

MINNESOTA DEPARTMENT OF TRANSPORTATION DEVELOPED BY: Design Standards ISSUED BY: Office of Project Management and Technical Support, Design Support Section	TRANSMITTAL LETTER NO. (19-04) MANUAL: Standard Plates DATED: December 5, 2019
SUBJECT: Standard Plate 8135	

The following Standard Plate is new:
8135 – Anchor Rod Assembly for Light Tower Foundation

INSTRUCTIONS:

- Record the transmittal letter number, date, and subject on the transmittal record sheet located in the front of the manual. The previous Transmittal Letter number issued for this manual was 19-03, dated July 11, 2019.
- Remove from the Standard Plates manual:
 - Title Page
 - Foreword (08/01/2015)
 - Standard Plate Index, Sheets 1-4 of 4, Numerical Index of Standard Plates (July 1, 2019)
- Insert into the Standard Plates manual:
 - Title Page
 - Foreword (November 5, 2019)
 - Standard Plate Index, Sheets 1-4 of 4, Numerical Index of Standard Plates (November 5, 2019)
 - Standard Plate 8135A, Anchor rod Assembly for Light Tower Foundations (November 5, 2019)
- Current Standard Plates including Transmittal Letters are available on the web at <https://standardplates.dot.state.mn.us/stdplate.aspx>
- Questions regarding this transmittal should be directed to the Design Standards Unit at DesignStandards.dot@state.mn.us

Michael Elle

Michael Elle, P.E.
Design Standards Engineer

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Summary of Changes
Standard Plate 8135A
Anchor Rod Assembly for Light Tower Foundation
Transmittal Letter No. (19-04)

General:

1. This is a new Standard Plate that includes details for upper and lower steel templates that hold the anchor rods in place for high mast light towers.

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Standard Plates Manual



MINNESOTA

**DEPARTMENT OF
TRANSPORTATION**

Developed by
Office of Project Management and Technical Support

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November 5, 2019

FOREWORD

The Standard Plates Manual contains a set of drawings developed by the Minnesota Department of Transportation and approved by the Federal Highway Administration. The plates show standard details of construction and materials.

The plates that apply to a construction project are referenced by a four digit number in the construction plan set.

The standard plates, including transmittal letters, index listings, and other items, are found at <http://standardplates.dot.state.mn.us/stdplate.aspx>

Users of this manual are encouraged to submit suggestions for the improvement of design standards. These should be submitted via the web form at <http://standardplates.dot.state.mn.us/review/stdplatechangerequest.aspx> or they can be submitted via email to DesignStandards.dot@state.mn.us.

Hard copies of this manual are available upon request by mail or in-person at Map and Manual Sales, Transportation Building, Room G19s, MS 260, 395 John Ireland Boulevard, St. Paul, MN 55155, or by phone at 651-366-3017.

When new or revised standard plates are developed by the Office of Project Management & Technical Support, a transmittal letter outlining the changes becomes available. To receive an email when this manual is updated, subscribe at <https://techmemos.dot.state.mn.us/subscribe.aspx?List=1>

State Design Engineer
Minnesota Department of Transportation

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STANDARD PLATES

BLANK	0000 SERIES
PAVEMENT	1000 SERIES
BLANK	2000 SERIES
CULVERTS AND APPURTENANCES	3000 SERIES
SEWER APPURTENANCES	4000 SERIES
EROSION CONTROL STRUCTURES.....	5000 SERIES
BLANK	6000 SERIES
CURB, CURB AND GUTTER, SIDEWALK.....	7000 SERIES
BARRICADES, SIGNALS, MARKERS, ETC.	8000 SERIES
MISCELLANEOUS.....	9000 SERIES

PLATE NO.

0000 SERIES—BLANK

1000 SERIES—PAVEMENT

- 1070M Supplemental Pavement Reinforcement
- 1103K Typical Dowel Bar Assembly (2 Sheets)
- 1150R Concrete Header Joints (2 Sheets)
- 1210G Concrete Pavement Adjacent to Railway Crossing

2000 SERIES—BLANK

3000 SERIES—CULVERTS AND APPURTENANCES

- 3000L Reinforced Concrete Pipe (5 Sheets)
- 3001B Reinforced Concrete Reducer Pipe
- 3002B Reinforced Concrete Increaser Pipe
- 3006G Gasket Joint for R.C. Pipe (2 Sheets)
- 3007E Shear Reinforcement for Precast Drainage Structures
- 3014J Reinforced Concrete Pipe Arch (2 Sheets)
- 3020H Reinforced Precast Concrete Cattle Pass (60" & 72")
- 3022C Precast Concrete Safety Apron (3 Sheets)
- 3040F Corrugated Metal Pipe Culvert (Standard 2-2/3" x 1/2" Corrugation)
- 3041D Corrugated Metal Pipe (3" x 1" Corrugation)
- 3050B Design Data Structural Plate Structures (18" Corner Radius)
- 3051B Design Data Structural Plate Structures (31" Corner Radius)
- 3065C Connection between Existing Culv. & New "C" Culv. Barrel (2 Sheets)
- 3066A C.M. Extension for Box Culvert
- 3100G Concrete Apron for Reinforced Concrete Pipe
- 3110G Concrete Apron for Reinforced Concrete Pipe-Arch
- 3114H Sectional Concrete Apron for Reinforced Concrete Pipe-Arch
- 3122K Metal Apron for C.M. Pipe-Arch Culvert
- 3123J Metal Apron for C.S. Pipe
- 3124B Metal Apron Connection
- 3125A Inlet Protection for Metal Culverts (90" dia. to 96" dia.)
- 3126B Inlet Protection for Structural Plate Pipe (60" thru 96" dia. or span)
- 3127A Inlet Protection for Structural Plate Pipe (102" thru 180" dia. or span)

PLATE NO.

3128H	Metal Safety Apron & Grate (2 Sheets)
3129A	Metal Apron for Corrugated Polyethylene Pipe (Use at Entrances and Driveways)
3131C	Precast Concrete Headwall for Subsurface Drains
3132A	Grate for 1:4 Precast Concrete Aprons
3133D	Riprap at RCP Outlets
3134D	Riprap at CSP Outlets
3135A	Hand-Placed Riprap at Precast Concrete Cattle Pass
3136B	Slotted Vane Drain for P.V.C. Pipe
3137B	Slotted Drain for 12" thru 30" Dia. C.M. Pipe (Stackable)
3138B	Slotted Drain for 12" thru 30" Dia. C.M. Pipe (Not Stackable)
3139B	Riprap at Precast Concrete End Sections
3142A	Outlet Screen for C.M. & S.C. Pipes
3143C	Inspection Tees
3145G	Concrete Pipe or Precast Culvert Ties
3146C	Anti-Seepage Diaphragm (For CMP and CMP-A)
3148A	Safety Slope Metal End Section for Circular & Arched Pipes (2 Sheets)
3221C	Corrugated Steel Pipe Coupling Band (3 Sheets)

4000 SERIES—SEWER APPURTENANCES

Drainage Structure and Castings (4 Sheets)

- Structure and Casting Combinations
- Standard Casting Assemblies
- List of Castings
- List of Drainage Structures

4000J	Manhole or Catch Basin (Masonry, Field Constructed) - Design A
4002F	Manhole or Catch Basin (Masonry, Field Construction) - Design C
4003B	30" Precast Catch Basin – Design N
4005M	Manhole or Catch Basin Type A & B Cone Sections Precast - Design F
4006L	Manhole or Catch Basin Precast - Designs G and H
4007C	Precast Mechanical Joint Sewer Manhole
4008E	Catch Basin (Sectional Concrete Pipe) - Design I
4009H	Manhole or Catch Basin (Sectional Concrete Pipe) - Design J
4010H	Concrete Short Cone & Adjusting Ring (Sectional Concrete)
4011E	Precast Concrete Base
4017C	Catch Basin (Concrete Pipe and Metal Pipe) - Designs PC and PM
4018B	Manhole or Catch Basin (Reducer Cone Section Precast) Design D
4020J	Manhole or Catch Basin (For Use With or Without Traffic Loads) (2 sheets)
4021F	Precast Curb Opening Catch Basin
4022A	Manhole or Catch Basin Cover (3 ft. X 2 ft. Opening)
4024A	48" Dia. Precast Shallow Depth Catch Basin - Design SD
4025B	Drop Inlets or Catch Basins - Design DI (Concrete & Metal)
4026A	Concrete Encased Concrete Adjusting Rings
4101D	Ring Casting For Manhole or Catch Basin
4108F	Adjusting Rings for Catch Basins and Manholes
4110F	Cover Casting for Manhole (For Use in all Traffic Areas) – Casting No. 715 and 716
4125D	Catch Basin Frame Casting (For Square Grate) – Casting No. 806
4126F	Catch Basin Frame Casting – Casting No. 801
4129G	Catch Basin Frame Casting (For Square Grate) - Casting No. 802A
4132G	Catch Basin Frame Casting (For Square Grate) – Casting No. 805
4133A	Curb Box Casting for Catch Basin - Casting No. 824
4134A	Curb Box Casting for Catch Basin (For Design B Curbs) - Casting No. 825
4140D	Special Grate Castings for Catch Basin (Convex and Concave) - Casting No. 720 and 721
4143E	Stool Grate & Concrete Frame (Median Drains) - Casting No. 731
4149C	Grate Casting for Catch Basin - Casting No. 810

PLATE NO.

- 4150C Grate Casting for All Pipe Drainage Structures
- 4151B Grate Casting for Catch Basin (Square Type) - Casting No. 811
- 4152C Catch Basin Grate Casting - Casting No. 814A
- 4153A Catch Basin Grate Casting - Casting No. 815
- 4154B Catch Basin Grate Casting - Casting No. 816
- 4155A ADA Grate Inlet Casting – Casting No. 817
- 4160D Curb Box Casting for Catch Basin - Casting No. 823A and 833A
- 4161F Curb Box Casting for Catch Basin - Casting No. 821B, 822 and 831A
- 4180J Manhole or Catch Basin Step

5000 SERIES—EROSION CONTROL STRUCTURES

- 5010A Reinforced Concrete Pipe Energy Dissipator

6000 SERIES—BLANK

7000 SERIES—CURB, CURB AND GUTTER, SIDEWALK

- 7000E Integrant Curbs (Design B, Design V and Design D)
- 7020K Concrete Curb (Design B, Design V, Design S, Design DR and Design BR) (2 Sheets)
- 7038A Detectable Warning Surface Truncated Domes
- 7065C Bituminous Curb
- 7100H Concrete Curb and Gutter (Design B and Design V)
- 7102K Concrete Curb and Gutter (Design D, Design S, and Design R)
- 7105C Concrete Median (Mountable Type)
- 7107I Entrance Nose (Urban Design)
- 7108G Exit Nose (Urban Design)
- 7109C Median Nose and Island (Undivided to Divided Roadway)
- 7111J Installation of Catch Basin Castings (Concrete Curb and Gutter)
- 7112C Installation & Reinforcement of Catch Basin & Manhole Castings (Concrete Integrant Curbs)
- 7113A Concrete Approach Nose Detail

8000 SERIES—BARRICADES, SIGNALS, MARKERS, ETC.

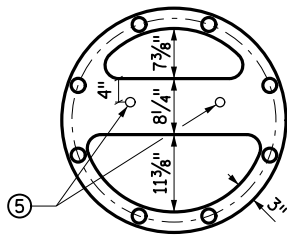
- 8000J Channelizers
- 8002G Permanent Barricade
- 8106D Equipment Pad B
- 8107A RLF Equipment Pad Foundation Layout
- 8110E Traffic Signal Bracketing (Pole Mounted)
- 8111E Traffic Signal Bracketing (Pedestal Mounted) (3 Sheets)
- 8112I Pedestal Foundation (Traffic Control Signals)
- 8117G Precast Concrete Handhole With Vehicle Load
- 8118D Service Equipment & Pole Traffic Control Signals
- 8119C Ground Mounted Cabinet Foundation
- 8120Q Pole Foundation (PA85)
- 8121H Transformer Base and Pole Base Plate (PA85, PA90 and PA100) (2 Sheets)
- 8122F Pedestal and Pedestal Base (For Traffic Control Signals Support) (2 Sheets)
- 8123G Pole and Mast Arm Luminaires and Traffic Lights Assembly (For All Pole Types) (2 Sheets)
- 8126L Pole Foundation (PA90 and PA100)
- 8127E Light Foundation - Design E, Precast/Cast-In-Place, 40 ft. Pole or Less (2 Sheets)
- 8128E Light Foundation - Design H, Precast/Cast-In-Place, 49 ft. Pole (2 Sheets)

PLATE NO.

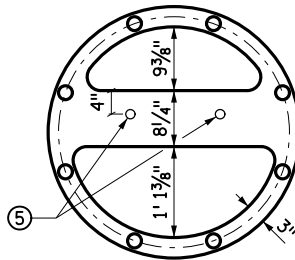
8129A Shim and Washer (Traffic Control Signals and Roadway Lighting)
8130E Saw Cut Loop Detectors (3 Sheets)
8132B Preformed Rigid PVC Conduit Loop Detector (3 Sheets)
8133A Pole and Mast Arm - Type BA (9 Sheets)
8134C Pole Foundation - Type BA (4 Sheets)
8135A Anchor Rod Assembly for Light Tower Foundation
8150C Installation of Culvert Markers
8307S W-Beam Guardrail & End Anchorages (Installation with Wood Posts) (4 Sheets)
8308B Reinforced Concrete Median Barrier Type F (Non-Glare Screen Type) Design 8308 (3 Sheets)
8309B Reinforced Concrete Median Barrier Type F & Glare Screen Design 8309 (3 Sheets)
8316C Post Seat for Anchorage on Footing or Box Culverts
8318C Guardrail Anchorage Plate for Bridges and BCT'S
8326D Flexible Plastic Glare Screen
8329I Eccentric Loader Breakaway Cable Terminal (ELT) (4 Sheets)
8330G 3-Cable Guardrail (With Wood Posts) (Assembly Details) (2 Sheets)
8331B 3-Cable Guardrail (With Steel Posts) (3 Sheets)
8332D Anchor Bolt Cluster and Base Plate for Light Poles
8333B 3-Cable Guardrail Anchor (Anchor Details) (4 Sheets)
8337C Temporary Portable Precast Concrete Barrier (Type "F") (3 Sheets)
8338D W-Beam Guardrail & End Anchorages (Installation with Steel Posts) (4 Sheets)
8339A 3-Cable (Steel Posts) to W Beam (Wood Posts) Guardrail Transition
8340A 3-Cable (Steel Posts) to W Beam (Steel Posts) Guardrail Transition
8342B High-Tension Cable Barrier Line Post Foundation (Concrete Design)
8343A High-Tension Cable Barrier Line Post Foundation (Steel Design)
8347B Portable Precast Concrete Barrier Anchors
8350A Thrie Beam Anchorage Plate
8352B Thrie Beam Wedge Plate for Single Slope Barrier
8356A W-Beam to Thrie-Beam Transition Guardrail
8357A Thrie Beam Guardrail
8360A Guardrail Post Length Marking
8361A Guardrail Steel Post (3 Sheets)
8369A Guardrail Blockout (2 Sheets)
8400F Pipe Railing

9000 SERIES—MISCELLANEOUS

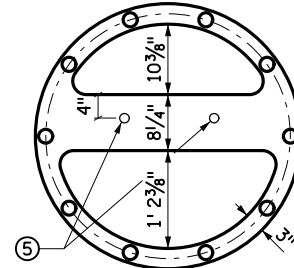
9000E Approaches and Entrances - Recommended Standards
9101B Shaping and Sodding of Slopes at Box Culvert Ends
9303B Geodetic Survey Disks (Aluminum) (2 Sheets)
9304A Geodetic Survey Disks (Removable Type Disk)
9308A Survey Monument Cap (2 Sheets)
9309G PLS (Public Land Survey) Monument (2 Sheets)
9320G Woven Wire Fence (Wood Post)
9321E Woven Wire Fence (Steel Post)
9322K Chain Link Fence (2 Sheets)
9323D Barbed Wire Fence (Wood Post)
9324C Barbed Wire Fence (Steel Post)
9350A Mailbox Support (Swing-Away Type)



T-100
(8 BOLT, 30" BOLT CIRCLE)

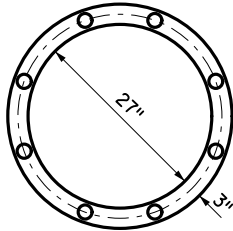


T-120
(8 BOLT, 34" BOLT CIRCLE)

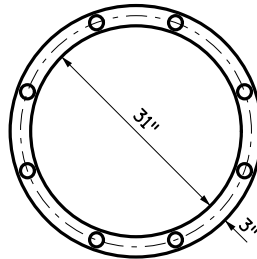


T-140
(10 BOLT, 36" BOLT CIRCLE)

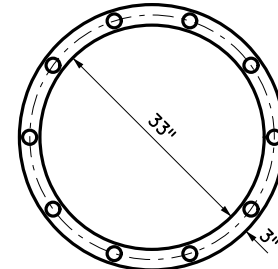
UPPER ANCHOR ROD TEMPLATE



T-100
(8 BOLT, 30" BOLT CIRCLE)

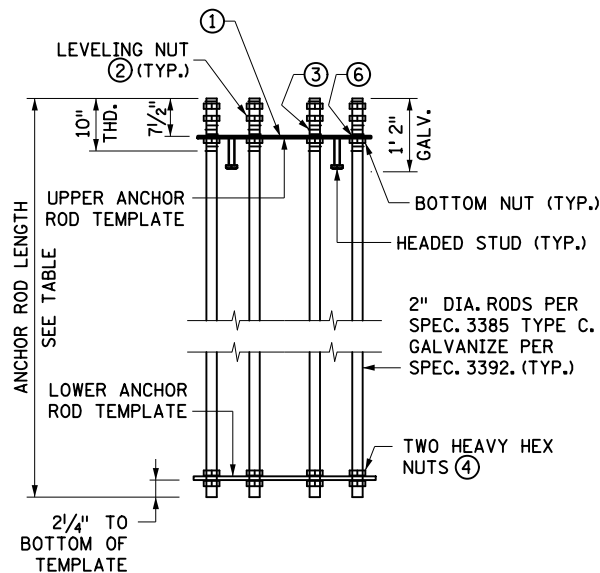


T-120
(8 BOLT, 34" BOLT CIRCLE)



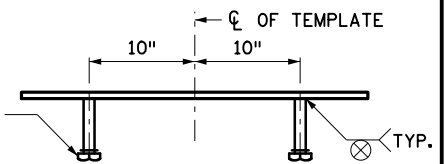
T-140
(10 BOLT, 36" BOLT CIRCLE)

LOWER ANCHOR ROD TEMPLATE



ANCHOR ROD ASSEMBLY
ELEVATION VIEW

1/2" DIA. X 3" HEADED
STUD IN ACCORDANCE
WITH SPEC. 3391.2.D
(TYP. 2 PER TEMPLATE)



DETAIL "A"
ELEVATION VIEW

UPPER ANCHOR ROD TEMPLATE
(T-100 SHOWN, OTHERS SIMILAR)

NOTES:

FURNISH AND INSTALL 1/2" THICK ANCHOR ROD METAL TEMPLATES IN ACCORDANCE WITH SPEC. 3306 WITH 2 1/16" DIA. HOLES MATCHING THE ANCHOR ROD PATTERN OF THE TOWER BASE PLATE. GALVANIZE TEMPLATES IN ACCORDANCE WITH SPEC. 3394.

ANCHOR RODS DESIGNED FOR IMPORTANCE CATEGORY I FATIGUE DESIGN.

FOR EACH ANCHOR ROD, FURNISH AND INSTALL FIVE HEX NUTS PER ASTM A194 GRADE 2H OR GRADE 7 WITH TWO HARDENED FLAT WASHERS PER ASTM F436, ALL GALVANIZED IN ACCORDANCE WITH SPEC. 3392.

USE AS FOLLOWS (PER ANCHOR ROD):

- TWO HEAVY HEX NUTS AND HARDENED FLAT WASHERS FOR THE DOUBLE NUT CONNECTION AT THE TOP OF THE ANCHOR ROD.
- ONE HEAVY HEX NUT ON THE UNDERSIDE OF THE UPPER ANCHOR ROD TEMPLATE (BOTTOM NUT).
- TWO HEAVY HEX NUTS TO SECURE THE LOWER ANCHOR ROD TEMPLATE.

- ① POSITION THE UPPER ANCHOR ROD TEMPLATE 7 1/2" FROM THE TOP OF THE ANCHOR RODS AND EMBED THE TOP OF THE TEMPLATE FLUSH WITH THE TOP OF THE PEDESTAL CONCRETE.
- ② TEMPORARILY SECURE THE TOP OF THE UPPER TEMPLATE WITH THE LEVELING NUT BEFORE CONCRETE PLACEMENT. DO NOT LOOSEN LEVELING NUTS UNTIL AT LEAST 24 HOURS AFTER CONCRETE PLACEMENT.
- ③ WRAP THREADED PORTION OF ANCHOR RODS PROJECTING ABOVE THE CONCRETE PEDESTAL WITH THREE LAYERS OF VINYL ELECTRICAL TAPE BEFORE PLACING CONCRETE TO AVOID THREAD CONTAMINATION (TYP.).
- ④ TIGHTEN NUTS TO A "SNUG TIGHT" CONDITION IN ACCORDANCE WITH SPEC. 2402.3.F.
- ⑤ HEADED STUD, SEE DETAIL "A".
- ⑥ REMOVE SURFACE CONTAMINANTS AND SUPPLY SILICONE JOINT SEALER TO THE UPPER TEMPLATE AROUND THE ANCHOR RODS AND ANCHOR ROD HOLES, AND THE INNER AND OUTER EDGES WHERE THE PLATE MEETS THE CONCRETE. USE AN APPROVED SILICONE JOINT SEALER FOUND ON MnDOT'S APPROVED/QUALIFIED PRODUCTS LIST UNDER BRIDGE PRODUCTS.

ANCHOR ROD FOR MAT OR PILE FOUNDATIONS (SEE PLANS FOR TYPE)	ANCHOR ROD LENGTH
MAT FOUNDATION FOR T-100	6' 4"
MAT FOUNDATION FOR T-120	6' 4"
MAT FOUNDATION FOR T-140	6' 10"
PILE FOUNDATION FOR T-100	6' 4"
PILE FOUNDATION FOR T-120	7' 4"
PILE FOUNDATION FOR T-140	7' 4"

APPROVED NOVEMBER 5, 2019

Peter A. Harff
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION
**ANCHOR ROD ASSEMBLY FOR
LIGHT TOWER FOUNDATION**

SPECIFICATION
REFERENCE

STANDARD
PLATE
NO.

8135A

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