



## 1.1 Introduction

The 4R (Resurfacing, Restoration, Rehabilitation and Reconstruction) program is a continuing post Interstate highway program established by Congress through a series of Federal Legislation [1], [2], [3], [4], [5]. The basic objective of this program is to preserve the integrity and operational effectiveness of the existing Interstate highway system.

This objective will be accomplished by appropriate work in three broad areas of activity. First, the useful life of various elements of the system may be substantially extended through various resurfacing, restoration and rehabilitation efforts. When such efforts would not be cost effective, it would be appropriate for the elements to be completely reconstructed. Finally, the program can respond to the need for improved functional effectiveness to reflect changed conditions. Consequently, where justified, Interstate Maintenance (IM) funds can be used to reconstruct facilities such as interchanges and overpasses, and provide for safety upgrading. In addition, IM funds can be used for other items of work which have been determined to be beyond that necessary "to provide a minimum level of acceptable service." Such items include rest area construction; new interchanges and added grade separations.

IM funds may also be used to construct new High Occupancy Vehicle (HOV) lanes, but cannot be used to construct new travel lanes. Other Federal aid funds, such as National Highway System (NHS) or Surface Transportation Program (STP) may be used to add new travel lanes.

## 1.2 Definitions

The following definitions and examples should help to clarify the meaning of each of the 4R's and how these terms differ from maintenance work. Note: These are federal definitions and are not meant for project programming purposes. For programming purposes use the definitions in [FDM 3-5-2](#).

### 1.2.1 Maintenance

Work of a short term nature to preserve the roadway (such as repair of pavement failures and sealing of joints) to restore safe traffic operations (such as snow removal) and to maintain highway appurtenances (such as mowing of roadside, sign cleaning and repair of damaged guardrail).

### 1.2.2 Resurfacing

Work to place additional layers of surfacing on highway pavement, shoulders and bridge decks and necessary incidental work to extend the structural integrity of these features for a substantial time period.

### 1.2.3 Restoration

Work to return the pavement, shoulders and bridges over a significant length of highway to an acceptable condition to ensure safety of operations for a substantial time period. This work may include the following: grinding and repair of joints of P.C. concrete pavement; sealing of shoulders and pavement joints in conjunction with other work; placement of a skid resistant surface treatment; correction of minor drainage conditions; and work to prepare a bridge deck for an overlay.

### 1.2.4 Rehabilitation

Work to remove and replace a major structural element of the highway to an acceptable condition to extend the service life of a significant segment for a substantial period of years commensurate with the cost to construct. This work may include the following: replacement of bridge deck, pavement, or shoulders without significant widening; recycling of pavement and shoulder materials; replacement of individual bridge elements to correct a structural deficiency; and minor subgrade work incidental to other work.

### 1.2.5 Reconstruction

Work required to effect substantial upgrading of major highway features to increase the serviceability and safety of operations for a design life of 20 years or more. This class of work may require acquisition of additional right-of-way. Examples of this type of work are the following: widening of roadway and bridge decks to add lanes; bridge work beyond replacement of deck including work to increase the vertical clearance under grade separations; major grading to improve drainage and alignment; addition of ramps and through lanes on cross

roads at interchanges.

### 1.3 Design Criteria

*Revise 11-44-1.3 (Design Criteria) to incorporate FHWA May 2016 controlling criteria revisions.*

#### 1.3.1 Reconstruction and New Construction Interstate Projects

All interstate highway segments being constructed on new right-of-way and segments undergoing complete reconstruction along existing right-of-way shall conform to current design standards [6][7].

Requests for design exceptions involving FHWA's controlling criteria on Reconstruction and New Construction Interstate Projects shall be prepared and processed in accordance with [FDM 11-1-2](#). Exceptions are approved by the Chief of the Design Services Section and, when required, by the Division Administrator of the FHWA. Exceptions should be few and will only be acceptable if adequately supported and are not shown to lead to an identifiable loss in the safety features of highway design.

#### 1.3.2 Resurfacing, Restoration and Rehabilitation (3R) Interstate Projects

The standards used for resurfacing, restoration and rehabilitation projects shall conform to current design standards for new construction, unless addressed by the following requirements.

The development of 3R projects must ensure that the as-built design features are preserved and/or enhanced. System functions including serviceability and safety of operations must not be degraded.

Except as noted below, requests for design exceptions involving FHWA's controlling criteria on 3R Interstate Projects shall be prepared and processed in accordance with [FDM 11-1-2](#). Exceptions are approved by the Chief of the Design Services Section and, when required, by the Division Administrator of the FHWA. Exceptions should be few and will only be acceptable if adequately supported and are not shown to lead to an identifiable loss in the safety features of highway design.

A Programmatic Exception Standards (PES) is available for Resurfacing, Pavement Replacement and Reconditioning Projects, as described in [FDM 11-40-4](#), which conditionally allows the retention of existing eligible substandard controlling criteria. An Exception to Standards in accordance with [FDM 11-1-2](#) is not required for eligible substandard controlling criteria on **with a PES**.

Only the following controlling criteria are eligible for a PES on Interstate 3R projects (see [FDM 11-44-1.3.2.10](#)):

- Horizontal **Curve Radius**
- **Maximum** Alignment
- Grades
- Stopping Sight Distance

##### 1.3.2.1 Width of Traffic Lanes

All traffic lanes shall be at least 12 feet.

Traffic lane width is not eligible for a PES.

##### 1.3.2.2 Sideslopes

Foreslopes shall be either recoverable (4:1 or flatter), or traversable (3:1 MAX) with adequate recovery area to meet clear zone requirements of [FDM 11-15 Attachment 1.9](#), or barriers shall be installed as warranted in accordance with current criteria.

Sideslopes are not eligible for a PES because it is not controlling criteria.

##### 1.3.2.3 Pavement Cross Slope

On tangent sections, the pavement cross slope should be a minimum of 2.0 percent.

For resurfacing or widening projects when necessary to match existing cross slopes the minimum shall be 1.5 percent and desirably 2.0 percent. However, the cross slope should be increased to 2.0 percent when practicable.

**C**ross slopes are not eligible for a PES.

##### 1.3.2.4 Superelevation **Rate**

Superelevation rates should be improved to meet the appropriate rate for new construction.

Superelevation **Rate** is not eligible for a PES.

### 1.3.2.5 Shoulders

All right shoulders will be paved to a full width of 10 feet. On all highways of six or more lanes, the left shoulder will be paved 10 feet in width. The left shoulder on all four-lane highways will be paved to a width of four feet.

Shoulder cross slopes should range between 4 and 6 percent and should be at least 1 percent more than the pavement cross slope on the tangent sections to facilitate drainage.

Shoulder width is not eligible for a PES.

Shoulder cross slope is not controlling criteria and is not eligible for a PES.

### 1.3.2.6 Bridge Vertical Clearance

Vertical Clearance requirements are shown in [FDM 11-35 Attachment 1.8](#), "Minimum Vertical Clearance for New Bridges and Replacement Bridges"; and [FDM 11-35 Attachment 1.9](#), "Minimum Vertical Clearance for Bridges to Remain". An Exception to Standards is required if these requirements are not met.

Bridge vertical clearance is not eligible for a PES.

Design exceptions for vertical clearances less than 16-feet must also be coordinated with the Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) of the Department of Defense. This applies whether the scope is a new construction project, a project that does not provide for correction of an existing substandard condition, or a project which creates a substandard condition at an existing structure (this includes temporary substandard conditions to accommodate construction staging). Furthermore, it applies to the full roadway width including shoulders for the through lanes, and to ramps and collector-distributor roadways in Interstate-to-Interstate interchanges. In no case shall the minimum vertical clearance for a segment of Interstate highway be reduced below conditions as controlled by the lowest bridge on the segment.

Only the FHWA Division Office has authority for approving the design exception for vertical clearance (as is the case for all exceptions to standards on the Interstate System and National Highway System); the Division Office is also responsible for coordination with SDDCTEA. A request for coordination may be forwarded directly to the SDDCTEA through the FHWA Division Office Field Operations Engineer at any time during project development, but in all cases prior to taking any action on the design exception. It should include a time period of 10 working days (after SDDCTEA receives request) for action on the request. The FHWA Division office can verify receipt of the request by telephone or fax. If the SDDCTEA does not respond within the time frame, it can be concluded that the SDDCTEA does not have any concerns with the proposed exception. If comments are forthcoming, the FHWA and WisDOT will consider mitigation to the extent feasible.

The WisDOT Project Manager will complete the Interstate Vertical Clearance Exception Coordination form provided in [Attachment 1.1](#) and send to the appropriate FHWA Field Operations Engineer for review and SDDCTEA coordination.

### 1.3.2.7 Bridge Roadway Width

The widening of existing structures is a high cost improvement which should be decided on a case by case basis with consideration given to site specific accident history, traffic characteristics, and the potential for accidents as traffic volumes increase. Bridges that warrant widening, except major long span structures, shall be widened to full approach roadway width. Major long span structures shall provide for a minimum offset from edge of traffic lane to parapet of at least 4 feet.

Bridge width may be increased to accommodate high traffic demand during construction and to reduce user delay in work zones on rural Corridors 2020 Backbone facilities. See [FDM 11-35-10](#) for additional information and warranting criteria.

#### 1.3.2.7.1 Bridges to Remain in Place

Bridges to remain in place must have 12-foot wide traffic lanes, 10-foot wide shoulders on the right, and 3.5-foot wide shoulders on the left. On major long bridges, the minimum shoulder widths shall be 3.5 feet for both left and right shoulders.

The width requirement for Bridges to Remain in Place **is not controlling criteria and** is not eligible for a PES.

#### 1.3.2.8 Design Loading Structural Capacity

All new bridges shall have at least an HS-20 structural capacity. A bridge can remain in place if the operating rating capacity can safely service the system for an additional 20-year service life, or is added to the 6-Year Improvement Program for replacement or rehabilitation.

**Design Loading** Structural capacity is not eligible for a PES.

**1.3.2.9 Lateral Clearance**

See [FDM 11-15 Table 1.2](#) for guidance on lateral clearance for 4R projects.

Lateral clearance is not controlling criteria and is not eligible for a PES.

**1.3.2.10 Controlling Criteria Eligible for PES**

Table 1.1 shows controlling criteria that are eligible for a PES (see [FDM 11-40-4](#)) on Interstate 3R projects and their minimum design standard with a PES. Use new construction design standards without a PES.

**Table 1.1 Minimum Design Standards with a PES for Eligible Controlling Criteria on Interstate 3R Projects**

Eligible Controlling Criteria	Minimum Design Standards with a PES
Horizontal Curve Radius	Existing, substandard* Horizontal Curve Radius may be retained but do not make worse - improve superelevation as closely as practical to the appropriate rate for new construction.
Maximum Grades	Existing, substandard* Graders may be retained but do not make worse.
Stopping Sight Distance	Existing, substandard* Stopping Sight Distance may be retained but do not make worse.

\* Determine if existing controlling criteria are sub-standard based on comparing to new construction design standards.

**1.4 Roadside**

The following items are not controlling criteria and are not eligible for a PES.

**1.4.1 Bridge Curbs, and Rails**

Improvements to structures carrying Interstate traffic must include the following improvements:

1. Elimination or modification of curbs of more than 9 inches in width.
2. Replacement or modification of all existing bridge rails which fail to conform with current design criteria.

Improvements to bridges on state or local highways crossing the Interstate roadway should comply with the provisions of [FDM 11-40-1](#).

**1.4.2 Existing Guardrail**

Guardrail needs shall be evaluated and provided in accordance with the guidance contained in [FDM 11-45-1](#) and the AASHTO Roadside Design Guide. Existing guardrail and attachments to bridges shall be upgraded or replaced as necessary to comply with current standards in [FDM 11-45-1](#) and the AASHTO Roadside Design Guide.

**1.4.3 Curb or Curb and Gutter**

Barrier curbs shall not be used and any existing barrier curbs along the through lanes shall be eliminated.

Mountable curbs, when used, should be located at the outer edge of the shoulder. Also, where a guardrail is used, the face of the curb should be flush with the face of guardrail or behind it.

**1.4.4 Clear Zone Width and Fixed Objects**

[FDM 11-15 Attachment 1.9](#) and the AASHTO Roadside Design Guide should be used for guidance regarding warranted clear zone widths. Any fixed objects within the clear zone limits shall be removed, made breakaway, or made safe through shielding by a roadside barrier and/or crash cushion.

**1.4.5 Cross-drain Culvert End Sections and Headwalls**

Refer to [FDM 11-45-2.2](#) and [FDM 11-45-2.6](#) for the definition of hazardous cross drain or cattle pass, treatment options, and warrants for various treatment options.

**1.4.6 Median Inlets and Ditch Checks**

Median inlets should have 6:1 or flatter traversable grates, and 10:1 or flatter ditch checks

#### **1.4.7 Median/Maintenance Crossovers**

Median /Maintenance Crossovers should be eliminated whenever possible, or reconstructed to have 10:1 or flatter side slopes.

#### **1.4.8 Construction Crossovers**

Construction crossovers should be removed after project completion unless they are planned to be used for subsequent maintenance or other traffic control operations. Construction crossovers left-in-place should have 10:1 or flatter side slopes and appropriate safety devices installed along their length to minimize the potential for median-crossing crashes or unauthorized U-turns.

See [FDM 11-50-20.4](#) for additional guidance.

#### **1.5 Traffic Control Devices/Signing**

All traffic control devices shall be upgraded to be in conformance with the current Manual on Uniform Traffic Control Devices (MUTCD) or the Wisconsin Manual on Uniform Traffic Control Devices (WMUTCD).

#### **1.6 Access Control**

Right-of-way fencing or other appropriate measures shall be incorporated into all Interstate projects to address any access control issues within the proposed project limits.

#### **1.7 References**

- [1] Federal-aid Highway Acts of 1976
- [2] Federal-aid Highway Act of 1981
- [3] The Highway Improvement Act of 1982
- [4] The Intermodal Surface Transportation Act of 1991 (ISTEA),
- [5] The Transportation Equity Act of 1998 (TEA 21)
- [6] A Policy on Design Standards Interstate System, AASHTO 2005
- [7] Design criteria for Design Class A3 highways in [FDM 11-15-1](#).

#### **LIST OF ATTACHMENTS**

[Attachment 1.1](#) SDDCTEA Interstate Vertical Clearance Exception Coordination Form