

STANDARD PLANS
FOR
PUBLIC WORKS CONSTRUCTION



UPDATED:
SEPTEMBER 2018

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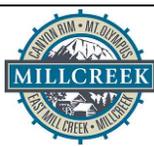
SECTION 1

ROADWAYS

- ⊙ SLCO BRASS RIVET
SV_BRVIT.DWG
- PK NAIL
SV_PKN.DWG
- PROPERTY MONUMENT
SV_PRMON.DWG
- REBAR & PLASTIC CAP
SV_REBAR.DWG
- ◆ SECTION MONUMENT
SV_SCMON.DWG
- STREET MONUMENT
SV_STMON.DWG
- ✉ MAILBOX
MAILBOX.DWG
- ⤵ UTILITY POLE
U_POLE.DWG
- ⦿ SIGNAL POLE
SIGNAL.DWG
- ☼ LIGHT POLE
LUMIN.DWG
- GUY WIRE ANCHOR
ANCHOR.DWG
- POLE ANCHOR
PANCHOR.DWG
- SINGLE POLE SIGN
SIGN1.DWG
- DOUBLE POLE SIGN
SIGN2.DWG
- ⚡ FLASHING SCHOOL SIGN
SCHOOLSN.DWG
- Ⓜ ELECTRICAL MANHOLE
MH_POWER.DWG
- Ⓜ ELECTRICAL CABINET
ELEC_CC.DWG
- ⚡ FIRE HYDRANT
E_HYD.DWG
- Ⓜ WATER METER
WM.DWG
- Ⓜ WATER MANHOLE
MH_WATER.DWG
- Ⓜ WATER VALVE
WV.DWG
- Ⓜ WELL
WELL.DWG
- Ⓜ GAS METER
GM.DWG
- Ⓜ GAS VALVE
GV.DWG
- Ⓜ GAS MANHOLE
MH_GAS.DWG
- Ⓜ SANITARY MANHOLE
SMH.DWG
- Ⓜ SANITARY CLEANOUT
SEWER_CO.DWG

- Ⓜ TELEPHONE MANHOLE
MH_PHONE.DWG
- Ⓜ TELEPHONE CABINET
TELE_CC.DWG
- Ⓜ STORM DRAIN CLEANOUT
DMH.DWG
- Ⓜ CLEANOUT WITH CURB INLET
6930-1.DWG
- Ⓜ CURB INLET WITH GRATE - SINGLE
6882-21A.DWG
- Ⓜ CURB INLET WITH GRATE - DOUBLE
6882-22A.DWG
- FLOW DIRECTION
DF.DWG
- Ⓜ SPRINKLER HEAD
SPRINK.DWG
- Ⓜ SPRINKLER BOX
SPRINKBX.DWG
- Ⓜ IRRIGATION CLEANOUT
MH_IRRIG.DWG
- Ⓜ IRRIGATION SERVICE
SPIGOT.DWG
- Ⓜ TREE
TREE.DWG
- Ⓜ PINE TREE
PINETREE.DWG
- Ⓜ SHRUB
SHRUB.DWG

- RIGHT OF WAY
- RL — RL — RL — PROPERTY LINE
- LOT LINE (SUBDIVISION)
- EASEMENT
- W — WATER
- SAN — SANITARY SEWER
- OH E — ELECTRICAL (OVERHEAD)
- UG E — ELECTRICAL (UNDERGROUND)
- OH T — TELEPHONE (OVERHEAD)
- UG T — TELEPHONE (UNDERGROUND)
- G — GAS
- SD — STORM DRAIN



LEGEND

STANDARD PLAN
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SHEET 1 OF 1

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

SUBGRADE: See APWA Section 32 05 10 (Backfilling Roadways) for preparation and proof rolling of roadway, curb and gutter, and sidewalk.

UNTREATED BASE COURSE: Shall be Grade 1 as per APWA Section 32 11 23 (Aggregate Base Courses). Place fill in no greater than 6 inch lifts after compaction as per APWA Section 32 05 10 (Backfilling Roadways). Compact to no less than 95% relative density based on the Modified Proctor Density as per APWA Section 31 23 26 (Compaction).

PRIME COAT: Prime coat, as directed by the engineer, on untreated base course before placing asphalt. See APWA Section 32 12 13 (Prime Coat).

TACK COAT: Grade SS-1, CSS-1, or CSS-1h emulsified asphalt shall be applied to existing asphalt concrete or portland cement concrete surfaces prior to placing asphalt concrete pavement as per APWA Section 32 12 13.13 (Tack Coat).

ASPHALT CONCRETE: Aggregate grading shall conform to Dense Grade DM-3/4 or DM-1/2 as per APWA Section 32 12 05 (Bituminous Concrete), unless specified otherwise. Dense Grade DM-1/2 shall be limited to asphalt tie-ins and driveways. Asphalt Cement shall be AC-20 as per APWA Section 32 12 03 (Asphalt Binder) unless otherwise specified and/or approved by the Millcreek Public Works Director or designated representative. Minimum allowed roadway section is 3 inches asphalt concrete on 8 inches untreated base course. Thicker sections are required for roadways with heavy truck traffic and all roadways with classification of collector or higher. Pave only when air temperature in the shade and road bed temperature are measured at 50 degrees and rising.

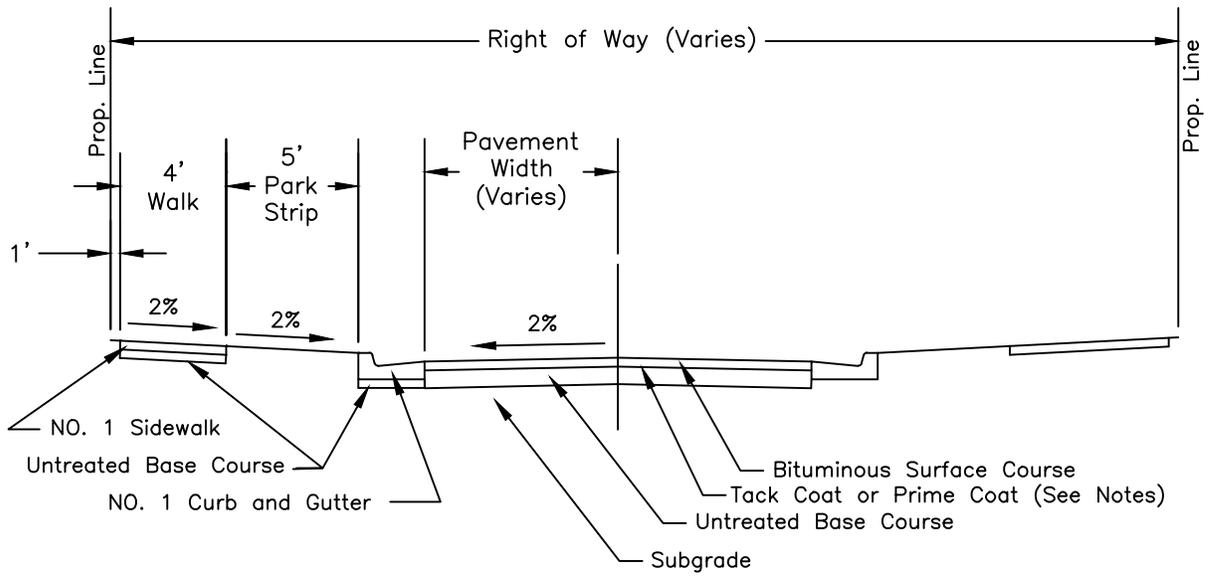


ROADWAY SECTION

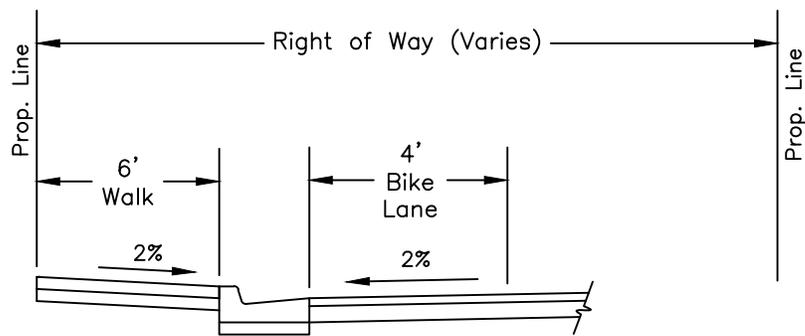
STANDARD PLAN

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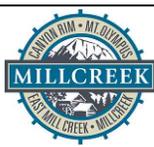
SHEET 1 OF 2



STANDARD CONFIGURATION



ROADWAY SECTION / BIKE LANE



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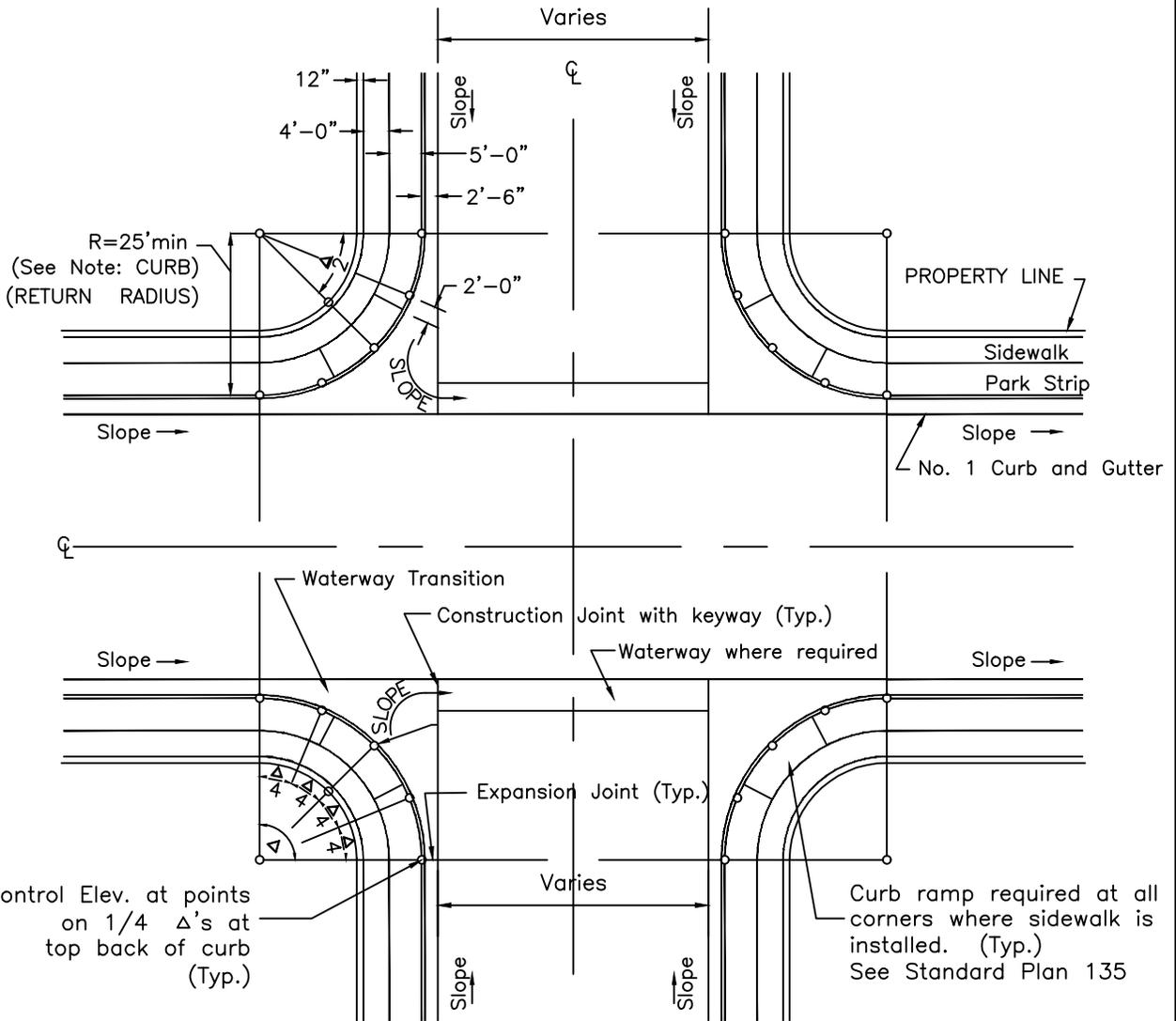
SIDEWALK WIDTH: Sidewalks placed contiguous to the curb and gutter in residential areas shall be minimum 5 feet in width. Contiguous sidewalks on streets with roadway classification of collector or above shall be a minimum of 6 feet in width.

WATERWAY DETAIL: See Standard Plan 116.

CURB RETURN RADIUS: Curb return radius at the intersection of a residential street with a higher classification roadway may be greater than 25 feet when significant truck traffic exists, or at the direction of the Millcreek Public Works Director or designated representative.

COLLECTOR AND ARTERIAL ROADWAYS: Dimensions for collector and arterial roadways can be found in the AASHTO Guidelines.





RESIDENTIAL STREET INTERSECTION

STANDARD PLAN

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SHEET 2 OF 2

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SUBGRADE: See APWA Section 32 05 10 (Backfilling Roadways) for preparation and proof rolling of roadway, curb and gutter, and sidewalk.

UNTREATED BASE COURSE: Shall be Grade 1 as per APWA Section 32 11 23 (Aggregate Base Courses). Place fill in no greater than 6 inch lifts as per APWA Section 32 05 10 (Backfilling Roadways). Compact to no less than 95% relative density based on the Modified Proctor Density as required in APWA Section 31 23 26 (Compaction).

REINFORCING STEEL: All reinforcing steel shall be grade 60 uncoated rebar as per APWA Section 03 20 00 (Concrete Reinforcing).

COVER: All steel shall have a minimum of 2" cover, except bottom of slab steel, which shall have 3" minimum cover.

CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04 (Concrete). Allowable slump shall not exceed 4".

FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement on a weight basis is 15%.

EXPANSION JOINT: Expansion joint shall be 1/2" thick preformed expansion joint filler F1-bituminous mastic as per APWA Section 32 13 73 (Concrete Paving Joint Sealants) at each interface between the curb and gutter and the waterway transition.

KEYWAY: Keyway required at construction joints, as shown.

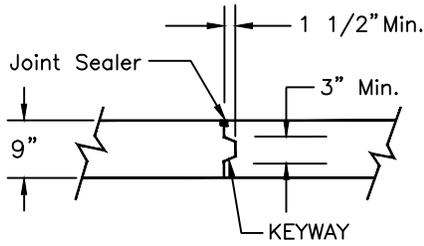


WATERWAY AND WATERWAY TRANSITION DETAIL

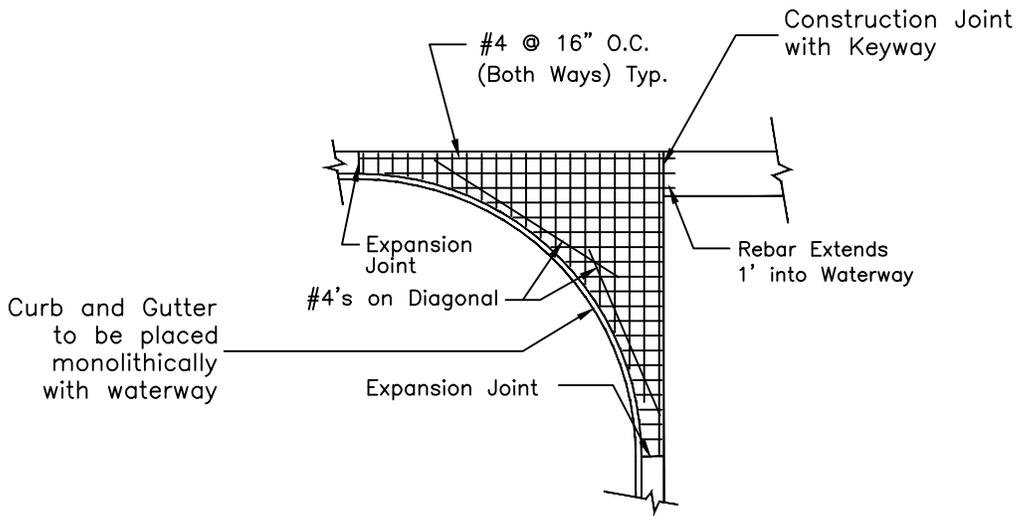
STANDARD PLAN

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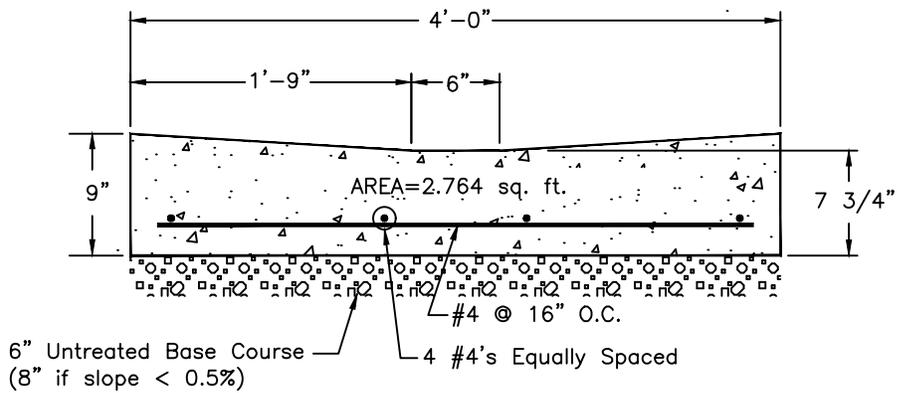
SHEET 1 OF 2



CONSTRUCTION JOINT WITH KEYWAY



WATERWAY TRANSITION



WATERWAY



WATERWAY AND WATERWAY
TRANSITION DETAIL

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NOTES:

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SUBGRADE: See APWA Section 32 05 10 (Backfilling Roadways) for preparation and proof rolling of roadway, curb and gutter, and sidewalk.

UNTREATED BASE COURSE: Shall be Grade 1 as per APWA Section 32 11 23 (Aggregate Base Courses). Place fill in no greater than 6-inch lifts before compaction as per APWA Section 32 05 10 (Backfilling Roadways). Compact to no less than 95% relative density based on the Modified Proctor Density as required in APWA Section 31 23 26 (Compaction).

CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04 (Concrete). Allowable slump shall not exceed 4".

FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement on a weight basis is 15%.

EXPANSION JOINT: Expansion joint shall be 1/2" thick preformed expansion joint filler F1-bituminous mastic as per APWA Section 32 13 73 (Concrete Paving Joint Sealants) at each interface as shown.

Sidewalk within driveway limits shall be considered incidental to flared drive approach cost.

Existing sidewalk, curb & gutter shall be removed to the nearest joint outside the drive approach section before constructing new drive approach.

DRIVEWAY APRONS WITH SIDEWALK CONTIGUOUS TO THE CURB: Sidewalk within the flared drive approach section shall maintain a minimum 4-foot width with a cross slope not to exceed 2 percent (see figure 1):

- a. The apron transition shown in Detail A of Standard Plan 125 (Sheet 2 of 2) may be used.
- b. Other approaches may be considered by submittal to the Millcreek Public Works Director for approval.

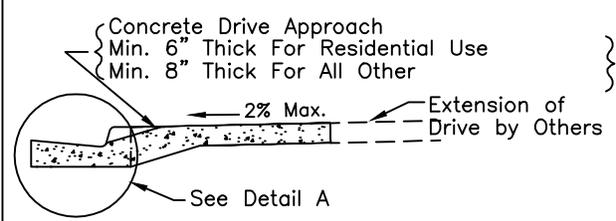
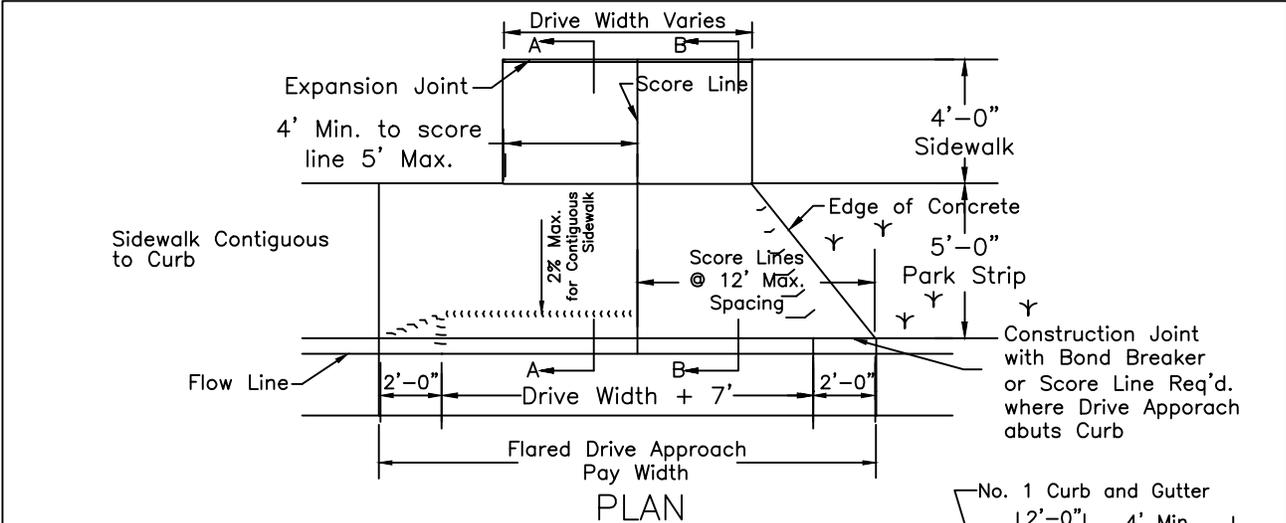


FLARED DRIVE APPROACH

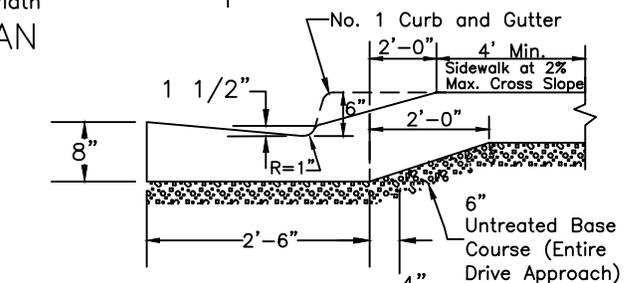
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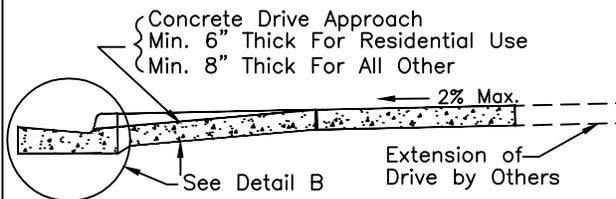
SHEET 1 OF 2



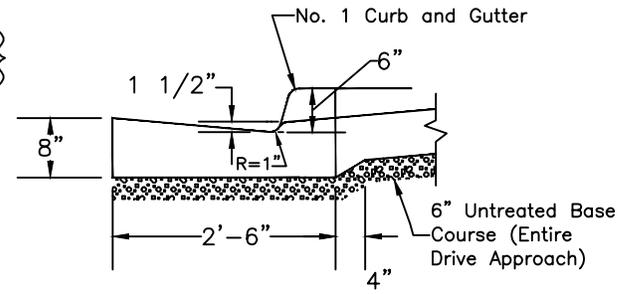
SECTION A-A



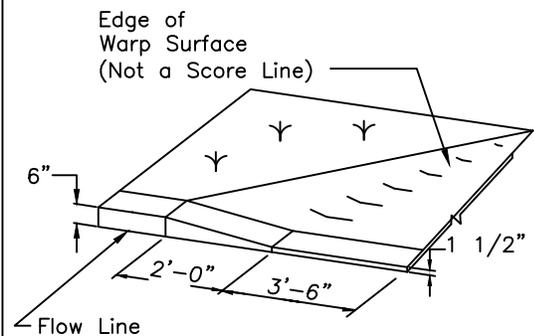
DETAIL A



SECTION B-B



DETAIL B



ISOMETRIC VIEW (With Park Strip)

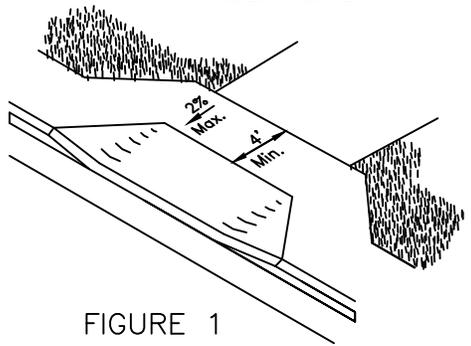


FIGURE 1



Slope Detail for Drive with Contiguous Sidewalk



Slope Detail for Drive with Park Strip



FLARED DRIVE APPROACH

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CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04 (Concrete). Allowable slump shall not exceed 4".

FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement on a weight basis is 15%.

EXPANSION JOINT: Expansion Joint shall be 1/2" (15 mm) thick preformed expansion joint filler F1-bituminous mastic as per APWA Section 32 13 73 (Concrete Paving Joint Sealants) at each interface as shown.

GENERAL:

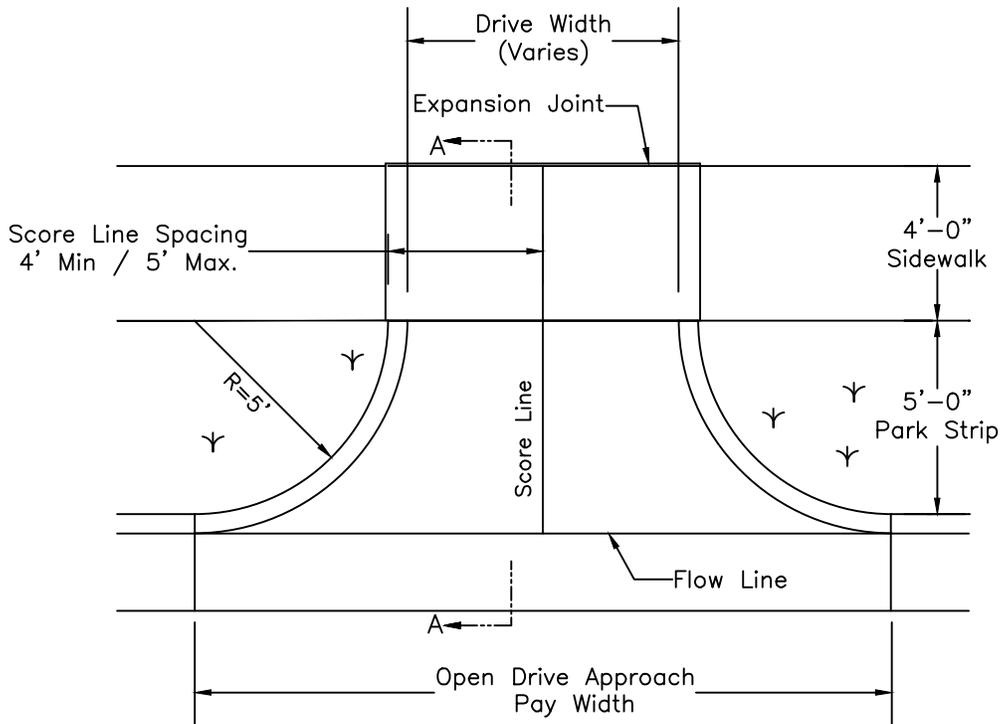
Sidewalk within driveway limits shall be considered incidental to open drive approach cost.

Existing sidewalk, curb & gutter shall be removed to the nearest joint outside the drive approach section before constructing new drive approach.

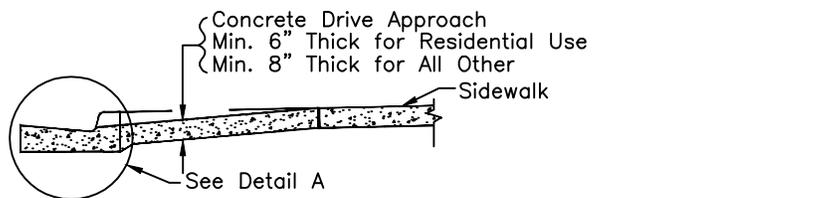


OPEN DRIVE APPROACH
(FOR REPLACEMENT ONLY)

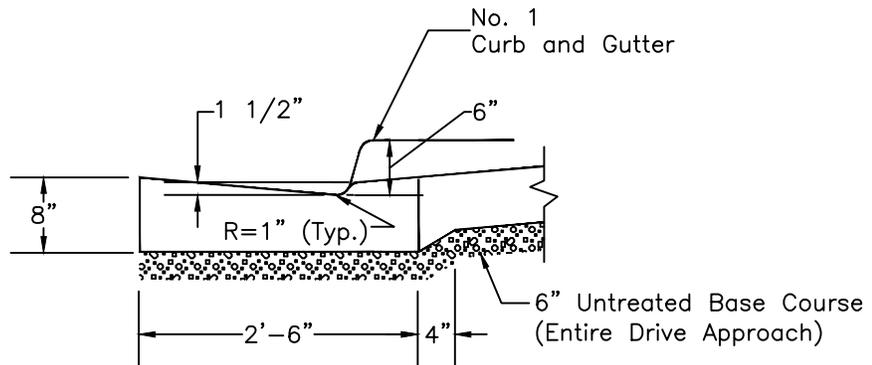
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PLAN



SECTION A-A



DETAIL A



OPEN DRIVE APPROACH
(FOR REPLACEMENT ONLY)

STANDARD PLAN
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SHEET 2 OF 2

NOTES:

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SUBGRADE: See APWA Section 32 05 10 (Backfilling Roadways) for preparation and proof rolling of roadway, curb and gutter, and sidewalk.

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CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04 (Concrete). Allowable slump shall not exceed 4".

FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement on a weight basis is 15%.

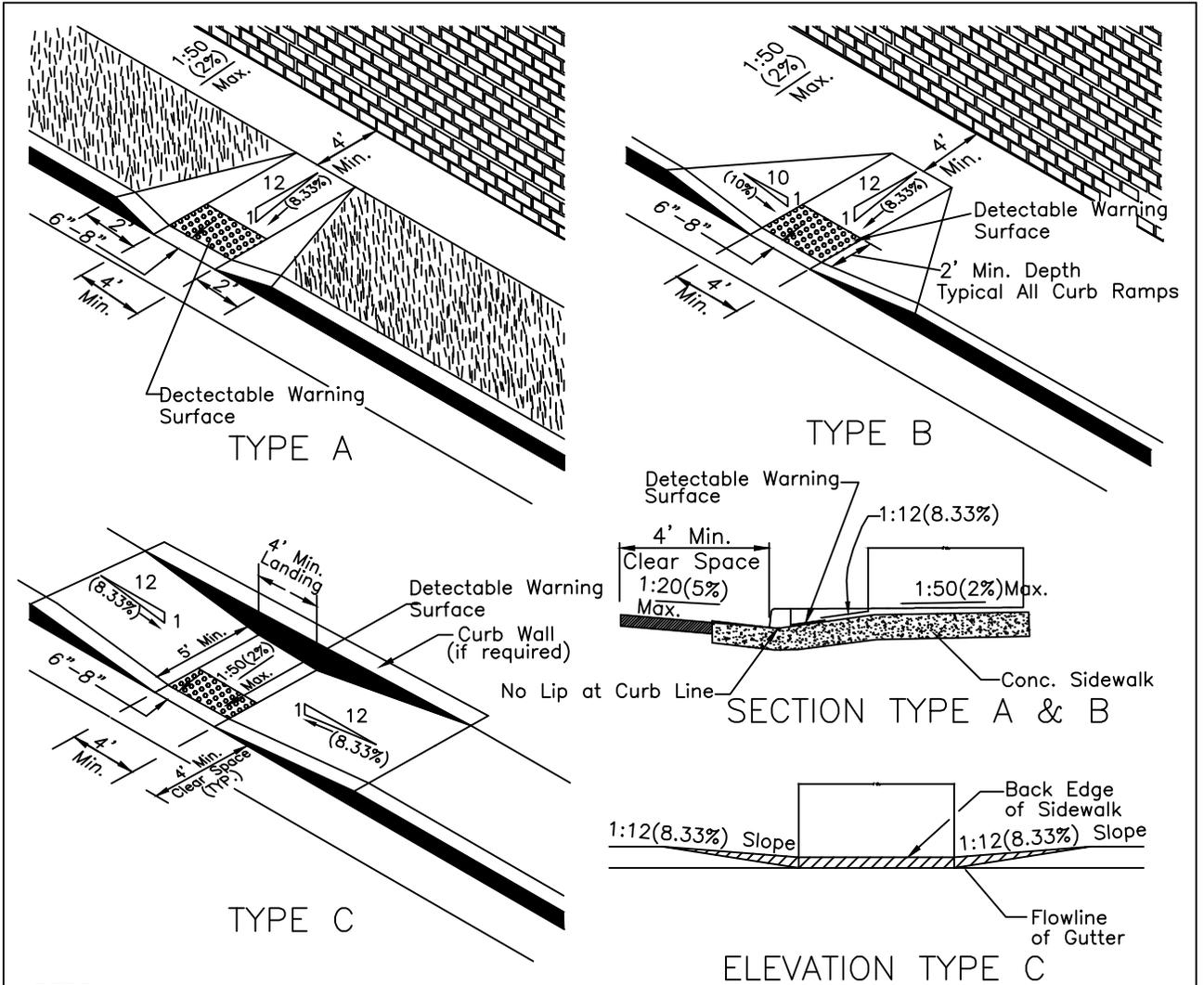
EXPANSION JOINT: Expansion joint shall be 1/2" thick preformed expansion joint filler F1-bituminous mastic as per APWA Section 32 13 73 (Concrete Paving Joint Sealants) at each interface as shown.

DETECTABLE WARNINGS: Locate raised truncated domes so that the edge nearest the curb line is within 6 to 8 inches of the curb line excluding Curb Ramp Types H and I, where $X < 5$ feet (see sheet 6 of 6). Provide 2-foot of truncated dome pattern at the lower end of all curb ramps extending the full width of the curb ramp. See typical dimensions on Type B Curb Ramp. Detectable warnings shall contrast visually with adjoining surfaces, either light-on-dark, or dark-on-light. Glued or surface applied domes are not acceptable for new construction. Stamped domes are not allowed under any conditions. Truncated dome materials shall be selected from the Millcreek approved materials list.

RAMPS: Length of any ramp not required to exceed 15 feet. Ramp shown are examples only, site specific ramps may require modification and additional features to comply with current Federal ADA Guidelines.



CURB RAMPS



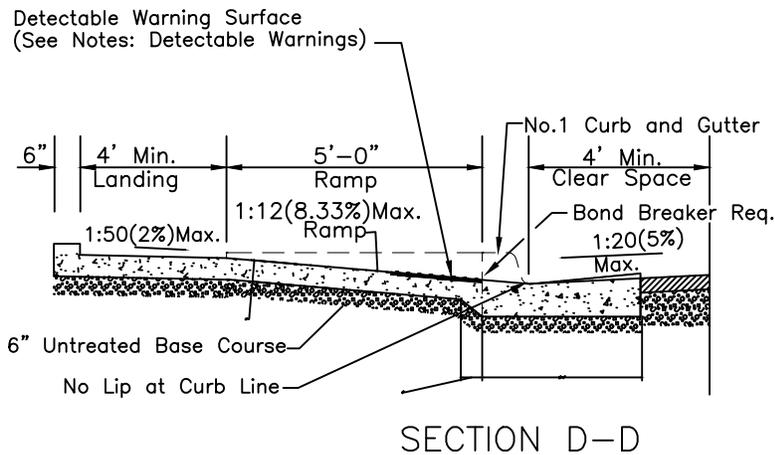
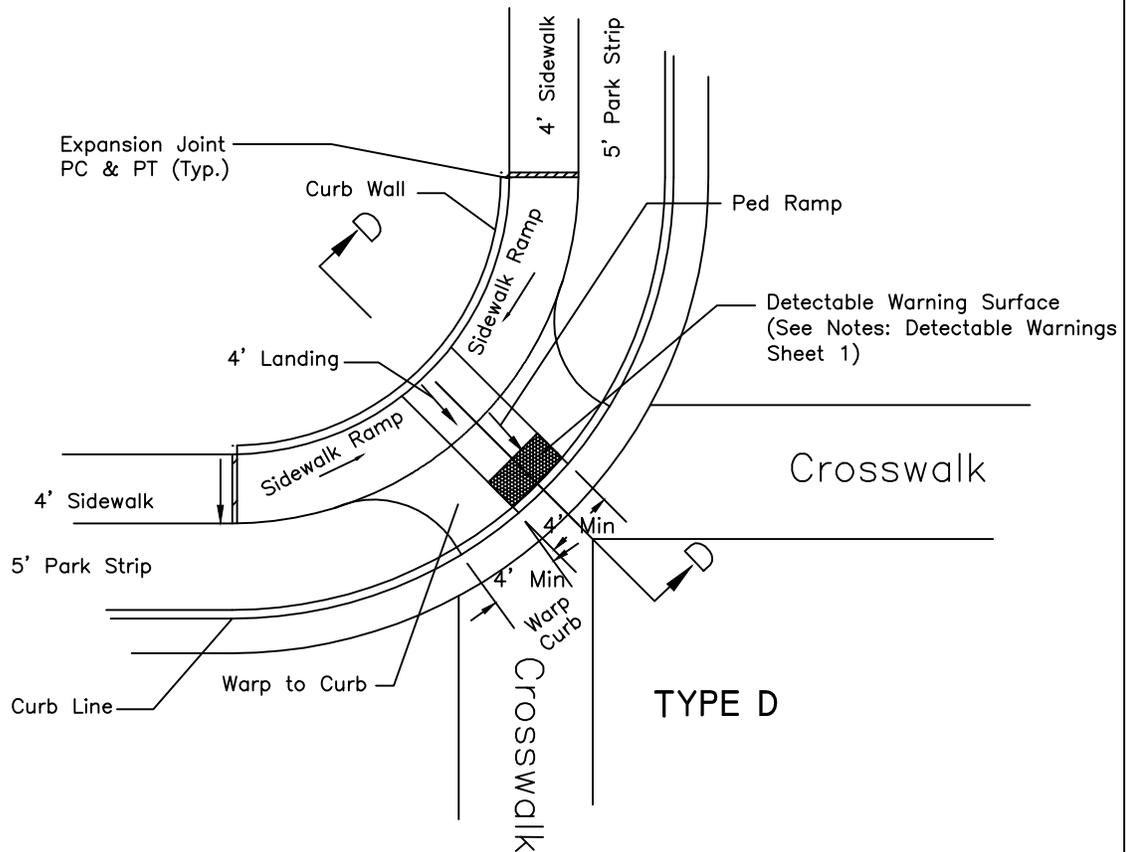
NOTES:

1. TYPE A
The entire ramp slope is achieved outside the sidewalk section. A concrete warped curb section shall begin 2' from edge of detectable warning surface.
2. TYPE B
Provide at least 4' of sidewalk width beyond the ramp.
3. TYPE C
Use this type of ramp when there is insufficient width to accommodate TYPE B curb ramp.
4. No pull box, utility vault, utility pole, manhole or similar appurtenance shall be located within the sidewalk ramp area.
5. It is desirable to locate all drain inlets out of sidewalk ramp area. Use of drain inlet within ramp area requires special design of inlets.
6. See Detail 'A' (sheet 4 of 6) for raised truncated dome detail on detectable warning surface.
7. Maximum cross slope of adjoining gutters and road surface immediately adjacent to the curb ramp, or accessible route, shall not exceed 1:20(5%).
8. Running and cross slope at midblock crossings shall be permitted to be warped to meet street or highway grade.



CURB RAMPS

STANDARD PLAN
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SHEET 2 OF 6



Landing: Cross Slope: 1:50(2%) Max. Towards The Street.

Ped Ramp Slope: 1:12(8.3%) Max.

Sidewalk Ramp: 1:12(8.3%) Max Slope With Minimum 1" Rise Above Curb.

Sidewalk: Cross Slope 1:50(2%) Max. Towards The Street.

Curb Wall (if required): 6" wide

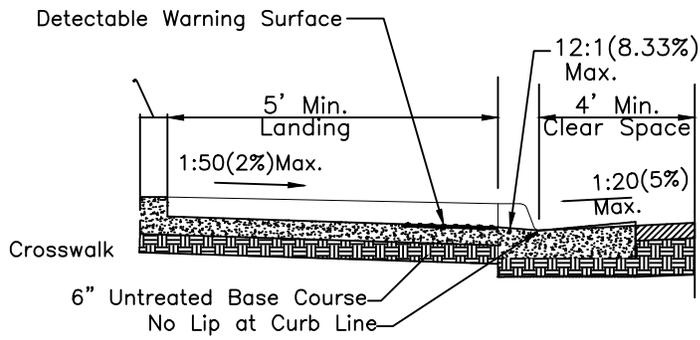
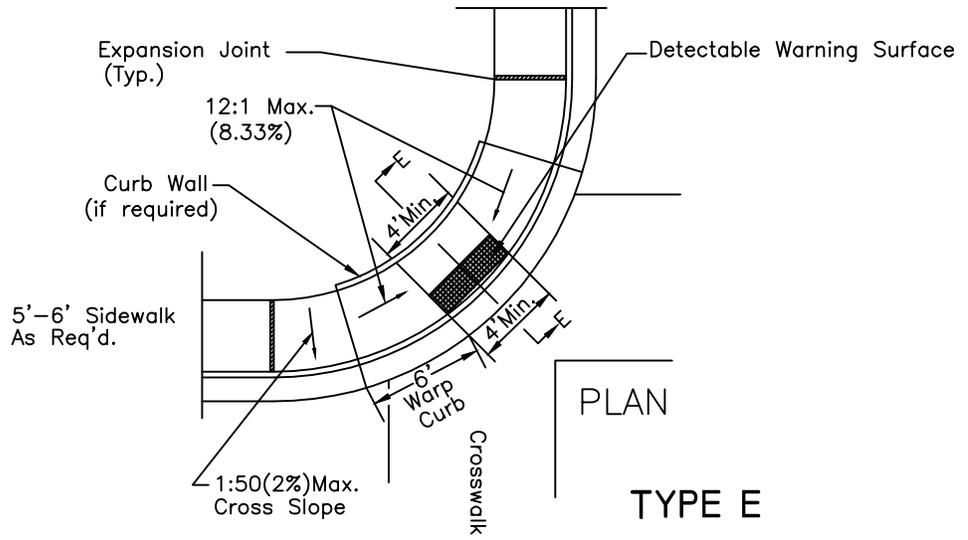


CURB RAMPS

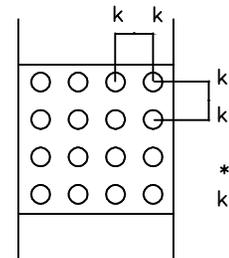
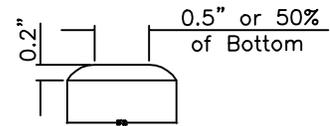
STANDARD PLAN

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SHEET 3 OF 6



SECTION E-E



* Spacing
k-k section
1.6" Min
2.4" Max

Raised Truncated Domes
of Detectable Warning Surface

DETAIL 'A'



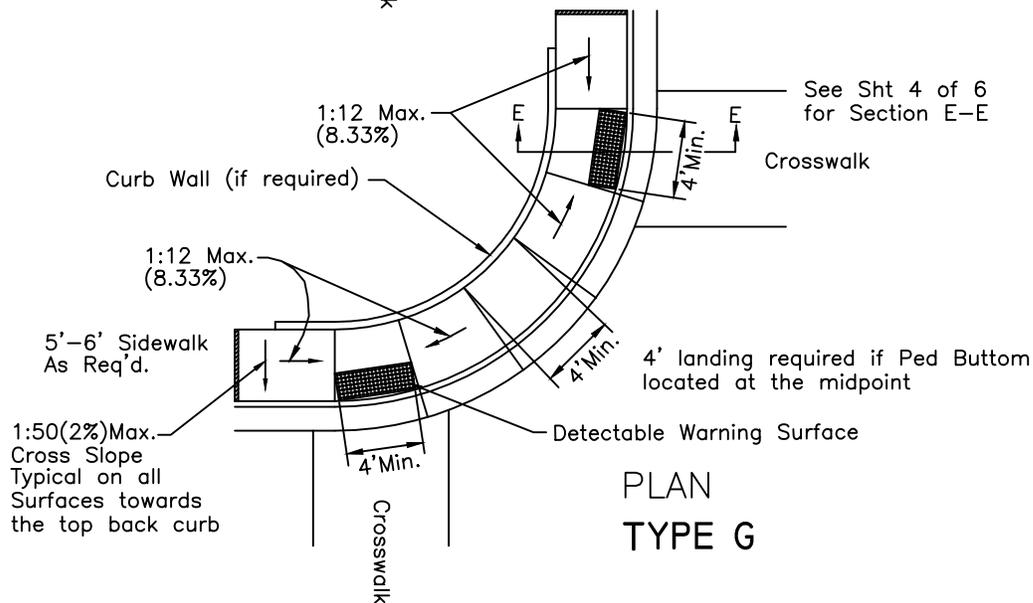
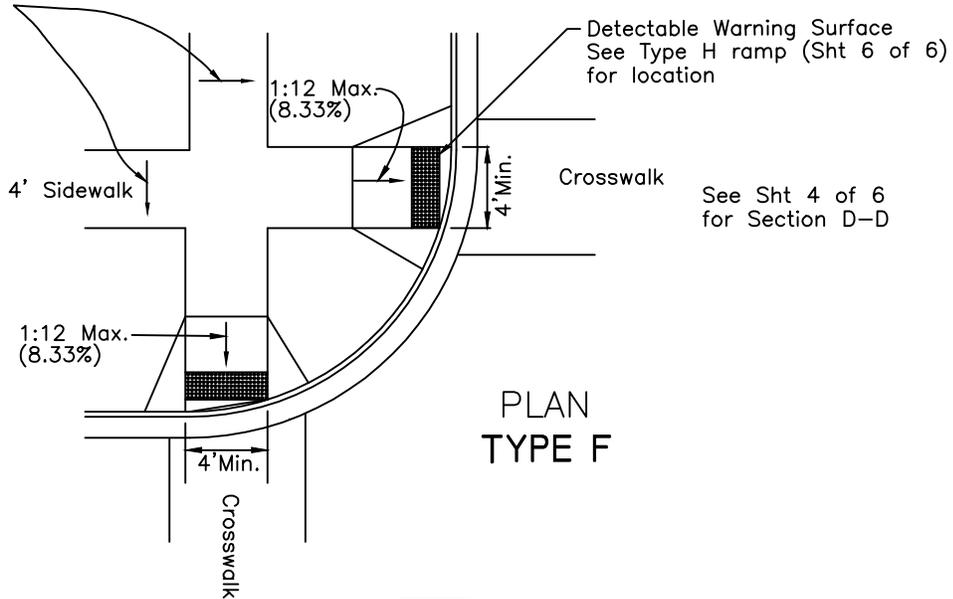
CURB RAMPS

STANDARD PLAN

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SHEET 4 OF 6

1:50(2%)Max.
Cross Slope



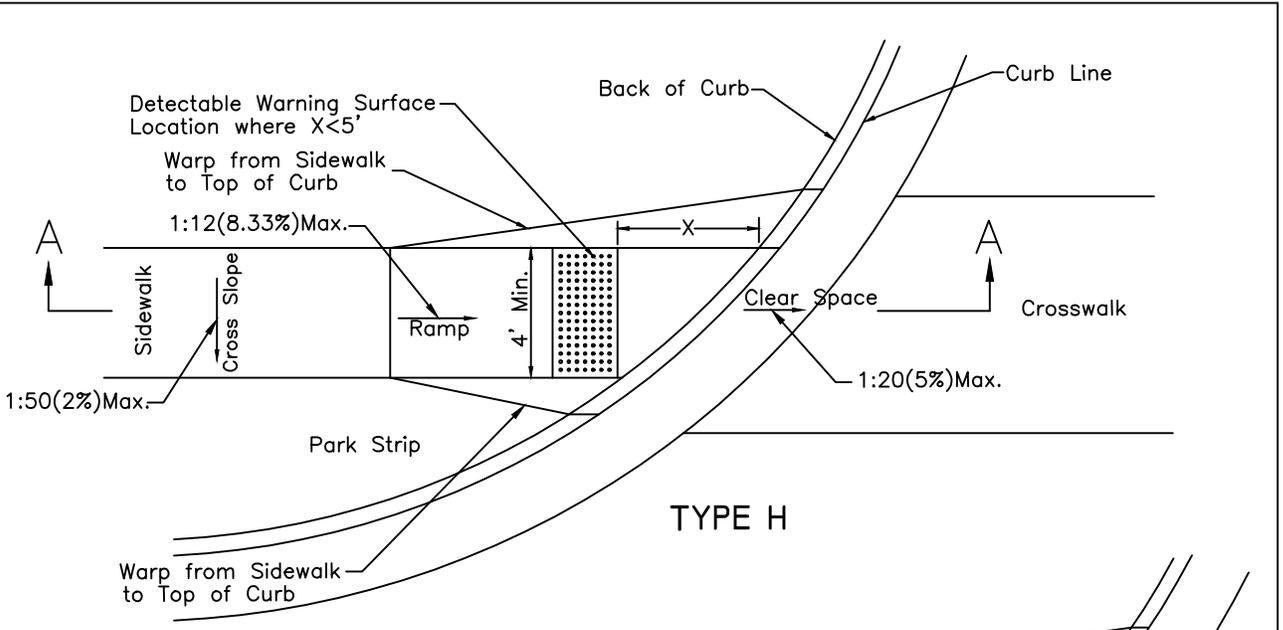
NOTES:

1. Provide detectable warning surface for full width of ramp, min. 4' width.
2. Detectable warning surface is required wherever curb is absent.
3. When detectable warning surface is cut, grind remaining portion of any cut domes. Seal all cut panel edges to prevent water damage.
4. Locate curb cut within crosswalk.

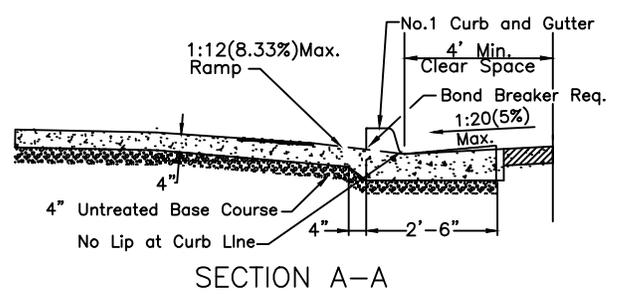


CURB RAMPS

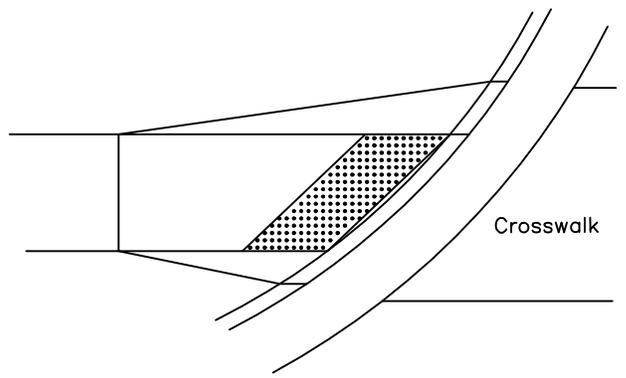
STANDARD PLAN
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SHEET 5 OF 6



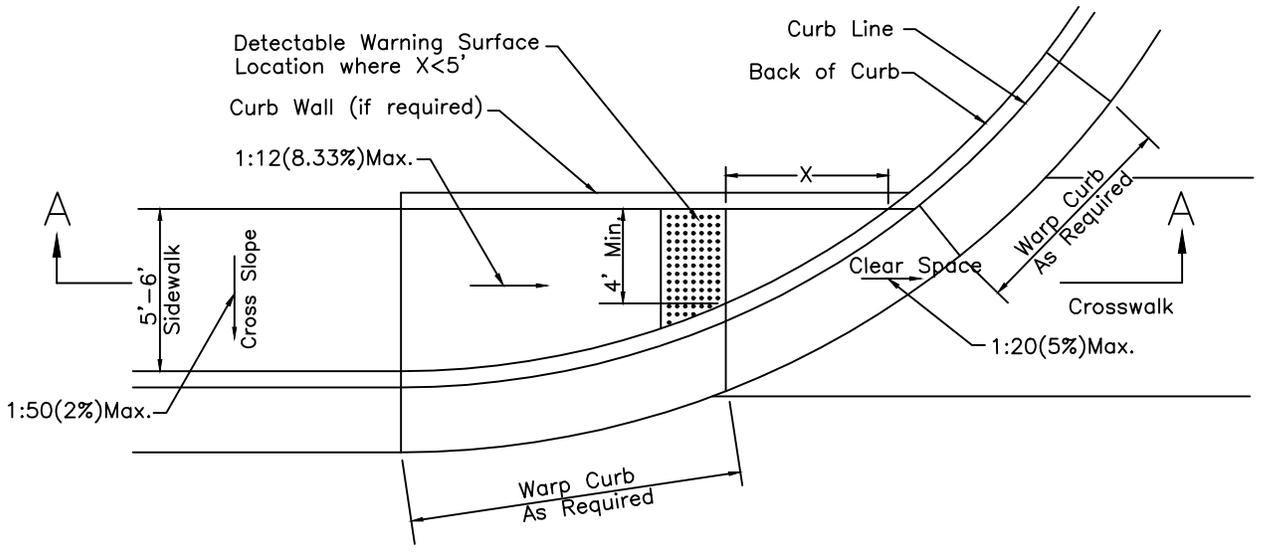
TYPE H



SECTION A-A



REQUIRED DETECTABLE WARNING SURFACE LOCATION WHERE X > 5' FOR TYPE H & TYPE I



TYPE I



CURB RAMPS

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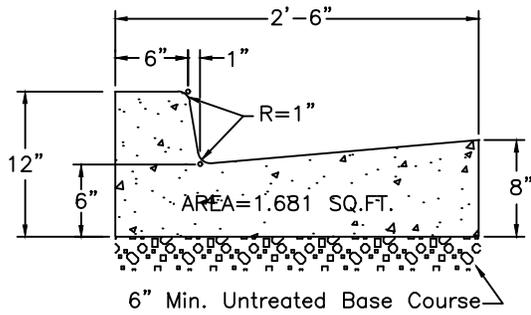
UNTREATED BASE COURSE: Shall be Grade 1 as per APWA Section 32 11 23 (Aggregate Base Courses). Place fill in no greater than 6-inch compacted lifts as per APWA Section 32 05 10 (Backfilling Roadways). Compact to no less than 95% relative density based on the Modified Proctor Density Method D as required in APWA Section 31 23 26 (Compaction).

CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04. Allowable slump shall not exceed 4".

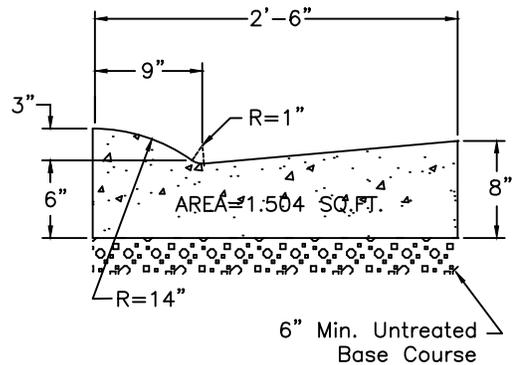
FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement on a weight basis is 15%.

EXPANSION JOINT: Expansion Joint shall be 1/2 inch thick preformed expansion joint filler F1-bituminous mastic as per APWA Section 32 13 73 (Concrete Paving Joint Sealents) at spacing shown.

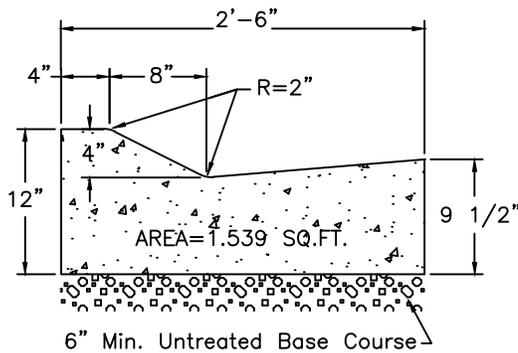




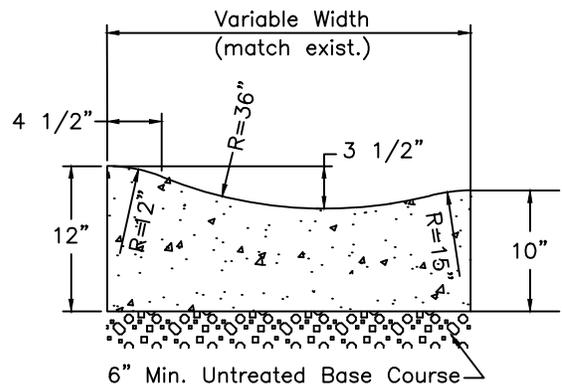
NO. 1 CURB AND GUTTER



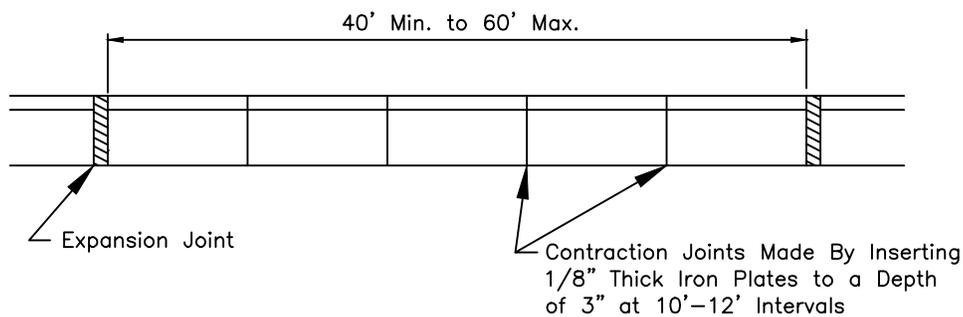
NO. 2 CURB AND GUTTER



NO. 3 CURB AND GUTTER



NO. 4 CURB AND GUTTER
(ROLL GUTTER REPLACEMENT ONLY)



CURB AND GUTTER JOINT DETAIL



NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

SUBGRADE: See APWA Section 32 05 10 (Backfilling Roadways) for preparation and proof rolling of roadway, curb and gutter, and sidewalk.

UNTREATED BASE COURSE: Shall be Grade 1 as per APWA Section 32 11 23 (Aggregate Base Courses). Place fill in no greater than 6-inch compacted lifts as per APWA Section 32 05 10 (Backfilling Roadways). Compact to no less than 95% relative density based on the Modified Proctor Density as required in APWA Section 31 23 26 (Compaction).

CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04 (Concrete). Allowable slump shall not exceed 4".

FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement on a weight basis is 15%.

EXPANSION JOINT: Provide 1/2" thick preformed expansion joint filler F1-bituminous mastic as per APWA Section 32 13 73 (Concrete Paving Joint Sealants) at a minimum of 40 feet and a maximum of 60 feet intervals.

CONTRACTION JOINT: Score lines shall be placed to create square panels in sidewalk. (When contiguous sidewalk is constructed, score lines shall align with curb score lines, with an additional sidewalk score line between curb score lines to provide a maximum of 6' spacing.)

CURB WALL: Shall have a 3/4 inch vertical chamfered joint at 12 feet spacing. Exposed surface of wall is to have a smooth finish free from irregularities.

SIDEWALK WIDTH: See Plan Sheets or Standard Plan 115.

TRIP HAZARD: Changes in elevation greater than 1/4" shall be beveled with a slope no greater than 1V:2H.

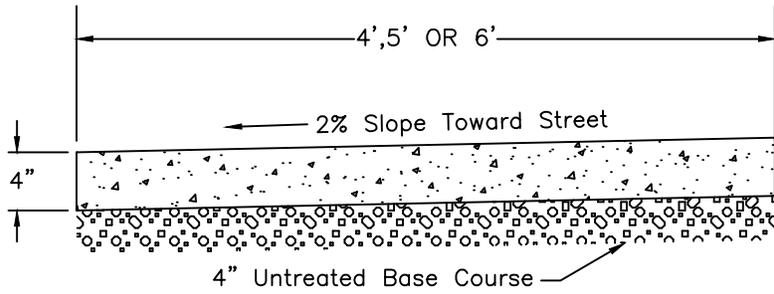


SIDEWALK

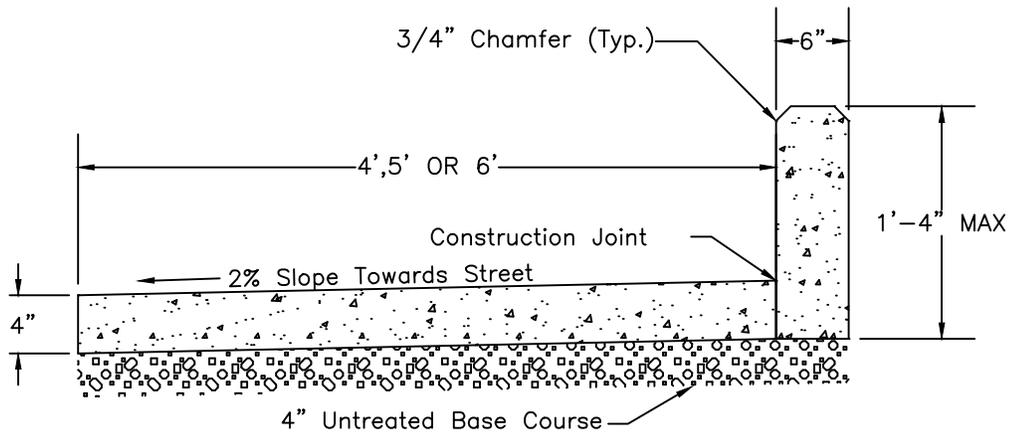
STANDARD PLAN

145

SHEET 1 OF 2



NO. 1 SIDEWALK



NO. 2 SIDEWALK



SIDEWALK

STANDARD PLAN

145

SHEET 2 OF 2

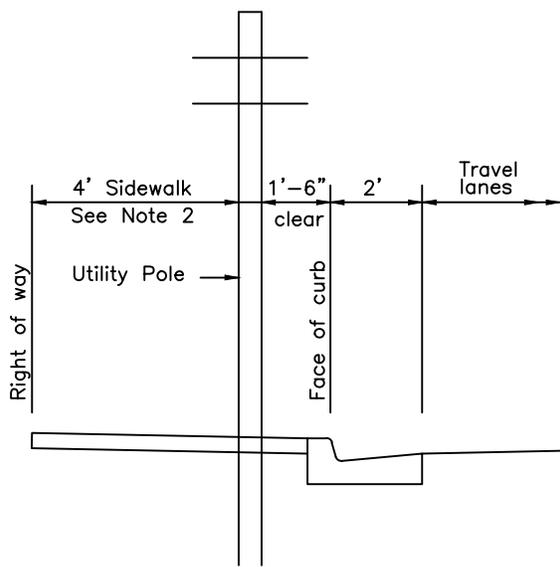
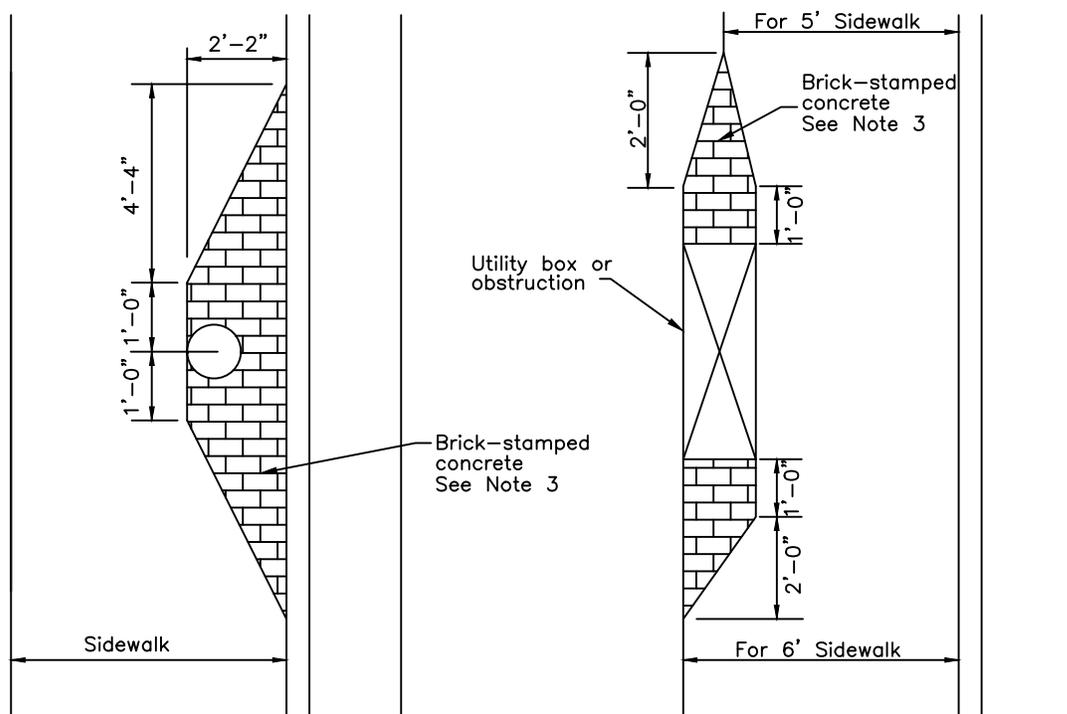
NOTES:

1. This detail has been developed to provide a location for utilities when sidewalk is placed contiguous with curb and gutter.
2. Sidewalk shall maintain minimum 4' width unless otherwise approved by the Millcreek Public Works Director.
3. Brick-stamped and colored concrete shall match the thickness of concrete and base course as the adjacent sidewalk.

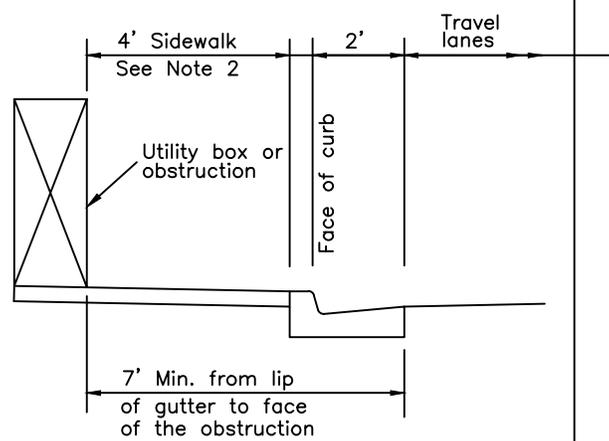


**UTILITY POLE LOCATION
DETAIL**

STANDARD PLAN
150
SHEET 1 OF 2



UTILITY POLE



ABOVE-GROUND UTILITY BOX



UTILITY LOCATION
DETAIL

STANDARD PLAN
150
SHEET 2 OF 2

NOTES:

1. Concrete is considered defective if any component has one or more of the conditions shown on sheet. Millcreek may require section replacement for any latent defects not described.

2. Defective concrete resulting from an individual crack is defined as having at least one of the following:
 - horizontal separation wide enough to insert a dime
 - vertical displacement resulting from crack
 - spalling, spidering, or chipping of crack

3. Defective concrete resulting from multiple cracks is defined as having at least one of the following:
 - one section with multiple cracks where both ends of crack link with slab edge, joint, or another crack.
 - adjacent sections with one or more cracks where both ends of crack link with slab edge, joint, or another crack.

4. Defective concrete resulting from vertical displacement is defined as one of the following:
 - at time of performance bond release: any vertical displacement at construction joint or expansion joint.
 - concrete not under warranty: vertical displacement at construction joint or expansion joint greater than $\frac{1}{4}$ ".

5. Defective concrete resulting from spalls is defined as one of the following:
 - at time of performance bond release: any spalling.
 - concrete not under warranty: spalling covering more than 20% of a section.

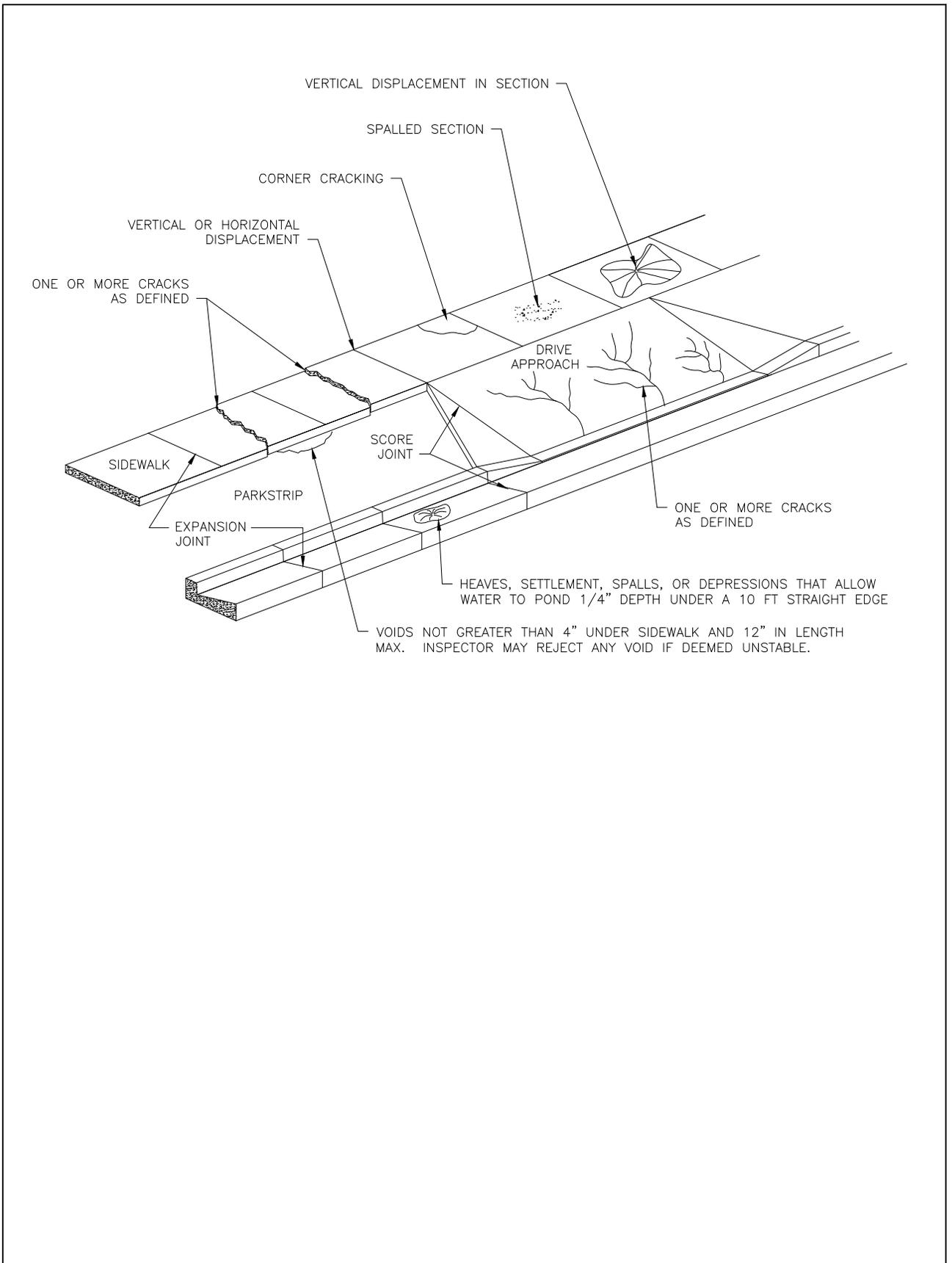


DEFECTIVE CONCRETE

STANDARD PLAN

155

SHEET 1 OF 2



DEFECTIVE CONCRETE

STANDARD PLAN

155

SHEET 2 OF 2

SECTION 2

STORM DRAIN FACILITIES

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

Cast Iron to conform to ASTM A-48, Class 35B H-20 wheel loading.

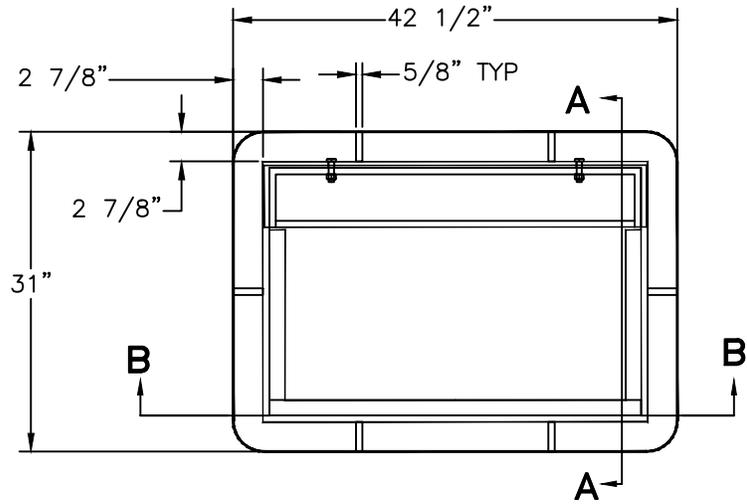


CURB OPENING FRAME AND GRATE

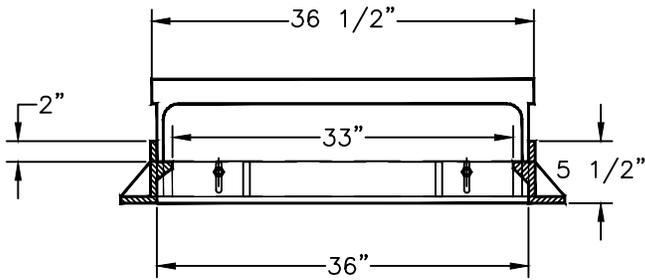
STANDARD PLAN

201

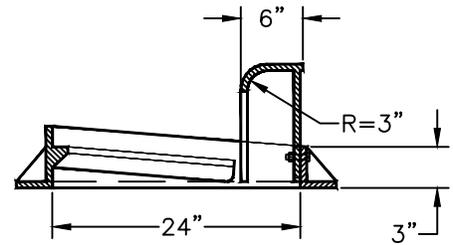
SHEET 1 OF 2



FRAME PLAN

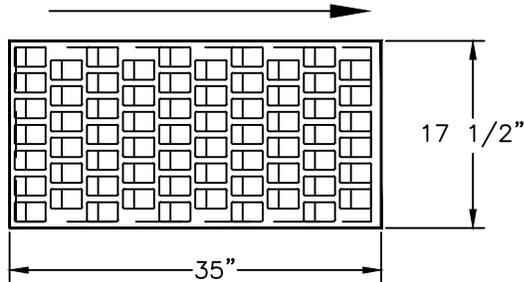


SECTION B-B

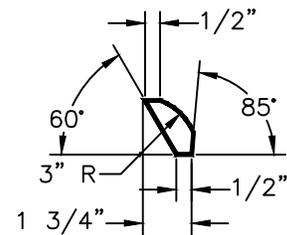


SECTION A-A

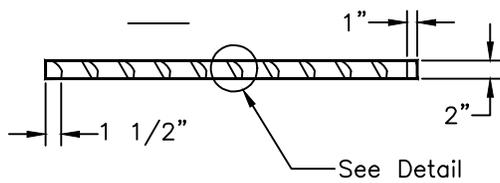
FLOW DIRECTION



GRATE PLAN



DETAIL



See Detail



CURB OPENING FRAME AND GRATE

STANDARD PLAN

201

SHEET 2 OF 2

NOTES:

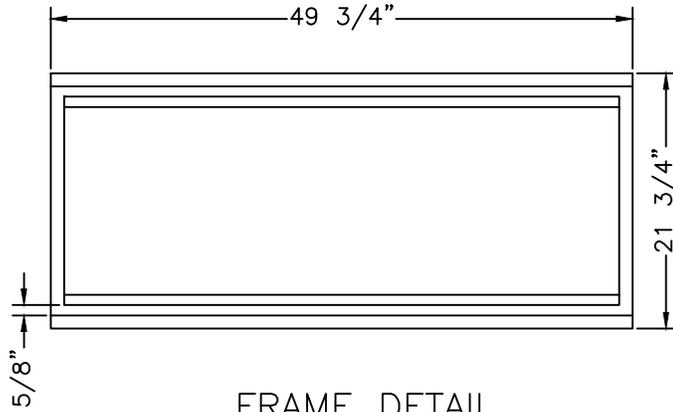
Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

Cast Iron to conform to ASTM A-48, Class 35B H-20 wheel loading.

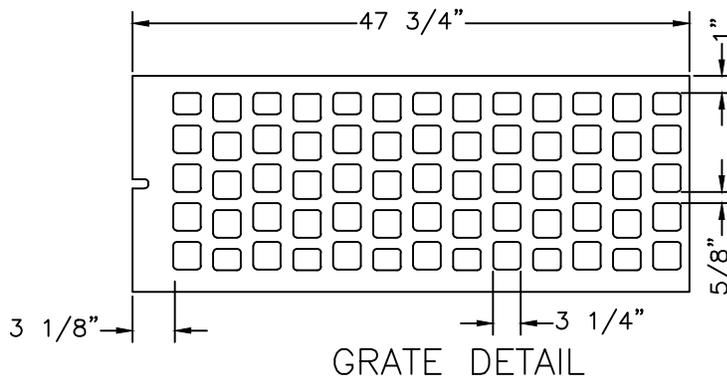


FRAME AND GRATE

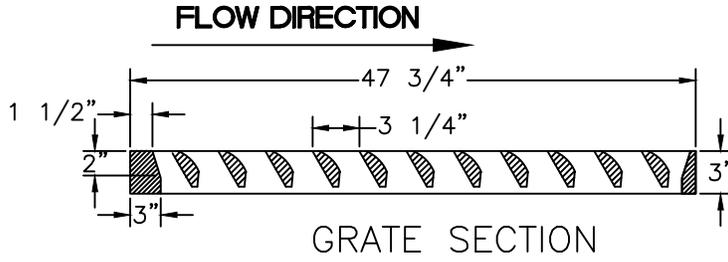
STANDARD PLAN
202
SHEET 1 OF 2



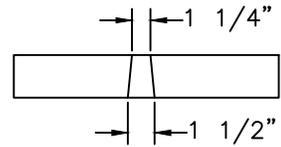
FRAME DETAIL



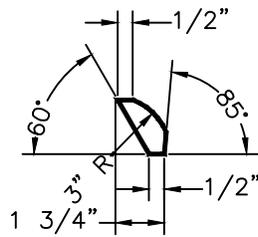
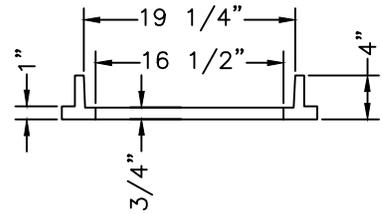
GRATE DETAIL



GRATE SECTION



FRAME SECTION



VANE DETAIL



FRAME AND GRATE

STANDARD PLAN

202

SHEET 2 OF 2

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

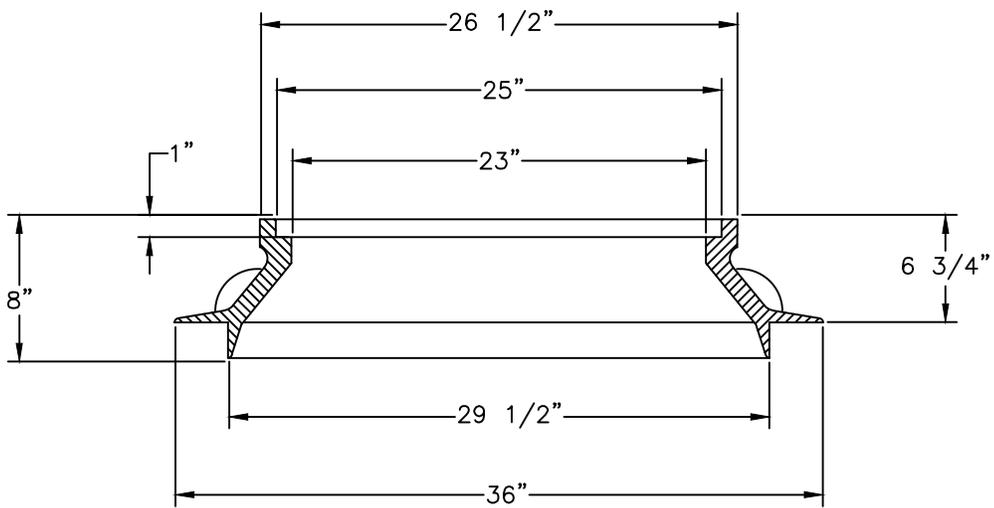
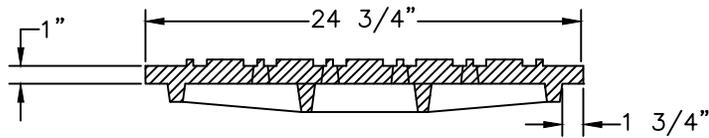
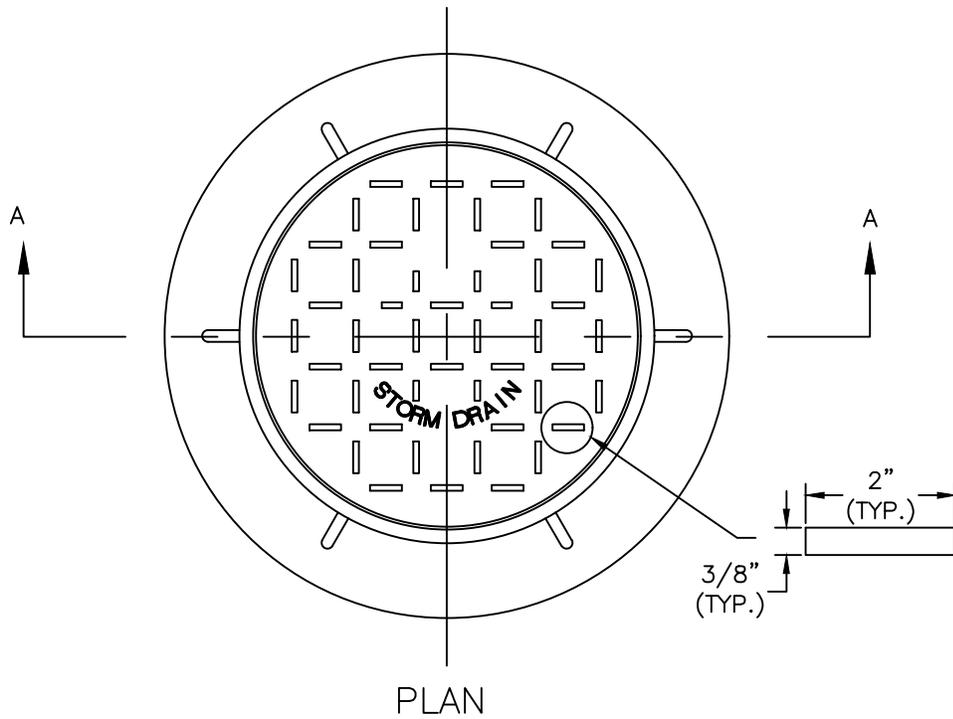
Cast Iron to conform to ASTM A-48, Class 35B H-20 wheel loading.

The words "STORM DRAIN" shall be cast into the lid as shown.



CLEANOUT FRAME AND LID

STANDARD PLAN
203
SHEET 1 OF 2



SECTION A-A



CLEANOUT FRAME AND LID

STANDARD PLAN

203

SHEET 2 OF 2

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

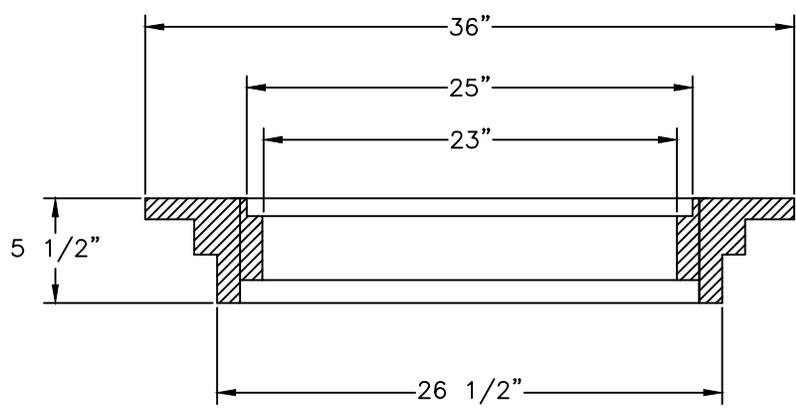
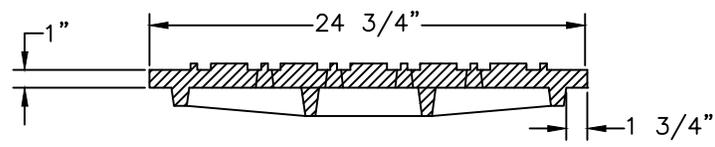
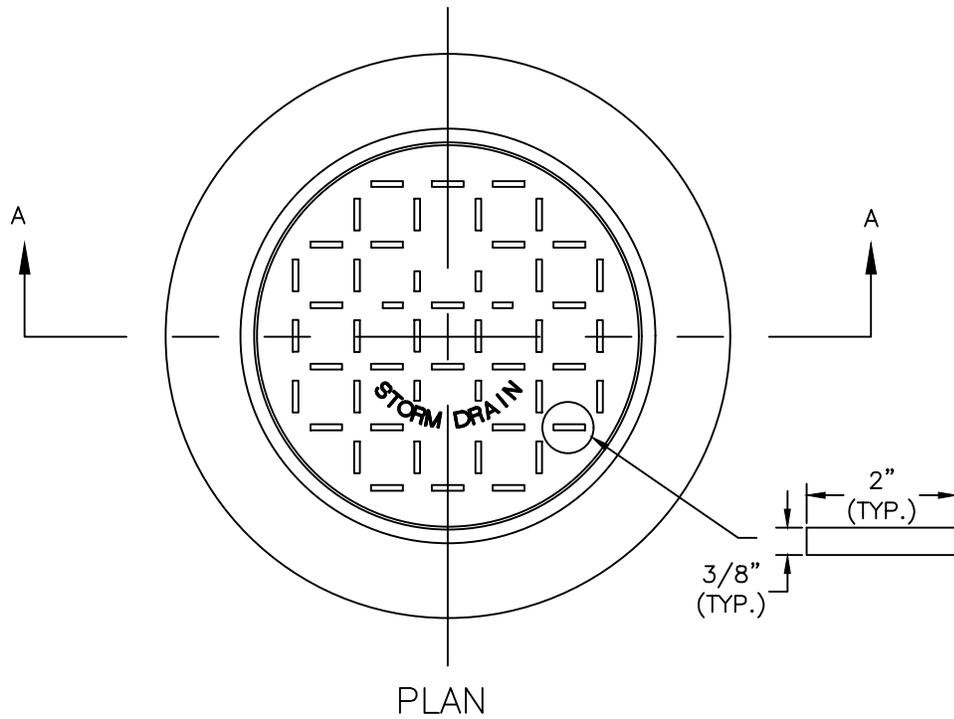
Cast Iron to conform to ASTM A-48, Class 35B H-20 wheel loading.

The words "STORM DRAIN" shall be cast into the lid as shown.



**LOW PROFILE
CLEANOUT FRAME AND LID**

STANDARD PLAN
204
SHEET 1 OF 2



SECTION A-A



LOW PROFILE
CLEANOUT FRAME AND LID

STANDARD PLAN
204
SHEET 2 OF 2

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

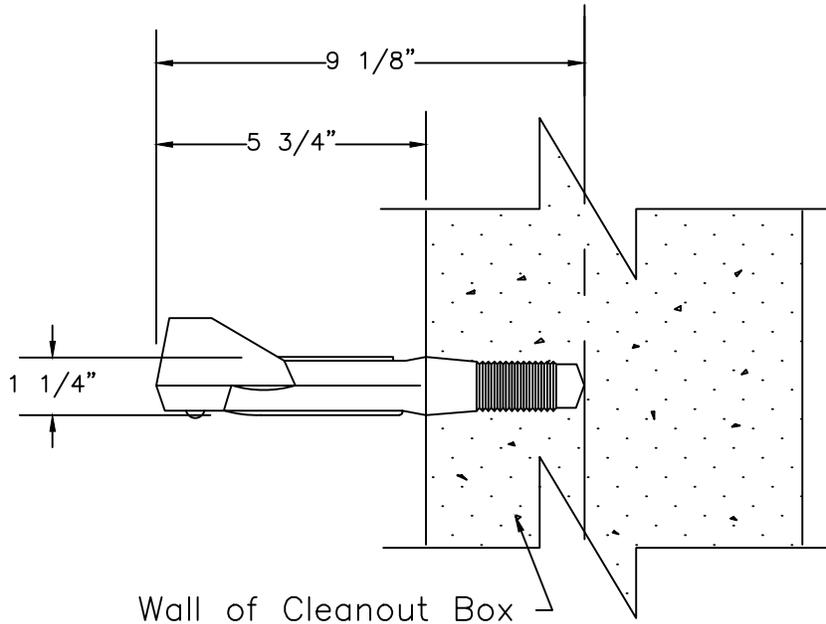
Ladder rungs shall be copolymer polypropylene plastic coating over a $\frac{1}{2}$ inch steel bar.

Steel bar shall conform to ASTM 615 Grade 60.

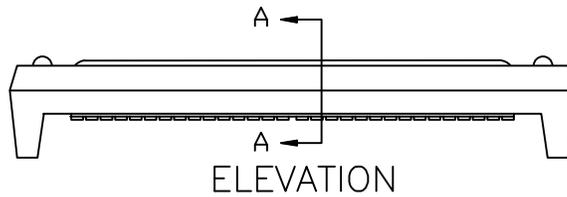


LADDER RUNG

STANDARD PLAN
208
SHEET 1 OF 2

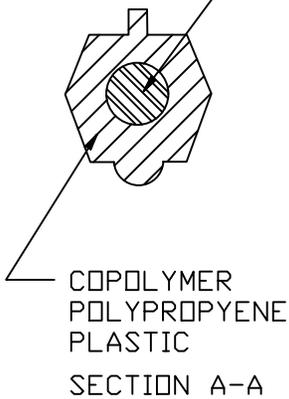


SECTION

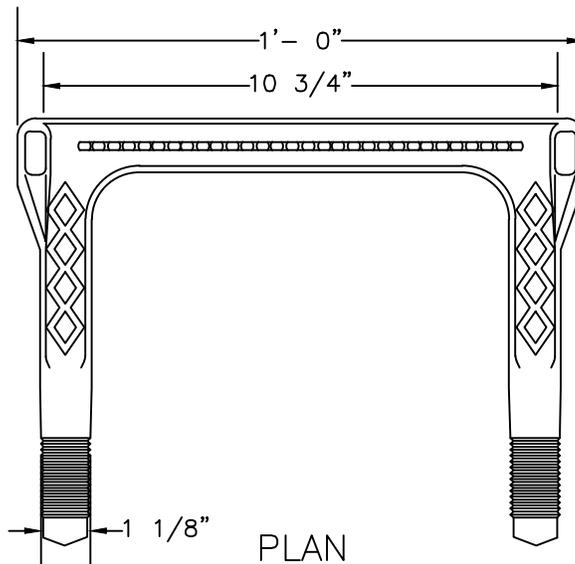


ELEVATION

1/2" DIAMETER
STEEL REINFORCEMENT
(GRADE 60)



COPOLYMER
POLYPROPYLENE
PLASTIC
SECTION A-A



PLAN



LADDER RUNG

STANDARD PLAN

208

SHEET 2 OF 2

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

REINFORCING STEEL: All reinforcing steel shall be grade 60 as per APWA Section 03 20 00 (Concrete Reinforcing). All reinforcing steel shall be centered in the walls and slabs, with a minimum of 2" cover. Steel shall be cut to maintain 2" clear around pipe opening. A1 bars required at all corners, vertical and horizontal at same size and spacing as wall steel.

PIPE: Pipe sizes and locations are as shown on plan and profile sheets, including flow-line elevations.

PIPE COVER: See Standard Plan 240 – Trench Section.

GROUT: Grout shall be cement based shrinkage resistant grout as per APWA 03 61 00 (Cementitious Grouting).

FORMING: Forming both sides of walls required.

FRAME AND GRATE: See Standard Plan 201 for Frame and Grate Detail.

BACKFILL: Granular backfill borrow shall conform to APWA 31 05 13 (Common Fill) and installed in accordance with APWA 31 23 23 (Backfilling For Structures) and compacted to 95% required all sides.

CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04 (Concrete). Allowable slump shall not exceed 4".

FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement on a weight basis is 15%.

DEPTH OF INLET: Depth of inlet can be extended to 12 feet by permission of the Millcreek Public Works Director.

WATER TABLE: No additional requirements when constructing in locations with high water table.



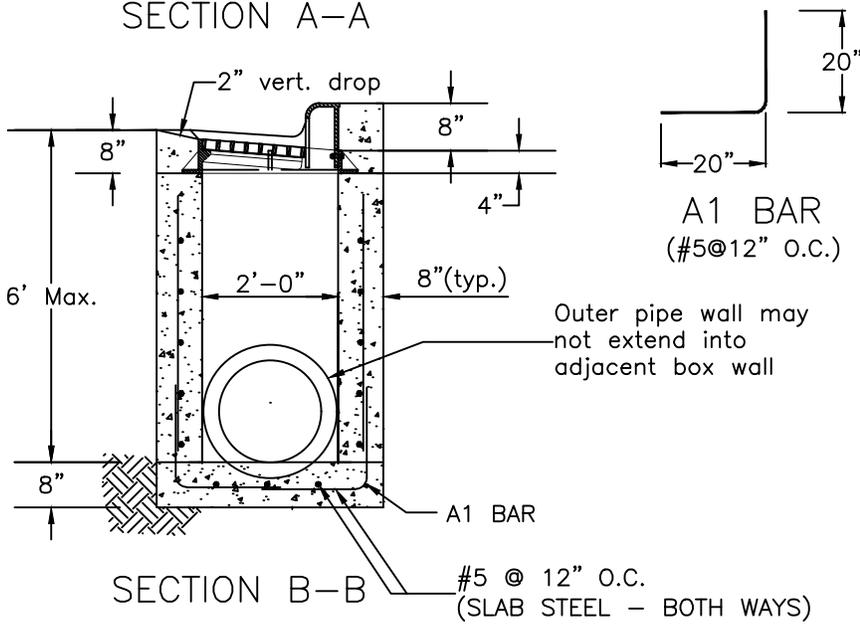
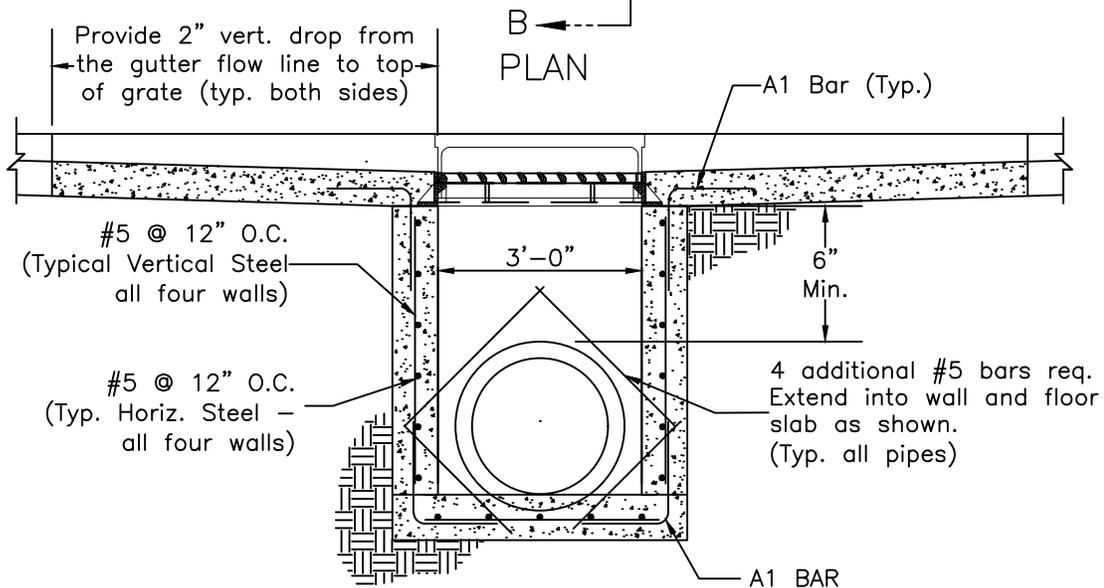
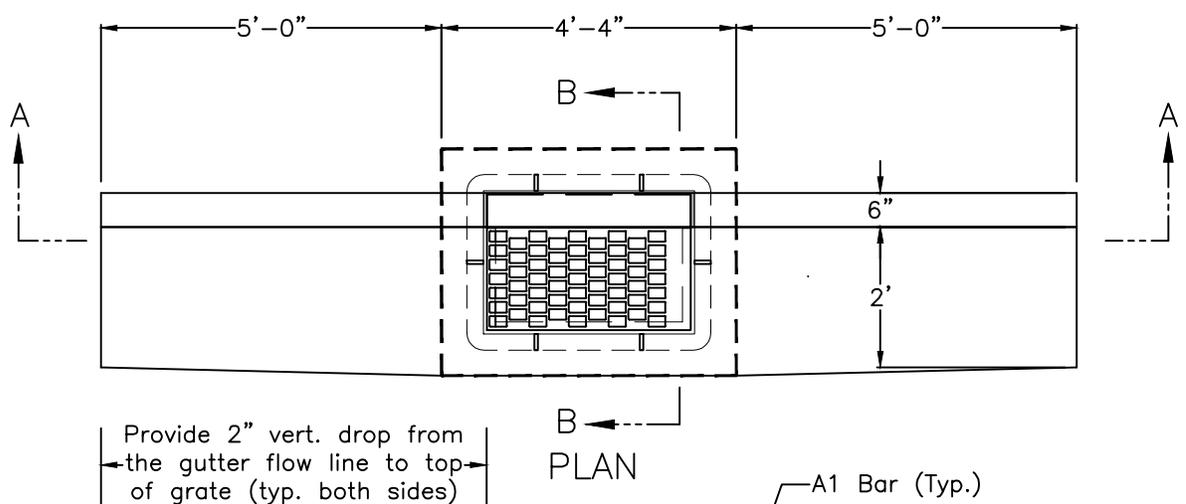
CURB INLET WITH GRATE

SINGLE

STANDARD PLAN

210

SHEET 1 OF 2



CURB INLET WITH GRATE
SINGLE

STANDARD PLAN
210
SHEET 2 OF 2

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

REINFORCING STEEL: All reinforcing steel shall be grade 60 as per APWA Section 03 20 00 (Concrete Reinforcing). All reinforcing steel shall be centered in the walls and slabs, with a minimum 2" cover. Steel shall be cut to maintain 2" clear around pipe opening. A1 bars required at all corners, vertical and horizontal at same size and spacing as wall steel.

PIPE: Pipe sizes and locations are as shown on plan and profile sheets, including flow-line elevations.

PIPE COVER: See Standard Plan 240 – Trench Section.

GROUT: Grout shall be cement based shrinkage resistant grout as per APWA 03 61 00 (Cementitious Grouting).

FORMING: Forming both sides of walls required.

FRAME AND GRATE: See Standard Plan 201 for Frame and Grate Detail. Double frame and grate consists of two single frames and grates with interior flange removed from frame.

BACKFILL: Granular backfill borrow (Common Fill) in accordance with APWA 31 23 23 (Backfilling For Structures) and compacted to 95% required all sides.

CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04. Allowable slump shall not exceed 4".

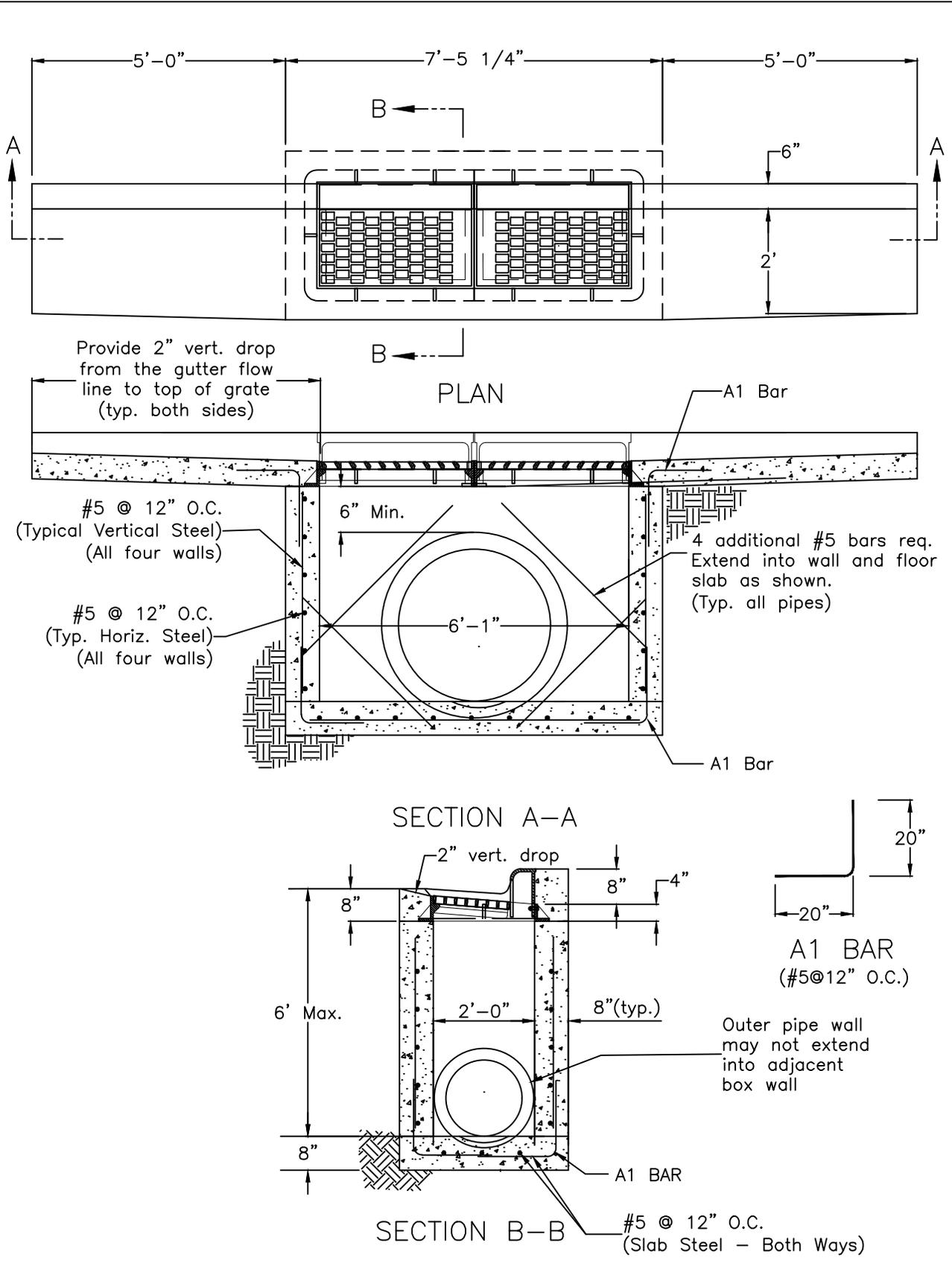
FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement by weight is 15%.

WATER TABLE: Reinforcing steel shall be increased to #5 @9" O.C. (walls) in locations with high water table.



CURB INLET WITH GRATE DOUBLE

STANDARD PLAN
211
SHEET 1 OF 2



CURB INLET WITH GRATE
DOUBLE

STANDARD PLAN
211
SHEET 2 OF 2

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

REINFORCING STEEL: All reinforcing steel shall be grade 60 as per APWA Section 03 20 00 (Concrete Reinforcing). All reinforcing steel shall be centered in the walls and slabs. Steel shall be cut to maintain 2" clear around pipe opening. A1 bars required at all corners, vertical and horizontal, at the same size and spacing as wall steel.

PIPE: Pipe sizes and locations are as shown on plan and profile sheets, including flow-line elevations.

PIPE COVER: See Standard Plan 240 – Trench Section.

GROUT: Grout shall be cement based shrinkage resistant grout as per APWA 03 61 00 (Cementitious Grouting).

FORMING: Forming both sides of walls required.

FRAME AND GRATE: See Standard Plan 202 for Frame and Grate Detail.

BACKFILL: Granular backfill borrow shall conform to APWA 31 05 13 (Common Fill) and installed in accordance with APWA 31 23 23 (Backfilling For Structures) and compacted to 95% required all sides.

CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04 (Concrete). Allowable slump shall not exceed 4".

FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement by weight is 15%.

DEPTH OF INLET: Depth of inlet may be extended to 8 feet by permission of the Millcreek Public Works Director.

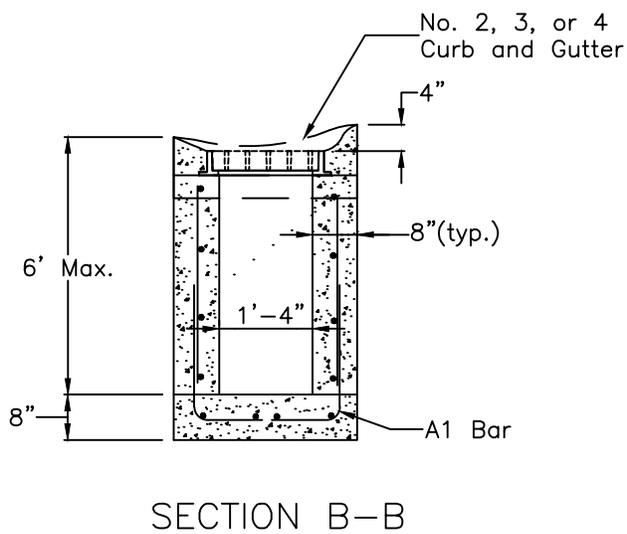
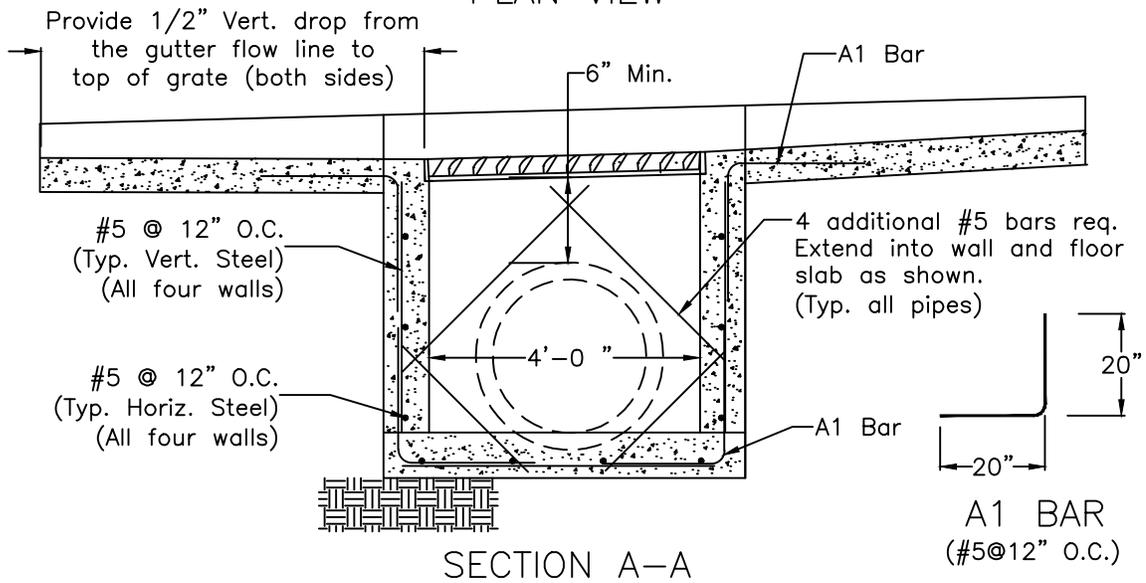
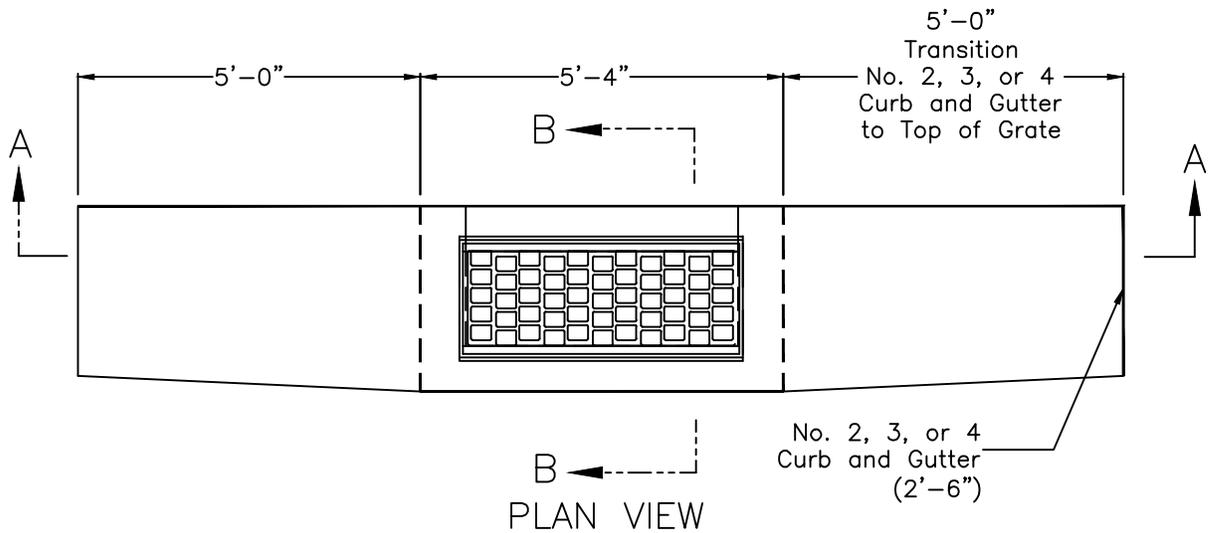
WATER TABLE: No additional requirements when constructing in locations with high water table.

LIMITATIONS: The Grate Inlet is for use with No. 2, 3, or 4 Curb and Gutter or locations with no curb and gutter.



GRATE INLET SINGLE

STANDARD PLAN
215
SHEET 1 OF 2



GRATE INLET
 SINGLE

STANDARD PLAN
 215
 SHEET 2 OF 2

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

REINFORCING STEEL: All reinforcing steel shall be grade 60 as per APWA Section 03 20 00 (Concrete Reinforcing). All reinforcing steel shall be centered in the walls and slabs. Steel shall be cut to maintain 2" clear around pipe opening. A1 bars required at all corners, vertical and horizontal, at same size and spacing as wall steel.

PIPE: Pipe sizes and locations are as shown on plan and profile sheets, including flow-line elevations.

PIPE COVER: See Standard Plan 240 – Trench Section.

GROUT: Grout shall be cement based shrinkage resistant grout as per APWA 03 61 00 (Cementitious Grouting).

FORMING: Forming both sides of walls required.

FRAME AND GRATE: See Standard Plan 202 for Frame and Grate Detail.

BACKFILL: Granular backfill borrow shall conform to APWA 31 05 13 (Common Fill) and installed in accordance with APWA 31 23 23 (Backfilling For Structures) and compacted to 95% required all sides.

CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04 (Concrete). Allowable slump shall not exceed 4".

FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement on a weight basis is 15%.

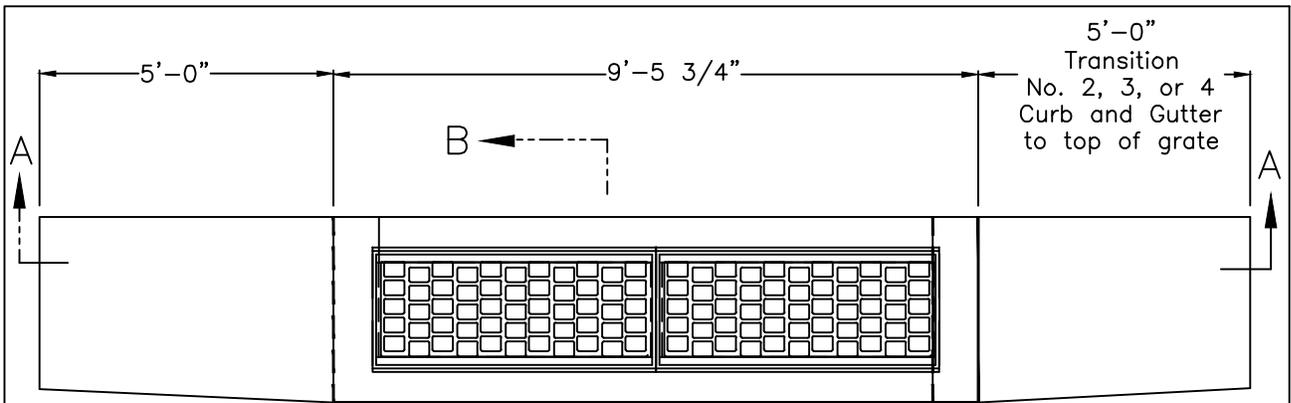
WATER TABLE: Wall thickness must be increased to 10" and steel spacing must be decreased to #5 @ 6" O.C. when constructing in locations with high water table.

LIMITATIONS: The grate inlet is for use with No. 2, 3, or 4 Curb and Gutter or locations with no curb and gutter.

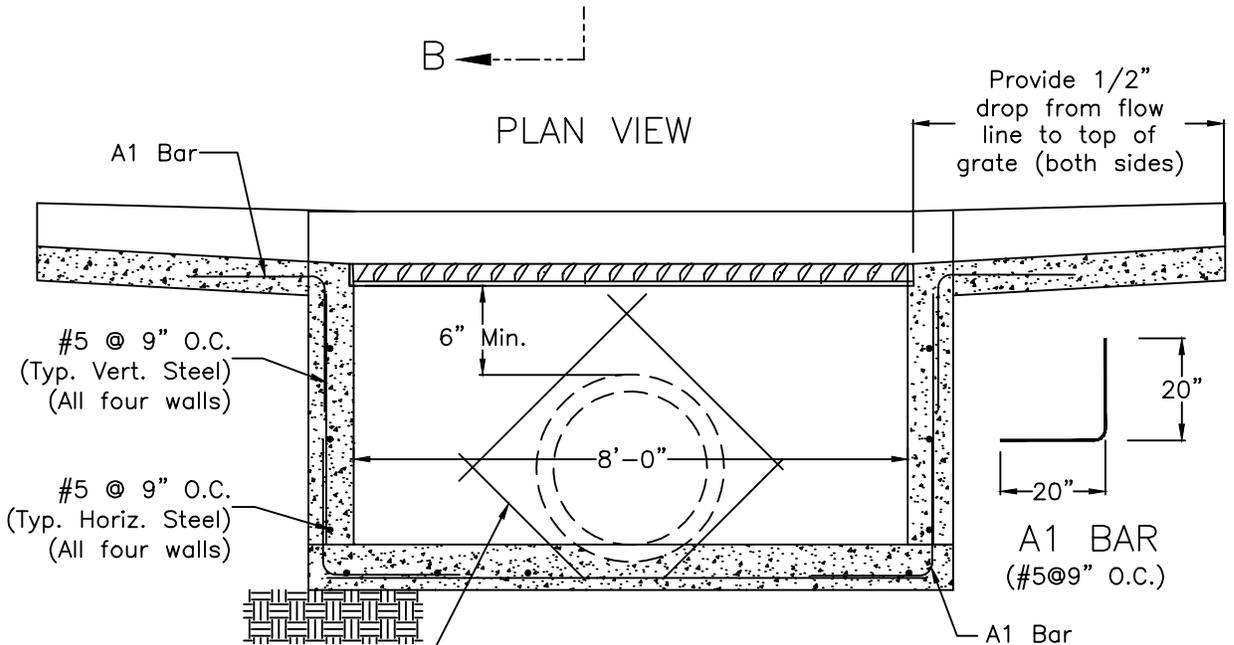


**GRATE INLET
DOUBLE**

STANDARD PLAN
216
SHEET 1 OF 2

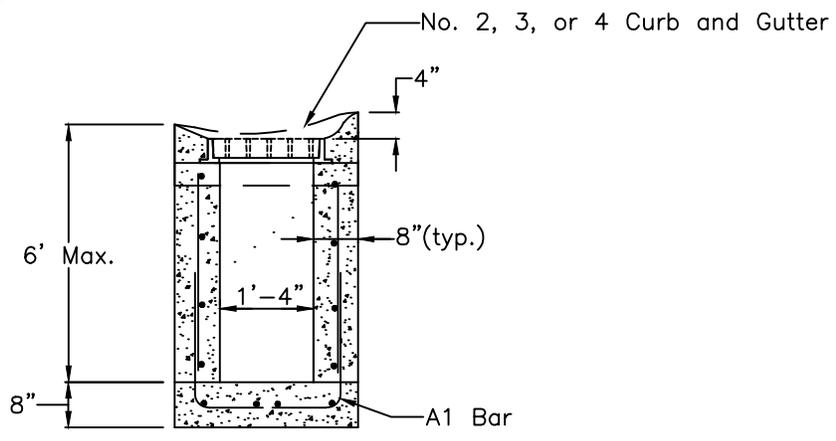


PLAN VIEW



SECTION A-A

4 additional #5 bars req. Extend into wall and floor slab as shown. (Typ. all pipes)



SECTION B-B



GRATE INLET
DOUBLE

STANDARD PLAN
216
SHEET 2 OF 2

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

REINFORCING STEEL: All reinforcing steel shall be grade 60 as per APWA Section 03 20 00 (Concrete Reinforcing). All reinforcing steel shall be centered in the walls and slabs with a minimum 2" cover. Steel shall be cut to maintain 2" clear around pipe and lid opening. A1 bars required at all corners, vertical and horizontal. A1 bars connecting two walls shall match wall steel size and spacing. A1 bars connecting walls to top slab shall match slab steel size and spacing.

PIPE: Pipe sizes and locations are as shown on plan and profile sheets, including flow-line elevations.

PIPE COVER: See Standard Plan 240 – Trench Section.

GROUT: Grout shall be cement based shrinkage resistant grout as per APWA 03 61 00 (Cementitious Grouting).

FORMING: Forming both sides of walls required.

FRAME AND LID: See Standard Plan 203 or 204 for Frame and Lid Detail.

LADDER RUNGS: Ladder rungs to be placed in boxes greater than 4 feet deep. See Standard Plan 208 for Detail. Ladder rungs shall be aligned with access opening.

BACKFILL: Granular backfill borrow shall conform to APWA 31 05 13 (Common Fill) and installed in accordance with APWA 31 23 23 (Backfilling For Structures) and compacted to 95% required all sides.

CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04 (Concrete). Allowable slump shall not exceed 4".

FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement by weight is 15%.

WATER TABLE: Wall thickness or steel requirement must be increased when constructing in locations with high water table. See table below for additional requirements.

BOX WALL THICKNESS & STEEL REQUIREMENTS:				
MAX. BOX WIDTH	6'	8'	8'	9'
MAX. BOX DEPTH	6'	8'	12'	12'
WALL THICKNESS	8"	8"	12"	12"
WALL STEEL (VERT. & HORIZ.)	#5 @12" O.C.	#5 @6" O.C.	#5 @6" O.C.	#7 @9" O.C.
MODIFICATION FOR HIGH WATER TABLE				
WALL THICKNESS	8"	10"	16"	12"
WALL STEEL (VERT. & HORIZ.)	#5 @9" O.C.	#5 @6" O.C.	#5 @6" O.C.	#7 @6" O.C.

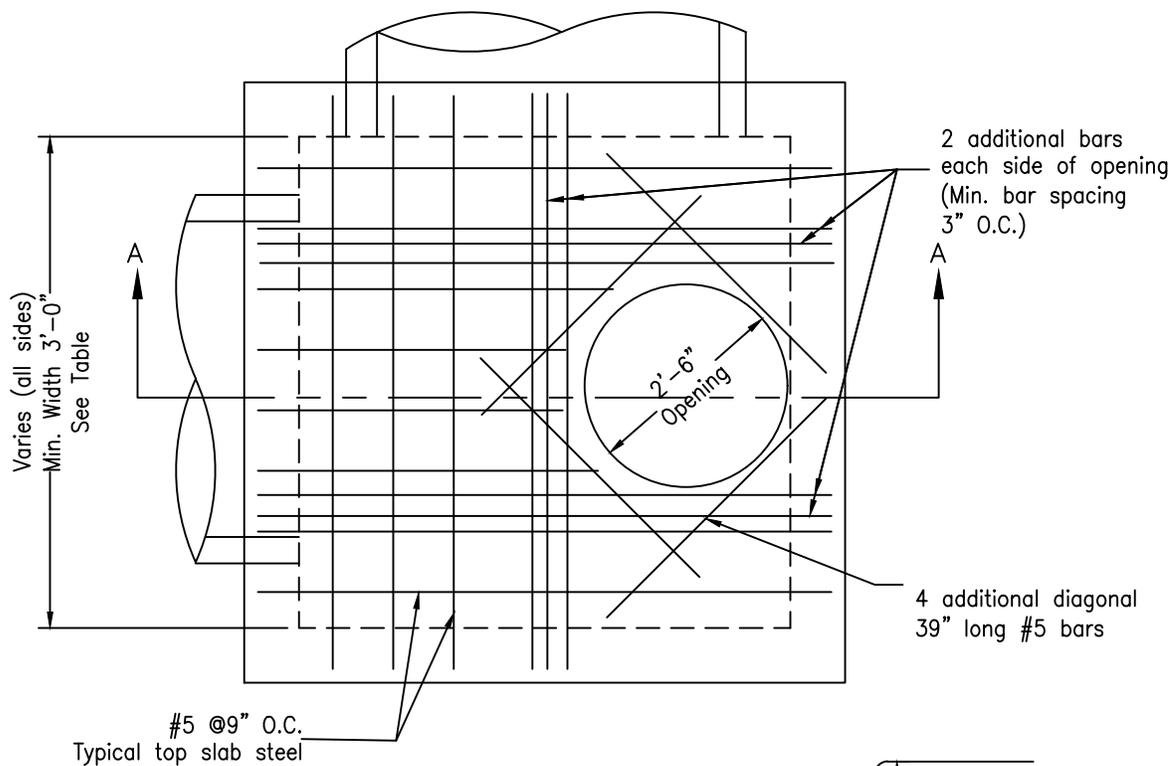


CLEANOUT

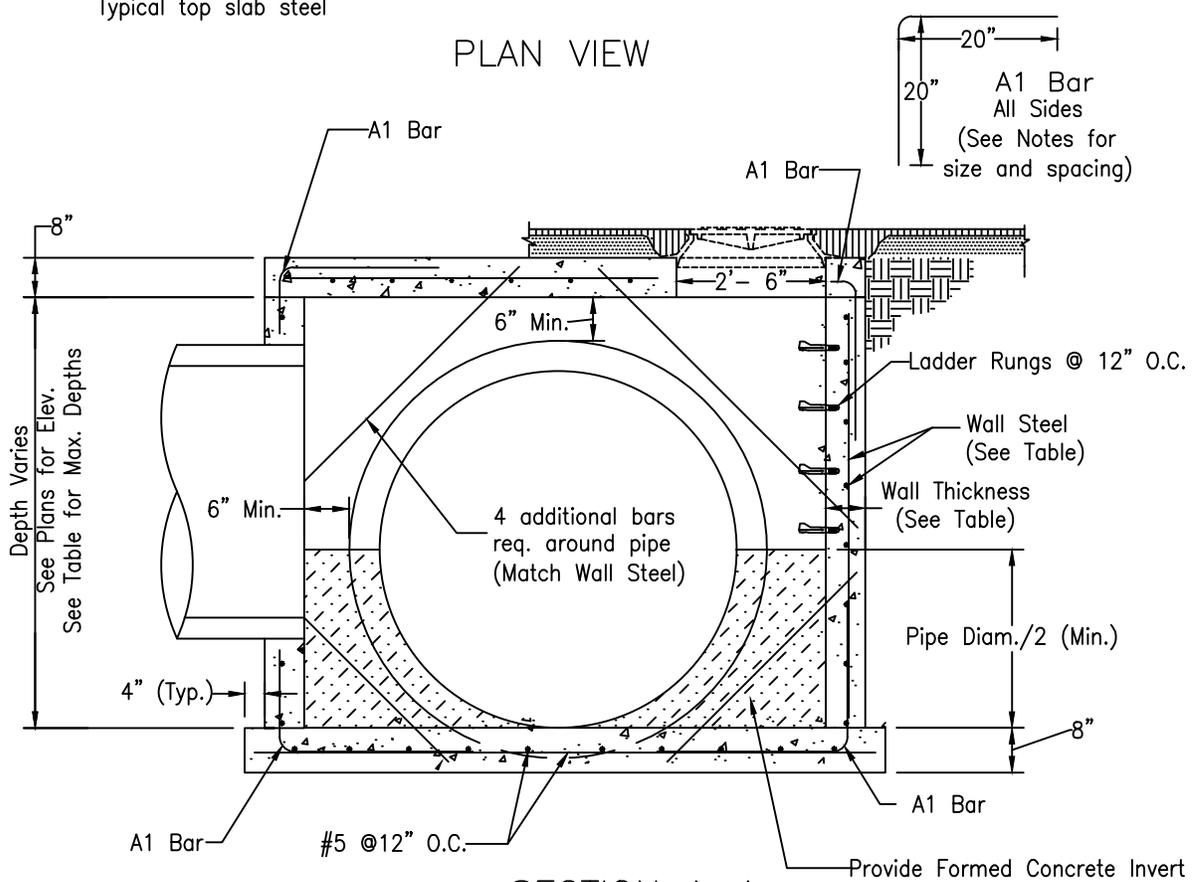
STANDARD PLAN

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SHEET 1 OF 2



PLAN VIEW



SECTION A-A



CLEANOUT

STANDARD PLAN
220
SHEET 2 OF 2

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

REINFORCING STEEL: All reinforcing steel shall be grade 60 as per APWA Section 03 20 00 (Concrete Reinforcing). All reinforcing steel shall be centered in the walls and slabs, with a 2" minimum cover. Steel shall be cut to maintain 2" clear around pipe and lid opening. A1 bars required at all corners, vertical and horizontal. A1 bars connecting two walls shall match wall steel size and spacing. A1 bars connecting walls to top slab shall match slab steel size and spacing.

PIPE: Pipe sizes and locations are as shown on plan and profile sheets, including flow-line elevations.

PIPE COVER: See Standard Plan 240 – Trench Section.

GROUT: Grout shall be cement based shrinkage resistant grout as per APWA 03 61 00 (Cementitious Grouting).

FORMING: Forming both sides of walls required.

FRAME AND LID: See Standard Plan 203 or 204 for Frame and Lid Detail.

FRAME AND GRATE: See Standard Plan 201 for Frame and Grate Detail.

LADDER RUNGS: Ladder rungs to be placed in boxes greater than 4 feet deep. See Standard Plan 208 for Detail. Ladder rungs shall be aligned with access opening.

BACKFILL: Granular backfill borrow shall conform to APWA 31 05 13 (Common Fill) and installed in accordance with APWA 31 23 23 (Backfilling For Structures) and compacted to 95% required all sides.

CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04 (Concrete). Allowable slump shall not exceed 4".

FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement on a weight basis is 15%.

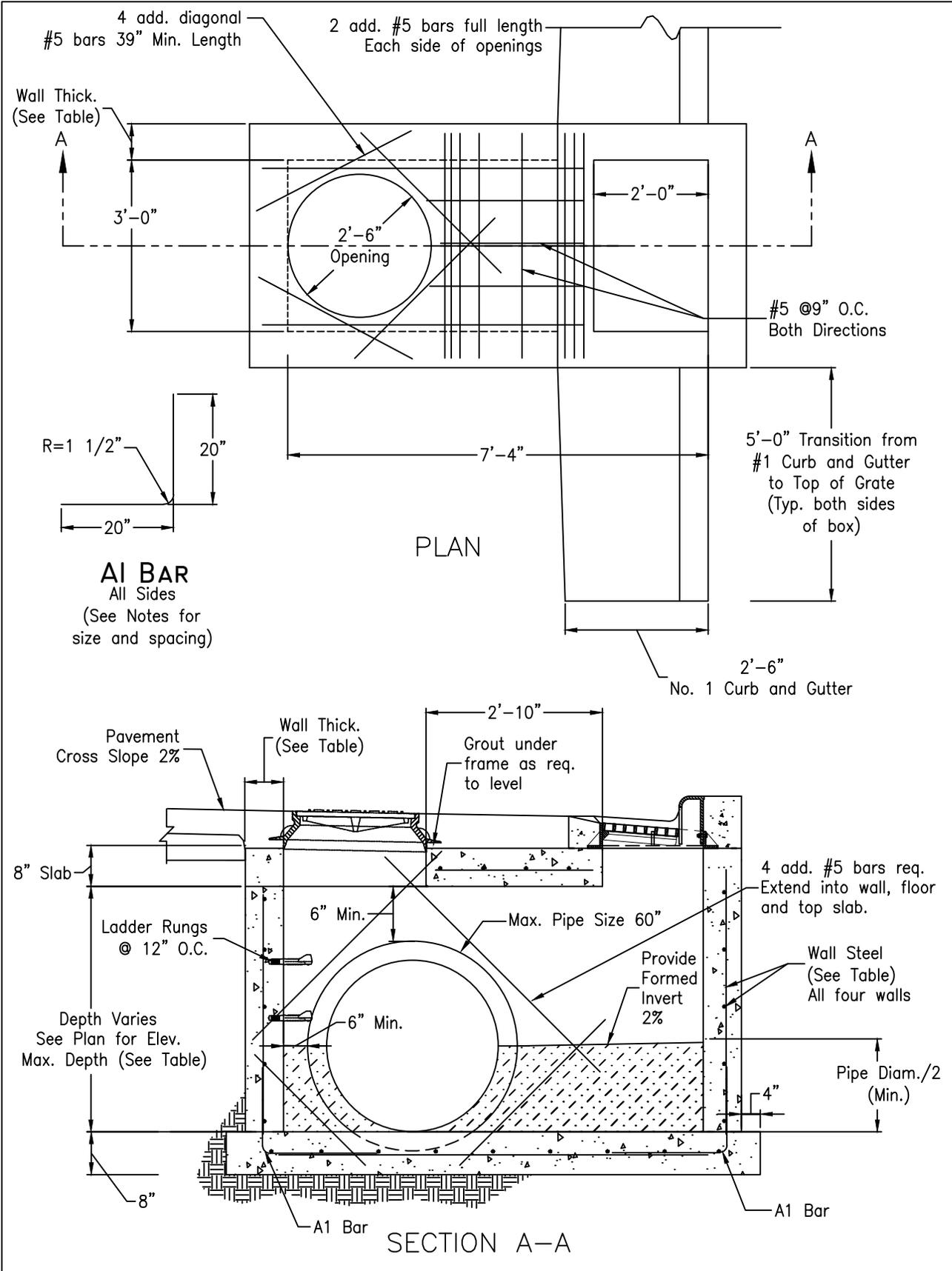
WATER TABLE: Wall thickness OR steel requirement must be increased when constructing in locations with high water table. See table below for additional requirements.

BOX WALL THICKNESS & STEEL REQUIREMENTS:			
MAX. BOX DEPTH	6'	8'	12'
WALL THICKNESS	8"	8"	10"
WALL STEEL (VERT. & HORIZ.)	#5 @9" O.C.	#5 @6" O.C	#5 @6" O.C.
MODIFICATION FOR HIGH WATER TABLE			
WALL THICKNESS	8"	8"	12"
WALL STEEL (VERT. & HORIZ.)	#5 @6" O.C.	#5 @6" O.C.	#5 @6" O.C.



CLEANOUT WITH CURB INLET & GRATE

STANDARD PLAN
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SHEET 1 OF 2



**CLEANOUT
WITH CURB INLET & GRATE**

STANDARD PLAN
225
SHEET 2 OF 2

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

REINFORCING STEEL: All reinforcing steel shall be grade 60 rebar as per APWA Section 03 20 00 (Concrete Reinforcing). All reinforcing steel shall be centered in the walls and slabs, with a minimum 2" cover. Steel shall be cut to maintain 2" clear around pipe and lid opening. A1 bars required at all corners, vertical and horizontal. A1 bars connecting two walls shall match wall steel size and spacing. A1 bars connecting walls to top slab shall match slab steel size and spacing.

PIPE: Pipe sizes and locations are as shown on plan and profile sheets, including flow-line elevations.

PIPE COVER: See Standard Plan 240 – Trench Section.

GROUT: Grout shall be cement based shrinkage resistant grout as per APWA 03 61 00 (Cementitious Grouting).

FORMING: Forming both sides of walls required.

FRAME AND LID: See Standard Plan 203 or 204 for Frame and Lid Detail.

FRAME AND GRATE: See Standard Plan 201 for Frame and Grate Detail.

LADDER RUNGS: Ladder rungs to be placed in boxes greater than 4 feet deep. Ladder rungs must be aligned with access opening. See Standard Plan 208 for Detail.

BACKFILL: Granular backfill borrow shall conform to APWA 31 05 13 (Common Fill) and installed in accordance with APWA 31 23 23 (Backfilling For Structures) and compacted to 95% required all sides.

CONCRETE: Concrete shall be Class 4000 as per APWA 03 30 04. (Concrete) Allowable slump shall not exceed 4".

FLY ASH: Fly ash is allowed as a portland cement replacement. Maximum percentage replacement on a weight basis is 15%.

WATER TABLE: Wall thickness or steel requirement must be increased when constructing in locations with high water table. See table below for additional requirements.

LIMITATIONS: Cleanout with grate is for use with No. 2, 3 or 4 curb and gutter only.

BOX WALL THICKNESS & STEEL REQUIREMENTS:			
MAX. BOX DEPTH	6'	8'	12'
WALL THICKNESS	8"	8"	10"
WALL STEEL (VERT. & HORIZ.)	#5 @9" O.C.	#5 @6" O.C.	#5 @6" O.C.
MODIFICATION FOR HIGH WATER TABLE			
WALL THICKNESS	8"	8"	12"
WALL STEEL (VERT. & HORIZ.)	#5 @6" O.C.	#5 @6" O.C.	#5 @6" O.C.

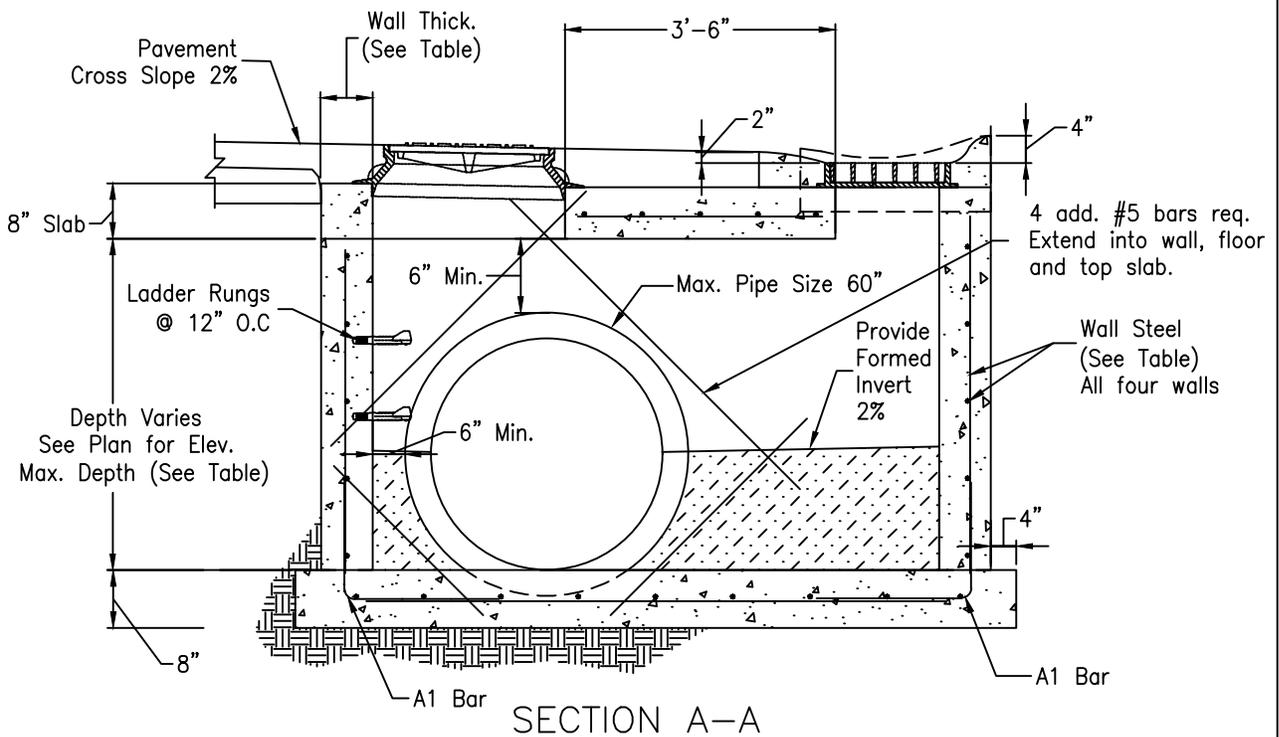
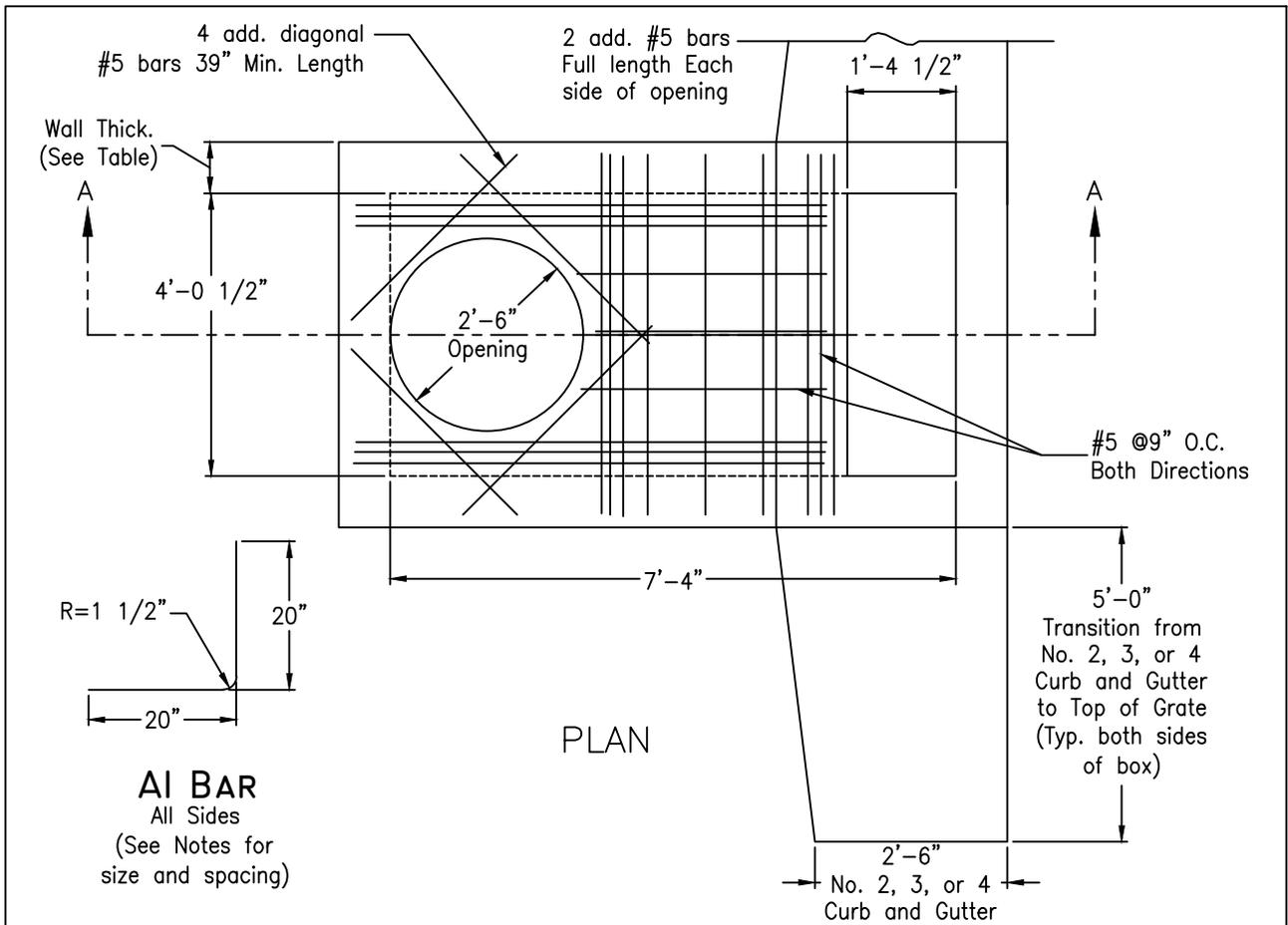


CLEANOUT WITH GRATE

STANDARD PLAN

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SHEET 1 OF 2



CLEANOUT WITH GRATE

STANDARD PLAN

230

SHEET 2 OF 2

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

All precast concrete shall conform to APWA Section 03 40 00 (Precast Concrete).

SHOP DRAWINGS: Prepare and submit shop drawings under the seal of a professional engineer as per APWA Section 03 40 00 (Precast Concrete). Manufacturers may submit designs that deviate from the standard plans. The submitted designs must meet HS20 loading and be approved by the Millcreek Public Works Director.

LIFTING HOLES: Two lifting holes are required for boxes weighing less than 40,000 pounds. Boxes weighing more than 40,000 pounds require four lifting holes and may only be used with permission of the Millcreek Public Works Director. Lifting holes shall be two inches in diameter and be located at least twelve inches below the top of the box. Lifting holes shall be placed so that the two inch minimum cover on steel is maintained. Lifting holes shall be filled with a Cement Based Shrinkage Resistant Grout as per APWA 03 61 00 (Cementitious Grouting).

LEVELING COURSE: A six inch thick leveling course consisting of granular backfill borrow is required and shall conform to APWA 31 05 13 (Common Fill) and installed in accordance with APWA 31 23 23 (Backfilling For Structures) and compacted to 95% required all sides.

FORMING OF PIPE OPENINGS: All pipe opening shall be formed or cored by manufacturer.

GROUTING AROUND PIPE OPENINGS: Grout required around all pipe openings with cement based shrinkage resistant grout as per APWA 03 61 00 (Cementitious Grout).

MINIMUM EXCAVATION WIDTH: Minimum excavation width shall be outer box dimension plus three feet each side.

INSPECTION: Inspection and certification required on all precast boxes. Inspectors must be on the Millcreek approved list of third party inspectors.



PRECAST BOX

STANDARD PLAN

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SHEET 1 OF 2

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PRECAST BOX

STANDARD PLAN
235
SHEET 2 OF 2

NOTES:

Materials, construction, and workmanship shall be in accordance with the current edition of "APWA Manual of Standard Specifications 2017 Edition", including addendum and modifications thereto, and as instructed by the Millcreek Public Works Director. Reference to specific sections of APWA does not limit requirements to that section.

PIPE: Pipe sizes and locations are as shown on plan and profile sheets, including flow-line elevations.

BACKFILLING TRENCHES: Granular backfill borrow (Common Fill) in accordance with APWA Section 33 05 20 (Backfilling Trenches) and meeting AASHTO M 145 A-1-a requirement

1. Non-plastic and well graded material.
2. Maximum aggregate size is 1 ½ inches for plastic pipe, 2 inches for all other pipes.
3. Compacted to 95% required all sides.

PIPE COVER: Pipe cover for all pipes shall be 2 feet minimum, as per APWA Section 33 41 00 (Storm Drainage Systems). Cover for Reinforced Concrete Pipe may be reduced to 1 foot with approval of the Millcreek Public Works Director.

PEA GRAVEL: Pea gravel is not allowed in any part of the trench.

SLOPES AND SHORING: All aspects of trench excavation shall conform to current OSHA requirements.

STABILIZATION ROCK: Stabilization rock shall conform follows gradation:

Sieve Size	% Passing
2"	95-100
1-1/2"	60-70
1"	40-50
1/2"	4-6

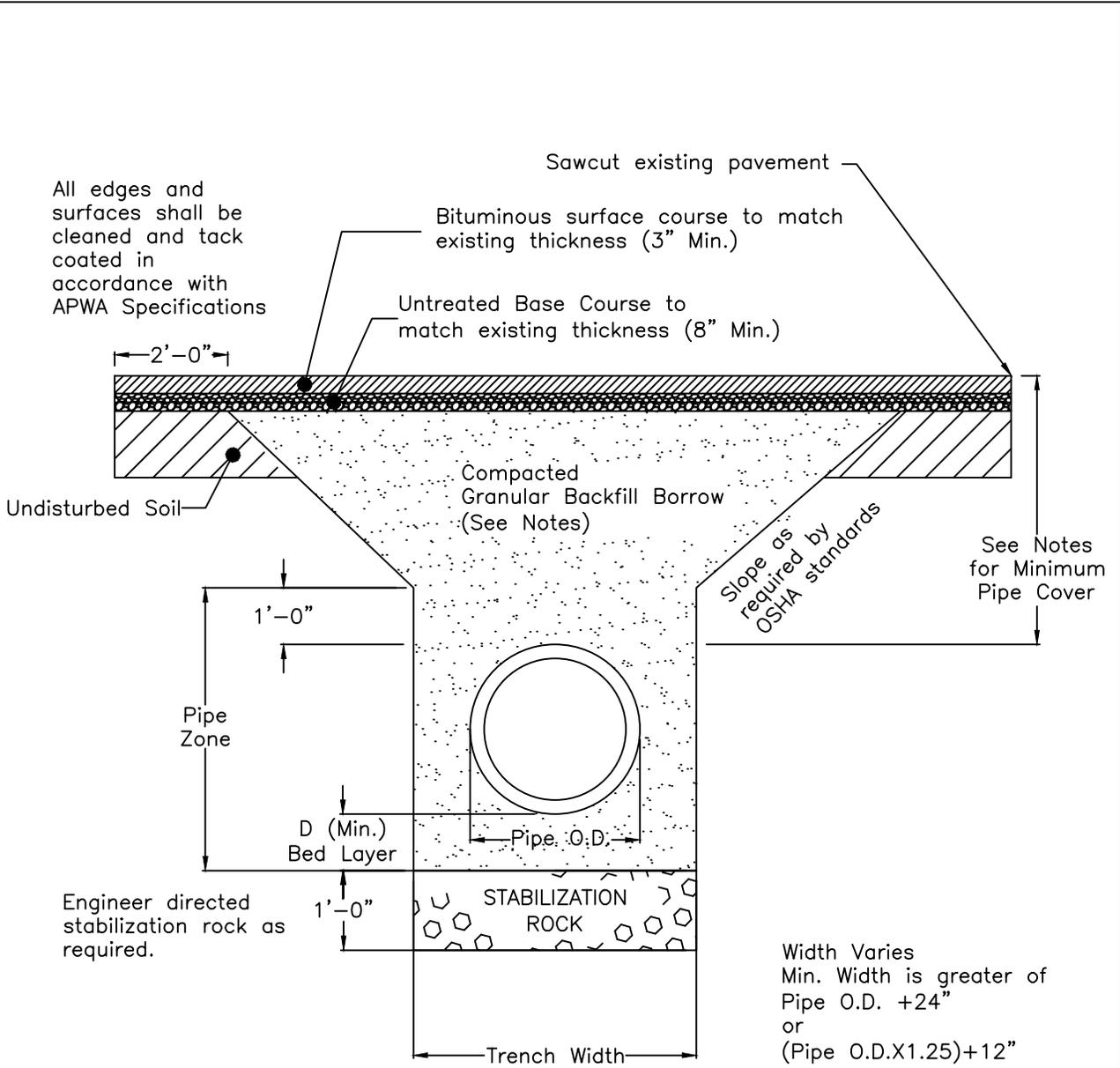


TRENCH SECTION

STANDARD PLAN

240

SHEET 1 OF 2



All edges and surfaces shall be cleaned and tack coated in accordance with APWA Specifications

Sawcut existing pavement
 Bituminous surface course to match existing thickness (3" Min.)

Untreated Base Course to match existing thickness (8" Min.)

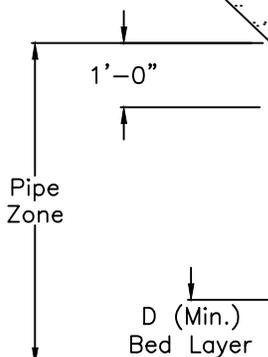
2'-0"

Undisturbed Soil

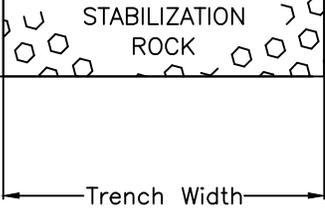
Compacted Granular Backfill Borrow (See Notes)

Slope as required by OSHA standards

See Notes for Minimum Pipe Cover



Engineer directed stabilization rock as required.



Width Varies
 Min. Width is greater of
 Pipe O.D. +24"
 or
 (Pipe O.D.X1.25)+12"

DEPTH OF BEDDING MATERIAL BELOW PIPE	
INSIDE DIA. OF PIPE	D (MIN.)
60" OR SMALLER	4"
66" AND LARGER	6"



TRENCH SECTION