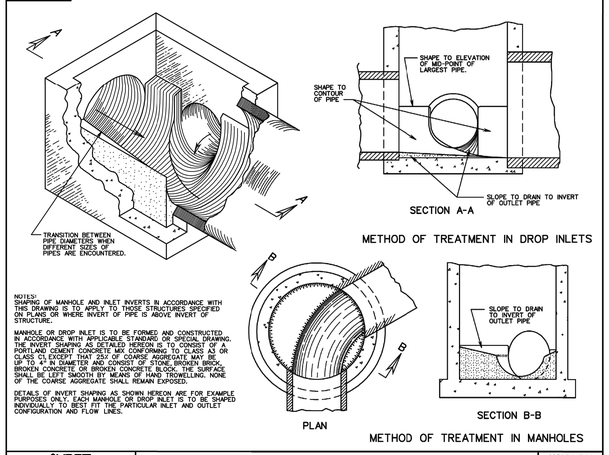
IS-1



NOTES:
SHAPING OF MANHOLE AND INLET INVERTS IN ACCORDANCE WITH THIS DRAWING IS TO APPLY TO THOSE STRUCTURES SPECIFIED ON PLANS OR WHERE INVERT OF PIPE IS ABOVE INVERT OF STRUCTURE.

MANHOLE OR DROP INLET IS TO BE FORMED AND CONSTRUCTED IN ACCORDANCE WITH APPLICABLE STANDARD OR SPECIAL DRAWING. THE INVERT SHAPING AS DETAILED HEREON IS TO CONSIST OF A PORTLAND CEMENT CONCRETE MIX CONFORMING TO CLASS A3 OR A4 CONCRETE AND SHALL BE PLACED AROUND STONE FILL UP TO 12" IN DIAMETER AND CONSIST OF STONE, BROKEN BRICK, BROKEN CONCRETE OR BROKEN CONCRETE BLOCK. THE SURFACE SHALL BE LEFT SMOOTH BY MEANS OF HAND TROWELLING. NONE OF THE COARSE AGGREGATE SHALL REMAIN EXPOSED.

DETAILS OF INVERT SHAPING AS SHOWN HEREON ARE FOR EXAMPLE PURPOSES ONLY. EACH MANHOLE OR DROP INLET IS TO BE SHAPED INDIVIDUALLY TO BEST ACCOMMODATE PARTICULAR INLET AND OUTLET CONFIGURATION AND FLOW LINES.

VDOT ROAD AND BRIDGE STANDARDS		STANDARD METHOD OF SHAPING MANHOLE & INLET INVERTS VIRGINIA DEPARTMENT OF TRANSPORTATION	SPECIFICATION REFERENCE
SHEET 1 OF 1	REVISION DATE		302
106.08			

PB-1

GENERAL

1. METHOD "A" PIPE BEDDING SHALL BE USED FOR ALL TYPES OF PIPE CULVERTS WITHIN THE APPLICABLE HEIGHT OF COVER RANGE NOTED IN 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. b = 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 d IS LESS THAN 36".
   X = 18" WHERE d IS 36" 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 (DI-13) OUTLET PIPES INSTALLATIONS.

ELLIPTICAL PIPE

1. S_1 = OUTSIDE SPAN DIMENSION OF PIPE.
2. S_2 = 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 S_2 IS LESS THAN 26".
   X = 18" WHERE S_2 IS 26" AND GREATER
5. WHERE DIRECTED BY THE ENGINEER, BEDDING MATERIAL MAY BE ELIMINATED FOR NORMAL EARTH FOUNDATIONS UNDER ROUTINE ENTRANCE PIPE WHERE S_2 IS 38" 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_2 IS 38" OR LESS AND HEIGHT OF COVER 15' OR LESS.

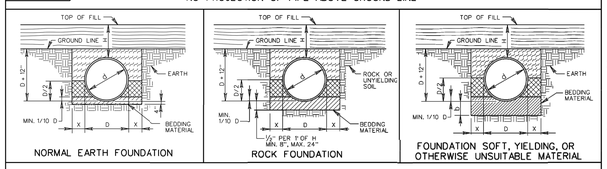
PIPE ARCH

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 S_2 IS LESS THAN 72".
   x = 18" WHERE S_2 IS 72" AND GREATER
5. WHERE DIRECTED BY THE ENGINEER, BEDDING MATERIAL MAY BE ELIMINATED FOR NORMAL EARTH FOUNDATIONS UNDER ROUTINE ENTRANCE PIPE WHERE S_2 IS 35" 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 35" OR LESS AND HEIGHT OF COVER 15' OR LESS.

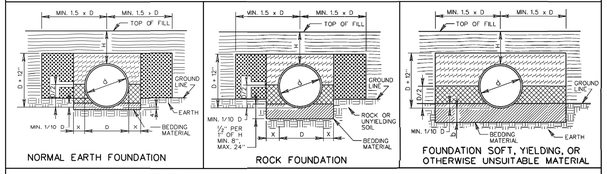
SPECIFICATION REFERENCE	INSTALLATION OF PIPE CULVERTS & STORM SEWERS GENERAL NOTES VIRGINIA DEPARTMENT OF TRANSPORTATION	VDOT ROAD AND BRIDGE STANDARDS	
302 303		REVISION DATE	SHEET 1 OF 1
			107.00

PB-1

NO PROJECTION OF PIPE ABOVE GROUND LINE



PIPE PROJECTION ABOVE GROUND LINE



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.

NOTES:
FOR GENERAL NOTES ON PIPE BEDDING, SEE INSTALLATION OF PIPE CULVERTS AND STORM SEWERS GENERAL NOTES ON SHEET 107.00.

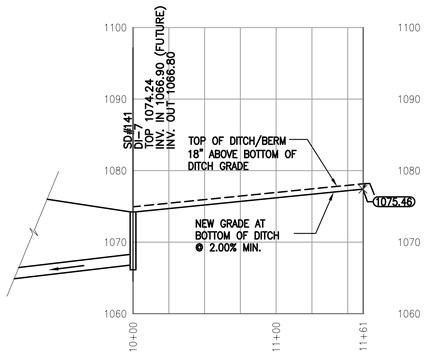
CRUSHED GLASS CONFORMING TO THE SIZE REQUIREMENTS FOR CRUSHER RUN AGGREGATE SIZE 25 AND 26 MAY BE USED IN PLACE OF CLASS I BACKFILL.

VDOT ROAD AND BRIDGE STANDARDS		INSTALL. OF PIPE CULVERTS AND STORM SEWERS CIRC. PIPE BEDDING AND BACKFILL - METHOD "A" VIRGINIA DEPARTMENT OF TRANSPORTATION	SPECIFICATION REFERENCE
SHEET 1 OF 4	REVISION DATE		302 303
107.01	07/12		

STORM DRAINAGE GENERAL NOTES:

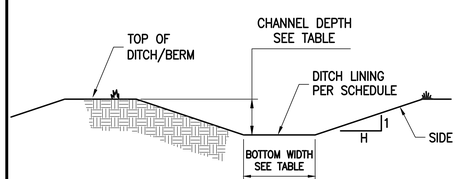
1. STORM DRAINAGE PIPE AND DRAINAGE STRUCTURES SHALL COMPLY WITH ALL APPLICABLE VDOT STANDARDS AND SPECIFICATIONS. REFER TO "INSTALLATION OF PIPE CULVERTS & STORM SEWER GENERAL NOTES" AND DETAILS SHOWN ON VDOT STD. PB-1 ON THIS SHEET FOR ADDITIONAL INFORMATION.
2. THE INVERT OF ALL NEW STORM DRAINAGE INLETS AND MANHOLES SHALL CONFORM TO VDOT STD. IS-1 – "STANDARD METHOD OF SHAPING MANHOLE AND INLET INVERTS." REFER TO DETAIL ON THIS SHEET.
3. ALL CONNECTIONS BETWEEN STORM DRAIN LINE (RCP) AND ROOF DRAIN LINE (PVC) SHALL BE ACCOMPLISHED BY USING "KOR-N-TEE" OR "KOR-N-TEE SADDLE" PIPE-TO-PIPE WATER-TIGHT CONNECTORS AS MANUFACTURED BY TRELLEBORG PIPE SEALS MILFORD, INC.
4. STORM DRAIN PIPE LENGTHS SHOWN HEREON ARE APPROXIMATE HORIZONTAL DISTANCES FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE. PIPE SLOPES SHOWN ARE COMPUTED USING INVERT OUT AT UPSTREAM STRUCTURE, INVERT IN AT DOWNSTREAM STRUCTURE, AND HORIZONTAL PIPE LENGTH MEASURES FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE.
5. UPON COMPLETION OF THE STORM DRAINAGE SYSTEM, THE CONTRACTOR SHALL FURNISH TO THE OWNER A FIELD SURVEYED FINAL CORRECT SET OF AS-BUILT PLANS OF THE NEWLY CONSTRUCTED STORM DRAIN AND/OR STORMWATER MANAGEMENT FACILITIES. AS-BUILT PLANS SHALL BE PROVIDED IN THE STATE PLANE VIRGINIA SOUTH COORDINATE SYSTEM, NAD 1983, FIPS 4502 FEET, US SURVEY FEET, DATUM NA 83, IN THE FORM OF 1 PAPER COPY AND 1 DIGITAL AUTOCAD FILE.

NOTE: CLASS I BACKFILL SHALL BE CRUSHER RUN AGGREGATE SIZE NO. 25 OR 26, AGGREGATE BASE MATERIAL SIZE 21A OR 21B, FLOWABLE FILL, OR CRUSHED GLASS CONFORMING TO THE SIZE REQUIRED FOR CRUSHER RUN AGGREGATE SIZE 25 AND 26.

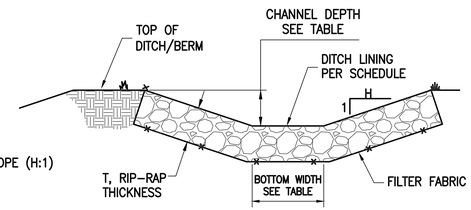


PROFILE – DITCH "A"

SCALE: 1" = 50' HORIZONTAL
1" = 10' VERTICAL



TYPICAL SECTION – GRASS LINED



TYPICAL SECTION – RIP-RAP LINED

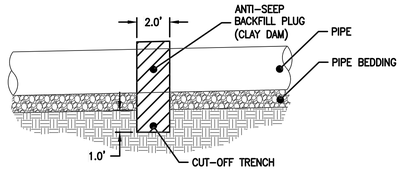
TYPICAL DITCH SECTION & SCHEDULE

NO SCALE

DITCH DESIGN SUMMARY TABLE

DITCH ID	DESIGN FLOW Q2 (CFS)	DESIGN FLOW Q10 (CFS)	BOTTOM WIDTH (FT)	CHANNEL DEPTH (FT)	SIDE SLOPE L/R (H:1)	CHANNEL SLOPE (MIN) (%)	CHANNEL SLOPE (MAX) (%)	DESIGN FLOW VELOCITY Q2 (FPS)	DESIGN FLOW DEPTH Q10 (FT)	TEMPORARY LINING MATERIAL	PERMANENT LINING MATERIAL	MANNINGS "N" PERMANENT LINING	NOTES:
A	2.80	3.94	1.0	1.25	3/3	2.00	2.00	2.74	0.44	EC-2	GRASS	0.032	1.
B	1.30	1.80	0.0	1.00	2/4	3.30	3.30	2.76	0.45	EC-2	GRASS	0.032	1.
C-1	4.6	6.7	4.0	2.00	2/2	2.50	2.50	3.10	0.40	EC-2	GRASS	0.032	1.
C-2	4.6	6.7	4.0	2.00	2/2	7.50	12.5	3.17	0.42	CLASS I RIP-RAP (T = 24")	CLASS I RIP-RAP (T = 24")	0.069	3.000

NOTES:
1. CHANNEL SHALL BE LINED WITH SOIL STABILIZATION BLANKETS AND MATTING IN ACCORDANCE WITH STD. AND SPEC. 3.36, TREATMENT - 1, VDOT EC-2
2. CHANNEL SHALL BE LINED WITH SOIL STABILIZATION BLANKETS AND MATTING IN ACCORDANCE WITH STD. AND SPEC. 3.36, TREATMENT - 1, VDOT EC-3, TYPE B.
3. CHANNEL SHALL BE LINED WITH RIP-RAP TO THE CROSS-SECTION AND DEPTH AS INDICATED IMMEDIATELY UPON EXCAVATION OF CHANNEL.



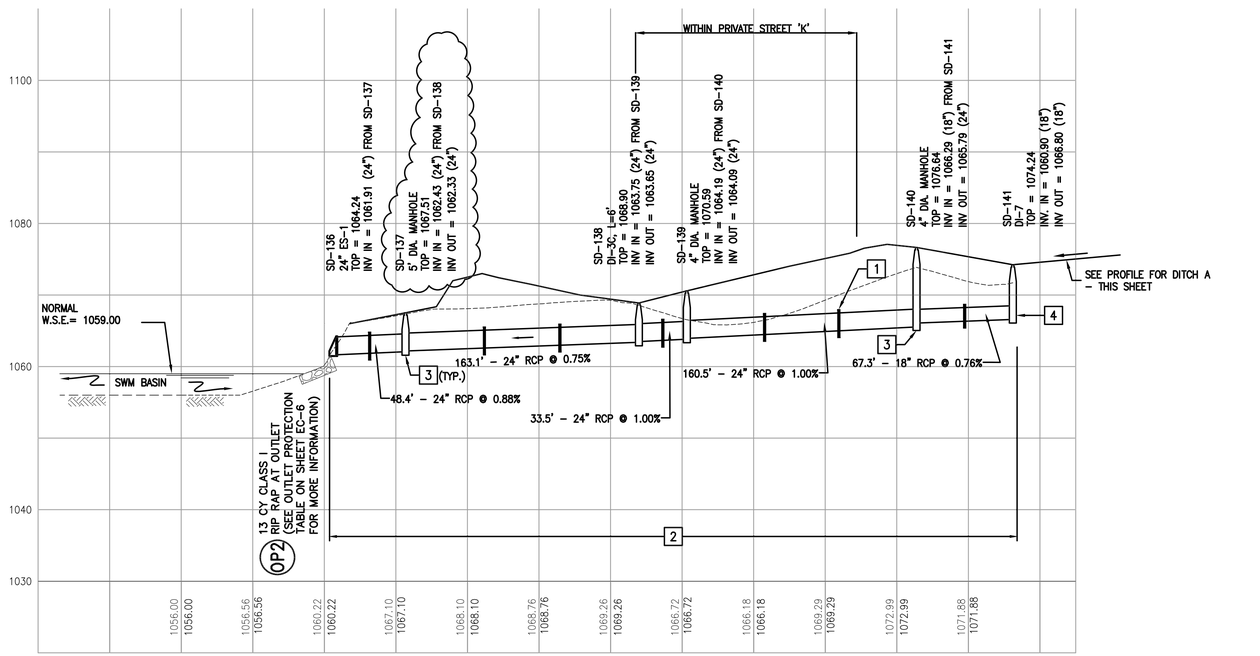
CUT-OFF TRENCH AND ANTI-SEEP BACKFILL PLUG

NO SCALE

STORM DRAINAGE PROFILE KEYNOTES:

1. CUT-OFF TRENCH AND ANTI-SEEP BACK-FILL PLUGS (CLAY DAMS) WHERE SHOWN. CUT-OFF TRENCH TO EXTEND 1-FOOT INTO NATIVE SOIL, SHALL BE 2-FEET WIDE, AND EXTEND FULL WIDTH OF TRENCH. SEE DETAIL THIS SHEET.
2. WATERTIGHT PIPE JOINTS AND MANHOLE CONNECTION SHALL BE USED IN THIS SECTION OF STORM DRAINAGE. WATER-TIGHT PIPE JOINTS SHALL CONFORM TO ASTM C76 AND ASTM C443 AND SHALL BE MANUFACTURED WITH AN OFF-SET SPIGOT CONFIGURATION AND SHALL USE TYPE 4G PROFILE PIPE GASKETS AS MANUFACTURED BY PRESS-SEAL GASKET CORPORATION, OR APPROVED EQUAL. REFER TO DETAIL ON SHEET C-10A FOR MORE INFORMATION.
3. WATERTIGHT PIPE-TO-MANHOLE CONNECTIONS SHALL BE MADE WITH FULLY GROUTED CONNECTION WITH PLACEMENT OF FULL-DEPTH NON-SHRINK GROUT / HYDRAULIC CEMENT ON THE INSIDE AND OUTSIDE OF THE MANHOLE CONNECTION.
4. CAST OPENING FOR FUTURE 18" DIA. RCP. SEAL/COVER WITH PLYWOOD SHEET PRIOR TO BACKFILLING.

NOTE: CONTRACTOR SHALL SUBMIT STORM DRAINAGE STRUCTURE FABRICATION ORDER SHEETS TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO START OF FABRICATION.



SD141–SD136

SCALE: 1" = 50' HORIZONTAL
1" = 10' VERTICAL

SCALE IN FEET
0 50 100

APPROVED, 4/14/2020

COMMONWEALTH OF VIRGINIA
WM. THOMAS AUSTIN II
No. 030907
5/11/15
PROFESSIONAL ENGINEER

Revisions		Date
1	1ST REVIEW COMMENTS	7/11/15
2	APPROVED SET	9/4/15
3	PLAN REVISION NO. 1	7/21/17

Issue Date: MAY 11, 2015
Drawn By: RWA
Designed By: RWA
Checked By: WTA
Date: 5/11/15

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THE VILLAGE AT TINKER CREEK – PHASE IIIA

PROFILES – STORM DRAINAGE

ROANOKE COUNTY, VIRGINIA

Vertical Scale: 1" = 10'
Horizontal Scale: 1" = 50'
Commission Number: 1966-P3
Sheet No.: C-10

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