

ABOUT THE RHODE ISLAND STATEWIDE PLANNING PROGRAM....

The Rhode Island Statewide Planning Program is established by Chapter 42-11 of the *General Laws* as the central planning agency for state government. The work of the Program is guided by the State Planning Council, comprised of state, local, and public representatives and federal advisors. The staff component of the Program is comprised of the Statewide Planning unit of the Office of Planning, Library and Information Services within the Department of Administration.

The objectives of the Program are to plan for the physical, economic, and social development of the state; to coordinate the activities of government agencies and private individuals and groups within this framework of plans and programs; and to provide planning assistance to the Governor, the General Assembly, and the agencies of state government. The Program prepares and maintains the State Guide Plan as the principal means of accomplishing these objectives. The State Guide Plan is comprised of a series of functional elements that deal with physical development and environmental concerns, the economy, and human services.

Program activities are supported by state appropriations and federal grants. Preparation of this handbook was supported in part by a grant from the Federal Emergency Management Agency (FEMA). The contents of the handbook reflect the views of the Statewide Planning Program, which is responsible for the accuracy of the facts and data presented herein. The contents do not necessarily reflect the views and policies of the Federal Emergency Management Agency, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use. This publication is based upon publicly-supported research and may not be copyrighted. It may be reprinted, in part or in full, with proper attribution of the source as follows:

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To conserve resources and reduce waste, this document is printed on acid-free, 30% post-consumer waste, recycled paper.

PREFACE

This Handbook provides an accessible and concise reference guide to the National Flood Insurance Program's (NFIP) land management and construction requirements. It has been designed primarily to address the needs of local building, planning and zoning officials engaged in the daily enforcement of the NFIP's requirements. The Handbook is intended to supplement the Program's regulations, published in the *Federal Register*, and incorporated in the *State Building Code*. It compiles, explains, illustrates, and provides examples of the Program requirements which local officials are charged to enforce. This, the second edition of the Rhode Island NFIP Handbook; updates and replaces the first edition that was published in 1984.

Information in the Handbook has been organized under four major headings or parts:

- Part 1 provides an overview of the NFIP and discusses the role communities play in the NFIP, including a summary of the major responsibilities of participating communities.
- Part 2 describes flood maps and studies published by the NFIP for use in administering the Program.
- Part 3--a key part of the Handbook--lists and explains all the locally-enforced NFIP requirements, and provides guidance on Program requirements that typically generate concern for local enforcement.
- Part 4 describes procedures that communities should follow in reviewing floodplain development proposals.

In addition to basic information, sections offering supplemental information or guidance on special topics are interspersed throughout the Handbook, identified by **→For Your Information←** and **→Special Consideration←** headings.

Tips to assist administration of the Program's requirements are identified by a symbol adjoining the narrative.



At the end of the Handbook are appendices providing lists of NFIP definitions, and sources of additional information; a selected bibliography; and an index. The last page of the Handbook is a **Quick Reference Guide and Checklist**, offering a handy, one-page summation of the Program's key requirements.

This Handbook was developed by George W. Johnson, Principal Planner, working under the supervision of Victor Parmentier, Supervising Planner, and Susan Morrison, Chief of Statewide Planning. Graphics for the Handbook were developed or revised by Mansuet Giusti, Chief Cartographer. Kim A. Gelfuso, Information Services Technician, also assisted publication of the Handbook to the web.

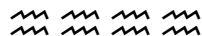
A draft of the Handbook was reviewed by an *ad hoc* committee comprised of the following state and local officials.

Mr. Ken Anderson, R.I. Coastal Resources Management Council
Mr. Russell Brown, Building Official, Town of South Kingstown, Rhode Island
Mr. William Carosi, Building Official's Office, City of Warwick, Rhode Island
Mr. Joseph Cirillo, R.I. State Building Commissioner
Mr. Robert Hunt, R.I. State Building Code Commission (*retired 1998*)
Mr. Robert Speaker, Building Official, Town of Barrington, Rhode Island
Mr. Jeff Willis, R.I. Coastal Resources Management Council

The staff of the Statewide Planning Program expresses its gratitude for the insights, helpful comments, and suggestions provided by this group.

Introduction: The NFIP Partnership

This Handbook explains and illustrates the locally-administered land management and construction requirements of the National Flood Insurance Program (NFIP). The NFIP, a federal program, makes flood insurance available for property throughout the country.



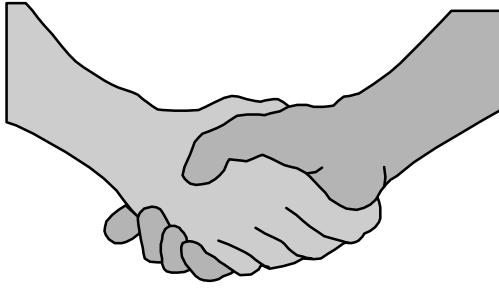
THE NFIP OPERATES AS a partnership between the federal and local governments and property owners. Under the program, the basic unit of local government--the municipality, or **community**--and the federal agency that administers the program--the **Federal Emergency Management Agency (FEMA)**--cooperate to make insurance available to private property owners, and to insure that new development is designed and constructed to resist flood damage.

Prior to creation of the Program by the Congress in 1968, insurance was prohibitively expensive or unavailable for most flood-prone properties. By providing affordable insurance to floodplain property owners, Congress sought to alleviate the heavy financial burdens and economic distress that recurring flooding has often created for individuals, local economies and for the nation as a whole. By linking the availability of insurance to the enforcement of land management and construction procedures designed to minimize the exposure of new floodplain development, Congress also sought to reduce future expenditures for flood disaster relief and recovery efforts and for structural flood control projects.

AT THE FOUNDATION OF the NFIP

The Goal:

As older floodplain development is replaced by new structures sited and constructed to minimize flood damage, federal outlays for disaster relief, flood protection, and the insurance program itself can be reduced.



partnership is the agreement of participating communities to adopt and enforce prudent floodplain management and construction practices to minimize the exposure of new development to flood risks. Only by assuring that new structures built in flood prone areas are sited and constructed to be as "flood-safe" as practicable can the NFIP advance its goal of reducing the costs of flood damage and disaster relief paid for by federal taxpayers.

THE NFIP PARTNERSHIP begins when FEMA identifies a community as **flood-prone** and the community elects to participate in the program. Communities initially enter the **Emergency Phase** of the Program, in which limited amounts of subsidized flood insurance are made available to all residents of the community*, and the community enacts a basic program of floodplain management. Upon completion of a detailed **Flood Insurance Study**, and local adoption of more rigorous floodplain land use measures, the community qualifies for the **Regular Phase** of the NFIP, under which increased dollar amounts of flood insurance are made available to property-owners at actuarial (non-subsidized) rates. In both Program phases, flood insurance policies are sold and serviced by private insurance companies and agents.

* Except where restricted by the Coastal Barrier Resources Act (see page 47) or other restriction.

Benefits of NFIP Participation

COMMUNITY PARTICIPATION in the NFIP is voluntary, but most flood-prone communities elect to participate in order to realize the benefits it provides to property owners, taxpayers, and the community at large. In addition to enabling floodplain property-owners to insure themselves against flood losses, participating communities receive several other benefits.

THESE INCLUDE:

INFORMATION - A comprehensive study of the community's flood problems and risks, providing data useful in floodplain management;

FINANCIAL ASSISTANCE - Community-wide* availability of federal grants, loans, mortgage guarantees, and other financial assistance (development assistance is restricted to non-flood-prone areas in non-participating communities);

PEACE OF MIND - Assurance that, when a flood disaster occurs, the community will be fully eligible for available federal disaster assistance, and that flood insurance payouts will supplement relief and recovery efforts (non-participating or *sanctioned* communities face limitations on the availability of certain disaster assistance).

The NFIP in Rhode Island

FLOODING IS A CONCERN for all communities in Rhode Island. Historically, coastal areas and river valleys were the focus of the state's early growth and development. This legacy has resulted in many of the state's centers of commerce and population being vulnerable to flooding. The state's history bears testament to this vulnerability, being replete with accounts of considerable damage and loss of life caused by violent storms, gales, and hurricanes lashing exposed coastal locations and flooding low-lying riverine areas.

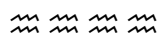
ALL 39 RHODE ISLAND communities are designated as flood-prone by FEMA, and all participate in the Regular Phase of the NFIP. Over 10,000 policies providing in excess of \$1 billion in coverage are in effect throughout Rhode Island.

TODAY, THE NEED FOR sound floodplain development is more compelling than ever. Coastal communities are among the fastest growing in the state, with shoreline building sites commanding extreme premiums. Lake and pond shore property is also coveted as year-round or vacation home sites. Interest in urban revitalization and creation of greenways along rivers is increasing, and redevelopment of riverfront properties may be further spurred by economic development incentives such as Enterprise Zone and "brownfields" industrial site reuse initiatives.

WHILE MUCH OF THE state's *historic* development took place without knowledge of, or proper regard to, flood risks, the maps, data, and guidelines available through the NFIP partnership now allow Rhode Island communities to be aware of flood risks and offer the means to minimize the exposure of new development to *future* flood damage. □

The Community Role

Effective local administration of the Program's floodplain management criteria is crucial to the success of the NFIP partnership. Although the NFIP is a federal program, it is solely through the diligence of community officials, the thoroughness of review by local boards and commissions, and the firm but fair local enforcement of local ordinances that the Program's criteria are given life and the goal of reducing flood damages realized.



Local Administration of the NFIP

LOCAL ADMINISTRATION of the NFIP requirements involves:

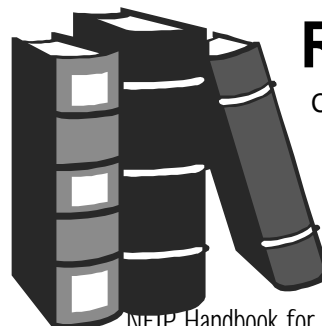
ORDINANCES - Incorporation of floodplain management measures meeting the Program's criteria within enforceable local ordinances or codes.

REVIEW - Development permitting to ensure conformance with applicable land management and construction requirements.

RECORDS - Keeping and reporting of statistics and data on development activities within flood hazard areas.

Inclusion of NFIP Criteria in Local Ordinances

THE NFIP'S FLOODPLAIN MANAGEMENT criteria include both limits on the usage of some flood hazard areas and construction standards for new or improved structures. All of the Program's *construction* standards have been incorporated as Chapter 31 of the Rhode Island State Building Code, obviating the need for participating communities to develop and adopt local building ordinances.



RHODE ISLAND COMMUNITIES must, however, include the Program's *land use*

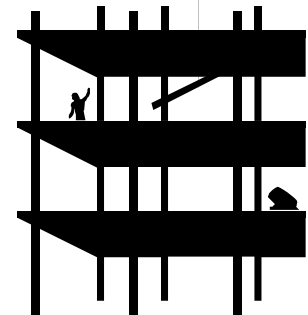
measures within their zoning and land development and subdivision review ordinances. Incorporation of floodplain management considerations within local land management ordinances has been provided for in the applicable state enabling acts*. Since all Rhode Island communities have been in the Regular Phase of the Program for a number of years, they all have properly adopted the NFIP-required land management measures. Communities must insure that all future amendments or revisions to their zoning and/or subdivision ordinances retain the NFIP-required provisions. Local ordinances are periodically reviewed by the **State Coordinating Agency** or by FEMA for continuing conformance to the NFIP minimum criteria.

Review of Development Proposals

ENSURING THAT DEVELOPMENT within a community's flood hazard areas conforms to the NFIP's construction and land use criteria is the fundamental responsibility of local NFIP administration. Participating communities must have administrative procedures in place to insure that development proposals in flood hazard areas are identified and reviewed for compliance with NFIP standards.

PROPER REVIEW procedures examine all development proposals to establish which are located within designated flood hazard areas; determine which NFIP construction and land use criteria are applicable to each development proposal located within a flood hazard area; and determine the compliance or non-compliance of each proposal with the criteria applicable to it. Following the issuance of development permits for compliant

proposals, actual construction must also be monitored to assure that structures are built in conformance with approved plans.



PART 2 OF THIS

HANDBOOK discusses the floodplain maps and data available from the NFIP for use in local administration of the Program. Part 3 provides a detailed listing, explanation and illustration of the NFIP land use and construction criteria that communities must administer. Part 4 outlines a recommended process for administration of the NFIP.

* Section 45-24-33(A)(5) of the *R.I. Zoning Enabling Act of 1991* includes among the allowable provisions of local zoning ordinances "permitting, prohibiting, limiting, and restricting development in flood plains or flood hazard areas...". The *Land Development and Subdivision Review Enabling Act of 1992* (R.I.G.L. 45-23) provides in section 30(4) that local ordinances address "provisions which concentrate development in areas which can support intensive use by reason of natural characteristics and existing infrastructure". Section 40(A)(2) includes information on NFIP-defined "floodplains" among the Master Plan submission requirements for major subdivisions and land development projects.

NFIP Recordkeeping

MAINAINING COMPLETE AND accurate records of floodplain development is also an essential ingredient in effective local administration of the NFIP criteria. Local officials and boards which review permit requests must record and retain critical data such as the number of permits and variances granted in flood hazard areas, the base flood elevation and the elevation of critical structural components or floodproofing level for new development permitted in flood hazard areas. Part 4 of this Handbook provides more information on the NFIP recordkeeping requirements.

The Local NFIP Team

IMPLEMENTATION OF THE NFIP requires teamwork at the local level. Responsibility for administering the various NFIP requirements is generally divided among several local officials or agencies. The incorporation of the NFIP's construction requirements in the Rhode Island State Building Code means that local building officials play a pivotal role in NFIP administration in Rhode Island communities. In some communities the building official also enforces zoning provisions relating to the program.

IN ADDITION TO THE local building official, other officials and agencies may play important roles in local administration of the NFIP's land use criteria. Typical members of the local *NFIP Team* and the roles each plays in administering the Program's requirements are outlined on page 7. □

Text continues on page 8...



→ For Your Information ←

- ❖ **BUILDING OFFICIAL:** the individual appointed by the chief executive officer of a city or town (pursuant to sec. 23-27.3-107.1 of the General Laws) to administer the provisions of the State Building Code, including the NFIP construction criteria.
- ❖ **ZONING OFFICIAL:** the officer or agency designated (pursuant to sec. 45-24-54 of the State Zoning Enabling Act of 1991) with administering and enforcing the community's zoning ordinance. This official has responsibility for insuring that development proposals conform to the NFIP's land use criteria included within the community's zoning regulations.

- ❖ **ADMINISTRATIVE OFFICER:** the municipal official designated by the local regulations (pursuant to sec. 45-23-32(1) of the Land Development and Subdivision Review Enabling Act of 1992) to administer the land development and subdivision regulations and to coordinate with local boards and commissions, municipal staff and state agencies with respect to land development and subdivision review. This official, often the local planner, or member or chair of the local planning board, assists the local planning board or commission in administering NFIP land use criteria which are included within the community's subdivision and land development regulations.

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- ❖ **PLANNING COMMISSION OR BOARD:** responsible under the Land Development and Subdivision Review Enabling Act of 1992 (RIGL chapter 45-23) for enforcing the community's subdivision and land development review regulations. Works with the administrative officer and a technical review committee (if established) to insure that administrative, minor, and major subdivisions of land and major and minor land development proposals conform to applicable NFIP land use criteria.



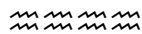
- ❖ **PLANNING STAFF:** the local planner or planning agency may play a role in NFIP administration by coordinating development review processes that involve a number of agencies and by acting as the administrative officer for land development and subdivision proposals.

- ❖ **ENGINEERING STAFF:** communities which employ professional engineering staff can utilize this expertise in the development review process. Areas in which an engineering evaluation can be most helpful include: establishing site elevations to determine applicability of NFIP criteria, assessing hydrologic and hydraulic effects of proposed development affecting watercourses or floodways, and verifying post-construction certifications of structural component or floodproofing elevations.

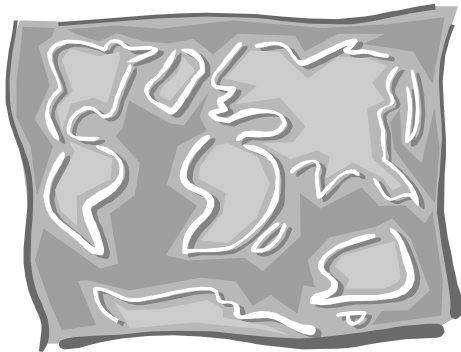
- ❖ **LOCAL APPEALS BOARD:** Applicants denied permits for floodplain development have a right to appeal the decision of the administrative official or board that denied their application. Appeals or requests for relief relating to floodplain *zoning or land use* issues are filed with the local zoning board of review, as provided for in sections 45-24-41 and 45-24-57 of the 1991 Zoning Enabling Act or section 45-23-67 of the 1992 Land Development and Subdivision Review Enabling Act. Appeals involving NFIP *construction* criteria contained in the State Building Code are filed with the local (building) board of appeals, established pursuant to section 23-27.3-127.2 of the General Laws. Appeals boards are empowered to decide appeals upon review of the facts and making definitive findings on the record. □

NFIP Maps and Studies

Floodplain data are furnished to participating NFIP communities by the Federal Emergency Management Agency (FEMA) to serve as the basis for local administration and enforcement of the Program.



IN ORDER TO EFFECTIVELY administer the NFIP's floodplain management standards (described in Part 3), the NFIP local team needs information on the location and characteristics of the 100 year flood in their communities.



SPECIFICALLY, LOCAL OFFICIALS need to know:

WHERE ...flood hazard areas have been designated;

WHETHER ...or not there are floodways and/or coastal high hazard areas (V ZONES) designated,

WHAT ...the projected 100-year (base) flood elevation is at various points in the community.

How ...to locate development sites relative to designated flood hazard areas in order to determine flood zone designations, establish which NFIP standards apply to projects, and determine the applicable flood protection elevation for projects.

THE TYPE AND AMOUNT OF data and degree of detail provided varies with the phase of the NFIP in which a community is enrolled. The principal informational documents provided are the:

FLOOD HAZARD BOUNDARY MAP

FLOOD INSURANCE STUDY

FLOOD INSURANCE RATE MAP

FLOOD BOUNDARY-FLOODWAY MAP

*Flood Hazard
Boundary Maps*

A FLOOD HAZARD BOUNDARY

MAP(FHBM) is provided by FEMA to a community when the community first joins the initial, or Emergency Phase, of the NFIP. It provides a preliminary delineation of the 100-year floodplain in the community, but does not provide specific data on floodwater depths, risk factors, or floodways. The 100 year floodplain is illustrated as a shaded area on a series of flat map sheets that each cover a portion of the corporate limits of the community.

Flood Insurance Studies

A FLOOD INSURANCE STUDY (FIS) is a published report issued by FEMA which examines, evaluates and determines flood hazards, and where appropriate, corresponding flood profiles showing water surface elevations, for a participating NFIP community. It forms the basis for development of the Flood Insurance Rate Map and Flood Boundary/Floodway Map, which are used in administration of the NFIP's land management and construction standards during the Regular Phase of the Program.

IN ADDITION TO DESCRIBING the study methodology and providing background on the community's flooding history, the FIS contains stream profiles, and (if applicable) coastal transects used to calculate water surface elevations for various flooding conditions, including the base or 100-year flood. Data on the

width, base flood elevation, and cross-sectional area of floodways are also given in the FIS for each stream segment studied in detail.

FLOOD INSURANCE STUDIES are developed and published following a standard procedure. After a community is identified as flood-prone and opts to join the NFIP, FEMA contracts for a FIS of the community. FEMA, its consultant, and State Coordinating Agency staff meet with local officials to determine areas of the community which are developed or are expected to be developed in the future. These areas are examined in detail by the study contractor using hydrologic and hydraulic modeling. Parts of the community judged likely to remain undeveloped are studied by less costly approximate methods. When the contractor completes a preliminary draft of the study, a second community meeting is held to review the results. The draft study is also reviewed by a Technical Review Contractor, which insures that proper engineering procedures were followed and transforms the preliminary maps into the NFIP's standard mapping format. Review drafts of the FIS and its accompanying map(s) are produced, which, following further public review and revision, are finalized, accepted by the community, and published by FEMA. A new or revised FIS may be conducted periodically to reflect advances in flood hazard delineation methodologies, or changes in the developmental status of the community which affect flood risk factors.

FOR DAY-TO-DAY LOCAL administration of the NFIP construction and land use standards, the most important products of the Flood Insurance Study are the maps that accompany it. The Flood Insurance Rate Map and the Flood Boundary and Floodway Map (if published separately) serve(s) as the basis of the community's floodplain management activities and is/(are) used by lenders and insurance agents to assess the need for and to issue flood insurance coverage for private properties.

Flood Insurance Rate Maps

FOLLOWING COMPLETION OF the Flood Insurance Study, a Flood Insurance Rate Map (FIRM) is issued, superseding the Flood Hazard Boundary Map, and signaling the community's entry into the Regular Phase of the NFIP.

FIRMS ARE USED BY citizens, community officials, insurance agents, lenders, and federal and state agencies to determine the nature and extent of flood hazards in various portions of the community. They provide data needed to identify areas subject to flooding, determine the base flood elevation and flood risks of specific properties, locate reference marks needed to establish the elevation of specific sites, and (on post-1986 FIRMs) locate the boundaries of floodways.

FLOOD INSURANCE RATE MAPS generally offer far superior floodplain data content and accuracy compared to

Flood Hazard Boundary Maps. Under FEMA's Accelerated Conversion Program, however, the FHBMs of rural communities having relatively low flood risk are converted into Flood Insurance Rate Maps without a detailed Flood Insurance Study. Although having the official stature of a Flood Insurance Rate Map, these maps resemble Flood Hazard Boundary Maps in format and data content. In Rhode Island, only two communities—Foster and West Greenwich—have the less-detailed FIRMs produced under the Accelerated Conversion Program.

MOST FIRMS ARE PRINTED in a "Z-fold", road map style, with each sheet or panel covering a portion of the community (small communities may have only one panel, or may be combined with neighboring communities on a county-wide FIRM). A map index sheet is provided for all FIRMs consisting of more than one panel. Newer (post 1987) FIRMs also include an index of flood prone streets on the cover sheet, and provide alpha-numeric grids on each panel to assist in locating streets. All FIRMs provide basic orientation and locational data including cultural features such as the corporate boundaries of the community, roads and streets (more detail may be provided in flood hazard areas), railroads, waterbodies, and coastlines (mean sea level waterline). FIRMs also list and locate a series of ground elevation reference points or "bench" marks in flood hazard areas. These are included to assist developers and local administrators in assuring that floodplain construction conforms to the NFIP elevation requirements.

THE MOST SIGNIFICANT DATA provided on FIRMs are the calculated base (100 year) flood elevations, which are given for all areas studied in detail. Flood elevation data are depicted in two manners. In riverine floodplains, base flood elevations are denoted by wavy lines crossing the floodplain (generally perpendicular to the river) at periodic intervals. The base flood elevation is given at each line, expressed in feet above mean sea level*, thusly:



Base flood elevations also appear printed directly under the zone designation thusly:

ZONE A13
(EL 56)

13

Figure 2.1 illustrates the features of a FIRM.

Text continues on page 13...

* Generally referenced to National Geodetic Vertical Datum-NGVD. See Appendix A--Glossary-for definition of Mean Sea Level.

→ For Your Information ←

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V1-30 ZONES Areas of 100 year coastal flood with velocity wave action, base flood elevations determined (pre-1987 maps)

V ZONES Areas of 100 year coastal flood with velocity wave action, base flood elevations NOT determined

VE ZONES Areas of 100 year coastal flood with velocity wave action, base flood elevations determined (post-1986 maps)

A1-30 ZONES Areas of 100 year flood, base flood elevations determined (pre-1987 maps)

AE ZONES Areas of 100 year flood, base flood elevations determined (post-1986 maps),

A ZONES Areas of 100 year flood, base flood elevations NOT determined

AO ZONES Areas of 100 year shallow flooding between 1 and 3 feet depth (generally on sloping terrain), average depths determined

AH ZONES Areas of 100 year shallow flooding (generally ponding) base flood elevations determined

A99 ZONES Areas of 100 year flood to be protected by construction of Federal flood protection system, base flood elevations NOT determined

B ZONES 500 year flood hazard areas(pre-1987 maps)

C ZONES Areas of minimal flood hazards (pre-1987 maps)

X ZONES (DARK SHADED) Areas of 500 year flood; areas of 100 year flood with depth less than 1 foot or < 1 sq. mi. drainage area, or areas of 100 year flood protected by levees (post-1986 maps)

X ZONES (NO SHADING) Areas determined to be outside 500 year floodplain (post-1986 maps)

D ZONES Areas in which flood hazards are undetermined.

FIGURE 2.1 SAMPLE FLOOD INSURANCE RATE MAP

FIRMS ALSO SHOW designated units of the Coastal Barrier Resources System within which restrictions on the sale of flood insurance policies apply (**see Coastal Barriers --page 47**).

FIRMS PUBLISHED SINCE 1986 also include floodway delineation and cross-section data. Designated floodways are shown as hatched areas within the boundaries of the (dark-shaded) A-zones of riverine floodplains.

FLOOD ZONES ARE ILLUSTRATED ON FIRMS via shading patterns and a variety of zone designations, which are listed on Figure 2.1.

*Flood Boundary/
Floodway Maps*

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FLOOD BOUNDARY AND FLOODWAY MAPS (FBFM) delineate the boundaries of designated floodways within which local officials must enforce the NFIP's

floodway non-encroachment standards (**see pages 25-26**). Similar in appearance to the Flood Insurance Rate Map, FBFMs differ by including designated floodways as white areas within the dark-shaded 100 year flood hazard areas. FBFMs also indicate the locations and designations of stream cross-sections, or points along a river or stream course for which detailed data on the dimensions and flood characteristics of the floodway are provided in the Flood Insurance Study's Floodway Data Table.

FLOOD BOUNDARY AND FLOODWAY MAPS were published as separate documents until 1986, and many remain in effect. Since 1986, the floodway delineation and cross-section data have been incorporated into the Flood Insurance Rate Map, and a separate FBFM is no longer published. Figure 2.2 illustrates a portion of a typical Flood Boundary and Floodway Map.

Text continues on page 16...

FIGURE 2.2
SAMPLE FLOOD BOUNDARY/FLOODWAY MAP

Flood Hazard Boundary Map

- ISSUED UPON COMMUNITY ENTRY INTO EMERGENCY PHASE OF NFIP
- PROVIDES INITIAL, APPROXIMATE IDENTIFICATION OF FLOOD HAZARDS
- NOT BASED ON FLOOD INSURANCE STUDY
- SHOWS AREAS OF 100 YEAR FLOOD HAZARD AREAS AS SHADED "A-ZONES"
- NO BASE FLOOD ELEVATION DATA PROVIDED

Flood Boundary Floodway Map

- BASED ON FLOOD INSURANCE STUDY
- ISSUED ONLY PRIOR TO 1986; AFTER 1986; COMBINED WITH FLOOD INSURANCE RATE MAP
- SHOWS 100 AND 500 YEAR FLOOD HAZARD AREAS WITH DARK AND LIGHT SHADINGS.
- SHOWS DESIGNATED FLOODWAYS AS WHITE AREAS INSIDE DARK-SHADED 100 YR. FHA

Flood Insurance Rate Map

(Accelerated Conversion Communities)

- BASED ON FLOOD HAZARD BOUNDARY MAP (APPROXIMATE STUDY METHODS)
- SHOWS AREAS OF 100 YEAR FLOOD HAZARD AREAS AS SHADED "A"-AND/OR "V ZONES"
- NO BASE FLOOD ELEVATION DATA
- IN RI, ONLY FOSTER AND WEST GREENWICH HAVE THESE MAPS.

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Flood Insurance Rate Map

(FIS Communities)

- BASED ON FLOOD INSURANCE STUDY

- SHOWS 100 AND 500 YEAR FLOOD HAZARD AREAS WITH DARK AND LIGHT SHADINGS.

- PROVIDES BASE FLOOD ELEVATION DATA
- SHOWS VARIOUS FLOOD ZONES AND FLOOD RISK FACTORS

- FOR AREAS STUDIED IN DETAIL.
- AFTER 1986, ALSO SHOWS DESIGNATED FLOODWAYS AS HATCHED AREAS.

Elements found on all NFIP Maps

- COMMUNITY NAME AND NUMBER
- MAP PUBLICATION\REVISION CHRONOLOGY
- PANEL NUMBER
- SCALE (VARIES), LEGEND, & NORTH ARROW
- MAJOR ROADS AND WATER BODIES
- EFFECTIVE DATE
- FLOOD HAZARD AREA DELINEATIONS

Elements found on some NFIP Maps

- COASTAL BARRIER RESOURCE SYSTEM DELINEATIONS
- ELEVATION REFERENCE MARKS AND DATA
- EXCLUDED AREAS
- FLOODWAYS

Challenging NFIP Maps

BASED AS IT IS upon an extensive scientific study of the community's flooding conditions, the official NFIP map (FIRM or FHBM) must be regarded as the definitive source of data on the nature and extent of flood hazards in the community. Local officials charged with enforcing the Program's requirements must rely upon the official map to make determinations of the applicability of the Program's requirements to development projects within the community. (see Part 4).

19 **W**HILE NFIP MAPS ARE generally very accurate, FEMA recognizes that the Program must provide a means for official NFIP maps to be changed to correct errors and to reflect changes that occur over time in data, or study methods, as well as physical changes to floodplain areas. Individuals or communities requesting changes to effective NFIP maps must provide information supporting their contentions of inaccurate or changed floodplain conditions.

WHILE FEES ARE NOT CHARGED for map amendment requests from private individuals for a single house or lot in their ownership, FEMA does charge a processing fee for more complex requests involving more than one property. Depending on the complexity of the review required, fees ranging from \$175 to upwards of \$2,000 must be paid to FEMA by those applying for map revisions or amendments.

THE procedures for revising and amending official NFIP maps are:

MAP REVISIONS

The map revision process allows a community or individual property owner (with approval of the community) to request changes in the effective FIRM based upon physical changes to the floodplain, such as flood control structures; improved methodology, including different or adjusted models than used in the original Flood Insurance Study; or improved data, including revised and new data. Requests for map revisions may result in a Conditional Letter of Map Revision (CLOMR), commenting on whether a proposed project, if built as proposed, would justify a map revision (LOMR or PMR); a Letter of Map Revision (LOMR), officially revising the current map to show changes to floodplains, floodways, or flood elevations; or a Physical Map Revision (PMR), a reprinted map or panel incorporating changes to floodplains, floodways, or flood elevations. Map revisions generally affect changes to an area larger than an individual residential lot.

MAP AMENDMENTS

The map amendment process allows a community or individual property owners to contend that the official map erroneously identifies the nature of the flood risk associated with their property. Following evaluation of map amendment requests, FEMA may issue a Letter of Map Amendment (LOMA) or Conditional Letter of Map Amendment (CLOMA), stating that a structure or parcel of land would not be inundated by the 100 year flood. Letters of Map Amendment may also be issued for structures or properties that have been elevated by fill to be above the 100 year flood elevation. LOMAs generally affect small changes or corrections to

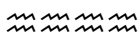
the effective map, such as reflecting small topographic features (knolls, hummocks, etc.) that did not appear on the original map due to its scale. A simplified application process is available for property owners requesting a LOMA for a single residential structure or single residential lot.

A FULL DESCRIPTION OF the various amendment and revision procedures is provided in the publication *Appeals, Revisions and Amendments to Flood Insurance Maps: A Guide for Community Officials*, available from FEMA. □



The NFIP Requirements

This part of the NFIP Handbook explains and illustrates the locally-administered land management and construction criteria of the National Flood Insurance Program (NFIP).



THE NFIP'S REQUIREMENTS are based on two premises:

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DO NO HARM - Insure that new floodplain development does not aggravate existing flooding conditions; and

BUILD SAFE - Insure that new or rebuilt floodplain structures are designed and constructed to resist flood damages.

These objectives are achieved through local enforcement of construction and land use regulations which meet or exceed the NFIP criteria and which are legally applicable to development within flood hazard areas of a community.

Areas Subject to Regulation

THE NFIP'S CONSTRUCTION and land use measures are applicable within areas of a participating community that would be inundated by the **base** or **one-hundred year flood**. The base flood is a flood of a magnitude which has a one percent or greater chance of occurring in any given year. This statistical measure of flood risk is transformed during the Flood Insurance Study, via examination of the community's climatic data, hydrological conditions, topography, and historical flooding records, into a map designating flood hazard areas of the community. Called a **Flood Insurance Rate Map**

The Objectives:

The NFIP seeks to insure...

...that new floodplain development does not aggravate flooding conditions, and

...that new or rebuilt floodplain structures are designed and constructed to resist flood damage.

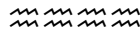
(FIRM), this map, described in Part 2, is a central tool in the community's administration of the NFIP requirements, since it illustrates the areas of the community within which the Program's requirements apply. The community's base floodplain is delineated on the FIRM as **Special Flood Hazard Areas** and shown with distinctive shade patterns and zone designations. The general distribution of designated Special Flood Hazard Areas in Rhode Island is shown below. The use of FIRMs in local administration of the NFIP construction and land use requirements is discussed in Part 4.

NFIP-Designated Flood Hazard Areas in Rhode Island

NFIP studies have found approximately seven percent of Rhode Island's area to be flood prone. Flood hazards are identified in all 39 of the state's communities.

NFIP Land Use & Construction Criteria

The specific construction and land use criteria, or standards, which communities must enforce under the NFIP partnership are the subject of this Part of the Handbook.



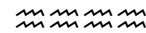
NFIP Standards Applicable to All Development

THE NFIP'S STANDARDS pertain to five broad categories of development. For ease of reference, discussion of the criteria are grouped by the type of activity they apply to, beginning with those that are universally-applicable to all forms of development:

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- ❑ **ALL LAND MODIFICATION/DEVELOPMENT PROJECTS** [see pages 20-26]
- ❑ **SUBDIVISIONS AND LAND DEVELOPMENTS** [see pages 27-30]
- ❑ **UTILITY INSTALLATION** [see pages 31-33]
- ❑ **NEW OR SUBSTANTIALLY-IMPROVED STRUCTURES,** [see pages 34-62]
 - *residential structures in A-zones* [see pages 34-40 & 51-54]
 - *non-residential structures in A zones* [see pages 34-38 & 41-42]
 - *structures in V-zones* [see pages 34-38, 43-50, & 54]
- ❑ **MOBILE OR MANUFACTURED HOMES** [see pages 64-66]

The most basic NFIP criteria apply to all types of development in order to assure that projects are reasonably safe from flooding and do not worsen existing flooding conditions.



NFIP STANDARD

Require permits for all development.

Review applications to determine if proposed development is located in a flood hazard area.

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REQUIRING ALL PROPOSED development to apply for a permit is the most basic NFIP requirement, since it allows the community to be aware of activities that could constitute a flood risk or worsen flooding. The permit application process also provides a means for the local administrator to obtain essential data on the parameters of each development proposal so that its conformance to all applicable NFIP criteria can be established.

PERMIT APPLICATIONS VARY in their particulars, but all must require sufficient data to enable the administrator to reach determinations relative to the applicability of the NFIP criteria to a proposal, and its conformance with the applicable standards.



GENERALLY, DEVELOPMENT permit applications should require submission of the following data:

CONTACT - Applicant information, including name and contact information (address, phone, etc.)

DESCRIPTION - A concise description of the development activity being proposed

LOCATION - Exact location of the development proposal, including a locus map, and general site map illustrating the limits of development activities proposed relative to natural and cultural features, such as rivers, streams, roads, etc.

FLOOD DATA - Applications for development proposals located (totally or partially) within identified flood hazard areas (A or V Zones on the community's FIRM) should also be required to delineate the 100-year flood boundary and provide base flood and structural component elevation data (referenced to Mean Sea Level*) on their site plans.

ALL DEVELOPMENT involving the construction of structures is subject to the Rhode Island State Building Code (SBC) and all applicants must complete a standard Building Permit Application. The SBC application requires applicants to state whether or not the proposed development site is within a Flood Hazard Area and to furnish the elevations (relative to MSL) of the lowest floor (including basement) of proposed structure(s) and the 100 year flood. Local building officials must insure that this section of the SBC application is properly completed.

J. FLOOD HAZARD AREA – 1. YES 2. NO

1. Elev (MSL) of lowest Floor incl. basement _____
2. Elev. (MSL) of 100 year flood _____

elevation data of construction projects.

LOCAL REGULATIONS ADOPTED pursuant to the Subdivision and Land Development Review Enabling Act of 1992 cover land development projects and subdivisions (even if they are not covered by the State Building Code). This act requires communities to establish project application and review procedures for three categories of development:

- ADMINISTRATIVE SUBDIVISIONS
- MINOR SUBDIVISIONS & LAND DEVELOPMENT PROJECTS
- MAJOR SUBDIVISIONS & LAND DEVELOPMENT PROJECTS

Submission requirements for these categories vary, with the most information required for the major category (*see Requirements Applicable to Subdivisions and Land Development Projects, pages 27-30*)

* See Glossary for definition of Mean Sea Level.

NFIP STANDARD

Determine if proposed development has received other necessary permits.

DEPENDING ON THEIR location and potential impacts, development activities may require permits from federal or state agencies in addition to the local development permit. These commonly include (but are not limited to): permits from the Department of Environmental Management (Freshwater Wetlands Act, water quality certifications, individual sewage disposal systems (ISDS), stormwater management); the Coastal Resources Management Council (Coastal Resources Management Program permits), and the U.S. Army Corps of Engineers (Section 404 permits for filling of wetlands).

UNDER THE NFIP, local administrators are responsible for determining if proposed development has received all necessary permits. This is desirable from the local administrator's point of view because it provides assurance that the project design has satisfied all pertinent environmental and other requirements and represents the final design and specifications. However, it does require local administrators to be generally aware of the different permits which are required for various types of development.

WHILE LOCAL OFFICIALS should determine whether a proposal has received all needed permits (and should inform applicants of any additional

permits the project requires), they may encounter a problem if they attempt to withhold the local permit on the grounds that other needed approvals have not been obtained. There is precedent in Rhode Island case law that local issuance of a State Building Code permit is a ministerial responsibility that cannot be denied to applicants meeting all relevant requirements of the State Building Code. Some local officials attempt to make the best of this



situation by issuing a letter stating an intent to issue the local permit, provided the development proposal successfully obtains other needed approvals. Such a letter is generally viewed by State regulatory agencies as indicating that the proposed design complies with applicable local requirements.

N F I P S T A N D A R D
Prohibit development or encroachment within designated floodways.

THE NFIP'S GOAL of avoiding development that would aggravate flooding conditions is achieved via stringent control of portions of the community's floodplain designated as **floodways (see inset page 24)**. Like an express highway, the floodway must be kept unobstructed if it is to do its job of conveying large quantities of high velocity floodwaters during the 100 year flood.

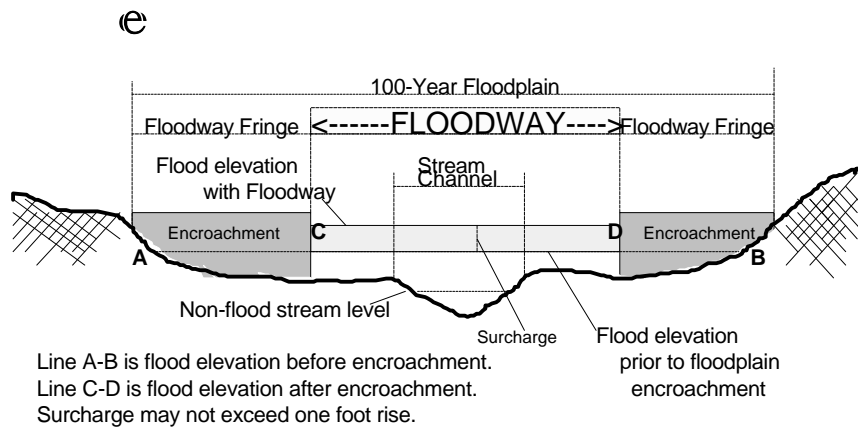
WITHIN DESIGNATED FLOODWAYS, the community must not permit any development, new construction, substantial reconstruction, filling, use,

activity or other encroachment which would cause **any** increase in the height of the 100 year (base) flood. While local regulations cannot exclude all potential usage of floodway areas, they should encourage low-intensity, non-structural uses such as agriculture or silviculture. Subdivision and land development regulations should require the reservation of floodways for greenways/open space, recreational areas, parking or other non-structural elements of development projects.

IN ALL CASES where development or encroachment within a floodway is proposed, the burden is upon the applicant to demonstrate, via competent engineering analysis, that no increase in the base flood elevation will occur as a consequence of the development.

ONCE DESIGNATED BY FEMA and adopted by the community, the boundaries of floodways cannot be changed lightly. FEMA will entertain floodway changes *only* if the Chief Elected Official formally submits a request for a **Letter of Map Revision (see pages 16-17)** providing necessary scientific and technical analyses of the effects of the requested change; an examination of alternatives and explanation why these are unfeasible; and assurances that no insurable structures are impacted and that all property owners affected by the change have been properly notified. Generally, realigning floodways is allowed only for projects which are clearly in the general public interest and necessity.

Text continues on page 25...



Floodways are the areas of land immediately adjacent to stream or river channels which must be reserved to carry the waters of the 100 year flood.

Key Floodway Concepts:

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Analogous to a *superhighway* for floodwaters--becomes the enlarged stream or river channel in times of flooding, transmitting large volumes of high velocity floodwaters.

Delineated for major rivers and streams by FEMA as part of Flood Insurance Study. Based upon hydrologic analysis that models future development/encroachment of floodway fringe area creating a one foot rise in floodwaters during base flood.

Mapped on community's Flood Insurance Rate Map (FIRM) or Flood Boundary and Floodway Map. Data on floodway width, cross-sectional area and flood velocity given in community's Flood Insurance Study.

Community adopts regulatory floodway and prohibits development or encroachment which would cause any increase in 100 year flood elevation. Burden of proof is upon applicant to show floodway development will not increase flooding at any point.

Once designated and adopted, can be changed only via FEMA approval of a map revision (requires substantial engineering documentation and demonstration of legitimate public purpose for revising).

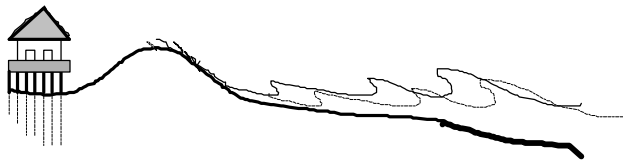
Generally acceptable uses of floodways include: agriculture, silviculture, recreation, greenways, parking and other non-structural uses.

NFIP STANDARD

Prohibit the modification of sand dunes in V-zones.

THE EXPANSIVE MOUNDS OF wind-blown sand that line ocean-fronting coastal barriers along Rhode Island's south coastline, and similar but smaller features on a number of barrier spits and beaches in Narragansett Bay, constitute the state's first line of defense against the onslaught of hurricanes and oceanic storm-induced tidal flooding. Sand dunes retard beach recession, replenish sand lost to wave attack, and dissipate wave energy.

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DESPITE THESE BENEFICIAL EFFECTS, dunes themselves are among the most vulnerable of landforms. Even modest man-made alterations can upset their delicate equilibrium and diminish their effectiveness as storm buffers. To preserve the integrity of dunes and the flood protection benefits they provide, the NFIP requires local administrators to prohibit man-made alterations to sand dunes within V-zones identified on the community's flood map.

THIS NFIP REQUIREMENT piggy-backs upon the R.I. Coastal Resources Management Program's regulation of beaches and dunes as coastal features. The Coastal Management Program's policies for dunes seek to limit

development to disturbed areas and enforce construction setbacks and buffers... *"to protect dunes from activities that have a potential to increase wind or wave erosion...."* and preserve their storm-buffering functions.

NFIP STANDARD

Maintain the flood-carrying capacity of any altered or relocated watercourse.

Notify FEMA, adjacent communities, and the State Coordinator of watercourse alterations.

DEVELOPMENT PROJECTS, particularly large ones, may propose extensive modifications to drainage patterns within the project area. While the NFIP criteria do not prohibit the modification or relocation of rivers, streams, ponds, wetlands and other watercourse, they do require participating communities to insure that the flood-carrying capacity of their watercourses are maintained. This means that any significant filling, channelization, damming or other obstruction that reduces the flood storage or conveyance parameters of a watercourse must be offset by compensatory measures elsewhere on the development site so that there is no overall diminishment in the carrying capacity of the re-engineered watercourse. Local administrators must also notify adjoining communities (e.g., in situations where the altered watercourse is a common boundary), the State Coordinating Agency and

FEMA of watercourse alterations they permit (see Appendix for addresses).

IN RHODE ISLAND, VIRTUALLY all watercourse alterations fall under the jurisdiction of the R.I.

Freshwater Wetlands Act, administered by the Department of Environmental Management. Generally, DEM regulations do not permit watercourse alterations unless the flood storage and conveyance characteristics of the watercourse will be maintained through compensatory excavation or other engineered measure.



SINCE LOCAL ADMINISTRATORS may not have access to the engineering expertise necessary to determine if an applicant's proposed changes to a watercourse will preserve its flood-carrying capacity, the best recommendation may be to refer applicants in such situations to DEM's Freshwater Wetlands Office and require that they produce evidence that they have applied for a determination as to whether a State wetlands permit is needed for the project. With this procedure, the NFIP requirement that localities regulate watercourse alterations can reinforce state wetlands protection measures, while avoiding duplicative permit procedures for the applicant.

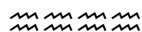


Standards Applicable to Subdivisions & Land Development Projects

The process of laying-out new building sites on the landscape presents a unique and valuable opportunity for a community to reduce flood risks.

Rhode Island communities are authorized to consider flood risks during the review of land development projects and subdivisions.

Pro-active planning requiring site designs to respond appropriately to flooding conditions can minimize future flood risks to life and property.



N F I P S T A N D A R D

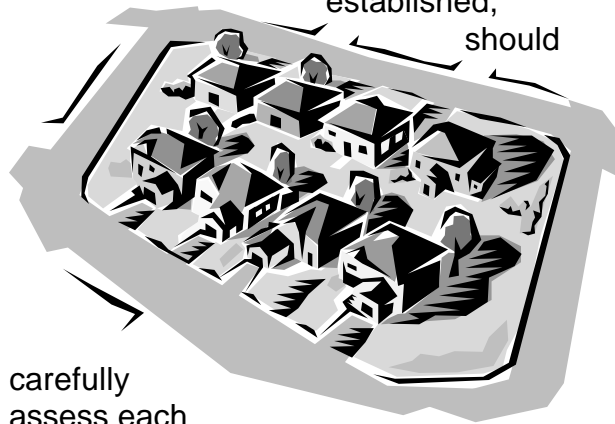
Require base floodplain delineations and elevation data on master plans for subdivision and land development projects.

Assure that subdivision or development project design will avoid or minimize flood damage.

LOCAL REVIEW OF SUBDIVISION and land development project proposals should routinely include an examination of potential flood hazards and damage inherent in the proposal. Under State enabling legislation, local regulations governing the review of all major* land development projects and subdivisions must require submission of a site master plan that includes information on floodplains. Local Subdivision and Land Development ordinances should require that applicants proposing major subdivisions or developments delineate the 100-year floodplain and show base flood elevations relative to mean sea level on all master plan and final plan submissions.

* "Major" includes all residential subdivisions or projects with more than five lots, and all non-residential subdivisions or projects.

LOCAL PLANNING BOARDS, and their technical review committees where established, should



carefully assess each development proposal's flood hazards to minimize the exposure of future occupants and structures to flood hazards, and to insure that the development will not aggravate flooding conditions on or off the site. Factors that local boards should assess in determining whether a subdivision or land development project proposal supports the goals of hazard minimization and minimal impact on flooding are discussed on page 29.

GENERALLY, LOCAL BOARDS should require projects to respond to the natural features of their sites, including flood characteristics, with designs that minimize impacts upon the natural landscape and minimize the exposure of the built environment (structures, roads, utilities and other facilities) to flood damage. Lots or project components that would create or worsen flood hazards or necessitate variances in order to be buildable should not be approved. The creation of lots located wholly within identified floodways, or that have topography requiring excessive filling, should also be avoided. Disallowing such lots is not

only sound floodplain management practice, but will also preempt possible future *takings* claims (against the community) from individuals who have unknowingly purchased the marginally-buildable lots.

OPEN SPACE SUBDIVISIONS and creatively clustered land developments incorporating greenways offer a solution for dealing with floodplains and other site constraints.



Proponents of this technique* point to its ability to yield high quality, marketable developments providing amenities sought by purchasers (open space, greenway trails and other recreational opportunities, scenery, preserved natural and cultural features, etc.) while avoiding the development of hazard and resource lands.

POLICIES OF THE STATE Guide Plan encourage Rhode Island communities to employ open space subdivision and creative development approaches in local land management ordinances to protect floodplains and other resource areas. Figure 3.1 on page 30 illustrates conventional versus creative/open space approaches to subdivision design.

Text continues on page 31...

* See Arendt, R. *Designing Open Space Subdivisions, A Practical Step-by-Step Approach*. Natural Lands Trust. 1994.



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considerations for flood hazard areas

UNDER RHODE ISLAND LAW, the local planning board and its technical review committee (where established) review subdivision and land development project proposals for conformance with local regulations. The impact of flooding upon the proposed development is an important consideration in local boards' review. Local review of proposed subdivisions and land developments should weigh each proposal's answers to the following questions in judging compliance with the NFIP's criteria for minimizing flood hazards:

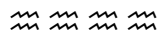
- ◆ What proportion of the subdivision/development will be impacted by the 100-year flood?
- ◆ How many lots are proposed to be entirely within the 100 year floodplain? Are any proposed entirely within designated floodways?
- ◆ Are all proposed critical facilities (public safety & communications centers, elderly/handicapped housing, public water and sewer treatment facilities, etc.) adequately protected from the 500-year flood?
- ◆ How difficult will construction on the floodplain lots be? Will excessive filling make construction infeasible unless variances are granted?
- ◆ How much warning time can be expected prior to a flood?
- ◆ Is the development configured so that the 100 year flood will completely cut off access to portions of the development? If so, can these areas be safely evacuated given the expected lead time?
- ◆ Are proposed culverts and bridge openings sized to convey the base flood, or to be safely overtopped without worsening flood hazards?
- ◆ Will proposed land modifications significantly increase runoff from the site to surrounding areas? Will the increased runoff worsen flooding problems?
- ◆ Are any modifications of watercourses or other natural drainageways proposed? Will the altered watercourses be adequate to convey the 100-year flood without worsening flooding?
- ◆ Could creative open space/greenway design alternatives lessen the development's flood risks and/or impact upon flooding? Why haven't these approaches been incorporated? Does the local ordinance offer incentives to promote such design features?
- ◆ What are the characteristics of the 100-year flood at the site? What floodwater depths are expected? Will high velocity waters affect parts of the site (floodways and V-zones)?



FIGURE 3.1 ALTERNATIVE

SUBDIVISION DESIGNS

The location of utility systems or facilities within flood hazard areas requires that special precautions be taken to insure that components are secure from flood effects and that the provision of service does not worsen the community's flood risks by stimulating new development in floodplain areas.



THE NFIP'S CRITERIA for utility installation apply to both:

PRIVATE UTILITIES - Construction of individual service lines and/or facilities on privately-owned development sites, generally by a private developer, builder; or property-owner; and

PUBLIC UTILITIES - Construction of utility mains, interceptors, and lateral lines, generally in a public right-of-way by a public or semi-public entity such as municipal government or a regional water or sewer district, or a state-regulated public utility corporation.

N F I P S T A N D A R D

On-site waste disposal systems must be located to avoid impairment to them or contamination from them during flooding.

New and replacement water supply and sewage systems must minimize or eliminate infiltration of floodwaters or discharges from the systems to floodwaters.

BECAUSE OF THEIR HIGH replacement costs and the potential public health risks associated with their failure during flooding, water and sewer utility systems and facilities must be afforded a high degree of protection from flood effects. Modern technology permits properly designed and installed underground water and sewer lines to be much more leakage- and infiltration- resistant than in the past. Construction with improved materials, coupled with their usual burial underground, generally affords utilities an adequate measure of flood protection. However, the siting and construction of utilities in flood hazard areas still requires careful consideration of the effects of flooding on the integrity and performance of the systems or facilities.

FACTORS THAT SHOULD be examined in assessing the conformance of utility installations to the NFIP requirements include:

AVOIDANCE ...of public utility installation within flood hazard areas;

SITING ...on-site utilities in non-floodplain portions of lots;

WATERTIGHT CONNECTIONS ...for all system components;

ANCHORING AND BALLASTING ...of underground tanks, chambers, boxes and pipes to prevent buoyancy or shifting;

ELEVATION OR DRY FLOODPROOFING ...of electrical or mechanical equipment (pumps, etc.) to or above the 100-year flood elevation. (consider 500-year flood protection for critical components of public systems);

PROTECTIVE ARMORING ...of segments of utility lines subject to high velocity, potentially erosive flooding (e.g., riprap protection for a utility facilities in a V-zone or floodway), or exposed to debris damage (e.g., locate utility lines carried on bridge superstructures on downstream side where debris damage is less likely).



NFIP STANDARD

Locate and construct utilities to eliminate or minimize flood damage.

PUBLIC INVESTMENTS FOR the development of utilities serving *undeveloped* floodplain areas must be carefully considered. The State Land Use Plan's policy is clear...

Locate public water and sewer facilities so as to shape development in accordance with state land use policies, rather than simply to accommodate growth.

WITH REGARD TO FLOODPLAINS, this policy implies that the installation of water and sewer utilities which would support or stimulate *new* development within undeveloped flood risk areas should **not** be publicly-supported. Often, however, the situation is not clear cut--public service provision may be desirable as a solution to pollution or contamination problems created by *existing* development in the floodplain, but the availability of public services would stimulate new growth as well. In instances where public support for provision of new infrastructure to flood hazard (and other sensitive) areas is requested, an evaluation of the pros and cons, including likely development stimulus, is called for to determine if the investment is in the general public interest.

WHILE PUBLIC OFFICIALS have less direct control over the planning of utilities other than publicly-financed sewer and water lines (e.g., electric, gas, telecommunications), local officials do have a duty to insure that such public services are designed and installed to minimize flood damage.

OBTAINING AND ANALYZING answers to questions such as the following can allow public officials to make fully informed infrastructure investment decisions that are in the public interest while avoiding support for projects which would result in unwise development of flood hazard areas:

PURPOSE - Is the primary purpose of the infrastructure expansion remedial or speculative?

PLAN CONFORMANCE - Do local and State plans identify the project area for public service provision?

REMEDATION - Is the new infrastructure designed to solve severe pollution or contamination problems?

ALTERNATIVES - Are there other actions that could correct problems of existing development without carrying the risk of stimulating additional floodplain development?

FLOODPLAIN ATTRIBUTES - What are the characteristics of the undeveloped floodplain land affected by the project? Are severe flooding conditions expected (e.g., V-zone, floodway)? Are there other resource limitations (wetlands, coastal feature, etc.) that would constrain development potential?

LIKELY DEVELOPMENT STIMULUS - How much new floodplain development is likely to eventually result if the infrastructure is provided? What development controls are in place to minimize potential new development of the flood risk areas?

DEVELOPMENT CONTROLS - Will the application of alternative development controls, such as open space subdivision provisions, lessen potential flood risks? Will such controls be applied as a condition of the project being funded?

DESIGN/OPERATIONAL CONTROLS - Do the infrastructure project's facility design and operational parameters recognize (via capacity limitations, tie-in restrictions, etc.) the need to limit its development-stimulus effect within floodplain areas?

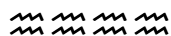


*Standards Applicable
to Construction
of Structures*

Insuring that floodplain structures are constructed to avoid or minimize potential flood damages is the focus of the flood insurance program's construction criteria.

NFIP standards require new or rebuilt structures subject to the risk of flooding to be designed and built to more exacting standards than normal construction.

In Rhode Island, all of the NFIP's construction standards are embodied in the State Building Code and are locally-enforced.



IN SIMPLE TERMS, the NFIP construction standards require structures subject to the regulations to be:

DESIGNED ...to resist flood damage

BUILT ...using flood-resistant materials and methods

ANCHORED ...securely to their sites

ELEVATEDto or above projected base flood levels (*A-zone non-residential only may be floodproofed*).

THE NFIP'S CONSTRUCTION standards apply to all **newly-constructed** structures and to **substantially-improved**, and **substantially-damaged** existing structures within a community's designated special flood hazard areas, or one-hundred year floodplain. *New construction* is any construction commencing after the effective date of the community's Flood Insurance Rate Map. Structures are *substantially-improved* when the cost of improvements (rehabilitations, repairs, improvements, renovations, expansions, etc.) equal or exceed 50% of the structure's pre-improvement market value (**see pages 61-63**). Substantially-damaged structures are those which have received damages (from any casualty) which exceed 50% of the pre-damage market value of the structure (**see pages 61-63**).

THE NFIP CONSTRUCTION requirements distinguish between structures located in coastal high hazard areas, designated as "V-zones" on the community's Flood Insurance Rate Map (FIRM), and those in other flood hazard areas, designated as "A-zones" on the FIRM. In "A zones", the NFIP, standards differentiate between residential and non-residential structures, while in "V-Zones", one set of standards apply to all types of new structures subject to the regulations. Requirements also apply to mobile or manufactured homes and, under certain conditions, to recreational vehicles such as campers or trailers.

THE SECTIONS WHICH follow address the Program's standards for various types of structures located within the different

zones subject to the NFIP requirements. Guidance is also given on special circumstances requiring interpretation.

THE NFIP'S CONSTRUCTION-RELATED standards are covered on the following pages:

- **DESIGN, MATERIALS AND ANCHORING REQUIREMENTS.....34-36**
- **REQUIREMENTS FOR A-ZONE STRUCTURES:**
 - **RESIDENTIAL STRUCTURES39-40**
 - **NON-RESIDENTIAL STRUCTURES41-42**
- **REQUIREMENTS FOR STRUCTURES IN V-ZONES43-47**
- **SPECIAL CONSIDERATIONS**
 - FREE OF OBSTRUCTION REQUIREMENT IN V-ZONES.....48-50**
 - ENCLOSURES BELOW BASE FLOOD ELEVATION 51-56**
 - ACCESSORY, TEMPORARY AND MIXED USE STRUCTURES 57-59**
 - SUBSTANTIAL IMPROVEMENTS OR SUBSTANTIAL DAMAGE TO STRUCTURES60-63**
- **REQUIREMENTS FOR MANUFACTURED HOMES AND RECREATIONAL VEHICLES.....64-66**
- **EVALUATING REQUESTS FOR VARIANCES67-69**

THREE BASIC CONSTRUCTION standards apply to all structures subject to the NFIP regulations.

NFIP STANDARD

Newly-constructed and substantially-improved structures in flood hazard areas* must:

be designed and adequately anchored to prevent flotation, collapse, or lateral movement.

be constructed with materials resistant to flood damage; and be constructed by methods and practices which minimize flood damage.

have utility equipment and service facilities that prevent water from entering or accumulating during flooding.

IN ADDITION TO THE ENVIRONMENTAL stresses which act upon all structures (gravity, wind, rain and snow, occupancy and use loads, etc.), buildings constructed in flood hazard areas also need to contend with stresses unique to flood events.

THE PRESSURES OF STANDING and flowing floodwaters (hydrostatic and hydrodynamic loading), velocity wave impacts and associated erosive undermining, battering by floating debris, and the effects of buoyancy, acting singularly or in combination, can all cause significant damage to or failure of critical structural components. Extended saturation of building materials by floodwaters carrying mud, silt, and other contaminants has added deleterious effects on structural performance.

THE SITING, DESIGN, AND engineering of floodplain structures must consider the additional stresses and loading forces imposed by flooding and respond to them with appropriate design solutions if the structures are to perform properly throughout their life cycles.



* "Flood Hazard Areas" include all zones designated as "V, V1-30, VE, A1-30, A, AH, AO, or AE" on the community's effective Flood Insurance Rate Map (FIRM). See Part 2 for information on NFIP maps.

DEPENDING UPON THE SPECIFICS of the site and structure being built, design responses to flood hazards may include:

LOCATING ...the structure on non-flood-prone portions of the site

RECONTOURING ...the site (grading and filling) to provide building pads elevated above the floodwater elevation (*NOTE: filling for structural support is not allowed in V zones*)

PROTECTING THE SITE ...from flood waters and /or velocity/erosive effects via floodwalls, levees or berms, riprap or breakwaters(*area beneath elevated V-zone structures must remain free of obstructions*)

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BALLASTING, BRACING, AND STIFFENING ...of foundation system components to resist flotation and lateral movement

REINFORCING STRUCTURES ...by use of metal framing fasteners for foundation-to-wall and wall-to roof system connections

USING WATER-RESISTANT ...framing, insulation, sheathing, flooring, and walling materials for any portions of structures likely to be inundated

INCORPORATING BREAKAWAY WALL

...enclosure systems designed to fail under anticipated floodwater loading without jeopardizing structural integrity of remainder of structure (*for limits on the use of such enclosures see pages 48-51, and FEMA's Technical Bulletin 5-93*)

PROVIDING OPENINGS IN FOUNDATION

...walls permitting inundation by floodwaters to equalize internal and external pressures during flooding (*allowed only for at-grade, non-habitable garage or storage space--see pages 40, 53-55*)

PROTECTING BUILDING UTILITY SYSTEMS

...by incorporation of backflow preventers in water and sewer lines, use of watertight casings and piping for water supply wells, elevation of electrical, heating/air conditioning and mechanical equipment above floodwater levels, and use of ground-fault-protected circuits, continuous submergence wiring and self-draining fixtures, and drainable HVAC ductwork for any utilities located in portions of structures susceptible to inundation.

ENGINEERED "DRY FLOODPROOFING"

...protection via use of strengthened, impermeable walls, gasketed flood door and window enclosures, waterproof membranes, backflow preventors, seepage pumps, and other features (*allowed for non-residential structures in "A-zones" only--see pages 42-44*)

A-Zone Structures

The majority of Rhode Island's flood hazard areas are affected by rising waters of streams, rivers, lakes, and ponds.

Periodic flooding in these hazard areas--identified as A-zones on the FIRM--can present significant risks to life and property unless structures are designed and built to minimize flood damages.

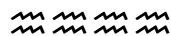
for achieving flood protection is by raising or *elevating* damage-susceptible portions of new or improved structures on fill, columns or piles above the base floodwater elevation.

ELEVATING STRUCTURES reflects a common-sense compromise between the extremes of precluding any new construction in flood risk zones, and allowing the cycle of recurring damage and imprudent re-building to continue.

FLOODPROOFING--an engineered means for physically excluding floodwaters from a structure--is allowed as an alternative to elevation *only for non-residential structures in A zones. Residential structures and structures of any type in V zones may not elect the floodproofing option.*

THE REQUIREMENTS FOR residential and non-residential structures in A zones are discussed separately below. (**See Figure 3.3, on page 53, for an illustration of flood protection elevation options for different types of structures in various flood hazard areas.**)

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IN ADDITION TO THE basic standards applicable to all structures, new or substantially-improved structures in A-zones* must have their **critical components** protected to or above the base flood elevation.

THE PROTECTION TO BASE flood level requirement is essential to the NFIP's goal of reducing future flood damages. The method prescribed by the NFIP standards and the State Building Code

* "A-ZONES" include all zones designated as A1-30, A, AH, AO, & AE on the community's effective Flood Insurance Rate Map (FIRM). See Part 2 for information on NFIP maps.



Residential Structures in A-Zones

NFIP STANDARD

All newly-constructed and substantially-improved RESIDENTIAL structures in A, A1-30, AE, AH & AO-zones must have their lowest floors (including basement or cellar) elevated to or above the base (100 year) flood elevation*.

A CLEAR UNDERSTANDING OF the NFIP's definition of the term basement is necessary for effective administration of the structural elevation requirement for A-zone structures. The NFIP's definition is clear and concise: a **basement** is any area of a building that has its floor below grade on all sides. Although the R.I. State Building Code's One and Two Family Residential Code considers enclosed areas under the primary living space to be *uninhabitable* if the minimum floor to ceiling clearance is less than six feet-eight inches, **for**

purposes of enforcing the NFIP's lowest floor elevation requirements, any enclosed area with a floor that is subgrade on all sides (irregardless of its ceiling clearance) is defined as a basement, and must be elevated.

THE NFIP CRITERIA DO allow for reasonable usage of portions of elevated structures which are below the base flood level. In new or substantially-improved residential structures in A zones, fully enclosed areas *other than basements* may be permitted below the base flood elevation if they meet certain flood protection design and usage standards.

TO COMPLY WITH NFIP standards, enclosed areas below the base flood level in A-zone structures must meet the following criteria:

FLOOR AT GRADE - The enclosure's floor must be at finished grade on at least one side (*NOTE: otherwise the enclosure meets the basement definition and must be elevated*)

USABILITY - The enclosed area must be usable solely for vehicle parking, building access, or storage;

EQUIPMENT - All mechanical or utility equipment and appliances (HVAC, electrical circuit and breaker boxes, washers/dryers/freezers, etc.) must be located above the base flood level, or in floodproof enclosures;

* See Table 4.2, *Base Flood Elevation Determination Guidelines*, page 74.

AUTOMATIC PRESSURE EQUALIZATION -

Enclosure must be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters, by having:

WALL OPENINGS - Enclosure must have a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding, with the bottoms of all openings no higher than one foot above grade (any screens, louvers, valves, or other coverings of wall openings must permit the automatic entry and exit of floodwaters). See *FEMA Technical Bulletin 1-93--Openings in Foundation Walls*. Alternative designs must have...

CERTIFICATION ...by a registered professional engineer or architect as to the performance of the design to equalize hydrostatic pressures.

UNFINISHED/FLOOD RESISTANT MATERIALS

- All interior walls, floors and ceilings located below the base flood must be unfinished and constructed with flood-resistant materials. See *FEMA Technical Bulletin 2-93--Flood Resistant Materials Requirements*.

INNOVATIVE DESIGNS which meet the above criteria can provide features such as (at grade) garages, storage areas, and entrances that make floodplain structures more functional and aesthetically suited to their sites. However, the prime considerations of structural integrity and occupant safety during flood events must always prevail.

LOCAL ADMINISTRATORS must use both their construction expertise and common sense judgement in reviewing designs for enclosed areas below the base flood level to insure that they do not present unacceptable flood risks. In addition to scrutinizing plans to see that such areas initially meet applicable performance standards, the official must also satisfy him or herself that the design does not facilitate future conversion to prohibited uses (*e.g., habitable space*) which would present unacceptable flood risks to life or property.



For more details on enclosed areas below the BFE, see the...

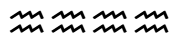
Special Consideration

...section on pages 51-56.



Non-Residential Structures in A-Zones

In recognition of the practical difficulties of elevating some forms of commercial or industrial buildings, the NFIP criteria allow floodproofing as an option for new or substantially-improved non-residential structures in A zones. Floodproofing of structures is not an option in high hazard coastal velocity zones (V-zones).



NFIP STANDARD

All newly-constructed and substantially-improved NON-RESIDENTIAL structures in A, A1-30, AE, AH, and AO-zones must either:

1. have their lowest floors (including basement or cellar) elevated to or above the base (100 year) flood elevation*, or
2. together with attendant utility and sanitary facilities, be designed so that below the base flood elevation* the structure is watertight.

TO MEET THE NFIP'S so-called "dry floodproofing" performance standard, set forth above, a non-residential structure and the utility and service facilities it depends upon must have:

IMPERMEABLE WALLS - Enclosure must be designed with walls substantially impermeable to the passage of water,

RESISTANT CONSTRUCTION - Enclosure must be built with structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy, and

CERTIFICATION - A registered professional engineer or architect must develop or review the plans for the structure, and certify its...

* See Table 4.2, *Base Flood Elevation Determination Guidelines*, page 74.

1 CONFORMANCE (certify that the design and methods of construction conform to accepted standards of practice for meeting the NFIP's watertight construction standards), and its...

2 FLOODPROOFING ELEVATION (certify the specific elevation (relative to mean sea level) to which the structure is floodproofed.)

FLOODPROOFED STRUCTURES must be engineered to withstand the particular flooding characteristics anticipated during the base flood at the building site (floodwater depth, velocity, scour potential, debris impact, etc.). Design must provide for:

STRENGTHENING OF COMPONENTS – (walls, foundation, and floor designed to withstand water pressure, buoyancy, and impact loads);

WATERPROOFING OF WALLS;

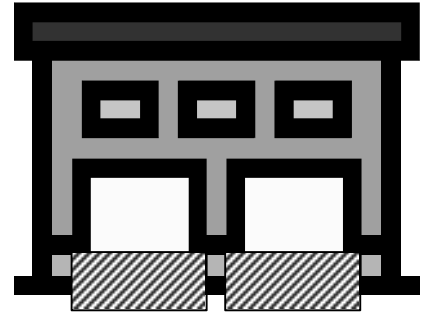
WATERTIGHT CLOSURE SYSTEMS – (for utility lines and structural openings below the flood level); and

SUMP PUMPS – (to eject any seepage that enters the floodproofed enclosure).

BEYOND THESE PROTECTIVE engineering measures, a flood response plan should also be prepared for floodproofed structures to specify the timing of, and responsibility for, implementing protective actions upon issuance of flood watches and warnings affecting the structure. Flood response plans direct actions such as evacuation of personnel, removing or raising expensive or critical equipment, machinery, or records; and removing hazardous or floatable stored materials, and implementing non-automatic

floodproofing measures needed to protect the structure (placing flood shields over openings, etc.). Plans should also direct and schedule necessary maintenance and testing of the structure's floodproofing system components.

WHILE THE NFIP CRITERIA require that floodproofed non-residential structures be



protected only to the base flood elevation, strong consideration should be given to providing floodproof protection to a level at least one foot above the base flood elevation. In addition to protecting the structure from floods of greater magnitude, and possible unforeseen backwater effects of debris-blocked channels, a one foot margin of safety, or *freeboard*, is required for a floodproofed structure to qualify for flood insurance rates which fully recognize its floodproofed status.

FLOODWALLS, DIKES, AND levees are alternative means of protecting non-residential structures which *may* satisfy the NFIP criteria. NFIP Regional Office staff should be consulted to assist in the evaluation of proposals for such flood protection systems for new or substantially-improved structures to assure that their design parameters meet the NFIP's floodproofing standards.

DEPENDING ON SITE CONDITIONS, the cost of designing and building a

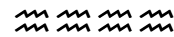
floodproofed non-residential structure can be significantly higher than standard construction, limiting application of the option to high value locations, small structures, and critical uses.

WHILE THE non-residential floodproofing option is economically viable for some new or substantially-improved buildings, elevation of the lowest floor above the base flood level via a filled construction pad, raised foundation walls, pilings or columns continues to be the least-cost method of complying with the NFIP requirements for most non-residential structures.

V-Zone Structures

The allure of living by the sea is irresistible to many, but construction in coastal environs presents unique challenges and risks.

Rigorous attention to design and engineering details is a necessity for all structures exposed to the portentous forces of coastal floods, hurricanes and winter nor'easters.

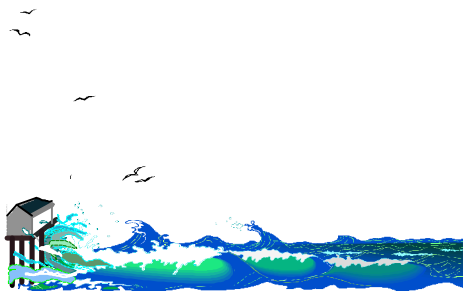


COASTAL HIGH HAZARD AREAS-- identified as "V-zones*"--represent the portion of the coastal zone most vulnerable to extreme tidal surges, punishing wave attacks, and savage winds of severe coastal storms.

* "V-ZONES" include all zones designated as V1-30, V, or VE on the community's effective Flood Insurance Rate Map (FIRM). See Part 2 for information on NFIP maps.



All Structures in V-Zones



ONE SET OF STANDARDS applies within V-ZONES to all new or substantially-improved structures. **The option of floodproofing for non-residential structures is not allowed in V-zones.** Within these areas of maximum hazard, communities must insure that all new and substantially-improved structures are designed to withstand the uniquely dangerous energies of oceanic storms and the flooding conditions they create.

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STRUCTURAL DESIGN IN V-ZONES must contend with a variety of environmental extremes that combine to promote structural failures. Long-term, gradual shoreline loss and short-term, storm-induced scour and erosion must both be considered when selecting and building on a coastal site. Where it is impossible to locate structures away from eroding shorelines, foundation systems must be designed for the erosion anticipated during the life of a structure. Non-structural erosion control is favored over structural control by State coastal resources management regulations (*consult section 300.7 of the RI CRMP*).

N F I P S T A N D A R D

All newly-constructed and substantially-improved structures in V1-30, VE, and V-zones must:

be located landward of mean high tide.

not be supported by fill.

be elevated on pilings or columns so that the bottom of the lowest horizontal structural member of their lowest floor is elevated above the base (100 year) flood elevation. have the pile or column foundation and structure attached thereto anchored to resist flotation, collapse, and lateral movement due to the effects of wind and water loads acting simultaneously on all building components.

have the space below the lowest floor free of obstructions, or enclosed only by non-supporting breakaway walls, open wood lattice work, or insect screening intended to collapse under wind and water loads without causing damage to the foundation system or the elevated portion of the structure.

have professionally-certified plans meeting NFIP criteria

THE HIGH WINDS WHICH accompany severe storms are a second major concern that the design of coastal structures must consider. Wind speed

design data and procedures for construction in Rhode Island are set forth in Chapter 1609.0 of the State Building Code. The Code's criteria specify design for at least 90 MPH wind speeds throughout the state.

STRUCTURAL COMPONENTS MUST ALSO be designed to avoid damage from floodwaters and wave run-up impacts. The 100-year flood elevation (storm-surge stillwater level plus wave height) can be from ten to thirty feet above mean sea level in V-zones closest to the coast.

IN V-ZONES, THE NFIP'S structural elevation requirement applies to the *lowest horizontal supporting member of the building's lowest floor*. This critical structural component must be elevated above the base flood level, and the space below this level kept open (except for the pile foundation and breakaway walls) in order to allow the free passage of floodwaters and waves, and minimize the risk of damage to habitable portions of the structure (**see the Special Consideration section on pages 48-50**). This requirement applies to all new or substantially-improved structures. The option of floodproofing non-residential structures is not allowed in V-zones.

A DESIGN PROFESSIONAL must certify that the design and construction specifications of V-zone structures will meet the NFIP criteria, and allow the structure to perform satisfactorily during severe flood events.

WHILE DETAILED DESIGN parameters for coastal V-zone construction are beyond the scope of this handbook; the

following measures and Figure 3.2 offer general guidance for V zone construction:

MATERIALS - Use only materials resistant to salt-air, moisture, and wind-driven rain. Heavy-weight, hot-dipped galvanized connectors are preferred..

CONNECTIONS - Provide a continuous series of positive connections from the roof rafters down through the walls to the first floor joists and piles. Joist anchors, well-nailed plywood sheathing, metal straps, and bolted floor beams contribute to wind/flood-resistance.

PILINGS - Timber pilings should have a minimum tip diameter of 8 inches, should meet ASTM standards for Class B piles, and should be treated with an acceptable wood preservative. Pilings in ocean-fronting locations should penetrate no less than ten feet below mean sea level. Driven piles are preferable to water-jetted or embedded piles. Kneebrace piles against lateral forces and provide support via a grade beam or slab foundation.

ROOFS - Hip and gable roofs generally offer better wind-damage resistance than gambrel or flat-roofed structures. Design and reinforce overhangs and extensions to resist uplift damage.

SHUTTERS - Provide storm shutters or other secure coverings for wall openings.

BREAKAWAY WALLS - Use light lattice work for breakaway walls below the lowest elevated floor designed to fail while protecting the foundation and superstructure.

Sources: FEMA's Coastal Construction Manual, & RI Coastal Resources Management Program "Redbook"

Text continues on page 48...

**FIGURE 3.2 STRUCTURAL
ANCHORING CONSIDERATIONS IN V-
ZONE CONSTRUCTION.**

T

MANY COASTAL V-ZONES are situated on **coastal barriers**. Coastal barriers are linear landforms located parallel to the coastline, but separated from the mainland by coastal ponds, marshes, and other forms of aquatic habitat. They are composed of unconsolidated materials (typically sands) and are geologically dynamic landforms that migrate over time in response to climatic trends and oceanic and atmospheric influences. Ecologically and economically they are among the most strategic locations. While coastal and environmental experts have long argued that putting permanent structures on coastal barriers is a losing proposition and causes loss of habitat and damage to coastal ecosystems, intensive development for vacation homes, hotels, and other water-based tourism facilities has been the fate of many of the nation's coastal barrier systems.

RHODE ISLAND HAS over 40 coastal barriers, ranging from tiny "bay barriers" formed where coastal streams enter Narragansett Bay, up to

Ninigret Beach--an ocean-fronting barrier on the South County coast that is over three miles long.

IN ADDITION TO BEING driven by market forces (e.g., high prices commanded by oceanfront building sites), the development of coastal barriers has historically been supported by explicit and implicit governmental subsidies--such as grants or loans for bridge, highway, and utility construction, and federal flood insurance coverage that reduces or removes the risk of financial institutions which make loans for private development on barriers.

TO REMOVE THIS stimulus, Congress passed the **Coastal Barrier Resources Act of 1982** and the **Coastal Barriers Improvement Act of 1991**. Championed by Rhode Island Senator John Chafee, these laws designate a system of undeveloped coastal barriers within which federal support for new development is

generally prohibited.

Significant for the NFIP is the Act's prohibition of new flood insurance coverage for structures built in designated units of the Coastal Barrier Resources System after certain dates (generally the date of designation of the unit). Areas subject to the CBRA/CBIA prohibition on new flood insurance are shown by distinct shading patterns on the FIRMs of all affected communities, and the effective date of the prohibition for each area designated is given.

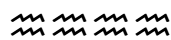
THE ACTS AFFECT only federal funding or subsidies, however, and do not prevent construction paid for with private funds, or underwritten by private insurance. Local officials should be mindful that, although federal flood insurance may not be available to structures in these areas, any new development that occurs in a designated Coastal Barrier Resources System unit **is** subject to applicable federal, state, and local laws and regulations, including the NFIP's construction and land use criteria.



→ Special Consideration ←

Free-of-Obstruction Requirements for V-Zone Structures

The NFIP construction criteria require that new or substantially-improved structures in V-Zones keep the space below the Base Flood Elevation free of obstructions in order that floodwaters will transfer only minimal forces to the foundation system when they pass beneath the structure.



UNDER THE "free of obstruction" requirement, any type of lower area enclosure *or other construction element* that will obstruct the flow of velocity flood water and wave action beneath an elevated V-zone structure is not allowed.

PILE OR COLUMN foundation systems meet the free of obstruction criterion, while standard foundations (solid masonry or wood frame walls) are generally not acceptable. Solid wall enclosures are allowed only if they meet breakaway design criteria (**see page 44**), and will not significantly increase the flood damage potential to the structure's foundation and/or superstructure. Fill may not be used for support of V-zone structures. Also, the

impacts on flood dynamics of pools, decks, and related construction elements must be considered.

ANY CONSTRUCTION ELEMENT, such as a garage, deck, or bulkhead, that is structurally dependent on, or attached to, a V-zone building is considered to be a part of that building, and its design must meet all the V-zone requirements. If such attached elements are located beneath the structure, they must be of breakaway design to allow the structure to meet the free of obstruction requirement.

UNDER THE NFIP's general criteria for flood damage prevention (**see pp. 36-37**) free-standing construction elements and site landscaping features of V-zone construction projects must also be evaluated. Free-standing construction elements include features such as pools, decks or patios, bulkheads, landscaped berms, and fences which are located outside the footprint of and not attached to a V-zone structure. Parking slabs, grade beams, bracing, and enclosed areas located beneath the elevated portions of a V-zone structure may also be considered free-standing construction elements, if not physically dependent on, or attached to, the structure in question.

AS PART OF THE certification process for new V-zone construction, the design professional must consider the effects that proposed project elements, including freestanding construction elements, will have on the physical characteristics of flooding, and upon wave or debris impacts upon the project structure and surrounding structures. The certified design of the structure

must take into account any additional storm-related loadings on the building attributable to allowable freestanding construction elements.

THE FOLLOWING considerations apply to common V-zone construction elements:

ACCESS STAIRS AND ELEVATORS - While access stairs and elevators may be of non-breakaway design, the potential loads generated by these obstructions must be taken into account in design of the V-zone structure.

ACCESSORY BUILDINGS - Unless properly elevated on columns, accessory buildings must be limited to low value, "disposable" buildings (see pp. 56-57), and consideration must be given to the debris effects on nearby structures.

BULKHEADS OR BERMS Any bulkhead or berm beneath an elevated V-zone structure constitutes an obstruction, and is not allowed. The effects of on-site berms or bulkheads which are not beneath the structure must be considered and reflected in the design of the structure. Communities should prohibit bulkheads or berms which would result in ramping or deflection of velocity waters or erosion that would damage nearby structures.

CONCRETE PADS Minimally- or un-reinforced concrete pads may be allowed under structures as a parking slab, or as a floor for an allowable enclosed area. Such pads should not be structurally-attached to the building's foundation system, and must not be elevated on fill.

DECKS AND PATIOS - Decks and patios which are unattached to the structure may be allowed, if they are found to have no adverse flooding or debris impact effects. Attached decks are considered part of the structure, and

must have their lowest structural member at/above the BFE.

ENCLOSED AREAS - Must be of screen, lattice, or non-supporting/breakaway wall design, and meet NFIP criteria (see pages: 51-54).

FENCES - Must be analyzed for impact on flood conditions and debris effects.

FILL/LANDSCAPING Fill may not be used for structural support. Fill may be used for landscaping and site grading provided it would not result in ramping or deflection of velocity waters or erosion that would cause additional damage to buildings on site or to nearby structures.

FOUNDATION BRACING - Only the minimum bracing necessary should be used, and, should be placed parallel to the direction of flood flow.

GRADE BEAMS - Grade beams tying together the perimeter piers or columns of a V-zone structure's foundation are allowed if their top surface is flush with the natural site grade, and they are designed to withstand erosion and scour of the supporting soil.

SEPTIC SYSTEMS - Mounded systems, requiring significant filling, constitute an obstruction, and are not allowed beneath a V-zone structure. System location, design, and installation must comply with applicable NFIP, RICRMC, and RIDEM regulations.

SWIMMING POOLS - May be sited beneath a V-zone structure only if top of pool (and any accompanying deck or walkway) are flush with existing grade, are structurally independent of the structure and its foundation, and only if the area beneath the lowest floor of the structure remains unenclosed, except for lattice or insect screening (N.B.: solid breakaway wall enclosures are not allowed around pools beneath V-zone structures). Design certification must assure that pools will not increase flood

damage to V-zone structure or adjacent structures by increased wave or debris impact forces.

SPECIAL GUIDANCE SUMMARY
FREE OF OBSTRUCTION
BELOW BFE
REQUIREMENT IN V-ZONES

Enclosures or other project features that obstruct the flow of velocity flood waters and wave action beneath an elevated V-zone structure are not allowed.

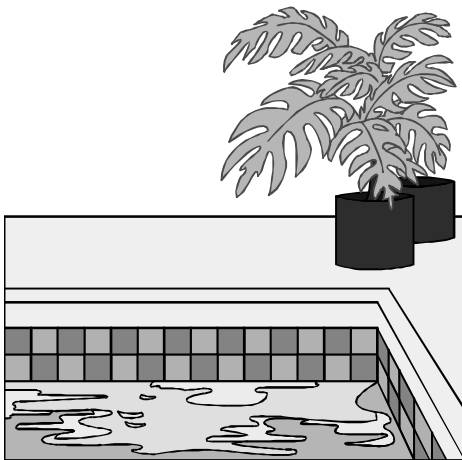
Construction elements that are structurally dependent on or attached to a V-zone building are considered a part of the building, and are subject to all V-zone requirements.

Freestanding construction elements (pools, fences, decks, walls, berms, landscaping, etc.) must not create obstruction beneath V-zone structure.

Design of V-zone structures must take into account any additional storm-related loadings on the building attributable to allowable enclosure or freestanding construction elements.

Certification of design must consider the effects of project on characteristics of flooding, and wave or debris impacts, both for the project structure and surrounding structures.

Project features which would result in ramping or deflection of velocity waters or erosion that would increase flood damage to nearby structures should be prohibited.

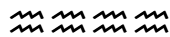


→ Special Consideration ←

Structures With Enclosed Areas Below the Base Flood Elevation

A central requirement of the NFIP is that new or substantially-improved floodplain structures be protected to or above the base flood level.

Compliance with the NFIP elevation requirements may result in the creation of areas beneath the lowest habitable floor of elevated structures.



UNDER NFIP STANDARDS, new or substantially-improved buildings in A-zones must have their lowest floors elevated to or above the base flood level, or be floodproofed to that level (non-residential only). In V-zones, the lowest horizontal structural member of the lowest floor must be raised to or above the base flood elevation. Depending upon the site and the structure's design, areas ranging from 1-2 foot high "crawl spaces", under the lowest elevated floor of A-zone buildings, to 10-15 foot high substructure clearances beneath V-zone buildings can result. Applicants often propose enclosing such areas to enhance security, improve the aesthetic

appearance of the structure, and to make some use of the area.

WHILE ENCLOSED AREAS below the base flood elevation are not prohibited outright by the NFIP criteria, the usage and design parameters of such areas are addressed both directly and indirectly by the regulations. Determining whether plans for new or substantially-improved structures which call for fully-enclosed areas below the base flood elevation meet the letter and spirit of the NFIP's requirements presents local administrative officials with some of the most difficult decisions they have to make. It requires them to carefully interpret applicants' plans and make rulings on what constitutes the lowest floor of the structure, whether or not enclosed areas below the base flood level meet the NFIP definition of a basement (A zones), or would constitute an obstruction to floodwaters (V zones), and whether the design, construction materials, and foreseeable future uses of the enclosed area will conform to the NFIP's requirements.



Determining the Lowest Floor

DETERMINING WHICH LEVEL OF a structure is the lowest floor is critical to proper NFIP enforcement, but is not always a straight-forward matter. Plans for floodplain structures commonly show enclosed areas below the BFE which are termed "crawl space", "cabana", "cellar", "storage area", "lobby", "ground floor", "walk-out", "first floor", "first level", "garage", "service level", or any number of other descriptive terms.

Regardless of nomenclature, however, the compliance of all such areas with the NFIP criteria must be assured.

Enclosed areas which meet the definitional criteria for a "lowest floor" must be elevated. Enclosed areas not meeting the definition of "lowest floor" may be allowed below the BFE, only if they conform to strict usage, design and construction guidelines.

THE NFIP DEFINES THE "lowest floor" of a structure as the "lowest enclosed area", but qualifies what this term encompasses. Basements--*defined as areas whose floors are sub-grade on all sides*--are included in the lowest floor definition, and must always be elevated. Unfinished, flood-resistant enclosures *which are not basements* and which are

used exclusively for parking of vehicles, building access or storage, are not considered as the "lowest floor" unless (by virtue of their design and construction) they render the structure in violation of other applicable (non-elevation) design requirements (e.g., free of obstruction, anchoring to resist floatation, collapse, lateral movement requirements). Figure 3.3 illustrates the proper interpretation of some typical situations on the "elevation of lowest floor" theme.

DESCRIBED BELOW ARE the general and specific requirements applying to enclosed areas below the Base Flood Elevation (BFE).

General Requirements for Enclosed Areas Below the BFE

SEVERAL NFIP STANDARDS apply to non-basement enclosures below the base flood elevation in all new or substantially-improved structures (except floodproofed A-zone, non-residential structures):

USAGE Areas must be suitable only for garage, building access, and/or storage of incidental materials having low flood damage potential (washer/dryer, freezers, and other appliances are not permitted).

MATERIALS All such enclosed areas must employ flood resistant construction materials below the base flood elevation. (see FEMA Technical Bulletin 2-93) *Text continues on page 54...*

FIGURE 3.3

Interpretative Examples: Elevation of lowest floor

UTILITIES Utilities are limited to wiring needed for essential lighting of the enclosure. Electric panels, heating, cooling systems, and other mechanical equipment are not permitted below the BFE unless they are floodproofed. Fuel tanks may be permitted in below BFE enclosures, if they are properly anchored/ballasted to prevent floatation, but increased insurance rates may result. Elevators may have essential components located below the BFE, but should be flood resistant, and should include automatic controls to send the car to an upper floor in the event of inundation.

ADDITIONAL requirements apply to below-BFE enclosures in both A-zones and V-zones.

Additional Criteria for Below-BFE Enclosures in V-Zone Structures

IN ADDITION TO THE usage (parking, access, limited storage), utility protection, and flood-resistant materials requirements, below-BFE enclosures in V-zone structures are subject to the NFIP requirement that areas below the lowest elevated floor of V-zone structures be kept "free of obstructions" (see pages 48-50), or enclosed only with open lattice, screening, or solid walls which meet the NFIP breakaway wall performance specifications. The only exception allowed to the breakaway construction requirement is for access stairways or elevators attached to, or beneath elevated V-zone structures. Such features must be constructed of flood-resistant materials, however, and the loads generated by these obstructions must be considered in the overall design of the building. The

size of enclosures below the BFE in V-zones structures is not limited, but applicants should be informed that if a below-BFE enclosure is greater than 300 square feet in size, the enclosure's floor will be used as the reference floor in the insurance rating of the structure, likely resulting in very high premiums for flood coverage.

Additional Criteria for Below-BFE Enclosures in A-Zone Structures

IN A-ZONES, ONLY NON-RESIDENTIAL structures have the option of having *dry-floodproofed* floor space below the BFE. Residential structures, and non-residential structures which are not floodproofed may incorporate either breakaway or structural (e.g., foundation) walled enclosures below the BFE, but such enclosures must comply with two critical design standards, as well as the general usage, flood-resistance, and utility protection criteria previously outlined:

UNLESS THEY ARE dry-floodproofed (*non-residential only*), below-BFE enclosures in A-zone structures must have:

FLOOR AT GRADE - The floor of all A-Zone below-BFE enclosures must be at grade on at least one side, and

OPENINGS - The walls of all A-Zone below-BFE enclosures must include automatic openings capable of equalizing the hydrostatic pressures of the base flood.

IN A-ZONES, the first determinant of the acceptability of a below-BFE enclosure is whether the floor of the enclosure is

to be level with the exterior (finished) grade on at least one side.

IF PLANS CALL FOR A BELOW BFE ENCLOSURE'S FLOOR TO BE SUBGRADE ON ALL SIDES, THE AREA IS DEFINED AS A BASEMENT UNDER NFIP CRITERIA AND IT MUST BE ELEVATED TO OR ABOVE THE BASE FLOOD ELEVATION.

IF THE ENCLOSURE PASSES the "floor at grade on one-side" test, officials must next assess whether its walls will perform as required under flooding conditions. If the walls are solid, non-breakaway design, openings must be provided to automatically allow flood waters to enter and drain out. The NFIP criteria set minimum standards for the sizing and locations of the required openings (**see page 40**). Openings which do not meet the minimum standards may be allowed if their design has been certified by a registered design professional for its performance in accord with the NFIP criteria.

FINALLY, BELOW-BFE enclosures in A-zones must also meet the general requirements for usage, flood-resistant materials, and utility/equipment protection. In addition, the design should not readily accommodate *future* conversion to prohibited uses (*e.g., habitable space*) which would present unacceptable flood risks to life or property.

Garages Below the BFE

PARKING OF VEHICLES IS allowed beneath elevated floodplain structures, subject to the requirements for below-BFE enclosures. A-zone structures often include attached or integral garages below the base flood level. Such features are acceptable as long as they meet the relevant tests: the floor of the garage must be at grade on at least one side, and wall openings must be provided per the NFIP standards. The garage level must also conform to the general requirements for usage, flood-resistant materials, and utility and equipment protection.

BELOW-BFE GARAGES whose floors are below grade on all sides are not allowed in A-zones, unless the garage is in a non-residential structure in which all portions of the structure below BFE (including the garage) are dry-floodproofed.

THE FOLLOWING SPECIAL considerations apply to the review of garage/vehicle parking enclosures below the BFE in **A-zone structures**:

USAGE TEST - All of the enclosed space below BFE must meet the usage test (be suited only for parking, access or limited storage). A residential structure that *combines* habitable space and garage/storage space on the lowest level must have that lowest floor elevated to or above the base flood elevation. A residential structure that has *only* garage, storage and access uses on its lowest level, and that meets the utility and foundation openings requirements *may* have its lowest floor below the BFE, but only if the local official can be assured that the enclosed space below the BFE cannot

be converted in the future to prohibited uses (habitable space).

AUTOMATIC OPENINGS - Garage doors which require human intervention to open do not constitute *automatically-functioning* wall openings meeting the NFIP criteria. However, some or all of the required *automatic* wall openings may be *integrated* into garage door panels.

IN **V-ZONES**, GARAGES below the BFE must meet the "free of obstruction" breakaway wall, flood-resistance, usage, and utility protection requirements that apply to all below BFE enclosures. **V-zone garages may not be below grade on all sides.**

FREE-STANDING GARAGES, which are not attached or integral to a principal structure, are considered separate non-residential structures, and must conform to the applicable requirements. They may be floodproofed in A-zones. In V-zones, such structures must be designed to prevent flotation or collapse have breakaway wall construction below the base flood elevation may be treated as accessory structures if their cost is modest. **(see pages 57-58)**

SPECIAL GUIDANCE SUMMARY

ENCLOSED AREAS BELOW BFE

REQUIREMENTS FOR ALL ZONES

Area must be suitable for parking, access, and limited storage only.

Flood-resistant construction materials must be used below BFE.

All utilities and service equipment in the enclosure must be located above BFE or floodproofed.

REQUIREMENTS FOR V ZONES

Enclosed area must not constitute an obstruction to the passage of flood waters.

All solid walls of the enclosure must meet breakaway design criteria.

REQUIREMENTS FOR A ZONES

(NON-FLOODPROOFED STRUCTURES)

Floor level of the enclosed area must be at (finished) grade on at least one side.

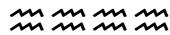
Openings must be provided in the walls of the enclosure which operate automatically to equalize hydrostatic pressures of the base flood.

→ Special Consideration ←

Accessory, Temporary, and Mixed-Use Structures

While the NFIP construction criteria technically apply to all new or substantially-improved structures, they must be applied with a reasonableness that considers the nature and extent of the risk.

Accessory, temporary, and mixed use structures present cases requiring special consideration and interpretative judgments on the part of local officials.



Accessory Structures

ACCESSORY STRUCTURES, such as detached garages, sheds, garden buildings, pool enclosures, and barns, are technically included under the definition of "structure" and, therefore, are subject to all applicable requirements. The NFIP recognizes, however, that the investment needed for such structures to comply with all of the NFIP's new construction standards would render many of them economically unfeasible.

CONSEQUENTLY, ACCESSORY structures which represent *minimal investments*, and which do not represent a hazard to life or other property, may be waived from complying with the NFIP's "lowest floor elevation" or "dry-floodproofing" requirement for new construction.

THE DEFINITION OF *minimal investment* must be determined by the community, and should be clearly established in local regulations. FEMA guidance recommends a dollar value of \$500 or less for the definition of *minimal investment*, but recognizes that regional and local variations in construction costs may necessitate adjustments to this recommended figure*.

ALL OTHER NFIP requirements do apply, however, including standards requiring structures to be securely

* NFIP *residential* flood insurance policies allow up to 10% of the face value of a policy to be applied to damages sustained by one garage or carport which is appurtenant to an insured structure. Other accessory structures must obtain separate coverage.

anchored to resist flotation, collapse or lateral movement, and be constructed by methods and practices that minimize flood damages, and with flood-resistant materials, utility systems, and equipment.

FEMA RECOMMENDS that communities adopt and implement the following standards to insure that accessory structures exempted from the normal elevation or floodproofing requirements comply with NFIP objectives:

USAGE Accessory structures shall not be used for human habitation (e.g., working, sleeping, living, cooking, or restroom uses not permitted)

DESIGN/SITING Accessory structures shall be designed and sited to have low flood damage potential, and to offer minimum resistance to the flow of floodwaters.

UTILITIES Accessory structures shall have all electrical and/or heating equipment elevated or floodproofed to the base flood elevation.

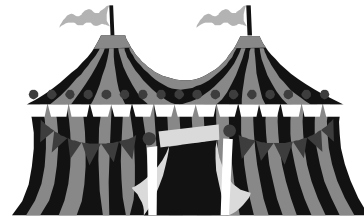
CONSTRUCTION Accessory structures shall be firmly anchored and constructed to prevent flotation. The walls of accessory structures shall have openings meeting the NFIP standards for equalizing hydrostatic pressures of the base flood.

V-ZONE Accessory structures shall utilize pilings, adequately embedded to resist scour and lateral deflection, have the lowest horizontal structural member of the roof system (including plates and beams connecting the upright supports of the structure) elevated to or above the Base Flood Elevation, and have their floors at or very close to grade. Any enclosure below the BFE shall be constructed of wooden lattice, insect screening or shall be of breakaway wall construction meeting the NFIP's standards.

Temporary Structures

COMMUNITY REGULATIONS frequently permit the placement of structures for a limited period of time in special situations. Mobile/manufactured homes may be allowed as a temporary residence while a homeowner rebuilds a principal structure destroyed by a fire or other disaster. Temporary buildings may be allowed at construction sites, sales offices, or commercial stands; and mobile structures may be permitted in connection with a fair, festival or traveling amusement show.

WHEN THE occupancy and use of a floodplain structure



will be so short-term in nature as to make enforcement of the NFIP's normal elevation or floodproofing standards impractical, communities may allow the temporary placement of non-conforming structures in flood hazard areas provided the following two conditions are met:

PERMIT - A permit is issued for the structure specifying the time period for which temporary uses are to occupy the site, and

REMOVAL PLAN - A written plan for removal of the structure in the event of hurricane or flood warning notification is provided by the owner or applicant prior to issuance of the permit.

Temporary structure removal plans should contain the following information:

- the name, address and phone number of the individual responsible for removal of the temporary structure,

- the time at which the structure will be removed (a minimum of 72 hours prior to forecasted landfall of hurricane, or immediately upon flood warning),
- a copy of a contract or other suitable instrument of agreement with a trucking company ensuring the on-demand availability of the hauler for removal of the structure,
- designation and documentation of availability of a suitable location outside flood hazard areas to which the structure will be moved.

Mixed Use Structures

Many structures in older urban areas and in the commercial districts of some resort areas contain a mix of commercial and residential uses, with shops occupying the ground floor and apartments or condominium units on the floors above. Village-centered and neo-traditional communities--popular trends in the development field--also generally feature mixed use buildings.

THE NFIP'S REQUIREMENTS differentiate between residential and non-residential structures in floodplains in only one aspect. New or substantially-improved *non-residential* structures which are not located in V-zones are allowed the option of floodproofing their lowest floors (including basement), whereas new or substantially-improved *residential* structures must elevate their lowest floors (including basement) to or above the base flood elevation. Apart from this distinction, residential and non-residential structures are treated identically under the NFIP.

NEW FLOODPLAIN STRUCTURES in A-Zones which combine residential and non-residential uses require permit

administrators to make a determination as to whether the floodproofing option is to be available for the structure. This decision should be based upon the proportion of the structure's total area (gross floor area) devoted to non-residential usage, and the location of the residential space relative to the base flood elevation. To qualify for the non-residential structure floodproofing option a mixed use structure must meet two conditions:

USE RATIO - The non-residential portion of the structure must comprise 25% or more of the building's total space, and must be at least 1,200 square feet; and

ELEVATION OF RESIDENTIAL SPACE - All of the structure's residential space must be located above the base flood elevation.



SPECIAL GUIDANCE SUMMARY

ACCESSORY STRUCTURES

NFIP floodproofing and elevation requirements may be waived **ONLY** if structure represents a minimal investment (generally <\$500) and if specific criteria for design, siting, construction, utilities, and usage are met.

TEMPORARY STRUCTURES

NFIP floodproofing and elevation requirements may be waived, but a permit setting time limits on use and a plan for removal in event of flood threat are required.

MIXED-USE STRUCTURES

Residential structure requirements apply (e.g., elevate lowest floor) if:

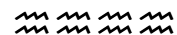
- non-residential use is less than 25% of gross structure area **OR** less than 1,200 square feet in total; or if
- **any** residential space is to be located below the Base Flood Elevation.

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→ Special Consideration ←

SUBSTANTIALLY-IMPROVED & SUBSTANTIALLY-DAMAGED STRUCTURES

The NFIP's substantial improvement and substantial damage provisions are instrumental to attainment of the Program's central goal: to reduce the nation's flood damage costs over time through the application of improved floodplain management and construction methods.



FLOODPLAIN STRUCTURES whose construction pre-dates the effective date of a community's FIRM are exempt from the requirements for new construction. However, this exemption—or grandfathering—applies only until an existing structure is either upgraded or damaged beyond a threshold point. Grandfathering also applies in the case of post-FIRM construction where a subsequent map revision results in the application of more stringent criteria (e.g., change of zone designation from an A to a V)—but again only until improvement or repair investments

exceed a certain level. In both cases, the point at which compliance with the currently-applicable NFIP criteria "kicks in" for grandfathered structures is set on economic basis: *a structure for which the upgrading or damage repair costs exceed 50% of the structure's market value must comply with the requirements for new construction.*

THE NFIP'S DEFINITION of substantial improvement (see glossary) includes any reconstruction, rehabilitation, addition or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of the improvement. Only two types of improvements are exempt from the definition of substantial improvement:



regardless of the actual value or cost of the repair work performed. Thus, once a structure has been declared substantially-damaged, it must meet the NFIP criteria for new construction if it is to be repaired.

ULTIMATELY, THE responsibility for determining whether a given structure improvement or damage situation meets or does not meet the definitions of "substantial" belongs to the local building official. Although straight-forward in principal, the NFIP substantial improvement and substantial damage provisions are frequently the source of considerable consternation for local officials in application. The following guidance is intended to assist local officials in determining the applicability of the substantial improvement and substantial damage provisions.

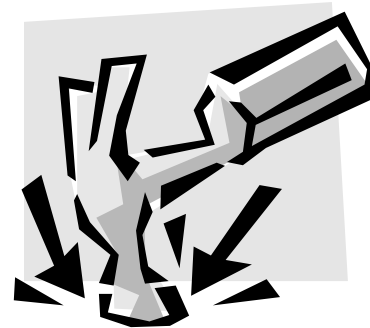
IMPROVEMENTS TO MEET

MINIMUM CODE - Improvements which are the minimum required to correct existing violations of state or local health, safety or sanitary codes which have been identified by the local code enforcement official; and

HISTORIC STRUCTURES -

Improvements to a designated historic structure, provided the improvements do not jeopardize the continued designation of the structure as historic.

UNDER THE NFIP, substantially damaged structures are those which sustain damages of any origin whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the (before damage) market value of the structure. All improvements to structures which have been substantially damaged are defined as substantial improvements,



Guidelines for Determining Substantially-Improved or Substantially-Damaged Structures

TO ESTABLISH WHETHER a structure meets the criteria for substantial improvement or substantial damage definitions, the building official must compare the dollar cost of the proposed improvement (or the cost of repairs) to the market value of the structure prior to the improvement (or damage). The following formulas should be used to determine if an improvement constitutes a *substantial* improvement, or if a damaged structure has been *substantially-damaged*:

FOR STRUCTURES BEING IMPROVED:

$$\frac{\text{Cost of Improvements}}{\text{Pre-Improvement Market Value}} \times 100 = \underline{\text{P}}\%$$

RULE: If "P" equals or exceeds 50%, improvements constitute a *substantial improvement*.

FOR DAMAGED STRUCTURES:

$$\frac{\text{Cost of Full Repairs}}{\text{Pre-Damage Market Value}} \times 100 = \underline{\text{P}}\%$$

RULE: If "P" equals or exceeds 50%, structure has been *substantially-damaged*.

TO ESTABLISH APPLICABLE values, the building official may require the applicant or owner of a structure to submit information (appraisals, contractor estimates, etc.) to use in the above formulas, but must assure that values used in the calculation reasonably reflect true property value and construction costs. The closer the level of improvement or damage appears to approach 50% of the market value of a structure, the greater the precision needed in making substantial improvement or damage rulings.

OTHER COMMON QUESTIONS and sources of confusion on substantial improvement/damage determinations include:

ADDITIONS Additions which constitute substantial improvements to an existing structure must always meet the criteria for new construction. If the addition requires structural changes in the walls or roof of the original structure, the entire structure (e.g., original plus addition) must comply with the NFIP criteria for new construction.

COST ESTIMATES Contractor's estimates may be used for determining the cost of repairs or improvements. Costs necessary to bring the structure up to minimum health and safety standards may be excluded from the calculation, if the appropriate local official was aware of the violations prior to the application for improvement or damaging event. The value of any donated materials or labor must be included in cost estimates.

MARKET VALUE NFIP criteria require that the costs of improvements or repairs be compared to the pre-improvement or pre-damage (as appropriate) market value of the structure. Market value is the price which the structure would sell for, as established in qualified appraisals. Local tax assessment data may be used to establish market value, but may require adjustment if the community uses less than full valuation, is near the end of the re-assessment cycle, or includes land values in the assessment figure. *Replacement value*-estimates of the cost of replacing the structure with like construction at present prices--may not be used as a surrogate for market value.

INCREMENTAL IMPROVEMENTS The Rhode Island State Building Code accords the local building official discretion to require compliance with appropriate parts of the Code's standards for new construction when improvements or

repairs constitute more than 25% but less than 50% of a structure's value.

FEMA guidance states that some communities require that the cumulative cost of improvements made over time to a structure be tracked, and the substantial improvement definition applied if and when cumulative investments reach the 50% of market value total.

ADDITIONAL GUIDANCE can be found in FEMA's publication on substantially-damaged structures listed in the bibliography.

SPECIAL GUIDANCE SUMMARY SUBSTANTIAL IMPROVEMENT DETERMINATIONS

Structure must be brought into compliance with current NFIP criteria whenever improvement cost equals 50% or more of market value of structure before improvement.

Cost and value estimates must be documented

Costs to correct pre-existing code violations may be excluded.

Designated historic structures exempt unless improvements impair historic character.

SPECIAL GUIDANCE SUMMARY SUBSTANTIAL DAMAGE DETERMINATIONS

Damaged structure must be brought into compliance with current NFIP criteria whenever cost to repair equals 50% or more of market value of structure before damage.

Cost and value estimates must be documented

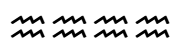
Costs to correct pre-existing code violations may be excluded.

Designated historic structures exempt unless improvements impair historic character.



Unless properly installed, mobile or manufactured homes can be very susceptible to flood damage, and can worsen risks to other property if swept from their sites by floodwaters.

To promote safe mobile home installation, the NFIP standards require communities to regulate how mobile or manufactured homes are anchored to their sites and insure that the lowest floors of mobile/manufactured homes are properly elevated.



A MANUFACTURED (OR MOBILE) home is defined by the NFIP as...

...a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities.

The NFIP's strictest standards for manufactured homes apply to units which are placed on individual private lots, those which go into new or expanding parks, and those which replace a flood-damaged unit. In these situations, the placement of a mobile or manufactured home is treated much the same as the construction of any new residential structure, and must meet the basic NFIP standards. Somewhat less stringent standards are provided for units which are placed on existing lots or pads in existing parks.

A NCHORING OF mobile/manufactured homes placed in flood hazard areas is a fundamental requirement. Anchoring includes, but is not limited to, over-the-top or frame-to-ground anchors. NFIP

Text continues on page 66...

NFIP STANDARD

Manufactured homes* placed or substantially-improved on sites which are.....

- a. outside of a manufactured home park or subdivision,
- b. in a new manufactured home park or subdivision,
- c. in an expansion to an existing manufactured home park or subdivision, or
- d. in an existing manufactured home park or subdivision on which a manufactured home has incurred substantial damage as a result of a flood;

Must meet standard MH1 at right... if located in a non-velocity flood hazard area (FIRM zones A, A1-30, AE, AH, & AO) or

Must meet Standard MH2 at right... if located in a coastal high hazard area (FIRM zones V1-30, VE, & V) .

Manufactured homes* placed or substantially-improved on other sites in an existing manufactured home park not meeting conditions a. through d. above ...

Must meet standard MH3 at right. (applies in both coastal high hazard and non-velocity flood hazard areas).

* Standards also apply to recreational vehicles unless licensed and ready for highway use, and kept on site for less than 180 consecutive days.

Standard MH1:

Manufactured home must be elevated on a permanent foundation so that its lowest floor is elevated to or above the base flood elevation, and must be securely anchored⁺ to an adequately anchored foundation system to resist flotation, collapse and lateral movement

Standard MH2:

Manufactured home must meet all requirements for new or substantially-improved V-zone structures (see pp. 44-46)

Standard MH3:

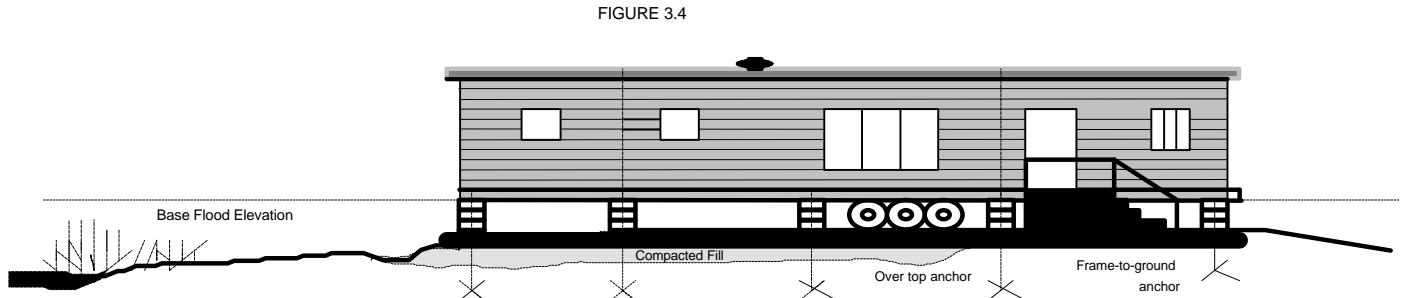
Manufactured home must be elevated so that either...

- its lowest floor is at or above the base flood elevation, or
- its chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade and it is securely anchored⁺ to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

⁺ Anchoring includes, but is not limited to, over-the-top or frame-to-ground anchors. NFIP anchoring requirements are in addition to that required by the State Building Code to resist wind forces.

anchoring requirements are in addition to that required by the State Building Code to resist wind forces. Figure 3.4, below, illustrates a typical method for

compliance with NFIP requirements for mobile/manufactured homes placed within a flood hazard zone, including the required tie-down anchoring system.



NFIP REQUIREMENTS FOR MOBILE HOMES PLACED IN EXISTING PARKS IN FLOOD ZONES

* Unit securely anchored to adequately-anchored foundation system

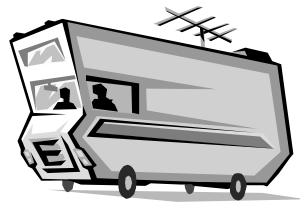
* Lowest floor elevated to/above Base Flood Elevation,

OR unit supported on reinforced piers at least 3 FT. high

Recreational Vehicles

66

THE NFIP DEFINITION OF manufactured home does not include recreational vehicles such as trailers and campers. Recreational vehicles are defined by the NFIP as vehicles which



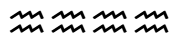
...are built on a chassis; are 400 square feet or less at their largest horizontal projection; are designed to be self-propelled or permanently towable by a light duty truck; and are designed primarily not for use as a permanent dwelling, but as temporary living quarters for recreational, camping, travel or seasonal usage.

THE NFIP DOES not prescribe standards for the siting and elevation of recreational vehicles, *per se*; however, unless the usage of the vehicles conforms to the NFIP definition and guidelines, recreational vehicles become subject to the Program's standards for manufactured homes. Recreational vehicles which are placed on a site in flood hazard area for 180 consecutive days or longer without being moved, or which are not fully licensed and ready for highway usage* must comply with the permitting, elevation, and anchoring requirements for manufactured homes (**set forth on page 65**).

* "Ready for highway use" means the recreational vehicle is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions.

Variations to the Program's Requirements

In circumstances where full compliance with the NFIP requirements would pose an exceptional hardship, the NFIP's regulations provide for duly-appointed appeals boards to consider requests from applicants for variances to the Program's requirements.



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APPPLICANTS WHO ARE denied a permit on the grounds that their plans do not conform with a NFIP standard have the right to appeal the decision of the permit official to the appropriate body established to process appeals to local administrative decisions. Depending on whether the NFIP standard at issue is a provision of the State Building Code, or of a local Zoning or Land Development Review ordinance, the appeal is filed with either the *Local Building Code Appeals Board* or the *Local Board of Review**. These bodies are authorized by the State Building Code, Zoning Enabling Act, or Land Development Review Act, and established by

* Some communities in Rhode Island have a single municipal appeals board that is authorized to handle appeals of Building Code and zoning/land development matters. The Rhode Island State Building Commissioner handles Building Code appeals for municipalities which have not established a local Building Code Appeals Board.



municipal ordinance to hear and decide appeals to local administrative decisions made under these statutes.

CASES IN WHICH variances to the requirements may be issued by local boards include:

SMALL LOT/INFILL - New construction or substantial improvements of structures to be erected on lots of one-half acre or less in size which are surrounded by and contiguous to lots with existing structures constructed below the base flood elevation.

HISTORIC RESTORATION - The rehabilitation or repair of historic structures, provided the proposed repair or rehabilitation will not preclude the continued designation of the structure as historic, and the variance is the minimum necessary to preserve the historic character and design of the structure.

WATER DEPENDENT USES - New construction or substantial improvements and other development necessary for the conduct of a use that cannot perform its intended purpose unless it is carried out in close proximity to water, including only docking facilities, port facilities necessary for the loading and unloading of cargo and passengers, and ship building and repair facilities.

Variances may not be issued within any designated floodway if any increase in the base flood level would result.

REQUESTS FOR VARIANCES must follow the procedures and meet the standards established in State law, and by the applicable regulations (e.g., local zoning or land development review ordinance, or the State Building Code). In addition, the NFIP requires that variances granted to the Program's requirements by local (and/or State) appeals boards conform to the following substantive standards:

CAUSE - A showing that the applicant has good and sufficient cause for requesting the variance;

HARDSHIP - A finding that, absent the variance, the applicant will suffer exceptional hardship;

BENIGN EFFECT - A demonstration that granting of the variance will not cause increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud or victimization of the public, or conflict with existing local laws or ordinances; and

MINIMUM NECESSARY RELIEF - A finding that the variance granted is the minimum necessary, considering the flood hazard, to afford relief.

VARIANCE-GRANTING authorities should make affirmative findings, supported by the record, for each of the criteria prior to issuing a variance. Failure to properly substantiate the rationale for granting variances to NFIP requirements, or a pattern of frequent variances can be grounds for community suspension from the NFIP. The appeals board must notify the applicant in writing that the grant of a variance to construct a structure below the base flood elevation increases risks to life and property and will result in increased premium rates

for flood insurance up to amounts as high as \$25 per \$100 of coverage.

VARIANCES FROM THE NFIP standards should not be lightly given. The implications of increased flood risk resulting from non-conforming structures are very serious, and the increased costs of insuring structures built below the base flood level onerous. FEMA and the State Coordinating Agency periodically review records of community variance actions, and a pattern of arbitrary or unsubstantiated variances can lead to sanctions on community participation in the NFIP (see page 82).

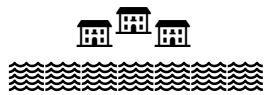


IN CONSIDERING VARIANCE requests, appeals boards must be mindful of the following factors:

UNIQUE CHARACTERISTICS - Variances pertain to a piece of property, and must be based upon the *unique characteristics of the property* which create an exceptional hardship. The unique characteristics must pertain to the land itself, not to the structure, its inhabitants, or the property owners.

TYPE OF HARDSHIP - The hardship that compliance would impose must be exceptional, unusual, and peculiar to the property involved. Mere economic or financial hardship alone is not exceptional. Inconvenience, physical handicaps, aesthetic considerations, personal preferences, or the disapproval of one's neighbors cannot, as a rule, qualify as exceptional hardships.

PUBLIC INTEREST REVIEW - In weighing the individual merits of variance requests, appeals boards must balance the applicant's hardship against the public purpose of the requirement. In cases where relief from a structural elevation requirement is being sought, appeals bodies must decide if the hardship the applicant faces is more serious than the increased flood risks and costs that the entire community would bear if the variance is granted. □



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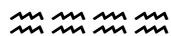
The duties of the local NFIP administrator, briefly described in Part 1, include:

- ❖ **review** of floodplain development permit applications,
- ❖ **inspection** of floodplain development in-progress, and
- ❖ **keeping of records** relating to floodplain development.

the NFIP standards. As described in Part 1, this generally means applying to the local building official for a permit under the State Building Code (for any construction project) or requesting approval under the community's subdivision and land development project review and/or zoning ordinance(s), depending on the type of development proposed. For construction activities regulated under the State Building Code (SBC), applicants must complete a standard application form (see page 22) that requires a determination of whether the construction project is located within a flood hazard area, and (if it is), the base flood elevation and the elevation of the lowest floor including basement of any structure(s) proposed.

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This Part of the Handbook explores these duties in greater detail and provides suggestions for a model process for local administration of the NFIP's requirements.



Development Permit Review

ALL CONSTRUCTION OR development in the community is required to obtain a permit from the appropriate local official(s) responsible for administering

DEVELOPMENT ACTIVITIES such as subdivision of land, installation of utilities, site grading, filling, or mining are generally regulated under a community's zoning and subdivision and land development review ordinances, whether or not they require a building permit under the State Building Code. Permit application procedures and data submission requirements for zoning and subdivision approvals vary somewhat from community to community, however, applications should request sufficient information regarding flooding conditions at the site and the effects of the proposed development to enable permit official(s) to determine the

applicability of relevant NFIP standards. (see pages 27-29).

WHEN AN APPLICATION is filed, the appropriate official (e.g., building official or administrative officer) must review it initially for completeness and adequacy of the information. All applicable sections of the application must be fully completed and required supporting data attached in order for the application to be accepted and substantive review initiated. Once the official determines that an application is properly completed, a substantive review is performed to determine the conformance of the proposed development activity with all relevant regulations, including the NFIP standards enforced by the community.

THE FOLLOWING STEPS outline a general process for reviewing development permit applications. The process describes review of a single permit, but, depending on the nature and scale of the development activity proposed, a number of different officials and review bodies may be involved and more than one permit required.

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STEP 1

Locate the Development Site on the Community's Official NFIP Map to Determine the Flood Map Zone(s) it Falls Within

THE KEY INITIAL determination in reviewing an application is the location of the proposed construction site relative to the flood hazard zones within the community, as shown on the

effective floodplain map (FHBM or FIRM--see Part 2). This determination is made by comparing the location of the site (supplied by the applicant via the property address, plat/lot designation, or locus map) with the street pattern and flood zone delineations shown on the effective map. In most instances, simply locating the site of proposed development by scaling site dimensions or a distance from a street intersection, or other physical landmarks or features shown on the effective map is adequate.

ONCE THE DEVELOPMENT site has been located on the effective flood map, a clearcut determination is generally possible as to which flood hazard zone the development activity is located within. In cases where a development site falls on or very near (within 100 feet) of the boundary between two different flood zones depicted on the map, specific decision rules are heeded to determine the applicable flood zone. These procedures differ based upon the zones involved. Table 4.1 provides ground rules for making "borderline" zone determinations.

Text continues on page 72...

TABLE 4.1

**FLOOD ZONE DETERMINATION GROUND RULES
IN BORDERLINE SITUATIONS**

BORDERLINE
SITUATION

Ground Rule

BETWEEN ZONES

SCALE SITE ON FLOOD MAP



V or VE

---and---

A or AE

Use applicant data to accurately scale and plot the location of the actual site of construction on effective map. Determine applicable zone based upon plotted site location relative to V/A Zone boundary shown at site on the effective map.

If the stillwater flood elevation at construction site is known to be less than 3.8 feet, this is also indication that the site is not subject to wave attack and is not in the V zone.

BETWEEN ZONES

COMPARE GRADES AT SITE TO BASE FLOOD ELEVATION



V, VE,
or
A, AE

---and---

B, C, or X

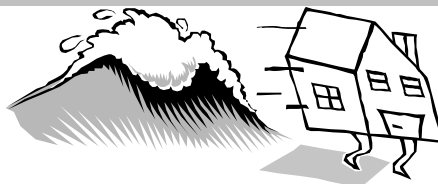
Compare Base Flood Elevation (BFE) shown on map for VE/AE (or determined for V/A zone) with the lowest pre-construction ground elevation (grade) at the actual site of development activity. If lowest site grade is greater than BFE, site is not in V/VE or A/AE zone. (Repeat process for each separate structure if development is a multi-structure development.)

ESTABLISHMENT OF the flood zone designation for the site of a development project application allows an initial determination to be made as to the applicability of the NFIP standards.

NFIP REQUIREMENTS apply only to development within designated **special flood hazard areas**, zones V1-30, V, VE, A1-30, A, AE, AH, AO, and A99. Projects (or project components) determined to be located entirely within zones B, C, D, or X on the effective community NFIP map are **not** subject to

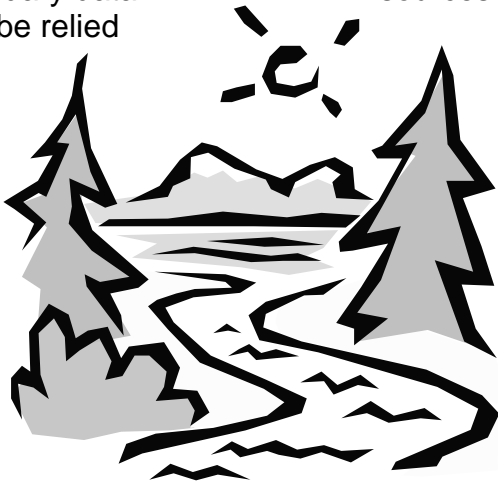
NFIP requirements (although they may be subject to other federal, state, or local laws or regulations). See Part 3 and the *NFIP Quick Reference Checklist* for a listing of the NFIP requirements.

**STEP 2
DETERMINE THE BASE FLOOD
ELEVATION FOR THE DEVELOPMENT
SITE**



FOR ALL DEVELOPMENT PROJECTS found to be subject to the NFIP requirements, the next step in the permit review process is to establish **the base flood elevation (BFE)** for the site. This elevation is the reference elevation for the project, against which the flood protection plans for new construction or substantial improvement of structures must be evaluated.

THE BASE FLOOD elevation for a development site is obtained (in most instances) from the community's effective floodplain map--the Flood Insurance Rate Map or Flood Hazard Boundary Map. If a BFE can not be determined from the effective map, secondary data sources must be relied upon, or the



applicant required to develop an estimated Base Flood Elevation. Table 4.2, on page 74, provides guidance on establishing applicable base flood elevations for various situations.

STEP 3:

DETERMINE IF THE PROPOSED DEVELOPMENT AFFECTS A DESIGNATED FLOODWAY

ALL PROPOSED DEVELOPMENT projects which lie within designated AE or A1-30 flood hazard zones must be checked to determine if they are situated within, or otherwise affect a designated **floodway (see page 24)**. This determination requires a second comparison of the location of the development site (locate site on the map by reference to cultural features and by scaling) versus the boundaries of designated floodways, which are shown on the community's effective floodplain map. **(See Part 2 for a description of floodplain maps and the information they provide.)** Sites located partially or totally within a designated floodway are subject to the NFIP's non-encroachment rule **(see page 24)**. Applicants must demonstrate that such projects will not cause any increase in the height of the base flood.

STEP 4:


ESTABLISH THE COMPLIANCE OF THE DEVELOPMENT PROPOSAL WITH ALL APPLICABLE NFIP REQUIREMENTS

FOLLOWING THE DETERMINATION of the applicable flood zone and base flood elevation, and assessment of the proposal's effect on floodway areas, the permit official must next examine the specifics of the development proposal to reach conclusions on its compliance with the NFIP criteria which apply to it. Depending upon the nature of the development project and the flood zone it is located in, different NFIP requirements will apply. **(See Part 3 for a discussion of which criteria apply to various types of projects.)**

Text continues on page 75...

TABLE 4.2

BASE FLOOD ELEVATION DETERMINATION GUIDELINES

FOR ZONES	Decision Rule
 V1-30 OR VE AND A1-30, AE, OR AH ZONES	<p>USE EFFECTIVE NFIP MAP Base flood elevations in feet (referenced to mean sea level*) are printed directly on the effective map (see description of NFIP maps in Part 2). Applicable base flood elevation is determined by locating site on the map, identifying the zone within which the site is located, and reading the base flood elevation for the zone. In riverine situations base flood elevations are given at periodic stream cross-sections. Base flood elevations for development sites located between cross-sections can be interpolated based upon the (stream) distances between the closest upstream and down stream cross-sections for which base flood elevations are given.</p>
AO ZONES	<p>USE EFFECTIVE NFIP MAP to locate site and identify zone. Base flood elevation equals the sum of "depth number" designated on effective map for the AO zone plus the pre-construction grade at site of development activity (referenced to Mean Sea Level), supplied by applicant's plans.</p>
UNNUMBERED A, AH, A99 AND UNNUMBERED V ZONES	<p>USE BEST AVAILABLE DATA for areas not studied in detail where no base flood elevations are established. Options:</p> <p>PREVIOUS STUDIES: The U.S. Army Corps of Engineers, USDA Natural Resources Conservation Service, or state agencies may have flood elevation data for specific locations.</p> <p>DEVELOP BASE FLOOD ELEVATION DATA: The community may develop data for unnumbered A-zones within its jurisdiction. A guide and software for development of BFE's in riverine and lake A-zones is available from FEMA.</p> <p>APPLICANT-FURNISHED DATA: If base flood elevation data are not available from other sources, the local official must require the applicant to furnish it. Applicant-submitted data must include documentation of the methodology used to develop it and should be reviewed by competent engineering/hydrologic staff prior to acceptance.</p> <p><i>Once a base flood elevation is established for an unnumbered area, the local permit official should record it on the community's NFIP map, so that it will be available for future development proposals in the immediate vicinity.</i></p>

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THE EXAMINATION OF proposed development projects looks for NFIP compliance within four general areas:

PERMITTED USE - Are all proposed land uses, activities, and construction

practices permitted within the flood risk zone the proposal is located within?

DESIGN & MATERIALS - Does the proposal employ appropriate flood resistant design, construction methods, materials and practices as required for the flood risk zone?

* See Glossary for definition of Mean Sea Level.

STRUCTURAL ELEVATION - Do all proposed structures meet or exceed the minimum flood protection elevation requirements and performance standards established for the flood risk zone?

DOCUMENTATION - Are all required certifications of flood protective design and construction practices provided?

WITHIN THESE general categories, specific determinations must be made relative to the compliance or non-compliance of the development proposal with the individual NFIP criteria applicable to it. Depending on the complexity of the development proposal being reviewed, many individual determinations of compliance with specific criteria may need to be made. The *NFIP Quick Reference Checklist* (see the last page of this **Handbook**) lists requirements that proposals must comply with based upon the flood zone designation and the type of development being proposed.

AVISIT TO THE SITE of proposed development by the permit official may be in order at this step, particularly for large or complex development proposals. Observing the existing site conditions, and *lay of the land* can assist in understanding a project's relationship to the floodplain, and facilitate the assessment of potential flood risks.

FOR LARGE DEVELOPMENTS, this step in the permit review process often requires coordinating the review and input from several other agencies or departments. The local NFIP administrator should recognize, however, that although a number of agencies may examine proposed projects for concerns relating to flooding (e.g., wetlands protection,

coastal management, etc.); the designated local NFIP administrator is responsible for determining compliance with the NFIP requirements.

STEP 5:

ISSUE OR DENY THE PERMIT

ONCE A PROJECT proposal has been reviewed by the local administrator (and other interested agencies) to establish its conformance with applicable NFIP criteria and (other applicable state and local requirements), the permit official must reach a final decision on the permit request. If the administrator is satisfied that the proposed development complies with all applicable NFIP requirements, and providing it complies with other applicable regulations which the official administers (zoning, etc.), the permit official should issue the permit for the project. Issuance of a permit may be unconditional (if the application submitted meets all criteria), or the permit may specify performance criteria or attach conditions that must be satisfied by the applicant, either prior to commencement of work, or while work is underway. All conditions attached to the permit should be in writing. A clear specification of the standards to be met at the time of permit issuance can prevent misunderstandings, delays and acrimony during the project. Providing approved applicants with a printed "punch list" of applicable NFIP requirements, and corresponding inspections and certifications at the time of permit issuance will minimize problems as the project advances to construction.

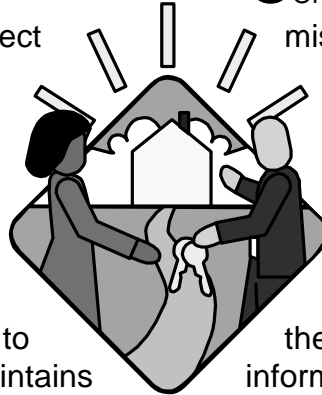
IN CASES WHERE proposed projects fail to meet one or more of the NFIP requirements, the permit official may not issue the permit. The applicant should be promptly informed of the decision to deny the permit, appraised of the application's area(s) of non-compliance, and advised, if possible, of means to achieve conformance. In most instances, a non-conforming project can be successfully redesigned to meet the NFIP requirements.

IF THE APPLICANT disagrees with the decision of the local administrator, or with the official's interpretation of how a particular NFIP standard applies to the project; or if the applicant maintains that redesign of the project to meet the NFIP criteria is not feasible; the applicant should be advised to request a hearing before the local Board of Appeals (either Building Code Appeals Board or Zoning Board of Review depending on which entity has jurisdiction over the particular NFIP standard at issue). An applicant may seek to have the local administrator's decision or findings overturned, or may request a variance or similar grant of relief from the application of the NFIP standard(s) which the project does not meet. (see pages 67-69 for guidance on the issuance of variances from the NFIP standards.)

Monitoring Work in Progress

AFTER A PERMIT has been issued, the local permit official has a duty to monitor the development to insure that it proceeds in accordance with the

approved plans. This requires one or more visits to the development site to inspect the construction work underway. The purpose of site inspections is to identify any deviations from approved plans which would violate NFIP standards at an early stage when they are preventable or easily correctable.



CONSTRUCTION mistakes or misinterpretations of plans can turn into uncorrectable violations of NFIP standards unless they are discovered and remedied. If a construction progress inspection reveals that work is proceeding at variance with approved plans, the local official should promptly inform the applicant (or on-site representative) of the problem and request that it be rectified. If the problem would result in a serious violation of an NFIP standard, or if continuation of work would make the problem physically impossible to correct later, the local administrator should issue a stop-work order to shut the jobsite down until the situation can be addressed.

Timing of Inspections

SEVERAL INSPECTIONS during the course of a development project are generally needed.

PRELIMINARY VISIT - An initial on-site inspection is called for once the site has been staked out for construction.

The local administrator and contractor or applicant should walk the site together, verifying the location of the proposed structures and facilities (relative to what was shown on the plans), and reviewing the "punch list" of

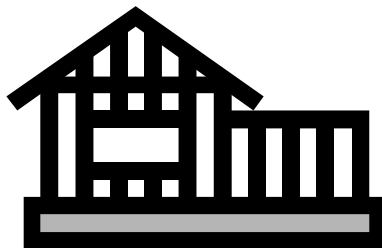
NFIP (and other) requirements pertaining to each component of the development project. Requiring the developer to establish the base flood elevation as a benchmark in a prominent location on the site at this stage provides a ready reference for both the developer and the official to use later when structural footings and foundation walls are to be poured, or pilings or columns installed.

SECOND INSPECTION - A second visit should be scheduled after excavation has begun but prior to the pouring of structure footings or foundations (or other similar "irreversible" steps).

This inspection should verify that grading of the site has been done properly to avoid floodway encroachment or filling that could worsen flood hazards (on or off site); to determine that any earth fill used has been properly placed and stabilized, and protected from flood erosive forces, and that the flood capacity of any altered watercourses has been maintained.

FOLLOW-UP VISITS As construction progresses, one or more follow-up spot inspections may be needed depending on the project's complexity.

Periodic spot checks help assure that all new or substantially-improved structures are elevated or floodproofed (as applicable) as specified on the approved plans, and that the installation of site utilities provides proper flood protection. The local administrator (or the city/town engineer, if available)



should verify that the lowest floor, lowest structural member, or floodproofing level (as applicable) of new or substantially-improved structures is installed at or above the base flood elevation established for the site.

FINAL INSPECTION - A final inspection of all development should be performed just prior to, or immediately after, completion of all work

A final on-site inspection is needed to assure that all work has been performed according to approved plans. Provided the applicant was informed of all applicable requirements at the time of permit issuance, and the project was inspected for compliance as construction work progressed; it is unlikely that the final inspection will reveal any significant violations of the NFIP criteria. Nevertheless, it is important to perform a final inspection prior to closing the books on the project, and, in the case of new structures, issuing a Certificate of Occupancy.

AS PART OF THE FINAL inspection, the *as-built* elevation of the critical regulated component (e.g., lowest floor, lowest horizontal member of lowest floor, floodproofing level) of new or substantially-improved structures should be verified and recorded. This can be accomplished by the community if it has access to surveying equipment and expertise. Alternately, the permit-holder should be required to provide a completed Elevation Certificate or other acceptable documentation of the *as-built* elevation of the structure's critical component.

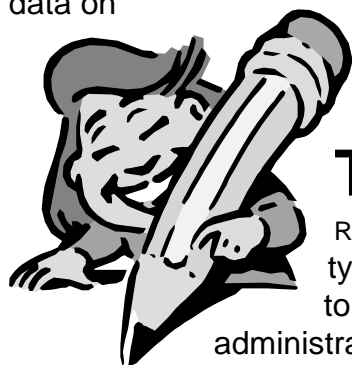
WRITTEN RECORDS of the findings of all site inspections should be kept in the project permit file.

Other Enforcement Activities

IN ADDITION TO CHECKING on the status of permitted development activities, local administrative officials must also monitor the community for signs of unpermitted development in floodplain areas. Development or construction initiated without the benefit of a local permit is illegal and should be stopped via a cease and desist order.

Maintaining Floodplain Development Records

AS PART OF THE NFIP partnership, local administrators are also responsible for obtaining and recording data on development in flood hazard areas.



THE NFIP REQUIRES two types of records to be kept by local

administrators: records relating to individual development projects in flood hazard areas, and summaries of total permit activity in flood hazard areas.

THE FOLLOWING RECORDS are required to document the compliance of individual floodplain development projects with the NFIP standards:

PERMITS - Copy of permit application, record of action taken on permit, approved development plans, copy of

variance or other relief granted from NFIP requirements (must include justification)

INSPECTION REPORTS - Copy of all work-in-progress inspection reports

AS-BUILT PLANS - Copy of professionally-certified as-built drawings showing elevation (Mean Sea Level*) of critical regulated component of new or substantially-improved structures, or properly-completed NFIP Elevation Certificate

FLOOD-PROOFING CERTIFICATION

Professional certification of floodproofing performance, or properly-completed NFIP Floodproofing Certificate (flood-proofed non-residential A zone structures)

V-ZONE CERTIFICATION - Professional certification of conformance to velocity zone structure performance standards (V zone structures)

In addition, records of the following statistics should be kept for the community as a whole:

PERMIT REQUESTS - Total number of permits requested within designated flood hazard areas

PERMITS APPROVED - Number of permits granted within designated flood hazard areas

NEW CONSTRUCTION PERMITS - Number of permits granted for new construction or substantial improvement of structures within designated flood hazard areas

VARIANCES GRANTED - Number of variances granted to NFIP standards.

THERE ARE A NUMBER of acceptable methods for recording and maintaining the required data on floodplain development projects. The best method for a given community will depend on

* See Glossary for definition of Mean Sea Level.

the level of staffing available, availability of automated data storage and retrieval systems, and the particulars of the community's permit review process (number of agencies involved and where final authority to grant or deny permits lies). While no single *model* record-keeping system exists for all situations, the following general suggestions may assist local officials in the task of maintaining the NFIP's required floodplain development records:

in Appendix A.3) to be retained with approved design plans as a permanent record of the required professional certification of V zone elevated structure design compliance with NFIP performance standards.

NFIP RECORD FLAG - Devise a unique means of identifying floodplain permit actions in the community's official log or database of all permit action. The use of a special flag--unique symbol in log column, check box, or data field--indicating location within a floodplain will allow floodplain permits to be separately tracked and retrieved, greatly simplifying the required tabulation of community-wide statistics on floodplain development. Keeping a copy of the cover sheet of every floodplain permit issued in a separate file folder is another means for segregating floodplain permits for retrieval and tabulation.



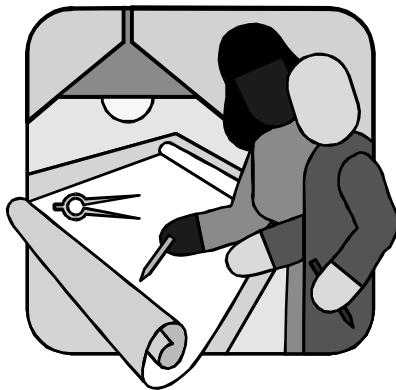
NFIP ELEVATION CERTIFICATES - Requiring permit holders to furnish a properly completed NFIP Elevation Certificate (see Appendix A.3) or Floodproofing Certificate (see Appendix A.3) (prior to issuance of a Certificate of Occupancy) provides the NFIP-required documentation of the elevation of the critical regulated component of new or substantially-improved structures. Elevation certificates are also generally needed for the issuance of new flood insurance coverage, so this is not an added burden on the developer/permittee.

V-ZONE CERTIFICATE - For V-zone construction projects, consider requiring permittees to furnish a standard form (such as the model



Biennial Reports

AN EFFECTIVE SYSTEM for recording and retrieving data on its floodplain development will assist the community in completing the NFIP Biennial Report required by FEMA. The Biennial Report requests data on the total number and percentage of the community's population and structures located in flood hazard areas, and reports on the number of total permits and permits within flood hazard areas issued by the community. FEMA uses such data to program map updates and revisions, to advise the State Coordinator on priorities for community assistance, and



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to develop aggregate data on regional and national flood risk exposures.

Community Assistance and Assessment

COMMUNITIES PARTICIPATING in the NFIP can rely upon several sources of assistance for help in administering the Program's requirements.

State Coordinator

GENERAL GUIDANCE on local implementation of the Program's criteria can be obtained by contacting the State NFIP Coordinating Office. In Rhode Island, the Statewide Planning Program within the R.I. Department of Administration is designated to coordinate the NFIP. the State Coordinator can be reached at the following address or numbers:

STATE NFIP COORDINATOR

R.I. Department of Administration
Statewide Planning Program
One Capitol Hill
Providence, RI 02908

☎ 401.222.6478

voice

☎ 401.222.2627

TDD

☎ 401.222.2083

fax

vparment@doa.state.ri.us

email

THE STATE NFIP COORDINATOR provides the following forms of assistance:

MAPS - Effective NFIP maps, studies, and accessing background data (where available) used in studies.

ANSWERS - To general questions relative to the Program's insurance aspects, and referrals on specific insurance questions.

LITERATURE - Program guidance including this Handbook, technical memos, brochures, and literature developed by FEMA.

GUIDANCE

assistance in using NFIP maps and studies,

guidance in interpreting the Program requirements to determine the applicability of a particular standard to a given set of circumstances presented by a development proposal.

non-technical assistance in assessing the conformance of design proposals.

referrals to sources of technical assistance (design and engineering review) where necessary.

help in drafting and/or reviewing local (and State) ordinance and code provisions required for enforcement of NFIP requirements, and effective



floodplain management.

Community Assistance Visits and Contacts

IN ADDITION TO RESPONDING to direct inquiries, the State NFIP Coordinator's Office also schedules periodic visits with all community officials responsible for administering the Program's requirements. The purpose of these **Community Assistance Visits (CAVs)** is to provide information about the NFIP and its provisions, offer an opportunity for local officials to ask questions, and assess the effectiveness of local administration of the Program's requirements.

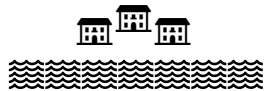
CAVs TYPICALLY consist of an interview with the official or officials primarily responsible for administering the NFIP requirements in the community, a review of local records of floodplain development which has occurred since the last visit, and site inspections of floodplain development completed and underway to establish conformance with Program fundamentals.

A PRIMARY PURPOSE of CAVs is to promote a direct relationship between the local official(s) responsible for daily administration of the NFIP requirements and the State Coordinating Office. CAVs seek to insure that local officials have complete and current information on the NFIP and on the responsibilities associated with their community's participation in it. Review of effective maps and community ordinances to identify problems is also a topic for CAVs. Monitoring of community compliance with the NFIP's requirements is a further objective of CAVs, with an emphasis on correcting any compliance problems discovered.

Following each CAV, a letter is sent to the Chief Elected Official of the community and to FEMA's Regional Office summarizing the findings of the visit and identifying any administrative, enforcement, mapping, recordkeeping, or reporting issues that require follow-up by the community.

COMMUNITY ASSISTANCE Contacts (CACs) offer an alternative means for FEMA or the State Coordinator's Office to reach out to local NFIP administrators. CACs consist of a phone call or a brief on-site visit to a local administrator to determine if any problems are being encountered by the community in its administration of the NFIP, or to answer questions about the Program.

CAVS AND CACS ARE scheduled by the State Coordinating Office in consultation with FEMA. Factors considered in programming a CAV or CAC include information requests, level of development activity, pending flood map revision or ordinance updates, data provided in biennial reports, changes in local administrative personnel, and past performance or compliance record.



Community Probation and Suspension

A PATTERN OF REPEATED, deliberate or capricious non-enforcement or lax enforcement of the NFIP requirements can result in FEMA placing a participating community on probation or suspension from the NFIP.

IN COMMUNITIES PLACED on probation, a surcharge of \$50 is levied on all new and renewal flood insurance policies for up to two years after the date the community is placed on probation.

THE EFFECTS OF SUSPENSION are more severe, and include:

PROHIBITION ...of the sale of new flood insurance policies, and the renewal of existing policies.

PRECLUSION ...of federally-backed mortgages, loans, grants, or other assistance to floodplain development.

LIMITATIONS ...on federal disaster recovery assistance following a flood event.

SUSPENSION OF A COMMUNITY is a radical step, one which FEMA takes only after all other attempts to improve community administration and enforcement of the NFIP criteria have been attempted. Enforcement problems are generally the result of a lack of knowledge or understanding of the Program's criteria, which FEMA and the State Coordinating Agency seek to remedy via CAVs CACs, and other technical assistance measures. □

GLOSSARY OF

NATIONAL FLOOD INSURANCE PROGRAM

DEFINITIONS AND FLOODPLAIN MANAGEMENT TERMINOLOGY

The following selected definitions are reproduced from the National Flood Insurance Program's regulations, codified as Part 44, CFR, Chapter 60.3.

Appurtenant structure - means a structure which is on the same parcel of property as the principal structure to be insured and the use of which is incidental to the use of the principal structure.

Area of shallow flooding - means a designated AO, AH, or VO zone on a community's Flood Insurance Rate Map (FIRM) with a one percent or greater annual chance of flooding to an average depth of one to three feet where a clearly defined channel does not exist, where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

Area of special flood hazard - is the land in the flood plain within a community subject to a one percent or greater chance of flooding in any given year. The area may be designated as Zone A on the FHBM. After detailed ratemaking has been completed in preparation for publication of the FIRM, Zone A usually is refined into Zones A, AO, AH, A1-30, AE, A99, VO, or V1-30, VE, or V. For purposes of these regulations, the term *special flood hazard area (SFHA)* is synonymous in meaning with the phrase *area of special flood hazard*.

Base flood - means the flood having a one percent chance of being equalled or exceeded in any given year.

Basement - means any area of the building having its floor subgrade (below ground level) on all sides.

Breakaway wall - means a wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces, without causing damage to the elevated portion of the building or supporting foundation system.

Chief Executive Officer - of the community (*CEO*) means the official of the community who is charged with the authority to implement and administer laws, ordinances and regulations for that community.

Coastal high hazard area - means an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources.

Community - means any State or area or political subdivision thereof, or any Indian tribe authorized tribal organization, or Alaska Native village or authorized native organization, which has authority to adopt and enforce flood plain management regulations for the areas within its jurisdiction.

Development - means any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

Eligible community or **participating community** - means a community for which the Administrator has authorized the sale of flood insurance under the National Flood Insurance Program.

Elevated building - means a non-basement building (i) built, in the case of a building in Zones A1-30, AE, A, A99, A0, AH, B, C, X, or D, to have the top of the elevated floor, or in the case of a building in Zones V1-30, VE, or V, to have the bottom of the lowest horizontal structure member of the elevated floor elevated above the ground level by means of pilings, columns (posts and piers), or shear walls parallel to the flow of the water and (ii) adequately anchored so as not to impair the structural integrity of the building during a flood of up to the magnitude of the base flood. In the case of Zones A1-30, AE, A, A99, A0, AH, B, C, X, or D, *elevated building* also includes a building elevated by means of fill or solid foundation perimeter walls with openings sufficient to facilitate the unimpeded movement of flood waters. In the case of Zones V1-30, VE, or V, *elevated building* also includes a building otherwise meeting the definition of *elevated building*, even though the lower area is enclosed by means of breakaway walls if the breakaway walls meet the standards of [44 CFR] § 60.3(e)(5).

Emergency Flood Insurance Program or **emergency program** - means the Program as implemented on an emergency basis in accordance with section 1336 of the Act. It is intended as a program to provide a first layer amount of insurance on all insurable structures before the effective date of the initial FIRM.

Exception - means a waiver from the provisions of Part 60 of this subchapter [44 CFR] directed to a community which relieves it from the requirements of a rule, regulation, order or other determination made or issued pursuant to the Act.

Existing construction - means for the purposes of determining rates, structures for which the *start of construction* commenced before the effective date of the FIRM or before January 1, 1975, for FIRMs effective before that date. *Existing construction* may also be referred as to *existing structures*.

Existing manufactured home park or subdivision - means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of the flood plain management regulations adopted by a community.

Existing structures -- see *existing construction*.

Expansion to an existing manufactured home park or subdivision - means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

Flood or Flooding means:

- (a) A general and temporary condition of partial or complete inundation of normally dry land areas from:
 - (1) The overflow of inland or tidal waters.
 - (2) The unusual and rapid accumulation or runoff of surface waters from any source.
 - (3) Mudslides (i.e., mudflows) which are proximately caused by flooding as defined in paragraph (a)(2) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.
- (b) The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in paragraph (a)(1) of this definition.

Flood elevation determination - means a determination by the Administrator of the water surface elevations of the base flood, that is, the flood level that has a one percent or greater chance of occurrence in any given year.

Flood elevation study - means an examination, evaluation and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation and determination of mudslide (i.e., mudflow) and/or flood-related erosion hazards.

Flood Hazard Boundary Map (FHBM) - means an official map of a community, issued by the Administrator, where the boundaries of the flood, mudslide (i.e., mudflow) related erosion areas having special hazards have been designated as Zones A, M, and/or E.

Flood insurance - means the insurance coverage provided under the Program.

Flood Insurance Rate Map (FIRM) - means an official map of a community, on which the Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community.

Flood Insurance Study -- see **flood elevation study**.

Flood plain or flood-prone area - means any land area susceptible to being inundated by water from any source (see definition of *flooding*).

Flood plain management - means the operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works and flood plain management regulations.

Flood plain management regulations - means zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as a flood plain ordinance, grading ordinance and erosion control ordinance) and other applications of police power. The term describes such state or local regulations, in any combination thereof, which provide standards for the purpose of flood damage prevention and reduction.

Flood protection system - means those physical structural works for which funds have been authorized, appropriated, and expended and which have been constructed specifically to modify flooding in order to reduce the extent of the area within a community subject to a *special flood hazard* and the extent of the depths of associated flooding. Such a system typically includes hurricane tidal barriers, dams, reservoirs, levees or dikes. These specialized flood modifying works are those constructed in conformance with sound engineering standards.

Flood proofing - means any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

Flood-related erosion - means the collapse or subsidence of land along the shore of a lake or other body of water as a result of undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as a flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding.

Flood-related erosion area or flood-related erosion prone area - means a land area adjoining the shore of a lake or other body of water, which due to the composition of the shoreline or bank and high water levels or wind-driven currents, is likely to suffer flood-related erosion damage.

Flood-related erosion area management - means the operation of an overall program of corrective and preventive measures for reducing flood-related erosion damage, including but not limited to emergency preparedness plans, flood-related erosion control works, and flood plain management regulations.

Floodway -- see *regulatory floodway*.

Floodway encroachment lines - mean the lines marking the limits of floodways on Federal, State and local flood plain maps.

Freeboard - means a factor of safety usually expressed in feet above a flood level for purposes of flood plain management. *Freeboard* tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.

Functionally dependent use - means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

Highest adjacent grade - means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

Historic Structure - means any structure that is:

- (a) Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
- (b) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
- (c) Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or
- (d) Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:
 - (1) By an approved state program as determined by the Secretary of the Interior or
 - (2) Directly by the Secretary of the Interior in states without approved programs.

Lowest Floor - means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; *Provided*, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of [44 CFR] § 60.3.

Manufactured home - means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term *manufactured home* does not include a *recreational vehicle*.

Manufactured home park or subdivision - means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

Map - means the Flood Hazard Boundary Map (FHBM) or the Flood Insurance Rate MAP (FIRM) for a community issued by the Agency.

Mean sea level - means, for purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which base flood elevations shown on a community's Flood Insurance Rate Map are referenced.

New construction - means, for flood plain management purposes, structures for which the *start of construction* commenced on or after the effective date of a flood plain management regulation adopted by a community and includes any subsequent improvements to such structures.

New manufactured home park or subdivision - means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after the effective date of flood plain management regulations adopted by a community.

100-year flood -- see **base flood**.

Participating community, also known as an **eligible community** - means a community in which the Administrator has authorized the sale of flood insurance.

Program - means the National Flood Insurance Program authorized by 42 U.S.C. 4001 through 4128.

Program deficiency - means a defect in a community's flood plain management regulations or administrative procedures that impairs effective implementation of those flood plain management regulations or of the standards in [44 CFR] § § 60.3, 60.4, 60.5, or 60.6.

Recreational vehicle - means a vehicle which is:

- (a) built on a single chassis;
- (b) 400 square feet or less when measured at the largest horizontal projection;
- (c) designed to be self-propelled or permanently towable by a light duty truck; and
- (d) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

Regular Program - means the Program authorized by the Act under which risk premium rates are required for the first half of available coverage (also known as *first layer* coverage) for all new construction and substantial improvements started on or after the effective date of the FIRM, or after December 31, 1974, for FIRM's effective on or before that date. All buildings, the construction of which started before the effective date of the FIRM, or before January 1, 1975 for FIRMs effective before that date, are eligible for first layer coverage at either subsidized rates or risk premium rates, whichever are lower. Regardless of date of construction, risk premium rates are always required for the second layer coverage and such coverage is offered only after the Administrator has completed a risk study for the community.

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

Remedy a violation - means to bring the structure or other development into compliance with State or local flood plain management regulations, or, if this is not possible, to reduce the impacts of its noncompliance. Ways that impacts may be reduced include protecting the structure or other affected development from flood damages, implementing the enforcement provisions of the ordinance or otherwise deterring future similar violations, or reducing Federal financial exposure with regard to the structure or other development.

Riverine - means relating to, formed by, or resembling a river (including tributaries), stream, brook, etc.

Sand dunes - mean naturally occurring accumulations of sand in ridges or mounds landward of the beach.

Special flood hazard area see **area of special flood hazard**.

Special hazard area - means an area having special flood, mudslide (i.e., mudflow) and/or flood-related erosion hazards, and shown on an FHBM or FIRM as Zone A, AO, A1-30, AE, A99, AH, VO, V1-30, VE, V, M or E.

Start of Construction (for other than new construction or substantial improvements under the Coastal Barrier Resources Act (Public Law 97-348)), includes substantial improvement, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

State coordinating agency - means the agency of the state government, or other office designated by the Governor of the state or by state statute at the request of the Administrator to assist in the implementation of the National Flood Insurance Program in that state [in Rhode Island, this is the

Structure - means, for flood plain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home.

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 percent of the market value of the structure before the damage occurred.

Substantial improvement - means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the *start of construction* of the improvement. This term includes structures which have incurred *substantial damage*, regardless of the actual repair work performed. The term does not, however, include either:

- (1) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or
- (2) Any alteration of a *historic structure*, provided that the alteration will not preclude the structure's continued designation as a *historic structure*.

V Zone -- see *coastal high hazard area*.

Variance - means a grant of relief by a community from the terms of a flood plain management regulation.

Violation - means the failure of a structure or other development to be fully compliant with the community's flood plain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in [44 CFR] § 60.3(b)(5), (c)(4), (c)(10), (d)(3), (e)(2), (e)(4), or (e)(5) is presumed to be in violation until such time as that documentation is provided.

Water surface elevation - means the height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, (or other datum, where specified) of floods of various magnitudes and frequencies in the flood plains of coastal or riverine areas.

SOURCES OF ADDITIONAL INFORMATION**STATE AGENCIES****RHODE ISLAND STATEWIDE PLANNING PROGRAM****One Capitol Hill, Providence, RI 02908***Offers:*

State NFIP Coordinating Agency; clearinghouse for floodplain management information and NFIP literature, maps, and studies.

Contact via:

voice: 222.6478

fax: 222.2803

TDD: 222.1227

email: vparment@doa.state.ri.us

RHODE ISLAND STATE BUILDING CODE COMMISSION**One Capitol Hill, Providence, RI 02908***Offers:*

Interpretations of State Building Code provisions. Information on flood and wind-resistant construction practices.

Contact via:

voice: 222.3033

fax: 222.6334

RHODE ISLAND EMERGENCY MANAGEMENT AGENCY**645 New London Avenue Cranston, RI 02920***Offers:*

Hurricane/flood preparedness and recovery planning; post-disaster recovery assistance.

Contact via:

voice: 946.9996

fax: 944.1891

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**235 Promenade Street, Providence, RI 02908***Offers:*

Regulatory programs for freshwater wetlands and water quality. Assistance in watershed management activities.

*Contact:**General Information:*

voice: 222.6800

TDD: 831.5508

Office of Technical and Customer Assistance

voice: 222.6822

Permits (freshwater wetlands, water quality, ISDS, UIC, RIPDES)

voice: 222.6820

fax: 222.6177

RHODE ISLAND COASTAL RESOURCES MANAGEMENT COUNCIL

William Stedman Government Center

Tower Hill Road, Wakefield, RI 02879

Offers:

Regulatory program for coastal zone; management policies for coastal flood lands and coastal features.

Contact via:

voice: 222.2476

fax: 22.3922

RHODE ISLAND RIVERS COUNCIL

c/o R.I. Statewide Planning Program

One Capitol Hill, Providence, RI 02908

Offers:

Establishes river use classifications and policies. Designates local watershed councils for managing rivers and watersheds.

Contact via:

voice: 222.6478

fax: 222.2083

TDD: 222.2627

RHODE ISLAND GREENWAYS COUNCIL

c/o R.I. Statewide Planning Program

One Capitol Hill, Providence, RI 02908

Offers:

Coordination of state agency and private efforts to create greenways, including river corridors. General information on greenways.

Contact via:

voice: 222.6479

fax: 222.2083

TDD: 222.2627

FEDERAL AGENCIES

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

J. W. McCormack Post Office and Courthouse, Room 462, Boston, MA 02109

Offers:

Answers to questions and policy interpretations relative to NFIP floodplain management and insurance aspects; processes requests for revisions or amendments to official NFIP maps; post-flood relief and recovery assistance; hazard mitigation planning.

Contact via:

voice: 617.223.9561

fax: 617.223.9574

website: <http://www.fema.gov/Reg-I/index.htm>

UNITED STATES ARMY CORPS OF ENGINEERS

696 Virginia Road, Concord, MA 01742-2751

Offers:

Regulatory program for freshwater wetlands; floodplain management planning assistance program; floodplain data;

Contact via:

voice: 800.343-4789

fax: 978.318.8303

NATIONAL PARK SERVICE

RIVERS, TRAILS AND CONSERVATION ASSISTANCE PROGRAM

15 State Street, Boston, MA

Offers:

Planning assistance for river conservation, multiple-objective river corridor management planning

Contact via:

voice: 617.223.5191

United States Environmental Protection Agency

JFK Federal Building, Boston, MA

Offers:

Regulatory programs for pollution prevention and remediation; grant assistance to states, local governments, and private groups for pollution prevention, environmental management, and education.

Contact via:

voice: 888.372.7341

TDD: 617.565.3409

UNITED STATES DEPARTMENT OF AGRICULTURE

NATURAL RESOURCES CONSERVATION SERVICE

60 Quaker Lane, Warwick, RI 02886

Offers:

Information and assistance in natural resources conservation, including water management, to communities and private landowners.

Contact via:

voice: 828.1300

PRIVATE ORGANIZATIONS

NATIONAL ASSOCIATION OF STATE FLOODPLAIN MANAGERS

4233 West Beltline Hwy., Madison, WI 53711

Offers:

Information on state floodplain management activities and programs.

Contact via:

voice: 608.274.0123

fax: 608.274.0696

APPENDIX A.3

NFIP CONSTRUCTION CERTIFICATION DOCUMENTS

SAMPLE NFIP ELEVATION CERTIFICATE

SAMPLE NFIP FLOODPROOFING CERTIFICATE

**MODEL CERTIFICATE FOR NFIP REQUIRED
V-ZONE CONSTRUCTION CERTIFICATIONS**

MODEL CERTIFICATE FOR REQUIRED NFIP V-ZONE CONSTRUCTION CERTIFICATIONS

CITY/TOWN OF _____

VELOCITY FLOOD ZONE CONSTRUCTION CERTIFICATE

The City/Town of _____'s participation in the National Flood Insurance Program requires that it enforce special construction performance standards for new and substantially-improved structures in high hazard coastal flood risk areas designated as V, V1-V30, or VE zones on the effective Flood Insurance Rate Map or Flood Hazard Boundary Map issued by the Federal Emergency Management Agency. In order to effectively enforce the NFIP construction requirements for new or substantially-improved structures within these zones, and to provide official records of structural compliance with applicable requirements, applicants for a Certificate of Occupancy for new or substantially-improved structures in designated V zones must submit this completed certification to the local building official..

BUILDING OWNER'S NAME _____

BUILDING STREET ADDRESS (including Apt. Unit. Suite and/or Bldg. Number) _____

OTHER DESCRIPTION (PLAT, LOT ,ETC.) _____

CITY _____ STATE **RHODE ISLAND** ZIP CODE _____

SECTION I FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

Provide the following from the effective FIRM

COMMUNITY NUMBER	PANEL NUMBER	SUFFIX	DATE OF FIRM INDEX	FIRM ZONE	BASE FLOOD ELEVATION (in feet NGVD)

SECTION II STRUCTURE INFORMATION (By a registered Professional Engineer or Architect)

BUILDING TYPE: (check one)

- Residential (other than manufactured/mobile home)
- Manufactured/mobile home*
- Non-residential

Does enclosed area contain building equipment? yes no

Type of wall system for enclosed area:
 open lattice screening solid breakaway other

ENCLOSED AREA BELOW BASE FLOOD ELEVATION

yes no

If yes, total square footage of enclosed area below
 Base Flood Elevation.. _____ FT.

Use of enclosed area: parking/access/storage other

Safe design load resistance of enclosure walls _____ psi.

* THIS FORM IS NOT REQUIRED FOR MOBILE /MANUFACTURED HOMES PLACED ON EXISTING LOTS IN EXISTING MOBILE/MANUFACTURED HOME PARKS, WHICH HAVE NOT BEEN SUBSTANTIALLY DAMAGED BY A FLOOD.

SECTION III CERTIFICATION (By a registered Professional Engineer or Architect)

Velocity Zone Construction Certification

I certify that based upon development and/or review of structural design, specifications, and plans for construction that the design and methods of construction are in accordance with accepted standards of practice for meeting the following provisions:

the bottom of the lowest horizontal structural member of the lowest floor (excluding supporting pilings or columns) is elevated to or above the base flood elevation;

the pile or column foundation and structure attached thereto is anchored to resist flotation, collapse, and lateral movement due to the effects of design wind loads (as specified in the R.I. State Building Code) and water loads associated with the base flood acting simultaneously on all building components;

that any obstructions below the lowest floor are either (check one)

constructed with non-supporting walls having a safe design loading resistance of not less than 10 and no more than 20 pounds per square inch (psi); OR

constructed with walls having a safe design loading resistance of greater than 20 pounds per square inch (psi) and which will collapse under a water loading less than that which would occur during the base flood without subjecting the elevated portion of the building and supporting foundation system to collapse, displacement or other structural damage due to the effects of design wind loads (as specified in the R.I. State Building Code) and water loads associated with the base flood acting simultaneously on all building components

I certify that the information on this certificate represents my best efforts to interpret the data available. I understand that any false statements may be grounds for license revocation under Rhode Island State law.

CERTIFIER'S NAME (or affix seal)	TITLE	LICENSE NUMBER
COMPANY NAME ZIP	ADDRESS	STATE
SIGNATURE	DATE	PHONE

BIBLIOGRAPHY

SELECTED FLOODPLAIN MANAGEMENT REFERENCES

The following reference documents provide further information on various aspects of floodplain management. Most are available for the use of local NFIP administrators and the general public in the library of the state NFIP Coordinating Agency and may be accessed by contacting the State NFIP Coordinator, Rhode Island Statewide Planning Program, One Capitol Hill, Providence, Rhode Island 02908, (401-222-6478).

Copies of most FEMA documents can be obtained by calling the NFIP at FEMA's Regional Office (617-223-9561).

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Below-Grade Parking Requirements for Buildings Located in Special Flood Hazard Areas in Accordance with the National Flood Insurance Program. Technical Bulletin 6-93. Federal Emergency Management Agency. April, 1993.

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