

The Floodway

Regulatory Floodway Definition

The “regulatory floodway” is defined as:

“the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.”

Floodway Designation

NFIP communities must designate a floodway that causes no more than a 1 foot increase in flood stage at any point in the community. Some states have more restrictive standards and FEMA will map floodways to those standards.

FEMA will develop a floodway for a community as part of a Flood Insurance Study. Floodways are usually shown on the community's Flood Insurance Rate Map (FIRM), but for many older studies a separate Flood Boundary and Floodway Map (FBFM) was published. Although communities can develop their own floodway, most adopt the floodway shown on the FIRM.

Floodways are designated by FEMA using the hydraulic computer model used to determine the base flood elevations (usually HEC-2 or HEC-RAS).

- The computer in effect squeezes the floodplain by progressively removing equal amounts of conveyance at the ends of each cross section until the allowable one foot surcharge is reached at one of the cross sections.
- This becomes the floodway placed on the FIRM and provided to the community.

Floodway Purpose

The primary purpose of the floodway is to preserve a portion of the floodplain to convey floodwaters from upstream to downstream.

If the floodway is obstructed by fill or buildings, flood elevations will increase upstream of the obstruction increasing flood damages to existing properties.

Designation of a floodway allows for part of the floodplain to be developed while at the same time preserving the ability of the floodplain to convey flood discharges.

- The allowable one foot rise in flood stage is a compromise intended to balance the rights of the property owner to develop their property against the need to protect adjacent and upstream property owners from increased flood heights and increased flood damages.
- If FEMA did not allow for some increase in flood stage when designating a floodway, the most of the floodplain would be floodway and development in the floodplain would be severely limited.

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Legal Basis for Floodways

- Floodway requirements are intended to prevent the actions of one property owner from causing increased flood damages to adjoining and upstream property owners.
- For this reason floodway requirements have been upheld in the courts as an appropriate use of the community's police powers even when they severely restrict the use of a particular property.
- NFIP floodway requirements are performance standards. They do not prohibit development in the floodway, but the applicant must be able to meet the performance standard – that there not be any increase in flood stage.

After adopting a floodway, a community must:

“prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the encroachment would not result in any increase in flood levels during the occurrence of the base flood discharge.”

The community is responsible to demonstrate through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the encroachment would not result in any increase in flood levels during the occurrence of the base flood discharge. A few communities perform the analysis themselves, but most require that the applicant hire a registered professional engineer to perform the analysis and submit what is commonly called a “no-rise certification”.

Variances

If a permit applicant requests a variance to allow for development in the floodway that would cause an increase in flood stage, the variance request must be denied. NFIP variance criteria at 44 CFR 60.6(a)(1) specifically prohibit the issuance of variances by communities for development in a floodway that increases flood levels during the base flood.

Meaning of “Any Increase”

- “Any increase” means a zero increase (0.00 feet). If you do not limit the increase to zero, the small increases in flood heights from individual developments can cumulatively have significant impacts on upstream flood elevations and flood damages.
- The hydraulic analysis must use the same model used for the current Flood Insurance Study if it is available.
- The increase is measured by comparing the base flood elevation in the current model with the base flood elevation that would result from the proposed development in the floodway.

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Meeting the “No-Rise” Requirement

Generally any development in the floodway can be expected to cause an increase in flood stage. The easiest and best way to meet the “no-rise” requirement is to design or modify the development so that no obstructions are placed in the floodway.

Other ways to meet the “no-rise” requirement include:

- Replacing an existing building, bridge or culvert with a same size building, bridge or culvert at the exact same location.
- Spanning the floodway.
- Demonstrating that there will be no-rise in flood stage through a hydraulic study.
- Compensating for any rise by modifying the floodway to replace the lost flood conveyance.

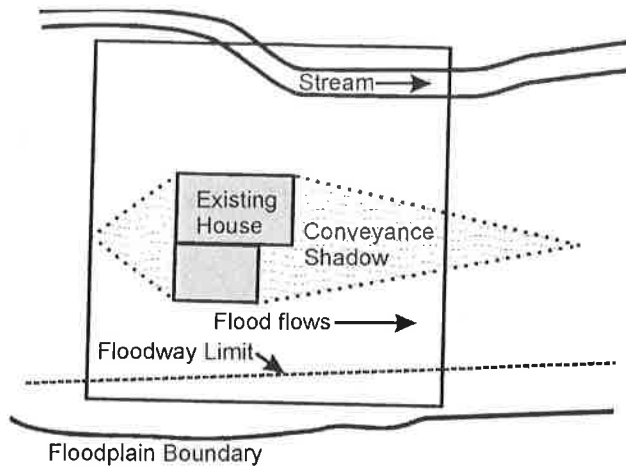
Before floodway boundaries can be changed, a community must apply for and obtain a floodway revision from FEMA through the LOMR process.

Hydraulic Analyses Of Minor Projects

There are some projects within the floodway that will require permits, but may be allowed without a hydraulic analysis once the community determines that they are not an obstruction to floodwaters. Examples are:

- Projects that do not increase the natural grade, such as the paving of driveway construction of driveway or parking area at the existing grade.
- Minor projects that probably will not increase flood stages. For example, small isolated obstructions such as a mailbox, a pitchers mound, or a single telephone pole can be permitted without requiring a no-rise certification. There is almost no likelihood that these very small obstructions by themselves or in combination could increase flood stages.
- Light duty fences such as barbed wire or chain link fences that are likely to be knocked over by floodwaters and debris long before flood heights approach the elevation of the base flood. (For fences, satisfy yourself that the fence will bend over or break away in floods less than the base flood. Consider using shallow embedments for fence posts. More substantial fences such as solid wood privacy fences on small streams may obstruct flood flows and will need to be evaluated.)
- Development that is in the “hydraulic shadow” or “conveyance shadow” of high ground or another obstruction.
 - Building additions or small accessory structures built entirely within the conveyance shadow can be permitted without the engineering analysis needed for a no-rise certification.
 - The conveyance shadow includes the areas immediately upstream and downstream of an existing building or other obstruction. Flood waters are already flowing around the existing obstruction so that the new development will not affect the existing flood flows.

Meeting the “No-Rise” Requirement (Continued)



Upstream of the existing obstruction: draw lines at a 1:1 ratio.

Downstream: draw lines at a 4:1 ratio

If in doubt, require that the permit applicant obtain the services of a registered professional engineer to conduct a no-rise analysis.

No-Rise Analysis and Certification

Most communities require that the permit applicant hire a registered professional engineer to perform the no-rise analysis and submit a no-rise certification. The study must be consistent with the technical criteria contained in *Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix C Detailed Hydraulic Analyses* (FEMA, April 2003).

The hydraulic analysis is done as follows:

- The engineer obtains a copy of the model used to develop the current floodway from FEMA. For information on how to obtain copies of the effective model see FEMA's Internet site.
- The engineer duplicates the results of the effective model (called the Duplicative Effective Model).
- The engineer makes any corrections to the effective model that are necessary such as adding cross sections at the site of the proposed development and to reflect better topographic information (called the Existing Conditions Model).
- The engineer modifies the Existing Conditions model to reflect the proposed development at the new cross sections while retaining the currently adopted floodway widths (called the Proposed Conditions Model).
- The engineer compares the results of the Existing Conditions Model and the Proposed Conditions Model to determine if there will be an increase in elevation of the base flood or floodway elevations at any existing or new cross section.

If there will not be an increase in either of the elevations, the engineer can prepare and submit the no-rise certification and the supporting technical documentation to the community.

If there will be an increase, the development will have to be redesigned to avoid the floodway, compensation provided for the loss of conveyance, or there will need to be a floodway revision.

Meeting the “No-Rise” Requirement (Continued)

Some communities require that the no-rise certification be submitted on a form. The no-rise certification must be accompanied by documentation to support the finding, including the results of the hydraulic study.

Reviewing a No-Rise Certification

It is the community’s responsibility to demonstrate that development in the floodway will not cause any increase in flood stage. You cannot depend solely on the engineer’s no-rise certification and must review and approve the submission.

Make sure that:

- The registered professional engineer is experienced in conducting hydrologic and hydraulic studies.
- The analysis is conducted using the hydraulic model that was used to develop the floodway if it is still available.
- The analysis is consistent with basic hydraulic principles. For example there needs to be smooth transitions in flood flows between cross sections.
- If the development is located between existing cross sections, additional cross sections must have been surveyed at the site of the development to accurately model the impacts of the development.
- The analysis does not include unrealistic land use or hydraulic assumptions. For example if the analysis changes the roughness coefficients used in the original Flood Insurance Study, the new roughness coefficients must reflect what is actually on the ground.
- There will be no cumulative impacts if other property owners undertake similar developments. It is important that there really is no increase in flood stage due to the development.
- If the no-rise analysis depends on adding additional flow areas to compensate for the impacts of an encroachment, ensure that the flow area will be available in perpetuity and that the floodwaters can get to and use that flow area. You will want to require the applicant to apply for a floodway revision and adopt the revised floodway as part of your ordinance.

If in doubt seek technical assistance to help you review the analysis. If you have a city or county engineering department or contract out for those services, try to develop your own in-house engineering capability to review these analyses. Other sources of assistance can include a flood control or water management district, your NFIP State coordinator’s office, or your FEMA Regional Office.

Generally, you must maintain documentation in your files of the hydraulic analysis, the no-rise certification, and your determination indefinitely. FEMA or your State will ask to see the documentation on your next Community Assistance Visit (CAV) and you will need the documentation if your floodway is ever revised.

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Encroachment Requirements for Rivers and Streams Without Floodways

An encroachment analysis is also required for development in the floodplains of rivers and streams where FEMA has provided communities with base flood elevations, but not a floodway. These studies are generally conducted in less populated areas where it is difficult to justify the expense of conducting an engineering study that would conduct a floodway.

Communities must:

Require until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted...unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface of the base flood by more than one foot at any point in the community.” 44 CFR 60.3(c)(10)

This requirement is essentially the same as the NFIP floodway requirement that allows for up to one foot increase in flood stage. The difference is that the hydraulic analysis is being done on a case by case basis for each development proposal rather than for an entire river or stream.

Ways to Meet the 60.3(c)(10) Requirement

The cost of performing a hydraulic analysis for a small development such as a single home is a concern.

- The costs of this analysis must be considered as part of the cost of developing in the floodplain.
- The potential adverse impacts of development in the floodplain on upstream and adjacent property owners can be significant and must be evaluated before the development is allowed to occur.

Ways a community can avoid or minimize these costs include:

- **Stay out of the floodplain entirely.** Usually studies without floodways are conducted in rural areas or less densely populated areas where parcels are large and there is a choice of building sites.
- **Limit development to backwater areas.** It may be possible to limit the development to backwater areas that are not effective flow areas. A qualified engineer can apply basic hydraulic principles to identify these areas.
- **Establish setbacks:** Your community may be able to develop a standard setback or an algorithm for establishing setbacks along smaller streams in your community that would serve the same purpose as 44 CFR 60.3(c)(10). You may already have adopted a setback to preserve a natural stream buffer to protect water quality.
 - Back-up up your setback or algorithm with engineering calculations to show that development will cause no more than a one foot rise in flood stage.
 - Be conservative.
 - Test the setback or algorithm on a reasonable number of cross-sections given the variety of stream conditions in your community. If you choose this alternative, check with your State or Regional Office first.

Encroachment Requirements for Rivers and Streams Without Floodways (Continued)

If you adopt either the second or third alternative and feel that permit applicants may challenge your setbacks or other requirements, you can always allow the applicant the option of hiring an engineer and submitting a (c)(10) analysis if they disagree.

Performing a 60.3(c)(10) Encroachment Analysis

If these alternatives are not feasible, you will have to conduct a hydraulic study to demonstrate that the development will cause no more than a one foot increase in the water surface elevation of the base flood at any point in the community. Again, some states or communities perform these analyses, but most communities require that the permit applicant hire a qualified registered professional engineer to perform the hydraulic study and certify that the development.

- The study must demonstrate that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface of the base flood by more than one foot at any point in the community.
- The study must be consistent with the technical criteria contained in *Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix C Detailed Hydraulic Analyses* (FEMA, April 2003).
- The study must assess the cumulative effects of the proposed development, when combined with all existing and anticipated development. The study must extend upstream and downstream from the development for enough to capture all of these cumulative effects.

It is particularly important that you treat all property owners equally – you must evaluate the development as if the property owners upstream and downstream and across from the proposed development encroached equally into the floodplain (called equal degree of encroachment). You must also keep records to ensure that you take into account past development when analyzing proposals for future development.

Maintain documentation in your files of the hydraulic analysis, the certification by the engineer that there will be no more than a one foot rise in flood stage, and your determination indefinitely. FEMA or your State will ask to see the documentation on your next Community Assistance Visit (CAV) and you will need the documentation if there are other proposals to develop in the floodplain along this reach of stream.

Obtaining a Floodway Revision

You must apply for and obtain a floodway revision from FEMA any time you want to make a change in the FEMA-designated floodway boundaries even if the change is so small that it would not be visible on your FIRM. Applicants for floodway revisions usually want to narrow the width of the floodway or shift the location or alignment of the floodway to allow for a development.

Requests for floodway revisions must come from the community. It is your floodway that you have legally adopted as part of your floodplain management ordinance. Remember that when you revise a floodway boundary, you may impact on other property owners in your community. You are not obligated to revise your floodway merely because a permit applicant can demonstrate that it is possible to narrow the floodway or change the floodway alignment.

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Obtaining a Floodway Revision (Continued)

Procedures for obtaining a floodway revision can be found in NFIP regulations at 44 CFR 65.7 *Floodway Revisions*. Applications for floodway revisions are submitted using FEMA's MT-2 Forms. The MT-2 Forms and the accompanying instructions can be downloaded from FEMA's web site. For further information see the MT-2 Forms and Instructions.

Development Proposals that Exceed the One Foot Standard

There are limited situations where it may be necessary to allow development in the floodway or the floodplain that would result in increases in the base flood elevation greater than that generally allowed by NFIP minimum criteria. This could include:

- A proposal for development in the floodway that would cause an increase in the base flood elevation.
- A request for a revision to floodway boundaries that would result in a floodway that would result in greater than the allowable one foot surcharge.
- A proposal for development in a floodplain where no floodway has been designated that would cause greater than a one foot increase in flood stage.

Generally this type of development is discouraged. Designation of the floodway can already cause up to a one foot increase in flood stage and even this one foot increase can substantially increase upstream flood damages.

There are situations where may be in the public interest to allow this development if no existing buildings are impacted and future buildings are elevated or floodproofed to the new base flood elevations. Examples include:

- Construction or increase in height of a dam or other water control structure particularly when it would reduce overall flood damages.
- Construction or replacement of roads or bridges that cross the floodplain. In situations where no existing development is impacted by the increase in flood stage there may be considerable cost savings in building a bridge with a smaller waterway opening.
- Other developments that have a net public benefit where there are no practicable alternatives that would comply with the community's floodplain management requirements.

A FIRM revision will be required to reflect any increase in base flood elevations due to the development. A floodway revision is required if there is a change in floodway boundaries.

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Development Proposals that Exceed the One Foot Standard (Continued)

A community may allow this type of development only if it applies for and obtains a conditional FIRM and floodway revision and meets specific requirements in Section 65.12. The community must:

- Evaluate alternatives to the development that would meet the requirements of 60.3(c)(10) or (d)(3) and demonstrate that these alternatives are not feasible.
- Provide individual notice to each property owner explaining the impact of the proposed action on their property.
- Obtain concurrence of the Chief Executive Officer of any other community impacted by the proposed action.
- Certify that no structures would be impacted by the increased base flood elevations.
- Once the community obtains approval of the FIRM and floodway revision, it must adopt the higher base flood elevations and revised floodway prior to permitting the development.

Guidance for meeting the requirements of Section 65.12 can be found in the MT-2 Forms and Instructions.

