



# Texas State Collaborative

*Established 2012*

## **City of Houston/Fort Bend County *Leadership Toolkit***

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**Texas State  
Collaborative**

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## TOOLKIT LEGEND



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Texas leaders play an important role in fostering communities that are resilient against damage from natural disasters. Residents of resilient communities are better prepared for severe weather events and experience multiple benefits from strong building codes and practices. Benefits include safe, strong, and sustainable homes and businesses, a more stable local economy, and fewer burdens and disruptions in the delivery of emergency services.

The Texas State Collaborative (TSC) is a private-public collaboration that was formed in 2012 to address the most pressing issues affecting Texas' built environment. Stakeholders from leading insurers, reinsurers, design/build associations, building code officials, emergency managers, meteorologists, and state and local government officials make up the collaborative.

The TSC supports three key building blocks in support of disaster-resilient communities:

- Increase public safety through enhanced awareness of Texas weather risks
- Modern, strong state and local building codes
- Consistent and effective enforcement of state and local building codes by trained professionals

To that end, the Federal Alliance for Safe Homes (FLASH)<sup>®</sup> created the *Texas Leadership Toolkit (Toolkit)* for the TSC to raise awareness of weather perils specific to City of Houston/Fort Bend County and to help spotlight what residential building code is in effect and what that means with respect to life safety for City of Houston/Fort Bend County.

## **Stakeholders of the TSC:**

- BASF – The Chemical Company
- Building Officials Association of Texas
- Cement Council of Texas
- Federal Alliance for Safe Homes (FLASH)
- Federal Emergency Management Agency (FEMA)
- FloodSmart
- Habitat for Humanity Texas
- International Code Council
- ISO
- KOHLER Generators
- National Storm Shelter Association
- National Weather Service
- Office of the Public Insurance Counsel
- Portland Cement Association
- Simpson Strong-Tie Co.
- State Farm Insurance Companies
- Texas Department of Insurance
- Texas Floodplain Management Association
- Texas Tech University, National Wind Institute
- The Home Depot
- The Salvation Army
- Truss Manufacturers of America
- USAA

## Top Three Hazards for Southeast Texas: Hurricane, Flood, and Lightning



### Hurricane

Galveston was the site of the greatest natural disaster in our nation's history in terms of loss of life with around 8,000 people killed by the 1900 Hurricane. Hurricanes and tropical storms remain the greatest threat to Southeast Texas and the Upper Texas Coast. Hurricanes Carla (1961), Alicia (1983) and Ike (2008) also inflicted tremendous damage on the region from the storm surge flooding, high winds, heavy rains, and tornadoes.

Although Hurricane Ike was a Category 2 storm with respect to intensity, its size was remarkable, with tropical storm force winds stretching a total of 425 miles from the northwest to southeast as it approached the upper Texas coast. By landfall, Ike brought hurricane force winds to the eastern two-thirds of Southeast Texas. For residents, Ike will forever be remembered for its significant storm surge.



### Flood

In Southeast Texas, it is not unusual to measure rainfall in feet rather than inches. For example, Tropical Storm Allison produced greater than three feet of rain over a 3-day period over portions of the Houston area with record flooding and damages of near \$11 billion. By comparison, Hurricane Alicia, the last major hurricane to strike the Upper Texas Coast, caused \$2 billion damage and 21 fatalities. In addition to tropical storms and hurricanes, slow moving thunderstorms can also generate rain amounts of 6 to 12 inches, producing flash flooding especially in urban areas in and around Houston.



### Lightning

Sometimes a forgotten danger, lightning is a frequent occurrence around Southeast Texas and frequently causes house fires, power outages, and other damage. Since 2006, 15 people have been seriously injured by lightning strikes and at least 9 have been killed. In one tragic case in July 2012, a storm approached a group of men playing a soccer game. It started to rain and the men took shelter under a tree in an attempt to stay dry. Lightning struck the tree, killing two men and injuring the third.

**Source:** Unless otherwise noted, all information in this document courtesy of the National Weather Service. FLASH would like to thank the various individuals who contributed to this toolkit.

## Better Building Codes and Practices Save Lives, Property, and Money

- **Building codes are a community’s first line of defense against natural disasters, including flash floods, hurricanes, hail, tornadoes, and wildfire.** Building codes offer a minimum level of life safety which is why modern, model codes, and beyond-code building practices better protect homes and businesses against natural disasters.
  - Over the last 15 years, Texas has experienced its share of property damage from devastating natural disasters including:

<u>By Year</u>		<u>By Cost</u>	
2013	Tornadoes/Hail (Palo Pinto) - \$200 million	\$13 billion	Hurricane Ike
2012	Hail/Wind (McAllen) - \$263 million	\$4.7 billion	Tropical Storm Allison
2012	Tornadoes/Hail (Dallas/Ft. Worth) - \$785 million	\$3.4 billion	Hurricane Rita
2012	Hail Storm (Dallas/Ft. Worth) - \$901 million	\$1.1 billion	Hail Storm (North Texas)
2011	Wildfire (Bastrop County) - \$367 million	\$901 million	Hail Storm (Dallas/Ft. Worth)
2009	Hail Storm (Austin) - \$150 million	\$785 million	Tornadoes/Hail (Dallas/Ft. Worth)
2008	Hurricane Ike (Galveston) - \$13 billion	\$605 million	Tornado (Ft. Worth)
2008	Hurricane Dolly (Port Mansfield) - \$543 million	\$543 million	Hurricane Dolly (Port Mansfield)
2005	Hurricane Rita (Sabine Pass) - \$3.4 billion	\$367 million	Wildfire (Bastrop County)
2003	Hail Storm (North Texas) - \$1.1 billion	\$263 million	Hail/Wind (McAllen)
2001	Tropical Storm Allison (Houston) - \$4.7 billion	\$200 million	Tornadoes/Hail (Palo Pinto)
2000	Tornado (Ft. Worth) - \$605 million	\$150 million	Hail Storm (Austin)

- **Better building codes and mitigation save lives and limit property losses.**
  - A 2011 Louisiana State University Hurricane Center study determined that if strong building codes had been in place before Katrina, wind damage would have been reduced by 80 percent and \$8 billion in property losses would have been saved.
  - A December 2013 report by the Federal Insurance Office of U.S. Department of the Treasury stated “proper construction techniques and materials can save lives and reduce both insured losses and taxpayer burden.” The report further cited that “effective mitigation strongly enhances the safety of occupants and durability of property.”
- **Better building codes and mitigation reduce the burden on taxpayers and local governments tasked with providing first responders and emergency management services.**
  - A 2005 study by the National Institute of Building Sciences’ Multihazard Mitigation Council documented that \$1 spent on mitigation for activities ranging from enhanced building codes and public awareness to large scale physical retrofitting and other mitigation construction projects saves society an average of up to \$4.
- **Better building codes prevent economic disruption to businesses, their employees, and the overall community.**
  - According to the National Oceanic and Atmospheric Administration, there have been 25 major disasters in the last two years that have caused more than \$1 billion in economic losses.

## **Introduction to Texas Windstorm Insurance Association (TWIA)**

TWIA provides windstorm and hail insurance coverage to coastal residents when private insurance companies exclude such coverage from their residential policies. TWIA currently provides this coverage in 14 Texas coastal counties as well as parts of Harris County. Generally, for designated catastrophe areas to be eligible for TWIA coverage, all construction, alteration, remodeling, enlargement, and repair of, or addition to, any structure in the designated catastrophe area must be performed in compliance with the applicable building code standards, as set forth in the plan of operation.

## **TWIA Credits for Meeting or Exceeding Applicable Building Code**

TWIA offers premium discounts ranging from 19% to 33% for building code compliance depending on the location of the insured property and which building code the home is constructed to meet. The Texas Department of Insurance (TDI) must certify the structure as meeting the requirements specified in the TWIA Building Code or the I-Codes adopted by TDI since February 1, 2003 to qualify for the rate reductions. The rate reductions apply to windstorm and hail insurance policies issued by TWIA on and after February 28, 1999 for the TWIA Building Code and on and after July 31, 2003 for the I-Codes adopted by TDI since February 1, 2003.

## **TWIA Discounts for Existing Structures with Retrofitted Exterior Openings**

TWIA policies are eligible for a rate reduction of 10% for dwelling coverage and 10% for personal property coverage for residential structures in a designated catastrophe area constructed prior to September 1, 1998, or February 1, 2003, as applicable, which have been retrofitted with exterior opening protection that meets the windborne debris impact-resisting standards established by TDI. "Exterior openings" are defined as "Openings in the exterior walls or roofs of residential structures, including, but not limited to, windows, doors, garage doors, and skylights." All exterior openings of the residential structure must be protected.

## **Homeowners' and TWIA Discounts for Impact-Resistant Roofing**

Many insurance companies offer a discount for impact-resistant roof coverings to their policyholders. Each insurance company has the ability to determine the test standards the products must comply with and the types of discounts or credits they offer. Also, TWIA offers credits to residential structures for impact-resistant roof coverings tested to UL Standard 2218. The credits range from 4% to 14% based on the territory, date installed, and class of roof from UL 2218.

## **Homeowners' Discount for Homes Constructed with an Insulating Concrete Form System**

Texas Statutes authorize an insurer the option to grant an applicant a discount on the applicant's homeowners' insurance premiums for insured property on receipt of written verification from the applicant that the property was constructed with an insulating concrete form system. "Insulating concrete form system" is defined as "a building construction system primarily used to frame exterior walls in which polystyrene foam forms are placed in the walls of a structure under construction and filled with concrete and steel reinforcing material to become a permanent part of the structure."

## **Freeboard, NFIP Premium Savings, and CRS Credits**

The *2008 Supplement to the 2006 Evaluation of the National Flood Insurance Program's Building Standards* validated the 2006 publication's general hypothesis of freeboard's benefits to homeowners and communities—both regarding avoided flood damages and National Flood Insurance Program (NFIP)



premium savings offsetting the additional costs of construction. This report provides additional information regarding NFIP premiums and construction costs as they correlate to different amounts of freeboard, and is available at <http://www.fema.gov/media-library/assets/documents/31735?id=7241>. Furthermore, participating communities may receive NFIP Community Rating System (CRS) credits if the community requires freeboard, in accordance with CRS specifications. For more information about the CRS Program, visit <http://www.fema.gov/national-flood-insurance-program-community-rating-system>.

**Sources:** TDI, *Texas Windstorm Insurance Association Overview*, August 9, 2013 Edition.

**Introduction to TWIA Building Code Standards:** Tex. Insurance Code § 2210.258; Tex. Admin. Code, §5.4007 -11.

**TWIA Credits for Meeting or Exceeding Building Code:** 28 Tex. Admin. Code, §5.4700; Tex. Insurance Code §2210.351.

**TWIA Discounts for Existing Structures with Retrofitted Exterior Openings:** 28 Tex. Admin. Code § 5.4700.

**TWIA Discount for Impact-Resistant Roofing:** Tex. Insurance Code §2251.101 for rate filing authority.

**Insulating Concrete Form System Homeowners' Discount:** Tex. Insurance Code §§ 2006.001-2.

**Freeboard, National Flood Insurance Program (NFIP) Premiums and Community Rating System (CRS) Credits:**

Federal Emergency Management Agency, *2008 Supplement to the 2006 Evaluation of the National Flood Insurance Program's Building Standards*; Federal Emergency Management Agency, *National Flood Insurance Program Community Rating System*.

**FLASH would also like to thank the generous assistance of Dr. Paul Bove with TDI in the development of this content.**



## City of Houston/Fort Bend County

The following is an executive summary of findings from an analysis conducted of the residential building code in effect for your community as it compares to model codes and beyond-code disaster resilient building practices.

### **Residential Building Code for City of Houston:**

2012 International Residential Code with amendments

### **Residential Building Code for Fort Bend County:**

See Additional Background

### **Residential Building Code Opportunities:**

- Increase ASCE 7-05 wind speed value 20 mph, increase roof deck thickness, and add requirement for sealed roof deck
- Provide more specificity for prescriptive requirements in Appendix L, “Conventional Light-Frame Wood Construction for Single Family Residential Construction in High-Wind Areas”
- Provide minimum subterranean termite protection
- Require a building official to issue a Certificate of Occupancy before a home is occupied or a change of use in the existing occupancy is made

**Building Code Effectiveness Grade Scale (BCEGS) Rating for City of Houston: 4**

**Building Code Effectiveness Grade Scale (BCEGS) Rating for Fort Bend County: 99**

All communities need building codes to protect their citizens from weather risks such as hurricanes, tornadoes, flash floods, hail, and wildfire. Safe, strong, and sustainable homes that are more resilient against damage from natural disasters also support a more stable local economy, fewer taxpayer burdens, and reduced demand for emergency services.

Local elected leaders committed to protecting the public have a central role in improving the level of safety for homes built in their communities. Strong building codes and effective enforcement of those are the foundation for disaster-resilient communities.

## Additional Background

### City of Houston<sup>1</sup>

The City of Houston has a population of 2,099,451 [2010 Census], and effective December 31, 2010, it adopted the 2012 IRC (with amendments).

Regarding some building code processes in the City of Houston, the residential code may be amended by the City Council<sup>2</sup>, and the Code Enforcement Division, Department of Public Works and Engineering is the building official.<sup>3</sup> The Houston Code Development Office coordinates, drafts and recommends code amendments; reviews and approves requests for alternate methods of construction; and creates Code Words for formal interpretations and provides written interpretation of the Houston codes.<sup>4</sup>

Additionally, as a general matter, a General Appeals Board interprets the provisions of the residential code in appeals from decisions of the building official; hears appeals from the building official as to the suitability of alternate materials or alternate methods of construction other than those relating to air-conditioning, plumbing, and electrical; and makes recommendations to the Mayor for amendments.<sup>5</sup>

### Fort Bend County

Fort Bend County has a population of 585,375 [2010 Census].<sup>6</sup>

Fort Bend County has not adopted a mandatory residential building code. However, Fort Bend County has its own floodplain regulations and permitting requirements.

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<sup>1</sup> The material in this document and throughout this toolkit is for informational and educational use only, and it is in no way intended to constitute legal advice. Contact the local government or other authority for official building code information.

<sup>2</sup> Code of Ordinances, City of Houston, Texas, Sec. 1-2.

<sup>3</sup> Houston Amendments to 2012 IRC, R103.1.



<sup>4</sup> City of Houston, Customer Assistance & Code Development Office, "Main Functions of Code Development Office." Available: <http://www.houstonpermittingcenter.org/code-enforcement/customer-assistance-code-development-cacd-section.html>.

<sup>5</sup> Houston Amendments to 2012 IRC R112.1; Houston Amendments to 2012 IBC, 113.2.

<sup>6</sup> This figure reflects the total population with the City of Houston included within it. The total population of the City of Houston within Fort Bend County according to the 2013 Census is 39,214. <http://www.txcip.org/tac/census/profile.php?FIPS=48157>.

## Amendment Profile Layout

### City of Houston: Substantial Amendment Changes, Impacts, & Recommendations

IRC Section	Current Amendment	Impact	Recommendation	
1 - Strengthens	<p>R322 Flood-Resistant Construction</p> 	<p>City of Houston floodplain regulations specify 12" freeboard above the Base Flood Elevation (BFE)</p>	<p>12" freeboard provides additional flood protection and results in potential insurance premium reductions; 2012 IRC generally does not require freeboard (outside of Coastal A and V Zones)</p>	<p>Continue practice of requiring freeboard, an effective measure of increasing a structure's resistance to flooding</p>
2 - Strengthens	<p>R301.2.1.1 Wind limitations and wind design required</p> 	<p>Adds Appendix L, "Conventional Light-Frame Wood Construction for Single Family Residential Construction in High-Wind Areas"</p>	<p>Appendix L provides an additional design criteria option for required existing high-wind methods in regions where wind design is required in accordance with Figure R301.2(4) B or where the basic wind speed from Figure R301.2(4)A equals or exceeds 110 miles per hour</p>	<p>For additional protection from high-wind events, increase the ASCE 7-05 wind speed value 20 mph, increase roof deck thickness, and add requirement for sealed roof deck. Additionally, provide more specificity for prescriptive requirements in Appendix L.</p>
<b>2012 International Residential Code</b>				
3 - Weakens	<p>R318 Protection Against Subterranean Termites</p>	<p>Deletes section protecting residential homes against subterranean termites</p>	<p>Inadequate termite proofing could cause potential damage to the building and contents</p>	<p>Reinstate Section R318 of the 2012 IRC to provide minimum protection subterranean termite protection</p>
4 - Weakens	<p>R110.1 Certificate of Occupancy (C.O.)</p>	<p>Removes requirement for builders to secure a C.O. for residential structures and replaced with certificate of compliance, to be issued only when requested after all final inspections have been approved</p>	<p>Potential decrease in building code compliance leading to concerns as to the determination of whether the residence can safely be occupied</p>	<p>Require a building official to issue a C.O. before a home is occupied or a change of use in the existing occupancy is made</p>

# City of Houston: Substantial Amendment Changes, Impacts, & Recommendations – Technical Notes

## 1) Amendment 1 Impact:

IRC Section 322 “Flood-Resistant Construction” was removed and replaced with Code of Ordinances, City of Houston, Texas, Chapter 19, “Flood Plain.” There are many differences between these two standards, and our recommendation focuses on increasing freeboard as just one measure of increased flood protection. Individual homes face different flood risks, and homeowners should learn their dwelling’s risk from local floodplain management professionals and other resources like those provided by the National Flood Insurance Program (NFIP). A general recommendation for improving a dwelling’s flood resistance is to incorporate freeboard above the BFE. This added factor of safety may also result in reduced flood insurance premiums. Furthermore, if your community participates in the NFIP Community Rating System (CRS) program, there could be additional flood insurance premium discounts up to 45%.

## 2) Amendment 2 Impact:

Added Appendix L, “Conventional Light-Frame Wood Construction for Single Family Residential Construction in High-Wind Areas”. Appendix L provides additional requirements to the five optional design criteria standards listed in R301.2.1.1: *AF&PA Wood Frame Construction Manual for One- and Two-Family Dwellings* (WFCM); *ICC Standard for Residential Construction in High-Wind Regions* (ICC-600); *ASCE Minimum Design Loads for Buildings and Other Structures* (ASCE 7); *AISI Standard for Cold-Formed Steel Framing—Prescriptive Method for One- and Two-Family Dwellings* (AISI S230); or *International Building Code* (IBC) in regions where wind design is required in accordance with Figure R301.2(4) B or where the basic wind speed from Figure R301.2(4)A equals or exceeds 110 miles per hour. Additionally, we recommend increasing the ASCE 7-05 wind speed value 20 mph (this should be revisited if ASCE 7-10 values are applied), increasing roof deck thickness, and adding a requirement for sealed roof deck. Additionally, more specificity in the prescriptive requirements in Appendix L would ensure clarity in its application.

## 3) Amendment 3 Impact:

The IRC’s figure R301.2 (6) “Termite Infestation Probability Map” illustrates geographical areas where termite damage is probable. This map indicates that the entire state of Texas has “very heavy or moderate to heavy” probability of termite infestation. IRC Section R318 provides a number of methods to protect structures against termite damage.

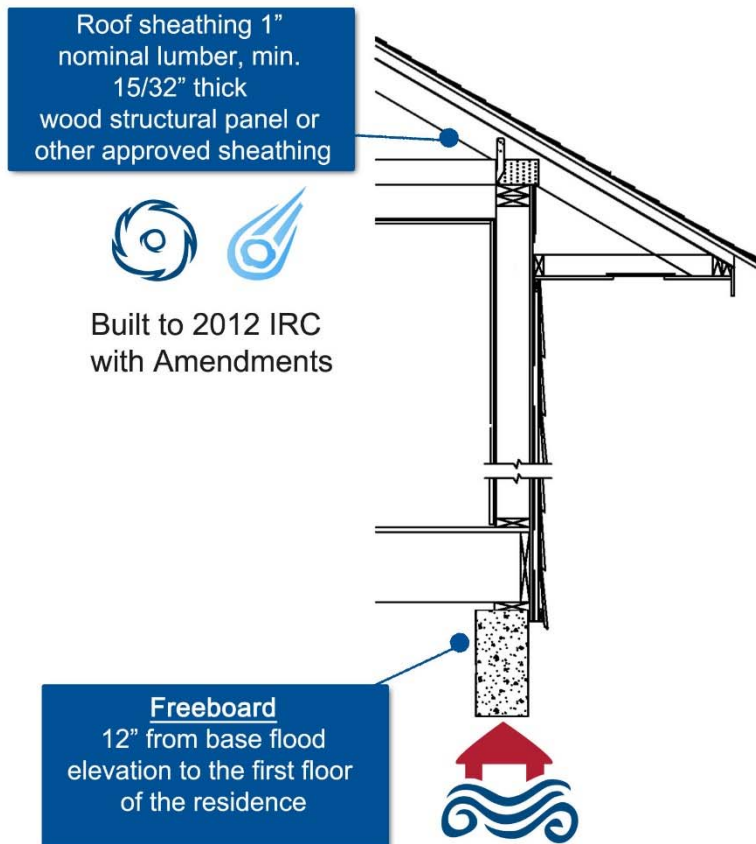
## 4) Amendment 4 Impact:

Generally, a C.O. is granted upon a determination that a structure may be occupied for its intended use. Before a C.O. is issued, compliance with the applicable building code is typically reviewed. Use of a C.O. is an important enforcement tool for a jurisdiction’s building official, and removing this tool may lead to decreased compliance with building codes.

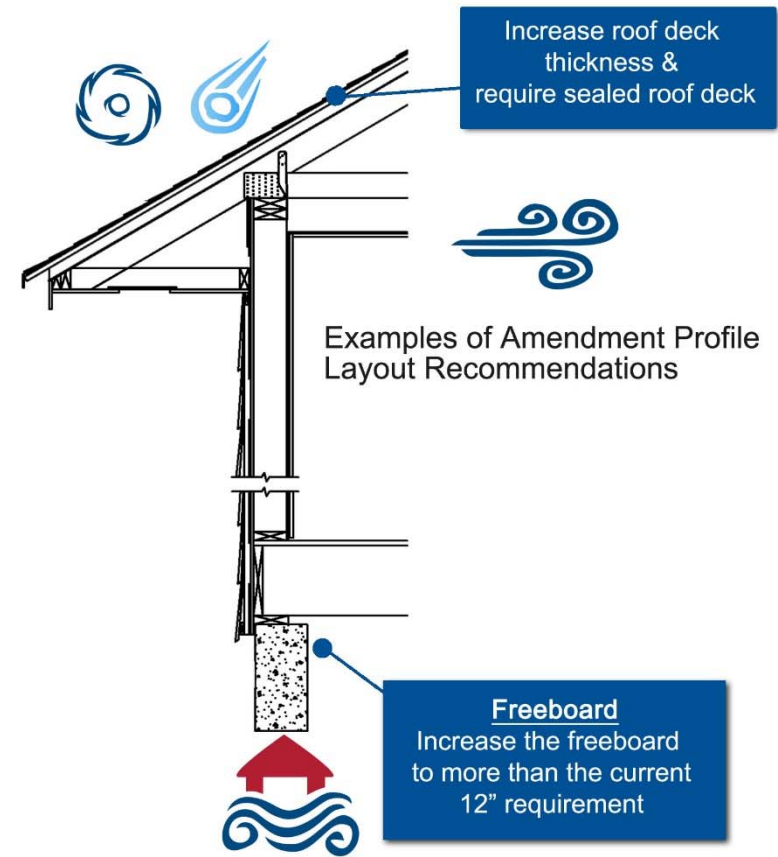
# Average Texas Home Profile

approximately 2850 square feet  
Median price \$197,000

## Current Residential Practices for Homes Built in City of Houston



## Recommended New or Retrofit Construction for Weather-Ready Homes



## How does the City of Houston/Fort Bend County Rate on Building Code Enforcement?

*(The lower the class number is, the more favorable the rating)*

**The City of Houston's BCEGS® rating is: 4**

**Fort Bend County's BCEGS rating is: 99**

Building Code Effectiveness Grading Scale (BCEGS) classification, a program of the Insurance Services Office, Inc. (ISO)®, is a tool used to measure the effectiveness of a jurisdiction's building code enforcement. The BCEGS program assesses the adoption and enforcement of a community's building codes with special emphasis on mitigation of losses from natural hazards. ISO collects information regarding the administration of building codes, building plan review, field inspections, and other underwriting data. This information is used to determine a "class" based on a 1 to 10 scale. The lower the class number is, the more favorable the rating. A BCEGS Class 99 rating may be assigned for several reasons: the properties were developed prior to the initial BCEGS evaluation, the jurisdiction does not meet the participation requirements of the BCEGS program, or the jurisdiction declines participation in the BCEGS program. More information can be found at <http://www.isomitigation.com/bcegs/building-code-classification.pdf>.

One important issue for Texans is that while certain Texas counties, including Fort Bend County, may adopt a residential building code, at least some Texas counties believe that they lack meaningful enforcement power over those building codes. Without effective enforcement, Texans in the county lose the assurance that their homes are, in fact, constructed to that minimum standard.

### Why building code enforcement is essential

Many Texas communities are at risk of severe damage from hurricanes, floods, tornados, wildfires, and other disasters. Adoption and effective enforcement of residential building codes creates the first line of defense for Texans against severe weather events. Texans deserve strong, safe, and resilient homes for protection of their families and financial security.

State and local jurisdictions have the opportunity—and in some cases, the obligation—to adopt updated building codes and enforce them. However, the adoption of modern, model building codes is only half of the equation. A jurisdiction's adoption of a building code can be rendered meaningless without effective enforcement. Furthermore, professional and ongoing training and certification of building officials is essential to effective enforcement.

Communities benefit from a favorable BCEGS classification. For example, a favorable BCEGS classification may positively impact jurisdictions in one or more of the following ways:

- Result in better homeowners and commercial insurance rates;
- Allow the community to apply for a better class rating in the Community Rating System (CRS), which may in turn result in lower insurance premiums; and
- Reflect and further incentivize better building practices that strengthen a community's resilience against disasters.

For more information about the BCEGS program, call ISO at (800) 444-4554 or e-mail [bcegsupdate@verisk.com](mailto:bcegsupdate@verisk.com).





## **What are building codes?**

Building codes have been in use in the United States for more than 100 years, when major cities began to adopt and enforce building codes in response to large fires in densely populated urban areas. While early building codes were in place to reduce fire risk, today's building codes are the minimum acceptable standards to protect the health, safety, and general welfare of building occupants.

Building codes can be classified as either “prescriptive” or “performance” based. Performance codes provide a technical objective which leaves the method of achieving the objective up to the architect/engineer and builder. Prescriptive codes specify the method for designers and builders to achieve the objective. Some model codes, like the International Residential Code (IRC) have both prescriptive and performance based provisions, although the IRC is a prescriptive-oriented code.

## **What is the process and timeframe for developing model building codes?**

The IRC for One- and Two-Family Dwellings is developed by the International Code Council (ICC) through the governmental consensus process. The IRC is revised every 18 months and new editions are published every three years. Most United States jurisdictions that adopt a residential code adopt an edition of the IRC, sometimes with amendments.

Model building codes developed by the ICC, like the IRC, establish minimum regulations for construction. They are a starting point—not a guarantee that a structure is impervious from natural disaster. The analysis contained within the *Texas Leadership Toolkit (Toolkit)* is based on the notion that modern, model building codes reflect the best available minimum building materials and practices; nonetheless, certain building materials and practices beyond these minimum standards should be considered for optimal resiliency.

## **Why are building codes important?**

Modern, model building codes that are consistently enforced by well-trained professionals are important steps to becoming a disaster-resilient community. Building codes protect the public health and safety. The increased burden from weak building codes or lax enforcement falls on taxpayers – through property losses, higher insurance premiums and lost economic opportunities. According to the Federal Emergency Management Agency (FEMA), structures built to higher standards are 77 percent less likely to be damaged.

## **Do stronger building codes make a difference when severe weather strikes?**

Modern, model building codes reflect the best available building practices to build to minimum regulations. Homes built to modern, model building codes will have the advantage of better wall bracing, improved roof tie-downs and overall stronger connections. For example, wind-resistant building practices like those included in the 2012 IRC can dramatically improve building performance during hurricanes and tropical storms. Moreover, according to the National Institute of Building Sciences, for every \$1 spent to make buildings stronger, the American taxpayer saves \$4 in federal disaster assistance.

## **What is a Certificate of Occupancy and why is it important?**

Generally, a certificate of occupancy (C.O.) is a document provided by a city or county upon determination that a structure may be safely occupied for its intended use. It is often required after new construction and changes in occupancy classifications, as well as for other conditions as specified by a jurisdiction. Before a C.O. is issued, compliance with the applicable building code is typically reviewed. Use of a C.O. is an important enforcement tool for a local building official.



### **Who is responsible for enforcing building codes?**

It is the responsibility of state and local jurisdictions to adopt and enforce building codes. Many communities are at risk of severe damage from hurricanes, floods, tornados, wildfires and other disasters. Adoption and effective enforcement of building codes creates a crucial line of defense against severe weather events.

### **Does it cost more to build to modern, model building codes?**

The most cost-effective and efficient means of strengthening buildings is at the time of new construction. Modern, model building codes ensure that new construction takes advantage of continuous innovation in building design, products, methods, and technologies. Often, there is only a marginal increase in costs to build better.

Communities with model codes that are well-enforced experience less damage and lower insured losses from severe weather events and rank better on the Building Code Effectiveness Grading Scale (BCEGS). Communities that adopt model codes also compete more effectively for large employers who bring jobs, economic vitality, and an overall stronger business climate.

### **What is the link between discounts on homeowners' insurance premiums and building codes?**

The Texas Windstorm Insurance Association (TWIA) provides windstorm and hail insurance coverage to coastal residents when private insurance companies exclude such coverage from their residential policies. TWIA currently provides this coverage in 14 Texas coastal counties as well as parts of Harris County.

TWIA offers premium discounts ranging from 19% to 33% for meeting or exceeding applicable building codes depending on the location of the insured property and which building code the risk is constructed to meet, including discounts for existing or new homes that:

- have retrofitted all exterior openings such as windows, doors, garage doors and skylights;
- have impact-resistant roof covering; and
- are constructed with an insulating concrete form system.

To learn more, check out the one-page summary included in this *Toolkit*.

**Sources:** Federal Emergency Management Agency, *Building Codes Toolkit, Frequently Asked Questions*, [http://www.fema.gov/media-library-data/20130726-1902-25045-9664/building\\_codes\\_toolkit\\_faq\\_508.pdf](http://www.fema.gov/media-library-data/20130726-1902-25045-9664/building_codes_toolkit_faq_508.pdf); 2012 *International Residential Code for One- and Two- Family Dwellings*® (International Code Council, Inc., 2011) , vii.

## Benefits of Using the I-Codes in a Community's Floodplain Management Program

Strong floodplain management regulations are integral to protect a community from the potentially devastating effects of flooding, which can occur without warning. Integrating the International Code Council's I-Codes as part of a community's floodplain management strategy furthers one of the long-term objectives of the National Flood Insurance Program: to reduce flood damage and losses. Communities that enforce the 2009 and later editions of the I-Codes can rely on the flood provisions of those codes for buildings and structures in flood hazard areas. Floodplain management regulations must also address other aspects of development in flood hazard areas.

There are various advantages to using the I-Codes as part of a community's floodplain management program, including:

- Reduced conflicts between building codes and floodplain management regulations
- Building construction requirements regarding perils are consolidated and are easy to reference
- Increased assurance of quality building
- Building codes have some increased standards and more specific requirements than the NFIP requirements
- Increased consistency in permit conditions and requirements
- Regulation of all buildings and structures, in flood hazard areas resulting in consolidated and strengthened enforcement; effective, routine inspections; and increased compliance of regulations in existing buildings

For more information about how a community can use the I-Codes as a part of its floodplain management strategy, see *Reducing Flood Loss Through the International Codes: Coordinating Building Codes and Floodplain Management Regulations*, Fourth Edition, 2014.

Additionally, the *2008 Quick Guide: Floodplain Management in Texas* is an excellent resource to better understand floodplain management and development.

### Sources:

ICC, et al., 2014. *Reducing Flood Loss Through the International Codes: Coordinating Building Codes and Floodplain Management Regulations*, Fourth Edition. Available: <http://www.fema.gov/media-library/assets/documents/96634>.

Texas Floodplain Management Association. *2008 Quick Guide: Floodplain Management in Texas*. Available: [https://www.twdb.texas.gov/flood/resources/doc/2008\\_Texas\\_Quick\\_Guide.pdf](https://www.twdb.texas.gov/flood/resources/doc/2008_Texas_Quick_Guide.pdf).



## Texas

- Texas Department of Public Safety, Division of Emergency Management, <http://www.txdps.state.tx.us/dem/index.htm>
- City of Houston – Mayor’s Office of Emergency Management, <http://www.houstonoem.org/go/site/4027/>
- Fort Bend County – Office of Emergency Management, <http://www.fbcoem.org/go/doc/1528/1523783/>
- Building Officials Association of Texas, <http://www.boatx.org/>
- National Fire Protection Association – Firewise Communities – [www.firewise.org](http://www.firewise.org)  
(Texas - [www.firewise.org/wildfire-preparedness/be-firewise/success-stories/texas.aspx](http://www.firewise.org/wildfire-preparedness/be-firewise/success-stories/texas.aspx))
- Texas Association of Regional Councils, <http://www.txregionalcouncil.org/>
- Texas Department of Insurance, <http://www.tdi.texas.gov/>
- Texas Floodplain Management Association, <http://www.tfma.org/>
- Texas Fire Marshal’s Association, <http://www.txfma.org/>

## Other

- National Weather Service, <http://www.weather.gov/>
- National Hurricane Center, <http://www.nhc.noaa.gov/>
- Insurance Services Office (ISO), <http://www.iso.com/>
- Federal Alliance for Safe Homes (FLASH), <http://www.flash.org/>
- Federal Emergency Management Agency (FEMA)
  - FEMA Building Codes & Technical Publications: <http://www.fema.gov/building-science-publications>
  - FEMA Building Sciences Branch: <http://www.fema.gov/protecting-homes>
  - FEMA Helpline: [BuildingScienceHelp@fema.dhs.gov](mailto:BuildingScienceHelp@fema.dhs.gov)
- International Code Council (ICC)
  - International Building Code: <http://shop.iccsafe.org/2012-international-building-code-1.html>
  - International Residential Code: <http://shop.iccsafe.org/codes/2012-international-codes/2012-international-residential-code/2012-international-residential-code-for-one-and-two-family-dwellings.html>
  - International Existing Residential Building Code: <http://shop.iccsafe.org/2012-international-existing-building-code-1.html>