

PAPER ON THE HIGHWAY DESIGN FLEXIBILITY GUIDELINES DEVELOPED  
BY THE FEDERAL HIGHWAY ADMINISTRATION (FHWA)

BROWN COUNTY PLANNING COMMISSION  
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## Introduction

Recently, representatives of the City of De Pere and Brown County Planning Commission were told that the Federal Highway Administration (FHWA) is requiring the new Claude Allouez Bridge and surrounding streets to be designed to accommodate the traffic projected for 20 years in the future. The city and planning commission were also told that federal funding for the project will be withheld if the design does not meet the FHWA standards.

The FHWA's desire to accommodate the future traffic volumes at what it believes to be an acceptable level of service is one of the primary reasons for the multi-lane design of the bridge, its approaches, and many of the surrounding streets. Many residents of De Pere have opposed the larger facilities at public meetings because of what will likely be their negative impact on many aspects of the city's downtown, and these concerns are shared by Brown County Planning Commission staff. However, the message has always been that there is no other choice.

### FHWA *Flexibility in Highway Design* Guide

In 1999, the FHWA published the *Flexibility in Highway Design* guide. The guide's purpose is to inform highway designers that they can and should consider more than just mobility when designing the nation's highway system. As the guide states in the Foreword:

“...this guide has been prepared for the purpose of provoking innovative thinking for fully considering the scenic, historic, aesthetic, and other cultural values, along with the safety and mobility needs, of our highway transportation system.”

In addition to provoking innovative thinking, the guide includes several statements and project examples that strongly encourage the consideration of a project's context during the planning and design phases.

This paper identifies some of the specific passages from the *Flexibility in Highway Design* guide that indicate the FHWA believes project context is important. The paper also discusses a means of appealing the FHWA's design standards and addresses the guide's discussion about liability associated with not following the guidelines in AASHTO's *A Policy on the Geometric Design of Highways and Streets*, which is commonly called the Green Book.

## The Highway Planning and Development Process

The *Flexibility in Highway Design* guide begins by identifying many of the issues that should be considered during a project's planning and development phases:

### *Planning – Page 3*

“...it is important that all parties agree that the problem exists, pinpoint what the problem is, and decide whether or not they want it fixed. For example, some communities may acknowledge that a roadway is operating over its capacity but do not want to improve the roadway for fear that such action will encourage more growth along the corridor.”

### *Assessing the Character of an Area – Page 7*

“In order for a designer to be sensitive to the project’s surrounding environment, he or she must consider its context and physical location carefully during this stage of project planning. This is true whether a house, a road, a bridge, or something as small as a bus passenger waiting shelter is to be built.”

### *Assessing the Character of an Area – Pages 8 and 9*

Some of the questions to ask at (the planning and development) stage include:

- What are the physical characteristics of the corridor? Is it in an urban, suburban, or rural setting?
- How is the corridor being used (other than for vehicular traffic)? Are there destination spots along the traveled way that require safe access for pedestrians to cross? Do bicycles and other non-motorized vehicles or pedestrians travel along the road?
- What is the size of the existing roadway and how does it fit into its surroundings?
- Are there historic or especially sensitive environmental features along the roadway?
- Are there particular features or characteristics of the area that the community wants to preserve (e.g. a rural character, a neighborhood atmosphere, or a main street)?
- Is there more than one community or social group in the area? Are different groups interested in different features/characteristics? Are different groups affected differently by possible solutions?
- Are there concentrations of children, the elderly, or disabled individuals with special design and access needs (e.g. pedestrian crosswalks, curb cuts, audible traffic signals, or median refuge areas)?

### *Considering Scale – Page 16*

“...designers must always consider the safety of pedestrian and non-vehicular traffic, along with the safety of motorists.”

“Widening a roadway that once allowed pedestrian access to the two sides of the street can turn the roadway into a barrier and change the way pedestrians use the road and its edges.”

These statements set the tone for the rest of the guide by clearly indicating that the context of a project is important, traffic capacity does not need to be a project’s primary planning and design consideration, and other modes of transportation should be taken into account when designing a facility. The statement from Page 3 also implies that the expansion of a transportation facility will attract additional traffic by encouraging growth along the corridor.

## Highway Design Standards

The guide extensively discusses the flexibility associated with the Green Book and the method available to communities to utilize design standards other than those contained in the Green Book. For instance, the guide states on Page 28:

“Although often viewed as dictating a set of national standards, this document is actually a series of guidelines on geometric design within which the designer has a range of flexibility. In order for the design criteria in the Green Book to become a standard, they must be adopted by a particular state (or may be set by a court decision).”

“The Federal Highway Administration (FHWA) has adopted applicable parts of the Green Book as the national standard for roads on the National Highway System (NHS). The design of roads other than those on the NHS is subject to the standards of the particular state.”

The latter statement is probably one of the reasons that the FHWA will withhold federal funds if certain design criteria aren’t met, for the Claude Allouez Bridge and the north leg of Broadway are included on the NHS. However, the *Flexibility in Highway Design* guide strongly implies that the FHWA standards are flexible in certain circumstances by acknowledging that the Green Book does not consider context and other important aspects of the planning and design process. To address these circumstances, the FHWA has created what it calls the **design exception process**. According to the flexibility guide (Page 37):

“...there are situations in which the application of even the minimum criteria would result in unacceptably high costs or major impact on the adjacent environment. For such instances when it is appropriate, the design exception process allows for the use of criteria lower than those specified as minimum acceptable values in the Green Book.”

“For projects on NHS routes, FHWA requires that all exceptions from accepted guidelines and policies be justified and documented in some manner and requires formal approval for 13 specific controlling criteria.”

The flexibility guide lists the criteria and states that they are, for the most part, easily identified and defined.

## Functional Classification

The functional classification section of the flexibility guide also emphasizes that the *context* of an arterial highway should be considered during the design process:

“Even after a decision has been made to functionally classify a highway section, there is still a degree of flexibility in the major controlling factor of design speed.”

“It is important to remember that there are no ‘cookie-cutter’ designs for arterial highways or collector streets. Because of the range of geometric design options available, arterials and collectors can vary considerably in appearance...”

These statements indicate that the arterial classification of the Claude Allouez Bridge and surrounding streets should not force engineers to design them as multi-lane facilities aimed at enabling motorists to travel quickly through downtown De Pere.

## Design Controls

The location of the Claude Allouez Bridge and surrounding streets within a downtown lined with historic buildings and other features would, based on the following statements from the guide’s Design Controls chapter, warrant lower design speeds on these facilities and provide justification for a design exception:

“...in areas that have significant historic interest or visual quality, a lower design speed may be appropriate in recognition of lower average operating speeds and the need to avoid affecting these historic or aesthetic resources.”

“...situations may arise where even the use of the lowest typically acceptable value would result in unacceptably high construction or right-of-way costs or unacceptable impact on adjacent properties. In such instances, the design exception process discussed in Chapter 2 can be employed.”

According to WisDOT staff, the multi-lane design of the bridge and surrounding streets is necessary because FHWA is insisting that the facilities be able to operate at Level of Service (LOS) D in the project’s design year. WisDOT staff also implied that this LOS standard is applied everywhere by FHWA, so it appears that project context was not considered by FHWA when this standard was established. However, the following two statements from the FHWA *Flexibility in Highway Design* guide clearly state that level of service should be determined by a variety of factors and that the *Highway Capacity Manual* should not be the only method used to choose an appropriate level of service.

“The appropriate degree of congestion (that is, level of service) to be used in planning and designing highway improvements is determined by considering a variety of factors. These factors include the desires of the motorists, adjacent land use type and development intensity, environmental factors, and aesthetic and historic values.”

“While the *Highway Capacity Manual* provides the analytical basis for design calculations and decisions, judgement must be used in the selection of the appropriate level of service for the facility under study.”

## **Bridges and Other Major Structures**

The following statements from the guide’s Bridges and Other Major Structures chapter clearly encourage community participation, consideration of context, and the design of facilities that consider more than just vehicle level of service.

“The conflicts in design of highway bridges relating to aesthetic, scenic, historic, and cultural resources commonly boil down to one of two issues:

- Should an existing structure be rehabilitated or should a new bridge be constructed?
- Is a new structure out of scale with its surroundings or is its design incompatible with its environment?”

“When rehabilitation of existing bridges is not feasible, a common concern of local residents is whether the proposed new structure will visually ‘fit into’ the community.”

The guide also includes an example of a bridge in New Hampshire that was built to complement its surroundings:

“The New Hampshire Department of Transportation (NHDOT) proposed to demolish the historic two-lane Oyster River Bridge because of structural deficiencies and replace it with a four-lane structure on a higher elevation. When the original four-lane replacement concept was presented to the community, significant opposition arose, not only to the greatly enlarged scale of the proposed improvement, but also to the impact this option would have on adjacent 18<sup>th</sup> century houses, a community park, and a small cemetery. In a collaborative effort with the town of Durham and local residents, NHDOT staff undertook a reassessment of the project’s scope to develop a design that was more compatible with its surroundings...The newly reconstructed crossing provides two 12 foot travel lanes and...incorporates a lower vertical profile very close to that of its 1800s vintage predecessor.”

“The Oyster River Bridge is an excellent example of a new structure designed to be compatible with the scale of its surrounding environment.”

The striking similarity between the New Hampshire and Claude Allouez Bridge projects strongly suggests that the De Pere project would qualify for a design exception.

## **Tort Liability as it Relates to the Green Book**

Many designers are reluctant to deviate from the standards in the Green Book because they believe these standards are their best defense against lawsuits, and this reluctance

often leads to designs that do not consider context and other important factors. The flexibility guide addresses this issue on Page 40:

“As a result of concerns about litigation, designers may be tempted to be very conservative in their approaches to highway design and avoid innovative and creative approaches to design problems. While it is important for design engineers to do their jobs as thoroughly and carefully as possible, avoiding unique solutions is not the answer.”

This section of the guide states that deviating from the Green Book guidelines through the use of a design exception does not automatically establish negligence. It also states that the best defense for a design engineer is to present persuasive evidence that the Green Book guidelines could not be reasonably met:

“If the justification documented by a designer completely describes the physical and environmental factors that make the exception or any design necessary, it is likely that this will be legally persuasive that the correct procedures were followed and ultimately the appropriate decision was made.”

These statements indicate that the fear of litigation should not deter the project engineers from seeking a design exception and creating a more environmentally-friendly concept for the Claude Allouez Bridge and surrounding streets.

## **Conclusions**

The FHWA *Flexibility in Highway Design* guide clearly states that context and other factors should be considered for all federally and non-federally funded highway projects, that the design exception process exists to enable communities to inject their priorities into the highway planning and design processes, and that highway designers should not cite fear of litigation as a reason for not deviating from what the Green Book believes to be acceptable. The flexibility guide also states that the Green Book and *Highway Capacity Manual* should not dictate the design of a facility and includes an example of a bridge in New Hampshire that was successfully redesigned by the state department of transportation to complement its surroundings.

## **Recommendation**

Based on the contents of the FHWA *Flexibility in Highway Design* guide, planning commission staff believes that WisDOT and the City of De Pere should apply for a design exception for the Claude Allouez Bridge project.