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## Chris Johnson, TEMA Assistant Director for Mitigation and Recovery Announcement by Director Patrick Sheehan

Chris brings decades of experience with TEMA and has worked closely with our counties on preparedness, recovery and mitigation initiatives, and his proven leadership ability and relationships across our agency will serve that division and emergency management across Tennessee well.

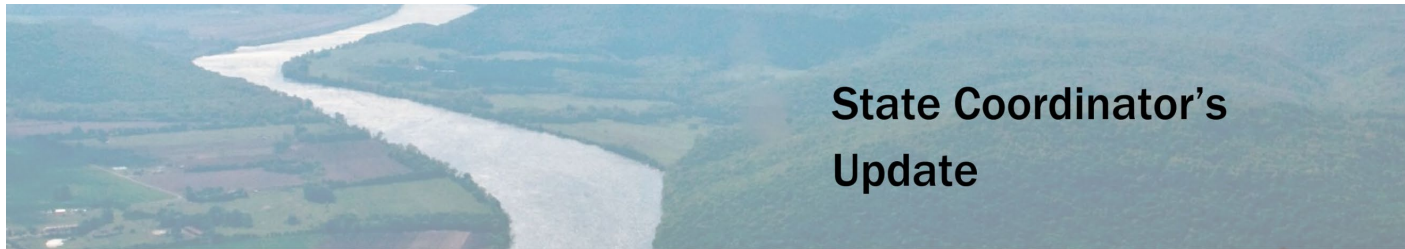
While I am, and I know many of you are too, still saddened by the loss of Charlie Bryant, with the ongoing disasters (and more certain to come), it is vitally important that this executive leadership position has an experienced leader to support the Recovery, Mitigation, Floodplain and Unmet needs team. Chris brings many of the same experiences that Charlie did when he was originally appointed to this position, and I look forward to the work he and the team will continue to do supporting Tennessee in this trying time and beyond.

HAVE A QUESTION???

## ask the expert!

Risk MAP program, engineering, mapping, flood insurance, etc.

Send the newsletter committee your question and we will find the right expert to answer it in our next issue.



## State Coordinator's Update

Faith is not a religious concept. It's a human concept. It's arguably the most powerful tool we have. The ability to believe something and act on it has launched life-saving medical developments to war. Everything that has been done good or bad, was done because somebody believed it could and should be done. Every problem that has been solved was solved because someone believed. Medical mountains, scientific mountains and financial mountains have been moved by faith.

Belief fuels anticipation and imagination. It enables us to picture a future for us and the people around us. For all these reasons, and more, it is impossible to imagine life without faith.

Our ability to believe can work for us or against us. We all have a propensity to look for evidence to support what we already believe. It's easier to see it in others than to see it in ourselves. As we continue to live in a "new normal" we will need to look within ourselves and others to continue to move mountains and move forward.

*We are born believing.*

*A man bears beliefs as a*

*tree bears apples.*

-Ralph Waldo Emerson

### **A Special Thank You:**

Many leaders talk about putting people first. Dan Brubaker lives it. And while his decision to step away from the North Carolina Floodplain Management program will leave a void, his emphasis on floodplain administrators, engineers and surveyors – will have an enduring impact on the floodplain management program.

I would like to personally thank him for his professional and personal support through the years. He helped teach the inaugural CFS class and attended the 2018 conference to present a session on hydraulic and hydrologic analysis. So here's the thing, I am going to miss my BFF and karaoke partner. Best of luck in your new endeavor!



# LETTER FROM THE CHAIR

## GREETINGS FROM THE BUNKER.

As I pull together this letter here in the middle of May, it still seems astounding that we are working from home, and uncertain just how long we will continue to do so. At Metro Water Services, we remain diligent about protecting ourselves, our families, our co-workers and our customers, and we continue to require that we practice social distancing and wearing masks. I encourage you to do the same.

We now know that the national ASFPM Conference will not be held on-site in Ft. Worth. It has been converted to a virtual, on-line conference, and as such, creates an opportunity for many more of our members to register, and to tune in and watch some great presentations. Most of the presenters will still present, and there is still an opportunity to earn your 12 Continuing Education Credits. Registration for an ASFPM member is \$300, and you can do it in the comfort of your office or your home. You may register from the ASFPM web site ([floods.org](http://floods.org)).

Likewise, because of uncertainty about the months ahead, we elected to postpone our next Tennessee Association of Floodplain Management annual conference until next year. We look forward to getting this pandemic behind us so that we can all gather together again. We appreciate the work that is being done by Amy Miller and Tammy Hansen and to our regional representatives, to keep some training going on. Please see Amy's announcement in this newsletter about a Webinar opportunity coming up on June 4. We are also optimistic that we will be able to complete our West Region training in December. Thanks, John! Please note that this is also an election of officers' year within our state association. Pay attention to the announcements in this newsletter, and let's nominate a great new slate of officers for the two-year term ahead!

Finally, we have scheduled an opportunity to take the CFM Exam on October 2, at the Wood Group's office in Nashville. Tom Palko and I have agreed to teach the Flood Plain Basics class the day before, on Thursday, October 1.

## 2020 TENNESSEE FLOODPLAIN MANAGEMENT WEBINAR SERIES

**MARCH 5, 2020** – LETTERS OF MAP CHANGE - LOMA, LOMR-F,  
LOMR, CLOMR-F, CLOMR

**JUNE 4, 2020** – SUBSTANTIAL DAMAGE ASSESSMENTS – WHY DO  
WE DO THEM? AND MITIGATION GRANTS FROM A LOCAL  
PERSPECTIVE

**SEPTEMBER 3, 2020** – FLOOD INSURANCE BASICS/UPDATES AND  
VARIANCES

**DECEMBER 3, 2020** – ENCROACHMENT INTO THE FLOODWAY,  
CLOMRS AND LOMRS

<https://share.dhs.gov/hansen-training/>

Call-in # for June 1-877-446-3914 PIN: 1565280#

Time: 10:00 eastern/9:00 central  
(June 4<sup>th</sup> - 10:30 eastern/9:30 central)

Duration: 1 hour  
CFMs earn 1 hour of credit from ASFPM

### CRS Training Resources

*A Training and Videos schedule for the rest of 2020, including registration  
information, is at the following link.*

CLICK ON ANY OF THE IMAGES  
TO FOLLOW THE LINK!



Visit our  
website!



### NEWSLETTER COMMITTEE

JAIME TYSON

IF YOU HAVE IDEAS OR  
FEEDBACK IN REGARDS TO  
THE NEWSLETTER,  
PLEASE EMAIL  
JAIME.TYSON@AECOM.COM



# TN AFPM NEEDS YOU!

There are a number of ways that you can get involved with the TN AFPM beyond simple membership and event attendance. We have activities going on behind the scenes all year long! While we are still working to build an official set of committees...there are a number of opportunities to start getting involved.

Below is a brief list with points of contact to get you started. If you'd like to help with something that isn't specifically listed...don't let that stop you from speaking up. Contact any of the board members and let us know what you're interested in...and we'll do what we can to make it work.

## NEWSLETTER -

JAIME TYSON (JAIME.TYSON@AECOM.COM)

## CONFERENCE -

CINDY POPPLEWELL (CINDY.POPPLEWELL@WOODPLC.COM)

## MEMBERSHIP -

WILLIAM VEAZEY (TCPLANNING@BELLSOUTH.NET)

## TRAINING -

SEE REGIONAL REPRESENTATIVES

### MIDDLE REP

THOMAS BRASHEAR  
WILSON COUNTY

BRASHERT@WILSONCOUNTYTN.GOV

### EAST REP

DAVID MCGINLEY  
CITY OF KNOXVILLE

DMCGINLEY@KNOVXILLETN.GOV

### WEST REP

JOHN MODZELEWSKI  
SHELBY COUNTY

JCMOD@AOL.COM

## Hazard Mitigation Grant Funding Overview

### Available Programs

The following are federal grant programs currently available to assist states and local communities in implementing long-term hazard mitigation measures.

- Hazard Mitigation Grant Program (HMGP), #4476

Program	Application Method	Notification Deadline	Available Funding	Funding Shares	Competitive
	*Paper			75% Federal 12.5% State 12.5% Local	Statewide
HMGP #4476		July 5, 2020	Amount Pending		
	*eGrants (web-based)	Pending		75% Federal 25% Local	Nationwide
PDM (BRIC)			\$		
FMA			\$		

\*Contact the State Hazard Mitigation Manager or Mitigation Application Specialist to gain access.

### What is the Notification Deadline?

- For a specific grant, all interested entities need to fill out a Pre-Application Form and forward to the State Mitigation office prior to this deadline to show interest in developing an application.

### Who applies for Mitigation Grants (Eligible Applicants)

- Government Entities (state and local) and Certain Private, Non-Profit Organizations.
- Jurisdiction must be in good standing in the National Flood Insurance Program.
- Jurisdiction must possess a FEMA approved Local Single or Multi-Jurisdiction Hazard Mitigation Plan. During disasters, a community without a FEMA approved plan may still apply for projects if they can provide that extraordinary circumstances prevented the development of a plan. A commitment to develop such plan within a 12-month period is required. Funding for approvable projects would follow the approval of such plan. These extraordinary circumstances are:
  - meets the criteria to be considered a small and impoverished community;
  - has been determined to have had insufficient capacity prior to the current disaster;
  - may have been considered to be at low risk from hazards; or
  - experienced significant disruption from the declared incident which impacts their ability to complete the planning process prior to award of a project grant.

### Types of Eligible Projects

- Acquisition/Demolition (Buyout) of repetitively flooded residences. Individuals work through their local government, who applies on their behalf. Individuals may not apply directly for participation in this program.
- Creation of retention/detention pond, drainage improvement, elevation of critical access roadways, etc.,
- Reinforced corridors/safe space in schools or public buildings,
- Back-up Generator for a Critical Facility
- Wildfire related projects including building flame resistant materials and defensible space projects,
- Creating/Updating a hazard mitigation plan, and
- Seismic retrofit to structure foundations.

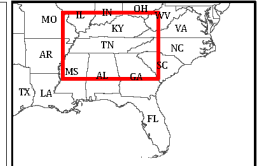
## Contacts

Doug Worden  
State Hazard Mitigation Manager  
615.741.1345  
Douglas.Worden@tn.gov

Kari Cochran  
Application Specialist  
615.741.3732  
Kari.M.Cochran@tn.gov

## Tennessee Hazard Mitigation Plan Status

As of 5/1/2020



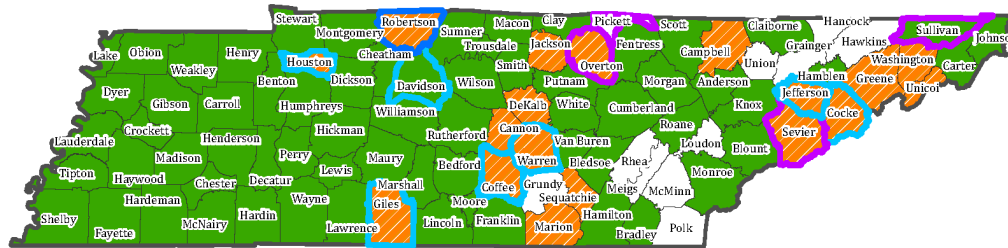
**Data Layer / Map Description:**  
Data source: FEMA Mitigation Planning Portal (MPP)

### Plan in Development

- Approved Pending Adoption (7)
- Awaiting Revisions (1)
- In Review (4)

### County Plan Status

- Approved (66)
- Expired (18)



FEMAR-IV.GRC

Doc Name: TN\_MPP\_Status



Please see the TEMA site for more information:  
<https://www.tn.gov/tema/emergency-community/mitigation/mitigation-grant-programs.html>

## Hazard Mitigation Assistance Mitigation Activity Chart

This page contains the Hazard Mitigation Assistance program mitigation activity eligibility chart which is relevant for the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM), and Flood Mitigation Assistance (FMA) grant programs.

The Hazard Mitigation Assistance (HMA) Mitigation Eligibility Activity chart lists eligible mitigation activity types for the HMA grant programs. A checked box (✓) indicates activity eligibility under a program. A grayed box indicates activity ineligibility under a program. Submission of an eligible activity type does not guarantee an award by FEMA.

Eligible Activities by Program	HMGP ⚡	PDM ⚡	FMA ⚡
<b>1. Mitigation Projects</b>	✓	✓	✓
Property Acquisition and Structure Demolition	✓	✓	✓
Property Acquisition and Structure Relocation	✓	✓	✓
Structure Elevation (Note this is not supported by the State of Tennessee)	✓	✓	✓
Mitigation Reconstruction	✓	✓	✓
Dry Flood proofing of Historic Residential Structures	✓	✓	✓
Dry Flood proofing of Non-residential Structures	✓	✓	✓
Generators (Under HMGP can be a standalone project application.) (Under PDM must be part of an overall larger project application.)	✓	✓	
Localized Flood Risk Reduction Projects	✓	✓	✓
Non-Localized Flood Risk Reduction Projects	✓	✓	
Structural Retrofitting of Existing Buildings	✓	✓	✓
Non-structural Retrofitting of Existing Buildings and Facilities	✓	✓	✓
Safe Room Construction (Note residential safe rooms are not supported by the State of Tennessee)	✓	✓	
Wind Retrofit for One- and Two-Family Residences	✓	✓	
Infrastructure Retrofit	✓	✓	✓
Soil Stabilization	✓	✓	✓
Wildfire Mitigation	✓	✓	
Post-Disaster Code Enforcement	✓		
Advance Assistance	✓		
5 Percent Initiative Projects*	✓		
Aquifer and Storage Recovery**	✓	✓	✓
Flood Diversion and Storage**	✓	✓	✓
Floodplain and Stream Restoration**	✓	✓	✓
Green Infrastructure**	✓	✓	✓
Miscellaneous/Other**	✓	✓	✓
<b>2. Hazard Mitigation Planning</b>	✓	✓	✓
<b>3. Technical Assistance</b>			✓
<b>4. Management Costs</b>	✓	✓	✓

\*FEMA allows increasing the 5% Initiative amount up to 10% for a Presidential major disaster declaration under HMGP. The additional 5% Initiative funding can be used for activities that promote disaster-resistant codes for all hazards. As a condition of the award, either a disaster-resistant building code must be adopted or an improved Building Code Effectiveness Grading Schedule is required.

\*\*Indicates that any proposed action will be evaluated on its own merit against program requirements. Eligible projects will be approved provided funding is available.

Last Updated:  
05/21/2018 - 09:32



## 2020 Elections TN AFPM Board of Directors

The TN AFPM Board of Directors includes a total of seven elected offices with two-year terms. All seven positions are up for re-election this year. These offices and current representation include:

- Chairperson, Roger Lindsey
- Vice-Chairperson, Cindy Popplewell
- Secretary, Jeffrey Shaver
- Treasurer, William Veazey
- East TN Regional Representative, David McGinley
- Middle TN Regional Representative, Tom Brashear
- West Regional Representative, John Modzelewski

### NOMINATIONS

Nominations will open on Monday, May 18<sup>th</sup> and close on Friday, June 5<sup>th</sup>.

A person being nominated must be a current member of TN AFPM and in good standing. You may nominate yourself or any other person you wish. You may nominate one person for one position, or you may nominate one person for each of the seven positions. A nominated person must be a willing participant and can only run for one position on the Board of Directors.

Nominations should be sent to: [tskehan@swtdd.org](mailto:tskehan@swtdd.org)

### VOTING

Voting will begin on Monday, June 15<sup>th</sup> via on-line survey and end Thursday, July 2<sup>nd</sup>. Instructions will be sent to all TN AFPM members.

Votes will be tallied and the new Board of Directors will be announced in the August newsletter. The new BOD terms of office will commence at that time.

### TN AFPM Membership Update

**77**  
unique  
jurisdictions

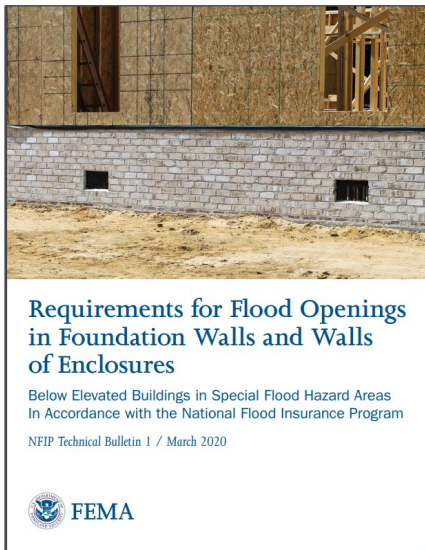
**180**  
members

**The board has extended all current memberships for one year, through July 2021.**

## NFIP Technical Bulletin Updates

The Bulletins are changing to modernize and streamline their content and presentation, incorporate relevant information from the latest I-Codes and ASCE Standards, provide updated guidance and best practices observed from post-disaster assessments and address known issues identified by a wide range of stakeholders. These changes intended to improve the TBs' usability, credibility, and content while presenting them in a streamlined format.

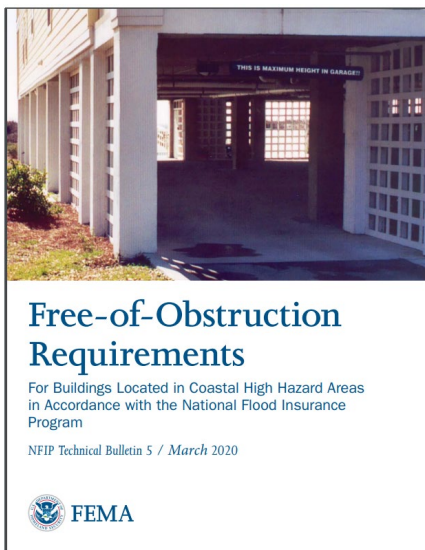
Technical Bulletin 1 and Technical Bulletin 5 were updated and made available to various stakeholders in March 2020. If you haven't taken the opportunity to read these guidance documents, these are great resources for your use and technical library.



### TB 1, Requirements For Flood Openings In Foundation Walls And Walls Of Enclosures (2020)

Provides guidance on the NFIP regulations concerning the requirement for openings in below-Base Flood Elevation foundation walls and walls of enclosures for buildings located in Zones A, AE, A1-A30, AR, AO, and AH.

Access Bulletin 1 at [www.fema.gov/media-library/assets/documents/2644](http://www.fema.gov/media-library/assets/documents/2644)



### TB 1, Requirements For Flood Openings In Foundation Walls And Walls Of Enclosures (2020)

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 elevated V1-V30).

Access Bulletin 5 at <https://www.fema.gov/media-library/assets/documents/3490>

# FEMA NFIP TECHNICAL BULLETIN 1 (2020) THE SURVEYOR AS FLOODPLAIN CONSULTANT

By Bart Crattie, LS, CFS, CFM

The much-anticipated revision of TB-1 is out. "Requirements for Flood Openings in Foundation Walls and Walls of Enclosures, Technical Bulletin 1" was released March, 2020. Any surveyor that offers flood services (EC's, LOMC applications and consulting) is familiar with TB-1. This document provides guidance on the factors related to the importance and proper application of having openings in the walls of enclosures (crawlspaces) beneath a structure.

Why are openings so important? From the National Flood Insurance Program's (NFIP) perspective, the primary "objective is protecting buildings constructed in Special Flood Hazard Areas (SFHA) from damage caused by flooding". Contrary to popular thought, the majority of damage claims paid by NFIP are not for mold or other cosmetic damages. The bulk of claims paid are for foundation damages.

Without openings, flood waters outside of the structure transmit a tremendous amount of hydrostatic pressure on a foundation wall. "The flood-opening requirements are intended to equalize hydrostatic forces (loads or pressure caused by standing or slow-moving water) on walls, thus preventing damage to or collapse of the building."

From the surveying-consultant's and homeowners' perspective, it is the tremendous savings in flood insurance premiums. Surveyors offering flood services should be familiar with relative insurance costs to the consumer, your client.

For example, let's assume the costs of a policy for a \$250,000 residence without a basement but having a crawlspace. In the 1% chance annual event, the water surface will be up two feet in the crawlspace. Without openings, the annual insurance premiums would be \$19,825. If the correct number of openings are installed properly within the enclosure walls and assuming the next higher floor of the structure is two feet above the Base Flood Elevation (BFE), the annual premium would be \$1250. The author is not qualified to quote flood insurance. These figures were found on Page 7, Appendix J of the NFIP Flood Insurance Manual (April, 2020). With these circumstances, you can easily convince your client about the importance of installing vents. An added bonus is the potential of saving your client's home.

Why the disparity in the cost of premiums? Flood insurance rates hinge primarily on the difference between the BFE and the lowest floor of the structure. The bottom floor of a structure can be the lowest floor but the lowest floor of a structure is not necessarily the bottom floor. How so? Think of a beach home. It is a living space atop 10 foot columns. Where is the lowest floor? The living space, exactly. When the proper openings are provided, your home becomes the beach home. Instead of columns, the living space is over an enclosure that allows water to move freely, without obstruction. The crawlspace is the bottom floor but is no longer the lowest floor.

Page 3 in TB-1: "Lowest Floor: Lowest floor of the lowest enclosed area of a building, including basement. An unfinished or flood resistant enclosure that is used solely for parking of vehicles, building access, or storage is not the lowest floor, provided the enclosure is built in compliance with applicable requirements." What has changed in NFIP requirements since the last publication in 2008 of TB 1? Nothing. There have been no revisions in Title 44, Part 60 of the Code of Federal Regulations.

This portion of Federal Code contains all of the NFIP requirements for this area of floodplain management, especially enclosures (44CFR S.60.3(c)(5)).

So, if nothing has changed in the NFIP regulations, why the necessity for a revision in TB-1? Mostly, it is to clarify some hold-over issues from the 2008 edition and then to provide much, much more information. The major change that is noticeable is the marriage of NFIP regulations with the International Codes published by the International Code Council (ICC) and ASCE 24 (Flood Resistant Design and Construction).

We, as surveyors, providing flood services are technically bound only to NFIP regulations. However, if one offers services as a floodplain consultant, one needs to be familiar with the applicable codes. These codes will apply to any new construction, substantial improvements or repair of substantial damages. In nearly all cases, these codes are more stringent than NFIP requirements. Portions of the codes related to floods can be found at <https://fema.gov/building-code-resources>.

Charts on pages 6 and 7 provide a summary of the major differences between ICC codes/ASCE 24 and NFIP regulations. These codes simply add to and expand on the current NFIP regulations. ICC specifies that the enclosure area (Section A8. a) on the Elevation Certificate) is determined by measuring the exterior walls. ICC eliminates the use of conventional crawlspace louvered vents by specifying that the opening cannot be less than 3" in any direction in the plane of the wall. NFIP requires a minimum of two openings. ICC takes that further by requiring the openings be on different walls. Openings must be within one foot of the adjacent grade. ICC clarifies that by allowing that the measurement be made from either the interior or the exterior grade. ICC allows openings to be installed in doors or windows. ASCE 24 provides the algebraic formula for calculating minimum opening size for an engineered opening.



What does all of this have to do with completing an Elevation Certificate? We are obligated to follow NFIP regulations, not the ICC or ASCE 24. Yet the importance for the consulting surveyor is to be aware of the additional requirements to be able to fully inform the client when dealing with new construction, retrofitting or substantial improvements or damages. In these cases, your best friend on the Elevation Certificate is Section D, "Comments". You are the eyes of the insurance agent, the code official and any number of NFIP personnel. ICC and ASCE 24 factors can be addressed in the comments. If an opening is questionable, take plenty of pictures and use that comment section. Comments must be entered when engineered openings are encountered.

One point that has been in contention from the 2008 edition is the area of a compliant opening that is above the BFE. Can that area be included in the square inch/square foot calculation? This is "resolved" on page 9 of the bulletin. "The certificate does not require users to determine whether any portion of a flood opening is above the BFE." However, Section 8.3.6 contradicts this with guidance within areas of shallow flooding. Personally, I'll continue differentiating above/below in Section D, Comments.

To qualify as the bottom floor, the enclosure can only be used for parking, access and storage. What other features can render this area non-compliant? Page 10 lists features not allowed below BFE: appliances, heating and air conditioning equipment, ventilation, ductwork, plumbing fixtures, materials that are not flood damage resistant and more than the minimum electrical service . . . This is outside any NFIP requirements that the author is aware of. Perhaps this is where Section D, Comments could be utilized.

Generally, NFIP regulations require that enclosed areas below the lowest floor of elevated buildings in any "A" Zone have flood openings to equalize hydrostatic flood forces. Section 7 of the bulletin goes into great detail for numerous types and style of enclosures. This can really be helpful when answering EC Item A7., "Building Diagrams". Section 8 deals with installation requirements for all types of flood openings. As mentioned earlier, a minimum of two vents are required and they should not be on the same wall for both the main structure and the attached garage. One point made in this section that should be well noted is that "Enclosures below grade on all sides are basements." Crawlspace encapsulation can require trenching around the perimeter walls. Sometimes interior foundation walls are not completely backfilled. In these cases, a basement has been created (Diagram 2A or 9, not 8). On a slope, the minimum one foot requirement will necessitate that the vents follow the contours. Townhomes present unique solutions that are well detailed in the bulletin.

Engineered openings and non-engineered openings. First off, what is and isn't a compliant opening? Ordinarily, crawlspace vents are not compliant openings. Unless they are permanently rendered open, they cannot be counted (NFIP, not ICC). If they have a detachable cover, not counted. What else is ineligible? Vents that automatically open and close with the temperature, vents that automatically open on one side, windows and garage doors. Yet, a simple 8"x16" wood frame with hardware cloth qualifies. Placing a cement block on its side qualifies. These are the openings that follow the simple one square inch of opening equals one square foot of enclosure area.

"Openings without moving parts are non-engineered openings while those with moving parts should be certified as engineered openings." (Page 28). The previously mentioned ASCE 24 provides the details for the design of engineered openings. There's a simple formula for the required opening size but in most states, the Land Surveyor is not qualified to certify to the minimum required opening size. Each factor in the formula is fairly straight forward; opening coefficient (round, width=long axis, height=long axis), total enclosed area. But floodwater rate of rise and fall requires a little investigation and finesse.

For the land surveyor/flood consultant, we are obligated to report on the presence of an engineered opening. When encountered, we are required to obtain the necessary certifications for that opening. EC Items A8.d and A9.d, must be answered "Yes". Then, documentation of that opening's performance and design must be attached. Insurance agents are required to have this documentation in order to quote a policy. Building code officials or the local floodplain administrator are required to keep these records on file for perpetuity. It is important that the surveyor obtain the necessary and correct documentation for any engineered openings. If this documentation is not available from the homeowner, secure the manufacturer and a serial number on site. The necessary paperwork can be found on the manufacturer's website.

What about the remainder of EC Items A8. and A9.? At A8.c) Total net area of engineered flood openings: enter the coverage/rated area (from the documentation), not the true opening size, times the number of openings. The same applies to A9.c). Though the units, square feet and square inches differ, they are equivalent in this instance.

Imagine. All of this for two items on the Elevation Certificate: A8. And A9.? It's simple: square footage of the enclosed area measured on the outside, number of permanent flood openings within 1.0 foot above adjacent grade, total net area of flood openings and whether engineered openings are used. Be extremely careful in your answers. There is a little more to an Elevation Certificate than Section C, "elevations". Unless you are qualified, I don't recommend surveyors attempt providing floodplain management services. Take the steps to become a Certified Floodplain Surveyor. The difference could mean the enclosure being classified as the lowest floor and the highest insurance premiums (\$19.8K v. \$1.2K, annually) for your client and an excellent cause for legal action against the surveyor. Remember to practice only within your area of competency.

## The Cost & Benefits of Building Higher



### Building in the Floodplain

Communities that participate in the National Flood Insurance Program must ensure all new residential buildings constructed in the floodplain are elevated to or above the base flood elevation (BFE). The base flood is the flood that has a 1% chance of occurring or being exceeded in any given year.

Many communities concluded the BFE is not a sufficient level of protection, saying:

- ✓ Floods higher than the base flood can and do occur.
- ✓ Most flood studies do not account for debris or obstructions during the base flood, thereby underestimating the BFE.
- ✓ NFIP flood studies do not account for the impacts of future development or sea level rise. Over time, the regulatory standard does not keep up with increases in flood elevations.
- ✓ In non-coastal areas, the protection level is measured at the top of the lowest floor, leaving the flooring, subfloor and floor joists exposed to the base flood.

To offset these shortcomings of building only to the BFE, over half of the communities in the country require new buildings to be protected to one or more feet higher than the BFE. Floodplain managers call this “freeboard.”

### Flood Damage Protection

A building built higher than the minimum level required by the NFIP is better protected from:

- ✓ Waves that are higher than the BFE,
- ✓ Unpredictable flooding conditions, such as debris at a bridge or culvert that creates a dam to stream flow,
- ✓ Increases in flood heights due to development and climate change, and
- ✓ Damage to the floor joists and other parts of the building lower than the top of the lowest floor.

Through a national consensus process, building higher has been part of the International Building and Residential Codes and the American Society of Civil Engineers' flood design and construction standard (ASCE 24).



Thousands of dollars in flood damage can be prevented by building higher.

### Flood Insurance Premiums

While the BFE is the minimum standard for communities in the NFIP, the program encourages regulations that set a higher protection level (44 CFR 60.1(d)).

As seen in the table below, flood insurance premiums are significantly lower for buildings with 1, 2 or 3 feet of freeboard.

More than 40 years of insurance claims experience has proven these buildings suffer much less flood damage. Less potential for damage means lower premiums.

Flood Insurance Premium Comparison		
Zone	Freeboard	Premium
AE	At BFE (no freeboard)	\$2,147
AE	BFE + 1 foot	\$1,106
AE	BFE + 2 feet	\$734
AE	BFE + 3 feet	\$614
Premiums are for a single-family house, one floor, slab on grade, stem wall foundation, or crawlspace with proper flood openings, \$200,000 in building coverage, \$80,000 in contents coverage, \$1,000 deductible, no CRS discount, April 2017 <i>Flood Insurance Manual</i>		

Lower insurance premiums are an immediate benefit to the property owner. Other benefits include less flood damage in the community, less suffering, less business interruption, quicker recovery, and higher property values.

### Costs of Building Higher

Under the rules of the National Flood Insurance Program, buildings must be protected to the Base Flood Elevation (BFE). Therefore, the cost of freeboard is just the additional cost of building higher than the minimum NFIP standard.

A study conducted by ASFPM in February 2017 estimated the approximate cost of building higher for a 2,000-square foot house. The study assumed the house was constructed to NFIP standards and then estimated the additional cost of building higher than the BFE (see table below).

Foundation Type*	Cost per add'l foot
Concrete block piers	\$890
Crawlspace with concrete block walls	\$1,850
Crawlspace with poured concrete walls	\$2,155
Stem wall with fill	\$2,345
Fill only	\$4,470

Using a house on fill with a stem wall (as illustrated on the cover), here are the average construction costs for building higher:

1 foot: \$2,345

2 feet:  $2,345 \times 2 = \$4,690$

3 feet:  $2,345 \times 3 = \$7,035$

*\*Costs are lower for other foundations.*

### Return on Investment

The owner of a building built higher will realize savings in two ways. The most important is when the area floods again and the building is not damaged. Also, the owner doesn't have to relocate, repair and rebuild.



Another form of savings is a reduced cost in flood insurance, which is required by most lenders. For example, using a 2,000-square foot home with a stem wall foundation with the floor 2 feet above the BFE (with fill underneath).

Additional cost of construction: \$4,690

Annual flood insurance premium built to the BFE: \$2,147

Annual flood insurance premium built 2 feet above the BFE: \$734

Annual flood premium savings: \$1,413

Number of years to pay off \$4,690 via premium savings: 3.3 years

Added savings realized during a 30-year mortgage: \$37,300\*

Another benefit of building is higher is potentially increase in value at the time of sale due to lower risk and lower insurance costs.

*\*Savings are greater for other foundations.*



Assn. of State Floodplain Managers

[www.floods.org](http://www.floods.org)

## Proposed Encroachment in the Floodway Flowchart

