FM 518 Corridor Access Management Plan

Introduction

In November 2002, the Houston-Galveston Area Council (H-GAC) announced a call for projects for candidate travel corridors that would benefit from operational and access management improvements. H-GAC is a voluntary association of local governments and local elected officials in the 13-county, 12,500-square-mile Gulf Coast State Planning Region — an area with more than 4.8 million people. The rate of growth in the Houston region is predicted to be approximately 41% between the years 2000 and 2025; this means abundant opportunities for economic growth and diversification of the local economy. However, such fantastic growth also presents numerous challenges to the natural and built environments. The regional transportation network is one such challenge. If it cannot provide an acceptable level of service in the area's main travel corridors, the economy, community, and environment as a whole will suffer.

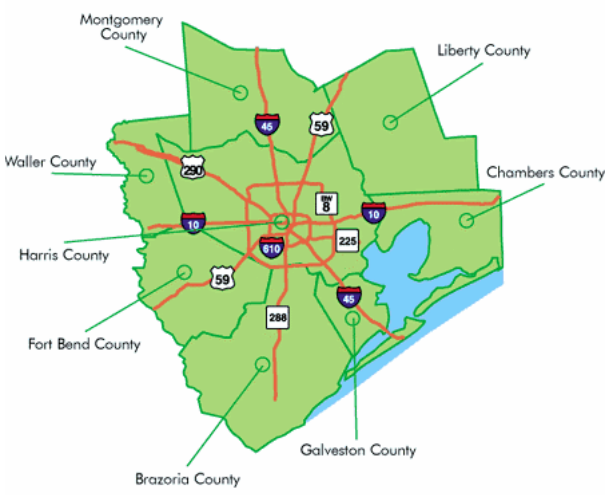


Figure 1 — H-GAC's Jurisdiction

H-GAC works to promote efficient and accountable use of local, state, and federal tax dollars; serves as a problem-solving and informational forum for local governments; and helps local governments, businesses, and civic organizations analyze trends and conditions affecting the area in order to respond to their needs. In response to H-GAC's call for projects, municipal officials from Pearland, Friendswood, League City, and Kemah identified the FM 518 corridor from US 288 to SH 146 as an area that was experiencing rapid growth and that had safety concerns and traffic congestion. The FM 518 corridor defines the term intergovernmental coordination, bisecting four cities and two counties as well as being a TxDOT facility and being under the H-GAC umbrella. H-GAC determined that the entire corridor warranted study. The challenge then becomes this: how does one involve all the necessary parties, and how can they all come to agreement on needed improvements?

Purpose of the Study

With regional growth in mind and limited funds for massive highway infrastructure, H-GAC commissioned the FM 518 study to identify enhancements that will improve public safety and traffic flow, reduce motorist delay, enhance air quality, and improve bicycle and pedestrian access without adding capacity. Built in the 1960s, FM 518 provides east-west mobility and access to many retail, commercial, and residential developments. In addition, the corridor intersects with four major north-south facilities: US 288, SH 35, I-45, and SH 146. These north-south routes provide commuters with direct routes to Houston, Galveston, and major attractions such as the Texas Medical Center and the Houston Space Center. FM 518 has a very high crash history and experiences peak-hour delays at many of its major intersections.

The access management study commissioned by H-GAC will ultimately provide the appropriate agencies with a list of short-term operational and access management improvements. In addition, the study will identify bicycle and pedestrian improvements and explore transit opportunities and funding. Recommendations for long-range improvements will be compiled into what could become an access management overlay district for the corridor. Long-range recommendations will include driveway

spacing guidelines, shared access provisions, and several other access-related techniques aimed at increasing safety and reducing traffic congestion.

Existing Conditions

The FM 518 corridor is generally a four-lane divided state highway with two-way left-turn lanes for approximately 90% of the corridor (25 miles). A short four-mile segment through the City of Friendswood has a raised median. Driveway densities range from 25 to 80 driveways per mile depending on the location within the corridor. The 24-hour traffic volumes range from 22,000 to 33,000 vehicles per day.

Recent crash records report that a total of 440 crashes occurred in the corridor in a one-year time frame. Interestingly, of the 400 crashes, 200 occurred in the City of Pearland, 200 in The City of League City, and only 40 in the City of Friendswood. The only difference in the actual layout of the corridor in the three cities is that Friendswood has a raised median.

With congestion levels high, driveway densities through the roof, no median throughout most of the corridor, and crash rates much higher than the regional average, FM 518 is in need of major access management and traffic operations improvements.

Study Goals

After considering the challenges outlined above, conducting an extensive public outreach program, and recognizing the current and projected deficiencies in the corridor, the study team established five corridor goals:

- Improve safety
- Identify short-term transportation solutions
- Improve traffic flow
- Reduce motorist delay
- Assess long-term corridor needs

Applying access management recommendations and actions will help the communities along FM 518 to move toward the above goals. The following section details how these goals will be achieved and measured.

Goal 1: Improve Safety

Access management saves lives and also reduces the frequency of injury and property damage crashes. The American Association of State Highway and Transportation Officials (AASHTO) indicates that 50% to 70% of all accidents are access related and could be relieved through proper access management strategies.

Measure 1: Driveway Density Ratio

In order to accurately quantify safety improvements, the team is measuring the effectiveness of reducing driveways per mile within the corridor; to do this, the team will use a goal driveway density of 30 driveways per mile. To negotiate the best possible scenario for all affected stakeholders with regard to the driveway density ratio, the project team conducted face-to-face meetings. The goal density will be measured against the actual driveway density to establish a driveway density ratio. The calculation for improving safety follows:

$$\frac{\text{Actual Driveway Density (X)}}{\text{Goal Driveway Density (30)}}$$

Strategies to meet the goal of 30 driveways per mile include the following:

- Relocating driveways
- Consolidating or eliminating driveways
- Promoting shared driveways

Measure 2: Conflict Point Reduction

The second measure of effectiveness for safety improvements comes from reducing the number of conflict points at driveways and unsignalized intersections. Intersections without access management considerations typically have 18 potential major conflict points; a corridor section with 50 driveways per mile and no median treatments has about 900 potential conflict points. The formula for calculating conflict points per mile is as follows:

Driveways Per Mile X Conflict Points = Total Conflict Points Per Mile

Strategies to meet this goal include:

- Relocating driveways
- Consolidating or eliminating driveways
- Promoting shared driveways
- Increasing corner clearance
- Improving driveway geometrics
- Installing raised medians

Goal 2: Identify Short-Term Transportation Solutions

The team will provide a list of improvements that include project cost, project description, and the measured benefits of each improvement. This list will then be used to identify funding sources and implementing agencies. These improvements can include, raised medians, intersection improvements, signal timing, driveway consolidation and auxiliary lanes.

Goal 3: Improve Traffic Flow

The team will establish traffic flow improvements and subsequent level of service benefits from each of the improvements noted in the above goals.

Measure 1: Level of Service (LOS)

The team will evaluate LOS by using an operations model to estimate the LOS before and after improvements. The levels of service will be evaluated at each intersection and on the corridor segments between the intersections.

Measure 2: Median Capacity Adjustments

The increased capacity that results from conversion of a two-way left-turn lane to raised medians will be incorporated into the operations model. A percentage of increased capacity will be added to simulate the reduction in side friction; the benefits of each improvement will then be measured against the no-build alternative.

Goal 4: Reduce Motorist Delay

Reducing overall corridor delay and individual intersection delay is a major issue throughout the FM 518 corridor. The measures described below will allow for evaluation of improvements and documentation of the benefits of each improvement.

Measure 1: Time Delay Benefits

In a manner similar to the LOS analysis described above, measuring time delay benefits will involve weighing proposed improvements against the no-build alternative. This calculation will be completed using our traffic operations model.

Measure 2: Median and Driveway Speed Adjustment

Additional travel time benefits will be derived from the increased speed realized from introducing raised medians and also from the reduction in driveway density. This speed will be added to the overall corridor speed and the subsequent benefits will be documented.

Goal 5: Assess Long-Term Corridor Needs

One of the FM 518 corridor's major goals is to establish long-term corridor needs. These could include the following:

- Developing a corridor overlay describing design standards
- Making thoroughfare plan recommendations
- Recommending changes to local municipal codes
- Recommending improvements to manage pedestrian and bicycle needs
- Investigating the viability of and funding opportunities for transit service

Public Involvement

An important element of the access management plan for the FM 518 corridor has been the proactive public involvement program, which provided opportunities for the public and various interest groups to participate in the study process and ultimately provided guidance in forming the proposed improvements. Since the local responsibility for compliance with federal regulations for public involvement lies with H-GAC, the program was designed to comply with the goals of the H-GAC transportation public involvement program, which has a strong emphasis on public education, outreach, and participation. The program provided opportunities for the public and various interest groups to participate in the planning process by using activities that addressed the need for an ongoing information exchange — from the very beginning of the study through its end. Arriving at consensus on the preferred alternatives during the study process will enable the next phase, programming improvements and detail design, to focus on design details rather than bigger-picture issues.

Short-Term and Long-Term Toolbox

The FM 518 access management study has provided both short-term operational improvements and access management improvements and long-term policy guidelines that will allow the corridor to develop in a responsible manner. The toolbox graphic below illustrates some of the tools the project team used to determine appropriate improvements for various areas of the corridor. The study's final report rigorously describes each improvement and how each improvement performed in the operations model.

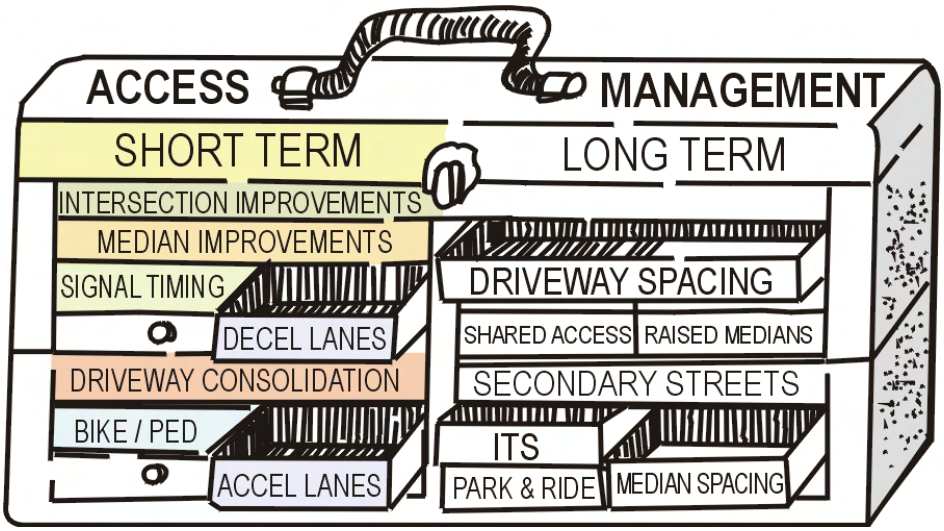
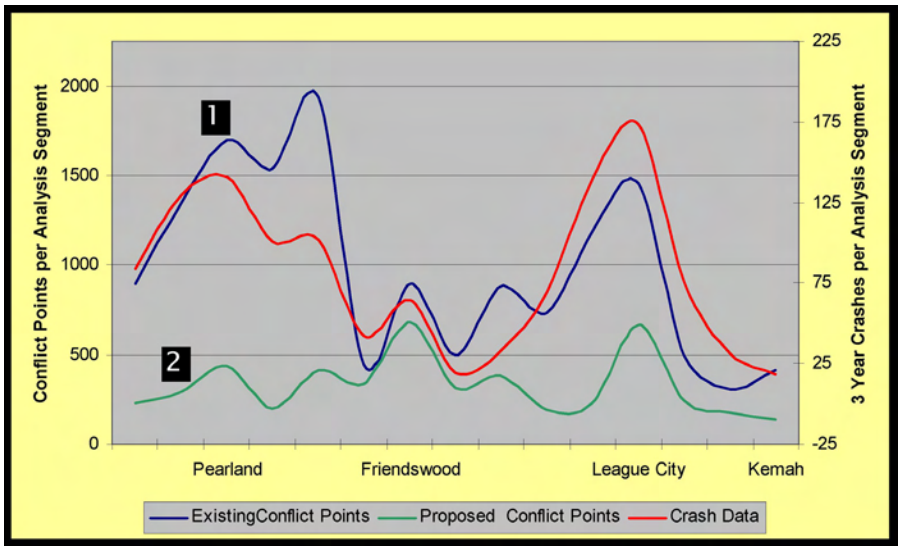


Figure 2 — The FM 518 Toolbox

Findings and Best Practices

Although the FM 518 study is currently evolving, a clear direction to use raised medians throughout the corridor is forming. One of the best tools used to provide citizens and policy makers with direction has been the use of crash data. With the severity of crashes in the corridor (shown blow), everyone involved, including the development community, saw the benefits derived and the value in reducing conflict points through using access management. Another valuable tool was the method of evaluating the driveway density ratio, as described above. This ratio allowed the team to establish thresholds and focus in areas that have the greatest need. Also, taking the driveway densities a step further and calculating the number of conflict points with and without improvements helped determine an additional level of access management need.



As always with access management improvements, the public involvement process allowed the team to describe the benefits that can be realized from such improvements. In the end, walking the communities through this process step by step has allowed for seamless public interaction.

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