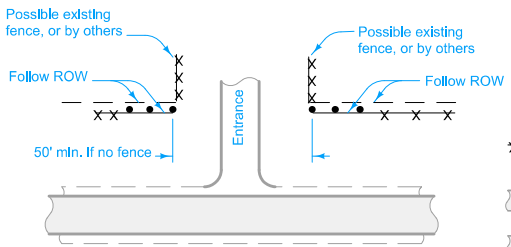
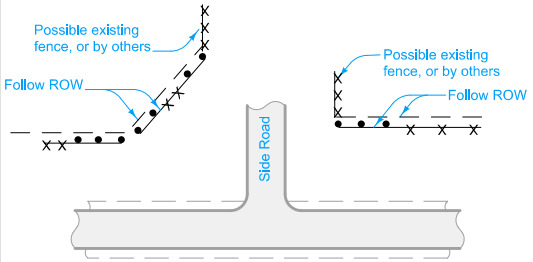
Miscellaneous

Miscellaneous

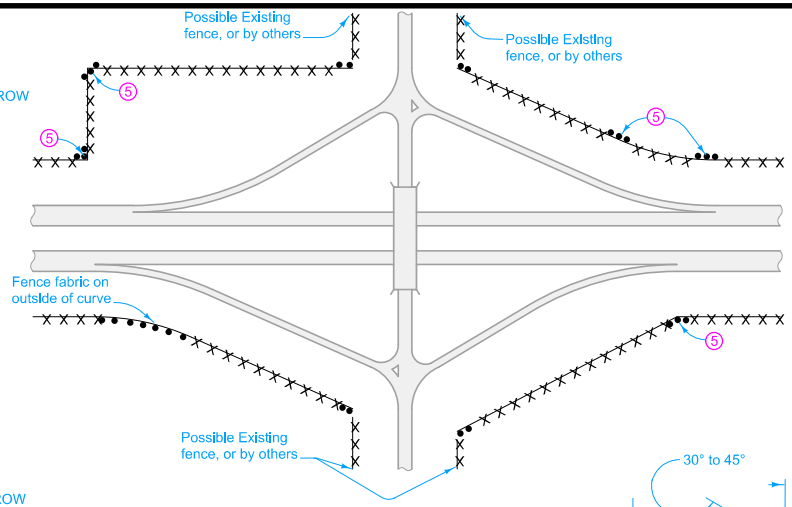
NO.	DATE	TITLE
		Fencing
MI-101	10-20-15	Fencing Layout
MI-102	10-20-15	Chain Link Fence Construction
MI-103	10-20-15	Deer Fence and Field Fence Construction
MI-104	10-17-17	Fence Construction at Channel Crossings, Flood Plains, and Minor Ground Depressions
		Sidewalks and Driveways
MI-210	10-20-15	PCC Driveways and Alleys
MI-220	10-20-15	Detectable Warnings and Pedestrian Ramp
MI-221	10-20-15	Combined Retaining Wall - Sidewalk



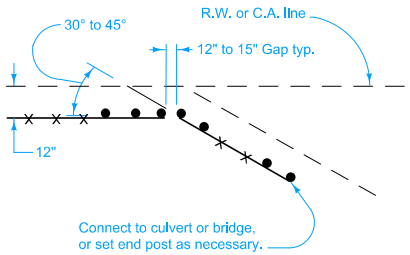
DRIVEWAYS AND ENTRANCES



AT-GRADE INTERSECTIONS



INTERCHANGES



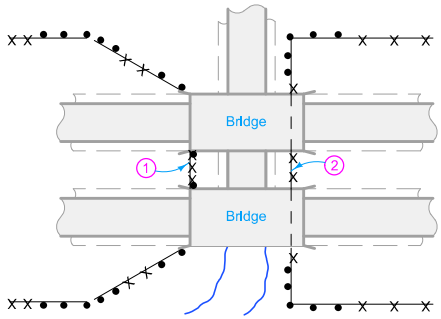
SHORT FENCES AT ANGLE

Details shown illustrate typical situations and are not intended to cover specific cases. Refer to project plans for particular requirements at various locations.

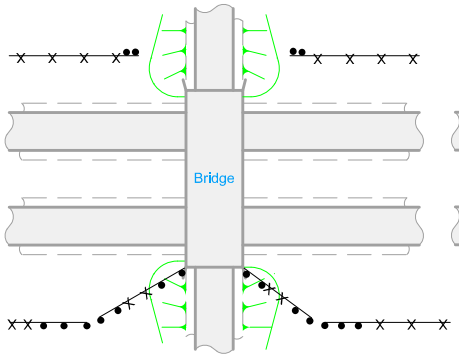
Do not disturb or destroy any Right-of-Way markers.

Provide 12 inches to 15 inches of clear space between adjoining end post installations.

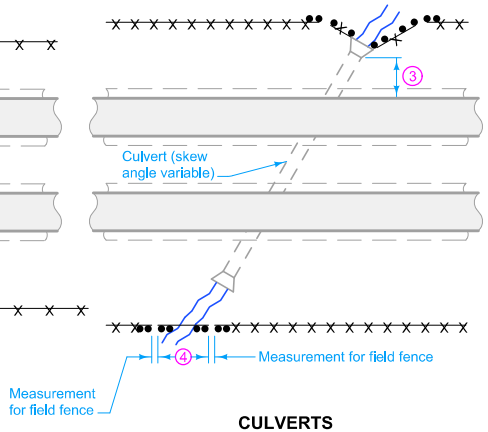
1. Review the exact location of the posts with the Engineer prior to construction.
2. Contractor has the option to install fence continuously beneath bridges when practical.
3. Contractor has the option to install fence over the top of the culvert if this dimension is a minimum of 50 feet.
4. Floodgate, Floodplain, or Channel Crossing Fence as specified on project plans. Review the exact location of the post with the Engineer prior to construction.
5. Construct corners with posts on the inside, unless wire is cut and wrapped.



DUAL BRIDGES
OVER STREAM AND SIDE ROAD



SIDE ROAD BRIDGE
OVER MAINLINE



CULVERTS

IOWA DOT

STANDARD ROAD PLAN

REVISION	
1	10-20-15

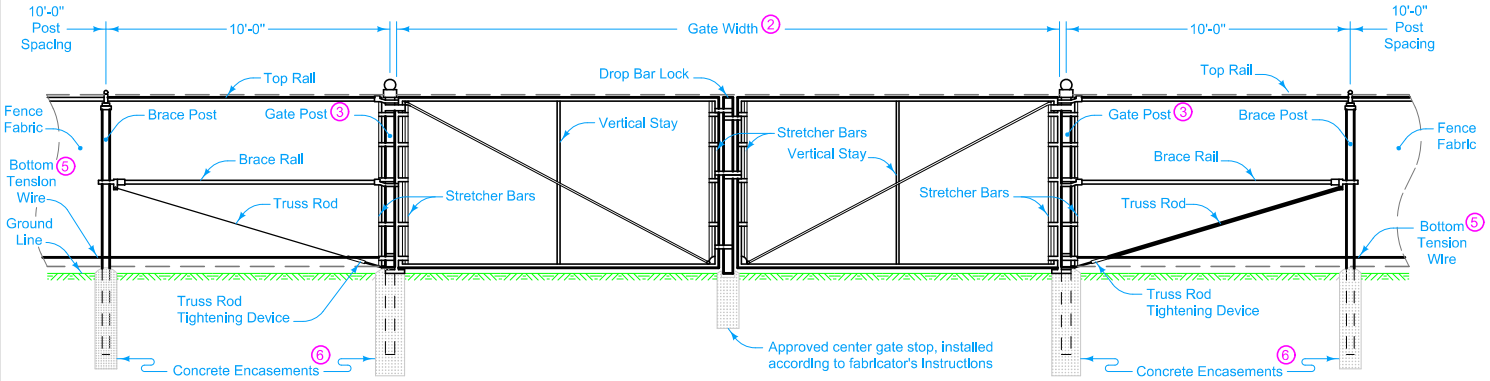
MI-101

SHEET 1 of 1

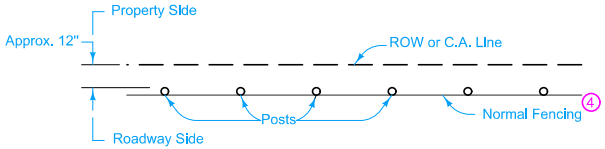
REVISIONS: Replaced the DOT logo in the title block with the new version.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

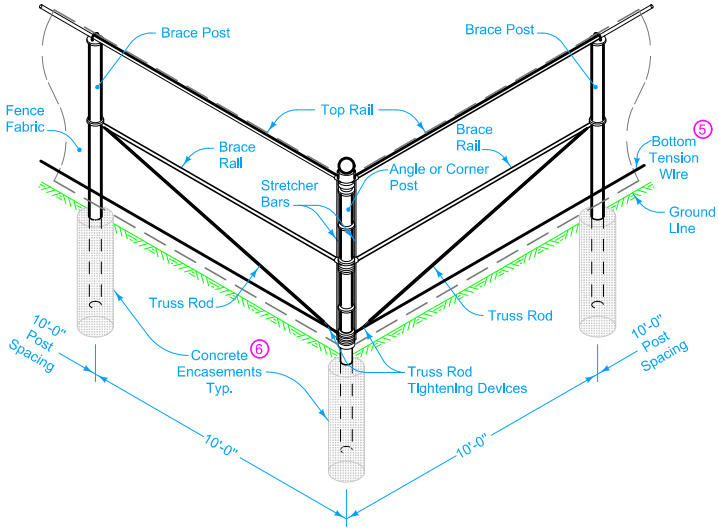
FENCING LAYOUT



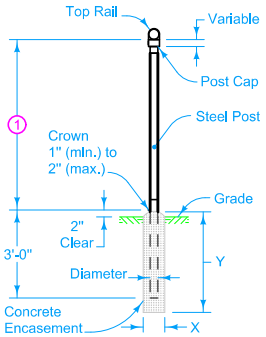
GATE INSTALLATION



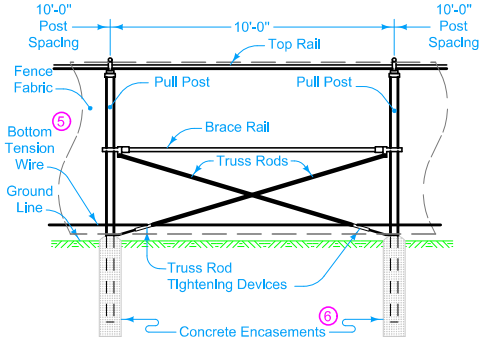
PLAN OF FENCE



ANGLE OR CORNER POST INSTALLATION



POST INSTALLATION



PULL POST INSTALLATION

Attach chain link fabric to braces, top rail, tension wire, and intermediate posts at intervals of 12 inches maximum.

Refer to MI-104 for fencing at Channel Crossings, Minor Ground Depressions, and Flood Plains.

1. Fabric width will be 6 feet unless specified otherwise.
2. Unless specified otherwise, install gates 16 feet in width. Double gate (shown) is required only for widths more than 16 feet. Exact details of gate design are subject to approval of the Engineer. Furnish gate with approved stop, latch and means for locking. Install as recommended by the manufacturer.
3. End Post used to terminate run of fence if no gate is proposed.
4. Place fence fabric on roadway side of post. For stream crossings place fabric on the upstream side of the post.
5. Connect bottom tension wire to end posts, angle posts, and pull posts. Install a turnbuckle or other approved tightening device on each continuous span of tension wire.
6. Refer to Post Installation detail.

Possible Contract Items:
Chain Link Fence
Chain Link Gate Assembly

ITEM	POST SIZE			CONCRETE ENCASEMENT SIZE	
	Nominal Pipe Size, in.	Outside Diameter, in.	Weight, lb./ft.	X	Y
Rail	1¼	1.660	2.27	---	---
Brace Post	1¼	1.660	2.27	0'-9"	3'-6"
Line Post	2	2.375	3.65	0'-9"	3'-6"
Angle, Corner, End, or Pull Post	2½	2.875	5.79	1'-0"	3'-9"
Gate Post for various gate widths:					
6 ft. or less	2½	2.875	5.79	1'-0"	3'-9"
over 6 ft. to 12 ft.	3½	4.000	9.11	1'-0"	4'-0"
over 12 ft. to 18 ft.	6	6.625	18.97	1'-4"	4'-0"
over 18 ft. to 24 ft.	8	8.625	28.55	1'-6"	4'-0"

IOWA DOT

STANDARD ROAD PLAN

REVISION 3 10-20-15

MI-102

SHEET 1 of 2

REVISIONS: Replaced the DOT logo in the title block with the new version.

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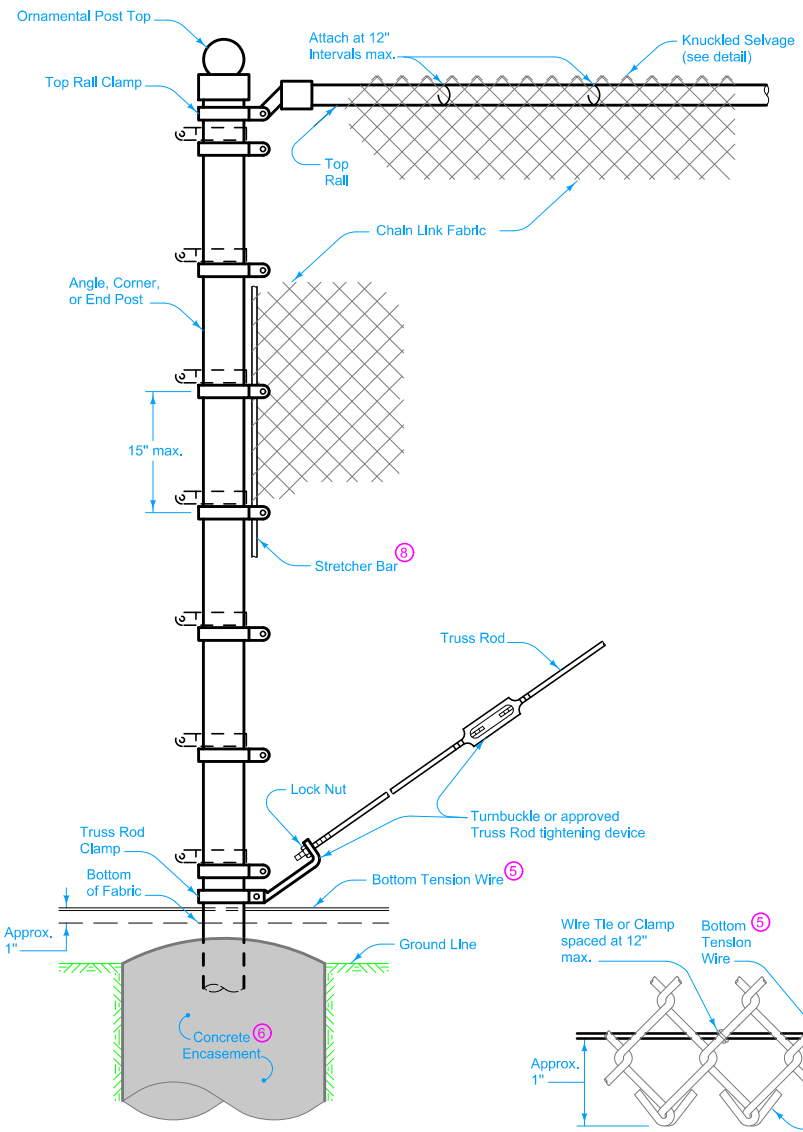
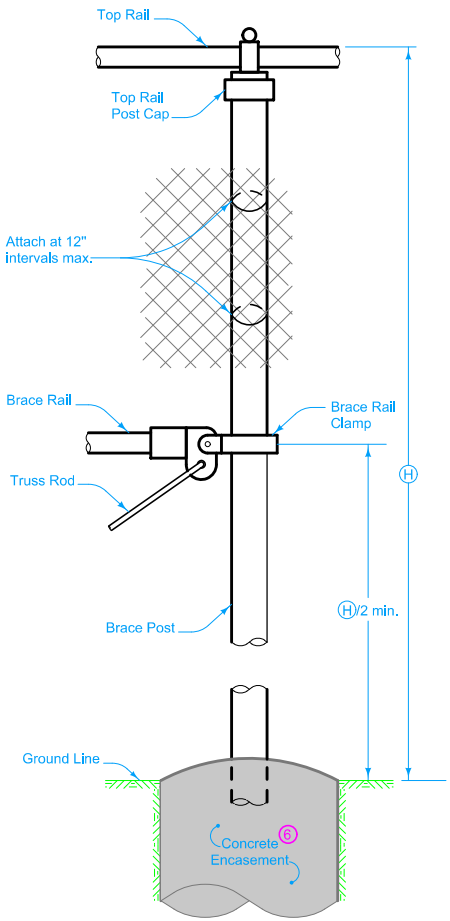
CHAIN LINK FENCE CONSTRUCTION



ANGLE, CORNER, OR END POST ASSEMBLY



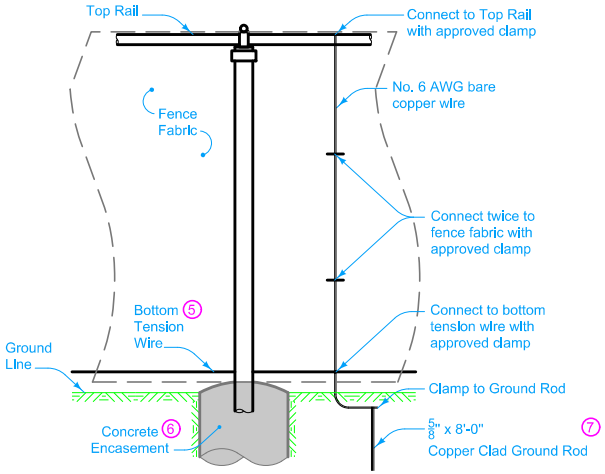
BRACE POST ASSEMBLY

5 Connect bottom tension wire to end posts, angle posts, corner posts, and pull posts. Install a turnbuckle or other approved tightening device on each continuous span of tension wire.

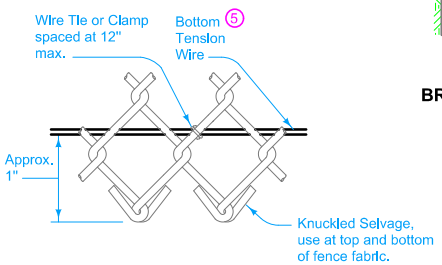
6 Refer to Post Installation detail.

7 Drive ground rod vertically until the top is 6 inches below the ground surface.

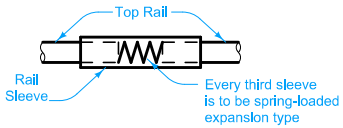
8 Secure each end of each run of fabric using a stretcher bar inserted in the final links of the fabric. Use a bar that is as long as the fabric is wide.



GROUND ROD INSTALLATION



BOTTOM TENSION WIRE AND KNUCKLED SELVAGE



RAIL SLEEVE

IOWA DOT

STANDARD ROAD PLAN

REVISION	
3	10-20-15

MI-102

SHEET 2 of 2

REVISIONS: Replaced the DOT logo in the title block with the new version.

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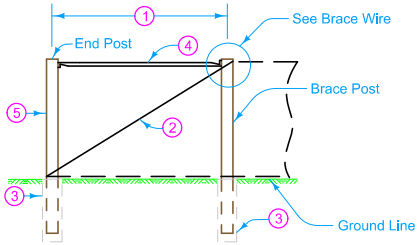
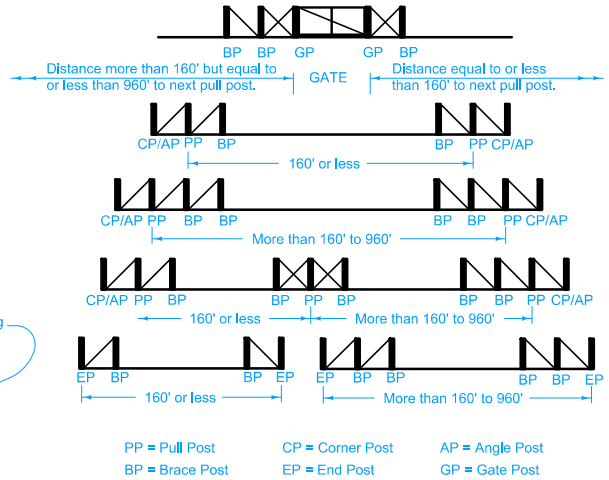
APPROVED BY DESIGN METHODS ENGINEER

CHAIN LINK FENCE CONSTRUCTION

DESIGNER INFO



END POST

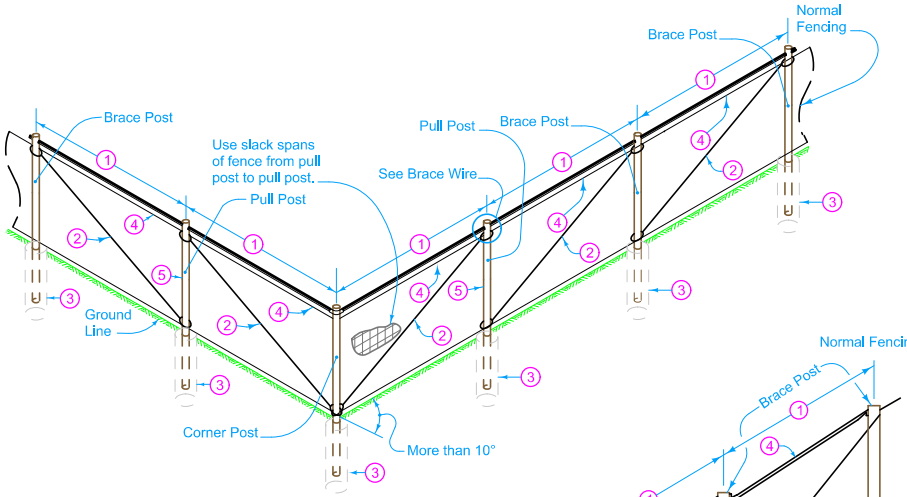


BRACE PANEL LAYOUT

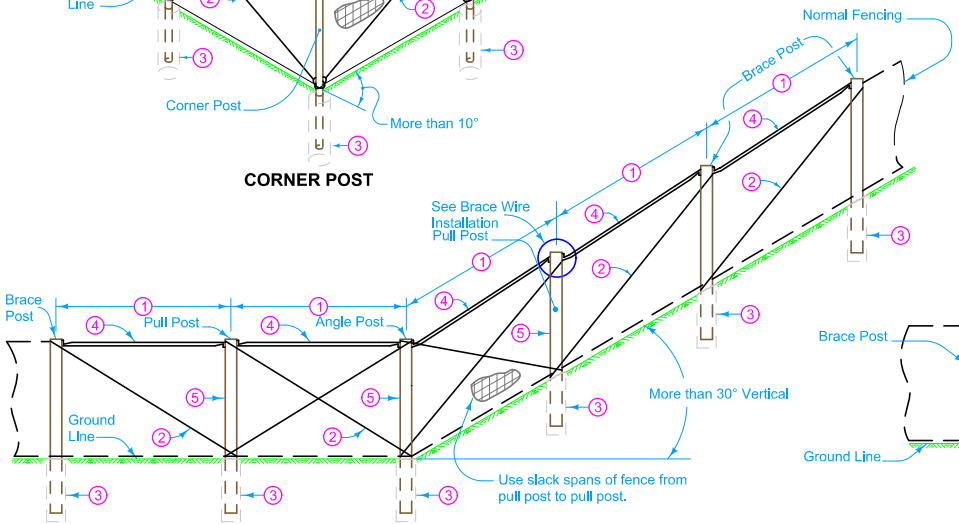
Double wrap barbed wire and tie off at end posts, corner posts, and line brace posts. Single wrap woven wire and tie off. Restart fence to be continued, in like manner.

Fence wire fabric may be placed on either the road side or the field side of posts, depending on local conditions; i.e., on curves, the wire should be placed on the side which would result in the least amount of tension on the staples. This will also apply where wind, drift, or other conditions would exert unusual pressure against the wire.

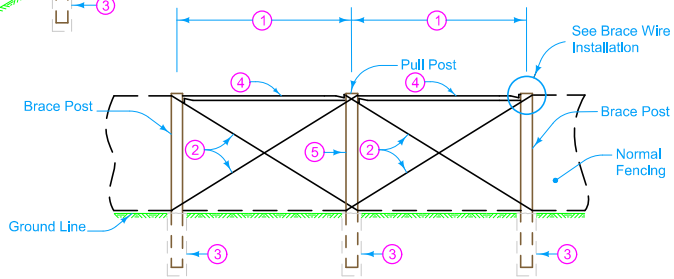
Refer to MI-104 for fencing at Channel Crossings, Minor Groud Depressions, and Flood Plains.



CORNER POST



ANGLE POST



PULL POST (6)

(1) Brace Panel.

(2) Brace Wire: 4 strands of No. 9 wire.

(3) Details indicate placement of granular material for certain posts. The Contractor has the option to drive posts if method demonstrated is satisfactory to the Engineer. Granular material will not be required for driven posts.

(4) Metal brace 8 feet long.

(5) Wrap wire fabric around post.

(6) Pull Post Assembly is required when the distance between pull posts is greater than 960 feet in straight lines of fence.

Possible Contract Items:
- Deer Fence
- Deer Fence Brace Panels
- Deer Fence Gate
- Field Fence
- Field Fence Brace Panel
- Field Fence Gate

Possible Tabulation:
- 100-7

IOWA DOT

STANDARD ROAD PLAN

REVISION	
2	10-20-15

MI-103

SHEET 1 of 7

REVISIONS: Added Designer Info button.

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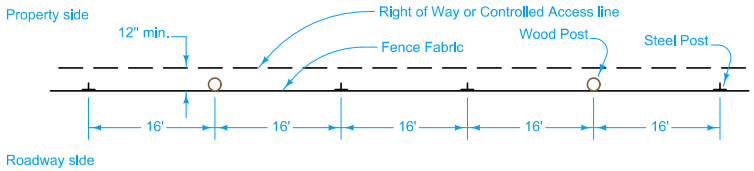
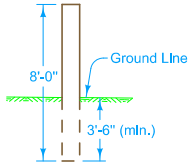
DEER FENCE AND FIELD FENCE CONSTRUCTION

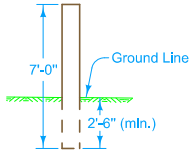


PLAN

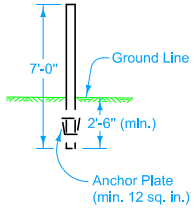
FIELD FENCE



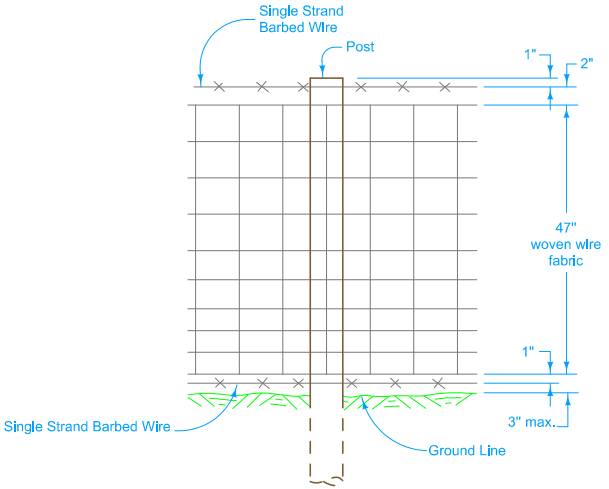
ANGLE, BRACE, CORNER, END OR PULL POST (WOOD)



LINE POST (WOOD)

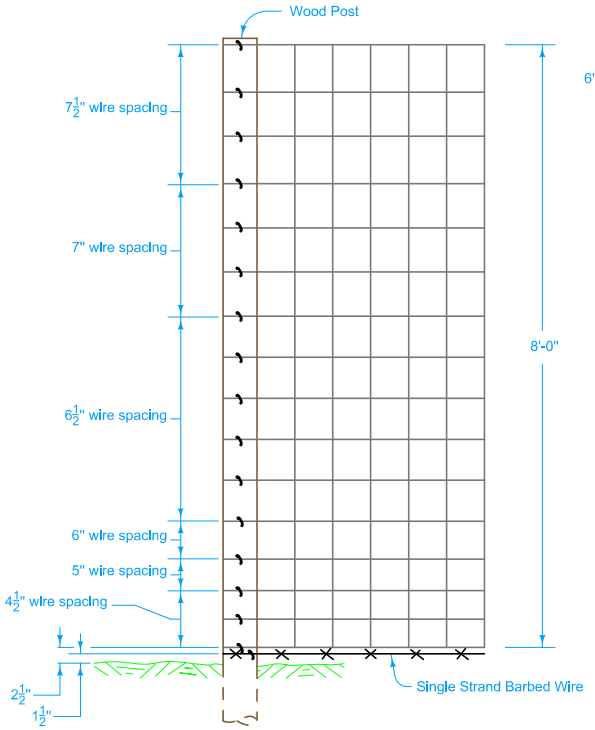


LINE POST (STEEL)

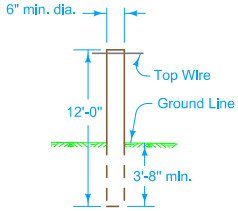


ELEVATION

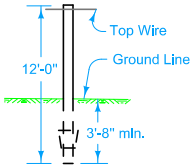
DEER FENCE



ELEVATION



WOOD POST



STEEL POST

IOWA DOT

REVISION	
2	10-20-15

STANDARD ROAD PLAN

MI-103

SHEET 2 of 7

REVISIONS: Added Designer Info button.

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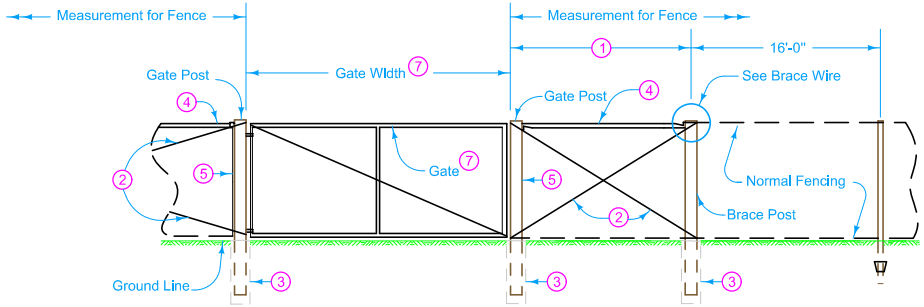
DEER FENCE AND FIELD FENCE CONSTRUCTION



FIELD FENCE GATE

1. Brace Panel.
2. Brace Wire: 4 strands of No. 9 wire.
3. Details indicate placement of granular material for certain posts. The Contractor has the option to drive posts if method demonstrated is satisfactory to the Engineer. Granular material will not be required for driven posts.
4. Metal brace 8 feet long.
5. Wrap wire fabric around post.
7. Unless specified otherwise, install a 16 foot gate. Double gate is required only for widths more than 16 feet. Exact details of gate design are subject to the approval of the Engineer. Install as recommended by the manufacturer.

IOWA DOT

STANDARD ROAD PLAN

REVISION	
2	10-20-15

MI-103

SHEET 3 of 7

REVISIONS: Added Designer Info button.

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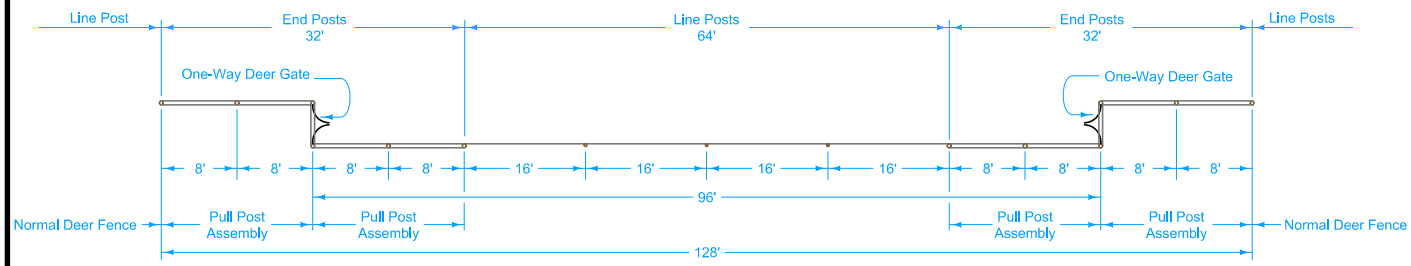
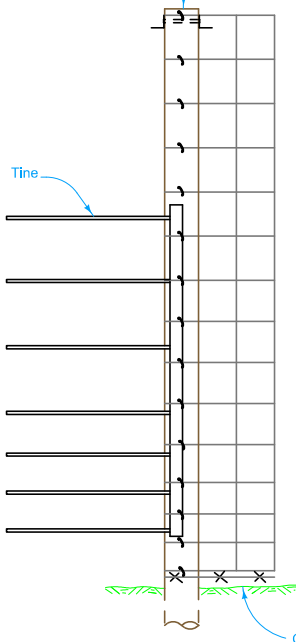
DEER FENCE AND FIELD FENCE CONSTRUCTION

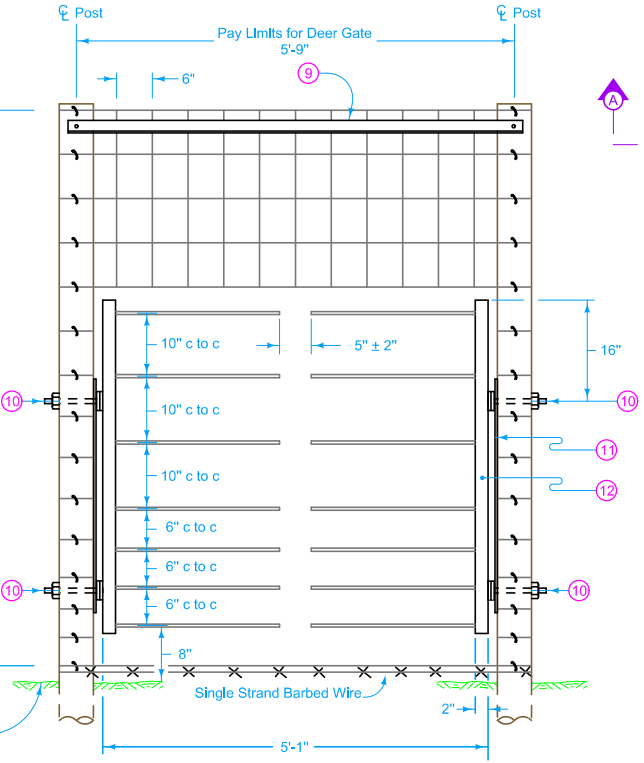


PLAN

8. Spring loaded hinge allows tines to spread apart and return to original position.
9. Two 2 in. x 2 in. x $\frac{1}{8}$ in. L top braces held by $\frac{1}{2}$ inch diameter bolts.
10. Attach nut and washer to each bolt.
11. Support Plate 3 in. x $\frac{5}{16}$ in. x 37 in.
12. 2 in. x 2 in. x 54 in. structural steel tubing welded to Hinge Plate.
13. $\frac{3}{4}$ in. diameter x 8 in. bolt welded to Support Plate

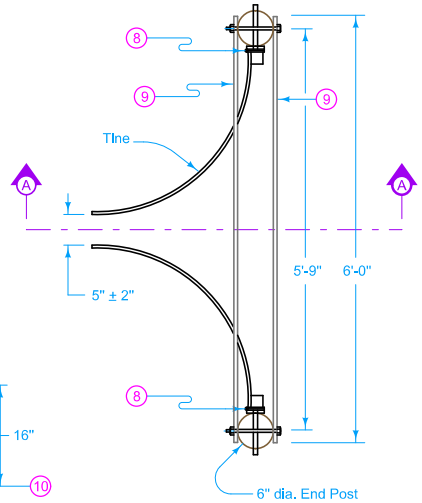


SECTION A-A

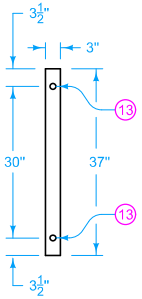


PROFILE

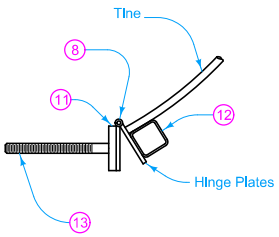
DEER GATE



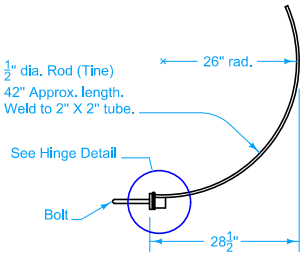
DEER GATE TOP



SUPPORT PLATE



HINGE



TINE

IOWA DOT

STANDARD ROAD PLAN

REVISION	
2	10-20-15

MI-103

SHEET 4 of 7

REVISIONS: Added Designer Info button.

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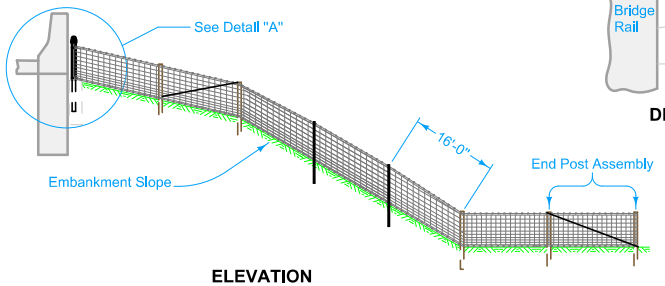
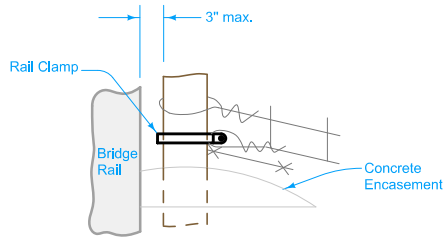
APPROVED BY DESIGN METHODS ENGINEER

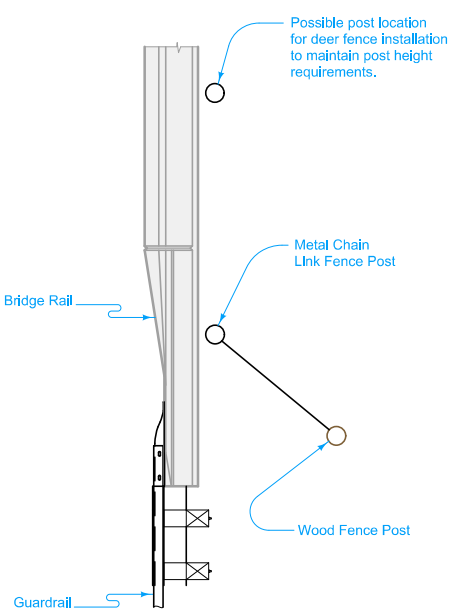
DEER FENCE AND FIELD FENCE CONSTRUCTION



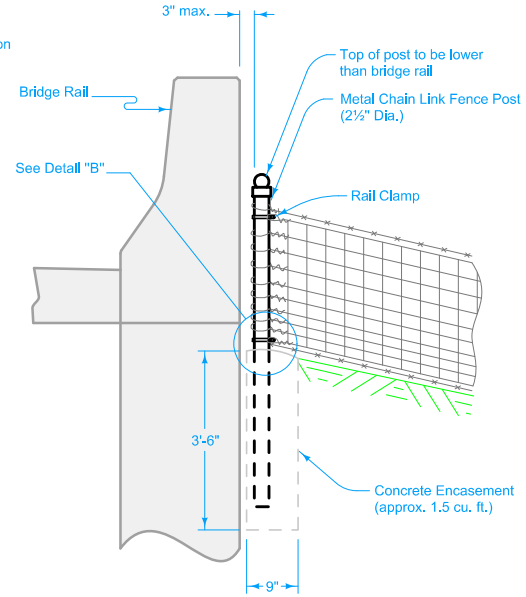
ELEVATION



DETAIL "B"



PLAN

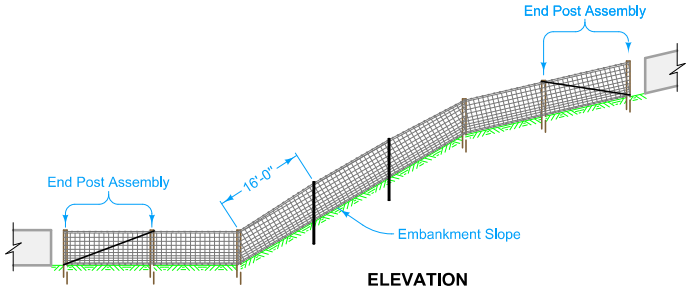


DETAIL "A"

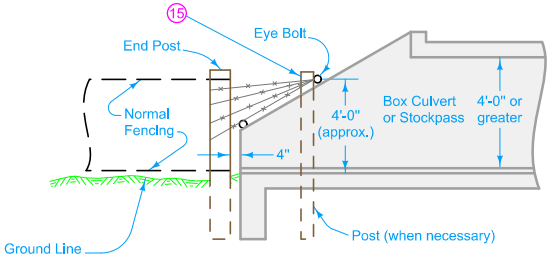
FENCE TERMINATION AT BRIDGES (14)

(14) Fence termination at bridges, culverts, and other structures as detailed hereon will not be paid for separately but will be considered incidental to the bid item "Deer Fence" or "Field Fence."

(15) Place minimum of four (4) barbed wires fan shaped, connected to eye bolt on culvert wall or set 4 inch post when necessary.



ELEVATION



BOX CULVERTS OR STOCK PASSES 4 FEET OR LARGER

FENCE TERMINATION AT STRUCTURES (15)

IOWA DOT

STANDARD ROAD PLAN

REVISION	
2	10-20-15

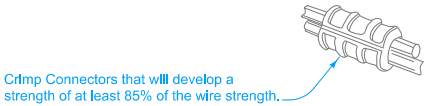
MI-103

SHEET 5 of 7

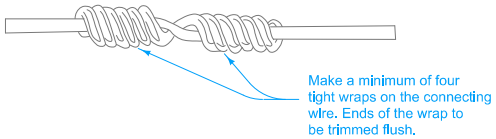
REVISIONS: Added Designer Info button.

Brian Smith
APPROVED BY DESIGN METHODS ENGINEER

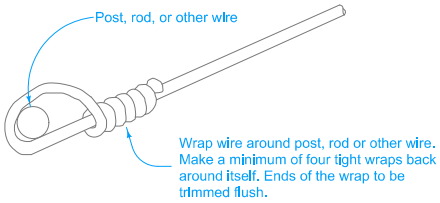
DEER FENCE AND FIELD FENCE CONSTRUCTION



CRIMP CONNECTION

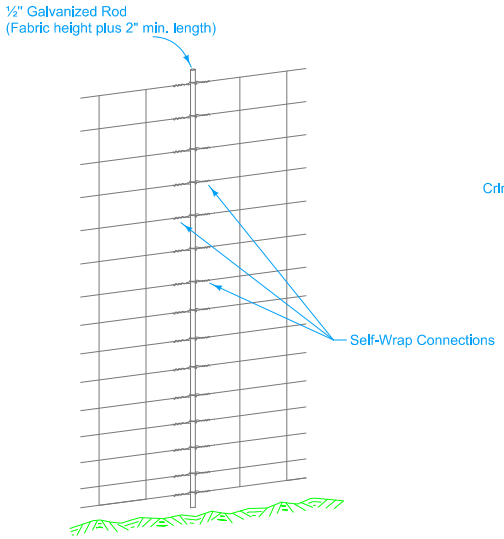


IN-LINE CONNECTION

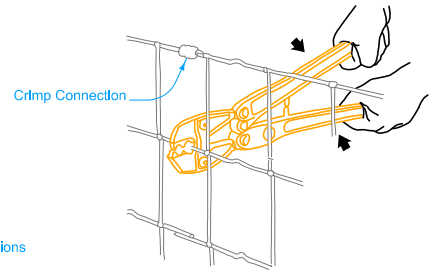


SELF-WRAP CONNECTION

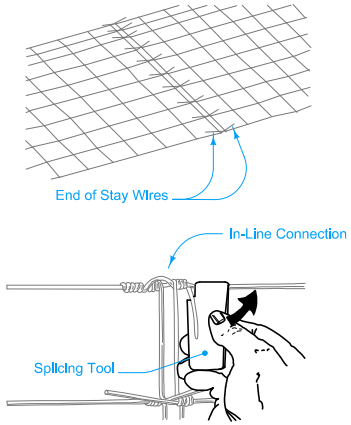
APPROVED WIRE CONNECTIONS



SPLICE WITH ROD



CRIMP SPLICE

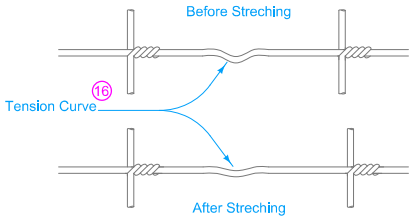


OVERLAP SPLICE

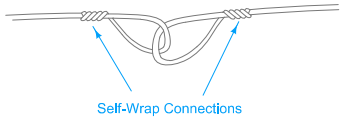
FABRIC SPLICES

(16) Tension curve consists of a "U" shaped crimp in the fence wires and has the same effect as a spring. Stretch to 50% removal of the factory crimp.

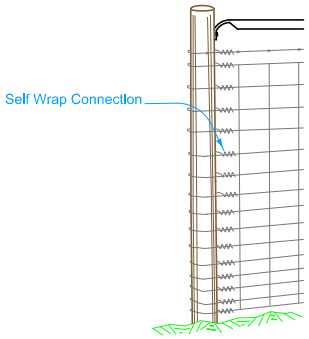
(17) Crimp connection and in-line connection are also acceptable brace wire splices.



STRETCHING DETAILS



BRACE WIRE SPLICE (17)



END POST CONNECTION

FENCE ASSEMBLY

IOWA DOT

REVISION	
2	10-20-15

STANDARD ROAD PLAN

MI-103

SHEET 6 of 7

REVISIONS: Added Designer Info button.

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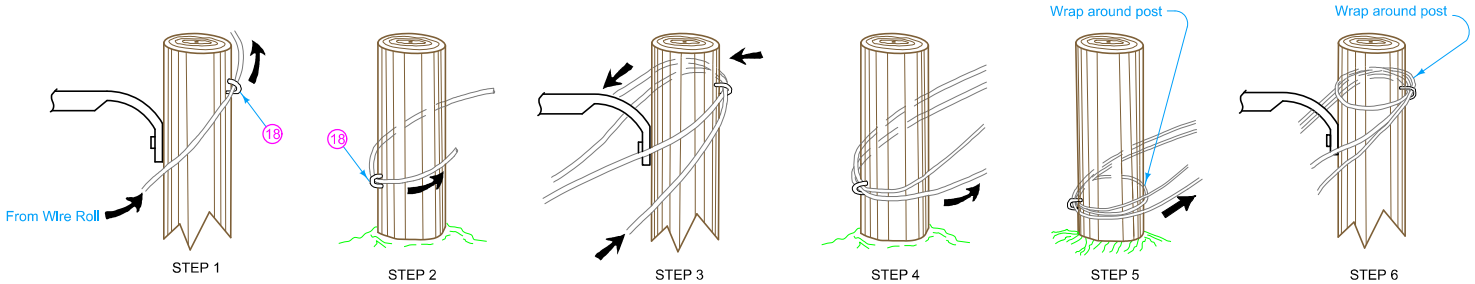
DEER FENCE AND FIELD FENCE CONSTRUCTION

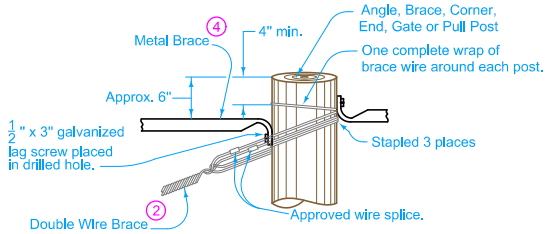


2 Brace Wire: 4 strands of No. 9 wire.

4 Metal brace 8 feet long.

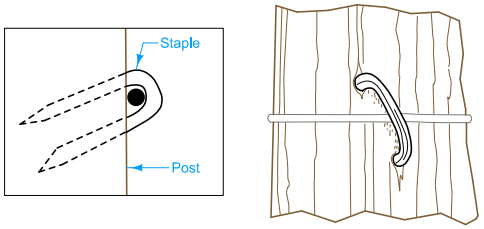
18 Set staples cross-wise to the grain. Drive staples tight at pull posts. Drive all other staples firm, but loose enough to allow lateral movement of the wire.

19 Twist the two brace wires together to produce proper tension in the brace assembly.



BRACE WIRE INSTALLATION 19

(Brace wire wrapped the same at the bottom of post.)



STAPLES 18

WIRE ASSEMBLY

IOWA DOT

STANDARD ROAD PLAN

REVISION	
2	10-20-15

MI-103

SHEET 7 of 7

REVISIONS: Added Designer Info button.

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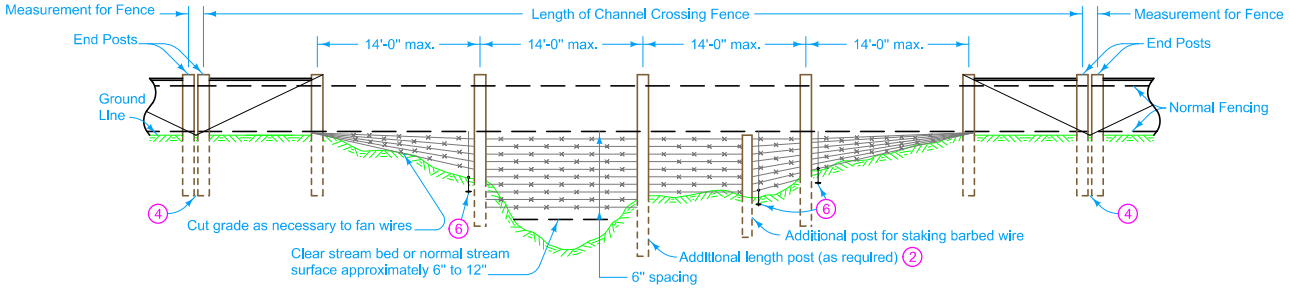
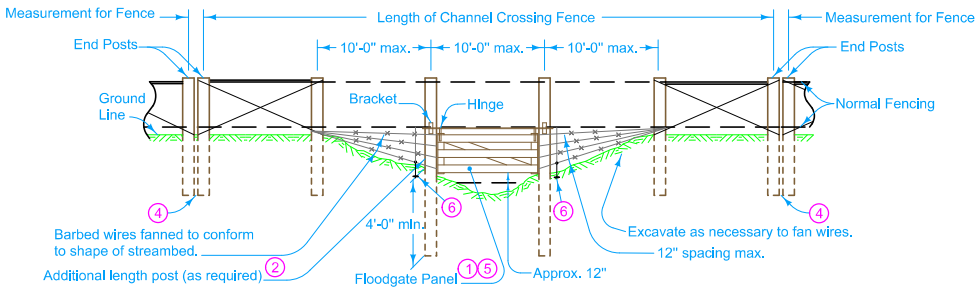
DEER FENCE AND FIELD FENCE CONSTRUCTION

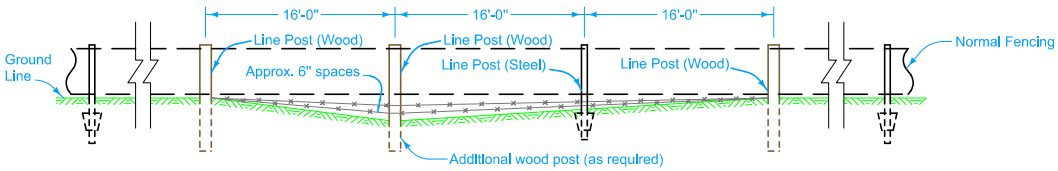
DESIGNER INFO



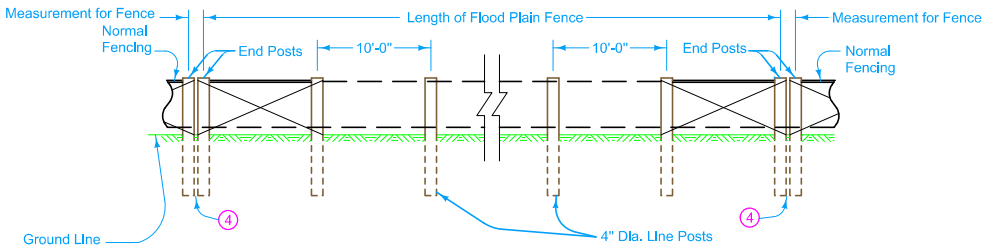
CHANNEL CROSSING FENCE - TYPE "A"



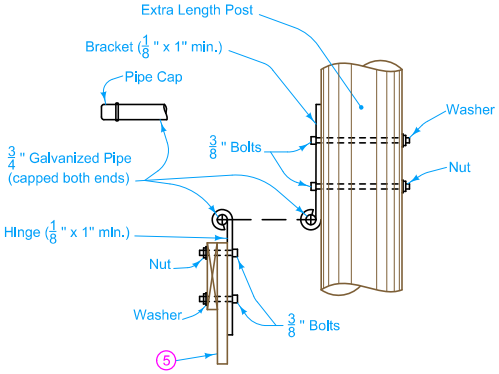
CHANNEL CROSSING FENCE - TYPE "B"



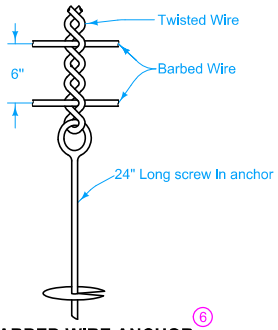
LINE FENCE AT MINOR GROUND DEPRESSIONS 3



FLOOD PLAIN FENCE



FLOODGATE HINGE AND BRACKET



BARBED WIRE ANCHOR 6

DEER FENCE AND FIELD FENCE

Space line brace posts according to MI-103 where fencing is continuous and where end, corner, and line brace posts are not specified.

Double wrap barbed wire and tie off at end posts, corner posts, and line brace posts. Single wrap woven wire and tie off. Restart fence to be continued, in like manner.

Deer and field fence wire may be placed on either the road side or the field side of posts, depending on local conditions. For example, on curves the wire should be placed on the side which will result in the least amount of tension on the staples. This also applies where wind, drift, or other conditions will exert unusual pressure against the wire. Place wire on the upstream side of any stream.

Refer to MI-101, MI-102, and MI-103 for layouts of General, Chain Link, Deer, and Field Fence.

1. Floodgate is part of the Type 'B' Channel Crossing Fence.
2. All extra length posts more than 8 feet long require a minimum embedment of 4 feet. For Flood Plain Fencing, install line posts of treated wood, 4 inches minimum diameter, 8 feet long and spaced at 10 foot centers. Maximum interval of Pull Posts Assembly is 600 feet.
3. For fence at minor ground depressions, additional wood line posts and up to two additional barbed wires will not be paid for directly but will be considered incidental to the price bid for Deer Fence or Field Fence.
4. Provide a minimum of 12 to 15 inches of clear space between adjoining end post installations.
5. Floodgate Panel built from Untreated Rough 1 in. x 8 in. (Nominal) Lumber. More than one Floodgate Panel if required by the contract documents.
6. Use screw-in anchor with twisted wire to hold barb wire at 6" spacing.

Possible Contract Items:
Type A Channel Crossing Fence
Type B Channel Crossing Fence
Flood Plain Fencing

Possible Tabulation:
100-7

IOWA DOT

STANDARD ROAD PLAN

REVISION	
5	10-17-17

MI-104

SHEET 1 of 2

REVISIONS: Added Designer Info button and Page 2 for Chain Link Fence.

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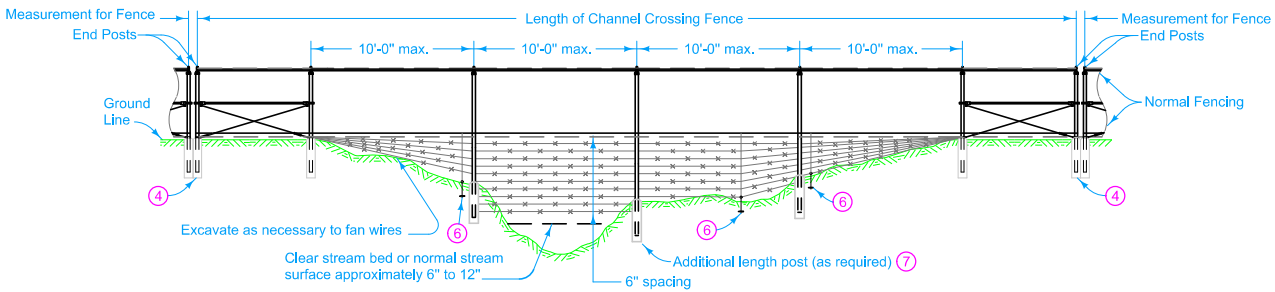
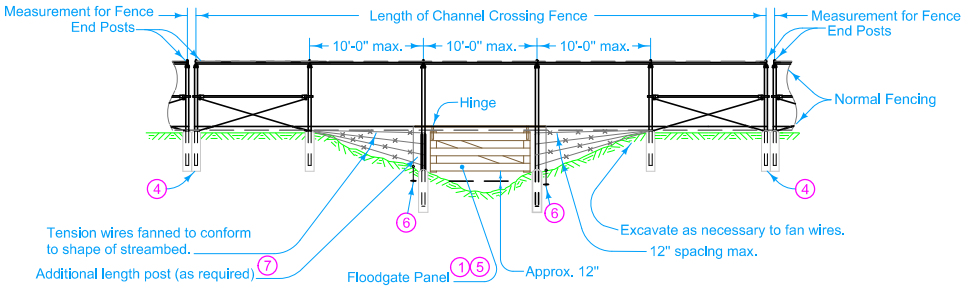
APPROVED BY DESIGN METHODS ENGINEER

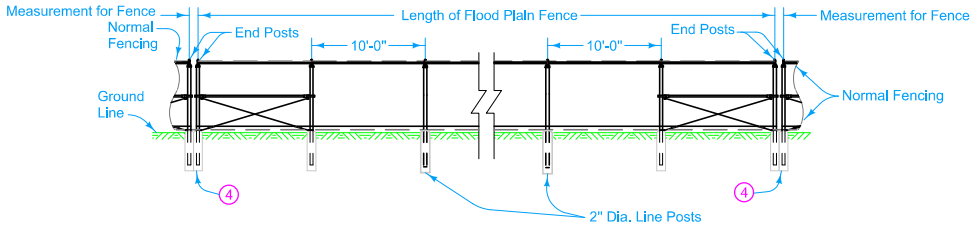
FENCE CONSTRUCTION AT CHANNEL CROSSINGS, FLOOD PLAINS, AND MINOR GROUND DEPRESSIONS



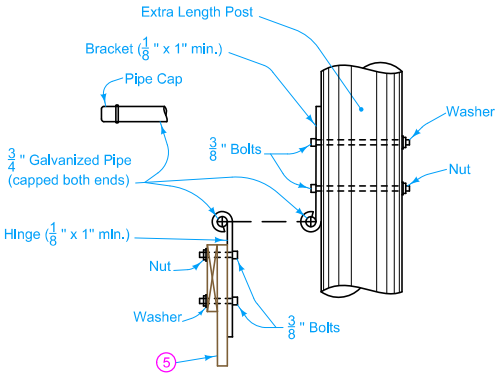
CHANNEL CROSSING FENCE - TYPE "A"



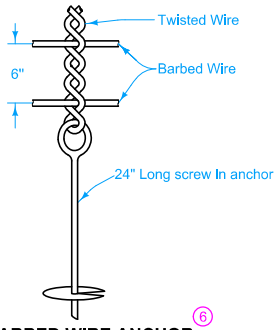
CHANNEL CROSSING FENCE - TYPE "B"



FLOOD PLAIN FENCE



FLOODGATE HINGE AND BRACKET



BARBED WIRE ANCHOR 6

Space line brace posts according to MI-102 where fencing is continuous and where end, corner, and line brace posts are not specified.

Double wrap barbed wire and tie off at posts. Attach chain link fence to braces, top rail, tension wire and posts at intervals of 12 inches. Restart fence to be continued, in like manner.

1. Floodgate is part of the Type 'B' Channel Crossing Fence.
4. Provide a minimum of 12 to 15 inches of clear space between adjoining end post installations.
5. Floodgate Panel built from Untreated Rough 1 in. x 8 in. (Nominal) Lumber. More than one Floodgate Panel if required by the contract documents.
6. Use screw-in anchor with twisted wire to hold barb wire at 6" spacing.
7. All extra length posts more than 8 feet long require a minimum embedment of 4 feet. For Flood Plain Fencing, posts will be 8 feet long and spaced at 10 foot centers. Maximum interval of Pull Posts Assembly is 600 feet.

CHAIN LINK FENCE

IOWA DOT

REVISION	
5	10-17-17

STANDARD ROAD PLAN

MI-104

SHEET 2 of 2

REVISIONS: Added Designer Info button and Page 2 for Chain Link Fence.

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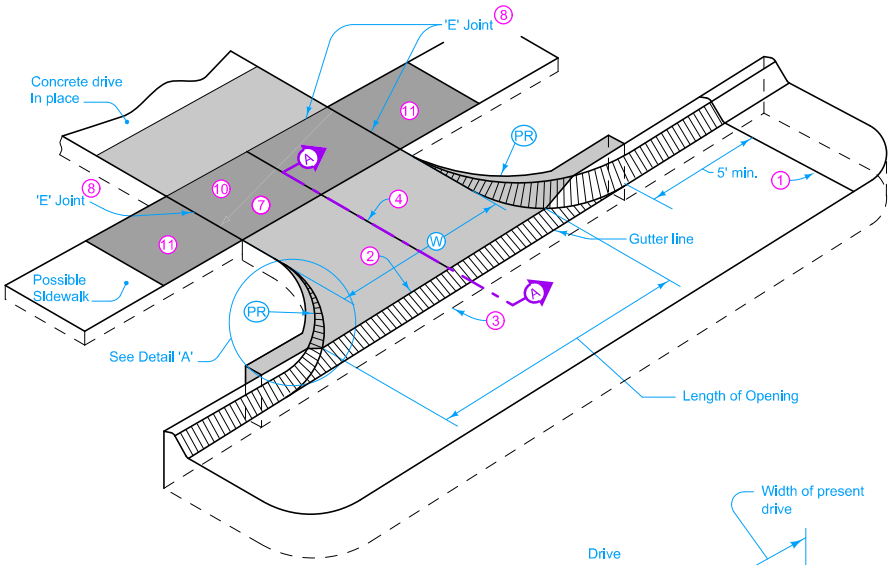
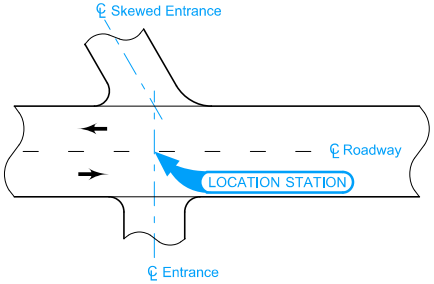
APPROVED BY DESIGN METHODS ENGINEER

FENCE CONSTRUCTION AT CHANNEL CROSSINGS, FLOOD PLAINS, AND MINOR GROUND DEPRESSIONS

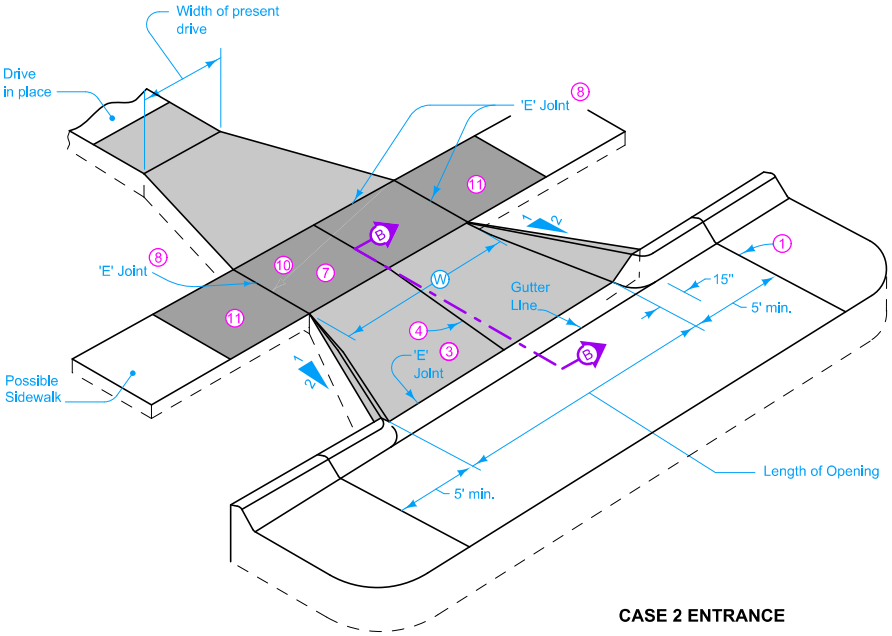
DESIGNER INFO



CASE 1 ENTRANCE



ENTRANCE LOCATION



CASE 2 ENTRANCE

Special details for entrances other than Cases 1 and 2 are included in the detail plans. The shape and surface of driveways and alleys will vary to fit individual conditions.

Use unreinforced concrete pavement mix with a minimum thickness of 6 inches, unless specified otherwise for driveways and alleys. If an alley drains toward the roadway, use a 2 inch inverted crown; otherwise, use flat surface for driveway pavement.

W is measured at the street side of sidewalk. If sidewalk is not present, W is to be measured at the end of the returns for Case 1 and 10 feet back of curb for Case 2.

1. Transverse Pavement Joints as per detail Project Plans.
2. 'K' Pavement Joint (Refer to **PV-101**) from end of radius to end of radius.
3. Line at the Back of Curb.
4. 'C' Joint on Centerline.
7. Refer to contract documents for sidewalk construction if the entrance is designed to accomodate sidewalk. Construct sidewalk using the same thickness as the driveway.
8. If the sidewalk is in place at the time of construction, place 'E' Joint along the front edge of the sidewalk. If the sidewalk is reconstructed with the driveway entrance, place 'E' Joint along the back edge of the sidewalk and a 'C' Joint sawed or formed along the front edge of the sidewalk. Refer to **PV-101** for joint details.
10. Maximum cross slope is 2% unless specified otherwise in the contract documents.
11. If cross slope of the sidewalk panel exceeds 2%, remove and replace to transition from existing sidewalk to sidewalk through driveway. If elevation change requires a curb ramp, comply with MI-220; verify need for detectable warning panel with Engineer.

Possible Contract Items:
- Driveway, P.C. Concrete
- Driveway, Reinforced P.C. Concrete
- Removal of Paved Driveway
- Sidewalk, P.C. Concrete

Possible Tabulation:
102-3

IOWA DOT

REVISION	
6	10-20-15

STANDARD ROAD PLAN

MI-210

SHEET 1 of 2

REVISIONS: Replaced the DOT logo in the title block with the new version.

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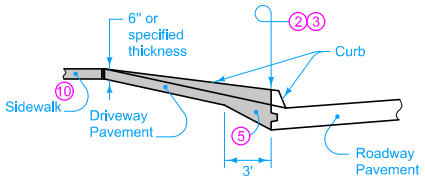
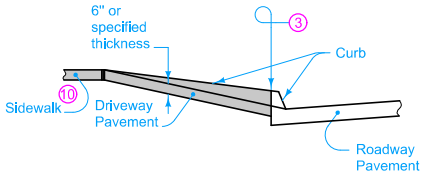
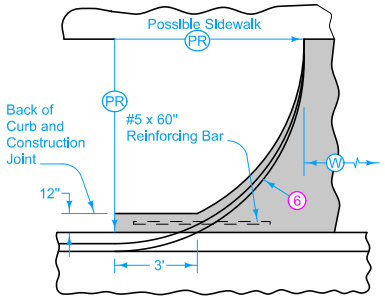
PCC DRIVEWAYS AND ALLEYS



SECTION A-A
(Case 1 Entrance)



SECTION B-B
(Cases 2 Entrance)



DETAIL 'A'
CASE 1 ENTRANCE

2 'K' Pavement Joint (Refer to PV-101) from end of radius to end of radius.

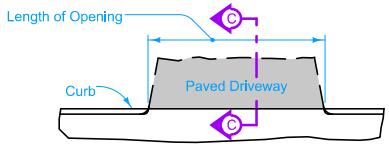
3 Line at the Back of Curb.

5 Taper to Pavement Thickness.

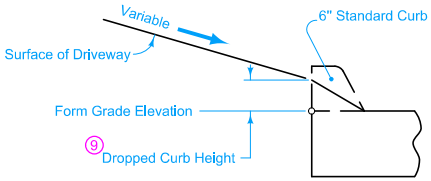
6 Lip curb varies from either $4\frac{1}{2}$ inch or 3 inch at back of curb to 0 inch at front of sidewalk.

9 Refer to Tabulation 102-3.

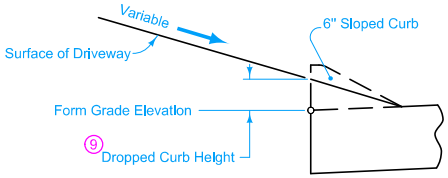
10 Maximum cross slope is 2% unless specified otherwise in the contract documents.



PLAN



SECTION C-C
(Standard Curb)



SECTION C-C
(Sloped Curb)

DROPPED CURB

IOWA DOT

REVISION	
6	10-20-15

STANDARD ROAD PLAN

MI-210

SHEET 2 of 2

REVISIONS: Replaced the DOT logo in the title block with the new version.

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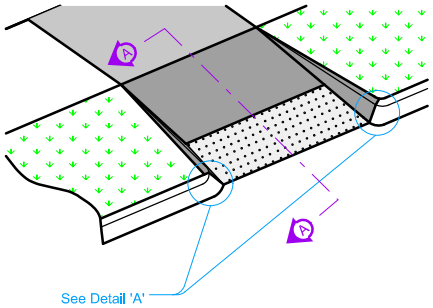
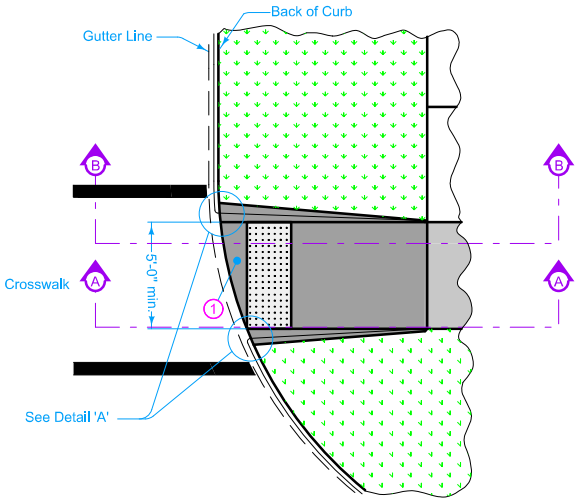
PCC DRIVEWAYS AND ALLEYS



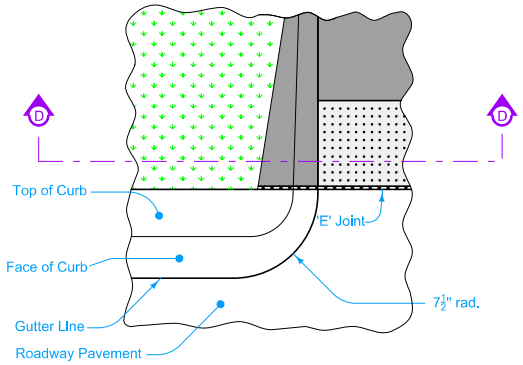
CURB RAMP PERPENDICULAR TO CURB



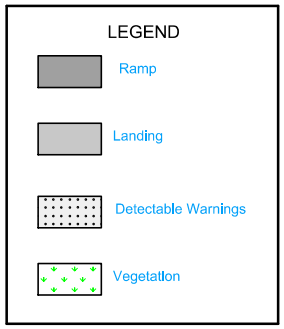
CURB RAMP NOT PERPENDICULAR TO CURB

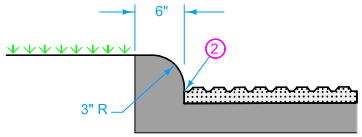
1. Unless curb ramp is aligned perpendicular to the street radius, provide an area of special shaping at the bottom of the ramp. This area allows the grade break at the bottom of the ramp to be perpendicular to the ramp and provides a smooth transition to gutterline for wheelchair access.

2. Use vertical curb adjacent to ramp unless flares are specified in the project plans. Install Detectable Warnings so that no gap is left between warning panel and base of curb.

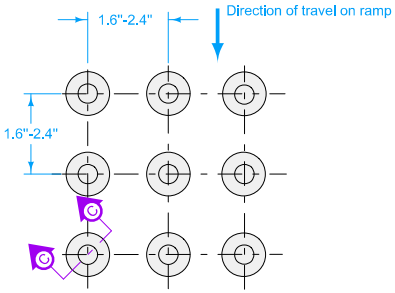


DETAIL 'A'

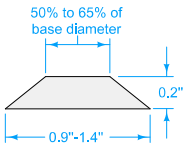




SECTION D-D



SQUARE PATTERN
(Parallel alignment)



SECTION C-C

DOME DETAILS ON DETECTABLE WARNINGS

Possible Contract Items:
- Detectable Warnings
- Sidewalk, P.C. Concrete, 6 in.
- Sidewalk, P.C. Concrete, 4 in.
- Removal of Sidewalk

Possible Tabulation:
- 113-1

IOWA DOT

REVISION	
6	10-20-15

STANDARD ROAD PLAN

MI-220

SHEET 1 of 3

REVISIONS: Changed dimension from track to detectable warning on Sheet 3. Added note 3 to Sheet 3.

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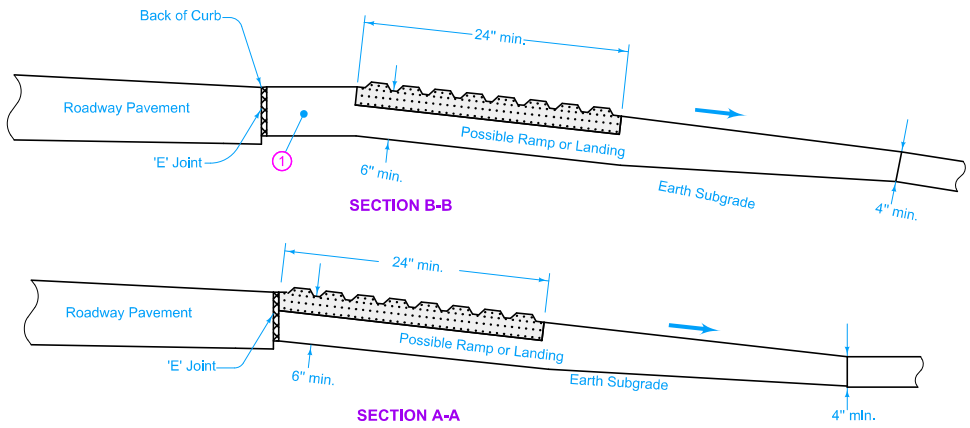
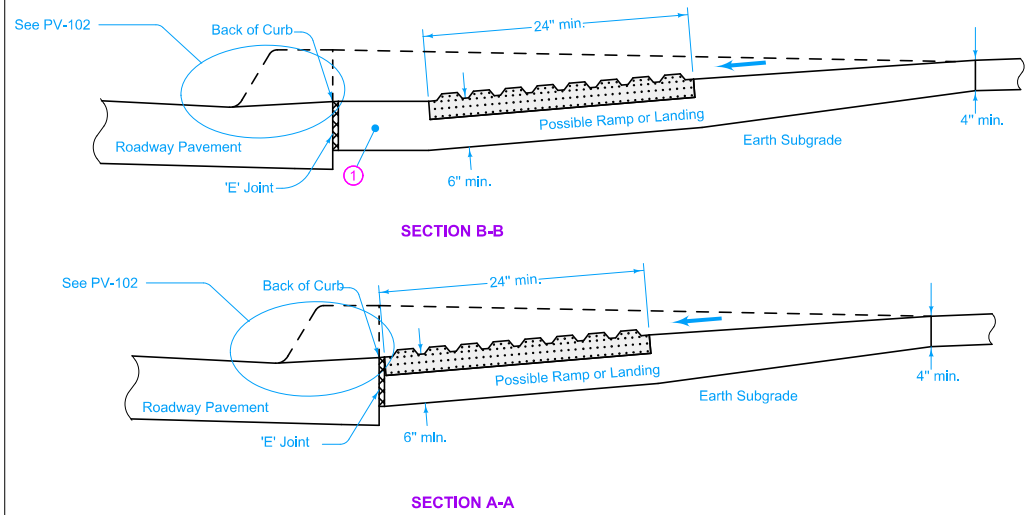
APPROVED BY DESIGN METHODS ENGINEER

DETECTABLE WARNINGS AND PEDESTRIAN RAMP



TYPICAL INSTALLATION DETECTABLE WARNING
WITH NON CURBED ROADWAY

1 Unless curb ramp is aligned perpendicular to the street radius, provide an area of special shaping at the bottom of the ramp. This area allows the grade break at the bottom of the ramp to be perpendicular to the ramp and provides a smooth transition to gutterline for wheelchair access.



TYPICAL INSTALLATION DETECTABLE WARNING
WITH CURBED ROADWAY

LEGEND

- Ramp
- Landing
- Detectable Warnings
- Vegetation

IOWA DOT

STANDARD ROAD PLAN

REVISION	
6	10-20-15

MI-220

SHEET 2 of 3

REVISIONS: Changed dimension from track to detectable warning on Sheet 3. Added note 3 to Sheet 3.

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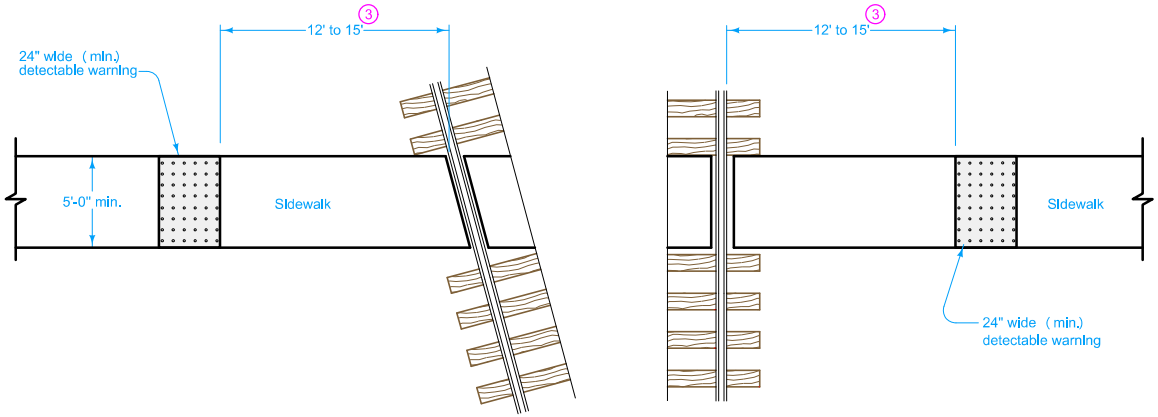
DETECTABLE WARNINGS
AND PEDESTRIAN RAMP

③ If crossing gate conflicts with location of detectable warning, or if pedestrian crossing gate is provided, place detectable warning panel in advance of the crossing gate.



RAILROAD CROSSING

LEGEND

- Ramp
- Landing
- Detectable Warnings
- Vegetation

IOWA DOT

STANDARD ROAD PLAN

REVISION	
6	10-20-15

MI-220

SHEET 3 of 3

REVISIONS: Changed dimension from track to detectable warning on Sheet 3. Added note 3 to Sheet 3.

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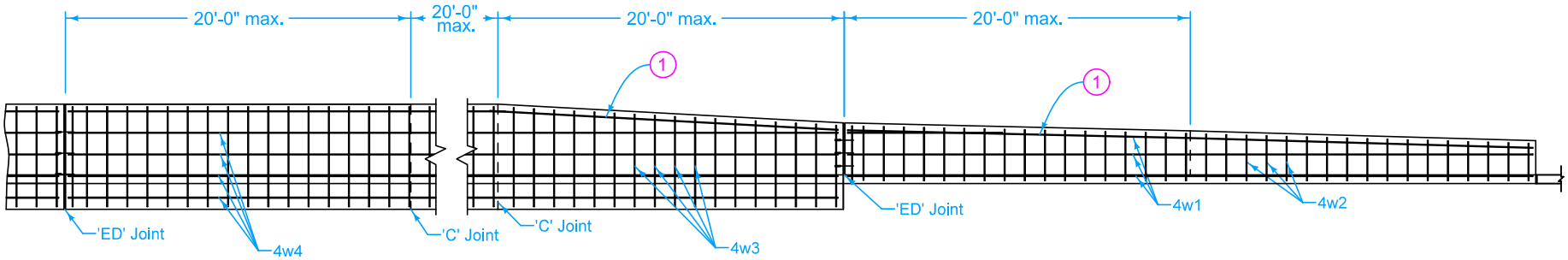
DETECTABLE WARNINGS AND PEDESTRIAN RAMP

Provide a minimum concrete cover to near reinforcement of 1 1/2 inches. Provide 3 inches minimum cover at the ends of bars.

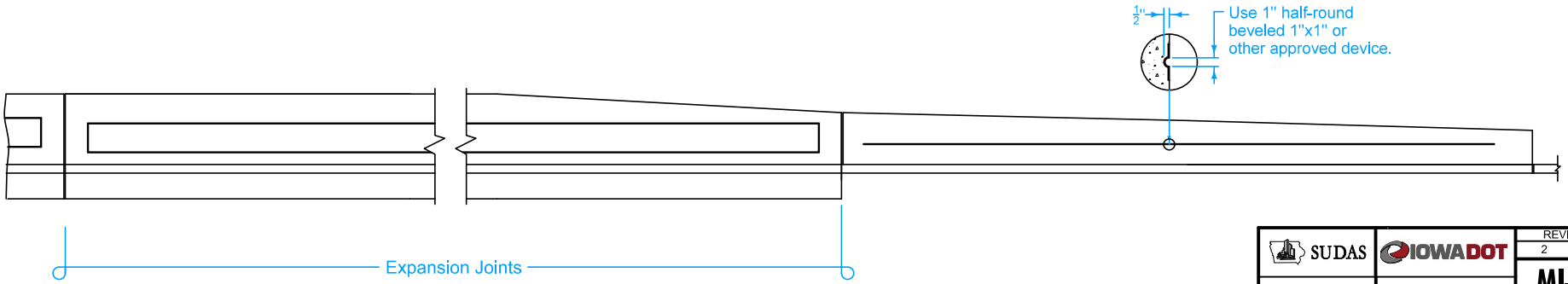
(1) Top bar parallel to top of wall. Lap 6 inch minimum as necessary. Tie securely.



TYPE B WALL

TYPE A WALL

TYPICAL LONGITUDINAL SECTION OF RETAINING WALL



TYPICAL RUSTICATION DETAIL

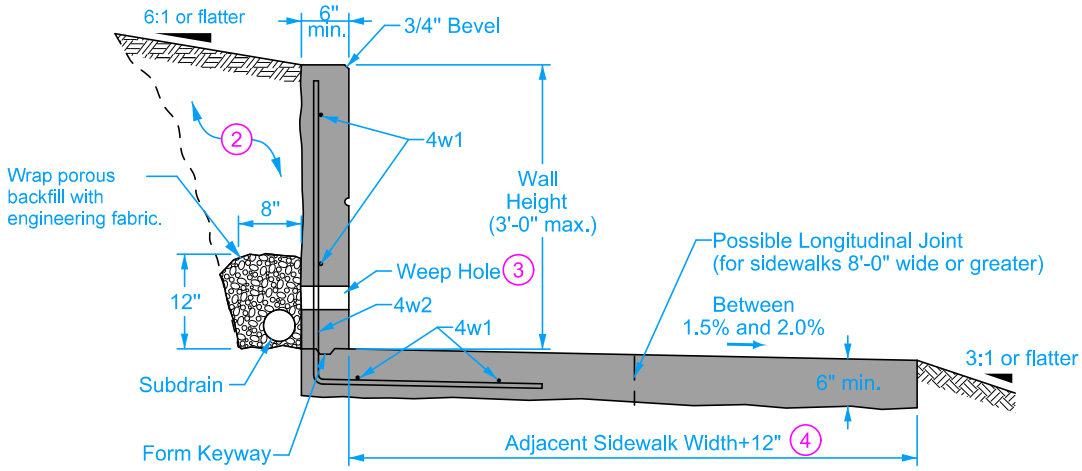
SUDAS	IOWA DOT	REVISION 2 10-20-15
FIGURE 9072.221	STANDARD ROAD PLAN	MI-221 SHEET 1 OF 2

REVISIONS: Replaced DOT and SUDAS logos with new versions.

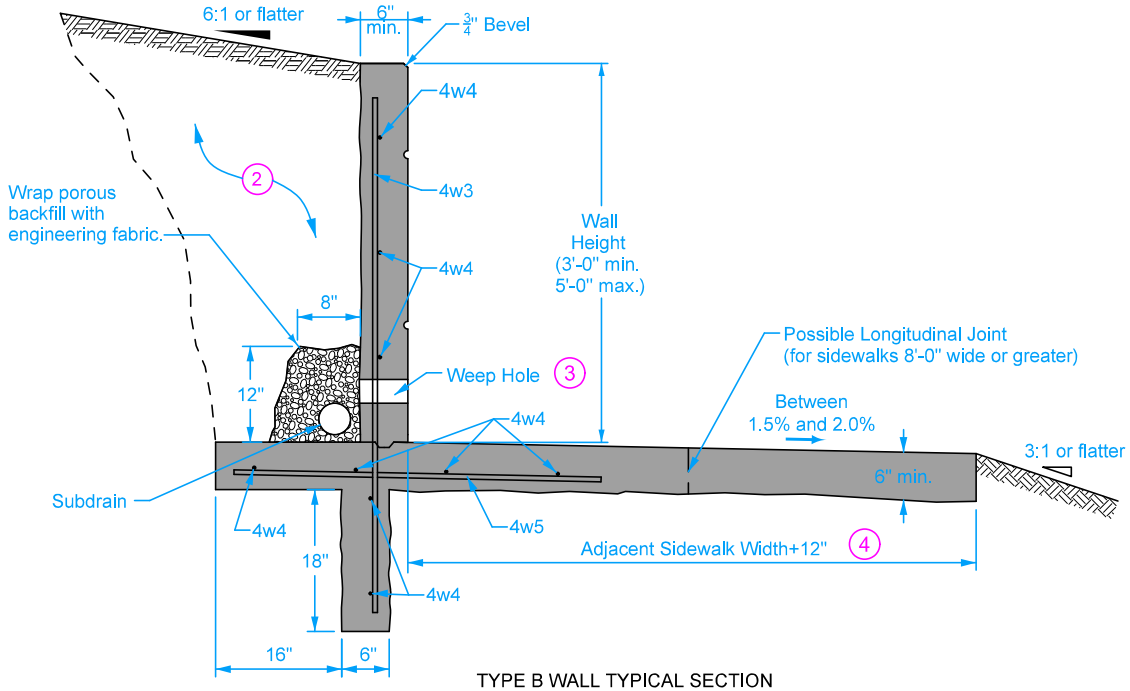
Paul D. Wiegand — SUDAS DIRECTOR
Brian Smith — DESIGN METHODS ENGINEER

COMBINED RETAINING WALL - SIDEWALK

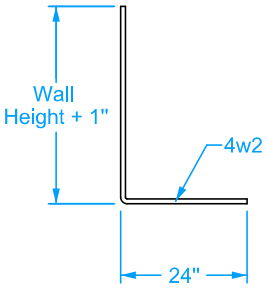
FIGURE 9072.221 | SHEET 1 OF 2



TYPE A WALL TYPICAL SECTION



TYPE B WALL TYPICAL SECTION



BENT BARS

Provide a minimum concrete cover to near reinforcement of 1 1/2 inches. Provide 3 inches minimum cover at the ends of bars.

2 Excavate and place backfill material as necessary.

3 Provide 3 inch diameter weep holes at 8 foot intervals. Install rodent guards in weep holes. Align bottom of weep hole with top of subdrain.

4 Additional 12 inch width is adjacent to wall.

REINFORCING BAR LIST

Wall Type	Mark	Size	Shape	Length	Spacing
Type A	4w1	4	———	Variable	15"
	4w2	4	∟	Variable	14"
Type B	4w3	4	—	Wall Height + 18"	14"
	4w4	4	—	Variable	15"
	4w5	4	—	3'-10"	14"

SUDAS | IOWA DOT | REVISION 2 10-20-15

FIGURE 9072.221 | STANDARD ROAD PLAN | MI-221

SHEET 2 OF 2

REVISIONS: Replaced DOT and SUDAS logos with new versions.

Paul D. Wiegand, SUDAS DIRECTOR | Brian Smith, DESIGN METHODS ENGINEER

COMBINED RETAINING WALL - SIDEWALK

FIGURE 9072.221 SHEET 2 OF 2