

METAL ROUND PIPE CULVERT

FILL HEIGHT AND METAL THICKNESS TABLE FOR HELICAL LOCKSEAM AND WELDED SEAM PIPE CULVERT

		STEEL										ALUMINUM																									
PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	2 3/8" x 1/2" CORRUGATIONS					3" x 1" CORRUGATIONS					5" x 1" CORRUGATIONS					PIPE SIZE DIAMETER INCHES		MINIMUM COVER INCHES	2 3/8" x 1/2" CORRUGATIONS					3" x 1" CORRUGATIONS												
		METAL THICKNESS (INCH/GAGE)																		METAL THICKNESS (INCH/GAGE)																	
		0.064/16 0.079/14 0.109/12 0.138/10 0.168/8																		0.064/16 0.079/14 0.109/12 0.138/10 0.168/8																	
		MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)																	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)																		
12	12	100	100	100	100	100																	100	100	100	100	100						100	100	100	100	100
15	12	100	100	100	100	100																	100	100	100	100	100						100	100	100	100	100
18	12	100	100	100	100	100																	100	100	100	100	100						100	100	100	100	100
21	12	100	100	100	100	100																	88	100	100	100	100						100	100	100	100	100
24	12	100	100	100	100	100																	77	97	100	100	100						100	100	100	100	100

NOTES:

1. WHEN DIRECTED, CAMBER PIPE CULVERTS UPWARD FROM A CHORD THROUGH THE INLET AND OUTLET INVERTS AN ORDINATE AMOUNT EQUAL TO 1% OF THE PIPE LENGTH. DEVELOP CAMBER ON A PARABOLIC CURVE. IF THE MIDPOINT ELEVATION ON THE PARABOLIC CURVE AS DESIGNED EXCEEDS THE ELEVATION OF THE INLET INVERT, REDUCE THE AMOUNT OF CAMBER OR INCREASE THE PIPE CULVERT GRADIENT.
2. FILL HEIGHTS EXCEEDING 100 FEET REQUIRE SPECIAL ANALYSIS BY THE CO.
3. THE FILL HEIGHTS IN THE TABLE ARE FOR HELICAL LOCKSEAM AND WELDED SEAM PIPE ONLY. FILL HEIGHTS FOR CULVERT PIPE WITH ANNULAR CORRUGATIONS ARE MORE RESTRICTIVE THAN THOSE OF HELICAL LOCKSEAM AND WELDED SEAM PIPE. OBTAIN APPROVAL BEFORE FURNISHING ANNULAR CORRUGATION PIPE.
4. MEASURE MINIMUM COVER FROM THE TOP OF THE PIPE CULVERT TO THE SUBGRADE FOR FLEXIBLE PAVEMENTS, AND TO THE TOP OF THE PAVEMENT FOR RIGID PAVEMENTS. MEASURE MAXIMUM FILL HEIGHT FROM THE TOP OF THE PIPE TO THE TOP OF THE PAVEMENT FOR BOTH FLEXIBLE AND RIGID PAVEMENT.

(A) ROUND METAL PIPE COVER DETAIL  
NO SCALE

METAL ELLIPTICAL PIPE CULVERT

FILL HEIGHT AND METAL THICKNESS TABLE FOR HELICAL LOCKSEAM AND WELDED SEAM PIPE CULVERT

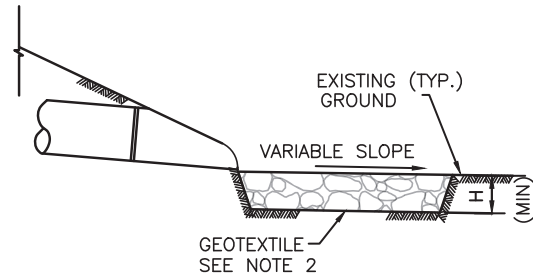
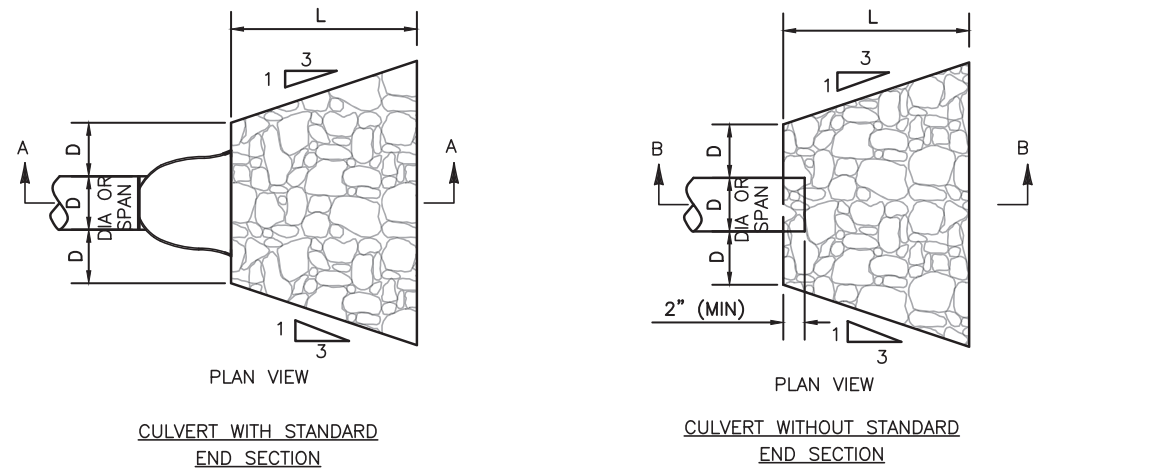
		STEEL										ALUMINUM																									
PIPE SIZE SPAN x RISE INCHES	EQUI-VALENT DIAMETER INCHES	MINIMUM CORNER RADIUS INCHES	MINIMUM COVER INCHES	2 3/8" x 1/2" CORRUGATIONS					3" x 1" CORRUGATIONS					5" x 1" CORRUGATIONS					PIPE SIZE SPAN x RISE INCHES	EQUI-VALENT DIAMETER INCHES	MINIMUM CORNER RADIUS INCHES	MINIMUM COVER INCHES	2 3/8" x 1/2" CORRUGATIONS					3" x 1" CORRUGATIONS									
				METAL THICKNESS (INCH/GAGE)																			METAL THICKNESS (INCH/GAGE)														
				0.064/16 0.079/14 0.109/12 0.138/10 0.168/8																			0.064/16 0.079/14 0.109/12 0.138/10 0.168/8														
		MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)																	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)																		
17 x 13	15	3	12	13																		13											13				
21 x 15	18	3	12	12																		12											12				
24 x 18	21	3	12	13																		13											13				
28 x 20	24	3	12	13																		13											13				

(B) ELLIPTICAL METAL PIPE COVER DETAIL  
NO SCALE

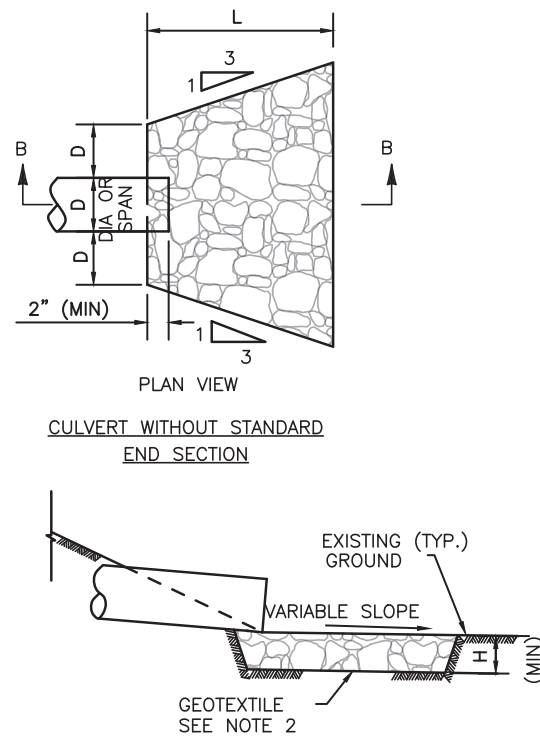
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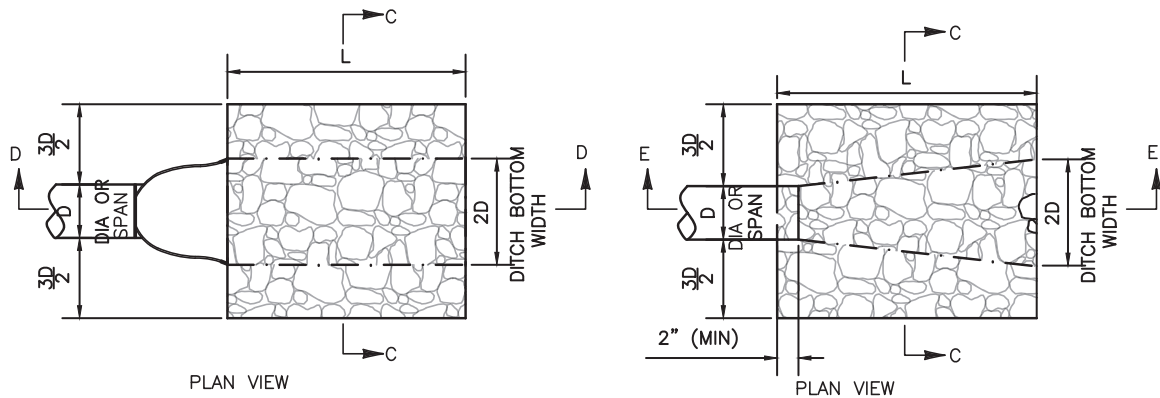
A/E FIRM PRIME: JACOBS DENVER, CO.	DESIGNED: CM	SUB SHEET NO.  <b>S9</b>	TITLE OF DRAWING <b>CULVERT PIPE COVER DETAILS</b>	DRAWING NO. #115 177002
SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	TECH. REVIEW: JM			DATE: 3/28/22



SECTION A-A  
PROTECTIVE APRON AT CULVERT OUTLET  
WITHOUT DITCH

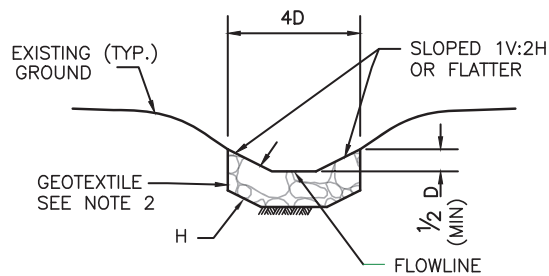


SECTION B-B

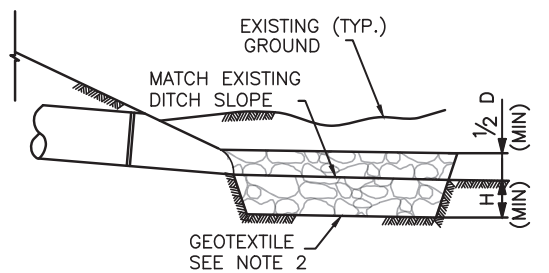


CULVERT WITH STANDARD  
END SECTION

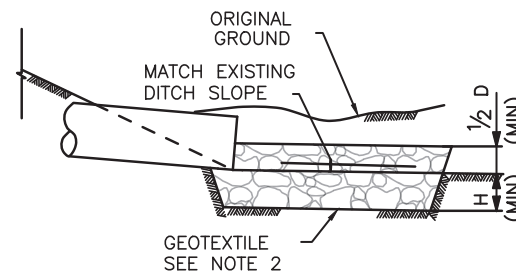
CULVERT WITHOUT STANDARD  
END SECTION



SECTION C-C



SECTION D-D  
PROTECTIVE APRON AT CULVERT OUTLET  
WITH DITCH



SECTION E-E

OUTLET WITHOUT DITCH PROTECTIVE APRON DIMENSIONS AND ESTIMATED QUANTITIES						
	CULVERT SIZE D (INCHES)	RIPRAP CLASS	LENGTH OF APRON L (FEET)	DEPTH OF APRON H (FEET)	ESTIMATED RIPRAP QUANTITY (CY)	ESTIMATED GEOTEXTILE QUANTITY (SY)
WITH END SECTION	12	2	4	1.5	1	5
	18	2	6	1.5	2.2	9
	24	2	8	1.5	3.9	14
	30	3	12.5	2	10.9	28
	36	3	16	2	15.6	37
	42	4	21	2.5	34.1	63
WITHOUT END SECTION	12	2	6	1.5	1.7	8
	18	2	8	1.5	3.2	12
	24	2	10	1.5	5.2	17
	30	3	14.5	2	13.3	33
	36	3	17	2	18.5	43
	42	4	23	2.5	38.7	70
48	4	26	2.5	49.8	87	

NOTES:

1. USE FOR APRONS SERVING CULVERTS WITH SLOPES OF LESS THAN 10%.
2. FURNISH GEOTEXTILE CONFORMING TO SPECIFICATION SECTION 33 43 00
3. EXCAVATION FOR PLACEMENT OF RIPRAP WILL NOT BE MEASURED FOR PAYMENT.
4. COST OF RIP RAP AND ASSOCIATED ITEMS PLACED AT CULVERT OUTLETS SHALL BE COINCIDENTAL TO THE CLEAN OUT CULVERT CONTRACT LINE ITEM

OUTLET WITH DITCH PROTECTIVE APRON DIMENSIONS AND ESTIMATED QUANTITIES						
	CULVERT SIZE D (INCHES)	RIPRAP CLASS	LENGTH OF APRON L (FEET)	DEPTH OF APRON H (FEET)	ESTIMATED RIPRAP QUANTITY (CY)	ESTIMATED GEOTEXTILE QUANTITY (SY)
WITH END SECTION	12	2	4	1.5	0.9	5
	18	2	6	1.5	2	8
	24	2	8	1.5	3.6	13
	30	3	12.5	2	9.3	24
	36	3	15	2	13.4	32
	42	4	21	2.5	27.3	53
WITHOUT END SECTION	12	2	6	1.5	1.4	6
	18	2	8	1.5	2.7	10
	24	2	10	1.5	4.5	15
	30	3	14.5	2	10.8	27
	36	3	17	2	15.2	36
	42	4	23	2.5	29.9	57
48	4	26	2.5	38.6	70	

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(A) CULVERT RIP RAP DETAILS  
NO SCALE



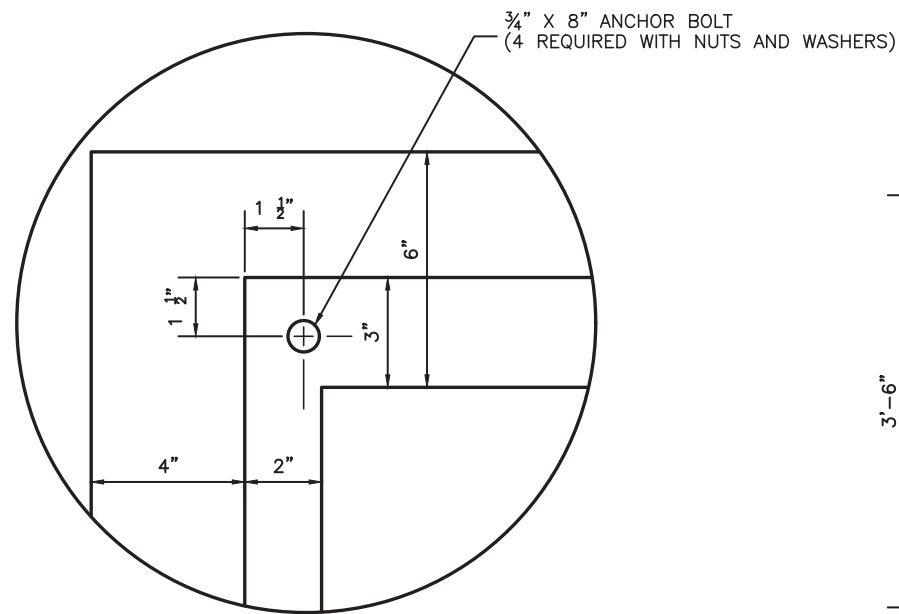
A/E FIRM  
PRIME:  
JACOBS  
DENVER, CO.  
SUBCONTRACTOR:  
SHANNON  
& WILSON  
DENVER, CO.

DESIGNED:  
CM  
CADD:  
CM  
TECH. REVIEW:  
JM  
DATE:  
3/28/22

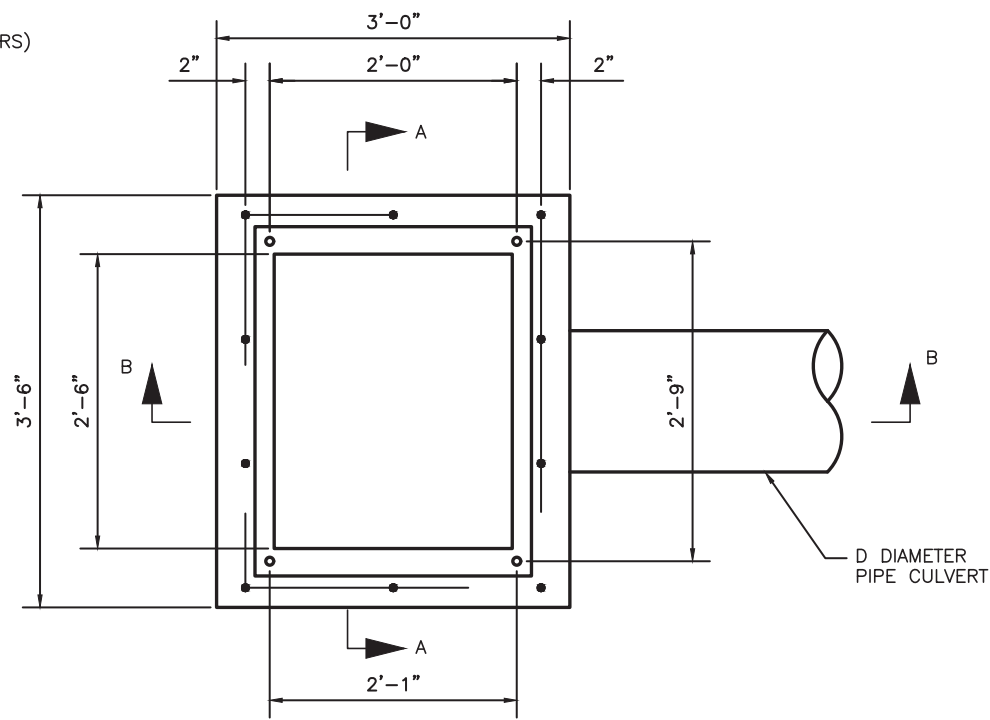
SUB SHEET NO.  
**S10**

TITLE OF DRAWING  
**RIP RAP STANDARD  
DETAILS**  
BLACK CANYON OF THE GUNNISON  
NATIONAL PARK

DRAWING NO.  
#115  
177002  
PKG. NO.  
1  
SHEET  
32  
OF 55



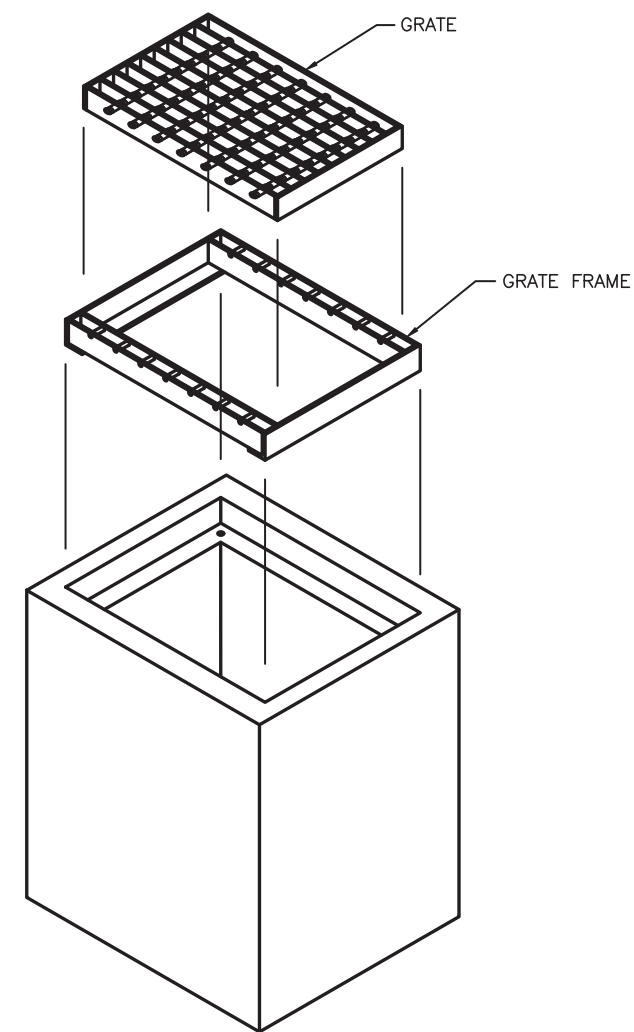
DETAIL A



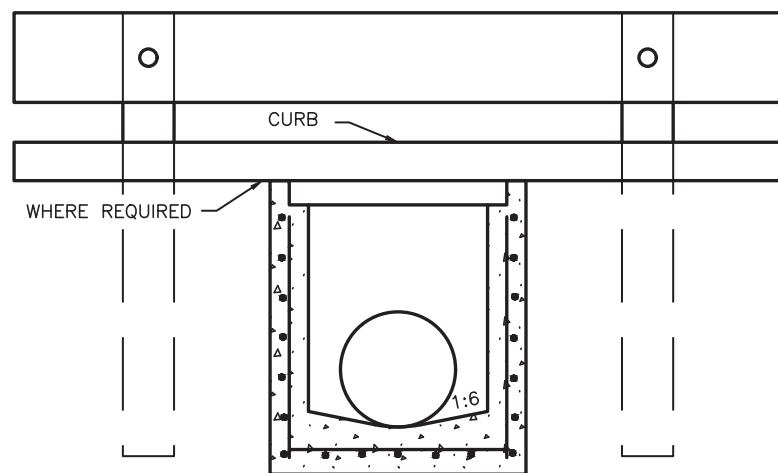
PLAN

NOTES:

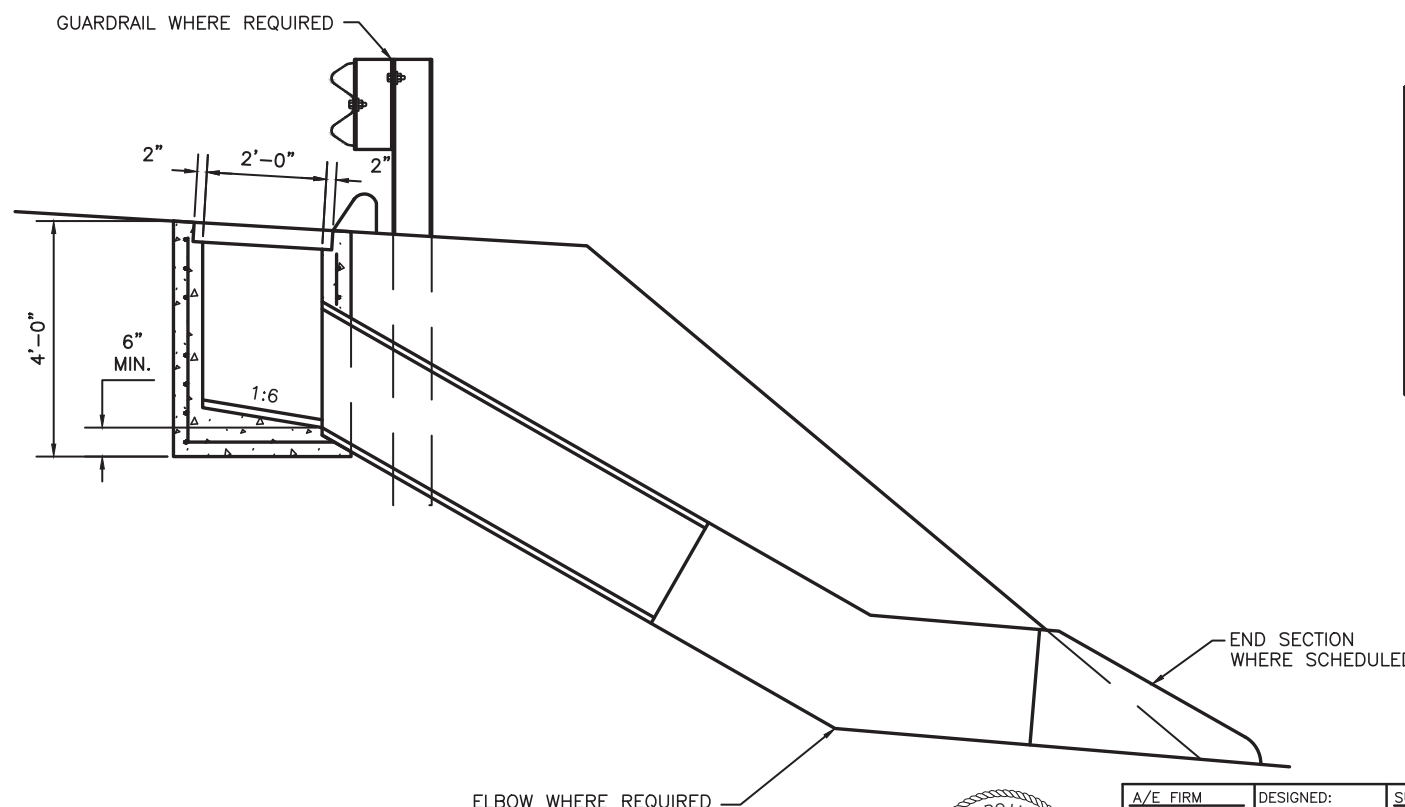
1. ALL REINFORCING BARS ARE #5 PLACED A MINIMUM 1" CLEAR FROM FACE OF CONCRETE. IN FLOORS, PLACE BARS ON 6 INCH CENTERS EACH WAY. IN WALLS, PLACE HORIZONTAL BARS IN 6 INCH CENTERS AND VERTICAL BARS ON 12 INCH CENTERS.
2. CURB SHAPE SHOWN FOR ILLUSTRATION ONLY. ACTUAL CURB SHAPE AND DIMENSIONS ARE SHOWN IN THE PLANS.
3. SEE SHEET S12 FOR FRAME AND GRATE DETAILS.
4. IF GUARDRAIL POST LOCATION RESULTS IN GUARDRAIL PENETRATING THE CULVERT, ELIMINATE THE POST AND PLACE ADDITIONAL NESTED W-BEAM RAIL SECTIONS PER STANDARD 617-24.



ISOMETRIC VIEW



SECTION A-A



SECTION B-B

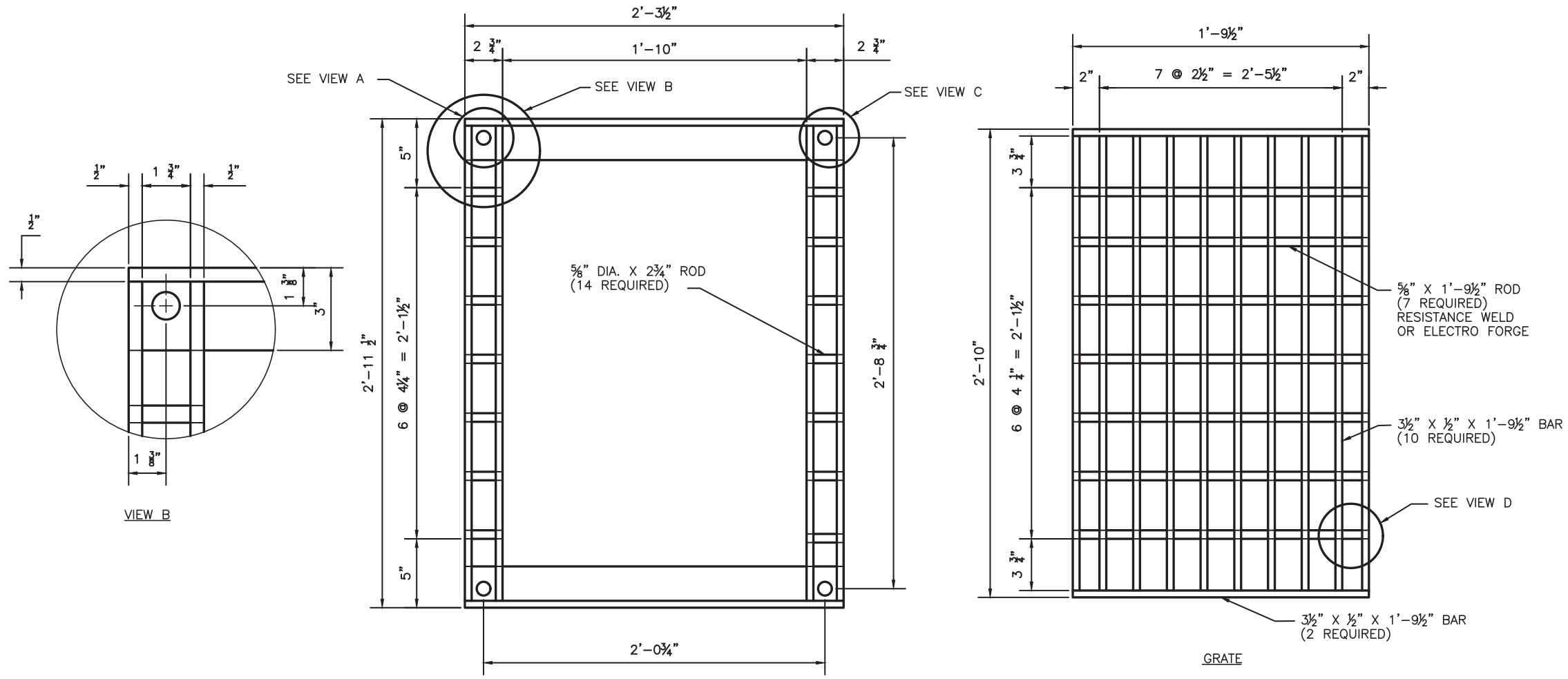
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**A** TYPE 5A INLET DETAILS  
NO SCALE

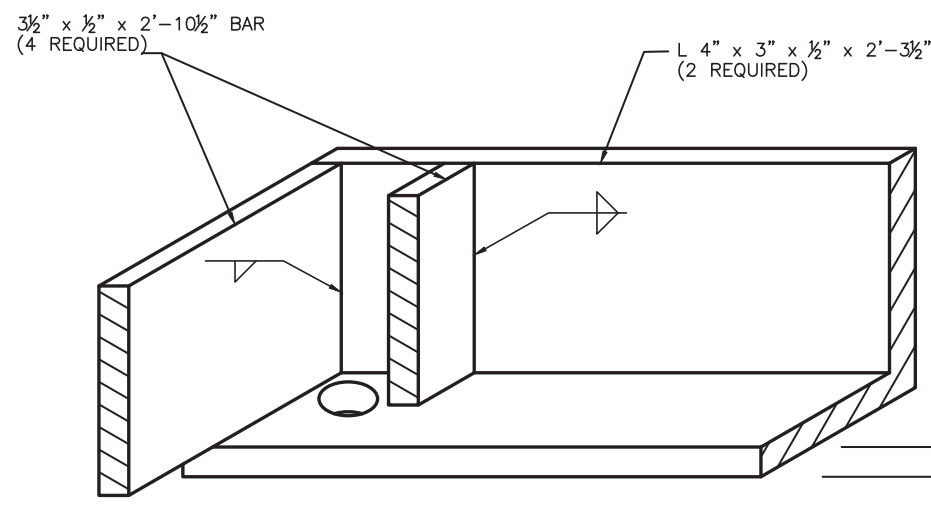
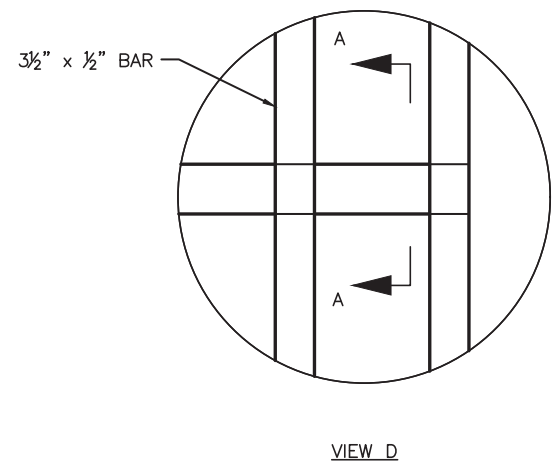
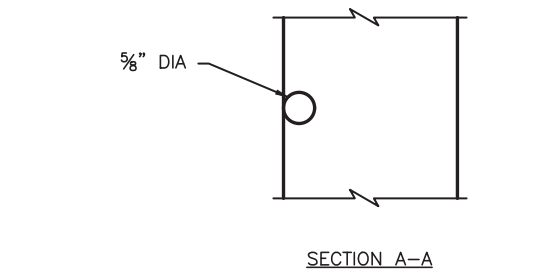


A/E FIRM PRIME: JACOBS DENVER, CO.	DESIGNED: CM	SUB SHEET NO. <b>S11</b>	TITLE OF DRAWING <b>TYPE 5A INLET STANDARD DETAILS</b>	DRAWING NO. #115 177002
	CADD: CM			PKG. NO. 1
SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	TECH. REVIEW: JM	DATE: 3/28/22	BLACK CANYON OF THE GUNNISON NATIONAL PARK	SHEET <b>33</b>
				OF 55

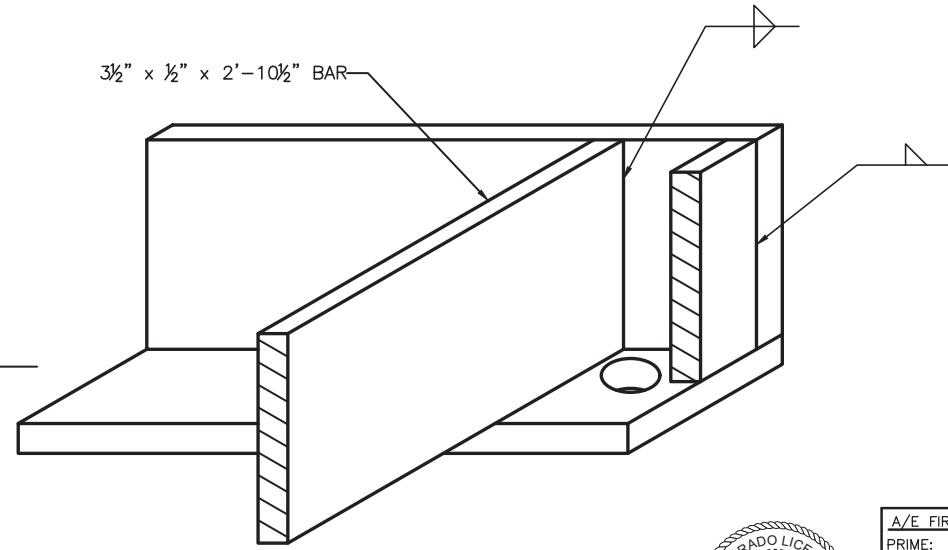
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- NOTES:**
- HOT DIP GALVANIZE ALL METAL PARTS FOR FRAME AND GRATE AFTER FABRICATION.
  - FABRICATE FRAME AND GRATE FROM STRUCTURAL STEEL.
  - FURNISH FOUR 3/4" X 8" ANCHOR BOLTS WITH NUTS TO ATTACH FRAME TO INLET.
  - CUT HOLES IN 3 1/2" X 1/2" X 1/2" BAR AS REQUIRED TO PLACE 5/8" INCH DIAMETER RODS.
  - SPOT WELD 1/2" INCH DIAMETER RODS FOR FRAME AND GRATE 8 1 1 TO 3 " X " BARS. 2 2



VIEW A  
(OBLIQUE)



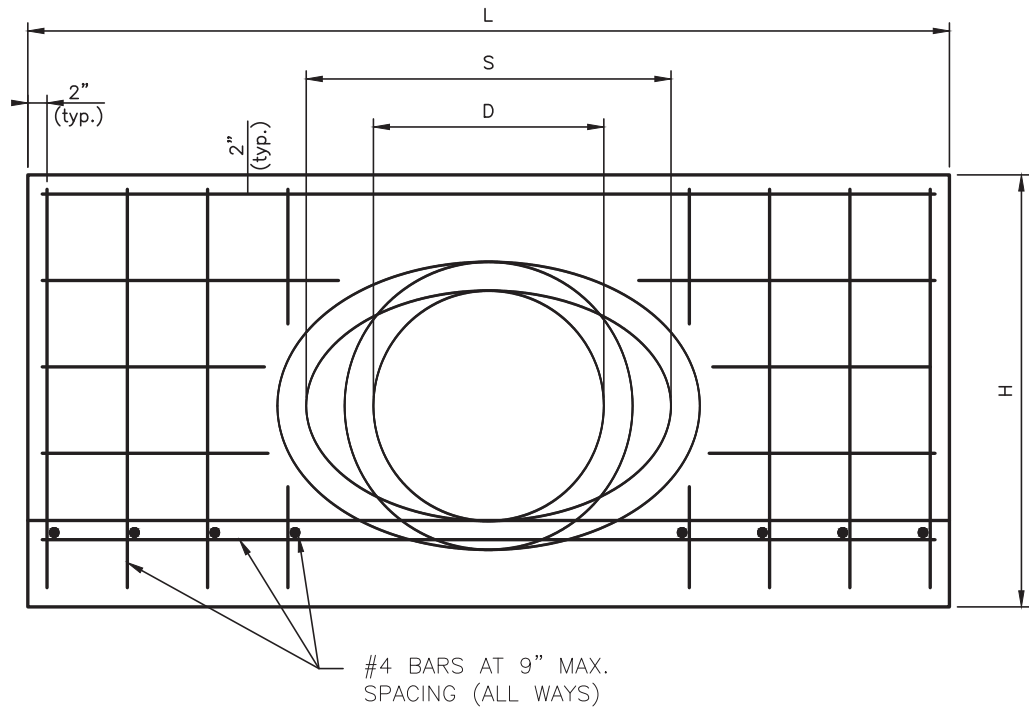
VIEW C  
(OBLIQUE)

**A** TYPE 5A INLET FRAME & GRATE DETAILS  
NO SCALE

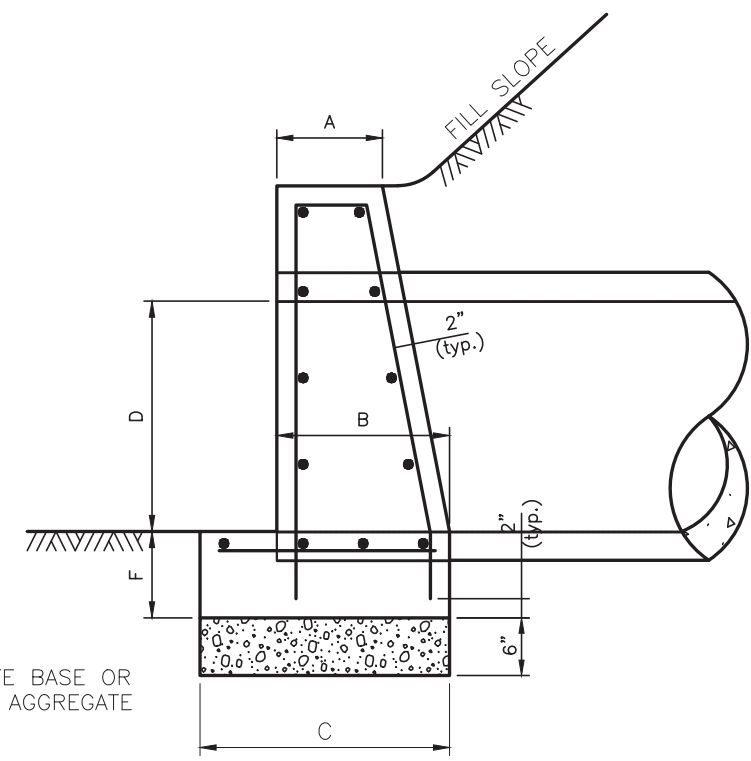


A/E FIRM PRIME: JACOBS DENVER, CO. SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	DESIGNED: CM	SUB SHEET NO. <b>S12</b>	TITLE OF DRAWING <b>INLET GRATE STANDARD DETAILS</b>		DRAWING NO. #115 177002
	TECH. REVIEW: JM		BLACK CANYON OF THE GUNNISON NATIONAL PARK		PKG. NO. 1
DATE: 3/28/22				SHEET <b>34</b>	OF 55

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**(A)** FRONT ELEVATION  
NO SCALE



**(B)** SIDE ELEVATION  
NO SCALE

**NOTE:**

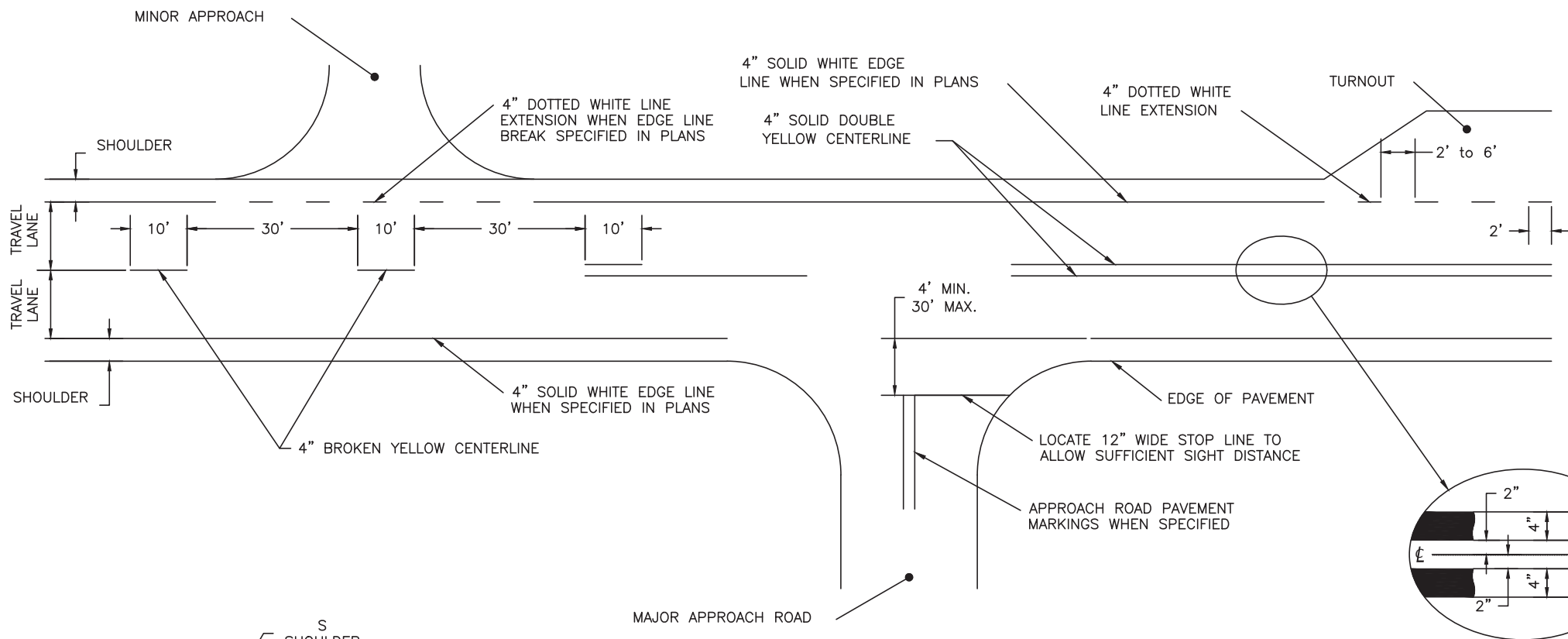
1. ORIENT ALL HEADWALLS PARALLEL TO THE ROADWAY CENTERLINE UNLESS OTHERWISE INDICATED IN THE PLANS OR BY THE CO.
2. WHEN PIPES ARE ON A SKEW, ADAPT AND LENGTHEN HEADWALLS AS DIRECTED.
3. CHAMFER ALL EXPOSED CORNERS NOT ROUNDED TO 3/4".
4. QUANTITIES SHOWN ARE FOR ONE HEADWALL WITH PIPE AT RIGHT ANGLES.
5. CONSTRUCT HEADWALLS USING DIMENSIONS SHOWN UNDER VALUES FOR 1V:1.5H SLOPE, UNLESS OTHERWISE DESIGNATED BY THE CO.

HEADWALL FOR ELLIPTICAL PIPE										
SIZE OF ELLIPTICAL PIPE CULVERT (SPAN x RISE)										
	23" x 14"	30" x 19"	34" x 22"	38" x 24"	42" x 27"	45" x 29"	49" x 32"	53" x 34"	60" x 38"	68" x 43"
A	0'-8"	0'-9"	0'-10"	0'-10"	0'-11"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
B	1'-2"	1'-5"	1'-6"	1'-8"	1'-9"	1'-10"	1'-11"	1'-11"	1'-11"	2'-0"
C	1'-8"	1'-11"	2'-1"	2'-4"	2'-5"	2'-7"	2'-8"	2'-9"	3'-3"	3'-6"
D	1'-2"	1'-7"	1'-10"	2'-0"	2'-3"	2'-5"	2'-8"	2'-10"	3'-2"	3'-7"
F	0'-8"	0'-8"	0'-9"	0'-9"	0'-9"	0'-9"	0'-9"	0'-9"	0'-9"	0'-9"
H	2'-10"	3'-3"	3'-7"	3'-9"	4'-0"	4'-2"	4'-5"	4'-7"	4'-11"	5'-4"
L	5'-5"	7'-2"	8'-6"	9'-2"	10'-2"	10'-11"	12'-1"	12'-11"	13'-0"	13'-0"
S	1'-11"	2'-6"	2'-10"	3'-2"	3'-6"	3'-9"	4'-1"	4'-5"	5'-0"	5'-8"
CUBIC YARDS OF CONCRETE										
CONC. PIPE	0.502	0.855	1.236	1.500	1.811	2.101	2.512	2.801	2.969	2.904

HEADWALL FOR CIRCULAR PIPE						
DIAMETER OF PIPE CULVERT						
	6"	15"	18"	21" or 24"	27" or 30"	33" or 36"
A	0'-6"	0'-8"	0'-9"	0'-11"	1'-0"	1'-0"
B	0'-9"	1'-1"	1'-3"	1'-6"	1'-9"	2'-0"
C	1'-2"	1'-7"	1'-9"	2'-2"	2'-6"	2'-9"
D	1'-0"	1'-3"	1'-6"	2'-0"	2'-6"	3'-0"
F	0'-6"	0'-8"	0'-8"	0'-9"	0'-9"	0'-9"
H	2'-0"	2'-11"	3'-2"	3'-9"	4'-3"	4'-9"
L	3'-8"	5'-0"	6'-0"	8'-0"	10'-0"	12'-0"
CUBIC YARDS OF CONCRETE						
CONC. PIPE	0.241	0.492	0.697	1.319	2.067	2.947
C.M. PIPE	0.257	0.521	0.739	1.398	2.198	3.145

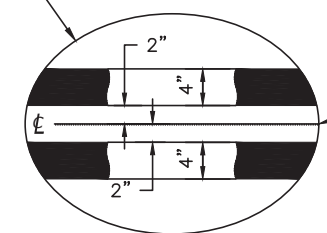


<b>A/E FIRM</b> PRIME: JACOBS DENVER, CO.  SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	DESIGNED: CM	SUB SHEET NO.  <h1>S13</h1>	TITLE OF DRAWING <h2>CONCRETE HEADWALL FOR SMALL PIPE CULVERT</h2> BLACK CANYON OF THE GUNNISON NATIONAL PARK		DRAWING NO. #115 177002
	TECH. REVIEW: JM		DATE: 3/28/22	PKG. NO. 1	SHEET 35 OF 55



**NOTES:**

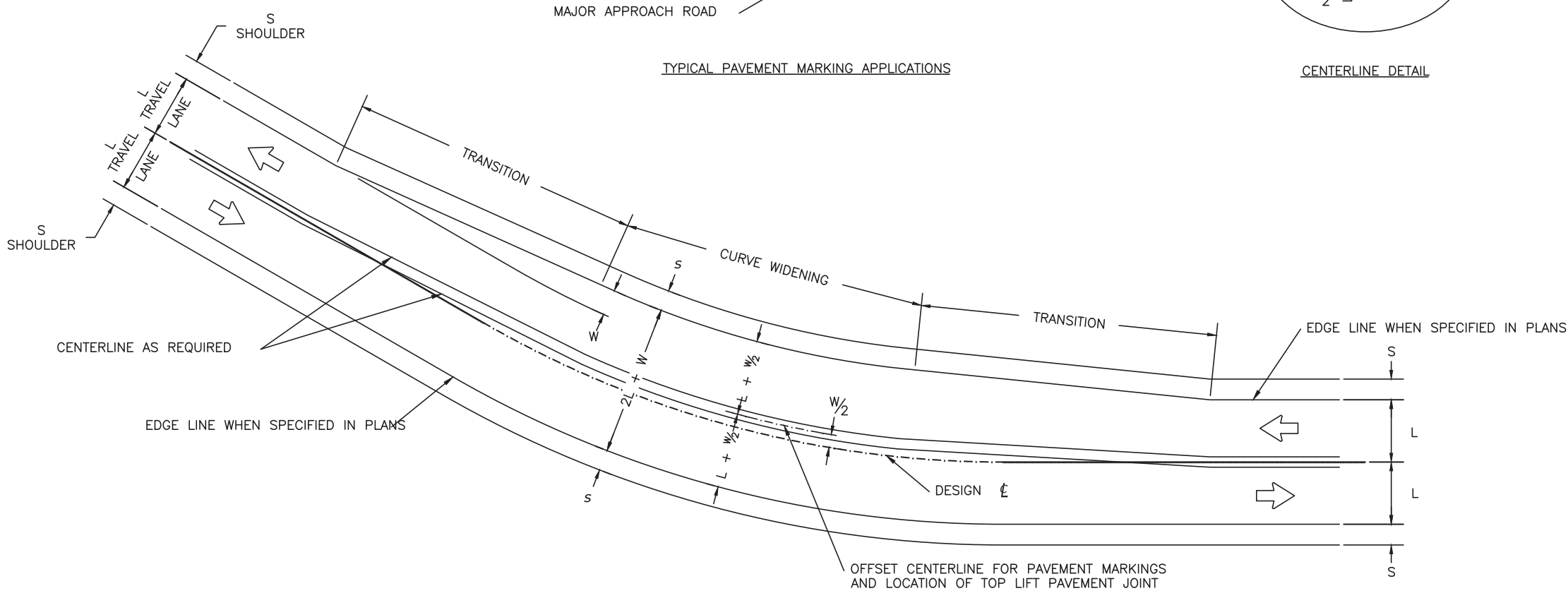
1. PLACE EDGE LINE PAVEMENT MARKINGS AT ASPHALT/CONCRETE CURB INTERFACE WHEN CURB IS PRESENT.
2. PAINT CENTERLINE PAVEMENT MARKINGS ON CURVES WITH CURVE WIDENING "W" TO ACHIEVE EQUAL LANE WIDTHS WITHIN THE ROADWAY. MAINTAIN A CONSTANT SHOULDER WIDTH "S" THROUGHOUT THE CURVE WIDENING AREA. SEE STAKING DETAILS FOR CURVE WIDENING TRANSITION LOCATIONS.
3. TYPICAL PAVEMENT MARKING WIDTHS ARE SHOWN. USE WIDER PAVEMENT MARKINGS WHEN SPECIFIED ON THE PLANS OR WHEN REQUIRED BY THE MAINTAINING AGENCY.



INCREASE SPACING BETWEEN PARALLEL LINES WHEN SPECIFIED IN THE PLANS OR WHEN REQUIRED BY THE MAINTAINING AGENCY

TYPICAL PAVEMENT MARKING APPLICATIONS

CENTERLINE DETAIL



CENTERLINE MODIFICATION FOR CURVES WITH WIDENING APPLIED ON INSIDE

SEE NOTE 2 FOR TREATMENT OF CURVES WHEN WIDENING "W" IS SPLIT EQUALLY ON BOTH SIDES OF CENTERLINE

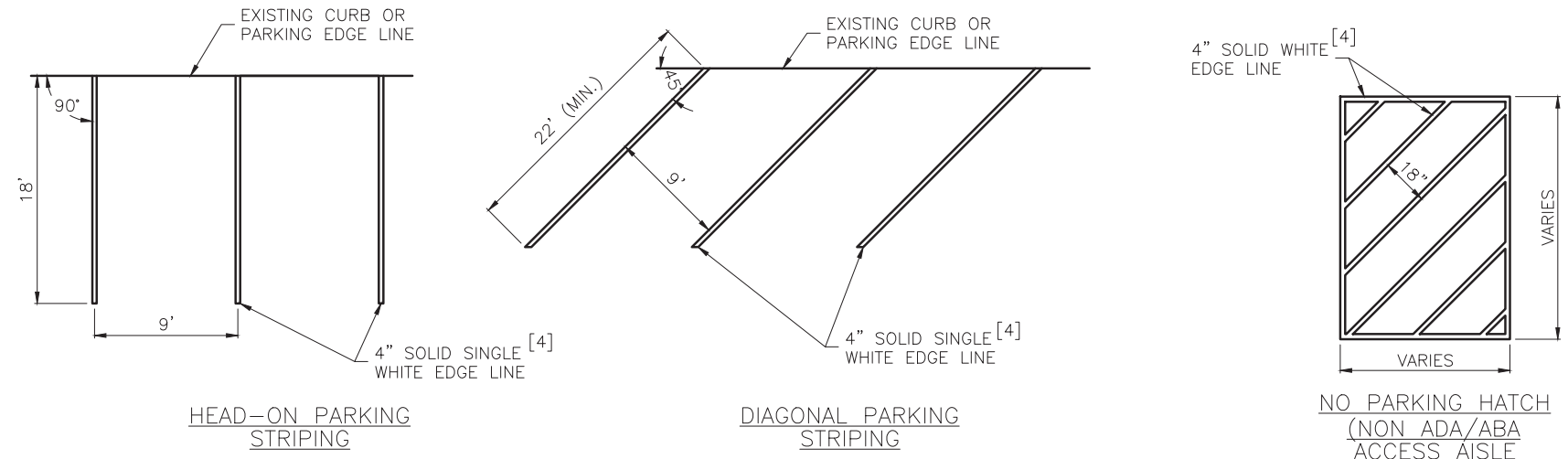
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(A) PAVEMENT MARKING DETAILS  
NO SCALE

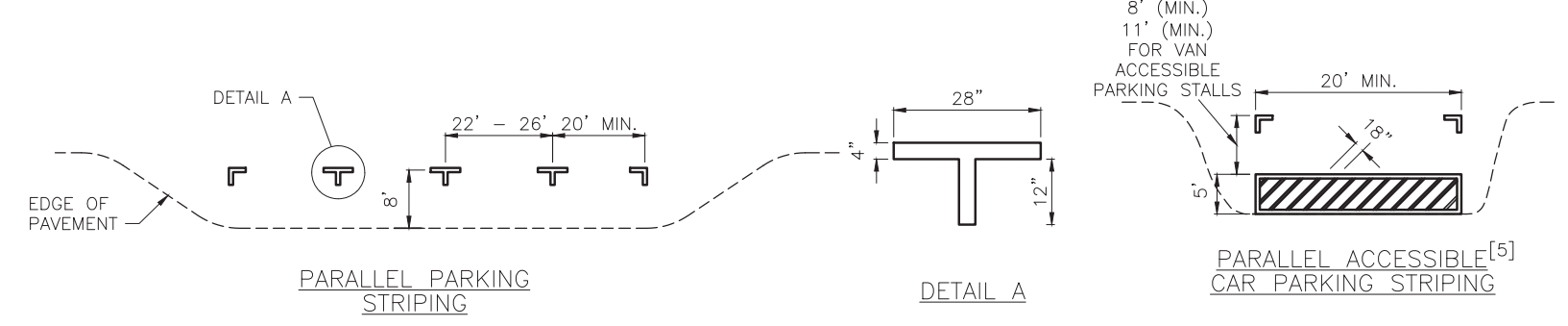
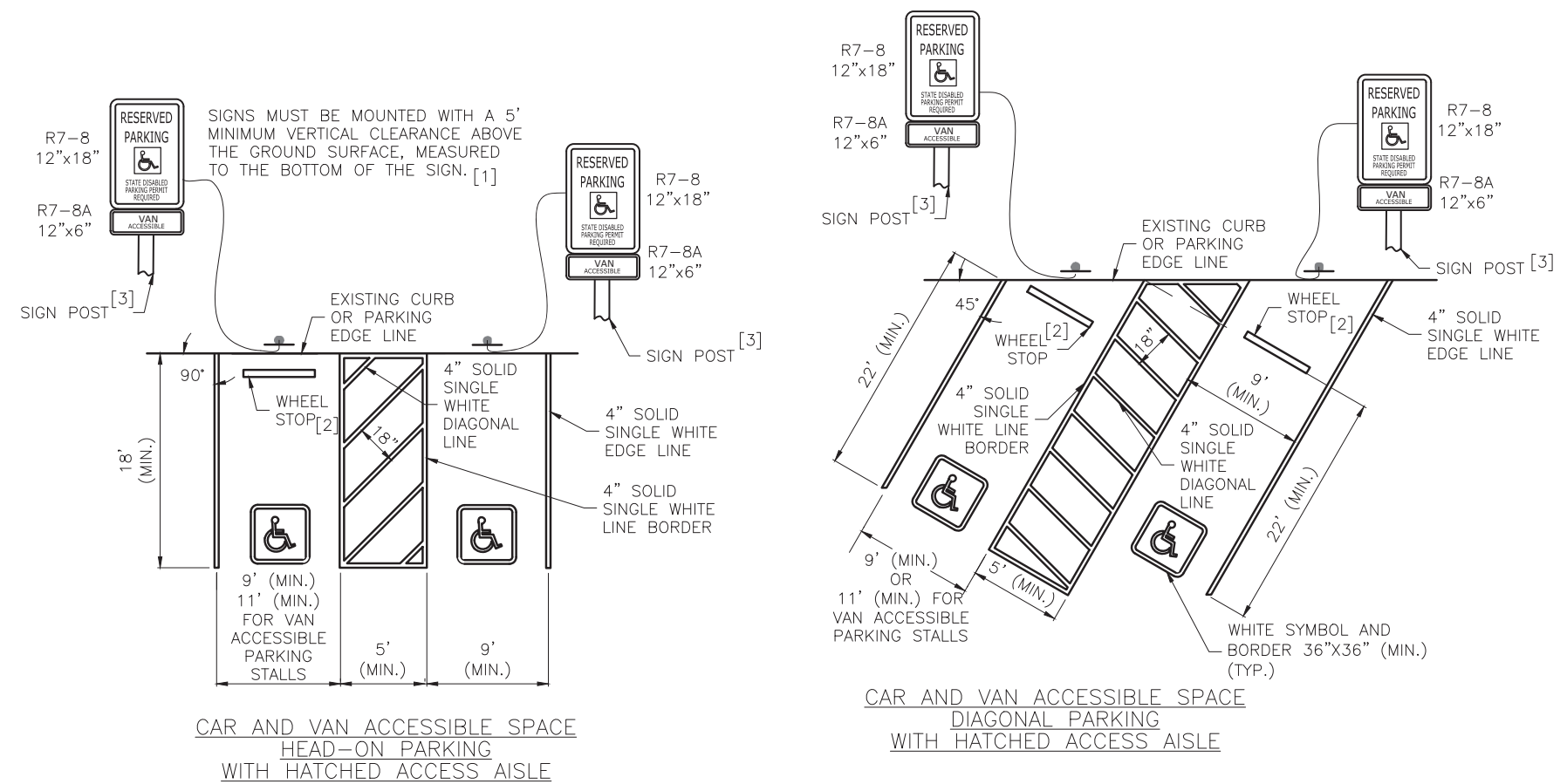


A/E FIRM	DESIGNED:	SUB SHEET NO.
PRIME: JACOBS DENVER, CO.	CM	<b>S14</b>
SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	CADD: CM	
	TECH. REVIEW: JM	
	DATE: 3/28/22	

TITLE OF DRAWING		DRAWING NO.
<b>PAVEMENT MARKING LAYOUT</b>		#115 177002
BLACK CANYON OF THE GUNNISON NATIONAL PARK		
PKG. NO.	SHEET	
1	<b>36</b>	
	OF	55



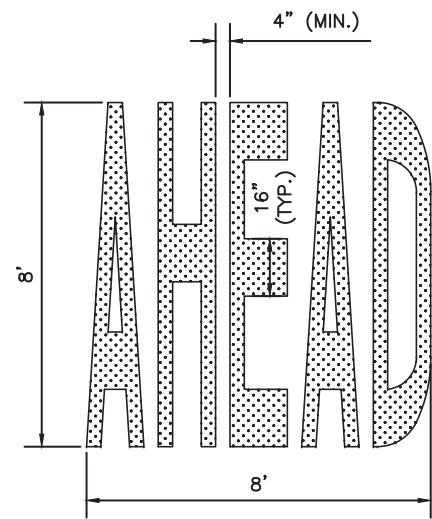
- NOTES:**
1. PROVIDE STRIPING IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) LATEST EDITION.
  2. PROVIDE LETTERS, NUMERALS, AND SYMBOLS THAT CONFORM WITH THE "STANDARD HIGHWAY SIGNS", LATEST EDITION.
  3. DIMENSIONS SHOWN ARE FOR INFORMATIONAL PURPOSES ONLY. SEE PLANS FOR PAVEMENT MARKING CONFIGURATIONS, SYMBOLS AND WORDS, OR AS DIRECTED BY THE CO.
  4. USE BLUE EDGE LINES ON CONCRETE SURFACES FOR ACCESSIBLE SPACES.
  5. DIMENSIONS ARE TO CENTER-LINE OF STRIPE.
- FOOTNOTE:**
- [1] PROVIDE SIGNS MATCHING PARKING DETAILS WHEN SPECIFIED IN THE QUANTITY TABULATION. MOUNT SIGNS WITH A 5'-0" MINIMUM VERTICAL CLEARANCE ABOVE THE GROUND SURFACE MEASURED TO THE BOTTOM OF THE SIGN.
  - [2] WHEEL STOP IF REQUIRED TO PREVENT ENCROACHMENT OF VEHICLE OVER THE REQUIRED WIDTH OF WALKWAY.
  - [3] INSTALL 4"x4" WOOD POSTS CONFORMING TO 718.04(A) WHEN SPECIFIED IN THE QUANTITY TABULATIONS.
  - [4] USE ONLY 4" TYPE B SOLID WHITE EDGE LINES UNLESS SPECIFIED AS YELLOW IN THE QUANTITY TABULATIONS OR OTHERWISE NOTED.
  - [5] SEE NO PARKING HATCH DETAIL ON THIS SHEET FOR STRIPING DIMENSIONS AND SPACINGS.



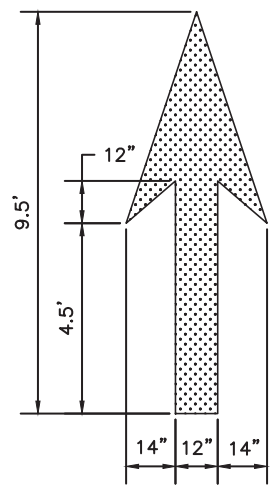
**A** PARKING LOT STRIPING  
NO SCALE



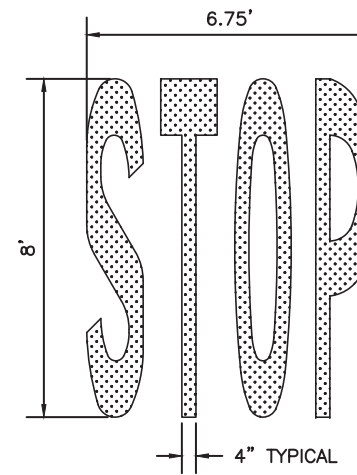
A/E FIRM PRIME: JACOBS DENVER, CO. SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	DESIGNED: CM	SUB SHEET NO. <b>S15</b>	TITLE OF DRAWING <b>PARKING LOT STRIPING</b>	DRAWING NO. #115 177002
	TECH. REVIEW: JM			
DATE: 3/28/22			BLACK CANYON OF THE GUNNISON NATIONAL PARK	PKG. NO. 1
				SHEET 37 OF 55



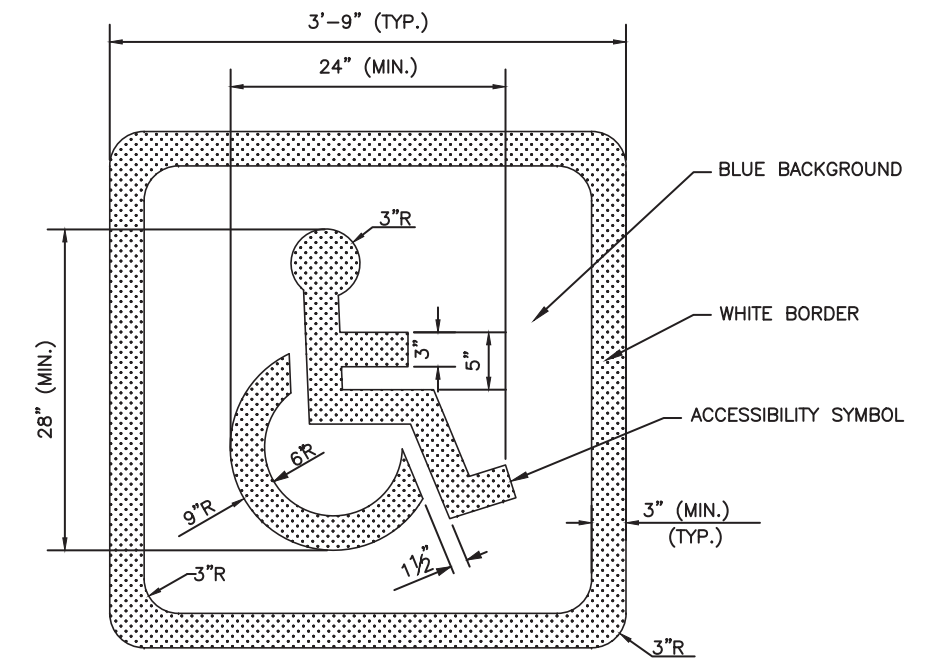
"AHEAD" WORD MARKING



THROUGH  
LANE-USE ARROW



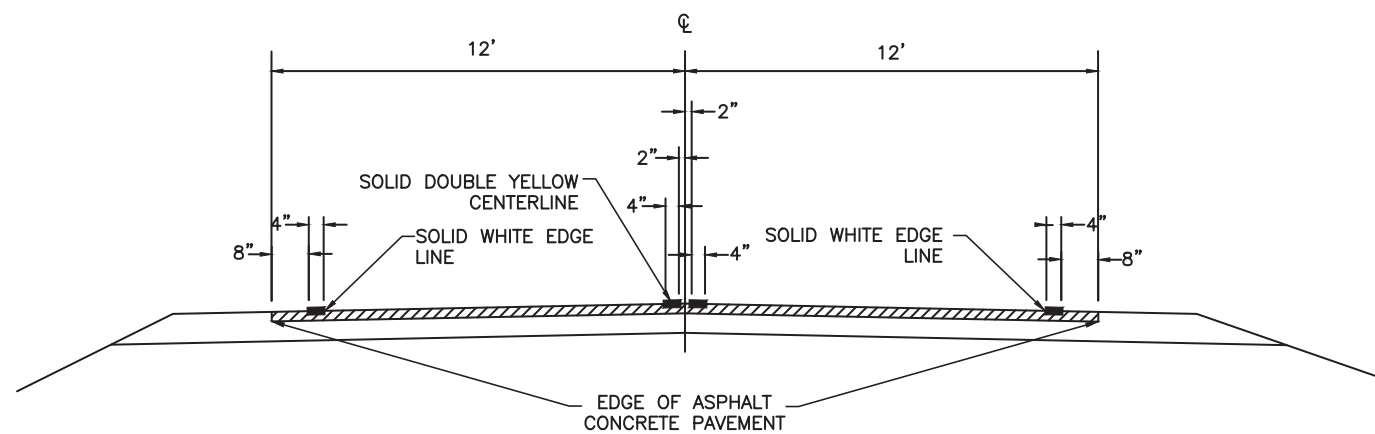
"STOP" WORD MARKING



ACCESSIBILITY SYMBOL

**A** PAVEMENT MARKING SYMBOL DETAILS  
NO SCALE

PAVEMENT MARKING AREAS	
TYPE	SQFT
THROUGH LANE-USE ARROW	12
ACCESSIBILITY SYMBOL	16
STOP WORD MARKING	22
AHEAD WORD MARKING	30



**B** PAVEMENT MARKING DETAIL  
NO SCALE

NOTES:

1. PLACE PAVEMENT WORD AND SYMBOL MARKINGS IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD), CURRENT EDITION.
2. ALL LETTERS, NUMERALS AND SYMBOLS SHALL CONFORM WITH THE "STANDARD HIGHWAY SIGNS", CURRENT EDITION.

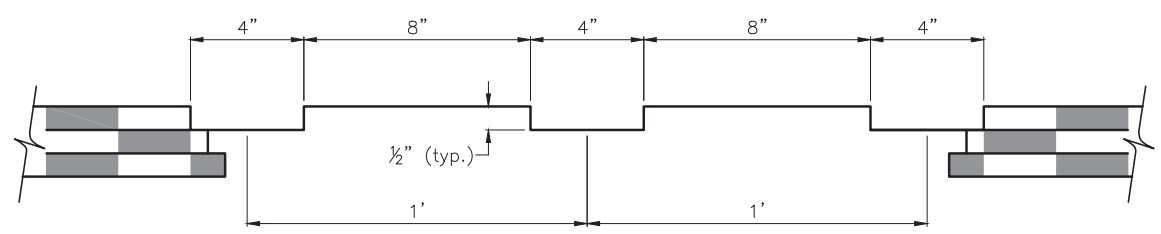
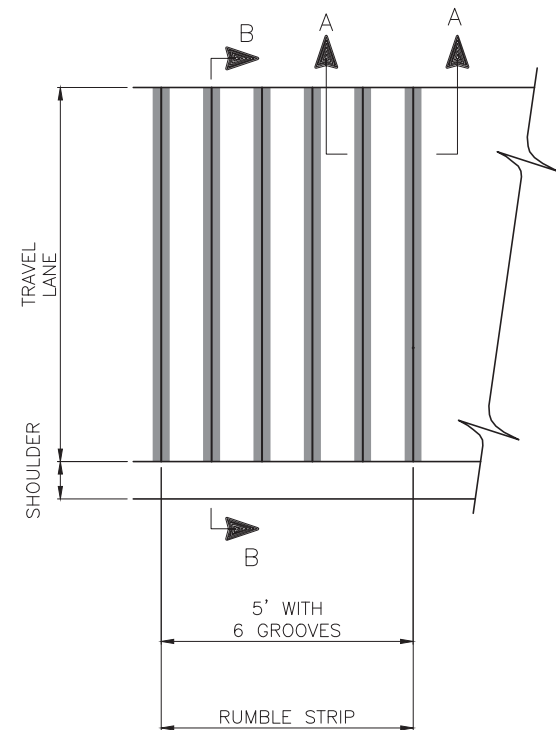
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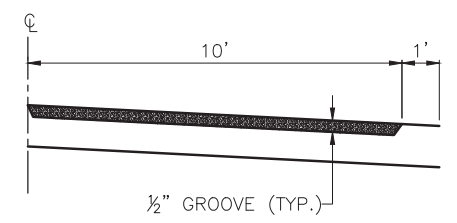
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SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.			PKG. NO. 1	SHEET 38 OF 55



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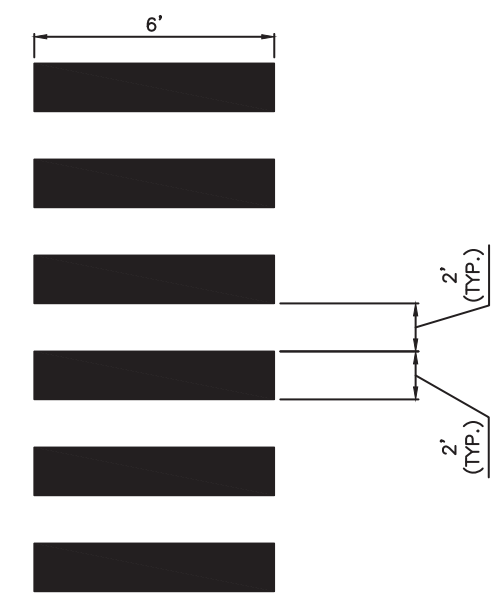
SECTION A-A  
(GROVED)



SECTION B-B  
(GROVED)

A RUMBLE STRIP CLUSTER  
NO SCALE

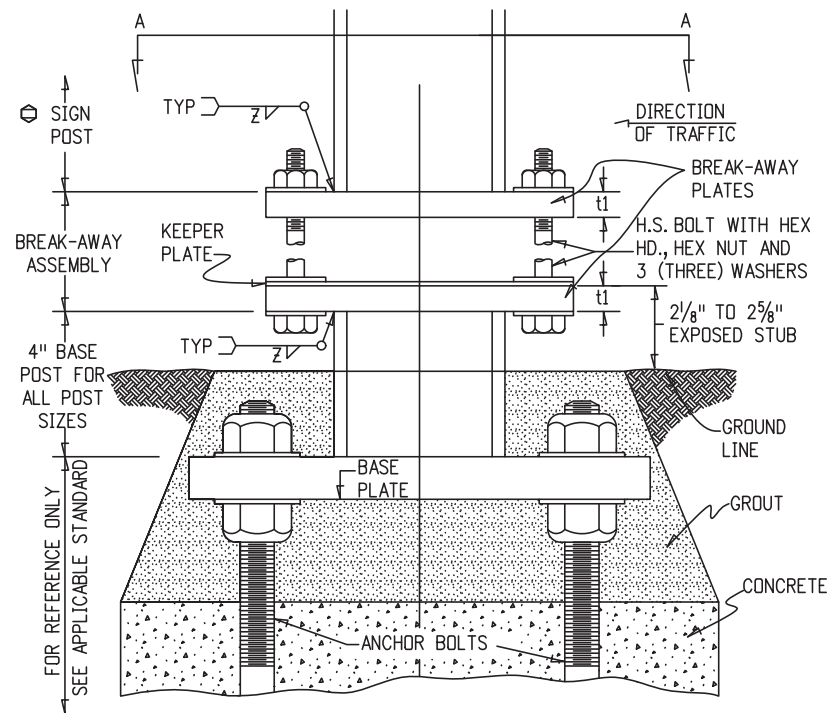
- NOTES:
- MILL RUMBLE STRIP GROOVES AS PER SECTION 32 12 16



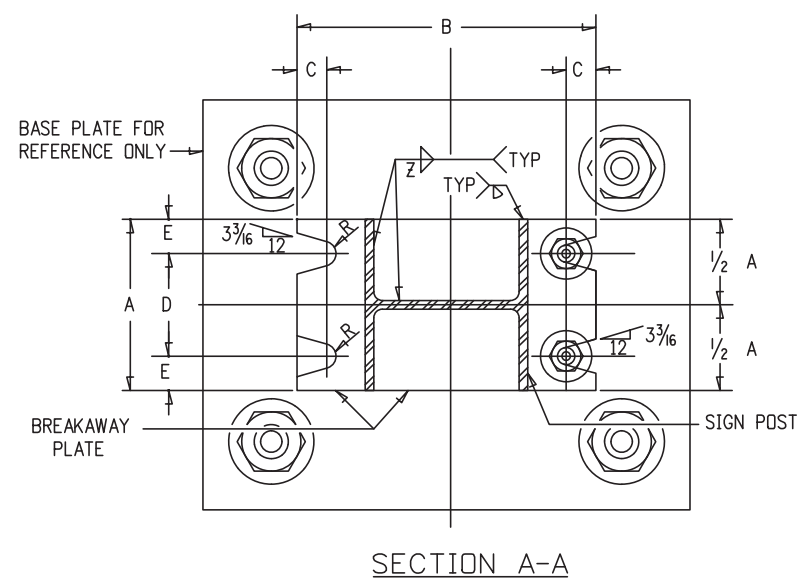
B CROSSWALK DETAIL  
NO SCALE



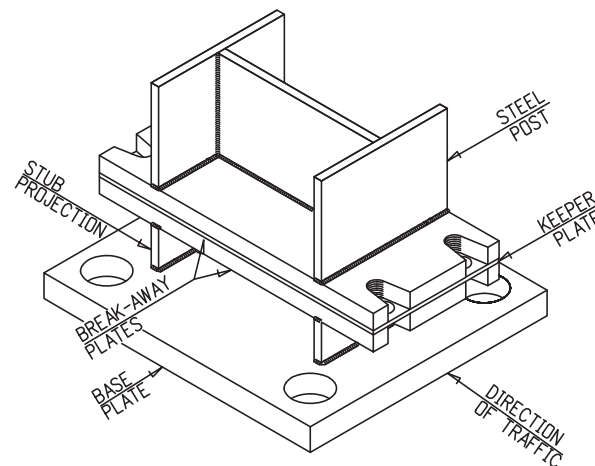
A/E FIRM PRIME: JACOBS DENVER, CO.	DESIGNED: CM	SUB SHEET NO.  <b>S17</b>	TITLE OF DRAWING <b>RUMBLE STRIPS AND CROSSWALK STRIPING</b>	DRAWING NO. #115 177002
	CADD: CM			PKG. NO. 1
SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	TECH. REVIEW: JM		BLACK CANYON OF THE GUNNISON NATIONAL PARK	OF 55
	DATE: 3/28/22			



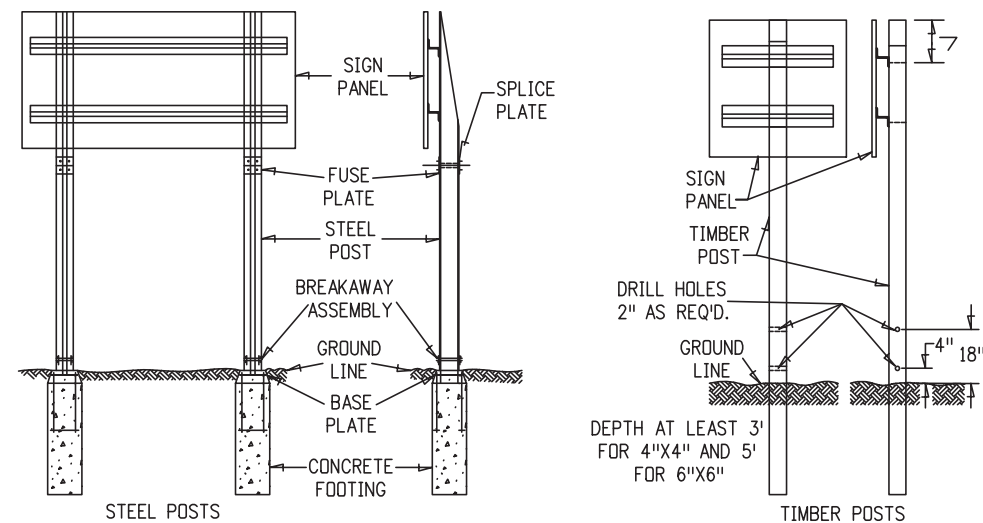
TYPICAL ELEVATION  
STEEL POST ASSEMBLY



SECTION A-A



TYPICAL PROJECTED VIEW  
STEEL POST ASSEMBLY



TYPICAL BREAKAWAY SIGN SUPPORT INSTALLATIONS

BOLTING PROCEDURE FOR  
BREAKAWAY PLATE ASSEMBLY

- ASSEMBLE THE POST TO THE STUB WITH BOLTS, WITH ONE FLAT WASHER ON THE TOP OF THE UPPER BREAKAWAY PLATE AND ONE BELOW THE LOWER BREAKAWAY PLATE, AND ONE FLAT WASHER AND A KEEPER PLATE BETWEEN THE BREAKAWAY PLATES.
- TIGHTEN ALL BOLTS TO A "SNUG TIGHT" CONDITION WITH A 12 IN. TO 15 IN. WRENCH, TO BED THE WASHERS AND CLEAN THE BOLT THREADS. THEN LOOSEN EACH BOLT IN TURN, AND RETIGHTEN IN A SYSTEMATIC ORDER TO THE PRESCRIBED TORQUE (SEE BREAKAWAY PLATE DATA TABLES).
- BURR THREADS AT JUNCTION WITH NUT TO PREVENT NUT LOOSENING.

NOTES:

- DESIGN CONFORMS WITH AASHTO "SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS".
- ALL STRUCTURAL STEEL SHALL CONFORM TO AASHTO M270 (ASTM A709) GRADE 36 AND SECTIONS 509 AND 614 OF THE STANDARD SPECIFICATIONS.
- STEEL FUSE PLATES AND SPLICE PLATES SHALL CONFORM TO AASHTO M270 (ASTM A709) GRADE 36.
- ALL STRUCTURAL STEEL INCLUDING FUSE AND SPLICE PLATES SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 AFTER FABRICATION. STEEL POSTS SHALL BE STAMPED WITH THEIR SIZE.
- ALL HIGH STRENGTH BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM-A325. WASHERS USED IN THE BREAK-AWAY PLATE AND FUSE PLATE ASSEMBLIES SHALL BE OF SUFFICIENT STRENGTH TO PREVENT ANY DEFLECTION OR CUPPING INTO THE SLOTTED GROOVES UNDER BOLT TORQUING.
- ALL BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED AS PER ASTM-A153 OR ASTM-A164.
- ALL HOLES IN FUSE PLATE AND POST FLANGE ON WHICH IT MOUNTS, SHALL BE DRILLED. ALL OTHERS MAY BE DRILLED OR SUB-PUNCHED AND REAMED.
- ALL STEEL CUTS SHALL PREFERABLY BE SAW CUTS; HOWEVER, FLAME CUTTING WILL BE PERMITTED PROVIDED ALL EDGES ARE GROUND. REMOVE ALL BURRS. METAL SHALL NOT PROJECT BEYOND THE PLANE OF THE PLATE FACE.
- A "KEEPER PLATE" OF 28-GAGE GALVANIZED SHEET METAL, FABRICATED TO MATCH BREAKAWAY PLATE DIMENSIONS BUT WITH HOLES RATHER THAN SLOTS, SHALL BE USED TO PREVENT BOLT LOOSENING DUE TO WIND VIBRATION.
- HIGH STRENGTH BOLTS IN THE BREAKAWAY ASSEMBLY SHALL BE TIGHTENED ONLY TO THE TORQUE SHOWN IN THE TABLE. DO NOT OVERTIGHTEN.
- TIMBER POSTS SHALL BE IN ACCORDANCE WITH SECTION 614 OF THE STANDARD SPECIFICATIONS AS TO SIZE, ALTERNATE SIZE, GRADE, SPECIES, TREATMENT, AND BREAKAWAY.
- FOR ALL BASE PLATE AND FOOTING WORK SEE STANDARD PLAN S-614-6.
- FOR ADDITIONAL INFORMATION, REFER TO "TABULATION OF SIGN AND CROSS SECTIONS FOR CLASS III SIGNS" INCLUDED IN THE PLANS.
- TIMBER POST SHALL BE FLUSH WITH TOP OF SIGN PANEL FOR DIRECT MOUNT AND 3-3/16" MINIMUM ABOVE BOLT FOR BACKING ZEE MOUNT.
- TIMBER SIGN POST MAY ONLY BE USED FOR TEMPORARY SIGNAGE DURING CONSTRUCTION. TUBULAR STEEL SHALL BE USED FOR PERMANENT INSTALLATIONS.
- IN NO CASE SHALL A BACKING ZEE BE PLACED BELOW THE FUSE PLATES.
- SIGN POST PAY LENGTH IS FROM THE UPPER BREAKAWAY PLATE TO THE TOP OF THE "COPE". THE 4-INCH "BASE POST" AND THE LOWER "BREAKAWAY PLATE" ARE PAID FOR AS PART OF THE FOOTING. THE UPPER "BREAKAWAY PLATE" AND ALL NUTS, BOLTS, WASHERS AND KEEPER PLATE FOR FASTENING THE BREAKAWAY PLATES ARE PAID FOR AS A PART OF THE POST.

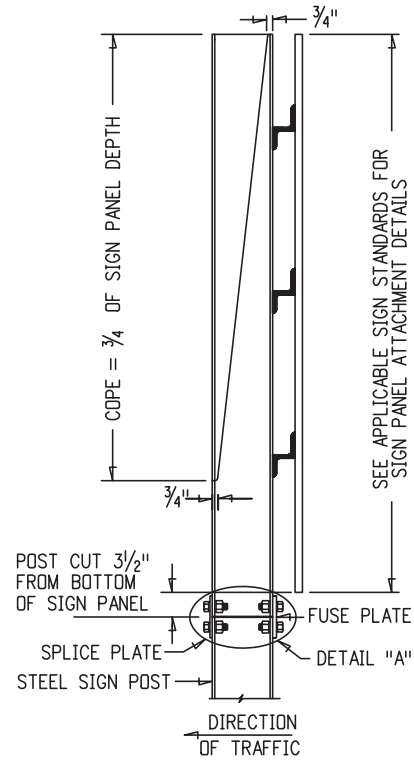
BREAKAWAY PLATE DATA TABLE									
DIMENSION	BOLT SIZE AND TORQUE	A	B	C	D	E	t1	WELD Z	R
POST SIZE									
W 12 X 26	3/4"Ø X 3 3/4" 46 Ft. Lb.	6 1/2"	17"	7/8"	3 1/2"	1 1/2"	1"	5/16"	1 3/32"
W 10 X 26		5 3/4"	14 7/8"	7/8"	3 1/4"	1 1/4"	1"	5/16"	1 3/32"
W 10 X 22		5 3/4"	14 5/8"	7/8"	3 1/4"	1 1/4"	1"	5/16"	1 3/32"
W 8 X 21	5/8"Ø X 3" 29 Ft. Lb.	5 1/4"	12 5/8"	7/8"	2 3/4"	1 1/4"	1"	5/16"	1 3/32"
W 8 X 18		5 1/4"	12"	3/4"	3"	1 1/8"	3/4"	1/4"	1 1/32"
W 6 X 15		6"	10"	3/4"	3 3/4"	1 1/8"	3/4"	1/4"	1 1/32"
W 6 X 12		5"	10"	3/4"	2 3/4"	1 1/8"	3/4"	1/4"	1 1/32"

A BREAKAWAY SIGN DETAILS  
NO SCALE

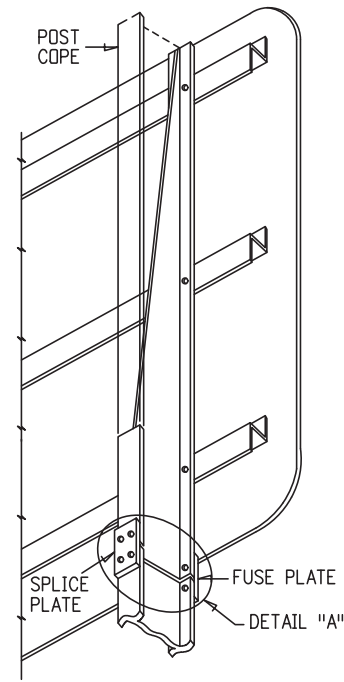


A/E FIRM PRIME: JACOBS DENVER, CO.	DESIGNED: CM CADD: CM TECH. REVIEW: JM DATE: 3/28/22	SUB SHEET NO.  <b>S18</b>	TITLE OF DRAWING <b>BREAKAWAY SIGN DETAILS</b>  BLACK CANYON OF THE GUNNISON NATIONAL PARK	DRAWING NO. #115 177002 PKG. NO. 1 SHEET <b>40</b> OF 55
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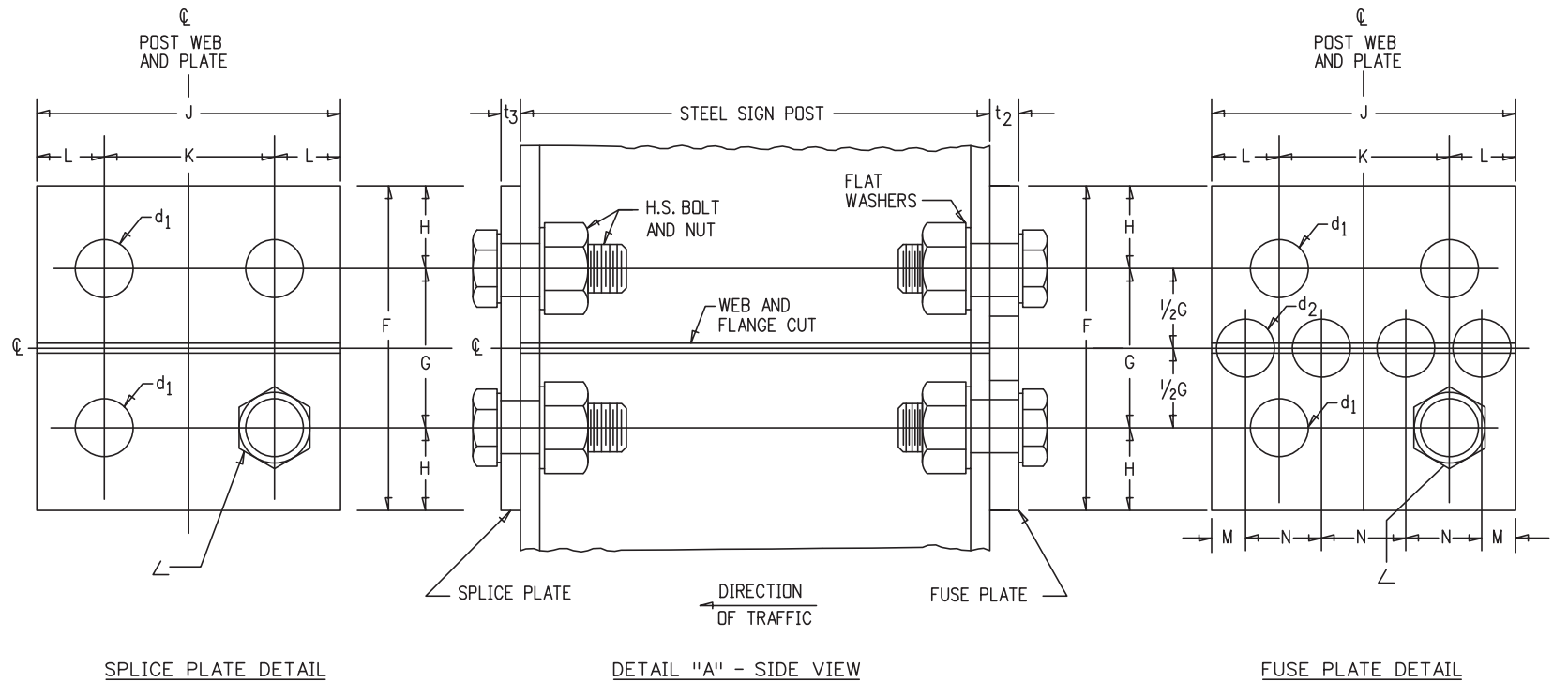
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TYPICAL SIDE VIEW  
FUSE PLATE AND POST COPE



TYPICAL PROJECTED VIEW  
FUSE PLATE AND POST COPE

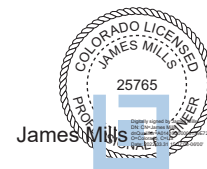


TYPICAL FUSE AND SPLICE PLATE HINGE DETAILS

∠ HOLE DIAMETER= d1  
USE HIGH STRENGTH BOLTS WITH HEX HEAD  
AND HEX NUT, WITH ONE FLAT WASHER  
UNDER EACH

FUSE AND SPLICE PLATE HINGE DATA TABLE														
SIZE POST	F	G	H	J	K	L	M	N	d <sub>1</sub>	d <sub>2</sub>	t <sub>2</sub>	t <sub>3</sub>	BOLT SIZE	FABRICATION NOTES
W 12 X 26	6"	3"	1/2"	6 1/2"	3 1/2"	1 1/2"	1 3/16"	1 5/8"	1 3/16"	1 5/16"	1/2"	7/16"	3/4" Ø X 2 1/2"	ALL HOLES IN FUSE PLATE AND POST FLANGE HOLES ON WHICH IT MOUNTS SHALL BE DRILLED. ALL OTHERS MAY BE PUNCHED. BURR THREADS AT JUNCTION WITH NUT TO PREVENT NUT LOOSENING.
W 10 X 26	6"	3"	1/2"	5 3/4"	2 3/4"	1 1/2"	1 3/16"	1 3/8"	1 3/16"	1 1/8"	1/2"	7/16"	3/4" Ø X 2 1/2"	
W 10 X 22	6"	3"	1/2"	5 3/4"	2 3/4"	1 1/2"	1 3/16"	1 3/8"	1 3/16"	1 1/8"	1/2"	3/8"	3/4" Ø X 2 1/2"	
W 8 X 21	5 1/2"	2 1/2"	1/2"	5 1/4"	2 3/4"	1 1/4"	3/4"	1 1/4"	1 3/16"	1"	1/2"	3/8"	3/4" Ø X 2 1/2"	ASTM-A441, ASTM-572 GRADE 50, OR ASTM-A588 MAY BE SUBSTITUTED FOR AASHTO M270 (ASTM A709) GRADE 36 AT THE OPTION OF THE FABRICATOR. STEEL USED SHALL HAVE AN ULTIMATE TENSILE STRENGTH NOT TO EXCEED 80 KSI.
W 8 X 18	5"	2 1/2"	1/4"	5 1/4"	2 3/4"	1 1/4"	3/4"	1 1/4"	1 1/16"	1 1/16"	3/8"	3/8"	5/8" Ø X 2 1/2"	
W 6 X 15	5"	2 1/2"	1/4"	6"	3 1/2"	1 1/4"	3/4"	1 1/2"	1 1/16"	1 1/4"	3/8"	1/4"	5/8" Ø X 2 1/2"	
W 6 X 12	4 1/4"	2"	1/8"	4"	2 1/4"	7/8"	1/2"	1"	3/16"	3/4"	1/4"	1/4"	1/2" Ø X 1 3/4"	

(A) BREAKAWAY SIGN DETAILS  
NO SCALE



A/E FIRM  
PRIME:  
JACOBS  
DENVER, CO.  
SUBCONTRACTOR:  
SHANNON  
& WILSON  
DENVER, CO.

DESIGNED:  
CM  
CADD:  
CM  
TECH. REVIEW:  
JM  
DATE:  
3/28/22

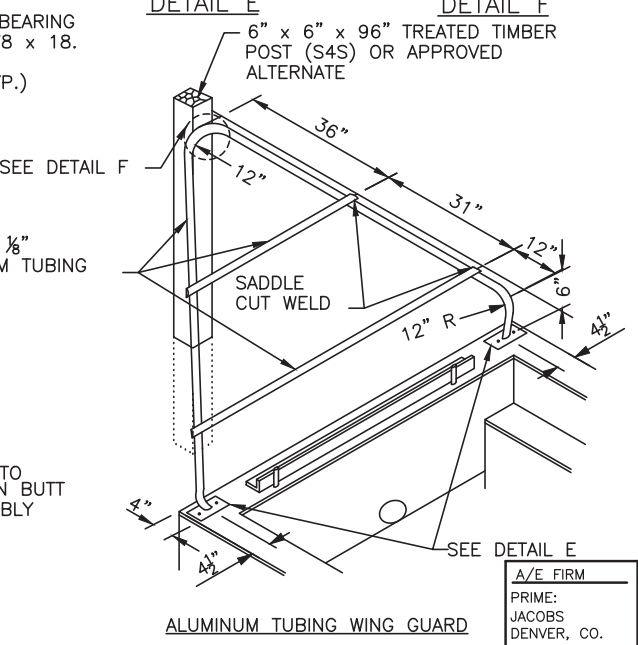
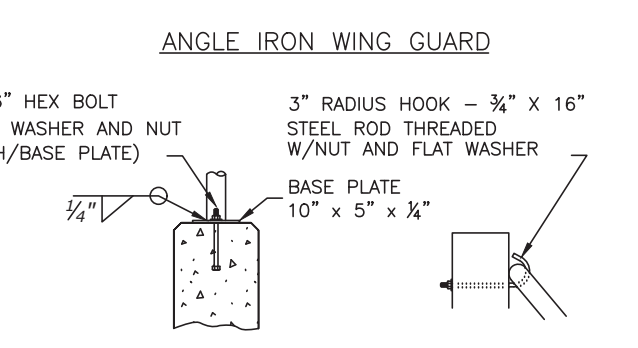
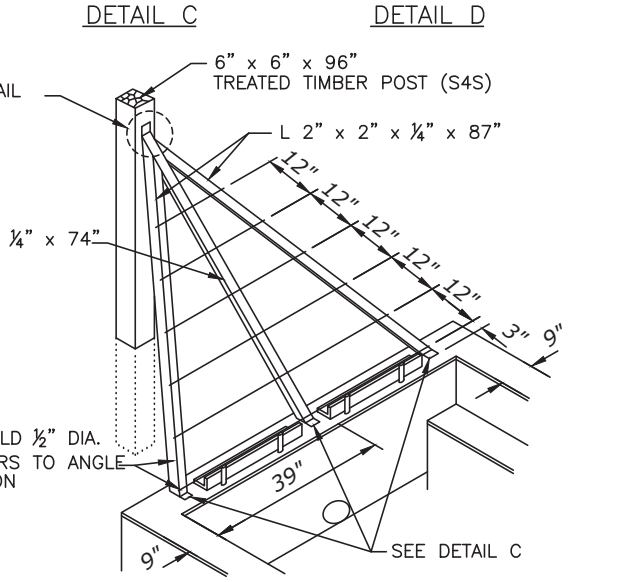
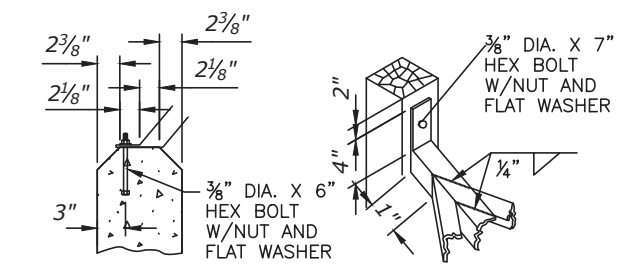
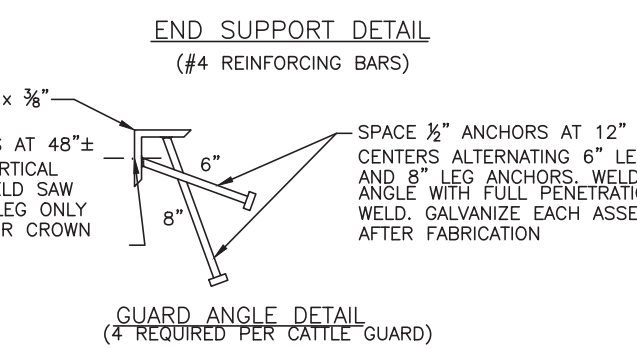
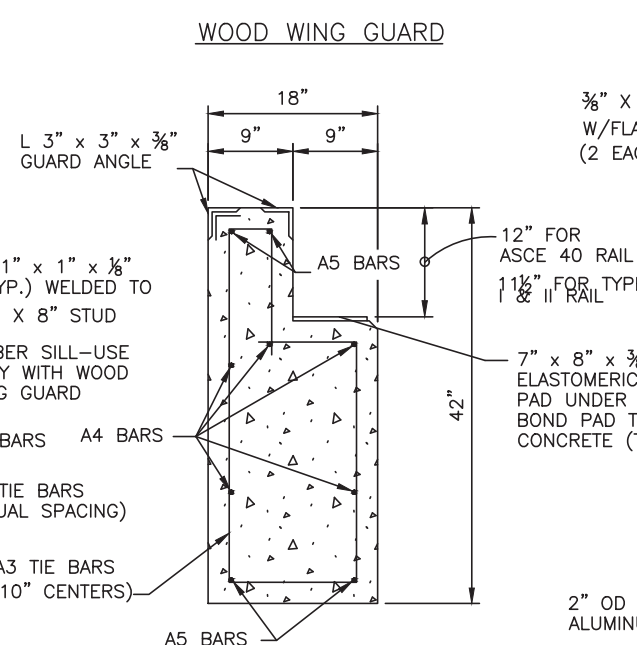
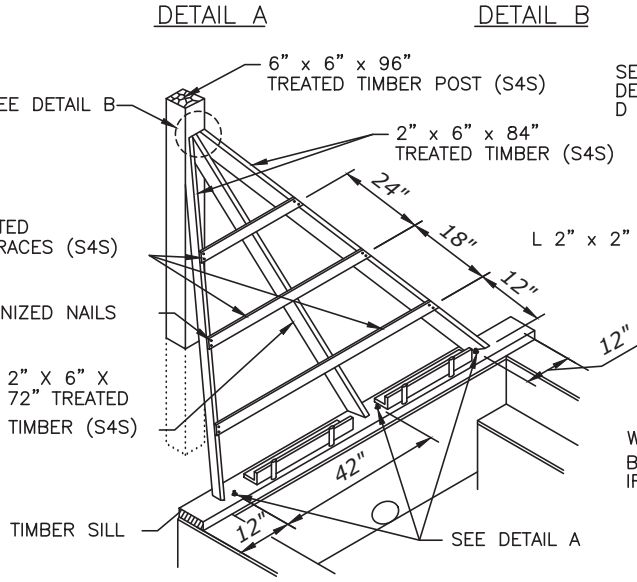
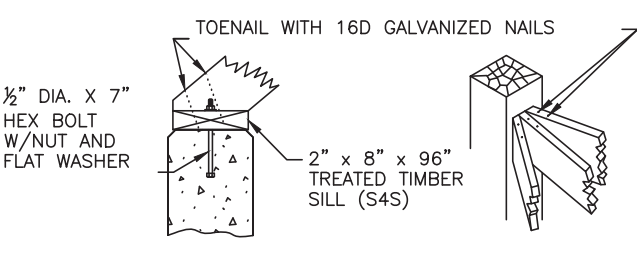
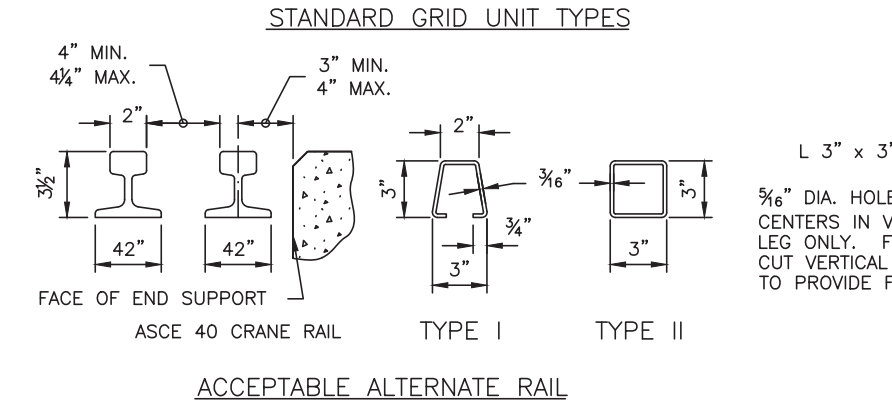
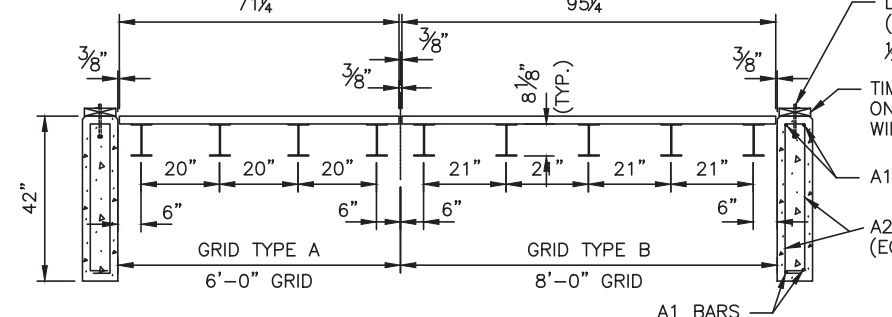
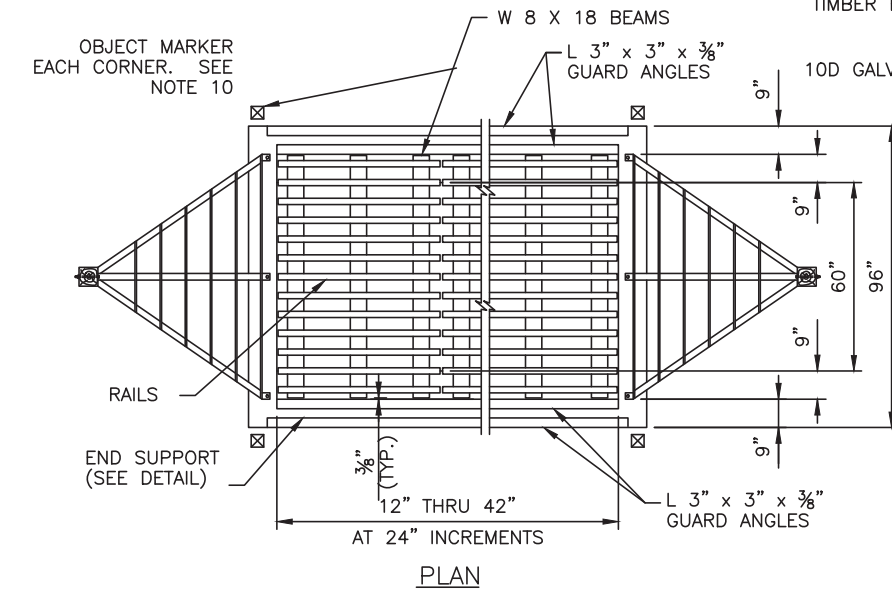
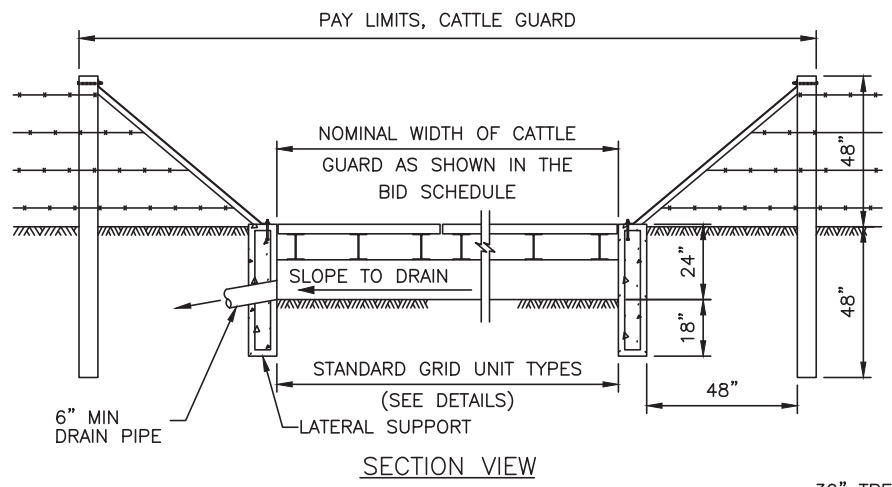
SUB SHEET NO.  
**S19**

TITLE OF DRAWING  
**BREAKAWAY SIGN  
DETAILS**  
BLACK CANYON OF THE GUNNISON  
NATIONAL PARK

DRAWING NO.  
#115  
177002

PKG. NO. 1  
SHEET 41  
OF 55

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- NOTES:**
- LOADING AASHTO HS20.
  - CONCRETE: CHAMFER EXPOSED EDGES UNLESS OTHERWISE SHOWN. GIVE ALL CONCRETE SURFACES A CLASS 1 FINISH.
  - STRUCTURAL STEEL: PROVIDE RAILS CONFORMING TO THE REQUIREMENTS FOR ASCE 40 CRANE RAIL. PROVIDE STRUCTURAL STEEL FOR ALTERNATE SECTIONS CONFORMING TO ASTM A 500, GRADE B, COPPER STEEL OR ASTM A 618, GRADE 2. IF THE STEEL DOES NOT CONTAIN A MINIMUM OF 0.2 PERCENT COPPER, GALVANIZE THE ALTERNATE SECTIONS. ALL OTHER STRUCTURAL STEEL CONFORMS TO AASHTO ASTM A36 AND IS PAINTED.
  - PROVIDE 2" MINIMUM CONCRETE COVER TO THE FACE OF ANY BAR UNLESS OTHERWISE SHOWN. ALL BARS ARE #4.
  - ALL WELDS ARE CONTINUOUS FILLET SHOP WELDS. WELD RAIL OR ALTERNATE SECTIONS ON BOTH SIDES TO THE W 8 x 18 BEAMS AT EACH INTERSECTION. WELD ACCORDING TO SECTION 555.
  - USE ALUMINUM ALLOY 6061-T6 OR 6063-T6 FOR ALUMINUM TUBING.
  - PROVIDE TIMBER CONFORMING TO AASHTO M 168. TREAT TIMBER WITH CHROMATED COPPER ARSENATE ACCORDING TO AASHTO M 133.
  - GALVANIZE ALL HARDWARE ACCORDING TO AASHTO M 111.
  - CONSTRUCT THE CATTLE GUARD TO CONFORM WITH THE FINISHED ROADWAY GRADE AND TEMPLATE.
  - PLACE ONE OBJECT MARKER AT EACH CORNER OF THE CATTLE GUARD AS SHOWN. MOUNT OBJECT MARKERS ON 4" X 4" X 6'-0" POSTS WITH THE REFLECTOR LOCATED 42" ABOVE THE ELEVATION OF THE LATERAL SUPPORT CONCRETE.
  - INSTALL DRAIN PIPE AS SHOWN WHERE REQUIRED. INCLUDE DRAIN PIPE WITH CATTLE GUARD UNLESS OTHERWISE SHOWN.
  - UNLESS OTHERWISE SHOWN IN THE SPECIAL CONTRACT REQUIREMENTS, SHOP APPLY PAINT SYSTEM 2 ACCORDING TO SECTION 555 AND COLOR THE TOP COAT ACCORDING TO FEDERAL STANDARD 595B, GRAY, 36231. REPAIR ANY DAMAGE TO THE PAINT SYSTEM DURING INSTALLATION.
  - SEE SHEET S21 FOR LATERAL SUPPORT WALL CUSTOMIZATIONS.

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A/E FIRM PRIME: JACOBS DENVER, CO. SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	DESIGNED: CM	SUB SHEET NO. <b>S20</b>	TITLE OF DRAWING <b>CATTLE GUARD DETAILS</b>		DRAWING NO. #115 177002
	CADD: CM		BLACK CANYON OF THE GUNNISON NATIONAL PARK		PKG. NO. 1
TECH. REVIEW: JM	DATE: 3/28/22			SHEET <b>42</b>	OF 55

**A** CATTLEGUARD DETAILS  
NO SCALE

CATTLE GUARD

REINFORCING STEEL, CONCRETE, STRUCTURAL STEEL, AND GRID UNIT TABLE OF QUANTITIES

DESCRIPTION	NOMINAL CATTLE GUARD WIDTH																												REMARKS								
	12'		14'		16'		18'		20'		22'		24'		26'		28'		30'		32'		34'		36'		38'			40'		42'					
	QTY	LENGTH	QTY	LENGTH	QTY	LENGTH	QTY	LENGTH	QTY	LENGTH	QTY	LENGTH	QTY	LENGTH	QTY	LENGTH	QTY	LENGTH	QTY	LENGTH	QTY	LENGTH	QTY	LENGTH	QTY	LENGTH	QTY	LENGTH		QTY	LENGTH	QTY	LENGTH				
#4 REINFORCING BARS, A1	8	92"	8	92"	8	92"	8	92"	8	92"	8	92"	8	92"	8	92"	8	92"	8	92"	8	92"	8	92"	8	92"	8	92"	8	92"	8	92"	8	92"			
#4 REINFORCING BARS, A2	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	20	86"	SEE BAR BENDING DETAIL
#4 REINFORCING BARS, A3	32	108"	36	108"	40	108"	46	108"	50	108"	54	108"	60	108"	64	108"	70	108"	74	108"	80	108"	84	108"	90	108"	94	108"	98	108"	102	108"	108	108"	SEE BAR BENDING DETAIL		
#4 REINFORCING BARS, A4	10	156"	10	180"	10	204"	10	228"	10	252"	10	276"	10	300"	10	324"	10	348"	10	372"	100	156"	10	420"	10	444"	10	468"	10	492"	10	516"					
#4 REINFORCING BARS, A5	8	140"	8	164"	8	188"	8	212"	8	236"	8	260"	8	284"	8	308"	8	332"	8	356"	8	140"	8	404"	8	428"	8	452"	8	476"	8	500"					
GRID UNIT A (6 FT)	2		1		2		3		2		1				3		2		5				3		6		1				7		SEE GRID UNIT LIST OF MATERIALS				
GRID UNIT B (8 FT)			1						1		2				1								2				4				5		SEE GRID UNIT LIST OF MATERIALS				
CONCRETE LATERAL SUPPORTS, YD3	1.56		1.56		1.56		1.56		1.56		1.56		1.56		1.56		1.56		1.56		1.56		1.56		1.56		1.56		1.56		1.56						
CONCRETE END SUPPORTS, YD3	4.03		4.70		5.37		6.04		6.71		7.38		8.05		8.73		9.40		10.07		10.74		11.41		12.08		12.75		13.42		14.10						
TOTAL CONCRETE, YD3	5.59		6.26		6.93		7.60		8.27		8.94		9.61		10.29		10.96		11.63		12.30		12.97		13.64		14.31		14.98		15.66						
W 8x18 BEAMS	936		1053		1170		1404		1521		1638		1755		1989		2106		2340		2340		2574		2808		2808		2925		3276		BEAMS 18 LB/FT				
RAIL, ASCE 40	2052		2398		2744		3078		3424		3770		4116		4450		4796		5130		5488		5822		6156		6514		6860		7182		13.30 LB/FT				
RAIL, TYPE I	806		942		1078		1209		1345		1481		1617		1748		1884		2015		2156		2287		2418		2559		2695		2821		APPROX. 5.22 LB/FT				
RAIL, TYPE II	1060		1238		1416		1590		1768		1946		2124		2298		2476		2650		2832		3006		3180		3362		3540		3710		6.86 LB/FT				
REINFORCING STEEL, LB	478		526		574		634		683		731		791		839		899		947		1007		1055		1115		1164		1212		1260		0.668 LB/FT				

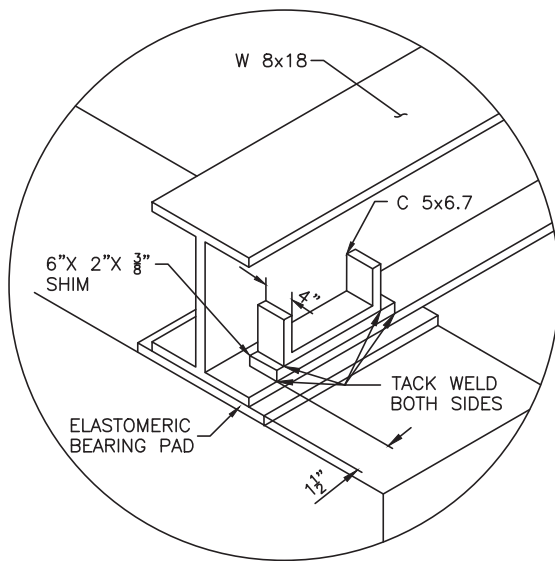
\* STRUCTURAL STEEL WEIGHTS DO NOT INCLUDE HARDWARE OR GUARD ANGLE.

STRUCTURAL

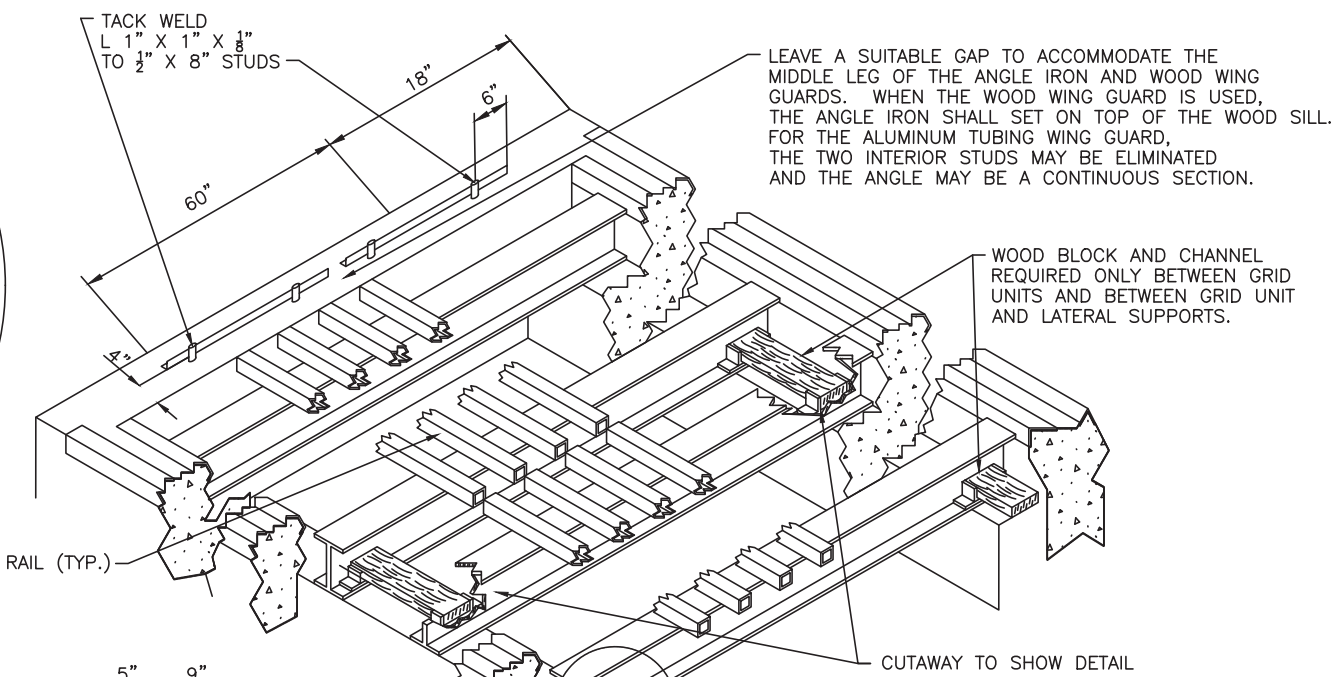
CATTLE GUARD WING

LIST OF MATERIALS PER WING  
(TWO REQUIRED PER INSTALLATION)

PART DESCRIPTION	WOOD WING	ANGLE IRON WING	ALUMINUM TUBING WING
OUTSIDE DIAGONAL SUPPORTS	TWO 2" X 6" X 84" TREATED S4S	TWO 2" X 2" X 1/4" 87" GALVANIZED STEEL ANGLE	ONE 2" OD X 1/8" X 165" ALUMINUM TUBING
MIDDLE SUPPORT	TWO 2" X 6" X 73" TREATED S4S	TWO 2" X 2" X 1/4" 73" GALVANIZED STEEL ANGLE	
HORIZONTAL BRACE NO. 1	TWO 2" X 6" X 66" TREATED S4S	ONE 1/2" 78" GALVANIZED STEEL BAR	ONE 2" OD X 1/8" X 72" ALUMINUM TUBING
NO. 2	TWO 2" X 6" X 48" TREATED S4S	ONE 1/2" 66" GALVANIZED STEEL BAR	ONE 2" OD X 1/8" X 30" ALUMINUM TUBING
NO. 3	TWO 2" X 6" X TREATED S4S	ONE 1/2" 54" GALVANIZED STEEL BAR	NONE
NO. 4	NONE	ONE 1/2" 39" GALVANIZED STEEL BAR	NONE
NO. 5	NONE	ONE 1/2" 24" GALVANIZED STEEL BAR	NONE
NO. 6	NONE	ONE 1/2" 9" GALVANIZED STEEL BAR	NONE
POST	6"x6"x96" TREATED S4S	ONE 6" X 6" X 84" TREATED S4S OR APPROVED ALTERNATE	ONE 6"x6"x96" TREATED S4S OR APPROVED ALTERNATE
TOP ANCHOR ASSEMBLY	TOENAIL DIAGONAL SUPPORTS TO THE POST WITH 16D GALVANIZED NAILS AS REQUIRED	3/8" DIA. X 6" GALVANIZED HEX BOLT W/NUT AND FLAT WASHER	3/4" DIA. X 16" GALVANIZED STEEL ROD THREADED ON ONE END W/NUT AND WASHERS & 3" RADIUS HOOK IN OTHER END
BOTTOM ANCHOR ASSEMBLY	2"x8"x96" TREATED S4S SILL ATTACHED TO CONCRETE W/ 3 EACH 1/2" DIA. X 7" HEX BOLTS W/NUTS & WASHERS EMBEDDED IN CONCRETE. TOENAIL DIAGONAL SUPPORTS TO WOODEN SILL W/16D GALVANIZED NAILS	3 EACH 3/8" DIA. X 6" GALVANIZED HEX BOLTS EMBEDDED IN CONCRETE. ATTACH STEEL L IRON TO BOLT W/FLAT WASHER AND NUT	2 EACH 1/2" X 5" X 10" FLAT IRONS WELDED TO 4" TUBING. 4 EACH 3/4" DIA X 6" GALVANIZED HEX BOLTS EMBEDDED IN CONCRETE. ATTACH THE FLAT IRON PLATES TO THE BOLTS WITH WASHER & NUTS



DETAIL A

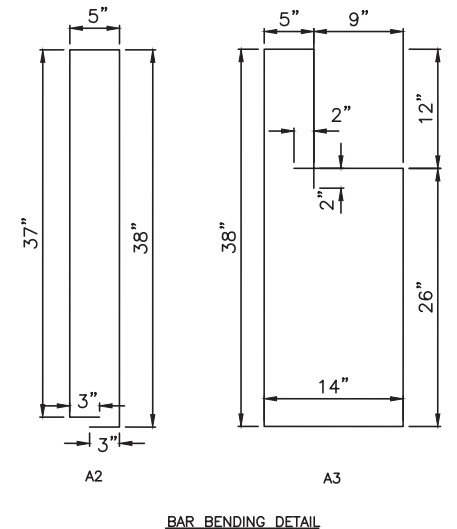


ISOMETRIC VIEW

A CATTLEGUARD DETAILS  
NO SCALE



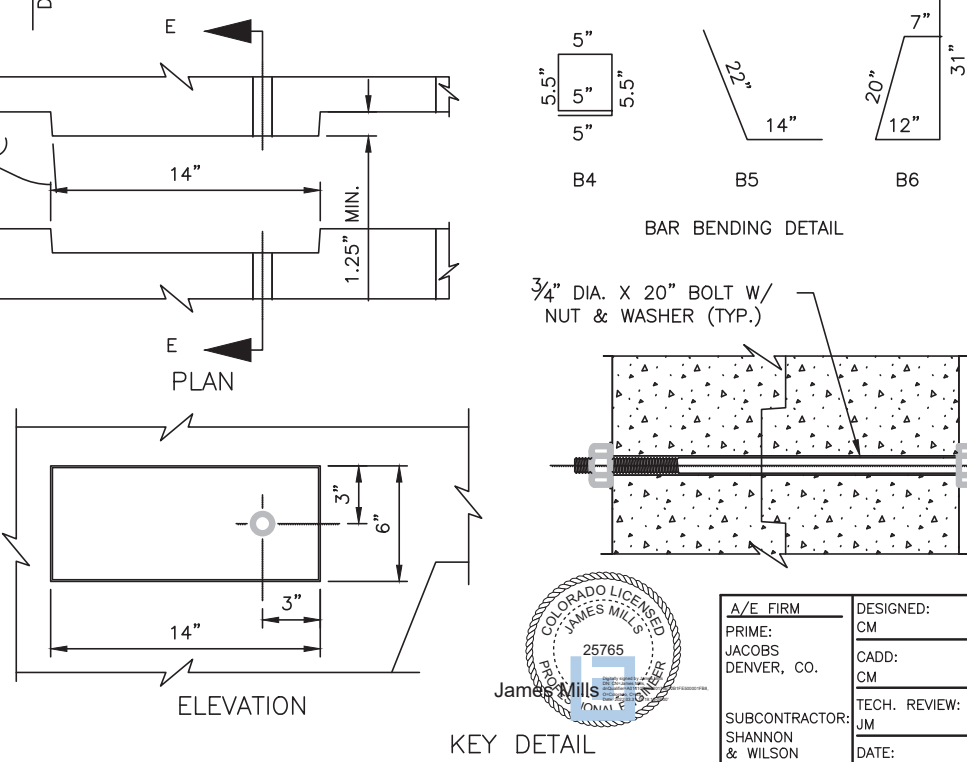
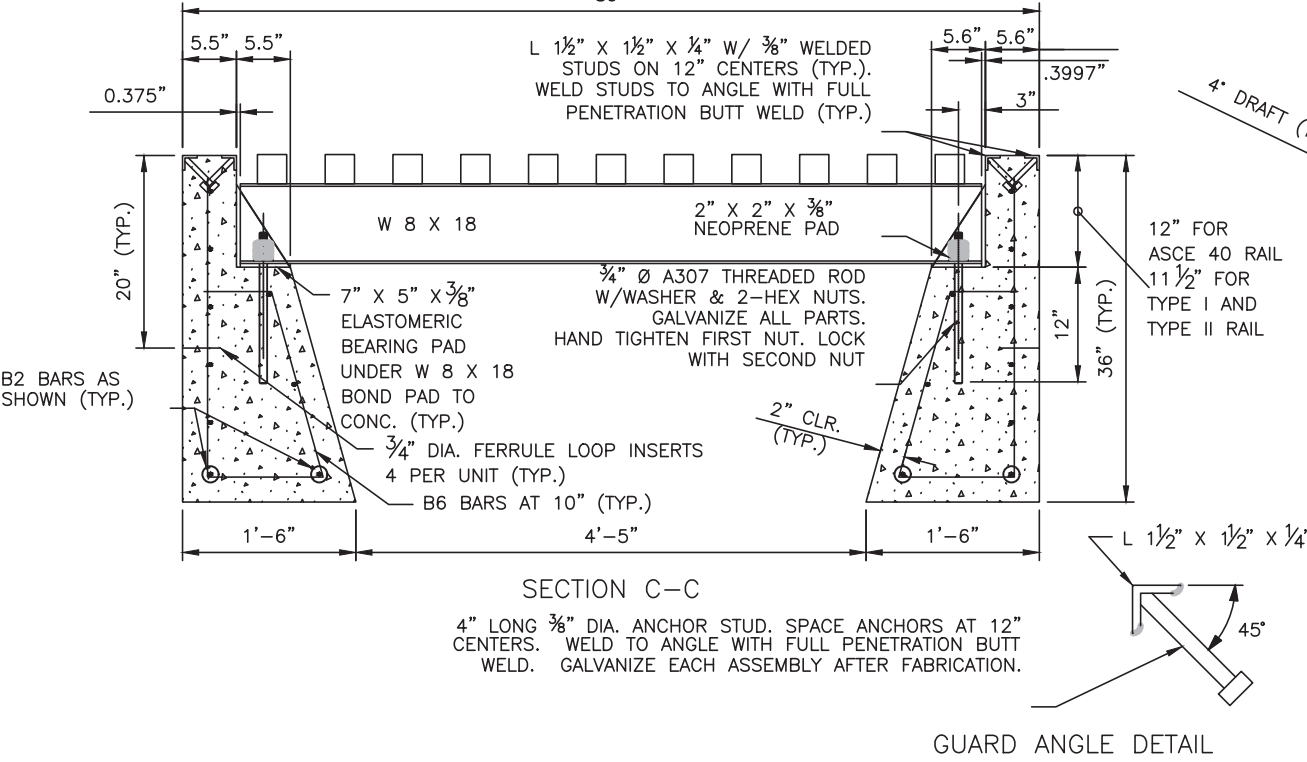
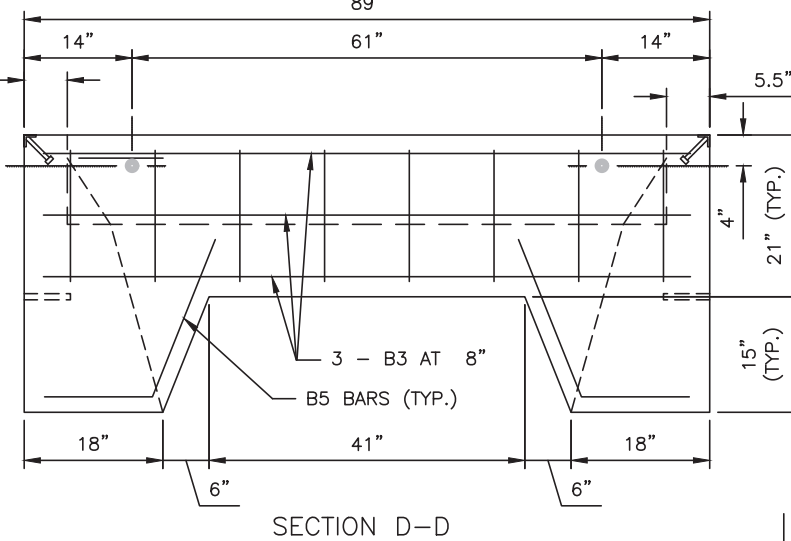
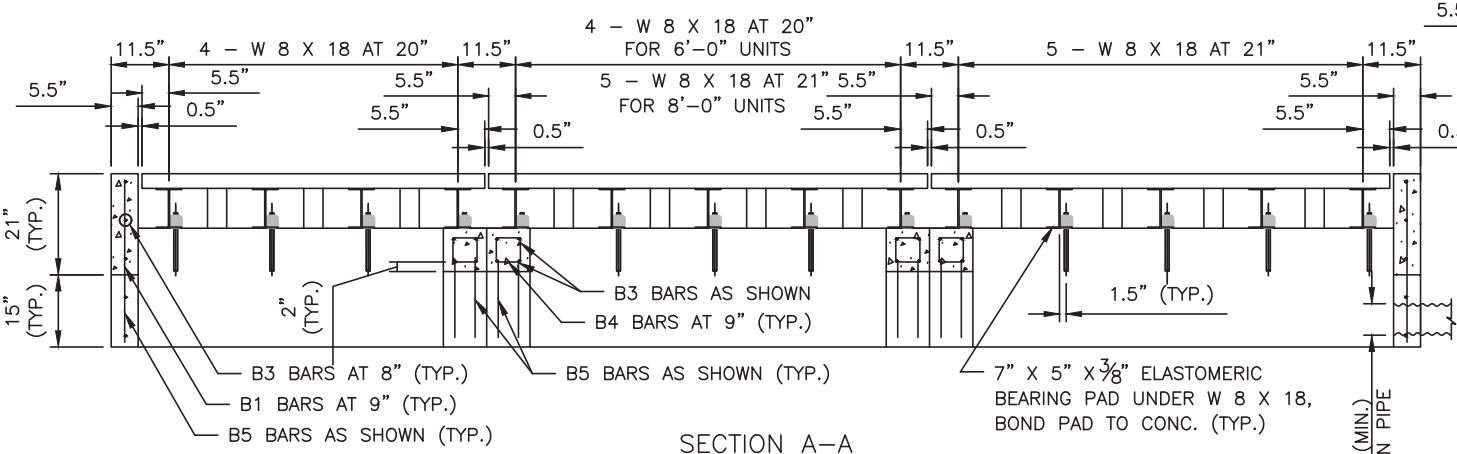
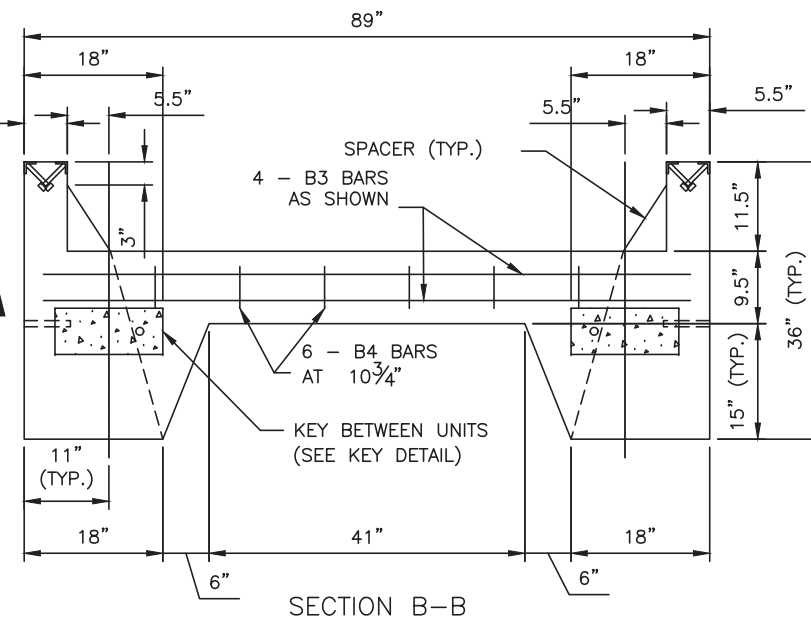
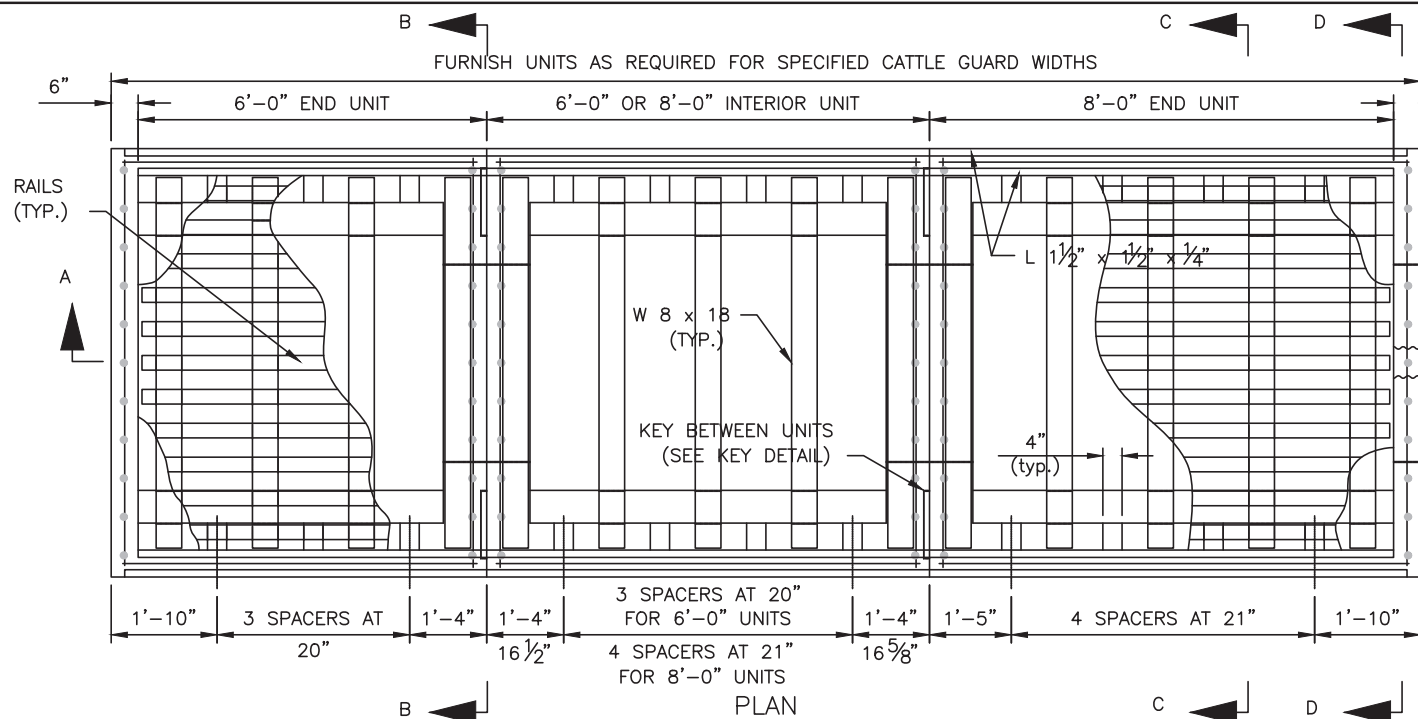
GRID UNIT LIST OF MATERIALS
GRID UNIT TYPE A
4 EACH W 8x18x77" LONG 13 EACH ASCE 40 CRANE RAIL (WITH MINIMUM SPACING), OR II TUBULAR CROSS BAR SECTIONS, (WITH MINIMUM SPACING),
GRID UNIT TYPE B
5 EACH W 8x18x77" LONG 13 EACH ASCE 40 CRANE RAIL (WITH MINIMUM SPACING), OR II TUBULAR CROSS BAR SECTIONS, (WITH MINIMUM SPACING),



BAR BENDING DETAIL

A/E FIRM PRIME: JACOBS DENVER, CO.	DESIGNED: CM CADD: CM TECH. REVIEW: JM DATE: 3/28/22	SUB SHEET NO. <b>S21</b>	TITLE OF DRAWING <b>CATTLE GUARD DETAILS</b>	DRAWING NO. #115 177002
SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.			BLACK CANYON OF THE GUNNISON NATIONAL PARK	PKG. NO. 1 SHEET <b>43</b> OF 55

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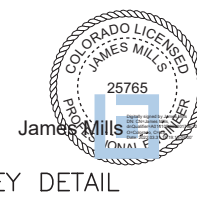


- NOTES:
- SEE STANDARD 619-1 FOR REINFORCING STEEL SIZE AND GRADE.
  - SEE STANDARD 619-1 AND 2 FOR CATTLE GUARD WING DETAILS. FABRICATE END UNITS TO ACCOMMODATE SELECTED CATTLE GUARD WING.
  - MINIMUM SOIL BEARING 4,000 LB/FT<sup>2</sup>. PLACE UNITS IN FINE AGGREGATE BED 3 INCH THICK OVER HAND LEVELED SOIL COMPACTED TO NOT LESS THAN 95% DENSITY.
  - CHAMFER EXPOSED CONCRETE EDGES 3/4" UNLESS OTHERWISE SHOWN. GIVE ALL CONCRETE SURFACES A CLASS 1 FINISH.
  - APPROVED ALTERNATE DESIGNS MAY BE USED.

PRECAST CATTLE GUARD					
REINFORCING STEEL AND CONCRETE					
UNIT	NO. OF BARS	BAR MARK	LENGTH	MASS LB	CONCRETE CUYD
6'-0" END	7	B3	85"	33.1	1.89
	10	B2	74"	41.2	
	8	B1	17"	7.6	
	6	B4	26"	8.7	
	18	B6	70"	70.1	
6'-0" INTERIOR	6	B5	36"	12.0	1.90
	8	B3	85"	37.9	
	10	B2	68"	37.9	
	12	B4	26"	17.4	
	18	B6	70"	70.1	
8'-0" INTERIOR	8	B5	36"	16.0	2.34
	8	B3	85"	37.9	
	10	B2	92"	51.2	
	12	B4	26"	17.4	
	20	B6	70"	77.9	
8'-0" END	8	B5	36"	16.0	2.32
	7	B3	85"	33.1	
	10	B2	98"	54.6	
	8	B1	17"	7.6	
	6	B4	26"	8.7	
	20	B6	70"	77.9	
	6	B5	36"	12.0	

(A) CATTLEGUARD DETAILS  
NO SCALE

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A/E FIRM  
PRIME:  
JACOBS  
DENVER, CO.

DESIGNED:  
CM

CADD:  
CM

TECH. REVIEW:  
JM

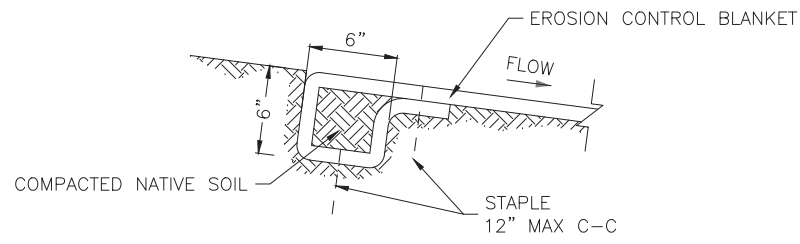
DATE:  
3/28/22

SUB SHEET NO.  
**S22**

TITLE OF DRAWING  
**CATTLE GUARD  
PRECAST  
FOUNDATION**  
BLACK CANYON OF THE GUNNISON  
NATIONAL PARK

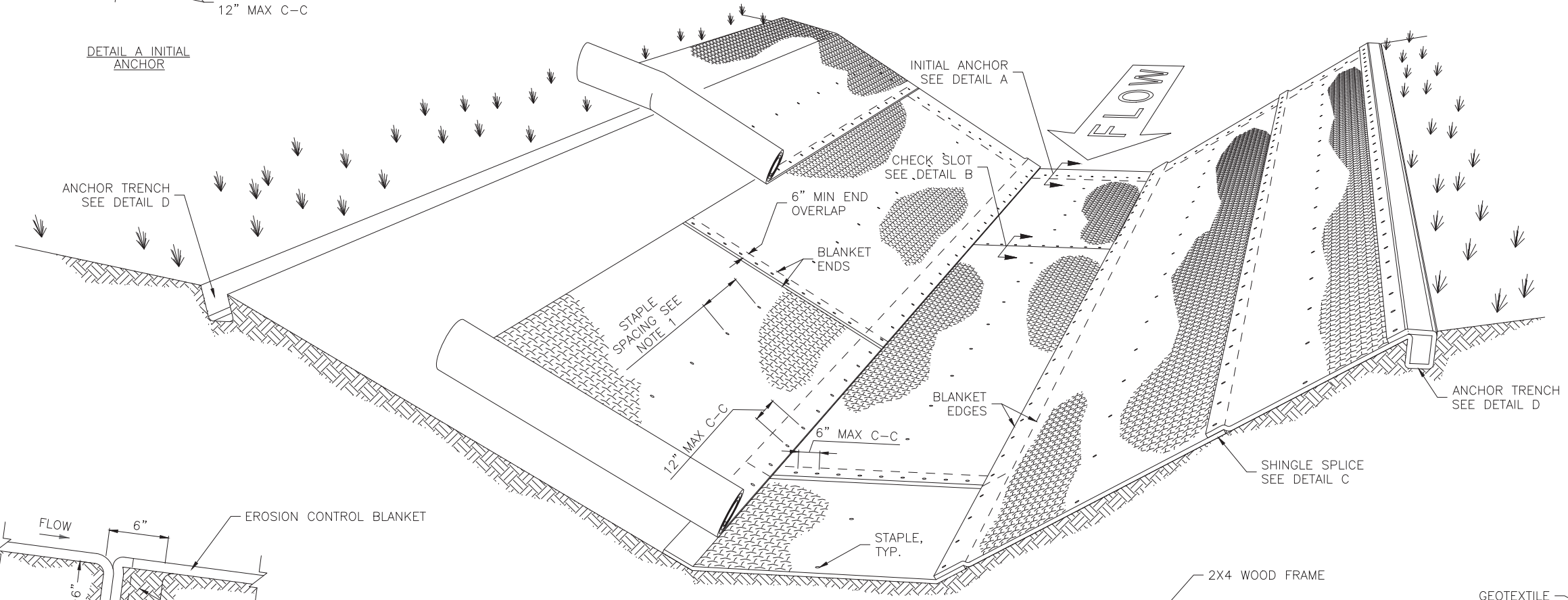
PKG. NO. 1  
SHEET 44 OF 55

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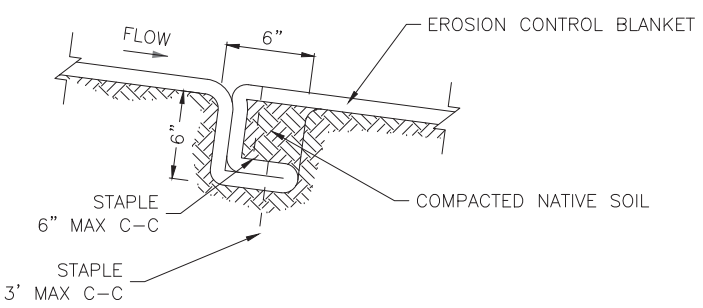


DETAIL A INITIAL ANCHOR

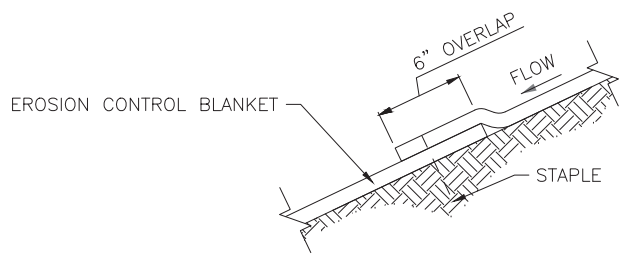
- NOTES:**
1. INSTALL STAPLES ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
  2. PROVIDE CHECK SLOTS ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. ROLL ENDS MAY BE SPLICED IN A CHECK SLOT.
  3. TRAPEZOIDAL DITCH SHOWN. SIMILAR DETAILS FOR A V-DITCH.



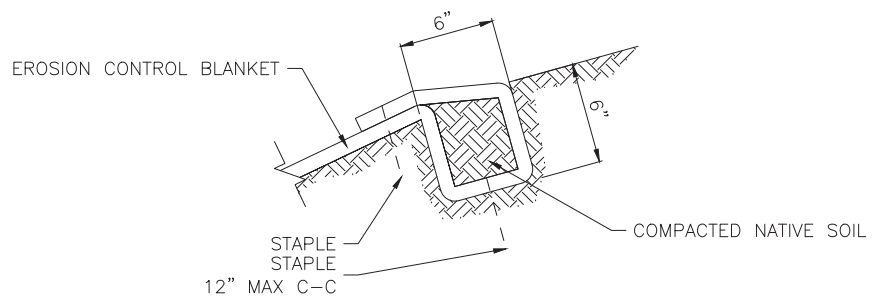
PERSPECTIVE VIEW



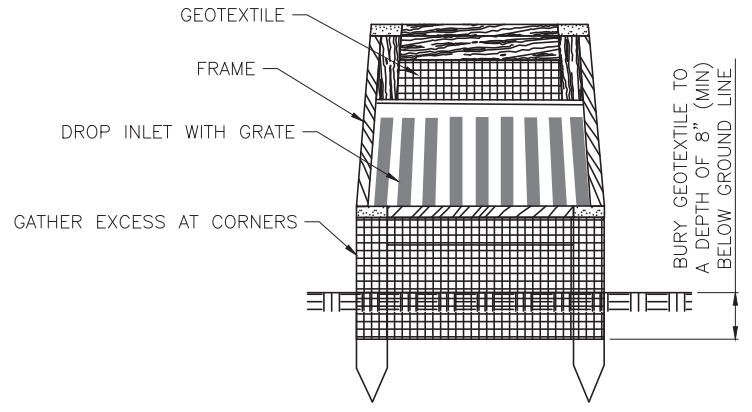
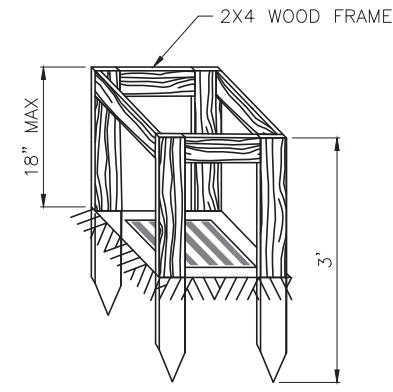
DETAIL B CHECK SLOT



DETAIL C SHINGLE SPLICE

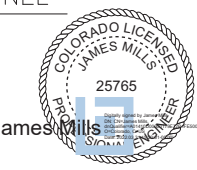


DETAIL D ANCHOR TRENCH



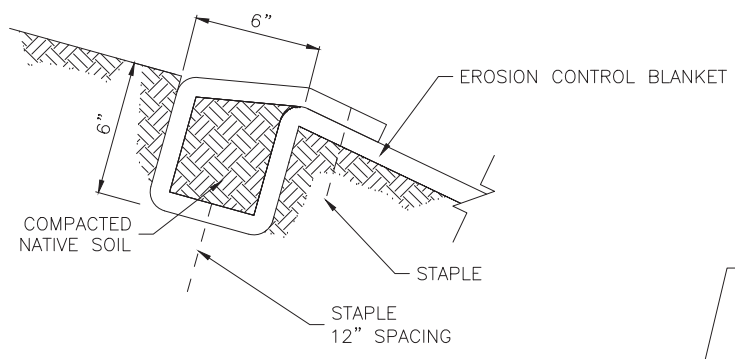
(A) SILT FENCE DROP INLET PROTECTION  
NO SCALE

(A) ROLLED EROSION CONTROL PRODUCT IN CHANNEL  
NO SCALE

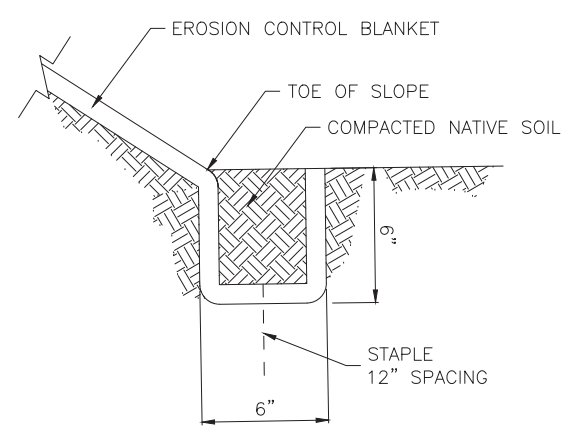


A/E FIRM PRIME: JACOBS DENVER, CO. SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	DESIGNED: CM	SUB SHEET NO. <b>S23</b>	TITLE OF DRAWING <b>ROLLED EROSION CONTROL IN CHANNEL</b>		DRAWING NO. #115 177002
	CADD: CM		BLACK CANYON OF THE GUNNISON NATIONAL PARK		
TECH. REVIEW: JM	DATE: 3/28/22	PKG. NO. 1	SHEET 45	OF 55	

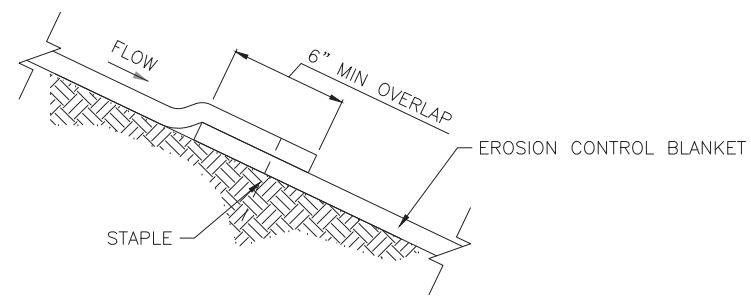
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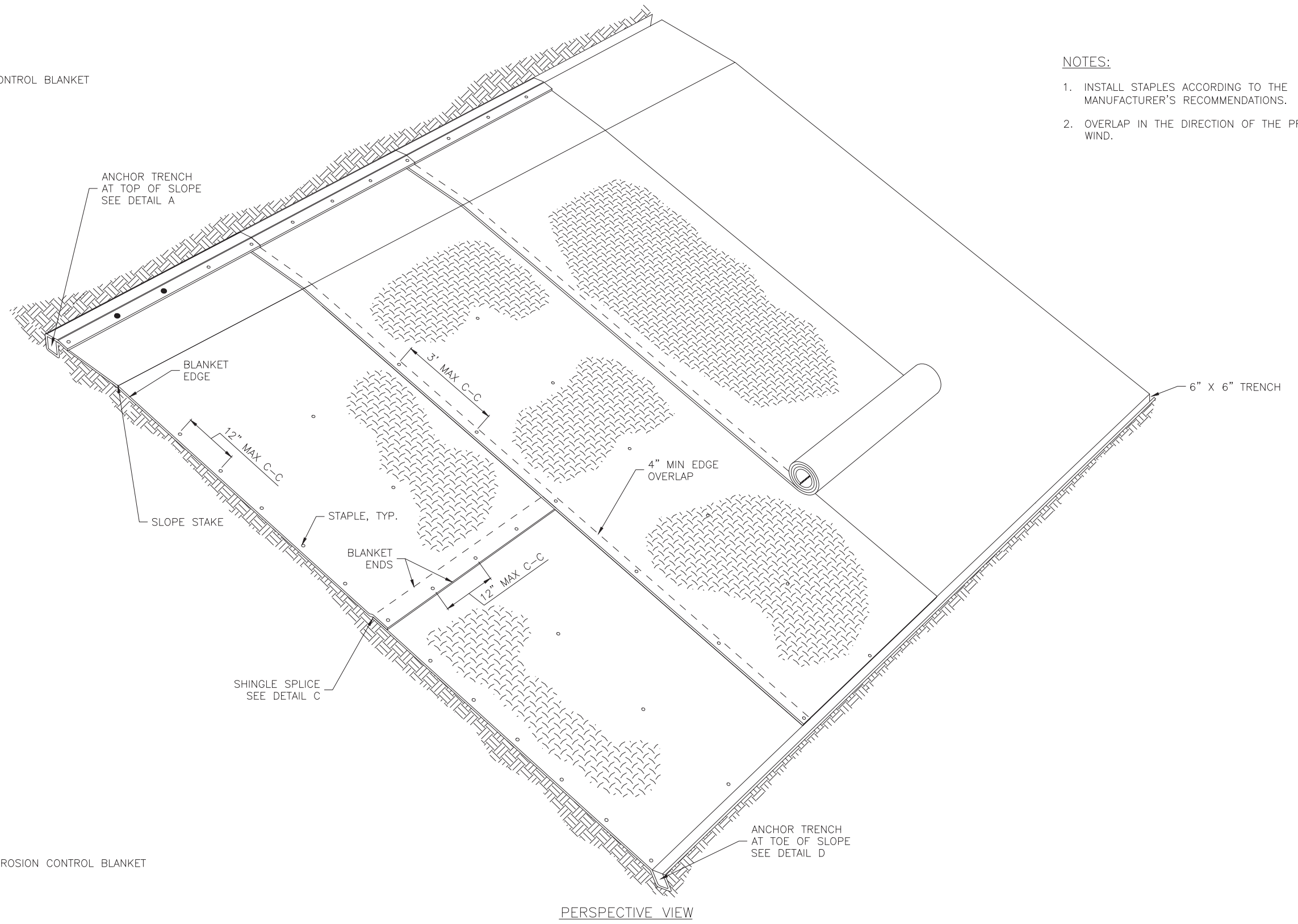
DETAIL A ANCHOR TRENCH AT TOP OF SLOPE



DETAIL B ANCHOR TRENCH AT TOE OF SLOPE



DETAIL C SHINGLE SPLICE



PERSPECTIVE VIEW

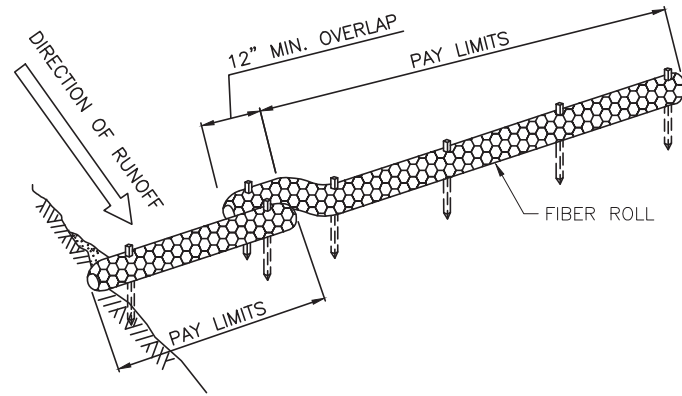
- NOTES:
1. INSTALL STAPLES ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
  2. OVERLAP IN THE DIRECTION OF THE PREVAILING WIND.

(A) ROLLED EROSION CONTROL PRODUCT ON SLOPE  
NO SCALE

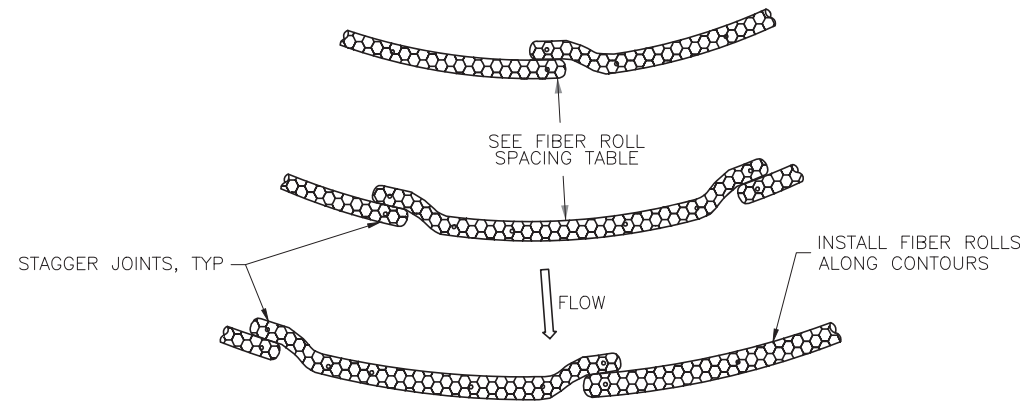


<b>A/E FIRM</b> PRIME: JACOBS DENVER, CO. SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	<b>DESIGNED:</b> CM	<b>SUB SHEET NO.</b>  <b>S24</b>	<b>TITLE OF DRAWING</b> <b>ROLLED EROSION CONTROL ON SLOPE</b> BLACK CANYON OF THE GUNNISON NATIONAL PARK	<b>DRAWING NO.</b> #115 177002
	<b>TECH. REVIEW:</b> JM	<b>DATE:</b> 3/28/22		<b>PKG. NO.</b> 1





FIBER ROLL JOINT DETAIL



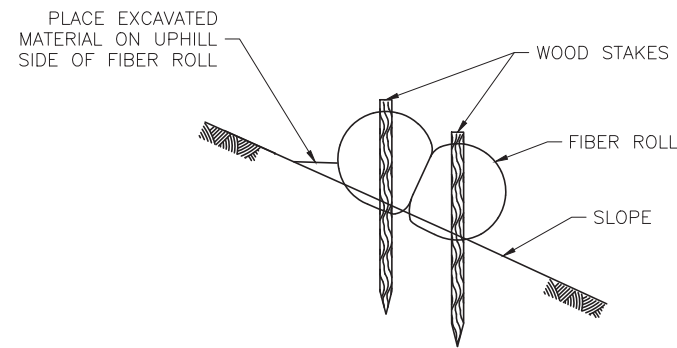
FIBER ROLL SLOPE LAYOUT

FIBER ROLLS AT CULVERTS*	
CULVERT SIZE	9" Ø FIBER ROLL LENGTH (FT)
24" OR SMALLER	10
30" TO 48"	20
54" OR LARGER	30

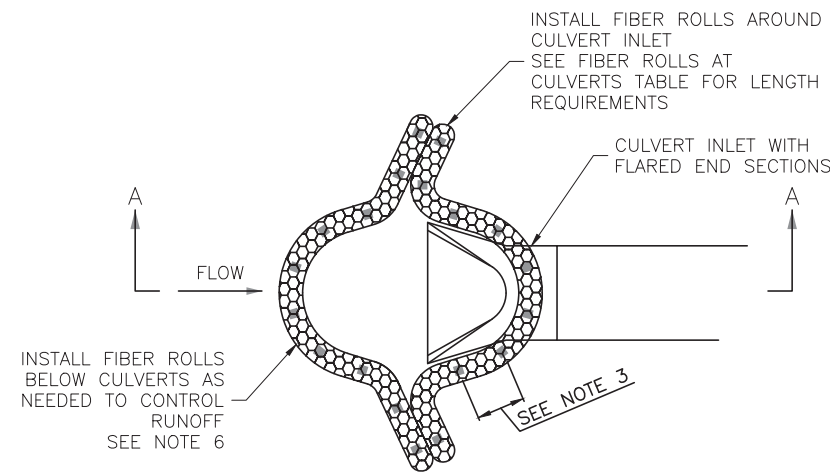
\*APPROXIMATE LENGTH SHOWN FOR ROLLS ACROSS THE TOP OF THE CULVERT INLET ONLY. ADJUST LENGTH AS NEEDED DUE TO PROJECT-SPECIFIC CONDITIONS.

NOTES:

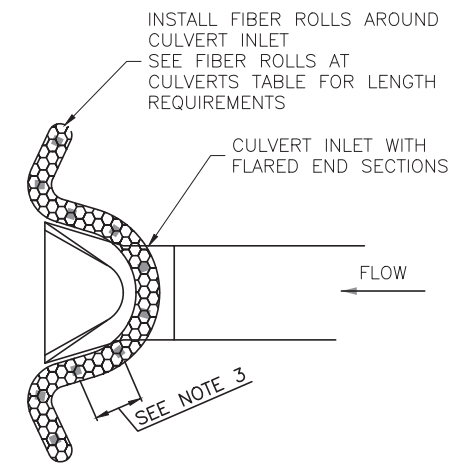
- REPAIR ALL RILLS OR GULLIES AND PROPERLY COMPACT PRIOR TO INSTALLATION.
- INSTALL FIBER ROLLS ALONG SLOPE CONTOURS. FOR ANY 20' SECTION OF FIBER ROLL, DO NOT ALLOW THE FIBER ROLL TO VARY MORE THAN 5% FROM LEVEL.
- STAKE FIBER ROLLS IN PLACE WITH 1" X 1" OR 1" Ø WOOD STAKES. SPACE STAKES 4' O.C. MAX. ON SLOPES AND 2' O.C. MAX. CULVERTS. STAKE FIBER ROLLS 6-INCHES FROM EACH END.
- DRIVE STAKES INTO UNDISTURBED SOIL AT LEAST 12" DEEP. EXPOSE STAKES 2" ABOVE TOP OF FIBER ROLL.
- FOR FIBER ROLLS ON BARE SOIL, CONSTRUCT TRENCHES PARALLEL TO THE CONTOUR. PLACE FIBER ROLLS IN CONTINUOUS CONTACT WITH TRENCH BOTTOM AND SIDES. TAMP SOIL BACKFILL AGAINST UPSTREAM SIDE OF FIBER ROLL TO ENSURE STORM WATER IS FORCED TO FLOW THROUGH FIBER ROLL RATHER THAN UNDER IT.
- PLACE FIBER ROLLS ALL THE WAY AROUND THE INLET WHEN THE DISTURBANCE IS ON BOTH THE ROAD AND AROUND THE CULVERT AND ALL WATER ENTERING THE CULVERT IS CROSSING THE DISTURBANCE.



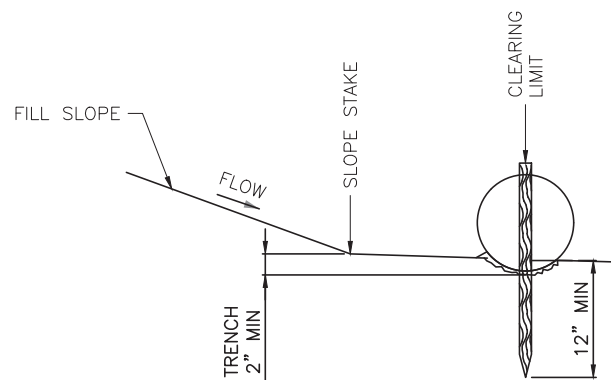
FIBER ROLL LAPPING DETAIL



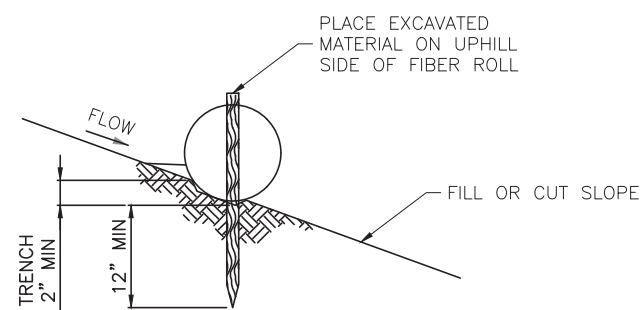
FIBER ROLL AT CULVERT INLET



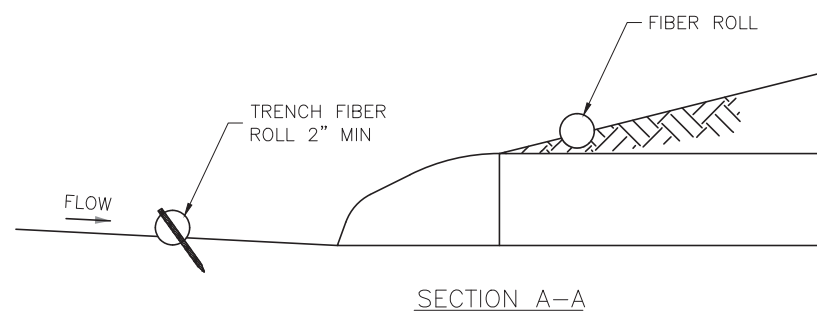
FIBER ROLL AT CULVERT OUTLET



FIBER ROLL AS PERIMETER CONTROL INSTALLATION DETAIL



STAKE DETAIL



SECTION A-A

⊙ A FIBER ROLL  
NO SCALE

FIBER ROLL SPACING TABLE*	
SLOPE GRADIENT	9" Ø FIBER ROLL MAXIMUM SPACING (FT)
1V:4H OR FLATTER	60
BETWEEN 1V:4H AND 1V:3H	45
BETWEEN 1V:3H AND 1V:2H	30
1V:2H OR STEEPER	15

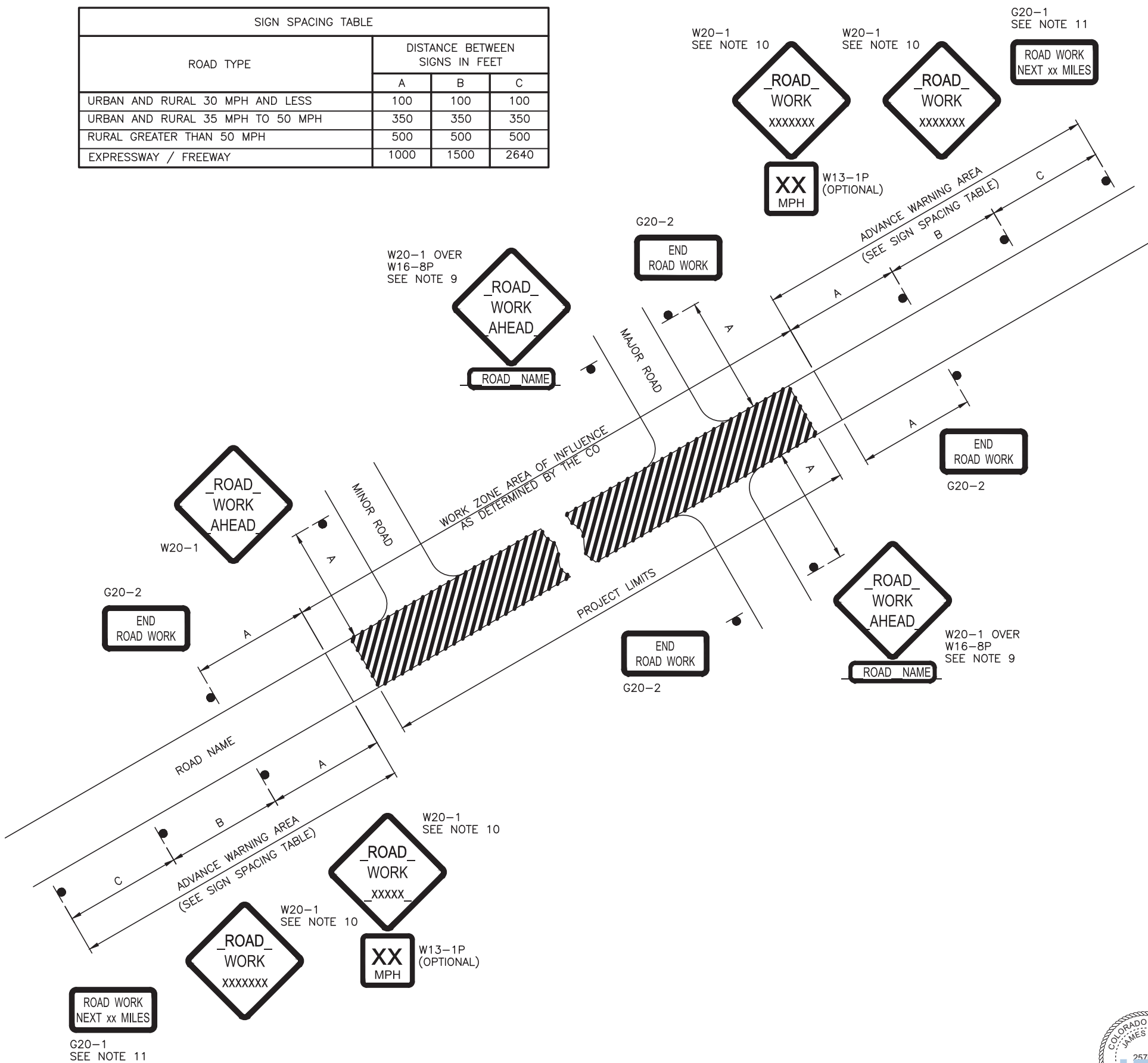
\*APPROXIMATE SPACING SHOWN. ADJUST SPACING AS NEEDED DUE TO PROJECT-SPECIFIC CONDITIONS.

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A/E FIRM PRIME: JACOBS DENVER, CO.	DESIGNED: CM CADD: CM	SUB SHEET NO. <b>S25</b>	TITLE OF DRAWING <b>FIBER ROLL</b>	DRAWING NO. #115 177002
SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	TECH. REVIEW: JM DATE: 3/28/22		BLACK CANYON OF THE GUNNISON NATIONAL PARK	PKG. NO. 1 SHEET <b>47</b> OF 55

SIGN SPACING TABLE			
ROAD TYPE	DISTANCE BETWEEN SIGNS IN FEET		
	A	B	C
URBAN AND RURAL 30 MPH AND LESS	100	100	100
URBAN AND RURAL 35 MPH TO 50 MPH	350	350	350
RURAL GREATER THAN 50 MPH	500	500	500
EXPRESSWAY / FREEWAY	1000	1500	2640



**NOTES:**

- ERECT ALL PROJECT ADVANCE WARNING SIGNS BEFORE STARTING CONSTRUCTION WORK.
- NOT ALL DETAILS SHOWN ON THE TEMPORARY TRAFFIC CONTROL SHEETS MAY BE APPLICABLE TO THIS PROJECT. THE CONTRACTOR MAY ADD OR DELETE INFORMATION AND DETAILS IN THIS TRAFFIC CONTROL PLAN AS NECESSARY TO ACCOMMODATE ACTUAL OPERATIONS.
- WHERE ADVANCE WARNING SIGNS, PLACED AS SHOWN, INTERFERE WITH PERMANENT SIGNS, LOCATE THE WARNING SIGNS AS DETERMINED BY THE CO FOR BEST RESULTS. VARY MESSAGES AS REQUIRED.
- ADDITIONAL OR DIFFERENT MESSAGE SIGNS MAY BE REQUIRED TO FIT THE ACTUAL CONSTRUCTION CONDITIONS.
- INSTALL ADVISORY SPEED PLATES UNDER THE W20 SERIES WARNING SIGNS AS NEEDED TO INDICATE A MAXIMUM RECOMMENDED SPEED THROUGH THE CONSTRUCTION AREA.
- ENSURE ALL SIGN SUPPORTS EXPOSED TO IMPACT BY TRAFFIC MEET THE REQUIREMENTS OF NCHRP-350 OR MASH FOR CRASHWORTHINESS.
- MAINTAIN TWO-WAY TRAFFIC DURING ALL NON-WORK HOURS EXCEPT AS APPROVED BY THE CO.
- DO NOT STORE TRAFFIC CONTROL DEVICES ALONG THE ROADWAY WHEN NOT IN USE. COVER POST-MOUNTED SIGNS WHEN NOT APPLICABLE.
- IF W20-1 IS PLACED ON A ROADWAY OTHER THAN THAT ON WHICH THE ACTUAL CONSTRUCTION WORK OCCURS, INCLUDE A SUPPLEMENTARY PLAQUE INDICATING THE NAME OF THE ROAD ON WHICH THE CONSTRUCTION DOES OCCUR (APPLIES TO MAJOR ROADS ONLY).
- THE MESSAGE ON THE W20-1 SIGNS MAY BE "ROAD WORK AHEAD" OR MAY SPECIFY THE DISTANCE TO THE WORK AREA IN FEET OR IN MILES. INSTALL AN ADDITIONAL W20-1 SIGN WHEN APPROACH SPEEDS EXCEED 50 MPH. WHEN USED PLACE THE TWO W20-1 SIGNS "B" FEET APART ACCORDING TO THE SIGN SPACING TABLE.
- FOR WORK ZONES THAT ARE 2 MILES OR MORE IN LENGTH, INSTALL G20-1 SIGNS AT EACH END OF THE PROJECT. SHOW THE DISTANCE ON THE G20-1 SIGN TO THE NEAREST WHOLE MILE.
- IF SIGNING ON A ROADWAY UNDER A JURISDICTION OTHER THAN THE CLIENT AGENCY, VERIFY THAT AN ENCROACHMENT PERMIT HAS BEEN OBTAINED.
- STATE STANDARDS MAY BE USED AS AN ALTERNATIVE IF APPROVED BY THE CO.
- REFER TO THE SECTION 635 OF THE SPECIAL CONTRACT REQUIREMENTS FOR ALLOWABLE RETROREFLECTIVE SHEETING TYPES.

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A/E FIRM PRIME: JACOBS DENVER, CO.	DESIGNED: CM CADD: CM TECH. REVIEW: JM DATE: 3/28/22	SUB SHEET NO.  <b>S26</b>	TITLE OF DRAWING <b>TEMPORARY TRAFFIC CONTROL ADVANCE SIGNING</b> BLACK CANYON OF THE GUNNISON NATIONAL PARK	DRAWING NO. #115 177002
SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.				PKG. NO. 1 SHEET 48 OF 55

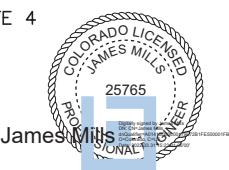
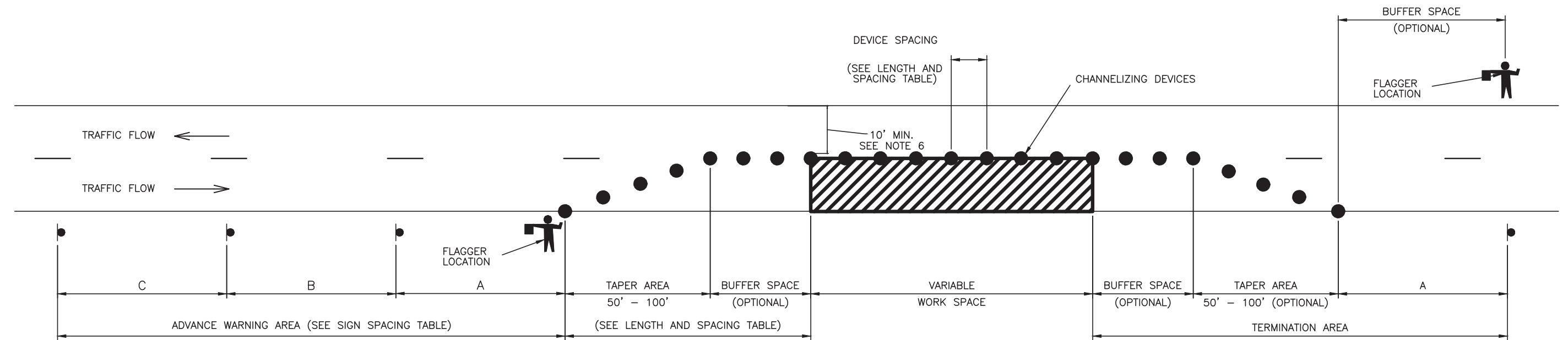
LENGTH AND SPACING TABLE				
APPROACH SPEED*	BUFFER SPACE LENGTH	CHANNELIZING DEVICE		
		TAPER AREA	BUFFER SPACE	WORK SPACE
MPH	FEET	SPACING IN FEET		
20	115	20	40	40
25	155	20	50	50
30	200	20	60	60
35	250	20	70	70
40	305	20	80	80
45	360	20	90	90
50	425	20	100	100
55	495	20	110	110
60	570	20	120	120
65	645	20	130	130
70	730	20	140	140

\* APPROACH SPEED BASED ON THE REGULATORY POSTED SPEED, NOT THE ADVISORY SPEED.

SIGN SPACING TABLE			
ROAD TYPE	DISTANCE BETWEEN SIGNS IN FEET		
	A	B	C
URBAN AND RURAL 30 MPH AND LESS	100	100	100
URBAN AND RURAL 35 MPH TO 50 MPH	350	350	350
RURAL GREATER THAN 50 MPH	500	500	500
EXPRESSWAY / FREEWAY	1000	1500	2640

**NOTE:**

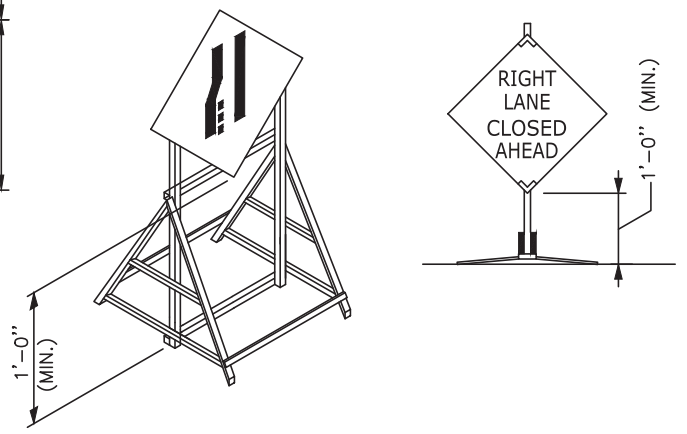
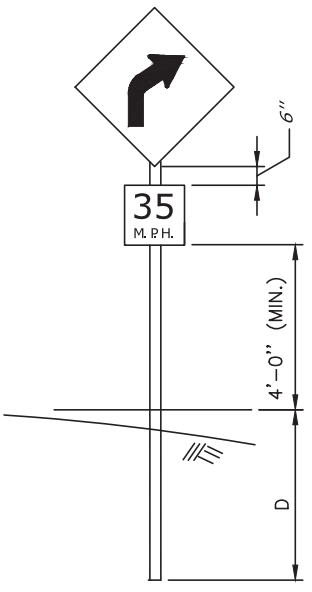
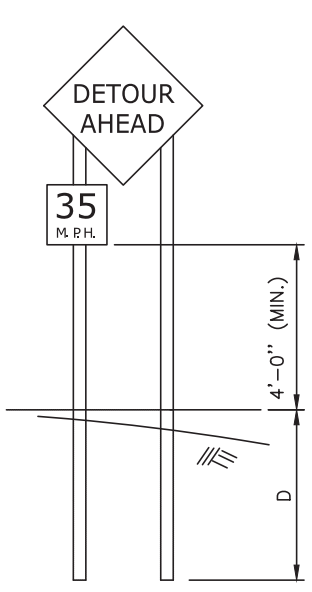
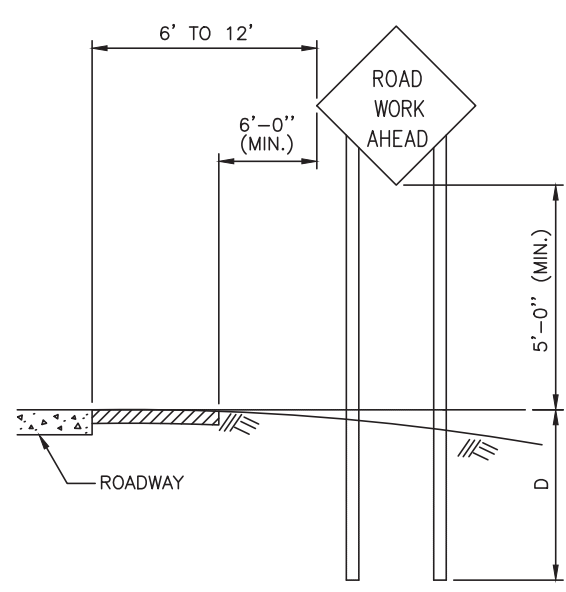
- SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL ONLY. PLACE DEVICES SIMILAR TO THOSE DEPICTED FOR THE OPPOSITE DIRECTION OF TRAVEL.
- FINAL LOCATION AND SPACING OF SIGNS AND DEVICES MAY BE CHANGED TO FIT FIELD CONDITIONS AS APPROVED BY THE CO.
- FOR PILOT CAR OPERATION, MOUNT THE PILOT CAR FOLLOW ME (G20-4) SIGN AT A CONSPICUOUS LOCATION ON THE REAR OF VEHICLE. PROMINENTLY DISPLAY THE NAME OF THE CONTRACTOR ON THE PILOT CAR.
- IF CLOSURE IS COMPLETELY WITHIN THE PROJECT LIMITS, ELIMINATE THE "ROAD WORK AHEAD" (W20-1) AND "END ROAD WORK" (G20-2) SIGNS.
- FOR NIGHT TIME FLAGGING OPERATION, PROVIDE FLOODLIGHTING AT FLAGGER STATIONS.
- FOR PROJECT SPECIFIC MINIMUM WIDTH, REFER TO THE SPECIAL CONTRACT REQUIREMENTS, SECTION 156.
- DO NOT ALLOW EQUIPMENT, MATERIALS, OR VEHICLES TO BE PARKED OR STORED IN THE BUFFER SPACE.



(A) TEMPORARY TRAFFIC CONTROL SINGLE LANE CLOSURE LAYOUT (WITH FLAGGERS)  
NO SCALE

A/E FIRM PRIME: JACOBS DENVER, CO. SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	DESIGNED: CM	SUB SHEET NO. <b>S27</b>	TITLE OF DRAWING <b>TEMPORARY TRAFFIC CONTROL SINGLE LANE CLOSURE LAYOUT (WITH FLAGGERS)</b>	DRAWING NO. #115 177002
	CADD: CM			
BLACK CANYON OF THE GUNNISON NATIONAL PARK				OF 55

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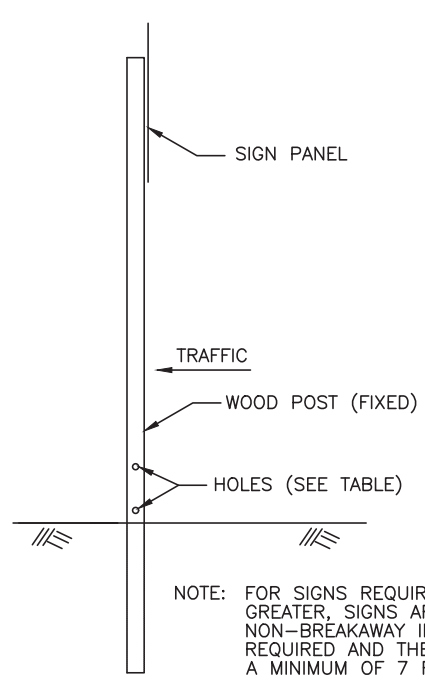
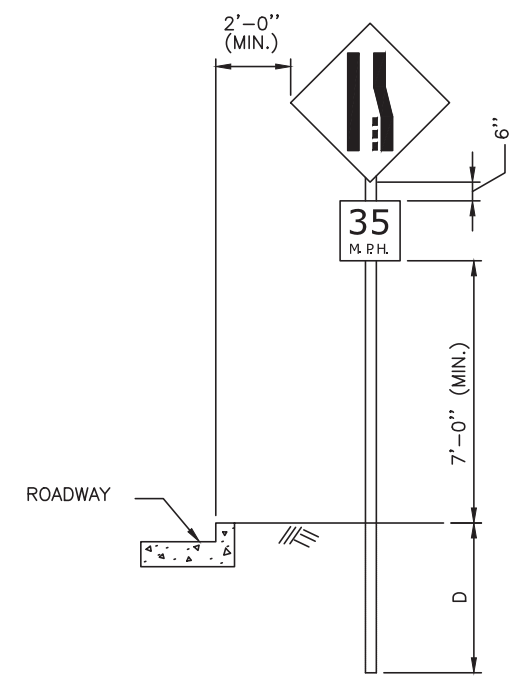
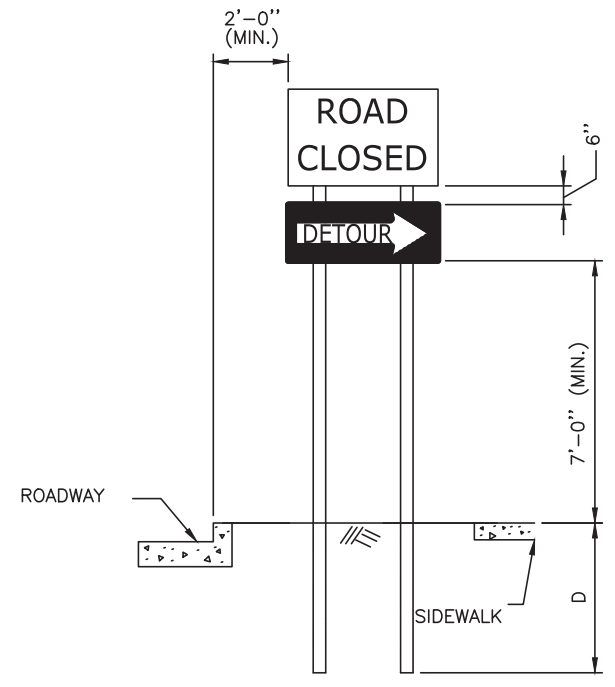


**A** RURAL AREA  
NO SCALE

**C** PORTABLE SIGNS  
NO SCALE  
(SEE NOTES 3 AND 4)

**NOTE:**

1. MOUNT SIGNS THAT ARE WIDER THAN 3 FEET OR LARGER THAN 10 SQUARE FEET ON DOUBLE POSTS.
2. ALL LUMBER DIMENSIONS ARE NOMINAL.
3. THE CONTRACTOR MAY SUBMIT ALTERNATE DETAILS FOR PORTABLE SIGNS. ENSURE SIGN MOUNTS HOLD THE SIGN FACE IN A VERTICAL PLANE. PORTABLE SIGNS MAY BE MOUNTED LOWER THAN FIXED SIGNS WHEN APPROVED BY THE CO. ENSURE ALL PORTABLE SIGN SUPPORTS MEET THE REQUIREMENTS OF NCHRP REPORT 350 FOR CRASHWORTHINESS.
4. WHEN PARKING IS PERMITTED WITHIN 200 FEET OF THE SIGN, MOUNT THE SIGN A MINIMUM OF 7 FEET ABOVE THE PAVEMENT SURFACE.
5. WHEN APPROVED BY THE CO AND THE UTILITY COMPANY, UTILITY POLES MAY BE USED FOR SIGN MOUNTING.
6. FOR POSTS 4-INCH X 6-INCH AND GREATER, SEE THE BREAKAWAY SUPPORT DETAIL. IF BREAKAWAY DESIGN CANNOT BE USED DUE TO POST SPACING, PLACE THE SIGN OUTSIDE THE CLEARZONE OR SHIELD WITH A BARRIER. DO NOT PLACE HOLES IN POSTS OF NON-BREAKAWAY SIGNS.



URBAN AREA

BREAKAWAY SUPPORT DETAIL  
(FIXED SIGNS 4" X 6" AND GREATER POSTS)

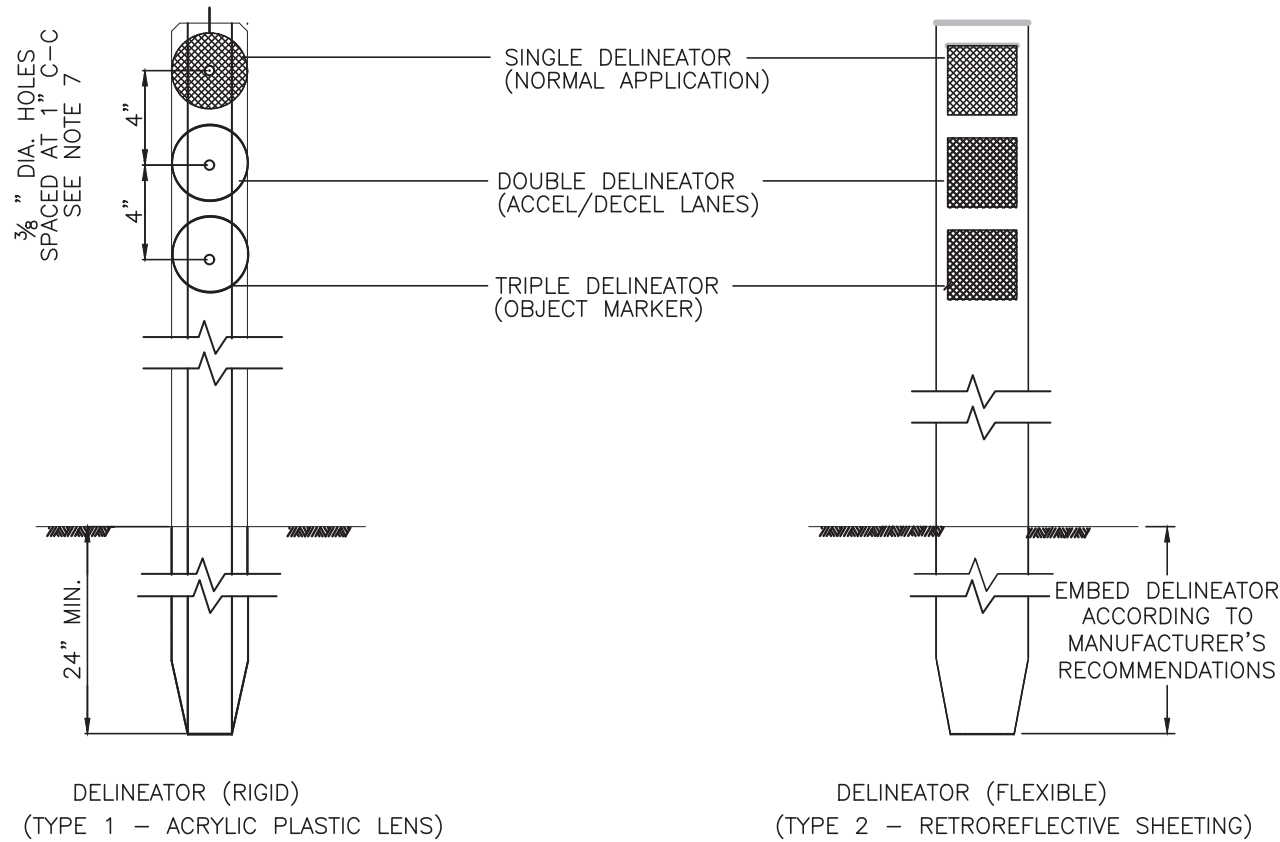
**B** FIXED ROADWAY SIGNS  
NO SCALE

POST SIZE TABLE						
POST SIZE	D	HOLE DIAMETER	MAXIMUM SIGN AREA (Sq. Ft.)			
			1 Post	2 Post	3 Post	4 Post
4" x 4"	4"	None Required	10	20		
4" x 6"	4"	1.5"		35	50	70
6" x 6"	5"	2"		50	75	100
6" x 8"	5"	3"		85	125	165

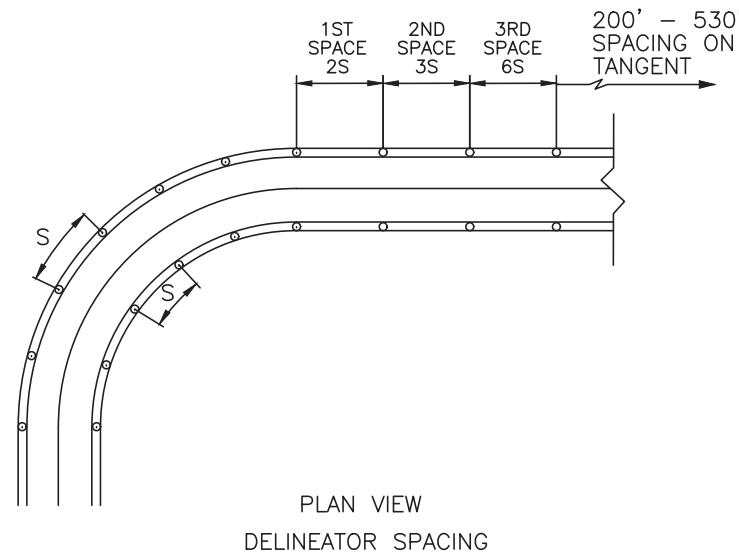
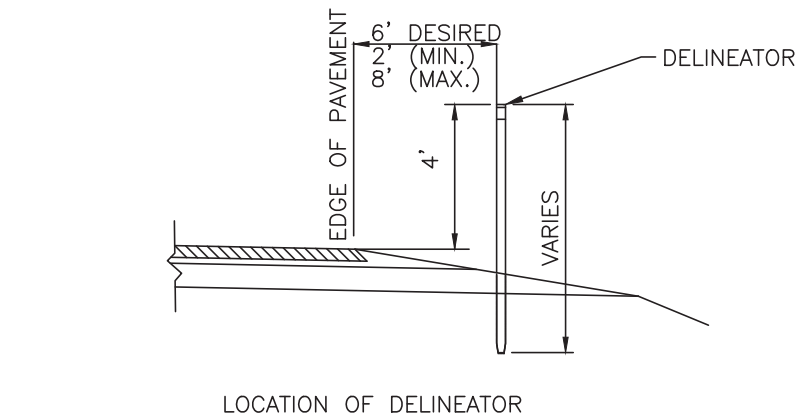
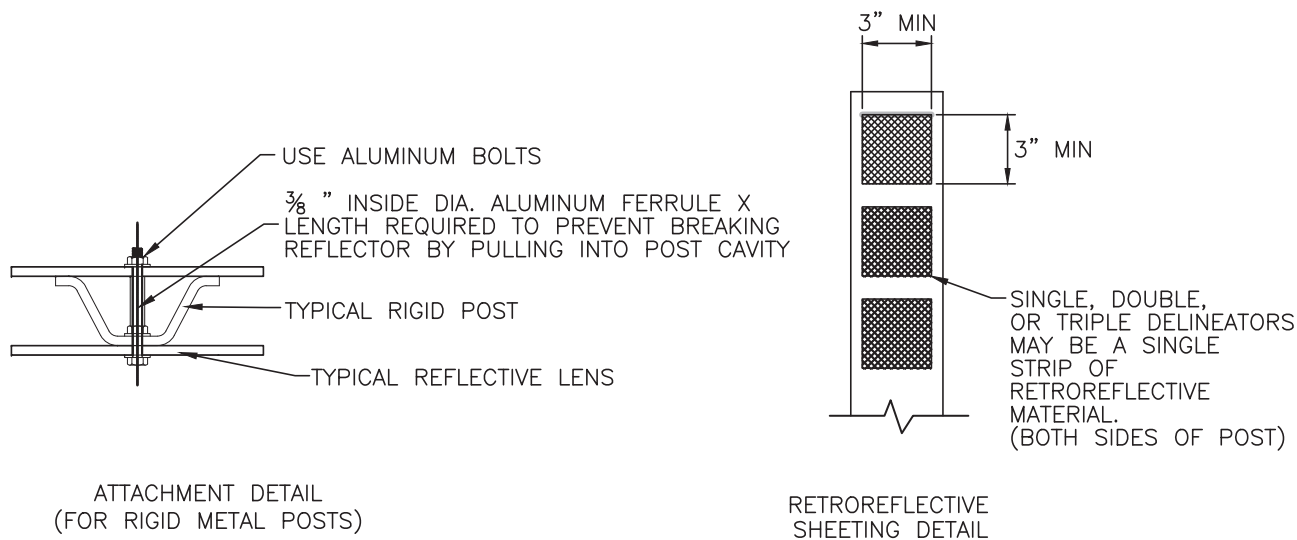
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<b>A/E FIRM</b> PRIME: JACOBS DENVER, CO.  SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	<b>DESIGNED:</b> CM	<b>SUB SHEET NO.</b>  <h1>S28</h1>	<b>TITLE OF DRAWING</b> <h2>CONSTRUCTION TRAFFIC CONTROL SIGN MOUNTING</h2>		<b>DRAWING NO.</b> #115 177002
	<b>TECH. REVIEW:</b> JM		<b>BLACK CANYON OF THE GUNNISON NATIONAL PARK</b>		<b>PKG. NO.</b> 1
<b>DATE:</b> 3/28/22					



POST DETAILS



NOTE:

- MATCH THE COLOR OF THE REFLECTIVE ELEMENT WITH THE EDGE LINE.
- USE YELLOW REFLECTIVE ELEMENTS FOR TRIPLE DELINEATORS INSTALLED TO MARK OBSTRUCTIONS.
- INSTALL DOUBLE DELINEATORS ON 100-FOOT SPACING FOR ACCELERATION AND DECELERATION LANES OR TO MARK CHANGES IN WIDTH.
- INSTALL REFLECTIVE ELEMENTS ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
- ALTERNATE DELINEATOR TYPES MAY BE USED WITH APPROVAL OF THE PROVIDE DELINEATORS CONFORMING TO THE MUTCD AND INSTALL ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
- PLACE DELINEATORS AT A CONSTANT DISTANCE FROM THE EDGE OF THE PAVEMENT. WHERE GUARDRAIL INTRUDES INTO THE SPACE BETWEEN THE EDGE OF PAVEMENT AND THE DELINEATOR OFFSET, LOCATE THE DELINEATOR IMMEDIATELY BEHIND THE GUARDRAIL.
- A MINIMUM OF 12 HOLES SPACED ON 1" CENTERS ARE REQUIRED FOR ALL RIGID POSTS. SEE SUBSECTION 718.04.
- FURNISH ANTI-THEFT HARDWARE FOR MOUNTING RETROREFLECTORS AS REQUIRED.
- SEE SUBSECTION 718.05 FOR RIGID POST REQUIREMENTS.
- INSTALL TYPE 1 DELINEATOR (OBJECT MARKERS) AT ALL CULVERT INLET AND OUTLETS PER DETAIL S29 UNLESS OTHERWISE NOTED.

DELINEATOR SPACING ON CURVES				
RADIUS OF CURVE (R)	SPACING ON CURVE (S)	SPACING ON TANGENTS AT CURVE ENDS		
		1ST SPACE (2S)	2ND SPACE (3S)	3RD SPACE (6S)
(FEET)	(FEET)	(FEET)	(FEET)	(FEET)
50	20	40	60	120
115	25	50	75	150
180	35	70	105	210
250	40	80	120	240
300	50	100	150	300
400	55	110	165	300
500	65	130	195	300
600	70	140	210	300
700	75	150	225	300
800	80	160	240	300
900	85	170	255	300
1,000	90	180	270	300

DELINEATOR SPACING NOTES

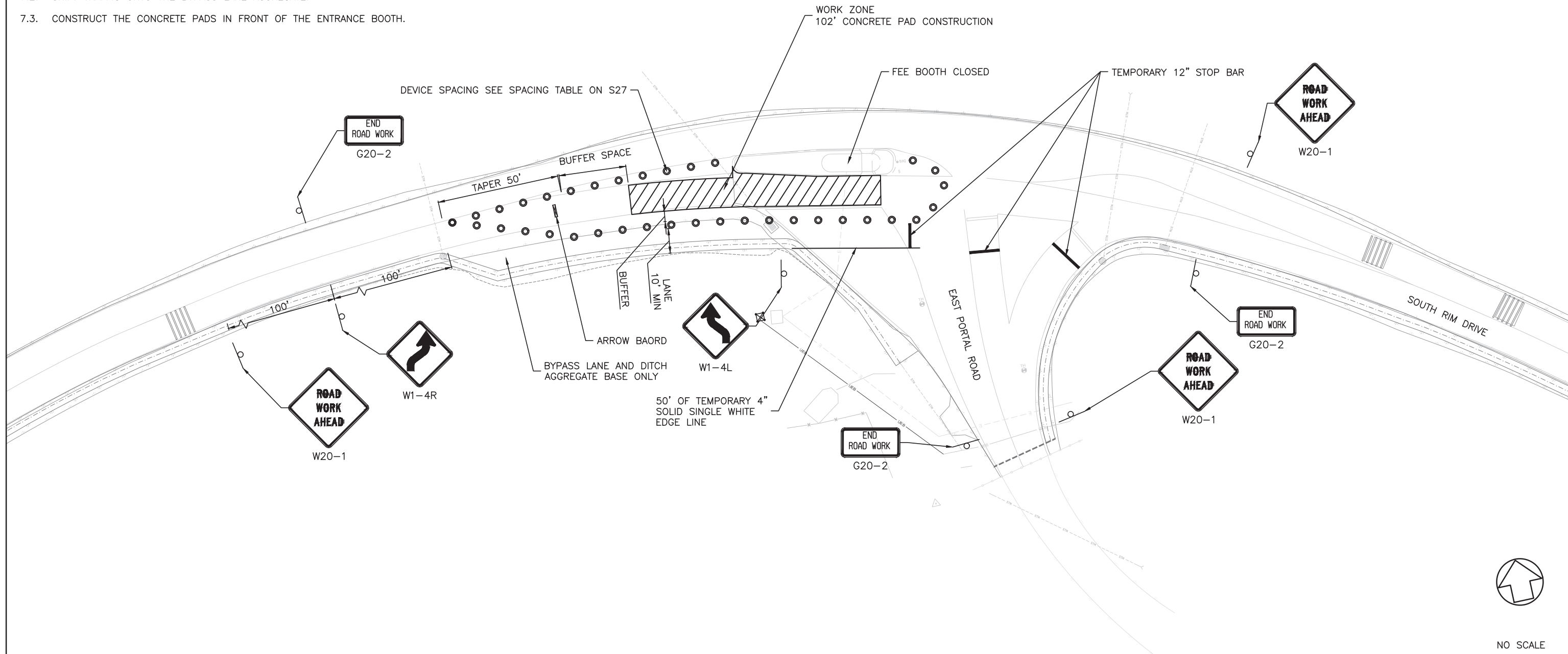
- SPACING FOR SPECIFIC RADII MAY BE INTERPOLATED FROM THE TABLE.
- VALUES SHOWN FOR S IN THE TABLE ARE COMPUTED FROM THE FORMULA  $S = 3\sqrt{R-50}$ , WHERE S = DELINEATOR SPACING AND R = HORIZONTAL CURVE RADIUS VALUES ARE ROUNDED TO THE NEAREST 5 FEET.

A/E FIRM PRIME: JACOBS DENVER, CO. SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	DESIGNED: CM CADD: CM TECH. REVIEW: JM DATE: 3/28/22	SUB SHEET NO. <b>S29</b>	TITLE OF DRAWING <b>DELINEATORS</b> BLACK CANYON OF THE GUNNISON NATIONAL PARK	DRAWING NO. #115 177002 PKG. NO. 1 SHEET 51 OF 55
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**NOTES**

1. FINAL LOCATION AND SPACING OF SIGNS AND DEVICES MAY BE CHANGED TO FIT FIELD CONDITIONS AS APPROVED BY CO.
2. IF CLOSURE IS COMPLETELY WITHIN THE PROJECT LIMITS, ELIMINATE THE "ROAD WORK AHEAD" (W20-1) AND "END ROAD WORK" (G20-2) SIGNS.
3. DO NOT ALLOW EQUIPMENT, MATERIALS, OR VEHICLES TO BE PARKED OR STORED IN THE BUFFER SPACE.
4. CONSTRUCT SUB-GRADE AND BASE COURSE OF BYPASS LANE BEFORE START OF CONCRETE PAD WORKS.
5. SEE SPECIFICATION SECTION 01 32 16 FOR CONSTRUCTION PHASING LIMITATIONS.
6. SEE LENGTH AND SPACING TABLE ON SHEET S26 FOR DRUM SPACING.
7. CONSTRUCTION STEPS:
  - 7.1. INSTALL AGGREGATE BASE FOR THE BYPASS LANE AND DITCH, DO NOT INSTALL ASPHALT SURFACE COATS.
  - 7.2. SHIFT TRAFFIC ONTO THE BYPASS LANE AGGREGATE.
  - 7.3. CONSTRUCT THE CONCRETE PADS IN FRONT OF THE ENTRANCE BOOTH.



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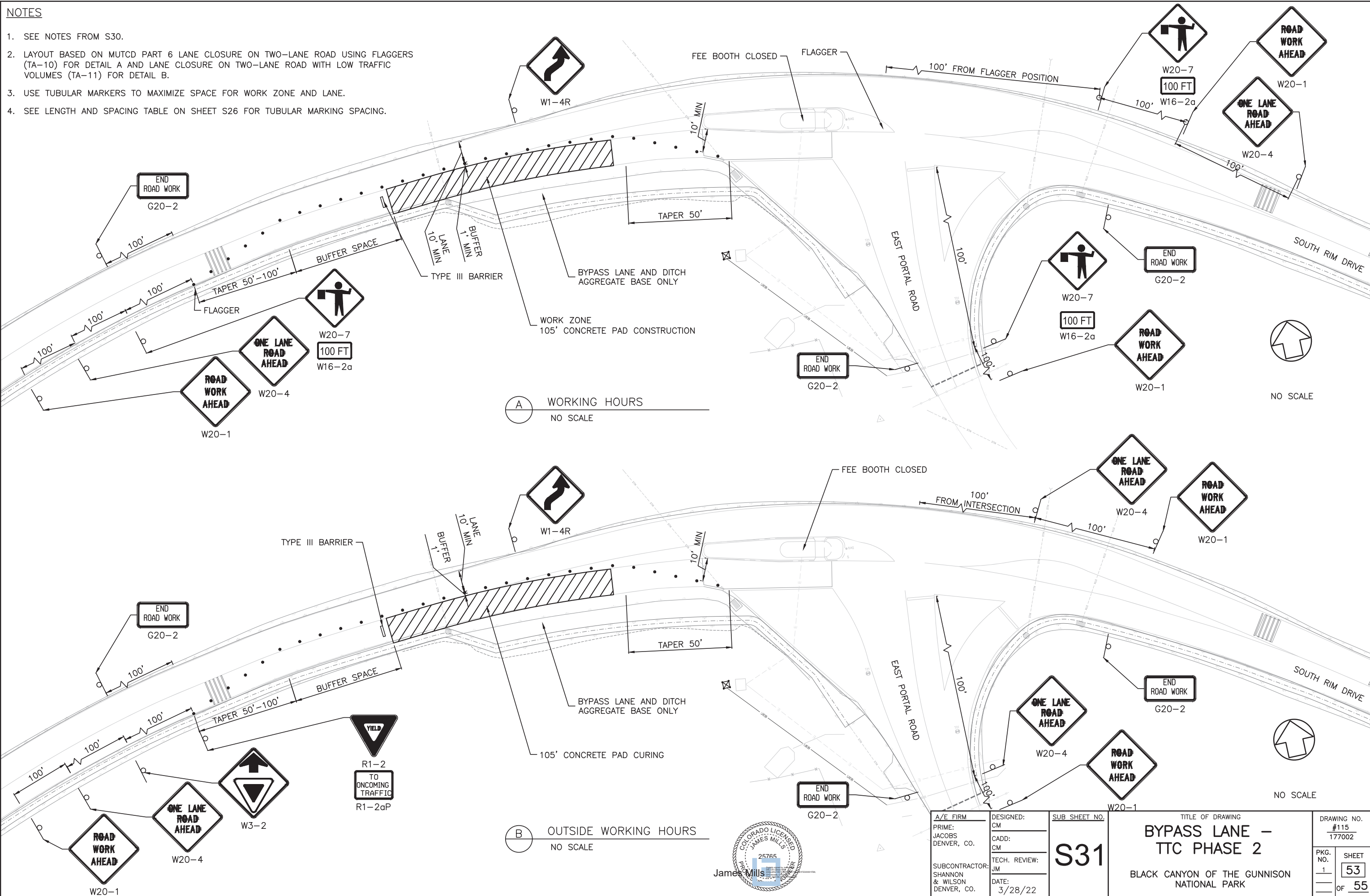
NO SCALE



A/E FIRM PRIME: JACOBS DENVER, CO. SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	DESIGNED: CM	SUB SHEET NO.  <b>S30</b>	TITLE OF DRAWING <b>BYPASS LANE –                  TTC PHASE 1</b>	DRAWING NO. #115 177002
	TECH. REVIEW: JM DATE: 3/28/22	BLACK CANYON OF THE GUNNISON NATIONAL PARK		PKG. NO. 1 SHEET <b>52</b> OF 55

**NOTES**

1. SEE NOTES FROM S30.
2. LAYOUT BASED ON MUTCD PART 6 LANE CLOSURE ON TWO-LANE ROAD USING FLAGGERS (TA-10) FOR DETAIL A AND LANE CLOSURE ON TWO-LANE ROAD WITH LOW TRAFFIC VOLUMES (TA-11) FOR DETAIL B.
3. USE TUBULAR MARKERS TO MAXIMIZE SPACE FOR WORK ZONE AND LANE.
4. SEE LENGTH AND SPACING TABLE ON SHEET S26 FOR TUBULAR MARKING SPACING.



**(A) WORKING HOURS**  
NO SCALE

**(B) OUTSIDE WORKING HOURS**  
NO SCALE

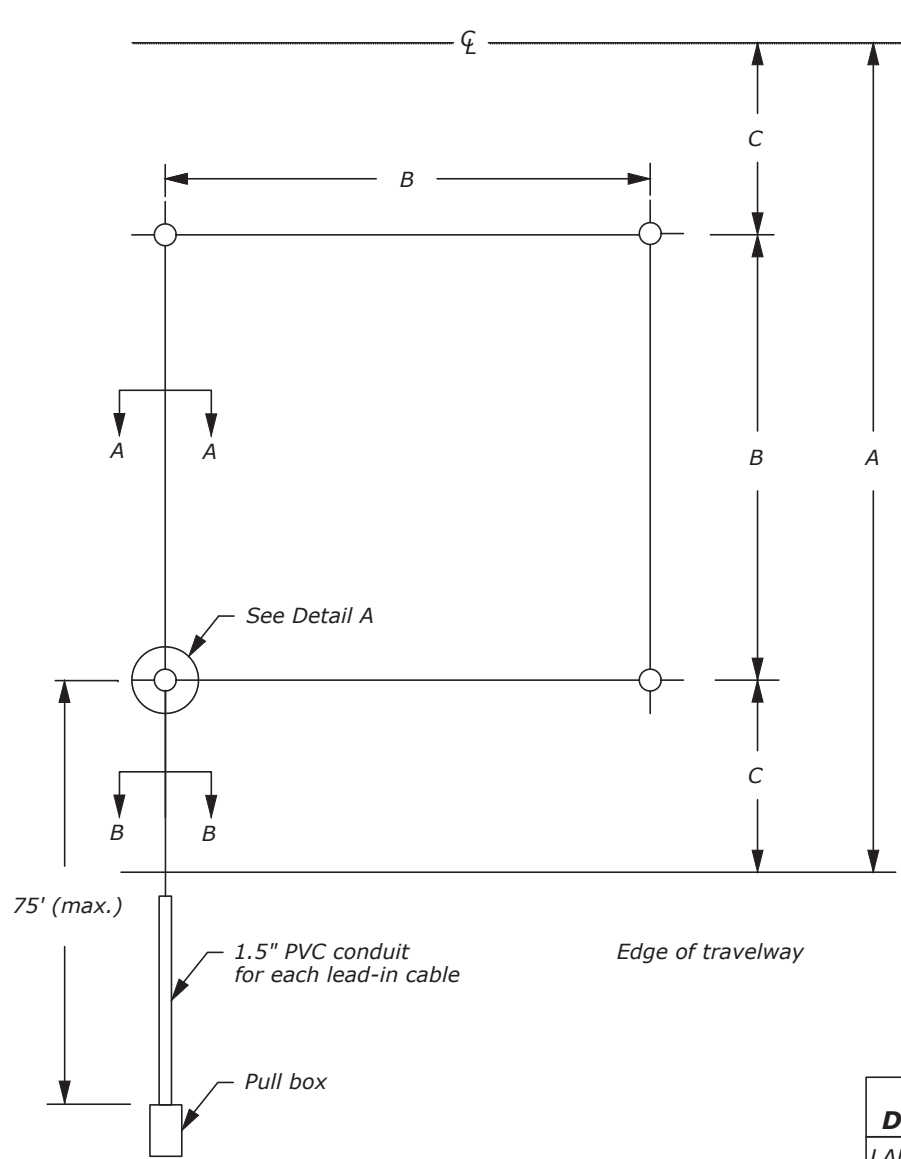
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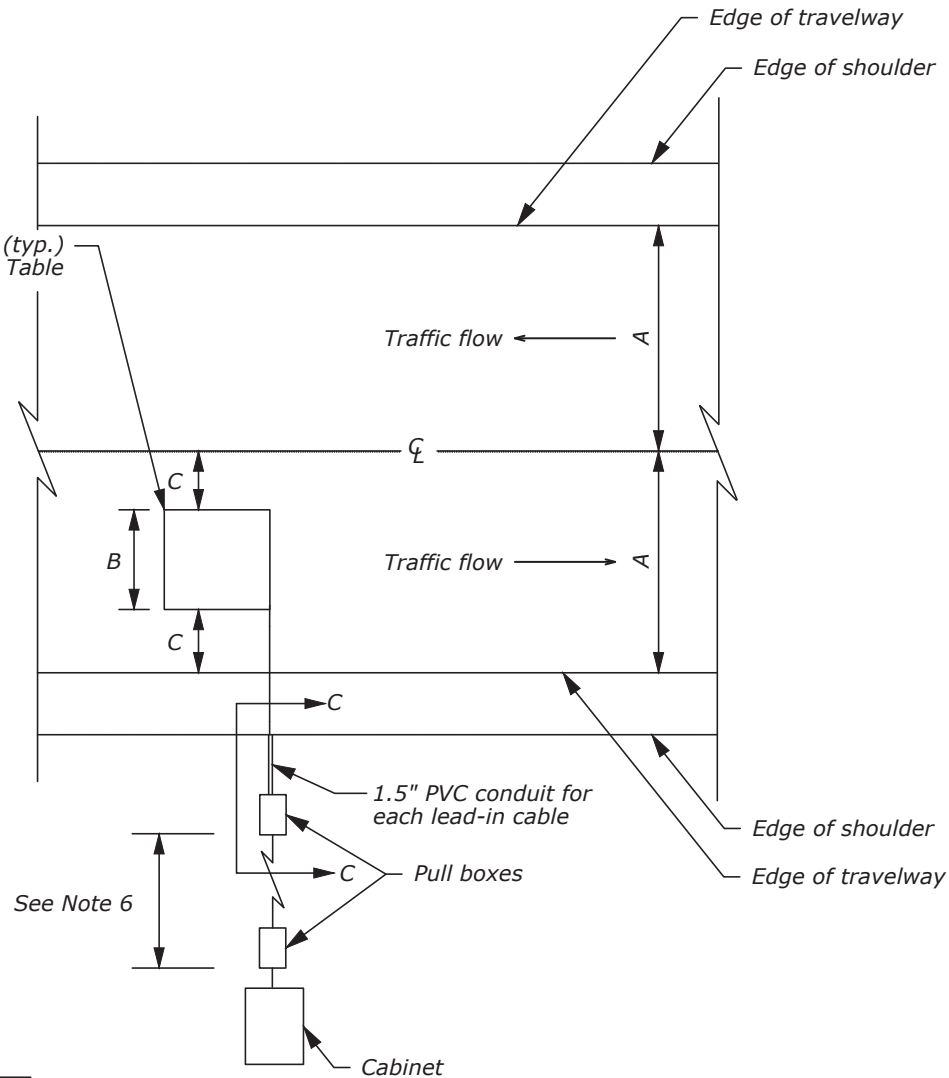
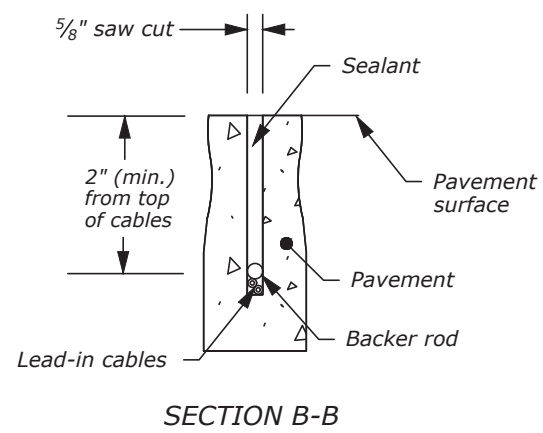
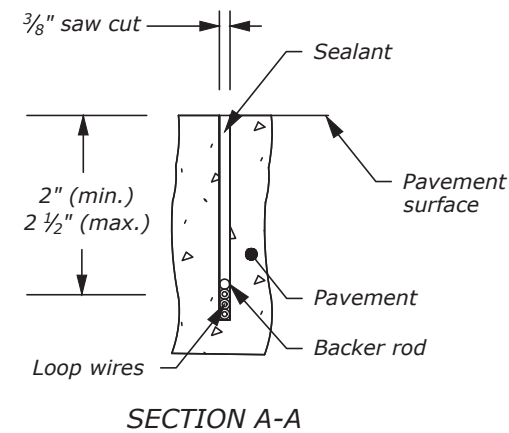
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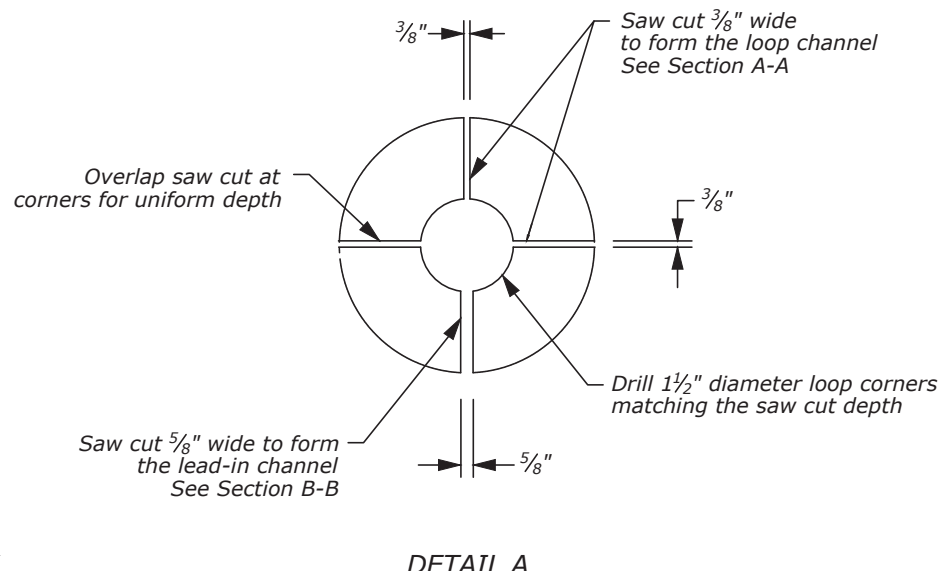
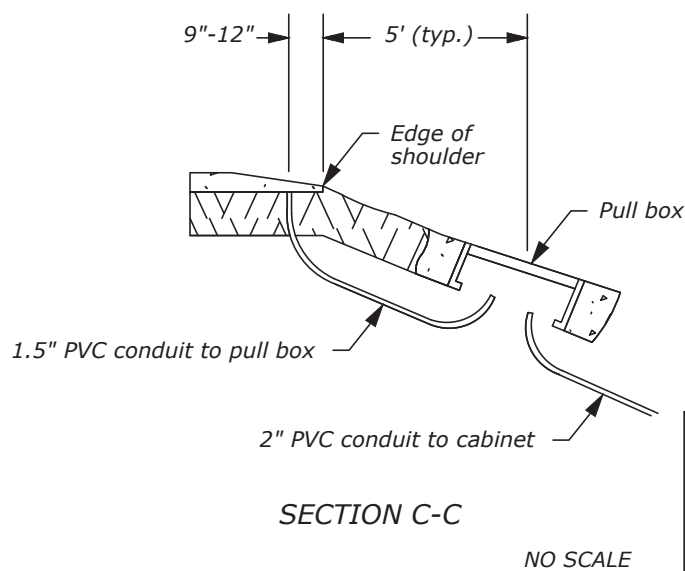
A/E FIRM PRIME: JACOBS DENVER, CO. SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	DESIGNED: CM	SUB SHEET NO.  <b>S31</b>	TITLE OF DRAWING <b>BYPASS LANE –          TTC PHASE 2</b>	DRAWING NO. #115 177002
	CADD: CM	TECH. REVIEW: JM	DATE: 3/28/22	BLACK CANYON OF THE GUNNISON NATIONAL PARK
				SHEET <b>53</b> OF 55



LANE WIDTH LNFT (A)	DIMENSIONS LNFT	
	(B)	(C)
12	6	3
11	5	3
10	5	2.5




**INDUCTIVE LOOP INSTALLATION PLAN VIEW**



**NOTES:**

1. Install square inductive loop, with sides perpendicular and parallel to the centerline.
2. For each loop, install the loop wire in one continuous length with no splices.
3. Provide dedicated polyvinyl chloride (PVC) conduits for each lead-in from the edge of pavement to the nearest pull box.
4. Install the 2-inch PVC conduit using directional boring or open trench as directed by the CO.
5. Obtain approval from the CO prior to installing inductive loop on lanes less than 10 feet wide.
6. If the distance between pull boxes is less than 50 feet, omit the second pull box nearest to the cabinet.
7. Ensure the loop channel and corners are smooth. Remove any burrs or roughness to full depth.
8. Identify and tag lead-in cable with loop number.
9. Before applying sealant, test each loop and lead-in for continuity and resistance according to Specification Section 10 14 26.
10. Waterproof end of lead-in cable and loop conductor before placing in conduit as approved by the CO.

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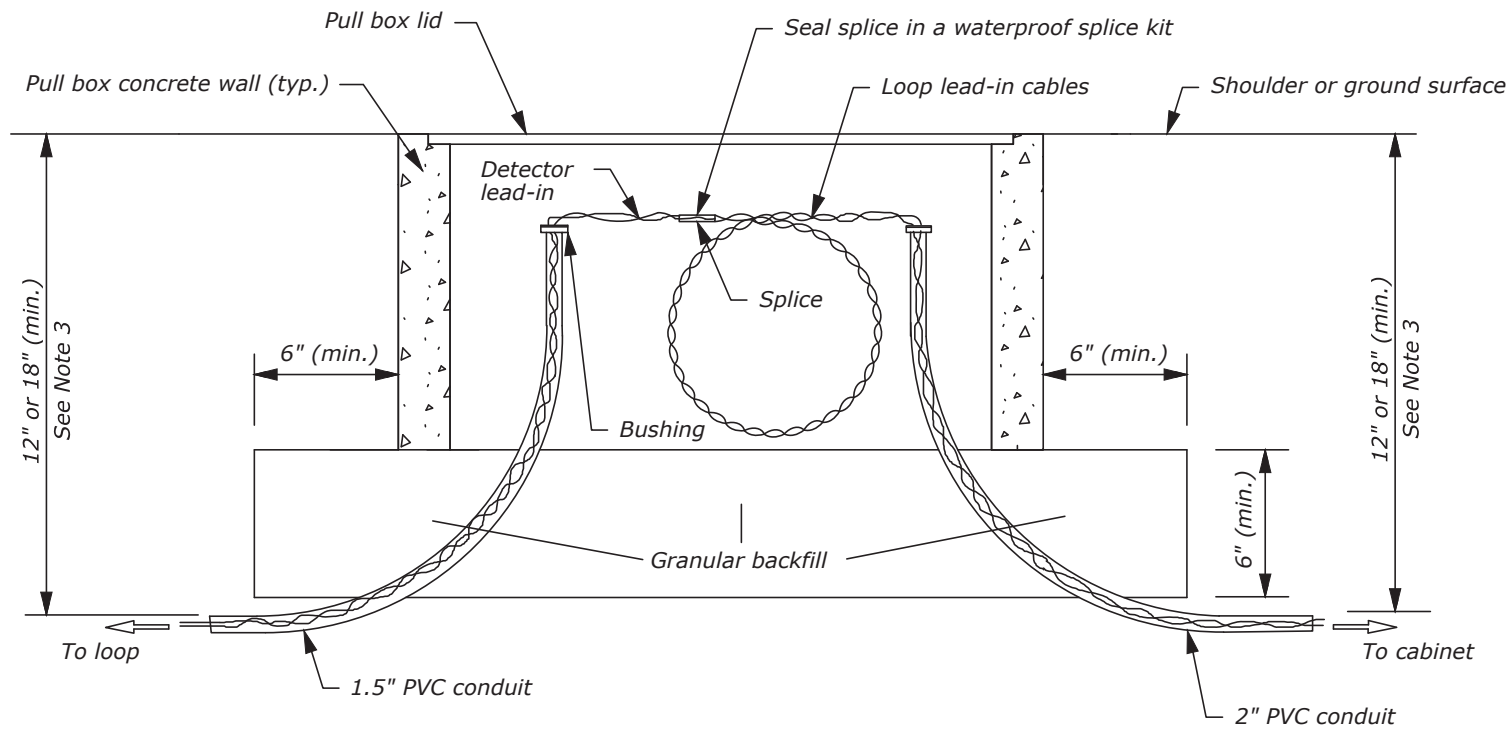
A/E FIRM PRIME: JACOBS DENVER, CO. SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	DESIGNED: CM	SUB SHEET NO.  <b>S32</b>	TITLE OF DRAWING <b>INDUCTIVE LOOP</b>	DRAWING NO. #115 177002
	TECH. REVIEW: JM		BLACK CANYON OF THE GUNNISON NATIONAL PARK	PKG. NO. 1 SHEET 54 OF 55
DATE: 3/28/22				

NO SCALE



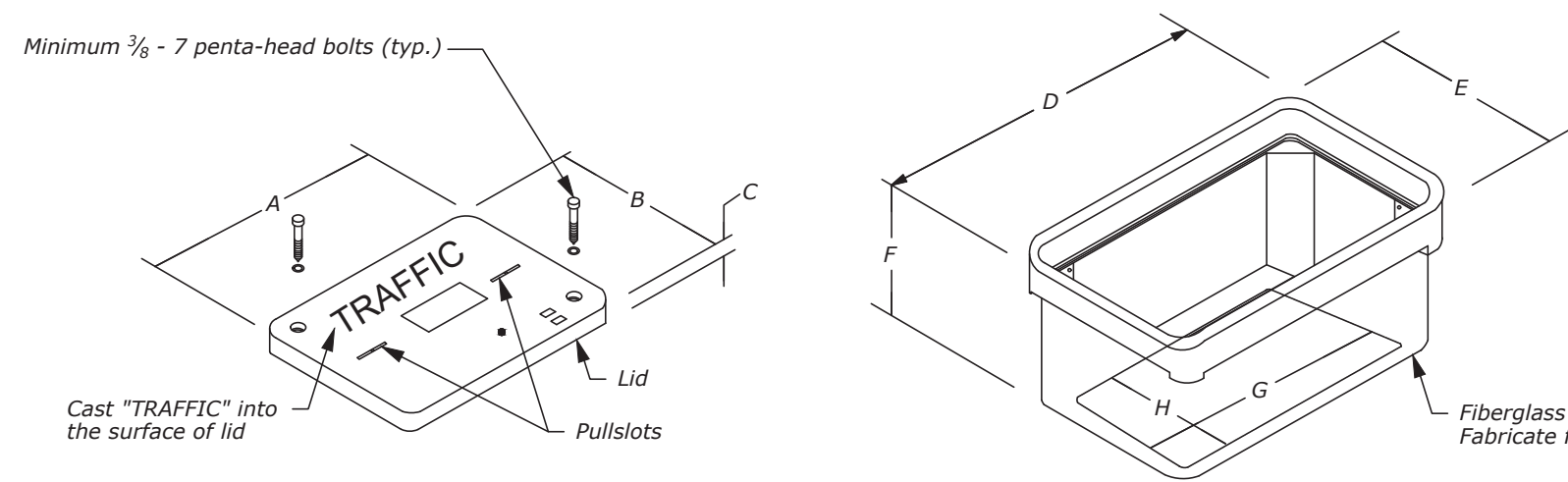
**NOTES:**

1. Install pull boxes flush with the shoulder surface. Restore the disturbed area around the pull box and conduit installations.
2. On long runs, install pull boxes such that each box is separated by no more than 150 feet.
3. If cabinet is located more than 30 feet from the edge of travelway, provide a minimum cover of 12 inches. Otherwise, provide a minimum cover of 18 inches.
4. Terminate stranded conductors smaller than #14 AWG with crimp style terminal lugs.
5. Size pull box according to the National Electric Code (NEC) as approved by the CO.
6. Ensure splices occur only in pull box nearest to the inductive loops.
7. Plug conduits and bushings with steel wool to prevent rodent entry and with a water resistant material to prevent moisture entry.



**PULL BOX INSTALLATION**

Minimum 3/8 - 7 penta-head bolts (typ.)



**PULL BOX ISOMETRIC VIEW**

PULL BOX DIMENSIONS TABLE								
TYPE	MINIMUM DIMENSIONS INCH							
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
1	15 3/8	10	1 3/4	17 5/8	12 3/8	12	13 5/8	8 3/8
2	12 7/8	12 7/8	1 3/4	14 3/4	14 3/4	12	12	12
3	18 1/8	11 1/4	1 3/4	20 1/4	13 3/8	12	15 3/4	8 7/8
4	23 1/4	13 3/4	2	25	15 1/2	12	19 1/4	9 3/4



A/E FIRM: PRIME: JACOBS DENVER, CO.	DESIGNED: CM	SUB SHEET NO. <b>S33</b>	TITLE OF DRAWING <b>INDUCTIVE LOOP PULL BOX</b>	DRAWING NO. #115 177002
SUBCONTRACTOR: SHANNON & WILSON DENVER, CO.	TECH. REVIEW: JM	DATE: 3/28/22	BLACK CANYON OF THE GUNNISON NATIONAL PARK	PKG. NO. 1 SHEET 55 OF 55

NO SCALE