

## **Crashes on US 59 West from IH 10 to SH 6**

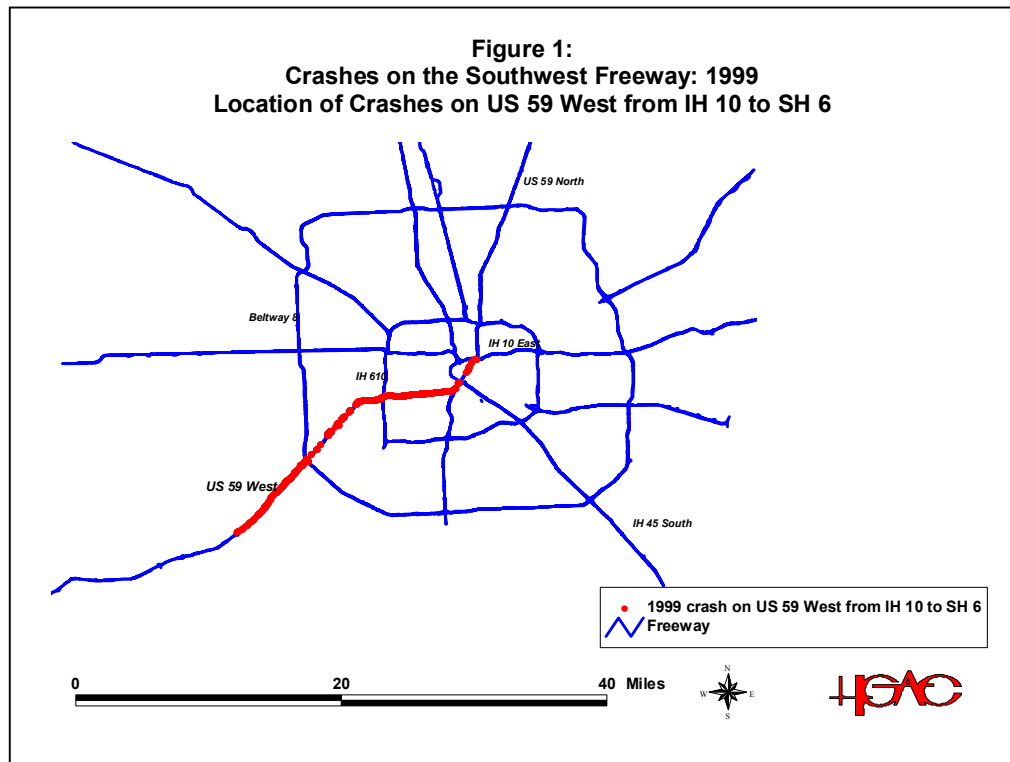
The following information is about safety along US 59 West between IH 10 and SH 6. There are several caveats to the data and analysis that you should be aware of:

1. The data H-GAC has analyzed is distributed by the Accident Records Bureau of the Department of Public Safety. This is the state agency vested with documenting crashes for the State. Currently, their reporting requirements are that all fatal crashes, all injury crashes, and all property damage only (PDO) crashes in which one or more vehicles were towed be reported. Thus, they do not include the typical 'fender bender' in which no one is injured and all vehicles are driven away from the crash scene. In other words, the data we have represent the more serious crashes.
2. We've geocoded the crashes. However, because the data are kept in a very old information system by DPS in which road names are represented either by five-digit codes, the first five letters of the road name, or control-section numbers (for rural state roads), there is inevitably some geocoding error. We were able to geocode about 82% of all crashes in the DPS data set with about 90% accuracy on average.
3. To date, we have only geocoded crashes for 1999. Thus, any conclusions about location are only tentative.
4. Spatial accuracy is within 50-100 yards. One would need actual crash diagrams to have more accuracy.
5. Please cite the Accident Records Bureau of the Texas Department of Public Safety as the source for the crash data and cite the Houston-Galveston Area Council as the source for the crash analysis.

Given these caveats, the results of the analysis are as follows:

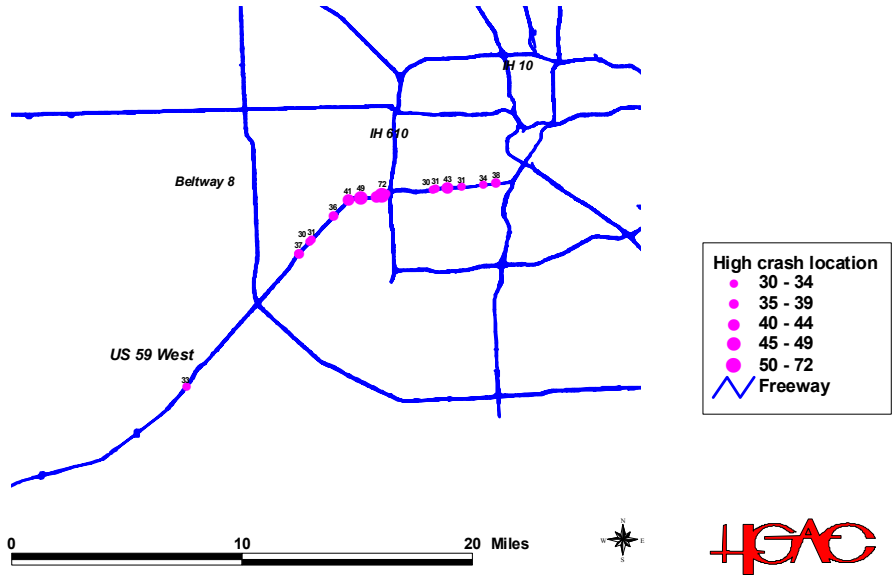
1. In 1999, there were 2,664 crashes on US 59 from IH 10 to SH 6. There were an additional 169 crashes from SH 6 westward to the far border of Fort Bend County, but you had indicated that this was not within the study area.
2. Of the 2,664 crashes in 1999, there were 6 fatal, 87 incapacitating injury (Type A), 288 non-incapacitating injury (Type B) and 1438 possible injury crashes (Type C). There were also 845 serious PDO crashes. As mentioned above, this is only a sub-set of all PDO crashes.
3. Figure 1 below shows a map of the distribution of crashes. Each crash location is represented by a red dot. At any one location, there may be

more than one crash. However, since the program plots the crashes on top of each other, multiple crashes cannot be identified from this map.

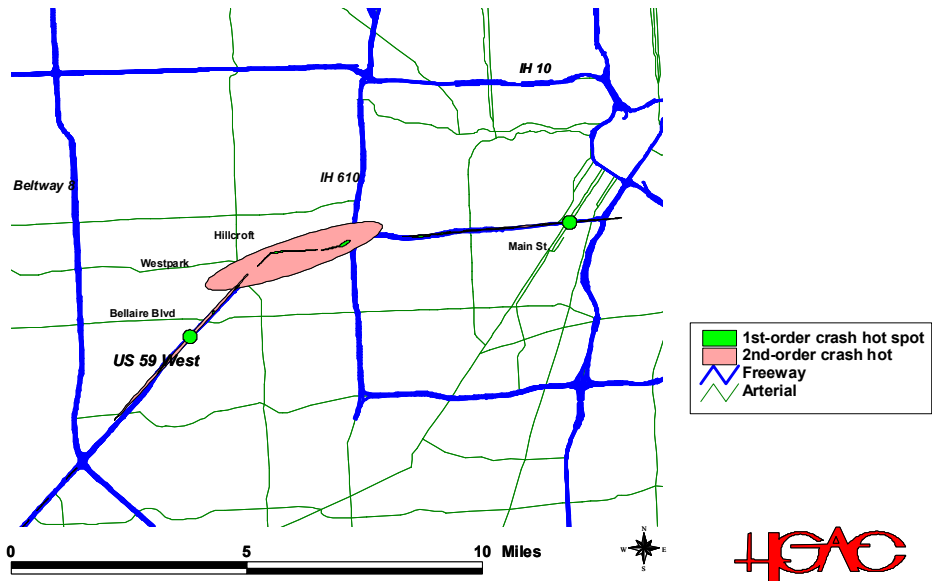


4. The *CrimeStat* program was used to identify the most frequent crash locations.<sup>1</sup> Figure 2 below shows a map of these high frequency locations, those with 30 or more crashes in 1999 ('hot spot locations'). As seen, there are increasing numbers of crashes as one approaches the IH 610 loop west as well as a large number of crashes within the IH 610 loop.
5. The number of crashes at a unique location is not necessarily a good indicator of high volume crashes since it depends on the precision of the coordinates. In our case, precision is within a 100 feet, usually within 50 feet. To identify where the actual hot spots are, we used the *CrimeStat* nearest neighbor hierarchical cluster routine to identify 'hot spot' areas. Figure 3 displays these. First-order clusters are shown in green and second-order clusters (clustering of first-order clusters) are shown in pink. As seen, the hot spot areas tend to be concentrated on the western edge of the IH 610 loop. There are also two hot spots at the junction of US 59 and Fannin and around the junction of US 59 with Fondren.

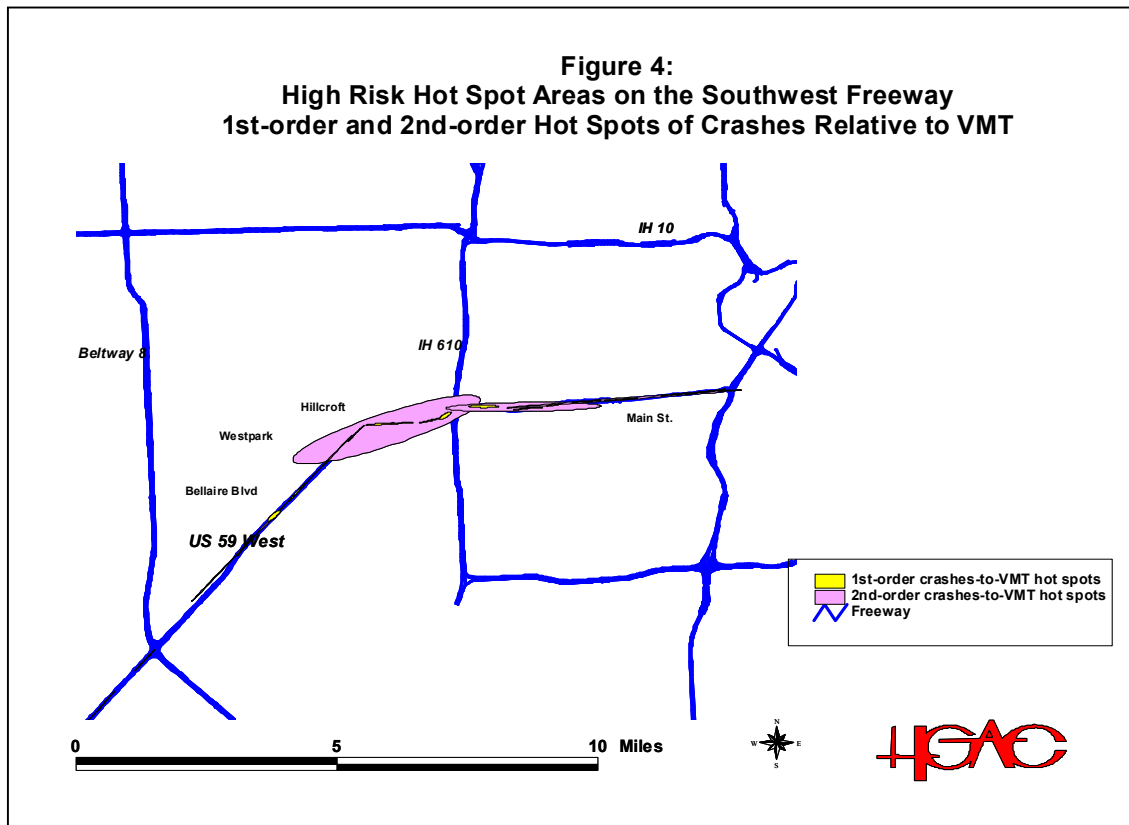
**Figure 2:**  
**High Crash Locations on Southwest Freeway**  
**Symbol Size Proportional to Number of Crashes**



**Figure 3:**  
**Crash Hot Spot Areas on the Southwest Freeway**  
**1st-order and 2nd-order Crash Hot Spots**



6. Based on the estimate of VMT from our modeling group, *serious crash risk* was calculated. This is the number of serious crashes per 100 million vehicle miles traveled (VMT). In 1999, crash risk on US 59 W (from IH 10 to SH 6) was 128.7 crashes per 100 million VMT. This is lower than the regional average of 199 crashes per 100 million VMT. Even though there are a large number of crashes on US 59 W, compared to the region as a whole, crash risk is low.
  
7. Figure 4 below shows the location of first-order and second-order crash risk hot spots. The hot spots are defined by the number of crashes relative to VMT. The second-order clusters are the clustering of first-order clusters. As seen, the high crash risk hot spots are almost in the same identical location as the regular crash hot spots (see figure 3 above). This means that the number of crashes occurring in those locations (particularly on the western side of the intersection with IH 610) are so much larger than would be expected on the basis of VMT. Even though those locations have very VMT, the number of crashes is disproportionately high. A reasonable hypothesis for this is that the high volumes and the level of congestion is causing a crash ‘multiplier’ (many more crashes occur because of the tightness of the traffic). Clearly, poor driving behavior is always a factor in a crash. But, the high level of congestion is making it much easier for this behavior to lead to crashes.



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<sup>i</sup> See Ned Levine, "CrimeStat: A Spatial Statistics Program for the Analysis of Metropolitan Crime Distributions". National Institute of Justice: Washington, DC.  
<http://www.icpsr.umich.edu/nacjd/crimestat.html>