



Chapter 2: Planning Context

CHAPTER HIGHLIGHTS

- Planning Context
- Goals and Objectives
- Demographics and Growth
- Thoroughfare Plans
- Travel Demand Model

The Planning Context

The **Regional Multimodal Plan** defines a consistent integrated transportation system, but it operates within the context of regional goals, regional demographics, regional plans, and the regional travel demand model setup and definitions.

One of the most vital plans to consider is the Thoroughfare Plan. In general terms, a Thoroughfare Plan is a long-range master plan for the orderly development of an efficient roadway transportation system. Most importantly, it defines an interconnected hierarchical system of roads that is required to meet the anticipated long-term growth within an area. The Thoroughfare Plan developed as part of the Regional Multimodal Plan is regional and therefore must not be overly deterministic: it presents typical cross-sections for roadways and general alignments for proposed roads, without dictating specific features of the thoroughfare system to the KTMPO member jurisdictions.

A second vital plan that provides context for the Regional Multimodal Plan is the Bicycle & Pedestrian Plan. Similar to the Thoroughfare Plan, the Bicycle & Pedestrian Plan is a long-range master plan for the



orderly development of bicycle and pedestrian facilities. There is a hierarchy of facilities identified within the plan that includes on-street bikeways and off-street trails.

Although the Thoroughfare Plan and the Bicycle & Pedestrian Plan are the more critical elements of the Regional Multimodal Plan, the other transportation modes in the region play an important role in providing mobility for people and freight, and are accommodated in the Plan as well. Facilities supporting group transportation modes must be supported, barriers must be identified and addressed, and connectivity between modes must be enhanced so that all users are served by the integrated transportation system.

The Context of Regional Goals and Objectives

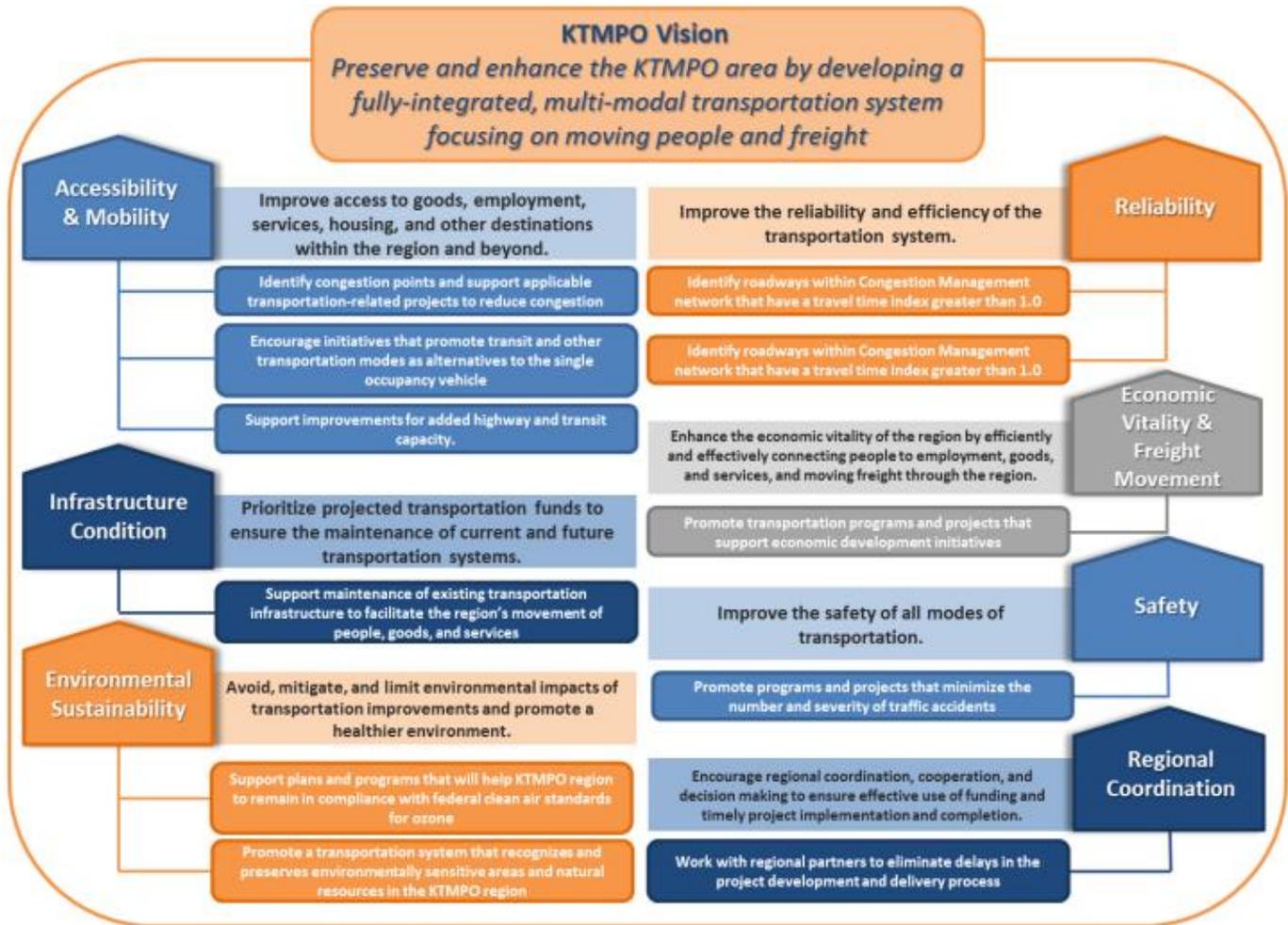
As one of the purposes of the Regional Multimodal Plan is to feed into the next update of the 2045 Metropolitan Transportation Plan (MTP), the goals and objectives of regional transportation planning as outlined in the current Mobility 2040 MTP are relevant to Plan development. The MTP goals are themselves derived from the eight Planning Factors first specified under the MAP-21 Federal Highway Authorization in 2012, and continued under the latest FAST Act Authorization in 2015. The component goals and objectives of the MTP are likewise supported by the Regional Multimodal Plan, and are shown in **Figure 2.1**.

The overall vision for the MTP is directly applicable to the Regional Multimodal Plan: **to preserve and enhance the KTMP area by developing a fully-integrated, multi-modal transportation system focusing on moving people and freight**. Five of the MTP's sub-goals are particularly applicable to the Regional Multimodal Plan:

- Identify congestion points and support applicable transportation-related projects to reduce congestion.
- Encourage initiatives that promote transit and other transportation modes as alternatives to the single occupancy vehicle.
- Support improvements for added highway and transit capacity.
- Identify roadways within Congestion Management network that have a travel time index greater than 1.0.
- Enhance the economic vitality of the region by efficiently and effectively connecting people to employment, goods, and services, and moving freight through the region.



Figure 2.1: Goals and Objectives of the Mobility 2040 Metropolitan Transportation Plan



Source: Mobility 2040: KTMP Metropolitan Transportation Plan



The Context of Regional Demographics and Growth

Current and forecast demographics also form an important context for regional transportation planning. Both the intensity and the distribution of population and employment affect how the transportation system should be designed to provide access and mobility for persons and freight.

Figure 2.2 illustrates the intensity and distribution of regional population for the year 2015. Population concentrations can be seen in cities along I-14, I-35, US 190, SH 36, SH 95, and SH 317. Note that on the periphery of the region, the larger Traffic Analysis Zone (TAZ) sizes causes the graphic to show more cumulative population, even though these are rural areas with low density.

Figure 2.2: 2015 Regional Population

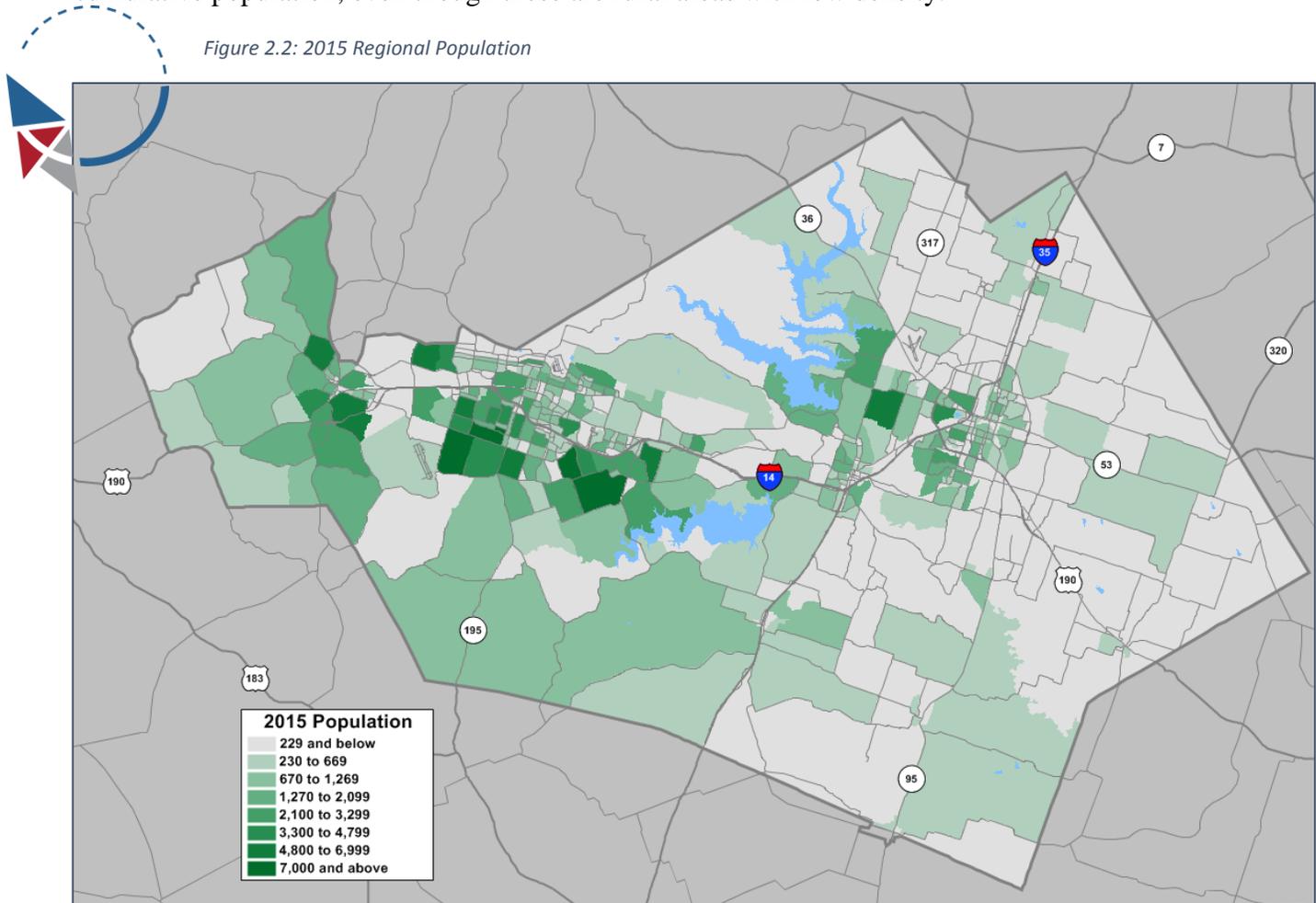
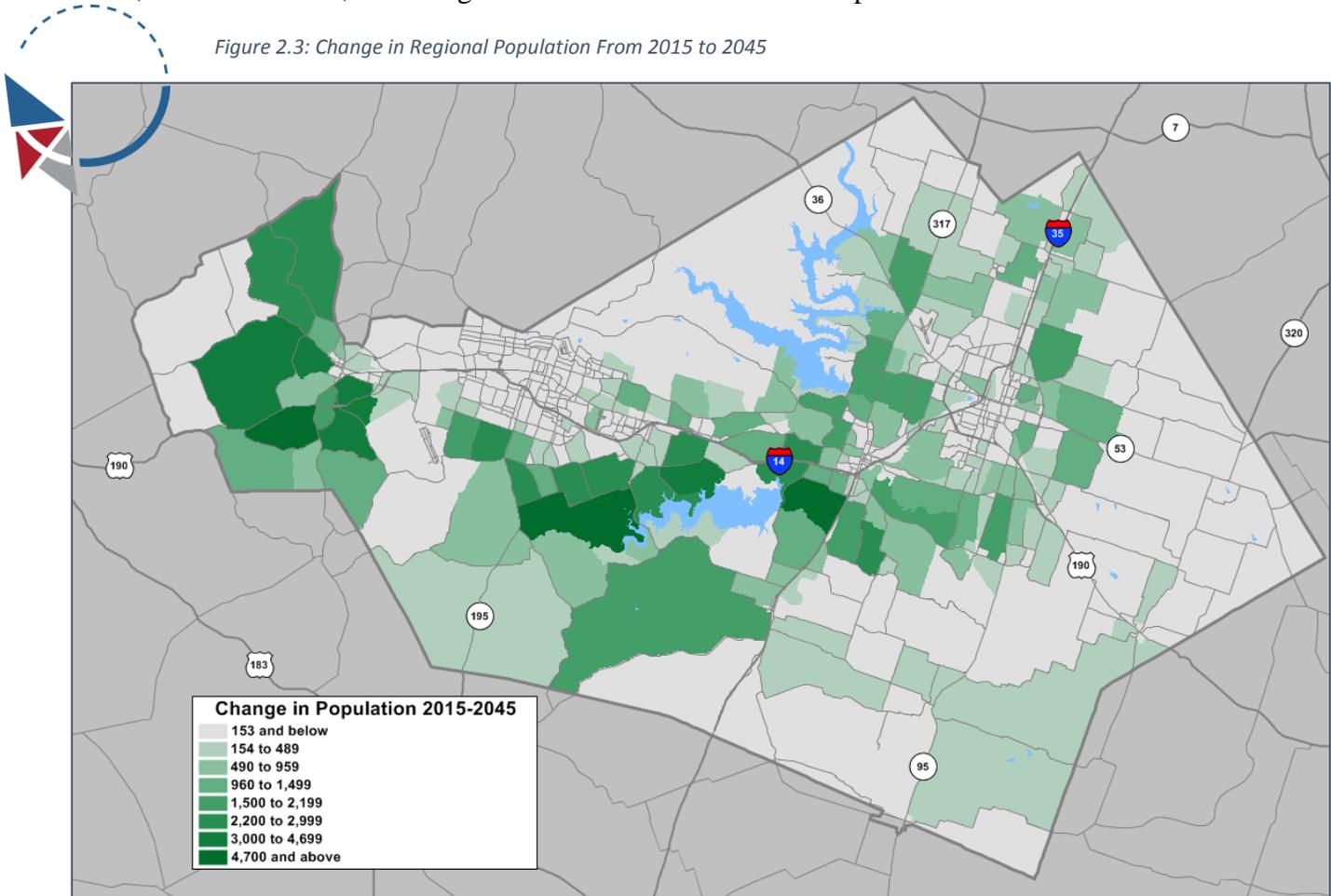




Figure 2.3 shows the projected changes in regional population from 2015 to the forecast year 2045. Population is generally shown growing outward from established areas to areas which are currently more rural and have available buildable land. The population change is greatest in the areas around Copperas Cove, south of Killeen, and along IH-35 and SH 317 west of Temple.

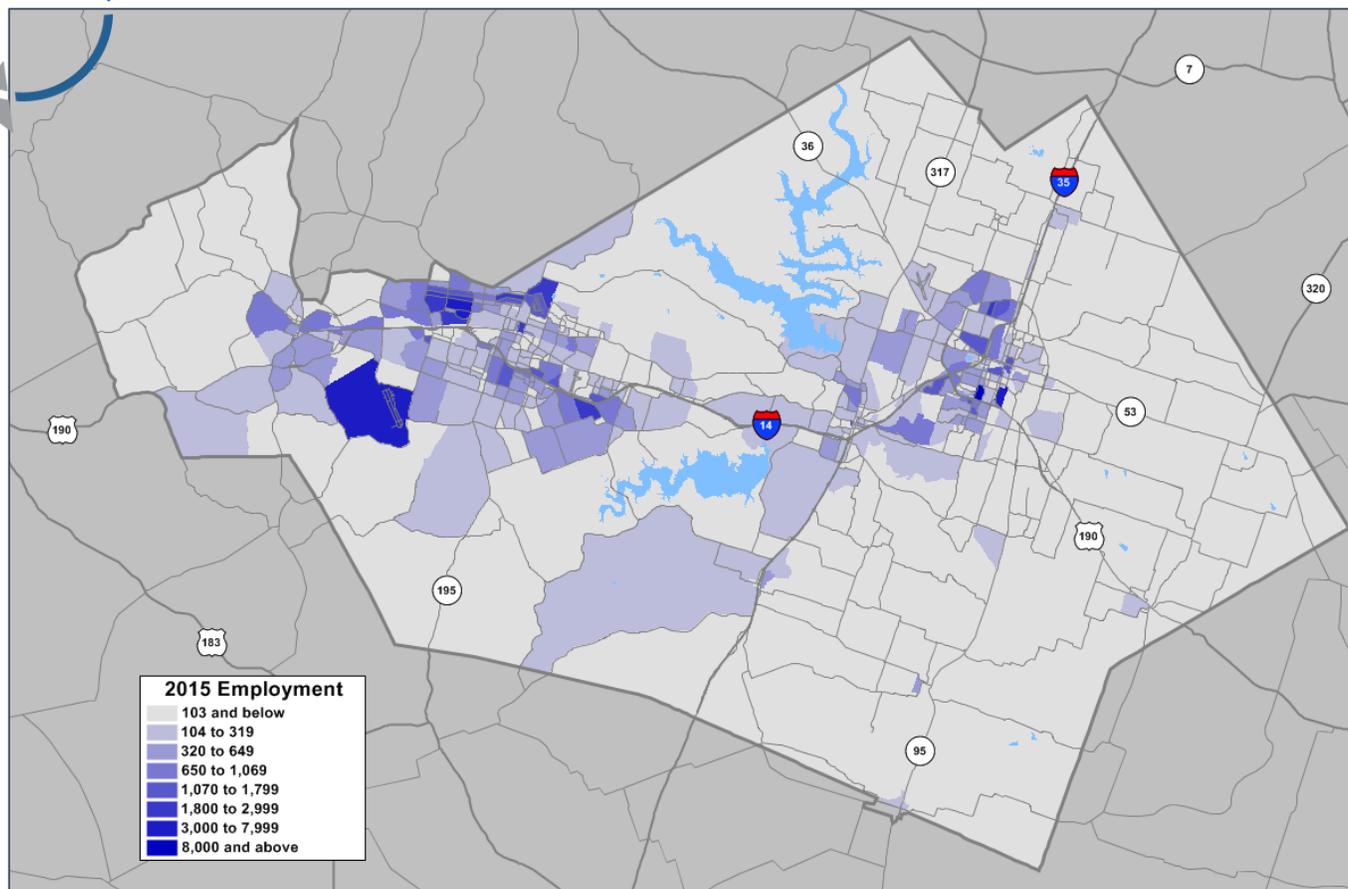
Figure 2.3: Change in Regional Population From 2015 to 2045





Regional employment for the year 2015 is shown in **Figure 2.4**. Concentrations of employment can be seen at Fort Hood and the Killeen-Fort Hood Regional Airport, in the retail areas along US 190 in Killeen, along I-35, and around Loop 363 in Temple.

Figure 2.4: 2015 Regional Employment

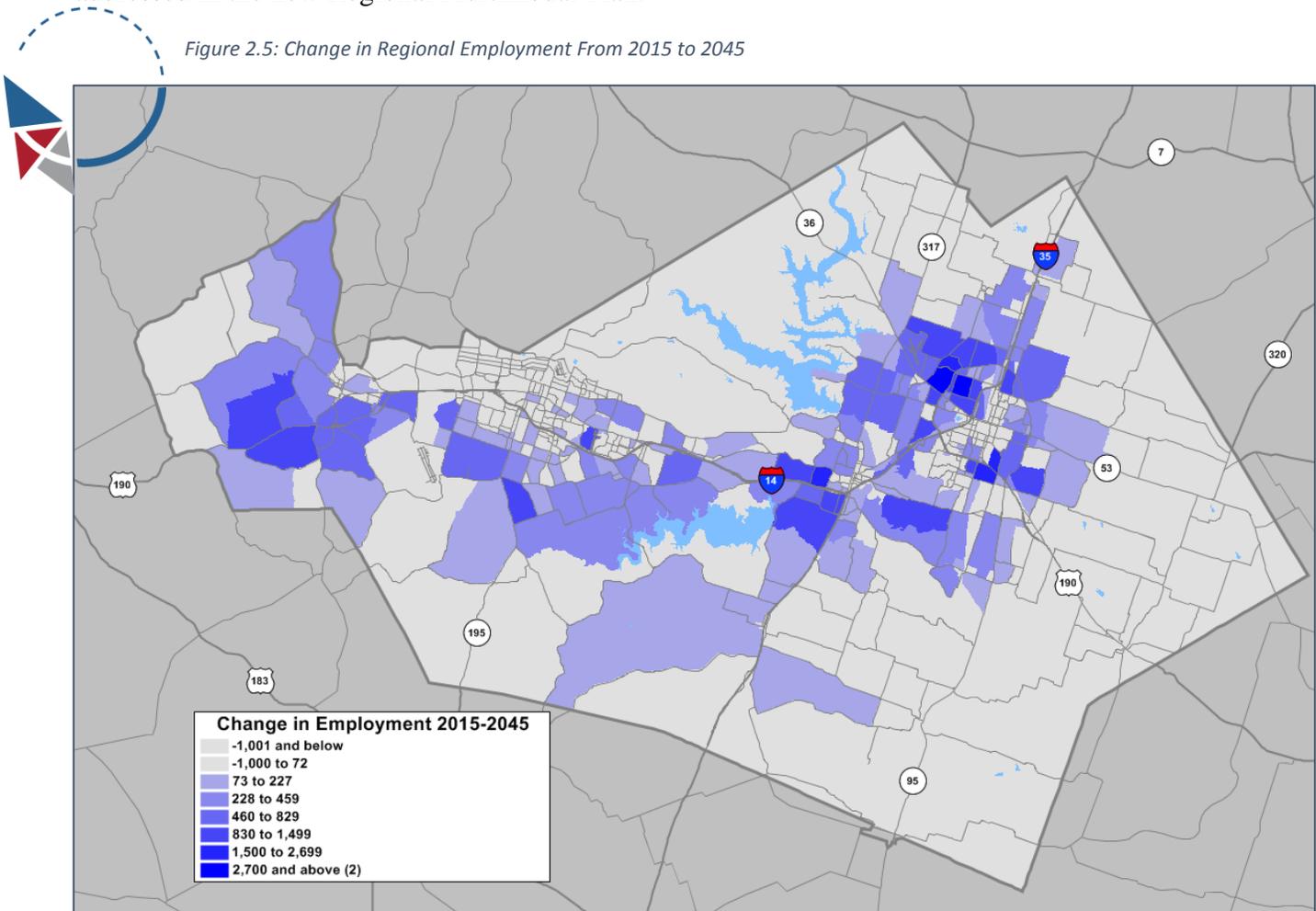




Forecast employment change for the year 2045 is shown in **Figure 2.5**. Forecast employment is concentrated in existing areas and around industrial parks, but to some extent also follows population growth to new areas. Employment growth is evident surrounding Temple, along I-35, south of Killeen, and surrounding Copperas Cove. The data also shows forecast reductions in employment in several smaller areas in the downtowns of Temple, Belton, Killeen, and Copperas Cove.

The intensity and distribution of forecast population and employment provide context for the integrated transportation system by defining new areas of need, revealing the need for additional connectivity in one mode and between modes, and defining new barriers to transportation. Each of these needs should be addressed in the new Regional Multimodal Plan.

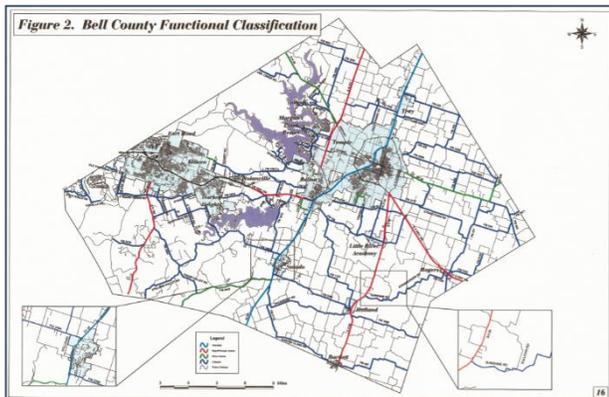
Figure 2.5: Change in Regional Employment From 2015 to 2045





The Context of Local Thoroughfare Plans

In addition to the KTMP Mobility 2040 MTP, which includes cross sections for typical roadway functional classes, the other planning documents with the most applicability to the Regional Multimodal Plan are the individual Thoroughfare Plans from the KTMP member jurisdictions. Each of the Thoroughfare Plans for the member jurisdictions responds to their specific local conditions and needs. Each defines their own customized Functional Classification system for the roads in their local area.



KTMP and the Central Texas Council of Governments (CTCOG) prepared a Thoroughfare Plan for Bell County in October 2001. That plan considered TxDOT design standards and defined a county-wide system of typical cross-sections for Interstates, Arterials, Minor Arterials, Collectors, and Local Roads. This plan recognized that there was no accepted regional Functional Classification system or policies for roadway spacing by Functional Class, and developed the plan to address these deficiencies.

The four Functional Classes defined for roadways in the Bell County Thoroughfare Plan are:

Interstate

Major Arterial
Minor Arterial

Collector



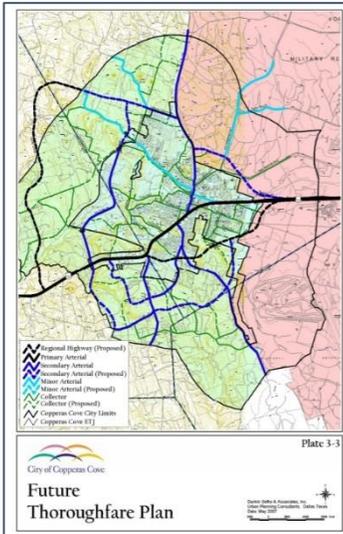
The Thoroughfare Plan for Belton is embedded in its Draft 2017 City Comprehensive Plan. The plan defines certain **Land Use Center** types around key intersections, which is a variation on the standard Functional Classification system which has been codified in the recent *NCHRP Report 855: An Expanded Functional Classification System for Highways and Streets*. The NCHRP Report likewise defines several Context Settings which modify the roadway and streetside features defined for each Functional Class.

The Belton Thoroughfare Plan defines five Functional Classes for roadways:

Interstate

Major Arterial
Minor Arterial

Major Collector
Minor Collector



The Copperas Cove Thoroughfare Plan is part of its 2007 Comprehensive Plan. Their Functional Class system considers the context of the street system, with attention given to each Functional Class' function, spacing, intersection spacing, land access, speed limits, and provisions for parking.

Seven Functional Classes are defined for roadways:

Regional Highway

Primary Arterial
Secondary Arterial
Minor Arterial

Major Collector
Collector
Residential

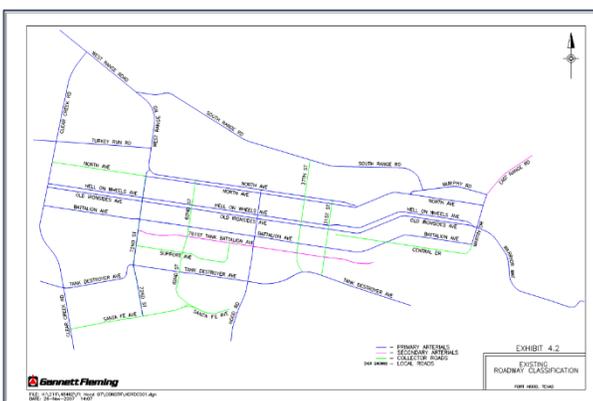


Harker Heights' Thoroughfare Plan is based on function, spacing, and width.

Although the Thoroughfare Plan map shows only Arterials and Collectors, the text of the plan defines four Functional Classes:

Major Arterial
Minor Arterial

Collector
Local



A Post-Wide Traffic Engineering and Safety Study was developed for Fort Hood in 2008. Primary goals of the study were traffic control, access control, an evaluation of intersections, traffic signals, pedestrian crossings, and a listing of planned projects.

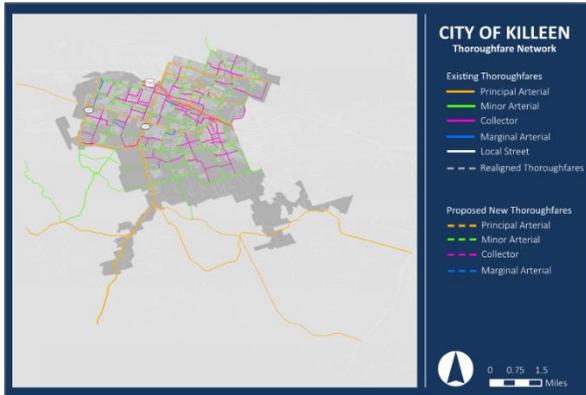
The study noted significant pedestrian activity on post, particularly during the morning physical training sessions. It noted that Battalion Ave, classified as a Primary Arterial, is closed to auto traffic each weekday

morning to accommodate pedestrians and physical training. Bicycle traffic on post was observed to be minimal.



Four Functional Classes were defined for roads in Fort Hood:

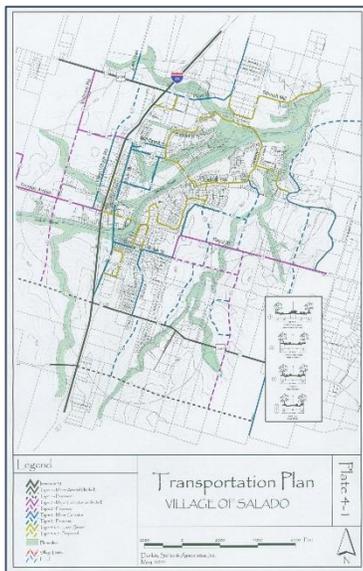
- Primary Arterial
Secondary Arterial
- Collector
Local



The Thoroughfare Plan for the City of Killeen was developed in 2015. This plan evaluates existing conditions and growth patterns to define development scenarios for the city. The Thoroughfare Plan then defines an appropriate Functional Classification system with typical roadway cross sections.

Five Functional Classes are defined for roadways:

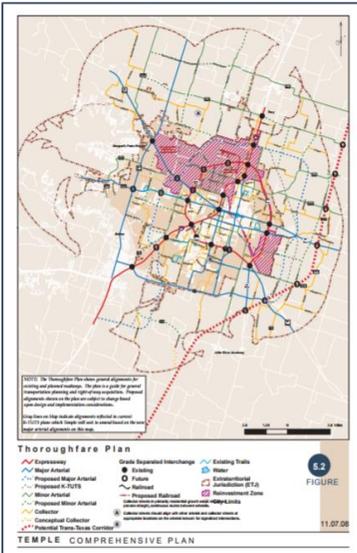
- Principal Arterial
Minor Arterial
Marginal Arterial
- Collector
Local



The Village of Salado does not appear to have an active Thoroughfare Plan. An artifact graphic labeled as the transportation plan was found referenced in another planning document, but is not posted or referenced on the village website. The map is dated May 2002. The artifact map shows village streets with a Functional Classification system and typical cross sections. Future as well as current roads are shown.

There are five Functional Classes in the map:

- Interstate
- Minor Arterial
- Major Collector
Minor Collector
Local



The Thoroughfare Plan for Temple is part of its 2008 Comprehensive Plan. The plan shows a commitment to reviewing regional mobility issues as well as the local network, and considers future growth and changes in land uses. Neighborhood connectivity is a concern, and one of the goals of the plan is to accommodate the needs of bicycles, pedestrians, and transit modes within the system.

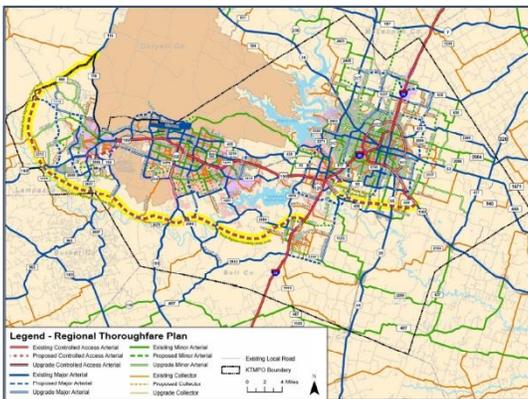
The Functional Classification system for Temple considers roadway function, spacing, continuity, posted speeds, and parking. Multimodal issues are considered by defining criteria for through truck routes, bikeways, and sidewalks for each Functional Classification.

The five Functional Classifications defined for Temple are:

Expressway

**Principal Arterial
Minor Arterial**

**Collector
Local**



The previous KTMP Regional Thoroughfare Plan, adopted in January 2011, is embedded in the Mobility 2040 MTP as Appendix E-2. Key elements of this plan are the synthesis of consistent roadway Functional Classification definitions based on local Thoroughfare Plans, and the inclusion of bicycle and pedestrian networks in the regional plan. The previous plan was termed a Regional Thoroughfare Plan, which emphasized the automobile portion of the plan. With this update, it is being termed a true Regional Multimodal Plan to highlight its role in providing planning for all transportation modes.

The previous Regional Thoroughfare Plan defines four Functional Classes based on the local jurisdictions' plans, the purpose of the road, access and access management, posted speed, and typical daily traffic volumes:

**Controlled Access
Arterial**

**Major Arterial
Minor Arterial**

Collector



The Context of the KTMP Travel Demand Model

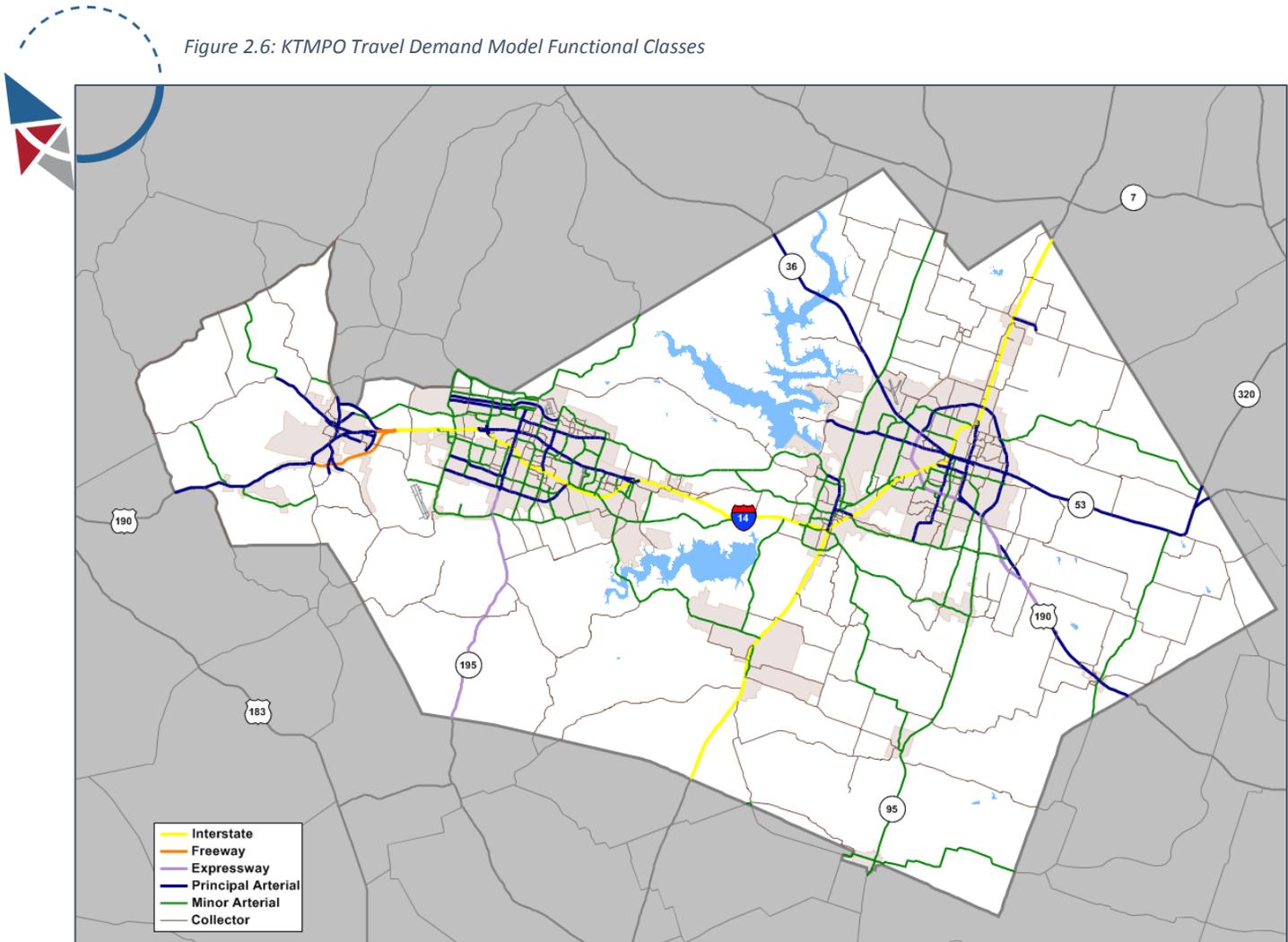
Consistent regional roadway Functional Classes are defined in the KTMP Mobility 2040 MTP based on a review and compilation of the Functional Classes contained in the member jurisdictions' Thoroughfare Plans, FHWA and TxDOT standards, and the TxDOT standard travel demand model Functional Classification system. The Functional Classes are shown in **Figure 2.6**.

The six Functional Classes in the KTMP travel demand model are:

- | | | |
|---|---|-------------------------|
| <p>Interstate</p> <p>Freeway</p> <p>Expressway</p> | <p>Principal Arterial</p> <p>Minor Arterial</p> | <p>Collector</p> |
|---|---|-------------------------|

Detailed coding of Interstates, Freeways, and Expressways includes supporting Functional Classes of Frontage Roads and Ramps. The travel demand model further stratifies Arterials and Collectors into three Facility Types: Divided, Continuous Center Turn Lane, and Undivided.

Figure 2.6: KTMP Travel Demand Model Functional Classes





Each region is different with its own specific mix of Functional Classes, conditions, and geography, so there is no hard and fast guidance on the appropriate mix of classes. However, FHWA has listed general guidelines for the appropriate percentages of each Functional Class within a typical region. The mix of Functional Classes in the KTMP region is appropriate when compared to these general standards, as detailed in **Table 2.1**. For sake of comparison with FHWA guidance, the Functional Classes for Interstate, Expressway, and Freeway were combined to be considered as Controlled Access. The Principal Arterial Functional Class from the KTMP travel demand model was re-named to Major Arterial for this Plan. Each Functional Class falls within its expected range except for Local Streets, which falls slightly under the generally recommended percentages.

Table 2.1: Regional Mix of Functional Classes

Regional Mix of Functional Classes			
Functional Class	Mileage	Percent	Guidelines
Controlled Access	143	4%	0 - 9%
Interstate	71	1.9%	
Expressway	51	1.4%	
Freeway	21	0.6%	
Major Arterial	110	3%	2 - 4%
Mnor Arterial	246	7%	4 - 8%
Collector	760	21%	20 - 25%
Local	2,406	66%	65 - 75%

General guidance is also provided for the spacing of Functional Classes in a region, as shown in **Table 2.2**.

Table 2.2: Regional Spacing of Functional Classes

Regional Mix of Functional Classes	
Functional Class	Spacing Guidelines
Regional	5 miles or more
Major Arterial	2 miles or more
Mnor Arterial	1/2 to 2 miles
Collector	1/4 to 1/2 mile
Local	less than 1 mile

This general guidance recognizes that the appropriate spacing of functionally classified streets depends on the types and lengths of the trips that they serve, access to land uses and access control, posted speeds, and traffic levels. The mix of attributes for each Functional Class determines the context of each in the regional setting. Overall, the spacing of functionally classified roads in the region falls within the recommended guidelines.

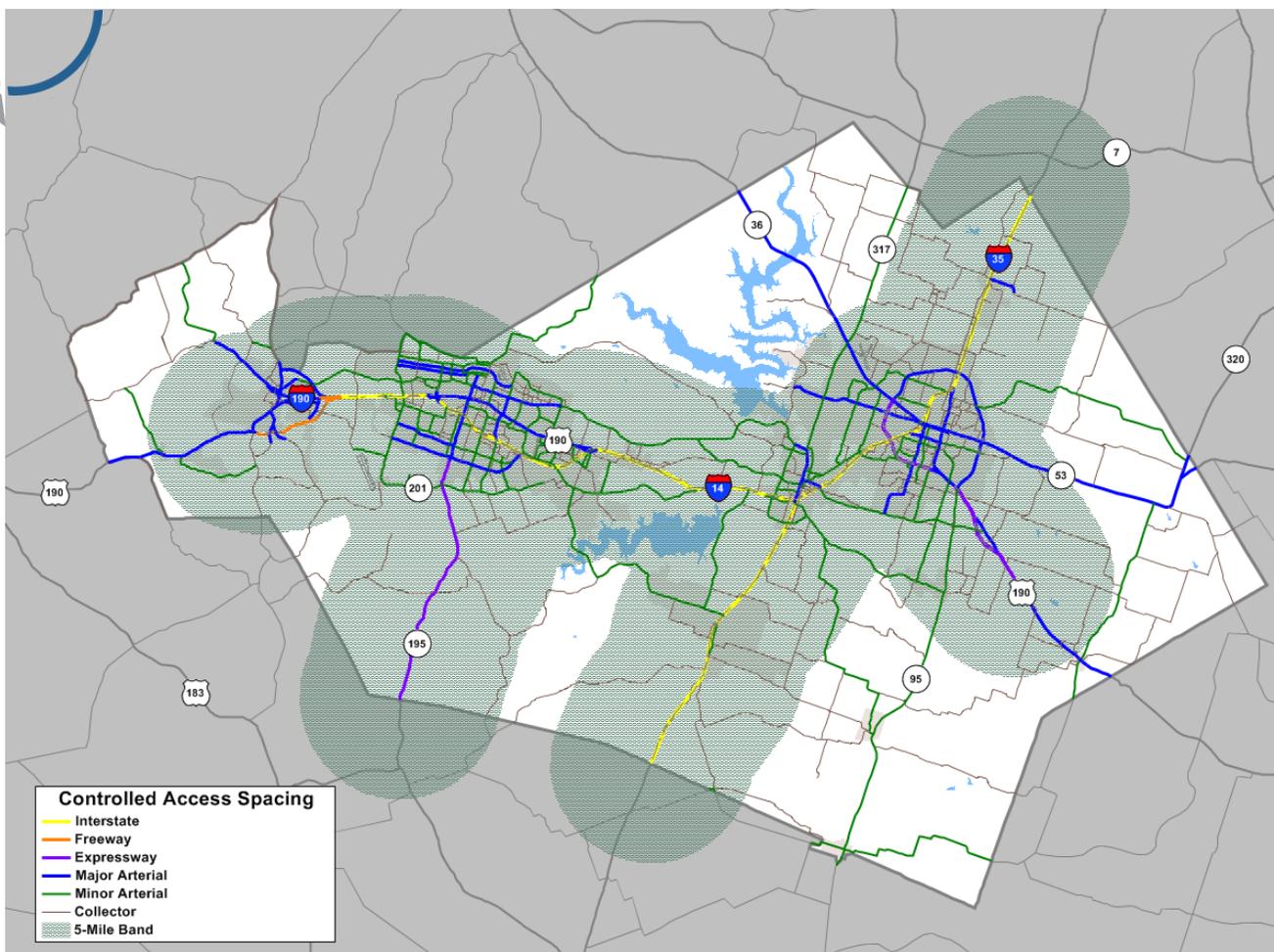


Controlled Access roads include the Interstate, Freeway, and Expressway Functional Classes. Interstates have the most access control with frontage roads and grade-separated crossings, while Expressways may have limited numbers of at-grade intersections and traffic signals. These facilities provide regional mobility with longer-distance trips. Posted speeds are in the 55-70 mph range and average daily traffic volumes are greater than 40,000.

Controlled access roads in the KTMP region include the Interstate, Freeway, and Expressway Functional Classes: the Copperas Cove Bypass on US 190, IH-14, IH-35, the southwest quadrant of Loop 363, and part of US 190 between Temple and Rogers.

Figure 2.7 shows a five-mile buffer around the controlled access roads in the region. All the urbanized areas in the region fall within the buffer area except for Holland, Bartlett, and a portion of Morgan’s Point Resort bordering Lake Belton.

Figure 2-7: 5-Mile Buffer Around Controlled Access Roads



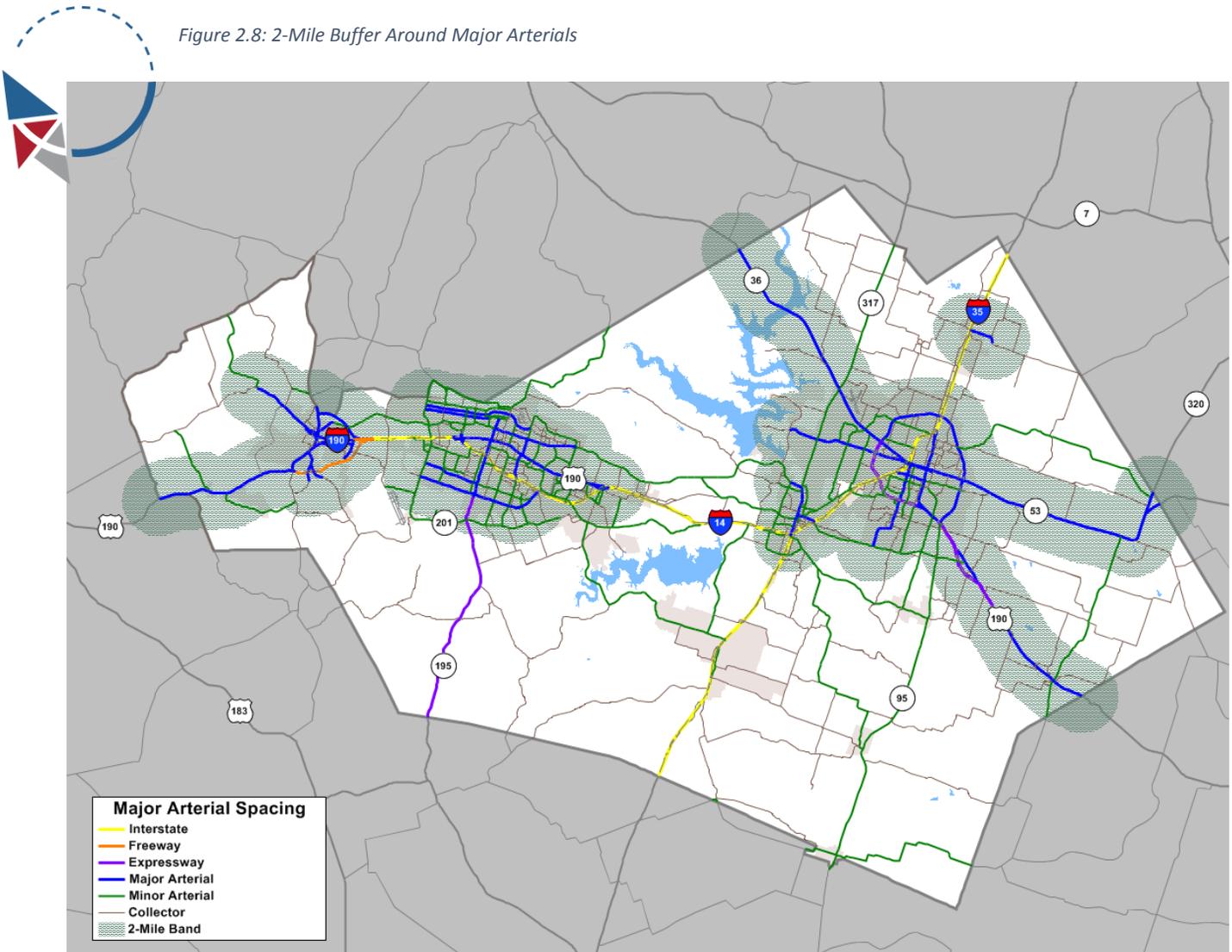


Major Arterials focus on providing regional mobility, but provide a greater amount of access to land uses than controlled access roads do. Posted speeds are in the 35-60 mph range and average daily traffic volumes are 15,000 to 50,000.

Prominent Major Arterials in the KTMP region include Business 190, Stan Schleuter Loop, Fort Hood St, SH 36, SH 53, and portions of Loop 363.

Figure 2.8 shows a two-mile buffer around the Major Arterials in the region. The majority of urbanized areas fall within the buffer area. Gaps in coverage are associated with Lake Belton and Stillhouse Hollow Lake, along with the southern portion of Bell County.

Figure 2.8: 2-Mile Buffer Around Major Arterials



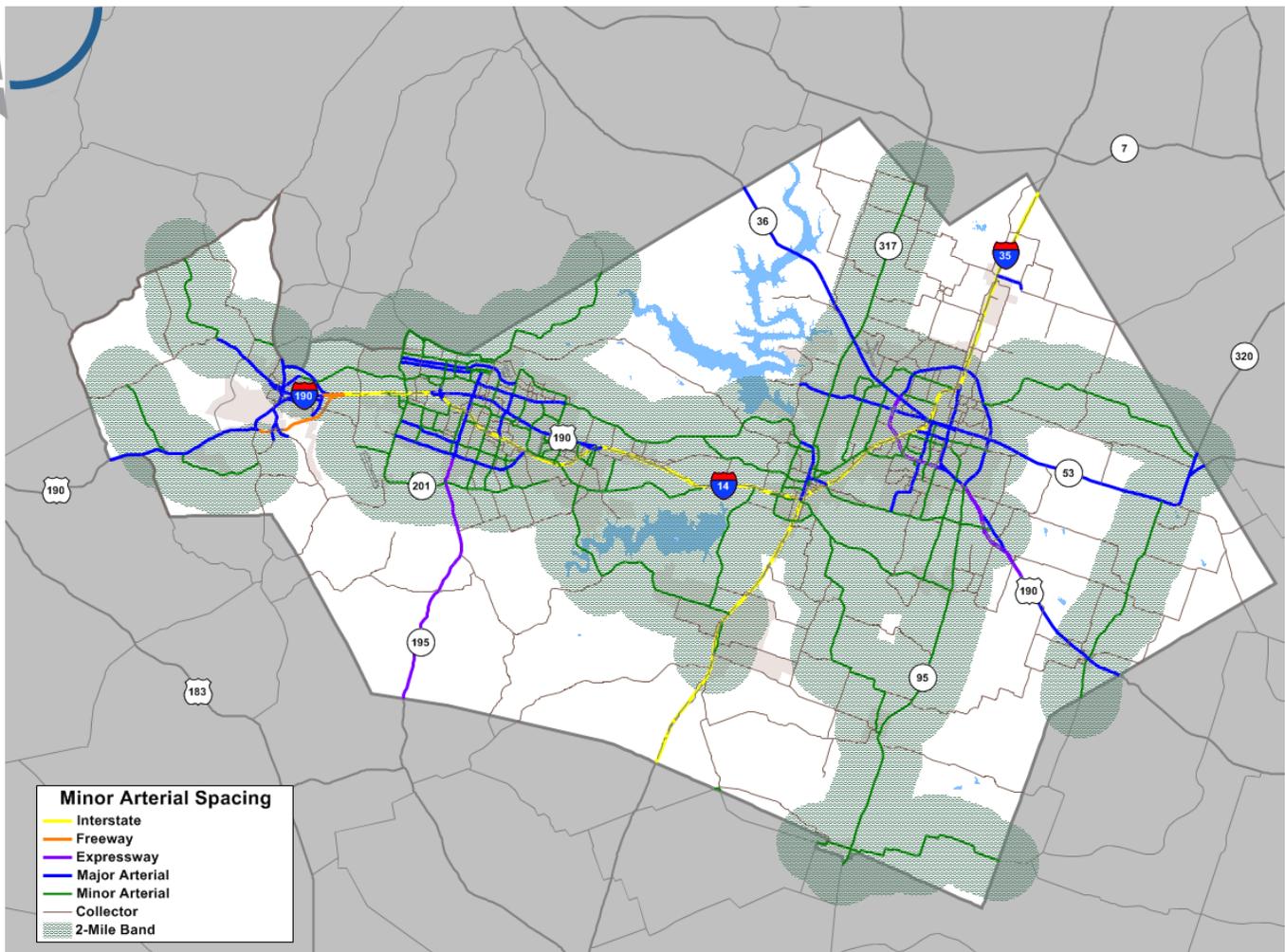


Minor Arterials are critical facilities for providing access to land uses. Regional mobility is a secondary purpose for Minor Arterials. Posted speeds are in the 30-40 mph range, but can be higher in rural areas. Average daily traffic volumes are in the range from 5,000 to 30,000.

Prominent Minor Arterials in the KTMP region include Elms Rd, FM 439 between Killeen and Belton, SH 95, and SH 317.

Because of their different purposes within the transportation network, the general recommended spacing for Minor Arterials is ½ to 2 miles. **Figure 2.9** shows a 2-mile buffer around Minor Arterials, illustrating how they cover the region. All the region’s urbanized areas except for Troy, the western portion of Copperas Cove, and a sliver of Morgan’s Point Resort are covered by the buffer area.

Figure 2.9: 2-Mile Buffer Around Minor Arterials





Collector streets often serve residential uses, but can also provide access for commercial areas. They function primarily to collect traffic from smaller streets for access to the road network and to provide access to land uses. Most trips on the Collector system are shorter length trips, with speeds below 35 mph and average daily volumes of 1,000 to 5,000.

Because Collectors primarily serve local trips and provide access to the network, the general recommended spacing is $\frac{1}{4}$ to $\frac{1}{2}$ mile. **Figure 2.10** shows how this smaller buffer defines areas of coverage which are more dense in urban areas, but which are relatively sparse in rural undeveloped areas.

Figure 2.10: 1/2-Mile Buffer Around Collectors

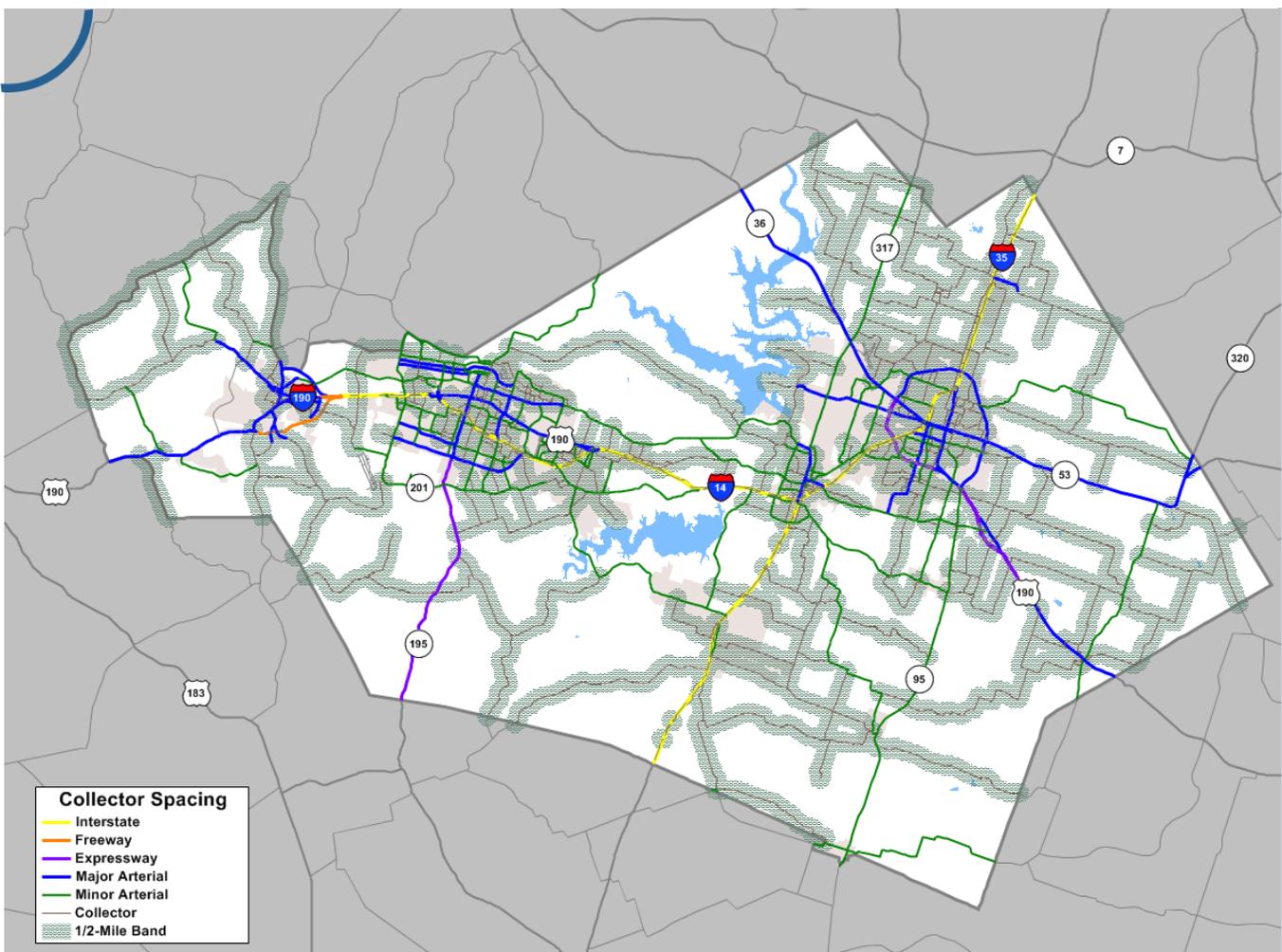
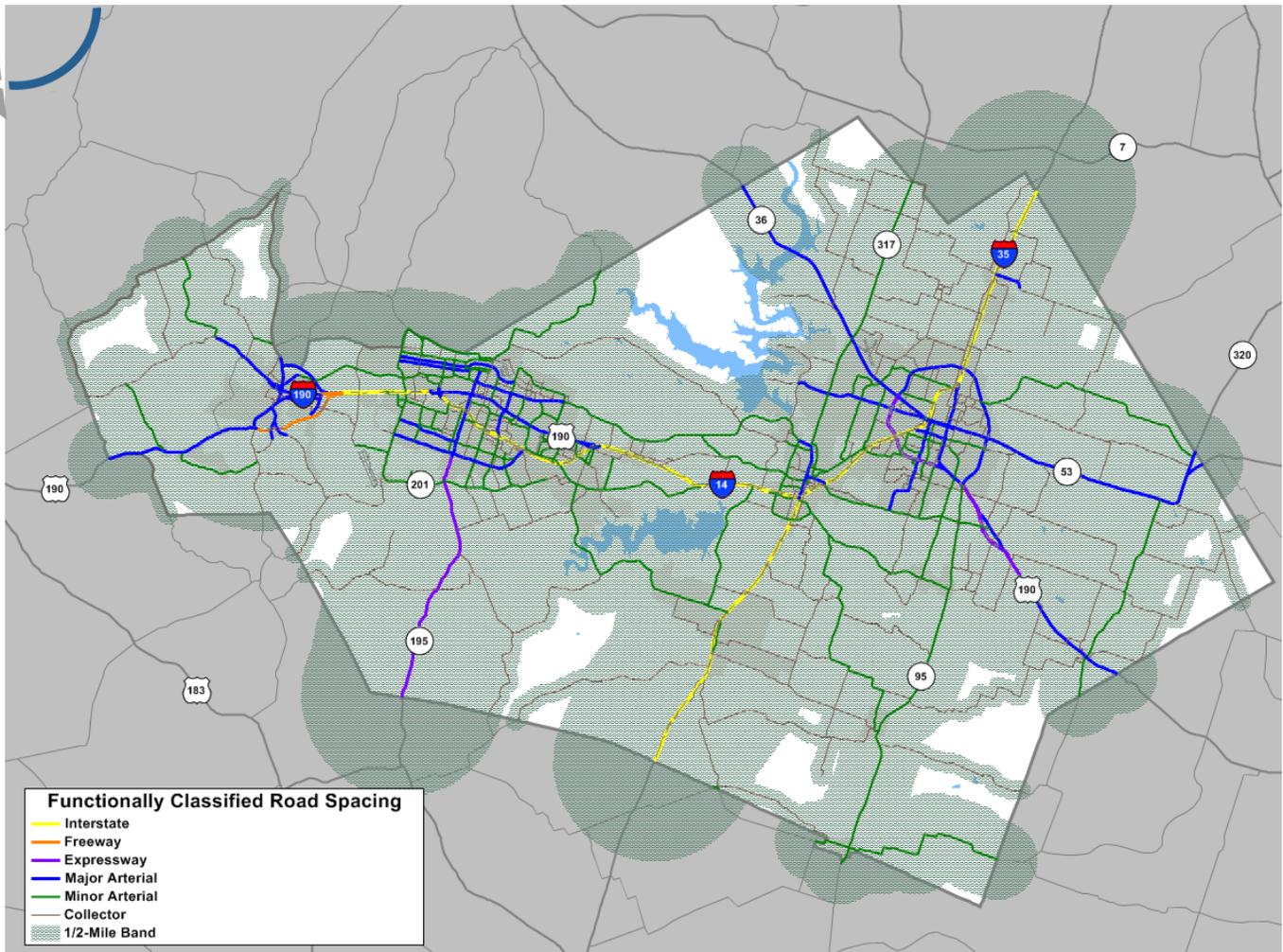




Figure 2.11 shows the overall coverage of the combined functionally classified road network with their respective spacing buffers ranging from ½ mile to 5 miles. All urbanized areas in the KTMP region fall within the combined buffer area. The rural areas not covered include the lakes and unbuildable park lands, active agricultural areas, and low-density rural areas. Overall, the buffer area from the combined functionally classified road network covers slightly over 92% of the total land area in the KTMP region.

Figure 2.11: Coverage of Functionally Classified Roads





Summary

The **Regional Multimodal Plan** defines a consistent integrated transportation system, but it operates within the context of regional goals, regional demographics, regional plans, and the travel demand model setup and definitions.

A review of each of these contexts shows that the existing transportation planning process and transportation infrastructure in the region are robust and supportive of the Plan.

The current Mobility 2040 MTP has an intermodal focus, and complies with the Federal and State planning regulations which were active at the time of its development. The embedded Regional Thoroughfare Plan and Bicycle & Pedestrian Plan provide a comprehensive review of regional facilities.

The intensities and patterns of existing demographics and projected growth show that the road infrastructure is generally well patterned to serve transportation demand.

The individual Thoroughfare Plans from the KTMPPO member jurisdictions define Functional Class systems that are appropriate to their local needs.

A review of general Federal guidelines for the definition of Functional Classes, their functions, their mix, and their spacings shows that the infrastructure in the region follows the guidelines.