Revisions for the month of December are listed and displayed below. They will be included in projects submitted for the April letting. The special detail index from October 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

Chapter 14 (Complete Replacement minus appendices): Revised the chapter in numerous locations to implement the Final Project Coordination (FPC) milestone and the Design Project Submittal - Certification Acceptance form. Implementation will be according to Chief Operations Officer, Tony Kratofil’s November 28, 2018 memo announcing these process improvements. Also, updated work type codes and descriptions, replaced PPMS Tasks with PPD Tasks, and revised AASHTOWare and PlanisWare references to reflect current software. For information regarding projects using the old process, contact the Standards Unit to view the prior version of Chapter 14.

14.03.03: Added a threshold for changes to original project budget for which approval to the fiscal year STIP may be required.

14.41.01: Added a statement that requests for agreements be submitted to the Governmental Trunkline Engineer at the e-mail address listed.

Bridge Design Manual

Chapter 2 & 3: An extensive update to Chapters 2 & 3 (complete replacement) has occurred. The major changes are described below. If no change is documented or dated, it is not considered major but in no way is any less important. Non-documented changes include updates to sections and areas within MDOT, additional or documented responsibilities for positions within MDOT, updates to procedural and submittal requirements (“shall” changed to “must” or “will”).

Chapter 2 Table of Contents: Added section 2.02.19, “Final Project Coordination (FPC) Meeting” and renumbered remaining sections in 2.02.

2.01.06, 2.01.07, 2.02, 2.02.02, 2.02.05, 2.02.09, 2.02.10, 2.02.13, 2.02.14, 2.02.15, 2.02.17, 2.02.18, 2.02.21, 2.03.02, 2.04.03, 2.04.05: Updates to sections and areas within MDOT, additional or documented responsibilities for positions within MDOT, updates to procedural and submittal requirements (“shall” changed to “must” or “will”).
2.02.14, 2.02.15, 2.02.18, 2.03.05, & 2.05.05 D.: Updated to JobNet, Preconstruction Process Documentation (PPD) and PlanisWare.

2.02.16: Distribute Plan Review materials 20 working days prior to meeting.

Chapter 2 Table of Contents, 2.02.16, .17, & .18: Updated title to “The Plan Review Meeting”.

2.02.19 & 2.02.20: See below. New/updated Sections.

2.02.21: Moved “Rehabilitation Project Scoping” to new section.

2.04.03: Updated man hour estimating.

2.05.03 C.4. b.: Clarified QC procedures for previously approved special provisions.

2.05.05 B.: Included reference to Road Design Manual Chapter 11.

Chapter 3 Table of Contents: Updated sections to reflect addition of Final Project Coordination (FPC) and Plan Completion (OEC and Certification Acceptance). Deleted section 3.02.03 and Programmed Cost Estimates becomes section 3.05.

3.01: Updates to sections and areas within MDOT, additional or documented responsibilities for positions within MDOT, updates to procedural and submittal requirements (“shall” changed to “must” or “will”).

3.01.01: Updated composition of information for Study Plans.

3.02.01: Updated composition of information for Preliminary Plans.

3.02.03: Section deleted.

3.02.04: Updates additional or documented responsibilities for positions within MDOT. Updated title to “The Plan Review Meeting”. Added ProjectWise requirements and electronic notification or invitation requirements for The Plan Review Meeting.
2.02.19, 2.02.20, 2.05.03 D., 3.03, 3.03.01 & 3.04: Implement the Final Project Coordination (FPC) milestone and the Design Project Submittal - Certification Acceptance form. Implementation will be according to Chief Operations Officer, Tony Kratofil’s November 28, 2018 memo announcing these process improvements. For information regarding projects using the old process, contact the Standards Unit to view the prior version of Chapter 3 and prior version of Road Design Manual Chapter 14.

3.04.01: Update plan composition for Final Plans.

3.04.02: Updates additional or documented responsibilities for positions within MDOT, updates to procedural and submittal requirements (“shall” changed to “must” or “will”).

3.05: Moved “Programmed Cost Estimates” to new section.

Effective immediately, MDOT is discontinuing the use of transversely post-tensioned, prestressed concrete side-by-side box beams as a superstructure alternative for MDOT trunkline bridges. This will only apply to MDOT trunkline projects, and not local agency projects. The following guides will be deleted or have modifications based on this change. The deleted guides will be posted as an archived material for use in rehabilitation, CPM and local agency projects. Holders of paper manuals may want to retain the deleted guides for their use. The deleted guides will not be updated(maintained).

This will also affect the Bridge Design Manual. The sections listed below were modified(updated) to reflect the change.

Deleted Bridge Design Guides:

- 6.29.06A Bridge Railing, 2 Tube on Prestressed Box Beam Deck
- 6.29.09E Bridge Barrier Railing, Type 4 on Prestressed Box Beam Deck
- 6.29.10D Aesthetic Parapet Tube Railing on Prestressed Concrete Box Beam
- 6.29.17A Bridge Railing, 4-Tube Bicycle Railing Option on Prestressed Box Beam Deck
- 6.60.11B Pier for Prestressed Concrete Box Beams for Live Load
- 6.65.12 Prestressed Concrete Box Beam Details
- 6.65.13 Prestressed Concrete Box Beam and Post - Tensioning Details
- 6.65.13A Prestressed Concrete Box Beam and Post Tensioning Details
Modified Bridge Design Guides:

Table of Contents: Deleted guides mentioned above.

6.65.02  Prestressed Concrete 12" & 17" Box Beam Properties
6.65.02A  Prestressed Concrete 21" & 27" Box Beam Properties
6.65.02B  Prestressed Concrete 33", 39" & 42" Box Beam Properties
6.65.10  Prestressed Concrete Box Beam Reinforcement Details
6.65.10A  Prestressed Concrete 3' Wide Box Beam Reinforcement Details
6.65.10B  Prestressed Concrete 4' Wide Box Beam Reinforcement Details
6.65.10C  Prestressed Concrete 4' Wide Box Beam Reinforcement Details
6.65.10D  Prestressed Concrete 4' Wide Box Beam Reinforcement Details
6.65.10E  Prestressed Concrete Box Beam Double Stirrup Details
6.65.11  Prestressed Concrete Box Beam Reinforcement Details
6.65.12A  Prestressed Concrete Box Beam Details - Spread Box Beams
6.65.14  Prestressed Concrete Beam Lifting Device Details

Modified Bridge Design Manual Sections:

7.01.15 (LFD & LRFD): Deleted reference to side by side box beams in second paragraph.

7.01.19 B.2.b(4) (LFD & LRFD): Deleted decked side-by-side box beams and renumbered remaining sections.

7.02.03 A 1. & 2. (LFD & LRFD): Deleted side by side box beams as a beam alternative and renumbered remaining sections.

7.02.18 A. 5. (LFD & LRFD): Deleted third paragraph & reference to side by side box beams.

7.02.18 B. 2. & 3. (LFD & LRFD): Deleted reference to side by side box beams.

7.02.18 B. 5., .6 & 7. (LFD & LRFD): Deleted old section 5 regarding transverse post tensioning, made editorial changes to new section 5 and renumbered remaining sections.

8.07.04 I., L. & M. (LFD & LRFD): Deleted notes I. and L. and deleted reference to “Prest Conc Deck, _____inch” pay item in note M.

Additional Bridge Design Manual Updates:

8.07.04 N. (LFD & LRFD): Deleted note N., the information is in the MDOT Standard Specifications for Construction.
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.
PROCEDURES FOR PLAN PREPARATION

14.01 GENERAL

14.02 DESIGN PACKAGE EVALUATIONS

14.03 ESTIMATES

14.03.01 Definitions

14.03.02 Program Estimates

14.03.03 Preliminary Estimates

14.03.04 Engineer's Estimate

14.04 Section Deleted

14.05 PROJECT STUDY TEAM

14.06 PROJECT ASSIGNMENT

14.07 PROJECT NUMBERS

14.07.01 Work Type Codes and Descriptions

14.08 ACTIVATION OF “PE” / “PE-S” PHASE

14.09 MDOT OVERSIGHT / FHWA OVERSIGHT
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14.10 SCOPE VERIFICATION MEETING
14.11 DESIGN EXCEPTIONS / VARIANCES
14.12 REQUEST FOR SURVEY / MAPPING
  14.12.01 Road
  14.12.02 Bridge
14.13 PROJECT AREA CONTAMINATION SURVEY
14.14 REVIEW / REVISE PLANISWARE NETWORK
14.15 CHANGE REQUEST (REVIEW OF PROJECT SCOPE, COST AND SCHEDULE)
14.16 REQUEST FOR UTILITY INFORMATION
14.17 FAA OBSTRUCTION EVALUATION
14.18 PAVEMENT DESIGN
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  14.21.01 Review by Bridge Design
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14.26 DISTRIBUTION OF PRELIMINARY PLANS TO UTILITIES AND UTILITY COORDINATION MEETING
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14.31 ENVIRONMENTAL REVIEW AND CLEARANCE

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14.32 MDOT ENVIRONMENTAL PERMITS

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14.32.04 Duration

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14.33 PRELIMINARY ROW SUBMITTAL

14.34 Section Deleted

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14.36 THE PLAN REVIEW

14.36.01 Requirements

14.36.02 Procedure

14.37 REVIEW OF PROJECT SCOPE, COST AND SCHEDULE

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14.41.02 Estimates
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14.41.04 Maintenance
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14.41.11 Special Maintenance and Operational Obligations
14.41.12 Michigan Institutional Roads (MIR Program)

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14.49 CRITICAL PATH NETWORKS

14.50 FINAL CONSTRUCTABILITY REVIEW

14.51 INCENTIVE AND LIQUIDATED DAMAGES CLAUSES

14.51.01 Guidelines

14.51.02 Applications

14.51.03 Procedure

14.52 REVIEW OF PROJECT SCOPE, COST AND SCHEDULE

14.53 Section Deleted

14.54 FINAL PROJECT COORDINATION (FPC)

14.54.01 Requirements

14.54.02 Procedure

14.54.03 Attendees

14.55 CONTRACT SELECTION TEAM (DBE PROGRAM)

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14.58 APPROVAL OF SPECIAL PROVISION

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14.60 SUBMISSION OF COMPLETED PLANS

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14.60.03 Exceptions

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14.61 PRE-LETTING BRIEFING / PRE-BID MEETING
14.61.01 Procedure

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14.73.03 As Built Turn in Process
14.73.04 Design Division Review and Approval Process

14.74 DOCUMENT RETENTION
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APPENDIX B – CRITICAL PATH CONSTRUCTION TIME ESTIMATES

APPENDIX D – LIST OF ACRONYMS
CHAPTER 14
PROCEDURES FOR PLAN PREPARATION

14.01 (revised 12-17-2018)

GENERAL

The following list is a basic outline of the road design plan development process. The sequence is not intended to be a rigid format that must be adhered to, but instead, a guide that is flexible enough to apply to all projects. Small projects may not require all the steps, whereas, large projects may require additional meetings, reviews, etc. to properly develop a complete plan/proposal package with input from all the appropriate disciplines. Project Managers should consider value added versus resources expended when omitting, revising, or adding steps to the process.

Numbers in parentheses after a heading refer to a corresponding or similar PPD (Preconstruction Process Documentation) Task Number and/or Milestone Number. For additional information, reference to the PPD Task Manual and individual task descriptions is encouraged.

14.02 (revised 2-26-2018)

DESIGN PACKAGE EVALUATIONS

The Design Package Evaluation (DPE) system has been retired and no longer exists. There is no replacement system at this time.

14.03

ESTIMATES

14.03.01 (revised 12-17-2018)

Definitions

AASHTOWare Project (AP) Preconstruction - AP Preconstruction is an AASHTO software system used for managing transportation programs and is a series of computer program modules. It is used to record and analyze data from the design, estimating, letting, award, and construction processes. MDOT has adopted the following modules at this time.

a. Construction and Administration System (CAS) - Is used by construction and utilizes Field Manager to track pay items and quantities in construction.

b. Decision and Support System (DSS) - Is used by the Specifications and Estimates Unit to analyze bid data and to determine average unit prices (bid-based prices) when generating detailed cost estimates.
Definitions

Program Estimates - Cost estimates made prior to the assignment of a project for preliminary and final design.

Preliminary Cost Estimates - Cost estimates made at any time during plan development but prior to plan completion.

Engineer's Estimate - Cost estimate based on final quantities reviewed by the Specifications and Estimates Unit of the Design Division.

Pay Item - The name used to describe an item of work for a project.

Unit Price - The price estimated as the cost to complete one unit of a pay item.

Pay Item Number - A standard pay item number assigned to a pay item for use in AP Preconstruction and other automated systems.


Method of Measurement - The method used to measure material or work used on a project. Measurement can be by unit, lump sum, or at times included in the measurement for other items.

Program Estimates

Original program estimates are usually made by Region/TSC personnel during the "Call-For-Projects" stage. These early estimates are broken down by major work items, such as; grading, pavement and shoulders, safety items, utilities, drainage, and so forth. Program estimates should be as complete and accurate as possible using such data as type of project, length, historical data, special features, etc. The program estimate is used by the Bureau of Transportation Planning to budget money for the project.

AP Preconstruction is available for use by Region System Managers and Region/TSC Design Engineers when preparing cost estimates. These program estimates are sent to Lansing with the Call-For-Projects submittals. When preparing these program estimates, only major pay item quantities would be estimated and inserted into the program under the proper code number. The resulting construction cost could then be adjusted to include miscellaneous unnamed pay items and for inflation. Use of AP Preconstruction would ensure that uniform and current unit prices would be used by all Region/TSCs for program cost estimates.

Program estimates should be reviewed by the Design Unit upon project assignment and during scope verification. This review should determine any obvious errors or omissions and/or if the estimate is reasonable. If the estimate is not reasonable, the Region/TSC or the author of the scope needs to obtain an approved cost increase or decrease, or re-scope the project. This needs to be completed before beginning the design.
Preliminary Estimates

Preliminary estimates are made periodically throughout the design of the project to update the estimated cost. Design revisions, changes in scope, and changes in project limits all can contribute to increases or decreases in the cost of the project. Changes in cost should be reviewed with the Region System Manager. If the change is sizable, a request to increase or decrease the programmed amount should be sent to the Bureau of Transportation Planning. Increases should be requested as early as possible to avoid a project delay. If the change to the original project budget varies more than ten percent, an approval to the Fiscal Year STIP may also be needed.

14.03.04

Engineer’s Estimate

The Engineer's Estimate is the final cost estimate prepared by design before letting. The estimator uses the final quantities, plans and proposal material to estimate the unit prices and project costs. This is the official estimate used by the Department to determine if the low bid is reasonable.
MICHIGAN DESIGN MANUAL
ROAD DESIGN

14.05

PROJECT STUDY TEAM

A Project Study Team is normally formed for all New Routes/Increased Capacity projects and comprises representatives of a number of divisions from various bureaus within MDOT, as well as the FHWA. The purpose of the team is to develop improvement alternatives for evaluation based on environmental, social, community and regional planning, engineering, traffic operations, safety, construction and right of way cost criteria. The goal of the Study Team is to reach a consensus, based on the evaluation of alternatives, on a recommended course of action for MDOT management approval. The recommendation must be consistent with MDOT strategies and goals.

The Study Team Chairperson is the Project Manager who is responsible for assembling the Project Study Team and who is usually from the Project Development Section of the Design Division. The Road Design Representative on the Study Team will normally be a Design Engineer-Road. The assignment is made similar to that described in Section 14.06 (Project Assignment) of this chapter.

The Road Design Representative is assigned to a Project Study Team to provide practical design information during the Early Preliminary Engineering phase (EPE) when alternatives are developed and analyzed. The Road Design Representative on the Study Team will review all proposed alternatives and recommendations based on criteria of Design Standards and Guides, professional judgement, and construction procedures, and provide studies and cost estimates as may be required. As a Project Study Team member, the Road Design Representative fills an important role in the consensus building process. Such involvement and knowledge of a project’s development during the EPE phase can be an invaluable tool since often the Design Engineer-Road is assigned the project once the Preliminary Engineering phase (PE) is initiated.

14.06 (revised 2-26-2018)

PROJECT ASSIGNMENT

MDOT projects that are ready to be designed are sent to the Region System Manager, who determines whether the project is to be designed by a Region/TSC design unit or by a consultant. The project is then assigned and authority transmitted through JobNet to the appropriate Design Unit.

The Design Unit should check the Design Division correspondence files for any pertinent documents that may impact the design of the project. Also, the Design Unit should check to see that all information in both JobNet and Phase Initiator is complete and correct on the electronic data screens for the project.
PROJECT NUMBERS

A project identification system is used to identify projects. A typical project identification would be: NH50022-05675-PE.

**Funding Identity:** “NH” identifies the funding category to which the project is being charged. See the Financial Systems Codes for a list of funds. (MDOT only, consultants contact your Project Manager)

**Control Section:** “50022” The first two digits identify the county (50-Macomb) and, in conjunction with the last three digits, define a specific section of trunkline, as shown in the Control Section Atlas-Report No. 42.

**Job Number:** “05675” A number assigned sequentially by JobNet. The digits in the number have no significance.

**Phase:** A phase designation identifies the stage of the project development process.

Additional information

1. A job number cannot be charged against until Phase Initiator indicates the "PE" or "PE-S" phase has been authorized with a chargeable account number and the Phase shows as “Active” vs “Programmed” in JobNet.

2. Time spent developing ROW plans is charged against the project "ROW" phase.

3. FHWA has agreed that the "PE" or "PE-S" phase can be charged against up to one month after the letting date (PE end date in JobNet).

4. Charges occurring after the Pre-Construction Meeting should be made against the "CON" phase.

The proper use of phases is outlined in the following table.
## PROJECT NUMBERS

<table>
<thead>
<tr>
<th>Phase</th>
<th>Phase Name</th>
<th>Description</th>
<th>Examples / Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPE</td>
<td>Early Preliminary Engineering</td>
<td>Work related to environmental clearance and classification of the project.</td>
<td>Note: design survey work can also be included in the PE or <strong>PE-S</strong> Phase.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Or Work related to study type projects.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Or Work related to the design survey of the project.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Or Work related to the scoping of the project.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Or Work related to the operation of a transportation system component.</td>
<td>Traffic Operations Center (TOC) operations or maintenance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Or Work that does not readily fit other phase definitions.</td>
<td></td>
</tr>
<tr>
<td>CON</td>
<td>Construction</td>
<td>Work related to the physical building of transportation system component.</td>
<td></td>
</tr>
<tr>
<td>ROW</td>
<td>Real Estate</td>
<td>Work related to the appraisal and acquisition of right-of-way necessary to construct a project, including planning and condemnation activities, and the relocation of displaced persons and personal property.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Or Work related to the demolition of or preparation of property to construct the project.</td>
<td></td>
</tr>
<tr>
<td>PE</td>
<td>Road Preliminary Design</td>
<td>Work related to the construction design of the road (non-structure) portion of the project.</td>
<td></td>
</tr>
<tr>
<td>PE-S</td>
<td>Structure Preliminary Design</td>
<td>Work related to the construction design of the structure portion of the project.</td>
<td>Note: JobNet requires a structure number.</td>
</tr>
<tr>
<td>UTL</td>
<td>Utility – Reimbursable Relocations</td>
<td>Work related to the project’s reimbursable utility relocations.</td>
<td></td>
</tr>
</tbody>
</table>
Work Type Codes and Descriptions

Each project is assigned a three digit work type code during the Region Call-for-Projects process. These work types exist in JobNet, and are provided here via Planisware for reference. They may change over time. The numbers correspond to the work descriptions listed below:

**PRESERVATION**

**Traffic Operations**

- 100 Raised Pavement Marking
- 110 Signing Replacement
- 111 Pavement Marking
- 112 Traffic Signals
- 113 Cantilevers/Trusses
- 114 Sign Replacement
- 264 Transit Operations
- 687 Delineation
- 688 Pedestrian Improvements

**Safety**

- 101 Relocate Roadside Obstacles
- 102 Rumble Strips – Shoulder
- 103 Intersection Geom. Imp. For Signals
- 104 Add Turn Lanes for Traffic Volumes
- 105 Vert/Horiz Alignment Revisions
- 120 Intersection Revisions
- 121 Lighting
- 122 Median Barriers
- 123 Guard Rails and Attenuators
- 126 Obstacle Removal
- 127 Culvert Extensions
- 128 Safety Upgrading-Slope Flattening
- 129 Widening for Accident Reduction
- 615 Security or Surveillance System
- 690 Centerline Rumble Strips
- 691 Segment Geom. Imp. for Safety
- 692 ADA Ramps

**Railroads**

- 124 RR Xing Imp & Safety Devices
- 630 Grade Crossing
- 633 Railroad Miscellaneous
- 635 Railroad Track
- 637 Rehabilitate Spurs

**Bridge Preservation**

- 115 Superstructure Repair
- 116 Substructure Repair
- 117 Substructure Replacement
- 130 Deck Replacement
- 135 Widening-Maintain Same # of Lanes
- 137 Superstructure Replacement
- 139 Miscellaneous Rehabilitation
- 152 Culvert Rehabilitation
- 234 Miscellaneous Replacement
- 417 Overlay – Shallow
- 420 Scour Protection
- 424 Overlay – Deep
- 434 HMA Overlay w/Waterproofing Mem.
- 452 Culvert Replacement
- 618 Bridge Barrier Railing Replace
- 621 Superstructure Repair Steel
- 622 Superstructure Repair Concrete

**Road Restoration and Rehabilitation**

- 140 Two Course HMA Resurfacing
- 141 Bit Resurfacing and HMA Shoulders
- 142 Bit Resurface-Mill and/or Pulverize
- 143 Bit Resurface and Minor Widening
- 144 Thin Concrete Overlay (<=4")
- 145 Concrete Overlay (> 4")
- 146 Bit Resurface and Drain Improvements
- 147 Bit Resurface and Curb And Gutter
- 148 Reconstruct Non-Freeway
- 149 HMA Resurfacing (One Course)
- 151 Shoulder Work
- 153 Pumpstation Rehabilitation
- 156 Unbonded Concrete Overlay
- 157 Asphalt Pavement Repair
- 158 Longitudinal and Transverse Joint Repairs
- 159 Minor Rehabilitation
- 165 Concrete Pavement Inlay
- 166 Concrete Pavement Repair
- 167 Crush & Shape & Asphalt Resurface
- 168 Cold In-Place Recycle & HMA Resurf
- 169 Conc Pavt Rubblize & HMA Resurf
- 170 Major Rehabilitation
- 199 General Miscellaneous
- 250 Multi-Course HMA Overlay
- 251 Multi-Crs HMA Over Composite Pavt
- 684 Mill and two Course HMA Overlay
- 685 Three Course Asphalt Resurfacing
- 693 Maintaining Traffic
- 695 Drainage Improvement
- 696 Curb and Gutter
### Work Type Codes and Descriptions

#### Reconstruction
- 160 Reconstruction
- 162 Interchange Reconstruction Only
- 163 Concrete Reconstruction
- 164 Asphalt Reconstruction

#### Minor Widening
- 171 Left Turn Lane
- 172 Right Turn Lane
- 173 Additional Lanes – Up to ½ mile
- 174 Passing Relief Lanes

#### Roadsides and Landscaping
- 183 Rest Area/Welcome Center Rehab
- 185 Misc. Roadside
- 186 Resurface Parking Area
- 187 Weigh Station Modernization
- 188 Landscaping Replacement
- 189 Streetscaping
- 191 Carpool Lots - Expansion
- 192 Drainage Assessments
- 198 Wetland Mitigation
- 240 Landscaping - Improve
- 241 Facility Expansion
- 242 New Non-Motorized Path
- 243 Parking Area Expansion
- 244 Sound Barrier Rehabilitation
- 245 Fence Upgrading
- 246 New Carpool Lots
- 247 Rest Area Repair/Rebuild
- 248 Weigh Station Replace or Rehab

### IMPROVE/EXPAND CAPACITY

#### Road
- 190 Non-Motorized Path Rehabilitation
- 210 Add one or more Lanes over ½ mile
- 212 Recon & Add Lanes over ½ mile
- 213 Interchange Redesign and Upgrading

#### Roadsides and Landscaping
- 243 Parking Area Expansion
- 244 Sound Barrier Rehabilitation
- 245 Fence Upgrading
- 246 New Carpool Lots

#### Bridge
- 221 Bridge Replacement
- 230 Bridge Widen and Add Lanes

#### Railroads
- 636 New Spurs
## Work Type Codes and Descriptions

### NEW ROUTES/STRUCTURES

#### Road

- 308 Wetland Mitigation for New Route
- 310 New Road
- 317 Landscaping New Facility

#### Relocation

- 320 New Road – Relocate Existing Route
- 321 New Structure on Relocated Route

#### Bridge

- 311 New Structure on New Road
- 340 New Interchange on Existing Route
- 341 New Structure on Existing Route

#### Roadsides and Landscaping

- 312 New Sound Barrier – Type II
- 313 New Rest Area
- 314 New Welcome Center
- 315 New Weigh Station
- 316 New Sound Barrier – Type I
- 331 Rest Area on New or Relocated Route
- 332 Welcome Center
- 333 Weigh Station
- 335 Landscaping New Facility

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## Preventative Maintenance and Miscellaneous

#### Road

- 186 Resurface Parking Area
- 400 Multiple Course Chip Seal
- 401 Cape Seal
- 402 Fog Seal
- 403 Diamond Grinding
- 404 Partial Depth Conc Pavt Repair
- 405 Overband Crack Fill
- 406 Concrete Crack Sealing
- 407 Ultra-Thin Bit Overlay (<0.75)
- 408 Cold Milling & Overlay (<1.5)
- 409 Hot In-Place Asphalt Recycling
- 410 Single Course Micro-Surfacing
- 411 Multiple Course Micro-Surfacing
- 412 Concrete Joint & Surface Spall Repair
- 413 Dowel Bar Retrofit
- 414 Paver Placed Surface Seal
- 415 Concrete Pavement Restoration
- 416 New Treatment Tech – Conc Pavts
- 440 Single Course Chip Seal
- 441 Slurry Seal
- 442 Skip Patching
- 443 Bituminous Overlay (<1.5)
- 444 Profile Milling
- 450 Full Depth Concrete Pavement Repair
- 451 Bituminous Shoulder Work
- 453 Underdrain Outlet Repair & Cleaning
- 454 Shoulder Slurry Seal
- 455 Shoulder Chip Seal
- 456 Bituminous Crack Treatment
- 457 Concrete Joint Resealing
- 459 New Treat Tech - Flex & Comp Pavts
- 499 Scoping
- 639 Real Estate Activities
- 686 Cold Milling
- 689 High Friction Surface
- 694 Carpool Lots Preservation
14.07.01 (continued)

Work Type Codes and Descriptions

**Bridge**

418  Overlay - Epoxy
419  Deck Patching
421  Miscellaneous Bridge Cpm
422  Painting Complete
423  Pin & Hanger Replacement
430  Joint Replacement
431  Substructure Patching
432  HMA Cap (No Membrane)
433  Painting - Zone
460  Superstructure Wash
461  Vegetation Control
462  Drain System Clean/Repair
463  Paint Spot
464  Joint Repair
465  Concrete Surface Coating
466  Crack Sealing
467  Minor Concrete Patching
468  Approach Pvmnt Relief Jts
469  Slope Paving Repair
470  Miscellaneous Bridge
471  New Technologies
472  Bridge Inspection
474  Bridge Removal
475  Special Needs
476  Miscellaneous Bridge CSM
479  Healer Sealer
467  Deck Patching - Full Depth
619  Bridge Barrier Railing Repair
620  Thrie Beam Retrofit
623  Bridge Approach
624  Metal Mesh Panels

**Rail**

477  Railroad Oversight
478  Relocation Of Railroad Facilities
634  Rail Structures

14.08 (revised 12-17-2018)

**ACTIVATION OF “PE” / “PE-S” PHASE (PPD Task Description 2560)**

Once an assignment is made, the Project Manager must activate funding for that project prior to charging any costs to the project. This is done by accessing Phase Initiator and entering additional information and/or revising existing information previously entered into the system. Information that may be added/revised includes:

- Job Location
- Character of Work
- Type of Job
- City
- County
- Urban Area
- Type of Highway
- Type of Improvement
- Length
- Highway System

14.09 (revised 7-23-2018)

**MDOT OVERSIGHT / FHWA OVERSIGHT**

Section 14.09 is currently under review to adopt revised oversight definitions and procedures. Oversight responsibility for individual project elements is determined exclusively for each project and mutually agreed on by MDOT and FHWA. Any questions regarding the status of projects should be directed to the appropriate FHWA Area Engineer.
14.10 (revised 12-17-2018)

SCOPE VERIFICATION MEETING
(PPD Task Description 3130)
(PPD Milestone 312M)

Once a project is assigned, the Project Manager/Cost and Scheduling Engineer should request from the office that scoped the project, a copy of the scoping documents. These documents may include such items as a completed copy of the appropriate scoping forms and checklists, the project concept statement, pavement coring information, a cost estimate, a sketch of the proposed typical cross section(s), and a preliminary survey. The initial Planisware Network should also be available. The Project Manager will then gather the necessary old plans, utility information, traffic data, and other useful background information and develop a preliminary cost estimate and compare it to the programmed cost. When sufficient information is available, the Project Manager will schedule the Scope Verification Meeting.

If this preliminary estimate differs significantly from the programmed cost, the Project Manager should discuss increasing the programmed cost, changing the scope of work, and/or reducing the project limits at the Scope Verification Meeting. Consensus should be reached at, or as soon as possible after, this meeting to minimize lost design time and to avoid a possible delay of the project.

Prior to or at the Scope Verification Meeting the Project Manager should verify that the “Pavement Design and Selection Policy” has been followed as described in Section 6.01.06. Depending on the type of fix and estimated paving cost, a Life Cycle Cost Analysis (LCCA) may also be required. If the procedure has not been followed, the Project Manager should contact the Pavement Design Engineer or Region/TSC Soils Engineer to initiate adherence to the policy.

In order to ensure that everyone understands and agrees with the proposed scope of work, it is essential that all the disciplines and work centers that will be involved in the development of the project be invited to this meeting. This will minimize possible “scope creep” and reduce the number of redesigns by verifying and documenting the scope of work as early as possible in the design process. Recommended attendees include:

- Project Manager/Cost and Scheduling Engineer
- Unit Leader(s)
- Environmental - Project Planning Division (BTP)
- Geometrics Unit
- Construction Field Services Division
- FHWA (FHWA Oversight)
- System Manager
- Region/TSC
  - Design/Development Engineer
  - Operations Engineer
  - Soils/Materials
  - Utilities/Permits
  - Construction Engineer
  - Maintenance
  - Development Services Division (if applicable)
  - Survey (if Right of Way is to be acquired or as otherwise applicable)

The Project Manager will write and distribute the meeting minutes. Copies should be sent to the Region/TSC System Manager, the Environmental Section in the Bureau of Transportation Planning and all attendees to the meeting.

If this meeting results in a revised scope of work and/or an increase in the project cost, it is the responsibility of the office that originally scoped the project to revise the project scope and/or schedule and request reprogramming of the project.
14.10 (continued)

SCOPE VERIFICATION MEETING

**NOTE:** At this stage, the Project Manager should check to see if the project is required to be on the STIP (Statewide Transportation Improvement Plan). This may be done by accessing: JobNet

<table>
<thead>
<tr>
<th>Job/CR Search (enter job number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved Job</td>
</tr>
</tbody>
</table>

The **S/TIP Indicator** shows if the project is required to be on the STIP or TIP. The Phase tab in JobNet shows the S/TIP Cycle each phase is proposed for and the status. Project Managers needing clarification concerning the status of the STIP should contact the Region Planner or Statewide Planning Section of the Statewide Transportation Planning Division in the Bureau of Transportation Planning.

14.11 (rev. 4-17-2017)

DESIGN EXCEPTIONS / VARIANCES

After the scope verification meeting is held and the project scope has been agreed upon, the Project Manager should identify any Design Exceptions or Variances (DE or DV) to MDOT standards that will be utilized in the design of the project (See Section 3.08.01E). Exceptions and Variances to MDOT design standards should be identified, and, ideally, completed during the scoping process. However, if this has not been done, a Design Exception Request (Form DE26) or Design Variance (Form DV26) should be completed. The Project Manager should consult with the Geometrics Unit of the Design Division when identifying and developing justification for design exceptions or variances. Previously completed Design Exceptions / Variances should also be reviewed for accuracy and revised at this time.

The Project Manager should request that Design Exception/Variance folders be created in ProjectWise under the project number by e-mailing MDOT-ProjectWise@michigan.gov with a link to the project or by providing the TSC and the Job Number. Consultant access to ProjectWise should also be requested at this time, if necessary. Two DE folders (MDOT and PoDI) and one DV folder will be created for each project, based on possible oversight type of Design Exception or Variance. The folders will be located under “Supporting Documents” and “Design Exception” or “Design Variance”. For each design exception/variance submitted, the Project Manager should place a single Adobe (.pdf) file (no attachments) containing the Design Exception or Design Variance Form, a site specific crash analysis, and other supporting documents into the folder which matches the project oversight Design Exception type or Design Variance. The Design Exception or Design Variance Form should be flattened or printed to Adobe (no longer fillable). However, the Project Manager should also save a copy of the fillable form for future
14.11 (continued)

DESIGN EXCEPTIONS / VARIANCES

revisions. Changing the "state" of the document to "next" will shift control of the DE document to the Design Exception Coordinator for comments or the DV document to the Region Associate Engineer Development. The Project Manager should address the e-mail that appears after changing state, to the appropriate recipient (DE Coordinator for DE or Region Associate Engineer, Development for DV while maintaining the E-ProjectWise address) to indicate that a Design Exception or Variance has been submitted. A similar return e-mail indicates that control has shifted back to the Project Manager with comments provided. Revised documents should be inserted into the Adobe file with comment sheets deleted. Electronic signatures are added to the Design Exception or Variance, Crash Analysis, and Crash Analysis Approval Memo (if necessary) only after all changes are made and the documents are ready to be reviewed by the Engineer of Design (for DE’s) or Region Associate Engineer, Development (for DV's).

For projects with “MDOT Oversight”, the completed Design Exception Request (Form DE26) must be approved and signed by the Engineer of Design. For Projects of Division Interest (PoDI), the completed Design Exception Request (Form DE26) must be approved and signed by the Engineer of Design and subsequently approved by the FHWA Area Engineer. The Design Exception Request (Form DE26) and instructions (Form DE26Instructions) for completing the form are available on the MDOT website.

Design Variances (Form DV26) are signed by the Region Associate Engineer, Development who then changes the state of the DV to complete the DV process.

For additional information see Sections 3.09.02C, 3.10.03, 3.11.02D and 3.11.03B.

14.12 (revised 12-17-2018)

REQUEST FOR SURVEY / MAPPING

(PPD Task Descriptions 3310, 3320, 3330, 3340, 3350 & 4510)

Once the scope is verified, the need for a ground survey and/or aerial photography and/or laser scanning for mapping should be determined. Requests for this work can be made by the Region System Manager, Project Manager/Cost and Scheduling Engineer, or the Design Unit Leader. Ideally, the need for, and the requirements of, survey and mapping on a project should be discussed and agreed upon at the Scope Verification Meeting.

If Right-of-Way (ROW) may be acquired for the project, an early control survey should be ordered immediately to enable Real Estate personnel to begin landowner contact and reduce the timeline through the critical path. This early control survey would consist of horizontal survey control being set throughout the project area, government corners being tied in to the coordinate system, and enough property corners being tied to develop approximate non-legal ROW and property lines throughout the project area.

The Survey/Mapping Action Request (Form 0226) should be used to initiate the work. If survey and/or mapping work was ordered and completed during the Call-for-Projects process or under an EPE phase, and additional information is required, a pick-up survey can be ordered using the above forms.

All survey requests should be directed to the Supervising Land Surveyor or Region Surveyor. The Region will decide whether to do the project themselves or request assistance from Lansing survey staff, either in the field or in hiring consultant surveyors. This should be done as soon as possible to allow for the survey and mapping to be completed in a timely manner that does not impact the project’s critical path.
14.12 (continued)

If a previous/existing consultant survey contract is still active, it may be possible to submit a revised scope of work to capture any additional information. During the original survey contract, if it is known additional information will be needed when design has furthered, additional information pick up should be included in the contract to reduce complications, keep information on the same datum, and create cohesion in data by utilizing the same team for data collection and compiling.

Also, when ordering survey or mapping work for complex projects, the requestor should consider all the disciplines involved and consolidate all of the survey needs prior to submitting a request. These disciplines may include such areas as bridges, hydraulics, utilities, electrical, railroads, signals, ADA, etc. This can save considerable time and effort by eliminating additional pick-up surveys and the resulting complications created when tying in multiple survey alignments and data.

Coordination of field survey data is necessary to support design. In order to ensure the necessary detail and accuracy for a set of plans, the Project Manager should discuss all requirements with the Supervising Land Surveyor or designated Survey Project Manager of Photogrammetry and Surveys. This will allow the most efficient methods to be used to obtain the field data.

Listed below are definitions for the different types of survey information that may be requested on the Survey/Mapping Action Request (Form 0226).

14.12.01 (revised 12-17-2018)

Road

Alignment

Typically, there are three different types of data described as 'Horizontal Alignments' that are used for MDOT design, any of which may or may not be considered a legal alignment. These three types of alignments are: Survey, As Constructed, and Construction.

Survey Alignment: Historically, a survey alignment was primarily used as a baseline for locating topographic features, cross-sections, etc., along a proposed route. This was an alignment provided to or created by survey crews to lay out a preliminary location and collect data relative to that route.

As-Constructed Alignment: This is frequently referred to as a “best fit” alignment, which represents the physical road location at a specific point in time. These alignments are typically computed using survey points collected along the actual roadway centerline (crack, crown, paint stripe, curb split, etc.).

Construction Alignment: An alignment developed for the purpose of constructing a roadway. The construction alignment is proposed by an engineer. Additional R.O.W. needed for a project was frequently described from this alignment.
MICHIGAN DESIGN MANUAL
ROAD DESIGN

14.12.01 (continued)

Road

Legal vs. Non-legal

A **legal alignment** defines actual location of the Right-of-Way based on a survey alignment, as constructed alignment, and/or a construction alignment as referenced in property descriptions, conveyances, i.e. legal documents. It is considered a property controlling entity similar in standing to government section lines. A legal alignment is often used as a basic part of these descriptions. A survey to re-establish the location of the legal alignment is necessary when the purchase of additional R.O.W. is required, or the designer wishes to know where the existing R.O.W. is located to avoid acquiring additional R.O.W. There may be several “legal” alignments on any particular project from which different parcels have been purchased over time. Considerable research and survey work may be required. The legal alignment and the physical centerline may not coincide. Generally, if property is purchased, the Department’s past policy has been to describe the conveyance from the construction alignment, potentially creating yet another “legal” alignment. In order to minimize the creation of multiple legal alignments and hereby the confusion and added cost of future surveys, future R.O.W. acquisitions should be based on previously established legal alignments whenever possible.

A **non-legal alignment** is used primarily to locate features for the purpose of design. It can be considered a line that provides direction and stationing for locating features, determining quantities, and staking out the project. A non-legal alignment is not intended to relate to the location of the Right-of-Way and is not used for property acquisition.

14.12.01 (continued)

**MDOT Alignment Standard**

Alignments will be designated only as **legal** or **non-legal** by the surveyor/engineer. Differentiation and perpetuation of existing alignments will be done through annotation. Design alignment deliverables will be designated on CAD levels as Ali_Legal_Line_GS or Ali_NonLegal_Line for MDOT_01 workspace and Geom_Horz_Legal_Wt0_Line_GS, Geom_Horz_Legal_Wt1_Line_GS, Geom_Horz_NonLegal_Wt0_Line_GS, Geom_Horz_NonLegal_Wt1_Line_GS for MDOT_02 workspace in MicroStation for the plan alignment sheets.

**Bench Marks:** Points of known elevation. Bench marks are usually set along a project at a given interval to provide the construction crews elevations from which to work. May be an assumed (elev. = 300.000 ft), National Geodetic Vertical Datum (NGVD 1929) or North American Vertical Datum of 1988 (NAVD 1988, which is most current and recommended).

**Drainage:** Data specific to surface and underground storm drainage and related features. This usually includes a separate report describing any existing or potential problems, location and direction of flow of surface drainage, and underground storm systems.

**Government Corners:** Monuments representing the locations of the corners as originally set as part of the United States Public Land Survey System (USPLSS). These corners control the location of nearly all property boundaries. Preservation and perpetuation of these monuments is required by state law.
14.12.01 (continued)

Road

Hydraulic Survey: A cross section survey used to analyze the flood flow and capacity of a given stream which helps to determine the design parameters of a stream crossing structure. (The Engineer of Hydraulics should always be consulted whenever this type of survey data is required.

Photo Control: X, Y and Z coordinate data on target points specified by Photogrammetry for the purpose of controlling aerial mapping. This process is very similar to that used to control laser scan mapping.

Planimetric Mapping: The act of locating all topographic features (by coordinates) for the purpose of creating a map. This is analogous to station plus and offset information. Typically, when speaking of planimetrics, this does not include terrain data (elevation/cross section). In practice, this information is collected together with the terrain data to produce a three dimensional model of the surface.

Plat Maps: Legal maps that indicate the description, easements, layout and dimensions of a platted subdivision and its included lots. These documents are recorded on file with the County Register of Deeds.

Property Owners: Owners of property adjacent to a roadway or bridge outside of the Department’s existing ROW limits.

Property Ties: Survey measurements that relate the location of existing property corners and or government corners to the alignment and horizontal coordinate system.

14.12.01 (continued)

Riparian Owners: Property owners adjacent to a lake, stream or river that may have some rights to the bottom lands of such a body of water or stream. Riparian ownership and contact information is usually required for the four quadrants around a bridge over water.

Terrain Mapping: The act of mapping the surface of the earth to determine the location and elevation of the ground features. This results in the creation of a Digital Terrain Model (DTM) and/or Triangulated Irregular Network (TIN) from which cross sections may be calculated. Usually collected at the same time as the planimetric data.

Utilities: Public and privately owned structures in place to carry electric, telephone, water, sanitary sewers, etc. Utility information would typically include ownership, location, rim and flow line elevations and pipe directions.

Other: Any other miscellaneous information.
Bridge

Alignment: Same as Road but should include exact stationing of the reference points (intersection of abutment and pier reference lines with the as-constructed alignment).

Angle of Crossing of Substructure: The angle at which the reference lines of the structure cross the as-constructed roadway alignment.

Bench Marks: Same as Road. Bench Marks should be left in the vicinity of the bridge structure on both sides of the crossing.

Bridge Seat Elevation: Elevations of the top of the abutment/pier that supports bearing pads/bridge beams.

Bridge Survey: A survey of a bridge structure. This survey often requires sketches in plan and elevation view, and diagrams to illustrate all critical dimensions, in addition to Microstation planimetric and terrain mapping.

Dimension of Existing Sub-structure Elements: Physical measurements of the abutments, piers, wingwalls, etc. such as width, length, face to face and height above natural ground, amount of cover and so on. Specific needs should be noted by the requestor.

Dimensions of Existing Superstructure Elements: Physical measurements of deck width, and length thickness, sidewalk and curb dimensions (face-face, width, height, etc.), bridge railing type and dimensions.

Property Ties: Same as road.

Riparian Owners: Same as road.

Top of Footing Elevation: Elevations of existing bridge footings. Usually requires probing and/or digging for location. Often difficult or impossible to find.

Topography: Typically describes planimetric and terrain features together. The planimetric detail should include the bridge deck as a feature. The terrain data should model the surface as though the deck did not exist. This should result in contours that accurately represent the surface of the ground.

Under clearance Elevation: Elevations of the bottom of the existing bridge beams. Normally taken over pavement edges and lane lines for grade separations. For design purposes, minimum vertical clearance must be maintained over the complete usable shoulder. See Section 3.12. For stream crossings the elevations would typically be taken over the intersection of the ground with the sub-structure units and over the highest low beam. The underclearance is then the difference between the elevation of the beams and the elevation of the appropriate feature below them. Any special locations should be noted in the request.

Utilities: See Road. Any utilities attached to the structure itself should be noted.

Water Surface Elevation: Elevation of the exact surface of the water on a given date, taken at intervals up and down stream to determine stream gradient. The date each measurement is made must be recorded.

Other Elevations: Any other elevations required that are not covered above.
14.13 (revised 12-17-2018)

PROJECT AREA CONTAMINATION SURVEY (PPD Task Descriptions 2810 & 2820)

The following interim procedures have been developed for identifying potential contaminated sites, conducting the necessary testing and estimating the cost of remediation.

1. The Project Manager/Cost and Scheduling Engineer sends a project description and location and requests a list of potential contaminated sites to both the Environmental Assessment Unit (EAU) in the Development Services Division and the Region/TSC Resource Specialist (RRS).

2. The EAU and PCU (Project Coordination Unit of the Environmental, Development Services Division) coordinate with the Region/TSC Resource Specialist to conduct a Project Area Contamination Survey (PACS) by searching state or local records, interviewing state and local officials and citizens.

   The Region/TSC Resource Specialist performs a visual inspection of the project area. The EAU and RRS notify the Project Manager.

3. If no known or potential sites are found, The Project Area Contamination Survey process terminates at this point. (The Project Manager would delete PPD Task Description 2820 from the project Planisware network.)

4. If potential contamination sites do exist, the Project Manager adds the locations of the sites to the base plans and reviews the sites for conflicts with the proposed work. If the Project Manager determines the potential sites do not conflict with the proposed work, the Project Area Contamination Survey process terminates at this point. (The Project Manager would delete PPD Task Description 2820 from the project Planisware network.)

5. If potential contamination sites conflict with the proposed work, the Project Manager requests the Grading/Drainage & Consulting Contracting Unit (G/DCCU) in the Construction Field Services Division to prepare a scope of field work with a cost estimate for the Project Manager.

6. The Project Manager reviews and approves the scope and cost estimate.

7. The G/DCCU prepares the Health and Safety Plan, obtains clearance from Miss Dig, and assembles or coordinates with the Region/TSC all necessary resources and personnel.

8. The G/DCCU conducts/coordinates borings, monitors well installation and/or sample collection as necessary to complete the field work.

9. The G/DCCU notifies the Michigan Department of Environmental Quality (MDEQ) of any contaminated or hazardous materials found during field work.
14.13 (continued)

PROJECT AREA CONTAMINATION SURVEY

10. The G/DCCU submits collected samples to MDOT or contracted laboratory for analysis, receives the results from the laboratory, reviews and interprets them.

11. If the data is insufficient to draw complete conclusions, the G/DCCU repeats steps 4-10 for further testing.

12. Utilizing all U. S. EPA and (MDEQ) guidance and policies, the G/DCCU develops and submits a report to the Project Manager and the Environmental Assessment Unit containing the location, nature, extent and volume of any contamination found and recommendations for dealing with it. Recommendations will include any permits or special procedures and/or provisions that are required and pay items with an estimate of construction costs relating to any contamination present.

13. The Project Manager incorporates the information in the plan/proposal package.

14.14

REVIEW / REVISE PLANISWARE NETWORK

Once the scope of work has been agreed upon, the original Planisware network submitted by the Project Initiator should be reviewed. At this time, the network may be revised to better represent the actual tasks and corresponding durations required during the design of the project. Durations of tasks should not be altered without first consulting the work center involved. Any change in the plan completion date, ROW certification date or the letting date should also be included in any change request submitted for scope of work or cost.

14.15 (revised 2-26-2018)

CHANGE REQUEST (REVIEW OF PROJECT SCOPE, COST AND SCHEDULE)

Once the scope has been verified, any changes in cost, limits, work, schedule or funding should be submitted to the appropriate System Manager or Statewide Transportation Planning Division. This change request is done through JobNet.
REQUEST FOR UTILITY INFORMATION

This process outlines the responsibilities and procedures for gathering utility information early in a project’s design phase. Gathering utility information typically occurs after the project scope verification has been completed. For this procedure, utility is defined as any type of private, public, municipal, or county drain commission facility that is within or near the limits of the proposed construction project.

Capital preventive maintenance and pavement marking projects are examples of projects that do not require plan distribution to utilities. The project must not include any guardrail work or any work beyond the outside edge of the shoulder, or require any excavation, trenching, boring, etc., into the aggregate base or subbase material. The Project Manager evaluates each project and use discretion on whether plans need to be distributed for utility coordination.

Subsurface Utility Engineering (SUE) projects that use a consultant to provide the underground utility information may not need to follow this entire procedure. The Project Manager needs to coordinate this request for utility information with the SUE vendor.

Procedure

Project Manager

1. Contact the TSC Utility Coordinator to request Letter Requesting Utility Information at Base Plan Stage, (Form 2480). Provide the following information:
   - Project Location
   - Scope of Work
   - Control Section(s)
   - Job Number(s)
   - Proposed Plan Completion Date
   - Consultant Information

2. Receive the Cover Letter and all Form 2480 letters within 7 working days from the TSC Utility Coordinator.

3. Review and sign Form 2480 letters

4. Send Form 2480 letters and plans to the utilities with courtesy copies to TSC Utility Coordinator.

Note:
Old plans, Right-of-Way maps, or MDOT Construction Base Plans are acceptable for sending to the utilities. The plans must provide the project’s location and limits of work. Vicinity maps may be included for general information, but are not used as the sole project plans as they provide inadequate information for the utilities to plot their facilities. This includes log jobs that may affect a utility.

5. Receive returned Form 2480 and plans from the TSC Utility Coordinator

Note:
The TSC Utility Coordinator will follow-up with non-responsive utilities and provide a status to the Project Manager.

6. Plot all utility facilities on the Preliminary Plans.

Note:
When project information exceeds the allowed space on Form 2480 an additional document is supplied by the Project Manager detailing this information. The applicable field(s) on Form 2480 state "see attached sheet" when this occurs.
14.17 (revised 12-17-2018)

FAA OBSTRUCTION EVALUATION

Federal regulation (14 CFR Part 77.9) requires notification with the FAA (Federal Aviation Administration) when construction alteration, or activity is planned in a zone that may impact aircraft flight operations. This may include changes in grades, structure elevations, lighting, towers, crane heights, etc.

Notification must be filed for any of the following conditions:

- Any construction or alteration exceeding 200 ft. above ground level
- Any construction or alteration:
  - Within 20,000 ft. of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 ft.
  - Within 10,000 ft. of a public use or military airport which exceeds a 50:1 surface from any point on the runway of each airport with its longest runway no more than 3,200 ft.
  - Within 5,000 ft. of a public use heliport which exceeds a 25:1 surface.
- Any highway, railroad or other traverse way whose prescribed adjusted height would exceed the above noted standards.
- When requested by the FAA.
- Any construction or alteration located on a public use airport or heliport regardless of height or location.

The notice can be filed either by mail or electronically on the FAA Obstruction Evaluation / Airspace Analysis website.

14.17 (continued)

The website features a “Notice Criteria Tool” to assist in determining if a project location is in a zone of influence requiring notification. If the results produced by the tool are inconsistent with known vicinity location information, they should be verified by requesting assistance from MDOT’s Office of Aeronautics, Planning and Development Section.

The Project Manager should determine as soon as possible if a notification is required. If a notification is required, it should be filed prior to FPC to allow the FAA to make a determination early enough to accommodate any conflicts. Allow 45 days from the time of submittal for FAA review.

Questions regarding the filing requirement or procedure should be directed to the Aeronautics Division, Planning and Development Section. Notices that require special airspace study may take up to 120 days.
PAVEMENT DESIGN

After the scope verification meeting, the Project Manager should determine the estimated pavement costs of the project. Depending on the type of work and estimated cost, a Life Cycle Cost Analysis (LCCA) may be required. This along with the actual pavement design will be done by either the Region/TSC Pavement Design Engineer or the Operations Unit of the Construction Field Services Division – Pavement Operations. Those done by the Operations Unit must be submitted for approval to the Engineering Operations Committee (EOC). See Section 6.01.06.

REQUEST FOR PAVEMENT CORES / SOIL BORINGS (PPD Task Description 3110 & 3510)

Most projects will require pavement core information, especially those involving pavement removal, rubblizing, crushing and shaping and/or cold milling. This information is useful not only in verifying the type of fix but also in assisting the Contractor in developing their bid prices. Pavement cores should be requested as soon as possible, but no later than the Scope Verification Meeting if they have not been completed prior in an EPE phase. The Project Manager should check with the Region/TSC involved to find out if cores were taken during the Call-for-Projects process.

When requesting pavement cores the Project Manager should include the following:

- Set of plans
- Description of what information is needed
- Desired location
- A target date when the information is needed
14.20 (revised 12-17-2018)

RECEIPT OF SURVEY / MAPPING DATA
(PPD Task Description 3310, 3320, 3330, 3340, 3350 & 4510)

When the survey or mapping work is submitted, the Supervising Land Surveyor or Region Surveyor forwards the data, notes, maps, etc. to the requestor in electronic format unless requested otherwise. This could be the initial survey ordered during the Call-for-Projects process or a pick-up survey with specific information not identified in the initial survey.

Photogrammetric and laser scan will be sent directly to ProjectWise. A transmittal memo with the map file names to be used on the project is sent to the requestor as notification the mapping has been completed.

14.21

BRIDGE REVIEW

Although the procedures discussed under Bridge Review should, ideally, occur during the scoping and Call-for-Projects process, the coordination described below should still be done during the initial stages of the design phase until the development of the Bridge Program is totally integrated into the Call-for-Projects process. This may sometimes eliminate any oversights during the programming of projects or due to scheduling changes of ongoing projects.

14.21.01 (revised 12-17-2018)

Review by Bridge Design

Whenever there are structures within the limits of a project, regardless of the scope of work, Bridge Design should be notified. The notification should be in the form of a memo to the Bridge Management Engineer initiating a review of those structures to determine if any design work is presently ongoing, being planned, or might be considered at each structure. The Bridge Management Engineer will contact Operations Field Services Division to determine if periodic inspections have revealed the need for structure repair or upgrading. This insures any future construction is coordinated and possibly consolidated thereby reducing PE and CE costs as well as minimizing the number of disruptions to traffic.

The following information should be relayed to the Bridge Management Unit:

- Control Section
- Job Number
- Route Number
- Location-Project Limits
- Proposed Scope of Work
- All Structures within the project limits
  a. names of crossroad/stream crossed by structure
  b. structure/bridge number
- Project Manager/Cost and Scheduling Engineer
- Proposed Plan Completion Date
- Proposed Letting Date

After the review is completed, the Bridge Management Engineer will inform the Project Manager in writing of any recommended work on each structure.
Historic Bridges

The following structures have been classified as historic bridges. Prior to initiating any design work on one of these structures, the Project Manager should contact the Project Planning Division in the Bureau of Transportation Planning. Any design restrictions should be identified as early in the design phase as possible.

<table>
<thead>
<tr>
<th>BRIDGE</th>
<th>CROSSING</th>
<th>ROUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>02041-B01</td>
<td>Sand River</td>
<td>M-28</td>
</tr>
<tr>
<td>05031-B01</td>
<td>Intermediate River</td>
<td>M-88</td>
</tr>
<tr>
<td>07012-B02</td>
<td>Sturgeon River</td>
<td>US-41</td>
</tr>
<tr>
<td>09032-B01</td>
<td>E. Channel-Saginaw River</td>
<td>M-13/M-84</td>
</tr>
<tr>
<td>10032-R01</td>
<td>Ann Arbor RR</td>
<td>US-31</td>
</tr>
<tr>
<td>11021-B02</td>
<td>St. Joseph River</td>
<td>US-12</td>
</tr>
<tr>
<td>11053-B01</td>
<td>St. Joseph River</td>
<td>M-63</td>
</tr>
<tr>
<td>15012-B01</td>
<td>Island Lake Outlet</td>
<td>US-31</td>
</tr>
<tr>
<td>16081-B03</td>
<td>Cheboygan River</td>
<td>US-23</td>
</tr>
<tr>
<td>17032-B02</td>
<td>Power Canal (Ashmun St.)</td>
<td>I-75BS</td>
</tr>
<tr>
<td>17034-B01</td>
<td>St. Mary River&amp;Portage Ave. W.</td>
<td>I-75</td>
</tr>
<tr>
<td>17062-B01</td>
<td>E. Br. Tahquemenon River</td>
<td>M-28</td>
</tr>
<tr>
<td>20012-B01</td>
<td>Au Sable River</td>
<td>I-75BL</td>
</tr>
<tr>
<td>22023-B01</td>
<td>Sturgeon River</td>
<td>US-2</td>
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<td>22031-B01</td>
<td>Menominee River</td>
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<tr>
<td>24011-B01</td>
<td>Bear Creek</td>
<td>US-31/M-68</td>
</tr>
<tr>
<td>26011-B03</td>
<td>Cedar Creek</td>
<td>M-18</td>
</tr>
<tr>
<td>31012-B01</td>
<td>Portage Lake</td>
<td>US-41&amp;Soo RR</td>
</tr>
<tr>
<td>33021-B01</td>
<td>Sycamore Creek</td>
<td>M-36</td>
</tr>
<tr>
<td>33032-R01</td>
<td>GTW RR&amp; Red Cedar River</td>
<td>I-96BL</td>
</tr>
<tr>
<td>34081-R01</td>
<td>Mid. Michigan RR</td>
<td>M-44/M-91</td>
</tr>
<tr>
<td>35012-B02</td>
<td>Au Sable River</td>
<td>M-65</td>
</tr>
<tr>
<td>36022-B01</td>
<td>Iron River</td>
<td>US-2</td>
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<tr>
<td>36023-B01</td>
<td>Paint River</td>
<td>M-69</td>
</tr>
<tr>
<td>41042-B01</td>
<td>Plaster Creek</td>
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<tr>
<td>41081-B01</td>
<td>Grand River</td>
<td>M-45(Fulton St.)</td>
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<td>42012-B02</td>
<td>Fanny Hoee Creek</td>
<td>US-41</td>
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<tr>
<td>42021-B03</td>
<td>Eagle River</td>
<td>M-26(Ped. Only)</td>
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<tr>
<td>45041-B01</td>
<td>Lake Leelanau Narrows</td>
<td>M-204</td>
</tr>
<tr>
<td>46032-B02</td>
<td>Silver Creek</td>
<td>M-156</td>
</tr>
<tr>
<td>49023-B01</td>
<td>Cut River</td>
<td>US-2</td>
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### Historic Bridges

<table>
<thead>
<tr>
<th>BRIDGE</th>
<th>CROSSING</th>
<th>ROUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>50051-B01</td>
<td>Clinton River</td>
<td>M-3SB</td>
</tr>
<tr>
<td>51011-B01</td>
<td>Manistee River</td>
<td>US-31</td>
</tr>
<tr>
<td>51021-B03</td>
<td>Pine River</td>
<td>M-55</td>
</tr>
<tr>
<td>55011-B01</td>
<td>Menominee River</td>
<td>US-41</td>
</tr>
<tr>
<td>58151-R03</td>
<td>Conrail RR &amp; W. Raison River</td>
<td>I-75</td>
</tr>
<tr>
<td>58151-S11</td>
<td>Dunbar Road</td>
<td>I-75</td>
</tr>
<tr>
<td>58152-S06</td>
<td>Sigler Road</td>
<td>I-75</td>
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<tr>
<td>60031-B01</td>
<td>Thunder Bay River</td>
<td>M-32 Spur</td>
</tr>
<tr>
<td>64012-B01</td>
<td>Pentwater River</td>
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</tr>
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<td>66013-B12</td>
<td>Ontonagon River</td>
<td>M-64</td>
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<tr>
<td>66023-B01</td>
<td>Middle Branch Ontonagon River</td>
<td>M-28</td>
</tr>
<tr>
<td>70041-B02</td>
<td>Grand River</td>
<td>M-45</td>
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<td>71073-B02</td>
<td>Ocqueoc River</td>
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<td>75022-B01</td>
<td>Manistique River</td>
<td>US-2/M-94</td>
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<td>77111-B04</td>
<td>St. Clair River</td>
<td>I-94/Blue Water Bridge</td>
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<td>78021-B01</td>
<td>St. Joseph River</td>
<td>US-12(Pedestrian)</td>
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<td>78061-B01</td>
<td>St. Joseph River</td>
<td>M-86</td>
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<td>78061-B03</td>
<td>Prairie River</td>
<td>M-86</td>
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<tr>
<td>81063-S04</td>
<td>Wiard Road(Sbd)</td>
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<td>81063-S05</td>
<td>Ford Exit Drive(Sbd)</td>
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<td>82022-S33</td>
<td>I-94</td>
<td>US-12(Michigan)</td>
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<td>82022-S34</td>
<td>I-94</td>
<td>US-12(Michigan)</td>
</tr>
<tr>
<td>82023-S22</td>
<td>I-94 Ramp</td>
<td>M-10SB</td>
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<td>82023-S23</td>
<td>I-94 Ramp to M-10</td>
<td>I-94EB</td>
</tr>
<tr>
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<td>I-94</td>
<td>M-10SB</td>
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<td>M-10SB &amp; I-94WB</td>
<td>I-94EB Ramp to M-10</td>
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<td>M-10NB &amp; I-94EB</td>
<td>I-94WB Ramp to M-10</td>
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<td>I-94</td>
<td>M-10</td>
</tr>
<tr>
<td>82023-S28</td>
<td>I-94 Ramp from M-10</td>
<td>I-94WB</td>
</tr>
<tr>
<td>82023-S29</td>
<td>I-94 Ramp from M-10</td>
<td>M-10NB</td>
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<tr>
<td>82071-B04</td>
<td>Rouge River</td>
<td>Old US-25(Fort Street)</td>
</tr>
<tr>
<td>86000-B01</td>
<td>Straits of Mackinac</td>
<td>I-75</td>
</tr>
</tbody>
</table>
14.21.03

Bridge Loading and Under Clearance Review

It is essential that the Department maintain accurate and detailed records and control of the added deadload on bridges and of the under clearance at underpasses. Occasionally these considerations will mean that deck surfacing material must be removed before a resurfacing can be undertaken or that surfacing under a bridge must be removed so that a new surface can be maintained at or near the existing elevation. On some H-15 bridges, 2" of surfacing may reduce the operating load capacity by 10,000 lbs.

After scope verification, a memo should be sent to the Bridge Management Unit listing structures within the limits of the project, proposed treatments, proposed plan completion and letting dates requesting recommendations. The Bridge Management Unit will contact the Operations Field Services Division to determine if periodic maintenance inspections have disclosed the need for remedial measures. Detailed recommendations will then be sent to the Project Manager.

14.21.04

Special Structures/Footing Design

On occasion there may be situations where the scope of work includes disciplines beyond the expertise of the Project Manager and/or the unit assigned the project. Frequently, items such as sound walls, retaining walls, unique culverts and footings are assigned a bridge unit for design assistance. In these instances the Project Manager should request assistance from the Special Assignment Structures Unit in Bridge Design. The request should be by memo with copies to the Supervising Engineer-Bridge, and Engineer of Bridge Design. These requests should be made as soon as the need is known to allow the bridge unit(s) as much lead time as possible to accommodate the project’s schedule while meeting their own schedules.
14.22 (revised 12-17-2018)

RAILROAD COORDINATION
(PPD Task Description 3650)

A contact by the Department with the railroad company is required any time a highway alteration occurs within the railroad right of way.

For at-grade crossings and grade separations, the contact is made by the Railroad Coordination Unit – Office of Rail.

In the case of at-grade crossings:

1. Provide electronic plan set access including the title sheet, typical cross section, and plan and profile sheets for the affected railroad crossing with a memorandum to the Railroad Coordination Unit – Office of Rail indicating the proposed improvements to be made. This unit will advise the Design Unit as to what preliminary additions and alterations are desirable in order to satisfy the particular railroad company involved. Even if little or no impact on the railroad is expected, the railroad will usually be notified, and a coordination clause may be required.

2. Always show track elevations and profiles on the plans. If sufficient survey is not available, write a note to this effect on the plans. If track adjustments in excess of 1” are required, a request for pick-up survey is needed to obtain the required information.

3. After the plan notes have been completed to the satisfaction of the Railroad Coordination Unit – Office of Rail, provide electronic plan set access to the Railroad Coordination Unit – Office of Rail for their use in contacting the railroad. Any required Special Provisions will be supplied to the Design Unit by the Railroad Coordination Unit – Office of Rail.

14.22 (continued)

4. While the general design of the railroad crossing should be set after The Plan Review, it should be noted that railroad negotiations will take a minimum of six months to complete. If an agreement is required, it will take a minimum of one year. The Design Unit must take this into account by timely submittal of the initial prints to the Railroad Coordination Unit – Office of Rail.

Note that The Plan Review does not attempt to determine whether a crossing is adequate, should be extended, or if a complete new crossing is warranted. An observation may be made regarding the condition of the crossing and compatibility with the proposed project, but it is the responsibility of the Railroad Coordination Unit – Office of Rail to determine the actual work required at the crossing. This may require scheduling of a diagnostic team review and ultimately, lead to the issuance of a regulatory order by the Department.

It is particularly important that both existing and proposed utility crossings under and over the railroad be shown. Details of those crossings must also be included and approved by that particular railroad company.

See also Section 12.11.03 of the Road Design Manual and Chapter 13 of the Bridge Design Manual.
REQUEST FOR TRAFFIC VOLUMES
(PPD Task Description 2120)

Existing traffic volumes (ADT, DHV) for 3R projects should be requested from the Data Collection Section in the Bureau of Transportation Planning. Volumes from the latest available year should be included in the plans (Title Sheet).

Increased Capacity/New Routes (4R) projects require projected traffic volumes, usually 20 years in advance of the projected year of construction. Ordinarily these volumes have already been determined during the Project Development stage (see Section 14.05). However, if a significant period of time has elapsed, these volumes should be revised. Revisions are requested from the Project Planning Section in the Bureau of Transportation Planning. This request should be made as soon as the need becomes evident. (Traffic Analysis Request (TAR) Form 1730)

If the amount of traffic data is large (i.e. entrance & exit ramps at several interchanges), it may be desirable to show the information on a separate plan sheet.

REQUEST FOR CRASH ANALYSIS AND SAFETY REVIEW
(PPD Task Description 3560)

All projects, except non-hot mix asphalt overlay Capital Preventive Maintenance projects, should have a crash analysis and safety review by the TSC or Region Traffic and Safety Engineer. The review may have already been completed as part of the Region/TSC's Call-for-Projects process, in which case an additional review may not be necessary. However, reviews older than two years should be updated by requesting another review. The review will identify any unusual occurrences or above average frequency crashes and will advise the Design Unit of any recommended measures to alleviate the situation. The Project Manager should review the plans to verify these measures have indeed been incorporated into the plans prior to the FPC Meeting.

Road Safety Audits (RSA) are warranted based on the conditions defined in the Road Safety Audit (RSA) Guidance document. An RSA is a formal safety performance examination of an existing or future road or bridge project by an independent, multidisciplinary RSA team. RSAs should be scheduled during the scoping process and are highly recommended to be scheduled prior to the Scope Verification meeting and include consideration for all users of the roadway to help achieve strategic safety goals. RSAs contribute to road safety by providing a fresh, unbiased assessment of the area or intersection in an effort to identify potential safety issues and solutions. The Project Manager (Project Owner) submits Form 3767 to request the RSA and follows the process as laid out in the Road Safety Audit Guidance to meet this requirement.
REQUEST FOR SPECIAL SOILS INVESTIGATIONS AND / OR DESIGNS (PPD Task Description 3510)

Although the Region/TSC Soils and Materials Engineer is responsible for supplying soil borings, pavement cores and limits and quantities for removal of unstable materials (peat, muck, etc.), to the Design Unit, other types of soil analysis may also be necessary. Any soil information, analysis and design regarding the following should be requested from the Geotechnical Services Unit of the Construction Field Services Division.

- Sewers and culverts greater than 5'-0"
- Box culverts greater than 4'-0" x 4'-0"
- Retaining walls
- Sound walls (except Metro Region)
- Light Towers (except Metro Region)
- Mechanically stabilized earth (MSE) walls
- Reinforced soil slopes
- Pipe and culvert trenchless installations

In order to request any of the above, the Project Manager should send a memo and electronic access to the plan set with the following minimum information:

- Plan of site (location map)
- Alignment with stationing
- Benchmarks as close to the location as possible
- A detailed description of the requested information
- Plan completion date and a date when the information is needed.
- Proposed method of controlling water (during culvert construction)-diversion channel, temporary dam, pump across road, etc.

DISTRIBUTION OF PRELIMINARY PLANS TO UTILITIES AND UTILITY COORDINATION MEETING (PPD Task Description 3660) (PPD Milestone 361M)

Preliminary plan distribution to utilities must be completed whether or not utility conflicts have been identified. It is important to provide preliminary plans because it allows the utilities an opportunity to review the proposed project, to ensure facilities are plotted accurately, and provides notification to relocate facilities in conflict.

Distribution of preliminary plans, and the Utility Coordination Meeting if necessary, typically occurs after The Plan Review Meeting and before the Final Project Coordination (FPC) Meeting. The TSC Utility Coordinator and the Project Manager will work together to determine if a particular project warrants scheduling a Utility Coordination Meeting. Some projects may not require a Utility Coordination Meeting while others may require several meetings. Those invited usually include:

- TSC Utility Coordinator
- Project Manager/Cost and Scheduling Engineer
- Private/Public utilities
- Municipalities
- Road Commissions
- Design Team key members
- Design Consultant representatives
- MDOT construction team members

The preferred method for preliminary plan distribution is to send separate letters to public/private and municipal utilities that address the following:
14.26 (continued)

DISTRIBUTION OF PRELIMINARY PLANS TO UTILITIES AND UTILITY COORDINATION MEETING

- The Letter to Public/Private Utilities at Preliminary Plan Stage, (Form 2481) includes the following:
  - References Public Act (PA) 368 of 1925 entitled Highway Obstructions and Encroachments; Use of Highway by Public Utilities
  - Gives legal notification to relocate
  - Authorizes preliminary engineering for reimbursable relocations
- The Letter to Municipal Utilities at Preliminary Plan Stage, (Form 2482) is used because MDOT may be responsible for the relocation costs associated with municipal utility relocations within their corporate limits. This may require MDOT to complete the following:
  - Perform the relocation design
  - Include relocation work in the project plans
  - Formalize an agreement

If Forms 2481 and 2482 are not sent to the utilities, the Utility Coordination Meeting Invitation letter must cite PA 368, authorize preliminary engineering, provide relocation reimbursement information, and be accompanied by preliminary plans.

**Procedure**

1. Send preliminary plans to the TSC Utility Coordinator for distribution to utilities.
2. Complete a preliminary assessment of utility issues and conflicts with the TSC Utility Coordinator and Design Team.

Note:
It may be beneficial to have a conflict list and special plans with cross section details for use as presentation tools to the utilities.

14.26 (continued)

3. Participate in the Utility Coordination Meeting if scheduled. Discuss the following topics at the meeting:
   - Introductions
   - Project Summary
     - Plan completion date
     - Letting Date
     - Construction start date
   - Key work areas that potentially involve utility conflicts
   - Municipal utilities
     - Relocations
     - Plan and specifications preparation
     - Betterments
   - Review entire project using one of the following methods:
     - Review the project utility by utility with each utility taking a turn to describe issues and concerns over the entire project.
     - Review the plans sheet by sheet. Each utility takes a turn describing involvement and concerns for each sheet.

Note:
The TSC Utility Coordinator acts as a facilitator and a resource for utility relocation policies/procedures in helping the utilities and Design Team work through the various utility issues and arrive at mutually agreeable resolutions to utility conflicts.

4. Receive meeting minutes from the TSC Utility Coordinator.
5. Ensure any required changes to the plans are made prior to FPC
14.27 (rev. 12-17-2018)

VALUE ENGINEERING
(PPD Task Description 3375)

A. Definitions

Value Engineering (VE) - A systematic process of review and analysis of a project, during the concept and design phases, by a multi-disciplined team of persons not involved in the project, that is conducted to provide recommendations for:

1. Providing the needed functions safely, reliably, efficiently, and at the lowest overall cost;
2. Improving the value and quality of the project; and
3. Reducing the time to complete the project.

Applicable VE Project - A portion of highway that is proposed for construction, reconstruction, or improvement as described in the preliminary design report or applicable environmental clearance document. A project may consist of several job numbers/contracts or phases over several years.

Estimated Total Cost of a Project - The estimated cost of the project includes the cost of all phases of a project including environmental, design, right-of-way, utilities and estimated construction cost based on final design.

Road Projects VE Study Cost Threshold - The federal regulations on VE studies are in 23 CFR Section 627. MDOT’s policy requires VE studies on all road projects that have a total project cost of $25 million or greater. The total project costs is the sum of the costs for all phases of the project. If any part of the environmental clearance document is to be let for construction, it must have a VE study even if the cost of the construction work is less than $25 Million. VE studies may also be conducted on projects below the required threshold when it is determined that a VE study may be beneficial to the project.

Bridge Project VE Study Cost Threshold - A project is considered a bridge project if the majority of the cost/work is related to bridge work. The federal regulations on VE studies are in 23 CFR Section 627. MDOT’s policy requires VE studies on all bridge projects that have a total project cost of $20 million or greater. The total project costs is the sum of the costs for all phases of the project. If any part of the environmental clearance document is to be let for construction, it must have a VE study even if the cost of the construction work is less than $20 Million.

Value Engineering Re-Study - If a project has a change to the scope of work between the final design and the letting, then FHWA will require an updated VE analysis.

Value Engineering Proposal/Recommendation - The ideas resulting from a Value Engineering study that provide the project’s functional requirements at less cost or improve value or service with no increase in cost. VE Proposals must have documented decisions and implementation. Proposals/recommendations that increase the cost of a project and still provide improved value are classified as Value Engineering Design Suggestions.

Value Engineering Change Proposal (VECP) - A frequently used special provision that is placed in all construction contracts except Construction Manager General Contractor (CMGC) and Design Build (DB) projects. It encourages the contractor to propose changes in contract work that will accomplish the project’s functional requirements at less cost, reduced time, or improve value or service at little or no increase in cost. The net savings of each proposal is shared with the contractor at a stated rate (50-50). MDOT’s procedures for Construction VECP’s are contained in Bureau of Highways Informational Memorandum 2014-03.
14.27 (continued)

VALUE ENGINEERING

MDOT State VE Coordinator - Design Division staff person responsible to assure all VE studies are completed per the Federal Regulations. The State VE Coordinator works with the Design Project Manager and other design personnel to schedule, complete, follow up and document VE Studies and decisions. The State VE Coordinator determines if the study can be done by MDOT personnel or by a Consultant. To hire a Consultant, they solicit and establish the contract per current vendor selection procedures. At the year end, they prepare the annual FHWA report on VE Studies documenting VE studies and activities. They also determine if a recommendation may be warranted as a best practice and provide information statewide.

VE Facilitator - A qualified facilitator experienced in performing and leading VE studies. MDOT personnel who facilitate VE studies must be experienced in VE studies and have additional facilitation and process reengineering training. VE studies done by outside consultant firms must have a VE facilitator with sufficient VE training, education and experience to be recognized by SAVE International as meeting the requirements for certification.

VE Team - The group with diverse expertise suited to the scope and complexity of a project to participate in the VE study. At a minimum, design, construction, and maintenance will be represented on the team. In the event of specialized projects, individuals with specific expertise necessary to perform a proficient Value Engineering study should be included in the team makeup. The VE Team must also include member(s) experienced in estimating construction costs and cost-benefit analysis. All members should have completed a Module 1 Value Engineering training seminar or have prior Value Engineering experience. The composition of the expertise should reflect the complexity of the project design to be studied. At least two members of the team should be experienced in the high-cost areas of the project. Anyone directly involved in the design of the project should not be a team member, but is expected to participate as an information source.

B. Federal Regulation

Title 23 CFR 627 under the authority of 23 USC Chapter 1, Section 106(e) requires a Value Engineering study be conducted before the advertisement/letting of all Federal Aid projects with an estimated total project cost of $50 million or greater for a road project, or $40 million or greater for a bridge project. See the previous section for MDOT thresholds, definitions of “project” and VE study requirements. The VE study might encompass a longer corridor of similar work, but only the projects for which there are design plans or sufficient scoping information available will receive VE credit.

Design/Build projects used to expedite the completion of a project are exempt from VE requirement. However, a Value Engineering study may be conducted prior to advertising the Request for Proposals of the Design/Build contract if requested by the Region or Leadership.

Road projects with a total cost between $25 million and $50 million or stand-alone bridge projects with a total cost between $20 million and $40 million may be exempt from a Value Engineering Study on a project by project basis if approved by the Engineering Operations Committee (EOC).
MICHIGAN DESIGN MANUAL  
ROAD DESIGN

14.27 (continued)

VALUE ENGINEERING

C. Procedures

1. Identification of Potential VE Studies. The State VE Coordinator prepares a list of potential VE studies and sends it to the System Managers and FHWA for concurrence.

The VE study is commonly performed between concept and 30% plan completion. Holding the VE study early allows the recommendations to be considered without disruption to the design process.

2. Funding. The Design Project Manager will confirm or obtain sufficient funding in the PE phase for the VE study. The cost of a study can range from $15,000 to $75,000.

3. Scheduling VE Study. The Design Project Manager and State VE Coordinator determine the VE Team. Team members should not be directly involved in the project design.

Based on the project, the State VE Coordinator and the Design Project Manager will choose one of the following methods for conducting the VE study:

a. A Consultant is hired to perform all parts of the VE study. Two to three MDOT/FHWA personnel are invited to join the VE Team.

b. MDOT performs all parts of the VE study, usually facilitated by personnel from Performance Excellence Division.

c. A Consultant is hired to provide a VE Facilitator/Trainer and MDOT/FHWA will provide the VE Team.

4. Information Needed for VE Study. The Project Manager(s) gathers current project information and provides it to the VE Facilitator. The VE Facilitator distributes the information to the VE Team prior to the first day of the VE study. This information can include but is not limited to the following:

1. Existing Aerials
2. Project Photographs
3. As Built Plans, Base Plans
4. Project Area Map
5. Environmental Clearance Document or Issues
6. Right of Way Plans or Concerns
7. Agreements
8. Utility Plans or Encroachment Issues
9. Detour, Staging Concepts, or Restrictions
10. Traffic Data
11. Crash Data
12. Context Sensitive Design Issues
13. Constructability Issues
14. Current Cost Estimate
15. Scoping Reports/ Scope Verification Meeting Minutes
16. Design Exceptions / Variances
17. Construction/Letting Schedule
18. Structure Appraisal and Inventory
20. Geotechnical Soils Reports and Foundation Reports
21. Hydrology/Hydraulic Information
22. Maintenance Records

In addition, the Project Manager should develop a written document to provide the VE Team with information on functionality (what is main purpose of project), constraints, needs, and/or any requirements that the VE Team should know about.
5. The VE Study. The VE study consists of the following phases:

Information Phase: The Project Manager presents project background information and is available for questions. The VE Team determines the needs, requirements, and constraints of the owners/users/stakeholders, as well as the design criteria. The VE Team develops a cost model, breaks the project down into functions, and performs functional analysis.

Speculation Phase: Brainstorming takes place to generate ideas to add value to the project without changing the function.

Evaluation Phase: The best ideas from the Speculation Phase are selected for consideration based on best blend of performance, cost and schedule.

Development Phase: Best ideas are developed into VE proposals and design recommendations through sketches, cost estimates, and schedules. Both initial and life-cycle costs will be examined.

Decision Phase: The Decision Team decides if the VE Proposals should be Accepted, Accepted for Further Study or Rejected. The final decisions are documented by the VE Team facilitator in the final VE Report. If a VE recommendation has a potential savings of more than $1.0 million, the Region Engineer must also be included on the Decision Team.

6. The VE Study Report. The VE Facilitator/VE Team prepares and provides electronically a final report. A typical report includes the following: executive summary, participant list, research sources, project history (including project criteria, commitments, and constraints), existing design, performance criteria, basic functions, life cycle cost estimate, proposal descriptions and cost calculations, implementation plan and documentation of MDOT’s decisions regarding the recommendations.

The State VE Coordinator saves the final report in ProjectWise and provides a copy to the FHWA.

Recommendations Accepted for Further Study. The MDOT Project Managers will report the outcome of unresolved recommendations that were labeled as “Recommendations Accepted for Further Study” to the State VE Coordinator for the annual report.

7. Annual Reporting

MDOT Annual Report. The State VE Coordinator prepares an annual report on the VE recommendations received during the previous year. The report includes certain cost and savings data (recommendations, recommended cost savings, VE study cost, etc.). It is provided to MDOT Management and staff involved in scoping new projects to encourage alternate solutions that provide cost savings or maximized benefits at little or no increase in cost.

FHWA Annual Report. The State VE Coordinator submits an annual report to the FHWA Division Office each year for national compilation and distribution. The report includes the number and cost of VE’s and VECP’s held and the value of recommendations made (both accepted and rejected).
REQUEST FOR PRELIMINARY MAINTAINING TRAFFIC (PPD Task Description 3390, 3540 & 3550)

Once the design has proceeded to a point where the proposed scope of work has been defined (typicals with existing and proposed dimensions, plan sheets with existing and proposed curb lines, etc.), the Project Manager should request a preliminary maintaining traffic scheme from the Region/TSC Traffic and Safety representative. This may include such items as:

- a detour route with any required work to accommodate the proposed traffic
- identification of local special events that may influence traffic during construction or that may be substantial enough to require scheduling the project around the activity
- the use of temporary traffic signals
- the use of temporary cross-overs or a runaround
- preliminary maintaining traffic special provision
- temporary and or permanent pavement markings
- construction staging plans/typicals

It is at this stage when critical construction staging issues may be identified that may significantly influence the proposed scope of work and the corresponding project cost. Situations such as a proposed reconstructed section not wide enough to maintain traffic that has no available detour route or a structure on a detour route with load restrictions often are not identified until this stage. It is essential that a preliminary maintaining traffic scheme be included for review at The Plan Review Meeting.

PRELIMINARY GEOMETRIC REVIEW FOR NON-FREeway RECONSTRUCTION / NEW CONSTRUCTION (4R) AND FREeway RESURFACING, RESTORATION, REHABILITATION AND RECONSTRUCTION / NEW CONSTRUCTION (3R/4R) (PPD Task Description 3560)

During preliminary design on Non-Freeway Reconstruction/New Construction (4R) and Freeway Resurfacing, Restoration, Rehabilitation and Reconstruction/New Construction (3R/4R) projects, it is necessary to have a review by the Geometrics Section of the Design Division. For further discussions on these classifications see Sections 3.08, 3.10 and 3.11. This review will evaluate such areas as:

- sight distance
- design speeds
- curve and interchange placement
- turning radii
- exit and entrance ramps
- driveways
- turn lanes
- roadside safety
- intersection design

Once the design elements have been identified and included in the plans, a memo with a set of plans (or appropriate plan sheets) should be sent to the Supervisor of the Geometrics Unit requesting a review and recommendations by a specified date. This should be done when base plans are available to allow any revisions/additions to be incorporated into the plans prior to The Plan Review. The memo should indicate the classification (3R or 4R) of the project in general (see Section 3.08.01C for combined work types).

Non-Freeway Resurfacing, Restoration and Rehabilitation (3R) projects (see Section 3.09) may be coordinated during plan development on an informal basis.

Regardless of the type of work, all outstanding geometric issues should be resolved prior to submitting for The Plan Review.
14.30 (revised 12-17-2018)

PRELIMINARY CONSTRUCTABILITY REVIEW
(PPD 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 Form 1961). After the Job Concept Statement has been created in JobNet, 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 12-17-2018)

ENVIRONMENTAL REVIEW AND CLEARANCE

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

14.31.01 (revised 12-17-2018)

Environmental Classification
(PPD 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)/Cost and Scheduling Engineer and MDOT Environmental Staff.
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 (JobNet) 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 JobNet. Classification is scheduled to occur on or before the completion of Base Plan Review (PPD Task 3380).

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:


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

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.
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.

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.

A final SDCM should be prepared and submitted with the FPC package and defined on the Design Plan Submittal Form (0303 – Comments Section) and noted on the Milestone Checklist – Supporting Documents Section – Environmental Classification (1775) Row. 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 FPC 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.
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 (revised 2-26-2018)

Environmental Certification (PPD 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 (PPD 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 JobNet.
MDOT ENVIRONMENTAL PERMITS

Permits from the Michigan Department of Environmental Quality (MDEQ), the Michigan Department of Natural Resources (MDNR) and/or the Army Corps of Engineers are required for projects that involve work in wetlands, inland lakes, streams, drains, flood plains, critical sand dune areas along the shores of the Great Lakes and navigable rivers/harbors. A current summary of the most frequently needed environmental permits is listed below:

- Michigan Act 451, Natural Resources and Environmental Protection Act of 1994
  - Part 31: Water Resource Protection (including NPDES and Flood plain Authority)
  - Part 91: Soil Erosion and Sediment Control
  - Part 301: Inland Lakes and Streams
  - Part 303: Wetland Protection
  - Part 365: Endangered Species Protection

- Federal Section 404: Clean Water Act of 1972
- Federal Section 10: River and Harbor Act of 1899

The Environmental Section in the Project Planning Division determines which regulations apply to a specific project and can help make recommendations for the project to better address the applicable policies. To make such determinations, project scope, location and a set of plans are required. The review may also involve field inspections or wetland delineation. The Environmental Section is also responsible for submitting the appropriate paperwork to the regulatory agencies for permits.

Clearance

The scope of work statement on project authorizations must be accurate and complete to insure the appropriate concerns can be determined in a timely manner. Along with the analysis of other environmental impacts, the clearance process includes determining when permits are required for a project. This may involve discussions between the Design/Development Engineer and the Environmental Section and possibly a field review. Plans are often required in the environmental clearance process. It is important that when plans are requested by the Environmental Section, they are submitted as soon as possible or the clearance or permitting process could be delayed. Projects with substantial impacts may require a preliminary review with the MDEQ.

Oversight

Once a project with environmental impacts receives a clearance, a letter is sent to the Design/Development Engineer identifying the contact people (environmental) for necessary coordination. Projects involving wetlands, flood plains, inland lakes and streams are entered into a database according to plan completion date. A project status record is maintained by the Environmental Services Section by entering permit request and review information. Therefore any changes in scheduling or scope of work should be communicated to the Environmental Section so that project clearances and permit requirements may be monitored.
Application

Project Managers of projects needing MDEQ permit applications will receive a list of required information from the Environmental Services Section. Submitting incomplete application information will result in additional time before the permit application can be filed with the regulatory agency. Listed below is the required information for MDEQ permit applications:

All projects must include the following.

- Project location map indicating approximate locations of each regulated activity. This must have road names legible on an 8.5” x 11” size (Example: a USGS quad map enlarged with culvert extensions at county drains circle d.).
- County, township, range, and section numbers of regulated activities.
- Estimated project letting and construction start date.
- **Electronic half-sized plan set** (11” x 17”) and a legible **electronic** set of 8.5” x 11” plan sheets and cross sections of regulated activities.
- Information on soil erosion and sedimentation controls planned in conjunction with regulated activities.
- Information on any temporary structures or measures to be used in the regulated area during construction.

14.32.03 (continued)

For culverts at regulated streams and drains, plans should include the following:

- Plan view of the culvert and road.
- Cross section view of the culvert and road. For projects that have similar treatments for all culvert work, a typical cross section that applies may be used. Projects requiring an Army Corps of Engineer Permit require a separate cross section for each culvert including elevations.
- Dimensions of pipe/culvert openings.
- Earth excavation (in cubic yards) needed to complete the crossing structure project.
- Volume of riprap (in cubic yards) needed to complete the crossing structure project.
- List of names and addresses of riparian owners on the four quadrants of the watercourse if work requires public notice by the MDEQ. (Examples of work requiring public notice are culvert extensions that total more than 24'-0" or a replacement of a culvert of a diameter 66" or greater).
- For culvert replacements or new culverts, the bottom section of page 2 of the MDEQ application must be completed. Information to be provided includes elevations of the invert, low steel, high water and road grades at the structure and the low point of approach.
14.32.04 (revised 3-26-2012)

Duration

It normally takes 60 to 90 days for the MDEQ to complete the permit process. This may vary depending on federal involvement and public notice requirements. If a project becomes urgent, such as emergency scour protection, culvert failure or channel stabilization, the MDEQ can issue permits on an expedited schedule. Projects with large impacts (such as new bridges or interchanges) are classified by the MDEQ as red files and may require a longer processing period due to coordination with the Environmental Protection Agency and other federal agencies. Projects involving the Army Corps of Engineers also require a longer processing period. For MDEQ red files and Army Corps of Engineers permit applications allow four to six months for permit processing. The Army Corps of Engineers often requires a higher degree of specificity in its applications compared to the MDEQ and may request additional information depending on the project type.

14.32.05 (revised 3-26-2012)

Issued Permits

Permits should be incorporated into the proposal package so that any special requirements are included. Any changes in the project after permitting should be relayed to the permit coordinator in case a permit revision is required. The permit coordinator should also be notified if a project is shelved or the Critical Path indicates the construction scheduling extends beyond the effective date of the permit so that a permit extension can be requested.

For additional information on MDEQ Permits for Sewer and Water Main Plans see Sections 9.04.03 and 9.04.07.
PRELIMINARY ROW SUBMITTAL

(PPD Task Description 3361)
(PPD Milestone 331M)

Preliminary Right-of-Way (ROW) plans are developed for use by the Development Services Division to: conduct title searches and preliminary appraisals, assign parcel numbers, and prepare the ownership sheet. Preliminary ROW plans should be submitted at base plan submittal. An estimated number of parcels affected must be entered in the Planisware network to establish the task duration.

The Project Manager initiates the review process by including the Preliminary ROW plans for Base Plan Review in the ProjectWise workflow.

Additional information on preliminary ROW plans and plan requirements can be found in Sections 5.16, 5.17 and 5.18.

14.34

Section deleted.

FINAL ROW SUBMITTAL

(PPD Task Description 3581)
(PPD Milestone 361M)

The scheduled Final ROW date is one of the most important deadlines that must be met. Final ROW is submitted at the Preliminary Plan submittal stage. The signed Final ROW Plans and the Design Plan Submittal (Form 0303) give the Development Services Division the authorization to initiate acquisition activities. The design plans must have enough detail and review to have reached a point where the designer is reasonably assured that the ROW being requested will not be changed except for minor design revisions to accommodate the actual acquisition.

NOTE: On large projects, it may be desirable to have an informal plan review with representatives from the Project Development and Control Section of the Development Services Division, the Region Real Estate Agent and the Design ROW Engineer in Quality Assurance prior to the formal ROW submittal. This may help avoid future revisions and ensure that the Development Services Division is receiving all the information it needs.

Additional information on final ROW plans including plan content requirements can be found in Sections 5.16, 5.19 and 5.20.
THE PLAN REVIEW
(PPD Task Description 3590)
(PPD Milestone 352M)

Most projects being designed by the Region/TSC or its Consultants require a Plan Review meeting. Refer to the table, QA/QC Process by Template on the Plan Development Services intranet website to verify the need for a Plan Review Meeting. The meeting and corresponding field review should be conducted by Quality Assurance. Under unusual circumstances such as expedited project schedules or when a Quality Assurance Engineer is unavailable, a Region/TSC Design Engineer or Region System Manager may arrange to facilitate The Plan Review meeting.

Section 14.36.01 identifies the information that should be provided in the Preliminary Plan file at a minimum if required. The Plan File must be developed consistently with Section 1.02 and the current version of the Road Sample Plans.

Requirements

The Plan Review material will be submitted in the following 3 files:

1. Supporting Documents File
   A. See the project Milestone Checklist and Form 0303 Design Plan Submittal.

2. Proposal File
   A. See the project Milestone Checklist and Form 0303 Design Plan Submittal.

3. Plan File
   A. See Road Sample Plans and Chapter 1.

4. RID
   A. Place required RID files according to the Design Submittal Requirements in the RID Preliminary folder.
14.36.02 *(revised 12-17-2018)*

**Procedure**

1. When the Project Manager or Consultant determines the plans meet the requirements for The Plan Review, the project Milestone Checklist is completed to verify that supporting documents, proposal materials and plans are ready to submit. The materials are entered into ProjectWise using the file naming conventions outlined in Section 1.03.02.

2. The Project Manager fills out a Design Plan Submittal (Form 0303) and initiates the Certification Acceptance form. Include E-mail addresses for invitees outside of MDOT. Include dates that key personnel and conference rooms are available. They should be at least 3 weeks (preferably 4-5 weeks) from the submittal date.

3. The Project Manager will verify that ProjectWise (folder 3) is current with the following format:
   - 3 – Plan Review
     o Design Submittal Form and Minutes
     o RID Preliminary

   If the format is not correct contact the ProjectWise administrator to apply the proper template.

4. When the project is ready for final review, Form 0303 is placed in the ProjectWise subfolder “Design Submittal Form and Minutes” using the file name *Job Number_0303_DPS_Prelim.pdf* and the state is advanced to “Request for Meeting” to initiate submittal to Quality Assurance for review. The ProjectWise state on the three files containing plans, proposal material and supporting documents in the “Plan Review” folder are also advanced once to “Submitted for Review”.

5. The plans will be reviewed by Quality Assurance for completeness and a meeting date scheduled 4-5 weeks from the time of submittal. Instances where projects require a compressed schedule or scheduling without plans should be kept to a minimum. The 4-5 week period is needed to assure all participants are given ample time to review the plans prior to the meeting. This is essential to making The Plan Review as useful and productive as possible.

6. Plans and other material are made accessible in ProjectWise by the Project Manager. Quality Assurance distributes the same to non-ProjectWise users in an alternate deliverable and usable format. The reviewers include the following:
   - Operations Field Services Division
   - Region System Manager
   - TSC Manager
   - Region/TSC Resident/Delivery Engineer
   - TSC Development Engineer
   - Region/TSC Operations Engineer
   - Region/TSC Soils/Materials Engineer
   - Region/TSC Traffic and Safety Engineer
   - Region/TSC Maintenance Engineer
   - Region/TSC Utilities/Permits Engineer
   - Region/TSC Real Estate Agent
   - Region Resource Specialist
   - Region Bridge Engineer
     (Bridge Jobs Only)
   - Region Bridge Inspection Engineer
     (Bridge Jobs Only)
   - Environmental Services Section
   - FHWA Oversight
   - Design Utilities Section
   - Railroad Coordination Unit – Office of Rail (if applicable)
   - Geometrics Section- Design
   - Utilities/Permits Development Services Division
   - MDOT-RIDSupport
   - City or Village (if applicable)
   - County Drain Commissioner
     (if applicable)
   - County Road Commission
   - Department of Management and Budget (MIR Program)
   - Others identified by the Project Manager
14.36.02 (continued)

Procedure

During the review process, reviewers can deposit comments in to the Review Comments subfolder in ProjectWise. Prior to the meeting, the Project Manager incorporates all comments received into the plan set for discussion at the meeting.

7. After The Plan Review Meeting is held, either the Quality Assurance Engineer or Region/TSC Design Engineer must resolve any undecided or controversial issues and inform the individuals involved of the outcome (approval/rejection) of their proposal prior to the distribution of the meeting minutes. The meeting minutes and an electronic set of plans with Plan Review comments will be given to the Design Unit, and should remain in the project files until the project is closed out.

14.37 (revised 11-26-2018)

REVIEW OF PROJECT SCOPE, COST AND SCHEDULE

After The Plan Review has been completed, the Project Manager should review the project scope, cost (preliminary engineering and construction) and schedule. Any significant changes to the scope, cost and/or schedule should be submitted to the appropriate System Manager or Statewide Transportation Planning Division. See Section 14.15 (Change Request/Review of Project Scope, Cost and Schedule). Project Managers can access the JobNet home screen for more information on the S/TIP User Guides and the MPO/RTF Actions Page for more information on changes that trigger a Federal amendment.

NOTE: If the project was required to be, but not, on the approved STIP at the time of the Scope Verification Meeting (see Section 14.10), the Project Manager should again check to see if the project is on the STIP by following the instructions given in that section.

If the project is not on the STIP, the Project Manager must immediately notify Statewide Planning Section of the Statewide Transportation Planning Division in the Bureau of Transportation Planning. The approval process for the STIP involves many independent entities and cannot be expedited. Therefore, it is imperative that the Project Manager take action at this time to avoid possible delays in advertising the project.
14.38 (revised 12-17-2018)

ROW REVISIONS

ROW revisions occur only after final ROW is submitted, not between preliminary and final ROW submittals. Revisions should be processed whenever changes in proposed ROW occur or when changes in the design plans could affect the appraisal of and/or negotiations for a ROW parcel(s). ROW revisions are processed by submitting a completed Design Plan Submittal (Form 0303) to the Design ROW Engineer in Quality Assurance with the standard size reproducible(s) of the revised sheets and one print of each sheet with the revision circled in red. The Design Plan Submittal (Form 0303) should include a description of each revision. The Design ROW Engineer will review the plans and submit the ROW revision to the Development Services Division.

Revisions, unless originated by the Development Services Division, are strongly discouraged within six months of the project letting date. If a revision is necessary within six months of the letting, consult with the Project Development and Control Section of the Development Services Division, or the Design ROW Engineer to determine the best method for processing the revision.

Additional information on ROW revisions can be found in Section 5.21.

14.39 (revised 12-17-2018)

UTILITIES STATUS REPORT CERTIFICATION (PPD Task Description 3660)

All projects require a utility certification prior to the contract award. The utility certification is comprised of the completion and inclusion of the Utilities Status Report (Form 2286), and the Notice to Bidders – Utility Coordination document if necessary, in the final plan/proposal package distributed for review at the Final Project Coordination (FPC) Meeting and later submitted to the Specifications and Estimates Unit for processing prior to advertisement.

Form 2286 informs project bidders and the awarded contractor of utility impacts and/or coordination requirements that can be expected. Utility impacts will be described using the following four categories as indicated on Form 2286:

- Relocation work identified
- Utility to relocate prior to start date
- Notice to Bidders – Utility Coordination
- Work included in contract

A Notice to Bidders - Utility Coordination document must be used when one of the following conditions applies:

- There is contract work which will need to be coordinated with a utility’s work. The document describes in detail the coordination effort necessary.
- There may be utility facilities that could affect normal contractor operations and/or scheduling. The document includes additional information that may be useful to the contractor.
UTILITIES STATUS REPORT
CERTIFICATION

Procedure
Project Manager

1. Request preliminary Form 2286 and Notice to Bidders - Utility Coordination from the TSC Utility Coordinator in preparation for the Plan Review Meeting mailing.

   Note:
   If no utility involvement in the project, the TSC Utility Coordinator may provide the final Form 2286 and Notice to Bidders - Utility Coordination.

2. Request final Form 2286 and Notice to Bidders - Utility Coordination after the Plan Completion Date in preparation for final plan turn-in.

MDEQ PERMITS FOR SEWER AND WATER MAINS
(PPD Task Description 3680)

Plans that include additions or changes to water mains, sanitary sewers or combination storm and sanitary sewers require a Michigan Department of Environmental Quality (MDEQ) permit. The Project Manager should contact the Design Engineer-Municipal Utilities as early as possible in the scope verification/plan development process when water mains or sanitary sewers are involved. The Municipal Utilities Unit will complete the required plan sheets and specifications, seal the plans (Licensed Professional Engineer) and make the distribution to any municipalities involved. The municipalities will request the permit from the MDEQ and return an approved copy to MDOT. If possible, a copy of the permit should be included in the proposal. For additional information see Section 9.04.07.
PARTICIPATION AGREEMENTS
(PPD Task Description 3630)

14.41.01 (revised 12-17-2018)

General

Any questions with respect to the necessity of an agreement, cost participation, cost splits, or negotiation of terms in an agreement should be coordinated with the Utility Coordination, Permits and Agreements Section - Development Services Division. Agreements for State trunkline highway projects are prepared by the Utility Coordination, Permits and Agreements Section - Development Services Division in the following categories:

- Memos of Understanding (for activities performed by local agencies-PE, CE, ROW acquisition, etc.)
- Trunkline Transportation Alternatives Program projects
- Statutory-Act 51 Participation
- Extra Width Construction and Resurfacing
- Non-trunkline Work
- Municipal Utility (betterment or relocation)
- Turn back
- Parking
- Maintenance and Operation (bike path, sound walls, pedestrian bridges, etc.)
- Michigan Institutional Roads
- Joint Storm Sewers
- Detour Route Improvements
- Local Agency Permit Work within Trunkline right-of-way
- Lighting on non-freeway projects

The Utility Coordination, Permits and Agreements Section - Development Services Division is responsible for the negotiation of terms and preparation of agreements. Contact should be made as early as possible in the plan development process to allow adequate time for the proper coordination to process an agreement.

14.41.01 (continued)

Any correspondence with a local unit of government that involves participation, whether statutory or special, should be originated by or cleared through the Utility Coordination, Permits and Agreements Section - Development Services Division. Particular care should be used when citing cost estimates and federal participation since the agreement cost estimate figures may include higher contingency percentage and lower federal-aid participation ratios.

Information on work to be included in a contract at 100% local expense should be submitted to the Utility Coordination, Permits and Agreements Section - Development Services Division upon request for the additional work from the local agency.

Requests for agreements should be submitted to the Governmental Trunkline Engineer by e-mailing MDOT-TLAgreements@michigan.gov

Requests for agreements should be submitted prior to scheduling an FPC Meeting. The following information should be submitted for an agreement preparation:

- Project Agreement Checklist (Form 2047) - with any special conditions included in the project.
- Engineer’s Estimate-with proper agency splits (proposal level in AP Preconstruction).

Plans should include the following:

1. Corporate limits and itemized quantity splits to be participated in by the city for Act 51 work.

2. Itemized quantity splits for any 100% local work (work not participated in with MDOT funds).

Other agreements such as, non-contract traffic signal (Operational Services), right-of-way (Development Services Division) and general road and bridge maintenance (Maintenance Services) are processed by other areas within MDOT.
14.41.02 (revised 12-17-2018)

Estimates

The estimate provided to the Utility Coordination, Permits and Agreements Section - Development Services Division for agreement purposes should NOT include contingencies since a contingency factor will be added to the construction cost for agreement purposes. The estimate should be refined to such a degree that it will be within 25% of the final engineer’s estimate. Anything in excess of 25% should be called to the attention of the Utility Coordination, Permits and Agreements Section - Development Services Division. The estimate must be split along corporate limits for projects with city participation. Any modifications to the scope should be incorporated in a revised or amended agreement.

Upon receipt of the request for involvement, the Utility Coordination, Permits and Agreements Section - Development Services Division will contact the Design Unit to request any additional information required and will coordinate the agreement processing procedure.

14.41.03 (revised 12-17-2018)

Act 51 Participation

Act 51 Public Acts of 1951, as amended (1982), as amended by Public Act 459 of 2016, provides that cities having a population of 25,000 or more will participate with the Department in the cost of opening, widening and improving, including construction and reconstruction, of State trunkline highways within said cities not within limited access trunkline right-of-way. Cities required to participate, based on the 2010 census, are:

<table>
<thead>
<tr>
<th>OVER 50,000</th>
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<tbody>
<tr>
<td>12.5 % Participation</td>
</tr>
<tr>
<td>Ann Arbor</td>
</tr>
<tr>
<td>Battle Creek</td>
</tr>
<tr>
<td>Dearborn</td>
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<tr>
<td>Dearborn Heights</td>
</tr>
<tr>
<td>Detroit</td>
</tr>
<tr>
<td>Farmington Hills</td>
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<tr>
<td>Flint</td>
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<tr>
<td>Grand Rapids</td>
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<td>Kalamazoo</td>
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<td>Lansing</td>
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<tr>
<td>Livonia</td>
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<td>Novi *</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>40,000 to 50,000</th>
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</thead>
<tbody>
<tr>
<td>11.25 % Participation</td>
</tr>
<tr>
<td>East Lansing</td>
</tr>
<tr>
<td>Kentwood</td>
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<tr>
<td>Midland</td>
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<table>
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<th>25,000 to 40,000</th>
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<tr>
<td>8.75 % Participation</td>
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<td>Allen Park</td>
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<tr>
<td>Bay City</td>
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<td>Burton</td>
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<td>Eastpointe</td>
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<td>Holland</td>
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<tr>
<td>Inkster</td>
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<tr>
<td>Jackson</td>
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</table>

* City has changed participation range.

Guidelines for determining types of work which should or should not be included in Act 51 categories in AP Preconstruction for participating Cities and Villages are posted at Act 51 Participation Items.
14.41.03 (continued)

Act 51 Participation

In order to facilitate the administration of this portion of Act 51, P.A. 1951, as amended, the Utility Coordination, Permits and Agreements Section - Development Services Division should be contacted to determine whether an agreement is required for a project and to determine the items requiring participation if the project lies within or partially within the corporate limits of any of the previously noted cities.

14.41.04 (revised 12-17-2018)

Maintenance

Maintenance work is excluded from statutory participation. The distinction between maintenance and construction items in a contract is sometimes hard to determine. The Utility Coordination, Permits and Agreements Section - Development Services Division will make the final determination. Generally, the following items are considered as non-participating, even though they may be in a construction contract:

- Replacing aggregate in a thickness of less than 3" on an existing gravel or stone surface where the original material has been lost or bladed off.
- The installation of traffic signs, delineators, or pavement markings other than those required for the maintenance of traffic during construction.
- Installation of freeway lighting for traffic safety.
- Nominal repair or painting of structures.
- Replacement of pavement joints unless performed in conjunction with a project to prepare the roadway for resurfacing.
- At existing railroad crossings, the installation of railroad crossing warning devices and the reconstruction or replacement of crossing materials, including maintaining traffic, detours and minor roadway approach work.

- Seal coating, patching and repairing of roadway surfaces.
- Snow and ice removal.
- Cleaning of road and street surfaces.
- County drain assessments.
- The trunkline share of traffic signals unless specifically included as part of the agreement with the participating city or village.
- Brushing and tree trimming other than in connection with a roadway improvement.
- Reconditioning of hot mix asphalt surfaces of any length by scarifying and remixing in place, or resurfacing without scarifying when the new material added increases the existing HMA surface less than 1½".
- Application of dust control layers, sprinkling and flushing.
- Outdoor advertising sign removals without widening or relocating the roadway.
- All work programmed as Capital Preventive Maintenance (CPM).
- Upgrading of existing sidewalk ramps or construction of new sidewalk ramps in order to comply with federal requirements under the Americans with Disabilities Act (ADA), ONLY when required ADA compliance is a direct result of CPM work.
14.41.05 (revised 12-17-2018)

Extra Width Construction or Resurfacing

Act 51 is specific as to the width of pavement for which the Department is responsible. An agreement is necessary whenever the proposed work covers a width greater than the Department can justify.

In any city or village, the width of a State trunkline highway will be the width required to serve expected future traffic needs for a 20 year period, as determined by a Department transportation survey. This width, except as noted below, will not be less than (1) the currently accepted standards for a 4-lane highway, (2) such width as may be built on the same trunkline route immediately beyond and adjacent to either legal boundary of the city or village, or (3) on trunklines eligible for federal highway funds, such width as may be prescribed by the federal government, whichever is greater. The Department and the governing body of a city or village by mutual agreement may determine that the width of a State trunkline highway will be less than the width prescribed above. If any city or village desires to widen a State trunkline highway for local purposes beyond the width prescribed above, the entire cost of the extra width must be borne by the city or village.

Resurfacing of any width greater than 47'-3" (64'-0" if parking is prohibited and marking is for 5 lane operation) or of any lane or bay on which parking is permitted should be reviewed with the Utility Coordination, Permits and Agreements Section - Development Services Division.

The Department will pay the costs for any construction on a trunkline highway where parking is permitted when the width is 47'-3" or less. If the resurfacing of the parking lanes is done at project cost, an agreement will be written that states that the Department may use the additional width for trunkline purposes, when and if, necessary.

14.41.05 (continued)

The Utility Coordination, Permits and Agreements Section - Development Services Division should be notified if there is a possibility of extra width construction or resurfacing. If so, it will conduct negotiations, make a final determination, and prepare an agreement if necessary.

14.41.06 (revised 12-17-2018)

100% Betterment for Local Party (non-trunkline work)

A local party, whether governmental or private, may request betterments to their local facilities, to be constructed in conjunction with a state trunkline project. Any such work requires a participation agreement. Regardless of the Division contacted, the Utility Coordination, Permits and Agreements Section - Development Services Division should be notified so that negotiations on the cost agreement can be started.

Betterments may be either improvement of utilities or any construction not required because of the trunkline project. Generally, this includes any construction beyond the spring points of the intersection on the local legs or the trunkline right-of-way lines extended (whichever is smaller), other than the minimum work to transition either in width or grade back to the existing road.
MICHIGAN DESIGN MANUAL
ROAD DESIGN

14.41.07 (revised 12-17-2018)

Municipal Utilities

General relocation of municipally owned utilities within their corporate limits is done at project expense, except for water main relocation (See Section 9.02.01B). If the relocation is part of the Department’s contract, no agreement is necessary; however, local notification is secured through the procedure outlined in Chapter 9 “Utilities.” If the relocation is to be done by the owner, or if the utility is located outside the corporate limits of the owner, an agreement is required. The Utility Coordination, Permits and Agreements Section - Development Services Division and the Municipal Utilities Unit will make the determination. For more information see Section 9.02.

14.41.08 (revised 12-17-2018)

Bicycle Paths

An agreement is necessary with the local government agency for the construction of independent bike paths within the limits of that agency. The Department will construct the path, including the initial signing, provided that the governmental agency agrees to certain conditions, principally a willingness to assume all maintenance responsibility. The agreement should be requested from the Utility Coordination, Permits and Agreements Section - Development Services Division at the beginning of the design phase. No agreement is required for shoulders designated as bike paths other than for reasons listed in other categories of agreements. For more information see Section 12.12.

14.41.09

Turnbacks

Turn back work will require an agreement. Cities with a population over 25,000 participate by statute. Special items or betterments are treated the same as regular trunkline work. Under some circumstances an agreement will be obtained only to outline the procedure for design, construction and transferring jurisdiction. Care in meeting these provisions must be exercised in the design process. Any work done in advance of or in anticipation of turn back may require an agreement to protect the Department’s interest. The Turn Back Law also contains provisions for making a lump sum payment to the local agency in lieu of a rehabilitation project. For more information see Section 12.03.

14.41.10 (revised 12-17-2018)

Parking

The Project Manager should notify the Traffic and Safety Unit of the possibility that a parking restriction agreement is required. The Traffic and Safety Unit will investigate the situation and formally request an agreement, if required. Any section of roadway being widened within the corporate limits of a city or village should be referred to and reviewed by the Traffic and Safety Unit. Resurfacing of any roadway in any city or village where parking is not prohibited should be reviewed.
Special Maintenance and Operational Obligations

When special conditions for either maintenance or operational obligations exist (sidewalks, bike paths, sound walls, pedestrian bridges, etc.), contact the Utility Coordination, Permits and Agreements Section - Development Services Division, as these must be covered by an agreement.

Michigan Institutional Roads (MIR Program)

Work done with MIR funds does not require an agreement since these are budgeted MDOT funds. Work is confined to roads open to the public. Institutions may request work on private roads, parking lots, or other items of benefit to them such as drainage or lighting. These items are not eligible for MIR funds and must be funded with a special account number. An agreement must be secured with the Department of Management and Budget by the Utility Coordination, Permits and Agreements Section - Development Services Division.

SPECIAL USE PERMITS

Special Use Permits (SUPs) are issued by local governmental agencies. Currently, except in a few instances, the Contractor is responsible for obtaining Special Use Permits. However, on occasion, construction delays can be caused if certain SUPs are required. Therefore, the Project Manager needs to address SUPs during the plan development process.

All SUPs are not required to be obtained during the design phase, only those that have the potential to delay construction. To determine which SUPs could impact construction schedules, the Project Manager should list any possible SUPs on the title sheet prior to submittal for The Plan Review. These can be discussed separately at The Plan Review and a determination made as to which, if any, are required to be obtained prior to advertising. The minutes from The Plan Review will indicate any SUPs that are required. The Project Manager will coordinate the work with the appropriate individual(s) to obtain the SUPs prior to the distribution of the plan/proposal package for the FPC Meeting. Any required SUPs should be included in the plan/proposal package submitted to the Specifications and Estimates Unit.

A partial list of Special Use Permits is given below:

- Mining (wetland)
- Night work
- Noise
- Tree cutting/replacement
- Burning
- Water system connections
- Public utility
- Concrete plants of crushers
- Pavement breakers
- County drain
- Dust control
- Storm sewer connection
- City/Township ordinance
- Other
SPECIAL DRAINAGE DESIGNS

The Special Drainage Structure Engineer in the Municipal Utilities Unit assists in the preparation of plans and specifications for various highway drainage structures including mechanical systems for pump houses, tunnel storm sewers, inverted siphons, special manholes, junction chambers, slab culverts, box culverts, precast three sided culverts, precast arch culverts, head walls, and circular culvert extensions. All requests for such work should be directed to the Design Engineer - Municipal Utilities Unit, Utilities, Drainage, and Roadside Section Design Division. Requests for design assistance must be made as soon as possible after the scope verification meeting.

COUNTY DRAIN REVIEW

When it becomes evident a county drain will be affected by a project, the Project Manager should contact both the Region/TSC Drainage Coordinator and MDOT Drainage Coordinator (Supervising Engineer – Utilities, Drainage & Roadside Section in the Design Division) as soon as possible.

MDOT drainage coordination responsibilities are described in the MDOT Drainage Manual, Section 2 Legal Policy and Procedures, Appendix 2-D, Attachment B.

MAINTAINING TRAFFIC AND CONSTRUCTION STAGING

(PPD Task Descriptions 3820 & 3830)

After the Plan Review Meeting has been held and the plans revised accordingly, the Project Manager should request the final maintaining traffic scheme from the Region/TSC Traffic and Safety representative. This should include the following applicable items:

- maintaining traffic special provision
- all pay items and quantities
- temporary and/or permanent signing
- temporary and/or permanent signals (this may have to be coordinated with the Operations Field Services Division)
- a copy of any agreement(s) authorizing MDOT use of a detour route
- maintaining traffic plans and staging typicals/plans

The above request can be initiated by sending a memorandum and an up-to-date set of plans to the Region/TSC Traffic and Safety representative. On large projects with separate staging typicals and/or plan sheets or unique/complex projects, a meeting with the Project Manager, Resident/Delivery Engineer, Traffic and Safety representative(s) and Utilities and Permit representative(s) may be beneficial to guarantee the plans, proposal and maintaining traffic special provision are compatible.
14.46 (revised 12-17-2018)

FINAL GEOMETRIC AND SAFETY REVIEW (PPD Task Description 3810)

After The Plan Review Meeting has been held and the comments are incorporated into the plans the Project Manager should transmit a set of plans to the Geometrics Unit of the Design Division for review. On large projects this may include several transmittals, discussions, meetings, etc. periodically during development of the final plan/proposal package. It is essential to have geometric and safety items reviewed and approved prior to the FPC Meeting to avoid delays and last second revisions. Items to review may include:

- sight distances
- design speeds
- curve and interchange location
- turning radii
- exit and entrance ramps
- driveways
- turn lanes
- storage and transition lengths
- superelevation
- roadside safety
- intersection layout

This review is only to allow the Geometrics Unit to verify that all previous recommendations have been incorporated in the plans.

14.47 (revised 12-17-2018)

RIGHT OF WAY MONUMENTING

Monumentation of trunkline Right-of-Way has presently been discontinued due to both a lack of funding and shortage of personnel. Permanently monumented Rights-of-Way benefit the Department both as physical evidence of the location of trunkline and property boundaries as well as reducing the costs of future surveys, adjacent surveys and other boundary control issues. Therefore, it is still to be included in construction plans as defined by the situations below.

Right-of-Way monumenting and documentation must be done by a Professional Surveyor licensed to practice in the State of Michigan.

14.47.01

New Construction

On new construction, ROW monumentation should be placed along the ROW at every deflection, Curve PC and PT, intersections with section lines, plat boundaries, and crossings with municipal Rights-of-Way. The monument locations should be coordinated with the project control and shown on the construction and ROW plans labeled with their Station and Coordinate values. The actual numbering of monuments should be coordinated with the Lansing Design Survey Unit. The scope of services for such a contract should be prepared by the Lansing Survey consultant management staff or the Regional Surveyor (if not included in the construction contract). Funding must be identified for any such work.
14.47.02 Improvements Requiring ROW Acquisition

On existing facilities requiring ROW, monuments should be placed so as to define the boundary of any newly acquired parcel (total or partial take). Those extending through platted areas should monument any new plat corner locations. These locations should be coordinated with the project control and shown on the construction and ROW plans labeled with their Station and Coordinate values. The actual numbering of monuments should be coordinated with the Lansing Design Survey Unit. The scope of services for such a contract should be prepared by the Lansing Survey consultant management staff or the Regional Surveyor (if not included in the construction contract). Funding must be identified for any such work.

14.48 (revised 12-17-2018) REQUEST FOR TURF ESTABLISHMENT RECOMMENDATIONS

Once the limits of earthwork are known and the construction schedule has been determined, the Project Manager should include the Region Soils Engineer and the Statewide NPDES Resource Specialist in all electronic plan submittals throughout the duration of the project to confirm the correct Soil Erosion Sedimentation Control (SESC) Measures have been properly implemented and finalized before the FPC Meeting. The Project Manager will contact Region/TSC construction staff or the Roadside Development Unit for turf establishment recommendations.

14.47.03 Improvements Not Requiring Row Acquisition

Existing Rights-of-Way typically have sufficient evidence or occupation (i.e.: fences, existing monumentation, etc.) to indicate the location of the boundary. Monumentation in these situations is not recommended. Any dispute involving the location of any ROW boundary should be resolved by formal survey on a case by case basis.

14.47.04 Coordination

Currently, MDOT rarely provides funding for monumentation. Project Managers for projects requiring ROW acquisition should contact the Lansing Design Survey Unit for direction in what, if any, monumentation information should be included in the plans.
CRITICAL PATH NETWORKS

Critical Path Networks are often needed to develop the progress schedule for a project. They are required on any project designated to include an Incentive/Disincentive or Special Liquidated Damages clause. Critical Path Networks are also recommended for projects with the following characteristics:

- New construction
- Major reconstruction or rehabilitation on an existing roadway that will severely disrupt traffic.
- Unique or experimental work.
- More than one construction season.
- Complex staging (multiple stages with traffic shifts).

There may be projects that do not fall under the above characteristics which should have a Critical Path Network. The Project Manager should evaluate each project separately. Construction Field Services Division staff and the Resident/Delivery Engineer assigned to the project should be consulted when determining the need for, and, when developing a Critical Path Network.

A list of construction time estimates for use in developing critical path networks is included in Appendix B at the end of this chapter.

FINAL CONSTRUCTABILITY REVIEW
(PPD Task Description 3860)

Once the revisions from The Plan Review Meeting have been incorporated into the plans, Final Plans begin. After the final maintaining traffic special provision has been received, and staging typicals and/or plan sheets have been completed, this information plus any unique special provisions should be sent to the Resident/Delivery Engineer for review. Discussions concerning a Construction Critical Path Network, if applicable, should also occur at this stage. In conjunction with the Constructability Review Checklist (Form 1960) for the Project Development/Design Phase, the work in this task must be addressed prior to the distribution of the final plan/proposal package for the FPC Meeting.

The final constructability review applies to all projects. On small projects this task may consist of only the transmittal of plans to the Resident or 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. For projects in templates that do not require an FPC Meeting, the Final Constructability Review must be completed prior to Plan Completion.
14.51 (revised 12-17-2018)

INCENTIVE AND LIQUIDATED DAMAGES CLAUSES

There are two inducements to completing work by the prescribed completion date or time. These are in addition to the normal schedule of Liquidated Damages included in Section 108.10 of the current Standard Specifications for Construction. Both are listed below.

1. Incentive payments - used primarily on critical projects where traffic inconvenience and delays are to be held to a minimum. The amounts are based on estimates of items such as traffic safety, traffic maintenance, and road user delay costs.

2. Liquidated Damages for Other Department Costs - based on increased user costs and/or additional cost incurred by MDOT; such as increased maintenance costs or costs due to the type of designs for temporary roads.

14.51.01 (revised 3-16-2015)

Guidelines

Guidelines for the development and use of Incentive or Liquidated Damages Clauses are as follows:

- Projects that are to be on an expedited schedule should be identified during the “Call for Projects” process and in the Project Concept Statement.
- Justification material such as hourly counts, user cost data and construction costs should be available prior to The Plan Review Meeting so a traffic control plan can be presented and reviewed at the meeting.
- When Incentive clauses or special expedited schedules are used, adequate Department staff must be available to maintain proper inspection and to assure a quality product.
- Projects should be straight forward and not require several different types of construction procedures or typical sections.

14.51.02 (revised 7-22-2013)

Applications

Incentive Clauses would be appropriate where the following conditions exist:

- A substantial savings in user costs can be realized by shortening the time of the traffic restrictions or completing the project ahead of schedule.
- Total additional user costs should be at least in the neighborhood of 5% of the project cost. $5000 per day should be considered as the daily minimum incentive for major projects. For smaller interim elements of a project, a lesser value may be used.
- The time of the traffic restriction should be long enough to allow the construction schedule to be compressed at least an additional 15 days, based on a completion date using an expedited schedule.
- Where capacity will be reduced below an acceptable level of service and no detour route is available.
- Where a detour route must be used and the detour has an unacceptable level of service.
14.51.02 (continued)

Liquidated Damages for Other Department Costs would be appropriate where the following conditions exist:

- Where additional costs would be incurred by MDOT in the form of maintenance costs on temporary roads, costs of over-designing temporary roads, maintaining traffic costs, etc. and where substantial additional user costs would be incurred or could be justified. An example would be a road being maintained on a detour or a temporary road through the construction area. The level of service would not be reduced but maintaining this situation beyond a specified date (winter shutdown) would create additional costs for MDOT. The amount of the Liquidated Damages should be substantive enough to cause the contractor to follow the schedule and to do the work as required otherwise the contractor may choose to pay the Liquidated Damages payment.

- Where the substantial user costs could be justified but the construction time is too short to allow a meaningful incentive period before the established completion date. An example would be to assess Liquidated Damages to assure the daily lane closures will not extend into the rush hour.

14.51.03 (revised 7-22-2013)

Procedure

As soon as the Project Managers are aware that Incentive or Liquidated Damages Clauses will be included in a project, they should request an analysis. Since the analysis often requires considerable data from different work centers, it is essential to give as much lead time as possible. The Project Manager should supply, as a minimum, the following information:

- all available traffic counts (24 hour)
- the number of lane closures, if applicable
- detour routes - distance and estimated travel times

Once the analysis is completed, reviewed, and approved the information is forwarded to the Project Manager and is incorporated into the progress clause.

The maximum cost (usually 5% of the total contract) must be included in the construction cost of the project and remain within the approved programmed amount.
REVIEW OF PROJECT SCOPE, COST AND SCHEDULE

Once the plans and proposal are completed and quantities have been entered into AP Preconstruction, the Project Manager should compare the estimate with the programmed cost. If a revision to the cost (or schedule) is required, a change request through JobNet should be submitted immediately. This will insure a decision concerning cost is reached prior to the FPC Meeting. If the cost increase is denied a revised scope, change in limits, etc. needed to reduce the cost to within the programmed amount can be incorporated into the plan/proposal package prior to distribution of the material for the FPC Meeting. It is essential that the AP Preconstruction estimate, when submitted to the Specifications and Estimates Section, be within the JobNet programmed budget allowable limits. This eliminates any delays in advertising due to funding.
14.54 (revised 12-17-2018)

**FINAL PROJECT COORDINATION (FPC)**
**(PPD Task Description 3870)**
**(PPD Milestone 387M)**

The Final Project Coordination indicates 90-95% completion of the plans, proposal and supporting documents herein after referred to as the FPC package. The FPC Meeting takes place 6-8 weeks prior to Plan Completion. See task timeline below.

<table>
<thead>
<tr>
<th>PPD Task</th>
<th>Duration</th>
<th>Weeks Prior to Letting</th>
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<tbody>
<tr>
<td>3840 Final Plans</td>
<td>Varies</td>
<td>36 (Varies)</td>
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<tr>
<td>3865 Region QA</td>
<td>1 week</td>
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<tr>
<td>3870 FPC Review</td>
<td>3 weeks</td>
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<td>388M FPC Review Meeting</td>
<td>1 day</td>
<td>27</td>
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<td>3885 Finalize Package</td>
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<tr>
<td>3880 Plan Completion</td>
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<td>3900 OEC/391M Certification Acceptance</td>
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<td>398M Plan Turn-In</td>
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<td>3910 Final Project Package</td>
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<td>6</td>
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<tr>
<td>910 S&amp;E Review</td>
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</tr>
<tr>
<td>3920 * Advertisement</td>
<td>6 weeks</td>
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</table>

* The Supervisor of the Specifications and Estimates Unit will determine which projects are candidates for letting with 3 or 4 week advertisements. Projects proposed for 3 week advertisements must have the approval of the Engineer of Design (except for Capital Preventive Maintenance, Non-Freeway Resurfacing Program and Pavement Marking projects).

**Note:** This is a general timeline. See Planisware for project specific network.
14.54.01 (revised 12-17-2018)

Requirements

The FPC Package material must include applicable items from the Milestone Checklist. If the submitted material is missing enough of the listed essential items, the System Manager will direct the Project Manager to cancel the meeting and reschedule when the material is more complete and/or available.

Every effort should be made to submit the project for FPC with Environmental Certification, ROW Certification, and approved design exceptions or variances, as well as any draft/approved Unique Special Provisions.

The FPC material will be submitted in the following files:

1. Supporting Documents
2. Proposal
3. Plans
4. RID

Place required RID files according to the Design Submittal Requirements in the folder 5-Final Project Coordination RID. The materials are entered into ProjectWise using the file naming conventions outlined in Section 1.03.02. MDOT-RID Support will review the ProjectWise RID FPC folder and provide comments prior to the FPC Meeting. The Design Team will address the comments in the RID FPC folder and place the files for letting in the RID Documents folder located in folder 6-Letting Plans and Proposal> RID Documents. MDOT-RID Support will then confirm that all comments have been addressed and the RID files are ready for letting.

14.54.02 (revised 12-17-2018)

Procedure

1. When the Project Manager or Consultant determines the plans meet the requirements for the Final Project Coordination, the Milestone Checklist is updated to verify the supporting documents, proposal materials and plans are ready to submit. The materials are entered into ProjectWise using the file naming conventions outlined in Section 1.03.02.

2. The Project Manager updates the Design Plan Submittal (Form 0303) and CA form.

3. The Project Manager will verify that ProjectWise (folder 5) is current with the following format:
   - 5 – Final Project Coordination
     - Design Submittal Form
     - RID

   If the format is not correct contact the ProjectWise administrator to apply the proper template.

4. When the project is ready for FPC review, a PDF copy of Form 0303 is placed in the ProjectWise subfolder “Design Submittal Form” and the state is advanced to “Ready for System Manager Review”.

5. The System Manager will verify that the package is sufficient to hold a productive FPC review meeting and items from the Milestone Checklist are included. The System Manager advances the state to “Meeting Scheduled and Ready for Review”. The Project Manager schedules the FPC meeting with a calendar appointment, 3 weeks from the time of submittal, with the date, time and location of the meeting with a link to the FPC package. See Section 14.54.03 for recommended review invitees. See chapter 1.3 of the Development Guide for further guidance on creating the review meeting appointment.
6. The Project Manager advances the state on Form 0303 and the three files in folder 5 (plans, proposal and supporting documents) to “Review in Progress”.

7. The Project Manager will conduct the FPC Meeting. During the meeting the Project Manager will document responses to the review comments within the electronic files. The purpose of this meeting is to discuss and resolve all final conflicts, contradictions, omissions, etc. If participants at the meeting are unable to resolve a conflict, the Project Manager should report the conflict to his/her supervisor for resolution.

8. Following the meeting, the design team will respond to the review comments that were not documented during the meeting and change the state from “Design Team Response” to “Completed”.

Attendees

See “Review meeting contacts list.xls” in Supporting Documents Milestone Forms list for the reviewers to be included for the Final Project Coordination. The following should attend the FPC Meeting:

- Project Manager/Cost and Scheduling Engineer
- Design Engineer(s)
- Construction Engineer(s)
- Operations Engineer
- Traffic & Safety Engineer
- Utilities/Permits Engineer
- TSC Maintenance Coordinator
- Region Quality Assurance Engineer
- Quality Assurance
- Geometrics Unit
- Environmental Clearance Coordinator
- Construction Field Services Division

Others (if applicable):

- FHWA Oversight
- Consultant Coordinator
- Consultant
- Electrical Unit/Lighting Unit
- Municipal Utilities Unit
- Hydraulics/Hydrology Unit
- Roadside Development Unit
- Signals (Operation Field Services Division)
- Signs
- Pavement Marking
- Region Real Estate
- Railroad Coordination Unit
- City or Village
- County Drain Commissioner
- County Road Commission
- MDOT Geotechnical Services Unit (if project includes bridge foundation work)
- MDOT Bridge Structural Fabrication Unit (if project includes bridge fabrication work)
14.54.03 (continued)

Ensure the Specifications & Estimates Unit receives notification of the FPC review. An estimator will review the estimate, adjust any unit costs and return it to the Project Manager prior to the FPC Meeting so that any funding problems can be discussed at the FPC Meeting.
14.55

CONTRACT SELECTION TEAM (DBE PROGRAM)

Each fiscal year the State Transportation Commission adopts a percentage goal for Disadvantaged Business Enterprise (DBE) participation on selected federally funded projects (all projects with any federal funding are eligible). The Contract Selection Team was established to set the DBE percentage on each MDOT construction project in order to meet or exceed the MDOT goal.

The DBE program attempts to aid DBE contractors in gaining the necessary skills to compete in their chosen field.

The Contract Selection Team may establish varying DBE levels of participation in order to achieve MDOT’s annual goal. However, due to location, type of work, or cost, some projects are not appropriate candidates for DBE participation.

The Project Manager should contact the Contract Selection Committee with any questions concerning established percentages.

14.56 (revised 12-17-2018)

PACKAGING OR CONSOLIDATING PROJECTS

Occasionally it may be advantageous to combine two or more projects into one contract. The benefits may include lower bid prices, improved maintaining traffic coordination, eliminating possible conflicts with more than one contractor working in the same area and reduction and/or simplification of required documentation during construction of the project. Projects that are scheduled for the same letting and are located in the same area should be considered for consolidating or packaging under one contract.

Consolidation is the combining of projects into one contract under one job number. Packaging is combining of projects into one contract but with separate job numbers for each project.

When consolidating, projects must have the same construction funding. Federal-aid projects must be on the same federal route and section. If projects are consolidated under one job number, usually the number associated with the largest project is the remaining number.

Projects programmed with different types of construction funding or that are not in the same federal section, although not eligible for consolidation, can be packaged into one contract. The projects have to retain separate job numbers but are advertised, bid, and let under one contract. Construction personnel have to maintain separate records for each project. The shared Contract ID is developed from the predominate Control Section with in the lowest job number of those being packaged together. This will also apply to the Progress Clause and MOT Special Provision where the Contract ID is also listed. Other locations, separate job numbers will be listed.

Projects with DBE (Disadvantaged Business Enterprises) requirements cannot be consolidated or packaged without prior approval from the Contract Selection Committee (DBE).
14.57 (revised 12-17-2018)

PLAN COMPLETION & OEC/CERTIFICATION ACCEPTANCE (PPD Milestone 380M) (PPD Milestone 391M)

The Plan Completion date indicates 100% completion of the plans, proposal and supporting documents.

As part of the stewardship agreement with the FHWA, MDOT developed a procedure involving a system of checks/reviews to verify all requirements of the agreement are met. The Department also made the decision to use the majority of the process (completion of the Certification Acceptance form) on all projects (Federal and M funded), including those classified as FHWA Oversight. The verification is accomplished by completing the Certification Acceptance form. The form includes reviews (with confirmation by e-signatures) by several divisions and sections within the Bureau of Highways. Once the form is complete in the ProjectWise Supporting Documents folder, it is submitted to the Specifications and Estimates Unit at final turn-in. The required signatures (or initials) are listed below:

- Bridge Design Unit (if applicable)
- Project Manager/Cost and Scheduling Engineer / Design Engineer / Consultants
- Quality Assurance Engineer
- Specifications and Estimates Engineer
- Utility Coordination and Permits
- Governmental Coordination and Engineering
- Office of Rail
- Drainage Engineer
- Force Account Work (if applicable)
- Geometric Design Engineer
- Traffic Signs and Delineation
- Traffic Signals
- Region/TSC Traffic and Safety
- Resident/Delivery Engineer
- FHWA Area Engineer (if applicable)

14.57 (continued)

The following documentation should be in the applicable ProjectWise location prior to final submittal to the Specifications and Estimate Unit.

- Environmental Classification (Form 1775) Special Design Considerations Memo
- Mitigation measures required in the environmental document (EIS, FONSI)
- Permits
- Copies of Scope Verification and The Plan Review Meeting minutes.
- Design Exceptions / Variances
- Waiver-Planting Wildflower Expenditures
- Pavement Selection Review Committee Approval Letter.
- Approved Unique Special Provisions

On FHWA Oversight projects, the Certification Acceptance form must be complete and then signed by the FHWA Area Engineer, prior to submitting the final plan/proposal submittal to the Specifications and Estimates Unit.
14.57.01

**Procedure**

1. Following the Final Project Coordination Meeting, the design team will incorporate the accepted review comments and complete the final plans and proposal package.

2. When plans are 100% complete (Plan Completion) the plan and proposal files are placed in folder 6 – Letting Plans and Proposal. The design team advances the state to “PM Review in Progress”. The Project Manager is responsible for verifying all the agreed-upon revisions are incorporated into the plans.

3. The reviewers from FPC and those required to sign the Certification Acceptance are notified with the state change to “CA Sign Off”. The reviewers and signers are responsible for verifying that their concerns have been resolved with the final plans. Certification Acceptance signers will e-sign the CA form.

4. The Project Manager advances the state to “Initiate Final Project Review” to submit the completed plans to Specifications and Estimates.

5. The Project Manager will also submit the Supporting Documents by selecting all files in that folder and changing state to “e-Prop – Initial Final Project Review – Supporting Documents”.

14.58 (revised 12-17-2018)

**APPROVAL OF SPECIAL PROVISIONS**

In order to clarify terminology surrounding this subject, the following definitions are provided:

1. **Standard Specifications.** - The book of specifications approved for general application and repetitive use.

2. **Supplemental Specifications.** - Detailed specifications that add to or supersede the Standard Specifications.

3. **Special Provisions.** - Revisions or additions to the Standard and Supplemental Specifications applicable to an individual project.

4. **Frequently Used Special Provisions.** - An approved special provision with stable requirements applicable to a number of projects used on a regular basis.

5. **Addendum** - a change, addition and/or deletion to the contract documents occurring after a project is advertised but before the letting date.

Occasionally, information in the plan/proposal package may differ or conflict. To help in resolving such conflicts, the following order of preference has been established per the 2012 Standard Specifications for Construction:

1. All proposal material except those listed in subsections 104.06B through 104.06F
2. Special Provisions
3. Supplemental Specifications
4. Project Plans and Drawings
5. Standard Plans
6. Standard Specifications
APPROVAL OF SPECIAL PROVISIONS

All unique special provisions that are part of the proposal must have the approval of the Design Division prior to contract printing and advertising. When a project is submitted to the Specifications and Estimates Unit for advertisement with unapproved unique special provisions, the Project Manager must complete Form 2908 Special Provision - Exception Risk Analysis, including approval by the appropriate region engineer. Although minimal use is encouraged, this form does allow for exceptions for multiple unique special provisions. These do not include the Frequently Used Special Provisions, which are reviewed and approved before they are placed on the FUSP list. The Project Manager should submit any unique special provisions for approval as soon as possible during project design, but no later than 30 working days (6 weeks) prior to the plan completion date. The special provision(s) must be placed in folder “Special Provisions – Unique” under “Letting Plans and Proposal” (folder 6) and state advanced to begin the review and approval process. Special provisions must be submitted in MSWord format following the guidelines outlined in Chapter 11. Consultant-written Special Provisions must also be submitted for approval by the MDOT Project Manager following the same process as internal designs. Drafts of these should be available for review and discussion at The Plan Review meeting.

Project Managers are encouraged to use previously approved Special Provisions whenever possible. To review an index of available approved Special Provisions, see the Previously Approved Special Provisions page on the MDOT Web site. If any changes are made to the approved document, it must be saved with another filename. When submitting a revised (previously approved) Special Provision, the redline and strikeout features under MSWord (track changes) should be used to delineate the changes made to the original document. This will substantially expedite the approval process.

For additional information regarding Special Provisions including a sample format see Chapter 11 (Specifications and Estimates) of the Road Design Manual.
SHELF PROJECTS

Projects with completed plan/proposal packages that do not have funding or approval for advertising and letting should not be submitted to the Specifications and Estimates Unit for processing. The Project Manager should verify all the contents of the plan/proposal package necessary for submission to the Specifications and Estimates Unit are included and correct. Once completed, the Project Manager should inform the Region System Manager of the completion of a “shelf project.” The Region System Manager will verify the project is indeed a “shelf project.” The Project Manager should periodically inquire about the status of the project.

Prior to submitting a “shelf project” to the Specifications and Estimates Unit for processing, the Project Manager must review the plan/proposal package and determine the amount and extent of revisions required to update the package. If a project has been on the shelf a significant amount of time the Project Manager should consider holding another FPC Meeting.
MICHIGAN DESIGN MANUAL
ROAD DESIGN

14.60

SUBMISSION OF COMPLETED PLANS

14.60.01 (revised 12-17-2018)

General

The final plan/proposal package should be submitted to the Specifications and Estimates Unit on or before the date listed in the calendar year’s schedule of Letting and Board Dates. This date should not be confused with “Plan Completion Date.” Plan completion date occurs after the FPC Meeting and is the date when 100% of the plans are completed. See Section 14.54 for task timelines. A copy of the letting schedule is located on the Plan Development Services intranet website.

The Supervisor of the Specifications and Estimates Unit will determine which projects are candidates for letting with 3 or 4 week advertisements. Projects proposed for 3 week advertisements must have the approval of the Engineer of Design (except for Capital Preventive Maintenance, Non-Freeway Resurfacing Program and Pavement Marking projects).

14.60.02 (revised 12-17-2018)

Requirements

All plan/proposal package and final supporting document submittals should include at least the following, in addition to the plans:

1. Title Sheet
2. Milestone Checklist
3. Proposal level cost summary (AP Preconstruction)
4. Unique special provisions (approved for project use) including maintaining traffic
5. Frequently used supplemental specifications and special provisions (package and checklist)
6. Required permits
7. Utility Relocation Status Report (Form 2286)
8. Utility Charge Estimate (Form 0223) - for bridge projects
9. ROW Certification for Advertising (Form 0725I or Form 0725N)
10. Coordination clauses
11. Completed and signed Certification & Acceptance
12. Notices to Bidder
13. Progress schedule with any incentive/disincentive clauses
14. Project Cost Estimating Checklist (Form 0268)
15. Exception with a memorandum signed by the Region Engineer acknowledging the risks and a completed Exception Risk Analysis (Form 2912).
16. Structure Lump Sum Items Worksheet (Form 2911) if applicable

The Project Manager must get approval from the Supervisor of the Specifications and Estimates Unit prior to submitting a final package without ALL of the above items.
Exceptions

There are some exceptions to the above minimum requirements for submittal of plan/proposal packages to the Specifications and Estimates Section. Exceptions are permitted in the following areas:

- Permits
- ROW Certification on non-federally funded projects
- Local Agency agreements
- Unique Special Provisions (not desirable and must have supporting signed/approved Risk Analysis)

In order to submit a package to the Specifications and Estimates unit with an allowable exception, the following steps must be followed:

- Perform a risk analysis for each appropriate exception.
- Invite appropriate experts for each exception to the FPC Meeting.
- Send the Exception Risk Analysis (Form 2912) along with the other required documents to the FPC participants (two weeks prior to the meeting).
- If the participants at the FPC meeting agree with your request for an exception, have them initial the Exception Risk Analysis (Form 2912).
- If the participants disagree with the need for an exception, they must attach written comments to the Exception Risk Analysis (Form 2912).
- The Exception Risk Analysis (Form 2912) along with any comments should be forwarded to the Region Engineer for their signature. The form is placed in the Supporting Documents folder in ProjectWise when the plan/proposal package is submitted to the Specifications and Estimates unit.
- If the exception is a permit, include a Notice to Bidders that a permit is required, the projected date of permit approval and identify any restrictive conditions.

Specifications and Estimates will not submit the package for advertisement without an approved exception.

Once a project is submitted to the Specifications and Estimates Unit the Project Manager can check ProjectWise for the status of a project.

Upon receipt of the plan/proposal package for processing, the Specifications and Estimates Unit may ask to review the project with the Design Unit in order to gain an insight into the type of work involved to determine if any additional special provisions and/or supplemental specifications are required.

Advertisement cannot occur until all projects within a contract have funding obligation. Funding obligation requests cannot occur without the following:

- All change requests in JobNet are approved
- Environmental Certification or Classification in JobNet is up to date
- ROW Certification or Conditional Certification is approved
- S/TIP CON phase is approved – if a JobNet change request increases the project budget significantly, a previously approved S/TIP phase may become pending, and will need to be approved again before obligation can occur
- FHWA has signed off on the CA Form, if necessary

Expedited or other projects requiring special attention should be brought to the attention of the Supervisor of the Unit prior to submittal. This includes projects without all the material described above.
QA/QC Review

It is the responsibility of the Project Manager to perform a QA/QC review of the entire plan/proposal package prior to submittal to the Specifications and Estimates Unit. As a minimum, in addition to those items listed under Section 14.60.02, the following items must be correct:

- Quantities and pay items on plan sheets must match those in AP Preconstruction.
- All Unique Special Provisions with a pay item must have a matching pay item in the plans and in AP Preconstruction.
- All 7000 numbers in AP Preconstruction must have a Unique Special Provision in the proposal.
- Any Frequently Used Special Provision with a pay item must have a matching pay item in the plans and in AP Preconstruction.
- All Frequently Used Special Provisions and Specifications include in the package are the latest version.
- AP Preconstruction files must be complete and correct.
- All references to standard plans and special details are the latest version.

AASHTOWare Project (AP) Preconstruction Files

Listed below are some directions/reminders concerning AP Preconstruction files:

- Project should be identified as J.N. with A (#######A)
- Proposal Contract ID should be “C.S.-J.N.”, with no extra spaces or characters, job number does not have an “A” or any other suffix
- If more than one job is packaged together, the Contract ID number is based on the predominate C.S. in the lowest numerical job number of those being packaged together.
- County number is filled in
- Spec year is correct, both at proposal and project level
- Section and Line number have been run
- Primary Region has been filled in
- Section List indicate “Road Work” or “Bridge Work”
- Long description entered using standard wording
- Number of plan sheets filled in
- Contract type is filled in
- All Pre-established prices have been marked
- Funding distribution adds to 100%
- Each Lump Sum item adds to a combined total of 1.00
- Administrative unit has been filled in
- Beginning and Ending termini have been filled in
- CE percentage is correct
- Control group changed to “DS” in the Project and Proposal level
- The unit bid requirement code (on Items tab) is fixed, NOT LOCKED, for all dollar items
- Project start date and completion date filled in
- The supplemental description for all 7000 items is the same as the pay item in the Special Provision.
14.60.05 (continued)

AASHTOWare Project (AP) Preconstruction Files

Listed below are some common oversights of plan/proposal packages submitted to the Specifications and Estimates Unit:

- Copies of Special Details not included in the plans.
- Undefined pay items. Every pay item used on the project must be covered by the Standard Specifications for Construction, Special Provision or Supplemental Specification.
- Identical pay items in both the road and bridge sections. These should be revised to appear in only one section. This eliminates the possibility of a Contractor bidding differently on the same pay item.
- Packaging of projects. Packages with road, bridge, utilities, signals, signing, etc. should be packaged prior to submittal to the Specifications and Estimates Unit.
- Project cost, including CE, not within the limits of JobNet CON phase programmed budget.
- Construction completion date exceeding a permit’s expiration date.
- Missing or incorrect Mobilization maximum amount.
- Funding for Incentive/Disincentive clause not programmed or quantity not properly entered in AP Preconstruction.

14.61 (revised 12-17-2018)

PRE-LETTING BRIEFING / PRE-BID MEETING

Pre-Bid Meetings are held for Contractors on complex or unique projects. These meetings are usually recommended by the Project Manager, Unit Leader or Engineer of Design, although others may propose the meeting be scheduled. Responsibility for arranging the meeting rests with the Project Manager. The Project Manager is also responsible for notifying the appropriate MDOT representatives (Construction, Utility-Permits, Traffic and Safety, Contracts, etc.) as well as outside agencies (cities, villages, counties, etc.) of the time and place. The Contracts Division will advertise the briefing.

The briefing consists of a presentation of the project by a spokesman of the Department before interested Contractors. The briefing is opened to questions after the presentation. Minutes should be recorded and distributed to the attendees.
14.61.01

Procedure

1. The Project Manager determines the need for a Pre-Bid Meeting. Projects with one or more of the following should be considered for a Pre-Bid Meeting:
   - a major project with programmed cost of $20 million or more.
   - a high impact project with a complex progress schedule.
   - a project with an expedited schedule, incentive/disincentive or increased liquidated damages.
   - project with complex traffic control and staging requirements.
   - project with extensive, new or unusual special provisions.
   - project in an environmentally sensitive areas (i.e. superfund site).
   - other projects which are unique, complex or experimental in nature.

Also, a determination as to whether the Pre-Bid Meeting is mandatory must be made at this time. Mandatory Pre-Bid Meetings should be rarely used.

2. Project Manager requests approval for Pre-Bid Meeting from Supervisor of the Specifications and Estimates Unit prior to advertisement of project, who reviews the request with Engineer of Design and notifies Project Manager and Financial Services (approvals only) of decision.

3. Project Manager arranges time and location of meeting. Pre-Bid Meetings should be scheduled a minimum of three weeks prior to letting to allow incorporation of any necessary changes by addendum. When selecting a location, consideration should be given as to whether the potential bidders may need/wish to visit the construction site.

4. Project Manager prepares a Notice to Bidders for inclusion in the proposal. This should be submitted with the plan/proposal package.

5. Project Manager identifies attendees (from MDOT) and notifies each of time and location of meeting.

6. Project Manager conducts meeting including preparation of agenda, distributing material to attendees, and taking notes at the meeting. For meetings which require attendance, a list of bidders in attendance must be submitted to Financial Services. Contractors must complete and sign the registration form to certify attendance.

7. Project Manager submits any changes (if required) to the Specifications and Estimates Unit for issuance of addendum.
CONTRACTOR INQUIRIES

During the advertising period, Contractors may contact the Department for clarification of plan/proposal material. Each proposal has a Notice to Bidders that specifies all inquiries be made by E-mail through the MDOT eProposal system. This is to ensure that all Contractors are given the same information (answers) and, therefore, an equal opportunity to bid the project. An MDOT eProposal Resource will post all contractor inquiries within the NTB Inquiry folder in folder 6, (Letting Plans and Proposal). The MDOT PM (Project Manager) will then post the response to the Inquiry within the same document when the correct response is determined.

The MDOT Project Manager/Cost and Scheduling Engineer will evaluate each inquiry and determine if it will have a significant impact on the bids and if an addendum is required. These inquiries may identify errors or oversights in the bidding document. If an addendum is required, the MDOT PM will submit the necessary information to the Specifications and Estimates Unit for review and distribution. The following information is intended to give some direction in dealing with Contractor Inquiries.

The MDOT PM may have to go to several sources to get an answer. If the answer is only a clarification of proposal or plan material that will not give the Contractor an unfair advantage in bidding the project, the MDOT PM can simply provide the answer via the NTB Inquiry System.

If the answer will give the Contractor an unfair advantage in bidding the project, the item is reviewed with the Supervisor of the Specifications and Estimates Unit to determine if an addendum should be issued.

If an addendum is required, the MDOT PM must take the necessary steps to ensure one is issued.

If it is too late to issue an addendum, the item should be bid as proposed. If the error or omission is significant enough, the project may have to be postponed or withdrawn from letting. See Section 14.64. Although undesirable, an alternate Letting may be necessary if the changes are too great from the original bid submittal.

Although all inquiries are supposed to be made a minimum of one week prior to the letting date (as stated in the proposal), they can still occur during the last week of advertising. Occasionally, these require a late addendum. The decision to require a late addendum should be discussed with the Supervisor of the Specifications and Estimates Unit. Late addenda must be approved by the Quality Assurance and Lettings Engineer prior to publishing.

Addenda are sent to prime Contractors only. If a Subcontractor makes an inquiry that results in an addendum, the addendum is sent only to the prime Contractor. MDOT is not responsible for notifying Subcontractors or suppliers.

Contractors may ask for additional information not contained in the plans such as exact locations of miscellaneous quantities on the note sheet or approval to substitute materials. These are examples of information the MDOT PM should not provide. Answers should be concise and only clarify, not expand the content of the plan/proposal material.
CONTRACTOR INQUIRIES

Please use the following standard language when responding to inquiries NOT made through the eProposal system:

“This inquiry was not made through the MDOT eProposal System. Please submit your inquiry using the eProposal System by using the link provided within the corresponding proposal page.”

In addition, when responding to Contractor Inquiries within ProjectWise, please use the following standard language and format for responses to the scenarios described:

1. Response WITHOUT an Addendum or Answer - Standardizes the “bid it as you see it” language that all PMs currently answer slightly differently

   “The above inquiry was received and reviewed by the MDOT Project Manager. An answer to this inquiry and/or an addendum was not deemed necessary for the requested information, it has been determined that all necessary information regarding this inquiry is contained in the existing plan and proposal package or within the RID documentation.”

2. Response WITH an Answer - Notifies Contractor that an answer to their inquiry has been provided

   - Answer

3. Response WITH an Addendum - Notifies Contractor that an addendum will be coming and gives them preliminary information as to what areas of the package it may alter

   “The above inquiry was received and reviewed by the MDOT Project Manager. It has been determined that an addendum will be necessary to address the requested information. An addendum will be issued to edit the following areas of the plan and proposal package:
   - Plans
   - Proposal
   - RID
   - etc.”
ADDENDA

Changes to the contract (plans, specifications and special provisions) are sometimes necessary when they affect the way a Contractor bids a project. Notification to Contractors is sent out by the Contract Services Division in the form of an addendum (an amendment to the contract documents as advertised). Changes most often originate by Contractor Inquiry. Addenda are issued at the request of the Project Manager/Cost and Scheduling Engineer, after a project is advertised but before the letting. Once the plans and proposal have been sent to the Contract Services Division, for advertising, the plan/proposal package cannot be changed except by addendum.

The Project Manager should determine if changes are necessary by determining the effect on the way the work will be bid. The Project Manager should consult with the Supervisor of the Specifications and Estimates Unit to determine the impacts. If there is no effect on the bidding, an addendum may not be necessary. This type of change can be handled by a plan revision after the project is let, prior to construction.

If an addendum is needed, it is initiated by supplying the required information to the Specifications and Estimates Unit. Detailed instructions and templates for submitting an addendum request can be found in ProjectWise or on the Plan Development website.

14.63 (continued)

Typically there are three types of changes made to the Contract Documents by an addendum. Pay item, proposal, and plan changes require the following information:

1. If Pay Items are Affected:

The proposal line number, pay item number, pay item description, and quantity and units as specified in the Schedule of Items in the Proposal.

2. If the Proposal is Affected:

The proposal page number of the document affected along with the change in the document if not supplying a new document.

3. If Plan Sheets are Affected:

The sheet numbers that need to be altered, the exact description of the change and any additional sheets as necessary.

The FHWA must give prior approval for all addenda involving FHWA oversight projects before they can be published. The Project Manager is responsible for obtaining FHWA approval. E-mail approval from the FHWA Area Engineer is sufficient documentation.

Addenda issued no later than four days prior to letting require the approval of the Specifications and Estimates Supervisor. Addenda issued after this date must also be approved by the Quality Assurance and Lettings Engineer. All approvals are facilitated by the Specifications and Estimates Unit.

Project Managers should make every attempt to minimize the number of addenda requests, especially those within the final five days prior to the letting date. Addenda must NOT be used as a process for completing the design of a project after advertisement.
POSTPONEMENT, WITHDRAWAL, OR REJECTIONS FROM LETTING

The Project Manager will be notified by the Specifications and Estimates Supervisor of any project that requires the following action:

1. **Postponement from Letting**

   Is usually a delay to the next available letting. The Contractor retains the plans and proposal and an addendum will be issued.

   The Project Manager will make the required changes and submit an addendum request to the Specifications and Estimates Unit.

2. **Withdrawal from Letting**

   Is usually a delay of more than one letting. The Contractor will dispose of the existing plans and proposal documents. The plans and proposal will be modified by the Project Manager and turned back in to Specifications and Estimates for re-advertising.

   Original plans and proposal material will be returned to the Project Manager by the Specifications and Estimates Unit.

3. **Rejection from Letting**

   Takes place after letting and Executive Bid Review. If rejected, the original plans and proposal will be returned to the Project Manager by the Specifications and Estimates Unit.

   A copy of the memo signed by the Director of the Bureau of Highway Development will be sent to the Director of the Bureau of Finance and Administration for appropriate action.

   The Project Manager has the responsibility to pursue whatever contract changes are necessary and turn the project back in to Specifications and Estimates for re-advertising.

4. **Bid Rejections Less Than 10% Over the Engineer’s Estimate**

   a) The Project Manager contacts the Specifications and Estimates Unit with concerns that the bids received are not reflective of previous projects with similar scope and type of work or that the project cannot be built as advertised.

   b) The Specifications and Estimates Unit and the Project Manager review the proposal package to document why the bids are not acceptable. The Project Manager, in cooperation with the Region Engineer, recommends that bids be rejected to the Director of the Bureau of Highway Development.

   c) If the decision is made to reject all bids, a memo is sent to the Director of the Bureau of Finance and Administration from the Director of the Bureau of Highway Development requesting rejection of all bids with an explanation why the bids should be rejected.
14.64 (continued)

POSTPONEMENT, WITHDRAWAL, OR REJECTIONS FROM LETTING

5. Bid Rejections More Than 10% Over the Engineer’s Estimate

a) Design Division’s Specifications and Estimates Unit reviews the bid tabulation with the Project Manager to determine what items caused the bid amounts to exceed the Engineer’s estimate.

b) The Specifications and Estimates Unit and the Project Manager reviews the proposal package to see if the bid amount is reasonable. The Project Manager, in cooperation with the Region Engineer, recommends that bids be rejected or accepted to the Director of the Bureau of Highway Development.

c) If bids are rejected, a memo is sent to the Bureau of Finance and Administration from the Director of the Bureau of Highway Development requesting rejection of all bids.

d) If bids are accepted, a “Justification Memo” is sent to the Bureau of Finance and Administration from the Director of the Bureau of Highway Development with reasons why the bids should be considered reasonable and be awarded to the low bidder.

e) If the low bid is $500,000 or greater, the justification memo is placed on the next State Transportation Commission agenda for approval, before it is submitted to the State Administrative Board agenda for approval.

14.64 (continued)

6. Single Bid Rejection less than 10% over the Engineer’s Estimate

a) If the single bid is not acceptable, the Project Manager contacts the Design Division’s Specifications and Estimates Supervisor with concerns that the low bid received is not reflective of previous projects with similar scope and type of work or that the project cannot be built as advertised.

b) The Specifications and Estimates Supervisor and the Project Manager review the proposal package to document why the single bid is not acceptable. The Project Manager, in cooperation with the Region Engineer, recommends the bid be rejected to the Director of the Bureau of Highway Development.

c) If the decision is made to reject the bid, a memo is sent to the Director of the Bureau of Finance and Administration from the Director of the Bureau of Highway Development requesting rejection of the bid with an explanation why the single bid should be rejected.

d) If the single bid is deemed acceptable, the Bureau of Finance and Administration will process the bid in the normal manner. This includes the extra step of reporting the single bid contract to the State Transportation Commission agenda for approval.
REFERENCE INFORMATION DOCUMENTS

The Reference Information Document (RID) process provides availability of electronic data files through the e-Proposal website. RID files are non-contractual items for contractor use prior to bidding on construction projects. They include design files, survey deliverable files, miscellaneous files and the RID Index.xlsx.

Milestone reviews by MDOT-RIDSupport are intended to be on the same timeline as other reviews mentioned in the previous sections. RID files will be submitted to the Specifications and Estimates Unit and MDOT-RIDSupport for review prior to final turn in. The files are subsequently published at the same time as the Proposal and Plans. Any changes made to the RID files after this time, due to an addendum, will be the responsibility of the Project Manager. Each published ‘set’ released after the original publication includes a revised RID Index.xlsx using the Project Changes tab that includes only the changed files and a brief explanation of the changes made to the files.

See the Design Submittal Requirements in the MDOT Development Guide for more information.

TABULATIONS OF BIDS

Approximately one week after the letting, bid tabulations with the Engineer’s Estimate, the low bid Contractor and the other prime Contractor’s bids are posted to the MDOT website. Some projects require an additional review and may take longer. The Tabulation of Bids can also be accessed through the Bid Letting System on the Plan Development website by selecting the appropriate letting date and letting item number.
14.67 (revised 12-17-2018)

PRE-CONSTRUCTION MEETING

A pre-construction meeting is usually held with the low-bid contractor, subcontractors, and MDOT representatives after the letting and award of a project. Participants usually include (when applicable):

- Contractor
- Subcontractor(s)
- Resident/Delivery Engineer
- Project Manager/Cost and Scheduling Engineer/Designer/Consultant
- Soils Engineer
- Traffic Engineer
- Utility/Permits Engineer
- Region/TSC Materials Engineer
- Utility Companies
- Counties and/or Municipalities
- Railroad Companies
- FHWA Area Engineer

The agenda may include:

- Introduction of attendees
- Recording of Minutes & Attendance record
- Project description
- Designation of Supervisors
- Proposal (including any addenda)
- Subcontractors
- Real Estate
- Utilities and Railroads
- Affected Municipalities and or Counties
  - Haul routes and hours
  - Special use permits
  - local ordinances
- Testing Order
- Soils/Materials
- Traffic
- Progress Schedule
- Safety Program/Issues
- Work Orders and Contract Modifications
- Labor Compliance
- OJT/EEO/DBE Requirements
- Miscellaneous
  - Erosion Control
  - Environmental Mitigation Requirements Review and/or Special Design Considerations Memo
  - NPDES NOC and BMP Measures

14.68

Section deleted.
DESIGN PROJECT RECORD

As soon as a project has been assigned, the Project Manager should begin to compile a Design Project Record. This is done by maintaining a chronological record of any events affecting plan development which:

1. Affect the cost of design or construction of the project
2. Change the scheduled dates (plan completion, ROW or letting).
3. Deviate from standard design practices via Design Exceptions, Design Variances, or Performance Based Practical Design decisions.

PLAN REVISIONS

Occasionally plans must be revised after a contract is let and, in extreme instances, after construction has begun. Changes issued by design team are done on a Revision of Plans (Form 0291). A Plan Revision Distribution (Form 0211) should accompany the Revision of Plans (Form 0291). No other letters of transmittal are required.

Plan revisions should contain a concise and accurate description of the work involved so as to be understood by anyone not associated with the project. The following are some guidelines for preparing a plan revision:

- The use of revised plan sheets should be avoided whenever possible. If the changes can be described easily and adequately on the Revision of Plans (Form 0291), revised plan sheets do not need to be included in the distribution. However, if the changes are complicated and extensive, revised plan sheets should accompany the Revision of Plans distribution.
- When making changes in dimensions or quantities, the old figures should be lightly crossed out (not erased) and new figures added above or adjacent to the old figures.
- Plan revisions involving FHWA Oversight projects must be reviewed and approved by the FHWA prior to distribution. A note stating FHWA concurrence (and by whom) should be included on the Revision of Plans (Form 0291).
- Plan revisions are numbered in ascending order with a letter prefix for the section issuing the revision (R-Road, B-Bridge, U-Utilities). The first plan revision distribution by Road Design would be R-1, the next R-2.
- Quantities should be exact. If exact quantities cannot be determined until after the work is completed, they should be estimated as accurately as possible.
- Do not revise the quantity sheet. This will be corrected with the authorizations (Recommendation and Authorization Form 1100B) submitted by the project office.
- If most of the plan sheets are affected, the complete set should be reissued to avoid possible confusion.
- If the RID files need to be changed submit the revised files consistent with the Design Submittal Requirements outlined in the MDOT Development Guide.
14.70.01 (revised 12-17-2018)

Procedure

The following general procedure should be used when preparing and distributing plan revisions:

1. Revise the plan sheet(s) affected (if required).
2. Complete Revision of Plans (Form 0291) and Plan Revision Distribution (Form 0211).
3. Discuss the proposed changes with the FHWA (FHWA Oversight).
4. Gather the following signatures:
   a. Project Manager/Cost and Scheduling Engineer/Development Engineer
   b. Resident/Delivery Engineer
5. Combine completed Forms 0211 and 0291 with the revised sheets in Adobe Acrobat format and name the file PLANREV1.pdf (or subsequent numerical naming if multiple). Save the file in the ProjectWise sub-folder entitled "Plan Revisions and Shop Drawings". If this sub-folder has not been created, contact the local or central office ProjectWise Administrator for assistance.
6. Distribute electronic copies per the instructions on each form. Copies must also be sent to any affected agencies and/or the FHWA (FHWA Oversight).

14.71 (revised 12-17-2018)

CONTRACT MODIFICATIONS

Contract modifications are the formal process by which revisions to the contract are formally authorized, approved and incorporated into the construction contract. Contract modifications are processed for any revisions to the contract that alters the nature, scope, cost or schedule of the project.

The Design Project Manager (PM)/Cost and Scheduling Engineer is included in the email distribution for all Contract Modifications which TSC Managers approve in ProjectWise. This email includes the ProjectWise link to the Contract Modification as well as any comments the TSC manager added to the body of the message.

Once the email is received, it is recommended that the Design PM does the following:

1. Review the file in ProjectWise to become familiar with the changes.
2. Take note of items that can be addressed as plan improvements for future projects.
3. Share changes and information with other internal designers and external design consultants involved in the plan design.

As Design PMs receive contract modification approval emails from various projects, they are asked to take notice of repetitive or similar modifications that can be identified as opportunities for future plan improvements, cost savings and innovations.

The Design PM is highly recommended to take a proactive stance, keep lines of communication open with construction, and become familiar with the modifications being made to the project during construction activities. This enables the Design PM to become more informed and be better prepared to engage in productive discussions during the post-construction review meetings, as well as maintain accurate records for future design considerations, maintenance strategies, and fixes.

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14.72 (revised 12-17-2018)

POST-CONSTRUCTION REVIEW MEETING

The purpose of a post-construction review is to provide feedback to design staff and other stakeholders to improve the quality and cost effectiveness of future projects. These meetings are initiated by Construction and held for selected projects per construction season.

It is essential for the Design Project Manager (PM)/Cost and Scheduling Engineer to take a proactive stance on all projects, keep lines of communication open with construction, and become familiar with any field implemented changes being made to projects during construction activities that differ from design. It is essential to understand why these changes were made and if they warrant a new perspective in design on certain fixes, or if it was a circumstantial instance. This enables the Design PM to become more informed and be better prepared to engage in productive discussions during the post-construction review meetings, as well as prepare better plans for future similar projects, and maintain quality records with a higher level of accuracy for future corridor improvement plans.

The Design PM should attend and coordinate invitations to internal designers and external design consultants who participated in the design process.

Upon completion of the post-construction meeting, the meeting minutes will be deposited into ProjectWise and an email notification will be sent to the project stakeholders letting them know that the minutes have been compiled, completed and ready for viewing.

For more specific details regarding Post-Construction Review Meetings criteria and agenda items, refer to http://mdotwiki.state.mi.us/construction/index.php/Plans,_Proposal,_Input,_Review_and_Evaluation#Post-Construction_Reviews of the MDOT Construction Wiki website.

14.73 (revised 9-21-2009)

MARKED FINAL PLANS

As Built Plans, also referred to as As Constructed Final Plans (ACFP), or Marked Final Plans, are original awarded project plan sheets that have been updated to show changes, corrections and comments made during construction.

After construction is complete, the Resident/Delivery Engineer’s office is responsible for creating and placing marked As Built Plans in ProjectWise.
14.73.01 (revised 12-17-2018)

Mark-Up Standards

Use the following guidelines to capture the As Built changes and corrections made to the As Let Plans:

**Horizontal Control**: Changes in alignment, bearings, PC’s, PI’s, PT’s, curve data, government corner witnesses, witnesses to alignment monuments, right-of-way monuments and boxes, and right-of-way fence should be shown on plan sheets.

**Vertical Control**: Changes in vertical curves, benchmarks, grade changes, structure grade changes, and changes in elevation and/or percent grade of ditch flow line should be shown on profile and plan sheets where applicable.

**Drainage and Topography**: Changes in location, elevation, length and size of culverts, sewers, edge drain, manholes, and catch basins should be shown on plan and profile sheets. This information should include stationing, offset from centerline, flow line elevation, types, sizes, lengths, end section types/materials, and quantities. Other topography changes including guardrail, slopes, drives (location, surface material type (HMA/Agg/Conc)), and width) utility changes such as water main, lighting, etc. should also be shown.

14.73.01 (continued)

**Earthwork and Surfacing**: It is not necessary to show minor changes in earthwork, sub-base or surfacing on plan and profile sheets if such changes are broken by balances on the quantity sheets. When borrow is contractor-furnished, actual earthwork balances are not important. Use the same station to station breakdown as was used for plan quantities. Undercuts also do not need to be shown as most reconstruction projects require a new soils investigation.

When capturing As Built mark-ups, adhere to the following As Built Mark-Up Standards:

- Mark-ups can be made in either CAD or by hand
- Use black ink only to mark-up plans
- Mark-ups must be clear and legible
- Hand comments must appear opaque (solid)
- Do not obliterate As Let plan data – only line out or place an “x” through item
- Final output must be PDF format in PLANHALF size of 11” x 17”
- Plan sheets with As Built mark-ups are to be saved individually outside of the original plan set
File Standards And Requirements

Once the As Built mark-ups are complete and formatted properly, use the following requirements to ensure the As Built plans are ready for submission.

Review Mark-ups for Legibility: Ensure the As Built Plan sheets being submitted meet the data capture and mark-up requirements as outline in Section 14.73.01.

File Requirements: As Built Plans must be in PDF format. They must also be sized and scaled to the PLANHALF size of 11” x 17”.

As Built File Naming Standards: In order to ensure consistency and proper search results, specific naming conventions must be maintained for all As Built sheets.
- File names must follow the naming conventions used in the Letting Plan or Proposal, including capitalization.
- The page number given to the sheet must be the page it represents in the PDF As Let plan set and NOT the page in the project drawing plan set.
- As Built plans sheets that are PDF pages 1-9 should be named as “01, 02, 03”… in order to keep them in proper page sequence in the folder.
- Corrected PDF plan sheets must be saved and named individually.
- Consecutive As Built sheets can be saved in a single pdf file and named according to the following format: “Road_09-22.pdf”, “Bridge_09-22.pdf”. Use this format only when the As Built contains corrected sheets that are in sequence.

The following list provides examples of the standard naming conventions for As Built.
- Proposal_15.pdf
- Road_01.pdf
- Bridge_22-46.pdf
- Road1_07.pdf
- Bridge1_22.pdf

As Built Turn In Process

After ensuring the As Built plans meet the required criteria, they are ready to be submitted. Submit the As Built Plans using ProjectWise by:
- Contacting your local ProjectWise administrator for As Built folder set-up
- Adding As Built plan sheets to the As Built folder for the designated job number
- Filling out and submitting Form 250

Detailed instructions can be found in the ProjectWise Reference documents for As Builts under the Standards and Submittal Instructions folder at: pusername://MDOTProjectWise/Documents/Reference Documents/As Builts/~ Standards and Submittal Instructions

Design Division Review and Approval Process

Upon receiving the submitted As Built plan information, the As Built Administrator reviews the As Built to determine if they are ready to be turned to Final status or if they need further correction.

When the As Built plans are approved, an electronic notification is sent to the submitter acknowledging the As Built is approved and marked to Final status. No further action is required by the submitter.

If the administrator rejects the submitted As Built plans, an electronic notification is sent to the submitter indicating the items that need to be re-addressed before the plans can be approved. Once the items have been re-addressed the submitter can re-submit the As Built for approval.
DOCUMENT RETENTION

Once a project has been completed and closed-out, document retention for the project is necessary.

14.74.01 (revised 12-17-2018)

Permanent Records

Permanent, or indefinite, paper files and electronic documents, are to be stored in ProjectWise. (Permanent paper files must be scanned and saved in the PDF format prior to storing in ProjectWise.) Such documentation includes:

- PDF plan sheets with “AsBuilt” changes and/or corrections
- Contract plans or proposal
- Agreement file
- Permit file

The following items should also be included in the permanent records as well:

- Drainage calculations
- Environmental Impact Statement
- Environmental Assessment
- Engineering Report
- Correspondence (only correspondence concerning design decisions on the project)
- Survey data (benchmark, government corner tie information only)
- Design exceptions / variances
- Design project records
  - **Guardrail Designs**

All other information, paper or electronically stored in ProjectWise, including review sets and calculations not described above, should be discarded. This specifically includes the Plan Review plans, FPC plans, design data, line and grade plans, office check plans, drainage approval plans, municipal approval plans and Health Department plans, etc.
CHAPTER 2

STEPS IN PRODUCING PLANS

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CHAPTER 2

STEPS IN PRODUCING PLANS

2.00

STEPS IN PRODUCING PLANS

This chapter briefly outlines the steps that are followed in producing plans for building and rehabilitating bridges and other structures on the trunkline system. Subsequent chapters will expand on this overview.

2.01

SOURCES OF ASSIGNMENT

No work can be started until it has been approved for programming by the Chief Engineer/Deputy Director Bureau of Highway Technical Services and programmed by the Bridge Systems Manager. Programming is based on available funding as appropriated by the Federal and State Transportation legislation.

2.01.01

"Improve and Expand" Projects

Engineering Reports for new work and major relocations are produced by the Project Development Section of the Design Division or Region/TSC Development personnel and serve as sources of assignments for the structure work required in the plan preparation of the Bridge Design Section.

2.01.02

Rehabilitation Programs

MDOT Regions and Bridge Systems Manager prepare an annual program of work to be performed. The program is based on needs observed in the field and the availability of funds to correct conditions as needed. (11-19-99)

2.01.03

Traffic and Safety Programs

The Division of Operations Safety Programs Section prepares an annual program of work to be performed. Funding for Safety Programs is usually based on separate categories of funding.

2.01.04

Turnback Projects

When the State relinquishes jurisdiction of a highway to a local authority, the State usually agrees to perform certain work on that highway prior to relinquishment. Such work is known as a "Turnback Project" and will be defined in an agreement with the local jurisdiction known as the "Turnback Agreement". For additional information regarding "Turnback Projects" see Chapter 12 of the Road Design Manual.
2.01.05

Region/TSC Requests

The Region/TSC Engineer in consultation with the Region Bridge Engineer may request work to be performed on projects in the Region/TSC based on citizens’ requests or based on field observations by Region/TSC personnel.

2.01.06

Privately-Owned Facilities

Occasionally MDOT will agree to perform work on privately-owned facilities at the request and expense of private parties. Such work must not be undertaken without a written agreement between the private parties and MDOT.

2.01.07

Bridges to Remain In Place

Bridges to remain in place criteria occurs when a bridge carrying road project traffic falls within a road project and no work is planned for the bridge (see AASHTO publication, A Policy on Design Standards - Interstate System or A Policy on Geometric Design of Highways and Streets, 2011, 6th Edition). If the bridge does not meet the criteria to “remain in place” the Road Designer or Road Project Manager must submit any necessary design exceptions or design variances for the bridge.

DATA SOURCES

Prior to preparation of Contract plans, the Design Engineer will request data from various sources to assist in the development of a set of contract drawings. Sources to be used are listed in the following paragraphs.

Engineering Reports

If an Engineering Report has been prepared and published by MDOT, it will provide the Design Engineer with general information regarding the location of the project and the proposed horizontal and vertical alignment. It may also include miscellaneous design constraints such as traffic control, architectural treatment, Michigan Department of Environmental Quality (MDEQ) permit and mitigation consideration, etc. It is essential that the design parameters established in the Engineering Report be closely followed in the preparation of the plans.

Environmental Impact Statement, Environmental Assessment or Categorical Exclusion

All three documents will provide the Engineer with valuable information regarding the project. For definitions see Section 14.12 and 14.13. If an Environmental Impact Statement has been issued, the restrictions listed in the document must be closely observed during preparation of the plans. Engineers should work with their Environmental Coordinator(s) early on to determine what impact category each job will be classified as, and how to proceed.

Geotechnical Data

The Design Engineer must request data from MDOT Geotechnical Services Section to determine soil conditions and nominal bearing resistance to be used in the design of the foundations. They will also indicate whether piles are required, and if so, the type, section, estimated length and minimum penetration and determine the effect of scour on the stability of the structure. For additional information, refer to Section 3.01.

For rehabilitation projects that may result in load increases on foundations, the Design Engineer must perform a foundation analysis and consult with the Geotechnical Services Section. A copy of the analysis will be kept in the project design folder.

Survey Data

The Design Engineer must determine whether sufficient survey data has been provided from other sources. If not, additional survey data such as a pickup survey must be requested from the Survey Section.

Normally, surveys should be ordered for all major reconstruction jobs, such as bridge widening. On stream or river crossings, survey requests should be combined/coordinated with those from the Hydraulics/Hydrology Unit to avoid duplication of effort by the Surveys Section. The Survey/Mapping Action Request, (Form 0226), is available from MDOT web site.

Road Design

Road Design Plans will provide proposed alignments and grades in detail, and will provide cross-sections of the approaches.
2.02.06
Hydraulic and Scour Data

The Design Engineer must request hydraulic analyses from the Hydraulics/Hydrology Unit to determine required waterway openings, scour countermeasures, and backwater calculations for proposed stream crossings. In most cases, two waterway analyses will be required by the FHWA. To accomplish this in time, the Hydraulics/Hydrology Unit must be involved as early as possible. The Bridge Unit should request data from them immediately after the project is assigned.

The Hydraulics/Hydrology Unit will conduct a scour analysis and provide estimated total scour depths at the foundation for waterway crossings. This information will be forwarded to the Geotechnical Services Section.

*(11-19-99)*

2.02.07
Railroad Data

The Design Engineer must request information regarding frequency and speed of railroad movements, and information regarding clearances and loadings. Such requests must be submitted to the Railroad Coordination Unit – Office of Rail. See Chapter 13, Railroad Crossings, for additional details. *(10-22-2012)*

2.02.08
Aesthetic Recommendations

Consideration should be given to providing motorists with an unobstructed view of surrounding scenery. Toward this end the Roadside Development Unit should be consulted to determine whether an open railing is appropriate for a structure spanning a river.

2.02.09
Utility Data

The Design Engineer must coordinate with corresponding Region/TSC Utility/Permit Engineer to determine whether there are utilities at the site of the structure and whether they will be affected by the proposed construction. The designer must also determine whether existing utilities may represent a safety hazard to the construction forces and work with corresponding Region/TSC Utility/Permit Engineer to arrange any necessary temporary or permanent relocations. *(12-17-2018)*

2.02.10
Permits *(11-19-99)*

The Design Engineer, along with Environmental Services Section, must determine which permits and notice of coverages will be required for the proposed work and initiate actions to obtain those permits. See Chapter 14, Permit Applications, for additional information. *(12-17-2018)*

Application for MDEQ permits should include detailed plans of any proposed haul route necessary to access the project site. See Section 2.02.15 for additional information. *(10-22-2012)*

2.02.11
Screening Requests

When work is performed on structures in the Metro Region, the Region Project Development or Bridge Engineer must be contacted, to see if pedestrian screening should be added to the proposed work. In other areas of the state the Region Bridge Engineer should be contacted to determine if pedestrian screening should be added. *(9-2-2003)*

2.02.12
Maintenance Reports

Before starting work on an existing structure, the Design Engineer should review the Maintenance Report/Bridge Scoping Report. An in-depth inspection should be requested if the extent of repairs on specific bridge elements is unknown or may change the scope of programmed work. *(11-19-99)*
Traffic and Safety Data & Road Safety Audit

The Division of Operations Safety Programs Section or Region Traffic & Safety personnel will provide traffic counts, crash history, and posted speeds when this information is relevant to Design decisions and requested by the Design Engineer. (10-22-2012)

The Project Manager (Project Owner) will request (Form #3767) that a Road Safety Audit (RSA) be conducted on project types that fall under the Warranting Conditions of the Road Safety Audit (RSA) Guidance document. This request will follow the process outlined in the guidance. RSAs should be conducted during the scoping process but are highly recommended to be scheduled prior to the Scope Verification meeting. (2-21-2017)

Preliminary Constructability Review

Constructability is taken into account during the scoping and early plan development process (and in conjunction with the Checklist for Constructability Review - Early Project Scoping (Form 1961)). After the Job Concept Statement has been created in JobNet, the Project Manager/Concept Author should consult with the Region/TSC Delivery Engineer, the Region Bridge Engineer and Design Engineer/Cost and Scheduling 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, the Region/TSC Traffic and Safety Engineer, the Region Bridge Engineer and Design Engineer/Cost and Scheduling Engineer may be required throughout this task. In both instances the review and incorporation of any comments must occur prior to Preliminary Plan Development. Place completed and signed checklist in the Design project file and ProjectWise. (10-22-2012) (12-17-2018)

Scope Verification Meeting (11-19-99)

Design Engineers should verify the scope of work that has been programmed. If the scope is unacceptable, the Design Engineer will request a scope verification meeting that includes the Region/TSC Project Development Engineer/Cost and Scheduling Engineer, Resident/Delivery Engineer, Bureau of Bridges and Structures (BOBS) Bridge Construction Engineer, and the Region Bridge Engineer. (12-17-2018)

Where a bridge will cross a waterway or wetland, the Region/TSC Construction Engineer should also be consulted to determine a practical means of accessing the project site during construction. If a haul route is required, the details will be included on the plans and in MDOT's request for a MDEQ permit. (10-22-2012)

After the “Scope Verification Meeting” the Design Project Manager will address any changes to the scope in a correspondence/letter to the involved attendees, including the Region Bridge Engineer. Once changes are agreed upon by all parties the Region Bridge Engineer or Design Project Manager will submit a Change Request in JobNet to reflect project changes. (8-20-2009)-(12-17-2018)

After project scope has been agreed upon, the Project Manager should identify any Design Exceptions / Variances to MDOT standards that will be utilized in the design of the project. Exceptions / Variances to MDOT design standards should be identified, and, ideally, completed during the scoping process. However, if this has not been done, a Design Exception (DE) or Design Variance (DV) form should be completed. The Project Manager should consult with the Geometrics Unit of the Design Division when identifying and developing justification for design exceptions / variances. Previously completed Design Exceptions / Variances should also be reviewed for accuracy and revised at this time if needed. (8-20-2009)(10-22-2012)(2-21-2017)

For additional information see Sections 12.00-12.03 as well as Chapter 3 of the Road Design Manual. See Road Design Manual Section 14.11 for design exception / variance submittal procedures. (2-21-2017)
During The Plan Review Meeting or field review of plans, Region/TSC engineers will again be consulted. Construction staging information should be reviewed by Region/TSC Field or Construction Engineer. The observations, discussions, and recommendations resulting from the meeting must be documented by a letter in the files. Generally, these letters are written by the Plans & Field Review Section representative who participated. However, if a Design Engineer arranges The Plan Review Meeting without someone from the Plans & Field Review Section, the Design Engineer will write the letter, addressing it to the Engineer of Design Operations - Structures Section.

At the time of The Plan Review Meeting, it is essential that Region/TSC personnel have had the opportunity to consider the nature and scope of work proposed by the Design Unit. Under ideal circumstances this is accomplished by distributing plans to provide 20 working days before the date of The Plan Review Meeting. Frequently, however, letting schedule changes leave insufficient time to "follow the book," and unit leaders must resort to alternatives.

1. If the plans are in a near-complete stage, that is, they clearly show all the proposed work, but they have not been reviewed for normal distribution, they can be transmitted as "advanced copies" to the Region/TSC with the notice of The Plan Review Meeting.

2. If plan preparation has not reached this stage, the unit should outline the proposed work with 8½" x 11" sketches. These then would accompany the notice of The Plan Review Meeting.

Project Managers should make an effort to combine The Plan Review Meetings for neighboring projects that have similar letting dates.

During The Plan Review Meeting or by separate request, the Region/TSC Traffic Engineer should be asked for recommendations for controlling traffic during construction. The designer will provide current details of approaches within 1500' of bridge reference lines to the Traffic Engineer to facilitate the preparation of maintaining traffic details, quantities, special provisions, etc. (3-20-92)

Once the revisions from The Plan Review Meeting have been incorporated into the plans, Final Plans begin. After the final maintaining traffic special provision has been received, and staging typicals and/or plan sheets have been completed, this information plus any unique special provisions should be sent to the Resident/Delivery Engineer for review. Discussions concerning a Construction Critical Path Network, if applicable, should also occur at this stage. In conjunction with the Checklist for Constructability Review Project Development Phase (Form 1960), the work in this task must be addressed prior to the distribution of the final plan/proposal package for the OEC Meeting. Place completed and signed checklist in the Design project file and ProjectWise.

The final constructability review applies to all projects. On small projects this task may consist of only the transmittal of plans to the Resident or Delivery Engineer for comment. On large projects with complex staging, one or more meetings with the Resident/Delivery Engineer, the Region/TSC Traffic and Safety Engineer, Cost and Scheduling Engineer, and the Region Bridge Engineer may be required throughout this task. For projects in templates that do not require an OEC Meeting, the Final Constructability Review must be completed prior to Plan Completion.
Final Project Coordination Meeting

The review of final plans and proposal and project coordination is completed through Final Project Coordination (FPC) meeting. The comments and information gathered at this meeting are used to complete the project and bring plans to 100% final stages in preparation for the Omissions/Errors Check (OEC). For more information regarding the FPC see Section 3.03.

Omissions / Errors Check (OEC)

The sign off for 100% completed final plans and proposal is done through an Omissions / Errors Check (OEC) Review. For more information regarding OEC sign off see Section 3.04. (11-19-99)

Rehabilitation Project Scoping (11-19-99)

Project Scoping Documents will be provided for all bridge rehabilitation projects and submitted to the Bridge Systems Manager. The document package will contain different items depending on if the scoping work is done by consultants or MDOT.

A. Scoping by MDOT

The following will be provided if the scoping work is done by MDOT:

1. Program Revision Request (within JobNet) (5-28-2013) (3-26-2018)
2. Project Concept Statement (from JobNet) (3-26-2018)
4. Latest Bridge Inspection Report
5. Project Photos

Additional information will be provided if available, such as:

6. Detailed Inspection Report
7. Underclearance waiver information
8. Diver Inspection Report
9. Load Posting Form
10. Delamination Survey (10-22-2012)
11. Other pertinent information which will assist in the design
2.02.21 (continued)

B. Scoping by Consultant

In addition to the above, the following will be provided if the scoping work is done by consultant:

1. Field Inspection Findings, describing all site issues
2. Recommended repair alternative
3. At least three rehabilitation options with cost estimates
4. Life Cycle Cost Analysis

The proponent Region has the responsibility for entering the project in JobNet (internal information system) and for submitting the Project Scoping Document Package to the Bridge Systems Manager. The project must also have the approval of the Regional Systems Manager/Associate Region Engineer of Development. (3-26-2018) (12-17-2018)
2.03

PLAN PREPARATION STEPS

Preparation of Plans for structures follows three steps. The first step is the development of a Study. The second step is the preparation of Preliminary Plans, and the third step is the development of Final Plans and accompanying specifications. A detailed discussion of each of these steps is covered in Chapters 3 and 4 of this volume.

2.03.01

FHWA Oversight / MDOT Oversight
(12-5-2005) (7-23-2018)

Section 2.03.01 is currently under review to adopt revised oversight definitions and procedures. Oversight responsibility for individual project elements is determined exclusively for each project and mutually agreed on by MDOT and FHWA. Any questions regarding the status of projects should be directed to the appropriate FHWA Area Engineer

2.03.02

Study

The study establishes the general design features such as the type of structure, cross-section, waterway opening (size), span arrangement, and alignment. For waterway crossings, hydraulic and scour analyses to determine the size of opening and the impact of scour on the design of the foundation must be part of the study. Studies of federally financed projects for new bridge construction and major rehabilitation must be approved by the FHWA before proceeding with preliminary plan preparation. Normally, the structure proposed should be the most cost effective of those considered based on a life cycle cost analysis. Studies are normally not required for rehabilitation projects. (11-19-99)
2.03.03  
Preliminary Plans  
Once the study is approved, preliminary plans and preliminary estimate of cost are prepared by the Design Unit for approval by the FHWA and other concerned agencies.

2.03.04  
Final Plans  
Work on final plans can begin after the FHWA has approved the preliminary plans and the project has been environmentally classified. The final plans consist of all the details necessary to build the structure, the quantities of the materials required for construction, and the specifications that must be included in the Bid Proposal.

2.03.05 (12-17-2018)  
Changes During Plan Preparation  
(9-1-88) Before requesting changes in programming, the Project Manager should contact all persons, sections, Regions/TSCs or support areas having an interest in the project in order to include as many changes as possible in a single request.

For bridge construction, rehabilitation, or preventative maintenance projects, a JobNet Change Request should be submitted to the Bridge System Manager for approval. Change Request may be submitted to request program revisions involving project costs, work revisions, work types, and scheduled dates. Program additions, deletions, project splits or consolidations (cost redistributions), and finance revisions must be requested and documented along with the Change Request submittal. All data and documentation supporting the requested change(s) should accompany any request submitted and can be attached in JobNet. A clear and concise justification (reason), which includes language indicating that the request was discussed and agreed with by the Region, must be submitted with all electronic Change Request submissions. (11-19-99)

2.03.05 (continued)  
Where it appears that a change in work scope may affect a project's environmental clearance, the Environmental Services Section should be notified as soon as possible. Notification should include copies of any correspondence, memos or forms that will help describe the project revisions. (8-6-92)

Project designs and plans should not be changed prior to receiving the approval of the Program Administration Division and the Change Request pertaining to the modifications.

2.03.06  
Changes after Plan Completion  
If policy or specification changes occur after the details have been completed, such changes must be discussed with the Design Supervising Engineer to determine if they will be retroactive. Addenda to a contract should be avoided where they do not significantly affect the bidding. Where they are required, an effort should be made to consolidate several items in one addendum with bridge and road unit leaders coordinating their submittals. The deadline for addenda is 10 days preceding the date of the letting. Projects not meeting the 10 day limit, but needing an addenda, should be discussed with Design Engineer-Specifications and Estimates. (11-19-99)
2.04

PLAN PRODUCTION PROCEDURE

It is the responsibility of the Project Manager and Design Engineer to produce sets of plans in a timely fashion and to be informed of the status of plans for a project at all times.

2.04.01

Unit Assignment

The Design Supervising Engineer will assign a project to a Design Unit and the Unit's Design Engineer will assign the project to an Engineer for plan preparation. The Engineer will gather information and data, perform necessary calculations, and run bridge program (internal only).

2.04.02

Plan Distribution

The plans are distributed for review to all interested agencies and parties according to the distribution schedules listed in Chapter 3 of this Manual. The Design Engineer will forward the Final Plans to the Specifications & Estimates and Plans & Field Review Section for preparation of the cost estimate and the contract documents. Final contract documents are advertised for bids by the Contracts Section.

2.04.03

Estimating Man-Hours (12-17-2018)

For estimating man-hour requirements of future projects, the average values of recently similar projects will generally serve as a guide, as well as the budgeted dates generated in the Planisware system. If unusual features are anticipated, the man-hour estimate will be adjusted accordingly. (11-19-99)

In estimating the unit's man-hour capabilities, the effects of temporary absences should be anticipated. This accounts for intermittent personnel absences for alternate assignments, training, vacations, holidays, etc. Temporary training assignments for new hires may also be a consideration.

2.04.04

Project History

Unit Design Engineers should keep an accurate and thorough history record of each project. These records are necessary to explain design costs and letting delays. Among items documented should be the changes in scheduling, whether or not the unit leader is aware of the reasons.

2.04.05

Project Contact Person

Prior to Letting, all Contractor requests for information concerning the project should be directed to the engineer who has been designated in the proposal as the project contact person, generally the Project Manager/Cost and Scheduling Engineer. (11-19-99)
2.05

BRIDGE DESIGN QUALITY ASSURANCE
& QUALITY CONTROL (5-23-2016)

2.05.01

Overview

A. To ensure bridges are designed correctly, with no errors once the design calculations, drawings, and specifications are finalized, MDOT requires QA/QC procedures in accordance with this section.

B. The MDOT Bridge Design QA/QC program consists of organizational procedures established to ensure a deliberate and systematic program that reduces the risk of introducing errors and omissions into bridge design final contract documents. The MDOT QA/QC program provides checks and balances within the organization to assure quality in final contract plans and specifications. The MDOT QA/QC program is implemented at different levels or phases of project activity, as defined in the MDOT Bridge Design Manual, the MDOT Road Design Manual, and the MDOT Quality Assurance and Quality Control Process Guide for Project Managers and as included in this section.

C. The rigor and level of resources allocated to QA/QC applications on a given bridge are tempered by the size, complexity, and degree of redundancy in the structural system involved, and by the degree of standardization of the design. For major projects involving unusual, complex, and innovative features, a peer review may be desirable to raise the level of confidence in the quality of design and construction.
2.05.02 Definitions

A. Quality Control (QC).

Procedures followed within a unit or working group to check the accuracy of the calculations, drawings, and specifications for the purpose of detecting and correcting design omissions and errors to accomplish the overarching goal of producing complete and error free final plans and specifications. QC occurs continuously throughout the course of a project.

B. Quality Assurance (QA).

Review procedures followed by staff outside the unit or working group to ensure the QC procedures were effective in preventing mistakes and promoting consistency in the development of bridge design calculations, drawings, and specifications.

C. Program Level Quality Assurance (PLQA).

Review procedures followed by management to assure the effectiveness of QC and QA procedures in verifying and measuring the level of quality of the entire bridge design QA/QC program.

D. Peer Review.

A high-level QA review by a separate unit or consultant not intimately involved with the design of the structure. Determination of the need for a peer review is made by the Bridge Design Supervising Engineer, with guidance provided by the State Bridge Alignment Team (SBAT).

E. Designer.

An individual directly responsible for the development of design calculations, drawings, and specifications, and review of shop drawings related to a specific bridge design.

2.05.02 Definitions (continued)

F. Checker.

An individual responsible for performing technical review of design calculations, drawings, and specifications.

G. Reviewer.

An individual responsible for performing QA procedures that ensure that QC procedures were performed properly.

H. Engineer of Record (EOR).

An individual responsible for all aspects of the design of the structure, including the design of all of the bridge’s systems and components. This individual is appointed by the bridge owner, and must be a licensed Professional Engineer in the State of Michigan. For MDOT in-house projects, the bridge squad leader is the EOR, and signs, but does not seal the final contract plans. For consultant-designed projects, the EOR is the consultant Project Manager, and is required to seal and sign his/her portion of the final contract plans.
Implementing and Documenting Procedures

A. Qualification of the Designer, Checker, and Reviewer.

The Designers, Checkers, and Reviewers are key personnel providing well-designed, accurate, and constructible plans for use in the construction of bridges. The Designers, Checkers, and Reviewers must be experienced in structural designs and familiar with the current AASHTO bridge design and construction specifications and the MDOT Bridge Design Manual, Bridge Design Guides, and procedures.

1. Designer and Checker.

The following are the requirements for a bridge Designer and Checker.

a. Possess a professional engineer (PE) license in Michigan with experience as a Bridge Engineer. A Designer or Checker without a PE license works under the direct supervision of a professional engineer licensed in Michigan who is the Reviewer and Engineer of Record for the project.

b. Non-engineer staff are often utilized to design and check CADD drawings, develop quantity calculations and perform other non-structural design functions during the course of a project. As noted above, all work is done under the direct supervision of a professional engineer licensed in Michigan who is the Reviewer and Engineer of Record for the project.

c. The Designers’ and Checkers’ experience is commensurate with the complexity of the bridge being designed. Whenever possible, the experience of the Checker exceeds the experience of the Designer.

2. Reviewer.

The Reviewer possesses a professional engineer (PE) license in Michigan, and has significant experience in bridge design and is familiar with MDOT’s bridge design and construction practices, procedures, and policies.
2.05.03 B. (continued)

2. Bridge Contract Drawings Checks.

All components (as described above) of bridge design drawings are checked in detail. Plan notes are checked, including verification of correct materials specified. Plan notes must not alter the work, materials, or method of payment for standard pay items. All quantities and pay items are verified to be in conformance with plan details, and pay item wording checked against MDOT Standard Specifications for Construction or associated special provisions. In cases where the Designer is not the drawing Checker, the Designer at least reviews the drawings to ensure that they are in conformance with the design. After any required changes are made, names or initials are placed on the drawings indicating the individual who prepared the drawing, the individual who modified the drawing (as needed), and the Designer. The plans include the name of the unit or work area responsible for the plans. Consultant plans include their company logo.


All special provisions are reviewed for appropriateness with respect to the contract plans and pay items and MDOT Standard Specifications for Construction. All permits, certifications, clauses and other supporting information are reviewed to ensure they are complete and correspond with the plans and remainder of contract package and that there are no conflicts between any documents.
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2.05.03 C. (continued)

Implementing and Documenting Procedures (continued)

C. QC Procedures.

1. A supervisor or team leader is responsible for determining the necessary technical knowledge and experience of the Designer and Checker for that specific design. Designers and Checkers are assigned to bridge projects by matching experience and performance to project complexity.

2. The Checker is responsible to the supervisor for quality control of the design, which includes checking the design calculations, plans, and specifications to assure accuracy and constructability. One hundred percent of all design calculations, quantity calculations, plans, and specifications are checked as part of the QC process.

3. All bridge plan sheets include the names or initials of the person who drafted the details along with the Checker of the sheet and the date last revisions were made to that plan sheet. See Guidelines For Bridge Plan Preparation (MDOT Sample Plans Bridge) of Development Guide (Design Submittal Requirements Chapter 7) for guidelines related to drafting and plan preparation.

4. All special provisions include the author's initials and work area identifier, and are subject to a well-defined review process facilitated by MDOT's Quality Assurance Section that includes various subject matter experts.
   a. Unique special provisions authored specifically for a project are drafted by the Designer or support area and submitted for review and approval during the course of the project.
   b. Previously approved special provisions can be used as long as approved in the current Standard Specifications for Construction edition year, and are reviewed by the Designer to assure that the entire content is appropriate for a project. (12-17-2018)
   c. Frequently used special provisions are utilized on projects as noted in specific use statements and are incorporated into the project without any changes.

5. Software programs such as MDOT’s Bridge Design System, MDX, or Leap Bridge, various finite element modeling programs, among others, are often too complex for a Designer and Checker to review and confirm directly. The Designer and Checker must fully understand the methodology, assumptions, and limitations of each program prior to utilizing output on a project. This can be accomplished through review of all available program documentation and independent verification with hand calculations, spreadsheets or other known and proven software.
2.05.03 Implementing and Documenting Procedures (continued)

6. All design calculations include name or initials of the Designer and Checker along with the date designed and checked.
   
a. Hand calculations have a “prepared by”, and “checked by” notation for each page of the calculations.

b. Spreadsheets, MathCad calculations, and computer programs have a “prepared by” and “checked by” notation on the user input and results pages. These sheets are generated specifically for a project, or are utilized from a previous project, sometimes generated by others. The Checker is responsible for reviewing the data input, and the Designer and Checker must have a full understanding of the methodology, assumptions, and limitations of the program or spreadsheet and be able to verify that they are appropriate for the design.

7. All calculations are checked vs. the Final Package Submittal for the project.
   
a. All dimensions, member sizes, bar sizes from design calculations are verified to match plan dimensions.

b. Reinforcing steel takeoffs are performed and verified for consistency between detail drawings and Steel Reinforcement Detail sheets.

c. A final cost estimate (project verification estimate) is printed, and the wording for each pay item is verified for consistency between the cost estimate, plan drawings and (if applicable) special provisions.

8. Calculations.

At the completion of the project, provide a set of design calculations for all elements of the bid package for the design file. All calculations include completed “prepared by” and “checked by” fields. Consultants provide calculations sealed/stamped and signed by the Engineer of Record for the project, who is licensed in Michigan. Design calculations are stored within the project file in ProjectWise and hard copies (if applicable) are stored in the MDOT Design Unit in accordance with the MDOT plan retention policy.

9. The design file includes (but is not limited to) the following.
   
a. Design calculations.

b. Check calculations (e.g. to verify computer output, if applicable).

c. Supporting reports (e.g. geotechnical recommendations).

d. Cost estimates including quantity calculations and supporting documentation.

e. Review comments/resolutions.

f. Documentation substantiating the completion of Quality Control and Quality Assurance procedures in accordance with this document and other accepted standards.
Implementing and Documenting Procedures (continued)

D. QA procedures.

1. The MDOT Quality Assurance and Quality Control Process Guide for Project Managers provides a deliberate and systematic process for plan development and quality assurance. These processes are further defined in other sections of the MDOT Bridge Design Manual and the MDOT Road Design Manual.

2. The MDOT Design Division Quality Assurance Section performs QA during The Plan Review, Final Project Coordination (FPC), Plan Completion (Omissions and Errors Check) and Final Package Submittal stages of each project. The Quality Assurance Section reviews all project contract documents, facilitates department wide review, and documents all review comments in accordance with section 14 of the MDOT Road Design Manual. (12-17-2018)

3. In accordance with National Bridge Inspection Standard requirements, a load rating is performed for each bridge rehabilitation and bridge replacement/new construction project. For bridge rehabilitation projects, a preliminary load rating is typically performed at The Plan Review stage, and finalized at the Plan Completion stage. For new or reconstructed bridges, load rating is typically performed at Plan Completion stage. Load rating calculations serve as a QA of structural design of the beams for projects, and feedback is provided to the Designer if deficiencies are discovered.

4. MDOT’s Bridge Field Services (BFS) section performs QA at the Plan Completion (Omissions and Errors Check) stage of each project. BFS maintains a plan review checklist comprised of focus areas for plan reviews based on past experience with construction issues. BFS focuses specifically on constructability and structural fabrication aspects of bridge projects and provides feedback to the designer for incorporation into the final project package.

5. QA is performed by the project supervisor or team leader at various times during the project and at The Plan Review, Final Project Coordination, Plan Completion, and Final Package submittal stages. While QC is performed on one hundred percent of project documents, the level of QA performed by the supervisor or team leader is subject to the supervisor’s discretion based on a combination of factors such as experience of the Designer and Checker, complexity of the project, uniqueness of project parameters and details. (12-17-2018)

6. PLQA is performed by the Bridge Design Supervising Engineer to ensure that the bridge design units, consultant coordinators, and consultant design teams are performing adequate QA/QC in accordance to this document. This involves periodic review of a representative sample of bridge design units and consultant coordinator projects at selected project milestones. The Bridge Design Supervising Engineer may assign peer reviews to promote consistency and uniformity between MDOT working units and between MDOT in-house and consultant designers. Performance measures will be developed and used to track progress in key areas.

7. If the QA review shows evidence that the proper QA/QC process is not being properly followed, a more rigorous review of the QA/QC process documentation is performed, and recommendations are provided.
2.05.03 D. (continued)

3. At the completion of a project, the consultant furnishes the completed design package, including all design calculations, quantity calculations, and documentation of completed QA/QC along with a letter certifying completion of QA/QC.

4. Consultant design contracts have clauses protecting MDOT from design errors and omissions by requiring that the consultant’s work meet “sound, prudent, appropriate, and required professional standards and practices,” and that the consultant will promptly revise work that does not meet MDOT criteria, at no additional cost to MDOT.

5. The Consultant Coordinator or Project Manager assures that the documented QA and QC program is followed by the consultant in accordance with this document and the project QA/QC program by performing cursory checks of submittals and contract documents throughout the course of the project and requiring changes as appropriate. Additionally, consultant coordinators will verify reasonableness of the design based on knowledge of design standards and engineering judgement.

6. At the completion of each project, consultants are rated via performance evaluations. Past performance is a part of the scoring criteria for proposals for all Quality Based Selections. Consultants are also scored based on the experience of their QA/QC review team and the quality of their QA/QC plan as detailed in a project proposal.
G. Corrective Actions.

QA/QC procedures are implemented on all projects. Through the PLQA, the overall program is continually monitored for effectiveness. When level of QC or QA is found to be insufficient, corrective actions are required.

1. The following actions are taken if QA or PLQA reviews indicate that a specific design unit, consultant, or consultant coordinator is not following the process.

   a. The representative sample of projects for that unit or coordinator is increased until the Bridge Design Supervising Engineer is satisfied that the issue is corrected.

   b. Concerns with consultant’s performance are noted on consultant’s review at the completion of the project.

   c. Concerns with MDOT staff member’s performance are reflected in the staff member’s annual performance review or interim performance review, depending on severity.

2. If, during the review of project submittals, it is evident that the consultant team has not followed QA/QC practices, payment for hours associated with QA of a project as negotiated prior to the start of a project can be withheld.

A. Initial Review and Approval of Program.

The general role of FHWA Division Office is to review each State Highway Agency (SHA) QA/QC Program and to ensure the QA/QC program is thorough, effective, documented, and followed. Further, it is the role of the FHWA Office of Bridge Technology to assure uniformity within division offices regarding implementation of this guidance.

B. Periodic Program Reviews.

FHWA division offices may perform periodic reviews of the MDOT’s programs. Upon request, MDOT will provide project documents to the FHWA division office for review, in accordance with the Federal-Aid Stewardship Agreement. The need of periodic reviews depends on the complexity of the bridge projects.
2.05.05

References and Other Sources of Information

A. MDOT Bridge Design Manual

The procedures involved in preparing bridge plans, quality control and quality assurance are interlaced within Chapters 2 – 6 as well as Chapter 15.

B. MDOT Road Design Manual

Specifications and Special Provisions guidance are addressed in Chapter 11. (12-17-2018)

Procedures for plan preparation are addressed in Chapter 14.

C. The Quality Assurance and Quality Control Process Guide for Project Managers

Documents the MDOT QA/QC process for preparing road and bridge projects, and is based on a well-documented plan development procedure.


Documents the preconstruction process as it pertains to project development. Networks based on the PPD Tasks are used to plan and to track virtually every aspect of a project design schedule.

E. Guidelines For Bridge Plan Preparation (MDOT Sample Plans Bridge)

Bridge sample plans including plan sheet examples of typical plan set detailing preferred details and drafting procedures.
CHAPTER 3

PLAN COMPOSITION - NEW AND RECONSTRUCTION PROJECTS

3.00 GENERAL (8-20-2009)

3.01 STUDY (8-20-99)
3.01.01 Composition (8-20-99)
3.01.02 Cost Estimate (8-20-99)

3.02 PRELIMINARY PLANS
3.02.01 Composition (8-20-99)
3.02.02 Preliminary Estimate (8-20-99)
3.02.03 (Section Deleted) (12-17-2018)
3.02.04 Reviews (8-20-99)
3.02.05 Municipal Participation - Act 51 (8-20-99)

3.03 FINAL PROJECT COORDINATION (FPC) (12-17-2018)
3.03.01 Composition (8-20-99) (12-17-2018)

3.04 PLAN COMPLETION (OEC AND CERTIFICATION ACCEPTANCE) (12-17-2018)
3.04.01 Plan Composition (12-17-2018)
3.04.02 Reference Information Documents (1/17/2017) (12-17-2018)

3.05 PROGRAMMED COST ESTIMATES (8-20-99) (12-17-2018)

Appendix 3.02.04 A. Sample Utility Coordination Letter (8-20-99)
CHAPTER 3

PLAN COMPOSITION - NEW & RECONSTRUCTION PROJECTS

3.00

GENERAL (12-17-2018)

New Construction and Reconstruction (4R) is defined as a new bridge, a bridge replacement, a superstructure replacement, a deck replacement or widening of at least one lane width (including a lane used for maintaining traffic or retained for use as a future lane). See also Chapter 3 of Road Design Manual.

If a project includes 3R (See Chapter 12) and 4R work (See Chapter 7) the applicable standards are governed by the standards that correspond individually to each work type (3R or 4R). Work type overlap within a structure may cause a default to 4R standards within the overlap (entire structure). Identify each work type on the project information sheet to distinguish where 3R guidelines and 4R standards are separately applied.

When other work types are combined with 3R or 4R projects, they are also governed separately and identified as such on the project information sheet.

Projects categorized as CPM (capital preventive maintenance) projects are governed by guidelines that differ from 3R and 4R Guidelines. When CPM work types are packaged with a 3R or 4R project, the portion of the project that is outside the 3R or 4R work limits is governed by the guidelines that pertain to CPM work type. When describing the work type in the request for Plan Review Meeting, identify the work type separation so that the appropriate requirements are considered within each structure. Work type overlap within a structure may cause a default to 3R or 4R requirements.

Cross road over bridges shall be treated as individual segments regardless of project work type. (8-20-2009) (2-27-2012) (8-22-2016)
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3.01

STUDY (12-17-2018)

The first plan of a structure is a feasibility study showing the basic design concept and the topography in the immediate structure area. This study is prepared on a reproduction of the General Plan of Site Sheet.

The study is submitted by the Unit Leader to the Design Supervising Engineer for approval. FHWA Oversight projects that are federally financed must also be reviewed by the FHWA. For definition/clarification of oversight see Chapter 2. These approvals must be obtained before Preliminary Plans can be started. The study, as approved, then becomes a permanent record and is to be kept by the Unit until the construction of the bridge is completed. (8-6-92)

A study must be completed for all new construction and reconstruction projects. For rehabilitation, e.g., railing replacement and/or deck overlay projects see Chapter 4.

Where a project involves earth excavation, the Project Manager sends a project description and requests a list of potentially contaminated sites identified by the Environmental Assessment Unit, Development Services Division, Project Coordination Unit of the Project Planning Division and the Region Resource Specialist. The Project Manager/Cost and Scheduling Engineer will locate identified potential sites of contamination on the preliminary plans. If earth excavation will impact a potential contaminated site, the Project Manager/Cost and Scheduling Engineer will request further investigation of the site to be done by MDOT Geotechnical Services Section, Bureau of Bridges and Structures. Geotechnical Services Section will provide information on the type and extent of the contamination, appropriate pay items and quantities for the Plans and Specifications. For more detailed information see Section 14.13 of the Road Design Manual. (5-1-2000)

3.01 (continued)

Before starting and during the preparation of the study plans, the following information relevant to the design of the bridge should be considered:

A. Engineering Report. (Including Environmental Impact Statement if applicable.) (8-20-99)

B. Topography.

C. Traffic data - If traffic data is unavailable at this time, it should be requested from Region/TSC Traffic and Safety personnel.
Soil Data - Soil borings should be ordered as soon as possible after receiving the project.

In general, one soil boring should be requested for each substructure unit less than 100' long and two borings for footings longer than 100'. For retaining walls, MSE walls and sewers, borings should be taken every 300'. If conditions are found to vary appreciably, additional borings will be required. Refer to the Geotechnical Investigation and Analysis Requirements for Structures, on the MDOT Web site, (8-20-2009)

Soil boring requests should be submitted to MDOT Geotechnical Services Section. The request (electronic format preferred) should consist of MDOT Form # 1088, Request for Foundation Investigation and the requirements set forth in the form. The General Plan of Site Sheet as described in Section 3.01.01 shall include the following information:

1. Town, range and section number.
2. Scope of work.
3. Location of substructure units and borings.
4. Approximate bottom of footing elevations.
5. Notification when piles will be used regardless of soil character.
6. Indicate whether 400 kip nominal pile resistance (60 ton LFD) piles are appropriate (widening jobs). (8-20-2009)
7. Indicate if continuous superstructure is anticipated, and if integral abutments are being considered. (8-20-99)

If previous plans of an existing structure are available, the General Plan of Site and Log of Borings should be included.

E. Maintenance Reports (reconstruction projects). (8-20-99)

F. Existing and/or proposed utilities.

G. Waterway data for stream and river crossings.

1. Stream crossings are to be checked to determine whether they are a part of the county drain system, and the findings are to be recorded as part of the project history. Contact Design Engineer - Hydraulics/Hydrology or Region Drainage Coordinator.

2. Scour potential shall be investigated and design provisions may be needed to prevent undermining of the substructure. Contact Design Engineer - Hydraulics/Hydrology or Geotechnical Services Section. A scour analysis is required at all stream crossings where reconstruction is proposed. (8-20-2009)

H. Scoping Document and Region/TSC Scoping estimate. (8-20-99)

I. Minutes of city, county, or other meetings that have been held relevant to the project.

J. Correspondence files.

K. Existing Plans (reconstruction projects) and web-based street level viewer.

L. At all stream crossings, contact Roadside Development Unit to determine if an aesthetic or open railing should be considered.

M. Project Safety Analyses - Requests should be made to Design Division, Safety Programs Section in Lansing and the TSC Traffic and Safety Engineer. (8-20-99)

N. Capacity Analysis – Region/TSC Traffic and Safety (requested for deck replacement and reconstruction projects only) (2-27-2012)
3.01 (continued)

STUDY

3.01.01

Composition (12-17-2018)

The following information shall be included on the study plans:

A. The survey centerline showing horizontal alignment and stationing. The construction centerline, if different than the survey centerline.

B. Topographical features and contour lines.

C. Existing and proposed profiles along the construction centerlines of the roadways (and railroad, if the project includes one).

D. Benchmarks and witnesses with corresponding coordinates. (Provide coordinates if they are available. If not, add note 8.03 CC. to the study plans.) (12-5-2005)

E. Alignment sketch where data cannot be clearly shown on the overall plan view.

F. Utilities.

G. Traffic Data.

H. Concept of Maintenance of Traffic

I. Non-Motorized traffic requirements. Future sidewalk or bike path plans.

J. Horizontal curve data, if any.

K. A plan view of the structure and proposed approaches superimposed on the topography.

L. Elevation view of the structure, showing actual horizontal and vertical clearances.

M. Typical approach cross section. Provide a road typical cross section sheet in lieu of adding the section to the bridge study plans.

N. Deck cross section (see Bridge Design Guide 6.05 series).

O. Standard note designating the design loading.

P. Waterway information (stream and river crossing). Summary of Hydraulic Analysis must be on General Plan of Structure Sheet. See Section 8.05 C. (8-20-99)

Q. In the title block, designate if this is Study A, B, C, etc., and above the title block indicate the proposed letting date. This is the only sheet on which these designations are required and will not be added to the Final Plans.

Generally, the above information is all that is required for the study. Other details and/or plan sheets may be added, if necessary or beneficial. The study is submitted by the Unit Leader to their Design Supervising Engineer for review. Major projects that are federally funded must also be reviewed by the FHWA. These approvals must be obtained before preliminary plans are started. (8-20-99) (12-17-2018)

3.01.02


Complete a Bridge Cost Estimating Worksheet (located on the Bridge Management and Scoping website, Project Estimating section) for each study option considered.
PRELIMINARY PLANS

Preliminary Plans are the second set of plans prepared. They are for distribution to various agencies which are involved with the bridge project to show them our intent. This allows each agency to make its comments or requests and give approval where such is required.

Preliminary Plans are required for projects. For minor rehabilitation, e.g., railing replacement and/or deck overlay projects, see Chapter 4.

Traffic volume information (if available) must be included in the Preliminary Plans.

When temporary structures are to be designed and made a part of the contract plans for FHWA Oversight jobs, Preliminary Plans for those structures must be submitted to the Federal Highway Administration (FHWA) for approval. MDOT Oversight jobs need not be sent to the FHWA. (8-20-99)

A public hearing must be held for all major projects or where we intend to close a portion of a route and detour traffic during construction. In general, the hearing will have been held as a prerequisite of the Environmental Impact Statement, and it is unnecessary for one to be requested by the Bridge Unit Leader. Should there be a question, contact the Public Hearings Officer, Hearings and Mitigation Section, Project Planning Division.

Composition (8-20-99) (12-17-2018)

Generally, plan sheets required are as follows:

A. Title Sheet: Show job numbers, location map, notes and traffic data.

B. General Plan of Site Sheet: If a bridge project doesn’t have a Study, all information that was to be shown on the Study Sheet shall be shown on the General Plan of Site Sheet. The following information should be added to the General Plan of Site Sheet:

1. The plan view of the structure and approaches as shown on the approved study.

2. Typical approach roadway cross section is no longer required on bridge plans because duplicate information is shown on road plans. It can be added on a case-by-case basis for unique situations or if the road plans do not supply the information.

3. General notes.

4. Any proposed relocation of existing utilities. Because of legal problems in other states, Designers should not label abandoned or out of service utilities as “abandoned”. Such utilities should be labeled “Utility Line Out of Service”. The name of the utility owner, if known, should also be placed on the plans.

5. A note designating all major items of work that are part of the project. This note should also identify items that are not part of the bridge plans but are included in road plans which are part of the project.

6. Where a bridge will cross a waterway or wetland, the plans should show a plan view, profile and cross section for any haul route required to access the project site. See Section 2.02.15 for additional information. (8-20-99)
3.02.01 (continued)

C. Log of Boring Sheet:
(Required for all new bridges and widening projects.) In addition to soil data, the elevations of the bottoms of footings, minimum pile penetration, and estimated pile tips shall be shown. All borings are to be plotted to a common datum utilizing the proposed stationing whenever possible. See Guidelines For Bridge Plan Preparation (MDOT Sample Plans Bridge) of Development Guide (Design Submittal Requirements Chapter 7) for various details and sample plan sheets.

Any recommendations or comments by the Soils Section are to be attached to the Preliminary Plan set that is turned in to the Design Supervising Engineer.

D. General Plan of Structure Sheet:
In general, the following views and sections shall be included:

1. Plan view of the structure including approach features such as pavement, shoulders, curb and gutter, and guardrail.
2. An elevation of the structure taken perpendicular to the roadway under, or for stream crossings, parallel to the roadway over.
3. A cross section of the deck showing the abutment, or half-abutment and half-pier.
4. Typical cross sections through the substructure units showing excavation and backfill limits.
5. Any other significant features peculiar to the project.
6. If temporary supports are to be used, they should be shown or noted on this sheet.

E. Existing General Plan of Site Sheet: If available, this sheet is required for all reconstruction and rehabilitation projects (4R). Create a new General Plan of Site for new structure or structure replacement projects and submit existing General Plan of Site as Reference Information Document (RID). See section 3.04.02. For all other projects include the existing General Plan of Structure. (12-17-2018)

F. Existing General Plan of Structure Sheet:
If available, this sheet is required for all reconstruction and rehabilitation projects (4R). Any removal of portion of structure is to be designated on this sheet. For projects with a new superstructure create a new General Plan of Structure, submit existing General Plan of Structure as Reference Information Document (RID). See section 3.04.02. For all other projects include the existing General Plan of Structure. (12-17-2018)

G. Interchange Layout: An interchange layout is required for all projects where the bridge is in a complex interchange area.
3.02.01 (continued)

Composition (12-17-2018)

H. Concept for Maintaining Traffic:
Preliminary plans of structure should include a proposed concept for maintaining traffic through the construction zone. Depending on the method selected, the plans or attachments should show or note the following:

1. Detours
   a. Show the proposed detour route
   b. Indicate the use of expressway crossovers

2. Part-width Construction
   a. Note the number of lanes to be maintained
   b. Indicate one-way or two-way traffic
   c. Note whether signals will be required
   d. Note if traffic is diverted on existing shoulders or temporary widening
   e. Show construction staging details

3. Traffic under a Grade Separation
   a. Indicate the number of lanes to be kept open
   b. Note if traffic is diverted on existing shoulders
   c. Note any time restrictions on lane closures

4. Temporary Runaround
   a. Show the centerline alignment
   b. Show a cross section of the temporary road

5. Navigable Water Traffic (12-17-2018)

The Design Project Manager/Cost and Scheduling Engineer should consult with the Region/TSC Traffic Engineer and the Division of Operations in Lansing to arrive at the concept for maintaining traffic.

(8-20-99)
3.02.02 (continued)

Preliminary Estimate Items (8-20-99)

1. Preliminary
   - Temporary Structures
   - Removal of Existing Structures
   - Removal of Portions of Structures
   - Cofferdams

2. Substructure
   - Unclassified Excavation
   - Temporary Steel Sheet Piling
   - Permanent Steel Sheet Piling
   - Foundation Piling
   - Tremie Concrete
   - Substructure Concrete
   - Steel Reinforcement - Substructure
   - Substructure Repair

3. Superstructure
   - Superstructure Concrete
   - Steel Reinforcement - Superstructure
   - Structural Steel Fabrication & Erection
   - Shear Developers
   - Prestressed Concrete Beams
   - Prestressed Concrete Deck
   - Expansion Joint, if cost is a major item
   - Bridge Railing
   - Concrete, Bridge Deck Overlay
   - Cleaning and Coating Structural Steel

4. Miscellaneous (12-17-2018)
   - Structure Backfill
   - Slope Protection
   - Riprap
   - Structure Embankment
   - Drainage Items
   - Temporary Supports
   - Channel Excavation
   - Approach Work
     - (If included in Bridge Plans)
   - Maintaining Traffic costs
   - Miscellaneous Road Costs

Where some of the above items represent a minor percentage of project cost, they may be grouped and given a lump sum price.
3.02.04 A. (continued)

Once the existing utility locations are received and incorporated in the plans and the proposed work is shown on the plans, the Project Manager/Cost and Scheduling Engineer submits the plans to the Utilities-Permits Section in the Development Services Division, who will distribute the plans with a transmittal letter to the utility companies. Any possible utility conflicts should be identified at this stage. If it is obvious no conflicts exist, the Utilities-Permits Section may elect to eliminate this distribution.

If required, a Utility Meeting will be scheduled and held prior to The Plan Review Meeting. All utility conflicts are to be resolved prior to The Plan Review Meeting.

B. The Plan Review Meeting - Required (12-17-2018)

Preliminary plans are reviewed by the agencies affected by the project and by Department personnel responsible for various aspects of construction. Much of this review takes place at a Scope Verification or The Plan Review Meeting held at the site (if required) with many of the concerned parties present. Included are: Design and Region/TSC personnel, as well as, representatives from the FHWA on FHWA Oversight projects, counties, cities, and both municipal and private utility companies.

Design Division’s Quality Assurance Supervising Engineer is responsible for the distribution of preliminary plans and estimates to those attending The Plan Review Meeting. The Design Engineer will provide the Plans & Field Review Section’s administrative assistant with tracings (or reproducible copies) and a completed MDOT form #0303; Plan Review Meeting. This form should include all utility companies in the area that either have received plans after completion of the Scope Verification or have responded indicating possible conflict. The administrative assistant will order and distribute the required sets of prints.

The Design Engineer will provide ProjectWise links to the plans to those not attending The Plan Review Meeting, or copies of the plans as requested. (8-6-92)
3.02.04 B. (continued)

Reviews (8-20-99) (12-17-2018)

The job specific Supporting Documents folder in ProjectWise supplies a list of recommended invitees to receive an email invitation to view the plan set in electronic format. Hard copies of plans can be supplied upon request to individuals outside of the Department who do not have access to view the plans electronically.

After Preliminary Plan distribution, time should be taken to investigate and initiate any construction permits necessary for the project. Complete details are contained in Chapter 14.

A written response is required to reply to any review recommendations made during preliminary plan review or The Plan Review Meeting. The response should verify compliance with review recommendations that will be incorporated into the plans, and provide an explanation for any comments received that cannot be included with the project. (8-6-92)

1. FHWA: Preliminary Plan prints are sent to the FHWA for all FHWA Oversight projects.

   The FHWA requires two sets of Preliminary Plan prints with estimate.

2. Design Files:
   A copy of The Plan Review Meeting letter is sent to the Design files.

3. Railroad:

   Preliminary Plan prints are sent to the railroad companies as follows:

   Highway Over Railroad

   Selected plan sheets (Title Sheet, General Plan of Site, General Plan of Structure, pier and crashwall detail sheets, plan sheets showing utilities within railroad right-of-way, and sheets showing how structure drainage is to be handled).

   Railroad Over Highway

   Also, the Preliminary Plans are sent to the Railroad Coordination Unit – Office of Rail for all railroad grade separations. (10-22-2012)

   Contact the Railroad Separations Engineer for addresses of the affected railroads.

   When it is expected that temporary steel sheet piling will be required, the railroad should be requested to submit any specified requirements as to the size and extent of the sheeting.

4. Design Engineer-Bridge Management: Preliminary Plans with estimate. No transmittal letter is required.

5. Design Engineer - Specifications and Estimates: One copy of the estimate and plans. No transmittal letter is required.
3.02.04 B. (continued)

Reviews (8-20-99) (12-17-2018)

6. USGS Stream Gauges:
   At sites where USGS stream gauges are located, two sets of Preliminary Plan prints should be sent to the U.S. Department of Interior for review and comments. If relocation of gauges is necessary, a letter requesting approval of relocation site, as shown on the plans, must accompany the prints.

7. Hydraulics/Hydrology Unit:
   The Hydraulics/Hydrology Unit is included on the electronic notification send out of the Preliminary Plans for all projects involving waterways.

8. Unit Files:
   The Design Unit is required to keep one set of Preliminary Plan prints with a Preliminary Estimate in its files. Also, the Design Unit should have one set of reproducible copies of the Preliminary Plans; these can be used in obtaining prints of the Preliminary Plan, if necessary, after final plan preparation has begun.

C. The Plan Review Meeting-Not Required (12-17-2018)

Occasionally, a project will not require The Plan Review Meeting. In this case, the Project Manager/Cost and Scheduling Engineer shall distribute the Preliminary Plans as shown previously, along with an additional distribution as follows:(8-6-92) (10-22-2012)

1. Region/TSC:
   Send an electronic invitation to the Preliminary Plans and corresponding estimates for review and commenting to the Region/TSC Project Development /Cost and Scheduling Engineer and Construction for all bridge projects. (8-6-92)

2. Construction & Technology Division:
   Send an electronic invitation to the Preliminary Plans and the corresponding estimate for review and commenting to the Engineer of Construction & Technology on all projects.

3.02.04 C. (continued)

3. Transportation Planning Services Division:
   Send an electronic invitation to the Preliminary plans for review and commenting.

4. Road:
   The Road Design Section is sent an electronic invitation to the plans for review and commenting. If the road design is being done by a consultant, please ensure access to view the electronic files is set up.

5. Municipally-Owned Utility Outside City Limits*:
   If the project is located outside the corporate limits of a city, but there are city-owned utilities in the project vicinity, send one set of prints of the Preliminary Plans to the Utility Coordination, Permits and Agreements Section - Development Services Division for the file and two for each utility for forwarding. The Utility Coordination, Permits and Agreements Section - Development Services Division is to be notified whether the bridge project is combined with a road contract.

6. City of ____ (any except Detroit):
   Transmit the following to the Utility Coordination, Permits and Agreements Section - Development Services Division
   - one set for the files, plus
   - one set for each nonparticipating city (population less than 25,000), or
   - two sets and one estimate of cost for each participating city, except
   - three sets and one estimate for Flint, Lansing, or Warren (for a list of participating cities see Subsection 3.02.05).

   In addition, provide the Utility Coordination, Permits and Agreements Section - Development Services Division with two sets for each municipally-owned utility.
   The Utility Coordination, Permits and Agreements Section - Development Services Division is to be notified if the bridge is to be let without a road contract.
Reviews (8-20-99) (12-17-2018)

7. City of Detroit:
Transmit 13 sets of Preliminary Plans and two estimates to the Utility Coordination, Permits and Agreements Section - Development Services Division (one for file, 12 to be forwarded). If the bridge is to be let without a road contract, notify the Utility Coordination, Permits and Agreements Section - Development Services Division

8. County Drain Commission:
Two sets of Preliminary Plan prints are to be sent to the County Drain Commissioner for comments and/or approval. Also, a copy of the transmittal is sent to the MDOT Drainage Coordinator in the Design Division, Bureau of Highway Development. (5-1-2000)

9. County of _________:
For all bridge projects involving county roads, two sets (three if Wayne County) of Preliminary Plan prints are to be sent to the county.

10. Consultant:
If a consultant is doing the design, one set of Preliminary Plan prints with Preliminary Estimate is returned to them.

11. Geometrics Coordination Engineer:
On all projects, the Geometrics Coordination Engineer is sent an electronic invitation to review and provide comments on the Preliminary Plans for comments.

12. Electrical Unit - Design:
The Electrical Unit Leader is sent an electronic invitation to review and provide comments on the Preliminary Plans for all bridge projects where lighting is involved.

13. Utilities-Permits Engineers:
The Region/TSC Utilities/Permits Engineer and the Assistant Engineer of Utilities/Permits in Lansing are sent copies of the letters to the utility companies for all projects that involve utilities. No plans are required. (8-6-92)

14. Municipal Utilities Unit - Design:
The Municipal Utilities Unit Leader is sent an electronic invitation to the Preliminary Plans for all bridge projects involving water main or sanitary sewer designed by that unit.
MICHIGAN DESIGN MANUAL
BRIDGE DESIGN

3.02.05

Municipal Participation - Act 51 (8-20-99)

For bridge construction work, only certain activities qualify for participation by municipalities pursuant to Act 51. In general, participation is required for new construction of bridge and major modifications due to widening, upgrading, replacement, increase traffic volume or strengthening the structure. Non-participating activities, in general, are those that involve the routine maintenance or repair of these existing structures.

Work requested by local municipalities will in general be 100% municipal participation. An agreement with chargeable expenses is required and administered through the Utility Coordination, Permits and Agreements Section - Development Services Division. (8-20-2009) (10-22-2012)

The following is a list of participating and non-participating work items related to bridge projects:

A. Participating Items

1. Replacement or widening of a bridge deck for at least one continuous span. The bridge deck does not have to be full width, but is required to be at least one continuous span. If the deck is required to improve drainage, safety or the existing road alignment, then it’s a participating item. The deck resurfacing or overlay must be a minimum of $\frac{3}{4}$" thick.

2. Trunkline approach work as required as part of a bridge project.

3. All preparatory work necessary for superstructure construction including hand chipping for the deck, hydrodemolishing and removal of existing pavement patches and joints.

4. Joint replacement as part of a deck overlay or deck replacement.

5. Pedestrian screening.

6. Any widening or replacement of piers, headwalls, and abutments necessary for superstructure construction.

7. Structural steel replacement as part of a deck replacement project.

8. The installation, extension or betterment of guardrail protecting the bridge structure.

9. The removal and replacement of sidewalk as required.

10. All maintaining traffic items related to the participating items of the bridge project (i.e. pavement markings and barricades used for traffic control).

11. All necessary landscaping required for this construction, widening or major modification to these bridges.

12. Mobilization and miscellaneous items related to participating items of the bridge projects involving construction or modifications.


B. Non-participating Items

1. Pin and hanger replacement.

2. Cleaning and coating existing structural steel.

3. Any patching or sealing work done on the substructure.

4. Rocker bearing realignment.

5. Removal and replacement of joints not part of a deck overlay.

6. Resurfacing of the trunkline approach with a length less than 500’ or one city block and not related to participating bridge construction.

7. Resurfacing of the deck that is less than one continuous span.
3.02.05 (continued)

Municipal Participation - Act 51 (8-20-99)

8. Routine maintenance which includes ordinary repair, painting, cleaning and snow and ice removal for the bridge deck and structure.

9. Replacement/adjustment in kind of existing guardrail.

10. Furnishing and fabricating structural steel additions and replacements for existing structures as a result of accidents.

11. The construction of temporary supports.

(2-27-2012) The following cities are required to participate in accordance with Act 51 PA 1951:

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Final Project Coordination (FPC)
(12-17-2018)

The Final Project Coordination indicates 90-95% completion of the plans, proposal and supporting documents herein after referred to as the FPC package. See Chapter 14 of the Road Design Manual for FPC Requirements and Procedures.

3.03.01 Composition

The FPC package should be as complete as possible to ensure that items essential to the FPC reviewers are present and complete. The FPC package must include all items in the Milestone Checklist and as noted in section 3.04 with the following exceptions/clarifications:

A. Final Plans

1. Project information sheet index should include all anticipated plan sheets, even if not included in FPC package.
2. Miscellaneous Quantities may be preliminary.
3. Abutment/Pier Details – rebar may not be finalized, and miscellaneous details may not be complete.
4. Superstructure Details – All details must be present. Rebar may not be finalized.
5. Reinforcement Details – sheet(s) may be omitted.
6. Slab and Screed Details – sheet(s) may be omitted.

B. Proposal

1. Progress clause will be Draft.
2. Unique Special Provisions must be submitted for approval but may not be approved.
3. Notice to Bidders, coordination clauses and permits will be submitted for approval but may not be approved.
4. Railroad Coordination – special provisions, coordination clause and agreement (if required) must be complete, pending final approval.
5. Cost Summary – some items may be estimated.
3.04

Plan Completion (OEC and Certification Acceptance) (12-17-2018)

The Plan Completion date indicates 100% completion of the plans, proposal and supporting documents. See Chapter 14 of the Road Design Manual for Plan Completion Requirements and Procedures.

Final plans are required for all projects. For minor rehabilitation (3R), e.g., railing replacement and/or deck overlay projects, see Chapter 4.

Also See Section 14.57 of the Road Design Manual for more details regarding plan completion and OEC/Certification Acceptance.

3.04.01

Plan Composition (12-17-2018)

The following list and ordering of sheets is suggested for final plans:

A. Title Sheet - all projects.
B. Project information Sheet
C. Legend Sheet
D. Note Sheet
E. Miscellaneous Quantities
F. Typical Cross Sections (if applicable)
G. Miscellaneous Details
H. Guardrail Details
I. Survey Information Sheet
J. Interchange Layout - for bridges in complex interchanges.
K. Staging Plans - all part-width construction projects let separately from road projects. (May be shown on General Plan of Structure)
L. Traffic Detail Sheets - where maintaining traffic is part of the project.

M. General Plan of Site Sheet - all projects.
N. Log of Borings Sheet - all new bridges and widening projects.
O. General Plan of Structure - all projects.
P. Abutment Details - all new bridges and widening projects.
Q. Pier Details - all new bridges and widening projects.
R. Structural Steel, Prestressed Concrete, etc., Detail Sheets - all new bridges and widening projects.
S. Expansion Joint Detail Sheet (when applicable). (8-20-99)
T. Superstructure Detail Sheets - all new bridges, widening, and slab replacement projects.
U. Slab and Screed Data Sheet. (8-20-99)
V. Steel Reinforcement Sheets - all projects.
W. Standard detail sheets as required.
X. Any road plans as applicable.

Existing General Plan of Site, existing General Plan of Structure and other existing sheets deemed necessary must be placed in Reference Information Document (RID) process as electronic data files. See Section 3.04.02 for process and definition.
MICHIGAN DESIGN MANUAL
BRIDGE DESIGN

3.04.02 (12-172018)

Reference Information Documents

A. Process and Definition

The Reference Information Document (RID) process provides availability of electronic data files through the e-Proposal website. RID files are non-contractual items for prospective bidders and awarded contractor to use to gain a better understanding of the project. RID can include design CADD files, survey deliverable files and other miscellaneous items pertinent to the project.

Milestone reviews by MDOT RID Support are intended to be on the same timeline as other reviews mentioned in the previous sections. RID files will be submitted to the Specifications and Estimates Unit and MDOT RID Support for review prior to final turn in. The files are subsequently published at the same time as the Proposal and Plans. Any changes made to the RID files after this time, due to an addendum, will be the responsibility of the Project Manager. Each published ‘set’ released after the original publication must include a revised RID_Index.xlsm using the Project Changes tab that includes only the changes made to the files.

See the Chapter 5 of Development Guide (Design Submittal Requirements) for more information.

B. Common Bridge RID Files and Criteria for Use

The Design Project Manager/Cost and Scheduling Engineer is responsible for ensuring that all appropriate RID files (including files from resource areas outside of Bridge Design) are incorporated into the RID folder for the project and in the RID_Index.xlsm file. Below are several types of RID files that are common to bridge projects.

1. Geotechnical Recommendations – The final Geotechnical Foundation Engineering Report must be included in the RID if foundation analysis was performed for a project.

2. Existing Plans – PDF’s of all applicable existing plans (including shop drawings) for a bridge should be included on all projects.

3. Pictures – If photos of the project would be helpful to illustrate the site or existing bridge conditions, they may be included.

4. CADD Files – For projects that are detailed on geospatial coordinates, CADD files including the general plan of site and structure as well as corresponding base files may be included.

5. Survey Information – If survey was performed for the project, the Survey Support Area will place final survey files in the RID folder in the survey deliverable folder structure. The Project Manager/Cost and Scheduling Engineer must copy this information to the RID folder for the project. Verify that the files contained in the folder are the latest version utilized on the project.

6. Other Information – If the Design Project Manager/Cost and Scheduling Engineer has other information not described above that may be useful to the contractor, MDOT RID Support or the Bridge Design Supervising Engineer should be consulted to confirm whether disclosing additional information causes any concerns for the Department.
PROGRAMMED COST ESTIMATES

The project estimate should be reviewed at the following stages of plan development:

A. Upon completion of Study.
B. Upon completion of Preliminary Plans.
C. Whenever the scope of work changes.
D. When lettings are delayed appreciably (review yearly).

The programmed cost estimate must be updated whenever the current cost estimate exceeds that shown on the Status of Plans by more than 10 percent.

Projects funded by bond issues may not be significantly altered in scope or cost. To avoid the need for a change, all items contributing to a project’s cost should be conservatively evaluated and included in the Engineer’s Estimate. (8-20-99)

Occasionally, the Estimating Engineer will notify the Project Manager that the difference between the final cost estimate and the programmed estimate exceeds the limits given in Section III of the Project Manager’s Handbook. In this case, the Project Manager should request the Statewide Transportation Planning Division’s approval of the final estimate. (8-6-92)
Dear

Subject: Request for Utility Information

Project Location (Route, City or Township, County):

Scope of Work:

Control Section(s):  Job Number(s):  Proposed Plan Completion Date:

For your Information, the design of this project will be done by a consultant:  No  Yes

If Yes, the consultant is:

Please mark your utility facilities on one set of the enclosed plans for the above mentioned Michigan Department of Transportation project. These facilities should be dimensioned to known features, such as a right-of-way line or road centerline. One set of marked plans and the attached “Request for Utility Information – Return Form” should be sent to the Transportation Service Center (TSC) utility coordination engineer listed. If you do not have any facilities in the area, please send only the completed return form. Please respond by .

For all potential utility conflicts, especially underground, the department may require the exact field location of your facilities. The enclosed plans are incomplete, and any utility relocation design should be undertaken only after discussion with the TSC utility coordination engineer. If certain items of utility work, such as adjustment of manholes, placing of conduits, etc., are to be included in this project, please indicate this in the Request for Utility Information – Return Form’s comments section.

Sincerely,

Enclosure

cc: TSC Utility Coordination Engineer (w/plans)
N. Lefke

Project Manager

MDOT 2480 (03/06)

www.michigan.gov
REQUEST FOR UTILITY INFORMATION – RETURN FORM

Date:

To:

Please return this completed form and marked plans (if applicable) by to the following utility coordinator:

Control Section(s):     Job Number(s):

Utility Response Information
Utility facilities within project limits  No    Yes
Marked MDOT plans enclosed  No    Yes
Utility company maps enclosed  No    Yes
Facilities are dimensioned from  Right-of-Way    Road Centerline    Other:    
Facilities are    Underground    Aerial
If available, approximate vertical dimension(s)
Size and type ____________________________    Year:
Facilities are    Active    Out of Service

Bridge(s)
Facilities attached to underside of bridge  No    Yes
Facilities located in bridge deck, sidewalk or barrier wall  No    Yes
Buried facilities near bridge  No    Yes
Aerial facilities near bridge  No    Yes

Municipal Utilities and County Drains Only
Any work proposed to be included in project?  No    Yes (If Yes, explain)________________________

Utility Contact for Design Phase:               Utility Contact for Construction Phase:
(Information to be shown on MDOT Plans)
Name:___________________________    Name:___________________________
Address:__________________________    Address:________________________
City, State and Zip Code:____________________    City, State and Zip Code:____________________
Telephone:_________________________    Telephone:____________________
Fax:_______________________________    Fax:___________________________
E-Mail:_____________________________    E-Mail:________________________
Comments:__________________________

Bridge Design Manual  Appendix 3.02.04A
## Shoulder Widths for Work Zone Safety and Mobility (11-28-2011) (6-16-2014)

For 2 lane freeway and interstate new bridge construction and reconstruction (superstructure replacement and deck replacement) the standard bridge shoulder widths shall be 14'-10". This will provide increased safety and mobility for future maintenance of traffic. The cross section will provide part width bridge construction with traffic being maintained on two 11 ft. lanes with 1 ft. shy distance on each side. For cross section see Bridge Design Guide 6.05.01A. An MDOT internal design exception will be required for 4R projects when the shoulder width is not met. The Region Systems Manager shall determine the required shoulder width at the scoping of the projects.

Designers should layout beam spacing to accommodate future part width reconstruction. In most cases beams at centerline of structure should be avoided. (11-28-2011) (12-17-2018)

Bridge approach guardrail and bridge approach curb and gutter will be affected as a result of the widened shoulders and must be addressed in the design of the approaches. If the increased shoulder width is deemed necessary on reconstruction projects substructure widening may become necessary.

## Redundancy (11-28-2011) (9-17-2012)

Consideration should be given to providing redundancy in bridge designs. Avoid nonredundant schemes if possible. All non-redundant or fracture critical designs shall be approved by the Engineer of Bridge Design.

## Part Width Construction (11-28-2011)

For existing bridges used to maintain traffic, the structural performance of the in-service portion of the structure shall be evaluated with respect to stage demolition and adjacent construction.

To the extent possible, plans shall show location of existing spread footings with respect to proposed construction.

Unbraced excavations for new substructure shall not extend below the bearing elevation of adjacent spread footing Foundations.

Drilled excavations adjacent to in-service spread footing foundations shall be cased to prevent undermining.

For part-width construction of bridges, provide a minimum of 6' between the centerline of temporary sheeting (along the stage line) and the existing substructure sawcut line. This will allow for the width of sheeting and any required whalers and/or tiebacks. (2-26-2018)
7.01.15

Shoulder Widths for Work Zone Safety and Mobility (8-20-2009) (6-16-2014)

For 2 lane freeway and interstate new bridge construction and reconstruction (superstructure replacement and deck replacement) the standard bridge shoulder widths shall be 14'-10". This will provide increased safety and mobility for future maintenance of traffic. The cross section will provide part width bridge construction with traffic being maintained on two 11 ft. lanes with 1 ft. shy distance on each side. For cross section see Bridge Design Guide 6.05.01A. An MDOT internal design exception will be required for 4R projects when the shoulder width is not met. The Region Systems Manager shall determine the required shoulder width at the scoping of the projects.

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Bridge approach guardrail and bridge approach curb and gutter will be affected as a result of the widened shoulders and must be addressed in the design of the approaches. If the increased shoulder width is deemed necessary on reconstruction projects substructure widening may become necessary.

7.01.16

Redundancy (8-20-2009) (9-17-2012)

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7.01.17

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7.01.19 (continued)

Accelerated Bridge Construction (ABC)

B. Prefabricated Bridge Elements & Systems (PBES)

2. Prefabricated Element Types

The following prefabricated elements may be considered for use on MDOT bridge projects:

a. Precast full depth deck panels.

(1) Panels may be connected by reinforcement splice with closure pours using high strength concrete or ultra-high performance concrete or they may be transverse or longitudinally post tensioned.

(2) Panels are sensitive to skew and beam camber and haunches.

(3) Panels using post tensioning may have long term maintenance concerns.

(4) Riding/wearing/sealing surface should be provided such as epoxy overlay or HMA overlay with waterproofing membrane.

(5) Dimensional tolerances are very tight.

(6) Additional geometry control will be required, and should be stated in the plans to be included in the Contractor Staking pay item.

(7) Match casting may be used to assure proper fit-up when complex geometry is required.

b. Decked Beam elements. (12-17-2018)

(1) Two steel beams connected with deck (modular beams).

(2) Decked Bulb Tee beams.

(3) Decked prestressed spread box beams.

4. These systems rely on full shear and moment capacity joints and closure pours.

Ultra High Performance Concrete may be used to reduce the lap length of the connection detail.

5. Camber control may require pre-loading of erected modular units, or partial post tensioning until all dead load deflections are applied.

6. Casting the roadway cross slope and/or vertical alignment curvature on modular units may be difficult, consider variable thickness overlays to develop required geometry.
7.01.19 (continued)

Accelerated Bridge Construction (ABC)

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The following prefabricated elements may be considered for use on MDOT bridge projects:

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   (3) Panels using post tensioning may have long term maintenance concerns.

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7.02

SUPERSTRUCTURE

7.02.01

Structure Type (5-6-99)

Whenever possible, multispans steel structures shall be continuous to avoid having expansion joints over piers. Consideration shall also be given to integral or semi-integral structures. Suspended cantilever design shall be avoided. When simple spans of an existing bridge are being replaced, consideration should be given to replacement with continuous beams and continuous for live load superstructure.

Where supporting members are prestressed concrete beams, decks should be cast continuous over piers where possible. Consideration shall also be given to integral or semi-integral structures.

Beam designs with complex layout may require the contractor to provide provisions and design any falsework required to ensure proper erection of beams. (11-28-2011)

Include the special provision, Complex Steel Erection, Shoring and Falsework, when one of the following situations may occur during the erection of structural members:

A. Construction of continuous spans > 200’.
B. Girders with horizontal curvature.
C. Field assembled suspension, movable bridge, cable-stayed, truss, tied arch, or other non-typical spans.

(11-23-2015)

7.02.02

Beam Spacing (5-6-99) (11-28-2011)

Space all beams so that the center to center distance does not exceed 10’-0”. If the spacing is exceeded the designer shall perform an analysis to ensure that the structure meets load rating criteria specified in MDOT Bridge Analysis Guide. Space spread box beams such that the center to center distance is not less than 6’-0”. (8-20-2009)

7.02.03

Beam Material Selection

The following is a guide for beam or girder material selection:


1. Spread box beams, 36” wide, up to 42” deep, 5000-8000 psi concrete.
2. Spread box beams, 48” wide, up to 60” deep, 5000-8000 psi concrete.
3. I-beams (Types I thru IV, 28” to 54” deep), 5000-8000 psi concrete.
4. I-beams (Wisconsin type, 70” deep), 5000-8000 psi concrete.
Use in Upper Peninsula.
5. I-beams (Michigan 1800 Girder, 70.9” deep), 5000-8000 psi concrete.
Use in Lower Peninsula.
6. Bulb Tee Beams (36” to 72” deep, 49” and 61” top flange), 5000-8000 psi concrete.

B. Steel (4-17-2017)

1. Rolled Beams, AASHTO M270 Grade 36, 50 or 50W.
2. Welded plate girders AASHTO M270 Grade 36, 50 or 50W.
7.02

SUPERSTRUCTURE

7.02.01

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7.02.03

Beam Material Selection

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A. Prestressed Concrete (12-5-2005)
   (11-24-2014) (4-17-2017) (12-17-2018)
   1. Spread box beams, 36" wide, up to 42" deep, 5000-8000 psi concrete.
   2. Spread box beams, 48" wide, up to 60" deep, 5000-8000 psi concrete.
   3. I-beams (Types I thru IV, 28" to 54" deep), 5000-8000 psi concrete.
   4. I-beams (Wisconsin type, 70" deep), 5000-8000 psi concrete.
   5. I-beams (Michigan 1800 Girder, 70.9" deep), 5000-8000 psi concrete.
   Use in Lower Peninsula.
   6. Bulb Tee Beams (36" to 72" deep, 49" and 61" top flange), 5000-8000 psi concrete.

B. Steel (4-17-2017)
   1. Rolled Beams, AASHTO M270 Grade 36, 50 or 50W.
   2. Welded plate girders
      AASHTO M270 Grade 36, 50 or 50W.
Prestressed Concrete Design

A. General

1. Strand Selection

The design and detail sheets shall specify only ASTM A416 (AASHTO M 203) Grade 270 low relaxation strands. Strands shall be 0.6 inches in diameter with a release force of 44,000 pounds. (5-6-99)

2. Bond Breakers/Debonding (5-1-2000)

Draped strands shall be avoided where possible. Debonding is MDOT’s preferred method of controlling stresses at the end of prestressed I beams. Strands should be debonded in pairs. A maximum of 40% of the strands may be debonded. Amounts more than that require draped strands. The debonding should be staggered by placing the debonded strands into groups similar to the table below.

<table>
<thead>
<tr>
<th>Number Debonded</th>
<th>Shortest</th>
<th>2nd</th>
<th>3rd</th>
<th>Longest</th>
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<tr>
<td>4</td>
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<td>14</td>
<td>6</td>
<td>4</td>
<td>2</td>
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</tr>
</tbody>
</table>

The shortest point refers to the closest point to the beam end that any debonding can be terminated without overstressing the beam. The longest point refers to the point that all debonding can be terminated. The above table was developed from the MDOT bridge program. Consultant debonding schemes shall follow a similar rational method.

From the end of the debonding to the point where the strands are no longer required to control stresses or provide ultimate capacity, a double development length (minimum) of bonding shall be provided (AASHTO 9.28.3).

Spans less than 30'-0" need not be debonded. It is realized that the continuity moments of continuous for live load structures may reduce the effectiveness of debonding & increase the number of draped strands. Wherever possible debonding shall not be placed on peripheral strands. If placing strands in the bottom row, they should be placed on every third strand with the corner strands being bonded.

3. To aid in stabilizing transverse reinforcement in the beam, a bar or strand shall be located in the bottom corners of the beam. Second row up for box beams and certain PCI beams. (11-28-2011)

4. Draping of strands shall be the last option to reduce stresses at the end of beams. Location of draped strands at beam ends shall start 2" from the top of the beam downward. Draped strands at beam end shall correspond to the highest available strands at beam center. (11-28-2011)

5. PCI beams under open joints are susceptible to corrosion from brine intrusion into the strands and mild reinforcement. This is the most prevalent distress to PCI beams. This can be mitigated by sealing the beam ends with an elastomeric sealer as described in Section 7.03.11A.

Prestressed I beams and spread box beams under expansion joints should be coated per the special provision for Concrete Surface Sealers. Apply the coating from the beam end a length the greater of twice the beam depth, or five feet. In addition, where the coating operation will have a minimal effect on the maintaining traffic schedule, and the cost of the project, the entire outside face of the fascia beam and its bottom flange, should be coated. On new construction or superstructure replacement the fascia beam can be coated prior to erection. (12-17-2018)

6. Continuous for live load prestressed concrete beams shall be designed as simple span beams for all positive dead load and live load moments. (9-2-2003)
7.02.18 (continued)

Prestressed Concrete Design

B. Prestressed Concrete Box Beam Design

1. Skew Bridges

The ends of the box beams shall be skewed to be parallel to the reference line.

2. Spacing (12-17-2018)

Spread box beams may be used and shall be treated similar to prestressed concrete I-beams. Space spread box beams such that the center to center distance is not less than 6'-0". The slab shall be according to Bridge Design Guide 6.41.01. (5-6-99) (11-28-2011)

3. Bridge Seats (5-6-99) (12-17-2018)

For spread box beams the bridge seat shall be bolstered and level.

4. Bearings

Where the pressure is less than 100 psi, ½” joint filler may be used for a bearing pad. Where bearing pressures are greater than 100 psi, 4” minimum (generally 6”) by 33” elastomeric pads shall be used (¾” minimum thickness, increase in ¼” increments). Cast steel sole plate (3/4” generally) in all beams. When the calculated bevel exceeds 1%, tilt sole plate as required. All position dowels for doweling beam to the substructure will be placed by drilling as described in the Standard Specifications. (8-20-2009) (11-28-2011) (11-24-2014)

5. Deck Slab/Wearing Course (12-17-2018)

a. MDOT Projects

Spread box beams shall use a slab according to Bridge Design Guide 6.41.01.

b. Local Agency Projects

A 6" thick reinforced concrete slab is to be used in all cases on local agency projects as described above except a hot mix asphalt, HMA, wearing surface may be used for side by side, prestressed concrete box beam bridges where the average daily traffic, ADT, is less than 500 vehicles and where the commercial traffic is less than 3% of the ADT. HMA (typically 2-3") shall be placed after placement of preformed waterproofing membrane as per Standard Specifications section 710.03. (11-28-2011)

6. Beam steel reinforcement, including stirrups, shall be Grade 60 (ksi) for all box beams except 17" & 21" box beams. For 17" & 21" box beams 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. Longitudinal beam steel reinforcement (A bars) shall be Grade 60 for 17" & 21" box beams. See note 8.07.04 Z. (11-24-2014)
Prestressed Concrete Design

A. General

1. Strand Selection

The design and detail sheets shall specify only ASTM A416 (AASHTO M 203) Grade 270 low relaxation strands. Strands shall be 0.6 inches in diameter with a release force of 44,000 pounds. (5-6-99)

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6. Continuous for live load prestressed concrete beams shall be designed as simple span beams for all positive dead load and live load moments. (9-2-2003)
7.02.18 (continued)

Prestressed Concrete Design

B. Prestressed Concrete Box Beam Design

1. Skew Bridges

   The ends of the box beams shall be skewed to be parallel to the reference line.

2. Spacing (12-17-2018)

   Spread box beams may be used and shall be treated similar to prestressed concrete I-beams. Space spread box beams such that the center to center distance is not less than 6'-0". The slab shall be according to Bridge Design Guide 6.41.01. (8-20-2009)

3. Bridge Seats (5-6-99) (12-17-2018)

   For spread box beams the bridge seat shall be bolstered and level.

4. Bearings

   Where the pressure is less than 100 psi, ½" joint filler may be used for a bearing pad. Where bearing pressures are greater than 100 psi, 4" minimum (generally 6") by 33" elastomeric pads shall be used (¾" minimum thickness, increase in ¼" increments). Cast steel sole plate (3/4" generally) in all beams. When the calculated bevel exceeds 1%, tilt sole plate as required. All position dowels for doweling beam to the substructure will be placed by drilling as described in the Standard Specifications. (8-20-2009) (11-28-2011) (11-24-2014)

5. Deck Slab/Wearing Course (12-17-2018)

   a. MDOT Projects

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   b. Local Agency Projects (8-20-2009)

      A 6" thick reinforced concrete slab is to be used in all cases on local agency projects as described above except a hot mix asphalt, HMA, wearing surface may be used for side by side, prestressed concrete box beam bridges where the average daily traffic, ADT, is less than 500 vehicles and where the commercial traffic is less than 3% of the ADT. HMA (typically 2-3") shall be placed after placement of preformed waterproofing membrane as per Standard Specifications section 710.03.

6. Beam steel reinforcement, including stirrups, shall be Grade 60 (ksi) for all box beams except 17" & 21" box beams. For 17" & 21" box beams 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. Longitudinal beam steel reinforcement (A bars) shall be Grade 60 for 17" & 21" box beams. See note 8.07.04 Z. (11-24-2014)
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.]


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. [Use for I-Beams, Bulb-Tee beams and spread box beams.]


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)

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)
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. [Use for I-Beams, Bulb-Tee beams and spread box beams.] (8-6-92)

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)
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1.21.01 Factors for Bridge Estimates

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9.40.03 Structural Steel Diaphragm for DTE Energy Gas Mains
9.50.01 Utility Charges
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#### Notes:
- 36" Wide Beams
- 48" Wide Beams
- BEVELED (TYP)
NOTES:
MINIMUM REINFORCEMENT SHOWN.

PLAN NOTES:
DECREASE VOID BOXES HEIGHT IN FASCIA BEAMS TO INCREASE TOP FLANGE THICKNESS TO 9" FOR EMBEDMENT OF BRIDGE BARRIER BARS. (USE WHEN BARRIER RAIL IS USED WITHOUT 6" CONCRETE WEARING SURFACE)
WHERE REQUIRED, DECREASE VOID BOXES HEIGHT TO PROVIDE 1½" CLEAR COVER FOR PRESTRESSING STRANDS IN UPPER ROW.

NOTES:
MINIMUM REINFORCEMENT SHOWN.

* IF REQUIRED FOR STRENGTH, USE 3" Ø HOLES FOR BUNDLED REINFORCEMENT FOR CONTINUOUS FOR LIVE LOAD INTEGRAL STUB ABUTMENTS.

** ALTERNATE ABOVE AND BELOW LONGITUDINAL BARS WITH HMA WEARING COURSE.

PLACE SPREAD BOX BEAM DIAPHRAGM/BACKWALL INSERTS AT 5" OR 7" UP FROM BOTTOM OF BEAM AND 3½" OR 5½" DOWN FROM TOP OF BEAM.

ALL A BARS SHALL BE GRADE 60 (ksi).
ALL D AND ED BARS SHALL BE GRADE 40 (ksi).
(SEE BRIDGE DESIGN MANUAL 8.07.04Z)
TYPICAL SECTION - 27”, 33”, 39” & 42” BEAMS

PLAN NOTES:
DECREASE VOID BOXES HEIGHT IN FASCIA BEAMS TO INCREASE TOP FLANGE THICKNESS TO 9” FOR EMBEDMENT OF BRIDGE BARRIER BARS. (USE WHEN BARRIER RAIL IS USED WITHOUT 6” CONCRETE WEARING SURFACE)
WHERE REQUIRED, DECREASE VOID BOXES HEIGHT TO PROVIDE 1½” CLEAR COVER FOR Prestressing STRANDS IN UPPER ROW.

NOTES:
MINIMUM REINFORCEMENT SHOWN.

* IF REQUIRED FOR STRENGTH, USE 3” HOLES FOR BUNDLED REINFORCEMENT FOR CONTINUOUS FOR LIVE LOAD INTEGRAL STUB ABUTMENTS.

** ALTERNATE ABOVE AND BELOW LONGITUDINAL BARS WITH HMA WEARING COURSE.

PLACE SPREAD BOX BEAM DIAPHRAGM/BACKWALL INSERTS AT 5” OR 7” UP FROM BOTTOM OF BEAM AND 3½” OR 5½” DOWN FROM TOP OF BEAM.

ALL A, D, AND ED BARS SHALL BE GRADE 60 (ksi).

(SEE BRIDGE DESIGN MANUAL 8.07.04U)
**NOTES:**

- Minimum reinforcement shown.
- If required for strength, use 3'0 holes for bundled reinforcement for continuous for live load integral stub abutments.
- ** Alternate above and below longitudinal bars with HMA wearing course.**
- Place spread box beam diaphragm/backwall inserts at 5" or 7" up from bottom of beam and 3½" or 5½" down from top of beam.
- All A bars shall be grade 60 (ksi).
- All D and ED bars shall be grade 40 (ksi).

**DECREASE VOID BOXES HEIGHT IN FASCIA BEAMS TO INCREASE TOP FLANGE THICKNESS TO 9" FOR EMBEDMENT OF BRIDGE BARRIER BARS. (USE WHEN BARRIER RAIL IS USED WITHOUT 6" CONCRETE WEARING SURFACE)"
Prestressed Concrete 4' Wide Box Beam Reinforcement Details

Plan Notes:

Typical Section - 27" & 33" Beams

Decrease Void Boxes Height in Fascia Beams to Increase Top Flange Thickness to 9" for Embedment of Bridge Barrier Bars. (Use When Barrier Rail is Used Without 6" Concrete Wearing Surface)

Notes:

Minimum Reinforcement Shown.

* If required for strength, use 3"Ø Holes for bundled reinforcement for continuous for live load integral stub abutments.

** Alternate above and below longitudinal bars with HMA wearing course.

Place Spread Box Beam Diaphragm/Backwall inserts at 5" or 7" up from bottom of beam and 3½" or 5½" down from top of beam.

All A, D, and ED bars shall be grade 60 (ksi). (See Bridge Design Manual 8.07.04U)
NOTES:

MINIMUM REINFORCEMENT SHOWN.

* IF REQUIRED FOR STRENGTH, USE 3" Ø HOLES FOR BUNDLED REINFORCEMENT FOR CONTINUOUS FOR LIVE LOAD INTEGRAL STUB ABUTMENTS.

** ALTERNATE ABOVE AND BELOW LONGITUDINAL BARS WITH HMA WEARING COURSE.

PLACE SPREAD BOX BEAM DIAPHRAGM/BACKWALL INSERTS AT 5" OR 7" UP FROM BOTTOM OF BEAM AND 3½" OR 5½" DOWN FROM TOP OF BEAM.

ALL A, D AND ED BARS SHALL BE GRADE 60 (ksi). (SEE BRIDGE DESIGN MANUAL 8.07.04U)

TYPICAL SECTION - 39", 42", 48", 54", & 60" BEAMS

DECREASE VOID BOXES HEIGHT IN FASCIA BEAMS TO INCREASE TOP FLANGE THICKNESS TO 9" FOR EMBEDMENT OF BRIDGE BARRIER BARS. (USE WHEN BARRIER RAIL IS USED WITHOUT 6" CONCRETE WEARING SURFACE)
NOTES:

1. VARIOUS

2. A BAR OR CUT STRAND (IF REQUIRED) (TYP)

3. 2 1/2" (TYP)

4. 2" (TYP)

5. CUT STRAND (IF REQUIRED) (TYP)

6. D04 BARS

7. 10" MIN. LAP

8. 1'-2" MIN. LAP

9. 1'-1" MIN. LAP

10. 1'-9" MIN. LAP

11. 1'-9" MIN. LAP

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96. 1'-9" MIN. LAP

97. 1'-9" MIN. LAP

98. 1'-9" MIN. LAP

99. 1'-9" MIN. LAP

100. DECAY, VOID BOXES HEIGHT (IN FASCIA BEAMS) TO INCREASE TOP FLANGE THICKNESS TO 9" FOR EMBEDMENT OF BRIDGE BARRIER BARS. (USE WHEN BARRIER RAIL IS USED WITHOUT 6" CONCRETE WEARING SURFACE)

101. ALL A BARS SHALL BE GRADE 60 (ksi).

102. FOR 27" AND GREATER DEPTH BEAMS ALL D AND ED BARS SHALL BE GRADE 60 (ksi).

103. (SEE BRIDGE DESIGN MANUAL 8.07.04U)

104. FOR 17" AND 21" BEAMS ALL D AND ED BARS SHALL BE GRADE 40 (ksi).

105. (SEE BRIDGE DESIGN MANUAL 8.07.042)
TYPICAL SECTION - 12" BEAM

NOTES:

* IF REQUIRED FOR STRENGTH, USE 3"Ø HOLES FOR BUNDLED REINFORCEMENT FOR CONTINUOUS FOR LIVE LOAD INTEGRAL STUB ABUTMENTS.

ALL A, D AND ED BARS SHALL BE GRADE 60 (ksi).
(SEE BRIDGE DESIGN MANUAL 8.07.04U)
SECTION THROUGH END BLOCK AT ABUTMENT

* IF NEEDED FOR STRENGTH, FOR CONTINUOUS FOR LIVE LOAD INTEGRAL STUB ABUTMENTS, REINFORCING STEEL MAY BE USED IN 2" OR 3" Ø HOLES.

ALTERNATE BEARING DETAILS

CORNER BLOCKING DETAIL

USE WHEN Ø < 70°
**Prestressed Concrete Beam Lifting Device Details**

**Details for Box Beams**

- **End of Beam Securely Tie or Clamp**
- **7" Min. 3'-0" Max.**

**Details for I-Beams**

- **End of Beam Securely Tie or Clamp**
- **7" Min. 3'-0" Max.**

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<td>3</td>
</tr>
<tr>
<td>54</td>
<td>1/2&quot;</td>
<td>3</td>
</tr>
</tbody>
</table>

*Maximum for 70" beams is as required to make beam laterally stable during handling.*

**Plan Note:**

Lifting devices shall be removed. Removal is included in the bid item "Prest Conc Box Beam, Erect, -- Inch" or "Prest Conc I Beam, Erect, -- Inch".