



Road & Bridge Design Publications

Monthly Update – April 2016

Revisions for the month of **April** are listed and displayed below. The March special detail index will remain in effect. E-mail Road related questions on these changes to MDOT-Road-Design-Standards@michigan.gov. E-mail Bridge related questions to MDOT-Bridge-Design-Standards@michigan.gov.

Road Design Manual

14.31.01: Environmental Classification (PPMS Task 3150): This section was updated to current practice. Some existing information was placed into newly titled section “A”, “Preliminary Design Activity”. Other information, including a couple of new paragraphs, were placed into newly titled section “B”, “Mitigation Requirements”. Section “C”, “Special Design Considerations Memo”, contains new information.

Bridge Design Manual

8.02 F. (LFD & LRFD): Updated use statement to include hydro demolition.

Updates to MDOT Cell Library, Bridge Auto Draw Program, etc., may be required in tandem with some of this month's updates. Until such updates to automated tools can be made, it is the designer's/detailer's responsibility to manually incorporate any necessary revisions to notes and plan details to reflect these revisions.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.30 (revised 2-18-2010)

PRELIMINARY CONSTRUCTABILITY REVIEW

(PPMS Task Description 3565)

Constructability is taken into account during the scoping and early plan development process (and in conjunction with the [Early Project Scoping Constructability Checklist](#)). After the Job Concept Statement has been created in MPINS, the Project Manager/Concept Author should consult with the Region/TSC Delivery Engineer concerning items such as Coordinating with other Agencies, Permits, Staging, Maintaining Traffic, Site Investigation, and Right of Way. Much of the work under this task should occur before the Scope Verification Meeting. On small projects this task may consist of only the transmittal of base plans to the Resident/Delivery Engineer for comment. On large projects with complex staging, one or more meetings with the Resident/Delivery Engineer and Region/TSC Traffic and Safety Engineer may be required throughout this task. In both instances the review and incorporation of any comments must occur prior to Preliminary Plan Development.

14.31 (revised 3-26-2012)

ENVIRONMENTAL REVIEW AND CLEARANCE

Environmental review and clearance is a two step process: Environmental Classification (PPMS Task 3150) and Environmental Certification (PPMS Task 3155).

14.31.01 (revised 4-18-2016)

Environmental Classification (PPMS Task 3150)

Environmental Classification is required by the National Environmental Policy Act (NEPA). All projects must be reviewed for potential environmental impacts and classified according to the significance of those impacts. Class I Actions are those projects with significant environmental impacts and require the preparation of an Environmental Impact Statement (EIS). Class II Actions have minor or no environmental impacts and require Categorical Exclusion (CE) documentation (Form 1775). Class III Actions are projects where the significance of the impacts is not known and require the preparation of an Environmental Assessment (EA).

Most projects are classified as CEs. However, environmental review is still required to identify non-significant environmental impacts, and establish measures to mitigate those impacts. Measures to mitigate can include avoidance, design changes, protective measures, or replacement. Establishing mitigation measures can be complex and require coordination with state, federal and local resource agencies. Often, mitigation measures can be developed through collaboration between the Project Manager (PM) and MDOT Environmental Staff.

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14.31.01 (continued)

Environmental Classification

The Environmental Clearance Coordinator (ECC) will contact the PM about one year prior to the Base Plan Date (BPD), or upon notification of project programming (Form 2604) for projects of short development duration. The ECC will request information about the scope and location of the project. This information can include the extent of grading and filling, right of way requirements, detour information, etc., and is critical in assessing project environmental impacts. The project description, location, and other pertinent project information are put on the Environmental Classification (Form 1775). MDOT Environmental Staff may contact the PM for more details about the project in order to assess impacts.

Once impacts are assessed, collaboration occurs between the PM and MDOT Environmental Staff, to develop mitigation measures. The goal of collaboration is to develop measures that both allow the project to accomplish its transportation goal and minimize impacts to the environment. Once impacts are identified and mitigation measures established the project can be classified as a CE. The PM will be notified and the Environmental Classification (Form 1775) and supporting documentation will be stored in ProjectWise under the Project Job Number. Classification is also recorded in the MAP database (MPINS/MFOS/REMIS). Classification is scheduled to occur on or before the completion of Base Plan Review (PPMS Task 3380).

14.31.01 (continued)

A. Preliminary Design Activity

Prior to completions of the NEPA review process, preliminary engineering and other activities and analyses must not materially affect the objective consideration of alternatives in the NEPA review process. FHWA defines Preliminary Design as activities that define the general project location and design concepts. It includes, but is not limited to, preliminary engineering and other activities and analyses, such as environmental assessments, topographic surveys, metes and bounds surveys, geotechnical investigations, hydrologic analysis, hydraulic analysis, utility engineering, traffic studies, financial plans, revenue estimate, hazardous materials assessments, general estimates of the types and quantities of materials, and other work needed to establish parameters for the final design.

If the information required for classification requires engineering work or environmental coordination extending beyond the BPD, the PM must receive approval from the ECC to continue work limited to the following tasks:

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14.31.01A (continued)

Environmental Classification

Task	PPMS Tasks	Task Extension	Approval
Preliminary Plan Preparation	3500 Series	Up to Plan Review	ECC notification of approval by Bureau of Development Environmental Manager
Utilities/Railroad	3600 Series		
Mitigation/Permits	3700 Series		
Prepare/Review Final Traffic Signal Operations	3825		
Early ROW Work	4100 Series		
ROW Technical Work	4150 Series		
ROW Appraisal Work	4350 Series		
Safety and Mobility Peer Team Review	3800	Up to Plan Completion	ECC notification of approval by FHWA and Bureau of Development Environmental Manager
Conduct Final Geometrics and Roadside Safety Reviews	3810		
Geotechnical Design Review - Structures	3815		
Prepare/Review Final Traffic Signal Design Plan	3821		
Complete Permanent Pavement Marking Plan	3822		
Complete Non-Freeway Signing Plan	3823		
Prepare/Review Final Traffic Signal Operations	3824		
Complete the Maintaining Traffic Plan	3830		
Develop Final Plans and Specification	3840		
Develop Structure Final Plans and Specifications	3850		
Final Constructability Review	3860		
Project Plan Quality Assurance Review	3865		

The Bureau of Development Environmental Manager will report to FHWA each quarter of the fiscal year the number of projects that have allowed any of the tasks noted above to be performed before the environmental classification.

Final design or right of way acquisition cannot proceed prior to classification. FHWA defines final design as any design activities following preliminary design and expressly includes the preparation of final construction plans and detailed specifications for the performance of construction work.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.31.01 (continued)

Environmental Classification

B. Mitigation Requirements

Between base plans and quality assurance review, environmental mitigation measures are to be fully developed and detailed in the plan package.

Development of the materials necessary to convey the environmental mitigation measures within the Form 1775 will include but not be limited to:

- Project specific Plan Notes
- Notice to Bidders
- Unique Special Provisions

Design staff must take into account that individual pay items needing modification to meet the requirements of environmental mitigation measures require the inclusion of an appropriate unique or frequently used Special Provision to ensure proper construction.

The Form 1775 filled out by the ECC will have highlighted mitigation measures in bold text to signify that those measures are to be transmitted directly to the TSC Construction Engineer for the project.

Design staff will prepare a Special Design Consideration Memo to be transmitted to the Construction Engineer for their use at the Pre-Construction meeting. The memo should highlight the specific environmental mitigation measures in the plans and proposal and include construction specific instructions related to environmental mitigation highlighted with bold text in the Form 1775.

14.31.01 (continued)

C. Special Design Considerations Memo

Preparation of the Special Design Considerations Memo (SDCM) if applicable to the project will be started in a draft form by the PM and in coordination with design personnel once the PM is in receipt of the Environmental Classification (form 1775) from the ECC. This draft will include the bolded items from the 1775 form and any other design issues that may need special consideration to include but not be limited to:

- Environmental mitigation and restrictions.
- Property Owner Agreements from negotiations involving the purchase of Right of Way.
- Unique design features that must not be modified in construction.

The DRAFT SDCM should be submitted with The Plan Review Meeting material submittal for review. This is included in (Form 2913).

A final SDCM should be prepared and submitted with the OEC package and defined on (Form 0330). This final copy should be reviewed by the ECC and the Construction Engineer to resolve any potential conflicts with constructability.

Transmittal of the SDCM from the PM to the TSC Construction Engineer will occur between the OEC Meeting and the Pre-Construction Meeting. A potential reason to wait for final submittal of the SDCM would be to include any items of note that should be brought to the attention of the Construction staff and the Contractor due to plan revisions, addenda, and contractor inquiries that occurred during that time frame.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.31.01C (continued)

Environmental Classification

It will be the responsibility of the Project Manager and the ECC to ensure that all mitigation measures whether or not highlighted in bold on the Form 1775 are incorporated into the project plans and proposal.

The Construction Engineer will be responsible for ensuring that the contractor is made aware of all environmental mitigation measures and the consequences of not meeting them.

The environmental section of the Pre-Con Boilerplate has been written to ensure this Memo is read at that meeting.

14.31.02 (new section 3-26-2012)

Environmental Certification (PPMS Task 3155)

Environmental Certification is the final step in the Environmental Review and Clearance Process. This task takes place during Project Plan Quality Assurance Review (PPMS Task 3865). During Certification, plans and other documents are reviewed to ensure that all areas of concern are avoided, all mitigation measures are in place, and all commitments adhered to. This review is conducted by the ECC and documented (Form [2002](#)).

If all mitigation measures are in place and all commitments adhered to, the project will be certified. The PM will be notified and Environmental Certification Form (Form [2002](#)) and supporting documentation will be stored in ProjectWise under the Project Job Number. Certification is also recorded in the MAP database (MPINS/MFOS/REMIS).

MICHIGAN DESIGN MANUAL BRIDGE DESIGN

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.

- A. The design of (this) (these) structure(s) (except the railroad overpass(es) (is) (are) based on current AASHTO Standard Specifications for Highway Bridges (HS25) (HS20-44) (and alternate military*) loading. Live load plus impact deflection does not exceed (1/800) (1/1000) of span length (and (1/375) (1/300) of cantilever arm). The (Working Stress) (Load Factor) method of design was used for this structure. [*Use only for structures on interstate routes.] (9-18-98)
- B. The (reconstruction) (rehabilitation) design is based on current AASHTO Standard Specifications for Highway Bridges (HS25) (HS20-44) (and alternate military*) loading. Live load plus impact deflection does not exceed (1/800) (1/1000) of span length (and 1/375) (1/300) of cantilever arm. The (Working Stress) (Load Factor) method was used for this design. The original structure was designed for _____ (and alternate military) loading. [*Use only for structures on interstate routes.] [See Subsection 7.01.06 for deflection limits.] (9-18-98)

8.02 (continued)

- 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.
- 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 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)

**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 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)

8.02 (continued)

- G. The design of the structural members is based on material of the following grades and stresses:
- | | |
|--------------------------------------|--|
| Concrete: Grade S2 | $f'_c = 3,000$ psi |
| Concrete: Grade D | $f'_c = 4,000$ 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 | $f'_s = 270,000$ psi |
| | (12-5-2005) (11-28-2011)(11-24-2014) |
- 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)