

## IV STRATEGY FOR PUBLIC SHELTER DEFICIT REDUCTION

The Division is responsible for developing a strategy to eliminate the deficit of “safe” public hurricane shelter space in Florida Statutes *See* Secs. 252.35(2)(a)2 and 252.385(1), (2) and (3), Florida Statutes. The Division’s strategy includes the following components:

### **Component 1 –Develop and Implement Model Shelter Survey and Selection Guidelines**

The Division is responsible for administering a survey program of existing schools, universities, community colleges, and other state, county and municipally-owned public buildings. Also, the Division is responsible for providing a list of facilities annually that are recommended to be retrofitted using state funds. To accomplish these tasks, the Division utilizes the American Red Cross’s *Standards for Hurricane Evacuation Shelter Selection* (ARC 4496, 2002) as minimum safety criteria; *See* Appendix C. ARC 4496 provides safety criteria for storm surge, rainfall flooding and wind hazards, plus a basic least-risk decision making process. However, to apply the criteria to field conditions and typical building stock, the Division expanded its interpretation of ARC 4496 into a *descriptive* least-risk decision making model. The model is qualitative and based largely upon building performance assessments following Hurricane Andrew. The performance assessments give preference to building qualities, or characteristics that performed well in Hurricane Andrew and avoid (or mitigate) those that performed poorly, and have been updated to accommodate modern building codes and practices. A condensed version of the model can be viewed at the following URL address: <http://www.floridadisaster.org/Response/engineers/HES/Manual/ARC4496-PrescriptiveSummary-Table.pdf>

### **Component 2 – Implement Shelter Survey Program**

To date, the Division has completed the first statewide baseline survey, and initiated a second baseline survey to improve accuracy and capture changes in the statewide inventory. The results of the surveys are used by state and local agencies to prepare and implement strategies to reduce, and ultimately eliminate, the deficit of recognized ARC 4496 hurricane shelter space. Between 1999 and 2017, more than 5,637 buildings were surveyed utilizing in house surveyors and private-sector consultants. The survey program has not only identified about 92,283 “as-is” spaces, but also directly, or in some cases indirectly, led to creation of more than 464,330 retrofitted shelter spaces. These totals combined with the EHPA construction of 499,670 spaces results in a total capacity of 1,056,283 spaces. The 2017 capacity is greater than the 2016 capacity of 1,046,662 spaces, but is less of an increase than the historical average of spaces gained annually. Over the past year, decommissioning of 37,966 formerly recognized risk space occurred due to new storm surge maps, changes in room use compatibility, and deterioration or removal of protection products.

### **Component 3 – Retrofit appropriate facilities to meet Guidelines**

Since 1999, the State Legislature has annually provided funds for retrofit projects listed in the annual *Shelter Retrofit Report*. The retrofit projects identified through the survey program, are recommended only when the retrofit can create spaces that meet ARC 4496.

For Fiscal Year 2017-2017, the State Legislature appropriated \$3 million to structurally enhance or retrofit public hurricane evacuation shelters. Funding will create an estimated 13,500 spaces during the life of the appropriation.

#### **Component 4 – New construction of public school facilities as Shelters**

Florida Department of Education (FDOE) appointed a committee to develop a public shelter design criterion for use in new school facility construction projects. The committee included representatives from many stakeholder agencies (e.g., state and local emergency management, school board, community college and university officials, the American Red Cross, architects, engineers, etc.). The charge to the committee was to develop a set of practical and cost-effective design criteria to ensure that appropriate new educational facilities can serve as public shelters for emergency management purposes. The final criterion recommended by the committee was consistent with the hurricane safety criteria of ARC 4496.

The recommended wind design criterion was the American Society of Civil Engineers Standard 7 (ASCE 7) with a 40 mile per hour increase in basic map wind speed and an importance factor  $I=1.00$ . In addition, the hurricane shelter's exterior envelope (walls, roofs, windows, doors, louvers, etc.) must all meet a basic wind-borne debris impact standard (i.e., SSTD 12; 9lb 2x4 @ 34 mph). However, school board officials successfully protested the increase in base wind speed, so the minimum wind design criterion was reduced to ASCE 7 at basic map wind speed with an essential facility importance factor  $I=1.15$ . The 40 mile per hour increase in base wind speed is still recommended within the code, but not required. The criteria were promulgated into the State Requirements for Educational Facilities in April, 1997. The Division's model hurricane shelter evaluation criteria's preferred rankings were adjusted to be consistent with FDOE's public shelter design criteria (also known as the Enhanced Hurricane Protection Area or EHPA criteria).

Schools are funded primarily by state and local capital outlay funds, and school districts are generally reporting that the EHPA construction cost premium is about three to seven percent. Since 1997, EHPA construction has created 499,670 spaces (Table 2.1), which accounts for about 47 percent of the statewide ARC 4496 space inventory.

#### **Component 5 – Shelter demand reduction through improved public information and education and through decreased evacuation**

Hurricane evacuation studies have historically indicated that at least 25 percent of a vulnerable population would seek public shelter during an evacuation event. However, recent studies indicate that only about 15 percent will actually seek public shelter. This is consistent with the findings of recent post-storm assessments that indicate less than 10 percent of vulnerable populations seek public shelter.

The public shelter demand resulting from hurricane evacuation was significantly reduced from 1995 to 2017 due to improvements in public education and information, and more accurate storm surge/evacuation zone modeling with the use of the LiDAR (Light Detection and Ranging). However, changes in Federal Emergency Management Agency flood and storm surge maps coupled with recent population and demographic trends reflected in evacuation studies, created a significant increase in shelter demand for 2016, which continues to impact 2017. Forecasting for the five-year period indicates higher demand for special needs shelters, specifically. These demand figures do not take into account the aging of the current stock of public shelters nor the approaching end of the useful life of the original retrofit projects. The *2017 Statewide Regional Evacuation Studies* (SRES) resulted in a statewide aggregate hurricane evacuation shelter space demand increase of 54,063 spaces. Florida's projected statewide hurricane evacuation shelter space demand for 2017 is 962,012.

### **Statewide Progress in Shelter Deficit Reduction**

Since 1995, Florida has made significant progress toward improving the safety and availability of public hurricane shelter space. A comprehensive strategy of surveys, retrofitting, new construction, evacuation studies and public education is the basis for the success. An expansion in storm surge/evacuation zones, aging building stock and consequent decommissioned buildings plus changes in planned local use has resulted in a decrease of nearly 20 percent. Losing hard won space is difficult when the State of Florida has made so much progress in increasing the overall state capacity. However, the usable life of buildings and the retrofits provided is a factor to be expected 20 plus years into the program. For example, the minimum useful life of storm screen retrofits was determined to be 15 years. As the retrofit materials and the buildings themselves show their age, it remains critical to ensure the safety of public hurricane shelter space by replacing the capacity of older buildings and retrofits with new projects with a longer life expectancy. Improved evacuation studies also benefitted the estimated total shelter demand with a reduction of more than 44 percent. This year, adequate public hurricane shelter space is available in 41 counties. RPC regions 6 and 8, when standing alone, have a deficit in shelter space, even though the statewide availability of space is sufficient.

### **Figure 4.1 Florida's Progress in Reducing Statewide Hurricane Shelter Space Deficit**

