Montana Department of Transportation **ENGINEERING MEMO**	Date Issued: March 25, 2021 Date Effective: March 25, 2021 Related Specifications:
Subject: MDT Geometric Design Criteria and Design Exceptions	

Memorandum

To: e-Distribution

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1. Purpose

1.1 The purpose of this memo is to rescind and replace the MDT Geometric Design Standards. This memo will better support MDT's performance-based practical design philosophy and meet the requirements of 23 CFR.
1.2 This memo establishes authority and procedure to establish MDT baseline design criteria.
1.3 This memo establishes authority and procedure to approve the use of context specific criteria.
1.4 This memo establishes MDT processes to streamline compliance with changes to CFR, FHWA rulemaking and as necessary to best meet the needs of the State of Montana.
1.5 This memo provides procedure and guidance for execution of a design exception.
1.6 This memo provides procedure and guidance for execution of a design variance.

2. Definitions

2.1 Baseline Criteria: Published quantitative design criteria to be used as uniform baseline design dimensions or values. A baseline criterion is a controlling criterion/standard if it is applicable to a design element that requires a design exception. A baseline criterion is not a controlling criterion/standard otherwise.
2.2 Context Specific Criteria: Established quantitative design criteria to be used in place of uniform baseline design dimensions or values, for projects or locations where context indicates deviation from the baseline criteria is desirable. A context specific criterion is a controlling criterion/standard if it is applicable to a design element that requires a design exception. A context specific criterion is not a controlling criterion/standard otherwise.
2.3 Scope Specific Considerations - Projects, with a limited and targeted purpose and need, that address a specific safety, operational, or serviceability deficiency may be excluded in whole or in part from meeting the requirements of the Engineering Memo 21-03. Hazard elimination, emergency repair, and

small infrastructure repair or replacement projects are examples of projects meeting this requirement. Scope specific considerations may also apply for connection or transition work to existing roadway features not included in the project scope.

2.4 Commission Designated Highways: This includes highways and highway use rights of way for Interstate, Non-Interstate National Highway System, Primary, Secondary, and Urban highways as specified in MCA 60-1-103. Commission Designated Highways are also referred to as "On-System" routes for purposes of these procedures.

2.5 Controlling Criteria: A FHWA term defining design elements established by FHWA rulemaking which have substantial importance for the safe and efficient operation of roadways on the National Highway System. Controlling criteria are the criteria that require formal documentation for deviations from standards not meeting 23 CFR 625.

2.6 High-speed: Design speed greater than or equal to 50 mph.

2.7 Urban Areas - Those places within boundaries set by the responsible State and local officials, or a place that has an urbanized character. Urban areas have three categories.

2.7.1 Urbanized Area - Those areas with a population greater than 50,000, as designated by the Bureau of the Census.

2.7.2 Small Urban Areas - Those areas with a population greater than 5,000, and not within any Urbanized Areas.

2.7.3 Urban fringe – Those areas characterized as a blend of urban and rural character and user needs.

2.8 Standard: MDT term for design elements established by this procedure that require a design exception.

2.9 State Highways: The highways throughout the state that are not located on the Commission Designated Highway System but are on the state maintenance system as specified in MCA 60-1-103.

2.10 Variance: Approved deviation from baseline criteria for design controls that do not require a design exception.

3. Scope

3.1 This memo is applicable to all parties performing work on any Montana On-System routes and State Highways. This memo is not applicable to work on Non-NHS On-System Urban and Secondary routes, having local maintenance responsibility, that are not using Federal Funds.

4. Administration

4.1 This memo rescinds and replaces all prior memos and procedures establishing, defining, or identifying Geometric Design Standards.

4.2 MDT Baseline Criteria and design elements requiring a design exception or a variance are signed and published by the MDT Chief Engineer in accordance with these procedures. An MDT review process is established in the associated procedure.

4.3 Context Specific Criteria must be established under the direction and supervision of a licensed MT Professional Engineer. Signature is required for use of Context Specific Criteria just as it is required for design exceptions in accordance with MDT "Signature Authorization" found on the MDT policies webpage.

4.4 Controlling Criteria for use on the NHS System are as established by 23 CFR and FHWA rulemaking. Federal code identifies the American Association of State Highway and Transportation Officials (AASHTO) "*A Policy on Geometric Design of Highways and Streets*" (Green Book) and the AASHTO "*A Policy on Design Standards - Interstate System*" as the minimum standard of design for use on the NHS.

4.5 MDT Baseline and Context Specific Criteria are in accordance with 23 CFR 625 and FHWA rulemaking for all projects on the National Highway System.

4.6 Variance and design exception documentation must be prepared under the direction and supervision of a licensed MT Professional Engineer. Signature is required for a variance or design exception in accordance with MDT "Signature Authorization" found on the MDT policies webpage.

5. Procedure

5.1 The Baseline Criteria Practitioner's Guide

5.1.1 The Baseline Criteria Practitioner's Guide provides quantitative minimum values for geometric design criteria for use on roadways based on functional classification, terrain, and the general rural or urban context.

5.1.2 The Baseline Criteria Practitioner's Guide is signed by the Chief Engineer, including all amendments and revisions, and published on the MDT website.

5.1.3 The Highways Engineer will contact the Chief Engineer and initiate MDT internal review of the version authorized for practical application upon:

5.1.3.1 Notice of proposed changes to controlling criteria in accordance with 23 CFR, or

5.1.3.2 Notice of proposed changes to controlling criteria in accordance with FHWA rulemaking.

5.1.4 The Chief Engineer may initiate review of the baseline criteria as deemed appropriate to protect the best interest of the State of Montana.

5.1.5 The Chief Engineer or designee will delegate a review team lead. The review team charge is to verify compliance with 23 CFR and FHWA rulemaking, research innovations and best practices, and present findings and recommendations.

5.1.6 The review team lead will be one of the positions as noted in the MDT "Signature Authorization" on the MDT policies page. The review team lead will notify FHWA for invitation to participate on the review team.

5.1.7 The Highways Bureau will maintain electronic archives of published versions and amendments, coordinate publication of revisions and amendments, and provide internal notifications of revisions and amendments.

5.2 Context Specific Criteria

5.2.1 Context specific criteria will be determined for locations where land use, traffic operations, or other context considerations make deviation from uniform baseline criteria desirable to better fit the individual roadway context and meet the needs of all users.

5.2.2 Context specific criteria must meet AASHTO requirements for all projects on the NHS and otherwise satisfy driver expectancy, safety, and operational requirements of all users.

5.2.3 Context specific criteria must be established under the direction and supervision of a licensed MT Professional Engineer. Signature is required for use of Context Specific Criteria just as it is required for design exceptions in accordance with MDT "Signature Authorization" found on the MDT policies webpage.

5.2.4 Context considerations and appropriate context specific criteria will be documented in all milestone reports through the Scope of Work (SOW) report, using MDT standard report templates. Documentation in an approved SOW Approval or SOW Amendment memo satisfies the signature approval requirement.

5.2.5 MDT baseline criteria remain in effect if not explicitly replaced by context specific criteria.

5.2.6 The design exception or variance requirements identified in the MDT Baseline Criteria Practitioner's Guide apply to approved context specific criteria used in place of MDT baseline criteria.

5.3 Scope Specific Considerations

5.3.1 Scope specific considerations may limit the extent that design elements need to meet established geometric design criteria. Projects, with a limited and targeted purpose and need, that address a specific safety, operational, or serviceability deficiency may be excluded in whole or in part from meeting the requirements of Engineering Memo 21-03. Hazard elimination, emergency repair, and small infrastructure repair or replacement projects are examples of projects meeting this requirement. Scope specific considerations may also apply for connection or transition work to existing roadway features not included in the project scope.

5.3.2 All substandard design elements identified as exempted from meeting requirements of these procedures due to scope specific considerations must maintain or improve the as-built or in place condition. Substandard design elements that are reduced from their as-built or in place condition require a design exception if the facility is on the NHS and the element is an FHWA controlling criteria, or a variance for all other MDT baseline criteria.

5.3.3 Scope specific considerations that limit or exempt the need to meet geometric design criteria established by these procedures will be documented in all milestone reports through the Scope of Work (SOW) report, using MDT standard report templates. Documentation in an approved SOW report or SOW Amendment memo satisfies the signature approval requirement for the exemption or limitation to these procedures for scope specific considerations.

5.3.4 The ability to exempt or limit the requirements of these procedures through scope specific considerations does not apply to projects for new construction or those proposed through the System Impact Action Process (SIAP).

5.4 Design Exceptions

5.4.1 The Licensed MT Professional Engineer responsible for preparing project plans, specifications, and estimates, reviews the Baseline Criteria Practitioners Guide and associated procedures, and Engineering and Design memos to determine if a design exception from baseline or approved context specific criteria is required.

5.4.2 The Licensed MT Professional Engineer responsible for preparing project plans, specifications and estimates verifies which design exception template is appropriate for use.

5.4.3 The design exception is prepared using MDT report templates.

5.4.4 The design exception is signed or initialed by the licensed MT Professional Engineer responsible for preparing plans specifications and estimates relevant to the requested exception.

5.4.5 The design exception is forwarded to the appropriate signatory in accordance with MDT "Signature Authorization" found on the MDT policies webpage for signature.

5.4.6 The design exception report is forwarded to FHWA for signature on projects with FHWA PE oversight.

5.4.7 The design exception documentation is filed with the project records.

5.4.8 The level of analysis required is commensurate with the scope and complexity of the project. Refer to the *Guidelines for Nomination and Development of Pavement Preservation Projects* and other guidance on practical application of design exceptions and variances. Refer to the Baseline Criteria Practitioners Guide for guidance on the application of design exceptions and variances.

5.5 Variances

5.5.1 The Licensed MT Professional Engineer responsible for preparing project, plans, specifications and estimates, reviews the Baseline Criteria Practitioners Guide and associated procedures, and Engineering and Design memos to determine if a variance is required.

5.5.2 Document variances from baseline or approved context specific criteria in a Combined

Preliminary Field Review/Scope of Work, Scope of Work, Scope of Work Approval, Scope of Work Amendment or Baseline Variance report.

5.5.3 Document the baseline or approved context specific criteria to which the variance applies, the proposed criteria, why the variance is preferred or necessary, and how the proposed criteria are consistent with the project purpose and need.

5.5.4 The report documenting the variance request is signed or initialed by the licensed MT Professional Engineer responsible for preparing plans specifications and estimates relevant to the requested variance.

5.5.5 The report documenting the variance request is forwarded to the appropriate signatory in accordance with MDT "Signature Authorization" found on the MDT policies webpage for signature.

5.5.6 The variance documentation is filed with the project records.

6. Closing

6.1 This procedure complies with Montana Administrative Rule 18.1.101. Questions concerning this procedure should be referred to the MDT Chief Engineer.

7. References

7.1 Federal Register

7.2 May 5, 2016 FHWA Revisions to the Controlling Criteria for Design and Documentation for Design Exceptions Memo

7.3 AASHTO, *A Policy on Geometric Design of Highways and Streets, Washington D.C., 2018*

7.4 AASHTO, *A Policy on Design Standards-Interstate System, Washington D.C., 2016*

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