

Rita Poses Texas-Sized Challenges

A week in the life of Harris County Appraisal District

By Jim Robinson

Photo of Hurricane Andrew, August 1992, from NASA Goddard Laboratory for Atmospheres Archive

Hurricane Rita, at its peak, was the third most intense tropical cyclone ever observed in the Atlantic basin. It struck the Texas-Louisiana coast near Sabine Pass on Saturday, September 24, 2005, as a strong Category 3 storm. Earlier, while Rita was still at Category 5 strength, the storm was forecast to make landfall near Freeport, Texas. This would have resulted in the metropolitan Houston area being in the path of the eye wall, and Galveston Bay would have been fully exposed to the storm's dangerous right semicircle.

The Houston region, including Harris and surrounding counties, is the third most heavily populated area in the United States. Wind and storm surge damage from a Category 5 hurricane, if it had made landfall just west of Galveston Bay, would have been incomprehensible.

The threat posed by Rita triggered what has been described as the most massive peacetime evacuation in American history. Millions of people—many prompted by scenes of Hurricane Katrina's recent devastation—fled to inland regions.

Rita's death toll in Texas ultimately topped 100, with more than half of those occurring as a result of the evacuation itself. As highways leading to the north became choked with traffic, people sat in their vehicles for hours. Traffic crawled along in record heat. Many cars simply stalled when they ran out of gas. Almost two dozen of the evacuation deaths were elderly nursing home patients from the Houston area who died when the chartered bus on which they were riding caught fire near Dallas.

Just a few weeks before Rita, Houston had opened its arms to evacuees from Hurricane Katrina. Tens of thousands of people were temporarily housed in Houston's Astrodome, Reliant Arena, and George R. Brown Convention Center. Many Katrina evacuees ultimately moved into Houston-area homes and apartments, occupying more than 17,600 apartments since Labor Day. Other Katrina evacuees, who were still in shelters as Rita approached,

were evacuated from Houston to other states.

Rita was not nearly as damaging to inland areas as Katrina was, but it inflicted considerably more damage to offshore oil and gas facilities in the Gulf of Mexico. Rita destroyed at least 63 offshore oil and gas platforms and capsized Chevron's deep-water Typhoon rig along with another jackup drilling rig. Katrina, according to Department of the Interior reports, took out 46 Gulf platforms and four drilling rigs. The two hurricanes also tore 19 drilling rigs from their moorings and set them adrift.

Had Rita scored a direct hit on Harris County, the Harris County Appraisal District (HCAD) was prepared to assist local emergency management officials with disaster damage assessment activities, and preparations were made to respond to any eventuality.

HCAD operates the Emergency Managers Weather Information Network (EMWIN) system in southeast Texas. It automatically disseminates warnings and other critical weather data from the National Weather Service directly to emergency managers and law enforcement personnel in more than 20 Texas counties. It also serves as a backup data point for Harris County Emergency Management's extensive automated rainfall and flood gauge system.

Pre-storm: Preparing for Rita

Tuesday, September 20

We began preparing for possible hurricane conditions early in the week. Activities included testing of emergency equipment including our two diesel generators, installation of plywood shutters over windows on the district's second-floor computer center, placement of flood logs at storage room areas behind the parking garage, and scheduling a skeleton crew that would remain in the computer center during and after the hurricane to keep systems operational and support emergency management in the compilation of post-hurricane damage estimates. Emergency water and food supplies were obtained for the skeleton crew.

Wednesday, September 21

A decision was made to release all staff, other than the skeleton crew, as of that day's close of business. Announcements were made on the HCAD Web site, and through the news media, that our offices would be closed on both Thursday and Friday and that appraisal review board (ARB) hearings previously set for those days would be automatically rescheduled.

Thursday, September 22

Offices closed. Skeleton crew remains on duty.

Friday, September 23

Power to the HCAD building became intermittent on Friday night, and it totally failed after midnight. During these periods, and continuing into late Sunday afternoon, two backup diesel generators provided power to the computer center and critical faci-

ties. We consumed over 500 gallons of diesel fuel, about 330 gallons of which was replaced by Harris County Emergency Management to ensure continued operation of EMWIN and the county's backup flood system sensors, which operate from our computer center.

Post-storm: Reporting the Damage

Saturday, September 24

Intermittent power failures continue. By early Saturday afternoon, we began compiling damage reports from various sources.

Sunday, September 25

Intermittent power failures continue. A drive-out data collecting trip, primarily in eastern sections of Harris County, was conducted.

Monday, September 26

Intermittent power failures continue. ARB hearings scheduled for today are automatically rescheduled. Due to the power situation and the large-scale evacuation from the Houston area, a decision was made to remain closed to the public on both Monday and Tuesday, September 26 and 27. Employees, however, were asked to report to work on both days.

Tuesday, September 27

ARB hearings scheduled for today are automatically rescheduled. Using data from all sources, we were able to compile and issue a damage estimate report.

Wednesday, September 28

The report, which follows this article, was officially released to the media during a news conference held in the HCAD boardroom . ■



Hurricane Rita Damage Estimate for Harris County, Texas Prepared by Harris County Appraisal District September 27, 2005

Rita made landfall near Sabine Pass, Texas, on September 24, 2005, as a Category 3 hurricane (figure 1). Harris County, which was on the west side of the storm track, experienced sustained winds ranging from 31 to 49 M.P.H. and peak gusts of 44 to 74 as reflected in table 1. Slightly higher winds were possible in some areas.

Harris County Appraisal District (HCAD) has for a number of years produced disaster damage estimates for Harris County Emergency Management. The estimates are developed from field observations by HCAD staff, information from other agencies, and computer modeling.

Table 1. Sustained Wind and Peak Gusts

Gauge Location	Sustained Wind	Peak Gust
Bush Intercontinental (IAH)	45	61
Hobby	44	55
Hooks	31	44
HCAD (EMWIN Gauge)	39	55
Morgan's Point	49	74
Eagle Point*	39	55
Sugarland*	38	51
Conroe*	38	55

* Location outside Harris County

Figure 1. Map showing Hurricane Rita's path and strength at the time advisories were issued



Winds of tropical storm force (39 M.P.H. or greater) began in Harris County about 6:30 P.M. Friday, September 23, and fell below tropical storm force by around 8:30 A.M. Saturday, September 24. Table 2, produced with HURRTRAK EM/Pro, shows the theoretical wind profile for Harris County and indicates that some areas (most likely in the far northeast part of the county) could have had gusts to as high as 80 M.P.H.

Another computer-modeled graphic, figure 2 in this report, depicts the theoretical wind field at 5 A.M. Saturday, the approximate time of peak gusts in Harris County. At that time, winds around the center of Rita (then 84 miles east of Harris County) were reported to be about 113 M.P.H.

Sustained winds of the velocity observed in the Houston area are expected to break branches off trees and shrubbery, blow some shingles off roofs, and cause slight damage to buildings. One would also expect some damage to poorly constructed signs. In the upper floors of high-rise build-

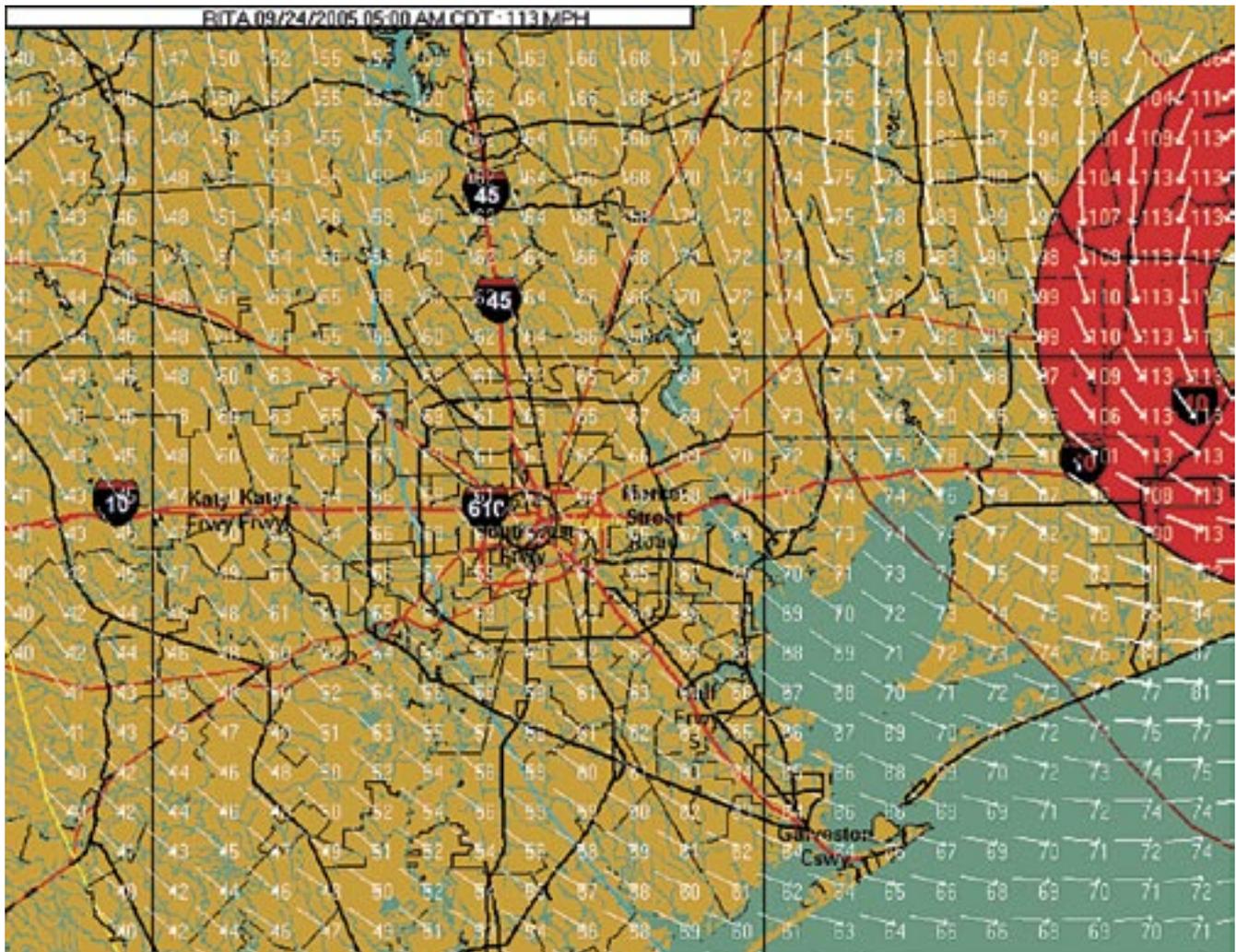
Table 2. Hurricane Rita Computer-Modeled Wind Profile for Harris County, Texas

Date / Time	Time of Day	Wind Speed (mph)	Wind Gusts (mph)	Wind Dir. (degs.)	Distance to 39 mph winds (mi.)	Distance to 58 mph winds (mi.)	Distance to 74 mph winds (mi.)
Friday: 09/23/2005 18:30 CDT	DAY	040	050	005		0044	0108
Friday: 09/23/2005 19:00 CDT	NIGHT	041	051	005		0040	0105
Friday: 09/23/2005 19:30 CDT	NIGHT	043	054	005		0038	0102
Friday: 09/23/2005 20:00 CDT	NIGHT	044	055	005		0035	0099
Friday: 09/23/2005 20:30 CDT	NIGHT	042	052	360		0037	0094
Friday: 09/23/2005 21:00 CDT	NIGHT	041	051	360		0039	0089
Friday: 09/23/2005 21:30 CDT	NIGHT	040	050	360		0039	0083
Friday: 09/23/2005 22:30 CDT	NIGHT	040	050	355		0037	0075
Friday: 09/23/2005 23:00 CDT	NIGHT	042	052	355		0032	0070
Friday: 09/23/2005 23:30 CDT	NIGHT	045	056	355		0026	0064
Saturday: 09/24/2005 00:00 CDT	NIGHT	047	059	355		0022	0060
Saturday: 09/24/2005 00:30 CDT	NIGHT	050	062	355		0017	0055
Saturday: 09/24/2005 01:00 CDT	NIGHT	052	065	350		0012	0051
Saturday: 09/24/2005 01:30 CDT	NIGHT	055	069	350		0007	0046
Saturday: 09/24/2005 02:00 CDT	NIGHT	056	070	345		0003	0043
Saturday: 09/24/2005 02:30 CDT	NIGHT	058	072	340			0040
Saturday: 09/24/2005 03:00 CDT	NIGHT	059	074	340			0037
Saturday: 09/24/2005 03:30 CDT	NIGHT	060	075	335			0035
Saturday: 09/24/2005 04:00 CDT	NIGHT	062	078	335			0032
Saturday: 09/24/2005 04:30 CDT	NIGHT	062	078	330			0030
Saturday: 09/24/2005 05:00 CDT	NIGHT	063	079	325			0029
Saturday: 09/24/2005 05:30 CDT	NIGHT	063	079	320			0029
Saturday: 09/24/2005 06:00 CDT	NIGHT	064	080	315			0029
Saturday: 09/24/2005 06:30 CDT	NIGHT	063	079	310			0030
Saturday: 09/24/2005 07:00 CDT	DAY	063	079	305			0031
Saturday: 09/24/2005 07:30 CDT	DAY	060	075	305			0036
Saturday: 09/24/2005 08:00 CDT	DAY	055	069	300		0007	0045
Saturday: 09/24/2005 08:30 CDT	DAY	046	058	295		0017	0051

ings, where wind speeds are greater, there could be glass failure. These general guidelines were consistent with the minimal damage actually observed in Harris County.

Field observations indicate relatively little wind damage in Harris County. There was, however, scattered minor damage to roof coverings, fences, advertising signs, sheds and other minor structures, and swimming pools. There were approximately 49 windows shattered or blown out in high-rise

Figure 2. Hurricane Rita Theoretical Wind Field at 5 A.M. Saturday, 9/24/2005



office buildings in Houston's central business district. In most cases, residential roof damage was confined to a few shingles being peeled back, or the roof damaged by falling tree limbs.

There were a few instances, primarily in eastern and northeastern Harris County, where trees fell onto homes. There were widely scattered instances of sections of older wooden fences being blown down, and we observed occasional failures of chain link fences that had plastic inserts. In areas with higher wind gusts, there were scattered failures of advertising signs, including some signs blown down or plastic faces blown out.

Based on computer modeling of observed and imputed winds, the estimated total damage in Harris County to real property is a nominal \$15,426,757. Considering that there are more than 1.2 million real property parcels in the county, this translates to an average loss of less than \$13.00 per parcel.

Of greater significance were problems associated with electric power outages. Harris County has many trees located near power lines, and broken limbs or fallen trees caused power outages that at times were estimated to have affected 70% of the users in the county. Center Point Energy officials told HCAD that the cost to remove this debris from power lines and fully restore service could be about \$20,000,000. These efforts were ongoing at the time this report was prepared.

Power outages resulted in spoilage of perishable inventories (primarily meat, dairy products, frozen foods, and some vegetables in many grocery and convenience stores, specialty markets, restaurants, and refrigerated vending machines. A computer model, run after interviews with various retailers and restaurant owners, estimated that losses to perishables could range in the order of \$75,804,871 to \$108,292,674 depending on the length of time power was out. While some of these inventories can still be sold at deep discount, many must be discarded for health reasons.

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Table 3. Estimated losses to private property in Harris County resulting from Hurricane Rita

Damage Category	Loss Estimate
Roof Coverings	\$ 3,915,046
Fence Damage	\$ 4,990,536
Sign Damage	\$ 4,875,000
CBD Glass Damage	\$ 100,000
Other Real Property Damage	\$ 1,546,175
Power Grid Repair	\$ 20,000,000
Perishable Inventories	<u>\$ 75,804,871</u>
Total Damage Estimate:	\$111,231,628
SAY	\$111,000,000



Harris County Appraisal District headquarters building provides a secure place for HCAD staff to handle regional weather emergencies and share information with emergency management agencies.

Jim Robinson, CFE, RPA is the Chief Appraiser for Harris County Appraisal District in Houston, Texas and previously served as Executive Director of the Texas State Tax Property Board.

Prior to becoming involved in property tax administration, Mr. Robinson served 18 months in Governor John Connally's Division of Defense and Disaster Relief, followed by more than a decade as a member of the director's personal staff in the Texas Department of Public Safety. During that same time, he was a citizen soldier and ended a 27-year stay in the Texas State Guard as its commanding general. A past president of the Texas Association of Appraisal Districts, he chaired the local host committee for IAAO's Houston conference and he has served as chair of the Metropolitan Jurisdiction Council and as an IAAO state representative.