

<p style="text-align: center;">Municipal Bridge Projects MGL Chapter 85 Section 35 Review Process Design Requirements and Submittals for New Bridge and Full Bridge Replacement Projects NOTE: Design Requirements to be used depend on the Category of the Proposed Structure and not on the Category of the Existing Structure</p>						
<p style="text-align: center;">Note: If the Category of the Proposed Structure is neither BRI nor NBI (i.e., span ≤ 10 feet), a Chapter 85 review is not required</p>						
<p style="text-align: center;">If the Category of the Proposed Structure is a BRI Bridge (10 feet < span ≤ 20 feet)</p>						
Roadway Functional Class	Hydraulic Design	Geotechnical Design	Structural Design	Construction Details	Design Review Submittals	Other Considerations
<p style="text-align: center;">TIER 1</p> <p>Rural Minor Collector Rural Local Road Urban Collector Urban Local Road</p>	<p>Hydraulic report: Designer of Record is fully responsible for the accuracy of the analysis and conclusions. Bridge Manual may be used as a guide in preparing the report except as noted below:</p> <p>Less than 2 feet of freeboard as measured according to Bridge Manual Subsection 2.6.4 I.</p> <p>Flood frequency: 10 year Design Scour freq.: 25 year Check Scour freq.: 50 year</p> <p>Footings must be located in accordance with AASHTO LRFD Article 2.6.4.4 or provide properly designed scour countermeasures. Bridge must be scour stable after Design Scour Event but not necessarily available for use.</p>	<p>Geotechnical Report: Designer of Record is fully responsible for the accuracy of the analysis and conclusions. Bridge Manual may be used as a guide in preparing the report except as noted below:</p> <p>At least one boring to refusal below bottom of footing or pile tip for every 30 feet of abutment width or culvert length. If rock is encountered, a 10 foot core is recommended.</p>	<p>Design in accordance with AASHTO LRFD for HL-93 Design Loading.</p> <p>Bridge Manual DL and LL load distribution procedure if applicable.</p> <p>Seismic: AASHTO Guide Specifications for SDC A requirements.</p> <p>If a pre-fabricated structure that is designed by the fabricator: when the Contractor submits the fabricator design calculations and shop drawings, the municipality's Designer of Record shall review and accept the design.</p> <p>Designer of Record should note and provide justification for any deviations from the design requirements.</p>	<p>Need not follow MassDOT Bridge Manual construction details.</p> <p>If not using standard MassDOT bridge railings or barriers and transitions, those used must be crash tested to either NCHRP 350 or MASH, Test Level 2 minimum if roadway speed ≤ 45 mph, minimum Test Level 3 if roadway speed > 45 mph. Provide 42" railing height if pedestrians are allowed on bridge.</p> <p>If the structure that is actually constructed deviates markedly from the approved plans, those plans, both full design or conceptual, need to be revised to document the as-built structure.</p>	<p>Hydraulic Report (if over water, not reviewed by MassDOT).</p> <p>Geotechnical Report (not reviewed by MassDOT).</p> <p>Complete final set of Construction Plans and one set of design calculations checked by a second engineer for MassDOT review. After MassDOT approval, a final set of Construction Plan PDFs with the MassDOT Chapter 85 approval stamp, if full design, or MassDOT Chapter 85 Conceptual Design approval stamp, if pre-fabricated structure, on each structural detail sheet for Bridge Engineer's signature.</p> <p>Pre-fabricated structure: shop drawings and fabricator design calculations after reviewed and accepted by the Designer of Record with the MassDOT Chapter 85 approval stamp on each sheet for Bridge Engineer's signature.</p>	<p>Evaluation of structure from a Cultural Resources standpoint.</p> <p>Consider Stream Crossing Standards requirements.</p> <p>Consider "no rise" guidelines for NFIP regulatory floodways.</p> <p>Consider Complete Streets guidelines.</p> <p>Provide for utilities (water, gas, etc.) if it is expected that they will be installed in the future.</p> <p>Environmental permitting may put restrictions on time of year when work can be done in the water.</p>
<p style="text-align: center;">TIER 2</p> <p>Rural Major Collector Urban Minor Arterial</p>	<p>Hydraulic report per Bridge Manual.</p> <p>Provide 2 feet of freeboard. measured according to Bridge Manual Subsection 2.6.4 I.</p> <p>Flood frequency: 25 year Design Scour freq.: 50 year Check Scour freq.: 100 year</p> <p>Footings must be located in accordance with Bridge Manual Subsection 2.6.5 requirements. Must be scour stable and available for limited use after the Design Scour Event.</p>	<p>Geotechnical Report per Bridge Manual.</p> <p>Perform a Design Boring program in accordance with Bridge Manual Part I, Section 1.2</p>	<p>Design in accordance with AASHTO LRFD for HL-93 Design Loading.</p> <p>Bridge Manual DL and LL load distribution procedure if applicable.</p> <p>Seismic design per Bridge Manual for a 1000 year return period event.</p> <p>If a pre-fabricated structure that is designed by the fabricator: when the Contractor submits the fabricator design calculations and shop drawings, the municipality's Designer of Record shall review and accept the design.</p> <p>Designer of Record should note and provide justification for any deviations from the design requirements.</p>	<p>If using MassDOT standard bridge details, follow MassDOT Bridge Manual construction details.</p> <p>Use MassDOT bridge railings and barriers and transitions.</p> <p>If the structure that is actually constructed deviates markedly from the approved plans, those plans, both full design or conceptual, need to be revised to document the as-built structure.</p>	<p>Hydraulic Report (if over water, reviewed by MassDOT).</p> <p>Geotechnical Report (reviewed by MassDOT).</p> <p>Complete final set of Construction Plans and one set of design calculations checked by a second engineer for MassDOT review. After MassDOT approval, a final set of Construction Plan PDFs with the MassDOT Chapter 85 approval stamp, if full design, or MassDOT Chapter 85 Conceptual Design approval stamp, if pre-fabricated structure, on each structural detail sheet for Bridge Engineer's signature.</p> <p>Pre-fabricated structure: shop drawings and fabricator design calculations after reviewed and accepted by the Designer of Record with the MassDOT Chapter 85 approval stamp on each sheet for Bridge Engineer's signature.</p>	<p>Evaluation of structure from a Cultural Resources standpoint.</p> <p>Consider Stream Crossing Standards requirements.</p> <p>Consider "no rise" guidelines for NFIP regulatory floodways.</p> <p>Consider Complete Streets guidelines.</p> <p>Provide for utilities (water, gas, etc.) if it is expected that they will be installed in the future.</p> <p>Environmental permitting may put restrictions on time of year when work can be done in the water.</p>

If the Category of the Proposed Structure is a BRI Bridge (10 feet < span ≤ 20 feet) (Continued)						
Roadway Functional Class	Hydraulic Design	Geotechnical Design	Structural Design	Construction Details	Design Review Submittals	Other Considerations
TIER 3 Rural Principal Arterial Rural Minor Arterial Urban Principal Arterial Or Any structure on the National Highway System (NHS) (See Note 1 Below)	Hydraulic report per Bridge Manual. Provide 2 feet of freeboard, measured according to Bridge Manual Subsection 2.6.4 I. Flood frequency: 50 year Design Scour freq.: 100 year Check Scour freq.: 200 year Footings must be located in accordance with Bridge Manual Subsection 2.6.5 requirements. Must be scour stable and available for limited use after the Check Scour Event.	Geotechnical Report per Bridge Manual. Perform a Design Boring program in accordance with Bridge Manual Part I, Section 1.2	Design in accordance with AASHTO LRFD for HL-93 Design Loading. Bridge Manual DL and LL load distribution procedure if applicable. Seismic design per Bridge Manual for a 1000 year return period event, or 2500 year return period event for NHS bridges, based on the SDC of the site. If a pre-fabricated structure that is designed by the fabricator: when the Contractor submits the fabricator design calculations and shop drawings, the municipality's Designer of Record shall review and accept the design. Designer of Record should note and provide justification for any deviations from the design requirements.	If using MassDOT standard bridge details, follow MassDOT Bridge Manual construction details. Use MassDOT bridge railings and barriers and transitions. If the structure that is actually constructed deviates markedly from the approved plans, those plans, both full design or conceptual, need to be revised to document the as-built structure.	Hydraulic Report (if over water, reviewed by MassDOT). Geotechnical Report (reviewed by MassDOT). Complete final set of Construction Plans and one set of design calculations checked by a second engineer for MassDOT review. After MassDOT approval, a final set of Construction Plan PDFs with the MassDOT Chapter 85 approval stamp, if full design, or MassDOT Chapter 85 Conceptual Design approval stamp, if pre-fabricated structure, on each structural detail sheet for Bridge Engineer's signature. Pre-fabricated structure: shop drawings and fabricator design calculations after reviewed and accepted by the Designer of Record with the MassDOT Chapter 85 approval stamp on each sheet for Bridge Engineer's signature.	Evaluation of structure from a Cultural Resources standpoint. Consider Stream Crossing Standards requirements. Consider "no rise" guidelines for NFIP regulatory floodways. Consider Complete Streets guidelines. Provide for utilities (water, gas, etc.) if it is expected that they will be installed in the future. Environmental permitting may put restrictions on time of year when work can be done in the water. Designer of Record should note and provide justification for any deviations from the design requirements.
If the Category of the Proposed Structure is a NBI Bridge (20 feet < clear span)						
Roadway Functional Class	Hydraulic Design	Geotechnical Design	Structural Design	Construction Details	Design Review Submittals	Other Considerations
TIER 1 Rural Minor Collector Rural Local Road Urban Collector Urban Local Road	Hydraulic report: Designer of Record is fully responsible for the accuracy of the analysis and conclusions. Bridge Manual may be used as a guide in preparing the report except as noted below: Less than 2 feet of freeboard as measured according to Bridge Manual Subsection 2.6.4 I. Flood frequency: 10 year Design Scour freq.: 25 year Check Scour freq.: 50 year Footings must be located in accordance with AASHTO LRFD Article 2.6.4.4 or provide properly designed scour countermeasures. Bridge must be scour stable after Design Scour Event but not necessarily available for use.	Geotechnical Report: Designer of Record is fully responsible for the accuracy of the analysis and conclusions. Bridge Manual may be used as a guide in preparing the report except as noted below: Perform a Design Boring program in accordance with Bridge Manual Part I, Section 1.2	Design in accordance with AASHTO LRFD for HL-93 Design Loading and following Bridge Manual guidelines. Seismic design per Bridge Manual for a 1000 year return period event based on the SDC of the site. If a pre-fabricated structure that is designed by the fabricator: when the Contractor submits the fabricator design calculations and shop drawings, the municipality's Designer of Record shall review and accept the design. Designer of Record should note and provide justification for any deviations from the design requirements.	Need not follow MassDOT Bridge Manual construction details. If not using standard MassDOT bridge railings or barriers and transitions, those used must be crash tested to either NCHRP 350 or MASH, Test Level 2 minimum if roadway speed ≤ 45 mph, minimum Test Level 3 if roadway speed > 45 mph. Provide 42" railing height if pedestrians are allowed on bridge. If the structure that is actually constructed deviates markedly from the approved plans, those plans, both full design or conceptual, need to be revised to document the as-built structure.	Hydraulic Report (if over water, not reviewed by MassDOT). Geotechnical Report (not reviewed by MassDOT). Complete final set of Construction Plans and one set of design calculations checked by a second engineer for MassDOT review. After MassDOT approval, a final set of Construction Plan PDFs with the MassDOT Chapter 85 approval stamp, if full design, or MassDOT Chapter 85 Conceptual Design approval stamp, if pre-fabricated structure, on each structural detail sheet for Bridge Engineer's signature. Pre-fabricated structure: shop drawings and fabricator design calculations after reviewed and accepted by the Designer of Record with the MassDOT Chapter 85 approval stamp on each sheet for Bridge Engineer's signature.	Evaluation of structure from a Cultural Resources standpoint. Consider Stream Crossing Standards requirements. Consider "no rise" guidelines for NFIP regulatory floodways. Consider Complete Streets guidelines. Provide for utilities (water, gas, etc.) if it is expected that they will be installed in the future. Environmental permitting may put restrictions on time of year when work can be done in the water.

If the Category of the Proposed Structure is a NBI Bridge (20 feet < clear span) (Continued)						
Roadway Functional Class	Hydraulic Design	Geotechnical Design	Structural Design	Construction Details	Design Review Submittals	Other Considerations
TIER 2 Rural Major Collector Urban Minor Arterial	Hydraulic report per Bridge Manual Provide 2 feet of freeboard. measured according to Bridge Manual Subsection 2.6.4 I. Flood frequency: 25 year Design Scour freq.: 50 year Check Scour freq.: 100 year Footings must be located in accordance with Bridge Manual Subsection 2.6.5 requirements. Must be scour stable and available for limited use after the Design Scour Event.	Geotechnical Report per Bridge Manual. Perform a Design Boring program in accordance with Bridge Manual Part I, Section 1.2	Design in accordance with AASHTO LRFD for HL-93 Design Loading and following Bridge Manual guidelines. Seismic design per Bridge Manual for a 1000 year return period event based on the SDC of the site. If a pre-fabricated structure that is designed by the fabricator: when the Contractor submits the fabricator design calculations and shop drawings, the municipality's Designer of Record shall review and accept the design. Designer of Record should note and provide justification for any deviations from the design requirements.	If using MassDOT standard bridge details, follow MassDOT Bridge Manual construction details. Use MassDOT bridge railings and barriers and transitions. If the structure that is actually constructed deviates markedly from the approved plans, those plans, both full design or conceptual, need to be revised to document the as-built structure.	Hydraulic Report (if over water, reviewed by MassDOT). Geotechnical Report (reviewed by MassDOT). Complete final set of Construction Plans and one set of design calculations checked by a second engineer for MassDOT review. After MassDOT approval, a final set of Construction Plan PDFs with the MassDOT Chapter 85 approval stamp, if full design, or MassDOT Chapter 85 Conceptual Design approval stamp, if pre-fabricated structure, on each structural detail sheet for Bridge Engineer's signature. Pre-fabricated structure: shop drawings and fabricator design calculations after reviewed and accepted by the Designer of Record with the MassDOT Chapter 85 approval stamp on each sheet for Bridge Engineer's signature.	Evaluation of structure from a Cultural Resources standpoint. Consider Stream Crossing Standards requirements. Consider "no rise" guidelines for NFIP regulatory floodways. Consider Complete Streets guidelines. Provide for utilities (water, gas, etc.) if it is expected that they will be installed in the future. Environmental permitting may put restrictions on time of year when work can be done in the water. Designer of Record should note and provide justification for any deviations from the design requirements.
TIER3 Rural Principal Arterial Rural Minor Arterial Urban Principal Arterial Or Any structure on the National Highway System (NHS) (See Note 1 Below)	Hydraulic report per Bridge Manual. Provide 2 feet of freeboard. measured according to Bridge Manual Subsection 2.6.4 I. Flood frequency: 50 year Design Scour freq.: 100 year Check Scour freq.: 200 year Footings must be located in accordance with Bridge Manual Subsection 2.6.5 requirements. Must be scour stable and available for limited use after the Check Scour Event.	Geotechnical Report per Bridge Manual. Perform a Design Boring program in accordance with Bridge Manual Part I, Section 1.2	Design in accordance with AASHTO LRFD for HL-93 Design Loading and following Bridge Manual guidelines. Seismic design per Bridge Manual for a 1000 year return period event, or 2500 year return period event for NHS bridges, based on the SDC of the site. If a pre-fabricated structure that is designed by the fabricator: when the Contractor submits the fabricator design calculations and shop drawings, the municipality's Designer of Record shall review and accept the design. Designer of Record should note and provide justification for any deviations from the design requirements.	If using MassDOT standard bridge details, follow MassDOT Bridge Manual construction details. Use MassDOT bridge railings and barriers and transitions. If the structure that is actually constructed deviates markedly from the approved plans, those plans, both full design or conceptual, need to be revised to document the as-built structure.	Hydraulic Report (if over water, reviewed by MassDOT). Geotechnical Report (reviewed by MassDOT). Complete final set of Construction Plans and one set of design calculations checked by a second engineer for MassDOT review. After MassDOT approval, a final set of Construction Plan PDFs with the MassDOT Chapter 85 approval stamp, if full design, or MassDOT Chapter 85 Conceptual Design approval stamp, if pre-fabricated structure, on each structural detail sheet for Bridge Engineer's signature. Pre-fabricated structure: shop drawings and fabricator design calculations after reviewed and accepted by the Designer of Record with the MassDOT Chapter 85 approval stamp on each sheet for Bridge Engineer's signature.	Evaluation of structure from a Cultural Resources standpoint. Consider Stream Crossing Standards requirements. Consider "no rise" guidelines for NFIP regulatory floodways. Consider Complete Streets guidelines. Provide for utilities (water, gas, etc.) if it is expected that they will be installed in the future. Environmental permitting may put restrictions on time of year when work can be done in the water. Designer of Record should note and provide justification for any deviations from the design requirements.
Note 1: The following NHS routes: Eisenhower Interstate, Other NHS Routes and STRAHNET Routes and Connectors, are considered Critical/Essential in that they are the primary routes for emergency use during and after an emergency or natural event. Structures on these NHS routes must be available for limited use after such an event. See MassDOT Bridge Manual for more information on these requirements. A map of NHS Routes in Massachusetts is available on the following website: https://www.fhwa.dot.gov/planning/national_highway_system/nhs_maps/						
Note 2: Bridge Railing and Transition and Bridge Railing Retrofit Resources: Federal Highway Administration: https://highways.dot.gov/safety/rwd/reduce-crash-severity AASHTO AGC ARTBA Task Force 13: https://tf13.org/bridge-rails-browse-search/						