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PRACTICE NOTE

Mass Evacuation: The Harris County, Texas, Office of Homeland Security and Emergency Management's Interactive Hurricane Evacuation Map

PRACTICE

Harris County, Texas, Office of Homeland Security and Emergency Management (HCOHSEM) developed an interactive hurricane evacuation map that can be accessed through its department Web site. This interactive map enhances Harris County residents' access to critical hurricane evacuation information.

DESCRIPTION

On September 20, 2005, Texas officials ordered the evacuation of 3 million residents in Chambers, Galveston, Harris, and Matagorda counties in response to the approach of Hurricane Rita. Prior to the hurricane's landfall, HCOHSEM implemented a staggered evacuation and collaborated with the media to inform the public of the plan. HCOHSEM provided the media with information and evacuation maps that used three colors but were not zip code-based. Television stations could not display the maps clearly, which left many residents confused about whether they were in an evacuation zone. To clarify this issue, HCOHSEM used Interstates 10 and 45 and other roads as reference points to specify evacuation areas, but residents still had difficulties determining when to evacuate. Evacuees encountered heavy traffic congestion and experienced unprecedented delays on routes to Austin, Dallas, and San Antonio.

Harris County, Texas, had 3,984,349 residents in 2008. The county is approximately 1,778 square miles, and the metropolitan areas include Houston, Sugar Land, and Baytown.

After the hurricane, HCOHSEM and many partner organizations recognized the need to improve Harris County residents' access to critical hurricane evacuation information. To address this issue, HCOHSEM and members of the Houston-Galveston Area Council developed a two-phase hurricane evacuation plan based upon lessons learned from the Hurricane Rita evacuation. During the first phase, HCOHSEM revised Harris County's existing hurricane evacuation plans and simplified the county's evacuation zones by basing them upon zip codes. The second phase focused on improving residents' access to critical hurricane preparedness information and existing geographic information systems (GIS) tools and technologies utilized by emergency managers. HCOHSEM concluded that an online map with GIS tools and links to HCOHSEM partner Web pages would be the most efficient and effective way to disseminate timely and accurate information to county residents. HCOHSEM identified several critical pieces of information for the map, which includes evacuation zones, traffic flow, contraflow routes,

For more information on zip code-based evacuation plans, please see the *Lessons Learned Information Sharing* Practice Note, [Mass Evacuation: Harris County, Texas, Office of Homeland Security and Emergency Management's Zip Code-Based Evacuation Plan](#).

weather patterns, and school closings. In spring 2007, HCOHSEM launched the interactive Hurricane Evacuation Map on HCOHSEM's department Web site (see Figure 1).

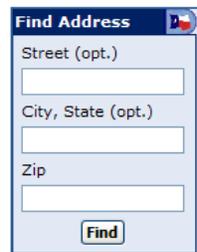
Map Overview

The interactive map is a one-stop shop for Harris County residents to access critical hurricane evacuation information. The map groups zip codes into four color-coded evacuation zones. It then provides a table of the county's zip codes and their corresponding evacuation zone. Users can manually zoom in and out on the map (see Figure 2) or print a PDF of it. The map also highlights the four contraflow evacuation routes HCOHSEM utilizes during evacuations and the two most effective feeders to access those routes. In addition, the homepage organizes critical information in four different boxes: Find Address, Contraflow Routes, Get Informed, and Get In Touch.



Find Address

The Find Address tool allows residents to search the evacuation map by street address or zip code. When users search for an address or zip code, the map zooms in on the entire zip code area. This allows users to see their proximity to other evacuation zones and helps them identify the appropriate contraflow evacuation route.



Contraflow Routes

The Contraflow Routes box allows users to access information about the county's four contraflow evacuation routes. Each link directs users to a two-page PDF that provides important information on a contraflow route's beginning, no-traffic zones, and exits to possible destinations. The PDF also supplies hurricane tips, emergency alert radio stations for Houston and each destination city, and phone numbers or links to the American Red Cross, Texas Department of Public Safety, 2-1-1 (for shelter and special needs information), Texas Division of Emergency Management, and Texas Department of Transportation.



Get Informed

The Get Informed box contains links to the National Weather Service (NWS) Web site and other sites that provide information about ozone levels, traffic maps, school alerts, Amber Alerts, and email alerts. The NWS link directs users to the county NWS page, where users can access area flood warnings, heat advisories, and a hazardous weather outlook. The Traffic Map link directs users to the Houston TranStar Real-Time Traffic Map Web page (see Figure 3). The map displays county highway speeds, road closures, construction areas, and accident locations in real time, which can be critical information for evacuees. Users can also access the Amber Alerts page to locate information on missing children or check current ozone levels at the Texas Commission Environmental Quality's Web site. In addition, users may sign up for email alerts from [AccuWeather.com](#), [CNN Breaking News](#), [Houston Regional Amber Alert](#), [Severe Weather Warnings \(KPRC TV\)](#), [The Weather Channel](#), and [The White House](#) on the email alerts page.



Get In Touch

The Get In Touch box links direct users to important Harris County phone numbers, important links, and additional information about 2-1-1, 3-1-1, and 9-1-1. State and local emergency management officials utilize 2-1-1



during disasters to disseminate official information about shelter availability, evacuation routes, road closures, and other critical information.

Utilization of the Interactive Map

The interactive evacuation map benefits were demonstrated before Hurricane Ike made landfall on September 13, 2008. On September 11, 2008, Judge Ed Emmett, the chief executive officer of Harris County, and his counterparts in surrounding counties ordered the evacuation of approximately 245,000 residents in Chambers, Galveston, Harris, and Matagorda counties. The zip code-based evacuation plan helped clarify when residents should evacuate, and the interactive map enabled residents to access critical evacuation information from HCOHSEM. Most residents knew when they should vacate, which allowed HCOHSEM to successfully notify 137,000 residents from 2 evacuation zones within a 12-hour period. Further, the reduced traffic congestion limited the number of drivers who took detours off the evacuation routes.

Further Improvements

HCOHSEM continues to improve its zip code-based evacuation plan and map based upon lessons learned from Hurricane Ike. Prior to each hurricane season, HCOHSEM updates its interactive map to conform to changing zip codes. In addition, HCOHSEM plans to add a feature to allow residents to find points of distribution on the map using GIS technology.

CITATIONS

Harris County Office of Homeland Security and Emergency Management. *Harris County Hurricane Ike After Action Report and Improvement Plan*. 01 Mar 2009.

<https://www.llis.dhs.gov/docdetails/details.do?contentID=37139>

Sanchez, Jr., Francisco. Public Information Officer, Harris County Office of Homeland Security and Emergency Management. Interview with *Lessons Learned Information Sharing*, 08 Jun 2010.

DISCLAIMER

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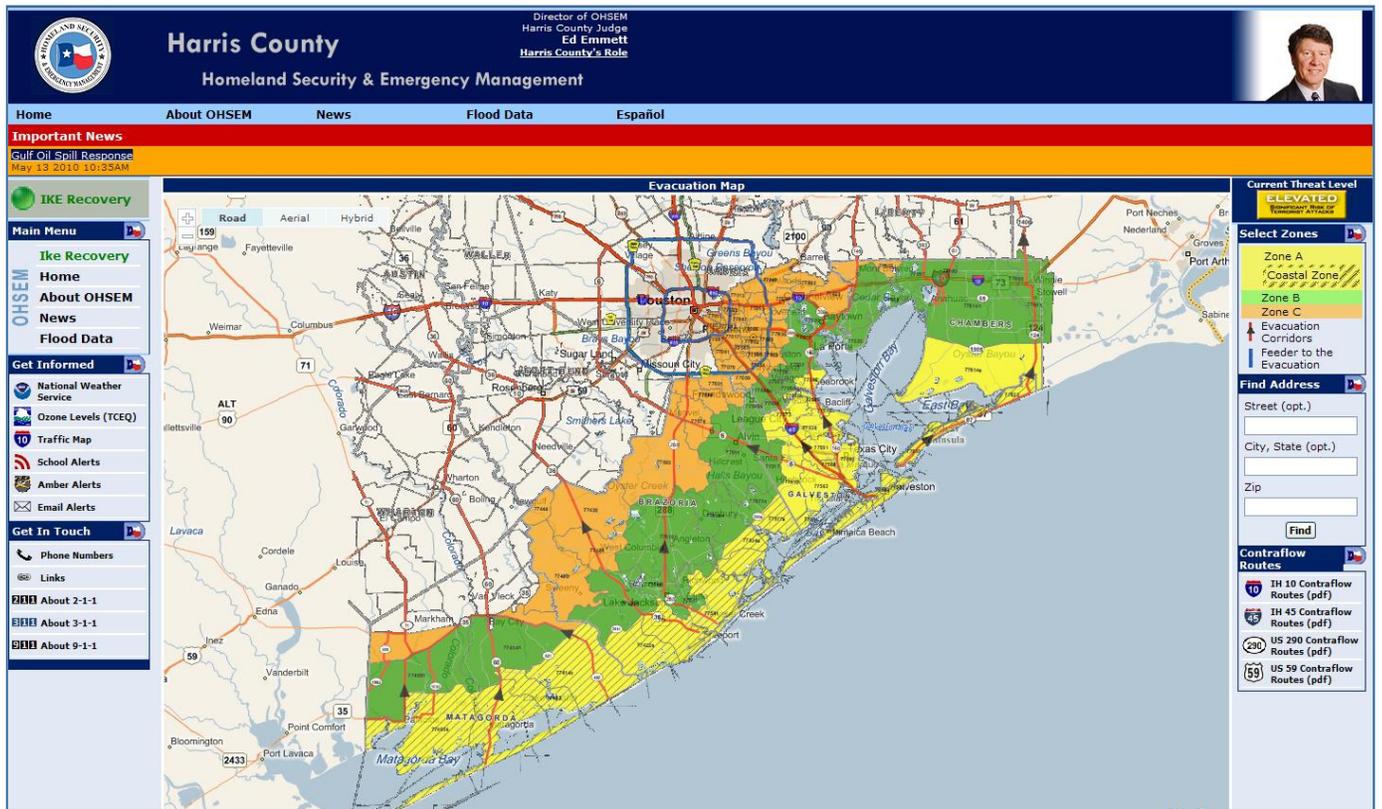


Figure 1: Harris County Interactive Hurricane Evacuation Map

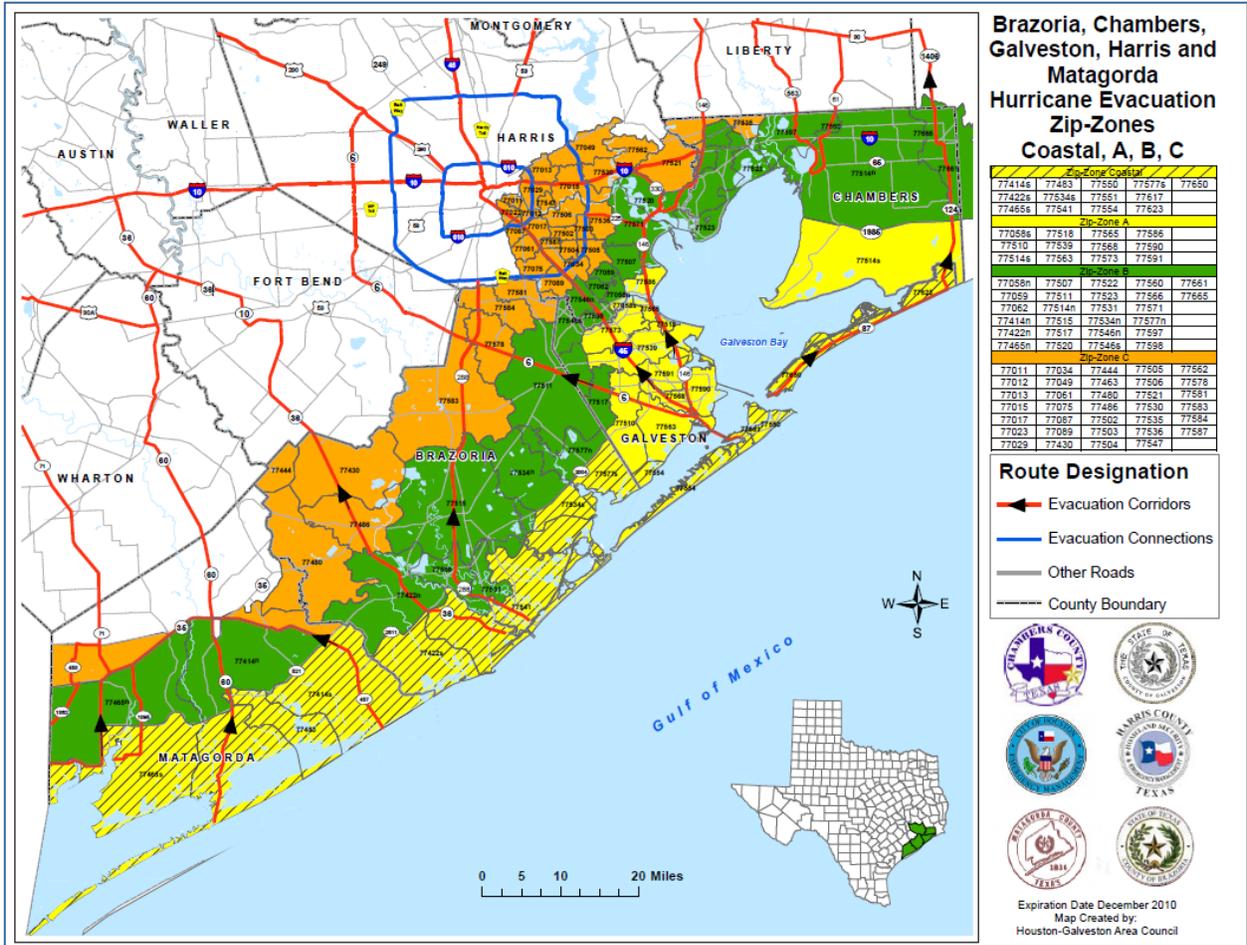


Figure 2: Harris County Zip Code Evacuation Map

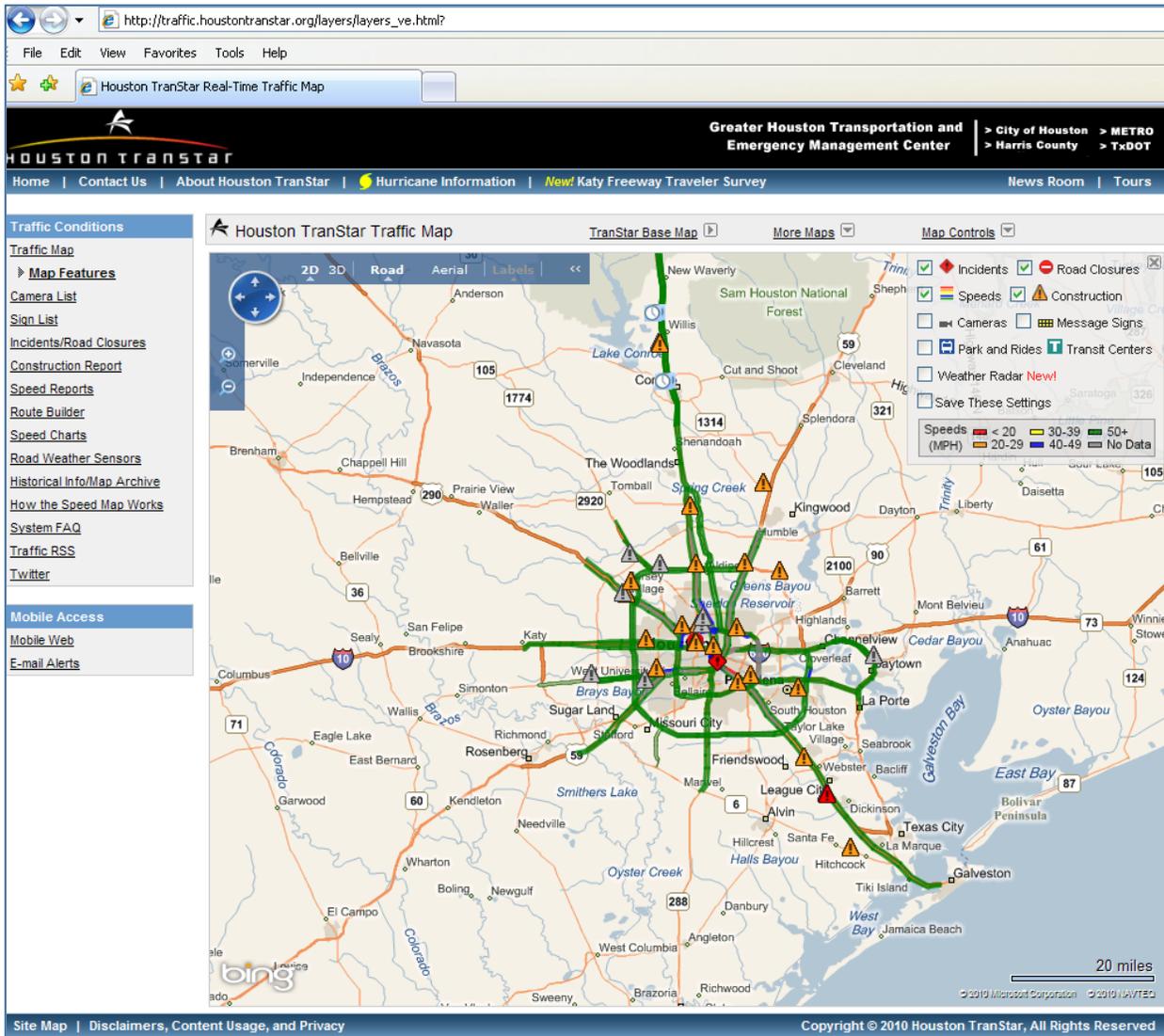


Figure 3: Houston TranStar Real-Time Traffic Map