Reduce motorist delay

Access Management Conference
September, 2004

Signals
Pedestrians
Intersection Improvements

Safety
**Project Description**

FM 518 provides east-west mobility and access to many retail, commercial, residential and employment destinations.

- Commissioned by Houston-Galveston Area Council
- Supported by the Cities of Pearland, Friendswood, League City and Kemah, TxDOT, and Brazoria and Galveston Counties, and various private entities.

- 25.6 Miles, 4 lanes, TWLTL

FM 518 intersects with four major north-south facilities such as US 288, SH 35, IH-45, and SH 146.
Study Process

- Twelve month study period
- Rational planning approach
- Public Involvement and Stakeholder meetings drove process
Current Corridor Conditions

<table>
<thead>
<tr>
<th>Geographical Area</th>
<th>Crash Rate (per 100 million VMT)</th>
<th>Roadway</th>
<th>Crash Rate (per 100 million VMT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-County Houston</td>
<td>Years 1998-2000: 203</td>
<td>Kirby Drive: 415</td>
<td></td>
</tr>
<tr>
<td>FM 518 Corridor - Galveston Area</td>
<td>Years 1998-2000: 197</td>
<td>Texas Medical Center: 314</td>
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<td></td>
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<td>FM 1960: 260</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FM 518: 203</td>
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<table>
<thead>
<tr>
<th>Corridor Sections</th>
<th>LOS</th>
<th>LOM</th>
</tr>
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<tbody>
<tr>
<td>SH 288 West Side to FM 865 (Cullen)</td>
<td>E</td>
<td>Moderate</td>
</tr>
<tr>
<td>FM 865 (Cullen) to CR 89</td>
<td>E</td>
<td>Moderate</td>
</tr>
<tr>
<td>CR 89 to Woody / Corrigan</td>
<td>F</td>
<td>Serious</td>
</tr>
<tr>
<td>Woody / Corrigan to Halbert / McLean</td>
<td>E</td>
<td>Moderate</td>
</tr>
<tr>
<td>Halbert / McLean to SH 35 / Main</td>
<td>F</td>
<td>Serious</td>
</tr>
<tr>
<td>SH 35 / Main to Sherwood</td>
<td>F</td>
<td>Serious</td>
</tr>
<tr>
<td>Sherwood to Woodcreek</td>
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</tr>
<tr>
<td>Woodcreek to Dixie Farm</td>
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<td>Serious</td>
</tr>
<tr>
<td>Dixie Farm to Williamsport</td>
<td>A - D</td>
<td>Tolerable</td>
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<tr>
<td>Williamsport to Newport</td>
<td>F</td>
<td>Serious</td>
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<tr>
<td>Newport to Interurban</td>
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<tr>
<td>Interurban to SH 3</td>
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<tr>
<td>SH 3 to FM 270 / FM 2094</td>
<td>F</td>
<td>Serious</td>
</tr>
<tr>
<td>FM 270 / FM 2094 to South Shore</td>
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</tr>
<tr>
<td>South Shore to SH 146</td>
<td>A - D</td>
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</table>
Corridor Goals and Objectives

• Improve safety
• Improve traffic flow
• Reduce motorist delay
• Identify short-term transportation improvements
• Assess long-term corridor needs
Access Management Tools Defined for Corridor
Identification of Operational Improvements

This process involved not only modeling recommended physical improvements such as left turn and right turn lanes but also, included optimizing the intersection phasing, timing, and offsets.

Over half (29) of the 58 signalized intersections along the corridor could be improved by a combination of adding right turn and/or left turn lanes and modifying signal timing.
One Additional Lane Improves Intersection Operation

**TYPICAL MINOR STREET LANE CONFIGURATIONS**

**EXISTING**
(creates need for split-phasing)

**ALTERNATIVE CONFIGURATIONS**
(do not require split-phasing)
Intersection Improvements

- Dedicated Left-Turn and Right-Turn Lanes Reduce Platoon Disruption and Enhance Signal Operations
- Shortening Signal Cycle Length Reduces Driver Delay
Silverlake Village/CR 94A Signal 3

- Re-stripe NB and SB from left-only, left-or-straight, and right-only to left-only, straight-only, and right-only
- Change N-S signal sequence from split-phased to quad-left
Signal System Recommendation

- The remaining isolated intersections should be incorporated into closed-loop systems.
- The timing of all of the systems should be optimized for current traffic.
Identification of Safety Improvements

GIS used to identify crash locations (hazards) and document access connections.
Application of Raised Medians
Characteristics of a short-term raised median recommendation

- Intersection with a high crash rate (>10)
- Adjacent land use has good alternative access ways (driveway on cross street)
- Adjacent land use has adequate internal circulation
- The addition of the raised median has limited safety benefits, but does contribute aesthetically to a gateway feature.
Medium-Term Raised Median Recommendations

- Intersection with a medium crash rate (>5)
- Adjacent land use has alternative access ways (multiple driveways).
- Adjacent land use has opportunity to share access with another development
Driveway Consolidation

- Consolidation Recommendations
  - Pearland - 103
  - Friendswood - 28
  - League City - 23
  - Total - 155

- Opportunities to Consolidate
  - Addition of right-turn lane
  - Retrofit of property
  - Sidewalk, drainage and sewer projects
Results

- Operational
- Safety
- Air Quality/Energy
Operational Benefits

AM CORRIDOR TRAVEL TIME DELAY

- Existing Condition
- Study Recommendations

PM CORRIDOR DELAY COMPARISON

- Existing Condition
- Study Recommendations
Driveways Related to Crashes

![Graph showing the relationship between driveways and crashes across different cities.](image-url)
Conflict Points After Raised Median

- Conflict Points per Analysis Segment
- 3 Year Crashes per Analysis Segment

Graph showing conflict points and crashes at different segments:
- Pearland
- Friendswood
- League City
- Kemah

Legend:
- Total Conflict Points
- Proposed Conflict Points
- Crash Data
## Air Quality

### Air Quality Benefits

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>% Reduced</th>
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<tr>
<td>NOx</td>
<td>37%</td>
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<tr>
<td>VOC</td>
<td>34%</td>
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<td>CO</td>
<td>36%</td>
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### Table: Air Quality for Each City

<table>
<thead>
<tr>
<th>NO.</th>
<th>City</th>
<th>AADT For Different Segments</th>
<th>Average AADT For Each City</th>
<th>Average Peak Period Traffic For Each City</th>
<th>Average Off-Peak Period Traffic For Each City</th>
<th>Nox</th>
<th>VOC</th>
<th>CO</th>
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<td>Kemah</td>
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<td>11,967</td>
<td>5,146</td>
<td>6,821</td>
<td>75,100</td>
<td>74,665</td>
<td>712,458</td>
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<td>Corridor Total</td>
<td>399,900</td>
<td>23,367</td>
<td>10,048</td>
<td>13,319</td>
<td>521,512</td>
<td>564,304</td>
<td>4,865,397</td>
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Bicycle/Pedestrian Improvements
Future Corridor Recommendations
Comprehensive Plan

- Chapter 213.001 of the Texas Municipal Code
- Access Management Goal Statement

Zoning Ordinance

- Chapter 211.001 of the Texas Municipal Code
- Compliment Access Management Standards

Subdivision Ordinance

- Chapter 213.001 of the Texas Municipal Code
- Access Management Guidelines
Comprehensive Plans

- Establish general policy on access management.
- More specific statement:
  - The FM 518 corridor is to be planned, designed and managed in accordance with the FM 518 Corridor Access Management Plan.
- Activity center strategies vs. strip development
Comprehensive Plans

- Use of parallel roads, side streets, and cross access easements connecting adjacent developments.
- Properties under the same ownership, consolidated for development, or part of phased development plans shall be considered one property for the purposes of access management.
- New residential subdivisions should include an internal street layout that connects to the streets of surrounding developments.
- Commercial development should be encouraged to share common access connections as well as to provide a convenient system of interparcel circulation.
Thoroughfare Plans

- Establish street hierarchy
- Designate public right-of-way to mitigate impacts to the functional integrity of FM 518 and other major arterials.
- Limit direct access to major thoroughfares
- Establish access management policies guidelines
Land Use Recommendations

- **Subdivision Regulations**
  - Establish cross and shared access provisions
  - Establish minimum connection spacing requirements
  - Minimum lot frontages
  - Discourage residential access on major thoroughfares

- **Zoning**
  - Discourage shallow strip development with no alternative access
  - Overlay zones

<table>
<thead>
<tr>
<th>Posted Speed (mph)</th>
<th>Distance (ft)</th>
</tr>
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<tbody>
<tr>
<td>≤ 30</td>
<td>200</td>
</tr>
<tr>
<td>35</td>
<td>250</td>
</tr>
<tr>
<td>40</td>
<td>305</td>
</tr>
<tr>
<td>45</td>
<td>360</td>
</tr>
<tr>
<td>≥ 60</td>
<td>425</td>
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</table>
Action Plan

- Policy board approval of study
- Adopt FM 518 Corridor Access Plan by ordinance
- Secure funding for short-term intersection improvements
- Implement intersection improvements
- Implement system-wide signal retiming
- Secure funding for median improvements
- Implement median improvements
- Coordinate with TxDOT for median aesthetics
- Identify funding and implement pedestrian / bike improvements
- Program long range thoroughfare improvements
- Update comprehensive plans and subdivision standards

Agency

- H-GAC
- Cities
- H-GAC and TxDOT
- TxDOT
- TxDOT and Cities
- H-GAC and TxDOT
- TxDOT
- Cities
- H-GAC, TxDOT, and Cities
- Cities
- Cities