



CHAPTER 4 MOBILITY



Successful community building depends upon a well-planned transportation system, whether done this way consistently in the past or brought up to par through ongoing retrofitting and improvements as the community grows. The system must address basic mobility needs at all levels, from the cross-town traveler needing a direct and uncongested route to the neighborhood resident focused on safe streets and convenient access to nearby, routine destinations. Options are essential, both in terms of ways to move around the city (driving, via transit, and by bike or on foot) and multiple, alternative paths to get places.

The purpose of this chapter is to ensure orderly development, extension, and improvement of Killeen’s transportation system, both in the City’s corporate limits and in current and future growth areas in the extraterritorial jurisdiction (ETJ). The approach is “multi-modal” by considering not only facilities for automobiles but other modes of transportation as well, such as pedestrian and bicycle circulation, public transit, and freight movement. As noted above, the geographic scope runs the gamut from local neighborhood streets to major arterial roadways, plus linkages to the rest of Texas and the world through regional expressways, airport facilities, and the potential for high-speed passenger rail connections in the future.

This chapter also works hand in hand with the Future Land Use & Character chapter by highlighting the need to establish and protect the distinct character of particular districts, neighborhoods, and corridors. From the transportation perspective, this is accomplished through roadway design that is sensitive to its natural and built surroundings, as well as through a commitment to “complete streets” and related improvements in areas where walking, biking, and/or transit use are as much or more important than getting places by car. Certain targeted improvements, such as landscaped esplanades along busy corridors, not only boost traffic safety but also enhance the community’s appearance and image.



Thoroughfare Plan

The City of Killeen maintains a previously adopted Thoroughfare Plan map (as last revised on June 22, 2010). The plan indicates the existing and proposed alignments of, and associated dimensional standards for, five street classifications:

- Principal Arterials (110 feet of right of way)
- Minor Arterials (90 ft of ROW)
- Collectors (70 ft of ROW)
- Marginal Access (50 ft of ROW)
- Local (50 ft of ROW)

It is important to note that the actual alignments of extended and planned new roadways will likely vary somewhat from the plan map and will be determined through the subdivision development process and the preliminary engineering phase of design. Slight modifications to facility locations, such as a shift of an alignment several hundred feet one way or another or changes in roadway curvature, are warranted and accepted as long as the intent of the Thoroughfare Plan to provide system connectivity and appropriate types of facilities is not compromised. The map is mainly a planning tool to enable the City to preserve future corridors for transportation system development as the need arises.

PLANNING CONTEXT

Key factors for mobility planning in Killeen include:

- ★ **Growth Impacts.** Killeen’s phenomenal population growth of recent years has put more and more people on the City’s street system each day to get to and from work, school, shopping, and countless other destinations. Some of this traffic growth has occurred in areas with roads and infrastructure that were not always ready to accommodate it. The City has responded with capital improvements aimed at increasing roadway capacity. At the same time, streets and sidewalks in older areas of the community will continue to need attention as their useful life winds down. As noted in the Future Land Use & Character chapter, traffic patterns and congestion “hot spots” in Killeen are also influenced by the limited commercial development that has emerged to date in new growth areas, causing residents there to travel especially to the U.S. 190 vicinity for their shopping and service needs. The geographic expansion of the City’s developed area also stretches the service areas for police and fire response and highlights the importance of a well-connected street network to maintain emergency circulation and access.
- ★ **Ongoing Improvements.** Key corridors such as Stagecoach Road, West Elms Road, and Rosewood Drive are the focus of City improvement projects to keep up with area development and eliminate gaps in the major street network. Residents generally welcomed this progress in public discussions for this Comprehensive Plan. However, some also noted their concerns about safety, especially of schoolchildren and others, where roadway widening and improvements help with traffic flow but do not necessarily contribute to safer crossing or pedestrian or bike activity. The potential for off-street trail links, both for mobility and recreation purposes, was mentioned often in this context, along with more attention to well-marked crosswalks in key locations.
- ★ **Fiscal Pressures.** Though confronted with so many legitimate needs to enhance mobility and safety in new and older areas of their communities, cities in Texas and across the nation are under increasing pressure to fund such “big ticket” improvements locally. Federal and state resources—and transportation financing mechanisms in general—are stretched to the limit. And in a state growing as rapidly as is Texas, competing demands for external funding are substantial, and ever increasing, statewide.
- ★ **Significant New Traffic Generators.** As Killeen works to upgrade and better connect its thoroughfare system, important new anchor



uses will be added to the mix that will alter traffic patterns in key areas and create new demands. Perhaps the most significant of these, though it will emerge gradually over time, is the new campus for Texas A&M University-Central Texas at the southwest corner of State Highways 195 and 201. The challenge here will be to accommodate new vehicular circulation patterns while also planning for safe and effective pedestrian and bicycle circulation plus transit activity that is the hallmark of a well-planned campus environment. The SH 201 corridor is also expected to draw further economic development driven by airport growth and Fort Hood spin-off activities. Funding was recently allocated for a grade-separated interchange at the 195-201 intersection, which will improve both traffic flow and safety. Additionally, adding to the daily traffic flows in Killeen associated with Fort Hood will be a recently announced new military hospital that is expected to serve the garrison's 55,000 soldiers and nearly as many military retirees, along with 67,000 military families.

- ★ **Airport Expansion.** With the successful transition to a joint-use commercial/military facility in Killeen-Fort Hood Regional Airport, Killeen is poised to gain further significance as an air travel destination and feeder point for the State's major hub airports. This trend, together with ongoing planning for an eventual second runway, has implications for traffic growth in the airport vicinity, especially in terms of hoped for economic development. Express and/or circulator transit services could also play a larger role in the airport's future mobility picture.
- ★ **Central Texas Passenger Rail Potential.** High-speed rail in Central Texas and beyond still has major financing and practical hurdles to overcome. However, there does appear to be a gradual shift in thinking and support for greater U.S. capital investment, both public and private, in upgraded rail infrastructure for both economic development reasons and given an uncertain energy future. Such investments would address the efficiency and capacity of the freight rail system and could also make it possible to expand the reach—and the potential operating speeds—of even conventional passenger rail service. Killeen would seem to be a logical passenger rail hub, with strong institutional partners (military, university) in its corner.
- ★ **I-35 Corridor Links.** It is anticipated that better highway connections between a growing Killeen and the Austin metropolitan area will emerge in the years ahead, which should also provide some relief for the Central Texas Expressway. The entire stretch of State Highway 195 southward toward Interstate 35 will eventually be improved to a complete four-lane, divided cross section. Options for



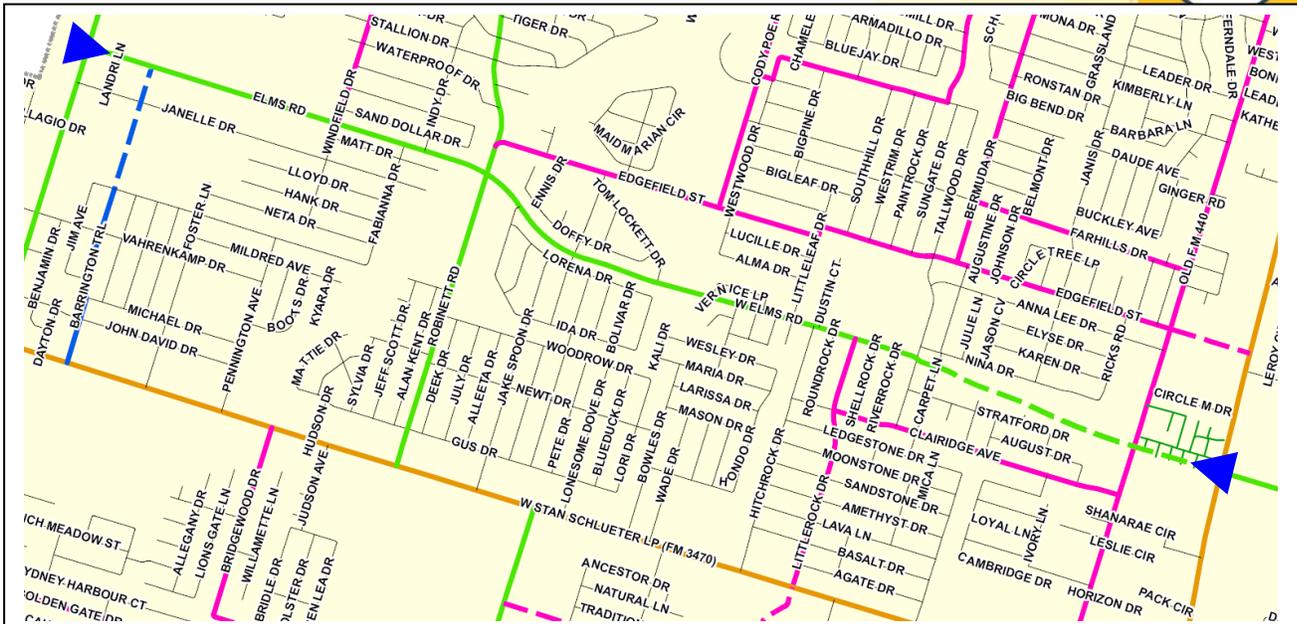
extending State Highway 201 eastward for a new I-35 connection also remain under consideration, although terrain and jurisdictional issues add difficulty in this direction.



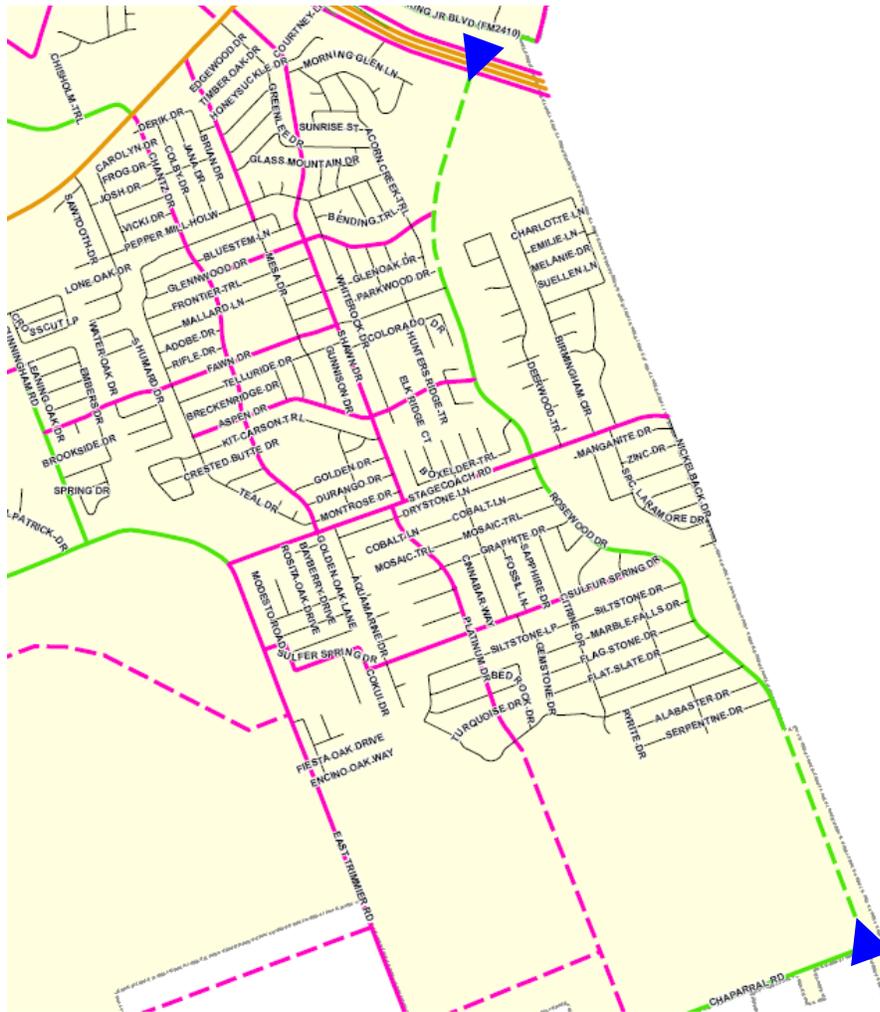
Lack of continuity and connectivity in the street network is an inherited problem in some areas of Killeen that will need to be overcome through better thoroughfare planning and implementation in newer growth areas—while also opening links in older areas, where feasible.



Homes fronting directly onto busy streets are a concern in various areas of Killeen, both for roadway capacity and safety reasons, as well as for the longer-term value and appeal of these properties for residential use.



Road improvements to achieve continuous arterial corridors, such as Elms Road in west Killeen (above) and Rosewood Drive on the east side (below), are an essential aspect of keeping pace with the rapid growth of recent years.





Capital improvements are proceeding to upgrade roadway corridors that have substandard cross sections and designs to accommodate the traffic demands generated by Killeen's recent growth. As in the situation above, roadway capacity and driving safety are enhanced through more and wider lanes, curb and gutter versus an undefined road edge, and better surfacing and provision for drainage.



As Killeen grows toward the 200,000 population mark in coming decades, a more extensive and carefully-routed public transit system will be vital to reduce peak-hour congestion around key traffic-generator locations and to offer more mobility options, especially for residents who do not own automobiles.



In this aerial view of newly developing residential areas in southwest Killeen, the street system layout puts significant traffic pressure on a single roadway, Golden Gate Drive (highlighted in blue), as the primary access route to numerous homes in the vicinity. Additionally, homes front directly on this busy street, creating numerous potential conflict points between through traffic and vehicles entering and exiting driveways that line the street on both sides—not to mention with neighborhood pedestrians and bicyclists. Furthermore, Golden Gate is a perfectly straight street for its three-quarter mile length from Clear Creek Road (SH 201) until its “T” intersection with Bridgewood Drive, which can lead to speeding issues and eventual calls for after-the-fact traffic calming measures to overcome this undesirable street design.





Good sidewalk connections and crosswalk locations are critical elements in the vicinity of schools to ensure the safety of kids and others on foot, as illustrated in the contrasting situations above (without sidewalks) and below (with sidewalks). The availability of such safe routes can also encourage more walking and biking and reduce local vehicle trips on neighborhood streets.





True coordination of land use and transportation infrastructure requires that street cross sections and design relate to the context of the surrounding area, particularly the development character. The downtown street scene above is distinguished by zero-setback buildings framing the street, extensive on-street parking (angle spaces in this case), and a pedestrian orientation through wider sidewalks and other streetscape amenities (landscaping, pedestrian-level lighting, awnings, benches and other street furniture, etc.).



The street above, in the Killeen Business Park area, has a cross section and surface design geared toward heavy vehicle traffic and the needs of the businesses and industrial land uses to which it provides access and circulation. While serving this primary function, the street also includes sidewalks, separated from the vehicle lanes by a parkway strip, and street trees planted within this buffer strip. On the other end of the spectrum, the street below is narrower, less formal (no striping), and framed by vegetation versus buildings to set the tone for a quieter, residential character area.





KEY PLANNING THEMES

Mobility issues will continue to be a challenge for Killeen, especially as the City expands southward and commercial development gradually emerges in areas that are almost purely residential, or sparsely settled, today. Based on the concerns and hopes expressed by residents, public and private leaders, and key community stakeholders and investors—from Fort Hood representatives to small business owners—Killeen must act, through this new Comprehensive Plan, on the following basic principles:

- ★ **Connectivity and Options.** Killeen must learn from the lessons of past growth and development patterns and ensure a future roadway network with continuity of major streets, avoidance of thoroughfare offsets (e.g., from W.S. Young to Featherline at Stagecoach), and multiple, complementary options for north-south and east-west circulation. The associated sidewalk and bikeway/trail systems must also be well-connected to offer a viable alternative to vehicular travel, especially for shorter-distance and convenience trips. For the older, developed areas of the City, enhanced access to downtown is frequently mentioned as a priority. As Killeen grows southward over the longer term, circulation across and in the vicinity of the Lampasas River will be a particular planning challenge.
- ★ **Capacity.** Especially on the south side, as Killeen proceeds to develop an almost entirely new street network that will support many decades of future growth, it will be essential to protect the traffic-carrying capacity of this system. In addition to careful implementation of access management policies and regulations, this can also include coordination of future school locations relative to primary roadways and appropriate planning and zoning for property that could be impacted someday by eventual road widening and/or interchange construction. Increasingly important in all large cities is phased investment in Intelligent Transportation System (ITS) technologies to better manage available capacity without costly and potentially disruptive physical changes. Remedial measures are needed along established corridors such as W.S. Young, as well as constrained intersections along the U.S. 190 corridor and elsewhere in the community.
- ★ **Safety.** This is a fundamental concern of Killeen residents and must be addressed on a variety of levels:
 - Safe crossing of major streets.
 - School-area safety.
 - Neighborhood traffic issues and calming strategies.
 - Street and trail system lighting.



- Emergency response times and accessibility.
 - The safety (versus capacity) aspect of access management policies, which aim to reduce conflict points and accident potential along busy corridors.
 - Rail corridor/crossing safety.
- ★ **Compatibility.** In conjunction with policies and strategies in the Future Land Use & Character chapter, Killeen must ensure that its mobility system reinforces community, corridor, and neighborhood character rather than turning a blind eye to or undermining it. This is not only about aesthetics. It is mostly about the quality and sensitivity of engineering design so that other objectives besides traffic capacity and flow are addressed. This is especially important in “greenfield” growth areas where the thoroughfare system, together with zoning strategy and utility infrastructure provision, can set a tone for the area’s long-term development pattern and character. Significantly, some residents in newer growth areas wish to see “neighborhood centers” that would bring shopping and services closer to home and reduce the need for longer trips. Meanwhile, other residents wish to maintain the more semi-rural atmosphere of their area and are willing to drive longer distances to avoid any commercial activity nearby.
- ★ **Coordination and Sustainability.** Given the funding realities and fiscal pressures noted earlier in this chapter, partnerships are more important than ever in mobility planning and project implementation. Fortunately, Killeen has potential partners all around, starting locally with Fort Hood, Texas A&M University-Central Texas, Killeen Independent School District, and other business, non-profit, and advocacy groups, and then working outward to encompass other area cities, Bell County, Killeen-Temple Metropolitan Planning Organization, Hill Country Transit, and ultimately the Texas Department of Transportation. Looking inward, Killeen must also be ready to explore alternative financing strategies that are available for fast-tracking mobility improvements and reducing the impact on existing residents and taxpayers. Finally, as emerging needs and new projects are contemplated and evaluated, ongoing operation and maintenance costs must always be factored in to ensure that the City’s capital investments can be sustained over the long term.



Trails Plan Map

In conjunction with the Comprehensive Plan process, City of Killeen staff refined a proposed **Hike and Bike Trails Map** which depicts a planned city-wide trail network for the community to work toward over time. The Trails Map will:

- Support identification and prioritization of specific trail projects for inclusion in the City's Capital Improvements Program and other implementation mechanisms.
- Promote coordination between street and utility infrastructure projects and potential trail improvements, as well as with ongoing park system planning and enhancements.
- Provide the basis for grant applications and pursuit of other external funding and partnership opportunities.

The proposed Hike and Bike Trails Map is considered a part of this Comprehensive Plan, by reference, and will be adopted in conjunction with this plan. Future review and map amendments should occur in conjunction with periodic Comprehensive Plan amendments, or be presented to City Council for interim approval just as occurs with the City's Thoroughfare Plan map.

ACTION STRATEGIES

This section outlines a series of potential action strategies considered by the Planning and Zoning Commission in response to the key planning themes identified for mobility:

1. Connectivity and Options
2. Capacity
3. Safety
4. Compatibility
5. Coordination and Sustainability

Also indicated for each option is the type of action(s) it involves based on five categories which represent the main ways that comprehensive plans are implemented (as elaborated upon in Chapter 7-Implementation):

- ★ Capital investments
- ★ Programs/initiatives
- ★ Regulations and standards
- ★ Partnerships/coordination
- ★ Ongoing study/planning (especially as required to qualify for external funding opportunities)

The Implementation chapter in this plan also identifies certain action items as immediate priorities to be pursued in the near term. Other action possibilities in this section may remain just that—only concepts and considerations that the City and/or community may not be ready to pursue until later in the 20-year horizon of this Comprehensive Plan, if even then. They represent action options that are available to Killeen as a Texas municipality and as acted on by other communities. However, it is recognized that they may not be feasible in Killeen for various reasons such as potential cost, complexity, and/or degree of community support, as well as the capacity of City government to carry out certain initiatives given available staffing and other resources. With these realities in mind, the actions were grouped into three categories—basic, intermediate, and advanced—to give some initial indication of the implementation outlook. More definitive determinations will ultimately be made through City Council priority-setting, ongoing public input, and the City's annual budget process.

More background on some action options is provided in the appendix to this chapter.



Basic Actions

1. Continue Ongoing Planning

- ★ Refine the Thoroughfare Plan for particular areas as more detailed corridor and/or special area studies and plans are prepared in follow-up to this Comprehensive Plan.
- ★ Also prepare a comprehensive Transportation Master Plan, similar to the regional KTMPO plan, which assesses all aspects of the City's multi-modal mobility systems, infrastructure, and management practices.

	Regulation		Capital Improvement		Program / Initiative		Partnership / Coordination	●	Further Study / Planning
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2. Utilize Transportation System Management

- ★ Continue to conduct targeted studies and invest in technology, equipment upgrades, and other solutions aimed at maximizing the efficiency of the existing transportation system (such as the recent grant award that enabled the City to recalibrate and better synchronize traffic signals to improve traffic flow along certain corridors).
- ★ As the region continues to add population and overall vehicle miles traveled (VMT) rise, various travel demand management measures can also be implemented in conjunction with KTMPO, TxDOT, and other public and private partners to mitigate peak traffic periods and congestion problems (e.g., real-time traffic information and incident alerts, ride-sharing programs, flexible work schedules, etc.).

	Regulation	●	Capital Improvement	●	Program / Initiative	●	Partnership / Coordination	●	Further Study / Planning
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3. Require Development Screening without Eliminating Local Circulation

- ★ Screening devices required in various sections of the zoning ordinance (e.g., Section 31-250, 31-280, etc.), especially to screen new non-residential development from nearby residential development, should include provisions for gaps where the screening device is a permanent wall or fence barrier. Otherwise, the mandated screening device, while serving a legitimate purpose to increase land use compatibility, can also eliminate completely the ability for residents to travel directly and safely between neighborhoods and nearby commercial areas by means other than vehicles.
- ★ This effective barrier to bicycle and pedestrian circulation is built into Killeen's current screening provisions since Section 31-280(b) advises that, "Insofar as it is practical, such screening device shall be erected



along the entire length of the common line between such business property and the abutting residentially zoned property.” The screening requirements should allow for gaps in a screening barrier at certain maximum intervals, typically with some horizontal overlap of wall/fence segments where the gap is provided so the visual screening function is preserved. Where screening and buffering is allowed to be accomplished with vegetation versus walls/fences (as provided for in Section 8-512 of the City’s Building and Construction Regulations), pedestrian/bicycle circulation through the landscaped area can also be addressed in the buffer design. The key point is to avoid total separation of uses on either side, thereby eliminating any direct, non-vehicular access.

●	Regulation		Capital Improvement		Program / Initiative		Partnership / Coordination		Further Study / Planning
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4. Promote School Area Safety

- ★ Continue coordination with KISD and private schools to manage bus traffic and vehicle queuing associated with peak-hour drop-off and pick-up activity, ensure the safety of students and parents on foot and on bikes, and to control on-street and overflow parking in campus areas.
- ★ Also monitor and prepare for future TxDOT Calls for Projects for the Texas Safe Routes to Schools (SR2S) program to secure external funding support for safety-related improvements.

	Regulation		Capital Improvement	●	Program / Initiative	●	Partnership / Coordination		Further Study / Planning
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5. Continue Leadership and Coordination on Mobility Needs

- ★ Continue to take an active leadership and advocacy role in KTMPO, with TxDOT and other agencies, and through other economic development and mobility alliances and initiatives focused on securing funding and strategic improvements for the region and Central Texas.
- ★ Also maintain active involvement in early conceptual planning and/or evolving designs for key corridors including U.S. 190-Central Texas Expressway (further widening and improvements through Killeen), SH 195 (widening and improvements in Williamson County), and any potential new linkage to IH-35 via an extension of SH 201.
- ★ Also continue to nurture special relationships with Fort Hood, the Texas A&M University System, Hill County Transit District (The HOP), Central Texas Trails Network, and other partners that can lead



to further investment in key highway interchanges, airport facilities and amenities, transit service and facility upgrades, regional trail connections within Bell County, and bicycle/pedestrian projects (including through periodic funding rounds of the transportation enhancement and Safe Routes to Schools programs), as well as potential future passenger rail initiatives benefitting Central Texas.

- ★ Close coordination with Texas A&M University-Central Texas will be especially crucial in coming years to ensure sound access and circulation plans for the new campus, effective transit linkages between the campus and the broader community (as well as potential shuttle service over time in the immediate campus vicinity), carefully located and well designed bicycle and pedestrian routes, and planning for peak-traffic events as the campus grows in coming years (especially given the anticipated location of all major athletic facilities near SH 195 and the SH 195-SH 201 interchange). Careful coordination of new development patterns in the area will also be essential, to accommodate off-campus housing needs and associated retail and services, emerging hospitality uses (hotels, restaurants, etc.), and possible mixed-use development nodes that will be especially conducive for transit service and a more walkable setting and urban atmosphere near the campus.

	Regulation		Capital Improvement		Program / Initiative	●	Partnership / Coordination	●	Further Study / Planning
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Intermediate Actions

6. Implement Intersection Improvements

- ★ Recognize the significance of intersections in maintaining an efficient and safe transportation system, especially where roadway widening or other capacity enhancements are not practical along the overall corridor.
- ★ Also identify and prioritize those intersections in the community that have the most pedestrian and bicycle activity and determine what safety improvements may be needed (e.g., marked, signed, and/or signaled bike/ped crossings; pedestrian-actuated signal detectors, bikeway signage, retro-fitting of wheelchair ramps).

	Regulation	●	Capital Improvement	●	Program / Initiative		Partnership / Coordination	●	Further Study / Planning
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7. Control Roadway Access

- ★ Determine the need for more stringent access management policies and standards (at the municipal level, as a supplement to TxDOT



requirements on state-maintained roads) for new development and redeveloping sites to maintain traffic capacity, reduce conflict points, and enhance safety along the City’s major thoroughfares.

- ★ Potential priorities are greater use of marginal access (“backage”) roads parallel to primary arterials (as indicated on the Thoroughfare Plan map), and installation of medians in place of continuous center left turn lanes in selected locations to control turning movements and increase safety.
- ★ Esplanades also provide an intermediate refuge area for pedestrians and bicyclists crossing major streets, and they can enhance corridor aesthetics when landscaped or improved with other design treatments.

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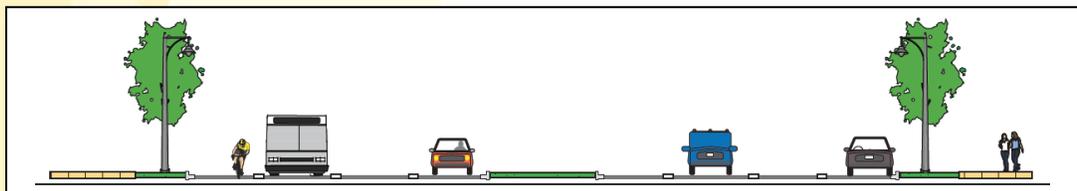
8. Consider a Concept Plan Requirement

- ★ Amend the subdivision and property development regulations to require submittal of an initial concept plan for all anticipated phases of larger-scale subdivision and development projects.
- ★ Without an overall concept, City planning and engineering staff are not able to complete a holistic evaluation of the potential future street network in the wider vicinity in light of the development plan.
- ★ This should include a variety of mobility considerations, including emergency and service vehicle access and circulation, connectivity between neighborhoods, pedestrian and bicycle circulation, transit service potential, school bus routing, etc.

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9. Adopt a “Complete Streets” Approach

- ★ Adopt a “Complete Streets” policy for new and reconstructed roadway corridors, where appropriate. Under this philosophy and approach, which is being implemented in jurisdictions nationwide, more effective corridor design and operation—and usually a wider right-of-way—provides for the mobility and safety of users of the transportation system and not just automobile traffic.





- ★ As described by the National Complete Streets Coalition (www.completestreets.org), elements of Complete Streets can include: sidewalks/trails, bike lanes, raised crosswalks, wide shoulders, refuge medians, audible pedestrian signals, sidewalk bulb-outs, pedestrian amenities, special bus lanes, bus pull-outs, shade and shelter, and trees and landscaping.

	Regulation	●	Capital Improvement	●	Program / Initiative	●	Partnership / Coordination	●	Further Study / Planning
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10. Use a Thoroughfare Plan Approach for Implementation of Bicycle/Pedestrian Network

- ★ A map of planned alignments and improvements comprising an eventual community-wide network for pedestrian and bicycle circulation should be formally adopted by the City Council so it can function just as a Thoroughfare Plan does.
- ★ It is then well-established practice by cities in Texas and elsewhere to require linear land dedications during subdivision and/or development platting, as well as construction (on a proportionate basis) of associated trail or bikeway segments in some cases, in accordance with City specifications.
- ★ Compensation and/or cost reimbursement provisions can also be included for cases where the dedication or construction disproportionately affects a particular site.
- ★ The bike/ped system should also be developed similar to a community's thoroughfare network, with primary and secondary alignments established and designed according to their anticipated system role and utilization level—and with principal segments usually built first, followed by secondary linkages.

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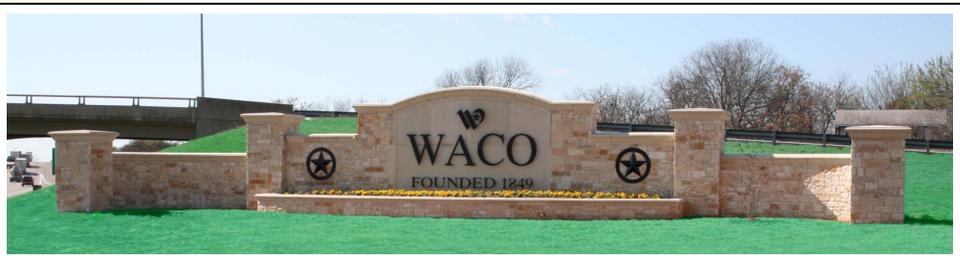
11. Apply Context-Sensitive Corridor Design

- ★ In coordination with the Texas Department of Transportation (TxDOT), insist on Context-Sensitive Design (CSD) approaches in all construction and rehabilitation project involving the community's primary, high-profile corridors. This includes U.S. Highway 190 and Business 190-Veteran's Memorial Boulevard, SH 195, SH 201-Clear Creek Road (especially in the Regional Airport and Texas A&M University-Central Texas vicinities), FM 3470-Stan Schlueter Loop, and FM 439-Rancier Avenue.
- ★ The City should also require a CSD approach for all major roadway projects implemented through the City's Capital Improvements Plan



and/or through economic development incentives or other City programs so that the resulting transportation infrastructure is consistent with—and enhances—area character.

- ★ Enhanced design is particularly critical at all major community entry locations which, in addition to the corridors cited above, include “gateways” into Killeen from the south and east on Stagecoach Road, W.S. Young Drive, and Trimmier Road, as well as the prominent future interchange at SH 195 and SH 201.



- ★ Another prime example is the pending project to make Rosewood Drive a continuous minor arterial on the City’s east side. This offers a unique opportunity to adopt a broader notion of corridor design that could incorporate a multi-modal street cross section to accommodate vehicles, bicyclists, pedestrians, and transit vehicles; recreational amenities via a parallel linear park and/or preserved open space along the creek corridor; innovative storm water retention and management methods; and special landscaping, aesthetic, and wayfinding elements to boost both city-wide and local area recognition and identity.
- ★ In Auto Urban character areas, new or retro-fitted medians are especially valuable to accommodate landscaping and other aesthetic treatments that can soften an otherwise harsh visual environment while also contributing to traffic safety.

● Regulation	● Capital Improvement	● Program / Initiative	● Partnership / Coordination	Further Study / Planning
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12. Address Non-Vehicular Circulation and Safety

- ★ Pursue opportunities to upgrade certain streets in Killeen to special pedestrian and bicycle corridors while still accommodating other transportation modes at reduced volumes and lower speeds. This could occur both through rehabilitation of existing roadways plus new street projects and could feature narrower or fewer traffic lanes, wider sidewalks and/or walking/jogging paths, pedestrian-scaled lighting (versus general roadway illumination), benches, exercise stations, pedestrian shelters, street trees, landscaping, etc.



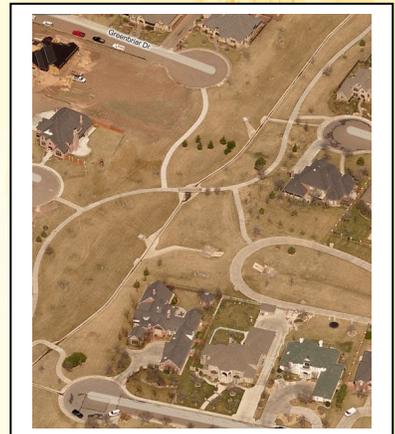
- ★ Such projects could also be coordinated with Safe Routes to Schools improvements to benefit both school kids’ safety as well as provide a general community amenity for all residents in an area.
- ★ More generally, continue to focus on non-vehicular circulation and safety in both older and newly developing areas of the city, especially in areas that clearly have (or potentially could have) higher levels of walking and biking activity, such as around schools, parks, public facilities, neighborhood retail areas, and in and around downtown. Consider increasing the width of sidewalks in such high-use areas from four feet to eight feet or more, as appropriate, along with enhanced crosswalks, signage and/or signalization, reduced speed limits, etc.



	Regulation	● Capital Improvement		Program / Initiative	● Partnership / Coordination		Further Study / Planning
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13. Consider Trail Alternative to Sidewalks

- ★ As a potential alternative to “one-size-fits-all” sidewalk requirements for new residential subdivisions, consider a more flexible approach—without the need for a waiver/exception procedure or Planned Development application—that would allow provision of off-street trails in lieu of sidewalks where appropriate, such as in subdivisions in suburban character areas.
- ★ Off-street trails can actually be safer, more convenient, and provide more direct routes compared to road-side sidewalks, as well as being situated in a more appealing setting than adjacent to roadways.
- ★ Additionally, the total extent of internal trails can be less, in linear feet, than if sidewalks are required along all local neighborhood streets. This can lead to cost savings that could help keep house prices lower or go toward other site amenities.



● Regulation		Capital Improvement		Program / Initiative		Partnership / Coordination	Further Study / Planning
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14. Build in Traffic Calming through Original Development Design

- ★ Through Section 26-101 of the subdivision and property development regulations, related to street layout and design in new development, require—or at least provide voluntary guidelines for—consideration of street design approaches that are demonstrated to reduce vehicle speeds and make drivers more alert and aware of safety issues in residential areas.
- ★ These design techniques can be as simple as avoiding long straight segments on local streets and also employing street curvature, “bulb-outs” and other physical diversions, on-street parking, surface



textures, and street trees (and other features that create street “enclosure”) to influence driver behavior.

- ★ The basic idea is to incorporate traffic calming strategies into initial street system design to avoid having to make costly, disruptive, and potentially ineffective retrofits to existing streets at some future point when residents complain about speeding, cut-through traffic, and/or other unsafe conditions on neighborhood streets.

●	Regulation		Capital Improvement		Program / Initiative		Partnership / Coordination		Further Study / Planning
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15. Support Transit Services

- ★ Pursue opportunities, in coordination with the Hill Country Transit District (The HOP) and other public and private partners to expand and enhance transit services within and between activity centers, major employers, and dense residential areas.
- ★ The City can also provide indirect support to local transit service and ridership by adopting guidelines and/or standards for pedestrian access to transit stop locations adjacent to new development or redeveloping sites. This could include provisions relating to sidewalks; curb cuts and handicap-accessible ramps; non-slip surfaces; marked, signed and/or signaled pedestrian crossings; and prevention of obstructions for wheelchair access.

●	Regulation	●	Capital Improvement	●	Program / Initiative	●	Partnership / Coordination		Further Study / Planning
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Advanced Actions

16. Accommodate Pedestrian/Bicycle Circulation on Commercial Sites

- ★ Add development standards to require dedicated pathways and other features within the expansive parking areas of large auto-oriented commercial developments to allow for safer movement of pedestrians and bicyclists on such sites.
- ★ Other possibilities include requiring dedicated bike parking locations near building entrances, and designated pedestrian connections to adjacent developments and/or transit stops. The key point is that these considerations should be a basic feature of commercial site design from the start, especially in close proximity to residential neighborhoods.



●	Regulation		Capital Improvement		Program / Initiative		Partnership / Coordination		Further Study / Planning
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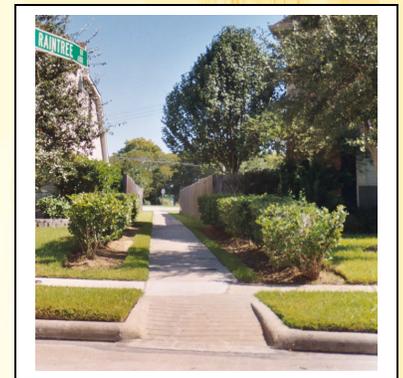
17. Allow Flexible Design for Local Residential Streets

- ★ Consider a flexible approach to standards for local residential street design, in appropriate situations, to avoid overbuilt and excessively wide streets not warranted by actual traffic volumes.
- ★ Under this approach, the type of lot access (front driveway versus rear alley), number of dwelling units served, and the average street frontage determine the street right-of-way, pavement width, and other design requirements such as parking lanes, curb width, parkways, and sidewalks. (Note that this approach would apply only to local streets with no potential for future connection or extension.)

●	Regulation		Capital Improvement		Program / Initiative		Partnership / Coordination		Further Study / Planning
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18. Promote Bicycle/Pedestrian Circulation within Neighborhoods

- ★ Add provisions to the subdivision and property development regulations to require public access paths and/or easements in mid-block locations where long block lengths—or the particular subdivision layout—will limit bicycle and pedestrian circulation options within a neighborhood (or access to/from portions of the City trail network).
- ★ Motivation to walk or bike to nearby destinations, even within the same subdivision, is undermined when the scale of the street network and associated block design is geared primarily toward automobile circulation and speeds (which help to overcome distance).
- ★ Additionally, similar off-street paths and/or easements should be provided at the end of cul-de-sacs where another cul-de-sac bulb is in close proximity in the subdivision layout, and where a cul-de-sac bulb is near an adjoining street, public sidewalk or trail, or the edge of a neighborhood park or school campus.



●	Regulation		Capital Improvement		Program / Initiative		Partnership / Coordination		Further Study / Planning
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19. Consider Traffic Impact Analysis Provisions

- ★ Incorporate provisions into the subdivision and property development regulations and the zoning ordinance that authorize the City to require a traffic impact analysis (TIA) study if projected traffic from a particular development site would exceed a certain established traffic generation threshold or specified development conditions (e.g., square feet of non-residential development, number of residential lots or units, etc.).



- ★ Such situations could require submission of a study as part of the official acceptance of an application for subdivision, site development, a change in zoning classification, or planned development (in some cases, a city may choose to conduct such a study itself or share the study cost with the applicant). The TIA helps to quantify the altered traffic conditions and justify mitigation steps that may be required.
- ★ TIAs are commonplace in many Texas and U.S. communities. They are used to help evaluate if the scale of development is appropriate for a particular site and what mitigation steps may be necessary, on and/or off the site, to ensure safe and efficient access and maintain traffic flow on affected public roadways and at nearby intersections.
- ★ Any TIA provisions should be very clear in spelling out the specific thresholds when such an analysis will be required and the study expectations, including evaluation of potential mitigation measures.

●	Regulation		Capital Improvement		Program / Initiative		Partnership / Coordination		Further Study / Planning
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20. Consider Adoption of Road Impact Fees

- ★ Building on the rationale for exploring impact fees in general, as presented in Chapter 3-Growth Management & Capacity, Killeen should specifically consider potential adoption of a road impact fee program.
- ★ Like impact fees that are authorized in Texas for water and wastewater infrastructure, road impact fees provide another funding mechanism to help municipalities finance road improvements that are directly necessitated by growth and ongoing economic development. The fees are assessed at the building permit stage, which also links the revenue directly to development activity.
- ★ Impact fees are particularly applicable in high-growth cities, where sufficient revenue can be generated in a relatively short time to help fund specific projects that will provide direct benefit to new development through expanded road capacity and improved safety.

	Regulation		Capital Improvement	●	Program / Initiative		Partnership / Coordination	●	Further Study / Planning
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APPENDIX

In this appendix are more details and observations on certain action options discussed within the chapter.

1. Continue Ongoing Planning

Based on lessons learned from past street network development in some areas of Killeen, all advance planning efforts should especially aim to ensure continuity of arterial roadways, good connectivity, and provision of multiple circulation options for both motorists and emergency vehicles. Another priority is to establish the long-term arterial street network in future growth areas, both in the City limits and ETJ, via the Thoroughfare Plan (and more detailed studies) to enable dedication and acquisition of adequate rights-of-way as new subdivision and development activity occurs—even if full thoroughfare build-out will not occur for some time. Arterial and collector configurations should also establish well placed and appropriately spaced intersections for potential future signalization needs.

3. Require Development Screening without Eliminating Local Circulation

This effective barrier to bicycle and pedestrian circulation is built into Killeen's current screening provisions since Section 31-280(b) advises that, "Insofar as it is practical, such screening device shall be erected along the entire length of the common line between such business property and the abutting residentially zoned property." The screening requirements should allow for gaps in a screening barrier at certain maximum intervals, typically with some horizontal overlap of wall/fence segments where the gap is provided so the visual screening function is preserved. Where screening and buffering is allowed to be accomplished with vegetation versus walls/fences (as provided for in Section 8-512 of the City's Building and Construction Regulations), pedestrian/bicycle circulation through the landscaped area can also be addressed in the buffer design. The key point is to avoid total separation of uses on either side, thereby eliminating any direct, non-vehicular access.

6. Implement Intersection Improvements

Intersection capacity and performance can be improved by adding left and/or right turning lanes (or multiple turning lanes in some instances), increasing lane length to accommodate vehicle queuing, eliminating and relocating access points that are too close to increasingly busy intersections, and upgrading signal equipment and/or operation. In some cases, complete reconstruction of a problem intersection may be necessary but particularly beneficial to traffic flow along an entire corridor.



7. Control Roadway Access

Access management is particularly important for preserving capacity along minimally-improved rural roadways and other corridors that are not already lined with development. The City can impose standards for development along ETJ roadways consistent with or similar to those recommended by TxDOT. The minimum spacing between property access points should increase as the posted speed limit increases. Minimum required lot widths should also correspond to the access standards to allow adequate access for each property or development. In turn, the wider lots and limited access points help to preserve the traffic-carrying capacity and safety of roadways that may be improved to arterial standards in the future. In some cases a developer may choose to construct a marginal access street parallel to the main roadway to enable more lots and driveways. Public dedication of the access street would trigger City plat review for subdivisions that would otherwise be exempted under Section 26-5 (exempt if dividing into parts greater than 5 acres within the City limits, and greater than 10 acres in the ETJ).

8. Consider a Concept Plan Requirement

Chapter 26 currently does not provide for this “sketch plan” phase explicitly, and Section 26-41 also makes preliminary platting optional and allows applicants to proceed directly to the final plat submittal and review stage.

In addition to supporting better mobility planning, concept plan review would provide early insights into the potential long-term development pattern in an area and implications for other specialized planning (e.g., infrastructure, drainage, parks and recreation, schools, etc.).

9. Adopt a “Complete Streets” Approach

A Complete Streets approach can be difficult to apply to many established thoroughfares unless road reconstruction projects make possible a significant redesign, as well as acquisition of additional right-of-way. Otherwise, existing corridors are often already designed—and widened to their full extent—to provide for maximum movement of vehicular traffic. In such cases, only some Complete Street features, such as wider sidewalks or streetscape enhancements, may be feasible through a redesign and retrofitting process. At the collector street level, narrowing the pavement width in appropriate situations would allow the extra right-of-way area to be used for wider sidewalks, trails, pedestrian-scale street lighting, tree preservation, landscaping, and open space.



10. Use a Thoroughfare Plan Approach for Implementation of Bicycle/Pedestrian Network

In effect, the adopted plan depicts another form of future “public ways” for which rights-of-way must be preserved, either for public or private construction of improvements. Easements are an alternative way to provide for public circulation and improvements but have various shortcomings relative to permanently dedicated land.

Some ordinances require development applicants with property affected by the bike/ped network plan to meet early with City staff to determine potential dedication and/or improvement requirements (including criteria to ensure feasible routes and conditions for construction, public use, and long-term maintenance). Any trails internal to the development should also be designed to link to the city-wide system.

11. Apply Context-Sensitive Corridor Design

Context-Sensitive Design (CSD) is a contemporary approach to transportation project design, operation and maintenance—embraced by TxDOT—that requires more careful consideration of the natural and built settings through which roads and transit projects pass (e.g., rural and scenic areas, commercial and industrial districts, campuses and business parks, downtowns, neighborhoods, etc.). In other words, the project should be responsive to its context and fit the physical setting. So, as described by various sources, this approach “seeks to balance the need to move vehicles efficiently and safely with other desirable outcomes, including historic preservation, environmental sustainability, and vital public spaces.”

In general, CSD considerations can be factored into most all major road design and construction projects by incorporating relevant criteria and procedural steps into the City’s project development process, as well as the thoroughfare standards that govern private street design for eventual public dedication. For example, roads in suburban and especially rural character areas could be designed with: a narrower cross section to leave more open and green space within the available right-of-way; drainage methods that rely more on swales and natural features versus “hard” infrastructure and curb-and-gutter design; wide and winding trails and/or bikeways versus typical sidewalks; preserved existing tree lines and vegetation, sometimes by acquiring extra right-of-way beyond the minimum needed; avoidance of adverse impacts to cultural or historic features, including one-of-a-kind structures; protection of prominent natural vistas and other scenic views; and higher standards for private perimeter fencing along key corridors.



Some cities, through their zoning ordinances and development standards, require “community fencing” for private developments that abut—and especially have rear lot lines along—arterial and/or collector roadways. This involves a higher standard of fencing material and design, sometimes requiring installation of masonry columns at certain intervals to break up expanses of wood fencing and add an aesthetic design element. Some ordinances go further, especially for more intensive development or higher-profile corridors, by ruling out wood fencing entirely in favor of materials such as masonry, wrought iron, tubular steel, or others that require less maintenance and are more resistant to deterioration than wood. Another option is to raise standards for basic wood fencing, such as requiring: finished side facing out toward roadway; use of weather- and decay-resistant materials; fence posts set in concrete footings; installation of horizontal rot/kick boards at bottom



and/or horizontal top boards; placement of ornamental caps on fence posts.

14. Build in Traffic Calming through Original Development Design

Section 26-101(c) authorizes the City Engineer to “increase, decrease or modify street right-of-way and design requirements based on sound engineering practice when safety concerns ... warrant.” Additionally, Section 26-101(h) allows the Planning and Zoning Commission to “require modification ... to the street design to accommodate public health, safety and welfare considerations.” However, traffic calming considerations and/or criteria could be spelled out more explicitly and in more detail than the current ordinance language. Traffic calming is especially a concern given the accepted practice in Killeen of allowing wider streets in some cases for temporary storm water storage and conveyance.

15. Support Transit Services

On busy arterials that are also key transit corridors, a more ambitious but often highly beneficial improvement is to identify potential locations for the installation of bus pull-out bays. These are specially constructed areas separate from the street travel lanes providing for passenger boarding and alighting at stops. In this way stopped buses are removed from the main traffic lanes, reducing disruption of traffic flow and improving safety for both regular traffic and the transit vehicles. The construction of bus pull-out bays may be difficult within constrained environments, but they are particularly applicable for implementation along new roadways and on corridors where transit service is to be focused over the long term.

17. Allow Flexible Design for Local Residential Streets

Under this approach, the required right-of-way and street design is directly tied to development density and locally generated traffic volumes as opposed to a “one-size-fits-all” standard for all local streets. Where appropriate, sidewalks or off-street trails could be required as a trade-off for reduced pavement width.

18. Promote Bicycle/Pedestrian Circulation within Neighborhoods

A typical standard is to require mid-block openings at least every 800 feet where there are continuous rows of homes abutting trails or collector and arterial roads (with a minimum easement width of 15 feet to accommodate a minimum five-foot sidewalk or trail link). Section 26-101(g) specifies that a “street section” should not exceed 1,200 feet, with some allowance for variation beyond this. For perspective, 1,200 feet is the length of four football fields.



19. Consider Traffic Impact Analysis Provisions

One area example of Traffic Impact Analysis (TIA) utilization is the City of Pflugerville, which has TIA provisions in its Unified Development Code for site development (Subchapter 3, Section I(2)(e)) and subdivisions (Subchapter 15, Section M(3)(e)). TIAs are essential for significant new development and redevelopment projects as this information helps to clarify when an adverse impact is isolated to a particular site and its newly-generated traffic. Even if it is City policy to encourage economic development by not placing the entire burden of mitigation on individual private projects (especially significant off-site and intersection improvements), the TIA will highlight impacts that need to be addressed immediately or near term to avoid very localized congestion and/or unsafe traffic conditions.

Cities and county and state governments plan for phased widening and improvement of primary roadways over time to accommodate economic development and increased traffic volume. However, they cannot anticipate how a certain development at a particular location may impact traffic flow and safety along a given roadway segment or at a nearby intersection.

The scope and complexity of TIAs varies depending on the type and size of the proposed development, but most are brief and quickly conducted and submitted. In practice, mitigation measures are often a shared effort between the developer and the public agency.

20. Consider Adoption of Road Impact Fees

Technical analysis and modeling of local traffic conditions will be necessary to pinpoint improvement needs and estimated costs. This study effort can be part of the comprehensive Transportation Master Plan recommended in this chapter.

Unlike water and wastewater impact fees, road fees may only be assessed within the City limits in Texas. However, municipalities typically divide their incorporated areas into a series of traffic analysis zones, which enables the impact fee program to be customized based on differing growth rates and traffic conditions around the community. Then, as particular areas of the community approach build-out, the impact fees gradually decline and are ultimately phased out as the primary roadway network in an area is completed (and impact fees are often minimal or set at zero in older, established areas of a city).