

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

CHAPTER 8 - LRFD

PLAN NOTES

8.01 INTRODUCTION

8.02 TITLE SHEET

8.03 GENERAL PLAN OF SITE SHEET

8.04 LOG OF BORING SHEET

8.05 GENERAL PLAN OF STRUCTURE SHEET

8.06 SUBSTRUCTURE

8.06.01 Miscellaneous Notes

8.06.02 Abutment Notes

8.06.03 Pier Notes

8.06.04 Footing Notes

8.06.05 Pile Notes

8.06.06 Retaining Wall Notes

8.06.07 Steel Sheet Pile Notes

8.06.08 Substructure Repair Notes

8.06.09 MSE Wall Notes (8-20-2009)

8.07 SUPERSTRUCTURE

8.07.01 Miscellaneous Notes

8.07.02 Chain Link Fence Notes

8.07.03 Elastomeric Bearings

8.07.04 Prestressed Concrete I-Beam and Box Beam Notes

8.07.05 Screed Notes

8.07.06 Shear Developers

8.07.07 Structural Steel Notes

8.07.08 Temporary Support Notes (New Construction)

8.07.09 Treatment of Epoxy-Coated Bars

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

CHAPTER 8 PLAN NOTES INDEX (continued)

8.08 RAILROAD OVERPASS

- 8.08.01 Introduction
- 8.08.02 Title Sheet
- 8.08.03 General Plan of Site Sheet
- 8.08.04 General Plan of Structure Sheet
- 8.08.05 Structural Steel Notes
- 8.08.06 Temporary Trestle

8.09 REHABILITATION PROJECTS

- 8.09.01 Anchoring Bolts or Reinforcement in Existing Concrete (8-6-92)
- 8.09.02 Bridge Deck Repair Notes (9-18-98)
- 8.09.03 Railing Replacement Notes
- 8.09.04 Maintenance Painting Notes
- 8.09.05 Hanger Assembly Replacement Notes
- 8.09.06 Deck Replacement Notes (9-18-98)
- 8.09.07 Existing Plan Sheet Notes (9-18-98)

8.10 STEEL REINFORCEMENT (9-1-88)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

CHAPTER 8 - LRFD

PLAN NOTES

8.01

INTRODUCTION

This section contains general notes that should be placed on the sheet indicated or where applicable. The notes on each plan sheet should be grouped according to subject matter.

Blanks are to be filled in with the appropriate word or words. Words in parentheses show the most common options used in the note; other wordings may be necessary to fit the particular option. Words in brackets give instruction on when to use the note or give a general description of additional information that may be needed in the note.

These notes are intended as a guide, not as a complete list for all cases. For instance, it may be necessary for the user to write a note to explain the purpose or intent of an unusual item of work so that the project engineer or contractor can judge the accuracy required or whether alternatives are suitable. (8-6-92)

MICHIGAN DESIGN MANUAL

BRIDGE DESIGN - CHAPTER 8: LRFD

8.02

TITLE SHEET

Care should be taken to see that the notes appearing on the title sheet actually apply to the work being done on the project. Most of the standard notes included in the Design Manual relate to new construction. For rehabilitation projects the wording of some of these notes must be modified. Other notes are completely inappropriate and should be deleted.

- A1. The design of (this) (these) structure(s) (except the railroad overpass(es) (is) (are) based on 1.2 times the current AASHTO LRFD Bridge Design Specification HL-93 loading with the exception that the design tandem portion of the HL-93 load definition shall be replaced by a single 60 kip axle load before application of this 1.2 factor. The resulting load is designated HL-93 Mod. Live load plus dynamic load allowance deflection does not exceed (1/425*) (1/800) (1/1000**) of span length (and (1/375) (1/300) of cantilever arm). [*Wood construction.] [**Use for structures with pedestrian loads.] (8-20-2009)
- A2. The design of this structure is based on current AASHTO LRFD Bridge Design Specification pedestrian loading of 90 psf (and a maintenance vehicle (H5) (H10) loading, not acting concurrently). Live load deflection does not exceed 1/360 of span length and 1/220 of cantilever arm. [Use for pedestrian bridges. For Clear Bridge Width, w, greater than 10'-0", use an H10 truck. For w between 7'-0" and 10'-0", use an H5 truck. For w less than 7'-0" the bridge does not need to be designed for a maintenance vehicle.] (11-28-2011) (5-25-2015)
- A3. The design of the deck slab is based upon the strip method as defined in the current AASHTO LRFD Bridge Design Specification. (8-20-2009)

8.02 (continued)

- B1. The (reconstruction) (rehabilitation) design is based on 1.2 times the current AASHTO LRFD Bridge Design Specification HL-93 loading with the exception that the design tandem portion of the HL-93 load definition shall be replaced by a single 60 kip axle load before application of this 1.2 factor. The resulting load is designated HL-93 Mod. Live load plus dynamic load allowance deflection does not exceed (1/425**) (1/800) (1/1000***) of span length (and (1/375) (1/300) of cantilever arm. The original structure was designed for _____ (and alternate military*) loading (based on AASHTO Standard Specifications for Highway Bridges). [*Used only for structures on interstate routes.] [**Wood construction.] [***Use for structures with pedestrian loads.] [See Subsection 7.01.06 for deflection limits.] (8-20-2009)
- B2. The (reconstruction) (rehabilitation) design is based on the 17th Edition of AASHTO Standard Specifications for Highway Bridges (HS25) (HS20-44) (and alternate military*) loading. Live load plus impact deflection does not exceed (1/425) (1/800) (1/1000) of span length (and (1/375) (1/300) of cantilever arm. The original structure was designed for _____ (and alternate military*) loading based on AASHTO Standard Specifications for Highway Bridges. [*Use only for structures on interstate routes.] [See 17th Edition of AASHTO for deflection limits.] [Use note for Load Factor method of design.] (8-20-2009)
- C Except where otherwise indicated on these plans, or in the proposal and supplemental specifications contained herein, all materials and workmanship shall be according to the Michigan Department of Transportation Standard Specifications for Construction _____ Edition.

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.02 (continued)

TITLE SHEET

D. The stationing as shown on these plans for the intersection of the centerline of bridge and roadway (and the railroad) centerline is believed to be correct. It shall, however, be checked at the time of starting construction, and if the stationing shown on the plans is incorrect, it shall be reported to the Design office in Lansing, and the structure shall be staked out using the actual intersection of the centerline of bridge and roadway (and the railroad) centerline as the control point.

E. This contract is for "Structural Steel, _____, Furn and Fab" only. Other items of work indicated on these plans are not a part of this contract. [Use when structural steel furnishing and fabricating must be done early in project to ensure timely delivery for construction.] (12-5-2005)

F. The Regulated Waste Activity Identification Numbers for this project are as follows:

Control Section	Number
_____	_____

[Use when hazardous material removal, cleaning or working on painted steel structure constructed prior to 1978 or when hydrodemolition is part of the project work. Place note directly above title block and use lettering twice the size of the other notes.]
(9-18-98) (4-18-2016) (1-27-2020)

8.02 (continued)

G. The design of the structural members is based on material of the following grades and stresses:

Concrete: Grade S2, S2M, P1M *
 $f'_c = 3,000$ psi

Concrete: Grade D, DM * $f'_c = 4,000$ psi

Steel Reinforcement $f_y = 60,000$ psi

Steel Reinforcement:

(Stirrups for Prestressed Beams

$f_y = 60,000$ psi)

(Stirrups for (17") (21") Box Beams

$f_y = 40,000$ psi)

Structural Steel:

AASHTO M270

Grade 36

$F_y = 36,000$ psi

Structural Steel:

AASHTO M270

Grade 50

$F_y = 50,000$ psi

Structural Steel:

AASHTO M270

Grade 50W

$F_y = 50,000$ psi

Structural Steel Pins:

ASTM A276

UNS Designation

S20161 or S21800

$F_y = 50,000$ psi

Temp Support Hanger Rods:

ASTM A 193 Grade B7 (AISI 4140)

2½" and under

$F_u = 125,000$ psi

$F_y = 105,000$ psi

Over 2½" to 4"

$F_u = 115,000$ psi

$F_y = 95,000$ psi

Over 4" to 7"

$F_u = 100,000$ psi

$F_y = 75,000$ psi

Prestressed Concrete

$f'_c = \underline{\hspace{1cm}}$ psi

Prestressed Concrete Compressive

Strength at Release

$f'_{ci} = \underline{\hspace{1cm}}$ psi

[7000 psi max]

Prestressing Strands

$f_{pu} = 270,000$ psi

[*Use Grade S2M, P1M and DM in all trunkline projects in Metro, University, Grand, Bay, Southwest and North Regions. Use Grade S2 and D in Superior Region and on non-trunkline projects.]

(12-5-2005) (11-28-2011) (11-24-2014)
(10-17-2016) (1-29-2018)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.02 (continued)

TITLE SHEET

H. (year) Estimated Traffic Distribution

0000	Average Daily Traffic
(000)	Design Hourly Volume
%	Commercial
0000	Commercial Directional Design Hourly Volume
0000	Directional Traffic
0000	Total Traffic

[Use on Rehabilitation jobs where there is no plan of site or structure.] (9-18-98)

I. All exposed concrete corners shown square on the plans shall be beveled with ½" triangular moldings except as otherwise noted. (8-20-99)

J. Note deleted. (1-29-2018)

K. Old plans do not exist for this structure. [Use on all projects where the designer is unable to verify that existing structure plans exist.] (8-20-2009)

L. The bridge paint may contain lead. [Use on all projects with existing painted structural steel regardless of work type. If no bridge Title Sheet is present with project place note on road Note Sheet. Also place on existing structural steel sheets (see note [8.09.07 D.](#))] (8-20-2009)

8.02 (continued)

M. The design of the foundation piling is based on material of the following grades and stresses (and losses):

Concrete: Grade S1	$f'_c = 3,500$ psi
Steel Reinforcement	$f_y = 60,000$ psi
Foundation Piling (Steel H-Piling):	
AASHTO M270	
Grade 50	$F_y = 50,000$ psi
Foundation Piling (Steel H-Piling):	
AASHTO M270	
Grade 50W	$F_y = 50,000$ psi
Foundation Piling (Steel Shells):	
ASTM A 252	
Grade 3	$F_y = 45,000$ psi
Foundation Piling (Timber)	$F_{CO} = 900$ psi

(8-20-2009)

N. Unless otherwise shown on the plans provide minimum concrete clear cover for reinforcement according to the following:

Concrete cast against earth:	3 in.
Prestressed Beams:	1 in.
All other unless shown on plans:	2 in.

(8-20-2009)

O. The bridge deck surface has an HMA overlay, HMA cap or HMA patches. Removal of HMA as a result of removal of other superstructure items shall be included in the removal of those items. (8-20-2009)

P. (FAA Obstruction) (,) (and) (Michigan Tall Structure) (,) (and) (Municipal Airport) permit(s) (have) (has) been obtained for this project. The Contractor is responsible for ensuring that all work is performed in compliance with (this) (these) permit(s). [Use when applicable permits have been obtained for project] (3-20-2017)

Q. This project has been evaluated using the FAA Notice Criteria Tool for a structure height of ____ feet above a ground level elevation of ____ feet and no permits are required. [Use when FAA Obstruction, Michigan Tall Structure or Municipal Airport permits are not required for the project.] (3-20-2017)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.03

GENERAL PLAN OF SITE SHEET

- A. The work covered by these plans includes (channel excavation), (maintaining traffic), construction of the proposed bridge and placing (slope protection) (scour countermeasures) (riprap) to the limits shown.* All other work is included in the road plans that are a part of this contract. [Used where bridge is part of a road-bridge package.]
- B. The work covered by these plans includes (clearing), (grubbing), (tree removal), (channel excavation), (earth excavation), (maintaining traffic), (construction of the temporary road), (construction and removal of temporary trestle), (grading for temporary and permanent track work), construction of the proposed bridge and placing (granular material), (sodding or seeding) and (slope protection) (scour countermeasures) (riprap) to the limits shown.* All other work is to be done by others and is not a part of this contract. [Used where bridge contractor constructs bridge only and approach work is done by a separate contract. Any work that is to be done by others prior to starting work on bridge contract is to be noted.]
- * This part of the note is to be identical with the one shown on the bottom of the Engineer's Preliminary Estimate of Cost.
- C. Removal of (fences and) buildings is not a part of this contract.
- D. No work shall be performed by the road contractor between stations ____ and ____ until the bridge has been completed, except as directed by the Engineer, in order to expedite the work of the bridge contractor. [Applicable to separate bridge contracts only.]

8.03 (continued)

- E. Removal of temporary structure and approaches (is) (is not) a part of this contract.
- F. The contractor shall locate all active underground utilities prior to starting work and shall conduct his operations in such a manner as to ensure that those utilities not requiring relocation will not be disturbed.
- G. Unsuitable material under ____ shall be removed and backfilled with ____ .
- H. Remove (____ cubic yards of) peat and other unsuitable material below proposed approach fill location and backfill with (____ cubic yards of) "Embankment, Structure, CIP" (see Road Plans for treatment limits, method and quantity). [Use when large peat deposits must be removed by surcharging.] (12-5-2005)
- I. (Scarify*) (Remove) roadway surfacing in area beneath proposed abutments prior to placing of fills. [Use for pile-supported abutments or where fill is 3'-0" or less.] [*Use when roadway surfacing is gravel or crushed stone with or without a seal coat.] (8-6-92)
- J. Piers 1 and ____ shall be constructed and backfilled prior to the placing of abutment fills. (Use where piers are within or at toes of slope.)
- K. The ground adjacent to the tracks and structure shall be graded by the contractor to provide drainage.
- L. . . . traffic is to be (maintained) (detoured) over (the bridge) (the bridge by part-width construction) (other existing roads) (the temporary road). [Specify facility and other modes of transportation on the project. Use multiple notes if modes are detoured or maintained in separate ways.] (9-18-98) (12-16-2019)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.03 (continued)

GENERAL PLAN OF SITE SHEET

- M. This bridge is part of an interchange and all area shown is within MDOT right-of-way.
- N. Buildings marked thus have been removed.
- 
- O. Plan elevations refer to _____ datum.
- P. Topography shown here represents conditions existing at the time the field survey was made. However, these conditions (may) have been materially altered by the operations of others prior to this contract. [Use only when we have definite information that work has been done in the area.]
- Q. The train movement and speed information shown in the proposal does not represent a commitment by the _____ railroad and is subject to change without notice.
- R. Excavate crosshatched area to El _____. [Place this note in the vicinity to which it applies.]
- S. Fill hatched area to El _____ with material from channel excavation. [Place this note in the vicinity to which it applies.]

8.03 (continued)

- T. Water level is subject to change. The contractor is responsible for making a determination of water levels that may exist during construction. [Use on all projects over water where the water level may impact the project work.]
- U. "Backfill, Structure, CIP", _____ cubic yards. (12-5-2005)
- V. Remove _____ cubic yards of topsoil (and unsuitable material) and place _____ cubic yards of "(Embankment, Structure,) (*Embankment,) CIP". [*Use with pile supported footing.] (12-5-2005)
- W. Soil classified as _____ shall be undercut and replaced with "Embankment, Structure, CIP" compacted to 100 percent of maximum unit weight. Excavation and backfill quantities are based on an estimated undercut to elevation _____. Actual limits of excavation will be determined by the Engineer at the time of construction. (12-5-2005)
- X. The following item(s) (is/are) railroad owned (fittings, ties, rails, etc.) and any of these items salvaged shall become the property of the railroad.
- Y. Measures shall be taken to prevent debris from falling from the structure. (*If debris falls into the waterway, it shall be removed within 24 hours. Since disturbance of the waterway bottom may be as harmful as the debris itself, the preventive measures must be effective.) Removal of debris will not be paid for separately, but will be included in the bid item ("Structures, Rem") ("Structures, Rem Portions") ("Structures, Rehabilitation, Rem Portions"). [*Use for bridges over waterways.] (8-6-1992) (11-25-2019)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.03 (continued)

GENERAL PLAN OF SITE SHEET

- Z. Immediately after the construction of an abutment is completed, slope protection and seeding or sodding shall be placed on the adjacent embankment slopes. [Use for bridges over waterways.] (9-1-88)

- AA. The haul route shown has been approved by the Michigan Department of Environment, Great Lakes and Energy (MDEGLE). A detailed alternate route may be proposed by the Contractor for MDOT review and submittal to the appropriate permitting agency. Additional time, project costs and any project delays resulting from submittal, approval, and/or denial of an alternate route request and implementation will be the responsibility of the contractor. [Use for bridges over waterways or wetlands.] (9-18-98) (11-28-2011) (6-17-2013) (6-24-2019)

- BB. The haul route shall be according to Subsection 105.03 of the Standard Specifications. [Use for bridges over waterways or wetlands.] (9-18-98)

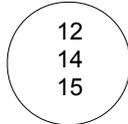
- CC. Coordinates are not available for this project. [Use when coordinates not available due to lack of survey for project.] (12-5-2005)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

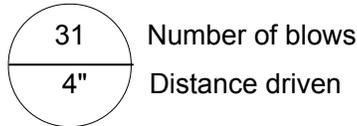
8.04

LOG OF BORING SHEET

- A. Numbers in circles denote number of blows required to drive a 2" O.D. (1½" I.D.) split spoon sampler 3 successive 6" increments using a 140 lbs. hammer falling 30".



(Where the sampler is driven distances other than 18", the distance is shown in the circle with the number of blows in the form of a fraction.)



- B. Consistency was determined by inspection of samples and substantiated by soils resistance to drilling tools. [This note shall be as written in field notes.]
- C. Bottom of footing (Abut. ____) (Pier ____), El. ____.*
- D. Estimated total scour limit (Abut. ____) (Pier ____), El. ____.* (8-6-92)
- *Show on plotted borings.
- E. Minimum pile penetration (Abut. ____) (Pier ____), El. ____.*
- F. Estimated bottom of piles (Abut. ____) (Pier ____), El. ____.*

8.04 (continued)

- G. Water levels may be influenced by residual boring water. [Use when borings are made by hydraulic, rotary, or coring methods.]
- H. Free water was first noted ____ feet below the surface. The water level was ____ feet below ground (____ hours after) (at) completion with the casing (in) (out). [Place under each soil boring log if applicable.] (9-1-88)
- I. The soil boring logs represent point information. Presentation of this information in no way implies that subsurface conditions are the same at locations other than the exact location of the boring.

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.05

**GENERAL PLAN OF
STRUCTURE SHEET**

- A1. The design of this structure is based on 1.2 times the current AASHTO LRFD Bridge Design Specification HL-93 loading with the exception that the design tandem portion of the HL-93 load definition shall be replaced by a single 60 kip axle load before application of this 1.2 factor. The resulting load is designated HL-93 Mod. Live load plus dynamic load allowance deflection does not exceed (1/425*) (1/800) (1/1000**) of span length (and 1/375) (1/300) of cantilever arm. [*Wood construction.] [**Use for structures with pedestrian loads.] [See Subsection 7.01.06 for deflection limits.] (8-20-2009)
- A2. The design of this structure is based on current AASHTO LRFD Bridge Design Specification pedestrian loading of 90 psf (and a maintenance vehicle (H5) (H10) loading, not acting concurrently). Live load deflection does not exceed 1/360 of span length and 1/220 of cantilever arm. [Use for pedestrian bridges. For Clear Bridge Width, w, greater than 10'-0", use an H10 truck. For w between 7'-0" and 10'-0", use an H5 truck. For w less than 7'-0" the bridge does not need to be designed for a maintenance vehicle.] (11-28-2011) (5-25-2015)
- A3. The design of the deck slab is based upon the strip method as defined in the current AASHTO LRFD Bridge Design Specification, utilizing HL-93 Loading. (8-20-2009) (5-27-2020)

8.05 (continued)

- B1. The (reconstruction) (rehabilitation) design is based on 1.2 times the current AASHTO LRFD Bridge Design Specification HL-93 loading with the exception that the design tandem portion of the HL-93 load definition shall be replaced by a single 60 kip axle load before application of this 1.2 factor. The resulting load is designated HL-93 Mod. Live load plus dynamic load allowance deflection does not exceed (1/425**) (1/800) (1/1000***) of span length (and 1/375) (1/300) of cantilever arm. The original structure was designed for _____ (and alternate military*) loading (based on AASHTO Standard Specifications for Highway Bridges). [*Used only for structures on interstate routes.] [**Wood construction.] [***Use for structures with pedestrian loads.] [See Subsection 7.01.06 for deflection limits.] [Use note for LRFD method of design.] (8-20-2009)
- B2. The (reconstruction) (rehabilitation) design is based on the 17th Edition of AASHTO Standard Specifications for Highway Bridges (HS25) (HS20-44) (and alternate military*) loading. Live load plus impact deflection does not exceed (1/425) (1/800) (1/1000) of span length (and 1/375) (1/300) of cantilever arm. The original structure was designed for _____ (and alternate military*) loading based on AASHTO Standard Specifications for Highway Bridges. [*Use only for structures on interstate routes.] [See 17th Edition of AASHTO for deflection limits.] [Use note for Load Factor method of design.] (8-20-2009)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.05 (continued)

**GENERAL PLAN OF
STRUCTURE SHEET**

C. [A chart similar to the following is to be placed on all plans where applicable:]

SUMMARY OF HYDRAULIC ANALYSIS							
EXISTING				PROPOSED			
FLOOD DATA	DISCHARGE (CFS)	WATER SURFACE ELEV. AT U/S FACE OF STRUCTURE	VELOCITY IN D/S CHANNEL (FPS)	WATER SURFACE ELEV. AT U/S FACE OF STRUCTURE	VELOCITY IN D/S CHANNEL (FPS)	WATERWAY AREA (SFT) AT D/S FACE	CHANGE IN WS EL. U/S OF PROPOSED STRUCTURE
50-YEAR							
100-YEAR							
MAXIMUM BRIDGE AREA BELOW LOW CHORD IS				SQUARE FEET			

- D. The drainage area contributory to this crossing is ____ square miles.
- E. The water surface and/or energy grade elevations shown on the above hydraulic table are to be used for comparison purposes only and are not to be used for establishing a regulatory floodplain. (9-2-2003)
- F. The (existing) (adjacent) structure, (feet) (miles) (upstream) (downstream), provides a waterway area of ____ square feet to (high water) (underclearance*) elevation _____. [*Use only if high water elevation is not available.]
- G. Without the preventive measures shown on these plans, there is a possibility that stream bed scour may occur. The estimated total scour depth is calculated to be ___ feet at (Abutment ___) (Pier___). These depths are based on a ____ year runoff event. (8-6-92)
- H. Geotextile liner shall be placed on all slopes prior to placing riprap. Payment for geotextile liner shall be included in payment for riprap. [Use when recommended by the Hydraulics/Hydrology Engineer.](9-18-98)

- I. The (abutment) (pier) maximum average foundation pressure(s) is (are) calculated to be ____ psf for Service Limit State, and ____ psf for Strength Limit State and are based on a gross footing width of ____ ft. [Use when **gross footing width** assumptions are used for footing designs. Create one note for abutments and one note for piers. MDOT designed projects.] (8-20-2009)

The (abutment) (pier) maximum foundation pressure(s) is (are) calculated to be ____ psf for Service Limit State based on an effective footing width of ____ ft, and ____ psf for Strength Limit State based on an effective footing width of ____ ft. [Use when **effective footing width** assumptions are used for footing designs. Create one note for abutments and one note for piers. Consultant designed projects.] (8-20-2009)

- J. For details of concrete slope paving protection, see Standard Plan B-102-Series. (6-29-2020)
- K. The nominal fatigue resistance is based on a design life of 75 years (and an average daily truck traffic of ____). [Use for steel bridges only and add ADTT if applicable/available.] (8-20-2009) (3/16/2015)

MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD

8.05 (continued)

**GENERAL PLAN OF
STRUCTURE SHEET**

- L. A cofferdam has not been provided for this structure. Other means of water control may be used, as approved by the Engineer, provided they do not disturb the stream bed. Water control, whether it be by cofferdam or other approved means, will be included in the bid item "Excavation, Fdn". [Use on stream crossings when water control measures other than a cofferdam are appropriate. See Subsection 7.03.04.] (12-5-2005)
- M. The tremie seal design was based on a water surface at El. _____.
- N. Placement of (standard) (and) (limited deflection) temporary barrier shall be according to (Standard Plan R-53-Series,) Standard Plan R-126-Series or as approved by the Engineer. (Placement of portable water-filled barrier shall be as specified by the Engineer.) [Use on all projects requiring standard temporary barrier, limited deflection temporary barrier, and/or portable water-filled barrier. Modify paragraph as needed depending on the temporary barrier type(s) required on each project. Delete references to Standard Plan R-53-Series when limited deflection temporary barrier is not required according to Standard Plan R-126-Series. Place note on staging sheet(s) where applicable.] (12-5-2005) (12-28-2015)
- O. The riprap quantity is based on the lateral dimensions of the area to be protected, regardless of the number of layers required. The estimated weight of riprap is _____ tons. (9-18-98)
- P. Alternate methods of stream diversion shall be submitted to the Engineer for approval. [Use when stream diversion method is detailed on Plan Sheet.] (9-18-98)

8.05 (continued)

- Q. Place riprap from El _____ to El _____. [Place this note in the vicinity to which it applies, when lateral limits are not fixed.]
- R. False decking shall include the area bounded by (Reference Lines ___& __) (edges of shoulders) and outside flange fascias of Beams ___& __. The estimated area is _____square feet during removal (and _____square feet during proposed construction). [Detail limits on the plans and include areas in note.] (12-5-2005)
- S. Items cast into structural precast concrete to facilitate bridge construction (forming, finishing, etc.) shall be galvanized or epoxy coated. [Use for box and three-sided culverts, MSE walls, sound walls, precast bridge element systems, etc.] (6-17-2013)
- T. Do not use wheeled, roller based or machine mounted compaction equipment to compact the subgrade, subbase, and base within 10' of the sleeper slab after it is built. Use only hand/plate compactors. Contact pressure of compaction equipment shall not exceed 10 psi. [Use on all projects with a sleeper slab.] (3-17-2014)
- U. Design headwalls to develop an ultimate moment capacity (about the horizontal axis) to resist a horizontal load of 24 k (kips) distributed over 3.5 feet applied 32 inches above top of pavement, and to develop an ultimate moment capacity (about the vertical axis) of 16.7 kft (kip feet), per foot of headwall height. Design headwall connection to deck and/or other precast units to resist these loads. Space blockouts for thrie beam guardrail at a distance of 10'-7¾" or less, center to center, along headwall. [Use when thrie beam guardrail is attached to the culvert headwalls and/or return walls. Use with Standard Plan B-23-Series.](5-27-2014)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.06

SUBSTRUCTURE

8.06.01

Miscellaneous Notes

- A. JWP denotes Joint Waterproofing.
- B. NS denotes Near Side.
- C. FS denotes Far Side.
- D. ES denotes Each Side.
- E. For bevel and molding details, see Standard Plan B-103-Series.
- F. Field-bend reinforcement to clear drain holes.
- G. For pile (quantities) (layout) (and notes), see sheet(s) ____.
- H. The Contractor may adhesive anchor (bolts) (position dowels) in holes drilled in the concrete at (Pier ____) (Abutment ____). [Use this note for steel beam or prestressed concrete beam bridges, where drilling holes will not damage substructure reinforcement.] (9-18-98)
- I. Uplift will occur at abutment(s) ____ (and pier(s) _____) during construction of the superstructure. Anchor bolt nuts and jam nuts shall be placed immediately after erection of the girders in Span(s) _____.
- J. The substructure concrete quantity is computed on the basis that the volume of concrete displaced by the embedment of the piles is deducted. [Use when timber or C.I.P. piles are embedded more than 1'-0".] (9-18-98)

8.06.01 (continued)

- K. Low temperature protection of concrete shall be applied according to Section 706.03 J. of the Standard Specifications for Construction. Low temperature protection of concrete will not be paid for separately, but will be included in the bid item "Substructure Conc". [Use when possibility of pouring concrete during cold weather. With known cold weather pours use the pay item for cold weather protection.] (8-20-2009)
- L. Note deleted. (1-29-2018)

MICHIGAN DESIGN MANUAL BRIDGE DESIGN - CHAPTER 8: LRFD

8.06.02

Abutment Notes

See Section [7.03.11](#) for usage and descriptions of concrete sealers.

- A. Substructure Horizontal Surface Sealer shall be applied to the top horizontal surface of abutment ___ (and ___) (prior to placing masonry plates) (after the elastomeric bearings have been placed in final position on the structure). Vertical surfaces accidentally coated shall be cleaned at contractor's expense. [Use when joint in deck exists above.] (12-5-2005)
- B. (Penetrating Water Repellent Treatment) (Concrete Surface Coating) shall be applied to the entire exposed surface of abutment___ (and ___) (except the tops) and the front face of independent backwall (prior to placing new masonry plates) (after the new elastomeric bearings have been placed in final position on the structure). (Concrete surface coating shall be [AMS-STD-595](#) color number [insert number], [insert color].) [Use when no joint exists above. Apply to tops when Horizontal surface sealer is not applied to tops. Use Concrete Surface Coating when requested by Region or Roadside Development section.] (12-5-2005) (2-26-2018)
- C. At no time prior to erecting the beams, shall the height of the backfill on the backside of the abutment be higher than the backfill on the front side. [Use on integral abutments.] (8-20-99)

8.06.03

Pier Notes

See Section [7.03.11](#) for usage and descriptions of concrete sealers.

- A. Substructure Horizontal Surface Sealer shall be applied to the top horizontal surface of pier ___ (and ___) (prior to placing masonry plates) (after the elastomeric bearings have been placed in final position on the structure). Vertical surfaces accidentally coated shall be cleaned at contractor's expense. [Use only when superstructure transverse joints are directly above the pier.] [Use for new construction.] (12-5-2005)
- B. (Penetrating Water Repellent Treatment) (Concrete Surface Coating) shall be applied to the entire exposed surface of piers___ (except the tops) (prior to placing new masonry plates) (after the new elastomeric bearings have been placed in final position on the structure.) (Concrete surface coating shall be [AMS-STD-595](#) color number [insert number], [insert color].) [Use when no joint exists above. Apply to tops when Horizontal Surface Sealer is not applied to tops. Use Concrete Surface Coating when requested by Region or Roadside Development section.] (2-26-2018)

MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD

8.06.04

Footing Notes

- A. For (Abutment _____) (Pier _____) design, the maximum average foundation pressure(s) is (are) calculated to be _____ psf for Service Limit State, and _____ psf for Strength Limit State and are based on a gross footing width of _____ ft. [Use when **gross footing width** assumptions are used for footing designs. MDOT designed projects.] (8-20-2009)

- B. For (Abutment _____) (Pier _____) design, the maximum foundation pressure(s) is (are) calculated to be _____ psf for Service Limit State based on an effective footing width of _____ ft, and _____ psf for Strength Limit State based on an effective footing width of _____ ft. [Use when **effective footing width** assumptions are used for footing designs. Consultant designed projects.] (8-20-2009)

- C. Footings are to be poured against undisturbed soil. No allowance will be made in concrete quantities due to excavation outside of the footing neat lines. [Use when required by design.]

- D. Construction joints in footings are optional. [Use unless design considerations deem the joints necessary.]

- E. The material properties of Concrete, Grade S2, Subfooting shall be those of Concrete, Grade S2. [Use on all projects with "Conc, Grade S2, Subfooting" bid item. Place note on sheets where item quantities are shown.] (8-20-2009)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.06.05

Pile Notes

- A. Drive all piles to a nominal pile driving resistance not less than _____ kips. Determine nominal pile driving resistance (R_{ndr}) using (the FHWA Modified Gates Dynamic Formula) (dynamic test with signal matching (P.D.A. testing)) (static load tests). [Provided by MDOT C&T or Geotechnical consultant. See section [7.03.09](#) for values and criteria.] (8-20-2009)
- B. Pile shells shall be a minimum of * _____ " nominal wall thickness, ** _____ " O.D. [Use with C.I.P. concrete piles.] (8-20-2009) (11-28-2011) (8-20-2012)
- * 0.375" nominal thickness
0.312" nominal thickness
- ** 16" O.D.
14" O.D.
12" O.D.
- C. The estimated pile length is based on the static analysis. (8-20-2009)
- D. Batter piles for Abutment(s) _____ shall be driven to a 3V:1H (2.5V :1H) batter angle. (9-18-98)
- E. Steel piles shall be * _____. (8-20-2009) (11-28-2011)
- * (HP 10X42) (HP 10X57) (HP 12X53)
(HP 12X74) (HP 12X84) (HP 14X73)
(HP 14X89)
- F. Piles are to be driven to such accuracy that the ends of the piles to be embedded in the concrete are within 3" of the location shown on the plans. [Use for pile bents.]
- G. Use steel for H-Piles and splices that have a yield strength not less than 50,000 psi. (8-20-2009)

8.06.05 (continued)

- H. The desired pile driving sequence shall be from the center of the pile group outward in both directions or from one side of the pile group to the other side. The contractor may request Engineer approval to sequence the pile driving from the center of the pile group outward in a clockwise or counterclockwise pattern if four or more rows of piles exist. [Use for pipe piles to alleviate soil pressure from driven piles. A pile driving sequence will minimize detrimental effects of heave and lateral displacement of the ground as well as the influence the new construction has on adjacent structures.] (8-20-2009)
- I. Use steel shells for CIP concrete piles that have a yield strength not less than 45,000 psi. (8-20-2009)
- J. The estimated loss of nominal pile resistance due to scour after driving is _____ kips. [For information only.] (8-20-2009)
- K. The estimated factored downdrag after pile driving is _____ kips. [For information only.] (8-20-2009)
- L. The factored pile resistance available to resist all factored loads (including the estimated factored downdrag) is equal to (50) (65) percent of nominal pile driving resistance (that is reduced by the loss due to scour). [For information only. Add downdrag and scour when appropriate. See section [7.03.09](#) for values and criteria.] (8-20-2009) (11-28-2011)
- M. Steel piles used for pile bents are considered primary members and all welding must be in accordance with AASHTO/AWS D1.5:2010, Bridge Welding Code, as modified by the current Special Provision for Structural Steel and Aluminum Construction. (7-30-2012)

MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD

8.06.06

Retaining Wall Notes

- A. The exposed faces of the retaining walls (and abutment) shall have special architectural treatment according to Subsection 706.03 of the Standard Specifications. [Use on retaining walls and abutments connected to retaining walls where special architectural treatment is desired.] (9-18-98)

8.06.07

Steel Sheet Pile Notes

- A. The substructure excavation and concrete quantities take into consideration the additional concrete and excavation necessary to excavate and pour to the Permanent Steel Sheet Piling. [Use on all projects where concrete is to be poured against Permanent Steel Sheet Piling.]
- B. All sheet piling used at _____ shall be hot-dip galvanized. [Specify location and use when sheet piling will be subjected to heavy chlorides or sulfates. Include Special Provision.] (9-18-98) (3-18-2013)
- C. All Permanent Steel Sheet Piling shall be _____. Where allowed by the Engineer, select alternate hot rolled sheet piling with a nominal section modulus of at least _____ in³/ft or cold rolled sheet piling with a nominal section modulus of at least _____ in³/ft. [Specify designation and appropriate section modulus. Refer to Section 7.03.08 D. for design criteria.] (12-5-2005)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.06.08

Substructure Repair Notes

- A. Mechanical expansion anchors along with adhesive anchor systems shall be chosen from the Qualified Products List in the current MDOT Materials Source Guide. (12-5-2005)

- B. (Penetrating Water Repellent Treatment) (Concrete Surface Coating) shall be applied to the entire exposed surface of abutment___ (and ___) (except the tops) (and the front face of the independent backwall). (Concrete surface coating shall be [AMS-STD-595](#) color number [insert number], [insert color].) [Use when no joint exists above or the abutment is adjacent to a pavement. Apply to tops when Horizontal Surface Sealer is not applied to tops. Use Concrete Surface Coating when requested by Region or Roadside Development section.] (12-5-2005) (2-26-2018)

- C. (Penetrating Water Repellent Treatment) (Concrete Surface Coating) shall be applied to entire exposed surfaces of pier(s) ____ (except top). (Concrete surface coating shall be [AMS-STD-595](#) color number [insert number], [insert color].) [Use when no joint exists above or the pier is adjacent to a pavement. Apply to tops when Horizontal Surface Sealer is not applied to tops. Use Concrete Surface Coating when requested by Region or Roadside Development section.] (12-5-2005) (2-26-2018)

- D. Substructure Horizontal Surface Sealer shall be applied to the top of (all) Pier(s) (___ & ___) (and) Abutment(s) (___ & ___). Vertical surfaces accidentally coated shall be cleaned at contractor's expense. [Use when the abutment or pier has been repaired and there is a superstructure transverse joint directly above or the unit is adjacent to a pavement.] (12-5-2005)

8.06.08 (continued)

- E. Forms for large patches shall be installed in 2'-0" to 4'-0" high sections with the top of form no more than 4'-0" above the level of concrete as the pour progresses.

- F. Note deleted. (1-29-2018)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.06.09

MSE Wall Notes (8-20-2009)

- A. MSE denotes Mechanically Stabilized Earth.
- B. Use soil reinforcement for MSE walls of a length not less than _____ percent of the wall height (H), as defined by these plans, or 8 feet (whichever is greater). [Use this note when the soil reinforcement length required by the Geotechnical investigation exceeds the minimum length (0.7H) required by the specifications.]
- C. The factored bearing resistance of the subgrade is _____ psf at abutment A and _____ psf at abutment B.
- D. Adjust MSE soil reinforcement to avoid foundation piles. Do not cut soil reinforcement.
- E. Use precast concrete facing panels with a nominal height of _____ feet and nominal width of _____ feet for MSE walls. [Use this note if aesthetic or design concerns dictate the panel size beyond what is allowed by the MSE specifications.]
- F. Use either precast or cast in place (CIP) MSE wall coping unless specified to be cast in place. [Include this note only if there are areas where cast in place coping is required and other areas may utilize precast coping.]
- G. Use cast in place (CIP) MSE wall coping. [Use this note only if coping is required to be cast in place.]
- H. Texture the exposed face of the precast concrete facing panels with a _____ pattern meeting the approval of the Engineer. Payment for texturing panels will be included in the pay item "MSE Wall, Precast, Furn".
- I. Coordinate placement of soil reinforcement with drainage structures and pipes and other obstructions.

8.06.09 (continued)

- J. The 100 year flood elevation is _____. [Use where MSE walls are placed near areas subject to fluctuations in water level.]
- K. Cutting of the MSE soil reinforcement is prohibited.
- L. See Special Provision for "MECHANICALLY STABILIZED EARTH RETAINING WALL SYSTEM".
- M. The top row of soil reinforcement should be a minimum of 6" below the bottom of footing. [Use on abutment sheet.]

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.07

SUPERSTRUCTURE

8.07.01

Miscellaneous Notes

- A. JWP denotes joint waterproofing.
- B. HPJS denotes hot-poured joint sealant.
- C. For bridge railing, anchorage for guardrail and name plate mounting details, see Standard Plan B- ____ -Series. For details of name plates, moldings and bevels, see Standard Plan B-103-Series. (8-20-2009)
- D. For name plate location, see General Plan of Structure Sheet (sheet(s) ____) (this sheet).
- E. A rubbed surface finish on the vertical and top concrete surfaces of the parapet railing is required on this structure. [Use on parapet railing with sidewalk.]
- F. For details of (drain casting assemblies) (light standard anchor bolt assemblies), see Standard Plan(B-101)(B-103)-Series.
- G. "Edge" or "groove" denotes edging or grooving with an approved tool.
- H. Alphabetical designation of deck pours is not to be construed as a pour sequence. [Use for simple spans.]
- I. Deck pours are to be made in the following sequence ____, ____, and ____. Whenever a deck pour is made, at least 15 hours shall have elapsed since the adjacent section was placed. This includes sections separated by longitudinal as well as transverse joints. [Use with continuous steel spans.] (8-20-2009)

8.07.01 (continued)

- J. Alphabetical designation of deck pours is not a pour sequence. Cast deck pours over piers after other deck pours have been cast. At least 15 hours shall have elapsed before the adjacent section is placed. This includes sections separated by longitudinal as well as transverse joints. [Use for prestressed concrete beams that are continuous for live load.] (8-20-2009)
- K. Low temperature protection of concrete shall be applied according to Section 706.03 J. of the Standard Specifications for Construction. Low temperature protection of concrete will not be paid for separately, but will be included in the bid item "Superstructure Conc (, Night Casting)." [Use when possibility of pouring concrete during cold weather. With known cold weather pours use the pay item for cold weather protection.] (8-20-2009)
- L. No portion of the deck formwork shall encroach on the existing underclearance. [Use where bridge deck is to be cast over traffic.] (8-6-92)
- M. The utility company shall be notified one week in advance of the time of installation of the ducts in the (sidewalk) (barrier). [Use when ducts are to be installed by others.] (9-18-98)
- N. Do not pour deck concrete until diaphragm concrete attains a compressive strength of 3,000 psi. [Use with prestressed concrete I-Beams, Bulb-Tee beams and spread box beams with diaphragms.] (4-17-2017)
- O. This deck pour is designated a night pour, and therefore subject to the restrictions of section 706.03 I. of the Standard Specifications. [Use when night pour is required.] (12-5-2005)

MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD

8.07.01(continued)

Miscellaneous Notes

- P. The light standard anchor bolt assemblies are included in the payment for "Bridge Railing, Aesthetic Parapet Tube." (10-24-2001)
- Q. Silica Fume Modified Concrete or Latex Modified Concrete may be selected for the bridge deck overlay concrete. (9-2-2003)
- R. The contractor may use metal stay in place forms. If used, eliminating the polystyrene and filling the corrugations with concrete is prohibited. [Use with metal stay in place forms where design calculations show the increase in dead load will result in an over stress.] (8-20-99)
- S. The contractor shall not use stay-in-place forms. All materials used to form the deck must be removed prior to opening the bridge to traffic. [Use where beam spacing or form loads preclude the use of stay-in-place forms.] (9-2-2003)
- T. The deck shall be saw-cut on both the top and bottom surface prior to deck removal procedures. [Use with bridge widening when the saw-cut is on the outside of the fascia beam or with removal procedures required for stage construction.] (8-20-2009)
- U. Fill perpendicular railing joints with 1" joint filler to 1/2" from the bevels of railing and seal remaining 1/2" with a polyurethane or polyurethane hybrid sealant. Included in the bid item (Bridge Barrier Railing, (Type 6) (Type 7)) (Bridge Railing, Aesthetic Parapet Tube) (Bridge Railing, 3 Tube With Pickets). [Use in all concrete railings over the piers of continuous deck, at midspan on all structures with a span greater than 100'-0" and cantilever decks where the cantilever is more than 10'-0" long.] (12-5-2005) (2-21-2017) (11-25-2019)

8.07.01(continued)

- V. Provide a sawed joint 1 1/2" deep by 1/8" wide (minimum) in the top of slab at the locations shown in section(s) _____. The joint is to be sawed within 24 hours of placing the curing and is to be filled to 1/4" below top of concrete with polyurethane or polyurethane hybrid sealant. (Included in the bid item "Superstructure Conc, Form, Finish, and Cure, Night Casting (Structure No.)"). [Use at all locations shown for continuous for live load slabs (generally at piers).] (11-28-2011) (7-18-2016) (8-24-2020)
- W. Note Deleted. (2-21-2017)
- X. No portion of deck formwork or supports shall protrude above the top of proposed haunch (or top of the beam where there is no proposed haunch). (8-20-2009)
- Y. In order to maintain the integrity of the existing structure during Stage _____ construction, the contractor shall saw cut entirely through the (abutment) (pier) and a minimum of 4" into the top of footing for removal purposes. [Used with part width construction]. (12-17-2012)
- Z. Provide a sawed joint 1/2" deep by 1/8" wide (minimum) in the top of slab at [transverse] [and longitudinal] [construction joints] [and] [reference joints] [and at fixed pin & hanger joints] and fill to 1/4" below top of concrete with polyurethane or polyurethane hybrid sealant. (Included in the bid item "Superstructure Conc, Form, Finish, and Cure, Night Casting (Structure No.)"). [Use at all bridge deck slab construction joints and reference joints over integral and semi-integral backwalls.] (6-17-2013) (7-22-2013) (7-18-2016) (8/24/2020)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.07.02

Chain Link Fence Notes (8-6-92)

- A. Grounding cables and tops of grounding rods shall be placed 1'-0" minimum below finished ground.
- B. Fence on (the ____ side of) this structure shall be (straight) (curved). [Use to designate type.] (9-18-98)

When pedestrian fencing is to be placed on an existing structure, refer to Subsection [8.09.03](#) for additional notes which, with modification, will be appropriate for use on the plans.

8.07.03

Elastomeric Bearings

- A. If the position dowels at (Abutment (Pier ____)) are misaligned, in relationship to the centerline of bearings, due to temperature effects on the (beams) (girders), holes in the elastomeric bearings shall be centered on the dowels. [Use for elastomeric expansion bearings.] (9-1-88)

VOLUME 5

MICHIGAN DESIGN MANUAL BRIDGE DESIGN - CHAPTER 8: LRFD

8.07.04

Prestressed Concrete I-Beam & Box Beam Notes

- A. The contractor shall be responsible for accurately locating the rod connection between box beams. [Use when widening box beam structures.]
- B. Prestressing strands shall be given an initial prestress as follows:

0.5" dia. - 31,000 lbs. prestress
0.6" dia. - 44,000 lbs. prestress

(9-18-98)
- C. Concrete inserts shall be ¾" diameter; Dayton Superior, Type B-1 Heavy or Type B-18; Williams Form, Type C 12 or Type C -19; Meadow Burke, Type CT-2 or Type CX-4; or equal. Inserts (coil or ferrule) must be electroplate galvanized in accordance with ASTM B633, Service Condition 4. Inserts shall be cast with the beams. Field installation of inserts is not allowed. [Use for I-Beams, Bulb-Tee beams and spread box beams.] (8-20-2009) (2-16-2016) (4-17-2017)
- D. Concrete inserts for drain casting assembly brackets shall be as called for on Standard Plan B-101-Series. Inserts shall be cast with the beams. Field installation of inserts is not allowed. (9-1-88)
- E. End blocks are (required) (optional). [Use for I-Beams.] (9-1-88)
- F. Total estimated change of length of bottom flange at transfer of prestress force is ____".
- G. The estimated beam camber at release is ____". This camber is due to prestress and dead load of the beam only and is measured in the erected position.(8-6-92)
- H. During handling and transportation, beams can be supported ____ feet from the end. If two additional strands are draped, the beams can be supported ____ feet from the end. [Use with 70" deep beam, Michigan 1800 beam and Bulb-Tee beams.] (4-17-2017)

8.07.04 (continued)

- I. Note deleted. (12-17-2018)
- J. Beams in span(s) ____ may be laterally unstable. Precautions shall be taken to insure that beams are not damaged during handling and transportation. [Use when factor of safety for lateral buckling is 1.2 or less.] (8-6-92)
- K. Threading of reinforcement and installation into concrete inserts is included in the bid item ("Prest Conc I Beam, Furn, ____ inch") ("Prest Conc Box Beam, Furn, ____ inch") ("Prest Conc Bulb-Tee Beam, Furn, ____ inch by ____ inch"). (12-5-2005) (4-17-2017)
- L. Note deleted. (12-17-2108)
- M. Lifting devices shall be removed after beams are erected. Removal is included in the bid item ("Prest Conc I Beam, Erect, ____ inch") ("Prest Conc Box Beam, Erect, ____ inch") ("Prest Conc Bulb-Tee Beam, Erect, ____ inch by ____ inch"). (12-5-2005) (4-17-2017) (12-17-2018)
- N. Note Deleted. (12-17-2018)
- O. Prestressing strand shall be 0.6" nominal diameter (or 0.5" nominal diameter) meeting the requirements of AASHTO M203 (ASTM A416), Grade 270, low relaxation strand. (9-18-98)

MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD

8.07.04 (continued)

Prestressed Concrete I-Beam & Box Beam Notes

- P. Any holes cast or formed in the beam shall be filled with non-shrinking grout. Included in the bid item ("Prest Conc 1800 Beam, Erect") (Prest Conc Bulb-Tee Beam, Erect, ___ inch by ___ inch"). [Use for Michigan 1800 Prestressed I-Beam and Bulb-Tee Beams.] (12-5-2005) (4-17-2017)
- Q. The outer 6" of the top surface of the beam shall be fabricated to a smooth trowel finish, and then coated with a bond breaker as specified in section 708 of the Standard Specifications. [Use for Michigan 1800 Prestressed I-Beam and Bulb-Tee Beams.] (12-5-2005) (4-17-2017)
- R. At the locations shown on these plans, coat the beams using a material selected from the Special Provision for Concrete Surface Coatings. Apply the coating in the manner specified in the Special provision for a distance of _____ feet, starting from the beam end at the joint, coating both sides and bottom of beam. (Concrete surface coating shall be [AMS-STD-595](#) color number [insert number], [insert color].) [Use on Prestressed I-Beam, Bulb-Tee Beams and Spread box beam projects with expansion joints on the bridge. Show the locations to be coated on the erection diagram (new) or on existing General Plan of Structure sheet for existing beams.] (8-20-2009) (4-17-2017) (2-26-2018)
- S. Coat the entire outside and bottom of the fascia beam using a material selected from the Special Provision for Concrete Surface Coatings. Apply the coating according to the Special Provision. (Concrete surface coating shall be [AMS-STD-595](#) color number [insert number], [insert color].) [Use on Prestressed I-Beam, Bulb-Tee Beams and spread box beam projects where the beam ends are being coated and where coating fascia beams will not significantly effect the maintaining traffic scheme of the project.] (8-20-09) (4-17-17) (2-26-18)

8.07.04 (continued)

- T. Steel for sole plates and other bearing components shall meet the requirements of AASHTO M 270 Grade 36. Sole plates are required in all beam ends. (12-5-2005) (11-24-2014)
- U. Beam steel reinforcement, including stirrups, shall be Grade 60 (ksi). [Use for all I-Beams, Bulb-Tee Beams and all box beams except 17" & 21" box beams.] (12-5-2005) (11-28-2011) (4-17-2017)
- V. Field drilling shall be allowed for sign support anchors only. Location of anchors shall be as detailed on Traffic & Safety Sign Support Special Details. Any damage to the beams shall be repaired at the contractor's expense and approved by the Engineer. (8-20-2009)
- W. Items cast into the beams to facilitate bridge construction (forming, finishing, etc.) shall be galvanized or epoxy coated. (8-20-2009) (3-18-2013) (6-17-2013)
- X. Concrete inserts shall be 1" diameter; Dayton Superior, Type B-1 Standard or Type B-18; Williams Form, Type C 12; Meadow Burke, Type CT-2; or equal. Inserts (coil or ferrule) must be electroplate galvanized in accordance with ASTM B633, Service Condition 4. Inserts shall be cast with the beams. Field installation of inserts is not allowed. [Use for I-Beams, Bulb-Tee Beams and spread box beams.] (8-20-2009) (2-16-2016) (4-17-2017)
- Y. Note deleted. (1-29-2018)
- Z. Longitudinal beam steel reinforcement (A bars) shall be Grade 60 (ksi). The design of transverse beam steel reinforcement, stirrups and slab ties (ED & D bars) is based on Grade 40 (ksi); the use of either Grade 40 or Grade 60 is allowed in construction of the beam. [Use for 17" & 21" box beams.] (11-28-2011) (11-24-2014)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.07.05

Screed Notes

- A. Bottom of slab elevations (are at right angles to the beam centerline and*) are based on the condition that the beams and diaphragms are completely erected with no other loads applied. (No temporary supports are allowed at this time.) These elevations include allowance for vertical curve and deflection due to forms, steel reinforcement, concrete slab, (sidewalks, railing) (barrier) and utilities. [*Use when dual bottom of slab elevations are shown.]
- B. Screeds affected by loads in other spans are to be set to the elevations shown before casting any concrete. Concrete in the suspended span(s) is to be cast before the concrete in the anchor spans.
- C. Screed elevations are based on the condition that no slab concrete has been cast and that formwork (shear developers) and steel reinforcement are in place (and the temporary supports are brought to a snug fit under each beam).
- D. (On span(s) ____,) the transverse finishing shall be parallel to reference lines. [Use when the angle of crossing is less than or equal to 45E]
- E. (Outer*) screed rails for finishing of structural concrete shall be located over fascia beams (and over the beam adjacent to the open joint**).

* Omit the word "outer" on narrow decks, one pour wide.

** Add this where diaphragms are not continuous across wide decks.

- F. Stage A is beams and diaphragms erected with no other loads applied. [For use with top of beam elevations.] (9-1-88)

8.07.05 (continued)

- G. Stage B is forms and steel reinforcement in place (all spans complete). [For use with top of beam and bulkhead elevations.] (9-1-88)

8.07.06

Shear Developers

- A. Shear developers shall be ¾" diameter studs. (9-18-98)
- B. If existing shear developers do not interfere with proposed shear developers and reinforcement, they may be cleaned and left in place instead of removed. The contractor shall install all proposed shear developers regardless of whether or not the existing shear developers remain. [Use on deck removal projects with existing shear developers.] (9-18-98)

MICHIGAN DESIGN MANUAL BRIDGE DESIGN - CHAPTER 8: LRFD

8.07.07

Structural Steel Notes

- A. Field connections shall be bolted with $\frac{3}{4}$ " high-strength bolts (except as noted).
- B. The beams (in span _____) shall have a parabolic camber with ordinates as shown on the camber diagram. Heating is to be used, if necessary, to provide the camber within a tolerance of $+\frac{1}{4}$ " at the center. The camber shown is to be measured with the beam lying on its side. [Use for rolled beams.] (8-6-92)
- C. The girders (in span _____) shall be cambered with ordinates as shown on the camber diagram. Heating is to be used, if necessary, to provide the camber within the tolerance specified in the AWS Specifications. The camber shown is to be measured with the girder lying on its side. [Use for plate girders.] (12-5-2005)
- D. The quantity Structural Steel includes:
- | | | |
|--------|-------|------|
| Steel | _____ | lbs. |
| Bronze | _____ | lbs. |
| Total | _____ | lbs. |
- Elastomeric bearing pads ($\frac{1}{8}$ ") used under steel masonry plates shall not be paid for separately but included in the quantity for Structural Steel. (9-2-2003)
- E. Anchor bolt lengths shown are minimum. Bolts longer than those shown may be furnished at no additional cost.
- F. The structural steel to be coated shall be coated according to Subsection 716 of the Standard Specifications. The color of the urethane protective coat shall be light gray. [AMS-STD-595](#) color number 16440. [Use with shop or field coating. Check with Roadside Development Unit if other color is desired.] (5-1-2000) (11-28-2011) (5-22-2017) (10-23-2017) (12-26-2017)
- G. Structural steel shall conform to AASHTO M270, Grade 50, or AASHTO M270, Grade 50W. (AASHTO M270, Grade 36, steel may be used in lieu of these steels for bearings, diaphragms, and cross frames.) (9-18-98)

8.07.07 (continued)

- H. The steel for cross frames shall meet the Charpy test requirements for main structural members shown in Subsection 906.04 of the Standard Specifications. [Use when bridge has horizontally curved girders.]
- I. Changes in the number and location of field splices shown will be permitted, subject to approval by the Engineer and at no additional cost to the project. The design of these splices will also be subject to approval by the Engineer.
- J. Field splice(s) _____, if used, is (are) optional and will not be paid for.
- K. The protection of work and environment during blast cleaning of existing painted faying surfaces (and structural steel exposed during deck slab removal) shall be according to Subsection 715 of the Standard Specifications. (Included in the bid item, ("Steel Structure, Cleaning, Type 4 (Structure No.)") ("Structures, Rem Portions (Structure No.)") ("Structures, Rehabilitation, Rem Portions (Structure No.)"). [Use when widening steel bridges, even where the contract includes overall field coating.] [*Use when coating is not included in the contract.] (12-5-2005)
- L. The following steel bridge members and member components have been designated as fracture critical, regardless of the direction of stress: ____*. Steel and fabrication procedures must conform to the requirements of the Special Provision for Fracture Critical Members. [*Identify component] [Use for structures that have fracture critical members other than pins and link plates.] (8-6-92) (11-23-2015)
- M. End diaphragms shall be field drilled and bolted to the existing beams prior to pouring the deck. Intermediate diaphragms shall be field drilled and bolted to the existing beams after pouring the deck. [Use when widening structural steel bridge with diaphragms.] (9-18-98)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.07.07 (continued)

Structural Steel Notes

- N. The plate surfaces of the main girder splices, and all other bolted connections unless noted otherwise, shall be coated according to subsection 716.03.B.2.a for Slip Critical Connections. Coated connections (faying surfaces) shall meet the minimum cure times according to the product qualification test and subsection 716.02 before connection assembly. [Use on all painting projects.] (8-20-2009)

MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD

8.07.08

**Temporary Support Notes
(New Construction)**

- A. The contractor shall provide a temporary support at each point shown on the plans.
- B. All temporary supports are to be placed after placing forms and steel reinforcement and prior to casting any concrete. Temporary supports must remain in place until such time as the concrete in pour(s) _____ has attained 70 percent of its 28-day strength, and in no case shall they be removed in less than five days after the concrete has been placed. The contractor shall remove the temporary supports in such a manner as to ensure a gradual and uniform reduction of loads as approved by the Engineer.
- C. Temporary supports shall support the beams (girders) at their elevation prior to pouring concrete. Each support shall be designed to sustain a vertical load of _____ tons. The soil pressure under the foot or sill of each support shall not exceed _____ psf.
- D. The allowable soil pressure shown for temporary supports is based on soils information available at the time of design for undisturbed soil at elevation _____. This may be adjusted by the Engineer due to conditions at the time of construction.
- E. All temporary supports shall meet the approval of the Engineer.
- F. Concrete shall be cast in the pour sequence shown on the plans.
- G. All temporary supports are to be removed prior to casting pour(s) _____.

8.07.09

Treatment of Epoxy-Coated Bars

- A. Reinforcement is to be shop cut as shown. The epoxy coating shall be repaired according to the Standard Specifications. [Place near cutting diagram for slab transverse reinforcement.] (8-6-92)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.08

RAILROAD OVERPASS

8.08.01

Introduction

The railroad overpass general notes are to be used in conjunction with the general notes.

8.08.02

Title Sheet

- A. The design of the railroad overpass(es) is based on the current American Railway Engineering and Maintenance-of-Way Association Specifications, Cooper's E 80 * Loading, and ____ percent of the specified impact. [This note is to replace or be used in conjunction with general note [8.02 A.](#)]

* Or as specified by the railroad company

- B. Except where otherwise indicated on these plans or in the proposal and supplemental specifications contained herein, all materials and workmanship shall be according to the current American Railway Engineering and Maintenance-of-Way Association Specifications.

8.08.03

General Plan of Site Sheet

- A. Railroad traffic will be maintained on a temporary trestle.
- B. The railroad will furnish all ties, ballast, rails, and all necessary materials and labor for all track work on a force account basis. [This note should be amended for each job by consulting the railroad agreement on each project.]
- C. The information concerning the movements of trains and speed thereof does not represent any commitment on the part of the railroad to continue them unchanged, inasmuch as they are subject to change without notice.
- D. Details of temporary steel sheet piling and bracing must meet with the approval of the _____ railroad.

8.08.04

General Plan of Structure Sheet

- A. The design of this structure is based on the current American Railway Engineering and Maintenance-of-Way Association Specifications, Cooper's E 80 * Loading, and ____ percent of the specified impact.

* Or as specified by the railroad company

8.08.05

Structural Steel Notes

- A. Shop and field coating shall be according to Subsections 716 & 715 of the Standard Specifications.

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.08.06

Temporary Trestle

- A. The temporary trestle shall be maintained by the contractor throughout the entire construction period as directed by the Engineer.
- B. The design of the temporary trestle is based on the American Railway Engineering and Maintenance-of-Way Association Specifications, Cooper's ____ Loading, and ____ percent of the specified impact.
- C. At any stage of construction, there shall not be unreasonable delay to the railroad traffic, as per the agreement with the ____ railroad.
- D. Coating of structural steel is not required on the temporary trestle.

MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD

8.09

REHABILITATION PROJECTS

8.09.01

Anchoring Bolts or Reinforcement in Existing Concrete

- A. Mechanical expansion anchors shall be chosen from the Qualified Products List in the current MDOT Materials Source Guide. (12-5-2005)
- B. Systems for anchoring horizontal or vertical (reinforcement) (bolts) in existing concrete shall be chosen from the Qualified Products List in the current MDOT Materials Source Guide. (12-5-2005)
- C. All concrete anchors shall be installed according to manufacturer's recommendations, except as modified in these plans. (5-1-2000)
- D. Note deleted. (1-29-2018)

8.09.02

Bridge Deck Repair Notes

- A. The work covered by these plans includes resurfacing the existing bridge deck and maintaining traffic.
- B. The work covered by these plans includes replacing the existing curb or sidewalk with Bridge Barrier Railing, (Type 6) (Type 7) (Modified), resurfacing the existing bridge deck, and maintaining traffic. (11-25-2019)
- C. The volume of "Concrete, (Bridge Deck Overlay) (Silica Fume Modified)" is based on the overlay and an estimated quantity to replace unsound concrete and to make (crown) (superelevation) (grade) adjustments as determined by the Engineer. (12-5-2005)
- D. Note Deleted. (3-20-2017)
- E. The plan quantity of scarifying involves an amount for the approaches which assumes an area equivalent to five passes over the entire surface, ¼" deep, to obtain a maximum depth of 1¼". [Use where the deck will be hydrodemolished and the existing concrete approach slab will remain.] (9-18-98)
- F. The contractor shall remove and replace only that portion of the (barrier) (sidewalk)(brush block) that is necessary for installation of the deck joint.
- G. The bid item "Deck Joint, Rem" includes hand chipping within limits required for removal. (12-5-2005)
- H. Before overlaying, sound concrete to determine whether the removal at either side of transverse joints will be adequate. Increase the removal limits as approved by the Engineer. (5-22-2017)

MICHIGAN DESIGN MANUAL BRIDGE DESIGN - CHAPTER 8: LRFD

8.09.02 (continued)

Bridge Deck Repair Notes

- I. The actual quantity of "Conc, (Bridge Deck Ovly) (Silica Fume Modified)" placed on the deck was ____cubic yards. (This information is to be filled in by the Engineer when submitting "as constructed" plans.) (12-5-2005)
- J. Silica Fume Modified Concrete or Latex Modified Concrete may be selected for the bridge deck overlay concrete. (9-2-2003)
- K. False decking shall include the area bounded by (Reference Lines ___& ___) (edges of shoulders) and outside flange fascias of Beams ___& __. [Use when limits are not detailed on the plans.] (12-5-2005)
- L. Bridge overlay cross slope shall be (2%)(1.5%)(placed to match existing slope). [Use 2% cross slope unless compelling reasons warrant the use of 1.5% or existing cross slope. See Section [7.02.19 G.](#) for additional information.] (8-20-2009)
- M. Work for removal and reinstallation of portions of the existing thrie beam guardrail required for access to screed the deck shall be included in the bid item, "Bridge Deck Surface Construction". [Use on overlay projects where work may arise.] (8-20-99)
- N. Work for removal and reinstallation of portions of the existing thrie beam guardrail required to replace the joints shall be included in the bid item, "Deck Joint, Rem". [Use on overlay projects where work may arise.] (12-5-2005)

8.09.02 (continued)

- O. Low temperature protection of concrete shall be applied according to Section 706.03 J. of the Standard Specifications for Construction. Low temperature protection of concrete will not be paid for separately, but will be included in the bid item(s) for "Conc, (Bridge Deck Ovly) (Silica Fume Modified)." (12-5-2005)
- P. Concrete trucks and other heavy equipment shall not be allowed on the deck when reinforcing steel is tied in place and exposed. (9-2-2003)
- Q. The area of link slab(s) as designated, shall not be scarified or hydrodemolished. [Detail limits on deck plan.] (12-5-2005)
- R. No portion of the deck formwork shall encroach on the existing underclearance. [Use where bridge deck is to be cast over traffic.] (12-5-2005)
- S. Concrete Surface Coating shall be applied to the (entire concrete portion of bridge railing (including brush block,),(slab fascia,)(sidewalk fascia,)(underside of deck from slab fascia to fascia beam flange,)(exterior face and bottom of bottom flange of fascia beam). (See Special Provision for coating color.) (Concrete surface coating shall be [AMS-STD-595](#) color number [insert number], [insert color].) * The estimated area of coating is ____ syd. [Include any and all parts that are to be coated. Add sketch to plans for clarity if desired. *Specify color in note if Frequently Used Special Provision is not used.] (12-5-2005) (2-26-2018)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.09.03

Railing Replacement Notes

- A. The work covered by these plans includes replacing the existing curb or sidewalk with Bridge Barrier Railing, (Type 6) (Type 7) (Modified) and maintaining traffic. (11-25-2019)
- B. For molding, bevel, light standard anchor bolt assembly, and name plate details see Standard Plan B-103-Series.
- C. For guardrail anchorage, bridge railing and name plate mounting details, see Standard Plan B- __ -Series. (8-20-2009)
- D. Removal of existing guardrail is included in the bid item "Guardrail, Type ____". [Applies to projects where the quantity is low or is not included in road plans.]
- E. Measures shall be taken to prevent debris from falling from the structure. (*If debris falls into the waterway, it shall be removed within 24 hours. Since disturbance of the waterway bottom may be as harmful as the debris itself, the preventive measures must be effective.) Removal of debris will not be paid for separately but will be included in the bid item ("Structures, Rem") ("Structures, Rem Portions") ("Structures, Rehabilitation, Rem Portions"). [*Use for bridges over waterways.] (8-6-1992) (11-25-2019)
- F. The metal expansion joint shall not be coated except as follows, exposed metal surfaces at the concrete barrier shall be shop and field coated according to Subsections 716 & 715 of the Standard Specifications. (Included in the bid item "Bridge Joint, Revise Expansion Device".) [Use when revising existing metal expansion joints.]
- G. All steel for expansion joint shall be AASHTO M270, Grade 36. (9-18-1998)

8.09.03(continued)

Railing Replacement Notes

- H. Remove rail and posts from parapet railing and retain anchor bolts. (Included in the bid item, "Bridge Railing, Thrie Beam Retrofit".) [Use when circumstances such as sight distance or poor condition warrant rail and post removal.] (8-20-2009)
- I. The work covered by these plans includes (removing) (retaining) the existing railing and constructing a new concrete block retrofit railing, B-50-Series, at the curb line atop the existing sidewalk or brush block. (11-25-2019)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.09.04

Maintenance Painting Notes

- A. This bridge is coated with lead based paint. [Existing bridge was built before 1967, has never been repainted, and has the original paint system (i.e. not uncoated A588 steel).] (8-20-2009)
- B. This bridge is coated with lead based paint. The structural steel has been blast cleaned prior to coating. The additional effort to clean the structural steel will not be paid for separately but will be considered included in the bid items. [Existing bridge was built between 1967 and 1978, has never been repainted, and has the original paint system (i.e. not uncoated A588 steel).] (8-20-2009)
- C. This bridge is coated with a lead based coating system. The structural steel has been blast cleaned prior to coating. The additional effort to clean the structural steel will not be paid for separately but will be considered included in the bid items. [Existing bridge was repainted between 1967 and 1978.] (8-20-2009)
- D. This bridge is coated with a zinc based coating system. The structural steel has been blast cleaned prior to coating. The additional effort to clean the structural steel will not be paid for separately but will be considered included in the bid items. [Existing bridge was built after 1978, or was repainted after 1978. It does not have uncoated A588 steel.] (8-20-2009)
- E. This bridge has uncoated A588 structural steel. The additional effort to clean the structural steel and the additional coating material required due to excessive surface profile will not be paid for separately but will be considered included in the bid items. [Existing bridge has uncoated A588 steel.] (8-20-2009) (1-23-2012)

8.09.04 (continued)

- F. See Subsection 715 of the Standard Specifications for Protection of Work and Environment During the Blast Cleaning of Structures.
- G. ____ (conduits) (mains) shall (*not) be cleaned and coated. (*See Subsection 715 of the Standard Specifications.) [*Use for Johns Manville Transite (asbestos) ducts or when protective shielding is requested by the utility company.] (8-6-92)
- H. The contractor shall notify each utility company a minimum of three full working days in advance of work impacting that company's conduits or facilities. (8-20-2009)
- I. End diaphragms of spans ____ shall be removed to permit proper cleaning and coating. See Subsection 715 of the Standard Specifications. [Use when clearance between end diaphragms and backwall or adjacent diaphragms is 14" or less and the slab above the diaphragms is not to be removed.] (8-6-92)
- J. When hanger assemblies are not to be replaced, the existing paint under the link plates shall be protected from damage due to blast cleaning by inserting an approved material around the periphery of the link plates. The material shall be removed prior to coating. (Included in the bid item "Steel Structure, Cleaning, Type 4 (Structure No.).") (12-5-2005)
- K. The Engineer shall inspect the structural steel parts that have been blast cleaned for evidence of cracks or loss of section due to corrosion of more than 25 percent. Such deterioration shall be reported in writing to the Region Bridge Engineer. (9-2-2003)
- L. The estimated area of structural steel to be coated is ____ square feet.

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.09.04 (continued)

Maintenance Painting Notes

- M. Substructure Horizontal Surface Sealer shall be applied to the top of Abutment ___ (and __) (and the front face of the independent backwall). Vertical surfaces accidentally coated shall be cleaned at contractor's expense. [Use when there is a superstructure transverse joint directly above or the unit is adjacent to a pavement.] (12-5-2005)
- N. Substructure Horizontal Surface Sealer shall be applied to the top of (all) Pier(s) (___ & ___). Vertical surfaces accidentally coated shall be cleaned at contractor's expense. [Use only when superstructure transverse joints are directly above the pier.] (12-5-2005)
- O. Shear locks shall be removed by methods approved by Engineer before structure is blast cleaned. (Included in the bid item "Steel Structure, Cleaning, Type 4 (Structure No.).") (12-5-2005)
- P. The sign(s) over (description of location) shall be removed for cleaning and coating of the fascia beam(s). Sign(s) shall be reinstalled using new connection hardware according to Subsection 919.02 of the Standard Specifications. (Included in the bid items for cleaning and coating existing steel structures.) [Use where it has been determined that signs must be removed to allow cleaning and coating of fascia beams.] (9-18-98)
- Q. Sealant shall be applied around the perimeter of bearing plate to concrete contact surfaces after cutting away any protruding portion of lead plate. [Use when superstructure transverse joints are directly above pier or abutment.](9-18-98)
- R. Sealant shall be applied around the perimeter of bolted end diaphragm connection plates and angles. [Use when end diaphragms are under an open transverse deck joint.] (9-18-98)

8.09.04 (continued)

- S. Sealant shall be applied around the perimeter of all riveted girder plates and angles. [Use at riveted plate girders.] (9-18-98)
- T. Sealant shall be applied around the perimeter of all beam ends where encased in the backwalls. (9-18-98)
- U. Sealant shall be applied to the perimeter of all riveted (bolted) girder plate and angle contact surfaces at the outside face of the fascia beams for the entire length and at each girder end, below deck joints, for a total length of 5'-0" [Use at riveted or bolted plate girders on outside of fascia only.] (9-18-98)
- V. Blast clean and prime faying surfaces prior to erecting (diaphragms) (bent plates). This work is included in the pay items for cleaning and coating existing structural steel. [Use where project includes field coating and steel members will be added or replaced.] (9-18-98)
- W. Sealant shall be applied around the perimeter of riveted pin plates and stiffeners. (9-18-98) (11-26-2012)
- X. Sealant shall be applied around the connection of new structural steel member to existing structural steel member. (9-18-98)
- Y. The color of the urethane protective coat shall be light gray. [AMS-STD-595](#) color number 16440. [Use with shop or field coating. Check with Roadside Development Unit if other color is desired.] (5-1-2000) (11-28-2011) (10-23-2017) (12-26-2017)
- Z. The contractor shall take necessary measures to avoid overspray on adjacent substructure and superstructure concrete surfaces and on signs attached to the structure. (Included in the bid item "Steel Structure, Coating, Type 4 (Structure No.).") (12-5-2005)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.09.04 (continued)

Maintenance Painting Notes

AA. The plate surfaces of the main girder splices, and all other bolted connections unless noted otherwise, shall be coated according to subsection 716.03.B.2.a for Slip Critical Connections. Coated connections (faying surfaces) shall meet the minimum cure times according to the product qualification test and subsection 716.02 before connection assembly.
(8-20-2009)

BB. This bridge was coated with the following paint system:

Manufacturer: _____

Primer: _____

Intermediate(s): _____

Top Coat: _____

(This information is to be filled in by the Engineer when submitting "as constructed" plans.) [Add note to all painting projects.](11-28-2011)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.09.05

Hanger Assembly Replacement Notes

- A. The area within 3 feet each side of the centerline of the hanger assembly shall be coated prior to installing the new link plates and pins. Proposed link plates shall be shop coated. (Proposed stiffeners shall be field coated.) (12-5-2005)
- B. The protection of work and environment during blast cleaning of webs behind and around hanger assemblies shall be according to Subsection 715 of the Standard Specifications. (Included in the bid item "Hanger Assembly, Rem and Erect".) [Use even where the contract includes overall field coating.] (12-5-2005)
- C. The Region/TSC Soils Engineer shall be requested to perform a foundation inspection prior to the placement of the temporary support footing (or the "Embankment, Structure, CIP"). (12-5-2005)
- D. Welding on existing girders (beams) will not be permitted (except as noted).
- E. The end diaphragm shall be repaired after installation of the new hanger assembly as shown on the plans. [Use if diaphragm repair is required.]
- F. Timber shall be structural grade having a minimum flexural strength of 1,200 psi and a minimum horizontal shear strength of 100 psi.

8.09.05 (continued)

Hanger Assembly Replacement Notes

- G. Temporary supports shall not remain loaded for a period greater than four weeks. [Use when footing is placed on soil or paved surface.]
- H. Temporary concrete barrier shall be used to protect the temporary support as shown on the plans or as directed by the Engineer. [Use when protection of temporary support is not covered in maintaining traffic.]
- I. Alternate designs of the temporary support shall be based on loads as follows:

_____ tons vertical girder load.
_____ psf allowable soil pressure.

(8-20-2009)

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.09.06

Deck Replacement Notes

- A. Prior to the removal of any portion of the bridge superstructure, the contractor shall have the proposed sequence and method of removal approved by the Engineer. When removing the bridge deck, the use of machine-mounted hydraulic or pneumatic hammers will be restricted to those areas of bridge deck between the prestressed concrete beams. Manual pneumatic hammers shall be used to remove the bridge deck over the prestressed concrete beams. If diaphragms are to be removed, manual pneumatic hammers shall be used to remove the diaphragms. Manual pneumatic hammers shall be limited to 60 lbs. maximum. [Use when removing a bridge deck from a prestressed concrete beam structure.] (9-18-98)
- B. During the deck removal operation, care shall be taken by the contractor to avoid damaging the prestressed concrete beams, diaphragms, and backwalls that are not removed. Damage to the prestressed concrete beams, diaphragms, or backwalls caused by the contractors removal operation, shall be repaired by the contractor, at the contractors expense, using a latex modified patching mixture selected from the Qualified Products List. [Use when removing a bridge deck from a prestressed concrete beam structure.] (9-18-98)

8.09.07

Existing Plan Sheet Notes

- A. Do not work from this sheet. The information shown here is for reference only. No pay items are shown. [Use on existing plan sheets used for information only.] (9-18-98)
- B. The only items of work to be done from this sheet are identified by the legend box below, labeled with this project's job number. [Use on existing plan sheets used for removal and proposed work. Add the legend box below.] (9-18-98)

JOB NO. <New Number>	
	Proposed Work
	Denotes Removal Portions

- C. Only the hatched areas, indicating removals, are to be used for bidding purposes. [Use if just removals are shown, with no legend box.] (9-18-98)
- D. The bridge paint may contain lead. [Use on all projects with existing painted structural steel regardless of work type.] (8-20-2009)

8.10

STEEL REINFORCEMENT (9-1-88)

- A. Reinforcement shall be bundled and tagged as to the location as shown on this sheet.