

MASTER THOROUGHFARE PLAN for the Waco Metropolitan Planning Organization

BACKGROUND / OBSERVATIONS

McLennan County has seen an overall steady increase in growth since 1990. The attractiveness of natural features, such as the rolling terrain and Lake Waco have contributed toward the population increases. The County's strategic position midway between Dallas and Austin within the Interstate Highway 35 corridor has also aided in its growth. In 1990, the U.S. Census showed that the County had a population of 189,123 persons and a MPO population of 163,703. In 2000, the Waco Metropolitan Planning Organization (MPO) estimated the County's population at approximately 205,000 persons, an average annual increase of approximately 1.0%. The largest city within the County is Waco with an estimated 2000 population of 110,000 persons. McGregor, Woodway, Hewitt, Robinson and other communities comprise about 78% of the County's total estimated population. The following population projections show possible increases for McLennan County. In the "Socioeconomic Data Collection and Forecast Study" performed by Wilbur Smith and Associates, Alternate "A" was adopted for estimation purposes as it is similar to the growth experienced within McLennan County since 1990.

<u>Year</u>	Alternate "A" <u>1.0%±*</u>	Alternate "B" <u>1.5%±*</u>
1990	189,123	189,123
2000	208,000	208,000
2010	230,000	241,000
2020	254,000	280,000

* Average annual compounded growth rate.

It is also evident that some of the growth has occurred within unincorporated areas of the County. In order to preserve those qualities which have attracted growth to the region, and to also ensure that existing and future residents have adequate circulation facilities, the MPO should adopt guiding principles and supporting guidelines that would help decision-makers in their efforts to further these ideals. Adoption of such principles and guidelines would also help to ensure that the public health, safety and welfare are preserved and enhanced as the region continues to grow and develop over time.

Relationship of the MPO to the County

The actual MPO boundaries (and associated study area) is smaller than McLennan County. Since the MPO boundary already includes most of the County, the planning area for this study was extended to the County line. This will assist the County should it decide to adopt this or a similar plan.

The Thoroughfare Plan for the Waco MPO has been formulated to address the issues stated above by recommending basic strategic objectives and thoroughfare standards.

Purpose Statement

The purpose of the Master Thoroughfare Plan is to establish guiding principles and policies which are specifically designed to advance the public health and safety of area residents.

Objectives

The guidelines and policies established within the Thoroughfare Plan are intended to advance two primary objectives:

1. Ensure adequate emergency access to all areas of the MPO and County, as well as reasonable access and circulation for school buses; and
2. Create a Master Thoroughfare Plan that comprehensively addresses traffic circulation and traffic safety throughout the MPO study area and McLennan County.

Planning Principles/Policies

In order to achieve the above listed objectives, the following planning principles, or policies, should be adopted:

1. All developments should provide for an orderly circulation system which can be serviced by fire, law enforcement, and other emergency agencies.
2. All developments should provide a circulation system which can be safely utilized by school buses.
3. All development parcels should have adequate frontage on a public street or road for the purpose of emergency access as well as private convenience.

4. All subdivisions having more than five lots should provide access onto at least one collector or arterial street. Subdivisions should be designed to facilitate future access to property(s) that is not adjacent to a major roadway.
5. All developments and subdivisions should conform to the basic requirements set forth in the Master Thoroughfare Plan.

THE MASTER THOROUGHFARE PLAN

Overview

The efficient movement of people and goods is one of the most important goals an urbanizing area can strive for. One of the primary tools that can help accomplish this is a comprehensive thoroughfare plan which shows the future thoroughfares that will be needed to ensure efficient movement of traffic within the MPO study area and throughout the County. The Waco MPO Master Thoroughfare Plan is designed and intended to provide an efficient, structured framework for the smooth flow of traffic that will result from future growth and development. It also ensures that existing traffic movement can be accommodated by improving certain aspects of the system. The Thoroughfare Plan is an overall guide used to enable individual developments within the MPO region to be coordinated into an integrated, unified transportation system. The Plan encourages the creation of neighborhoods with a minimal amount of through traffic, while providing high capacities for routes that are intended to move both regional and local traffic throughout the area. The Thoroughfare Plan (see **Plate 1**) specifies roadway corridors, as well as pavement and right-of-way configurations (i.e., cross-sections) that are based upon the anticipated future traffic needs of both the MPO and the County.

The Master Thoroughfare Plan creates a comprehensive approach by which the various departments and agencies responsible for thoroughfare development can coordinate their individual efforts. Examples of these agencies include the MPO, Texas Department of Transportation (TxDOT), the County, and municipalities within the County. The standards and criteria contained within this Plan are intended to promote consistent design practices in the region, as may be appropriate. This Plan was prepared by analyzing the existing system of thoroughfares, and by proposing recommendations for future thoroughfares based upon the goals and objectives cited above.

The Regional Traffic Circulation System

Interstate Highway 35 is the major highway connecting Dallas, Austin and San Antonio, and it carries a significant amount of traffic associated with the North American Free Trade Agreement (NAFTA). Interstate Highway 35 is also the most heavily traveled north/south roadway through the County carrying a large amount of local traffic. Interstate Highway 35 is presently undergoing improvements by TxDOT along many portions to improve capacity. Traffic counts

have shown steady increases with traffic doubling approximately every 20 years. Other major regional highways include U.S. Highway 84, U.S. Highway 77, State Highway 6, and State Highway 31. These roadways will continue seeing increases in traffic as the region continue to grow.

It is essential that a complementary thoroughfare system be developed in the MPO area and County that is capable of accommodating the expanding vehicular traffic volumes which future growth will create, and which will also provide convenient access to the various existing major traffic generators.

The Local Traffic Circulation System

Most of the local traffic patterns are created by the following traffic generators:

- Waco, and other cities
- Major employment centers such as the Texas Central Industrial Park and Raytheon E-Systems
- High schools, elementary schools and middle schools
- The County Courthouse and other government agencies
- Shopping and business areas along Interstate Highway 35 and the existing arterial system
- Various regional airports in Waco and McGregor
- Baylor University, McLennan Community College, and the Texas State Technical College
- Public use areas such as the zoo and museums

Most of these traffic generators are located on or close to major thoroughfares, and the areas adjacent to them occasionally experience some periods of congestion during peak traffic times (see “Waco Metropolitan Transportation Plan”). Although the original system of streets was functional in its original intent for the various cities, growth within the region has expanded to such an extent that there is a greater need for efficient, well-defined traffic collection and distribution routes through areas outside of the major cities. This is becoming even more evident due to the linear commercial development patterns along U.S. Highway 84 and other major roadways, and the need for alternate routes around Lake Waco.

Thoroughfare Standards and Functional Classification System

To prevent functional obsolescence of the transportation facilities, a hierarchical system which defines the role of each major thoroughfare needs to be established. This system, called a functional classification system, in turn translates into physical design features concerning thoroughfare cross-sections, pavement standards, pavement widths, and access management. The Master Thoroughfare Plan for the MPO is based upon this system. These functional

classifications are intended to reflect the role or function of each roadway within the overall thoroughfare system (see **Table 1**).

The commonly used functional classification system consists of a hierarchy of streets that range from those which provide for traffic movement to those whose function is access to adjacent properties. **Illustration 1** shows the functional street classification system, or hierarchy, for the MPO. Mobility refers to the ability of a street to carry a large volume of traffic at high speeds. As the illustration indicates, local streets provide the most access to the adjacent properties (i.e., individual lots), but function very poorly in mobility. Principal arterials, or major thoroughfares, function very well mobility-wise but, because of speeds and volumes, they serve very poorly as access to adjacent roads and properties. With this in mind, streets which carry a higher volume of traffic, such as major thoroughfares, should have as few intersections and curb cuts (i.e., driveway openings) as possible so traffic movement will not be impeded. Collectors are intended to collect and distribute traffic between the arterial system and individual land uses within the area. Arterial or major thoroughfares carry longer trips and should, therefore, form continuous links to carry traffic through, as well as to, areas.

Illustration 1
FUNCTIONAL CLASSIFICATION

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Table 1
ROADWAY FUNCTIONAL CLASSIFICATION AND GENERAL PLANNING GUIDELINES

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Neighborhoods should be developed between arterials and major collector streets so that traffic is routed around, not through, these areas. Minor collectors should penetrate the neighborhoods to collect and distribute traffic, but should not provide convenient cut-through routes. Commercial and other nonresidential activities should be developed in such a manner that the primary mobility function of arterials or major collectors is not compromised due to poor access management.

The regional street system should consist of arterials (i.e., primary thoroughfares), collectors and local streets. Highways and expressways are normally under the jurisdiction of the Texas Department of Transportation (TxDOT). U.S. Highway 84 is an example of a State-supported highway.

The application of a functional classification system and design principles over a long period of time can help produce an optimized traffic circulation system. Major advantages include preservation of residential neighborhoods, long-term stability of land use patterns, increased values of commercial properties, fewer traffic accidents, and a decreased portion of developable

land devoted to streets. **Table 1** describes the most important characteristics of the functional roadway classification system for the MPO area as stated in the MPO Mobility 2025 Plan.

The following recommended cross-sections have been developed to reduce the chance of obsolescence of the regional thoroughfare system. The following sections outline the various standards of streets and thoroughfare cross-sections that are appropriate for the MPO.

Arterials & Expressways

The primary traffic-carrying system is made up of arterials and expressways. The primary function of major arterials is to provide for continuity and high traffic volume movements between major activity centers (e.g., neighborhoods, commercial centers, etc.). These arterial thoroughfares are usually spaced at approximately one-mile intervals, but wider spacing is acceptable if terrain or other barriers create a need for major deviation. The minimum major arterial cross-section contains four moving lanes, two in each direction. Right-of-way requirements for arterials typically range from 100 to 130 feet. Since these thoroughfares will carry high traffic volumes (20,000 to 40,000 vehicles per day), it is essential that they have continuous and direct alignment and that they interconnect with highways. For the same reasons, access from adjacent property should be controlled. This can be accomplished by limiting the number and location of driveways or curb cuts that access this thoroughfare type. Also, major arterials can be divided, since it is important to provide left turn lanes with adequate stacking that are separate from the normal traffic lanes. Divided arterials with medians also offer opportunities for landscaping and other aesthetic treatments.

- Expressway -- Expressway (see **Illustration 2**) can provide up to three twelve-foot wide lanes in either direction with a fourteen-foot wide raised median. The median can be the "lay down" type, which allows access for emergency vehicles. U.S. Highway 84 is an example of an expressway. Most portions of U.S. Highway 84 have at least 120 feet of right-of-way. Minimum right-of-way requirements will be determined by TxDOT during the development of necessary environmental documentation.

Illustration 2

EXPRESSWAY

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- Principal Arterial -- Principal arterials are designed to utilize a minimum of 120 feet of right-of-way with two 36-foot roadway surfaces separated by a fourteen-foot median. The median should be raised to allow for better access management and for better aesthetics. Flush medians should only be used in areas of intense commercial development and where speeds are less than 30 mph. An additional ten feet of right-of-way would allow for wider parkways along the sides of the roadway, and would help buffer adjacent properties. **Illustration 3** shows the cross-section for principal arterials.

Illustration 3

PRINCIPAL ARTERIAL

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- Minor Arterial -- Where traffic volumes are expected to be more moderate (less than 20,000 to 25,000 vehicles per day), it should be possible to use a four-lane thoroughfare called a minor arterial. These thoroughfares typically have a 100-foot right-of-way and two 24-foot roadway surfaces separated by a fourteen-foot median. Similar to principal arterials, the medians should be raised except in areas of intense commercial development with low speeds. This standard may also be utilized for secondary thoroughfares or major collector streets that may be appropriate with special parkway and landscape treatments. **Illustration 4** shows the cross-section for minor arterials.

Illustration 4

MINOR ARTERIAL

[click here for graphic](#)

Collector Streets (Secondary Thoroughfares)

A collector street's primary function is to collect and distribute traffic from local access streets, as in residential neighborhoods, to an arterial or primary thoroughfare. The collector street is usually located in a manner that discourages through traffic movements. To discourage such movements, these streets are typically disrupted at some point by offsetting intersections or incorporating curvilinear design. Within industrial or multi-family areas, or areas adjacent to schools and major parks, 60 to 70 feet is the minimum right-of-way requirement, while the minimum pavement is usually 24 to 37 feet. The minimum right-of-way requirement for minor collectors is 60 feet. Two moving lanes of traffic plus any on-street parking represent the minimum paving requirements for a collector street in a residential area.

- Major Rural Collector -- Major rural collector streets are for moderate volume facilities whose primary purpose is to distribute traffic from residential streets and accommodate this movement to the nearest arterial. The average daily traffic volumes for these types of streets should not exceed 10,000 to 15,000 trips per day. The major rural collector street provides for a minimum of 70 feet of right-of-way with 24 feet of paving with wider shoulders or parkways. This standard may also be used as a local street in industrial or commercial areas. **Illustration 5** shows the cross-section for major rural collectors.

Illustration 5

MAJOR RURAL COLLECTOR (WITHOUT MEDIAN)

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- Urban Collectors – Urban Collector standard provides a street with two moving lanes of traffic with room for parking on either side of the street. This requires a minimum of 36 feet of pavement with a minimum of 70 feet of right-of-way. Generally, collector streets should be shorter than two miles in length, and are expected to collect moderate volumes (less than 10,000 vehicles per day) of traffic from the internal neighborhood and convey it to a primary thoroughfare on a neighborhood boundary. The Urban Collector may be used as a local street in industrial or commercial areas. Where heavy turning movements can be expected at intersections with primary thoroughfares on a urban collector street, intersections should be flared to provide for a short length of wider street section to allow for right turn on red movements. **Illustration 6** shows the cross-section for urban collectors.

Illustration 6

URBAN COLLECTOR

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- Minor Rural Collector – The minor rural collector standard provides a street with two moving lanes of traffic on 24 feet of pavement with a minimum of 64 feet of right-of-way. Generally, collector streets should be shorter than two miles in length, and are expected to collect moderate volumes (less than 10,000 vehicles per day) of traffic from the internal neighborhood and convey it to a primary thoroughfare on a neighborhood boundary. As with the major rural collector, the minor rural collector street may also be used as a local street in industrial or commercial areas. Where heavy turning movements can be expected at intersections with primary thoroughfares on a minor rural collector street, intersections should be flared to provide for a short length of wider street section to allow for right-turn-on-red movements. **Illustration 7** shows the cross-section for minor rural collectors.

Illustration 7

MINOR RURAL COLLECTOR

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Residential Street

The streets within a neighborhood which provide access to residential lots and building sites should be arranged to discourage most through traffic, except that which is directly related to the area. The alignment of residential streets should be either of a curvilinear, discontinuous, loop, cul-de-sac, or court configuration. Because only limited traffic is attracted to the residential streets, they have more narrow rights-of-way and pavement widths than other types of streets. The usual paving width of a residential street is 22 feet, and the right-of-way requirements are usually 56 feet of right-of-way (see **Illustration 8**). Residential streets are usually designed to accommodate up to 500 vehicles per day.

Illustration 8 **RESIDENTIAL STREET**

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The Master Thoroughfare Plan

The purpose of the Master Thoroughfare Plan is to provide a long-range plan to assist in thoroughfare facility planning and the dedication of needed rights-of-way to implement such a plan. The recommended Master Thoroughfare Plan is shown on **Plate 1**. One of the benefits of the Master Thoroughfare Plan is the identification of streets upon which the MPO can concentrate resources for improvements and be assured that these monies are spent efficiently. The Master Thoroughfare Plan is designed to identify the location of collectors and arterials designed to carry higher levels of traffic. The existing State highways and farm-to-market roads constitute the majority of roadways with the necessary length to serve as major connectors.

Transportation planning in the County has been complicated by recent increases in development activity. Related to this have been the complicating factors of the area's physical features, lakes, and property ownership patterns which make it expensive to construct thoroughfares in certain locations. Therefore, the Master Thoroughfare Plan concentrates specifically upon assuring that thoroughfare continuity can be improved as future development occurs.

Two major regional loop connections have been shown on the plan. One loop connector is shown along FM 933 and FM 2837 (north and west of Waco), and the other an extension of FM 1858 and generally along FM 2416 (also north and west of Waco). Because of Lake Waco and associated flood plains and the fact that much of the area's growth is anticipated along these corridors, it will be important to plan for these strategic roadways. Growth in western McLennan County will benefit from access to these roadways, which are proposed to connect to Interstate Highway 35.

Map 1 - Thoroughfare Plan - McLennan County & MPO Study Area

[click here for map](#)

Map 2 - Thoroughfare Plan - Waco Urban Area Inset

[click here for map](#)

Thoroughfare Planning Issues

The following four broad issues have been considered in developing policies for the MPO's Master Thoroughfare Plan:

- Maintaining an adequate, appropriate and efficient roadway network -- Increased population will increase traffic on the County's roadways. A carefully planned network of roadways can help maintain adequate circulation without sacrificing the region's development potential. The network should include a hierarchy of streets, such as that shown previously in **Table 1**, with each class of street being designed to serve an appropriate function. Standards for each class of street must balance the volume and speed of traffic, public safety, roadway construction and maintenance costs, as well as impacts upon adjacent development.
- Coordinating roadways and adjacent development -- Just as inappropriate land uses can dramatically reduce the effectiveness of adjacent roadways, poorly planned roadways can reduce the viability of adjacent land uses. By coordinating land use and roadway decisions with area cities, the MPO can minimize future compatibility problems between roads and adjacent land uses. Waco and McGregor's thoroughfare plans have recently been updated and coordinated with the MPO plan.
- Cost-effective infrastructure investment -- Building and maintaining an efficient roadway network requires significant investment of local resources. Careful planning is needed to ensure that the various agencies involved make the most cost-effective investments in the roadway network. Funding based upon capital improvements plan (see Waco MPO 2025 Mobility Plan) can help to ensure that the MPO addresses its highest priority roads first.
- Emergency access and school bus routing -- As the region continues to expand its population, efficient emergency access will be important to all areas of the County. Planning roadways with logical connections will help to accomplish this, while also facilitating more efficient and convenient school bus routing.

Thoroughfare and Neighborhood Relationship

The importance of the overall thoroughfare system is providing the skeletal framework within which logical residential neighborhood areas can be developed, and this idea should be an important planning concept. A "neighborhood" usually results from the assembly of a series of subdivisions into a logical, functional unit. The thoroughfares shown previously on **Plate 1** have been designed, where possible, to allow for the formulation of cohesive residential areas. Internal neighborhood streets should be arranged to be discontinuous and curvilinear, thereby discouraging through traffic movements, but access should be provided onto arterials and into adjacent subdivisions.

The basic thoroughfare system shown on **Plate 1** should be considered as the structuring framework for future residential areas within the MPO and McLennan County. The preponderance of vehicular traffic movement within the County should be concentrated on the arterial system, while the collector street system should complement the major arterials. Through better pre-planning of neighborhood areas and with developer cooperation, it may be possible to achieve the basic primary and secondary thoroughfare system arrangement recommended by the Master Thoroughfare Plan for the MPO.

In order to achieve the pattern of thoroughfares envisioned by the Plan, it will require the cooperation of all levels of government responsible for highway and thoroughfare development. The significant thoroughfare facilities (i.e., State roads) within the MPO and County, have resulted mainly from a combination of efforts by the County, all of the cities in the County, and various State and Federal agencies. Continued local efforts will be necessary to finance future thoroughfare development and to require adequate rights-of-way at the time of subdivision platting and development.

Transportation Planning Policies

The following sections describe the recommended policies to guide the MPO's transportation planning efforts:

- **Map 1** shows the proposed Master Thoroughfare Plan for the MPO and McLennan County. It shows the location of existing or planned roadways other than local streets. The MPO should use this Plan to assist in the determination of the classification of planned roadway segments. Additional collector streets may be needed to serve traffic within new developments. The alignment and capacity of these streets should be determined as part of any action on a preliminary plat or a final plat. The County's construction standards and subdivision regulations should contain detailed standards for roadway design and construction for those areas outside the jurisdiction of area cities.
- The MPO should continue to develop a short- and long-term capital improvements program (as in the Mobility Plan) for use in establishing funding priorities and schedules for State funded construction, operation, and maintenance of its transportation facilities, as identified within this Plan.

- The MPO should prioritize, phase and schedule transportation system improvements in accordance with the Master Thoroughfare Plan and the ability to fund such improvements.
- On-site local and collector streets that are constructed by developers must be in accordance with local or County regulations. This policy should also be implemented through specific provisions within the County's and various cities' Subdivision Regulations.
- The MPO should continue to coordinate with the County, TxDOT and other local jurisdictions, when planning transportation improvements.

Thoroughfare Implementation

The proper administration of the MPO's Master Thoroughfare Plan will require the following:

- Coordination of Capital Improvements -- Many of the major thoroughfares which are improved within McLennan County and the MPO will involve cooperation with Waco and other cities since many of them are, or eventually will be, within the extraterritorial jurisdiction (ETJ) of those cities. Future capital improvement bond programs should be coordinated with the State's ability to participate in any of these facilities. The County may also have to assume the responsibility for constructing a reasonable portion of its thoroughfare system as it grows and develops. Other growing counties within Texas have successfully passed bond programs to build roads. It must be recognized that the thoroughfare system will be built at an increment-at-a-time basis over an extended period, perhaps 20 or 30 years.
- Subdivision Control -- The subdivision of land into building sites represents the first step in the development of urban land uses and the creation of traffic generators. Reasonable land (right-of-way) must be set aside at the time of subdivision platting so that adequate thoroughfares can be created without adversely affecting the value, stability, and long-range character of the area being developed. Specifically, right-of-way must be dedicated in accordance with the Master Thoroughfare Plan as each plat is approved.
- Building Lines -- Where widening of existing thoroughfare rights-of-way are contemplated, buildings should be set back to allow for the planned widening to ensure that the uses function properly with the new thoroughfare after the proposed improvement is made. In some cases, it will be desirable to establish building lines by minute order to assure the orderly and uniform development of thoroughfare frontage.

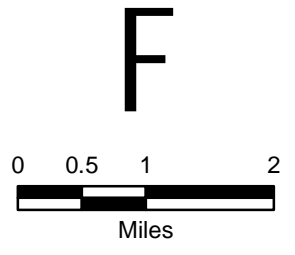
Use of the Master Thoroughfare Plan

All plats should be based upon the Master Thoroughfare Plan. The Public Works Director of each member government should require conformance with the spirit and intent of the Plan. When plats are presented to the County Commissioners Court or an area city for approval, a statement should be made by the Public Works Director regarding whether or not the plat conforms with the MPO Plan (or its own plan if it has one). Plats which are not in conformance with the Master Thoroughfare Plan should be denied unless acceptable alternatives are presented for consideration at the time of plat review.

The MPO should review (and, if necessary, update) its Master Thoroughfare Plan at least every five years to ensure that the Plan remains reflective of existing conditions and prevailing trends in mobility, and to ensure that the Plan does not become obsolete. Periodic review of the Plan should also take into account then-current thoroughfare plans for the various communities within the County, as well as any thoroughfare planning efforts being conducted by neighboring counties/jurisdictions. Such ongoing review and updating will help to ensure that MPO's Master Thoroughfare Plan will continue to be a useful planning tool as the County continues to develop over time.

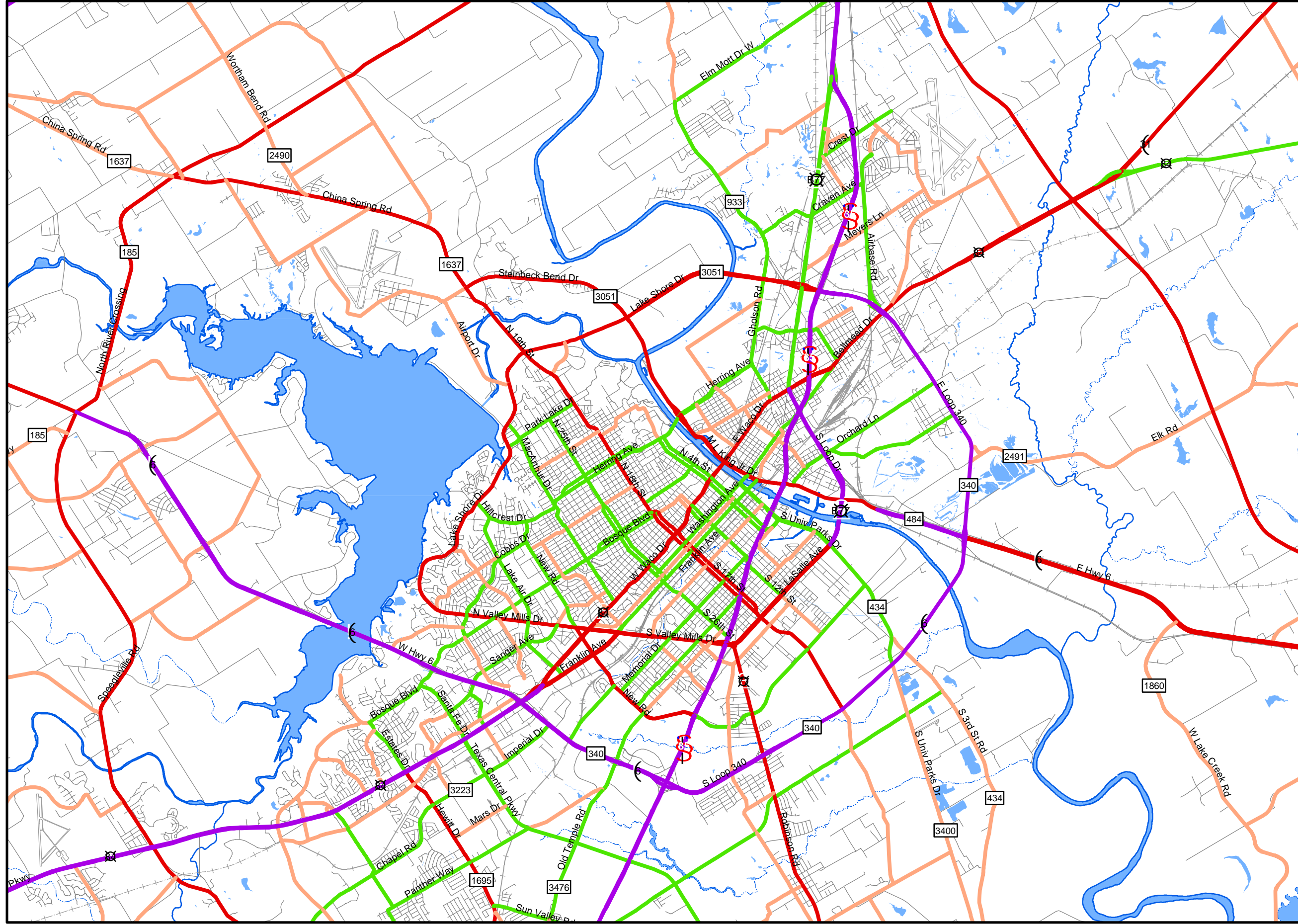
Thoroughfare Classifications

- Expressways
- Principal Arterials
- Minor Arterials
- Collectors
- Local Streets



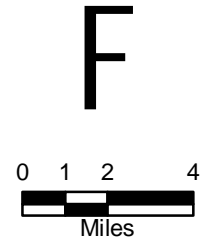
Amended - Jul y 14, 2004

**Waco Metropolitan Area
Thoroughfare Plan
Urban Area Inset**



Thoroughfare Classifications

- Expressways
- Principal Arterials
- Minor Arterials
- Collectors



Amended - July 14, 2004

**Waco Metropolitan Area
Thoroughfare Plan**

