



Texas State Collaborative

Established 2012

City of Arlington/Tarrant County *Leadership Toolkit*

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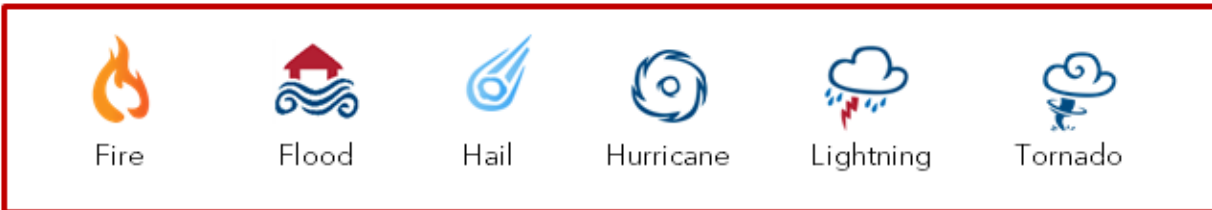


**Texas State
Collaborative**

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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)[®] created the *Texas Leadership Toolkit* for the TSC to raise awareness of weather perils specific to City of Arlington/Tarrant County and to help spotlight what residential building code is in effect and what that means with respect to life safety for City of Arlington/Tarrant County.

Stakeholders of the TSC:

- Austin Fire Department
- 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
- Portland Cement Association
- RenaissanceRe
- 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
- WeatherPredict Consulting Inc.

Top Three Hazards for North Central Texas: Hail, Flash Floods and Tornadoes



Hail

In the late afternoon of May 5, 1995, a line of intense thunderstorms developed west of Fort Worth, Texas, and moved rapidly eastward into the city. The storm dumped copious amounts of hail, producing 18-inch deep accumulations in some areas.

Directly in the path of the intensifying storm was one of Fort Worth's biggest outdoor events—Mayfest. More than 10,000 people were enjoying the festival's activities when the storm struck. With few places to seek proper shelter, thousands were exposed to baseball- and softball- size hail, which ripped tree branches and tore through tents and car windshields. At least 90 individuals were injured and thousands of vehicles, homes and businesses sustained damage.

Across the Metroplex, the storm inflicted damages estimated at \$1.6 billion (in 1995 dollars), making it one of the costliest thunderstorm events in U.S. history and the costliest hail event in Texas history.



Photos Courtesy of Sam Barricklow



Photo Courtesy of Cooke County EMA



Flash Floods

During the early morning hours of June 18, 2007, slow moving thunderstorms dumped eight inches of rain in a broad area extending from the Red River, southward into the Dallas-Fort Worth Metroplex. Six people lost their lives and hundreds became homeless as devastating flash floods struck several communities across North Texas. In the Metroplex, about 100 mobile homes were inundated and many washed off their foundations. Water covered numerous roadways throughout North Texas, killing drivers trapped in floodwaters and requiring water rescues from emergency officials.



Tornadoes

On May 15, 2013, a series of 19 tornadoes struck North Texas, including an EF-4 which took six lives near Granbury, TX. Another 54 people were injured by tornadoes that evening and hundreds of homes suffered major damage or were destroyed.



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:

By Year

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

By Cost

\$13 billion	Hurricane Ike
\$4.7 billion	Tropical Storm Allison
\$3.4 billion	Hurricane Rita
\$1.1 billion	Hail Storm (North Texas)
\$901 million	Hail Storm (Dallas/Ft. Worth)
\$785 million	Tornadoes/Hail (Dallas/Ft. Worth)
\$605 million	Tornado (Ft. Worth)
\$543 million	Hurricane Dolly (Port Mansfield)
\$367 million	Wildfire (Bastrop County)
\$263 million	Hail/Wind (McAllen)
\$200 million	Tornadoes/Hail (Palo Pinto)
\$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.

Executive Summary of Findings

City of Arlington/Tarrant 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 Arlington:

2009 International Residential Code with amendments

Residential Building Code for Tarrant County:

See Additional Background

Residential Building Code Opportunities:

- Require all roof coverings and individual replacement shingles or shakes be minimum Class A for additional protection against wildfire
- Increase wind design speed value to ASCE 7-05 wind speed value plus 20 mph, increase roof deck thickness and add requirement for sealed roof deck for additional protection against hurricane winds, wind-borne debris and hail
- Require asphalt shingles be removed prior to replacement in all hail prone areas and impact-resistant roof coverings with a rating of Class 3 or 4 when tested in accordance with UL 2218 or FM 4473, to provide increased resistance to hail
- 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 Arlington: 4

Building Code Effectiveness Grade Scale (BCEGS) Rating for Tarrant 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 Arlington¹

The City of Arlington has a population of 365,438 [2010 Census], and effective April 24, 2012, it adopted the 2009 IRC (with amendments).²

Regarding some building code processes in the City of Arlington, the Building Inspections Division is identified as the enforcement agency, and the Building Official is the official in charge.³

Additionally, a Building Code Board of Appeals has various roles including: hearing appeals of the building official's interpretations, varying an application of the building code, acting as an advisory board to obtain public comment on the proposed adoption or amendment of a model building code, and the City Council adopts and amends the building code.⁴

Tarrant County

Tarrant County has a population of 1,809,034 [2010 Census]⁵. On September 1, 2009 the Commissioners Court of Tarrant County adopted an order to apply to new residential construction within that portion of the County's unincorporated area outlining a residential building code, inspections, and notices, available at http://www.tarrantcounty.com/egov/lib/egov/Commissioners_Court_Resolution.pdf.

However, some Texas counties perceive that they lack effective enforcement power over residential building codes. Adoption and enforcement are the key requirements for strong building codes, and it is important to understand that adoption without adequate enforcement places both people and property at risk.

Additionally, Tarrant County has its own floodplain regulations and permitting requirements.

¹ 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.

² Copy of the City of Arlington Code of Ordinances, Construction, available: <http://www.arlingtontx.gov/citysecretary/pdf/codeofordinances/CONSTChapter.pdf>.





³ Article I, Section 1.04, <http://www.arlingtontx.gov/citysecretary/pdf/codeofordinances/CONSTChapter.pdf>.

⁴ Article II, Building Code Board of Appeals, <http://www.arlingtontx.gov/citysecretary/pdf/codeofordinances/CONSTChapter.pdf>; and Article VII, Powers of the City Council, <http://www.arlingtontx.gov/citysecretary/pdf/codeofordinances/CHARTChapter.pdf>

⁵ This figure reflects the total population with the City of Arlington included within it. The total population of Tarrant County according to the 2010 Census without the City of Arlington included is 1,443,596.

Amendment Profile Layout

City of Arlington: Substantial Amendment Changes to 2009 IRC, Impacts & Recommendations

IRC Section	Current Amendment	Impact	Recommendation	
1 - Strengthens	R902.1 Roofing Covering Materials 	Amending R902.1 specifying that Class A, B or C roofing be installed	Roofing meets testing standards to protect against light fire exposures	For additional protection against wildfire, require that all roof coverings and individual replacement shingles or shakes be a minimum Class A
2 - Strengthens	R401.2 Requirements	Adding requirement that foundations for the construction of new 1- and 2- family homes, and additions to existing, are designed by a Texas licensed engineer	A strong foundation is the first step to a strong home, and an engineer-designed foundation provides a design focused on accommodating and transmitting loads specific to that planned dwelling and site calculated by a Texas licensed engineer	Continue practice of beyond-code building practices
3 - Strengthens	R322 Flood-Resistant Construction 	City of Arlington floodplain regulations specify two feet of freeboard above the Base Flood Elevation (BFE)	Freeboard provides additional flood protection and results in potential insurance premium reductions; 2009 IRC generally does not require freeboard (outside of Coastal A and V Zones)	Continue practice of requiring freeboard, an effective measure of increasing a structure's resistance to flooding
2009 International Residential Code				
4 - 2009 IRC	Table R301.2(1) Climatic and Geographic Design Criteria 	City of Arlington specifies 90 mph (3-sec gust) for wind design speed in table R301.2(1)	City of Arlington's current wind design speed corresponds to values in 2009 IRC	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
2009 International Residential Code				
5 - Weakens	R907.3 Recovering vs. Replacement 	Deleting requirement that asphalt shingles be removed before new roof coverings are installed in areas with moderate to severe hail risk	Results in weaker roof performance (sponge effect) and effectiveness as shown in RICOWI Report	Require asphalt shingles be removed prior to replacement in all hail prone areas and recommend impact resistant roof coverings with a rating of Class 3 or 4 when tested in accordance with UL 2218 or FM 4473, to provide increased resistance to hail
6 - Weakens	R110 Certificate of Occupancy (C.O.)	Removing requirement for builders to secure a C.O. for certain residential structures	Potential decrease in building code compliance leading to concerns as to the determination of whether the residence can safely be occupied	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

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

1) Amendment 1 Impact

Amendment 1 reflects the amendment of Section R902.1 “Roofing covering materials” to provide that Class A, B or C roofing be installed.* Class A, B and C roofing have been tested for fire exposure protection. However, Class A is the highest rated roof class for fire exposure protection in accordance with ASTM E108 or UL 790. The City of Arlington faces an excessive heat hazard, a condition conducive to wildfires. Upgrading to Class A roof coverings will provide increased resistance to the spread of wildfire.

2) Amendment 2 Impact

Amendment 2 reflects the added requirement that foundations for the construction of new 1- and 2- family homes, and additions to existing, are designed by a Texas licensed engineer. The foundation is the base for the remainder of the structure; therefore, this added design requirement for the foundation may advance the structure properly accommodating and transmitting loads specific to that planned dwelling and site calculated by a Texas licensed engineer.

3) Provision 3 Impact

Provision 3 amends IRC R322.1 General “Construction in flood hazard areas” to provide that “Permits for the construction, reconstruction, rehabilitation, addition or other improvements shall be performed in accordance with the provisions of SECTION 1612 FLOOD LOADS of the International Building Code, as amended.”* City of Arlington’s “Flood Damage Prevention” specifies two feet of freeboard above the BFE for residential construction in all areas of special flood hazards where base flood elevation data has been provided as described in the floodplain ordinance. 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 can learn more about their dwelling’s risk from local floodplain management professionals or from 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 percent.

4) Provision 4 Impact

The basic wind speed value in Table R301.2(1) conforms with the values specified in the basic wind speed map on Figure R301.2(4)A in the 2009 IRC.* Since tornados are one of the top three weather hazards identified by the Weather Forecast Office for the City of Arlington, additional design measures can be taken to protect structures from less intense tornadoes and other high-wind events. Additionally, we recommend increasing the ASCE 7-05 wind speed value 20 mph (this value should be revisited if ASCE 7-10 applies), increasing roof deck thickness, and adding a requirement for sealed roof deck. We also recommend that the code invoke ICC-500 regarding the installation of storm shelters for life safety protection.

5) Amendment 5 Impact

The Roofing Industry Committee on Weather Issues (RICOWI) Hailstorm Investigation Report http://www.ricowi.com/docs/reports/RICOWI_OKCity_Hail_Report.pdf (p. 9) confirms that roofs with asphalt shingles overlaid over other roof coverings experienced damage at smaller size hail than roofs on solid decks. Stiffness plays a critical role in hail resistance and layered shingles or roof coverings create a “sponge” effect with the top layer being more susceptible to penetration by hailstones, thus increasing the risk of water penetration. The City of Arlington is identified as a moderate/severe hail region by the 2009 IRC. Additionally, we recommend impact resistant roof coverings with a rating of Class 3 or 4 when tested in accordance with UL 2218 or FM 4473. The most effective way to minimize hail damage to a structure’s roof system is to use roofing materials that are resistant to hail impacts. Hail damage occurs on other elements of the structure as well (e.g., windows and sidings), which should be considered for potential mitigation measures. While the IRC does not require impact resistant roof coverings, such coverings are an effective way to increase resistance to hail.

6) Amendment 6 Impact

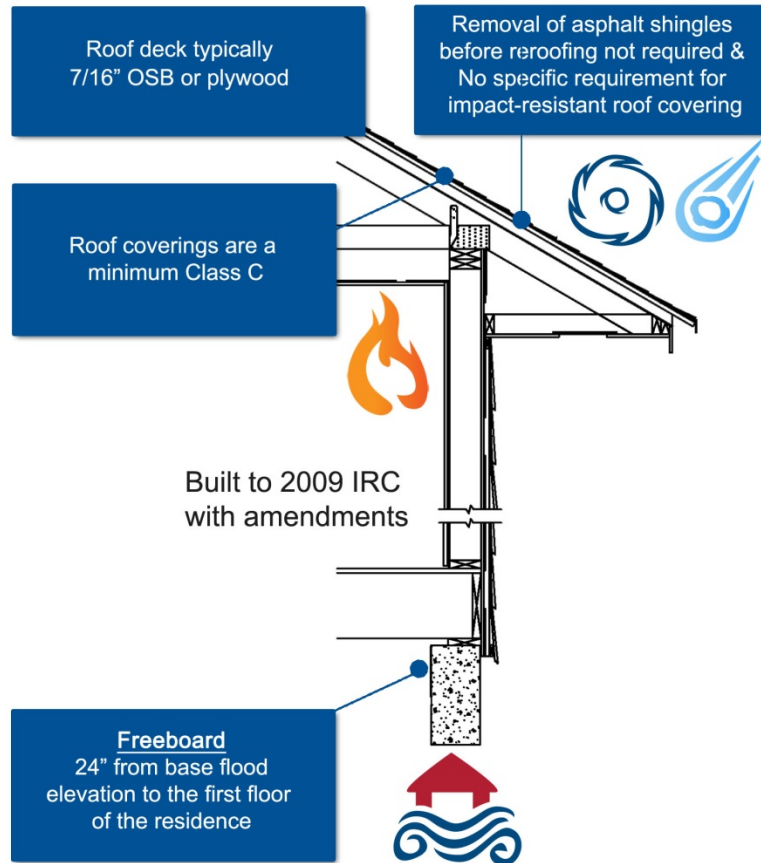
The City of Arlington exempted Group R-3 and Group U structures, as defined by the City of Arlington, from the requirement of a Certificate of Occupancy. Generally, a C.O. is granted upon a determination that a structure may be occupied for its intended use. Before a C.O. is issued, compliance with the 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.*

*Asterisk indicates that the City of Arlington amendment to the IRC is consistent with the North Central Texas Council of Governments’ “Recommended Amendments to the 2009 International Residential Code.”

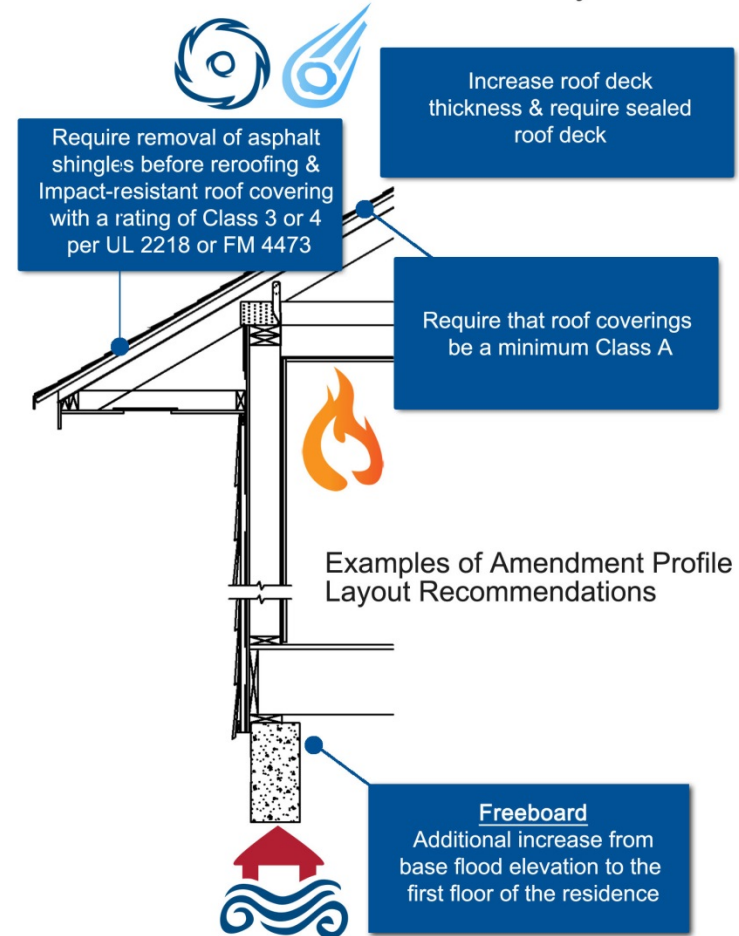
Average Texas Home Profile

Approximately 2850 square feet
Median price \$197,000

Current Residential Practices for Homes Built in City of Arlington



Recommended New or Retrofit Construction for Weather-Ready Homes



How does City of Arlington/Tarrant County Rate on Building Code Enforcement?

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

The City of Arlington's BCEGS® rating is: 4

Tarrant 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 Tarrant 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 Tarrant 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
- 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 email 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; 2012 *International Residential Code for One- and Two- Family Dwellings*® (International Code Council, Inc., 2011) , vii.



Texas

- Texas Department of Public Safety, Division of Emergency Management, <http://www.txdps.state.tx.us/dem/index.htm>
- City of Arlington – Office of Emergency Management, <http://www.arlingtontx.gov/FIRE/OEM/index.html>
- Tarrant County – Office of Emergency Management, <http://www.tarrantcounty.com/egov/cwp/view.asp?A=711&Q=460295>
- Building Officials Association of Texas, <http://www.boatx.org/>
- National Fire Protection Association – Firewise Communities – www.firewise.org
(Texas - 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
- 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>