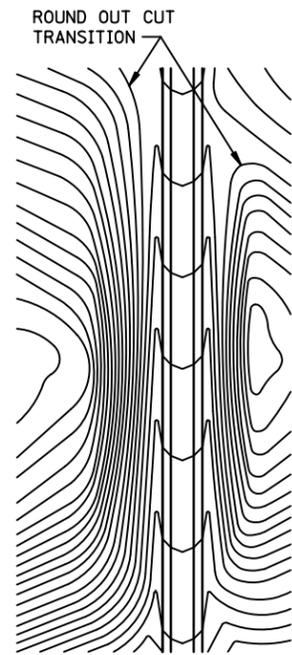
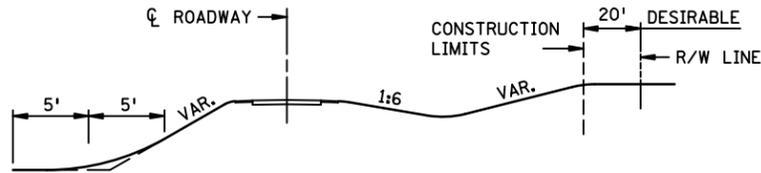


PLOTTED/REVISED: 4-APR-2018

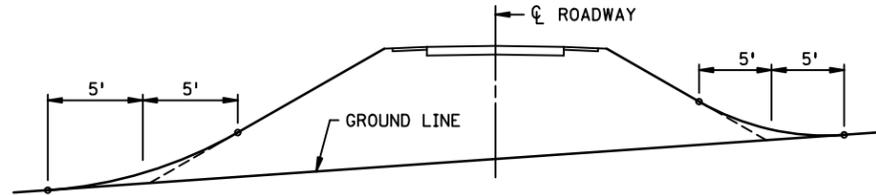
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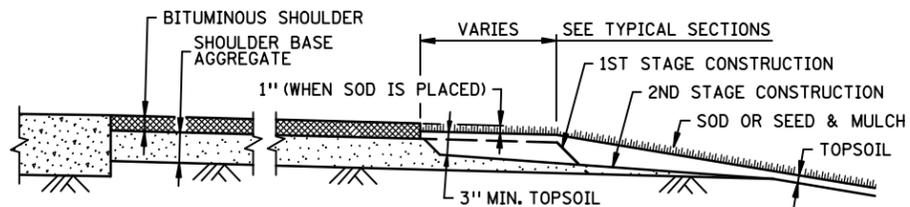
CONTOURING ROAD CUTS



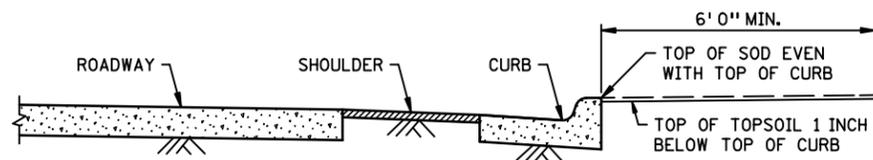
ROUNDING SHOULDERS AND BACKSLOPES



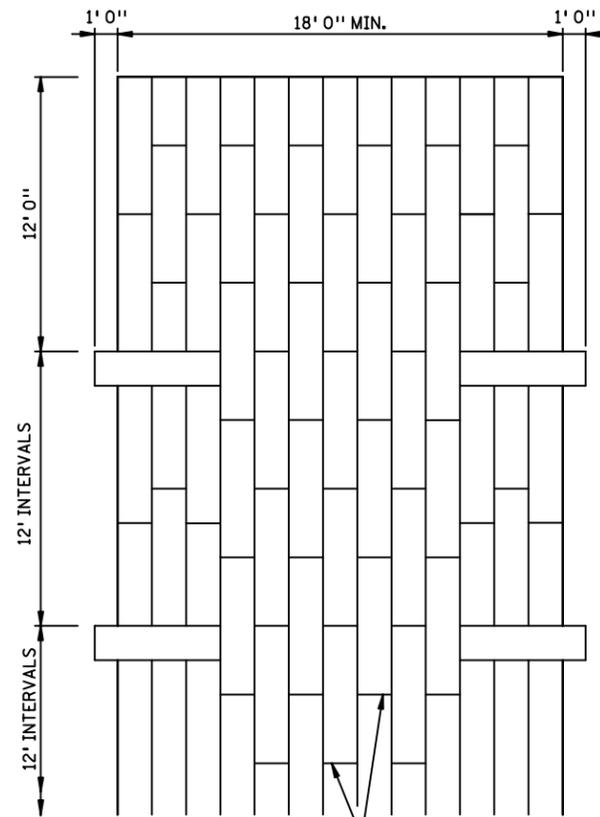
SHAPING FOR DRAINAGE ALONG THE TOE OF FILL SLOPES



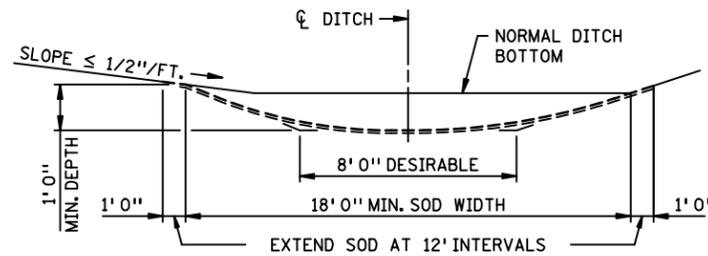
SHAPING AND TOPSOILING INSLOPES



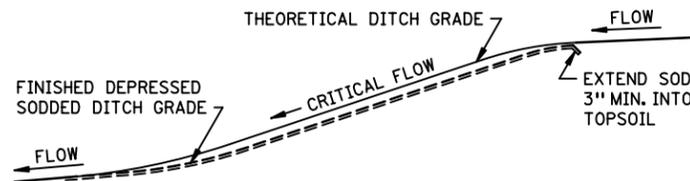
SHAPING ADJACENT TO CURBS WHEN SOD IS PLACED



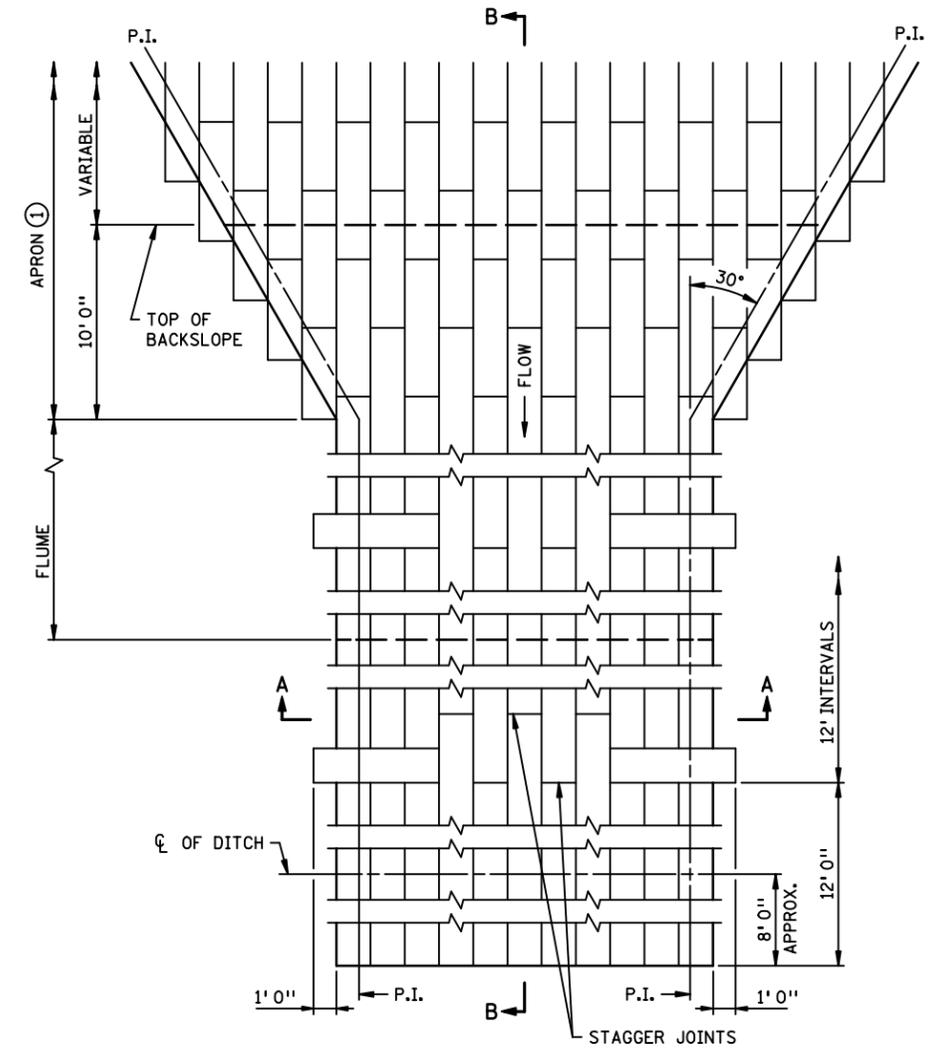
PLAN VIEW



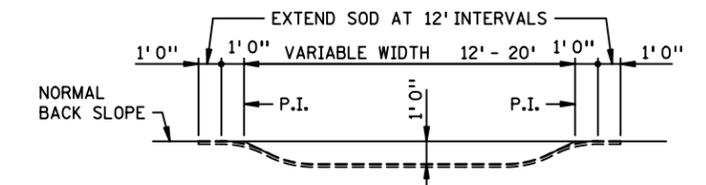
SODDED DITCH CROSS SECTION  
WHERE FRONT OR BACK SLOPE IS FLAT (LESS THAN 1/2"/FT.), FIRST NOTCH DITCH AND THEN PROVIDE ROUNDING.



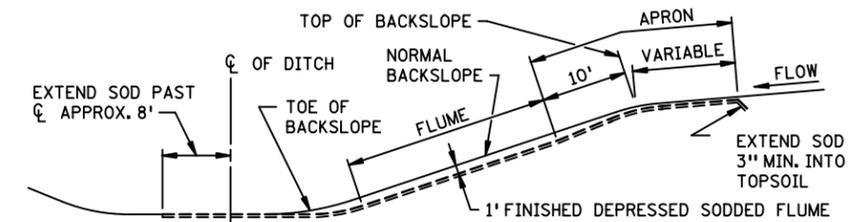
DITCH PROFILE  
SODDED DITCH DETAILS



PLAN VIEW



SECTION A-A



SECTION B-B

SODDED FLUME DETAILS

NOTES:  
SEE SPEC. 2575.3 FOR ADDITIONAL INFORMATION.  
① CONSTRUCT TAPER AS DIRECTED BY THE ENGINEER.

REVISION:  
APPROVED: 2-28-2017

Chief Environmental Officer



STANDARD PLAN 5-297.404

1 OF 3

Tom S...  
STATE DESIGN ENGINEER

APPROVED: 2-28-2017  
REVISED:

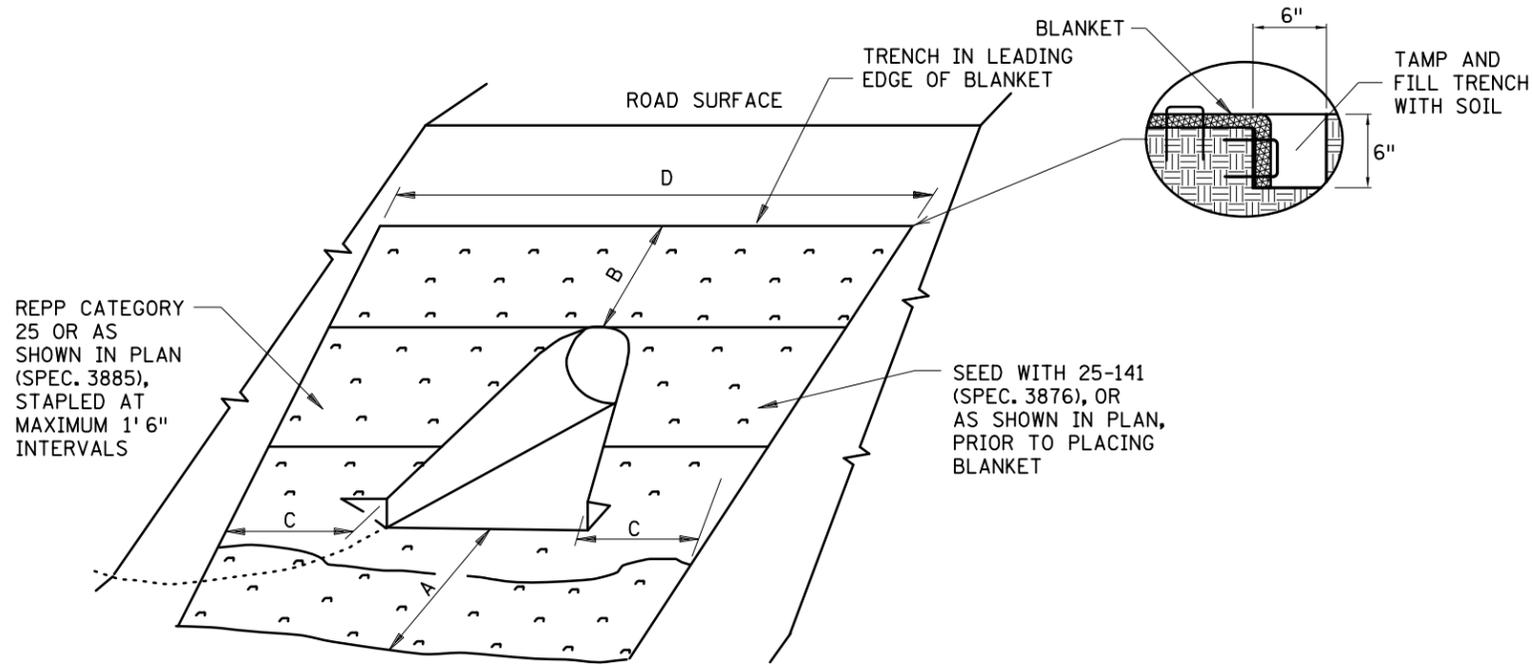
STATE PROJ. NO.

PERMANENT EROSION CONTROL  
ALONG ROADWAYS, DITCHES AND FLUMES

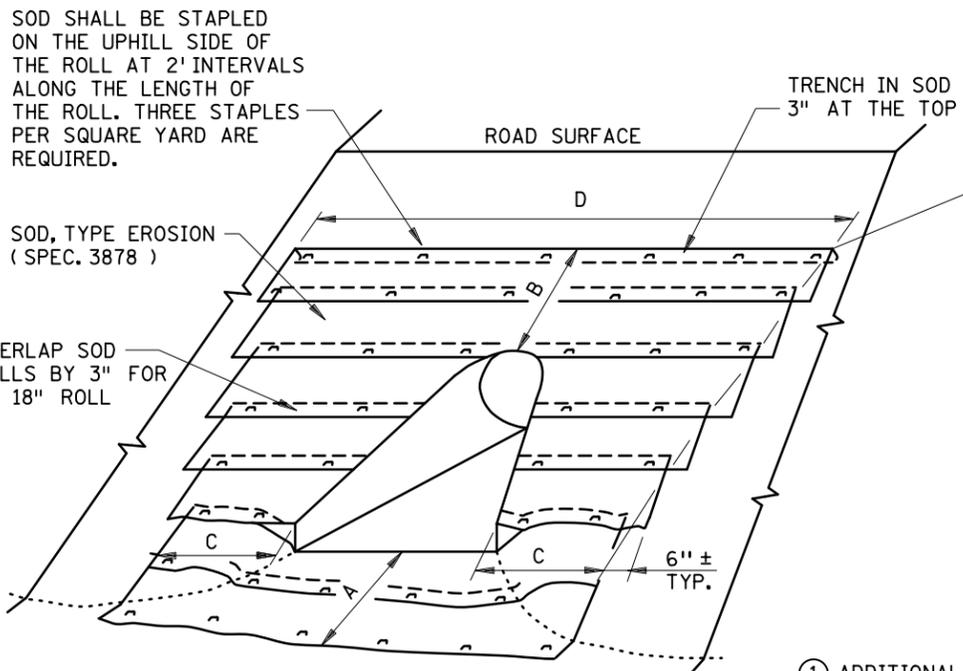
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PLOTTED/REVISED: 24-JAN-2020

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ROLLED EROSION PREVENTION PRODUCT (BLANKET) & SEED DETAIL



SODDING DETAIL

- ① ADDITIONAL QUANTITIES MAY BE SHOWN IN THE PLAN OR REQUIRED BY THE ENGINEER.
- ② FOR ARCH PIPE USE CLOSEST CIRCULAR PIPE DIAMETER AND APRON SLOPE. DIAMETERS LARGER THAN 72" REQUIRE SPECIAL DESIGNS.

| CULVERT DIAMETER<br>② | SOD OR REPP (SQ. YDS.)                                      |  |  |  |  |  | "A"  | "B"   | "C"  | "D" |
|-----------------------|---|--|--|--|--|--|------|-------|------|-----|
|                       | CIRCULAR AND ARCH PIPE METAL APRON (PLATE 3123, PLATE 3122) | CIRCULAR AND ARCH PIPE CONCRETE APRON (PLATE 3100, PLATE 3110) | CIRCULAR AND ARCH PIPE METAL SAFETY APRON 1:4 SLOPE (PLATE 3148) | CIRCULAR AND ARCH PIPE METAL SAFETY APRON 1:6 SLOPE (PLATE 3148) | CIRCULAR CORRUGATED METAL PIPE SAFETY APRON 1:6 SLOPE (PLATE 3128) | CIRCULAR CORRUGATED METAL PIPE SAFETY APRON 1:4 SLOPE (PLATE 3128) |      |       |      |     |
| 15"                   | 9   | 9  | 8  | 8  | N/A  | N/A  | 3'   | 1.5'  | 3'   | 13' |
| 18"                   | 13  | 12   | 12   | 14   | 16   | N/A  | 3'   | 3'    | 3'   | 16' |
| 21"                   | 14  | 14   | 14   | 16   | 18   | 14   | 3'   | 3'    | 3'   | 17' |
| 24"                   | 16  | 15   | 16   | 19   | 21   | 17   | 3'   | 3'    | 3'   | 18' |
| 27"                   | N/A   | 20   | N/A  | N/A  | N/A  | N/A  | 3'   | 4.5'  | 3'   | 20' |
| 30"                   | 23  | 22   | 25   | 30   | 32   | N/A  | 3'   | 4.5'  | 3'   | 22' |
| 36"                   | 34  | 34   | 39   | 48   | 51   | 37   | 4.5' | 4.5'  | 4.5' | 27' |
| 42"                   | 43  | 40   | 51   | 64   | N/A  | N/A  | 4.5' | 6'    | 4.5' | 30' |
| 48"                   | 54  | 50   | 66   | 82   | N/A  | N/A  | 4.5' | 7.5'  | 4.5' | 34' |
| 54"                   | 65  | 58   | 81   | 102  | N/A  | N/A  | 4.5' | 9'    | 4.5' | 37' |
| 60"                   | 69  | 59   | 91   | 115  | N/A  | N/A  | 4.5' | 9'    | 4.5' | 39' |
| 66"                   | 69  | 63   | N/A  | N/A  | N/A  | N/A  | 4.5' | 9'    | 4.5' | 39' |
| 72"                   | 78  | 72   | 99   | 122  | N/A  | N/A  | 4.5' | 10.5' | 4.5' | 41' |

| CULVERT DIAMETER<br>② | SOD OR REPP (SQ. YDS.)                                      |  |  |  |  |  | "A"   | "B"  | "C"  | "D" |
|-----------------------|---|--|--|--|--|--|-------|------|------|-----|
|                       | CIRCULAR AND ARCH PIPE METAL APRON (PLATE 3123, PLATE 3122) | CIRCULAR AND ARCH PIPE CONCRETE APRON (PLATE 3100, PLATE 3110) | CIRCULAR AND ARCH PIPE METAL SAFETY APRON 1:4 SLOPE (PLATE 3148) | CIRCULAR AND ARCH PIPE METAL SAFETY APRON 1:6 SLOPE (PLATE 3148) | CIRCULAR CORRUGATED METAL PIPE SAFETY APRON 1:6 SLOPE (PLATE 3128) | CIRCULAR CORRUGATED METAL PIPE SAFETY APRON 1:4 SLOPE (PLATE 3128) |       |      |      |     |
| 15"                   | 10  | 10   | 9  | 10   | N/A  | N/A  | 4.5'  | 1.5' | 3'   | 13' |
| 18"                   | 13  | 13   | 12   | 14   | 15   | N/A  | 6'    | 1.5' | 3'   | 14' |
| 21"                   | 16  | 14   | 16   | 18   | 19   | 15   | 6'    | 1.5' | 3'   | 15' |
| 24"                   | 18  | 18   | 18   | 21   | 22   | 18   | 7.5'  | 1.5' | 3'   | 16' |
| 27"                   | N/A   | 19   | N/A  | N/A  | N/A  | N/A  | 7.5'  | 1.5' | 3'   | 17' |
| 30"                   | 23  | 23   | 24   | 28   | 29   | N/A  | 9'    | 1.5' | 3'   | 18' |
| 36"                   | 36  | 35   | 38   | 47   | 48   | 37   | 10.5' | 1.5' | 4.5' | 23' |
| 42"                   | 43  | 40   | 47   | 58   | N/A  | N/A  | 12'   | 1.5' | 4.5' | 25' |
| 48"                   | 50  | 46   | 57   | 70   | N/A  | N/A  | 13.5' | 1.5' | 4.5' | 27' |
| 54"                   | 57  | 50   | 67   | 84   | N/A  | N/A  | 15'   | 1.5' | 4.5' | 29' |
| 60"                   | 74  | 63   | 90   | 113  | N/A  | N/A  | 16.5' | 1.5' | 6'   | 33' |
| 66"                   | 75  | 67   | N/A  | N/A  | N/A  | N/A  | 16.5' | 1.5' | 6'   | 33' |
| 72"                   | 77  | 70   | 92   | 114  | N/A  | N/A  | 16.5' | 1.5' | 6'   | 34' |

NOTES:

- REPP = ROLLED EROSION PREVENTION PRODUCT.
- AREA SHOWN IN SQUARE YARDS IS FOR ONE CULVERT END.
- QUANTITIES ARE CALCULATED TO INCLUDE SOD REQUIRED TO PROVIDE A 3" OVERLAP ON ALL 18" WIDE ROLLS. THIS ALLOWS FOR SHRINKAGE OF THE SOD.
- FOR PIPE ARCHES USE EQUIVALENT PIPE DIAMETER TO APPROXIMATE AREA.
- FOR CORRUGATED POLYETHYLENE PIPE METAL APRON (PLATE 3129), USE THE METAL APRON COLUMN (PLATE 3123).
- AREAS AND DIMENSIONS ARE APPROXIMATE AND ARE BASED ON APRON SIDE SLOPES OF NO STEEPER THAN 1:2, UNLESS INDICATED AS FOR SAFETY APRONS.
- CARE SHOULD BE TAKEN IN SELECTING SOD TO STABILIZE THE APRON. RIP-RAP SHOULD BE USED FOR FLOW VELOCITIES GREATER THAN 6 FPS.

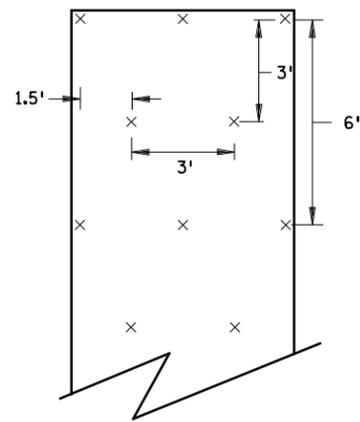
REVISION:  
 APPROVED: JANUARY 8, 2020  
  
 MARNI KARNOWSKI  
 CHIEF ENVIRONMENTAL OFFICER

STANDARD PLAN 5-297.404 2 OF 3  
  
 THOMAS STYRBICKI  
 STATE DESIGN ENGINEER  
 APPROVED: 1-8-2020  
 REVISED:  
 STATE PROJ. NO. (T.H. ) SHEET NO. OF SHEETS

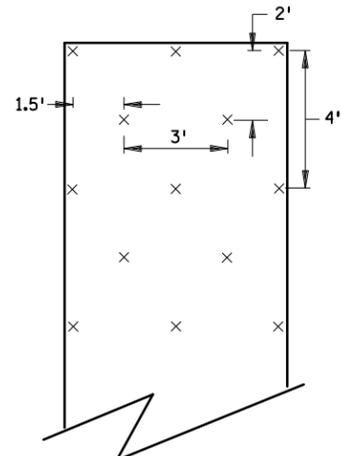
PERMANENT EROSION CONTROL  
 TURF ESTABLISHMENT DETAIL AT CULVERT ENDS

PLOTTED/REVISED: 24-JAN-2020

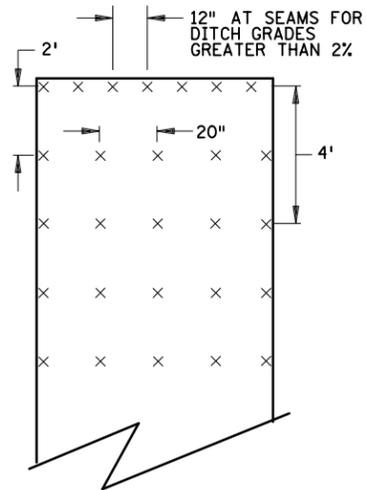
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SLOPES FLATTER THAN 1:2  
120 STAPLES PER 100 SQ YD

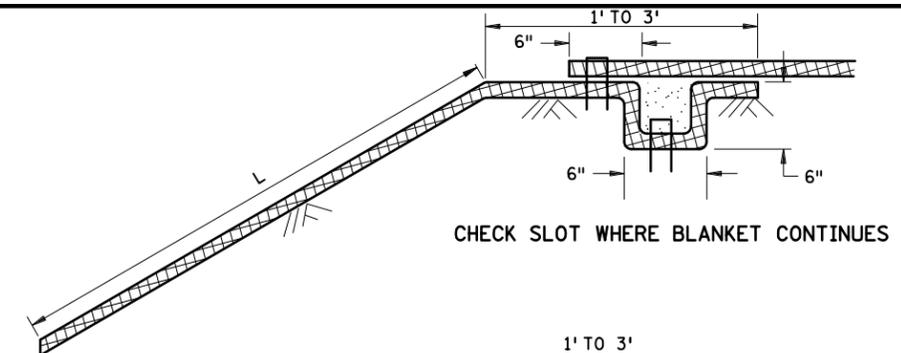


SLOPES 1:2 TO 1:1  
170 STAPLES PER 100 SQ YD

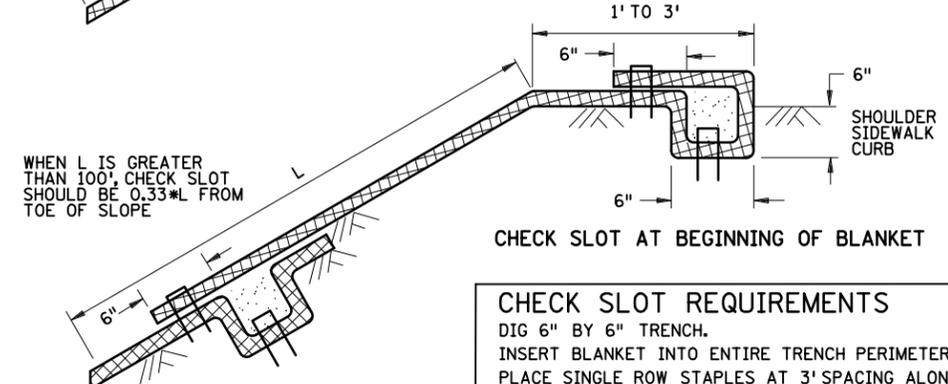


CHANNEL AND DITCH APPLICATIONS  
350 STAPLES PER 100 SQ YD

BLANKET STAPLE PATTERN

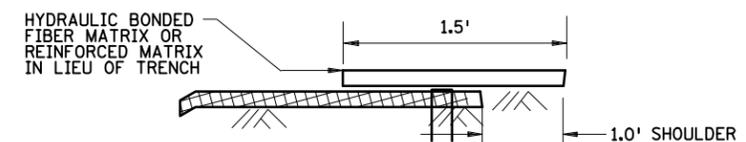


CHECK SLOT WHERE BLANKET CONTINUES

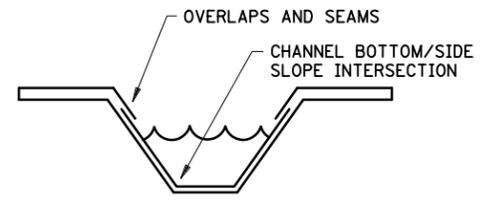


CHECK SLOT AT BEGINNING OF BLANKET

**CHECK SLOT REQUIREMENTS**  
DIG 6" BY 6" TRENCH.  
INSERT BLANKET INTO ENTIRE TRENCH PERIMETER.  
PLACE SINGLE ROW STAPLES AT 3' SPACING ALONG THE BOTTOM OF THE TRENCH.  
BACKFILL TRENCH WITH SOIL AND TAMP.  
PLACE SINGLE ROW STAPLES AT 3' SPACING ON OVERLAP.



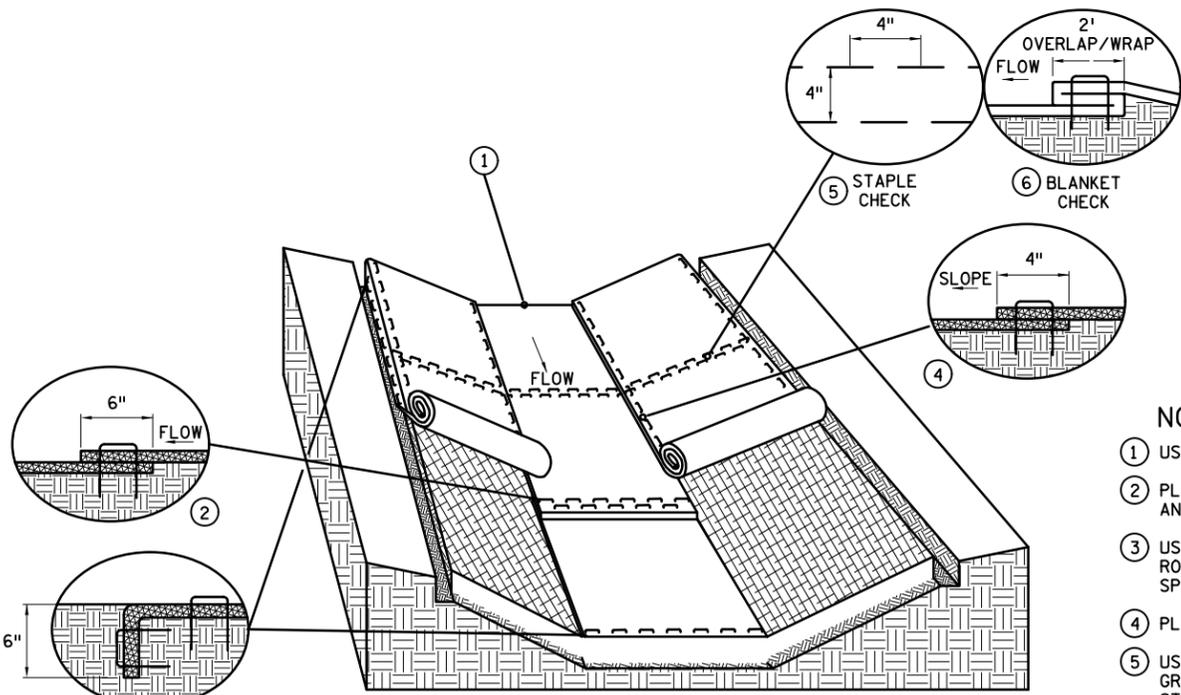
CHECK SLOT ALTERNATIVE  
PLACE SINGLE ROW STAPLES AT 12" SPACING  
CHECK SLOT DETAILS



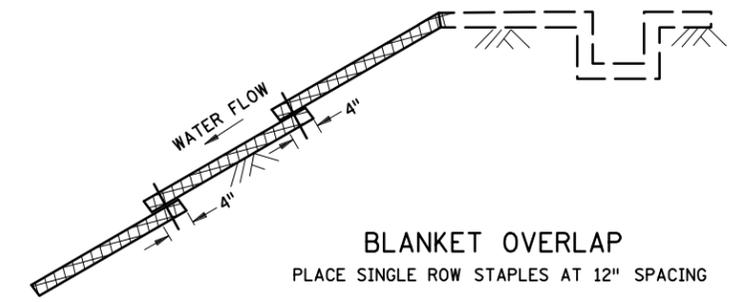
DITCH BLANKET CRITICAL POINTS 7

NOTES:

- 1 USE CHECK SLOT DETAIL (NO ALTERNATES).
- 2 PLACE DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER.
- 3 USE 6" X 6" TRENCH TO PLACE BLANKET. PLACE SINGLE ROW OF STAPLES ON TOP AND TRENCH SIDES AT 12" SPACING. BACKFILL TRENCH WITH SOIL AND TAMP.
- 4 PLACE SINGLE ROW OF STAPLES AT 12" SPACING.
- 5 USE STAPLE CHECK FOR CHANNEL SLOPES LESS THAN 2.5%. GRADE AT 100' INTERVALS. PLACE DOUBLE ROW OF STAPLES STAGGERED 4" APART AND AT 4" SPACING.
- 6 USE BLANKET CHECKS FOR THE FOLLOWING SLOPES:  
2.5%-3% 100' INTERVALS  
3%-5% 50' INTERVALS  
5%-7% 25' INTERVALS
- 7 CRITICAL POINTS SHALL BE SECURED WITH PROPER STAPLE PATTERNS.



DITCH BLANKET STAPLE DETAIL



BLANKET OVERLAP  
PLACE SINGLE ROW STAPLES AT 12" SPACING

**GENERAL BLANKET INSTALLATION REQUIREMENTS**  
REPP = ROLLED EROSION PREVENTION PRODUCT.  
PREPARE SOIL AS PER SPECIFICATION 2574.  
LAY PARALLEL OR PERPENDICULAR TO THE DIRECTION OF WATER FLOW.  
OVERLAP ADJACENT STRIP EDGES A MINIMUM OF 4".  
OVERLAP BLANKET 6" (MINIMUM) AT EACH END. OVERLAP BOTTOM END OF UPPER BLANKET OVER TOP END OF LOWER BLANKET. STAPLE ALONG OVERLAP EVERY 1.5'.  
THE UPPERMOST BLANKET OF ALL SLOPE APPLICATIONS MUST START IN A CHECK SLOT. IF SLOPE LENGTH (L) IS 100' OR GREATER, INSERT BLANKET INTO A CHECK SLOT 1/3 FROM THE BOTTOM OF THE SLOPE.

REVISION:  
APPROVED: JANUARY 8, 2020  
*Marni Karnowski*  
MARNI KARNOWSKI  
CHIEF ENVIRONMENTAL OFFICER

**m**  
MINNESOTA  
DEPARTMENT  
OF  
TRANSPORTATION

STANDARD PLAN 5-297.404 3 OF 3  
*Tom Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER  
APPROVED: 1-8-2020  
REVISED:  
STATE PROJ. NO.

**PERMANENT EROSION CONTROL**  
REPP (BLANKET) STAPLE PATTERN FOR SLOPES  
(T.H. ) SHEET NO. OF SHEETS