

Module 3

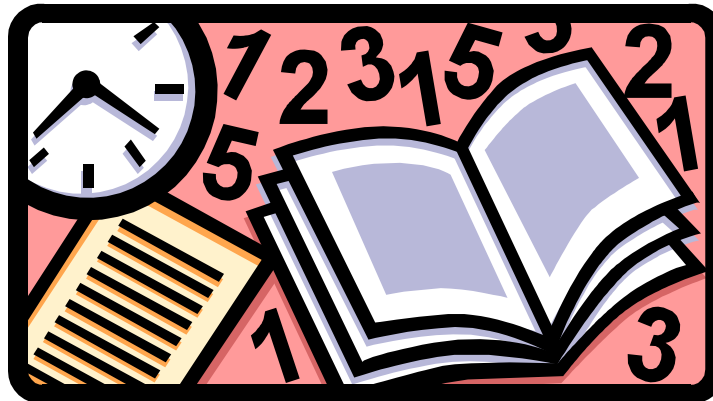


Design and Construction Standards

Module Outline

Key Definitions and Terms of Floodplain Management

- Development
- Base Flood
- Basement
- Elevated Building
- Lowest Floor
- New Construction
- Special Flood Hazard Area
- Structure
- Substantial Improvement



National Flood Insurance Program Minimum Standards

- Special Flood Hazard Areas not Identified
- Special Flood Hazard Areas Identified Without Base Flood Elevation
- Base Flood Elevations Provided
- Base Flood Elevation and Floodway Provided
- Coastal Hazard Areas Provided

Design and Construction Standards



The minimum National Flood Insurance Program design and construction standards are applicable to:

- ✓ New construction, and/or
- ✓ Substantial damages, and/or
- ✓ Substantial improvements for all structures located in the Special Flood Hazard Areas*

**The Special Flood Hazard Areas represent the statistical chance of a 100-year flood occurring in any given year. The 100-year flood has a one-percent chance of occurring in any given year. This statistical measure of flood risk is transformed during the Flood Insurance Study into the Flood Insurance Rate Maps.*

More Definitions

BASE FLOOD

(a.k.a. 100-year flood):

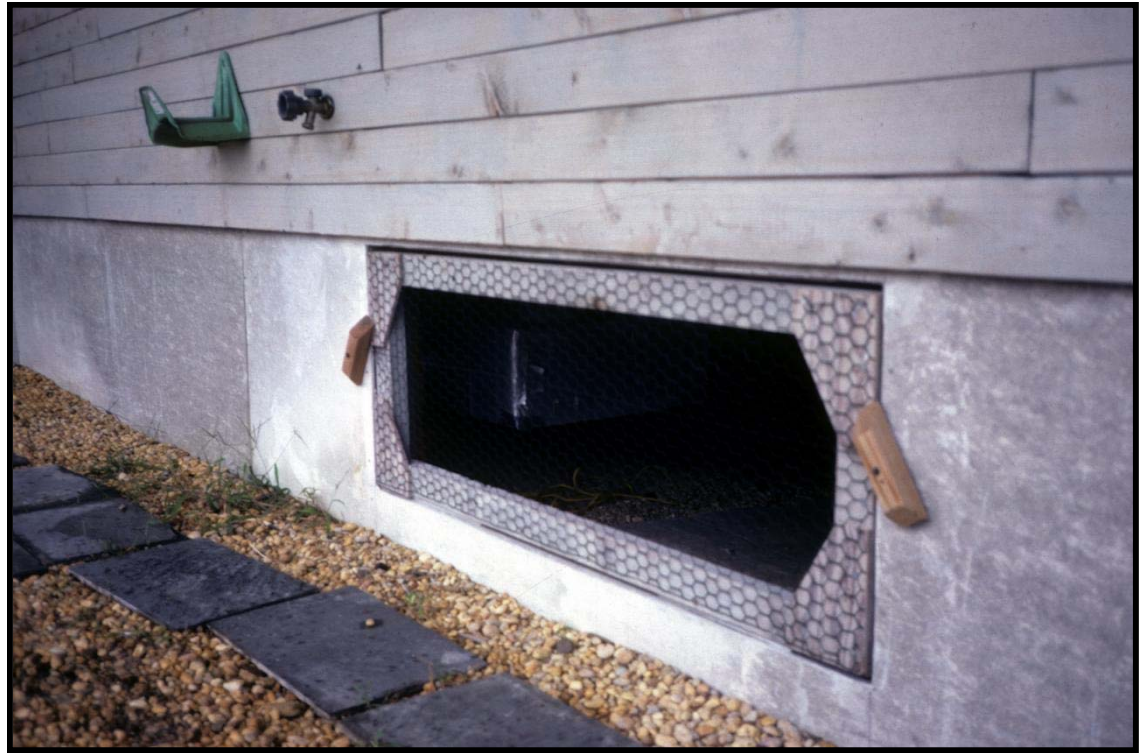
The flood having a 1% chance of being equaled or exceeded in any given year. The base flood is the national standard used by the NFIP and all Federal agencies for the purposes of requiring the purchase of flood insurance and regulating new development. Base Flood Elevations (BFEs) are typically shown on Flood Insurance Rate Maps (FIRMs).



More Definitions

BASEMENT:

An area of the structure having its floor subgrade (below ground level) on all sides



More Definitions

Development:

Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, drilling operations and storage of equipment or materials.

This definition of development:

- ✓ Applies to the entire floodplain, not just the floodway;
- ✓ Includes activities that might not otherwise be regulated by some communities;
- ✓ Is designed to give a community maximum opportunity to review for flood impacts;
- ✓ Includes outside storage of materials



Elevated Buildings:

An elevated building is a structure without a basement which meets the following standards:

- ✓The building is elevated above the ground by means of fill, stem walls, crawl spaces, pilings, piers, posts or columns, such that the top of the floor is at or above the Base Flood Elevation.
- ✓If there is an enclosed area below the elevated floor, it must be constructed of flood-resistant materials and provided with hydrostatic openings.
- ✓If duct work for the heating and air conditioning is installed below the floor, it must be made watertight to prevent water from entering or within the system components when inundated.
(www.fema.gov/pdf/fima/fema467-6-10-04.pdf)
- ✓In a VI-V30 or VE-Zone, the building is elevated above ground level by use of pilings or columns, such that the bottom of the lowest **horizontal** structural member is at or above Base Flood Elevation.
- ✓Only non-supporting breakaway wall panels, lattice, or screening may be used to enclose the area below Base Flood Elevation.
- ✓These standards raise the elevated floors above the wave crest of a base flood and comply with the “free of obstruction” standard below Base Flood Elevation
(See Federal Emergency Management Agency Technical Bulletin 5-93)

www.fema.gov/txt/floodplain/nfip_sg_appendix_c.txt

To summarize the last slide....

An elevated building should have:

- ✓ Top of lowest floor at or above the Base Flood Elevation in A-Zones;
- ✓ Hydrostatic openings in enclosures below Base Flood Elevation in A-Zones; and
- ✓ Bottom of lowest horizontal structural member at Base Flood Elevation in V-Zones;
- ✓ Only pilings or columns for foundations in V-Zones.



Lowest Floor

The “lowest floor” means 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 constructed of flood resistant materials and is designed to automatically allow for entry

and exit of floodwater in A-Zones.

(This means that parking areas do not

have to be elevated to Base Flood

Elevation. However, in V-Zones,

breakaway walls or obstruction-free areas must be used.)



New Construction

New construction refers to structure for which the “start of construction” commenced on or after the effective date of a floodplain management regulation (i.e., post-flood insurance rate maps) and any subsequent improvements to such structures.



For flood insurance rating purposes, the applicable date is December 31, 1974, or the effective date of the initial Flood Insurance Rate Map, whichever is later. This means that buildings built after the initial Flood Insurance Rate Map was issued but before the community joined the National Flood Insurance Program, are still subject to post-Flood Insurance Rate Map rating.

If they were built below the Base Flood elevation, the rates will be very expensive.

“New Construction” also includes...

- ✓ Substantial improvements to structures built before ordinance adoption;
- ✓ All additions onto post-FIRM Structures (assuming the original structure was compliant);
- ✓ New construction, for insurance purposes, is given post-Flood Insurance Rate Map actuarial rates rather than pre-Flood Insurance Rate Map subsidized rates.



Start of Construction

Start of construction 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.

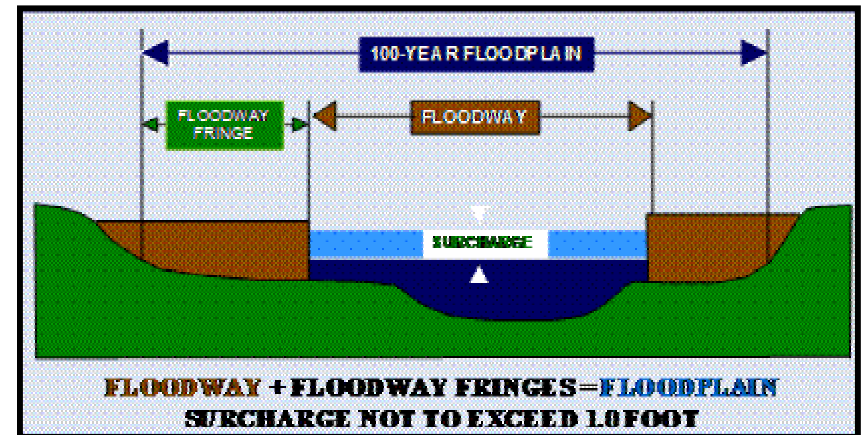
Permanent construction does not include land preparation, such as clearing, grading, and filling, nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the 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.

For determining if new construction and substantial improvements within the Coastal Barrier Resources System (CBRS) can obtain flood insurance, a different definition applies.

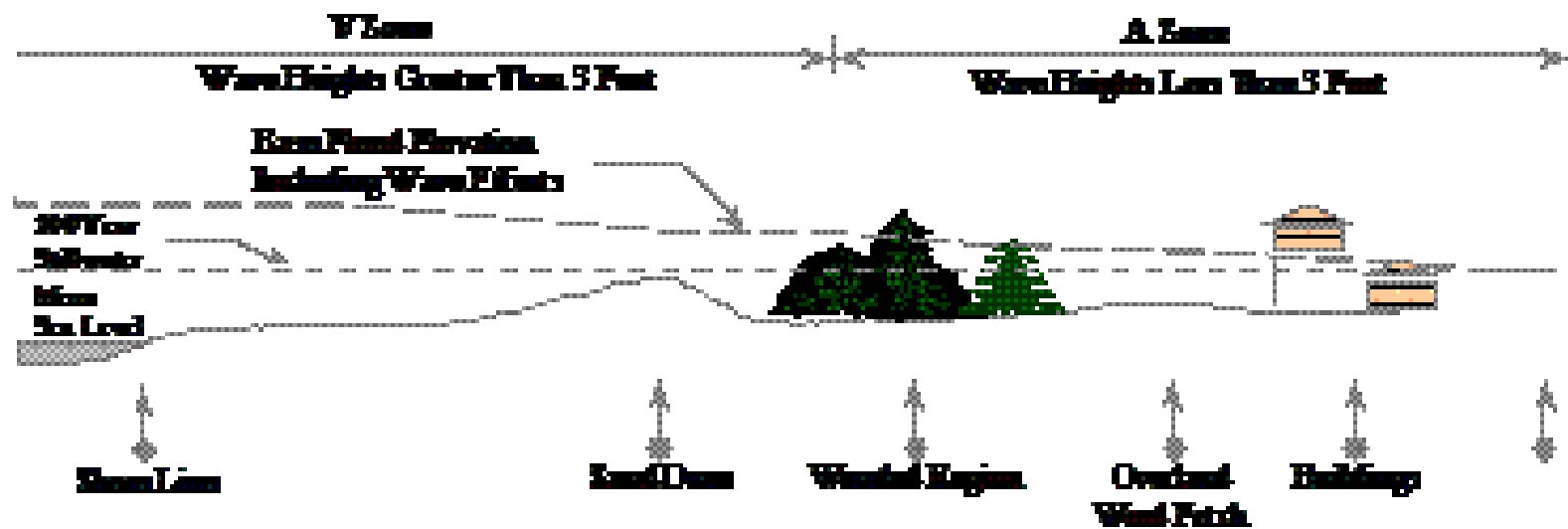
Special Flood Hazard Area

The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on NFIP maps. The SFHA is the area where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The SFHA includes Zones A, AO, AH, A1-30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, V1-30, VE, and V.



If the development is located in the floodway portion of the area, additional ordinance provisions will have to be met.

Coastal Flood Hazard Areas



Structure

A structure is a walled and roofed building that is principally above ground and affixed to a permanent foundation; the definition includes a gas or liquid storage tank, as well as a manufactured home. For insurance purposes, the definition includes buildings under construction. A structure is also more than 50% above ground



Substantial Improvement

A substantial improvement is any reconstruction, rehabilitation, addition, or other improvement to 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.

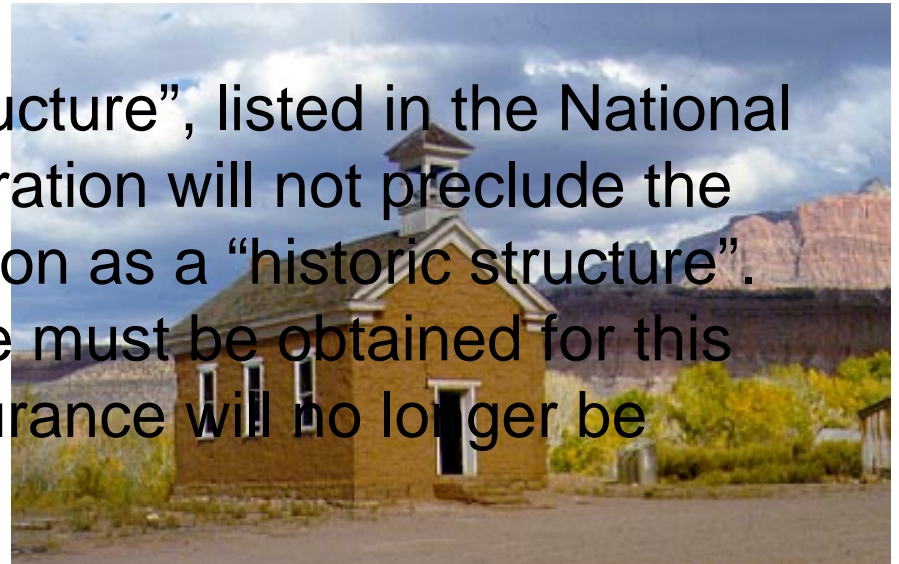
This term includes structures that have incurred “substantial damage”, regardless of the actual repair work performed.



Substantial Improvement

The term does **NOT**, however include either:

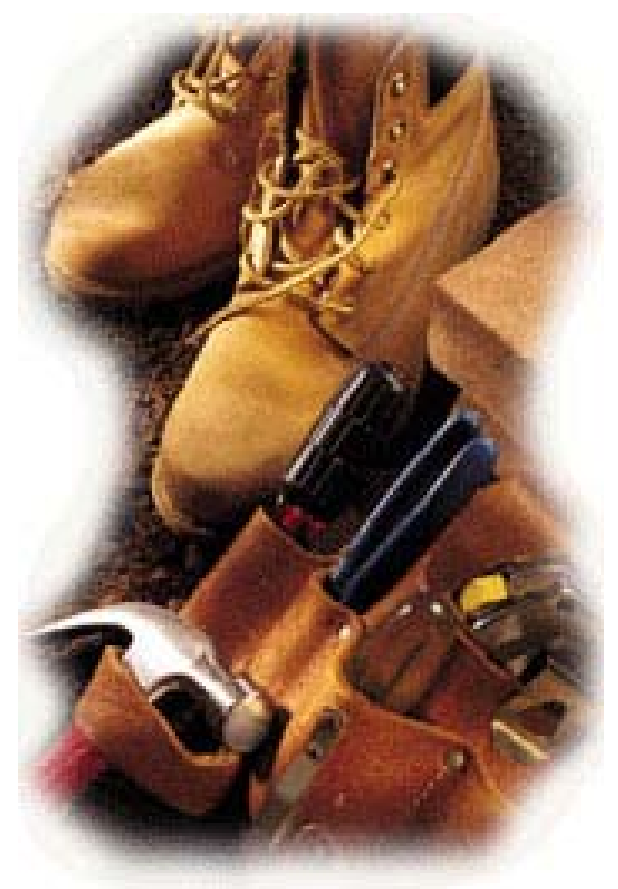
- (1) Any project for improvements of a structure to correct existing violations of state or local health, sanitary, or safety code specifications that have been identified by the local code enforcement official and that are the minimum necessary to assure safe living conditions, or
- (2) Any alteration of a “historic structure”, listed in the National Register provided that the alteration will not preclude the structure’s continued designation as a “historic structure”. Also a local floodplain variance must be obtained for this reason and the flood plain insurance will no longer be subsidized



In other words....

Substantial Improvements:

- ✓ Include improvements equal to or exceeding 50% of the market value of the structure;
- ✓ Include substantial damage; and
- ✓ Exclude corrective actions for pre-identified code violations and historic structures as identified by the state or federal historic register.



NFIP Minimum Standards

The specific floodplain management criteria are contained in Title 44 Code of Federal Regulations, Chapter 1, Section 60.3, Parts (a), (b), (c), (d) and (e). The requirements are cumulative, which means that if a community is required, for example, to meet 44 Code of Federal Regulations, Section 60.3(d) it must also meet the applicable requirements of Section 60.3(a), Section 60.3(b), and Section 60.3(c).

READ THE CRITERIA ONLINE AT:

<http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=0c201529b92ff910bc2a1fe0ab384af5&rgn=div5&view=text&node=44:1.0.1.2.27&idno=44#44:1.0.1.2.27.1.25.3>

Section 60.3(a) of 44: Special Flood Hazard Areas Not Identified

Section 60.3(a) of the floodplain management criteria applies to communities in which Special Flood Hazard Areas have not yet been identified by the Federal Emergency Management Agency. Often the community is aware of possible flood-prone areas and thus desires that flood insurance be available. In these situations, the community may apply to participate in the National Flood Insurance Program, if it agrees to six requirements....

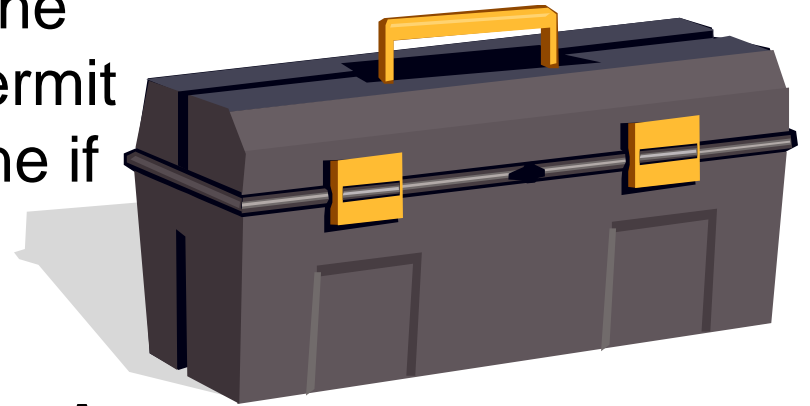


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60.3 (a) Requirements

(1) Require Permits

Require permits for all proposed construction or development in the community. In evaluating the permit site, the community will determine if flood risk exists at the proposed location



(2) Ensure All Required Permits Are Obtained

Review proposed development to ensure other required federal and state permits have been obtained.

60.3 (a) Requirements



(3) Review Permit Application

- ✓ Review permit applications to determine whether proposed building sites will be reasonably safe from flooding.
- ✓ Anchor buildings to prevent flotation, collapse, and lateral movement during a flood.
- ✓ Use materials and apply construction methods and practices that minimize flood damage, including site design. This means use of flood-resistant materials and finishes for that portion of a building subject to flooding.
- ✓ Design and/or locate electrical and mechanical equipment so as to prevent the entry or accumulation of floodwater.

60.3 (a) Requirements

(4) Review Subdivision Proposals



- ✓ Review subdivision proposals and other proposed new development to determine if such proposals will be reasonably safe from flooding.
- ✓ The proposal should minimize flood damage (e.g. through locating structures on highest ground, setbacks from streams, etc.)
- ✓ Locate and construct public utilities and facilities to minimize flood damage.
- ✓ Provide adequate drainage for each building site.

60.3 (a) Requirements

(5) Minimize Water System Infiltration

Require new and replacement water supply systems located within flood-prone areas to be designed to minimize or eliminate infiltration of floodwater into the systems.

(6) Prevent Sewage System Contamination or Impairment



Require new and replacement sanitary sewage systems and on-site waste disposal systems be protected or sited to prevent contamination or impairment from floodwater.

Section 60.3(b) of 44: Special Flood Hazard Areas Identified Without Base Flood Elevations

Section 60.3 (b) applies to communities for which the Federal Emergency Management Agency has provided a Flood Hazard Boundary Map or Flood Insurance Rate Map that identifies Special Flood Hazard Areas (A-Zones, but has not identified Base Flood Elevations, a floodway, or coastal high hazard area.



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60.3(b) Requirements

(1) Permits required

Require permits for all development in Special Flood Hazard Areas on the Flood Hazard Boundary Map or Flood Insurance Rate Map.

(2) Apply Section 60.3 (a) Requirements

Require Development in flood hazard areas to meet standards of Section 60.3(a)(2)B(6).



60.3(b) Requirements



(3) Flood Data for Subdivision Proposals and Other Large-Scale Development

Require floodplain elevation data for subdivisions and other proposed developments (including manufactured home parks and subdivisions) over 50 lots or 5 acres. Such data must be developed using standard hydrologic and hydraulic engineering studies that are acceptable to Federal Emergency Management Agency.

60.3(b) Requirements

4) Use of Available Flood Data

Obtain, review and reasonably utilize any base flood elevation data available from a federal, state, or other source to require development to meet the elevation or flood-proofing requirements.

(For insurance purposes...Locate lowest floor at least 2ft above the highest adjacent grade in an unnumbered A-Zone, without a Base Flood Elevation.)



60.3(b) Requirements

(5) Elevation or Flood- proofing

When Base Flood Elevation data are utilized, document elevation or flood-proofing of structures in the flood hazard area.



(6) Watercourse Alterations

Notify, in riverine situations, adjacent communities and the state National Flood Insurance Program coordinating agency of any proposed watercourse alteration. Provide the Federal Emergency Management Agency Region II office with documentation of this notification.

60.3(b) Requirements

(7) Maintain Carrying Capacity

Assure that the flood-carrying capacity of any altered watercourse is maintained

(8) Anchoring and Placement of Manufactured Homes

Require manufactured homes placed in flood hazard areas to be installed using methods and practices that minimize flood damage.



Section 60.3(c) of 44: Base Flood Elevations Provided

Section 60.3 (c) applies to communities where the Federal Emergency Management Agency has provided Base Flood Elevations for one or more Special Flood Hazard Area on the community's Flood Insurance Rate Map, but has not identified a regulatory floodway or coastal high hazard area. Often such communities also have unnumbered A Zone areas. Communities that fit this description must fulfill the specific requirements listed in Section 60.3(a) and (b) as well as other requirements.



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60.3(c) Requirements

1) Elevation of Residential Structures

Require elevation of the lowest floor (including basement) of new or substantially damaged/improved residential structures to or above the Base Flood Elevation.

2) Elevation or Flood-proofing of Non-residential Structures

Require elevation or flood-proofing of new or substantially damaged/improved non-residential structures to or above the Base Flood Elevation.



60.3(c) Requirements

3) Professional Certification of Flood-proofing (Non-Residential Structures Only)

Require certification by a registered professional engineer or architect that the design and construction methods proposed for a dry flood-proofed structure are in accordance with accepted standards to satisfy the requirements.

4) Enclosures Below Lowest Floor

Ensure that fully enclosed areas below elevated lowest floors are designed to automatically equalize hydrostatic pressures on the structure through the use of openings or self-activating vents.

These areas must be used solely for parking, access, or storage and must be constructed of flood-resistant materials.



60.3(c) Requirements

5) **Elevation and Anchoring of Manufactured Homes**

Require that newly placed or substantially improved manufactured homes in A1-30 or AE or AH zones have the lowest floor elevated to or above the Base Flood Elevation on an adequately anchored foundation system.

6) **Residential Structures in AO Zones**



Require elevation of residential structures in AO Zones to or above the highest adjacent grade at least as high as the depth number in feet on the Flood Insurance Rate Map (at least two feet if no depth number is specified).

60.3(c) Requirements

7) Non-Residential Structures in AO Zones

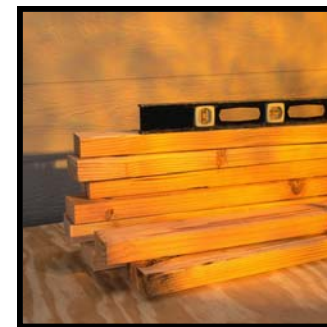
Require elevation or flood-proofing of non-residential structures in AO Zones to or above the depth number on the Flood Insurance Rate Map (at least two feet if no depth number is specified)

8) Development Protected by Flood Control Projects

Require within A99 Zones on the Flood Insurance Rate Map the standards of Section 60.3(a)(1)B (a)(4)(I), and Section 60.3(b)(5)B(b)(9).

9) Regulating Encroachments Where Floodways Are Not Identified

Require that, until a regulatory floodway is designated, no development is permitted within A1-30 or AE zones unless it is demonstrated that the cumulative effect of the proposed development, and existing or anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point in the community.



60.3(c) Requirements

10) Drainage around Structures

Require adequate drainage around structures on slopes in AH or AO Zones. Remember Section 60.3(a)(4) requires adequate drainage for all building sites.

11) Manufactured Homes in Existing Parks

Require manufactured homes, to be placed or substantially improved, on sites within an existing manufactured home park or subdivision within A1-30, AH, or AE-Zones, on the Flood Insurance Rate Map, be elevated such that their lowest floor is at or above the Base Flood Elevation or the chassis is 36 inches above grade and is anchored to an adequately foundation system. In a park in which a manufactured home has incurred substantial damage as the result of a flood, any home to be place on that the lot must be elevated with the lowest floor at or above Base Flood Elevation and be adequately anchored. This requirement of elevation for substantially damaged manufactured homes is on a lot- by- lot basis.



60.3(c) Requirements

12) Recreational Vehicles

- ✓ Require that recreational vehicles placed on sites within A1-30, AE, or AH Zones, either
- ✓ Be on site fewer than 180 consecutive days; or
- ✓ Be fully licensed and road ready



Section 60.3(d) of 44:

Base Flood Elevations and Floodway Provided

Section 60.3(d) of 44 Code of Federal Regulations applies to communities where the Federal Insurance Administrator has (1) Provided final Base Flood Elevations within A1-30 and/or AE-Zones on the Flood Insurance Rate Map, (2) Provided information to designate a regulatory floodway, but (3) Has not identified a coastal high hazard area. The community must fulfill the specific requirements listed in Section 60.3 (a), (b), and (c), as well as other requirements.

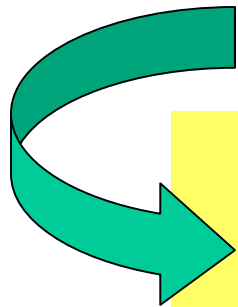


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60.3(d) Requirements

1) Adopt Floodway

Select and adopt a regulatory floodway that will carry the base flood with no more than a one foot increase in the water surface elevation at any location along the waterway. **(Note: NJ requires a 0.2 ft increase in the water surface elevation)**



No Impact Requirement

Prohibit encroachments within the adopted regulatory floodway unless it is demonstrated through hydrologic and hydraulic analyses by a professional engineer that the proposed encroachment would not result in any increase in flood levels within the community during a base flood discharge. A no-impact certificate must accompany the permit application.

Section 60.3(e) of 44: Coastal High Hazard Areas Provided

Section 60.3(e) applies to communities for which the Federal Insurance Administrator has provided final Base Flood Elevations within the A1-30 and/or AE zones; has identified AH, AO, and A99-Zones, if appropriate; and has identified coastal high hazard areas by designating Zones V1-30, VE, and/or V-Zones. The V1-30, VE, and/or V-Zones identified on Flood Insurance Rate Maps are associated with coastal high hazard areas located along coastlines which are subject to high water levels, wave action, and erosion from strong storms and hurricanes. The wind and resultant waves and tidal surges associated with these storms cause water of high velocity to sweep over nearby land. Generally, the V-Zone indicates the inland extent of a three-foot breaking wave atop a storm surge. *These areas are extremely hazardous to life and property. Because of such hazardous conditions, the Federal Emergency Management Agency standards require that buildings in V-Zones be constructed to a stricter standard.*



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60.3(e) Requirements

1) Apply Section 60.3(a), (b), (c), and (d) Requirements.

2) Maintain Elevation of Lowest Member

Within V1-30, VE, and V-Zones, obtain and maintain the elevation of the bottom of the lowest horizontal structural member of the lowest floor of new and substantially improved/damaged structures.

3) Locate Structures Landward of Mean High Tide

Require that new construction or substantially improved/damaged structures in V1-30, VE, or V-Zones be located landward of mean high tide. No new construction is allowed over water.



60.3(e) Requirements

4) Elevation on Piles or Columns

Require new construction and substantial improvements/damages in V1-VE, or V-Zones to be elevated such that the bottom of the lowest horizontal structural member of the lowest floor is at or above the Base Flood Elevation, on a pile or column foundation. Assure that the foundation and the structure attached thereto are anchored to resist wind and water loads acting simultaneously on the building components. This requires an engineering certification that design and construction methods will resist the water loads from the base flood and wind loads according to state or local code.



5) Free of Obstruction or Breakaway Walls

Require the space below the lowest elevated floor to be free of obstruction meaning left open, or enclosed with non-supporting break-way walls, open lattice-work, or insect screening designated to collapse under wind and water loads without causing damage to structural supports or the elevated structure.

60.3(e) Requirements

6) No Fill

Prohibit the use of fill for structural support of buildings within V1-30, VE, or V-Zones.

7) No Alteration of Sand Dunes and Mangrove Stands

Prohibit manmade alteration of sand dunes and mangrove stands within V1-30, VE, or V-Zones that would increase potential flood damage.

8) Manufactures Homes

Require newly placed or substantially improved/damaged manufactured homes in V1-30, VE, or V-Zones to meet the requirements of 44 Code of Federal Regulations, Section 60.3(e)(2)-(e)(7). Manufactured homes in existing manufactured home parks or subdivisions that have not previously incurred substantial damage due to flooding may meet the requirements of Section 60.3(c)(12) instead.



60.3(e) Requirements

9) Recreational Vehicles

- ✓ Require recreational vehicles placed on site in V1-30, VE, or V-Zones
- ✓ Be on site less than 180 consecutive days; and
- ✓ Be fully licensed and ready for highway use



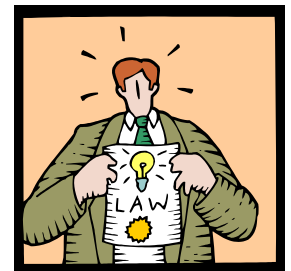
The Relationship Between Floodplain Management and the Construction Office



How do all the codes fit together?

In order to participate in the NFIP municipalities must have a Flood Damage Prevention Ordinance in place. This ordinance dictates the construction standards for your specific municipality. The state also has a set of standards which can be found in the NJ Uniform Construction Code and the NJ International Building Code. You should be familiar with these codes, but remember that your own township's ordinance layouts the specific floodplain rules and codes that you have to enforce. The Flood Ordinance is the prior approval before you address the UCC or the IBC.

The next set of slides will help to familiarize you with the appropriate floodplain UCC and IBC rules....

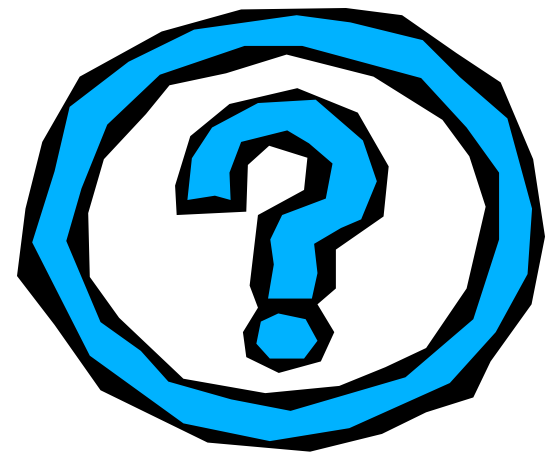


What is the NJ UCC?

The New Jersey State Uniform Construction Code (UCC) Act, which was signed into law in 1975, authorizes the Commissioner of the DCA to adopt and enforce rules pertaining to construction codes .

The UCC is comprised of four basic technical subcodes for construction:

- Building
- Electrical
- Fire protection
- Plumbing



What is the UCC? Cont'd...

In addition, the UCC contains technical subcodes for:

- Fuel gas installations
- Mechanical installations
- One- and two-family dwellings
- Accessible (barrier free) construction
- The construction of manufactured homes
- The rehabilitation of existing buildings
- Playground safety
- Radon hazard abatement
- Asbestos hazard abatement

In short, the UCC is a complete set of technical standards for construction with a uniform method of administration and enforcement.

How is the UCC Involved in Floodplain Management?

1. The Local Floodplain Manager uses DEP approved maps to establish flood zones
2. He/She tells the Local Construction Official, through the “prior approval” (*see the next few slides*) process, whether the building needs to be designed for flood mitigation or allowed at all.



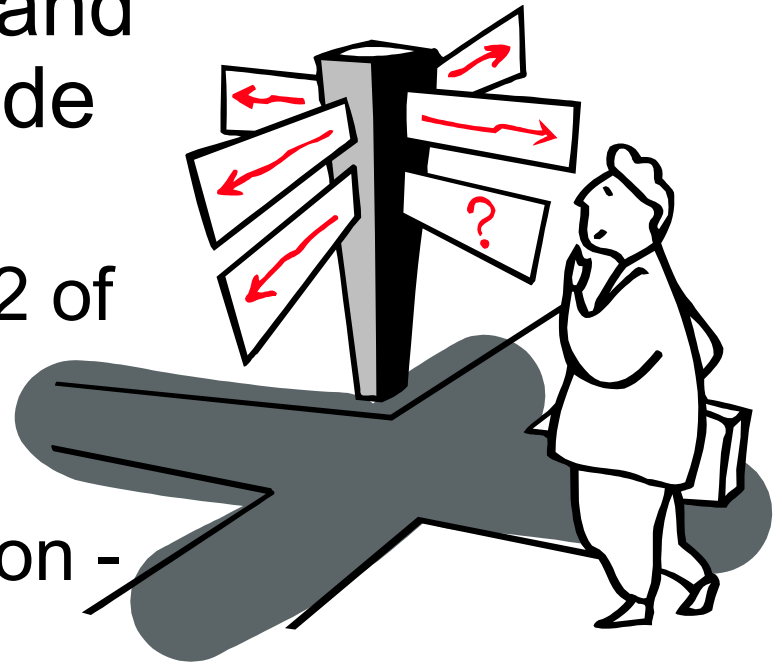
“Prior Approvals”

- ...means the necessary certifications or approvals issued which are conditions precedent to the issuance of a construction permit or a CO or approval.
- Prior approvals shall include (But not limited to):
 - Zoning, Soil Erosion and Sediment Control, Highway curb cuts, Water and Sewer Treatment Works approvals, CAFRA, Underground Storage Tank Systems, Educational adequacy review of public school facilities, Pinelands review and Compliance of abandoned wells

UCC and New Construction

- The following sections of the building subcode or one- and two-family dwelling subcode apply:
 - Flood Loads - Section 1612 of the International Building code/2006, or
 - Flood Resistant Construction - Section R324 of the International Residential Code/2006

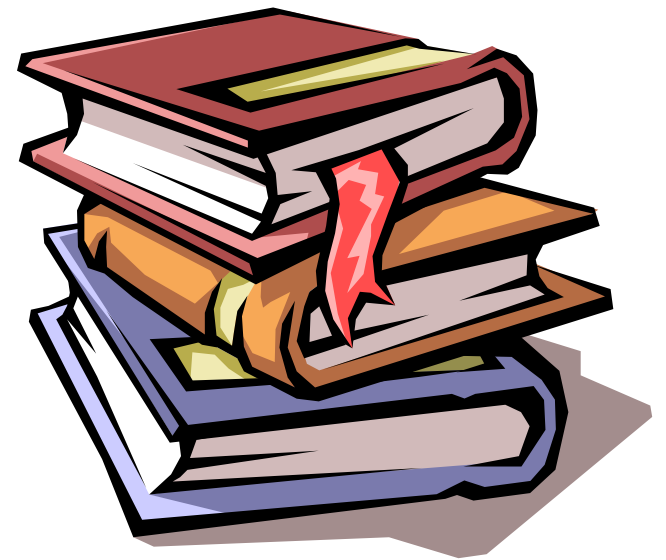
(More details in subsequent slides)



Section 1612 – NJ

International Building Code

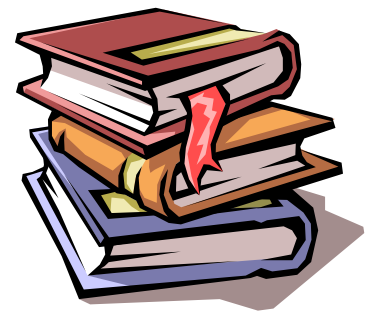
- 1612.1 (General): W/in flood hazard areas, all new construction and structures shall be designed and constructed to resist the effect of flood hazards and flood loads. If buildings are located in more than one flood hazard area, the most restrictive flood hazard are shall apply.



Section 1612 – NJ

International Building Code

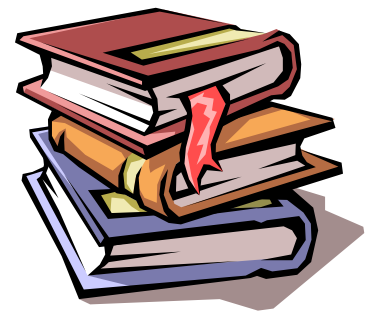
- 1612.2 (Definitions):
 - **BASE FLOOD:** The flood having a 1% chance of being equaled or exceeded in any given year
 - **BASE FLOOD ELEVATION:** The elevation of the base flood, including wave height, relative to the National Geodetic Vertical Datum (NGVD), the North American Vertical Datum (NAVD) or other datum specified on the Flood Insurance Rate Map (FIRM)



Section 1612 – NJ

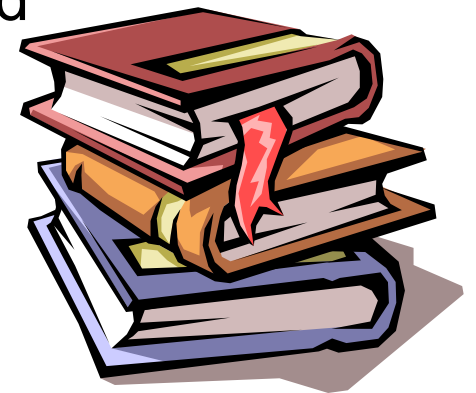
International Building Code

- 1612.2 (Definitions):
 - **BASEMENT:** The portion of a building having its floor subgrade on all sides
 - **DESIGN FLOOD:** The flood associated with the greater of the following 2 areas:
 1. An area with a flood plain subject to a 1% or greater chance of flooding in any year
 2. An area designated as a flood hazard area on a community's flood hazard map, or otherwise legally designated



Section 1612 – NJ International Building Code

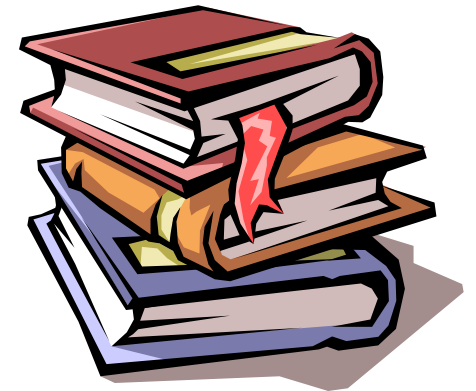
- 1612.2 (Definitions):
 - **DESIGN FLOOD ELEVATION:** The elevation of the design flood, including wave height, relative to the datum specified on the community's legally designated flood map. IN areas designated as AO, the design flood elevation should be the elevation of the highest existing grade as the building's perimeter plus the depth specified on the flood hazard map. (Where a depth number is no specified on the map, the number should be taken a being equal to 2 feet.)



Section 1612 – NJ

International Building Code

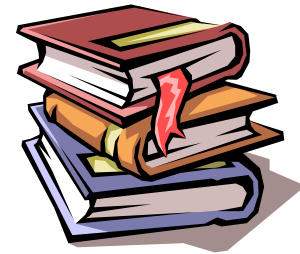
- 1612.2 (Definitions):
 - **DRY FLOOD PROOFING:** A combination of design modifications that result in a building being water tight with structural components having the capacity to resist loads as identified in ASCE7



Section 1612 – NJ

International Building Code

- 1612.2 (Definitions):
 - **EXISTING CONSTRUCTION:**
Buildings and structures for which the “start of construction” commenced before the effective date of the community’s entry into the regular phase of the National Flood Insurance Program (a.k.a **Existing structures**)



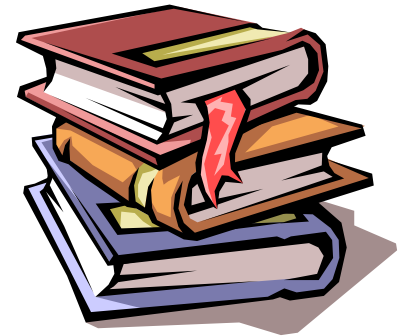
Section 1612 – NJ

International Building Code

- 1612.2 (Definitions):

FLOOD OR FLOODING: A general and temporary condition of partial or complete inundation of normally dry land from:

1. The overflow of inland or tidal waters
2. The unusual and rapid accumulation or runoff of surface waters from any source

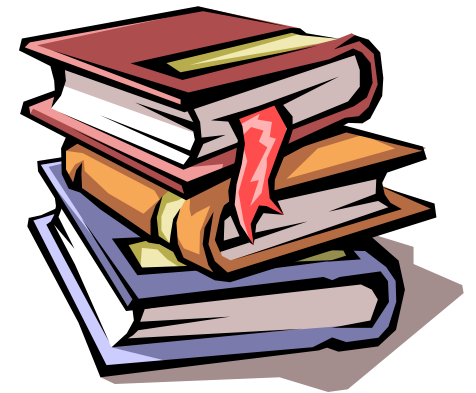


Section 1612 – NJ International Building Code

- 1612.2 (Definitions):

FLOOD DAMAGE-RESISTANT

MATERIALS: Any construction material capable of withstanding direct and prolonged contact with floodwaters without sustaining any damage that requires more than cosmetic repair.



For more information see FEMA Technical Bulletin 2-93:
<http://www.fema.gov/plan/prevent/floodplain/techbul.shtm>

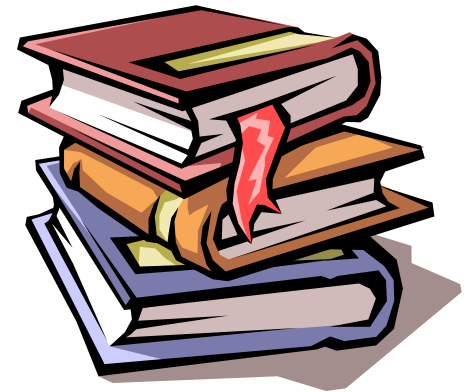
Section 1612 – NJ

International Building Code

- 1612.2 (Definitions):

FLOOD HAZARD AREA: The greater of the following two areas:

1. The area within a floodplain subject to a 1% or greater chance of flooding in any year
2. The area designated as a flood hazard are on a community's flood hazard map, or otherwise legally designated.



Section 1612 – NJ

International Building Code

- 1612.2 (Definitions):

FLOOD HAZARD AREA SUBJECT TO HIGH VELOCITY WAVE ACTION:

Area within the flood hazard area that is subject to high velocity wave action, and shown on the FIRM or other flood hazard map as Zone V, VO, VE or V1-30 (NOTE: *The State of NJ only has VE zones*)

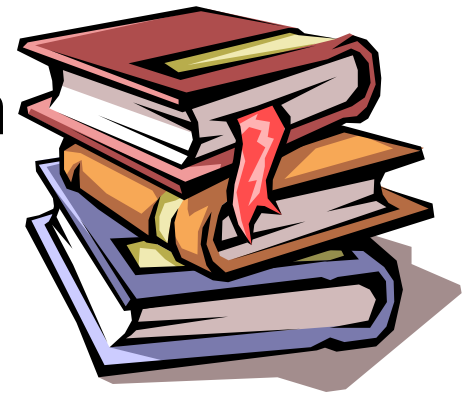
Section 1612 – NJ

International Building Code

- 1612.2 (Definitions):

FLOOD INSURANCE RATE MAP

(FIRM): An official map of a community on which the Federal Emergency Management Agency (FEMA) has delineated both the special flood hazard areas and the risk premium zone applicable in the community.



Section 1612 – NJ

International Building Code

- 1612.2 (Definitions):

FLOOD INSURANCE STUDY: The official report provided by FEMA containing the FIRM, the Flood Boundary and Floodway Map (FBFM), the water surface elevation of the base flood and supporting technical data.

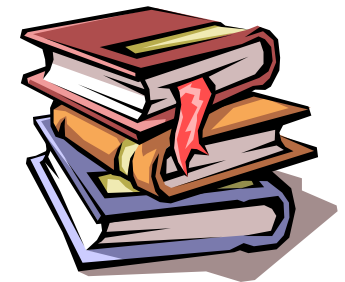


Section 1612 – NJ

International Building Code

- 1612.2 (Definitions):

FLOODWAY: The channel of the river, creek or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood w/out cumulatively increasing the water surface elevation more than a designated height.

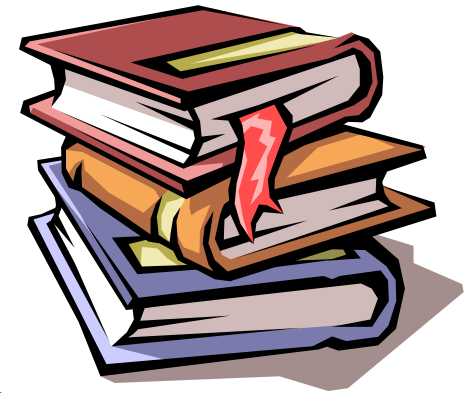


Section 1612 – NJ

International Building Code

- 1612.2 (Definitions):

LOWEST FLOOR: The floor of the lowest enclosed area, including basement, but excluding any unfurnished or flood-resistant enclosure, usable solely for vehicle parking, building access or limited storage provided that such an enclosure is not built so as to render the structure in violation.



Section 1612 – NJ

International Building Code

- 1612.2 (Definitions):

SPECIAL FLOOD HAZARD AREA: The land area subject to flood hazards and shown on a FIRM or other flood hazard map as Zone A, AE, A1-30, A99, AR, AO, AH, V, VO, VE or V1-30.

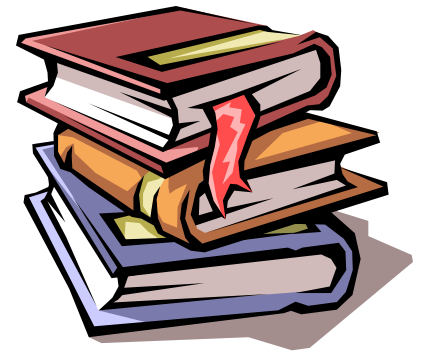


Section 1612 – NJ

International Building Code

- 1612.2 (Definitions):

START OF CONSTRUCTION: The date of permit issuance for new construction and substantial improvements to existing structures, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement or other improvements is w/in 180 days after the date of issuance.



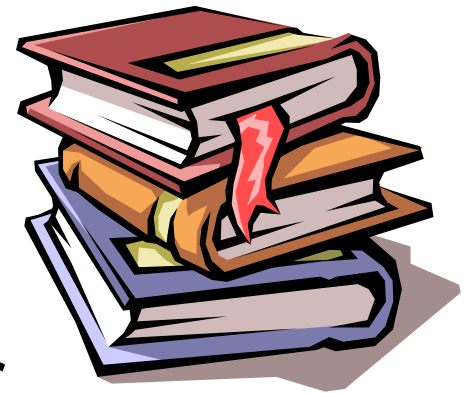
(The actual start of construction means the first placement of permanent construction of a building on a site, such as the pouring of a slab or footing, installations of pilings or construction of columns.)

Section 1612 – NJ

International Building Code

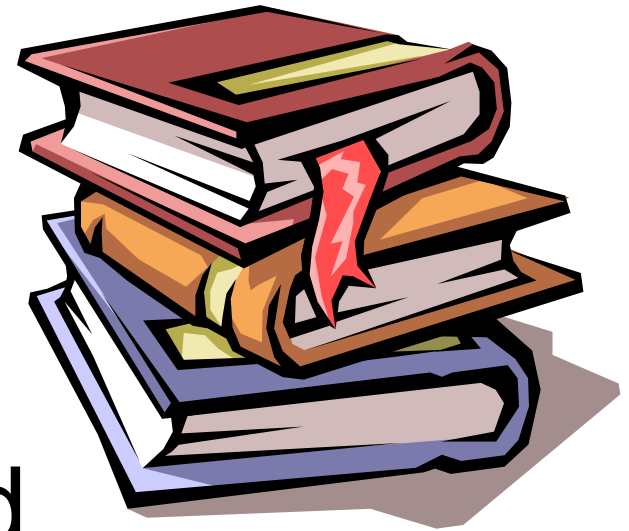
The next few slides will provide an overview of the other pertinent sections of the NJ International Building Code. These will be listed with the citation number and its associated topic.

- Specific language under each of the citations can be found in your copy of the NJ International Building Code.

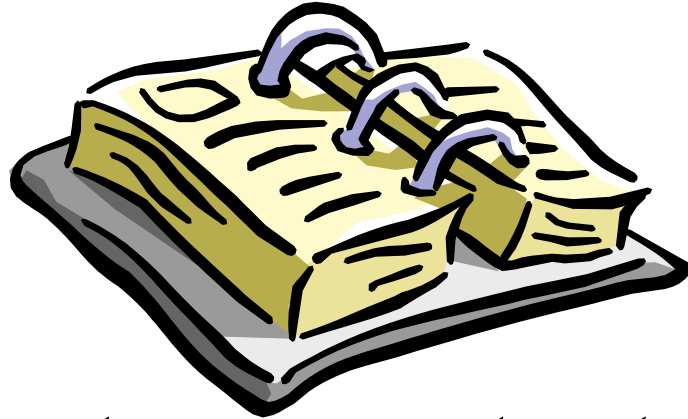


Section 1612 – NJ International Building Code

- 1612.3 – Establishment of Flood Hazard Areas
- 1612.4 – Design and Construction
- 1612.5 – Flood Hazard Documentation



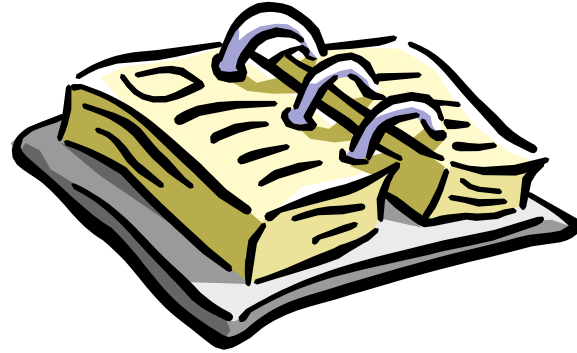
Section R324 – Flood Resistant Construction



R324.1 General:

Buildings and structures constructed in whole or in part in flood hazard areas (including A or V zones) as established in Table R301.2(1) shall be designated and constructed in accordance with the provisions contained in this section.

Section R324 – Flood Resistant Construction



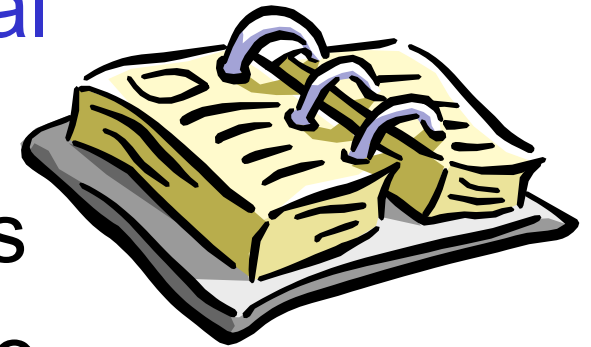
The next few slides will provide an overview of the other pertinent sections of the NJ International Residential Code. These will be listed with the citation number and its associated topic.

- Specific language under each of the citations can be found in your copy of the NJ International Building Code.

Section R324 – Flood

Resistant Construction

The following slides provide an overview of the other pertinent sections of the NJ International Residential Code:



- R324.1.1 – Structural Systems
- R324.1.2 – Flood – Resistance Construction
- R324.1.3 – Establishing the Design Flood Elevation

Section R324 – Flood Resistant Construction

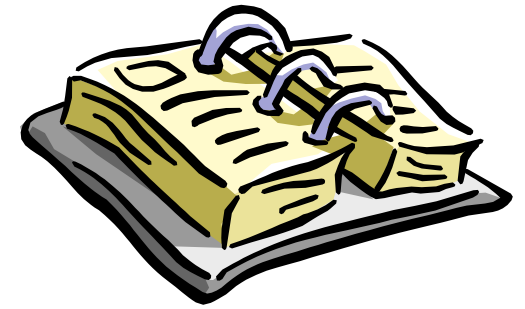
R324.1.3.1 – Determination of Design
Flood Elevations

R324.1.3.2 – Determination of Impacts

R324.1.4 – Lowest Floor

R324.1.5 – Protection of Mechanical and
Electrical Systems

R324.1.6 – Protection of Water Supply and
Sanitary Sewage Systems



Section R324 – Flood Resistant Construction

R324.1.7 – Flood-resistant Materials

R324.1.8 – Manufactured Housing

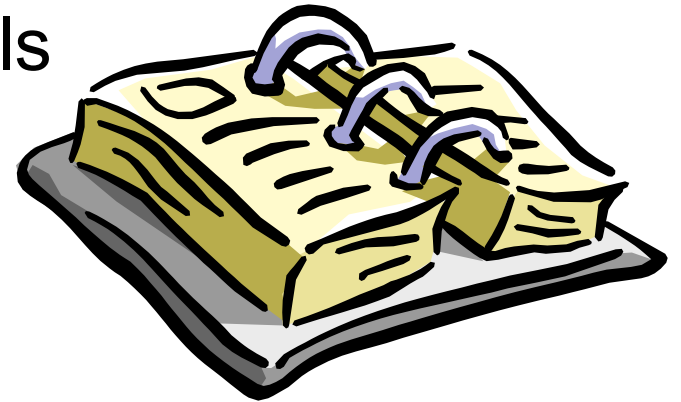
R324.1.9 – As-built Elevation

Documentation

R324.2 – Flood Hazard Areas (Including A
Zones)

R324.2.1 – Elevation Requirements

R324.2.2 – Enclosed area below design
flood elevation



Section R324 – Flood Resistant Construction

R324.2.3 – Foundation Design and
Construction

R324.3 - Coastal high-hazard areas
(including V zones)

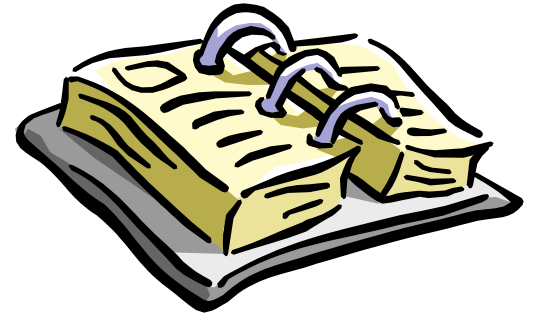
R324.3.1 – Location and site preparation

R324.3.2 – Elevation requirements

R324.3.3 – Foundations

R324.3.4 – Walls below design flood
elevation

R324.3.5 – Enclosed areas below design
flood elevation



UCC and Existing Buildings

- The floodplain administrator uses the definitions from FEMA (44CFR59.1) to determine what's required.

(See the next slide for definitions of “*substantial damage*” and “*substantial improvement*”)

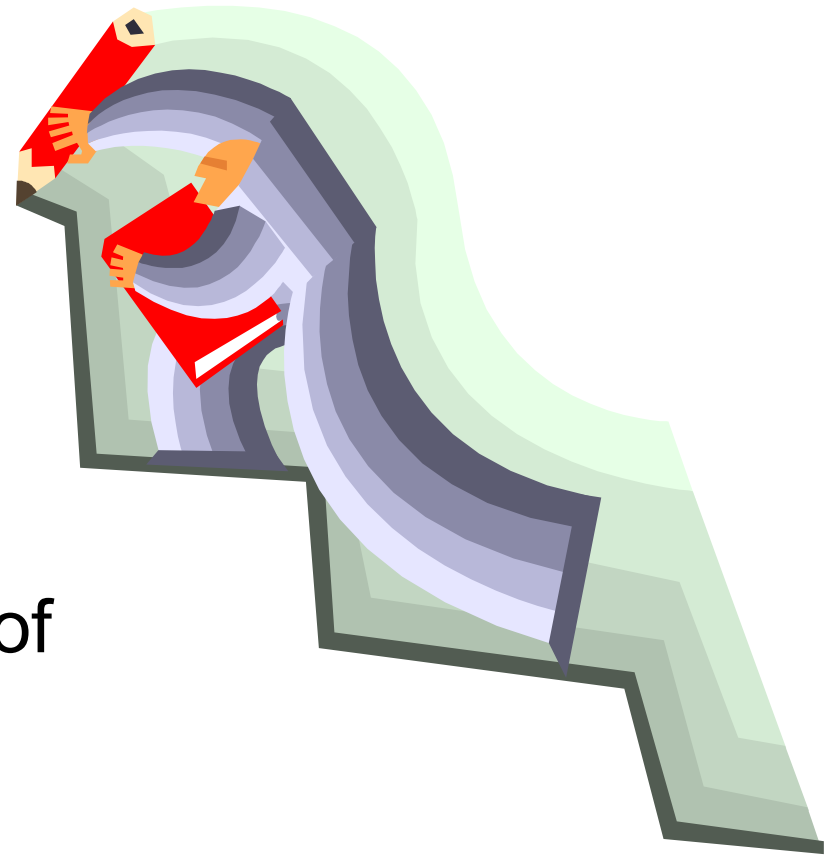
Definitions

- **Substantial damage** = damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred



Definitions

- **Substantial Improvement** = any reconstruction, rehabilitation, addition or other improvement, the cost of which exceeds 50% of the market value of the structure before the “start of construction” or improvement



Technical Help from FEMA

If you are interested in additional technical help and definitions from FEMA, they have a great list of technical bulletins online at www.fema.gov/plan/prevent/floodplain/techbul.shtm



- **1-93 Openings in Foundation Walls -- (PDF 137 KB)**
Provides guidance on the NFIP regulations concerning the requirement for openings in below-Base Flood Elevation foundation walls for buildings located in Zones A, AE, A1-A30, AR, AO, and AH.
- **2-93 Flood-Resistant Materials Requirements -- (PDF 465 KB)**
Provides guidance on the NFIP regulations concerning the required use of flood-damage resistant construction materials for building components located below the Base Flood Elevation in Special Flood Hazard Areas (both A and V zones).
- **3-93 Non-Residential Floodproofing -- Requirements and Certification -- (PDF 150 KB)**
Provides guidance on the NFIP regulations concerning watertight construction and the required certification for floodproofed non-residential buildings in Zones A, AE, A1-A30, AR, AO, and AH whose lowest floors are below the Base Flood Elevation.
- **4-93 Elevator Installation -- (PDF 93 KB)**
Provides guidance on the NFIP regulations concerning the installation of elevators below the Base Flood Elevation in Special Flood Hazard Areas (both A and V zones).
- **5-93 Free-of-Obstruction Requirements -- (PDF 102 KB)**
Provides guidance on the NFIP regulations concerning obstructions to flood waters below elevated buildings and on building sites in Coastal High Hazard Areas (Zones V, VE, and V1-V30).
- **6-93 Below-Grade Parking Requirements -- (PDF 111 KB)**
Provides guidance on the NFIP regulations concerning the design of below-grade parking garages beneath buildings located in Zones A, AE, A1-A30, AR, AO, and AH.
- **7-93 Wet Floodproofing Requirements -- (PDF 158 KB)**
Provides guidance on the NFIP regulations concerning wet floodproofing of certain types of structures located in Zones A, AE, A1-A30, AR, AO, and AH.
- **8-96 Corrosion Protection for Metal Connectors in Coastal Areas -- (PDF 881 KB)**
Provides guidance on the need for, selection of, and use of corrosion-resistant metal connectors for the construction of buildings in coastal areas.
- **9-99 Design and Construction Guidance for Breakaway Walls Below Elevated Coastal Buildings -- (PDF 192 KB)**
Provides guidance on the NFIP regulations concerning the design and construction of breakaway walls beneath elevated buildings in Coastal High Hazard Areas (Zones V, VE, and V1-V30).
- **10-01 Ensuring that Structures Built on Fill In or Near Special Flood Hazard Areas are Reasonably Safe From Flooding -- (PDF 852 KB)**
This technical bulletin discusses building techniques, including the use of fill, that can be used to ensure structures are reasonably safe from flooding.
- **11-01 Crawlspace Construction for Buildings Located in Special Flood Hazard Areas -- (PDF 607 KB)**
Provides interim guidance on minimum NFIP requirements as well as best practices for crawlspace construction in the Special Flood Hazard Area.

In order to move onto the next section you must complete this module's web quiz. This Quiz can be found by clicking on the link below:

www.surveymonkey.com/s.asp?u=536993440584