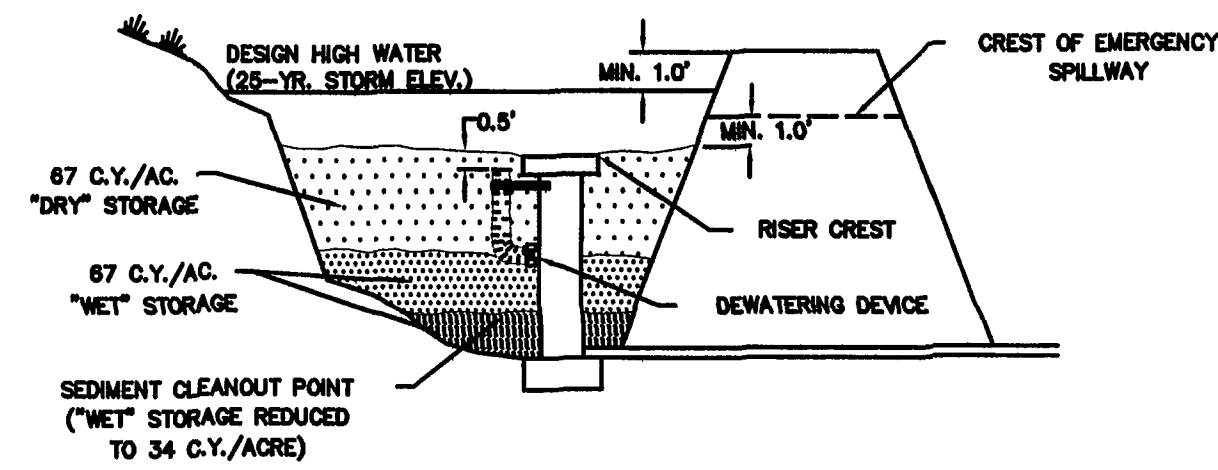
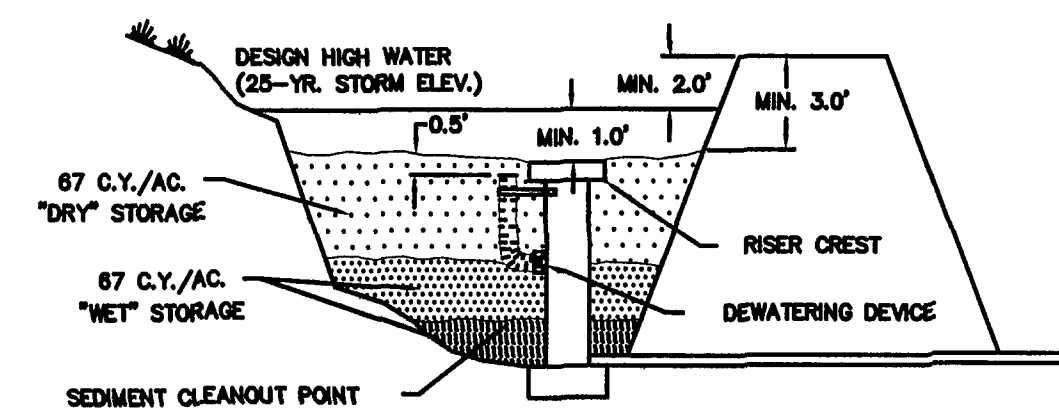


SEDIMENT BASIN SCHEMATIC ELEVATIONS

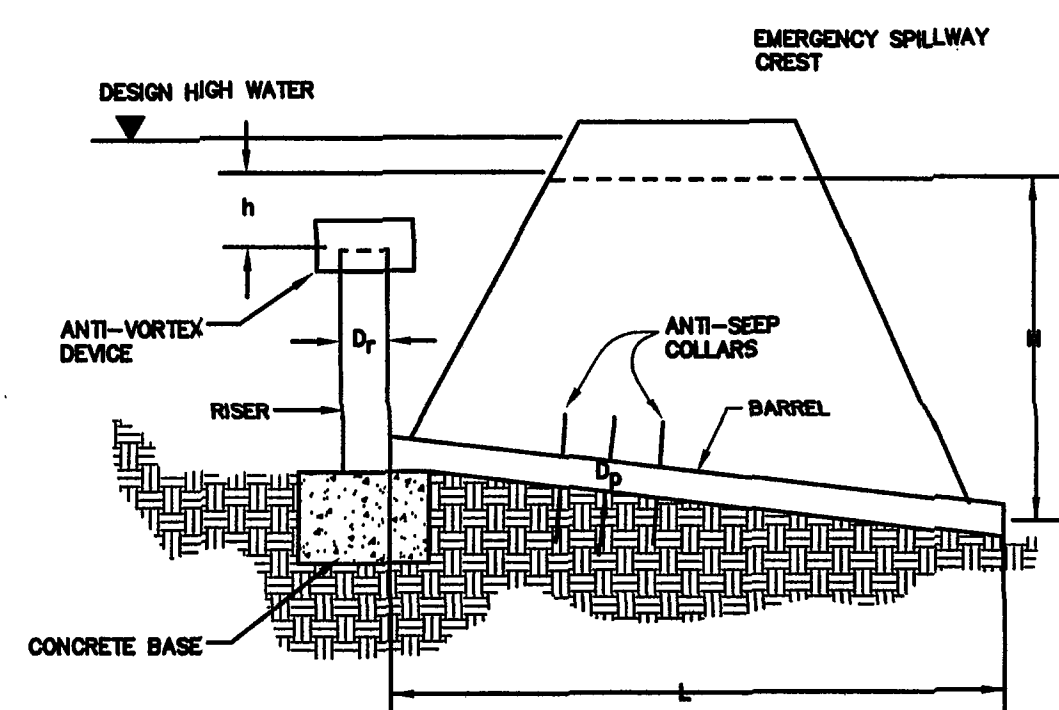


DESIGN ELEVATIONS WITH EMERGENCY SPILLWAY



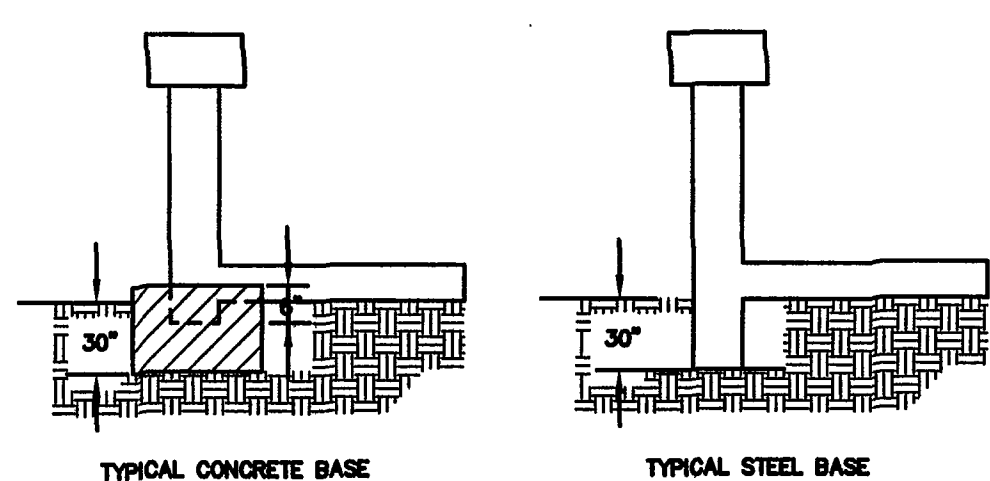
DESIGN ELEVATIONS WITHOUT EMERGENCY SPILLWAY
(RISER PASSES 25-YR. EVENT)

PRINCIPAL SPILLWAY DESIGN

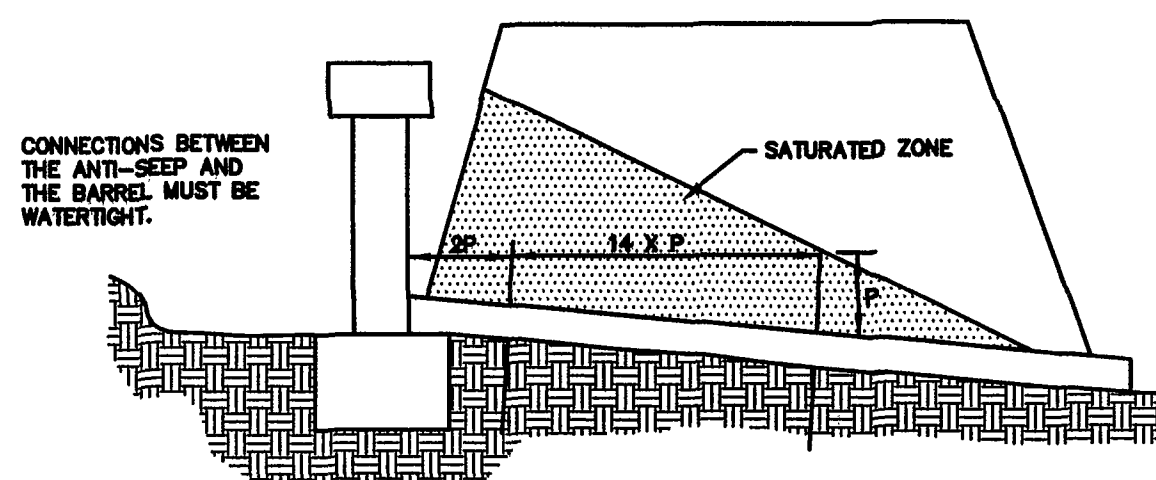


h = HEAD ON PIPE THROUGH EMBANKMENT
L = LENGTH OF PIPE THROUGH EMBANKMENT
D = DIAMETER OF PIPE THROUGH EMBANKMENT
Dr = DIAMETER OF RISER

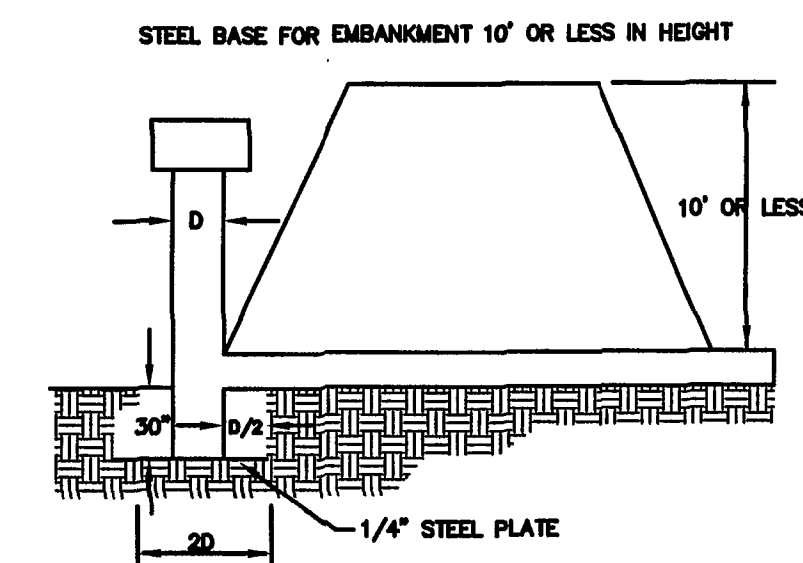
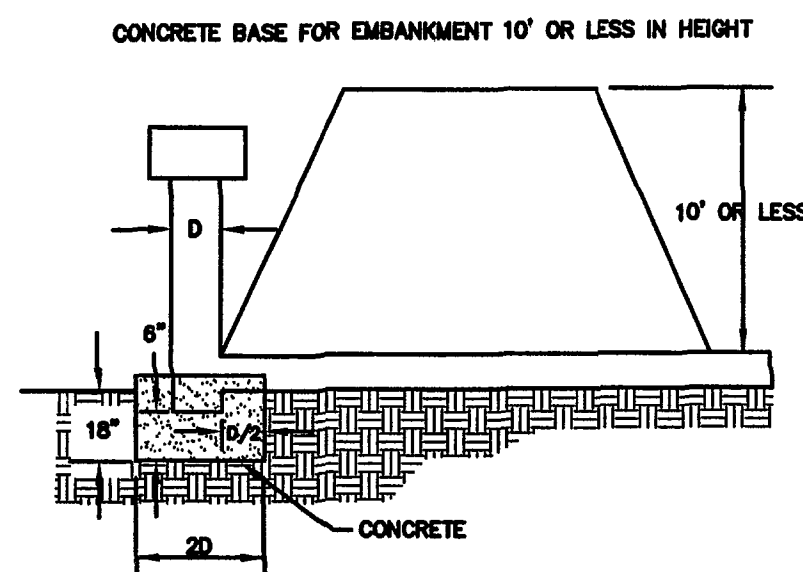
RISER PIPE BASE CONDITIONS



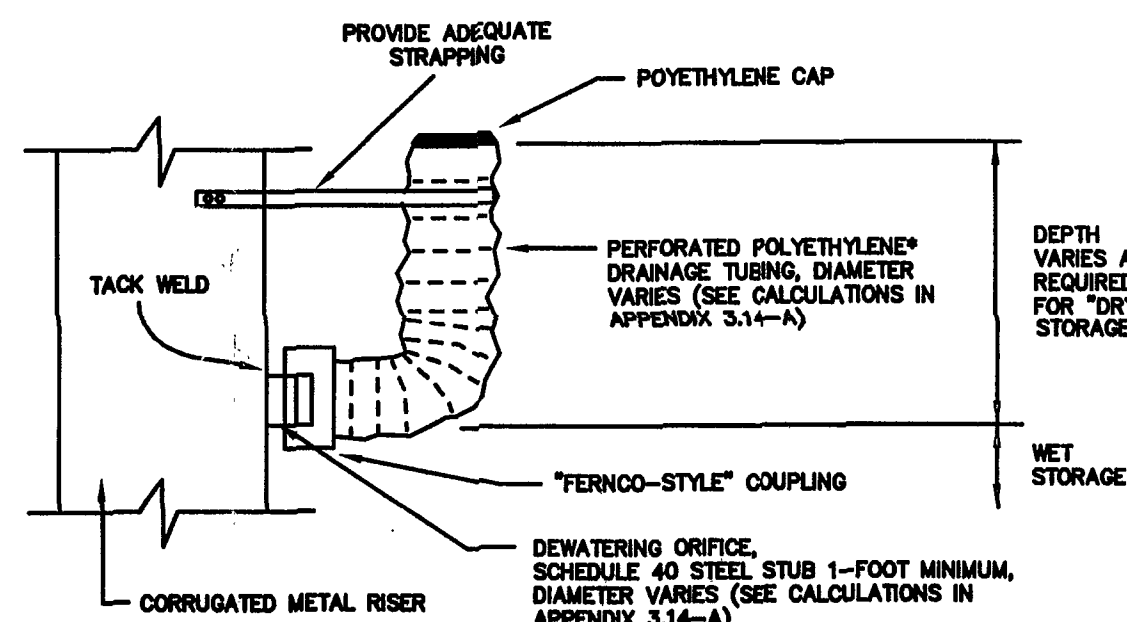
ANTI-SEEP COLLAR



RISER PIPE BASE CONDITIONS FOR EMBANKMENTS LESS THAN 10' HIGH



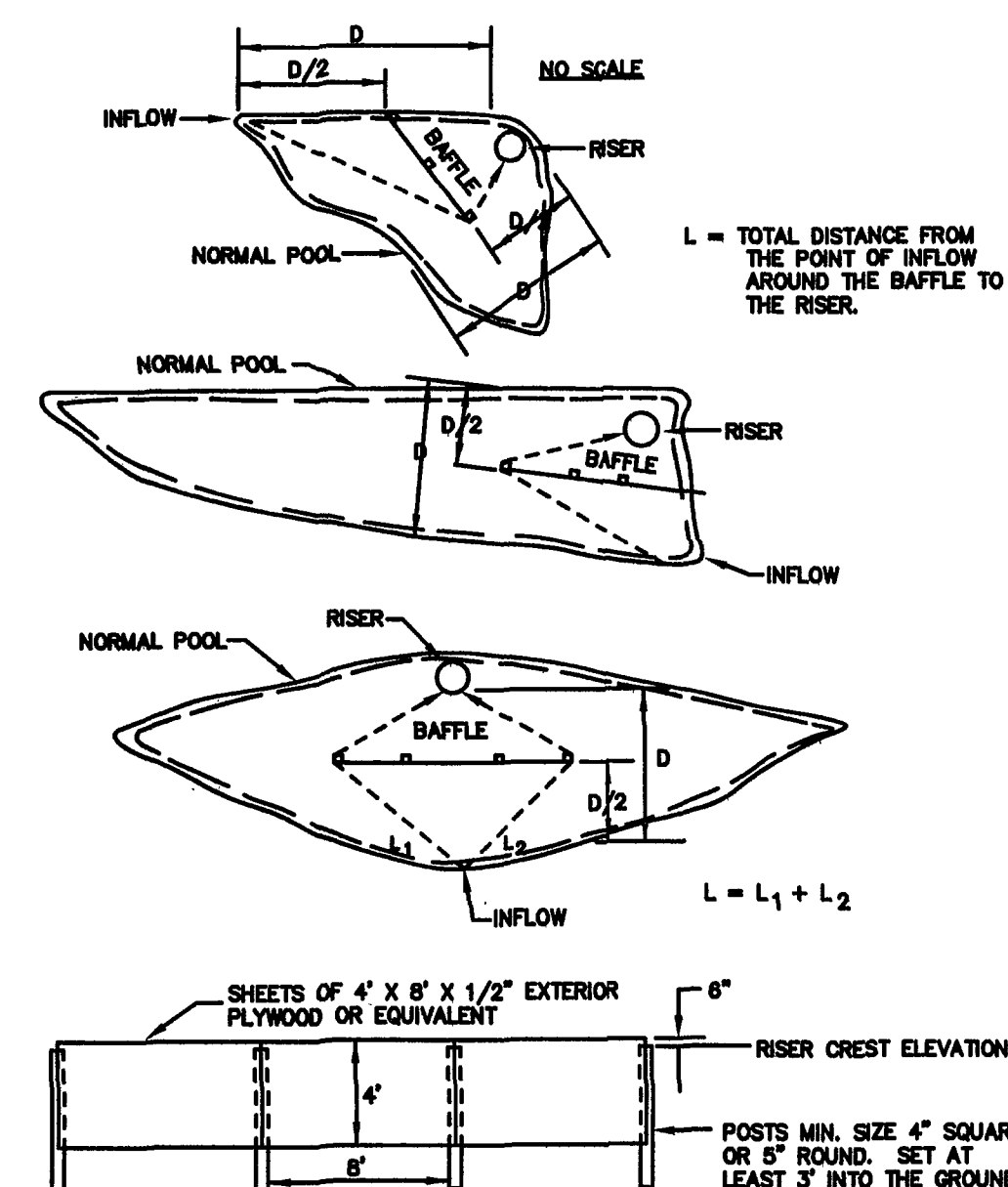
RECOMMENDED DEWATERING SYSTEM FOR SEDIMENT BASINS



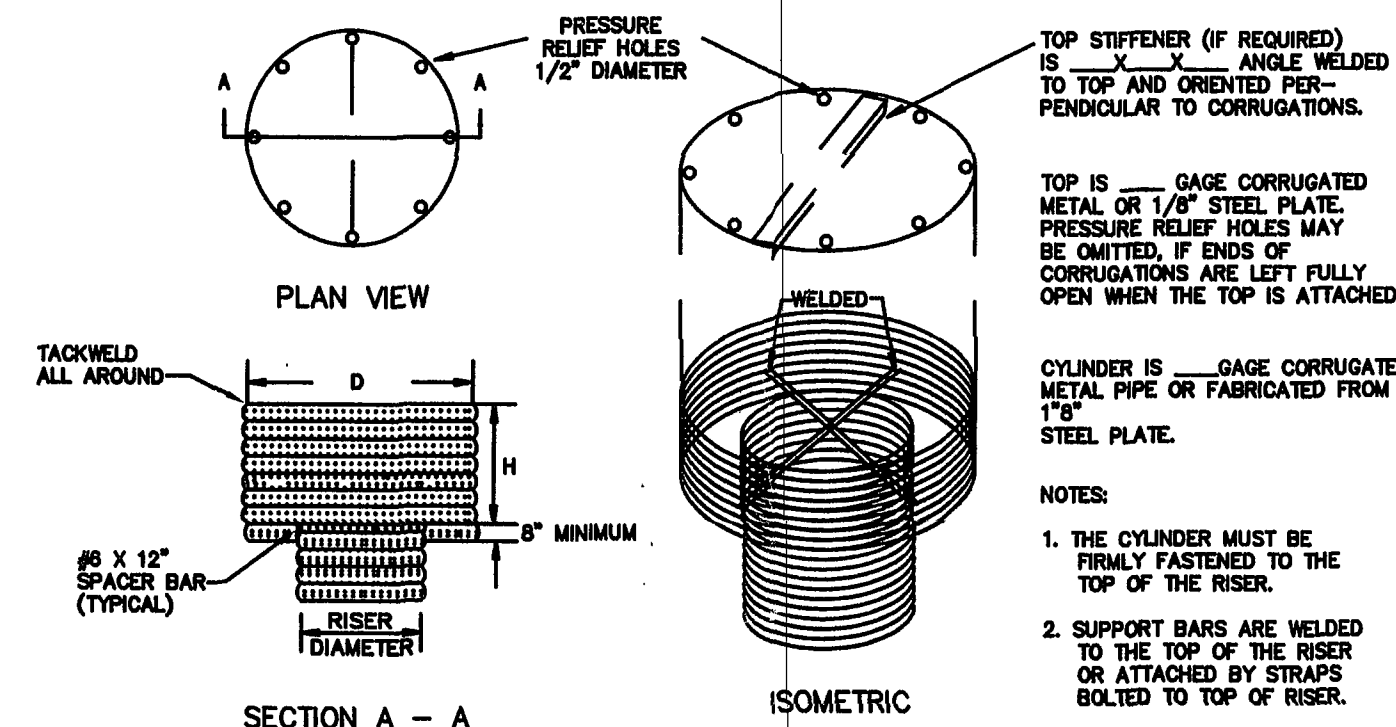
NOTE: WITH CONCRETE RISER, USE PVC SCHEDULE 40 STUB FOR DEWATERING ORIFICE

*DRAINAGE TUBING SHALL COMPLY WITH ASTM F667 AND AASHTO M294

EXAMPLE PLAN VIEWS OF BAFFLE LOCATIONS IN SEDIMENT BASINS



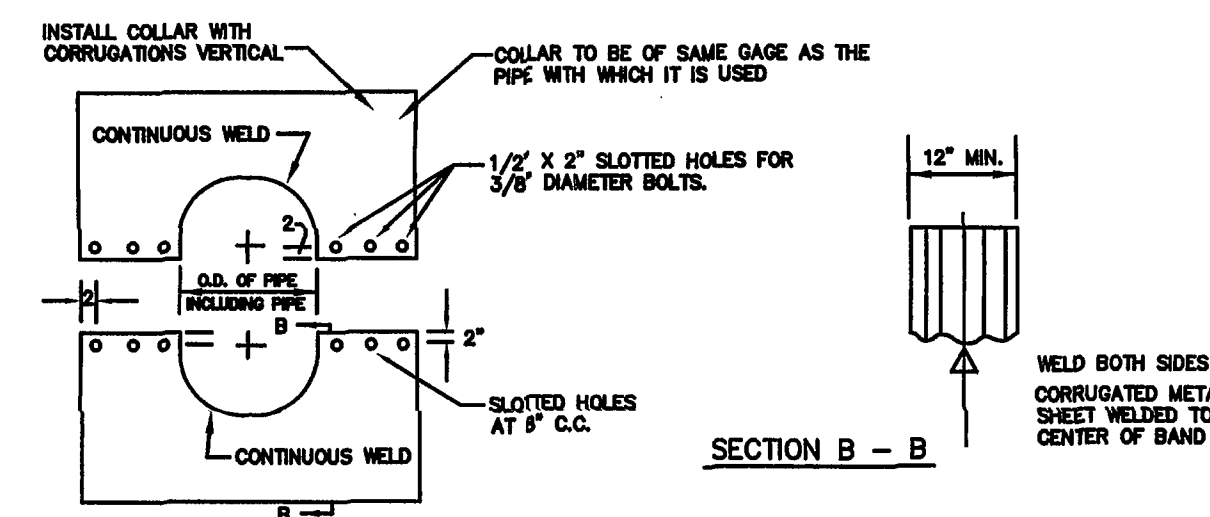
ANTI-VORTEX DEVICE DESIGN



Riser Diam., in.	Cylinder Diameter, inches	Thickness, gage	Height, inches	Minimum Size Support Bar	Minimum Top Thickness	Stiffener
12	18	16	6	#8 Rebar or 1 1/2 x 1 1/2 x 3/16 angle	16 ga. (F)	-
15	21	16	7	"	"	"
18	27	16	8	"	"	"
21	30	16	11	"	16 ga. (C), 14 ga. (F)	-
24	36	16	13	"	"	"
27	42	16	15	"	"	"
36	54	14	17	#8 Rebar	14 ga. (C), 12 ga. (F)	-
42	60	16	19	"	"	"
48	72	16	21	1 1/4" pipe or 1 1/4 x 1 1/4 x 1/4 angle	14 ga. (C), 10 ga. (F)	-
54	78	16	25	"	"	"
60	90	14	29	1 1/2" pipe or 1 1/2 x 1 1/2 x 1/4 angle	12 ga. (C), 8 ga. (F)	-
66	98	14	33	2" pipe or 2 x 2 x 3/16 angle	12 ga. (C), 8 ga. (F) w/ stiffener	2 x 2 x 1/4 angle
72	102	14	36	"	"	2 1/2 x 2 1/2 x 1/4 angle
78	114	14	39	2 1/2" pipe or 2 x 2 x 1/4 angle	"	"
84	120	12	42	2 1/2" pipe or 2 1/2 x 2 1/2 x 1/4 angle	"	2 1/2 x 2 1/2 x 1/4 angle

Note: The criterion for sizing the cylinder is that the area between the inside of the cylinder and the outside of the riser is equal to or greater than the area inside the riser. Therefore, the above table is invalid for use with concrete pipe risers.
Note: Corrugation for 12"-36" pipe measures 2 1/2" x 1/2"; for 42"-84" the corrugation measures 3" x 1" or 3" x 1 1/2".
Note: C = corrugated; F = flat.

DETAILS OF CORRUGATED METAL ANTI-SEEP COLLAR

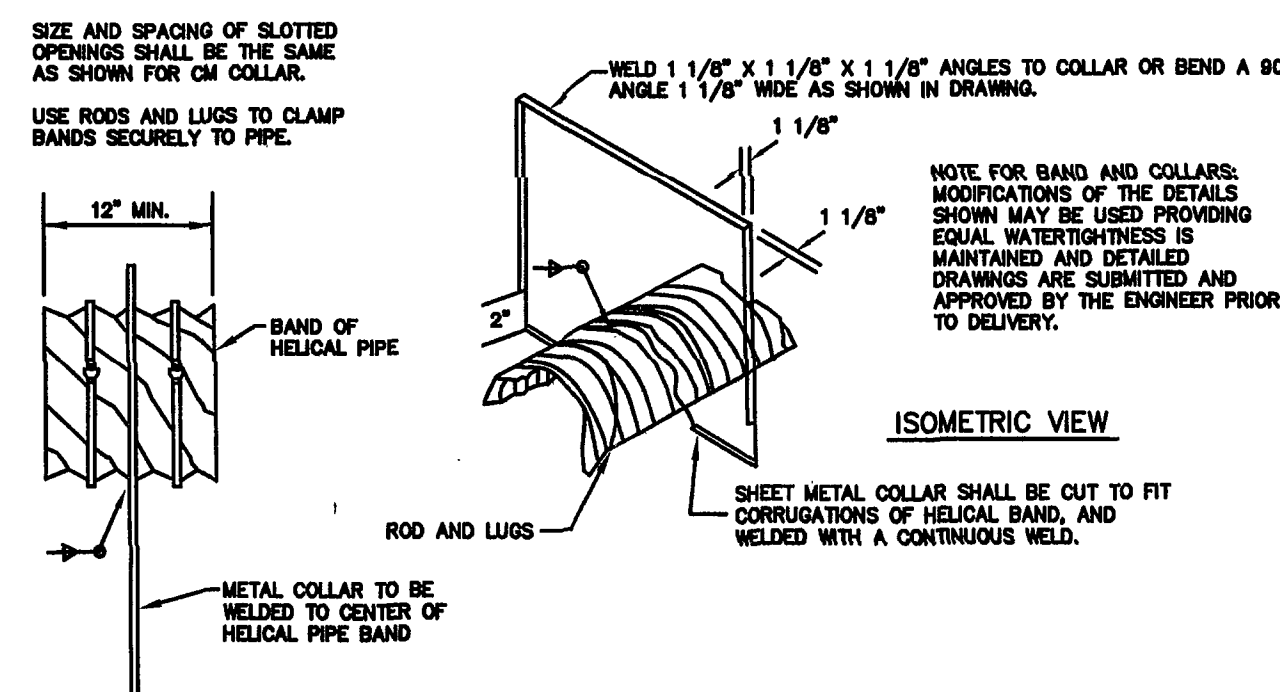


ELEVATION OF UNASSEMBLED COLLAR

NOTES:
1. ALL MATERIALS TO BE IN ACCORDANCE WITH CONSTRUCTION AND CONSTRUCTION MATERIAL SPECIFICATIONS.
2. WHEN SPACING ON THE PLANS, COATING OF COLLARS SHALL BE IN ACCORDANCE WITH CONSTRUCTION AND CONSTRUCTION MATERIAL SPECIFICATIONS.

3. UNASSEMBLED COLLARS SHALL BE MARKED BY PAINTING OR TACKLING TO IDENTIFY MATCHING PAIRS.
4. THE LAP BETWEEN THE TWO HALF SECTIONS AND BETWEEN THE PIPE AND CONNECTING BAND SHALL BE CAULKED WITH ASPHALT MASTIC AT TIME OF INSTALLATION.
5. EACH COLLAR SHALL BE FURNISHED WITH TWO 1/2" DIAMETER RODS WITH STANDARD TANK LUGS FOR CONNECTING COLLARS TO PIPE.

DETAIL OF HELICAL PIPE ANTI-SEEP COLLAR



PARTIAL ELEVATION
REF: ENGR. FIELD MANUAL

NOTE: TWO OTHER TYPES OF ANTI-SEEP COLLARS ARE:

1. CORRUGATED METAL, SIMILAR TO UPPER, EXCEPT SHOP WELDED TO A SHORT (4 FT.) SECTION OF THE PIPE AND CONNECTED WITH CONNECTING BANDS TO THE PIPE.
2. CONCRETE, SIX INCHES THICK FORMED AROUND THE PIPE WITH #8 REBAR SPACED 12" HORIZONTALLY AND VERTICALLY.

CONSTRUCTION SPECIFICATIONS

SITE PREPARATION

AREAS UNDER THE EMBANKMENT OR ANY STRUCTURAL WORKS RELATED TO THE BASIN SHALL BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBJECTIONABLE MATERIAL. IN ORDER TO FACILITATE CLEANOUT AND RESTORATION, THE AREA OF MOST FREQUENT INUNDATION (MEASURED FROM THE TOP OF THE PRINCIPAL SPILLWAY) WILL BE CLEARED OF ALL BRUSH AND TREES.

CUTOFF TRENCH

FOR EARTH-FILL EMBANKMENTS, A CUTOFF TRENCH SHALL BE EXCAVATED ALONG THE CENTERLINE OF THE DAM. THE TRENCH SHALL EXTEND AT LEAST 1 FOOT INTO A STABLE STRONG LAYER OF SOIL AND HAVE A MINIMUM DEPTH OF 2 FEET. THE CUTOFF TRENCH SHALL EXTEND UP BOTH ABUTMENTS TO THE RISER CREST ELEVATION. THE MINIMUM BOTTOM WIDTH SHALL BE 4 FEET, BUT ALSO MUST BE WIDE ENOUGH TO PERMIT OPERATION OF COMPACTION EQUIPMENT. THE SIDE SLOPES SHALL BE NO STEEPER THAN 1:1.

COMPACTION REQUIREMENTS SHALL BE THE SAME AS THOSE FOR THE EMBANKMENT. THE TRENCH SHALL BE DRAINED DURING THE BACKFILLING/COMPACTION OPERATIONS.

EMBANKMENT

THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED BORROW AREAS. IT SHALL BE CLEAN MINERAL SOIL, FREE OF ROOTS, WOODY VEGETATION, STUMPS, SOD, OVERSIZED STONES, ROCKS, OR OTHER PERSHABLE OR OBJECTIONABLE MATERIAL. THE MATERIAL SELECTED MUST HAVE ENOUGH STRENGTH FOR THE DAM TO REMAIN STABLE AND BE TIGHT ENOUGH, WHEN PROPERLY COMPACTED, TO PREVENT EXCESSIVE PERCOLATION OF WATER THROUGH THE DAM. FILL CONTAINING PARTICLES RANGING FROM SMALL GRAVEL OR COARSE SAND TO FINE SAND AND CLAY IN DESIRED PROPORTION IS APPROPRIATE. ANY EMBANKMENT MATERIAL SHOULD CONTAIN APPROXIMATELY 20% CLAY PARTICLES BY WEIGHT. USING THE UNITED SOIL CLASSIFICATION SYSTEM, SC (CLAYEY SAND), GC (CLAYEY GRAVEL) AND CL ("LOW LIQUID LIMIT" CLAY) ARE AMONG THE PREFERRED TYPES OF EMBANKMENT SOILS. AREA ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL. THE MATERIAL SHOULD CONTAIN THE PROPER AMOUNT OF MOISTURE TO ENSURE THAT 95% COMPACTION WILL BE ACHIEVED. FILL MATERIAL WILL BE PLACED IN 6-INCH CONTINUOUS LAYERS OVER THE ENTIRE LENGTH OF THE FILL. COMPACTION SHALL BE OBTAINED BY ROUTING THE HAULING EQUIPMENT OVER THE FILL SO THAT THE ENTIRE SURFACE OF THE FILL IS TRANSVERSED BY AT LEAST ONE WHEEL OR TREAD TRACK OF THE EQUIPMENT, OR BY USING A COMPACTOR. SPECIAL CARE SHALL BE TAKEN IN COMPACTING AROUND THE ANTI-SEEP COLLARS (COMPACT BY HAND, IF NECESSARY) TO AVOID DAMAGE AND ACHIEVE DESIRED COMPACTION. THE EMBANKMENT SHALL BE CONSTRUCTED TO AN ELEVATION 10% HIGHER THAN THE DESIGN HEIGHT TO ALLOW FOR SETTLEMENT IF COMPACTION IS OBTAINED WITH HAULING EQUIPMENT. IF COMPACTORS ARE USED FOR COMPACTION, THE OVERBUILD MAY BE REDUCED TO NOT LESS THAN 5%.

PRINCIPAL SPILLWAY

THE RISER OF THE PRINCIPAL SPILLWAY SHALL BE SECURELY ATTACHED TO THE BARREL BY A WATERTIGHT CONNECTION. THE BARREL AND RISER SHALL BE PLACED ON A FIRMLY COMPACTED SOIL FOUNDATION. THE BASE OF THE RISER SHALL BE FIRMLY ANCHORED ACCORDING TO DESIGN CRITERIA TO PREVENT ITS FLOATING. PIERVIOUS MATERIALS SUCH AS SAND, GRAVEL, OR CRUSHED STONE SHALL NOT BE USED AS BACKFILL AROUND THE BARREL OR ANTI-SEEP COLLARS. SPECIAL CARE SHALL BE TAKEN IN COMPACTING AROUND THE ANTI-SEEP COLLARS (COMPACT BY HAND, IF NECESSARY). FILL MATERIAL SHALL BE PLACED AROUND THE PIPE IN 4-INCH LAYERS AND COMPACTED UNTIL 95% COMPACTION IS ACHIEVED. A MINIMUM OF TWO FEET OF FILL SHALL BE HAND-COMPACTED OVER THE BARREL BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.

EMERGENCY SPILLWAY

VEGETATION EMERGENCY SPILLWAYS SHALL NOT BE CONSTRUCTED OVER FILL MATERIAL. DESIGN ELEVATIONS, WIDTH, ENTRANCE AND EXIT CHANNEL SLOPES ARE CRITICAL TO THE SUCCESSFUL OPERATION OF THE SPILLWAY AND SHOULD BE ADHERED TO CLOSELY DURING CONSTRUCTION.

VEGETATION STABILIZATION

THE EMBANKMENT AND EMERGENCY SPILLWAY OF THE SEDIMENT BASIN SHALL BE STABILIZED WITH TEMPORARY OR PERMANENT VEGETATION IMMEDIATELY AFTER INSTALLATION OF THE BASIN SEE TEMPORARY SEEDING, STD. & SPEC. 3.31 OR PERMANENT SEEDING, STD. & SPEC. 3.32.

EROSION AND SEDIMENT CONTROL

THE CONSTRUCTION OF THE SEDIMENT BASIN SHALL BE CARRIED OUT IN A MANNER SUCH THAT IT DOES NOT RESULT IN SEDIMENT PROBLEMS DOWNSTREAM.

SAFETY

ALL STATE AND LOCAL REQUIREMENTS SHALL BE MET CONCERNING FENCING AND SIGNS WARNING THE PUBLIC OF THE HAZARDS OF SOFT, SATURATED SEDIMENT AND FLOOD WATERS (REFER TO STD. & SPEC. 3.01, SAFETY FENCE).

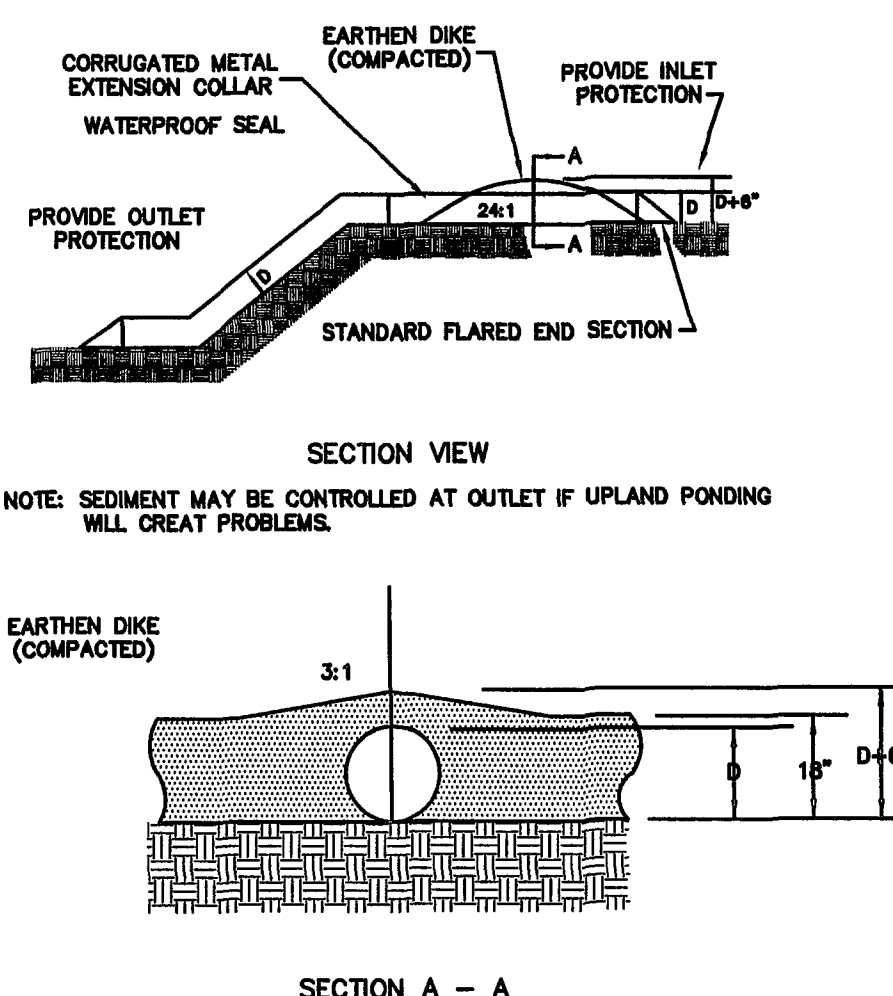
MAINTENANCE

THE BASIN EMBANKMENT SHOULD BE CHECKED REGULARLY TO ENSURE THAT IT IS STRUCTURALLY SOUND AND HAS NOT BEEN DAMAGED BY EROSION OR CONSTRUCTION EQUIPMENT.

THE EMERGENCY SPILLWAY SHOULD BE CHECKED REGULARLY TO ENSURE THAT ITS LINING IS WELL ESTABLISHED AND EROSION-RESISTANT.

THE BASIN SHOULD BE CHECKED AFTER EACH RUNOFF-PRODUCING RAINFALL FOR SEDIMENT CLEANOUT. WHEN THE SEDIMENT REACHES THE CLEAN-OUT LEVEL, IT SHALL BE REMOVED AND PROPERLY DISPOSED OF.

TEMPORARY SLOPE DRAIN



SECTION VIEW

NOTE: SEDIMENT MAY BE CONTROLLED AT OUTLET IF UPLAND PONDING WILL GREAT PROBLEMS.

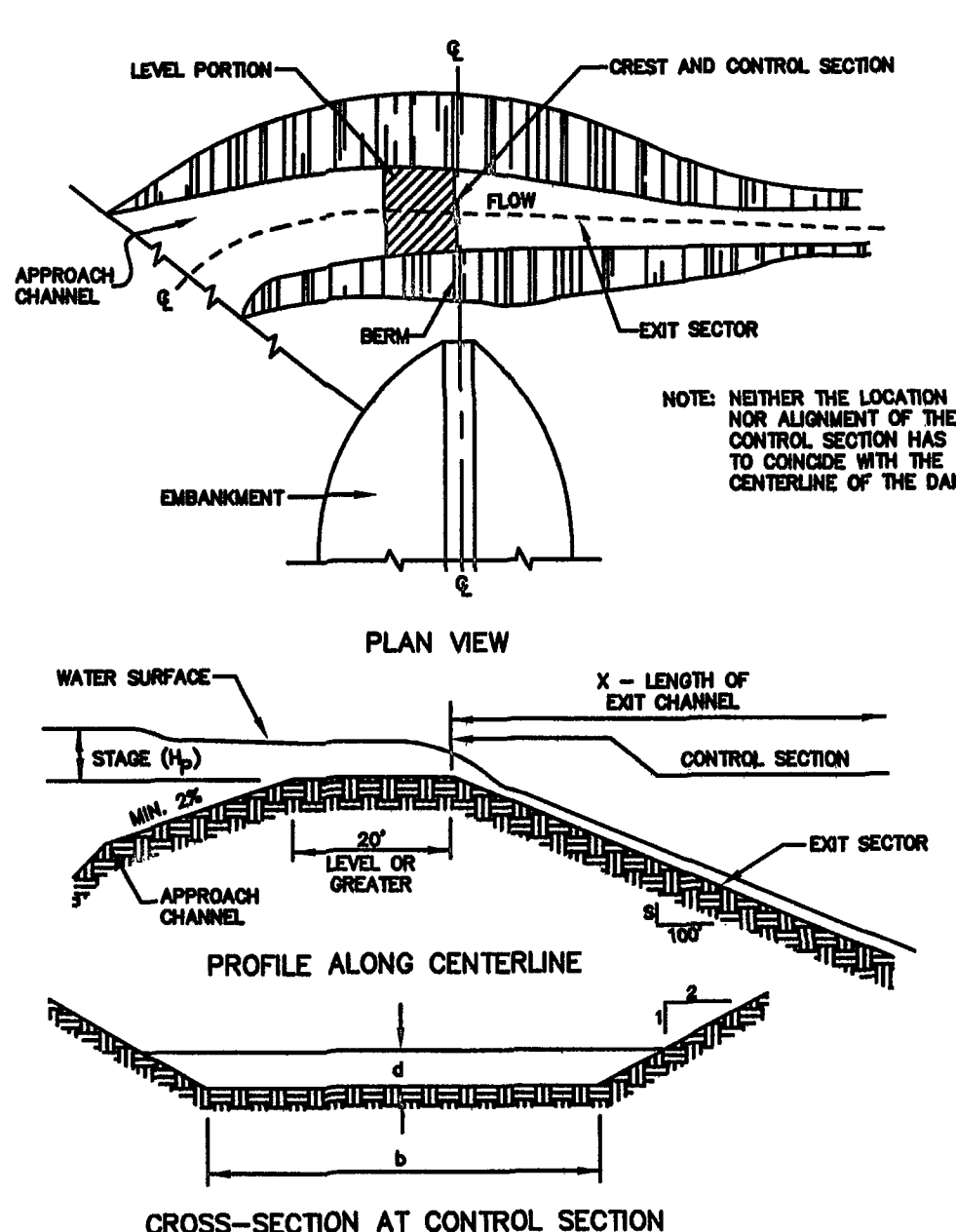
SECTION A - A

SEDIMENT BASIN DATA

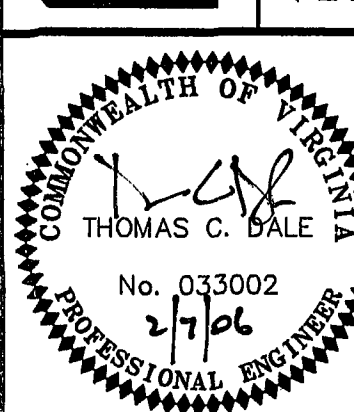
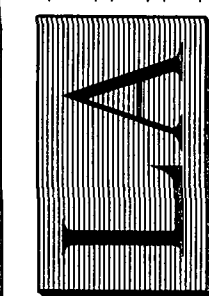
	BASIN 1A	BASIN 1B
BARREL		
Barrel Diameter	24"	SAME
Barrel Length	67'	SAME
Barrel Outlet Invert	1107.08	SAME
Barrel Inlet Invert	1108.00	SAME
Barrel Slope	1.37%	SAME
Riprap Close at Outlet	N/A	N/A
RISER		
Riser Diameter - Cono.	60"	SAME
Riser Top Elevation	1110.33	1114.25
Barrel Inlet Invert	1107.75	1108.00
Dewatering Device Diameter	6"	SAME
Dewatering Device Invert	1108.67	1112.00
Dewatering Device Tubing Dia.	8"	SAME
Anti-Vortex Diameter (D)	SPECIAL DESIGN ANTI-VORTEX DEVICE SEE NOTE BELOW	SAME
Anti-Vortex Height (H)		
ANTI-SEEP COLLARS		
Number	N/A	N/A
Size	0	0
Spacing		
BAFFLES		
Length	N/A	65'
EMERGENCY SPILLWAY		
Bottom Elevation	1111.00	1114.75
Bottom Width	22'	36.7'
Exit Channel Slope	3.8%	33.3%
Exit Channel Length	15'±	20'±
EMBANKMENT		
Basin Bottom Elevation	1105.50	SAME
Embankment Top Elevation	1112.50	1116.75
Interior Slope	3:1	3:1
Exterior Slope	3:1	3:1
Top Width	> 8'	8'
CUT-OFF TRENCH		
Depth	4'	SAME
Width	4'	SAME
Slopes	1:1	SAME

NOTE: SEE SHEET 9 FOR SPECIAL DESIGN ANTI-VORTEX DEVICE DETAIL.

EXCAVATED EARTH SPILLWAY



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



SECTION No. 1
"WILLOW WALK"
PREPARED FOR
BLACKSTOCK, INC.
SITUATED ALONG COVE ROAD, N.W.
THE CITY OF ROANOKE, VIRGINIA

REVISIONS		
NO.	DATE	DESCRIPTION
1		
2		
3		
4		

DATE: FEBRUARY 7, 2006
SCALE: NONE

COMMISSION NO.: 2004-367

SHEET 13 OF 16