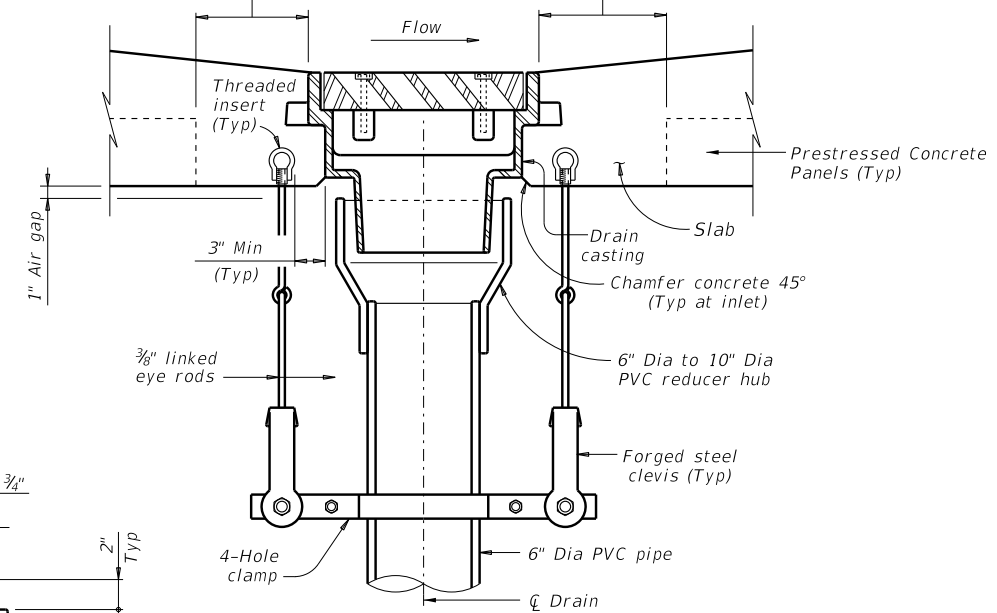
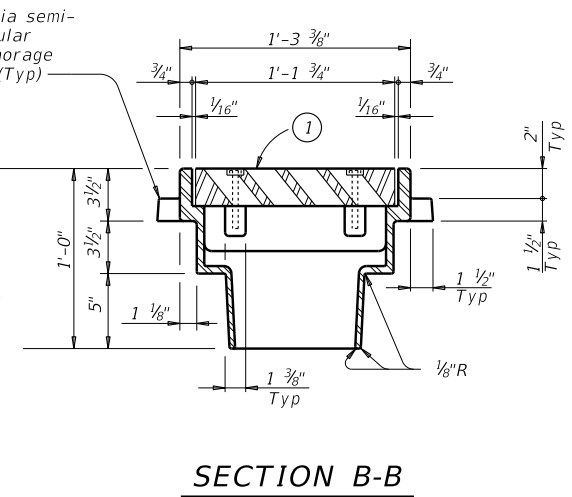
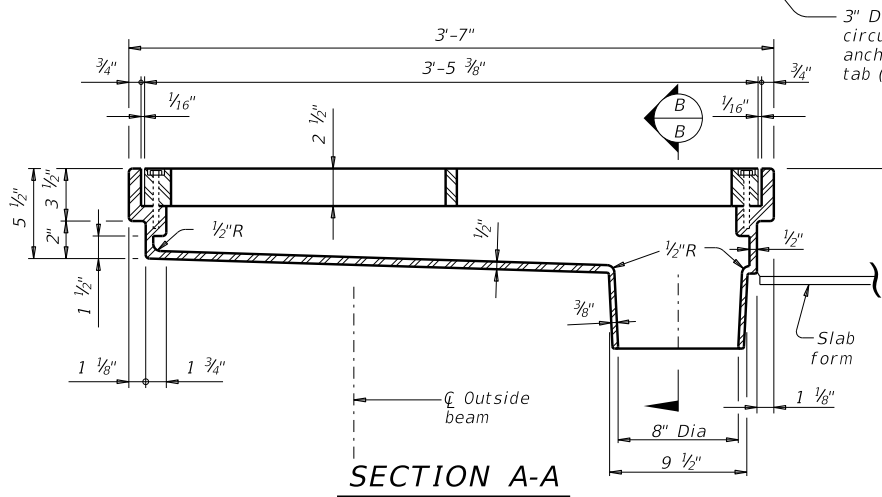
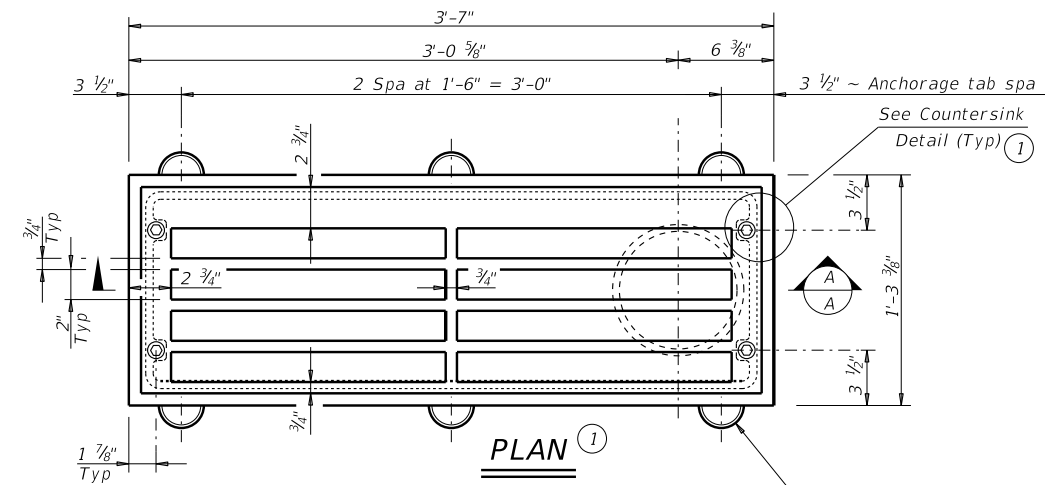


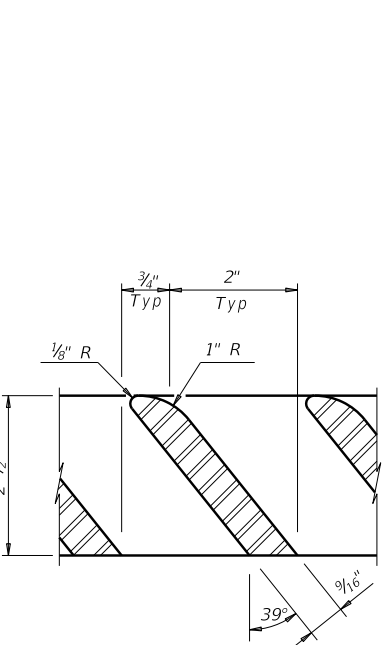
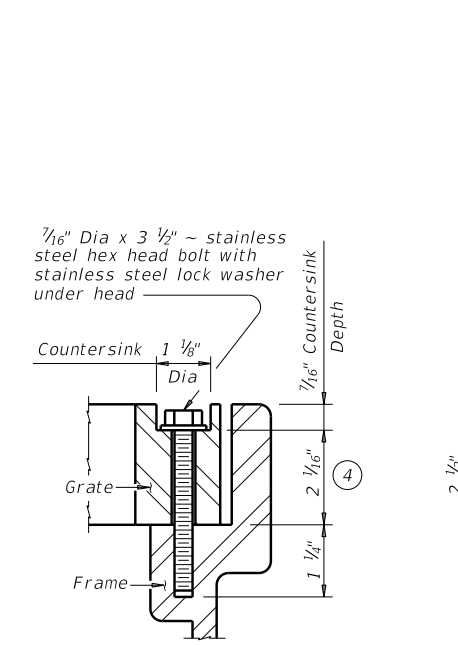
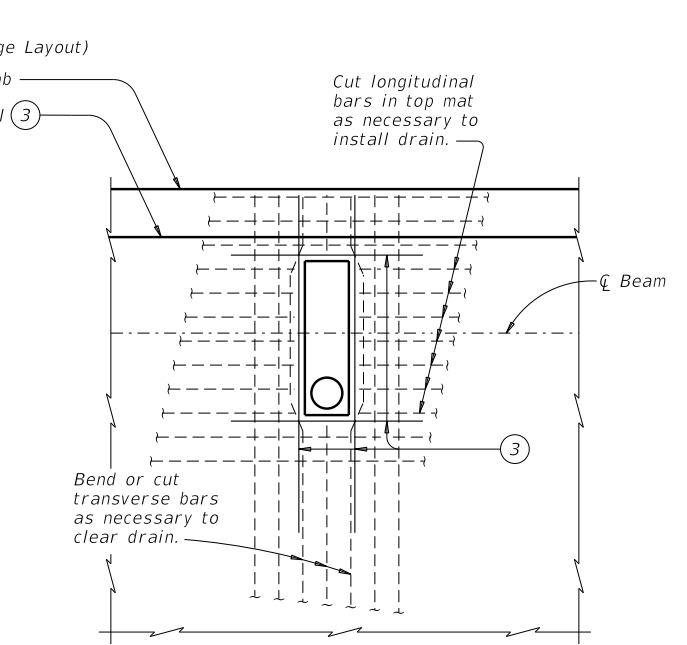
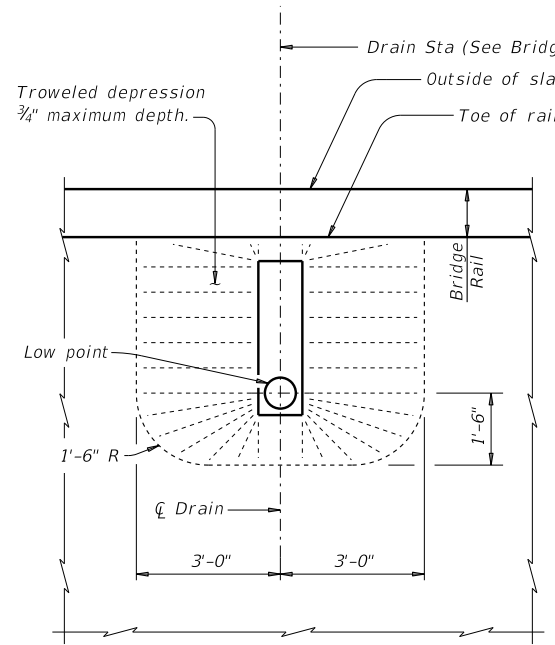
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If prestressed concrete panels are used, placed panels 3' Min from edges of casting. Conventionally reinforce this portion of cast-in-place slab as detailed on the span, unit sheets, or miscellaneous standard details and as directed by the Engineer.



GENERAL NOTES:
 Provide cast steel bridge drain frame and grate as detailed herein conforming to Item 471 "Frames, Grates, Rings, and Covers" and ASTM A27 Grade 65-35.
 Provide stainless steel ASTM F593 hex head bolts with one stainless steel lock washer, each.
 Take care to ensure uniform bearing between contact surfaces of grate and frame.
 Irregularities may be removed by grinding. Provide 3° drafts.
 All fillets 1/4" radius unless otherwise shown.
 Galvanize frame and grate in accordance with Item 445 "Galvanizing" after all fabrication and adjustments.
 Alternate bridge drains may be substituted for the bridge drain shown on this sheet provided they are approved by the Engineer prior to fabrication and installation. Alternate drains must have an approximately equal grate opening area (300 sq in) and an 8" diameter outfall. The grate should be of a similar configuration with vanes oriented perpendicular to the direction of traffic and angled toward the flow direction of the storm water. Acceptable materials for cast alternate bridge drains are ASTM A48, Class 35-B gray iron or ASTM A536, Grade 65-45-12 or Grade 70-50-05 ductile iron. Galvanization of these materials will not be required.
 Bend slab reinforcing bars to clear casting by 1".
 When bending is not possible, stop or cut reinforcing bars to clear casting as shown. Additional slab reinforcing is considered subsidiary to "Reinforced Concrete Slab." When placing concrete, take care to prevent honeycombing or air pockets around or beneath the casting.
 Provide Schedule 40 DWV PVC pipe conforming to ASTM D2665. Minimum wall thickness: 0.280" ~ 6" Dia, 0.322" ~ 8" Dia. Use fittings as directed by the Engineer. Attach the pipe securely to the superstructure. Provide pipe and supports that accommodate anticipated longitudinal movements of pipe and bridge slab. For long downhill pipe runs, match pipe grade to roadway grade. Galvanize metallic pipe support hardware and fasteners in accordance with Item 445 "Galvanizing." Include the cost of attachment devices in the unit price bid for "Grate and Frame."
 Payment will be by each Grate & Frame (Bridge Drain).
 See Bridge Layout for location of drains.
 Deviations from Bridge Drain Details contained herein will not be permitted without prior approval from the Engineer.

- ① During fabrication, test fit the grate to ensure grate can be rotated 180° to accommodate water flow from either direction.
- ② Place edge of bridge drain close to the toe of rail.
- ③ Provide 4 additional (#5) bars around perimeter in top mat of reinforcing and 4 additional (#5) bars around perimeter in bottom mat of reinforcing. Extend bars 1'-6" from edges of drain.
- ④ Provide 1/2" Dia hole for bolt thru grate.



This sheet is intended for use as a guide for fabricating and installing bridge deck drains in prestressed concrete beam and simply supported steel beam bridge decks. The size of this drain makes it undesirable for use in negative moment regions of continuous steel units where slab tensile stresses are high. Appropriate details and notes should be prepared for the specific application based on the information presented herein. This sheet may not be used without modification. The details shown here may need to be amended and/or expanded if the exact conditions are not covered. Special consideration should be given to beam, slab and slab reinforcing configuration with respect to the deck drain. Pipe configuration and support details must be done in accordance with manufacturer's recommendations, and drain outfall at the base of the column constructed in such a manner as to disrupt the cap and column reinforcing steel as little as possible. In all cases, details and notes not required must be crossed out or eliminated, "(MOD)" added to the title block, this note and the phrase "(Not to be used as a standard)" removed, and the sheet sealed and signed by a licensed professional engineer.

HL93 LOADING

Bridge Division Standard

BRIDGE DRAIN DETAILS (CAST)

(Not to be used as a standard)

BD-1

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