



Floodplain Management Improvements

Recommended Floodplain Management Improvements

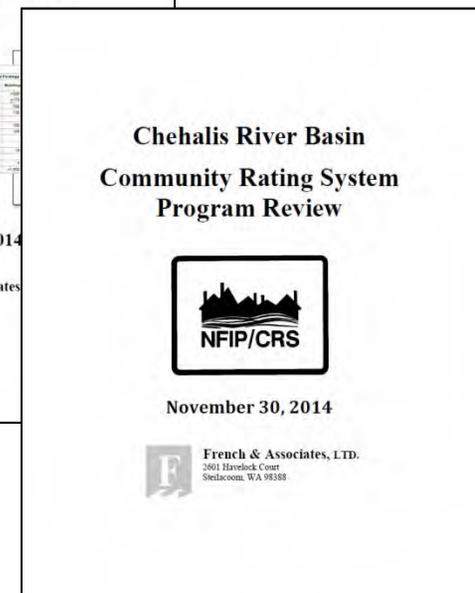
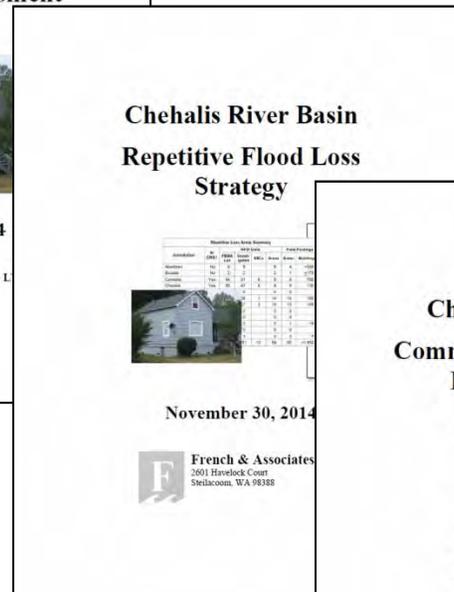
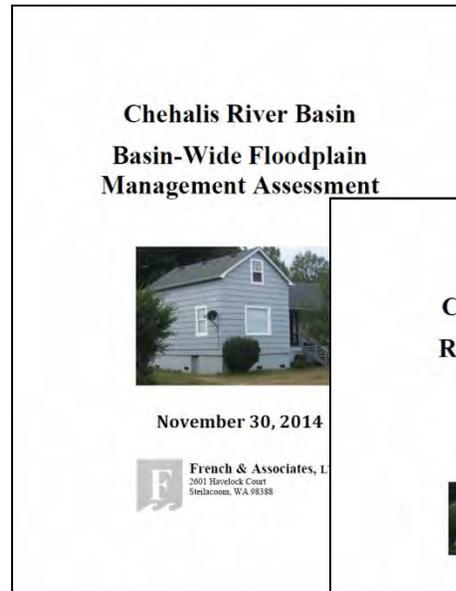


January 15, 2015



Floodplain Management Improvements

Floodplain Management Assessments





Floodplain Management Improvements

Guiding New Development

Basin communities have:

- ✓ Significant amounts of vacant floodplain land
- ✓ Comprehensive plans that do not address floodplain development
- ✓ Zoning ordinances that do not have floodplain or low density uses
- ✓ Expected increases in population





Floodplain Management Improvements

Regulating New Construction

- ✓ Communities' floodplain construction regulations can be found in
 - Flood hazard area ordinance
 - Building code
 - Critical areas ordinance
 - Shoreline management regulations
- ✓ Standards differ in the different ordinances
- ✓ Some do not meet all current NFIP requirements
- ✓ Minimum national NFIP standards are minimums



January 15, 2015



Floodplain Management Improvements

Mitigating Existing Problems

Mitigation tools

1. Regulations
2. Flood control
3. Retrofitting
4. Public information



**Chehalis River Basin
Repetitive Flood Loss
Strategy**

November 30, 2014

F French & Associates, LTD.
3501 Havenlock Court
Steilacoom, WA 99188

**Another Chehalis Basin Flood
Protection Project**

CENTRALIA
COMMUNITY DEVELOPMENT

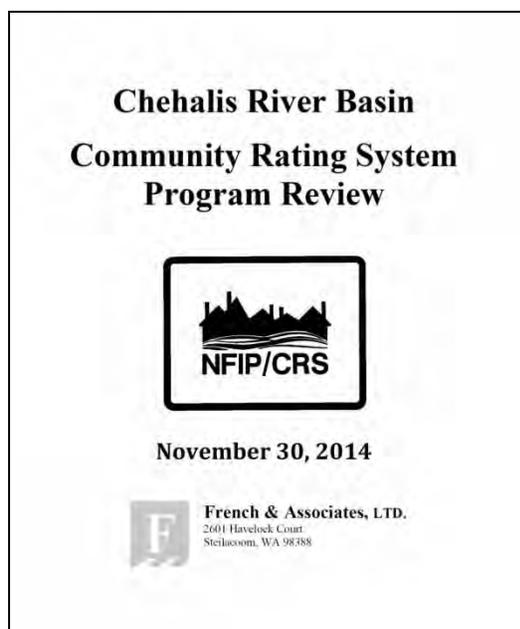
*Flood Safety
Information*

A Publication for City of
Centralia Property Owners.
Tel: 360-330-7662
Online: www.cityofcentralia.com



January 15, 20

Community Rating System



- ✓ Voluntary program to reduce flood insurance premiums in a community
- ✓ Recognizes activities that exceed minimum NFIP criteria
- ✓ Floodplain policy holders save \$50 - \$90 per class per year on premiums
- ✓ Centralia, Chehalis, Lewis and Thurston Counties are saving a total of \$450,000/year
- ✓ Better and better organized programs
- ✓ Public information builds constituency
- ✓ Incentive to keep implementing
- ✓ Community pride

\$100
Taxes

\$150
CRS

January 15, 2015



Floodplain Management Improvements

Proposed Improvements

Proposed Improvements to Local Floodplain Management
Chehalis Basin Communities
Draft January 12, 2015

The National Flood Insurance Program (NFIP) sets the minimum national standards for managing development in mapped flood hazard areas. Eleven of the Chehalis Basin communities (all but Napavine) are in the NFIP and must abide by these criteria. The NFIP criteria are minimum national standards. Higher local standards are explicitly recommended by the NFIP where they provide better protection from local hazards.

State law, the Washington Department of Ecology, and the Washington State Building Code have some higher floodplain management standards that communities must follow. These agencies also recommend that communities adopt additional criteria where they are appropriate.

French & Associates' floodplain management assessment identified 25 provisions that are improvements to the minimum NFIP and State criteria and that would help prevent or reduce flood losses in the Basin. Many of the improvements are already being implemented by one or more Basin community. These provisions were reviewed with local floodplain managers to get their technical input.

French & Associates has prepared the following list of recommended improvements for consideration by the Flood Authority and the local governments in the Chehalis Basin. All of these recommendations can receive credit under the Community Rating System and potentially reduce the rates for flood insurance to Basin residents.

Provision	Why Needed	Communities with similar standards
1. Maps and data		
1.1. Use the flood of record where it was known to be higher than the mapped Base Flood Elevation (BFE, also known as the 100-year or 1% chance flood elevation).	Most of the current maps used by local governments are based on data from the 1970's. The 100 year flood prediction has increased by over 30 percent since the 1970's. People should be protected from known flood hazards, including those not shown on floodplain maps. There are areas where floods have gone higher than shown on NFIP maps three times since 1990.	Thurston County
1.2. Use basin floodplain maps and profiles where the FEMA's Flood Insurance Rate Map (FIRM) shows an approximate A Zone.	Much of the Basin's rural areas are mapped as approximate A Zone, areas with no BFEs or other regulatory data. The Authority can prepare maps with historical flood elevations and BFEs. These maps will facilitate local permit work and will reduce the burden on landowners to identify the elevations. They will also provide the data needed for recommendation 1.1.	

Proposed Floodplain Management Improvements - 1 - January 12, 2015

- ✓ Better align local programs to the flood hazard
- ✓ Improve management of new development
- ✓ Improve mitigation tools for existing problems
- ✓ Receive CRS credit



Floodplain Management Improvements

Provision	Why Needed	Communities with similar standards
1. Maps and data		
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<p>1.2. Use basin floodplain maps and profiles where the FEMA's Flood Insurance Rate Map (FIRM) shows an approximate A Zone</p>	<p>Much of the Basin's rural areas are mapped as approximate A Zone, areas with no BFEs or other regulatory data. The Authority can prepare maps with historical flood elevations and BFEs. These maps will facilitate local permit work and will reduce the burden on landowners to identify the elevations. They will also provide the data needed for recommendation 1.1.</p>	



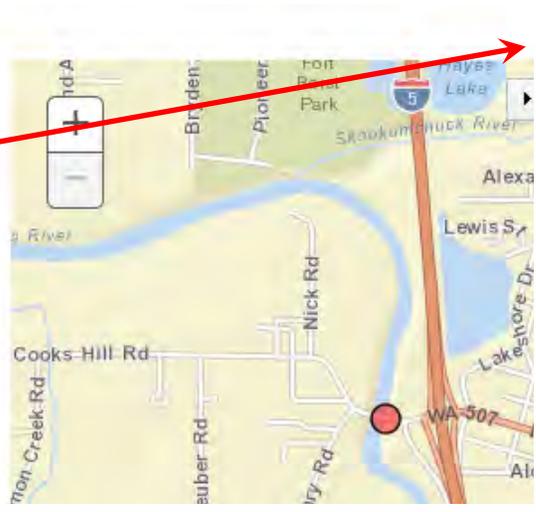
Floodplain Management Improvements

Flood Categories (in feet)
 Major Flood Stage: 72
 Moderate Flood Stage: 68.5
 Flood Stage: 65

Historic Crests
 (1) 74.78 ft on 12/04/2007
 (2) 74.31 ft on 02/09/1996
 (3) 73.50 ft on 01/10/1990
 (4) 72.40 ft on 01/08/2009
 (5) 71.99 ft on 11/25/1986
 Show More Historic Crests

(P): Preliminary values subject to further review.

Recent Crests
 (1) 72.40 ft on 01/08/2009
 (2) 74.78 ft on 12/04/2007



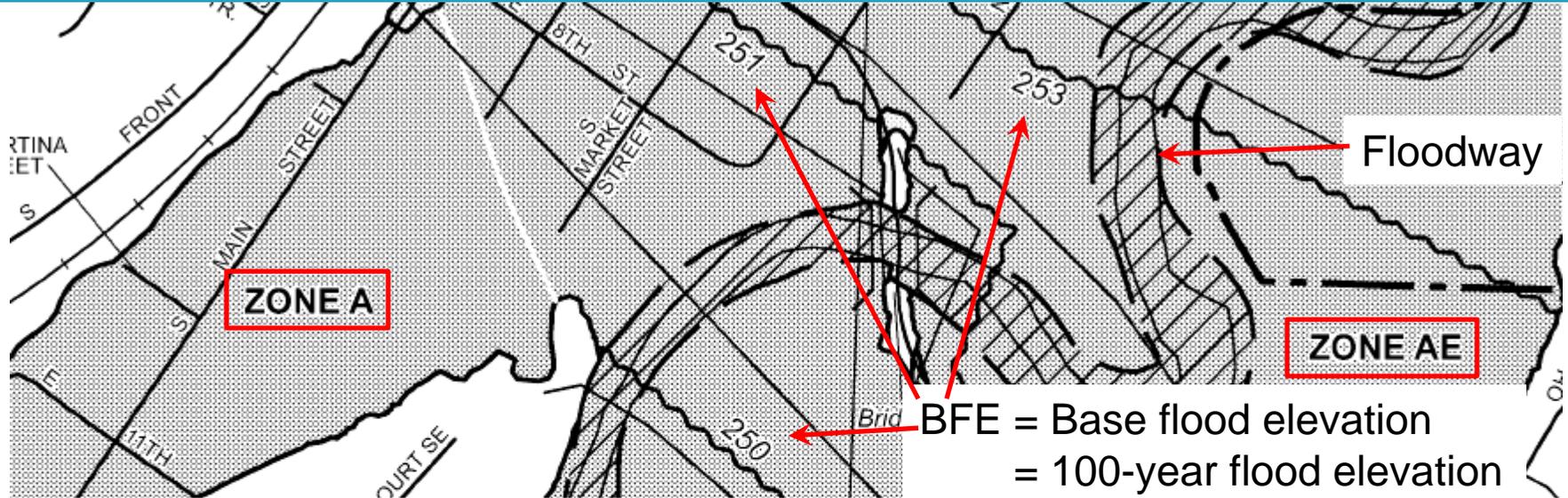
Historic Crests

- (1) 74.78 ft on 12/04/2007
- (2) 74.31 ft on 02/09/1996
- (3) 73.50 ft on 01/10/1990
- 73.20 ft Base flood elevation
- (4) 72.40 ft on 01/08/2009
- (5) 71.99 ft on 11/25/1986

Provision	Why Needed	Communities with similar standards
<p>1. Maps and data</p> <p>1.1. <u>Use the flood of record where it was known to be higher than the mapped Base Flood Elevation (BFE, also known as the 100-year or 1% chance flood elevation).</u></p>	<p>Most of the current maps used by local governments are based on data from the 1970's. The 100 year flood prediction has increased by over 30 percent since the 1970's. People should be protected from known flood hazards, including those not shown on floodplain maps. There are areas where floods have gone higher than shown on NFIP maps three times since 1990.</p>	<p>Thurston County</p>



Floodplain Management Improvements



1.2. Use basin floodplain maps and profiles where the FEMA's Flood Insurance Rate Map (FIRM) shows an approximate A Zone

Much of the Basin's rural areas are mapped as approximate A Zone, areas with no BFEs or other regulatory data. The Authority can prepare maps with historical flood elevations and BFEs. These maps will facilitate local permit work and will reduce the burden on landowners to identify the elevations. They will also provide the data needed for

1.3. Building applicants should calculate a BFE and delineate the regulatory floodway in approximate A Zones

This would provide flood protection data in flood hazard areas not covered by the maps in recommendation 1.2.

Centralia, Lewis County, Thurston County

Floodplain Management Improvements



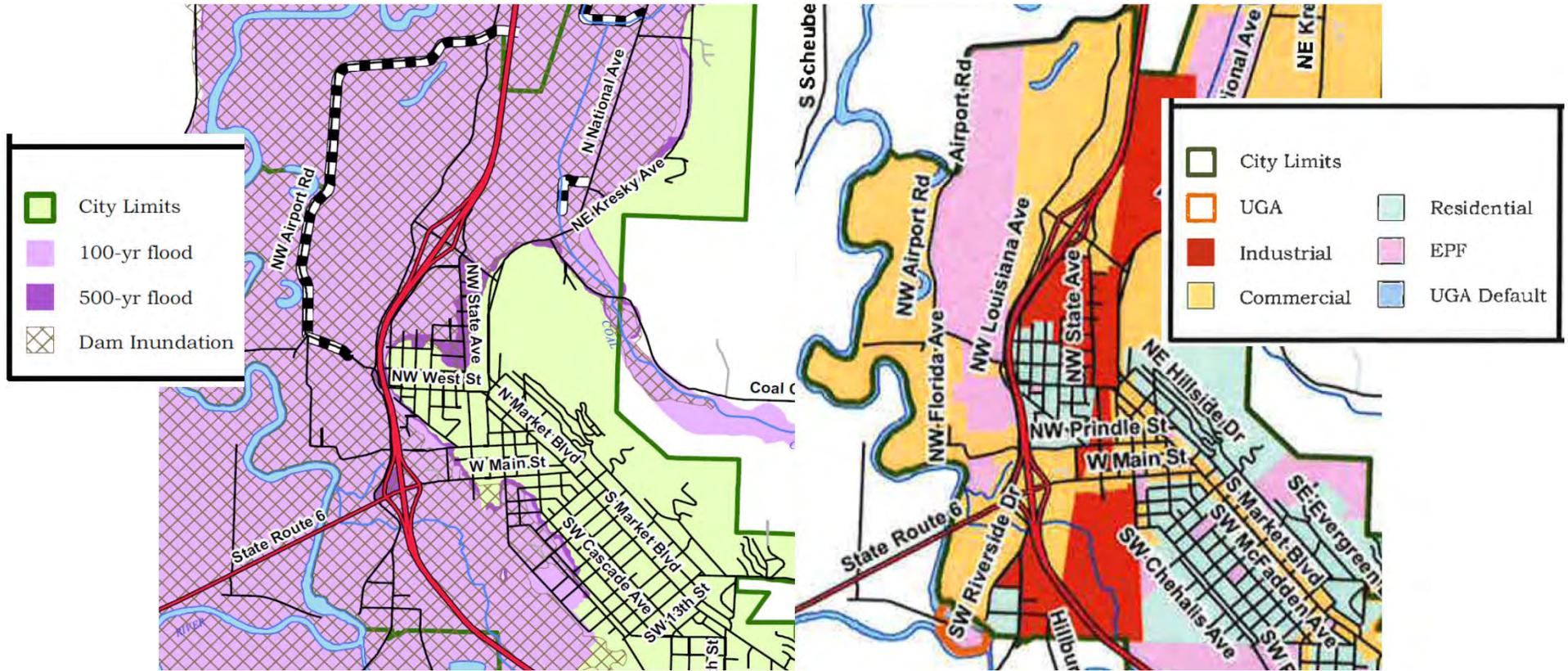
1.4. Protect new building in flood-related special hazards, such as channel migration zones

Standard floodplain management regulations only address overbank flood hazards. Shoreline Management and Critical Areas ordinances' setback requirements provide limited protection from channel migration.

Thurston County (regulates areas of high ground water)



Floodplain Management Improvements



2. Maintain Existing Floodplain Functions

2.1. Encourage low density and open space uses in the floodplains.

There are numerous instances where local plans and zoning call for high density development in flood hazard areas.

Grays Harbor County, Lewis County, Thurston County



Floodplain Management Improvements

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WACs > Title 173 > Chapter 173-158 > Section 173-158-070

[173-158-064](#) << [173-158-070](#) >> [173-158-075](#)

WAC 173-158-070

Additional floodway requirements.

The following additional state requirements are established in accordance with (1) Special flood hazard areas with designated floodways. In addition to those residential structures except for: (a) Repairs, reconstruction, or improvements to a structure either (i) before the repair, reconstruction, or improvement is started, or (ii) identified by the local code enforcement or building official and are the minimum net floor area to be considered as totally within a designated floodway and must comply with this section. (2) Special flood hazard areas without designated floodways. When a regulatory agency receives information from a federal, state, or other source to consider the cumulative effect of development near streams without a designated floodway.

[Statutory Authority: Chapter 86.16 RCW. WSR 02-15-093 (Order 00-26), § 173-158-070, filed 5/4/88.]

“...communities with designated floodways shall restrict land uses within such areas to include the prohibition of construction or reconstruction of residential structures except for: (a) Repairs, reconstruction...”

2.2. Discourage hazardous development in the floodway of the floodplain.

The floodway is the most hazardous part of the floodplain and where development can obstruct flows and cause problems to other properties. State law prohibits non-farm residential buildings, but does not address other habitable structures.

All communities enforce the state requirement (WAC 173-158-070)



Floodplain Management Improvements

Flood Categories (in feet)
 Major Flood Stage: 72
 Moderate Flood Stage: 68.5
 Flood Stage: 65

Historic Crests
 (1) 74.78 ft on 12/04/2007
 (2) 74.31 ft on 02/09/1996
 (3) 73.50 ft on 01/10/1990
 (4) 72.40 ft on 01/08/2009
 (5) 71.99 ft on 11/25/1986
 Show More Historic Crests

(P): Preliminary values subject to further review.

Recent Crests
 (1) 72.40 ft on 01/08/2009
 (2) 74.78 ft on 12/04/2007
 (3) 67.34 ft on 11/08/2006 (P)
 (4) 68.43 ft on 01/30/2006 (P)
 (5) 67.61 ft on 01/11/2006 (P)
 Show More Recent Crests

(P): Preliminary values subject to further review.

Low Water Records
 (1) 47.96 ft on 08/29/2007
 Show More Low Water Records

Historic Crests

- (1) 74.78 ft on 12/04/2007
- (2) 74.31 ft on 02/09/1996
- (3) 73.50 ft on 01/10/1990
- 73.20 ft Base flood elevation
- (4) 72.40 ft on 01/08/2009
- (5) 71.99 ft on 11/25/1986
- (6) 71.65 ft on 01/21/1972
- (7) 71.30 ft on 11/25/1990
- (8) 71.17 ft on 12/05/1975
- (9) 70.20 ft on 01/26/1971

<div style="background-color: black; color: white; padding: 5px; margin-bottom: 10px;"> PREMIUM AT BASE FLOOD ELEVATION </div> <p style="text-align: center;">\$1,410/year \$14,100/10 years</p> <div style="text-align: center;">  <p style="margin-top: 5px;">B F E</p> </div>	<div style="background-color: black; color: white; padding: 5px; margin-bottom: 10px;"> PREMIUM AT 3 FEET ABOVE BASE FLOOD ELEVATION </div> <p style="text-align: center;">\$427/year \$4,270/10 years</p> <div style="text-align: center;">  <p style="margin-top: 5px;">B F E</p> </div>
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<h3>3. New buildings</h3>		
<p>3.1. Protect new and substantially improved buildings to a minimum of <u>3 feet above the BFE</u> (“freeboard”)</p>	<p>Freeboard accounts for unpredicted problems, like downstream log jams, and floods greater than the 100-year. Because it has been shown to have such an impact on flood damage, NFIP premiums are significantly reduced based on the amount of a building’s freeboard.</p>	<p>All but Aberdeen, Montesano, and Oakville have some freeboard</p>

Floodplain Management Improvements



3.2. Protect fill used for building foundations

If fill is used to protect a building, it should be properly compacted, extend at least 10 feet beyond the foundation, and protected from erosion.

The State Building Code only requires compaction

Floodplain Management Improvements



3.3. Ensure individual building site plans account for the flow of drainage

Many problems are caused when new construction alters drainage flows onto a neighbor. Site plans can help prevent this and ensure that new buildings are protected from local drainage flooding.

The State Building Code requires positive drainage away from the building



Floodplain Management Improvements



3.4. Protect for enclosures below the elevated floor

Owners often improve the lower area of a building elevated eight feet above grade, forgetting about the flood hazard.

January 15, 2015

Floodplain Management Improvements

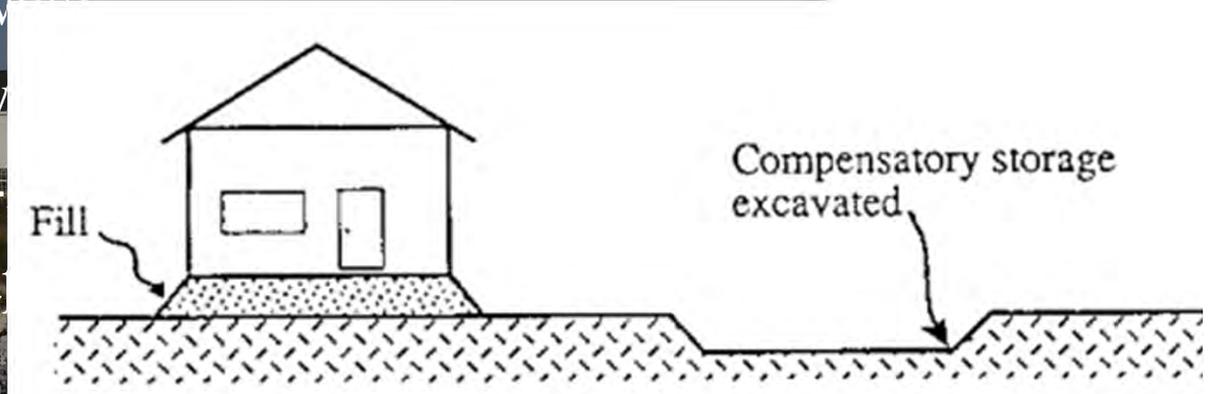


4. Existing buildings		
<u>4.1. Track improvements cumulatively</u>	<p>The NFIP requirement is that if a building improvement is valued at more than 50% of the building's value, it must meet the standards for protecting new buildings. The same rule applies for a building that is substantially damaged. It is not uncommon for owners to do major improvements incrementally, by applying for one small permit at a time, thereby extending the life of a noncompliant structure.</p>	<p>Lewis County, Thurston County</p>
<u>4.2. Track damage cumulatively</u>		<p>Thurston County</p>
<u>4.3. Use a substantial improvement and/or damage threshold lower than 50%</u>		
<u>4.4. Ensure all additions to meet the flood protection requirements</u>		

Floodplain Management Improvements

Fill

- + Cheap way to elevate
- + Keeps water away
- + Can get a LOMR
- + Easier for landscaper



- Reduces storage capacity (riverine floodplains)
- Kill native vegetation
- Redirects drainage onto others



<p>5. Other development</p>		
<p><u>5.1. Ensure new fill does not increase flooding</u></p>	<p>Filling destroys natural floodplain functions, reduces flood storage, and can divert waters to other properties.</p>	<p>Bucoda, Thurston County</p>



Floodplain Management Improvements



5.2. Ensure safe storage of hazardous materials in the floodplain

The minimum NFIP rules do not differentiate for the use of a property. It is OK to put a chemical plant in the floodplain.

Thurston County

Floodplain Management Improvements



5.3. Protect critical facilities to a minimum of the 500-year flood level plus freeboard

The minimum NFIP rules do not differentiate for the use of a property. However, fire stations, water treatment plants, hospitals, etc., should have higher protection standards.

All but Grays Harbor County, Montesano, Oakville, and Pe Ell have some critical facility standards



Floodplain Management Improvements



5.4. Construct new streets to be at or above the BFE

New buildings may be protected from flooding, but may still be occupied, catch fire, or otherwise need to be accessible by emergency vehicles.

Bucoda

January 15, 2015

Floodplain Management Improvements



6. Administration

6.1. Encourage one permit official to be a Certified Floodplain Manager (CFM – see www.floods.org)

Having a CFM on staff helps ensure that the floodplain management provisions will be properly enforced.

Centralia, Lewis County, and Thurston County have CFMs on staff

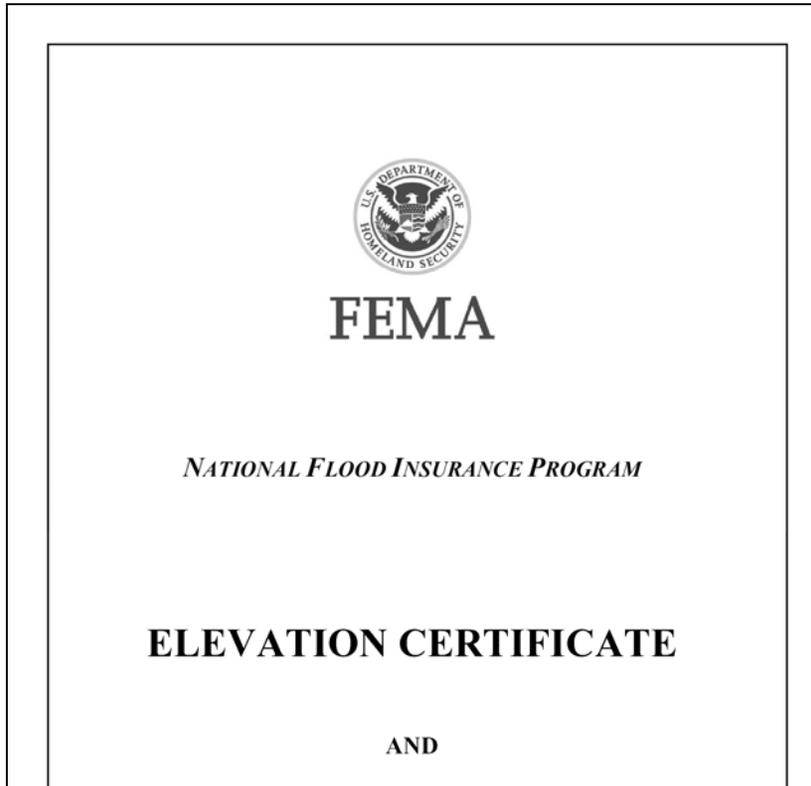
6.2. Encourage three inspections to verify all floodplain management requirements

Inspecting a site during construction ensures that the project will comply with the approved plans. Problems can be caught before it is too late to correct them.

Most building departments conduct at least three site inspections, but not necessarily for flood provisions.



Floodplain Management Improvements



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE
IMPORTANT: Follow the instructions on pages 1-9.

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION

A1. Building Owner's Name _____

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. _____
City _____ State _____ ZIP Code _____

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) _____

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) _____

A5. Latitude/Longitude: Lat. _____ Long. _____ Horizontal Datum: NAD 1927 NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number _____

A8. For a building with a crawlspace or enclosure(s):
a) Square footage of crawlspace or enclosure(s) _____ sq ft
b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____
c) Total net area of flood openings in A8.b _____ sq in
d) Engineered flood openings? Yes No

A9. For a building with an attached garage:
a) Square footage of attached garage _____ sq ft
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade _____
c) Total net area of flood openings in A9.b _____ sq in
d) Engineered flood openings? Yes No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number _____ B2. County Name _____ B3. State _____

B4. Map/Panel Number _____ B5. Suffix _____ B6. FIRM Index Date _____ B7. FIRM Panel Effective/Revised Date _____ B8. Flood Zone(s) _____ B9. Base Flood Elevation(s) (Zone A0, use base flood depth) _____

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9:
 FIS Profile FIRM Community Determined Other/Source: _____

B11. Indicate elevation datum used for BFE in Item B9: NGVD 1929 NAVD 1988 Other/Source: _____

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? Yes No
Designation Date: _____ / _____ / _____ CBRS OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: Construction Drawings* Building Under Construction* Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: _____ Vertical Datum: _____

Indicate elevation datum used for the elevations in items a) through h) below. NGVD 1929 NAVD 1988 Other/Source: _____
Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

a) Top of bottom floor (including basement, crawlspace, or enclosure floor) _____ feet meters

b) Top of the next higher floor _____ feet meters

c) Bottom of the lowest horizontal structural member (V Zones only) _____ feet meters

d) Attached garage (top of slab) _____ feet meters

e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments) _____ feet meters

f) Lowest adjacent (finished) grade next to building (LAG) _____ feet meters

g) Highest adjacent (finished) grade next to building (HAG) _____ feet meters

h) Lowest adjacent grade at lowest elevation of deck or stairs, including _____ feet meters

6.3. Provide FEMA Elevation Certificates for all new buildings and substantial improvements

The Elevation Certificate identifies all the provisions needed to ensure that a building meets the NFIP criteria. It is also needed to obtain a flood insurance policy for a new building.

Most of the Basin NFIP communities use this form, but it is not always required.



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