



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 14-10 Policy Change

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TO: All Design, Operations, and District Personnel, and Consultants

FROM: /s/John E. Wright

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SUBJECT: Practical Design

REVISES: *Indiana Design Manual* Sections 40-8.01, 40-8.04(01), Chapter 53, Sections 55-3.0 and 55-4.01(03), and Figures 40-8B, 40-8C, 53-1 through 53-9, and 55-3A through 55-3H

EFFECTIVE: Immediately

Implementing practical design standards throughout the project delivery process is included as part of INDOT's goals for 2014.

The approach of Practical Design, similar to Design Flexibility and Context Sensitive Solutions, is not to throw out design criteria, but to make design decisions based on the project scope of work instead of solely on a technical requirement. Innovation and creativity are necessary to accomplish Practical Design and adhere to the project's purpose and need. While the Department has not developed a Practical Design Manual, we are encouraged by what we have seen from other Departments of Transportation. Keeping the project scope of work at the forefront throughout the project development process is essential when making design decisions. Designers should consider how a project fits within a corridor and provide a roadway that is as safe or safer than the existing conditions. It is equally important that cost savings in design or construction not create a cost burden for maintenance.

The *Indiana Design Manual (IDM)* provides information on the geometric design for application to each individual project. It is the intent that the design criteria be applied with engineering judgment, recognizing that satisfying the design criteria is not always practical or a cost-effective solution. The Department encourages the use of design exceptions where appropriate. The design exception process is the means to evaluate, approve, and document exceptions to geometric design criteria.

4R, 3R Freeway, and Partial 4R Freeway Projects

To promote Practical Design, the Department has revised the *IDM* to permit the use of minimum design values from AASHTO's *A Policy on the Geometric Design of Highways and Streets* (the *Green Book*) for Level One controlling criteria without a design exception in lieu of the minimum design criteria shown in *IDM* Chapters 53 (4R) and 54 (3R and Partial 4R Freeway). The revisions to the Chapter 55 (3R Non-Freeway) criteria and the associated design exception process appear later in this memo.

4R, 3R Freeway, and Partial 4R Freeway Design Exceptions

When the *Green Book* minimum values or exceptions as noted below for Level One controlling criteria are not met, a design exception is required.

1. The *Green Book* may not be used to supersede State or Federal code requirements, e.g. National Truck Network, Americans with Disabilities Act (ADA).
 - a. Highways that are on the National Truck Network must use 12-ft lanes. In Indiana, the National Truck Network is comprised of those routes designated as Federal-Aid primary as of June 1, 1991. The National Truck Network is available as a separate layer on the INDOT Roadway Inventory map at <http://gis.in.gov/apps/DOT/RoadwayInventory/>.
 - b. The Public Right of Way Guidelines (PROWAG), July 2011 are the recommended best practice for complying with the ADA inside the public right of way. The proposed guidelines are available from the US Access Board website at <http://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way>. Exceptions to the ADA require a determination of technical infeasibility in lieu of a design exception.
2. Department policy is to limit superelevation rate to $e_{\max} = 8\%$ due to the prevalence of snow and ice. The selection of e_{\max} should be based on the characteristics of the roadway, not solely on the classification of the roadway as rural or urban.
3. Ramp requirements, including acceleration and deceleration lengths, are per the *IDM*.
4. Vertical clearance must include an additional 6" for as consideration for future resurfacing.

5. Roadways with an ADT less than or equal to 400 may be designed in accordance with AASHTO's *Geometric Guidelines for Design of Very Low Volume Roads ADT ≤ 400*.
6. AASHTO's *A Policy on Design Standards, Interstate System* is the minimum design criteria for interstates.

Mitigation measures must be considered when existing conditions do not meet the minimum values. Mitigation resources are available from the FHWA publication *Mitigation Strategies for Design Exceptions*. This publication is available from the FHWA website at <http://safety.fhwa.dot.gov/geometric/pubs/>.

3R Non-Freeway Projects

IDM Chapter 55 contains the Department criteria for 3R Non-Freeway projects. As noted in the foreword of AASHTO's *A Policy on Geometric Design of Highways and Streets* (the *Green Book*), the *Green Book* is not intended as a policy for 3R projects; however, some design criteria in Chapter 55 may meet or exceed the *Green Book* values. The *Green Book* may be used as minimum values without a design exception if they are lower than similar values shown in Chapter 55. The exceptions noted for 4R projects and the minimum bridge clear-roadway width requirements on a rural State highway in Chapter 55 apply.

3R Non-Freeway Design Exceptions

It may be appropriate to retain or replace in kind the existing Level One geometric conditions for a 3R project. A streamlined design exception may be used in these instances or when the proposed criteria do not meet the *IDM* values. When multiple design exceptions are required for a 3R Non-Freeway project, a single document with multiple cover sheets should be created. At a minimum the design exception will include the following.

1. Project Description. Include the project location, functional classification, description of work, design year ADT including the percentage of trucks, and type of area (residential, commercial, rural, etc.) in which the project is located.
2. Design Feature. Include a description of the design feature that does not satisfy the *IDM* criteria. The existing criterion, the proposed criterion and the *IDM* criterion should be identified, with respective design speeds where applicable. Drawings should be used to explain the criterion if necessary. The reason for the design exception request should be indicated. The intent to retain or replace in kind an existing geometric condition should be clearly stated.
3. Crash Analysis. Using the most recent 3-year crash history, document that the roadway is performing as expected. For INDOT projects crash history is available through the Automated Reporting Information Exchange System (ARIES), which is the Web portal to the Indiana Vehicle Crash Report System database maintained by the Indiana State Police.

An acceptable crash history may be no crashes, an evaluation using RoadHAT Form 1 resulting in an I_{CF} and I_{CC} of 0 or less, or a review of crash data that indicates there is not an apparent relationship between existing roadway geometry or operation (e.g. sharp horizontal curve, lack of exclusive left turn lane) and crash location and manner of collision (e.g. head-on, rear end, right angle). The RoadHAT program is available from the INDOT Technical Application Pathway (ITAP).

A summary of the raw data including the following should be included in tabular form at a minimum: year, location, manner of collision, and severity level (e.g. property damage only, injury, or fatal).

4. Plans for Expansion. Document that roadway expansion is not planned due to increased traffic demand or as part of an overall corridor improvement. For the State Highway System, the district Technical Services Division, in cooperation with the central office Asset Management Division Office of Technical Planning can provide this information.
5. Compatibility with Adjacent Sections. Indicate if the proposed roadway cross section is compatible with the roadway section before and after the project limits, i.e. the same cross section width or negligibly wider or narrower than the adjacent roadway. In general, the proposed roadway should not be narrower than the existing roadway. Treatment of an existing roadway section that is wider than the adjacent sections should be addressed on a project-by-project basis.
6. Mitigation. Mitigation measures must be considered when conditions do not meet the minimum values. Examples include signing, delineators, pavement marking, rumble stripes. Mitigation resources are available from the FHWA publication *Mitigation Strategies for Design Exceptions*. This publication is available from the FHWA website at <http://safety.fhwa.dot.gov/geometric/pubs/>

The Level One controlling criteria checklist and *IDM* Chapters 40, 53, and 55, including the geometric tables have been revised to reflect this policy change. No revisions were made to Chapter 54 as it currently includes the flexibility to use the *Green Book* or maintain the as-constructed standard for specific elements. Partial 3R project guidance in *IDM* chapter 56 and additional information contained in the *IDM* not expressly revised by this policy remains in effect.

JEW:ewp