

Appendix B

Standard Details

Iowa DOT DR-201	Concrete Aprons
Iowa DOT DR-212	Beveled Pipe and Guard
Iowa DOT DR-632	Corrugated Pipe Culvert Letdown Structure with Double Elbow
Iowa DOT EC-101	Special Ditch Control
Iowa DOT EC-103	Wood Excelsior Mat for Slope Protection
Iowa DOT TC-202	Work within 15ft of Traveled Way

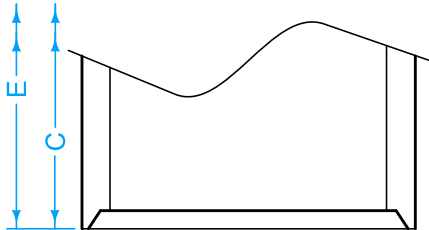
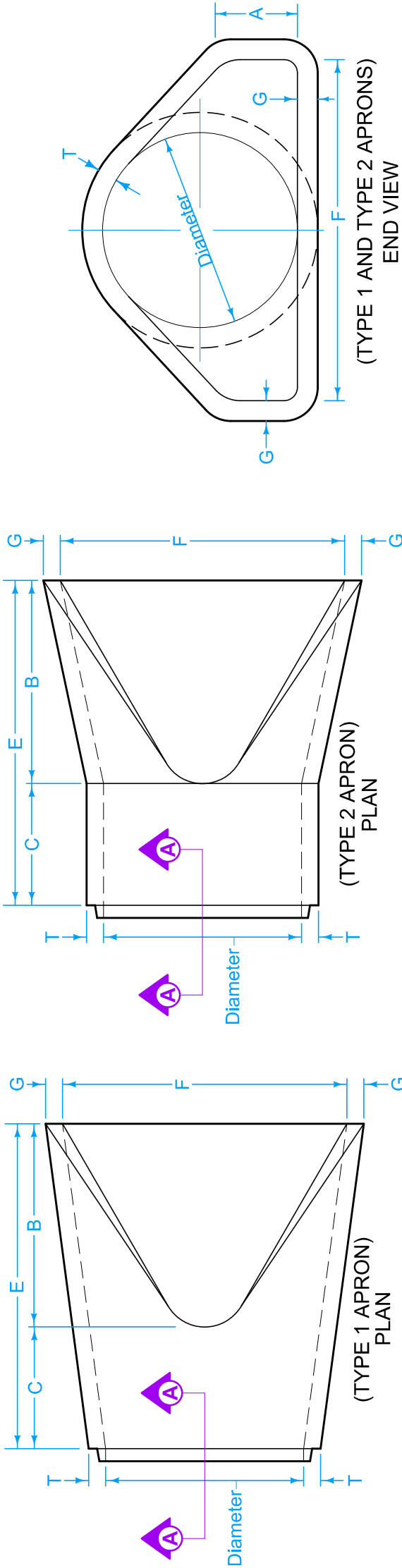
Dimension 'E' shown is the minimum and is considered the design length. Adjust for any difference between the actual length of concrete apron installed and the length indicated hereon within the length of concrete culvert pipe furnished.

Install connected pipe joints as shown on DR-121.

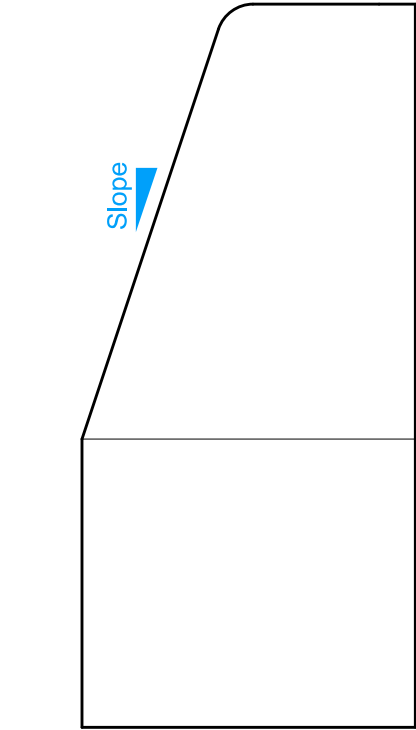
When specified in the contract documents, install pipe apron guards as shown on DR-213. Pipe apron guards are incidental to "Concrete Aprons".

Slight variations in both shape and dimensions from those shown may be accepted if approved by the engineer.

1 Tongue end used on inlet end section. Groove end used on outlet end section.



SECTION A-A
TONGUE END DETAIL



SIDE VIEW

TYPE 1 APRONS							* Maximum			
DIAM.	SLOPE	A	B	MINIMUM		F	G	T		
				C	E					
12"	2.4:1	4"	2'-0"	4'- ⁷ / ₈ "	6'- ⁷ / ₈ "	2'-0"	2"	2"		
15"	2.4:1	6"	2'-3"	3'-10"	6'-1"	2'-6"	2 ¹ / ₄ "	2 ¹ / ₄ "		
18"	2.3:1	9"	2'-3"	3'-10"	6'-1"	3'-0" *	2 ¹ / ₂ "	2 ¹ / ₂ "		
21"	2.4:1	9"	3'-0"	3'-1 ¹ / ₂ "	6'-1 ¹ / ₂ "	3'-5"	3"	3"		
24"	2.5:1	9 ¹ / ₂ "	3'-7 ¹ / ₂ "	2'-6"	6'-1 ¹ / ₂ "	4'-0"	3"	3"		
27"	2.5:1	10 ¹ / ₂ "	4'-1"	2'-0"	6'-1 ¹ / ₂ "	4'-4"	3 ¹ / ₂ "	3 ¹ / ₂ "		
30"	2.5:1	12"	4'-6"	1'-7 ³ / ₄ "	6'-1 ³ / ₄ "	5'-0"	3 ¹ / ₂ "	3 ¹ / ₂ "		
36"	2.5:1	15"	5'-3"	2'-9"	8'-0"	6'-0"	4"	4"		
42"	2.5:1	21"	5'-3"	2'-9"	8'-0"	6'-6"	4 ¹ / ₂ "	4 ¹ / ₂ "		
48"	2.5:1	24"	6'-0"	2'-0"	8'-0"	7'-0"	5"	5"		
54"	1.8:1	27"	5'-0"	3'-0"	8'-0"	7'-6"	5 ¹ / ₂ "	5 ¹ / ₂ "		
60"	1.6:1	29 ¹ / ₂ "	5'-0"	3'-0"	8'-0"	8'-0"	5 ¹ / ₂ "	6"		
66"	1.7:1	30"	6'-0"	2'-3"	8'-3"	8'-0"	5 ¹ / ₂ "	6"		
72"	1.6:1	30"	6'-6"	1'-9"	8'-3"	9'-0"	6"	7"		
78"	1.8:1	36"	7'-6"	1'-9"	9'-3"	9'-6"	6 ¹ / ₂ "	7 ¹ / ₂ "		
84"	1.3:1	29 ¹ / ₂ "	6'-9"	2'-6 ¹ / ₂ "	9'-3 ¹ / ₂ "	10'-0"	6 ¹ / ₂ "	8"		

TYPE 2 APRONS							* Maximum			
DIAM.	SLOPE	A	B	MINIMUM		F	G	T		
				C	E					
12"	2.4:1	4"	2'-0"	4'- ⁷ / ₈ "	6'- ⁷ / ₈ "	2'-0"	2"	2"		
15"	2.4:1	6"	2'-3"	3'-10"	6'-1"	2'-6"	2 ¹ / ₄ "	2 ¹ / ₄ "		
18"	2.3:1	9"	2'-3"	3'-10"	6'-1"	3'-0" *	2 ¹ / ₂ "	2 ¹ / ₂ "		
21"	2.4:1	9"	3'-0"	3'-1 ¹ / ₂ "	6'-1 ¹ / ₂ "	3'-5"	3"	3"		
24"	2.5:1	9 ¹ / ₂ "	3'-7 ¹ / ₂ "	2'-6"	6'-1 ¹ / ₂ "	4'-0"	3"	3"		
27"	2.5:1	10 ¹ / ₂ "	4'-1"	2'-0"	6'-1 ¹ / ₂ "	4'-4"	3 ¹ / ₂ "	3 ¹ / ₂ "		
30"	2.5:1	12"	4'-6"	1'-7 ³ / ₄ "	6'-1 ³ / ₄ "	5'-0"	3 ¹ / ₂ "	3 ¹ / ₂ "		
36"	2.5:1	15"	5'-3"	2'-9"	8'-0"	6'-0"	4"	4"		
42"	2.5:1	21"	5'-3"	2'-9"	8'-0"	6'-6"	4 ¹ / ₂ "	4 ¹ / ₂ "		
48"	2.5:1	24"	6'-0"	2'-0"	8'-0"	7'-0"	5"	5"		
54"	1.9:1	24 ¹ / ₂ "	5'-5"	2'-7"	8'-0"	7'-6"	5 ¹ / ₂ "	5 ¹ / ₂ "		
60"	1.4:1	24 ¹ / ₂ "	5'-0"	3'-0"	8'-0"	8'-0"	5 ¹ / ₂ "	6"		
66"	1.7:1	30"	6'-0"	2'-3"	8'-3"	8'-0"	5 ¹ / ₂ "	6"		
72"	1.4:1	24"	6'-6"	1'-9"	8'-3"	9'-0"	6"	7"		
78"	1.8:1	36"	7'-6"	1'-9"	9'-3"	9'-6"	6 ¹ / ₂ "	7 ¹ / ₂ "		
84"	1.5:1	23 ¹ / ₂ "	7'-6 ¹ / ₂ "	1'-9"	9'-3 ¹ / ₂ "	10'-0"	6 ¹ / ₂ "	8"		

Contract Item:
Apron, Concrete

Tabulations:
104-3
104-5C

IOWA

DOT

3

10-17-23

DR-201

SHEET 1 of 1

REVISIONS: Added note about shape and dimensions.

APPROVED BY DESIGN METHODS ENGINEER

CONCRETE APRONS

DESIGNER INFORMATION

For reinforcing steel used in construction of "Beveled Pipe and Guard", use deformed bars meeting the requirements of Article 4151.03 of the Standard Specifications and hot-dip galvanized according to ASTM A123.

Use Class 'C' Concrete in the construction of Beveled Pipe and Guard.

Cut the pipe to fit the foreslope. Cut slots into the pipe for placement of the No. 8 bars. After the foreslope has been placed, fit the No. 8 bars into the slots cut in the pipe so they will be in proper position when the concrete collar is poured.

Price bid for "Beveled Pipe and Guard," each, is full compensation for furnishing all materials and constructing the Beveled Pipe and Guard.

Special Note:

A silt fence ditch check is required immediately upstream from the inlet. Refer to EC-201 for construction details.

Possible Contract Item:
Beveled Pipe and Guard

Possible Tabulations:
104-3
112-8

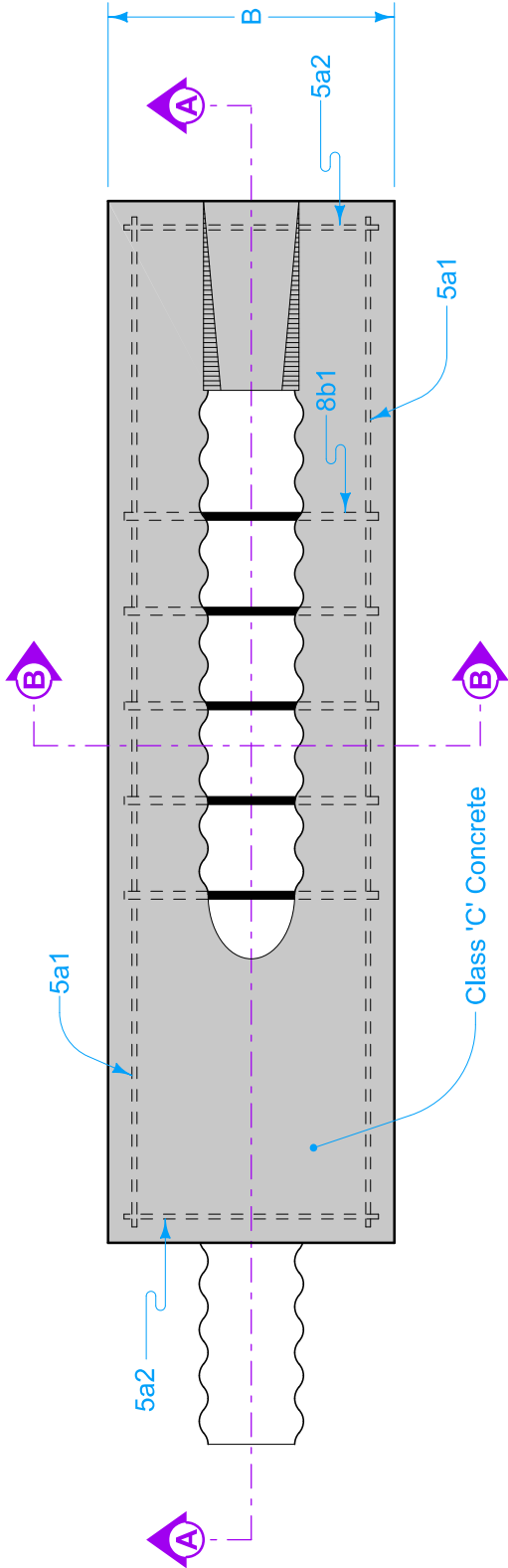
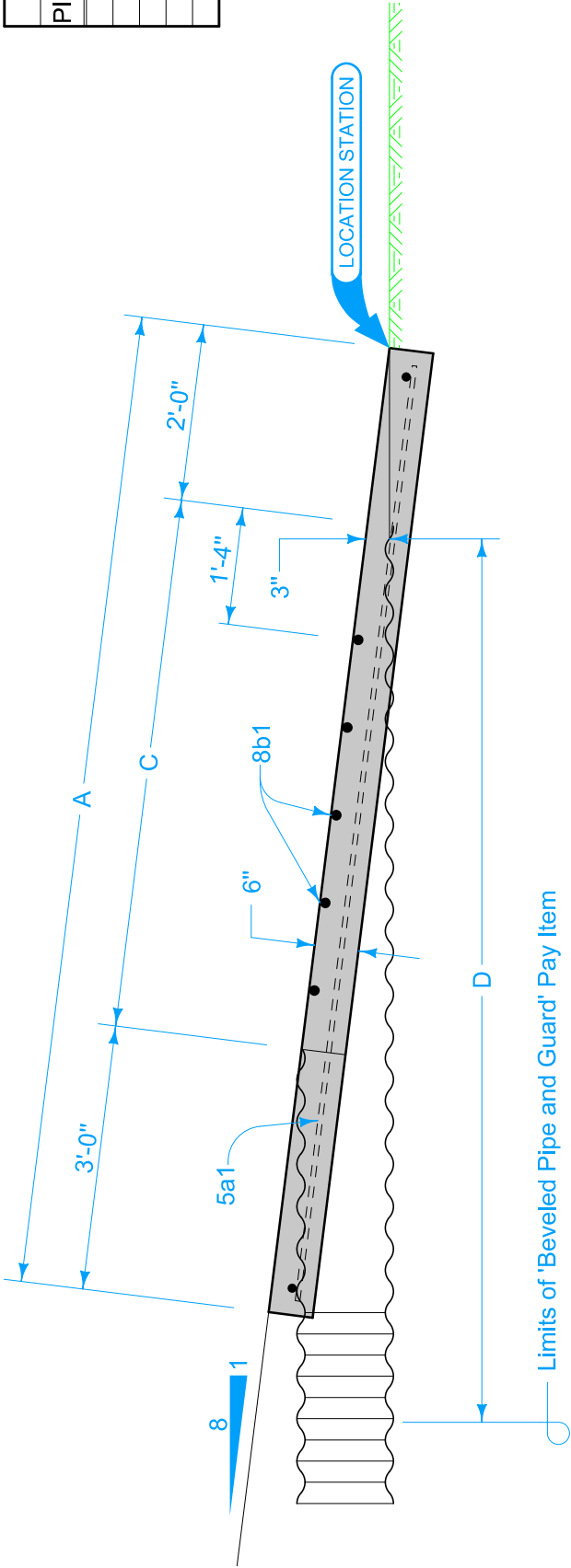
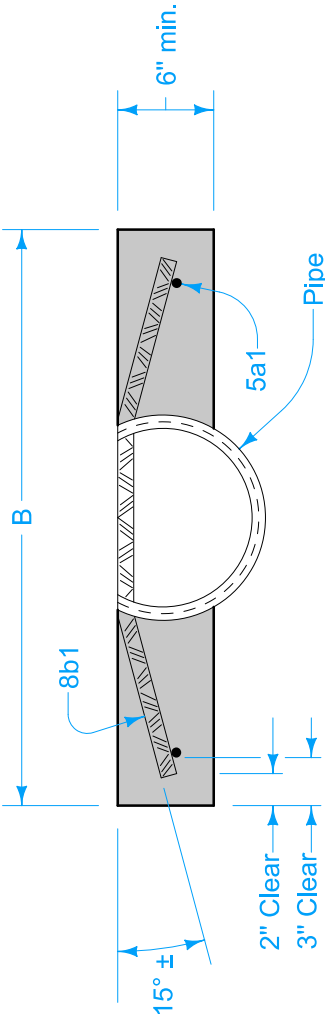


TABLE OF DIMENSIONS				
PIPE SIZE	A	B	C	D
12"	11'-0"	3'-0"	6'-0"	10'-0"
15"	13'-2"	3'-3"	8'-2"	12'-0"
18"	15'-4"	3'-6"	10'-4"	14'-0"
21"	17'-6"	3'-9"	12'-6"	16'-0"
24"	19'-8"	4'-0"	14'-8"	18'-0"



SECTION A-A



SECTION B-B

REINFORCING BAR LIST									
PIPE SIZE	BAR	LOCATION	SHAPE	COUNT	LENGTH	LIN. FT.	WEIGHT	TOTAL WEIGHT	SPACING
12"	5a1	Base	—	2	10'-8"	21.4	22.3	65.8	See Detail
	5a2	Base	—	2	2'-8"	5.4	5.6		See Detail
	8b1	Base	⌒	5	2'-10"	14.2	37.9		12"
15"	5a1	Base	—	2	12'-10"	25.7	26.8	90.7	See Detail
	5a2	Base	—	2	2'-11"	5.9	6.2		See Detail
	8b1	Base	⌒	7	3'-1"	21.6	57.7		12"
18"	5a1	Base	—	2	15'-0"	30.0	31.3	118.1	See Detail
	5a2	Base	—	2	3'-2"	6.4	6.7		See Detail
	8b1	Base	⌒	9	3'-4"	30.0	80.1		12"
21"	5a1	Base	—	2	17'-2"	34.4	35.9	148.6	See Detail
	5a2	Base	—	2	3'-5"	6.9	7.2		See Detail
	8b1	Base	⌒	11	3'-7"	39.5	105.5		12"
24"	5a1	Base	—	2	19'-4"	38.7	40.4	181.3	See Detail
	5a2	Base	—	2	3'-8"	7.4	7.7		See Detail
	8b1	Base	⌒	13	3'-10"	49.9	133.2		12"

IOWA

DOT

STANDARD ROAD PLAN

REVISION

104-21-20

DR-212

REVISIONS:

Added Designer Info button.

APPROVED BY DESIGN METHODS ENGINEER

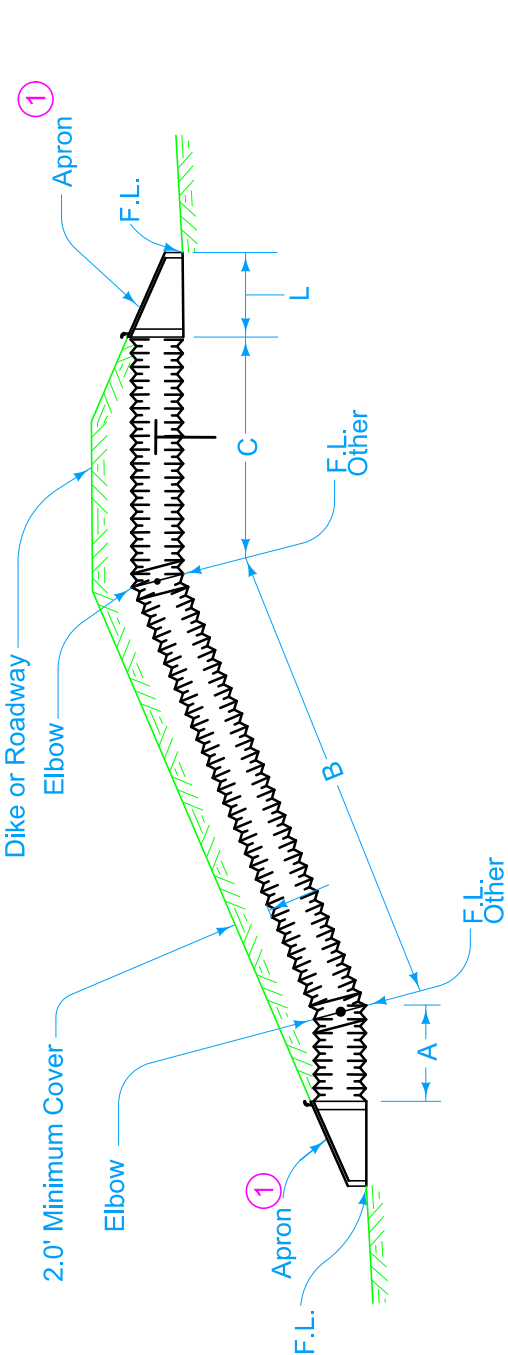
BEVELED PIPE AND GUARD

Standard type joint couplings are required. See Materials I.M. 441.

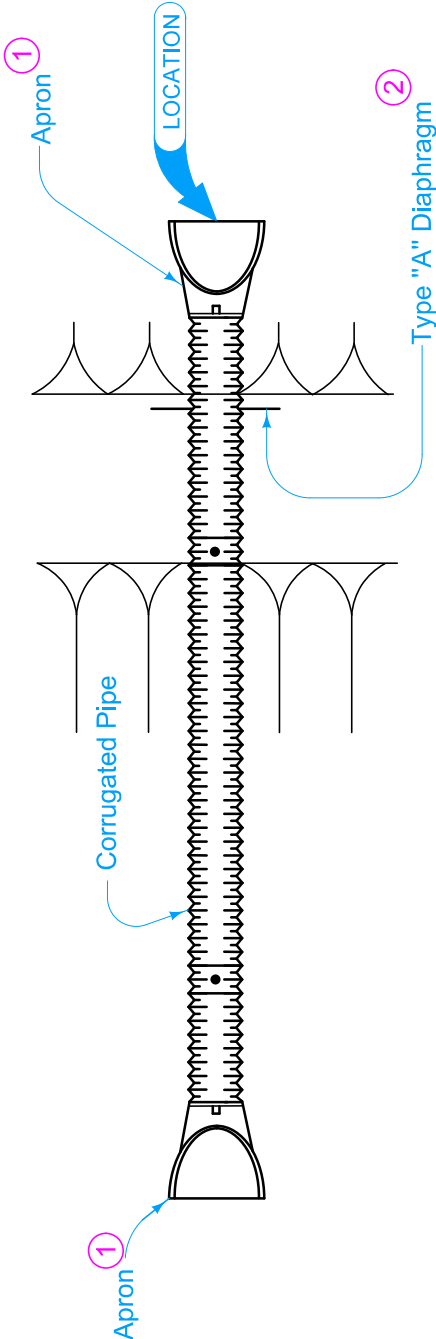
Connection to outlet, if required, is incidental and will not be paid for separately.

- 1 Refer to the following:
DR-203 for the circular metal.
DR-204 for arch metal.
- 2 See DR-501. If more than one diaphragm is specified, install 15 feet apart or as specified.

A+B+C = Pipe Length



SECTION



PLAN

Possible Tabulations:
104-3

IOWA DOT	REVISION	
	1	04-18-17
STANDARD ROAD PLAN		DR-632
		SHEET 1 of 1
REVISIONS: Modified note 1 to include references to additional apron types.		
APPROVED BY DESIGN METHODS ENGINEER		
CORRUGATED PIPE CULVERT LETDOWN STRUCTURE WITH DOUBLE ELBOW		

Provide necessary excavation at locations where silt conditions require shaping of a ditch to provide a proper type or area for installation of wood excelsior mat for special ditch control.

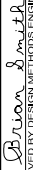
Ensure ground surface adjacent to any channels is shaped to facilitate natural drainage into the protected area.

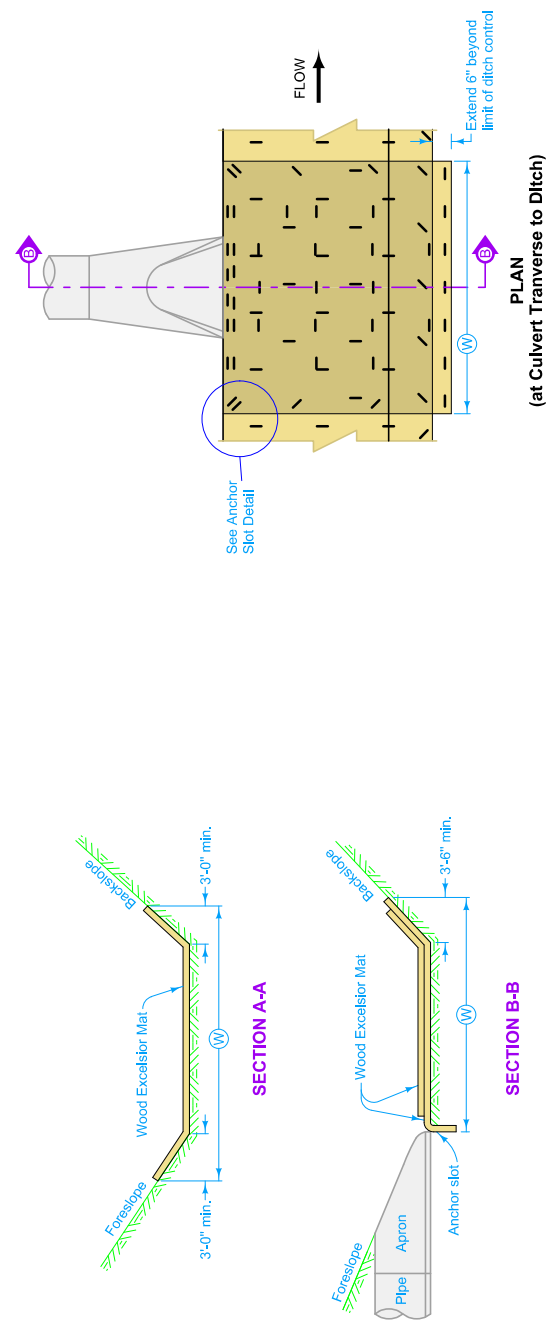
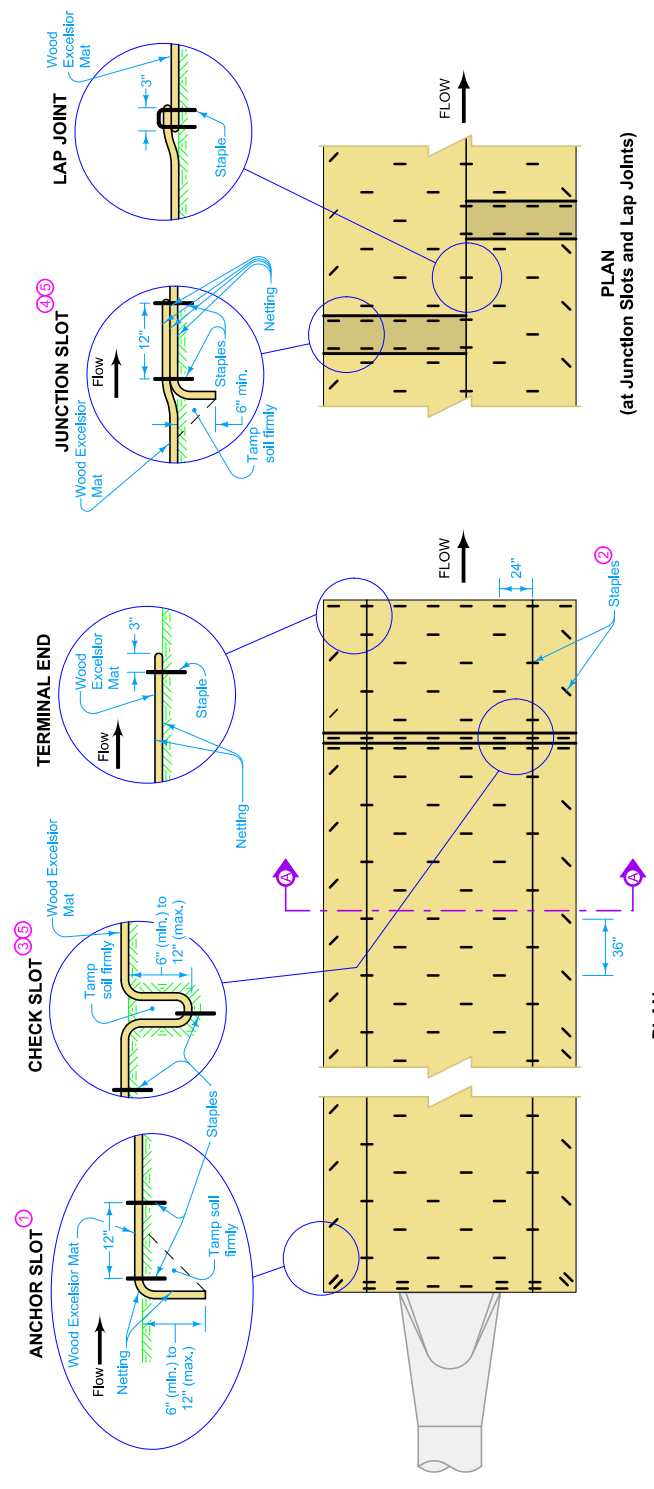
Use all excavated material to fill low areas, gullies, backslope scours, and otherwise facilitate the free flow of surface water into the channel as directed by the Engineer. Alignment should be smooth and avoid abrupt changes.

- 1 Install anchor slot at the beginning (upstream end) of all wood excelsior mat installations.
- 2 Place staples alternately in rows approximately 24 inches apart. Approximately 30 staples required per square (100 sq. ft.) of wood excelsior mat.
- 3 Space Check Slots in ditch channel so that one occurs within each 50 feet on slopes of more than 4%.
- 4 Stagger Junction Slots (end of rolls).
- 5 Do not use Junction Slots or Check Slots when Wood Excelsior Mat is placed over Turf Reinforced Mat.

Possible Contract Item:
Special Ditch Control, Wood Excelsior Mat

Possible Tabulation:
100-22

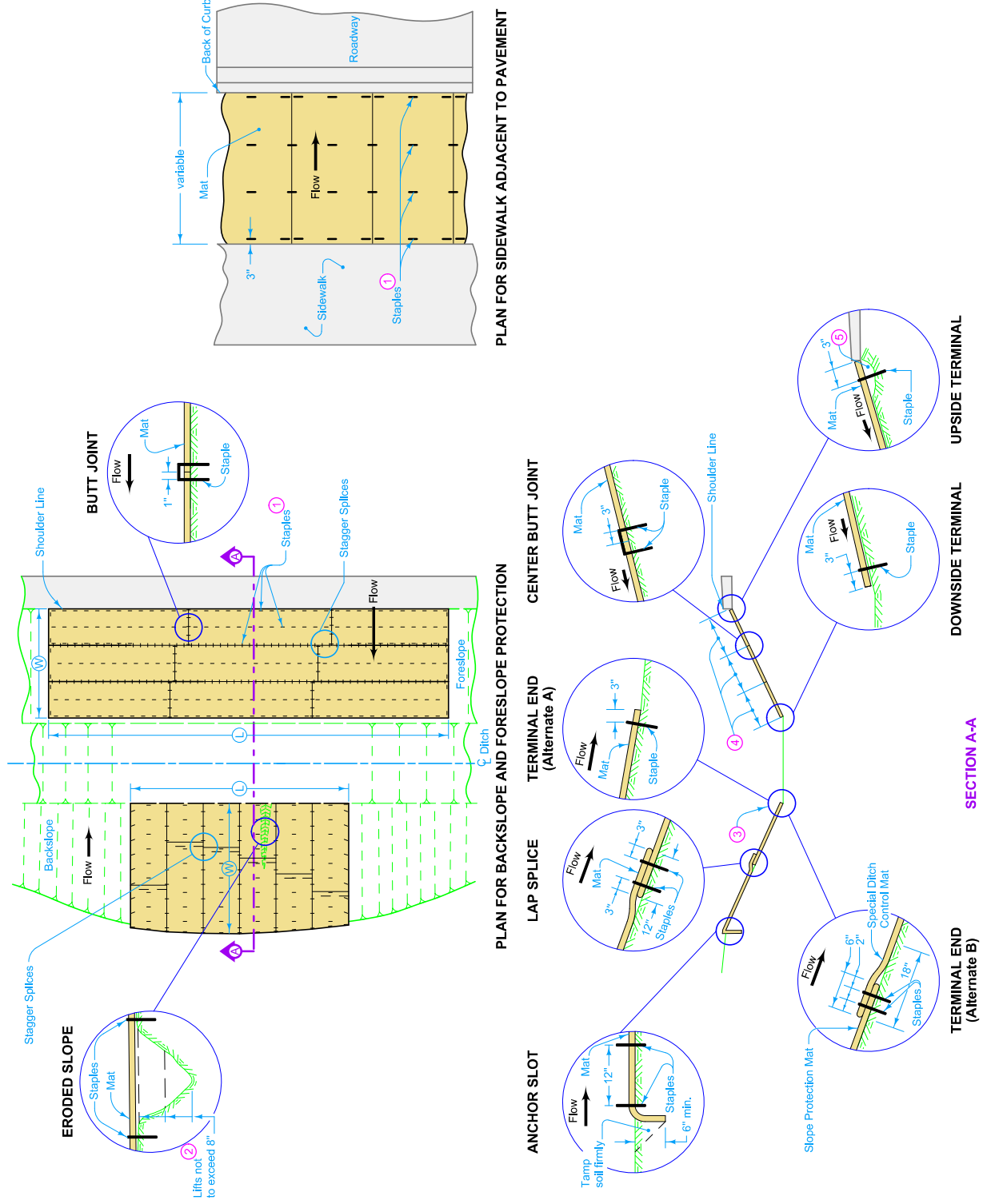
	REVISION 2 04-19-16
	EC-101
	SHEET 1 of 1
REVISIONS: Revised to show placement of erosion control beginning at the end of the apron.	
APPROVED BY DESIGN METHODS ENGINEER 	
SPECIAL DITCH CONTROL	



Excelsior mat for foreslope protection is installed with strips placed approximately parallel to roadway. The location, width, and number of strips are specified on project plans.

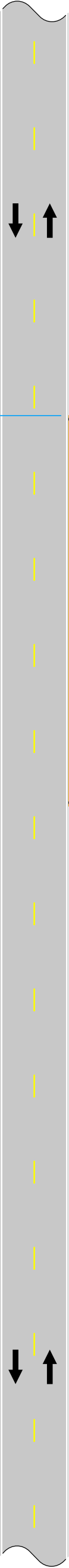
- Possible Contract Item:
Slope Protection, Wood Excelsior Mat
- Possible Tabulation:
100-22

	REVISION	
	1	04-21-15
EC-103		
SHEET 1 of 1		
REVISIONS: Revised layout from general notes placed in the Schedule of Values. Modified drawings to Added Possible Contract Item and Possible Tabulation.		
<i>Brian Smith</i> APPROVED BY DESIGN METHODS ENGINEER		
STANDARD ROAD PLAN WOOD EXCELSIOR MAT FOR SLOPE PROTECTION		



END
ROAD WORK
G20-2A
48" x 24"

W20-1
48" x 48"



END
ROAD WORK
G20-2A
48" x 24"

②



W20-1
48" x 48"



W8-9A
48" x 48"

LEGEND

- Traffic Sign
- 42" Channelizer
- Work Area
- Direction of Traffic

When a pavement edge drop-off exists, install a SHOULDER DROP-OFF sign.

No pavement edge drop-offs greater than pavement depth will be allowed during non-working hours.

Shoulder edge drop-offs shall be mitigated according to Article 1107.08.K2 of the Standard Specifications.

For work lasting less than one hour, refer to TC-1.

① When the length of a pavement edge drop-off is 1000 feet or less, the temporary fillet requirement of Article 1107.08 of the Standard Specifications does not apply. Reduce channelizer spacing to 40 feet.

② For work areas less than 200 feet long, use channelizers spaced at 20 foot centers or use a vehicle with an amber revolving light or amber strobe light.

* Speed Limit refers to regulatory speed limit before road work.

SPEED LIMIT (mph)*	A	B	C	T
35 or less	500'	250'	40'	100'
40 - 45	700'	350'	80' ①	200'
50 or greater	1000'	500'	100' ①	200'

	REVISION	
	10	4-18-23
TC-202		
STANDARD ROAD PLAN		
REVISIONS: Added speed limit note.		
SHEET 1 of 1		
APPROVED BY DESIGN METHODS ENGINEER		

WORK WITHIN 15 FT
OF TRAVELED WAY

Possible Contract Item:
Traffic Control