



# Chapter 9: Freight Plan

## CHAPTER HIGHLIGHTS

- Introduction
- Freight General Design Guidance
- Potential Freight Projects
- Future Freight Network

### Introduction

Freight modes for the KTMPO region include truck, freight rail, and freight air. Because the freight rail and freight air modes access the network only at specific intermodal points, Functional Classes have been defined as an organizing element only for trucks. Truck Functional Classes are defined in Chapter 4 according to the differences in the desirability of the presence of trucks on the road network. They include the *Truck Priority*, *Truck Restricted*, *Truck Hazardous Material*, and *Truck Prohibited* Functional Classes.

The purpose of this Plan is to define the freight transportation modes so that all potential projects may be displayed and reviewed together, and so that the appropriate right-of-way and the interaction between modes may be identified and planned for.

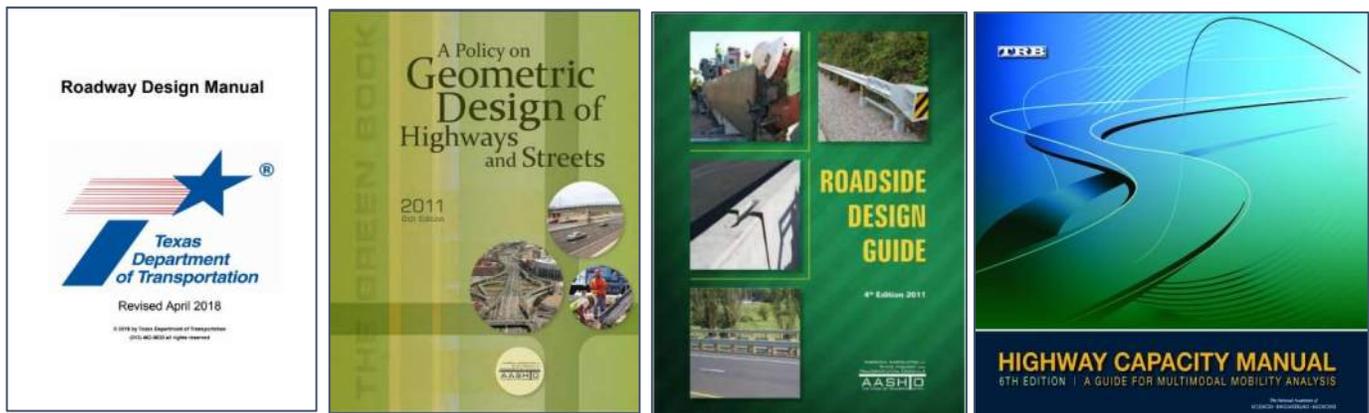


## Freight General Design Guidance

### General Design Guidance for the Truck Network

Since the truck network corresponds to the road network, general design guidance follows the cross-sections by Functional Class as defined in the Thoroughfare Plan in Chapter 6. Truck Functional Classes are envisioned as being a complementary overlay on road Functional Classes.

General design guidance for on-system roads in Texas is provided by the *TxDOT Roadway Design Manual*. The manual includes general and basic design guidance, with additional guidance addressing the specific needs of urban streets, suburban streets, two-lane and multi-lane rural highways, and freeways. It references several other publications, such as the *AASHTO Policy on Geometric Design of Highways and Streets* (the green book), the *AASHTO Roadside Design Guide*, and the *TRB Highway Capacity Manual*.



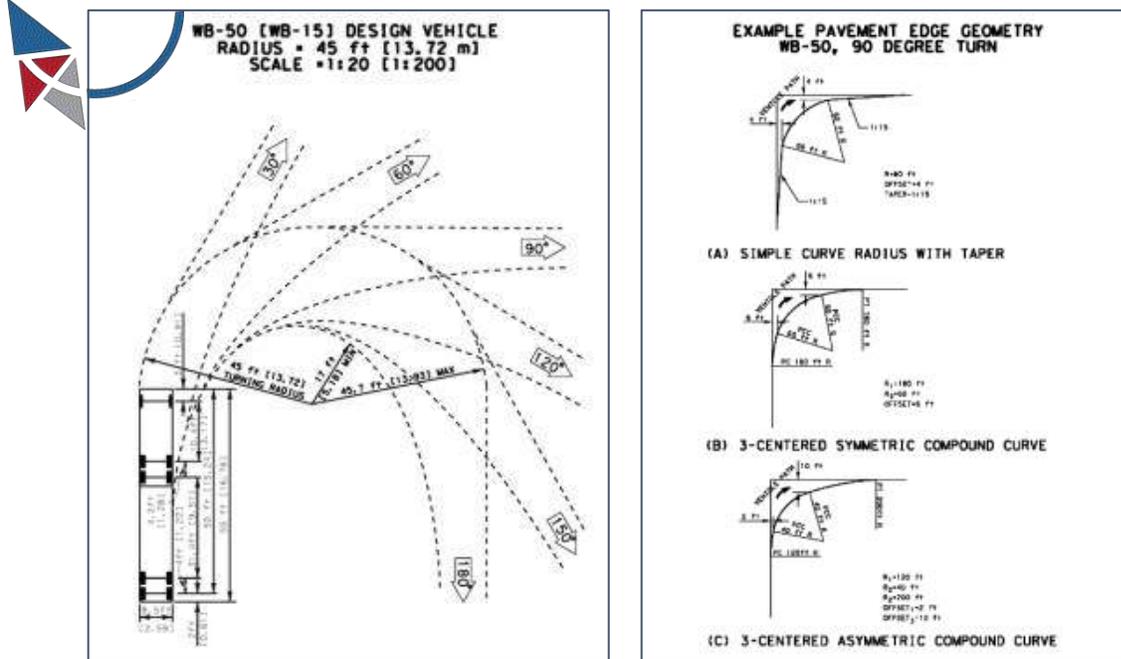
The presence of trucks within any particular road Functional Class is accommodated through the concept of the “design vehicle.” Larger vehicles such as trucks, emergency response vehicles, and buses have specific needs which must be addressed in road design; particularly turning radius, lane width, vertical clearance, and horizontal clearance. The specific design vehicle which is chosen for a particular road impacts the speed and safety of the road for all users. The *TxDOT Roadway Design Manual* does not define firm guidelines for the selection of the design vehicle for road design. It recognizes several factors which impact the selection of the design vehicle:

- Functional Class of the road and of intersection roads
- Frequency of use of the road by large vehicles (i.e., truck percentage of ADT)
- Types of large vehicles that use the road
- Available right-of-way

Templates defining the minimum turn radius and pavement edge geometries for turns for various types of large vehicles are provided, as shown in **Figure 9-1**.



Figure 9-1: Sample TxDOT Templates for Design Vehicle Geometrics



The *TxDOT Roadway Design Manual* provides special design criteria for the Texas Highway Freight Network (THFN). TxDOT policy for roads designated as the THFN calls for a minimum 18.5’ vertical clearance. Horizontal clearance is shown as dependent on the design speed of the roadway, with higher speeds requiring greater clearance. A horizontal clearance of 80’ from the edge of the road to the closest vertical element of the roadside is required for design speeds up to 90 mph; higher design speeds require a 90’ clearance.

The NACTO *Urban Street Design Guide* provides additional general guidance on the definition of the design vehicle. Rather than focusing road design on the needs of the largest vehicle, it brings an alternate viewpoint of designing for the most vulnerable user while providing reasonable accommodation for all vehicles within the full road network. This approach considers two vehicles: the “design vehicle,” which is a frequent user of a particular road setting the minimum turning radius and other geometrics, and the “control vehicle,” which is an infrequent user of the road but which still must be accommodated.

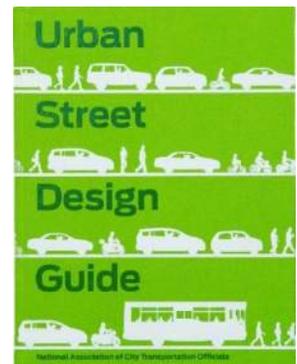
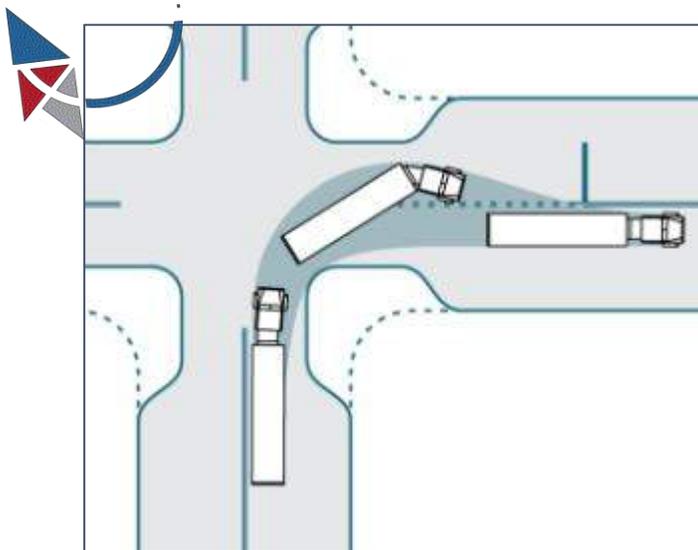




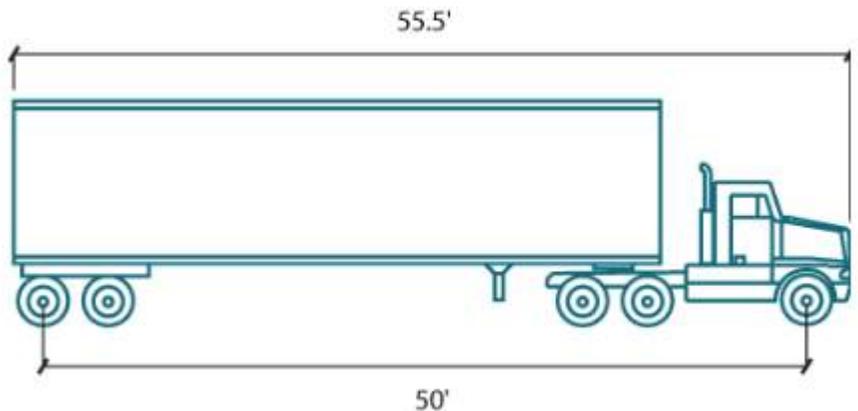
Figure 9-2: Control Vehicle Using Multiple Lanes for a Turn



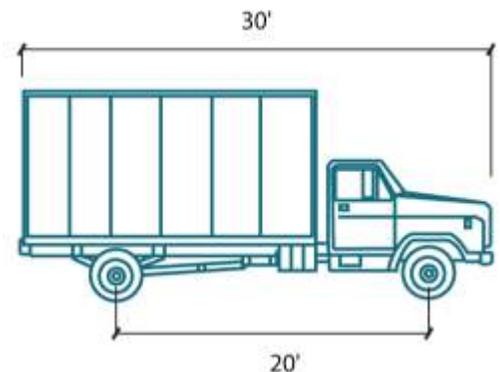
The NACTO guide recommends defining both a design vehicle and a control vehicle for each road based on its context. In reference to this Plan, road context is defined by the combination of road and truck Functional Classes. The NACTO guide posits that roads should be designed so that the design vehicle can make a turn using one turning lane. In contrast, the infrequent control vehicle is still accommodated, but its turns may use multiple lanes within an intersection. **Figure 9-2** shows how a setback stop line accommodates the larger turn radius of a control vehicle to allow it to encroach on the adjacent lane to make its turn. The intent of this design guidance is to reduce the width of the intersection and to slow traffic to improve road safety for all users.

The NACTO guide recommends the use of different design vehicles for different contexts, which correspond to road and truck Functional Classes.

For designated truck routes, corresponding to the *Truck Priority* and *Truck Hazardous Material* Functional Classes, a WB-50 design vehicle is recommended. The standard WB-50 is an 18-wheeler with a 50' wheelbase and an overall length of 55.5'.

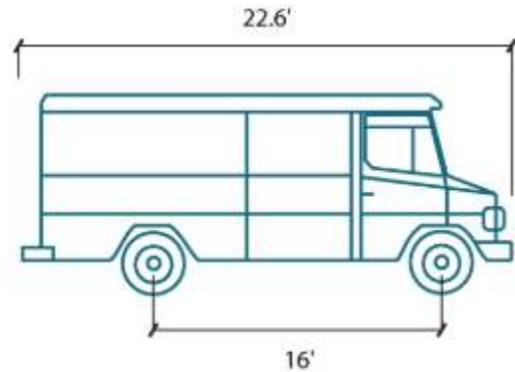


A smaller SU-30 design vehicle is recommended for downtown and commercial streets, which serve land uses requiring deliveries of goods. As a single unit vehicle with a smaller wheelbase, the SU-30 requires a smaller turning radius to stay within one lane on its turns. The larger WB-50 may be used as a control vehicle for these roads, with stop line setbacks accommodating turns which use the full intersection. The use of this class of design vehicle is appropriate for roads in the *Truck Restricted* Functional Class.

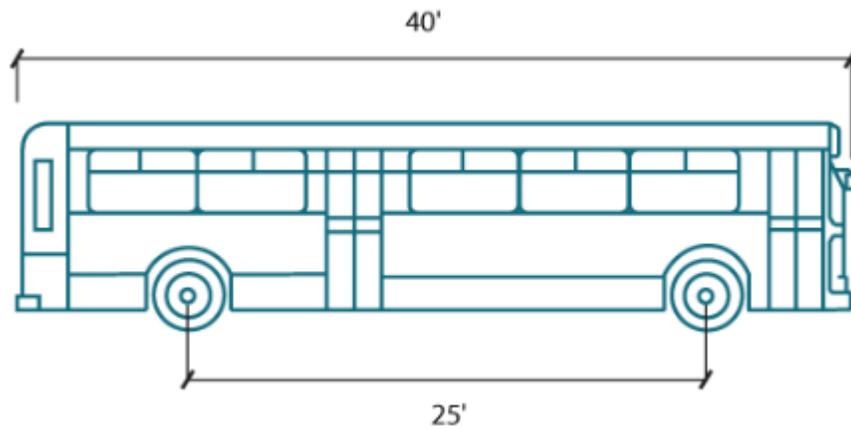




For the *Truck Prohibited* Functional Class on neighborhood and residential streets, the smaller single unit DL-23 delivery truck is an appropriate design vehicle. This choice allows the greatest flexibility to reduce lane widths, reduce the size of intersections, and slow traffic to design the road for the safety and convenience of all users.



Bus routes are defined independently of other design considerations, and may be present on any road Functional Class from Interstate Highway down to Local Streets. The needs of the BU-40 bus should be considered when selecting the design vehicle and control vehicle for all designated bus routes. When selecting the appropriate design vehicle based on truck access to land uses in a particular context, care should be taken that buses do not routinely have difficulty in managing turns on their routes.



The use of different design vehicles for each road and truck Functional Class is a concept that emphasizes the need for planning to define road rights-of-way. Roads built with a specific turning radius, lane width, vertical clearance, and horizontal clearance cannot easily be updated if land use changes create a need for accommodating larger vehicles. This makes the designation of truck routes and bus routes dependent on the design of the adjacent roads and their ability to accommodate larger vehicles. This is also a consideration in the development of industrial parks and intermodal areas. The size and characteristics of fire trucks should be considered when setting the design vehicle and control vehicle for all streets in order to ensure access.

**General Design Guidance for Other Freight Modes**

Freight railroads access the road network only at specific intermodal points and, in addition, are privately owned. Design standards and construction projects for railroad infrastructure are, therefore, largely defined by their private sector owners. TxDOT provides *Plans, Specifications, & Estimates Requirements on Projects with Railroads*, which provides guidance to road contractors when their projects interact with at-grade crossings. However, the TxDOT document does not specify standards for railroad infrastructure.



The exception on freight railroad design standards involves specific guidance from the Federal Railroad Administration (FRA) on infrastructure for railroad crossings for designated railroad quiet zones. A quiet zone is an exception to the FRA rules requiring trains to sound their horns when approaching at-grade crossings. To ensure safety, the quiet zone requires active warning devices, which typically include four-quadrant gates with warning lights, road channelization, and medians.



There are currently no designated railroad quiet zones in the KTMP region.

Similar to rail freight, air freight accesses the road network only at specific intermodal points. Design guidance for roadside access to airports corresponds to the road design guidance by Functional Class as defined in the Thoroughfare Plan in Chapter 6.

### Potential Freight Transportation Projects

The 2017 Texas Freight Mobility Plan provides insights into the scope of freight projects by detailing project evaluation criteria for freight transportation modes, as shown in **Table 9-1**. These criteria show that freight projects have multiple goals and, therefore, may also have multiple sources.

Table 9-1: Project Evaluation Criteria from the Texas Freight Mobility Plan

| <b>Texas Multimodal Freight Network (TMFN) Project Evaluation Criteria</b>   |
|--|
| On the Texas Multimodal Freight Network                                      |
| Eliminates an at-grade rail crossing on the Texas Multimodal Freight Network |
| Improves structurally deficient or functionally obsolete facility            |
| Improves access to a terminal or certified development site                  |
| Reduces travel time  |
| Improves travel time reliability   |
| Improves efficient movement  |
| Encourages truck to rail diversion   |
| Improves a safety hot spot   |
| Improves safety on a high-volume hazmat route                                |



To address this, potential future projects for freight modes have been derived from sources that address the range of the listed project evaluation criteria. They include:

- Routes defined by the KTMPPO Freight Advisory Committee, as shown in **Table 9-2**.
- Load-restricted bridges, as shown in **Table 9-3**.
- Load-restricted roads, as shown in **Table 9-4**.
- Roads with geometric restrictions, as shown in **Table 9-5**.
- At-grade railroad crossings, shown in **Table 9-6**.

The listing of truck routes identified by the KTMPPO Freight Advisory Committee in Table 9-2 also includes a proposed new intermodal site. The Civilian-Military Joint Use Rail-Truck Multimodal Facility is under study for a site on Fort Hood, located between the railroad tracks and IH-14 in an area bounded by Clarke Rd to the west and Clear Creek Rd to the east. While this site is not itself a rail or a road project, and has not been proposed by KTMPPO, it is a proposed multimodal terminal which may generate the need for projects, and so should be considered.

Table 9-2: Truck Routes Identified by the KTMPPO Freight Advisory Committee

| Freight Advisory Committee Identified Truck Routes |                  |                   |
|--|------------------|-------------------|
| Road   | Limits From      | Limits To         |
| FM 93  | IH 35            | US 190            |
| FM 436   | IH 35            | US 190            |
| FM 439   | SH 195           | SH 317            |
| FM 1741  | US 190           | FM 93             |
| LP 121   | FM 436           | FM 439            |
| SH 36  | Coryell Co line  | Loop 363          |
| SH 53  | Loop 363         | Falls Co line     |
| SH 317   | FM 439           | McLennan Co line  |
| Temple Outer Loop                                  | IH 35 at Hart Rd | IH 35 S of Temple |

Table 9-3: Load Restricted Bridges

| Load Restricted Bridges |          |              |
|-------------------------|----------|--------------|
| Road                    | Crossing | Weight Limit |
| BIG ELM CREEK           | #100     | 36,000       |
| BIG ELM CREEK           | #607     | 15,000       |
| BIRD CREEK              | #67      | 12,000       |
| LEON RIREV              | #62      | 36,000       |
| LITTLE ELM CREEK        | #507     | 21,000       |
| LITTLE ELM CREEK        | #618     | 21,000       |
| LITTLE ELM CREEK        | #95      | 12,000       |
| LITTLE ELM CREEK        | #98      | 12,000       |
| NOLAN CREEK             | #1       | 12,000       |
| RUNNELLS CREEK          |          | 28,000       |
| S DARRS CREEK           | #52      | 21,000       |
| SALADO CREEK            | #60      | 24,000       |
| WILLOW CREEK            | #18      | 21,000       |



Table 9-4: Load Restricted Roads

| Load Restricted Roads      |                         |                         |
|----------------------------|-------------------------|-------------------------|
| Road                       | Limits From             | Limits To               |
| FM 116                     | US 190                  | 0.3 mi S of Abbot Ln    |
| FM 436                     | Loop 121                | US 190                  |
| FM 437                     | US 190                  | SH 53                   |
| FM 438                     | Loop 363                | FM 935                  |
| FM 487                     | Williamson Co line east | Williamson Co line west |
| FM 487                     | SH 95                   | Milam Co line           |
| FM 580                     | CR 3270                 | FM 116                  |
| FM 935                     | IH 35                   | Falls Co line           |
| FM 940                     | FM 437                  | FM 485                  |
| FM 964                     | Farmers Rd              | FM 485                  |
| FM 1113                    | FM 580                  | N 1st St                |
| FM 1123                    | Holland Rd              | SH 95                   |
| FM 1237                    | SH 317                  | IH 35                   |
| FM 2086                    | FM 438                  | SH 53                   |
| FM 2115                    | FM 487                  | IH 35                   |
| FM 2184 North              | US 190                  | New Colony Rd           |
| FM 2184 South              | Reeds Cemetery Rd       | US 190                  |
| FM 2268                    | FM 1123                 | IH 35                   |
| FM 2268                    | SH 95                   | Milam Co line           |
| FM 2409                    | SH 36                   | FM 2601                 |
| FM 2410                    | Verna Lee Blvd          | IH 14                   |
| FM 2483                    | FM 2271                 | SH 317                  |
| FM 2484                    | SH 195                  | IH 35                   |
| FM 2601                    | Moody Leon Rd           | SH 317                  |
| FM 2670                    | Wolfridge Rd            | FM 440                  |
| FM 2843                    | Cedar Valley Rd         | IH 35                   |
| FM 2904                    | FM 2086                 | SH 320                  |
| FM 3046                    | Lampasas Co line        | FM 116                  |
| FM 3117                    | US 190                  | SH 53                   |
| FM 3219                    | Bus 190                 | FM 439                  |
| FM 3369                    | FM 438                  | SH 320                  |
| LOOP 121                   | IH 14                   | IH 35                   |
| MARTIN LUTHER KING JR BLVD | Bus 190                 | IH 14                   |
| N FORT HOOD ST             | Bus 190                 | Rancier Ave             |
| SPUR 1237                  | FM 1237                 | Southerland Rd          |
| SPUR 439                   | IH 14                   | FM 439                  |



Table 9-5: Roads with Geometric Restrictions

| Geometric Restricted Roads |  |
|----------------------------|--|
| Road                       | Restrictions                             |
| Charter Oak Dr             | RR underpass 13' 8", curve, narrow, hill |
| Levy Crossing Rd           | At grade crossing with excessive crown   |
| N 5th St                   | At grade crossing with excessive crown   |
| Waco Rd                    | RR underpass 14' 5", curve, narrow, hill |

**Table 9-6** lists the 109 at-grade railroad crossings in the region. There are also 29 grade-separated crossings, which are not included in the table.

Table 9-6: At-Grade Railroad Crossings

| Railroad  | City           | Crossing Street    | Number of Tracks | Angle of Crossing |
|-----------|----------------|--------------------|------------------|-------------------|
| UP        | Bartlett       | E Bell St          | 1                | 90                |
| BNSF      | Belton         | College St         | 2                | 60                |
| BNSF      | Belton         | N Beal St          | 1                | 70                |
| BNSF      | Belton         | N Penelope St      | 1                | 70                |
| BNSF      | Belton         | N Wall St          | 1                | 70                |
| UP        | Belton         | Hubbard Ln         | 2                | 70                |
| BNSF      | Copperas Cove  | 7th St             | 1                | 90                |
| BNSF      | Copperas Cove  | Bradford Dr        | 1                | 90                |
| BNSF      | Copperas Cove  | FM 116             | 1                | 90                |
| BNSF      | Copperas Cove  | Grimes Crossing Rd | 1                | 80                |
| BNSF      | Copperas Cove  | Main St            | 1                | 90                |
| BNSF      | Copperas Cove  | Unnamed Rd         | 1                | 90                |
| BNSF      | Copperas Cove  | Wolf Rd            | 1                | 90                |
| BNSF      | Fort Hood      | Ammo Rd            | 2                | 70                |
| BNSF      | Fort Hood      | S 79th St          | 2                | 90                |
| Fort Hood | Fort Hood      | S 79th St          | 1                | 90                |
| Fort Hood | Fort Hood      | Santa Fe Ave       | 1                | 90                |
| Fort Hood | Fort Hood      | Spur Dr            | 1                | 90                |
| Fort Hood | Fort Hood      | Spur Dr            | 1                | 90                |
| Fort Hood | Fort Hood      | Warehouse Ave      | 1                | 90                |
| BNSF      | Harker Heights | FM 3219            | 1                | 90                |
| UP        | Holland        | Fannin St          | 2                | 80                |
| UP        | Holland        | FM 1123            | 1                | 90                |
| BNSF      | Kempner        | FM 2313            | 1                | 90                |



Table 9-7: At-Grade Railroad Crossings (continued)

| Railroad | City                 | Crossing Street           | Number of Tracks | Angle of Crossing |
|----------|----------------------|---------------------------|------------------|-------------------|
| BNSF     | Killeen              | 2nd St                    | 1                | 90                |
| BNSF     | Killeen              | College St                | 1                | 90                |
| BNSF     | Killeen              | Ft Hood St                | 1                | 85                |
| BNSF     | Killeen              | Gilmer St                 | 1                | 90                |
| BNSF     | Killeen              | N 10th St                 | 1                | 90                |
| BNSF     | Killeen              | N 28th St                 | 2                | 90                |
| BNSF     | Killeen              | N 4th St                  | 1                | 90                |
| BNSF     | Killeen              | N 8th St                  | 1                | 90                |
| BNSF     | Killeen              | N Gray St                 | 1                | 90                |
| BNSF     | Killeen              | N Roy Reynolds Dr         | 1                | 85                |
| BNSF     | Killeen              | Twin Creeks Dr            | 1                | 90                |
| UP       | Little River-Academy | Bill Money Rd             | 1                | 80                |
| UP       | Little River-Academy | FM 436                    | 1                | 80                |
| UP       | Little River-Academy | W Church St               | 1                | 80                |
| BNSF     | Nolanville           | Jack Rabbit Flat Rd       | 1                | 90                |
| BNSF     | Nolanville           | Levy Crossing Rd          | 2                | 90                |
| BNSF     | Nolanville           | N 5th St                  | 2                | 90                |
| BNSF     | Nolanville           | Old Nolanville Rd         | 3                | 90                |
| BNSF     | Nolanville           | Pleasant Hill Cemetery Rd | 1                | 90                |
| Spur     | Nolanville           | E Ave H                   | 1                | 90                |
| Spur     | Nolanville           | FM 439                    | 1                | 80                |
| BNSF     | Rogers               | Benton Rd                 | 2                | 90                |
| BNSF     | Rogers               | FM 2184                   | 3                | 90                |
| BNSF     | Rogers               | FM 437                    | 3                | 90                |
| BNSF     | Rural Bell Co        | 1237 Spur                 | 3                | 60                |
| BNSF     | Rural Bell Co        | Brewster Rd               | 1                | 70                |
| BNSF     | Rural Bell Co        | FM 1237                   | 1                | 60                |
| BNSF     | Rural Bell Co        | FM 93                     | 1                | 45                |
| BNSF     | Rural Bell Co        | Franklin Rd               | 1                | 45                |
| BNSF     | Rural Bell Co        | Guyton Rd                 | 1                | 45                |
| BNSF     | Rural Bell Co        | Heidenheimer Rd           | 3                | 90                |
| BNSF     | Rural Bell Co        | Highland School Rd        | 2                | 90                |
| BNSF     | Rural Bell Co        | Knob Creek Rd             | 2                | 45                |
| BNSF     | Rural Bell Co        | Luther Curtis Rd          | 1                | 60                |
| BNSF     | Rural Bell Co        | Neroc Rd                  | 2                | 90                |
| BNSF     | Rural Bell Co        | Pritchard Rd              | 2                | 45                |



Table 9-8: At-Grade Railroad Crossings (continued)

| Railroad | City              | Crossing Street          | Number of Tracks | Angle of Crossing |
|----------|-------------------|--------------------------|------------------|-------------------|
| BNSF     | Rural Bell Co     | Southerland Rd           | 2                | 60                |
| BNSF     | Rural Bell Co     | Tem Bel Ln               | 1                | 70                |
| BNSF     | Rural Bell Co     | Wheat Rd                 | 1                | 90                |
| BNSF     | Rural Bell Co     | Willow Grove Rd          | 1                | 45                |
| Spur     | Rural Bell Co     | Levy Crossing Rd         | 1                | 50                |
| UP       | Rural Bell Co     | E Big Elm Rd             | 1                | 90                |
| UP       | Rural Bell Co     | Harber Rd                | 1                | 90                |
| UP       | Rural Bell Co     | Hillyard Rd              | 1                | 90                |
| UP       | Rural Bell Co     | Landfill Rd              | 1                | 80                |
| UP       | Rural Bell Co     | Lindemann Rd             | 1                | 90                |
| UP       | Rural Bell Co     | Mills Ln                 | 1                | 90                |
| UP       | Rural Bell Co     | Roberts Rd               | 1                | 90                |
| UP       | Rural Bell Co     | Stag Rd                  | 1                | 80                |
| BNSF     | Rural Lampasas Co | FM 1715                  | 1                | 90                |
| BNSF     | Rural McLennan Co | Stampede Rd              | 1                | 45                |
| BNSF     | Temple            | 49th St                  | 2                | 60                |
| BNSF     | Temple            | Center St                | 1                | 90                |
| BNSF     | Temple            | FM 3117                  | 2                | 45                |
| BNSF     | Temple            | Industrial Blvd          | 2                | 85                |
| BNSF     | Temple            | Industrial Blvd          | 1                | 60                |
| BNSF     | Temple            | Industrial Blvd          | 1                | 60                |
| BNSF     | Temple            | Kegley Rd                | 1                | 70                |
| BNSF     | Temple            | Lucius McCelvey Dr       | 2                | 90                |
| BNSF     | Temple            | Martin Luther King Jr Dr | 2                | 45                |
| BNSF     | Temple            | Moore's Mill Rd          | 1                | 70                |
| BNSF     | Temple            | S 25th St                | 2                | 70                |
| BNSF     | Temple            | S Main St                | 2                | 70                |
| BNSF     | Temple            | Unnamed Rd               | 1                | 70                |
| UP       | Temple            | 31st St                  | 1                | 45                |
| UP       | Temple            | Berger Rd                | 1                | 80                |
| UP       | Temple            | Blackland Rd EB          | 1                | 90                |
| UP       | Temple            | Blackland Rd WB          | 1                | 90                |
| UP       | Temple            | E Ave C                  | 1                | 80                |
| UP       | Temple            | E Central Ave            | 1                | 90                |
| UP       | Temple            | E Houston Ave            | 1                | 90                |
| UP       | Temple            | E Munroe Ave             | 1                | 90                |



Table 9-9: At-Grade Railroad Crossings (continued)

| Railroad | City   | Crossing Street          | Number of Tracks | Angle of Crossing |
|----------|--------|--------------------------|------------------|-------------------|
| UP       | Temple | E Shell Ave              | 1                | 80                |
| UP       | Temple | E Young Ave              | 1                | 90                |
| UP       | Temple | FM 93                    | 1                | 80                |
| UP       | Temple | Hatrick Bluff Rd         | 1                | 45                |
| UP       | Temple | Martin Luther King Jr Dr | 2                | 50                |
| UP       | Temple | S 5th St NB              | 1                | 75                |
| UP       | Temple | S 5th St SB              | 1                | 75                |
| UP       | Temple | Taylor's Valley Rd       | 1                | 45                |
| UP       | Temple | Unnamed Rd               | 1                | 90                |
| UP       | Troy   | Bottoms East Rd          | 1                | 90                |
| UP       | Troy   | E Austin St              | 1                | 45                |
| UP       | Troy   | Lely Dr                  | 1                | 90                |
| UP       | Troy   | Main St                  | 1                | 70                |

### Future Regional Freight Network

All the truck routes identified by the KTMPO Freight Advisory Committee and load restricted bridges, load restricted roads, and roads with geometric restrictions have been included in the future network, as shown for the region in **Figure 9-3**. Insets to show better detail of projects are included as **Figure 9-4** for the western area and as **Figure 9-5** for the eastern area.

The Figures show the existing 2017 streets and the proposed projects for upgrades to the freight network. There are three instances of overlaps among categories of projects where a load restricted road is also on an existing truck priority route or on a freight route identified by the KTMPO Freight Advisory Committee:

- Fort Hood Street from BUS 190 and Tank Destroyer Blvd in Killeen, which is an existing truck priority route. Fort Hood Street is also SH 195.
- Loop 121 from IH 14 to IH 35 in Belton. This is not on an existing truck priority route, but is an upgrade project proposed by the KTMPO Freight Advisory Committee.
- FM 436 from Loop 121 to US 190 south of Killeen. This is not on an existing truck priority route, but is an upgrade project proposed by the KTMPO Freight Advisory Committee.

The key purpose of the Freight Plan is to identify future projects so that right-of-way can be planned for. Supporting this purpose, the Plan is coded with all projects defined by KTMPO from relevant sources, as detailed in Table 9-2 through Table 9-5. This listing has been developed as an input into the updated KTMPO MTP for the year 2045. One of the functions of the 2045 MTP will be to prioritize the listing of projects and to balance them against the anticipated available funding to derive funded and unfunded project listings.



Figure 9-3: Regional Future Freight Network

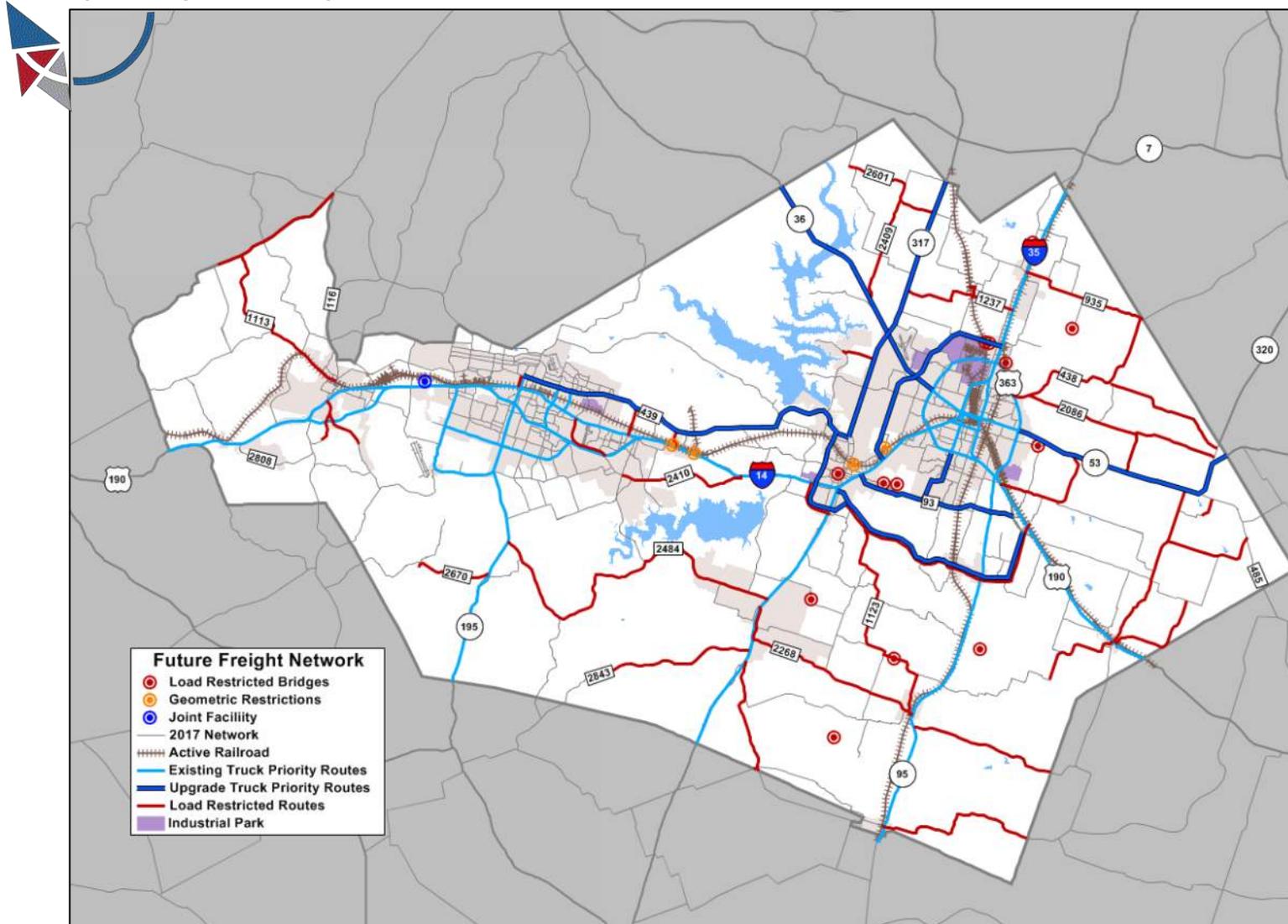




Figure 9-4: Future Freight Network in the Western Area

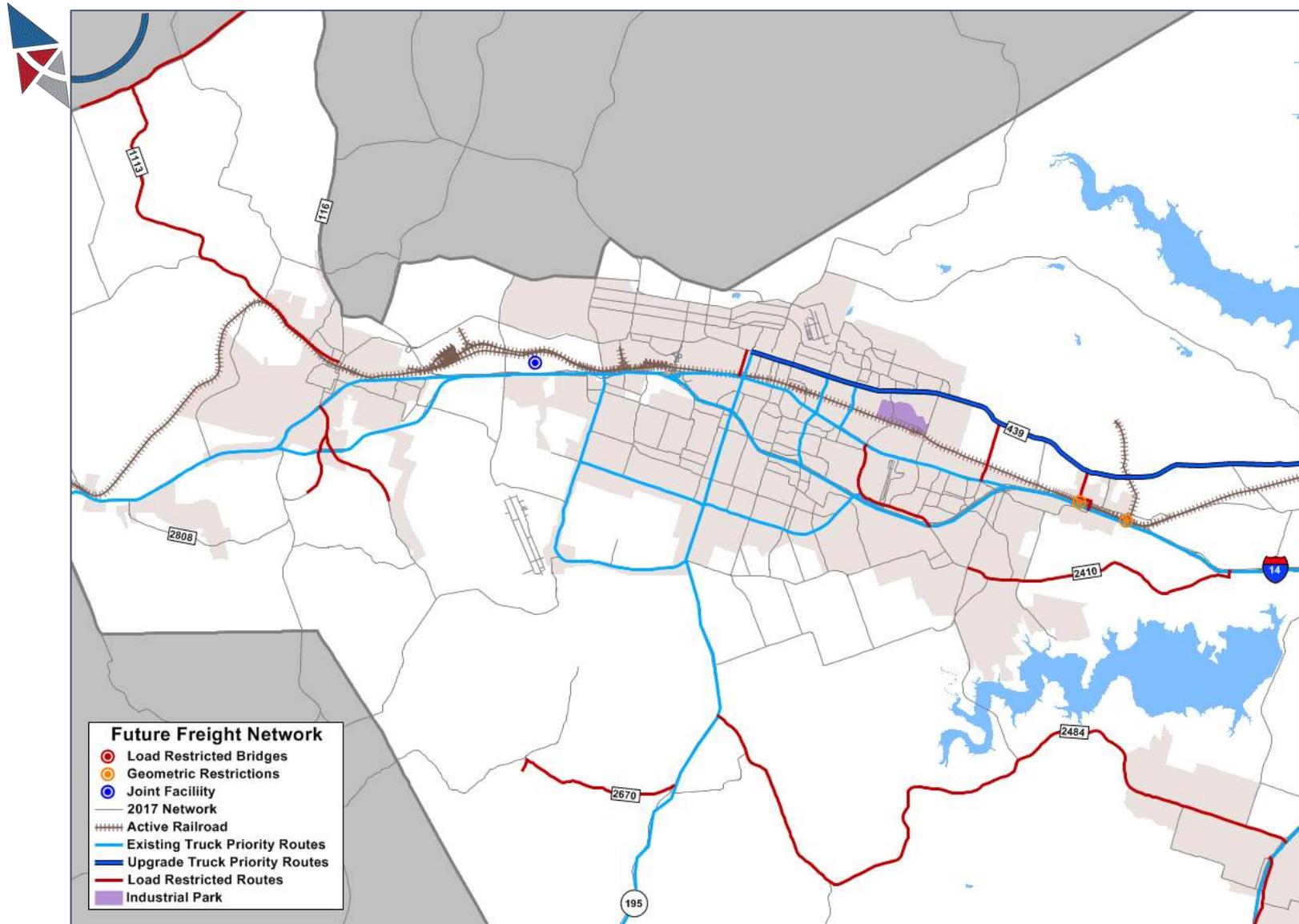
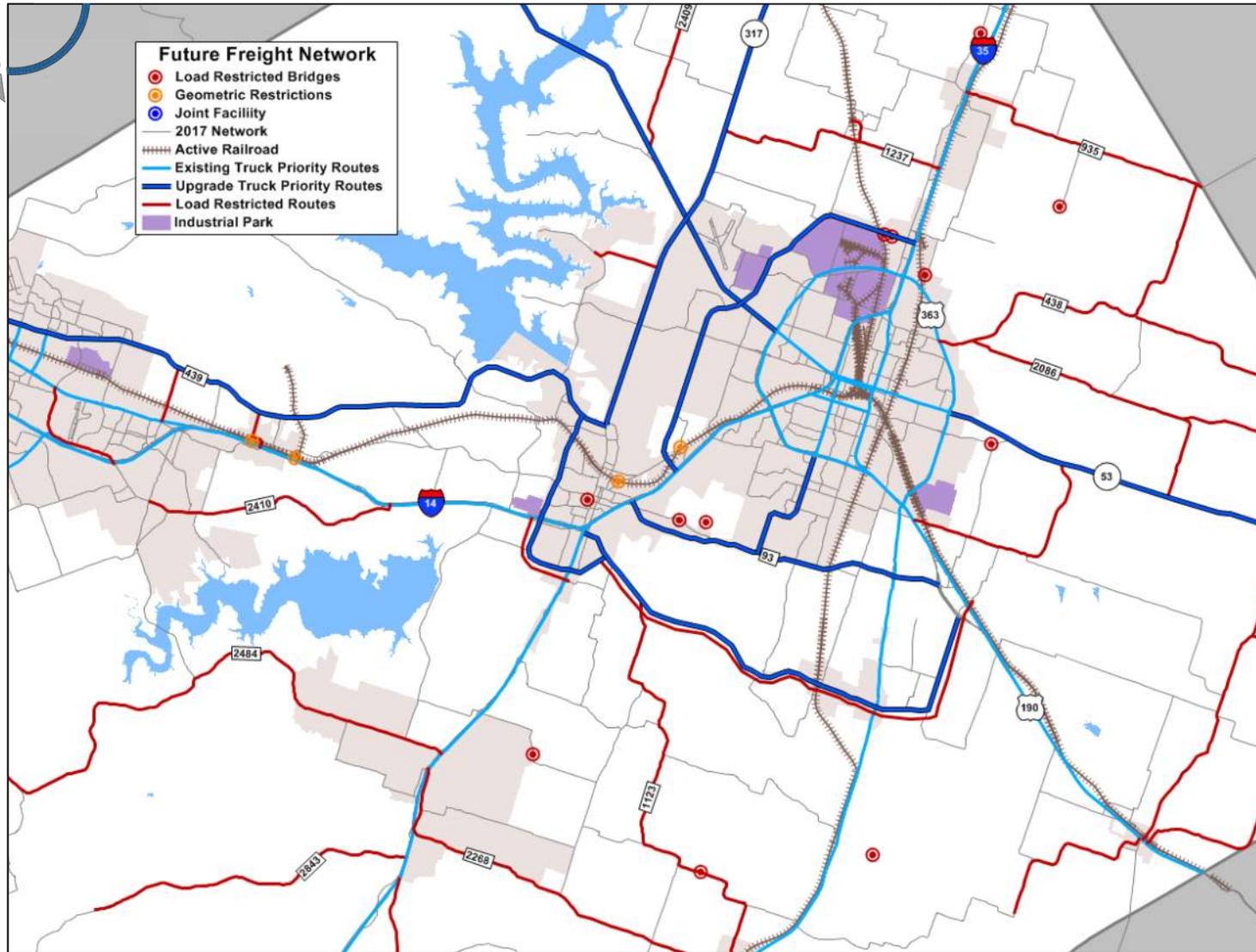




Figure 9-5: Future Freight Network in the Eastern Area





## Summary

General design guidance for the truck network follows the auto network; the respective Functional Classes are designed to be complementary layers. National and TxDOT general design guidance relative to the truck network focuses on the definition of the design vehicle, which impacts the geometrics of the road for turning radius, lane width, vertical clearance, and horizontal clearance. These design criteria in turn affect vehicle speeds and the safety of the road for all users.

The *TxDOT Roadway Design Manual* does not define firm guidelines for the selection of the design vehicle for road design, but recognizes that various factors influence the appropriate choice. The NACTO *Urban Street Design Guide* considers two vehicles: the “design vehicle,” which is a frequent user of a particular road and which sets the minimum turning radius and other geometrics, and the “control vehicle,” which is an infrequent user of the road, but which still must be accommodated. It recommends defining both a design vehicle and a control vehicle for each road based on its context.

The use of different design vehicles for different road and truck Functional Classes is a concept that emphasizes the need for planning to define road rights-of-way. The size and characteristics of heavy trucks, fire trucks, and buses and their need for access should be considered when setting the design vehicle and control vehicle for all streets.

Since the rail freight and the air freight modes only interact with the road network at specific points, general design guidance on their infrastructure is not considered as a part of this Plan. However, guidance on the development of infrastructure for designated quiet zones for at-grade rail crossings is referenced. There are currently no designated railroad quiet zones in the KTMPO region.

Potential projects for the truck network are sourced to reflect the project evaluation criteria from the *Texas Freight Mobility Plan*. Sources include routes identified by the KTMPO Freight Advisory Committee and listings of load restricted bridges, load restricted roads, and geometric restricted roads.