

Revisions By	Date
1-STRMWTR RVNS	10/7/14
2-OP & STRM NOTES	12/29/14

INTEGRITY ENGINEERING

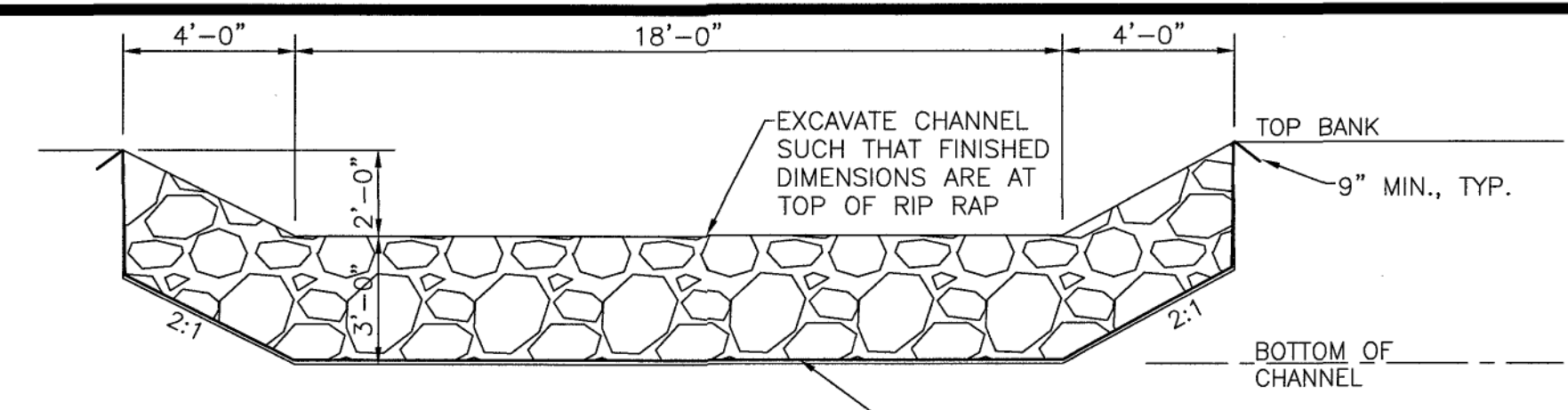
465 White Oak Drive
Blue Ridge, VA 24064
Ph: (540) 537-2390
Email: integrityengpc@gmail.com

STORM SEWER & MANAGEMENT DETAILS

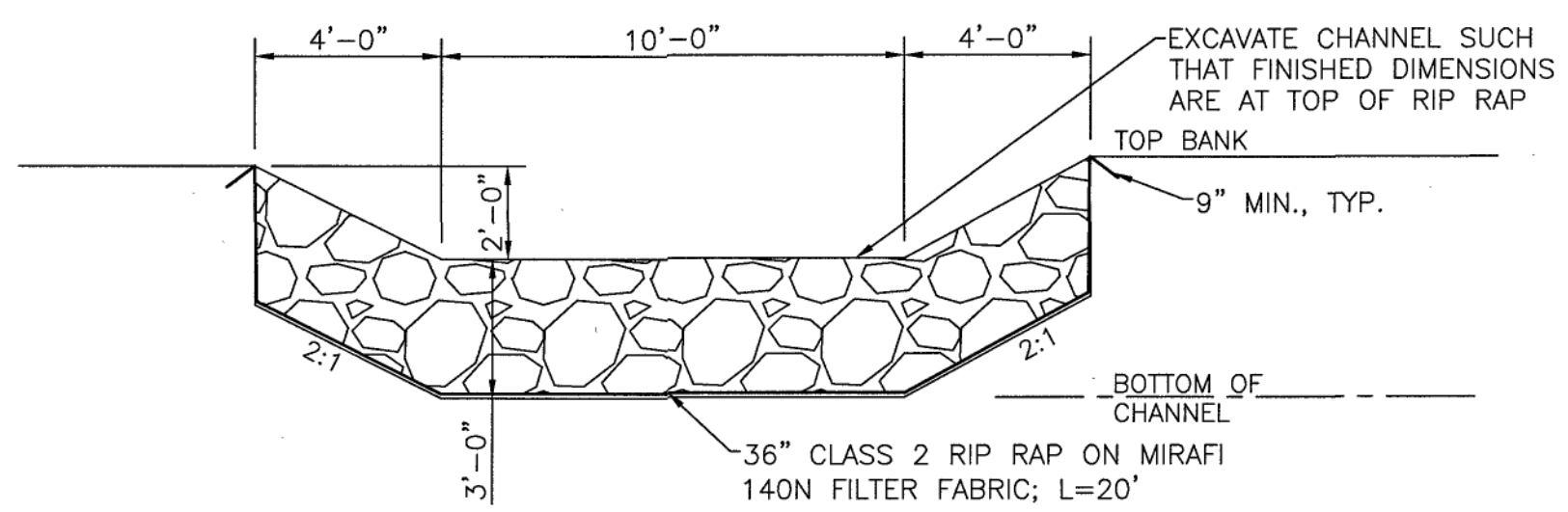
PHASE 1
COTTAGES OF STEEPLECHASE
BOTETOURT COUNTY, VIRGINIA

Scale: AS SHOWN
Date: 4-24-14
Design By: SCG
CAD By: SCG
Checked By:
Project No.: 12052

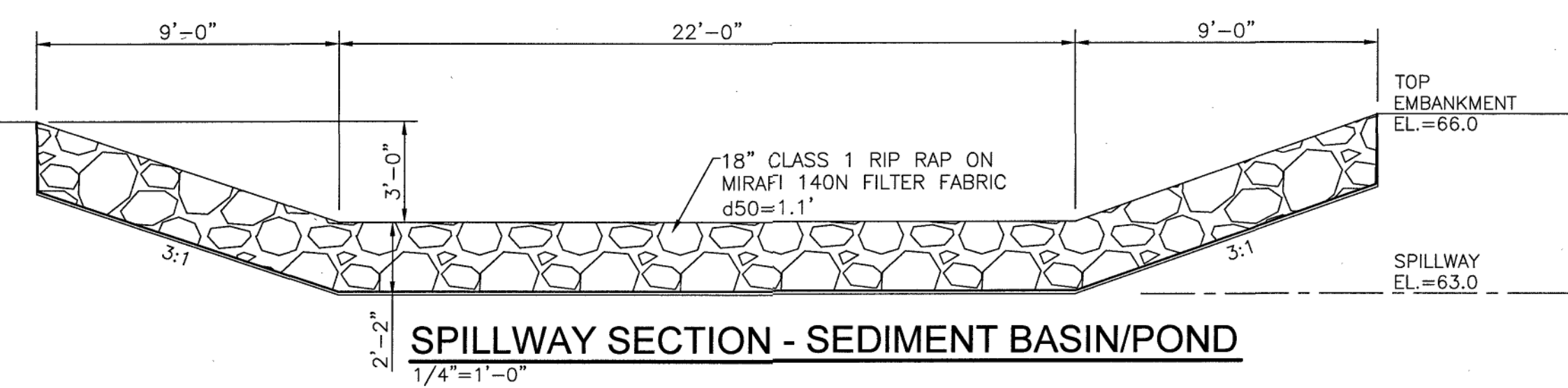
Sheet No.
C8



CHANNEL SECTION - CULVERT C1 OUTLET
1/4"=1'-0"



CHANNEL SECTION - CULVERT C2 OUTLET
1/4"=1'-0"



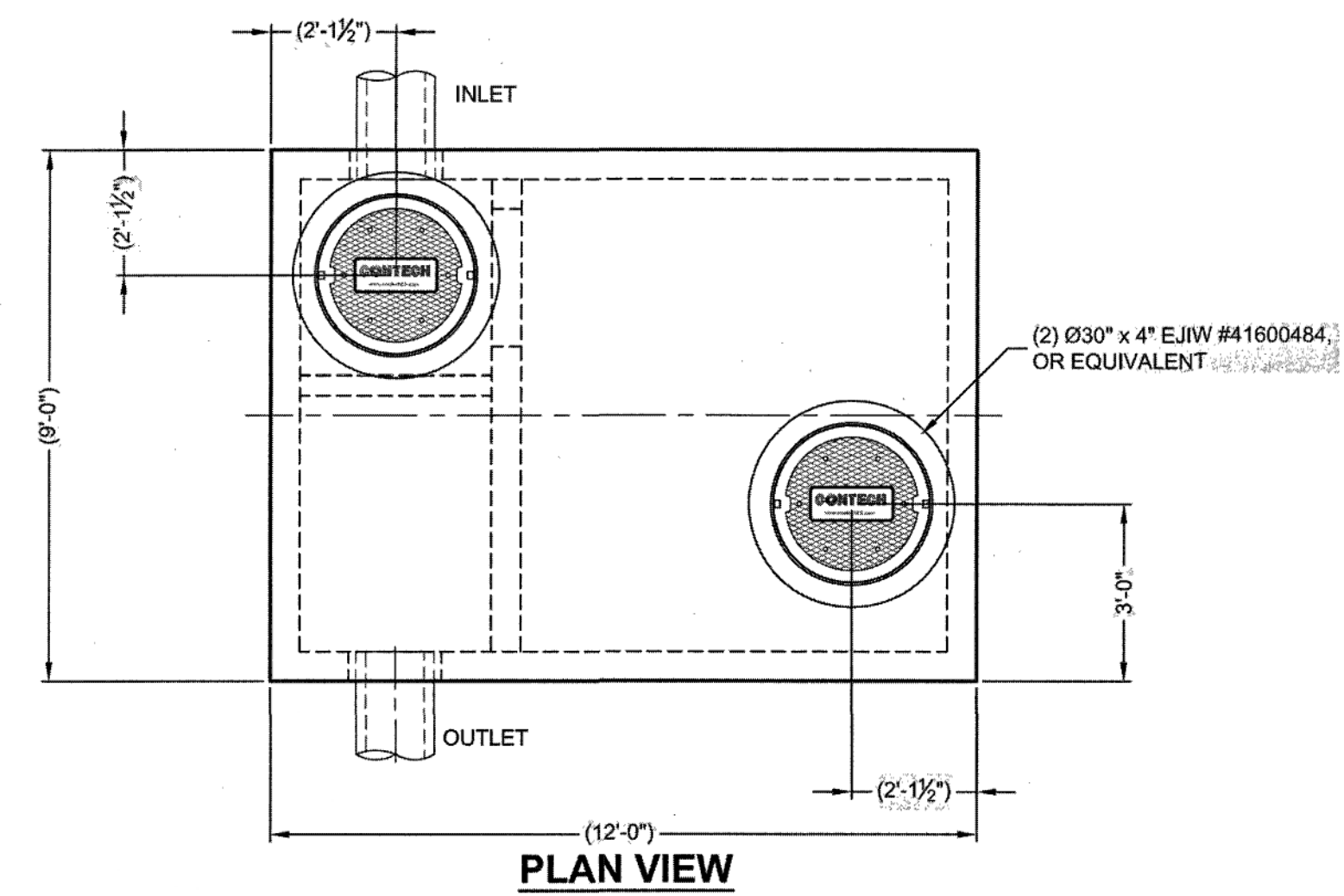
SPILLWAY SECTION - SEDIMENT BASIN/POND
1/4"=1'-0"

STORM SEWER NOTES:

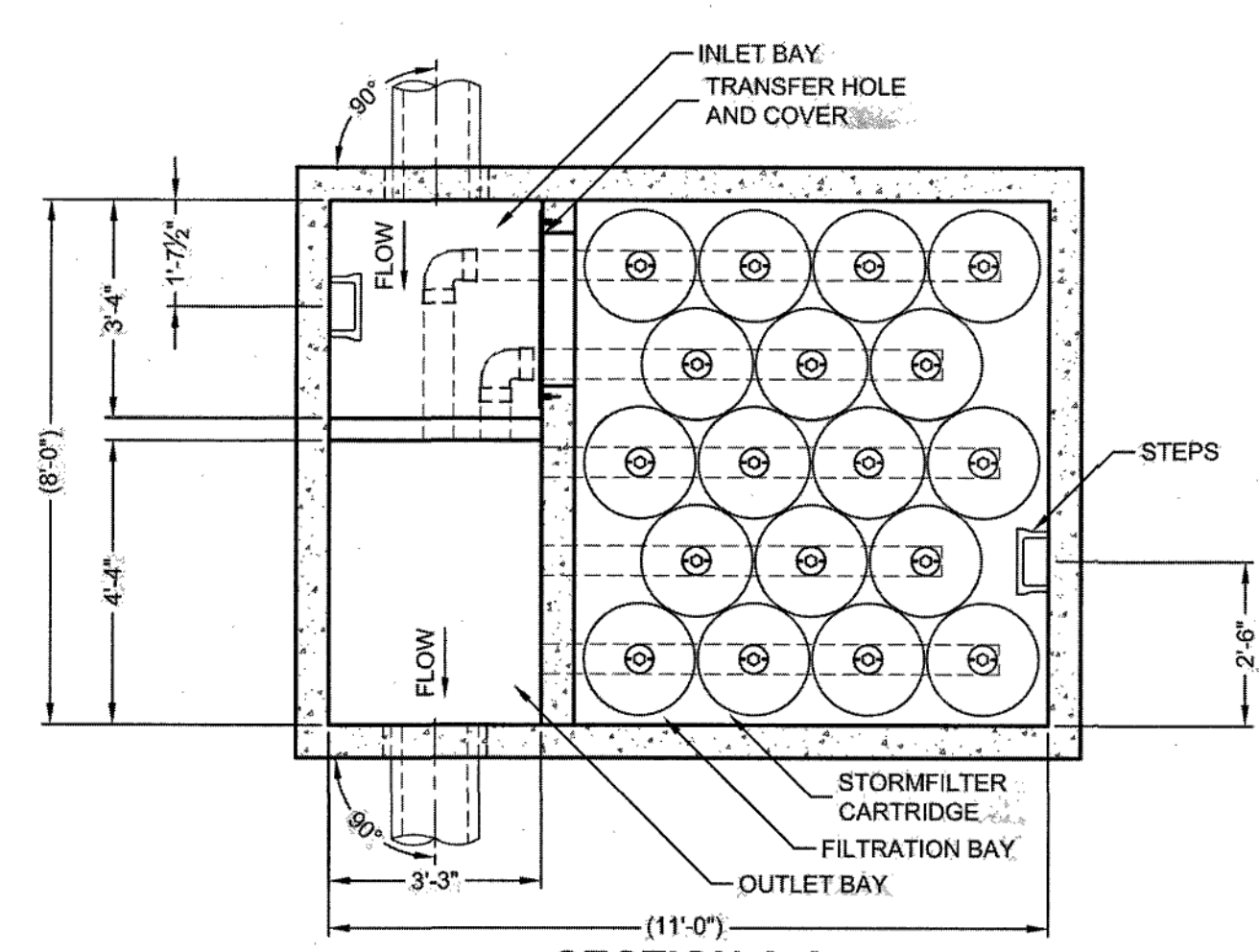
1. STORM PIPE SHALL BE LAID IN STRAIGHT LINES, AT UNIFORM GRADE BETWEEN STRUCTURES. PIPE SIZES SHALL BE AS SHOWN. PIPE SHALL BE BEDDED AS SHOWN. BACKFILL SHALL BE PLACED IN LIFTS NOT EXCEEDING 12" IN COMPACTED THICKNESS, COMPACTED WITH SMALL MOBILE COMPACTOR ("WACKER"). BACKFILL MATERIAL SHALL NOT BE MUDDY IN CONSISTENCY AND TRENCHES TO BE BACKFILLED SHALL NOT CONTAIN WATER. CURB INLETS SHALL BEAR ON A 6" LEVELING BED OF CRUSHED STONE OR SAND IN UNDISTURBED CUT SURFACES OF EXCAVATIONS IN ORIGINAL GROUND.
2. STORM DRAIN PIPING SHALL BE BEDDED IN ACCORDANCE WITH DETAIL THIS SHEET.
3. INLET SHAPING IN ACCORDANCE WITH VDOT SPECIFICATION IS-1 (Std. 106.08) SHALL BE UTILIZED ON ALL STORM STRUCTURES THAT ARE NOT STRAIGHT THRU RUNS.
4. ALL STORM STRUCTURES WITH DEPTHS GREATER THAN 4' SHALL HAVE STEPS IN ACCORDANCE WITH VDOT STD. 106.09.
5. STORM DRAIN SHOWN IS TO BE INSTALLED AS SHOWN ON PLANS. STORM DRAIN LENGTHS ARE BASED ON HORIZONTAL CL STRUCTURE TO CL STRUCTURE DISTANCE. SLOPES ARE CALCULATED BASED ON FACE STRUCTURE DISTANCES.
6. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR OR REPLACE ANY UTILITY OR STORM STRUCTURES DAMAGED DURING CONSTRUCTION.
7. ALL PIPES EXCEEDING 16% SLOPE SHALL HAVE ANCHOR BLOCKS INSTALLED IN ACCORDANCE WITH VDOT DETAIL PI-1, METHOD 2. PIPE MANUFACTURER'S ANCHOR DESIGNS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW AND APPROVAL.

STORM SEWER MATERIALS:

STORM DRAIN PIPING: ALL PIPING SHALL BE ADS, N-12 HDPE OR APPROVED EQUAL
ROAD CROSSING AND POND CULVERTS: RCP, CLASS 3
STRUCTURES: ALL STRUCTURES SHALL BE PRECAST CONCRETE ASSEMBLIES CONSTRUCTED IN ACCORDANCE WITH VDOT STANDARDS; VDOT STD MH, VDOT STD BASE, JB-1 BASE & RISER, DI-7 TOP, DI-3B TOP, DI-3C TOPS
MANHOLE FRAMES AND COVERS: CAST IRON, BOTETOURT COUNTY STANDARD WITH "STORM" ON COVER



PLAN VIEW



SECTION A-A
VAULT STYLE: 80L

MATERIAL LIST - PROVIDED BY CONTECH

COUNT	DESCRIPTION	INSTALLED BY
18	27", ZPG CARTRIDGE	CONTECH
18	RESTRICTOR DISK (GLD), 22.5 GPM	CONTECH
0	2" PVC SLIP PLUG	CONTECH
1	FLOW KIT (80L)	CONTECH
1	36" x 14" TRANSFER HOLE COVER	CONTECH
1	JOINT SEALANT	CONTRACTOR
2 PLCS	GRADE RINGS/RISERS	CONTRACTOR
2	Ø30" x 4" EJIW #41600484, OR EQUIVALENT FRAME AND COVER	CONTRACTOR
10	STEPS, P100TS LANE LADDER, OR EQUIVALENT	CONTECH

SITE DESIGN DATA

WATER QUALITY FLOW RATE	0.90 CFS
PEAK FLOW RATE	14.22 CFS
RETURN PERIOD OF PEAK FLOW	10 YRS
FILTER MEDIA TYPE	ZPG

PERFORMANCE SPECIFICATION

FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF-CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 37 SECONDS. SPECIFIC FLOW RATE SHALL BE 2 GPM/SF (MAXIMUM). SPECIFIC FLOW RATE IS THE MEASURE OF THE FLOW (GPM) DIVIDED BY THE MEDIA SURFACE CONTACT AREA (SF). MEDIA VOLUMETRIC FLOW RATE SHALL BE 6 GPM/CF OF MEDIA (MAXIMUM).

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
3. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. STORMFILTER STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING WITH ASTM C-857 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES

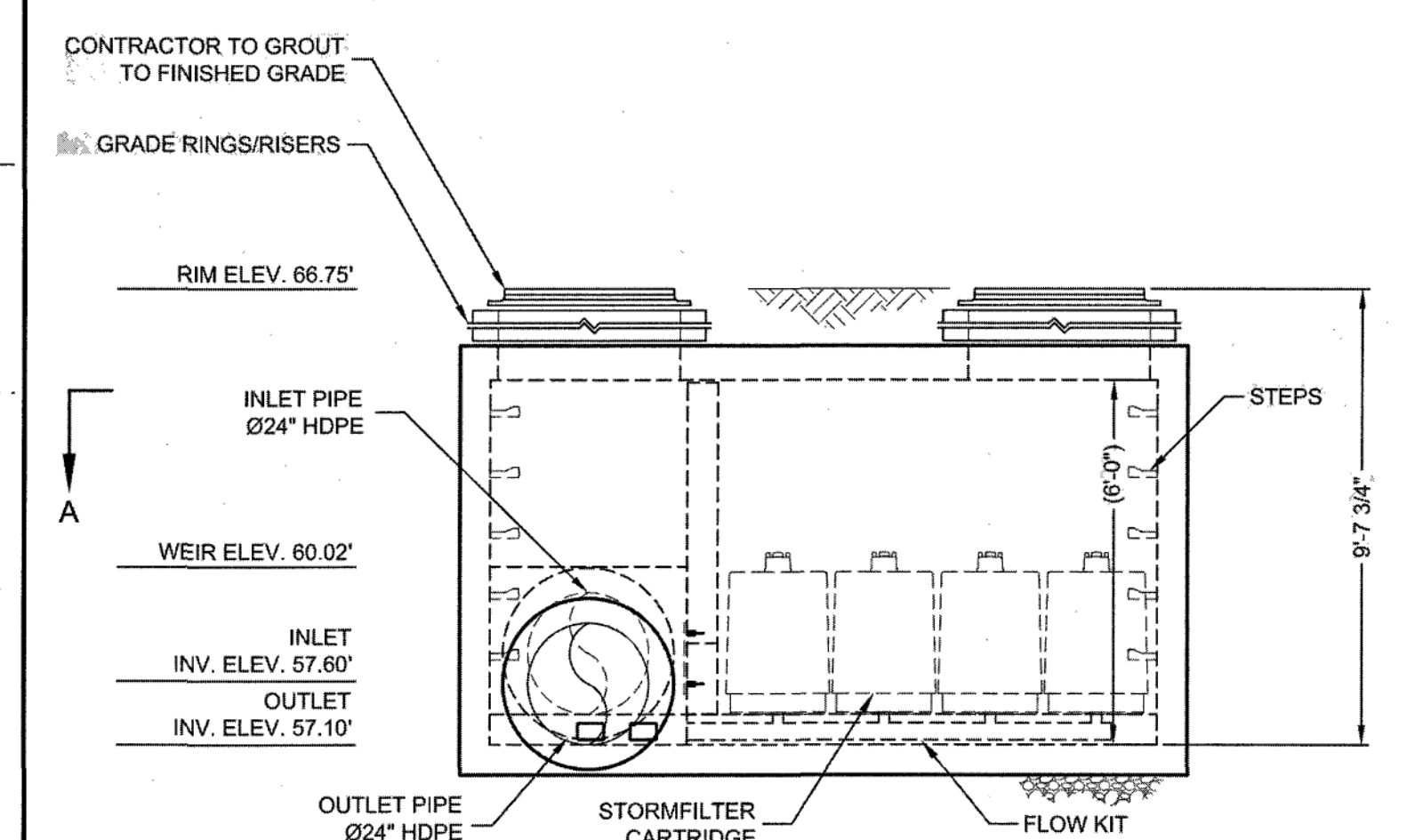
- A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING CLUTCHES PROVIDED).
- C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL SECTIONS AND ASSEMBLE STRUCTURE.
- D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
- E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
- F. CONTRACTOR TO REMOVE THE TRANSFER HOLE COVER WHEN THE SYSTEM IS BROUGHT ONLINE.

STRUCTURE WEIGHT

APPROXIMATE HEAVIEST PICK = 38,000 LBS.

CONTECH
PROPOSAL
DRAWING

LS/R/S



ELEVATION

BMP - CONTECH STORMFILTER DETAIL
NOT TO SCALE

GENERAL

1. METHOD "A" PIPE BEDDING SHALL BE USED FOR ALL TYPES OF PIPE CULVERTS WITHIN THE APPLICABLE HEIGHT OF COVER RANGING FROM THE STANDARD PC-1 TABLES UNLESS OTHERWISE NOTED ON THE PLANS.
2. H = HEIGHT OF COVER MEASURED FROM TOP OF CULVERT TO FINISHED GRADE.
3. D = EXCAVATION DEPTH AS SHOWN ON PLANS OR TO FIRM BEARING SOIL.

CIRCULAR PIPE

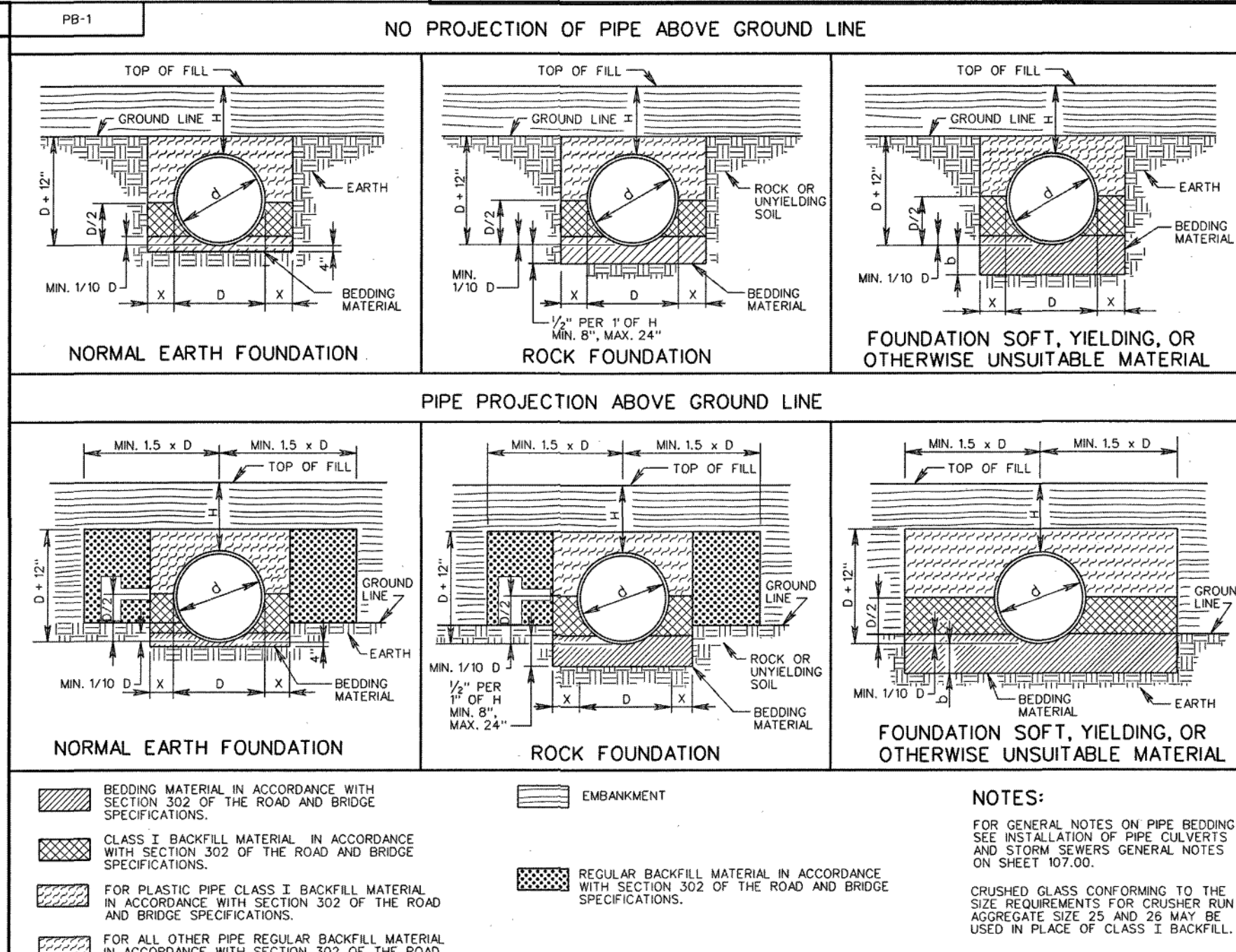
1. D = OUTSIDE DIAMETER OF PIPE.
2. d = INSIDE DIAMETER OF PIPE.
3. X = WIDTH OF CLASS I BACKFILL MATERIAL BEYOND THE EXTREMITY OF THE PIPE.
X = 12" WHERE S2 IS LESS THAN 30°
X = 18" WHERE S2 IS 30° AND GREATER
4. WHERE DIRECTED BY THE ENGINEER, BEDDING MATERIAL MAY BE ELIMINATED FOR NORMAL EARTH FOUNDATIONS UNDER ROUTINE ENTRANCE PIPE (EXCEPT PLASTIC PIPE) 30" AND LESS IN DIAMETER WITH HEIGHT OF COVER 15' OR LESS.
5. REGULAR BACKFILL MATERIAL MAY BE USED IN LIEU OF CLASS I BACKFILL MATERIAL FOR ALL FOUNDATION TYPES FOR ROUTINE ENTRANCE PIPE (EXCEPT PLASTIC PIPE) 30" AND LESS IN DIAMETER WITH HEIGHT OF COVER 15' OR LESS.
6. BEDDING MATERIAL AND CLASS I BACKFILL MATERIAL MAY BE ELIMINATED FOR SHOULDER SLOT INLET (D-10) OUTLET PIPES INSTALLATIONS.

ELLIPTICAL PIPE

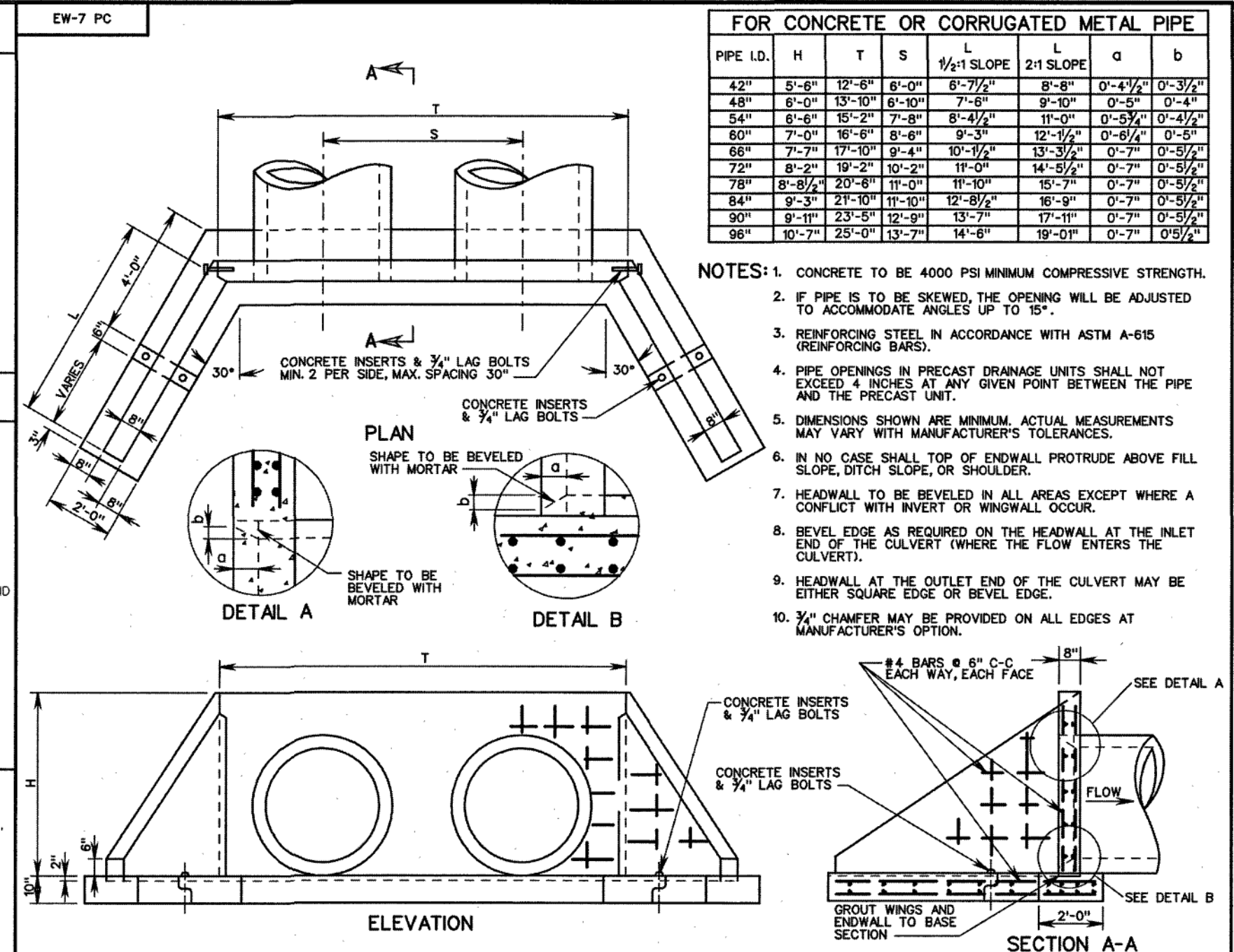
1. S1 = OUTSIDE SPAN DIMENSION OF PIPE.
2. S2 = INSIDE SPAN DIMENSION OF PIPE.
3. R = OUTSIDE RISE DIMENSION OF PIPE.
4. X = WIDTH OF CLASS I BACKFILL MATERIAL BEYOND THE EXTREMITY OF THE PIPE.
X = 12" WHERE S2 IS LESS THAN 30°
X = 18" WHERE S2 IS 30° AND GREATER
5. WHERE DIRECTED BY THE ENGINEER, BEDDING MATERIAL MAY BE ELIMINATED FOR NORMAL EARTH FOUNDATIONS UNDER ROUTINE ENTRANCE PIPE WHERE S2 IS 30° OR LESS AND HEIGHT OF COVER 15' OR LESS.
6. REGULAR BACKFILL MATERIAL MAY BE USED IN LIEU OF CLASS I BACKFILL MATERIAL FOR ALL FOUNDATION TYPES FOR ROUTINE ENTRANCE PIPE WHERE S2 IS 30° OR LESS AND HEIGHT OF COVER 15' OR LESS.

PIPE ARCH

1. S = SPAN DIMENSION OF PIPE.
2. R = RISE DIMENSION OF PIPE.
3. B = SEE PC-1 TABLE FOR APPLICABLE PIPE MATERIAL.
4. X = WIDTH OF CLASS I BACKFILL MATERIAL BEYOND THE EXTREMITY OF THE PIPE.
X = 12" WHERE S2 IS LESS THAN 30°
X = 18" WHERE S2 IS 30° AND GREATER
5. WHERE DIRECTED BY THE ENGINEER, BEDDING MATERIAL MAY BE ELIMINATED FOR NORMAL EARTH FOUNDATIONS UNDER ROUTINE ENTRANCE PIPE WHERE S2 IS 30° OR LESS AND HEIGHT OF COVER 15' OR LESS.
6. REGULAR BACKFILL MATERIAL MAY BE USED IN LIEU OF CLASS I BACKFILL MATERIAL FOR ALL FOUNDATION TYPES FOR ROUTINE ENTRANCE PIPE WHERE S IS 30° OR LESS AND HEIGHT OF COVER 15' OR LESS.



- NOTES:**
- FOR GENERAL NOTES ON PIPE BEDDING, SEE INSTALLATION OF PIPE CULVERTS AND STORM SEWERS GENERAL NOTES ON SHEET 107.00.
 - CRUSHED GLASS CONFORMING TO THE SIZE REQUIREMENTS FOR CRUSHER RUN AGGREGATE, SIZE 10 AND 20 MAY BE USED IN PLACE OF CLASS I BACKFILL.
- LEGEND:**
- BEDDING MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.
 - CLASS I BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.
 - FOR PLASTIC PIPE CLASS I BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.
 - FOR ALL OTHER PIPE REGULAR BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.
 - EMBANKMENT
 - REGULAR BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.



FOR CONCRETE OR CORRUGATED METAL PIPE									
PIPE I.D.	H	T	S	1/4" SLOPE	2/1 SLOPE	a	b	c	d
42"	5'-6"	12'-6"	8'-0"	6'-7 1/2"	8'-8"	0'-4 1/2"	0'-3 1/2"	0'-4"	0'-4"
48"	6'-0"	13'-0"	8'-10"	7'-8"	9'-10"	0'-5"	0'-4"	0'-4"	0'-4"
54"	6'-6"	13'-6"	9'-0"	8'-0"	10'-0"	0'-5 1/2"	0'-4"	0'-4"	0'-4"
60"	7'-0"	14'-0"	9'-6"	9'-0"	11'-0"	0'-6"	0'-4"	0'-4"	0'-4"
66"	7'-6"	14'-6"	10'-0"	10'-0"	12'-0"	0'-6 1/2"	0'-4"	0'-4"	0'-4"
72"	8'-0"	15'-0"	10'-6"	11'-0"	13'-0"	0'-7"	0'-4"	0'-4"	0'-4"
78"	8'-6"	15'-6"	11'-0"	11'-0"	14'-0"	0'-7 1/2"	0'-4"	0'-4"	0'-4"
84"	9'-0"	16'-0"	11'-6"	12'-0"	15'-0"	0'-8"	0'-4"	0'-4"	0'-4"
90"	9'-6"	16'-6"	12'-0"	12'-0"	16'-0"	0'-8 1/2"	0'-4"	0'-4"	0'-4"
96"	10'-0"	17'-0"	12'-6"	13'-0"	17'-0"	0'-9"	0'-4"	0'-4"	0'-4"

- NOTES:**
1. CONCRETE TO BE 4000 PSI MINIMUM COMPRESSIVE STRENGTH.
 2. IF PIPE IS TO BE SLOPED, THE OPENING WILL BE ADJUSTED TO ACCOMMODATE ANGLES UP TO 15°.
 3. REINFORCING STEEL IN ACCORDANCE WITH ASTM A-615 (REINFORCING BARS).
 4. PIPE OPENINGS IN PRECAST DRAINAGE UNITS SHALL NOT EXCEED 4 INCHES AT ANY GIVEN POINT BETWEEN THE PIPE AND THE PRECAST UNIT.
 5. DIMENSIONS SHOWN ARE MINIMUM ACTUAL MEASUREMENTS MAY VARY WITH MANUFACTURER'S TOLERANCES.
 6. IN NO CASE SHALL TOP OF ENDWALL PROTRUDE ABOVE FILL SLOPE, DITCH SLOPE OR SHOULDER.
 7. HEADWALL TO BE REVELED IN ALL AREAS EXCEPT WHERE A CONFLICT WITH INVERT OR WINGWALL OCCUR.
 8. BEVEL EDGE AS REQUIRED ON THE HEADWALL AT THE INLET END OF THE CULVERT (WHERE THE FLOW ENTERS THE CULVERT).
 9. HEADWALL AT THE OUTLET END OF THE CULVERT MAY BE EITHER SQUARE EDGE OR BEVEL EDGE.
 10. 3/4" CHAMFER MAY BE PROVIDED ON ALL EDGES AT MANUFACTURER'S OPTION.

SPECIFICATION REFERENCE	INSTALLATION OF PIPE CULVERTS & STORM SEWERS GENERAL NOTES
302 303	

VDOT ROAD AND BRIDGE STANDARDS	
REVISION DATE	SHEET 1 OF 1 107.00

VDOT ROAD AND BRIDGE STANDARDS	
REVISION DATE	SHEET 1 OF 4 107.01

INSTALL. OF PIPE CULVERTS AND STORM SEWERS CIRC. PIPE BEDDING AND BACKFILL - METHOD "A"	
SPECIFICATION REFERENCE	302 303

VDOT ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 1	REVISION DATE 101.18

PRECAST ENDWALLS FOR MULTIPLE PIPE CULVERTS 42" - 96" CIRCULAR PIPES	
SPECIFICATION REFERENCE	105 302