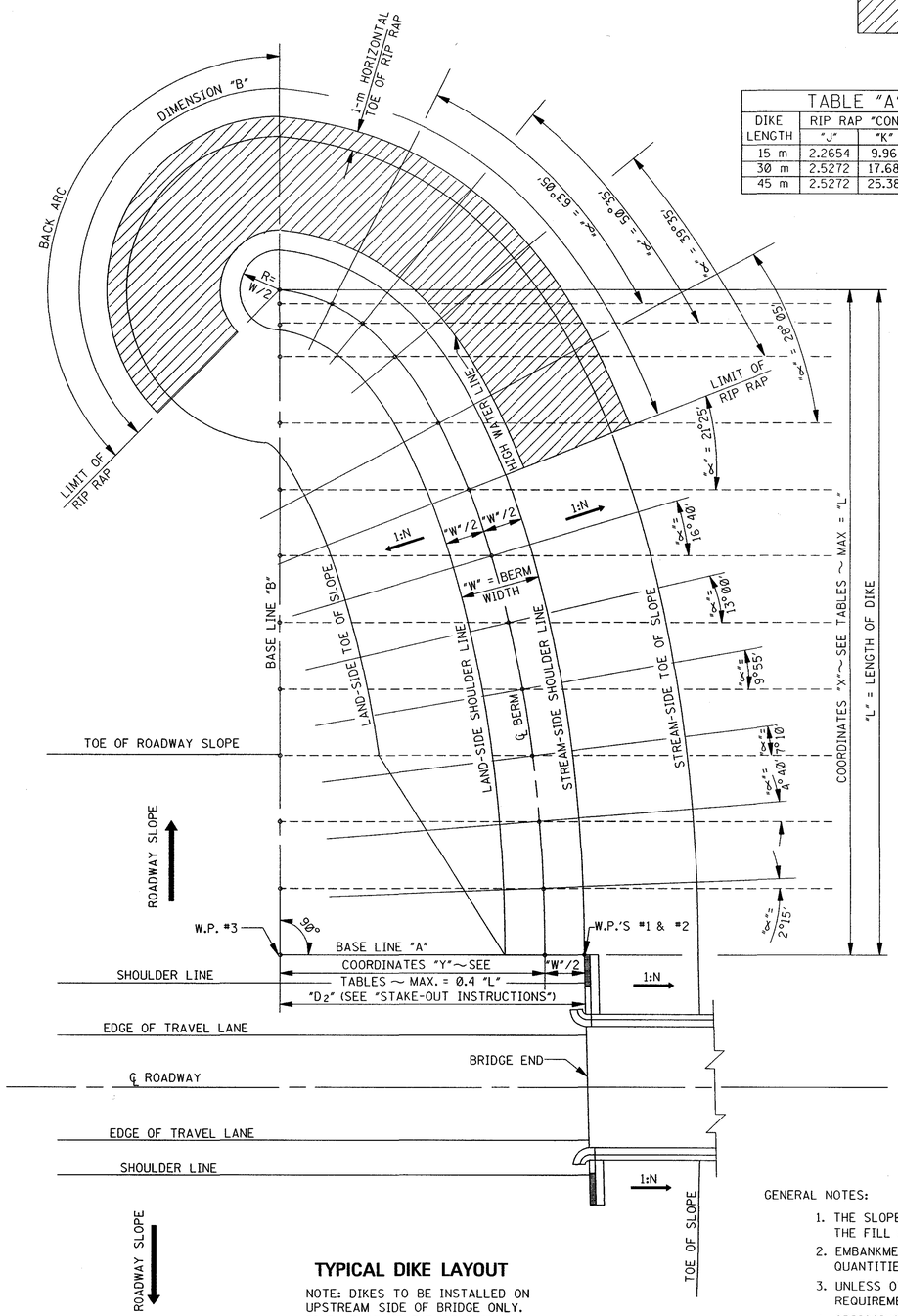
STATE	PROJECT NO.
MISS.	

AREA TO BE RIP-RAPPED INDICATED THUS:



TYPICAL DIKE LAYOUT

NOTE: DIKES TO BE INSTALLED ON UPSTREAM SIDE OF BRIDGE ONLY. DIKE AT OTHER END OF BRIDGE SAME EXCEPT OPPOSITE HAND.

TABLE "A"			
DIKE LENGTH	RIP RAP "CONSTANTS"		
	"J"	"K"	"P"
15 m	2.2654	9.96	1.02
30 m	2.5272	17.68	1.14
45 m	2.5272	25.38	1.14

15-m DIKE	
BERM WIDTH, "W" = 3 m BACK ARC = 120° "L" = 15 m	
COORDINATES (m)	
"X"	"Y"
0.00	6.00
1.50	5.97
3.00	5.88
4.50	5.72
6.00	5.50
7.50	5.20
9.00	4.80
10.50	4.28
12.00	3.60
13.50	2.62
14.25	1.88
14.70	1.19
15.00	0.00

30-m DIKE	
BERM WIDTH, "W" = 3.6 m BACK ARC = 135° "L" = 30 m	
COORDINATES (m)	
"X"	"Y"
0.00	12.00
3.00	11.94
6.00	11.76
9.00	11.45
12.00	11.00
15.00	10.39
18.00	9.60
21.00	8.57
24.00	7.20
27.00	5.23
28.50	3.75
29.40	2.39
30.00	0.00

45-m DIKE	
BERM WIDTH, "W" = 4.5 m BACK ARC = 135° "L" = 45 m	
COORDINATES (m)	
"X"	"Y"
0.00	18.00
4.50	17.91
9.00	17.64
13.50	17.17
18.00	16.50
22.50	15.59
27.00	14.40
31.50	12.86
36.00	10.80
40.50	7.85
42.75	5.62
44.10	3.58
45.00	0.00

TO ESTIMATE THE QUANTITY OF EMBANKMENT MATERIAL:

THE VOLUME OF EMBANKMENT MATERIAL, IN CUBIC METERS, IS DETERMINED BY THE FOLLOWING FORMULA:

$$V = 1.15\ [(L)\ (H)\ (W+(N)\ (H))]$$

WHERE "L" IS THE DIKE LENGTH, IN METERS; "H" IS THE DIFFERENCE IN ELEVATIONS OF THE BERM AND THE AVERAGE GROUND LEVEL; "W" IS THE BERM WIDTH, IN METERS; AND 1:N IS THE DIKE SLOPE.

TO ESTIMATE THE QUANTITY OF RIP RAP:

DIMENSION "B" GIVES THE LENGTH ALONG THE STREAM-SIDE FACE AT ANY DISTANCE, "H", BELOW THE BERM, AND IS MEASURED FROM THE LINE WHERE $\alpha <= 21°25'$ AROUND THE END TO THE "BACK ARC" RIP RAP LIMIT. IT IS DETERMINED BY THE FOLLOWING FORMULA:

$$B = [(J)\ (N)\ (H)] + K$$

WHERE "J" & "K" ARE CONSTANTS, FROM TABLE "A", AND 1:N IS THE DIKE SLOPE.

THE AREA OF RIP RAP IS DETERMINED AS FOLLOWS:

A. FIND THE MEAN LENGTH AT MID-HEIGHT OF THE RIP RAP SECTION = [(LENGTH AT HIGH WATER ELEVATION) + (LENGTH AT AVERAGE GROUND ELEVATION) / 2].
B. MULTIPLY THE DIFFERENCE IN ELEVATIONS OF HIGH WATER AND AVERAGE GROUND LEVEL BY "M" (FOR 1:2 SLOPE, M = 2.236: FOR 1:3 SLOPE, M = 3.162) TO FIND THE SLANT HEIGHT ON SLOPE.
C. AREA OF RIP RAP ON SLOPE = [(MEAN LENGTH) (SLANT HEIGHT)], IN SQUARE METERS.
D. FIND THE MEAN LENGTH OF THE ONE METER HORIZONTAL TOE PORTION = [(LENGTH AT AVERAGE GROUND LEVEL) + ("P" FROM TABLE "A")]
E. AREA OF TOE PORTION = MEAN LENGTH (FROM D) x 1, IN SQUARE METER.
F. TOTAL RIP RAP AREA = [(SLOPE AREA) + (TOE AREA)].

HAVING TOTAL RIP RAP AREA, THE QUANTITY OF LOOSE RIP RAP MAY BE ESTIMATED AT 1930 $kg/m^2/m$ OF DEPTH.

STAKE OUT INSTRUCTIONS:

1. W.P. #1 IS LOCATED AT THE LAND-SIDE CORNER OF THE UPSTREAM END BENT WING WALL, UNLESS OTHERWISE SPECIFIED. ESTABLISH BASE LINE "A" PASSING THRU W.P. #1 AND PARALLEL TO ℄ ROADWAY. WHERE ℄ ROADWAY IS ON HORIZONTAL CURVE, BASE LINE "A" IS PARALLEL TO THE TANGENT OF ℄ ROADWAY AT ℄ JOINT (OR END OF SPAN) AT BRIDGE END. WHERE SKEWED DIKE IS REQUIRED, ROTATE BASE LINE "A" ABOUT W.P. #1 THRU THE ANGLE OF SKEW.

2A. UNLESS OTHERWISE SPECIFIED, ASSUME THE BERM ELEVATION, "E_B", TO BE EQUAL TO THE ROADWAY SLOPE ELEVATION, "E_S", AT W.P. #1. IN ALL CASES WHERE $E_B = E_S$, W.P. #2 COINCIDES WITH W.P. #1 AS SHOWN IN "TYPICAL DIKE LAYOUT." FOR BRIDGES WHERE ELEVATIONS "E_S" ARE NOT THE SAME AT BOTH BRIDGE ENDS, SET ELEVATION "E_B" FOR BOTH DIKES EQUAL TO THE LOWER GRADE.

2B. FOR DIKES WHERE THE BERM IS TO BE SET AT AN ELEVATION, "E_B", OTHER THAN ELEVATION "E_S", ESTABLISH W.P. #2 ALONG BASE LINE "A" A DISTANCE, "D_1", STREAMWARD (LANDWARD, IF "D" IS NEGATIVE) FROM W.P. #1, WHERE:

$$D_1 = N(E_S - E_B)$$

AND 1:N IS THE DIKE SLOPE. SEE DETAIL "A" BELOW.

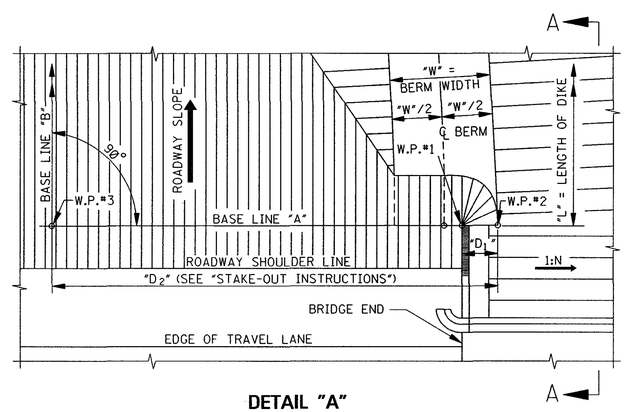
3. MEASURE LANDWARD FROM W.P. #2 ALONG BASE LINE "A" A DISTANCE, "D_2", TO ESTABLISH W.P. #3, THE ZERO OF BASE LINE "B", WHERE:

$$D_2 = \frac{W}{2} + Y_0,$$

"W" IS THE BERM WIDTH, AND "Y_0" IS THE DISTANCE "Y" GIVEN IN THE TABLES FOR "X" = 0.

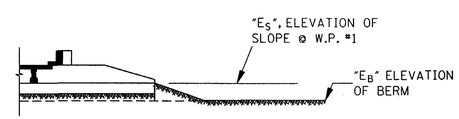
4. AT W.P. #3, TURN 90° UPSTREAM FROM BASE LINE "A" TO ESTABLISH BASE LINE "B". LOCATE THE "X" COORDINATES ALONG BASE LINE "B" AND, AT RIGHT ANGLES TO BASE LINE "B" THRU THESE POINTS, MEASURE CORRESPONDING "Y" COORDINATES TO ESTABLISH POINTS ON ℄ BERM.

5. AT EACH POINT THUS OBTAINED ON ℄ BERM, TURN CORRESPONDING ANGLE, "α", AND SET:
(A) STREAM-SIDE SHOULDER LINE, AT HALF THE BERM WIDTH FROM ℄ BERM.
(B) STREAM-SIDE TOE OF SLOPE, FROM THE PRECEDING POINT.
(C) LAND-SIDE SHOULDER LINE, AT HALF THE BERM WIDTH FROM ℄ BERM.
(D) LAND-SIDE TOE OF SLOPE, FROM THE PRECEDING POINT.



DETAIL "A"

NOTE: SHOWING LOCATION OF WORKING POINTS FOR STAKING OUT DIKE WHEN BERM ELEVATION (E_B) IS BELOW SLOPE ELEVATION (E_S) AT W.P. #1.



SECTION A–A

GENERAL NOTES:

1. THE SLOPE OF THE DIKE EMBANKMENT SHALL BE THE SAME AS THE SLOPE (1:N) OF THE FILL UNDER THE BRIDGE UNLESS SPECIFIED OTHERWISE ON BRIDGE LAYOUT SHEET.
2. EMBANKMENT MATERIAL FOR EARTH DIKES WILL BE INCLUDED IN EXCAVATION QUANTITIES AS SHOWN ON THE PLANS.
3. UNLESS OTHERWISE NOTED ON THE PLANS AND/OR TO MEET OTHER CONTRACT REQUIREMENTS, RIP RAP SHALL BE REQUIRED ON ALL EARTH DIKES AS SHOWN HEREON.
4. SPRIGGING, WHEN REQUIRED, WILL BE INCLUDED IN REGULAR ROADWAY SPRIGGING QUANTITIES.
5. SODDING, WHEN REQUIRED, WILL BE INCLUDED IN REGULAR ROADWAY SODDING QUANTITIES.
6. THE RIP-RAP SIZE AND MINIMUM DEPTH FOR RIP-RAP TREATMENT ARE AS FOLLOWS:

RIP-RAP SIZE & MINIMUM DEPTH	
DEPTH (MIN.) (mm)	RIP-RAP SIZE (kg)
300	45
450	136

ALL DIMENSIONS ARE IN MILLIMETERS (mm) EXCEPT WHERE NOTED.

DATE	REVISION	BY
12-1-99	REVISE NOTES	S.W.R.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN DIVISION
STANDARD PLAN

SPUR DIKE: EARTH

METRIC

WORKING NUMBER ED-1

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