

# Data Audit Report



TEXAS WINDSTORM  
INSURANCE ASSOCIATION

Data as of November 30, 2019

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## Scope & Confidentiality

Data auditing and preparation are among the most important aspects of catastrophe modeling. The accuracy of the loss estimates calculated by the model(s) relates to the accuracy of the data used as model input. Therefore, we thoroughly audit and summarize the data we receive. We provide and receive advice from the client and/or broker in the process of preparing the data to be an accurate representation of the portfolio to be analysed. This report will serve as documentation of the process, and the report will evolve until the client acknowledges that the preparations have resulted in data that accurately represents their portfolio.

This report summarizes the details of the data audit and the assumptions use for editing the data for the analysis. We ask that you review all of the assumptions to ensure that they are representative of your book of business.

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Acceptance of this document shall be deemed agreement to the above.

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## Assumptions

- Texas Windstorm Insurance Association (TWIA) provided exposure data as of November 30, 2019 in two text files: *TWIA\_Loc\_20191130.txt* for location and *TWIA\_Pol\_20191130.txt* for policy. Total records provided in the location file is 201,179 and in policy file is 189,916. TWIA categorized business by two main categories: *Commercial and Residential*. All business reported under occupancy type field as *Residential*, *Manufactured Home* and *Residential Farm* are grouped under Residential; all business reported as *Commercial, Governmental, and Commercial Farm* are grouped under *Commercial*.
- Excluded records:
  - 1,831 policies (with 1,840 corresponding locations) listed as 'Y' under depop\_FL field are excluded from this report and modeling as they represent depopulated policies. After this exclusion, a total of 199,879 records with total insured value of \$65.3B will be considered for modelling hurricane.
- Geographic details.
  - All the locations have been geocoded using Pitney Bowes software. Addresses with low resolution were further geocoded in the modeling software in order to enhance higher resolution results. **Exhibit 1** provides a summary of the geocoding resolution. Exhibit 1.A is for all TWIA business, Exhibit 1.B is for Residential, and Exhibit 1.C is for Commercial business.
- Building Characteristics

The quality of loss projections produced by computer modeling is highly dependent upon the quality of exposure data. Primary exposure characteristics are used by the RMS and AIR model in calculating the damage ratio for a particular location. These characteristics are occupancy type, construction type, year of construction, number of stories and square footage.

  - Occupancy type is provided for all records and is translated into RMS and AIR specific codes for modeling. A summary of exposure by Occupancy type and their mappings to each model is available in **Exhibit 2**.
  - Construction type is provided for most of the records and is translated into RMS and AIR specific codes for modeling. A summary of exposure by Construction type and their mappings to each model is available in **Exhibit 3**.
  - Square footage is provided for most of the records and will be modeled accordingly. Square footage reported by TWIA as 'Not Applicable' will be modeled as unknown. A summary of exposure by Square Footage is available in the **Exhibit 4**.
  - Year-Built is provided for most of the records and will be modeled accordingly. One location with risk number of 'GW-WH-2237353-2477039' reported a year-built of '2109'; we edited this to be 2019. Year-Built information was not provided for 'Manufactured Home' type of business. There are 11 records with policy inception date before Year-Built date; we set the year-built for these to equal the year of inception for modeling purpose. A summary of exposure by Year-Built is available in the **Exhibit 5**.
  - Number of stories is provided for most of the records. A summary of exposure by Number of Stories is available in the **Exhibit 6**.
  - Secondary risk characteristics

TWIA provided three supplemental files called *TWIA\_Loc\_File\_20191130\_PC.xlsx*, *TWIA\_Loc\_File\_20191130\_EV.xlsx*, and *TWIA\_Loc\_File\_20191130\_WPI8.xlsx* for use in determining secondary risk characteristics to model in RMS and or AIR where appropriate. Information from these additional files led to the incorporation of the following secondary risk characteristics into the modeling for a portion of the portfolio:

    - Roof Cover in both RMS & AIR - A summary of exposure is available in **Exhibit 7**.
    - Roof Geometry in both RMS & AIR - A summary of exposure is available in **Exhibit 8**.
    - Roof Age in both RMS & AIR - A summary of exposure is available in **Exhibit 9**.
    - Construction Quality - A summary of exposure is available in **Exhibit 10** (applicable to RMS only).
    - Building Condition - A summary of exposure is available in **Exhibit 11** (applicable to AIR only).
    - Tree Exposure - A summary of exposure is available in **Exhibit 12** (applicable to AIR only).
    - Opening Protection / Window Protection - A summary of exposure is available in **Exhibit 13** (RMS) & **Exhibit 14** (AIR)
- Financial Characteristics
  - Building Value and Building Limit is provided for all records. There are 50,421 records with Building Value less than Building Limit; for these records we set the Building Limit equal to Building Value.
  - Content Value and Content Limit is provided for all records. There are 10,171 records with zero value; for these records, we set the Content Value equal to the Content Limit.
  - Time Element Value and Time Element Limit is provided for all records. We modeled these as reported.
  - Site Limit is provided and is equal to the sum of the individual Building Limit, Contents Limit and Time Element Limits for all records except 208 records. The individual coverage limits for these 208 records is greater than the reported Site Limit. For consistency, we modeled site limit as the sum of the individual coverage limits, which include the adjustment we made to the the Building Limit where it was greater than reported Building Value. Finally, all site limits are updated to reflect the current TWIA statutory limits, per below chart:

Business Class	Statutory Limit
Commercial/Government	\$4,424,000
Residential	\$1,773,000
Manufactured/Mobile Home	\$84,000

  - Building and content deductibles are provided for most of the records and will be modeled accordingly. There are 3 records with building deductible greater than or equal to building value and 11 records with contents deductible greater than or equal to contents value; these records will be modeled as reported but gross loss generated will be zero.
  - Premiums are provided for all records and are summarized in this report, although it has no impact on modeling results.

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# Exhibit 1.A

## Texas Windstorm Insurance Association (TWIA)

### Exposure Summary by County - All Lines

Data as of November 30, 2019

\$Values in \$000's

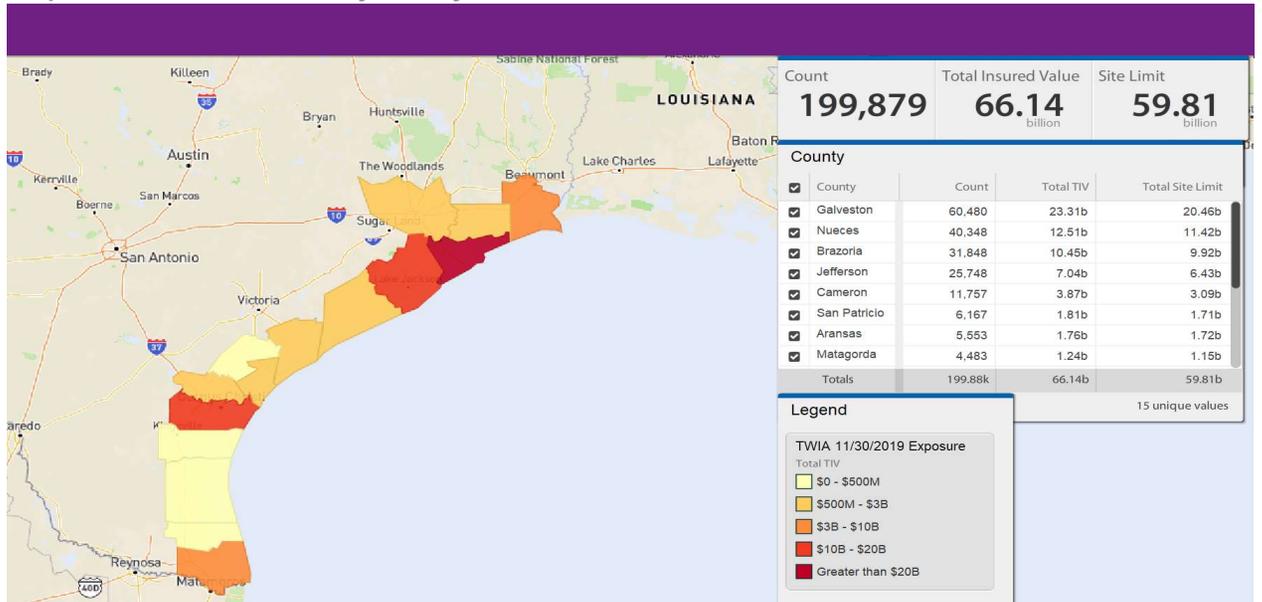
### Exposure by County - All Lines

Reported County	Risk Count	% of Total Premium	% of Total	Total Insured Value	% of Total	Building Value	Contents Value	Loss of Use Value	Total Insured Limit	% of Total	Building Limit	Contents Limit	Loss of Use Limit	
Galveston	60,480	30.3%	\$130,878	35.3%	\$23,313,223	35.3%	\$16,862,301	\$4,546,953	\$1,903,970	\$20,461,986	34.2%	\$14,021,511	\$4,546,953	\$1,903,970
Nueces	40,348	20.2%	\$71,000	19.2%	\$12,513,301	18.9%	\$8,829,962	\$2,615,779	\$1,067,561	\$11,423,661	19.1%	\$7,748,028	\$2,615,779	\$1,067,561
Brazoria	31,848	15.9%	\$56,601	15.3%	\$10,454,439	15.8%	\$6,969,022	\$2,381,905	\$1,103,512	\$9,917,111	16.6%	\$6,433,261	\$2,381,905	\$1,103,512
Jefferson	25,748	12.9%	\$40,995	11.1%	\$7,041,935	10.6%	\$4,712,241	\$1,631,506	\$698,188	\$6,431,515	10.8%	\$4,102,641	\$1,631,506	\$698,188
Cameron	11,757	5.9%	\$18,552	5.0%	\$3,873,019	5.9%	\$3,066,541	\$589,720	\$216,758	\$3,085,059	5.2%	\$2,280,936	\$589,720	\$216,758
San Patricio	6,167	3.1%	\$10,582	2.9%	\$1,807,776	2.7%	\$1,233,411	\$403,304	\$171,061	\$1,706,126	2.9%	\$1,132,443	\$403,304	\$171,061
Aransas	5,553	2.8%	\$11,969	3.2%	\$1,764,258	2.7%	\$1,222,781	\$416,441	\$125,036	\$1,715,110	2.9%	\$1,174,719	\$416,441	\$125,036
Matagorda	4,483	2.2%	\$7,299	2.0%	\$1,243,587	1.9%	\$852,538	\$289,251	\$101,798	\$1,153,461	1.9%	\$762,412	\$289,251	\$101,798
Chambers	4,274	2.1%	\$7,872	2.1%	\$1,502,675	2.3%	\$974,196	\$363,653	\$164,827	\$1,442,190	2.4%	\$913,815	\$363,653	\$164,827
Calhoun	4,024	2.0%	\$7,119	1.9%	\$1,020,301	1.5%	\$722,140	\$229,864	\$68,298	\$969,501	1.6%	\$671,462	\$229,864	\$68,298
Harris	3,495	1.7%	\$4,757	1.3%	\$1,177,323	1.8%	\$779,428	\$272,070	\$125,826	\$1,119,873	1.9%	\$722,922	\$272,070	\$125,826
Kleberg	871	0.4%	\$1,323	0.4%	\$215,214	0.3%	\$158,196	\$38,987	\$18,032	\$194,854	0.3%	\$137,836	\$38,987	\$18,032
Willacy	405	0.2%	\$679	0.2%	\$96,497	0.1%	\$73,482	\$17,606	\$5,409	\$88,366	0.1%	\$65,351	\$17,606	\$5,409
Refugio	392	0.2%	\$749	0.2%	\$105,552	0.2%	\$78,567	\$20,322	\$6,663	\$96,656	0.2%	\$69,751	\$20,322	\$6,663
Kenedy	34	0.0%	\$42	0.0%	\$6,976	0.0%	\$5,942	\$998	\$35	\$6,161	0.0%	\$5,127	\$998	\$35
<b>Grand Total</b>	<b>199,879</b>	<b>100.0%</b>	<b>\$370,417</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$46,540,747</b>	<b>\$13,818,359</b>	<b>\$5,776,973</b>	<b>\$59,811,632</b>	<b>100.0%</b>	<b>\$40,242,215</b>	<b>\$13,818,359</b>	<b>\$5,776,973</b>

### Geocoding Resolution by County

Reported County	Risk Count	Addresses	Postal code
Galveston	60,480	98.5%	1.5%
Nueces	40,348	99.0%	1.0%
Brazoria	31,848	99.3%	0.7%
Jefferson	25,748	99.3%	0.7%
Cameron	11,757	98.8%	1.2%
San Patricio	6,167	98.3%	1.7%
Aransas	5,553	96.8%	3.2%
Matagorda	4,483	92.0%	8.0%
Chambers	4,274	96.6%	3.3%
Calhoun	4,024	95.5%	4.5%
Harris	3,495	99.8%	0.2%
Kleberg	871	95.3%	4.7%
Willacy	405	93.1%	6.9%
Refugio	392	87.2%	12.8%
Kenedy	34	55.9%	44.1%
<b>Grand Total</b>	<b>199,879</b>	<b>98.5%</b>	<b>1.5%</b>

### Map of Total Insured Value by County



## Exhibit 1.B

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by County - Residential

Data as of November 30, 2019

\$Values in \$000's

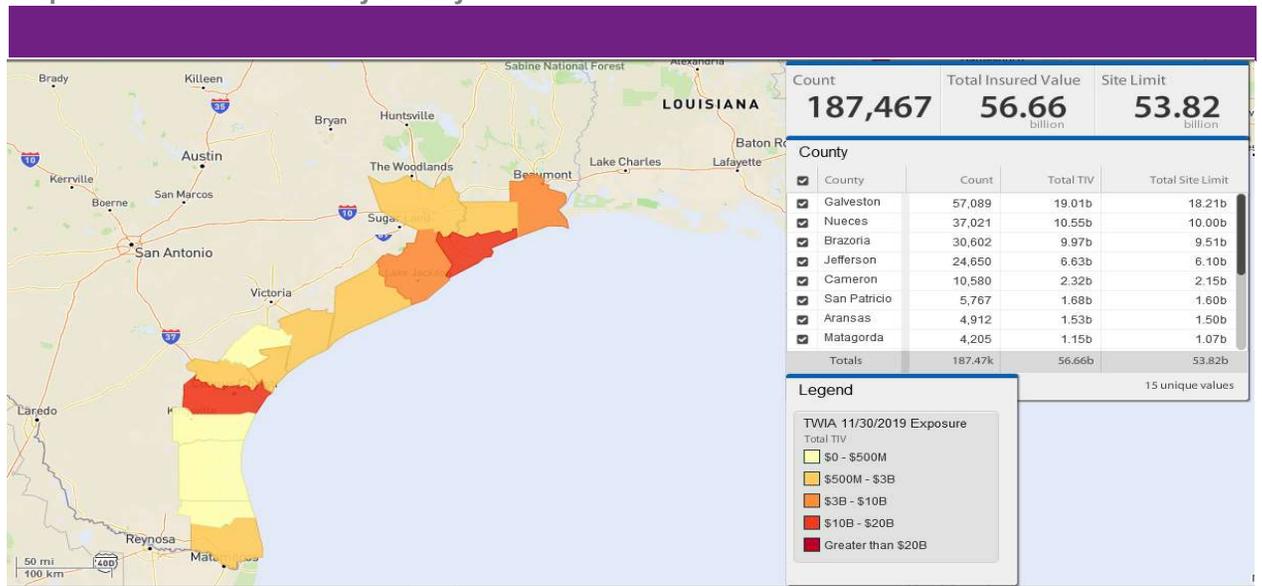
#### Exposure by County - Residential

Reported County	Risk Count	% of Total	Premium	% of Total	Total Insured Value	% of Total	Building Value	Contents Value	Loss of Use Value	Total Insured Limit	% of Total	Building Limit	Contents Limit	Loss Of Use Limit
Galveston	57,089	30.5%	\$107,352	34.3%	\$19,011,149	33.6%	\$12,849,103	\$4,301,739	\$1,860,306	\$18,210,569	33.8%	\$12,056,145	\$4,301,739	\$1,860,306
Nueces	37,021	19.7%	\$58,200	18.6%	\$10,550,054	18.6%	\$7,052,852	\$2,467,153	\$1,030,048	\$10,000,258	18.6%	\$6,510,474	\$2,467,153	\$1,030,048
Brazoria	30,602	16.3%	\$52,079	16.7%	\$9,968,195	17.6%	\$6,549,068	\$2,323,836	\$1,095,290	\$9,510,900	17.7%	\$6,093,251	\$2,323,836	\$1,095,290
Jefferson	24,650	13.1%	\$37,418	12.0%	\$6,629,306	11.7%	\$4,374,118	\$1,567,493	\$687,696	\$6,102,167	11.3%	\$3,847,798	\$1,567,493	\$687,696
Cameron	10,580	5.6%	\$12,203	3.9%	\$2,315,756	4.1%	\$1,581,930	\$522,859	\$210,966	\$2,149,686	4.0%	\$1,417,545	\$522,859	\$210,966
San Patricio	5,767	3.1%	\$9,386	3.0%	\$1,678,719	3.0%	\$1,119,749	\$390,424	\$168,547	\$1,597,345	3.0%	\$1,039,056	\$390,424	\$168,547
Aransas	4,912	2.6%	\$9,983	3.2%	\$1,533,196	2.7%	\$1,012,876	\$400,516	\$119,803	\$1,501,272	2.8%	\$981,990	\$400,516	\$119,803
Matagorda	4,205	2.2%	\$6,385	2.0%	\$1,145,737	2.0%	\$770,755	\$275,191	\$99,790	\$1,072,679	2.0%	\$697,697	\$275,191	\$99,790
Chambers	4,106	2.2%	\$7,253	2.3%	\$1,438,663	2.5%	\$918,070	\$356,347	\$164,246	\$1,387,662	2.6%	\$867,174	\$356,347	\$164,246
Calhoun	3,627	1.9%	\$5,861	1.9%	\$898,166	1.6%	\$615,820	\$215,802	\$66,544	\$863,024	1.6%	\$580,710	\$215,802	\$66,544
Harris	3,398	1.8%	\$4,350	1.4%	\$1,128,468	2.0%	\$734,108	\$269,000	\$125,360	\$1,085,358	2.0%	\$691,943	\$269,000	\$125,360
Kleberg	812	0.4%	\$1,162	0.4%	\$197,719	0.3%	\$142,967	\$37,181	\$17,571	\$181,257	0.3%	\$126,506	\$37,181	\$17,571
Willacy	345	0.2%	\$541	0.2%	\$80,462	0.1%	\$59,270	\$15,882	\$5,310	\$74,777	0.1%	\$53,585	\$15,882	\$5,310
Refugio	324	0.2%	\$471	0.2%	\$79,139	0.1%	\$54,652	\$17,904	\$6,583	\$73,132	0.1%	\$48,726	\$17,904	\$6,583
Kenedy	29	0.0%	\$29	0.0%	\$6,184	0.0%	\$5,356	\$792	\$35	\$5,467	0.0%	\$4,639	\$792	\$35
<b>Grand Total</b>	<b>187,467</b>	<b>100.0%</b>	<b>\$312,674</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$37,840,696</b>	<b>\$13,162,119</b>	<b>\$5,658,095</b>	<b>\$53,815,552</b>	<b>100.0%</b>	<b>\$35,017,239</b>	<b>\$13,162,119</b>	<b>\$5,658,095</b>

#### Geocoding Resolution by County

Reported County	Risk Count	Addresses	Postal code
Galveston	57,089	98.6%	1.4%
Nueces	37,021	99.2%	0.8%
Brazoria	30,602	99.4%	0.5%
Jefferson	24,650	99.4%	0.6%
Cameron	10,580	99.0%	1.0%
San Patricio	5,767	98.4%	1.6%
Aransas	4,912	97.4%	2.6%
Matagorda	4,205	91.9%	8.1%
Chambers	4,106	96.7%	3.3%
Calhoun	3,627	96.1%	3.9%
Harris	3,398	99.8%	0.2%
Kleberg	812	95.1%	4.9%
Willacy	345	92.5%	7.5%
Refugio	324	89.8%	10.2%
Kenedy	29	48.3%	51.7%
<b>Grand Total</b>	<b>187,467</b>	<b>98.7%</b>	<b>1.3%</b>

#### Map of Total Insured Value by County



## Exhibit 1.C

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by County - Commercial

Data as of November 30, 2019

\$Values in \$000's

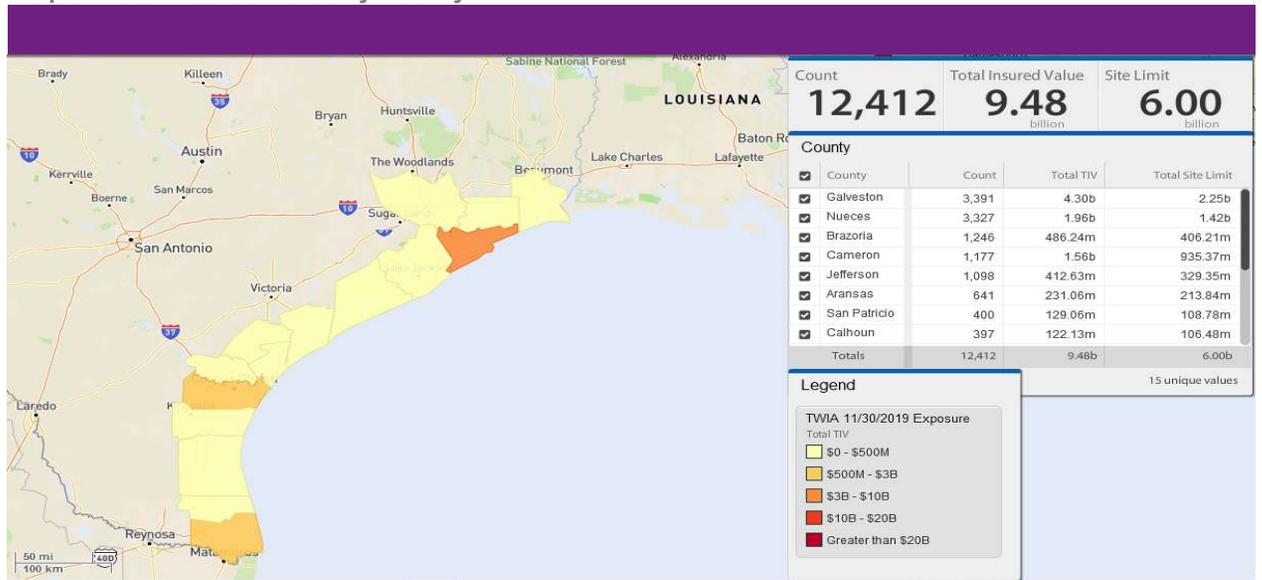
#### Exposure by County - Commercial

Reported County	Risk Count	% of Total Premium	% of Total	Total Insured Value	% of Total	Building Value	Contents Value	Loss of Use Value	Total Insured Limit	% of Total	Building Limit	Contents Limit	Loss Of Use Limit
Galveston	3,391	27.3%	40.7%	\$4,302,075	45.4%	\$4,013,197	\$245,213	\$43,664	\$2,251,418	37.5%	\$1,965,365	\$245,213	\$43,664
Nueces	3,327	26.8%	22.2%	\$1,963,248	20.7%	\$1,777,109	\$148,626	\$37,513	\$1,423,404	23.7%	\$1,237,555	\$148,626	\$37,513
Brazoria	1,246	10.0%	7.8%	\$486,244	5.1%	\$419,954	\$58,069	\$8,222	\$406,211	6.8%	\$340,011	\$58,069	\$8,222
Cameron	1,177	9.5%	11.0%	\$1,557,263	16.4%	\$1,484,611	\$66,861	\$5,791	\$935,373	15.6%	\$863,390	\$66,861	\$5,791
Jefferson	1,098	8.8%	6.2%	\$412,629	4.4%	\$338,124	\$64,013	\$10,492	\$329,349	5.5%	\$254,843	\$64,013	\$10,492
Aransas	641	5.2%	3.4%	\$231,063	2.4%	\$209,904	\$15,925	\$5,233	\$213,838	3.6%	\$192,729	\$15,925	\$5,233
San Patricio	400	3.2%	2.1%	\$129,057	1.4%	\$113,663	\$12,880	\$2,515	\$108,781	1.8%	\$93,387	\$12,880	\$2,515
Calhoun	397	3.2%	2.2%	\$122,135	1.3%	\$106,320	\$14,062	\$1,753	\$106,478	1.8%	\$90,752	\$14,062	\$1,753
Matagorda	278	2.2%	1.6%	\$97,850	1.0%	\$81,783	\$14,060	\$2,008	\$80,783	1.3%	\$64,715	\$14,060	\$2,008
Chambers	168	1.4%	1.1%	\$64,013	0.7%	\$56,126	\$7,306	\$581	\$54,528	0.9%	\$46,641	\$7,306	\$581
Harris	97	0.8%	0.7%	\$48,855	0.5%	\$45,319	\$3,070	\$466	\$34,515	0.6%	\$30,979	\$3,070	\$466
Refugio	68	0.5%	0.5%	\$26,413	0.3%	\$23,915	\$2,418	\$81	\$23,524	0.4%	\$21,026	\$2,418	\$81
Willacy	60	0.5%	0.2%	\$16,035	0.2%	\$14,212	\$1,724	\$99	\$13,589	0.2%	\$11,766	\$1,724	\$99
Kleberg	59	0.5%	0.3%	\$17,496	0.2%	\$15,229	\$1,806	\$461	\$13,597	0.2%	\$11,330	\$1,806	\$461
Kenedy	5	0.0%	0.0%	\$792	0.0%	\$586	\$207	\$0	\$694	0.0%	\$488	\$207	\$0
<b>Grand Total</b>	<b>12,412</b>	<b>100.0%</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$8,700,051</b>	<b>\$656,240</b>	<b>\$118,877</b>	<b>\$5,996,080</b>	<b>100.0%</b>	<b>\$5,224,976</b>	<b>\$656,240</b>	<b>\$118,877</b>

#### Geocoding Resolution by County

Reported County	Risk Count	Addresses	Postal code
Galveston	3,391	96.1%	3.9%
Nueces	3,327	96.3%	3.7%
Brazoria	1,246	96.6%	3.4%
Cameron	1,177	97.1%	2.9%
Jefferson	1,098	95.8%	4.2%
Aransas	641	91.9%	8.1%
San Patricio	400	96.3%	3.8%
Calhoun	397	89.9%	10.1%
Matagorda	278	94.6%	5.4%
Chambers	168	95.2%	4.8%
Harris	97	99.0%	1.0%
Refugio	68	75.0%	25.0%
Willacy	60	96.7%	3.3%
Kleberg	59	98.3%	1.7%
Kenedy	5	100.0%	0.0%
<b>Grand Total</b>	<b>12,412</b>	<b>95.7%</b>	<b>4.3%</b>

#### Map of Total Insured Value by County



## Exhibit 2

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by Occupancy

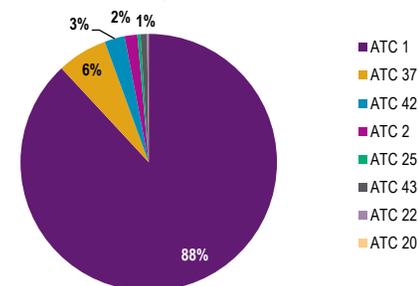
Data as of November 30, 2019

\$Values in \$000's

#### Exposure Summary by Occupancy - All Lines

RMS Mapped Occupancy	AIR Mapped Occupancy	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
ATC 1: Permanent Dwelling (single family housing)	AIR 302: Permanent Dwelling: Single-Family	177,380	88.7%	\$55,469,767	83.9%	\$52,686,396	88.1%
ATC 37: General Commercial	AIR 311: General Commercial	9,650	4.8%	\$5,617,355	8.5%	\$3,795,869	6.3%
ATC 42: Multi-Family Dwelling - Homeowners Association	AIR 306: Apartments/Condominiums	1,620	0.8%	\$2,287,959	3.5%	\$1,525,646	2.6%
ATC 2: Permanent Dwelling (multi- family housing)	AIR 303: Permanent Dwelling: Multi-Family	4,486	2.2%	\$1,199,899	1.8%	\$955,905	1.6%
ATC 25: Education	AIR 346: Primary and Secondary Schools	101	0.1%	\$898,605	1.4%	\$235,966	0.4%
ATC 43: Multi-Family Dwelling - Condo Unit Owner	AIR 306: Apartments/Condominiums	6,410	3.2%	\$503,900	0.8%	\$503,900	0.8%
ATC 22: Religion and Nonprofit	AIR 341: Religion and Non-Profit	134	0.1%	\$149,453	0.2%	\$99,294	0.2%
ATC 20: Agriculture	AIR 373: Agriculture	98	0.0%	\$9,140	0.0%	\$8,655	0.0%
<b>Total</b>		<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>

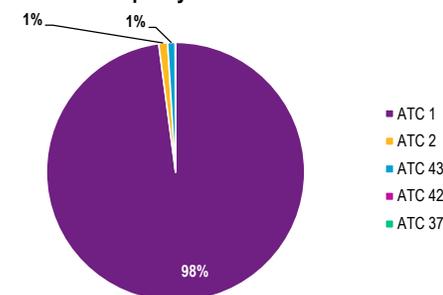
#### Occupancy as % of Limit - All Lines



#### Exposure Summary by Occupancy- Residential

RMS Mapped Occupancy	AIR Mapped Occupancy	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
ATC 1: Permanent Dwelling (single family housing)	AIR 302: Permanent Dwelling: Single-Family	177,370	94.6%	\$55,468,152	97.9%	\$52,684,781	97.9%
ATC 2: Permanent Dwelling (multi- family housing)	AIR 303: Permanent Dwelling: Multi-Family	3,525	1.9%	\$654,571	1.2%	\$594,046	1.1%
ATC 43: Multi-Family Dwelling - Condo Unit Owner	AIR 306: Apartments/Condominiums	6,410	3.4%	\$503,900	0.9%	\$503,900	0.9%
ATC 42: Multi-Family Dwelling - Homeowners Association	AIR 306: Apartments/Condominiums	126	0.1%	\$31,940	0.1%	\$30,478	0.1%
ATC 37: General Commercial	AIR 311: General Commercial	36	0.0%	\$2,348	0.0%	\$2,348	0.0%
<b>Total</b>		<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>

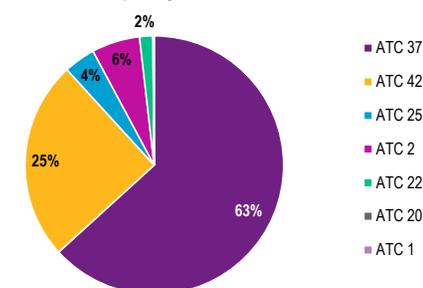
#### Occupancy as % of Limit - Residential



#### Exposure Summary by Occupancy - Commercial

RMS Mapped Occupancy	AIR Mapped Occupancy	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
ATC 37: General Commercial	AIR 311: General Commercial	9,614	77.5%	\$5,615,007	59.3%	\$3,793,521	63.3%
ATC 42: Multi-Family Dwelling - Homeowners Association	AIR 306: Apartments/Condominiums	1,494	12.0%	\$2,256,019	23.8%	\$1,495,168	24.9%
ATC 25: Education	AIR 346: Primary and Secondary Schools	101	0.8%	\$898,605	9.5%	\$235,966	3.9%
ATC 2: Permanent Dwelling (multi- family housing)	AIR 303: Permanent Dwelling: Multi-Family	961	7.7%	\$545,328	5.8%	\$361,860	6.0%
ATC 22: Religion and Nonprofit	AIR 341: Religion and Non-Profit	134	1.1%	\$149,453	1.6%	\$99,294	1.7%
ATC 20: Agriculture	AIR 373: Agriculture	98	0.8%	\$9,140	0.1%	\$8,655	0.1%
ATC 1: Permanent Dwelling (single family housing)	AIR 302: Permanent Dwelling: Single-Family	10	0.1%	\$1,615	0.0%	\$1,615	0.0%
<b>Total</b>		<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

#### Occupancy as % of Limit - Commercial



Note: All business reported under occupancy type field as 'Residential', 'Manufactured Home' and 'Residential Farm' are grouped under Residential; all business reported as 'Commercial', 'Governmental', and 'Commercial Farm' are grouped under Commercial. Please see Appendix 1 for documentation on the mapping of the above RMS & AIR occupancy for modeling.

### Exhibit 3

#### Texas Windstorm Insurance Association (TWIA)

##### Exposure Summary by Construction

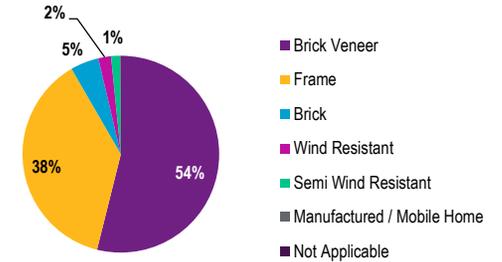
Data as of November 30, 2019

\$Values in \$000's

##### Exposure Summary by Construction - All Lines

Reported Construction	RMS Mapped Construction Description	AIR Mapped Construction Description	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Brick Veneer	RMS 1: Wood with Brick Veneer Cladding	AIR 103: Masonry Veneer	96,371	48.2%	\$33,838,036	51.2%	\$32,246,765	53.9%
Frame	RMS 1: Wood	AIR 101: Wood Frame (Modern)	89,791	44.9%	\$24,186,318	36.6%	\$22,572,744	37.7%
Brick	RMS 2: Masonry	AIR 111: Masonry	8,340	4.2%	\$3,250,843	4.9%	\$2,783,948	4.7%
Wind Resistant	RMS 3: Reinforced Concrete	AIR 131: Reinforced Concrete	3,132	1.6%	\$2,807,210	4.2%	\$1,251,817	2.1%
Semi Wind Resistant	RMS 2C1: Reinforced Masonry	AIR 116: Reinforced Masonry	1,064	0.5%	\$1,995,689	3.0%	\$899,809	1.5%
Not Applicable*	RMS 5B: Mobile Home with tie-downs	AIR 194: Mobile homes full tie down	714	0.4%	\$38,018	0.1%	\$37,871	0.1%
Not Applicable	RMS 0: Unknown	AIR 100: Unknown	467	0.2%	\$19,964	0.0%	\$18,678	0.0%
<b>Total</b>			<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>

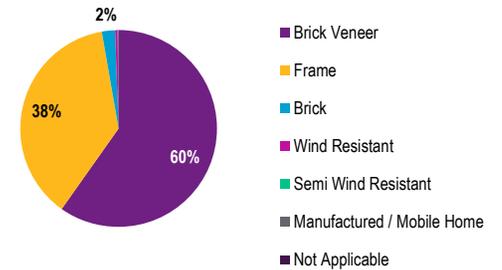
Construction as % of Limit, All Lines



##### Exposure Summary by Construction - Residential

Reported Construction	RMS Mapped Construction Description	AIR Mapped Construction Description	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Brick Veneer	RMS 1: Wood with Brick Veneer Cladding	AIR 103: Masonry Veneer	96,152	51.3%	\$33,774,966	59.6%	\$32,184,553	59.8%
Frame	RMS 1: Wood	AIR 101: Wood Frame (Modern)	83,410	44.5%	\$21,363,431	37.7%	\$20,168,489	37.5%
Brick	RMS 2: Masonry	AIR 111: Masonry	4,280	2.3%	\$1,228,320	2.2%	\$1,169,156	2.2%
Wind Resistant	RMS 3: Reinforced Concrete	AIR 131: Reinforced Concrete	2,332	1.2%	\$215,793	0.4%	\$215,159	0.4%
Semi Wind Resistant	RMS 2C1: Reinforced Masonry	AIR 116: Reinforced Masonry	377	0.2%	\$36,437	0.1%	\$36,437	0.1%
Not Applicable*	RMS 5B: Mobile Home with tie-downs	AIR 194: Mobile homes full tie down	714	0.4%	\$38,018	0.1%	\$37,871	0.1%
Not Applicable	RMS 0: Unknown	AIR 100: Unknown	202	0.1%	\$3,944	0.0%	\$3,887	0.0%
<b>Total</b>			<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>

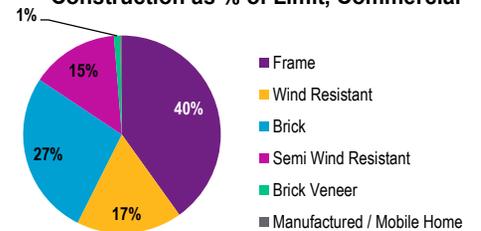
Construction as % of Limit, Residential



##### Exposure Summary by Construction - Commercial

Reported Construction	RMS Mapped Construction Description	AIR Mapped Construction Description	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Brick Veneer	RMS 1: Wood with Brick Veneer Cladding	AIR 103: Masonry Veneer	219	1.8%	\$63,070	0.7%	\$62,212	1.0%
Frame	RMS 1: Wood	AIR 101: Wood Frame (Modern)	6,381	51.4%	\$2,822,887	29.8%	\$2,404,255	40.1%
Brick	RMS 2: Masonry	AIR 111: Masonry	4,060	32.7%	\$2,022,523	21.3%	\$1,614,792	26.9%
Wind Resistant	RMS 3: Reinforced Concrete	AIR 131: Reinforced Concrete	800	6.4%	\$2,591,417	27.3%	\$1,036,658	17.3%
Semi Wind Resistant	RMS 2C1: Reinforced Masonry	AIR 116: Reinforced Masonry	687	5.5%	\$1,959,251	20.7%	\$863,371	14.4%
Not Applicable*	RMS 0: Unknown	AIR 100: Unknown	265	2.1%	\$16,020	0.2%	\$14,791	0.2%
<b>Total</b>			<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

Construction as % of Limit, Commercial



Note: For records where Construction is reported as 'Not Applicable' and Occupancy type reported as 'Manufactured Home', construction will be modeled as Manufactured/Mobile Homes with Tie-Downs.

## Exhibit 4

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by Square Footage

Data as of November 30, 2019

\$Values in \$000's

#### Exposure Summary by Square Footage Band - RMS

RMS Square Footage Band <sup>1</sup>	All Lines						Residential						Commercial					
	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
<= 10	7,322	3.7%	514,981,315	0.8%	511,412,708	0.9%	6,180	3.3%	\$415,925	0.7%	\$415,699	0.8%	1,142	9.2%	\$99,056	1.0%	\$95,714	1.6%
11 - 1,506	77,830	38.9%	14,612,383,184	22.1%	13,639,324,803	22.8%	75,458	40.3%	\$14,337,538	25.3%	\$13,390,056	24.9%	2,372	19.1%	\$274,845	2.9%	\$249,268	4.2%
1,507 - 2,507	79,480	39.8%	25,671,346,663	38.8%	24,475,238,134	40.9%	77,240	41.2%	\$25,156,863	44.4%	\$24,015,603	44.6%	2,240	18.0%	\$514,483	5.4%	\$459,635	7.7%
2,508 - 5,005	30,772	15.4%	16,817,113,059	25.4%	15,983,374,815	26.7%	27,689	14.8%	\$15,657,487	27.6%	\$14,976,057	27.8%	3,083	24.8%	\$1,159,626	12.2%	\$1,007,317	16.8%
5,006 - 10,010	2,815	1.4%	2,430,122,910	3.7%	2,169,620,510	3.6%	857	0.5%	\$1,083,215	1.9%	\$1,008,647	1.9%	1,958	15.8%	\$1,346,908	14.2%	\$1,160,974	19.4%
>= 10,011	1,660	0.8%	6,090,130,967	9.2%	3,032,660,904	5.1%	43	0.0%	\$9,881	0.0%	\$9,490	0.0%	1,617	13.0%	\$6,080,250	64.2%	\$3,023,171	50.4%
<b>Total</b>	<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>	<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>	<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

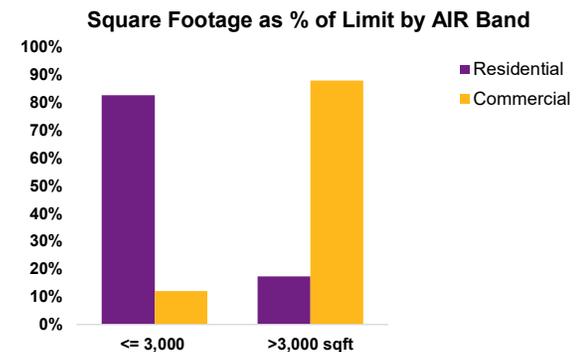
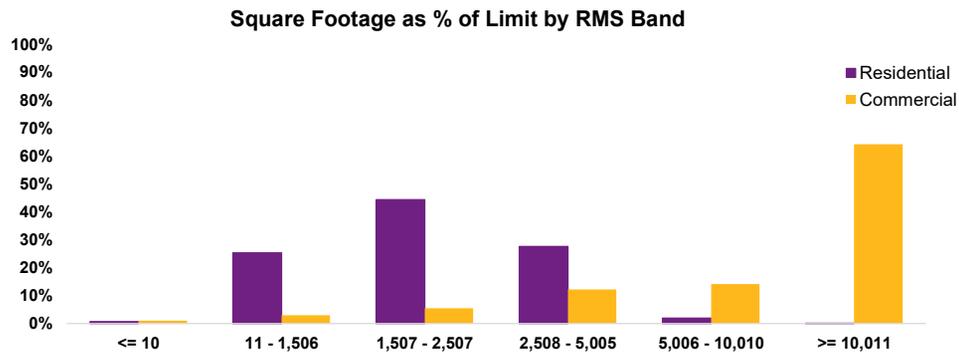
#### Exposure Summary by Square Footage Band - AIR

AIR Square Footage Band <sup>2</sup>	All Lines						Residential						Commercial					
	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
<= 3,000	180,158	90.1%	47,992,947,634	72.6%	45,519,129,598	76.1%	173,560	92.6%	\$46,854,944	82.7%	\$44,497,081	82.7%	6,598	53.2%	\$1,138,003	12.0%	\$1,022,049	17.0%
>3,000 sqft	19,721	9.9%	18,143,130,465	27.4%	14,292,502,276	23.9%	13,907	7.4%	\$9,805,966	17.3%	\$9,318,471	17.3%	5,814	46.8%	\$8,337,164	88.0%	\$4,974,031	83.0%
<b>Total</b>	<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>	<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>	<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

#### Notes:

1. These bands are applicable to Residential only; banding for Commercial is similar to Residential except RMS consolidates 11 - 1,506 & 1,507 - 2,507 into 11 - 2,507 and 2,508 - 5,005 & 5,006 - 10,101 into 2,508 - 10,010.

2. AIR does not currently have a square footage-based vulnerability function implemented for low-rise commercial.



## Exhibit 5

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by Year Built

Data as of November 30, 2019

\$Values in \$000's

#### RMS Year-Built Band

RMS Year Built Band <sup>1</sup>	All Lines						Residential						Commercial					
	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Before 1995	126,504	63.3%	\$37,080,291	56.1%	\$32,886,529	55.0%	118,564	63.2%	\$31,084,826	54.9%	\$29,070,094	54.0%	7,940	64.0%	\$5,995,465	63.3%	\$3,816,435	63.6%
1995 - 2001	19,501	9.8%	\$7,627,832	11.5%	\$7,049,078	11.8%	18,496	9.9%	\$6,779,087	12.0%	\$6,526,187	12.1%	1,005	8.1%	\$848,745	9.0%	\$522,891	8.7%
2002 - 2008	29,171	14.6%	\$11,900,154	18.0%	\$10,923,831	18.3%	27,909	14.9%	\$10,478,142	18.5%	\$10,120,548	18.8%	1,262	10.2%	\$1,422,011	15.0%	\$803,283	13.4%
2009 or Later	23,989	12.0%	\$9,489,783	14.3%	\$8,914,323	14.9%	21,784	11.6%	\$8,280,837	14.6%	\$8,060,852	15.0%	2,205	17.8%	\$1,208,946	12.8%	\$853,470	14.2%
Unknown	714	0.4%	\$38,018	0.1%	\$37,871	0.1%	714	0.4%	\$38,018	0.1%	\$37,871	0.1%	0	0.0%	\$0	0.0%	\$0	0.0%
<b>Total</b>	<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100%</b>	<b>\$59,811,632</b>	<b>100.0%</b>	<b>187,467</b>	<b>100%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>	<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

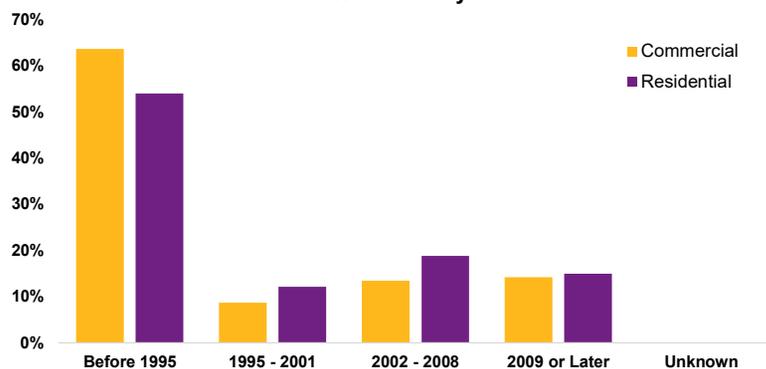
#### AIR Year-Built Band

AIR Year Built Band <sup>1</sup>	All Lines						Residential						Commercial					
	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Before 1995	126,504	63.3%	\$37,080,291	56.1%	\$32,886,529	55.0%	118,564	63.2%	\$31,084,826	54.9%	\$29,070,094	54.0%	7,940	64.0%	\$5,995,465	63.3%	\$3,816,435	63.6%
1995 - 2003	27,657	13.8%	\$10,788,428	16.3%	\$10,017,733	16.7%	26,352	14.1%	\$9,692,279	17.1%	\$9,333,468	17.3%	1,305	10.5%	\$1,096,148	11.6%	\$684,265	11.4%
2004 - 2012	30,235	15.1%	\$12,257,710	18.5%	\$11,299,860	18.9%	28,851	15.4%	\$10,778,876	19.0%	\$10,428,188	19.4%	1,384	11.2%	\$1,478,834	15.6%	\$871,672	14.5%
2013 or Later	14,769	7.4%	\$5,971,631	9.0%	\$5,569,639	9.3%	12,986	6.9%	\$5,066,911	8.9%	\$4,945,931	9.2%	1,783	14.4%	\$904,720	9.5%	\$623,708	10.4%
Unknown	714	0.4%	\$38,018	0.1%	\$37,871	0.1%	714	0.4%	\$38,018	0.1%	\$37,871	0.1%	0	0.0%	\$0	0.0%	\$0	0.0%
<b>Total</b>	<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100%</b>	<b>\$59,811,632</b>	<b>100.0%</b>	<b>187,467</b>	<b>100%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>	<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

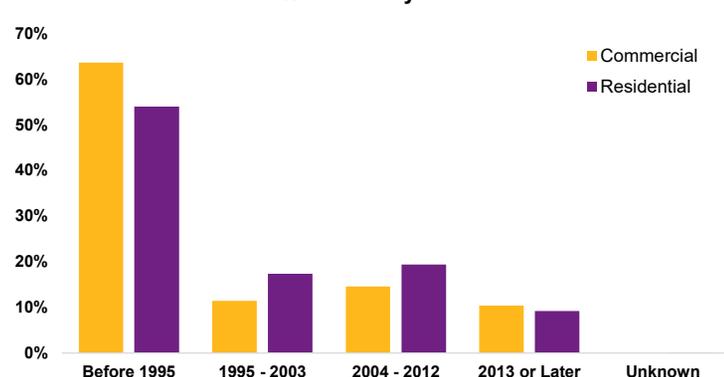
Notes:

1. For all building types except Manufactured/ Mobile Homes. RMS has a different year-built band for MH; since MH business is a tiny fraction of the business, we did not separate it out from the exhibits.
2. All risk with unknown year-built are from Manufactured/ Mobile Homes.

Year-Built as % of Limit by RMS Band



Year-Built as % of Limit by AIR Band



**Exhibit 6**

**Texas Windstorm Insurance Association (TWIA)**

**Exposure Summary by Number of Stories**

Data as of November 30, 2019

\$Values in \$000's

**RMS # of Stories Band - Residential**

# of Stories Band <sup>1</sup>	Construction	Risk Count	% of Total	TIV	% of Total	Total Limit	% of Total
Unknown	Wood Frame, Brick Veneer, or Masonry Structures	928	0.5%	\$42,987	0.1%	\$42,806	0.1%
1 Story	Wood Frame, Brick Veneer, or Masonry Structures <sup>1</sup>	143,317	76.4%	\$39,198,870	69.2%	\$37,062,519	68.9%
Greater than 1 Story	Wood Frame, Brick Veneer, or Masonry Structures <sup>2</sup>	43,222	23.1%	\$17,419,053	30.7%	\$16,710,228	31.1%
<b>Grand Total</b>		<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>

1. 378 records with construction reported as other than Wood Frame, Brick Veneer or Masonry are included in this figure.

2. 2,436 records with construction reported as other than Wood Frame, Brick Veneer or Masonry are included in this figure.

**RMS # of Stories Band - Commercial**

# of Stories Band	Construction	Risk Count	% of Total	TIV	% of Total	Total Limit	% of Total
Unknown	Wood Frame or Brick Veneer Structures <sup>3</sup>	1,650	24.0%	\$381,818	13.2%	\$378,559	15.3%
Greater than 1 Story	Wood Frame or Brick Veneer Structures <sup>3</sup>	5,215	76.0%	\$2,520,159	86.8%	\$2,102,699	84.7%
<b>Wood Total</b>		<b>6,865</b>	<b>100.0%</b>	<b>\$2,901,976</b>	<b>100.0%</b>	<b>\$2,481,258</b>	<b>100.0%</b>
Unknown	Masonry or Reinforced Masonry Structures	360	7.6%	\$50,093	1.3%	\$48,505	2.0%
1 to 3 Stories	Masonry or Reinforced Masonry Structures	4,278	90.1%	\$3,243,826	81.5%	\$2,232,493	90.1%
Greater than 3 Stories	Masonry or Reinforced Masonry Structures	109	2.3%	\$687,855	17.3%	\$197,167	8.0%
<b>Masonry Total</b>		<b>4,747</b>	<b>100.0%</b>	<b>\$3,981,774</b>	<b>100.0%</b>	<b>\$2,478,164</b>	<b>100.0%</b>
Unknown	Reinforced Concrete Structures	257	32.1%	\$31,903	1.2%	\$31,043	3.0%
1 to 3 Stories	Reinforced Concrete Structures	330	41.3%	\$663,332	25.6%	\$473,378	45.7%
4 to 7 Stories	Reinforced Concrete Structures	115	14.4%	\$683,952	26.4%	\$343,461	33.1%
8 to 14 Stories	Reinforced Concrete Structures	51	6.4%	\$838,665	32.4%	\$149,659	14.4%
Greater than 15 Stories	Reinforced Concrete Structures	47	5.9%	\$373,565	14.4%	\$39,117	3.8%
<b>Concrete Total</b>		<b>800</b>	<b>100.0%</b>	<b>\$2,591,417</b>	<b>100.0%</b>	<b>\$1,036,658</b>	<b>100.0%</b>
<b>Grand Total</b>		<b>12,412</b>		<b>\$9,475,168</b>		<b>\$5,996,080</b>	

3. Unknown construction (Manufactured / Mobile Homes) is reflected in Wood Frame or Brick Veneer band.

AIR does not have vulnerability bandings based on number of stories for residential single family occupancy for wind loss.

**AIR # of Stories Bands - Commercial**

# of Stories Band	Construction	Risk Count	% of Total	TIV	% of Total	Total Limit	% of Total
Unknown	Wood Frame or Brick Veneer Structures <sup>3</sup>	1,650	24.0%	\$381,818	13.2%	\$378,559	15.3%
1 Story	Wood Frame or Brick Veneer Structures <sup>3</sup>	3,222	46.9%	\$945,687	32.6%	\$809,323	32.6%
Greater than 1 Story	Wood Frame or Brick Veneer Structures <sup>3</sup>	1,993	29.0%	\$1,574,471	54.3%	\$1,293,376	52.1%
<b>Wood Total</b>		<b>6,865</b>	<b>100.0%</b>	<b>\$2,901,976</b>	<b>100.0%</b>	<b>\$2,481,258</b>	<b>100.0%</b>
Unknown	Masonry or Reinforced Masonry Structur	360	7.6%	\$50,093	1.3%	\$48,505	2.0%
1 Story	Masonry or Reinforced Masonry Structur	3,682	77.6%	\$1,961,537	49.3%	\$1,551,512	62.6%
2 to 3 Stories	Masonry or Reinforced Masonry Structur	596	12.6%	\$1,282,289	32.2%	\$680,981	27.5%
Greater than 4 Stories	Masonry or Reinforced Masonry Structur	109	2.3%	\$687,855	17.3%	\$197,167	8.0%
<b>Masonry Total</b>		<b>4,747</b>	<b>100.0%</b>	<b>\$3,981,774</b>	<b>100.0%</b>	<b>\$2,478,164</b>	<b>100.0%</b>
Unknown	Reinforced Concrete Structures	257	32.1%	\$31,903	1.2%	\$31,043	3.0%
1 to 3 Stories	Reinforced Concrete Structures	330	41.3%	\$663,332	25.6%	\$473,378	45.7%
4 to 7 Stories	Reinforced Concrete Structures	115	14.4%	\$683,952	26.4%	\$343,461	33.1%
Greater than 8 Stories	Reinforced Concrete Structures	98	12.3%	\$1,212,230	46.8%	\$188,776	18.2%
<b>Concrete Total</b>		<b>800</b>	<b>100.0%</b>	<b>\$2,591,417</b>	<b>100.0%</b>	<b>\$1,036,658</b>	<b>100.0%</b>
<b>Grand Total</b>		<b>12,412</b>		<b>\$9,475,168</b>		<b>\$5,996,080</b>	

## Exhibit 7

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by Roof Cover

Data as of November 30, 2019

\$Values in \$000's

#### Exposure Summary by Roof Cover - All Lines

RMS	AIR	Risk	% of	Total Insured	% of	Total Insured	% of
Mapped Roof Cover	Mapped Roof Cover	Count	Total	Value	Total	Limit	Total
Normal Shingle	Asphalt Shingles	124,747	62.4%	\$35,791,555	54.1%	\$33,426,696	55.9%
Shingle Rated for High Wind Speeds	Hurricane Rated Roof Covering	50,595	25.3%	\$18,209,377	27.5%	\$17,535,850	29.3%
Built-up Roof or Single Ply Membrane roof without the presence of gutters	Built-up Roof Without Gravel	2,203	1.1%	\$2,864,941	4.3%	\$1,394,153	2.3%
Concrete & Clay Tiles	Clay/Concrete Tiles	4,825	2.4%	\$2,858,746	4.3%	\$2,166,458	3.6%
Metal sheathing with concealed fasteners	Light Metal Panel	6,646	3.3%	\$2,834,864	4.3%	\$2,274,407	3.8%
Built-up Roof or Single Ply Membrane roof without the presence of gutters	Built-up Roof With Gravel	2,490	1.2%	\$1,280,965	1.9%	\$844,054	1.4%
Concrete & Clay Tiles	Slate	2,426	1.2%	\$740,015	1.1%	\$701,226	1.2%
Metal sheathing with concealed fasteners	Standing Seams Metal Roof	1,642	0.8%	\$659,130	1.0%	\$635,575	1.1%
Unknown	Unknown	3,758	1.9%	\$654,372	1.0%	\$634,932	1.1%
Built-up Roof or Single Ply Membrane roof without the presence of gutters	Single ply membrane	339	0.2%	\$176,117	0.3%	\$135,777	0.2%
Wood Shakes	Wooden Shingles	191	0.1%	\$64,079	0.1%	\$60,634	0.1%
Bermuda-Style Roof	Unknown	17	0.0%	\$1,917	0.0%	\$1,869	0.0%
<b>Total</b>		<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>

#### Exposure Summary by Roof Cover - Residential

RMS	AIR	Risk	% of	Total Insured	% of	Total Insured	% of
Mapped Roof Cover	Mapped Roof Cover	Count	Total	Value	Total	Limit	Total
Normal Shingle	Asphalt Shingles	121,177	64.6%	\$33,954,512	59.9%	\$31,923,415	59.3%
Shingle Rated for High Wind Speeds	Hurricane Rated Roof Covering	50,233	26.8%	\$18,054,055	31.9%	\$17,412,302	32.4%
Concrete & Clay Tiles	Clay/Concrete Tiles	4,363	2.3%	\$1,784,081	3.1%	\$1,715,088	3.2%
Metal sheathing with concealed fasteners	Light Metal Panel	3,356	1.8%	\$875,529	1.5%	\$844,092	1.6%
Concrete & Clay Tiles	Slate	2,298	1.2%	\$692,941	1.2%	\$661,869	1.2%
Metal sheathing with concealed fasteners	Standing Seams Metal Roof	1,570	0.8%	\$620,960	1.1%	\$601,077	1.1%
Built-up Roof or Single Ply Membrane roof without the presence of gutters	Built-up Roof With Gravel	1,585	0.8%	\$253,318	0.4%	\$242,805	0.5%
Built-up Roof or Single Ply Membrane roof without the presence of gutters	Built-up Roof Without Gravel	1,021	0.5%	\$186,700	0.3%	\$181,148	0.3%
Unknown	Unknown	1,444	0.8%	\$148,513	0.3%	\$147,334	0.3%
Built-up Roof or Single Ply Membrane roof without the presence of gutters	Single ply membrane	241	0.1%	\$44,213	0.1%	\$42,027	0.1%
Wood Shakes	Wooden Shingles	162	0.1%	\$44,172	0.1%	\$42,527	0.1%
Bermuda-Style Roof	Unknown	17	0.0%	\$1,917	0.0%	\$1,869	0.0%
<b>Total</b>		<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>

#### Exposure Summary by Roof Cover - Commercial

RMS	AIR	Risk	% of	Total Insured	% of	Total Insured	% of
Mapped Roof Cover	Mapped Roof Cover	Count	Total	Value	Total	Limit	Total
Built-up Roof or Single Ply Membrane roof without the presence of gutters	Built-up Roof Without Gravel	1,182	9.5%	\$2,678,241	28.3%	\$1,213,006	20.2%
Metal sheathing with concealed fasteners	Light Metal Panel	3,290	26.5%	\$1,959,336	20.7%	\$1,430,315	23.9%
Normal Shingle	Asphalt Shingles	3,570	28.8%	\$1,837,043	19.4%	\$1,503,281	25.1%
Concrete & Clay Tiles	Clay/Concrete Tiles	462	3.7%	\$1,074,665	11.3%	\$451,370	7.5%
Built-up Roof or Single Ply Membrane roof without the presence of gutters	Built-up Roof With Gravel	905	7.3%	\$1,027,647	10.8%	\$601,250	10.0%
Unknown	Unknown	2,314	18.6%	\$505,859	5.3%	\$487,599	8.1%
Shingle Rated for High Wind Speeds	Hurricane Rated Roof Covering	362	2.9%	\$155,322	1.6%	\$123,548	2.1%
Built-up Roof or Single Ply Membrane roof without the presence of gutters	Single ply membrane	98	0.8%	\$131,904	1.4%	\$93,750	1.6%
Concrete & Clay Tiles	Slate	128	1.0%	\$47,074	0.5%	\$39,357	0.7%
Metal sheathing with concealed fasteners	Standing Seams Metal Roof	72	0.6%	\$38,170	0.4%	\$34,498	0.6%
Wood Shakes	Wooden Shingles	29	0.2%	\$19,907	0.2%	\$18,107	0.3%
<b>Total</b>		<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

Note: Please see Appendix 2 for documentation on the mapping of the above RMS & AIR roof cover types for modeling.

## Exhibit 8

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by Roof Geometry

Data as of November 30, 2019

\$Values in \$000's

#### Exposure Summary by Roof Geometry - All Lines

Reported Roof Style	RMS Mapped Roof Geometry	AIR Mapped Roof Geometry	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Null	Unknown	Unknown	71,211	35.6%	\$25,395,658	38.4%	\$21,486,508	35.9%
Gabled	Gable Roof with Slope Less Than or Equal To 6:12 (26.5 Degrees)	Gable end without bracing	47,826	23.9%	\$12,821,551	19.4%	\$12,028,921	20.1%
Hip	Hip Roof with Slope Less Than Or Equal To 6:12 (26.5 Degrees)	Hip	38,710	19.4%	\$12,656,694	19.1%	\$12,032,068	20.1%
Mixed	Unknown	Complex	37,996	19.0%	\$13,626,779	20.6%	\$12,999,663	21.7%
Flat	Flat roof without parapets	Flat	4,136	2.1%	\$1,635,396	2.5%	\$1,264,472	2.1%
<b>Total</b>			<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>

#### Exposure Summary by Roof Geometry - Residential

Reported Roof Style	RMS Mapped Roof Geometry	AIR Mapped Roof Geometry	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Null	Unknown	Unknown	60,236	32.1%	\$17,005,838	30.0%	\$16,162,302	30.0%
Gabled	Gable Roof with Slope Less Than or Equal To 6:12 (26.5 Degrees)	Gable end without bracing	47,185	25.2%	\$12,556,895	22.2%	\$11,801,931	21.9%
Hip	Hip Roof with Slope Less Than Or Equal To 6:12 (26.5 Degrees)	Hip	38,495	20.5%	\$12,508,706	22.1%	\$11,914,842	22.1%
Mixed	Unknown	Complex	37,776	20.2%	\$13,508,170	23.8%	\$12,906,526	24.0%
Flat	Flat roof without parapets	Flat	3,775	2.0%	\$1,081,302	1.9%	\$1,029,950	1.9%
<b>Total</b>			<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>

#### Exposure Summary by Roof Geometry - Commercial

Reported Roof Style	RMS Mapped Roof Geometry	AIR Mapped Roof Geometry	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Null	Unknown	Unknown	10,975	88.4%	\$8,389,820	88.5%	\$5,324,206	88.8%
Gabled	Gable Roof with Slope Less Than or Equal To 6:12 (26.5 Degrees)	Gable end without bracing	641	5.2%	\$264,656	2.8%	\$226,990	3.8%
Flat	Flat roof without parapets	Flat	361	2.9%	\$554,094	5.8%	\$234,522	3.9%
Mixed	Unknown	Complex	220	1.8%	\$118,609	1.3%	\$93,136	1.6%
Hip	Hip Roof with Slope Less Than Or Equal To 6:12 (26.5 Degrees)	Hip	215	1.7%	\$147,988	1.6%	\$117,226	2.0%
<b>Total</b>			<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

Note: When there are more than one options within a given roof geometry (i.e., subtype), Willis selected the more conservative option (i.e., more punitive) when it cannot be determined based on the available information. For RMS, where some guidance is provided around the Unknown roof cover distribution mix, Willis selected the option that aligns more with the RMS unknown / default mix.

## Exhibit 9

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by Roof Year

Data as of November 30, 2019

\$Values in \$000's

#### Exposure Summary by Roof Year Band - All Lines

Roof Year Band	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
0 - 5 Years	37,463	18.7%	\$12,869,561	19.5%	\$11,935,937	20.0%
6 - 10 Years	34,277	17.1%	\$12,224,318	18.5%	\$10,850,469	18.1%
11 Years or Older	120,424	60.2%	\$39,370,727	59.5%	\$35,546,029	59.4%
Unknown	7,715	3.9%	\$1,671,472	2.5%	\$1,479,198	2.5%
<b>Total</b>	<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>

#### Exposure Summary by RMS Roof Year - All Lines

Roof Year Band	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
0 - 5 Years	37,209	18.6%	\$12,796,020	19.3%	\$11,866,705	19.8%
6 - 10 Years	34,040	17.0%	\$12,133,115	18.3%	\$10,772,563	18.0%
11 Years or Older	119,050	59.6%	\$38,965,381	58.9%	\$35,196,993	58.8%
Obvious Signs of Deterioration or Distress	2,005	1.0%	\$598,077	0.9%	\$521,062	0.9%
Unknown	7,575	3.8%	\$1,643,486	2.5%	\$1,454,308	2.4%
<b>Total</b>	<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>

#### Exposure Summary by Roof Year Band - Residential

Roof Year Band	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
0 - 5 Years	34,597	18.5%	\$11,152,607	19.7%	\$10,689,076	19.9%
6 - 10 Years	32,678	17.4%	\$10,328,991	18.2%	\$9,869,579	18.3%
11 Years or Older	112,881	60.2%	\$33,687,001	59.5%	\$31,906,508	59.3%
Unknown	7,311	3.9%	\$1,492,311	2.6%	\$1,350,389	2.5%
<b>Total</b>	<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>

#### Exposure Summary by RMS Roof Year - Residential

Roof Year Band	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
0 - 5 Years	34,349	18.3%	\$11,081,965	19.6%	\$10,622,441	19.7%
6 - 10 Years	32,449	17.3%	\$10,262,926	18.1%	\$9,809,948	18.2%
11 Years or Older	111,551	59.5%	\$33,341,341	58.8%	\$31,588,058	58.7%
Obvious Signs of Deterioration or Distress	1,944	1.0%	\$509,541	0.9%	\$468,801	0.9%
Unknown	7,174	3.8%	\$1,465,138	2.6%	\$1,326,304	2.5%
<b>Total</b>	<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>

#### Exposure Summary by Roof Year Band - Commercial

Roof Year Band	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
0 - 5 Years	2,866	23.1%	\$1,716,953	18.1%	\$1,246,861	20.8%
6 - 10 Years	1,599	12.9%	\$1,895,327	20.0%	\$980,890	16.4%
11 Years or Older	7,543	60.8%	\$5,683,726	60.0%	\$3,639,520	60.7%
Unknown	404	3.3%	\$179,162	1.9%	\$128,809	2.1%
<b>Total</b>	<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

#### Exposure Summary by RMS Roof Year - Commercial

Roof Year Band	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
0 - 5 Years	2,860	23.0%	\$1,714,054	18.1%	\$1,244,265	20.8%
6 - 10 Years	1,591	12.8%	\$1,870,189	19.7%	\$962,615	16.1%
11 Years or Older	7,499	60.4%	\$5,624,040	59.4%	\$3,608,935	60.2%
Obvious Signs of Deterioration or Distress	61	0.5%	\$88,536	0.9%	\$52,262	0.9%
Unknown	401	3.2%	\$178,348	1.9%	\$128,003	2.1%
<b>Total</b>	<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

Note: Modeled roof year was taken as the max of 'ROOF\_YR\_NO' from 'TWIA\_Loc\_File\_20191130\_PC.xlsx' file or Certified Date from 'TWIA\_Loc\_File\_20191130\_WPI8.xlsx' file. For Modeled roof year before 1970, Willis will model it as unknown if roof type is reported as anything other than metal roofs. Furthermore, if roof condition is reported by EagleView to be in poor condition, Willis will model the roof as being in 'Obvious Signs of Deterioration or Distress' (applicable in RMS only).

## Exhibit 10

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by RMS Construction Quality

Data as of November 30, 2019

\$Values in \$000's

#### Exposure Summary by RMS Construction Quality - All Lines

RMS Construction Quality	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	155,086	77.6%	\$47,975,096	72.5%	\$42,207,385	70.6%
Certified Design and Construction	44,793	22.4%	\$18,160,982	27.5%	\$17,604,247	29.4%
<b>Total</b>	<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>

#### Exposure Summary by RMS Construction Quality - Residential

RMS Construction Quality	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	142,674	76.1%	\$38,499,929	67.9%	\$36,211,305	67.3%
Certified Design and Construction	44,793	23.9%	\$18,160,982	32.1%	\$17,604,247	32.7%
<b>Total</b>	<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>

#### Exposure Summary by RMS Construction Quality - Commercial

RMS Construction Quality	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	12,412	100.0%	\$9,475,168	100.0%	\$5,996,080	100.0%
Certified Design and Construction	-	0.0%	\$0	0.0%	\$0	0.0%
<b>Total</b>	<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

Note: Please see Appendix 3 for documentation on the mapping of the above RMS Construction Quality for modeling.

## Exhibit 11

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by AIR Building Conditions

Data as of November 30, 2019

\$Values in \$000's

#### Exposure Summary by AIR Building Condition- All Lines

Reported Structure Condition	AIR Building Condition	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Good	Good	80,729	40.4%	\$24,227,073	36.6%	\$22,925,753	38.3%
VeryGood	Good	49,325	24.7%	\$16,527,800	25.0%	\$15,767,114	26.4%
Unknown	Unknown	33,874	16.9%	\$13,668,776	20.7%	\$10,022,142	16.8%
Excellent	Good	23,529	11.8%	\$9,039,795	13.7%	\$8,716,552	14.6%
Average	Average	11,604	5.8%	\$2,531,678	3.8%	\$2,268,733	3.8%
Fair	Average	794	0.4%	\$136,703	0.2%	\$108,214	0.2%
Poor	Poor	24	0.0%	\$4,253	0.0%	\$3,125	0.0%
<b>Total</b>		<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>

#### Exposure Summary by AIR Building Condition - Residential

Reported Structure Condition	AIR Building Condition	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Good	Good	80,729	46.1%	\$24,227,073	44.9%	\$22,925,753	44.6%
VeryGood	Good	49,325	28.2%	\$16,527,800	30.6%	\$15,767,114	30.7%
Excellent	Good	23,529	13.4%	\$9,039,795	16.7%	\$8,716,552	16.9%
Unknown	Unknown	21,462	12.3%	\$4,193,608	7.8%	\$4,026,062	7.8%
Average	Average	11,604	6.6%	\$2,531,678	4.7%	\$2,268,733	4.4%
Fair	Average	794	0.5%	\$136,703	0.3%	\$108,214	0.2%
Poor	Poor	24	0.0%	\$4,253	0.0%	\$3,125	0.0%
<b>Total</b>		<b>175,045</b>	<b>100.0%</b>	<b>\$53,988,276</b>	<b>100.0%</b>	<b>\$51,435,480</b>	<b>100.0%</b>

#### Exposure Summary by AIR Building Condition - Commercial

Reported Structure Condition	AIR Building Condition	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	Unknown	12,412	100.0%	\$9,475,168	100.0%	\$5,996,080	100.0%
<b>Total</b>		<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

Note: The Building Condition modifier in AIR refers to the qualitative assessment of the building, therefore Willis have mapped it directly based on TWIA reported structure condition.

## Exhibit 12

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by AIR Tree Exposure

Data as of November 30, 2019

\$Values in \$000's

#### Exposure Summary by AIR Tree Exposure - All Lines

Reported Tree Overhang	AIR Tree Exposure	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	Unknown	71,290	35.7%	\$25,430,936	38.5%	\$21,520,722	36.0%
None	No	59,618	29.8%	\$20,219,971	30.6%	\$18,982,812	31.7%
Low	Yes	57,493	28.8%	\$17,445,325	26.4%	\$16,465,156	27.5%
Medium	Yes	11,396	5.7%	\$3,019,213	4.6%	\$2,823,887	4.7%
High	Yes	82	0.0%	\$20,633	0.0%	\$19,055	0.0%
<b>Total</b>		<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>

#### Exposure Summary by AIR Tree Exposure - Residential

Reported Tree Overhang	AIR Tree Exposure	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	Unknown	60,315	32.2%	\$17,041,116	30.1%	\$16,196,516	30.1%
None	No	58,547	31.2%	\$19,293,561	34.1%	\$18,439,031	34.3%
Low	Yes	57,159	30.5%	\$17,297,650	30.5%	\$16,345,965	30.4%
Medium	Yes	11,364	6.1%	\$3,007,950	5.3%	\$2,814,985	5.2%
High	Yes	82	0.0%	\$20,633	0.0%	\$19,055	0.0%
<b>Total</b>		<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>

#### Exposure Summary by AIR Tree Exposure - Commercial

Reported Tree Overhang	AIR Tree Exposure	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	Unknown	10,975	88.4%	\$8,389,820	88.5%	\$5,324,206	88.8%
None	No	1,071	8.6%	\$926,410	9.8%	\$543,781	9.1%
Low	Yes	334	2.7%	\$147,675	1.6%	\$119,192	2.0%
Medium	Yes	32	0.3%	\$11,263	0.1%	\$8,901	0.1%
High	Yes	-	0.0%	\$0	0.0%	\$0	0.0%
<b>Total</b>		<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

## Exhibit 13

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by RMS Opening Protection

Data as of November 30, 2019

\$Values in \$000's

#### Exposure Summary by RMS Opening Protection - All Lines

RMS Opening Protection	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	167,444	83.8%	\$53,674,154	81.2%	\$47,700,709	79.8%
All glazed openings designed for pressure & large missiles (doors not designed for pressure/impact)	25,435	12.7%	\$9,599,655	14.5%	\$9,313,455	15.6%
All openings designed for pressure & large missiles (including doors)	7,000	3.5%	\$2,862,269	4.3%	\$2,797,468	4.7%
<b>Total</b>	<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>

#### Exposure Summary by RMS Opening Protection - Residential

RMS Opening Protection	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	155,049	82.7%	\$44,208,863	78.0%	\$41,713,544	77.5%
All glazed openings designed for pressure & large missiles (doors not designed for pressure/impact)	25,428	13.6%	\$9,598,291	16.9%	\$9,312,186	17.3%
All openings designed for pressure & large missiles (including doors)	6,990	3.7%	\$2,853,756	5.0%	\$2,789,822	5.2%
<b>Total</b>	<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>

#### Exposure Summary by RMS Opening Protection - Commercial

RMS Opening Protection	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	12,395	99.9%	\$9,465,291	99.9%	\$5,987,164	99.9%
All openings designed for pressure & large missiles (including doors)	10	0.1%	\$8,513	0.1%	\$7,647	0.1%
All glazed openings designed for pressure & large missiles (doors not designed for pressure/impact)	7	0.1%	\$1,363	0.0%	\$1,269	0.0%
<b>Total</b>	<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

Note: Please see Appendix 4 for documentation on the mapping of the above RMS Opening Protection for modeling.

## Exhibit 14

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by AIR Window Protection

Data as of November 30, 2019

\$Values in \$000's

#### Exposure Summary by AIR Window Protection - All Lines

AIR Window Protection	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	168,052	84.7%	\$53,874,959	82.1%	\$47,892,021	80.8%
Non Engineered Shutters	30,411	15.3%	\$11,726,156	17.9%	\$11,399,563	19.2%
Engineered Shutters	1,416	0.7%	\$534,963	0.8%	\$520,048	0.9%
<b>Total</b>	<b>198,463</b>	<b>100.0%</b>	<b>\$65,601,115</b>	<b>100.0%</b>	<b>\$59,291,584</b>	<b>100.0%</b>

#### Exposure Summary by AIR Window Protection - Residential

AIR Window Protection	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	155,657	83.0%	\$44,409,668	78.4%	\$41,904,857	77.9%
Non Engineered Shutters	30,411	16.2%	\$11,726,156	20.7%	\$11,399,563	21.2%
Engineered Shutters	1,399	0.7%	\$525,087	0.9%	\$511,133	0.9%
<b>Total</b>	<b>187,467</b>	<b>100.0%</b>	<b>\$56,660,910</b>	<b>100.0%</b>	<b>\$53,815,552</b>	<b>100.0%</b>

#### Exposure Summary by AIR Window Protection - Commercial

AIR Window Protection	Risk Count	% of Total	Total Insured Value	% of Total	Total Insured Limit	% of Total
Unknown	12,395	99.9%	\$9,465,291	99.9%	\$5,987,164	99.9%
Non Engineered Shutters	-	0.0%	\$0	0.0%	\$0	0.0%
Engineered Shutters	17	0.1%	\$9,877	0.1%	\$8,915	0.1%
<b>Total</b>	<b>12,412</b>	<b>100.0%</b>	<b>\$9,475,168</b>	<b>100.0%</b>	<b>\$5,996,080</b>	<b>100.0%</b>

Note: Please see Appendix 4 for documentation on the mapping of the above AIR Window Protection for modeling.

## Exhibit 15

### Texas Windstorm Insurance Association (TWIA)

#### Exposure Summary by Limit & Deductible Profile

Data as of November 30, 2019

\$Values in \$000's

#### Exposure Summary by Limit Profile

Limit Range	All Lines							Residential				Commercial					
	Risk Count	% of Total	TIV	% of Total	Total Limit	% of Total	Avg Limit in Band	Risk Count	TIV	Total Limit	% of Total	Avg Limit in Band	Risk Count	TIV	Total Limit	% of Total	Avg Limit in Band
(\$0 - \$100K]	23,454	11.7%	\$1,771,355	2.7%	\$1,421,334	2.4%	\$61	20,090	\$1,571,844	\$1,260,361	2.3%	\$63	3,364	\$199,510	\$160,973	2.7%	\$48
(\$100K - \$200K]	44,989	22.5%	\$7,819,879	11.8%	\$6,955,395	11.6%	\$155	42,563	\$7,347,554	\$6,587,850	12.2%	\$155	2,426	\$472,325	\$367,545	6.1%	\$152
(\$200K - \$300K]	54,604	27.3%	\$14,408,632	21.8%	\$13,623,599	22.8%	\$249	52,812	\$13,867,429	\$13,175,059	24.5%	\$249	1,792	\$541,203	\$448,540	7.5%	\$250
(\$300K - \$400K]	37,584	18.8%	\$13,479,963	20.4%	\$12,963,433	21.7%	\$345	36,408	\$12,995,191	\$12,551,239	23.3%	\$345	1,176	\$484,772	\$412,193	6.9%	\$351
(\$400K - \$500K]	18,227	9.1%	\$8,385,821	12.7%	\$8,089,605	13.5%	\$444	17,477	\$7,989,423	\$7,749,987	14.4%	\$443	750	\$396,398	\$339,619	5.7%	\$453
(\$500K - \$750K]	14,816	7.4%	\$9,139,355	13.8%	\$8,789,736	14.7%	\$593	13,770	\$8,412,128	\$8,153,433	15.2%	\$592	1,046	\$727,227	\$636,303	10.6%	\$608
(\$750K - \$1M]	3,399	1.7%	\$3,012,524	4.6%	\$2,888,971	4.8%	\$850	2,875	\$2,499,927	\$2,435,881	4.5%	\$847	524	\$512,598	\$453,090	7.6%	\$865
(\$1M - \$1.5M]	1,634	0.8%	\$2,046,820	3.1%	\$1,952,243	3.3%	\$1,195	1,137	\$1,367,313	\$1,338,578	2.5%	\$1,177	497	\$679,507	\$613,665	10.2%	\$1,235
(\$1.5M - \$2M]	579	0.3%	\$1,077,638	1.6%	\$992,478	1.7%	\$1,714	335	\$610,101	\$563,164	1.0%	\$1,681	244	\$467,537	\$429,314	7.2%	\$1,759
(\$2M - \$4M]	294	0.1%	\$967,829	1.5%	\$820,583	1.4%	\$2,791	0	\$0	\$0	0.0%	n/a	294	\$967,829	\$820,583	13.7%	\$2,791
Greater than \$4M	299	0.1%	\$4,026,260	6.1%	\$1,314,255	2.2%	\$4,396	0	\$0	\$0	0.0%	n/a	299	\$4,026,260	\$1,314,255	21.9%	\$4,396
<b>Total</b>	<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>100.0%</b>	<b>\$299</b>	<b>187,467</b>	<b>\$56,660,910</b>	<b>\$53,815,552</b>	<b>100.0%</b>	<b>\$287</b>	<b>12,412</b>	<b>\$9,475,168</b>	<b>\$5,996,080</b>	<b>100.0%</b>	<b>\$483</b>

#### Exposure Summary by Deductible Profile

Deductible Range	All Lines							Residential				Commercial					
	Risk Count	% of Total	TIV	% of Total	Total Limit	Total Deductible	Deductible as % of TIV	Risk Count	TIV	Total Limit	Total Deductible	Deductible as % of TIV	Risk Count	TIV	Total Limit	Total Deductible	Deductible as % of TIV
[0 -1K]	16,989	8.5%	\$1,248,818	1.9%	\$1,067,018	\$13,648	1.1%	14,355	\$1,105,144.2	\$944,415	\$11,030	1.0%	2,634	\$143,673.8	\$122,603	\$2,617	1.8%
(\$1K - \$2K]	21,997	11.0%	\$3,582,917	5.4%	\$3,133,664	\$34,240	1.0%	19,931	\$3,253,830.3	\$2,872,268	\$30,781	0.9%	2,066	\$329,086.6	\$261,396	\$3,459	1.1%
(\$2K - \$3K]	25,342	12.7%	\$5,704,364	8.6%	\$5,262,962	\$63,630	1.1%	23,692	\$5,275,346.2	\$4,905,857	\$59,462	1.1%	1,650	\$429,018.3	\$357,105	\$4,168	1.0%
(\$3K - \$5K]	46,975	23.5%	\$12,713,316	19.2%	\$11,969,224	\$186,962	1.5%	44,936	\$11,917,606.7	\$11,283,254	\$178,881	1.5%	2,039	\$795,708.8	\$685,971	\$8,080	1.0%
(\$5K - \$10K]	60,182	30.1%	\$21,868,097	33.1%	\$20,893,029	\$417,902	1.9%	58,151	\$20,623,476.3	\$19,821,558	\$403,483	2.0%	2,031	\$1,244,620.7	\$1,071,470	\$14,419	1.2%
\$10K	28,394	14.2%	\$21,018,566	31.8%	\$17,485,736	\$504,205	2.4%	26,402	\$14,485,506.6	\$13,988,200	\$442,293	3.1%	1,992	\$6,533,059.5	\$3,497,535	\$61,912	0.9%
<b>Total</b>	<b>199,879</b>	<b>100.0%</b>	<b>\$66,136,078</b>	<b>100.0%</b>	<b>\$59,811,632</b>	<b>\$1,220,587</b>	<b>1.8%</b>	<b>187,467</b>	<b>\$56,660,910.3</b>	<b>\$53,815,552</b>	<b>\$1,125,931</b>	<b>2.0%</b>	<b>12,412</b>	<b>\$9,475,167.8</b>	<b>\$5,996,080</b>	<b>\$94,656</b>	<b>1.0%</b>

## Appendix 1

### Texas Windstorm Insurance Association (TWIA)

#### Occupancy Mapping

Data as of November 30, 2019

**Note:** For classes with very little contribution to the overall TWIA business or if it was not obvious how to map based on class information provided, Willis default to the original reported occupancy ("Occupancy\_Type" field) for modeling (i.e, if Residential, then model as ATC 1: Permanent Dwelling - Single Family Dwelling and if Commercial then model as ATC 37 - General Commercial.)

#### Occupancy Mapping

TWIA Reported Occupancy Information		Occupancy Type	Mapped ATC Occupancy
CONF_CLASS_CD	CONF_CLASS_CD_SHORT_TEXT		
D02	Building: Dwelling residential FRAME, BV, BRICK	Residential	ATC 1: Permanent Dwelling (single family housing)
CML01	Building : Commercial FRAME, BV, BRICK	Commercial	ATC 37: General Commercial
CON14	HHG : Condominiums residential HHG FRAME, BRICK OR HC	Residential	ATC 43: Multi-Family Dwelling - Condo Unit Owner
CON13	HHG: Condominiums residential HHG WR OR SWR	Residential	ATC 43: Multi-Family Dwelling - Condo Unit Owner
D08	Outbuilding: Dwelling residential Outbuildings FRAME, BV, BRICK	Residential	ATC 1: Permanent Dwelling (single family housing)
CML05	Contents: Commercial ( all constructions)	Commercial	ATC 37: General Commercial
D12	Building / Duplex: Duplex Building FRAME, BV, BRICK	Residential	ATC 2: Permanent Dwelling (multi- family housing)
D06	HHG: Dwelling residential HHG (Insured without building) FRAME, BV, BRICK	Residential	ATC 1: Permanent Dwelling (single family housing)
B07	21 Builders Risk DWELLING AND F&R DWELLING / ORIGINAL CONSTRUCTION	Commercial	ATC 37: General Commercial
CON02	Building: Condominiums Association FRAME, BV, BRICK	Commercial	ATC 42: Multi-Family Dwelling - Homeowners Association
T06	Building: Individually owned Townhouse FRAME, BV, OR BRICK	Residential	ATC 2: Permanent Dwelling (multi- family housing)
MH1	MH BUILDING : COASTAL	Manufactured Home	ATC 1: Permanent Dwelling (single family housing)
CML02	Building: Commercial HC, WR, SWR	Commercial	ATC 37: General Commercial
T10	HHG: Individually owned Townhouse (Insured without building) FRAME, BV, OR BRICK	Residential	ATC 2: Permanent Dwelling (multi- family housing)
A04	Building: Apartment house schedule 3 Thru 7 Units, FRAME, BV, BRICK	Commercial	ATC 2: Permanent Dwelling (multi- family housing)
P06	Building: Public Housing Project 3 or more unit Apartment FRAME BRICK, HC	Commercial	ATC 2: Permanent Dwelling (multi- family housing)
A17	HHG: Apartment house residential (3 or more) FRAME, BRICK OR HC	Residential	ATC 2: Permanent Dwelling (multi- family housing)
M1	Miscellaneous : Commercial Structures	Commercial	ATC 37: General Commercial
P02	Building: Public Housing Project 1 & 2 Unit FRAME, BV, BRICK WITH PHC	Residential	ATC 2: Permanent Dwelling (multi- family housing)
T02	Building / Outbuilding: Townhouse Association FRAME,BV,BRICK	Commercial	ATC 42: Multi-Family Dwelling - Homeowners Association
CON01	Building: Condominiums Association HC, WR, SWR	Commercial	ATC 42: Multi-Family Dwelling - Homeowners Association
CON04	Outbuilding: Condominiums Association FRAME, BV, BRICK	Commercial	ATC 42: Multi-Family Dwelling - Homeowners Association
B03B	Builders Risk Dwelling Repairs/Improvements Form 21	Commercial	ATC 37: General Commercial
A06	Building: Apartment house schedule 8 or more Units FRAME, BV, BRICK	Commercial	ATC 2: Permanent Dwelling (multi- family housing)
F01	Building: Farm & Ranch Dwelling	Residential Farm	ATC 1: Permanent Dwelling (single family housing)
A02	Building: Apartment house schedule 1 or 2 Units FRAME, BV, BRICK	Residential	ATC 2: Permanent Dwelling (multi- family housing)
CML08	Building / Contents: BLANKET CHURCH	Commercial	ATC 22: Religion and Nonprofit
T12	Townhouse Association 1-2 Unit Frame, BV, Brick	Residential	ATC 42: Multi-Family Dwelling - Homeowners Association
M5H	Canopy	Commercial	ATC 37: General Commercial
M5Q	Fence	Commercial	ATC 37: General Commercial
M5M	Tank	Commercial	ATC 37: General Commercial
M5O	Swimming Pool (inground)	Commercial	ATC 37: General Commercial
D17	Boathouse: Attached Boathouse over water FRAME, BV, BRICK	Residential	ATC 1: Permanent Dwelling (single family housing)
M4C	Deck, Dock or Pier Over Water Stand Alone	Residential	ATC 1: Permanent Dwelling (single family housing)
D18	Boathouse: Detached Boathouse over water FRAME, BV, BRICK	Residential	ATC 1: Permanent Dwelling (single family housing)
B01	18 Builders Risk Dwelling and F&R Dwelling original construction Form 18	Commercial	ATC 37: General Commercial
A15	HHG: Apartment house residential (1-2 Units) FRAME, BV, BRICK	Residential	ATC 2: Permanent Dwelling (multi- family housing)
M5R	Light Pole	Commercial	ATC 37: General Commercial
M4	Miscellaneous: Residential Structure	Residential	ATC 1: Permanent Dwelling (single family housing)
F03	Outbuilding: Farm & Ranch Barns & Outbuildings	Commercial Farm	ATC 20: Agriculture
D16	HHG: Duplex HHG (Insured without building) FRAME, BV, BRICK	Residential	ATC 2: Permanent Dwelling (multi- family housing)
CML04A	Building / Contents: BLANKET "PUBLIC" SCHOOLS HC, WR, SWR	Governmental	ATC 25: Education

## Appendix 1

### Texas Windstorm Insurance Association (TWIA)

#### Occupancy Mapping

Data as of November 30, 2019

**Note:** For classes with very little contribution to the overall TWIA business or if it was not obvious how to map based on class information provided, Willis default to the original reported occupancy ("Occupancy\_Type" field) for modeling (i.e, if Residential, then model as ATC 1: Permanent Dwelling - Single Family Dwelling and if Commercial then model as ATC 37 - General Commercial.)

#### Occupancy Mapping

TWIA Reported Occupancy Information		Mapped ATC Occupancy	
CONF_CLASS_CD	CONF_CLASS_CD_SHORT_TEXT	Occupancy Type	
CML03A	Building / Contents: BLANKET "PUBLIC" SCHOOLS Frame, BV, Brick	Governmental	ATC 25: Education
M4B	Deck, Dock or Pier Over Water Attached	Residential	ATC 1: Permanent Dwelling (single family housing)
D01	Building: Dwelling residential WR, SWR, HC	Residential	ATC 1: Permanent Dwelling (single family housing)
M5J	Carport	Commercial	ATC 37: General Commercial
M5L	Sign	Commercial	ATC 37: General Commercial
D10	HHG / Contents : Outbuilding HHG FRAME, BV, BRICK	Residential	ATC 1: Permanent Dwelling (single family housing)
CML10	HHG: RESIDENTIAL HHG IN COMMERCIAL BLDG	Residential	ATC 37: General Commercial
CON03	Outbuilding: Condominiums Association HC, WR, SWR	Commercial	ATC 42: Multi-Family Dwelling - Homeowners Association
F05	Miscellaneous: Class 1 Grain Tanks	Commercial Farm	ATC 20: Agriculture
A12	Outbuilding: Apartment house schedule FRAME, BV, BRICK	Commercial	ATC 2: Permanent Dwelling (multi- family housing)
CML11	Building: ROOMING & BOARDING HOUSES FRAME, BV, BRICK	Commercial	ATC 37: General Commercial
M5F	Stand alone deck/dock or pier over water	Commercial	ATC 37: General Commercial
CON06	Contents: Condominiums Association Contents of (BLDGS & OUTBLDGS) FRAME, BRICK OR HC	Commercial	ATC 42: Multi-Family Dwelling - Homeowners Association
B06D	Builders Risk Commercial Repairs/Improvements Form 21	Commercial	ATC 37: General Commercial
M4H	Miscellaneous: Swimming Pool (In-ground)	Residential	ATC 1: Permanent Dwelling (single family housing)
B10	21 Builders Risk COMMERCIAL AND F&R NON-DWELLING / ORIGINAL CONSTRUCTION	Commercial	ATC 37: General Commercial
B12D	Builders Risk Commercial Repairs/Improvements Form 18	Commercial	ATC 37: General Commercial
B03A	18 Builders Risk Dwelling and F&R Dwelling with additions and exceeding 10% Form 18 (BR)	Commercial	ATC 37: General Commercial
F18	Farm & Ranch Dwelling - Outbuilding (Excluding "Barn" Type Structures) HC, WR or SWR	Residential	ATC 1: Permanent Dwelling (single family housing)
M5K	Gazebo	Commercial	ATC 37: General Commercial
M5B	Tennis court surface	Commercial	ATC 37: General Commercial
B02	18 Builders Risk Dwelling and F&R Dwelling No additions or less than 10% Form 18	Commercial	ATC 37: General Commercial
F04	Miscellaneous: Miscellaneous Farm Property	Commercial Farm	ATC 20: Agriculture
M5D	Boathouse over water - stand alone	Commercial	ATC 37: General Commercial
B09B	Builders Risk Residential Repairs/Improvements Form 18	Commercial	ATC 1: Permanent Dwelling (single family housing)
P10	Building: Public Housing iProject Administrative Buildings FRAME BV BRICK	Commercial	ATC 42: Multi-Family Dwelling - Homeowners Association
M1A	Miscellaneous : Commercial Contents	Commercial	ATC 37: General Commercial
A18	HHG: Apartment house residential (3 or more) WR, SWR	Residential	ATC 2: Permanent Dwelling (multi- family housing)
M5A	Flag Pole	Commercial	ATC 37: General Commercial
T01	Building / Outbuilding: Townhouse Association HC,WR,SWR	Commercial	ATC 42: Multi-Family Dwelling - Homeowners Association
MH3	MH CONTENTS : COASTAL	Manufactured Home	ATC 1: Permanent Dwelling (single family housing)
MH2	MH BUILDING : BEACH	Manufactured Home	ATC 1: Permanent Dwelling (single family housing)
A03	Building: Apartment house schedule 3 Thru 7 Units HC, WR, SWR	Commercial	ATC 2: Permanent Dwelling (multi- family housing)
M4J	Miscellaneous: Fence	Residential	ATC 1: Permanent Dwelling (single family housing)
P05	Building: Public Housing Project 3 or more units Apartments WR, SWR, HC	Commercial	ATC 2: Permanent Dwelling (multi- family housing)
CML09	Building / Contents: "PRIVATE" SCHOOL BLANKET COVERAGE	Commercial	ATC 25: Education
F02	HHG: Farm & Ranch HHG	Residential Farm	ATC 1: Permanent Dwelling (single family housing)
B09A	21 Builders Risk DWELLING AND F&R DWELLING WITH ADDITONS EXCEEDING 10% (BR)	Commercial	ATC 37: General Commercial
T16	Townhome Outbuilding	Commercial	ATC 42: Multi-Family Dwelling - Homeowners Association
CON08	Building: Condominiums Association / Form 4 FRAME, BV,BRICK	Commercial	ATC 42: Multi-Family Dwelling - Homeowners Association
M5S	Score Board	Commercial	ATC 37: General Commercial
A05	Building: Apartment house schedule 8 or more Units HC, WR, SWR	Commercial	ATC 2: Permanent Dwelling (multi- family housing)

## Appendix 1

### Texas Windstorm Insurance Association (TWIA)

#### Occupancy Mapping

Data as of November 30, 2019

**Note:** For classes with very little contribution to the overall TWIA business or if it was not obvious how to map based on class information provided, Willis default to the original reported occupancy ("Occupancy\_Type" field) for modeling (i.e, if Residential, then model as ATC 1: Permanent Dwelling - Single Family Dwelling and if Commercial then model as ATC 37 - General Commercial.)

#### Occupancy Mapping

TWIA Reported Occupancy Information		Mapped ATC Occupancy	
CONF_CLASS_CD	CONF_CLASS_CD_SHORT_TEXT	Occupancy Type	
B05	18 Builders Risk COMMERCIAL AND F&R NON-DWELLING NO ADDITIONS OR LESS THAN 10%	Commercial	ATC 37: General Commercial
T09	HHG: Individually owned Townhouse (Insured without building) WR, SWR OR HC	Residential	ATC 2: Permanent Dwelling (multi- family housing)
M4D	M4d	Residential	ATC 1: Permanent Dwelling (single family housing)
B08	21 Builders Risk DWELLING AND F&R DWELLING NO ADDITIONS OR LESS THAN 10%	Commercial	ATC 37: General Commercial
D11	Building / Duplex: Duplex Building WR, SWR, HC	Residential	ATC 2: Permanent Dwelling (multi- family housing)
M5T	Bleachers/Stadium	Commercial	ATC 37: General Commercial
D05	HHG: Dwelling residential HHG (Insured without building) WR, SWR, HC	Residential	ATC 1: Permanent Dwelling (single family housing)
B04	18 Builders Risk COMMERCIAL AND F&R NON-DWELLING / ORIGINAL CONSTRUCTION	Commercial	ATC 37: General Commercial
M4E	Greenhouse Stand Alone	Residential	ATC 1: Permanent Dwelling (single family housing)
M5P	Antenna/Satellite Dish	Commercial	ATC 37: General Commercial
CON09	Contents: Condominiums Association / Form 4 HC,WR,SWR	Commercial	ATC 42: Multi-Family Dwelling - Homeowners Association
D15	HHG: Duplex HHG (Insured without building) WR, SWR, HC	Residential	ATC 2: Permanent Dwelling (multi- family housing)
D04	HHG: Dwelling residential HHG (Insured with building) FRAME, BV, BRICK	Residential	ATC 1: Permanent Dwelling (single family housing)
A08	Contents: Apartment house schedule 1 or 2 Units FRAME, BV, BRICK	Residential	ATC 2: Permanent Dwelling (multi- family housing)
P09	Building: Public Housing Project Administrative Buildings WR, SWR HC	Commercial	ATC 42: Multi-Family Dwelling - Homeowners Association
T05	Building: Individually owned Townhouse WR, SWR OR HC	Residential	ATC 2: Permanent Dwelling (multi- family housing)

## Appendix 2

### Texas Windstorm Insurance Association (TWIA)

#### Roof Cover Mapping

Data as of November 30, 2019

**Note:** When there are more than one options within a given roof type (i.e., subtype), Willis selected the more conservative option (i.e., more punitive) when it cannot be determined based on the available information. For RMS, where some guidance is provided around the Unknown roof cover distribution mix, Willis selected the option that aligns more with the RMS unknown / default mix.

Willis mapped all roof cover reported as *Shingles, Asphalt/Fiberglass*, *Shingles, Asphalt*, *Shingles, Architectural*, *shinglesAsphaltFiberglassIrrPattExt*, or *Shingles, Fiberglass* as *Shingle Rated for High Wind Speeds* in RMS and *Hurricane Rated Roof Covering* in AIR if the risk has IRC or IBC building code per *TWIA\_Loc\_File\_20191130\_PC.xlsx* file OR identified as re-rated roof with IRC or IBC code per *TWIA\_Loc\_File\_20191130\_WPI8.xlsx* file. This is consistent with standards noted for asphalt roofs per TDI site: <https://www.tdi.texas.gov/wind/documents/asphaltshnglst.pdf>

#### Roof Cover Mapping

TWIA Reported Roof Cover Information	Mappings for Modeling	
CONF_ROOF_TYPE_CD_SHORT_TEXT	RMS Roof Covering	AIR Roof Covering
Shingles, Asphalt/Fiberglass	Normal Shingle	Asphalt Shingles
Shingles, Asphalt/Fiberglass	Shingle Rated for High Wind Speeds	Hurricane Rated Roof Covering
Shingles, Asphalt	Normal Shingle	Asphalt Shingles
Shingles, Asphalt	Shingle Rated for High Wind Speeds	Hurricane Rated Roof Covering
Shingles, Architectural	Normal Shingle	Asphalt Shingles
Shingles, Architectural	Shingle Rated for High Wind Speeds	Hurricane Rated Roof Covering
Steel	Metal sheathing with concealed fasteners	Light Metal Panel
(blank)	Unknown	Unknown
Built-Up/Tar and Gravel	Built-up Roof or Single Ply Membrane roof without the presence of gutters	Built-up Roof With Gravel
Slate	Concrete & Clay Tiles	Slate
Built-Up, Smooth	Built-up Roof or Single Ply Membrane roof without the presence of gutters	Built-up Roof Without Gravel
Tile - Concrete	Concrete & Clay Tiles	Clay/Concrete Tiles
Tin	Concrete & Clay Tiles	Clay/Concrete Tiles
Tile - Clay	Concrete & Clay Tiles	Clay/Concrete Tiles
Steel, Standing Seam	Metal sheathing with concealed fasteners	Standing Seams Metal Roof
Aluminum, Standing Seam	Metal sheathing with concealed fasteners	Standing Seams Metal Roof
Tile, Spanish	Concrete & Clay Tiles	Clay/Concrete Tiles
Fiberglass, Translucent Panel	Unknown	Unknown
Hail Proof	Built-up Roof or Single Ply Membrane roof without the presence of gutters	Built-up Roof Without Gravel
Metal Sandwich Panels	Metal sheathing with concealed fasteners	Light Metal Panel
Aluminum, Corrugated	Metal sheathing with concealed fasteners	Light Metal Panel
Rolled Roof/Single Ply	Built-up Roof or Single Ply Membrane roof without the presence of gutters	Single ply membrane
shinglesAsphaltFiberglassIrrPattExt	Normal Shingle	Asphalt Shingles
Shingles, Wood	Wood Shakes	Wooden Shingles
Aluminum Shingle	Metal sheathing with concealed fasteners	Light Metal Panel
Rubber Roof	Built-up Roof or Single Ply Membrane roof without the presence of gutters	Built-up Roof Without Gravel
Aluminum	Metal sheathing with concealed fasteners	Light Metal Panel
Shingles, Fiberglass	Normal Shingle	Asphalt Shingles
Vinyl	Built-up Roof or Single Ply Membrane roof without the presence of gutters	Single ply membrane
Single-Ply Membrane	Built-up Roof or Single Ply Membrane roof without the presence of gutters	Single ply membrane
Foam	Unknown	Unknown
shinglesAsphaltFiberglassIrrPattExt	Shingle Rated for High Wind Speeds	Hurricane Rated Roof Covering
Shingles, Steel, Aggregate Finish	Metal sheathing with concealed fasteners	Light Metal Panel
Shakes, Wood	Wood Shakes	Wooden Shingles
shingleCementFiberExt	Bermuda-Style Roof	Unknown
Copper	Metal sheathing with concealed fasteners	Light Metal Panel
Shingles, Synthetic/Rubber	Built-up Roof or Single Ply Membrane roof without the presence of gutters	Single ply membrane
None	Unknown	Unknown

## Appendix 2

### Texas Windstorm Insurance Association (TWIA)

#### Roof Cover Mapping

Data as of November 30, 2019

**Note:** When there are more than one options within a given roof type (i.e., subtype), Willis selected the more conservative option (i.e., more punitive) when it cannot be determined based on the available information. For RMS, where some guidance is provided around the Unknown roof cover distribution mix, Willis selected the option that aligns more with the RMS unknown / default mix.

Willis mapped all roof cover reported as *Shingles*, *Asphalt/Fiberglass*, *Shingles, Asphalt*, *Shingles, Architectural*, *shinglesAsphaltFiberglassIrrPattExt*, or *Shingles, Fiberglass* as *Shingle Rated for High Wind Speeds* in RMS and *Hurricane Rated Roof Covering* in AIR if the risk has IRC or IBC building code per *TWIA\_Loc\_File\_20191130\_PC.xlsx* file OR identified as re-rated roof with IRC or IBC code per *TWIA\_Loc\_File\_20191130\_WPI8.xlsx* file. This is consistent with standards noted for asphalt roofs per TDI site: <https://www.tdi.texas.gov/wind/documents/asphaltshnglst.pdf>

#### Roof Cover Mapping

TWIA Reported Roof Cover Information	Mappings for Modeling	
CONF_ROOF_TYPE_CD_SHORT_TEXT	RMS Roof Covering	AIR Roof Covering
shinglesWoodFireResistantExt	Wood Shakes	Wooden Shingles
Tile, Mission	Concrete & Clay Tiles	Clay/Concrete Tiles
tileClayGlazedExt	Concrete & Clay Tiles	Clay/Concrete Tiles
Shingles, Pine	Wood Shakes	Wooden Shingles
shinglesSteelExt	Metal sheathing with concealed fasteners	Light Metal Panel
Steel, Porcelain Coated	Metal sheathing with concealed fasteners	Light Metal Panel
tileClayCustomColorsExt	Concrete & Clay Tiles	Clay/Concrete Tiles
tinLeadCoatedStandingSeamExt	Unknown	Unknown
Shingles, Photovoltaic	Unknown	Unknown
copperBattenSeamExt	Unknown	Unknown
Plexiglass	Unknown	Unknown
Shingles, Fiberglass	Shingle Rated for High Wind Speeds	Hurricane Rated Roof Covering
terneFlatSeamExt	Unknown	Unknown
tinLeadCoatedBattenSeamExt	Unknown	Unknown

## Appendix 3

### Texas Windstorm Insurance Association (TWIA)

#### RMS Construction Quality Mapping

Data as of November 30, 2019

**Note:** The option of *Certified Design and Construction* for RMS Construction Quality is selected for a given risk only if WPI8 flag is null, has IBC, WRC or IRC building credit AND structure condition reported as above average. Per RMS, the option represents a *permanent building designed by a certified professional engineer and inspected by a certified building inspector, thus implying that the building is designed to a level that exceeds minimum building codes.*

#### RMS Construction Quality Mapping

TWIA Reported Building Condition Information			Mappings for Modeling
MOD_WPI8_WAIVER_FL	MOD_BLDG_CD_CREDIT_CD	STRUCTURE_CONDITION_CD	RMS Construction Quality
Y	(blank)	Average	Unknown
Y	(blank)	Excellent	Unknown
Y	(blank)	Fair	Unknown
Y	(blank)	Good	Unknown
Y	(blank)	Poor	Unknown
Y	(blank)	Unknown	Unknown
Y	(blank)	VeryGood	Unknown
Y	(blank)	(blank)	Unknown
(blank)	IBC	Average	Unknown
(blank)	IBC	Excellent	Certified Design and Construction
(blank)	IBC	Good	Certified Design and Construction
(blank)	IBC	Unknown	Unknown
(blank)	IBC	VeryGood	Certified Design and Construction
(blank)	IBC	(blank)	Unknown
(blank)	IRC	Average	Unknown
(blank)	IRC	Excellent	Certified Design and Construction
(blank)	IRC	Fair	Unknown
(blank)	IRC	Good	Certified Design and Construction
(blank)	IRC	Unknown	Unknown
(blank)	IRC	VeryGood	Certified Design and Construction
(blank)	IRC	(blank)	Unknown
(blank)	WRC	Average	Unknown
(blank)	WRC	Excellent	Certified Design and Construction
(blank)	WRC	Fair	Unknown
(blank)	WRC	Good	Certified Design and Construction
(blank)	WRC	Poor	Unknown
(blank)	WRC	Unknown	Unknown
(blank)	WRC	VeryGood	Certified Design and Construction
(blank)	WRC	(blank)	Unknown
(blank)	(blank)	Average	Unknown
(blank)	(blank)	Excellent	Unknown
(blank)	(blank)	Fair	Unknown
(blank)	(blank)	Good	Unknown
(blank)	(blank)	Poor	Unknown
(blank)	(blank)	Unknown	Unknown
(blank)	(blank)	VeryGood	Unknown
(blank)	(blank)	(blank)	Unknown

## Appendix 4

### Texas Windstorm Insurance Association (TWIA)

#### RMS Opening Protection/ AIR Window Protection Mapping

Data as of November 30, 2019

##### **AIR Window Protection:**

Risk identified as having built to Seaward standard and have IRC or IBC building credit per *TWIA\_Loc\_File\_20191130\_PC.xlsx* file OR identified as having opening protections repaired or replaced to IRC or IBC with location in Seaward per *TWIA\_Loc\_File\_20191130\_WPI8.xlsx* file will be modeled with AIR Window Protection modifier "Non Engineered Shutters" option; it will be modeled with option of "Engineered Shutters" if the risk is also listed with "Y" under the Engineered field per *TWIA\_Loc\_File\_20191130\_WPI8.xlsx* file .

##### **RMS Opening Protection:**

Risk identified as having built to Seaward standard and have IRC or IBC building credit per *TWIA\_Loc\_File\_20191130\_PC.xlsx* file OR identified as having opening protections repaired or replaced to IRC or IBC with location in Seaward per *TWIA\_Loc\_File\_20191130\_WPI8.xlsx* file will be modeled with RMS Opening Protection modifier, option All openings designed for pressure & large missiles (including doors).

Risk identified as having built to Inland 1 standard and have IRC or IBC building credit per *TWIA\_Loc\_File\_20191130\_PC.xlsx* file OR identified as having opening protections repaired or replaced to IRC or IBC with location in Inland 1 per *TWIA\_Loc\_File\_20191130\_WPI8.xlsx* file will be modeled with RMS Opening Protection modifier, option *All glazed openings designed for pressure & large missiles (doors not designed for pressure/impact)* .

Risk identified as having built to "RETROFIT" standards per *TWIA\_Loc\_File\_20191130\_PC.xlsx* file regardless of location will be modeled with RMS Opening Protection modifier, option All glazed openings designed for pressure & large missiles (doors not designed for pressure/impact).