

Summary of Sign Standard Updates

ITS-030-A/ITS-031-A

Components of Interest

- The length of the gusset plate for one angle connecting to the chord was found to not be sufficient for fatigue detail 5.5. The length was increased from 7 1/2" to 10" to satisfy the detail.
- The thickness of the shaft was increased from 1/2" to 9/16" to satisfy the requirements of fatigue detail 6.2.
- The size of the weld at the base plate was increased from 1/2" to 5/8" to satisfy the fatigue requirements of detail 6.3.

Annotated Design Standard

- **ITS-030-A**
 - **All pages**
 - Updated fractions to stacked fractions.
 - Dates in footing deleted.
 - **Sheet 2 of 16**
 - Updated the column wall thickness from 1/2" to 9/16".
 - Included 5/8" thickness option to the column wall callout.
 - Added +/- 6" to the distance from the ladder to the bottom of signpost.
 - Fixed spelling of "Luminaires" in Notes.
 - Changed "Standard" to "LRFD" in Notes
 - Updated the edition of AASHTO LRFD used in Notes.
 - Added three new notes: "10. Contractor may also use structural steel plate and rolled shapes meeting the requirements of AASHTO M270M/M270, GR. 50 if readily available", "11. Charpy V-notch testing is required for the column upright in accordance with the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 1st Edition, with interim revisions through 2022.", and "12. Select sealant for perimeter of backing bar plate from the qualified products list. Provide sealant in caulking tubes."
 - **Sheet 7 of 16**
 - Updated the dimension in one of the gusset plate connection details from 7 1/2" to 10".
 - Added a callout to check that certain element lengths in the gusset plate are also 10".
 - **Sheet 9 of 16**
 - Updated stiffener plate welds from 1/2" to 5/8".
 - Included a "Caulk" callout in the stiffener detail.
 - Added " 1/2 " max. x 1/2" max" to backing bar callout.

- Added a note regarding caulking: "Caulk on top of unwelded joint between backing bar and column wall after HDG"
 - **Sheet 11 of 16**
 - **Sheet 12 of 16**
 - Fixed angle orientation on the handhole and coupling detail.
 - Adjusted position of dimension lines and dimension text on the coupling detail
 - **Sheet 15 of 16**
 - Updated values of dimensions in the end cap detail.
- **ITS-031-A**
 - **All pages**
 - Updated fractions to stacked fractions.
 - Dates in footing deleted.
 - **Sheet 2 of 16**
 - Updated the column wall thickness from ½" to 9/16".
 - Included 5/8" thickness option to the column wall callout.
 - Added +/- 6" to the distance from the ladder to the bottom of signpost.
 - Fixed spelling of "Luminaires" in Notes.
 - Changed "Standard" to "LRFD" in Notes
 - Updated the edition of AASHTO LRFD used in Notes.
 - Added three new notes: "10. Contractor may also use structural steel plate and rolled shapes meeting the requirements of AASHTO M270M/M270, GR. 50 if readily available", "11. Charpy V-notch testing is required for the column upright in accordance with the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 1st Edition, with interim revisions through 2022.", and "12. Select sealant for perimeter of backing bar plate from the qualified products list. Provide sealant in caulking tubes."
 - **Sheet 7 of 16**
 - Updated the dimension in one of the gusset plate connection details from 7 ½" to 10".
 - Added a callout to check that certain element lengths in the gusset plate are also 10".
 - **Sheet 9 of 16**
 - Updated stiffener plate welds from ½" to 5/8".
 - Included a "Caulk" callout in the stiffener detail.
 - Added " ½ " max. x ½" max" to backing bar callout.
 - Added a note regarding caulking: "Caulk on top of unwelded joint between backing bar and column wall after HDG"
 - **Sheet 12 of 16**
 - Adjusted position of dimension lines and dimension text on the coupling detail
 - **Sheet 15 of 16**
 - Updated values of dimensions in the end cap detail.

ITS-032-A-17

Components of Interest

- The shear capacity of the drilled shaft design was found to be adequate for the shear demands encountered in the design check; however, the amount of shear reinforcement provided does not meet the current minimum reinforcement required by the 9th edition of AASHTO LRFD Bridge Design Specifications, article 5.7.2.5. Therefore, the shear reinforcement spacing was changed from 2'-0" to 1'-0" to satisfy the requirements of the code.
- The minimum shaft length was previously found insufficient for some cases when using cyclic loading settings in LPILE. When this was switched to static loading, per MDOT recommendation, the minimum shaft length was determined to be adequate.
- Shear reinforcement within the non-contact lap splice region between the anchor rods and shaft reinforcement was adjusted to 6" spacing to obtain adequate capacity.
- In discussion with MDOT, all drilled shaft reinforcement will no longer be epoxy coated. The calculations have been adjusted to reflect this update.
- For ITS-032-A, the bottom template plate is not required for structural capacity of the anchorage. However, it will be left in the standard for conformity with the other drilled shaft standards and for the benefits to constructability.

Annotated Design Standard

- **All Pages**
 - "Anchor bolt(s)" updated to "anchor rod(s)"
 - Removed dates from footing.
 - Updated fractions to be stacked fractions.
 - Removed "(Special Detail)" callout in footing.
- **Sheet 1 of 6**
 - Removed one bar from drilled shaft, 11 A10 bars required.
 - Updated "Plan View – Type B Drilled Shaft In Barrier Wall" to reflect the updated 11 bars in the drilled shaft.
 - Changed "ED04" and "EK04" to "D04" and "K04", respectively.
- **Sheet 2 of 6**
 - Added callout "Anchor rod cage shall be shop fabricated from #6 bar circle or $\frac{3}{4}$ " square stock or approved equal and tied or welded to inside of anchor rods to hold alignment. No field welding is allowed, shop welding shall be performed by a certified welder. No cross-bracing is allowed in the center of the anchor rod circle. (Typ)"
 - Variable for height of drilled shaft updated from Z to D to unify nomenclature with other standards.
 - Anchor rod cage bars moved up 12" to avoid conflict with bottom template.
 - Added nuts on both sides of template plate to secure it.
 - Added callout for 1" max. distance between top of drilled shaft and bottom of nut.
 - Updated transverse reinforcement spacing to 6" until the end of anchorage, 12" for the remainder of the shaft.
 - "EV051206 Bars" callout changed to "V051400 Bars".

- 4'-0" distance from top anchor rod cage to the top of bolt updated to 3'-0"
- **Sheet 3 of 6**
 - "Y" length changed to "***Y"
 - "ED04" callout changed to "D04"
 - Same updates to drawing as on sheet 2.
 - ** Note added stating "Contractor to determine dimensions for D04 and K04 bars based on limits of removal, type of barrier, and clear cover requirements specified herein."
- **Sheet 4 of 6**
 - Added "see sheet 6 of 6 for weld details" after the note on welding V06 anchor rod cage bar reinforcement.
 - Removed "latest" with reference to AWS D1.4 using E8018 or E9018" in welding V06 anchor rod cage note.
 - Added note "V06 anchor rod cage bar reinforcement shall meet the requirements of ASTM A706if welded to the anchor rods."
 - Added note "Top and bottom anchor rod templates may be fabricated from multiple parts using CJP welds located a minimum of 2" clear of anchor rod holes."
 - Added note "Anchor rods shall be in accordance with subsection 908.14 of the MDOT Standard Specifications for Construction."
- **Sheet 5 of 6**
 - Increased thread length to 10 ½" shown on "Anchor Rod Detail"
 - Updated embedment length to 8'-8" in "Anchor Rod Detail"
 - Specified 10' projection in "Anchor Rod Detail"
 - Added Chart:

FOUNDATION CHART					
SOIL TYPE	SOIL CONDITION		DIAMETER (in)	DEPTH "D" (ft)	CONCRETE (cyd)
	*Su	**N60			
LOW SAND	-	5<N60<10	48	26	12.1
MED SAND	-	10<N60<20		22	10.2
HIGH SAND	-	N60>20		20	9.3
LOW CLAY	400< Su <1000	-		37	17.2
MED CLAY	1000< Su <2000	-		21	9.8
HIGH CLAY	Suc > 2000	-		17	7.9

* Su = Undrained shear strength of cohesive soils. (lbs/ft²)
 ** N60 = SPT blow count corrected for hammer efficiency. (blows/ft)
 (ASTM D1586 testing procedure)

- In the "Miscellaneous Quantities" note section substructure concrete changed from 0.5 cy/ft to 0.465 cy/ft and steel reinforcement changed from 76 lb/ft to 70 lb/ft
- **Sheet 6 of 6**
 - Removed "E" before bar callouts.

SIGN-300-C

Components of Interest

- The bolt diameter for bolts in the arm connection were increased from 1" to 1 $\frac{3}{4}$ "
- The diameter for the circular transverse plates in the arm connection were increased from 20" to 22" to meet edge distance requirements.
- A note was added in the plans that the splice welds must be ground to provide a smooth transition between members.
- The welds attaching the stiffener plates to the column in the arm connection were increased from $\frac{1}{2}$ " to $\frac{3}{4}$ "
- The optional column splice was removed.

Annotated Design Standard

- **All pages**
 - Updated fractions to stacked fractions.
 - Dates in footing deleted.
- **Sheet 1 of 6**
 - Added CJP weld.
 - Removed optional splice and related dimensions.
 - Added "Column Base Cutting (Sheet 4)" callout.
- **Sheet 2 of 6**
 - Fixed spelling of "Luminaires" in Notes.
 - Changed "Standard" to "LRFD" in Notes
 - Updated the edition of AASHTO LRFD used in Notes.
 - Changed note 2 to "2. Welding must be in accordance with AWS D1.1 as specified in 20SP-707A, structural steel and aluminum construction."
 - Corrected typo in note 3.
 - Deleted note 4.
 - Deleted "Provide lock washers that meet ANSI B18.21.1." in note 5.
 - Replaced "707.03.D" with "707.03.E" in note 6.
 - Changed note 7 to "7. All welds must be inspected in accordance with subsection 707.03.D.12 of the standard specifications for construction, except minimum MT inspection frequency is increased to 25 percent."
 - Deleted note 10.
 - Deleted note 13.
 - Added 5 new notes: "13. CJP Welds on optional arm splices shall be ground smooth. Any grinding of welds is to be done prior to galvanization. Welding shall be in accordance with section 707 of the standard specifications for construction.", "14. Select sealant for perimeter of backing bar plate from the qualified products list. Provide sealant in caulking tubes.", "4. Galvanizing of bolt assemblies shall be in accordance with subsections 919.07.I and 906.07 of the MDOT Standard Specifications for

Construction.", "10. Column sections and arm sections materials must be provided in accordance with subsection 919.07 of the MDOT Standard of Specifications for Construction.", and "15. Charpy V-notch testing is required for the column upright in accordance with the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 1st Edition, with interim revisions through 2022."

- **Sheet 3 of 6**
 - Changed "Bolt circle" to "Anchor rod" in the Plan View 38" Base Plate Detail.
 - Changed "18" O.D. Column" to "1/2" x 18" O.D. Column".
 - Changed "Anchor Bolt" to "Anchor Rod" in Section A-A.
- **Sheet 4 of 6**
 - Included a "Caulk" callout in Detail B.
 - Added, "1/2" max. x 2" max." to "Backing bar" callout.
 - Adjusted base plate thickness from 3" to 1 5/8"
 - Added a note regarding caulking: "Caulk top of unwelded joint between backing bar and column wall after HDG".
- **Sheet 5 of 6**
 - Adjusted dimension in Detail C- Front for "Cope (TYP)" from 1" x 1" to 1 1/4" x 1 1/4".
 - Increased weld in Detail C-Front from 1/2" to 3/4"
 - Added "3/8" x 10 3/4" O.D. arm" callout to Section C-C
 - Changed 20" to 22" for flange plate dimensions in Section C-C
 - Changed "(8) 1"..." to "(8) 1 1/2"..." callout for the bolt circle.
- **Sheet 6 of 6**
 - Changed dimension in Section D-D from 1" x 1" to 1 1/4" x 1 1/4".
 - Adjusted weld in Section D-D from 5/8" to 5/16"
 - Increased weld in Section D-D from 1/2" to 3/4"
 - Changed Cap Plate size from 1/4" to 3/8"
 - Changed End Cap Detail size from 1/4" to 3/8"

SIGN-330-B

Components of Interest

- The bar spacing for transverse reinforcement in the E-3 footing was changed from #4 bars at 1'-5" spacing to #6 bars at 5" spacing for both top and bottom.
- The length of the footing was increased to 11ft for both the E-1 and E-2 configurations.

Annotated Design Standard

- **All pages**
 - Updated all fractions to be stacked.
 - "Anchor bolt(s)" updated to "anchor rod(s)"
 - Dates in footing deleted.
- Sheet 1 of 4
 - Added a "34 1/2" Inner Diameter" dimension to plan view

- Adjusted hidden lines to be able to show callouts more clearly.
- Fixed layout of J Bars, 8 drawn but 9 called out.
- Sheet 2 of 4
 - Replaced the second and third columns of the table with the following:

SOIL TYPE	SOIL CONDITION	
	*Su	**N60
SAND		N60≥15
CLAY	2000≥Su	
SAND		10≤N60<15
CLAY	1000≤Su<2000	
SAND		5≤N60<10
CLAY	500≤Su<1000	

- Updated the footing length to 11' in rows E-1 and E-2
- Updated the bar spacing for E-1 to "#5 Bars, 21 SPA @ 0'-6" = 10'-6" ", E-2 to " #4 Bars, 18 SPA @ 0'-7" = 10'-6" ", and E-3 to "#6 Bars, 35 SPA @ 0'-5" = 14'-7" ".
- Updated Concrete Cu. Yd. for E-1 to 9.2 and E-2 to 9.2.
- Updated Reinforcement Steel Weight for E-1 to 992 lbs, E-2 to 787 lbs, and E-3 to 2392 lbs.
- Added note "**Su = Undrained shear Strength of cohesive soils. (lbs/ft2)" and "***N60 = SPT blow count corrected for hammer efficiency. (blows/ft) (ASTM D1856 testing procedure)".
- Sheet 3 of 4
 - Updated callout in Section C-C to "An anchor rod cage shall be shop fabricated from #6 bar circle or 3/4" square stock or approved equal tied to inside of anchor rods to hold alignment. No cross-bracing is allowed in the center of the rod circle."
 - Updated callout in Section D-D to "An anchor rod cage shall be shop fabricated from #6 bar circle or 3/4" square stock or approved equal tied to inside of anchor rods to hold alignment. No cross-bracing is allowed in the center of the rod circle."
 - Updated note to "**The top of foundation shall be 3" (+/- 1") above the finished grade around the perimeter of the footing. The maximum slope around the foundation shaft of the footing shall be 1:2."
- Sheet 4 of 4
 - Added periods (.) to "Max" and "Min".
 - Adjusted dimension font and location in detail.
 - Capitalized "MDOT" and "Standard Specifications for Construction".
 - Added "Section 905 of the..." to note 1.
 - Deleted "prior to being approved by MDOT for chipping' from note 2.
 - Updated diameter to 1/16" in note 3.
 - Added two new notes: "8. Anchor Rod template may be fabricated from multiple parts using CJP welds located a minimum of 2" clear of anchor rod holes.", and "9. Anchor rod cage bar reinforcement shall meet the requirements of ASTM A706."

SIGN-340-B

Components of Interest

- 16- anchor rod circle updated to 14 anchor rods to meet minimum spacing requirements.

Annotated Design Standard

- **All pages**
 - Updated all fractions to be stacked.
 - "Anchor bolt(s)" updated to "anchor rod(s)"
 - Dates in footing deleted.
- **Sheet 1 of 7**
 - Two EV06 bars bundled at the top of the drilled shaft.
 - 48" distance from the anchor projection to the top anchor rod cage bar updated to 36"
 - Anchor rod cage bars moved up 12" to avoid bottom bar conflicting with bottom template.
 - Included both nut and washer on both sides of bottom steel template.
 - Updated anchor rod cage from specifying being "welded to inside of anchor rod" to "tied or welded to inside of anchor rod"
 - Added the note "No field welding is allowed; shop welding shall be performed by a certified welder" with reference to the anchor rod cage.
 - Distance from the bottom of nut and washer on steel template updated from 6" to 18"
 - Updated steel reinforcement 3" clear cover
 - Department director updated from Kimberly Avery to "Bradley C. Wieferich, P.E"
- **Sheet 2 of 7**
 - Updated bolt circle from having 16 anchor rods to having 14 anchor rods. Spacing of anchor rods updated from 22.5 degrees to 25.7 degrees.
 - Space added in "Plan View Drilled Shaft for Type E Truss 110'-140'" heading.
- **Sheet 3 of 7**
 - Length of anchor rod threads were updated to 10 ½ " on both ends.
 - 2" typical thickness called out on Anchor Rod Detail
 - 10" projection shown on Anchor Rod Detail and accounted for in the Anchor Rod Table
 - Anchor Rod Table updated to show the updated 14 anchor rods from the former 16 anchor rods in the 110' to 140' type E truss.
 - Updated to 4 nuts per anchor rod and 4 washers per anchor rod.
 - In the notes section:
 - "Section 905 of the" added before MDOT Standard Specifications for Construction.
 - Removed "approved by MDOT prior to shipping"
 - Added "subsections 810.03.N.1 and 706.03.H. after MDOT Standard Specifications for Construction
 - Added "V06 anchor rod cage bar reinforcement shall meet the requirements of ASTM A706 if welded o anchor rods"
 - Added "Top and bottom anchor rod templates may be fabricated from multiple parts using CJP welds located a minimum of 2" clear of anchor rod holes."

- **Sheet 4 of 7**
 - 10'-9" lap provided for vertical reinforcement updated to 9'-2" lap
 - Vertical reinforcement bars shall stagger the ends of the individual bar laps.
 - 3'-10" lap provided for #6 bar circles updated to 4'-8"
- **Sheet 5 of 7**
 - Updated soil condition form N to N60
 - Added callout **N60 that means "SPT blow count corrected for hammer efficiency (blows/ft)"
 - Added *Su callout that means "Undrained shear strength of cohesive soils. (lbs/ft²)"
 - Added callout *** that means " 72" diameter foundation provided for information only, sit specific foundation design required."
- **Sheet 6 of 7**
 - Updated soil condition form N to N60
 - Added callout **N60 that means "SPT blow count corrected for hammer efficiency (blows/ft)"
 - Added *Su callout that means "Undrained shear strength of cohesive soils. (lbs/ft²)"
 - Added "Bottom Anchor Rod Template Detail" to page.

SIGN-360-B

Annotated Design Standard

- **Sheet 1 of 10**
 - Department director updated from Kimberly Avery to "Bradley C. Wieferich, P.E"
- **Sheet 2 of 10**
 - Specified "AASHTO LRFD"
 - Removed "current edition" note from the AASTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.
 - Updated welding note to "Welding must be in accordance with AWS d1.1 as specified in 20SP-707A, structural steel and aluminum construction."
 - Updated hot-dip galvanizing note to "galvanizing of bolt assemblies shall be in accordance with subsections 919.07.I and 906.07 of the MDOT Standard of Specification for Construction."
 - "ANSI" updated to "ASME"
 - Removed "Except at splice connections. Splice connections must have a flat washer and lock washer under each nut and tightened to a snug tight condition per subsection 707.03.D of the MDOT Standard Specifications for Construction."
 - Updated column section note to "Column sections must be ASTM A53, Grade B or API-5L-X42. Sections for 50 feet to 105 feet trusses must be 24" by 0.969" sections for 110 feet to 140 feet trusses must be 24" by 1.219" chord sections must be ASTM A500 grade B 6 5/8"x0.432 or ASTM A519-4140 annealed 6"x0.375"
 - Deleted backing bar for option splice note.

- Added "CJP Welds on optional column and arm spliced shall be ground smooth. Any grinding of welds is to be done prior to galvanization. Welding shall be in accordance with section 707 of the Standard Specifications for Construction."
- Added "Select sealant for perimeter of backing bar plate from the qualified products list. Provide sealant in caulking tubes."
- Added "Charpy V-notch testing is required for the column upright in accordance with the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals."
- **Sheet 4 of 10**
 - Updated the 1 ½" and 2 ½" dimensions to 1" and 2" respectively. With new dimensions, the hole shall be centered on the plate.
- **Sheet 5 of 10**
 - Added a Caulk callout in detail B.
 - Modified the formatting of a welding annotation in Detail B
 - Added "½" max. x2" max." callout in Detail B
 - Specified new ** callout to mean "Caulk top of unwelded joint between backing bar and column wall after HDG"
- **Sheet 6 of 10**
 - Updated bolt circle to show 14 anchor rod hole and adjusted the stiffener spacing/count accordingly in "Plan View 42" Base Plate Detail".

SIGN-365-B

- **All pages**
 - Removed plan date "06/03/2021" from border design.
- **Sheet 1 of 8**
 - Removed "Paul O. Ajegba" as department director to "Bradley C. Wieferich, P.E."
 - Move section A-A back to before the transition section.
 - Corrected the kink for the line representing the top of barrier.
 - Updated to show 14 anchor rods in the plan view.
 - Fix the dimension line to start at the kink of the taper.
 - Change "bolt" to "anchor rod" in the plan detail.
 - Add "anchor rod" to the diameter callout in the plan detail.
- **Sheet 2 of 8**
 - Update the anchor rods to show 14 in the plan view.
- **Sheet 4 of 8**
 - Update the outer dimension line to the "varies – 2'-8" to 4'-6"" in section B-B type A barrier.
 - Update the inner dimension line to "varies – 1'-4" to 4'-6"" in section B-B. type A barrier.
 - Update the outer dimension line to the "varies – 2'-8" to 4'-6"" in section B-B type B barrier.
 - Update the inner dimension line to "varies – 1'-4" to 4'-6"" in section B-B. type B barrier.

- **Sheet 5 of 8**

- Add a callout stating "anchor rod cage shall be tied to inside of anchor rods to hold alignment. No cross-bracing is allowed in the center of the rod circle." In section D-D.
- Update "anchor bolt (typ.)" to "anchor rod (typ.)" in section D-D.

- **Sheet 6 of 8**

- Update the callouts that contained the word "bolt" to "rod" in both truss plan views.
- Adjusted the interface of the lines and text in both plan views.
- Redrew the rod circle layout with 14 rods in the truss 110'-140' plan view.
- Update the "16 anchor bolts – 2" dia. Equally spaced at 22.5 degrees on a 36" dia. Bolt circle" to "14 anchor rods – 2" dia. Equally spaced at 25.7 degrees on a 36" dia. Bolt circle" in the truss 110'-140' plan view.

- **Sheet 7 of 8**

- Add "finished ground" callout at the cross section at shoulder detail.
- Add a dimension line titled "V1 or V2 bars at 1'-0" spacing" and draw in the anchor rod cage in the cross section at shoulder detail.
- Update the "anchor bolt (typ.)" callout to "anchor rod (typ.)"
- Add "Anchor rod cage shall be tied to inside of anchor rods to hold alignment. No cross-bracing is allowed in the center of the rod circle" callout to cross section at shoulder detail.
- Increase the thread length to 10 ½" in the anchor bolt detail.
- Update "bolt" to "rod" in the anchor bolt detail title.
- Add a dimension line stating a 10" projection.
- Update the title to "anchor rod table" in the table title.
- Update "bolt" to "rod" in table notes
- Move the anchor rod detail up and copy in "bottom anchor rod template detail" from SIGN-340 (sheet 6).

- **Sheet 8 of 8**

- Update the notes to state "templates may use multiple pieces joined by two-sided complete joint penetration welds, with welds at least 2" clear of rod holes."
- Update note to "The design of this foundation is based on the AASHTO LRFD Standard specifications for structural supports for highway signs, luminaires, and traffic signals."
- Delete note stating "The foundation design is based on a maximum average foundation pressure of 2500 psf."
- Update all notes that contain the word "bolt" to "rod."
- Delete note stating, "The templates and anchor bolt cage must be approved by MDOT prior to shipping."
- Update slope notes to "undrained shear strength (su)"
- Update the standard penetration note to state "Do not use this footing on granular soil with standard penetration test N-60 values less than 5."

SIGN-370-B

Components of Interest

- The diameter of the chords have been increased from 6" to 10"
- The size of the weld at the base for the 42" diameter bolt circle has been increased from 5/8" to 3/4"

Annotated Design Standard

- **All pages**
 - Updated all fractions to be stacked.
 - "Anchor bolt(s)" updated to "anchor rod(s)"
 - Dates in footing deleted.
 - Original name and signatures deleted.
- **Sheet 2 of 10**
 - Specified "AASHTO LRFD"
 - Removed "current edition" note from the AASTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.
 - Changed note 2 to "2. Welding must be in accordance with AWS D1.1 as specified in 20SP-707A, structural steel and aluminum construction."
 - Updated hot-dip galvanizing note to "5. Galvanizing of bolt assemblies shall be in accordance with subsections 919.07.I and 906.07 of the MDOT Standard of Specification for Construction."
 - "ANSI" updated to "ASME".
 - Removed "Except at splice connections. Splice connections must have a flat washer and lock washer under each nut and tightened to a snug tight condition per subsection 707.03.D of the MDOT Standard Specifications for Construction", from note 7.
 - Updated note 13 to "Column sections must be ASTM A53, Grade B or API-5L-X42 24" Ø X 1.219". Chord sections must be ASTM A500 grade B HSS 10.75"Ø X 0.625" ASTM A519-4140 annealed HSS 10"Ø X 0.500"
 - Deleted "Grade 36 or ASTM A36" and added "Grade 36 or 50, ASTM A36, or ASTM A572 Grade 50" in note 14.
 - Deleted note 17.
 - Added note "Charpy V-notch testing is required for the column upright in accordance with the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals."
- **Sheet 5 of 10**
 - Added a Caulk callout in detail B.
 - Modified the formatting of a welding annotation in Detail B
 - Added "1/2" max. x2" max." callout in Detail B
 - Added weld size note "W= 5/8" for 38" base plate, 3/4" for 42" base plate"
- **Sheet 10 of 10**
 - Changed Cap Plate size to 3/8"
 - Changed End Cap Detail size to 3/8"

- Removed lock washer from Detail of Washer Placement
- Added callout for Flat Washer

SIGN-375-A

Components of Interest

- The longitudinal reinforcement in the pedestal has been updated from 14 bars to 16 bars to meet the code minimum compression reinforcement requirement.

Annotated Design Standard

- **All pages**
 - Removed plan date "06/03/2021" from border design.
- **Sheet 1 of 6**
 - Rotated "concrete barrier, split" note 180 degrees.
 - Added two "1'-6" (min)" dimensions to plan view.
 - Added 3" and 8" dimensions to plan view.
 - Added linework to ends of plan view.
 - Adjusted dimension in the plan view.
 - Fixed lines to reflect the spacing while maintaining the position of the top of the line in the plan view.
 - Changed "bolt" to "rod" in the elevation view.
 - Added "Bradley C. Wieferich, P.E." under department director in the border design.
- **Sheet 2 of 6**
 - Added "(16)" in front of reinforcement detail "B1 equally spaced on a 45³/₄" circle" on footing plan.
- **Sheet 3 of 6**
 - Changed "bolt" to "anchor rod" in plan views 1 and 2.
 - Updated layout of anchor bolts to reflect new value in plan view 1.
 - Changed "16" to 14" in plan view 1.
 - Changed "22.5" to "22.7" in plan view 1.
 - Changed "bolts" to "rods" in plan views 1 and 2.
- **Sheet 4 of 6**
 - Changed "bolts" to "rods" in plan views 1 and 2.
- **Sheet 5 of 6**
 - Moved the diameter symbol from after to before the 4'-6" annotation in the cross section at shoulder.
 - Changed "bolt" to "rod" in cross section at shoulder.
 - Changed "anchor bolt detail" to "anchor rod detail".
 - Increased the thread length in the anchor rod detail.
 - Added dimension "2" (Typ.)" in the anchor rod detail.

- Changed "anchor bolt table" to "anchor rod table".
 - Changed "16" to "14" in the anchor rod table.
 - Changed "bolt" to "rod" in both notes under the anchor rod table.
- **Sheet 6 of 6**
 - Updated "AASHTO LRFD specifications for structural supports for highway signs, luminaires and traffic signals, 1st edition, with interim revisions through 2022" to "AASHTO LRFDLTS-1 specifications for structural supports for highway signs, luminaires and traffic signals, 1st edition, with interim revisions through 2022".
 - Removed note "the foundation design is based on a maximum average foundation pressure of 2500 psf".
 - Changed "undrained shear strength (Suc)" to "undrained shear strength (Su)" in the notes.
 - Added "N60 values" after "penetration test".
 - Removed note "the templates and anchor bolt cage must be approved by MDOT prior to shipping."
 - Changed "bolt" to "rod" in the note "diameter of bolt holes in templates shall be 1/16" larger than anchor bolt diameter".
 - Changed "bolts" to "rods" in the note "do not hammer on anchor bolts or templates".
 - Changed note "after the top steel template is removed, thread nuts on to bolt flush with the bolt end to protect threads until truss is erected" to "after the top steel template is removed, thread nuts on to rods flush with the rod end to protect threads until truss is erected".
 - Added note "Templates may use multiple pieces joined by two-sided complete joint penetration welds, with welds at least 2" clear of rod holes."

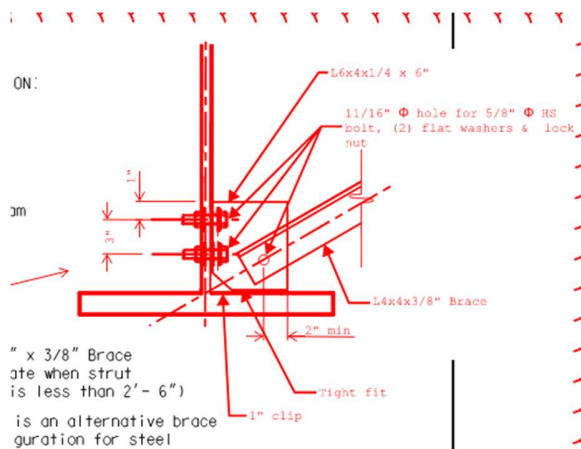
SIGN-800-A

Components of Interest

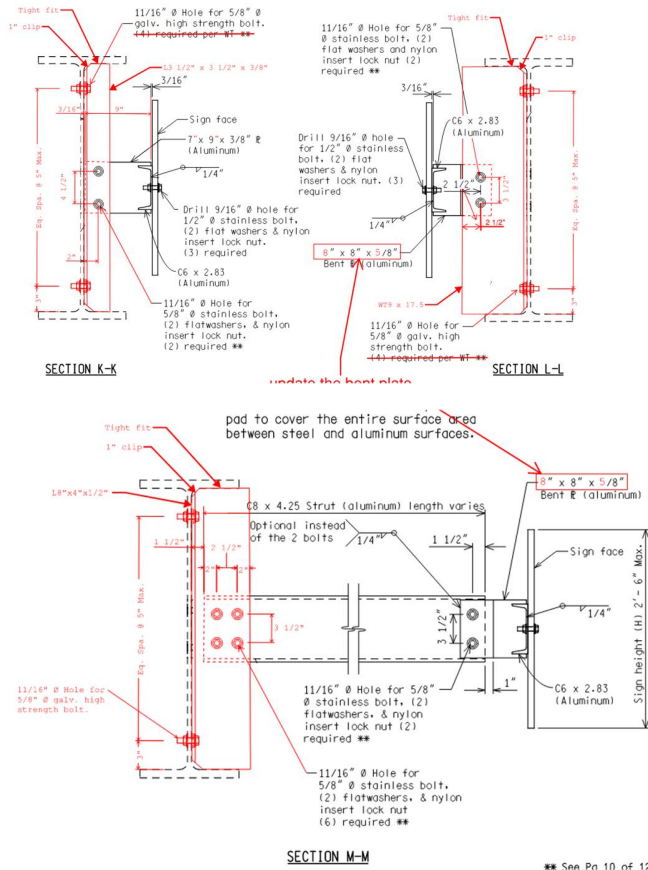
- Bent plate 7x8x3/8 for Type A1, Type A2 and Type B configurations where the skew is 5°-40° are increased to 8x8x5/8.
- The bridge connection for Type A1 configuration where the skew is 5°-40° for a steel has been updated to the detail shown in Figure 1.
- The connection plate to the girder for Type B configuration where the skew is 0° and 5°-40° is increased in length to the full depth of the girder, adding bolts at a max spacing of 5". See Figures 2, 3, and 4.
- The connection plate to the girder for Type B configuration where the skew is 5°-40° is changed from a WT9x17.5 to a L8x4x1/2, as shown in Figure 4.

Annotated Design Standard

- **All sheets**
 - Removed Date
 - Updated bent plate properties to 8"x8"by5/8"
 - Removed inch marks from weld symbols.
- **Sheet 1 of 12**
 - Moved arrowhead for section callout to point the other way in "Bridge Connection – Type A1" detail.
 - Department director updated from Kimberly Avery to "Bradley C. Wieferrich, P.E"
- **Sheet 2 of 12**
 - Updated alternate connection detail for attachment to steel girder.



- **Sheet 5 of 12**
 - Added "* Stop fillet weld short of corner" note.
- **Sheet 6 of 12**
 - Added "* Stop fillet weld short of corner" note.
 - Added "1" clip" callout to "Section H-H" detail.
- **Sheet 8 of 12**
 - Moved section K cut slightly to the left in "Plan 0 degrees Connection" detail.
 - Added "WT9x17.5" and "L8"x4"x 1/2"" callout to "Plan 5 degrees – 40 degrees Connection" detail.
- **Sheet 9 of 12**
 - Updated "Section K-K", "Section L-L", and "Section M-M" detail to the following.



- **Sheet 11 of 12**

- Removed "current" prior to Standard Specification for Construction
- Added "or grade 50S" after AASHTO M 270 grade 36.
- Updated 707.03 to 707.03.E.6
- In reference to non-shrink grout "702.02.B" updated to "1005.02.B"

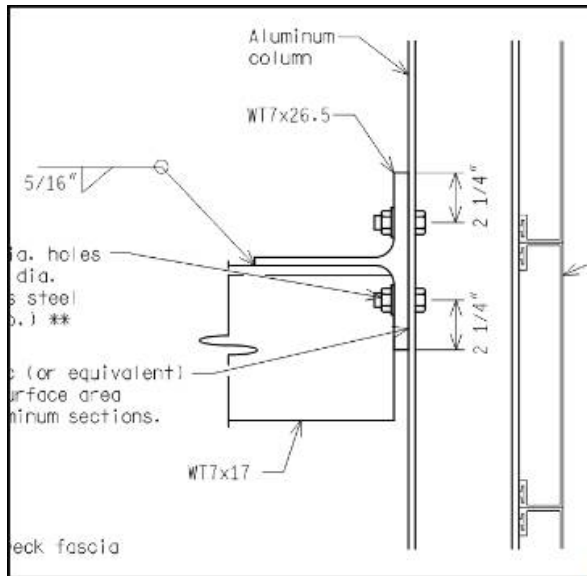
- **Sheet 12 of 12**

- Removed "current" prior to Standard Specification for Construction
- Updated section callout from "712, 713, and 715" to see bridge sign connections to existing bridges in MDOT Standard for Specification to "810".
- Removed the "2000 edition" note after referencing the "Aluminum Association Aluminum Design Manual"
- Updated "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" to "AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals."

SIGN-810-A

Components of Interest

- Diagonal braces have been included for all configurations.
- Horizontal braces have been included for all configurations. The L4x4x3/8 section has been replaced with a L8x8x3/4 section.
- The aluminum WF6x7.85 section for Type II columns has been replaced with a W6x7.61.
- The aluminum WF8x10.72 section for Type III columns has been replaced with a W8x10.7.
- The WT7x17 section has been replaced with a WT7x24 section.
- The WT7x26.5 section has been replaced with a WT8x33.5 section.
- The L7x4x3/8 section has been replaced with a L7x4x5/8 section.
- The 5/8" bolts connecting the column flange and WT7 was replaced with 7/8" bolts. This connection is shown in the figure below.



Annotated Design Standard

- **All Pages**
 - Updated fractions to be stacked.
 - Removed dates in footing.
 - Updated WT7x17 callout for the top chord and bottom chord to WT7x24
 - Remove inch marks from weld symbols.
 - 11/16" diameter holes for 5/8" diameter stainless steel bolt updated to 15/16" and 7/8", respectively.
 - Updated WT7x26.5 to WT8x33.5
 - Updated L7x4x3/8 callout to L7x4x5/8
- **Sheet 1 of 11**
 - Added a 3'-0" Max. callout to the deck overhang length dimension.
 - Updated 20 degrees for the minimum skew of the diagonal braces to be 0 degrees.

- Added note "These details are only to be used for structures with Type IV prestressed I-beam bridges with applicable concrete deck configurations."
- Department director updated from Kimberly Avery to "Bradley C. Wieferrich, P.E"
- **Sheet 2 of 11**
 - Updated L8x8x 3/8 to L8x8x 3/4 in "Section Thru Bridge" detail
- **Sheet 3 of 11**
 - Updated L8x8x 3/8 to L8x8x 3/4 in "Plan View Top Chords" detail.
- **Sheet 5 of 11**
 - In "Bolt Detail" "5.5" callouts updated to "S.S"
- **Sheet 7 of 11**
 - Added table:

* ADHESIVE ANCHOR GROUP DESIGN ULTIMATE STRENGTHS				
BEAM TYPE	INSTALLED IN BEAM FLANGE		INSTALLED IN DECK FASCIA	
	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)
I	9988	4115	18481	6608
II	12208	10236		
III	14649	10236		
IV	15981	10236		

* DESIGN ULTIMATE STRENGTH IS EQUAL TO THE ULTIMATE STRENGTH MODIFIED BY THE APPROPRIATE EDGE DISTANCE AND ANCHOR SPACING REDUCTION FACTORS RECOMMENDED BY THE MANUFACTURER.

- **Sheet 8 of 11**
 - Changed Type I aluminum columns from Wf6x7.85 to W6x7.61
 - Changed Type III aluminum columns from WF8x10.72 to W8x10.7
 - Updated reference to the 2000 edition of Aluminum Association Aluminum Design Manual to the 2020 edition.
- **Sheet 9 of 11**
 - Removed dimension for angle of 0 degrees min. for aluminum column to sign.
- **Sheet 10 of 11**
 - Added "or grade 50S" after AASHTO M 270 grade 36.
 - Updated 707.03.E.6 to 707.03.E.6
 - In reference to non-shrink grout "702.02.B" updated to "1005.02.B"
 - "Current" removed before "MDOT Materials Source Guide"
 - Updated to reference subsection 810.03.T to 810.03.U regarding removal of existing bridge sign connections.
 - Updated reference to section 712 to 810 for bridge sign connections to existing bridges.
- **Sheet 11 of 11**
 - Updated "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" to "AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 1st edition, with interim revisions through 2022."
 - Updated note on types of prestressed concrete I-beam bridges to "These details are only to be used for structure with Type I, Type II, Type III, or Type IV prestressed I-beam bridges with applicable concrete deck configurations."

SIGN-820-B/SIGN-830-A

Components of Interest

- The WF6x7x85 section for Type II columns has been replaced with a W8x10.7 section.
- The WF8x10.72 section for Type III columns has been replaced with a W12x18.3 section.
- The W21x44 section has been replaced with a W18x65 section.
- The WT7x26.5 section has been replaced with a WT7x34 section.
- The L7x4x3/8 section has been replaced with a L7x4x5/8 section.
- With the steel beam web connected bridge mounted sign structures, local web concerns have been considered. For the aforementioned Standard 820A/830B, it is recommended to maintain the current configuration as the angle connection component distributes the demand over a wider region of the web despite the larger sign size.

Annotated Design Standard

- **All sheets**
 - Updated fractions to stacked fractions.
 - Remove dates on the title block.
- **Sheet 1 of 8 (SIGN-820)**
 - Replaced the W21x44 callout with W18x65 in the section thru bridge detail and detail D.
 - Changed the L7"x4x3/8 callout with L7x4x5/8
- **Sheet 2 of 8**
 - Changed the section callouts from A to D.
- **Sheet 3 of 8**
 - Added Section D detail from Sign-830-A
 - Changed WT7x26.5 callout to WT7x34 in detail A
 - Changed the L7"x4x3/8 callout with L7x4x5/8 in detail B.
 - Changed W21x44 callout to W18x65 in detail B.
 - Changed nut callouts from 5.5 to S.S
- **Sheet 4 of 8**
 - Changed the L7"x4x3/8 callout with L7x4x5/8 in section B.
 - Changed W21x44 callout to W18x65 in section B.
 - Changed the 1'-4 7/16" dimension line to 1'-2 5/8"
- **Sheet 5 of 8**
 - Changed W21x44 callout to W18x65 in section A and C
 - Changed WT7x26.5 callout to WT7x34 in section A and C
- **Sheet 6 of 8**
 - Changed the WF6x7.85 callout to W8x10.7 in the aluminum column table.
 - Changed the WF8x10.72 callout to W12x18.3 in the aluminum column table.
- **Sheet 8 of 8**
 - The notes sheet was updated to the following: Note 5 added "or Grade 50S. Note 6 was changed "707.03.D.7" to "707.03.E.6" and added "for construction" in between

specifications and except. Note 10 Changed the "707.03.D.7" to "1005.02.B" and added "for construction" after Specifications. Note 15 changed "813.03.P" to "810.03.P". Note 16 changed the I in "810.03.I" to U. Note 20 changed the word Standard to LRFD and removed the current edition at the end of the sentence.

- **Sheet 1 of 8 (SIGN-830)**
 - Replaced the W21x44 callout with W18x65 in the section thru bridge detail and detail D.
 - Changed the L7"x4x3/8 callout with L7x4x5/8
- **Sheet 3 of 8**
 - Changed WT7x26.5 callout to WT7x34 in detail A
 - Changed the L7"x4x3/8 callout with L7x4x5/8 in detail B.
 - Changed W21x44 callout to W18x65 in detail A and B
- **Sheet 4 of 8**
 - Changed the L7"x4x3/8 callout with L7x4x5/8 in section C.
 - Changed W21x44 callout to W18x65 in section C and A
 - Changed the 2'- 11/16" dimension line to 1'-11 3/8" in section C.
- **Sheet 5 of 8**
 - Changed W21x44 callout to W18x65 in section B and D
 - Changed nut callouts from 5.5 to S.S
 - Changed WT7x26.5 callout to WT7x34 in section B and D
- **Sheet 6 of 8**
 - Changed the WF6x7.85 callout to W8x10.7 in the aluminum column table.
 - Changed the WF8x10.72 callout to W12x18.3 in the aluminum column table.
 - Delete "2000 Edition" in table.
 - Delete the minimum angle callout in elevation of sign detail.
- **Sheet 8 of 8**
 - The notes sheet was updated to the following: Note 5 added "or Grade 50S. Note 6 was changed "707.03.D.7" to "707.03.E.6" and added "for construction" in between specifications and except. Note 10 Changed the "707.03.D.7" to "1005.02.B" and added "for construction" after Specifications. Note 15 changed "813.03.P" to "810.03.P". Note 16 changed the I in "810.03.I" to U. Note 20 changed the word Standard to LRFD and removed the current edition at the end of the sentence.

SIGN-850-A

Components of Interest

- The W21x44 section is slender for compression, so it was replaced with a W18x65 section. Per LRFDLTS-1 Section 5.7.4 slender sections are not permitted for use.
- The L7x4x3/8 section is slender for compression, so it was replaced with a L7x4x5/8 section. Per LRFDLTS-1 Section 5.7.4 slender sections are not permitted for use.
- The connection WT between the beam and column has been updated to WT7x34 to conform with the other bridge mounted sign standards.

Annotated Design Standard

- **All sheets**
 - Updated all fractions to be stacked fractions.
 - Date removed from footing.
- **Sheet 1 of 3**
 - 1'-9 3/16" distance between bolts updated to 1'-7"
 - 2'-0" max. distance of deck overhang updated to 3'-0" max.
 - Department director updated from Kimberly Avery to "Bradley C. Wieferich, P.E"
- **Sheet 2 of 3**
 - 1'-9 3/16" distance between bolts updated to 1'-7"
 - Updated WT7.26.5 to WT7x34 to match SIGN 830-A
 - Updated L7x4x3/8x3'-6" Long callout to L7x4x5/8
 - Updated W21x44 callout to W18x65
- **Sheet 3 of 3**
 - Added "for Construction" after "Standard Specifications"
 - Added 'or grade 50S" after AASHTO M 270 grade 36.
 - Updated 707.03.E.6 to 707.03.E.6
 - In reference to non-shrink grout "702.02.B" updated to "1005.02.B"
 - "Current" removed before "MDOT Materials Source Guide"
 - Updated to reference subsection 810.03.T to 810.03.U regarding removal of existing bridge sign connections.
 - Updated reference to section 712 to 810 for bridge sign connections to existing bridges.
 - Updated "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" to "AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals."

SIGN-880-A

Components of Interest

- The W21x44 section is slender for compression, so it was replaced with a W18x65 section. Per LRFDLTS-1 Section 5.7.4 slender sections are not permitted for use.
- The L7x4x3/8 section is slender for compression, so it was replaced with a L7x4x5/8 section. Per LRFDLTS-1 Section 5.7.4 slender sections are not permitted for use.
- The WT7x26.5 section was replaced by a WT7x34 section for uniformity with SIGN-820-B.
- The WF6x7.85 section is no longer part of the Aluminum Design Manual, so it was replaced with a WF6x7.61 section.

Annotated Design Standard

- **All pages**
 - Updated fractions to be stacked.
 - Dates in border deleted.
 - Removed inch symbols ("") from weld symbols.

- **Sheet 1 of 4**
 - Department director changed from Kimberly Avery to “Bradley C. Wiefelich, P.E.”
 - Approval signatures removed.
 - Updated steel member from a L7x4x3/8 to a L7x4x5/8
 - Updated steel member from a W21x44 to a W18x65
 - Updated distance from outer edge of flange to centerline of W member from 10 5/16” to 9 3/16” which corresponds to the new shape used as detailed in previous comment
 - Added Type 6 and Type 7 as possible bridge barrier railing types.
 - Updated “Type I aluminum column” to “Type II aluminum column”
- **Sheet 2 of 4**
 - Updated steel member from a L7x4x3/8 to a L7x4x5/8
 - Updated steel member from a WT7x26.5 to a WT7x34
 - Updated steel member from a W21x44 to a W18x65
 - Added Type 6 and Type 7 as possible bridge barrier railing types.
 - Changed centerline to centerline distance between top and bottom anchor bolts from 1’-4 7/16” to 1’-2 5/8”
- **Sheet 3 of 4**
 - Changed note 5 to say “or Grade 50s” as a possible steel grade for steel members to conform to.
 - Updated Subsection 707.03.D.7 to 707.03.E.6 in note 6.
 - Changed the standard name from “Standard Specifications” to “Standard Specifications for Construction” in notes 6 and 10.
 - Fixed typo “nutsand” to “nuts and” in note 6
 - Fixed spelling error “oterwise” as “otherwise” in note 7
 - Updated Section 702.02.B to 1005.02.B in note 10
 - Changed Subsection 810.03.T to 810.03.U in note 13.
 - Added new note 14 to say, “See section 810 of the Standard Specifications for bridge design connects to existing bridges.” and renumbered remaining notes
- **Sheet 4 of 4**
 - Added “Bridge Barrier Railing, Type 6; Bridge Barrier Railing, Type 7” to the list of possible new bridge railing types in note 19.
 - Changed standard name from “AASHTO Standard Specifications for Structural Supports for Highway signs, Luminaries and Traffic Signals, current Edition” to “AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals” including fixing capitalization in note 21.

SIGN-870-B/SIGN-890-B

Components of Interest

- The W21x44 section is slender for compression, so it was replaced with a W18x65 section. Per LRFDLTS-1 Section 5.7.4 slender sections are not permitted for use.

- The L7x4x3/8 section is slender for compression, so it was replaced with a L7x4x5/8 section. Per RFDLTS-1 Section 5.7.4 slender sections are not permitted for use.
- The WT7x26.5 section was replaced by a WT7x34 section for uniformity with SIGN-830-A.
- The WF6x7.85 section is no longer part of the Aluminum Design Manual, so it was replaced with a WF6x7.61 section.

Annotated Design Standard

- **All sheets**
 - Updated all fractions to be stacked fractions.
 - Updated L7x4x3/8" connection to a L7x4x5/8 connection
 - Updated WT7x26.5 to WT7x34
 - Updated W21x44 to be W18x65.
- **Sheet 1 of 5**
 - Removed the date from the footing.
 - Updated L7x4x3/8" connection to a L7x4x5/8 connection
 - Added Type 6 and Type 7 to the bridge barrier railing types.
 - Updated the 10 5/16th dimension to 9 3/16"
 - Department director updated from Kimberly Avery to "Bradley C. Wieferrich, P.E"
- **Sheet 2 of 5**
 - Changed the dimension between bolts from 2'-1 11/16" to 1'-11 3/8"
- **Sheet 4 of 5**
 - Added "for Construction" after "Standard Specifications"
 - Added "or grade 50S" after AASHTO M 270 grade 36.
 - Updated 707.03.E.6 to 707.03.E.6
 - In reference to non-shrink grout "702.02.B" updated to "1005.02.B"
 - "Current" removed before "MDOT Materials Source Guide"
 - Updated to reference subsection 810.03.T to 810.03.U regarding removal of existing bridge sign connections.
 - Updated reference to section 712 to 810 for bridge sign connections to existing bridges.
- **Sheet 5 of 5**
 - Updated "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" to "AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals."
 - Added "Bridge Barrier Railing, Type 6; Bridge Barrier Railing, Type 7" to the note on new bridge railings.