

NOTES:  
 1.) STANDARD MANHOLE FRAMES & COVERS SHALL BE USED ON ALL MANHOLES NOT LOCATED WITHIN CASSEMENTS UNLESS DIRECTED OTHERWISE BY THE ENGINEER.  
 2.) STANDARD MANHOLE FRAME & COVER SHALL BE BROUGHT TO PATTERN #1012B, OR APPROVED EQUIVALENT, WITH NON-PENETRATING PICK HOLES.  
 3.) "FLOW-SEAL" MANHOLE COVERS SHALL BE USED ON MANHOLES LOCATED WITHIN CASSEMENTS, IN UNPAVED AREAS, AND OUTSIDE OF THE CENTERLINE OF PAVED ROADS.  
 4.) ALL MANHOLE FRAME AND COVERS SHALL BE MADE IN THE USA.

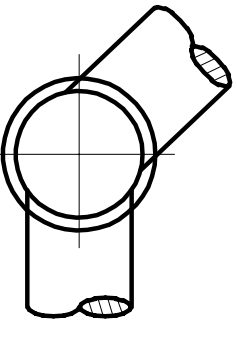
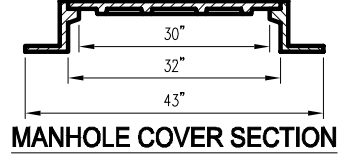


TABLE A  
 BASE SLAB DIMENSIONS

MIN. DEPTH FROM TOP OF FOOTING	FOOTING DIAMETER	FOOTING THICKNESS
10'-0"	6'-0"	1'-0"
20'-0"	6'-0"	1'-0"
30'-0"	6'-0"	1'-0"
40'-0"	7'-0"	1'-0"
50'-0"	8'-0"	1'-0"
60'-0"	8'-0"	1'-0"

NOTES:

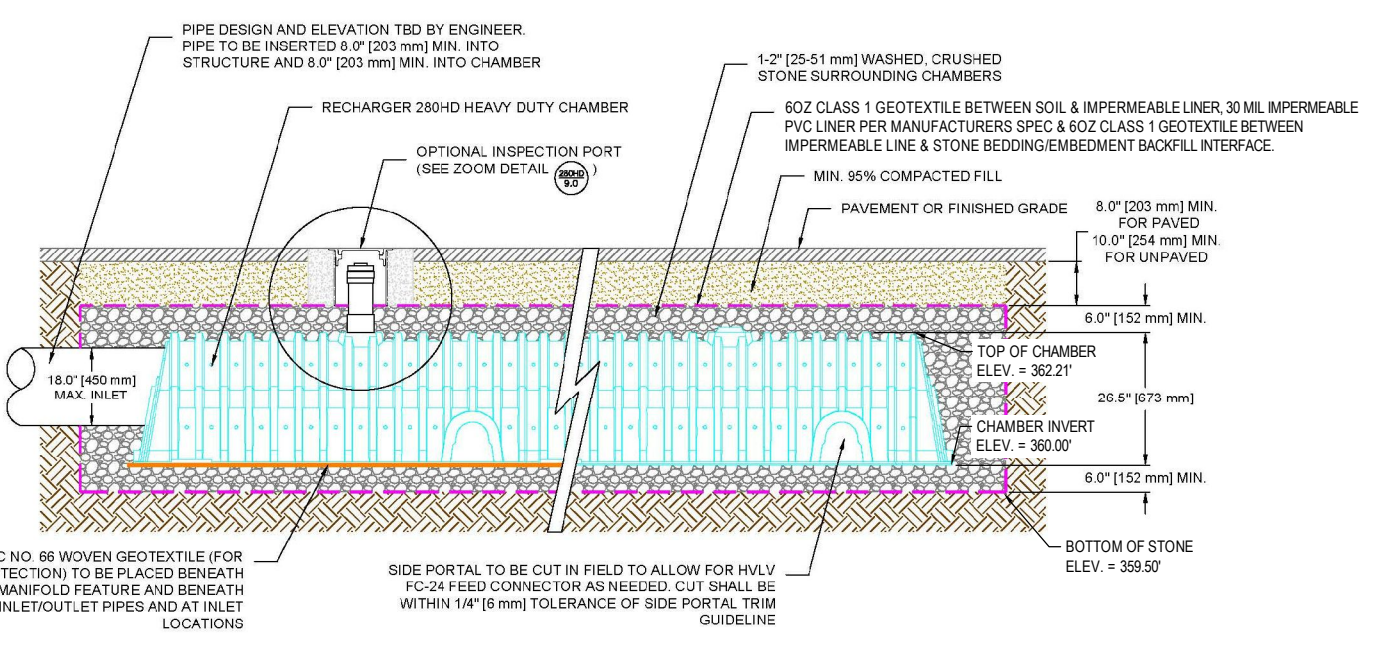
- PRECAST MANHOLES MEETING THE REQUIREMENTS OF PUBLICATION 409 SPECIFICATIONS, SECTION 714, MAY BE SUBSTITUTED FOR THE STANDARD CAST-IN-PLACE MANHOLE.
- CONSTRUCTION NOTES:  
 A. CONDUIT IN ACCORDANCE WITH GENERAL PUBLICATION 409 SPECIFICATIONS, SECTION 605, 606, 714 AND 715 OR 4-1/2" OR 6" STANDARD SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS, AS NOTED HERE IN.  
 B. MINIMUM CONCRETE CLASS 40.  
 C. PROVIDE 2" DIA. COILED STEEL REINFORCEMENT IN ACCORDANCE WITH ACI 308.1, STEEL REINFORCING BARS IN ACCORDANCE WITH ACI 308.1 AND 308.2, PLAIN BUILT STEEL BARS IN ACCORDANCE WITH ACI 308.1 AND 308.2, OR CORRODED BUILT STEEL BARS, PROVIDE MINIMUM YIELD STRENGTH OF 60,000 PSI.  
 D. CLEAR COVER FOR STEEL:  
 WALLS: 1" (1/2" SIDE COVER)  
 FOOTINGS: 2" (TOP BARS), 1 1/2" (BOTTOM BARS)  
 E. PROVIDE 1/2" MINIMUM HORIZONTAL CLEARANCE BETWEEN OPENINGS LOCATED AT THE SAME DEPTH. PIPES NOT LOCATED AT THE SAME DEPTH MUST BE LOCATED VERTICALLY AT LEAST ONE TIMES MINIMUM OPENING DIAMETER APART.  
 F. FOR RISERS OR BASE SECTIONS WITH OPENINGS, PROVIDE A MINIMUM HEIGHT OF SECTION TO BE TWO TIMES THE LARGEST OPENING CENTER OF OPENING TO BE LOCATED AT LEAST ONE TIMES THE OPENING FROM THE CLOSEST JOINT BETWEEN RISERS.  
 G. FOR PRECAST RISER OR BASE SECTIONS WITH ONE OPENING LOCATED AT DEPTHS TO 60" OR FOR SECTIONS WITH TWO OR MORE OPENINGS, LOCATED AT A DEPTH OF 10 FEET AND LESS, PROVIDE CIRCUMFERENTIAL REINFORCEMENT IN ACCORDANCE WITH REINFORCEMENT DETAIL AT OPENINGS.  
 H. FOR RISERS OR BASE SECTIONS WITH 2 OR MORE OPENINGS, LOCATED AT A DEPTH GREATER THAN 10 FEET, BUT LESS THAN OR EQUAL TO 30 FEET, PROVIDE CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.44 SQ/IN VERTICAL FOOT FOR THE DEPTH OF THE RISER OR BASE SECTION.  
 I. FOR RISERS OR BASE SECTIONS WITH 2 OR MORE OPENINGS, LOCATED AT DEPTHS GREATER THAN 30 FEET, USE A 10 INCH THICK WALL RISER OR BASE SECTION WITH CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQ/IN VERTICAL FOOT EACH FACE.  
 J. RISERS OR BASE SECTIONS WITH HOLES TO BE CLEARLY MARKED WITH MINIMUM ALLOWABLE DEPTH.  
 K. PROVIDE ADDITIONAL REINFORCEMENT BARS AROUND OPENINGS AS SHOWN ON REINFORCEMENT DETAILS AT OPENINGS.  
 L. PROVIDE MANHOLE STEPS MEETING THE REQUIREMENTS OF PUBLICATION 409 SPECIFICATIONS, SECTION 802(C). ALTERNATE CONDUITINGS AND UNIFORMS, AS APPROVED BY THE ENGINEER, MAY BE USED.  
 M. PROVIDE MINIMUM 1" SECTION DIMENSION FOR METAL STEPS. PROVIDE MINIMUM 3/4" SECTION DIMENSION FOR NON-STEERING MATERIAL STEPS.  
 N. MECHANICAL ANCHOR REQUIRED FOR INSULATION OF STEPS WITHOUT HOLES.  
 O. FOR FOOTING TOP REINFORCEMENT, BOTH DIRECTIONS, USE NO. 19 @ 12" ON CENTER TO 60" OR 0.30 IN/FT<sup>2</sup> W/FT FOR DEPTHS TO 30", 6" MAXIMUM SPACING FOR W/FT.  
 P. FOR FOOTING BOTTOM REINFORCEMENT, BOTH DIRECTIONS, USE NO. 13 @ 18" ON CENTER TO 60" OR 0.15 IN/FT<sup>2</sup> W/FT FOR DEPTHS TO 30" AND 0.16 IN/FT<sup>2</sup> W/FT FOR DEPTHS GREATER THAN 30". 6" MAXIMUM SPACING FOR W/FT.  
 Q. A SAFE BEARING CAPACITY OF (1.5) TONS PER SQ' UNDER THE ENTIRE SLAB IS ASSUMED TO DETERMINE THE BASE SIZE. WHEN THE SUBGRADE IS EXTREMELY POOR, PROCEED WITH CONSULTATION ONLY AFTER THE ENGINEER SPECIFIES ADEQUATE BASE DESIGN.

CULTEC RECHARGER 280HD SPECIFICATIONS

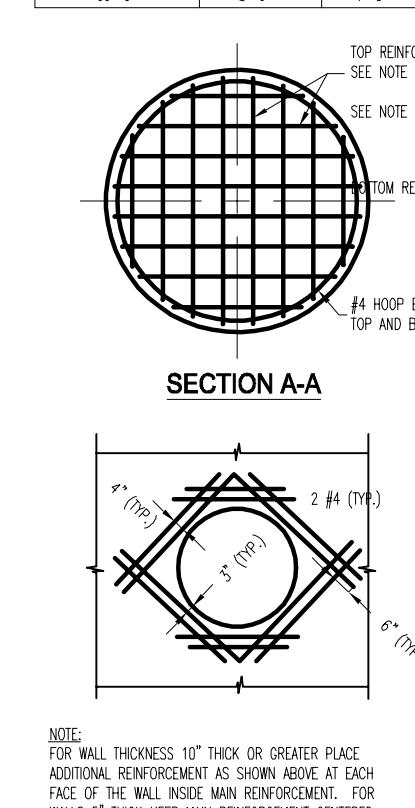
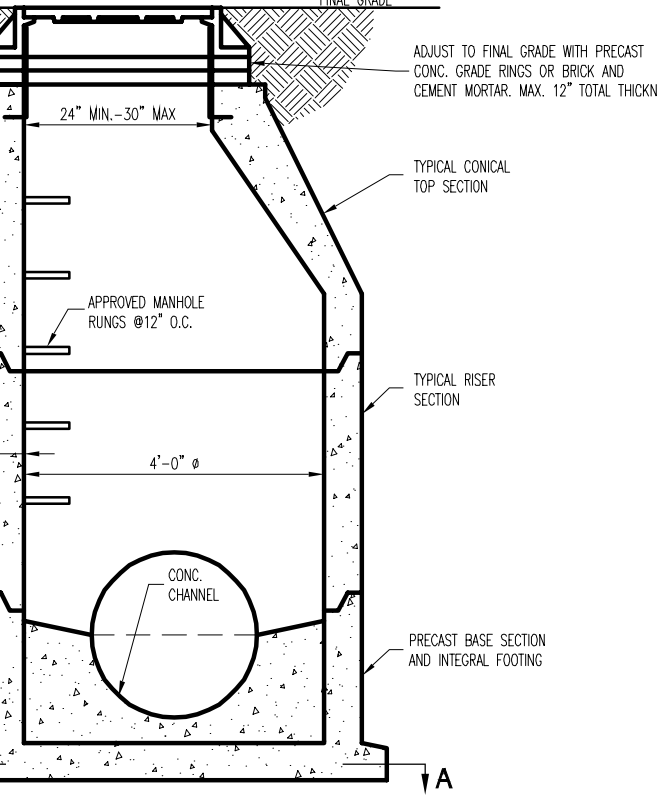
**GENERAL**  
 CULTEC RECHARGER 280HD CHAMBERS ARE DESIGNED FOR UNDERGROUND STORMWATER MANAGEMENT. THE CHAMBERS MAY BE USED FOR RETENTION, RECHARGING, DETENTION OR CONTROLLING THE FLOW OF ON-SITE STORMWATER RUNOFF.

**CHAMBER PARAMETERS**

- THE CHAMBERS WILL BE MANUFACTURED IN THE U.S.A. BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832).
- THE CHAMBER WILL BE VACUUM THERMOFORMED OF BLACK HIGH MOLECULAR WEIGHT HIGH DENSITY POLYETHYLENE (HMWHDPE).
- THE CHAMBER WILL BE ARCHED IN SHAPE.
- THE CHAMBER WILL BE OPEN-BOTTOMED.
- THE CHAMBER WILL BE JOINED USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS OR SEPARATE END WALLS.
- THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC RECHARGER 280HD SHALL BE 26.5 INCHES (673 mm) TALL, 47 INCHES (1194 mm) WIDE AND 8 FEET (2.44 m) LONG. THE INSTALLED LENGTH OF A JOINED RECHARGER 280HD SHALL BE 17 FEET (5.18 m).
- MAXIMUM INLET OPENING ON THE CHAMBER ENDWALL IS 18 INCHES (450 mm).
- THE CHAMBER WILL HAVE TWO SIDE PORTALS TO ACCEPT CULTEC HVLV/FC-24 FEED CONNECTORS TO CREATE AN INTERNAL MANIFOLD. NOMINAL INSIDE DIMENSIONS OF THE SIDE PORTAL SHALL HAVE A WIDTH OF 11.35" (289 mm) AND HEIGHT OF 11.5" (293 mm). THE SIDE PORTAL CAN ACCEPT A MAXIMUM OUTER DIAMETER (O.D.) PIPE SIZE OF 12.25 INCHES (311 mm).
- THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC HVLV/FC-24 FEED CONNECTOR SHALL BE 12 INCHES (305 mm) TALL, 16 INCHES (406 mm) WIDE AND 24 INCHES (614 mm) LONG.
- THE NOMINAL STORAGE VOLUME OF THE RECHARGER 280HD CHAMBER WILL BE 6.079 FT<sup>3</sup>/FT (0.565 m<sup>3</sup>/m) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF A JOINED RECHARGER 280HD SHALL BE 42.553 FT<sup>3</sup>/UNIT (1.355 m<sup>3</sup>/UNIT) - WITHOUT STONE.
- THE NOMINAL STORAGE VOLUME OF THE HVLV/FC-24 FEED CONNECTOR WILL BE 0.913 FT<sup>3</sup>/FT (0.085 m<sup>3</sup>/m) - WITHOUT STONE.
- THE RECHARGER 280HD CHAMBER WILL HAVE EIGHT (8) TWO DISCHARGE HOLES BORED INTO THE SIDEWALLS OF THE UNIT'S CORE TO PROMOTE LATERAL CONVEYANCE OF WATER.
- THE RECHARGER 280HD CHAMBER SHALL HAVE 15 CORRUGATIONS.
- THE ENDWALL OF THE CHAMBER, WHEN PRESENT, WILL BE AN INTEGRAL PART OF THE CONTINUOUSLY FORMED UNIT. SEPARATE END PLATES CANNOT BE USED WITH THIS UNIT.
- THE RECHARGER 280HD STAND ALONE UNIT MUST BE FORMED AS A WHOLE CHAMBER HAVING TWO FULLY FORMED INTEGRAL ENDWALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS.
- THE RECHARGER 280HD STARTER UNIT MUST BE FORMED AS A WHOLE CHAMBER HAVING ONE FULLY FORMED INTEGRAL ENDWALL AND ONE PARTIALLY FORMED INTEGRAL ENDWALL WITH A LOWER TRANSFER OPENING OF 9 INCHES (229 mm) HIGH X 35 INCHES (889 mm) WIDE.
- THE RECHARGER 280HD INTERMEDIATE UNIT MUST BE FORMED AS A WHOLE CHAMBER HAVING ONE FULLY OPEN ENDWALL AND ONE PARTIALLY FORMED INTEGRAL ENDWALL WITH A LOWER TRANSFER OPENING OF 9 INCHES (229 mm) HIGH X 35 INCHES (889 mm) WIDE.
- THE RECHARGER 280HD END UNIT MUST BE FORMED AS A WHOLE CHAMBER HAVING ONE FULLY FORMED INTEGRAL ENDWALL AND ONE FULLY OPEN END WALL AND HAVING NO SEPARATE END PLATES OR END WALLS.
- THE HVLV/FC-24 FEED CONNECTOR MUST BE FORMED AS A WHOLE CHAMBER HAVING TWO OPEN END WALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS. THE UNIT WILL FIT INTO THE SIDE PORTALS OF THE RECHARGER 280HD AND ACT AS CROSS FEED CONNECTIONS.
- CHAMBERS MUST HAVE HORIZONTAL STIFFENING FLEX REDUCTION STEPS BETWEEN THE RIBS.
- HEAVY DUTY UNITS ARE DESIGNATED BY A COLORED STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER.
- THE CHAMBER WILL HAVE A RAISED INTEGRAL CAP AT THE TOP OF THE ARCH IN THE CENTER OF EACH UNIT TO BE USED AS AN OPTIONAL INSPECTION PORT OR CLEAN-OUT.
- THE UNITS MAY BE TRIMMED TO CUSTOM LENGTHS BY CUTTING BACK TO ANY CORRUGATION.
- THE CHAMBER SHALL BE MANUFACTURED IN AN IN AN ISO 9001:2008 CERTIFIED FACILITY.
- THE CHAMBER WILL BE DESIGNED TO WITHSTAND TRAFFIC LOADS WHEN INSTALLED ACCORDING TO CULTEC'S INSTALLATION INSTRUCTIONS.
- MAXIMUM ALLOWED COVER OVER TOP OF UNIT SHALL BE 12 FEET (3.66 m).



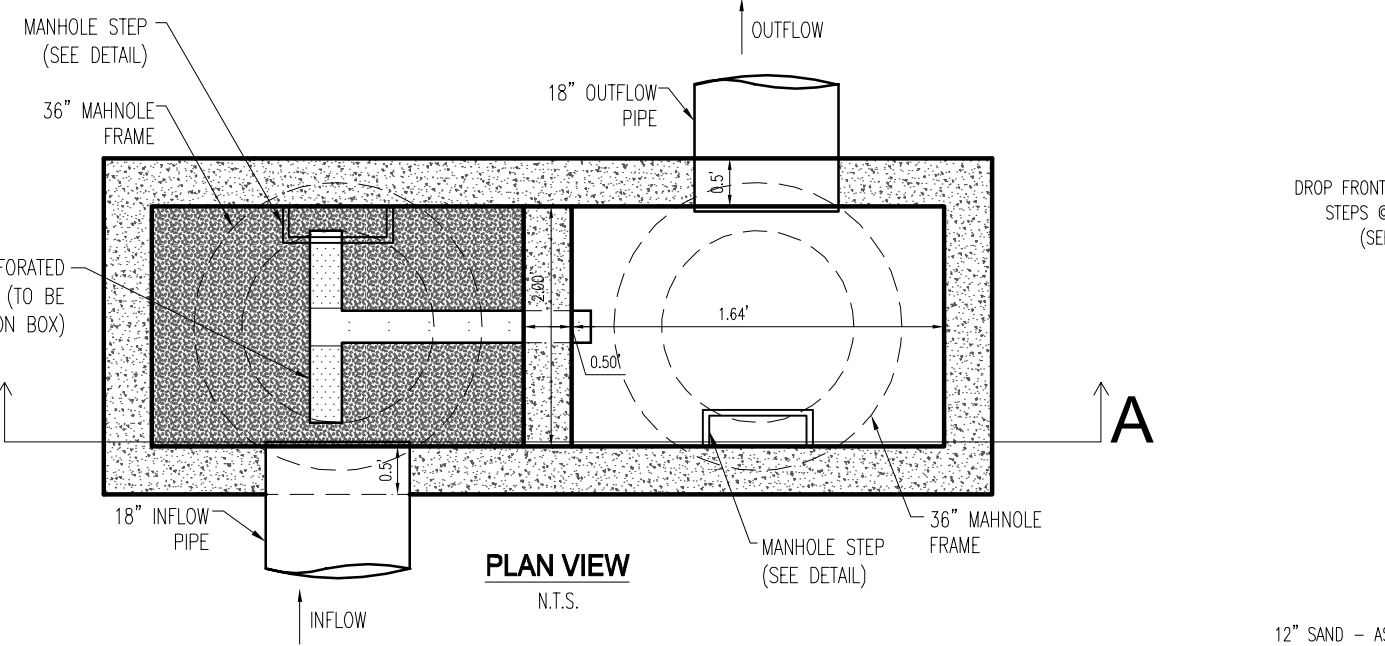
CULTEC INTERNAL MANIFOLD - OPTIONAL INSPECTION PORT DETAIL



SECTION

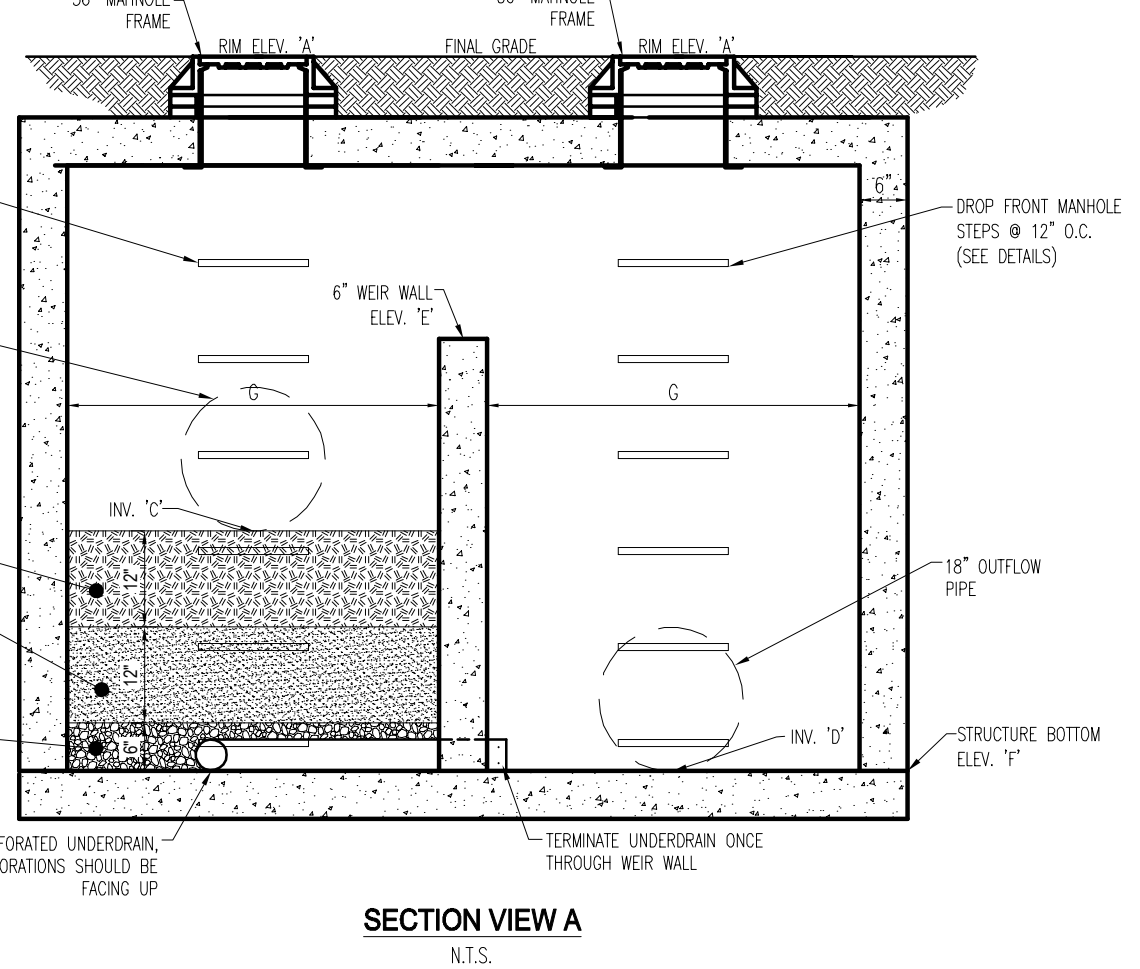
REINFORCEMENT DETAIL AT OPENINGS

PRECAST STORM MANHOLE DETAILS  
 SCALE: N.T.S.  
 REV. 2015.03.09

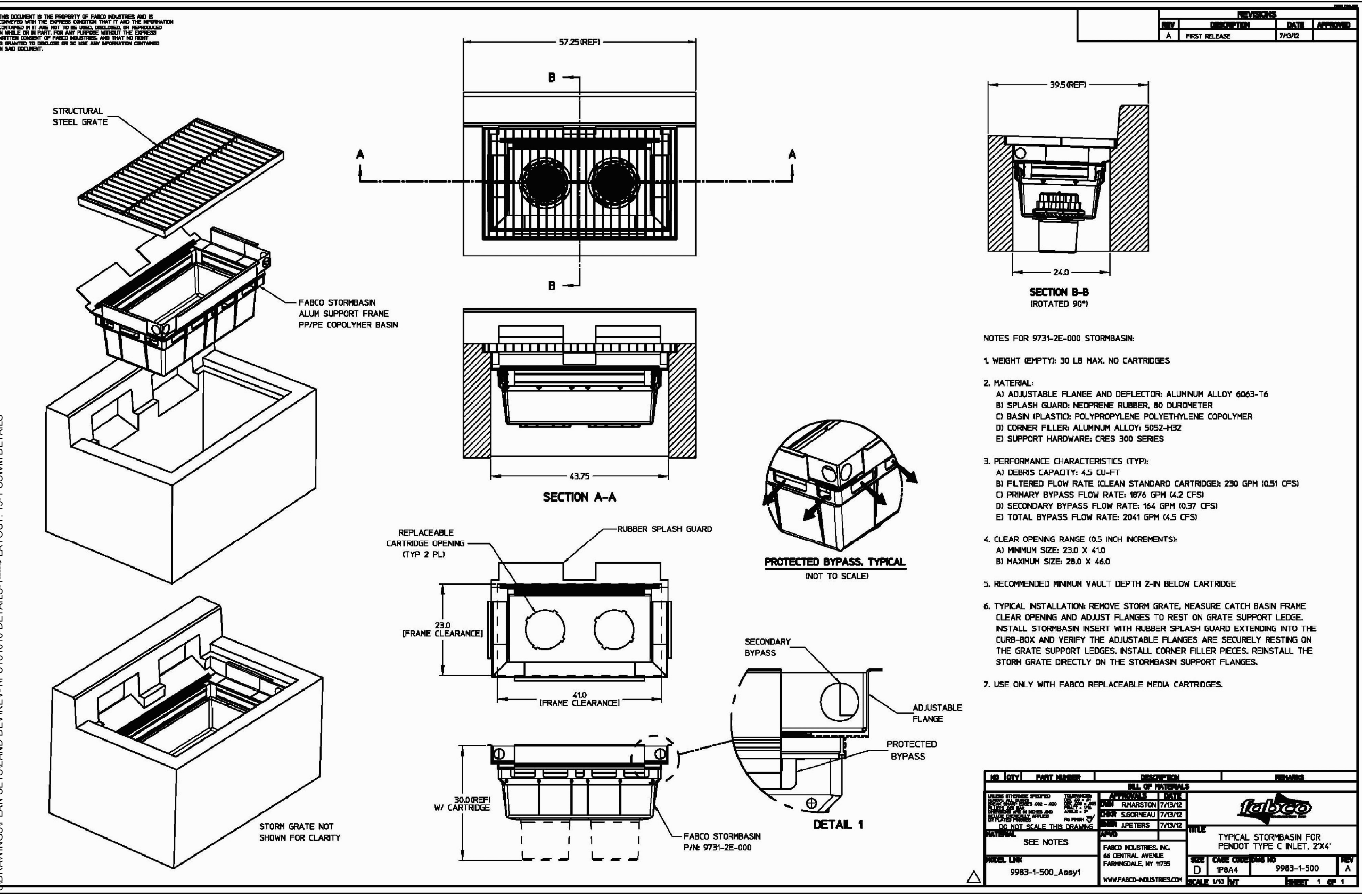


WATER QUALITY OUTLET STRUCTURE	PADOT BOX TYPE	RIM ELEV. 'A'	INFLOW INV. 'C'	OUTFLOW INV. 'D'	TOP OF WEIR ELEV. 'E'	STRUCTURE BOTTOM ELEV. 'F'	DIM. 'G'
OS-01	STANDARD BOX	365.12	360.00	357.50	361.50	357.50	1.64'

OS-01 - TYPICAL SUBSURFACE CONSTRUCTED FILTER DETAIL

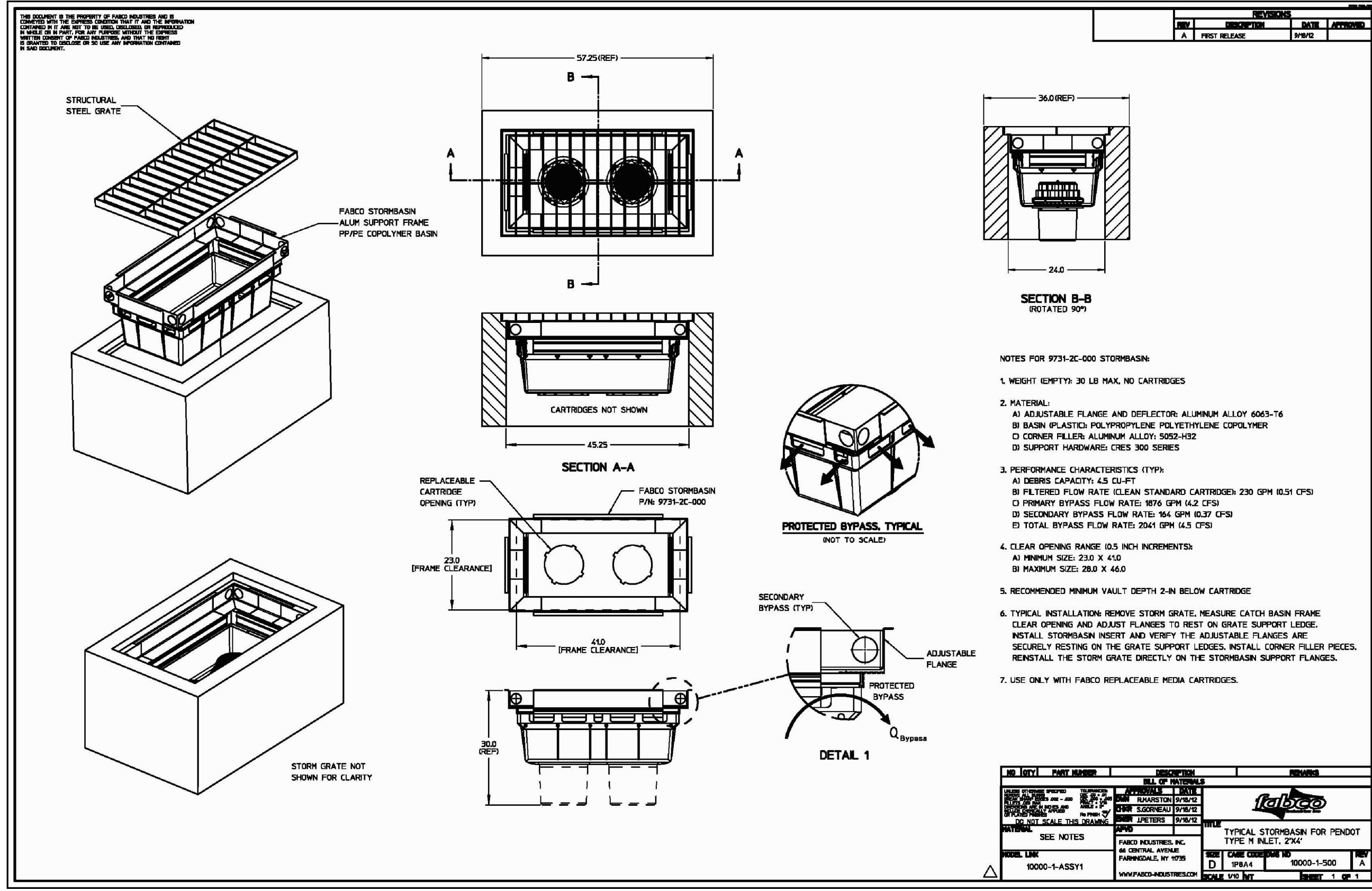


SECTION VIEW A  
 N.T.S.



**NOTES:**

- WEIGHT (EMPTY): 30 LB MAX. NO CARTRIDGES
- MATERIAL:  
 A) ADJUSTABLE FLANGE AND DEFLECTOR: ALUMINUM ALLOY 6063-T6  
 B) SPLASH GUARD: NEOPRENE RUBBER, 80 DUROMETER  
 C) BASKET: POLYPROPYLENE  
 D) CORNER FILLER: ALUMINUM ALLOY 2024-T3Z52  
 E) SUPPORT HARDWARE: CRES 300 SERIES
- PERFORMANCE CHARACTERISTICS (TYP):  
 A) DESIG. CAPACITY: 4.5 CU-FT  
 B) FILTERED FLOW RATE (CLEAN STANDARD CARTRIDGE): 230 GPM (8.51 CPS)  
 C) PRIMARY BYPASS FLOW RATE: 167 GPM (4.2 CPS)  
 D) SECONDARY BYPASS FLOW RATE: 94 GPM (3.37 CPS)  
 E) TOTAL BYPASS FLOW RATE: 261 GPM (4.2 CPS)
- CLEAR OPENING RANGE: 0.5 INCH INCREMENTS:  
 A) MINIMUM SIZE: 230 X 410  
 B) MAXIMUM SIZE: 280 X 460
- RECOMMENDED MINIMUM VAULT DEPTH: 2-IN BELOW CARTRIDGE
- TYPICAL INSTALLATION REMOVE STORM GRATE, MEASURE CATCH BASIN FRAME CLEAR OPENING AND ADJUST FLANGES TO REST ON GRATE SUPPORT LEGS. INSTALL STORMBASIN WITH RUBBER SPLASH GUARD EXTENDING INTO THE CURB-BOX AND VERIFY THE ADJUSTABLE FLANGES ARE SECURELY RESTING ON THE GRATE SUPPORT LEGS. INSTALL CORNER FILLER PIECES. REINSTALL THE STORM GRATE DIRECTLY ON THE STORMBASIN SUPPORT FLANGES.
- USE ONLY WITH FABRIC REPLACEABLE MEDIA CARTRIDGES.



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- USE ONLY WITH FABRIC REPLACEABLE MEDIA CARTRIDGES.

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REVISIONS

REV	DATE	COMMENT	BY
1	08/31/2018	PER DOT COMMENTS	MCM

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 PENNSYLVANIA LAW REQUIRES 3 WORKING DAYS NOTICE FOR CONSTRUCTION PHASE AND 10 WORKING DAYS IN DESIGN STAGE - STOP CALL  
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NOT APPROVED FOR CONSTRUCTION  
 PROJECT NO.: PC181016  
 DRAWN BY: MCM  
 CHECKED BY: EAB  
 DATE: 2018.07.13  
 SCALE: AS NOTED  
 CAD ID.: PC181016 DETAILS-1

PRELIMINARY LAND DEVELOPMENT PLANS  
 FOR  
 WAYNE PROPERTY ACQUISITION INC.  
 ROUTE 30 (LANCASTER AVE) & ABERDEEN AVE  
 RADNOR TOWNSHIP  
 DELAWARE COUNTY, PA

**BOHLER ENGINEERING**  
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SHEET TITLE: POST CONSTRUCTION STORMWATER MANAGEMENT DETAILS  
 SHEET NUMBER: 15 OF 19  
 REVISION 1 - 2018.08.31