# APPENDIX E

Excerpts from unpublished

## *Local Administrator's Handbook for Floodplain Management*

North Carolina Division of Emergency Management


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# INTRODUCTION

The requirement that each NFIP participating community enact and enforce a floodplain management ordinance thrusts people from a variety of disciplines into the field of floodplain management. Whether their role in ordinance administration is performing map determinations or inspecting new floodplain structures for compliance, and whether they are county planners or small town mayors, each local NFIP administrator has a responsibility to safeguard the floodplain in his or her community.

The guidance in this manual is based on the North Carolina Model Flood Damage Prevention Ordinance. Those communities that did not adopt the Model Ordinance should consult their ordinance for further guidance. For all NFIP communities, the adopted floodplain management ordinance is the "final word" because it is legally enforceable.

This manual is not intended to make phenomenal floodplain managers out of every NFIP administrator in North Carolina, but instead to provide a resource for unanswered questions, to instruct new staff members, and to raise the level of interest in responsible floodplain management. Some communities in North Carolina process only one floodplain permit every two years and their knowledge of floodplain management ordinance specifics is not critical. Used in combination with the ordinance, this manual can answer many local community questions and the forms contained herein can make the job of permitting floodplain construction much easier. Other problems may arise which reach beyond the scope of this manual, and local administrators should contact the North Carolina NFIP Coordination staff at the Division of Emergency Management.

# AGREEMENT BETWEEN COMMUNITIES AND THE NFIP

Communities that participate in the NFIP agree to adopt, administer, and enforce an ordinance that meets the NFIP's standards for floodplain management. In return, federal flood insurance is available for all structures in the community. Officials also commit the community to fulfilling several responsibilities:

- Assist the Administrator in delineation of special flood hazard areas;

- Provide information concerning present uses and occupancy of the floodplain; and,

- Maintain for public inspection and furnish upon request, information on the elevation of the lowest floor of all new or substantially improved structures within special flood hazard areas.

The maximum amount of federal flood insurance available for non-residential structures is $250,000. The maximum amount of coverage available for contents in a non-residential structure is $500,000. For additional information concerning insuring structures and contents against flood damage, contact your local insurance agent.

Compliance with the floodplain management ordinance is required in order for citizens in North Carolina's counties and towns to be eligible for federal flood insurance through the NFIP. FEMA may place noncompliant communities on probation and impose a $50 surcharge on all flood insurance policies. If further violations occur or problems are not corrected, communities may be suspended. Suspension halts the availability of flood insurance. Structures built in violation of floodplain management ordinances may be denied flood insurance under Section 1316 of the NFIP regulations.

The reponsibilities of the community floodplain manager include:

1. Require development permits in floodplain areas and regulate development in accordance with flood damage prevention regulations approved by the FEMA Regional Office;

2. Obtain Elevation Certificates for all new construction and substantial improvements. Obtain Floodproofing and V-Zone Construction certificates as applicable;

3. Maintain records of all floodplain development and index or file them so that information can be easily retrieved by address or other geographic identifier. A log of all floodplain permits is usually necessary;

4. When otherwise not provided, obtain detailed flood information (base flood elevations and base flood boundaries) for any development project greater than five acres or fifty

lots;

5. Notify FEMA of all new floodplain information, including the impacts of new development, within six months, or require a developer to submit this information via the Letter of Map Revision process;

6. Protect regulatory floodways from encroachment. Require "No-Rise" evaluations and certificates for **any** proposed development in the floodway;

7. Ensure all other necessary permits are obtained;

8. Notify affected agencies and neighboring communities of any changes proposed to a stream channel;

9. Ensure that the carrying capacity of a stream channel is maintained if it is to be altered;

10. Design water supply and sewage disposal systems to minimize or eliminate infiltration of flood waters into the systems; and,

11. Require on-site sewage disposal systems to be located and designed so as to minimize flood damage.

# ACCESSORY STRUCTURES

***A-Zone Accessory Structure Minimum Requirements***

1. Accessory structures represent a **minimal investment** (less than $3000 in NC Model Ordinance) and **shall not be used for human habitation,** including working, sleeping, living, cooking, or restroom areas. Farm buildings of greater cost are also allowed to be treated as "accessory", provided they are not habitable, *i.e.*, barns, storage bins, haysheds;

2. Elevating the floor to or above the BFE **is not required;**

3. Accessory structures shall be designed to have low flood damage potential;

4. Accessory structures shall be constructed and placed on the building site so as to offer the minimum resistance to the flow of floodwaters;

5. Accessory structures shall be **firmly anchored** to prevent flotation which may result in damage to other structures;

6. **Service facilities such as electrical and heating equipment shall be protected to the BFE** (generally by elevating), subject to the use of a ground fault interrupt (GFI) circuit for any outlets, switches, and service that must provided below the BFE; and,

7. **Openings to relieve hydrostatic pressure during a flood shall be provided below BFE.**

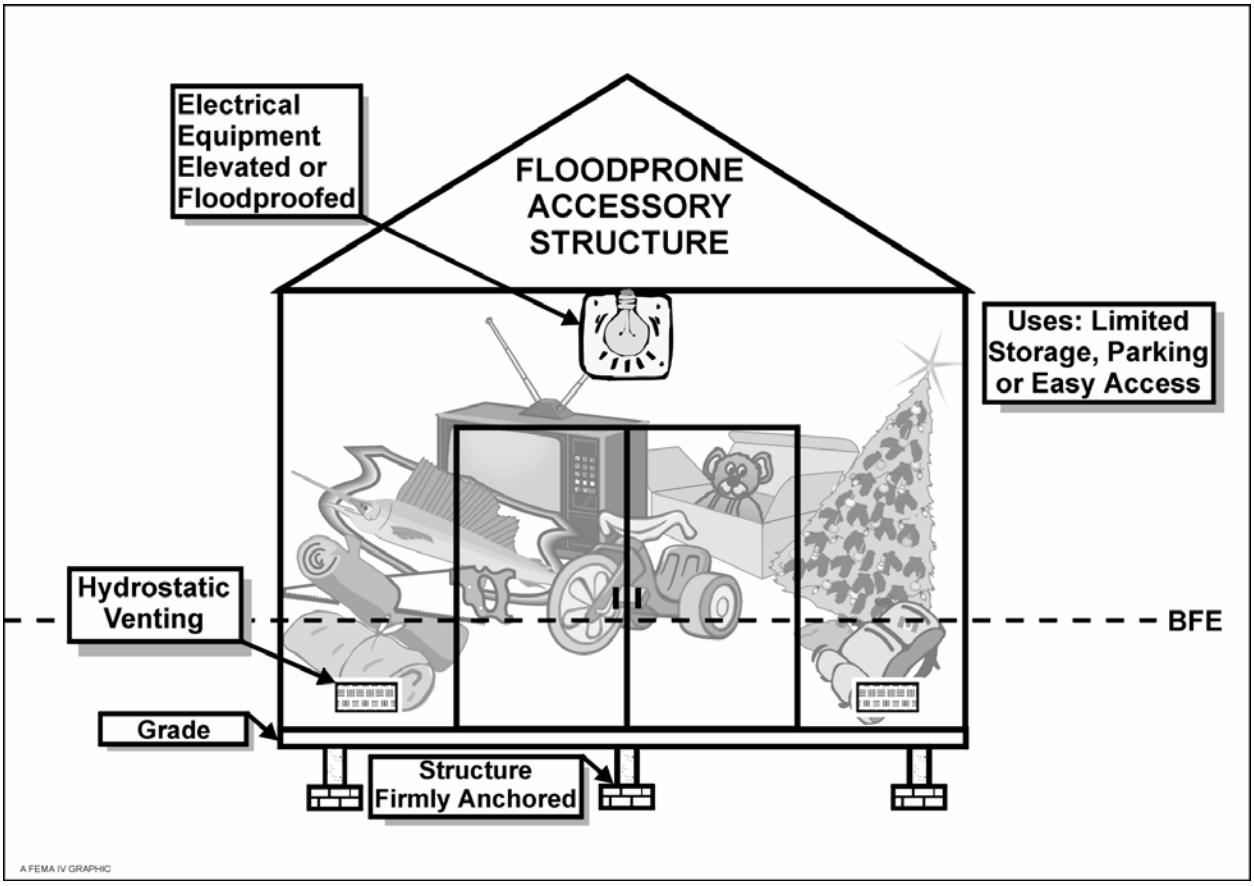
***Additional Requirements for V-Zone Accessory Structures***

8. The structural system shall **utilize piles**, adequately embedded to resist scour and lateral deflection;

9. **Any enclosure below BFE shall be constructed of wooden lattice or insect screening, or shall be designed as a "breakaway wall"**;

10 **Floor shall be at or very close to grade**; and,

11. The **lowest horizontal structural member of roof systems**, including plates and beams connecting upright supports of the structure, **shall be placed at or above BFE**.




***General Discussion***

The definition of "structure" for floodplain management purposes, pursuant to the NFIP regulations, means any walled and roofed building as well as a manufactured home. "Accessory structures" are structures which are located on the same parcel of property as the principal structure and the use of which is incidental to the use of the principal structures. Garages, carports, and storage sheds are common urban accessory structures. Pole barns, hay sheds, and the like, qualify as accessory structures on farms, and may or may not be located on the same parcel as the farm dwelling or shop building.

Accessory structures qualify under the general definition of structure and are, consequently, subject to all floodplain management regulations pertaining to structures. There is, however, justification for treating accessory structures which do not represent a significant investment differently in regard to the application of floodplain management measures. The minor initial investment in such structures would be greatly increased by the necessity to either elevate or dry floodproof the accessory structure. Such measures provide an excessive degree of protection for these types of structures.

Consequently, when an accessory structure represents a minimal investment, the elevation or dry floodproofing standards of the NFIP regulations need not be met. However, all

other requirements applicable to structures will apply. Of course, the floodway encroachment standards and the need for a development permit and accompanying Elevation Certificate would continue to apply. In the North Carolina Model Flood Damage Prevention Ordinance, $3000 or less constitutes a minimal investment regarding accessory structures. For communities that have adopted the Model Ordinance, accessory structures valued at $3000 or less do not have to have their lowest floors elevated above the BFE, but still must be firmly anchored, equipped with hydrostatic vents, and designed to be flood resistant. Proposals for new accessory structures valued at more than $3000 must go through the variance process and be closely scrutinized by the Board of Appeals before they can be allowed to have the lowest floor below the BFE.

Ten percent of the amount of the flood insurance coverage purchased for a dwelling may apply to one garage or carport that services the insured dwelling and which is used for garaging a vehicle and limited storage. To be covered by flood insurance, all other accessory structures must be rated separately. Therefore, other accessory structures which are not elevated to or above the BFE, or otherwise built in accordance with NFIP standards, could be subject to extremely high flood insurance premiums.

### *Permitting Accessory Structures*

Communities that choose to adopt the North Carolina Model Flood Damage Prevention Ordinance adopt a threshold value of $3000 for accessory structures in the floodplain that do not have to have the lowest floor elevated above the BFE. Building permit application forms should provide a notation of the type of proposed structure, the cost of construction, and require an attached site plan which shows building orientation and allows the permit official to determine the flood zone and any possible floodway encroachments. Accessory structures in the floodway are strongly discouraged and, if permitted, must be certified by a registered professional engineer to cause absolutely no change in the Base Flood Elevations, floodway, or floodway widths.

Accessory structures valued at more than $3000 require a variance to the elevation requirements of the ordinance in order to be permitted below the BFE. The reasons for the variance must satisfy all of the requirements set forth in the variance section of the ordinance; and therefore, should be very carefully scrutinized by the reviewing board. A large, expensive accessory structure is easy for a homeowner to convert to habitable space in the future.

Inspection of accessory structures is an essential part of the floodplain permitting process in order to ensure that permittees have conformed to all of the requirements set forth in the permit and in the ordinance. All electrical and mechanical equipments must be elevated above the BFE or floodproofed. The structure must be firmly anchored to resist flotation and lateral movement, and sufficient, proper hydrostatic venting must be provided in order to allow the automatic equalization of water pressure.

Enforcing restrictions against conversion of enclosed areas below the BFE to habitable space is a problem for many community permitting officials. Often, homeowners convert these spaces into bedrooms, recreation rooms, or other living areas long after the original permit for construction has been issued, resulting in a noncompliant structure. If the property changes ownership, new residents may claim ignorance of the restrictions. The conversions may be difficult to catch by even the most experienced building inspectors. The *Nonconversion Agreement for Certain Structures in the Floodplain* and accompanying *Declaration of Land Restriction* provide a solution to this enforcement problem.

The Nonconversion Agreement must be signed by the property owner, indicating that he is aware of the restrictions in the Flood Damage Prevention Ordinance which prohibit finishing off enclosed areas below the BFE. The Permitting Official also signs the form, noting that he permitted only an enclosed structure meeting specific standards. The Recorder of Deeds signs the form indicating that the restrictions on the below BFE enclosure have been recorded on the deed to the property. Since the deed follows the property, future homebuyers are apprised of the restrictions. The Declaration of Land Restriction should be used to record the land restrictions directly on the deed.

The signed Nonconversion Agreement should become a part of the permit file for most accessory structures permitted in the floodplain. Small metal storage sheds bought at local hardware stores may not necessitate the extra paperwork. Community officials should consider inserting an ordinance requirement that this form be signed and submitted to the building official before an accessory structure can be permitted in the floodplain. These forms will not prevent all conversions of below BFE enclosures to habitable space, but will sufficiently inform homeowners of the potential danger, ordinance violation, and subsequent enforcement actions that could result from turning their below BFE garage into a below BFE bedroom.

### *Defining "Limited Storage": The Intent of Storage Areas*

The purpose of a building is to house (*i.e.,* support, shelter, or enclosure of persons, animals, chattels, or property of any kind) individuals or property. Materials, items, chattel, inventory, stock, merchandise, wares, goods, and all personal property intended to be used for the primary purpose of the building's function must be protected from flooding while housed within the building and, therefore, may not be stored below the Base Flood Elevation, *i.e.*, lowest floor.

Therefore, storage areas are intended to be limited to incidental items which can withstand exposure to the elements and have low flood damage potential. These items would include lawn mowers, garden equipment, bicycles, and other low damage items for which, under most circumstances, flood insurance coverage is not provided.

Furthermore, such storage area must be of flood resistant or breakaway materials, non-partitioned, void of utilities except for essential lighting (outdoor type switches and fixtures), with openings to preclude hydrostatic loading and allow ventilation. The area cannot be temperature controlled and therefore exists simply because of aesthetic or load bearing design of the building. As such, the enclosed area should be considered bonus space with minimum access to store items that otherwise would be stored outside the building or in a garage or shed.

# NONCONVERSION AGREEMENT
# FOR CERTAIN STRUCTURES IN THE FLOODPLAIN

Application has been made for a Permit _____ or Variance _____ to build a _____ which does not conform to the elevation requirements of the Floodplain Management Ordinance of County/Town of _____.

Permit # _____

Property Owner _____

Address _____

Deed dated _____, Recorded in liber _____, folio _____,

tax map _____, block _____, parcel _____.

Base Flood Elevation at the site is _____ feet (NGVD).

Map Panel Number _____, effective date _____.

In consideration for the granting of a Permit or Variance for the above structure which does not conform to the requirements of the Floodplain Management Ordinance of _____, the Property Owner agrees to the following:

1. That the enclosed area, if permitted, shall be used solely for parking of vehicles, limited storage, or access to the building and will never be used for human habitation without first becoming fully compliant with the Floodplain Management Ordinance in effect at the time of conversion.

2. That all interior walls, ceilings, and floors below the Base Flood Elevation shall be unfinished or constructed of flood resistant materials.

3. That mechanical, electrical, or plumbing devices shall not be installed below the Base Flood Elevation.

4. The walls of the enclosed areas below the Base Flood Elevation shall be equipped with at least two vents which permit the automatic entry and exit of floodwater with total openings of at least one square inch for every square foot of enclosed area below flood level. The vents shall be on at least two different walls, and the bottoms of the vents shall be no more than one foot above grade.

5. That the requested structure may increase the risk to life and property, and may be subject to increased premium rates for flood insurance available from the National Flood Insurance Program.

6. That any variation in construction beyond what is permitted shall constitute a violation and be abatable as such.

7. That this **Nonconversion Agreement** becomes part of Permit # _____.

_____
Date

_____
Witness Signature of Property Owner

_____..

At a minimum, the following has been recorded on the deed to the above property**:** "This structure has been allowed without conforming to the elevation requirements of the Floodplain Management Ordinance of _____. No conversion to habitable space is to occur unless the enclosed area below the Base Flood Elevation becomes fully compliant with the Ordinance in effect at the time of conversion. At this site, the Base Flood Elevation is _____feet above mean sea level, National Geodetic Vertical Datum."

_____
Date Signature, Recorder of Deeds

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**.....**

Based on satisfaction of the above conditions and proper recordation in the land records of _____, a permit may be issued for an enclosed structure which is not fully compliant with the elevation requirements of the Floodplain Management Ordinance of _____.

_____
Date Signature, Permitting Official

Note:
This Agreement must be used whenever an enclosed structure is requested to be built or substantially improved within the 100-year floodplain below the Base Flood Elevation. This Agreement must be signed whenever variances are to be issued, for example, garages and accessory structures which exceed the $3000 cost ceiling.

# DECLARATION OF LAND RESTRICTION
# FOR CERTAIN STRUCTURES IN THE FLOODPLAIN

This DECLARATION made this_____ day of _____, 19 ___, by ("Owner") having an address at:

_____

WITNESSETH:

WHEREAS, the Owner is the record owner of all that real property located at _____ in the _____th Election District of _____ County, designated in the Tax Records as map_____, parcel _____ , plat _____ , and being that same property acquired by the Owner by deed dated _____, 19 __ and recorded among the Land Records of _____ County, North Carolina at liber _____, folio _____.

WHEREAS, the Owner has applied for a permit or variance to place a structure on that property that either (1) does not conform, or (2) may be made noncompliant by later conversion, to the strict elevation requirements of Article _____ Section ____ of the Floodplain Management Ordinance of _____ ("Ordinance") and under Permit Number ("Permit").

WHEREAS, the Owner agrees to record this DECLARATION and certifies and declares that the following covenants, conditions, and restrictions are placed on the affected property as a condition of granting the Permit, and affects rights and obligations of the Owner and shall be binding on the Owner, his heirs, personal representatives, successors, and assigns.

UPON THE TERMS AND SUBJECT TO THE CONDITIONS, as follows:

1. The structure or part thereof to which these conditions apply is:

_____

_____

2. This structure has been allowed without strict conformance with the elevation requirement of the Ordinance. Conversion to habitable space shall not occur unless the enclosed area below the Base Flood Elevation is brought into full compliance with this Ordinance. At this site, the Base Flood Elevation is _____ feet above mean sea level, National Geodetic Vertical Datum.

3. Enclosed areas below the Base Flood Elevation shall be used solely for parking of vehicles, limited storage, or access to the building. All interior walls, ceilings, and floors below the Base Flood Elevation shall be unfinished or constructed of flood resistant materials. Mechanical, electrical, or plumbing devices shall not be installed below the Base Flood Elevation.

4. The walls of the enclosed areas below the Base Flood Elevation shall be equipped with at least two vents which permit the automatic entry and exit of flood waters with total openings of at least one square inch for every square foot of enclosed area below flood level. The vents shall be on at least two different walls, and the bottoms of the vents shall be no more than one foot above grade.

5. Any alterations or changes from these conditions constitute a violation of the Permit and may render the structure uninsurable or increase the cost for flood insurance. The jurisdiction issuing the Permit and enforcing the Ordinance may take any appropriate legal action to correct any violation.

6. Other conditions:_____

OWNER:

In witness whereof the undersigned set their hands and seals this ___ day of _____, 19___.

WITNESS:

(Seal)

_____

Owner

(Seal)

_____

Owner

NOTARY:

STATE OF NORTH CAROLINA, _____ of _____, TO WIT:

I hereby certify that on this_____ day of _____, 19 ____ , before me the subscriber, a Notary Public of the State aforesaid, personally appeared _____ and _____, known to me, or satisfactorily proven to be the person(s) whose name is subscribed to the foregoing instrument, who acknowledged that he has executed it for the purposes therein set forth, and that it is his act and deed.

In witness whereof, I have set my hand and Notarial Seal, the day and year first written above.

My Commission expires on _____.

# ENCLOSURES BELOW BASE FLOOD ELEVATION

In Thompson, *et al* vs. Monroe County, decided in Circuit Court November 8, 1993, Judge J. Jefferson Overby upheld the county's restrictions on below BFE enclosures, ". . . the amount and extent of post-disaster relief, often subsidized by the public-at-large, is minimized by the requirements that all habitable space be constructed above the base flood elevation." Enclosed areas below the lowest habitable floor are subject to numerous restrictions.

**A. Uses allowed:**

- ✓ parking;
- ✓ limited incidental storage; and,
- ✓ building access.

A bathroom, laundry, in-law suite, recreation room, office, etc., is **not** permissible. Such uses **must not** be added after the Certificate of Occupancy is issued. A Nonconversion Agreement should be completed as part of the permit file and the Declaration of Land Restriction used to record restrictions on the deed.

**B. Openings -** hydrostatic openings must be provided to relieve the pressure of floodwaters on the exterior walls. (See next section, *Openings Requirement for Enclosed Areas Below BFE* for additional guidance.)

- ✓ Minimum of two openings, no more than 1 foot above adjacent finished grade. The combined area of openings must be at least one square inch for each square foot of enclosed area below BFE.
- ✓ Openings may be louvered, screened, etc., but must be self-actuating.
- ✓ Openings must be provided for any interior walls, so that the enclosed area floods evenly.

**C. Materials -** flood resistant materials must be used below BFE. (See attached FEMA Technical Bulletin 2-93).

**D. Electrical Service -** the number of switches and outlets must be the minimum necessary for adequate safety and security. All electrical service below BFE must be provided on a ground-fault interrupt (GFI) circuit separate from other circuits used in the building.

**E. Other**

- ✓ Heating and/or air conditioning of enclosed areas should **not** be permitted.
- ✓ Any interior partitioning must be minimized to that necessary to accommodate fire, life, safety, and security standards; for example, separating the parking area from the rest of the enclosed area.

***Openings Requirements for Elevated Buildings***

The NFIP has established minimum criteria for enclosed areas below the Base Flood Elevation (BFE). The requirements are as follows: new construction or substantial improvements of elevated buildings that include fully enclosed areas formed by foundation and other exterior walls below the BFE shall be designed to allow for the entry and exit of floodwaters to automatically equalize hydrostatic flood forces on exterior walls.

Designs for complying with this requirement must either be certified by a professional registered engineer or architect or meet the following minimum criteria: (*I*) provide a minimum of two openings having a net area of not less than one square inch for every square foot of enclosed area subject to flooding; (*ii*) the bottom of all openings shall be no higher than one foot above grade; and, (*iii*) openings may be equipped with screens, louvers, valves or other coverings or devices provided they permit the automatic flow of floodwater in *both* directions. Garage doors cannot be used to satisfy this requirement because they do not permit the automatic flow of floodwater. Crawl space doors on universal hinges that swing both ways are acceptable as long as the latch will not prevent the door from opening. A small magnet or piece of Velcro can be used as a latch. Homeowners concerned about extreme cold weather damaging pipes in the crawl space may *tape* fitted sections of Styrofoam to the inside of vents to retain heat.

Access to the enclosed area shall be the minimum necessary to allow for the parking of vehicles (garage door) or limited storage of maintenance equipment used in connection with the premises (standard exterior door) or entry to living area (stairway). The interior portion of such enclosed area shall not be partitioned or finished into separate rooms, except to enclose storage areas.

The Elevation Certificate requires the land surveyor to calculate this requirement in order to determine the reference level of the structure. If the above criteria are met, the elevation of reference level A in Figure 2 should be recorded on the Elevation Certificate, line 2A. However, if the above criteria are not met, then the level of the lowest grade adjacent to the structure (reference level B in Figure 2 ) is the appropriate elevation to be recorded on Line 2A of the certificate. When the lowest adjacent grade is used, comments should be entered in Section E.

Note: This diagram corresponds to Diagram 8 of the Elevation Certificate.

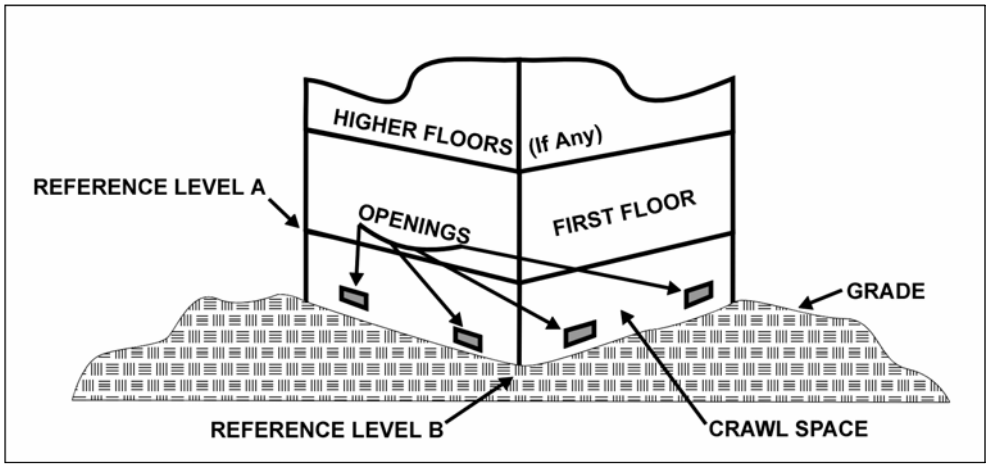



**Figure 2**

***How to Calculate Opening Area***

**Step 1:** Calculate the total required opening area. For example, if one wall of a structure in the floodplain is 60 linear feet, and the other wall is 24 linear feet, then

the area subject to flooding = 60 l.f. x 24 l.f. = 1440 sq. ft.

Since NFIP regulations require one square inch of net area for every square foot of enclosed area, the total required opening area must equal 1440 square inches.

**Step 2:** Calculate the number of vents needed. Continuing with the same example, suppose the vents to be used are 8 inches high by 16 inches long. Then,

area per vent = 8 in. x 16 in. = 128 sq. in.

The number of vents required is found by dividing the total required opening area by the area per vent. For this example,

$$\text{vents required} = \frac{\text{1440 square inches}}{\text{128 square inches}} = 11.25 \text{ vents}$$

***Coastal High Hazard Areas***

In addition to Standards A through D noted above, the following requirements and recommendations apply in the Coastal High Hazard Areas (V-Zones). FEMA recommends, but cannot require, that these restrictions also apply in the shoreline areas of coastal AE Zones, which may be subject to wave action of up to 2.9 feet during a major storm.

**F.** **Breakaway walls -** prohibit solid walls below BFE to keep the area "free of obstruction", unless they are designed to be "breakaway" when subjected to water loads of only 10 to 20 psi, or are designed and certified by a registered professional architect or engineer to breakaway during a Base Flood, without damaging the superstructure. We recommend use of only lattice or insect screening to provide enclosure.

**G.** **Size of area** - if more than 299 square feet are enclosed with solid breakaway walls, flood insurance rates will be significantly higher; therefore, we recommend limiting the size of such enclosed areas to 299 square feet. Enclosure by screening or lattice is exempted.

**H.** **Foyers -** foyers **should** be designed to be structurally separated from the habitable living areas, since the lower foyer is enclosed with breakaway walls intended to be destroyed during a 100-year storm. Unless the building is carefully designed, such an event could create a large opening in the elevated building "envelope", rendering it subject to severe damage by high winds.

# ELEVATION CERTIFICATES

NFIP Regulations require that participating communities collect and maintain Elevation Certificates (EC) for all new floodplain construction and substantial improvements to existing floodplain structures. The EC should be collected as soon as the lowest floor is in place, but before further vertical construction continues, thereby providing time to correct any problems that may exist. [Note: A sample elevation certificate is provided in Appendix I.]

***Common Elevation Certificate Issues***

**1.** **Filling out the new forms -** Building Officials must check form to ensure that surveyor has provided the following:

A. Correct FIRM, Community Identification Number, Panel Number, and effective date (Note 6, 7, and 8 on pg. 2 of the EC);
B. Floor level above adjacent grade. (Section C, Number 6);
C. **Building diagram number** (Section C, Number 1);
D. Date of construction or substantial improvement (date permit issued) (Section D, Number 2);
E. Correct site address, proper community information, etc. (Section A and B); and,
F. **Lowest grade adjacent to the structure** (Section C, Number 6).

**2.** **Determining flood zone -** The flood zone must be determined by scaling off the FIRM. Select and use known points of reference. Scale from an assumed centerline, not the edge of the mapped road. Beware that many newer streets or small streets are not accurately located on the FIRM.

Ground elevations can only be used to determine a flood zone if the building site straddles the boundary between two zones, in which case the surveyor will need community concurrence on the correct zone to use. **If the site is within the SFHA, but the ground elevation is above BFE, it is still in the SFHA. Only FEMA can legally remove a site from the SFHA** based on survey data through the Letter of Map Amendment (LOMA) process. Zone B, C, or X must not be entered in Section B, Number 5 based on ground elevation if the site is within the SFHA.

**3.** **Determining the base flood elevation (BFE) -** The BFEs shown on the FIRMs along nontidal rivers and streams are normally illustrative and are for reference purposes. The actual BFE for construction purposes must be established using the Stream Profile Charts in the Flood Insurance Study, if available.

**4.** **Estimated BFEs in unnumbered A Zones (Section B, Number 8) -** A BFE may have been estimated by the community or another government agency or may have been established by an engineering study. For any development or subdivision larger than 50 lots or 5 acres which contains area designated unnumbered A-Zone, a BFE must be established by a detailed flood study. The community must issue a letter accepting an estimated BFE or a BFE established by a new engineering study. This letter should be

attached to the Building Permit and Elevation Certificate. The detailed flood study must be provided to the FEMA Atlanta Regional Office within 6 months.

**5.** **Which is the "elevated floor"?** Many surveyors are confused when there is an elevated living floor, but an enclosed area below it. The insurance underwriter, who will use the Elevation Certificate, will need to know both elevations. Also, the underwriter will need to know:

- ✓ if there are breakaway walls (V-Zones) or adequate hydrostatic openings (A-Zones);
- ✓ what the enclosed areas are used for;
- ✓ if there is building service equipment below BFE, *(e.g.,* air conditioner, furnace, laundry facilities, or freezer), what is the elevation of the platform, floor, or slab on which they are located?
- ✓ if the lowest floor is below BFE, was a variance issued? (Finding out about a variance can be deferred to the insurance agent).

Surveyors are encouraged to include all such information in the Comments section on the second page of the EC.

Surveyors should use the building diagrams to determine the "reference level", but always provide the elevated floor elevation in the Comments section. They can help the insurance agent by placing an asterisk adjoining the reference elevation in Section C, Number 2, with a notation "see comments". The reference elevation in Diagram 7 is usually not the lowest floor elevation used for flood insurance rating. Instead, the underwriters will rate the building as "elevated", but charge a "loading factor" for the enclosure problems that classify a building as Diagram 7. These loading factors are much less costly than the insurance rates would be if the reference elevation is used to rate the building.

Hydrostatic openings are not required in a stemwall foundation if the area within has been backfilled with dirt or sand and capped by a floor slab. Surveyors and building officials should beware of technical **basements** created when the elevation of the crawl space floor is below the exterior elevation on all sides. Since a technical basement meets the NFIP definition of basement ("any area of the building having its floor subgrade on all sides"), they are prohibited. Diagram 2 must be used in this situation, with the top of the crawl space floor cited as the Reference Level.

**6.** **County-wide FIRMs -** Many counties now have county-wide FIRMs, which portray all of the incorporated municipalities as well as the unincorporated areas. A separate Community Map Number has been provided for each set of county-wide maps. However, each incorporated city and the unincorporated areas of the county retains its own Community Identification Number. The Elevation Certificate must have **both** the Community Map Number and the Community Identification Number. This information should be typed onto the EC since no box is provided for this information.

**7.** **Annexations -** If a building site is shown within the unincorporated area of the County, but has been annexed to an incorporated city, **both** the County Map Panel Number and the city's Community Identification Number must be provided. This information must be typed onto the form.

8. **Using old FIRMs or Flood Hazard Boundary Maps (FHBMs) -** For insurance rating, the FIRM **in effect at the date of construction** must be referenced. The surveyor should note both the previous and current flood zones and BFEs in order for an insurance agent to properly rate the structure. Often, the agent will require submittal of a copy of the building permit to confirm the date of construction. **The community MUST keep old copies of the FIRMs, other FEMA maps, and LOMAs or LOMRs to use as references.** If the maps are not locally available, contact the FEMA Region IV Office in Atlanta.

9. **Pre-FIRM vs. Post-FIRM -** Pre-FIRM and post-FIRM refer to the date of the first FIRMs for a community or to December 31, 1974, whichever is later. Flood insurance rating is based on whether a building is pre- or post-FIRM. Pre-FIRM rates are fixed and subsidized. Post-FIRM rates are actuarial and decrease as a structure's lowest floor elevation above BFE increases. Rates increase if a building is built below the BFE. A pre-FIRM building becomes a post-FIRM building if it is substantially damaged or substantially improved. Section D, Number 2 on the Elevation Certificate requires a notation concerning a building's pre-FIRM or post-FIRM status.

10. **Elevating a building above the BFE**

    A. Elevating a building above the BFE on pilings, extended stem walls, piers, etc. does **not** take it out of the SFHA. The ground is still below the BFE, so the building is still in the SFHA.

    B. Elevating a building on a fill pad that is raised above BFE does **not** automatically remove the building from the SFHA. However, FEMA can remove a building site that is filled to above the BFE from the SFHA via a Letter of Map Revision (LOMR). Even if the fill pad is above the BFE, the community cannot say that the building site is legally out of the floodplain until and unless FEMA issues a LOMR to that effect.

11. **What if the natural grade is above the BFE?** Only FEMA can remove a building site from the SFHA via a Letter of Map Amendment (LOMA). Surveyors, community floodplain managers, and real estate agents must refrain from telling a bank or a customer that a property is out of the floodplain until and unless FEMA issues a LOMA to that effect. LOMA/LOMR application packages are available from the State NFIP Coordinator or FEMA Regional Office. There is no fee for single lot LOMAs.

12. **What is the "highest adjacent grade"?** According to 44 CFR 59.1 of the NFIP regulations, "highest adjacent grade" is defined as: "the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure." Thus, for slab-on-grade construction on a fill pad, the highest adjacent grade means the **original ground level below the fill**. The depth of the fill may be determined from construction plans or by using a hand soil bore. A practical alternative is to locate the highest natural grade adjoining the base of the fill pad out away from the house.

This determination is critical in unnumbered A Zones where the insurance rating is based on height above "highest adjacent grade". If the surveyor says the slab is only 6" above grade, flood insurance rates will be very high. The reduced flood hazard obtained by elevating on fill will not be recognized. If the slab was poured flat on the original natural ground, the structure would be in violation of the NFIP minimum requirements for post-FIRM structures.

*Note:* Strange as it may seem, if the building is slab-on-grade construction on fill, the lowest adjacent grade will usually be above the highest adjacent grade. That is because the lowest adjacent grade refers to **finished grade** following construction, whereas highest adjacent grade refers to the original natural grade prior to the start of construction.

**13. Coastal Barrier Resource System Units (COBRA Zones) -** If the property is in a COBRA Zone, the engineer or surveyor should note this on the EC.

**14. To order Elevation Certificates, please call:**

**1-800-480-2520**

**15. Which Elevation Certificate should be used?** The most recent form 81-31 is dated March 1997, and should be used whenever possible [see Appendix I]. Versions dated May 1996, May 1990, and May 1993 are very similar and may be used, if necessary. The older, one-page form dated October 1987 is no longer acceptable.

**16. Recommended enhancements to a completed Elevation Certificate:**

**A. Photocopy of the FIRM -** attach a photocopy of the FIRM, with the property boundaries and the building clearly outlined.

**B. Photograph of the building -** attach a dated photograph(s) of the building to verify the appearance and condition at the time the EC is prepared. A photograph is highly advisable and may be very useful in the future if there is an enclosure below the BFE.

**C. Other certificates -** copies of other certificates which were required as part of the permit should be attached to the EC, *e.g.*, Floodproofing Certificate, V-Zone Certificate.

## *Choosing the Correct Reference Level Diagram*

**Building Diagram Descriptions**

#1 Slab-on-grade lowest floor, or lowest floor at grade on at least one side. May be multiple floors, but not a split-level. This includes buildings elevated on stemwall foundations when the crawl space is backfilled and concrete floor slab is poured on top of the stemwalls and fill.

#2 Lowest floor is a basement (including garage), below grade on all four sides. May be multiple floors, but not a split-level. Includes technical basement created when elevation of crawl space floor is below level of exterior grade on all sides.

#3 Split-level structure with lowest floor at grade on at least one side. This includes buildings elevated on stemwall foundations when the crawlspace is backfilled and concrete floor slab is poured on top of the stemwalls and fill.

#4 Split-level structure with lowest floor (including garage) below grade on all four sides.

#5 Elevated on piers, posts, pilings, columns, or shear walls, completely open beneath, or enclosed with only lattice or screening. The area below does not contain equipment for servicing the building, such as furnace, air conditioner, etc.

#6 V Zones only. Elevated on piers, posts, pilings, columns, or shear walls, with enclosed area below BFE of 300 sq ft or less, provided fully or partially with solid breakaway walls, which does not contain equipment for servicing the building, and which is used solely for parking, building access, and/or limited storage.

#7 Elevated on piers, posts, pilings, columns, or shear walls, with one or more of the following characteristics relating to the enclosed area below BFE:

a. V Zones - area is enclosed with non-breakaway walls;
b. V Zones - area of more than 300 sq ft enclosed by solid breakaway walls;
c. All Zones - area contains equipment servicing the building;
d. All Zones - area is not used solely for parking, building access, and/or limited storage (*e.g.*, laundry, bathroom, family room, rec room, or bedroom is present);
e. A Zones - enclosed area is not provided with sufficient openings to equalize hydrostatic pressure during a flood (one sq in per sq ft of enclosed area). If the enclosed area is completely filled with dirt or sand, and a floor slab is poured on top, hydrostatic openings are not required. For such buildings use Diagram 1 or 3; or,
f. A Zones - area is "finished" with non flood resistant materials.

#8 A Zones only. Elevated on solid perimeter walls above a crawl space or walk-out lower level which is below BFE. The lower enclosed area must exhibit **all** of the following characteristics:

a. the solid walls are provided with hydrostatic openings;
b. uses are limited to parking, building access, and limited storage;
c. does not contain equipment servicing the building; and,
d. is either unfinished or is finished with flood-resistant materials.

**Elevation Certificate Decision Chart**

A. Does it have a basement, garage, crawl space, or a sunken living room or other floor area that is below grade on all four sides?
- No: Go to B.
- Yes: Is the building split-level?
  - No: #2
  - Yes: #4

B. Does it have a walk-out lower level or sunken room which is at grade on at least one side, or a garage floor lower than the lowest living area floor?
- No: Go to C.
- Yes: Is the floor of the walk-out or garage below BFE?
  - No: Go to G.
  - Yes: Is the building split-level?
    - No: #1

Yes: #3

C. Is the building slab-on-grade construction?
- No: Go to D.
- Yes: Is the building split-level?
  - No: #1
  - Yes: #3

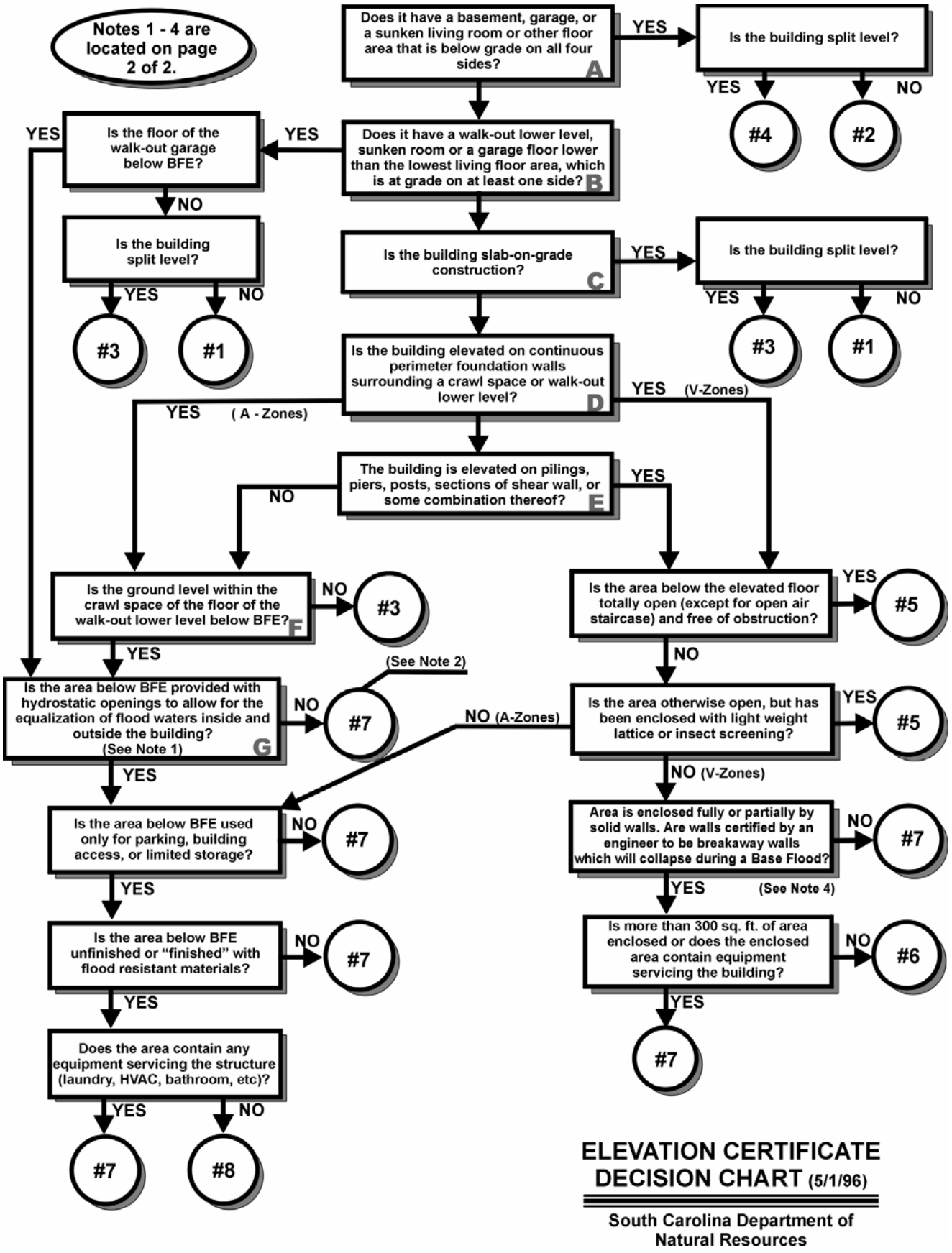
D. Is the building elevated on continuous perimeter foundation walls surrounding a crawl space or walk-out lower level?
- No: Go to E.
- Yes: Go to F.

E. The building is elevated on piling, piers, posts, sections of shear wall, or some combination thereof. Is the building in a V, VE, or V1-99 Zone?
- No: Go to F.
- Yes: Is the area below the elevated floor totally open (except for open-air staircase) and free of obstruction?
  - Yes: #5
  - No: Is area otherwise open but has been enclosed with light-weight lattice or insect screening?
    - Yes: #5
    - No: The area is enclosed either fully or partially by solid walls. Are the walls certified by a registered engineer to have been designed as "breakaway walls" which will collapse during the occurrence of the base flood?
      - No: #7
      - Yes: Is more than a total of 300 sq ft of area enclosed or does the enclosed area contain equipment servicing the building?
        - No: #6
        - Yes: #7

F. Is the ground level within the crawlspace or the floor of the walk-out lower level below BFE?
- No: #3
- Yes: Go to G.

G. Is the area below BFE provided with hydrostatic openings to allow for the automatic equalization of flood waters inside and outside the building? (Minimum of two, total area 1 sq in per 1 sq ft of enclosed area.)
- No: #7 (reference elevation is at grade)
- Yes: Is the area below BFE used only for parking, building access, or limited storage?
  - No: #7
  - Yes: Is the area below BFE unfinished or finished with flood resistant materials?
    - No: #7
    - Yes: Does the area contain any equipment servicing the structure (laundry, HVAC, bathroom, etc.)?
      - No: #8
      - Yes: #7

Heating, air conditioning, and other equipment servicing the building must be elevated to or above the BFE or floodproofed. The reference elevation for this equipment is the top of the slab, floor, or shelf which supports them, for A Zones, and the lowest horizontal structural member of those supports for V Zones. The elevations of this equipment need to be provided on the EC. Their location below or to the side of the building should be noted as well.


Notes 1 - 4 are located on page 2 of 2.
Does it have a basement, garage, or a sunken living room or other floor area that is below grade on all four sides? A
YES
Is the building split level?
YES
NO
#4
#2
Does it have a walk-out lower level, sunken room or a garage floor lower than the lowest living floor area, which is at grade on at least one side? B
YES
Is the floor of the walk-out garage below BFE?
YES
NO
Is the building split level?
YES
NO
#3
#1
Is the building slab-on-grade construction? C
YES
Is the building split level?
YES
NO
#3
#1
Is the building elevated on continuous perimeter foundation walls surrounding a crawl space or walk-out lower level? D
YES (A - Zones)
YES (V-Zones)
The building is elevated on pilings, piers, posts, sections of shear wall, or some combination thereof? E
NO
YES
Is the ground level within the crawl space of the floor of the walk-out lower level below BFE? F
NO
#3
YES
Is the area below the elevated floor totally open (except for open air staircase) and free of obstruction?
YES
#5
NO
(See Note 2)
Is the area below BFE provided with hydrostatic openings to allow for the equalization of flood waters inside and outside the building? (See Note 1) G
NO
#7
YES
NO (A-Zones)
Is the area otherwise open, but has been enclosed with light weight lattice or insect screening?
YES
#5
NO (V-Zones)
Is the area below BFE used only for parking, building access, or limited storage?
NO
#7
YES
Area is enclosed fully or partially by solid walls. Are walls certified by an engineer to be breakaway walls which will collapse during a Base Flood?
NO
#7
YES
(See Note 4)
Is the area below BFE unfinished or "finished" with flood resistant materials?
NO
#7
YES
Is more than 300 sq. ft. of area enclosed or does the enclosed area contain equipment servicing the building?
NO
#6
YES
#7
Does the area contain any equipment servicing the structure (laundry, HVAC, bathroom, etc)?
YES
NO
#7
#8
ELEVATION CERTIFICATE DECISION CHART (5/1/96)
South Carolina Department of Natural Resources

**Note 1:** A minimum of two openings are required with a total net area of at least one square inch for every square foot of area enclosed, with the bottom of the openings no more than one foot above grade. Alternatively, certification may be provided by a registered professional engineer or architect that the design will allow equalization of hydrostatic flood forces on exterior walls.

**Note 2:** Reference elevation is at grade.

**Note 3:** Heating, air conditioning and other equipment servicing the building must be elevated to or above the BFE or floodproofed. The reference elevation for this equipment is the top of the slab, floor, or shelf which supports them, for A-Zones, and the lowest horizontal structural member of those supports for V-Zones. These elevations need to be provided on the Elevation Certificate. Their location below or to the side of the building needs to be identified.

**Note 4:** Solid breakaway walls are walls that are not an integral part of the structural support of a building and are intended through their design and construction to collapse under specific lateral loading forces, without causing damage to the elevated portion of the building or supporting foundation. An area so enclosed is not secure against forcible entry.

# FLOODPROOFING

According to the North Carolina Model Flood Damage Prevention Ordinance, the floodproofing of non-residential buildings may be permitted as an alternative to elevating the structure's lowest floor to or above the Base Flood Elevation (BFE); however, a floodproofing design certification is required. FEMA Form 81-65 (May 1993), "*Floodproofing Certificate for Non-Residential Structures*", should be used to satisfy this requirement and a copy of the completed form must be maintained in the community's permit file for any non-residential floodproofed structure. [The Floodproofing Certificate can be found in Appendix I.]

For insurance rating purposes, the building's floodproofed design elevation must be at least one foot above the BFE to receive rating credit. If the building is floodproofed only to the BFE, then the building's insurance rating will result in a higher premium. The floodproofing option **is not available** for residential structures that have been substantially damaged or are being substantially improved.

The attached FEMA Technical Bulletin 3-93, "*Non-Residential Floodproofing - Requirements and Certification for Buildings Located in Special Flood Hazard Areas*" describes design, construction, and planning requirements for the floodproofing of non-residential buildings under the NFIP regulations and also discusses how to correctly complete FEMA Form 81-65.

Floodproofing means making a building watertight, or substantially impermeable to floodwaters. Before a floodproofed building is designed, numerous planning considerations, including flood warning time, uses of the building, mode of entry to and exit from the building and the site in general, floodwater velocities, flood depths, debris impact potential, and flood frequency, must be addressed to ensure that dry floodproofing will be a viable floodplain management tool. Technical Bulletin 3-93 contains detailed discussion on each of these considerations.

Additional guidance on floodproofing retrofits of entire buildings (non-substantial residential or non-residential), or building components, may be obtained by contacting the North Carolina NFIP State Coordinator's Office. The following resources also provide information concerning floodproofing materials and techniques:

*Design Manual for Retrofitting Flood-Prone Residential Structures*, FEMA, September 1986, FEMA-114.

*Floodproofing Non-Residential Structures*, FEMA, May 1986, FEMA-102.

*Floodproofing Regulations*, U.S. Army Corps of Engineers, March 1992, EP 1165-2-314.

*Flood Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas*, FEMA, April 1993, Technical Bulletin 2-93.

# FLOODWAYS

The floodway is that portion of the 100-year floodplain which serves as a flood channel to pass the deeper, faster moving water. Buildings, structures, and other development activities, such as fill, placed within the floodway can obstruct flood flows causing the waters to slow down and back up, resulting in higher flood flows. Therefore, the floodway should be reserved or excluded from development plans. The flood fringe is that portion of the 100-year floodplain outside of the floodway.

The method for delineating the floodway on the FEMA Flood Boundary Floodway Maps (FBFM) or on the newer Flood Insurance Rate Maps (FIRM) is relatively straightforward. After 100-year flood levels have been calculated for a particular stream, a computer model is used to simulate full flood fringe development or fill. The fill gradually encroaches on the stream, squeezing the waters of the 100-year flood together, until: 1) hazardous velocities are reached in the stream; or, 2) the 100-year flood elevation is increased by one foot. At this point, the computer stops the encroachment and designates the limit of the fill as the limit of the floodway. Figure 4 illustrates this process.

Development in the floodway is strongly discouraged because of the hazardous nature of the floodwaters during a severe flood. Any proposed floodway development must be accompanied by an engineer's certification that the development will cause absolutely no rise in the Base Flood Elevation, floodway, or floodway widths. In addition, the North Carolina Model Flood Damage Prevention Ordinance prohibits the placement of new manufactured homes in the floodway. Although some special exceptions are made for replacement of manufactured homes in existing manufactured home parks (see local ordinance), the placement of these structures in the floodway is extremely dangerous to the inhabitants and must be strongly discouraged.

Pre-FIRM structures that were permitted and constructed in the floodway before the effective date of the detailed study are assumed to be included in the calculations of floodway width, floodwater height, and velocity. Therefore, if a pre-FIRM structure is substantially damaged or will be substantially improved, an engineer's no-rise certification is not required **as long as the structure maintains the same footprint.** Any additions to the footprint require a no-rise certification to ensure the Base Flood Elevation does not change. The structure must **be built in accordance with the current ordinance requirements, including elevation of the lowest floor to or above the Base Flood Elevation.** Local administrators have a responsibility to inform floodway homeowners of the dangers involved in rebuilding their homes in the floodway. Every effort should be made to relocate the house out of the floodway, and out of the 100-year floodplain, if possible. If relocation is not an option, the house should be designed to withstand the floodway water velocities during a 100-year flood event. Careful consideration should be given to elevating the structure on deeply embedded piles.

Following the diagrams is detailed guidance for engineers on *Procedures for No-Rise Certification for Proposed Developments in Regulatory Floodways.* Local administrators should also be familiar with these procedures and the data required as a supplement to any no-rise certification.

# FLOODWAY ILLUSTRATION

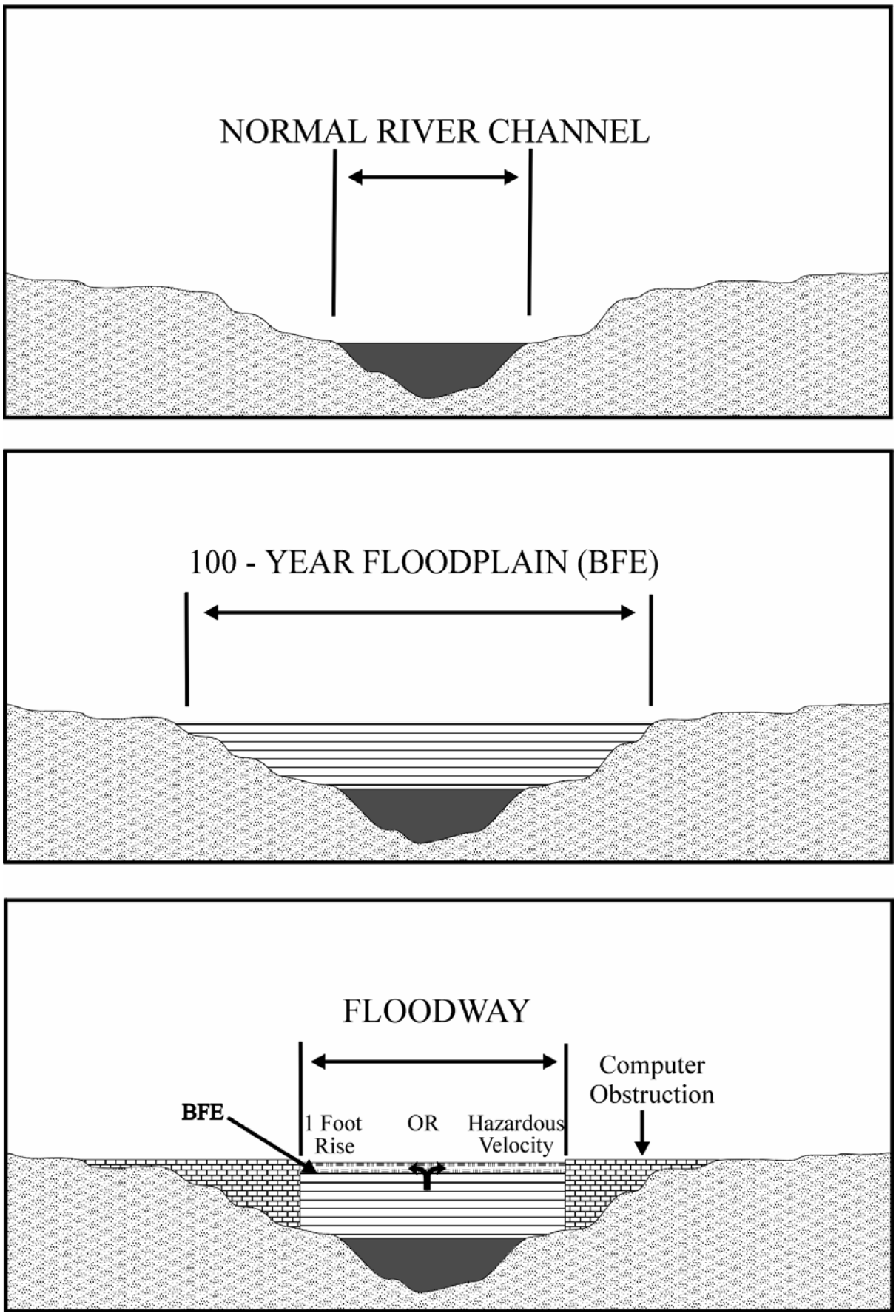



**Figure 4**

***Procedures for No-rise Certification for Proposed Developments in Regulatory Floodways***

Section 60.3(d)(3) of the NFIP regulations at 44 CFR states that a community shall "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 analysis performed in accordance with standard engineering practices that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base (100-year) flood discharge."

Prior to issuing any building, grading or development permits involving activities in a regulatory floodway, the community must obtain a certification stating the proposed development will not impact the pre-project base flood elevations, floodway elevations or floodway widths. The certification should be obtained from the permittee and be signed and sealed by a registered professional engineer.

The engineering or "no-rise" certification must be supported by technical data. The supporting technical data should be based upon the standard step-backwater computer model used to develop the 100-year floodway shown on the community's effective Flood Insurance Rate Map (FIRM) or Flood Boundary and Floodway Map (FBFM) and the results tabulated in the community's Flood Insurance Study (FIS).

Although communities are required to review and approve the "no-rise" submittal, they may request technical assistance and review from the FEMA regional office. However, if this alternative is chosen, the community must review the technical submittal package and verify that all supporting data, listed in the following paragraphs, are included in the package before forwarding to FEMA.

To support a "no-rise" certification for proposed developments encroaching into the regulatory floodway, a community will require that the following procedures be followed:

*Currently Effective Model*

1. Furnish a written request for the step-backwater computer model for the specified stream and community, identifying the limits of the requested data. A fee will be assessed for the requested data. Send requests to:

Federal Emergency Management Agency
3003 Chamblee-Tucker Road
Atlanta, Georgia 30341
or to:
FIS Information Specialist
Dewberry & Davis
8401 Arlington Boulevard
Fairfax, Virginia 22031-4666

*Duplicate Effective Model*

2. Upon receipt of step-backwater computer model, the engineer should run the original step-backwater model to duplicate the data in the effective FIS.

*Existing Conditions Model*

3. Revise the original step-backwater model to reflect site specific conditions by adding new cross-sections in the vicinity of the proposed development (two or more cross-sections) without the proposed development in place. Floodway limits should then be manually set at the new cross-section locations by measuring from the effective FIRM or FBFM. The cumulative reach lengths of the stream should also remain unchanged. The results of these analyses will indicate the 100-year ??floodway?? elevation for revised existing conditions at the proposed project site.

*Proposed Conditions Model*

4. Modify the revised existing conditions model to reflect the proposed development at the new cross-section, while retaining the currently adopted floodway widths. The overbank roughness coefficients should remain the same unless a reasonable explanation of how the proposed development will impact Manning's 'n' values is included with the supporting data. The results of this floodway run will indicate the 100-year floodway elevations for the proposed conditions at the project site. **The results must indicate NO impact on the 100-year flood elevations, floodway elevations, or floodway widths shown in the Duplicate Effective Model or in the Existing Conditions Model.** The original FIS model, the duplicate effective FIS model, the revised conditions model, and the proposed conditions model should all produce exactly the same results.

The "no-rise" supporting data and copy of engineering certification must be submitted to and reviewed by the appropriate community official prior to issuing a permit. The "no-rise" supporting data should include, but may not be limited to:

a. Duplicate of the original FIS step-backwater model printout or floppy disk;
b. Revised existing conditions step-backwater model;
c. Proposed conditions step-backwater model;
d. FIRM and topographic map, showing floodplain and floodway, the additional cross-sections, the site location with the proposed topographic modification superimposed onto the maps, and a photocopy of the effective FIRM or FBFM showing the current regulatory floodway;
e. Documentation clearly stating the analysis procedures. All modifications made to the original FIS model to represent revised existing conditions, as well as those made to the revised existing conditions model to represent proposed conditions, should be well documented and submitted with all supporting data;
f. Copy of the effective Floodway Data table copied from the FIS report;
g. Statement defining source of additional cross-section topographic data and supporting information;
h. Cross-section plots of the added cross sections, for revised existing and proposed conditions;

i. Certified planimetric (boundary survey) information indicating the location of structures on the property;
j. Copy of the microfiche, or other applicable source, from which the input for the original FIS HEC-2 model was taken;
k. Computer disk with all input files; and
l. Printout of output files from EDIT runs for all three floodway models.

The engineering "no-rise" certification and supporting technical data must stipulate NO impact on the 100-year flood elevation, floodway elevations, or floodway widths at the new cross-sections and at all existing cross-sections anywhere in the model. Therefore, the revised computer model should be run for a sufficient distance (usually one mile depending on hydraulic slope of the stream) upstream and downstream of the development site to insure a proper "no-rise" certification.

Attached is a sample "no-rise" certification form that can be completed by a registered professional engineer and supplied to the community along with the supporting technical data when applying for a development permit.

**ENGINEERING "NO-RISE" CERTIFICATION**

This is to certify that I am a duly qualified engineer licensed to practice in the State of North Carolina. It is further to certify that the *attached technical data* supports the fact that proposed _____ (Name of Development) will not impact the 100-year flood elevations, floodway elevations, or floodway widths on _____ (Name of Stream) at published sections in the Flood Insurance Study for _____(Name of Community) dated _____ (Study Date) and will not impact the 100-year flood elevations, floodway elevations, or floodway widths at unpublished cross-sections in the vicinity of the proposed development.

_____ _____

(Date) (Signature)

_____

(Title)

SEAL: _____

(Address)

# INSPECTION OF FLOODPLAIN DEVELOPMENT

Inspection of all floodplain development is the responsibility of communities that participate in the NFIP. Scheduled inspections throughout the development process minimize and prevent unnecessary violations. Site inspections ensure that the structure design which was proposed and approved during the permitting process is consistent with the actual construction, and give the community an opportunity to intervene if construction is not consistent with the Flood Damage Prevention Ordinance.

Inspections for compliance with the Flood Damage Prevention Ordinance can be planned to correspond with the Footing Inspection (308.2), the Foundation Inspection (308.4), and the Certificate of Compliance Inspection (308.8) of Section 308 of the North Carolina State Building Code. To assist the building inspector, communities should adopt a policy of requiring that an elevation reference mark be placed on a stationary object such as a tree or telephone pole near the structure that signifies the height to which the lowest floor must be elevated. This mark can be easily placed by the surveyor when the structure is staked out.

### *Footing Inspection*

In conjunction with the Footing Inspection required by the State Building Code, the inspector should ensure consistency with the site plan that was submitted with the permit application. The building should be situated and placed in the proper location according to the permit. Setback distances, and the location of floodplain and floodway boundaries must be verified and measured, if necessary.

### *Foundation Inspection*

The second inspection to ensure compliance with floodplain management requirements should coincide with the Foundation Inspection. (Non-residential floodproofed buildings will have to be inspected under a slightly different schedule and the building inspector should be accompanied by a consulting or staff engineer.) Making sure a structure is properly elevated is the key to the entire regulatory process. The building inspector can, at this time, verify that the lowest floor will be elevated above the Base Flood Elevation, plus any freeboard specified in the local ordinance. Using a simple hand level available from most surveying supply stores for under $50, and the reference mark placed at the site, the inspector can easily check to see that the lowest floor will be properly elevated. This simple process saves time, money, and frustration because this inspection occurs at a point of construction where changes to the height of the foundation can be made without major difficulty. If a crawl space is being used, the inspector can measure and check the hydrostatic vent openings to ensure that they will be sufficient to satisfy the ordinance requirements. The Foundation Inspection is especially important for V-Zone construction and manufactured homes. The inspector should, once again, verify that there

are no floodway encroachments at the site.

After the Foundation Inspection, the lowest floor will be constructed. The North Carolina Model Flood Damage Prevention Ordinance states that an Elevation Certificate must be completed by a registered, professional engineer or surveyor within 21 days after the lowest floor is set, and before any further vertical construction continues. The Building Inspector is responsible for carefully checking the Elevation Certificate to ensure that the lowest floor is properly elevated. The Elevation Certificate should then become part of the permit file.

### *Final Inspection*

The third inspection coincides with the Certificate of Occupancy Final Inspection. The **"Permitted Items Checklist"** can be used to verify that utilities and other facilities have been properly placed above the elevation indicated on the reference mark at the site. At this time, the inspector should compare the Elevation Certificate with the completed construction to ensure that the reference level has not changed. Any enclosures below the lowest floor should be inspected carefully, and hydrostatic vents should be reinspected to ensure that they open correctly. Placement of any fill at the construction site should be checked for proper compaction and slope. Breakaway walls in V-Zones, and the anchoring system for manufactured homes should be checked. Floodway areas must be checked for encroachments. Flood-resistant materials must be used for all building components below the Base Flood Elevation, plus freeboard. FEMA Technical Bulletin 2-93 "*Flood-Resistant Materials Requirements"* is located at the back of this section. All aspects of the Flood Damage Prevention Ordinance must be satisfied and all necessary certifications must be in the permit file before a Certificate of Occupancy can be issued.

### *Future Inspections*

Once a structure is completed and occupied, the permit process ends; however, the property must remain in compliance with floodplain management regulations and the conditions for which the permit was originally issued. Section 308.12 of the NC State Building Code, *Periodic Inspections for Hazardous or Unlawful Conditions*, states that "the Inspection Department . . . shall make any necessary inspections when it has reason to believe that [hazardous and unlawful] conditions may exist in a particular building." Furthermore, "each Code Enforcement Official (CEO) has a right to enter upon any premises under the provisions of Section 202 (*Right of Entry)* of this code." This enforcement capability extended to the CEO after occupancy can be extremely useful in enforcing restrictions on enclosures below the Base Flood Elevation. Such enclosures, if not properly permitted and constructed, can be hazardous to the residents and contrary to the Flood Damage Prevention Ordinance. Therefore, periodic inspections after construction is complete are recommended, particularly when a structure contains an enclosure below the lowest floor.

**PERMITTED ITEMS CHECKLIST**
**ITEMS BELOW BFE—A ZONE**

PERMIT NO._____ PROPERTY OWNER _____
MAP PANEL _____ MAP DATE _____ FLOOD ZONE _____

BASE FLOOD ELEVATION _____ FREEBOARD _____
PLAN REVIEWER _____ DATE OF REVIEW _____

| | **Zone A** | Allowed | Plan Review Consistency | Inspection Consistency | Corrective Measures to be taken |
|---|---|---|---|---|---|
| 1. | Enclosed area below the BFE [at least 2 water equalizing vents on different walls, 1sq.in./1sq. ft., no more than 1 ft. above grade] | yes | | | |
| 2. | All construction material below BFE flood resistant | yes | | | |
| 3. | Residential garage, unfinished walls, vented | yes | | | |
| 4. | Limited unfinished storage areas, vented | yes | | | |
| 5. | Floodproofed walls (non-residential only) | yes | | | |
| 6. | Electrical outlets | no | | | |
| 7. | Electrical meters (see Note below) | yes | | | |
| 8. | Clothes washer/dryer | no | | | |
| 9. | Air conditioning equipment/components | no | | | |
| 10. | Heating equipment/ components, ductwork | no | | | |
| 11. | Hot water tank | no | | | |
| 12. | Water pressure tank/ pump | no | | | |
| 13. | 2nd refrigerator in storage area/garage | no | | | |
| 14. | Bathroom(s) | no | | | |
| 15. | Gas tanks (unless anchored to prevent flotation) | no | | | |

Note: Electrical meters are allowed below BFE because utility companies are not subject to NFIP criteria. However, installation above BFE is strongly recommended.

## ITEMS BELOW BFE—V ZONE

PERMIT NO._____ PROPERTY OWNER _____
MAP PANEL _____ MAP DATE _____ FLOOD ZONE _____

BASE FLOOD ELEVATION _____ FREEBOARD _____
PLAN REVIEWER _____ DATE OF REVIEW _____

| | **Zone V** | Allowed | Plan Review Consistency | Inspection Consistency | Corrective Measures to be taken |
|---|---|---|---|---|---|
| 1. | Open area, below lowest floor for parking/access | yes | _____ | _____ | _____ |
| 2. | Breakaway walls enclosing area below lowest floor, used for storage, parking, or access | yes | _____ | _____ | _____ |
| 3. | Finished entrance foyer | no | _____ | _____ | _____ |
| 4. | Floodproofed walls | no | _____ | _____ | _____ |
| 5. | Electrical outlets | no | _____ | _____ | _____ |
| 6. | Electrical meters (see Note below) | yes | _____ | _____ | _____ |
| 7. | Clothes washer/dryer | no | _____ | _____ | _____ |
| 8. | Air conditioning equipment/components | no | _____ | _____ | _____ |
| 9. | Heating equipment/ components, ductwork | no | _____ | _____ | _____ |
| 10. | Hot water tank | no | _____ | _____ | _____ |
| 11. | 2nd refrigerator in garage/storage area | no | _____ | _____ | _____ |
| 12. | Bathroom(s) in garage, limited storage or building access | no | _____ | _____ | _____ |
| 13. | Water pressure tank/ pump | no | _____ | _____ | _____ |

Note: Electrical meters are allowed below BFE because utility companies are not subject to NFIP criteria. However, installation above BFE is strongly recommended.

# MAP AMENDMENTS AND REVISIONS

***Why So Many Mapping Problems?***

Flood Insurance Rate Maps (FIRMs) usually utilize U.S. Geological Survey 7.5 Minute Quads as the base map upon which flood hazard areas are portrayed. These topographic maps usually have a scale of 1 inch = 2000 feet, with contour intervals of 5, 10, or 20 feet. Two factors create serious problems for accurately depicting the boundaries of Special Flood Hazard Areas (SFHAs) on the FIRMs:

1. The scale of FIRMs is often at 1 inch = 500 feet or 1 inch = 1000 feet, and much detail is missing from the USGS 1 inch = 2000 feet quads; and,
2. The contour line of the base (100-year) flood elevation must be interpolated between the contours shown on the USGS Quad.

Unless a community can provide FEMA with detailed 1 foot or 2 feet contour topographic mapping, the map product is the best FEMA can produce.

***Legal Status of the FEMA Maps***

The Flood Insurance Rate Maps (FIRMs) and Flood Hazard Boundary Maps (FHBMs) portray the Special Flood Hazard Area (SFHA). For structures located within the SFHA, the purchase of flood insurance is required as a condition for receiving a mortgage from a federally-backed or federally-regulated lending institution. The lender or insurance agent must use the boundaries of the SFHAs shown on the maps to determine if flood insurance is mandatory, even though a site survey may indicate the homesite is above the BFE and is technically outside of the floodplain.

***How Does FEMA Correct the Maps?***

In order to amend or revise the maps to reflect better survey or topographic information, new flood studies, channel improvements, drainage programs, or new land developments, the NFIP regulations provide for the Letter of Map Amendment and Map Revision processes. Letters are issued by FEMA formally removing lots or portions of lots, by legal description, from the SFHA or changing the boundaries of the SFHA. The latter are accompanied by "annotated map panels", a small photocopy of a portion of the FIRM showing the revised SFHA boundaries. All are dated and filed with the community.

**Letter of Map Amendment (LOMA):** This document is used to revise the SFHA boundary based on detailed elevation surveying and/or topographic mapping of *natural conditions*. If the homesite and the lowest floor of the building (including basement or garage) are above the BFE, FEMA can amend the map to remove the homesite and other land area from the SFHA. Thus, the mandatory flood insurance purchase requirement is

lifted.

**Letter of Map Revision, based on fill (LOMR-F):** When land is filled above the BFE and then built upon, FEMA can remove the raised area from the boundaries of the SFHA, thus lifting mandatory flood insurance purchase requirements.

**Letter of Map Revision (LOMR):** This is used for new detailed flood studies, drainage improvements, channel alterations, etc., where the boundaries of the SFHA are altered.

***What Is a "Conditional" LOMA or LOMR?***

A "Conditional" LOMA or LOMR (CLOMA or CLOMR) is one that is approved tentatively, based on construction plans. "As-built" survey information must be submitted in order for approval to be finalized. Thus, two separate letters are issued. The LOMR or LOMA is not legally valid until the as-builts are submitted and acknowledged by the second letter.

***Can Only a Portion of a Parcel Be Removed?***

Yes, if FEMA is provided with a legal description of the land area above the base flood elevation, they can issue a LOMA or LOMR for only a portion of the parcel. Or, in the LOMA or LOMR they might state that only the immediate building site is removed from the SFHA, but that portions of the rest of the property remain within the SFHA, subject to all floodplain management regulations.

***How Does One Apply for a LOMA or LOMR?***

An MT-1 application form [see Appendix I] must be completed and submitted for individual lot LOMRs and LOMAs, which are processed at the FEMA Region IV office. Multi-lots and major LOMRs are submitted on MT-2 applications which go through the Regional Office, but are processed in Washington, D.C. Fees are often assessed for multi-lot application reviews.

**NOTE:** The Elevation Data Sheet for MT-1, individual lot LOMA or LOMR-F, requires determination of some information not normally required on the Elevation Certificate, specifically, the lowest elevation on the parcel. This requirement is in addition to the lowest grade immediately adjacent to the structure and the lowest floor elevation of the structure, including the garage. **If the garage floor is below BFE, FEMA cannot issue a LOMA or LOMR.**

## SUMMARY OF NFIP MAP CHANGE PROCESSES

| Type of Map to be Changed | Status of Map | Type of Change | Process and Authority | Method of Change |
|---|---|---|---|---|
| **FIRM** | In 90-day appeal period | Change to BFE | Appeal (44 CFR, Part 67) | Map and report revised before printing |
| **FHBM**<br>**FIRM**<br>**FBFM** | Effective | Changes to any flood or non-flood information. | | Physical map revision or letter of map revision (LOMR) |
| | | Exclusion from SFHA of structures and legally described parcels of undeveloped land elevated by fill placed after the effective date of the first NFIP map that showed the structure or parcel to be within the SFHA. | Map revision (44 CFR, Part 65) | Letter of map revision (LOMR) |
| | | Conditional changes and conditional exclusion of structures and legally described parcels of land proposed to be elevated by fill. | Conditional map revision (44 CFR, Part 72) | Conditional LOMR |
| **FHBM**<br>**FIRM** | Effective | Exclusion from SFHA of structures and legally described parcels of undeveloped land. | Map amendment (44 CFR, Part 70) | Letter of map amendment (LOMA) |
| | | Conditional exclusion of proposed structures. | Conditional map amendment (44 CFR, Part 72) | Conditional LOMA |

# MINIMUM CONSTRUCTION STANDARDS

The following minimum construction standards are based on the National Flood Insurance Program minimum requirements outlined in Part 44, Code of Federal Regulations, Section 60.3. Local ordinance requirements may be more restrictive.

***AE, A1-99 Flood Zones***

**1.** **Minimize flood damages**: design and construct buildings to minimize future flood damages to life and property.

**2.** **Elevate building**: the lowest floor of all primary buildings must be elevated to or above the Base Flood Elevation (BFE), utilizing stem walls, piling, piers, or fill. Basements are not allowed. We recommend elevating at least one foot above the BFE.

**3.** **Mechanical and electrical equipment**: all mechanical and electrical equipment servicing the building must be elevated to or above BFE, or must be floodproofed to prevent the entry of water into the system. This includes bathrooms, laundry facilities, electrical panels, AC units, furnaces, freezers.

**4.** **Anchoring**: buildings and foundations systems must be designed and adequately anchored to resist buoyancy, flotation, collapse, and lateral movement due to the force of floodwaters.

**5.** **Enclosures below flood level**: enclosed areas below and elevated habitable floor are subject to numerous restrictions:

**A.** **Uses allowed**: only parking, storage, and building access is allowed. A bathroom, laundry, in-law suite, recreation room, etc. is not permissible;

**B.** **Openings**: hydrostatic openings must be provided to relieve the pressure of floodwaters on the exterior walls. Minimum of 2 openings, no more than 1 ft. above adjacent finished grade. Openings may be louvered, screened, etc., but must be self-actuating. Openings must be provided for any interior walls, so that the enclosed area floods evenly;

**C.** **Materials**: flood-resistant materials must be used below BFE (see FEMA Technical Bulletin 2-93);

**D.** **Electrical service**: the number of switches and outlets must be the minimum necessary for adequate safety and security. All electrical service below BFE must be provided on a ground-fault interrupt (GFI) circuit separate from other circuits used in the building.

**E.** **Other**: heating and/or air conditioning of enclosed areas should not be permitted. Any interior partitioning must be minimized to that necessary to accommodate fire, life, safety, and security standards; for example, separating the parking area from the rest of the enclosed area.

***VE, V1-99 Zones***
***Coastal High Hazard Areas***

**1.** **Minimize Flood Damages**: design and construct buildings to minimize future flood damages to life and property.

**2.** **Elevate Building**: the *bottom surface of the lowest horizontal structural member* (*e.g.,* floor beam) of the lowest floor of all primary buildings must be elevated to or above the Base Flood Elevation (BFE), utilizing piles or columns. Basements are not allowed. We recommend elevating at least one foot above BFE.

**3.** **Mechanical and Electrical Equipment**: all mechanical and electrical equipment servicing the building must be elevated to or above BFE, or must be floodproofed to prevent the entry of water into the system. This includes bathrooms, laundry facilities, electrical panels, AC units, furnaces, and freezers.

4. **Foundation Systems**: foundation systems must be designed to adequately withstand the simultaneous forces of both water and wind associated with a Base Flood, acting on all building components, including buoyancy, flotation, collapse, and lateral movement. Buildings must be adequately anchored to such foundation systems. Each building/foundation system must be certified by a registered professional architect or engineer that it conforms to the minimum NFIP standards (use the V-Zone Certificate).

5. **Enclosures Below Base Flood Elevation**: enclosed areas below an elevated habitable floor are subject to numerous restrictions:

**A.** **Uses allowed**: only parking, storage, and building access is allowed. A bathroom, laundry, in-law suite, recreation room, etc. is not permissible.

**B.** **Breakaway walls**: prohibit solid walls below BFE to keep the area "free of obstruction", unless they are designed to be "breakaway" when subjected to water loads of only 10 to 20 psi, or

are designed and certified by a registered professional architect or engineer to breakaway during a Base Flood, without damaging the superstructure. FEMA recommends use of only light lattice or insect screening to provide enclosure.

**C.** **Size of area**: if more than 299 square feet are enclosed with solid breakaway walls, flood insurance rates will be significantly higher. Therefore, we recommend limiting the size of such enclosed areas to 299 square feet. Enclosure by screening or light lattice is exempted.

**D.** **Materials**: flood resistant materials must be used below BFE (see FEMA Technical Bulletin 2-93).

**E.** **Electrical service**: the number of switches and outlets must be the minimum necessary for adequate safety and security. All electrical service below BFE must be provided on a ground-fault interrupt (GFI) circuit separate from other circuits used in the building.

**F.** **Other**: heating and/or air conditioning of enclosed areas should not be permitted. Any interior partitioning must be minimized to that necessary to accommodate fire, life, safety, and security standards; for example, separating the parking area from the rest of the enclosed area. Foyers should be designed to be structurally separated from the habitable living areas, since the lower foyer is intended to be destroyed during a 100-year storms. Unless the building is carefully designed, such an event could create a large opening in the elevated building "envelope", rendering it subject to severe damage by high winds.

6. **Fill**: prohibit the use of structural fill.

7. **Environmental Protection**: protect sand dunes and mangroves from man-made alteration that would increase flood hazard.

## *Manufactured Homes*
***Zones AE, A1-99***

1. New manufactured home installations must comply with the minimum standards for other new construction, *(i.e.*, elevating, anchoring, adequate foundation system to withstand flood forces.)

2. Replacing a manufactured home is considered "new construction".

3. Additions to manufactured homes must be treated as independent structures subject to the standards for "new construction".

4. An exemption is provided for pre-existing manufactured home parks or subdivisions, if the following criteria are met:

    A. The park or subdivision pre-exists the effective date of the FIRMs;

    B. No manufactured home occupying the given space or lot has been "substantially damaged" (*i.e.*, 50% or more of its value) by a flood; and,

    C. The portion of the park or subdivision was not created after the effective date of the FIRMs.

5. The exemption for replacing manufactured homes in pre-existing manufactured home parks and subdivisions allows elevating the manufactured home only 36 inches above grade (to the bottom of the chassis), in lieu of elevating to or above the BFE. However, the foundation system must be reinforced piers or a system of equivalent strength.

# SUBSTANTIAL IMPROVEMENT

***General Discussion***

The following discussion addresses several of the issues surrounding the NFIP regulations concerning substantial improvement and substantial damage. The attached ***Notice to Property Owners***, adapted from a Dare County form, should be used by local governments for both non-disaster related structural improvements and in post-disaster damage situations.

**Substantial Damage:** Pre-FIRM buildings must be elevated if damaged by any cause for which repair costs are 50% or more of the value of the building. The damage can be incurred from **any** cause, including: flooding; fire; earthquake; wind; rain; or, man. The substantial damage rule applies to all buildings in a flood hazard area, regardless of whether the building has flood insurance. The costs to repair the structure must be calculated for full repair to before-damage condition, even if the owner elects to do less. The total costs to repair include both structural and finish materials, and labor.

**Substantial Improvement:** When a pre-FIRM building is proposed to be remodeled, renovated, rehabilitated, added to, or in any way improved, the proposed modifications must be evaluated for "substantial improvement". If the total costs of improvement are 50% or more of the building value, the building must be elevated. "Total costs" means all structural costs, as well as all finish materials, built-in appliances, hardware, profit, and overhead.

**Building Value:** Building value = market value of the structure only. Land and exterior improvements are excluded, *e.g.,* swimming pool, pool enclosure, landscaping, paving. Market value = assessed value or properly depreciated appraised building value. The assessed value may be adjusted upward to reflect the market more accurately. Replacement cost can only be used if properly depreciated. Certified appraisals must be based on the comparable sales method. The land value must be deducted and it must be equal to or greater than that established by the County Assessor. The building value must be fairly depreciated to reflect the age of the building and the deterioration of building components.

**Costs to Be Included:** The construction costs to be calculated for both substantial damage and improvement include both structural and finish labor and materials. This includes lighting fixtures, built-in appliances, interior moldings, paneling, tiling, wall-to-wall carpet over subflooring, built-in cabinets, etc. The cost to demolish undamaged building components must be established and included. Overhead and profit are also included, although the cost of permits may be excluded. Many of these costs are not

normally calculated for purposes of a building permit, nor are they regulated as part of the building code, but they must be calculated for compliance with the 50% rule.

**When Maps Are Revised:** Substantial damage and substantial improvement can affect post-FIRM buildings, too. If the FIRMs are revised, and the flood elevations increase, many post-FIRM buildings may be affected. The 50% rule then applies to them if they decide to make improvements or they incur damage. All additions to a post-FIRM structure must be elevated to or above the current BFE, whether they are "substantial" or not.

**Cumulative Costs:** Substantial damage and substantial improvement are subject to "cumulative" clauses in many community ordinances. FEMA generally requires that all separate permits for the same structure within a 1-2 year period are a single improvement and/or repair. This period runs from the date of final inspection or Certificate of Occupancy, not from the date the building permit was issued. Some communities require 5, 10, 50 years, or the life of the structure.

# Notice to Property Owners

## Rebuilding or Remodeling a Structure in a Special Flood Hazard Area

If your home or business has sustained damage or if you are making improvements to the structure and/or interior of the building, please be advised that _____(Community) has adopted a Flood Damage Prevention Ordinance that may affect how you rebuild or make improvements to a structure in the Special Flood Hazard Area (SFHA). The ordinance was adopted on _____ (date of adoption) in order to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions. This document addresses the "substantial improvement" clauses in the ordinance and can save property owners time, aggravation, and money.

If a structure is substantially damaged, or remodeling is planned that will substantially improve the structure, it must be brought into compliance with _____ (Ordinance # and title), including elevation of the structure to or above the 100-year flood elevation. "Substantial damage" means damage **of any origin** sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred. The cost of repairs must include all costs necessary to fully repair the structure to its before-damage condition.

"Substantial improvement" includes any repair, reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement. Please refer to the ordinance for special exemptions that may apply to buildings with previously cited health or safety violations, and historic structures.

_____ (Community and Department) has the responsibility of determining substantial damage and substantial improvement and has implemented procedures to do so in accordance with the guidelines established by the National Flood Insurance Program:

1. Estimate the market value by using the tax assessment value of the structure, excluding land. If you disagree with this estimate, you may hire a state licensed appraiser and submit a comparable property appraisal;

2. You must obtain and submit to permitting officials a detailed and complete cost estimate for reconstruction or repair of all planned improvements or all damages sustained by your home, prepared and signed by a licensed general contractor. The contractor must sign the document as an affidavit that the cost estimate includes all damages and/or improvements to your home, not just structural alterations;

3. If your home is determined to have substantial damage or to be a substantial improvement, you must obtain and submit an Elevation Certificate to permitting officials to determine if the lowest floor elevation is in compliance with the ordinance. Garages and carports, if used strictly for limited storage, parking, or access to the building are not considered a structure's lowest floor;

4. If the lowest floor of a substantially damaged structure is below the required lowest floor elevation in the ordinance, the building must be elevated to or above the requisite elevation. All electrical and mechanical equipment (heating, cooling, hot water heaters, etc.), bathrooms, and laundry rooms facilities must be elevated to or above the required lowest floor elevation. If the lowest floor, electrical and mechanical equipment, laundry and bathrooms are already above the requisite lowest floor elevation, and the structure is otherwise compliant with the ordinance, the repairs or alterations may be permitted without further modifications. Repairs or alterations which would make the building nonconforming are prohibited;

5. Building plans must be submitted which show how the building is to be elevated. If located in a V-Zone, Coastal High Hazard Area, these plans must be prepared and certified by a registered professional engineer or architect. Certified plans and a completed V-Zone Certificate are required prior to issuance of a building permit;

6. The ordinance requires that gas and liquid storage tanks be anchored to prevent flotation during conditions of flooding. Tanks which were separated from the structure during the flooding event must be anchored upon replacement.

7. The ordinance also regulates accessory structures, which must be anchored. Any electrical equipment in these buildings must be elevated to or above the requisite lowest floor elevation.

## APPLICATION FOR DETERMINATION OF
## ❒ Substantial Improvement
## ❒ Substantial Damage

Permit No._____ Tax Map _____ Block _____ Parcel _____
Lot_____

Property Address: _____ Subdivision Name: _____

FIRM Panel #: _____ Flood Zone: _____ BFE: _____
❒ MSL
❒ NGVD
Pre-Damage Elevation: _____ ❒ NAVD Date Damage Sustained: _____

| | **Property Owner** | **Co-Owner** |
|---|---|---|
| Name | _____ | _____ |
| Mailing Address | _____ | _____ |
| | _____ | _____ |
| | _____ | _____ |
| Phone Number | _____ | _____ |

❒ I am attaching an appraisal report of my property, or Initials_____
❒ I am not submitting an appraisal report of my property and
I accept Estimated Market Value from tax assessment. Initials_____

❒ I accept the attached estimated cost of construction as a fair
cost of repair/improvement for my home. Initials_____

The following documents are attached:
❒ Detailed Construction Cost Estimate, signed by a General Contractor
❒ Contractor's Affidavit, signed, dated, and certified
❒ Copy of Contractor's License
❒ Owner's Affidavit, signed, dated, and certified
❒ FEMA Elevation Certificate
❒ Floor plan drawing (if available)
❒ Photos before and after damage event (if available)

**Signatures**

**Owner: _____ Date: _____**

**Co-Owner: _____ Date: _____**

# OWNER AFFIDAVIT

Permit No._____ Tax Map _____ Block _____ Parcel _____ Lot ____

Property Address: _____ Subdivision Name: _____

Contractor Name: _____ License Number: _____

Owner Name: _____ Phone Number: _____

.....

(check one or both, as applicable)

❒ I hereby attest to the fact that the repairs/reconstruction and/or remodeling list submitted for review by my contractor are all the damages sustained by this structure and that all other additions and improvements, or repairs proposed on the subject property are included in this estimate. **No other contractor has made any repairs, reconstruction, additions, or remodeling not included on the attached list.**

❒ I hereby attest to the fact that the repairs, additions, rehabilitations, reconstructions and/or remodeling list submitted for review by my contractor are all of the improvements that will be done to the existing structure and that all other additions, improvements, or repairs on the subject property are included in this estimate. **No other contractor has made any repairs, reconstruction, additions, or remodeling not included on the attached list.**

I understand that I am subject to enforcement actions and/or fines if inspection of the property reveals that I have made repairs **not included on the attached list of repairs/modifications to my home** or that I have included non-conforming or illegal structures/additions to the existing structure without having presented any plans for such additions. I understand that any permit issued by this jurisdiction pursuant to this affidavit does not authorize the reconstruction, repair, or maintenance of any illegal additions, fences, sheds, or nonconforming uses of structures on the subject property.

**State of North Carolina, County of**

Before me this day personally appeared _____ and _____ each of whom, being duly sworn, deposes and says that he has read, understands and agrees to comply with all the aforementioned conditions.

_____ _____

**Signature of Owner** **Signature of Co-Owner**

Sworn to and subscribed before me this _____ day of _____ A.D. 19____.

(Seal)

Notary Public, State of North Carolina

**My Commission expires: _____**

# CONTRACTOR AFFIDAVIT

Permit No._____ Tax Map _____ Block _____ Parcel _____ Lot _____

Property Address: _____ Subdivision Name: _____

Contractor Name: _____ License Number: _____

Owner Name: _____ Phone Number: _____

I hereby attest to the fact that I, or an employee of my company, personally inspected the above mentioned property and produced the attached list of itemized repairs, additions, rehabilitations, reconstructions and/or remodeling list which are hereby submitted for review:

(check one or both, as applicable)

❒ These damages are all the damages sustained by this structure, and all other additions and improvements or repairs proposed on the subject property are included in this estimate.

❒ These improvements are all of the improvements that will be done to the existing structure, and all other additions, improvements, or repairs on the subject property are included in this estimate.

I understand that I am subject to enforcement actions and/or fines if inspection of the property reveals that I have made repairs **not included on the attached list of repairs/modifications to this structure** or that I have included non-conforming or illegal structures/additions to the existing structure without having presented any plans for such additions. I understand that any permit issued by this jurisdiction pursuant to this affidavit does not authorize the reconstruction, repair, or maintenance of any illegal additions, fences, sheds, or non-conforming uses of structures on the subject property.

Total Labor and Materials: $_____
Overhead and Profit: **$**_____
Total Cost: $_____

**State of North Carolina, County of** _____

Before me this day personally appeared_____ who, being duly sworn deposes and says that he has read, understands and agrees to comply with all the aforementioned conditions.

**Signature of Contractor:** _____

Sworn to and subscribed before me this _____ day of _____ A.D. 19____.

(Seal) _____
Notary Public State of North Carolina

**My Commission expires:**

# ESTIMATED COST OF RECONSTRUCTION

Permit No._____ Tax Map _____ Block _____ Parcel _____ Lot _____

Property Address: _____ Subdivision Name: _____

| ITEMS | COST | | TOTAL COST |
|---|---|---|---|
| | LABOR | MATERIALS | |
| Concrete, Form, etc. | | | |
| Carpentry Material (rough) | | | |
| Carpentry Labor (rough) | | | |
| Roofing | | | |
| Insulation and Weather Strip | | | |
| Exterior Finish (Stucco) | | | |
| Doors, Windows, and Shutters | | | |
| Lumber Finish | | | |
| Carpenter Labor, Finish | | | |
| Hardware, Rough | | | |
| Hardware, Finish | | | |
| Cabinets, built-in | | | |
| Floor Covering (tile, rug) | | | |
| Plumbing | | | |
| Shower/Tub/Toilet | | | |
| Electrical | | | |
| Light Fixtures | | | |
| Built-in Appliances | | | |
| HVAC | | | |
| Paint | | | |
| Overhead and Profit | | | |
| **TOTAL** | | | |

Note: Full market value must be applied for all donated labor and materials.

Contractor Name: _____ License Number: _____
Address: _____ Phone Number: _____
Signature: _____ Date: _____

# SUBSTANTIAL DAMAGE
# SUBSTANTIAL IMPROVEMENT

## *Items to be Included*

**All structural elements, including:**

Spread or continuous foundation footings and pilings
Monolithic or other types of concrete slabs
Bearing walls, tie beams, and trusses
Floors and ceilings
Attached decks and porches
Interior partitions walls
Exterior wall finishes (*e.g.*, brick, stucco, or siding) including painting and decorative moldings
Windows and doors
Reshingling or retiling a roof
Hardware

**All interior finishing elements, including:**

Tiling, linoleum, stone, or carpet over subflooring
Bathroom tiling and fixtures
Wall finishes (*e.g.*, drywall, painting, stucco, plaster, paneling, marble, or other decorative finishes)
Kitchen, utility, and bathroom cabinets
Built-in bookcases, cabinets, and furniture
Hardware

**All utility and service equipment, including:**

HVAC equipment
Repair or reconstruction of plumbing and electrical services
Light fixtures and ceiling fans
Security systems
Built-in kitchen appliances
Central vacuum systems
Water filtration, conditioning, or recirculation systems

**Also:**

Labor and other costs associated with moving or altering undamaged building components to accommodate improvements or additions
Overhead and profits

## *Items to be Excluded*

**Plans and specifications**

**Survey costs**

**Permit fees**

**Cost to demolish storm-damaged building components**

**Outside improvements, including:**

Landscaping
Sidewalks
Fences
Yard lights
Swimming pools
Screened pool enclosures
Sheds
Gazebos
Detached structures (including garages)
Landscape irrigation systems

# GUIDANCE ON GRANTING VARIANCES TO FLOODPLAIN MANAGEMENT REQUIREMENTS

A variance, for National Flood Insurance Program (NFIP) purposes, is a grant of relief by a community from floodplain management regulations. It is granted for floodplain management purposes only; hence flood insurance will still be rated according to risk. A variance pertains to a piece of property and must not be personal in nature. A properly issued variance is granted for a parcel of property with physical characteristics so unusual that complying with the ordinance would create exceptional hardship on the applicant or surrounding property owners. The unique characteristics must pertain to the land itself, not the structure, its inhabitants, or the property owners.

The NFIP does not provide any absolute criteria for granting a variance, except in the cases cited below. The best policy is not to grant any variance to the NFIP minimum regulations unless it fits into the categories below, or there are compelling reasons. Individual discretion may be used when considering a variance to ordinance criteria which are more stringent than the NFIP requirements unless those criteria are established by State law or regulations. Specifically, NFIP regulations provide for the granting of a variance in the following situations:

1) A structure individually listed on the Federal or State Register of Historic Places is not required to meet the elevation requirement when it is substantially improved, provided the modifications do not preclude the structure's continued designation as a historic structure.

2) A functionally dependent use, in which the use of the building is absolutely dependent on its close proximity to water, may be excluded from the elevation requirement, provided that acceptable methods of wet floodproofing are incorporated into the design.

3) A new structure or substantial improvement on a lot of one half acre or less in size and contiguous to and surrounded by existing structures below flood level, provided all other variance criteria are met. The assumption is that a larger lot will allow enough flexibility to meet all of the NFIP requirements.

### *Criteria for Granting Variances*

In granting a variance, the following factors must be considered:

1) Applicant must show good and sufficient cause for a variance. The cause must pertain to constraints of the property which would not allow reasonable use while meeting the requirements of the ordinance. The variance must not grant special benefits to the applicant not enjoyed by other floodplain residents.

2) Applicant will suffer hardship if denied the variance. Again, the hardship must pertain to the characteristics of the land itself, not personal hardship. Any physical characteristic of the land that would justify a variance to the flood elevation requirement is difficult to imagine. Therefore, a variance would be very difficult to grant in the case of #3 above, since other options must be exhausted.

3) A variance will not cause increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with other State and local laws or ordinances.

4) The variance granted must be the minimum necessary, considering the flood hazard, to afford relief. The greater the hazard, the less the relief that can be afforded. The variance must be modified to be the minimum that will both provide relief and preserve the integrity of the local ordinance. The resulting variance issued may be considerably less than that requested.

5) Additional conditions may be added to mitigate any possible detrimental effects of granting the variance. Other property owners cannot be adversely affected in any material way.

***Hardship and Variances***

Hardship is the least understood and hardest to establish criterion for granting a variance. To determine whether an applicant has established an exceptional hardship sufficient to justify a variance, the local appeals board must weigh the hardship against the purpose of the ordinance. The floodplain ordinance is based on public safety and damage reduction. If the variance requested is to waive or reduce the elevation requirement, the individual hardship must be weighed against the community's need to protect its citizens against the dangers and damages due to flooding. Only a truly exceptional and unique hardship should persuade a local board to set aside provisions of an ordinance designed with the entire community's safety in mind. In many cases, the applicant may be better advised to seek a variance to other standards that have less impact on public safety, such as lot line setbacks or height requirements. In many cases, the personal circumstances evoke compassion, but the hardship is not sufficient to justify deviation from the flood damage prevention requirements. A variance cannot be based on the personal circumstances of the applicant. The effects of the variance often survive long after a personal hardship ceases to exist, and can create unforeseen flooding problems. Even if flooding does not occur, the salability of the property may be affected.

A variance to provide access for a handicapped person cannot be granted as an exceptional hardship because the problem is personal in nature and can be solved in other ways than not elevating. In addition, granting a variance in this case raises a critical public safety concern. A disabled person may be unable to evacuate the building during flooding, but may be able to survive the flood by remaining at home safely above the level of the flood waters, if the building is elevated properly. A variance would postpone, and perhaps increase, the personal hardship.

***Insurance Rates***

In considering a variance, the effects on flood insurance premiums should not be minimized. A structure at greater risk to flooding than the ordinance allows will be rated according to the risk. Premiums may be as high as $25 for each $100 of coverage. The community must notify the applicant in writing that the issuance of a variance to construct a structure below the BFE will result in increased premium rates and that such construction increases risks to life and property. This notification shall be maintained with a record of all variance actions. Since flood insurance is required by lenders, prohibitively high rates can result in a structure which is difficult or impossible to sell.

***Fraud and Victimization***

Buildings that are constructed below the elevation of the 100-year flood will probably remain part of the community for 50 to 100 years. During this time they remain subject to increased risk of damage from flooding and to higher flood insurance premiums. Fraud and victimization may occur if future owners who purchase the building are unaware that it is subject to increased risk and can be insured only at very high flood insurance rates. Therefore, variances should be recorded on the deed to the property so that a title search will disclose these facts.

***Summary***

The duty of local governments to protect their citizens from flooding is so compelling, and the implications of the cost of insuring a structure below flood level are so serious, that variances from the 100-year flood elevation requirement should not be granted. Requests for variances to ordinance requirements must be evaluated according to the public safety function that the requirement serves and the additional risk granting a variance would generate. In some cases, variances to other zoning or code requirements may satisfy the need of the applicant, but have less public safety impact. The applicant should be advised to seek relief from these other requirements first.

# SUPPLEMENTAL DATA FOR VARIANCE

## A. GENERAL DATA

**Name of Applicant**: _____

The above named individual, firm, or corporation hereby respectfully submits the following supplemental data in support of the preliminary information provided on the accompanying Permit Application dated _____ for the purpose of securing a variance from existing land use zoning controls.

_____ _____ _____

**Contact Person Last Name, First M.I. Daytime Phone Evening Phone**

……

## B. PROJECT INFORMATION

1. Specify the section of the ordinance from which the variance is sought: _____

2. Explain how you wish to vary from the applicable provisions of the ordinance: _____
_____

3. Explain the hardship or practical difficulty imposed if strict application of the ordinance is imposed (financial hardship is not sufficient reason to grant a variance): _____

4. Check all additional supporting documents and data which are being submitted to help explain this project proposal:
[ ] sketch plan; [ ] topographic map; [ ] detailed narrative; [ ] operation plans; [ ] engineering plans; [ ] floodplain hydraulic analysis; [ ] floodproofing plans and specifications;
[ ] other (specify)
_____

I hereby certify with my signature that all data on my application forms, plans, and specifications are true and correct to the best of my knowledge:

_____ _____
Signature of Applicant Date

……

## ORDER GRANTING OR DENYING VARIANCE

In accordance with the findings stated on the reverse side of this document, the Board of Adjustment of _____ hereby [ ] approves, [ ] denies the foregoing request for Variance. If approved, said approval is subject to the General and Special Provisions following the Findings section on page 2.

By: _____ _____ _____
(Authorized Signature) (Title) (Date)

# PAGE 2
# VARIANCE
# FINDINGS

1. This matter was heard at a public hearing before the Board of Adjustment on: _____

2. Strict application of the provisions of the Zoning Ordinance [ ] would, [ ] would not cause undue hardship to the owner of the property in question because of the following facts which were presented at the hearing held on this case: _____
_____
_

3. The hardship found to exist in Finding 1, above [ ] is, [ ] is not unique to the property in question, and [ ] is, [ ] is not shared by properties in the immediate vicinity of this property and in the same use district because of the following facts:
_____
_

## GENERAL PROVISIONS

1. This variance is not valid until the recipient has recorded it at the Office of the County Recorder and submitted a certified copy thereof to the Office of the Zoning Administrator.

2. This variance does not constitute a building permit, sewage system permit, grading/filling permit, well permit or the like. Separate permits may have to be applied for and obtained in order to accomplish all of the goals of your project.

3. The issuance of this variance does not negate the need to secure other permits from other local units of government, state agencies or federal agencies who may also have jurisdiction over portions of your project.

## SPECIAL PROVISIONS

1. _____

2. _____

3. _____

4. _____

5. _____

# COASTAL HIGH HAZARD AREAS

Coastal high hazard areas are special flood hazard areas (SFHA) that are located along coastlines which are subject to high water levels and wave action from strong storms and hurricanes. The winds and resultant waves and tidal surges associated with these storms cause water of high velocities to sweep over near shore lands. These areas are extremely hazardous to life and property. The V-Zone (Velocity Zone) is that portion of the coastal 100-year floodplain that would be inundated by tidal surges with velocity wave action. Generally, the V-Zone indicates the inland extent of a 3-foot breaking wave, where the still water depth during the 100-year flood decreases to less than 4 feet. The A-Zone is that portion of the 100-year floodplain not subject to wave action. However, the residual forward momentum of the breaking wave may be present in this zone. Coastal high hazard areas are identified on the Flood Insurance Rate Maps as Zones V1-30, VE, and V.

### *V-Zone Structures*

All new structures in coastal high hazard areas (VE or V1-30 flood zones) must be located landward of the reach of mean high tide. All new construction or substantial improvements must be elevated on pilings, columns, or shear walls so that the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings or columns) is elevated to or above the 100-year flood level so as not to impede the flow of water. No fill material may be used for structural support.

The structure must be adequately anchored to the pile or column foundation to resist flotation, collapse, and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Wind and water loading values must each have a one percent chance of being equaled or exceeded in any given year (100-year mean recurrence interval).

The space below the lowest floor of all new structures or substantial improvements to existing structures in coastal high hazard areas must either be free of obstruction or constructed with non-supporting breakaway walls. Permissible construction materials are solid breakaway walls, open wood lattice-work or insect screening. Any construction below the lowest floor should collapse under wind and water loads without causing collapse, displacement or other structural damage to the elevated portion of the building or the supporting foundation system.

Additional construction requirements for V-Zones can be found in Part I, Section *Minimum Basic Requirements* of this manual. In order to ensure that all construction requirements are met for V-Zone development, the attached ***V-Zone Certification*** form must be completed and signed by a registered professional engineer or architect. Furthermore, the community must maintain a copy of the completed form in the permit file for all structures built or substantially improved in the V-Zone.

# THE COMMUNITY RATING SYSTEM

The NFIP has been successful in requiring new buildings to be protected from damage by the 100-year flood. However, the program had few incentives for communities to do more than enforce the minimum regulatory standards. Flood insurance rates had been the same in all participating communities, even though some do much more than regulate construction of new buildings to the national standards.

The Community Rating System (CRS) was established to encourage, by the use of flood insurance premium adjustments, community and state activities beyond those required by the National Flood Insurance Program to:

- reduce flood losses;
- facilitate accurate insurance rating; and,
- promote awareness of flood insurance.

### *Community Classification*

Flood insurance premium credits are available in communities based on their CRS classification. There are ten classes with Class I having the greatest premium credit and Class 10 having no premium credit. A community's CRS class is based on the number of credit points calculated for the activities that are undertaken to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance.

A community is automatically in Class 10 unless it applies for CRS classification and shows that the activities it is implementing warrant a better class. Currently, each 500 points accumulated by a community results in a 5% reduction in flood insurance premiums.

### *Operation*

Community application for CRS classification is **voluntary**. Any community in full compliance with the rules and regulations of the NFIP may apply for a CRS classification. Eighteen creditable activities are organized under four categories. Credit points are assigned based on how well an activity affects the three goals of the CRS. Communities are welcome to propose alternative approaches in their applications.

The community's activities and performance are reviewed periodically. If it is not properly or fully implementing the credited activities, its credit points and, possibly, its CRS classification, will be revised. A community may add or drop creditable activities each year. Criteria for each activity may also change as more experience is gained in implementing, observing, and measuring the effectiveness of activities.

### *Costs and Benefits*

It is important to note that reduction in flood insurance rates is only one of the rewards communities receive by undertaking activities credited under the Community Rating System. Others include increased public safety, reduction of damages to property and public infrastructure, avoidance of economic disruption and losses, reduction of human suffering, protection of the environment, and industrial recruitment.

Communities should prepare and implement those activities that best deal with the local flood problem. In considering whether to undertake a new activity, communities will want to consider all of the benefits the activity will provide in order to determine whether it is cost effective.

## AVERAGE POINTS FOR THE CRS CREDITABLE ACTIVITIES

| Activity | | Average Points |
|---|---|---|
| *Public Information Activities* | | |
| 310 Elevation Certificate | | 73 |
| 320 Map Determinations | | 140 |
| 330 Outreach Projects | | 59 |
| 340 Hazard Disclosure | | 39 |
| 350 Flood Protection Library | 20 | |
| 360 Flood Protection Assistance | | 51 |
| *Mapping and Regulatory Activities* | | |
| 410 Additional Flood Data | | 60 |
| 420 Open Space Preservation | | 115 |
| 430 Higher Regulatory Standards | | 101 |
| 440 Flood Data Maintenance | 41 | |
| 450 Stormwater Management | | 90 |
| *Flood Damage Reduction Activities* | | |
| 510 Repetitive Loss Projects | | 41 |
| 520 Acquisition and Relocation | | 97 |
| 530 Retrofitting | | 23 |
| 540 Drainage System Maintenance | | 26 |
| *Flood Preparedness Activities* | | |
| 610 Flood Warning Program | 173 | |
| 620 Levee Safety | | 0 |
| 630 Dam Safety | | 63 |

To apply, the community must obtain a letter of "good standing" in the NFIP from FEMA, and then submit documentation that it is implementing one or more of the activities recognized in the CRS Schedule to total at least 500 points. This application must be forwarded to the Federal Emergency Management Agency at the following address:

FEMA Region IV
3003 Chamblee-Tucker Road
Atlanta, Georgia 30341

A community may choose to apply using either the standard application or the condensed "Short Form Application" which is intended mainly for use by first-time applicants to the CRS. To obtain a current CRS Schedule, which contains application materials, contact the ISO representatives in Atlanta at (404) 923-9898. The North Carolina Division of Emergency Management, NFIP Coordinator's Office is prepared to help communities design creditable activities and assist with the application process.