STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
DESIGN DIVISION
NASHVILLE, TENNESSEE 37243-0348

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

INSTRUCTIONAL BULLETIN NO. 13-13

Regarding New and Revised Standard Drawings

Effective for the August 30th Letting (June 19th Turn-in), the following Standard Drawings are new or revised and Section V of the Design Guidelines is revised for this update.

DRAWING NUMBER	CURRENT REVISION DATE	DESCRIPTION
RD01-TS-5W		TYPICAL DETAIL FOR INSIDE LANE WIDENING OF FREEWAYS
D-PB-1	01-02-13	STANDARD DETAILS FOR CONCRETE PIPE INSTALLATION
D-PB-2	01-02-13	STANDARD DETAILS FOR FLEXIBLE PIPE INSTALLATION
D-PB-3		INDUCED TRENCH SOIL EMBANKMENT FOR PIPE CULVERT INSTALLATION
D-PE-4	01-15-13	STRAIGHT CONCRETE ENDWALL
D-CB-99RB		ROUND JUNCTION BOX AND SPRING DRAIN BOX
RP-H-3	05-08-13	CURB RAMP AND TRUNCATED DOME SURFACE DETAIL
RP-H-4	01-15-13	PERPENDICULAR CURB RAMP
RP-H-5	01-15-13	PARALLEL CURB RAMP
RP-H-7	05-08-13	PERPENDICULAR CURB RAMP FOR 20’ THRU 75’ RADIUS
RP-H-8	05-08-13	PERPENDICULAR CURB RAMP FOR 20’ THRU 60’ RADIUS
RP-H-9	05-08-13	PARALLEL CURB RAMP FOR 20’ THRU 50’ RADIUS
RP-J-23	07-25-12	CONCRETE PAVEMENT REPAIR DETAILS
RP-S-7	05-07-13	DETAILS FOR STANDARD CONCRETE SIDEWALKS
S-CB-1		CABLE BARRIER PLACEMENT
S-CC-1		CRASH CUSHION

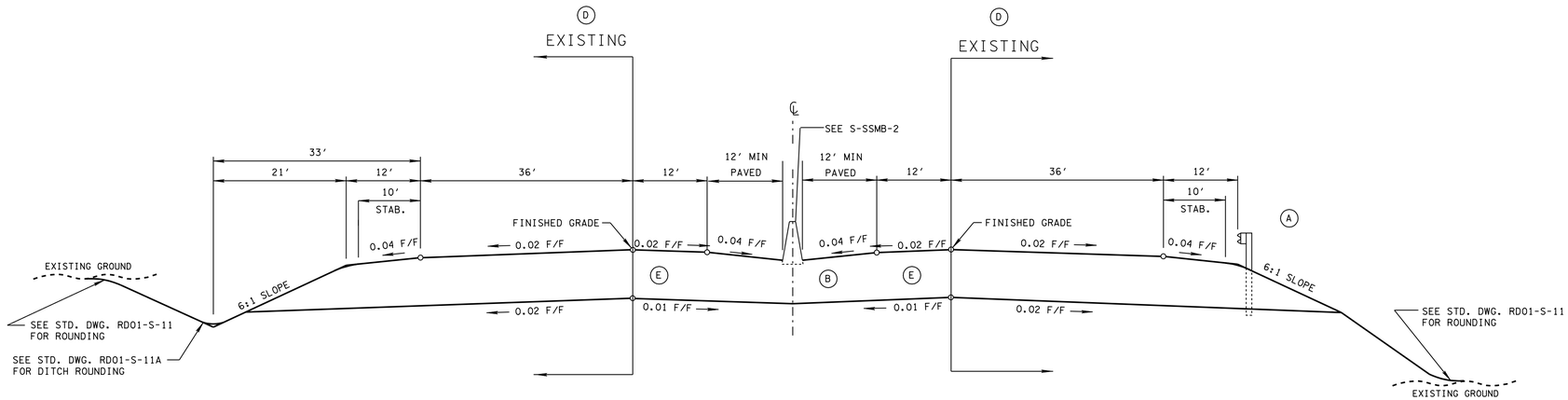
S-CC-2		CRASH CUSHION (GATING) BARREL ARRAY
S-GR-48		BIKE/PEDESTRAIN SAFETY RAIL
S-SSMB-3	01-15-13	51” HALF SIZE SINGLE SLOPE CONCRETE BARRIER WALL
S-SSMB-9		SINGLE SLOPE BARRIER WALL FOR GRADE SEPARATED MEDIAN
T-M-2	01-15-13	DETAILS OF PAVEMENT MARKING FOR CONVENTIONAL ROADS
T-M-5	04-23-13	MARKING DETAILS FOR EXPRESSWAYS & FREEWAYS
T-M-16A		ASPHALT CENTER LINE RUMBLE STRIPE
T-S-21	02-28-13	DETAILS FOR SIGNS MOUNTS ON CONCRETE MEDIAN BARRIERS
T-S-23A		MULTI-DIRECTIONAL SLIP BASE BREAKAWAY SQUARE TUBE SIGN SUPPORT
T-S-23B		MULTI-DIRECTIONAL SLIP BASE BREAKAWAY STRUCTURAL PIPE SIGN SUPPORT
T-S-23C		BREAKAWAY U-POST SIGN SUPPORTS
T-S-24		DETAILS OF SIGN WITH SOLAR FLASHING ASSEMBLY
T-SG-10	05-06-13	MAST ARM POLE AND STRAIN POLES FOUNDATION DETAILS
EC-STR-1	08-01-12	DEWATERING STRUCTURE
EC-STR-2	08-01-12	SEDIMENT FILTER BAG
EC-STR-3B	08-01-12	SILT FENCE
EC-STR-3C	08-01-12	SILT FENCE WITH WIRE BACKING
EC-STR-4	08-01-12	ENHANCED SILT FENCE CHECK (TRAPEZOIDAL DITCH)
EC-STR-4A	08-01-12	ENHANCED SILT FENCE CHECK (V-DITCH)
EC-STR-4B	08-01-12	ENHANCED SILT FENCE CHECK DETAILS
EC-STR-6	08-01-12	ROCK CHECK DAM
EC-STR-6A	08-01-12	ENHANCED ROCK CHECK DAM
EC-STR-7	08-01-12	SEDIMENT TRAP WITH CHECK DAM
EC-STR-8	08-01-12	FILTER SOCK
EC-STR-11	08-01-12	CULVERT PROTECTION TYPE 1
EC-STR-11A	08-01-12	CULVERT PROTECTION TYPE 2

EC-STR-12	08-01-12	ROCK SEDIMENT DAM
EC-STR-13	08-01-12	ROCK AND EARTH SEDIMENT EMBANKMENT
EC-STR-15	08-01-12	SEDIMENT BASIN
EC-STR-16	08-01-12	SEDIMENT BASIN RISER AND COLLAR APPURTENANCES
EC-STR-17	08-01-12	SEDIMENT BASIN EMBANKMENT DETAILS
EC-STR-21	08-01-12	PERMANENT RIPRAP BASIN ENERGY DISSIPATORS
EC-STR-25	08-01-12	TEMPORARY CULVERT CROSSING, CONSTRUCTION EXIT, CONSTRUCTION FORD
EC-STR-27	08-01-12	TEMPORARY SLOPE DRAIN AND BERM
EC-STR-29	08-01-12	PERMANENT SLOPE DRAIN PIPE
EC-STR-31	08-01-12	TEMPORARY DIVERSION CHANNEL
EC-STR-32	08-01-12	TEMPORARY DIVERSION CULVERTS
EC-STR-33	08-01-12	SUSPENDED PIPE DIVERSION (DOWNSTREAM)
EC-STR-33A	08-01-12	SUSPENDED PIPE DIVERSION (UPSTREAM)
EC-STR-34	08-01-12	EROSION CONTROL BLANKET FOR SLOPE INSTALLATION
EC-STR-35	08-01-12	FILTER BERMS
EC-STR-36	08-01-12	TURF REINFORCEMNET MAT FOR CHANNEL INSTALLATION
EC-STR-37	08-01-12	SEDIMENT TUBE
EC-STR-38	08-01-12	FLOATING TURBIDITY CURTAIN
EC-STR-39	08-01-12	CURB INLET PROTECTION TYPE 1 & 2
EC-STR-39A	08-01-12	CURB INLET PROTECTION TYPE 3 & 4
EC-STR-55	08-01-12	GABION CHECK DAM
EC-STR-59	08-01-12	GABION CHECK DAM GENERAL NOTES AND COMPONENT PROPERTIES
EC-STR-61	08-01-12	LEVEL SPREADERS

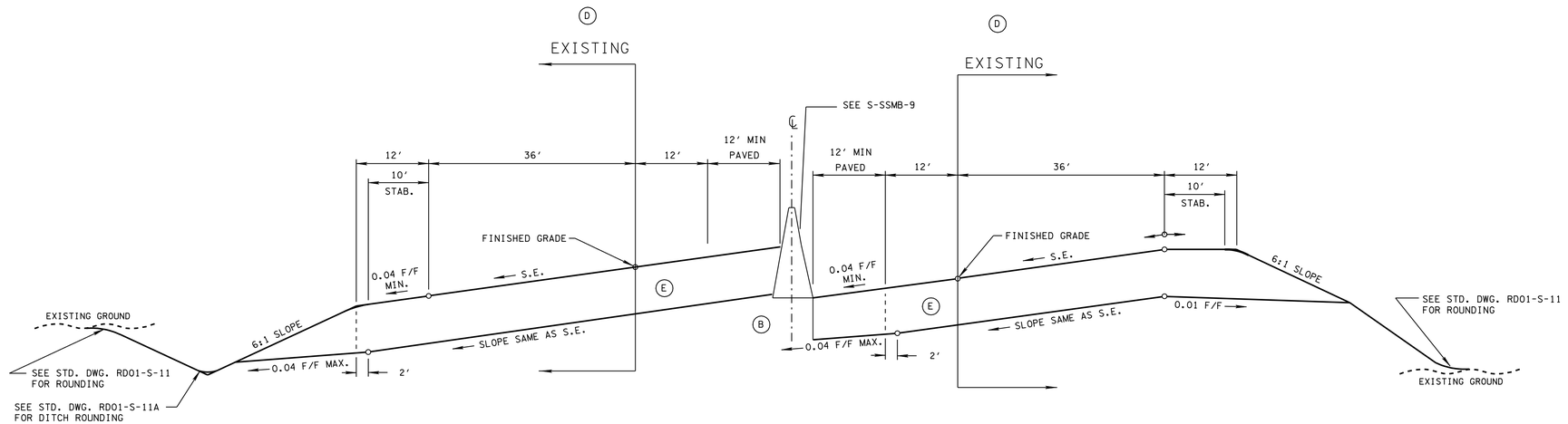
Carolyn Stonecipher

Carolyn Stonecipher, PE
Civil Engineering Director
Roadway Design Division

CS:ARH:MWC
5/28/13

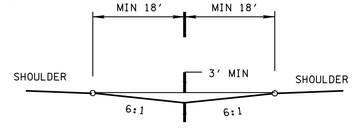


TANGENT SECTION



SUPERELEVATED SECTION

C



ALTERNATE DITCH DETAIL

PURPOSE

THIS STANDARD IS ONLY TO BE USED FOR THE WIDENING OF EXISTING SIX LANE FREEWAYS WHERE THE NEW LANES TO BE ADDED UTILIZE THE EXISTING MEDIAN.

DESIGN STANDARD

SEE TABLE II ON RDO1-TS-5

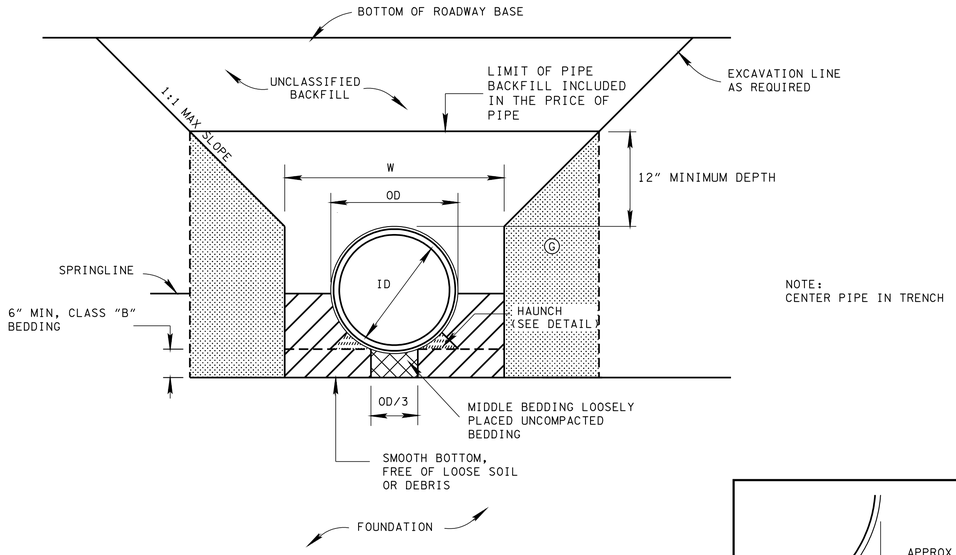
GENERAL NOTES

- (A) SEE GUARDRAIL DRAWINGS FOR TYPICAL PLACEMENT.
- (B) SEE S-SSMB-2 OR S-SSMB-9 FOR BARRIER WALL DETAILS.
- (C) IF THE EXISTING MEDIAN IS WIDE ENOUGH, A MEDIAN DITCH MAT BE BUILT PROVIDING THAT THE DITCH IS AT LEAST 3 FEET DEEP AND THE FORE SLOPES ARE NO STEEPER THAN 6:1. SHORT SECTIONS OF DITCH BETWEEN SECTIONS OF MEDIAN WALL ARE UNDESIRABLE.
- (D) EXISTING LANES TO REMAIN IN PLACE UNLESS OTHERWISE SPECIFIED.
- (E) EXISTING INSIDE SHOULDERS REQUIRE FULL DEPTH REMOVAL UNLESS OTHERWISE SPECIFIED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL DETAIL FOR INSIDE LANE WIDENING OF FREEWAYS

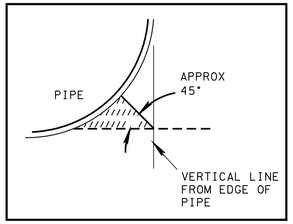
2-4-13 | RDO1-TS-5W



NOTE:
CENTER PIPE IN TRENCH

STANDARD TRENCH INSTALLATION (H)

(PIPE CULVERT INSTALLATION IN CUTS)



MINIMUM HAUNCH AREA DETAIL

TABLE A

REINFORCED CONCRETE PIPE CLASSIFICATION (AASHTO M170)	
FILL	CLASS
≤ 16	III
> 16 TO ≤24	IV
> 24 TO ≤ 38	V
> 38	SPECIAL DESIGN

TABLE B

PIPE CULVERT			CLASS "B" BEDDING MATERIAL CY/LF
PIPE DIA	PAYMENT ITEM NO	W	
18"	607-03.30	47"	0.149
24"	607-05.30	54"	0.192
30"	607-06.30	61"	0.239
36"	607-07.30	68"	0.289
42"	607-08.30	75"	0.343
48"	607-09.30	82"	0.400
54"	607-10.30	89"	0.461
60"	607-11.30	96"	0.525
66"	607-12.30	106"	0.623
72"	607-13.30	115"	0.719
78"	607-14.30	124"	0.821
84"	607-15.30	133"	0.929

OD=OUTSIDE DIAMETER
ID=INSIDE DIAMETER

CLASS "B" BEDDING COMPACTED TO 90% STANDARD PROCTOR DENSITY

CLASS "B" BEDDING UNCOMPACTED

FIRM INSITU SOIL OR CLASS "B" BEDDING COMPACTED TO 90% STANDARD PROCTOR DENSITY

HAUNCH AREA, SHOVEL COMPACTED

GENERAL NOTES

(A) REINFORCED CONCRETE PIPE SHALL MEET THE REQUIREMENTS OF AASHTO M-170 THE WALL THICKNESS SHALL BE "WALL B" (EXPECT: FOR STRUCTURES DEEPER THAN THE MINIMUM DEPTH, "WALL C" MAY BE USED) AND THE CLASS SHALL BE AS LISTED IN "TABLE A". ALL PIPES SHALL BE CERTIFIED BY EITHER ACPA OR NCPA.

(B) WHERE THE TRENCH FOUNDATION IS FOUND UNACEPTABLE OR LOCATION WHERE THE WATER TABLE IS FOUND HIGH:

(1) IMPROVED FOUNDATION OR EXCAVATABLE FLOWABLE FILL (EFF) MAY BE USED AT ENGINEER'S INSTRUCTION AS SHOWN ON D-PB-2.

(2) MAX FILL HEIGHTS AND JOINT SPECIFICATIONS SHALL BE REVIEWED TO VERIFY CONDITIONS MEET WITH THE MANUFACTURER'S SPECIFICATIONS.

(C) FOR MINIMUM CONSTRUCTION COVER DEPTHS SEE D-PB-3.

(D) IF LOCAL SOIL CONDITIONS MEET MINIMUM BEDDING REQUIREMENTS BEDDING IS NOT REQUIRED UNDER SIDE DRAINS FOR PRIVATE DRIVES, FIELD ENTRANCES, PIPES PARALLEL TO THE ROADWAY IN AN UNPAVED MEDIAN, PIPES OUTSIDE THE SHOULDER LIMITS OF INTERCHANGE RAMPS, OR PIPES OUTSIDE NORMAL SLOPE LINES.

(E) FOR ADDITIONAL INSTALLATION INFO SEE SECTION 27 "CONCRETE CULVERTS" OF THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES AND ASTM C-1479-10 AND TO MANUFACTURER'S SPECIFICATIONS.

(F) ONLY AS MUCH TRENCH AS CAN BE SAFELY MAINTAINED SHALL BE OPENED. ALL TRENCHES SHALL BE BACK FILLED TO THE MINIMUM COVER DEPTH "D" ABOVE THE PIPE AND COMPACTED AS SOON AS PRACTICABLE, BUT NOT LATER THAN THE END OF EACH WORKING DAY.

(G) FOR TRENCHES WITH IN SITU SOIL WALLS, THE SOIL SHALL BE AT RELATIVELY AS DENSE AS THE MAJORITY OF THE SUBGRADE AS DETERMINED BY THE ENGINEER. SOIL NOT MEETING THIS REQUIREMENT SHALL BE REMOVED AND REPLACED.

(H) FOR EMBANKMENT AREAS OR WHERE TRENCH CONDITIONS DO NOT EXIST, AN INDUCED TRENCH SOIL EMBANKMENT SHALL BE CONSTRUCTED SEE D-PB-3.

(I) ARCH AND ELLIPTICAL SHAPED PIPE CULVERTS SHALL BE INSTALLED THE SAME AS CIRCULAR WITH O.D. EQUAL TO THE WIDEST HORIZONTAL DIMENSION ON THE PIPE. TO ESTIMATE BEDDING MATERIAL FOR THESE PIPES WITH INTERNAL WIDTH THE SAME AS DIAMETER IN THE TABLE, MULTIPLY BEDDING QUANTITY BY 0.5 FOR THE SHOWN MIN TRENCH DIMENSIONS.

(J) FOR MULTIPLE PIPES MINIMUM SPACING BETWEEN PIPES IS:

36" PIPES AND SMALLER: EQUAL TO THE OUTSIDE DIAMETER OF THE LARGEST PIPE.

PIPES LARGER THAN 36": EQUAL TO HALF THE OUTSIDE DIAMETER OF THE LARGEST PIPE.

(K) THE BACKFILL SHALL BE TYPE "B" BEDDING MATERIAL MEETING THE REQUIREMENTS OF CONSTRUCTION SPECIFICATION SUBSECTION 903.05 TO THE SPRINGLINE.

UNCLASSIFIED BACKFILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING AN 8 INCH LOOSE LIFT THICKNESS AND BROUGHT UP EVENLY AND SIMULTANEOUSLY ON BOTH SIDES OF THE PIPE TO AN ELEVATION NOT LESS THAN ONE FOOT ABOVE THE TOP OF THE PIPE.

UNCLASSIFIED BACKFILL TO THE LIMIT OF PIPE BACKFILL LINE SHALL BE COMPACTED IN ACCORDANCE TO STANDARD SPECIFICATION 204.11.

A MINIMUM COMPACTION LEVEL OF 90% STANDARD PROCTOR DENSITY PER AASHTO T99 SHALL BE ACHIEVED BY USE OF VIBRATORY PLATE. HYDROHAMMER TYPE COMPACTORS SHALL NOT BE USED OVER THE PIPE. ALL COMPACTION EQUIPMENT USED SHALL BE APPROVED BY THE ENGINEER.

(L) JOINTS BETWEEN PIPES REQUIRE A RUBBER GASKET MEETING ASTM C443. AT CONNECTIONS TO STRUCTURES USE NON-SHRINK GROUT OR RUBBER GASKET PER C923 OR C1478.

(M) INSPECTION REQUIREMENTS

(1) ALL PIPES SHALL UNDERGO INSPECTION DURING INSTALLATION, FOR LONGITUDINAL AND TRANSVERSE CRACKS. (PER SECTION 27 OF AASHTO STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES)

(2) FINAL INSPECTIONS SHALL BE CONDUCTED NO SOONER THAN 30 DAYS AFTER COMPLETION OF INSTALLATION AND FINAL FILL.

(N) EXCAVATION FOR PIPE WILL NOT BE MEASURED AND PAID FOR DIRECTLY, BUT THE COST WILL BE INCLUDED IN THE COST OF THE PROPOSED PIPE CULVERT.

PAYMENT FOR GRANULAR COMPACTABLE TYPE "B" BACKFILL, UNCLASSIFIED BACKFILL TO THE LIMIT LINE, AND/OR EXCAVATABLE FLOWABLE FILL INCLUDING BEDDING MATERIAL WILL BE INCLUDED IN THE UNIT PRICE OF THE PIPE.

REV. 7-12-07: REVISED GENERAL NOTE (J).

REV. 6-1-09: REVISED GENERAL NOTE (I) AND TITLE NAME. ADDED GENERAL NOTE (J).

REV.2-1-12: REVISED DRAWING NAME ADDED EFF DETAIL. REVISED GENERAL NOTES AND TABLE. ADDED MINIMUM COVER TABLE.

REV. 8-21-12: REVISED GENERAL NOTES. CHANGED BACKFILL MATERIAL.

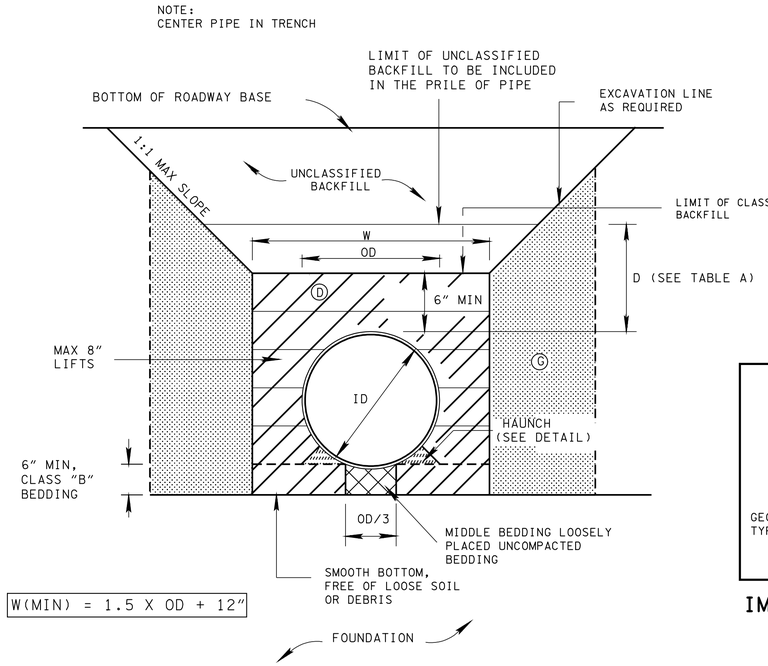
REV. 1-2-13: REVISED TRENCH DETAILS REVISED BEDDING TABLE.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

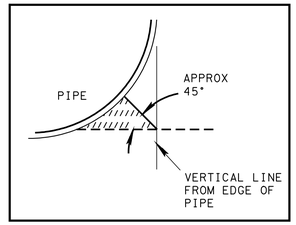
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STANDARD DETAILS FOR CONCRETE PIPE INSTALLATION

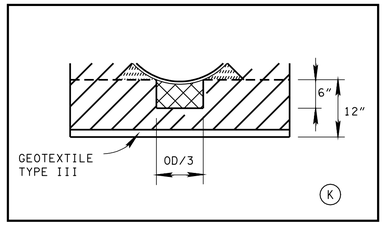
D-PB-1



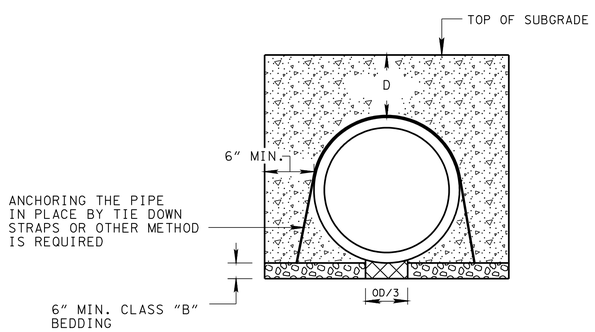
STANDARD TRENCH INSTALLATION (F)



MINIMUM HAUNCH AREA DETAIL



IMPROVED FOUNDATION DETAIL



ALTERNATE BACKFILL DETAIL USING EXCAVATABLE FLOWABLE FILL (EFF)

SEE GENERAL NOTE (K)

OD=OUTSIDE DIAMETER
ID=INSIDE DIAMETER

CLASS "B" STRUCTURAL BACKFILL COMPACTED TO 90% STANDARD PROCTOR DENSITY

CLASS "B" BEDDING UNCOMPACTED

FIRM INSITU SOIL OR CLASS "B" BEDDING COMPACTED TO 90% STANDARD PROCTOR DENSITY

HAUNCH AREA, SHOVEL COMPACTED

TABLE A

MINIMUM DEPTH (D)	
MATERIAL	D
HDPE ID ≤ 36"	12"
HDPE ID > 36"	21"
PVC	12"
SRTRP	12"
CMP	12"

TABLE B

PIPE CULVERT		CLASS "B" BEDDING MATERIAL (CY/LF)
PIPE DIA	PAYMENT ITEM NO	
18"	607-03.30	0.313
24"	607-05.30	0.382
30"	607-06.30	0.497
36"	607-07.30	0.626
42"	607-08.30	0.767
48"	607-09.30	0.969
54"	607-10.30	1.141
60"	607-11.30	1.588
66"	607-12.30	1.805
72"	607-13.30	2.035

GENERAL NOTES

PIPE MATERIALS:

(A) FLEXIBLE PIPE MATERIALS ARE HDPE, PVC, CMP, AND THERMOPLASTIC STEEL REINFORCED RIBBED PIPE INCLUDING CORRUGATED ALUMINUM PIPE.

(B) ALL HIGH-DENSITY POLYETHYLENE (HDPE) PIPE USED FOR CULVERT AND STORMDRAIN APPLICATIONS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M294, TYPE S, CURRENT EDITION ALL HDPE PIPE DELIVERED AND USED SHALL BE A PARTICIPANT IN NTPEP. MAX. PIPE DIA. FOR HDPE PIPE IS 60 INCHES.

(C) POLY VINYL CHLORIDE (PVC) PROFILE WALL DRAINAGE PIPE SHALL MEET AASHTO DESIGNATION M304. THE MAXIMUM PIPE DIAMETER FOR PVC PIPE IS 36 INCHES.

(D) STEEL REINFORCED THERMOPLASTIC RIBBED PIPE (SRTRP) SHALL MEET AASHTO DESIGNATION MP-20. THE MAXIMUM PIPE DIAMETER FOR THE PIPE IS 36".

(E) CORRUGATED METAL PIPE (CMP) SHALL BE ALUMINIZED COATED CORRUGATED METAL PIPE SHALL MEET AASHTO M274, MAXIMUM DIA IS 72".

INSTALLATIONS REQUIREMENTS:

(F) FOR EMBANKMENT AREAS OR WHERE TRENCH CONDITIONS DO NOT EXIST, AN INDUCED TRENCH SHALL BE CONSTRUCTED SEE D-PB-3.

(G) FOR TRENCHES WITH IN SITU SOIL WALLS, ANY PORTION OF THE WALL SHALL BE AT LEAST AS FIRM AS THE MAJORITY OF THE SUBGRADE. SOIL NOT MEETING THIS REQUIREMENT SHALL BE REMOVED AND REPLACED.

(H) FOR ADDITIONAL INSTALLATION INFORMATION SEE AASHTO SECTION 30 OR ASTM D2321 ALL PIPES SHALL BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. PIPE SHALL BE PLACED IN THE BED STARTING AT THE DOWNSTREAM END.

(I) ONLY AS MUCH TRENCH AS CAN BE SAFELY MAINTAINED SHALL BE OPENED. ALL TRENCHES SHALL BE BACKFILLED TO THE MINIMUM COVER DEPTH "D" ABOVE THE PIPE AND COMPACTED AS SOON AS PRACTICABLE, BUT NOT LATER THAN THE END OF EACH WORKING DAY.

(J) JOINTS FOR FLEXIBLE PIPE SHALL MEET THE PERFORMANCE REQUIREMENT OF ASTM D3212. JOINTS SHALL BE INSTALLED SO THAT THE CONNECTION OF PIPE SECTION, FOR A CONTINUOUS LINE WILL BE FREE FROM IRREGULARITIES IN THE FLOW LINE. JOINTS BETWEEN FLEXIBLE PIPE AND STRUCTURE SHALL HAVE A GASKET MEETING ASTM C923 OR ASTM F2510. FOR PIPE TO STRUCTURE CONNECTIONS AT A SKEW GREATER THAN 15° WHERE A GASKET WILL NOT WORK, NON-SHRINK GROUT APPLIED IN TWO STAGES MAY BE SUBSTITUTED.

(K) WHERE THE TRENCH FOUNDATION IS FOUND UNACCEPTABLE OR LOCATION WHERE THE WATER TABLE IS FOUND HIGH:

(1) IMPROVED FOUNDATION OR EFF MAY BE USED AT ENGINEER'S INSTRUCTION.

(2) MAX FILL HEIGHTS AND JOINT SPECIFICATIONS SHALL BE REVIEWED TO VERIFY CONDITIONS MEET WITH THE MANUFACTURER'S SPECIFICATIONS.

(L) ALL PIPE INSTALLATIONS REQUIRE CONCRETE ENDWALLS.

(M) MINIMUM SPACING BETWEEN MULTIPLE PIPES IS:

36" PIPES AND SMALLER: EQUAL TO THE OUTSIDE DIAMETER OF THE LARGEST PIPE.

PIPES LARGER THAN 36": EQUAL TO HALF THE OUTSIDE DIAMETER OF THE LARGEST PIPE.

(N) MAXIMUM ALLOWABLE FILL HEIGHTS ARE AS DEFINED IN THE DRAINAGE MANUAL TABLE 6A-1.

(O) FOR MINIMUM COVER DEPTHS FOR CONSTRUCTION LOADS SEE D-PB-3.

GRANULAR COMPACTABLE BACKFILL REQUIREMENTS:

(P) THE BACKFILL SHALL BE TYPE "B" GRADING D OR E MATERIAL MEETING THE REQUIREMENTS OF SUBSECTION 903.05.

STRUCTURAL BACKFILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING AN 8 INCH LOOSE LIFT THICKNESS AND BROUGHT UP EVENLY AND SIMULTANEOUSLY ON BOTH SIDES OF THE PIPE TO AN ELEVATION NOT LESS THAN 6 INCHES ABOVE THE TOP OF THE PIPE.

UNCLASSIFIED BACKFILL TO THE LIMIT OF PIPE BACKFILL LINE SHALL BE COMPACTED IN ACCORDANCE TO STANDARD SPECIFICATION 204.11.

A MINIMUM COMPACTION LEVEL OF 90% STANDARD PROCTOR DENSITY PER AASHTO T99 SHALL BE ACHIEVED BY USE OF VIBRATORY PLATE. HYDROHAMMER TYPE COMPACTORS SHALL NOT BE USED OVER THE PIPE. ALL COMPACTION EQUIPMENT USED SHALL BE APPROVED BY THE ENGINEER.

INSPECTION REQUIREMENTS:

(1) ALL PIPES SHALL UNDERGO INSPECTION DURING INSTALLATION.

(2) FINAL INSPECTIONS SHALL BE CONDUCTED NO SOONER THAN 30 DAYS AFTER COMPLETIONS OF INSTALLATION AND FINAL FILL.

(3) THE PIPE SHALL BE EVALUATED TO DETERMINE WHETHER THE INTERNAL DIAMETER OF THE BARREL HAS BEEN REDUCED MORE THAN 5% WHEN MEASURED NOT LESS THAN 30 DAYS FOLLOWING COMPLETION OF THE INSTALLATION.

(4) FOR LOCATIONS WHERE PIPE DEFLECTION EXCEEDS 5% OF THE INSIDE DIAMETER, AN EVALUATION SHALL BE CONDUCTED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL CONSIDERING THE SEVERITY OF THE DEFLECTION, STRUCTURAL INTEGRITY, ENVIRONMENTAL CONDITIONS,AND THE DESIGN SERVICE LIFE OF THE PIPE. PIPE REMEDIATION OR REPLACEMENT SHALL BE REQUIRED FOR LOCATIONS WHERE THE EVALUATION FINDS THAT THE DEFLECTION COULD BE PROBLEMATIC.

(5) INSTALLED PIPE DEFLECTIONS THAT EXCEED 5% OF THE INITIAL INSIDE DIAMETER MAY INDICATE THAT THE INSTALLATION WAS SUBSTANDARD. SEE SECTION 607.09.

(6) IN ALL PIPE INSTALLATIONS, AT LEAST 10% OF THE TOTAL NUMBER OF PIPE RUNS REPRESENTING AT LEAST 10% OF THE TOTAL PROJECT FOOTAGE ON THE PROJECT SHALL BE RANDOMLY SELECTED BY THE ENGINEER AND INSPECTED FOR DEFLECTION. ALSO AS DETERMINED BY THE 100% VISUAL INSPECTION IN AASHTO SECTION 30.5.6.1, ALL AREAS IN WHICH DEFLECTION CAN BE VISUALLY DETECTED SHALL BE INSPECTED FOR DEFLECTION. (REFER TO AASHTO, SECTION 30,5.6 AS ADOPED BY THE AASHTO SUBCOMMITTEE ON BRIDGES AND STRUCTURES, JUNE 29, 2005)

PAYMENT:

(Q) EXCAVATION FOR PIPE WILL NOT BE MEASURED AND PAID FOR DIRECTLY, BUT THE COST WILL BE INCLUDED IN THE COST OF THE PROPOSED PIPE CULVERT.

PAYMENT FOR GRANULAR COMPACTABLE TYPE "B" BACKFILL, UNCLASSIFIED BACKFILL TO THE LIMIT LINE, AND/OR EXCAVATABLE FLOWABLE FILL INCLUDING BEDDING MATERIAL WILL BE INCLUDED IN THE UNIT PRICE OF THE PIPE.

GEOTEXTILE TYPE III WILL BE PAID UNDER ITEM NO. 740-10.03 IF IMPROVED FOUNDATION IS REQUIRED.

☐ REV. 7-12-07: REVISED GENERAL NOTE (J).

REV. 6-1-09: REVISED GENERAL NOTE (I) AND TITLE NAME. ADDED GENERAL NOTE (J).

REV.2-1-12: REVISED DRAWING NAME ADDED EFF DETAIL. REVISED GENERAL NOTES AND TABLE. ADDED MINIMUM COVER TABLE.

REV. 8-21-12: REVISED GENERAL NOTES. CHANGED BACKFILL MATERIAL.

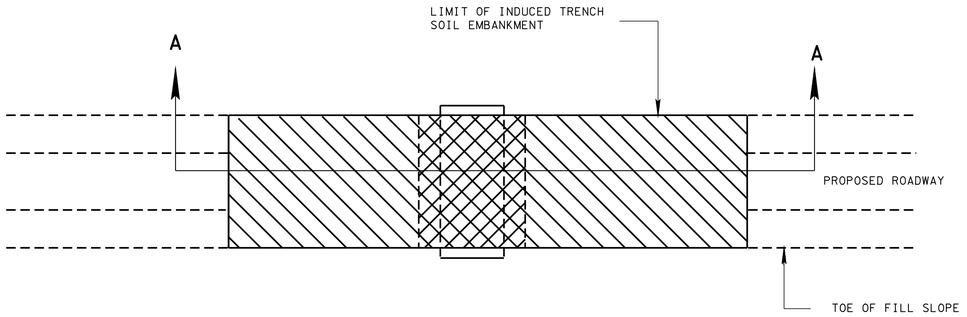
REV. 1-2-13: REVISED TRENCH AND ADDED FILL DETAIL.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STANDARD DETAILS FOR FLEXIBLE PIPE INSTALLATION

3-15-07 | D-PB-2



PLAN VIEW

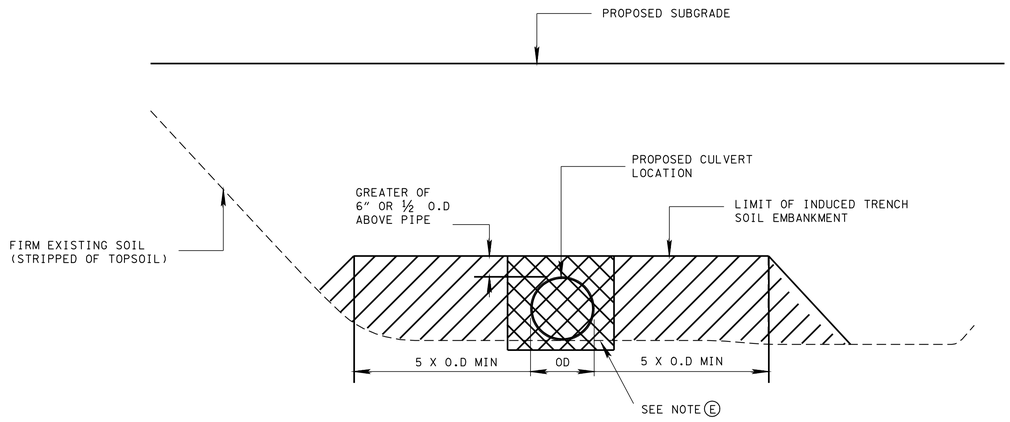
TO BE USED FOR PIPE CULVERT INSTALLATION IN FILL AREAS

PIPE FILL MINIMUM COVER DEPTHS, DURING CONSTRUCTION FOR INDICATED AXLE LOADS, (IN.)				
NOMINAL PIPE DIA. FT	18.0-50.0 KIP	50.0-75.0 KIP	75.0-110.0 KIP	110.0-150.0 KIP
2.0-3.0	24.0	30.0	36.0	36.0
3.5-4.0	36.0	36.0	42.0	48.0
4.5-5.0	36.0	36.0	42.0	48.0

(AASHTO, SECTION 30)

SOIL EMBANKMENT

AREA TO BE EXCAVATED FOR TRENCH AS SHOWN ON D-PB-1 (CONCRETE) OR D-PB-2 (FLEXIBLE)



SECTION A-A

NOTES

(A) INDUCED TRENCH DETAIL MAY BE USED WHEN INSITU SOIL IS FOUND UNACCEPTABLE OR NO TRENCH EXISTS.

(B) IF FIRM EXISTING SOIL IS FOUND WITHIN THE EMBANKMENT ZONE IT SHALL BE LEFT IN PLACE.

(C) FILL FOR THE INDUCED TRENCH TO BE TO A MIN DEPTH OF THE GREATER OF 6" OR ½ OD OVER THE PIPE.

(D) SOIL EMBANKMENT SHALL BE COMPACTED TO MEET SUBGRADE COMPACTION REQUIREMENTS IN STANDARD SPECIFICATION 207.04.

(E) ONCE SOIL EMBANKMENT IS PLACED AND COMPACTED AS SHOWN, STANDARD DETAILS FOR CONCRETE OR FLEXIBLE PIPE STANDARDS SHALL BE FOLLOWED TO COMPLETE THE INSTALLATION.

(F) PAYMENT:

SOIL EMBANKMENT THAT IS TO REMAIN IN PLACE WILL BE PAID FOR IN ITEM NO.203-01.

SOIL THAT IS EXCAVATED FOR PIPE INSTALLATION WILL BE INCLUDED IN THE COST OF THE PIPE.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

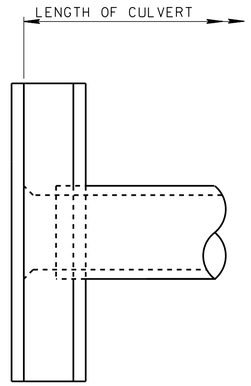
INDUCED TRENCH SOIL EMBANKMENT FOR PIPE CULVERT INSTALLATION

1-2-13 | D-PB-3

REV. 9-28-83: REDREW AND ADDED TABLE FOR STRAIGHT ENDWALL WHEN PIPE IS SKEWED.

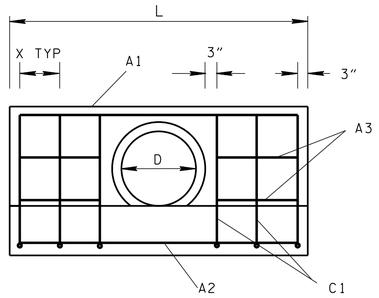
REV. 2-19-88: ADDED SAFETY ADJUSTMENTS " U " TYPE ENDWALL.

- REV. 1-19-94 : REDREW AND REORGANIZED DRAWING. ELIMINATED TYPE " U " ENDWALL FOR 3:1 SLOPE.
- REV. 1-19-97: ADDED UNITS TO HEADING FOR TABLE FOR SKEWED PIPE.
- REV. 6-1-09: ADDED GENERAL NOTE (D)
- REV. 7-19-10: REMOVED GENERAL NOTE (D)
- REV. 1-15-13: ADDED REINFORCEMENT AND CHANGED NOTES. ADDED BILL OF STEEL, REMOVED "U" AND "L" TYPE ENDWALL.

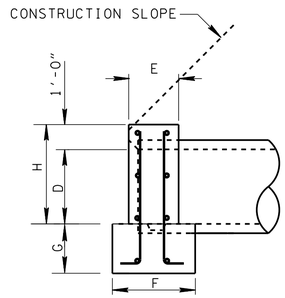


PLAN

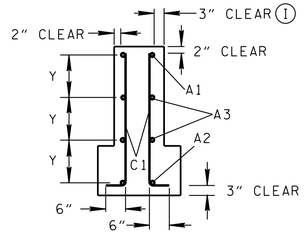
NOTE: ALL BARS ARE #4.



FRONT ELEVATION



SIDE ELEVATION



REINFORCING DIAGRAM

STRAIGHT TYPE CONCRETE ENDWALL

TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES FOR ONE STRAIGHT CONCRETE ENDWALL (SKEW 90°)

DIMENSIONS						CONC. IN ONE ENDWALL	REINF. STEEL LB
	WALL			FOOTING		TOTAL	
DIA	L	H	E	F	G	C.Y.	
18"	6'-0"	2'-6"	1'-3"	2'-1"	1'-3"	1.16	40
24"	8'-0"	3'-0"	1'-4"	2'-2"	1'-4"	1.86	68
30"	10'-0"	3'-6"	1'-6"	2'-4"	1'-6"	2.98	90

NOTE: WHEN PIPE IS ON A SKEW USE TWO STRAIGHT ENDWALLS AND MAKE "L" EQUAL TO "L" IN TABLE ABOVE DIVIDED BY SINE OF ANGLE OF SKEW. TO ADJUST QUANTITIES MULTIPLY BY TWO AND DIVIDE BY SINE OF ANGLE OF SKEW.

BAR SPACING

DIA.	X	Y
18"	2 @ 18.5	4 @ 13
24"	3 @ 13.5	4 @ 15.33
30"	3 @ 17.75	5 @ 13.5

REINFORCING STEEL LEGEND

a BAR A b a BAR C

BILL OF STEEL

STRAIGHT ENDWALL

	18" PIPE				24" PIPE				30" PIPE			
BAR	a	b	LENGTH	NUMBER	a	b	LENGTH	NUMBER	a	b	LENGTH	NUMBER
A1	66	0	66	2	90	0	90	2	114	0	114	2
A2	66	0	66	2	90	0	90	2	114	0	114	2
C1	40	6	46	8	47	6	53	12	55	6	61	12
A3	18.5	0	18.5	8	27	0	27	8	35.5	0	35.5	12
	TOTAL LB		706 in 40		TOTAL LB		1212 in 68		TOTAL LB		1614 in 90	

GENERAL NOTES

(A) CONCRETE ENDWALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATION, SECTION 611, AND/OR SPECIAL PROVISIONS.

(B) ALL STRAIGHT CONCRETE ENDWALLS ON THE INLET END OF PIPE, AND AT 90° SKEW SHALL BE BEVELED AT 3" AT AN 45° ANGLE. BEVEL WILL NOT BE REQUIRED WHEN ENDWALL IS CONSTRUCTED ON THE "BELLED "END OF CONCRETE PIPE.

(C) MAY BE MODIFIED TO ACCOMMODATE MULTIPLE PIPES WHEN MORE THAN ONE LINE OF PIPE IS REQUIRED THE DISTANCE FROM CENTER TO CENTER OF PIPE SHALL BE D + 1'-0".

(D) PAYMENT FOR ENDWALLS WILL BE MADE AS FOLLOWS:

ITEM 611-07.01, CLASS "A" CONCRETE (PIPE ENDWALLS)----CUBIC YARD.
ITEM 611-07.02. STEEL BAR REINFORCING (PIPE ENDWALLS)----POUND.

(E) SEE 6.04.3.3 IN THE TDOT DRAWING MANUAL FOR RIPRAP APRON REQUIREMENT.

(F) PRECASTING IS ALLOWED.

(G) PIPE OPENING TO BE BASED ON TYPE "B" WALL THICKNESS (AASHTO M170).

(H) PIPE ENDWALLS FOR SLOPES STEEPER THAN 3:1 (PREVIOUSLY TYPE "U") WILL NOW USE TYPE "B" SEE D-PE-9.

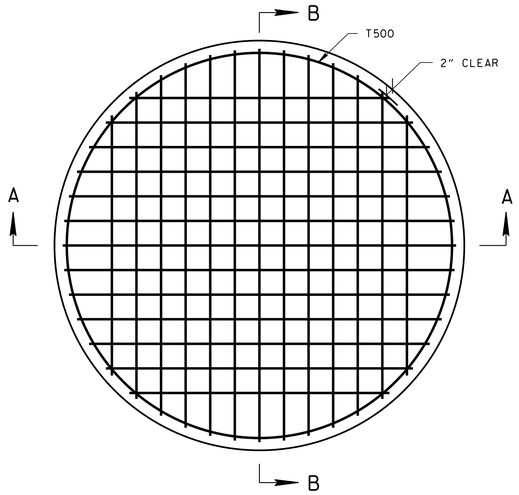
(I) THE FACE OF THE ENDWALL PLACED AGAINST EARTH SHALL HAVE 3" COVER.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

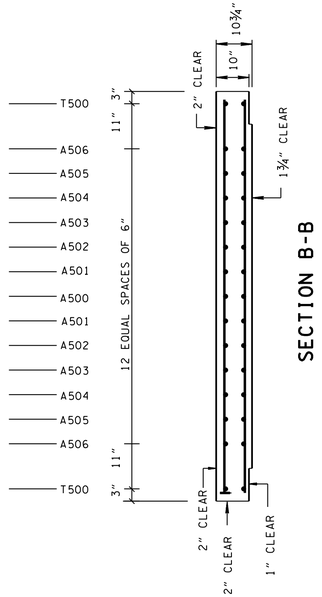
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STRAIGHT CONCRETE ENDWALL

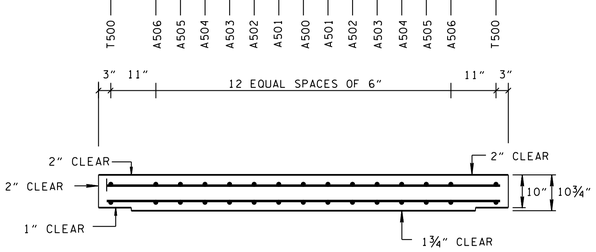
3-1-94 D-PE-4



LID REINFORCING

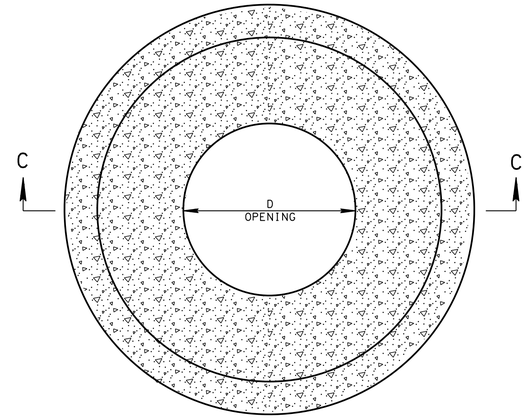


SECTION B-B

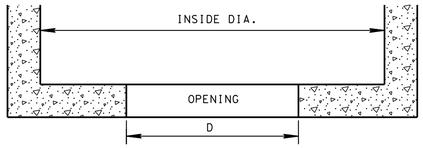


SECTION A-A

SPECIAL LID DETAIL FOR ROUND JUNCTION BOXES AND SPRING BOX



PLAN VIEW



SECTION C-C

ROUND SPRING BOX BOTTOM SLAB DETAIL

SPRING BOX OPENING	
INSIDE DIA. (INCHES)	OPENING DIA.(D) (INCHES)
48	24
60	30
72	36
84	42
96	48
108	54
120	60

JUNCTION BOX AND SPRING BOX SECTION TABLE		
INSIDE DIA. (INCHES)	LID DIA. (INCHES)	REFERENCE CATCH BASIN DRAWING (B)
48	58	D-CB-12RA
60	72	D-CB-12RB
72	86	D-CB-12RB
84	100	D-CB-12RC
96	114	D-CB-12RC
108	128	D-CB-12RC
120	142	D-CB-12RC

TABLE KEY
160 X 2
LENGTH OF BARS — NUMBER OF BARS

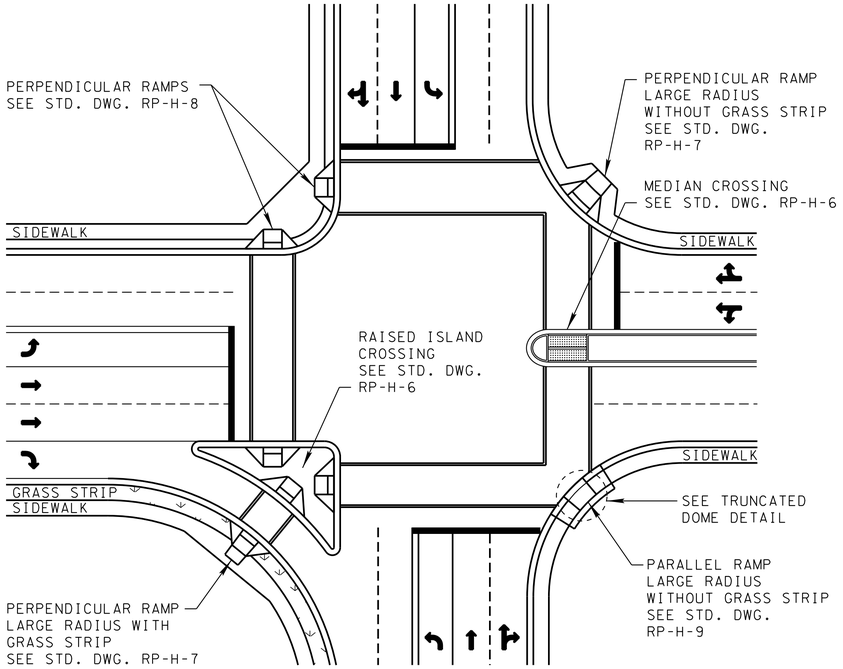
GENERAL NOTES
(A) ROUND JUNCTION OR SPRING DRAIN BOXES TO BE BUILT USING STANDARD ROUND CATCH BASIN EXCEPT FOR LID AND SPRING DRAIN BOX BOTTOM SLAB.
(B) SEE REFERENCED CATCH BASIN STANDARD FOR ALL STRUCTURE DETAILS EXCEPT LID AND SPRING DRAIN BOX BOTTOM SLAB.
(C) SEE D-CB-99R FOR OTHER DETAILS AND PIPE OPENINGS.
(D) 100" DIA LID SHOWN, OTHER SIMILAR. SEE BILL OF STEEL FOR REQUIRED BARS. ADDITIONAL BARS TO BE ADDED AS REQUIRED BY BILL OF STEEL AT 6" SPACING C-C.

BILL OF STEEL FOR LID (INCHES)											
LID DIA.	T500	A500	A501	A502	A503	A504	A505	A506	A507	A508	A509
58	160X2	54X4	52¾X8	48¾X8	41½X8	28⁹⁄₁₆X8					
72	204X2	68X4	67X8	63⅞X8	58⅜X8	49⅝X8					
86	248³⁄₁₆X2	82X4	81³⁄₁₆X8	78⁹⁄₁₆X8	74¹⁄₁₆X8	67⅜X8	57⁹⁄₁₆X8				
100	292⅛X2	96X4	95¼X8	93¹⁄₁₆X8	89¼X8	83¾X8	76X8	65⅜X8			
114	336⅛X2	110X4	109⅜X8	107⅜X8	104⅛X8	99⅜X8	92¹⁵⁄₁₆X8	84⅜X8	73X8		
128	380⅛X2	124X4	123⁷⁄₁₆X8	121¾X8	118⅞X8	114⅝X8	109⅛X8	101⅞X8	92⁹⁄₁₆X8	80⅝X8	
142	424⅛X2	138X4	137⁷⁄₁₆X8	135¹⁵⁄₁₆X8	133⅜X8	129⅝X8	124⅝X8	118⅜X8	110½X8	100⅝X8	88⅛X8

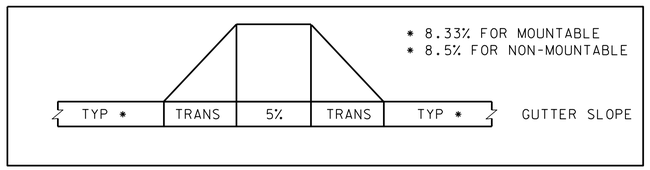
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

ROUND
JUNCTION BOX
SPRING DRAIN BOX

2-21-13 | D-CB-99RB



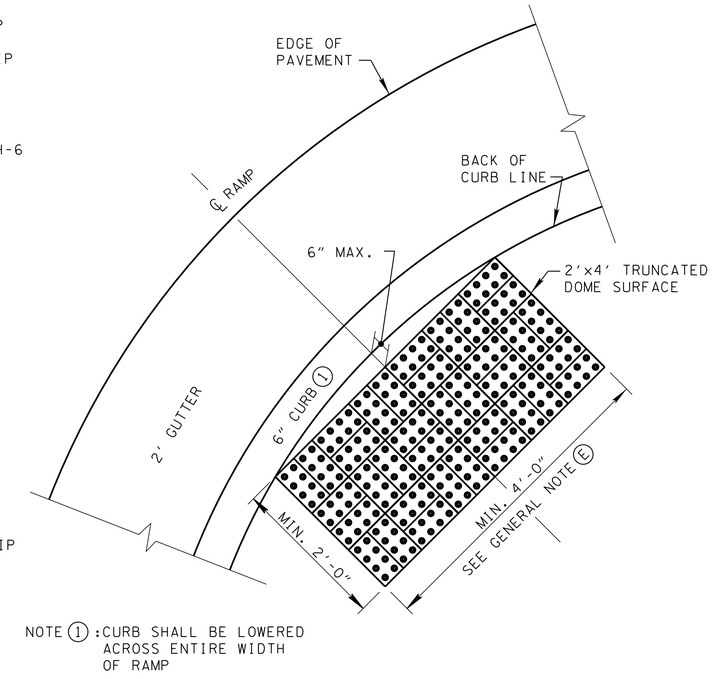
PLAN VIEW
(4-WAY INTERSECTION)



GUTTER SLOPE AT CURB RAMP

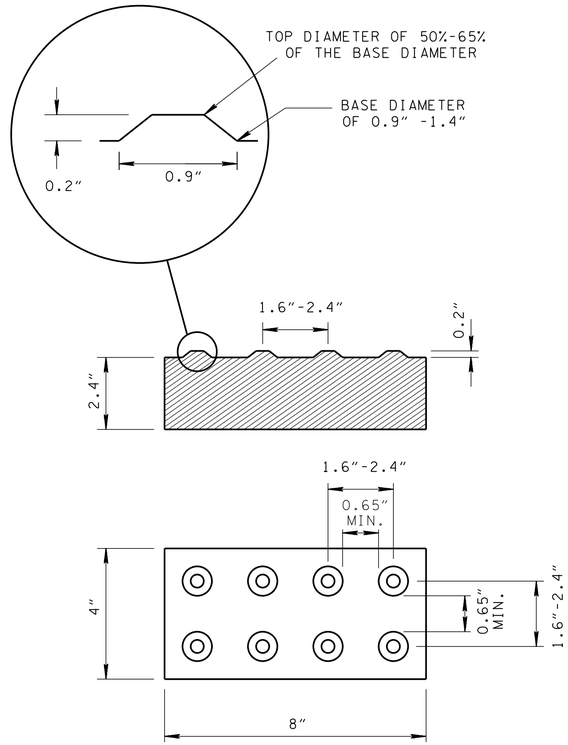
SPECIAL PAVER NOTES

1. CONCRETE PAVER UNITS SHALL MEET ALL REQUIREMENTS OF ASTM C-936. 4"X8" CONCRETE PAVERS SHALL BE PLACED IN A BASKET WEAVE PATTERN, AS SHOWN. CONCRETE PAVERS OF OTHER DIMENSIONS ARE ALSO ACCEPTABLE PROVIDED THE PAVERS CAN BE PLACED IN A 2'X4' DIMENSION WITHOUT CUTTING THE PAVERS AND PAVER DEPTH IS 2.4".
2. COMPOSITE TILES WITH NOMINAL DEPTH OF 0.4" MAY BE USED INSTEAD OF CONCRETE PAVERS. COMPOSITE TILES SHALL BE INSTALLED SO THAT DOMES ARE ALIGNED IN A SQUARE GRID PATTERN.
3. CONCRETE PAVER UNITS SHALL HAVE A TRUNCATED DOME TOP SURFACE FOR DETECTABLE WARNING TO PEDESTRIANS.
4. CONCRETE PAVER UNITS OR COMPOSITE TILES SHALL BE A TRADITIONAL BRICK RED COLOR UNLESS SHOWN OTHERWISE IN THE PLANS.
5. CONCRETE PAVER UNITS SHALL BE SAW CUT ONLY AND CUT UNITS SHALL NOT BE LESS THAN 25 PERCENT OF A FULL UNIT.
6. ALL PRODUCTS LISTED ON THE QUALIFIED PRODUCTS LIST ARE ACCEPTABLE.
7. PLACE A MINIMUM TOTAL PAVER WIDTH OF 2'-0" ADJACENT TO CURB LINE.



NOTE (1) :CURB SHALL BE LOWERED ACROSS ENTIRE WIDTH OF RAMP

DETAIL OF TRUNCATED DOME SURFACE IN RADIUS



CONCRETE PAVER WITH TRUNCATED DOME SURFACE
(SEE SPECIAL PAVER NOTES)

GENERAL NOTES

(A) DETAILS SHOWN ON THIS PLAN APPLY TO THE CONSTRUCTION OR RECONSTRUCTION OF STREETS, CURBS, OR SIDEWALKS.

(B) CURB RAMPS ARE TO BE LOCATED AS SHOWN ON THE PLANS.

(C) CURB RAMPS SHALL BE PROVIDED AT ALL CORNERS OF STREET INTERSECTIONS WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT WALK LOCATIONS IN MID-BLOCK AND ACROSS FROM CORNER RAMPS AT T-INTERSECTIONS.

(D) THE FIRST TWO FEET OF RAMP MUST CONSIST OF A TRUNCATED DOMED SURFACE. RAMPS SHALL INCLUDE THE TRUNCATED DOME SURFACE TO PROVIDE A DETECTABLE WARNING FOR VISUALLY IMPAIRED PEDESTRIANS.

(E) THE DETECTABLE WARNING SHOULD EXTEND THE FULL WIDTH OF THE CURB RAMP (EXCLUSIVE OF FLARED SIDES).

(F) THE DETECTABLE WARNING SURFACES SHALL PROVIDE A 70 PERCENT CONTRAST IN LIGHT REFLECTANCE WITH THE ADJOINING SURFACE.

(G) CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP. THE GRADE SHALL BE FREE OF SAGS AND SHORT GRADE CHANGES.

(H) DRAINAGE STRUCTURES SHALL NOT BE PLACED IN LINE WITH RAMPS.

(I) THE NORMAL GUTTER LINE PROFILE SHALL BE MAINTAINED THROUGH THE AREA OF THE RAMP. THE GUTTER CROSS SLOPE AT THE RAMP SHALL NOT EXCEED 5%.

(J) CROSSWALK MARKINGS, IF USED, SHALL BE LOCATED AS SHOWN ON THE APPLICABLE HANDICAP RAMP STD. DWG. SEE STD. DWG. T-M-4 FOR TYPICAL STOP LINE PLACEMENT AND STANDARD CROSS WALK MARKING.

(K) COST OF THE LOWERED CURB AND GUTTER TO BE INCLUDED IN THE PRICE OF ITEM NO. 702-01, CONCRETE CURB OR ITEM NO. 702-03, CONCRETE COMBINED CURB & GUTTER.

(L) ENGINEER SHOULD BE NOTIFIED FOR ASSESMENT IF THE HANDICAP RAMP SIDE FLARES EXCEED 10' IN LENGTH DUE TO THE LONGITUDINAL ROADWAY GRADE.

(M) ALL COST OF INSTALLING CURB RAMPS INCLUDING TRUNCATED DOME IN EXISTING SIDEWALK AREAS INCLUDING REMOVAL OF THE EXISTING SIDEWALK SHALL BE BID FOR UNDER THE FOLLOWING PAY ITEM:

701-02.01, CONCRETE CURB RAMP (RETROFIT) PER SQUARE FOOT.

PAYMENT SHALL INCLUDE ALL MATERIALS, EQUIPMENT, AND LABOR NECESSARY FOR CONSTRUCTION OF THE HANDICAP RAMP(S).

(N) ALL COST OF INSTALLING CURB RAMPS INCLUDING TRUNCATED DOME IN NEWLY CONSTRUCTED SIDEWALK AREAS SHALL BE BID FOR UNDER THE FOLLOWING PAY ITEM:

701-02.03, CONCRETE CURB RAMP PER SQUARE FOOT.

PAYMENT SHALL INCLUDE ALL MATERIALS, EQUIPMENT, AND LABOR NECESSARY FOR CONSTRUCTION OF THE HANDICAP RAMP(S).

(O) SURFACE TEXTURE TO BE OBTAINED BY A COURSE BROOMING TRANSVERSE TO THE SLOPE OF RAMP.

(P) FOR SIGNALIZED INTERSECTIONS THAT REQUIRE PEDESTRIAN SIGNAL PUSH BUTTONS, SEE TDOT TRAFFIC DESIGN MANUAL FOR PLACEMENT AND DETAILS.

- ☐ REV. 7-17-07: REVISED SIZE AND SPACING OF TRUNCATED DOMES. ADDED NOTE (E). MODIFIED SPECIAL PAVER NOTES.
- ☐ REV. 4-13-11: ADDED LOWERED CURB FOOTNOTE (1) TO TRUNCATED DOME DETAIL. MISC. EDITS TO DRAWING.

  REV. 5-8-13: ADDED GUTTER SLOPE DETAIL AND REVISED NOTE (1). UPDATED TERMINOLOGY.

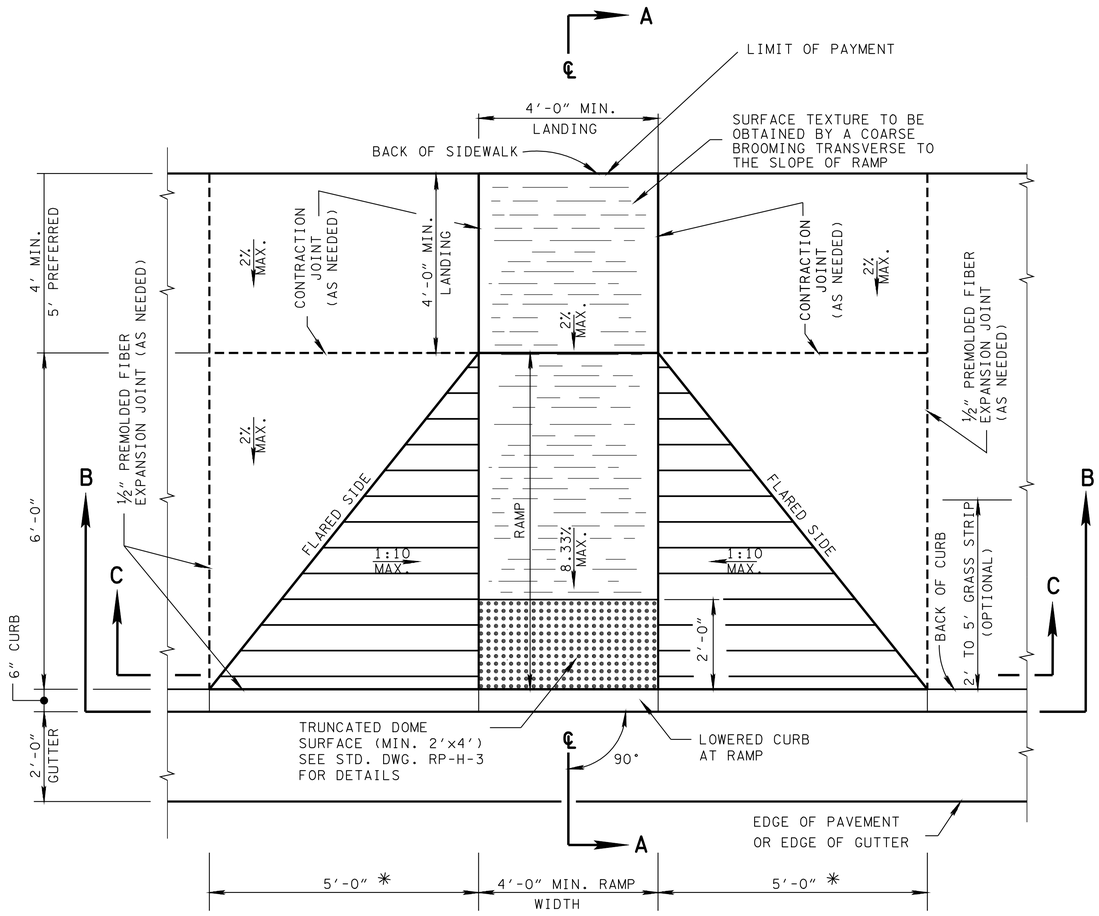
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

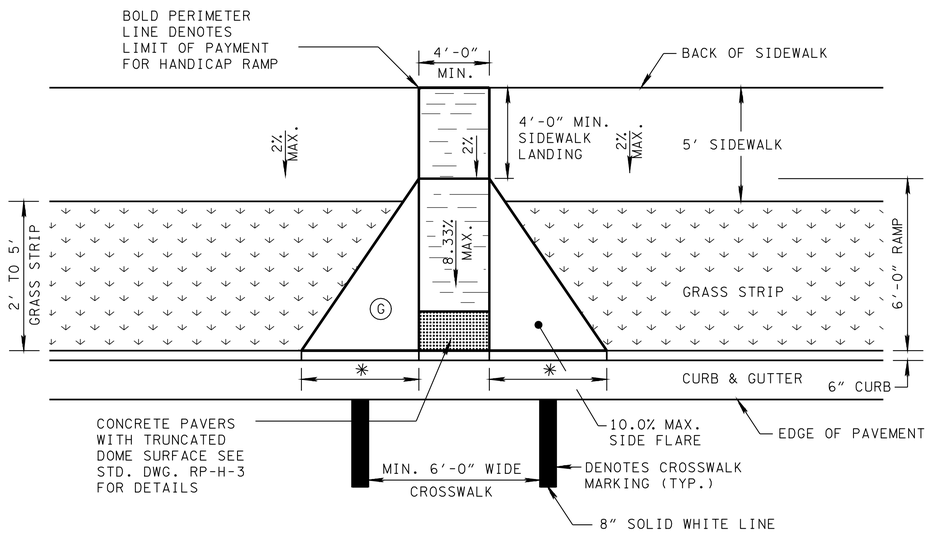
CURB RAMP AND TRUNCATED DOME SURFACE DETAIL

1-15-07 | RP-H-3

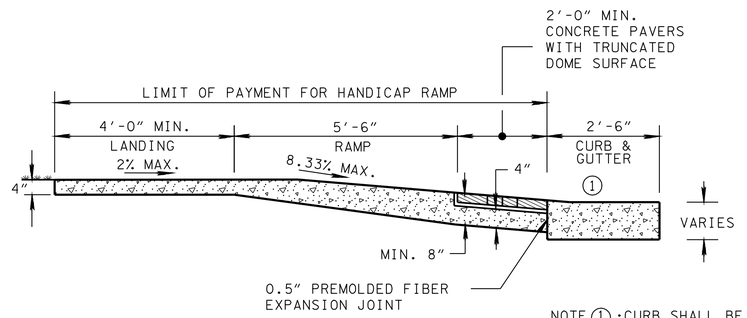
- REV. 4-13-11: ADDED CURB NOTE AND REVISED RAMP DIMENSION IN SECTION A-A, ADDED FOOTNOTE (1), MISC. EDITS TO DRAWING.
- REV. 1-15-13: ADDED GENERAL NOTES. REVISED RAMP LENGTH.



PLAN VIEW

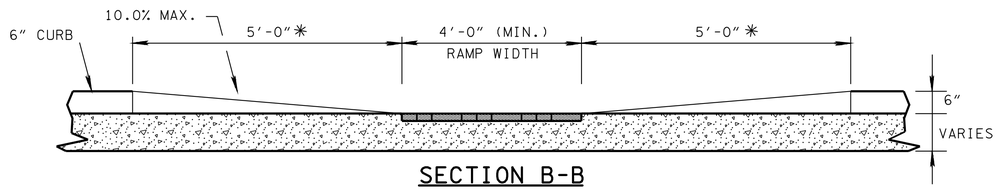


TANGENT SECTION WITH GRASS STRIP

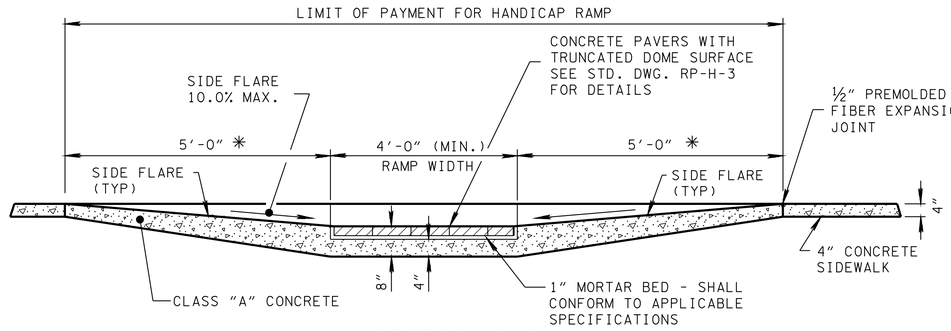


NOTE (1): CURB SHALL BE LOWERED ACROSS ENTIRE WIDTH OF RAMP.

SECTION A-A



SECTION B-B



SECTION C-C

* DIMENSION VARIES RELATIVE TO LONGITUDINAL ROADWAY GRADE SEE GENERAL NOTE (L) ON RP-H-3

GENERAL NOTES

(A) CURB SHALL BE LOWERED ACROSS ENTIRE WIDTH OF RAMP THE FIRST TWO FEET OF RAMP MUST CONSIST OF A TRUNCATED DOMED SURFACE. RAMPS SHALL INCLUDE THE TRUNCATED DOME SURFACE TO PROVIDE A DETECTABLE WARNING FOR VISUALLY IMPAIRED PEDESTRIANS SEE SPECIAL PAVER NOTES ON STD. DWG. RP-H-3.

(B) THE COST OF THE LOWERED CURB AND GUTTER TO BE INCLUDED IN THE PRICE OF ITEM NO. 702-01, CONCRETE CURB OR ITEM NO. 702-03, CONCRETE COMBINED CURB & GUTTER.

(C) DESIGN/CONSTRUCTION MODIFICATIONS MAY BE REQUIRED FOR HANDICAP RAMPS TO BE INSTALLED ALONG A ROADWAY WITH LONGITUDINAL GRADES EXCEEDING FIVE PERCENT.

(D) ALL COST OF INSTALLING HANDICAP RAMPS IN NEWLY CONSTRUCTED SIDEWALK AREAS SHALL BE BID FOR UNDER THE FOLLOWING PAY ITEM:

701-02.03 CONCRETE HANDICAP RAMP PER SQUARE FOOT.

PAYMENT SHALL INCLUDE ALL MATERIALS (INCLUDING TRUNCATED DOME SURFACE), INTREGAL BACK CURB, EQUIPMENT, AND LABOR NECESSARY FOR CONSTRUCTION OF THE HANDICAP RAMP(S).

(E) IF PEDESTRIAN SIGNAL IS PROPOSED SEE TDOT TRAFFIC DESIGN MANUAL FOR PLACEMENT.

(F) IF MAILBOXES ARE REMOVED DURING INSTALLATION OF THE RAMP PROVIDE A 12" X 12" OPENING BEHIND THE CURB.

(G) IF GRASS STRIP IS LARGER THAN 5'. THE SIDE FLARES MAY BE OMITTED AND A RETURNED CURB RUNNING PARALLEL TO THE RAMP FROM THE CURB TO THE SIDEWALK.

- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

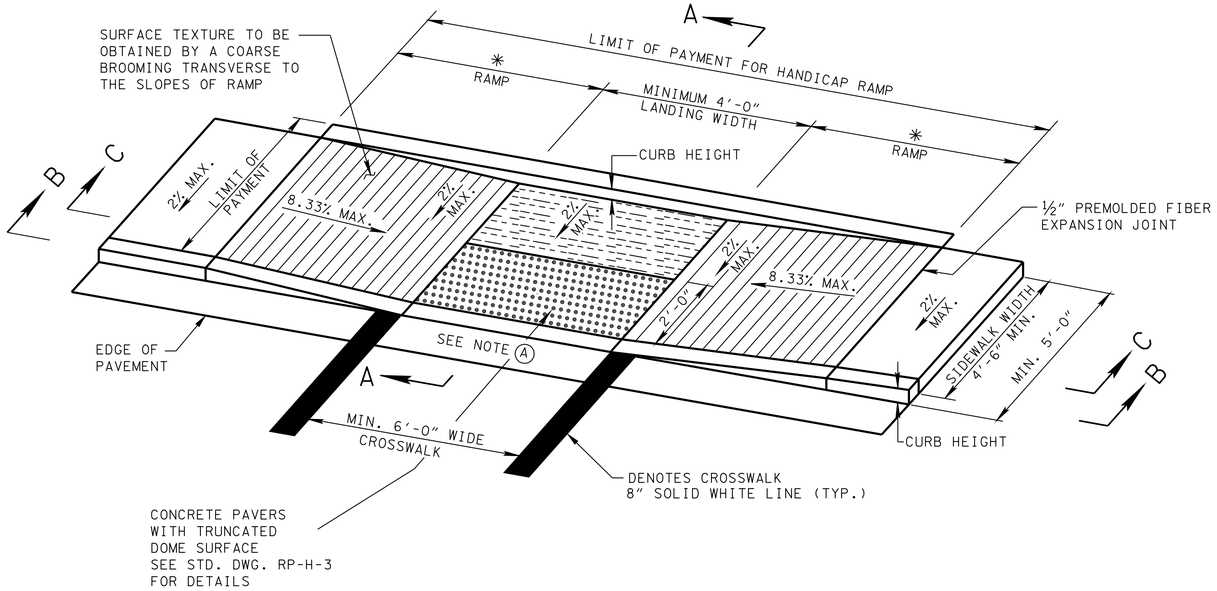
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PERPENDICULAR CURB RAMP

1-15-07 | RP-H-4

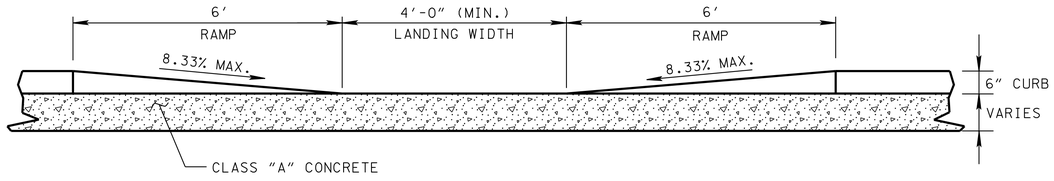
15-JAN-2013 14:30
\\JU0190831WF013.tdot.state.tn.us\3SHARED\StandDraw\STANDARD DRAWINGS\ENGLISH\ENGLISH 2013\RHP4_01513.DGN

- REV. 4-13-11: ADDED FOOTNOTE Ⓘ, ADJUSTED DIMENSIONS IN RAMP DETAIL, MISC. EDITS TO DRAWING.
- REV 1-15-13: MODIFIED LANDING WIDTH, REVISED NOTES.



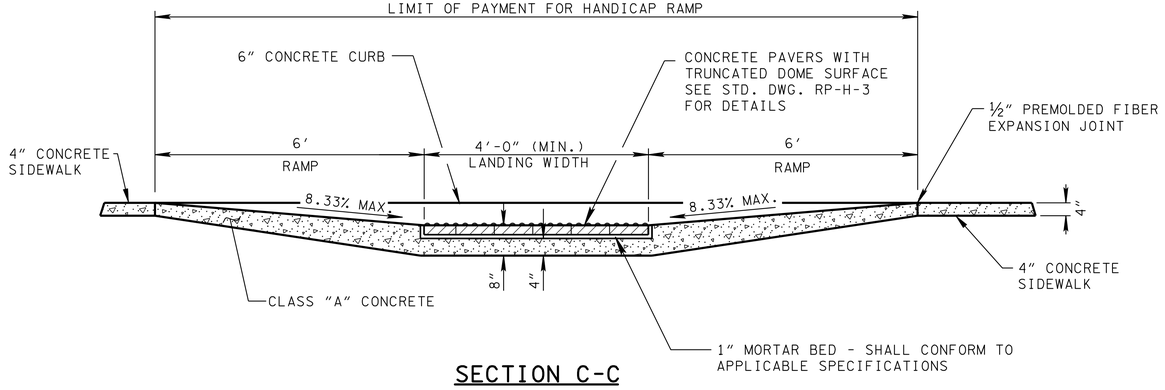
PARALLEL CURB RAMP DETAIL

DIMENSIONS SHOWN ABOVE FOR 0% LONGITUDINAL ROADWAY GRADE

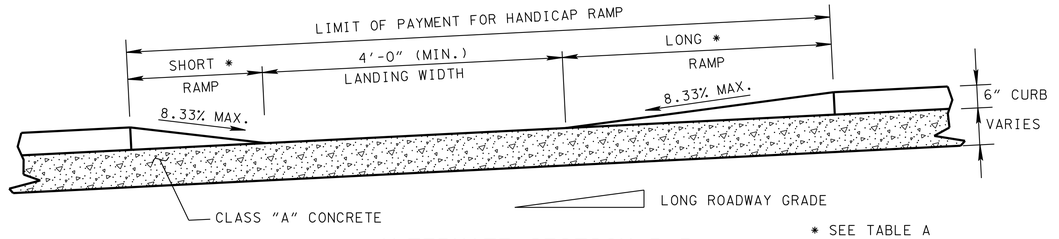


SECTION B-B

DIMENSIONS SHOWN ABOVE FOR 0% LONGITUDINAL ROADWAY GRADE



SECTION C-C



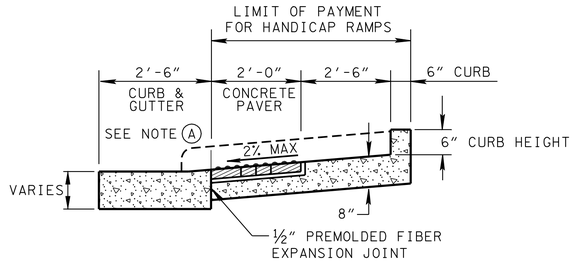
* SEE TABLE A

ALTERNATE SECTION B-B

PARALLEL CURB RAMP DETAIL SHOWN WITH LONGIUDINAL ROADWAY GRADE

MODIFICATIONS MAY BE REQUIRED FOR 5% LONGITUDINAL ROADWAY GRADE

NOTE: ENGINEER SHOULD BE NOTIFIED FOR ASSESMENT IF THE HANDICAP RAMP SIDE FLARES EXCEED 10' IN LENGTH DUE TO THE LONGITUDINAL ROADWAY GRADE.



SECTION A-A

LONGITUDINAL ROADWAY GRADE	LONG	SHORT
5 %	15'	3'9"
4 %	11'6"	4'1"
3 %	9'5"	4'5"
2 %	7'11"	4'10"
1 %	6'10"	5'5"

TABLE A

GENERAL NOTES

Ⓐ CURB SHALL BE LOWERED ACROSS ENTIRE WIDTH OF RAMP THE FIRST TWO FEET OF RAMP MUST CONSIST OF A TRUNCATED DOMED SURFACE. RAMPS SHALL INCLUDE THE TRUNCATED DOME SURFACE TO PROVIDE A DETECTABLE WARNING FOR VISUALLY IMPAIRED PEDESTRIANS SEE SPECIAL PAVER NOTES ON STD. DWG. RP-H-3.

Ⓑ THE COST OF THE LOWERED CURB AND GUTTER TO BE INCLUDED IN THE PRICE OF ITEM NO. 702-01, CONCRETE CURB OR ITEM NO. 702-03, CONCRETE COMBINED CURB & GUTTER.

Ⓒ DESIGN/CONSTRUCTION MODIFICATIONS MAY BE REQUIRED FOR HANDICAP RAMPS TO BE INSTALLED ALONG A ROADWAY WITH LONGITUDINAL GRADES EXCEEDING FIVE PERCENT.

Ⓓ ALL COST OF INSTALLING HANDICAP RAMPS IN NEWLY CONSTRUCTED SIDEWALK AREAS SHALL BE BID FOR UNDER THE FOLLOWING PAY ITEM:

701-02.03 CONCRETE HANDICAP RAMP PER SQUARE FOOT.

PAYMENT SHALL INCLUDE ALL MATERIALS (INCLUDING TRUNCATED DOME SURFACE), INTREGAL BACK CURB, EQUIPMENT, AND LABOR NECESSARY FOR CONSTRUCTION OF THE HANDICAP RAMP(S).

Ⓔ IF PEDESTRIAN SIGNAL IS PROPOSED SEE TDOT TRAFFIC DESIGN MANUAL FOR PLACEMENT.

Ⓕ IF MAILBOXES ARE REMOVED DURING INSTALLATION OF THE RAMP PROVIDE A 12" X 12" OPENING BEHIND THE CURB.

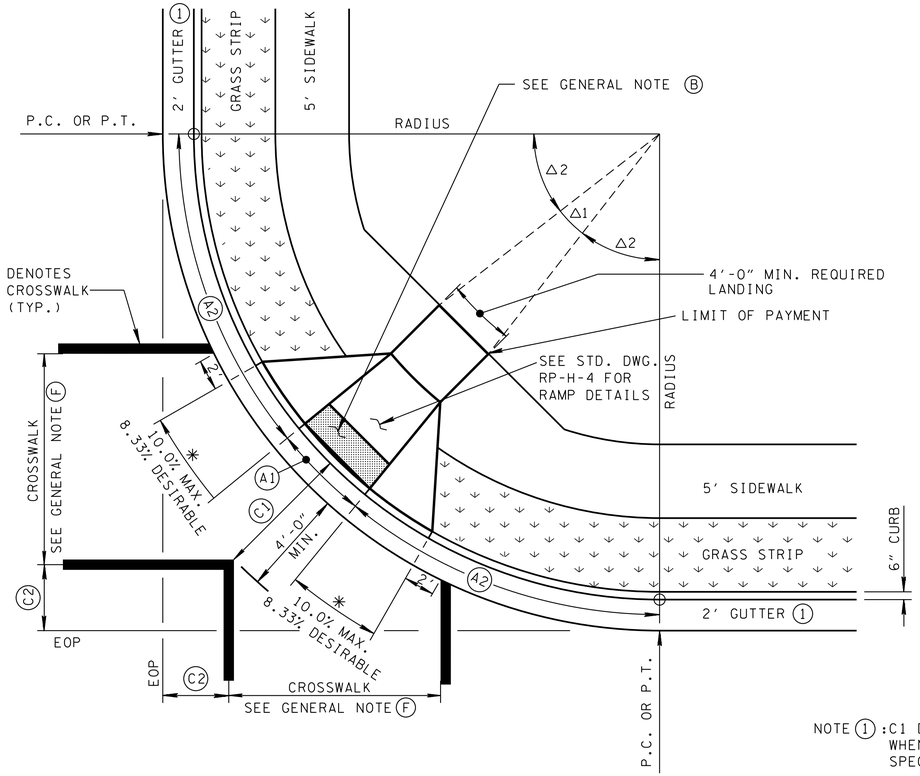
- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

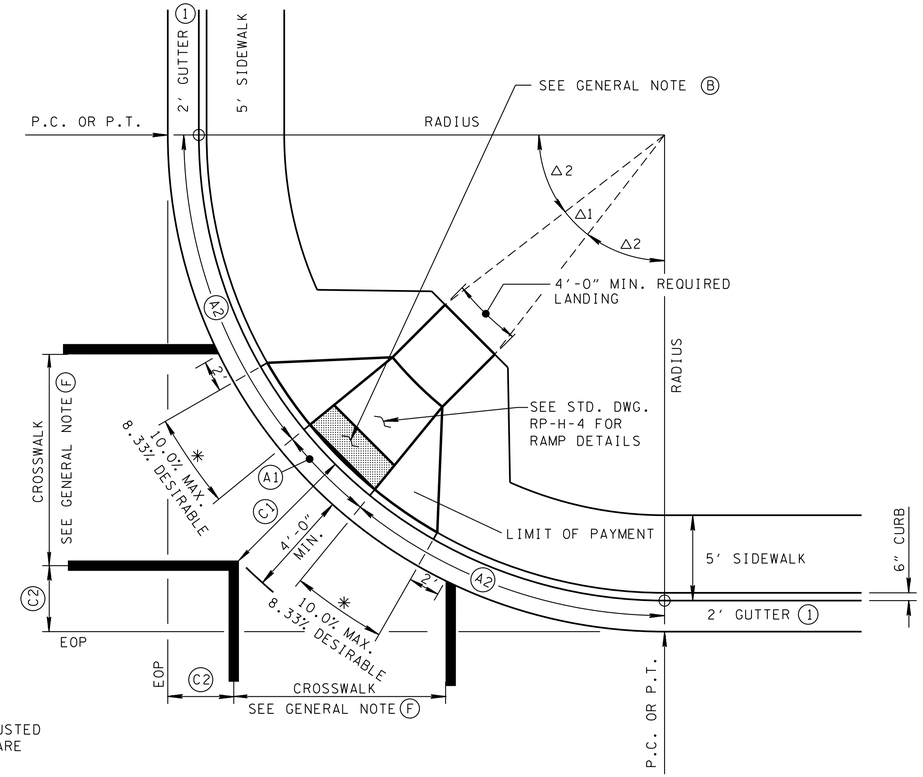
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PARALLEL CURB RAMP

1-15-07 | RP-H-5

- REV. 4-13-11: REVISED TABLE DIMENSIONS, ADDED NOTE (1), AND ADDED GUTTER TO CROSSWALK INTERSECTION DIMENSION.
- REV. 5-8-13: REVISED TITLE FOR TERMINOLOGY.





NOTE (1): C1 DIMENSION SHALL BE ADJUSTED WHEN OTHER GUTTER WIDTHS ARE SPECIFIED ON PLANS.

TYPE 1
RAMP IN RADIUS (WITH GRASS STRIP)

* DIMENSION VARIES RELATIVE TO LONGITUDINAL ROADWAY GRADE

TYPE 1 ALTERNATE
RAMP IN RADIUS (SIDEWALK ADJACENT CURB & GUTTER)

* DIMENSION VARIES RELATIVE TO LONGITUDINAL ROADWAY GRADE

TABLE OF DIMENSIONS (1)
PERPENDICULAR RAMPS - RADIUS OF 20' TO 75'

R RADIUS (FEET)	(A1) (FEET)	(A2) (FEET)	(C1) (FEET)	(C2) (FEET)	△1	△2	ESTIMATED QUANTITY (SQUARE FEET)
20	9.55	10.54	6.00	3.62	28°04'21"	30°57'50"	113
25	7.48	15.50	6.00	5.08	17°29'32"	36°15'14"	103
30	6.53	19.90	6.00	6.54	12°40'49"	38°39'35"	98
35	5.98	24.11	6.00	8.01	9°56'22"	40°01'49"	95
40	5.63	28.21	6.00	9.47	8°10'16"	40°54'52"	93
45	5.39	32.26	6.00	10.94	6°56'11"	41°31'54"	91
50	5.21	36.27	6.00	12.40	6°01'32"	41°59'14"	90
55	5.07	40.27	6.00	13.87	5°19'34"	42°20'13"	90
60	4.96	44.25	6.00	15.33	4°46'19"	42°36'51"	89
65	4.87	48.22	6.00	16.80	4°19'20"	42°50'20"	89
70	4.79	52.19	6.00	18.26	3°57'00"	43°01'30"	88
75	4.73	56.15	6.00	19.72	3°38'12"	43°10'54"	88

(1) VALUES SHOWN IN TABLE ARE BASED ON A 90° INTERSECTION ON 0.0% ROADWAY GRADE AND ARE APPROXIMATE ONLY.

GENERAL NOTES

(A) FOR SIGNALIZED INTERSECTIONS THAT REQUIRE PEDESTRIAN SIGNAL PUSH BUTTONS, SEE TDOT TRAFFIC DESIGN MANUAL FOR PLACEMENT DETAILS.

(B) SEE STANDARD DRAWING RP-H-3 FOR TRUNCATED DOMED SURFACE DETAILS.

(C) 5'-0" SIDEWALK WIDTH INCLUDES 6" CONCRETE CURB.

(D) GRATES FOR STORM DRAINS SHALL NOT BE PLACED IN THE ACCESSIBLE ROUTE.

(E) C1 DIMENSIONS SHALL NOT BE LESS THAN 4'.

(F) CROSS WALK MARKINGS SHALL BE CALCULATED BY USING THE DIMENSIONS FROM THE TABLES ON A CASE BY CASE BASIS, UNLESS SPECIFIED.

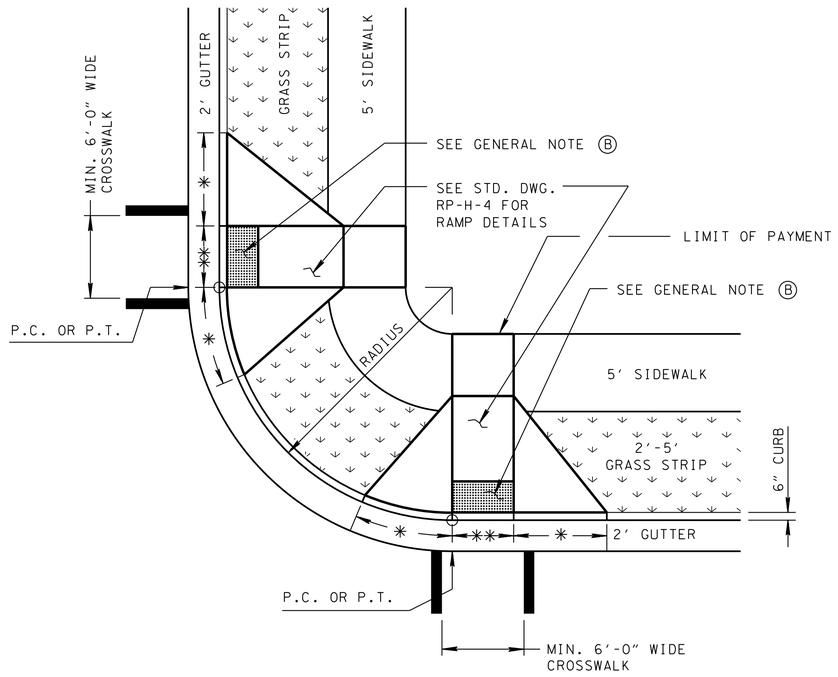
- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PERPENDICULAR CURB RAMP FOR 20' THRU 75' RADIUS

1-15-07 | RP-H-7

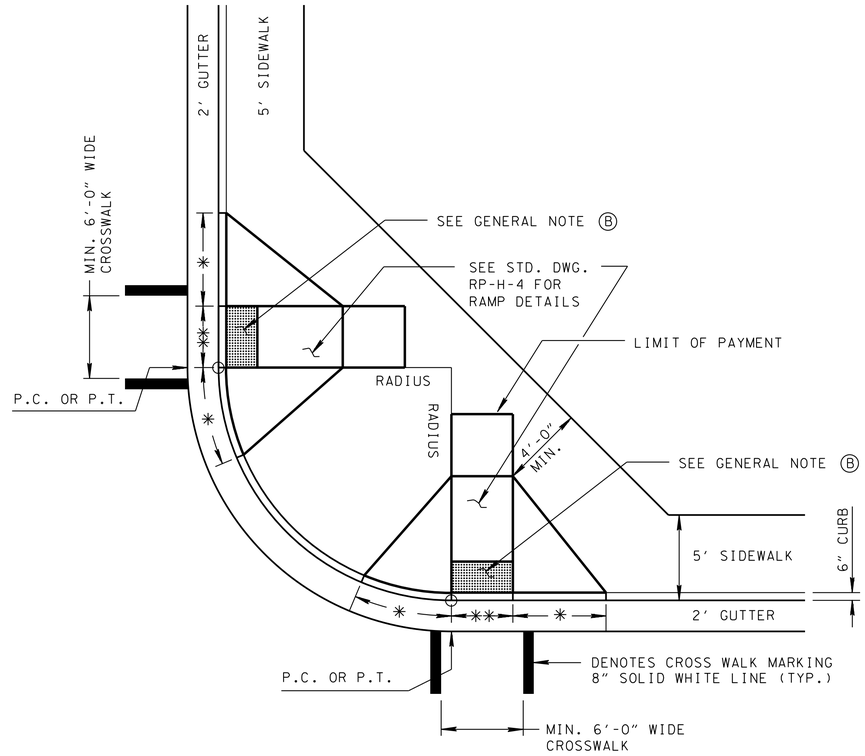
- REV. 4-13-11: ADJUSTED CROSSWALK MARKINGS, ADDED TYPE 2 SIDEWALK DIMEMSION, MISC. EDITS TO DRAWING.
- REV. 5-8-13: REVISED TITLE FOR TERMINOLOGY.



TYPE 2
RAMP OUTSIDE RADIUS (WITH GRASS STRIP)

* DIMENSION VARIES RELATIVE TO LONGITUDINAL ROADWAY GRADE 10.0% MAX.(8.33% DESIRABLE)

** 4'-0" MINIMUM REQUIRED



TYPE 2 ALTERNATE
RAMP OUTSIDE RADIUS (SIDEWALK ADJACENT TO CURB & GUTTER)

* DIMENSION VARIES RELATIVE TO LONGITUDINAL ROADWAY GRADE 10.0% MAX.(8.33% DESIRABLE)

** 4'-0" MINIMUM REQUIRED

GENERAL NOTES

(A) FOR SIGNALIZED INTERSECTIONS THAT REQUIRE PEDESTRIAN SIGNAL PUSH BUTTONS, SEE TDOT TRAFFIC DESIGN MANUAL FOR PLACEMENT DETAILS.

(B) SEE STANDARD DRAWING RP-H-3 FOR TRUNCATED DOMED SURFACE DETAILS.

(C) 5'-0" SIDEWALK WIDTH INCLUDES 6" CONCRETE CURB.

(D) GRATES FOR STORM DRAINS SHALL NOT BE PLACED IN THE CROSSWALK OR IN FRONT OF THE HANDICAP RAMP.

(E) DESIRABLE DIMENSIONS SHALL BE USED UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

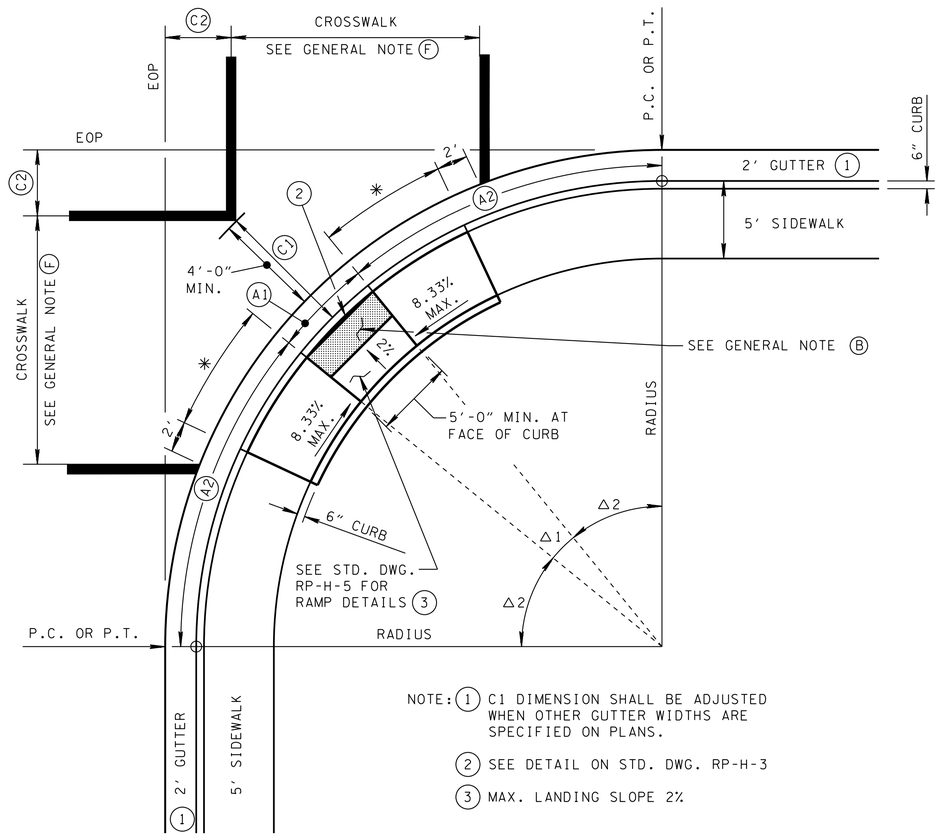
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PERPENDICULAR CURB RAMP FOR 20' THRU 60' RADIUS

1-15-07 | RP-H-8

- REV. 4-13-11: ADJUSTED CROSSWALK MARKINGS, ADDED NOTE (1), REVISED TABLE DIMENSIONS, ADDED GUTTER TO CROSSWALK INTERSECT DIMENSION, OTHER MISC. EDITS TO DRAWINGS.
- REV. 5-8-13: REVISED TITLE FOR TERMINOLOGY.



NOTE: (1) C1 DIMENSION SHALL BE ADJUSTED WHEN OTHER GUTTER WIDTHS ARE SPECIFIED ON PLANS.

(2) SEE DETAIL ON STD. DWG. RP-H-3

(3) MAX. LANDING SLOPE 2%

TYPE 3
(RAMP IN RADIUS)

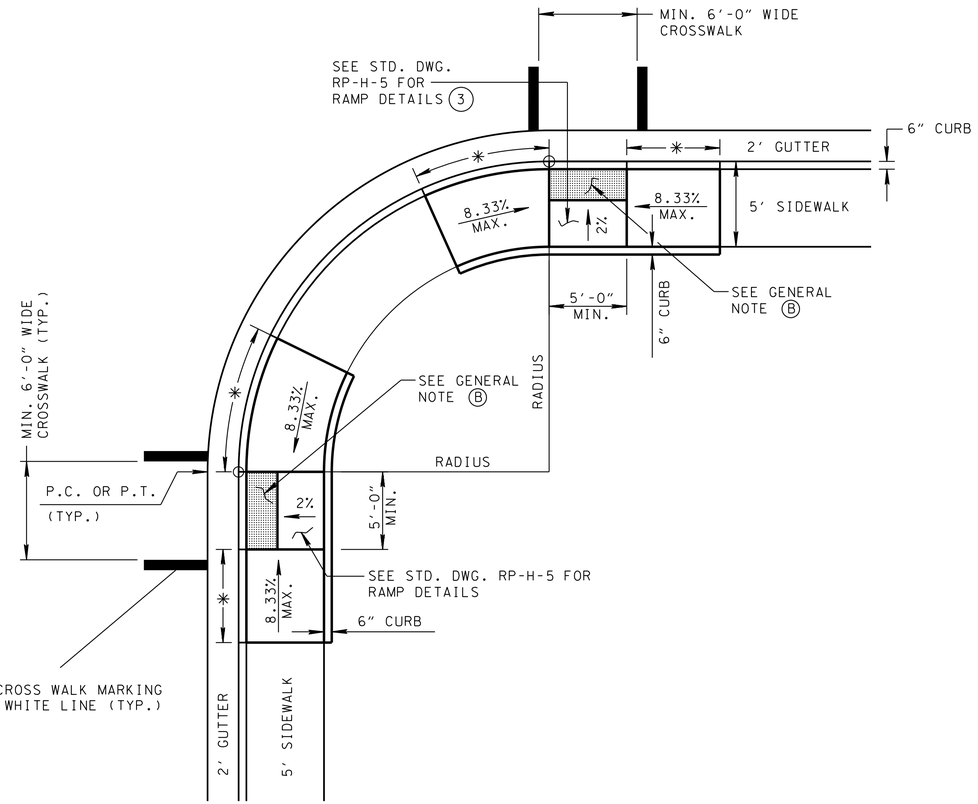
(CONSTRUCTION IN RADIUS)

✳ DIMENSION VARIES RELATIVE TO LONGITUDINAL ROADWAY GRADE

TABLE OF DIMENSIONS (1)
PARALLEL CURB RAMPS - RADIUS OF 20' TO 75'

R RADIUS (FEET)	(A1) (FEET)	(A2) (FEET)	(C1) (FEET)	(C2) (FEET)	Δ1	Δ2	ESTIMATED QUANTITY (SQUARE FEET)
20	6.50	12.07	6.00	3.62	19°05'55"	35°27'03"	96
25	6.13	16.18	6.00	5.08	14°19'26"	37°50'17"	94
30	5.90	20.22	6.00	6.54	11°27'33"	39°16'14"	92
35	5.75	24.22	6.00	8.01	9°32'57"	40°13'31"	91
40	5.64	28.20	6.00	9.47	8°11'06"	40°54'27"	90
45	5.56	32.17	6.00	10.94	7°09'43"	41°25'08"	89
50	5.50	36.13	6.00	12.40	6°21'58"	41°49'01"	89
55	5.45	40.08	6.00	13.87	5°43'46"	42°08'07"	88
60	5.41	44.03	6.00	15.33	5°12'31"	42°23'44"	88
65	5.38	47.97	6.00	16.80	4°46'29"	42°36'46"	88
70	5.35	51.91	6.00	18.26	4°24'27"	42°47'47"	88
75	5.32	55.85	6.00	19.72	4°05'33"	42°57'13"	87

(1) VALUES SHOWN IN TABLE ARE BASED ON A 90° INTERSECTION ON 0.0% ROADWAY GRADE AND ARE APPROXIMATE ONLY.



TYPE 4
(RAMP OUTSIDE RADIUS)

✳ DIMENSION VARIES RELATIVE TO LONGITUDINAL ROADWAY GRADE

GENERAL NOTES

(A) FOR SIGNALIZED INTERSECTIONS THAT REQUIRE PEDESTRIAN SIGNAL PUSH BUTTONS, SEE TDOT TRAFFIC DESIGN MANUAL FOR PLACEMENT DETAILS.

(B) SEE STANDARD DRAWING RP-H-3 FOR TRUNCATED DOMED SURFACE DETAILS.

(C) 5'-0" SIDEWALK WIDTH INCLUDES 6" CONCRETE CURB.

(D) GRATES FOR STORM DRAINS SHALL NOT BE PLACED IN THE CROSSWALK OR IN FRONT OF THE HANDICAP RAMP.

(E) DESIRABLE DIMENSIONS SHALL BE USED UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

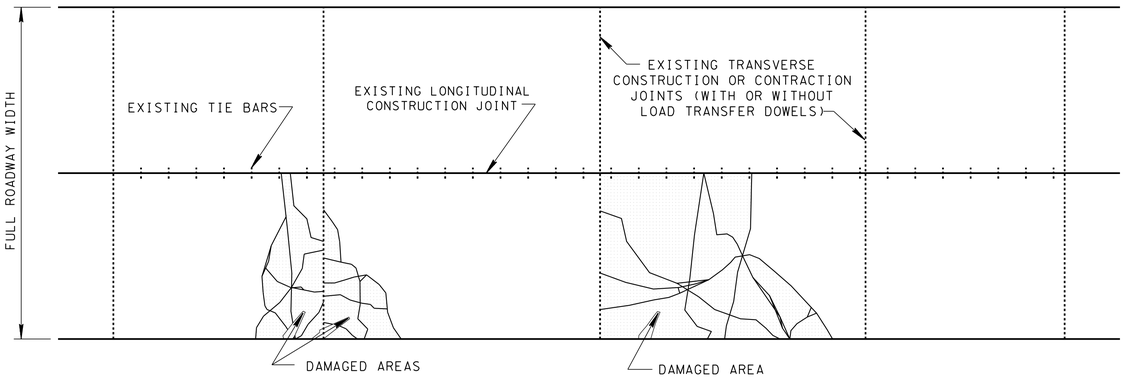
(F) CROSS WALK MARKINGS SHALL BE CALCULATED BY USING THE DIMENSIONS FROM THE TABLE ON A CASE BY CASE BASIS, UNLESS SPECIFIED.

- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

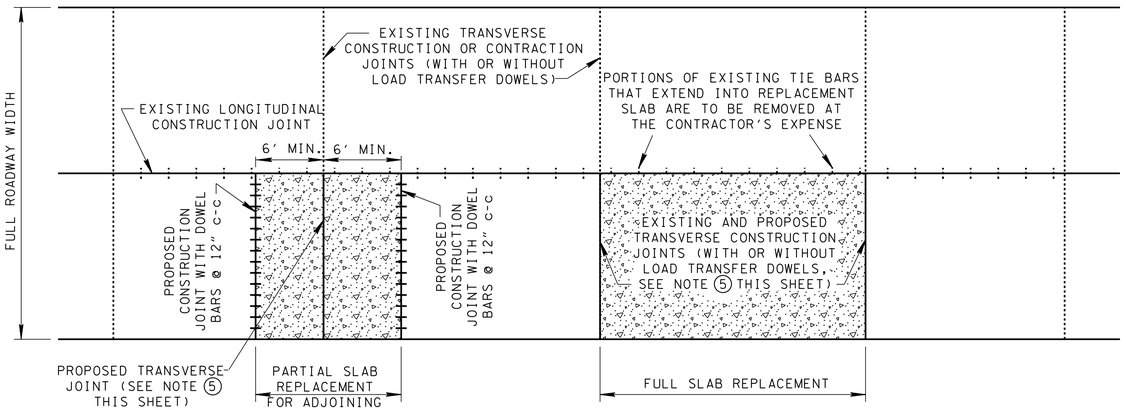
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PARALLEL CURB RAMP FOR 20' THRU 75' RADIUS

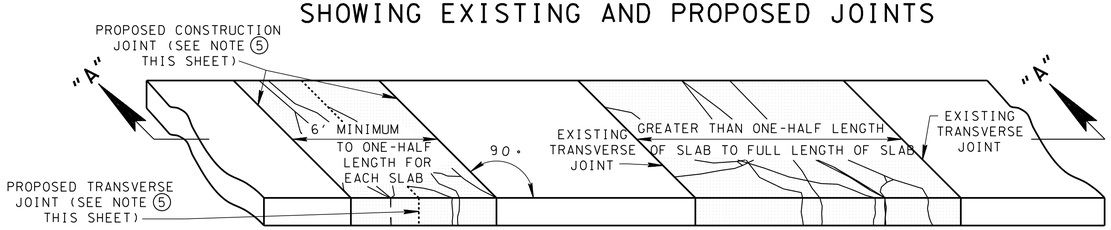
1-15-07 | RP-H-9



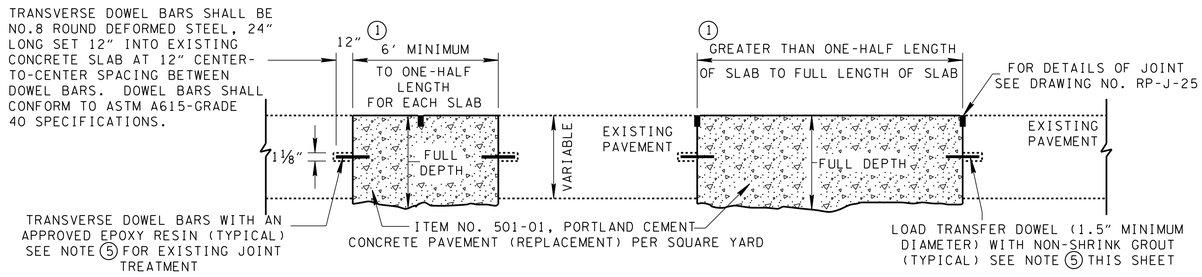
PLAN VIEW OF EXISTING LAYOUT OF CONCRETE PAVEMENT REPLACEMENT SHOWING EXISTING JOINTS



PLAN VIEW OF PROPOSED LAYOUT OF CONCRETE PAVEMENT REPLACEMENT SHOWING EXISTING AND PROPOSED JOINTS



PLAN VIEW OF CONCRETE PAVEMENT REPLACEMENT



PROFILE VIEW ALONG SECTION "A-A" OF CONCRETE PAVEMENT REPLACEMENT

GENERAL NOTES

(1) SEE STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS FOR CONCRETE PAVEMENT REPAIR.

(2) IF THE LENGTH OF CONCRETE SLAB TO BE REPLACED IS GREATER THAN HALF THE ENTIRE LENGTH OF THE SLAB, THE ENTIRE SLAB SHALL BE REPLACED. IF THE LENGTH OF CONCRETE SLAB TO BE REPLACED IS LESS THAN HALF THE ENTIRE LENGTH OF THE SLAB (6' MINIMUM), THEN ONLY A PORTION OF THE SLAB WILL BE REPLACED.

(3) THE EXISTING CONCRETE PAVEMENT SHALL BE SAWED FULL DEPTH AROUND THE AREA TO BE REMOVED. WITHIN THE LANE SAWING SHALL BE PERPENDICULAR TO THE CENTERLINE AND A MINMUM OF 6" OUTSIDE THE DAMAGED AREAS.

(4) NO ADDITIONAL BASE MATERIAL SHALL BE ADDED AND ALL LOOSE BASE MATERIAL NOT RECOMPACTABLE SHALL BE REMOVED PRIOR TO PLACEMENT OF THE NEW CONCRETE SLAB. THE CONCRETE SLAB SHALL BE PLACED TO THE FULL DEPTH OF THE MATERIAL REMOVED. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR ADDITIONAL CONCRETE REQUIRED TO BRING PROPOSED CONCRETE SLAB UP TO PROPOSED GRADE.

(5) WHEN EXISTING TRANSVERSE JOINTS ARE REMOVED AND NOT TO FULL ROADWAY WIDTH, THEY SHALL BE RECONSTRUCTED IN KIND (WITH OR WITHOUT LOAD TRANSFER DOWELS) AND IN THE SAME LOCATION. WHEN A JOINT IS REPLACED FOR THE FULL ROADWAY WIDTH, LOAD TRANSFER DOWELS SHALL BE USED IN THE JOINT. SEE DRAWING NO. RP-J-9 FOR DOWEL PLACEMENT DETAILS. SPACING IS AT 12" CENTER-TO-CENTER BETWEEN DOWELS.

(6) FOR DETAILS REGARDING INSTALLATION OF CONTRACTION AND CONSTRUCTION JOINTS, SEE DRAWING NO. RP-J-9.

(7) LONGITUDINAL CONSTRUCTION JOINT TIE BARS AS SHOWN ON DRAWING NO. RP-J-15 SHALL BE OMITTED BETWEEN THE NEW REPLACEMENT SLAB AND THE EXISTING SLAB. THE CONTRACTOR IS TO REMOVE WHATEVER PORTION OF THE EXISTING TIE BARS THAT EXTENDS FROM EXISTING SLAB ALONG LONGITUDINAL JOINT INTO NEW SLAB. ALL COST WILL BE INCLUDED IN THE PRICE BID FOR ITEM NO. 501-01, PORTLAND CEMENT CONCRETE PAVEMENT (REPLACEMENT) PER SQUARE YARD.

(8) REMOVAL OF THE DAMAGED CONCRETE PAVEMENT SHALL BE BY LIFTING. ANY GOOD CONCRETE PAVEMENT WHICH IS DAMAGED DURING REMOVAL OF DAMAGED AREAS SHALL BE REMOVED AND REPLACED BY THE CONTRACTOR, AT HIS EXPENSE.

(9) IF THE ROADWAY CONTRACT INCLUDES EITHER GRINDING OR UNDERSEALING, THEN THE SLAB REPAIR SHALL BE PERFORMED FIRST.

(10) THE COSTS OF REMOVAL AND DISPOSAL OF EXISTING CONCRETE PAVEMENT, PLACEMENT OF NEW CONCRETE PAVEMENT, AND SAWING NEW JOINTS SHALL BE INCLUDED IN THE PRICE BID FOR ITEM NO. 501-01, PORTLAND CEMENT CONCRETE PAVEMENT (REPLACEMENT) PER SQUARE YARD.

(11) ONCE THE CONTRACTOR BEGINS REMOVING AN EXISTING FULL OR PARTIAL DEPTH CONCRETE SLAB, HE SHALL CONTINUE THE WORK UNTIL IT IS COMPLETE INCLUDING JOINT SEALING. JOINTS SHALL NOT BE LEFT UNSEALED DURING WINTER MONTHS.

(12) THE COST OF ALL RELATED WORK (DRILLING HOLES, GROUTING, ETC.) SHALL BE INCLUDED IN THE PRICE BID FOR THE FOLLOWING ITEMS AS APPROPRIATE:

- (A) ITEM NO. 502-04.01 ..... SAWING CONCRETE PAVEMENT (FULL DEPTH) PER LINEAR FOOT
- (B) ITEM NO. 502-04.02 ..... LOAD TRANSFER DOWELS PER EACH
- (C) ITEM NO. 502-04.03 ..... TRANSVERSE TIE - BARS PER EACH

(13) WHEN SPECIFIED BY AN ENGINEER, FAST TRACK CONCRETE OR EQUIVALENT MAY BE USED TO REPAIR CONCRETE PAVEMENT

ITEM NO. 501-01.31..... CONCRETE REPLACEMENT (FAST TRACK) S. Y.

(14) FOR FULL SLAB REPLACEMENTS ON SLABS WITH JOINT SPACING LONGER THAN 15', THE SLAB SHALL BE REPLACED WITH TWO SLABS OF EQUAL LENGTH.

NOTE

IF REPLACEMENT IS MID-SLAB, NO TRANSVERSE JOINT IS REQUIRED. IN THIS SITUATION A CONSTRUCTION JOINT WITH TIE BARS WILL BE USED.

CROSS-REFERENCE DRAWINGS NOTED ON THIS SHEET: RP-J-9, RP-J-24 AND RP-J-25.

REV. 7-17-84: ADDED EXISTING AND PROPOSED LAYOUTS OF CONCRETE PAVEMENT REPLACEMENT. ADDED TIE BARS AND CHANGED NOTES.

REV. 4-2-90: REDREW AND RENAMED SHEET. PLACED SPALL REPAIR, RANDOM CRACK REPAIR, AND JOINT REPAIR, AND JOINT REPAIRS DETAILS ON NEW SHEET NO. RP-J-24.

☐ REV. 12-18-94: ELIMINATED USE OF TIE BARS BETWEEN REPLACEMENT AND EXISTING SLAB.

☐ REV. 5-27-96: CHANGED MINIMUM SIZE OF LOAD TRANSFER DOWEL TO 1.5".

☐ REV. 7-29-96: CHANGED GENERAL NOTES (3) AND (8).

☐ REV. 5-27-01: CHANGED ITEM NO. 501-04.03.

☐ REV. 1-19-02: IN GENERAL NOTE (9) REMOVED REFERENCE TO UNDERSEALING OF SLAB.

☐ REV. 10-26-04: CHANGED PAY ITEMS IN GENERAL NOTE (12).

☐ REV. 1-24-12: ADDED GENERAL NOTE (13).

☐ REV. 7-25-12: ADDED GENERAL NOTE (14).

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CONCRETE PAVEMENT REPAIR DETAILS

RP-J-23

REV. 7-1-72: CHANGED DEPARTMENT NAME.

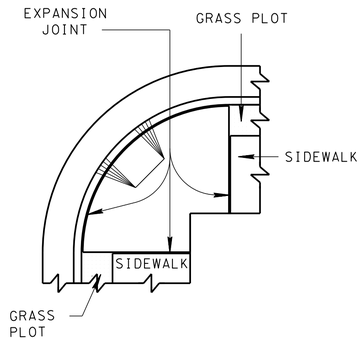
REV. 1-1-76: CHANGED DWG. NO. FROM P-S-7a(68) TO RP-S-7.

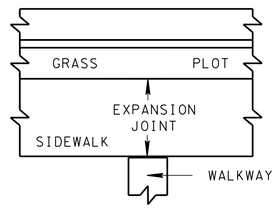
REV. 5-14-87: ADDED EXPANSION JOINTS BETWEEN CURB AND SIDEWALK.

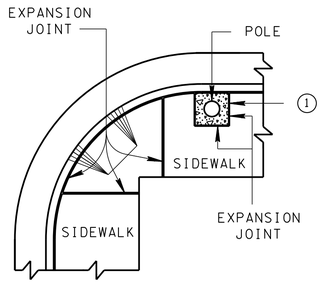
REV. 4-15-91: REDREW, RENAMED AND REORGANIZED SHEET. MOVED INFORMATION REGARDING CONCRETE STEPS TO DWG. NO. RP-S-8.

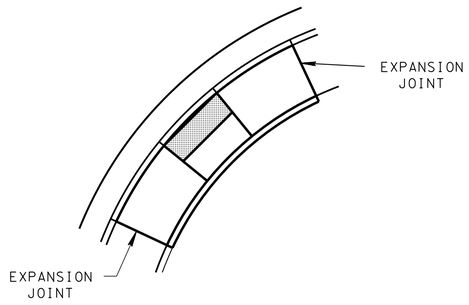
☐ REV. 7-29-96: CHANGED GENERAL NOTE (G).

☐ REV. 5-7-13: ADDED MAIL BOX DETAIL.

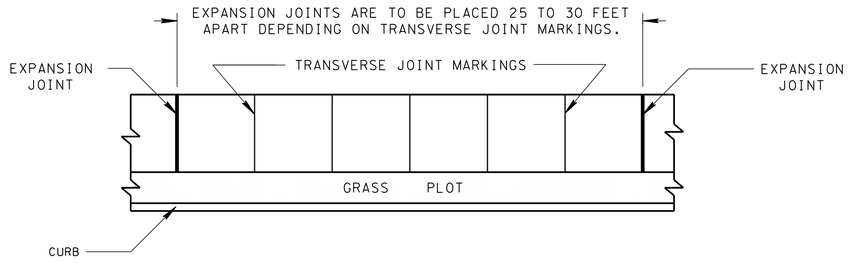




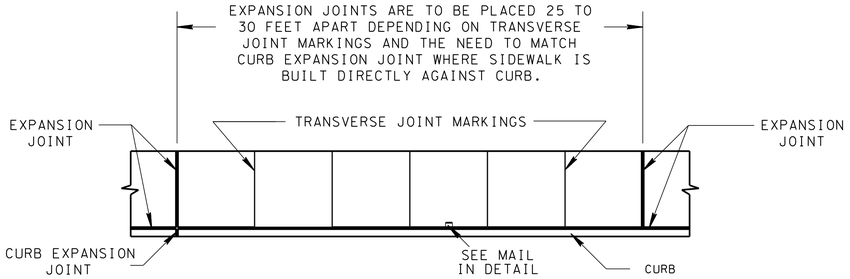




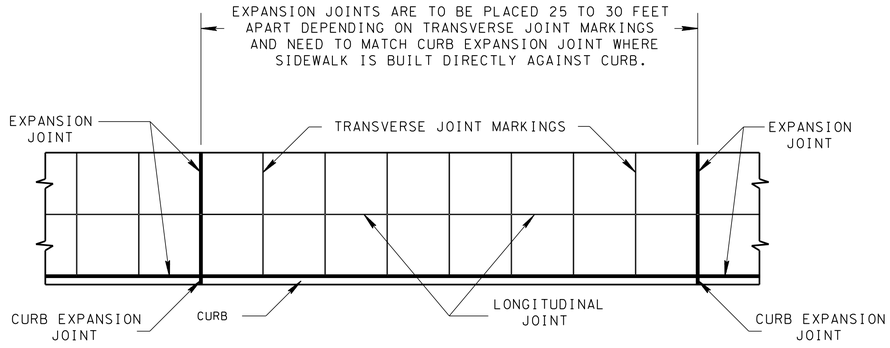
VARIOUS EXAMPLES FOR USE OF PREMOLDED FIBER EXPANSION JOINTS IN SIDEWALKS



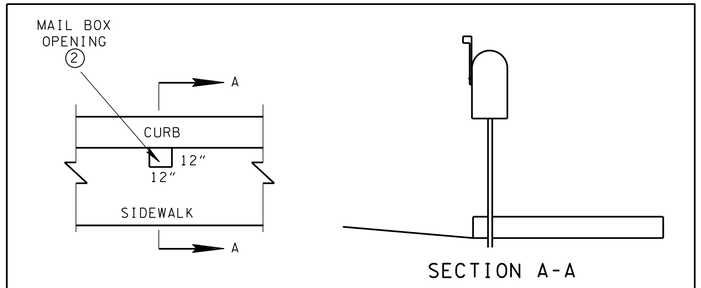
5 FOOT SIDEWALK WITH GRASS PLOT



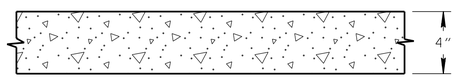
5 FOOT SIDEWALK BUILT TO CURB



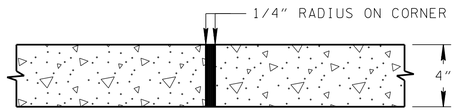
8 FOOT SIDEWALK BUILT TO CURB



MAIL BOX DETAIL FOR 5' SIDEWALK BUILT TO CURB



CROSS-SECTION OF CONCRETE SIDEWALK



DETAIL OF EXPANSION JOINT

FOOTNOTE

(1) LEAVE SQUARE CUTOUT IN SIDEWALK. IT WILL BE DIAMETER OF POLE PLUS SIXTEEN INCHES. IT WILL BE BORDERED BY HALF INCH EXPANSION JOINT.

(2) LEAVE 12"X12" OPENING IN SIDEWALK FOR MAIL BOX POST. ORIENT BOXES TO FACE DIRECTION OF TRAFFIC. EDGE OF MAIL BOX SHALL NOT OVERHANG THE CURB.

GENERAL NOTES

(A) FOR SPECIFICATIONS SEE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION.

(B) WHERE IT BECOMES NECESSARY TO REMOVE PARTS OF EXISTING CONCRETE SIDEWALKS OR RAMPS, THE RESULTING EDGES SHALL BE CUT TO A NEAT LINE, AND ANY OFFSETS IN SUCH LINES SHALL BE MADE AT RIGHT ANGLES.

(C) CONCRETE JOINT MATERIAL TO BE HALF INCH AND/OR ONE INCH PREMOLDED FIBER IN ACCORDANCE WITH SECTION 905 OF THE STANDARD SPECIFICATIONS.

(D) EXPANSION JOINTS ARE TO BE PLACED AS SHOWN ON THIS DRAWING OR AS DIRECTED BY THE ENGINEER WHERE THE PROPOSED SIDEWALK IS IN CONTACT WITH THE STREET RETURNS, ON BUILDING LINES PRODUCED AT STREET INTERSECTIONS, WHERE WALKS LEAD TO HOUSE OR OTHER ENTRANCES AND ANY OTHER LOCATIONS WHERE STRESSES MAY DEVELOP. THE COST OF ALL EXPANSION JOINTS IS TO BE INCLUDED IN THE UNIT PRICE BID FOR THE PROPOSED SIDEWALK.

(E) ONE INCH EXPANSION JOINTS ARE TO BE PLACED WHERE THE PROPOSED SIDEWALK IS IN CONTACT WITH CIRCULAR CURBS, BUILDINGS AND/OR RETAINING WALLS.

(F) HALF INCH EXPANSION JOINTS ARE TO BE USED AT ALL OTHER LOCATIONS.

(G) ALL SIDEWALK WIDTHS ARE TO INCLUDE SIX INCH WIDTH OF PROPOSED TOP OF CURB. MINIMUM SIDEWALK WIDTH OF FIVE FOOT SHALL CONSIST OF SIX INCH FOR TOP OF CURB WIDTH PLUS 4'-6" OF ACTUAL SIDEWALK WIDTH.

(H) LONGITUDINAL JOINT MARKINGS WILL NOT BE REQUIRED ON SIDEWALKS 5 FEET OR LESS IN WIDTH.

(I) ONE LONGITUDINAL JOINT MARKING WILL BE REQUIRED ON SIDEWALKS OVER 5 FEET BUT LESS THAN 9 FEET IN WIDTH.

(J) TWO LONGITUDINAL JOINT MARKINGS WILL BE REQUIRED ON SIDEWALKS OVER 9 FEET BUT LESS THAN 12 FEET IN WIDTH.

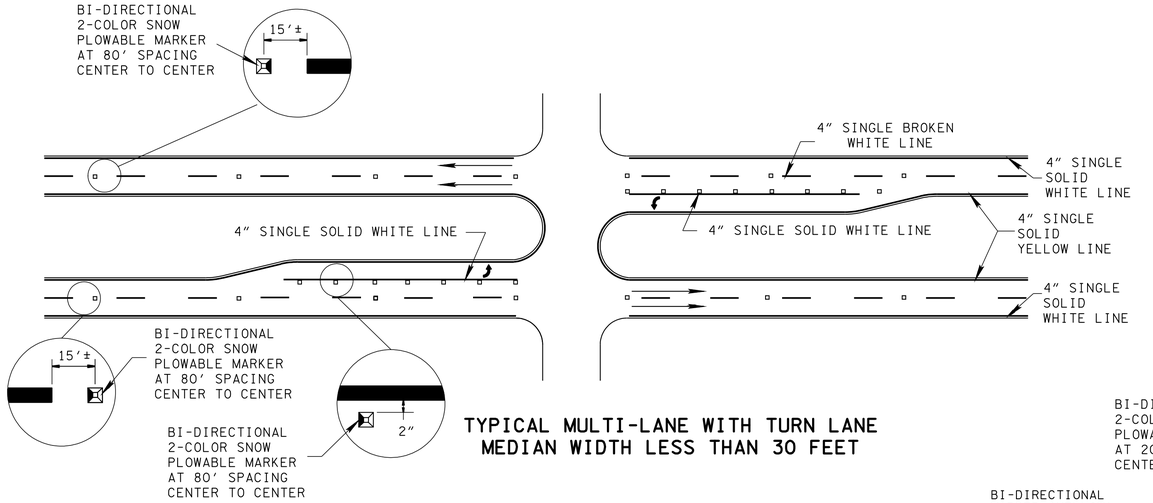
(K) TRANSVERSE JOINT MARKINGS ARE TO BE MADE TO FORM BLOCKS AS NEARLY TO SQUARE AS PRACTICAL.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

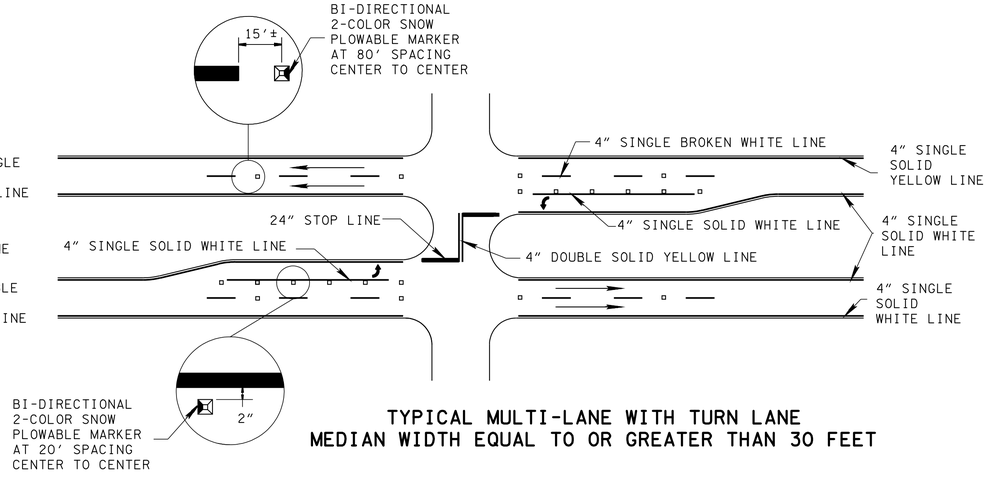
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

DETAILS FOR STANDARD CONCRETE SIDEWALKS

1-19-96 | RP-S-7



TYPICAL MULTI-LANE WITH TURN LANE MEDIAN WIDTH LESS THAN 30 FEET



TYPICAL MULTI-LANE WITH TURN LANE MEDIAN WIDTH EQUAL TO OR GREATER THAN 30 FEET

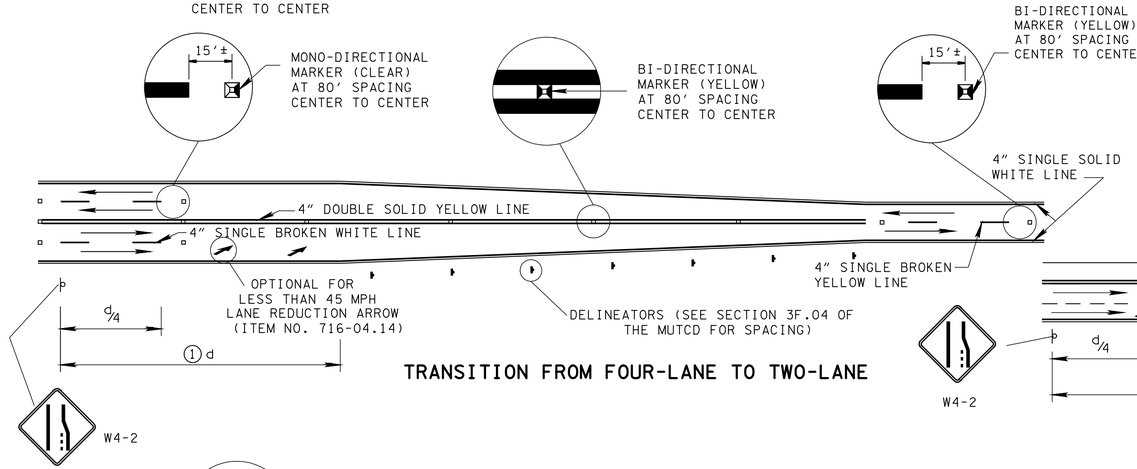
REV. 2-22-88: ADDED EDGE-LINES, NOTES, AND DETAILS FOR TRANSITION MARKING. CHANGED SHEET TITLE AND DRAWING NO. FROM T-M-8 TO T-M-2. ADDED DETAILS ON RIGHT OF SHEET.

REV. 3-20-91: REDREW SHEET. CHANGED TYPE 2 PAVEMENT MARKERS (CLEAR) TO MONO-DIRECTIONAL PAVEMENT MARKERS (CLEAR) AND TYPE 1 PAVEMENT MARKERS (YELLOW) TO BI-DIRECTIONAL MARKERS (YELLOW).

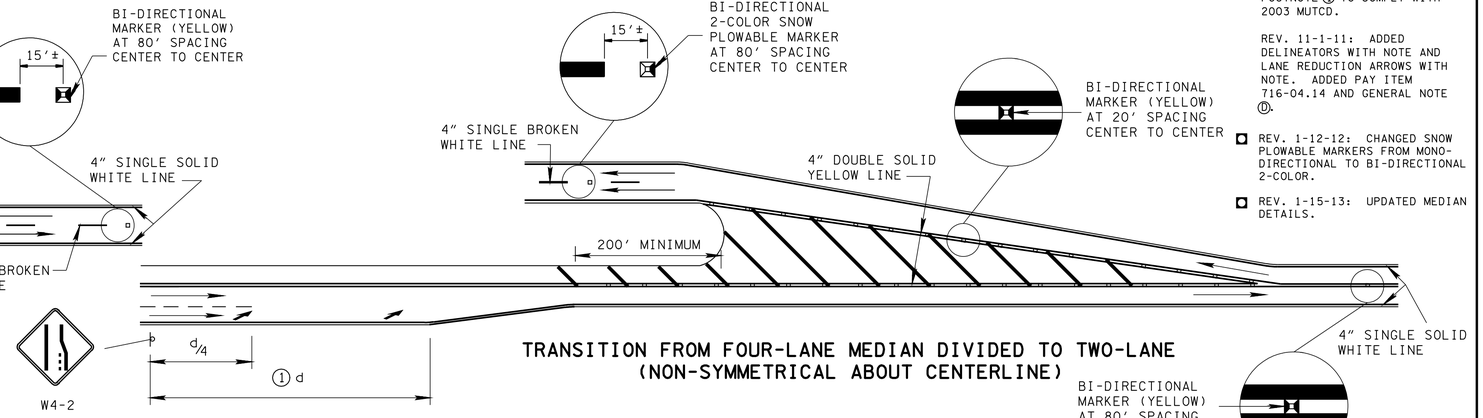
- REV. 10-26-92: ADDED GENERAL NOTE Ⓒ.
- REV. 12-18-93: ADDED EDGELINES INSIDE MEDIAN CROSSOVERS FOR MEDIAN WIDTHS LESS THAN 44 FEET.
- REV. 1-19-94: CHANGED WIDTH CRITERION FOR MEDIAN WIDTH FROM 44 FEET TO 64 FEET.
- REV. 1-19-96: CHANGED DETAIL ON LEFT BOTTOM OF SHEET.
- REV. 4-15-04: CHANGED W4-2 SIGNS AND FOOTNOTE ① TO COMPLY WITH 2003 MUTCD.
- REV. 9-5-04: CHANGED FOOTNOTE ① TO COMPLY WITH 2003 MUTCD.

REV. 11-1-11: ADDED DELINEATORS WITH NOTE AND LANE REDUCTION ARROWS WITH NOTE. ADDED PAY ITEM 716-04.14 AND GENERAL NOTE Ⓓ.

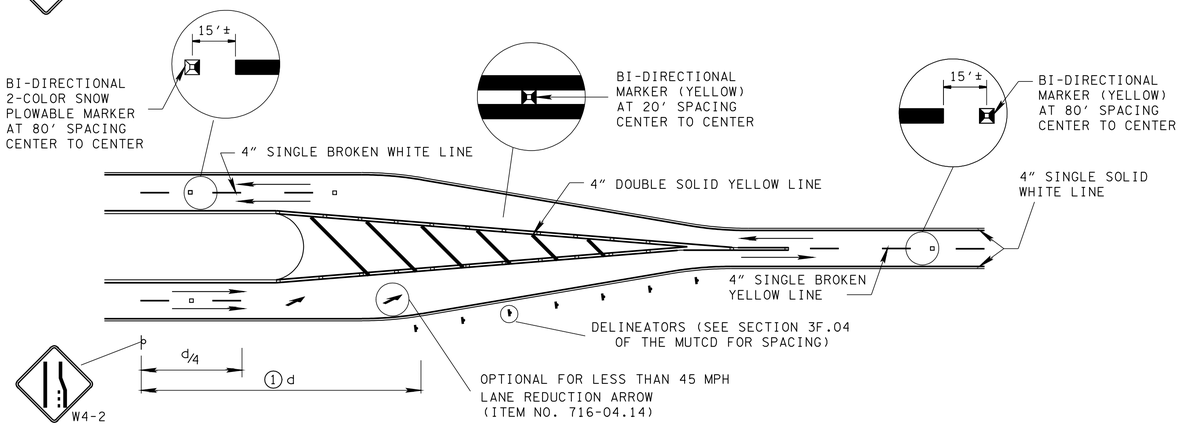
- REV. 1-12-12: CHANGED SNOW PLOWABLE MARKERS FROM MONO-DIRECTIONAL TO BI-DIRECTIONAL 2-COLOR.
- REV. 1-15-13: UPDATED MEDIAN DETAILS.



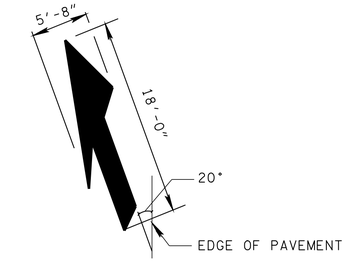
TRANSITION FROM FOUR-LANE TO TWO-LANE



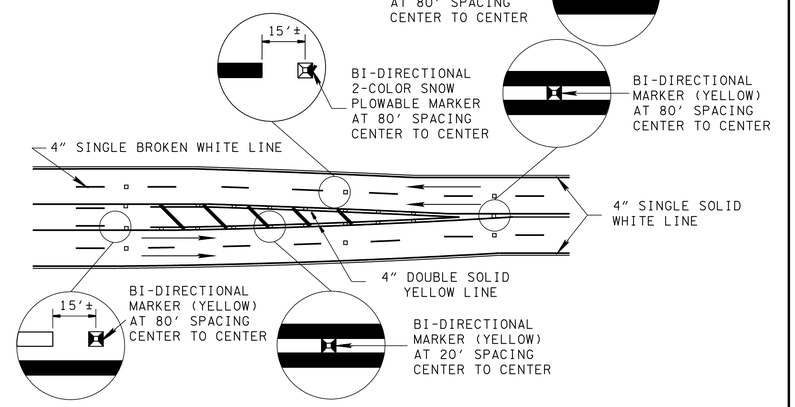
TRANSITION FROM FOUR-LANE MEDIAN DIVIDED TO TWO-LANE (NON-SYMMETRICAL ABOUT CENTERLINE)



TRANSITION FROM FOUR-LANE MEDIAN DIVIDED TO TWO-LANE (SYMMETRICAL ABOUT CENTERLINE) (SIMILAR FOR MULTI-LANE WITH TWO WAY LEFT TURN LANE TO TWO-LANE)



LANE-REDUCTION ARROW



TRANSITION FROM MULTI-LANE WITH TWO WAY LEFT TURN LANE TO FOUR-LANE

FOOTNOTE

① SEE TABLE 2C-4 OF PART 2 OF THE MANUAL ON UNIFORM TRAFFIC DEVICES (MUTCD) FOR GUIDELINES FOR ADVANCE PLACEMENT OF WARNING SIGNS DISTANCE d.

GENERAL NOTES

Ⓐ EDGE LINES ARE NOT REQUIRED FOR PAVEMENT WIDTH LESS THAN 16 FEET OR ON CURB AND GUTTER SECTIONS UNLESS SPECIFIED IN PLANS.

Ⓑ SEE STANDARD DRAWING NOS. T-M-3 AND T-M-4 FOR CHANNELIZATION MARKING AND INTERSECTION MARKING DETAILS.

Ⓒ PAVEMENT MARKERS ARE REQUIRED ONLY WHEN SPECIFIED IN THE PLANS.

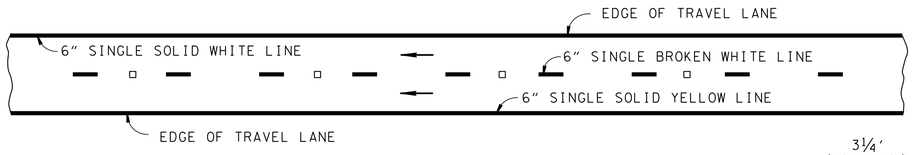
Ⓓ SEE STD. DWG. T-S-11 FOR DETAILS OF DELINEATORS.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

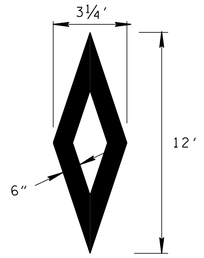
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

DETAILS OF PAVEMENT MARKINGS FOR CONVENTIONAL ROADS

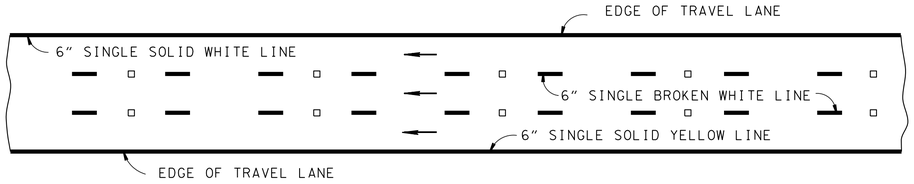
T-M-2



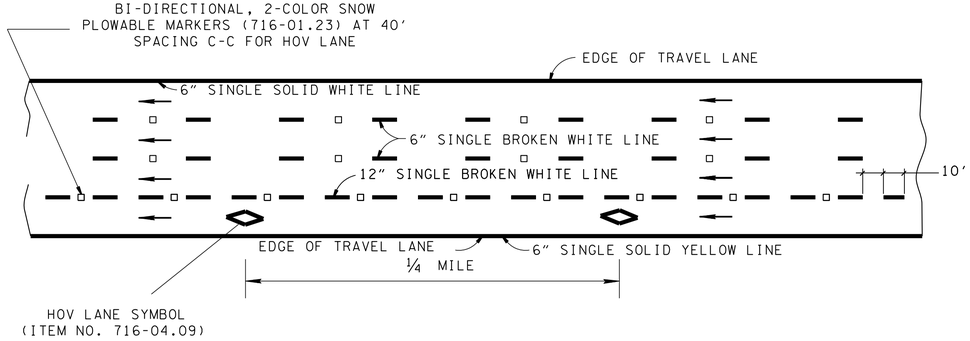
TYPICAL TWO LANE



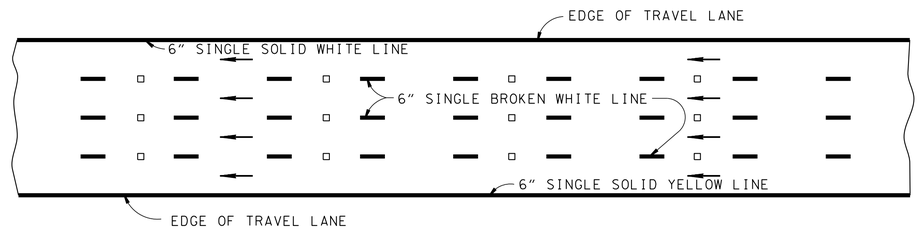
HOV LANE SYMBOL



TYPICAL THREE LANE



TYPICAL FOR HOV LANE
(FOR MORE DETAILS SEE MUTCD CURRENT EDITION)
SEE T-S-22 FOR SIGNING



TYPICAL FOUR LANE

REV. 2-22-88: REVISED TO SHOW RAISED REFLECTIVE PAVEMENT MARKERS CENTERED BETWEEN BROKEN LINES. CHANGED DRAWING NO. FROM T-M-2 TO T-M-5.

REV. 3-20-91: REDREW SHEET. CHANGED TYPE 2 PAVEMENT MARKERS (CLEAR) TO MONO-DIRECTIONAL PAVEMENT MARKERS (CLEAR).

☐ REV. 10-26-92: ADDED GENERAL NOTE Ⓐ.

☐ REV. 7-29-98: CHANGED WIDTH OF CENTERLINES, EDGE LINES, AND DOTTED WHITE LANE LINES FROM 4 TO 6 INCHES.

☐ REV. 4-15-04: CHANGED W4-2 SIGNS AND TRANSITION NOTE IN LOWER RIGHT CORNER TO COMPLY WITH 2003 MUTCD.

☐ REV. 9-5-04: IN TYPICAL SHOWING ENDING OF ADDITIONAL LANE CHANGE NOTE Ⓘ.

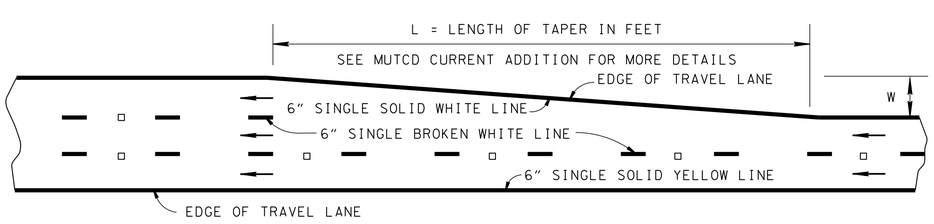
REV. 11-1-11: ADDED HOV SIGNS AND PAVEMENT MARKING DETAILS. ADDED LANE REDUCTION ARROWS WITH DETAILS, REVISED PAVEMENT MARKINGS TYPICAL DETAILS.

☐ REV. 1-12-12: CHANGED SNOW PLOWABLE MARKERS FROM MONO-DIRECTIONAL TO BI-DIRECTIONAL 2-COLOR.

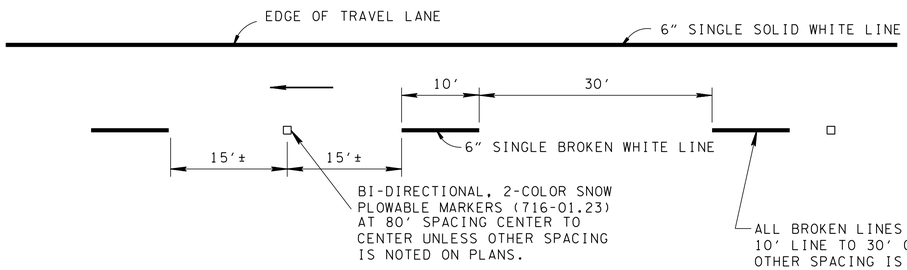
☐ REV. 5-24-12: REMOVED BROKEN LINE FROM TRANSITION AREA ON BEGINNING OF ADDITIONAL LANE.

☐ REV. 8-16-12: REMOVED HOV SIGNS.

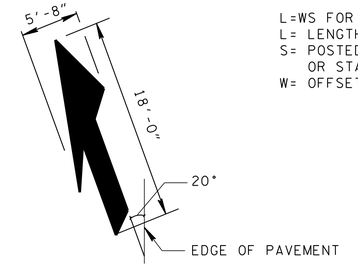
☐ REV. 4-23-13: CHANGED HOV LANE LINE MARKING.



TYPICAL SHOWING
BEGINNING OF ADDITIONAL LANE

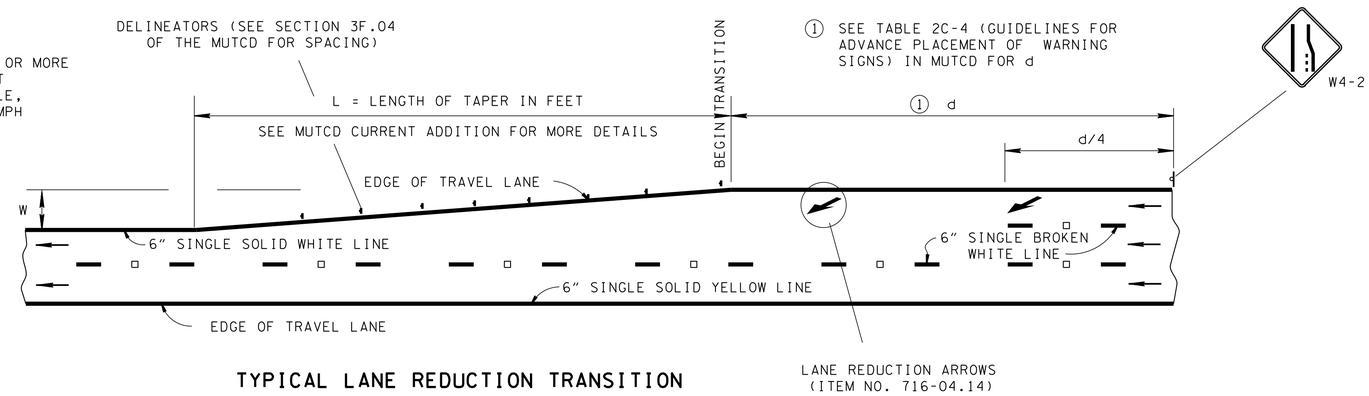


SPACING DETAILS



L=WS FOR SPEEDS OF 45 MPH OR MORE
L= LENGTH OF TAPER IN FEET
S= POSTED, 85 TH-PERCENTILE, OR STATUTORY SPEED IN MPH
W= OFFSET IN FEET

LANE-REDUCTION ARROW



TYPICAL LANE REDUCTION TRANSITION

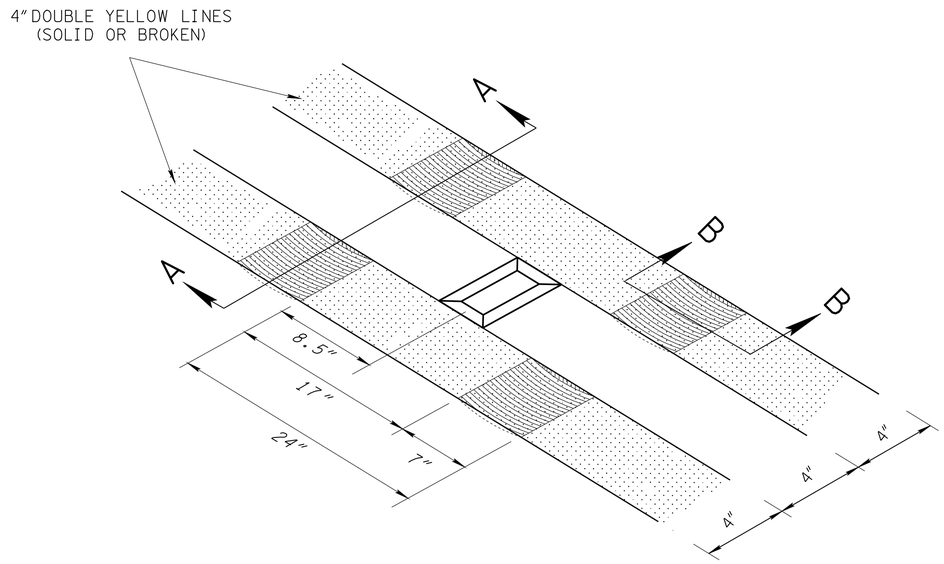
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

MARKING DETAILS FOR EXPRESSWAYS & FREEWAYS

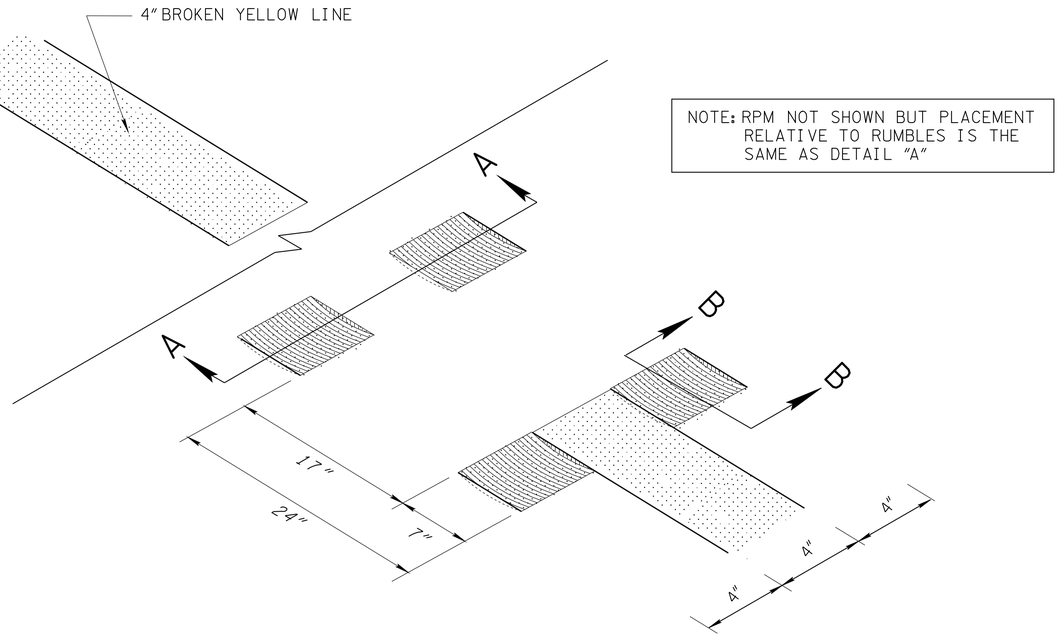
T-M-5

DETAIL "A"
FOR NO PASSING ZONES
OR
ONE WAY PASSING ZONES



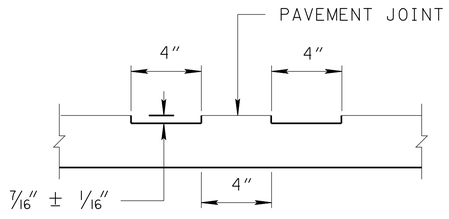
ISOMETRIC VIEW

DETAIL "B"
FOR TWO WAY PASSING ZONES

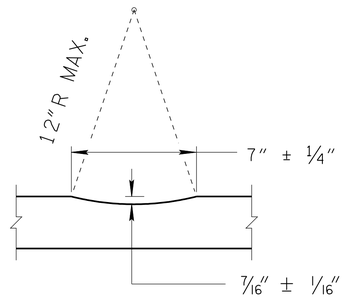


NOTE: RPM NOT SHOWN BUT PLACEMENT RELATIVE TO RUMBLES IS THE SAME AS DETAIL "A"

ISOMETRIC VIEW



SECTION A-A



SECTION B-B

DESIGN NOTES

(A) FOR IMPROVEMENTS OR RECONSTRUCTION OF EXISTING ROADS RUMBLE STRIPES MAY BE USED AS NEED DUE TO ACCIDENT HISTORY. FOR NEW CONSTRUCTION CENTERLINE RUMBLE STRIPES MAY BE SPECIFIED IF THE FOLLOWING CONDITIONS EXIST:

1) DESIGN SPEED GREATER THAN 50 MPH
2) ADT OF 1500 OR MORE
3) TOTAL TRAVEL WAY WIDTH GREATER THAN OR EQUAL TO 20 FEET.
4) ASPHALT PAVEMENT THAT IS AT LEAST 2.5 IN THICK.

(B) WHEN RUMBLE STRIPES ARE SPECIFIED, TABLE 4-3 OF THE DESIGN GUIDELINES DOES NOT APPLY. ONLY SPRAY THERMOPLASTIC (60 MIL) 4 IN LINE) (716-13.01) SHALL BE USED.

(C) CENTERLINE RUMBLE STRIPES SHALL NOT BE USED ON BRIDGES.

(D) THE PAVEMENT JOINT SHALL NOT BE MILLED.

(E) RUMBLE STRIPE SHALL BE DISCONTINUED WHENEVER THE CENTERLINE MARKING IS ALSO DISCONTINUED.

(F) RUMBLE STRIPE SHOULD NOT BE USED IN RESIDENTIAL OR COMMERCIAL AREAS.

(G) SCORING FOR RUMBLE STRIPES TO PAID FOR UNDER ITEM NO. 411-12.05 (INCLUDES BOTH LEFT AND RIGHT SIDE PER LINEAR MILE).

(H) FOR RPM SPACING SEE T-M-1. IN LOCATIONS WHERE RPMS ARE PRESENT STAGGER RUMBLES SUCH THAT RPMS ARE CENTERED BETWEEN RUMBLES.

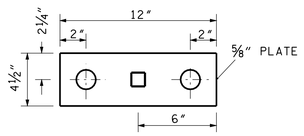
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

ASPHALT CENTER LINE RUMBLE STRIPE

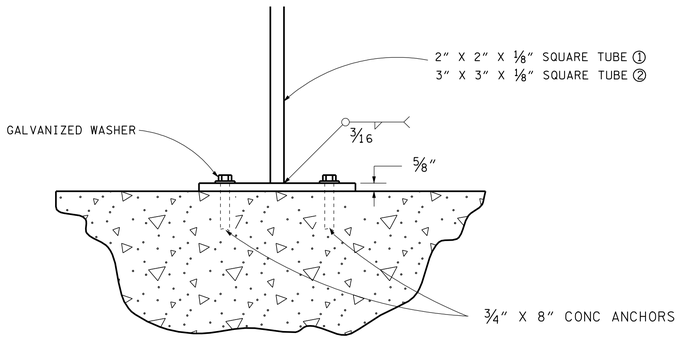
1-3-13 | T-M-16A

REV. 7-11-12: ADDED 6" WALL ATTACHMENT DETAIL AND NOTE ⑤.

☐ REV. 2-28-13: DELETED NOTE Ⓓ ADDED NOTE ⑥.



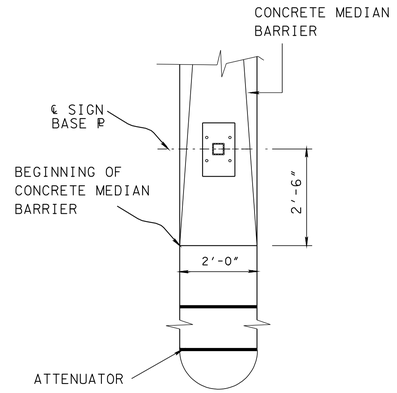
BASE PLATE DETAIL



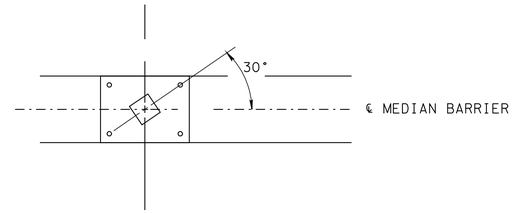
ELEVATION

DETAILS FOR MOUNTING SMALL AND REGULAR SIGNS ON CONCRETE MEDIAN BARRIERS ① ②

(TO BE PAID FOR UNDER ITEM NO. 713-30.09)



LOCATION DETAIL FOR MOUNTING EXIT GORE SIGNS ON CONCRETE MEDIAN BARRIERS ③



SIGN ORIENTATION DETAIL FOR H.O.V. SIGNS MOUNTED ON CONCRETE MEDIAN BARRIERS ④

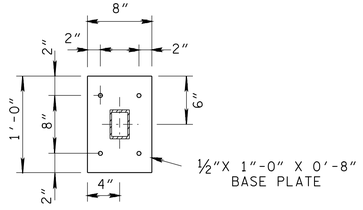
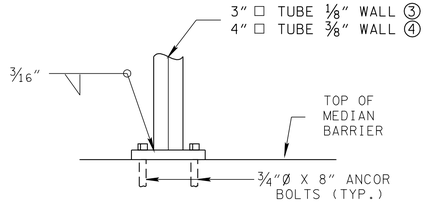


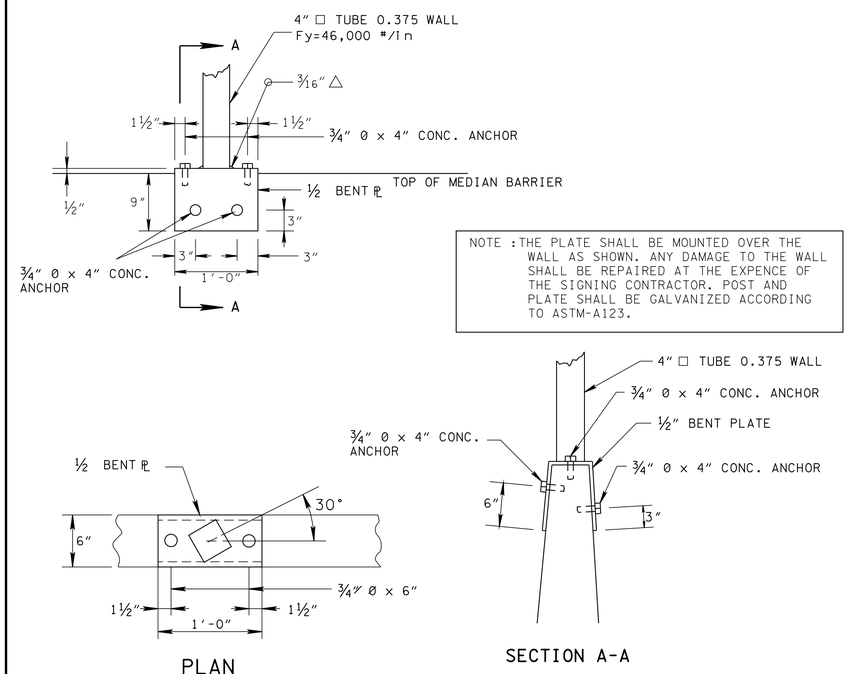
PLATE DETAIL



ELEVATION

DETAILS FOR MOUNTING LARGE SIGNS ON CONCRETE MEDIAN BARRIERS ③ ④

(TO BE PAID FOR UNDER ITEM NO. 713-30.10)



NOTE : THE PLATE SHALL BE MOUNTED OVER THE WALL AS SHOWN. ANY DAMAGE TO THE WALL SHALL BE REPAIRED AT THE EXPENCE OF THE SIGNING CONTRACTOR. POST AND PLATE SHALL BE GALVANIZED ACCORDING TO ASTM-A123.

ATTACHMENT DETAIL FOR 6" WIDE WALL ⑤

(NOT INTENDED TO BE USED FOR NEW CONSTRUCTION)
(TO BE PAID FOR UNDER ITEM NO.713-30.05)

GENERAL NOTES

- (A) WELDING SHALL BE IN ACCORDANCE WITH AASHTO SPECIFICATIONS.
- (B) ALL STEEL SHALL BE GALVANIZED AFTER FABRICATION AND CONFORMING TO THE REQUIREMENTS OF ASTM A123. DAMAGE TO THE COATING SHALL BE REPAIRED SUBSEQUENT TO ERECTION.
- (C) MATERIAL FOR PLATES SHALL BE ASTM A36 STEEL.
- (D) ALL BOLTS AND WASHERS SHALL BE MADE OF MATERIAL CONFORMING TO ASTM A307.
- (E) MINIMUM CLEARANCE BETWEEN BOTTOM OF THE SIGN AND TOP OF BARRIER SHALL BE 48".
- (F) PLATE TO BE CENTERED ON BARRIER CENTER LINE.
- (G) ITEM NO. 713-30.09 AND 713-30.10 INCLUDES BASE PLATE, ANCHOR BOLTS AND WELDING TO ATTACH SIGN POST. SIGN POST TO BE PAID FOR SEPARATE UNDER ITEM NO. 713-11.05 PER LB.

DESIGN NOTES

1. FOR (18"X48") EMERGENCY MILE MARKER OR (12"X24", 12"X36" OR 12'X48") STANDARD MILE MARKERS.
2. FOR (36"X48") SPEED LIMIT, (48"X72" OR 48"X60") TRUCK RESTRICTION SIGNS (IF DIRECTED BY REGIONAL TRAFFIC ENGINEER) OR (36"X36") DIAMOND WARNING SIGNS.
3. FOR EXIT GORE SIGNS (72" X 48" OR 90" X 48").
4. FOR H.O.V. SIGNS (84" X 60").
5. FOR ATTACHMENT TO EXISTING 6" WIDE CONCRETE BARRIER WALLS ONLY.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

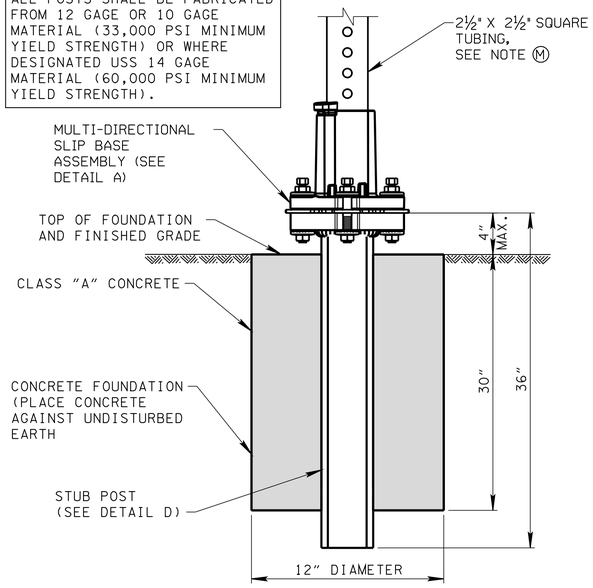
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

DETAILS FOR SIGNS MOUNTS ON CONCRETE MEDIAN BARRIERS

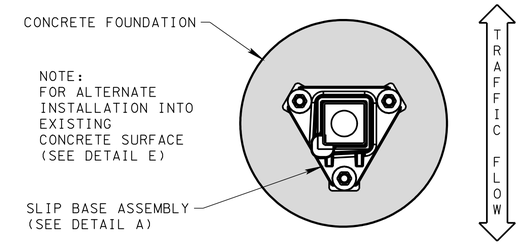
2-29-12 | T-S-21

05-MAR-2013 09:10
\\JJ0019083WF013.tdot.state.tn.us\I3SHARED\StandDraw\STANDARD DRAWINGS\ENGLISH\ENGLISH 2013\FHWA Submittals\Mar- 5\TS2L020713.DGN

ALL POSTS SHALL BE FABRICATED FROM 12 GAGE OR 10 GAGE MATERIAL (33,000 PSI MINIMUM YIELD STRENGTH) OR WHERE DESIGNATED USS 14 GAGE MATERIAL (60,000 PSI MINIMUM YIELD STRENGTH).

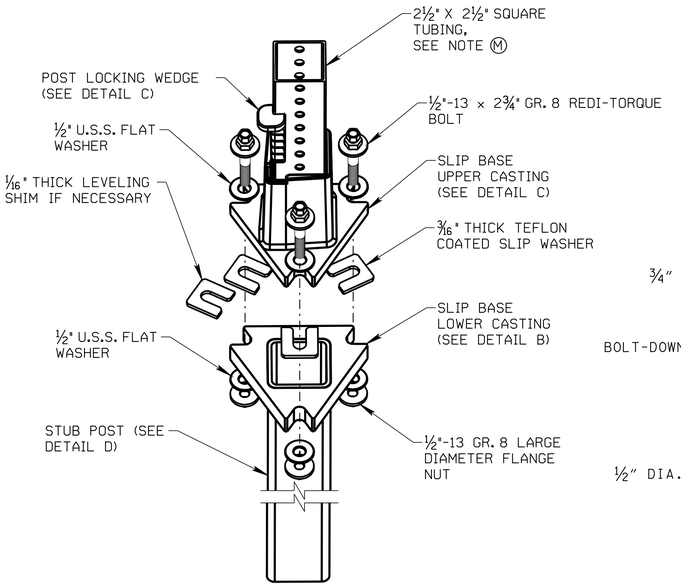


ELEVATION



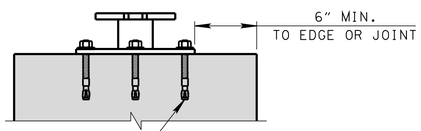
TOP VIEW

SLIP BASE SIGN SUPPORT FOR SQUARE TUBE

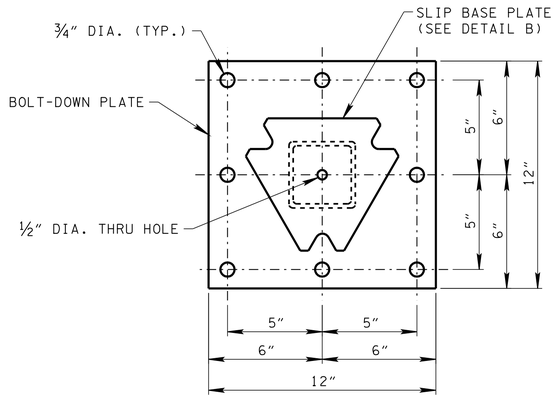


DETAIL A

TRIANGULAR SLIP BASE



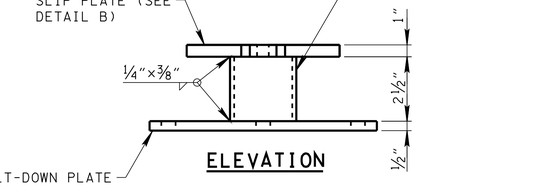
ANCHOR DETAIL



TOP VIEW

DETAIL B

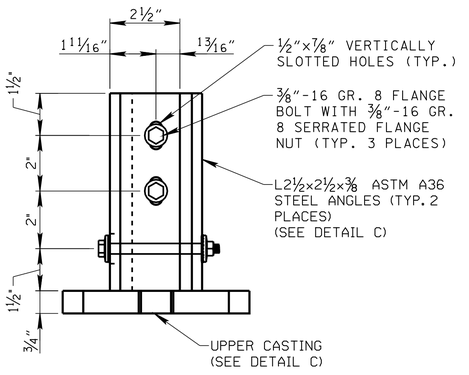
SLIP BASE LOWER CASTING



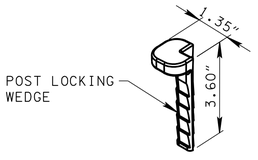
ELEVATION

DETAIL E

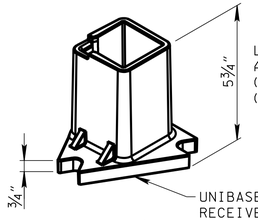
BOLT-DOWN ANCHOR INTO EXISTING CONCRETE



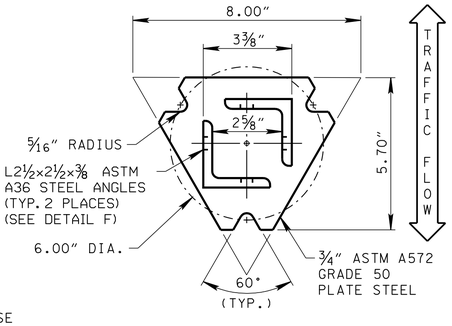
DETAIL F



DUCTILE IRON CASTING, CLASS 65-45-12, HOT DIP GALVANIZED PER ASTM A153.



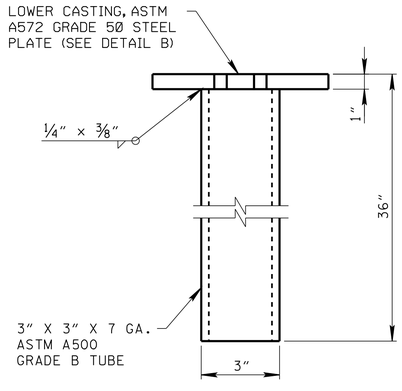
UNI-BASE



RECEIVER BY ANGLES

DETAIL C

SLIP BASE UPPER CASTING OPTIONS



DETAIL D

STUB POST

GENERAL NOTES

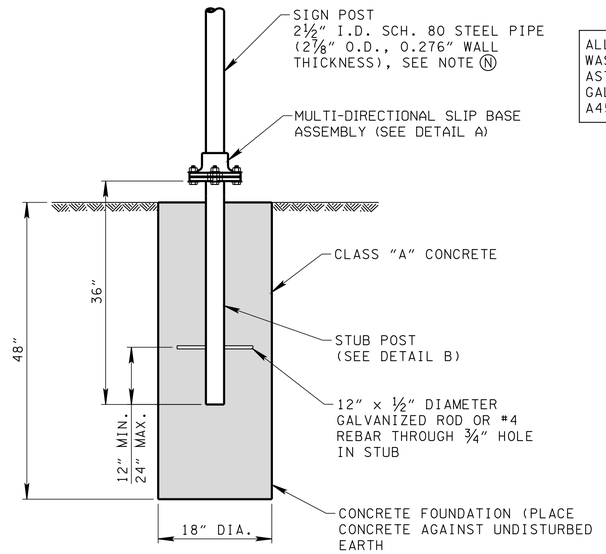
- (A) BREAKAWAY SIGN SUPPORTS SHALL BE USED ON ALL SIGN POSTS LOCATED WITHIN THE CLEAR ZONE OF A ROADWAY AND NOT PROTECTED BY AN APPROVED BARRIER SYSTEM.
- (B) NO MORE THAN THREE OMNI-DIRECTIONAL SLIP BASES MAY BE INSTALLED WITHIN A SEVEN FOOT SPAN.
- (C) MULTI-DIRECTIONAL BREAKAWAY SLIP BASE SHALL BE USED AT LOCATIONS WHERE THE POSSIBILITY EXISTS OF THE SIGN BEING HIT FROM ANY DIRECTION. ALL SQUARE TUBE SIGNS LOCATED IN ISLANDS, AT INTERSECTIONS, OR LOCATED ALONG THE OUTSIDE OF A HORIZONTAL CURVE SHALL BE EQUIPPED WITH A BREAKAWAY SYSTEM, REGARDLESS OF THE NUMBER OF POSTS OR SPACING.
- (D) ALL SIGN PANELS PLACED PARALLEL TO THE DIRECTION OF TRAFFIC FLOW (SUCH AS ONE-WAY SIGNS ON A DIVIDED HIGHWAY) SHALL BE MOUNTED ON A MULTI-DIRECTIONAL BREAKAWAY SYSTEM.
- (E) BASE POST STUB HEIGHT SHALL BE 4 INCHES OR LESS ABOVE FINISHED GROUND SURFACE.
- (F) ALL FINISHED COMPONENTS OF THE SLIP BASE SYSTEM SHALL BE PERMANENTLY MARKED TO INDICATE THE MANUFACTURER. METHOD, DESIGN, AND LOCATION OF MARKING SHALL BE AS APPROVED BY THE ENGINEER.
- (G) INTERMIXING OF U-CHANNEL POSTS WITH PERFORATED SQUARE TUBE POSTS AT ANY SIGN INSTALLATION LOCATION WILL NOT BE ALLOWED.
- (H) INSTALL MULTI-DIRECTIONAL SLIP BASE STRUCTURAL SIGN SUPPORT SYSTEM AS SHOWN OR APPROVED EQUAL. ONLY THOSE SYSTEMS APPROVED BY FHWA ACCEPTANCE LETTER AND FOUND ON THE TDOT QPL SHALL BE USED.
- (I) SQUARE TUBE POSTS, BASE POSTS, SLIP BASES, AND HARDWARE SHALL BE SELECTED FROM THE QPL.
- (J) ALL STEEL SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SPECIFICATION ASTM-A123.
- (K) CLASS "A" CONCRETE CONSTRUCTION AND MATERIALS SHALL MEET THE REQUIREMENTS OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION, SECTION 604."
- (L) ANCHORS MAY BE EXPANSION TYPE AS SHOWN OR ADHESIVE TYPE LISTED ON THE QPL MEETING THE STRENGTH REQUIREMENTS. EXPANSION ANCHORS SHALL CONSIST OF 5/8 INCH DIAMETER STUD BOLT WITH UNC-SERIES BOLT THREADS ON THE UPPER END WITH HEAVY HEX NUT PER ASTM A563, AND HARDENED WASHER PER ASTM F436. THE STUD BOLT SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI AND ULTIMATE TENSILE STRENGTH OF 75 KSI.
- (M) PERFORATED/KNOCKOUT POSTS SHALL BE SQUARE TUBE FORMED FROM 0.105% USS GAGE ASTM A-446 COLD ROLLED CARBON STEEL. THE SQUARE TUBES SHALL BE WELDED DIRECTLY IN THE CORNER BY HIGH FREQUENCY RESISTANCE WELDING OR EQUAL. THE POSTS SHALL BE EXTERNALLY SCARFED TO AGREE WITH STANDARD CORNER RADII OF $\frac{5}{32}\pm\frac{1}{64}$ INCHES.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

MULTI-DIRECTIONAL SLIP BASE BREAKAWAY SQUARE TUBE SIGN SUPPORT

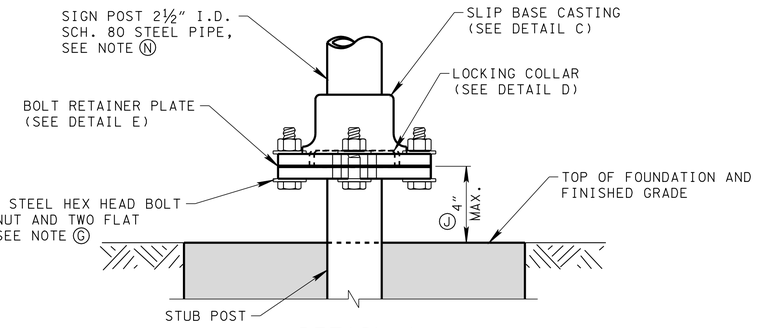
09-01-12 | T-S-23A



TRIANGULAR SLIP BASE PIPE SIGN SUPPORT

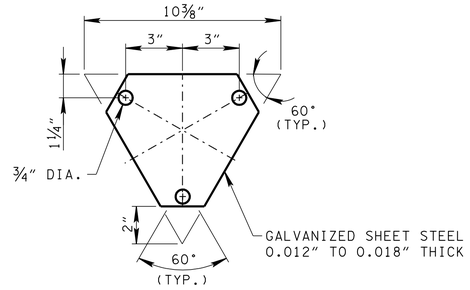
FOR ALTERNATE INSTALLATION INTO EXISTING CONCRETE SURFACE, SEE DETAIL G

ALL BOLTS, NUTS, AND WASHERS SHALL BE PER ASTM A325 OR A449 AND GALVANIZED TO ASTM A454.



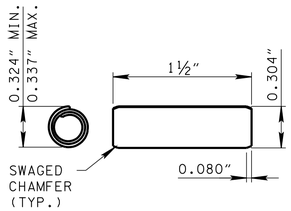
DETAIL A

TRIANGULAR SLIP BASE



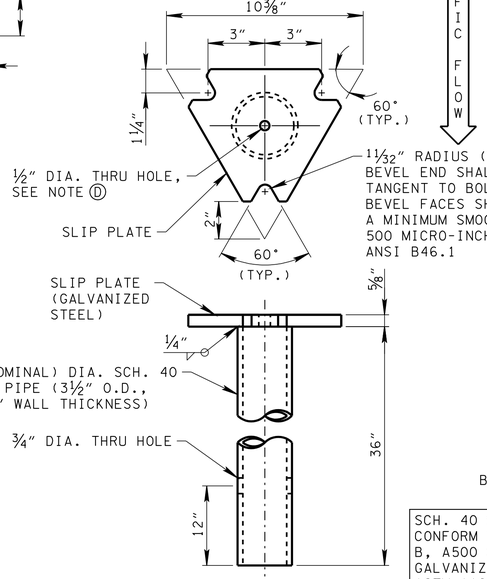
DETAIL E

BOLT RETAINER PLATE



DETAIL F Ⓗ

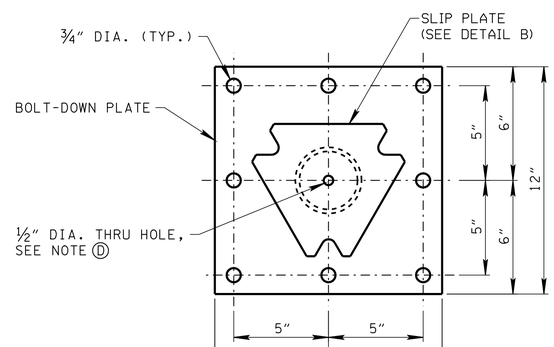
COILED PIN



TRAFFIC FLOW

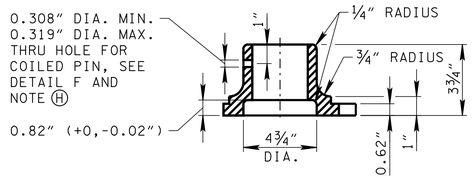
DETAIL B

STUB POST

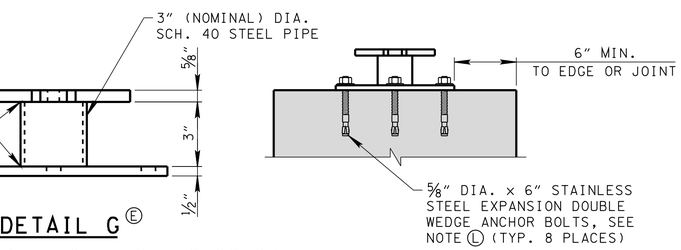


DETAIL C Ⓐ

SLIP BASE CASTING



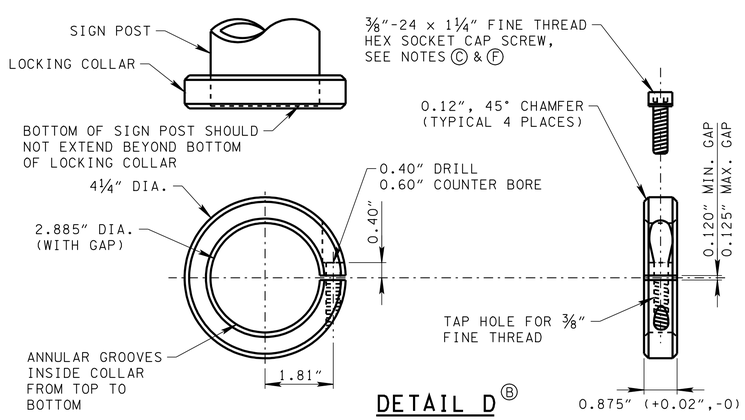
SECTION H-H



SCH. 40 STEEL PIPE SHALL CONFORM TO ASTM A53 GR. B, A500 GR. B, OR A501. GALVANIZE ACCORDING TO ASTM A123 AFTER FABRICATION.

DETAIL G Ⓔ

BOLT-DOWN ANCHOR INTO EXISTING CONCRETE



DETAIL D Ⓑ

LOCKING COLLAR

NOT TO SCALE

GENERAL NOTES

Ⓐ FURNISH SLIP BASE CASTING FABRICATED FROM DUCTILE IRON CONFORMING TO ASTM A 536 GRADE 65-45-12 AND GALVANIZED ACCORDING TO ASTM A 153, CLASS A. IF FABRICATION CONSISTS OF STEEL, IT SHALL CONFORM TO ASTM A36 OR A572.

Ⓑ FURNISH LOCKING COLLAR MACHINED FROM STEEL BAR CONFORMING TO ASTM A 108 GRADE 12L14, STEEL BAR CONFORMING TO ASTM A 576 GRADE 12L14 OR 1026, OR STEEL TUBING CONFORMING TO ASTM A 519 GRADE 12L14 OR 1026, AND ELECTRODEPOSITED ZINC COATED AND SUPPLEMENTAL CHROMATE CONVERSION COATED TO ASTM B 633 CLASS FE/ZN 12 TYPE II.

Ⓒ FURNISH HEX SOCKET CAP SCREW MANUFACTURED ACCORDING TO ASTM A 574 WITH ELECTRODEPOSITED ZINC COATING AND SUPPLEMENTAL CHROMATE CONVERSION COATING TO ASTM B 633 CLASS FE/ZN 12 TYPE II.

Ⓓ CENTER HOLES IN THE SLIP BASE AND BOLT-DOWN ANCHOR ARE FOR GALVANIZING VENTING AND DRAINAGE. EXACT HOLE PLACEMENT MAY VARY AS NEEDED.

Ⓔ USE BOLT-DOWN ANCHOR FOR INSTALLATIONS ON EXISTING CONCRETE SURFACES.

Ⓕ TIGHTEN HEX SOCKET CAP SCREW TO 60 FOOT-POUNDS. DO NOT OVERTIGHTEN.

Ⓖ TIGHTEN SLIP BASE BOLTS TO BETWEEN 40 AND 80 FOOT-POUNDS. TIGHTEN ALL BOLTS EVENLY BY WORKING AROUND THE SUPPORT IN APPROXIMATELY 10 FOOT-POUND INCREMENTS TO ASSURE BALANCED TENSION IN THE BOLTS. TIGHTEN ALL THREE BOLTS TO THE SAME TORQUE. DO NOT OVERTIGHTEN.

Ⓗ AFTER TIGHTENING SLIP BASE BOLTS, DRILL A 5/16 INCH DIAMETER HOLE IN THE PIPE THROUGH THE HOLE IN THE SLIP BASE CASTING, AND DRIVE IN THE COILED PIN TO PREVENT PIPE TWISTING IN THE SLIP BASE. DRIVE THE COILED PIN IN, SUCH THAT APPROXIMATELY ¼ TO ⅜ INCHES OF THE PIN REMAINS PROTRUDING BEYOND THE OUTSIDE DIAMETER OF THE SLIP BASE CASTING. THE COILED PIN SHALL BE STANDARD DUTY, STAINLESS STEEL.

Ⓘ MULTI-DIRECTIONAL SLIP BASE BREAKAWAY STRUCTURAL PIPE SIGN SUPPORT STANDARD SHALL BE USED FOR ALL STRUCTURAL PIPE SIGN POSTS LOCATED WITHIN THE CLEAR ZONE AND NOT PROTECTED BY AN APPROVED BARRIER SYSTEM.

Ⓙ POST STUB HEIGHT SHALL BE 4 INCHES OR LESS ABOVE FINISHED GROUND SURFACE.

Ⓚ ALL FINISHED COMPONENTS OF THE SLIP BASE SYSTEM SHALL BE PERMANENTLY MARKED TO INDICATE THE MANUFACTURER. METHOD, DESIGN, AND LOCATION OF MARKING SHALL BE AS APPROVED BY THE ENGINEER.

Ⓛ ANCHORS MAY BE EXPANSION TYPE AS SHOWN OR ADHESIVE TYPE LISTED ON THE QPL MEETING THE STRENGTH REQUIREMENTS. EXPANSION ANCHORS SHALL CONSIST OF 5/8 INCH DIAMETER STUD BOLT WITH UNC-SERIES BOLT THREADS ON THE UPPER END WITH HEAVY HEX NUT PER ASTM A563, AND HARDENED WASHER PER ASTM F436. THE STUD BOLT SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI AND ULTIMATE TENSILE STRENGTH OF 75 KSI.

Ⓜ INSTALL MULTI-DIRECTIONAL SLIP BASE STRUCTURAL SIGN SUPPORT SYSTEM AS SHOWN OR APPROVED EQUAL. ONLY THOSE SYSTEMS APPROVED BY FHWA ACCEPTANCE LETTER AND FOUND ON THE TDOT QPL SHALL BE USED.

Ⓝ SCHEDULE 80 PIPE SPECIFICATIONS (SIGN POST):
2.875" OUTSIDE DIAMETER
0.276" NOMINAL WALL THICKNESS
STEEL TUBING PER ASTM A500 GRADE C
OTHER SEAMLESS OR ELECTRIC-RESISTANCE WELDED STEEL TUBING OR PIPE WITH EQUIV. OUTSIDE DIA. AND WALL THICKNESS MAY BE USED IF THEY MEET THE FOLLOWING:
46,000 PSI MINIMUM YIELD STRENGTH, 62,000 PSI MINIMUM TENSILE STRENGTH
WALL THICKNESS (UNCOATED) SHALL BE WITHIN THE RANGE OF 0.248" TO 0.304"
OUTSIDE DIAMETER (UNCOATED) SHALL BE WITHIN THE RANGE OF 2.855" TO 2.895"
GALVANIZATION PER ASTM A123

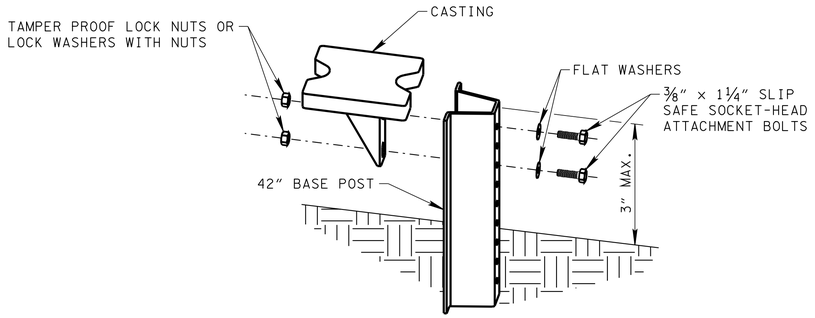
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

MULTI-DIRECTIONAL SLIP BASE BREAKAWAY STRUCTURAL PIPE SIGN SUPPORT

09-01-12 | T-S-23B

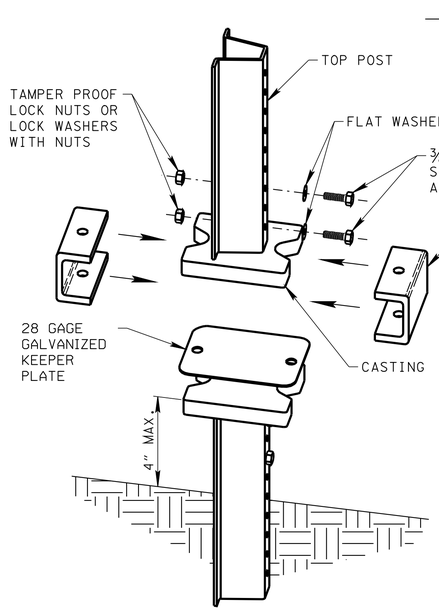
TYPICAL U-POST INSTALLATION DETAILS (B)(C)

MULTI-DIRECTIONAL BREAKAWAY SLIP BASE (D)(E)(K)

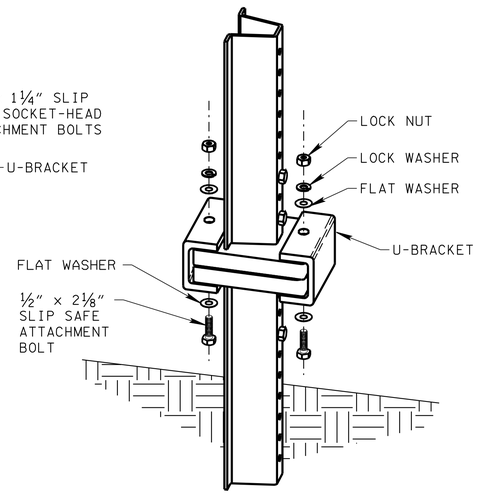


NOTE: BOLTS SHOULD BE TIGHTENED ½ TO ¾ TURN AFTER SNUG.

STEP 1



STEP 2

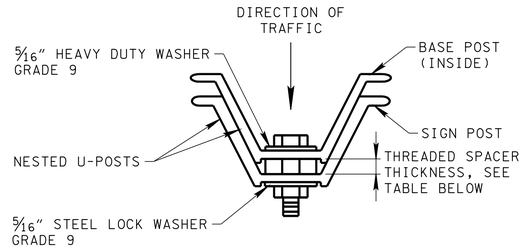


NOTE: TIGHTEN NUTS ⅓ TO ½ TURN AFTER SNUG.

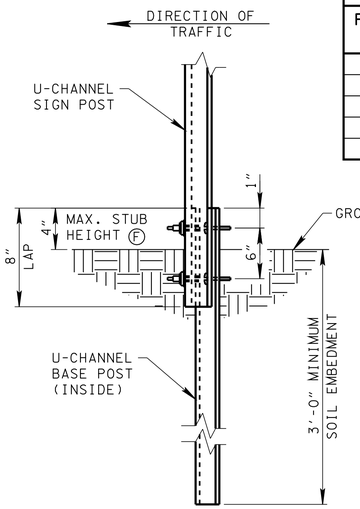
STEP 3

SINGLE-DIRECTIONAL BREAKAWAY LAP SPLICE (H)

FLORIDA LAP SPLICE



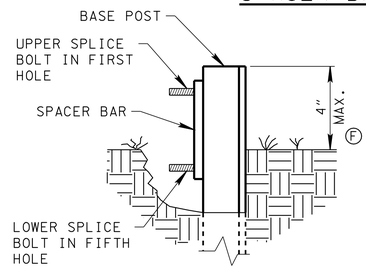
SECTION
(THRU BREAKAWAY SPLICE)



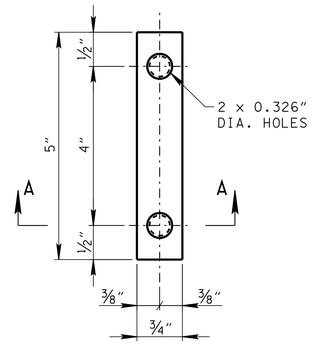
ELEVATION

SPACER THICKNESS FOR NESTED POSTS	
POST SIZE (LB/FT)	THICKNESS (INCHES)
2.00	⅜
2.50	5/16
2.75	¼
3.00	⅝
4.00	½

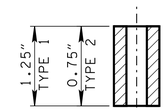
SPACER BAR ALTERNATE



SIDE VIEW



SPACER BAR ELEVATION

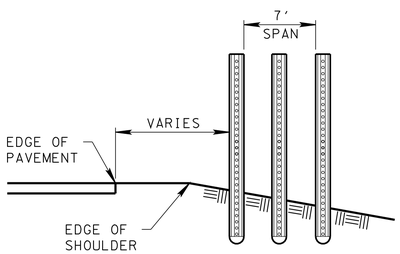


SECTION A-A

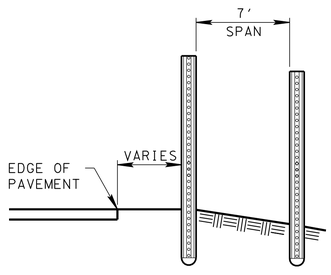
ISOMETRIC VIEW

NOTE: WHEN 'X' IS GREATER THAN ¾", USE TYPE 1 SPACER BAR
WHEN 'X' IS ¾" OR LESS, USE TYPE 2 SPACER BAR

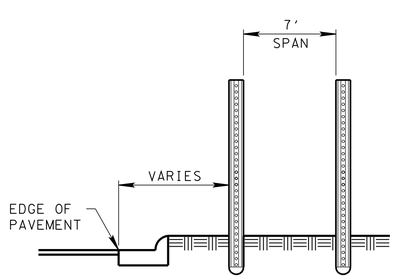
SECTION
(THRU SPACER BAR)



3 LB/FT BREAKAWAY POSTS
3 POSTS WITHIN 7' SPAN



3 LB/FT POSTS
WITH OR WITHOUT BREAKAWAY POSTS
2 POSTS WITHIN 7' SPAN



4 LB/FT BREAKAWAY POSTS
2 POSTS WITHIN 7' SPAN

GENERAL NOTES

(A) BREAKAWAY SIGN SUPPORTS SHALL BE USED ON ALL SIGN POSTS LOCATED WITHIN THE CLEAR ZONE OF A ROADWAY AND NOT PROTECTED BY AN APPROVED BARRIER SYSTEM.

(B) SINGLE OR DOUBLE POSTS SIZED 3 LBS/FT OR SMALLER WITH A 7-FOOT CLEAR SPAN BETWEEN DOUBLE POSTS MAY BE DIRECT DRIVEN, AS THE POSTS ALONE ARE CONSIDERED BREAKAWAY PER FHWA. ALL TRIPLE U-POST INSTALLATIONS OF ANY SIZE POST, AND ALL 4 LBS/FT U-POST (MEMBER DESIGNATION U7 ON T-S-19) INSTALLATIONS OF ANY NUMBER OF POSTS, SHALL UTILIZE AN APPROVED BREAKAWAY SYSTEM. MULTI-DIRECTIONAL OR LAP-SPLICE SYSTEMS MAY BE USED, EXCEPT WHERE NOTED OTHERWISE, OR AS DIRECTED BY THE ENGINEER.

(C) NO MORE THAN 2 SIGN POSTS OF ANY GAGE SHALL BE LOCATED WITHIN A 7-FOOT CIRCLE.

(D) MULTI-DIRECTIONAL BREAKAWAY SLIP BASE SHALL BE USED AT LOCATIONS WHERE THE POSSIBILITY EXISTS OF THE SIGN BEING HIT FROM ANY DIRECTION. ALL U-POST SIGNS LOCATED IN ISLANDS, AT INTERSECTIONS, OR LOCATED ALONG THE OUTSIDE OF A HORIZONTAL CURVE SHALL BE EQUIPPED WITH A BREAKAWAY SYSTEM, REGARDLESS OF THE NUMBER OF POSTS OR SPACING.

(E) ALL SIGN PANELS PLACED PARALLEL TO THE DIRECTION OF TRAFFIC FLOW (SUCH AS ONE-WAY SIGNS ON A DIVIDED HIGHWAY) SHALL BE MOUNTED ON A MULTI-DIRECTIONAL BREAKAWAY SYSTEM.

(F) BASE POST STUB HEIGHT SHALL BE 4 INCHES OR LESS ABOVE FINISHED GROUND SURFACE. WHEN DRIVING THE STUB POST, A DRIVE CAP OR OTHER ACCEPTABLE MEANS SHALL BE USED TO PROTECT THE TOP OF THE STUB POST FROM DAMAGE.

(G) ALL FINISHED COMPONENTS OF THE SLIP BASE SYSTEM SHALL BE PERMANENTLY MARKED TO INDICATE THE MANUFACTURER. METHOD, DESIGN, AND LOCATION OF MARKING SHALL BE AS APPROVED BY THE ENGINEER.

(H) THE STUB POST AND THE U-CHANNEL POST SHALL BE OF THE SAME SIZE (LB/FT) AND FROM THE SAME MANUFACTURER.

(I) INTERMIXING OF U-CHANNEL POSTS WITH PERFORATED SQUARE TUBE POSTS AT ANY SIGN INSTALLATION LOCATION WILL NOT BE ALLOWED.

(J) FOR BASE STUB AND U-POST MATERIAL PROPERTIES, SEE STANDARD DRAWING T-S-19. FOR DETAILS OF SIGN CONNECTION TO U-POST, SEE OTHER T-S-SERIES STANDARDS.

(K) INSTALL MULTI-DIRECTIONAL SLIP BASE STRUCTURAL SIGN SUPPORT SYSTEM AS SHOWN OR APPROVED EQUAL. ONLY THOSE SYSTEMS APPROVED BY FHWA ACCEPTANCE LETTER AND FOUND ON THE TDOT QPL SHALL BE USED.

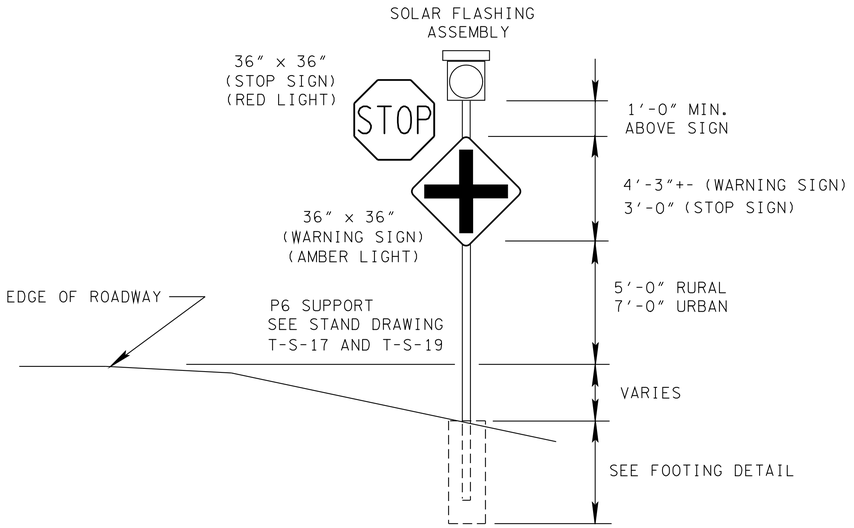
(L) STEEL U-POSTS, BASE POSTS, SLIP BASES, AND HARDWARE SHALL BE SELECTED FROM THE QPL.

NOT TO SCALE

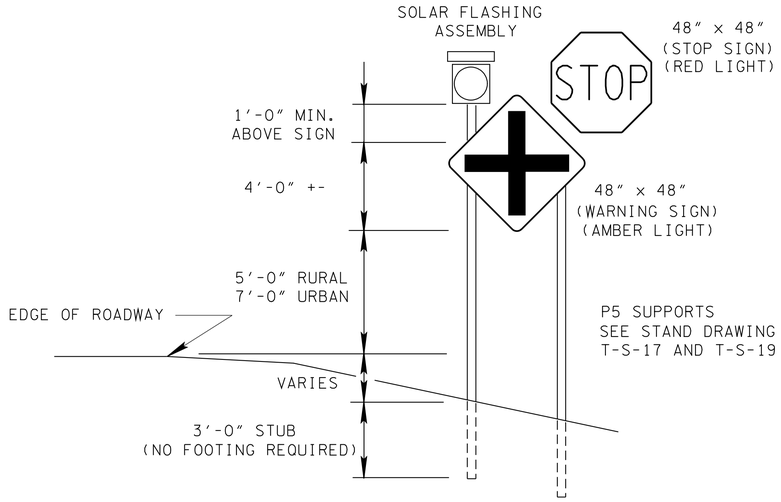
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

BREAKAWAY U-POST SIGN SUPPORTS

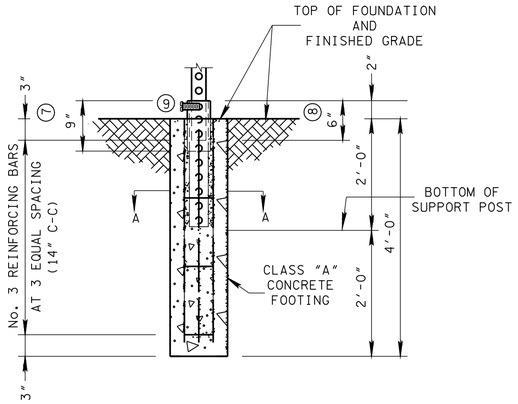
09-01-12 | T-S-23C



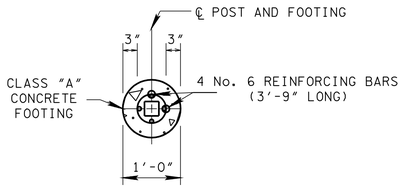
36" SIGNS



48" SIGNS



CLASS "A" CONCRETE FOOTING DETAIL
TYPE 4 FOOTING



SECTION A-A

SIGN SUPPORT WEIGHT PER FOOT

P5	P6
3.141 LB/FT	4.006 LB/FT

QUANTITIES PER FOOT

CLASS A CONCRETE	STEEL REINFORCEMENT
0.12 CY	25.5 LB

GENERAL NOTES

(A) SOLAR FLASH ASSEMBLY INCLUDING SOLAR PANEL AND ALL ELECTRONICS ARE TO BE HOUSED IN A COMPACT ENCLOSURE LOCATED ABOVE TRAFFIC SIGNAL MODULE

(B) FLASH PATTERN TO BE M.U.T.C.D. COMPLIANT. LIGHT BEAM TO BE HIGH INTENSITY LED. LIGHT COLOR TO BE AMBER OR RED DEPENDING ON THE SIGN. LIGHT SIZE TO BE 12" DIA. AND THE SIGNAL HEAD SHALL BE BLACK. BATTERY LIFE SPAN TO BE A MINIMUM OF 3 YEARS.

(C) SHALL INCLUDE MOUNTING BRACKET FOR P5 AND P6 SQUARE TUBE POST.

(D) WARRANTY SHALL BE MANUFACTURER STANDARD OR 2 YEARS WHICHEVER IS GREATER.

(E) SIGN WITH SOLAR FLASHING LIGHT ASSEMBLY SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

713-01.01	CLASS A CONCRETE (FOUNDATION FOR SIGN SUPPORTS) PER CY
713-01.02	STEEL BAR REINFORCEMENT (FOUNDATION FOR SIGN SUPPORTS) PER LB
713-11.02	PERFORATED/KNOCKOUT SQUARE TUBE POST PER LB
713-13.03	FLAT SHEET ALUMINUM SIGNS (0.100" THICK) PER SF
730-26.07	FLASHING WARNING BEACON (RED) PER EACH
730-26.08	FLASHING WARNING BEACON (AMBER) PER EACH

☒ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

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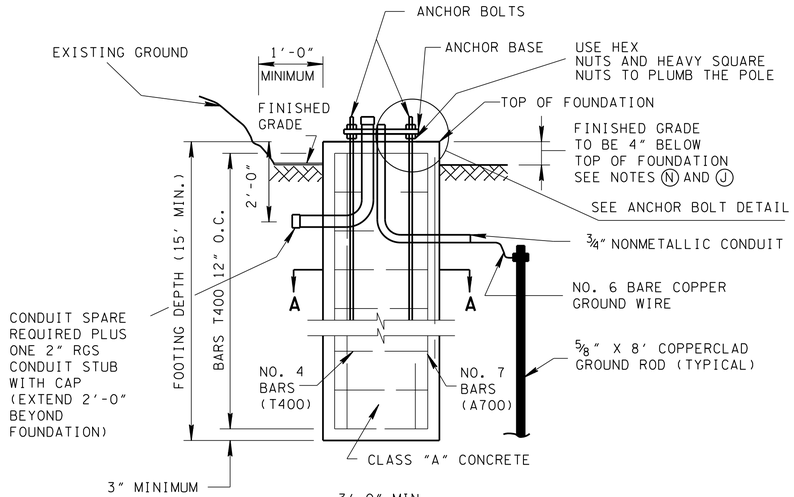
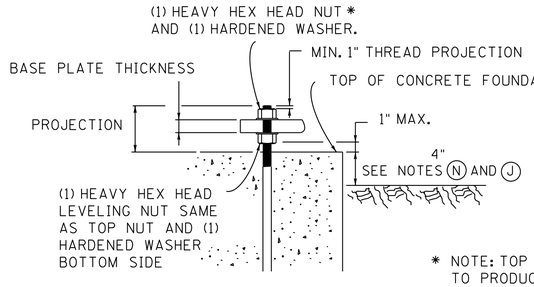
DETAILS OF SIGN WITH SOLAR FLASHING ASSEMBLY

3-1-13 | T-S-24

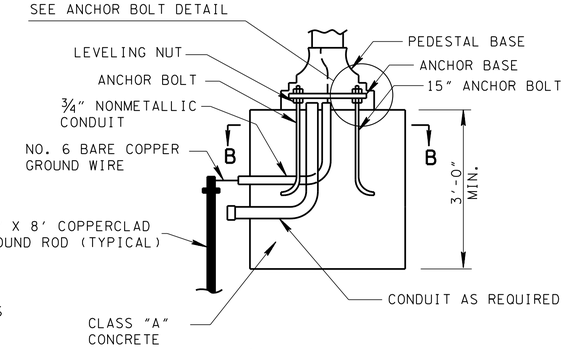


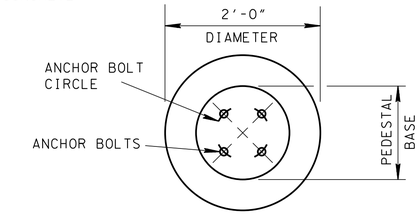


ANCHOR BOLT DETAIL

UNDER NO CONDITIONS WILL DRILLED AND GROUTED ANCHOR BOLTS BE ALLOWED)
(CANTILEVER AND BUTTERFLY SIGN BASES SHALL REQUIRE A MINIMUM OF 8 ANCHOR BOLTS 1 1/2" IN DIAMETER)

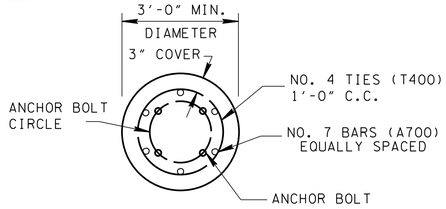
* NOTE: TOP NUT TO BE TORQUED TO PRODUCE 60% YIELD STRESS OF ANCHOR BOLT.
NOTE: DO NOT GROUT BETWEEN BOTTOM OF BASE PLATE AND TOP OF CONCRETE FOUNDATION.





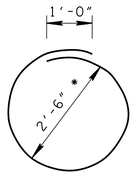
SECTION B-B

FOOTING DETAIL FOR STEEL PEDESTAL POLE



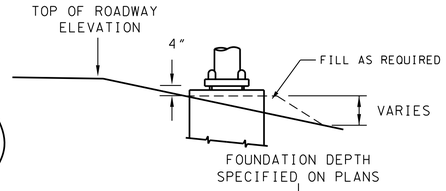
SECTION A-A

FOUNDATION DETAIL FOR STRAIN OR MAST ARM POLE



T400 BARS SHALL LAP 1'-0"

* FOR 3'-0" DIAMETER FOOTING. USE 3'-6" FOR 4'-0" DIAMETER FOOTING.



LOW SHOULDER FOUNDATION DETAIL

ESTIMATED FOUNDATION QUANTITIES

FOOTING DIAMETER	FOOTING DEPTH	T400 REINFORCING BARS			A700 REINFORCING BARS			CONCRETE (CUBIC YARDS)	MAXIMUM DESIGN MOMENT (FT-KIP) SERVICE LOAD
		NUMBER OF BARS	LENGTH OF EACH BAR	TOTAL WEIGHT IN POUNDS	NUMBER OF BARS	LENGTH OF EACH BAR	TOTAL WEIGHT IN POUNDS		
3'-0"	15'-0"	15	8'-10"	89	8	14'-6"	237	3.9	134
3'-0"	16'-0"	16	8'-10"	95	8	15'-6"	253	4.2	150
3'-0"	17'-0"	17	8'-10"	101	10	16'-6"	337	4.5	167
3'-0"	18'-0"	18	8'-10"	107	10	17'-6"	358	4.7	184
3'-0"	19'-0"	19	8'-10"	113	10	18'-6"	378	5.0	202
3'-0"	20'-0"	20	8'-10"	119	12	19'-6"	478	5.2	221
3'-0"	21'-0"	21	8'-10"	125	12	20'-6"	503	5.5	240
3'-0"	22'-0"	22	8'-10"	130	12	21'-6"	527	5.8	260
3'-0"	23'-0"	23	8'-10"	136	12	22'-6"	552	6.0	280
3'-0"	24'-0"	24	8'-10"	142	14	23'-6"	672	6.3	300
4'-0"	15'-0"	15	12'-0"	121	10	14'-6"	296	7.0	179
4'-0"	16'-0"	16	12'-0"	128	10	15'-6"	317	7.4	200
4'-0"	17'-0"	17	12'-0"	136	12	16'-6"	405	7.9	223
4'-0"	18'-0"	18	12'-0"	145	12	17'-6"	429	8.4	246
4'-0"	19'-0"	19	12'-0"	153	12	18'-6"	454	8.8	270
4'-0"	20'-0"	20	12'-0"	161	14	19'-6"	558	9.3	295
4'-0"	21'-0"	21	12'-0"	169	14	20'-6"	587	9.8	320
4'-0"	22'-0"	22	12'-0"	177	14	21'-6"	615	10.2	346
4'-0"	23'-0"	23	12'-0"	185	16	22'-6"	736	10.7	373
4'-0"	24'-0"	24	12'-0"	193	16	23'-6"	769	11.2	401
4'-0"	25'-0"	25	12'-0"	201	16	24'-6"	801	11.7	429
4'-0"	26'-0"	26	12'-0"	209	18	25'-6"	938	12.1	458
4'-0"	27'-0"	27	12'-0"	217	18	26'-6"	975	12.6	487
4'-0"	28'-0"	28	12'-0"	224	18	27'-6"	1012	13.0	517
4'-0"	29'-0"	29	12'-0"	233	20	28'-6"	1165	13.5	547
4'-0"	30'-0"	30	12'-0"	241	20	29'-6"	1206	14.0	578
4'-0"	31'-0"	31	12'-0"	248	20	30'-6"	1247	14.4	609
4'-0"	32'-0"	32	12'-0"	257	22	31'-6"	1416	14.9	641

GENERAL NOTES

(A) ALL STEEL STRAIN POLES SHALL CONFORM TO "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION, SECTION 730 - TRAFFIC SIGNALS.

(B) STRAIN POLES SHALL BE DESIGNED ACCORDING TO AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (CURRENT EDITION).

(C) THE CONTRACTOR SHALL FURNISH POLES DESIGNED FOR A WIND VELOCITY ACCORDING TO THE CURRENT STANDARDS AS SPECIFIED IN AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS".

(D) ANCHOR BOLTS SHALL BE DESIGNED BY THE POLE FABRICATOR. THEY SHALL BE CAPABLE OF RESISTING THE FULL BENDING MOMENT OF THE SHAFT AT ITS YIELD STRENGTH STRESS.

MATERIAL SPECIFICATI NS - BOLTS:

1.) ANCHOR BOLTS SHALL BE ASTM F1554 GRADE 55 ksi WITH THREADS CONFORMING TO THE REQUIREMENTS OF ASTM A563.

2.) NUTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A563.

3.) ALL HARDWARE, EXCEPT STAINLESS STEEL, SHALL BE HOT DIPPED GALVANIZED ACCORDING TO ASTM A153 OR MECHANICALLY GALVANIZED ACCORDING TO ASTM B695.

(E) THE COST OF ALL FOOTING MATERIALS AND INSTALLATION SHALL BE INCLUDED IN THE PRICE BID FOR STEEL POLES

(F) THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND NOTES TO THE ENGINEER OF STRUCTURES FOR APPROVAL PRIOR TO FABRICATION.

(G) THE MOMENT CAPACITY OF THE STRAIN POLES AND THE FOOTING DEPTHS FOR BOTH STRAIN POLE AND MAST ARM POLE SHALL BE AS SPECIFIED IN THE PLANS.

(H) CANTILEVER SIGNAL SUPPORTS SHALL BE DESIGNED BY THE POLE FABRICATOR.

(I) TOP OF FOOTING SHALL BE FLUSH IN SIDEWALK OR PAVED ISLANDS. TOP OF FOOTING SHALL NOT EXTEND MORE THAN 4" ABOVE THE GROUND LINE IN OTHER AREAS.

(J) IF ROCK IS ENCOUNTERED WHILE DRILLING FOR FOOTING, AND CORE AND THE DRILLING INDICATES ROCK IS SOLID, THE CONTRACTOR SHALL PROCEED BY ONE OF TWO METHODS. METHOD1: PROVIDE A ROCK SOCKET TWO TIMES THE DIAMETER OF THE POLE FOUNDATION. METHOD 2: DRILL SIX 1 1/8" DIAMETER HOLES IN TO ROCK A MIMIMUM DISTANCE OF THREE FEET. FILL HOLES WITH A-B EPOXY MIX AND ROTATE THE A700 BARS UNTIL FULLDEPTH IS ACHIEVED. THE A-B EPOXY MIX SHALL BE APPROVED BY TENNESSE DEPARTMENT OF TRANSPORTATION, MATERIALS AND TEST DIVISION. GROUND ROD MAY BE PLACED HORIZONTALLY, AS DEEP AS ROCK ALLOWS, WITH A 3" MINIMUM SEPARATION FROM ANY CONDUIT. THE CONTRACTOR SHALL CONTACT THE DIVISION OF STRUCTURES TO DETERMINE WHICH METHOD IS APPLICABLE OR WHETHER A SPECIAL SPREAD FOOTING DESIGN MUST BE FURNISHED BT THE DIVISION OF STRUCTURES.

(K) ALL STRAIN POLES AND MAST ARM POLES TO HAVE SPARE 2" RGS CONDUIT STUB EXTENDING 24" BEYOND POLE FOUNDATION.

(L) ALL CONDUIT BENDS IN POLE FOUNDATION TO BE 6" RADIUS.

(M) BASE OF POLE SHALL REMAIN OPEN TO PERMIT DRAINAGE AND AIR CIRCULATION. FINISHED GROUND PROFILE SHOULD DRAIN WATER AWAY FROM FOUNDATION.

- REV. 9-18-89: ADDED NOTE (J) AND GRADE DETAILS TO FOOTING DETAIL.
- REV. 1-18-91: REDREW AND REORGANIZED SHEET. ADDED GENERAL NOTE (K) REGARDING FOOTINGS IN ROCK.
- REV. 1-19-96: CHANGED GENERAL NOTE (A).
- REV. 2-14-99: REVISED GENERAL NOTE (K).

REV. 12-16-03: REVISED SHEET TITLE. DELETED ESTIMATED QUANTITY FOR FOUNDATIONS LESS THAN 10', ADDED SPARE CONDUIT TO STRAIN OR MAST ARM FOUNDATION DETAIL, ADDED LOW SHOULDER FOUNDATION DETAIL, DELETED NOTE G, RE LETTERED REMAINING NOTES AND ADDED NOTES (L) TO (N).

REV. 7-29-04: MODIFIED ESTIMATED FOOTING QUANTITIES FOR STRAIN POLE TABLE. ADDED LOWER SHOULDER FOUNDATION DETAIL.

- REV. 02-15-07: ADDED ANCHOR BOLT DETAIL. REVISED GENERAL NOTES (D),(G) & (N) AND CHANGED TITLE
- REV. 1-5-10: MODIFIED ESTIMATED FOUNDATION QUANTITIES TABLE.

REV. 5-6-13: MODIFIED ESTIMATED FOUNDATION QUANTITIES, T400 BARS, GENERAL NOTES AND FOUNDATION DETAILS.

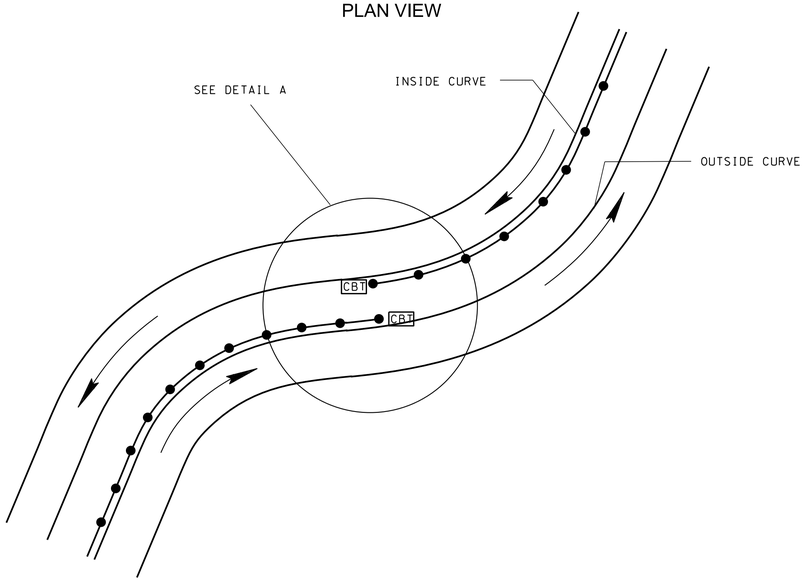
- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

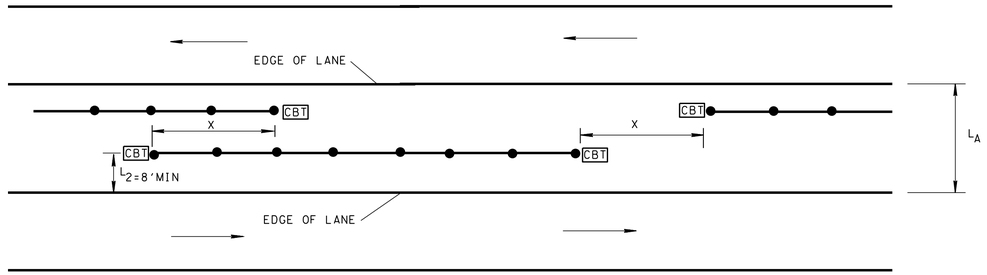
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

MAST ARM POLE AND STRAIN POLES FOUNDATION DETAILS

T-SG-10

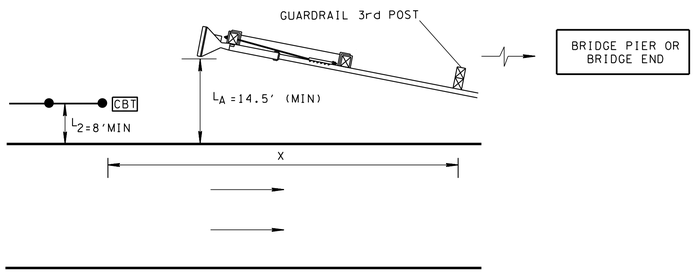
PLAN VIEW



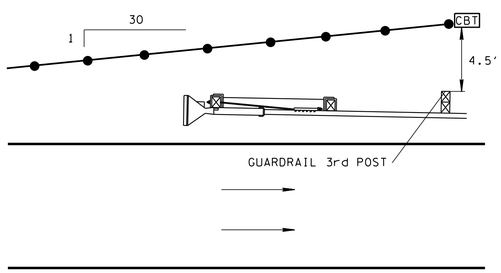


DETAIL A
CABLE BARRIER MEDIAN SIDE TRANSITION

$$X\ (FT) = \frac{L_A - L_2}{(L_A/360)}$$



DETAIL B-1
CABLE TERMINAL AT OVERPASS/UNDERPASS APPROACH

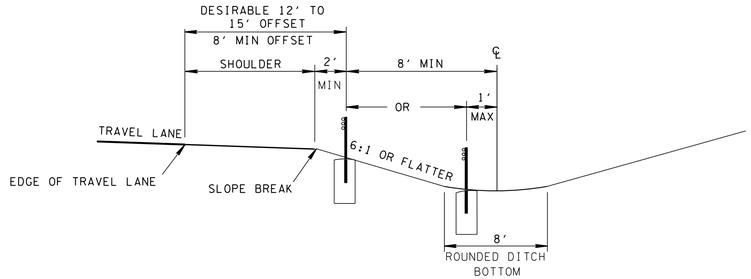


DETAIL B-2
CABLE GUARDRAIL TERMINAL
AT TANGENTIAL GUARDRAIL TERMINAL

LEGEND

CABLE BARRIER

CBT CABLE BARRIER TERMINAL



TYPICAL PLACEMENT LOCATIONS FOR CABLE MEDIAN BARRIER
(MINIMUM WIDTH SHOWN Ⓑ)

MINIMUM CRASH TEST LEVEL	
SYSTEM	NCHRP OR MASH TEST LEVEL
CABLE BARRIER ≤ 6:1	TL-4
CABLE BARRIER > 6:1 TO ≤ 4:1	TL-3 *
CABLE BARRIER TERMINAL	TL-3

* TL-4 SYSTEMS ON STEEPER SLOPES THAN 6:1 PERFORM ONLY TO TL-3.

GENERAL NOTES

Ⓐ MEDIAN BARRIERS SHOULD BE CONSIDERED FOR DEPRESSED MEDIANS THAT ARE: LESS THAN 50 FEET WIDE, HAVE ADT GREATER THAN 20,000 VEH/DAY AT LOCATION WITH A HISTORY OF MEDIAN CROSSOVER CRASHES OR WHERE ENGINEERING JUDGEMENT DICTATES.

Ⓑ CABLE BARRIER SHALL ONLY BE USED ON MEDIANS WIDER THAN 32 FEET.

Ⓒ CABLE BARRIERS TERMINALS VARY IN LENGTH BY MANUFACTURER AND DO NOT PROVIDE REDIRECTIVE PROTECTION. THE FIRST POST OF CABLE BARRIER SHOWN ON PLANS REPRESENTS THE END OF THE TERMINAL SECTION AND THE BEGINNING OF FUNCTIONAL CABLE BARRIER.

Ⓓ CABLE BARRIERS SHOULD ONLY BE INSTALLED WITH FORESLOPES 6:1 OR FLATTER IF POSSIBLE, IF NOT POSSIBLE THE FORESLOPE SHALL NOT BE STEEPER THAN 4:1.

Ⓔ CABLE BARRIERS SHALL NOT BE INSTALLED BETWEEN 1 FEET AND 8 FEET FROM THE EDGE OF ROUNDED DITCH.

Ⓕ IF CABLE BARRIER IS INSTALLED ON SLOPES GREATER THAN 6:1 CABLE GUARD RAIL SHALL NOT BE PLACED MORE THAN 4 FEET FROM SLOPE BREAK.

Ⓖ MAXIMUM RUN LENGTH IS 5000 FT.

Ⓗ INSTALL CABLE BARRIERS TO MANUFACTURER'S SPECIFICATION.

Ⓘ CABLE BARRIER SHALL NOT BE USED TO SHIELD FIXED OBJECTS. CABLE BARRIER RUNS SHALL BE TERMINATED AND GUARDRAIL OR RIGID BARRIER SHALL BE INSTALLED TO SHIELD FIXED OBJECTS (SEE DETAIL "B").

Ⓙ CABLE BARRIER SHALL ONLY BE USED IF A MINIMUM OF 10 FEET OF CLEAR ZONE IS AVAILABLE BEHIND THE BARRIER TO ALLOW FOR DEFLECTION.

Ⓚ CABLE BARRIER SHALL BE PLACED ON THE INSIDE CURVE IF POSSIBLE.

Ⓛ IF CABLE BARRIER IS PLACED ON THE OUTSIDE CURVE, MINIMUM OFFSET FROM EDGE OF TRAVEL LANE SHALL BE 10 FEET AND POST SPACING SHALL BE ADJUSTED TO PREVENT DEFLECTION INTO THE TRAVELED WAY BY A BACKSIDE IMPACT. CONTACT CABLE BARRIER MANUFACTURER FOR DETAILS.

Ⓜ ONE DELINEATOR SHALL BE POSTED ON AT LEAST ONE OUT OF TWO POSTS IN SEQUENCE. DELINEATORS SHALL CONFORM TO THE MINIMUM SIZE, RETRO-REFLECTIVITY AND COLOR REQUIREMENTS OF SECTION 3F.02 AND 3F.03 OF THE MUTCD. DELINEATORS SHALL BE POSTED AS HIGH AS POSSIBLE ON THE POST. DELINEATOR COST TO BE INCLUDED IN THE COST OF CABLE BARRIER.

Ⓝ USE DETAIL A AT EMERGENCY MEDIAN CROSS OVER LOCATIONS.

Ⓞ ONLY HIGH TENSION CABLE BARRIER SYSTEMS ON THE QUALIFIED PRODUCTS LIST MAY BE USED.

Ⓟ PAY ITEMS FOR CABLE BARRIER WILL BE UNDER THE FOLLOWING ITEM NUMBERS:

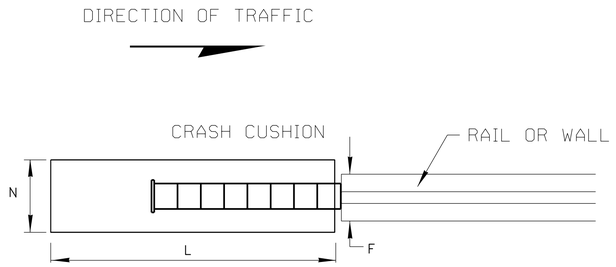
705-80.01	LONGITUDINAL CABLE BARRIER	PER LF
705-80.18	CABLE BARRIER TERMINAL	EACH

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

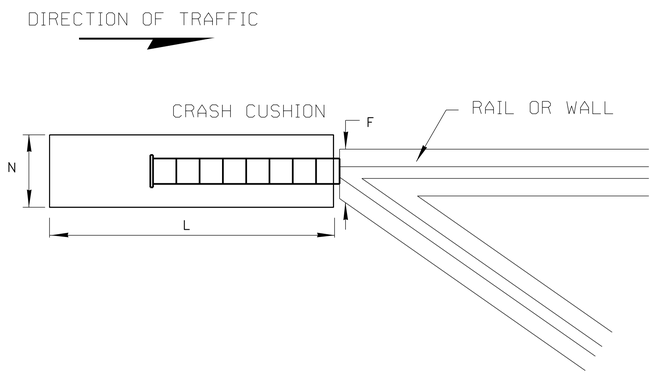
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CABLE BARRIER PLACEMENT

3-7-13 S-CB-1

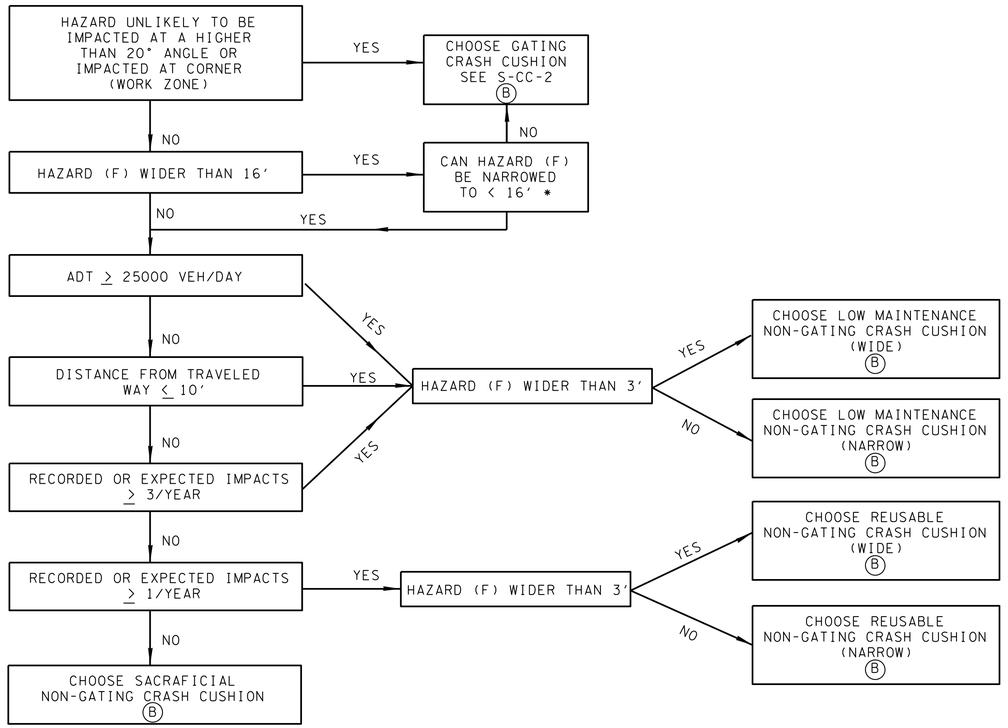


CRASH CUSHION AT THE END OF GUARDRAIL OR BARRIER WALL



CRASH CUSHION AT THE END OF DIVERGING GUARDRAILS OR BARRIER WALLS

CRASH CUSHION SELECTION



* REDUCTION TO 16' CAN BE DONE BY MODIFYING BARRIER OR TRANSITION SECTION

MINIMUM CRASH CUSHION RESERVE AREA (FT)

DESIGN SPEED MPH (MAIN LINE)	MINIMUM DIMENSIONS (1)				DESIRABLE DIMENSIONS	
	RESTRICTED (2) DIMENSIONS		UNRESTRICTED DIMENSIONS			
	N	L	N	L	N	L
30	6	8	8	11	12	17
50	6	17	8	25	12	33
70	6	28	8	45	12	55

(1) MINIMUM DIMENSIONS SHOULD ONLY BE USED AT LOCATIONS WHERE IT IS INFEASIBLE TO PROVIDE THE DESIRABLE AREA. IN CASES WHEN MORE THAN THE MINIMUM AREA CAN BE PROVIDED, AS MUCH SPACE AS POSSIBLE SHOULD BE PROVIDED.

(2) RESTRICTED MINIMUM DIMENSIONS TO ONLY BE USED IF THE MINIMUM UNRESTRICTED DIMENSIONS ARE UNATTAINABLE.

(3) F IS THE FIXED WIDTH OF HAZARD TO BE PROTECTED.

LEGEND: CRASH CUSHION

ATTENUATOR CLASSES DESCRIPTION

SACRIFICIAL: DEVICES DESIGNED FOR A SINGLE IMPACT SHOULD ONLY BE USED IF FREQUENT ATTENUATOR IMPACTS ARE NOT EXPECTED AT THE LOCATION.

REUSABLE: DEVICES FREQUENT DESIGNED THAT CAN BE REPAIRED BY SALVAGING MOST MAJOR COMPONENTS.

LOW-MAINTENANCE: DEVICES DESIGNED TO BE EASILY RESET AFTER IMPACT WITH MINIMAL REPAIR, USE IN AREAS WITH FREQUENT IMPACTS.

GENERAL NOTES

(A) CRASH CUSHIONS SHOULD ONLY BE USED IF LIMITED SPACE (SUCH AS A GORE AREA) PRECLUDES THE USE OF GUARDRAIL END TERMINALS OR AT OTHER LOCATIONS WHERE GUARDRAIL END TERMINAL WILL NOT FUNCTION.

(B) SYSTEMS APPEARING ON THE QUALIFIED PRODUCT LIST 34 SECTION C ONLY MAY BE USED FOR THE SPECIFIED CATEGORY DETERMINED.

(C) THE NOSE OR FIRST BARREL OF THE CRASH CUSHION SHALL BE MARKED WITH OBJECT MARKER STRIPING TYPE 3 INCLUDED IN THE COST OF THE SYSTEM.

(D) SYSTEMS SHALL BE INSTALLED ON HARD, SMOOTH SURFACES WITH SLOPES LESS THAN 5% AND VARIATION OF CROSS SLOPE LESS THAN 2% CHANGE FOR THE LENGTH OF RESERVE AREA.

(E) ONLY TL-3 CRASH CUSHION SHALL BE USED ON TDOT PROJECTS.

(F) CURBS SHALL NOT BE INSTALLED IN AREAS NEAR CRASH CUSHIONS, EXISTING CURBS TO BE REMOVED UNLESS OTHERWISE SPECIFIED.

(G) IF A CRASH CUSHION WOULD COMPROMISE SIGHT DISTANCE A SYSTEM WITH REDUCED HEIGHT MAY BE SPECIFIED.

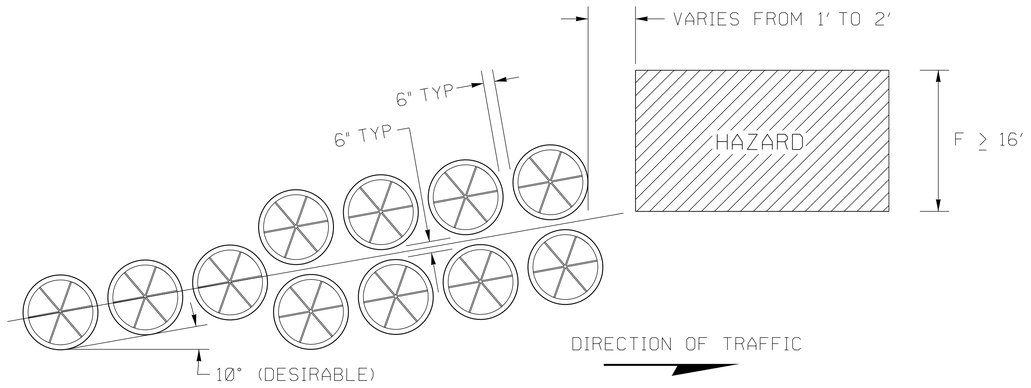
(H) NON-GATING CRASH CUSHIONS (ATTENUATORS) SHALL BE PAID FOR:

PERMANENT		
705-17.94	ATTENUATOR (SACRIFICIAL)	EACH
705-17.95	ATTENUATOR (NARROW-REUSABLE)	EACH
705-17.96	ATTENUATOR (WIDE-REUSABLE)	EACH
705-17.97	ATTENUATOR (NARROW-LOW MAINTENANCE)	EACH
705-17.98	ATTENUATOR (WIDE-LOW MAINTENANCE)	EACH
WORK ZONES		
705-08.51	PORTABLE IMPACT ATTENUATOR	EACH

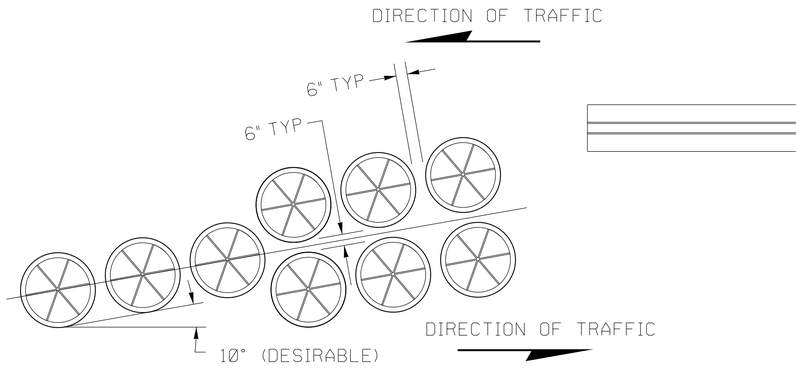
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CRASH CUSHION

2-13-13 | S-CC-1

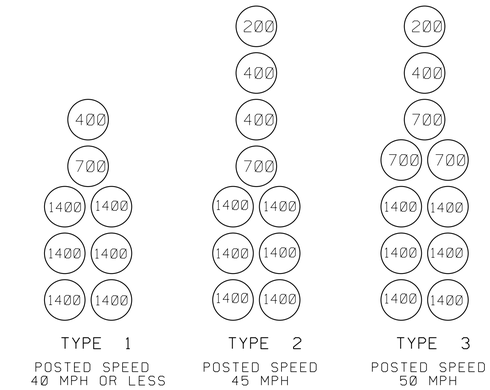


ROADSIDE INSTALLATION DETAIL

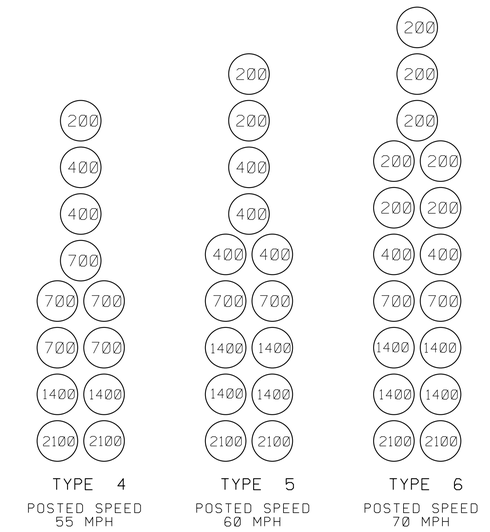


(WORK ZONE ONLY)
MEDIAN INSTALLATION DETAIL

ISOMETRIC



PLAN VIEW



PLAN VIEW

TYPICAL CRASH CUSHION CONFIGURATIONS
(NUMBERS INSIDE BARRELS INDICATE LBS. OF SAND REQUIRED)

PAY ITEMS (PER EACH)	
705-17.84	200 LB (PLASTIC DRUM W/SAND) EACH
705-17.85	400 LB (PLASTIC DRUM W/SAND) EACH
705-17.86	700 LB (PLASTIC DRUM W/SAND) EACH
705-17.87	1400 LB (PLASTIC DRUM W/SAND) EACH
705-17.88	2100 LB (PLASTIC DRUM W/SAND) EACH

GENERAL NOTES

(A) BARREL ARRAYS ARE GATING MEANING A SIDE IMPACT IS NEITHER STOPPED OR REDIRECTED AND IS ONLY MEANT TO SHIELD HEAD ON IMPACTS, BARREL ARRAYS SHALL ONLY BE USED IF AREA ADJACENT TO THE ARRAY IS FREE OF HAZARDS.

(B) A PERMANENT BARREL ARRAY SHALL BE INSTALLED ONLY FOR HAZARDS WIDER THAN 16' THAT CANNOT BE NARROWED. BARREL ARRAYS MAY BE USED FOR TEMPORARY TRAFFIC CONTROL.

(C) THE FIRST BARREL SHALL BE MARKED WITH A TYPE 3 OBJECT MARKER TO BE INCLUDED IN THE COST OF THE BARREL.

(D) SYSTEMS SHALL BE INSTALLED ON HARD, SMOOTH SURFACES WITH SLOPES LESS THAN 5% AND VARIATION OF CROSS SLOPE LESS THAN 2% CHANGE FOR THE LENGTH OF RESERVE AREA. THE COST OF PREPARING GROUND SHALL BE INCLUDED IN THE COST OF ROADWAY GRADING (203-01).

(E) PRIOR TO INSTALLATION THE CONTRACTOR SHALL MARK THE LOCATION AND WEIGHT OF EACH BARREL TO ASSIST IN FUTURE MAINTENANCE OR RECONSTRUCTION.

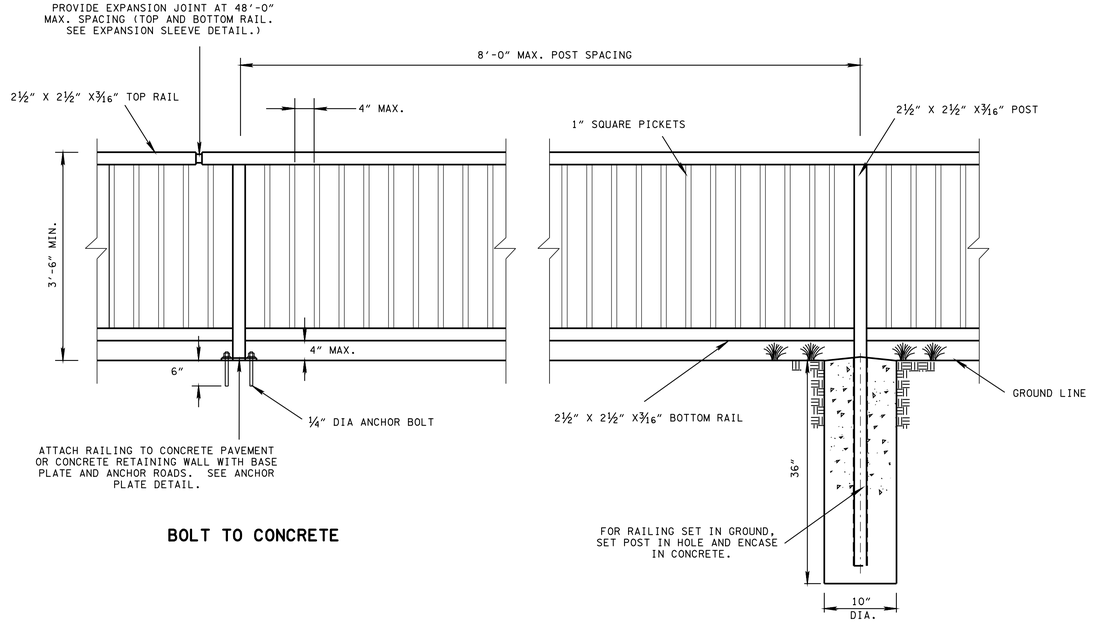
(F) CURBS SHALL NOT BE INSTALLED IN THE AREA OF THE BARREL ARRAY.

(G) MINIMUM WIDTH SHOWN SYSTEM TO BE WIDENED AS NECESSARY BY ADDING ADDITIONAL CONFIGURATIONS SIDE BY SIDE.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

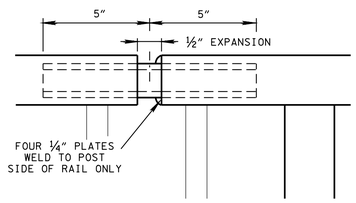
CRASH CUSHION (GATING) BARREL ARRAY

2-6-13 | S-CC-2

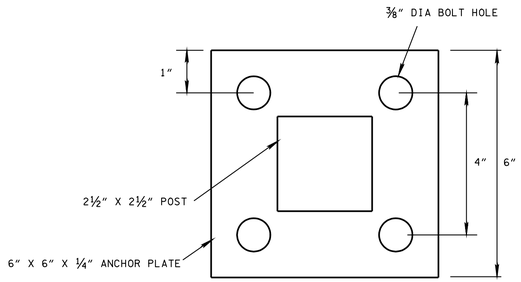


BOLT TO CONCRETE

POST SET IN GROUND

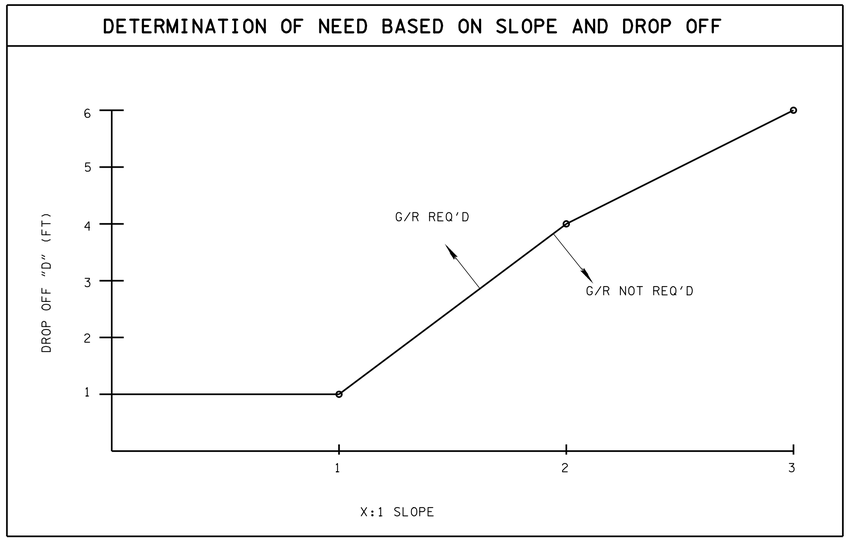


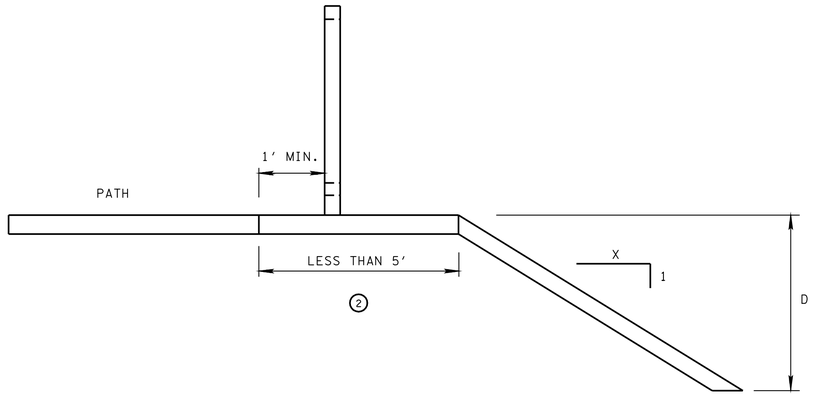
EXPANSION SLEEVE DETAIL ⑤

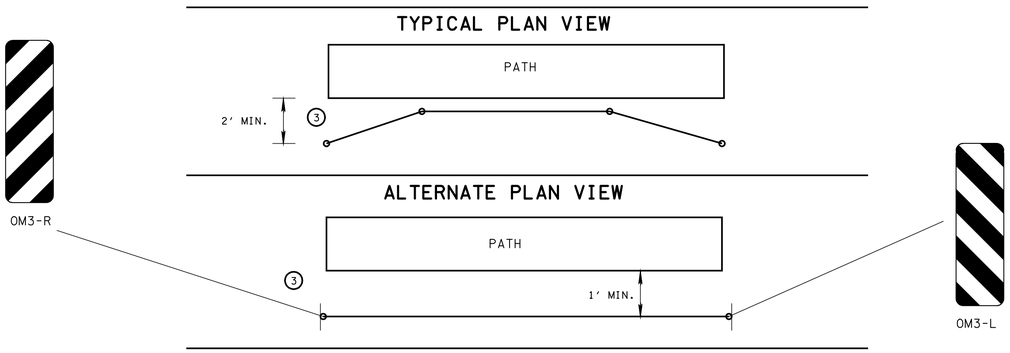


ANCHOR PLATE DETAIL

FIGURE A







GENERAL NOTES

① SAFETY RAIL SHALL BEGIN 25' BEFORE AND EXTEND 25' BEYOND AREA OF NEED.

② IF THE SHOULDER WITH A MAXIMUM CROSS SLOPE OF 6:1, IS 5' OR WIDER SAFETY RAIL IS NOT REQUIRED, BUT MAY BE INSTALLED BASED ON ENGINEERING JUDGEMENT.

③ SAFETY RAIL ENDS SHALL BE FLARED TO BEYOND 2' OF THE EDGE OF THE PATH OR MARKED WITH OBJECT MARKERS.

④ STEEL SHALL CONFORM TO ASTM A36 WELD ALL COMPONENTS¼" FILLET WELDS. GRIND WELDS AND CONNECTIONS AS REQUIRED TO PROVIDE A SMOOTH SURFACE, FREE OF BURRS.

FIELD PAINT SAFETY RAIL AFTER INSTALLATION AS SPECIFIED IN THE CONTRACT DOCUMENTS.

⑤ DETAIL SHOWN IS FOR TOP RAIL. EXPANSION JOINT FOR BOTTOM RAIL IS SIMILAR.

⑥ SYSTEM REPLACEMENTS MAY BE ALLOWED PROVIDING THAT THE HEIGHT AND SPACING LIMITATIONS SHOWN ON THIS DRAWING ARE MET.

⑦ SAFETY RAIL (INCLUDING FOOTINGS OR ANCHOR PLATE AND BOLTS) TO BE PAID FOR UNDER ITEM NO. 604-01.04 PER LINER FOOT.

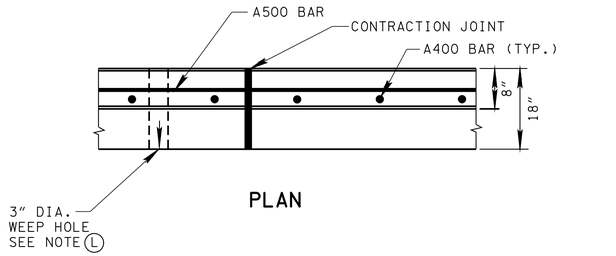
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

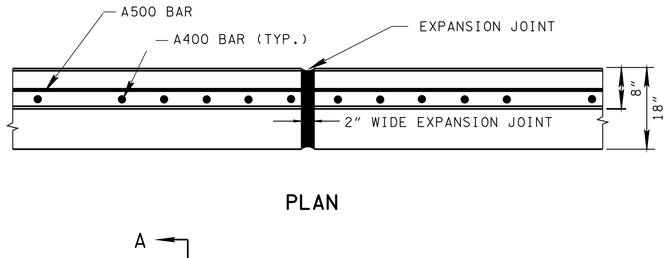
BIKE/PEDESTRIAN SAFETY RAIL

8-23-12

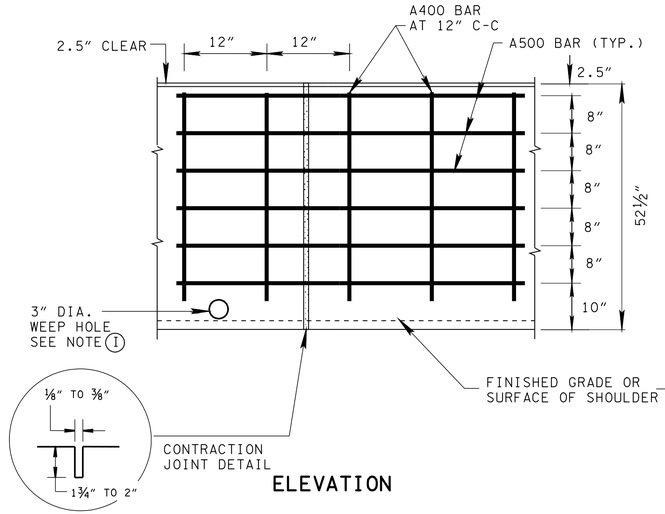
S-GR-48



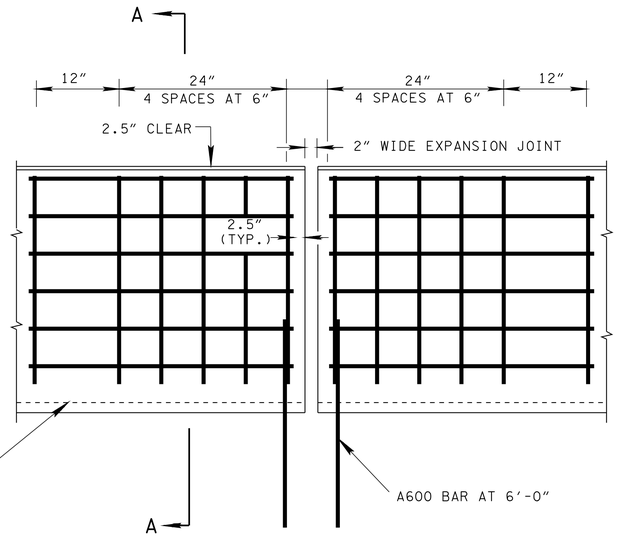
PLAN



PLAN



ELEVATION



ELEVATION

NOTE: ALL A400, A500, AND A600 REINFORCING STEEL BARS ARE TO BE EPOXY COATED MEETING ALL REQUIREMENTS OF ASTM D3963.

REV. 7-30-10: REVISED REINFORCING STEEL DETAILS AND GENERAL NOTES.

REV. 1-15-13: REVISED SECTION A-A, ADDED WALL AT PRECAST NOISE WALL DETAIL.

REINFORCING STEEL LEGEND

47.5"	A400
VARIABLE	A500
48"	A600

GENERAL NOTES

(A) HALF SIZE SINGLE SLOPE CONCRETE BARRIER WALL IS TO BE USED IN CONJUNCTION WITH NOISE BARRIER OR RETAINING WALL INSIDE THE CLEAR ZONE AS SHOWN ON THIS DRAWING.

(B) CONCRETE BARRIER WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 711 AND/OR CURRENT SPECIAL PROVISIONS.

(C) CONCRETE: F_c = 3,000 POUNDS PER SQUARE INCH AT 28 DAYS
REINFORCING STEEL: ASTM A615, F_y = 60,000 POUNDS PER SQUARE INCH
ALL REINFORCING IS TO BE INSTALLED AS DETAILED ON THIS DRAWING.

(D) THE CONCRETE BARRIER WALL SHALL BE GIVEN AN APPLIED TEXTURE FINISH. THE COLOR OF THE FINISH SHALL BE WHITE, FEDERAL SPECIFICATION NO. 37886. THE COST OF MATERIALS AND LABOR FOR THE TEXTURE FINISH SHALL BE INCLUDED IN THE BID PRICE FOR CONCRETE MEDIAN BARRIER.

(E) THE TWO (2) INCH OPEN EXPANSION JOINTS SHALL BE PLACED IN THE PROPOSED SINGLE SLOPE BARRIER WALL AT A MAXIMUM SPACING NOT TO EXCEED 300 FEET. IF FIXED OBJECTS SUCH AS BRIDGE PIERS, BRIDGE ENDS, OVERHEAD SIGN SUPPORTS, OR OTHER FEATURES PROJECTING THROUGH, INTO OR AGAINST THE BARRIER EXIST THAT REQUIRE TWO INCH EXPANSION JOINTS, THEN THE DISTANCE BETWEEN THE EXPANSION JOINTS IS TO BE REDUCED IN ORDER TO ALLOW AN EQUAL DISTANCE BETWEEN JOINTS THAT IS LESS THAN 300 FEET. ALL ADDITIONAL STEEL REQUIRED AT EXPANSION JOINTS TO BE EPOXY COATED REINFORCING STEEL. THE COST OF MATERIAL AND LABOR FOR THE JOINT INSTALLATION INCLUDING SAWING EXPANSION JOINTS SHALL BE INCLUDED IN THE BID PRICE FOR CONCRETE MEDIAN BARRIER.

THE CONTRACTION JOINTS ARE TO BE SPACED AT 20 TO 25 FOOT INTERVALS WHEN CONSTRUCTED ON ASPHALT PAVEMENT. WHEN THE CONCRETE BARRIER WALL IS ATTACHED TO CONCRETE PAVEMENT THE CONTRACTION JOINTS WILL RESPOND TO THE JOINTS IN THE CONCRETE PAVEMENT. THE COST OF MATERIAL AND LABOR FOR THE JOINT INSTALLATION SHALL BE INCLUDED IN THE BID PRICE FOR CONCRETE MEDIAN BARRIER.
IF SAWED CONTRACTION JOINTS ARE USED, THE JOINTS MUST BE SAWED WITHIN FOUR (4) HOURS AFTER THE CONCRETE IS PLACED.

(F) THE COST OF FURNISHING AND INSTALLING BARRIER WALL DELINEATORS, INCLUDING ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION, SHALL BE INCLUDED IN PRICE BID FOR CONCRETE BARRIER WALL. SEE STANDARD DRAWING S-MB-1 FOR LOCATION. BARRIER WALL DELINEATOR WILL NOT BE REQUIRED IN AREAS WHERE ROADWAY IS LIGHTED.

(G) CHAMFER ALONG TOP EDGES ¾".

(H) FOR CONCRETE PAVEMENT:
ANY METHOD DEVISED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL ROADWAY REINFORCING STEEL WILL BE FIXED AGAINST MOVEMENT AND POSITIONED ± 0.5" AS DIMENSIONED WHEN TIED TO THE TRANSVERSE ROADWAY REINFORCING STEEL WILL BE SATISFACTORY.

(I) 3" DIAMETER WEEP HOLES AT 10'-0" CENTER-TO-CENTER MAXIMUM ARE TO BE PLACED AT LOWEST POINT PRACTICAL FOR PROPER DRAINAGE WITH MIN. 4% SLOPE. WEEP HOLES SHOULD ALIGN WITH THE RETAINING WALL WEEP HOLES IF EXIST. CONSTRUCTION OF WEEP HOLES ARE TO BE PAID FOR UNDER THE PRICE BID FOR OTHER ITEMS OF CONSTRUCTION.

(J) FIBER EXPANSION JOINT FILLER MATERIAL TO BE 0.5" OR 1.0" PREMOLDED FIBER IN ACCORDANCE WITH SECTION 905 OF STANDARD SPECIFICATIONS.

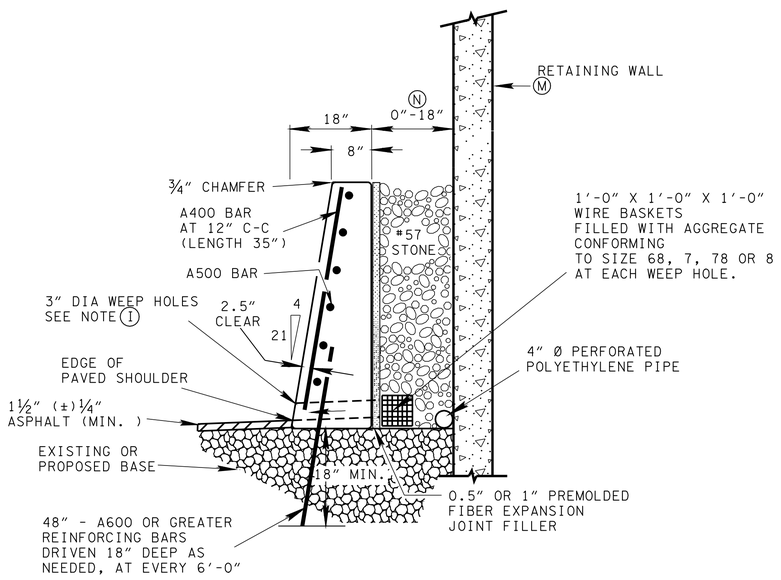
(K) PAYMENT WILL BE MADE UNDER ITEM NO. 711-05.72 SINGLE SLOPE HALF CONCRETE BARRIER WALL PER LINEAR FOOT.

(L) MIN. SAFETY PERFORMANCE OF 52½" SINGLE SLOPE WALL IS ACCEPTABLE ACCORDING TO THE TL-3 EVALUATION CRITERIA SPECIFIED IN NCHRP REPORT 350. SEE TTI STUDY TPF-5(114).

(M) DO NOT USE HALF SIZE WALL WITH PRECAST SECTIONAL NOISE WALL SEE S-SSMB-2.

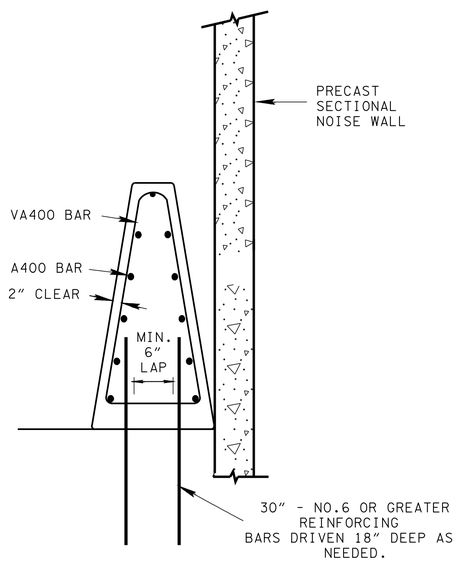
(N) FOR MSE RETAINING WALL OFFSET MAY BE 0" FOR CONCRETE RETAINING WALL OFFSET SHALL BE 18".

DETAILS OF REINFORCING AT CONTRACTION JOINT FOR CONCRETE BARRIER



REINFORCING STEEL AT SECTION A-A
(AT RETAINING WALL)

DETAILS OF REINFORCING AT WALL ENDS OR EXPANSION JOINT FOR CONCRETE BARRIER

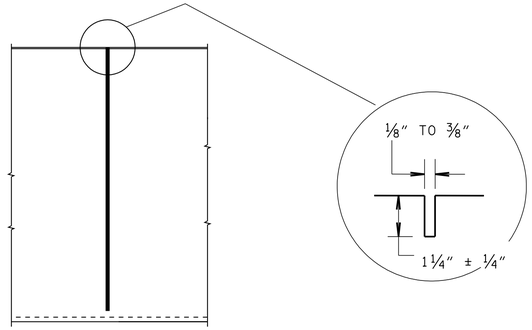


TYPICAL TREATMENT
FOR BARRIER WALL AT PRECAST
SECTIONAL NOISE WALL (M)

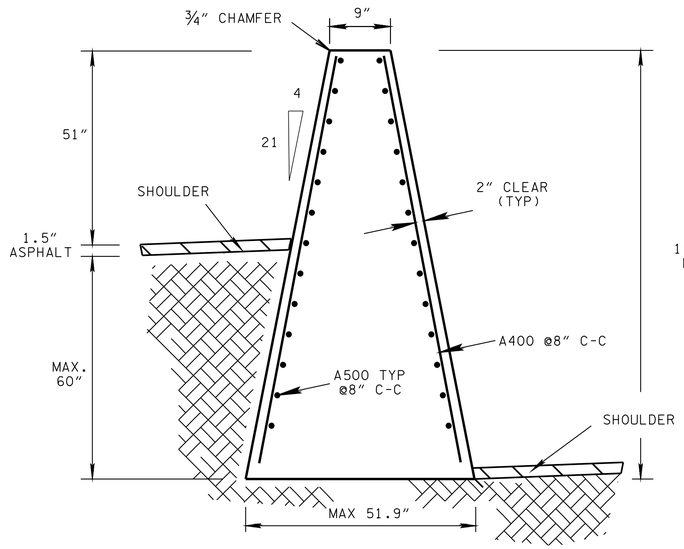
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

51" HALF SIZE SINGLE SLOPE CONCRETE BARRIER WALL

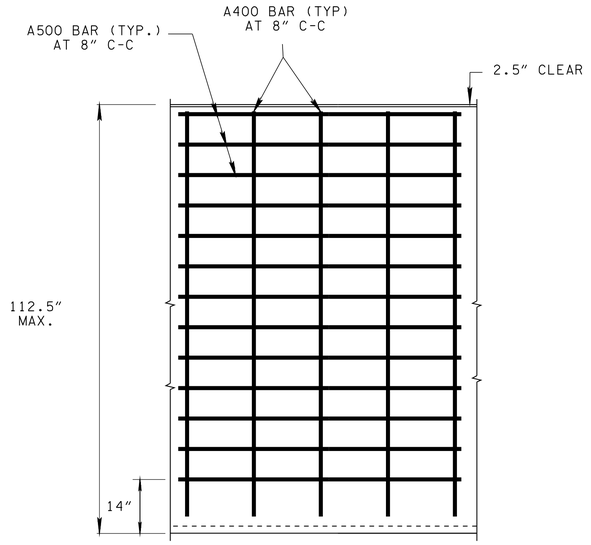
10-15-09 | S-SSMB-3



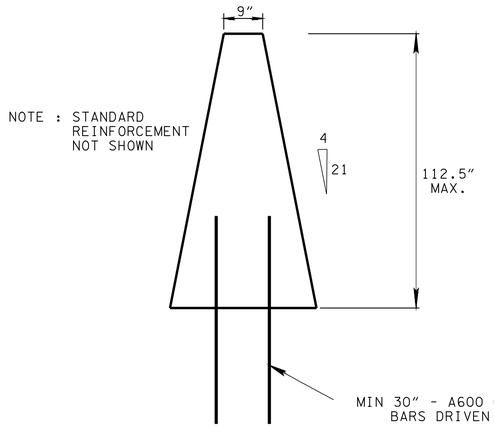
CONTRACTION JOINT DETAIL



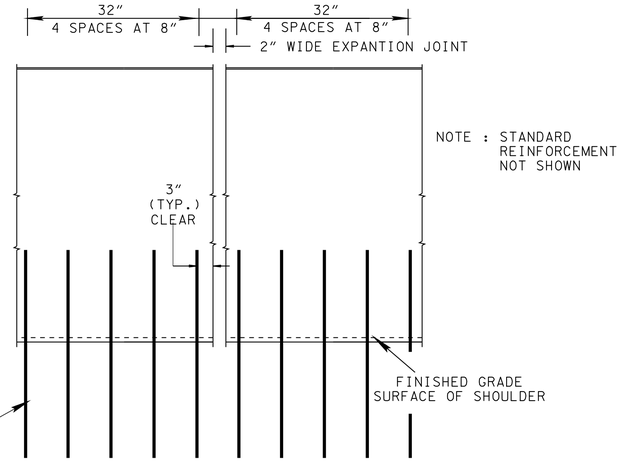
SECTION VIEW



ELEVATION VIEW

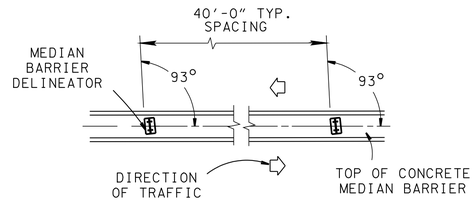


SECTION VIEW



ELEVATION VIEW

DETAILS OF ADDITIONAL REINFORCING AT THE WALL ENDS OR AT EXPANTION JOINT



MOUNTING DETAIL

DELINEATOR NOTES

1. MEDIAN BARRIER DELINEATOR REFLECTIVE SHEETING SHALL MEET ASTM D4956, TYPE V SPECIFICATIONS. DELINEATORS WITH DIMENSIONS OTHER THAN 4" X 3" MAY BE USED IF THE PRODUCT IS ON THE APPROVED PRODUCTS LIST. THE VARIATIONS IN DELINEATOR DIMENSION SHOULD NOT EXCEED ± 10%. DIFFERENT SIZE OR MANUFACTUREED MEDIAN BARRIER DELINEATORS SHOULD NOT BE MIXED IN THE SAME LINE.
2. MEDIAN BARRIER DELINEATORS SHALL BE HIGH IMPACT, UV-STABILIZED, ENGINEERED THERMOPLASTIC OR POLYCARBONATE SUBSTRATE. SEE TDOT APPROVED QUALIFIED PRODUCT LISTS FOR ACCEPTABLE PRODUCTS.
3. MEDIAN BARRIER DELINEATORS WILL NOT BE REQUIRED IN AREAS WHERE ROADWAY IS LIGHTED.
4. SINGLE WHITE REFLECTIVE SHEETING WILL BE SUBSTITUTED FOR THE DOUBLE YELLOW REFLECTIVE SHEETING WHEN TRAFFIC ON EACH SIDE OF THE BARRIER IS GOING IN THE SAME DIRECTION.
5. THE COST OF FURNISHING AND INSTALLING MEDIAN BARRIER DELINEATORS, INCLUDING ALL MATERIALS, LABOR, AND INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION, SHALL BE INCLUDED IN BID PRICE FOR CONCRETE MEDIAN BARRIER.
6. MEDIAN BARRIER DELINEATORS SHALL BE MOUNTED TO THE CONCRETE MEDIAN BARRIER WITH A ONE COMPONENT ADHESIVE AS RECOMMENDED BY THE MANUFACTURER. THEY SHALL BE INSTALLED NO EARLIER THAN THREE WEEKS AFTER THE TEXTURE COATING HAS BEEN APPLIED.

GENERAL NOTES

A. CONCRETE BARRIER WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 711 AND/OR CURRENT SPECIAL PROVISIONS. MIN WALL SECTION IS 33' FOR 112'-5" WALL HEIGHT AND 60' FOR 51' WALL HEIGHT.

B. IF SAWED CONTRACTION JOINTS ARE USED, THE JOINTS MUST BE SAWED WITHIN FOUR (4) HOURS AFTER THE CONCRETE IS PLACED.

C. THE CONTRACTION JOINTS ARE TO BE SPACED AT 20 TO 25 FOOT INTERVALS WHEN CONSTRUCTED ON ASPHALT PAVEMENT. WHEN THE CONCRETE BARRIER WALL IS ATTACHED TO CONCRETE PAVEMENT THE CONTRACTION JOINTS WILL CORRESPOND TO THE JOINTS IN THE CONCRETE PAVEMENT. THE COST OF MATERIAL AND LABOR FOR THE JOINT INSTALLATION SHALL BE INCLUDED IN THE BID PRICE FOR CONCRETE MEDIAN BARRIER.

D. THE CONCRETE BARRIER WALL SHALL BE GIVEN AN APPLIED TEXTURE FINISH. THE COLOR OF THE FINISH SHALL BE WHITE, FEDERAL SPECIFICATION NO. 37886. THE COST OF MATERIALS AND LABOR FOR THE TEXTURE FINISH SHALL BE INCLUDED IN THE BID PRICE FOR CONCRETE MEDIAN BARRIER.

E. THE TWO (2) INCH OPEN EXPANSION JOINTS SHALL BE PLACED AT A MAXIMUM SPACING NOT TO EXCEED 300 FEET. IF FIXED OBJECTS SUCH AS BRIDGE PIERS, BRIDGE ENDS, OVERHEAD SIGN SUPPORTS, OR OTHER FEATURES PROJECTING THROUGH, INTO OR AGAINST THE BARRIER EXIST THAT REQUIRE TWO INCH EXPANSION JOINTS, THEN THE DISTANCE BETWEEN THE EXPANSION JOINTS IS TO BE REDUCED IN ORDER TO ALLOW AN EQUAL DISTANCE BETWEEN JOINTS THAT IS LESS THAN 300 FEET. ALL ADDITIONAL STEEL REQUIRED AT EXPANSION JOINTS TO BE EPOXY COATED REINFORCING STEEL. THE COST OF MATERIAL AND LABOR FOR THE JOINT INSTALLATION SHALL BE INCLUDED IN THE BID PRICE FOR CONCRETE MEDIAN BARRIER.

F. CHAMFER TOP AND END EDGES 3/4 INCH.

G. BAR SPLICES FOR ROADWAY BARRIER SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.

H. ANY METHOD DEVISED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL ROADWAY REINFORCING STEEL WILL BE FIXED AGAINST MOVEMENT AND POSITIONED ± 1/2 INCH AS DIMENSIONED WHEN TIED TO THE TRANSVERSE ROADWAY REINFORCING STEEL WILL BE SATISFACTORY.

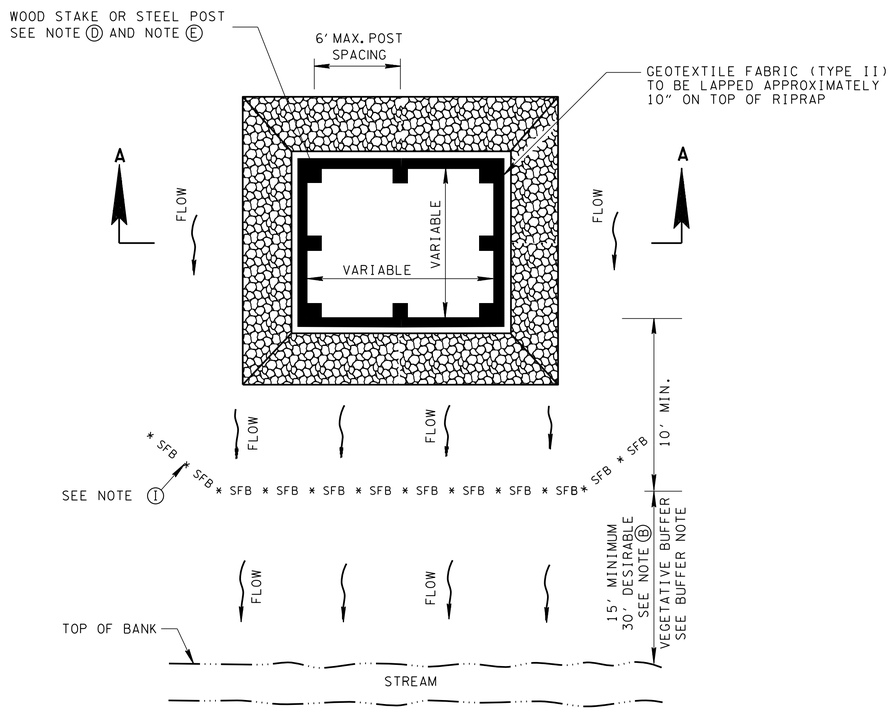
I. PAYMENT WILL BE MADE UNDER ITEM NO. 711-05.70, SINGLE SLOPE CONCRETE MEDIAN BARRIER WALL PER LINEAR FOOT.

J. MIN. SAFETY PERFORMANCE OF 112.5" SINGLE SLOPE WALL IS ACCEPTABLE ACCORDING TO THE TL-4 EVALUATION CRITERIA SPECIFIED IN MASH AS EVALUATED BY TTI REPORT 405160-3335.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SINGLE SLOPE BARRIER WALL FOR GRADE SEPARATED MEDIAN

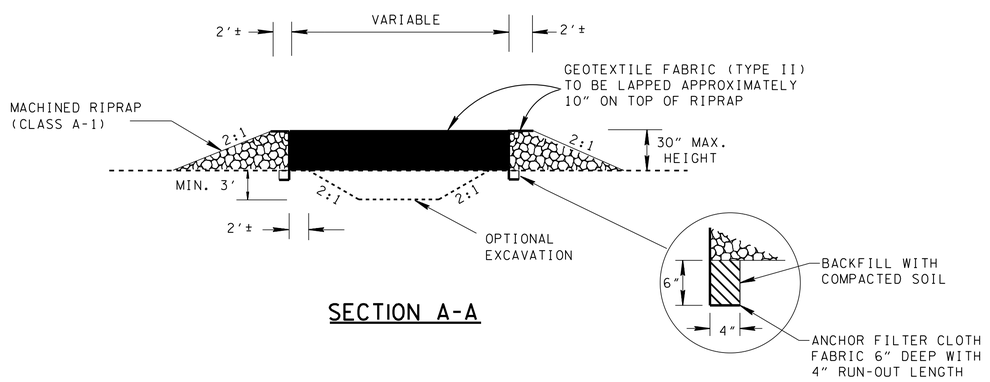
2-4-13 | S-SSMB-9



PLAN VIEW

BUFFER NOTE:

ATTEMPTS SHOULD BE MADE TO PROVIDE THE DESIRABLE WIDTH AT ALL SITES. THE AVERAGE WIDTH OF THE BUFFER STRIP MAY BE USED WHEN CALCULATING THE DESIRABLE WIDTH.



SECTION A-A

TRENCHING DETAIL

EROSION CONTROL PLAN LEGEND: DEWATERING STRUCTURE

DEWATERING STRUCTURE VOLUMES AND DIMENSIONS				
PUMP DIAMETER (INCHES)	PUMP RATE (GALLONS PER MINUTE)	STORAGE VOLUME REQ'D (CUBIC YARDS)	INTERIOR DIMENSIONS	EXTERIOR DIMENSIONS
2	140	84	30' X 30'	44' X 44'
3	260	155	41' X 41'	55' X 55'
4	500	298	57' X 57'	71' X 71'
6	1,100	654	85' X 85'	99' X 99'

(1) DIMENSIONS BASED ON THE MAXIMUM STRUCTURE HEIGHT OF 30" AND THE LENGTH BEING EQUAL TO THE WIDTH. OPTIONAL EXCAVATION IS NOT INCLUDED.

(2) ADJUSTMENTS SHOULD BE MADE TO THE DIMESIONS TO OBTAIN THE BEST CONFIGURATION FOR THE PROJECT SITE. DIMENSIONS ARE BASED ON THE DEWATERING STRUCTURE BEING HORIZONTAL.

DEWATERING STRUCTURE GENERAL NOTES

(A) DEWATERING STRUCTURES MAY BE USED WHENEVER SEDIMENT LADEN WATER IS REMOVED BY MEANS OF PUMPING. THEY SHOULD BE USED IN CONJUNCTION WITH THE DEWATERING OF COFFERDAMS, TRENCHES, ENCLOSED DITCHES, AND OTHER CONSTRUCTION ACTIVITIES WHICH REQUIRE THE REMOVAL OF SEDIMENT LADEN WATER.

(B) DEWATERING STRUCTURES SHOULD NOT BE PLACED WITHIN A JURISDICTIONAL WETLAND OR WITHIN 15 FEET (30 FEET DESIRABLE) OF A STABILIZED OUTLET, STREAM, OR OTHER NATURAL WATER RESOURCE. WHEN DISCHARGING TO SEDIMENT-IMPAIRED STREAMS OR EXCEPTIONAL TENNESSEE WATERS, THE BUFFER SHALL BE A MINIMUM OF 30 FEET WITH A DESIRABLE WIDTH OF 60 FEET. BUFFER REQUIREMENT DOES NOT APPLY TO ANY LOCATION ON SITE WITH A VALID ARAP OR EQUIVALENT PERMIT BY FEDERAL AGENCIES.

(C) THE MINIMUM STORAGE VOLUME REQUIRED FOR A DEWATERING STRUCTURE SHOULD BE BASED ON 2 HOURS OF PUMPING AT THE RATE SHOWN IN THE "DEWATERING STRUCTURE VOLUMES AND DIMENSIONS" TABLE. THE MINIMUM STORAGE VOLUME REQUIRED IN CUBIC FEET IS OBTAINED BY MULTIPLYING THE PUMPING RATE IN GALLONS PER MINUTE BY 16.

(D) POST SHALL BE PLACED ALONG THE INTERIOR PERIMETER OF THE DEWATERING STRUCTURE. ONE POST SHOULD BE PLACED IN EACH CORNER AND POSTS SHOULD BE PLACED ALONG THE SIDES AT A MAXIMUM SPACING OF 6 FEET. POST SHOULD BE EMBEDDED A MINIMUM OF 30 INCHES INTO THE EXISTING GROUND AND SHOULD EXTEND AT A MINIMUM THE HEIGHT OF THE DEWATERING STRUCTURE.

(E) THE POST SHOULD BE A MINIMUM 2.25" (NOMINAL) X 2.25" (NOMINAL) HARDWOOD POST (OAK OR HICKORY) OR MINIMUM 1.25 LB./FT. STEEL POST (STD. "T" OR "U" SECTION).

(F) DIVERT ANY STORMWATER RUNOFF AWAY FROM THE DEWATERING STRUCTURE.

(G) SEDIMENT FILTER BAGS MAY BE USED TO COLLECT SEDIMENT WHEN PUMPING FROM A DEWATERING STRUCTURE INTO AN ADJACENT STREAM WHEN APPROVED BY THE ENGINEER. SEE STANDARD DRAWING EC-STR-2.

(H) ONLY GEOTEXTILE FABRIC (TYPE II) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(I) INSTALL SILT FENCE WITH WIRE BACKING BETWEEN STREAM AND/OR DRAINAGE DITCH AND THE DEWATERING STRUCTURE. SEE STANDARD DRAWINGS EC-STR-3C AND EC-STR-3E FOR INSTALLATION DETAILS.

(J) THE EXISTING VEGETATIVE BUFFER SHOULD REMAIN BETWEEN SILT FENCE WITH WIRE BACKING AND STABILIZED OUTLET, STREAM OR OTHER NATURAL RESOURCE. BUFFER ZONE EXEMPTIONS ARE DEFINED BASED ON EXISTING LAND USES.

(K) THE VOLUME OF DEWATERING STRUCTURE SHOWN IN THE EROSION PREVENTION AND SEDIMENT CONTROL PLANS IS TO BE BASED ON USE OF THE 4 INCH PUMP SHOWN IN THE "DEWATERING STRUCTURE VOLUMES AND DIMENSIONS" TABLE.

(L) DEWATERING STRUCTURES SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

203-01	ROAD & DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD
209-10.01	TEMPORARY DEWATERING STRUCTURE PER CUBIC YARD

SILT FENCE WITH WIRE BACKING SHALL BE PAID FOR ACCORDING TO ITS RESPECTIVE STANDARD DRAWING.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE DEWATERING STRUCTURE.

(M) THE ACCUMULATED SEDIMENT MUST BE REMOVED WHEN THE STRUCTURE IS HALF FULL AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-1 TO EC-STR-1.

- REV. 10-26-00: IN TEMPORARY EROSION AND SEDIMENT CONTROL PAY ITEMS BLOCK CHANGED PAY ITEM NUMBERS AND DESCRIPTIONS TO CONCUR WITH CHANGES MADE BY CONSTRUCTION DIVISION.
- REV. 5-27-01: REVISED PAY ITEMS AND GENERAL NOTES TO COMPLY WITH NEW PAY ITEM SYSTEM GOING IN EFFECT OCTOBER 26, 2001.
- REV. 12-18-02: ADDED PAY ITEM NOS. 209-08.02 AND 209-08.04. CHANGED SHEET NAME.
- REV. 1-22-03: CHANGED GENERAL NOTE (H).
- REV. 4-1-08: REMOVED TEMPORARY REFERENCE, REMOVED PAY ITEMS TABLE, REPLACED GENERAL NOTES AND DEWATERING STRUCTURE VOLUMES TABLE, AND OTHER MINOR DRAFTING EDITS.
- REV. 8-1-12: MODIFIED BUFFER DIMENSION, ADDED BUFFER NOTES, MINOR EDITS TO GENERAL NOTES.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

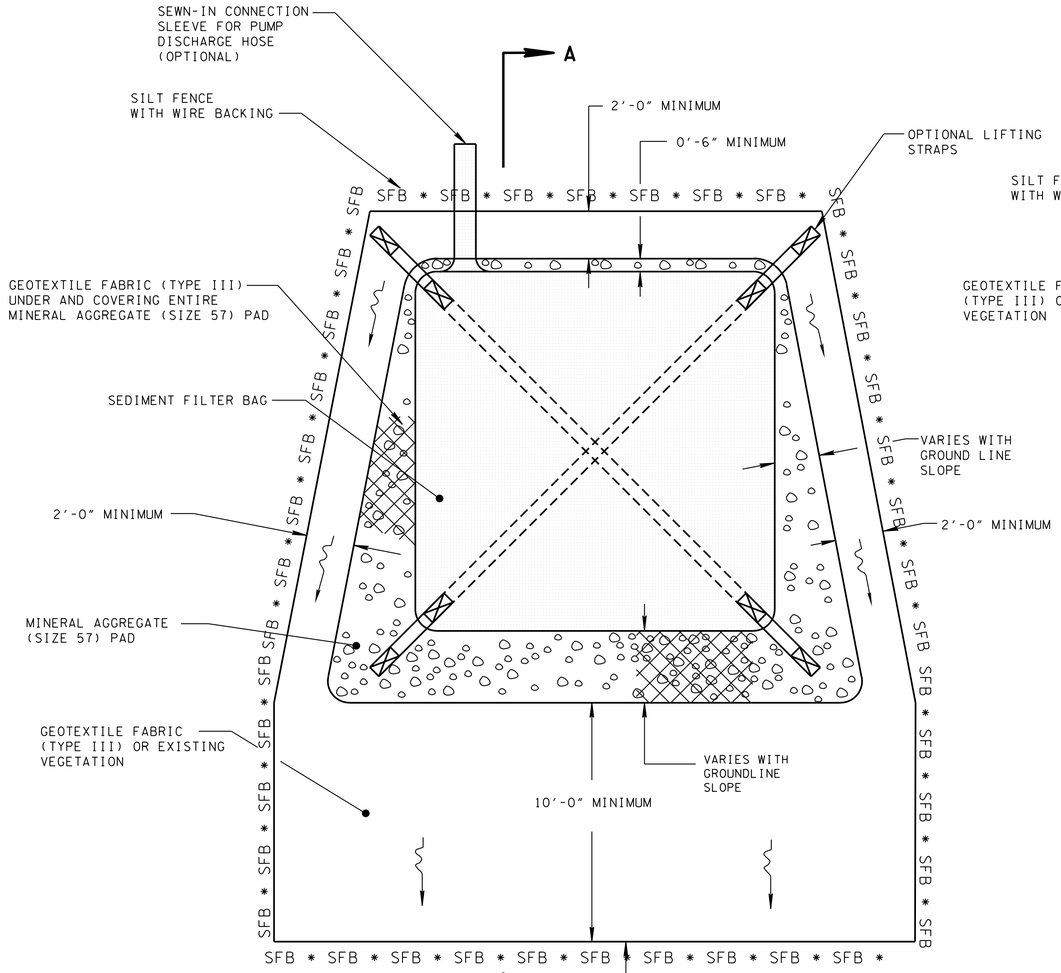
NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

DEWATERING STRUCTURE

10-26-92 EC-STR-1

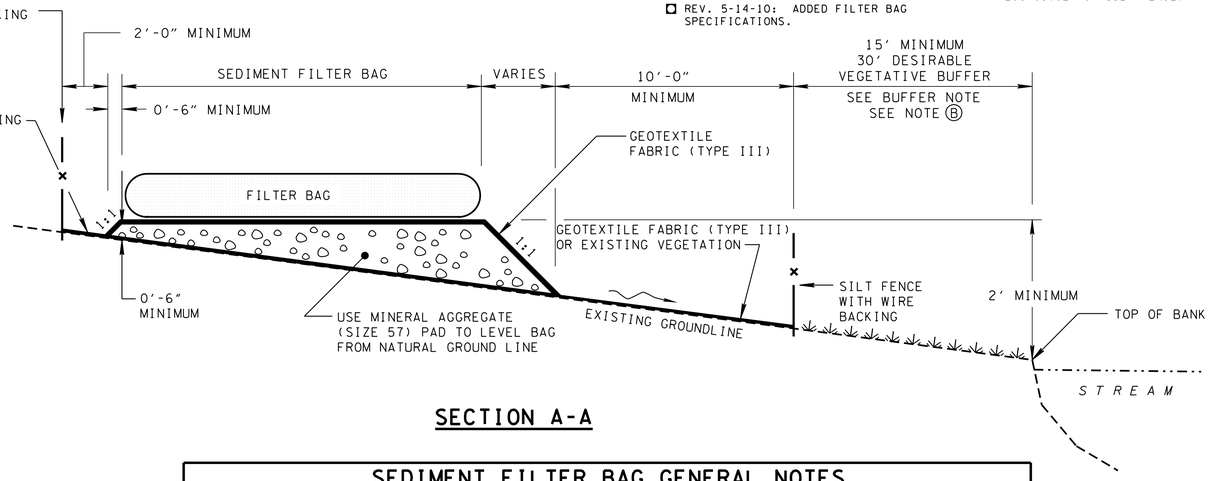
- REV. 8-1-12: MODIFIED BUFFER DIMENSION, ADDED BUFFER NOTE, MINOR EDITS TO GENERAL NOTES.
- REV. 10-26-03: ADDED EROSION CONTROL SYMBOL.
- REV. 5-27-04: CORRECTED DIMENSION IN SECTION A-A.
- REV. 4-15-06: ADDED CONNECTION SLEEVE AND OPTIONAL LIFTING STRAPS. REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REMOVED TEMPORARY REFERENCE, REVISED GENERAL NOTES, AND DRAFTING EDITS.
- REV. 5-14-10: ADDED FILTER BAG SPECIFICATIONS.
- REV. 2-28-01: CORRECTED PAY ITEM NUMBER IN PLAN VIEW.
- REV. 5-27-01: CHANGED ITEM NOS. 209-08 TO 209-08.03, 209-08.10 TO 209-09.02 AND 303-15.01 TO 303-10.01. CHANGED DESCRIPTION IN ITEM NO. 209-20.03.
- REV. 12-18-02: CHANGED SILT FENCE (WITHOUT BACKING) TO SILT FENCE (WITH BACKING) IN PLAN AND SECTIONAL VIEW. CHANGED PAY ITEM FROM 209-08.03 TO 209-08.02 FOR SILT FENCE.



PLAN VIEW

BUFFER NOTE:

ATTEMPTS SHOULD BE MADE TO PROVIDE THE DESIRABLE WIDTH AT ALL SITES. THE AVERAGE WIDTH OF THE BUFFER STRIP MAY BE USED WHEN CALCULATING THE DESIRABLE WIDTH.



SECTION A-A

FILTER BAG SPECIFICATIONS

PROPERTIES		TEST METHOD
WEIGHT	10.0 oz/yd.	ASTM D3776
TENSILE STRENGTH	250 lbs.	ASTM D4632
TENSILE ELONGATION AT BREAK	50%	ASTM D4632
PUNCTURE STRENGTH	115 lbs.	ASTM D4833
TRAPEZOIDAL TEAR	100 lbs.	ASTM D4533
MULLEN BURST	350 lbs.	ASTM D3786
WATER, FLOW RATE	80 gpm/ft.2	ASTM D4491
PERMITTIVITY	1.2 sec.-1	ASTM D4491
UV RESISTANCE	70% str. Ret.	ASTM D4355

STANDARD BAG MINIMUM DIMENSIONS	MAXIMUM FLOW RATE
15 X 10 ft.	up to 1500 gpm
15 X 15 ft.	up to 2000 gpm

NOTE:
THE MATERIAL SHALL BE A NON-WOVEN GEOTEXTILE FABRIC BAG RESISTANT TO ROT, MILDEW, PUNCTURE AND TEARING, WITH A MINIMUM SEAM BREAKING STRENGTH OF 200 LBS (90 Kgs) THE SEAMS SHALL DEMONSTRATE LESS ELONGATION AND DEFORMATION OF THE GEOTEXTILE FABRIC.

EROSION CONTROL PLAN LEGEND: SEDIMENT FILTER BAG

SEDIMENT FILTER BAG GENERAL NOTES

(A) SPECIAL PROVISION 209B IS TO BE USED FOR SEDIMENT FILTER BAGS. ALL REFERENCES IN SPECIAL PROVISION 209B TO PUMPING FROM SEDIMENT TRAPS ALSO APPLIES TO PUMPING FROM COFFERDAMS.

(B) SEDIMENT FILTER BAG INSTALLATION, INCLUDING DOWNSLOPE GEOTEXTILE AND SILT FENCE WITH WIRE BACKING SHOULD NOT BE PLACED WITHIN A JURISDICTIONAL WETLAND OR WITHIN 15 FEET (30 FEET DESIRABLE) OF A STABILIZED OUTLET, STREAM, OR OTHER NATURAL WATER RESOURCE. WHEN DISCHARGING TO SEDIMENT-IMPAIRED STREAMS OR EXCEPTIONAL TENNESSEE WATERS, THE BUFFER SHALL BE A MINIMUM OF 30 FEET WITH A DESIRABLE WIDTH OF 60 FEET. BUFFER REQUIREMENT DOES NOT APPLY TO ANY LOCATION ON SITE WITH A VALID ARAP OR EQUIVALENT PERMIT BY FEDERAL AGENCIES.

(C) CONTRACTOR SHALL EXERCISE CAUTION NOT TO BURST OR DAMAGE THE SEDIMENT FILTER BAG WHEN PUMPING.

(D) THE LENGTH AND WIDTH OF THE SEDIMENT BAG SHOWN ON THIS DRAWING MAY VARY PER VENDOR SPECIFICATIONS. THE MINIMUM "FOOTPRINT" OF THE BAG SHALL BE 150 SQUARE FEET.

(E) SEDIMENT FILTER BAGS MAY BE EQUIPPED WITH A SEWN-IN SLEEVE OF SUFFICIENT SIZE TO ACCEPT A MINIMUM FOUR-INCH DIAMETER PUMP DISCHARGE HOSE. A HOSE CONNECTION THROUGH A SLIT IN THE BAG IS ALSO ACCEPTABLE. THE DISCHARGE HOSE SHOULD BE EXTENDED INTO THIS SLEEVE A MINIMUM OF SIX INCHES AND BE TIGHTLY SECURED WITH A HOSE CLAMP OR OTHER SUITABLE MEANS TO PREVENT LEAKAGE.

(F) THE PUMP DISCHARGE HOSE CONNECTION SLEEVE, OR SLIT, SHALL BE SECURELY TIED OFF DURING DISPOSAL OF THE SEDIMENT FILTER BAG IN ORDER TO PREVENT LEAKAGE OF COLLECTED SEDIMENTS.

(G) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(H) SURROUND SEDIMENT FILTER BAG ASSEMBLY WITH SILT FENCE WITH WIRE BACKING. SEE STANDARD DRAWING EC-STR-3C AND EC-STR-3E FOR INSTALLATION DETAILS.

(I) EXISTING VEGETATIVE BUFFER TO REMAIN BETWEEN SILT FENCE WITH WIRE BACKING AND STABILIZED OUTLET, STREAM OR OTHER NATURAL WATER RESOURCE. BUFFER ZONE EXEMPTIONS ARE DEFINED BASED ON EXISTING LAND USES.

(J) SEDIMENT TUBES OR FILTER SOCKS MAY BE USED AS AN ALTERNATIVE TO SILT FENCE WITH WIRE BACKING. SEE STANDARD DRAWINGS EC-STR-37 AND EC-STR-8 FOR INSTALLATION DETAILS. FILTER SOCKS MAY NOT REQUIRE STAKING WHEN APPROVED BY THE ENGINEER.

(K) SEDIMENT FILTER BAGS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-09.03	SEDIMENT FILTER BAG (15' X 15') PER EACH
209-09.04	SEDIMENT FILTER BAG (15' X 10') PER EACH
303-10.01	MINERAL AGGREGATE (SIZE 57) PER TON
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD

SILT FENCE WITH BACKING, SEDIMENT TUBES, AND FILTER SOCKS SHALL BE PAID FOR ACCORDING TO ITS RESPECTIVE STANDARD DRAWING.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF SEDIMENT FILTER BAGS.

(L) WHEN SEDIMENT FILTER BAGS ARE REPLACED ONLY THE REPLACEMENT BAG SHALL BE PAID FOR. MAINTENANCE ON ALL OTHER PARTS OF THE SEDIMENT FILTER BAG ASSEMBLY SHALL BE INCLUDED IN THE INITIAL PAYMENT.

(M) ONLY SEDIMENT FILTER BAGS LISTED ON THE QUALIFIED PRODUCTS LIST MAY BE USED.

(N) SEDIMENT FILTER BAGS SHALL BE REPLACED WHEN SEDIMENT HAS ACCUMULATED TO ONE-HALF OF THE BAGS CAPACITY OR IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

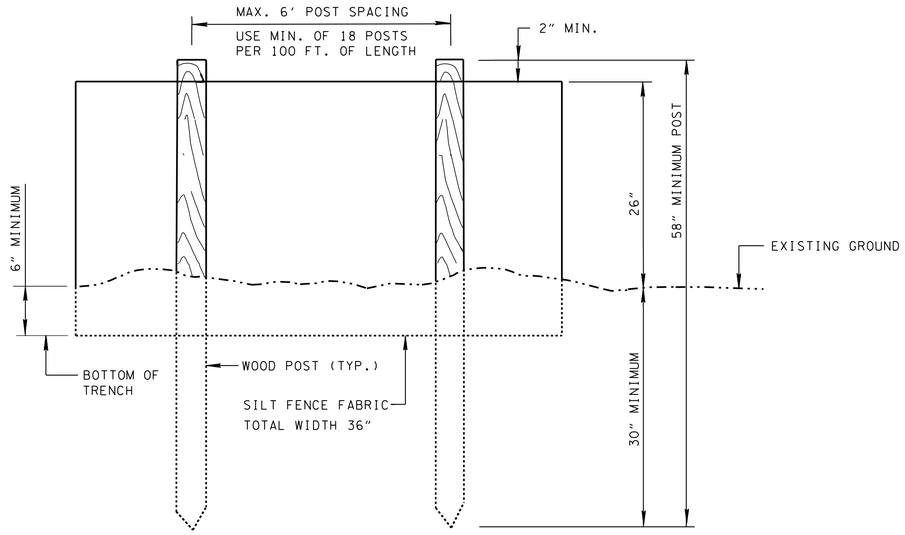
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

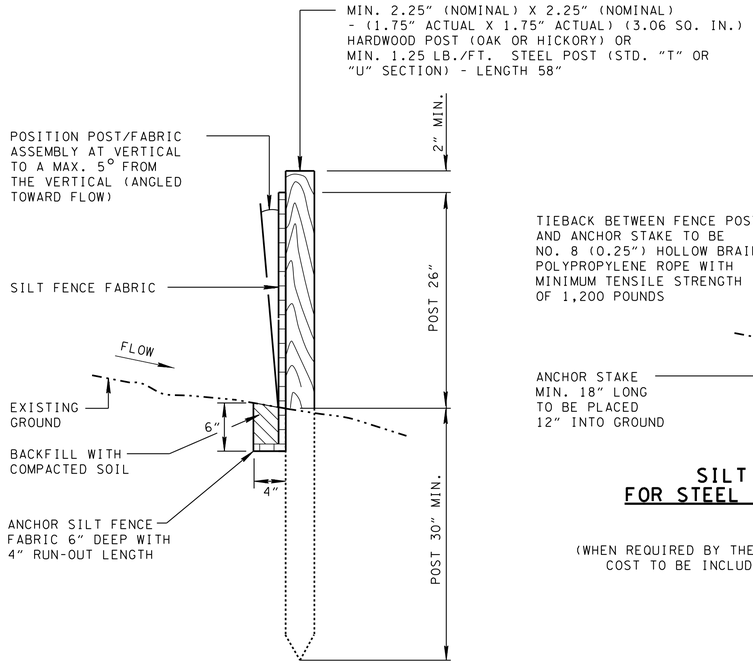
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SEDIMENT FILTER BAG

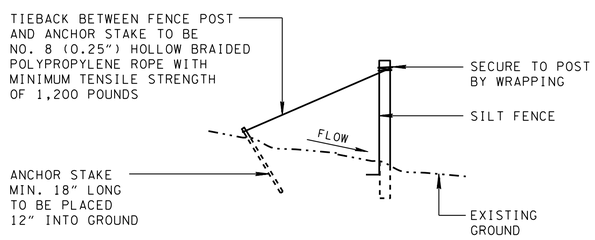
10-26-00 EC-STR-2



ELEVATION VIEW



SECTIONAL VIEW



SILT FENCE TIEBACK
FOR STEEL POSTS OR WOOD POSTS

(WHEN REQUIRED BY THE ENGINEER OR NOTED IN THE PLANS.
COST TO BE INCLUDED IN THE ITEMS FOR SILT FENCE)

EROSION CONTROL PLAN LEGEND: * SF * SF * SF * SILT FENCE

SILT FENCE FABRIC SPECIFICATIONS

FABRIC PROPERTY AND TEST METHODS	REQUIRED PHYSICAL PROPERTIES (MARV VALUES OF TEST DATA)
GEOTEXTILE FABRIC TYPE	WOVEN SLIT FILM
APPARENT OPENING SIZE (ASTM D4751)	# 30 TO # 70 STANDARD SIEVE
WATER FLUX (ASTM D4491)	≥ 4 GPM/FT^2
TENSILE STRENGTH (ASTM D4632)	≥ 120 LB. (WARP DIRECTION) X 100 LB. (FILL DIRECTION)
ULTRAVIOLET STABILITY (AFTER 500 HRS PER ASTM D4355)	≥ 70%
ELONGATION (ASTM D4632)	≤ 20% (MAX)
BURST STRENGTH (ASTM D3786)	≥ 250 PSI
PUNCTURE STRENGTH (ASTM D4833)	≥ 60 LB.
TRAPEZOIDAL TEAR (ASTM D4533)	≥ 50 LB. (WARP DIRECTION) X 40 LB. (FILL DIRECTION)

SILT FENCE GENERAL NOTES

(A) SILT FENCE IS USED TO INTERCEPT SMALL AMOUNTS OF SEDIMENT AND REDUCE VELOCITY FROM SHEET FLOW ONLY. DO NOT USE IT ADJACENT TO NATURAL WATER RESOURCES (WETLANDS OR STREAMS) OR ACROSS CONCENTRATED FLOW PATHS.

(B) THE MAXIMUM DRAINAGE AREA SIZE FOR A CONTINUOUS BARRIER SHALL BE ¼ ACRE PER 100 LINEAR FEET OF FENCE LENGTH UP TO A MAXIMUM DRAINAGE AREA OF 2 ACRES. MAXIMUM SLOPE LENGTH BEHIND FENCE ON UPSLOPE SIDE SHALL BE 110 FEET (AS MEASURED ALONG THE GROUND SURFACE).

(C) WHEN INSTALLED AT THE TOE OF A SLOPE, SILT FENCE SHOULD BE PLACED 5 FEET TO 7 FEET AWAY FROM THE TOE TO ALLOW SPACE FOR PONDING OF WATER, COLLECTION OF SEDIMENT, AND EASE OF MAINTENANCE AND REMOVAL.

(D) WHEN TWO SECTIONS OF SILT FENCE FABRIC ADJOIN EACH OTHER THEY SHALL BE JOINED ACCORDING TO THE DETAILS ON STANDARD DRAWING EC-STR-3E.

(E) MAINTENANCE SHALL BE PERFORMED AS NEEDED; CAPTURED SOIL MATERIAL SHALL BE REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE AND/OR OTHER EVIDENCE OF FILTER CLOGGING IS OBSERVED.

(F) STEEL POSTS SHALL BE ROLLED FROM HIGH CARBON STEEL AND SHALL HAVE A MINIMUM WEIGHT OF 1.25 LB/FT. POSTS SHALL BE HOT-DIPPED GALVANIZED OR PAINTED WITH HIGH GRADE WEATHER RESISTANT STEEL PAINT. STEEL POSTS SHALL BE EQUIPPED WITH AN ANCHOR PLATE HAVING A MINIMUM AREA OF 14 SQUARE INCHES. POSTS SHALL BE STUDDED, EMBOSSED, OR PUNCHED TO AID IN THE ATTACHMENT OF THE WIRE BACKING. POSTS AND ANCHOR PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A702.

(G) WHEN STEEL POSTS ARE USED THEY SHALL HAVE A PROJECTION FOR FASTENING WIRE TO THEM. THE WIRE FASTENERS SHOULD BE EVENLY SPACED WITH AT LEAST FIVE PER POST.

(H) IF THE FILTER MATERIAL IS STAPLED TO THE WOODEN STAKES, HEAVY DUTY WIRE STAPLES WITH ONE-HALF INCH LENGTH AND 1 INCH WIDTH SHALL BE USED AND EVENLY SPACED WITH AT LEAST FOUR PER POST. SILT FENCE FABRIC SHALL NOT BE STAPLED TO TREES.

(I) SILT FENCES SHOULD BE PLACED ALONG OR NEAR THE GROUND CONTOUR. THE BOTTOM OF FENCE AT GROUNDLINE SHOULD BE ON A ZERO PERCENT (0%) GRADE, PLUS OR MINUS FIVE TENTHS OF ONE PERCENT (±0.5%). THE ENDS OF A ROW OF SILT FENCE SHOULD BE TURNED UPSLOPE FORMING A J-HOOK TO FILTER ANY CONCENTRATED FLOW BEHIND FENCE.

(J) A PREASSEMBLED SILT FENCE MEETING THE REQUIREMENTS OF THIS DRAWING IS ACCEPTABLE IN LIEU OF A FIELD CONSTRUCTED SILT FENCE.

(K) STATIC SLICING IS THE PREFERRED METHOD OF FENCE INSTALLATION. STATIC SLICING INVOLVES THE INSERTION OF A NARROW CUTTING BLADE, PLACED AT THE SPECIFIED ANCHOR DEPTH FOR THE GIVEN FABRIC AS SHOWN ON THE APPLICABLE DETAIL, AND SIMULTANEOUSLY PULLING THE FENCE FABRIC INTO THE TRENCH AS THE TRENCH IS BEING EXCAVATED. ALTERNATE TRENCH-BASED METHODS ARE ALSO ACCEPTABLE. FOR TRENCH-BASED INSTALLATIONS, SILT FENCING SHALL BE INSTALLED PER THE FOLLOWING STEPS AND IN THE FOLLOWING ORDER:

- EXCAVATE TRENCH A MAXIMUM OF 4 INCHES WIDE AND 6 INCHES DEEP. THE TRENCH SHALL BE HAND-CLEANED FOLLOWING EXCAVATION TO REMOVE BULKY DEBRIS SUCH AS ROCKS, STICKS, AND SOIL CLODS FROM THE TRENCH.
- INSTALL FABRIC IN TRENCH.
- BACKFILL TRENCH (OVER-FILL) WITH SOIL PLACED AROUND FABRIC.
- COMPACT SOIL BACKFILL WITH MECHANICAL EQUIPMENT. DO NOT DAMAGE THE FABRIC DURING COMPACTION (DAMAGED FABRIC SHALL BE REPLACED).
- DRIVE AND SET SUPPORT POSTS PER SPACING REQUIREMENTS GIVEN ON THE APPLICABLE FENCE DETAIL. FOR PRE-ASSEMBLED SILT FENCE, DRIVE SUPPORT IN TO GROUND FIRST, FOLLOWED BY FABRIC PLACEMENT IN TRENCH.
- ATTACH FABRIC TO THE POSTS USING WIRE TIES OR STAPLES. SPACING AND DENSITY OF TIES OR STAPLES SHALL BE INSTALLED AS DESCRIBED IN NOTES F AND G.

(L) ONLY SILT FENCE FABRIC LISTED ON THE QUALIFIED PRODUCTS LIST MAY BE USED. ANY PRODUCTS LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE MAY ALSO BE USED.

(M) SILT FENCE SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-08.03 TEMPORARY SILT FENCE (WITHOUT BACKING) PER LINEAR FOOT

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE SILT FENCE.

(M) SEDIMENT SHALL BE REMOVED FROM BEHIND THE SILT FENCE WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE STRUCTURE AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

- ☐ REV. 12-18-03: MODIFIED TABLE (I) AND GENERAL NOTE (E).
- ☐ REV. 7-29-04: CHANGED VALUES IN TABLE 1 FROM MEAN TO MARV VALUES.
- ☐ REV. 4-15-06: REMOVED POA SPECS. FROM TABLE 1. ADDED NOTE (L). REVISED TABLE TITLE. REORDERED GENERAL NOTES. REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- ☐ REV. 4-1-08: REMOVED TEMPORARY REFERENCE, REVISED NOTES, AND MISC. EDITS TO DRAWING.
- ☐ REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

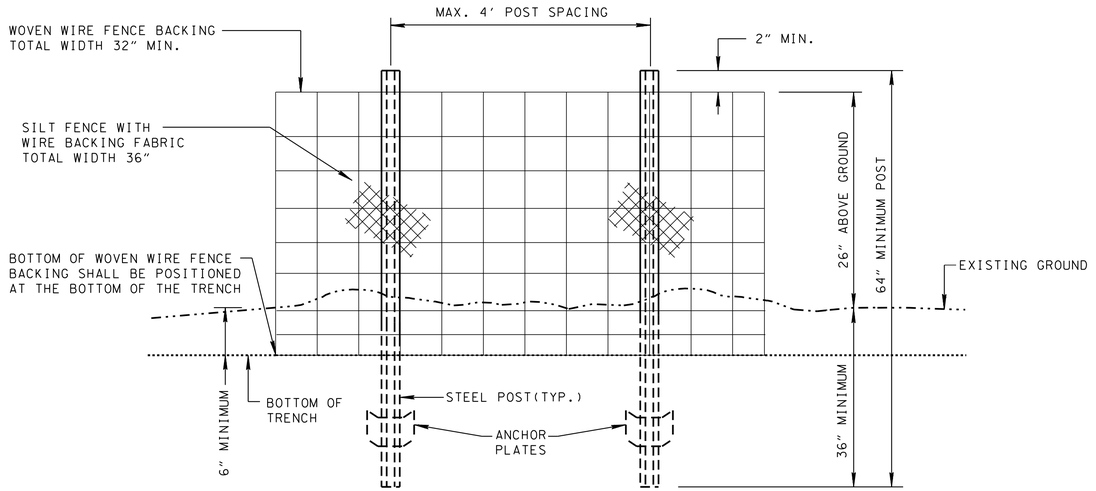
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

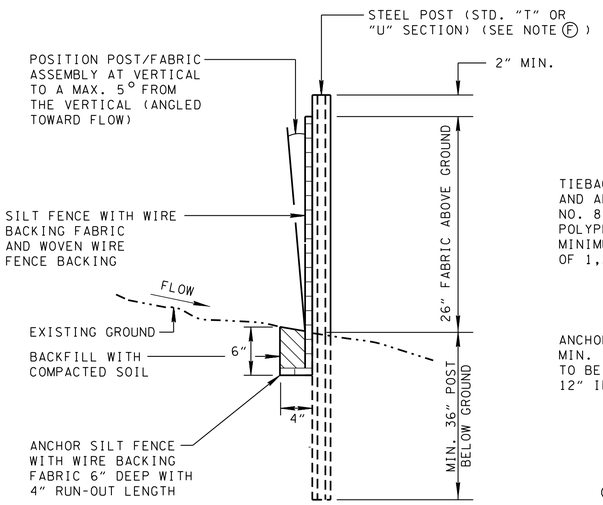
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SILT FENCE

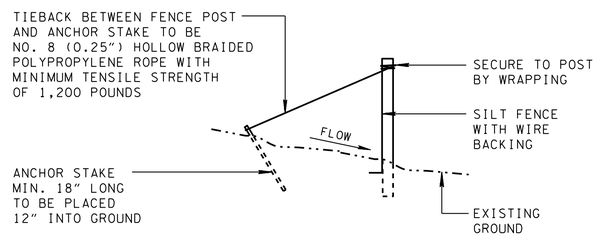
12-18-02 EC-STR-3B



ELEVATION VIEW



SECTIONAL VIEW



SILT FENCE TIEBACK

(WHEN REQUIRED BY THE ENGINEER OR NOTED IN THE PLANS. COST TO BE INCLUDED IN THE ITEMS FOR SILT FENCE WITH WIRE BACKING)

EROSION CONTROL PLAN LEGEND: * SFB * SFB * SFB * SILT FENCE WITH WIRE BACKING

SILT FENCE WITH WIRE BACKING FABRIC SPECIFICATIONS

FABRIC PROPERTY AND TEST METHODS	REQUIRED PHYSICAL PROPERTIES (MARV VALUES OF TEST DATA)
GEOTEXTILE FABRIC TYPE	WOVEN MONOFILAMENT
APPARENT OPENING SIZE (ASTM D4751)	# 70 TO # 100 STANDARD SIEVE
WATER FLUX (ASTM D4491)	≥ 18 GPM/FT^2
TENSILE STRENGTH (ASTM D4632)	≥ 310 LB. (WARP DIRECTION) X 200 LB. (FILL DIRECTION)
ULTRAVIOLET STABILITY (AFTER 500 HRS PER ASTM D4355)	≥ 90%
BURST STRENGTH (ASTM D3786)	≥ 400 PSI
PUNCTURE STRENGTH (ASTM D4833)	≥ 105 LB.
TRAPEZOIDAL TEAR (ASTM D4533)	≥ 100 LB. (WARP DIRECTION) X 60 LB. (FILL DIRECTION)

SILT FENCE WITH WIRE BACKING GENERAL NOTES

(A) SILT FENCE WITH WIRE BACKING IS USED TO INTERCEPT SMALL AMOUNTS OF SEDIMENT AND REDUCE VELOCITY FROM SHEET FLOW ONLY. USE SILT FENCE WITH WIRE BACKING UP-GRADIENT TO, AND ALONG THE PERIMETER OF STREAMS, WETLANDS, PONDS, SPRINGS, OR OTHER NATURAL WATER RESOURCES LOCATED WITHIN OR ADJACENT TO THE PROJECT RIGHT-OF-WAY AND AT LARGE FILL SLOPES.

(B) THE MAXIMUM DRAINAGE AREA SIZE FOR CONTINUOUS SILT FENCE WITH BACKING SHALL BE 1 ACRE PER 150 LINEAR FEET OF FENCE LENGTH. MAXIMUM SLOPE LENGTH BEHIND FENCE ON UPSLOPE SIDE SHALL BE 290 FEET (AS MEASURED ALONG THE GROUND SURFACE).

(C) WHEN INSTALLED AT THE TOE OF A SLOPE SILT FENCE WITH WIRE BACKING SHOULD BE PLACED 5 FEET TO 10 FEET AWAY FROM THE TOE TO ALLOW SPACE FOR PONDING OF WATER, COLLECTION OF SEDIMENT, AND EASE OF MAINTENANCE AND REMOVAL.

(D) WHEN TWO SECTIONS OF SILT FENCE WITH WIRE BACKING FABRIC ADJOIN EACH OTHER, THEY SHALL BE JOINED ACCORDING TO THE DETAILS ON STANDARD DRAWING EC-STR-3E.

(E) MAINTENANCE SHALL BE PERFORMED AS NEEDED; CAPTURED SOIL MATERIAL SHALL BE REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE AND/OR WHEN EVIDENCE OF FILTER CLOGGING IS OBSERVED.

(F) STEEL POSTS SHALL BE ROLLED FROM HIGH CARBON STEEL AND SHALL HAVE A MINIMUM WEIGHT OF 1.25 LB/FT. POSTS SHALL BE HOT-DIPPED GALVANIZED OR PAINTED WITH HIGH GRADE WEATHER RESISTANT STEEL PAINT. STEEL POSTS SHALL BE EQUIPPED WITH AN ANCHOR PLATE HAVING A MINIMUM AREA OF 14 SQUARE INCHES. POSTS SHALL BE STUDDED, EMBOSSED, OR PUNCHED TO AID IN THE ATTACHMENT OF THE WIRE BACKING. POSTS AND ANCHOR PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A702.

(G) STEEL POSTS SHALL HAVE A PROJECTION FOR FASTENING WIRE TO THEM. WOVEN WIRE FENCE BACKING TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. THE WIRE FASTENERS SHOULD BE EVENLY SPACED WITH AT LEAST SIX PER POST.

(H) FABRIC SHALL BE FASTENED SECURELY TO WOVEN WIRE FENCE BACKING WITH THE TIES SPACED EVERY 24 INCHES ALONG TOP AND MIDSECTION.

(I) WOVEN WIRE FENCE BACKING SHALL MEET THE REQUIREMENTS FOR ASTM A-116 FOR NO. 11 FARM, DESIGN NO. 832-6-11, CLASS 3 COATING.

(J) SILT FENCE WITH BACKING SHOULD BE PLACED ALONG OR NEAR THE GROUND CONTOUR. THE BOTTOM OF FENCE AT GROUNDLINE SHOULD BE ON A ZERO PERCENT (0%) GRADE, PLUS OR MINUS FIVE TENTHS OF ONE PERCENT (±0.5%). THE END OF A ROW OF SILT FENCE WITH WIRE BACKING SHOULD BE TURNED UP SLOPE FORMING A J-HOOK TO FILTER ANY CONCENTRATED FLOW BEHIND FENCE.

(K) FOR TRENCH-BASED INSTALLATIONS, SILT FENCING WITH WIRE BACKING SHALL BE INSTALLED PER THE FOLLOWING STEPS AND IN THE FOLLOWING ORDER:

- EXCAVATE TRENCH A MAXIMUM OF 4 INCHES WIDE AND 6 INCHES DEEP. THE TRENCH SHALL BE HAND-CLEANED FOLLOWING EXCAVATION TO REMOVE BULKY DEBRIS SUCH AS ROCKS, STICKS, AND SOIL CLODS FROM THE TRENCH.
- DRIVE AND SET SUPPORT POSTS PER SPACING REQUIREMENTS GIVEN ON THE APPLICABLE FENCE DETAIL.
- ATTACH WOVEN WIRE FENCE BACKING TO POSTS AND FABRIC TO THE WIRE BACKING USING WIRE TIES. SPACING AND DENSITY OF TIES SHALL BE INSTALLED ACCORDING TO NOTES G AND H
- INSTALL FABRIC IN TRENCH.
- BACKFILL TRENCH (OVER-FILL) WITH SOIL PLACED AROUND FABRIC.
- COMPACT SOIL BACKFILL WITH MECHANICAL EQUIPMENT. DO NOT DAMAGE THE FABRIC DURING COMPACTION (DAMAGED FABRIC SHALL BE REPLACED).

(L) ONLY SILT FENCE WITH WIRE BACKING FABRIC LISTED ON THE QUALIFIED PRODUCTS LIST MAY BE USED. ANY PRODUCTS LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE MAY ALSO BE USED.

(M) SILT FENCE WITH WIRE BACKING SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-08.02 TEMPORARY SILT FENCE (WITH BACKING) PER LINEAR FOOT

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE SILT FENCE WITH WIRE BACKING.

(N) SEDIMENT SHALL BE REMOVED FROM BEHIND THE SILT FENCE WITH WIRE BACKING WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE STRUCTURE AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

REV. 12-18-03: MODIFIED TABLE (2) AND GENERAL NOTE (E).

- REV. 7-29-04: CHANGED VALUES IN TABLE 2 FROM MEAN TO MARV VALUES.
- REV. 4-15-06: MODIFIED FABRIC HEIGHT. ADDED NOTES (J) AND (K). REVISED TABLE TITLE. REORDERED GENERAL NOTES. REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REMOVED TEMPORARY REFERENCE, REVISED NOTES, AND MISC. EDITS TO DRAWING.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

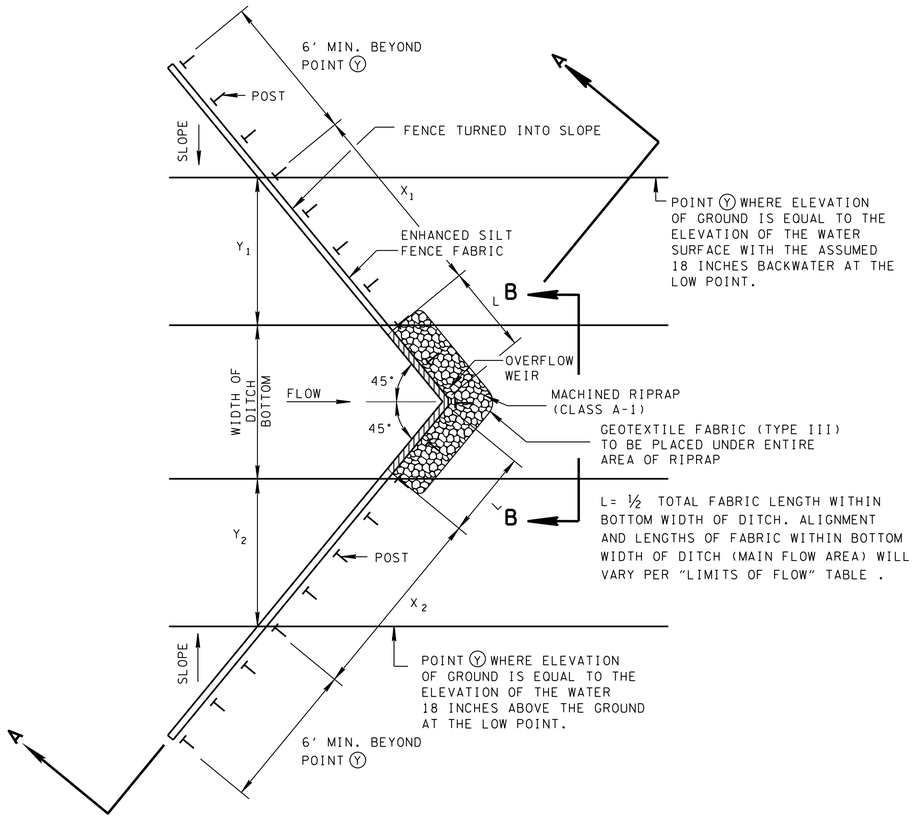
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

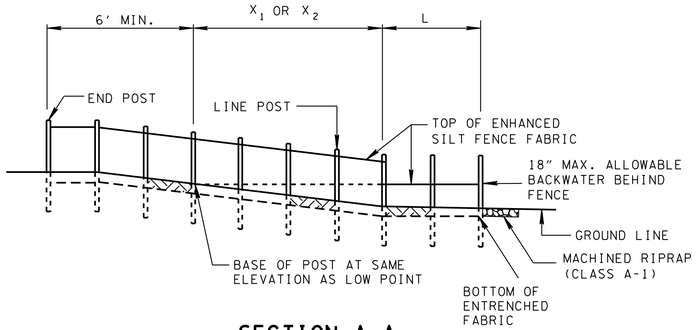
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SILT FENCE WITH WIRE BACKING

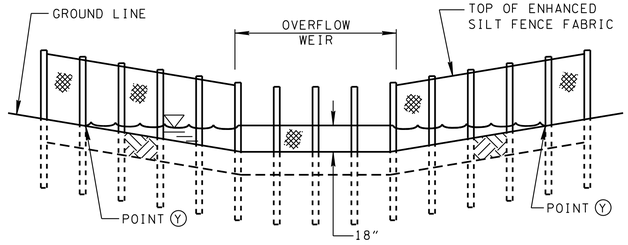
12-18-02 | EC-STR-3C



PLAN VIEW



SECTION A-A



ELEVATION VIEW B-B

- REV. 12-18-03: MODIFIED SPACING FOR ENHANCED SILT FENCE DETAIL AND ADDED SUPPORTING TABLE. MODIFIED TABLE 4 AND GENERAL NOTES.
- REV. 3-15-04: CHANGED PLANS LEGEND SYMBOL.
- REV. 4-15-06: ADDED OVERFLOW WEIR, SECTION B-B, REVISED TABLE TITLE. REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING. CHANGED PLAN SYMBOL. CHANGED DRAWING NAME.
- REV. 4-1-08: REMOVED TEMPORARY REFERENCE, MISC. EDITS TO DRAWING, CHANGED DRAWING NAME, REVISED GENERAL NOTES.
- REV. 1-1-10: MOVED SPACING DETAILS TO EC-STR-4B. REVISED GENERAL NOTES.
- REV. 8-1-12: REVISED GENERAL NOTES.

LIMITS OF FLOW

WIDTH OF DITCH BOTTOM (FT) SEE NOTE Ⓔ	② TOTAL ENHANCED SILT FENCE CHECK LENGTH 2L (LENGTH L) WITHIN FLAT-BOTTOM ZONE OF DITCH, (FT)	X_1 OR X_2 (FT)			TOTAL AVAILABLE SURFACE AREA OF FABRIC IN DITCH AT 18 INCHES OF FLOW DEPTH (FT^2)			① MAXIMUM ALLOWABLE PEAK FLOW (CFS)		
		2:1	3:1	4:1	2:1 SIDESLOPE	3:1 SIDESLOPE	4:1 SIDESLOPE	2:1 SIDESLOPE	3:1 SIDESLOPE	4:1 SIDESLOPE
3	4.2 (2.1)	4.2	6.4	8.5	12.6	15.8	19.0	4.6	5.5	6.4
4	5.7 (2.9)	4.2	6.4	8.5	14.9	18.0	21.2	5.6	6.5	7.4
5	7.0 (3.5)	4.2	6.4	8.5	16.8	20.0	23.2	6.4	7.3	8.3
6	8.5 (4.3)	4.2	6.4	8.5	19.1	22.2	25.4	7.4	8.3	9.2
7	9.9 (5.0)	4.2	6.4	8.5	21.2	24.3	27.5	8.3	9.2	10.1
8	11.3 (5.7)	4.2	6.4	8.5	23.3	26.4	29.6	9.2	10.1	11.1
9	12.7 (6.4)	4.2	6.4	8.5	25.4	28.5	31.7	10.1	11.0	12.0
10	14.1 (7.1)	4.2	6.4	8.5	27.5	30.6	33.8	11.0	12.0	12.9
12	17.0 (8.5)	4.2	6.4	8.5	31.8	35.0	38.2	12.9	13.8	14.8
15	21.2 (10.6)	4.2	6.4	8.5	38.1	41.3	44.5	15.7	16.6	17.5

① BASED ON 110 GPM/FT^2 (0.02 INCHES/SEC PERMEABILITY) ENHANCED SILT FENCE DITCH CHECK FABRIC AND TRAPEZOIDAL DITCH CROSS SECTION. SEE STANDARD DRAWING EC-STR-3D FOR FABRIC SPECIFICATIONS. A HEAD OF 18 INCHES BEHIND THE FENCE WAS USED TO DETERMINE MAXIMUM ALLOWABLE DESIGN PEAK FLOW THROUGH THE FILTER FABRIC. ALLOWABLE FLOWS DO NOT INCLUDE HYDRAULIC REDUCTION DUE TO ACCUMULATION OF CAPTURED SOIL PARTICLES ON THE FABRIC SURFACE AREA.

② THIS LENGTH IS TO BE ADDED TO CALCULATED LENGTHS X_1 AND X_2. LENGTH Y_1 AND Y_2 ARE BASED ON PERPENDICULAR SLOPE LENGTHS TO A POINT WHERE THE BASE OF POST ENTERING THE GROUND IS AT THE SAME ELEVATION AS A POINT 18 INCHES ABOVE THE GROUND AT THE LOW POINT OF THE DITCH. LENGTHS X_1 AND X_2 ARE CALCULATED BY MULTIPLYING THE LENGTHS OF SLOPE Y_1 OR Y_2 AT EACH INDIVIDUAL LOCATION BY 1.414.

EROSION CONTROL PLAN LEGEND: ⩾ ENHANCED SILT FENCE CHECK (TRAPEZOIDAL DITCH)

ENHANCED SILT FENCE CHECK GENERAL NOTES

(A) ENHANCED SILT FENCE CHECKS ARE USED TO REMOVE SUSPENDED SEDIMENTS FROM STORM WATER FLOW VIA SETTLING AND FILTRATION. THEY ARE ALSO USED FOR VELOCITY REDUCTION. ENHANCED SILT FENCE CHECKS SHOULD NOT BE PLACED IN STREAMS OR OTHER NATURAL WATER RESOURCES.

(B) A DITCH WITH A TRAPEZOIDAL CROSS-SECTION IS ASSUMED WITH SIDE SLOPES AS NOTED.

(C) CHECK LENGTH DESIGNATED IN THE "LIMITS OF FLOW" TABLE ONLY INCLUDES THE LENGTH OF FENCE STAKED WITHIN THE BOTTOM WIDTH OF DITCH (2L).

(D) SELECT A DITCH BOTTOM WIDTH FROM THE "LIMITS OF FLOW" TABLE SUCH THAT THE MAXIMUM ALLOWABLE DESIGN PEAK FLOW OBTAINED FROM THE APPROPRIATE COLUMN AT THE RIGHT SIDE OF THE TABLE IS EQUAL TO OR GREATER THAN THE 2-YEAR, 24-HOUR FLOW RATE AT THE CHECK. IF THE SITE DRAINS TO A SEDIMENT-IMPAIRED STREAM OR EXCEPTIONAL TENNESSEE WATERS, THE FLOW OBTAINED FROM THE TABLE MUST BE EQUAL TO OR GREATER THAN THE 5-YEAR, 24-HOUR FLOW RATE. FLOWS IN EXCESS OF THESE VALUES MAY BE PASSED OVER THE WEIR.

(E) IT MAY BE NECESSARY TO FLATTEN THE DITCH SIDE SLOPES AND/OR WIDEN THE DITCH BOTTOM WIDTH IN THE VICINITY OF THE CHECK IN ORDER TO ACHIEVE THE SURFACE AREA OF FABRIC REQUIRED FOR THE CHECK. REFER TO EC-STR-4B.

(F) THE SPACING OF ENHANCED SILT FENCE CHECKS ALONG A DITCH SHOULD BE BASED ON A COMBINATION OF HYDRAULIC PROPERTIES OF THE FENCE MATERIAL, LIMITS OF FLOW TABLE, AND THE SPACING TABLE (EC-STR-4B).

(G) THE FLOW VALUES IN THE LIMITS OF FLOW TABLE ASSUME NO CLOGGING OF THE ENHANCED SILT FENCE CHECK FABRIC SURFACE. IN ORDER TO INSURE MINIMAL INFLUENCE FROM CLOGGING, ENHANCED SILT FENCE CHECKS SHOULD BE REGULARLY CLEANED BY DRY BRUSHING AND/OR PRESSURE WASHING THE FABRIC SURFACE.

(H) FOR INSTALLATION DETAILS FOR ENHANCED SILT FENCE SEE STANDARD DRAWINGS EC-STR-3D AND EC-STR-3E.

(I) UPON REMOVAL OF THE ENHANCED SILT FENCE CHECK THE AREA BENEATH THE ENHANCED SILT FENCE CHECK LOCATION SHOULD BE IMMEDIATELY COVERED WITH SEEDING AND EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS OR IT SHOULD BE SODDED.

(J) ANY PRODUCTS LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE MAY ALSO BE USED.

(K) ENHANCED SILT FENCE CHECKS SHOULD BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-08.06 ENHANCED SILT FENCE CHECK (TRAPEZOIDAL) PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE ENHANCED SILT FENCE CHECK.

(L) SEDIMENT SHALL BE REMOVED FROM BEHIND THE ENHANCED SILT FENCE CHECK WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT TO THE STRUCTURE AND PAID FOR UNDER ITEM NO. 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

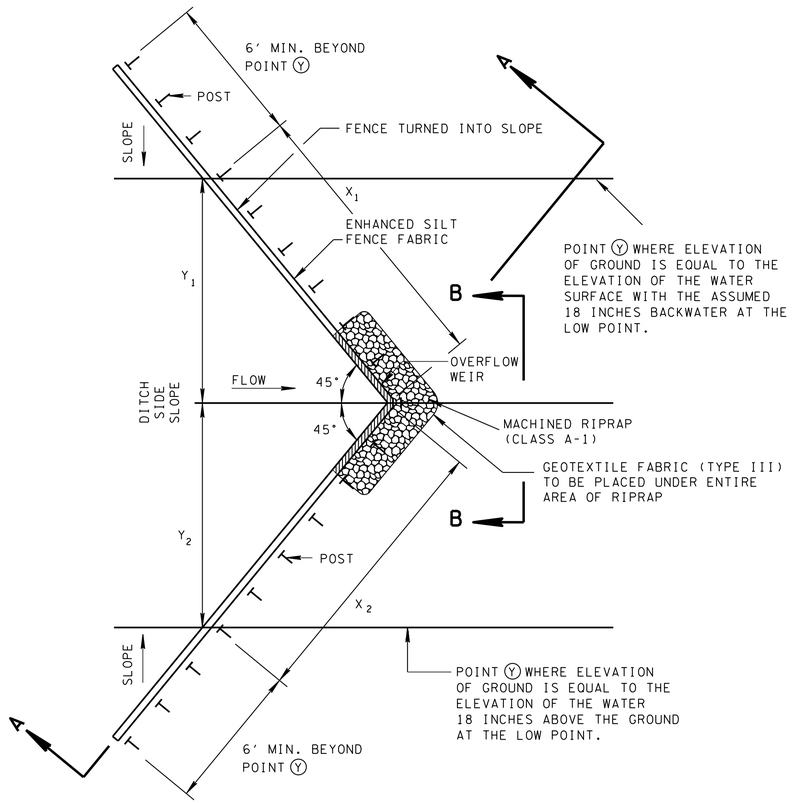
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

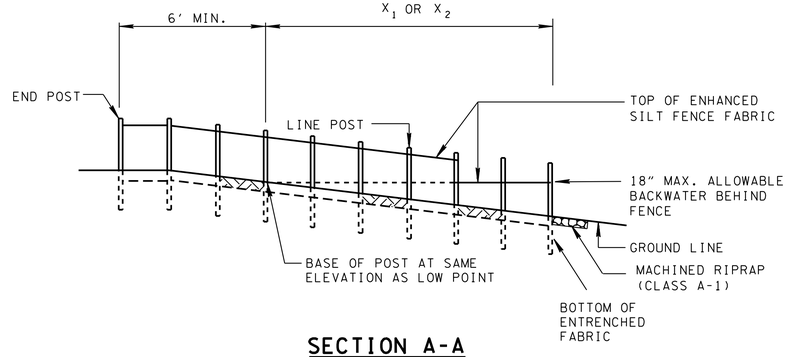
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

ENHANCED SILT FENCE CHECK (TRAPEZOIDAL DITCH)

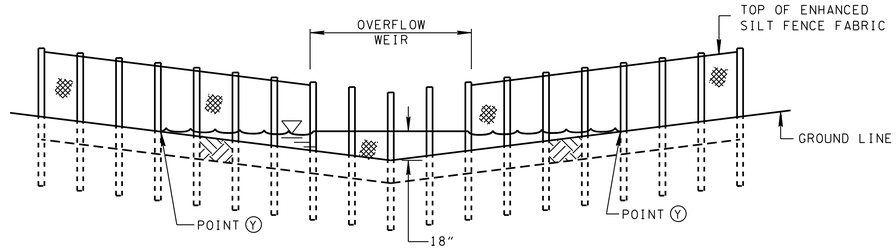
12-28-02 EC-STR-4



PLAN VIEW



SECTION A-A



ELEVATION VIEW B-B

LIMITS OF FLOW

DITCH SIDESLOPES (SEE NOTE D)	(2) X_1 OR X_2 (FT)	TOTAL AVAILABLE SURFACE AREA OF FABRIC IN DITCH AT 18 INCHES OF FLOW DEPTH (FT^2)	(1) MAXIMUM ALLOWABLE PEAK FLOW (CFS)
2:1	4.2	6.4	1.9
3:1	6.4	9.5	2.8
4:1	8.5	12.7	3.7
5:1	10.6	15.9	4.6
6:1	12.7	19.1	5.6
7:1	14.8	22.3	6.5
8:1	17.0	25.4	7.4
9:1	19.1	28.6	8.3
10:1	21.2	31.8	9.3

(1) BASED ON 110 GPM/FT^2 (0.02 INCHES/SEC PERMEABILITY) ENHANCED SILT FENCE DITCH CHECK FABRIC AND TRIANGULAR DITCH CROSS SECTION. SEE STANDARD DRAWING EC-STR-3D FOR FABRIC SPECIFICATIONS. A HEAD OF 18 INCHES BEHIND THE FENCE WAS USED TO DETERMINE MAXIMUM ALLOWABLE DESIGN PEAK FLOW THROUGH THE FILTER FABRIC. ALLOWABLE FLOWS DO NOT INCLUDE HYDRAULIC REDUCTION DUE TO ACCUMULATION OF CAPTURED SOIL PARTICLES ON THE FABRIC SURFACE AREA.

(2) LENGTHS Y_1 AND Y_2 ARE BASED ON PERPENDICULAR SLOPE LENGTHS TO A POINT WHERE THE BASE OF THE POST ENTERING THE GROUND IS AT THE SAME ELEVATION AS A POINT 18 INCHES ABOVE THE GROUND AT THE LOW POINT OF THE DITCH. LENGTHS X_1 AND X_2 ARE CALCULATED BY MULTIPLYING THE LENGTHS OF THE SLOPE Y_1 OR Y_2 AT EACH INDIVIDUAL LOCATION BY 1.414.

EROSION CONTROL PLAN LEGEND: ≫ ENHANCED SILT FENCE CHECK (V-DITCH)

ENHANCED SILT FENCE CHECK GENERAL NOTES

(A) ENHANCED SILT FENCE CHECKS ARE USED TO REMOVE SUSPENDED SEDIMENTS FROM STORM WATER FLOW VIA SETTLING AND FILTRATION. THEY ARE ALSO USED FOR VELOCITY REDUCTION. ENHANCED SILT FENCE CHECKS SHOULD NOT BE PLACED IN STREAMS OR OTHER NATURAL WATER RESOURCES. ENHANCED SILT FENCE CHECKS SHOULD NOT BE USED WITHIN THE CLEAR ZONE OF A ROADWAY WHERE TRAFFIC IS TO BE MAINTAINED DURING CONSTRUCTION.

(B) A DITCH WITH A TRIANGULAR CROSS-SECTION IS ASSUMED WITH SIDE SLOPES AS NOTED.

(C) SELECT DITCH SIDE SLOPES FROM THE "LIMITS OF FLOW" TABLE SUCH THAT THE MAXIMUM ALLOWABLE DESIGN PEAK FLOW OBTAINED FROM THE APPROPRIATE COLUMN AT THE RIGHT SIDE OF THE TABLE IS EQUAL TO OR GREATER THAN THE 2-YEAR, 24-HOUR FLOW RATE AT THE CHECK. IF THE SITE DRAINS TO A SEDIMENT-IMPAIRED STREAM OR EXCEPTIONAL TENNESSEE WATERS, THE FLOW OBTAINED FROM THE TABLE MUST BE EQUAL TO OR GREATER THAN THE 5-YEAR, 24-HOUR FLOW RATE. FLOWS IN EXCESS OF THESE VALUES MAY BE PASSED OVER THE WEIR.

(D) IT MAY BE NECESSARY TO FLATTEN THE DITCH SIDE SLOPES AND/OR WIDEN THE DITCH BOTTOM WIDTH IN THE VICINITY OF THE CHECK IN ORDER TO ACHIEVE THE SURFACE AREA OF FABRIC REQUIRED FOR THE CHECK. REFER TO EC-STR-4B.

(E) THE SPACING OF ENHANCED SILT FENCE CHECK ALONG A DITCH SHOULD BE BASED ON A COMBINATION OF HYDRAULIC PROPERTIES OF THE FENCE MATERIAL, THE LIMITS OF FLOW TABLE, AND THE SPACING TABLE (EC-STR-4B).

(F) THE FLOW VALUES IN THE LIMITS OF FLOW TABLE ASSUME NO CLOGGING OF THE ENHANCED SILT FENCE CHECK FABRIC SURFACE. IN ORDER TO INSURE MINIMAL INFLUENCE FROM CLOGGING, ENHANCED SILT FENCE CHECKS SHOULD BE REGULARLY CLEANED BY DRY BRUSHING AND/OR PRESSURE WASHING THE FABRIC SURFACE.

(G) FOR INSTALLATION DETAILS FOR ENHANCED SILT FENCE SEE STANDARD DRAWINGS EC-STR-3D AND EC-STR-3E.

(H) UPON REMOVAL OF THE ENHANCED SILT FENCE CHECK THE AREA BENEATH THE ENHANCED SILT FENCE CHECK LOCATION SHOULD BE IMMEDIATELY COVERED WITH SEEDING AND EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS OR IT SHOULD BE SODDED.

(I) ANY PRODUCT LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE MAY ALSO BE USED.

(J) ENHANCED SILT FENCE CHECKS SHOULD BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-08.05 ENHANCED SILT FENCE CHECK (V-DITCH) PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE ENHANCED SILT FENCE CHECK.

(K) SEDIMENT SHALL BE REMOVED FROM BEHIND THE ENHANCED SILT FENCE CHECK WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT TO THE STRUCTURE AND PAID FOR UNDER ITEM NO. 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

- REV. 12-18-03: MODIFIED SPACING FOR ENHANCED SILT FENCE DETAIL AND ADDED SUPPORTING TABLE. MODIFIED TABLE 5 AND GENERAL NOTES.
- REV. 3-15-04: CHANGED PLANS LEGEND SYMBOL.
- REV. 4-15-06: ADDED OVERFLOW WEIR AND SECTION B-B, REVISED TABLE TITLE. REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING. CHANGED DRAWING NAME.
- REV. 4-1-08: REMOVED TEMPORARY REFERENCE, MISC. EDITS TO DRAWING, CHANGED DRAWING NAME, REVISED GENERAL NOTES.
- REV. 1-1-10: MOVED SPACING DETAILS TO EC-STR-4B. REVISED GENERAL NOTES.
- REV. 8-1-12: REVISED GENERAL NOTES.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

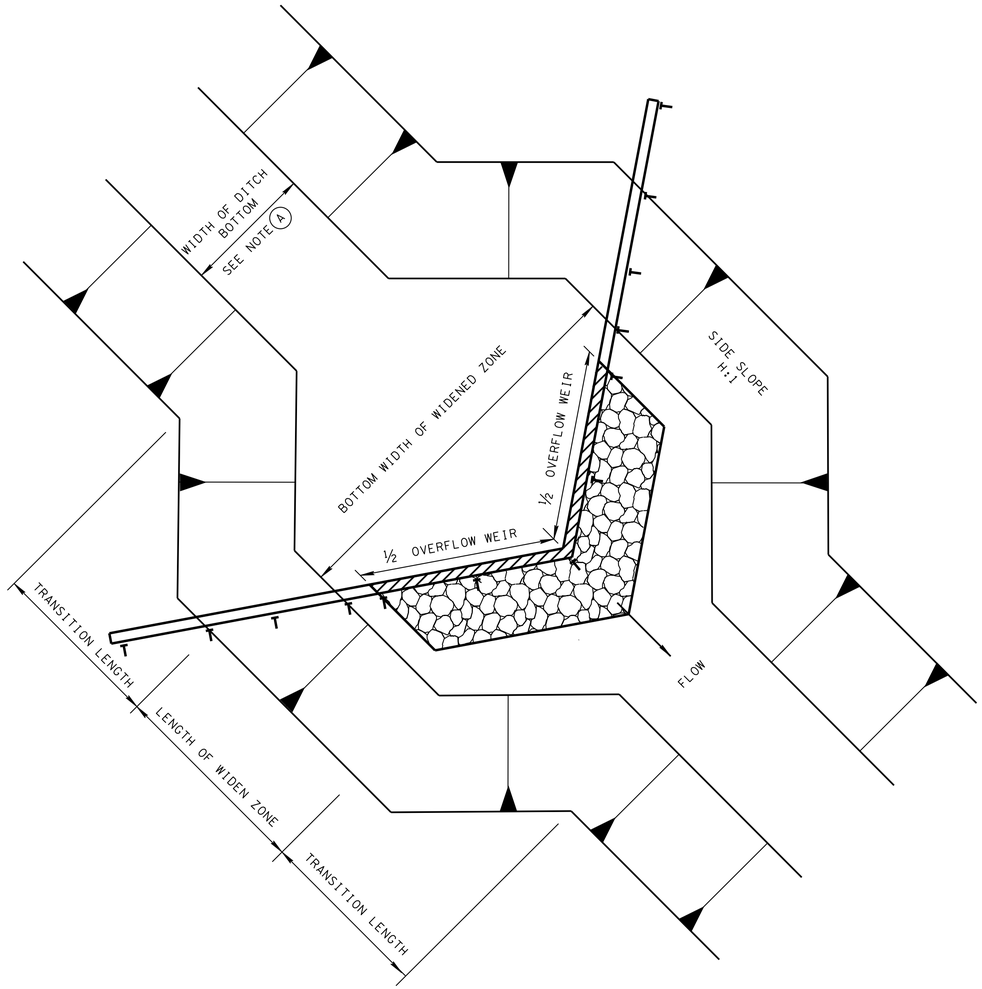
ENHANCED SILT FENCE CHECK (V-DITCH)

12-28-02 EC-STR-4A

REV. 8-1-12: ADDED NOTE REFERENCE TO PLAN VIEW.

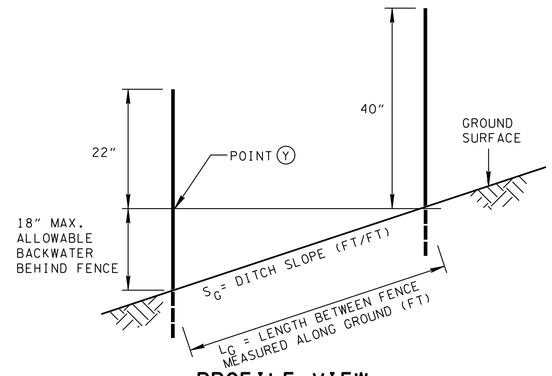
STATION (LT or RT)	L (FT) (1)	X1 (FT) (1)	X2 (FT) (1)	OVERFLOW WEIR LENGTH (FT)	TOTAL LENGTH OF ESF (FT)	WIDENED ZONE				
						BOTTOM WIDTH (FT)	SIDE SLOPE (H:1)	LENGTH (FT)	TRANSITION	
									RATIO	LENGTH (FT)

(1) REFER TO STD. DWG. EC-STR-4 OR EC-STR-4A



PLAN VIEW

DITCH SLOPE S_G (FT/FT)	RECOMMENDED SPACING, (L_G) BETWEEN ENHANCED SILT FENCE CHECKS (FT)
0.01	150
0.02	75
0.03	50
0.04	40
0.05	30
0.06 AND STEEPER	25



PROFILE VIEW

SPACING FOR ENHANCED SILT FENCE CHECKS

ENHANCED SILT FENCE CHECK GENERAL NOTES

(A) ENHANCED SILT FENCE CHECKS ARE USED TO REMOVE SUSPENDED SEDIMENTS FROM STORM WATER FLOW VIA SETTLING AND FILTRATION. THEY ARE ALSO USED FOR VELOCITY REDUCTION. ENHANCED SILT FENCE CHECKS SHOULD NOT BE PLACED IN STREAMS OR OTHER NATURAL WATER RESOURCES.

(B) IT MAY BE NECESSARY TO FLATTEN THE DITCH SIDE SLOPES AND/OR WIDEN THE DITCH BOTTOM WIDTH IN THE VICINITY OF THE CHECK IN ORDER TO ACHIEVE THE SURFACE AREA OF FABRIC REQUIRED FOR THE CHECK. REFER TO LIMITS OF FLOW TABLE ON EC-STR-4 AND EC-STR-4A.

(C) FOR ADDITIONAL INSTALLATION INFORMATION REFER TO EC-STR-4 FOR ENHANCED SILT FENCE CHECK USED IN TRAPEZOIDAL DITCHES AND EC-STR-4A FOR ENHANCED SILT FENCE CHECKS USED IN V-DITCHES.

(D) FOR INSTALLATION DETAILS FOR ENHANCED SILT FENCE SEE STANDARD DRAWING EC-STR-3D AND EC-STR-3E.

(E) THE SPACING OF ENHANCED SILT FENCE CHECKS, ALONG A DITCH SHOULD BE BASED ON A COMBINATION OF HYDRAULIC PROPERTIES OF THE FENCE MATERIAL, LIMITS OF FLOW TABLE (EC-STR-4 AND EC-STR-4A), AND THE SPACING TABLE.

(F) UPON REMOVAL OF THE ENHANCED SILT FENCE CHECK THE WIDENED ZONE SHOULD BE IMMEDIATELY RESHAPED TO MATCH THE PROPOSED DITCH SIZE. IT SHOULD BE COVERED WITH SEEDING AND EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS OR IT SHOULD BE SODDED.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

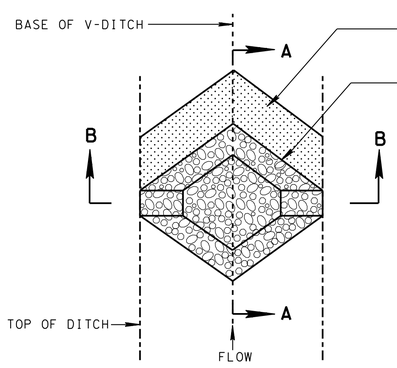
NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

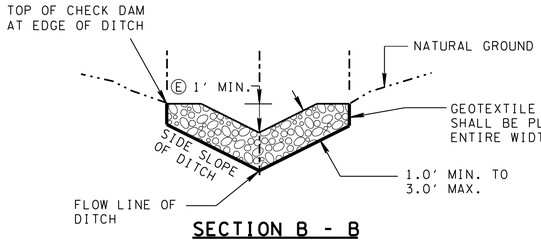
ENHANCED SILT FENCE CHECK DETAILS

01-01-10 EC-STR-4B

DETAIL FOR V-DITCH

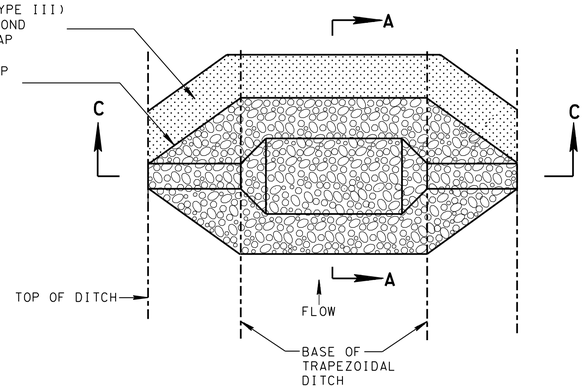


PLAN VIEW

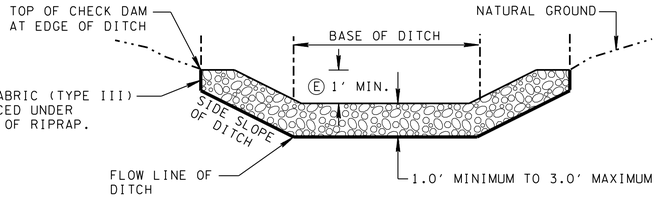


SECTION B - B

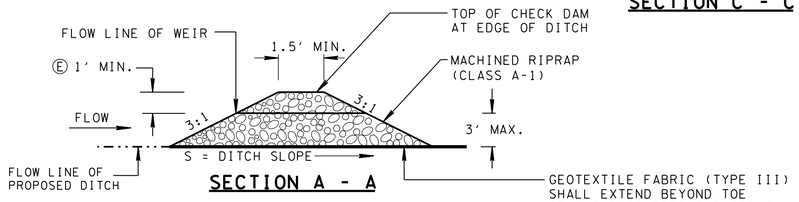
DETAIL FOR TRAPEZOIDAL DITCH



PLAN VIEW

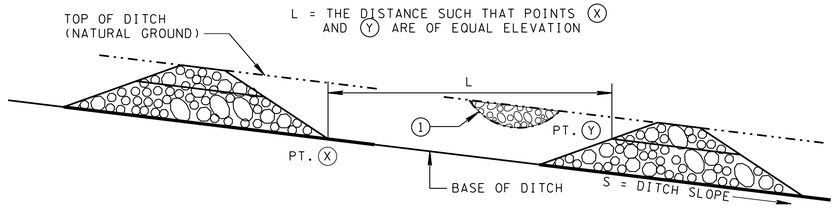


SECTION C - C



SECTION A - A

DETAIL FOR SPACING BETWEEN CHECK DAMS



NOTE (1): FILL LOW AREAS ALONG TOP OF BANK TO PREVENT BACKWATER FROM EXITING DITCH.

ROCK CHECK DAM ESTIMATED QUANTITIES

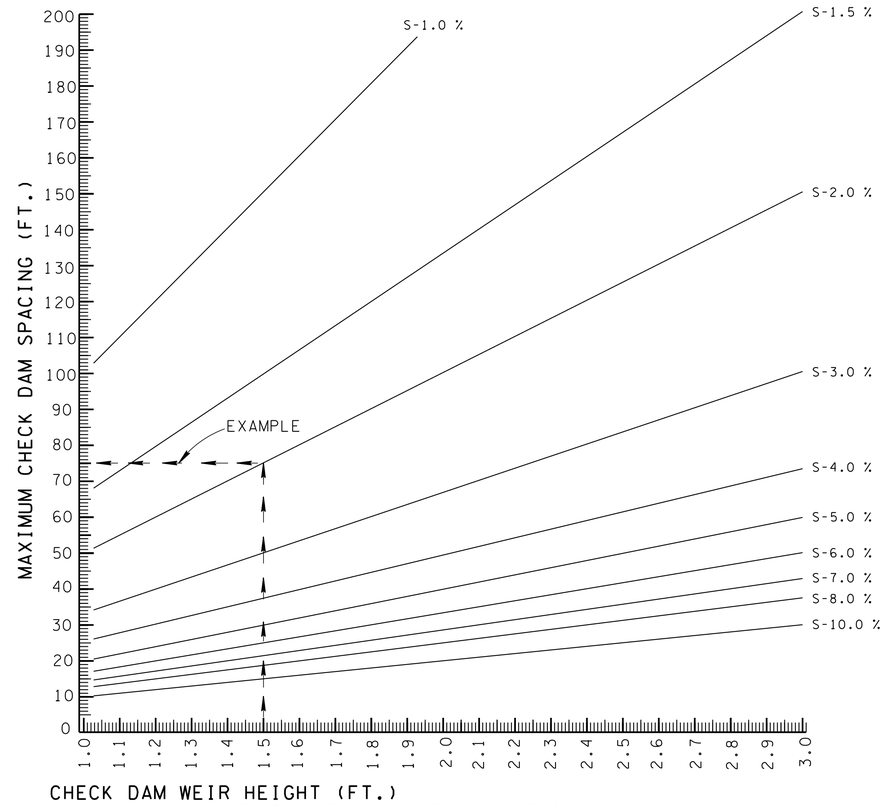
DEPTH	V-DITCH[1] MACHINED RIPRAP (CLASS A-1) (TON)	V-DITCH[1] GEOTEXTILE FABRIC (TYPE III) (S.Y.)	TRAPEZOIDAL DITCH[2] MACHINED RIPRAP (CLASS A-1) (TON)	TRAPEZOIDAL DITCH[2] GEOTEXTILE FABRIC (TYPE III) (S.Y.)
1.5	12.2	26.7	17.2	33.3
2.0	20.2	36.0	27.6	44.0
2.5	31.1	46.7	41.2	56.0
3.0	45.1	58.7	58.3	69.3

1. ESTIMATED QUANTITIES BASED ON 4:1 SIDE SLOPES. QUANTITIES WILL VARY BASED ON ACTUAL DITCH CONFIGURATION.
2. ESTIMATED QUANTITIES BASED ON 4FT BOTTOM WIDTH, AND 4:1 SIDE SLOPES. QUANTITIES WILL VARY BASED ON ACTUAL DITCH CONFIGURATION.

EROSION CONTROL PLAN LEGEND : ROCK CHECK DAM (V-DITCH)

EROSION CONTROL PLAN LEGEND : ROCK CHECK DAM (TRAPEZOIDAL DITCH)

ROCK CHECK DAM SPACING



EXAMPLE: HEIGHT OF WEIR 1.5'; SLOPE 2%
EXTEND PERPENDICULAR FROM 1.5' HEIGHT TO INTERSECT S = 2.0% SLOPE
EXTEND 90° TO THE LEFT TO DETERMINE SPACING (75'+)

- REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-6 TO EC-STR-6.
- REV. 7-29-96: MADE MINOR CORRECTIONS TO GENERAL NOTES.
- REV. 4-15-98: CHANGED PAY ITEMS FOR CHECK DAMS.
- REV. 5-27-01: CHANGED DESCRIPTION FOR GEOTEXTILE FABRIC (TYPE III, CLASS A) TO GEOTEXTILE FABRIC (TYPE III).
- REV. 12-18-02: CHANGED GENERAL NOTE Ⓖ.
- REV. 1-22-03: CORRECTED NOTE IN SECTION A-A.
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REMOVED TEMPORARY REFERENCE, REVISED NOTES, MISC. EDITS TO DRAWING, MODIFIED SPACING CHART.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

ROCK CHECK DAM GENERAL NOTES

(A) ROCK CHECK DAMS ARE TO BE USED FOR VELOCITY REDUCTION AND EROSION PREVENTION IN AREAS WHERE CONCENTRATED FLOW EXISTS. ROCK CHECK DAMS SHALL NOT BE USED IN STREAMS OR OTHER NATURAL WATER RESOURCES. ROCK CHECK DAMS ARE NOT TO BE USED FOR SEDIMENT CONTROL AND SHOULD NOT BE CONSIDERED A SEDIMENT TRAPPING DEVICE.

(B) THE DRAINAGE AREA FOR THE ROCK CHECK DAMS SHALL BE 10 ACRES OR LESS.

(C) ROCK CHECK DAMS MAY REMAIN IN PLACE AS PERMANENT CHECK DAMS, IF SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

(D) THE CENTER OF THE ROCK CHECK DAM MUST BE AT LEAST ONE (1) FOOT LOWER THAN THE OUTER EDGES.

(E) THE DEPTH OF FLOW ON THE CENTER OF THE STRUCTURE SHALL BE COMPUTED FOR THE PEAK FLOW RATE GENERATED BY THE 2-YEAR, 24-HOUR STORM IN ORDER TO ENSURE THAT THE TOP OF THE STRUCTURE WILL NOT BE OVERTOPPED. FOR SITES WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPARIED STREAMS, THE DEPTH SHOULD BE DETERMINED FOR THE 5-YEAR, 24-HOUR PEAK FLOW RATE. THIS WILL ELIMINATE THE ROCK-SOIL FAILURE POINT WHERE THE ROCK CHECK DAM AND NATURAL GROUND MERGE.

(F) FOR SITES WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE MINIMUM HEIGHT OF THE STRUCTURE ABOVE THE DITCH BOTTOM SHALL BE INCREASED TO 2 FEET.

(G) THE MAXIMUM SPACING BETWEEN ROCK CHECK DAMS SHOULD BE SUCH THAT THE TOE OF THE UPSTREAM DAM IS AT THE SAME ELEVATION AS THE FLOW LINE OF THE WEIR OF THE DOWNSTREAM DAM (SEE ROCK CHECK SPACING GRAPH THIS SHEET).

(H) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(I) ANY PRODUCT LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE IS ALSO ACCEPTABLE.

(J) ROCK CHECK DAMS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-08.07 ROCK CHECK DAM PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF ROCK CHECK DAMS.

(K) SEDIMENT SHALL BE REMOVED FROM BEHIND THE ROCK CHECK DAMS WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE DAM AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

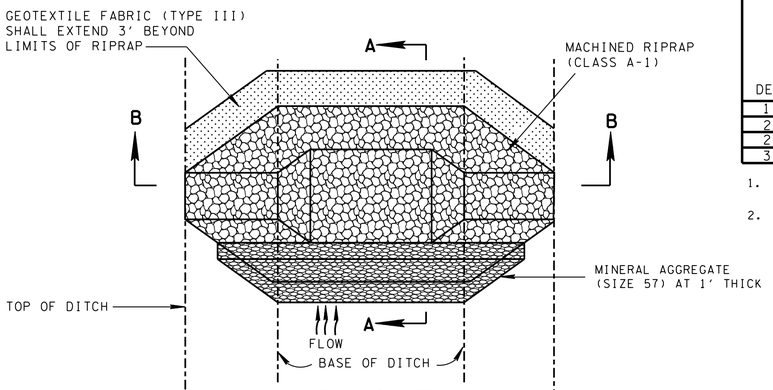
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

ROCK CHECK DAM

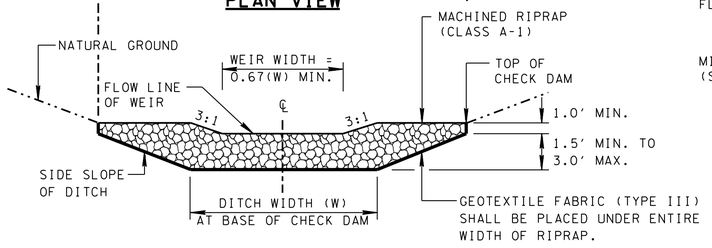
10-26-92 EC-STR-6

REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

DETAIL FOR TRAPEZOIDAL DITCH



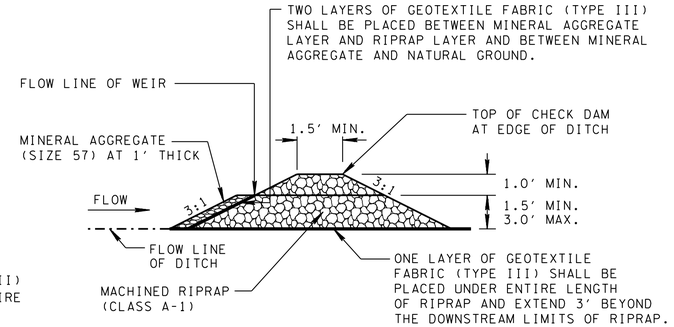
PLAN VIEW



SECTION B - B

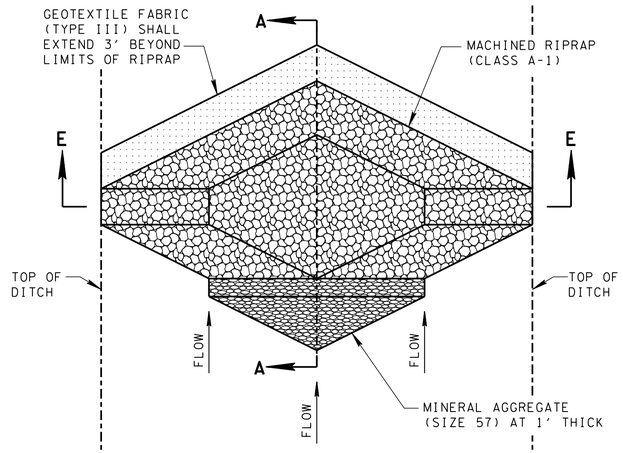
ENHANCED ROCK CHECK DAM ESTIMATED QUANTITIES						
	V-DITCH[1]			TRAPEZOIDAL DITCH[2]		
DEPTH	MINERAL AGGREGATE (SIZE 57) (TON)	MACHINED RIPRAP (CLASS A-1) (TON)	GEOTEXTILE FABRIC (TYPE III) (S.Y.)	MINERAL AGGREGATE (SIZE 57) (TON)	MACHINED RIPRAP (CLASS A-1) (TON)	GEOTEXTILE FABRIC (TYPE III) (S.Y.)
1.5	0.21	12.2	31.7	0.29	17.2	40.3
2.0	0.33	20.2	44.0	0.44	27.6	54.7
2.5	0.48	31.1	58.3	0.62	41.2	71.0
3.0	0.66	45.1	74.7	0.83	58.3	89.3

1. ESTIMATED QUANTITIES BASED ON 4:1 SIDE SLOPES. QUANTITIES WILL VARY BASED ON ACTUAL DITCH CONFIGURATION.
2. ESTIMATED QUANTITIES BASED ON 4FT BOTTOM WIDTH, 4 FT DEPTH, AND 4:1 SIDE SLOPES. QUANTITIES WILL VARY BASED ON ACTUAL DITCH CONFIGURATION.

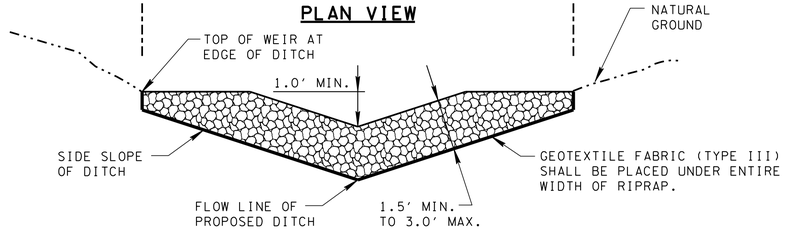


SECTION A - A

DETAIL FOR V-DITCH

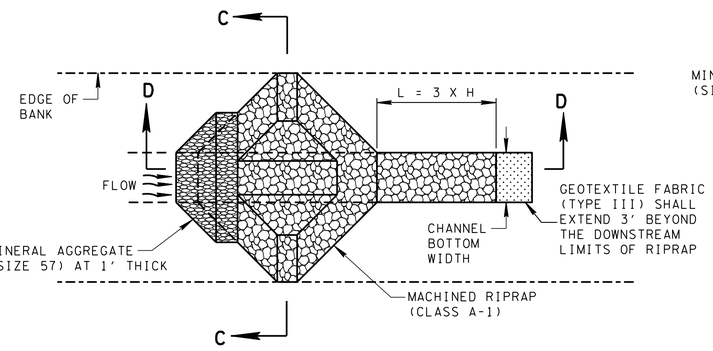


PLAN VIEW

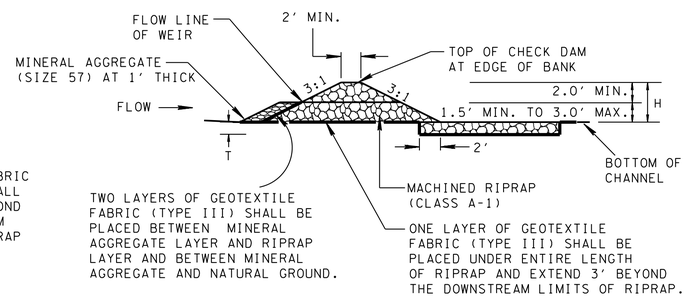


SECTION E - E

DETAIL FOR CHANNELS

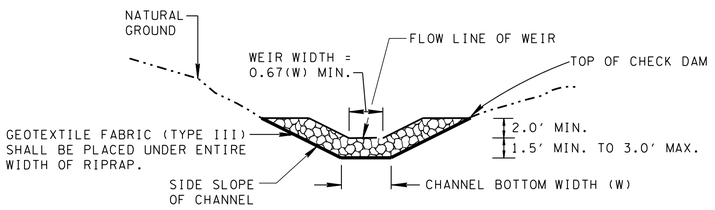


PLAN VIEW



SECTION D - D

T = 1.0' MINIMUM TO 1.5' MAXIMUM
H = HEIGHT OF CHECK DAM
L = LENGTH OF RIPRAP PAD
W = WIDTH OF DITCH (CHANNEL) BOTTOM



SECTION C - C

EROSION CONTROL PLAN LEGEND:

ENHANCED ROCK CHECK DAM (TRAPEZOIDAL DITCH)

ENHANCED ROCK CHECK DAM (V-DITCH)

ENHANCED ROCK CHECK DAM (CHANNEL)

ENHANCED ROCK CHECK DAM GENERAL NOTES

(A) ENHANCED ROCK CHECK DAMS MAY BE USED TO REDUCE FLOW VELOCITIES TO ALLOW SEDIMENTS TO DROP OUT. THEY MAY BE EMPLOYED WHERE THE DRAINAGE AREA EXCEEDS THE MAXIMUM FOR ROCK CHECK DAMS OR WHERE A FILTRATION FUNCTION FOR VERY LOW FLOWS IS DESIRED. ENHANCED ROCK CHECK DAMS SHALL NOT BE USED IN STREAMS OR WETLANDS UNLESS PROVIDED FOR IN THE PERMITS.

(B) AT MOST SITES, THE MAXIMUM ALLOWABLE DRAINAGE AREA SHALL BE 30 ACRES. AT SITES WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE MAXIMUM ALLOWABLE DRAINAGE AREA SHALL BE 20 ACRES.

(C) ENHANCED CHECK DAM MAY REMAIN IN PLACE AS PERMANENT CHECK DAM. IF SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

(D) THE CENTER OF THE ENHANCED ROCK CHECK DAM USED IN DITCHES MUST BE AT LEAST ONE (1) FOOT LOWER THAN THE OUTER EDGES. THE CENTER OF ENHANCED ROCK CHECK DAMS USED IN CHANNELS MUST BE AT LEAST TWO (2) FEET LOWER THAN THE OUTER EDGES.

(E) THE DEPTH OF FLOW ON THE CENTER OF THE STRUCTURE SHALL BE COMPUTED FOR THE PEAK FLOW RATE GENERATED BY THE 2-YEAR, 24-HOUR STORM IN ORDER TO ENSURE THAT THE TOP OF THE STRUCTURE WILL NOT BE OVERTOPPED. FOR SITES WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT IMPAIRED STREAMS, THE DEPTH SHOULD BE DETERMINED FOR THE 5-YEAR, 24-HOUR PEAK FLOW RATE. THIS WILL ELIMINATE THE ROCK - SOIL FAILURE POINT WHERE THE ENHANCED ROCK CHECK DAM AND NATURAL GROUND MERGE.

(F) THE MAXIMUM SPACE BETWEEN ENHANCED ROCK CHECK DAMS SHOULD BE SUCH THAT THE TOE OF THE UPSTREAM IS AT THE SAME ELEVATION AS THE FLOW LINE OF THE WEIR OF THE DOWNSTREAM DAM. (SEE ROCK CHECK DAM SPACING GRAPH ON EC-STR-6)

(G) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(H) ANY PRODUCT LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE TO ENHANCED ROCK CHECK DAM IS ALSO ACCEPTABLE.

(I) ENHANCED ROCK CHECK DAMS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-08.08 ENHANCED ROCK CHECK DAM PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF ENHANCED ROCK CHECK DAMS.

(J) SEDIMENT SHALL BE REMOVED FROM BEHIND THE ENHANCED ROCK CHECK DAM WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE STRUCTURE AND PAID FOR UNDER ITEM NUMBER 209-05, SEDMENT REMOVAL PER CUBIC YARD.

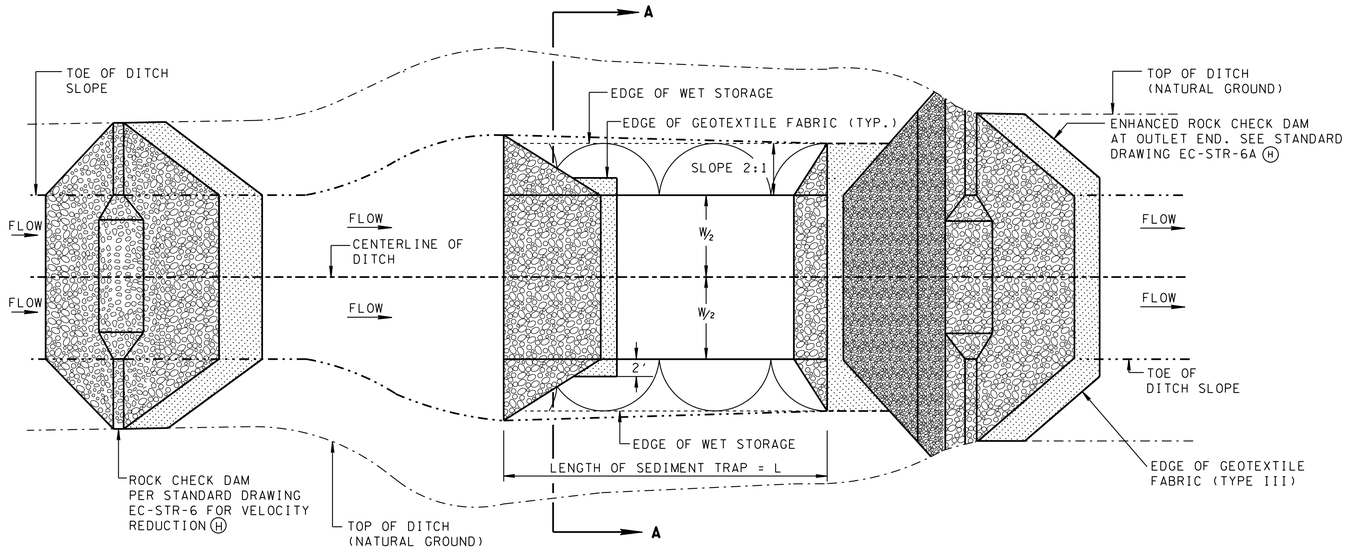
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

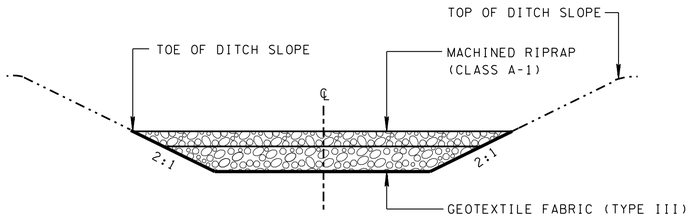
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

ENHANCED ROCK CHECK DAM

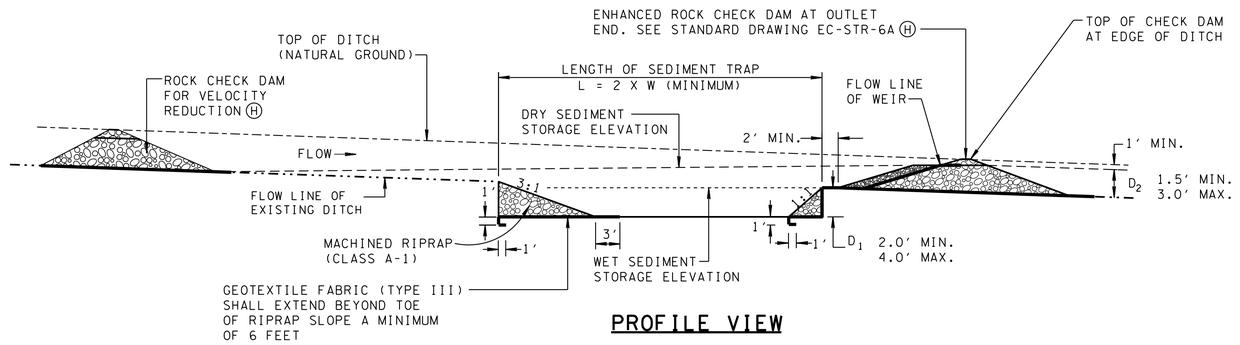
4-1-08 EC-STR-6A



PLAN VIEW



SECTION A - A



PROFILE VIEW

GENERAL NOTES

(A) SEDIMENT TRAPS WITH CHECK DAMS DETAIN SEDIMENT LADEN STORMWATER RUNOFF FROM SMALL DISTURBED AREAS SO THE MAJORITY OF THE SEDIMENT CAN SETTLE OUT. SEDIMENT TRAPS WITH CHECK DAMS SHALL NOT BE USED IN STREAMS OR WETLANDS UNLESS PROVIDED FOR IN THE PERMITS.

(B) THE DRAINAGE AREA FOR THE SEDIMENT TRAP SHALL BE 3 ACRES OR LESS.

(C) THE BELOW GROUND SEDIMENT TRAP IS LOCATED IN A DITCH LINE AND WILL REQUIRE GEOTEXTILE FABRIC (TYPE III) AND RIPRAP AT BOTH ENDS.

(D) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(E) FOR INSTALLATION DETAILS AND ITEM NUMBERS FOR ROCK CHECK DAMS (EC-STR-6), ENHANCED ROCK CHECK DAMS (EC-STR-6A), AND GABION CHECK DAMS (EC-STR-55) REFER TO THEIR RESPECTIVE STANDARD DRAWING.

(F) SEDIMENT TRAP WITH CHECK DAM SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-10.20 TEMPORARY SEDIMENT TRAP PER CUBIC YARD

ROCK CHECK DAMS, ENHANCED ROCK CHECK DAMS, AND GABION CHECK DAMS SHALL BE PAID FOR ACCORDING TO THEIR RESPECTIVE STANDARD DRAWING.

PAYMENT SHALL INCLUDE ALL MATERIALS, EXCAVATION, AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE SEDIMENT TRAP WITH CHECK DAM.

(G) SEDIMENT SHALL BE REMOVED FROM THE SEDIMENT TRAP WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE STRUCTURE AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

(H) GABION CHECK DAM PER STANDARD DRAWING EC-STR-55 MAY BE SUBSTITUTED WHERE REQUIRED.

EROSION CONTROL PLAN LEGEND: SEDIMENT TRAP WITH ENHANCED ROCK CHECK DAM

EROSION CONTROL PLAN LEGEND: SEDIMENT TRAP WITH GABION CHECK DAM

REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-7 TO EC-STR-7.

☐ REV. 5-27-01: CHANGED ITEM NOS. 209-10.01 THROUGH 209-10.19 TO 209-10.20.

☐ REV. 9-5-01: CORRECTED NOTE REGARDING GEOTEXTILE FABRIC IN SECTION A-A AND SECTION B-B.

☐ REV. 12-18-02: CHANGED GENERAL NOTE (D).

☐ REV. 1-22-03: CORRECTED GENERAL NOTE (B). ADDED ADDITIONAL GEOTEXTILE FABRIC TO PROFILE VIEW.

☐ REV. 7-29-04: ADDED ROCK CHECK DAM TO PLAN AND PROFILE VIEWS. CHANGED GENERAL NOTE (B).

☐ REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.

☐ REV. 4-1-08: REMOVED TEMPORARY REFERENCE, CHANGED SILT SCREEN TO ENHANCED CHECK DAM, ADDED GABION ALTERNATE, REVISED NOTES, MISC. DRAWING EDITS.

☐ REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

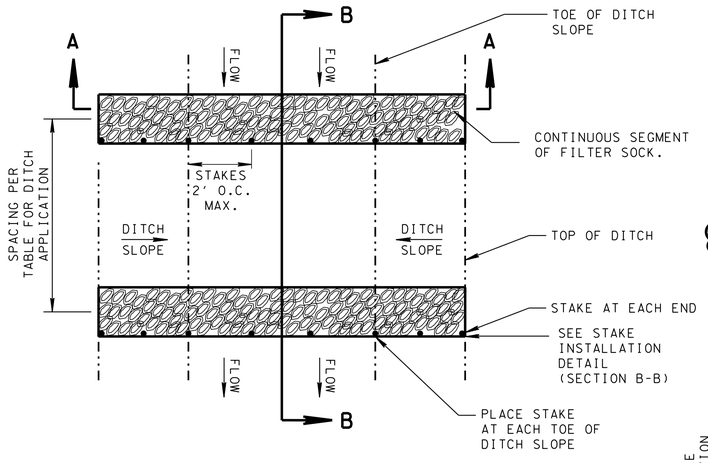
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

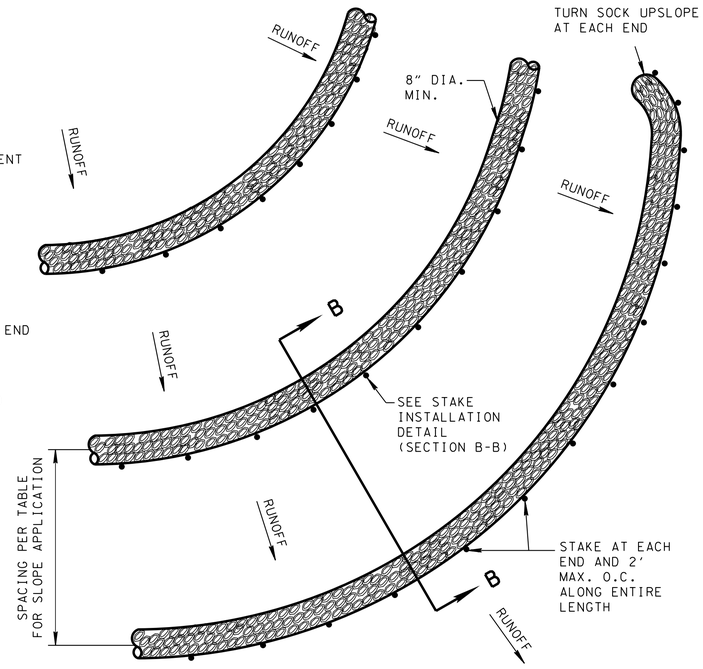
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SEDIMENT TRAP WITH CHECK DAM

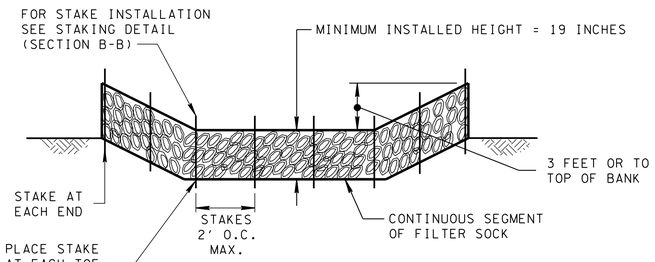
10-26-92 EC-STR-7



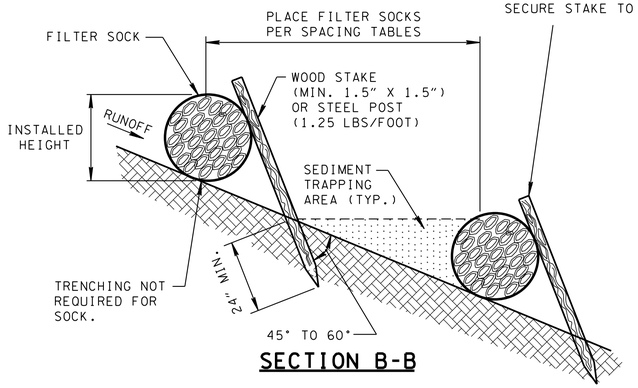
PLAN VIEW FOR DITCH APPLICATION



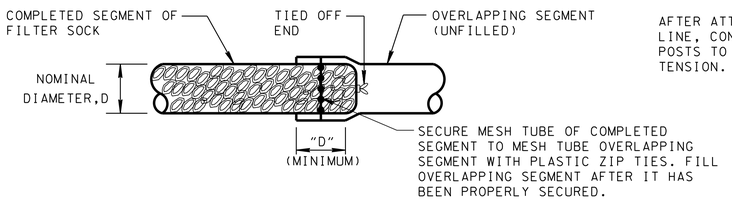
PLAN VIEW FOR SLOPE APPLICATION



SECTION A-A



SECTION B-B



FILTER SOCK JOINT DETAIL (FOR SLOPE APPLICATION ONLY)

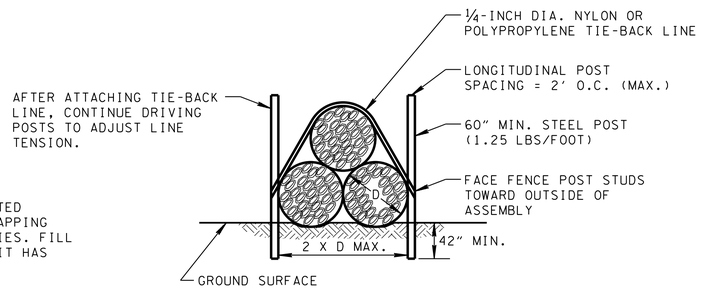
SOCK HEIGHTS INSTALLED

NOMINAL DIAMETER, D	INSTALLED HEIGHT OF SINGLE SOCK	INSTALLED HEIGHT OF STACKED SOCKS
8"	6.5"	N/A
12"	9.5"	19"
18"	14.5"	29"
24"	19"	38"

MINIMUM SPECIFICATION FOR FILTER MEDIA

PROPERTY	UNITS	RANGE
pH	pH	5.0 - 8.5
MOISTURE CONTENT	% WET WEIGHT BASIS	< 60
ORGANIC MATTER CONTENT	% DRY WEIGHT BASIS	25 - 100
PHYSICAL CONTAMINANTS	% DRY WEIGHT BASIS	< 1
PARTICLE SIZE	% PASSING SELECTED MESH SIZE, DRY WEIGHT BASIS	2 INCH - 99% ⅜INCH - 30% - 50% MAX. PARTICLE SIZE 2 INCHES

NOTE: MANUFACTURER SPECIFICATION MAY BE SUBSTITUTED WITH THE APPROVAL OF ENGINEER.



FILTER SOCK STACKING DETAIL

SEE NOTE Ⓓ

EROSION CONTROL PLAN LEGEND: ••SOCK••SOCK••SOCK••SOCK•• FILTER SOCK

FILTER SOCK CHECK DAM ESTIMATED QUANTITIES

	V-DITCH [1]			TRAPEZOIDAL DITCH [2]		
	24' FILTER SOCK (INSTALLED HEIGHT 19")	12" FILTER SOCK STACKED (INSTALLED HEIGHT 19")	18" FILTER SOCK STACKED (INSTALLED HEIGHT 29")	24' FILTER SOCK (INSTALLED HEIGHT 19")	12" FILTER SOCK STACKED (INSTALLED HEIGHT 19")	18" FILTER SOCK STACKED (INSTALLED HEIGHT 29")
LENGTH(FT)	20	60	48	24	72	60

1. ESTIMATED QUANTITIES BASED ON 4:1 SIDE SLOPES. QUANTITIES WILL VARY BASED ON ACTUAL DITCH CONFIGURATION.
2. ESTIMATED QUANTITIES BASED ON 4FT BOTTOM WIDTH, 4 FT DEPTH, AND 4:1 SIDE SLOPES. QUANTITIES WILL VARY BASED ON ACTUAL DITCH CONFIGURATION.

FILTER SOCK SPACING FOR SLOPE APPLICATION

SLOPE	8"	12"	18"	24"
2%	70'	100'	N/A	N/A
5%	30'	60'	100'	100'
10%	20'	30'	70'	100'
6:1	N/A	20'	40'	55'
4:1	N/A	20'	30'	30'
3:1	N/A	N/A	20'	25'
2:1	N/A	N/A	20'	20'

N/A = NOT RECOMMENDED

FILTER SOCK SPACING FOR DITCH APPLICATION

DITCH SLOPE	MAXIMUM FILTER SOCK SPACING
LESS THAN 2%	125'
2%	100'
3%	70'
4%	50'
5%	40'
6%	30'
GREATER THAN 6%	25'

BASED ON AN INSTALLED HEIGHT OF 19 INCHES. SEE NOTE D.

FILTER SOCK GENERAL NOTES

Ⓐ FILTER SOCKS CAN BE PLACED IN DITCHES OR AT THE TOP, ON THE FACE, OR AT THE TOE OF SLOPES AS SEDIMENT-TRAPPING DEVICES. THEY CAN ALSO SERVE TO REMOVE SEDIMENT FROM RUNOFF AND RELEASE IT AS SHEET FLOW.

Ⓑ FILTER SOCKS INSTALLED ON A SLOPE SHALL BE PLACED ALONG OR ON THE GROUND CONTOUR. WHERE POSSIBLE FILTER SOCKS APPLIED AT THE TOE OF A SLOPE SHOULD BE PLACED 10 FEET AWAY FROM THE TOE IN ORDER TO PROVIDE SEDIMENT STORAGE. THE MAXIMUM DRAINAGE AREA SHALL BE ¼ ACRE PER 100 LF OF SOCK.

Ⓒ FOR DITCH APPLICATIONS, THE MAXIMUM DRAINAGE AREA SHALL BE 15 ACRES. AT SITES WHICH OUTFALL TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE MAXIMUM DRAINAGE AREA SHALL BE LIMITED TO 10 ACRES. FILTER SOCKS SHALL NOT BE USED IN STREAMS, WETLANDS, OTHER NATURAL WATER RESOURCES, OR IN DITCHES WITH CONTINUOUS FLOWS.

Ⓓ FOR DITCH APPLICATIONS, THE MINIMUM INSTALLED HEIGHT OF A SINGLE SOCK, OR OF AN ASSEMBLY OF STACKED SOCKS, SHALL BE 19 INCHES. FILTER SOCKS MAY BE STACKED AS DETAILED ON THIS DRAWING TO ACHIEVE THE REQUIRED HEIGHT. SOCKS SHALL BE PLACED PERPENDICULAR TO THE FLOW OF WATER. FILTER SOCKS SHALL CONTINUE UP THE SIDE SLOPES TO THE TOP OF BANK OR A MAXIMUM OF 3 FEET ABOVE THE INSTALLED HEIGHT FILTER SOCKS SHALL REMAIN IN PLACE UNTIL ALL UPSTREAM AREAS ARE PERMANENTLY STABILIZED.

Ⓔ FILTER SOCKS SHALL CONSIST OF A TUBULAR MESH SOCK WITH OPENINGS NO GREATER THAN 3/8THS OF AN INCH IN SIZE. THE MESH SOCK IS NOT REQUIRED TO BE BIODEGRADABLE. FILL MATERIAL SHALL CONSIST OF EITHER WOOD CHIPS (MULCH) OR A 50/50 COMBINATION OF WOOD CHIPS AND MANUFACTURED COMPOST MATERIAL.

Ⓕ FILTER SOCKS ARE TYPICALLY SUPPLIED AND INSTALLED IN DIAMETERS OF 8, 12, 18 OR 24 INCHES. DIAMETER TOLERANCE IS 2 INCHES. A FILTER SOCK WILL FLATTEN OUT TO AN OVAL WHEN IT IS PLACED; THUS, THE INSTALLED HEIGHT WILL BE LESS THAN THE NOMINAL DIAMETER.

Ⓖ STEEL POSTS SHALL BE ROLLED FROM HIGH CARBON STEEL AND SHALL HAVE A MINIMUM WEIGHT OF 1.25 LB/FT. POSTS SHALL BE HOT-DIPPED GALVANIZED OR PAINTED WITH HIGH GRADE WEATHER RESISTANT STEEL PAINT. STEEL POSTS SHALL BE EQUIPPED WITH AN ANCHOR PLATE HAVING A MINIMUM AREA OF 14 SQUARE INCHES. POSTS SHALL BE STUDDED, EMBOSSED, OR PUNCHED. POSTS AND ANCHOR PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A702.

Ⓗ FILTER SOCKS ARE FILLED ON THE PROJECT SITE AND MAY BE UP TO 250 FEET LONG. WHEN USED ON LONG SLOPES, FILTER SOCKS MAY BE JOINTED AS SHOWN ON THIS DRAWING.

Ⓘ ANY PRODUCT LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE TO FILTER SOCKS IS ALSO ACCEPTABLE. FOR DITCH APPLICATIONS, SANDBAG OR GRAVEL BAG BERMS MAY ALSO BE USED AS ALTERNATE MATERIALS.

Ⓙ FILTER SOCKS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-03.20 FILTER SOCK (8 INCH) PER LINEAR FOOT
209-03.21 FILTER SOCK (12 INCH) PER LINEAR FOOT
209-03.22 FILTER SOCK (18 INCH) PER LINEAR FOOT
209-03.23 FILTER SOCK (24 INCH) PER LINEAR FOOT
209-08.09 FILTER SOCK CHECK DAM PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF FILTER SOCKS.

Ⓚ SEDIMENT SHALL BE REMOVED FROM BEHIND THE FILTER SOCK WHEN IT HAS ACCUMULATED TO ONE-HALF OF THE ORIGINAL HEIGHT OF THE STRUCTURE AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

Ⓛ FILTER SOCKS SHALL BE INSPECTED AFTER EACH RUNOFF EVENT AND SHALL BE REMOVED AND REPLACED IF SIGNS OF UNDERCUTTING OR DOWNSTREAM RILLS ARE OBSERVED.

Ⓜ FILTER SOCKS SHOULD BE REMOVED FROM SLOPES AFTER STABILIZATION IS COMPLETE. THIS MAY BE ACCOMPLISHED BY CUTTING THE SOCK OPEN AND SPREADING THE FILL MATERIAL ON THE SITE. ALL NON-BIODEGRADABLE MATERIALS SHALL BE REMOVED. FILTER SOCKS APPLIED IN DITCHES SHALL BE COMPLETELY REMOVED.

☐ REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

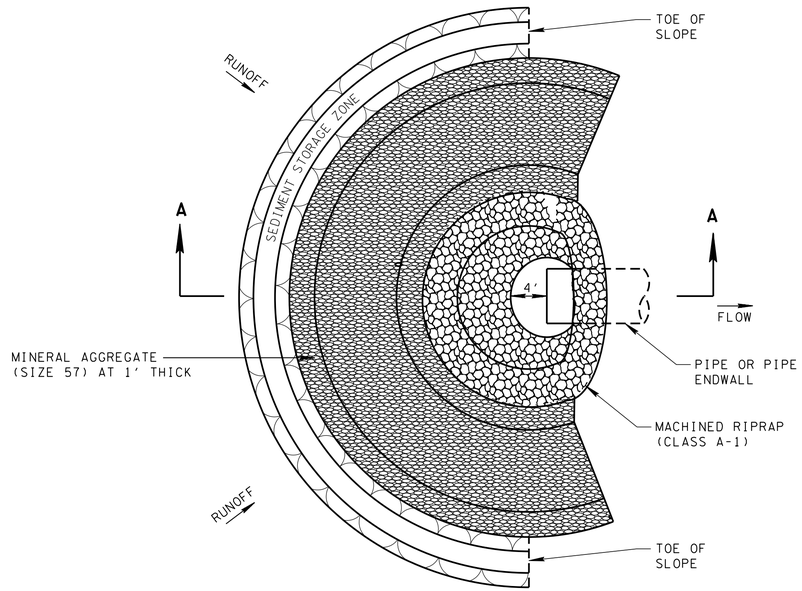
FILTER SOCK

4-1-08 EC-STR-8

REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-11 TO EC-STR-11.

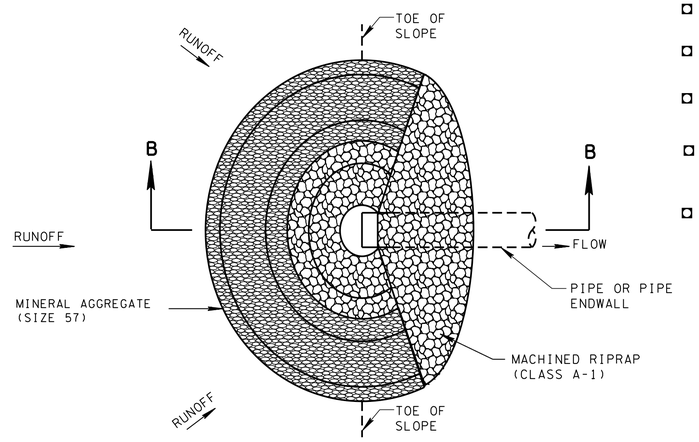
- REV.5-27-01: CHANGED ITEM NOS. 303-15.01 TO 303-10.01 AND 740-03.01 TO 740-10.03. CHANGED DESCRIPTION FOR ITEM NOS. 709-05.05, 709-05.06, AND 709-05.07.
- REV. 12-18-02: CHANGED GENERAL NOTE (D).
- REV. 1-22-03: ADDED ADDITIONAL GEOTEXTILE FABRIC TO ALL SECTIONAL VIEW.
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REMOVED DITCH AND CHANNEL APPLICATION, RENAMED DRAWING, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

DETAIL FOR UP TO 36" PIPE SIZE

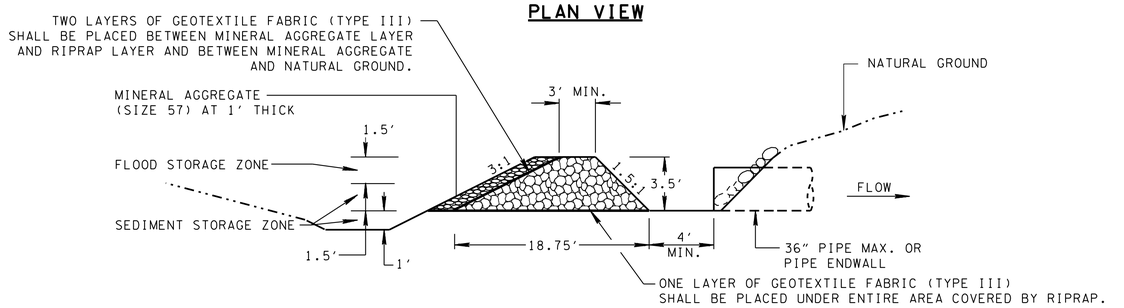


PLAN VIEW

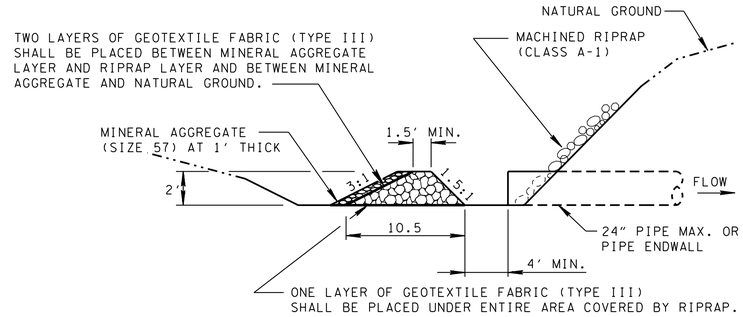
DETAIL FOR 18" TO 24" PIPE SIZE



PLAN VIEW



SECTION A - A



SECTION B - B

CULVERT PROTECTION TYPE 1 GENERAL NOTES

(A) CULVERT PROTECTION (TYPE 1) MAY BE USED AROUND A CULVERT INLET TO REDUCE FLOW VELOCITIES TO ALLOW SEDIMENTS TO DROP OUT. IT IS NORMALLY USED WHERE ALL OF THE INFLOW TO THE CULVERT IS ON-SITE RUNOFF. IT MAY ALSO BE USED WHERE A FILTRATION FUNCTION FOR VERY LOW FLOWS IS DESIRED.

(B) CULVERT PROTECTION (TYPE 1) SHALL NOT BE USED IN STREAMS OR OTHER NATURAL WATER RESOURCES, UNLESS PROVIDED FOR IN THE PERMITS.

(C) CULVERT PROTECTION (TYPE 1) SHOULD NOT BE USED IN DITCHES, SWALES, OR OTHER DEPRESSIONS WITH A DEPTH GREATER THAN 1 FOOT.

(D) CULVERT PROTECTION (TYPE1) SHOULD NOT BE USED AT THE CULVERT OUTLET.

(E) WHERE CONDITIONS OF HIGH SEDIMENT FLOW EXIST, MACHINED RIPRAP (CLASS A-3) MAY BE USED IN LIEU OF MACHINED RIPRAP (CLASS A-1) FOR PIPES UP TO 24 INCHES IN DIAMETER WITH A DRAINAGE AREA LESS THAN 3 ACRES. IT MAY ALSO BE USED FOR PIPE FROM 24 INCHES IN DIAMETER WITH A DRAINAGE AREA LESS THAN 6 ACRES.

(F) AT MOST SITES, THE MAXIMUM ALLOWABLE DRAINAGE AREA SHALL BE 30 ACRES. AT SITES WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE MAXIMUM ALLOWABLE DRAINAGE AREA SHALL BE 20 ACRES.

(G) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(H) CULVERT PROTECTION (TYPE 1) SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

203-01	ROAD & DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD
303-10.01	MINERAL AGGREGATE (SIZE 57) PER TON
709-05.05	MACHINED RIPRAP (CLASS A-3) PER TON
709-05.06	MACHINED RIPRAP (CLASS A-1) PER TON
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF CULVERT PROTECTION (TYPE 1).

(I) SEDIMENT SHALL BE REMOVED FROM BEHIND THE CULVERT PROTECTION (TYPE 1) WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE STRUCTURE AND PAID FOR UNDER ITEM NUMBER 209-05, SEDMENT REMOVAL PER CUBIC YARD.

EROSION CONTROL PLAN LEGEND: CULVERT PROTECTION (TYPE 1)

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

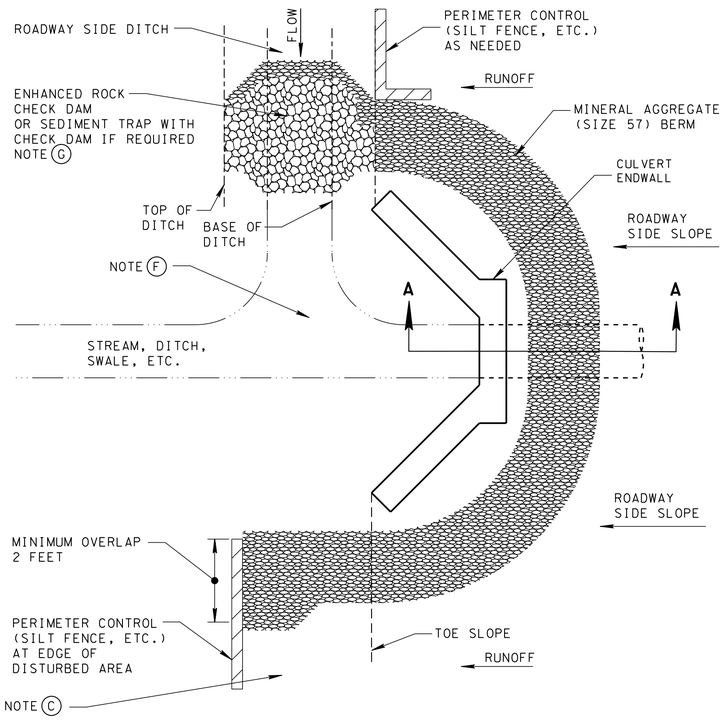
NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

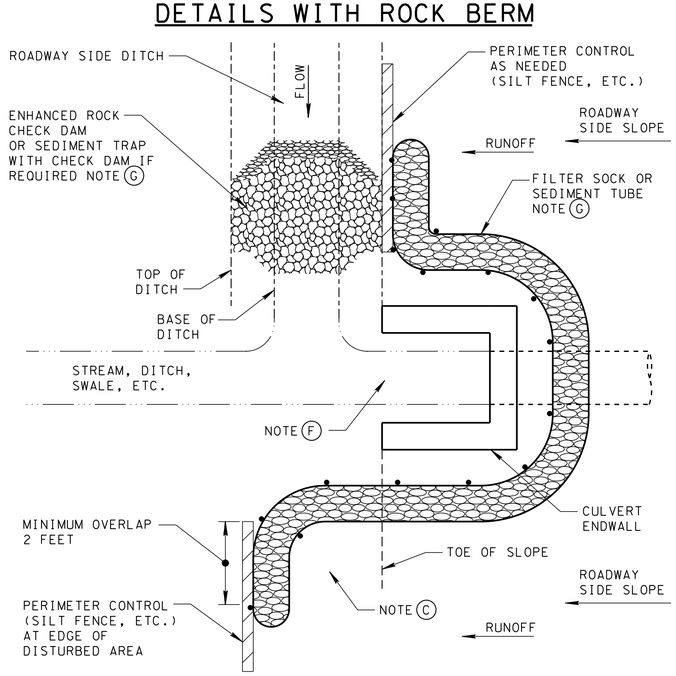
CULVERT PROTECTION TYPE 1

10-26-92 | EC-STR-11

REV. 8-1-12: MINOR EDITS TO DRAWING AND NOTES.

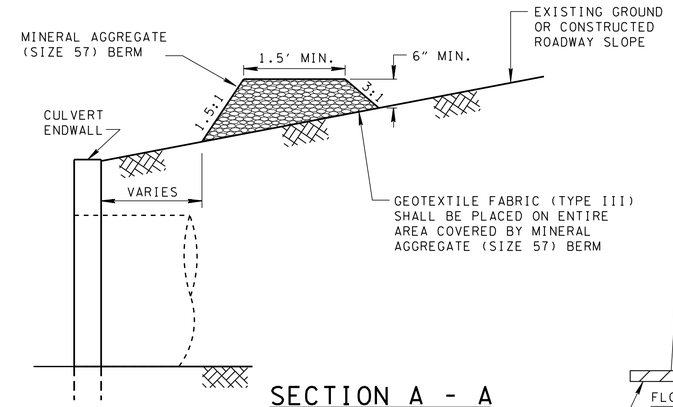


DETAILS WITH ROCK BERM

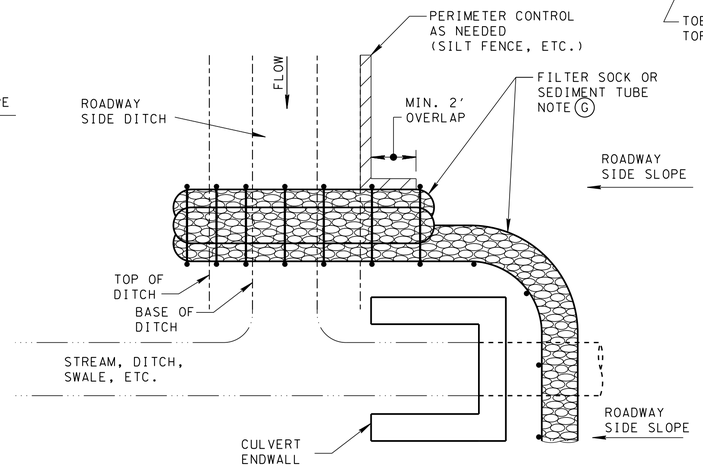


DETAILS WITH ALTERNATE MATERIALS

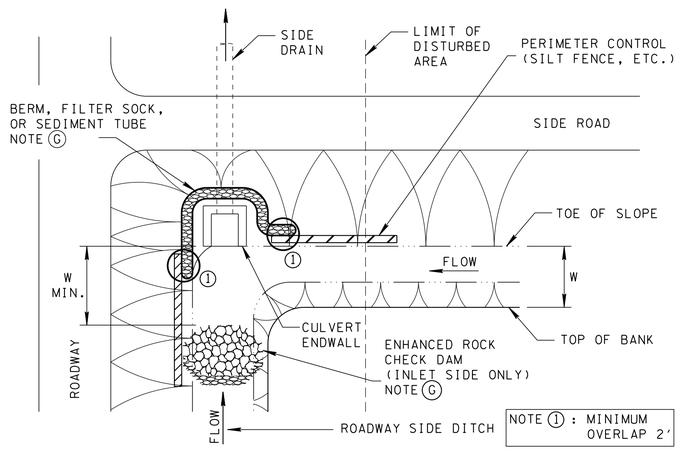
EROSION CONTROL PLAN LEGEND: CULVERT PROTECTION (TYPE 2)



SECTION A - A

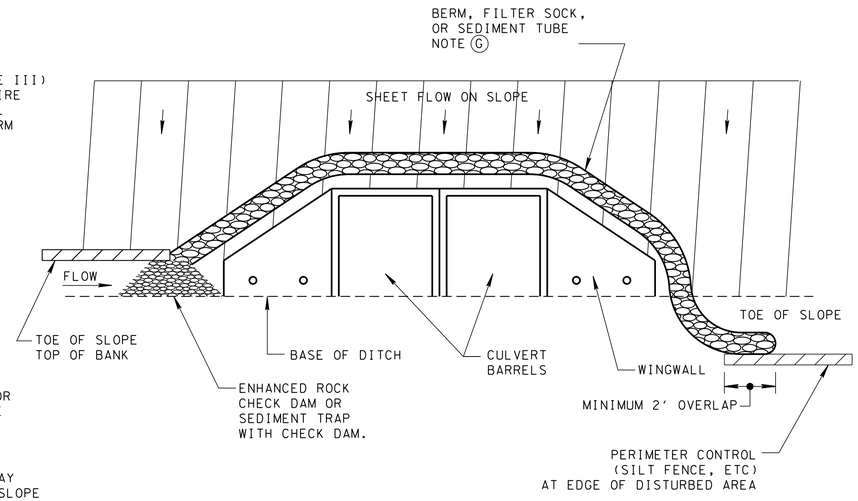


STACKED FILTER SOCK OR SEDIMENT TUBE FOR ROADWAY SIDE DITCHES



SIDE DRAIN APPLICATION

MAY BE APPLIED AT SIDE ROAD OR PRIVATE DRIVES



BOX CULVERT APPLICATION

CULVERT PROTECTION TYPE 2 GENERAL NOTES

(A) CULVERT PROTECTION TYPE 2 MAY BE USED AT SITES WHERE A CULVERT CONVEYS A SIGNIFICANT AMOUNT OF RUN-ON FLOW. IT CONSISTS OF ONE OR MORE EROSION PREVENTION OR SEDIMENT CONTROL MEASURES WHICH SERVE TO REMOVE SEDIMENTS FROM ON-SITE RUNOFF WHILE ALLOWING RUN-ON FLOWS TO PASS THROUGH UNIMPEDED. CULVERT PROTECTION TYPE 2 MAY BE USED AT ANY CULVERT, INLET OR OUTLET, INCLUDING THOSE WHICH CONVEY A PERENNIAL STREAM WHERE CULVERT PROTECTION TYPE 1 WOULD NOT BE ALLOWED IN THE CHANNEL.

(B) WHERE A SIDE DITCH IS LOCATED ADJACENT TO THE ROADWAY, CULVERT PROTECTION TYPE 2 SHALL EITHER BE CONTINUOUS WITH THE CHECK DAM OR ELSE TERMINATE ADJACENT TO IT AS SHOWN.

(C) IN SITUATIONS WHERE NO SIDE DITCH IS REQUIRED, EXTEND THE PROTECTION TO THE EDGE OF THE DISTURBED AREA AND OVERLAP WITH THE PERIMETER CONTROLS A MINIMUM OF 2 FEET.

(D) THE ENDWALLS SHOWN IN THIS DRAWING ARE FOR ILLUSTRATIVE PURPOSES ONLY. CULVERT PROTECTION TYPE 2 MAY BE USED WITH ANY TYPE OF CULVERT ENDWALL OR WITH BOX BRIDGE WINGWALLS.

(E) CULVERT PROTECTION TYPE 2 IS SHOWN ON THIS DRAWING WITH ENDWALL IN PLACE. HOWEVER, IT SHOULD BE APPLIED AS SOON AS GRADING ACTIVITIES ABOVE THE CULVERT ARE COMPLETE, AND THUS MAY BE IN PLACE PRIOR TO ENDWALL CONSTRUCTION.

(F) ANY DISTURBED AREAS IN FRONT OF THE ENDWALL SHALL BE PROVIDED WITH EITHER TEMPORARY SEEDING, SOD, OR PERMANENT SEEDING WITH EROSION CONTROL BLANKET AS APPROPRIATE.

(G) FOR INSTALLATION DETAILS AND ITEM NUMBERS FOR SILT FENCE (EC-STR-3B), SILT FENCE WITH WIRE BACKING (EC-STR-3C), ENHANCED ROCK CHECK DAM (EC-STR-6A), SEDIMENT TRAP WITH CHECK DAM (EC-STR-7), FILTER SOCK (EC-STR-8), AND SEDIMENT TUBE (EC-STR-37) REFER TO THEIR RESPECTIVE STANDARD DRAWING.

(H) CULVERT PROTECTION (TYPE 2) SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

303-10.01 MINERAL AGGREGATE (SIZE 57) PER TON
740-10.03 GEOTEXTILE (TYPE III) EROSION CONTROL PER SQUARE YARD

SILT FENCE, SILT FENCE WITH WIRE BACKING, ENHANCED ROCK CHECK DAM, SEDIMENT TRAP WITH CHECK DAM, FILTER SOCK, AND SEDIMENT TUBE SHALL BE PAID FOR UNDER THEIR RESPECTIVE STANDARD DRAWING.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF CULVERT PROTECTION (TYPE 2).

(I) SEDIMENT SHALL BE REMOVED FROM THE CULVERT PROTECTION (TYPE 2) BASED ON THE CRITERIA SHOWN ON THE STANDARD DRAWINGS FOR THE SPECIFIC MEASURES BEING EMPLOYED AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

(J) MAINTENANCE SHALL BE PERFORMED AS NEEDED BASED ON THE MAINTENANCE REQUIREMENTS FOR THE SPECIFIC MEASURES BEING EMPLOYED.

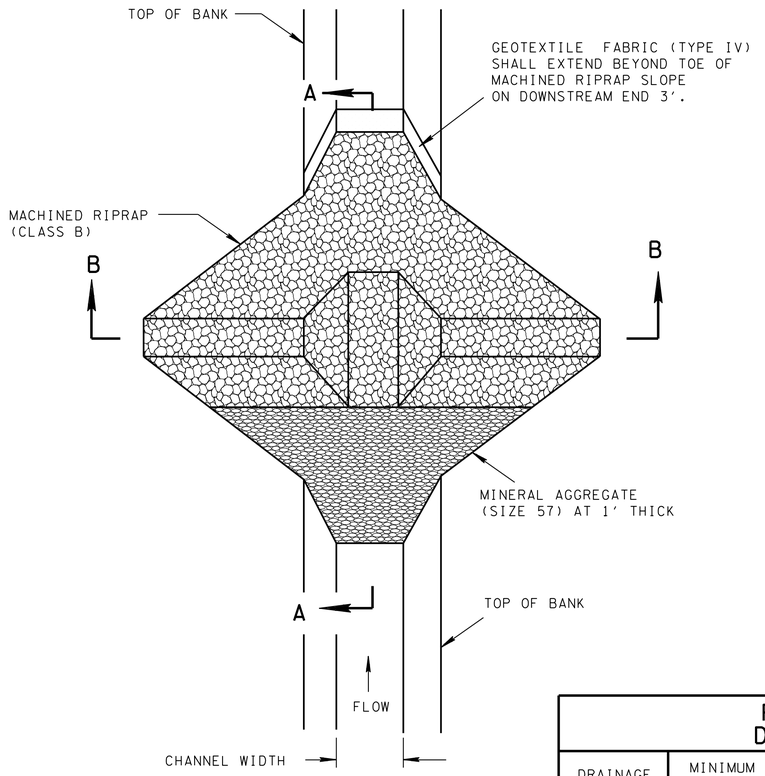
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

CULVERT PROTECTION TYPE 2

4-1-08 EC-STR-11A



PLAN VIEW

WEIR HEIGHT AND TOP WIDTH		
HEIGHT OF DAM (D) IN FEET	WEIR HEIGHT (Do) IN FEET	WIDTH AT TOP OF DAM (W) IN FEET
5 - 7	3 - 5	4
7 - 8	5 - 6	5
8 - 10	6 - 8	6

MAXIMUM HEIGHT (Do) OF DAM AT WEIR IS 8 FEET.

ROCK SEDIMENT DAM DIMENSIONS				
DRAINAGE AREA (ACRES)	MINIMUM WEIR LENGTH, Bw (FEET)	MINIMUM CHANNEL WIDTH (FEET)	MAXIMUM WEIR FLOW VELOCITY (FT/SEC)	MINIMUM REQ'D WEIR HEIGHT, Do (FEET)
20	4.0	4.0	4.97	3.0
30	4.0	4.0	5.43	3.5
40	4.0	4.0	5.70	4.0
50	4.2	6.3	5.92	4.5

ROCK SEDIMENT DAM GENERAL NOTES

(A) ROCK SEDIMENT DAMS ARE FOR TEMPORARY USE. WHERE A PERMANENT FACILITY IS REQUIRED, CONSIDER THE USE OF A SEDIMENT BASIN, WHICH CAN BE CONVERTED INTO A PERMANENT DETENTION BASIN. ROCK SEDIMENT DAMS WILL REQUIRE A PERMIT IF USED IN A STREAM.

(B) THE MAXIMUM DRAINAGE AREA SHALL BE 50 ACRES.

(C) ROCK SEDIMENT DAMS SHALL ONLY BE USED WHEN THE WATER IMPOUNDMENT AREA CAN BE CONTAINED WITHIN THE RIGHT-OF-WAY OR WITHIN A DRAINAGE EASEMENT FOR THE PROJECT.

(D) ROCK SEDIMENT DAM IMPOUNDMENTS SHOULD BE DEWATERED WITH A DEWATERING STRUCTURE (EC-STR-1) OR SEDIMENT FILTER BAG (EC-STR-2) AS NEEDED. REFER TO THEIR RESPECTIVE STANDARD DRAWING FOR INSTALLATION DETAILS AND ITEM NUMBERS.

(E) THE CENTER OF THE ROCK SEDIMENT DAM MUST BE AT LEAST TWO (2) FEET LOWER THAN THE OUTER EDGES. THIS WILL ELIMINATE THE ROCK - SOIL FAILURE POINT WHERE THE SEDIMENT DAM AND NATURAL GROUND MERGE.

(F) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(G) ONLY GEOTEXTILE FABRIC (TYPE IV) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

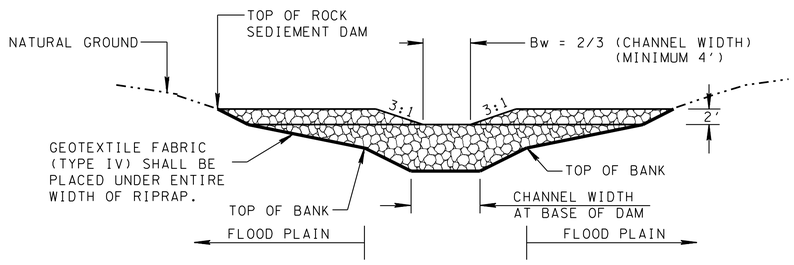
(H) ROCK SEDIMENT DAMS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

203-01	ROAD AND DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD
303-10.01	MINERAL AGGREGATE (SIZE 57) PER TON
709-05.08	MACHINED RIPRAP (CLASS B) PER TON
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD
740-10.04	GEOTEXTILE (TYPE IV) (STABILIZATION) PER SQUARE YARD

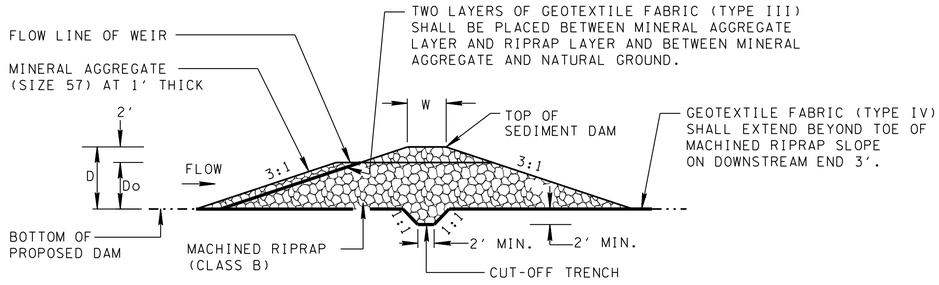
DEWATERING STRUCTURES AND SEDIMENT FILTER BAGS SHALL BE PAID FOR UNDER THEIR RESPECTIVE STANDARD DRAWING.

PAYMENT SHALL INCLUDE ALL MATERIALS, EXCAVATION, AND LABOR NECESSARY FOR THE CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE ROCK SEDIMENT DAMS.

(I) SEDIMENT SHALL BE REMOVED FROM BEHIND THE ROCK SEDIMENT DAMS WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE STRUCTURE AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL PER CUBIC YARD.



SECTION B-B



SECTION A-A

EROSION CONTROL PLAN LEGEND: ROCK SEDIMENT DAM

REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-12 TO EC-STR-12.

- REV. 5-27-01: CHANGED ITEM NOS. 303-15.01 TO 303-10.01 AND 740-04.01 TO 740-10.04. CHANGED DESCRIPTION FOR ITEM NOS. 709-05.06 AND 709-05.07.
- REV. 12-18-02: CHANGED GENERAL NOTE (C).
- REV. 1-22-03: CORRECTED GENERAL NOTE (B). ADDED ADDITIONAL GEOTEXTILE FABRIC TO PROFILE VIEW.
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: MISC. EDITS TO DRAWING, ADDED AND RE-ORDERED GENERAL NOTES, CHANGED DRAWING NAME.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

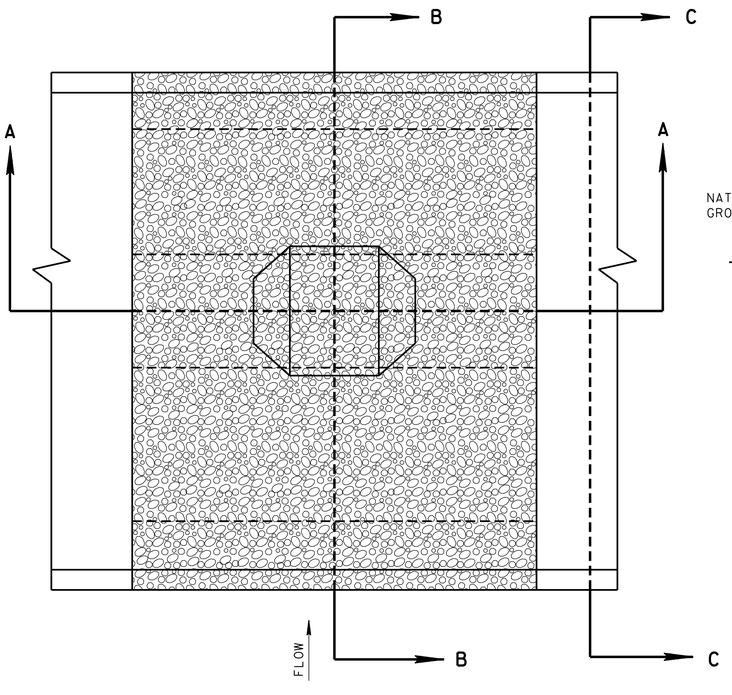
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

ROCK SEDIMENT DAM

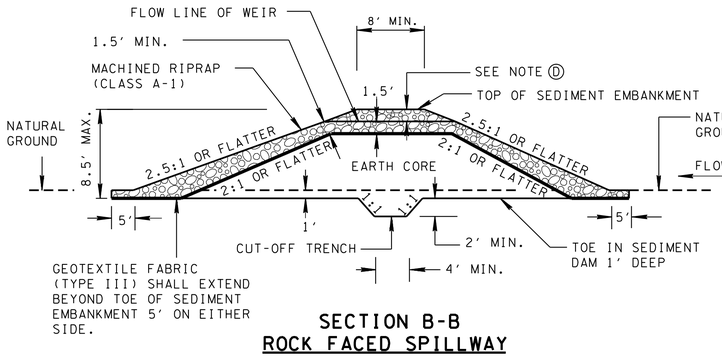
10-26-92 EC-STR-12

REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-13 TO EC-STR-13.

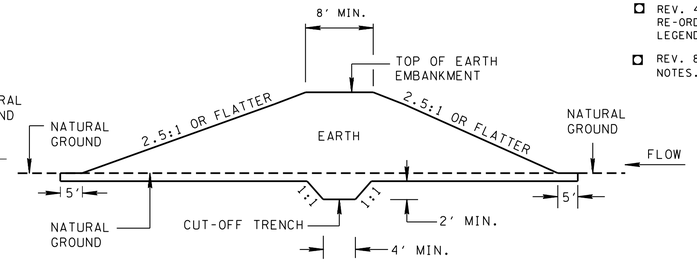
- ☐ REV. 5-27-01: CHANGED ITEM NO. 740-03.01 TO 740-10.03.
- ☐ REV. 12-18-02: CHANGED GENERAL NOTE (C).
- ☐ REV. 1-22-03: CORRECTED GENERAL NOTE (F).
- ☐ REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING, CHANGED DRAWING NAME.
- ☐ REV. 4-1-08: MISC. EDITS TO DRAWING, RE-ORDERED GENERAL NOTES, CHANGED LEGEND AND DRAWING NAME.
- ☐ REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.



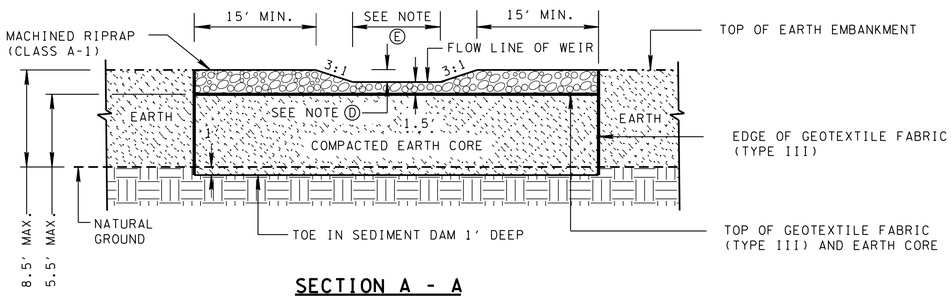
PLAN VIEW OF ROCK FACED SPILLWAY WITH EARTH CORE AND ADJOINING EARTH EMBANKMENT



SECTION B-B
ROCK FACED SPILLWAY



SECTION C-C
EARTH EMBANKMENT



SECTION A - A

EROSION CONTROL PLAN LEGEND: (RE) (SE) ROCK AND EARTH SEDIMENT EMBANKMENT

SEDIMENT EMBANKMENT GENERAL NOTES

(A) ROCK AND EARTH SEDIMENT EMBANKMENTS ARE FOR TEMPORARY USE. WHERE A PERMANENT FACILITY IS REQUIRED, CONSIDER THE USE OF A SEDIMENT BASIN, WHICH CAN BE CONVERTED INTO A PERMANENT DETENTION BASIN. THIS SHALL NOT BE PLACED IN STREAMS, WETLANDS, OR OTHER NATURAL WATER RESOURCES.

(B) AT MOST SITES, TEMPORARY ROCK AND EARTH SEDIMENT EMBANKMENTS SHALL BE DESIGNED TO CREATE AN IMPOUNDMENT VOLUME EQUAL TO THE RUNOFF VOLUME FROM THE 2-YEAR, 24-HOUR RAINFALL EVENT. AT SITES WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE IMPOUNDMENT VOLUME SHALL BE EQUAL TO THE RUNOFF FROM THE 5-YEAR, 24-HOUR EVENT. IN NO CASE SHALL THE IMPOUNDMENT VOLUME EXCEED FIFTEEN (15) ACRE-FEET.

(C) ROCK AND EARTH SEDIMENT EMBANKMENTS SHALL ONLY BE USED WHEN THE WATER IMPOUNDMENT AREA CAN BE CONTAINED WITHIN THE RIGHT-OF-WAY OR WITHIN A DRAINAGE EASEMENT FOR THE PROJECT.

(D) THE TOP OF THE SEDIMENT EMBANKMENT SHOULD BE A MINIMUM OF ONE (1) FOOT ABOVE THE 25 YEAR DESIGN FLOW DEPTH OVER THE WEIR. THE MINIMUM HEIGHT OF THE OVERFLOW WIER IS 1.5 FEET.

(E) THE WEIR MUST BE DESIGNED TO PASS THE PEAK 25-YEAR FLOW RATE WITHOUT OVERTOPPING THE EMBANKMENT.

(F) THE HEIGHT OF THE OVERFLOW WEIR SHOULD BE SET SUCH THAT ALL FLOWS IN EXCESS OF THE DESIGN IMPOUNDMENT VOLUME SHALL PASS OVER THE WEIR.

(G) FOR EARTH-FILL EMBANKMENTS, A CUT-OFF TRENCH SHALL BE EXCAVATED ALONG THE CENTERLINE OF THE EMBANKMENT. THE TRENCH MUST EXTEND AT LEAST ONE (1) FOOT INTO A STABLE, IMPERVIOUS LAYER OF SOIL AND HAVE A MINIMUM DEPTH OF 2 FEET. 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 1H:1V.

(H) THE EARTH EMBANKMENT SHALL BE COMPACTED AS REQUIRED FOR ANY STRUCTURE WHICH IS INTENDED TO IMPOUND WATER.

(I) THE EXPOSED SLOPES OF THE EARTH EMBANKMENT SHOULD BE STABILIZED WITH TEMPORARY SEEDING WITH MULCH OR OTHER STABILIZATION METHODS.

(J) ROCK AND EARTH SEDIMENT EMBANKMENT IMPOUNDMENTS SHOULD BE DEWATERED WITH A DEWATERING STRUCTURE (EC-STR-1) OR SEDIMENT FILTER BAG (EC-STR-2) AS NEEDED.

(K) ROCK AND EARTH SEDIMENT EMBANKMENTS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

203-01	ROAD AND DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD
709-05.06	MACHINED RIPRAP (CLASS A-1) PER TON
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD
801-01.07	TEMPORARY SEEDING (WITH MULCH) PER UNIT

DEWATERING STRUCTURES AND SEDIMENT FILTER BAGS SHALL BE PAID FOR UNDER THEIR RESPECTIVE ITEM NUMBERS.

PAYMENT SHALL INCLUDE ALL MATERIALS, EXCAVATION, AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE ROCK AND EARTH SEDIMENT EMBANKMENTS.

(L) SEDIMENT SHALL BE REMOVED FROM BEHIND THE ROCK AND EARTH SEDIMENT EMBANKMENT WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE STRUCTURE AND PAID FOR UNDER ITEM NUMBER 209.05, SEDIMENT REMOVAL PER CUBIC YARD.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

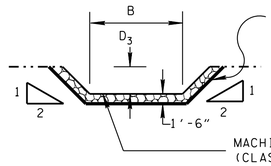
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

ROCK AND EARTH SEDIMENT EMBANKMENT

7-29-94 | EC-STR-13

REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-15 TO EC-STR-15.

- REV. 5-27-01: CHANGED REFERENCE TO RIP-RAP AND GEOTEXTILE FABRIC.
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING. CHANGED DRAWING NAME.
- REV. 4-1-08: REVISED GENERAL NOTES, MISC. DRAFTING EDITS.
- REV. 8-1-12: REVISED GENERAL NOTES, ADDED FLOATING OUTLET STRUCTURE, ADDED GENERAL NOTES H AND I.



SECTION D-D
EMERGENCY SPILLWAY

SEDIMENT BASIN GENERAL NOTES

(A) SEDIMENT BASINS DETAIN STORMWATER RUNOFF FROM A DISTURBED AREA FOR AN EXTENDED TIME, ALLOWING SEDIMENT TO SETTLE WHICH REDUCES THE QUANTITY OF SEDIMENT IN THE STORMWATER RELEASED FROM THE BASIN.

(B) THE DRAINAGE AREA FOR A SEDIMENT BASIN SHALL NOT EXCEED 50 ACRES.

(C) FOR SITES WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE DESIGN STORM SHALL BE THE 5-YEAR EVENT. THE DESIGN MAY BE BASED ON THE 2-YEAR EVENT AT OTHER SITES.

(D) THE MINIMUM SEDIMENT STORAGE VOLUME BELOW THE DRY SEDIMENT STORAGE ELEVATION SHALL BE 134 CUBIC YARDS PER ACRE OF CONTRIBUTING DRAINAGE AREA.

(E) DAMS THAT CAN STORE AT LEAST 30 ACRE-FEET OF RUNOFF OR ARE TWENTY (20) FEET OR MORE IN HEIGHT MUST MEET THE REQUIREMENTS ESTABLISHED BY THE TENNESSEE SAFE DAM ACT.

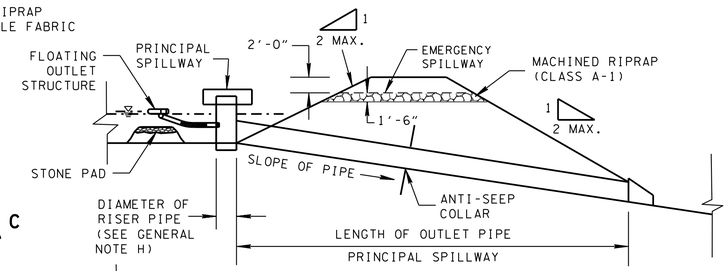
(F) SEDIMENT BASINS MAY REMAIN IN PLACE AS PERMANENT BASINS, AS INDICTED IN THE PLANS OR AS DIRECTED BY THE ENGINEER. THE DESIGN FOR PERMANENT BASINS SHALL BE APPROVED BY THE HYDRAULIC SECTION OF THE STRUCTURES DIVISION.

(G) SEE STANDARD DRAWINGS EC-STR-16, EC-STR-17 AND EC-STR-18 FOR ADDITIONAL DETAILS AND GENERAL NOTES NOT SHOWN ON THIS DRAWING.

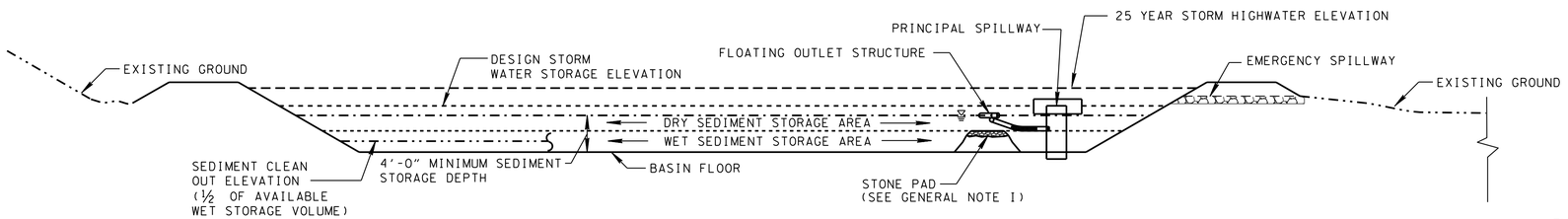
(H) WHERE ACCEPTABLE, THE SQUARE CONCRETE NO. 42 CATCH BASIN WITH GRATE UNIT NO. 42 MAY BE USED IN LIEU OF USING ROUND PIPE FOR THE RISER.

(I) TOP OF STONE PAD SHALL BE AT SAME ELEVATION AS THE TOP OF THE WET SEDIMENT STORAGE AREA.

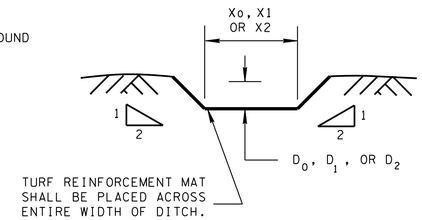
PLAN VIEW



SECTION B-B



SECTION A-A



SECTION C-C

EROSION CONTROL PLAN LEGEND: SEDIMENT BASIN

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SEDIMENT BASIN

10-26-92 EC-STR-15

REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-16 TO EC-STR-16.

☐ REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.

☐ REV. 4-1-08: REVISED GENERAL NOTES AND CHANGED DRAWING NAME.

☐ REV. 8-1-12: REVISED DEWATERING SYSTEM DETAIL.

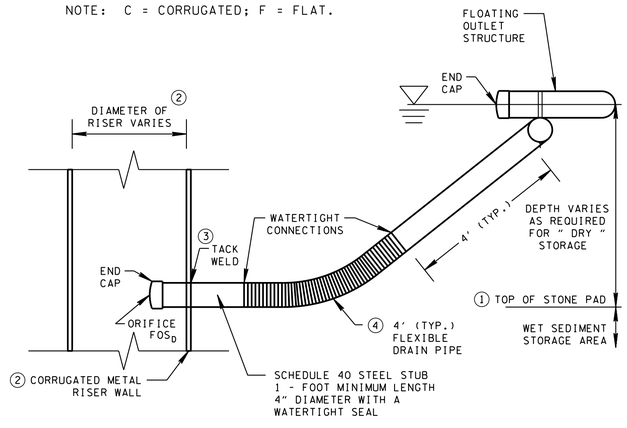
CONCENTRIC TRASH RACK AND ANTI-VORTEX DEVICE DESIGN TABLE

RISER DIA. (IN)	CYLINDER		HEIGHT (INCHES)	MINIMUM SUPPORT BAR	MINIMUM TOP	
	DIAMETER (INCHES)	THICKNESS (GAUGE)			THICKNESS	STIFFENER
12	18	16	6	NO. 6 REBAR OR 1.5 X 1.5 X 0.19 ANGLE	16 GA. (F&C)	-
15	21	16	7	NO. 6 REBAR OR 1.5 X 1.5 X 0.19 ANGLE	16 GA. (F&C)	-
18	27	16	8	NO. 6 REBAR OR 1.5 X 1.5 X 0.19 ANGLE	16 GA. (F&C)	-
21	30	16	11	NO. 6 REBAR OR 1.5 X 1.5 X 0.19 ANGLE	16 GA. (C) 14 GA. (F)	-
24	36	16	13	NO. 6 REBAR OR 1.5 X 1.5 X 0.19 ANGLE	16 GA. (C) 14 GA. (F)	-
27	42	16	15	NO. 6 REBAR OR 1.5 X 1.5 X 0.19 ANGLE	16 GA. (C) 14 GA. (F)	-
36	54	16	17	NO.8 REBAR	14 GA. (C) 12 GA. (F)	-
42	60	16	19	NO.8 REBAR	14 GA. (C) 12 GA. (F)	-
48	72	16	21	1.25" PIPE OR 1.25 X 1.25 X 0.25 ANGLE	14 GA.(C) 10 GA.(F)	-
54	78	16	25	1.25" PIPE OR 1.25 X 1.25 X 0.25 ANGLE	14 GA.(C) 10 GA.(F)	-
60	90	14	29	1.5" PIPE OR 1.5 X 1.5 X 0.25 ANGLE	12 GA. (C) 8 GA. (F)	-
66	96	14	33	2" PIPE OR 2 X 2 X 0.19 ANGLE	12 GA.(C) 8 GA.(F) W/STIFFENER	2 X 2 X 0.25 ANGLE
72	102	14	36	2" PIPE OR 2 X 2 X 0.19 ANGLE	12 GA.(C) 8 GA.(F) W/STIFFENER	2.5 X 2.5 X 0.25 ANGLE
78	114	14	39	2.5" PIPE OR 2 X 2 X 0.25 ANGLE	12 GA.(C) 8 GA.(F) W/STIFFENER	2.5 X 2.5 X 0.25 ANGLE
84	120	12	42	2.5" PIPE OR 2.5 2.5 X 0.25 ANGLE	12 GA.(C) 8 GA.(F) W/STIFFENER	2.5 X 2.5 X 0.31 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" THRU 36" PIPE MEASURE 2.67" X 0.5"; FOR 42" THRU 84" THE CORRUGATION MEASURES 5" X 1" OR 8" X 1".

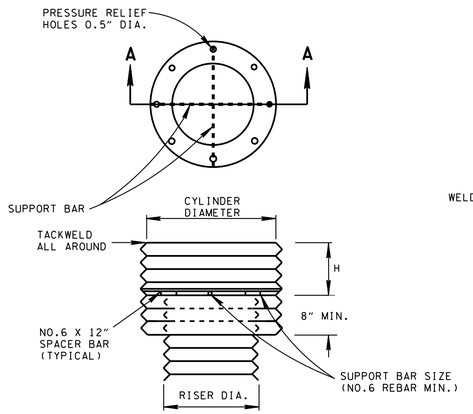
NOTE: C = CORRUGATED; F = FLAT.



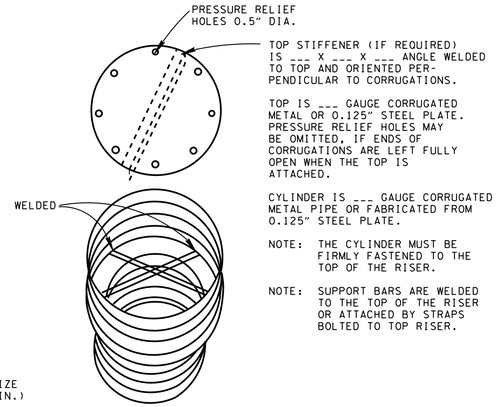
1. TOP OF STONE PAD SHALL BE AT SAME ELEVATION AS THE TOP OF THE WET SEDIMENT STORAGE AREA.
2. WHERE ACCEPTABLE, THE SQUARE CONCRETE NO. 42 CATCH BASIN WITH GRATE UNIT NO. 42 MAY BE USED IN LIEU OF USING ROUND PIPE FOR THE RISER.
3. WITH CONCRETE RISER, USE PVC SCHEDULE 40 STUB GROUTED TO CREATE A WATERTIGHT SEAL
4. DRAINAGE TUBING SHALL COMPLY WITH ASTM F667 AND AASHTO M294

DEWATERING SYSTEM DETAIL FOR SEDIMENT BASIN

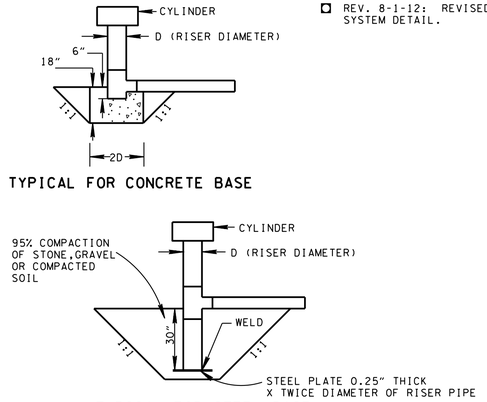
ANTI-VORTEX DEVICE DETAIL



SECTION A - A



ISOMETRIC VIEW



TYPICAL FOR CONCRETE BASE

TYPICAL FOR STEEL BASE

TYPICAL ANTI-FLOTATION BLOCK DETAILS FOR RISERS TEN FEET OR LESS IN HEIGHT

NOTE: THE BASE OF THE PRINCIPAL SPILLWAY MUST BE FIRMLY ANCHORED TO PREVENT ITS FLOATING. IF THE RISER OF THE SPILLWAY IS GREATER THAN 10 FEET IN HEIGHT, COMPUTATIONS MUST BE MADE TO DETERMINE THE ANCHORING REQUIREMENTS. A MINIMUM FACTOR OF 1.25 SHALL BE USED (DOWNWARD FORCES = 1.25 X UPWARD FORCES).

ANTI - SEEP COLLAR DIAPHRAGM DIMENSION TABLE

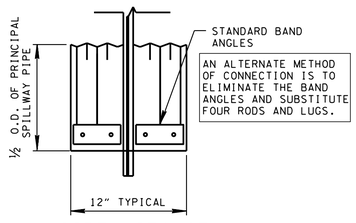
DIA (IN)	GAUGE	MINIMUM DIAPHRAGM SIZE (IN)	FABRICATION DIM. FOR ½ DIAPHRAGM(INCH)	
			W (WIDTH)	H (HEIGHT)
8	16	58 X 58	58.5	30.5
10	16	58 X 58	58.5	30.5
12	16	60 X 60	64	32.5
15	16	63 X 63	68	34
18	16	66 X 66	69.25	35.5
21	16	69 X 69	72	37
24	14	72 X 72	72	38.5
30	14	78 X 78	82.5	41.5
36	14	84 X 84	88	44.5
42	14	90 X 90	93.25	47.5
48	14	96 X 96	96	50.5
54	14	102 X 102	101.25	53.5

ANTI-SEEP COLLAR DETAIL ASSEMBLY NOTES

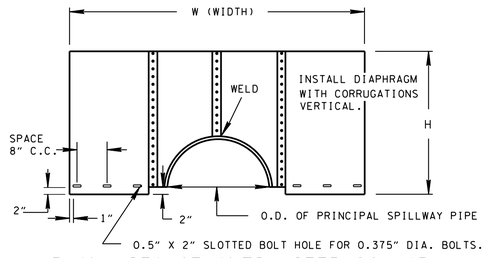
- A1 UNASSEMBLED DIAPHRAGMS SHALL BE MARKED BY PAINTING OR TAGGING WHEN NECESSARY TO IDENTIFY MATCHING PAIRS TO SECURE A PROPER INSTALLATION.
- A2 THE LAP BETWEEN THE TWO HALF SECTIONS AND BETWEEN THE PIPE AND COUPLING BAND SHALL BE CAULKED WITH BITUMINOUS MASTIC AT TIME OF INSTALLATION. NEOPRENE GASKET 0.375" x 7" MINIMUM WIDTH MAY BE USED IN LIEU OF MASTIC.
- A3 ALL WELDS AND ALL HEAT AFFECTED AREAS ON ZINC COATED METAL SHALL BE THOROUGHLY CLEANED AND TREATED IN ACCORDANCE WITH SPECIFICATIONS (STEEL ONLY).
- A4 EACH DIAPHRAGM SHALL BE FURNISHED WITH TWO RODS AND NUTS AND TWO STANDARD TANK LUGS OR "L" LUGS FOR SECURING DIAPHRAGMS TO PIPE.
- A5 RODS FOR COLLAR COUPLING BANDS AND DIAPHRAGMS FOR 6" THRU 15" DIAMETER PIPE SHALL BE 0.375" DIAMETER AND FOR PIPE LARGER THAN 15" DIAMETER THE RODS SHALL BE 0.5" DIAMETER.

SEDIMENT BASIN GENERAL NOTES

- C1 THE LENGTH, L, AND WIDTH, W, OF THE BASIN MAY VARY TO CONFORM TO THE SPECIFIC SITE CONDITIONS, PROVIDED THE REQUIRED VOLUME IS MAINTAINED.
- C2 THE MINIMUM LENGTH TO WIDTH RATIO OF THE BASIN SHALL BE 2:1.
- C3 THE SEDIMENT STORAGE DEPTH SHALL BE A MINIMUM OF 4' - 0".
- C4 THE EMERGENCY SPILLWAY SHOULD BE LOCATED IN A CUT AREA WHENEVER POSSIBLE.
- C5 THE DIAMETER OF THE RISER SHALL BE DETERMINED BY THE RISER INFLOW CURVES SHOWN IN THE DESIGN DIVISION DRAINAGE MANUAL.
- C6 THE PRINCIPAL SPILLWAY CAPACITY SHALL BE BASED ON THE DESIGN STORM FREQUENCY WHEN AN EMERGENCY SPILLWAY IS USED, OR THE TWENTY-FIVE (25) YEAR STORM WHEN AN EMERGENCY SPILLWAY IS NOT USED. IF AN EMERGENCY SPILLWAY IS USED, IT SHALL BE DESIGNED FOR A 25-YEAR FLOOD. THE RIPRAP PLACED AT THE OUTFALL OF THE PRINCIPAL SPILLWAY OUTLET PIPE SHALL BE DESIGNED TO REMAIN STABLE UNDER THE FLOW CONDITIONS IMPOSED BY THE DESIGN PEAK FLOW RATE.
- C7 SEDIMENT BASIN VOLUME IS MEASURED FROM THE CREST OF THE PRINCIPAL SPILLWAY TO THE BOTTOM OF THE BASIN.
- C8 SEDIMENT SHALL BE REMOVED AND THE SEDIMENT BASIN RESTORED TO THE ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ½ OF THE WET STORAGE VOLUME. A SUITABLE MARKER SHALL BE INSTALLED IN THE BASIN TO INDICATE WHEN THE BASIN REQUIRES MAINTENANCE.
- C9 THE PIPE USED IN THE CONSTRUCTION OF THE PRINCIPAL SPILLWAY BARREL WILL BE PAID FOR IN ACCORDANCE WITH STANDARD SPECIFICATIONS, SECTION 607, PIPE CULVERT AND STORM SEWERS.
- C10 SEE STANDARD DRAWINGS EC-STR-15, EC-STR-17 AND EC-STR-18 FOR ADDITIONAL DETAILS AND GENERAL NOTES NOT SHOWN ON THIS DRAWING.



SIDE VIEW OF ANTI-SEEP COLLAR



PLAN VIEW OF ANTI- SEEP COLLAR

NOTE: UPPER ONE HALF DIAPHRAGM SHOWN, OTHER HALF SAME EXCEPT SLOTS ARE VERTICAL

ANTI-SEEP COLLAR DETAIL

ANTI-SEEP COLLAR GENERAL NOTES

- B1 THE ANTI-SEEP COLLAR IS TO BE USED ON THE BARREL OF THE PRINCIPAL SPILLWAY TO REDUCE SEEPAGE LOSS AND PIPING FAILURE.
- B2 USE IF PIPE BARREL IS LARGER THAN 10 INCHES IN DIAMETER.
- B3 USE A MINIMUM OF ONE ANTI-SEEP COLLAR, IF THE EMBANKMENT IS 15 FEET OR LESS IN HEIGHT AND A MINIMUM OF TWO ANTI-SEEP COLLARS, IF THE EMBANKMENT IS GREATER THAN 15 FEET IN HEIGHT.
- B4 USE MAXIMUM SPACING BETWEEN COLLARS OF FOURTEEN TIMES THE PROJECTION OF THE COLLAR ABOVE THE PIPE, FROM THE DETAILS - THE COLLAR SPACING WOULD BE ONE - HALF THE DIAMETER OF THE PRINCIPAL SPILLWAY PIPE TIMES FOURTEEN.
- B5 COLLARS SHOULD NOT BE CLOSER THAN 2 FEET TO A PIPE JOINT.
- B6 PRECAUTIONS SHOULD BE TAKEN TO ENSURE 95 % COMPACTION IS ACHIEVED AROUND THE COLLARS.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

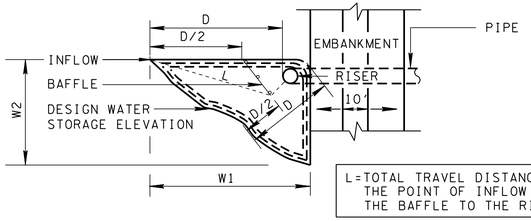
SEDIMENT BASIN RISER AND COLLAR APPURTENANCES

10-26-92 EC-STR-16

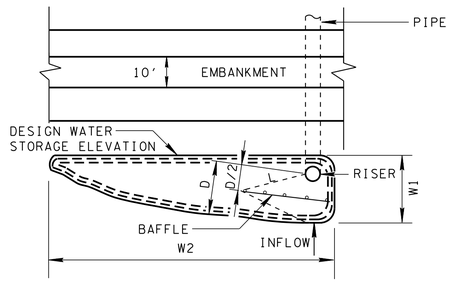
REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-17 TO EC-STR-17.

- REV. 5-27-01: CHANGED ITEM NO. 740-03.01 TO 740-10.03.
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING. CHANGED DRAWING NAME.
- REV. 4-15-06: REVISED NOTES.
- REV. 4-1-08: REVISED GENERAL NOTES, MINOR EDITS TO DRAWING, CHANGED DRAWING NAME, AND CHANGED LEGEND.
- REV. 8-1-12: REVISED DRAWING FOR FLOATING OUTLET STRUCTURE, ADDED PAY ITEM.

EXAMPLE PLAN VIEWS OF BAFFLE LOCATIONS IN SEDIMENT BASINS



SHAPE NO.1



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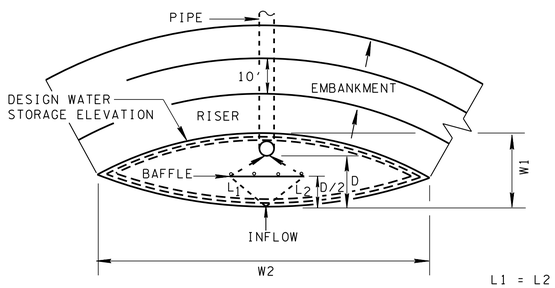
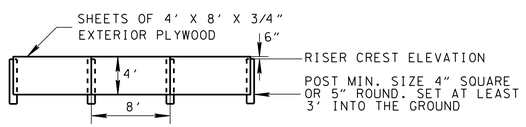
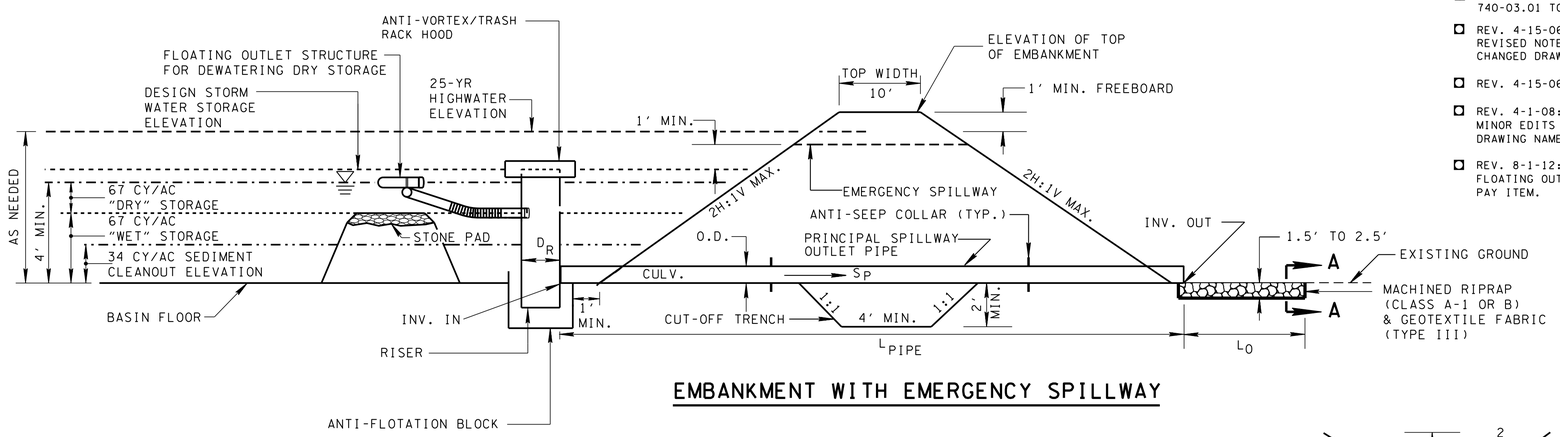


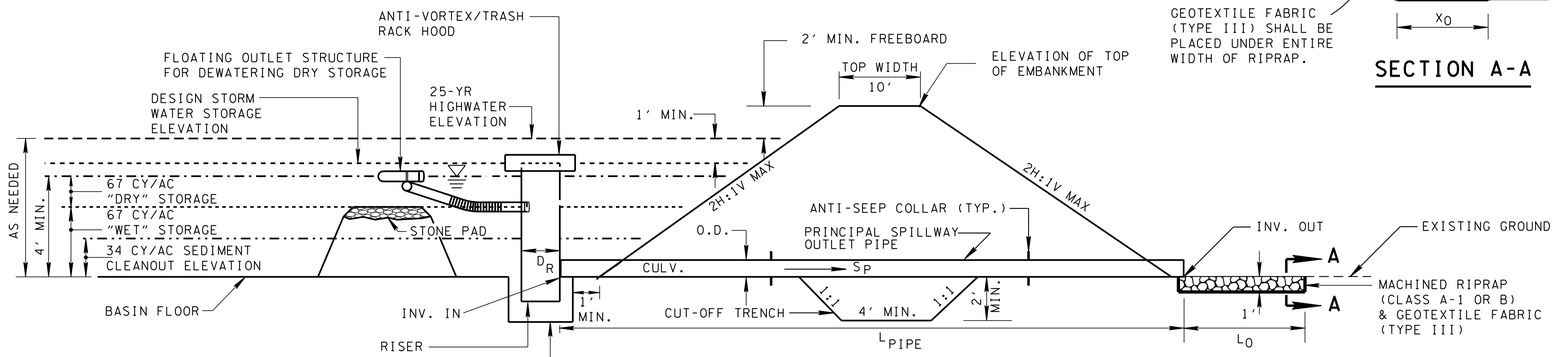
SHAPE NO.3



BAFFLE DETAIL



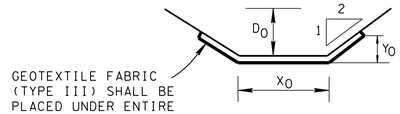
EMBANKMENT WITH EMERGENCY SPILLWAY



EMBANKMENT WITHOUT EMERGENCY SPILLWAY

(TEMPORARY ONLY)

(TO BE USED FOR SMALL SEDIMENT VOLUMES ONLY)



SECTION A-A

SEDIMENT BASIN GENERAL NOTES

(A) BAFFLES SHALL BE 4 FEET X 8 FEET X ¾ INCH EXTERIOR PLYWOOD, TYPE "PLYFORM" GRADE BB, D, AND ES.

(B) FOR EARTH-FILL EMBANKMENTS, A CUT-OFF TRENCH SHALL BE EXCAVATED ALONG THE CENTERLINE OF THE DAM. THE TRENCH MUST EXTEND AT LEAST ONE (1) FOOT INTO A STABLE, IMPERVIOUS LAYER OF SOIL AND HAVE A MINIMUM DEPTH OF TWO (2) FEET. 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.

(C) THE EXPOSED SLOPES OF THE SEDIMENT BASIN SHOULD BE STABILIZED WITH TEMPORARY SEEDING WITH MULCH OR OTHER STABILIZATION METHODS.

(D) SEDIMENT BASINS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

203-01	ROAD & DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD
209-05	SEDIMENT REMOVAL PER CUBIC YARD
209-11.01 THRU 209-11.09	SEDIMENT BASIN RISER (_ _") PER EACH
209-11.20	SEDIMENT BASIN BAFFLES PER LINEAR FOOT
209-20.21	SEDIMENT BASIN OUTLET STRUCTURE (DESCRIPTION) PER LS
607-37.02 THRU 607-37.13	_ _" CORRUGATED METAL PIPE CULVERT PER LINEAR FOOT
709-05.06	MACHINED RIP-RAP (CLASS A-1) PER TON
709-05.08	MACHINED RIP-RAP (CLASS B) PER TON
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD
801-01.07	TEMPORARY SEEDING (WITH MULCH) PER UNIT

(E) PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR THE CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE SEDIMENT BASIN.

SEE STANDARD DRAWINGS EC-STR-15. EC-STR-16 AND EC-STR-18 FOR ADDITIONAL DETAILS AND GENERAL NOTES NOT SHOWN ON THIS DRAWING.

EROSION CONTROL PLAN LEGEND: SEDIMENT BASIN

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

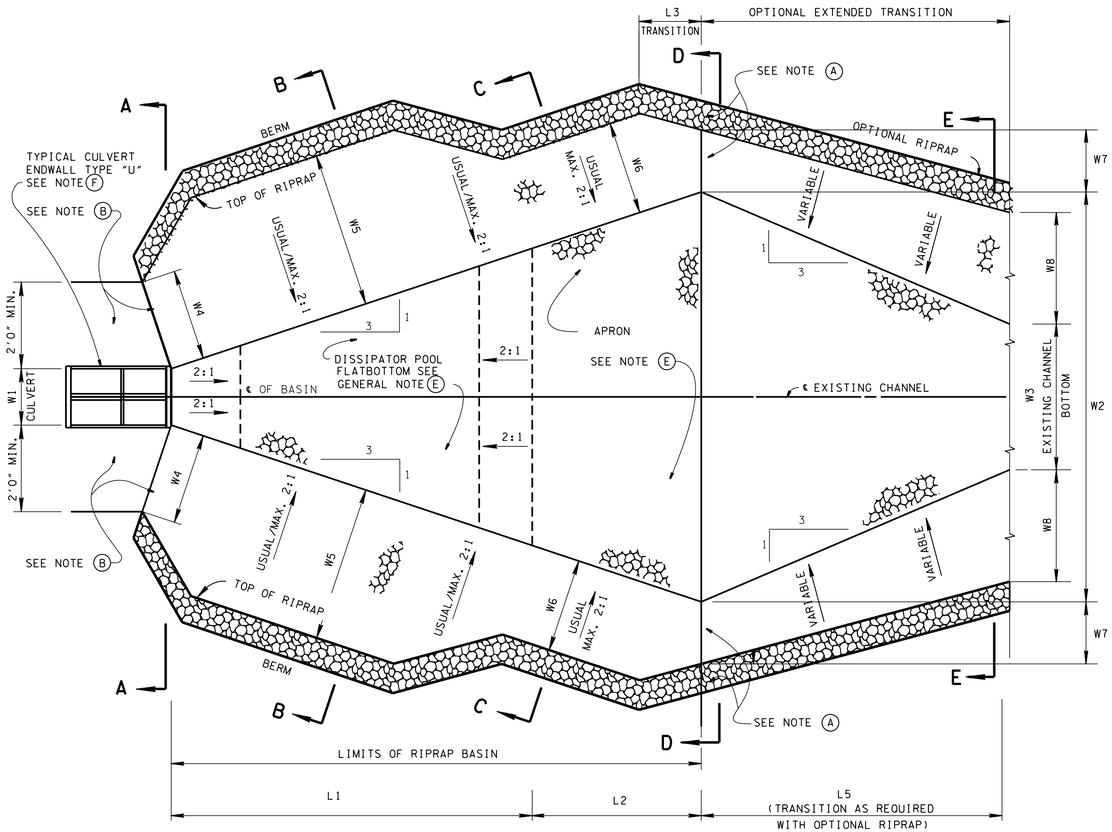
NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SEDIMENT BASIN EMBANKMENT DETAILS

10-26-92 EC-STR-17

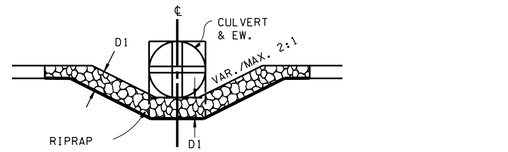
- ☐ REV. 4-1-08: MISC. EDITS TO DRAWING, TABLE, AND NOTES.
- ☐ REV. 8-1-12: MINOR EDITS TO DRAWING AND GENERAL NOTES.
- REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-21 TO EC-STR-21.
- ☐ REV. 5-27-01: CHANGED DESCRIPTION OF ITEM NOS. 709-05.06 AND 709-05.07. CHANGED DRAWING NAME.



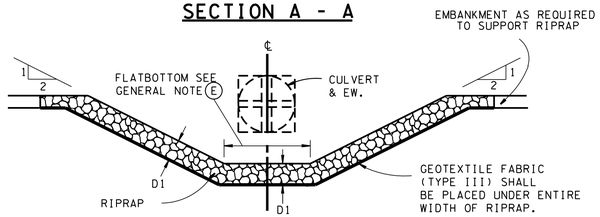
PLAN VIEW

RIPRAP BASIN LOCATIONS, DIMENSIONS, AND QUANTITIES

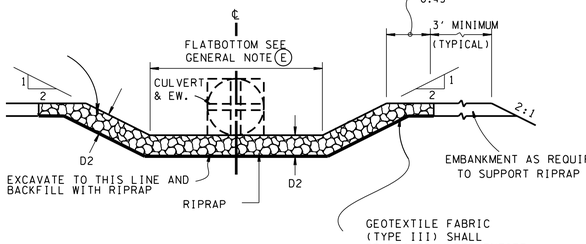
LOCATION			CULVERT OUTLET		BASIN DIMENSIONS (FT.)														RIPRAP DEPTHS (FT.)				GEOTEXTILE FABRIC (S.Y.)	RIPRAP CLASS (TON)		
STATION	DIST. (FT.)	DIR.	SIZE	LENGTH (FT.)	W1	W2	W3	W4	W5	W6	W7	W8	H1	H2	L1	L2	L3	L4	L5	D1	D2	D3	D4		A1	B	C
TOTAL																											



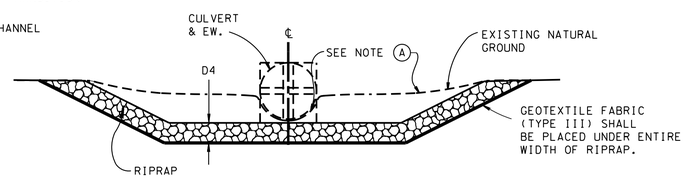
SECTION A - A



SECTION B - B



SECTION C - C



SECTION D - D

GENERAL NOTES

(A) WARP BASIN TO CONFORM TO THE NATURAL CHANNEL. TOP OF RIPRAP IN FLOOR OF BASIN DISSIPATOR POOL OR APRON SHALL BE AT THE SAME OR LOWER ELEVATION THAN THE NATURAL CHANNEL BOTTOM SECTION D-D. MODIFY FLATBOTTOM WIDTH IF THE OPTIONAL EXTENDED TRANSITION IS REQUIRED.

(B) MODIFY THE BASIN DIMENSIONS AS REQUIRED TO MATCH THE CONFIGURATION OF CULVERT END TREATMENTS.

(C) REFER TO TDOT DESIGN DIVISION DRAINAGE MANUAL (CHAPTER 9) FOR HYDRAULIC DESIGN PROCEDURES OF ENERGY DISSIPATORS FOR CULVERT AND CHANNELS.

(D) MODIFY DIMENSION W1 AS REQUIRED TO MATCH CULVERT WITH ENDWALL TYPE "A" (WITH OR WITHOUT CONCRETE PAVED APRONS OR OUTLETS).

(E) DESIRABLE SLOPE IS 0.0% IN DISSIPATOR POOL FLATBOTTOM AND IN APRON FLATBOTTOM.

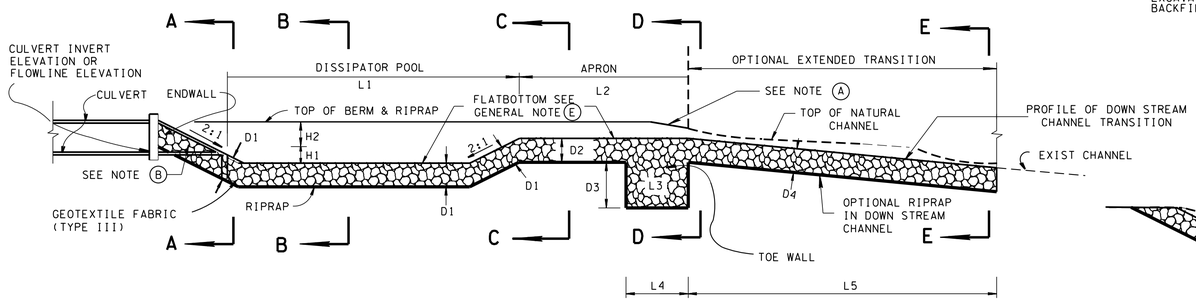
(F) THE ENDWALL SHOWN IN THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. PERMANENT RIPRAP BASIN ENERGY DISSIPATOR MAY BE USED WITH ANY TYPE OF CULVERT ENDWALL.

(G) GEOTEXTILE FABRIC (TYPE III) SHALL MEET REQUIREMENTS OF THE STANDARD SPECIFICATION FOR GEOTEXTILES AASHTO DESIGNATION M-288, EROSION CONTROL.

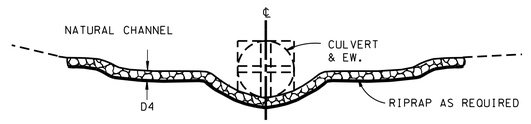
(H) PERMANENT RIPRAP BASIN ENERGY DISSIPATORS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

203-01	ROAD & DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD
709-05.06	MACHINED RIP-RAP (CLASS A-1) PER TON
709-05.08	MACHINED RIP-RAP (CLASS B) PER TON
709-05.09	MACHINED RIP-RAP (CLASS C) PER TON
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION AND MAINTENANCE OF PERMANENT RIPRAP BASIN ENERGY DISSIPATORS.



ELEVATION VIEW



SECTION E - E

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

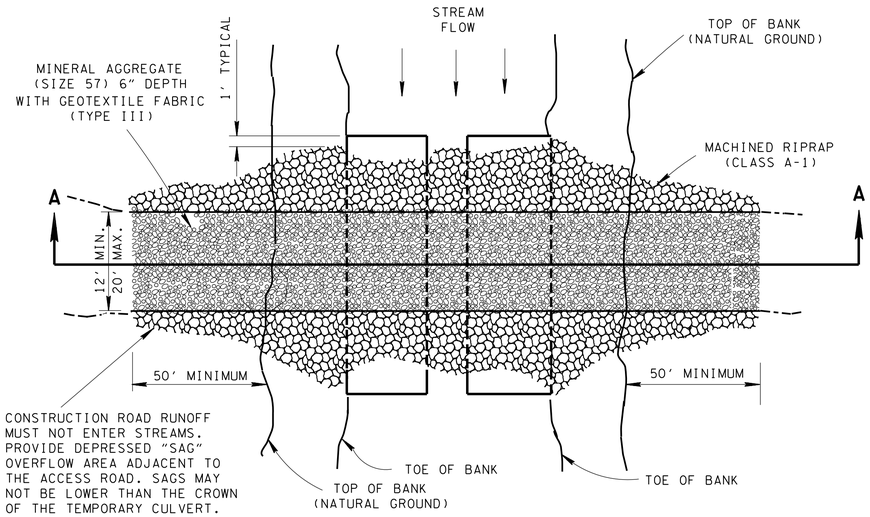
EROSION CONTROL LEGEND: RP ED PERMANENT RIPRAP ENERGY DISSIPATOR

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

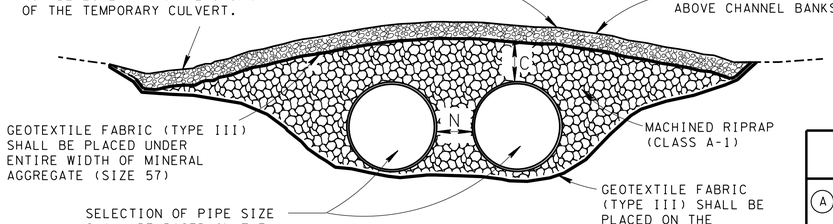
PERMANENT RIPRAP BASIN ENERGY DISSIPATORS

10-26-92 EC-STR-21

TEMPORARY CULVERT CROSSING



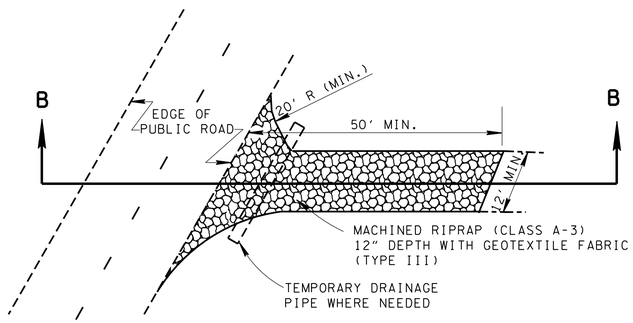
PLAN VIEW OF TEMPORARY CULVERT CROSSING



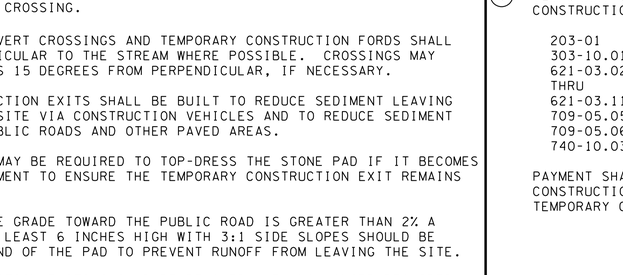
SECTION A-A

C = ½ DIAMETER OF PIPE OR 18" WHICHEVER IS GREATER
N = ½ DIAMETER OF PIPE OR 12" WHICHEVER IS GREATER

TEMPORARY CONSTRUCTION EXIT



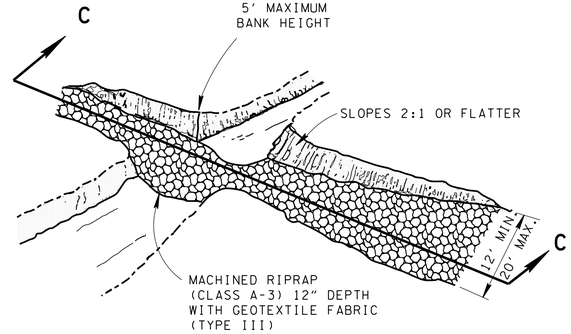
PLAN VIEW OF TEMPORARY CONSTRUCTION ROAD



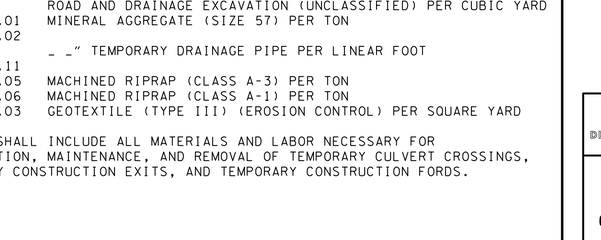
SECTION B-B

TEMPORARY CONSTRUCTION FORD

(NOT TO BE PLACED IN STREAMS)



PLAN VIEW OF TEMPORARY CONSTRUCTION FORD



SECTION C-C

EROSION CONTROL PLAN LEGEND:

TCC — TEMPORARY CULVERT CROSSING (DESCRIBE NUMBER AND SIZE OF PIPES)

TCE — TEMPORARY CONSTRUCTION EXIT

TCF — TEMPORARY CONSTRUCTION FORD

GENERAL NOTES

(A) TEMPORARY CULVERT CROSSINGS SHALL CONSIST OF ONE OR MORE TEMPORARY DRAINAGE PIPES INSTALLED ACROSS A FLOWING WATER COURSE FOR USE BY CONSTRUCTION EQUIPMENT. THE TEMPORARY DRAINAGE PIPES WILL VARY IN SIZE FROM EIGHTEEN TO SEVENTY-TWO INCHES IN DIAMETER.

(B) MINIMIZE CLEARING OF VEGETATION FROM STREAM BANKS WHEN USING TEMPORARY CULVERT CROSSINGS.

(C) TEMPORARY CULVERT CROSSINGS SHALL BE SEPARATED FROM FLOWING WATER DURING THEIR CONSTRUCTION AND REMOVAL.

(D) PROVISION SHOULD BE MADE TO PREVENT CONSTRUCTION ROAD RUNOFF FROM ENTERING THE STREAM.

(E) TEMPORARY CULVERT CROSSINGS SHOULD BE REMOVED, INCLUDING THE AGGREGATE AND GEOTEXTILE, AS SOON AS POSSIBLE AFTER THE CROSSING IS NO LONGER REQUIRED. ANY EXPOSED AREAS SHOULD BE IMMEDIATELY STABILIZED.

(F) FOR SITES WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT -IMPAIRED STREAMS, A 9-INCH LAYER OF MACHINED RIPRAP (CLASS A-3) SHALL BE SUBSTITUTED FOR THE MINERAL AGGREGATE (SIZE 57) USED TO TOP-DRESS A TEMPORARY CULVERT CROSSING.

(G) ALL TEMPORARY CULVERT CROSSINGS AND TEMPORARY CONSTRUCTION FORDS SHALL BE PLACED PERPENDICULAR TO THE STREAM WHERE POSSIBLE. CROSSINGS MAY DEVIATE AS MUCH AS 15 DEGREES FROM PERPENDICULAR, IF NECESSARY.

(H) TEMPORARY CONSTRUCTION EXITS SHALL BE BUILT TO REDUCE SEDIMENT LEAVING THE CONSTRUCTION SITE VIA CONSTRUCTION VEHICLES AND TO REDUCE SEDIMENT TRACKING ON TO PUBLIC ROADS AND OTHER PAVED AREAS.

(I) ADDITIONAL STONE MAY BE REQUIRED TO TOP-DRESS THE STONE PAD IF IT BECOMES CLOGGED WITH SEDIMENT TO ENSURE THE TEMPORARY CONSTRUCTION EXIT REMAINS EFFECTIVE.

(J) ON SITES WHERE THE GRADE TOWARD THE PUBLIC ROAD IS GREATER THAN 2% A MOUNTABLE BERM AT LEAST 6 INCHES HIGH WITH 3:1 SIDE SLOPES SHOULD BE PROVIDED AT THE END OF THE PAD TO PREVENT RUNOFF FROM LEAVING THE SITE.

(K) TEMPORARY CONSTRUCTION EXITS SHOULD BE REMOVED WHEN NO LONGER REQUIRED. ANY EXPOSED AREAS SHOULD BE IMMEDIATELY STABILIZED.

(L) TEMPORARY CONSTRUCTION FORDS ARE EFFECTIVE FOR INFREQUENT CROSSINGS OF DITCHES OR SWALES. THEY SHALL NOT BE USED IN STREAMS, WETLANDS OR OTHER NATURAL WATER RESOURCES.

(M) TEMPORARY CONSTRUCTION FORDS SHOULD BE CONSTRUCTED TO MINIMIZE THE BLOCKAGE OF FLOW AND TO ALLOW FREE FLOW OVER THE FORD. THE MAXIMUM AMOUNT OF BLOCKAGE ALLOWED IS THE LESSER OF TWELVE INCHES OR ONE-HALF THE HEIGHT OF THE EXISTING BANKS.

(N) A MOUNTABLE BERM AT LEAST 6 INCHES HIGH WITH 3:1 SIDE SLOPES SHOULD BE PROVIDED ON EITHER SIDE OF THE CHANNEL TO PREVENT RUNOFF FROM ENTERING THE CHANNEL.

(O) TEMPORARY CONSTRUCTION FORDS SHOULD BE REMOVED WHEN NO LONGER REQUIRED. THE CHANNEL BANKS SHOULD BE RESTORED TO THEIR ORIGINAL DIMENSIONS. ANY EXPOSED AREAS SHOULD BE IMMEDIATELY STABILIZED.

(P) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(Q) TEMPORARY CULVERT CROSSINGS, TEMPORARY CONSTRUCTION EXITS, AND TEMPORARY CONSTRUCTION FORDS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

203-01	ROAD AND DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD
303-10.01	MINERAL AGGREGATE (SIZE 57) PER TON
621-03.02 THRU 621-03.11	_ _" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT
709-05.05	MACHINED RIPRAP (CLASS A-3) PER TON
709-05.06	MACHINED RIPRAP (CLASS A-1) PER TON
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY CULVERT CROSSINGS, TEMPORARY CONSTRUCTION EXITS, AND TEMPORARY CONSTRUCTION FORDS.

- ☐ REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-25 TO EC-STR-25.
- ☐ REV. 5-27-01: CHANGED ITEM NO. 303-15.01 TO 303-10.01. CHANGED DESCRIPTIONS IN ITEM NOS. 621-03.02 TO 621-03.10, AND 709-05.05 TO 709-05.07.
- ☐ REV. 12-18-02: CHANGED GENERAL NOTE (B).
- ☐ REV. 1-22-03: CORRECTED GENERAL NOTE (C).
- ☐ REV.7-29-03: ADDED GEOTEXTILE FABRIC TO TEMPORARY CULVERT CROSSING AND TEMPORARY CONSTRUCTION ROAD ENTRANCE DETAILS. CHANGED MINERAL AGGREGATE TO CLASS A-3 RIPRAP IN TEMPORARY CONSTRUCTION ROAD ENTRANCE DETAIL. CHANGED GENERAL NOTES (D) AND (F).
- ☐ REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- ☐ REV. 4-1-08: REVISED VARIOUS GENERAL NOTES, MISC. EDITS TO DRAWING, AND REMOVED CLASS A-2 RIPRAP.
- ☐ REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

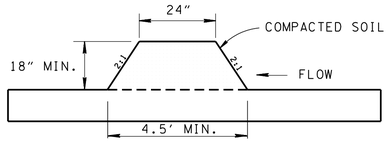
NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

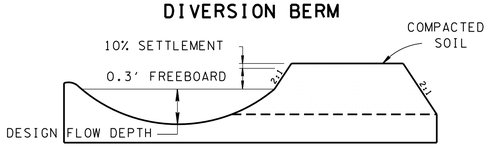
TEMPORARY CULVERT CROSSING, CONSTRUCTION EXIT, CONSTRUCTION FORD

10-26-92 EC-STR-25

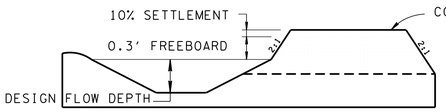
TEMPORARY BERM DETAILS



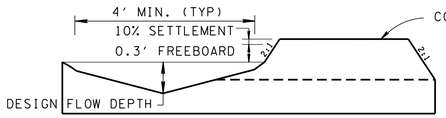
DIVERSION BERM



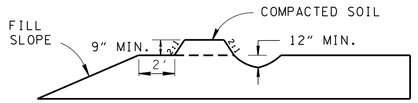
PARABOLIC DIVERSION



TRAPEZOIDAL DIVERSION

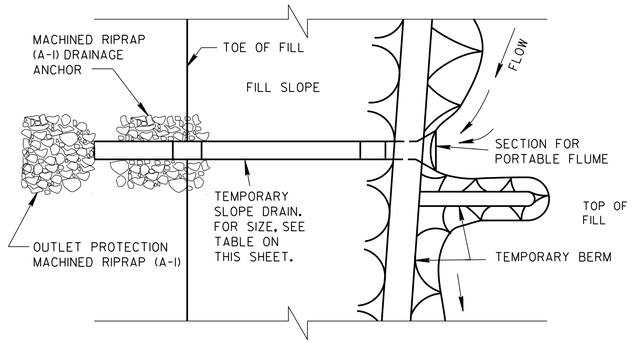


VEE-SHAPED DIVERSION

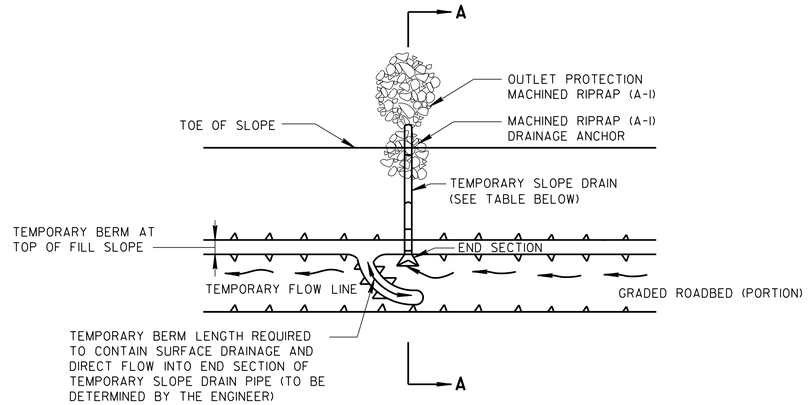


TEMPORARY FILL DIVERSION

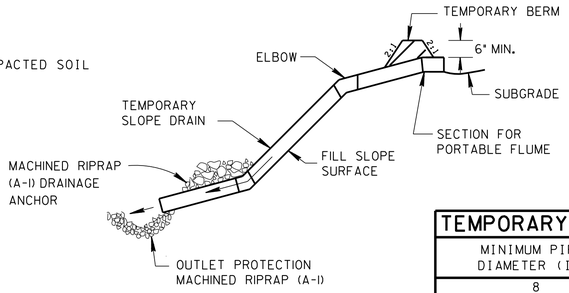
TEMPORARY SLOPE DRAIN WITH BERM AND RIPRAP



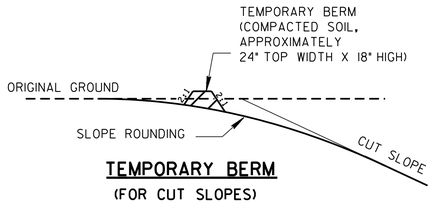
PLAN VIEW



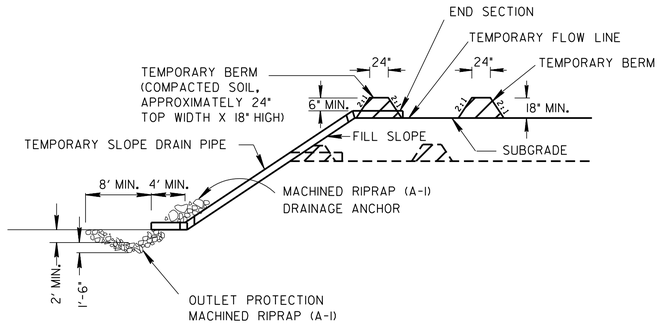
PLAN VIEW



SIDE VIEW



TEMPORARY BERM
(FOR CUT SLOPES)



SECTION A-A
(FOR FILL SLOPES)

TEMPORARY SLOPE DRAIN SIZES

MINIMUM PIPE DIAMETER (IN)	MAXIMUM DRAINAGE AREA (ACRES)
8	0.25
10	0.3
12	0.5
15	0.75
18	1.5

TEMPORARY BERMS GENERAL NOTES

(A1) USE TEMPORARY BERMS TO DIVERT FLOW FROM UNPROTECTED SLOPES TO STABILIZED DITCHES (OUTLETS) AND TO DIVERT SEDIMENT LADEN RUNOFF TO SEDIMENT TRAPS. TEMPORARY BERMS MAY BE USED ABOVE, ACROSS, OR BELOW DISTURBED AREAS.

(A2) TEMPORARY BERMS SHALL BE CONSTRUCTED AT THE TOP OF ALL ERODIBLE CUT SLOPES DESIGNATED BY THE ENGINEER. THE GRADIENT OF THE BERMS SHALL BE THE MINIMUM POSSIBLE THAT CONDITIONS PERMIT. WHERE EXCESSIVE GRADIENTS ARE NECESSARY, CHECK DAMS SHALL BE USED IN ORDER TO REDUCE THE VELOCITY OF THE RUNOFF.

(A3) STABILIZE THE BERMS AND/OR DITCHES OUTSIDE LIMITS OF CONSTRUCTION WITH VEGETATION OR RIPRAP WHENEVER THE PROFILE GRADE IS GREATER THAN 2%.

(A4) CONSTRUCT THE TEMPORARY BERMS OUTSIDE THE LIMITS OF CONSTRUCTION BEFORE ACTUAL PROJECT CONSTRUCTION BEGINS AND SEED THE TEMPORARY BERMS WITHIN 15 CALENDAR DAYS OF CONSTRUCTION.

(A5) MAINTAIN THE TEMPORARY BERMS BY INSPECTING AFTER EACH RAINFALL AND/OR ONCE WEEKLY AND REPAIR AS NEEDED.

(A6) THE MAXIMUM DRAINAGE AREA FOR TEMPORARY BERMS SHALL BE 1.5 ACRES.

(A7) TEMPORARY BERMS MAY REMAIN IN PLACE AS PERMANENT BERMS IF SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

(A8) TEMPORARY BERMS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

203-01 ROAD & DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD

ITEMS USED FOR THE STABILIZATION OF BERMS SHALL BE PAID FOR UNDER THEIR RESPECTIVE ITEM NUMBERS.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY BERMS.

TEMPORARY SLOPE DRAIN WITH BERM AND RIPRAP GENERAL NOTES

(B1) TEMPORARY SLOPE DRAINS ARE USED TO CONVEY CONCENTRATED STORMWATER FROM THE TOP OF A CUT OR FILL SLOPE TO ITS BASE, THUS PROTECTING THE SLOPE FROM EROSION.

(B2) TEMPORARY SLOPE DRAINS SHALL BE USED AS THE EMBANKMENT IS CONSTRUCTED. LOCATION AND SPACING OF THE DRAIN ASSEMBLY SHALL BE DESIGNATED BY THE ENGINEER. ALL SLOPE DRAINS SHALL BE IN PLACE BY THE END OF EACH WORK SHIFT. THE DRAIN ASSEMBLIES SHALL BE USED UNTIL THE SLOPES ARE PROTECTED WITH PERMANENT SOIL EROSION CONTROL MEASURES.

(B3) THE MAXIMUM DRAINAGE AREA FOR TEMPORARY SLOPE DRAINS SHALL BE 1.5 ACRES. MULTIPLE PIPES MAY BE USED IN PLACE OF A SINGLE TEMPORARY SLOPE DRAIN FOR DRAINAGE AREAS LARGER THAN 1.5 ACRES.

(B4) TEMPORARY SLOPE DRAINS SHALL BE ANCHORED WITH GROMMETS OR STAKES AT INTERVALS NOT TO EXCEED 10 FEET. IN SOME CASES IT MAY BE NECESSARY TO EMBED THE SLOPE DRAIN INTO THE FILL SLOPE TO ENSURE PROPER ANCHORAGE.

(B5) FOR HIGH FLOW CONDITIONS, A T-JOINT OR ELL-JOINT MAY BE USED DOWN STREAM ON THE TEMPORARY SLOPE DRAIN TO CONTROL VELOCITY. A T-JOINT OR ELL-JOINT MAY ALSO BE USED UPSTREAM AT LOW POINTS TO INTERCEPT FLOW.

(B6) TEMPORARY SLOPE DRAINS SHALL EXTEND DOWN THE CUT OR FILL SLOPE TO A POINT BEYOND THE TOE OF THE SLOPE. A STABILIZED OUTLET FOR VELOCITY REDUCTION SHOULD BE PROVIDED.

(B7) TEMPORARY SLOPE DRAINS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

203-01	ROAD & DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD
209-02.03 THRU 209-02.07	__"TEMPORARY SLOPE DRAIN PER LINEAR FOOT
709-05.06	MACHINED RIP-RAP (CLASS A-1) PER TON

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY SLOPE DRAIN.

EROSION CONTROL PLAN LEGEND: TEMPORARY BERM

EROSION CONTROL PLAN LEGEND: TEMPORARY SLOPE DRAIN

- REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-27 TO EC-STR-27.
- REV. 7-29-97: CHANGED EROSION CONTROL PLAN LEGEND.
- REV. 5-27-01: CHANGED ITEM NOS. 209-01 TO 203-01, 209-02.02 TO 209-02.03, 209-07 TO 709-05.06, 209-07.01 TO 709-05.07, AND 801-07 TO 801-01.07.
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REVISED AND ADDED NOTES, REFORMATTED SHEET, CHANGED DRAWING NAME, AND MISC. DRAWING EDITS.
- REV. 8-1-12: MINOR EDITS TO DRAWING AND GENERAL NOTES.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

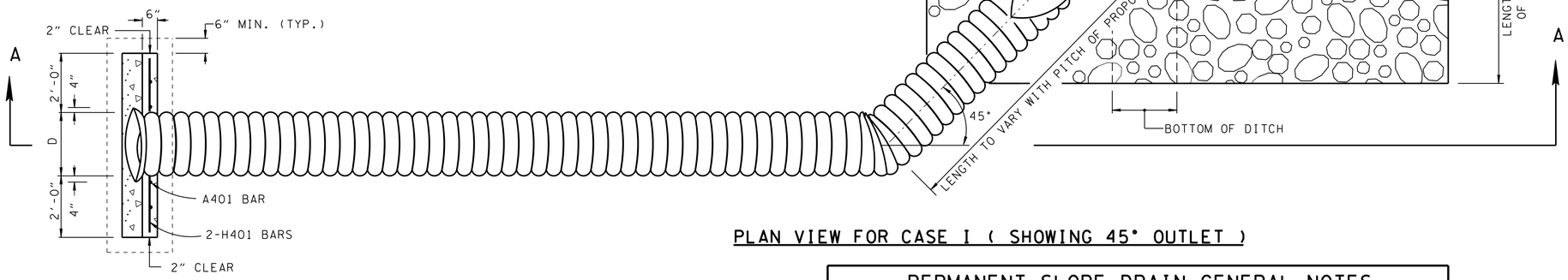
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TEMPORARY SLOPE DRAIN AND BERM

10-26-92 EC-STR-27

REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-29 TO EC-STR-29.

- REV. 5-27-01: CHANGED ITEM NO. 709-07 TO 709-02.01.
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING. CHANGED DRAWING NAME.
- REV. 4-1-08: MINOR EDITS, ADDED ITEMS 607-41.02 AND 709-05.06. CHANGED STANDARD SYMBOL, REVISED GENERAL NOTES, AND MISC. DRAFTING EDITS.
- REV. 8-1-12: ADDED FOOTING DIMENSION IN PLAN VIEW.



PLAN VIEW FOR CASE I (SHOWING 45° OUTLET)

PERMANENT SLOPE DRAIN GENERAL NOTES

(A) MATERIALS AND SPECIFICATIONS FOR PERMANENT SLOPE DRAIN PIPE SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 604, SECTION 607, AND SECTION 709.

(B) METAL AND PLASTIC PIPES USED FOR PERMANENT SLOPE DRAIN PIPE ARE TO BE ATTACHED TO THE GROUND WITH CONCRETE COLLARS OR OTHER METHODS AS APPROVED BY THE ENGINEER TO ASSURE PROPER ANCHORAGE AND PREVENT THE PIPE FROM SLIPPING DOWN THE SLOPE.

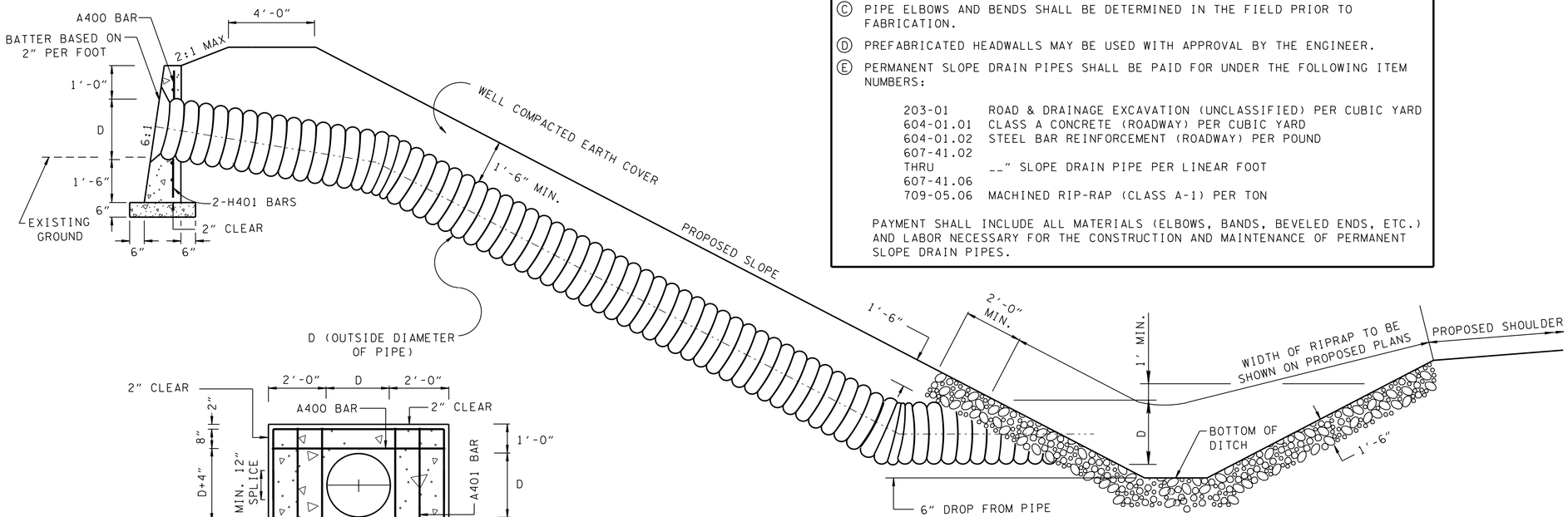
(C) PIPE ELBOWS AND BENDS SHALL BE DETERMINED IN THE FIELD PRIOR TO FABRICATION.

(D) PREFABRICATED HEADWALLS MAY BE USED WITH APPROVAL BY THE ENGINEER.

(E) PERMANENT SLOPE DRAIN PIPES SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

203-01	ROAD & DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD
604-01.01	CLASS A CONCRETE (ROADWAY) PER CUBIC YARD
604-01.02	STEEL BAR REINFORCEMENT (ROADWAY) PER POUND
607-41.02 THRU 607-41.06	__" SLOPE DRAIN PIPE PER LINEAR FOOT
709-05.06	MACHINED RIP-RAP (CLASS A-1) PER TON

PAYMENT SHALL INCLUDE ALL MATERIALS (ELBOWS, BANDS, BEVELED ENDS, ETC.) AND LABOR NECESSARY FOR THE CONSTRUCTION AND MAINTENANCE OF PERMANENT SLOPE DRAIN PIPES.



SECTIONAL VIEW A-A FOR CASE I (SHOWING 45° OUTLET)

FRONTAL ELEVATION VIEW FOR INLET HEADWALL FOR CASE I

EROSION CONTROL PLAN LEGEND: PERMANENT SLOPE DRAIN PIPE (SHOW SIZE)

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

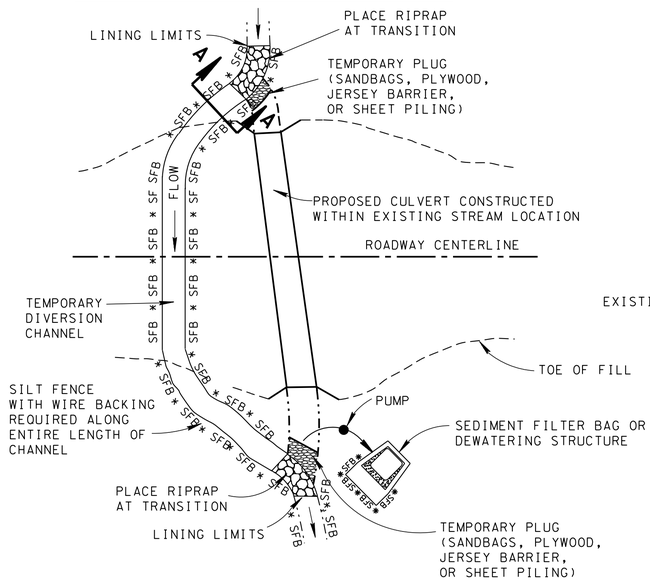
NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

PERMANENT SLOPE DRAIN PIPE

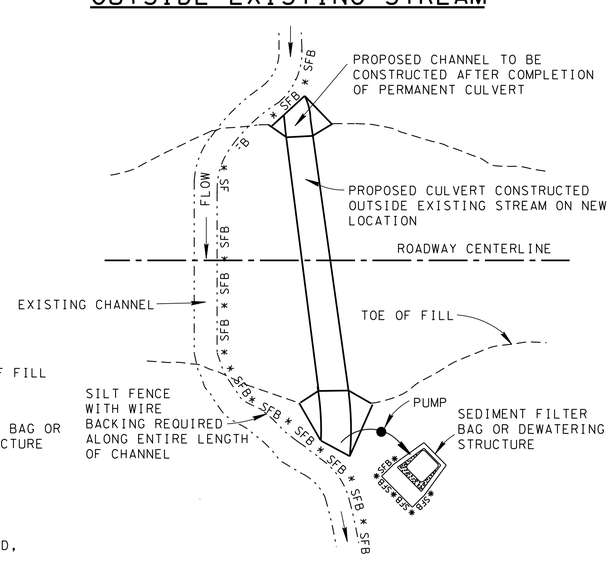
10-26-92 | EC-STR-29

CULVERT CONSTRUCTED WITHIN EXISTING STREAM

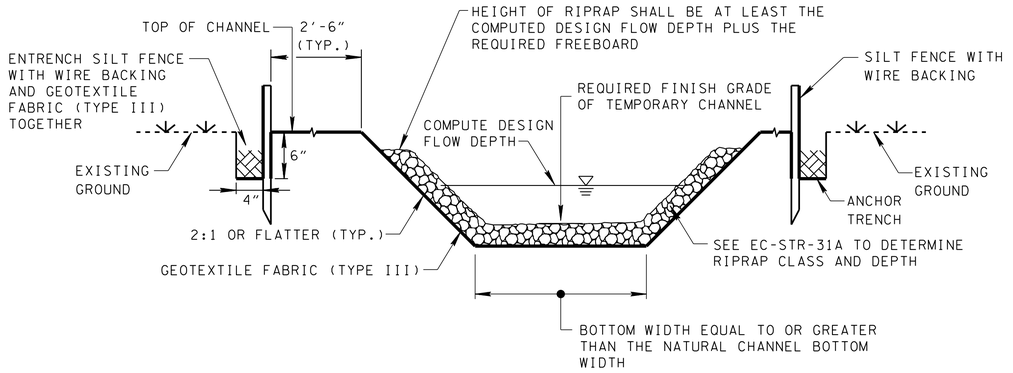


PLAN VIEW

CULVERT CONSTRUCTED OUTSIDE EXISTING STREAM

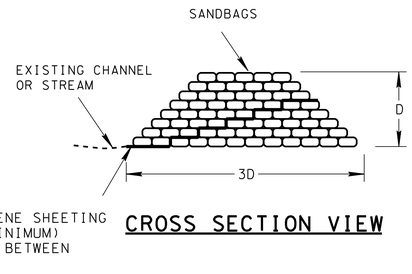


PLAN VIEW



SECTION A-A

ELEVATION VIEW



CROSS SECTION VIEW

PLUG DETAIL

EROSION CONTROL PLAN LEGEND: TEMPORARY DIVERSION CHANNEL (DESCRIBE - SIZE AND TYPE OF LINING)

TEMPORARY DIVERSION CHANNELS GENERAL NOTES

(A) DIVERSION CHANNELS SHALL BE USED TO DIVERT NORMAL STREAM FLOW FROM AN ERODIBLE AREA IN ORDER TO PREVENT POLLUTION OF THE STREAM DUE TO EROSION.

(B) EXAMPLE SHOWN IS FOR NEW CULVERT CONSTRUCTION. OTHER PROJECTS WOULD BE CONSTRUCTED IN A SIMILAR MANNER.

(C) TEMPORARY DIVERSION CHANNELS SHALL BE DESIGNED USING A 2-YEAR, 24-HOUR STORM FREQUENCY FLOW RATE. STANDARD DRAWING EC-STR-31A, MAY BE USED AS A GUIDELINE FOR DETERMINING THE CHANNEL SIZE. FOR ANY SITE WHERE Q_{50} EXCEEDS 500 CFS, THE DESIGN OF THIS MEASURE SHOULD BE COMPLETED BY THE HYDRAULICS SECTION OF THE STRUCTURES DIVISION. AT SITES WHICH INVOLVE EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE STABILITY OF THE RIPRAP CHANNEL LINING SHOULD BE DESIGNED FOR THE 5-YEAR, 24-HOUR PEAK FLOW.

(D) ALL TEMPORARY DIVERSION CHANNELS SHALL HAVE A TRAPEZOIDAL SHAPE AND THE BOTTOM WIDTH SHALL BE EQUAL TO OR GREATER THAN THE NATURAL CHANNEL BOTTOM WIDTH.

(E) TO DETERMINE RIPRAP CLASS AND DEPTH USE STANDARD DRAWING EC-STR-31A.

(F) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(G) GEOTEXTILE (TYPE III) (EROSION CONTROL) SHALL BE USED EITHER WITH OR WITHOUT RIPRAP, AS RECOMMENDED IN NOTE B6 ON STANDARD DRAWING EC-STR-31A.

(H) GEOTEXTILE FABRIC (TYPE III) SHALL BE USED ALONE ONLY IN CHANNELS WITH INTERMITTENT FLOW. USE A RIPRAP LINED CHANNEL OR CULVERT WHERE THE STREAM FLOWS YEAR-ROUND.

(I) WHERE EXCAVATION FOR A DIVERSION CHANNEL EXPOSES BEDROCK, GEOTEXTILE FABRIC AND RIPRAP SHALL BE REQUIRED ONLY ON THE SIDES OF THE CHANNEL.

(J) RIPRAP TRANSITIONS AT THE ENTRANCE AND EXIT OF THE DIVERSION CHANNEL SHALL BE DESIGNED IN ACCORDANCE WITH APPROVED TDOT METHODS.

(K) DURING CONSTRUCTION OF THE DIVERSION CHANNEL, DAMAGE TO THE EXISTING STREAM AND DAMAGE TO THE CANOPY SHALL BE MINIMIZED. ALL EXISTING VEGETATION OUTSIDE THE CUT AND FILL LINES BUT INSIDE THE RIGHT-OF-WAY SHALL NOT BE DISTURBED UNLESS IT INTERFERES WITH SAFETY STANDARDS.

(L) THE PROJECT SHALL BE PLANNED IN ORDER TO MINIMIZE THE LENGTH OF TIME THE DIVERSION WILL BE REQUIRED.

(M) DIVERSION CHANNEL CONSTRUCTION SHALL BE COMPLETED IN THE DRY BEFORE DIVERTING WATER FROM THE EXISTING CHANNEL. WHERE THIS IS NOT FEASIBLE, TEMPORARY FLOW DIVERSION STRUCTURES CAN BE USED UNTIL WORK IS COMPLETE. THESE STRUCTURES CAN BE ANY NON-ERODIBLE MATERIAL.

(N) CONSTRUCTION SHALL PROCEED AS FOLLOWS:

1. CONSTRUCT A MEANDERING TEMPORARY CHANNEL ADJACENT TO THE PROPOSED PROJECT. ISOLATE THE TEMPORARY CHANNEL FROM THE EXISTING CHANNEL WITH TEMPORARY PLUGS. TEMPORARY EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 209 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
2. THE DIVERSION CHANNEL SHALL BE STABILIZED AND INSPECTED BY THE PROJECT ENGINEER BEFORE FLOW IS DIVERTED. DIVERT FLOW BY MOVING THE TEMPORARY PLUGS FROM THE TEMPORARY CHANNEL TO THE EXISTING CHANNEL. A COFFER DAM MAY BE USED UPSTREAM TO PREVENT STREAM FLOW DURING THIS OPERATION.
3. CONSTRUCT THE PROJECT IN THE EXISTING STREAM AND PLACE PERMANENT EROSION CONTROL ON THE EXISTING STREAM BANKS.
4. WHERE A TEMPORARY PLUG IS REQUIRED AT THE DOWNSTREAM END OF THE DIVERSION, IT SHOULD BE REMOVED FIRST. THEN REMOVE THE UPPER PLUG IN ORDER TO RELEASE FLOW INTO THE RECONSTRUCTED CHANNEL.
5. REMOVE LINING MATERIALS FROM THE DIVERSION CHANNEL, RESTORE THE AREA TO GRADE, AND STABILIZE EXPOSED SOILS.

(O) ALTERNATIVE DIVERSION METHOD MAY INCLUDE PARALLEL JERSEY BARRIERS LINED WITH POLYETHYLENE SHEETING (6 MIL MINIMUM).

(P) DIVERSION CHANNEL SHALL BE INSPECTED WEEKLY OR AFTER EVERY RAIN EVENT. ANY NEEDED REPAIRS SHALL BE DONE IMMEDIATELY.

(Q) FOR INSTALLATION DETAILS AND ITEM NUMBERS FOR DEWATERING STRUCTURES (EC-STR-1), SEDIMENT FILTER BAGS (EC-STR-2), AND SILT FENCE WITH WIRE BACKING (EC-STR-3C) SEE THEIR RESPECTIVE STANDARD DRAWINGS.

(R) TEMPORARY DIVERSION CHANNELS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-65.03	TEMPORARY DIVERSION CHANNEL PER LINEAR FOOT
709-05.06	MACHINED RIPIAP (CLASS A-1) PER TON
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD

DEWATERING STRUCTURES, SEDIMENT FILTER BAGS, AND SILT FENCE WITH WIRE BACKING SHALL BE PAID FOR ACCORDING TO THEIR RESPECTIVE STANDARD DRAWINGS.

TEMPORARY PLUGS SHALL BE PAID FOR UNDER THEIR RESPECTIVE ITEM NUMBERS.

PAYMENT SHALL INCLUDE ALL MATERIALS (EXCAVATION, GEOTEXTILE FABRIC, RIPRAP, ETC.) AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY DIVERSION CHANNELS.

REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-31 TO EC-STR-31.

☐ REV. 5-27-01: CHANGED ITEM NO. 740-03.01 TO 740-10.03. CHANGED REFERENCE OF TEMPORARY EROSION CONTROL PIPE TO TEMPORARY PIPE.

☐ REV. 12-18-02: CHANGED ALL SILT FENCE IN DETAILS TO ENHANCED SILT FENCE. CHANGED GENERAL NOTE (E).

☐ REV. 4-15-06: MODIFIED ALL GENERAL NOTES. REMOVED "TEMPORARY CULVERT USED DURING CONSTRUCTION". REMOVED TABLE FOR "PIPE DIA. FOR STREAM CROSSINGS OR TEMP. DIVERSION CHANNELS (INCHES)" REMOVED DETAIL FOR "TEMP. DIVERSION CHANNEL W/GEOTEXTILE FABRIC LINING."REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.

☐ REV. 4-1-08: REVISED GENERAL NOTES, ADDED NOTE R, AND MISC. EDITS TO DRAWING.

☐ REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

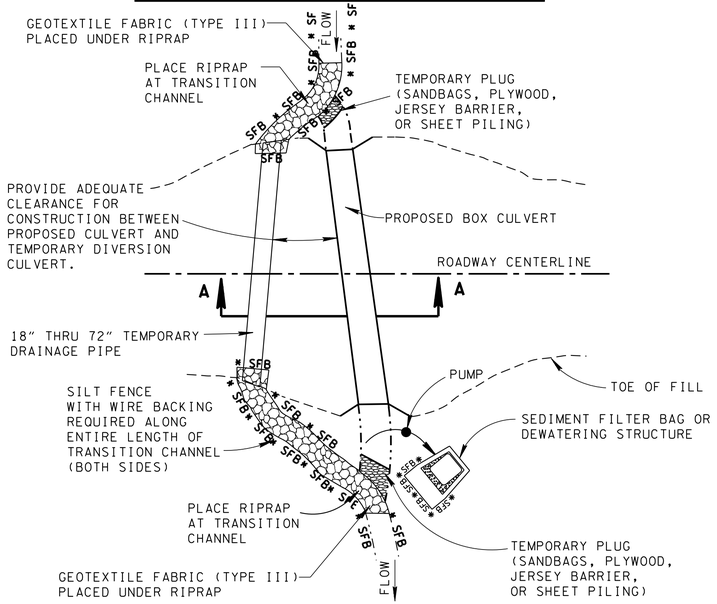
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TEMPORARY DIVERSION CHANNEL

10-26-92 EC-STR-31

- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REVISED GENERAL NOTES, ADDED NOTE N, MISC. EDITS TO DRAWING, AND CHANGED STANDARD SYMBOL.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

TEMPORARY DIVERSION CULVERT WITH CHANNEL TRANSITIONS



PLAN VIEW

TEMPORARY DIVERSION CULVERT SELECTION

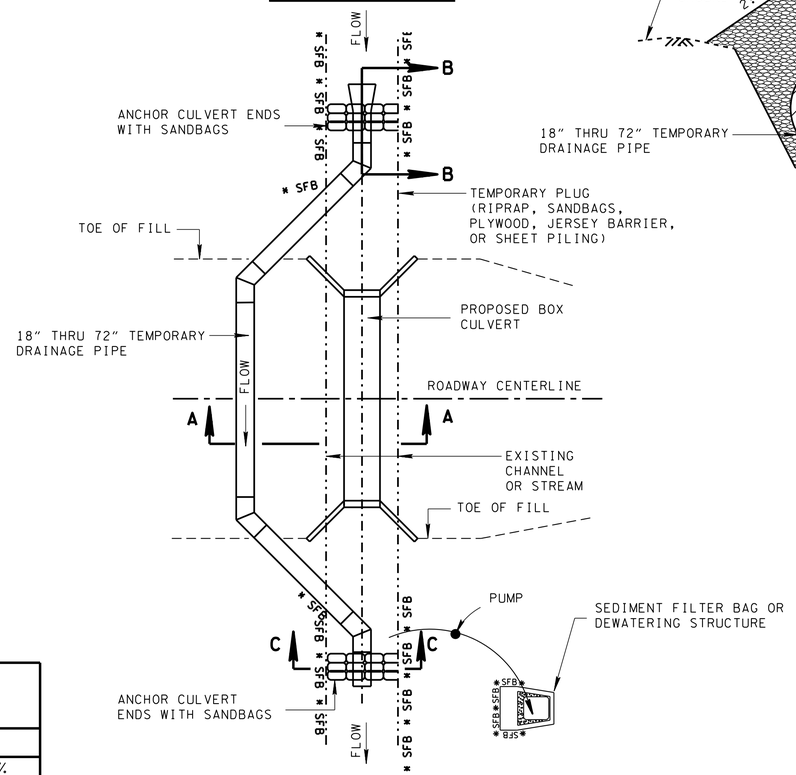
FLOW CAPACITY IN CFS OF A GIVEN PIPE AT A GIVEN CHANNEL SLOPE

PIPE DIAMETER (INCHES)	AVERAGE CHANNEL SLOPE					
	0.5%	1%	1.5%	2.0%	2.5%	3.0%
18	8.5	9.1	9.8	10.4	11.0	11.3
24	17.4	18.8	20.0	21.4	21.5	21.7
30	30.1	32.3	33.9	34.1	33.5	33.0
36	46.8	50.4	49.5	47.8	46.6	45.8
42	67.7	69.0	65.5	62.8	61.0	59.6
48	92.6	88.1	76.8	78.6	75.8	73.7
54	127.2	107.0	91.9	94.9	91.1	88.1
60	146.5	121.1	118.4	111.1	106.1	101.9
72	194.9	142.2	153.6	141.3	133.3	127.9
RIPRAP	B	B	B	B	B/C	B/C

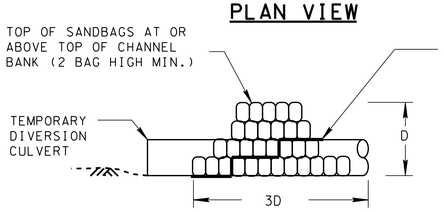
NOTES: FLOW RATES BASED ON 2.5-FOOT INCREASE IN WATER SURFACE ELEVATION ABOVE NORMAL LEVEL FOR THE 2-YEAR, 24 HOUR STORM EVENT

ASSUMES CORRUGATED PIPE (n = 0.024)

TEMPORARY DIVERSION CULVERT WITH ELBOWS



PLAN VIEW



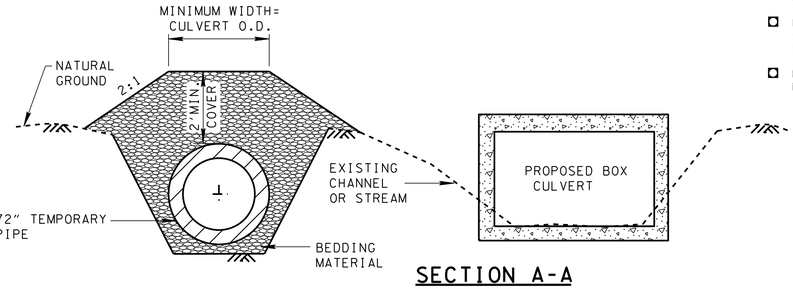
SECTION B-B

EXAMPLE:

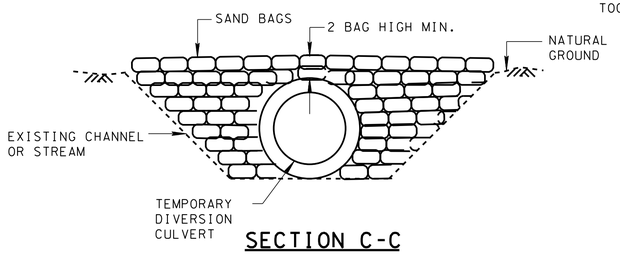
Q2 = 87.6 CFS
CHANNEL SLOPE 1%

SELECT EITHER:

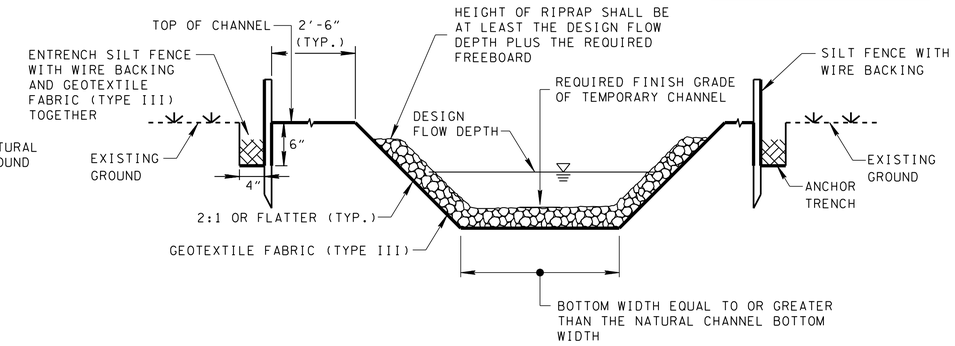
SINGLE 48-INCH PIPE OR TWIN 36-INCH PIPES



SECTION A-A



SECTION C-C



TRANSITION CHANNEL CROSS-SECTION

EROSION CONTROL PLAN LEGEND: TEMPORARY DIVERSION CULVERT (DESCRIBE NUMBER AND SIZE OF PIPES)

TEMPORARY DIVERSION CULVERTS GENERAL NOTES

(A) TEMPORARY DIVERSION CULVERTS ARE GENERALLY CONSTRUCTED UNDER AN EXISTING ROADWAY, WHERE IT IS NECESSARY TO MAINTAIN TRAFFIC, TO CONVEY STREAM FLOW AROUND IN-STREAM CONSTRUCTION. THIS ALLOWS IN-STREAM WORK TO BE COMPLETED IN THE DRY, SEPARATED FROM FLOWING WATER.

(B) EXAMPLE SHOWN IS FOR CULVERT REPLACEMENT OR NEW CONSTRUCTION. OTHER PROJECTS WOULD BE CONSTRUCTED IN A SIMILAR MANNER.

(C) TEMPORARY DIVERSION CULVERTS SHALL BE DESIGNED USING A 2-YEAR FREQUENCY STORM FLOW RATE. AT SITES WHICH INVOLVE EXCEPTIONAL TENNSESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE PIPE SHALL BE ADEQUATE TO CONVEY THE 5-YEAR, PEAK FLOW. THE TABLE "TEMPORARY DIVERSION CULVERT SELECTION" MAY BE USED AS A GUIDELINE FOR DETERMINING THE PIPE SIZE. FOR ANY SITE WHERE Q_{50} EXCEEDS 500 CFS, THE DESIGN OF THIS MEASURE SHOULD BE COMPLETED BY THE HYDRAULICS SECTION OF THE STRUCTURES DIVISION.

(D) THE DESIGNER SHALL PROVIDE CULVERT SECTIONS FOR TEMPORARY CULVERT CROSSINGS. MINIMUM COVER FOR CONSTRUCTION LOADS IS 2 FEET.

(E) THE RIPRAP TRANSITION AT THE INLET AND THE DIVERSION CULVERT SHALL BE DESIGNED IN ACCORDANCE WITH APPROVED TDOT METHODS.

(F) WHERE EXCAVATION FOR A DIVERSION TRANSITION EXPOSES BEDROCK, GEOTEXTILE FABRIC AND RIPRAP SHALL BE USED ONLY ON THE SIDES OF THE CHANNEL.

(G) IN ORDER TO PROVIDE THE BEST POSSIBLE SEAL, THE POLYETHYLENE SHEETING USED IN AN UPSTREAM PIPE ANCHOR SHOULD BE FITTED AROUND THE PIPE. SANDBAGS ON THE DOWNSTREAM SIDE OF THE SHEETING SHOULD BE PLACED FIRST, AND THE SHEETING PLACED ON THESE BAGS. THE REMAINING SANDBAGS WOULD THEN BE PLACED ON THE SHEETING. WHERE MULTIPLE SHEETS ARE USED, THEY SHOULD OVERLAP A MINIMUM OF 18 INCHES.

(H) DURING CONSTRUCTION OF THE TEMPORARY DIVERSION CULVERT, DAMAGE TO THE EXISTING STREAM AND CANOPY SHALL BE MINIMIZED. ALL EXISTING VEGETATION OUTSIDE THE CUT AND FILL LINES BUT INSIDE THE RIGHT-OF-WAY SHALL NOT BE DISTURBED UNLESS IT INTERFERES WITH SAFETY STANDARDS. THE TEMPORARY CULVERT SHOULD BE LOCATED SO AS TO MINIMIZE THE LENGTH OF ANY TRANSITIONS REQUIRED.

(I) DIVERSION CULVERT CONSTRUCTION SHALL BE COMPLETED IN THE DRY BEFORE DIVERTING WATER FROM THE EXISTING CHANNEL. WHERE THIS IS NOT FEASIBLE, TEMPORARY FLOW DIVERSION STRUCTURES CAN BE USED UNTIL WORK IS COMPLETE. THESE STRUCTURES CAN BE ANY NON-ERODIBLE MATERIAL.

(J) CONSTRUCTION SHALL PROCEED AS FOLLOWS:

1. CONSTRUCT THE TEMPORARY CULVERT ADJACENT TO THE PROPOSED PROJECT. ISOLATE THE TEMPORARY CHANNEL FROM THE EXISTING CHANNEL WITH TEMPORARY PLUGS.
2. DIVERT FLOW BY MOVING THE TEMPORARY PLUGS FROM THE TEMPORARY CHANNEL TO THE EXISTING CHANNEL. A COFFER DAM MAY BE USED UPSTREAM TO PREVENT STREAM FLOW DURING THIS OPERATION.
3. CONSTRUCT THE PROJECT IN THE EXISTING STREAM AND PLACE PERMANENT EROSION CONTROL ON THE EXISTING STREAM BANKS.
4. WHERE A TEMPORARY PLUG IS REQUIRED AT THE DOWNSTREAM END OF THE DIVERSION, IT SHOULD BE REMOVED FIRST. THEN REMOVE THE UPPER PLUG IN ORDER TO RELEASE FLOW INTO THE RECONSTRUCTED CHANNEL.
5. REMOVE LINING MATERIALS FROM THE DIVERSION TRANSITIONS, RESTORE THE AREA TO GRADE AND STABILIZE EXPOSED SOILS.

(K) DIVERSION CULVERT, SANDBAG ANCHORS AND TRANSITIONS SHALL BE INSPECTED WEEKLY OR AFTER EVERY RAIN EVENT. ANY NEEDED REPAIRS SHALL BE DONE IMMEDIATELY.

(L) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(M) FOR INSTALLATION DETAILS AND ITEM NUMBERS FOR DEWATERING STRUCTURES (EC-STR-1), SEDIMENT FILTER BAGS (EC-STR-2), AND SILT FENCE WITH WIRE BACKING (EC-STR-3C), SEE THEIR RESPECTIVE STANDARD DRAWINGS.

(N) TEMPORARY DIVERSION CULVERTS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

203-01	ROAD AND DRAINAGE EXCAVATION (UNCLASSIFIED) PER CUBIC YARD
209-09.01	SAND BAGS PER BAG
209-20.03	POLYETHYLENE SHEETING (6 MIL. MINIMUM) PER SQUARE YARD
621-03.02 THRU 621-03.11	-- "TEMPORARY DRAINAGE PIPE PER LINEAR FOOT
709-05.06	MACHINED RIP-RAP (CLASS A-1) PER TON
709-05.08	MACHINED RIP-RAP (CLASS B) PER TON
709-05.09	MACHINED RIP-RAP (CLASS C) PER TON
740-10.03	GEOTEXTILE (TYPE III) (EROSION CONTROL) PER SQUARE YARD

DEWATERING STRUCTURES, SEDIMENT FILTER BAGS, AND SILT FENCE WITH WIRE BACKING SHALL BE PAID FOR ACCORDING TO THEIR RESPECTIVE STANDARD DRAWINGS.

TEMPORARY PLUGS SHALL BE PAID FOR UNDER THEIR RESPECTIVE ITEM NUMBERS.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY DIVERSION CULVERTS.

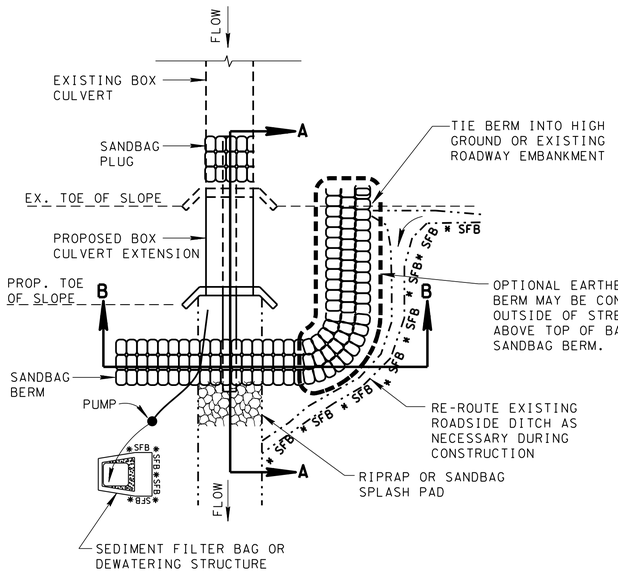
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

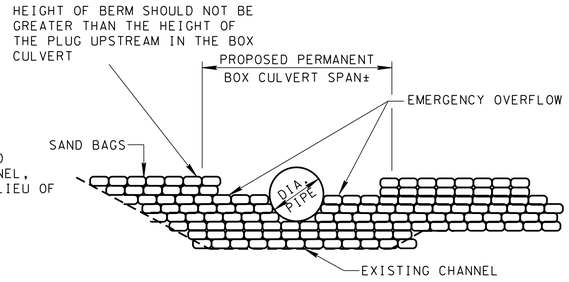
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TEMPORARY DIVERSION CULVERTS

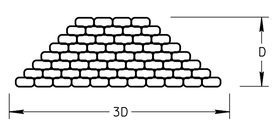
1-20-06 | EC-STR-32



PLAN VIEW

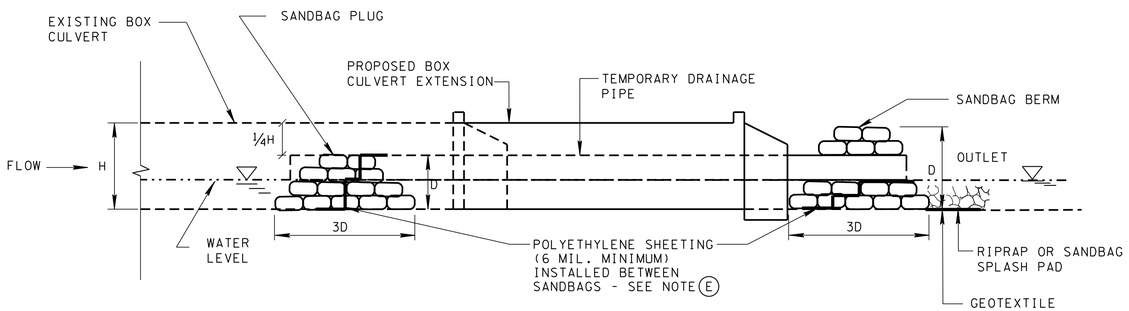


SECTION B-B



SAND BAG PLUG & BERM CROSS SECTION

SEE NOTE (E)



SECTION A-A

EROSION CONTROL PLAN LEGEND: SUSPENDED PIPE DIVERSION

MAXIMUM SPAN FOR PIPE SUPPORTS, FEET

DIAMETER OF PIPE (IN.)	STEEL THICKNESS (IN.)				
	0.064	0.079	0.109	0.138	0.168
	2" X ½" CORRUGATION				
24	13	15	20		
36	12	15	20	25	
48	11	14	19	25	30
60		14	19	24	29
72			18	24	29
	5" X 1" OR 3" X 1" CORRUGATION				
36	9	11			
48	9	11	15		
60	8	10	14	18	
72	8	10	14	18	22

FOR PIPE SIZES NOT SHOWN REFER TO NEXT LARGER SIZE

SOURCE: HANDBOOK OF STEEL DRAINAGE AND HIGHWAY CONSTRUCTION PRODUCTS, 1994, P. 278

SUSPENDED PIPE DIVERSION (DOWNSTREAM) GENERAL NOTES

(A) SUSPENDED PIPE DIVERSIONS MAY BE USED TO ALLOW BOX CULVERT EXTENSIONS TO BE CONSTRUCTED, WHILE SEPARATED FROM FLOWING WATER, THUS REDUCING SEDIMENTATION. OPTIONAL FLEXIBLE PIPE DIVERSION MAY BE UTILIZED ON STREAMS WITH INTERMITTENT FLOW WHERE THE DURATION OF CONSTRUCTION IS EXPECTED TO BE BRIEF.

(B) SUSPENDED PIPE DIVERSIONS SHALL BE DESIGNED USING A 2-YEAR STORM FREQUENCY FLOW RATE. AT SITES WHICH INVOLVE EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE PIPE SHALL BE ADEQUATE TO CONVEY THE 5-YEAR, PEAK FLOW. THE TABLE "TEMPORARY DIVERSION CULVERT SELECTION" ON STANDARD DRAWING EC-STR-32 MAY BE USED AS A GUIDELINE FOR DETERMINING THE PIPE SIZE. FOR ANY SITE WHERE Q_{50} EXCEEDS 500 CFS, THE DESIGN OF THIS MEASURE SHOULD BE COMPLETED BY THE HYDRAULICS SECTION OF THE STRUCTURES DIVISION.

(C) SUSPENDED PIPE DIVERSIONS MAY BE USED WHERE ADVERSE IMPACTS WILL NOT BE CAUSED BY WATER PONDED UPSTREAM OF THE PIPE.

(D) THE SANDBAG PLUG AT THE UPSTREAM END OF THE SUSPENDED PIPE DIVERSION SHOULD BE CONSTRUCTED TO A HEIGHT EQUAL TO THREE QUARTERS OF THE RISE OF THE BOX CULVERT.

(E) POLYETHYLENE SHEETING (6 MIL. MINIMUM) SHALL BE PLACED INSIDE THE SANDBAG PLUG IN THE BOX CULVERT AND IN THE SAND BAG BERM WITHIN THE CHANNEL IN ORDER TO PROVIDE THE BEST POSSIBLE SEAL. SANDBAGS ON THE DOWNSTREAM SIDE OF THE SHEETING SHOULD BE PLACED FIRST, AND THEN SHEETING PLACED ON THESE BAGS. AS MUCH AS POSSIBLE, THE SHEETING SHOULD BE FITTED AROUND THE PIPE. THE REMAINING SANDBAGS WOULD THEN BE PLACED ON THE SHEETING. WHERE MULTIPLE SHEETS ARE USED, THEY SHOULD OVERLAP A MINIMUM OF 18 INCHES.

(F) THE PROPOSED CULVERT CONSTRUCTION SHALL BE SEALED FROM THE EXISTING STREAM BY MEANS OF A SANDBAG BERM WHICH SHOULD BE AT THE SAME HEIGHT AS THE PLUG INSIDE THE BOX CULVERT. THIS BERM SHALL BE TIED INTO EITHER HIGH GROUND ADJACENT TO THE CHANNEL OR THE EXISTING ROADWAY EMBANKMENT. IT SHALL BE PROVIDED WITH A SPILLWAY EQUAL IN WIDTH TO THE BOX CULVERT AND AT A HEIGHT LOWER THAN THE REST OF THE BERM.

(G) THE TEMPORARY DRAINAGE PIPE SHALL BE SUPPORTED AT ALL JOINTS AND AT INTERVALS NOT TO EXCEED MAXIMUM VALUES SPECIFIED IN THE TABLE "MINIMUM SPAN FOR SUPPORTS." SUPPORTS MAY CONSIST OF SANDBAGS, CONCRETE BLOCKS, WOODEN FRAMES, OR ANY OTHER MATERIAL SUFFICIENT TO SUPPORT THE WEIGHT OF THE PIPE WHEN IT IS FLOWING FULL. SUPPORTS AT JOINTS SHALL BE A MINIMUM OF 18 INCHES IN LENGTH, ALONG THE TEMPORARY DRAINAGE PIPE AND CENTERED ON THE JOINT. SUPPORTS SHOULD "CRADLE" THE TEMPORARY DRAINAGE PIPE TO ENSURE THAT IT WILL NOT ROLL DURING CONSTRUCTION OF THE BOX CULVERT.

(H) ALL PIPE JOINTS SHALL BE PROPERLY BANDED OR OTHERWISE PROVIDED WITH A REASONABLE SEAL AGAINST LEAKAGE.

(I) THE OPTIONAL FLEXIBLE PIPE DIVERSION USING PUMPS AND SHOWN ON STD. DWG. EC-STR-33A CAN BE USED AS AN ALTERNATE FOR SUSPENDED PIPE DIVERSIONS (UPSTREAM AND DOWNSTREAM).

(J) CONSTRUCTION SHALL PROCEED AS FOLLOWS:

1. INSTALL TEMPORARY DRAINAGE PIPE ON ITS SUPPORTS INSIDE THE CULVERT TO BE EXTENDED.
2. CONSTRUCT THE SANDBAG PLUG AT THE UPSTREAM END OF THE SUSPENDED PIPE DIVERSION.
3. CONSTRUCT THE SANDBAG BERM AT THE DOWNSTREAM END OF THE SUSPENDED PIPE DIVERSION.
4. ONCE THE BOX CULVERT EXTENSION HAS BEEN COMPLETED, REMOVE THE DOWNSTREAM SANDBAG STRUCTURE, EXCEPT FOR THOSE BAGS NEEDED TO SUPPORT THE END OF THE PIPE. THE UPSTREAM SANDBAG STRUCTURE SHOULD THEN BE REMOVED GRADUALLY, IN ORDER TO ALLOW THE UPSTREAM WATER LEVEL TO DRAW DOWN AT A SAFE RATE.
5. REMOVE THE TEMPORARY DRAINAGE PIPE, SUPPORTS AND ANY REMAINING SANDBAGS.

(K) TEMPORARY DRAINAGE PIPE, SANDBAG PLUGS, BERMS, AND SUPPORTS SHALL BE INSPECTED WEEKLY OR AFTER EVERY RAIN EVENT. ANY NEEDED REPAIRS SHALL BE DONE IMMEDIATELY. ANY DEBRIS WHICH HAS ACCUMULATED AT THE INLET OF THE SUSPENDED PIPE DIVERSION SHALL BE IMMEDIATELY REMOVED.

(L) FOR INSTALLATION DETAILS AND ITEM NUMBERS FOR DEWATERING STRUCTURES (EC-STR-1), SEDIMENT FILTER BAGS (EC-STR-2), AND SILT FENCE WITH WIRE BACKING (EC-STR-3C), SEE THEIR RESPECTIVE STANDARD DRAWINGS.

(M) SUSPENDED PIPE DIVERSIONS (DOWNSTREAM) SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-09.01	SANDBAGS PER BAG
209-20.03	POLYETHYLENE SHEETING (6 MIL. MINIMUM) PER SQUARE YARD
621-03.02 THRU 621-03.11	__ "TEMPORARY DRAINAGE PIPE PER LINEAR FOOT
709-05.06	MACHINED RIP-RAP (CLASS A-1) PER TON
709-05.08	MACHINED RIP-RAP (CLASS B) PER TON
709-05.09	MACHINED RIP-RAP (CLASS C) PER TON

DEWATERING STRUCTURES, SEDIMENT FILTER BAGS, AND SILT FENCE WITH WIRE BACKING SHALL BE PAID FOR ACCORDING TO THEIR RESPECTIVE STANDARD DRAWINGS.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF SUSPENDED PIPE DIVERSION (DOWNSTREAM).

- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REVISED, ADDED, AND RENUMBERED NOTES, MINOR EDITS TO DRAWING.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

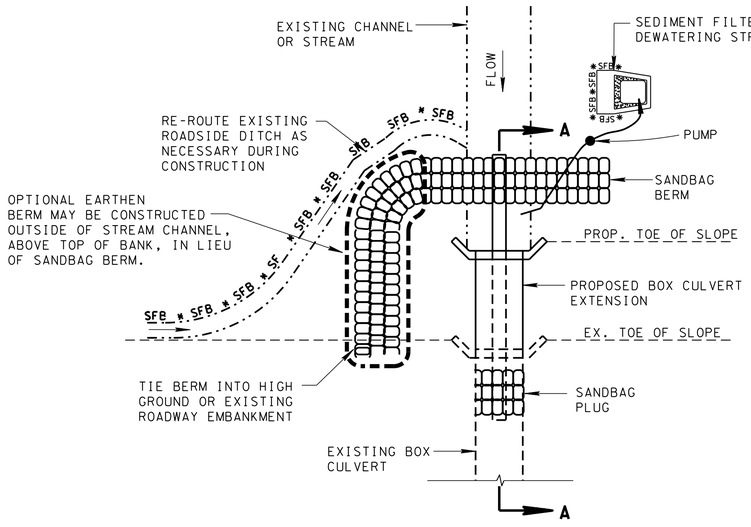
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SUSPENDED PIPE DIVERSION (DOWNSTREAM)

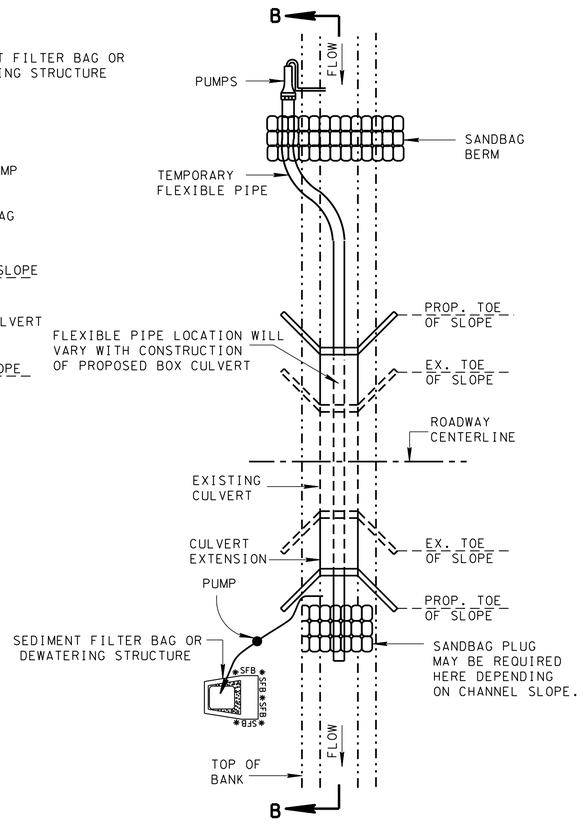
1-20-06 EC-STR-33

- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REVISED, ADDED, AND RENUMBERED NOTES, MINOR EDITS TO DRAWING.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

FLEXIBLE PIPE DIVERSION (OPTIONAL)

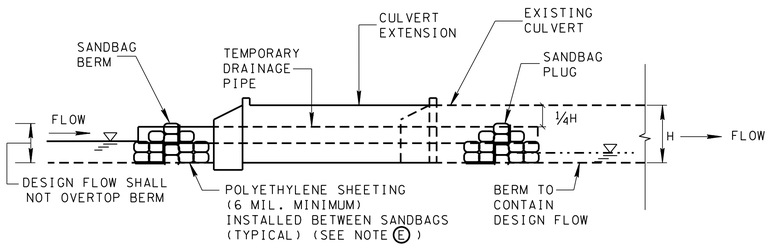


PLAN VIEW

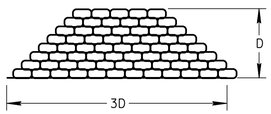


PLAN VIEW

(SHOWN WITH UPSTREAM & DOWNSTREAM EXTENTIONS)

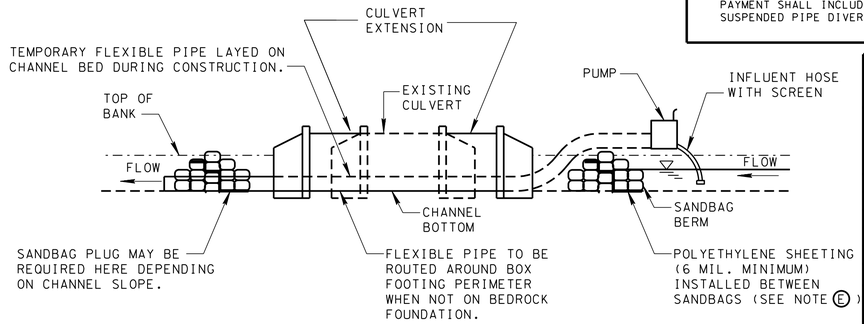


SECTION A-A



SAND BAG PLUG & BERM CROSS SECTION

(SEE NOTE E)



SECTION B-B

SUSPENDED PIPE DIVERSION (UPSTREAM) GENERAL NOTES

(A) SUSPENDED PIPE DIVERSIONS MAY BE USED TO ALLOW BOX CULVERT EXTENSIONS TO BE CONSTRUCTED, WHILE SEPARATED FROM FLOWING WATER, IN THE DRY, THUS REDUCING SEDIMENTATION. FLEXIBLE PIPE DIVERSION MAY BE UTILIZED ON STREAMS WITH INTERMITTENT FLOW WHERE THE DURATION OF CONSTRUCTION IS EXPECTED TO BE BRIEF.

(B) SUSPENDED PIPE DIVERSIONS SHALL BE DESIGNED USING A 2-YEAR STORM FREQUENCY FLOW RATE. AT SITES WHICH INVOLVE EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE PIPE SHALL BE ADEQUATE TO CONVEY THE 5-YEAR, PEAK FLOW. THE TABLE "TEMPORARY DIVERSION CULVERT SELECTION" ON STANDARD DRAWING EC-STR-32 MAY BE USED AS A GUIDELINE FOR DETERMINING THE PIPE SIZE. FOR ANY SITE WHERE Q_{50} EXCEEDS 500 CFS, THE DESIGN OF THIS MEASURE SHOULD BE COMPLETED BY THE HYDRAULICS SECTION OF THE STRUCTURES DIVISION.

(C) SUSPENDED PIPE DIVERSIONS MAY BE USED WHERE ADVERSE IMPACTS WILL NOT BE CAUSED BY WATER PONDED UPSTREAM OF THE PIPE.

(D) THE SANDBAG PLUG AT THE DOWNSTREAM END OF THE SUSPENDED PIPE DIVERSIONS SHOULD BE CONSTRUCTED TO A HEIGHT EQUAL TO THREE QUARTERS OF THE RISE OF THE BOX CULVERT.

(E) POLYETHYLENE SHEETING (6 MIL. MINIMUM) SHALL BE PLACED INSIDE THE SANDBAG BERM IN THE CHANNEL AND THE SAND BAG PLUG IN THE BOX CULVERT, IN ORDER TO PROVIDE THE BEST POSSIBLE SEAL. SANDBAGS ON THE DOWNSTREAM SIDE OF THE SHEETING SHOULD BE PLACED FIRST, AND THEN SHEETING PLACED ON THESE BAGS. AS MUCH AS POSSIBLE, THE SHEETING SHOULD BE FITTED AROUND THE PIPE. THE REMAINING SANDBAGS WOULD THEN BE PLACED ON THE SHEETING. WHERE MULTIPLE SHEETS ARE USED, THEY SHOULD OVERLAP A MINIMUM OF 18 INCHES.

(F) THE PROPOSED CULVERT CONSTRUCTION SHALL BE SEALED FROM THE EXISTING STREAM BY MEANS OF A SANDBAG BERM WHICH WILL BE TIED IN TO EITHER HIGH GROUND BESIDE THE CHANNEL OR THE EXISTING ROADWAY EMBANKMENT, UP TO THE 2-YEAR OR 5-YEAR FLOOD LEVEL.

(G) THE TEMPORARY DRAINAGE PIPE WILL BE SUPPORTED AT ALL JOINTS AND AT INTERVALS NOT TO EXCEED MAXIMUM VALUES SPECIFIED IN THE TABLE "MINIMUM SPAN FOR SUPPORTS." SUPPORTS MAY CONSIST OF SANDBAGS, CONCRETE BLOCKS, WOODEN FRAMES, OR ANY OTHER MATERIAL SUFFICIENT TO SUPPORT THE WEIGHT OF THE PIPE WHEN IT IS FLOWING FULL. SUPPORTS AT JOINTS SHALL BE A MINIMUM OF 18 INCHES IN LENGTH, ALONG THE TEMPORARY DRAINAGE PIPE AND CENTERED ON THE JOINT. SUPPORTS SHOULD "CRADLE" THE TEMPORARY DRAINAGE PIPE TO ENSURE THAT IT WILL NOT ROLL DURING CONSTRUCTION OF THE BOX CULVERT.

(H) ALL PIPE JOINTS SHALL BE PROPERLY BANDED OR OTHERWISE PROVIDED WITH A REASONABLE SEAL AGAINST LEAKAGE.

(I) THE OPTIONAL FLEXIBLE PIPE DIVERSION CAN BE USED AS AN ALTERNATE FOR SUSPENDED PIPE DIVERSIONS (UPSTREAM OR DOWNSTREAM).

(J) CONSTRUCTION SHALL PROCEED AS FOLLOWS:

1. INSTALL TEMPORARY DRAINAGE PIPE ON ITS SUPPORTS INSIDE THE CULVERT TO BE EXTENDED.
2. CONSTRUCT THE SANDBAG BERM AT THE UPSTREAM END OF THE SUSPENDED PIPE DIVERSIONS.
3. CONSTRUCT THE SANDBAG PLUG AT THE DOWNSTREAM END OF THE SUSPENDED PIPE DIVERSIONS.
4. ONCE THE BOX CULVERT EXTENSION HAS BEEN COMPLETED, REMOVE THE DOWNSTREAM SANDBAG STRUCTURE, EXCEPT FOR THOSE BAGS NEEDED TO SUPPORT THE END OF THE PIPE. THE UPSTREAM SANDBAG STRUCTURE SHOULD THEN BE REMOVED GRADUALLY, IN ORDER TO ALLOW THE UPSTREAM WATER LEVEL TO DRAW DOWN AT A SAFE RATE.
5. REMOVE THE TEMPORARY DRAINAGE PIPE, SUPPORTS AND ANY REMAINING SANDBAGS.

(K) TEMPORARY DRAINAGE PIPE, SANDBAG PLUGS, BERMS, AND SUPPORTS SHALL BE INSPECTED WEEKLY OR AFTER EVERY RAIN EVENT. ANY NEEDED REPAIRS SHALL BE DONE IMMEDIATELY. ANY DEBRIS WHICH HAS ACCUMULATED AT THE INLET OF THE SUSPENDED PIPE DIVERSIONS SHALL BE IMMEDIATELY REMOVED.

(L) FOR INSTALLATION DETAILS AND ITEM NUMBERS FOR DEWATERING STRUCTURES (EC-STR-1), SEDIMENT FILTER BAGS (EC-STR-2), AND SILT FENCE WITH WIRE BACKING (EC-STR-3C), SEE THEIR RESPECTIVE STANDARD DRAWINGS.

(M) SUSPENDED PIPE DIVERSIONS (UPSTREAM) SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-09.01	SANDBAGS PER BAG
209-20.03	POLYETHYLENE SHEETING (6 MIL. MINIMUM) PER SQUARE YARD
621-03.02 THRU 621-03.11	__" TEMPORARY DRAINAGE PIPE PER LINEAR FOOT

DEWATERING STRUCTURES, SEDIMENT FILTER BAGS, AND SILT FENCE WITH WIRE BACKING SHALL BE PAID FOR ACCORDING TO THEIR RESPECTIVE STANDARD DRAWING.

PUMPS AND FLEXIBLE PIPES SHALL BE PAID FOR UNDER THEIR RESPECTIVE ITEM NUMBERS.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF SUSPENDED PIPE DIVERSIONS (UPSTREAM).

MAXIMUM SPAN FOR PIPE SUPPORTS, FEET

DIAMETER OF PIPE (IN.)	STEEL THICKNESS (IN.)				
	0.064	0.079	0.109	0.138	0.168
	2" X ½" CORRUGATION				
24	13	15	20		
36	12	15	20	25	
48	11	14	19	25	30
60		14	19	24	29
72			18	24	29
	5" X 1" OR 3" X 1" CORRUGATION				
36	9	11			
48	9	11	15		
60	8	10	14	18	
72	8	10	14	18	22

FOR PIPE SIZES NOT SHOWN REFER TO NEXT LARGER SIZE

SOURCE: HANDBOOK OF STEEL DRAINAGE AND HIGHWAY CONSTRUCTION PRODUCTS, 1994, P. 278

EROSION CONTROL PLAN LEGEND: SUSPENDED PIPE DIVERSION

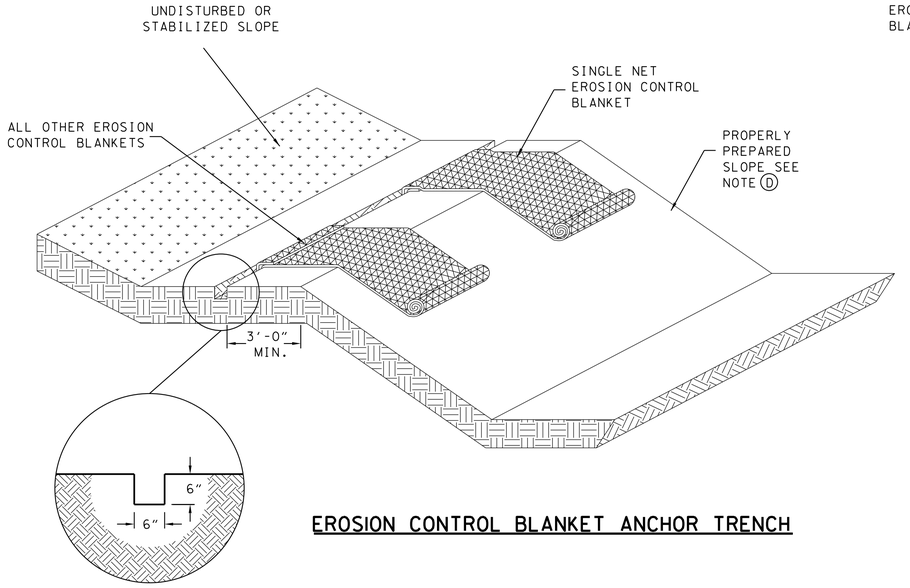
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

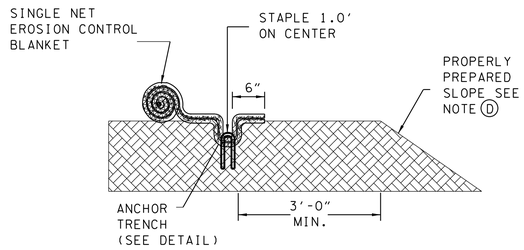
SUSPENDED PIPE DIVERSION (UPSTREAM)

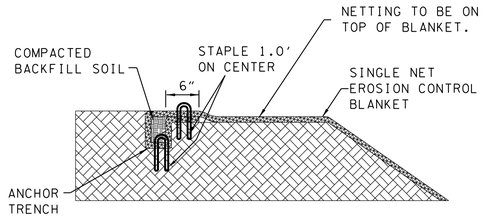
1-20-06 EC-STR-33A



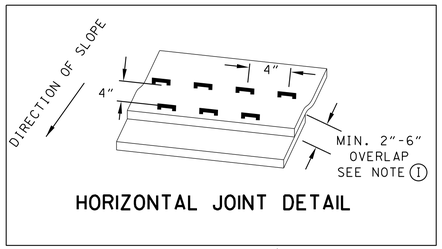
TRENCH DETAIL

EROSION CONTROL BLANKET ANCHOR TRENCH

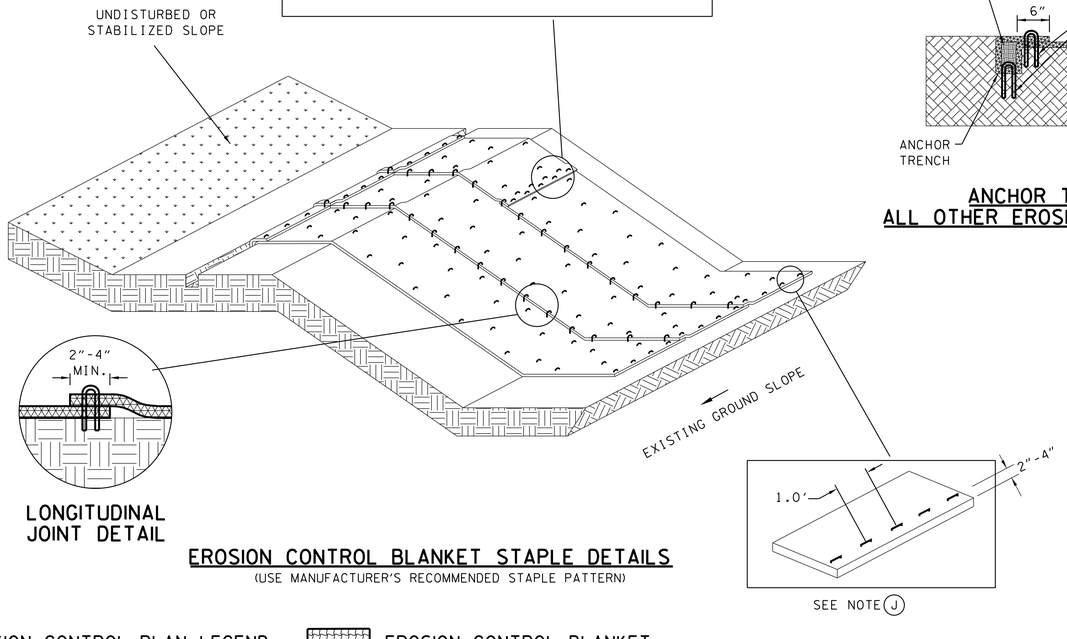




ANCHOR TRENCH DETAILS
SINGLE NET EROSION CONTROL BLANKETS

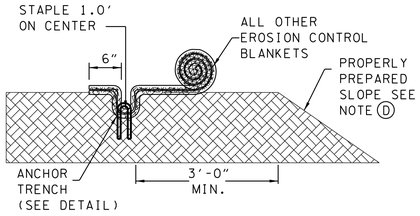


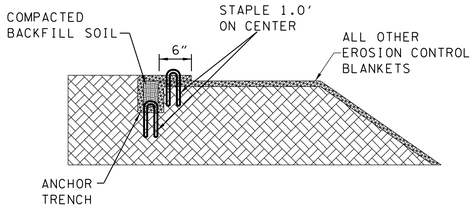
HORIZONTAL JOINT DETAIL



LONGITUDINAL
JOINT DETAIL

EROSION CONTROL BLANKET STAPLE DETAILS
(USE MANUFACTURER'S RECOMMENDED STAPLE PATTERN)





ANCHOR TRENCH DETAILS
ALL OTHER EROSION CONTROL BLANKETS

EROSION CONTROL BLANKET SLOPE INSTALLATION GENERAL NOTES

(A) EROSION CONTROL BLANKETS ARE INTENDED TO BE USED AS AN IMMEDIATE MULCH COVER FOR DISTURBED SLOPES THAT HAVE BEEN TEMPORARILY OR PERMANENTLY SEEDED.

(B) EROSION CONTROL BLANKETS MAY ALSO BE USED AS CHANNEL LINERS WHERE THE ANTICIPATED MAXIMUM SHEAR STRESS IS LOW. REFER TO EC-STR-36 FOR INSTALLATION DETAILS.

(C) EROSION CONTROL BLANKETS SHALL BE INSTALLED ACCORDING TO MANUFACTURERS SPECIFICATIONS. WHEN NOT AVAILABLE, INSTALL ACCORDING TO NOTES D THRU J.

(D) STEP ONE: SITE PREPARATION
THE SITE SHOULD BE FINE GRADED TO A SMOOTH PROFILE AND RELATIVELY FREE FROM ALL WEEDS, CLODS, STONES, ROOTS, STICKS, RIVULETS, GULLIES, CRUSTING AND CAKING. FILL ANY VOIDS AND MAKE SURE THE SLOPE IS COMPACTED PROPERLY.

(E) STEP TWO: SEEDING
SEEDING WITHOUT MULCH SHOULD BE APPLIED TO THE AREA TO BE VEGETATED.

(F) STEP THREE: PREPARE THE ANCHOR TRENCH
AT THE TOP OF THE SLOPE EXCAVATE AN ANCHOR TRENCH 6 INCHES DEEP BY 6 INCHES WIDE. THE EROSION CONTROL BLANKET WILL BE ANCHORED INTO THE TRENCH BY STAPLES. ALLOW A MINIMUM OF 3 FEET FROM THE CREST OF THE SLOPE TO THE ANCHOR TRENCH.

(G) STEP FOUR: SECURE THE EROSION CONTROL BLANKET IN THE ANCHOR TRENCH
BEGIN EROSION CONTROL BLANKET PLACEMENT 30 INCHES ABOVE THE ANCHOR TRENCH. RUN THE EROSION CONTROL BLANKET INTO THE ANCHOR TRENCH. ANCHOR THE EROSION CONTROL BLANKET WITH STAPLES ONE FOOT ON CENTER IN THE ANCHOR TRENCH. BE SURE TO DRIVE STAPLES OR STAKES FLUSH WITH THE SOIL SURFACE. BACKFILL THE ANCHOR TRENCH AND COMPACT THE SOIL. PLACE SEED OVER THE COMPACTED SOIL. COVER THE COMPACTED SOIL WITH THE REMAINING 12 INCHES OF THE TERMINAL END OF THE EROSION CONTROL BLANKET. STAPLE OR STAKE TERMINAL END DOWN SLOPE OF THE ANCHOR TRENCH ON ONE FOOT CENTERS.

(H) STEP FIVE: EROSION CONTROL BLANKET DEPLOYMENT
STARTING AT THE CREST OF THE SLOPE, ROLL THE EROSION CONTROL BLANKET DOWN THE SLOPE IN A CONTROLLED MANNER. APPROXIMATELY EVERY 20-25 FEET PULL THE EROSION CONTROL BLANKET TO TAKE OUT ANY EXCESS SLACK. THE GOAL IS TO HAVE THE EROSION CONTROL BLANKET CONTOUR AND INITIATE CONTACT WITH THE SOIL.

(I) STEP SIX: STAPLE OR STAKE THE EROSION CONTROL BLANKET
SECURE THE OVERLAP OR THE EDGES WITH STAPLES. THE TYPICAL INSTALLATION WILL REQUIRE ONE STAPLE PLACED AT THREE TO FIVE FEET INTERVALS ALONG THE VERTICAL LENGTH OF THE EROSION CONTROL BLANKET. STAPLES SHOULD BE STAGGERED EVERY 18 TO 24 INCHES HORIZONTALLY ACROSS THE EROSION CONTROL BLANKET. IF THE EROSION CONTROL BLANKET NEEDS TO BE SPLICED IN THE MIDDLE OF A SLOPE BE SURE THE EROSION CONTROL BLANKET IS "SHINGLED" WITH UP-SLOPE EROSION CONTROL BLANKET OVERLAPPING THE DOWN-SLOPE EROSION CONTROL BLANKET. THERE SHOULD BE A MINIMUM OF 4-INCHES OF OVERLAP IN A SPLICE. USE A STAPLE CHECK SLOT TO SECURE THE OVERLAP. A STAPLE CHECK SLOT IS MADE BY PLACING A ROW OF STAPLES 4-INCHES ON CENTER AND THEN PLACING A SECOND ROW OF STAPLES 4-INCHES ON CENTER, STAGGERED FROM THE FIRST ROW.

(J) STEP SEVEN: SECURING THE EROSION CONTROL BLANKET AT THE TOE OF SLOPE
ROLL THE EROSION CONTROL BLANKET 24-INCHES PAST THE TOE OF THE SLOPE. STAPLE OR STAKE TERMINAL END OF THE EROSION CONTROL BLANKET ON ONE FOOT CENTERS.

(K) ONLY EROSION CONTROL BLANKETS LISTED ON THE QUALIFIED PRODUCTS LIST MAY BE USED.

(L) EROSION CONTROL BLANKETS FOR SLOPE INSTALLATION SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

801-02	SEEDING (WITHOUT MULCH) PER UNIT
801-02.01	CROWN VETCH MIXTURE (WITHOUT MULCH) PER UNIT
801-02.08	TEMPORARY SEEDING (WITHOUT MULCH) PER UNIT
805-12.01	EROSION CONTROL BLANKET (TYPE I) PER SQUARE YARD
805-12.02	EROSION CONTROL BLANKET (TYPE II) PER SQUARE YARD
805-12.03	EROSION CONTROL BLANKET (TYPE III) PER SQUARE YARD
805-12.04	EROSION CONTROL BLANKET (TYPE IV) PER SQUARE YARD

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION AND MAINTENANCE OF EROSION CONTROL BLANKETS.

EROSION CONTROL PLAN LEGEND: EROSION CONTROL BLANKET

REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-34 TO EC-STR-34.

☐ REV. 1-22-03: LAPPED LONGITUDINAL SEAM IN ISOMETRIC VIEW. REMOVED ITEM 805-12.01 FROM GENERAL NOTE (G) SINCE TYPE I BLANKETS ARE NO LONGER USED.

☐ REV. 1-19-05: CHANGED GENERAL NOTE (B). CHANGED PLAN VIEW AND LONGITUDINAL SEAM VEIW.

☐ REV. 4-1-08: REDREW REVISED GENERAL NOTES, ADDED STANDARD SYMBOL, REVISED INSTALLATION DETAILS.

☐ REV. 8-1-12: MINOR EDITS TO DRAWING AND GENERAL NOTES.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

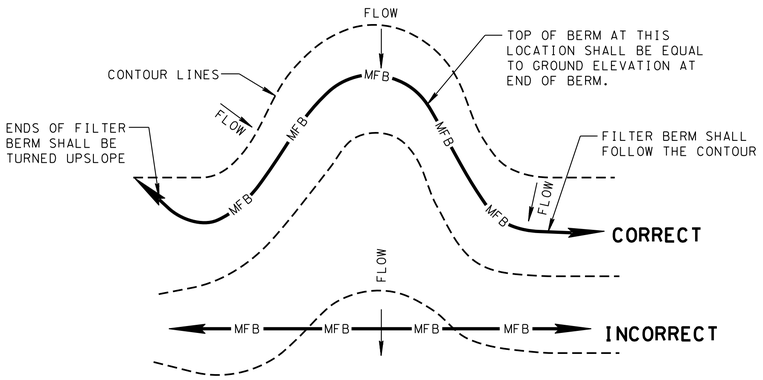
NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

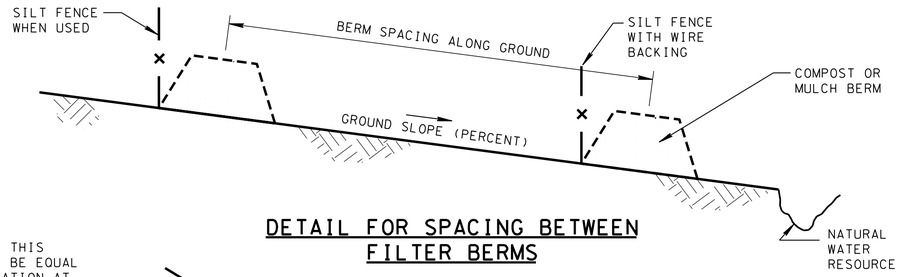
EROSION CONTROL
BLANKET FOR
SLOPE INSTALLATION

10-26-92 EC-STR-34

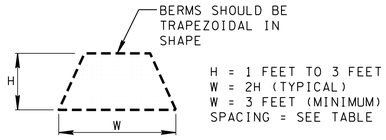
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REMOVED TEMPORARY REFERENCE, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.



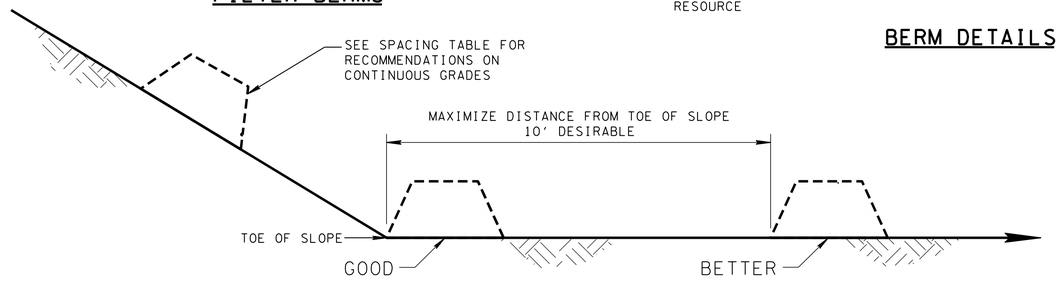
PLAN VIEW



DETAIL FOR SPACING BETWEEN FILTER BERMS



BERM DETAILS



SLOPE PROFILE

FILTER BERM SPACING	
GROUND SLOPE (%)	RECOMMENDED SPACING BETWEEN BERMS ALONG GROUND (FT)
<2	110
2-5	100
5-10	75
10-20	25
>20	NOT ALLOWED

COMPOST MATERIAL SPECIFICATIONS			
		RANGE	
PROPERTY	UNITS	BERM TO BE VEGETATED (1)	BERM TO BE NON-VEGETATED
pH	pH	5.0-8.5	N/A
SOLUBLE SALT CONCENTRATION	dS/m	MAXIMUM 5	N/A
MOISTURE CONTENT	% WET WEIGHT BASIS	30-60	30-60
ORGANIC MATTER	% DRY WEIGHT BASIS	25-65	25-100
PHYSICAL CONTAMINANTS (MAN-MADE INERTS)	% DRY WEIGHT BASIS	LESS THAN 1	LESS THAN 1
PARTICLE SIZE	% PASSING SELECTED MESH SIZE, DRY WEIGHT BASIS	3 INCH - 100% 1 INCH - 90% - 100% ¾ INCH - 70% - 100% ¼ INCH - 30% - 75% MAXIMUM PARTICLE SIZE LENGTH 6 INCHES	3 INCH - 100% 1 INCH - 90% - 100% ¾ INCH - 70% - 100% ¼ INCH - 30% - 75% MAXIMUM PARTICLE SIZE LENGTH 6 INCHES

(1) COARSE COMPOSTS WHICH CONTAIN LESS THAN 30% OF FINE PARTICLES 0.039 INCHES (1 mm IN SIZE) SHOULD BE AVOIDED IF THE COMPOST BERM IS TO BE VEGETATED

EROSION CONTROL PLAN LEGEND: ——CFB——CFB—— COMPOST FILTER BERM

EROSION CONTROL PLAN LEGEND: ——MFB——MFB—— MULCH FILTER BERM

COMPOST OR MULCH FILTER BERM GENERAL NOTES

(A) COMPOST OR MULCH FILTER BERMS ARE SEDIMENT CONTROL DEVICES WHICH MAY BE USED IN PLACE OF SILT FENCE TO CONTROL SEDIMENT TRANSPORT FROM AREAS WHERE RUNOFF OCCURS AS SHEET FLOW.

(B) THE MAXIMUM DRAINAGE AREA FOR A CONTINUOUS BERM SHALL BE ¼ ACRE PER 100 LINEAR FEET OF FILTER BERM.

(C) FILTER BERMS SHALL NOT BE USED TO TREAT CONCENTRATED FLOW AND SHOULD BE USED WITH SILT FENCE WITH WIRE BACKING OR OTHER APPROPRIATE STRUCTURAL MEASURES ON SITES WHICH DRAIN TO SENSITIVE NATURAL WATER RESOURCES (WETLANDS, SEDIMENT-IMPAIRED STREAMS, OR EXCEPTIONAL TENNESSEE WATERS).

(D) FILTER BERMS MAY BE USED IN CONJUNCTION WITH SILT FENCE OR SILT FENCE WITH WIRE BACKING AND SHOULD BE CONSTRUCTED DIRECTLY AT THE BASE OF THE OTHER STRUCTURAL MEASURE (DOWNHILL SIDE).

(E) WHERE POSSIBLE, BERMS SHOULD BE PLACED AWAY FROM THE TOE OF SLOPES A MINIMUM OF 10 FEET TO ALLOW FOR ENERGY DISSIPATION AND STORAGE OF SEDIMENT.

(F) FILTER BERMS SHALL BE PLACED ALONG OR ON THE GROUND CONTOUR WITH THE ENDS OF THE FILTER BERM TURNED UP SLOPE. ADEQUATE AREA SHALL BE PROVIDED BEHIND BERM FOR PONDING OF WATER.

(G) MULCH FILTER BERMS SHALL CONSIST OF 100 PERCENT WOOD CHIPS. COMPOST FILTER BERM SHALL CONSIST OF 50 PERCENT WOOD CHIPS BLENDED WITH 50 PERCENT COMPOST SPECIFIED IN COMPOST MATERIAL SPECIFICATIONS TABLE. ALL WOOD CHIPS SHALL BE LESS THAN 6 INCHES IN LENGTH WITH 95 PERCENT PASSING A 2 INCH SCREEN AND NOT LESS THAN 30 PERCENT PASSING A 1 INCH SCREEN.

(H) COMPOST FILTER BERM MAY BE VEGETATED WITH TEMPORARY OR PERMANENT SEEDING AFTER PLACEMENT. MULCH FILTER BERMS SHALL NOT BE SEEDED.

(I) ROUTINELY INSPECT FILTER BERMS AND MAINTAIN TO A FUNCTIONAL CONDITION THROUGHOUT CONSTRUCTION. INSTALL ADDITIONAL FILTER MATERIAL AS DIRECTED BY THE ENGINEER. UPON PROJECT COMPLETION, DISPERSE OR REMOVE BERM OR LEAVE IN PLACE AS DIRECTED BY THE ENGINEER.

(J) FOR INSTALLATION DETAILS AND ITEM NUMBERS FOR SILT FENCE (EC-STR-3B) AND SILT FENCE WITH WIRE BACKING (EC-STR-3C) SEE STANDARD DRAWINGS.

(K) ANY PRODUCT LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE IS ALSO ACCEPTABLE.

(L) COMPOST OR MULCH FILTER BERMS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-01.30 TEMPORARY COMPOST FILTER BERM PER CUBIC YARD
209-01.31 TEMPORARY MULCH FILTER BERM PER CUBIC YARD

SILT FENCE AND SILT FENCE WITH WIRE BACKING SHALL BE PAID FOR ACCORDING TO THEIR RESPECTIVE STANDARD DRAWING.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE FILTER BERMS.

(M) SEDIMENT SHALL BE REMOVED FROM BEHIND THE FILTER BERM WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE STRUCTURE AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL, PER CUBIC YARD.

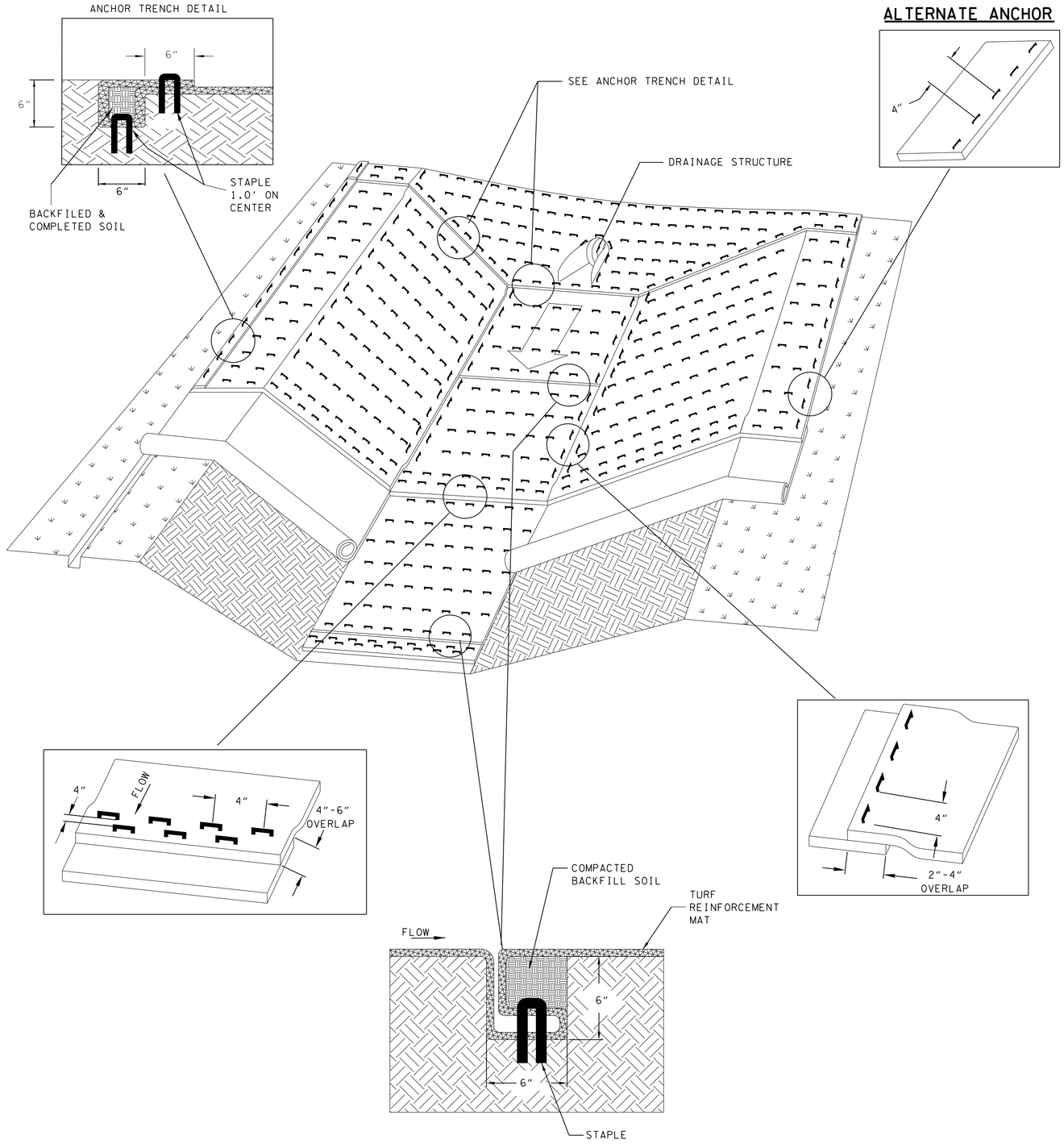
- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

FILTER BERMS

1-20-06 | EC-STR-35



CHANNEL CHECK SLOT

SEE NOTE (H)

EROSION CONTROL PLAN LEGEND: TURF REINFORCEMENT MAT

TURF REINFORCEMENT MAT FOR CHANNEL INSTALLATION GENERAL NOTES

(A) TURF REINFORCEMENT MATS ARE USED TO PERMANENTLY STABILIZE DITCHES AND SWALES.

(B) EROSION CONTROL BLANKETS MAY BE USED TO TEMPORARILY STABILIZE DITCHES AND SWALES.

(C) TURF REINFORCEMENT MATS SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. WHEN NOT AVAILABLE INSTALL ACCORDING TO NOTES D THRU J.

(D) STEP ONE: SITE PREPARATION
THE CHANNEL SHOULD BE FINE GRADED TO A SMOOTH PROFILE AND RELATIVELY FREE FROM ALL WEEDS, CLODS, STONES, ROOTS, STICKS, RIVULETS, GULLIES, CRUSTING AND CAKING. FILL ANY VOIDS AND MAKE SURE THE CHANNEL IS COMPACTED PROPERLY.

(E) STEP TWO: SEEDING
SEEDING WITHOUT MULCH SHOULD BE APPLIED TO THE AREA TO BE VEGETATED.

(F) STEP THREE: ANCHORING THE TURF REINFORCEMENT
TURF REINFORCEMENT MATS SHALL BE ANCHORED AT THE BEGINNING OF THE CHANNEL. A 6-INCH WIDE X 6-INCH DEEP TRENCH SHOULD BE EXCAVATED PERPENDICULAR TO THE DIRECTION OF WATER FLOW ACROSS THE ENTIRE WIDTH OF THE CHANNEL. THE TURF REINFORCEMENT MAT SHOULD BE LAID IN THE CHECK SLOT WITH 30 INCHES OF THE TURF REINFORCEMENT MAT EXTENDING UPSTREAM OF THE ANCHORING TRENCH. STAKE OR STAPLE THE TURF REINFORCEMENT MAT IN THE CHECK SLOT ON 12-INCH CENTERS. BACKFILL THE ANCHOR TRENCH AND COMPACT THE SOIL. PLACE SEED OVER THE COMPACTED SOIL. COVER THE COMPACTED SOIL WITH THE REMAINING 12 INCHES OF THE TERMINAL END OF THE TURF REINFORCEMENT MAT. STAPLE OR STAKE TERMINAL END DOWN SLOPE OF THE ANCHOR TRENCH ON 12-INCH CENTERS.

(G) STEP FOUR: TURF REINFORCEMENT MAT DEPLOYMENT IN THE CHANNEL BOTTOM
THE TURF REINFORCEMENT MATS SHOULD BE UNROLLED IN THE DIRECTION OF WATER FLOW. FIRST THE TURF REINFORCEMENT MAT IS DEPLOYED IN THE CHANNEL BOTTOM. IT IS ALSO NECESSARY TO PREVENT A SEAM FROM GOING DOWN THE CENTER OF THE CHANNEL BOTTOM OR IN AREAS OF CONCENTRATED WATER FLOW. WHEN INSTALLING TWO TURF REINFORCEMENT MATS SIDE BY SIDE IN A WATERWAY THE CENTER OF THE TURF REINFORCEMENT MAT SHOULD BE CENTERED IN THE AREA OF CONCENTRATED WATER FLOW. INSTALL ADJOINING TURF REINFORCEMENT MATS AWAY FROM THE CENTER OF THE CHANNEL BOTTOM. ADJOINING TURF REINFORCEMENT MATS SHOULD BE OVERLAPPED 2 TO 4 INCHES. CONTINUE TO INSTALL A COMMON ROW OF STAPLES AT TWO-FOOT CENTERS ALONG THE LENGTH OF THE OVERLAP.

(H) STEP FIVE: CHECK SLOTS
CHECK SLOTS SHOULD BE PLACED PERPENDICULAR TO THE FLOW DIRECTION ACROSS THE ENTIRE WIDTH OF THE CHANNEL AT 25-FOOT INTERVALS AND AT THE TERMINAL END OF THE CHANNEL. THE CHECK SLOTS SHOULD BE PLACED IN A 6-INCH WIDE X 6-INCH DEEP TRENCH AS SHOWN. SECURE TURF REINFORCEMENT MAT IN THE UP STREAM SIDE OF THE CHECK SLOT WITH STAPLES OR STAKES ON 12-INCH CENTERS. FLIP THE TURF REINFORCEMENT MAT ROLL ON THE UPSTREAM EDGE. BACK FILL THE CHECK SLOT AS SHOWN AND COMPACT THE SOIL. CONTINUE ROLLING THE TURF REINFORCEMENT MAT DOWN STREAM OVER THE COMPLETED CHECK SLOT.

(I) STEP SIX: TURF REINFORCEMENT MAT DEPLOYMENT ON THE SIDE SLOPES
CONTINUE TO ROLL THE TURF REINFORCEMENT MAT ALONG THE CHANNEL BOTTOM AND SIDE SLOPES IN THE DIRECTION OF THE WATER FLOW. AS THE TURF REINFORCEMENT MAT IS INSTALLED FROM THE CHANNEL BOTTOM UP THE SLOPE, A SHINGLE TYPE INSTALLATION IS RECOMMENDED WITH THE UP-SLOPE TURF REINFORCEMENT, MAT OVERLAPPING THE LOWER TURF REINFORCEMENT MAT APPROXIMATELY 2-4 INCHES. ANCHOR THE TURF REINFORCEMENT MATS WITH A MINIMUM ONE STAPLE EVERY 24 INCHES ACROSS THE WIDTH AND ONE STAPLE EVERY 36 INCHES DOWN ITS LENGTH. IF THE TURF REINFORCEMENT MAT NEEDS TO BE SPLICED, BE SURE THE TURF REINFORCEMENT MAT IS "SHINGLED" WITH THE UP-STREAM TURF REINFORCEMENT MAT OVERLAPPING THE DOWN-STREAM TURF REINFORCEMENT MAT. THERE SHOULD BE A MINIMUM OF 4 INCHES OF OVERLAP IN A SPLICE. USE A STAPLE CHECK SLOT TO SECURE THE OVERLAP. ANCHOR THE TURF REINFORCEMENT MAT PLACED AT THE TOP OF THE CHANNEL SLOPE IN THE SAME MANNER AS SHOWN.

(J) STEP SEVEN: TERMINAL END
SECURE THE TURF REINFORCEMENT MAT AT THE TERMINAL END OF THE CHANNEL WITH A CHECK SLOT SIMILAR TO THE ONE MADE AT THE BEGINNING OF THE CHANNEL.

(K) ONLY TURF REINFORCEMENT MATS LISTED ON THE QUALIFIED PRODUCTS LIST MAY BE USED.

(L) TURF REINFORCEMENT MATS FOR CHANNEL INSTALLATION SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

801-02	SEEDING (WITHOUT MULCH) PER UNIT
801-02.01	CROWN VETCH MIXTURE (WITHOUT MULCH) PER UNIT
801-02.08	TEMPORARY SEEDING (WITHOUT MULCH) PER UNIT
805-01.01	TURF REINFORCEMENT MAT (CLASS I) PER SQUARE YARD
805-01.02	TURF REINFORCEMENT MAT (CLASS II) PER SQUARE YARD
805-01.03	TURF REINFORCEMENT MAT (CLASS III) PER SQUARE YARD

EROSION CONTROL BLANKETS SHALL BE PAID FOR ACCORDING TO THEIR RESPECTIVE ITEM NUMBERS.

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION AND MAINTENANCE OF TURF REINFORCEMENT MATS.

REV. 1-22-03: CORRECTED LONGITUDINAL SEAM IN ISOMETRIC VIEW.

- REV. 12-18-95: CHANGED DRAWING NO. FROM ESC-STR-35 TO EC-STR-36.
- REV. 5-27-01: CHANGED REFERENCE IN GENERAL NOTES FOR ALL EROSION CONTROL BLANKETS TO FLEXIBLE CHANNEL LINERS.
- REV. 4-1-08: REDREW REVISED GENERAL NOTES, ADDED STANDARD SYMBOL, REVISED INSTALLATION DETAILS.
- REV. 8-1-12: MINOR REVISIONS TO ITEM NUMBERS DESCRIPTIONS AND MINOR EDITS TO DRAWING.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

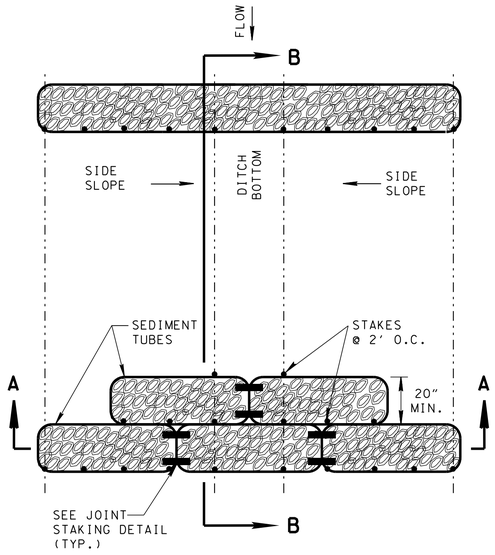
NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

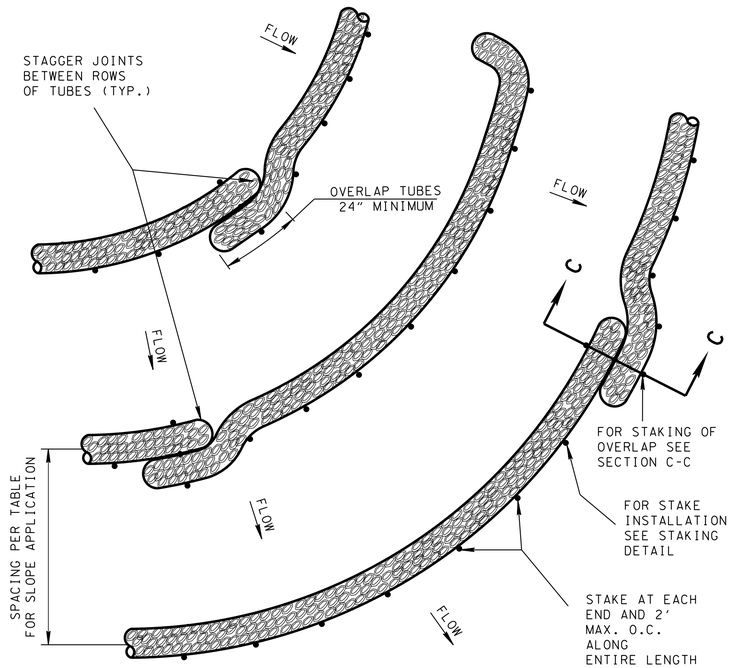
TURF REINFORCEMENT MAT FOR CHANNEL INSTALLATION

10-26-92 EC-STR-36

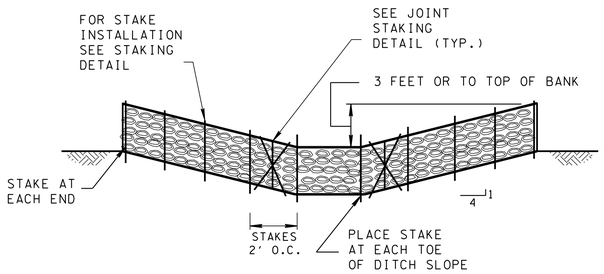
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REMOVED TEMPORARY REFERENCE, ADDED OVERLAP DETAIL, OTHER MINOR MISC. EDITS, REVISED GENERAL NOTES.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.



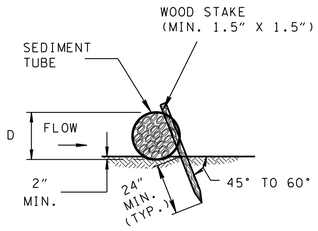
PLAN VIEW FOR DITCH APPLICATION



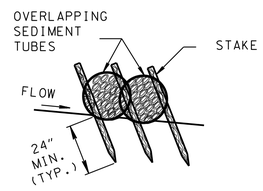
PLAN VIEW FOR SLOPE APPLICATION



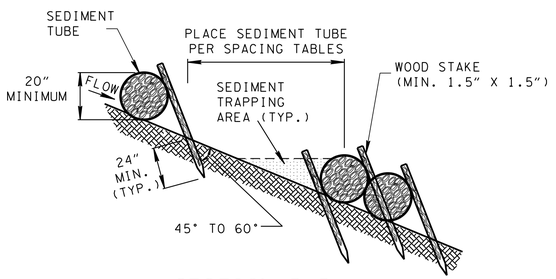
SECTION A-A



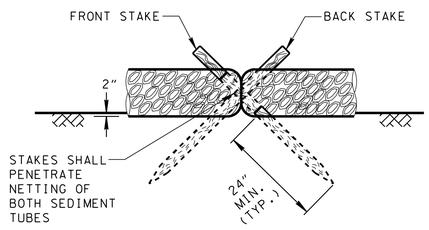
STAKING DETAIL



SECTION C-C



SECTION B-B



JOINT STAKING DETAIL

(DITCH APPLICATION ONLY)

EROSION CONTROL PLAN LEGEND: TUBE**TUBE**TUBE **SEDIMENT TUBE**

SEDIMENT TUBE SPACING FOR SLOPE APPLICATION

SLOPE	8"	12"	18"	20"	24"
2%	70'	100'	N/A	N/A	N/A
5%	30'	60'	100'	100'	100'
10%	20'	30'	70'	85'	100'
6:1	N/A	20'	40'	50'	55'
4:1	N/A	20'	30'	30'	30'
3:1	N/A	N/A	20'	20'	25'
2:1	N/A	N/A	20'	20'	20'

N/A = NOT RECOMMENDED

SEDIMENT TUBE SPACING TABLE FOR DITCH APPLICATION

SLOPE	MAXIMUM SEDIMENT TUBE SPACING
LESS THAN 2%	125'
2%	100'
3%	75'
4%	50'
5%	40'
6%	30'
GREATER THAN 6%	25'

BASED ON A 20" SEDIMENT TUBE

SEDIMENT TUBE GENERAL NOTES

(A) SEDIMENT TUBES CAN BE PLACED AT THE TOP, ON THE FACE, OR AT THE TOE OF SLOPES TO INTERCEPT RUNOFF, REDUCE FLOW VELOCITY, RELEASE THE RUNOFF AS SHEET FLOW AND PROVIDE REMOVAL OF SEDIMENT FROM THE RUNOFF.

(B) SEDIMENT TUBES SHALL BE INSTALLED ALONG OR ON THE GROUND CONTOUR, AT THE TOE OF SLOPES, OR IN A DITCH TO HELP REDUCE THE EFFECTS OF SOIL EROSION AND RETAIN SEDIMENT. SEDIMENT TUBES SHOULD NOT BE USED IN DITCHES OR STREAMS.

(C) FOR DITCH APPLICATIONS, THE MAXIMUM DRAINAGE AREA SHALL BE 15 ACRES. AT SITES WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE MAXIMUM DRAINAGE AREA SHALL BE 10 ACRES. FOR SLOPE APPLICATIONS, THE MAXIMUM DRAINAGE AREAS SHALL BE ¼ ACRE PER 100 LF OF TUBE.

(D) SEDIMENT TUBES SHALL NOT BE USED ON PAVEMENT, ROCKY SOILS, OR AT ANY OTHER LOCATIONS WHERE THE STAKES CANNOT BE DRIVEN TO THE REQUIRED DEPTH.

(E) SEDIMENT TUBES SHALL BE MANUFACTURED FROM WOOD EXCELSIOR, RICE OR WHEAT STRAW, COCONUT FIBERS, OR HARDWOOD MULCH THAT IS ENCLOSED BY A TUBULAR FLEXIBLE NETTING MATERIAL. ALL MATERIALS INCLUDING THE NETTING SHALL BE BIODEGRADABLE.

(F) PINE NEEDLE AND LEAF MULCH FILLED SEDIMENT TUBES AND STRAW BALES ARE NOT ACCEPTABLE MATERIALS.

(G) THE DIAMETER OF A SEDIMENT TUBE SHALL BE A MINIMUM OF 8 INCHES AND A MAXIMUM OF 24 INCHES. DIAMETER TOLERANCE IS 2 INCHES. FOR DITCH APPLICATIONS, SEDIMENT TUBES SHALL BE A MINIMUM OF 20 INCHES.

(H) SEDIMENT TUBES SHALL BE INSTALLED WITH WOODEN STAKES (MIN. 1.5" x 1.5" ACTUAL). THE STAKE SHALL BE EMBEDDED A MINIMUM OF 2 FEET.

(I) SEDIMENT TUBES SHALL BE TRENCHED IN A MINIMUM OF 2 INCHES.

(J) IF MORE THAN ONE SEDIMENT TUBE IS PLACED IN A ROW IN SLOPE APPLICATION, THE TUBES SHALL BE OVERLAPPED A MINIMUM OF 24 INCHES TO PREVENT FLOW AND SEDIMENT FROM PASSING THROUGH THE FIELD JOINT. WHEN USED IN DITCHES, TWO ROWS OF TUBE SHALL BE PLACED ON THE CHANNEL BOTTOM WITH STAGGERED JOINTS AS SHOWN.

(K) FOR DITCH APPLICATIONS, SEDIMENT TUBES SHALL BE A MINIMUM OF 20 INCH DIAMETER AND SHALL BE PLACED PERPENDICULAR TO THE FLOW OF WATER. SEDIMENT TUBES SHALL CONTINUE UP THE SIDE SLOPES A MINIMUM OF 3 FEET PLUS THE DIAMETER OF THE TUBE, OR TO THE TOP OF THE DITCH, WHICHEVER IS LESS.

(L) SEDIMENT TUBES USED IN SLOPE APPLICATIONS MAY REMAIN IN PLACE TO BIODEGRADE. FOR DITCH APPLICATIONS SEDIMENT TUBES SHALL BE COMPLETELY REMOVED AFTER FULLY ESTABLISHED VEGETATION HAS COMPLETELY DEVELOPED.

(M) SEDIMENT TUBES SHALL BE PAID FOR UNDER THE FOLLOWING ITEMS NUMBERS:

740-11.01 TEMPORARY SEDIMENT TUBE (8 INCH) PER LINEAR FOOT
740-11.02 TEMPORARY SEDIMENT TUBE (12 INCH) PER LINEAR FOOT
740-11.03 TEMPORARY SEDIMENT TUBE (18 INCH) PER LINEAR FOOT
740-11.04 TEMPORARY SEDIMENT TUBE (20 INCH) PER LINEAR FOOT
740-11.05 TEMPORARY SEDIMENT TUBE (24 INCH) PER LINEAR FOOT

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF SEDIMENT TUBE.

(N) ONLY SEDIMENT TUBES LISTED ON THE QUALIFIED PRODUCTS LIST MAY BE USED.

(O) SEDIMENT SHALL BE REMOVED FROM BEHIND THE SEDIMENT TUBE WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE STRUCTURE AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

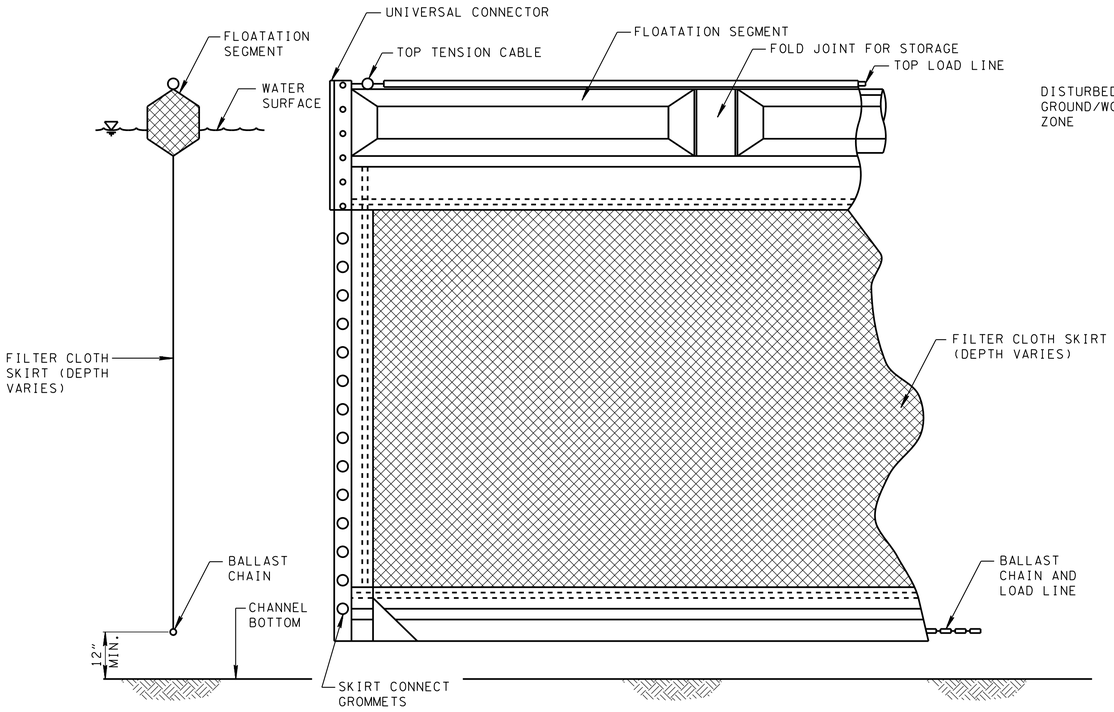
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SEDIMENT TUBE

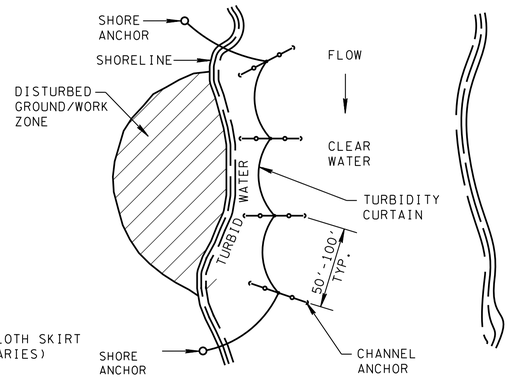
1-20-06 | EC-STR-37

- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REVISED GENERAL NOTES.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

FLOATING TURBIDITY CURTAIN

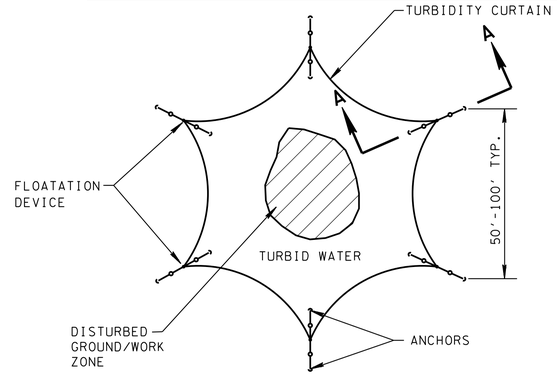


TYPICAL ANCHORING PLAN FOR SHORELINE/RIVER EDGE WORK



PLAN VIEW

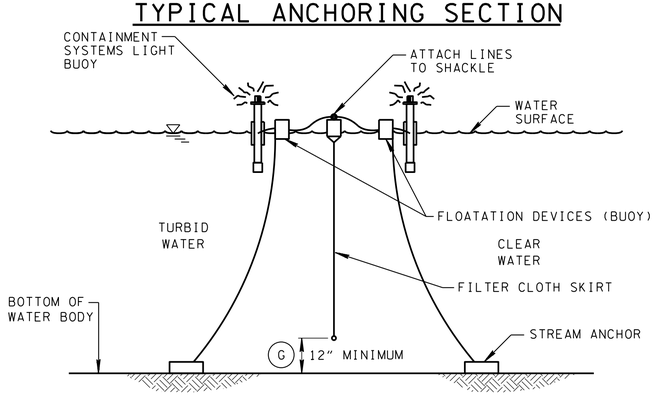
TYPICAL ANCHORING PLAN FOR MID CHANNEL WORK (BRIDGE PIER, CAISSON, ETC.)



PLAN VIEW

PHYSICAL PROPERTIES OF TURBIDITY CURTAIN FABRIC	
PHYSICAL PROPERTY	MINIMUM REQUIREMENT
THICKNESS, MILS	45
WEIGHT, OZ. / SQ. YD.	18
GRAB TENSILE STRENGTH, LBS.	300
UV INHIBITOR	MUST BE INCLUDED
APPARENT OPENING SIZE (AOS)	FINER THAN OR EQUAL TO #70 U.S. STANDARD SIEVE

TYPICAL ANCHORING SECTION



SECTION A-A

AUTOMATIC FLASHING LIGHT BUOY (ON AT DUSK-OFF AT DAWN) 100' ON CENTER SHALL BE USED IN NAVIGABLE CHANNELS ONLY

EROSION CONTROL PLAN LEGEND: FLOATING TURBIDITY CURTAIN

FLOATING TURBIDITY CURTAIN GENERAL NOTES

(A) FLOATING TURBIDITY CURTAINS (ALSO KNOWN AS TURBIDITY BARRIERS OR SILT CURTAINS) CREATE A BARRIER TO PREVENT TURBID WATER FROM ENTERING CLEAR WATER. FLOATING TURBIDITY CURTAINS SHOULD BE USED TO ISOLATE ACTIVE CONSTRUCTION AREAS WITHIN OR ADJACENT TO A BODY OF WATER TO MINIMIZE THE MIGRATION OF SILT LADEN WATER OUT OF THE CONSTRUCTION ZONE.

(B) TURBIDITY CURTAINS SHALL NOT BE INSTALLED PERPENDICULAR ACROSS THE MAIN FLOW OF A SIGNIFICANT BODY OF MOVING WATER.

(C) FLOATING TURBIDITY CURTAINS SHALL NOT BE USED WHERE THE ANTICIPATED FLOW VELOCITIES WILL EXCEED 5 FT/SEC.

(D) TURBIDITY CURTAINS SHALL BE ANCHORED TO PREVENT DRIFT SHOREWARD OR DOWNSTREAM. ANCHORAGE SHALL BE INSTALLED ON BOTH SHORE AND STREAM SIDE. CURTAINS SHALL BE INSTALLED AS CLOSE TO PROJECT SITE AS POSSIBLE. BARRIERS SHOULD BE A BRIGHT COLOR (YELLOW OR "INTERNATIONAL" ORANGE ARE RECOMMENDED) THAT WILL ATTRACT THE ATTENTION OF NEARBY BOATERS.

(E) SHORE ANCHORS SHALL CONSIST OF A POST WITH DEADMAN OR APPROVED EQUAL. STREAM ANCHORS SHALL BE OF SUFFICIENT SIZE TO STABILIZE THE BARRIER WITH NUMBER AND SPACING DEPENDENT ON WATERWAY VELOCITIES AND MANUFACTURER'S RECOMMENDATIONS.

(F) IN SHALLOW WATER (2 FEET OF DEPTH OR LESS) A TURBIDITY CURTAIN MAY BE INSTALLED ON STAKES DRIVEN INTO THE BED OF THE WATER BODY.

(G) FABRIC SECTIONS SHALL BE CONNECTED END TO END WITH A MINIMUM 5/8 INCH DIAMETER POLYPROPYLENE ROPE. FABRIC SHALL BE SEAMED TOGETHER IN A MANNER THAT RETAINS THE OVERALL TENSILE STRENGTH.

(H) DESIGN OF CURTAIN AND ANCHORAGE SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. FILTER CLOTH SKIRT SHOULD BE ABLE TO WITHSTAND THE FORCES IMPARTED ON IT DUE TO THE EXPECTED WIND VELOCITY OR STREAM VELOCITY. FABRIC SHALL BE MADE OF A NON-DETERIORATING MATERIAL, SUCH AS PLASTIC OR NYLON, WHICH WILL ALLOW WATER TO PASS THROUGH WHILE STILL RETAINING SEDIMENT.

(I) THE TURBIDITY CURTAIN AND ADJACENT WORK AREAS SHALL NOT BE DISTURBED 12 HOURS PRIOR TO REMOVAL FROM WATER BODY. MAINTENANCE SHALL BE PERFORMED AS NEEDED. CONTRACTOR SHALL REMOVE THE CURTAIN AT COMPLETION OF WORK IN A MANNER THAT WILL PREVENT SILTATION OF THE WATERWAY. DURING REMOVAL, EXTREME CARE SHOULD BE TAKEN NOT TO DISTURB ANY SEDIMENT DEPOSITS.

(J) MAINTAIN 12" MINIMUM GAP BETWEEN SKIRT BOTTOM AND CHANNEL BOTTOM TO PREVENT ACCUMULATED SEDIMENT FROM PULLING TOP OF CURTAIN BELOW WATER SURFACE.

(K) IN WIND OR WAVE ACTION SITUATIONS, THE MAXIMUM DEPTH OF THE CURTAIN SHALL BE 12 FEET.

(L) CONCENTRATED FLOWS SHALL NOT DISCHARGE BEYOND FLOATING TURBIDITY CURTAIN. CURTAINS ARE NOT TO BE INSTALLED ACROSS FLOWING BODY OF WATER.

(M) WHEN INSTALLED IN A NAVIGABLE WATERWAY, BUOYS SHOULD BE LIT ACCORDING TO REGULATORY AGENCY STANDARDS.

(N) WHEN ESTIMATING THE LENGTH OF TURBIDITY CURTAIN, ALLOW 10 TO 20 PERCENT VARIANCE IN STRAIGHT LINE MEASUREMENT.

(O) FLOATING TURBIDITY CURTAIN SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

209-13.04 TURBIDITY CURTAIN (DESCRIPTION) PER LINEAR FOOT
209-13.05 TURBIDITY CURTAIN (DESCRIPTION) PER LINEAR FOOT
209-13.06 TURBIDITY CURTAIN (DESCRIPTION) PER LINEAR FOOT
209-13.07 TURBIDITY CURTAIN (DESCRIPTION) PER LINEAR FOOT
209-13.08 TURBIDITY CURTAIN (DESCRIPTION) PER LINEAR FOOT

PAYMENT SHALL INCLUDE ALL MATERIAL AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TURBIDITY CURTAINS

(P) ONLY FLOATING TURBIDITY CURTAINS LISTED ON THE QUALIFIED PRODUCTS LIST MAY BE USED. ANY PRODUCTS LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE IS ALSO ACCEPTABLE.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

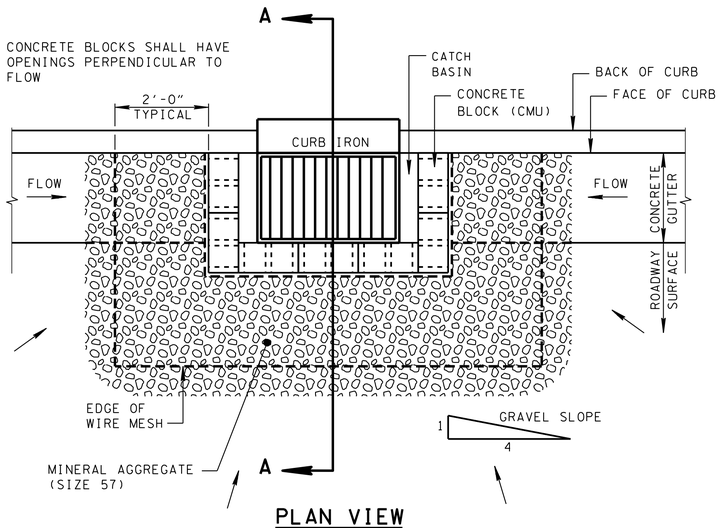
FLOATING TURBIDITY CURTAIN

1-20-06 EC-STR-38

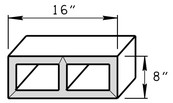
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: MISC. MINOR EDITS AND GENERAL NOTE REVISIONS.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

CURB INLET PROTECTION TYPE 1

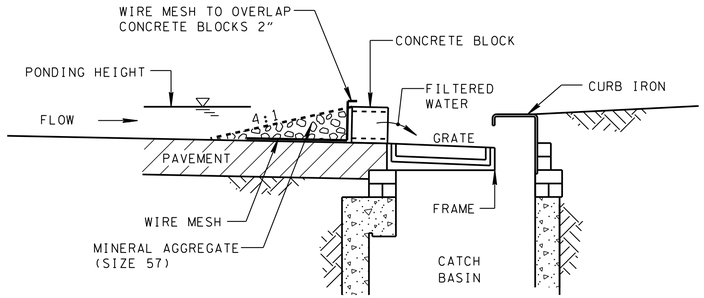
LOW VOLUME, LOW SPEED TRAFFIC AREAS ONLY



PLAN VIEW



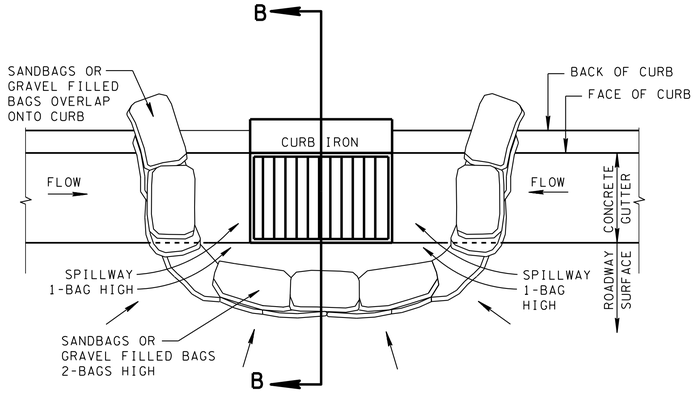
TYPICAL CMU



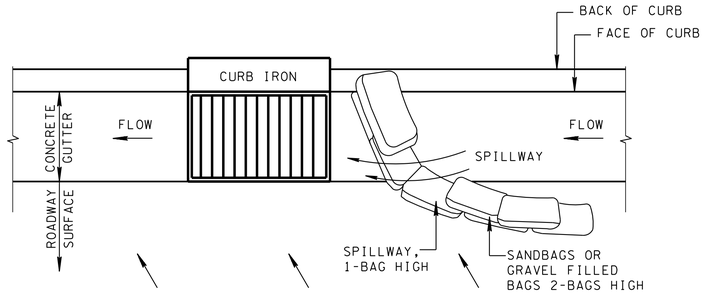
SECTION A-A

CURB INLET PROTECTION TYPE 2

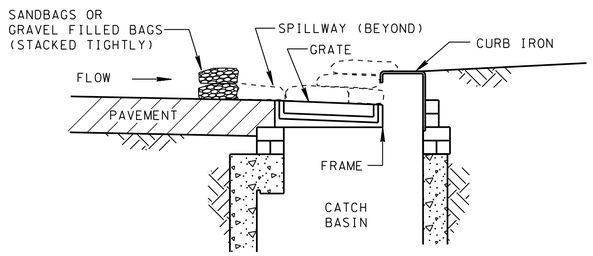
LOW VOLUME, LOW SPEED TRAFFIC AREAS ONLY



PLAN VIEW - INLET AT SAG



PLAN VIEW - INLET ON GRADE



SECTION B-B

CURB INLET PROTECTION TYPE 1 GENERAL NOTES

(A1) CURB INLET PROTECTION (TYPE 1) IS USED TO INTERCEPT SEDIMENT AND PREVENT SEDIMENT LADEN WATER FROM ENTERING STORM SEWER SYSTEMS. THIS DEVICE IS INTENDED AS A SECONDARY SEDIMENT CONTROL MEASURE. CURB INLET PROTECTION (TYPE 1) IS USED IN AREAS WHERE PONDING IS NOT A CONCERN AND ADEQUATE AREA IS AVAILABLE FOR PONDING.

(A2) MAXIMUM DRAINAGE AREA IS 1 ACRE.

(A3) CONCRETE BLOCKS SHALL BE PLACED LENGTHWISE ON THEIR SIDES IN A SINGLE ROW AROUND THE PERIMETER OF THE INLET. THE ENDS OF ADJACENT BLOCKS SHOULD ABUT TIGHTLY TOGETHER.

(A4) ADDITIONAL BLOCKS WITH OPENINGS PERPENDICULAR TO FLOW MAY BE REQUIRED DEPENDING ON AMOUNT OF FLOW AND AVAILABLE PONDING AREA.

(A5) WIRE MESH SHALL BE 19 GUAGE GALVANIZED HARDWARE CLOTH WITH ¼ INCH OPENINGS. WIRE SHALL BE SHAPED TO FIT SECURELY AGAINST CONCRETE BLOCK AND SHALL LAP OVER THE TOP OF THE BLOCK A MINIMUM OF 2 INCHES.

(A6) CURB INLET PROTECTION (TYPE 1) SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER.

209-09.40 CURB INLET PROTECTION (TYPE 1) PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF CURB INLET PROTECTION (TYPE 1).

(A7) ANY PRODUCT LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE IS ALSO ACCEPTABLE.

(A8) MAINTENANCE SHALL BE PERFORMED AS NEEDED. FOR PROPER FUNCTION, SEDIMENT REMOVAL SHALL BE PERFORMED CONTINUOUSLY AND/OR AFTER EVERY RAIN EVENT AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL, PER CUBIC YARD.

CURB INLET PROTECTION TYPE 2 GENERAL NOTES

(B1) CURB INLET PROTECTION (TYPE 2) IS USED TO INTERCEPT SEDIMENT AND PREVENT SEDIMENT LADEN WATER FROM ENTERING STORM SEWER SYSTEMS. THIS DEVICE IS INTENDED AS A SECONDARY SEDIMENT CONTROL MEASURE. CURB INLET PROTECTION (TYPE 2) IS USED IN AREAS WHERE PONDING IS NOT A CONCERN AND ADEQUATE AREA IS AVAILABLE FOR PONDING.

(B2) MAXIMUM DRAINAGE AREA IS 1 ACRE.

(B3) MAXIMUM TOP OF SPILLWAY ELEVATION = TOP OF CURB ELEVATION MINUS 1 INCH.

(B4) BAGS SHALL BE MADE OF EITHER BURLAP OR GEOTEXTILE FABRIC AND FILLED WITH CLEAN MINERAL AGGREGATE (SIZE 57) OR SAND.

(B5) PACK SAND/GRAVEL FILLED BAGS TIGHTLY TOGETHER END TO END TO ENSURE NO SEDIMENT FLOWS BETWEEN OR UNDERNEATH THE BAGS. WHERE TIGHT FIT IS UNACHIEVABLE, INSTALL GEOTEXTILE FABRIC (TYPE III) ALONG THE UPSTREAM FACE OF THE BAGS LAPPING OVER THE TOP BAGS 6 INCHES AND EXTENDING GEOTEXTILE FABRIC (TYPE III) A MINIMUM OF 18 INCHES UPSTREAM OF THE BAGS. COVER GEOTEXTILE FABRIC (TYPE III) WITH MINERAL AGGREGATE (SIZE 57) STONE WEDGE TO THE TOP OF THE BAGS.

(B6) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(B7) AN OVERFLOW SPILLWAY SHALL BE PROVIDED BY LEAVING AN OPENING OF ONE SAND OR GRAVEL BAG WIDE AND HIGH AS SHOWN. STORMS GREATER THAN 2-YEAR, 24 HOUR STORM SHOULD NOT OVERTOP THE CURB.

(B8) CURB INLET PROTECTION (TYPE 2) SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-09.41 CURB INLET PROTECTION (TYPE 2) PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF CURB INLET PROTECTION (TYPE 2).

(B9) ANY PRODUCT LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE IS ALSO ACCEPTABLE.

(B10) MAINTENANCE SHALL BE PERFORMED AS NEEDED. FOR PROPER FUNCTION SEDIMENT REMOVAL SHALL BE PERFORMED CONTINUOUSLY AND/OR AFTER EVERY RAIN EVENT AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL, PER CUBIC YARD.

EROSION CONTROL PLAN LEGEND: ① CURB INLET PROTECTION (TYPE 1)

EROSION CONTROL PLAN LEGEND: ② CURB INLET PROTECTION (TYPE 2)

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

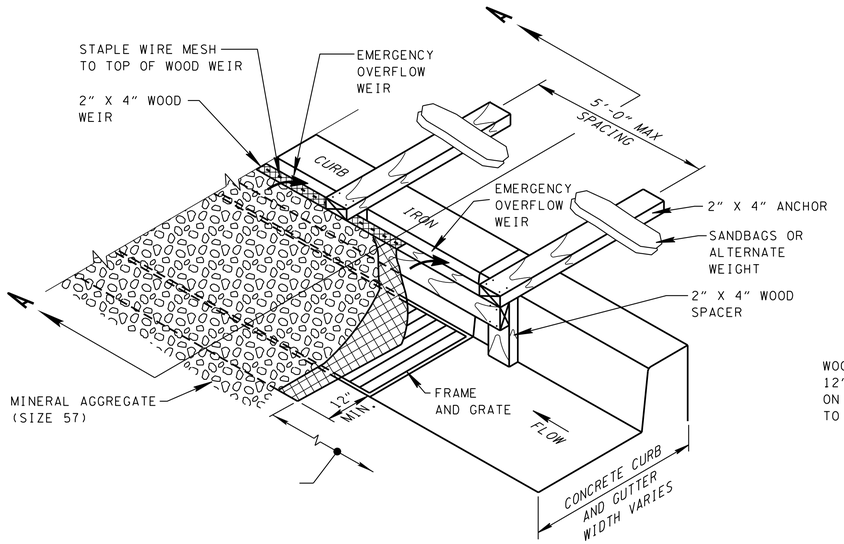
CURB INLET PROTECTION TYPE 1 & 2

1-20-06 EC-STR-39

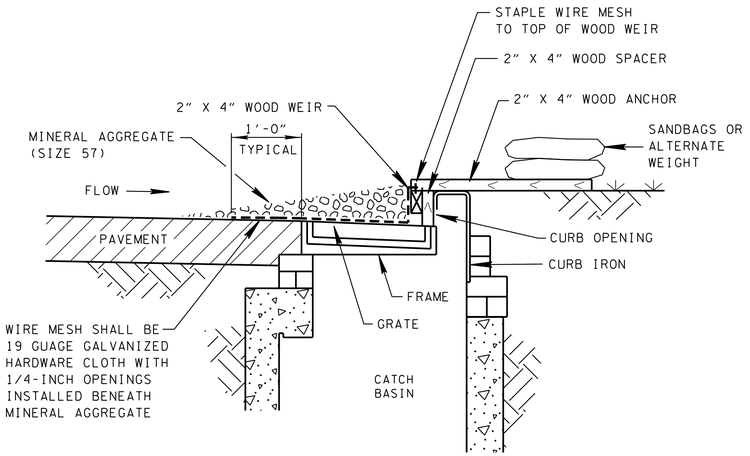
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: MISC. MINOR EDITS AND GENERAL NOTE REVISIONS.
- REV.6-24-10: MISC. MINOR EDITS.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

CURB INLET PROTECTION TYPE 3

LOW VOLUME, LOW SPEED TRAFFIC AREAS ONLY



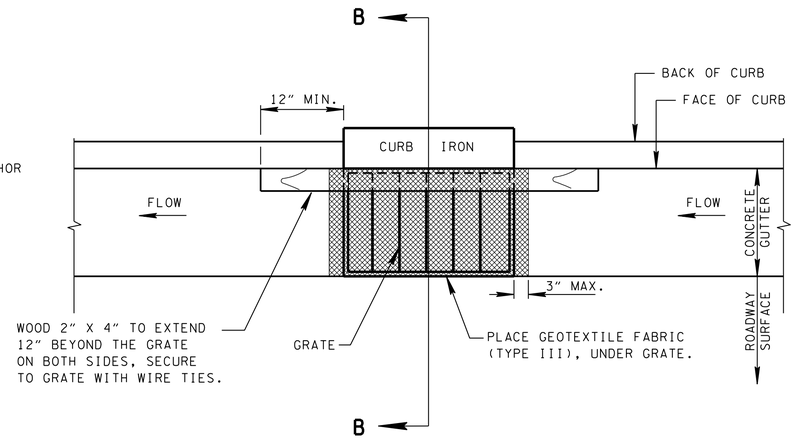
ISOMETRIC VIEW



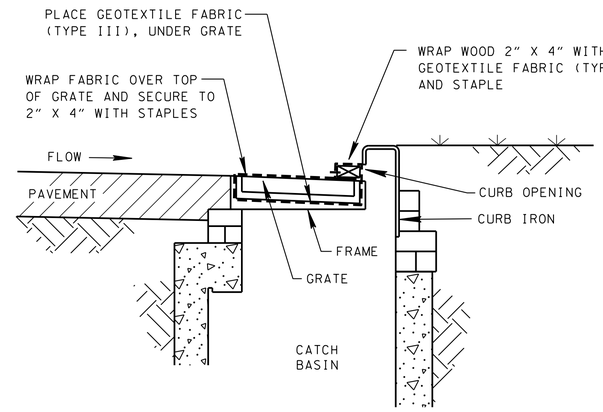
SECTION A-A

EROSION CONTROL PLAN LEGEND: ③ CURB INLET PROTECTION (TYPE 3)

CURB INLET PROTECTION TYPE 4



PLAN VIEW



SECTION B-B

EROSION CONTROL PLAN LEGEND: ④ CURB INLET PROTECTION (TYPE 4)

CURB INLET PROTECTION TYPE 3 GENERAL NOTES

(A1) CURB INLET PROTECTION (TYPE 3) IS A SEDIMENT CONTROL DEVICE USED TO INTERCEPT SEDIMENT LADEN WATER AND PREVENT TRANSPORTED SEDIMENT FROM ENTERING AN EXISTING STORM SEWER SYSTEM. THIS SEDIMENT CONTROL DEVICE SHOULD BE CONSIDERED, AND IS INTENDED TO BE, A SECONDARY TREATMENT DEVICE.

(A2) CURB INLET PROTECTION (TYPE 3) IS APPLICABLE TO CURB AND GUTTER INLETS WHERE A STURDY, COMPACT INSTALLATION IS DESIRED AND WHERE PONDING IS NOT A CONCERN. EMERGENCY OVERFLOW CAPABILITIES ARE MINIMAL, SO EXPECT THE POTENTIAL FOR SIGNIFICANT PONDING WITH THIS DEVICE.

(A3) MAXIMUM DRAINAGE AREA IS 1 ACRE.

(A4) CURB INLET PROTECTION (TYPE3) SHALL NOT BE USED WHERE LARGE QUANTITIES OF SEDIMENT ARE EXPECTED OR WHERE THE LONGITUDINAL GRADE OF CURB AND GUTTER EXCEEDS ONE (1) PERCENT.

(A5) WIRE MESH SHALL BE 19 GAUGE GALVANIZED HARDWARE CLOTH WITH ¼ INCH OPENINGS. MESH SHALL BE PLACED OVER THE CURB INLET OPENING AND AGAINST THE FACE OF CURB ON BOTH SIDES OF THE INLET SO THAT AT LEAST 12 INCHES OF WIRE EXTENDS ACROSS THE PAVEMENT AND AT LEAST 12 INCHES ACROSS THE CONCRETE GUTTER BEYOND THE EDGES OF THE INLET OPENING.

(A6) THE WIRE MESH USED FOR THIS SEDIMENT CONTROL DEVICE SHALL BE A CONTINUOUS PIECE OF MATERIAL FORMED AND SHAPED TO MATCH THE SHAPE OF THE CURB AND GUTTER AND SECURED TO THE WOOD FRAME AS NEEDED BY WIRE STAPLES.

(A7) MINERAL AGGREGATE (SIZE 57) SHALL BE PLACED AGAINST THE WIRE MESH SO AS TO ANCHOR IT AGAINST THE CONCRETE GUTTER, PAVEMENT, AND WOOD FRAME.

(A8) 2" X 4" WOOD ANCHORS SHALL BE NAILED TO THE TOP OF THE WEIR AND VERTICAL WOOD SPACERS AT SPACER LOCATIONS AND SHALL BE SECURED BEHIND THE CURB IRON WITH SANDBAGS OR OTHER APPROVED ANCHORING DEVICE.

(A9) CURB INLET PROTECTION (TYPE 3) SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-09.42 CURB INLET PROTECTION (TYPE 3) PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF CURB INLET PROTECTION (TYPE 3).

(A10) ANY PRODUCT LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE IS ALSO ACCEPTABLE.

(A11) MAINTENANCE SHALL BE PERFORMED AS NEEDED. FOR PROPER FUNCTION, SEDIMENT REMOVAL SHALL BE PERFORMED CONTINUOUSLY AND/OR AFTER EVERY RAIN EVENT AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL, PER CUBIC YARD.

CURB INLET PROTECTION TYPE 4 GENERAL NOTES

(B1) CURB INLET PROTECTION (TYPE 4) IS A SEDIMENT CONTROL DEVICE USED TO PREVENT TRANSPORTED SEDIMENT FROM ENTERING AN EXISTING STORM SEWER SYSTEM. THIS SEDIMENT CONTROL DEVICE SHOULD BE CONSIDERED, AND IS INTENDED TO BE, A SECONDARY TREATMENT DEVICE.

(B2) CURB INLET PROTECTION (TYPE 4) IS APPLICABLE TO CURB AND GUTTER INLETS WHERE A COMPACT INSTALLATION IS DESIRED AND POST PAVING CONDITIONS ARE PRESENT. THIS DEVICE WILL REQUIRE FREQUENT MAINTENANCE WHILE IN USE.

(B3) MAXIMUM DRAINAGE AREA IS 1 ACRE.

(B4) TYPE 4 INLET PROTECTION SHALL NOT BE USED WHERE LARGE QUANTITIES OF SEDIMENT ARE EXPECTED OR WHERE HIGH VELOCITIES OF APPROACHING WATER ARE ANTICIPATED DUE TO LONGITUDINAL GRADE OF CURB AND GUTTER.

(B5) GEOTEXTILE FABRIC (TYPE III) SHALL BE A CONTINUOUS PIECE WRAPPED AROUND THE 2" X 4" AND SECURED WITH STAPLES. TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3 INCHES OF THE GRATE.

(B6) ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.

(B7) WOOD 2" X 4" SHALL BE PRESSURE TREATED YELLOW PINE. THE WOOD SHALL NOT BLOCK THE ENTIRE OPENING HEIGHT OF THE CURB IRON, AS THIS WILL OBSTRUCT THE EMERGENCY OVERFLOW CAPABILITIES OF THE DEVICE.

(B8) THE CONTRACTOR SHALL SECURE THE DEVICE WHEN REMOVING THE GRATE TO PREVENT SEDIMENT FROM ENTERING THE STORM SEWER SYSTEM. WHEN REPLACING THE GRATE, CARE MUST BE TAKEN TO INSURE THAT THE 2" X 4" RESTS FIRMLY AGAINST THE FACE OF THE CURB AND/OR THE CONCRETE GUTTER.

(B9) CURB INLET PROTECTION (TYPE 4) SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

209-09.43 CURB INLET PROTECTION (TYPE 4) PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF CURB INLET PROTECTION (TYPE 4).

(B10) ANY PRODUCT LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE IS ALSO ACCEPTABLE.

(B11) MAINTENANCE SHALL BE PERFORMED AS NEEDED. FOR PROPER FUNCTION, SEDIMENT REMOVAL SHALL BE PERFORMED CONTINUOUSLY AND/OR AFTER EVERY RAIN EVENT AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL, PER CUBIC YARD.

- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

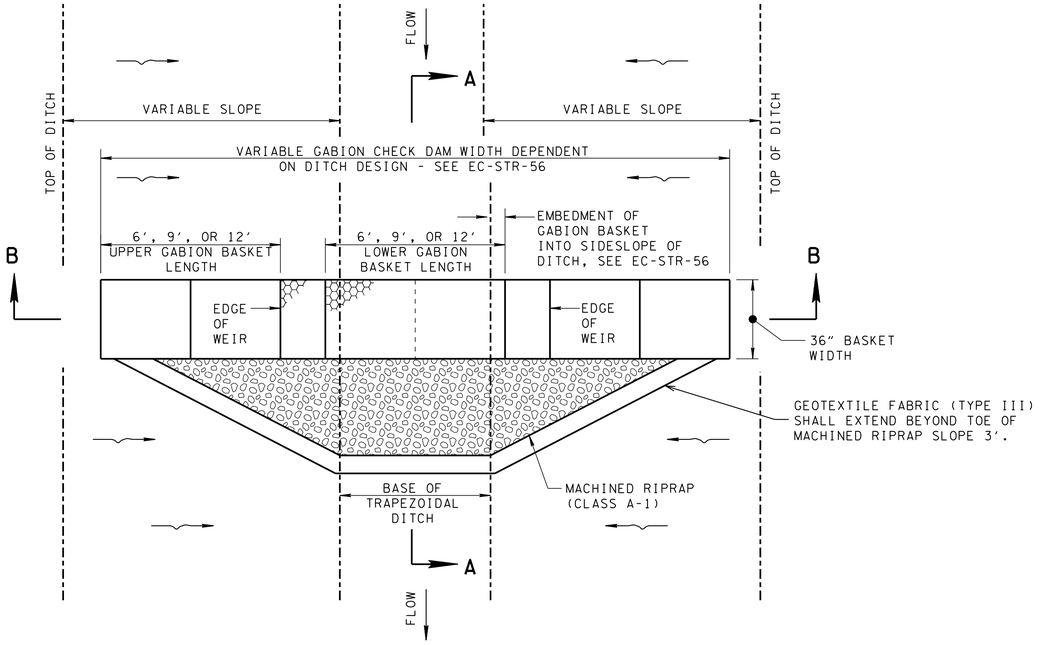
NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

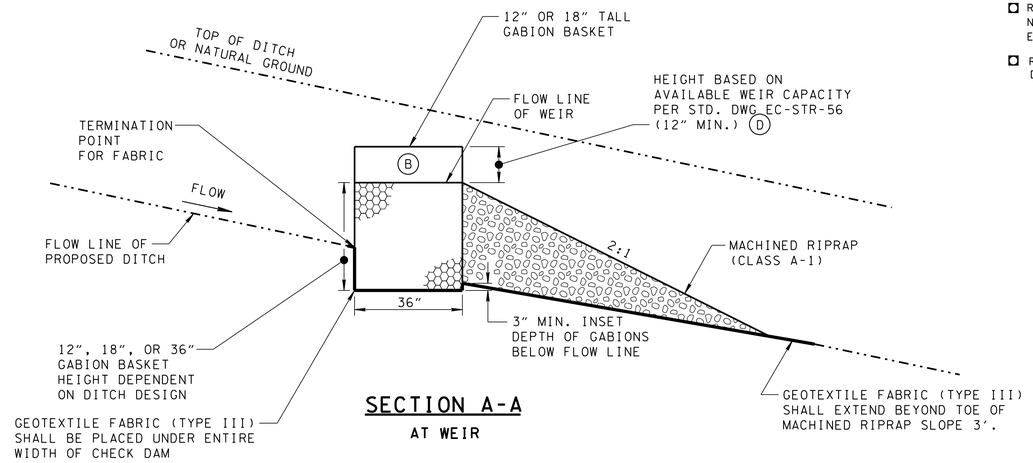
CURB INLET PROTECTION TYPE 3 & 4

1-20-06 EC-STR-39A

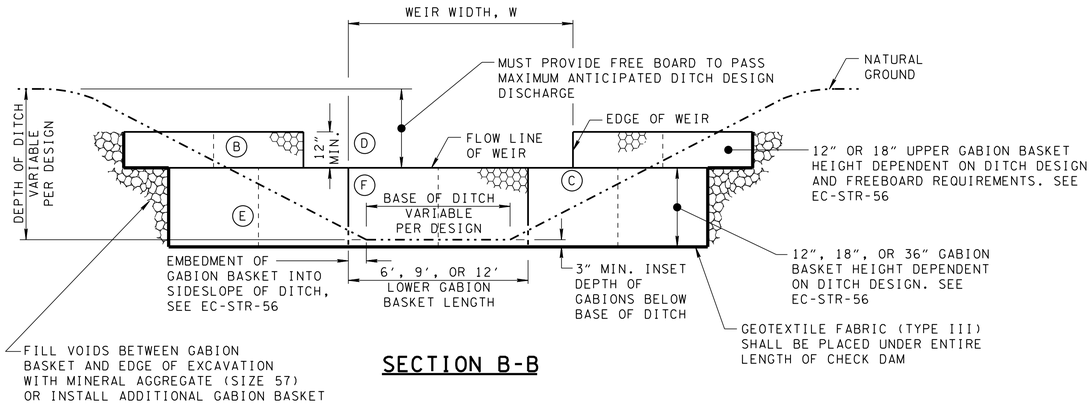
- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REVISED GENERAL NOTES, TABLES, MISC. DRAFTING EDITS.
- REV. 8-1-12: MINOR EDITS TO DRAWING AND GENERAL NOTES.



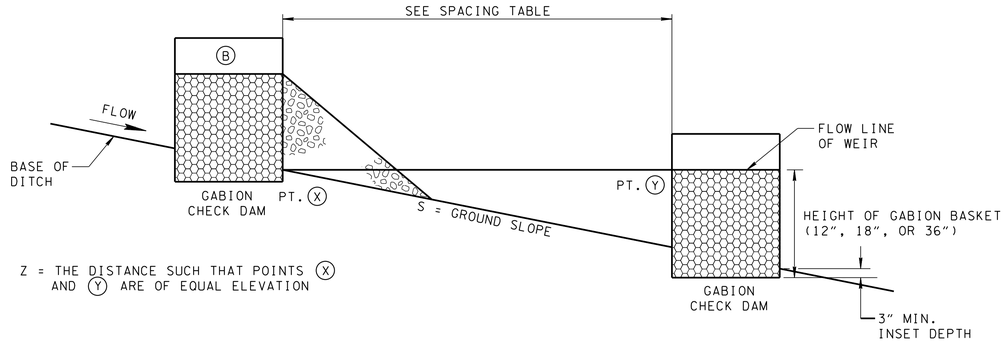
PLAN VIEW



SECTION A-A
AT WEIR



SECTION B-B



Z = THE DISTANCE SUCH THAT POINTS (X) AND (Y) ARE OF EQUAL ELEVATION

GABION CHECK DAM SPACING AT CENTER OF WEIR

GABION CHECK DAM GENERAL NOTES

(A) GABION CHECK DAMS ARE USED FOR VELOCITY REDUCTION AND EROSION PREVENTION IN AREAS WHERE CONCENTRATED FLOWS EXIST. GABION CHECK DAMS ARE NOT TO BE USED FOR SEDIMENT CONTROL AND SHOULD NOT BE CONSIDERED A SEDIMENT TRAPPING DEVICE. GABION CHECK DAMS SHALL NOT BE USED IN STREAMS OR OTHER NATURAL WATER RESOURCES.

(B) HEIGHT OF UPPER GABION SHALL BE OF EQUAL OR LESSER HEIGHT THAN LOWER GABION AND SHALL NOT EXCEED 18".

(C) VERTICAL JOINTS OF GABION BASKETS SHALL BE STAGGERED.

(D) SIZE WEIR TO CONTAIN THE 2-YEAR, 24-HOUR STORM. CONTAIN DESIGN DISCHARGE WITHIN WEIR STRUCTURE WHERE POSSIBLE. FOR SITES WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE WEIR SHALL BE SIZED TO CONTAIN THE 5-YEAR, 24-HOUR STORM.

(E) DIAPHRAGMS SEPARATE INDIVIDUAL GABION CELLS.

(F) BASKET-TO-BASKET CONNECTIONS SHALL BE AS DIRECTED

(G) THE DRAINAGE AREA FOR THE GABION CHECK DAM SHALL BE 35 ACRES OR LESS.

(H) SEE STANDARD DRAWINGS EC-STR-56, EC-STR-57, EC-STR-58, AND EC-STR-59 FOR ADDITIONAL DETAILS AND GENERAL NOTES NOT SHOWN ON THIS DRAWING.

MAXIMUM GABION CHECK DAM SPACING TABLE (IN FEET)

GROUND SLOPE, S (FT/FT)	12-INCH BASKETS	18-INCH BASKETS	36-INCH BASKETS
0.010	72	122	272
0.015	47	81	181
0.020	35	60	135
0.030	22	39	89
0.040	16	29	66
0.050	12	22	52
0.060	10	18	43
0.070	N/A	15	37
0.080	N/A	13	32
0.090	N/A	11	28
0.100	N/A	10	25
0.110	N/A	N/A	22
0.120	N/A	N/A	20
0.130	N/A	N/A	19
0.140	N/A	N/A	17
0.150	N/A	N/A	16
0.200	N/A	N/A	11

EROSION CONTROL PLAN LEGEND: GABION CHECK DAM

- MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

GABION CHECK DAM

7-29-04 | EC-STR-55

- REV. 4-15-06: REFORMATTED SHEET, REVISED NOTES, MISC. EDITS TO DRAWING.
- REV. 4-1-08: REVISED GENERAL NOTES, REMOVED GEOTEXTILE SPEC. TABLE, REFORMATTED SHEET.
- REV. 8-1-12: MINOR EDITS TO GENERAL NOTES, REVISED NOTE BELOW COMPONENT PROPERTIES.

GABION CHECK DAM GENERAL NOTES

(A) GABIONS SHALL BE APPLIED AS CHECK DAMS WHERE ALLOWABLE MAXIMUM SHEAR FORCES AND VELOCITIES FOR LOOSE RIP RAP ARE EXCEEDED.

(B) GABION CHECK DAMS SHALL NOT BE USED IN STREAMS.

(C) GABION CHECK DAMS ARE TO BE USED, PRIMARILY AS AN EROSION CONTROL MEASURE FOR VELOCITY REDUCTION. AN APPROPRIATE GABION CHECK DAM CONFIGURATION MAY BE SELECTED USING EC-STR-56. THE 2-YEAR PEAK FLOW RATE MUST BE LESS THAN OR EQUAL TO THE WEIR FLOW SHOWN FOR THE SELECTED GABION CHECK DAM CONFIGURATION. AT SITES WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, THE 5-YEAR PEAK FLOW RATE MUST BE LESS THAN OR EQUAL TO THE WEIR FLOW SHOWN ON THE TABLE.

(D) GABION CHECK DAMS MAY REMAIN IN PLACE AS PERMANENT CHECK DAMS, IF SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

(E) THE CENTER OF THE GABION CHECK DAM MUST BE AT LEAST ONE (1) FOOT LOWER THAN THE OUTER EDGES. THIS WILL ELIMINATE THE BASKET-SOIL FAILURE POINT WHERE THE GABION CHECK DAM AND NATURAL GROUND MERGE.

(F) WIRE MESH GABION ALTERNATES:

1. WOVEN MESH - NON-RAVELING TRIPLE TWISTED HEXAGONAL WIRE MESH, CONSISTING OF TWO WIRES TWISTED TOGETHER IN THREE 180 DEGREE TURNS. AREA OF MESH OPENINGS SHALL NOT EXCEED 10 SQUARE INCHES. THE MINIMUM LINEAR DIMENSION OF A WOVEN MESH OPENING SHALL NOT EXCEED 4.5 INCHES.

2. WELDED MESH - WELDED WIRE MESH WITH A UNIFORM SQUARE OR RECTANGULAR PATTERN AND RESISTANCE WELD AT EACH INTERSECTION. THE WELDED WIRE CONNECTIONS SHALL CONFORM WITH THE REQUIREMENTS OF ASTM A185, INCLUDING WIRE SMALLER THAN W1.2 (0.124 IN.), EXCEPT THAT THE WELDED CONNECTIONS SHALL HAVE A MINIMUM AVERAGE SHEAR STRENGTH OF 70% AND A MINIMUM SHEAR STRENGTH OF 60% OF THE MINIMUM ULTIMATE TENSILE STRENGTH OF THE WIRE. WIRE SHALL BE GALVANIZED AFTER THE FORMING OF THE WELDED MESH.

(G) WIRE FOR FABRICATION AND ASSEMBLY SHALL BE HOT-DIPPED GALVANIZED. THE WIRE SHALL HAVE A MINIMUM TENSILE STRENGTH OF 60,000 PSI. GALVANIZED STEEL WIRE SHALL CONFORM TO ASTM A641, CLASS 3, SOFT TEMPER.

(H) TYPE 1, TYPE 2 AND TYPE 3 FASTENERS MUST PROVIDE A MINIMUM STRENGTH OF 1,400 POUNDS PER LINEAR FOOT FOR GABION BASKETS. ALL FASTENERS SHALL MEET ALL OF THE COATING REQUIREMENTS OF THE GABION MANUFACTURER IN ADDITION TO ANY REQUIREMENTS SPECIFIED IN THESE GENERAL NOTES.

(I) TYPE 4 SPIRAL BINDERS ARE FOR WELDED-MESH GABION BASKETS ONLY AND SHALL BE FORMED FROM WIRE MEETING THE SAME QUALITY AND COATING THICKNESS REQUIREMENTS AS SPECIFIED FOR THE GABION BASKETS. ALTERNATE FASTENERS FOR USE WITH WIRE MESH GABIONS, SUCH AS RING FASTENERS, SHALL BE FORMED FROM WIRE MEETING THE SAME QUALITY AND COATING THICKNESS REQUIREMENTS AS SPECIFIED FOR THE GABIONS.

(J) FOUNDATION PREPARATION - SURFACE IRREGULARITIES, LOOSE MATERIAL, VEGETATION, AND ALL FOREIGN MATTER SHALL BE REMOVED FROM FOUNDATIONS.

(K) ASSEMBLY - ROTATE THE GABION PANELS INTO POSITION AND JOIN THE VERTICAL EDGES WITH FASTENERS FOR GABION ASSEMBLY. WHERE LACING WIRE IS USED, WRAP THE WIRE WITH ALTERNATING SINGLE AND DOUBLE HALF-HITCHES AT INTERVALS BETWEEN FOUR (4) TO FIVE (5) INCHES. WHERE SPIRAL FASTENERS ARE USED FOR WELDED-WIRE MESH, CRIMP THE ENDS TO SECURE THE SPIRALS IN PLACE. WHERE RING TYPE ALTERNATE FASTENERS ARE USED FOR BASKET ASSEMBLY, INSTALL THE FASTENERS AT A MAXIMUM SPACING OF 6 INCHES. USE THE SAME FASTENING PROCEDURES TO INSTALL INTERIOR DIAPHRAGMS WHERE THEY ARE REQUIRED. INTERIOR DIAPHRAGMS WILL BE REQUIRED WHEN ANY INSIDE DIMENSION OF A GABION BASKET EXCEEDS 3 FEET.

(L) PLACEMENT - PLACE THE EMPTY GABIONS ON THE FOUNDATION AND INTERCONNECT THE ADJACENT GABIONS ALONG THE TOP, BOTTOM, AND VERTICAL EDGES USING LACING WIRE. WRAP THE WIRE WITH ALTERNATING SINGLE AND DOUBLE HALF-HITCHES AT INTERVALS BETWEEN FOUR (4) TO SIX (6) INCHES. UNLESS OTHERWISE SPECIFIED, LACING WIRE WILL BE THE ONLY FASTENER ALLOWED FOR INTERCONNECTING WOVEN MESH GABIONS. SPIRAL FASTENERS ARE COMMONLY USED FOR THE ASSEMBLY AND INTERCONNECTION OF WELDED MESH GABIONS. SPIRALS ARE SCREWED DOWN AT THE CONNECTING EDGES, THEN EACH END OF THE SPIRAL IS SECURELY TIED DOWN TO PREVENT UNRAVELING. LACING MAY BE USED AS NEEDED TO SUPPLEMENT THE INTERCONNECTION OF WELDED MESH GABIONS, AND THE CLOSING OF LIDS. FOR GABION LACING DETAILS, SEE EC-STR-57.

GABION CHECK DAM GENERAL NOTES (CONT.)

(M) UNLESS OTHERWISE SPECIFIED ON THE PLANS, THE VERTICAL JOINTS BETWEEN GABION BASKET UNITS OF ADJACENT LAYERS OR TIERS, ALONG THE LENGTH OF THE CHECK DAM, SHALL BE STAGGERED BY A MINIMUM OF ONE CELL.

(N) FILLING OPERATION

1. FOR REINFORCEMENT, INTERNAL CONNECTING WIRES SHALL BE PLACED IN EACH UNRESTRAINED GABION CELL 18 INCHES OR GREATER IN HEIGHT, INCLUDING GABION CELLS LEFT TEMPORARILY UNRESTRAINED. TWO INTERNAL CONNECTING WIRES SHALL BE PLACED (TWO ACROSS THE WIDTH AND TWO ACROSS THE LENGTH) CONCURRENTLY WITH ROCK PLACEMENT, AT THE SPECIFIED DEPTH INTERVAL SHOWN ON STANDARD DRAWING EC-STR-58. IN WOVEN MESH GABIONS THESE REINFORCING WIRES SHALL BE EVENLY SPACED ALONG THE FRONT FACE AND CONNECTING TO THE BACK FACE. ALL CONNECTING WIRES SHALL BE LOOPED AROUND TWO MESH OPENINGS AND EACH WIRE END SHALL BE SECURED BY A MINIMUM OF FIVE 180 DEGREE TWISTS AROUND ITSELF AFTER LOOPING.

2. IN WELDED MESH GABIONS, OPTIONAL CORNER STIFFENERS MAY BE USED IN LIEU OF INTERNAL CONNECTING WIRE REINFORCEMENT. WHEN USED, DIAGONAL STIFFENERS SHALL BE PLACED ACROSS THE CORNERS OF THE GABIONS AT 12 INCHES FROM CORNERS AS DETAILED ON STANDARD DRAWING EC-STR-58. LACING WIRE OR PREFORMED HOOKING WIRE STIFFENERS MAY BE USED.

3. THE GABIONS SHALL BE CAREFULLY FILLED WITH ROCK, EITHER BY MACHINE OR HAND METHODS, ENSURING ALIGNMENT, AVOIDING BULGES, AND PROVIDING A COMPACT MASS THAT MINIMIZES VOIDS. MACHINE PLACEMENT WILL REQUIRE SUPPLEMENTING WITH HAND WORK TO ENSURE THE DESIRED RESULTS. THE CELLS IN ANY ROW SHALL BE FILLED IN STAGES SO THAT THE DEPTH OF ROCK PLACED IN ANY ONE CELL DOES NOT EXCEED THE DEPTH OF ROCK IN ANY ADJOINING CELL BY MORE THAN 3 INCHES. ALONG THE EXPOSED FACES, THE OUTER LAYER OF STONE SHALL BE CAREFULLY PLACED AND ARRANGED BY HAND TO ENSURE A NEAT, COMPACT PLACEMENT WITH A UNIFORM APPEARANCE.

4. THE LAST LAYER OF ROCK SHALL BE UNIFORMLY LEVELED TO THE TOP EDGES OF THE GABIONS. LIDS SHALL BE STRETCHED TIGHT OVER THE ROCK FILLING USING ONLY APPROVED LID CLOSING TOOLS AS NECESSARY. THE USE OF CROWBARS OR OTHER SINGLE POINT LEVERAGE BARS FOR LID CLOSING IS PROHIBITED, AS THEY MAY DAMAGE THE BASKETS. THE LID SHALL BE STRETCHED UNTIL IT MEETS THE PERIMETER EDGES OF THE FRONT AND END PANELS. THE GABION LID SHALL THEN BE SECURED TO THE SIDES, ENDS, AND DIAPHRAGMS WITH SPIRAL BINDERS, INTERLOCKING WIRE, OVERLAPPING RING FASTENERS, OR LACING WIRE WRAPPED WITH ALTERNATING SINGLE AND DOUBLE HALF-HITCHES IN THE MESH OPENINGS.

(O) CARE SHOULD BE TAKEN WHEN PLACING ROCK IN GABIONS TO INSURE THAT THE GABION BASKETS WILL NOT BE DAMAGED OR BROKEN.

(P) ROCK OR STONE SIZE FOR USE IN GABION BASKETS SHALL BE BETWEEN 4 AND 8 INCHES WITH A D_{50} OF 6 INCHES (MINIMUM) AND SHALL CONSIST OF FIELD STONE OR ROUGH UNHEWN QUARRY STONE. THE SPECIFIC GRAVITY OF INDIVIDUAL STONES SHALL BE A MINIMUM OF 2.6. STONES SHALL BE OF A QUALITY THAT WILL NOT DISINTEGRATE WITH EXPOSURE TO WATER OR WEATHERING.

(Q) GEOTEXTILE FABRIC (TYPE III) SHALL MEET REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GEOTEXTILES AASHTO DESIGNATION M-288, EROSION CONTROL.

(R) GABION CHECK DAMS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:

709-05.06 MACHINE RIP-RAP (CLASS A-1) PER TON
709-10.01 GABIONS (DESCRIPTION) PER CUBIC YARD
709-10.02 GABIONS (DESCRIPTION) PER CUBIC YARD
709-10.03 GABIONS (DESCRIPTION) PER CUBIC YARD
709-10.04 GABIONS (DESCRIPTION) PER CUBIC YARD
709-10.05 GABIONS (DESCRIPTION) PER CUBIC YARD
740-10.03 GEOTEXTILE (TYPE III)(EROSION CONTROL) PER SQUARE YARD

PAYMENT SHALL INCLUDE ALL MATERIALS, EQUIPMENT, EXCAVATION, AND LABOR NECESSARY FOR CONSTRUCTION AND MAINTENANCE OF THE GABION CHECK DAMS.

(S) SEDIMENT SHALL BE REMOVED FROM BEHIND THE GABION CHECK DAMS WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE DAM AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL, PER CUBIC YARD.

(T) SEE STANDARD DRAWINGS EC-STR-55, EC-STR-56, EC-STR-57, AND EC-STR-58 FOR ADDDITIONAL DETAILS AND GENERAL NOTES NOT SHOWN ON THIS DRAWING.

GABION CHECK DAM COMPONENT PROPERTIES *

TYPE OF WIRE	MESH SIZE (INCHES)	U.S WIRE (GAGE)	GALVANIZED ZINC COATING (OZ/S.F.)	TOTAL DIAMETER CORE WIRE (INCHES)
WOVEN (TWISTED) WIRE MESH	3.25 X 4.50	12	0.8	0.105
WELDED WIRE MESH	3.00 X 3.00	12	0.8	0.105
SELVEDGE	—	10	0.8	0.130
LACING WIRE	—	13.5	0.8	0.087
INTERNAL REINFORCING WIRE	—	13.5	0.8	0.087
SPIRAL BINDER	—	12	0.8	0.105

* ALL COMPONENTS SHALL BE HOT-DIPPED GALVANIZED STEEL (SEE NOTE F2 REGARDING WELDED MESH GABIONS).

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

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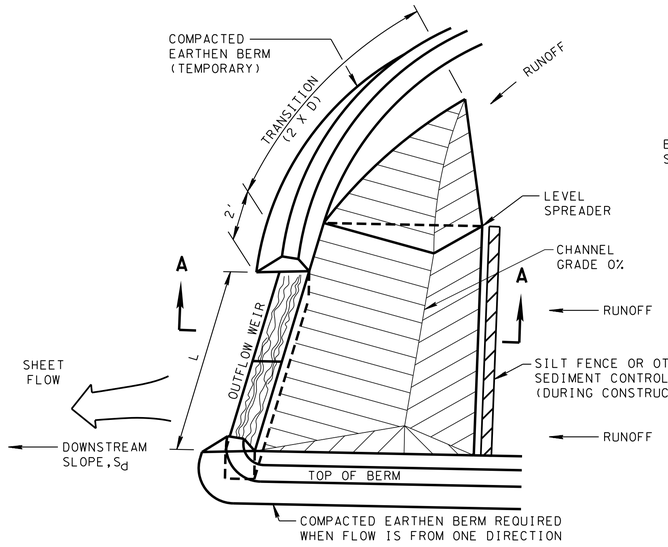
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

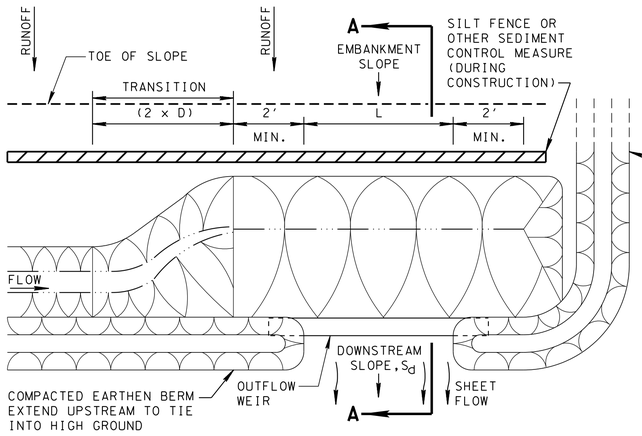
GABION CHECK DAM GENERAL NOTES AND COMPONENT PROPERTIES

7-29-04 EC-STR-59

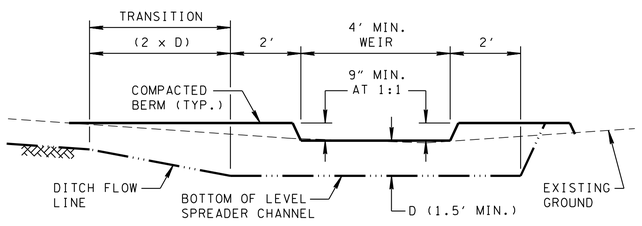


NOTE: ALL TEMPORARY BERMS, SWALES AND LEVEL SPREADER DITCH MUST RECEIVE TEMPORARY SEEDING IMMEDIATELY AFTER INSTALLATION

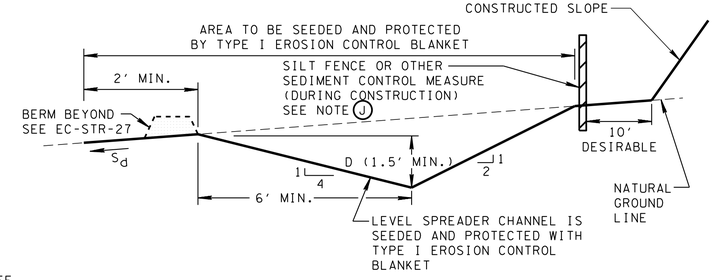
PERSPECTIVE VIEW
(APPLICATION WITH TEMPORARY BERM)



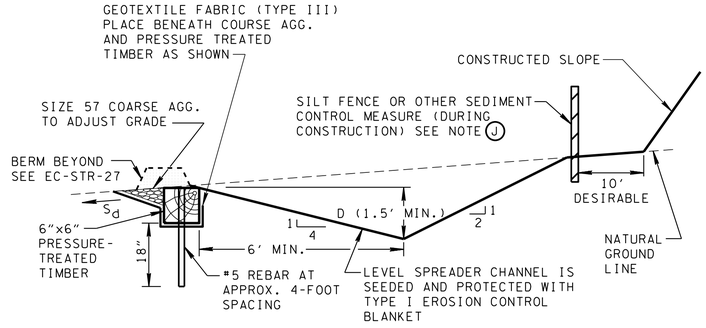
PLAN VIEW
(APPLICATION WITH SIDE DITCH FROM ONE DIRECTION)



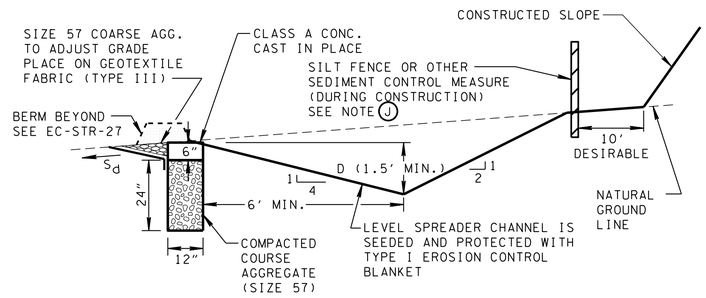
PROFILE VIEW (HORIZONTAL)
(APPLICATION WITH SIDE DITCH FROM ONE DIRECTION)



SECTION A - A
TYPE 1 WEIR
(TEMPORARY APPLICATION)

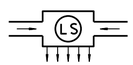


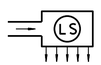
SECTION A - A
TYPE 2 WEIR
(TEMPORARY APPLICATION)



SECTION A - A
TYPE 3 WEIR
(PERMANENT APPLICATION)

EROSION CONTROL PLAN LEGEND:

LEVEL SPREADER (DUAL DIRECTION) 

LEVEL SPREADER (SINGLE DIRECTION) 

MINIMUM LEVEL SPREADER CHANNEL DEPTH "D" IN FEET				
DESIGN DISCHARGE Q (cfs)	DOWNSTREAM SLOPE, "S_d" IN PERCENT (%)			
	0%-4%	4%-6%	6%-8%	8%-10%
1	1.5	1.5	1.5	1.5
2	1.5	1.5	1.7	2.0
4	1.5	1.8	2.5	3.0
7	1.9	2.5	3.5	4.1
10	2.3	3.1	4.2	*
15	3.0	3.9	*	*
20	3.5	4.5	*	*
25	3.9	5.2	*	*
30	4.3	5.7	*	*
35	4.7	6.2	*	*
40	5.1	6.7	*	*
45	5.5	*	*	*
50	5.8	*	*	*

* = NOT RECOMMENDED

UNIT WEIR FLOW RATES IN CFS/LF			
DOWNSTREAM SLOPE, "S_d" IN PERCENT (%)			
0%-4%	4%-6%	6%-8%	8%-10%
0.49	0.20	0.07	0.04

WEIR LENGTH "L" = DESIGN Q IN CFS DIVIDED BY UNIT WEIR FLOW IN CFS/LF

MINIMUM WEIR LENGTH = 4 FEET

WEIR LENGTH > 200 FEET IS NOT RECOMMENDED

EXAMPLE: DESIGN Q = 7 cfs
S_d = 6%

THUS, L = 7/0.20 = 35 FEET
D = 2.5 FEET

LEVEL SPREADER GENERAL NOTES

(A) LEVEL SPREADERS INCLUDE A LEVEL CHANNEL AND WEIR WHICH RECEIVE CONCENTRATED INFLOW AND RELEASE IT IN A SHEET FLOW CONDITION. THEY CAN BE USED ON A TEMPORARY BASIS IN COMBINATION WITH TEMPORARY EPSC MEASURES OR ON A PERMANENT BASIS WITH SIDE DITCHES OR OTHER STORM WATER CONVEYANCES. LEVEL SPREADERS MAY ACCEPT CONCENTRATED INFLOWS FROM ONE OR BOTH ENDS.

(B) LEVEL SPREADERS MAY BE USED WHERE THE SLOPE DOWNSTREAM OF THE WEIR Sd IS UNIFORM AND IS AT A GRADE OF 10% OR LESS. UNDER IDEAL CONDITIONS, A UNIT SHEET FLOW RATE OF 0.49 CFS/LF CAN BE ALLOWED ON DOWNSTREAM SLOPES UP TO 4% HOWEVER, WHERE DOWNSTREAM VEGETATION IS SPARSE OR Sd EXCEEDS 4%, THE WEIR LENGTH SHOULD BE INCREASED AS INDICATED BY THE TABLE OF UNIT WEIR FLOW RATES.

(C) THE WEIR AND CHANNEL MUST BE LEVEL TO WITHIN ⅛ INCH PER 10 LF OF WEIR, AND THUS MUST BE INSTALLED ALONG THE CONTOUR OF THE SLOPE. NON-LINEAR HORIZONTAL ALIGNMENTS (CURVED WEIRS) ARE PERMISSIBLE.

(D) IN GENERAL, LEVEL SPREADERS FOR TEMPORARY USE SHALL BE DESIGNED FOR THE 2-YEAR STORM EVENT. AT LOCATIONS WHICH DRAIN TO EXCEPTIONAL TENNESSEE WATERS OR SEDIMENT-IMPAIRED STREAMS, TEMPORARY LEVEL SPREADERS SHALL BE DESIGNED FOR THE 5-YEAR EVENT. LEVEL SPREADERS FOR PERMANENT USE SHALL BE DESIGNED FOR THE 10-YEAR STORM EVENT.

(E) WEIR LENGTH SHALL BE DETERMINED ON THE BASIS OF THE ALLOWABLE DISCHARGE PER FOOT OF WEIR LENGTH, AS PROVIDED IN THE TABLE "UNIT WEIR FLOW RATES." THE WEIR LENGTH SHALL BE DETERMINED BY DIVIDING THE DESIGN DISCHARGE BY THE ALLOWABLE UNIT FLOW RATE. THE MINIMUM WEIR LENGTH SHALL BE 4 FEET. WEIR LENGTHS GREATER THAN 200 FEET ARE NOT RECOMMENDED.

(F) TYPE 3 WEIRS SHALL BE CONSIDERED FOR PERMANENT USE AND SHALL BE CONSTRUCTED OF CAST-IN-PLACE CONCRETE. TYPE 2 AND 3 WEIRS SHALL BE FOR TEMPORARY USE. A TYPE 2 WEIR SHALL BE CONSTRUCTED WITH 6"X6" PRESSURE-TREATED TIMBERS. A TYPE 1 WEIR CONSTRUCTED FROM GRADED EARTH AND EROSION CONTROL BLANKET MAY BE USED FOR WEIR LENGTHS OF 10 FEET OR LESS.

(G) WHEN LEVEL SPREADERS ARE USED IN CONJUNCTION WITH A ROADWAY SIDE DITCH, A COMPACTED BERM SHALL BE PROVIDED ON THE SIDE OF THE DITCH IN ORDER TO ENSURE THAT OUTFLOWS OCCUR OVER THE WEIR. THE MINIMUM HEIGHT OF THE BERM SHALL BE 6 INCHES AND IT SHALL BE EXTENDED UPSTREAM TO A POINT WHERE THE EXISTING GROUND IS SUFFICIENTLY HIGH TO INTERCEPT THE TOP OF THE BERM.

(H) WHEN LEVEL SPREADERS RECEIVE FLOWS FROM ONE END, THE OPPOSITE END OF THE STRUCTURE SHALL BE PROVIDED WITH A COMPACTED BERM A MINIMUM OF 9 INCHES HIGH IN ORDER TO PREVENT OVERFLOWS. (SEE EC-STR-27)

(I) PERMANENT INSTALLATIONS SHALL BE MARKED WITH DELINEATOR POSTS IN ORDER TO IMPROVE SAFETY FOR MAINTENANCE DIVISION MOWING CREWS.

(J) LEVEL SPREADERS ARE NOT SEDIMENT CONTROL DEVICES. DURING CONSTRUCTION, THE BACK SLOPE SHOULD BE PROVIDED WITH SILT FENCE OR OTHER SUITABLE SEDIMENT CONTROL MEASURES. THESE SEDIMENT CONTROL DEVICES SHALL BE INSTALLED ACCORDING TO THE APPLICABLE STANDARD DRAWINGS.

(K) GEOTEXTILE FABRIC (TYPE III) SHALL MEET REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR GEOTEXTILES AASHTO DESIGNATION M-288, EROSION CONTROL.

(L) LEVEL SPREADERS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:

805-01.69 LEVER SPREADERS PER EACH

PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR THE CONSTRUCTION AND MAINTENANCE OF THE LEVEL SPREADERS.

(M) THE DESIGN LIFE FOR A TEMPORARY INSTALLATION IS CONSIDERED TO BE ONE YEAR. INSPECT AFTER SIGNIFICANT RUNOFF EVENTS TO ENSURE THAT THE WEIR IS FREE OF DEBRIS. IMMEDIATELY REMOVE ANY SEDIMENT WHICH HAS COLLECTED IN THE LEVEL SPREADER CHANNEL. IF IN PLACE DURING THE WINTER MONTHS, INSPECT AFTER EACH FREE/THAW CYCLE TO ENSURE THAT THE WEIR IS STILL LEVEL.

☐ REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

NOT TO SCALE

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

LEVEL SPREADERS

2-1-08 | EC-STR-61