

Guide and / or I.M. Revision Notice

To: Cities, Counties, and Consultants

Date: March 26, 2008

From: Office of Local Systems

Revision Notice Number: 2008-02

The Federal-aid Project Development Guide (Guide) and / or Instructional Memorandums to Local Public Agencies (I.M.s) have been revised as indicated below. This revision notice identifies all new or revised documents and includes a summary of the significant changes. Where appropriate, it also references the existing Project Development Information Packet (Packet) or County Engineers I.M. documents that have been replaced or superseded.

The Iowa DOT does not provide paper copies of the Guide or I.M.s. Since these documents are updated frequently, we recommend using the on-line version of the [Guide and I.M.s](#) for reference. However, if you prefer using paper copies, all new or revised documents have been included in this file for convenient printing. If you maintain a paper copy of these documents, please remove the old documents and replace them with the new documents. Note: This file is designed for double-sided printing; therefore, all documents with an odd number of pages will be followed by a blank page.

For more information and additional download options, refer to the [Guide and I.M.s](#) web page. If you have any questions concerning these revisions, please contact Charlie Purcell at Charlie.Purcell@dot.iowa.gov or 515-239-1532.

***** PLEASE NOTIFY ALL AFFECTED PERSONNEL OF THIS CHANGE *****

Document Title or I.M Number	Summary of Significant Revision(s)
I.M. Table of Contents March 26, 2008	The I.M. Table of Contents has been revised to reflect new or revised I.M.s, as indicated below.
I.M. 3.130 404 Permit Process March 26, 2008	This I.M. has been substantially re-written. Significant changes include: <ul style="list-style-type: none"> • Definitions of key terms have been added. • The guidance on wetlands has been rearranged and significantly expanded. • The guidance on Nationwide Permits (NWP) has been expanded to better explain the NWP program and provide a summary of several NWPs that may be used for transportation projects. • Guidance on Regional and Individual Permits has been added. • The contact information has been updated. • Attachment A, 404 Permit checklist, has been updated to include two new items: <p>Under Part 1, cover letter, item 2.k has been added to indicate whether or not a temporary stream access will be allowed for the project. Section 2547 The Iowa DOT Standard Specifications now requires the local agency to either obtain approval for a temporary stream access via their permit request to the Corps or specifically indicate on the plans that a temporary stream access will not be allowed. Therefore, the Iowa DOT strongly recommends that all local agencies include a temporary stream access in their 404 permit request for all bridge or culvert projects.</p> <p>Under Part 1, cover letter, item 2.l has been added to indicate whether or not the project has completed the National Environmental Policy Act (NEPA) process as a Categorical Exclusion (CE). This has been requested by the U.S. Army Corps of Engineers (Corps) and may help expedite the permit processing.</p> • Attachment B, Engineering / Environmental Consulting Firms, has been eliminated. This list was previously obtained by the Iowa DOT from the Corps. However, since this I.M. is not updated very frequently, the Iowa DOT recommends that LPAs contact the Corps directly to obtain a current list.

Document Title or I.M Number	Summary of Significant Revision(s)
<p>I.M. 3.210 Rural Design Guidelines March 26, 2008</p>	<p>This I.M. has been revised. References to the various American Association of State Highway and Transportation Officials (AASHTO) guidelines have been updated and several changes related to clear zone guidelines have been made. Significant changes include:</p> <ul style="list-style-type: none"> • The Design Aids and AASHTO Guidelines tables no longer provide a specific value for clear zone. Because the recommended clear zone distance is a function of design speed, design volume, and roadside geometry, providing a specific value necessarily involves several assumptions. Those assumptions are difficult to communicate clearly in a table format. Therefore, instead of providing a specific value, these tables now reference I.M. 3.215, Clear Zone Guidelines, for the recommended clear zone distance. • The introduction to each design table has been revised to clarify the applicability and origin of the design values. • A new footnote has been added to the Design Aids and AASHTO Guidelines tables for local roads to clarify the use of a 2:1 foreslope. The note alerts designers that using a 2:1 foreslope inside of the recommended clear zone distance should be reviewed for possible shielding with a barrier, as per I.M. 3.215.
<p>I.M. 3.214 3R Guidelines March 26, 2008</p>	<p>This I.M. has been substantially re-written. Similar to I.M. 3.210, many of the changes are related to revised clear zone guidance. Significant changes include:</p> <ul style="list-style-type: none"> • The I.M. now includes 3R guidelines for both rural and urban roadways. The urban 3R guidelines were added because in the future, SUDAS will be referenced as the source for urban design guidelines for new or complete reconstruction. However, SUDAS does not currently contain any 3R guidelines. Therefore, since the 3R concept is the same for both rural and urban roadways, including the need to address safety considerations, both rural and urban 3R guidelines have been included in this I.M. • The 3R Tables no longer specify a certain value for the recommended clear zone distance. Instead, clear zone for 3R projects should be addressed as per Safety Consideration No. 7 in this I.M. These changes have been made because it may not always be practical or cost-effective to provide the recommended clear zone distance for 3R projects. Therefore, specifying a recommended clear zone distance in the table may imply a requirement that may not be appropriate. • Safety Consideration No. 7 (clear zone review) has been significantly revised and expanded. It addresses both rural and urban roadways, but treats them differently: <p style="margin-left: 40px;">For rural roadways, it now requires that a clear zone review be conducted, but only if the road has an above-average fatal or major injury crash rate. These are the same roads that are eligible for the High Risk Rural Roads (HRRR) program, which makes them easy to identify by referring to the linked HRRR map. These roads also have an additional funding source in the HRRR program that may be able to offset the cost of clear zone improvements.</p> <p style="margin-left: 40px;">For urban roadways, clear zone must also be considered where an identifiable safety problem exists, but no specific requirements are imposed. Typically urban projects don't provide cost effective or practical opportunities to provide the full recommended clear zone distance. Therefore, the designer is encouraged to address clear zone to the extent practical, but the manner in which clear zone is addressed is based primarily on good engineering judgment, rather than a specified criteria or procedure.</p>

Document Title or I.M Number	Summary of Significant Revision(s)
<p>I.M. 3.215 Clear Zone Guidelines March 26, 2008</p>	<p>This I.M. has been substantially re-written. It contains similar information as before, but also includes a lot of new guidance. Significant changes include:</p> <ul style="list-style-type: none"> • Definitions for terms associated with clear zone have been added. These are consistent with the terminology used in the AASHTO Roadside Design Guide (RDG). • An extended discussion of how to apply the clear zone concept has been added. This includes an updated list of prioritized options for addressing obstacles in the clear zone. It also includes a discussion of how clear zone applies to new or complete reconstruction, 3R projects, and curbed roadways. An expanded summary of AASHTO recommendations for clear zone has also been provided, as noted in the following items. • Additional guidance has been provided on how the recommended clear zone distances should be determined, when design exceptions are needed, and application of clear zone on very-low volume roads (<400 ADT). • New sections have been added for understanding how clear zones relate to non-recoverable and critical slopes. These sections include several figures and tables that have been adapted from the RDG. A brief discussion of "barn-roof" cross sections has also been included.

Instructional Memorandums To Local Public Agencies

Table of Contents



Some I.M.s are written either to counties or cities; others are written to both counties and cities. The intended audience is indicated in the "To:" field of the I.M. as well as the Table of Contents below. Many of the I.M.s are referenced by the Federal-aid Project Development Guide (Guide). These I.M.s are marked with an asterisk (*). For more information about the relationship between the Guide and I.M.s, refer to the [Guide and I.M.s web page](#).

Note: The I.M.s are currently in the process of being transitioned into a new format and numbering system. New or updated I.M.s will use the new format. Existing I.M.s will remain in the old format until they are revised or updated. Some of the I.M.s are not yet complete, as shown in light grey text. Some incomplete I.M.s will be based on an existing Project Development Information Packet document, some will be based on an existing County Engineers I.M. that will be renumbered, and some will include entirely new content. Where applicable, a reference and link to the existing Packet document or County Engineers I.M. is provided.

No.	Subject	Revision Date	Written To
Chapter 1 – General Information			
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1.010	County Road Embargoes on the Iowa Detour and Road Embargo Map	November 2001	Counties
1.020	Pavement Friction Evaluation Program	August 2003	Counties
1.030	Ordering Forms and Supplies From the Iowa Department of Transportation	November 2001	Both
1.050	Manuals, Guides and Instructional Information Available to Counties	December 2002	Both
1.070*	Title VI and Nondiscrimination Requirements	February 21, 2008	Both
1.080*	ADA Requirements	February 21, 2008	Both
	Attachment A – Sample Curb Ramp Transition Plan (Word) (PDF)	February 21, 2008	Both
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1.120	References to the Iowa Code	August 2003	Counties
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2.010	Transfer of Local Secondary Road Use Tax Funds to the Farm-to-Market Fund	November 2001	Counties
	Attachment A - Local to FM Fund Transfer Resolution (Word)	November 2001	Counties
2.020	Federal and State Bridge Replacement and Rehabilitation Programs	August 2004	Counties
2.030	Transfer of Farm-to-Market Funds to the Local Secondary Road Fund	April 12, 2007	Counties
2.040	Temporary Allocation of Farm-to-Market Funds	November 2001	Counties
2.050	Procedure to Change a County Secondary Road Construction Program (see I.M. 3.11 , dated March 2003)	(future)	Counties
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	Attachment B - Advance Local Project Resolution (see attachment to I.M. 3.11, dated March 2003) (Word)	(future)	Counties
2.071	Secondary Road Budget Accounting Code Series	July 2005	Counties
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	Attachment C - Resolution for Establishing Speed Limits (Word)	March 2002	Counties
2.220	Establishing and Signing Area Service B and Area Service C Roads	January 2004	Counties
	Attachment A - Area Service "B" Ordinance (Word)	March 2002	Counties
	Attachment B - Area Service "B" Resolution (Word)	March 2002	Counties
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2.230	Signing for Low Cost Stream Crossings	June 2002	Counties
	Attachment A - Resolution for Low-Water Stream Crossing (Word)	June 2002	Counties
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	Attachment A - Resolution for Construction Agreement between City and County on Secondary Road Extensions (Word)	April 2002	Both
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3.002*	Federal-aid Project Scheduling	February 16, 2007	Both
3.005*	Project Development Submittal Dates and Information	August 6, 2007	Both
3.010	Project Development Outline -- Federal-Aid Funding (BRS, BHS, BROS, BHOS, STS-S, STP-A, STP-E, STP-ES)	February 2002	Both
3.020	Project Development Outline -- Farm-to-Market Funding (FM)	February 2002	Counties
3.030	Project Development Outline -- Local Funding (L)	February 2002	Both
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3.110*	Environmental Data Sheet Instructions (see Packet, Index No. 6, Environmental Datasheet Instructions)	(future)	Both
	Attachment A – Example Environmental Data Sheet	(future)	Both
3.112*	FHWA Environmental Concurrence Process (see Packet, Index No. 6, NEPA Project Classification Process)	(future)	Both
	Attachment A - Environmental Concurrence Process Overview (see Packet, Flowcharts, Chart No. 6 – Environmental Process Overview)	(future)	Both
	Attachment B - Environmental Assessment / FONSI Process (see Packet, Flowcharts, Chart No. 6A – Environmental Assessment / FONSI Process)	(future)	Both
	Attachment C - Environmental Impact Statement / ROD Process (see Packet, Flowcharts, Chart No. 6B – Environmental Impact Statement / ROD Process)	(future)	Both
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3.114*	Cultural Resource Regulations (see Packet, Index No. 6, Cultural Resource Regulations)	(future)	Both
3.120*	Farmland Protection Policy Act Guidelines (see Packet, Index No. 6, Farmland Protection Policy Act Guidelines)	(future)	Both
	Attachment A - Farmland Protection Policy Act Process Flowchart (see Packet, Flowcharts, Chart No. 6E – Farmland Protection Policy Act Process)	(future)	Both
3.130*	404 Permit Process	March 26, 2008	Both
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3.220*	Design Exception Information for Bridges Narrower than Approach Pavement (see I.M. 3.132 , dated February 2002)	(future)	Both
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	Attachment B – Guidelines for Federal-Aid Consultant Contracts	August 29, 2006	Both
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	Attachment D – Sample Consultant Contract (Word)	August 29, 2006	Both
3.310*	Federal-aid Participation in In-House Engineering Costs (see Packet, Index No. 2, In-House Engineering Guidelines and Steps to Utilize Federal-aid for In-House Engineering)	(future)	Both
3.315	Farm-to-Market Funded Consultant Contracts	(future)	Counties
Section 3.4 -- Preliminary Design			
3.405*	Preliminary Plans (see I.M. 3.12 , dated June 2002)	(future)	Both
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3.510*	Check and Final Bridge or Culvert Plans	February 16, 2007	Both
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3.605*	Right-of-Way Acquisition	June 18, 2007	Both
	Attachment A – Compensation Estimate Procedures	June 18, 2007	Both
	Attachment B – FHWA Authorization of Right-of-Way Costs Flowchart	June 18, 2007	Both
	Attachment C – Early Right-of-Way Acquisition Process Flowchart	June 18, 2007	Both
3.640*	Utility Accommodation and Coordination	(future)	Both
3.650*	Federal-aid Participation in Utility Relocations	June 18, 2007	Both
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3.680*	Federal-aid Projects Involving Railroads	May 1, 2007	Both
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3.710*	DBE Guidelines	June 18, 2007	Both
3.720*	Local Letting Process – Federal-aid	April 12, 2007	Both
	Attachment A – Pre-Award Checklist and Certification	April 12, 2007	Both
	Attachment B – Post-Award Checklist and Certification	April 12, 2007	Both
	Attachment C – Supplemental Agreement	April 12, 2007	Both
	Forms Packet Note: The documents included in the Forms Packet are not actually a part of I.M. 3.720 or its attachments. However, for convenient download, these documents are bundled together in a self-extracting executable file (forms.exe).	N/A	Both
3.730*	Iowa DOT Letting Process (see I.M. 3.44 , dated September 2005)	(future)	Both
	Attachment A – Iowa DOT Letting Process Flowchart (see Packet, Flowcharts, Chart No. 12 – DOT Pre-letting Process and Chart No. 13 – DOT Post-letting Process)	(future)	Both
3.750*	Project Development Certification Instructions	December 3, 2007	Both
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3.810*	Federal-aid Construction by Local Agency Forces (see Packet, Index No. 3, Force Account Construction Guidelines and Steps to Utilize Federal-aid for Force Account Construction)	(future)	Both
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	Attachment A – Project Close-out Process Overview Flowchart	December 3, 2007	Both
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3.920	Final Review, Audit, and Close-out Procedures for State-aid Projects	(future)	Both
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	Attachment A – Sample Interest Payment Information Form	December 3, 2007	Both
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INSTRUCTIONAL MEMORANDUMS

To Local Public Agencies



To: Counties and Cities	Date: March 26, 2008
From: Office of Local Systems	I.M. No. 3.130
Subject: 404 Permit Process	

Contents: This Instructional Memorandum (I.M.) includes guidelines and procedures for a Local Public Agency (LPA) to understand and comply with the requirements of Section 404 of the Clean Water Act, as it applies to transportation projects. This I.M. also includes the following attachments:

[Attachment A](#) – 404 Permit Checklist

Definitions

Discharges of Dredged or Fill Material – Generally, this includes, but is not limited to: placement of dredge or fill that is necessary for the construction of any structure or infrastructure (including formed or pre-formed cast culverts and aprons); the building of any structure, infrastructure, or impoundment requiring rock, sand, dirt, concrete, flowable mortar, or other material for its construction; causeways or road fills; dams and dikes; artificial islands; riprap, groins, weirs, spur-dikes, breakwaters, and revetments; and levees. These terms are defined more precisely under Title 33 of the Code of Federal Regulations (CFR), Part 323, Section 323.2 ([33 CFR 323.2](#)).

Waters of the United States – Generally, this includes all waters, impoundments of waters, or tributaries of waters, such as lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, or natural ponds. This term is defined more precisely at [33 CFR 328.3](#).

Wetlands – Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR 328.3(b)).

Introduction

Discharges of dredged or fill material into waters of the United States are regulated under the Clean Water Act, now codified at Title 33, United States Code, Section 1344 ([33 U.S.C. 1344](#)). This law and its associated regulations are administered by the United States Army Corps of Engineers (Corps), the United States Environmental Protection Agency (EPA), and the Iowa Department of Natural Resources (Iowa DNR).

The goal of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. While there are many different sections of this law pertaining to clean water, there are two sections that significantly affect transportation projects. Section 404 and Section 401 require the Corps and the Iowa DNR, respectively, to issue permits for certain activities that affect the waters of the United States. In Iowa, the permitting required under both Section 404 and Section 401 has been merged into one process, allowing for joint application and approval of these permits.

When is a Permit Required?

A Section 404 permit will be required before placing any dredged or fill material into waters of the United States. Therefore, projects that involve placement of dredged or fill materials in or near any waters of the United States should be reviewed to determine if a permit will be required or what type of permit will be required. Projects that should be reviewed typically involve activities such as the following:

- Grading
- Borrow areas
- Culvert extensions
- Bridge or culvert replacements
- Temporary fills or crossings
- Cofferdams and work pads
- Bank stabilization or channel realignment

A good rule of thumb is any project that requires additional property rights or involves any work in or near an aquatic resource, such as a lake, river, stream or wetland, should be reviewed for compliance with Section 404.

Wetland Considerations

Since wetlands are by definition part of the waters of the United States and therefore protected under the Section 404 laws and regulations, it is critical to understand what wetlands are, how they are identified, and how impacts to wetlands must be addressed. Each of these topics are briefly addressed below.

What are Wetlands?

The regulatory definition of wetlands is provided in the Definitions section above. A key consideration is whether or not saturated (hydric) soils are present at some point during the growing season. Examples of wetland areas include, but are not limited to:

1. Timbered or non-timbered floodplain
2. Potholes/depressed areas
3. Grassed waterways
4. Farmed wetlands
5. Fringe wetlands (associated with streams, rivers, lakes, hillside seeps, etc.)

How are Wetlands Identified?

Trained wetland professionals should be utilized to conduct wetland investigations. Assistance may be available from Corps regulatory staff, United States Department of Agriculture Natural Resources Conservation Service (NRCS) field staff, or through environmental consultants. A list of environmental consultants that may be able to provide these services may be obtained from the Corps (see Contact Information section below). However, inclusion on this list is neither an endorsement nor a recommendation by either the Corps or the Iowa DOT.

The Corps may accept certified NRCS determinations of wetland impacts on actively-cropped land. Therefore it may be advisable to first contact the local NRCS office to determine if certified wetlands determinations have been performed. Cultivated areas termed "prior converted" by the NRCS are not usually regulated by Corps. However, cultivated areas that are called "farmed wetlands" may be regulated by Corps. If the NRCS office is unable or unavailable to help you determine if regulated wetlands are present, you may need to hire an environmental consultant to make that determination. For additional guidance in determining whether any wetlands exist within the project limits, refer to the [1987 Corps of Engineers Wetland Delineation Manual](#).

Note: The Corps will make the final determination of which wetlands are regulated and what type of permit is required. On occasion, the Corps could differ from the NRCS. When in doubt, contact the Corps as early as possible to avoid costly delays later on.

How Should Impacts to Wetlands be Mitigated?

Since protecting wetlands is one of the primary purposes of Section 404, mitigation of impacts to wetlands is a key consideration in the Section 404 permit process. A wetland is "impacted" if there is a temporary or permanent adverse affect by filling, flooding, excavating, or draining the wetland. If permanent wetland impacts exceed 0.1 acres, mitigation will be required. Impacts of 0.1 acres or less may or may not require mitigation.

The term "mitigation" means more than simply "compensation" in the Federal regulations and it is more specific than the dictionary definition, "to make less severe." Rather, the Section 404 regulations require an analysis of alternatives and mitigation actions must be considered in a specific sequence of steps:

1. **Avoidance:** Before the Corps will issue a 404 permit, the LPA must demonstrate that every effort has been made to first avoid any impacts, both temporary and permanent, to the maximum extent practicable.

2. **Minimization:** If impacts are unavoidable, the LPA must demonstrate that impacts will be minimized as much as possible. Typically, impacts can be minimized by keeping channel shaping and road relocation to an absolute minimum.
3. **Compensation:** Finally, compensation at a minimum ratio of 1:1 (wetlands compensated to wetlands lost) may be required. The Iowa DOT recommends providing compensatory mitigation at a 1.5:1 ratio. Compensation may consist of creating, restoring, enhancing, or preserving wetlands to replace those that were lost because of the transportation project. Compensation options include on-site mitigation, off-site mitigation within the watershed, purchasing credits from a mitigation bank, or contributing funds to a separate wetland project in-lieu of mitigation. Stream mitigation may also be required.

The mitigation process should be performed in accordance with the EPA's Section 404(b)(1) Guidelines (as specified in [40 CFR 230](#)), the [Corps / EPA Memorandum of Agreement](#), and with input from other resource and regulatory agencies. The Corps and the Iowa DNR have the final authority to approve or disallow any proposed mitigation plan offered by the LPA.

What Type of Permit is Required?

There are three basic types of Section 404 permits that may be used. The proposed project activities and their impacts to the waters of the United States will determine which type may be used. Figure 1 illustrates a generalized process that may be used to determine which type of permit might be appropriate. Each type of permit is further described below.

Note: Figure 1 should be used as guide only. The Corps District Engineer will make the final determination regarding which type of permit is required and may require a Regional or Individual Permit on a case-by-case basis. Controversial projects, in particular, should be examined carefully. These should be submitted to the Corps regardless of the amount of impacts to waters of the United States.

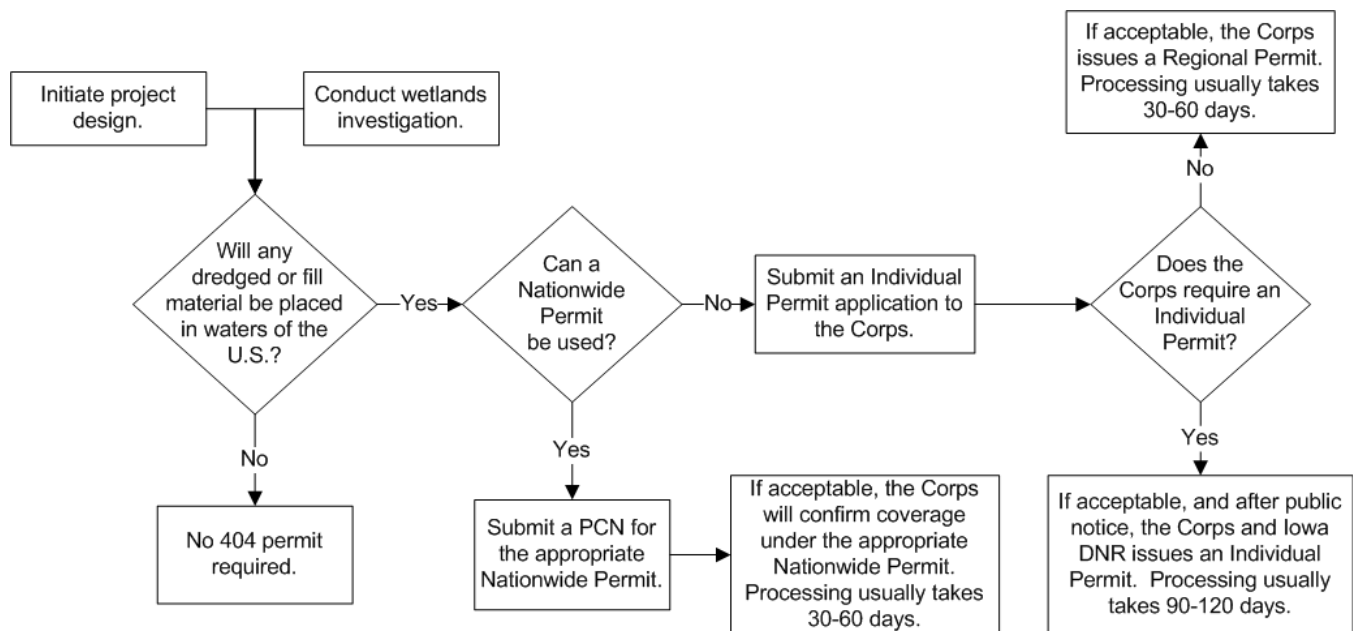


Figure 1 – 404 Permit Determination Process

Nationwide Permits

A Nationwide Permit (NWP) is a general type of permit and is intended to apply throughout the United States and its territories. There are many different types of NWPs, and each one allows a certain type of activity, subject to certain conditions and / or limits. In order to use one of the NWPs, there are also number of other regional and general conditions which may also apply. All of the applicable conditions, limitations, and permitting procedures for the NWP program in Iowa are explained in the Corps' [Fact Sheet No. 6\(IA\)](#). Therefore, if an NWP will be used, the LPA should thoroughly review the Fact Sheet. Finally, in addition to

the conditions and limitations specified in the Fact Sheet, the Corps also has the authority to impose case-specific conditions on any project approved under an NWP.

In general, NWPs may be used for projects with relatively minor impacts to waters of the United States. Most NWPs limit the loss waters of the United States to less than 0.5 acres.

Table 1 below summarizes the NWPs commonly used for transportation projects. This table also includes a description of the type of activity that may be approved, the applicable conditions and / or limits, and if a Pre-Construction Notice (PCN) is required.

Note: As Table 1 indicates, there are a few instances when a PCN may not be required in order to use an NWP; however, **the Iowa DOT strongly recommends sending a PCN to the Corps whenever any type of activity is proposed under an NWP.** This provides documentation of compliance with the Section 404 requirements, which is critical if questions or problems arise later on.

Table 1 – Commonly Used NWPs for Transportation Projects

NWP	Activities Allowed	Conditions and / or Limits	PCN Required?
3. Maintenance	(a) Repair, rehabilitation, or replacement of previously approved, currently serviceable structures or fills.	<ul style="list-style-type: none"> • Structures or fills will only be used for the purposes for which they were originally approved. • Only minor deviations for maintenance are allowed. 	No
	(b) Removal of accumulated sediments and debris in the vicinity of existing structures (e.g., bridges or culverts) including intake and outfall structures and associated canals; and the placement or new or additional rip-rap to protect the structure.	<ul style="list-style-type: none"> • Removal is limited to 200 feet, or the minimum necessary to restore capacity of the intake or outfall structure or associated canal. • All dredged or excavated materials must be deposited and maintained in an upland area. 	Yes
	(c) Temporary structures, fills, and work necessary to conduct the maintenance activities allowed by this NWP.	<ul style="list-style-type: none"> • Maintain normal downstream flows and minimize flooding to the maximum extent practicable. • Construct and maintain temporary fills so they will not be eroded by expected high flows. • Remove temporary fills and return to pre-construction elevations; revegetate affected areas as appropriate. 	No
13. Bank Stabilization	Bank stabilization activities necessary for erosion prevention.	<ul style="list-style-type: none"> • Length is limited to 500 feet along the bank (unless waived by DE) • Amount of material placed must be less than 1 cubic yard per running foot (unless waived by DE) 	Yes, if any of the following conditions exist: <ul style="list-style-type: none"> • The length will exceed 500 feet along the bank. • More than 1 cubic yard of material will be placed per running foot. • The discharge will occur in a special aquatic site.
14. Linear Transportation Crossings	Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in WUS. This includes temporary structures, fills, and work necessary to construct the linear transportation project.	<ul style="list-style-type: none"> • Less than 0.5 acres of WUS will be filled. • Stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project. • Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable. • Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. • Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. Areas affected by temporary fills must be revegetated, as appropriate. 	Yes, if greater than 0.1 acres of WUS will be filled.

NWP	Activities Allowed	Conditions and / or Limits	PCN Required?
18. Minor Discharges	Minor discharges of dredged or fill material into all WUS.	<ul style="list-style-type: none"> The quantity of discharged material and the volume of area excavated do not exceed 25 cubic yards below the plane of the ordinary high water mark. The discharge will not cause the loss of more than 1/10 acre of WUS. The discharge is not placed for the purpose of a stream diversion. 	Yes, if any of the following conditions exist: <ul style="list-style-type: none"> The discharge or the volume of area excavated exceeds 10 cubic yards below the plane of the ordinary high water mark. The discharge is in a special aquatic site.
23. Approved Categorical Exclusions	Activities undertaken, assisted, authorized, regulated, funded, or financed, in whole or in part, by another Federal agency where the activity has been classified as a Categorical Exclusion (CE).	<ul style="list-style-type: none"> The Iowa DOT, on behalf of the FHWA, has granted a CE for the proposed project. Applies only to those activities FHWA has classified as a CE, as specified in the Corps' Regulatory Guidance Letter (RGL) No. 05-07. Additional information about the CE classification is provided, as listed in Attachment A - 404 Permit Checklist (see Part 1, cover letter, item 2.I). 	Yes, if required by the Corps' RGL No. 05-07.
33. Temporary Construction, Access, and Dewatering	Temporary structures, work, and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites. This also includes temporary structures, work, and discharges, including cofferdams, necessary for construction activities not otherwise subject to the Corps or U.S. Coast Guard permit requirements.	<ul style="list-style-type: none"> The associated primary activity is approved by the Corps of Engineers or the U.S. Coast Guard. 	Yes

Abbreviations / definitions: **DE** = District Engineer, Rock Island District of the Corps; **WUS** = waters of the United States; **discharge** = the placement of dredged or fill material into WUS; **special aquatic site** = are geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region, as listed in [40 CFR 230, Subpart E](#).

Regional Permits

A Regional Permit is an intermediate type of permit between the NWPs described above and the Individual Permits described below. This type of permit is used when the conditions or limits of the NWPs are exceeded, but the level of impacts may not warrant the type of public involvement or review required for Individual Permits.

There are three different Regional Permits in Iowa. The one used for transportation projects is Regional Permit 7, Fill Associated with Bridge Construction. Typical conditions for approval under Regional Permit 7 include the following:

- Wetland impacts must be 1 acre or less.
- All wetland impacts will be mitigated at a 1.5:1 ratio.
- Stream realignment and shaping is allowed within 300 feet upstream and downstream of the centerline of the roadway (existing channel length, with a maximum distance of existing channel length impacted not to exceed 500 feet).
- Banks will be stabilized with vegetation or rock, at no steeper than a 2:1 slope.

For more detailed information about the conditions and limitations of this permit, refer to [Regional Permit 7](#) provided by the Rock Island District of the Corps.

Note: The decision to approve a project under a Regional Permit is made at the discretion of the Corps District Engineer. LPAs seeking approval under a Regional Permit should complete an Individual Permit application and request the Corps to make this determination.

Individual Permits

An Individual Permit (IP) is typically required for major projects with significant impacts to waters of the United States. This includes all projects that cannot be approved under a NWP or a Regional Permit.

Before granting this type of permit, the Corps will publish a public notice and subject the project to a rigorous public interest review among the resource agencies, interested parties, and the public at large. The Iowa DNR must also issue a specific 401 Water Quality Certification for the project. Like the Corps, the Iowa DNR conducts a public notice and public interest review. The public notice and review process typically requires a minimum of 30 days to complete.

Projects approved under an IP often require wetland and / or stream mitigation. A detailed mitigation plan must be submitted that includes documentation of the alternatives considered to avoid and minimize the impacts to wetlands and streams, and if they cannot be avoided, the type of compensatory mitigation that will be provided.

How are Permits Obtained?

[Attachment A](#) - Section 404 Permit Checklist, provides detailed instructions for preparing and submitting a PCN or IP application. Please note the Corps' review will not commence until all the requested information is received, so it is important to review this checklist carefully before submitting the PCN or IP application.

The PCN or IP application should be submitted to the Corps as soon as possible. Processing time for a NWP or Regional Permit is typically 30 to 60 calendar days from the Corps' receipt of the PCN or IP application. Processing time for an IP is typically 90-120 from the Corps' receipt of a complete IP application.

Project activities may not begin until after notice has been received from the Corps (and for IPs, the Iowa DNR) that the proposed project has been approved under the terms and conditions on the appropriate permit. The notice will consist of a letter that identifies the permit(s) that have been granted and any special conditions which must be met.

How do 404 Permits Affect the Project Plans and Letting Process?

If a 404 permit is required, the plans shall indicate which 404 permit has been obtained. The plans shall also include the appropriate standard plans, details, specifications, and bid items to ensure the proposed construction will meet all of the terms and conditions of the applicable 404 permit, including any special conditions or restrictions specified by the Corps. For more specific information, refer to [I.M. 3.505](#), Check and Final Plans, Attachment B – Check and Final Plans Checklist.

Projects that typically require a 404 permit will not be submitted for letting through the Iowa DOT if the appropriate permit has not been obtained, unless documentation is provided to establish that either a 404 permit is not required or a Public Interest Finding has been approved, as per [I.M. 3.760](#), Public Interest Findings.

Additional Resources

[U.S. Army Corps of Engineers - Rock Island District Regulatory Branch](#) Links to public notices concerning nationwide permits, permit application forms and instructions, frequently asked questions (FAQs), and a posting of recent public notices for upcoming projects in Iowa.

[U.S. Fish & Wildlife Service - National Wetlands Inventory](#) Contains information on the characteristics, extent, and status of the Nation's wetlands and deepwater habitats. This site contains mapping information for most of the United States.

[United States Geological Survey - Iowa Water Science Center](#) Includes current and historic hydrologic data and various other reports and publications.

[Iowa Department of Natural Resources](#) Home page for the Iowa DNR.

[Iowa Department of Natural Resources - Natural Resources Geographic Information System \(NRGIS\) Library](#) A collection of more than 1000 geographically referenced databases that are available to local agencies through a file transfer protocol (ftp) server.

[Society of Wetland Scientists](#) A non-profit organization founded in 1980 to promote wetland science and the exchange of information related to wetlands.

[Association of State Wetland Managers](#) This nonprofit membership organization established in 1983 to promote and enhance protection and management of wetland resources, to promote application of sound science to wetland management efforts and to provide training and education for our members and the public.

[U.S. Environmental Protection Agency – Wetlands, Oceans, and Watersheds](#) Links to laws, regulations, executive orders, guidance, and scientific documents related to wetlands.

[Iowa State University – Iowa's Wetlands and Riparian Areas](#) Provides a clearinghouse of information about wetlands and riparian areas in Iowa.

Contact Information

Corps

The [Rock Island District](#) of the Corps has jurisdiction over most of the State of Iowa; however, for projects involving the Missouri River levee system or located in areas between the levees and the Missouri River, contact the [Omaha District](#) of the Corps.

U.S. Army Corps of Engineers, Rock Island District
Attn: Regulatory Branch
Clock Tower Building - PO Box 2004
Rock Island, IL 61204-2004
309-794-5370

U.S. Army Corps of Engineers, Omaha District
Wehrspann Regulatory Office
8901 South 154th Street
Omaha, NE 68138-3635
402-896-0896

Iowa DNR

For projects that will use an NWP, the Iowa DNR does not need to be contacted, unless its Section 401 Water Quality Certification conditions for the NWP program are not met, as listed on page 1 of the Corps' [Fact Sheet No. 6\(IA\)](#). For projects that will use an IP, the Iowa DNR should always be contacted regarding individual Section 401 Water Quality Certifications.

Iowa Department of Natural Resources
Attn: Floodplain Permits Section
Wallace State Office Building
502 E. 9th Street
Des Moines, IA 50319-0034
515-281-6615

Iowa DOT

Iowa Department of Transportation
Water Resources Section
800 Lincoln Way
Ames, IA 50010
(515) 239-1225

404 Permit Checklist

About the Checklist

This checklist is provided as a guide for submittal of a Pre-Construction Notice (PCN) for a Nationwide Permit (NWP) or an Individual Permit (IP) application, as required by Section 404 of the Clean Water Act and its associated regulations. These checklists have been developed with assistance from the Water Resources Section of the Iowa Department of Transportation (Iowa DOT), the Rock Island District of the U.S. Army Corps of Engineers (Corps), and the Iowa Department of Natural Resources (Iowa DNR). Following this checklist typically results in a complete submittal under normal circumstances. Nevertheless, actual PCN or IP applications should be developed at the applicant's discretion and coordinated directly with the Corps and other regulatory agencies as appropriate.

Instructions

The type of information required as part of the PCN or IP application depends primarily on the type of permit used and the anticipated loss of waters of the United States (WUS). Therefore, in order to simplify the submittal preparation, this checklist is divided into three parts. A "loss of WUS" includes adverse affects by filling, flooding, excavation, or drainage that is a result of the regulated activity.

Part 1: For projects with a loss of WUS less than 0.10 acres, submit a PCN to the Corps that includes the following:

- A cover letter that includes:
 1. Applicant information
 - a. Agency name
 - b. Name of contact person
 - c. Mailing address
 - d. Telephone number
 - e. E-mail address
 2. Project information
 - a. Project number(s)
 - b. Location
 - i. Section(s), Township, Range
 - ii. Generally, describe WUS affected by project
 - iii. Location map
 - 8.5 x 11 County map or Quad map
 - Show beginning and end of project
 - Show any borrow areas
 - c. Target letting or anticipated construction dates
 - d. A description of the type and purpose of the project
 - e. A description of the existing land use (agricultural lands, woodlands, etc.)
 - f. If the project is located in a Federal Emergency Management Administration (FEMA) mapped floodway, include documentation that discharges comply with FEMA or FEMA approved local floodplain construction requirements.
 - g. Types of project funding sources (Federal, State, or local)
 - h. Identify if any threatened or endangered species are present. (For assistance, check with the County Conservation Office or Iowa DNR local wildlife and fisheries biologists.)
 - i. Identify impacts, if any, to historical resources. Include copies of correspondence such as archaeological surveys and State Historic Preservation Officer (SHPO) clearances.
 - j. Note any other agencies that will be reviewing the project for permits or clearances.
 - i. Iowa DNR (Floodplain Permits, NPDES Permits)
 - ii. FEMA flood insurance
 - k. State if the contractor will be allowed to construct a temporary stream crossing, temporary stream access, or any other type of temporary structure or fill in WUS.

- I. Note if the project will be reimbursed with Federal funds or not. For Federal-aid projects, also include the following:
 - i Note if FHWA Environmental Concurrence has been obtained as a Categorical Exclusion (CE).
 - ii If the project has been cleared as a CE:
 - Provide a copy of the FHWA Environmental Concurrence memo from the Iowa DOT Office of Location and Environment.
 - Indicate which work activity, as specified in the [Corps' Regulatory Guidance Letter \(RGL\) No. 05-07](#), applies to the project.

Preliminary project plans that include:

1. Typical cross sections
2. Main line and side roads cross-sections at stream crossings and wetlands locations only
3. All borrow locations
4. Bridge and culvert plans, including Type, Size and Location (TS&L) information
5. WUS shown on the plan sheets. Include soils maps showing all soil types and highlight hydric soils. (Required only at crossing locations, not the entire project.)

Part 2: For projects with a loss of WUS between 0.10 and 0.50 acres, submit a PCN to the Corps that includes all the information noted for Part 1 above, plus the following:

Wetland determinations and delineations that include:

1. A description of the techniques used, a summary of the locations and impacts to WUS, including impacts related to channel work (e.g., lost channel length and how it was figured, fate of the old channel).
2. For corridor projects impacting several locations, a table that summarizes impacts to WUS and proposed mitigation, including:
 - a. Acreage for wetlands and ponds, linear feet for channels
 - b. Cowardin (U. S. Fish and Wildlife classification system) and/or Hydro Geomorphic Method (HGM) classifications
 - c. Project stationing to show locations
 - d. Universal Transverse Mercator (UTM) coordinates for each crossing, if available

Site-specific WUS information that includes:

1. A depiction of the WUS impacted by the project (direct & indirect) on aerial photography at crossings and / or borrow locations.
2. Delineation and determination forms (see examples provided in Appendix B of the [1987 Corps of Engineers Wetland Delineation Manual](#)). Please note:
 - a. Provide a description of how the boundary was identified.
 - b. One form for center of wetland is not useful.
 - c. Some non-wetland samples may be required to justify the boundary identified for the WUS.

A mitigation concept that includes:

1. Mitigation goals, including a no net loss statement (statement that project will not result in a net loss of water quality resources)
2. A mitigation site search summary (note the cities, county conservation boards, Natural Resources Conservation Service (NRCS), or other agencies contacted).
3. Information related to: mitigation site location; site specific objective; existing conditions relating to soils, hydrology, and vegetation; proposed manipulation of soils, hydrology, vegetation, landscape, and water control structures (preliminary design).
4. Delineations of existing conditions (certified determination from NRCS on agricultural land)
5. Management plans, acquisition plan, site ownership, agreements, excess, disposal
6. Plat/Legal description for filing deed restriction (will be required when site is approved)
7. Monitoring proposal
 - a. Mitigation monitoring protocol
 - b. Variations
 - c. Timing, intervals
8. Design plans of proposed mitigation sites, if available. Include mitigation area or locations of each site showing: proposed grading, seeding, and planting; expected limits of mitigation wetlands; and property lines.

Part 3: For projects with a loss of WUS greater than 0.5 acres, submit an IP application to the Corps that includes all of the information for Parts 1 and 2 above, plus the following:

- ❑ A [Joint Application Form](#), completed as per the [cover letter and instructions](#) provided by the Corps. The Joint Application Form has been developed by the Corps and the Iowa DNR to obtain approval for both the Section 404 and Section 401 individual permits.
- ❑ Alternatives analysis and documentation, including:
 1. Descriptions of the other alignment or design alternatives considered, including the “do-nothing” alternative.
 2. Reasons why the preferred alternative was selected.
- ❑ Avoidance and minimization documentation, for both temporary and permanent impacts, including:
 1. Provide information on alternate alignments considered from files and environmental documents.
 2. Discuss special precautions related to minimization (adverse impacts to water quality, flooding, or erosion upstream and downstream from site).

Submittals

For projects that require a PCN (Parts 1 or 2), submit 1 copy of the information listed to the Corps (see Contact Information section in [I.M. 3.130](#)). For projects that require an IP (Part 3), submit copies as indicated in the Joint Application form [cover letter and instructions](#).

INSTRUCTIONAL MEMORANDUMS

To Local Public Agencies



To: Counties

Date: March 26, 2008

From: Office of Local Systems

I.M. No. 3.210

Subject: Rural Design Guidelines

Contents: This Instructional Memorandum (I.M.) provides design guidelines for new construction or complete reconstruction of road or bridge projects on rural collectors and rural local roads. It includes general design considerations, background on the development and application of the design guidelines, and several design tables. These guidelines are most applicable to counties; however they may be used on projects within the corporate limits that have a rural cross section (e.g., shoulders with open ditches, no curbs). Please note the following:

1. These guidelines will be used by the Iowa Department of Transportation (Iowa DOT) to review the proposed design values of Federal-aid road or bridge projects.
2. The Iowa County Engineers Association (ICEA), by action of the Association's Design Guide and Supervisor Engineer Committee, and Executive Board, has adopted the AASHTO Guidelines Tables contained in this I.M. for use on County projects funded only with Farm-to-Market or local funds. For such projects, the Iowa DOT will not provide any review of the proposed design values, unless specifically requested by the County.
3. These guidelines are not applicable for projects on arterial roadways. For arterials roadways on the Primary or Interstate systems, refer to the Iowa DOT [Road Design Manual](#). For minor arterials that are not on either the Primary or Interstate systems, refer to the Green Book.

Design Considerations

The objective of the engineering design of any public facility is to satisfy the demands for service in the safest and most economical manner while maintaining the integrity of the environment. On new or complete reconstruction projects, the selected design speed should be consistent with the proposed or existing operating speed limit. Any individual curves below this design speed may require mitigation by placement of warning signs and/or markings such as: curve or turn signs, advisory speed plates, chevrons, no passing lines, edgelines, or reduced speed zones.

Development and Application of the Design Tables

The guidelines in this I.M. are applicable to rural collectors and rural local roads, as classified on the [Federal Functional Classification Maps](#). For each of these road classifications, two design tables are provided: the Design Aids tables and the AASHTO Guidelines tables. These tables were developed using two American Association of State Highway and Transportation Officials (AASHTO) publications: *A Policy on Geometric Design of Highways and Streets* (2004), commonly referred to as the "Green Book", and the *Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT \leq 400)* (2001). The proper application and use of each kind of table is described below.

The values in the Design Aids tables are based on the upper range of recommended values provided by the Green Book. These tables should be used in the initial stages of project development. Values approaching or exceeding the upper limits of the ranges in the Design Aids tables should be used as the basis for design wherever the conditions permit. However, values within the ranges are acceptable. For Federal-aid projects, the County Engineer shall identify any design values that do not meet or exceed the Design Aids tables, and explain the reasons for not meeting these values. This documentation should be included with the Concept Statement submittal.

The values in the AASHTO Guidelines tables typically represent the lower range of recommended values given in the Green Book. For local roads with design traffic volumes less than or equal to 400 ADT, some of the values are based on the *Guidelines for Geometric Design of Very Low-Volume Local Roads*. The AASHTO Guidelines tables are furnished to provide alternate values for design criteria if problems with excessive costs or adverse impacts to adjacent property occur when using the Design Aids values. Any proposed Federal-aid project that does not meet the values in the AASHTO Guidelines tables will require a design exception. The design exception request will need to be in the form of safety and service (crash experience, function of road, etc.) benefits versus the economics and environment (right of way and construction costs, farmsteads affected, parks, etc.), as described in I.M. [I.M. 3.218](#), Design Exception Process.

Design Aids For Rural Collectors

These “Aids” are presented to help in the design of new or complete reconstruction projects on rural collector roads. Each design element of each project should reflect the most practicable and economically justified value. For Federal-aid projects, design values below those shown in this table will be considered on a project-by-project basis, provided that an explanation is provided to the Iowa DOT Administering Office.

Design Elements	Paved Roadway						Non-Paved Roadway			
	Over 1500		1500 – 400		Under 400		400 – 50		Under 50	
Terrain (1)	Level	Rolling	Level	Rolling	Level	Rolling	Level	Rolling	Level	Rolling
Design Speed (mph)	60	50	55	50	55	45	55	45	50	40
Stopping Sight Distance (ft)	570	425	495	425	495	360	495	360	425	305
Minimum Radius (ft) (2)	1205	760	965	760	965	500	965	500	760	465
Maximum Gradient (%) (3)	5	6	6	7	6	8	6	8	7	8
Traveled Way (ft) (4)	24	24	22	22	22	22	20	20	20	20
Shoulder Width (ft)	8	8	6	6	6	6	4	4	2	2
Roadway Top Width (ft)	40	40	34	34	34	34	28	28	24	24
New Bridge Roadway Width (ft) (5)	40	40	30	30	30	30	24	24	24	24
Existing Bridge Roadway Width (ft) (6)	24	24	22	22	22	22	22	22	22	22
Foreslope	4:1	4:1	3:1	3:1	3:1	3:1	3:1	3:1	3:1	3:1
Cross Slopes	8:1	8:1	6:1	6:1	6:1	6:1	3:1	3:1	3:1	3:1
Clear Zone Distance (ft)	See note (7)									

- NOTES:
- (1) Prevailing (over 50%) slopes of natural ground are: Level-less than 3%, Rolling-3% or more.
 - (2) a. Based on a maximum superelevation (e) of 0.08.
b. Horizontal curves should have a minimum length of 500 feet.
 - (3) Short lengths of grade (less than 500 feet) and grades on low-volume collectors (<400 vpd) may be steepened by 2%.
 - (4) Traveled Way is the pavement or surfacing width.
 - (5) a. For bridges over 100 feet long, the width may be the traveled way plus 6 feet (Note: This only applies for Design Volumes of 1500 ADT or greater).
b. Bridges should have a design loading of HS-20.
 - (6) a. For bridges less than 100 feet in length. Bridges over 100 ft. will be analyzed individually.
b. If the Design Volume is over 2000 ADT, use 28 feet.
c. Design loading should be H-15.
d. Existing Bridge Roadway Width should be greater than or equal to the Traveled Way width, unless a design exception has been approved. For more information, refer to [I.M. 3.220](#), Design Exception Information for Bridges Narrower than Approach Pavement.
 - (7) The recommended clear zone distance is a function of Design Speed, Design Volume, horizontal curvature, and roadside geometry. To determine the recommended clear zone distance, refer to [I.M. 3.215](#), Clear Zone Guidelines.

AASHTO Guidelines For Rural Collectors

These "Guides" are a composite of the recommendations from Chapter 6 of the AASHTO Green Book (2004). These guidelines are presented to help in the design of new or complete reconstruction projects on rural collectors. For Federal-aid projects, design values below those shown in this table may be used on a project-by-project basis, provided that a design exception is approved by the Iowa DOT Administering Office, as per [I.M. 3.218](#), Design Exception Process.

Design Elements	All Collector Roads							
	Over 2000		2000 – 1500		1500 – 400		Under 400	
Terrain (1)	Level	Rolling	Level	Rolling	Level	Rolling	Level	Rolling
Design Speed (mph)	60	50	50	40	50	40	40	30
Stopping Sight Distance (ft)	570	425	425	305	425	305	305	200
Minimum Radius (ft) (2)	1205	760	760	465	760	465	465	250
Maximum Gradient (%) (3)	5	7	6	8	6	8	7	9
Traveled Way (ft) (4)	24	24	22	22	22	22	20	20
Shoulder Width (ft)	8	8	6	6	5	5	2	2
Roadway Top Width (ft)	40	40	34	34	32	32	24	24
New Bridge Roadway Width (ft) (5)	40	40	30	30	28	28	24	24
Existing Bridge Roadway Width (ft) (6)	28	28	24	24	22	22	22	22
Foreslope	3:1	3:1	3:1	3:1	3:1	3:1	3:1	3:1
Clear Zone Distance (ft)	See note (7)							

- NOTES:
- (1) AASHTO "Mountainous" terrain design guides may be used on Federal-aid projects only with Iowa DOT concurrence. Note (1) in the Design Aids Table provides definitions for Level and Rolling.
 - (2) Based on a maximum superelevation (e) of 0.08.
 - (3) Short lengths of grade (less than 500 feet) and grades on low-volume collectors (<400 vpd) may be steepened by 2%.
 - (4) Traveled Way is the pavement or surfacing width.
 - (5) a. Bridges over 100 feet long, the width may be the traveled way plus 6 feet (Note: This only applies for Design Volumes of 1500 ADT or greater).
b. Design loading should be HS-20
 - (6) a. For bridges less than 100 feet in length. Bridges over 100 feet will be analyzed individually.
b. Design Loading should be H-15.
c. Existing Bridge Roadway Width should be greater than or equal to the Traveled Way width, unless a design exception has been approved. For more information, refer to [I.M. 3.220](#), Design Exception Information for Bridges Narrower than Approach Pavement.
 - (7) The recommended clear zone distance is a function of Design Speed, Design Volume, horizontal curvature, and roadside geometry. To determine the recommended clear zone distance, refer to [I.M. 3.215](#), Clear Zone Guidelines.

Design Aids For Rural Local Roads

These "Aids" are presented to help in the design of new or complete reconstruction projects on rural local roads. Each design element of each project should reflect the most practicable and economically justified value. For Federal-aid projects, design values below those shown in this table will be considered on a project-by-project basis, provided that an explanation is provided to the Iowa DOT Administering Office.

Design Elements	All Local Roads									
	Over 1500		1500 – 400		400 – 250		250 – 50		Under 50	
Terrain (1)	Level	Rolling	Level	Rolling	Level	Rolling	Level	Rolling	Level	Rolling
Design Speed (mph)	55	50	55	45	50	45	50	40	40	35
Stopping Sight Distance (ft)	495	425	495	360	425	360	425	305	305	250
Minimum Radius (ft) (2)	965	760	965	500	760	500	760	465	465	350
Maximum Gradient (%) (3)	6	8	6	9	6	9	6	10	7	10
Traveled Way (ft) (4)	24	24	22	22	22	22	20	20	20	20
Shoulder Width (ft)	8	8	6	6	4	4	3	3	2	2
Roadway Top Width (ft)	40	40	34	34	30	30	26	26	24	24
New Bridge Roadway Width (ft) (5)	30	30	30	30	30	30	24	24	24	24
Existing Bridge Roadway Width (ft) (6)	24	24	22	22	22	22	20	20	20	20
Foreslope (7)	4:1	4:1	3:1	3:1	2:1*	2:1*	2:1*	2:1*	2:1*	2:1*
Clear Zone Distance (ft)	See note (8)									

NOTES:

- (1) Prevailing (over 50%) slopes of natural ground are: Level – less than 3%, Rolling - 3% or more.
- (2) a. Based on a maximum superelevation (e) of 0.08.
b. Horizontal curves should have a minimum length of 500 feet.
- (3) Maximum gradient may be steepened by 2% for a short distance (less than 500 feet).
- (4) Traveled Way is the pavement or surfacing width
- (5) a. For Design Volumes over 2000 ADT, use approach roadway width.
b. For bridges over 100 feet long, the width may be the traveled way plus 6 feet (Note: This only applies for Design Volumes of 1500 ADT or greater).
c. Bridges should have a design loading of HS-20.
- (6) a. For bridges less than 100 feet in length. Bridges over 100 feet will be analyzed individually.
b. If the Design Volume is over 2000 ADT, use 28 feet.
c. Design loading should be H-15. H-10 acceptable under 50 ADT.
d. Existing Bridge Roadway Width should be greater than or equal to the Traveled Way width, unless a design exception has been approved. For more information, refer to [I.M. 3.220](#), Design Exception Information for Bridges Narrower than Approach Pavement.
- (7) * If slopes steeper than 3:1 are used within the recommended clear zone distance, they should be reviewed for shielding with a traffic barrier, as per [I.M. 3.215](#), Clear Zone Guidelines.
- (8) The recommended clear zone distance is a function of Design Speed, Design Volume, horizontal curvature, and roadside geometry. To determine the recommended clear zone distance, refer to [I.M. 3.215](#), Clear Zone Guidelines.

AASHTO Guidelines For Rural Local Roads

These "Guides" are a composite of the AASHTO recommendations from Chapter 5 of the Green Book (2004) and the Guidelines for Geometric Design of Very Low-Volume Local Roads (2001). The values in the first four columns are based on the Green Book. The values in the last column (Agricultural Access) are based on the Guidelines for Geometric Design of Very Low-Volume Local Roads. These guidelines are presented to help in the design of new or complete reconstruction projects on rural local roads. For Federal-aid projects, design values below those shown in this table may be used on a project-by-project basis, provided that a design exception is approved by the Iowa DOT Administering Office, as per [I.M. 3.218](#), Design Exception Process.

Design Elements	All Local Roads									
	Over 2000		2000 – 1500		1500 – 400		Under 400		Under 400 Agricultural Access (9)	
Design Volume (ADT)	Level	Rolling	Level	Rolling	Level	Rolling	Level	Rolling	Level	Rolling
Terrain (1)	Level	Rolling	Level	Rolling	Level	Rolling	Level	Rolling	Level	Rolling
Design Speed (mph)	50	40	50	40	50	40	40	30	30	20
Stopping Sight Distance (ft)	425	305	425	305	425	305	305	200	165	95
Minimum Radius (ft) (2)	760	465	760	465	760	465	465	250	170	105
Maximum Gradient (%) (3)	6	10	6	10	6	10	7	10	UAC	UAC
Traveled Way (ft) (4) (10)	24	24	22	22	22	20	18	18	--	--
Shoulder Width (ft) (10)	8	8	6	6	5	5	2	2	--	--
Roadway Top Width (ft)	40	40	34	34	32	30	22	22	24	24
New Bridge Roadway Width (ft) (5)	40	40	28	28	28	26	22	22	22	22
Existing Bridge Roadway Width (ft) (6)	28	28	24	24	22	22	22	22	UAC	UAC
Foreslope (7)	2:1*	2:1*	2:1*	2:1*	2:1*	2:1*	2:1*	2:1*	UAC*	UAC*
Clear Zone Distance (ft)	See note (8)									

- NOTES:
- (1) AASHTO "Mountainous" terrain design guides may be used on Federal-aid projects only with Iowa DOT concurrence. Note (1) in the Design Aids Table provides definitions for Level and Rolling.
 - (2) Based on a maximum superelevation (e) of 0.08.
 - (3) Maximum gradient may be steepened by 2% for short distance (less than 500 feet).
 - (4) Traveled Way is the pavement or surfacing width.
 - (5) a. For bridges over 100 feet long, the width may be the traveled way plus 6 feet (Note: This only applies for Design Volumes of 2000 ADT or greater)
b. Design Loading should be HS-20.
 - (6) a. For bridges less than 100 feet in length. Bridges over 100 feet will be analyzed individually.
b. Design loading should be H-15. H-10 acceptable under 50 ADT.
c. 20 foot minimum clear roadway width is acceptable for Design Volumes from 0 – 250 ADT
d. Existing Bridge Roadway Width should be greater than or equal to the Traveled Way width, unless a design exception has been approved. For more information, refer to [I.M. 3.220](#), Design Exception Information for Bridges Narrower than Approach Pavement.
 - (7) * If slopes steeper than 3:1 are used within the recommended clear zone distance, they should be reviewed for shielding with a traffic barrier, as per [I.M. 3.215](#), Clear Zone Guidelines.
 - (8) The recommended clear zone distance is a function of Design Speed, Design Volume, horizontal curvature, and roadside geometry. To determine the recommended clear zone distance, refer to [I.M. 3.215](#), Clear Zone Guidelines.
 - (9) Agricultural Access roads are used regularly or seasonally to provide access to fields and farming operations for agricultural equipment that is wider than a typical truck.
 - (10) No values are shown in the Agricultural Access column because there are no criteria for surfacing width or shoulder width in the Very Low-Volume Local Roads Design Guide.

INSTRUCTIONAL MEMORANDUMS

To Local Public Agencies



To: Counties and Cities

Date: March 26, 2008

From: Office of Local Systems

I.M. No. 3.214

Subject: 3R Guidelines

Contents: This Instructional Memorandum (I.M.) provides guidelines for design of Local Public Agency (LPA) Federal-aid Resurfacing, Restoration, or Rehabilitation (3R) projects on both urban and rural roads.

Definitions

Resurfacing – These projects include resurfacing or overlays that result in less than an additional nominal 4 inches to the pavement structure. Other types of work such as pavement patching or short areas of reconstruction, joint replacement or repair, and shouldering may be included. Usually no additional right-of-way is required.

Restoration – These projects are primarily for the major resurfacing or overlays which add a considerable amount of structure to the existing pavement. Usually resurfacings or overlays that result in an additional nominal 4 inches or more to the pavement structure are included. In addition, some pavement widening, short sections of pavement reconstruction, shoulder widening, flattening foreslopes on high fills, and intersection reconstruction may be involved. Consideration may be given to improving isolated grades, curves, or sight distance by construction or traffic control measures. In some cases minor right-of-way acquisitions or easements may be required.

Rehabilitation – For these projects, the traffic service improvement and safety needs may be of equal importance to the need to improve the riding quality. Projects may involve intersection reconstruction; pavement widening; pavement replacement; shoulder widening; flattening foreslopes; drainage improvement; and in the context of such improvements, improvement of isolated grades, curves, or sight distance by reconstruction. Some additional right-of-way may be necessary.

Introduction

It is apparent that available funding is insufficient to improve existing roads to the geometric requirements desirable for new construction. Roads constructed to previous design criteria are still capable of performing a useful transportation service; and in many cases, minor improvements will make such roads serviceable for many more years.

Safety Considerations

In addition to extending the service life of an existing street or highway, Federal-aid 3R projects shall also include consideration of safety improvements. To satisfy this requirement, a description of how each of the following safety considerations have been addressed, including supporting documentation, shall be included with the Concept Statement submittal, as per [I.M. 3.105](#), Concept Statement Instructions.

1. All bridges and culverts within the recommended clear zone distance, as per [I.M. 3.215](#), Clear Zone Guidelines, which are not presently shielded should be reviewed according to [I.M. 3.213](#), Traffic Barriers (Guardrail and Bridge Rail). If culverts need to be extended for reasons other than safety (e.g., lane widening), consideration should be given to extending them outside the recommended clear zone distance or made safely traversable. Document this consideration by describing how bridges and culverts will be addressed.
2. All signing and marking should be in conformance with the Manual on Uniform Traffic Control Devices (MUTCD). Document this consideration by stating the signs and markings were reviewed. If any signing or marking is found not to be in conformance with the MUTCD, identify what improvements or upgrades will be made.
3. The last 5-year crash history should be analyzed with respect to number, rate, location, type, and severity in order to identify areas that offer the greatest potential for safety enhancements. Document this consideration by providing a summary of the crash history analysis, including a copy of the crash data printout. Crash data and analysis tools are available on the Iowa DOT Office of Traffic and Safety [Crash Analysis Resources](#) web page.

4. If the project is located on a rural roadway, "Use as constructed" (U.A.C.) of bridges narrower than the approach pavement width must have prior approval as per [I.M. 3.220](#), Design Exception Information for Bridges Narrower than Approach Pavement. If approved, the guardrail should be erected, delineated with reflectors, and an edge line extending 300 feet from all 4 corners should be painted. This is in addition to the narrow bridge signs. Document this consideration by stating whether existing bridges comply with this requirement. If any bridges do not comply with this requirement, reference the prior design exception approval or include the design exception request information, as outlined by I.M. 3.220. Also state the proposed mitigation, as indicated above.
5. Bridge rails and guardrails on existing bridges should be reviewed for structural adequacy. If found to be structurally inadequate and functionally obsolete such that it cannot adequately contain and redirect vehicles without snagging, penetrating, or vaulting, it should be considered for upgrading. For additional guidance, refer to [I.M. 3.213](#), Traffic Barriers (Guardrail and Bridge Rail). Document this consideration by stating whether the existing bridge rails and approach guard rails will be left in place, delineated, retrofitted, or replaced.
6. All horizontal curves with recommended speeds less than the speed limit should be signed with curve or turn signs and advisory speed plates. Intersections or narrow bridges, which exist within the stopping sight distance of a crest vertical curve, should be signed accordingly. Document this consideration by indicating if advisory speed plates or other warning signs will be installed, and if so, the type of signs and general locations where they will be installed.
7. Obstacles within the recommended clear zone distance, as per [I.M. 3.215](#), Clear Zone Guidelines, except for bridges and culverts, should be reviewed for both rural and urban projects, as indicated below. Bridges and culverts should be addressed as per Safety Considerations 1, 4, and 5 above.

Rural Projects: If the project is located on a rural roadway with an above average fatal and major injury crash rate or crash density, as indicated on the [High Risk Rural Roads \(HRRR\) Eligibility Corridors](#) map, a clear zone review shall be conducted as follows. If the project is not located on an HRRR eligible road, simply note this and the following review is not required.

- a) Determine the recommended clear zone distance.
- b) Review the crash data and site conditions to determine if there are crashes related to inadequate clear zone distance. Generally speaking, these would include crashes associated with an obstacle located within or near the recommended clear zone distance. If such a review indicates there are no crashes related to clear zone distance, document this finding and the clear zone review is complete. If the review finds there are some crashes related to clear zone distance, proceed to the next step.
- c) Review the possible treatment options, as per I.M. 3.215, and determine which treatment would be most appropriate for the situation. If a treatment option other than delineation is proposed, document which option will be used and the clear zone review is complete. If delineation is proposed, proceed to the next step.
- d) For the least expensive treatment option considered (other than delineation), perform a benefit-cost calculation, as per [I.M. 3.216](#), Economic Analysis (Benefit-to-Cost Ratio). If the least expensive treatment option is cost effective, include this work in the project. If it is not cost effective, delineate the obstacle. Document the decision by providing a copy of the benefit-cost calculation and indicating which treatment option will be used.

Note: The cost of safety improvements resulting from this review are eligible for funding under the HRRR program. For more information, refer to the [High Risk Rural Roads Program](#) web page.

Urban Projects: If the project is located on an urban roadway, fixed objects (utility poles, traffic signal supports, etc.) within the recommended clear zone distance should be reviewed. Fixed objects that must be installed or relocated within the recommended clear zone distance should be fitted with breakaway devices if possible. Otherwise, they should be installed or relocated outside the recommended clear zone distance or at the right-of-way line, whichever is less. Fixed objects that do not have to be relocated because of the project should also be considered for removal, relocation, or use of a breakaway device, in those locations where identifiable safety problems associated with inadequate clear zone distance exist.

Document this consideration by indicating the proposed set back for newly installed or relocated fixed objects. If any safety problems associated with existing fixed objects exist, identify what types of improvements will be made or explain why it is not practical to provide the recommended clear zone distance.

3R Table For Rural Collectors

This table contains acceptable design values for Federal-aid resurfacing, restoration, or rehabilitation (3R) projects on rural collector roads. Each project must be considered individually to determine what improvements are feasible to extend the useful service life and enhance safety. Design values below those shown on this table may be used on a project-by-project basis, provided that a design exception is approved by the Iowa DOT Administering Office, as per [I.M. 3.218](#), Design Exception Process.

Design Elements	Resurfacing			Restoration			Rehabilitation		
	> 2000	2000-750	< 750	> 2000	2000-750	< 750	> 2000	2000-750	< 750
Design Volume (ADT)	> 2000	2000-750	< 750	> 2000	2000-750	< 750	> 2000	2000-750	< 750
Design Speed (mph)	Existing	Existing	Existing	40	40	40	40	40	40
Stopping Sight Distance (ft)	250	Existing	Existing	305	305	305	305	305	305
Minimum Radius (ft) (1)	465	465	Existing	465	465	465	465	465	465
Maximum Gradient (%)	Existing	Existing	Existing	Existing	Existing	Existing	7	8	9
Pavement Width (ft)	22	22	20	22	22	20	24	22	22
Shoulder Width (ft)	6	3	2	6	3	2	6	3	2
Roadway Top Width (ft)	34	28	24	34	28	24	36	28	26
Existing Bridge Roadway Width (ft) (2)	22	22	20	26	24	22	28	24	22
Foreslope (ft)	Existing	Existing	Existing	3:1	3:1	2:1	3:1	3:1	3:1
Clear Zone Distance (ft)	Existing (except as required by Safety Consideration No. 7 in this I.M.)								

Notes:

- (1) a. Based on maximum superelevation (e) of 0.08.
 b. Curves more than 15 mph below the posted speed should be delineated.
- (2) Existing Bridge Roadway Width should be greater than or equal to the Traveled Way width, unless a design exception has been approved. For more information, refer to [I.M. 3.220](#), Design Exception Information for Bridges Narrower than Approach Pavement.

3R Table

For Urban Arterials and Collectors

This table contains acceptable design values for Federal-aid resurfacing, restoration, or rehabilitation (3R) projects on urban arterials and collector streets. Each project must be considered individually to determine what improvements are feasible to extend the useful service life and enhance safety. Design values below those shown on this table may be used on a project-by-project basis, provided that a design exception is approved by the Iowa DOT Administering Office, as per [I.M. 3.218](#), Design Exception Process.

Design Elements	Arterial (1)				Collector (1)			
	Commercial or Industrial		Fringe or Residential		Commercial or Industrial		Fringe or Residential	
Traffic Lanes (number) (2)	4	2	4	2	4	2	4	2
Design Speed (mph) (3)	Existing							
Stopping Sight Distance (ft.) (4)	(Based on Design Speed)							
Horizontal Curve Radius (ft.) (5)	(Based on Design Speed)							
Maximum Gradient (percent)	Existing							
Travel Lane Width (ft.)	11	11	10	10	11	11	10	10
Parking Lane Width (ft.) (6)	9	9	8	8	8	8	7	7
Curb & Gutter Width (ft.)	(no separate gutter width required)							
Raised Median Width (ft.)	2	NA	2	NA	2	NA	2	NA
Raised Median Width with Lt. Turn (ft.)	12	NA	12	NA	10	NA	10	NA
Two Way Left Turn Lane Width (ft.)	10	NA	10	NA	10	NA	10	NA
Border Area Width (ft.)	Existing							
Vertical Clearance (ft.)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
Object Setback (ft.) (7)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Clear Zone Distance (ft.)	Existing (except as required by Safety Consideration No. 7 in this I.M.)							
Existing Bridge Roadway Width (ft.) (8)	44	22	40	20	44	22	40	20

Notes:

- (1) Use the roadway classification corresponding to the existing Federal Functional Classification.
- (2) Actual number of lanes equal to existing.
- (3) Design Speed should be equal to or greater than posted speed.
- (4) Distance required by the driver traveling at the design speed to bring a vehicle to a stop after an object on the road becomes visible (eye height = 3.5 feet and object height = 2 feet).
- (5) Minimum radius should be compatible with the design speed.
- (6) Gutter width may be included as part of the parking lane width.
- (7) Measured from the face of curb. This area should be free of all fixed objects in order to provide a minimum operational clearance to permit curbside parking or to avoid negative impacts on traffic flow.
- (8) a. Existing Bridge Roadway Width should be greater than or equal to the Traveled Way width, unless a design exception has been approved. For more information, refer to [I.M. 3.220](#), Design Exception Information for Bridges Narrower than Approach Pavement.
b. Design loading should be at least HS-15.

INSTRUCTIONAL MEMORANDUMS

To Local Public Agencies



To: Counties and Cities

Date: March 26, 2008

From: Office of Local Systems

I.M. No. 3.215

Subject: Clear Zone Guidelines

Contents: This Instructional Memorandum (I.M.) provides guidelines for providing a clear zone on Local Public Agency (LPA) road or bridge improvement projects. It includes definitions of key terms, application of the clear zone concept, and a summary of the American Association of State and Highway Transportation Officials (AASHTO) recommendations. Please note the following:

1. These guidelines will be used by the Iowa Department of Transportation (Iowa DOT) to review the proposed design values of Federal-aid road or bridge improvement projects.
2. The LPA, at its option, may use these guidelines for non-Federal-aid projects; however, for such projects, the Iowa DOT will not provide any review of the proposed design values, unless specifically requested by the LPA.
3. These guidelines are not applicable for projects on Primary or Interstate highways. For such projects, refer to the Iowa DOT [Road Design Manual](#).

Definitions

Clear Zone – The total roadside border area, starting at the edge of the traveled way, available for safe recovery of errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope, and / or a clear run-out area.

Recommended Clear Zone Distance – The total distance, measured from the edge of the traveled way, that a typical vehicle will require to stop or regain control after leaving the traveled way.

Recoverable Slope – A foreslope on which a motorist may, to a greater or lesser extent, retain or regain control of a vehicle by slowing or stopping. Slopes 4:1 and flatter are generally considered recoverable. Recoverable slopes may count toward the recommended clear zone distance.

Non-recoverable Slope – A foreslope which is considered traversable but on which an errant vehicle will continue to the bottom. Foreslopes from 3:1 up to 4:1 may be considered traversable but not recoverable. Non-recoverable slopes may occur within the clear zone, but do not count toward the recommended clear zone distance.

Clear Run-out Area – An area at the toe of a non-recoverable slope which is available for safe recovery by errant vehicles. The clear run-out area may count toward the recommended clear zone distance.

Critical Slope – A foreslope which may be too steep to be safely traversed by errant vehicles. Slopes steeper than 3:1 are generally considered to be in this category. Critical slopes may neither be considered part of the clear zone nor counted toward the recommended clear zone distance. Depending on the speed and angle of encroachment, vehicles encountering a critical slope could overturn. Critical slopes occurring within the recommended clear zone distance may warrant shielding with a barrier.

Obstacle – A critical slope or any fixed object which is not safely traversable or may pose a hazard to errant vehicles.

Application of the Clear Zone Concept

The clear zone concept has been developed based on several decades of highway design experience and research. The purpose of providing a clear zone is to reduce the likelihood and severity of crashes that may result when a vehicle leaves the traveled way. This is often referred to as the “forgiving roadside concept”.

Roadside obstacles should be reviewed during the design of any highway or bridge project. Where practical, obstacles should not be located within the recommended clear zone distance. Any obstacles that are located within the recommended clear zone distance should be reviewed, in order of preference, according to the following design options:

1. Remove the obstacle.
2. Redesign the obstacle so that it can be safely traversed.
3. Relocate the obstacle to a point where it is less likely to be struck.
4. Reduce the impact severity by using an appropriate breakaway device.
5. Shield the obstacle with a longitudinal traffic barrier designed for redirection or use a crash cushion.
6. Delineate the obstacle if the above alternatives are not appropriate.

New Construction or Complete Reconstruction Projects

The clear zone concept is most applicable to new construction or complete reconstruction projects. These projects often involve significant changes to horizontal or vertical alignment, and therefore offer the greatest opportunity to address roadside safety in an economical manner.

3R Projects

Clear zone should also be reviewed for Resurfacing, Restoration, or Rehabilitation (3R) projects. However, because the scope of a 3R project is generally focused on the roadway itself, and because funds are usually limited, the clear zone review should be focused on those areas within the project that have identifiable safety problems associated with clear zone widths. For additional guidance, refer to [I.M. 3.214](#), 3R Guidelines.

Curbed Roadways

Curbs are often provided on urban roadways. Curbs may serve many functions, but research has demonstrated they have limited ability to redirect vehicles that leave the roadway, especially at higher speeds. Therefore, consideration should be given to providing a clear zone for curbed urban roadways as well. However, in contrast to rural roadsides, urban roadsides are typically much more restricted by the presence of existing buildings, utility poles or appurtenances, walkways, trees, etc. These constraints often make it impractical to provide the recommended clear zone distance throughout the entire length of the project. Nevertheless, designers should review those locations that have identifiable safety problems associated with clear zone widths, and where it is practical, provide the recommended clear zone distance behind the curb.

Apart from clear zone considerations, designers should in all cases provide a minimum object setback (sometimes referred to as an operational clearance) from the face of curb to any obstructions. A minimum object setback of 1.5 feet from the face of curb is recommended by the AASHTO Roadside Design Guide (RDG) and AASHTO's Policy on Geometric Design of Highways and Streets, commonly referred to as the "Green Book". *The object setback is not a clear zone.* The clear zone is intended to accommodate vehicles that *leave the roadway*. In contrast, the purpose of the object setback is to provide a roadside environment that is not likely to adversely affect the speed or position of vehicles *on the roadway*. It also serves other practical purposes, such as providing adequate room for snow storage or opening car doors on roadways that allow parking.

Traffic barriers on roadways with curbs may be appropriate in some cases. However, care should be exercised when using curbs in combination with roadside barriers. For more information, refer to the RDG, Section 3.4.1.

AASHTO Recommendations

The recommended clear zone distance is a function of several variables: traffic speed, traffic volume, horizontal curvature, and roadside geometry. The RDG provides several tables and charts that may be used to obtain the recommended clear zone distance based on these variables. It is important to understand the recommended clear zone distances are neither absolute nor precise. In some instances, it may be acceptable to leave an obstacle within the clear zone distance; in other cases, obstacles outside of the recommended clear zone distance may warrant removal or shielding. As with all design guidelines, use of good engineering judgment is critical.

For Federal-aid new construction or complete reconstruction projects, if the following recommended clear zone distances will not be provided, a design exception shall be requested, as per [I.M. 3.218](#), Design Exception Process.

Very Low Volume Local Roads (ADT \leq 400 vpd)

The AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT \leq 400 vpd) indicates a clear zone of 6 feet or more in width may be considered when it can be provided at low cost and with minimum social or environmental impacts. Where constraints of cost, terrain, or potential social or environmental impacts make provision of a 6 foot clear zone impractical; clear zones less than 6 feet, including designs with 0 feet may be used. These guidelines are applicable to both new construction, complete reconstruction, and 3R projects. These guidelines may also be used for collectors with less than or equal to 400 ADT, provided they carry mostly local traffic.

Other Roads (ADT > 400 vpd)

For roads other than very low volume local roads, the recommended clear zone should be provided in accordance with the following tables and figures. These tables and figures have been developed based on the guidance provided in the 2006 Edition of the RDG.

Table 1 – Recommended Clear Zone Distances, Recoverable Slopes
 In feet from the edge of traveled way
 (RDG, Table 3.1)

Design Speed (mph)	Design Traffic (ADT)	Foreslopes		Backslopes		
		6:1 or flatter	5:1 to 4:1	3:1	4:1 to 5:1	6:1 or flatter
\leq 40	Under 750	7-10	7-10	7-10	7-10	7-10
	750-1500	10-12	12-14	10-12	10-12	10-12
	1500-6000	12-14	14-16	12-14	12-14	12-14
	Over 6000	14-16	16-18	14-16	14-16	14-16
45-50	Under 750	10-12	12-14	8-10	8-10	10-12
	750-1500	14-16	16-20	10-12	12-14	14-16
	1500-6000	16-18	20-26	12-14	14-16	16-18
	Over 6000	20-22	24-28	14-16	18-20	20-22
55	Under 750	12-14	14-18	8-10	10-12	10-12
	750-1500	16-18	20-24	10-12	14-16	16-18
	1500-6000	20-22	24-30	14-16	16-18	20-22
	Over 6000	22-24	26-32*	16-18	20-22	22-24
60	Under 750	16-18	20-24	10-12	12-14	14-16
	750-1500	20-24	26-32*	12-14	16-18	20-22
	1500-6000	26-30	32-40*	14-18	18-22	24-26
	Over 6000	30-32*	36-44*	20-22	24-26	26-28
65-70	Under 750	18-20	20-26	10-12	14-16	14-16
	750-1500	24-26	28-36*	12-16	18-20	20-22
	1500-6000	28-32*	34-42*	16-20	22-24	26-28
	Over 6000	30-34*	38-46*	22-24	26-30	28-30

* Where a site specific investigation indicates a high probability of continuing crashes, or such occurrences are indicated by crash history, the designer may provide clear zone distances greater than 30 feet as indicated. Clear zones may be limited to 30 feet for practicality and to provide a consistent roadway template if previous experience with similar projects or designs indicates satisfactory performance.

The recommended clear zone distance obtained from Table 1 may need to be adjusted on the outside of a horizontal curve at selected locations. This adjustment should be considered when the crash history suggests the need for additional clear zone distance or when all of the following criteria are met:

1. The radius of the curve is less than 2860 feet.
2. The curve occurs on a high-speed roadway (design speed of 55 mph or greater).
3. The curve occurs on a normally tangent alignment (one where the curve is preceded by a tangent of more than one mile in length).

If an adjustment of the clear zone distance is determined to be appropriate, calculate the adjusted recommended clear zone distance by multiplying the recommended clear zone distance obtained from Table 1 by the appropriate Horizontal Curve Adjustment factor, as obtained from Table 2 below:

Table 2 – Horizontal Curve Adjustment Factors
 (RDG, Table 3.2)

Radius (ft)	Design Speed (mph)						
	40	45	50	55	60	65	70
2860	1.1	1.1	1.1	1.2	1.2	1.2	1.3
2290	1.1	1.1	1.2	1.2	1.2	1.3	1.3
1910	1.1	1.2	1.2	1.2	1.3	1.3	1.4
1640	1.1	1.2	1.2	1.3	1.3	1.4	1.5
1430	1.2	1.2	1.3	1.3	1.4	1.4	--
1270	1.2	1.2	1.3	1.3	1.4	1.5	--
1150	1.2	1.2	1.3	1.4	1.5	--	--
950	1.2	1.3	1.4	1.5	1.5	--	--
820	1.3	1.3	1.4	1.5	--	--	--
720	1.3	1.4	1.5	--	--	--	--
640	1.3	1.4	1.5	--	--	--	--
570	1.4	1.5	--	--	--	--	--
380	1.5	--	--	--	--	--	--

Clear Zones and Non-recoverable Slopes

Vehicles that encroach upon a non-recoverable slope at high speeds are not likely to recover until they reach the toe of the non-recoverable slope. Therefore, if a non-recoverable slope occurs within the recommended clear zone distance, fixed objects should not be present on the non-recoverable slope or in the vicinity of the toe of the non-recoverable slope. Determination of the width of the clear run-out area at the toe of slope should take into consideration right of way availability, environmental concerns, economic factors, safety needs, and crash histories. Also, the distance between the edge of the travel lane and the beginning of the non-recoverable slope should influence the clear run-out area provided at the toe of the non-recoverable slope. While the application may be limited by several factors, the fill slope parameters which may enter into determining clear run-out area are illustrated in Figure 1 below.

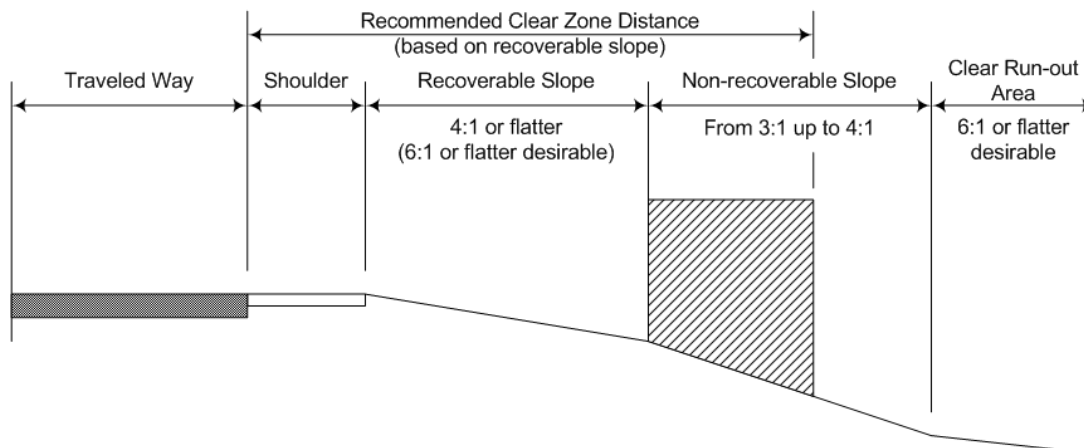


Figure 1 – Variables Affecting the Clear Run-out Area
 (RDG, Figure 3.2)

As Figure 1 shows, when a non-recoverable foreslope is within the recommended clear zone distance, an additional clear run-out area should be provided at the toe of the non-recoverable foreslope. The width of the additional clear run-out area should be greater than or equal to the portion of the recommended clear zone distance that falls on the non-recoverable slope (see cross-hatched area in Figure 1 above).

For many rural roadways, no recoverable slope exists between the shoulder and the beginning of the non-recoverable slope. In such cases, the recommended clear run-out area distance can be determined as follows: Using Table 1 (and if appropriate, Table 2), determine the recommended clear zone distance based on a 6:1 or flatter foreslope. Deduct the shoulder width from this recommended clear zone distance to obtain the recommended clear run-out area distance. The results of this calculation for certain design speeds, traffic volumes, and common shoulder widths are shown in Table 3 below. Clear run-out distances for other shoulder widths may be calculated in a similar manner.

Table 3 – Clear Run-out Area Distance (6:1 or flatter)
 In feet from the toe of a non-recoverable slope which begins at the edge of shoulder

Design Speed (mph)	Design Traffic (ADT)	Shoulder Width (ft)				
		2	4	6	8	10
≤ 40	Under 750	5-8	3-6	1-4	0-2	0
	750-1500	8-10	6-8	4-6	2-4	0-2
	1500-6000	10-12	8-10	6-8	4-6	2-4
	Over 6000	12-14	10-12	8-10	6-8	4-6
45-50	Under 750	8-10	6-8	4-6	2-4	0-2
	750-1500	12-14	10-12	8-10	6-8	4-6
	1500-6000	14-16	12-14	10-12	8-10	6-8
	Over 6000	18-20	16-18	14-16	12-14	10-12
55	Under 750	10-12	8-10	6-8	4-6	2-4
	750-1500	14-16	12-14	10-12	8-10	6-8
	1500-6000	18-20	16-18	14-16	12-14	10-12
	Over 6000	20-22	18-20	16-18	14-16	12-14
60	Under 750	14-16	12-14	10-12	8-10	6-8
	750-1500	18-22	16-20	14-18	12-16	10-14
	1500-6000	24-28	22-26	20-24	18-22	16-20
	Over 6000	28-30*	26-28*	24-26*	22-24	20-22
65-70	Under 750	16-18	14-16	12-14	10-12	8-10
	750-1500	22-24	20-22	18-20	16-18	14-16
	1500-6000	26-30*	24-28*	22-26*	20-24*	18-22*
	Over 6000	28-32*	26-30*	24-28*	22-26*	20-24*

* See note for Table 1.

Clear Zones and Critical Slopes

If a critical slope occurs within the recommended clear zone distance, as per Table 1, the crash history and site conditions should be reviewed to determine if a traffic barrier may be warranted. The RDG provides a generalized recommendation for barrier warrants, as shown in Figure 2 below. This figure is based on studies of relative severity of encroachments on embankments versus impacts with roadside barriers. However, it should be noted that Figure 2 does not account for the probability of encroachment upon the critical slope (i.e., traffic volume) or the cost-effectiveness of installing a barrier (i.e., the potential reduction in crash severity vs. the cost of providing a barrier).

Therefore, even if Figure 2 indicates a barrier may be warranted, if the critical slope is part of a uniform roadway cross section and the crash history of the roadway does not indicate a problem, installation of a traffic barrier may not be warranted. In summary, decisions regarding the use of a critical slope within the recommended clear zone distance should be based on the crash history, site conditions, and good engineering judgment.

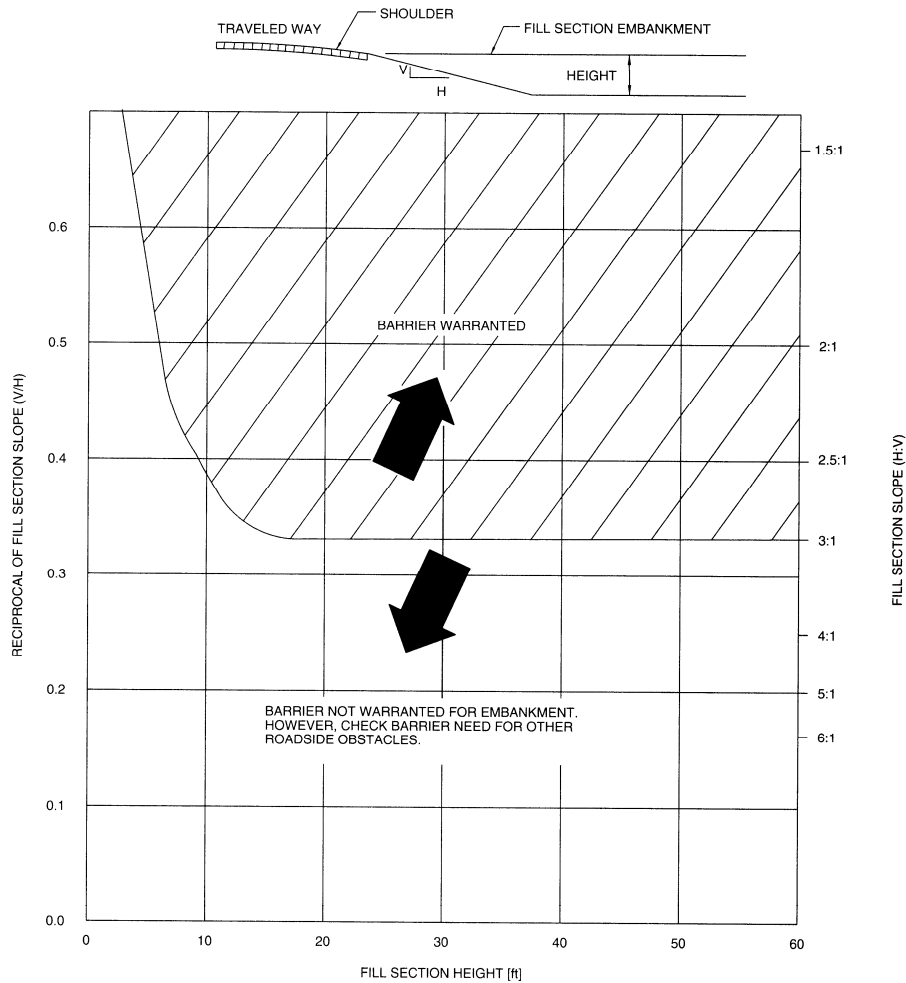


Figure 2 – Comparative Risk Warrants for Embankments
 (RDG, Figure 5.1b)

Use of “Barn Roof” Designs

When right-of-way or environmental impacts make provision of the recommended clear zone difficult, consideration should be given to using a “barn roof” type of roadway section, as shown in Figure 3 below. This type of section uses a relatively flat foreslope, followed by a steeper foreslope which begins outside the recommended clear zone distance. Since the recommended clear zone distance is less for flatter foreslopes, it may be possible to provide the recommended clear zone distance with less right-of-way or environmental impacts than other roadway sections would require.

Figure 3 – Typical Barn Roof Section

