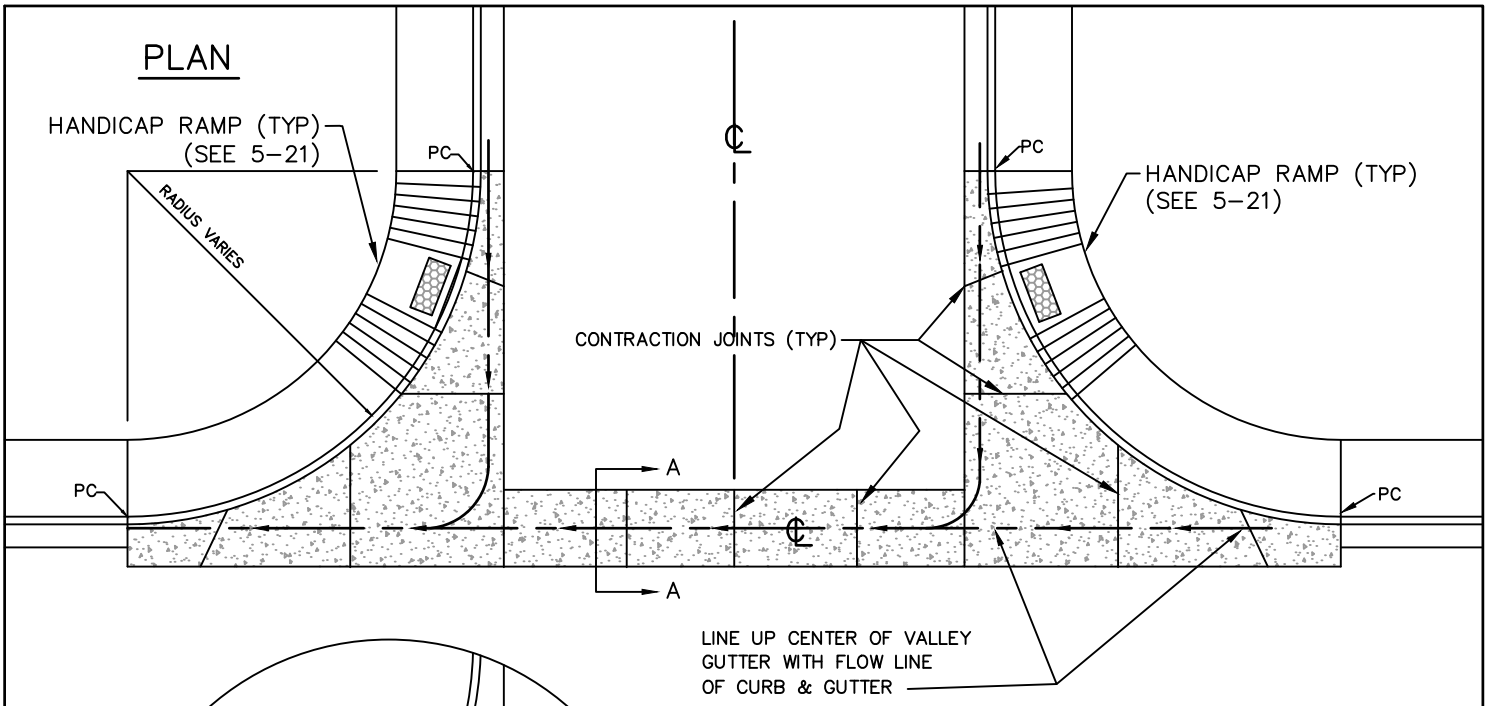


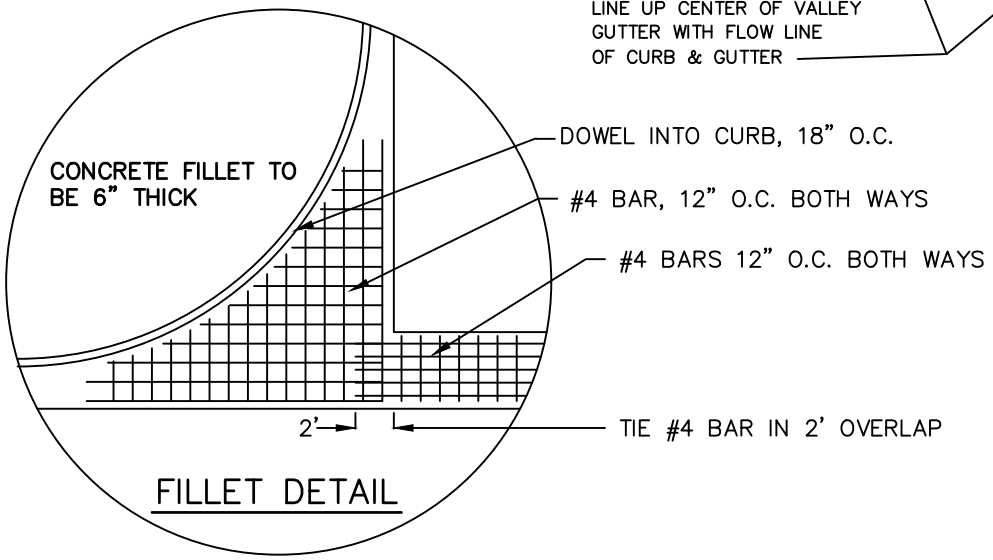
NOT TO SCALE

VALLEY GUTTER WITH CORNER CURB FILLETS & DOUBLE RAMPS

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	94, 97, 04, 06, 07 REVISED: APRIL 2009	5 – 15A

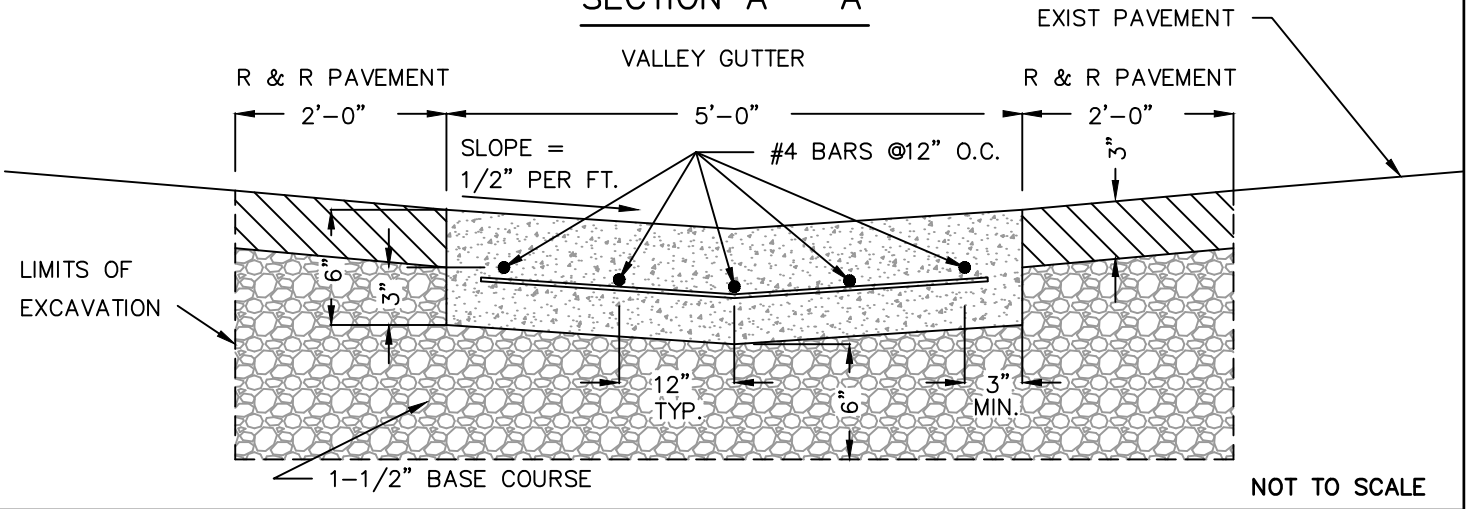
PLAN





FILLET DETAIL

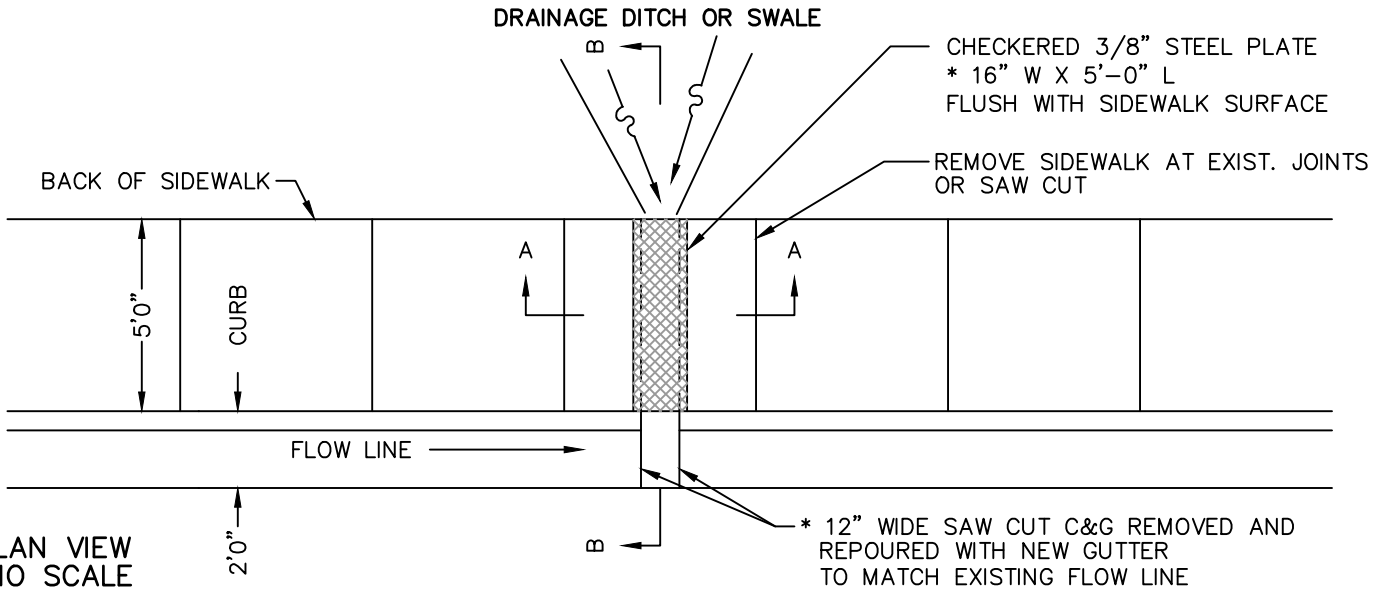
SECTION A – A



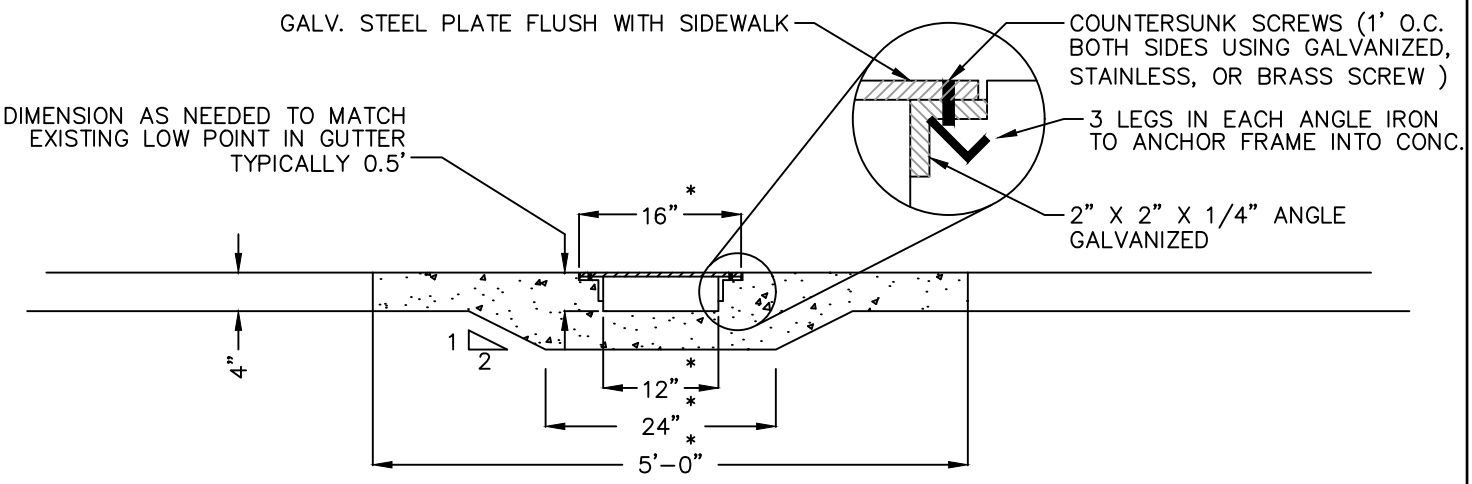
NOT TO SCALE

VALLEY GUTTER WITH CORNER CURB FILLETS & SINGLE RAMPS

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED: APRIL 2009	5 – 15B

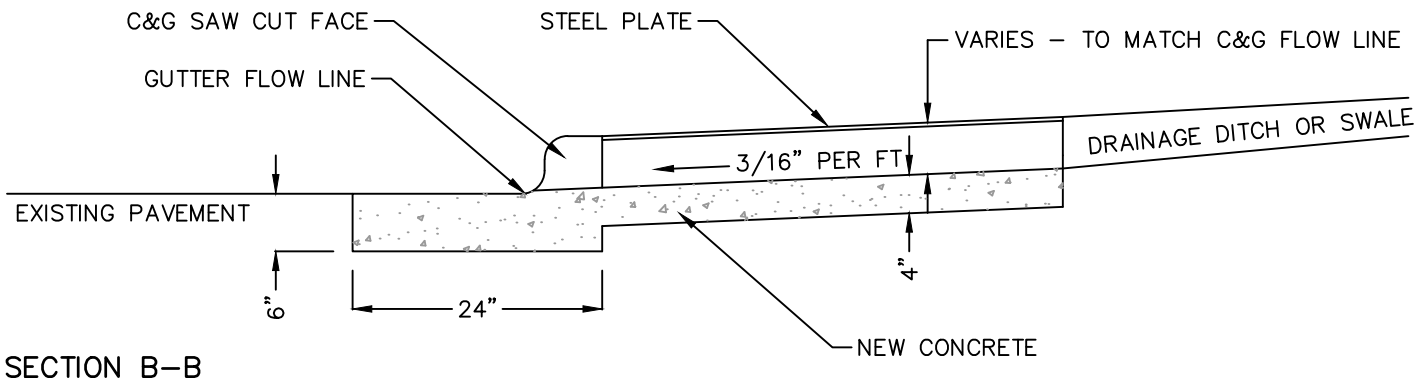


PLAN VIEW
NO SCALE



SECTION A–A
NO SCALE

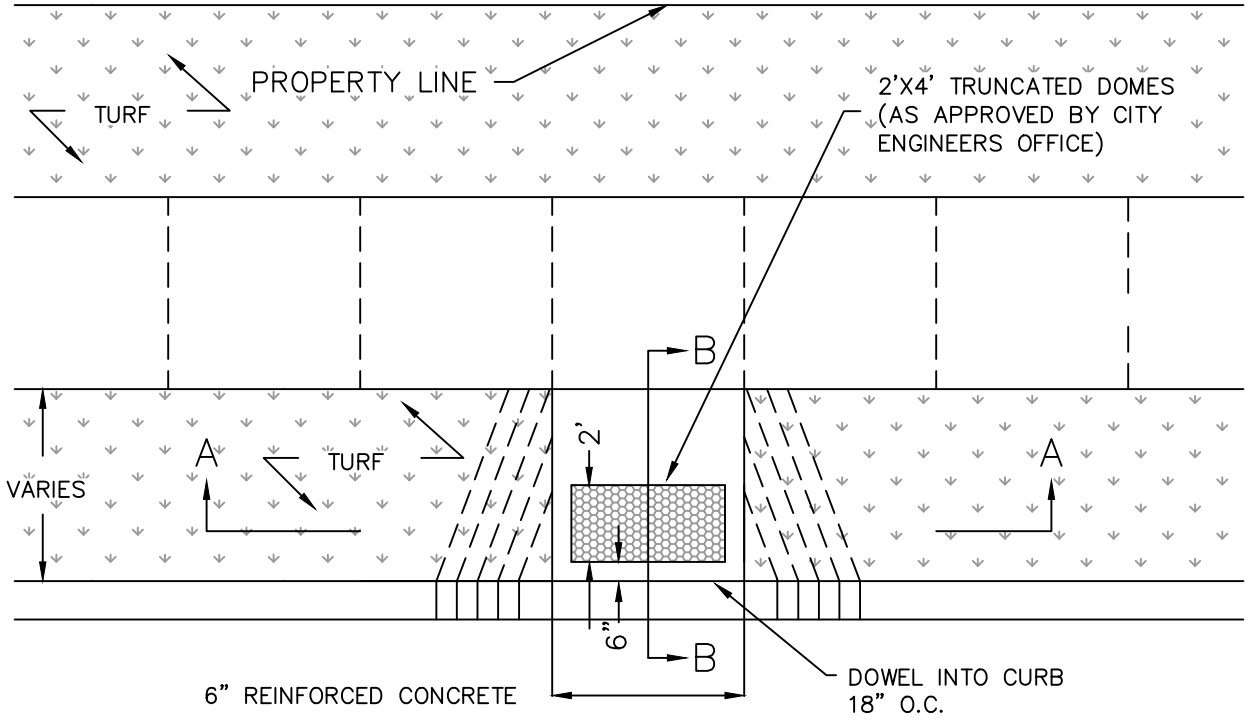
* NOTE: WIDTH OF CHANNEL AND STEEL PLATE MAY VARY DEPENDING ON OUTLET FLOW REQUIREMENTS.

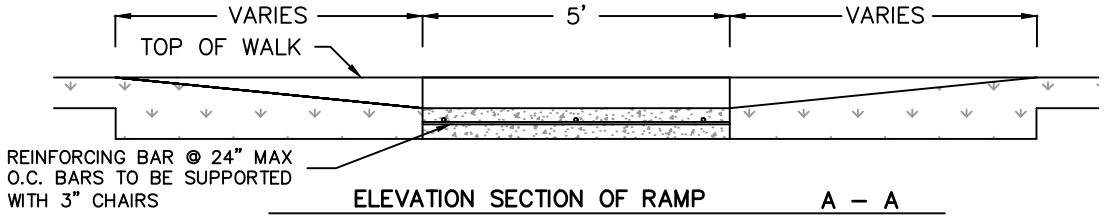


SECTION B–B
NO SCALE

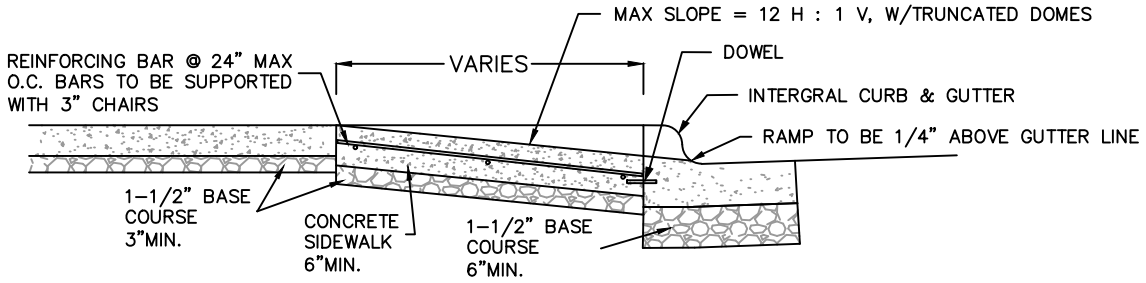
TYPICAL SIDEWALK DRAINAGE CROSSING GUTTER DETAIL

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	JULY 1991 REVISED AUGUST 2018	5 – 16





ELEVATION SECTION OF RAMP A – A



CROSS SECTION OF RAMP B – B

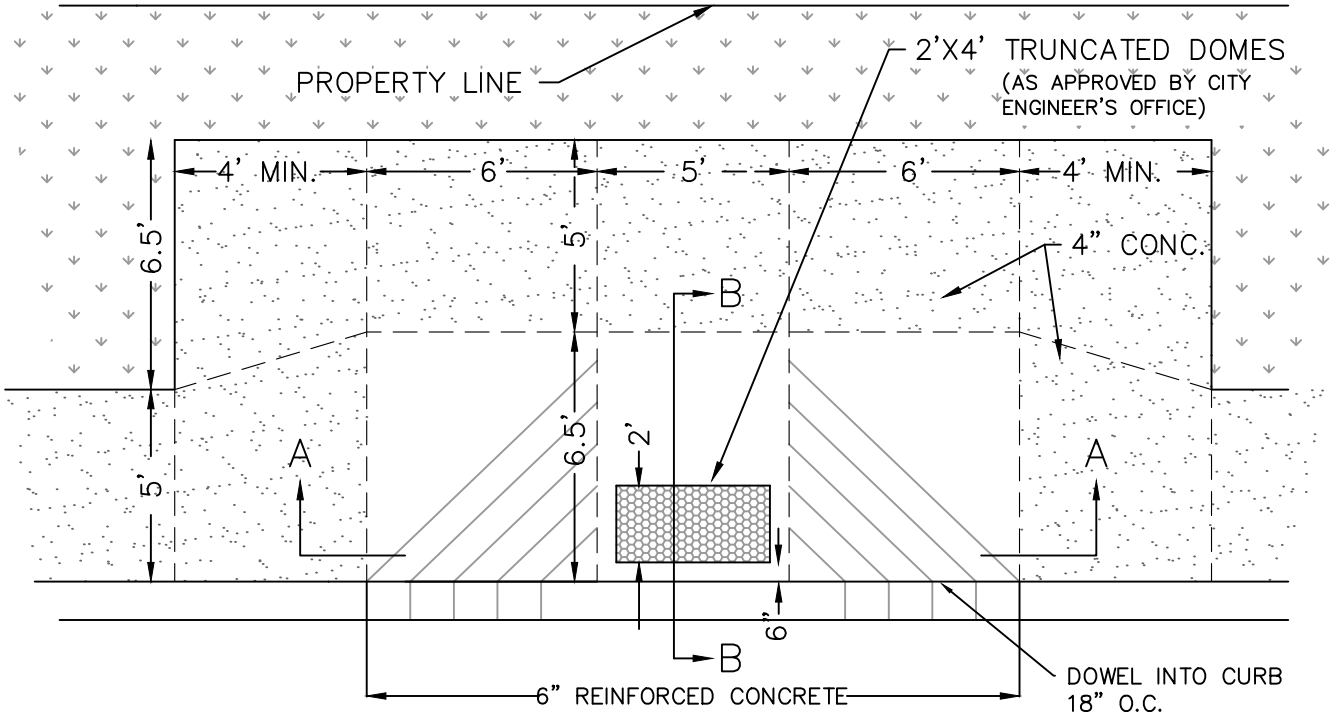
NOT TO SCALE

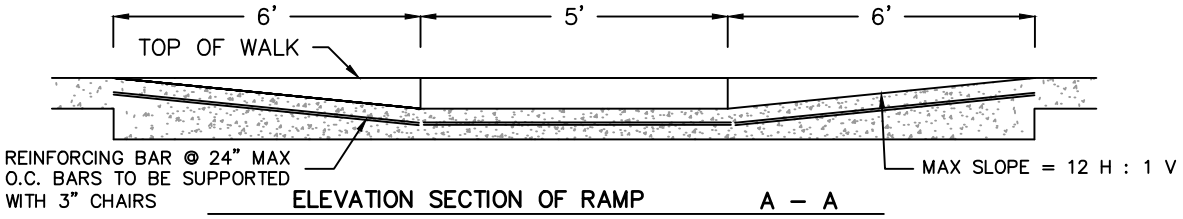
NOTES :

1. SURFACE TEXTURE OF RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING TRAVERSE TO THE SLOPE OF THE RAMP.
2. CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, FREE OF SAGS AND SHORT GRADE CHANGES.
3. DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH THE RAMP. LOCATION OF THE HANDICAP RAMP SHOULD TAKE PRECEDENCE OVER LOCATION OF NEW STORM DRAINAGE STRUCTURE INSTALLATIONS.
4. THE NORMAL GUTTER LINE PROFILE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP. RAMP LIP TO BE 1/4" ABOVE THE GUTTER LINE.
5. CROSSWALK AND STOP LINE MARKINGS , IF USED , SHALL BE SO LOCATED TO STOP TRAFFIC SHORT OF RAMP CROSSINGS.
6. TRUNCATED DOMES SHALL BE INSTALLED AT THE BOTTOM 2' OF RAMPS, LOCATE THE EDGE OF THE PANEL NO MORE THAN 6" FROM THE BACK OF CURB. RED BRICK COLOR ONLY ON TRUNCATED DOMES.
7. CONCRETE IN RAMP AREAS SHALL BE 6" REINFORCED (24" O.C) USING 4,000 PSI MIX (6.5 SACK).
8. ALL 6" REINFORCED CONCRETE IN RAMP AREAS SHALL BE DOWELED INTO CURB AND GUTTER (18" O.C.)
9. DOWEL INTO EXISTING CONCRETE AS DIRECTED BY CITY ENGINEER'S OFFICE.
10. DOWELS SHALL BE #3 STRAIGHT (SMOOTH) BAR WITH A MIN. LENGTH OF 12" MIN. EMBED DEPTH SHALL BE 3"

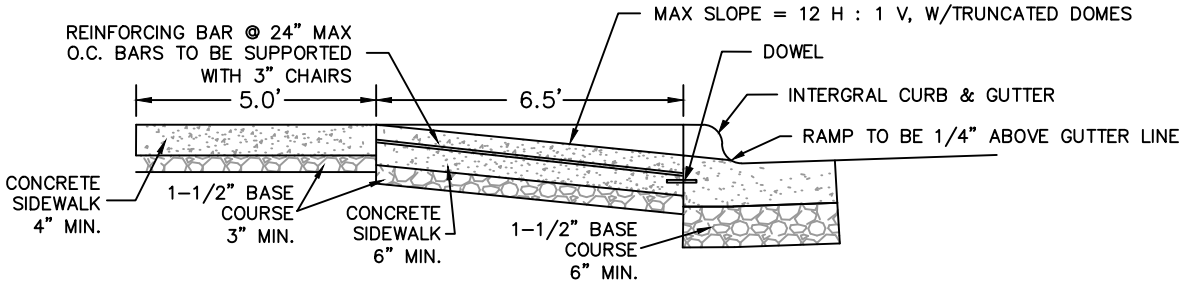
HANDICAP RAMP – MID BLOCK (BOULEVARD)

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED MAY 2016	5 – 17





ELEVATION SECTION OF RAMP A – A



CROSS SECTION OF RAMP B – B

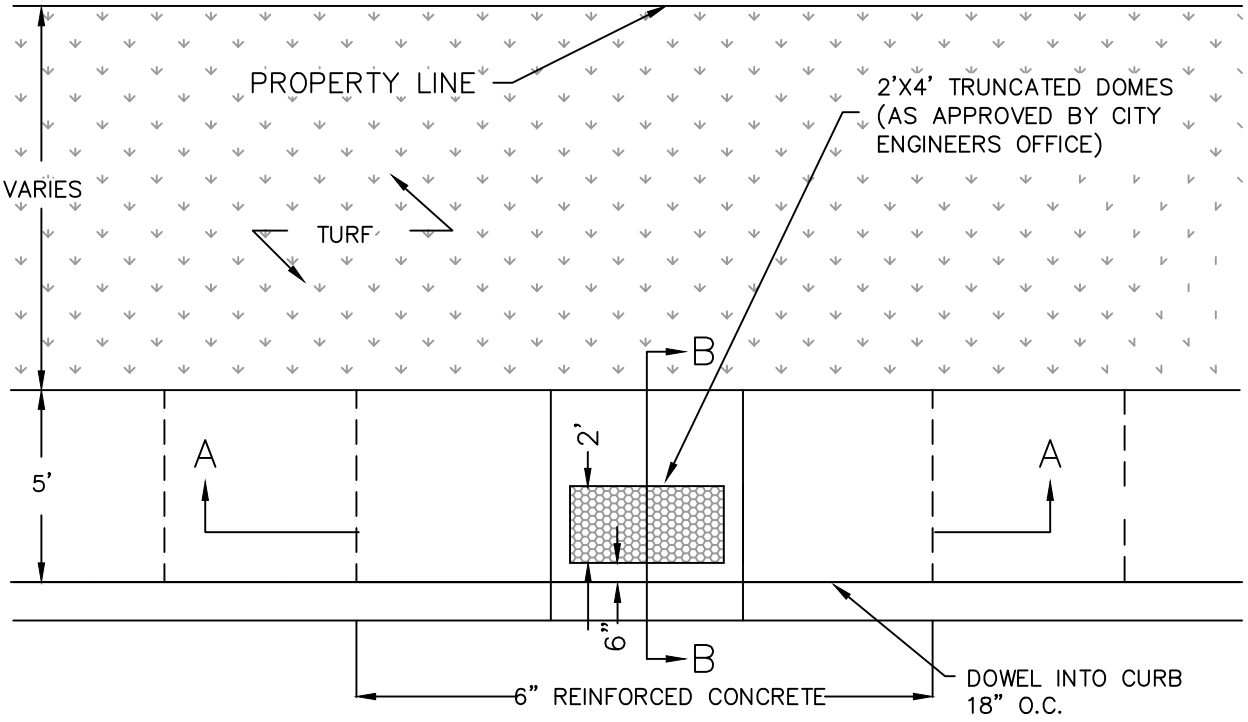
NOT TO SCALE

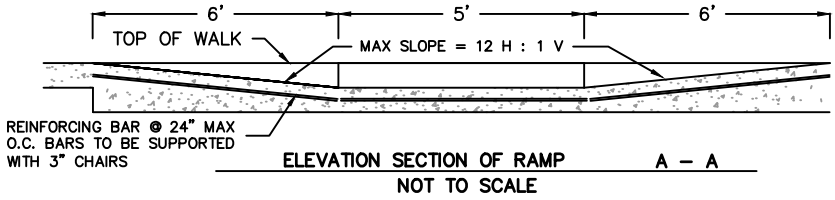
NOTES :

1. SURFACE TEXTURE OF RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING TRAVERSE TO THE SLOPE OF THE RAMP.
2. CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, FREE OF SAGS AND SHORT GRADE CHANGES.
3. DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH THE RAMP. LOCATION OF THE HANDICAP RAMP SHOULD TAKE PRECEDENCE OVER LOCATION OF NEW STORM DRAINAGE STRUCTURE INSTALLATIONS.
4. THE NORMAL GUTTER LINE PROFILE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP. RAMP LIP TO BE 1/4" ABOVE THE GUTTER LINE.
5. CROSSWALK AND STOP LINE MARKINGS , IF USED , SHALL BE SO LOCATED TO STOP TRAFFIC SHORT OF RAMP CROSSINGS.
6. TRUNCATED DOMES SHALL BE INSTALLED AT THE BOTTOM 2' OF RAMPS. WIDTH OF RAMPS MAY VARY. BRICK RED COLOR ONLY ON CONCRETE TRUNCATED DOMES.
7. CONCRETE IN RAMP AREAS SHALL BE 6" REINFORCED (24" O.C) USING 4,000 PSI MIX (6.5 SACK).
8. ALL 6" REINFORCED CONCRETE IN RAMP AREAS SHALL BE DOWELED INTO CURB AND GUTTER (18" O.C.)
9. DOWEL INTO EXISTING CONCRETE AS DIRECTED BY CITY ENGINEER'S OFFICE.
10. DOWELS SHALL BE #3 STRAIGHT (SMOOTH) BAR WITH A MIN. LENGTH OF 12" MIN. EMBED DEPTH SHALL BE 3"

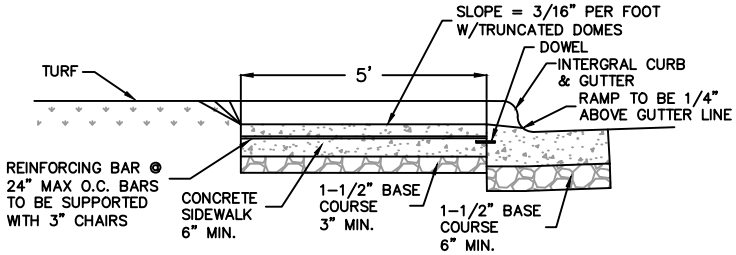
HANDICAP RAMP – MID BLOCK
(SIDEWALK ADJACENT TO CURB, OFFSET LANDING)

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	JUNE 2016	5 – 17B





ELEVATION SECTION OF RAMP A – A
NOT TO SCALE



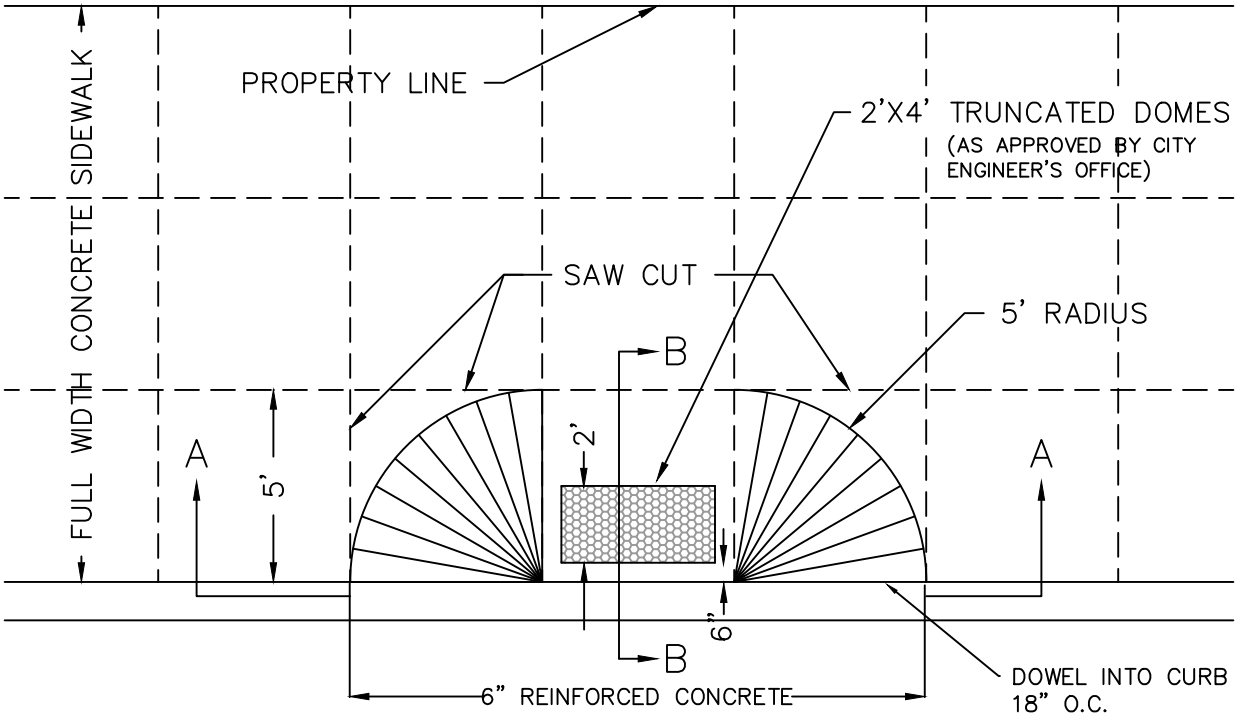
CROSS SECTION OF RAMP B – B
NOT TO SCALE

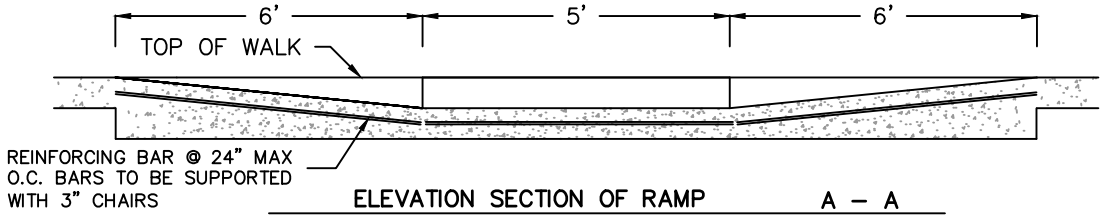
NOTES :

1. SURFACE TEXTURE OF RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING TRAVERSE TO THE SLOPE OF THE RAMP.
2. CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, FREE OF SAGS AND SHORT GRADE CHANGES.
3. DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH THE RAMP. LOCATION OF THE HANDICAP RAMP SHOULD TAKE PRECEDENCE OVER LOCATION OF NEW STORM DRAINAGE STRUCTURE INSTALLATIONS.
4. THE NORMAL GUTTER LINE PROFILE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP. RAMP LIP TO BE 1/4" ABOVE THE GUTTER LINE.
5. CROSSWALK AND STOP LINE MARKINGS , IF USED , SHALL BE SO LOCATED TO STOP TRAFFIC SHORT OF RAMP CROSSINGS.
6. TRUNCATED DOMES SHALL BE INSTALLED AT THE BOTTOM 2' OF RAMPS, LOCATE THE EDGE OF THE PANEL NO MORE THAN 6" FROM THE BACK OF CURB. RED BRICK COLOR ONLY ON TRUNCATED DOMES.
7. CONCRETE IN RAMP AREAS SHALL BE 6" REINFORCED (24" O.C) USING 4,000 PSI MIX (6.5 SACK).
8. ALL 6" REINFORCED CONCRETE IN RAMP AREAS SHALL BE DOWELED INTO CURB AND GUTTER (18" O.C.)
9. DOWEL INTO EXISTING CONCRETE AS DIRECTED BY CITY ENGINEER'S OFFICE.
10. DOWELS SHALL BE #3 STRAIGHT (SMOOTH) BAR WITH A MIN. LENGTH OF 12" MIN. EMBED DEPTH SHALL BE 3"

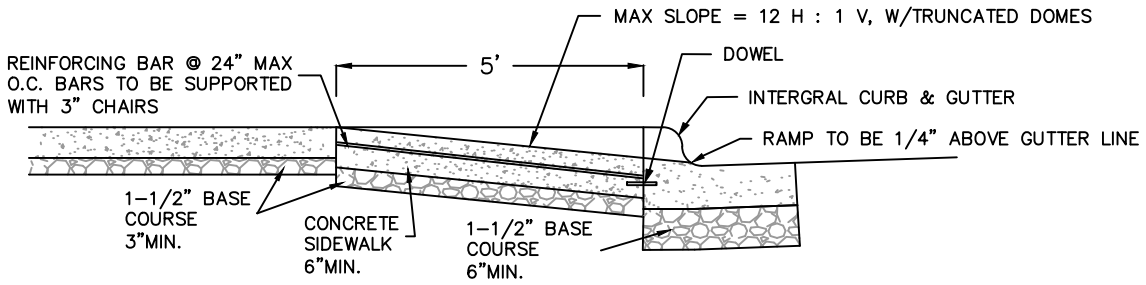
HANDICAP RAMP – MID BLOCK (SIDEWALK ADJACENT)

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	JUNE 2016	5 – 17C





ELEVATION SECTION OF RAMP A – A



CROSS SECTION OF RAMP B – B

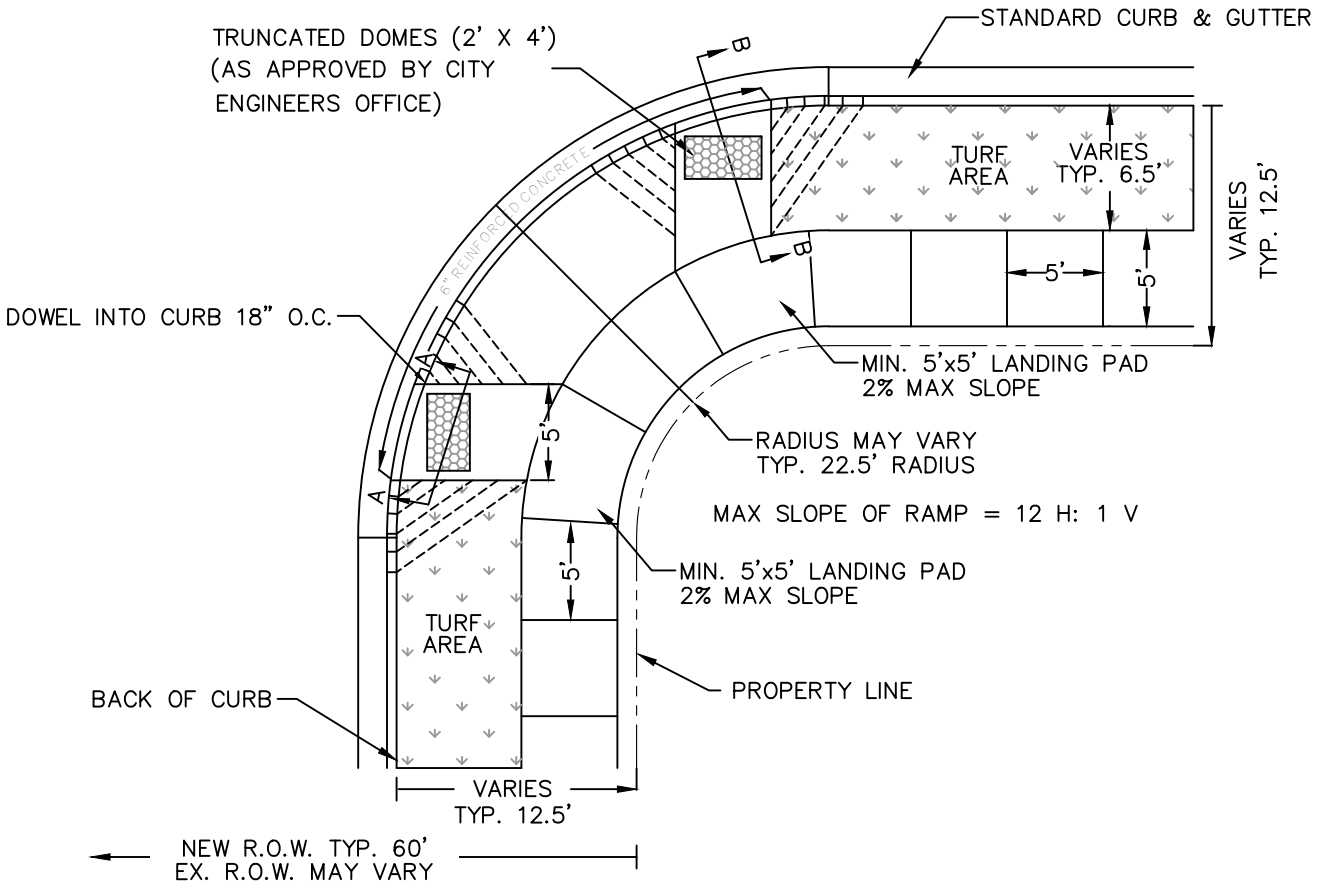
NOT TO SCALE

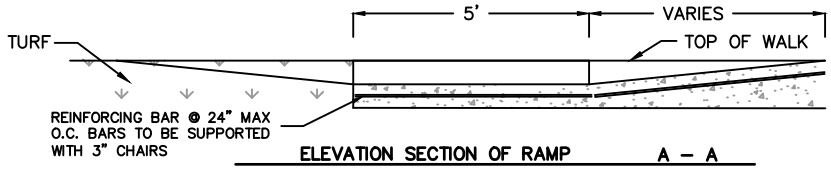
NOTES :

1. SURFACE TEXTURE OF RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING TRAVERSE TO THE SLOPE OF THE RAMP.
2. CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, FREE OF SAGS AND SHORT GRADE CHANGES.
3. DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH THE RAMP. LOCATION OF THE HANDICAP RAMP SHOULD TAKE PRECEDENCE OVER LOCATION OF NEW STORM DRAINAGE STRUCTURE INSTALLATIONS.
4. THE NORMAL GUTTER LINE PROFILE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP. RAMP LIP TO BE 1/4" ABOVE THE GUTTER LINE.
5. CROSSWALK AND STOP LINE MARKINGS , IF USED , SHALL BE SO LOCATED TO STOP TRAFFIC SHORT OF RAMP CROSSINGS.
6. TRUNCATED DOMES SHALL BE INSTALLED AT THE BOTTOM 2' OF RAMPS. WIDTH OF RAMPS MAY VARY. BRICK RED COLOR ONLY ON TRUNCATED DOMES.
7. CONCRETE IN RAMP AREAS SHALL BE 6" REINFORCED (24" O.C) USING 4,000 PSI MIX (6.5 SACK).
8. ALL 6" REINFORCED CONCRETE IN RAMP AREAS SHALL BE DOWELED INTO CURB AND GUTTER (18" O.C.)
9. DOWEL INTO EXISTING CONCRETE AS DIRECTED BY CITY ENGINEER'S OFFICE.
10. DOWELS SHALL BE #3 STRAIGHT (SMOOTH) BAR WITH A MIN. LENGTH OF 12" MIN. EMBED DEPTH SHALL BE 3"

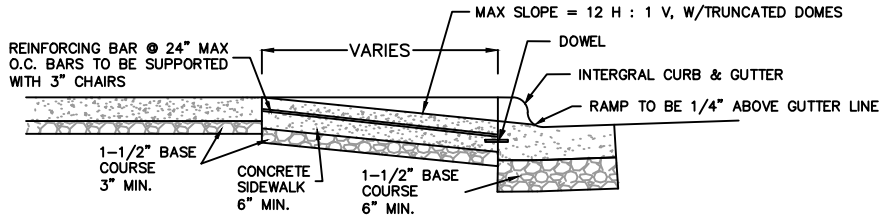
HANDICAP RAMP – MID BLOCK

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED MAY 2016	5 – 18





ELEVATION SECTION OF RAMP A – A



CROSS SECTION OF RAMP B – B

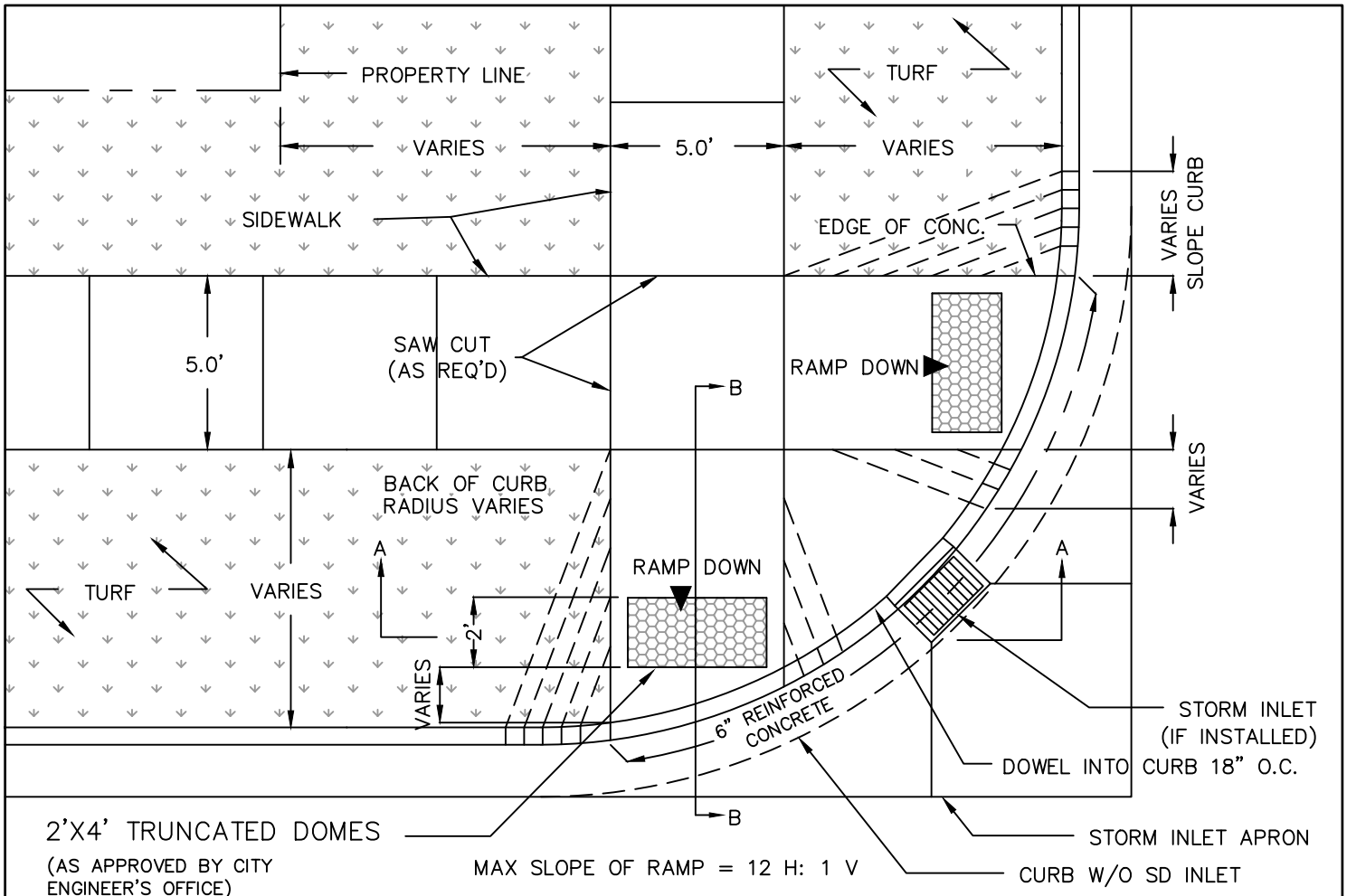
NOT TO SCALE

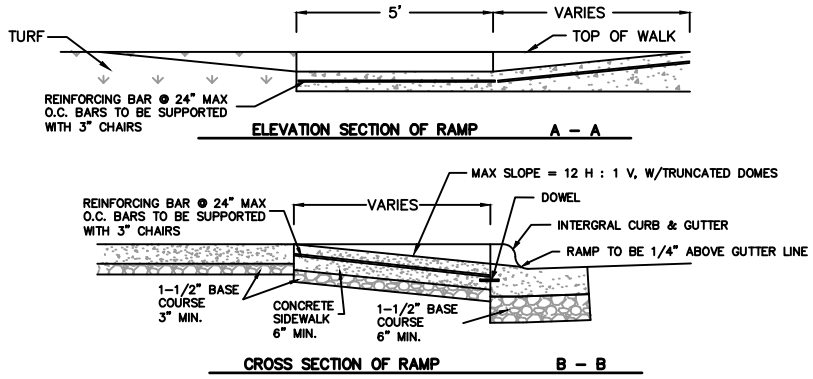
NOTES :

1. SURFACE TEXTURE OF RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING TRAVERSE TO THE SLOPE OF THE RAMP.
2. CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, FREE OF SAGS AND SHORT GRADE CHANGES.
3. DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH THE RAMP. LOCATION OF THE HANDICAP RAMP SHOULD TAKE PRECEDENCE OVER LOCATION OF NEW STORM DRAINAGE STRUCTURE INSTALLATIONS.
4. THE NORMAL GUTTER LINE PROFILE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP. RAMP LIP TO BE 1/4" ABOVE THE GUTTER LINE.
5. CROSSWALK AND STOP LINE MARKINGS , IF USED , SHALL BE SO LOCATED TO STOP TRAFFIC SHORT OF RAMP CROSSINGS.
6. TRUNCATED DOMES SHALL BE INSTALLED AT THE BOTTOM 2' OF RAMPS. WIDTH OF RAMPS MAY VARY. BRICK RED COLOR ONLY ON TRUNCATED DOMES.
7. CONCRETE IN RAMP AREAS SHALL BE 6" REINFORCED (24" O.C) USING 4,000 PSI MIX (6.5 SACK).
8. ALL 6" REINFORCED CONCRETE IN RAMP AREAS SHALL BE DOWELED INTO CURB AND GUTTER (18" O.C.)
9. DOWEL INTO EXISTING CONCRETE AS DIRECTED BY CITY ENGINEER'S OFFICE.
10. DOWELS SHALL BE #3 STRAIGHT (SMOOTH) BAR WITH A MIN. LENGTH OF 12" MIN. EMBED DEPTH SHALL BE 3"

DOUBLE HANDICAP RAMPS AT ROUNDED SIDEWALK BOULEVARD AREAS

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED NOVEMBER 2021	5 – 19





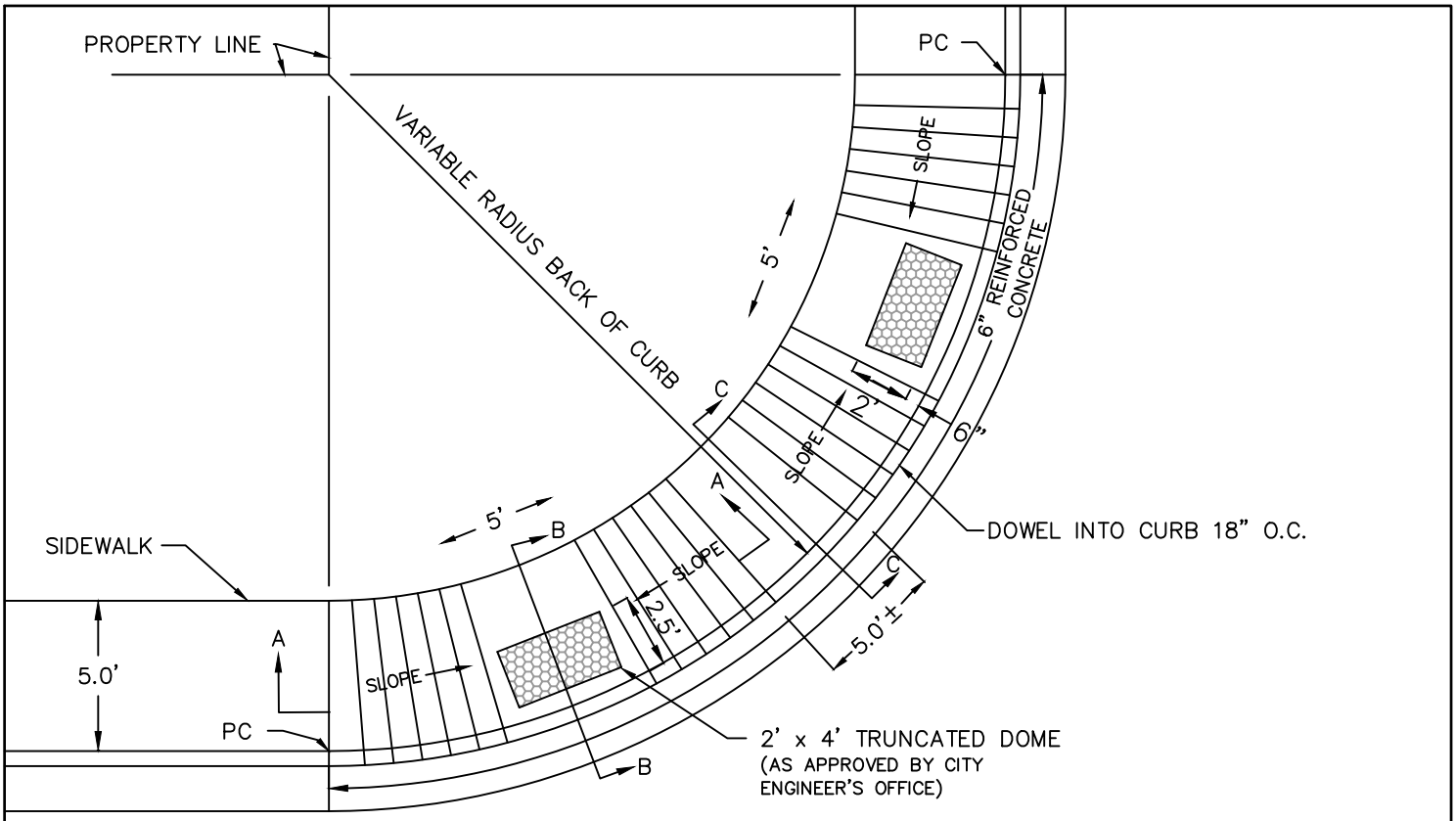
NOT TO SCALE

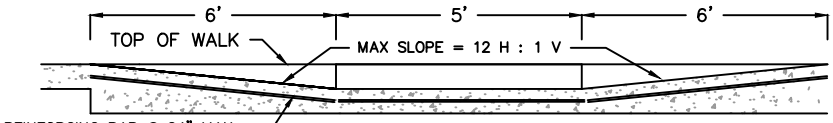
NOTES :

1. SURFACE TEXTURE OF RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING TRAVERSE TO THE SLOPE OF THE RAMP.
2. CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, FREE OF SAGS AND SHORT GRADE CHANGES.
3. DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH THE RAMP. LOCATION OF THE HANDICAP RAMP SHOULD TAKE PRECEDENCE OVER LOCATION OF NEW STORM DRAINAGE STRUCTURE INSTALLATIONS.
4. THE NORMAL GUTTER LINE PROFILE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP. RAMP LIP TO BE 1/4" ABOVE THE GUTTER LINE.
5. CROSSWALK AND STOP LINE MARKINGS , IF USED , SHALL BE SO LOCATED TO STOP TRAFFIC SHORT OF RAMP CROSSINGS.
6. TRUNCATED DOMES SHALL BE INSTALLED AT THE BOTTOM 2' OF RAMPS. WIDTH OF RAMPS MAY VARY. BRICK RED COLOR ONLY ON TRUNCATED DOMES.
7. CONCRETE IN RAMP AREAS SHALL BE 6" REINFORCED (24" O.C) USING 4,000 PSI MIX (6.5 SACK).
8. ALL 6" REINFORCED CONCRETE IN RAMPS AREAS SHALL BE DOWELED INTO CURB AND GUTTER (18" O.C.)
9. DOWEL INTO EXISTING CONCRETE AS DIRECTED BY CITY ENGINEER'S OFFICE.
10. DOWELS SHALL BE #3 STRAIGHT (SMOOTH) BAR WITH A MIN. LENGTH OF 12" MIN. EMBED DEPTH SHALL BE 3"

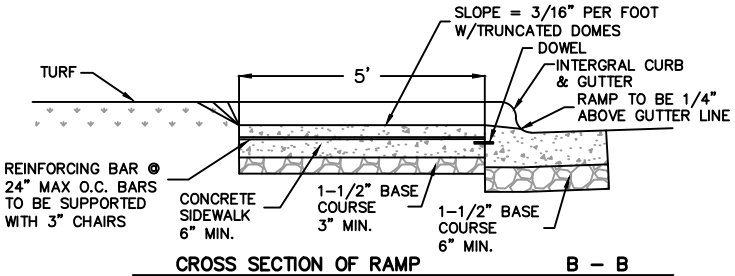
DOUBLE HANDICAP RAMPS AT CORNERS IN BOULEVARD AREAS

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED MAY 2016	5 – 20

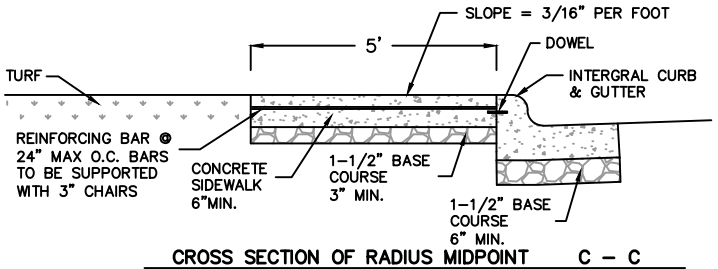




ELEVATION SECTION OF RAMP A – A
NOT TO SCALE



CROSS SECTION OF RAMP B – B
NOT TO SCALE



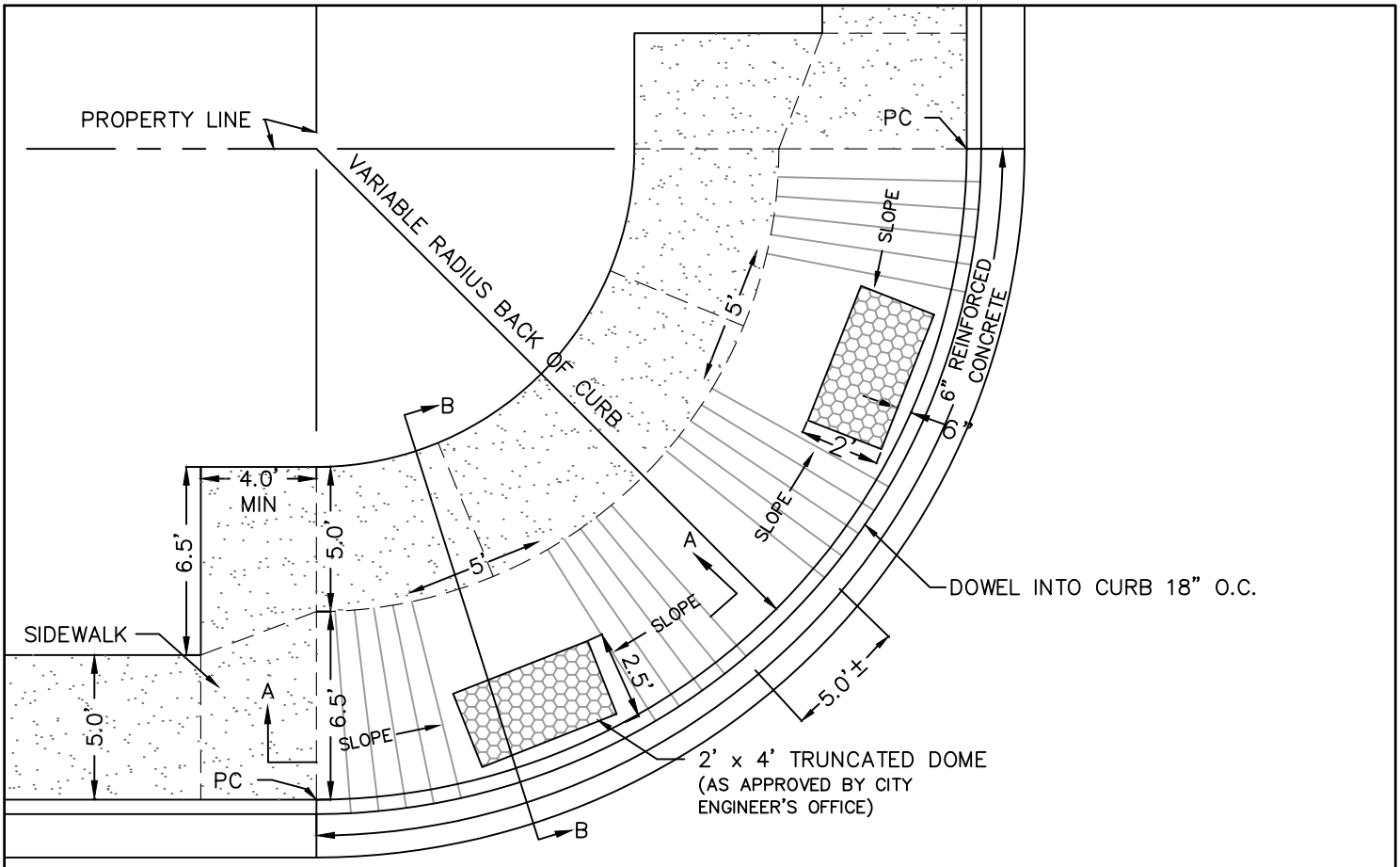
CROSS SECTION OF RADIUS MIDPOINT C – C
NOT TO SCALE

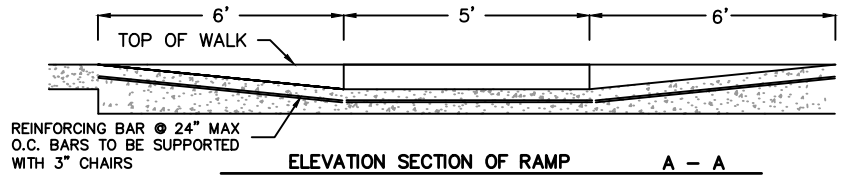
NOTES :

1. SURFACE TEXTURE OF RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING TRAVERSE TO THE SLOPE OF THE RAMP.
2. CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, FREE OF SAGS AND SHORT GRADE CHANGES.
3. DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH THE RAMP. LOCATION OF THE HANDICAP RAMP SHOULD TAKE PRECEDENCE OVER LOCATION OF NEW STORM DRAINAGE STRUCTURE INSTALLATIONS.
4. THE NORMAL GUTTER LINE PROFILE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP. RAMP LIP TO BE 1/4" ABOVE THE GUTTER LINE.
5. CROSSWALK AND STOP LINE MARKINGS , IF USED , SHALL BE SO LOCATED TO STOP TRAFFIC SHORT OF RAMP CROSSINGS.
6. TRUNCATED DOMES SHALL BE INSTALLED AT THE BOTTOM 2' OF RAMPS. WIDTH OF RAMPS MAY VARY. BRICK RED COLOR ONLY ON TRUNCATED DOMES.
7. CONCRETE IN RAMP AREAS SHALL BE 6" REINFORCED (24" O.C) USING 4,000 PSI MIX (6.5 SACK).
8. ALL 6" REINFORCED CONCRETE IN RAMP AREAS SHALL BE DOWELED INTO CURB AND GUTTER (18" O.C.)
9. DOWEL INTO EXISTING CONCRETE AS DIRECTED BY CITY ENGINEER'S OFFICE.
10. DOWELS SHALL BE #3 STRAIGHT (SMOOTH) BAR WITH A MIN. LENGTH OF 12" MIN. EMBED DEPTH SHALL BE 3"

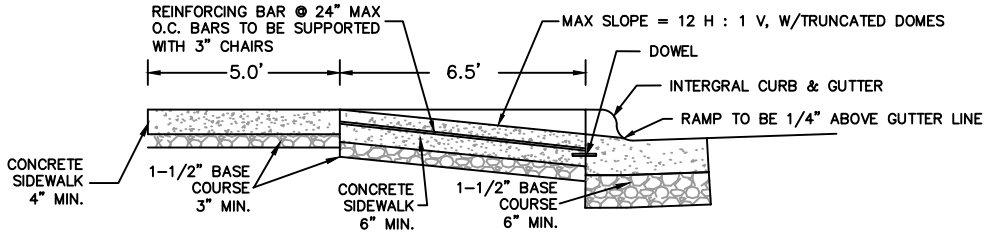
DOUBLE HANDICAP RAMPS WITH SIDEWALK ADJACENT TO CURB

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED MAY 2016	5 – 21





ELEVATION SECTION OF RAMP A – A



CROSS SECTION OF RAMP B – B

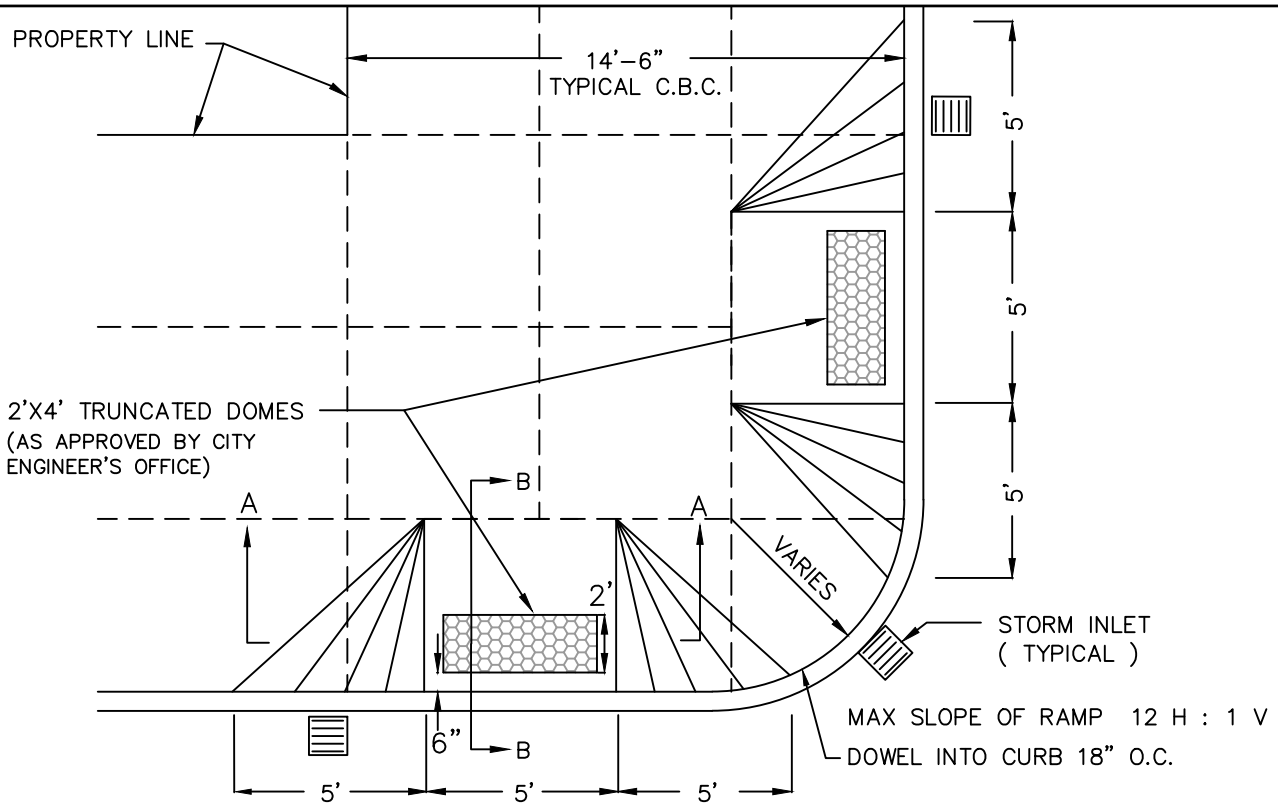
NOT TO SCALE

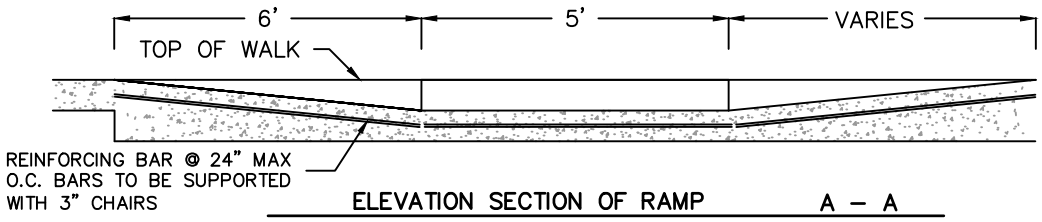
NOTES :

1. SURFACE TEXTURE OF RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING TRAVERSE TO THE SLOPE OF THE RAMP.
2. CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, FREE OF SAGS AND SHORT GRADE CHANGES.
3. DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH THE RAMP. LOCATION OF THE HANDICAP RAMP SHOULD TAKE PRECEDENCE OVER LOCATION OF NEW STORM DRAINAGE STRUCTURE INSTALLATIONS.
4. THE NORMAL GUTTER LINE PROFILE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP. RAMP LIP TO BE 1/4" ABOVE THE GUTTER LINE.
5. CROSSWALK AND STOP LINE MARKINGS , IF USED , SHALL BE SO LOCATED TO STOP TRAFFIC SHORT OF RAMP CROSSINGS.
6. TRUNCATED DOMES SHALL BE INSTALLED AT THE BOTTOM 2' OF RAMPS. WIDTH OF RAMPS MAY VARY. BRICK RED COLOR ONLY ON CONCRETE TRUNCATED DOMES.
7. CONCRETE IN RAMP AREAS SHALL BE 6" REINFORCED (24" O.C) USING 4,000 PSI MIX (6.5 SACK).
8. ALL 6" REINFORCED CONCRETE IN RAMP AREAS SHALL BE DOWELED INTO CURB AND GUTTER (18" O.C.)
9. DOWEL INTO EXISTING CONCRETE AS DIRECTED BY CITY ENGINEER'S OFFICE.
10. DOWELS SHALL BE #3 STRAIGHT (SMOOTH) BAR WITH A MIN. LENGTH OF 12" MIN. EMBED DEPTH SHALL BE 3"

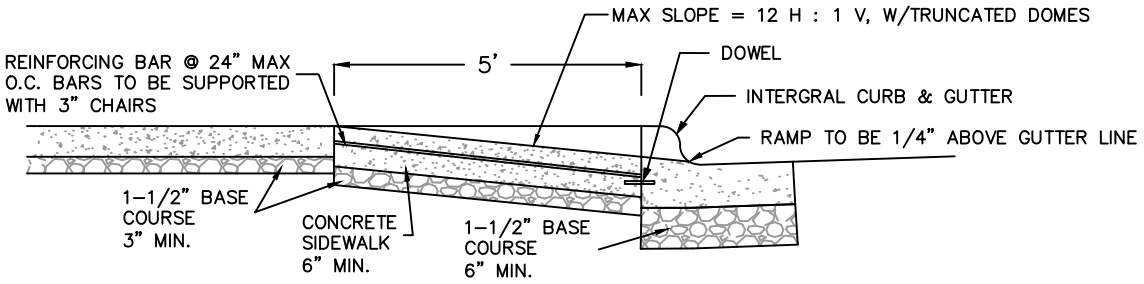
DOUBLE HANDICAP RAMPS WITH SIDEWALK ADJACENT TO CURB

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED JUNE 2016	5 – 21B





ELEVATION SECTION OF RAMP A – A



CROSS SECTION OF RAMP B – B

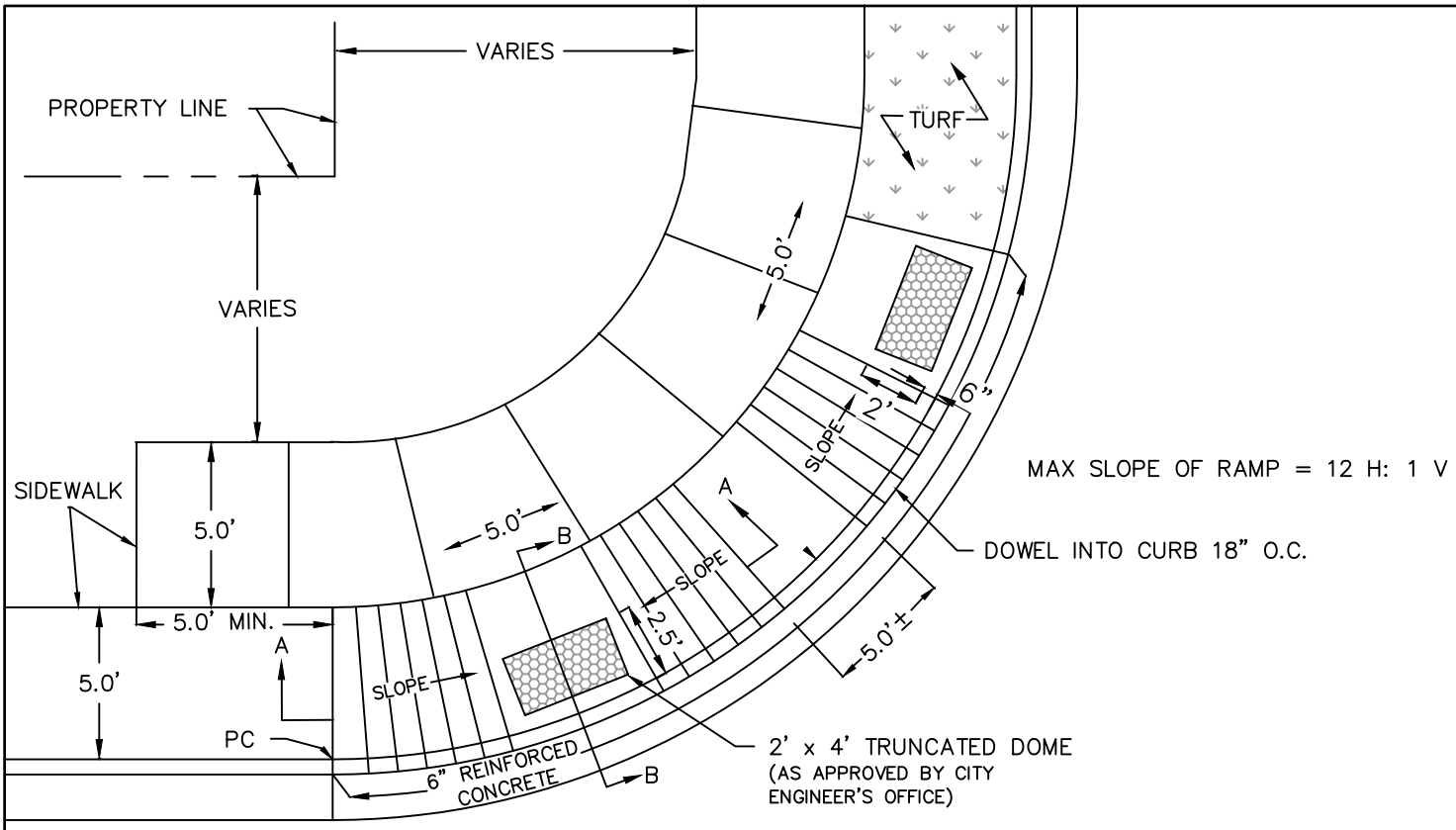
NOT TO SCALE

NOTES :

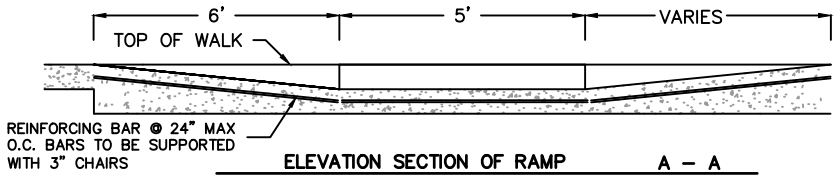
1. SURFACE TEXTURE OF RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING TRAVERSE TO THE SLOPE OF THE RAMP.
2. CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, FREE OF SAGS AND SHORT GRADE CHANGES.
3. DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH THE RAMP. LOCATION OF THE HANDICAP RAMP SHOULD TAKE PRECEDENCE OVER LOCATION OF NEW STORM DRAINAGE STRUCTURE INSTALLATIONS.
4. THE NORMAL GUTTER LINE PROFILE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP. RAMP LIP TO BE 1/4" ABOVE THE GUTTER LINE.
5. CROSSWALK AND STOP LINE MARKINGS , IF USED , SHALL BE SO LOCATED TO STOP TRAFFIC SHORT OF RAMP CROSSINGS.
6. TRUNCATED DOMES SHALL BE INSTALLED AT THE BOTTOM 2' OF RAMPS. WIDTH OF RAMPS MAY VARY. BRICK RED COLOR ONLY ON TRUNCATED DOMES.
7. CONCRETE IN RAMP AREAS SHALL BE 6" REINFORCED (24" O.C) USING 4,000 PSI MIX (6.5 SACK).
8. ALL 6" REINFORCED CONCRETE IN RAMP AREAS SHALL BE DOWELED INTO CURB AND GUTTER (18" O.C.)
9. DOWEL INTO EXISTING CONCRETE AS DIRECTED BY CITY ENGINEER'S OFFICE.
10. DOWELS SHALL BE #3 STRAIGHT (SMOOTH) BAR WITH A MIN. LENGTH OF 12" MIN. EMBED DEPTH SHALL BE 3"

HANDICAP RAMPS – CENTRAL BUSINESS DISTRICT

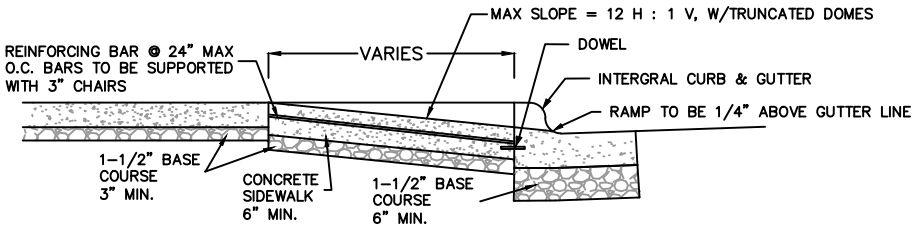
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED MAY 2016	5 – 22



MAX SLOPE OF RAMP = 12 H: 1 V



ELEVATION SECTION OF RAMP A – A



CROSS SECTION OF RAMP B – B

NOT TO SCALE

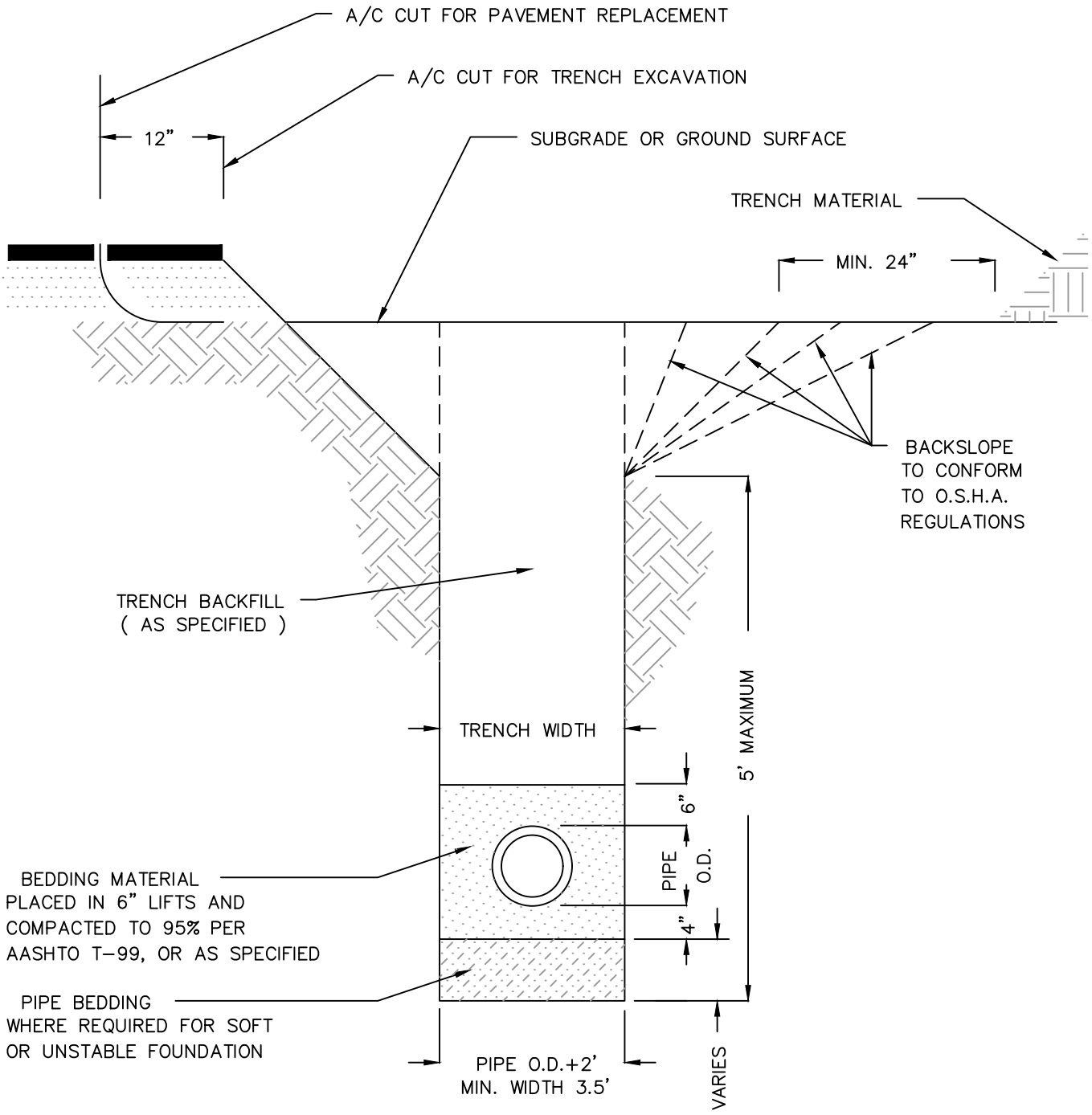
NOTES :

1. SURFACE TEXTURE OF RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING TRAVERSE TO THE SLOPE OF THE RAMP.
2. CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, FREE OF SAGS AND SHORT GRADE CHANGES.
3. DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH THE RAMP. LOCATION OF THE HANDICAP RAMP SHOULD TAKE PRECEDENCE OVER LOCATION OF NEW STORM DRAINAGE STRUCTURE INSTALLATIONS.
4. THE NORMAL GUTTER LINE PROFILE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP. RAMP LIP TO BE 1/4" ABOVE THE GUTTER LINE.
5. CROSSWALK AND STOP LINE MARKINGS , IF USED , SHALL BE SO LOCATED TO STOP TRAFFIC SHORT OF RAMP CROSSINGS.
6. TRUNCATED DOMES SHALL BE INSTALLED AT THE BOTTOM 2' OF RAMPS. WIDTH OF RAMPS MAY VARY. BRICK RED COLOR ONLY ON TRUNCATED DOMES.
7. CONCRETE IN RAMP AREAS SHALL BE 6" REINFORCED (24" O.C) USING 4,000 PSI MIX (6.5 SACK).
8. ALL 6" REINFORCED CONCRETE IN RAMP AREAS SHALL BE DOWELED INTO CURB AND GUTTER (18" O.C.)
9. DOWEL INTO EXISTING CONCRETE AS DIRECTED BY CITY ENGINEER'S OFFICE.
10. DOWELS SHALL BE #3 STRAIGHT (SMOOTH) BAR WITH A MIN. LENGTH OF 12" MIN. EMBED DEPTH SHALL BE 3"

DOUBLE HANDICAP RAMPS WITH SIDEWALK ADJACENT TO CURB AND BOULEVARD AREAS

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED MARCH 2017	5 – 24

NOTE : WHERE TRENCH PASSES THROUGH EXISTING PAVEMENT
THE PAVEMENT SHALL BE CUT ALONG A NEAT VERTICAL LINE
12" FROM THE A/C CUT AT THE EDGE OF THE TRENCH OPENING
AFTER RESTORATION OF THE TRENCH BACKFILL.

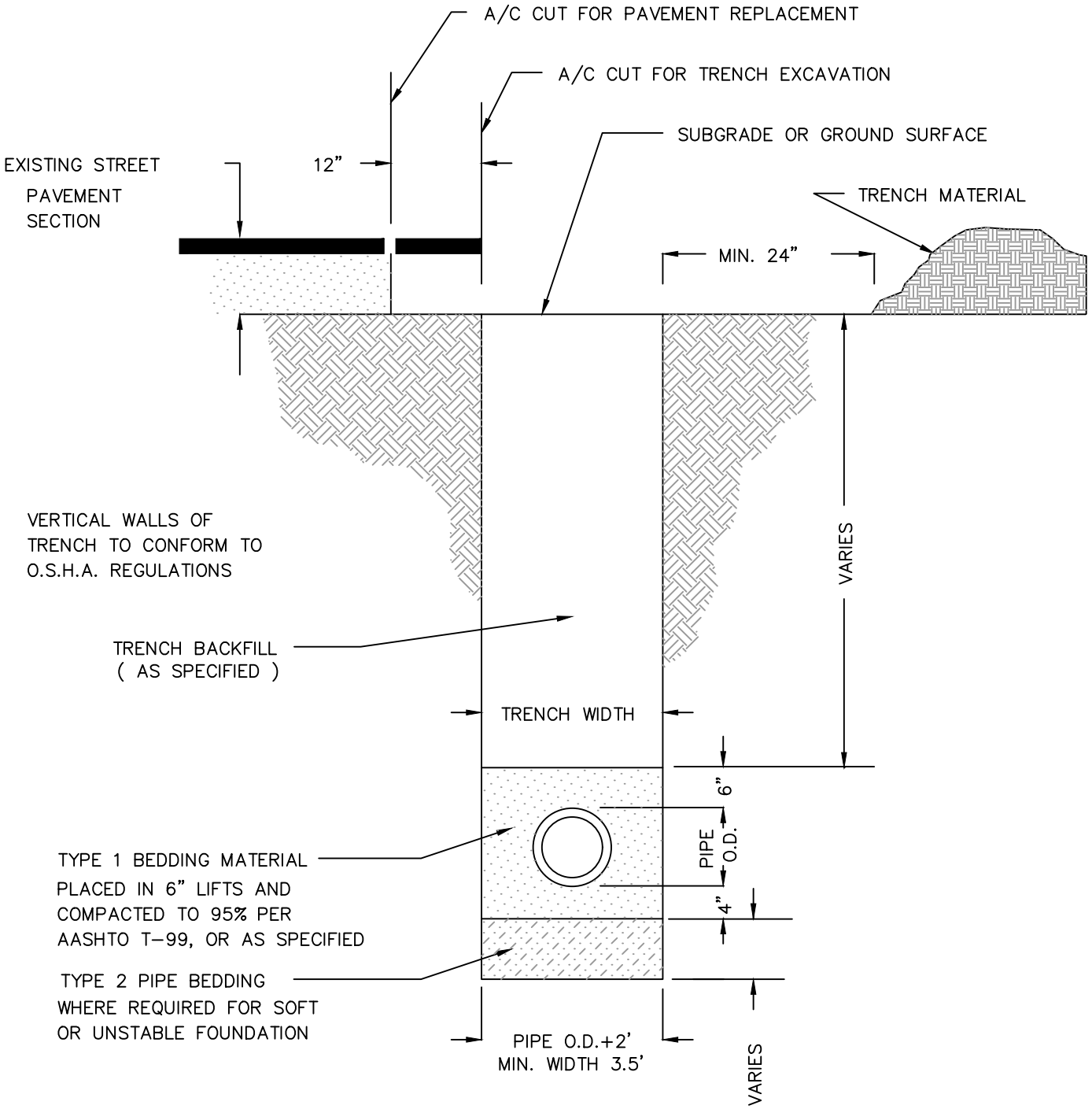


NOTE : WHEN IN UNSTABLE OR SOFT MATERIAL, TRENCH WALLS
SHALL BE BACKSLOPED FROM THE BOTTOM OF THE TRENCH

TYPICAL TYPE 1 TRENCH DETAIL

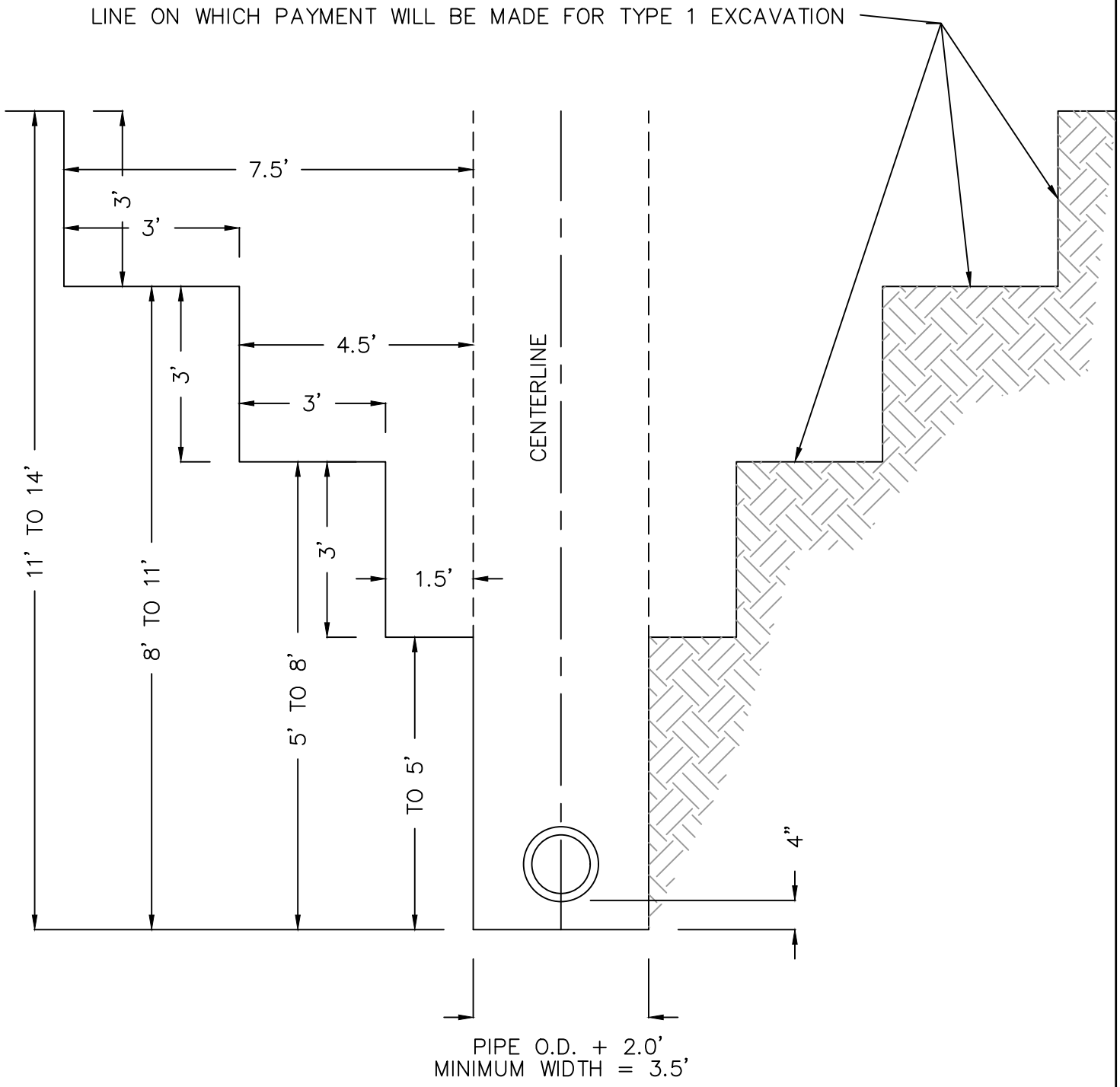
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 REVISED	5 – 30

NOTE : WHERE TRENCH PASSES THROUGH EXISTING PAVEMENT
THE PAVEMENT SHALL BE CUT ALONG A NEAT VERTICAL LINE
12" FROM THE A/C CUT AT THE EDGE OF THE TRENCH OPENING
AFTER RESORATION OF THE TRENCH BACKFILL.



TYPICAL TYPE 2 TRENCH DETAIL

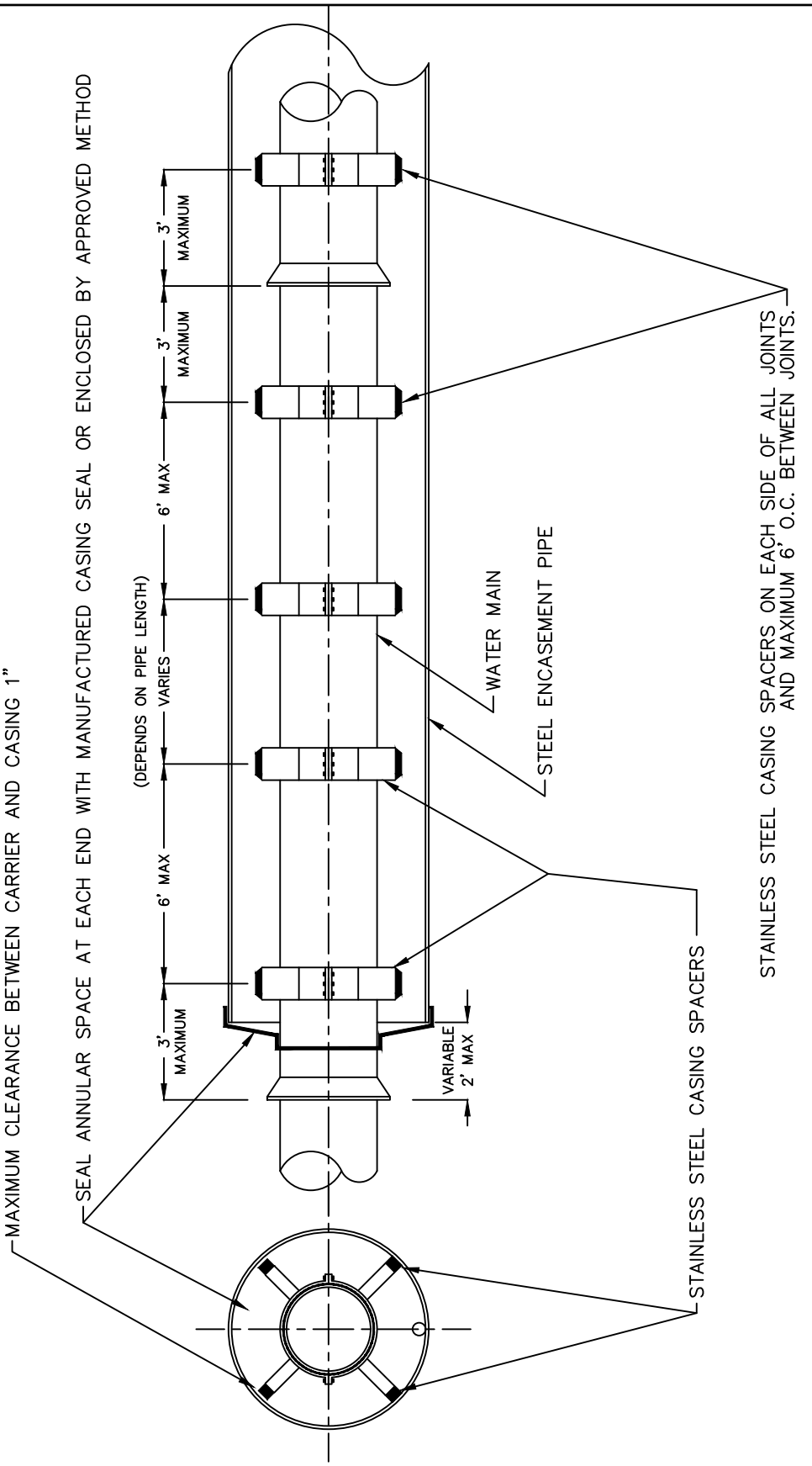
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 REVISED APR 1999	5 – 31



TRENCH DEPTH WILL BE MEASURED ALONG THE CENTERLINE OF THE TRENCH AT DEPTHS EQUAL TO THE VERTICAL DISTANCE FROM THE FINISHED GROUND SURFACE, OR TOP OF PAVEMENT, TO THE FLOW (INVERT) LINE OF THE PIPE PLUS THE THICKNESS OF THE PIPE BARREL AND BEDDING MATERIAL.

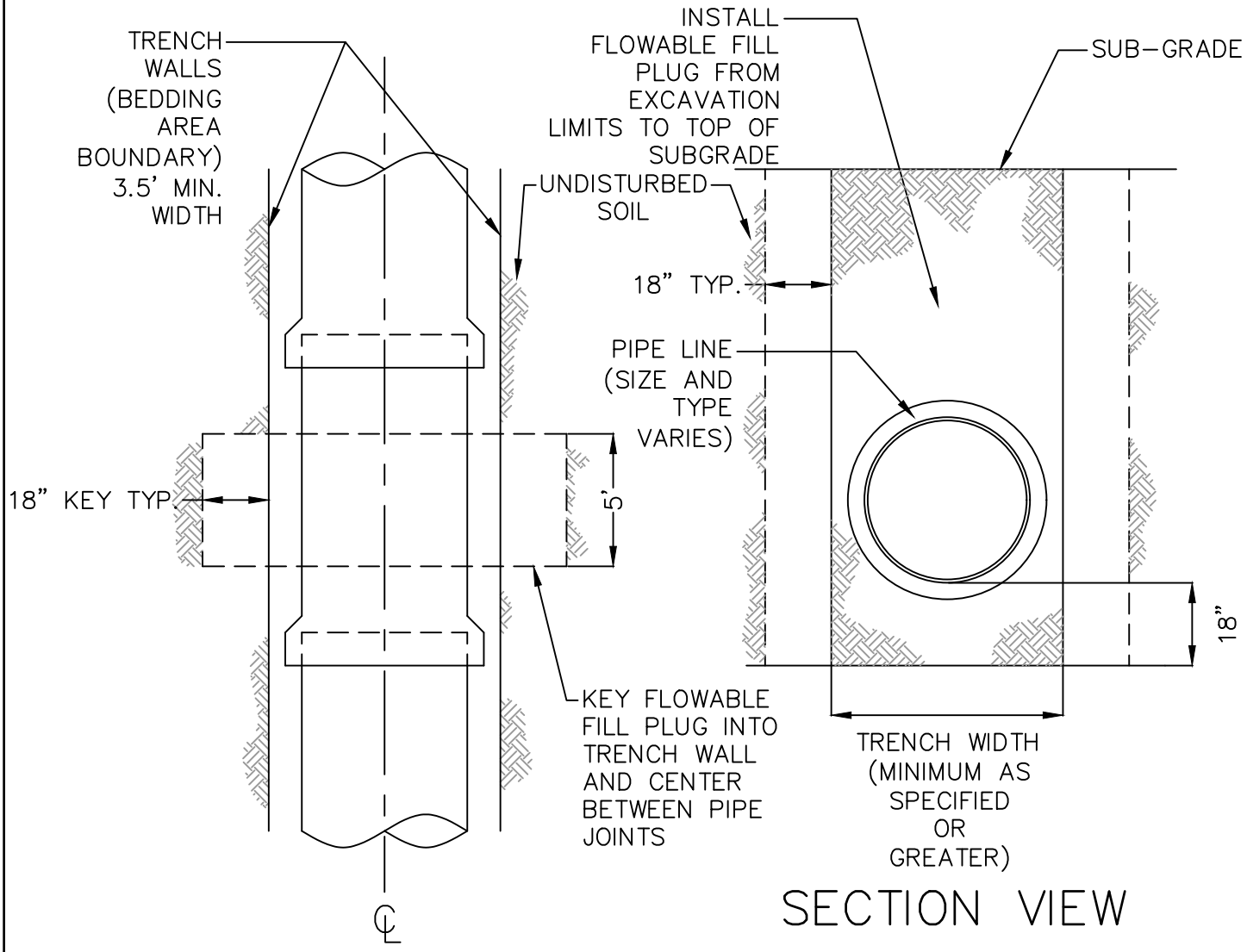
TYPE 1 TRENCH – METHOD OF PAYMENT

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 REVISED	5 – 32



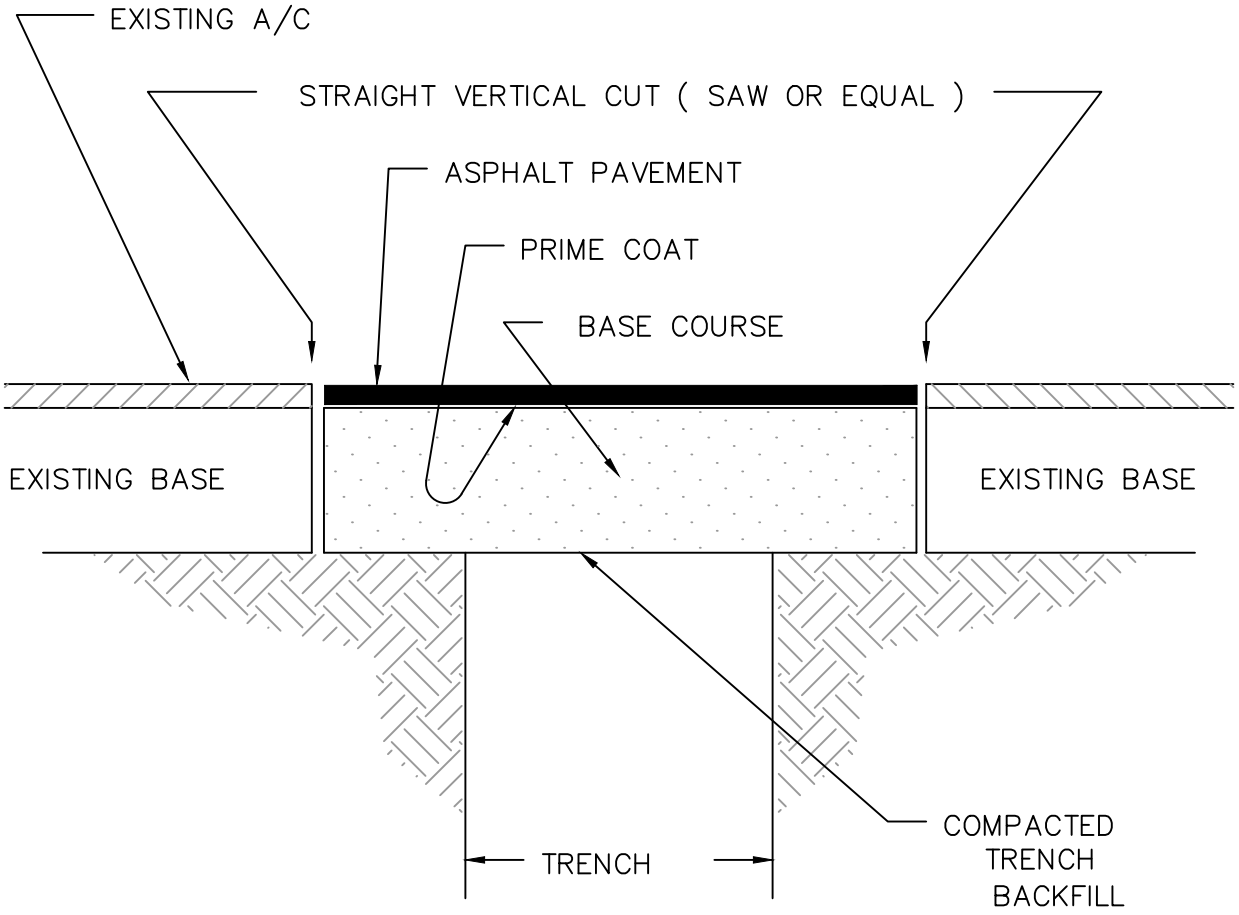
WATER MAIN CASING DETAIL

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	FEBRUARY 1995 REVISED	5 – 33



FLOWABLE FILL TRENCH PLUG

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	FEB 2009 REVISED	5 – 34



PAVEMENT TO BE 2'–0" WIDER THAN PAY WIDTH OF TRENCH EXCAVATION.

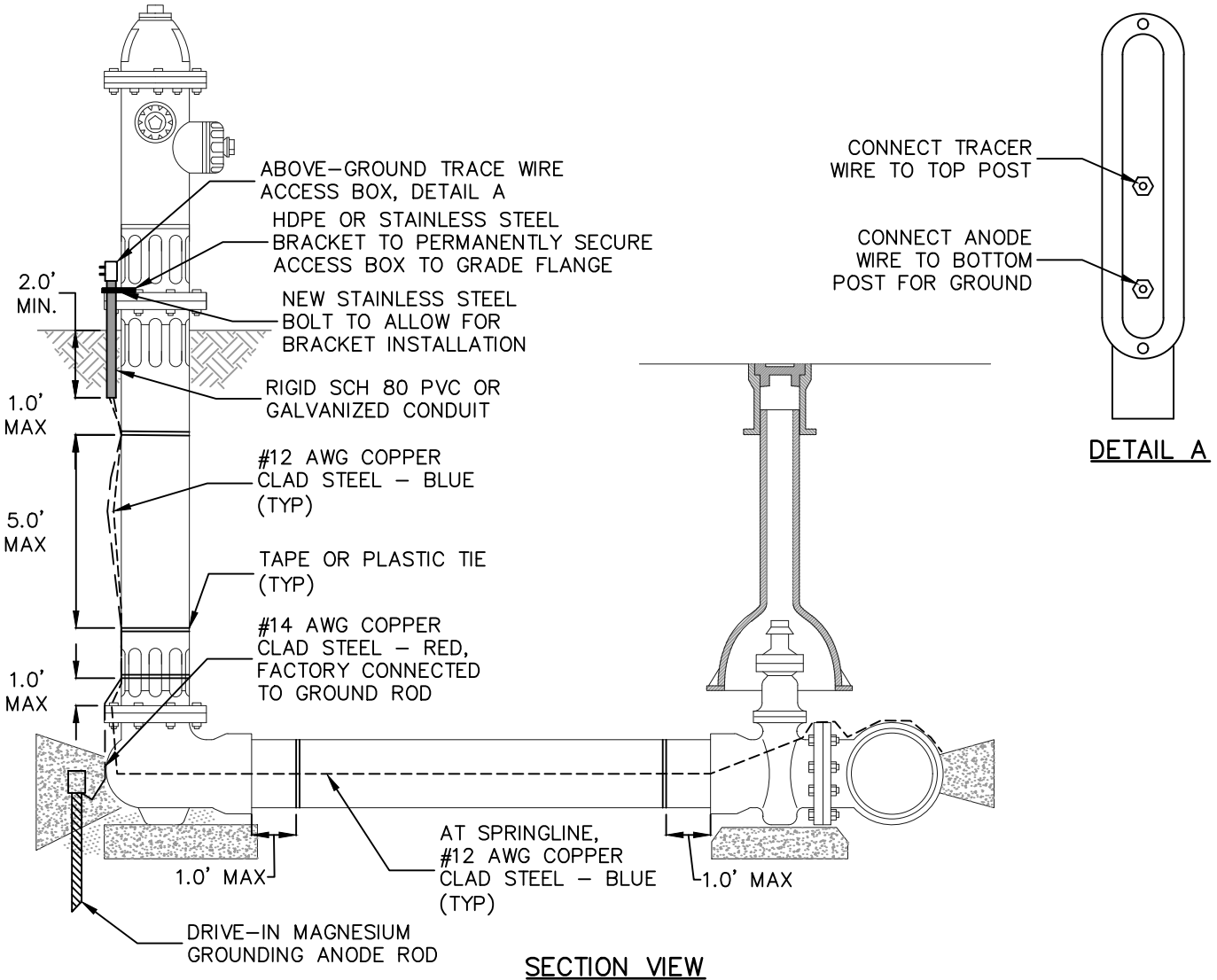
PAVEMENT SHALL BE ASPHALTIC CONCRETE ,UNLESS SPECIFIED OTHERWISE.

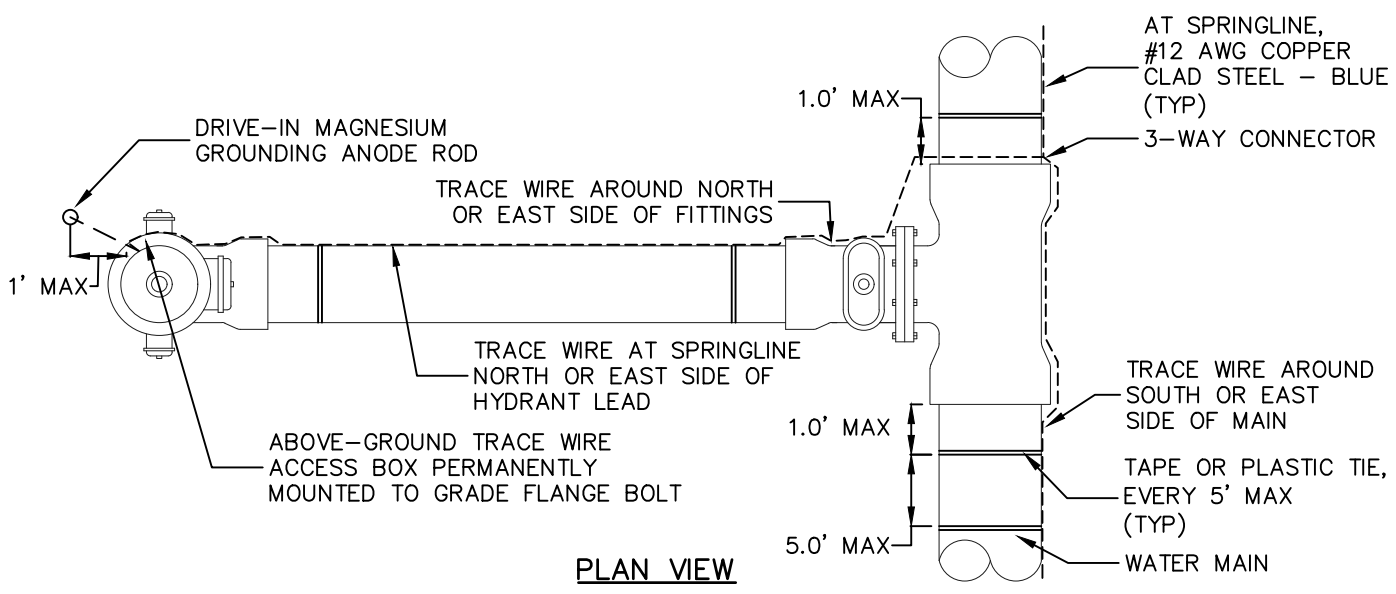
ASPHALTIC CONCRETE AND BASE COURSE MATERIALS SHALL
BE PLACED AS CALLED FOR IN SPECIFICATIONS.

PAY WIDTH OF PAVEMENT REPLACEMENT EQUALS
WIDTH OF TRENCH EXCAVATION PLUS 2'–0".

TYPICAL TRENCH PAVEMENT REPLACEMENT

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 REVISED	5 – 36



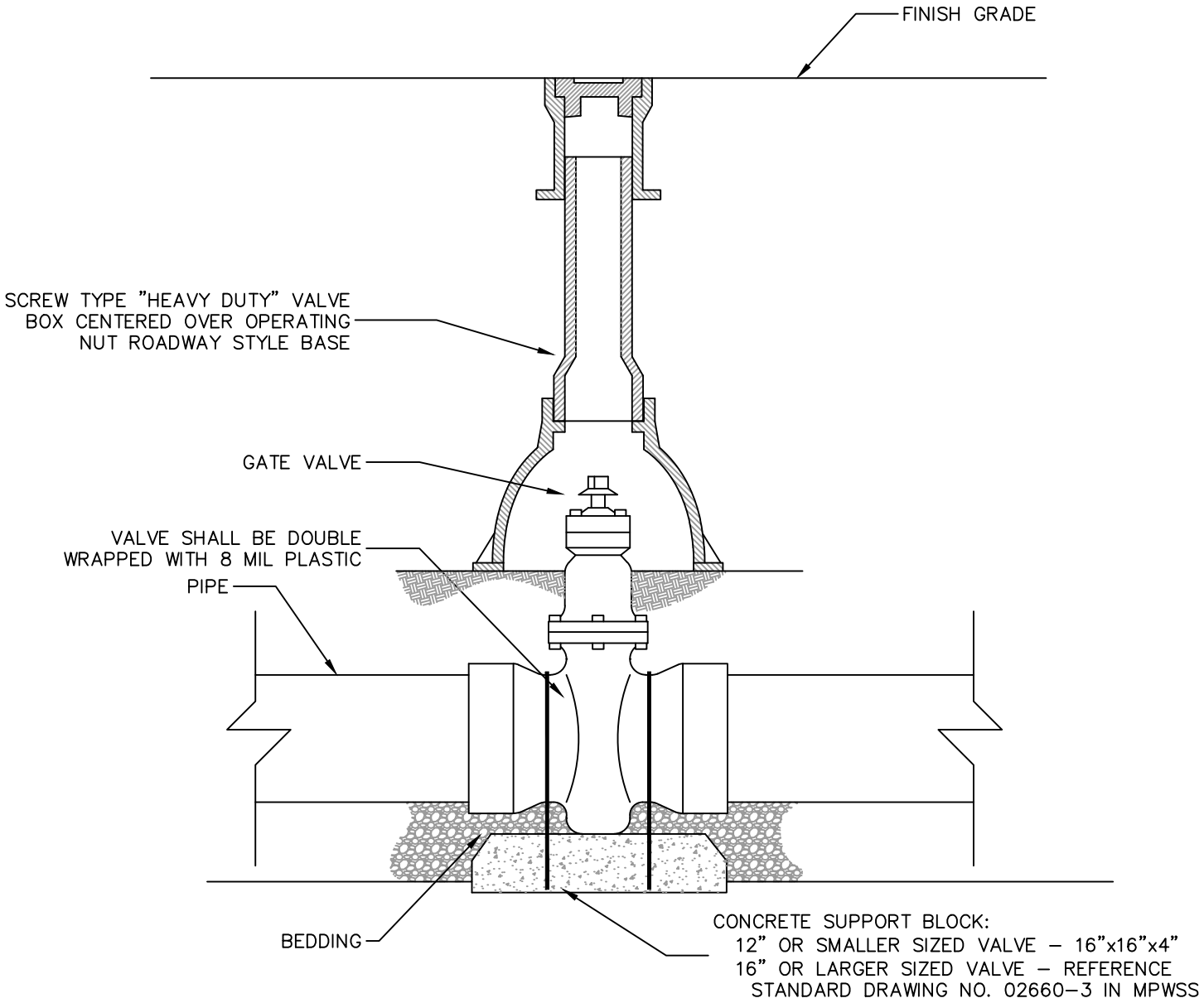


TRACE WIRE – HYDRANT DETAIL

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	JANUARY 2018 REVISED	5 – 38

Notes :

1. The use of "Drop In" risers to achieve final grade is not allowed.
2. Three piece riser shall be used. A four piece riser with upward adjustment shall be allowed for deeper valves.
3. Engineer may require additional support and rebar anchor system for valves 12" and smaller depending on location and project conditions.
4. All bolts, mechanical and flanged joint fittings shall be double wrapped with polyethylene encasement in accordance with AWWA C105, and wrapped with Wax–Tape System.
5. 16" or larger sized valves shall be butterfly valves. Operating nut shall be on south or east side of water main. Rebar anchor system required.

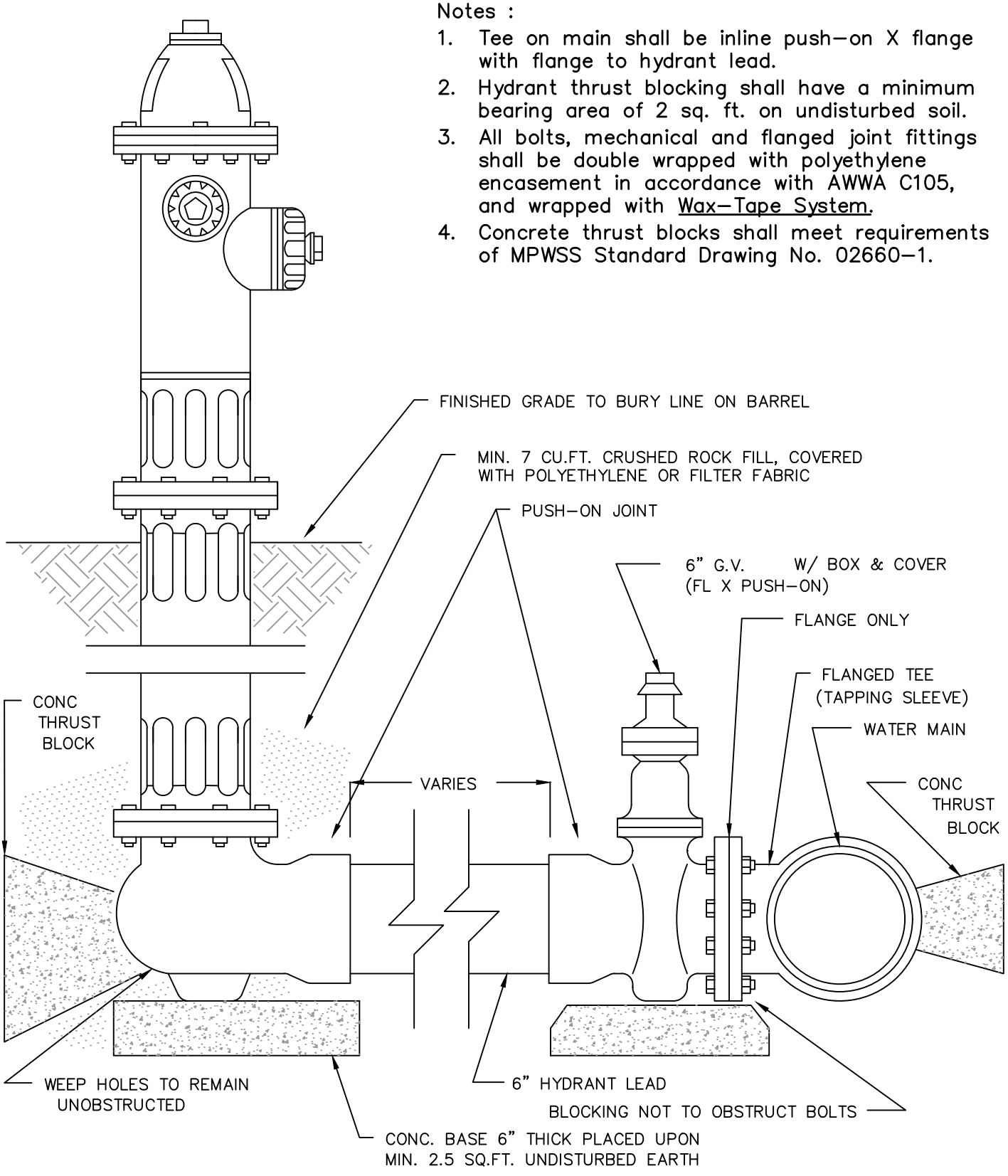


STANDARD GATE VALVE DETAIL

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	OCT 2011 REVISED MAY 2018	5 – 39

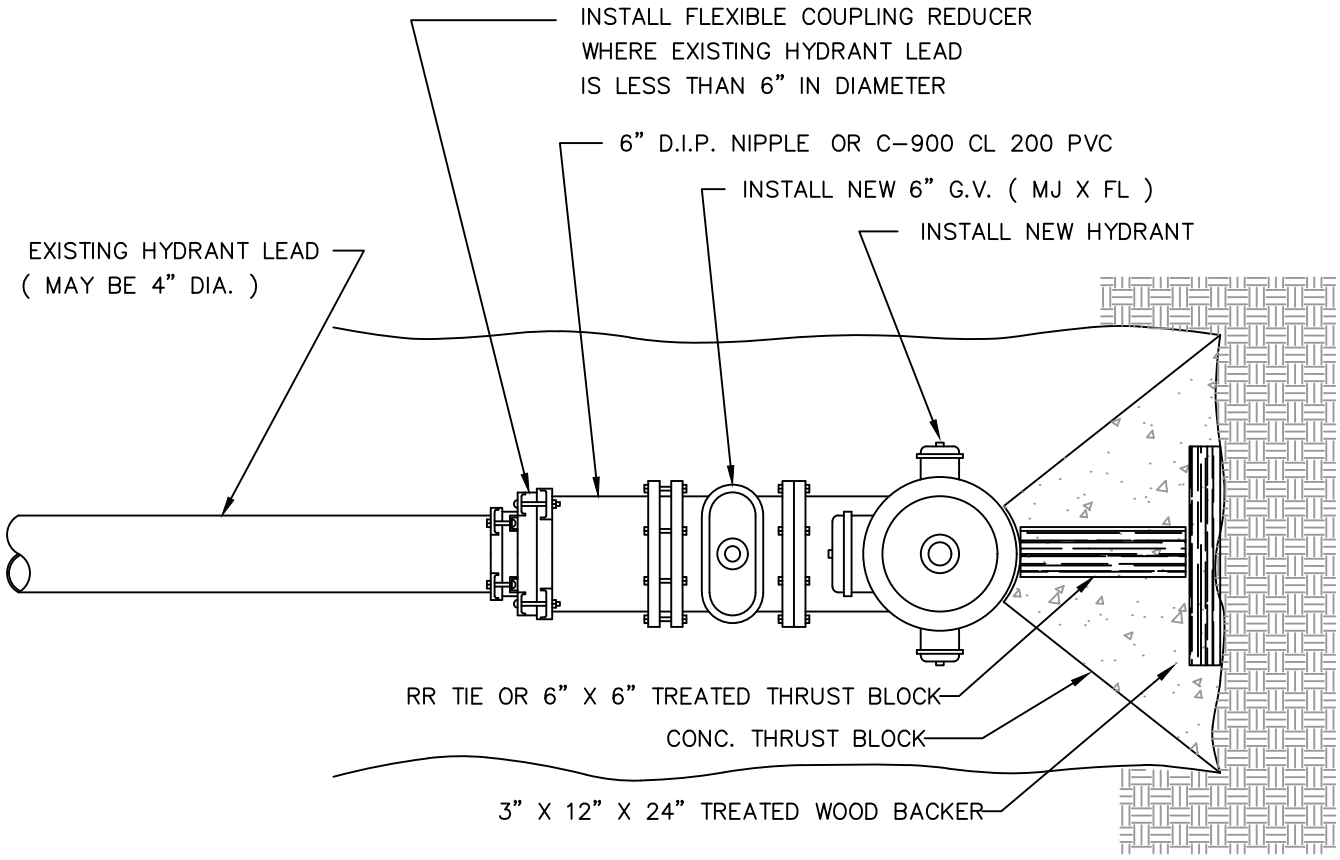
Notes :

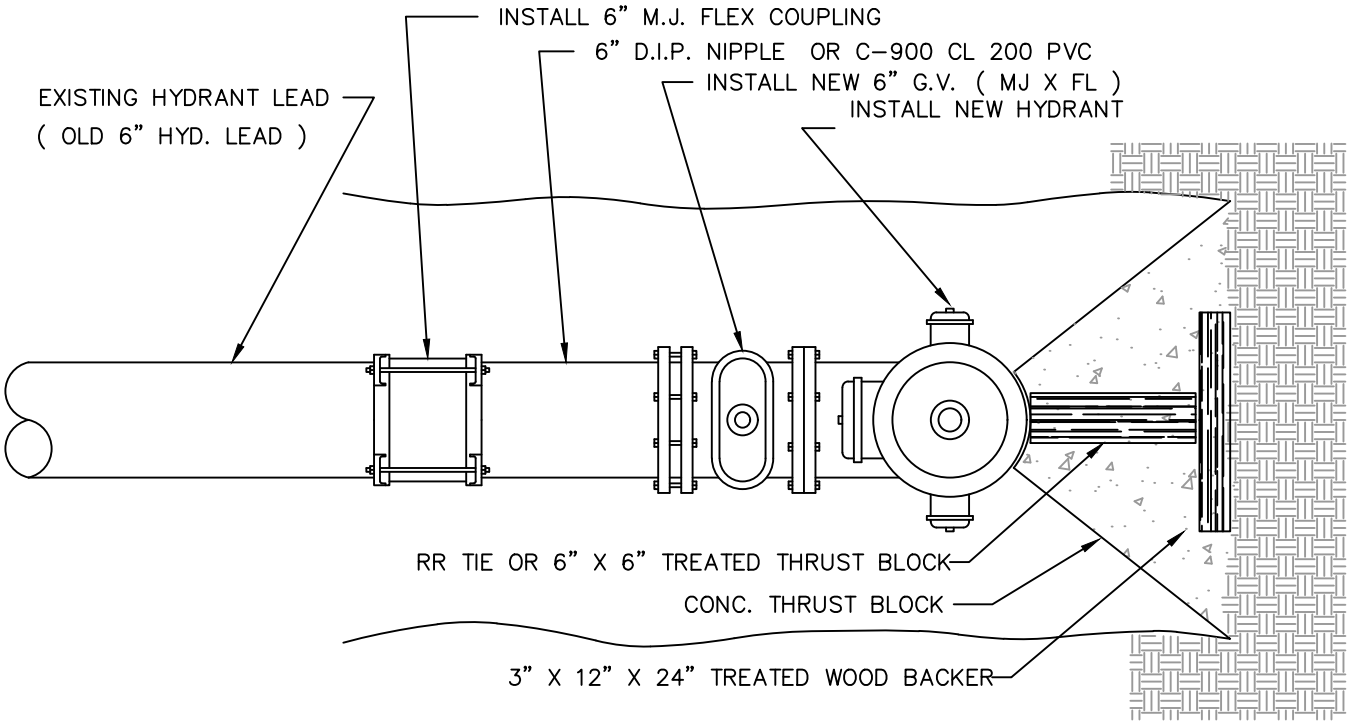
1. Tee on main shall be inline push–on X flange with flange to hydrant lead.
2. Hydrant thrust blocking shall have a minimum bearing area of 2 sq. ft. on undisturbed soil.
3. All bolts, mechanical and flanged joint fittings shall be double wrapped with polyethylene encasement in accordance with AWWA C105, and wrapped with Wax–Tape System.
4. Concrete thrust blocks shall meet requirements of MPWSS Standard Drawing No. 02660–1.



STANDARD FIRE HYDRANT DETAIL

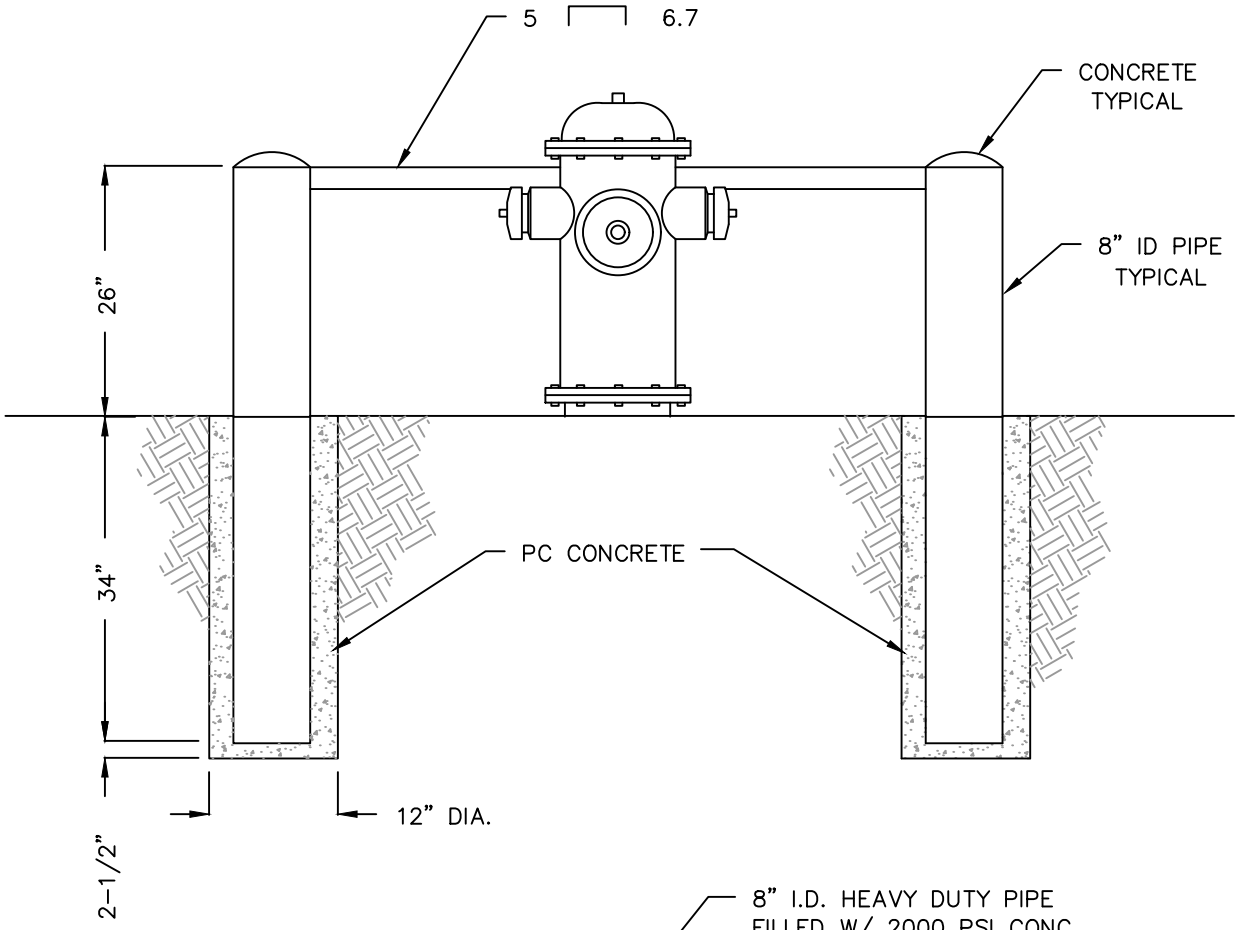
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 REVISED MARCH 2018	5 – 40

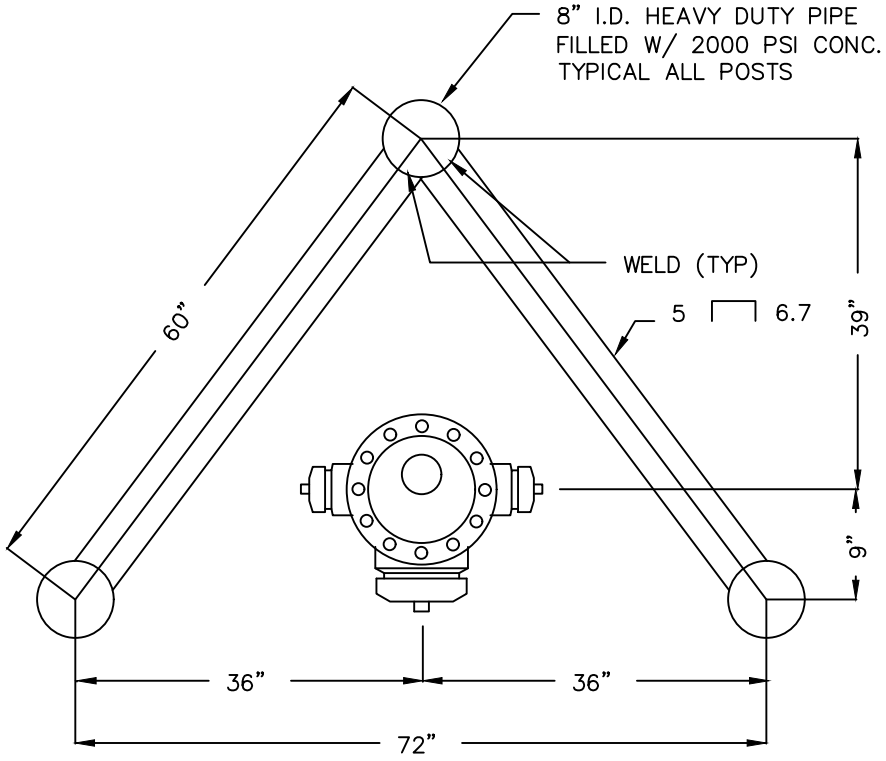




FIRE HYDRANT REPLACEMENT ON EXISTING HYDRANT LEAD

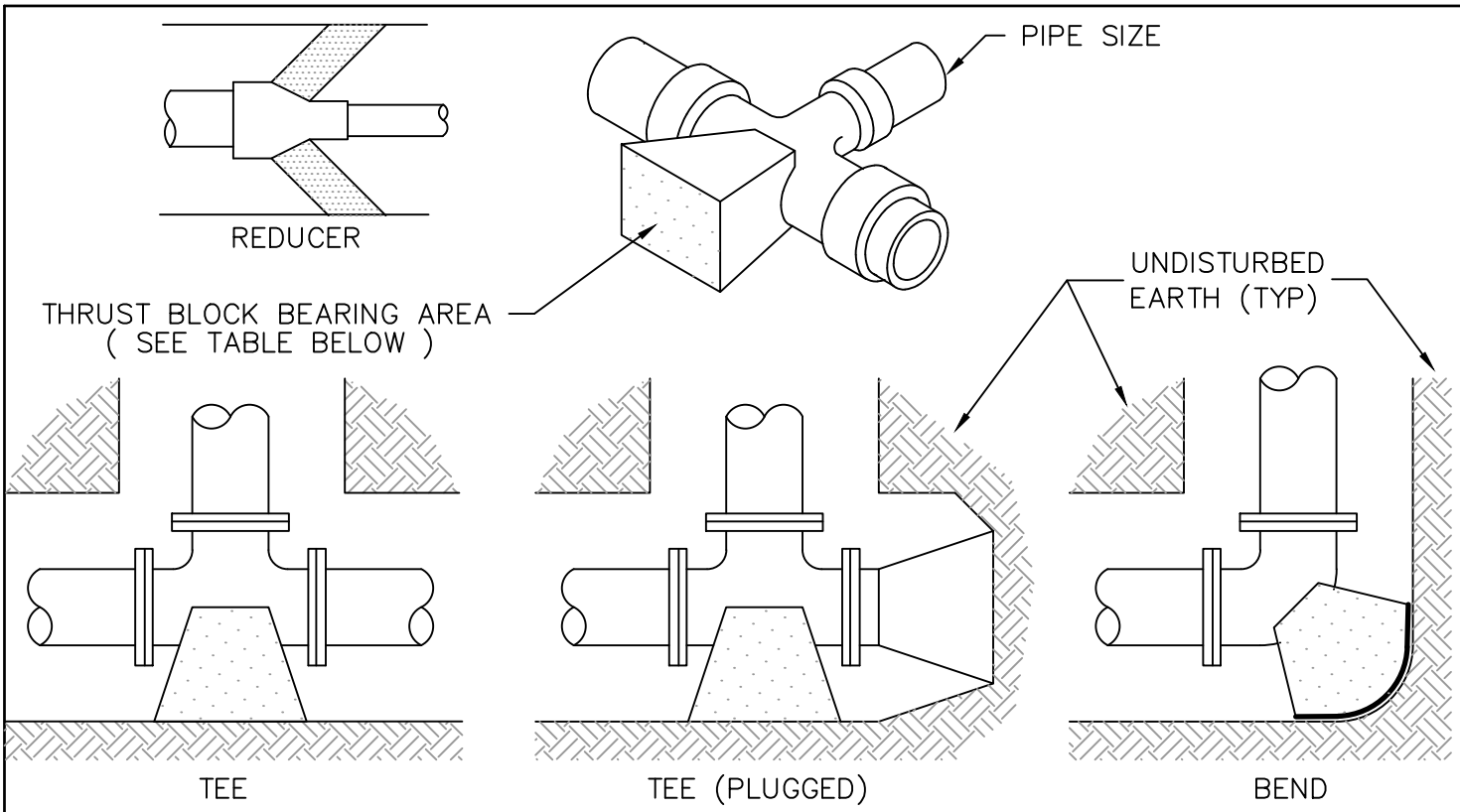
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	JANUARY 1993 REVISED MARCH 1993	5 – 41





TYPICAL FIRE HYDRANT GUARD

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 REVISED	5 – 42



* Blocking for tapping sleeves shall be the same as tee.

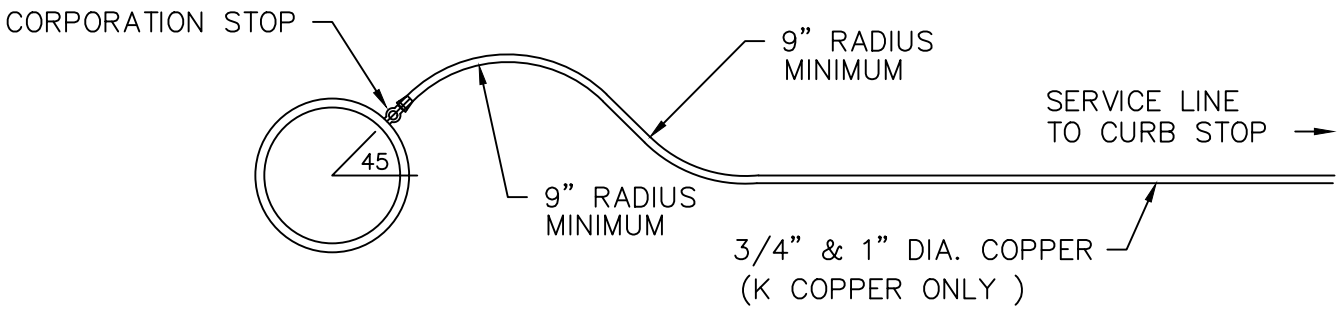
\# Blocking is required on reducer (or increaser) if reducing over one pipe size.

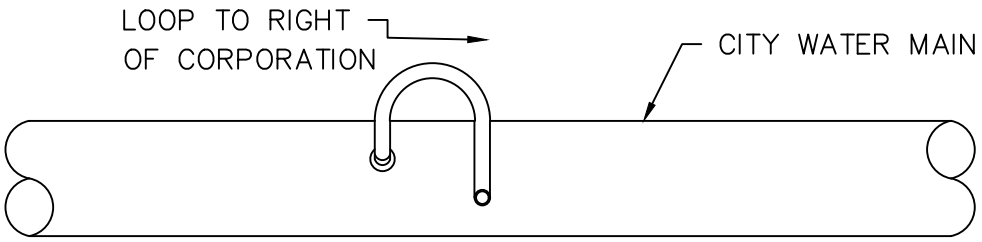
MINIMUM THRUST BLOCK BEARING AREA (SQUARE FEET)					
PIPE SIZE	TEES * & PLUGS	90 Deg BEND	45 Deg & WYES	22–1/2 BEND & REDUCER #	VALVES
4"	1.8	2.6	1.4	0.8	4.0
6"	3.8	5.2	2.9	1.5	4.0
8"	6.7	9.5	5.0	2.6	4.0
10"	10.8	15.3	8.3	4.2	6.25
12"	15.3	21.8	11.9	5.8	9.0
14"	20.8	28.8	16.2	8.3	10.5
16"	27.4	37.7	20.9	10.8	16.0
18"	34.7	47.7	26.6	13.6	16.25
20"	42.8	58.9	32.7	16.8	
24"	61.7	84.8	47.1	24.2	32.5
30"	96.4	123.5	73.6	37.9	

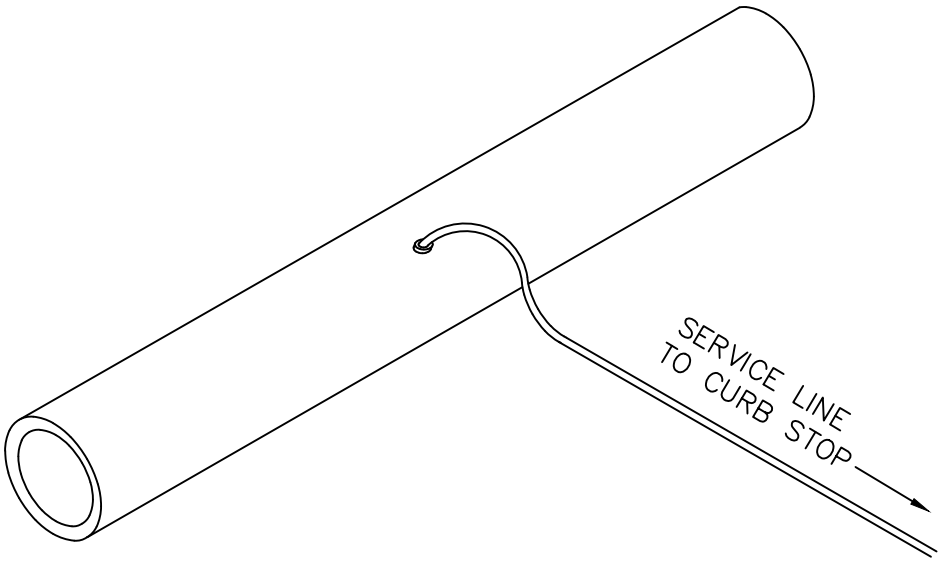
NOTE:
1. This table is based on 150# PSI main pressure & 2000 # soil pressure.
2. Wrap all fittings with polyethlene.
3. Blocking for valves where determined by Engineer.
4. Concrete used for thrust blocks shall be allowed to 'CURE' for approx. 24 hours.

THRUST BLOCKING DETAILS FOR WATER MAIN FITTINGS

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DECEMBER 1987 REVISED	5 – 43





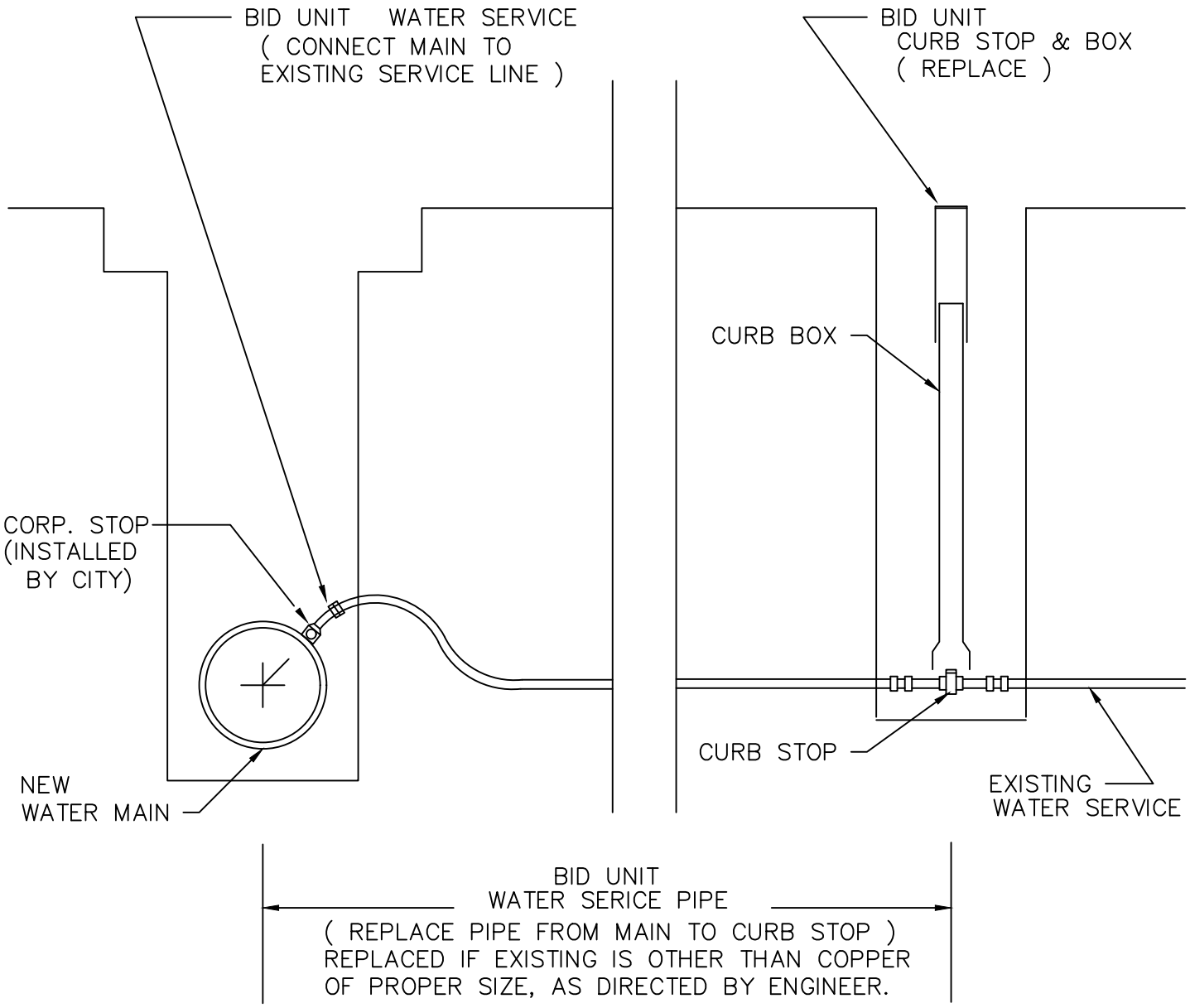


NOTE : CORPORATION STOP PROVIDED & INSTALLED BY CITY.

TAP MAY REQUIRE SADDLE ON ACP OR PVC MAINS.

EXPANSION LOOP – WATER SERVICE LINE CONNECTION AT MAIN

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 REVISED	5 – 44

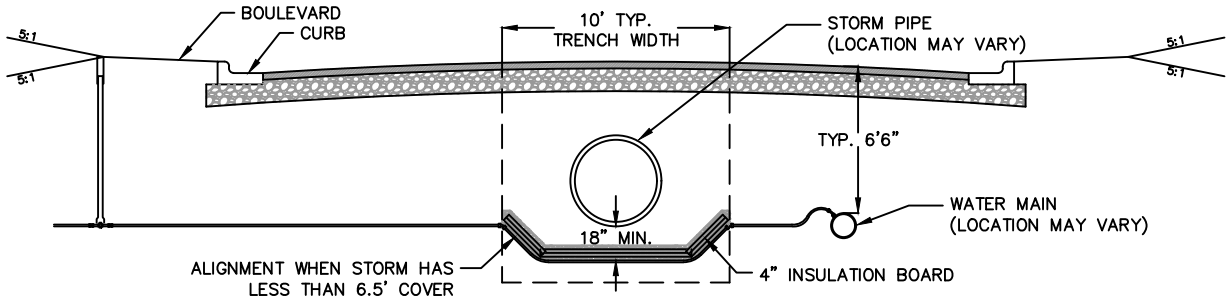


NOTE :

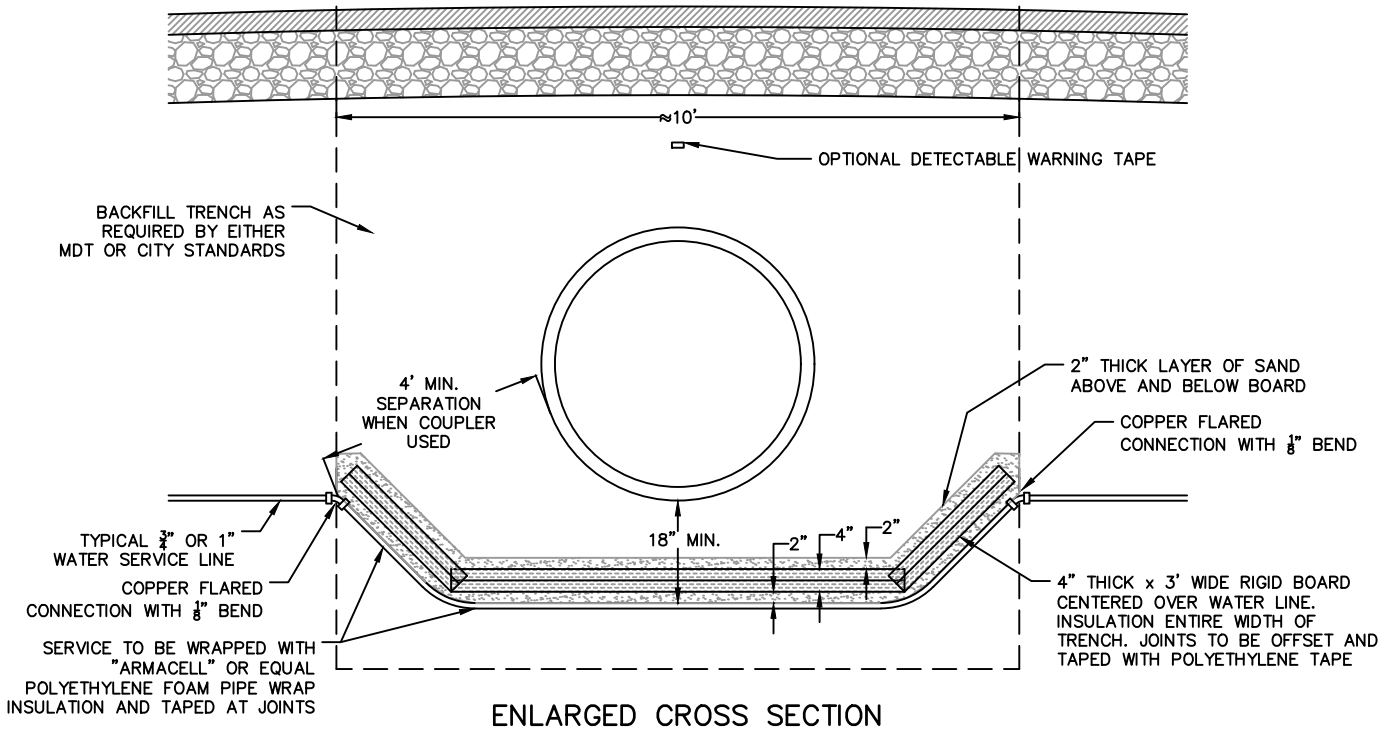
CORP. STOP PROVIDED BY CONTRACTOR & INSTALLED BY CITY
CURB STOP & CURB BOX PROVIDED BY AND INSTALLED BY CONTRACTOR
TAPPING SADDLE MAY BE REQUIRED IF MAIN OTHER THAN D.I.P.

WATER MAIN REPLACEMENT – WATER SERVICE CONNECTIONS

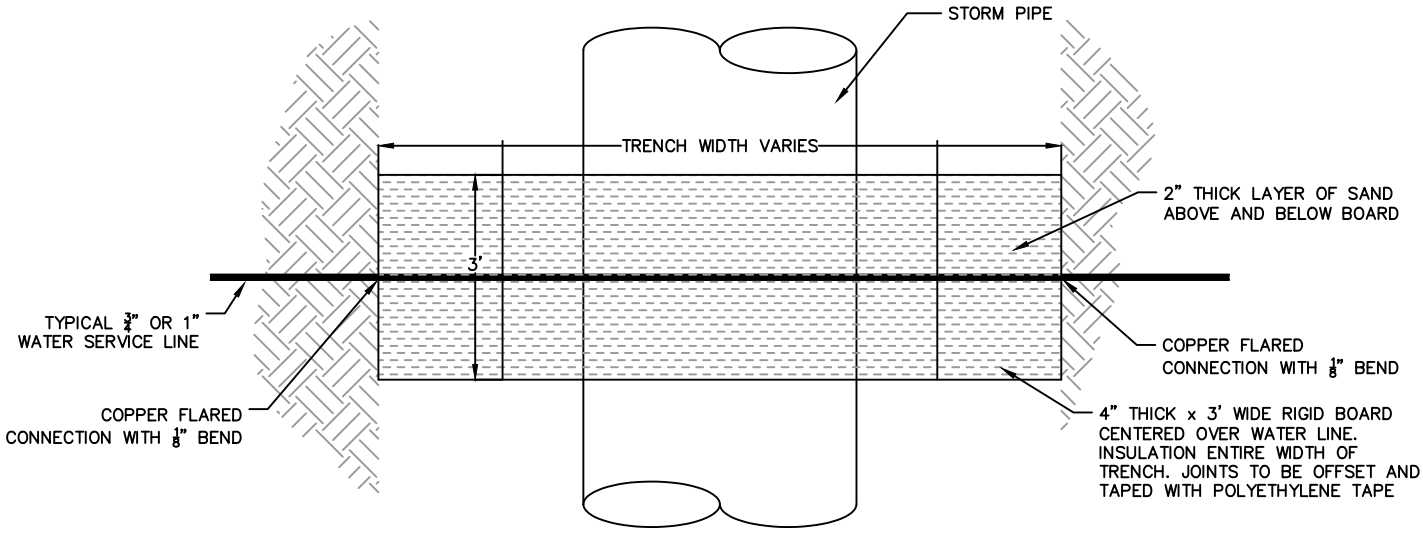
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DECEMBER 1987 REVISED JULY 2001	5 – 45



CROSS SECTION



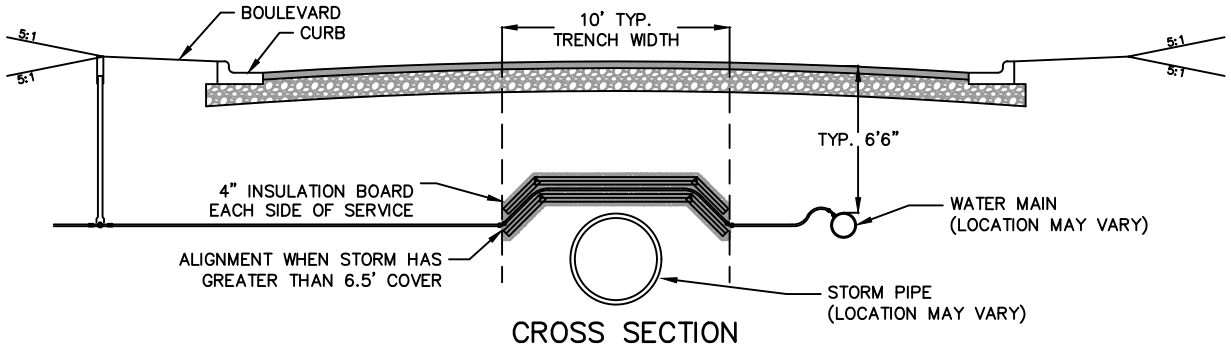
ENLARGED CROSS SECTION



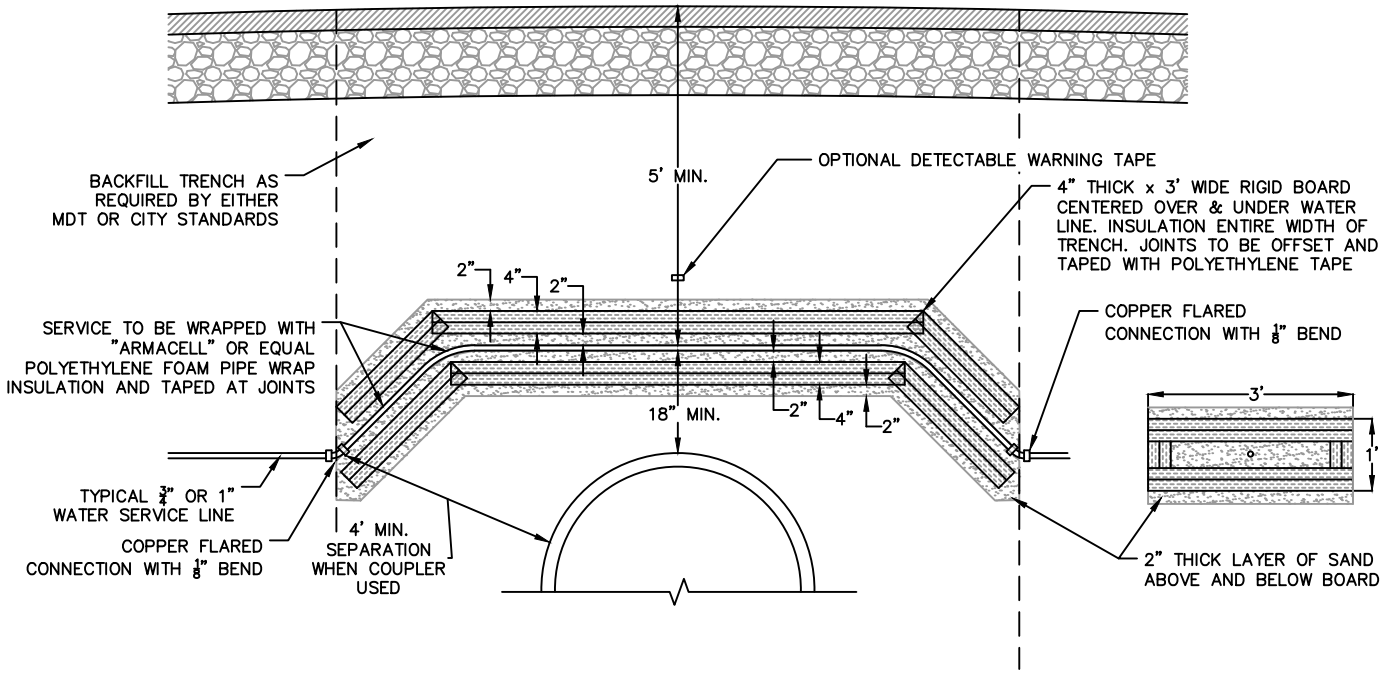
PLAN DETAIL

WATER SERVICE CROSSING BELOW STORM

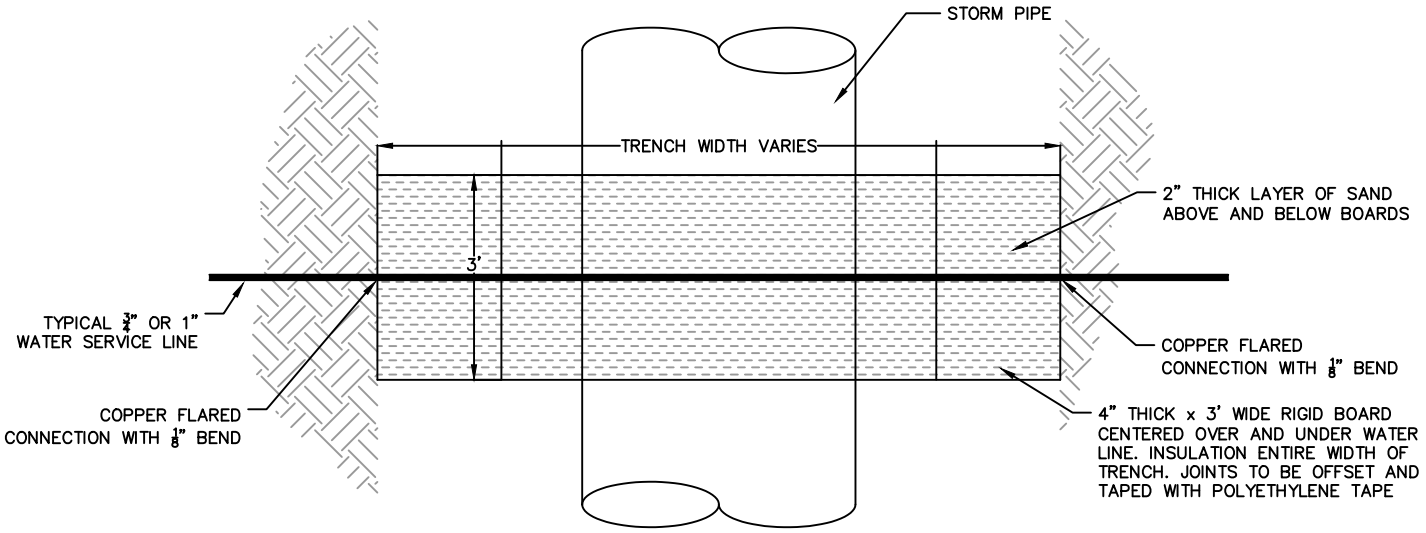
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	MARCH 2017 REVISED: MARCH 2018	5 – 45A



CROSS SECTION



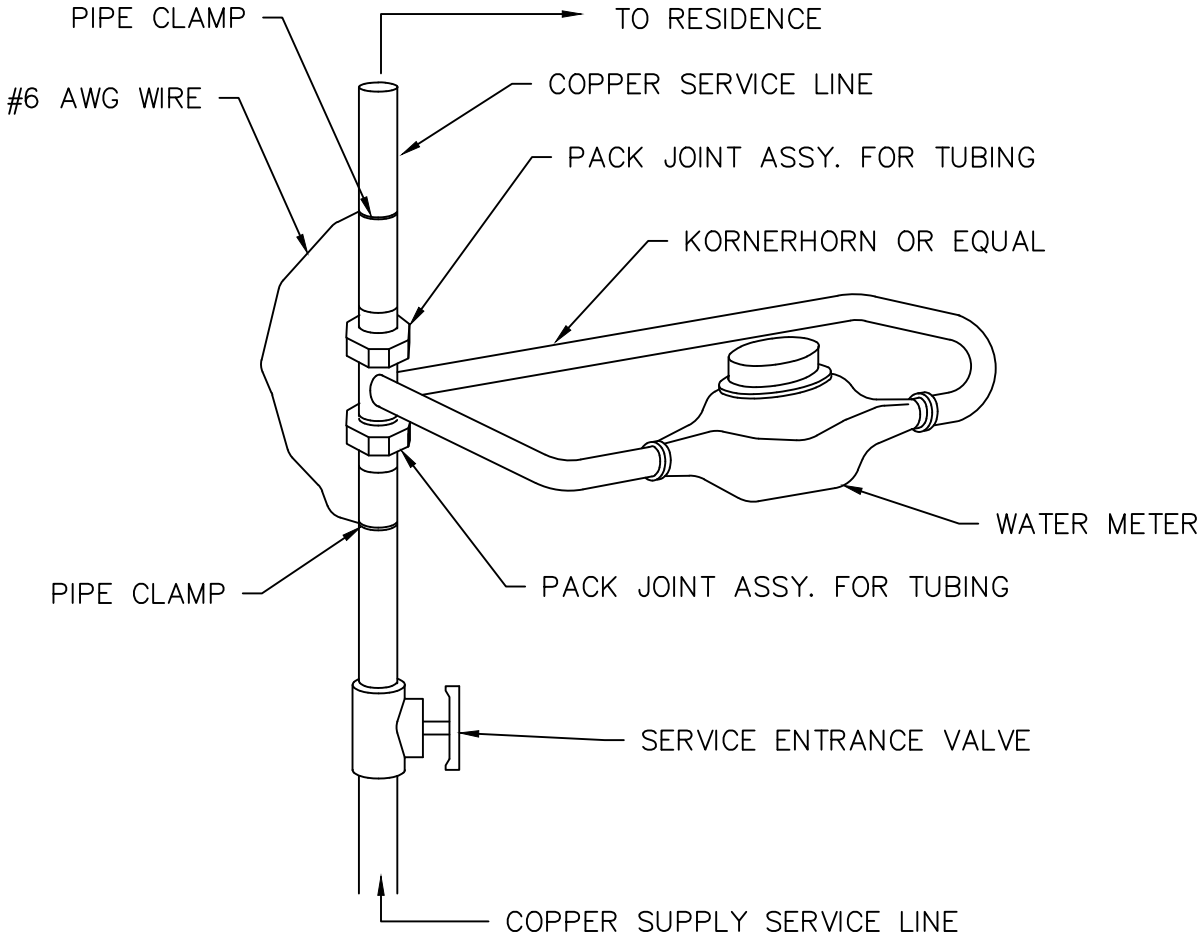
ENLARGED CROSS SECTION

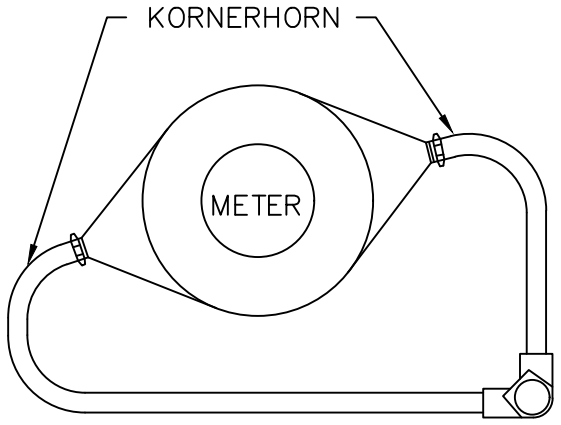


PLAN DETAIL

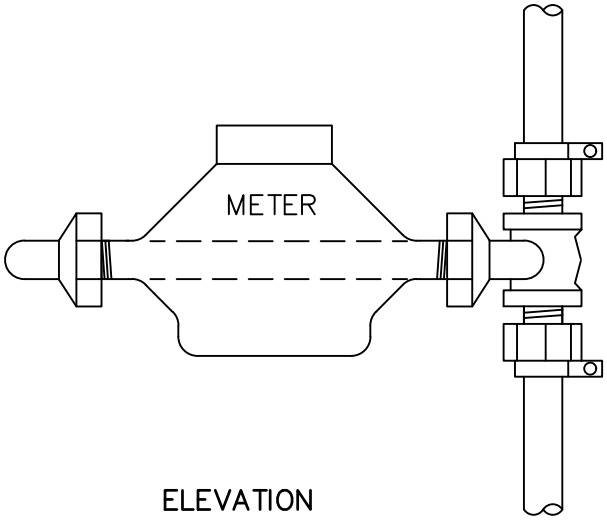
WATER SERVICE CROSSING ABOVE STORM

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	MARCH 2017 REVISED: MARCH 2018	5 – 45B





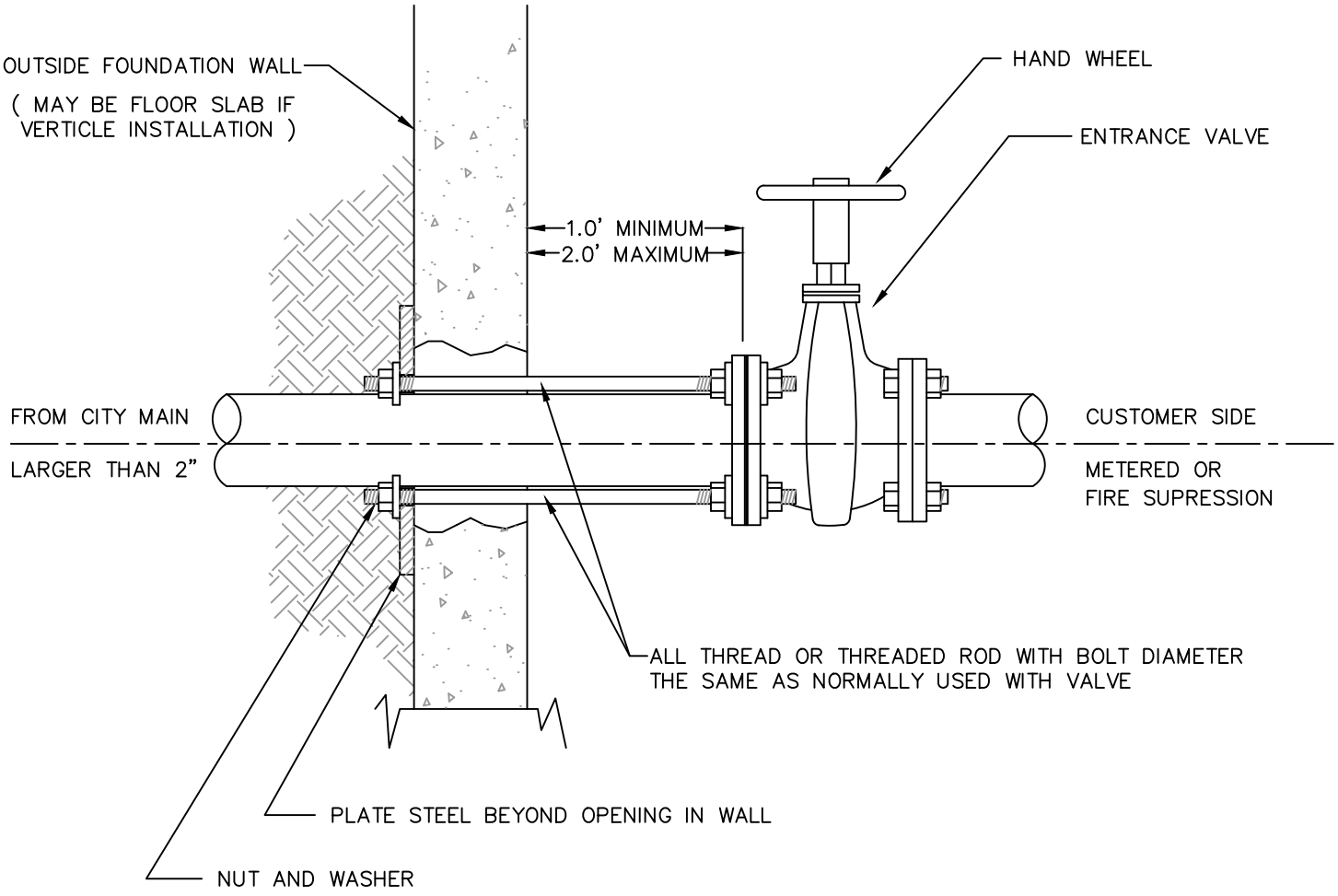
PLAN (TOP VIEW)



ELEVATION

TYPICAL WATER METER INSTALLATION

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	NOVEMBER 1987 REVISED	5 – 46

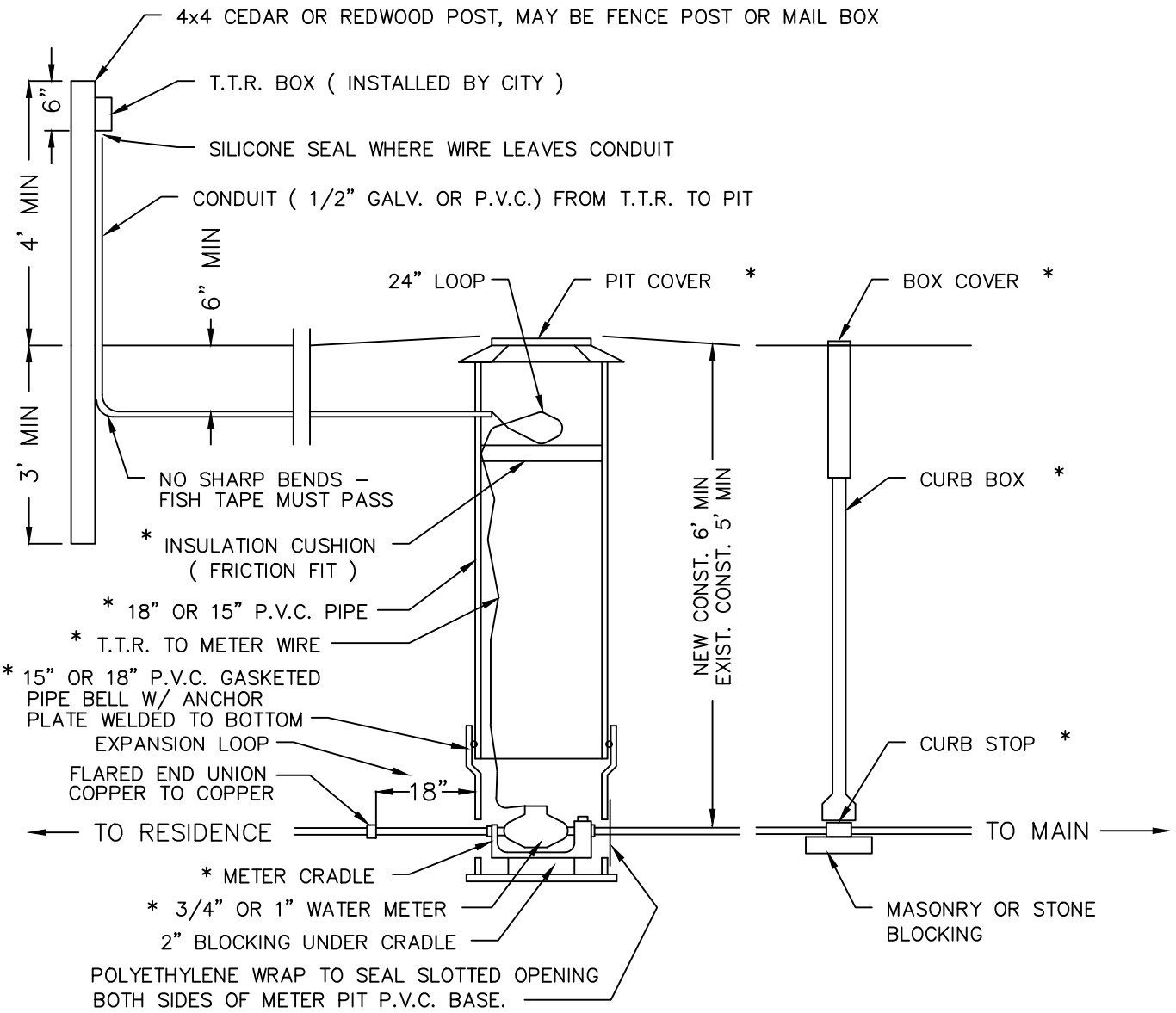


WATER PROOF COATING ON ALL METAL OUTSIDE FOUNDATION WALL

WATER SERVICE ENTRANCE OVER 2" DIAMETER

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	FEBRUARY 1995 REVISED	5 – 47

NOTE :
CURB BOX SHALL BE LOCATED IMMEDIATELY BEHIND CURB OR SIDEWALK
METER PIT SHALL BE PLACED ADJACENT TO DISCHARGE SIDE OF CURB BOX.



* = PARTS SUPPLIED BY CITY TO CONTRACTOR

NOTE:
PLUMBER SHALL SEAL METER REGISTER WITH DOW–CORNING SILICONE SEALANT OR APPROVED EQUAL. (BLACK IN COLOR)

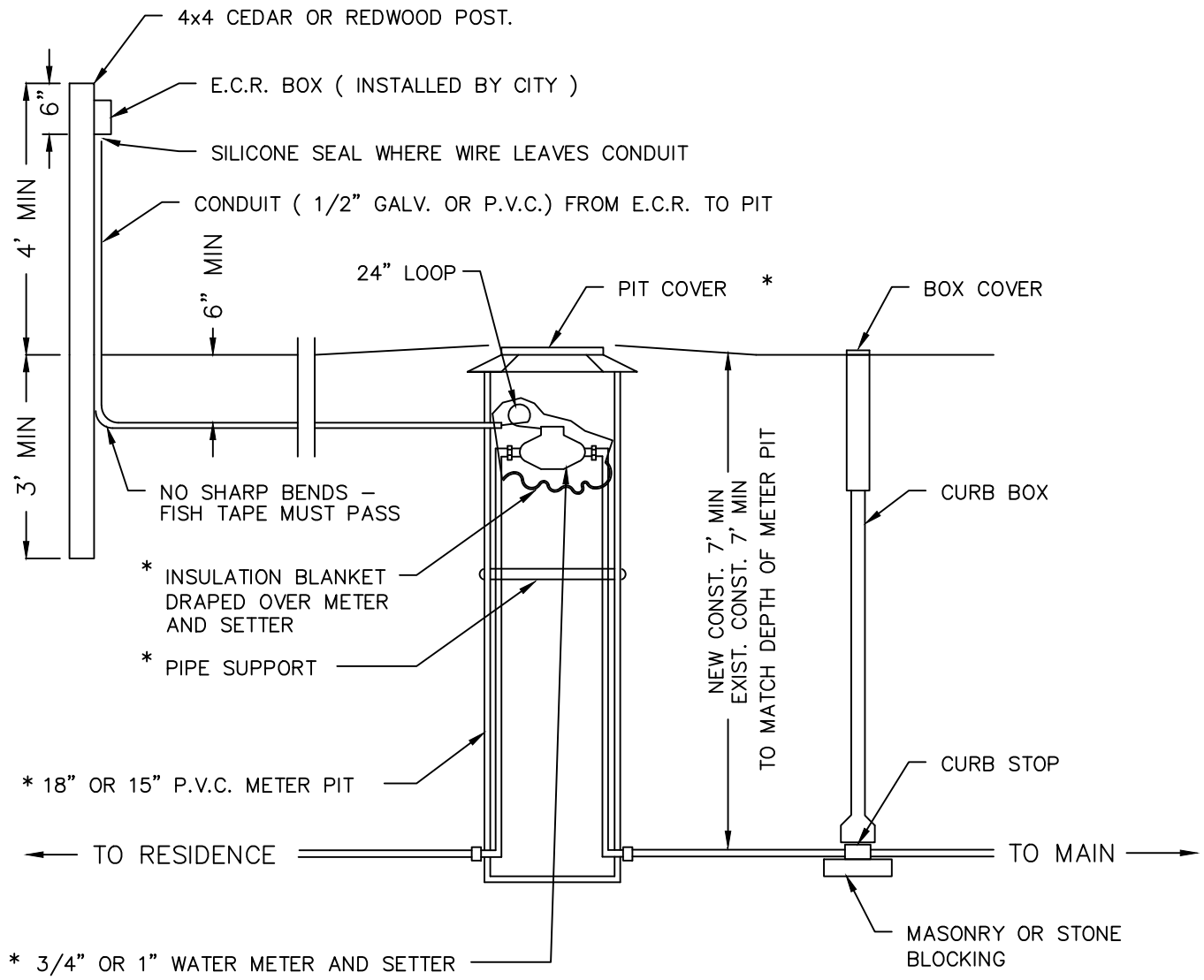
RESIDENTIAL WATER METER PIT

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DECEMBER 1987 REVISED	5 – 48

NOTE :

CURB BOX SHALL BE LOCATED IMMEDIATELY BEHIND CURB OR SIDEWALK
METER PIT SHALL BE PLACED ADJACENT TO DISCHARGE SIDE OF CURB BOX.

METER PIT DEPTH IS APPROXIMATELY 7' WITH LID. MAKE DEPTH ADJUSTMENTS ON SERVICE LINES OUTSIDE PIT BY RAISING OR LOWERING SERVICE LINE.
DO NOT CUT METER PIT TO MATCH DEPTH OF SERVICE LINE.



* = PARTS SUPPLIED BY CITY TO CONTRACTOR ON EXIST. USED SERVICE LINES

NOTE:

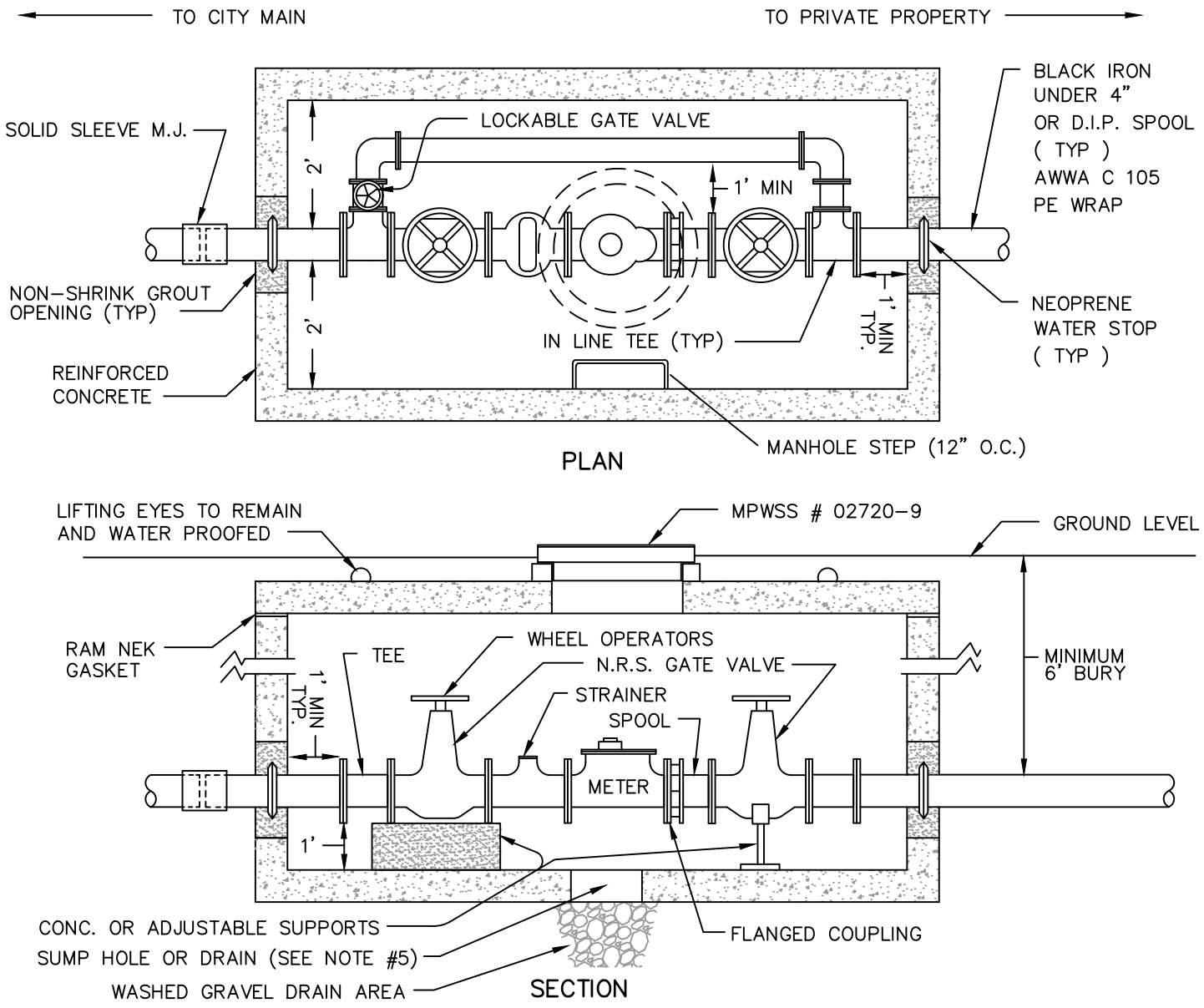
PLUMBER SHALL SEAL METER REGISTER WITH DOW–CORNING SILICONE SEALANT OR APPROVED EQUAL.

RESIDENTIAL WATER METER PIT

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DECEMBER 1987 REVISED OCT 1994	5 – 48A

NOTES :

1. THE SIZE OF BYPASS LINE TO BE DETERMINED BY FIRE FLOW REQUIREMENTS, HOWEVER, IN NO CASE SHALL A BYPASS LINE BE MORE THAN ONE (1) PIPE SIZE SMALLER THAN THE PRIMARY FEED. ALL FITTINGS ON 4" AND LARGER PIPE SHALL BE FLANGED, LESS THAN 4" MAY BE THREADED.
2. A CHECK VALVE SHALL BE INSTALLED ON DISCHARGE SIDE OF VALVING IF ON A LOOPED SYSTEM OR WHERE HIGHER HEADS MAY BE DEVELOPED ON DISCHARGE SIDE.
3. VAULT SHALL NOT BE PLACED IN AN AREA ACCESSIBLE TO VEHICLE TRAFFIC. ACCESS HATCH TO BE CENTERED OVER WATER METER AND SIZED TO ALLOW REMOVAL OF METER, MINIMUM SIZE OF HATCH MUST ALLOW PERSONNEL TO ENTER AND EXIT VAULT. HATCH SHALL BE APPROVED BY CITY PRIOR TO INSTALLATION.
4. RIGID INSULATION SHALL BE APPLIED TO OUTSIDE OF VAULT TO A DEPTH OF 3' BELOW GROUND SURFACE. MANHOLE FRAME AND COVER SHALL BE INSULATED WITH ADHESIVE TYPE FOAM INSULATION.
5. IF VAULT IS NEAR GROUND WATER, WATER PROOFING SHALL BE APPLIED TO THE OUTSIDE OF VAULT, NO DRAIN HOLE.
6. REMOTES FOR REMOTE READ METERS SHALL BE MOUNTED ON A 4X4 POST 42" ABOVE GROUND. WIRE SHALL BE RAN INSIDE CONDUIT FROM VAULT TO THE 4X4 POST.



TYPICAL WATER METER VAULT DETAIL

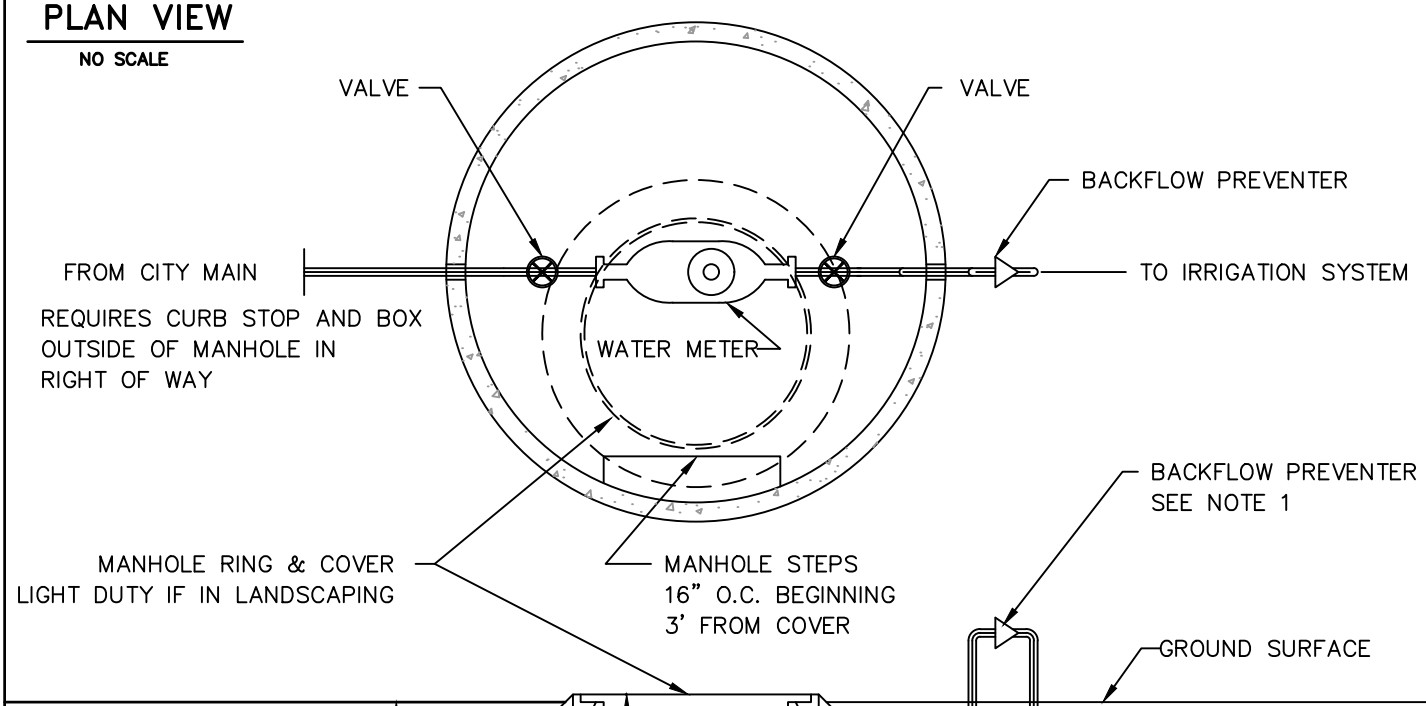
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	1987, 1991, REVISED: JULY 2006	5 – 49

NOTES :

1. BACKFLOW PREVENTER TYPE AND LOCATION TO BE APPROVED BY CITY PLUMBING INSPECTOR.

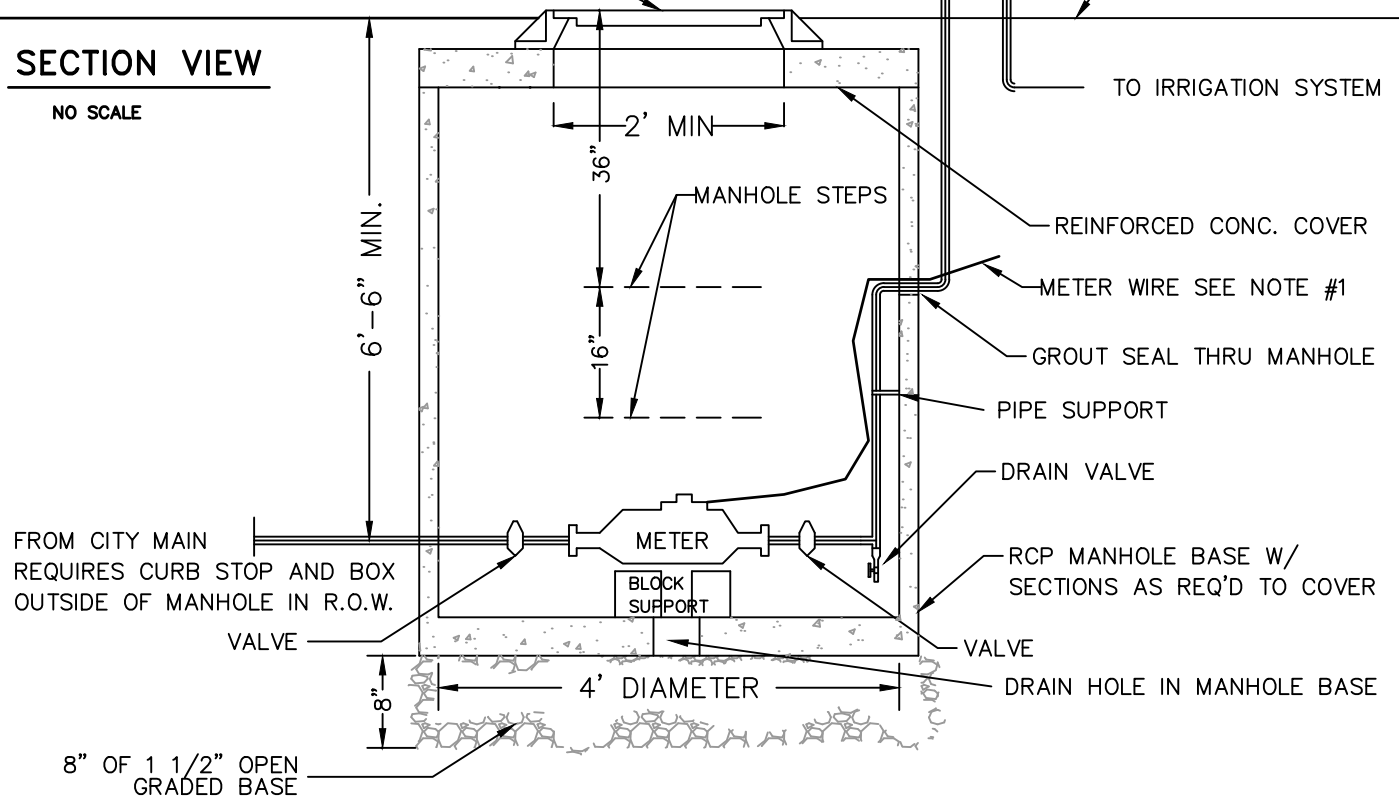
PLAN VIEW

NO SCALE



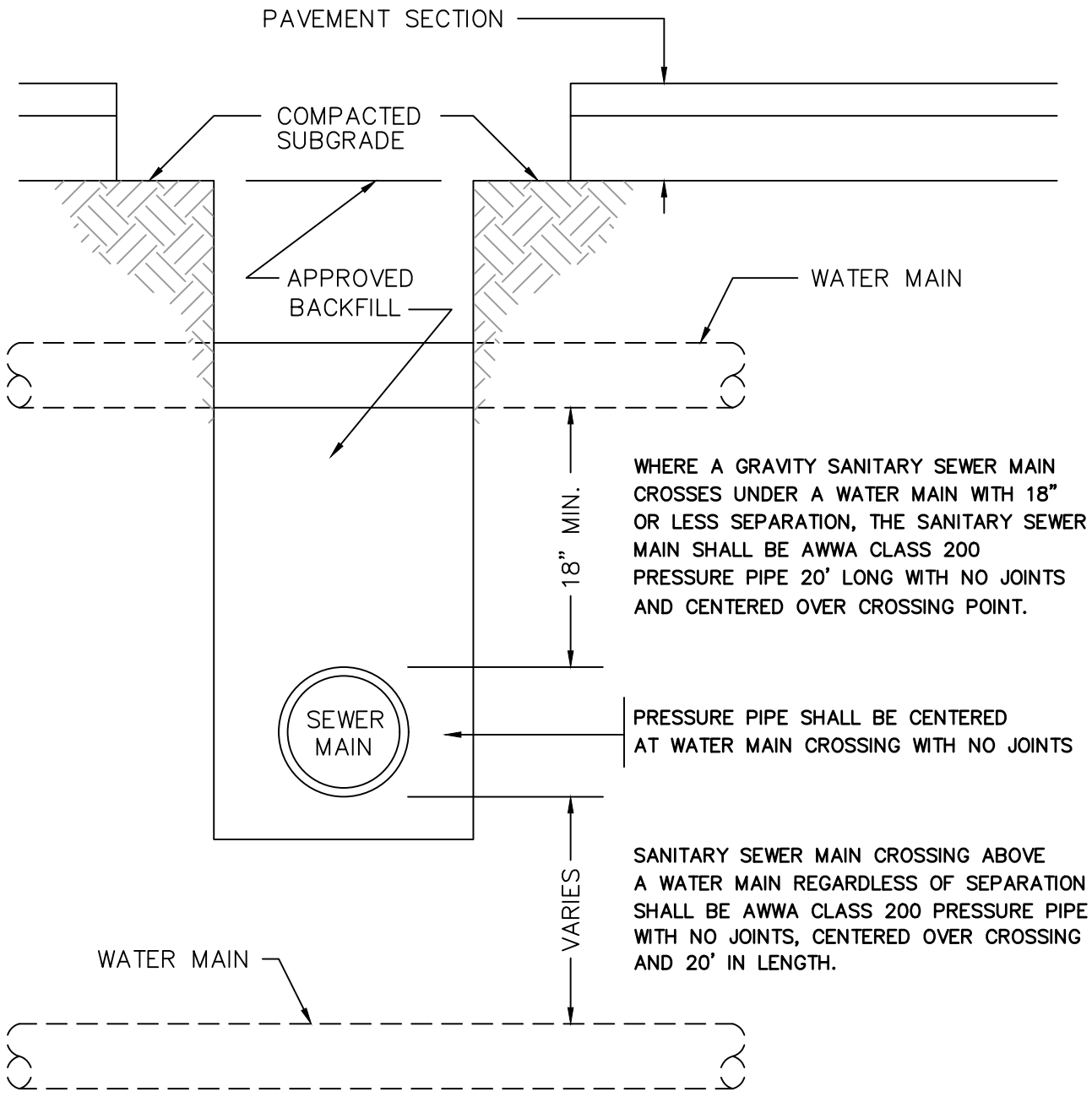
SECTION VIEW

NO SCALE



IRRIGATION MANHOLE FOR 1-1/2" OR LARGER WATER METER

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	MAY 2009 REVISED	5 – 49A



SANITARY SEWER MAINS AT WATER MAIN CROSSINGS

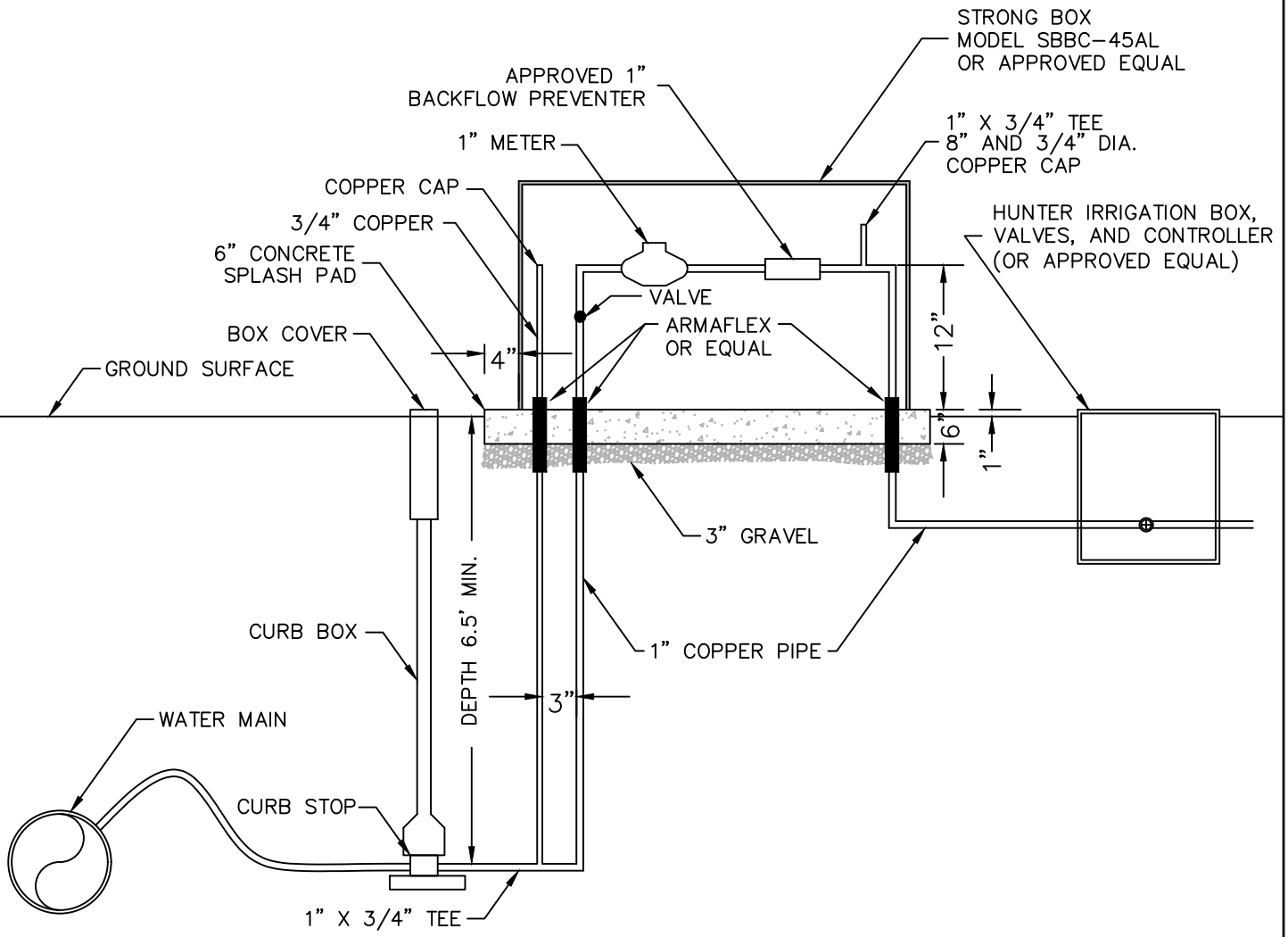
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DECEMBER 1987 REVISED AUGUST 1993	5 – 50

NOTES :

1) INSTALL ENCLOSURE AND CONCRETE PAD PER MANUFACTURES INSTALLATION DETAILS

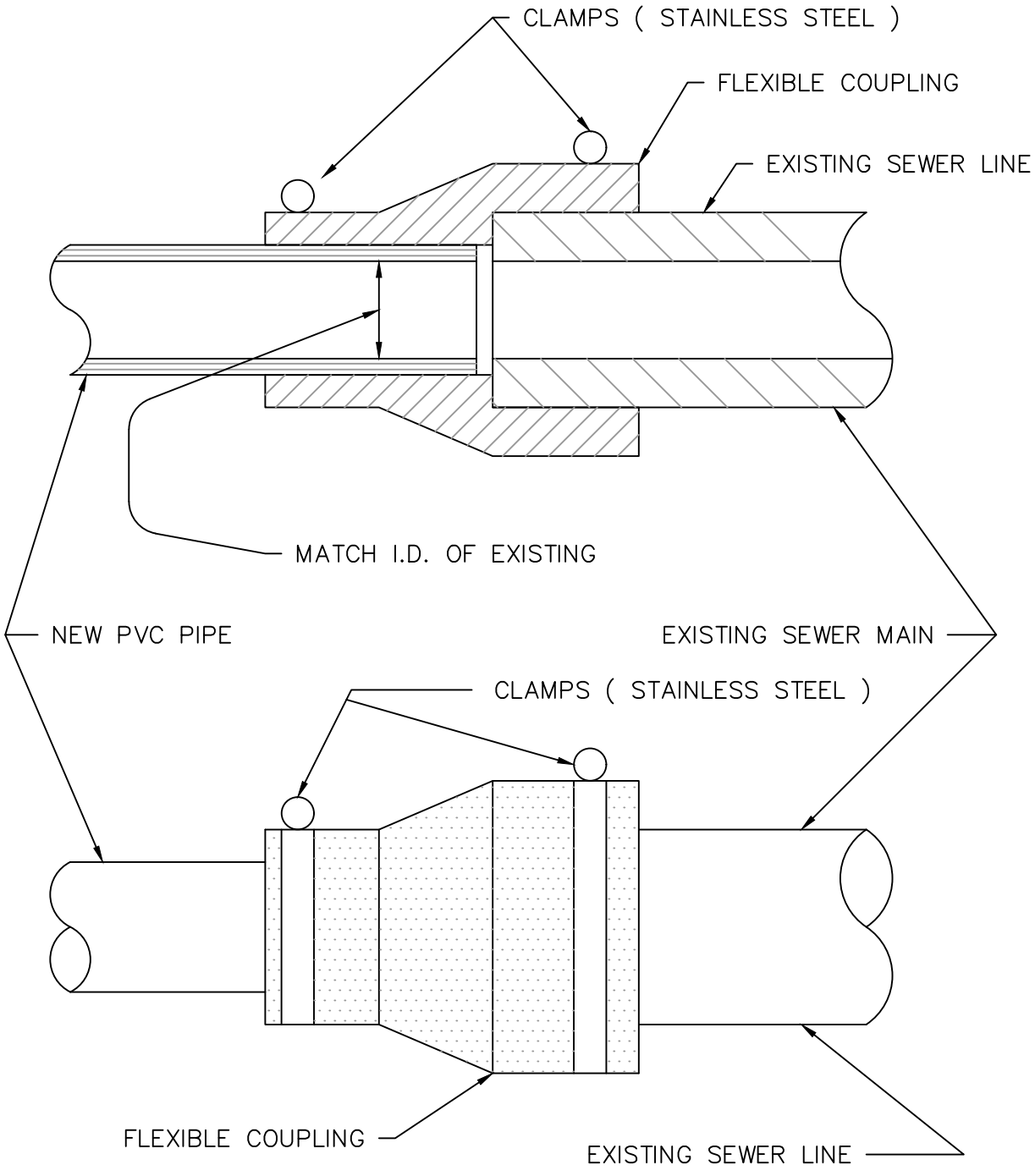
SECTION VIEW

NO SCALE



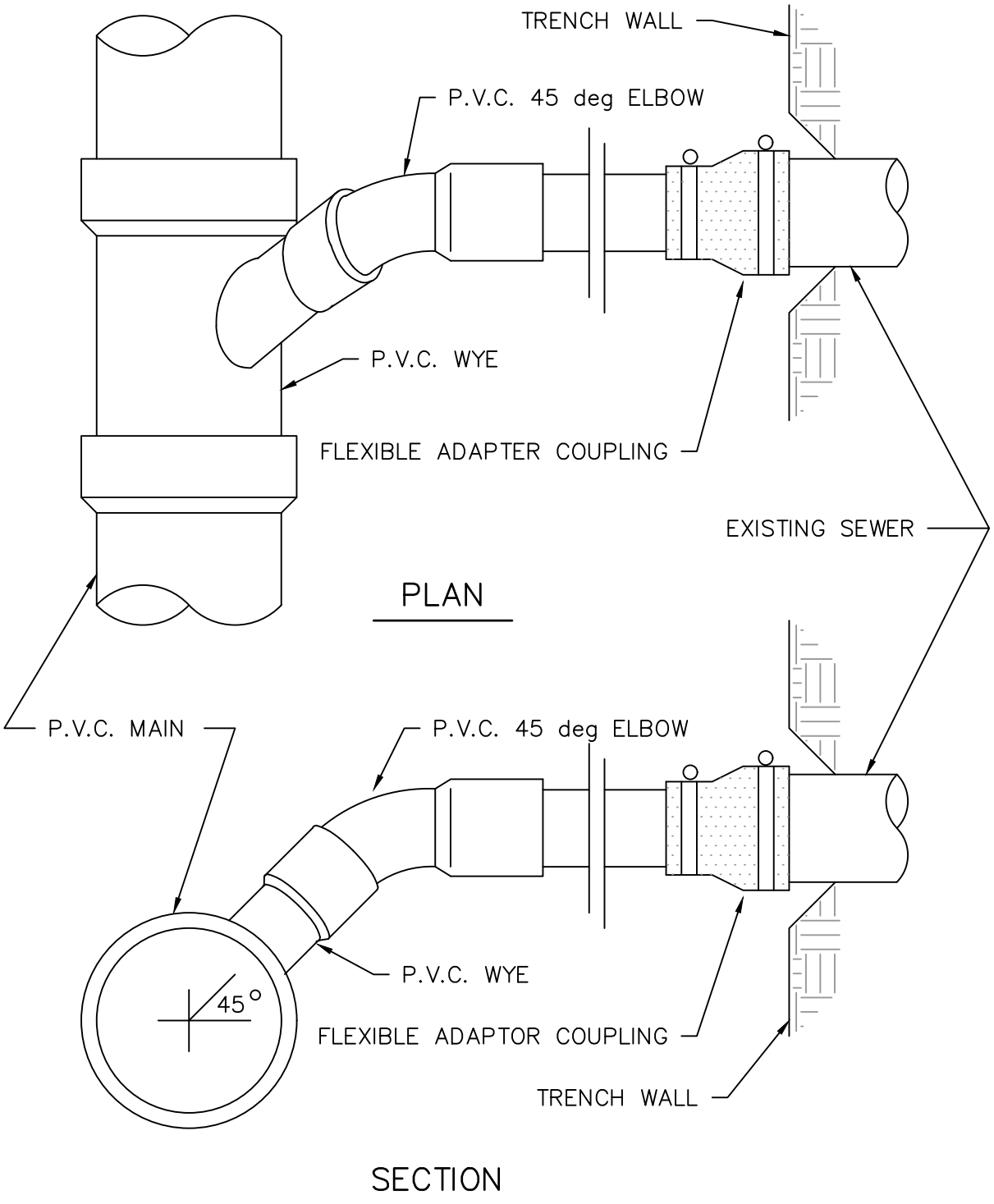
IRRIGATION DETAIL DRAWING

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	REVISED: SEPT 2019	5 – 51



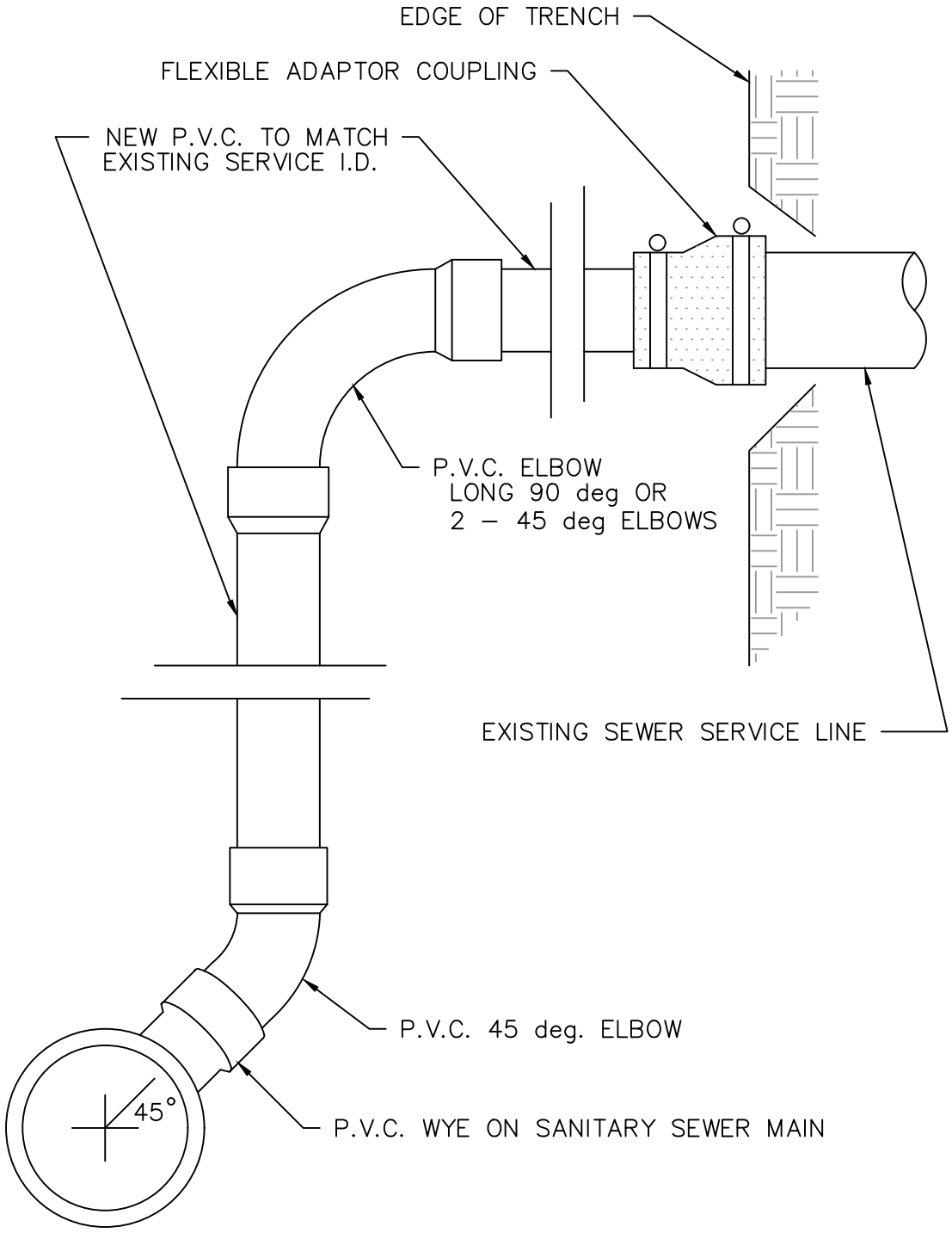
SEWER REPAIR COUPLING – PVC TO CONCRETE, CLAY OR IRON

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DECEMBER 1987 REVISED	5 – 52



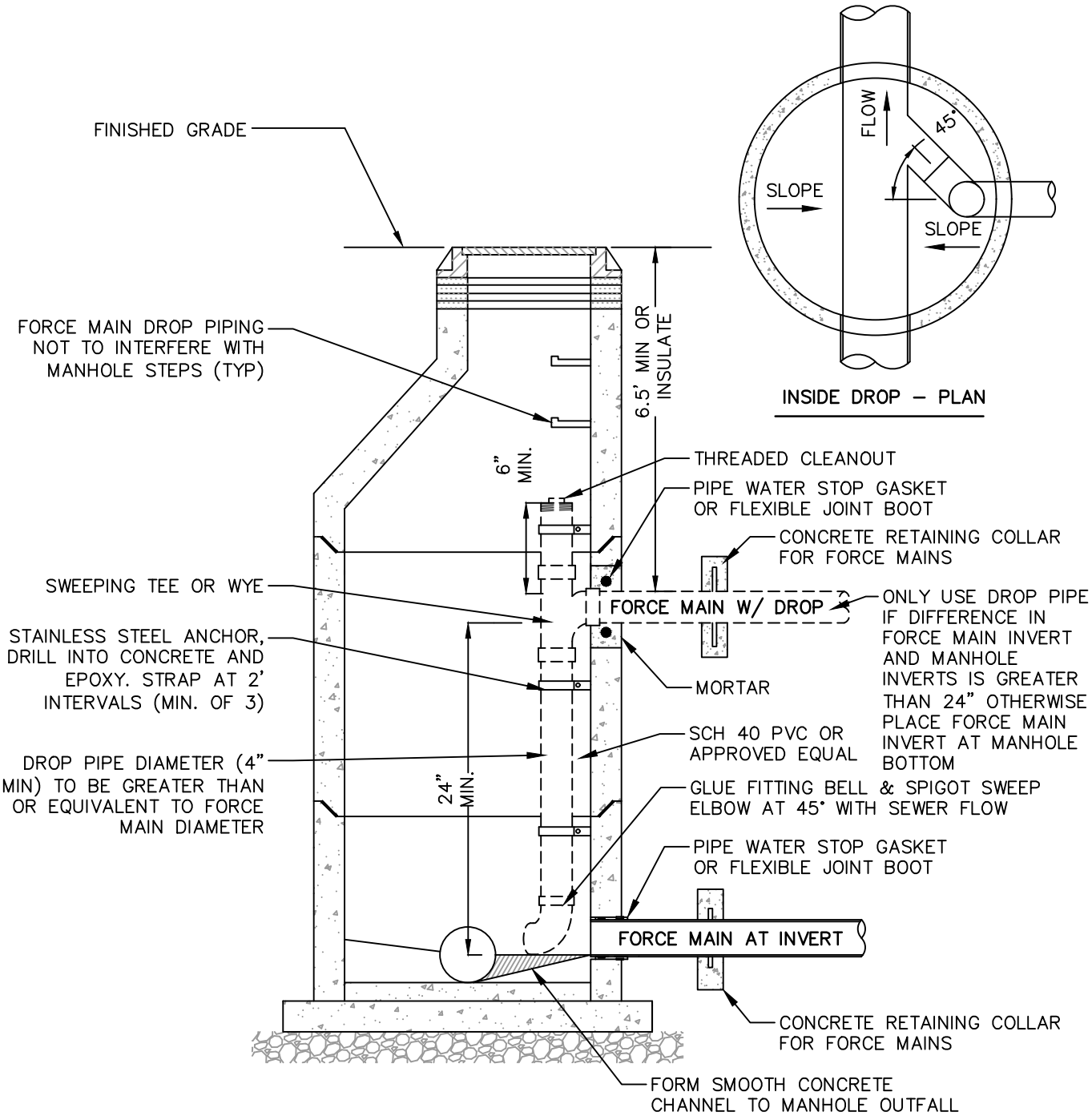
PVC LATERAL TO EXISTING SEWER SERVICE LINE

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DECEMBER 1987 REVISED	5 – 53



PVC RISER LATERAL WITH RISER TO EXISTING SERVICE LINE

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DECEMBER 1987 REVISED	5 – 54

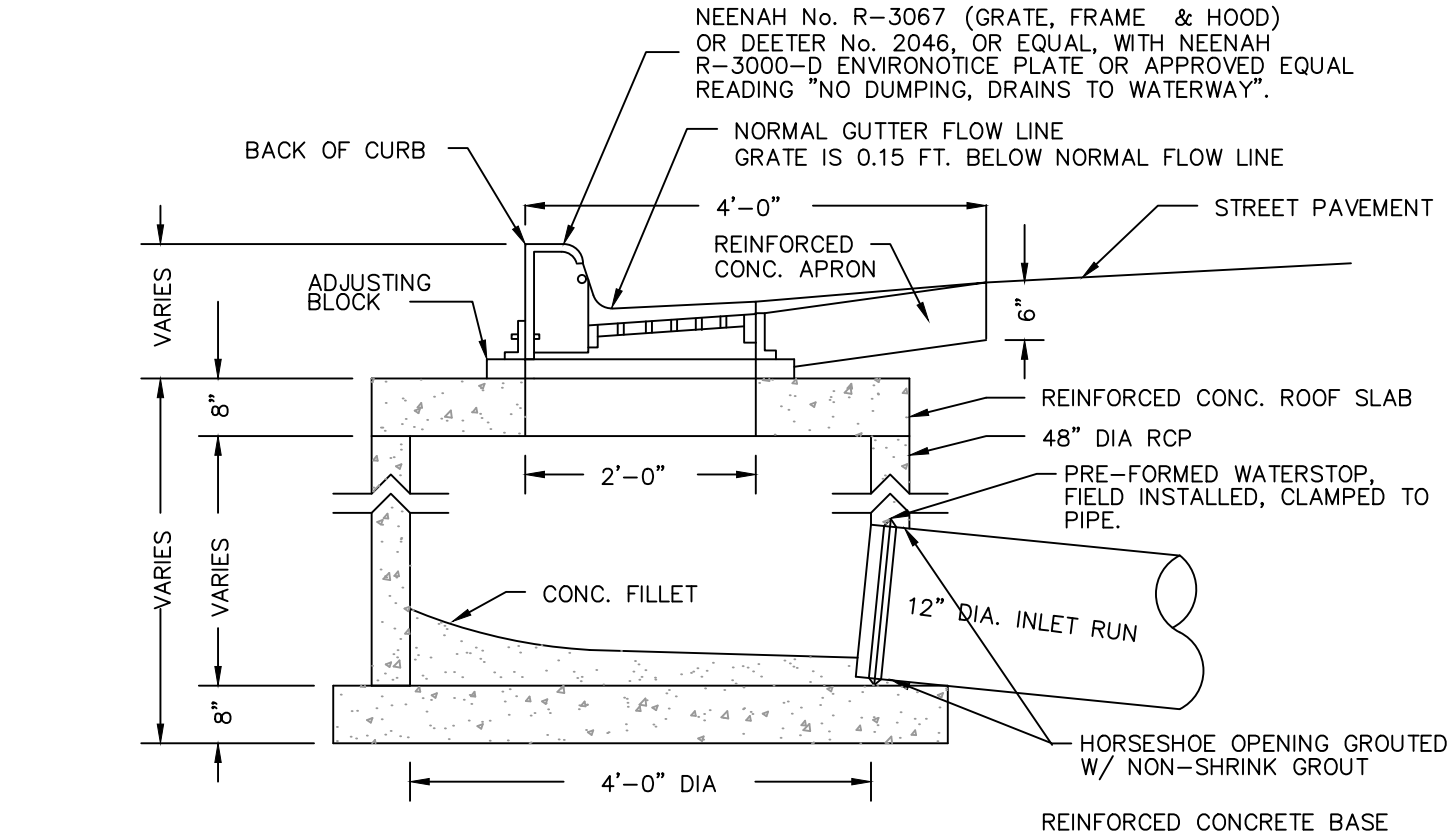


NOTES:

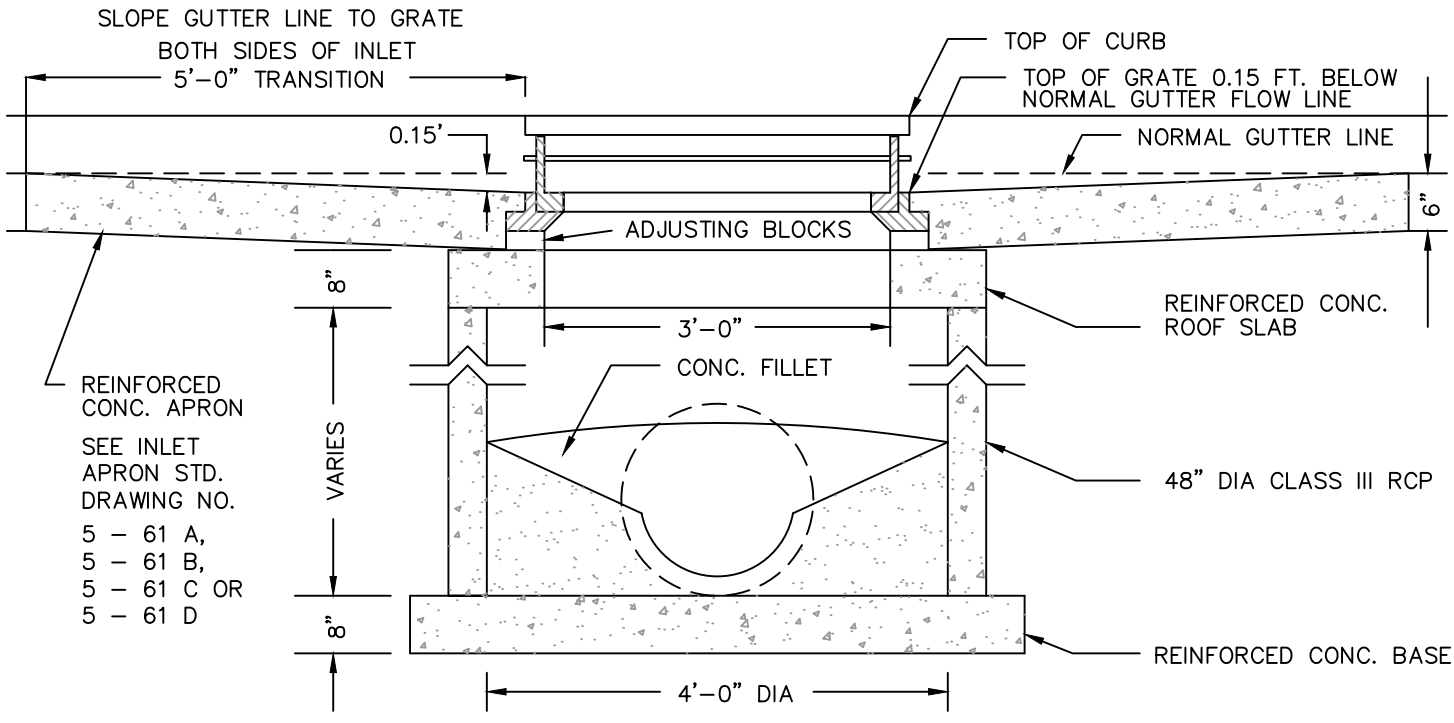
1. THIS STANDARD DETAIL SHOULD BE REVIEWED AND ADJUSTED ON A PROJECT BY PROJECT BASIS BY A LICENSED ENGINEER.
2. GRADUAL FORCE MAIN DROPS WITH PROPER AIR RELIEF OUTSIDE OF THE MANHOLE SHOULD ALSO BE CONSIDERED IF THE DESIGN WARRANTS.
3. TEST FORCE MAIN PUMPS TO ENSURE DROP PIPING IS ADEQUATELY THRUST RESTRAINED AND THAT AIR LOCK DOES NOT OCCUR IN DROP PIPING

FORCE MAIN DISCHARGE

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	OCTOBER 2021	5 – 55



SECTION A – A

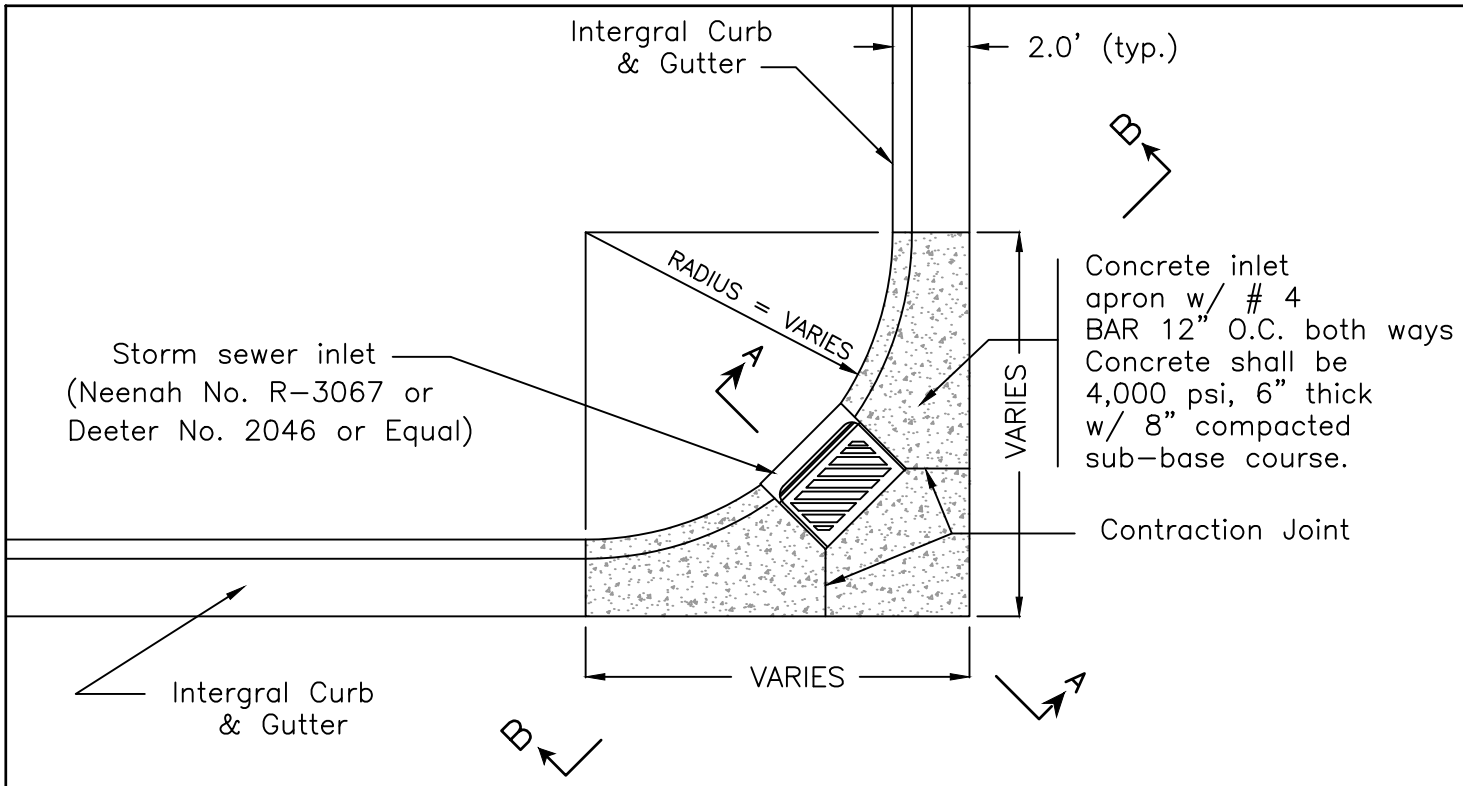


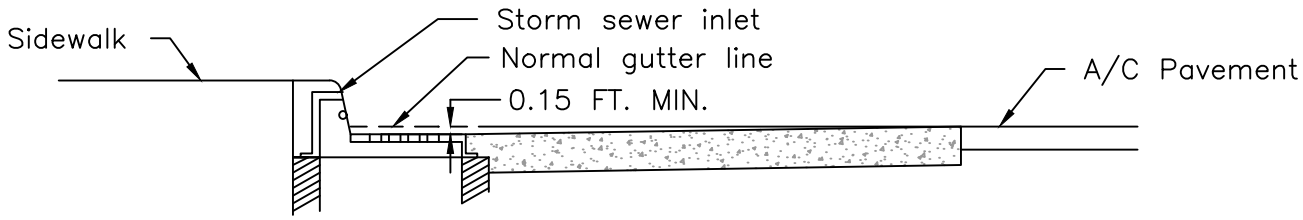
SECTION B – B

NOT TO SCALE

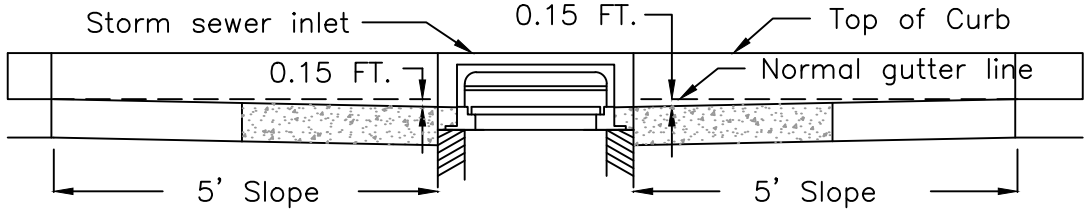
TYPE I STORM SEWER STANDARD INLET DETAIL

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DECEMBER 1987 REVISED: AUGUST 2014	5 – 60





SECTION A – A



SECTION B – B

Note :

1. Inner two ft.(2') of apron shall match TYPICAL BARRIER INTERGRAL CURB & GUTTER cross-section except for the additional slope to gutter depression at grate.
2. Slope outer portion of apron to match grade at pavement cut.
3. Install Neenah R-3000-D environotice plate or approved equal reading "NO DUMPING, DRAINS TO WATERWAY"

TYPE I TYPICAL CORNER INLET APRON DETAIL

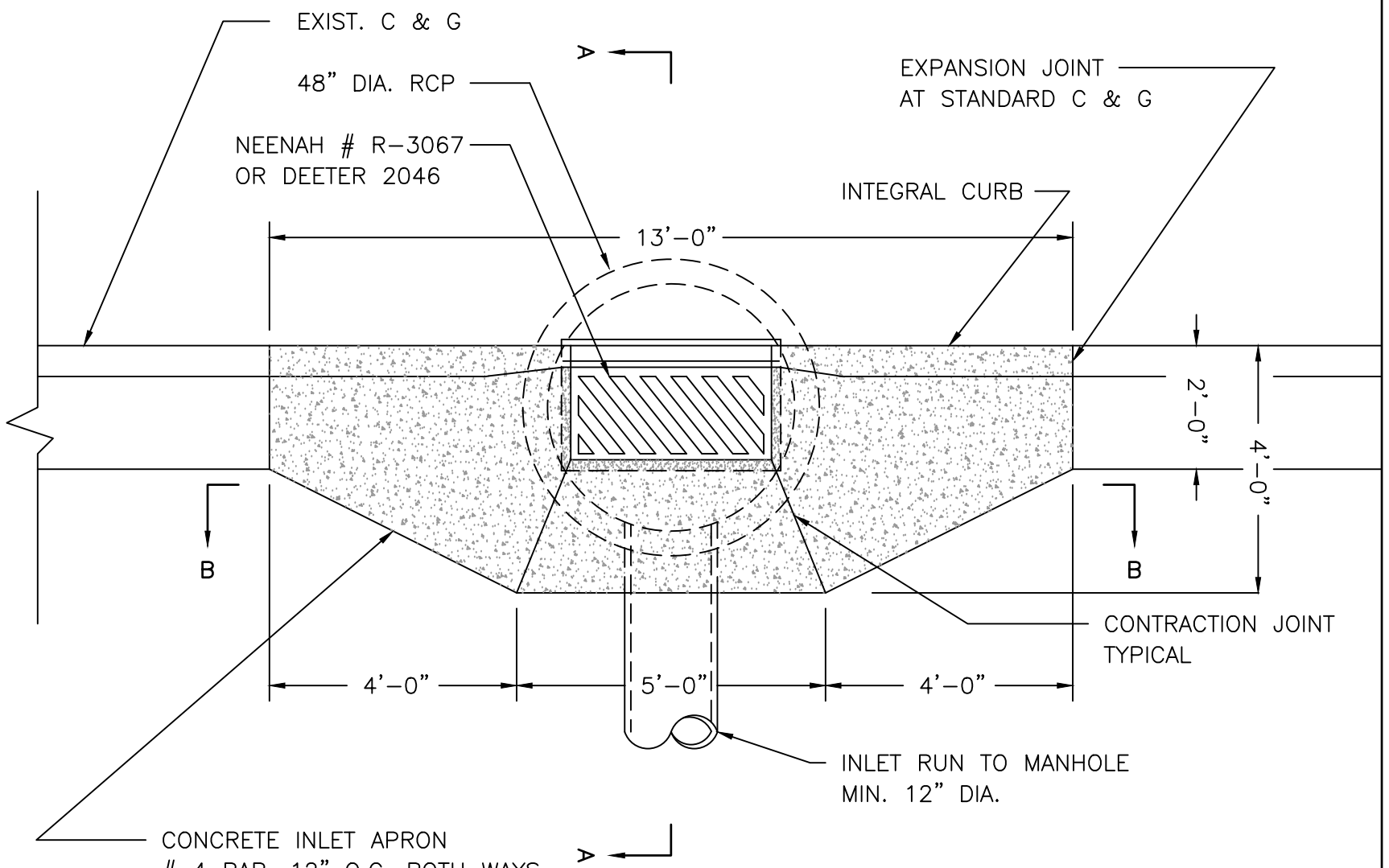
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	AUGUST 1987 REVISED: MAY 2017	5 – 61A

OFFICE OF CITY ENGINEER
GREAT FALLS, MONTANA

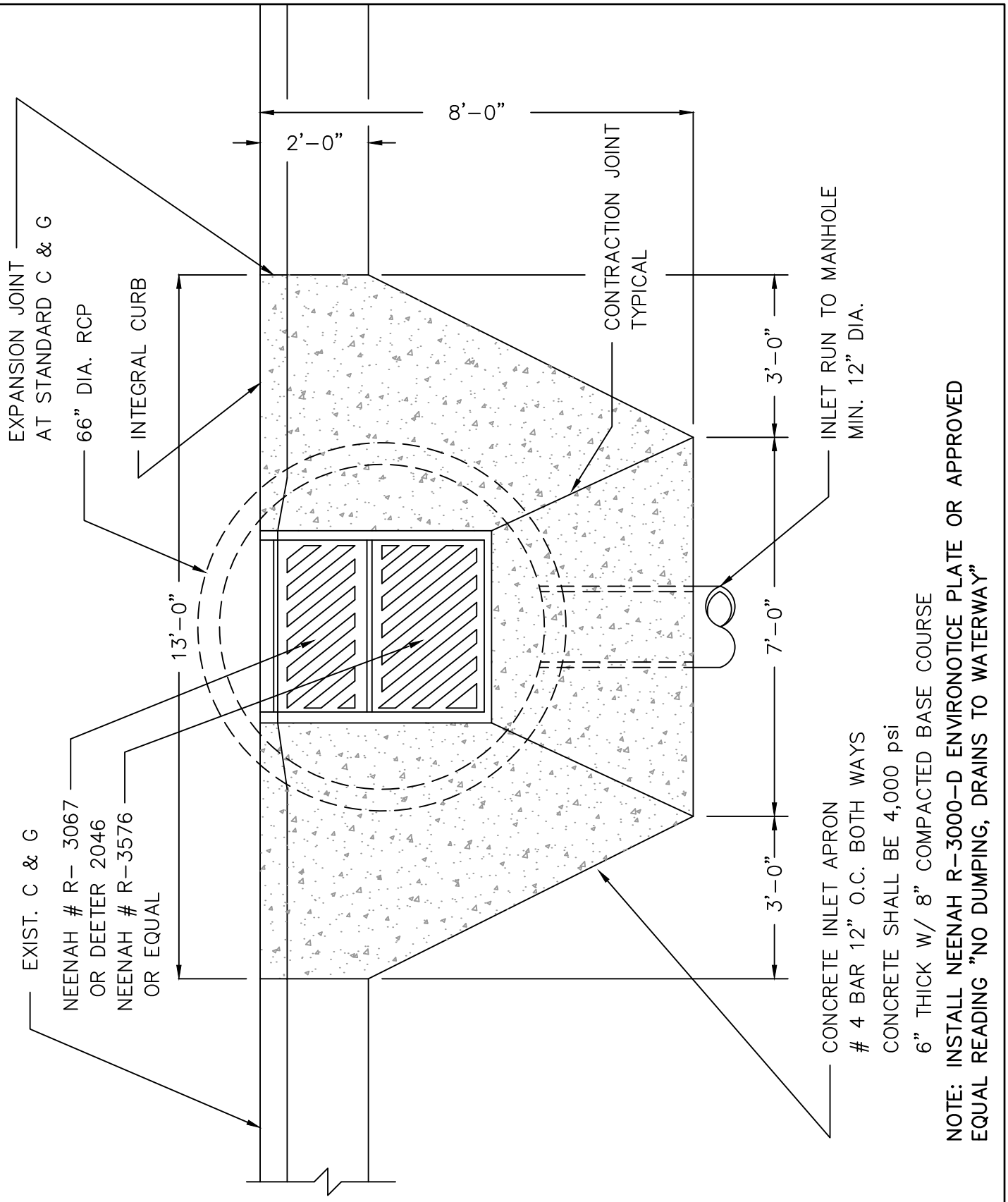
JANUARY 1992
REVISED AUGUST 2014

5 – 61B

TYPE I STORM SEWER INLET APRON DETAIL

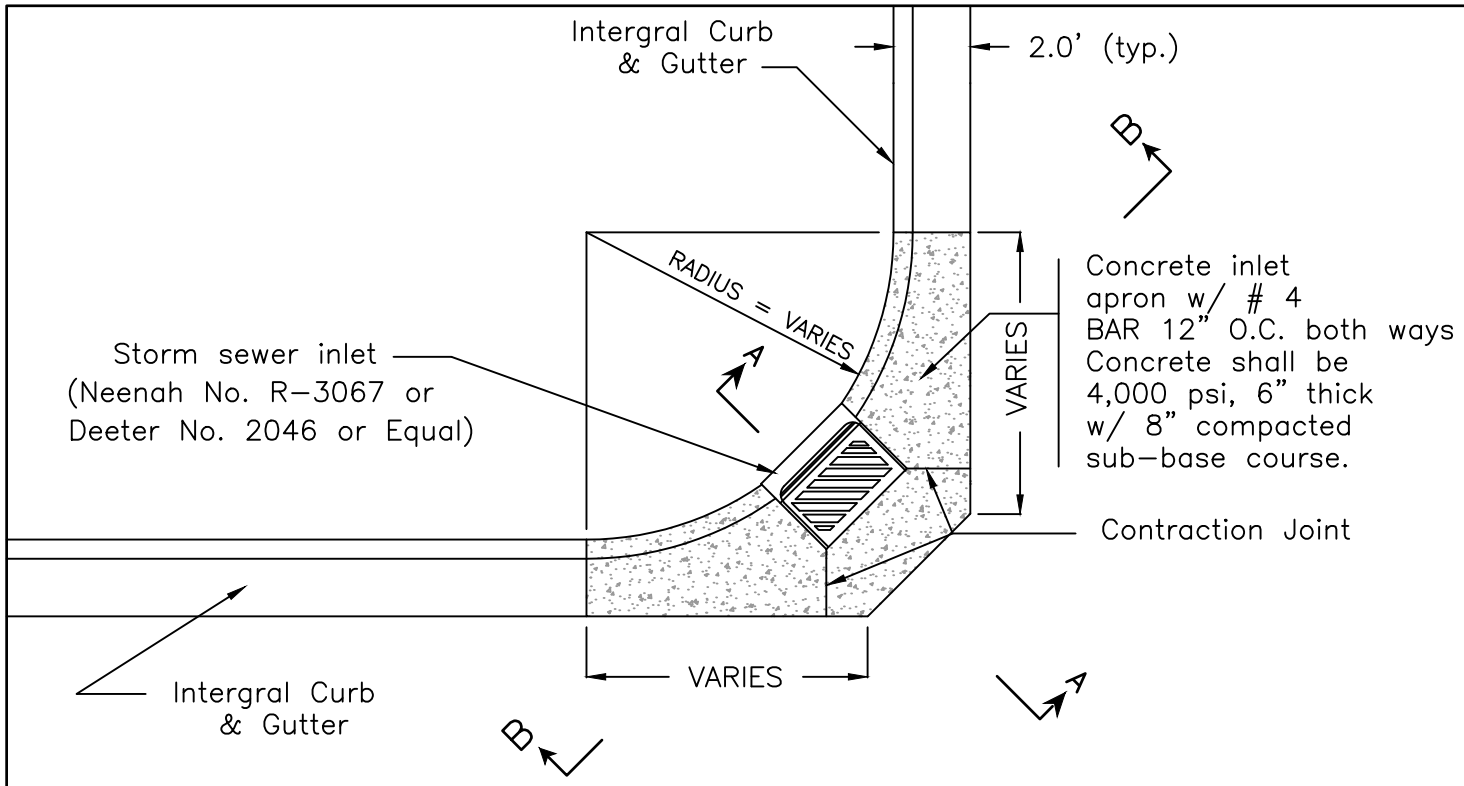


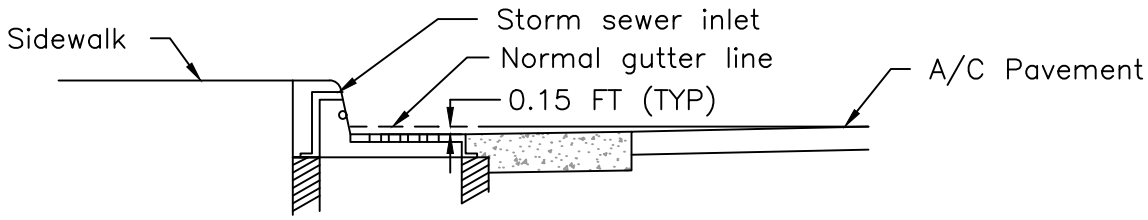
NOTE: INSTALL NEENAH R–3000–D ENVIRONOTICE PLATE OR APPROVED EQUAL READING "NO DUMPING, DRAINS TO WATERWAY"



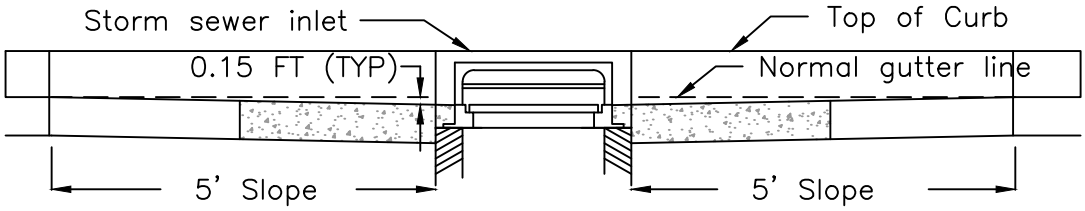
TYPE II STORM SEWER INLET APRON DETAIL

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	JANUARY 1992 REVISED AUGUST 2014	5 – 61C





SECTION A – A



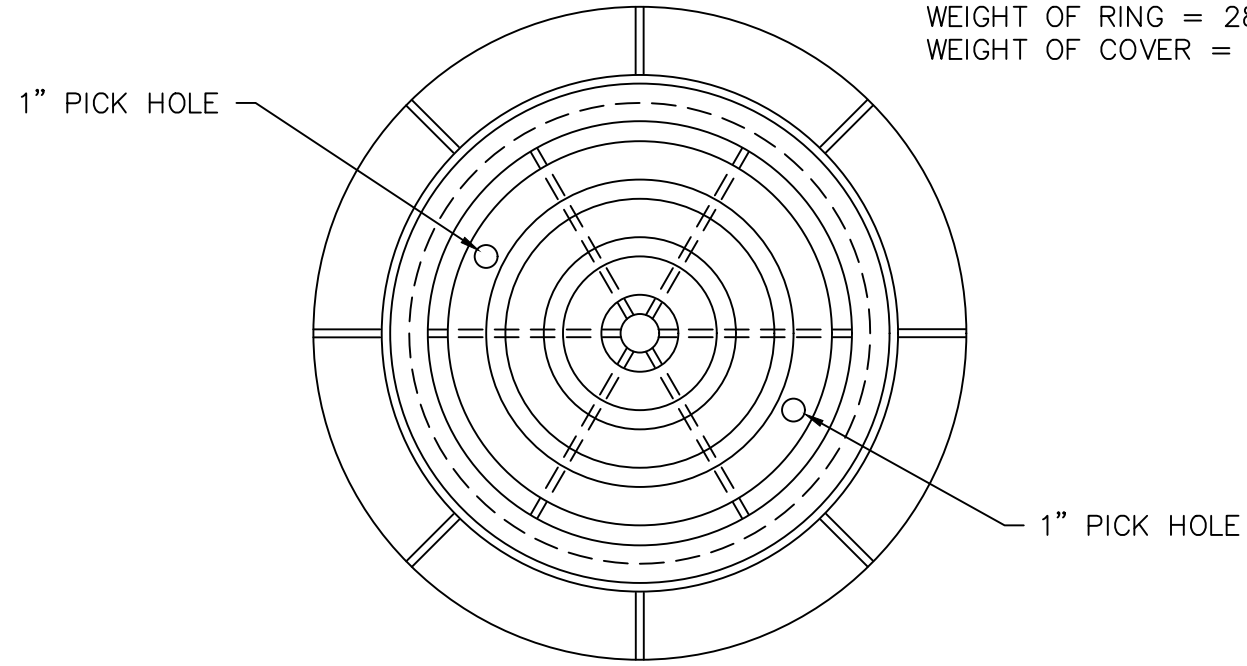
SECTION B – B

Note :

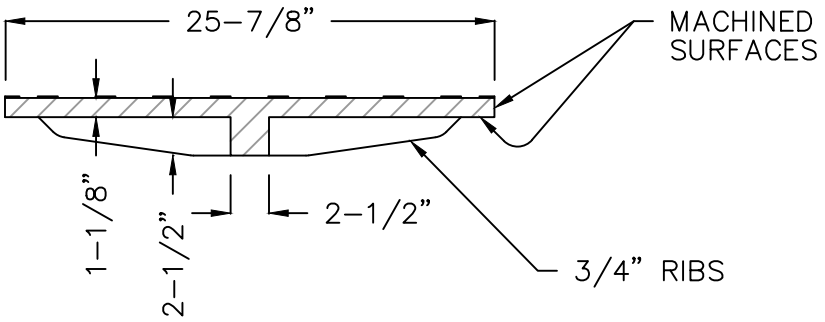
1. Inner two ft.(2') of apron shall match TYPICAL BARRIER INTERGRAL CURB & GUTTER cross-section except for the additional slope to gutter depression at grate.
2. Slope outer portion of apron to match grade at pavement cut.
3. Install Neenah R-3000-D environotice plate or approved equal reading "NO DUMPING, DRAINS TO WATERWAY".

TYPE I TYPICAL CORNER INLET APRON DETAIL

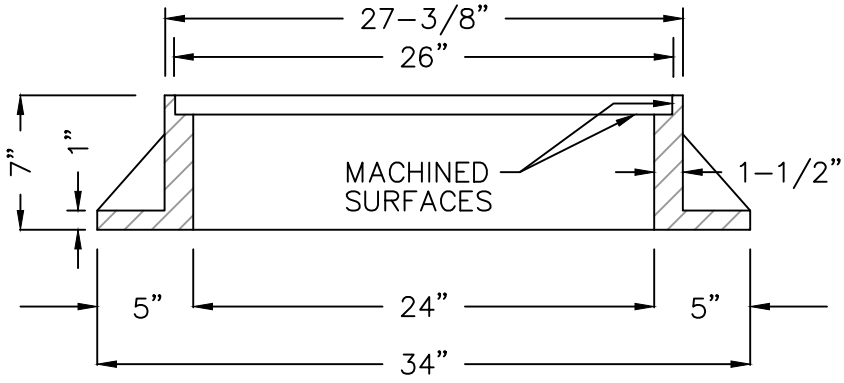
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	AUGUST 1987 REVISED: AUGUST 2014	5 – 61D



MANHOLE RING & COVER PLAN



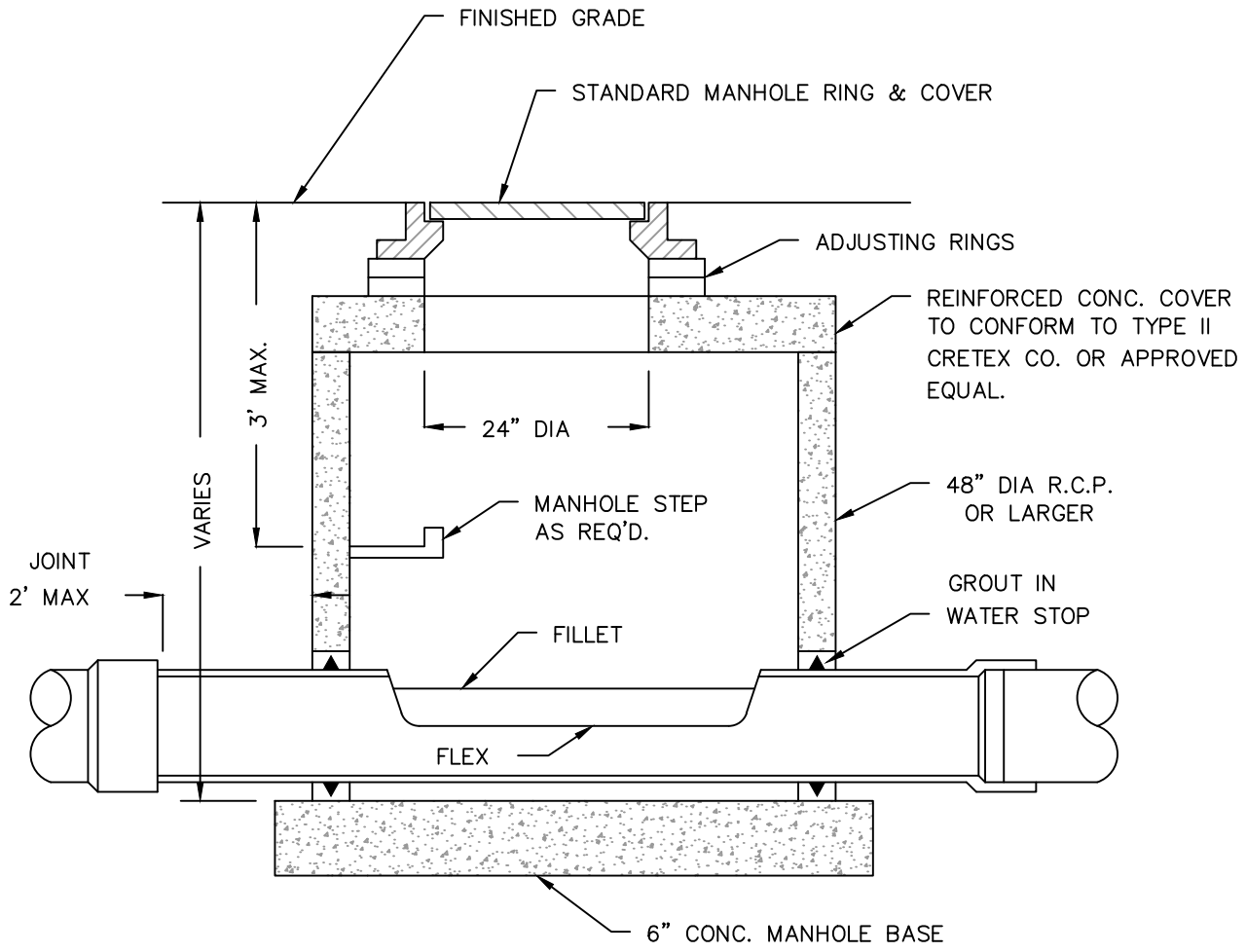
MANHOLE COVER SECTION



MANHOLE RING (FRAME) SECTION

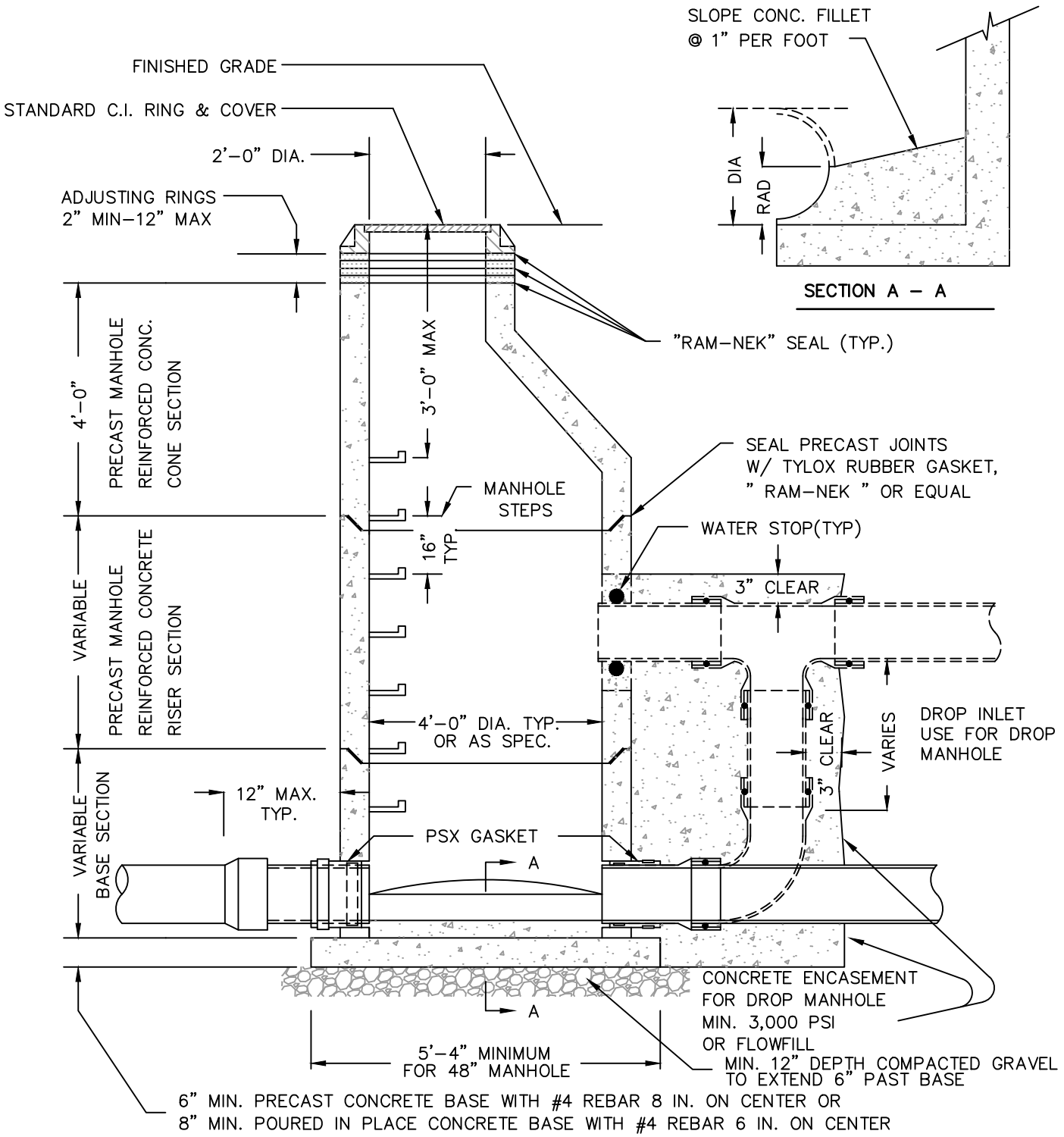
SANITARY SEWER MANHOLE RING & COVER

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DECEMBER 1987 REVISED	5 – 63



SHORT SEWER MANHOLE

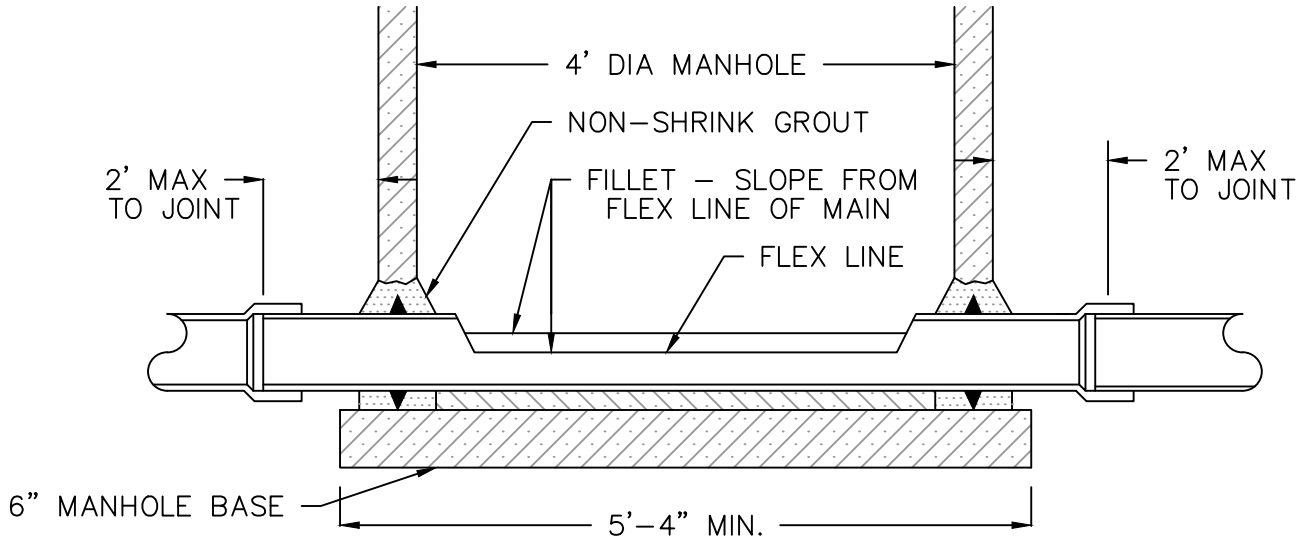
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DECEMBER 1987 REVISED	5 – 64

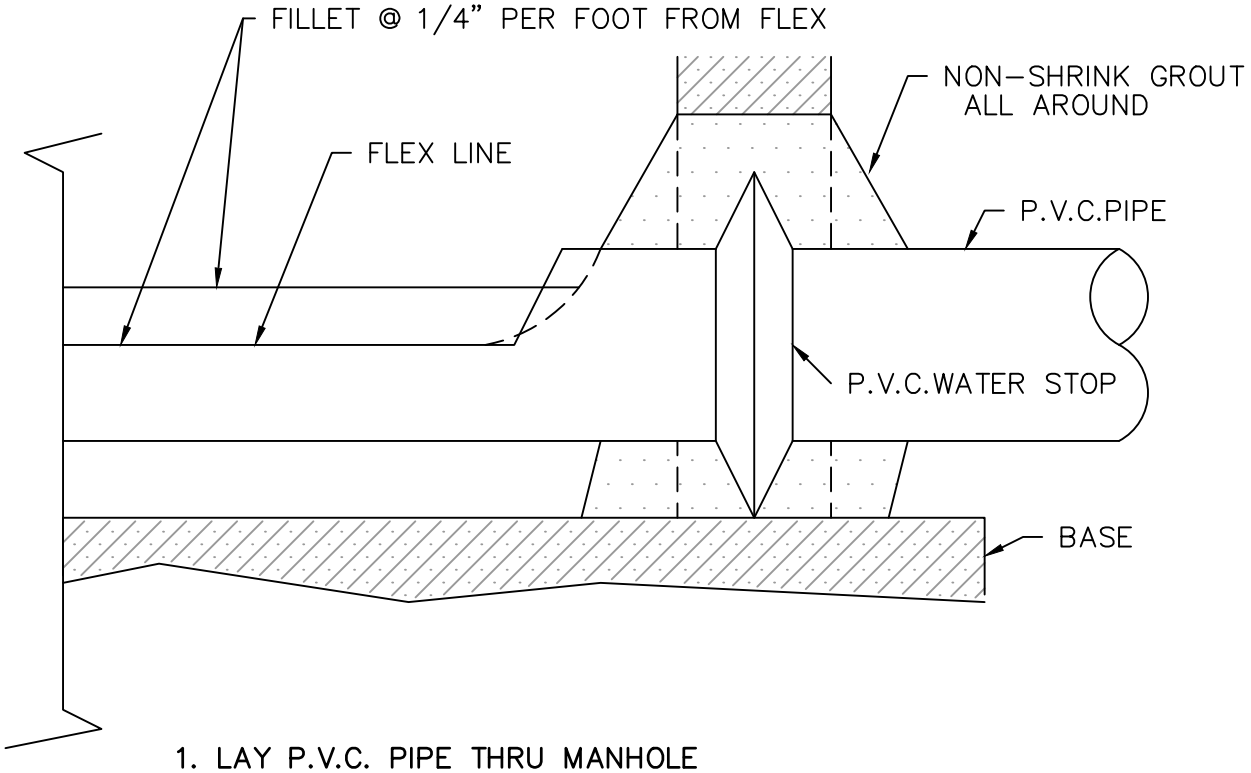


NOTE : ALL JOINTS BETWEEN MANHOLE SECTIONS, ADJUSTING RINGS, MANHOLE RING AND TOP SECTION, AND AROUND SEWER PIPE INTO MANHOLE SHALL BE WATERTIGHT.
FOR CONNECTION TO NEW MANHOLES USE PSX OR EQUIVALENT GASKET AT ALL PIPE PENETRATIONS.
FOR CONNECTIONS TO EXISTING MANHOLES USE WATERSTOP.
MANHOLE CONSTRUCTION TO ADHERE TO ASTM C-478.

STANDARD SANITARY SEWER MANHOLE (AND DROP INLET MH)

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DEC 1987, AUG 1993 REVISED MAY 2010	5 - 65





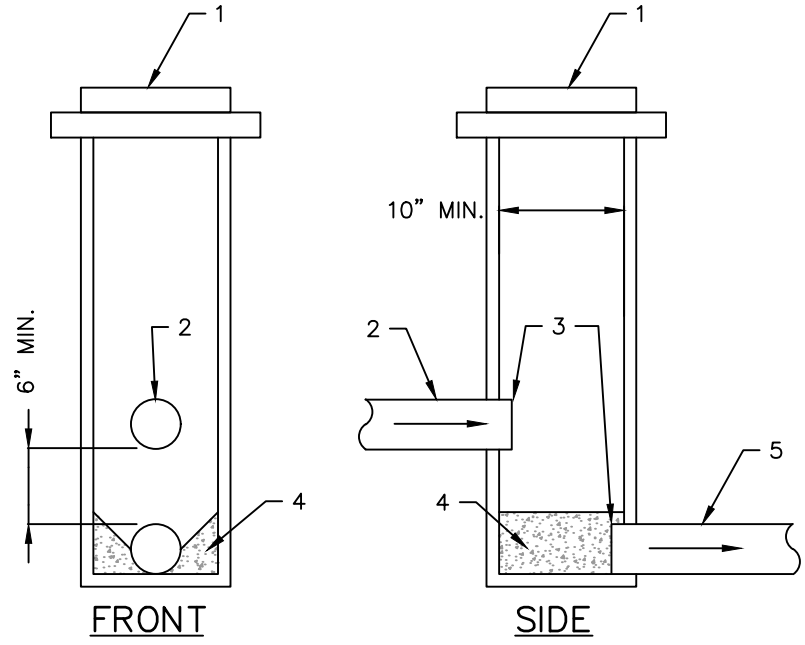
1. LAY P.V.C. PIPE THRU MANHOLE
2. REMOVE UPPER 1/2 OF PIPE IN MANHOLE, CLEAN CUT EDGES.
3. SHAPE FILLET IN MANHOLE @ SLOPE OF 1/4" PER FOOT FROM PIPE FLEX TO MANHOLE PERIMITER.

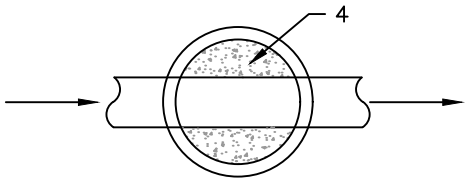
MANHOLE CONNECTION - P.V.C. MAIN

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DECEMBER 1987 REVISED	5 - 69

SAMPLE PORTS

1. ALL INTERCEPTORS ARE TO BE INSTALLED WITH A SAMPLING PORT THAT RECEIVES FLOW FROM THE INTERCEPTOR'S EFFLUENT.
2. TEE PIPING ON THE INTERCEPTOR'S INTERIOR WILL NOT SUFFICE AS A SAMPLE PORT.
3. SAMPLE PORTS MUST BE LOCATED IN AREAS PROTECTED FORM VEHICLE TRAFFIC.
4. SAMPLE PORTS ARE TO BE CLEANED AND INSPECTED DURING ROUTINE INTERCEPTOR PUMPING.
5. SAMPLE PORTS WILL HAVE A MINIMUM 10" DIAMETER ACCESS COVER.
6. SAMPLE PORTS WILL HAVE A MINIMUM 6" DROP BETWEEN INLET AND DISCHARGE PIPING.
7. SAMPLE PORTS MUST DRAIN COMPLETELY AND NOT HOLD WATER. BOTTOM TO BE GROUTED AND SLOPED
8. INLET PIPE PENETRATION MUST EXTEND 1" PAST THE INSIDE WALL OF THE SAMPLE PORT. PENETRATIONS ARE TO BE SEALED TO PREVENT LEAKS.

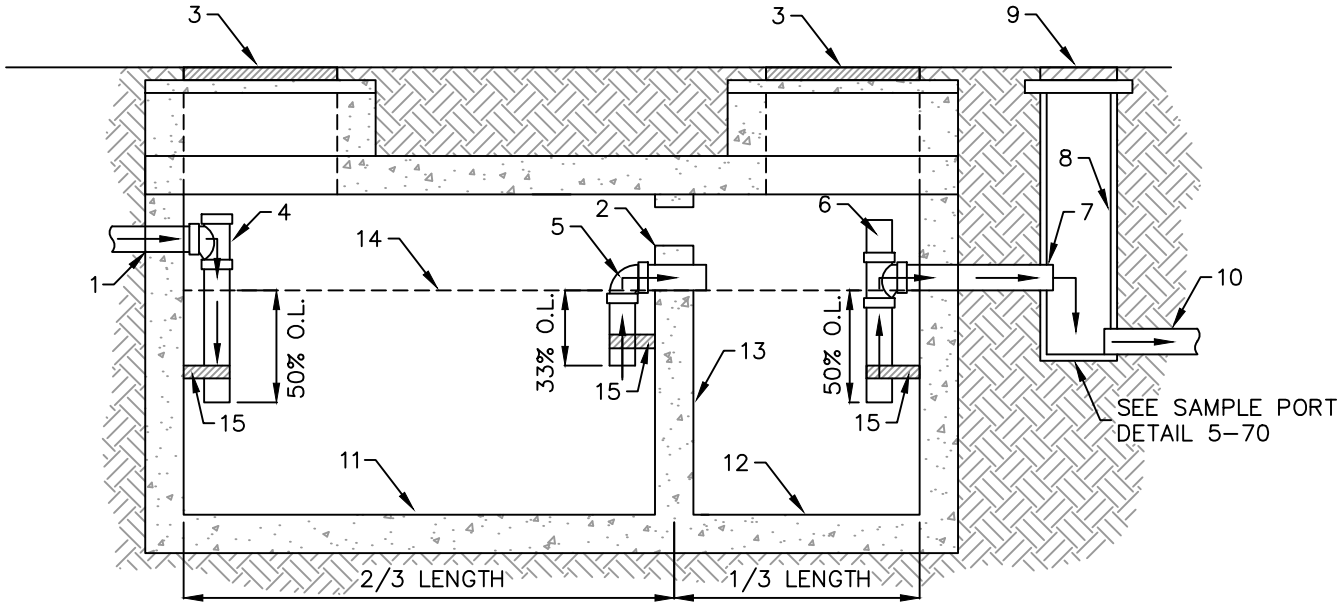




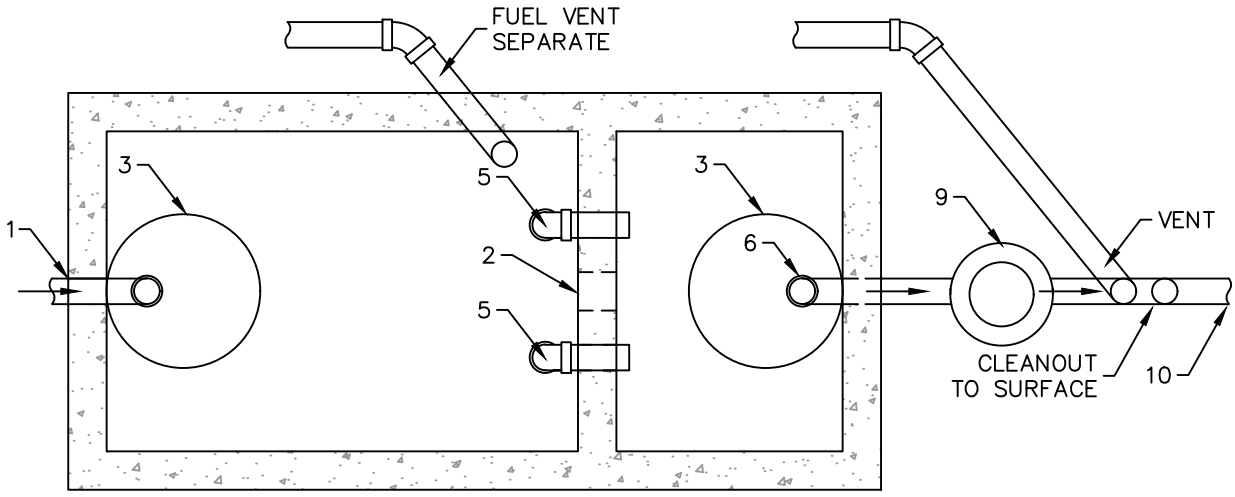
NOTES:
1. SAMPLE PORT RING AND LID
2. GREASE INTERCEPTOR DISCHARGE LINE
3. PIPE PENETRATION (EXTEND 1" PAST THE INSIDE WALL OF THE SAMPLE PORT – MUST BE SEALED TO PREVENT LEAKS. IF USING PVC, A SADDLE MUST BE USED)
4. GROUT (SLOPED TO WASTEWATER CHANNEL – THE SAMPLE PORT MUST DRAIN COMPLETELY AND NOT HOLD WATER)
5. SAMPLE PORT DISCHARGE LINE TO CITY'S SANITARY SEWER

SAMPLE PORT

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DEC 2019	5 – 70



SECTION VIEW



PLAN VIEW

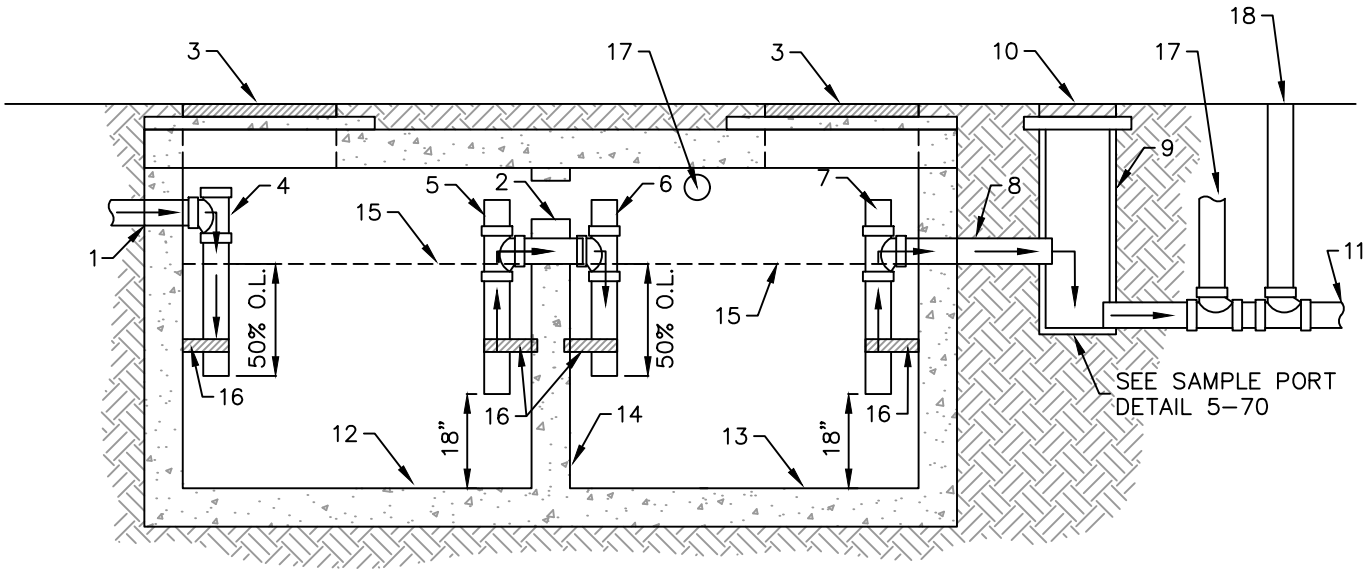
NOTES:

1. INFLUENT LINE
2. 6" DIAMETER VENT SLEEVE
3. MINIMUM 24" OPENING, BOLTED LID WITH GASKET
4. PRIMARY CHAMBER INLET PIPING (MUST EXTEND TO 50% OF THE OPERATING LEVEL)
5. PRIMARY CHAMBER OUTLET PIPING (MUST EXTEND TO 33% OF THE OPERATING LEVEL)
6. SECONDARY CHAMBER OUTLET PIPING (MUST EXTEND TO 50% OF THE OPERATING LEVEL)
7. SAND & OIL INTERCEPTOR DISCHARGE LINE
8. SAMPLE PORT (MINIMUM 10" DIAMETER, PROVIDE A 6" VERTICAL DROP – SEE 5-70)
9. SAMPLE PORT RING AND LID
10. SAMPLE PORT DISCHARGE LINE TO CITY'S SANITARY SEWER
11. PRIMARY CHAMBER (2/3 TOTAL VOLUME). CHAMBER SHALL BE VENTED SEPARATELY
12. SECONDARY CHAMBER (1/3 TOTAL VOLUME)
13. BAFFLE
14. OPERATING LEVEL
15. PIPE SUPPORT

FOR MORE INFORMATION, CONTACT THE INDUSTRIAL PRETREATMENT COORDINATOR'S OFFICE AT 406-727-8390

TYPICAL EXTERIOR SAND & OIL INTERCEPTOR

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DEC 2019	5 – 71



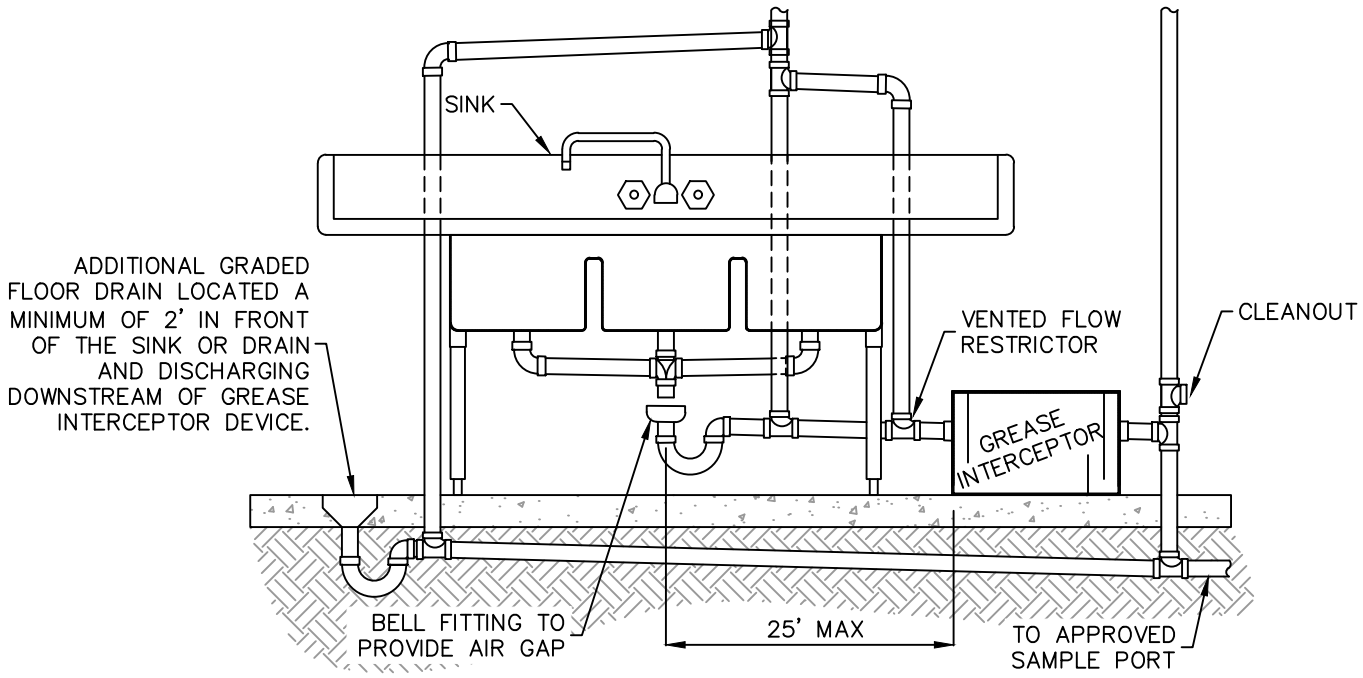
NOTES:

1. INFLUENT LINE
2. 6" DIAMETER VENT SLEEVE
3. MINIMUM 24" OPENING WITH RING AND LID, OR VENTED AND BOLTED CASKETED LID IN AREAS OF HIGH TRAFFIC
4. PRIMARY CHAMBER INLET PIPING (MUST EXTEND TO 50% OF THE OPERATING LEVEL)
5. PRIMARY CHAMBER OUTLET PIPING (MUST EXTEND TO 18" FROM BOTTOM OF CHAMBER)
6. SECONDARY CHAMBER INLET PIPING (MUST EXTEND TO 50% OF THE OPERATING LEVEL)
7. SECONDARY CHAMBER OUTLET PIPING (MUST EXTEND TO 18" FROM BOTTOM OF CHAMBER)
8. GREASE INTERCEPTOR DISCHARGE LINE
9. SAMPLE PORT
10. SAMPLE PORT RING AND LID
11. SAMPLE PORT DISCHARGE LINE TO CITY'S SANITARY SEWER
12. PRIMARY CHAMBER (2/3 TOTAL VOLUME)
13. SECONDARY CHAMBER (1/3 TOTAL VOLUME)
14. BAFFLE
15. GREASE INTERCEPTOR OPERATING LEVEL
16. PIPE SUPPORT
17. VENT
18. CLEANOUT

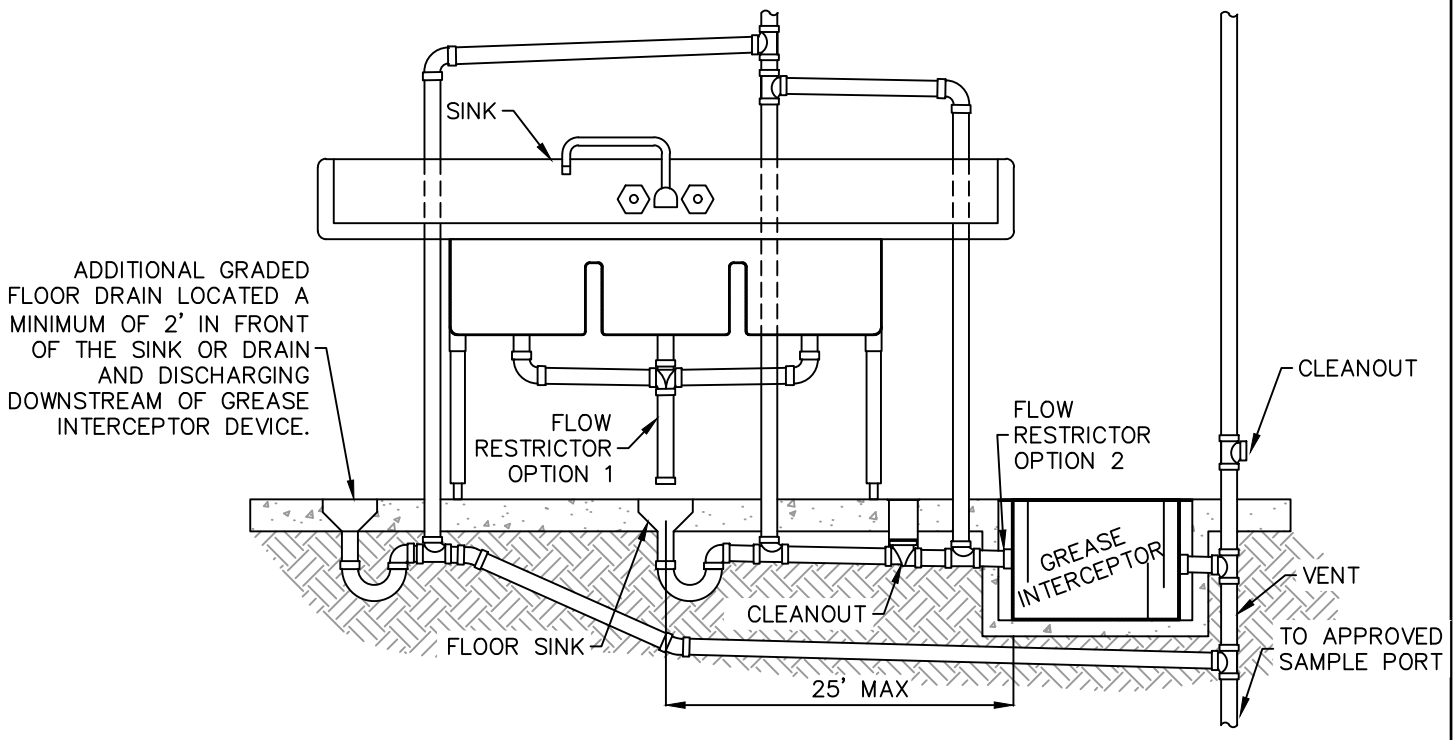
FOR MORE INFORMATION, CONTACT THE INDUSTRIAL PRETREATMENT COORDINATOR'S OFFICE AT 406-727-8390

TYPICAL EXTERIOR GREASE INTERCEPTOR

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DEC 2019	5 – 75



INTERIOR ABOVE GRADE GREASE INTERCEPTOR

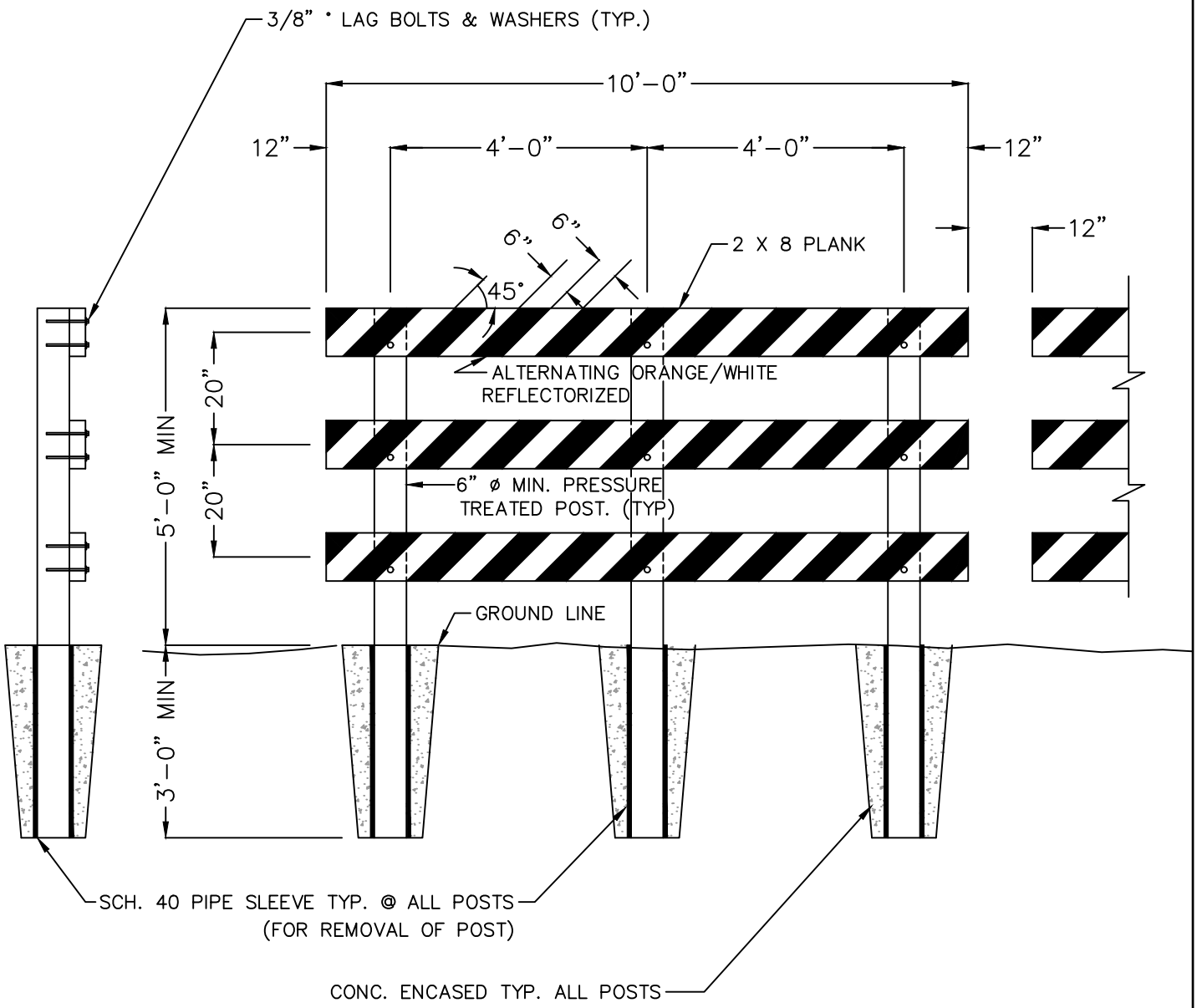


INTERIOR BELOW GRADE GREASE INTERCEPTOR

FOR MORE INFORMATION, CONTACT THE INDUSTRIAL PRETREATMENT COORDINATOR'S OFFICE AT 406-727-8390

TYPICAL INTERIOR GREASE INTERCEPTORS

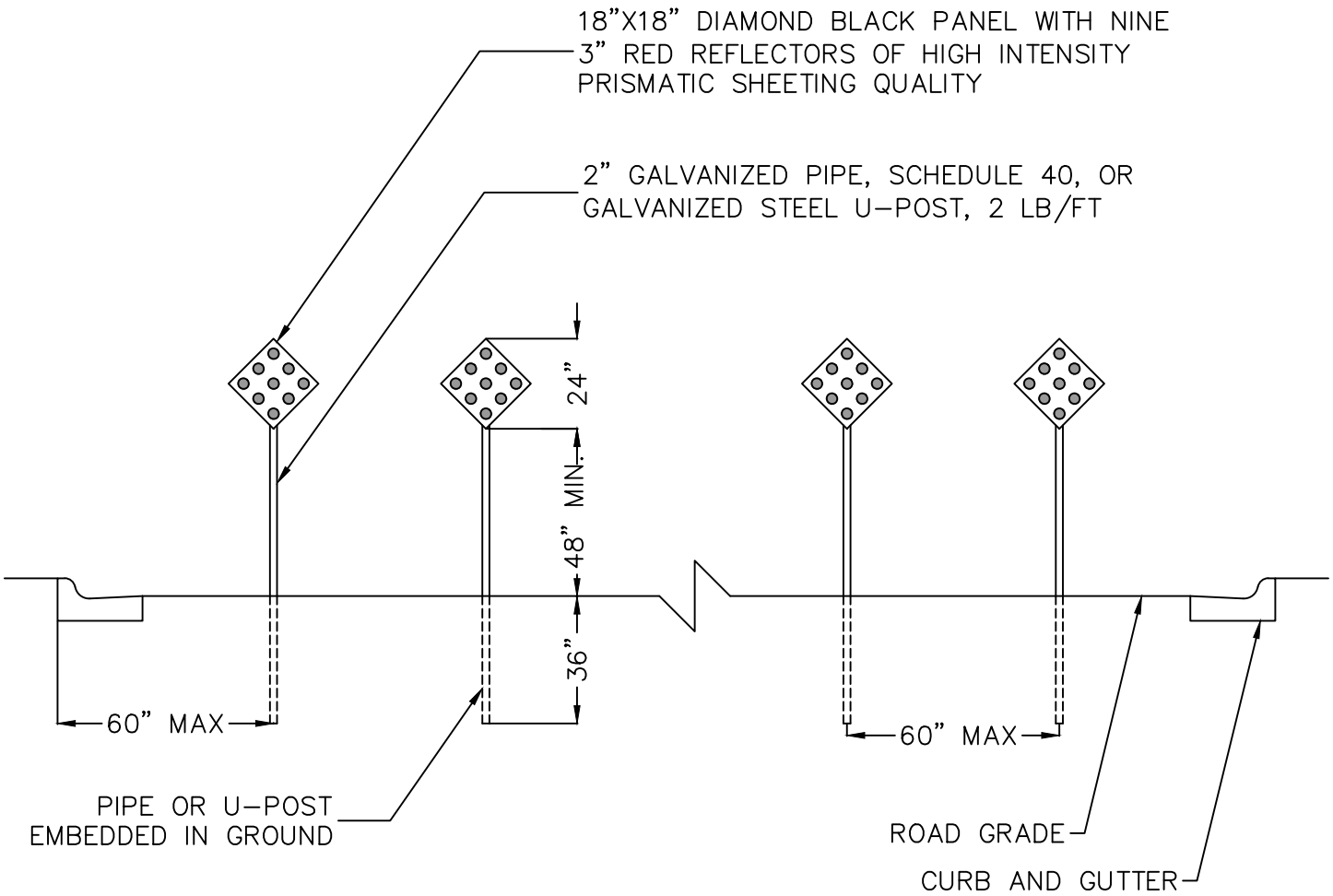
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	DEC 2019	5 – 76

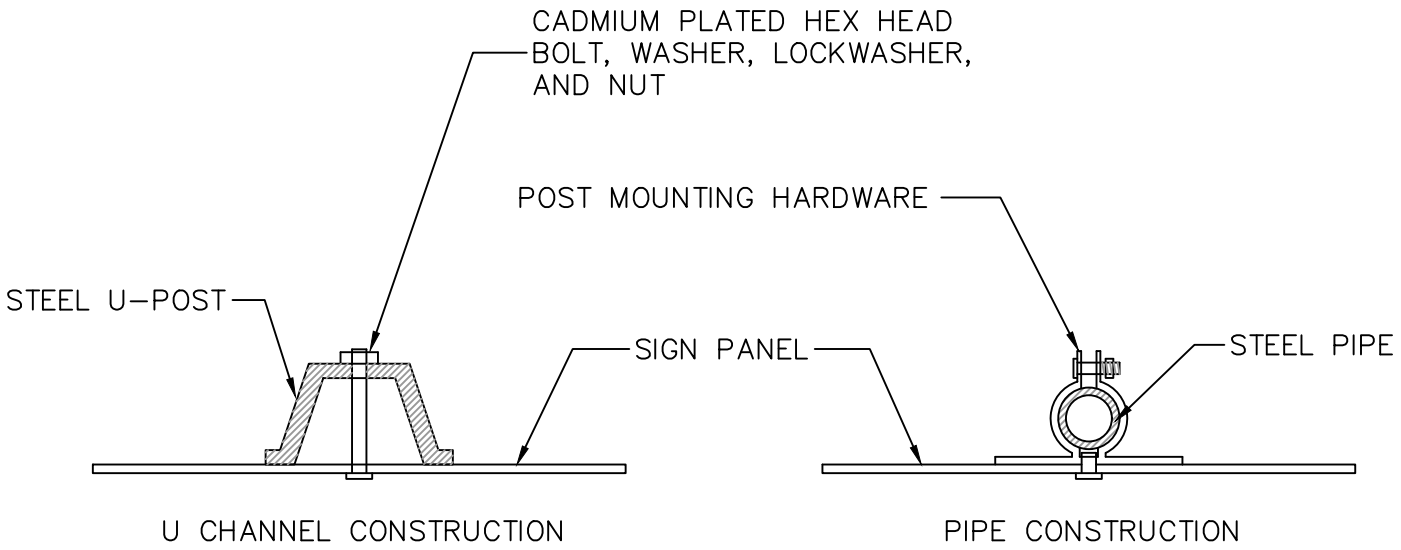


1. STRIPES SHALL SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN.
2. USE 3/8" • LAG BOLTS AND WASHERS. (6 EA PER BOARD)
3. ALL BARRICADES SHALL BE PAINTED WITH TWO COATS OF WHITE PAINT IN ACCORDANCE WITH SECTION M-280.02, (4) AND (8) OF THE STANDARD SPECIFICATION MANUAL, STATE OF MONTANA – DEPARTMENT OF HIGHWAYS.
4. ALL BARRICADES SHALL BE REFLECTORIZED WITH SHEETING MOUNTED ON A SHEET ALUMINUM BACKING AT LEAST 0.019" THICK. THIS REFLECTIVE ALUMINUM SHEETING SHALL BE SECURED WITH ALUMINUM WOOD SCREWS AND SHEETS SHALL BE THE SAME WIDTH AS 2 X 8.

STANDARD FIXED BARRICADE

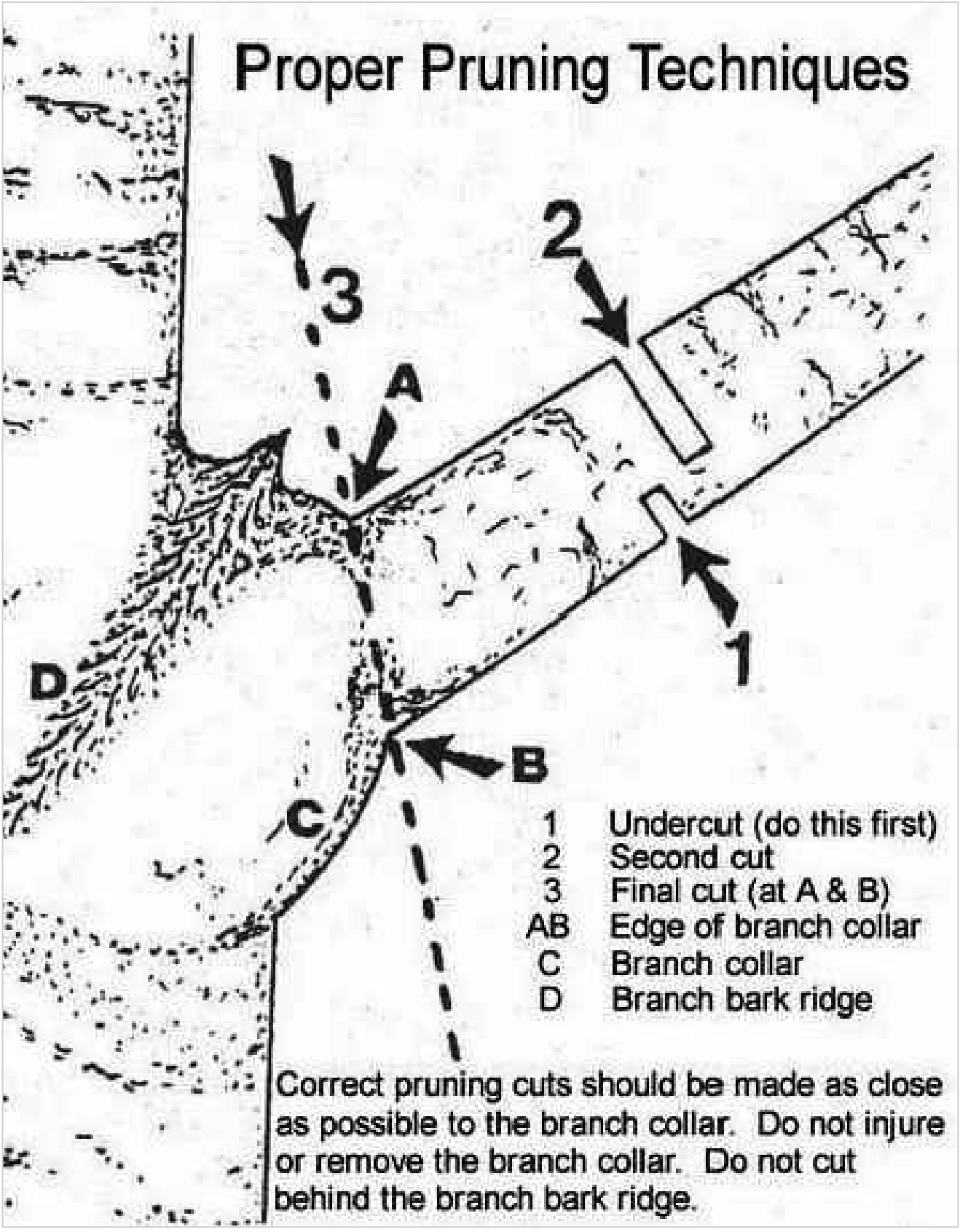
OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	MAY 1993 REVISED	5 – 80





DEAD END – WARNING SIGN DETAIL

OFFICE OF CITY ENGINEER GREAT FALLS, MONTANA	FEB 2009 REVISED	5 – 81



BRANCH TRIMMING