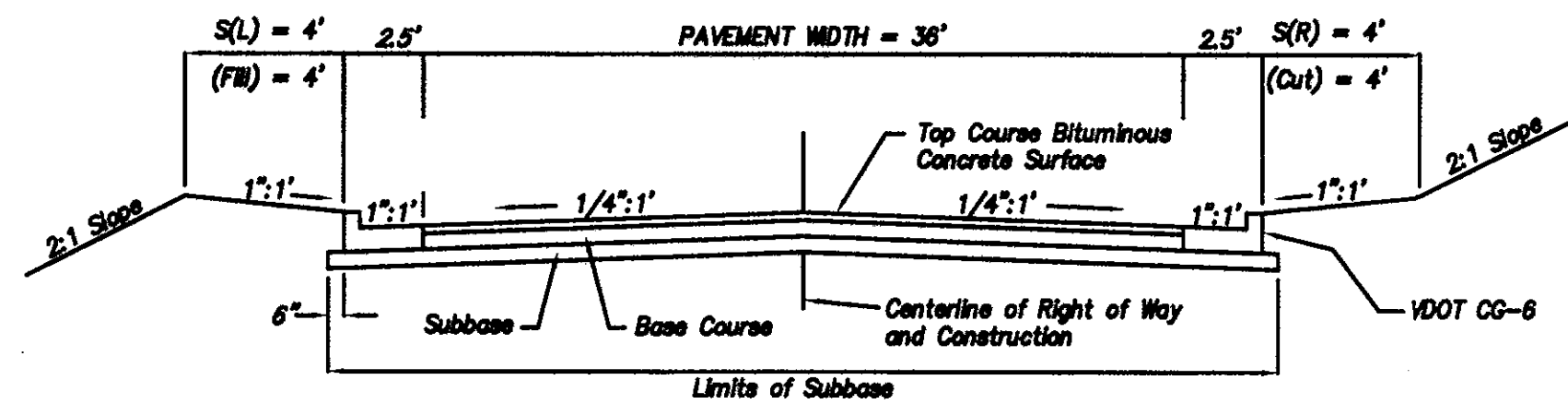




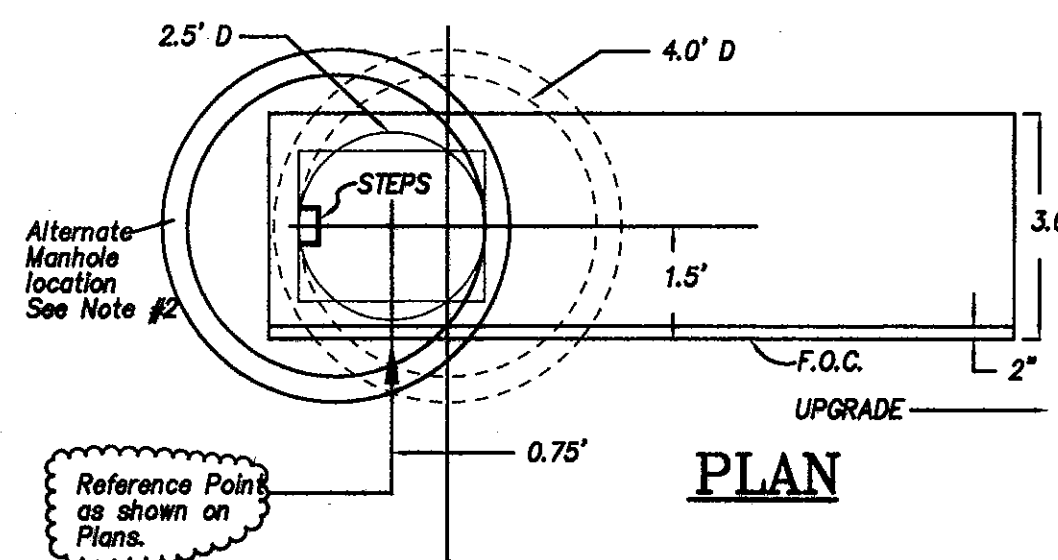
TYPICAL STREET SECTION
NO SCALE

PAVEMENT SPECIFICATIONS:

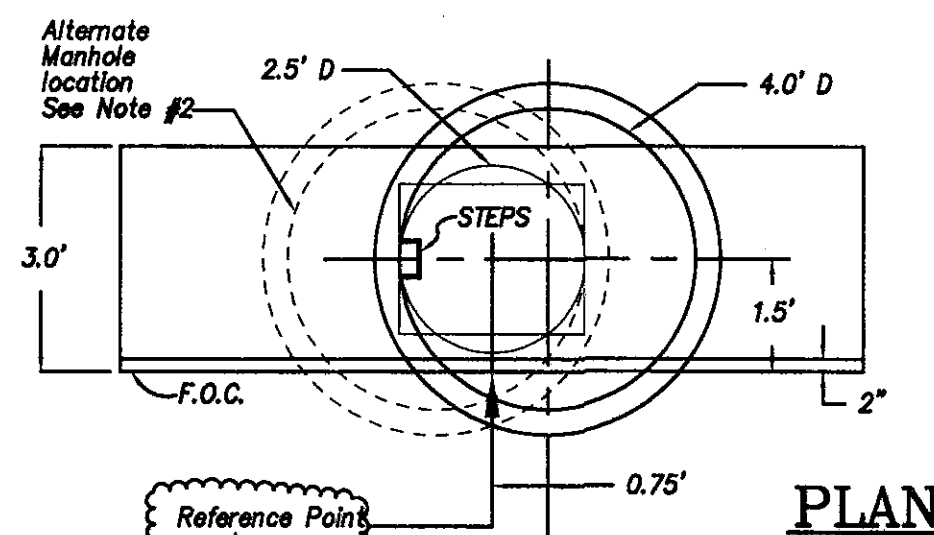
STREET NAME	FROM STATION TO STATION	PAVEMENT WIDTH	RIGHT OF WAY WIDTH	VEHICLE TRIPS PER DAY	NUMBER OF REQ'D CBR TESTS	PAVEMENT SPECIFICATION
GANDER WAY	10+00 TO CUL DE SAC	36'	50'	10,600	6 (INCL. ONE AT INTERSECTION WITH PLANTATION)	165 PSY ASPH. CONCRETE (1.5"), TYPE SM-9.5D 550 PSY ASPH. CONCRETE (5"), TYPE BM-25.0 8" AGGREGATE BASE-21B

NOTES:

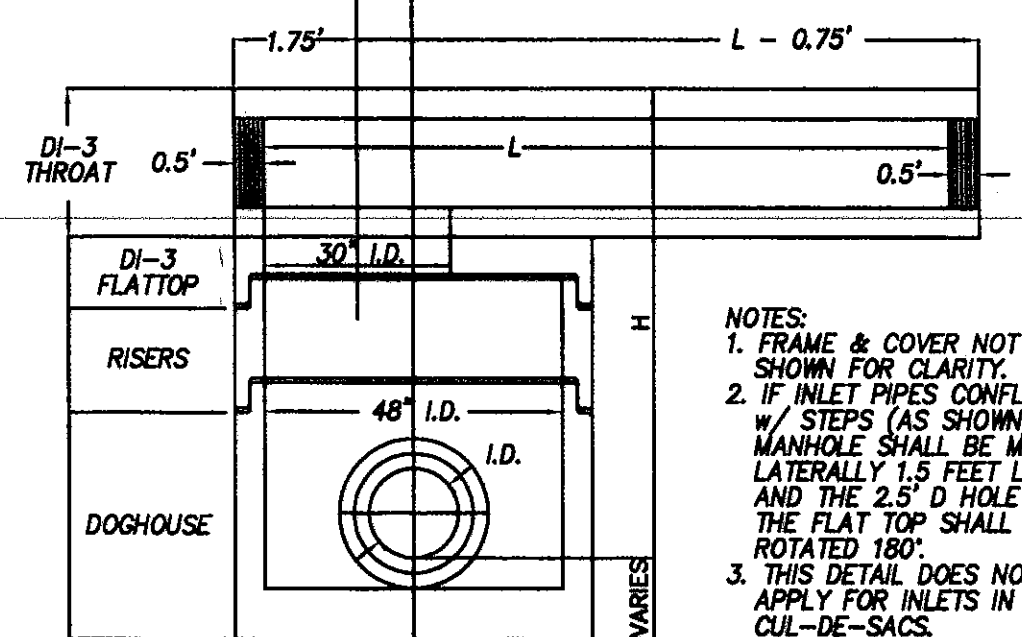
- THE PRELIMINARY PAVEMENT DESIGNS SHOWN ARE BASED ON A PREDICTED SUB-GRADE CBR VALUE OF 7.0 AND A RESILIENCY FACTOR (RF) OF 2.0 AS SHOWN IN APPENDIX I OF THE 2000 VIRGINIA DEPARTMENT OF TRANSPORTATION PAVEMENT DESIGN GUIDE FOR SUBDIVISION AND SECONDARY ROADS. THE SUB-GRADE SOIL IS TO BE TESTED BY AN INDEPENDENT LABORATORY AND THE RESULTS SUBMITTED TO THE VIRGINIA DEPARTMENT OF TRANSPORTATION PRIOR TO BASE CONSTRUCTION. SHOULD THE SUB-GRADE CBR VALUE AND/OR THE RF VALUE BE LESS THAN THE PREDICTED VALUES, ADDITIONAL BASE MATERIAL WILL BE REQUIRED IN ACCORDANCE WITH DEPARTMENTAL SPECIFICATIONS. REFER TO THE SAME MANUAL FOR THE NUMBER AND LOCATIONS OF THE REQUIRED SOIL SAMPLES TO BE TESTED. ALL PAVEMENT DESIGNS SHALL BE SUBMITTED TO THE DEPARTMENT FOR REVIEW AND APPROVAL. (CHANGE VALUES FOR EACH SPECIFIC LOCATION).
- THE SUB-GRADE SHALL BE APPROVED BY THE VIRGINIA DEPARTMENT OF TRANSPORTATION PRIOR TO THE PLACEMENT OF THE BASE. BASE SHALL BE APPROVED BY THE VIRGINIA DEPARTMENT OF TRANSPORTATION FOR DEPTH, TEMPLATE, AND COMPACTION BEFORE SURFACE IS APPLIED.



PLAN



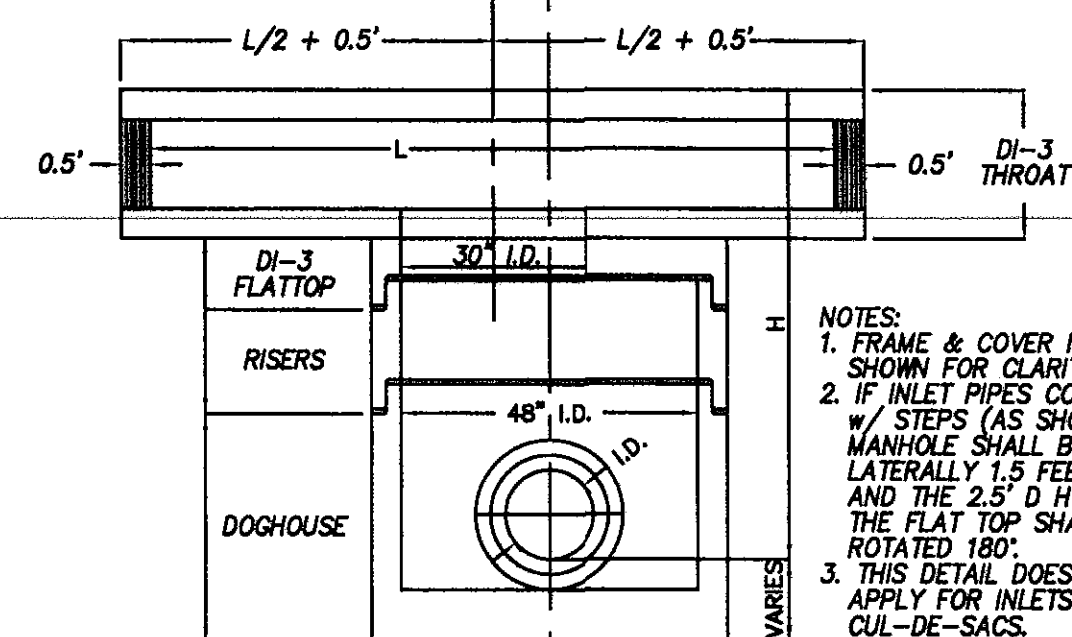
PLAN



PROFILE

LOCATION DETAIL FOR DI-3B (PRECAST)

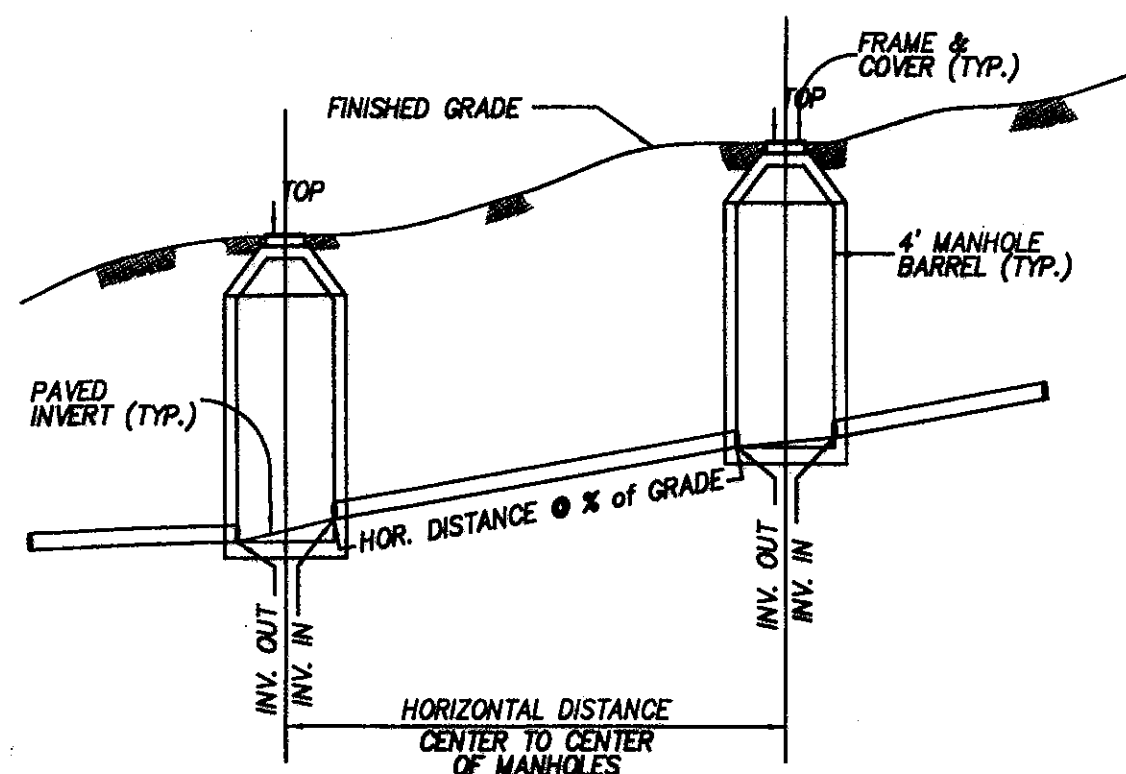
NO SCALE



PROFILE

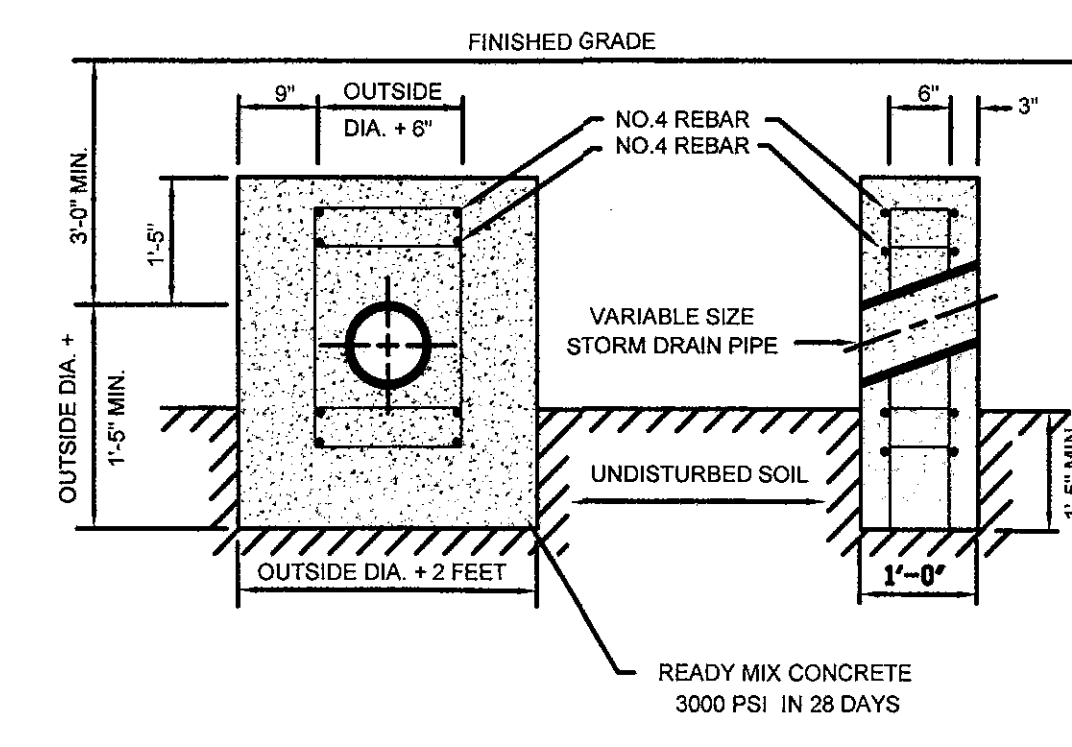
LOCATION DETAIL FOR DI-3C (PRECAST)

NO SCALE



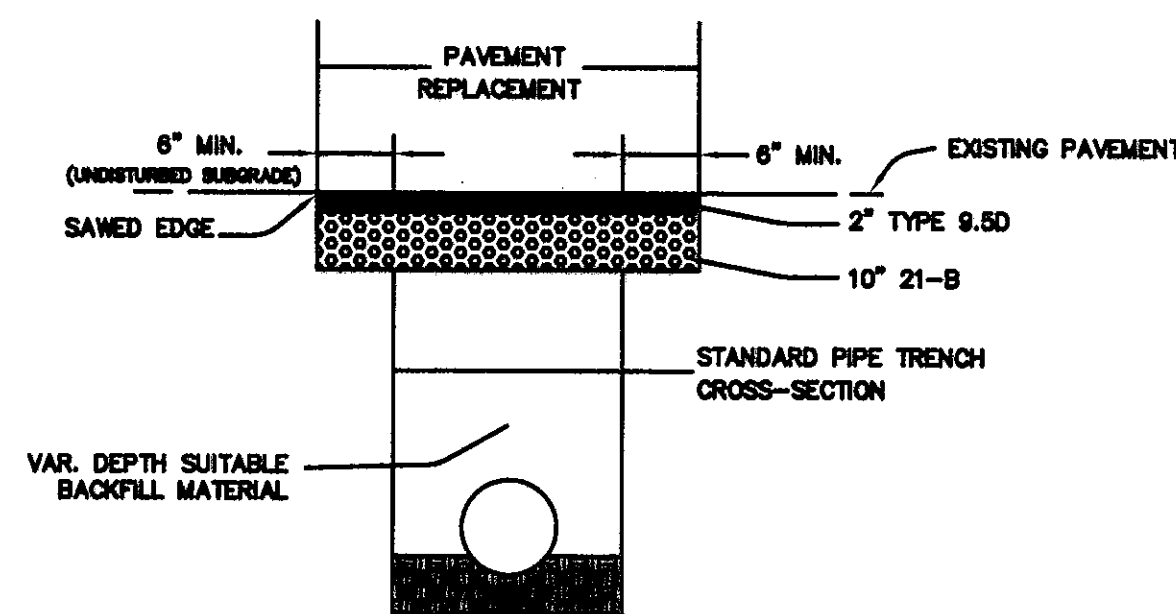
**SANITARY SEWER
HORIZONTAL AND SLOPE DISTANCE DETAIL**

NO SCALE



STORM DRAIN ANCHOR BLOCK

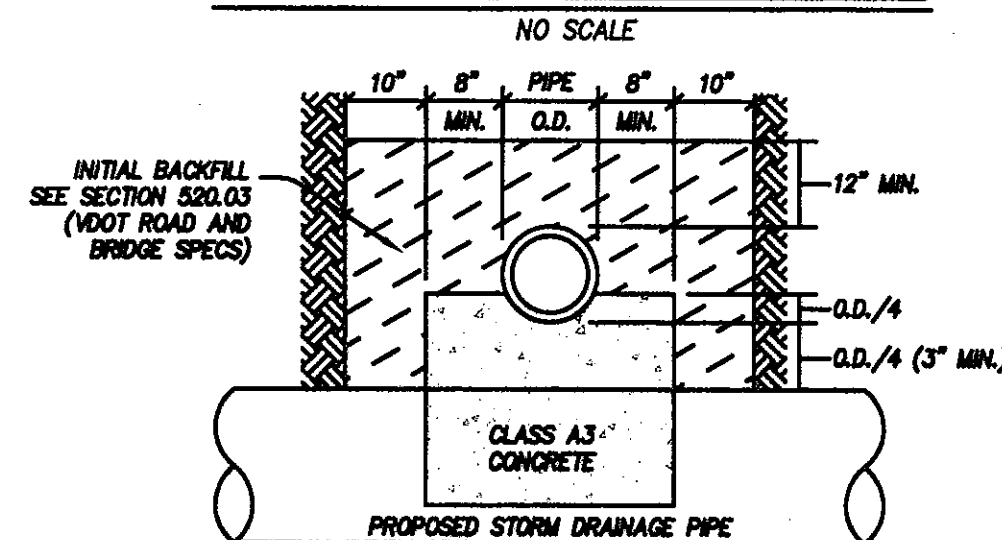
NO SCALE



NOTES:

- SURFACE AND BASE REPLACEMENT WILL GENERALLY BE REQUIRED TO MATCH EXISTING ASPHALT LAYERS AND SHALL BE COMPLETED IN LIFTS ACCORDING TO VIRGINIA DEPARTMENT OF TRANSPORTATION SPECIFICATION 302.
- AGGREGATE BASE MATERIAL SHALL BE REPLACED TO A DEPTH GREATER THAN EXISTING STONE BASE TO ENSURE LOAD BEARING CAPACITY OF CUT RELATED TO UNDISTURBED EARTH AREAS. AGGREGATE BASE SHALL BE COMPACTED ACCORDING TO VIRGINIA DEPARTMENT SPECIFICATION 208.
- BEDDING MATERIAL SHALL BE ACCORDING TO REQUIREMENT OF EACH UTILITY (GENERALLY FROM BOTTOM OF TRENCH DITCH TO SIX INCHES ABOVE PIPE WITH A MINIMUM OF FOUR INCHES BELOW THE PIPE).
- SAW CUT TO BE MADE WITH A MECHANICAL SAW AND SIDES TO BE TACKED WITH BITUMINOUS MATERIAL TYPE RO-250 OR EQUAL.

PAVEMENT REPLACEMENT DETAIL

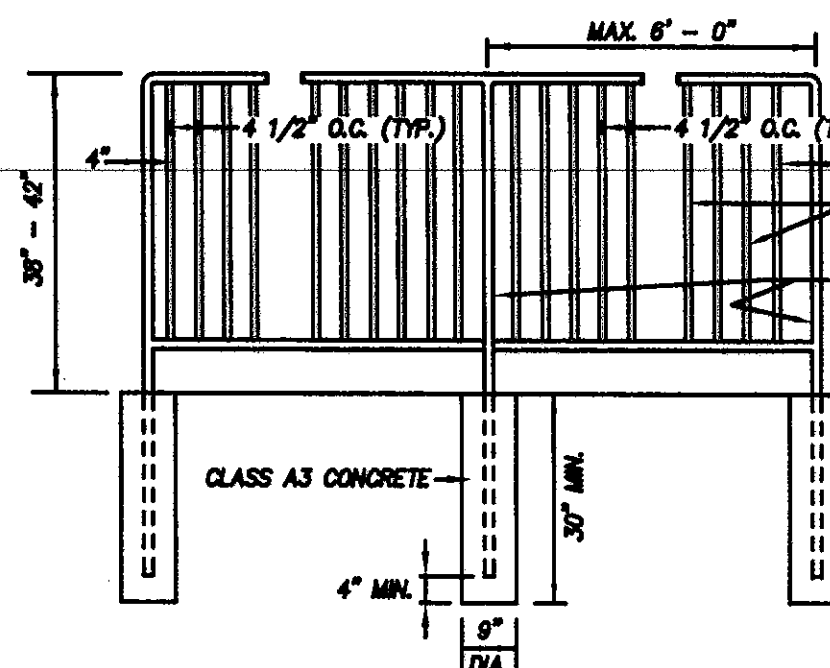


NOTES:

- FOR ADDITIONAL NOTES AND DETAILS, SEE VDOT STD. UB-1, 1401.01.
- CONCRETE CRADLE SHALL FOLLOW THE PIPE CONTOUR A MINIMUM OF 4\"/>

**CONCRETE CRADLE OPTION
VDOT STD. UB-1 (1401.01)**

NO SCALE



HANDRAIL FOR RETAINING WALL

NO SCALE

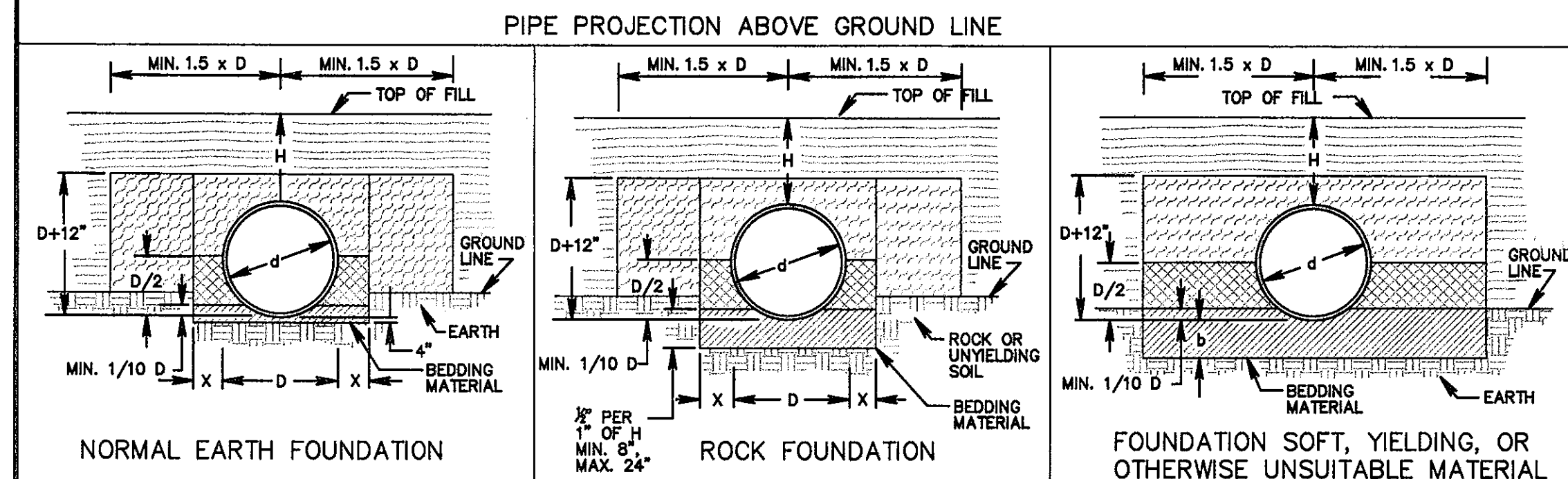
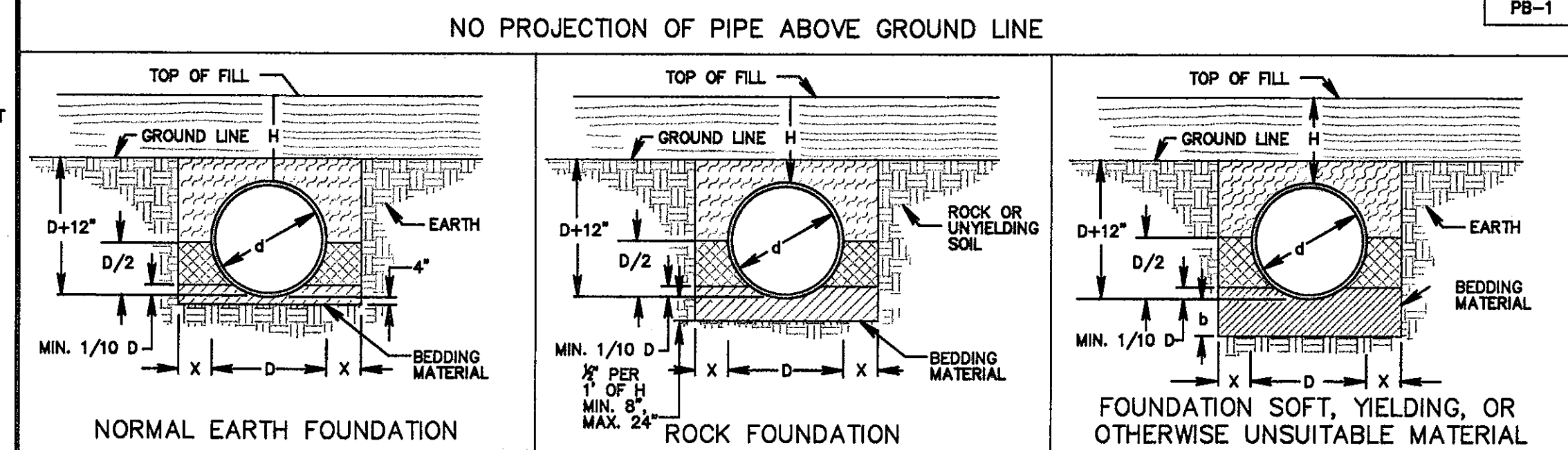
PIPE I.D.	H	L	A	B
12"	2.00'	4.00'	1.83'	1.83'
15"	2.25'	5.00'	1.83'	1.83'
18"	2.50'	6.00'	1.83'	1.83'
24"	3.17'	8.00'	1.83'	1.83'
30"	3.83'	10.00'	1.83'	1.83'
36"	4.33'	12.00'	1.83'	1.83'
42"	5.50'	14.00'	3.00'	2.83'
48"	6.00'	16.00'	3.00'	2.83'

NOTES:

- CONCRETE 4,000 P.S.I.
- REINFORCING #4 @ 6" C.C. E.W. DOUBLE ROW THROUGHOUT.
- FOUR (4) BOLTS AND INSERTS ARE REQUIRED FOR 42" AND 48" EW-1.
- PLACE CLASS I RIP RAP ALONG THE PERIMETER OF THE STRUCTURE TO PREVENT SCOUR AND EROSION.

EW-1 MODIFIED WITH ENERGY DISSIPATER

NO SCALE



NOTES:

- FOR PLASTIC PIPE, THE LIMITS OF THE CLASS I BACKFILL MATERIAL SHALL BE EXTENDED TO 12" ABOVE THE TOP OF THE PIPE.
- FOR GENERAL NOTES ON PIPE BEDDING, SEE INSTALLATION OF PIPE CULVERTS AND STORM SEWERS GENERAL NOTES ON SHEET 107.00.

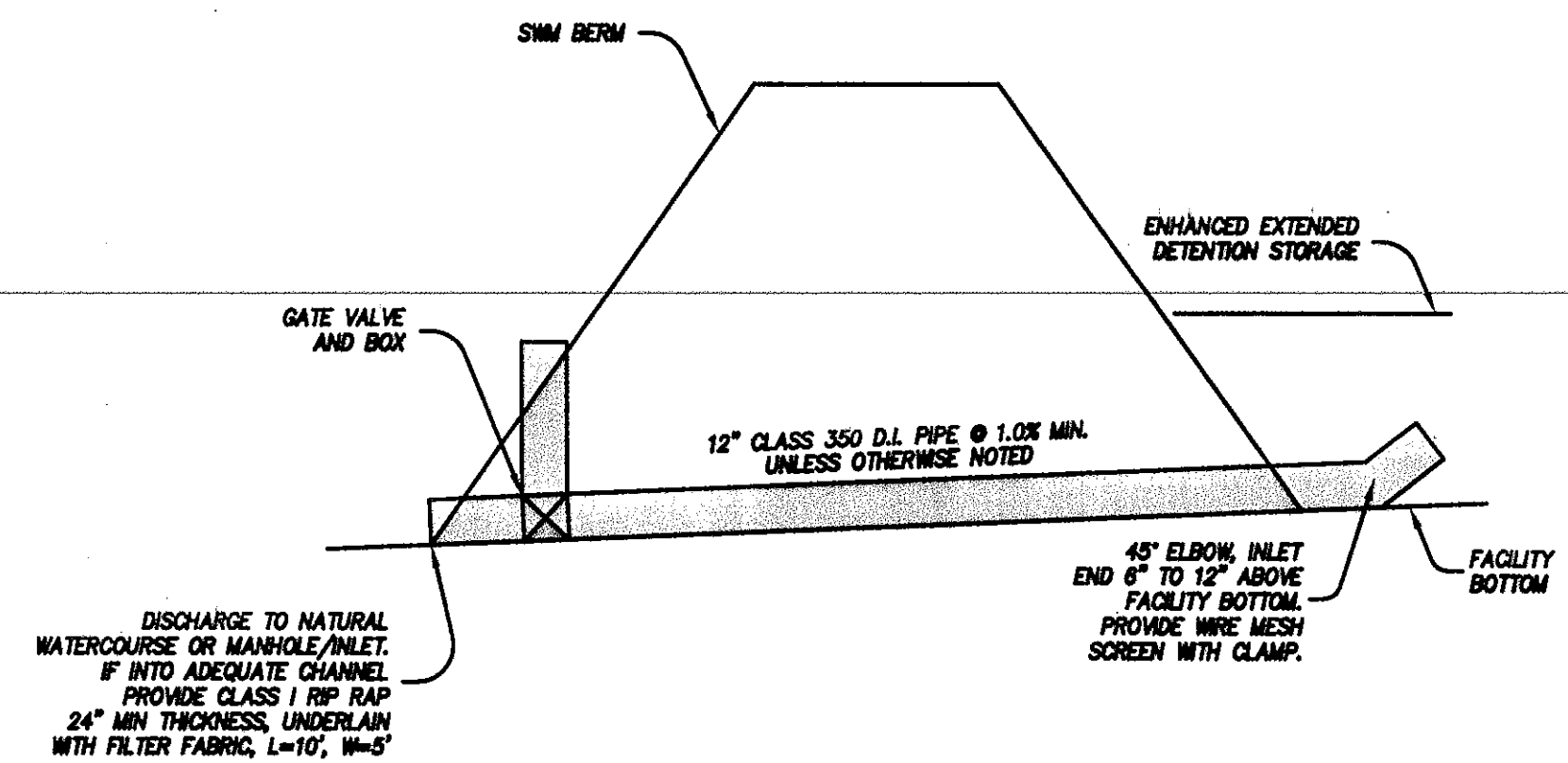
**INSTALLATION OF PIPE CULVERTS AND STORM SEWERS
CIRCULAR PIPE BEDDING AND BACKFILL - METHOD "A"**

VIRGINIA DEPARTMENT OF TRANSPORTATION

SHEET 1 OF 4

REV. 7/05

107.01



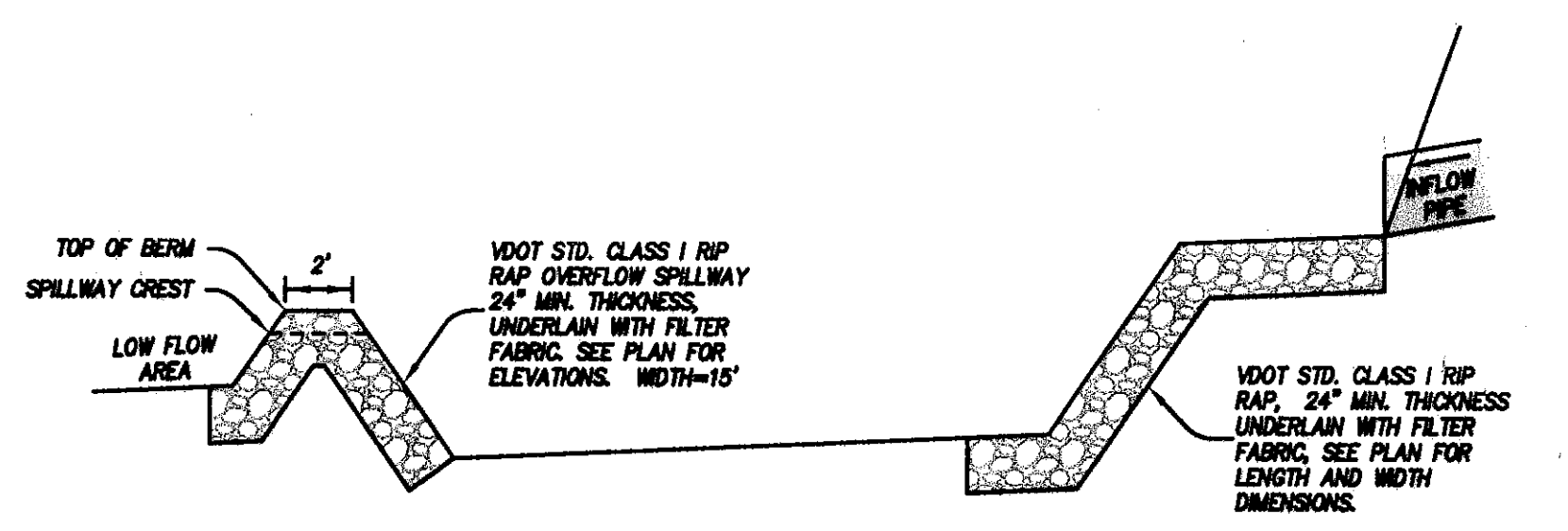
STORMWATER MANAGEMENT MAINTENANCE DRAIN DETAIL

NO SCALE

ALL MAINTENANCE OF THE STORMWATER MANAGEMENT FACILITIES SHALL BE IN ACCORDANCE WITH THE STORMWATER MANAGEMENT AGREEMENT EXECUTED AS A PART OF THE APPROVAL OF THESE DEVELOPMENT PLANS BY ROANOKE COUNTY. IN ADDITION, ALL MAINTENANCE OF EACH STORMWATER MANAGEMENT FACILITY SHALL BE IN ACCORDANCE WITH DCR STANDARDS. IF DRAINING OF ONE OF THE STORMWATER MANAGEMENT FACILITIES IS REQUIRED, AN INSPECTION OF THE WATER WITHIN THE FACILITY SHALL BE PERFORMED PRIOR TO DRAINING. IF THE WATER WITHIN THE FACILITY IS SEDIMENT LOADED, THEN THE MAINTENANCE DRAIN SHALL NOT BE UTILIZED. THE FACILITY THEN SHALL BE DRAINED BY MEANS OF PUMPING AND THE WATER MUST BE FILTERED IN ACCORDANCE WITH DCR STANDARDS THROUGH SUCH METHODS AS DESCRIBED IN DCR'S ESC HANDBOOK, STANDARD AND SPECIFICATION 3.26 - DRAINAGE STRUCTURE.

**STORMWATER MANAGEMENT
MAINTENANCE DRAIN DETAIL**

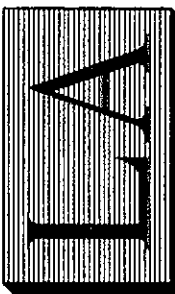
NO SCALE



**STORMWATER MANAGEMENT
SEDIMENT FOREBAY CROSS SECTION**

NO SCALE

LUMSDEN ASSOCIATES, P.C.
ENGINEERS-SURVEYORS-PLANNERS
ROANOKE, VIRGINIA



4664 BRAMBLETON AVENUE
P.O. BOX 20669
ROANOKE, VIRGINIA 24018
PHONE: (840) 774-4411
FAX: (840) 772-9445
E-MAIL: MAIL@LUMSDENPC.COM

THOMAS C. DALE
Lic. No. 033002
9/1/07
PROFESSIONAL ENGINEER

APPROVED
CONSTRUCTION DETAILS

OVERALL SITE INFRASTRUCTURE AND
MASS GRADING DEVELOPMENT PLANS FOR
THE OPIDAN RETAIL CENTER
PREPARED FOR
OPIDAN INVESTMENT COMPANY
HOLLINS MAGISTERIAL DISTRICT
ROANOKE COUNTY, VIRGINIA

REVISIONS	DATE	DESCRIPTION
1	6/25/07	ADDED NOTE FOR SWM MAINTENANCE
2		
3		
4		
5		

DATE: June 5, 2007

SCALE: NONE

COMMISSION NO: 2006-2240

SHEET 22 OF 23