



FEMA

May 13, 2008

MEMORANDUM FOR: Mitigation Division Directors
Regions I - X

A handwritten signature in black ink, appearing to read "Doug Bellomo", written over a horizontal line.

FROM: Doug Bellomo, P.E., Director
Risk Analysis Division

SUBJECT: Procedure Memorandum No. 49 - Revisions to Appendix K
of *Guidelines and Specifications for Flood Hazard
Mapping Partners*

EFFECTIVE DATE: Required for all FY09 study starts. Optional for all
ongoing studies.

Background: The Federal Emergency Management Agency (FEMA) developed the *Guidelines and Specifications for Flood Hazard Mapping Partners (Guidelines)* in February 2002 and updated portions in April 2003. The *Guidelines* define the technical requirements and product specifications for production of flood hazard maps and related Flood Insurance Program (NFIP) products. The *Guidelines* consists of an introduction, three volumes and 14 appendices.

Appendix K of the *Guidelines* sets forth specifications for the graphic elements that are shown on Flood Insurance Rate Maps (FIRMs), including the mapping format representation, presentation of base map information, map frame sizing, legend, title block and notes to user appearance, and presentation of flood hazard information. It also addresses the specifications for the FIRM Map Index, Flood Boundary and Floodway Map (FBFM) Map Index and all Preliminary and Final map deliverables.

Issue: FEMA is taking steps to make the digital flood data the source for all mapping products, including the paper FIRMs. As part of that process, FEMA is revising mapping specifications outlined in Appendix K for the graphical presentation of the FIRMs to be derived from DFIRM information. This will allow FEMA to continue to make paper mapping products available into the future as flood hazard mapping shifts to digital production and distribution processes and tools.

Although FEMA is currently in the process of updating Appendix K of the *Guidelines*, changes to labeling and symbols associated with the format of FIRMs can be implemented immediately in an effort to simplify the production process and achieve cost savings.

Action Taken: The specifications provided in Attachment A supersede the indicated sections of Appendix K of the *Guidelines*. At the effective date of this memorandum,

implementation is optional. Implementation is required for studies started on or after October 1, 2008.

Enclosure: Attachment A

cc: See Distribution List

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ATTACHMENT A

Change No.	General Category	Short Description	Affected Section/Table	Change From	Change To
	Reducing Labeling				
1		Relax requirement to label all roads within 1” of SFHA, and only major roads outside of 1”	K.4.1.2 Transportation Features	See Section K.4.1.2 below	See Section K.4.1.2 below
2		Label political areas, but not lines	K.4.1.2 Political and Cultural Entities and Boundaries	See Section K.4.1.2 below	See Section K.4.1.2 below
3		There is no need to label unnamed road, private drive, etc., unless it appears in the profile.	Table K-9	See Section K.4.1.2 below	See Section K.4.1.2 below
4		Reasonably close symbols for highway shields may be used, such as ESRI symbols	Table K-9	K-9 note: "Font specifications that cannot be matched may be approximated"	"Font specifications that cannot be matched (including symbol shape) may be approximated"
5		Labeling of shaded and unshaded X Zones is no longer required. Zone X must still appear in Legend. Labeling of Zone X future conditions may still apply.	K.4.2.3 and K.4.2.2	See Section K.4.2.3 below	See Section K.4.2.3 below

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6		Clarification of Limit rules and labeling.	K.4.2.7	See Section K.4.2.7 below	See Section K.4.2.7 below
7		Incorporate FIRM Text Placement Guide (9/2006)	Should be done in future revisions to Appendix K		
	Simplify or eliminate leader line requirements				
8		Leader for X zone (removed since they're no longer labeled)	K.2.4.3	Last Paragraph of K.4.2.3	Remove last paragraph
9		Eliminate dot and arrow (plain line OK)	Table K-16	Row 19-20	Remove Row 19-20
10		Leader only as necessary	K-52; K-59 (0.1" BFE rule)		
11		BFE Leader Line 0.1" rule	K.4.2.4	See Section K.4.2.4 below	See Section K.4.2.4 below
	Font Specification				
12		Allow approximation in font sizes and symbol shapes	Tables K-1 to K-19 and K-21 to K-22	"Font specifications that cannot be matched may be approximated"	"Font and symbol specifications, including size, may be approximated"

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	Line Symbols				
13		Eliminate culvert wing wall graphics	Table K-11	The culvert symbol	The angled wing ties are no longer required by the culvert.
14		Limit of Floodway Line is no longer necessary	K-16, Row 12	Row 12	Remove Row 12, limit of floodway symbolization
	Cross Sections				
15		Hexagon may be made smaller in crowded areas at the discretion of the mapping partner	K-65	Existing Symbol	Addressed by font specification change 13
16		Add new sentence at the end of section	K.4.2.6	See Section K.4.2.6 below	See Section K.4.2.6 below
17		Remove prescription for cross section feet (tick in Table K-16, line 17)	Table K-16	Foot 0.1”	(Remove text)
18		Remove transparency and orientation requirements from hexagons	K.4.2.6	See Section K.4.2.6 below	See Section K.4.2.6 below
19		At the request of a community and with the approval of the Project Officer, cross sections may also be labeled numerically (i.e. stream stationing).	K.4.2.6	See Section K.4.2.6 below	See Section K.4.2.6 below

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	Base Features				
20		Eliminate extra base info (forests, parks, etc.)	K.4.1.2	See Section K.4.1.2 below	See Section K.4.1.2 below
21		Labeling over transportation features OK with halo	K.4.1.2 Base Map Features	See Section K.4.1.2 below	See Section K.4.1.2 below
22		Legend placement is offered as an alternative to labeling culvert and bridge features	Table K-9, column 2 ("feature"), Rows 13 to 15 (the bridges)	Keep current text	Add "Instead of labeling, feature may be added to legend".
23		Require inclusion in legend for features not labeled in map	K.5	See Section K.5 below	See Section K.5 below
24			Table K-11, column 2 ("feature"), Row 1 (culvert, etc.)	Keep current text	Add "Instead of labeling, feature may be added to legend".

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K.4.1.2 Base Map Features

The following are the types of base map features that the assigned Mapping Partner shall depict on the FIRM if they occur within the community:

- Transportation features, including roads, railroads, and airports shall be depicted. If digital orthophotos are supplied, these features must be clearly visible. Bridges that are included in the hydraulic models shall be included on the FIRM. Unimproved roads or trails (i.e., those travel ways not intended for motorized vehicles or not usually used by motorized vehicles due to width or seasonal conditions) may be included, particularly if they cross the floodplains.
- Hydrographic features (e.g., streams, rivers, lakes, shorelines) shall be depicted.
- Hydraulic structures (e.g., levees, dams, weirs, floodwalls, jetties) shall be depicted.
- NGS bench marks shall be depicted.
- Political and other boundaries that identify county and state boundaries, corporate limits, extraterritorial jurisdictional areas, military lands, and Native American lands.
- U.S. Public Land Survey System (PLSS) features, also known as range, township, and section lines, and their designators, shall be depicted. Graphic and usage specifications for other horizontal reference grid systems are also included here.
- Significant land forms shall be depicted.
- Other features and notes shall be depicted.
- The features listed above may include names and/or labels; refer to subsections below for detailed specifications.

The assigned Mapping Partner shall separately symbolize base map features that are not clearly visible on the orthophoto due to their location within a floodplain. For example, a dam symbol should be outlined if it is not visible on the orthophoto or if other floodplain features obscure it.

The assigned Mapping Partner shall derive base map feature names from community-supplied files or hardcopy sources, current FIRM panels, U.S. Census Bureau Topologically Integrated Geographic Encoding and Reference System files, and/or other sources. All feature names that are available in digital format shall be shown on the FIRM. All feature labels on

orthophotobased FIRMs shall be shown as black text with a white halo around the letters to enable the names to be clearly read against the intensity of the background image. Feature labels on vector-based FIRMs shall be shown as black text. Further graphic specifications are provided in the tables below, with separate paragraphs emphasizing information of particular importance.

Please note that the tables throughout this section contain specifications for orthophoto and vector base maps. In general, the vector-based examples also apply to FIRMs that are produced manually. Specific exceptions are individually noted. In general, bold type fonts surrounded by a white halo are used on orthophoto-based FIRMs. Medium type fonts are used on vector-based FIRMs where the background allows them to show more clearly. All base map features and labels are shown on the FIRM in black unless otherwise noted.

Transportation Features

Any road shown and labeled on a Flood Profile shall be labeled on the map. As many named roads as possible should be labeled inside of and within one inch of an SFHA. Primary and major roads farther than one inch from an SFHA shall be labeled. Communities should be encouraged to provide road labels beyond these stated minimums. Community supplied labels shall be shown on the FIRM, provided they meet the text placement standards and do not render the map unusable due to excessive clutter.

Road name labels shall be placed parallel to the road and spaced so that there is no more than one-half inch between each word in the road name. Additional road name labels shall be added for roads that traverse entire FIRM panels, or as necessary for clarity.

All railroads that traverse the community's mapped area shall be labeled. When available, the formal name taken from the sources defined above is to be used. The name shall be placed along the feature when feasible or leadered, if space is limited. If space is limited, a label may be placed over a transportation feature as long as the feature is still recognizable and the label is haloed. If several different names for the same feature are available and would cause clutter and/or confusion, the generic term "Railroad" shall be used. If the generic name option is used, the formal name shown on the unrevised flood profiles shall not be changed. Specifications for the depiction of transportation features on base maps are provided in Table K-9.

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Hydraulic Structures

Hydraulic structures including dams, weirs, culverts and bridges in identified detailed floodplains shall be labeled if the structure is shown on the profile. In addition, levees and floodwalls shall be labeled if a levee symbol is shown. The labels shall be placed near the structure and leadered in as appropriate. If no official name for the structure is available, the

appropriate feature symbol and a label identifying the structure type (e.g., levee) shall be added. Culverts, flumes, penstocks, and aqueducts need not be labeled, but if they are not labeled in the map body, the structure shall appear in the legend and identified by type. Specifications for the depiction of hydraulic structures are presented in Table K-11.

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Political and Cultural Entities and Boundaries

All political and cultural entities shall be labeled as described below. The Mapping Partner should use leader lines as appropriate to reduce clutter. The area should be labeled in accordance with the guidance below.

Political entities (incorporated areas, unincorporated areas, Extraterritorial Jurisdictions, Areas Not Included, etc.) shall be labeled with the appropriate jurisdiction names and CIDs or area designator, placed near the center of the jurisdiction, if possible. For incorporated communities, the community type shall be followed by the name of the community (e.g., City of Smithville), and the CID centered immediately under the community name. For unincorporated county areas, the county name should be shown with “Unincorporated Areas” beneath it and the county CID should be centered immediately under that label.

On single-jurisdiction FIRMs, the appropriate entity name shall be placed in each corporate area. For single-jurisdiction studies that span multiple counties, the county must be labeled on the boundary or in the area.

On countywide FIRMs, corporate areas shall be labeled with the appropriate jurisdiction name. If a multiple-county community is shown in its entirety on a countywide FIRM, both counties should be clearly and unambiguously labeled. If the boundary is also a state boundary, the state names shall be shown as well.

When Extraterritorial Jurisdictional (ETJ) areas are significant for the purposes of the NFIP, they shall be shown on the FIRM. The ETJ area shall be labeled with the community name, followed by the words “Extraterritorial Jurisdiction,” and the CID number of the community exercising its extraterritorial jurisdiction authority. ETJ boundaries shall be labeled on the ETJ side of the boundary with “[*Community Name*] Extraterritorial Jurisdiction Limits.” If there are space constraints, the label may be shortened to “[*Community Name*] ETJ Limits.”

Any area shown as an “Area Not Included” shall be labeled with the appropriate jurisdiction name and “Area Not Included” centered within the area. Flood hazard information shall not be depicted in these areas. In addition, orthophoto-based FIRMs shall not show labels for planimetric features; vector-based FIRMs shall not show base map information of any kind in an Area Not Included. An exception occurs when a flooding source studied in detail passes through the area, in which case the stream centerline or shoreline shall be shown. The Area Not Included boundary shall not be labeled. For additional information on depicting Areas Not Included, see Subsection K.1.6.

Military lands and Native American lands shall be labeled with the official name at least once. If the area is large, additional labels should be added as needed.

When boundaries of different types are coincident with each other or with base map features, the Mapping Partner shall show only one, with preference given as follows (presented from highest to lowest priority):

1. Political boundary
2. Coastal Barrier boundary
3. Flood insurance risk zone boundary
4. Other boundaries
5. Base map feature

In general, the heaviest or widest line is most prominent. For example, if a corporate boundary, a road, and a flood hazard zone boundary are coincident, only the corporate boundary is to be shown. Jurisdiction and military boundary specifications are provided in Table K-13.

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K.4.2.3 Zone Labels

All zone areas except Zone X (shaded and unshaded) shall be labeled at least once with their appropriate flood zone and static elevation or depth, if appropriate. Zone labels should be repeated as necessary for clarity in large or complicated areas. Zone X shall still be labeled in areas where it represents future conditions (see K.4.2.2).

In the 1-percent-annual-chance floodplains, the floodway fringe areas should not be considered separate areas requiring labels. One zone label should be sufficient for both the regulatory floodway and the floodway fringe.

K.4.2.4 Base Flood Elevations

BFEs of increasing elevation values shall be shown in floodplains as wavy lines perpendicular to the flow of the 1-percent-annual-chance flood. All BFEs should be labeled with an elevation value that is located above, below, or at the end of the line (i.e., where it meets the 1-percent-annual-chance floodplain boundary). The Mapping Partner should use leader lines as appropriate to reduce clutter. BFEs in floodplains with uniform elevations shall be shown as static (single) values. The value shall be placed below the zone label.

The basic intent of plotting BFEs on a FIRM is to represent the Flood Profile to within 0.5 foot of elevation tolerance. If BFEs are plotted correctly, the FIRM can be used to recreate the flood profile within 0.5 foot. Refer to Appendix C, Subsection C.6.3 for further guidance on BFE plotting.

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K.4.2.6 Cross-Section Labeling

Cross sections for each stream studied by detailed methods shall be labeled alphabetically from the downstream to the upstream limit of the study. With the approval of the Project Officer, cross sections may also be labeled numerically, such as by stream station. The typical numbering sequence is from the downstream to the upstream limit of study using the stream distance value at that location. Cross sections shall be labeled on the map with a hexagon at each end of the cross-section line. If there is not enough space to add a hexagon on each end, a hexagon may be placed on only one end. .

Cross-section lines shall cross the entire floodplain (past the limits of the 0.2-percent-annual-chance whenever possible). If the cross-section line cannot exit either side of the floodplain on the panel, the hexagon should be placed in the middle of the cross-section line and the line removed behind the hexagon. All graphic adjustments to cross sections shall remain separate from modeled cross-section locations that are stored in the FIRM GIS files.

Hexagon may be made smaller in crowded areas at the discretion of the mapping partner.

K.4.2.7 Limit of Detailed Study and Limit of Study

Limit of Detailed Study lines shall be placed at the beginning and at the end (terminus) of flow of every area studied by detailed methods. It shall be depicted as a thin, blue (orthophoto base) or black (vector base) line when it is the terminus of the detailed study and there is no approximate study area defined beyond it. A Limit of Detailed Study shall be depicted as a thick, white line when it divides a detailed study area from an approximate study area.

Limit of Study lines and labels should be used whenever the study (approximate or detailed) ends abruptly and has no corresponding Flood Profile. This situation occurs most often along streams studied by approximate methods but can also occur on backwater arms of detailed studied streams.

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K.5 Map Legend

The map legend shall contain those items that are needed to assist the map user in interpreting map symbols, flood hazard screens, linework, flood hazard zone information, and other data within the body of the map. Planimetric data (such as railroads and political boundaries) shall not be included in the FIRM legend unless it is symbolized and not labeled in the map body.