

APPENDIX F  
FLOODPLAIN MANAGEMENT  
USING APPROXIMATE STUDIES

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## ***Approximate Study Areas***

Approximate floodplain areas are those areas not studied by the detailed hydrologic/hydraulic methods during the FIS. These areas are shown as “unnumbered A zones” on the FIRM and “approximate 100-year flood zones” on the FBFM. The FIS will not contain specific 100-year flood elevations for approximate study areas nor will there be a floodway/fringe designation on the FBFM.

Often only a portion of the streams and other bodies of water in a community are studied by detailed methods during an FIS. For those areas not studied, the approximate flood elevation shown on the FBFM are usually transferred directly onto the FIRM. The FIS contractor may have performed limited field and data review of these areas and revised the delineation as appropriate.

With any development proposal, the local administrator must determine whether the proposed activity is located within a designated floodplain. The first step in making this determination would be to locate the proposed development on the community’s FIRM.

There will, undoubtedly, be borderline situations where the development is not clearly in, or out, of the approximate floodplain. There may also be situations where the approximate floodplain boundary does not appear reasonable. In these situations, the administrator should make a good faith effort in reviewing all available data prior to reaching a decision. Neither the North Carolina Division of Emergency Management (DEM) state NFIP coordinating agency, nor FEMA will second guess the local administrator who makes a reasonable approximate floodplain boundary determination based on historic flood data, site inspection, soils mapping, or other approximate data.

## ***Determining Base Flood Elevations***

An important step in the permitting process is determining a base flood elevation (BFE) at a site. This task is considerably more difficult in an approximate A-Zone.

The following is a list of acceptable methods that DEM and the Federal Emergency Management Agency (FEMA) recommend as best for determining the elevations for regulation of development in A-Zones that have no published BFEs.

- If the stream forms a boundary between two communities, the community on the other side of the stream may have a detailed study. The base flood data for the stream is valid for both sides of the stream or body of water.

- Check with the U.S. Army Corps of Engineers (USACE), U.S. Department of Agriculture/Natural Resources Conservation Service (USDA/NRCS), or U.S. Geological Survey (USGS) and ask if they have knowledge of any base flood elevation reports, other unpublished reports, or any data that may be of assistance for the stream in question.
- If the property is along a stream that is near any state highway structures such as bridges or culverts, the North Carolina Department of Transportation (DOT) may sometimes have done a study to properly size the structure. This does not typically work for older structures, but on many newer facilities the DOT has made an effort to size the structure to meet a certain standard.
- Compare the shaded area of the Flood Insurance Rate Map (FIRM) with the contours on a USGS quadrangle map and determine which contour best approximates the boundary of the shaded area. Use that contour and the elevation as the regulatory flood elevation.
- Use historical records or the flood of record. This approach may also be helpful in trying to determine which contour on the shaded area of the USGS map best fits the shaded area of the FIRM map.
- If no flood elevation data are available, then require that the building be elevated or floodproofed to a reasonable level based upon any recent or past flood experienced in the area. It is recommended that the lowest floor or floodproofing level be set one foot above the experienced flood events.
- When BFE data are not available and cannot be determined using any of the above methods, the lowest floor of the structure, including the basement, shall be elevated to at least two feet above the highest adjacent grade (three feet is recommended).
- FEMA has developed a software program that enables a community to determine a BFE using a simplified shortcut to the backwater program. This new program, Quick-2, is available through the North Carolina DEM. This program does involve a minimum of computer skills and some basic cross section information.

## ***Documentation***

Whatever method is used in the determination of a flood elevation for an unnumbered A-Zone, **always** document on the permit application where the determination came from. It is also advisable to write the source on the FIRM or Flood Hazard Boundary Map (FHBM) that is used in the administration of the ordinance. Consistency is extremely important when working with unnumbered A-Zones.

## ***Requirements for Large Developments***

NFIP regulations require that “all new subdivision proposals and other developments (including proposals for manufactured home parks and subdivisions) greater than 50 lots or 5 acres, whichever is the lesser, include within such proposals base flood elevation data.” The developer must obtain a BFE which reflects the actual field conditions or must obtain the services of a hydrologist or professional engineer to compute the BFE. The project must be designed to the BFE in accordance with NFIP criteria.

### ***Additional Guidance***

The following additional guidance on “Regulating Development in Unnumbered A-Zones” is an excerpt from *Local Administrator’s Handbook for Floodplain Management*, prepared by the North Carolina Division of Emergency Management. It is followed by selected pages from a recent FEMA document *Managing Floodplain Development in Approximate Zone A Areas: A Guide for Obtaining and Developing Base (100-Year) Flood Elevations*. It is recommended that the administrator and other officials obtain a copy of this document through the Division of Emergency Management or the FEMA Region IV office. It includes the Quick-2 disk for computation of flood elevations referred to above.

Excerpt from *Local Administrator's Handbook for Floodplain Management*

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REGULATING DEVELOPMENT  
IN UNNUMBERED A ZONES

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**1. Try to obtain a Base Flood Elevation (BFE):**

- A. Detailed study for a large development, complete with BFEs and floodways.
- B. Scientific estimate obtained via standard engineering methodologies, perhaps prepared by the Water Management District, County, Soil Conservation Service, etc.
- C. Estimate obtained by comparing FIRM with accurate topographic maps, and utilizing the highest contour line touched by the boundary of the SFHA as the BFE.
- D. Historic high water marks.

**2. Building Elevation Requirements:**

- A. *When a BFE is available or estimated:* If a BFE is obtained, the lowest floor as well as mechanical and electrical equipment must be elevated to or above the estimated BFE.
- B. *When a BFE is not available:* If you can't obtain a BFE, the floor level as well as mechanical and electrical equipment must be elevated at least two (2) feet above highest adjacent natural grade. (FEMA recommends at least three (3) feet.)

NOTE: if this level is below observable high water marks on nearby trees, elevate at least one foot above those marks.

**3. Building Construction Standards:** All other AE and A1-99 Zone construction standards apply.

**4. Elevation Certificates:** Elevation Certificates (EC) are required. If an estimated BFE is

used, a registered land surveyor must prepare the EC. If no estimated BFE is available, the Building Official may complete the EC since the measurement is from ground level, not from NGVD.

When a BFE has been estimated, it must be noted on the EC and a copy of a letter from the community or FEMA confirming the estimated BFE should be attached. The EC must provide the actual elevation of the reference floor above mean sea level, not distance above grade.

When there is no BFE, the EC must provide the distance from the reference floor to “highest adjacent grade.” This is the highest **natural** grade, immediately adjacent to the building, **prior to construction**. If the structure is slab-on-grade on a fill pad, the highest adjacent grade is **beneath the fill**. This distance can be determined from the grading and fill information filed with the building plans and/or by using a hand soil bore to obtain a core of soil from alongside the structure. A practical alternative to locate the highest natural grade adjoining the base of the fill pad out away from the house. The distance from the top of the core to the original soil level can be measured and placed on the EC. Highest grade is **not** the top of the fill pad.

Flood insurance rates are based on actuarial risk. Rates are lower when a BFE has been established or estimated in an “A” Zone. When no BFE is estimated or available, the rates are based on distance above highest adjacent grade. The higher above grade, the lower the rates. Houses raised on fill will be inadvertently penalized if the top of the fill pad is used as highest grade, rather than the original natural grade.

5. **Requirement for Detailed Flood Studies:** If any proposed development is larger than 5 acres, or has more than 50 lots, and any portion of the project impacts an unnumbered A-Zone, the developer is required to have a detailed engineering study and topographic survey prepared to develop a BFE and identify its boundary on the project site. This study must be provided to FEMA via a free Letter of Map Revision (LOMR). If the floodplain boundaries are proposed to be changed as a result of filling for building sites, a “Conditional” LOMR must be filed, for which fees are assessed. These provisions apply to subdivisions as well as other developments such as roads, shopping centers, apartments, landfills, industrial plants, etc.

## BASE FLOOD ELEVATIONS IN ZONE A AREAS

### Background Information

Community Name: \_\_\_\_\_, North Carolina Community NFIP #: \_\_\_\_\_  
 Panel #: \_\_\_\_\_ FIRM Date: \_\_\_\_\_ Project Identifier: \_\_\_\_\_

### Approach Used to Develop the Base Flood Elevation (BFE)

#### EXISTING DATA

	Available	Not Available	Did Not Check
FEMA	[ ]	[ ]	[ ]
Federal	[ ]	[ ]	[ ]
State	[ ]	[ ]	[ ]
Other	[ ]	[ ]	[ ]

SIMPLIFIED      Contour Interpolation      [ ]      Data Extrapolation      [ ]

#### DETAILED

*Hydraulics*      Normal Depth [ ]      Weir Flow [ ]      Culvert Flow [ ]  
 Other

*Hydrology*      Regression Equations [ ]      Rational Formula [ ]  
 Discharge-Drainage [ ]      TR-55 [ ]  
 Other

*Topography*      Topographic Map [ ]      or      Field Survey [ ]

Map Scale: 1" = \_\_\_\_'      Contour Interval: \_\_\_\_'  
 Field Survey tied to Datum?      YES      NO      N/A  
 Datum:      NGVD 1929 [ ]      Other  
 # Cross-Sections [ ]      Length of Stream \_\_\_\_\_ ft.

### Results

BFE or Depth of 100-year Flood      \_\_\_\_\_

First Flood Elevation or Depth      \_\_\_\_\_

Lowest Adjacent Grade to Structure      \_\_\_\_\_

Lowest Grade on Entire Property      \_\_\_\_\_

***Excerpt from Managing Floodplain Development in Approximate  
Zone A Areas: A Guide for Obtaining and Developing Base (100-  
Year) Flood Elevations***