



enhance public
and private
investments

improve Safety



reduce congestion



construction coordination



reduce motorist delay



improved mobility

Lower Rio Grande Valley Development Council / Hidalgo County MPO

April 2005

Access Management Plan



Kimley-Horn
and Associates, Inc.



EXECUTIVE SUMMARY I

DEFINING ACCESS MANAGEMENT I

MTP SELECTION CRITERIA II

CORRIDOR CASE STUDIES II

DEVELOPMENT OF PERFORMANCE MEASURES, FINAL REPORT, AND FINAL PRESENTATIONS II

INTRODUCTION 1

CHAPTER 1 INTEGRATING ACCESS MANAGEMENT INTO THE HCMPO PLANNING PROCESS 2

1.1 BASIC - ACCOMMODATED TRANSPORTATION PLAN 2

1.2 ENHANCED - MODIFIED TRANSPORTATION PLAN WITH LAND USE RECOMMENDATIONS 5

1.3 AGGRESSIVE - COORDINATED TRANSPORTATION AND LAND USE PLANS 6

CHAPTER 2 ACCESS MANAGEMENT TOOLBOX 8

2.1 INTRODUCTION 8

2.2 OPERATIONAL IMPROVEMENTS 10

2.4 POLICY 11

2.5 THOROUGHFARE PLANNING 12

2.6 DESIGN GUIDELINES 12

CHAPTER 3 ACCESS MANAGEMENT CASE STUDY: FM 88 24

3.1 EXISTING TRAFFIC CHARACTERISTICS 15

3.2 ROADWAY AND ACCESS INVENTORY 19

3.3 SHORT AND MEDIUM-TERM CORRIDOR IMPROVEMENT OPTIONS 20

RECOMMENDATION 1: NON-TRAVERSABLE MEDIAN 21

RECOMMENDATION 2: IMPROVE FM 88/US-83 FRONTAGE ROAD INTERSECTIONS 22

RECOMMENDATION 3: DRIVEWAY CONSOLIDATION AND RELOCATION 23

RECOMMENDATION 4: FUTURE DRIVEWAY REGULATIONS 23

RECOMMENDATION 5: MISCELLANEOUS ACCESS MANAGEMENT 24

CHAPTER 4 ACCESS MANAGEMENT CASE STUDY: S. 23RD STREET, 26

RECOMMENDATION 1: NON-TRAVERSABLE MEDIAN 32

RECOMMENDATION 2: IMPROVE 23RD STREET/US-83 FRONTAGE ROAD INTERSECTION 33

RECOMMENDATION 3: DRIVEWAY CONSOLIDATION AND RELOCATION 34

RECOMMENDATION 4: FUTURE DRIVEWAY REGULATIONS 35

CHAPTER 5 ACCESS MANAGEMENT PERFORMANCE MEASURES IN THE HCMPO TRAVEL DEMAND MODEL 39

5.1 INTRODUCTION 39

5.2 MODELING 101 39

5.3 PERFORMANCE MEASURES 39

5.4 INCORPORATING IMPROVEMENTS INTO THE MODEL 40

CHAPTER 6 ADDRESSING ACCESS MANAGEMENT IN LOCAL GOVERNMENT POLICIES 41

6.1 LOCAL GOVERNMENT AND ACCESS MANAGEMENT 41

6.2 AUTHORITY 42

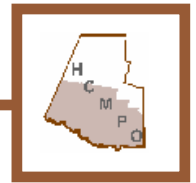
6.3 THE COMPREHENSIVE PLAN 42

6.4 SUBDIVISION ORDINANCE 44

6.6 THOROUGHFARE PLANNING 45

APPENDIX A STATE OF THE PRACTICE – EXAMPLES OF ACCESS MANAGEMENT INTEGRATION 46

APPENDIX B MODEL MUNICIPAL ACCESS MANAGEMENT ORDINANCE 49



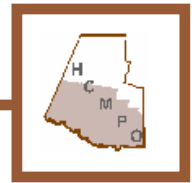
APPENDIX C FM 88 TEXAS BLVD. MAPS.....52
APPENDIX D 23RD STREET MAPS.....53
APPENDIX E REFERENCES54

List of Tables

TABLE 3.1-2 CORRIDOR ADDTs..... 15
 TABLE 3.1-3 CRASH TYPE BREAKDOWN 16
 TABLE 3.1-4 CRASH RATE..... 17
 TABLE 3.1-5 CRASH CRASH RATE BY MILE 17
 TABLE 3.1-6 CRASH BY TYPE MILE BY MILE 18
 TABLE 3.1-7 CRASH TYPE PERCENTAGE BY MILE..... 18
 TABLE 3.1-8 INJURY CRASHED BY MILE..... 18
 TABLE 3.2-1 DRIVEWAYS BY MILE 19
 TABLE 3.2-2 CONFLICT POINTS BY MILE..... 20
 TABLE 3.2-3 MEDIAN PERFORMANCE MEASURE SAFETY 25
 TABLE 3.2-4 MEDIAN PERFORMANCE MEASURE SPEED 25
 TABLE 4.1-1 CORRIDOR AADTs..... 27
 TABLE 4.1-2 CRASH TYPE 28
 TABLE 4.1-3 CRASH RATE BY SECTION 29
 TABLE 4.2-1 EXISTING ROADWAY CHARACTERISTICS 30
 TABLE 4.2-2 DRIVEWAYS BY SECTION 31
 TABLE 4.2-3 CONFLICT POINTS 31
 TABLE 4.3-1 TWO-WAY DRIVEWAY DESIGN..... 36
 TABLE 4.4-1 MEDIAN PERFORMANCE MEASURE SPEED 37
 TABLE 4.4-1 MEDIAN PERFORMANCE MEASURE SAFETY 37
 TABLE 5.2-1 PERFORMANCE MEASURES 39

List of Figures

FIGURE 2.2-1 CONFLICT POINTS 8
 FIGURE 2.2-2 MEDIAN TREATMENTS 9
 FIGURE 2.2-3 COMPOSITE CRASH RATE INDICES 9
 FIGURE 2.2-4 DRIVEWAY CONSOLIDATIONS 9
 FIGURE 2.3-1 RIGHT-TURN LANE 10
 FIGURE 2.3-2 LEFT-TURN LANE..... 10
 FIGURE 2.4-1 CROSS ACCESS..... 11
 FIGURE 2.4-3 MINIMUM CONNECTION SPACING..... 12
 FIGURE 3.2-1 CONFLICT POINTS 20
 FIGURE 3.2-2 CURB EXTENSIONS 28
 FIGURE 4.1-1 CRASH RATE..... 28
 FIGURE 4.1-2 CRASH RATE BY SECTION 29
 FIGURE 4.2-3 CONFLICT POINTS 31
 FIGURE 4.3-1 MEDIAN TREATMENT..... 32
 FIGURE 4.3-2 MEDIAN TREATMENT..... 32
 FIGURE 4.3-3 MEDIAN TREATMENT..... 33
 FIGURE 4.3-4 CROSS HATCH ADDED 34
 FIGURE 4.3-5 EFFECTS OF TOO SHORT OF RADIUS..... 35
 FIGURE 4.1-2 INTERSECTION PERFORMANCE MEASURE BEFORE..... 38
 FIGURE 4.1-3 INTERSECTION PERFORMANCE MEASURE AFTER..... 38
 FIGURE 6.3-1 ACTIVITY CENTERS..... 44



Executive Summary

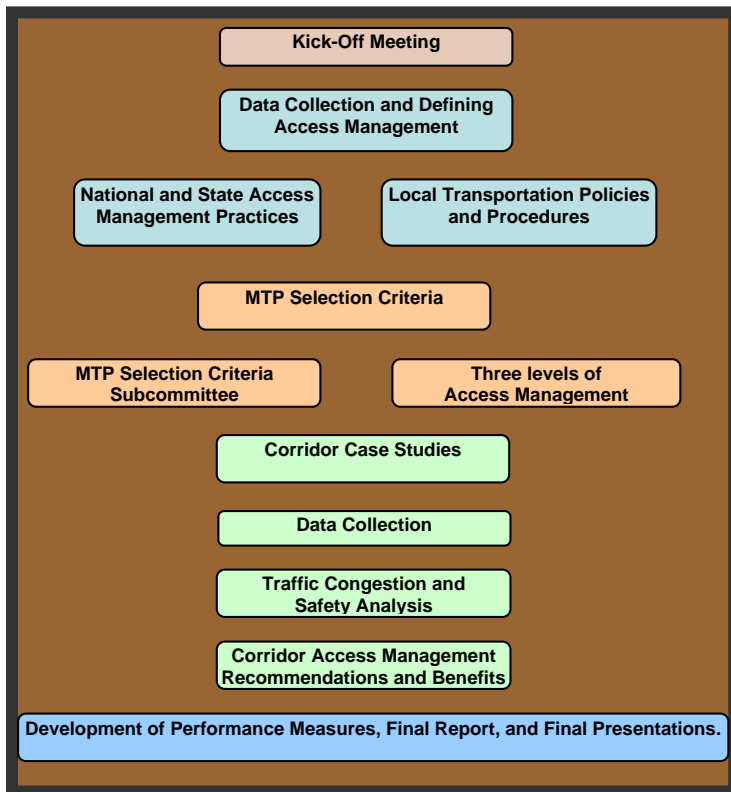
This study was commissioned by the Hidalgo County Metropolitan Planning Organization (HCMPO). The HCMPO is a federally funded program that works with Hidalgo County communities and the Texas Department of Transportation (TxDOT) to plan for the county's future transportation needs.

Since 1998, the Hidalgo County Metropolitan Planning Organization (HCMPO) has included an access management element within the Master Transportation Plan (MTP) Project Selection Criteria. However, this element has not promoted the use of access management techniques in project applications.



On September 25, 2003 the Texas Department of Transportation, Transportation Commission, adopted new rules on access management. These rules direct TxDOT to apply access management on all state owned roads. The rules and subsequent access management manual represent an opportunity for metropolitan and local agencies to practice access management along roadways within their jurisdictions.

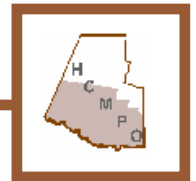
Therefore, in April 2004 the HCMPO contracted with Kimley-Horn to study how access management can be applied to local transportation projects. The adjacent chart explains the process used during this study. Below each of these tasks are introduced.



Defining Access Management

HCMPO and TxDOT recognize developing a viable transportation system not only includes building new roadways and adding transit, but managing the access and demand for travel on these systems. Access Management is a set of strategies designed to make best use of existing transportation facilities as well as enhancing transportation improvements.

Access management involves the systematic location, spacing and design of driveways, median openings, and street connections to the public roadway system. It also involves roadway design applications, such as median treatments and auxiliary lanes, and the appropriate spacing of traffic signals. The purpose of access management is to provide vehicular access to land development in a



manner that preserves the safety and efficiency of the transportation system. This study will establish mechanisms to apply access management to local transportation plans, projects and procedures.

MTP Selection Criteria

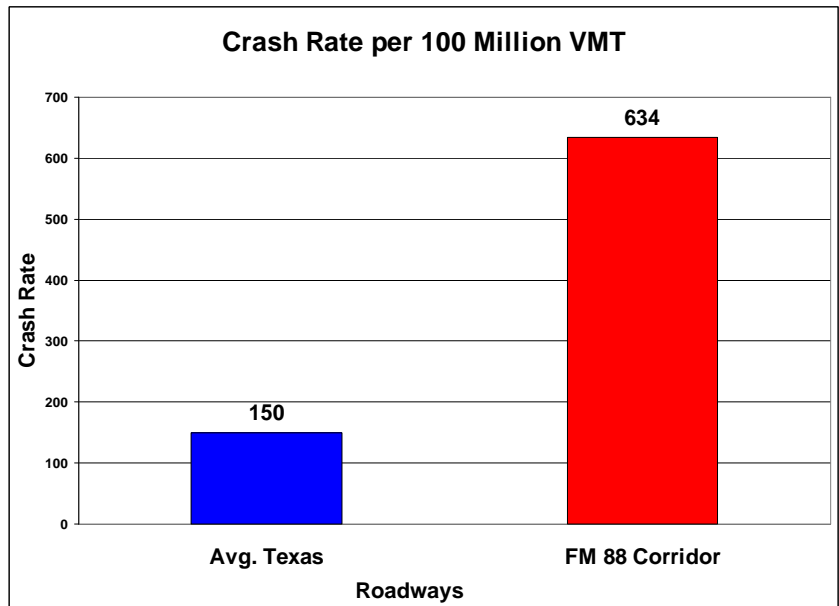
Integrating access management into the HCMPO planning process begins with defining the approach that is best suited for the area. The following report outlines three approaches for the application of access management. The levels (basic, enhanced and aggressive) are separated by both the intensity of application and possible resource commitment needed. All the approaches recommend amending the Master Transportation Plan (MTP) Criteria to better account for access management. By building in five performance measures into the selection criteria, the need for access management will be easier to identify and prioritize relative to other roadway improvements.

1. Cross Section
2. Access Connections per mile
3. Signals per mile
4. Crash Rate
5. CMS

Corridor Case Studies

Working with the HCMPO Project Selection Criteria Subcommittee to the Technical Advisory Committee, the study team determined that FM 88 in Weslaco and 23rd Street in McAllen would be good corridor case studies. Chapter 3 and Chapter 4 detail the data collection, traffic analysis and access management recommendations and benefits that were performed for FM 88 and 23rd Street, respectively.

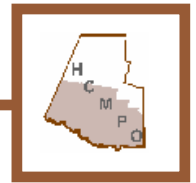
The study team documented the existing conditions in both of the corridors prior to applying approved access management techniques (Chapter 2). Such findings as the adjacent graphic illustrating safety concerns on FM 88, helped devise performance measures for the application of access management techniques in the HCMPO area.



Development of Performance Measures, Final Report, and Final Presentations

Access Management is recognized as one of the quickest and least expensive means to reduce congestion and increase safety on major roadways. This study identifies that access management can offer the following benefits:

Improvement Type	% Improvement
Raised Median	10-15% additional capacity 5-15 MPH improvement in speed
Intersection Improvements	30-50% intersection delay reduction
Driveway Consolidation	10-15% improved speed



Introduction

Without access management, the function and character of major roadways can deteriorate rapidly. Characteristics of a poorly managed roadway include:

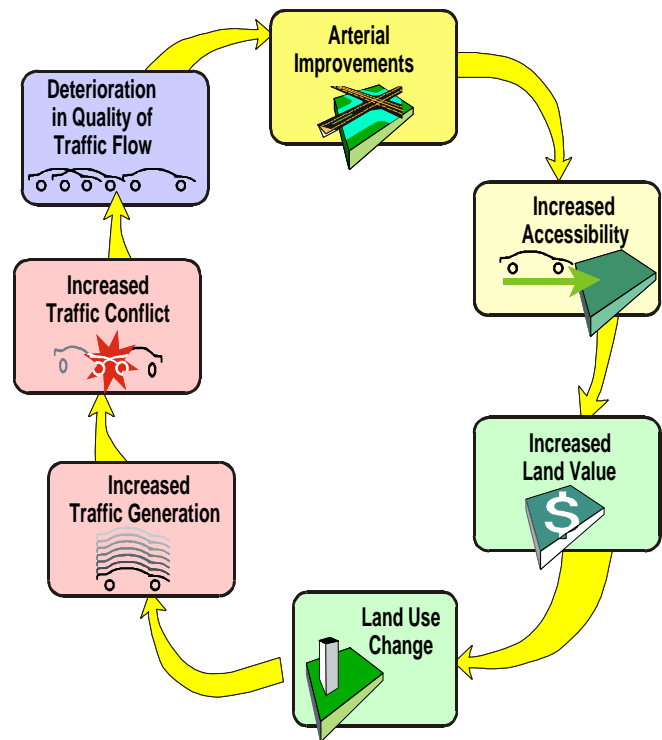
- Unightly commercial strip development**
- High amount of vehicular crashes**
- High incidence of pedestrian and bicycle accidents**
- Increased commute times, fuel consumption and vehicular emissions**
- Cut-through traffic in residential areas**



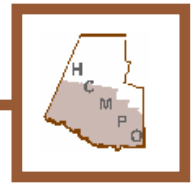
Costly road improvements are often sought as the only solution to a roadway that has become congested and unsafe. So, a major public investment is made on “improving” the poorly managed arterial and the transportation and land use cycle begins (figure 2.2). The arterial improvements trigger land values to increase and stimulate real estate development. In the absence of effective planning and access management, conflict typically emerges between transportation and land development objectives.

Issues include:

- Future streets and widening are not considered in right-of-way determinations.**
- Plat review do not consider access and allow for excessive subdividing into small or narrow lots that gain direct access to the arterial.**
- Zoning or utility arraignments promote strip commercial developments.**
- Piecemeal developments lack internal circulation and adequate access roads.**
- Soon the roadway is congested and unsafe and the cycle begins again.**



Access management programs can stop this cycle, thereby protecting public and private investment in major roadways. However, the transportation and land use cycle can only be managed effectively by addressing both the transportation system and the adjacent land development. Participation of state, metropolitan and local agencies is necessary. Therefore, a key element of this study is to provide a process that the Texas Department of Transportation, Hidalgo County Metropolitan Planning Organization and the local agencies can use during transportation project conception, funding and implementation.



Chapter 1 Integrating Access Management into the HCMPO Planning Process

The following section defines the key strategies and support strategies for integrating Access Management into the HCMPO planning process. A variety of strategies are used to manage the demand on the transportation system. These strategies focus on encouraging a greater connection between land uses and the transportation system. Each alternative is introduced in three levels of potential application. The level demonstrates both the intensity of application and possible resource commitment needed. The three levels are defined as:

Basic – using existing resources that are relatively common and readily available to alter the project selection process.

Enhanced – applying strategies from similar successful project selection process and adding resources to the basic services.

Aggressive – moving beyond current experiences from around the country to create a new project selection criterion. In some cases, concepts may be experimental.

1.1 Basic - Accommodated Transportation Plan

This approach is the most widely used by metropolitan planning organizations to address access management. It is the least evasive means to promote access management into the development and transportation planning process. Nevertheless, it has proven to have a positive impact on transportation system preservation.

Steps to produce an accommodated transportation plan:

1. **Define Access Management:** Make access management a part of the goals and objectives of the Master Transportation Plan.

Example Goals:

- Study and model the transportation network to investigate system efficiency, accessibility, and efficiency issues (i.e. unsynchronized signals, excessive distance between roadways of the same classification, improper signal spacing, parking, excessive access points, or improper posted speeds that result in inefficient traffic flow)
- Local governments should coordinate access management between permitting agencies according to the MPO

Example Objectives:

- Undertake pre-emptive measures, such as access management, to discourage congestion at the corridor level
- Provide reasonable access through planned capacity and routing for all modes

These ideas are further illustrated within elements of the plan, such as Safety, Mobility, System Preservation, Bicycle and Pedestrians Accommodations and Thoroughfare Design. Or, it is possible to devote an entire section to access management policy.

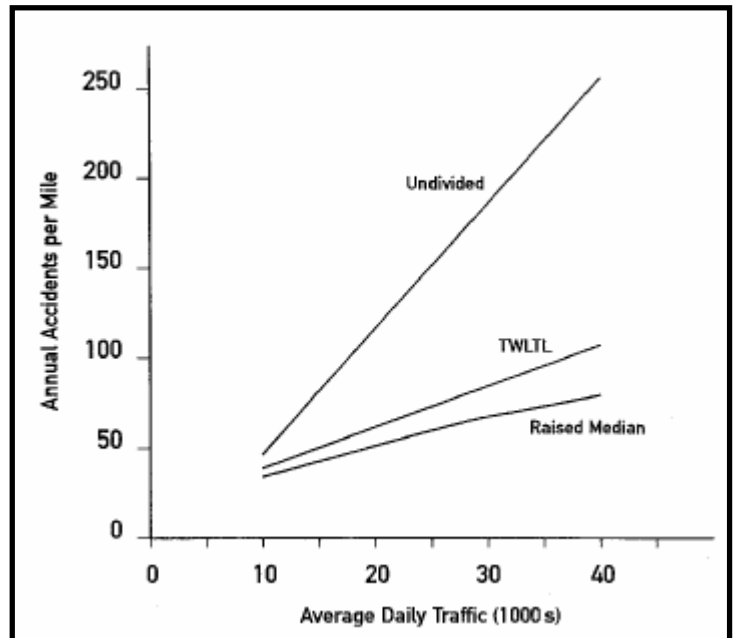


2. **Project Selection Criteria:** The following are basic indicators of roadways that could benefit from access management treatments.

Access Management Project Selection Criteria				
Indicator (Low, Medium, High)	Low	Medium	High	Total
1. Cross Section (4+ lanes with raised median; 4+ TWLTL; 2 lanes, 4 lanes undivided)				
2. Access Connections per mile (Low ≤ 40 , Medium 41-60, High >61)				
3. Signals per mile (Low ≤ 2 , Medium 3-5, High >6)				
4. Crash Rate (Rural: Low ≤ 100 , Medium 101-150, High ≥ 151 ; Urban/Suburban: low ≤ 350 , Medium 350-450, High > 451) per 100 million vehicle miles				
5. CMS (Red, Yellow, Green)				

Cross Section

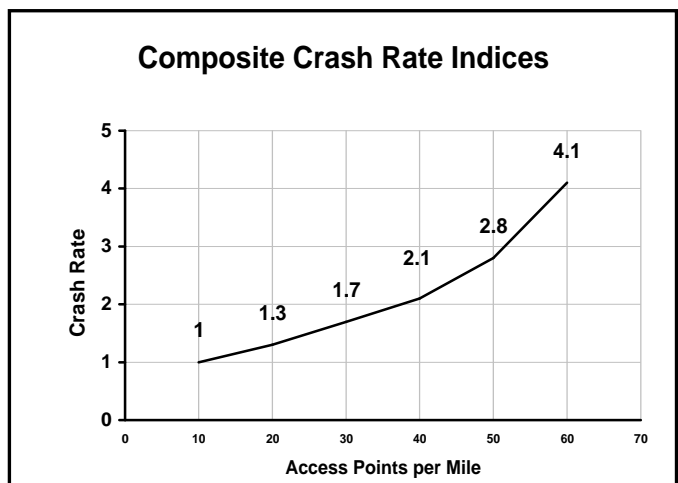
Using the cross section as an indicator of need for access management treatments will identify roadways that could benefit from the addition of a median. Many studies have detailed the safety benefits of medians. The adjacent graph was used in NCRHP 420, Impacts of Access Management, to illustrate the correlation between accidents per mile and the cross section of the roadway. The report also outlines the operational benefits and business impacts of median application. In general, two-way left turn lanes (TWLTL) are an improvement over undivided roadways in terms of safety and operations. Raised medians are useful in making roadways that are experiencing an average annual daily traffic volume in excess of 24,000 safer and less congested.



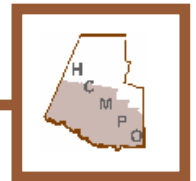
So, roadway cross sections in the HCA that are 2 lanes or 4 lanes undivided have a high need for access management treatments. Roadways with four plus lanes and a TWLTL constitute a medium need for access management treatments. Roadways with four-plus lanes and a raised median have the lowest need for access management treatments.

Access Connections per mile

Driveways and unsignalized intersections constitute the access connections on a roadway. In general, the more access connections on a roadway, the greater the amount of vehicular conflicts, and the higher the potential is for crashes. Less than 40 access connections per mile should be considered low.



In the 41 to 60 access connections per mile the

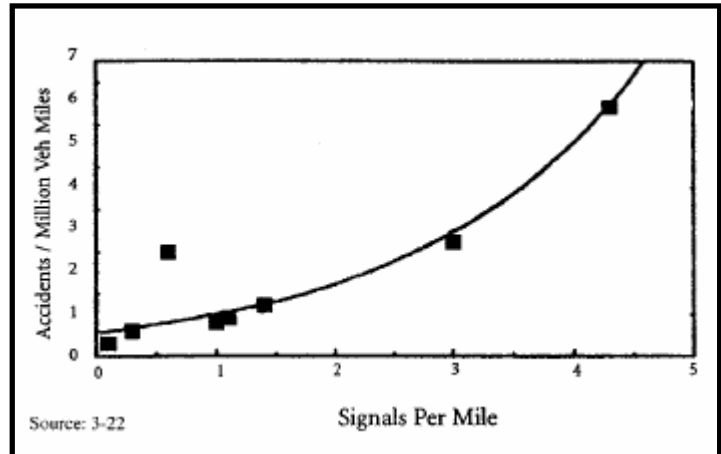


crash rate begins to worsen exponentially and travel speeds become reduced by 10 MPH or more. A medium need for access management treatments would then be warranted. More than 60 access connections per mile garners a high need for access management treatments. When a roadway has this many access connections, the crashes are frequent and delay is obvious.

Signals per mile

Traffic signals account for the majority of the delay that motorists experience in Hidalgo County, and throughout the nation. While the timing and synchronization of signals has much to do with this, access management is focused on the spacing of them. The frequency and uniformity of traffic signals govern the performance and safety of urban and suburban highways. NCRHP 420 reveals that the accidents per mile in a corridor are directly related to the frequency of signals.

There is a low need for access management treatments on roadways that have less than two signals per mile. Three to five signals per mile reflect a serious increase in the frequency of automotive accidents. These sections of roadway have a medium concern for access management treatments. Six or more signals per mile warrant a high concern for access management solutions.



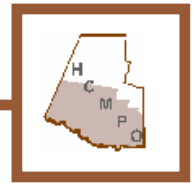
Crash Rate

The crash rate on a roadway is a powerful indicator of the need for access management treatments. This calculation should be quantified based upon vehicle miles traveled. This is done by determining the current average annual traffic volume (AADT*365) and multiplying by the section length in order to determine the annual miles of vehicle travel for the segment. Then, divide the annual miles of vehicle travel by one hundred million. Finally, divide the average number of crashes per year on the segment by the annual vehicle miles traveled (expressed in units of one hundred million). This will yield the annual number of crashes per one hundred million miles of vehicle travel.

The State of Texas average crash rate for the years 1998 to 2000 was 150 per 100 million vehicle miles traveled. As most Texas roads are rural ones, this figure should be used as a standard as to whether access management should be used for rural corridors. Therefore, rural roadways in Hidalgo County that are experiencing a crash rate below 100 will have a low need for access management treatments. A crash rate from 101 to 150 indicates a medium need for access management. And one above 151 proves a high need for access management measures.

Urban and suburban roadways, however, have a higher crash rate than rural roads, as stated by NCHRP 420. Therefore, the crash rate indicating a need for access management will be somewhat higher. A roadway with a crash rate below 350 has a low need for access management. One with a crash rate from 350 to 450 has a medium need. An urban or suburban roadway with a crash rate above 450 has a high need for access management.

Crash information for the State of Texas is becoming much easier to acquire and quantify. The TxDOT Hazard Elimination Program is automating all of its crash data and making it available to agencies in easy-to-read databases that are ready for analysis using MS Excel and ESRI ArcMap GIS software. By



identifying specific roadway limits, crash information will be only a few clicks away via their fully automated web-site.

Level of Service

Access management can address many of the congestion issues on a roadway. The best available measure of congestion available to the HCMPO is found in the Congestion Management Studies (CMS), and more specifically, the red, yellow, green determinations. Green reveals a low need for access management. Yellow warrant a medium consideration for access management treatments. Roadways that have a Red warrant a high consideration.

Provide Guidance to Member Agencies

Educating public officials and decision makers about the benefits of access management and the means to implement these treatments is critical to the success of any new program. Access management requires the cooperation of multiple agencies. Education and the development of easily understood guidelines will greatly aid in winning champions of the program, promoting the program to various interest groups and assuring full implementation of program's objective.

Appendix A details how the Duluth-Superior Metro Interstate Committee (MIC) in Duluth, MN and the West Florida Regional Planning Council (WFRPC) in Pensacola, FL use this method to promote access management.

Strengths: Can be done in a short time frame.

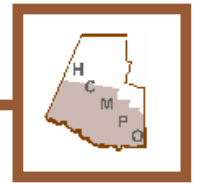
Weaknesses: Does little to promote the communities' vision of how the transportation system and land development should co-exist.

1.2 Enhanced - Modified Transportation Plan with Land Use Recommendations

This approach attempts to create a relationship between transportation decisions and land use policy by regulatory means. Generally, this entails the creation of a model land development code. Such a code would be recommended in the MPO's Master Transportation Plan, and the acceptance of it by municipal agencies would factor into the selection of transportation projects for funding.

Steps to producing a modified transportation plan with land use recommendations:

1. **Corridor Plans:** The MPO should view itself as a public sector consultant (as is the case with many MPOs) and as such develop a program to conduct corridor plans for member jurisdictions on a competitive basis. The MPO could solicit ideas for corridor plans every year and conduct 1-2 corridor plans a year. These plans could be funded through the UPWP using federal PL funds. One of the primary purposes of these corridor plans should be to identify transportation deficiencies in the corridor and to recommend various transportation and land use approaches for addressing those deficiencies. Additionally, "what if?" land use scenarios could be assessed during these studies to determine a strategy for coping with a particular change in land use before the actual change occurs. An example might be considering the potential impact on transportation from the construction of a new Wal-Mart in the corridor. Safety conditions in the corridor should also be evaluated based on existing and potential future land use scenarios. Access management improvements often play a key role in the recommended strategy for addressing identified corridor deficiencies. Often, access improvements recommended through the corridor planning efforts of the MPO become funded projects through the LRTP process. Another possible result is the development of corridor access control policies, standards and/or



guidelines.

2. **Model Land Development Ordinance:** This ordinance alters the standard roadway classification to consider access as a key element of the hierarchy. Sections of the ordinance will establish minimum design of the transportation network. Access management treatments are addressed in terms of an access classification system and standard, corner clearance minimums, joint and shared access requirements, requirements for unified access and circulation, driveway location and design, redevelopment requirements and provisions for corridor access overlay districts. The ordinance could also encourage a land development or redevelopment pattern, i.e. Traditional Neighborhood Design, Transit-Oriented Design. **Appendix B** provides a Model Municipal Access Management Ordinance for local governments in the HCMPO area.
3. **Amend Master Transportation Plan:** Incorporating these provisions into the MTP is the first step to empowering the model land development ordinance. This process normally requires an entire re-write of the document. Therefore, if the political will exists, then the undertaking should coincide with the five year update.
4. **Adoption of Model Ordinance:** While the model ordinance is recommended in the Master Transportation Plan and may be a factor in the selection of projects, that alone does not assure its utilization. Each municipality must have a champion to advocate the adoption and institution of the ordinance.

Strengths: Assured that access management will become a central focus of the development and transportation planning process.

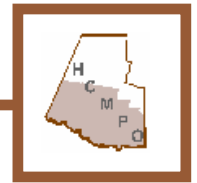
Weaknesses: The approach demands less of a public involvement process, but is also less flexible in terms of accommodating differing community visions.

1.3 Aggressive - Coordinated Transportation and Land Use Plans

Coordinated transportation and land use plans provide a framework that facilitates predictable development. By engaging in coordinated land use/transportation planning, a community can weigh development decisions against its stated vision of the future. Knowledge of existing transportation facilities and their interaction with land use and other infrastructure needs lends predictability to the development process. Such predictability provides a foundation for public and private investment decisions.

Typically, an Urban Service Area is defined based upon the ability of the current city services to accommodate the future growth scenarios. This strategy promotes opportunities for infill development and other kinds of redevelopment. Once defined in the context of regional planning efforts, this Urban Service Area can direct transportation investments to benefit appropriate development within its boundaries. This policy is not intended to neglect legitimate safety and infrastructure condition needs in rural areas, nor the need for adequate connectivity between urban and rural areas for commerce and recreation.

Rather, this policy seeks to preserve the current public investment and promote the efficient use of land and existing infrastructure. They also enhance main streets and central business districts, making them safer and more attractive for business and public activities. Transportation investments, based on coordinated transportation and land use plans, also lessen the demand to develop in environmentally sensitive areas and will help to preserve rural character. The Capital District Transportation Committee



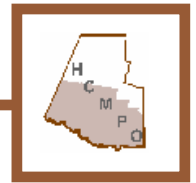
(CDTC) in Albany, NY and the Tri-County Regional Planning Council (TCRPC) in Lansing, MI use this approach. **Appendix A** provides examples of how this approach can be used and the benefits from it.

Steps to producing a coordinated transportation and land use plan:

1. **Community Visioning:** The communities' vision for the future provides a context for how separate investments in the region (health and human services, police protection, schools, etc.) will fit into a larger picture of development, including the larger impact of roadway investments on the image of an area. Typically, these efforts include an extensive and lengthy visioning process that involves a diverse pool of citizens, technical experts and quality visualization tools (e.g., artistic renderings and photographs).
2. **Strong, committed leaders are essential to translating visionary plans into implemented projects.** Successful coordinated transportation and land use plans come from strong city leadership. Often, city mayors and other key officials make a political commitment to a redevelopment project that integrates transportation and land use ideas. These city officials not only need to support the project, they must become the political champions for them.
3. **A unified effort across multiple levels of government, the private sector, and the public is vital to actualizing a community-wide vision.** Consensus should be reached across agencies at key stages of the development process. Subsequently, private developers are often willing to support an engaging, creative, and common vision forwarded by the city. Partnership and follow-through build trust and credibility, improving stability and predictability of the economic climate for private developers. Community participation dramatically increases support from the citizenry and political leadership, and, ultimately, the success of the project. Each stage of the visioning, planning, and implementation process should thus be as transparent as possible to the public.
4. **Change requires persistence, flexibility, and a long-term commitment to action.** Once the vision is defined, communities should focus on being solution-oriented in the face of challenges. For example, not all the comprehensive plans, subdivision ordinances, zoning codes and development process will be amended at once. But a major roadway improvement may be programmed that crosses jurisdictional boundaries and could benefit from consistent land use practices. This instance may require special consideration and flexibility.
5. **It is important to create an environment for coordinated effort and collaborative planning.** Transportation planning, land use planning, and housing and economic development can all be facilitated to induce cross-fertilization of ideas and perspectives within and among agencies at the city, regional, and state levels. Creating a Coordinated Transportation and Land Use Working Group could catalyze change and move the region toward greater coordination. Some regions are combining the master transportation and comprehensive planning responsibilities into a singular effort.

Strengths: Creates a strong vision for the future.

Weaknesses: Does not guarantee that access management will be preferred technique to achieve the community's vision.



Chapter 2 Access Management Toolbox

2.1 Introduction

The access management toolbox for this plan has several dimensions. To organize these improvements, the team has created four separate categories of improvements:

- Safety
- Operational
- Policy
- Other Improvements



The following sections will detail the available improvements within each option.

Safety

Safety improvements are largely concepts derived from access management techniques. Below is a description the two primary access management techniques.

- Median Installation
- Driveway Consolidation

Raised Median Installation

This technique involves adding a raised median barrier to restrict the movement of traffic and thereby reduce the number of conflicts in the corridor. **Figure 2.2-1** illustrates that any full access location creates potential conflict points (there are 32). With the introduction of a raised median barrier to restrict the left out maneuver, these conflict points are reduced by 50%.

Roadways with non-traversable medians are safer at higher speeds and at higher traffic volumes than undivided roadways or those with continuous TWLTL. Numerous studies from across the nation have been conducted relating to undivided, TWLTL, and divided roadways with a non-traversable median. Based on studies, it can be concluded that roadways with a non-traversable median have an average crash rate about 30% less than roadways with a TWLTL.

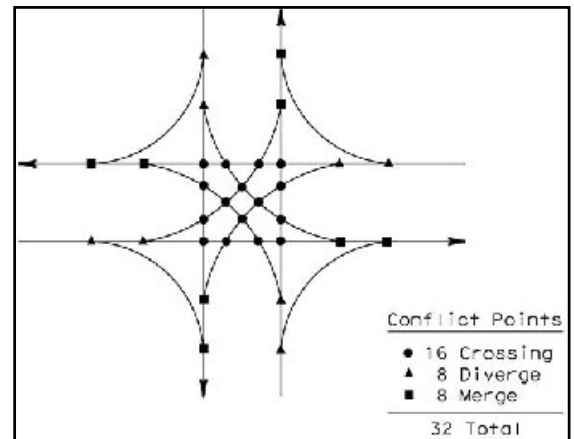
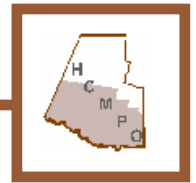


Figure 2.2-1: Conflict Points

Additionally, where ADT exceeds 20,000 vehicles per day and the demand for mid-block turns is high, a raised median should be considered. With raised medians, additional safety benefits are found for pedestrian and bicycle activity, in terms of having a refuge area when crossing a thoroughfare.



With the addition of a raised median, consideration of the median opening and opening type will need to occur. The placement of the median opening must first consider the thoroughfare system. Priority should be given to those thoroughfares providing mobility and access throughout the community. Then, the opening can consider other traffic generators along the corridor. The median treatment can take on many different forms. **Figure 2.2-2** illustrates five variations available for a median opening.

Driveway Consolidation

This technique involves removing or relocating existing access connections (driveways) for the purpose of improving safety and travel delay. Research has shown that driveways that are closely spaced can have direct impact on safety along a roadway. Moreover, research has also found that a nexus exists between access connection density and crash rates, as indicated in **Figure 2.2-3**. As you can see as the density of access connections increase, the crash rates increase.

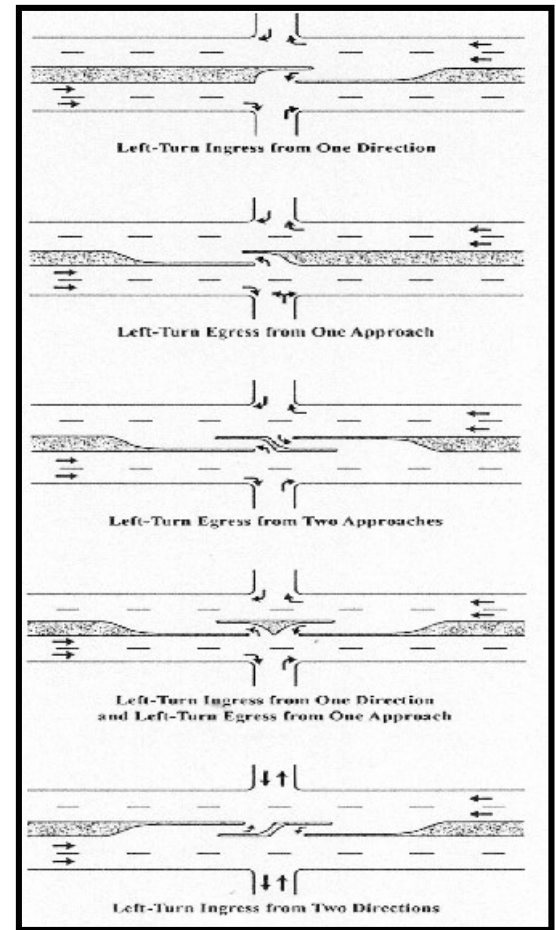


Figure 2.2-2: Median Treatments

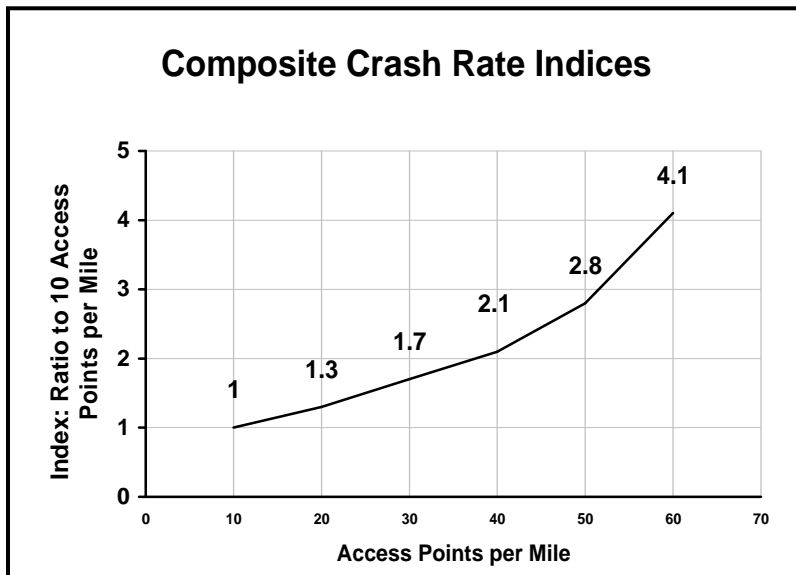


Figure 2.2-3: Composite Crash Rate Indices

Driveway consolidation is only possible through a cooperative agreement between the property owner and the agency attempting to consolidate the driveway. Application of this technique will be focused on the greatest need. For instance, those areas in the corridor with a very high safety ratio (as described in **Chapter 3 & 4**) will be evaluated for possible consolidation. Each situation is unique and a great deal of negotiation will need to occur between all parties involved. The spacing between driveways can be found below in **figure 2.4-3**.

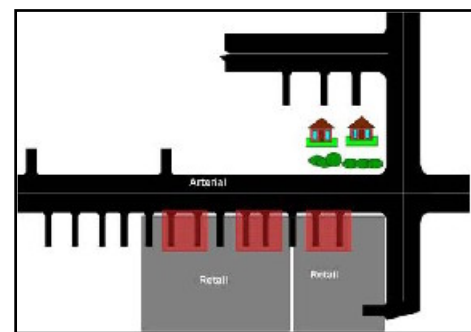
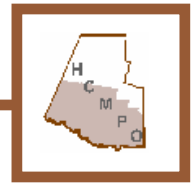


Figure 2.2-4: Driveway Consolidation



2.2 Operational Improvements

In addition to safety, the operations in the corridor are another vital goal of this overall corridor study. The operational improvements for this corridor can be broken down into several distinct pieces.

- Right-Turn Lane
- Left-Turn Lane
- Signal Timing

Right-Turn Lane

The addition of acceleration and deceleration lanes can provide operational benefits throughout the corridor by allowing turning vehicles to exit the roadway without affecting the through movement of traffic. This allows for a more efficient flow of traffic in the corridor, and allows vehicles to form platoons at the signalized intersections, thereby maximizing the flows that the signal can handle.

The safety benefits of adding right-turn acceleration and deceleration lanes are well-documented. A vehicle that is traveling 10 mph more or less than the normal traffic flow is twice as likely to be involved in an accident, and a vehicle traveling 20 mph more or less than normal traffic is six-and-a-half times more likely to be involved in an accident (1). Right-turn lanes can eliminate this speed differential and thus aid safety on a corridor.

Lengths of auxiliary lanes are a function of posted speeds, but queue lengths are normally established on a case-by-case basis. The Highway Capacity Manual and TxDOT's Operations and Procedures Manual provide guidance on this matter.

Figure 2.3-1 illustrates the general layout and design for a right-turn lane. These improvements are not one-size-fits-all. Consideration must be given for posted speed, traffic volume and development type.

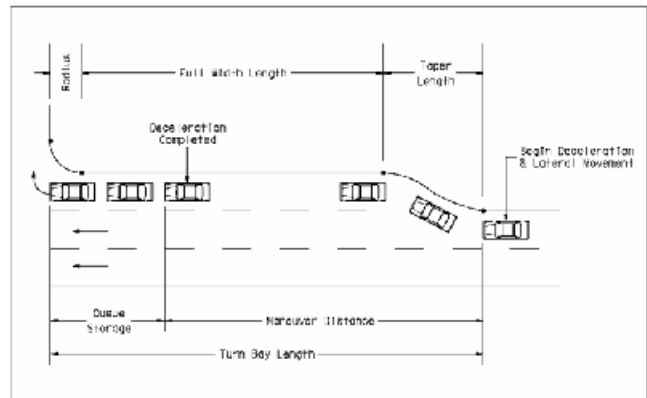


Figure 2.3-1: Right-Turn Lane

Left-Turn Lane

Much like right-turn lanes, left-turn lanes also allow

the turning vehicles to exit the through lanes without affecting the through traffic. However, these lanes generally provide for more queue storage for left turning vehicles for both signalized and un-signalized intersections.

Figure 2.3-2 illustrates the general design elements for a left-turn lane. The length of deceleration should consider the posted speed and the amount of speed differential acceptable for the thoroughfare.

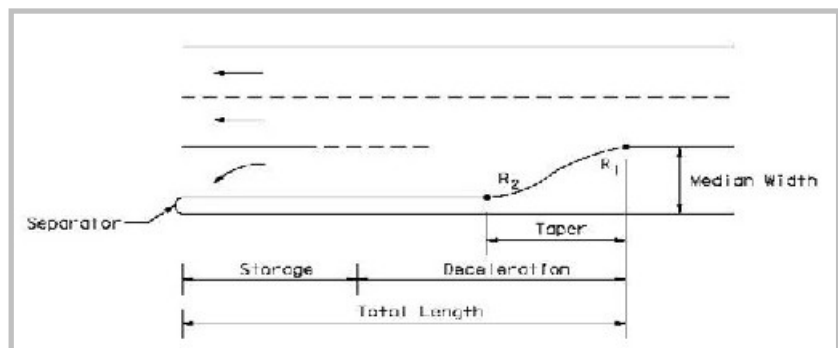
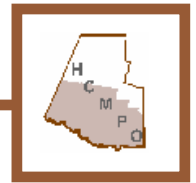


Figure 2.3-2: Left-Turn Lane



Studies have shown that more than two-thirds of all driveway-related accidents are caused by left-turn movements. Statistically, adding a dedicated left-turn lane has been shown to eliminate accidents by a median amount of over fifty percent.

Signal Timing

Signal timing is a critical technique to improve the overall traffic flow throughout the corridor. The timing of signals often involves coordinating an entire signal system. By regularly updating signal timing, the Institute of Transportation Engineers estimates that traffic delay can be reduced from fifteen to thirty-seven percent.

2.4 Policy

Authority and Purpose

This document will ultimately serve as an overlay for land use and design related issues throughout the corridor. The access policy direction must be established in terms of:

- Coordination with TxDOT
- Shared and Cross Access Provisions
- Thoroughfare Planning
- Design Guidelines

Coordination with TxDOT

On September 25, 2003, the TxDOT Transportation Commission adopted the State's proposed rules on access management. The newly adopted rules direct TxDOT to apply access management statewide. In addition, the rules activate TxDOT's new manual on access management. The manual includes general policy implications and minimum driveway spacing criteria along state highways. There is a provision in the manual for local agencies to develop corridor access plans in cooperation with TxDOT which could become a corridor overlay.

This corridor overlay would then supersede any criteria established by the local agency and/or TxDOT. The benefit of this approach is to allow for a more coordinated effort among all agencies involved. Moreover, it provides an interactive mechanism for developers and landowner to understand the vision for the corridor and gain general confidence of future access decisions in the corridor. If agreed to, all the agencies involved can enter into an inter-local agreement to activate this corridor access plan and provide for a clear delineation of access authority in the corridor.

Shared and Cross Access Provisions

Access management is much more than just spacing of driveways and providing raised medians. In order to fully realize the benefits of access management, certain land use provisions should be provided in the local municipalities subdivision code and zoning ordinance.

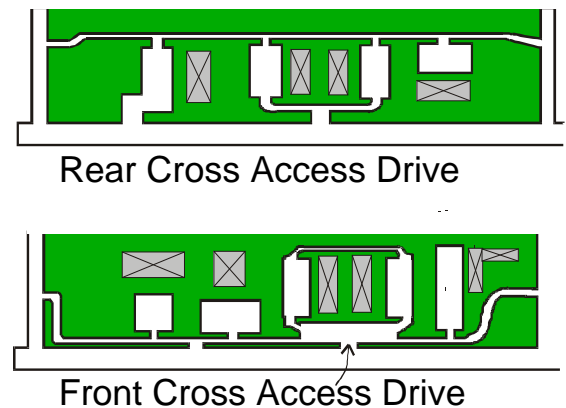


Figure 2.4-1: Cross Access

Subdivision ordinances can require property owners to dedicate land on their common property lines or develop joint access easements. A parking lot cross access provision assures that a single driveway can



serve both properties. The result is greater internal circulation between neighboring properties, which allows vehicles to circulate between businesses without having to re-enter the major roadway and overall fewer driveways (see **Figure 2.4-1**). For the benefits of access management to be fully realized in the HCMPO area municipalities should consider adopting all or part of the Model Municipal Access Management Ordinance found in **Appendix B**.

2.5 Thoroughfare Planning

The local government code provides the authority for local agencies to adopt and implement thoroughfare plans. These plans generally describe the alignment and ROW requirements for major thoroughfares through a community. This policy goes a step further and investigates the potential for the use of collector roads and backage roads to serve local developments without adding more turning traffic onto the major thoroughfares. These roads will generally be localized and dependent on site development and property boundaries.

2.6 Design Guidelines

These guidelines shall form the basis for technical guidance with regard to access decisions in the HCMPO area. Specific guidelines have been developed for access connection (driveway) spacing and median opening spacing.

Access Connections

The access connection distances in the following sections are intended for passenger cars on a level grade. These distances may be increased for downgrades, truck traffic, or where otherwise indicated for the specific circumstances of the site and the roadway. In other cases, shorter distances may be appropriate to provide reasonable access, and such decisions should be based on safety and operational factors supported by an engineering study.

The distance between access connections, measured along the edge of the traveled way from the closest edge of pavement of the first access connection to the closest edge of pavement of the second access connection. **Figure 2.4-3** provides minimum connection spacing criteria for the HCMPO area.

A lesser connection spacing than the ones set forth in this document may be allowed in the following situations:

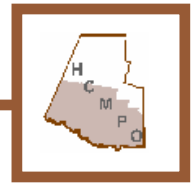
- To keep from land-locking a property.
- Replacement or re-establishment of access to the highway under a reconstruction / rehabilitation projects.

Other State Highways Minimum Connection Spacing	
Posted Speed (mph)	Distance (ft)
= 30	200
35	250
40	305
45	360
= 50	425

Figure 2.4-3: Minimum Connection Spacing

Median Installation

Openings should only be provided for street intersections or at intervals for major developed areas. Spacing between median openings must be adequate to allow for introduction of left-turn with proper deceleration and storage lengths. Refer to TxDOT Design Guidelines for proper deceleration and storage lengths.



Deceleration Lane Tolerances

When a raised median is present and a left-turn deceleration lane shall be provided for every opening. Right-turn deceleration lanes shall be required when the peak hour turning movement is greater than 60 vehicles.



Chapter 3 Access Management Case Study: Texas Boulevard (FM 88), Weslaco

Farm Road 88 (FM 88), called by the name Texas Boulevard within the city limits of Weslaco, is the main north/south thoroughfare through Weslaco, and traverses both the central business district of the city and the main suburban commercial area, which contains major retail centers such as Wal-Mart, Palm Plaza and HEB.

The area studied was the part of FM 88 that is contained within the city limits. The length of this corridor is exactly four miles. Each of the four miles features a different type of land development. The following table below summarizes the function of each part of the FM 88 corridor mile-by-mile.

	Start	End	Description
Mile 1	Mile 10 Rd. N.	Mile 9 Rd N.	Rural
Mile 2	Mile 9 Rd. N.	Pike	Large Lot Commercial
Mile 3	Pike	6th St.	Small Lot Commercial/ Central Business District
Mile 4	6th St.	18th St.	Residential

Mile 1 is characterized as an undeveloped rural area with very limited current commercial activity, which in the future is most likely to become more commercialized as Weslaco grows to the north. The majority of the accidents around this part of the corridor are due to traffic being struck while making left turns onto FM 88 from intersecting driveways.

Mile 2 features many large lot commercial establishments, as well as many national restaurant chains. This section of the corridor has the highest traffic of any of the four sections, and also features most of the accidents on the corridor as well. Most of these accidents are concentrated around the US 83 frontage roads and the entrance to Wal-Mart, with many accidents also between US 83 and Pike Street due to the high number of intersections concentrated in a small area.

Mile 3 is made up of small-lot commercial parcels in the northern section, while Downtown Weslaco is located in the southern part. The highest number of collisions for this part of the corridor is in the northern section. Most of these collisions are rear-end collisions, but a high number of sideswipe collisions are also evident in this section. Reasons for this are identified later in **3.3 Current Corridor Conditions**.

Finally, **Mile 4** is a mainly residential area with many driveways leading out onto FM 88. Most of the residences are in the northern part of this section, and the driveways of each of these residences create many access points leading out onto FM 88. While this section of the corridor had the least number of accidents, it also had a high percentage of rear-end collisions that could be avoidable if vehicle speeds were slowed. This section of the corridor also had two of the three corridor’s head-on collisions. Thus, while the consolidation of access points will likely be limited in this section, traffic calming measures could be researched and considered by the city.





3.1 Existing Traffic Characteristics

Daily Traffic Volumes

Average annual daily traffic (AADT) volumes were provided by Pharr District of the Texas Department of Transportation and the Hidalgo County MPO. The 24-hour counts were recorded at multiple locations along the FM 88 corridor. Projected 2030 volumes were taken from the MPO’s travel demand model.

The traffic volumes used to analyze each section of the corridor are shown below in **Table 3.1-2**

Corridor Section		2000	2030	% Change
Mile 10 N.	to Steve	14,700	23,843	62%
Steve	to Peña	15,800	23,959	52%
Peña	to US-83	27,000	32,256	19%
US-83	to Pike	24,000	25,494	6%
Pike	to Business 83	8,200	16,199	98%
Business 83	to 6th	8,200	14,137	72%
6th	to 18th	6,400	8,553	34%

Table 3.1-2: Corridor AADT's

Population growth within the city limits of Weslaco accounts for much of the growth in the traffic volumes from 2000 to 2030. Especially noteworthy is the growth shown in the northern part of the city. As much of the population growth is in northern Weslaco, the need to plan for access management for this part of the corridor is evident despite the fact that this part of the corridor is currently rural. Recommendations included in the section will thus be split into both immediate and long-term needs for access management.

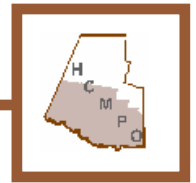
Corridor Travel Speeds

Corridor speed is very important in determining the need for access management. Streets with both high speeds and many access driveways are especially unsafe, as the stopping distance for vehicles traveling at a high speed is much greater, and the many access driveways make it a greater possibility that traffic will occasionally have to brake for entering vehicles. Furthermore, when travel speeds are greater, the severity of accidents will also be much greater, causing more injuries to people and greater economic loss in terms of lives and property.

Posted corridor speeds were recorded throughout the corridor. The speeds were found to be 55 miles per hour in the more rural, northern section of the corridor, 45 miles per hour in the southern, residential portion of the corridor, as well as a short transition section to the north at Mile 9 Road N., and 30 miles per hour in urban Weslaco itself.

Crash Data

The movements of the vehicles involved in the crashes were also analyzed. The crash data provided the direction of the crash along with the individual movements of each vehicle involved in the crash. The crash data were summarized to include the major crashes, categorized by the relative directions of the vehicles at time of impact. The serious impacts were determined to be: head-on, when multiple vehicles moving in a direction towards each other are involved in a crash; left-turn, when at least one of the vehicles involved in the crash was making a left-turn movement; right-turn, when at least one of the vehicles involved in the crash was making a right-turn movement; side impact, when at least one of the



vehicles involved in the crash was struck perpendicular to the vehicle; and rear end, when at least one of the vehicles in the crash was struck from behind, either while driving or stopped, by another vehicle. The crashes that were categorized as “Other” involve incidents including sideswipes and other non-major type collisions. The breakdown of these crashes can be seen in **Table 3.1-4**. Note that these data do not include crashes after December 1, 2004, due to lack of available data at the time of this report.

Movement Type	2003-04 Crashes	%
Head-On	3	0.9%
Left-Turn	67	20.9%
Right-Turn	15	4.7%
Side Impact	43	13.4%
Rear End	142	44.4%
Pedestrian	5	1.6%
Bicyclist	1	0.3%
Fixed Object	8	2.5%
Other	36	11.3%
Total	320	100%

Table 3.1-3 Crash Type Breakdown

As can be seen above, the majority of crashes were rear-end collisions. These accidents are the results both of a lack of access management and due to the lack of channelization of lanes at major intersections, such as at the US-83 frontage roads. These issues and possible solutions addressing them will be address later in the report.

The high number of left-turn collisions is also notable within the corridor. These collisions are the primary type that can be eliminated with access management techniques, as decreasing the number of driveways and installing a raised median will reduce the number of left turns being made on the corridor.

Another crash analysis tool used by the study team is crash rates. This factor is generated by comparing traffic volumes to the number of crashes. The National Safety Council uses crashes per 100 million vehicles miles of travel (VMT). This common denominator allows for comparisons to be performed between roads, areas, cities and states. **Table 3.1-5** illustrates this comparison for the FM 88 corridor as a whole, compared to the State of Texas average crash rate. **Table 3.1-6** illustrates this comparison on a mile to mile basis for the corridor, identifying the most severe segments of the corridor.

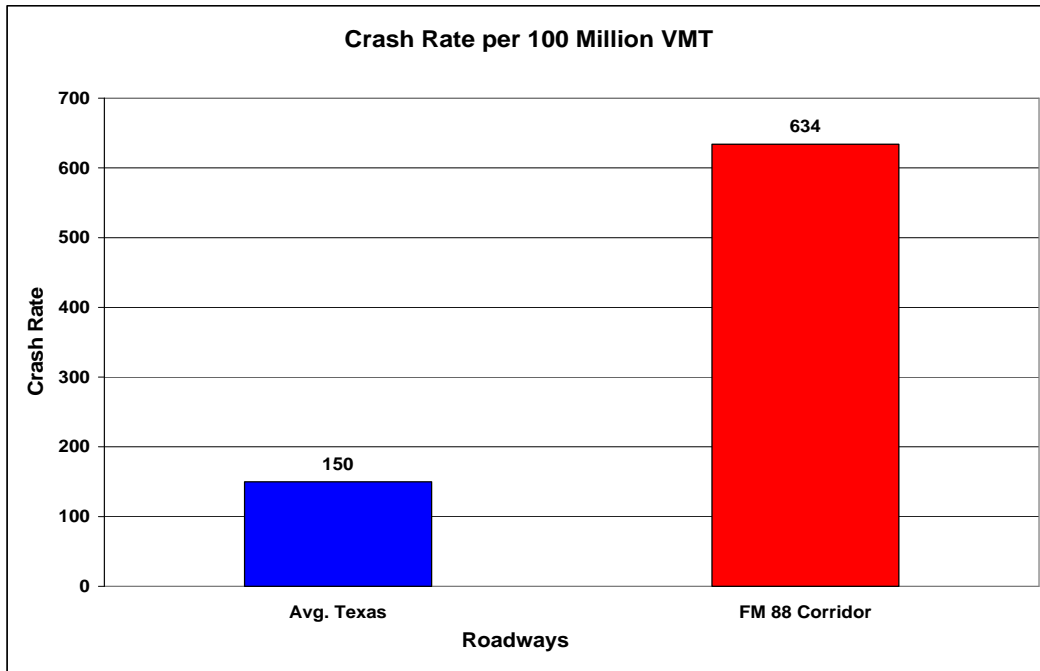


Table 3.1-4 Crash Rate

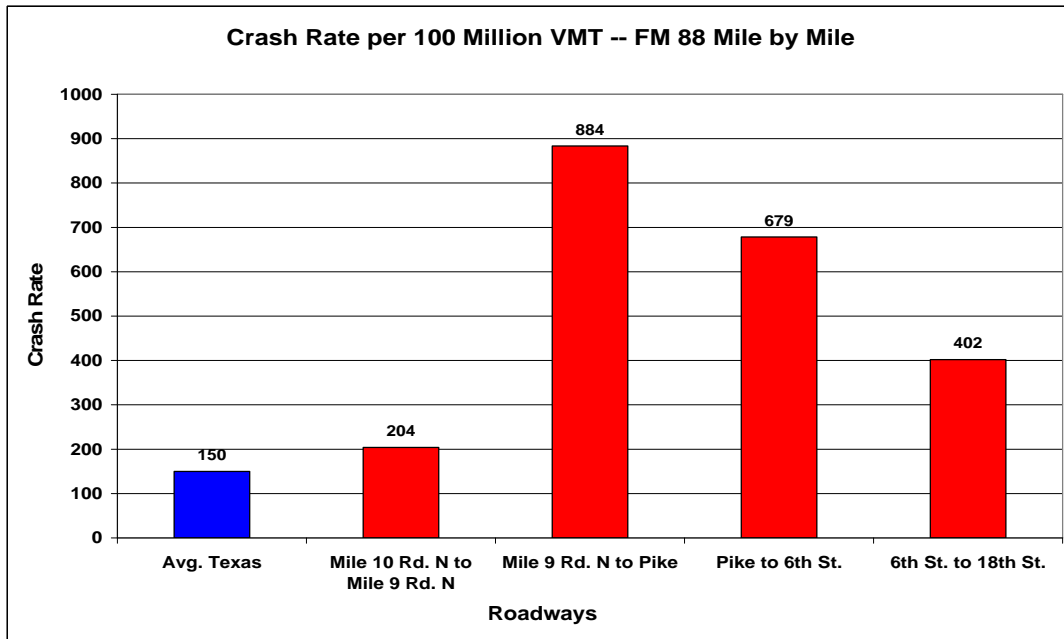
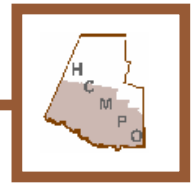


Table 3.1-5 Crash Rate by Mile



The study team further analyzed crashes in the corridor by mapping the actual locations of the crashes and the type of movement that caused them. These maps may be reviewed in **Appendix C**. By geographically analyzing the crash data, the study team was able to document crash hot spots, otherwise known as hazardous locations, where crashes have continually occurred over the two years worth of data. This information is valuable in determining mitigating strategies for intersection improvements, median separations and driveway consolidations. The breakdown of these collisions is detailed below in **Table 3.1-7**, with the percentage of each type of collision by mile illustrated in **Table 3.1-8**

	Bike	Left	Head	Object	Other	Ped	Rear	Right	Side	Total
Mile 1	0%	52%	0%	0%	0%	5%	24%	0%	19%	100%
Mile 2	0%	22%	1%	1%	10%	1%	49%	6%	10%	100%
Mile 3	1%	14%	0%	3%	18%	2%	43%	4%	16%	100%
Mile 4	0%	11%	11%	17%	6%	0%	39%	0%	17%	100%

Table 3.1-6 Crash by Type: Mile-by-Mile

Injury Accidents by Mile	Total Crashes	Total Injury Crashes	% Crashes Injury
Mile 1	21	6	29%
Mile 2	167	31	19%
Mile 3	114	22	19%
Mile 4	18	5	28%
Total	320	64	20%

Table 3.1-7 Crash Type Percentage by Mile

While all injuries cause property damage and need to be reduced through roadway measures such as access management, injury accidents are more severe and show the areas of the corridor where access management must be emphasized. **Table 3.1-9** lists the number of crashes for the years 2003 and 2004 along with the percentage of these crashes that were injury crashes. Not surprisingly, the parts of the corridor where speeds are faster have a higher percentage of injury collisions.

	Bike	Left	Head	Object	Other	Ped	Rear	Right	Side	Total
Mile 1	0	11	0	0	0	1	5	0	4	21
Mile 2	0	38	1	2	17	2	84	11	18	173
Mile 3	1	16	0	3	20	2	48	4	18	112
Mile 4	0	2	2	3	1	0	7	0	3	18
Total	1	67	3	8	38	5	144	15	43	324

Table 3.1-8 Injury Crashes by Mile



3.2 Roadway and Access Inventory

Table 3.2-1 presents the existing access connections with associated driveway densities (per-mile).

Weslaco -- FM 88		Mile 10 Road N.		Mile 9 Road N.		Pike		6th		18th	Totals
Signalized Crossroads by Mile		to		to							
(North to South)											
<i>Mile Number</i>		1		2		3		4			
Distance (miles)		1		1		1		1			4
Driveways Northbound per ZONE		19		23		30		45			117
Driveways Southbound per ZONE		25		39		31		33			128
Access Total Driveways		44		62		61		80			247
Driveway Density Per Mile NB		19		23		30		45			29
Driveway Density Per Mile SB		25		39		31		33			32
Total Driveway Density Per Mile		44		62		62		80			62
Average Driveway Spacing (ft.)		120		85		87		66			86
Accidents per 100 Million VMT		204		884		679		402			634

Table 3.2-1 Driveways by Mile

Mile 4, from 6th Street to 18th Street, has the most access points per mile, with 78 of them. However, most of these access points are from residential driveways. These driveways do not create a large access management problem such as occurs in other sections of the corridor, due to the relative lack of traffic a residential driveway receives. Only 18 accidents were recorded in this part of the corridor over a two-year period. However, it should be noted that a high percentage of injury accidents occurred in this section of the corridor. Of the 18 accidents, 5 of them involved injuries, a higher rate than in other sections of the corridor. While this total number of accidents is small compared to the number of accidents in other parts of the corridor, it does show the potential danger posed by corridors with many residential driveways, especially when traffic is traveling at a high speed down such a corridor. The speed limit of this part of FM 88 is 45 miles per hour.

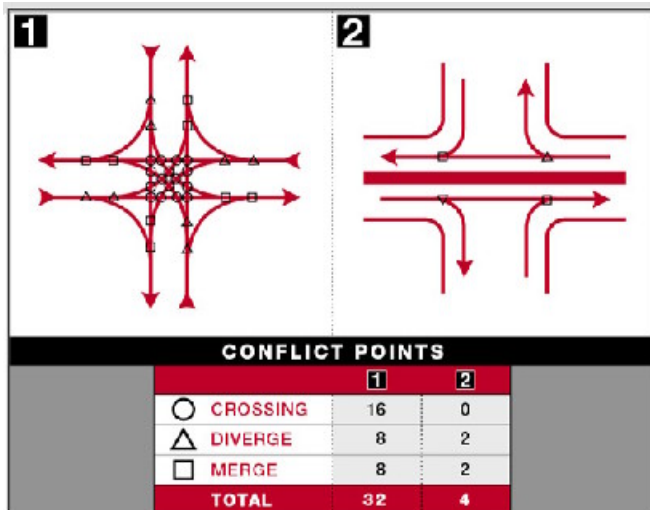


Figure 3.2-1 Conflict Points

Conflict Points		
Start	End	Conflict Points
Mile 10 Rd. N.	Mile 9 Rd. N	451
Mile 9 Rd. N	Pike St.	627
Pike St.	6th St.	690
6th St.	18th St.	803
Total		2571

Table 3.2-2 Conflict Points by Mile

Conflict points in the corridor were inventoried by counting all the unsignalized intersections and driveways. **Figure 3.2-1** illustrates how conflict points are generated by the crossing, diverging and merging movements of vehicles. **Table 3.2-2** reveals that the number of conflict points increases as one travels south along the FM 88 corridor. However, due to the differing nature of the surrounding land uses in each mile of the corridor, there is not a direct correlation between the number of conflict points and the amount of accidents. Nevertheless, if the proposed access measurements are implemented, we can still estimate the percentage decrease in accidents along each part of the corridor. These benefits are described in **Section 3.4**.

3.3 Short and Medium-Term Corridor Improvement Options

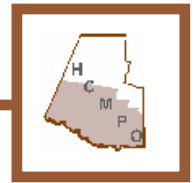
Operational Improvements

Part of access management includes ensuring that the corridor functions in a way that minimizes traffic delay. This involves determining the optimal functioning and timing of traffic signals on a corridor, as well as determining the placement of lanes at each intersection. The study team used field observation as well as turning movement counts in order to determine the current operational capability of several traffic signals on the FM 88 corridor in Weslaco. Based upon this observation, several recommendations can be made which could be applied to other corridors within the Hidalgo County MPO boundaries.

Access management plans for individual corridors are heavily dependent upon consistently checking signal timing in order to minimize traffic delay. Within the FM 88 corridor, signal timing exists from the US 83 frontage roads south to the intersection with Business 83. Signals all speak to a central receiver at Business 83.

Study team engineers determined that signal timing on the FM 88 corridor did not accurately reflect the amount of traffic the corridor received at specific times during the day. Thus, it is important to use a signal timing system for corridors that reflect accurate time of day counts in order to reduce traffic delay to the maximum extent possible. Access management measures will always work best on corridors where signals are efficiently timed.

Safety and Median Improvements



FM 88 between Mile 10 Road North and 18th Street has a high number of accidents. Most of these are concentrated around the US-83 freeway and the commercial area immediately to the north and south of the freeway, bounded by Ballard Street to the north, and Pike Street to the south. Attention to this area of the corridor is paramount due to the higher intensity of commercial uses that will be occurring north of US-83 in the near future, much of this activity directly attributable to the expansion of the pre-existing Wal-Mart into a Wal-Mart Super Center, greatly increasing the amount of customer traffic as a result.

Recommendation 1: Non-traversable median

The study team recommends that a non-traversable median be constructed on parts of FM-88 in order to reduce the number of potential automobile conflicts. Such a median would be constructed in several different phases. The maps in **Appendix C** illustrate these recommendations for a median. Furthermore, the recommendations have been categorized as either short-term or long-term.

While it might seem more inconvenient and less safe for traffic to have to make U-turns, a Florida study in 2000 actually found that a U-turn after making a right turn actually decreases crashes by 17.8%, and decreases injury crashes by 27.3%. Also, the study found that delay from making a right turn and then a U-turn was actually less than the delay caused by having to make a left-turn at an unsignalized intersection (3).

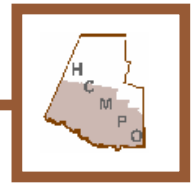
According to statistics recorded in NCHRP 420, installation of a non-traversable median could conceivably reduce accidents to an average number of 820 per 100 million VMT if the number of access points remains at the present number of 61. With reducing the number of access points by only ten driveways, in addition to adding a non-traversable median, accidents could be reduced to 680 per 100 million VMT. With a total reduction to less than 20 access points per mile, the number of accidents could conceivably be reduced to 290 per 100 million VMT with the installation of a median. As can be seen, the safety benefits of medians are well-documented.

In the short-term, a median should definitely be placed between Paisano/Ballard Streets and Pike Street. Reasons for this include:

- Large amount of traffic at Wal-Mart/Peña Street intersection with FM 88, especially with expansion into Wal-Mart Supercenter
- Concentrated density of driveways between US-83 and Pike Street
- Numerous accidents at FM 88 intersection with US-83 frontage roads
- U-turns can be created at Pike Street to the south and Paisano/Ballard to the north for traffic that wishes to turn left out of commercial driveways
- Allows a safe “island” for pedestrians crossing FM 88

A non-traversable median could prevent traffic leaving Wal-Mart and its associated pad properties from turning left onto FM 88. Such traffic could then proceed northbound to the intersection at Ballard/Paisano, where another median cut and a traffic signal would allow traffic to make a U-turn southbound. Under such circumstances, traffic may choose to use the alternate access from Wal-Mart onto the westbound frontage road, as a right-turn only turn onto a one-way frontage road is more likely to be safer than making a left turn onto FM 88. A median would also provide a safe refuge for pedestrians crossing the street in this heavily commercial section of the corridor.

Such a median should be used in concordance with a reduction in the number of driveways in this part of



the corridor. Cross access, another possible access management recommendation, could be provided from the parking lot onto other pad properties associated with the site, thus providing a way for customers to access these businesses without multiple access locations off of the main road.

South of US-83, the heavy concentration of driveways would be less of a risk to drivers if a median were in place. A potential U-turn site could be at Pike Street, although it is not recommended that the intersection of FM 88 with the frontage roads should be used for U-turns. Once again, cross access would need to be heavily utilized so that traffic exiting from commercial sites could use either one centralized driveway out onto FM 88, or perhaps use one of the cross streets. Right of way for such a median already exists by eliminating the paved shoulders of the road that exists south of the freeway to the intersection with Business 83.

The reason for this urgent need for a median is due to the fact that access driveways are too closely spaced together. It is recommended that not only should a median be placed in order to allow left turns only at the busiest intersections, but that driveways should be consolidated in this section as well. The aerial photos in the Appendix illustrate precisely where medians and driveway consolidation should occur.

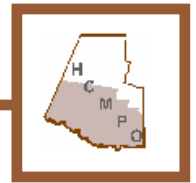
In the long-term, the study team recommends a median that should extend from Mile 10 Road North south to Business Highway 83. The median north to Mile 10 Road North should be placed there in anticipation of future commercial development of this area. The median south to Business 83 would bring down the accident rate and reduce delay and should be placed there when as the city needs. The area south of Business 83 is either part of the central business district, or a residential area, and therefore has no need of median placement.

Recommendation 2: Improve FM 88/US-83 Frontage Road intersections

Another location that was found to contain a high cluster of accidents was near the intersection of both the eastbound and westbound frontage roads of US-88. The study team determined that the main type of accidents at this intersection were rear end collisions. Accidents were at a high rate for both the left-hand and right-hand turning lanes. While a full-scale turning movement study could not be performed on this intersection, sight observation by the study team determined that greater channelization of turning lanes would aid this intersection both north and south of the freeway, as lack of space for both right and left-hand turning movements contributed to the rear end collisions. An even better solution, but with a higher cost, would involve creating an actual median for left-turn movements, or creating a free-flow right at both frontage roads to ease the process of making right turns.

At present, the paved shoulder is too wide and, based upon study team observation, is used too often as a through lane for traffic. This overly wide shoulder leads to many sideswipe collisions on the corridor, as vehicles that are turning from the correct turn lane are struck by vehicles attempting to drive in the shoulder. By taking away this paved shoulder, and then constructing a median, allowing left turns only at roadway intersections and at high intensity land uses, many of the roadway conflicts can be easily eliminated, and the elimination of most of the wide shoulder will keep drivers in proper traffic lanes.

Commercial development in the area north of Ballard/Paisano is likely in the city of Weslaco; plans should already be in place for the placement of a median. Median openings should ideally be placed at major roadways where they exist present, as well as where any future roadways are planned. Openings should also be planned at the property lines between properties, and plans should be made for shared access, so that both properties can use the same access points, for instance, a common driveway. The general



rule is that driveways should provide shared access between properties for all but the highest intensity uses, and that cross access should be provided whenever possible between properties so that traffic does not have to reenter the main road in order to simply go from one property to the next one. In cases of very high intensity commercial uses, municipalities should even consider constructing a frontage road. These costs do not necessarily need to be borne by the municipality. Impact fee regulations could be considered in order to pass on some of the infrastructure costs of development to real estate developers.

Recommendation 3: Driveway Consolidation and Relocation

Driveway consolidation is an access management technique that can greatly improve the overall corridor safety and operations. Aerial graphics in **Appendix C** represent potential driveway consolidation candidates that the implementing agencies can consider for driveway consolidation. As development or redevelopment occurs, the location and design of all driveways should be re-evaluated. Also, in areas where a raised median is limiting the left-turn maneuver from a private drive, some discussion about driveway relocation or closing and encouraging shared or cross access might be appropriate.

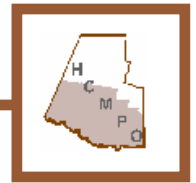
Whenever possible, driveways should be located as far away from intersections as possible in order to provide for sufficient corner clearance for vehicles. Failure to do this causes numerous spillback problems, meaning that vehicles are either unable to enter traffic from access points close to intersections, or that it will be unsafe for them to do so. This is especially a problem in corridors with multiple lanes. Vehicles in one lane may stop short of an intersection to let traffic in from nearby driveways. Such driveway traffic enters the corridor, only to be struck by oncoming traffic from another lane that fails to stop for such traffic. By placing driveways as far away from intersections as possible, such potential conflicts may be avoided.

Numerous properties on the FM 88 corridor have multiple access points placed closely to each other. While these access points may aid the business when it comes to attracting customers, they create unsafe conditions for drivers entering and exiting these businesses, especially when such access points are close to intersections. By consolidating driveways, both potential roadway conflicts and roadway delay, while businesses more often than not suffer no loss of business due to losing a driveway.

Recommendation 4: Future Driveway Regulations

Future driveways on FM 88 should ideally be located at the intersection of property lines, so that a shared access driveway or cross access is most easily planned. Regulations can be suggested to the municipality of Weslaco that they should seek to make land use decisions that would limit the number of access points onto arterial streets. New commercial businesses in Weslaco should also be encouraged to share access points with adjacent businesses. Unless a business receives a greater than average amount of commercial traffic, separated access points are usually unnecessary, and the greater safety afforded by businesses having less driveways should outweigh any complaints of economic harm, although most businesses usually do not report a decrease of business due to driveway consolidation. In fact, studies show that that most drivers find access management measures create more of a desire to frequent a business rather than less desire. At the same time, NCHRP 420 estimates that removing just one access point on an urban commercial street could reduce accidents by up to 18 accidents per 100 million miles traveled (1).

See the discussion in **Section 4.3** under recommendation 4 for more information concerning driveways and turning radius.



Recommendation 5: Miscellaneous Access Management

At several places along the FM 88 corridor, local streets intersecting the corridor are not located straight across from each other. Instead, drivers must turn left onto FM 88 and then make another left turn onto the nearest local street to continue in their previous direction. Continuing straight on a local street in such a manner is known as a “jog maneuver,” and creates dangerous left-turn conflicts for vehicles that should normally be traveling in a straight line.

Examples of cross-streets such as this include Esplanada Street and Sgt. Garcia Streets. Planning streets in such a fashion is unsafe and can cause accidents. In the absence of a non-traversable median preventing traffic from making left turns onto such streets, which is the safest solution, streets should be retrofitted so that a driver need only travel in a straight line to go from one side of the thoroughfare to the other. Future streets that are created in a municipality should be offset at least 300 to 600 feet away from each other. Such an offset will eliminate unnecessary jog maneuvers.

Techniques could also be used to calm traffic along the corridor, particularly in the residential area south of the downtown. Examples of such techniques include the use of curb extensions at intersections and lane narrowing see **figure 3.2-2**. Using these innovative types of intersections would slow down traffic along this part of the corridor and make it safer overall. Another possible technique to use is to provide room for on-street parking. While it seems that on-street parking may increase the number of collisions overall, studies show that streets with on-street parking have slower travel speeds, with all other factors equal. This is most likely due to a driver’s natural caution to avoid striking a parked car, thus slowing travel speeds.

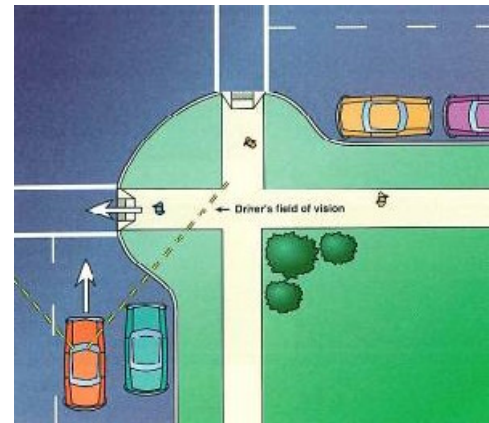


Figure 3.2-2 Curb Extensions

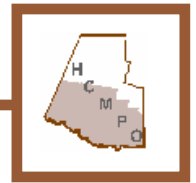
In the long term, better planning of commercial land uses within Weslaco could create not only a safer environment, but a more aesthetically pleasing one as well. It should be noted that the safest area on the corridor, and also the area with the least need for access management, is Downtown Weslaco itself. In this district, buildings are close to the street and parking is either on the street or inside off-street parking ramps, the traditional way in which to design land use and transportation rather than the more common “large parking lot developments” seen today. Alleys behind the buildings provide delivery access for trucks. There are very few access driveways onto FM 88 in this area, and the slower speeds in this part of the corridor due to the presence of on-street parking mean that accidents are very few.

3.4 Performance Measures of Improvements

Raised Median and Driveway Consolidation/Relocation

The benefit of a non-traversable median would be that it restricts left turns at the many driveways along the FM 88 corridor. This, in turns, decreases the number of conflict points, allowing for a safer roadway with less accidents, and allowing for better traffic movement by eliminating many of the left-turns that cause the much of the delay on commercial corridors.

Below is the total number of conflict points. With driveway consolidation and median



placement, the number of total conflict points can be decreased as shown in the table below. The greatest percentage decrease is possible between Mile 9 Road N and Pike Street, where most of the accidents occur. Between 6th St. and 18th Streets, the possibility of access management is limited, due to the residential nature of this area. As this area has fewer, but more severe, accidents, measures such as traffic calming may work better than access management.

Conflict Points After Access Management				
Start	End	Conflict Points Before Access Management	Conflict Points After Access Management	% Decrease From Base
Mile 10 Rd. N.	Mile 9 Rd. N	451	361	20%
Mile 9 Rd. N	Pike St.	627	454	28%
Pike St.	6th St.	690	553	20%
6th St.	18th St.	803	746	7%
Total		2571	2114	18%

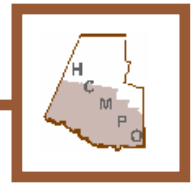
Table 3.2-3 Median Performance Measure: Safety

With the strategic application of a raised median and driveway consolidations, the FM 88 corridor could see a 15% to 20% reduction in its crash rate.

Start	End	Existing Access Points	Reduction in Free Flow Speed MPH	Access Points After Consolidation/Median	Reduction in Free Flow Speed MPH	Improvement to Free Flow Speed MPH
Mile 10 Rd. N.	Mile 9 Rd. N	44	13	37	9	4
Mile 9 Rd. N	Pike St.	62	15	47	13	2
Pike St.	6th St.	61	15	51	14	1
6th St.	18th St.	80	15	74	15	0
Total		247	14.5	209	12.75	1.75

Table 3.2-4 Median Performance Measure: Speed

With the application of a raised median and driveway consolidations, the FM 88 corridor could see a 1 to 2 MPH increase in corridor speeds. In some instances these increase represents at 10% improvement in speed. However, the addition of a raised median often has other benefits to speed and capacity that are not as obvious. These additional benefits come in the form of driver confidence and decreased crash incidents.

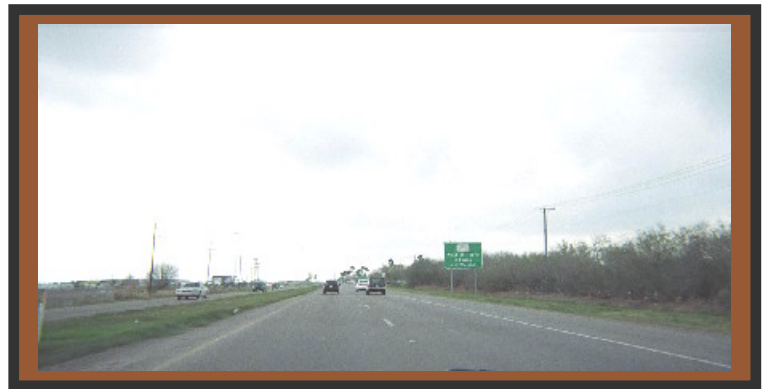


Chapter 4 Access Management Case Study: S. 23rd Street,

Spur 115, known as 23rd Street within the City of McAllen, is a main link between Mexico and the City, with all four miles of roadway studied in this report being within the City of McAllen. For the purposes of this study the roadway was broken-up into five sections. The adjacent table and paragraphs below describe these sections in detail.

	Start	End	Description
Section 1	US 83	Uvalde	Commercial
Section 2	Uvalde	El Rancho	Commercial
Section 3	El Rancho	Elmira	Rural
Section 4	Elmira	Lucille	Distribution/Commercial
Section 5	Lucille	FM 1016	Distribution/Commercial/ Rural

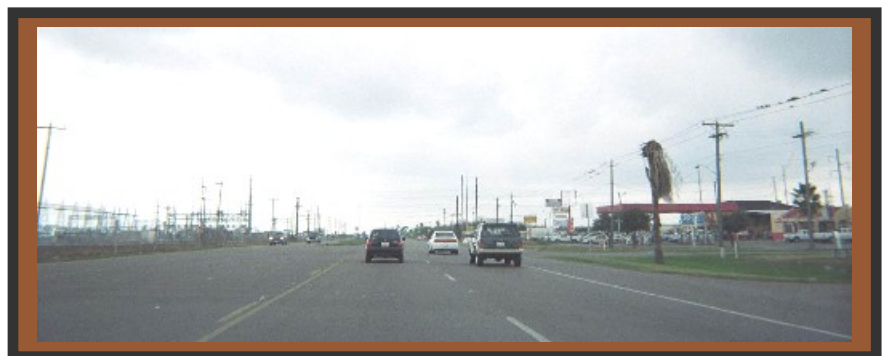
Section 1 of 23rd Street begins north of US 83 and continues south one mile to Uvalde Avenue. Land use in this section is influenced by access to US 83. Convenience stores and fast food restaurants dominate this diamond intersection. Agricultural uses and a water treatment facility have limited the development to mostly small commercial lots.



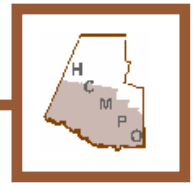
Section 2 of 23rd Street is defined from Uvalde Avenue to El Rancho Avenue, a length of 0.8 miles. Agricultural uses and residential properties give way to small lot commercial developments that abut the frontage of 23rd Street. The commercial uses are mainly used car dealers, convenience stores and an assortment of small distribution centers.

Section 3 of 23rd Street continues south from El Rancho Avenue to Elmira Avenue, a length of 0.9 miles. Agricultural uses are most dominant in this section. A few small lot commercial developments are found near the Elmira Avenue intersection.

Section 4 of 23rd Street begins at Elmira Avenue and progresses only .3 miles south to Lucille Avenue. This section contains many of the same characteristics found in sections 1 and 2, namely small lot commercial development and agricultural uses. Car dealers and convenience stores are the main land uses fronting the street, while residential areas can be found north of the commercial strip.



Section 5 of 23rd Street consists of one mile of roadway from Lucille to FM 1016. This section of roadway is mostly divided and limited access. Land uses include both small-lot commercial and distribution/trucking centers.



4.1 Existing Traffic Characteristics

Daily Traffic Volumes

Average annual daily traffic (AADT) volumes were provided by the Pharr District of the Texas Department of Transportation, and the Hidalgo County MPO. The 24-hour counts were recorded at multiple locations along the 23rd Street corridor. Projected 2030 volumes were extracted from the MPO’s travel demand model.

The traffic volumes used to analyze each section of the corridor are shown below in **Table 4.1-1**

Corridor Section		2000	2030	% Change
US 83	to Uvalde	33,400	40,000	20%
Uvalde	to El Rancho	38,100	42,000	10%
El Rancho	to Elmira	33,550	48,400	44%
Elmira	to Lucille	33,550	42,700	27%
Lucille	to Tanya	22,400	40,226	80%
Tanya	to FM 1016	22,490	39,000	73%
FM 1016	to Border	26,690	34,000	27%

Table 4.1-1 Corridor AADT’s

Population growth and increases in truck traffic within the city limits of McAllen account for much of the growth in the traffic volumes from 2000 to 2030. Especially noteworthy is the growth shown in the census tracts between Lucille and Tanya in the southern section of the corridor. This automobile demand on the roadway will need to be balanced with the truck/freight traffic. Recommendations included in this section will thus be split into both immediate and long-term needs for access management.

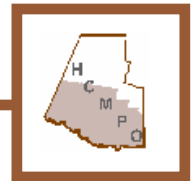
Intersection Delay

The 23rd Street intersection with US 83 is experiencing severe peak hour delay and a moderate amount of delay due to crash incidents and near misses. This intersection is experiencing a level of service (LOS) of D in the PM peak hour. Major turning movements that are failing (LOS F) include: the north bound right turn-lane and south bound through movement.

Corridor Travel Speeds

Corridor speed is very important in determining the need for access management. Streets with both high speeds and many access driveways are especially unsafe, as the stopping distance for vehicles traveling at a high speed is much greater, and the many access driveways make it a greater possibility that traffic will occasionally have to brake for entering vehicles. Furthermore, when travel speeds are greater, the severity of accidents will be much greater, causing more injuries to people and greater economic loss in terms of lives and property.

Posted corridor speeds were recorded throughout the corridor. The speeds were found to be 55 miles per hour in the more rural, southern section of the corridor, 45 miles per hour in the southern, residential and strip-commercial portion of the corridor, and 35 miles per hour in the northern highway interchange area.



Crash Data

The movements of the vehicles involved in the crashes were also analyzed. The crash data provided the direction of the crash along with the individual movements of each vehicle involved in the crash. The crash data were summarized to include the major crashes, categorized by the relative directions of the vehicles at time of impact. The serious impacts were determined to be: head-on, when multiple vehicles moving in a direction towards each other are involved in a crash; left-turn, when at least one of the vehicles involved in the crash was making a left-turn movement; right-turn, when at least one of the vehicles involved in the crash was making a right-turn movement; side impact, when at least one of the vehicles involved in the crash was struck perpendicular to the vehicle; and rear end, when at least one of the vehicles in the crash was struck from behind, either while driving or stopped, by another vehicle. The crashes that were categorized as “Other” involve incidents including side-swipes and other non-major type collisions. The breakdown of these crashes can be seen in **Table 4.1-2**.

The majority of crashes were rear-end collisions. These accidents are the result both of a lack of access management and due to the lack of channelization of lanes at major intersections, such as at the US-83 frontage roads. Side impact and left turn collisions are the main type of collision that can be solved with access management techniques, as decreasing the number of driveways and installing a raised median will reduce the number of left turns being made on the corridor.

Another crash analysis tool used by the study team is crash rates. This factor is generated by comparing traffic volumes to the number of crashes. The National Safety Council uses crashes per 100 million vehicles miles of travel (VMT). This common denominator allows for comparisons to be performed between roads, areas, cities and states. **Figure 4.1-3** illustrates this comparison for the 23rd Street corridor as a whole, compared to the State of Texas average crash rate.

Movement Type	2003-04 Crashes	%
Head-On	0	0.0%
Left-Turn	9	18.0%
Right-Turn	5	10.0%
Side Impact	13	26.0%
Rear End	22	44.0%
Pedestrian	0	0.0%
Bicyclist	0	0.0%
Fixed Object	1	2.0%
Other	0	0.0%
Total	50	100%

Figure 4.1-4 illustrates this comparison on a mile to mile basis for the corridor, identifying the most severe segments of the corridor.

23rd Street Crash Rate Table 4.1-2 Crash Type

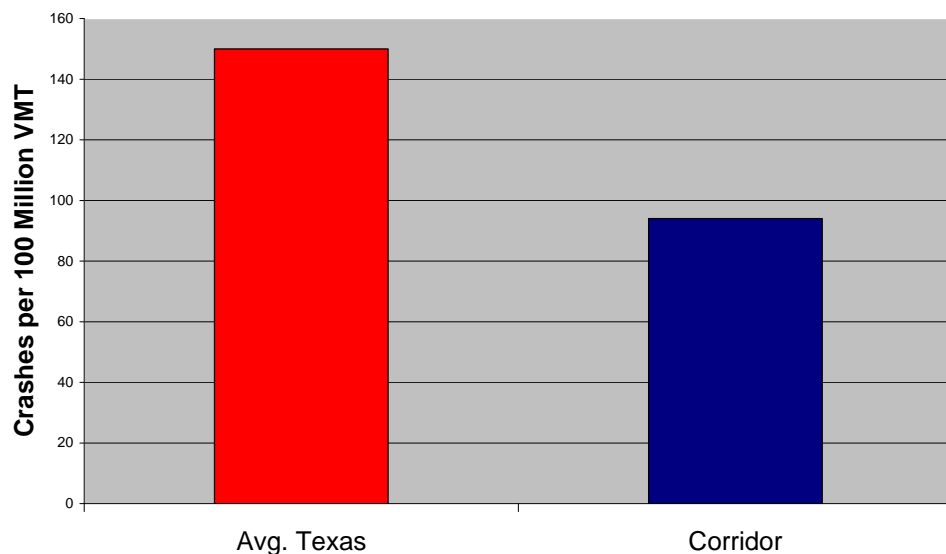


Figure 4.1-1 Crash Rate



The study team further analyzed crashes in the corridor by mapping the actual locations of the crashes and the type of movement that caused them. These maps may be reviewed in **Appendix D**. By geographically analyzing the crash data, the study team was able to document crash hot spots, otherwise known as hazardous locations, where crashes have continually occurred over the two years worth of data. This information is valuable in determining mitigating strategies for intersection improvements, median separations and driveway consolidations. The breakdown of these collisions is detailed below in **Table 4.1-5**.

Crash Rate by Section

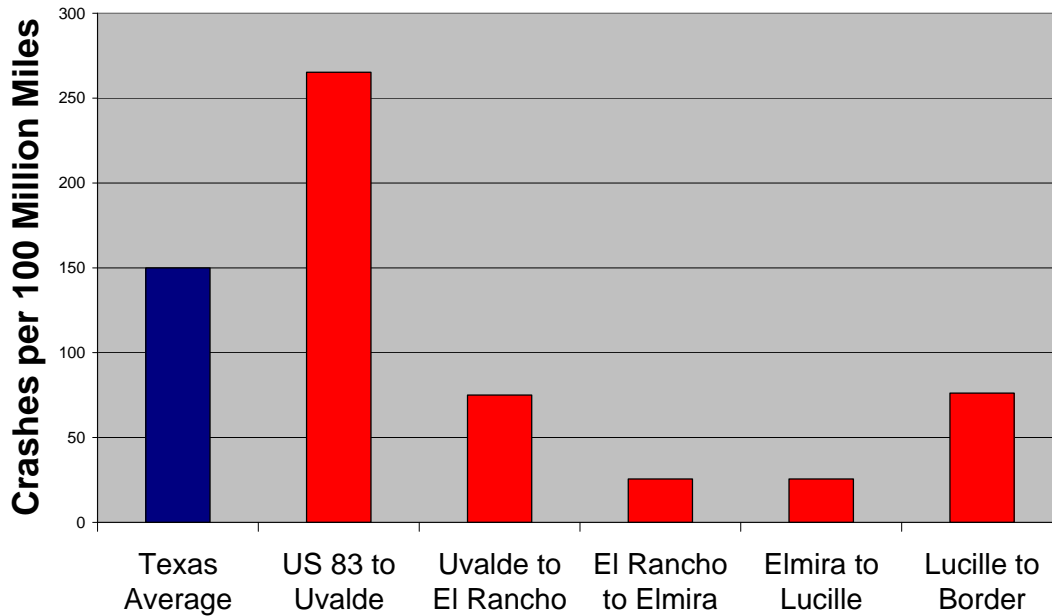
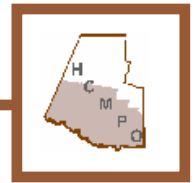


Figure 4.1-2 Crash Rate by Section

	Bike	Left	Head	Object	Other	Ped	Rear	Right	Side	Total
Section 1	0	7	0	0	0	0	10	2	8	27
Section 2	0	1	0	0	0	0	4	1	1	7
Section 3	0	0	0	1	0	0	3	0	2	6
Section 4	0	1	0	0	0	0	1	1	1	4
Section 5	0	0	0	0	0	0	5	0	1	6
Total	0	9	0	1	0	0	23	4	13	50

Table 4.1-3 Crash Rate by Section and Type

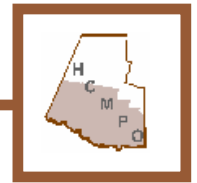


4.2 Roadway and Access Inventory

Table 4.2-1 presents the existing roadway characteristics.

Roadway Characteristics	US 83	to	Uvalde Ave	to	El Rancho Ave	to	900' N of Elmira Ave	to	1500' S of Lucille Ave	to	FM 1016
	Distance		0.5		0.7		0.5		0.4		1.0
	Lanes		4.0		4.0		4.0		4.0		4.0
	Median Type		TWLTL		TWLTL		Raised		Striped		Raised
	Edge Treatment		Shoulder		Shoulder		Shoulder		Shoulder		Shoulder
	Sidewalks		No		Discontinuous		No		No		No
	Bike Lanes		No		No		No		No		No
	Speed (MPH)		35		35		45		45		55
	Cartway (ft)		75		75		100		90		100

Table 4.2-1 Existing roadway characteristics



McAllen -- S. 23rd Selected Signalized Crossroads		US 83	to	Uvalde Ave	to	El Rancho Ave	to	900' North of Elmira Ave	to	1500' South of Lucille Ave	to	FM 1016	Totals
Access	Distance (miles)		0.5		0.7		0.5		0.4		1.0		3.1
	Driveways SB per ZONE		9		29		2		29		31		100
	Driveways NB per ZONE		10		20		3		10		8		51
	Total Driveways		19		49		9		28		45		150
	Total Driveway Density		38		70		18		70		45		48

Table 4.2-2 Driveways by Section

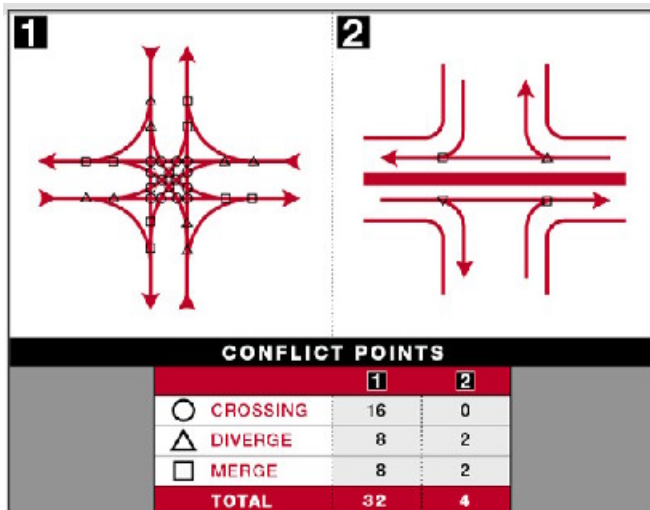


Figure 4.2-1 Conflict Points

Conflict Points		
Start	End	Conflict Points
US 83	Uvalde	260
Uvalde	El Rancho	476
El Rancho	Elmira	116
Elmira	Lucille	272
Lucille	FM 1016	240
Total		1364

Table 4.2-3 Conflict Points

Conflict points in the corridor were inventoried by counting all the unsignalized intersections and driveways. **Figure 4.2-1** illustrates how conflict points are generated by the crossing, diverging and merging movements of vehicles. **Table 4.2-3** details the number of conflict points by the study section of 23rd St. These values are an important indicator in terms of impact to vehicle speed and crash rate. The next section of this chapter will use these base-line numbers to establish performance measures for access management techniques.



4.3 Short and Medium-Term Corridor Improvement Options

Operational Improvements

Part of access management includes ensuring that the corridor functions in a way that minimizes traffic delay. This involves determining the optimal functioning and timing of traffic signals on a corridor, as well as determining the placement of lanes at each intersection. The study team used field observation as well as turning movement counts in order to determine the current operational capability of several traffic signals on the 23rd Street corridor in McAllen. Based upon these observations, several recommendations can be made which could be applied to other corridors within the Hidalgo County MPO boundaries.

Safety Improvements

A second concern that access management seeks to address is safety. The study team used the City of McAllen’s accident reports to generate base data for a crash analysis. This data was sorted in order to exclude the idiosyncratic data and highlight the repeatable crash scenarios. Furthermore, the data was mapped (**Appendix D**). Field observations were then done to visualize the crash scenarios. During this time engineers and planners were able to reconstruct the cause of the collisions and determine what flaws in the roadway could account for the crash. These observations are reflected in the following recommendations:

Recommendation 1: Non-traversable median

The study team recommends that a non-traversable median be constructed on portions of 23rd Street in order to reduce the number of potential automobile conflicts. **Appendix D** graphically represents how these recommendations for a median are categorized as either short-term or long-term.

The benefit of a non-traversable median would be that it restricts left turns at the many driveways along the 23rd Street corridor. This, in turns, decreases the number of conflict points, allowing for a safer roadway with less accidents, and allowing for better traffic movement by eliminating many of the left-turns that cause the much of the delay on commercial corridors.

In the short-term, a median should be placed between in the functional intersection area of US 83. This median should begin 300’ north of the intersection and stretch south 675’ to Colbath Rd. were a median opening would occur. This opening would allow for left turn ingress to occur in two directions and displayed in **figure 4.3-1**.

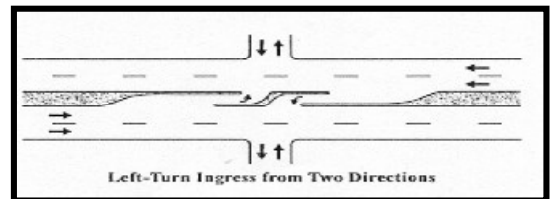


Figure 4.3-1 Median Treatment

The raised median would continue south 1125’ to the signalized intersection of Uvalde, were a full opening would occur. Then the median would continue 600’ south of the intersection were an opening would allow for left-turn queues.

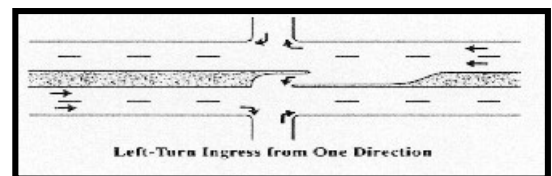


Figure 4.3-2 Median Treatment



The warrants for this recommendation include:

- ADT's in this section are 33,400. 24,000 is the threshold for adding a raised median.
- Colbath Rd. recently warranted a signal based on 8-hour traffic volumes. A new signal in this location would increase delay on 23rd Street and Colbath because the new signal would become a part of the coordinated system that give priority to 23rd Street. The new signal would increase rear end collisions on 23rd Street, due to the extended queue from the US 83 intersection.
- Numerous accidents at 23rd Street intersection with US-83 frontage roads could be mitigated with a median.
- U-turns can be performed at Colbath and Uvalde to handle traffic that wishes to turn left out of commercial driveways
- Allows a safe "island" for pedestrians crossing 23rd Street

Such a median should be used in concordance with a reduction in the number of driveways in this part of the corridor. Cross access, another access management recommendation, could be provided from the parking lot onto other pad properties associated with the site, thus providing a way for customers to access these businesses without multiple access locations off of the main road.

600' south of Uvalde Ave. a long term median improvement is proposed due to the intense concentration of driveways (35). This median is phased in the long term because the impact of placing a median in the short term would negatively impact businesses and traffic flow. The intensity of left turns could not be accommodated using u turn lanes. Therefore this median improvement should be coordinated with land use improvements which include: cross access, shared access and larger lot sizes.

A third median improvement is recommended in the Lucille Avenue intersection area of 23rd Street. This intersection is currently meeting signal warrants based on eight, four and peak hour traffic volumes. However, an existing signal (Elmira) is only 600' feet north of this intersection. Adding an additional signal would greatly intensify delay and reduce safety. The grid structure of the roads allows for channelization of traffic circulation without a significant impact to access. Therefore, the study team recommends a raised median from the southern portion of the Elmira Drive intersection to Lucille Ave. The median opening at Lucille should be designed similarly to **Figure 4.3-3**.

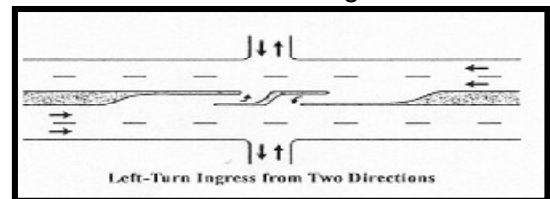
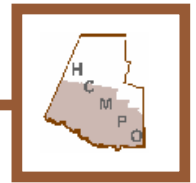


Figure 4.3-3 Median Treatment

The aerial photos in the **Appendix D** illustrate precisely where medians and driveway consolidation should occur.

Recommendation 2: Improve 23rd Street/US-83 Frontage Road Intersection

The 23rd Street intersection with US 83 is experiencing a LOS of D. The north bound right-turn lane is the major turning movement that is failing (LOS F). A Possible mitigation measure is to provide a dedicated right turn lane in the northbound direction. This would allow the intersection to operate at a LOS of B. To create this dedicated right a lane shift would need to occur that would eliminate the shoulder on the south bound side of 23rd Street. This lane shift could begin 600' south of Uvalde Avenue and end at the East bound frontage road. Minor changes may need to occur to the lane structure under the overpass of US 83.



Moreover, this lane shift would allow for a dedicated right at Uvalde Avenue. Field observations indicated that the right turning movements at the intersection of Uvalde Avenue and 23rd Street are experiencing significant delay and queuing. Rear end crashes would also be lessened by the addition of a right turn only lane.

Safety improvements at the 23rd Street and US 83 intersection are needed on the west bound dual left. A high amount of left turn crashes are occurring due to drivers not recognizing they are in a dedicated left turn lane. These drivers are looking forward to enter the mainlanes of US 83 and being sideswiped by drivers in the through-left lane. Field observations have determined that the cause of these crash occurrences is due to improper striping of the opposing lane stop bar. A possible mitigation measure is to restripe the opposing dead lane area with yellow cross hatch as shown in **Figure 4.3-4**. This and additional overhead signage could provide drivers with a clearer understanding that the lane they are in is a dedicated left turn lane.

The study team previously recommended a raised median for this intersection. Until this recommendation is implemented, the study team recommends increasing the size of the left turn queue lane approaches to US 83 from 150' to 375'. This will allow for greater through movement, thus a better LOS.



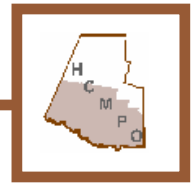
Figure 4.3-4 Cross Hatch Added

Recommendation 3: Driveway Consolidation and Relocation

Driveway consolidation is an access management technique that can greatly improve the overall corridor safety and operations. Aerial graphics in **Appendix D** represent potential driveway consolidation candidates that the implementing agencies can consider for driveway consolidation. As development or redevelopment occurs, the location and design of all driveways should be re-evaluated. Also, in areas where a raised median is limiting the left-turn maneuver from a private drive, some discussion about driveway relocation or closing and encouraging shared or cross access might be appropriate.

Whenever possible, driveways should be located as far away from intersections as possible in order to provide for sufficient corner clearance. Failure to do this causes numerous spillback problems, meaning that vehicles are either unable to enter traffic from access points close to intersections, or that it will be unsafe for them to do so. This is especially a problem in corridors with multiple lanes. Vehicles in one lane may stop short of an intersection to let traffic in from nearby driveways. Such driveway traffic enters the corridor, only to be struck by oncoming traffic from another lane that fails to stop for such traffic. By placing driveways as far away from intersections as possible, such potential conflicts may be avoided.

Numerous properties on the 23rd Street corridor have multiple access points placed closely to each other. While these access points may aid the business when it comes to attracting customers, they create unsafe conditions for drivers entering and exiting these businesses, especially when such access points



are close to intersections. By consolidating driveways, both potential roadway conflicts and roadway delay, while businesses more often than not suffer no loss of business due to losing a driveway.

Recommendation 4: Future Driveway Regulations

Future driveways on 23rd Street should ideally be located at the intersection of property lines, so that a shared access driveway or cross access is most easily planned. Regulations can be suggested to the municipality of Weslaco that they should seek to make land use decisions that would limit the number of access points onto arterial streets. New commercial businesses in McAllen should also be encouraged to share access points with adjacent businesses. Unless a business receives a greater than average amount of commercial traffic, separated access points are usually unnecessary, and the greater safety afforded by businesses having less driveways should outweigh any complaints of economic harm, although most businesses usually do not report a decrease of business due to driveway consolidation. In fact, studies show that that most drivers find access management measures create more of a desire to frequent a business rather than less desire. On the other hand, NCHRP 420 estimates that removing just one access point on an urban commercial street could reduce accidents by up to 18 accidents per 100 million miles traveled (1).

Turning radii are also an important consideration when it comes to access management see **figure 4.3-5**. Poor turning radii at intersections mean that vehicles often must brake quickly to make a right turn onto local streets or into driveways, and most often causes excessive delay and rear-end collisions. Such turns have most likely contributed to the high number of rear end collisions occurring on 23rd Street. Therefore, whenever possible, an adequate turning radius needs to be provided, especially when such access points are located near other access points or major intersections.

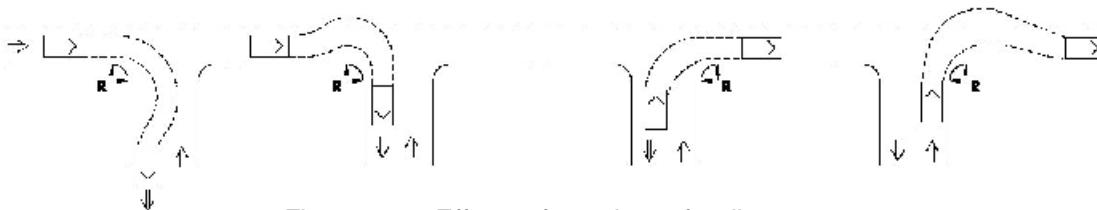


Figure 4.3-5 Effects of too short of radius

The best way that this can be done is to widen the driveway width. This is especially important at the throat of the driveway, the part of the driveway that is directly adjacent to the arterial. By ensuring that a driveway throat is wide enough, vehicles will not have to slow so much to turn into driveways, and the incidence of a rear-end collision is more likely to decrease. In fact, it is much safer for there to be one wide driveway than two narrow driveways, the latter creates a risk of accident not only from two closely spaced access points that will conflict with traffic, but also because driveway narrowness will necessitate an excessive slowdown for vehicles to enter these driveways. Municipalities should also be aware that the slope of their driveways is not excessive, as this too will create unnecessary slowdown when entering driveways. Also, driveway corners should also not be overly sharp, as this will lead to unnecessary slowdown in order to turn into the driveway as well.

Table 4.3-1 on the next page provides TxDOT’s standard design criteria for two-way commercial driveways that would be expected to accommodate only P and SU design vehicles. Other combinations of radius and width may be considered by the Engineer on a case-by-case basis. Also, designs for



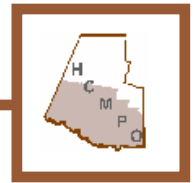
driveways that routinely need to accommodate a design vehicle larger than SU will be considered by the Engineer on a case-by-case basis.

Designs for Two-Way Commercial Driveways							
Condition	US Customary Units			Metric Units			
	Radius (ft.)		Throat Width (ft.)	Radius (m)		Throat Width (m)	
One entry lane and one exit lane, fewer than 4 large vehicles per day (see Fig. A3-3)	25		28	7.6		8.5	
One entry lane and one exit lane, 4 or more SU vehicles ³ per day (see Fig. A3-3)	30		30	9.1		9.1	
One entry lane and two exit lanes, without divider (see Fig. A3-4)	25		40	7.6		12.2	
One entry lane and two exit lanes, with divider (see Fig. A3-5)	25		44 ⁽¹⁾ -50 ⁽²⁾	7.6		13.4 ⁽¹⁾ -15.2 ⁽²⁾	
Two entry lanes and two exit lanes, with divider (see Fig. A3-6)	25		56 ⁽¹⁾ -62 ⁽²⁾	7.6		17.1 ⁽¹⁾ -18.9 ⁽²⁾	

⁽¹⁾ 4 ft. [17.7 m] wide divider, face-to-face of curbs
⁽²⁾ 10 ft. [3.0 m] wide divider, face-to-face of curbs
⁽³⁾ Driveway designs for larger vehicles will be considered on a case by case basis

Table 4.3-1 Two-Way Driveway Design

Besides the width of the driveway, the length of the driveway throat is also important, especially for high-traffic driveways. This is important because if the driveway length is not long enough, vehicles can queue back on the arterial due to excessive traffic within the site itself. If driveway throats are long enough, vehicle queuing occurs on the site itself, and does not spill back onto the arterial itself, affecting traffic by causing excessive delay and increasing the number of accidents. TxDOT’s Driveway Design Guidelines establishes lengths and widths for driveways. New construction in McAllen should adhere to these guidelines were applicable.



4.4 Improvement Performance

Raised Median and Driveway Consolidations

Medians and driveway consolidations have several important safety and travel delay benefits. Medians physically separate opposing directions of travel, thereby virtually eliminating head-on accident potentials. They also control (sometimes eliminate) left turns and other movements across the median. Driveway consolidations reduce the amount of possible turning movements and improve driver decision making.

These access management techniques translate into fewer conflicts, greater safety, and more uniform arterial speeds. **Table 4.4-1** describes the estimated benefit to free flow speed from driveway consolidations and raised median application. **Table 4.4-1** outlines the possible improvements to safety in the corridor when conflict points are reduced.

Start	End	Existing Access Points	Reduction in Free Flow Speed MPH	Access Points After Consolidation/Median	Reduction in Free Flow Speed MPH	Improvement to Free Flow Speed MPH
US 83	Uvalde	19	5	15	3	2
Uvalde	El Rancho	49	14	35	9	5
El Rancho	Elmira	9	0	7	0	0
Elmira	Lucille	28	7	11	3	4
Lucille	FM 1016	45	12	40	10	2
Total		131	7.6	108	5	2.6

Table 4.4-1 Median Performance Measure: Speed

With the application of a raised median and driveway consolidations, the 23rd Street corridor could see a 2 to 3 MPH increase in corridor speeds. In some instances these increase represents at 15% improvement in speed. However, the addition of a raised median often has other benefits to speed and capacity that are not as obvious. These additional benefits come in the form of driver confidence and decreased crash incidents.

Conflict Points After Access Management				
Start	End	Conflict Points Before Access Management	Conflict Points After Access Management	% Decrease
US 83	Uvalde	260	150	42%
Uvalde	El Rancho	476	336	29%
El Rancho	Elmira	116	96	17%
Elmira	Lucille	272	80	71%
Lucille	FM 1016	240	190	21%
Total		1364	852	36%

Table 4.4-2 Median Performance Measure: Safety

With the application of a raised median and driveway consolidations, the 23rd Street corridor could see a



30% to 40% reduction in its crash rate.

Intersection Improvements

The addition of a dedicated right turn-lane in the north bound side on the 23rd Street/US 83 intersection will improve the intersection LOS from D to C. **Figure 4.1-1** represents the intersection prior to adding a dedicated right turn-lane. **Figure 4.1-2** illustrates the intersection after the improvements, which reveals a savings of almost 10 seconds to intersection delay.

Control Type	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Lanes and Shading (BRL)	↑	↑↑	↑					↑↑↑	↑↑	↑↑	↑↑			
Traffic Volume (vph)	221	229	131	0	0	0	0	849	424	344	1059	0		
Turn Type	Perm	Perm							pm-pt					
Protected Phases		9 16						6		5	5 6			
Permitted Phases	8 16		8 16							5 6				
Detector Phases	8 16	9 16	8 16					6		5	5 6			
Minimum Initial (s)								4.0		4.0				
Minimum Split (s)								20.0		9.0				
Total Split (s)	40.0	40.0	40.0					27.0		23.0	50.0			
Yellow Time (s)								3.5		3.5				
All-Red Time (s)								0.5		0.5				
Lead/Lag								Lead		Lag				
Allow Lead/Lag Optimize?								Yes		Yes				
Recall Mode								Coord		Coord				
Actuated Effct. Green (s)	24.0	24.0	24.0					26.6		53.9	58.0			
Actuated g/C Ratio	0.27	0.27	0.27					0.30		0.60	0.84			
Volume to Capacity Ratio	0.37	0.37	0.31					0.91		0.30	0.51			
Control Delay (s)	26.2	26.3	15.8					45.2		1.7	3.8			
Level of Service	C	C	B					D		A	A			
Approach Delay (s)		23.9			0.0			45.2			3.3			
Approach LOS		C			A			D			A			
Queue Length 50th (ft)	79	83	99					258		2	210			
Queue Length 95th (ft)	130	116	82					4395		m5	256			
Queueing Penalty	0	0	0					233		0	30			
Stops (vph)	112	235	62					1197		72	576			
Fuel Used (gph)	2	4	1					25		1	6			

Figure 4.1-1 Intersection Performance Measure -Before

Control Type	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Lanes and Shading (BRL)	↑	↑↑	↑					↑↑↑	↑↑	↑↑	↑↑			
Traffic Volume (vph)	221	229	131	0	0	0	0	849	424	344	1059	0		
Turn Type	Perm	Perm							Perm	pm-pt				
Protected Phases		9 16						6		5	5 6			
Permitted Phases	8 16		8 16							5 6				
Detector Phases	8 16	9 16	8 16					6		5	5 6			
Minimum Initial (s)								4.0		4.0				
Minimum Split (s)								20.0		20.0				
Total Split (s)	40.0	40.0	40.0					27.0		23.0	50.0			
Yellow Time (s)								3.5		3.5				
All-Red Time (s)								0.5		0.5				
Lead/Lag								Lead		Lead				
Allow Lead/Lag Optimize?								Yes		Yes				
Recall Mode								Coord		Coord				
Actuated Effct. Green (s)	24.0	24.0	24.0					26.6		53.9	58.0			
Actuated g/C Ratio	0.27	0.27	0.27					0.30		0.60	0.84			
Volume to Capacity Ratio	0.37	0.37	0.31					0.91		0.30	0.51			
Control Delay (s)	26.2	26.3	15.8					45.2		1.7	3.8			
Level of Service	C	C	B					D		A	A			
Approach Delay (s)		23.9			0.0			45.2			3.3			
Approach LOS		C			A			D			A			
Queue Length 50th (ft)	79	83	99					258		2	210			
Queue Length 95th (ft)	130	116	82					4395		m5	256			
Queueing Penalty	0	0	0					233		0	30			
Stops (vph)	112	235	62					1197		72	576			
Fuel Used (gph)	2	4	1					25		1	6			

Figure 4.1-2 Intersection Performance Measure After



Chapter 5 Access Management Performance Measures in the HCMPO Travel Demand Model

5.1 Introduction

The two prototypical corridor plans generated several performance measures that could be incorporated into the region’s travel demand model. Much of data leading into specific benefits received from access management and operations improvements is a result of the previous corridor studies and also years of research done by the Texas Transportation Institute (TTI) and the Center of Urban Transportation Research (CUTR). This research when compared to the benefit results from the two corridor studies performed in this study verify that access management improvements are consistent and can be applied to a regional travel demand model for the purposes of identifying and prioritizing transportation projects.

Therefore, the question arises, how can access management improvements be incorporated into the MPO’s modeling process? Before specifics are discussed a general understanding of the modeling process is in order.

5.2 Modeling 101

Most travel demand models are very sensitive to speed and capacity and the Hidalgo County MPO TransCAD model is no different. The model begins with population and employment as the input into the model to generate person trips (Trip Generation). Once person trips are generated, travel times from trip origins to trip destinations are calculated based on the speeds coded into the roadway system. The travel times from origins to destinations are then used to pair people’s homes to their workplace (trip distribution). Once this is complete people are then converted to vehicles and the result is a vehicle trip table (mode split). These trip tables are then assigned to the roadway system in an attempt to find the best path to satisfy their trip purpose (traffic assignment).

It is during traffic assignment when vehicles are most sensitive to roadway speed and available capacity. Any minor adjustments will effect the traffic assignment and will in turn provide options for the vehicles.

5.3 Performance Measures

The performance measures below in **Table 5.2-1** represent three basic types of access management techniques. The resulting numbers can be supported by research projects and specific corridor plans done throughout the past fifteen to twenty years^{2,4}.

Improvement Type	% Improvement
Raised Median	10-15% additional capacity 5-15 improved speed
Intersection Improvements	30-50% intersection delay reduction
Driveway Consolidation	10-15% improved speed

Table 5.2-1 Performance Measures



5.4 Incorporating Improvements into the Model

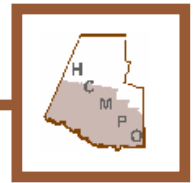
As described earlier the models are very sensitive to speed and capacity. With that several input factors need to be determined.

First, subject corridors need to be defined. This is the subject of **Chapter 1** this study. The selection criterion will enable the MPO to identify corridors that are “ripe” for the application of access management.

Second, once the subject corridors are defined, the type of improvement needs to be identified. An access management toolbox is provided in **Chapter 2** and these tools are applied to the two subject corridors in **Chapters 3 and 4**. For instance, one corridor might have more than 50 driveways per mile and therefore a raised median or driveway consolidation might be appropriate. Or a corridor might be in need of intersection improvements.

Third, the percent improvement numbers in **Table 5.2-1** above should be used as inputs into the model. This is done by editing the TransCAD network with the appropriate numbers. For instance, if roadway A has a capacity of 10,000 vehicles per day on a one mile segment and your improvement calls for a raised median improvement the resulting capacity used in the model would be 11,000. The same goes for speed.

Once all the improvements are input into the model one would re-run traffic assignment and measure the volume to capacity ratio comparing it back to the original results without the improvements. This process could be easily incorporated into the models macro environment so it becomes invisible to the user. In which case the network might have a special facility type it acquires from a look-up table and automatically incorporates the improvement.

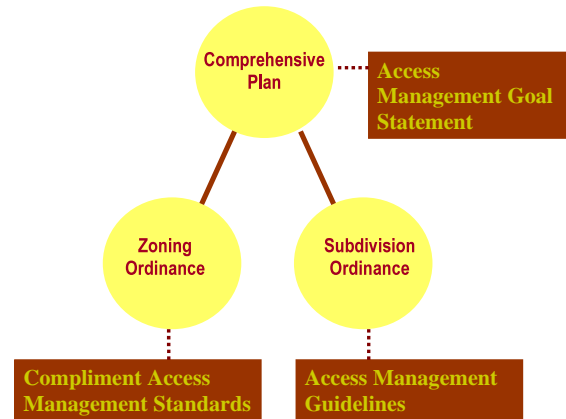


Chapter 6 Addressing Access Management in Local Government Policies

Effective access management requires planning as well as regulatory solutions. Communities that establish a policy framework that supports access management in local comprehensive plans, prepare corridor or access management plans for specific problem areas and encourage good site planning techniques will be better prepared to permit and manage access.

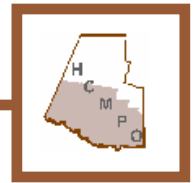
6.1 Local Government and Access Management

There are many ways in which planning documents and municipal codes can address access management issues and set the stage for an effective access management program. Local governments can accomplish access management as follows:



- 1 – Address access management in the transportation and land use elements of the comprehensive plan.
- 2 – Adopt an access management ordinance that establishes connection spacing, driveway design and corner clearance requirements for all major roadways, along with supporting land development regulations.
- 3 – Consider establishing a corridor overlay district for high priority arterial roadways (e.g. a new bypass or strategic state highway) that establishes a high degree of access control and supporting land development regulations. Small communities may choose this approach to focus on one key corridor, as opposed to a system-wide program.
- 4 – Promote the development of a supporting network of local and collector streets to provide alternative access off of major arterial roadways through subdivision regulations, development exactions, traffic impact studies, and capital improvement plans and programs.

Two of the most widely accepted methods are to reference a separate “Access Management Guidelines” or make broad policy statements concerning access management in their comprehensive plans, thoroughfare plans and local municipal codes. These options are explained in further detail in the following sections.



6.2 Authority

Responsibilities granted by Chapter 213.001 of the Texas Municipal Code are for the purpose of promoting sound development of municipalities and promoting public health, safety, and welfare. Local Comprehensive Plans are the policy and decision making guide for future development and capital improvements in the municipality. It is also the correct document to identify the desired access management approach.

Municipalities also have the authority to practice access management through the rules and definitions of the State of Texas Local Government Code Chapter 212 “MUNICIPAL REGULATION OF SUBDIVISION AND PROPERTY DEVELOPMENT.” Therein, Cities may adopt Access Management Plans as a part of the existing Subdivision and Zoning regulations or tailor sections of the ordinances to advance access management strategies.

6.3 The Comprehensive Plan

Responsibilities granted by Chapter 213.001 of the Texas Municipal Code are for the purpose of promoting sound development of municipalities and promoting public health, safety, and welfare. Local Comprehensive Plans are the policy and decision making guide for future development and capital improvements in the municipality. It is also the correct document to identify the desired access management approach.

The comprehensive plan and corridor studies provide the legal basis for access management by establishing the relationship between access management and the public health, safety, and welfare. In determining the validity of local regulatory actions, courts typically review whether the action is consistent with and based upon a local comprehensive plan (6). Access management policies in the comprehensive plan demonstrate an overall public commitment to managing access, rather than an arbitrary approach that singles out property owners for special treatment.

Core elements of a local comprehensive plan are those that relate to transportation, land use, and capital improvements. Most local governments include the following in the transportation element of their comprehensive plan:

1. A roadway classification system based on function (e.g., major arterial, minor arterial collector, local).
2. A map indicating the existing streets and roadways according to the adopted classification system.
3. A map indicating future transportation needs, including any new corridors and planned improvements to existing roadways.
4. A typical cross-section for each class of street/roadway.
5. Transportation goals, objectives and policies of the community.

The transportation element should also include a section that describes the principles and benefits of access management. This section would describe how access management carries out the physical and policy objectives of the transportation plan and protects public safety.

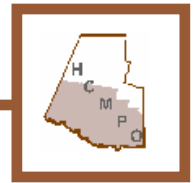


Policy statements in the transportation element of the comprehensive plan that support access management as well as efficient and stable land use patterns include:

1. Public roadways are to be planned, designed and managed to preserve their functional integrity.
2. Allowable levels of access will be established for each functional classification of roadway to preserve the safe and efficient operation of the major roadways.
3. Direct access to major roadways will not be permitted where alternative access is available.
4. Access connections to major arterials that may be considered for future signalization must conform to a uniform one-half mile spacing unless it can be demonstrated that an intersection deviating from this interval can be signalized without interfering with traffic operations or safety.
5. A thoroughfare map will be adopted that indicates all existing and potential signalized locations.
6. A nontraversable, landscaped median will be provided on all new multilane major arterials. Undivided roadways and roadways with a continuous two-way, left-turn lane will be considered for reconstruction when the volume exceeds 24,000 vehicles per day.
7. Unsignalized median openings will be designed as directional openings.
8. New driveway connections will not be located within the functional distance of an intersection.

Policies to include in the land use element of the comprehensive plan in support of efficient and stable land use patterns as well as to support the objectives of access management include:

1. Access to land development along major arterial roadways shall be preserved through the use of parallel roads, side streets, and cross access easements connecting adjacent developments.
2. 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. Access points to such developments shall be the minimum necessary to provide reasonable access, and not the maximum available, for that property frontage.
3. New residential subdivisions shall include an internal street layout that connects to the streets of surrounding developments to accommodate travel demand between adjacent neighborhoods, without the need to use the major thoroughfare system.
4. Residential subdivisions abutting arterial roadways shall be designed so that street connections conform with access spacing standards for those roadways. Streets between those points shall



be cul-de-sacs with pedestrian and bicycle connections to be arterial wherever feasible to preserve bicycle and pedestrian mobility. Where the street pattern is discontinuous within the subdivision, continuity shall be maintained for pedestrian and bicycle movement.

5. Commercial development shall be encouraged to share common access connections as well as to provide a convenient system of interparcel circulation so that customers as well as delivery and service vehicles can move between the sites without using the abutting public roadway.
6. Zoning and subdivision actions shall discourage shallow commercial strip development where most, or all, access is directed to the abutting major public roadway.
7. Commercial office and retail will be encouraged to develop activity centers schematically illustrated as the preferred pattern in Figure 6.3-1. This land use arrangement facilitates pedestrian circulation between businesses, eliminates the need for vehicles to use the public street when moving from one establishment to another, increases the corner clearance between driveways and the intersection, and improves safety and intersection operations by reducing the occurrence of conflicts within close proximity of the intersection.

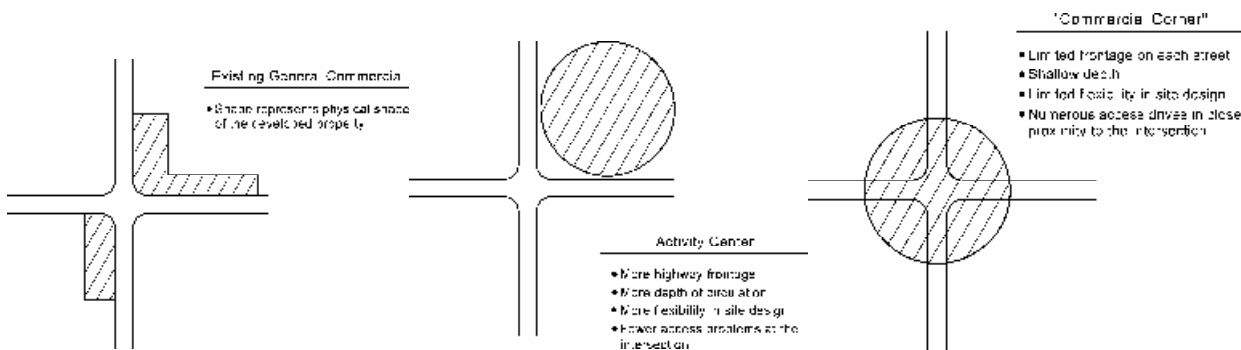


Figure 6.3-1 Activity Centers

6.4 Subdivision Ordinance

Communities' access management policies may be codified by the State of Texas Local Government Code Chapter 212 "Municipal Regulation of Subdivisions and Property Development." Herein, "Municipalities may adopt rules governing plats and subdivisions of land within the municipality's jurisdiction (including ETJ) to promote the health, safety, morals or general welfare of the municipality and the safe, orderly and healthful development of the municipality."

Therefore, municipalities may choose to adopt "traffic access management guidelines" by ordinance as part of the Subdivision Ordinance. Typically, these standards would be available for the general public as a separate or stand alone document, but the official codification of these standards would be found in the Subdivision Ordinance. See **Appendix B** for an example of an Access Management Ordinance.



6.5 Zoning Ordinances

Zoning Ordinances may compliment the “traffic access management guidelines” by establishing lot standards (minimums and possibly maximums) that correspond appropriately with the access criteria. For example, if the subdivision criteria states that the first median cut from an intersection shall be no closer than 750’ from the centerline of the intersection, the zoning standards for the adjacent property(s) should have the minimum depth and width to allow for orderly growth. Similarly, with the driveways spacing, if the first driveway cut shall be no closer than 100’ from the centerline of the intersection, than the zoning standards for the adjacent property(s) should have the minimum depth and width to compliment. See **Appendix B** for an example of an Access Management Ordinance that establishes minimum lot widths.

6.6 Thoroughfare Planning

Access management programs should not only strive to limit and control access to major arterial roadways. It is equally important to provide local and collector streets that can accommodate access to development. Roadway functional classification systems in transportation plans call for local and collector roads to provide more access to property than arterial roadways. Therefore, a supporting system of local and collector roads should be provided along arterial roadways where development is desired.

Benefits of an adequate supporting street system include improved accessibility of corridor businesses to abutting neighborhoods, more compact development patterns, and reduced need for individual driveway access to the principal roadway. Local streets also provide alternative routes for short local trips, thereby reducing traffic congestion on the arterial.

Existing local street systems can provide an initial framework for a corridor access management plan. Where they are not adequate, then the plan could identify preferred future locations. Side streets may be laid out in a general grid pattern or branch out to accommodate terrain or other natural features. A system of parallel roads or service roads could run behind corridor properties with side streets intersecting the arterial at reasonable spacing intervals. Frontage roads often connect too close to an intersection, creating new access problems.

Ideally, major arterial roadways would not accommodate low volume, individual driveways. Instead, minor arterial and collector roadways could be planned to intersect the arterial roadways at regular intervals to coordinate with desired spacing of median openings and signals. Unsignalized local streets or high volume access points could connect to the arterial at intervals that conform to connection spacing standards, and commercial driveways could be primarily focused onto local and collector streets.

Regulatory Techniques that Support Access Management

- Regulate driveway spacing, sight distance and corner clearance;
- Requirements for joint and cross access, driveway consolidation, interparcel connections, and unified access and circulation plans (including regulations for shopping center outparcels);
- Limit the number of driveways per existing parcel on developing corridors;
- Increase the minimum lot frontage along major thoroughfares.
- Encourage joint access and parking lot cross access.
- Review lot splits to prevent access problems.
- Minimize commercial strip zoning and promote mixed use and flexible zoning.
- Require measurements of building setbacks from future right-of-way lines.
- Promote unified circulation and parking plans.
- Traffic impact assessment requirements and procedures, that are keyed to access management requirements;
- Redevelopment or “change in use criteria for bringing existing situations into conformance when there is a change in use;



Appendix A State of the Practice – Examples of Access Management Integration

The University of South Florida Center for Urban Transportation (CUTR) conducted a State of the Practice survey in order to document how Metropolitan Planning Organizations are integrating Access Management Techniques into their Transportation Planning Processes and Funding Apparatuses. The following is a summary of this effort.

Capital District Transportation Committee (CDTC), Albany, NY

CDTC took a comprehensive approach to linking transportation planning with land use decisions. Their Master Transportation Plan (MTP) establishes roadway widening as an option of last resort. Rather, this combined land use and transportation plan favors operational and land use strategies such as access management.

The result is that the CDTC MTP is a budget and policy plan that focuses not just on the service provided by the transportation system, but also on the quality of the transportation system. This places transportation quality and quantity on an even playing field in the resource allocation process. The following is a list of how the CDTC does this:

- Establishes a policy that no specific recommendation or project will be identified in the regional plan until a local study is completed looking at transportation and land use issues.
- The congestion management system process extends the LRTP concept that roadway widening is an option of last resort. Corridors that are congested and would benefit from enhanced access management treatments, as well as other congestion relieving strategies, are identified through the CMS process.
- Establishes a number of land use consistency requirements as a part of the TIP screening process, each reinforcing the fact that the MPO will not entertain highway capacity projects without land use planning and access management commitments.
- The MPO funds “Linkage Studies” using PL funds through a solicitation process. These small studies are conducted by either the local government or the MPO and are intended to provide the basis for linking land use and transportation in a particular corridor. Access management is among the key strategies suggested for meeting corridor mobility and compatibility goals and needs.

Duluth-Superior Metro Interstate Committee (MIC), Duluth, MN

MIC integrated access management into their planning process and plans in two separate objectives under the System Efficiency goal of their Master Transportation Plan. These read as follows:

- “Encourage projects that enhance freight mobility and provide access improvements to major activity centers, incorporating access management principles.”
- “Study and model the transportation network to investigate system efficiency, accessibility, and efficiency issues (i.e. unsynchronized signals, excessive distance between roadways of the same



classification, improper signal spacing, parking, excessive access points, or improper posted speeds that result in inefficient traffic flow).”

The MPO views itself as a public sector consultant (as is the case with many MPOs) and, as such, has developed a program to conduct corridor plans for member jurisdictions on a competitive basis.

- The MPO solicits ideas for corridor plans every year and conducts 3-4 corridor plans a year.
- They are funded through the UPWP using federal PL funds.
- The studies identify transportation deficiencies in the corridor and recommend various transportation and land use approaches for addressing those deficiencies.
- Often, access improvements recommended through the corridor planning efforts of the MPO become funded projects through the LRTP process. Another possible result may be the development of corridor access control policies, standards and/or guidelines.

Access management treatments are considered in the TIP based upon the benefit they produce. Stand-alone, access-related improvements can be made under a number of categories (safety, preservation, etc.) while access improvements can also be integrated into bigger projects (capacity expansion, major investment, intersection, etc.). Each proposed project is ranked based on a score between 1 and 100. Project points are awarded according to a variety of criteria. Access improvements, whether stand alone or as part of a bigger project, can receive favorable consideration in the point allocation process under such broad criteria as:

- Project Need and Benefit (30 of 100 points) - access management improvements may be described as improving safety, reducing accidents, improving efficiency, etc.
- Impact on Network Mobility (30 of 100 points) – access management improvements may be described as contributing to improved flow and safety, reduced travel time and congestion prevention, integration of access management principles, preserving current functional classification, etc.
- Planning Support (15 of 100 points) – access management improvements that rise from a corridor, sub-area, safety or a separate planning effort could receive points.
- Multimodalism (10 of 100 points) – access management improvements related to multimodal access or improved transit service (bus pull-outs, signal coordination, etc.) could receive points.
- Environmental and Social Considerations (10 of 100 points) – access management improvements that maximize the efficient use of land, maximize access to commercial uses, etc. could receive points.

West Florida Regional Planning Council (WFRPC), Pensacola, FL

WFRPC addresses access management in their MTP Goals and Objectives, in the project selection process (cost feasible) and the identification of corridors in which corridor management plans will be developed.

Corridor management plans are composed of roadways that are in need of capacity improvements, but funding is not anticipated to be available in the 20-year time frame of the MTP. Other characteristics include:



- The corridor management plans are funded through the UPWP and conducted through consultant contracts with the MPO.
- In at least one case, the Florida Department of Transportation conducted the corridor management planning activity as a preliminary environmental document – a level 1 PD&E study.
- Conducts one corridor management plan per year.
- Implementation is typically funded using State Transportation Planning funds or through developer contributions.

Additional access management approaches:

- Safety studies have been conducted resulting in access management improvements.
- The congestion management system process identifies congested roadway segments. Access management improvements are commonly implemented to address the congestion problem. This process is separate from the corridor management planning activities of the MPO, and congested corridors identified by the CMS process that are also being reviewed as part of a corridor management plan will be left to the corridor management planning process. It is not uncommon for these access management improvements to be implemented during roadway resurfacing or other roadway maintenance and traffic operations projects.

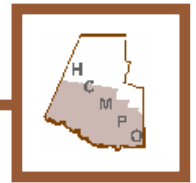
Tri-County Regional Planning Council (TCRPC), Lansing, MI

Access management is part of a broad strategy to integrate land use and transportation decision-making in the Tri-County Area. Their MTP is based on a shared land use vision for the region.

The project selection process employed in developing the MTP was developed to be consistent with MTP shared land use vision. Projects were selected in 23 program areas, each including performance measures and projects selection criteria. Access management supports several of the program areas including: management/operations, safety, land use, and preservation. Based on the success of access management strategies in the past, the MPO is now considering taking another look at proposed capacity projects identified in the MTP and testing access management alternatives in their place.

Other access management techniques used at TCRPC:

- The congestion management system (CMS) requires corridor and traffic impact studies that include consideration of non-capacity improvements to address congestion as the primary strategy, including improved access conditions in the study corridor.
- The MPO's model Access Management Study is one of the oldest in the country, dating back to 1981. This document provides a resource for local agencies upon which to base access management decisions and also includes a discussion of the relationship between access, roadway corridor function and safety and land use and roadway design.
- The MPO formed a standing Management and Operations Task Force. The role of the Task Force includes updating and maintaining the regional ITS architecture, taking the lead on developing and implementing the regional Congestion Management System and safety-conscious planning efforts in the region. The Task Force is now considering priorities for regional congested corridors so it can begin applying this approach in specific corridors to improve transportation system management and operations practices.



Appendix B Model Municipal Access Management Ordinance

Minimum Connection Spacing Along Major Thoroughfares

The minimum distance between driveways, alleys, service drives, streets, or other roadway facilities along a major thoroughfare shall not be less than the distances shown in table 1 below for the posted speed limit on the major thoroughfare. Major thoroughfares are the roadways designated on the City of (insert city) Thoroughfare Plan. The minimum distance between driveways, alleys, service drives, streets or other roadway facilities is measured along the edge of the travel way from closest edge of pavement of the first access connection to the closest edge of pavement of the second access connection including corner clearance. This is illustrated in figure 1.

Minimum Connection Spacing	
Posted Speed (mph)	Distance (ft)
= 30	200
35	250
40	305
45	360
= 50	425

Table 1

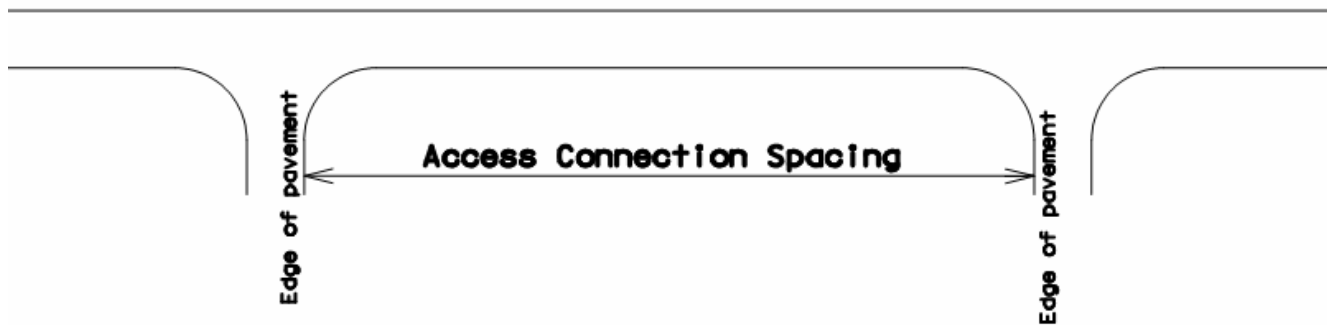
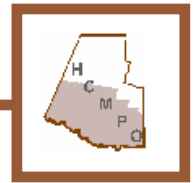


Figure 1

Joint and Cross Access

Adjacent commercial or office properties and major traffic generators (i.e. shopping plazas, office parks) shall provide a cross access drive and pedestrian access way to allow circulation between sites. This



requirement shall also apply to a building site that abuts an existing developed property unless the decision making body finds that this would be impractical. Property owners shall:

1. Record an easement in the public records of (insert city) allowing cross access to and from the adjacent properties;
2. Agree that any pre-existing driveways provided for access in the interim shall be closed and eliminated after construction of the joint use driveway; and
3. Record a joint maintenance agreement in the public records of (insert city) defining maintenance responsibilities of property owners that share the joint use driveway and cross access system.

Requirements for Unified Access and Circulation

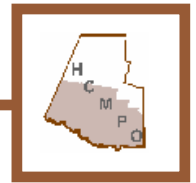
1. In the interest of promoting unified access and circulation systems, development sites under the same ownership or consolidated for the purposes of development and comprised of more than one building site shall be considered unified parcels. This shall also apply to phased development plans. Accordingly, the following requirements shall apply:
 - a. The number of connections permitted shall be the minimum number necessary to provide reasonable access to the overall site and not the maximum available for that frontage.
 - b. All easements and agreements required under the above shall be provided.
 - c. Access to outparcels shall be internalized using the shared circulation system and designed to avoid excessive movement across parking aisles or queuing across surrounding parking and driving aisles.
2. Where abutting properties are in different ownership and not part of an overall development plan, cooperation between the various owners in development of a unified access and circulation system is encouraged. Abutting properties shall not be required to provide unified access and circulation until they are developed or are redeveloped.

Access to Homes and Subdivisions

When a residential development is proposed that would abut an arterial or major collector roadway, it shall be designed to provide lots abutting the roadway with access from an interior local road or frontage road. Direct driveway access to individual one and two family dwellings from arterial and major collector roadways shall be avoided. All other reasonable access alternatives shall be investigated and judged unacceptable by the City Engineer before direct residential driveway access on an arterial or major collector is permitted.

Redevelopment Requirements

1. Properties with access connections which do not meet the requirements above shall be brought into compliance to the extent possible when modifications to the roadway are made or when a change in use results in one or more of the following conditions:
 - a. When a connection permit is required.
 - b. When site plan review is required.
 - c. When a site experiences an increase of twenty percent (20%) or greater in peak hour trips or 100 vehicles per hour in the peak hour, whichever is less, as determined by one of the following methods:
 - (1) An estimation based on the ITE Trip Generation Manual (latest edition) for typical land uses, or
 - (2) Traffic counts made at similar traffic generators located in (insert city), or
 - (3) Actual traffic monitoring conducted during the peak hour of the adjacent roadway traffic for the property.
2. If the principal activity on a parcel with access connections which do not meet the regulations of the above is discontinued for a period of one year or more, then that parcel must comply with all applicable access requirements of the above to the extent possible.



Corridor Access Management Overlay Zones

(Insert city) may designate segments of a roadway corridor for the purpose of developing corridor access management plans that apply special access management requirements to the corridor. The purpose of this designation is to develop a specific plan for the roadway system, including, but not limited to, median openings, signal location, access connections and cross access and joint access requirements for adjacent developments that reduces access problems on major thoroughfares and advances sustainable development patterns in conformance with the desired character of the (insert city) and the Comprehensive Plan. Corridor access management overlay zones do not supercede underlying land use and zoning provisions, but provide additional requirements for designated areas.

Minimum Lot Frontage

The minimum lot frontage for access to a major thoroughfare shall not be less that the lot width shown in table 2. Major thoroughfares are the roadways designated on the (insert city) Thoroughfare Plan.

Minimum Lot Frontage	
Posted Speed (MPH)	Lot Width
≤ 30	225
35	275
40	330
45	385
≥ 50	450

Table 2

A greater lot width may be required for driveways greater than twenty-five (25) feet or requiring more than one access connection to the major thoroughfare.

A lesser lot width may be provided for lots with common access easements and shared access driveways.



Appendix C FM 88 Texas Blvd. Maps



Appendix D 23rd Street Maps



Appendix E References

- (1) Vergil G. Stover and Frank J. Koepke, *Transportation and Land Development*, Institute of Transportation Engineering, Prentice Hall, Inc., 1987.
- (2) Iowa Primary Road Access Management Policy, July 1995.
- (3) Lu, J., S. Dissanayake, N. Castillo, and K. Williams. *Methodology to Quantify the Effects of Access Management on Roadway Operations and Safety* (3 volumes). Florida Department of Transportation, 2001.
- (4) National Cooperative Highway Research Program (NCHRP) Report No. 91 by Zeeger, et al.
- (5) *NCHRP Report 420: Impacts of Access Management Techniques*.
- (6) K. Williams and J. R. Forester, *NCHRP Synthesis 233, Land Development Regulations that Promote Access Management*, Transportation Research Board, 1996