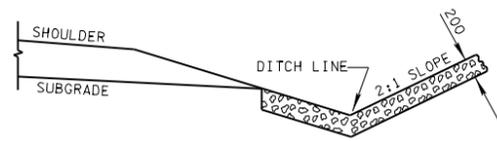
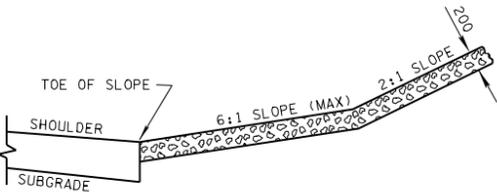


ALL UNITS ARE IN MILLIMETERS
UNLESS NOTED OTHERWISE.

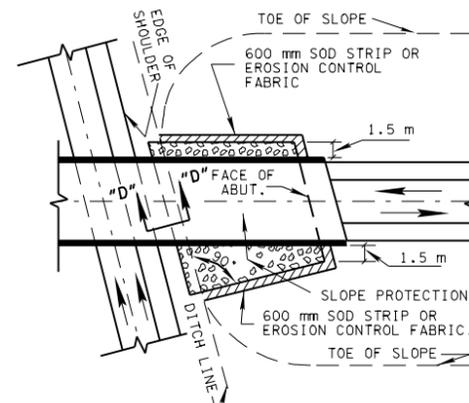
DUMPED RIP-RAP DETAILS



SECTION "D-D"
WITH DITCH

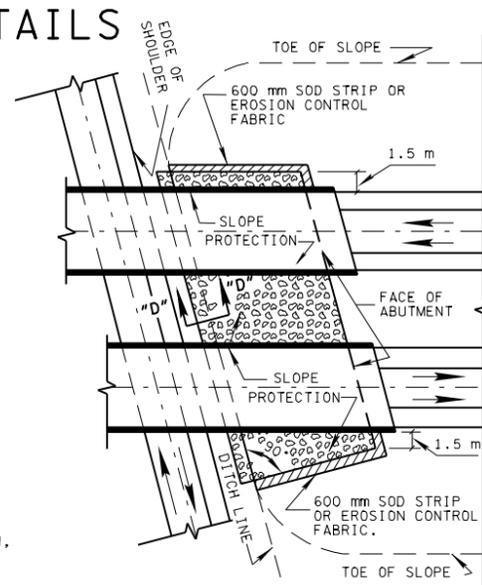


SECTION "D-D"
WITHOUT DITCH



PLAN VIEW
SINGLE BRIDGE

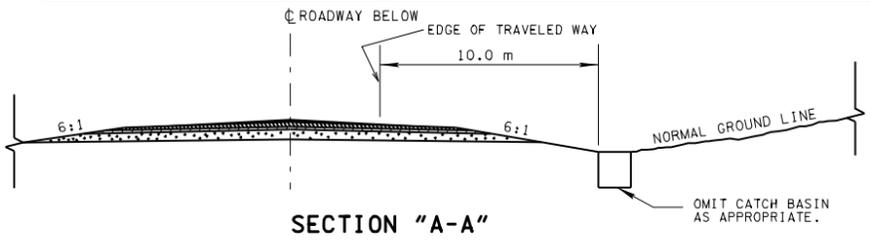
NOTE: PLAN VIEWS ARE SHOWN WITH DITCH. FOR VIEW WITHOUT DITCH, SEE GRADING DESIGN LAYOUT ON THIS SHEET.



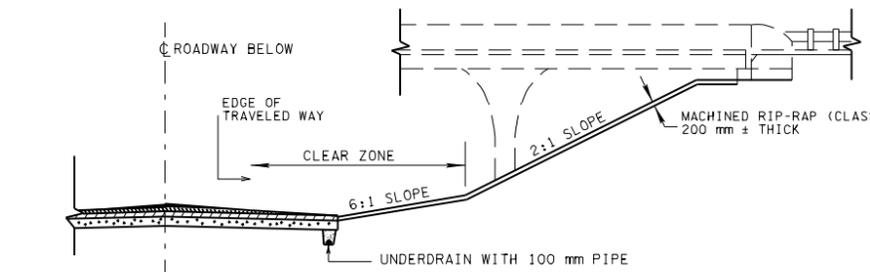
PLAN VIEW
DUAL BRIDGES

- ### GENERAL NOTES
- (A) ALL WORK INDICATED ON THIS DRAWING SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT EDITION OF TENNESSEE DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION."
 - (B) PAYMENT FOR ALL ITEMS DIRECTLY INDICATED OR IMPLIED ON THIS DRAWING WILL BE MADE UNDER APPROPRIATE ITEM NUMBER(S) AND DESCRIPTION(S) RECORDED ELSEWHERE IN THE PLANS.
- NOTES TO DESIGNERS:
- (C) WHEN EXISTING PHYSICAL CONDITIONS OF THE APPROACH AND TRANSITION ZONE ARE SO UNIQUE AS TO WARRANT INDIVIDUAL DESIGN, A CONTOUR PLAN SHALL BE PREPARED TO PROVIDE THE CONSTRUCTION ENGINEER WITH DATA FOR CONSTRUCTION TO THE INTENDED LINES AND GRADES.
 - (D) IN RARE CASES WHEN A STEEP (GREATER THAN 3:1) FILL SLOPE IS UNAVOIDABLE WITHIN THE SAFETY APPROACH ZONE, A BARRIER WILL BE INDICATED ON PLANS IN ACCORDANCE WITH DESIGN POLICY SET OUT IN THE "SM-GR-" SERIES OF STANDARD DRAWINGS.

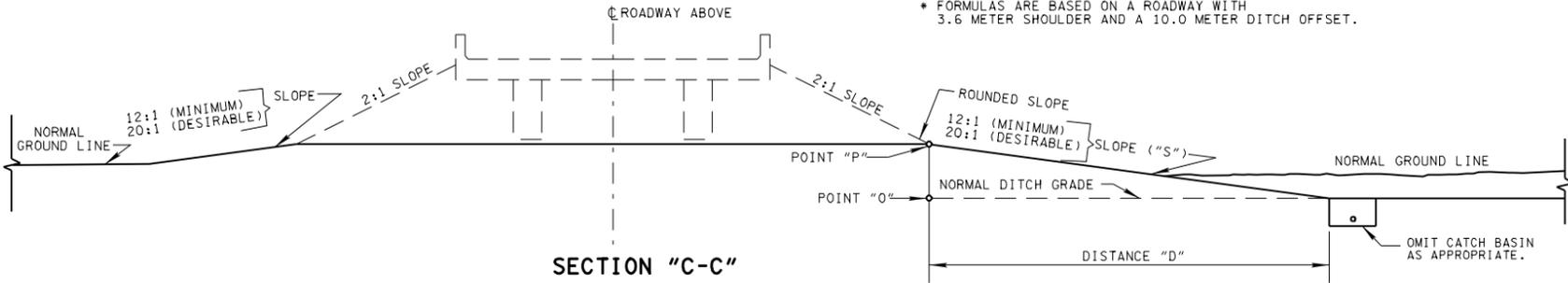
- ### MACHINED RIP-RAP SLOPE PROTECTION NOTES
- 1 MACHINED RIP-RAP FOR SLOPE PROTECTION SHALL BE 50 MILLIMETERS TO 150 MILLIMETERS IN SIZE, UNIFORMLY GRADED AND MEET THE REQUIREMENTS OF SUBSECTION 709 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. IT IS TO BE PAID FOR UNDER ITEM NO. 709M05.05, MACHINED RIP-RAP (CLASS A-3) PER TONNE.
 - 2 AGGREGATE SHALL BE PLACED TO A DEPTH OF 200 MILLIMETERS MEASURED PERPENDICULAR TO THE SLOPE FLUSH WITH THE EMBANKMENT SLOPE UNDER THE BRIDGE, SHALL EXTEND FROM THE FACE OF THE ABUTMENTS OR END BENTS ACROSS THE BERM AND DOWN THE SLOPE TO A POINT AS SHOWN IN SECTION "D-D" ABOVE AND SHALL EXTEND LATERALLY TO 1.5 METERS BEYOND THE OUTER EDGES OF THE SUPERSTRUCTURE.
 - 3 THE CRUSHED AGGREGATE MAY BE DUMPED IN PLACE. PLACING SHALL BE CONDUCTED IN A MANNER TO PRODUCE A UNIFORM SURFACE VARYING NO MORE THAN 50 MILLIMETERS IN 1200 MILLIMETERS FROM A TRUE PLANE. HAND PLACINGS MAY BE REQUIRED AS NECESSARY TO CORRECT IRREGULARITIES EXCEEDING THE SPECIFIED TOLERANCES.
 - 4 WHERE THE MEDIAN IS OVER 18.0 METERS THE SLOPE PROTECTION SHALL EXTEND TO THE WIDTH REQUIRED FOR EACH SEPARATE STRUCTURE AND THE AREA BETWEEN THE SLOPE PROTECTION OF EACH STRUCTURE SHALL BE SODDED.
 - 5 WHERE THE MEDIAN IS 18.0 METERS OR LESS, THE SLOPE PROTECTION SHALL EXTEND AS SHOWN IN THE PLAN VIEW ABOVE.



SECTION "A-A"



SECTION "B-B"

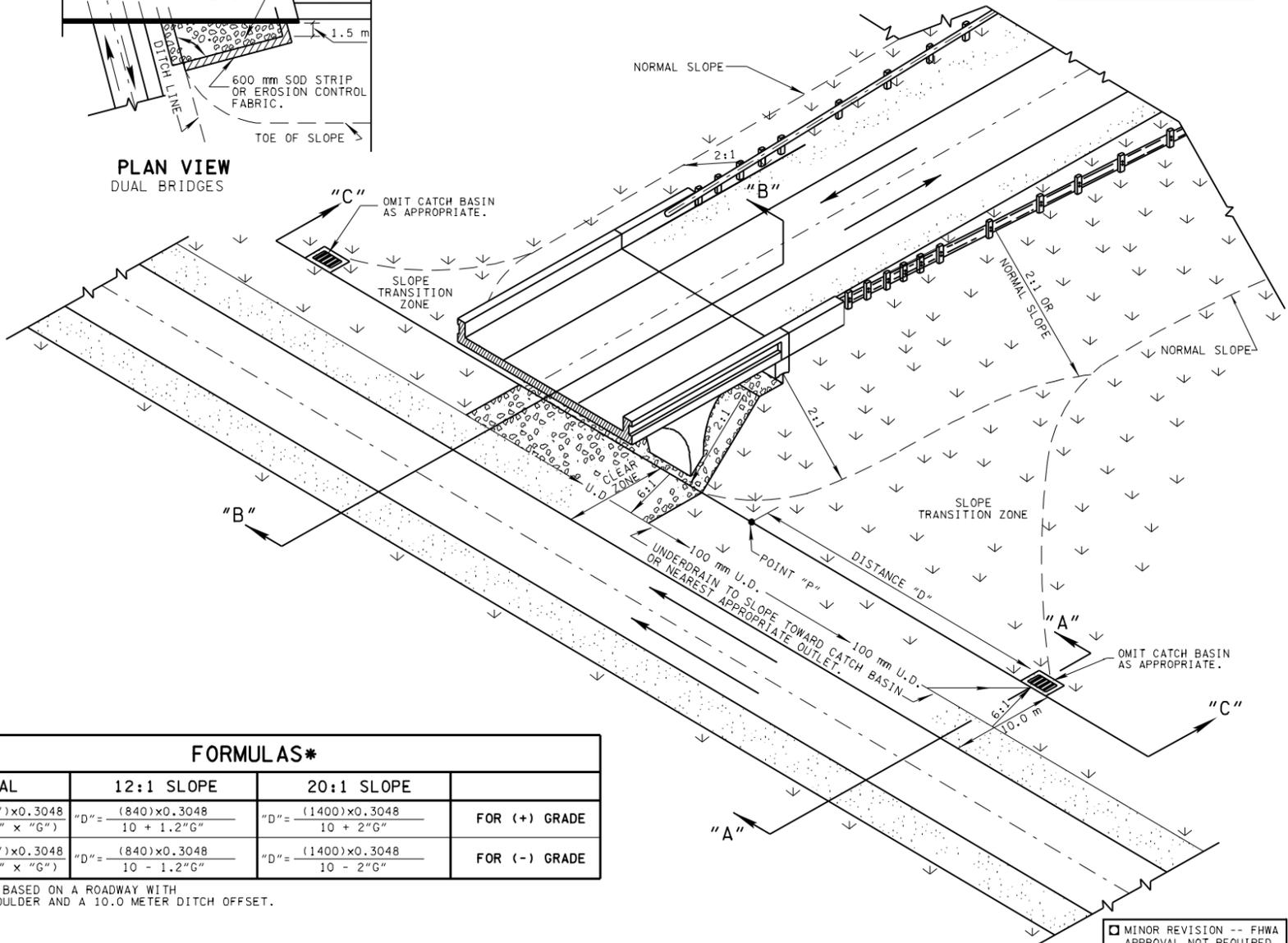


SECTION "C-C"

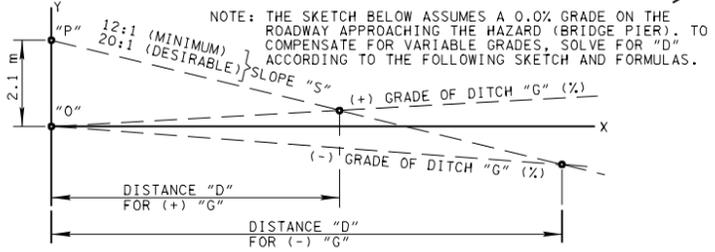
FORMULAS*

GENERAL	12:1 SLOPE	20:1 SLOPE	
$D = \frac{(700 \times "S") \times 0.3048}{100 + ("S" \times "G")}$	$D = \frac{(840) \times 0.3048}{10 + 1.2"G"}$	$D = \frac{(1400) \times 0.3048}{10 + 2"G"}$	FOR (+) GRADE
$D = \frac{(700 \times "S") \times 0.3048}{100 - ("S" \times "G")}$	$D = \frac{(840) \times 0.3048}{10 - 1.2"G"}$	$D = \frac{(1400) \times 0.3048}{10 - 2"G"}$	FOR (-) GRADE

* FORMULAS ARE BASED ON A ROADWAY WITH 3.6 METER SHOULDER AND A 10.0 METER DITCH OFFSET.



MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS

SAFETY APPROACH TO UNDERPASSES GRADING DESIGN & SLOPE PROTECTION

10-15-02 RDM01-SA-1

06-JUN-2003 08:54
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