APPROVED BY ORDINANCE 2008-4230

Choices

TRANSPORTATION

5 CHAPTER

Advance transportation planning and thoroughfare development will help prepare a community for future traffic demands and create a safe and efficient system of travel to, from and within the community. A well-balanced and comprehensive transportation system should offer a choice of modes and be appropriately designed for safety and visual appeal. The Transportation element of the Temple Comprehensive Plan establishes a system to accommodate local and regional travel demand through the year 2025 and beyond.

Traffic congestion, street maintenance, and safety along roadways are often the most prevalent and most talked about issues when addressing current and future community needs. As with many other communities, increased congestion brought about by new development, confusing intersections, lack of connectivity, and lack of sidewalks and trails are all issues that have been expressed by the citizens of Temple during the public involvement process. When residents cannot move with relative ease throughout their community, this leads to frustration and detracts from local quality of life. Likewise, retaining and attracting businesses requires having adequate roadway, rail, air and other facilities to move people and goods to and from this area in an effective and efficient manner.

Much of the emphasis of this plan element is placed on the roadway system as it connects the entire region and is the most predominant form of mobility in Temple. However, while traveling by car is the most common mode of travel, this plan recognizes that building and widening roadways will not adequately address future transportation needs in the community. With continued growth, high costs of developing infrastructure, escalating fuel costs, and impacts to air quality and the environment, planning for all of the future travel needs in the City will involve looking at transportation as an interconnected system of roadways, paths, trails and sidewalks, with multiple options for getting around including by transit and bike. An integrated and connected system with multiple alternatives for traveling within the community will help keep traffic flowing and alleviate congestion on

Other local and regional plans reviewed for this chapter include:

Metropolitan Transportation Plan (July 31,2006)

Transportation Improvement Program Fiscal Years 2008-2011 (April 2007)

Bell County Thoroughfare Plan (2001-2025)

Thoroughfare Plan for City of Temple (June 1998)

Preliminary Design Report for the Western Outer Loop Project (2002)

Draughon-Miller Central Texas Regional Airport, Airport Master Plan (March 2001)

Temple 20/20 Alliance Strategic Plan (2002)

Killeen-Temple Urban Transportation Study Unified Planning Work Program FY 2006/2007

Coordinated Planning

Transportation planning is closely related to other elements of the plan including Urban Design & Future Land Use and Economic Development. For instance, the future land use and overall development patterns outlined in Chapter 3 help determine the transportation infrastructure necessary to meet future mobility needs. Additionally, the transportation system is vital to the movement of goods, thereby having direct influence on the community's economic development. Businesses seeking to locate or expand are interested in their access to and circulation within the community and, in the case of a major industry, the proximity to a freeway. Transportation arteries also provide opportunities for linear connections via sidewalks and/or bicycle routes, which complement the parks and recreation system. The location, design and capacity of roadways also determine the type and character of development.

A coordinated planning approach was utilized in developing the Transportation Plan element, ensuring the plan and its recommended policies and strategies are compatible with the community's land use goals and economic development objectives.

roadways. Options should apply not only in terms of offering different modes of transportation but also in offering multiple connections and choices on the roadway system. Part of providing multiple options and enhancing mobility in the community will include promoting development patterns that encourage alternative uses and shorter trips (i.e., mixed use developments, compatible commercial uses within close proximity to neighborhoods). The transportation system has a strong influence on the quality and type of growth and should therefore be closely coordinated with the community's overall land use goals and policies.

OBSERVATIONS on Existing Mobility Conditions

- Overall mobility and access is good in the Temple area. The City is strategically located along the I-35 corridor and has a generally good system of arterials. There are a number of options for moving goods and people to, from and within the region including by rail, air and transit. Also the community has the beginnings of a trail system.
- Areas of traffic include Loop 363 at I-35, the 31st Street corridor, and Industrial Blvd. at I-35.
- There is some lack of connectivity between neighborhoods, with several neighborhoods having only one way in and out.
- Certain arterial streets like 31st Street have a proliferation of driveways, which reduces capacity, speed and through movement.
- As shown in **Figure 5.1**, the highest levels of traffic occur on I-35 where volumes range from 83,800 vehicles per day (vpd) at the southern city limits to 62,030 vpd south of Troy. Other heavily traveled roadways include the South Loop, 31st Street, Adams and Central avenues.
- Lack of east/west connections from Belton and the lake area to Temple.
- Inadequate access to South Temple.
- Lack of collector streets within residential neighborhoods in South Temple.

Purpose

The purpose of this element is to identify and address key transportation issues in the community and make recommendations to help improve mobility in the area and accommodate future growth. Additionally, included in this plan element is a Thoroughfare Plan map that can be used by City staff, the Planning and Zoning Commission, and City Council for securing needed rights-of-way as new development occurs.

Issues and Opportunities

Through the plan development process a number of issues and concerns were expressed related to mobility in the community. These discussions formed the basis of the following issue statements, along with analysis of existing conditions, review of the current Thoroughfare Plan, and examination of expected future growth trends. These statements bring focus to this plan regarding the community's values, expectations and priorities for transportation in Temple. Following the identification of the key issues is a set of community goals and objectives along with discussion of necessary implementation steps.

Regional Transportation

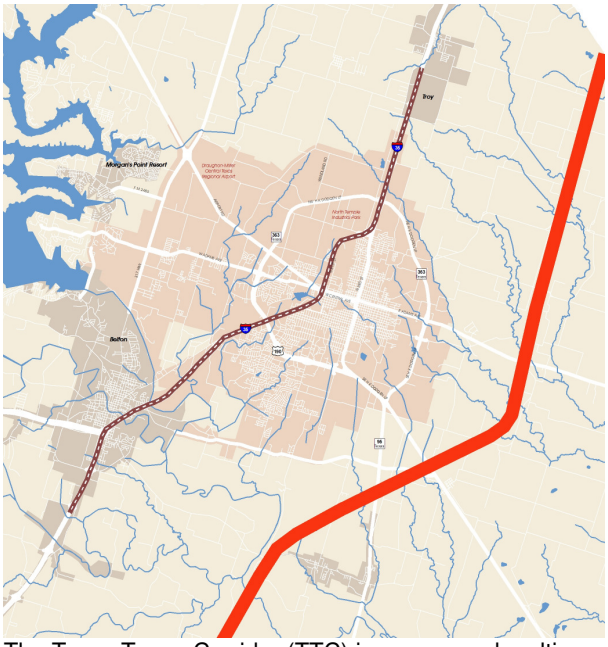
Over the past couple of years the Temple region has experienced strong growth which is expected to continue over the next several decades. Growth pressures have placed increasing demands on the transportation system, resulting in congested roadways and longer commutes. Traffic pressures in Temple are a result of a growing local economy, expanding residential market, particularly to the south and west, and increasing external

pressures stemming from growth in the Austin and Waco area and across Central Texas. In addition to local growth in the region, Temple is strategically located along the I-35 corridor, which brings international trade flows and other through travelers to the community. With the large number of industries located in Temple, its strategic interstate highway location, and two railroads running through town, moving people and goods through the region efficiently is an important planning consideration for the community.

Key planning considerations for regional mobility, as addressed by Goal 5.1, include:

1. Long-term solutions to traffic along the I-35 corridor, as population growth and international trade continue to increase in Texas.
2. The proposed Trans Texas Corridor and resulting transportation and land use implications for Temple.
3. Location and feasibility of an intermodal facility.
4. Future role of the Draughon-Miller Central Texas Regional Airport in regional air travel.
5. Coordination with other entities in enhancing regional mobility including Bell County, the Central Texas Council of Governments (CTCOG), Killeen-Temple Urban Transportation Study (KTUTS) which serves as the Metropolitan Planning Organization (MPO) for the Temple area, and the Texas Department of Transportation (TxDOT).
6. Preserving environmental features and the character of corridors through "Context Sensitive Solutions."
7. NW Loop 363, which will function as a bypass/detour for I-35 during construction.

Preferred TTC Alignment



The Trans-Texas Corridor (TTC) is a proposed multi-use, statewide network of transportation routes that will incorporate existing and new highways, railways and utility rights-of-way. Plans call for the TTC to be completed in phases over the next 50 years, with routes prioritized according to Texas' transportation needs. The proposed Trans Texas Corridor (TTC-35) nearest the Temple area generally parallels I-35. The TTC-35 Tier One Draft Environmental Impact Statement (DEIS) has been released for public review and comment. The document identifies a recommended preferred corridor alternative for this project that is just east of Temple (red line on map).

Local Transportation Network

Moving residents through the community from their homes to employment and shopping centers, schools, and places of leisure in an efficient and safe manner is essential to local quality of life in Temple. As development continues, ensuring through movement along the arterial street system, adequate connectivity, and ample options for travel on the roadway network will be important in enhancing local mobility. There are several districts in the community where congestion is more concentrated, particularly during certain times of day, like the medical-education district, the mall area, and the northwest industrial area. Special studies beyond basic thoroughfare planning – with specific solutions – may be needed to address the unique circumstances of these districts. Likewise, given limited resources and constraints to thoroughfare development in some cases, maximizing existing roadway assets through access management techniques and other land use decisions and strategies will be important in enhancing local mobility.

Key planning considerations for local mobility, as addressed by Goal 5.2, include:

1. An adequate arterial and collector street system that provides for multiple connections and options.
2. Maximizing flow and reducing traffic conflicts on existing facilities through access management and other Transportation System Management (TSM) strategies.
3. Development patterns and land use decisions that have a positive effect on the transportation system.
4. Planning for an aging population, and for the needs of others with reduced mobility and/or disabilities.
5. Expansion of major traffic generators.
6. The need for a more systematic way of assessing the traffic impact of new development.

Alternative Modes of Travel

Currently the private automobile is the primary form of transportation for most individuals in the Temple area. However, with an aging population, escalating fuel costs, increased environmental concerns, and the high cost of planning and building roadways, opportunities exist for providing and accommodating alternative modes of transportation including transit, "on demand" services (e.g., taxis, airport shuttle), and bike and pedestrian facilities. The HOP is Central Texas' regional public transit system, which provides service to Killeen and Temple. In Temple fixed-route service is provided to key destinations of the city. HOP fixed route service has increased since it began operation in 20021. The HOP is a relatively new transit system, and as the system matures the City, in coordination with the Hill Country Transit District, should continue to look for opportunities to enhance and expand service to better meet the varying needs of the community.

"The year 2050 will mark the first time in human history that the percentage of older people (over 60) will exceed the percentage of children (under 14)."

Planning magazine, May 2007

In addition to providing more transit service, making the community more pedestrian and bike friendly and accessible can help alleviate traffic on local streets by providing for another alternative mode of travel. Bicycle and pedestrian facilities add to the quality of life of the community and help create a cohesive environment that is interconnected not only through roadways but through a system of bike lanes, trails and sidewalks. In addition to their practical function of getting people around, pedestrian and bicycle opportunities can help meet some of the recreational needs in the community. Temple currently has a multi-use trail that runs along the Adams Avenue corridor on the west side.

Key planning considerations for alternative travel modes, as addressed by Goal 5.3, include:

1. Expanding public transit to the east, west and south as development and population density increases.
2. Identifying needs and innovative transportation options for accommodating an aging population and disabled residents (e.g., those using motorized wheelchairs and scooters), including appropriate transit services and parking facilities.
3. Expanding the existing trail/bike system to create an integrated and connected system throughout the community.

[1] K-TUTS Metropolitan Transportation Plan, July 31, 2006.

4. Finding a balance between the social service aspect of providing public transit and the overall community benefit of increased mobility.
5. The need for a way to model the cost and benefit of alternate travel modes compared to roadway construction.
6. Assessing the implications of regional and statewide initiatives which could make passenger and/or commuter rail connections between Temple and Austin and other destinations possible in coming decades – and recognizing that evolving transportation technologies, especially in light of new energy realities, could dramatically impact personal mobility choices, vehicle design, fuel options, and even how local transit services function and are funded by state and federal agencies.

The intersection of I-35, Airport Road and Adams Avenue is confusing due to the number of roadways coming together in one busy location.

There is a lack of collector and minor arterial streets in South Temple, making it difficult to move throughout this area and access I-35 and Loop 363.

Neighborhood Safety and Connectivity

Preserving the integrity and character of neighborhoods is an important consideration in transportation planning. Traffic congestion on primary roadways can result in cut-through traffic and unsafe neighborhood conditions, while through roadways can often divide neighborhoods and alter their character. Likewise, gated neighborhoods and lack of connectivity can result in increased traffic along the arterial street system and decreased emergency response. Neighborhood development should enhance mobility and safety through appropriate street design and connections. The transportation system should connect and enhance neighborhoods and be aesthetically pleasing and compatible with the surrounding environment.

Key planning considerations for neighborhood safety and connectivity, as addressed by Goal 5.4, include:

1. Neighborhood design that calms traffic and encourages slower speeds, including narrower streets where appropriate (which can also reduce impervious surface and resulting storm water runoff).
2. Connectivity between neighborhoods and commercial and public areas through the roadway system, sidewalks, and trails.
3. Thoroughfare development that is compatible with and complements neighborhood character.

Goals, Objectives and Action Recommendations

The following goals, objectives, and recommended actions were formulated to specifically address the issues and needs outlined above. The goals reflect the overall vision of the community, which may be achieved through the objectives and by acting on the recommendations. It is important to note that these are also general statements of policy that may be cited when reviewing development proposals and used in making important community investment decisions regarding the provision and timing of facilities and services.

GOAL 5.1: A regional transportation network for moving people and goods to, from and through the community in an efficient and effective manner.

♦ ***Prioritize needed improvements to the street network in Temple.***

1. Immediately following adoption of the Comprehensive Plan, prepare a Transportation Master Plan in consultation with major property owners. Considerations of the Transportation Master Plan should include, at a minimum:
   - Involving major property owners;
   - Evaluating traffic counts and performance of streets; and
   - Integrating multiple modes of transportation throughout the City.
2. In the interim between Comprehensive Plan adoption and completion of a Transportation Master Plan, place the highest priority on street capital improvement projects that improve mobility in west Temple, specifically in the area west of I-35 and south of Airport Road.

♦ ***Coordinate with local, state and federal agencies in enhancing regional mobility.***

3. Continue coordination with TxDOT in improving mobility along I-35 and identifying long-term solutions to handling future growth and traffic along this corridor.
4. Actively participate with TxDOT and other state agencies during the Environmental Impact Statement process for the Trans Texas Corridor. As the environmental process proceeds, the City should evaluate the implications of this corridor for the community.
5. Continue coordination with the CTCOG and K-TUTS in identifying and prioritizing regional transportation projects to be placed in the Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP). The City maintains a capital improvements program (CIP) and K-TUTS maintains an MTP that prioritizes roadway construction projects in the area.

♦ ***Accommodate future expansion of the Draughon-Miller Central Texas Regional Airport.***

6. Prioritize and implement improvements in the updated Airport Master Plan. The City should be proactive in acquiring land and establishing appropriate land use controls around the airport as identified in the Master Plan so future expansion will not be restricted.
7. Review and amend as necessary zoning regulations around the airport to protect its long-term operational interests from encroaching incompatible development.

♦ ***Accommodate future expansion of rail transportation through Temple.***

8. Encourage expanded rail service through Temple for the movement of freight and passengers, and capitalize on the major rail infrastructure in the City.

"Weakest" Links in the Transportation System

- Loop 363 & I-35
- Adams Street
- Adams St. and I-35
- 31st Street
- 31st Street and Central Avenue
- Downtown to south side – no direct routes
- 1st and Avenue H at 7:00 am

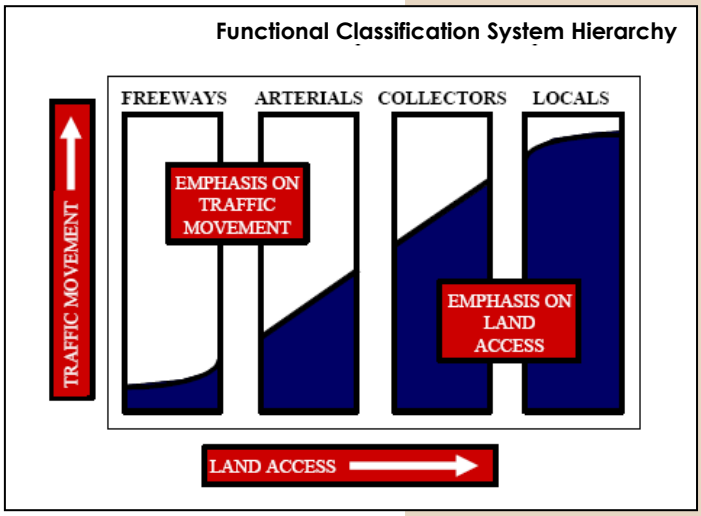
Needed Improvements

- Pedestrian crossings near high school
- Truck route enforcement
- Railroad grade crossings – 25th Street, 1st Street, Main Street
- More streets to south
- Sidewalks, jogging trails
- Widen Lake Road (2305)
- Synchronize light timing
- MLK & 93 needs a light

Source:
Focus Group Interviews – March 2007
District Meetings – April/May 2007

GOAL 5.2: A local transportation system that moves people through the community in a safe and convenient manner.

- ***Utilize the Thoroughfare Plan map and functional classification of roadways to achieve adequate mobility within the community and preserve rights-of-way.***



1. Ensure that capital improvement projects undertaken by the City are constructed in conformance with the land development regulations.
2. Adopt the functional classifications of arterial and collector roadways as shown on the Thoroughfare Plan map. The recommended street cross sections and pavement widths that correspond with the functional classifications should be adhered to in all new developments. In certain instances where there are unavoidable constraints for complying with the City's standards (that are peculiar to the location and not brought about by the subdivider through the subdivision layout or design), the City may allow an exception as long as it is the minimum variation needed to otherwise abide by the City's standards, which may require additional study to verify.
3. Amend the Subdivision Regulations to include the cross section standards and required right-of-way and pavement widths for arterial and collector streets as identified in this plan.
4. Consider adopting standards for wider collector sections where collectors intersect with arterials. Wider sections should consider:
    - Necessary turning lanes to accommodate turning movements;
    - Adequate lane length for stacking of vehicles; and
    - Limited or prohibited access onto the collector near intersections with arterials.
5. Explore the concept of incorporating performance standards for local residential streets into the City's Subdivision Regulations. Under this approach, the type of access, number of dwelling units served, and the units' average frontages determine the street right-of-way, pavement width, and other design requirements such as parking lanes, curb width, parkways, and sidewalks (this would apply only to local streets with no potential for future connection or extension). Therefore, the required right-of-way and street design is directly tied to development density and 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.
6. Utilize the future land use plan for incorporation into the Killeen-Temple Urban Transportation Study (K-TUTS) transportation model to define the functional classification of streets and the necessary roadway capacities. The use of character-based land use designations allows quantification of the transportation impacts, including population and dwelling unit counts, trip generation, and other model inputs. The land use projections developed as part of this plan may be organized into traffic analysis zones (TAZs) as the planning variable inputs into the transportation model. In this way, there is a high level of coordination between the adopted land use and

growth plans and the resulting thoroughfare network, thereby greatly improving the accuracy of trip generation and the corresponding assignment and distribution of trips by the computer model.

7. Consider incorporating provisions into the land development regulations authorizing 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 units, or other site-specific factors that could trigger the need for mitigation measures along adjacent public streets or at nearby intersections). Such situations could require submission of a study prior to the official acceptance of an application for subdivision, property development, or a change in zoning (and, in some cases, the City could choose to conduct such a study itself or share the study cost with the applicant).

Traffic Impact Analysis (TIA) Studies

A Traffic Impact Analysis is a study which assesses the effects that the traffic generated by a particular development will have on the immediate transportation network in the vicinity. TIAs are a common planning tool used by many communities in Texas and elsewhere to gauge site-specific demands on abutting and nearby roadways and intersections. Their scope and complexity varies depending on the type and size of the proposed development, but most are brief and quickly conducted and submitted. The TIA process is used to help evaluate if the scale of development is appropriate for a particular site and what mitigation measures may be necessary, on and/or off the site, to ensure safe and efficient access and maintain traffic flow on affected public roadways.

Typical solutions, which vary according to the extent of traffic impact, include:

- Limiting the number of access driveways or altering their design or location along the development frontage;
- Requiring developer contribution to traffic signal upgrades or timing changes;
- Requiring installation of deceleration and/or acceleration lanes for main driveways to reduce traffic conflicts in busy areas; or
- Requiring developer contribution to intersection improvements, which typically involves construction of new or lengthened left and/or right turn lanes.

Cities and county and state governments plan for phased widening and improvement of primary roadways over time to accommodate economic development. 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.

In practice, mitigation measures are often a shared effort between the developer and the public agency. Needed traffic flow and safety solutions which clearly go beyond the effects of any one development remain the responsibility of public agencies. TIAs help to clarify when an adverse impact is isolated to a particular site development and its newly-generated traffic.

"Transportation System Management (TSM) is the improvement of vehicular flow by implementing low-cost measures that increase the efficiency of the existing road pavement and avoid the need for major roadway expansion. Examples of such measures include traffic signals and intersection improvements, one-way road pairs, access control measures, and removal of on-street parking."

Your Government & Community Online Resource,
Martin County. FL

- ***Implement access management and other Transportation System Management (TSM) measures to help increase capacity along constrained roadways and maintain capacity along arterials in the community.***

8. In conjunction with TxDOT, prepare an access management study for 31st Street and other corridors, which identifies and evaluates appropriate TSM measures that would be suitable and feasible along these corridors of concern. These measures could

include the addition of right or left turn lanes at certain locations, consolidation of driveways, and signal timing. There are a number of sources and criteria that could be used in determining appropriate TSM measures in the community including those identified in TxDOT's Access Management Manual and the Transportation Research Board's Access Management Manual.

There are a number of driveways and access points along 31st Street, which reduces traffic capacity and through movement along this busy corridor.

9. Develop an access management program and guidelines that provide appropriate strategies and access design requirements based on a roadway's functional classification as identified on the Thoroughfare Plan map (with the greatest emphasis placed on mobility versus access on arterial streets). This roadway management approach aims to restrict and/or guide the number, location and spacing of driveways, median openings, and street intersections to maintain smooth and safe traffic flow. Other typical measures include provision of acceleration/deceleration lanes at major intersections and busy driveway locations, more and/or longer turn lanes, and marginal access roads (service streets that are parallel to a higher-order street, which, for purposes of safety, provide access to abutting properties and separation from through traffic). These strategies are particularly important for preserving capacity along roadways that are not currently lined with development.
10. The access management program could also lead to development code amendments that would limit or prohibit driveways along collector streets and restrict driveway access on arterial roadways to preserve the intended function of these roadways. Such provisions might:
    - restrict the number of residential streets with access to arterial streets by requiring marginal access streets or collector roadways located no less than 660 feet apart; and
    - require marginal access roads and/or cross-access easements along all commercial frontage abutting arterial and collector roads to minimize the number of driveways (adjacent commercial properties might also be required to have shared driveways and/or cross-access to eliminate the need to use the public street between them).
11. Periodically conduct signal warrant studies as area travel volumes increase with new development. In areas that are already managed by traffic signals, signal timing should be reviewed, particularly in congested areas, to determine if timed traffic signals are appropriate relative to the volume and peaks in traffic flow. Adjustments should be made to traffic signals so they are timed accordingly. Pedestrian- and bicycle-actuated traffic signals should be installed at intersections near schools, parks, and other areas with high pedestrian traffic.

COMPLETE STREETS are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and bus riders of all ages and abilities are able to safely move along and across a "complete" street.

Source: www.completestreets.org

- ***Account for the unique needs of aging and disabled persons when planning for future transportation in the community.***

12. Review current standards relative to the need for handicap and van-accessible parking in Temple. Revise standards as appropriate to ensure adequate spaces are available and appropriately designed.
13. Identify and evaluate alternative transit options for seniors including a "community bus," which is a smaller bus that would be more flexible and accommodating to seniors than fixed routes.

- ***Utilize land use policies and land development regulations to encourage developments that enhance mobility within a neighborhood and throughout the community.***

14. Refer to the recommendations identified in Chapter 3, Urban Design & Future Land Use, relating to mixed use and higher density developments.

GOAL 5.3: A mobility system that offers a variety of choice in modes of travel.

- ***Develop a public transit system that meets the varying needs of the community.***

1. Work with the Hill Country Transit District in preparing a transit study to evaluate the current performance of the fixed routes and establish service performance standards, identify modifications to the exiting routes as well as potential new routes (including expanded service to the east and new service to the south and west as development and densities increase), explore coordination opportunities with other area transportation providers, analyze daily commuting patterns and assess the feasibility of commuter routes, analyze fuel alternatives, recommend vehicle types and specifications, identify infrastructure improvement needs, and recommend future funding needs, revenue options, and funding strategies.
2. As part of the above recommended transit study, explore the option of developing a transit service for choice/discretionary riders. In other words, in addition to servicing transit-dependent persons, who are those most likely to use the service, design a service that is highly attractive for those who ordinarily drive their cars to work or elsewhere. This may include a well-publicized rideshare program to key destinations (i.e. Temple College, the Medical District), some form of unique travel option such as a trolley or streetcar, or a combination thereof. The cost of the start-up may be borne by the local governments or in partnership with a business sponsor, with the user paying a portion of the daily ride cost.
3. Revisit the feasibility and potential ridership of a route to the industrial district.
4. In coordination with the Hill Country Transit District develop and execute an expanded advertising and marketing campaign to better educate and

The **TEXAS HIGH SPEED RAIL & TRANSPORTATION CORPORATION** (THSRTC) is a not-for-profit corporation consisting of local transportation
and elected officials from across the State in a grassroots, collaborative effort to realize the first-ever high-speed rail passenger system and multi-modal transportation corridor in Texas. The purpose of THSRTC is to provide innovative solutions to growing transportation issues through a plan that connects millions of people in the fastest growing area of one of the fastest growing states in the nation, linking airports and facilitating our military's ability to efficiently and quickly deploy to protect our homeland.

One of THSRTC's primary objectives is to correct an oversight in federal law that leaves unconnected the greater Houston / Harris County area from the South Central High Speed Rail (HSR) Corridor, which is one of two HSR corridors in Texas recognized by federal law. THSRTC is currently working on obtaining an extension of the federally designated South Central HSR Corridor from Killeen / Temple to Houston / Harris County via Bryan / College Station in an alignment known as the "Texas T-Bone."

Source: www.thsrtc.com

inform the public as to the services and schedules available in Temple, as well as inter-city connections.

5. Evaluate potential locations for the installation of bus pull-out bays, which are specially constructed areas separate from the street travel lanes providing for passenger boarding and alighting. The construction of bus pull-out bays may be difficult within constrained environments, but they are particularly applicable for implementation along new roadways. Consider on a case-by-case basis which bay design is more applicable given the stop environs and geometric street design.
6. Identify locations for construction of street and curb side improvements. Explore low-cost, transit-oriented street improvements such as:
    - bus shelters in areas of heavy use;
    - special left turn lane signal phases at select intersections;
    - preferential signal timing to aid bus travel time;
    - parking regulations to clear the curb lane for bus operations, particularly at high-volume transit stop locations and during peak travel periods;
    - improved identification of bus stop locations and installation of no parking signs; and
    - pavement markings at transit stops.
7. Prepare guidelines for pedestrian access to transit stop locations.
8. Within future street improvement projects along bus routes, incorporate design provisions relating to sidewalks; curb cuts and handicap-accessible ramps; non-slip surfaces; marked, signed and/or signaled pedestrian crossings; prevention of obstructions for wheelchair access; and installation of pedestrian-actuated traffic signals.

- ***Develop new and/or enhance existing pedestrian and bicycle amenities and facilities throughout the City.***

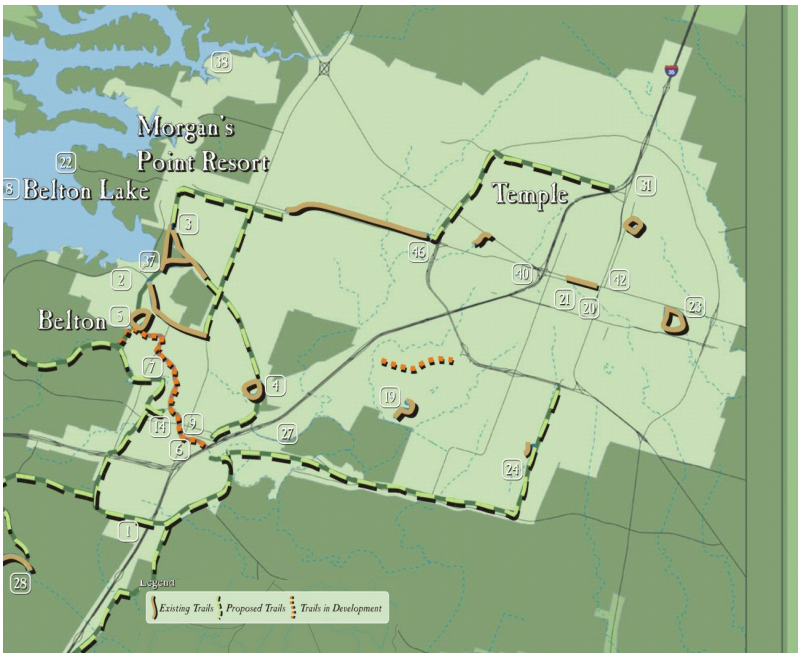
9. Immediately following adoption of the Comprehensive Plan, prepare a comprehensive bike and pedestrian plan for the community that identifies a network of new or extended bike lanes, trails, greenways, and pedestrian linkages throughout the city limits and extraterritorial jurisdiction (ETJ), with disabled access and the potential impacts on street design standards as prime planning considerations. The resulting study should identify a network of on- and off-street linear connections between neighborhoods, parks, schools, and commercial areas, with prioritization of improvement packages. Attention should be given to identifying bikeway and sidewalk improvements in and around the downtown and Temple College areas, in particular where roadways could be “retrofitted” to accommodate bike lanes and/or sidewalks. Along with the circulation and safety needs of casual biking within and between neighborhoods, the needs and interests of long-distance recreational cyclists should also be addressed. The plan might also include recommendations, as appropriate, for amending the Subdivision Regulations to include alternative cross-section standards for collectors and minor arterials that include sufficient right-of-way for bike lanes. As urged by area cycling groups and interests during the comprehensive planning process, the process for preparing a bike and pedestrian plan should include consideration of:

- actions needed to become the most bicycle-friendly city in Central Texas and thereby boost the quality of life of Temple residents;
- identification of opportunities to add designated bike lanes, hike-and-bike trails or other bike/pedestrian improvements along existing rights-of-way, and to acquire additional rights-of-way in strategic locations;
- potential installation of "Share the Road" signs along all streets within Temple that have painted shoulders;
- potential installation of bicycle racks at key locations and buildings throughout the community;
- preparation of a grant proposal to the Texas Safe Routes to School (SRS) program to secure external funding support for infrastructure improvement and construction, as well as educational activities; and
- promotion of cycling awareness and safety by declaring an annual "Share the Road" day in Temple.

The planning process should emphasize input from groups such as the Scott & White Cycling Club, the Tem-Bel Coalition, the Bell County Cycling Club, and other user groups, residents and developers to help identify safe and desirable routes that should be designated within the plan and targeted for associated improvements and signage.

10. Consider adopting alternative street sections that incorporate bike lanes. Possible configurations could include wide curb lanes, shoulder bikeways, bicycle lanes, and bike paths (see example illustrations in **Figure 5.5** toward the end of this chapter).
11. Work with the Central Texas Trails Network in developing trails that link the communities in Bell County.
12. Make it standard practice to add sidewalks along roadways where they are not already present when such roadways are improved or widened.
13. Identify intersections in the community that are heavily used by pedestrians and prioritize and implement safety improvements at these intersections. Intersections should be prioritized based on use and pedestrian risk. Improvements could include walk overs; installing accessible ramps for persons with disabilities; marked, signed, and/or signaled pedestrian crossings; and pedestrian-actuated signal detectors.
14. Conduct a community-wide sidewalk inventory to denote the existence or non-existence of sidewalks along each street. Inventory segments that are in poor condition or unfit for safe use (particularly by handicapped individuals), as well as barriers to connectivity. Barriers may include major

Vision Map for Area Trails



Central Texas Trails Network (CTTN) is a volunteer organization that exists to facilitate the establishment and promotion of trails throughout greater Bell County. CTTN, working with city, county, state and federal organizations, supports and promotes coordination among these groups to leverage resources and maximize progress.

Source: www.centraltexastrails.org

roadways, utility poles/boxes, and buildings. Subsequently, prepare a five-year capital improvement program (CIP). The program should include a prioritization of projects, with the highest priority assigned to areas most likely in need of sidewalks such as around schools, downtown, parks, and other areas where there is a high propensity for walking. The City should also consider increasing the minimum width of sidewalks in such high-use areas from four feet to five feet or more, as appropriate. An established amount should be budgeted annually for sidewalk improvement, replacement, and construction. Alternatively, the City could establish a public improvement district (PID), where appropriate, whereby the improvement costs would be proportionately allocated to individual property owners.

15. Prepare a Safe Sidewalks Program to identify those locations where the condition and maintenance of the sidewalk are particularly important, such as around, adjacent to, and leading to/away from schools; near and adjacent to public buildings and spaces; and other areas prone to heavy utilization of the sidewalks. In these priority areas, conduct regular inspections of safety conditions to ensure the walking surface is free from hazards and dangerous obstructions. Also organize a public education program to notify the community of the Safe Sidewalks Program, the priority pedestrian areas, and individual responsibilities for care and maintenance. The City should also submit a grant proposal to the Texas Safe Routes to School (SRS) program to secure external funding support.
16. Consider amending the City's street design standards for the installation of pedestrian- and bicycle-actuated traffic signals. Also, coordinate with TxDOT to ensure their installation at targeted locations on State highways in town.

"Context sensitive solutions (CSS) is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist."

Federal Highway Administration

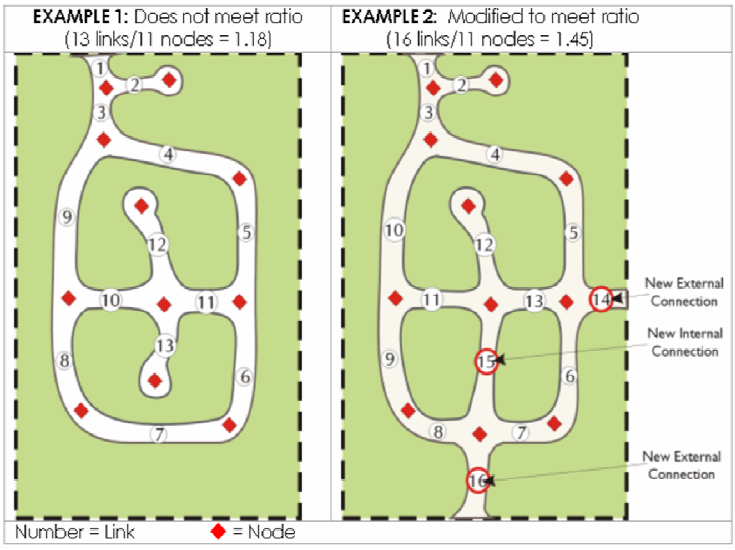
GOAL 5.4: A mobility system that is integrated with and complements neighborhood and community character.

- ***Insist on well-designed roadways that are aesthetically pleasing and reflective of the surrounding community character.***

1. Consider implementing context sensitive solutions when widening existing and constructing new roadways. In Temple, consideration should be given to enhancing and preserving the community's character through protection of environmental and historic resources.

- ***Implement a formal traffic calming program.***

2. Periodically conduct travel speed studies to determine appropriate speed restrictions in neighborhood pedestrian areas. Street pavement markings and signage for all school safety zones should be improved and regularly maintained. Raised cross walks should be installed along all streets that front onto public facilities, such as schools, but also including municipal parks and the library.
3. Perform localized traffic calming studies where there are observed unsafe conditions of cut-through and/or high-speed traffic. Traffic calming is applicable where there are continuous and relatively straight streets (for a distance of 500 feet or more) carrying higher volumes of traffic in excess of 100 vehicles per hour during peak hours; when actual speeds exceed the posted limit on a regular basis; when a local street functions as a collector street, and/or when the street is in close proximity to a school, park, or other location frequented by children. The study should identify the recommended improvements based upon site-specific conditions.



A connectivity index increases the number of street connections in a neighborhood and improves directness of routes.

- ***Enhance connectivity between neighborhoods.***

4. Evaluate the existing street layout regulations in the Subdivision Regulations to optimize the number and location of street connections in a neighborhood and improve directness of routes and create more route options for people on foot and bicycles. Features of a potential ordinance could include:
   - An appropriate connectivity index (e.g., street links divided by street nodes).
   - Requirements for connecting local and collector streets to adjacent developments to ensure a minimum level of external connectivity.
   - Requirements to establish pedestrian routes between land uses. This is particularly important where natural features or other constraints make it impractical to connect streets.
   - Provisions to discourage cut-through traffic and speeding.

City of Temple Thoroughfare Plan Map

The plan depicted in **Figure 5.2, Thoroughfare Plan**, is intended as a guide for gradual roadway network expansion and improvement in coming years, in coordination with ongoing land development and redevelopment and further investments in public utility infrastructure. Care was taken during the process of creating the Thoroughfare Plan to ensure that the designated routes follow existing roadway alignments, parcel boundaries, and topography as much as possible. These factors, as well as accepted engineering design considerations should, at a minimum, be taken into account when the Thoroughfare Plan is interpreted and modified (as well as the general principles and considerations included in **Table 5A.1, Functional Classification Criteria).** The effect that any modifications might have to the overall traffic circulation of the area should be considered and discussed prior to modifying the Thoroughfare Plan. The City's staff Design Review Committee (DRC) will work with developers and their design professionals to interpret the Thoroughfare Plan and determine how roadway alignments depicted on the map should be incorporated into proposed developments.

Thoroughfare Plan Highlights

Some key considerations in preparing a new Thoroughfare Plan map for Temple included:

- Removing various impractical or ill-advised arterial and collector alignments which had appeared on previous Thoroughfare Plans for the area (e.g., proposed connection of Nugent Avenue, a collector street, from the Historic District westward to the I-35 area, across the major railyard area in between).
- Depicting a future arterial network with better continuity and spacing, and covering a larger geographic area, particularly in Temple's north and northwest ETJ, given recent annexation activity by the City.
- Providing for more east-west connections in west Temple (e.g., Tarver Drive and Poison Oak Road extensions), especially to offer alternatives for motorists and thereby provide relief to the busy FM 2305 (W. Adams Avenue) corridor.
- Clarifying road extension and connection priorities in the North Temple Industrial Park area, particularly for consistency with the latest area-specific planning for Temple's TIF District #1.
- Indicating the latest potential alignment for the proposed Trans Texas corridor (TTC-35) through the Temple area, and showing possible interchange locations to maintain the continuity of existing state highways in the vicinity.

Several proposed refinements to the future Outer Loop are also reflected on the Thoroughfare Plan map. The gray dashed line on the east side of Temple reflects a prior alignment for the Outer Loop that appeared on previous Temple thoroughfare plans and was also incorporated into K-TUTS planning. A proposed new Outer Loop alignment is shown in blue. As noted on the map, the City will seek to amend regional transportation plans to reflect the desired change in this major arterial alignment. Likewise, another gray dashed line is shown for the potential extension of the Outer Loop south of I-35 in southwest Temple. This line also represents previous thinking on this potential alignment, but the blue major arterial line in the same vicinity is included on the new Thoroughfare

Plan map as a preferred alternative – at least conceptually, subject to further study – that would avoid several constraint areas and would prove more beneficial to Temple over the long term.

Collector-Level Planning

The new Thoroughfare Plan purposely avoids depicting potential collector streets in all undeveloped areas of the city and ETJ, especially beyond the 20-year growth planning area delineated in **Chapter 4, Growth Plan** (aside from existing roads which already serve a collector function amid the arterial network). When such lines are shown on thoroughfare plans, too often their location is taken literally rather than being treated as conceptual alignments to be considered further as actual development patterns emerge. They can also be troubling in areas with an existing, scattered rural development pattern, where a more urban-oriented street system for future growth is difficult to contemplate – despite the critical importance of such foresight and planning. Instead, the Comprehensive Plan establishes the importance of collectors and provides guidance for when and where they are needed as urbanization reaches new growth areas.

Therefore, the absence of a collector on the Thoroughfare Plan does not necessarily mean that a collector street is not warranted in a particular area. The need for collectors within a development should be discussed between staff, land owners, and design professionals regardless of whether there is a line on the Thoroughfare Plan designating the potential location of a collector street.

The likely location of future signalized intersections along the arterial network is the most important factor in determining where collectors should be required as part of new developments. Traffic signals ideally should be spaced one-third to one-half mile apart along arterials, although private property patterns sometimes require suboptimal spacing of down to one-quarter mile. If a subdivision is proposed within a largely undeveloped superblock, and it is situated at a point along an abutting arterial where the above spacing criteria suggest a future signalized intersection, then an access point to the development should be planned at that location, and the access street should include sufficient right-of-way to accommodate a cross section built to collector standards (which may not actually be constructed to that standard until later). This should be the case even though the first subdivision to emerge in a superblock may not, on its own, be large enough to generate the traffic necessary to justify a collector street. However, over time, as the area is built out, sufficient traffic will flow to and from the arterial-collector intersection to warrant its signalization and justify the collector cross section. **In summary, it is not the size of initial developments that drives collector needs but the location of new development within the arterial grid and relative to preferred locations for signalized intersections.**

Naturally, real world conditions are rarely ideal for applying textbook rules and criteria. That is why traffic impact analysis procedures (as recommended under Goal 5.2) are important for situations that require more in-depth study of traffic circulation and access considerations across a larger area beyond the proposed development site. It is essential for both the developer and the City to know whether a collector designation is warranted in an area as this has implications for the extent of right-of-way dedication, the eventual street

improvements, whether a sidewalk will be required, whether homes or businesses can be oriented toward and take access from the street, etc.

Finally, footnote "A" on the Thoroughfare Plan map points out that a collector street originating from an arterial intersection typically should not be straight and continuous across a superblock, especially through primarily residential areas. However, it is advantageous for collector streets to provide for internal circulation and connectivity, though indirect, within a superblock. Speeding and cut-through traffic is discouraged primarily by offsetting and/or curving the collectors and having them meet at "T" intersections.

Priorities for Further Study

Recognizing the extent of study that is possible through a comprehensive plan update process, and aware that this plan makes a strong recommendation that the City of Temple proceed immediately to prepare a Transportation Master Plan (TMP), the Comprehensive Plan Advisory Committee identified the following as priority items for more in-depth study through the TMP process:

- The southward extension of the future Outer Loop, south of I-35, as discussed earlier in this section.
- The east and northeast alignment of the future Outer Loop, particularly in light of potential future land use and development activity on Temple's east side and toward the north I-35 corridor.
- A potential east-west connection between S. 31st Street and S. 5th Street, to the north of FM 93 (as indicated by a conceptual collector line on the Thoroughfare Plan map).
- The overall outlook for and implications of TTC-35, including connections with existing state highways in the area (and the proposed extension of FM 1237 eastward to TTC-35).
- Other corridor concepts under consideration through ongoing regional transportation planning, and how Temple might connect to these future thoroughfares or be impacted by them.

Roadway Design Standards

This section describes existing and proposed roadway design standards associated with each of the functional classifications as shown on the Thoroughfare Plan map. Further general background information on thoroughfare planning principles is provided in **Appendix 5A,** at the end of this chapter. Roadway design standards are located in the City of Temple's Subdivision Ordinance and include roadway design criteria and cross sectional elements for arterial, collector and local streets. While street classification reflects the functions that roadways serve as part of the street network, roadway design standards are related to traffic volume, design capacity and level of service. The City's existing requirements are shown in **Table 5.1**. These current standards reflect back-of-curb to back-of-curb dimensions. It is recommended that when the City updates its subdivision regulations to incorporate new standards, they should reflect face-of-curb to face-of-curb dimensions.

Table 5.1, Existing City of Temple Roadway Design Standards

Category	*Pavement Width (ft)*	*Right-of-Way Width (ft)*
Local Street	31	50
Rural Local	22	50
Collector	36	55
Rural Collector	26	55
Arterial	49	70
Major Thoroughfare	60	80

In the administration and enforcement of the Thoroughfare Plan, special cases and unique situations will occasionally arise where physical conditions and development constraints in certain areas conflict with the need for widening of designated thoroughfares to the planned right-of-way width and roadway cross section. Such special circumstances require a degree of flexibility and adaptability in the administration and implementation of the plan. Acceptable minimum design criteria and special roadway cross sections may have to be applied in constrained areas where existing conditions limit the ability to meet desirable standards and guidelines. Special roadway cross sections should be determined on a case-by-case basis when a unique design is necessary, and these exceptions should be subject to approval by the City Engineer. Otherwise, standard roadway cross sections should be used in all newly developing areas and, whenever possible, in existing developed areas.

A single set of standards for development within the city versus that within the ETJ may be problematic. Standards for development within the city limits, with rare exception, should reflect its urban, auto-urban, and suburban character, with provision for curb and gutter construction, sidewalks, street lighting, signage, and sufficient open space. In the outlying areas of the ETJ where the character of development is estate or rural, for example, the standards may be varied to mirror the character, yet remain reasonable and feasible.

Local Streets

Local streets allow direct property access within residential and commercial areas. Through traffic and excessive speeds should be discouraged by using appropriate geometric designs, traffic control devices, and traffic calming techniques. Local streets typically comprise about 65 to 80 percent of the total street system.

The Thoroughfare Plan does not differentiate between local streets by assigning class. Instead, the plan establishes standard street cross sections, with alternatives based upon such performance characteristics as type of access, number of dwelling units served, and the units' average frontage dimensions.

The current Temple standard for local streets is a right-of-way width of 50 feet and a pavement width of 31 feet. However, these standards do not account for situations where less right-of-way and pavement width may be acceptable due to lower density and fewer trips generated. As a result, there is more pavement width than necessary in some cases, which adds to development costs, occupies additional space (thereby reducing development efficiency), causes higher travel speeds, and results in increased impervious surface and, hence, stormwater runoff. Therefore, this plan proposes alternative street cross sections where the standard pavement width is not warranted. Narrower streets encourage reduced travel speeds, an increased distance between the street and sidewalk, and a wider streetscape. Additionally, where appropriate, allowing for a reduced pavement width would make providing sidewalks more attractive and cost effective to a developer.

The City should consider adopting alternative narrower street standards for local streets if such standards are consistent with the findings of the bike and pedestrian plan recommended in this chapter. A local street with a less pavement width would be limited to developments with fewer, larger lots taking access onto the local street. On-street parking would not be allowed on the narrower street width but would be allowed on one side of the 31-foot street section. Such parking restrictions necessitate review of lot sizes, setbacks, and on-lot parking provisions to accommodate parked vehicles out of the public right-of-way, as recommended in this section. Pavement widths should be designed to carry immediate local traffic adequately, still be sufficient to accommodate fire apparatus, and yet be an appropriate width to accomplish neighborhood traffic calming.

Local streets may also be adapted to an estate or rural character by including an open or closed ditch system rather than curb and gutter. The right-of-way of local streets within these environments may be reduced to 40 feet with a 20-foot pavement width. The street cross section must include adequate provision for stormwater management by way of sufficient ditch cross sections. For very low-density developments, trails may be constructed in lieu of sidewalks. Alternatively, a striped pedestrian/bicycle lane may be included within the right-of-way with the provision of an adequate minimum pavement width.

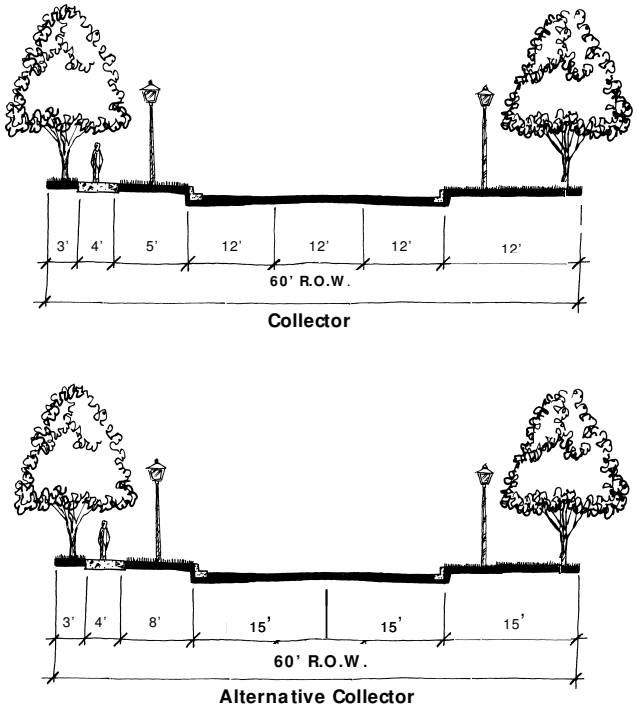
Collector Streets

Subdivision street layout plans and commercial and industrial districts must include collector streets in order to provide efficient traffic ingress/egress and circulation. Since collectors generally carry higher traffic volumes than local streets, they require a wider roadway cross-section and added lanes at intersections with arterial streets to provide adequate capacity for both through traffic and turning movements. However, since speeds are slower and more turn movements are expected on collectors versus arterials, a higher speed differential and much closer intersection/access spacing can be used than on arterials. Collectors typically make up about five to 10 percent of the total street system.

The proposed collector cross sections, as displayed in **Figure 5.3**, require 60 feet of right-of-way with pavement widths of 36 and 32 feet. The standard collector roadway will have a 36-foot pavement section with sidewalks on one side. As an alternative, a developer willing to set aside additional green space and provide enhanced pedestrian pathways and/or street trees may request that the pavement width be reduced to 32 feet with parking permitted on one side only. A street cross section that is 32 feet wide provides two, 12-foot travel lanes and an eight-foot parking lane, which is sufficient to serve the traffic carrying capacity of a collector roadway.

Another option possible for estate and rural development is consideration of collector roads without sidewalks or curb and gutter. This permits the development to maintain the look and feel of a rural area, and it also would not provide the drainage system offered with roads that utilize curbs and gutters. In this type of development, significant green space and an interior trail system would be necessary to compensate for the loss of sidewalks. Pavement width could be reduced to 32 feet while the right-of-way requirement would remain at 60 feet to account for the space required for open or covered ditches.

Figure 5.3, Collector Street Sections



NOTE: Not to Scale

Source: Kendig Keast Collaborative

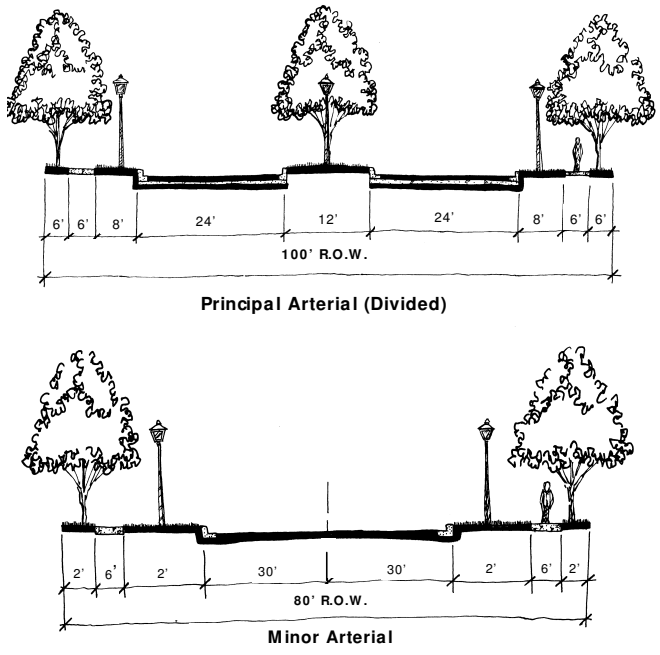
As shown on the Thoroughfare Plan map, some existing collectors and proposed collectors along existing alignments have geometric concerns (horizontal and vertical curves) that need to be addressed during design and construction. This should be coordinated with the Public Works Department and the City Engineer.

Arterial Streets

Arterial streets form an interconnecting network for broad movement of traffic. Although they usually represent only five to 10 percent of the total roadway network, arterials typically accommodate between 30 and 40 percent of an area's travel volume. Since traffic movement, not land access, is the primary function of arterials, access management is essential to avoid traffic congestion and delays caused by turning movements for vehicles entering and exiting driveways. Likewise, intersections of arterials with other public streets and private access drives should be designed to limit speed differentials between turning vehicles and other traffic to no more than 10 to 15 miles per hour. Signalized intersection spacing should be long enough to allow a variety of signal cycle lengths and timing plans that can be adjusted to meet changes in traffic volumes and maintain traffic progression (preferably one-third to one-half mile spacing).

Functional classification is not dependent on the existing number of lanes since the functional role served by a roadway typically remains constant over time, while the roadway's cross section is improved to accommodate increasing traffic volumes. For example the cross section of arterials may vary from multi-lane roadways with four to six lanes down to two-lane roadways in the developing fringe and rural areas of the ETJ where traffic volumes either have not increased to the point that more travel lanes are needed or they are not warranted due to limited density. Thus, lower-volume roadways that are continuous over long distances may also function as arterials, particularly in the ETJ.

Figure 5.4, Arterial Street Sections



NOTE: Not to Scale

Source: Kendig Keast Collaborative

According to the current thoroughfare design standards, right-of-way for a Minor Arterial (Arterial) and Principal Arterial (Major Thoroughfare) are 70 and 80 feet respectively. Displayed in **Figure 5.4** are alternative standards with a minimum of 80 feet for a minor arterial and 100 feet for a principal arterial (130 feet for a 6 lane). This will allow for a center turn lane on the minor arterial cross section and a raised median on the principal arterial cross section. This plan advocates a raised or depressed median in all new principal arterial roadways where the land development pattern is not yet fully established. Medians for principal arterials within the existing urbanized, developed area should be evaluated on a case-by-case basis based upon the warrants and constraints,

accident records and fatality incidents, and specific design considerations. It is proposed that the minor arterial roadways consist of an undivided street section with the dimensional characteristics shown in **Figure 5.4**.

Some elements of the thoroughfare system, such as those roadways for which abutting development has already occurred or is planned to occur, will require new or wider rights-of-way and may ultimately be developed as two-lane or multi-lane roadways with various cross sections. Some streets identified as arterials or collectors on the plan will not necessarily ever be widened due to physical constraints and right-of-way limitations. Instead, the designation signifies its traffic-handling role in the overall street system and highlights the importance of maintaining it and similar streets in superior condition to maximize their traffic capacity since they most likely cannot be improved to an optimal width and cross section.

Streets with Bike Lanes

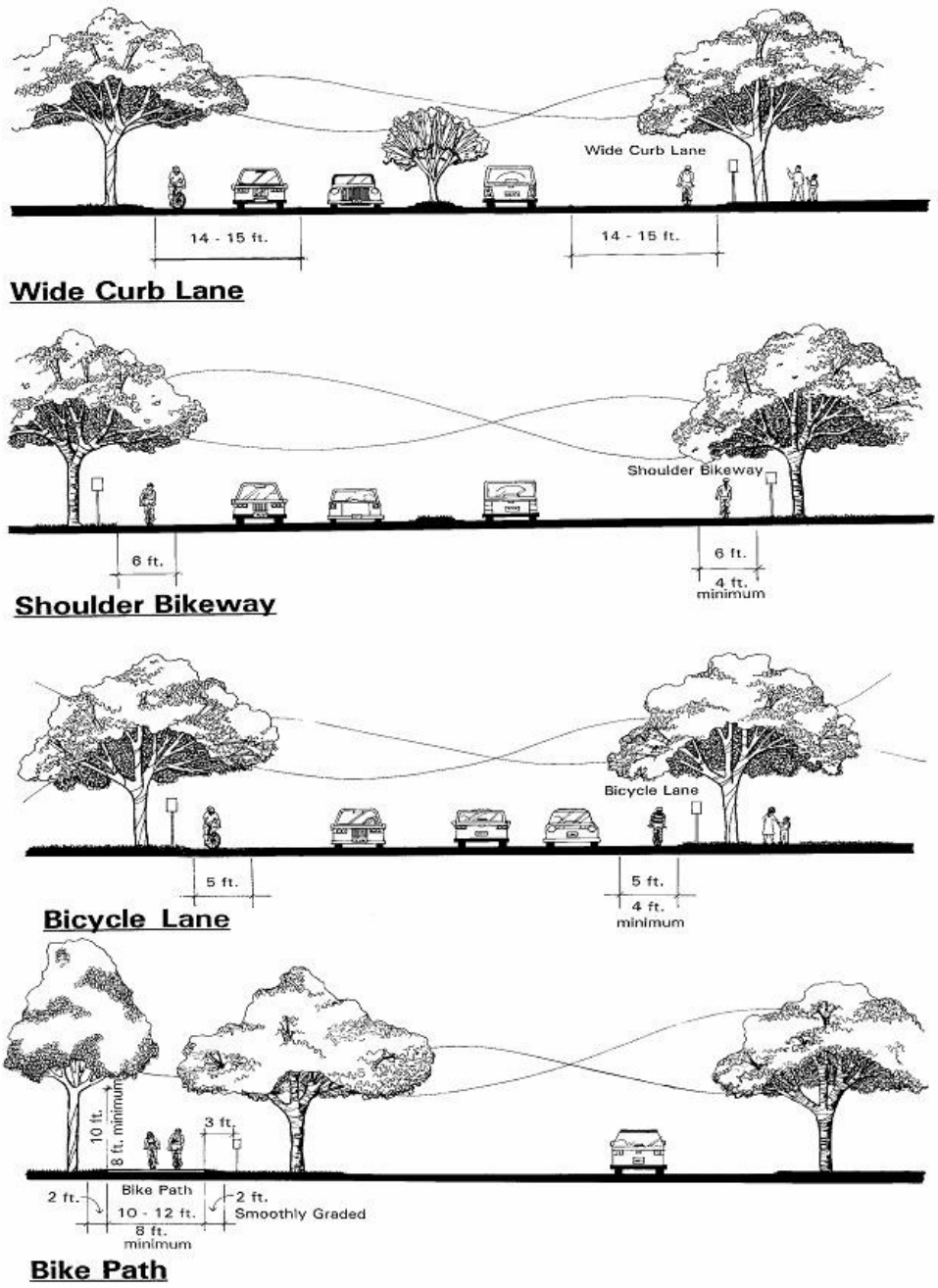
When the need for bike lanes is identified, required right-of-way may need to be adjusted. Alternative cross sections examples for accommodating bicycle traffic are shown in **Figure 5.5**.

Plan Implementation

Implementation of thoroughfare system improvements occurs in stages over time as the community grows and, over many years, builds toward the ultimate thoroughfare system shown by the Thoroughfare Plan. The fact that a future thoroughfare is shown on the plan does not represent a commitment to a specific timeframe for construction or that the City – or other jurisdiction – will build the roadway improvement. Individual thoroughfare improvements may be constructed by a variety of implementing agencies, including the City, Bell County, and/or TxDOT, as well as private developers and land owners for sections of roadways located within or adjacent to their property. Road construction can be implemented by individual entities or in partnership, as is the case for construction of roads that are identified in the regional Transportation Improvement Plan.

The City, County, and TxDOT, as well as residents, land owners, and subdividers, can utilize the Thoroughfare Plan in making decisions relating to planning, coordination, and programming of future development and transportation improvements. Review of preliminary and final plats for proposed subdivisions in accordance with the City's subdivision regulations should include consideration of compliance with the Thoroughfare Plan in order to ensure consistency and availability of sufficient rights-of-way for the general roadway alignments shown on the plan. It is particularly important to provide for continuous roadways and through connections between developments to ensure mobility. By identifying thoroughfare locations where rights-of-way are needed, land owners and subdividers can consider the roadways in their subdivision planning, dedication of public rights-of-way, and provision of setbacks for new buildings, utility lines, and other improvements located along the right-of-way for existing or planned thoroughfares.

Figure 5.5, Alternative Cross Sections for Bicycle Facilities



Source: Kendig Keast Collaborative