MDOT Design Standards are typically based on the national design standards listed in the AASHTO *Green Book*. These standards have been modified by MDOT to fit the particular geographic and environmental considerations specific to Michigan. The evolution of design standards both nationally and in Michigan has resulted in the development of design flexibility, which is conducive to implementing context sensitive solutions.

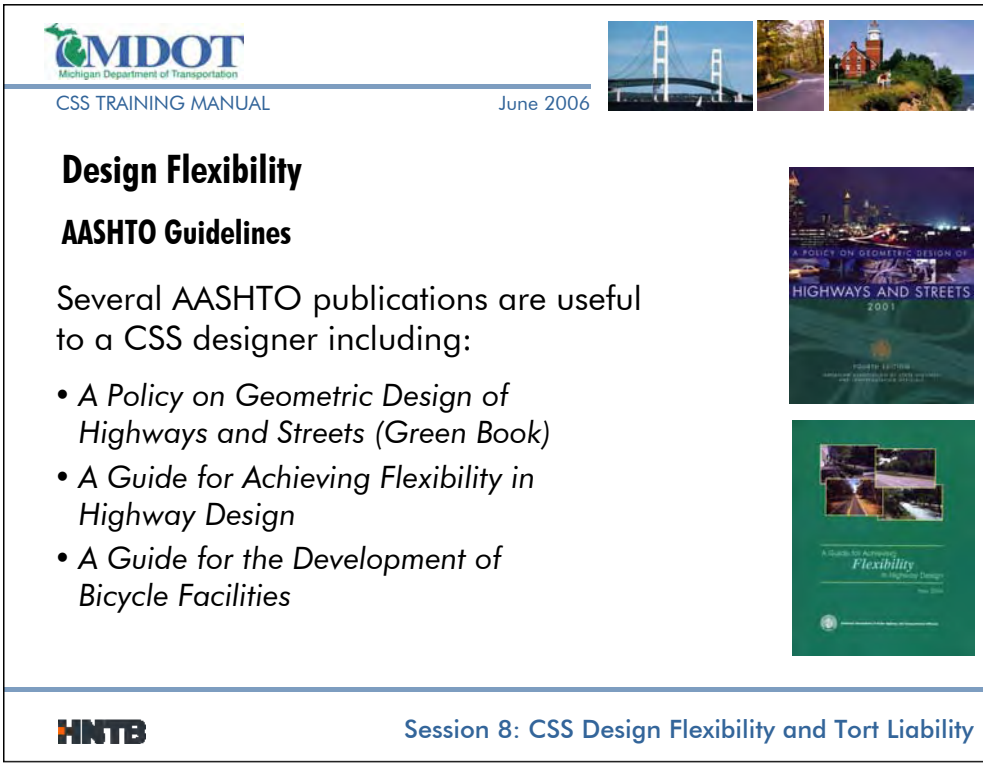
Design standards depend on several design controls, such as a roadway's functional classification, the type of construction proposed, the terrain the road will traverse, adjacent land uses, and volume and composition of traffic. However, design standards are typically expressed as ranges based on these design controls, not as a single dimension. It is the range that allows for flexibility.

Although a DOT historically may have selected the most conservative end of a particular range (say, always the widest recommended dimension for a travel lane or shoulder), it is not required to do so. Any dimension within the range is considered appropriate. Many times we have flexibility, but just have elected not to use it. So when practicing CSS, first check to see what sort of flexibility is available within a given design standard.

The second way of finding flexibility is to ask if the design controls being applied to a particular road are correct. For example, is the road correctly classified? Is it still an arterial or has it become a collector due to changes in land use or expansion of alternate routes? Making sure that the design controls are correct will ensure an appropriate amount of flexibility.

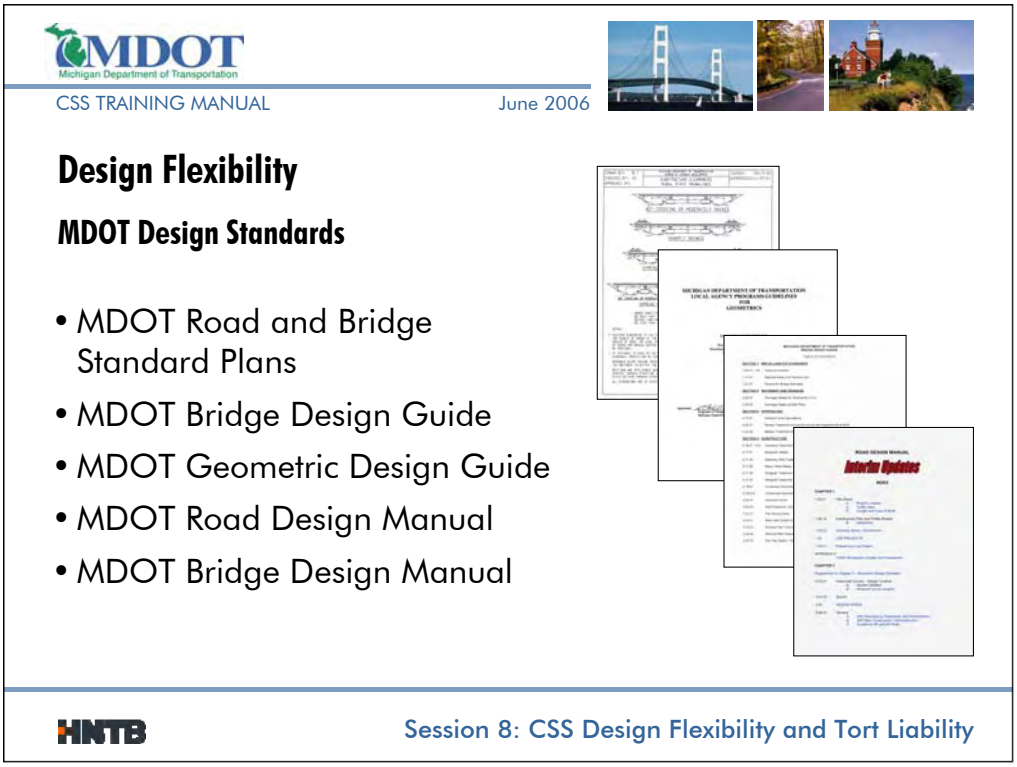
When a particular design standard cannot be met, a formal exception may be pursued. Situations that may require design exceptions should be identified during the scoping process so that all options can be considered prior to the submission of a formal design exception request.

Design exceptions should be considered a last resort; CSS is not about racking up design exceptions. On the contrary, CSS is meant to give a designer sufficient flexibility to design without resorting to exceptions.



National guidance for highway design is provided in several publications by the American Association of State Highway and Transportation Officials (AASHTO). The most often referenced of AASHTO's publications is *A Policy on Geometric Design of Highways and Streets*, commonly referred to as *The Green Book*.

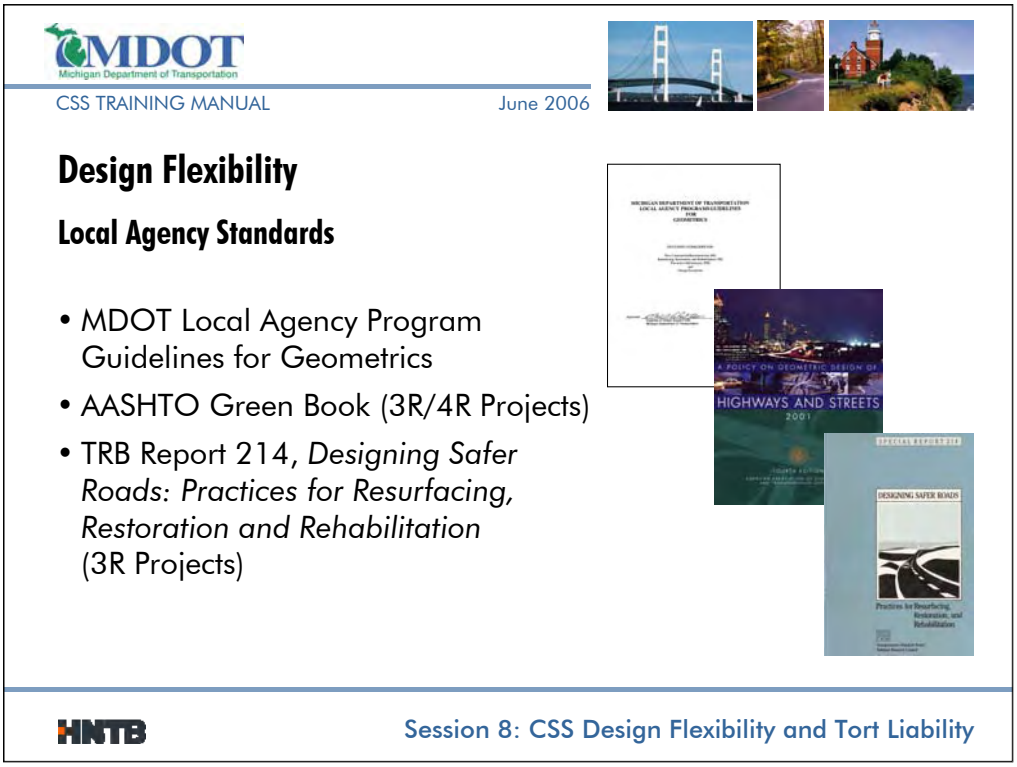
This publication is a series of guidelines on geometric design presented with recommended ranges of minimum and maximum design values. Within the Green Book is a range of solutions for almost any design situation. Historically MDOT has tended to use the most conservative values in these ranges. CSS suggests that community values and environmental constraints might warrant the use of other design values.



The standards adopted by MDOT for interstate and state highways are incorporated in several Department publications:

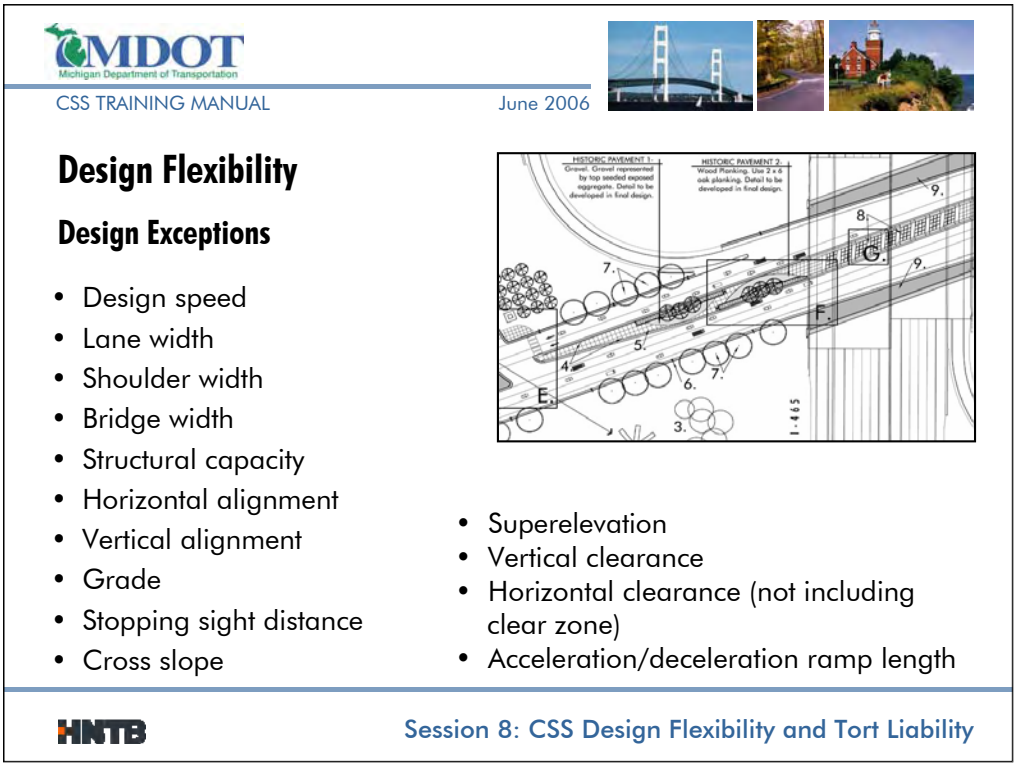
- The MDOT Road and Bridge Standard Plans include detailed drawings approved by the Department and FHWA for repeated use on road and bridge construction projects. They provide detailed technical information for use in both the design and construction of highways and highway appurtenances.
- The MDOT Bridge Design Guides provide detailed drawings for bridge designs that are not subject to the same formal approvals as standard plans. Although some MDOT standards are incorporated in the details, these drawings primarily serve as an aid for designing and detailing bridges.
- The MDOT Road Design Manual and Bridge Design Manual provide both technical and procedural information to assist the designer throughout the design process for road and bridge projects. The Michigan standards for controlling design elements are included in these two publications.

Historically MDOT has tended to use the most conservative design values expressed in these manuals. CSS suggests that community values and environmental constraints might warrant the use of other design values.



The standards used by Local Agency Programs are listed in the "Michigan Department of Transportation Local Agency Program Guidelines for Geometrics." This document utilizes the MDOT 4R/3R standards as a baseline with a more detailed commentary on certain requirements and added features specific to local agency projects. The basic premise for Local Agency 4R standards is the AASHTO Green Book. Local Agency 3R standards are derived from the Transportation Research Board (TRB) Report 214, *Designing Safer Roads: Practices for Resurfacing, Restoration and Rehabilitation*. As with MDOT projects, design exceptions should be identified during the scoping process so that all options can be considered prior to submitting a formal design exception request.

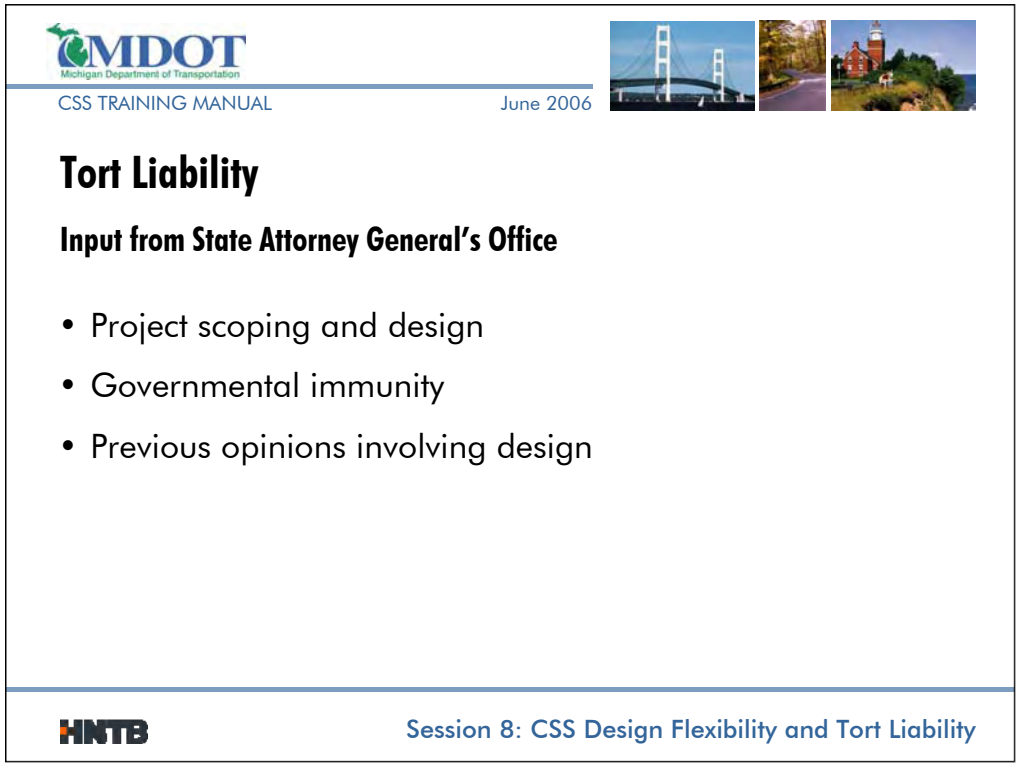
Again, CSS suggests that community values and environmental constraints might warrant the use of other design values.



When design criteria cannot be met within the specified ranges, designs outside the range may be considered, though documentation (including crash analyses) must justify the alternative. The FHWA requires formal requests and documentation for design exceptions on the NHS for 13 specific controlling criteria:

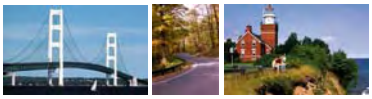
- Design speed
- Lane width
- Shoulder width
- Bridge width
- Structural capacity
- Horizontal alignment
- Vertical alignment
- Grade
- Stopping sight distance
- Cross slope
- Superelevation
- Vertical clearance
- Horizontal clearance (not including clear zone)

An additional MDOT design exception requirement is added for freeway ramp taper lengths. These requirements are detailed in the MDOT Geometric Design Guides. On non-NHS routes, MDOT considers formal design exception requirements applicable for the same elements listed above. The design exception process is rigorous for all projects; contrary to rumor, CSS is not a “free pass” for garnering design exceptions.



The Michigan Attorney General for Transportation has addressed the question of tort liability during project scoping and design. Based on answers previously received from the Office of Attorney General, MDOT employees involved in project scoping and design who use CSS principles and practices are exempt under Michigan's Immunity Rules. The Department is also immune.

For a more thorough explanation, please refer to Appendix D, where the complete text of a letter from the Office of the Attorney General is found.



Conclusion

- Design flexibility is available
- Practicing design flexibility is using good engineering judgment
- Practicing design flexibility will not increase MDOT or MDOT employees' exposure to liability as CSS is practiced.

M-119, Emmet County, MI

In conclusion, the flexibility available to MDOT designers allows transportation facilities to be designed in a context-sensitive manner. Utilizing design flexibility is an ethical and proper use of engineering judgment. Based on past opinion of the state Attorney General, it is anticipated that MDOT and its employees will not increase their exposure to tort liability by employing flexible design practices.