4. ACTIVE TRANSPORTATION

INTRODUCTION

The active transportation network primarily consists of sidewalks and bicycle infrastructure – such as bike lanes or paths – and helps to facilitate the use of non-single-occupancy-vehicle (SOV) modes of transportation. Encouraging walking and cycling can help to create healthy communities as well as a stronger, more effective transit network and address the "first/last mile problem" by providing better connections between transit stops and trip origins and destinations. This section explores the existing conditions of the El Paso region's active transportation network through a comprehensive analysis of walkability and cycling accessibility. The section also identifies walking and bicycling infrastructure gaps in the region. The results of this analysis identify areas where improvements to the active transportation network can be most effective.

ANALYSES

WALKABILITY ANALYSIS

A geospatial analysis was done to measure the availability of pedestrian infrastructure and other walkability indicators within the El Paso MPO study area. Data on sidewalks, intersection density, parks, schools, and other walking destinations (restaurants, bars, pharmacies, grocery stores, etc.) were collected, measured, and aggregated to come up with an overall walkability score.

Methodology

The cumulative length of sidewalks in an area was compared against the cumulative length of the roadway network in the same area to get a relative ratio of sidewalk feet to roadway feet. A ratio of 2:1 indicates that there are twice as many sidewalk feet as roadway feet in an area. This could indicate that a roadway has sidewalks on both sides of the street. A ratio of 1:1 means that there are just as many sidewalk feet as roadway feet. This could mean that a roadway has sidewalks on at least one side of the road. A ratio of 1:2 means that there are half as many sidewalk feet as roadway feet in an area. This could mean sporadic sidewalk coverage. Some streets might have sidewalks on one side, other streets might not have sidewalks. It should be noted that only streets that would have sidewalks were considered in this measurement. Freeways and ramps were removed from the roadway network because there would normally not be sidewalks on these roads. A score of 1-5 was assigned to each area depending on the ratio of sidewalk feet to roadway feet. The final walkability or walk score was calculated utilizing a variety of different scores. Figure 4.1 illustrates the sidewalk to road ratio for the City of El Paso (which was the only municipality for which sidewalk data was available). Red colors illustrate locations with few sidewalks in relation to roadways, whereas, blue and green colors illustrate more comprehensive sidewalk networks.

Intersection density (Figure 4.2) was used as another measurement of walkability. An area with more intersections has shorter block lengths that result in slower automobile travel speeds, which creates a safer and more pleasant walking environment. In addition, smaller block lengths generally equate to denser and more walkable land uses that enhance the pedestrian environment. Similar to the sidewalk ratio measurement, only walkable roads are considered when looking at intersection density (Intersections with freeways and ramps were not considered). Areas were given a score of 1-5 depending on the density of intersections, and this score was factored into the final walkability score.

Scores were also assigned to areas based on the relative number of nearby destinations or points of interest. Areas with more destinations within a five-minute walk (1/4 mile) were given higher scores, and areas with fewer destinations within a five-minute walk were given lower scores. Other destinations such as parks (Figure 4.3) and schools (Figure 4.4) were also taken into consideration. Areas received points when a school or park were located within a five-minute walk. Parks and schools were considered separately from restaurants, bars, pharmacies, and grocery stores because trips to parks and schools often differ from other trips and often involve children. Other points of interest are shown in Figure 4.5.

Once all factors were measured and scored, the scores were summed together to create a master walkability score. This score was then adjusted to a 1-5 scale with 5 indicating excellent walkability and 1 indicating poor walkability.

FIGURE 4.1: SIDEWALK TO ROAD RATIO

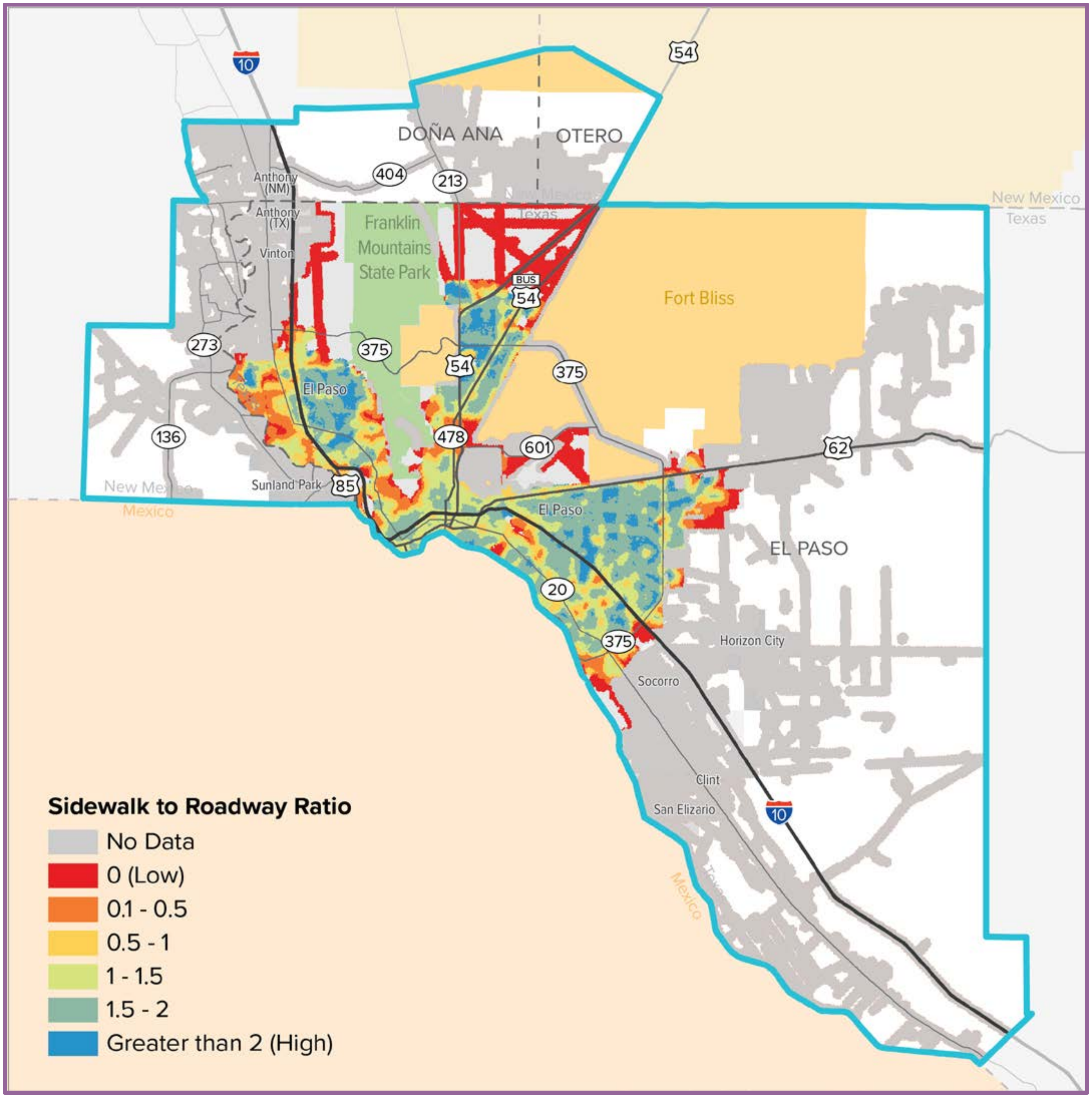


FIGURE 4.2: INTERSECTION DENSITY

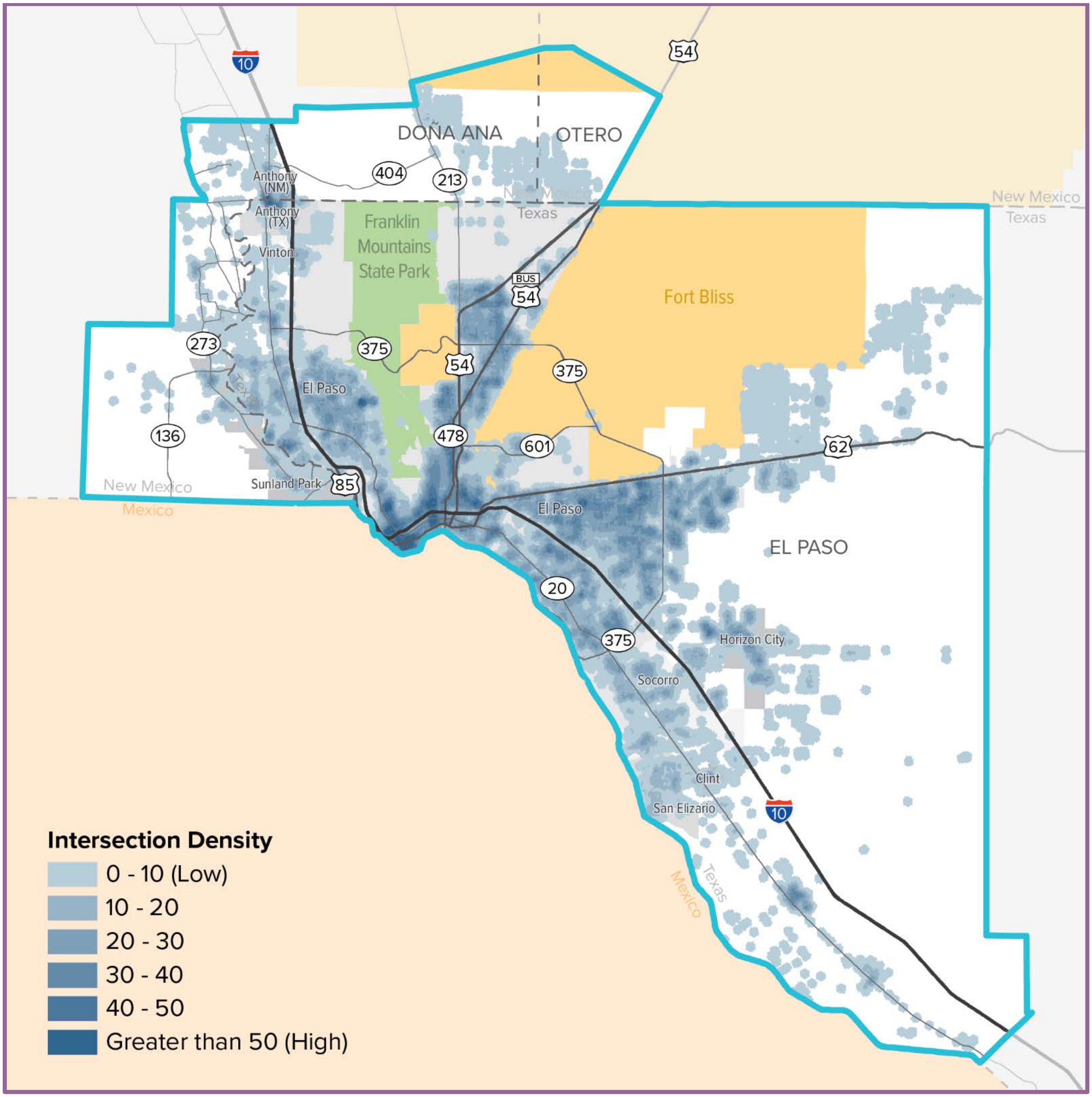


FIGURE 4.3: PARKS

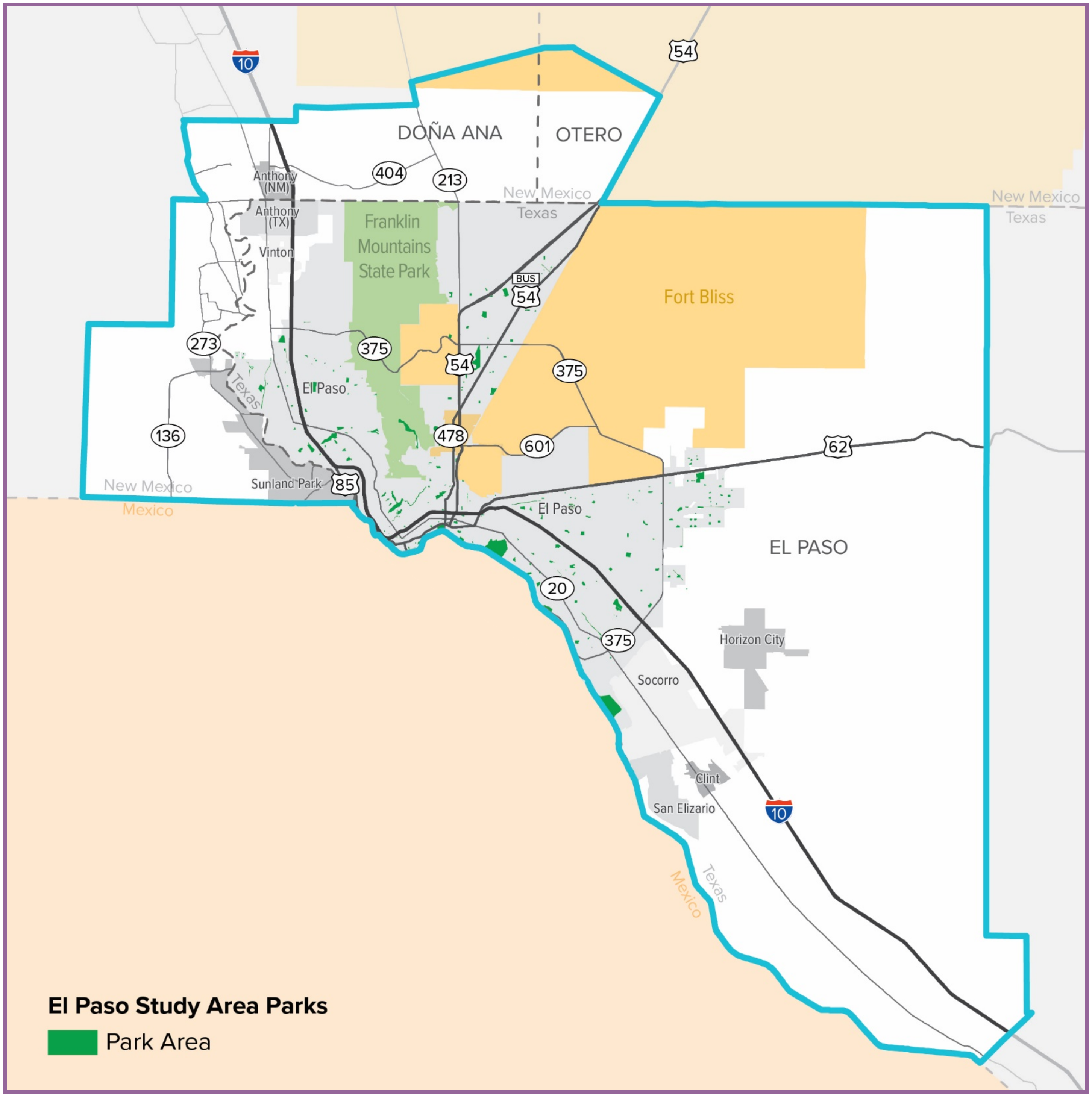


FIGURE 4.4: SCHOOLS

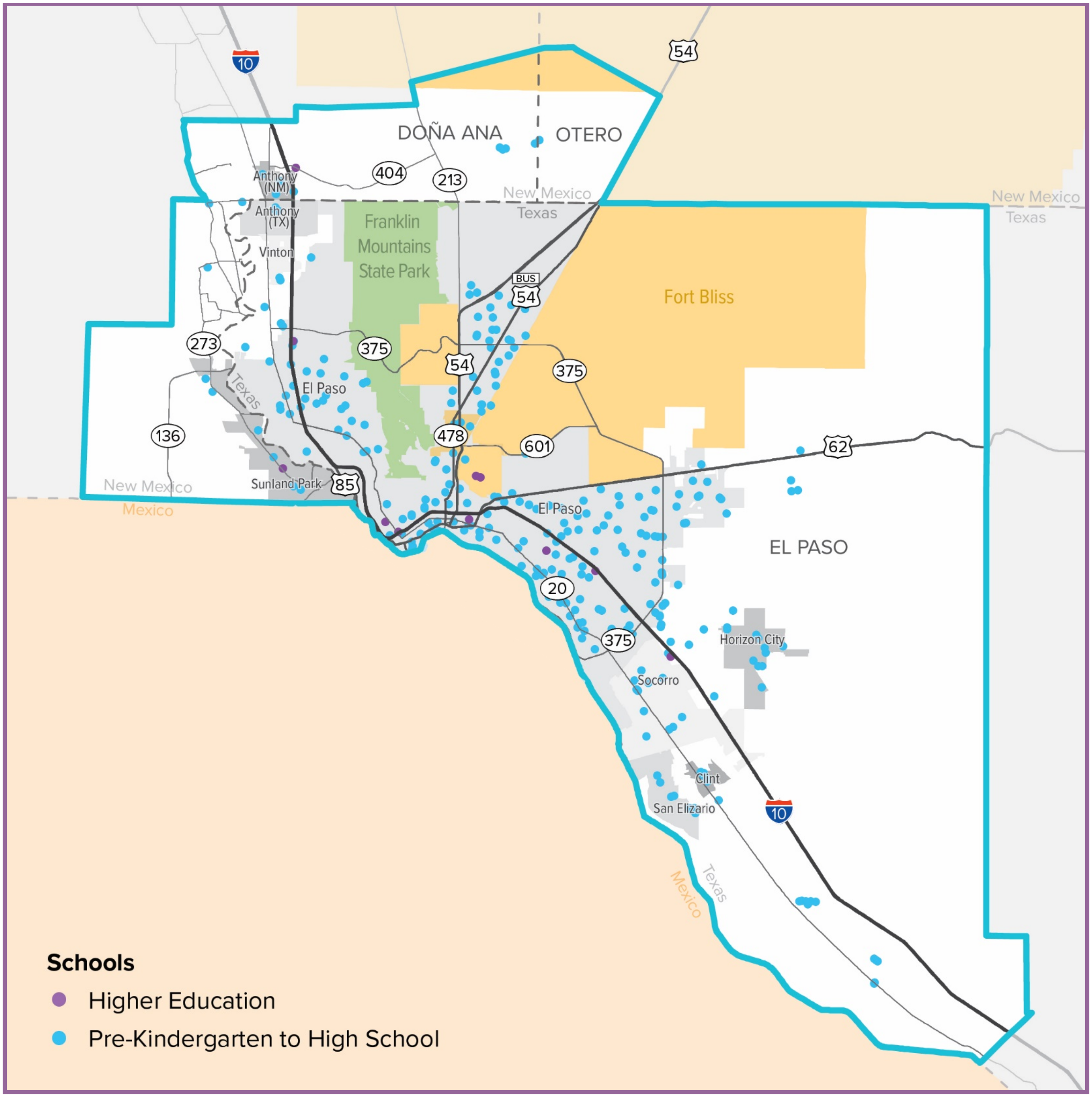
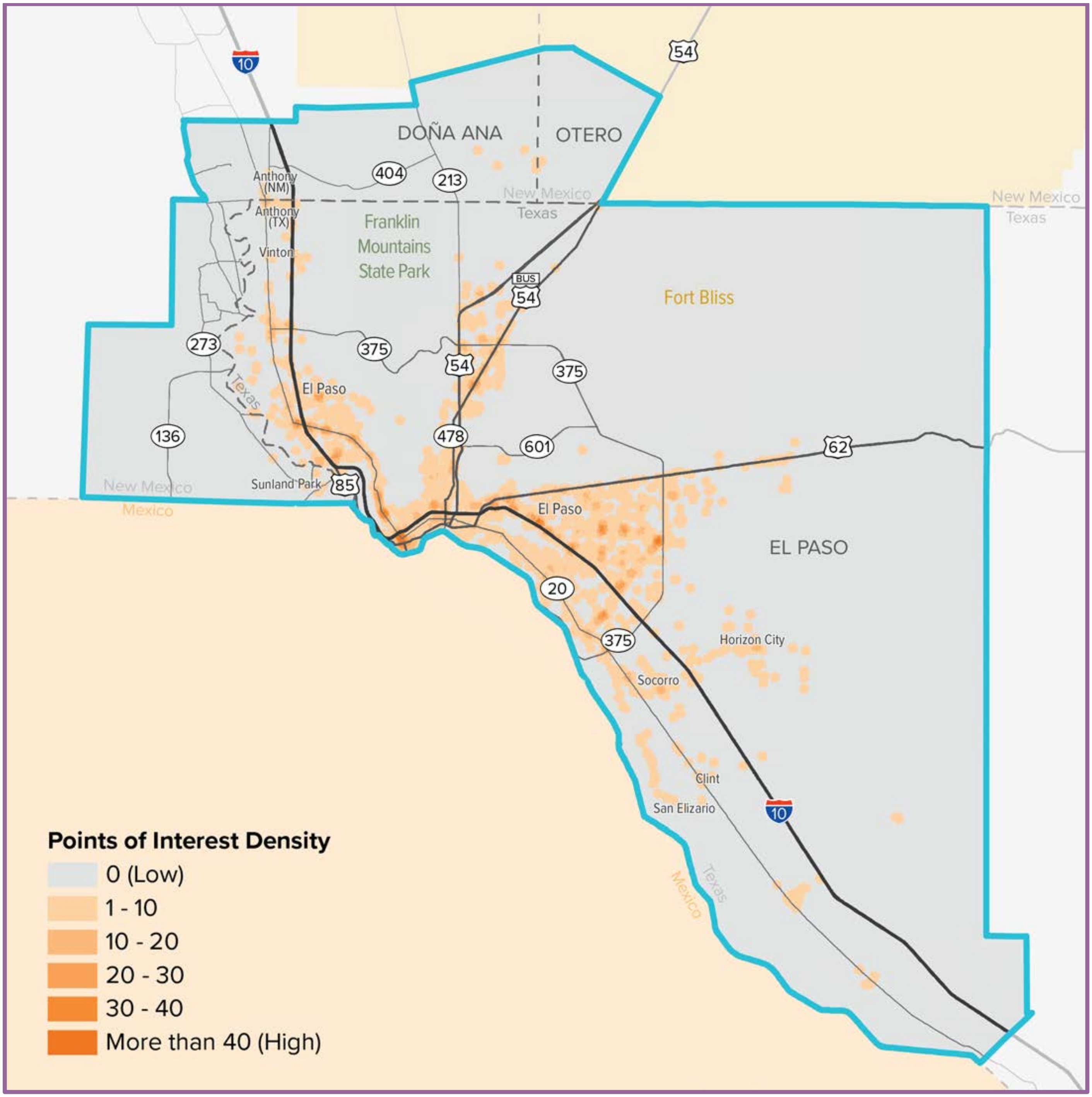


FIGURE 4.5: OTHER POINTS OF INTEREST



Analysis Results

The individual walkability criteria were combined to produce a walkability score at the Traffic Analysis Zone (TAZ) level ranging from 1 (poor walkability) to 5 (high walkability), as shown in (Figure 4.6). Some areas lacked enough data to produce a score, which is reflected in Figure 4.6 as well. Population, employment, and transit access were compared to the walkability score to provide insight into what proportion of the region's population and jobs are in relatively walkable and non-walkable areas.

FIGURE 4.6: WALKABILITY SCORES

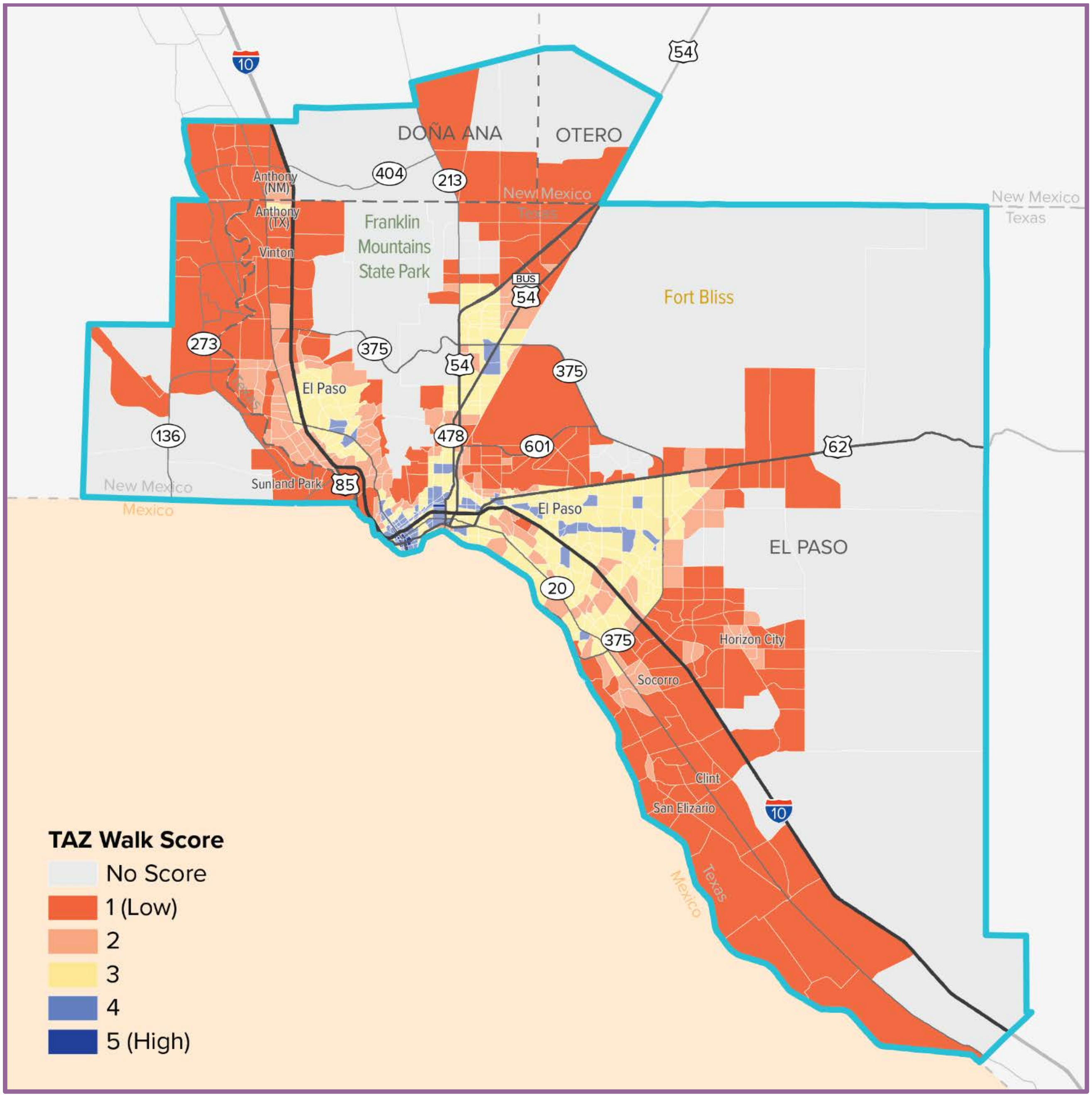


Table 4.1 below show that most of the region's population and employment is in an area with a walkability score of 3, meaning that the area is moderately walkable, or above. For the most part, only a small percentage of the population and jobs are in areas with the highest walkability. Roughly 20% of the population is in an area with a walkability score of 1, which indicates very poor walking conditions. Only 1% of the region's population is in an area with excellent walking conditions (walkability score of 5).

TABLE 4.1: POPULATION AND EMPLOYMENT BY WALKABILITY SCORE

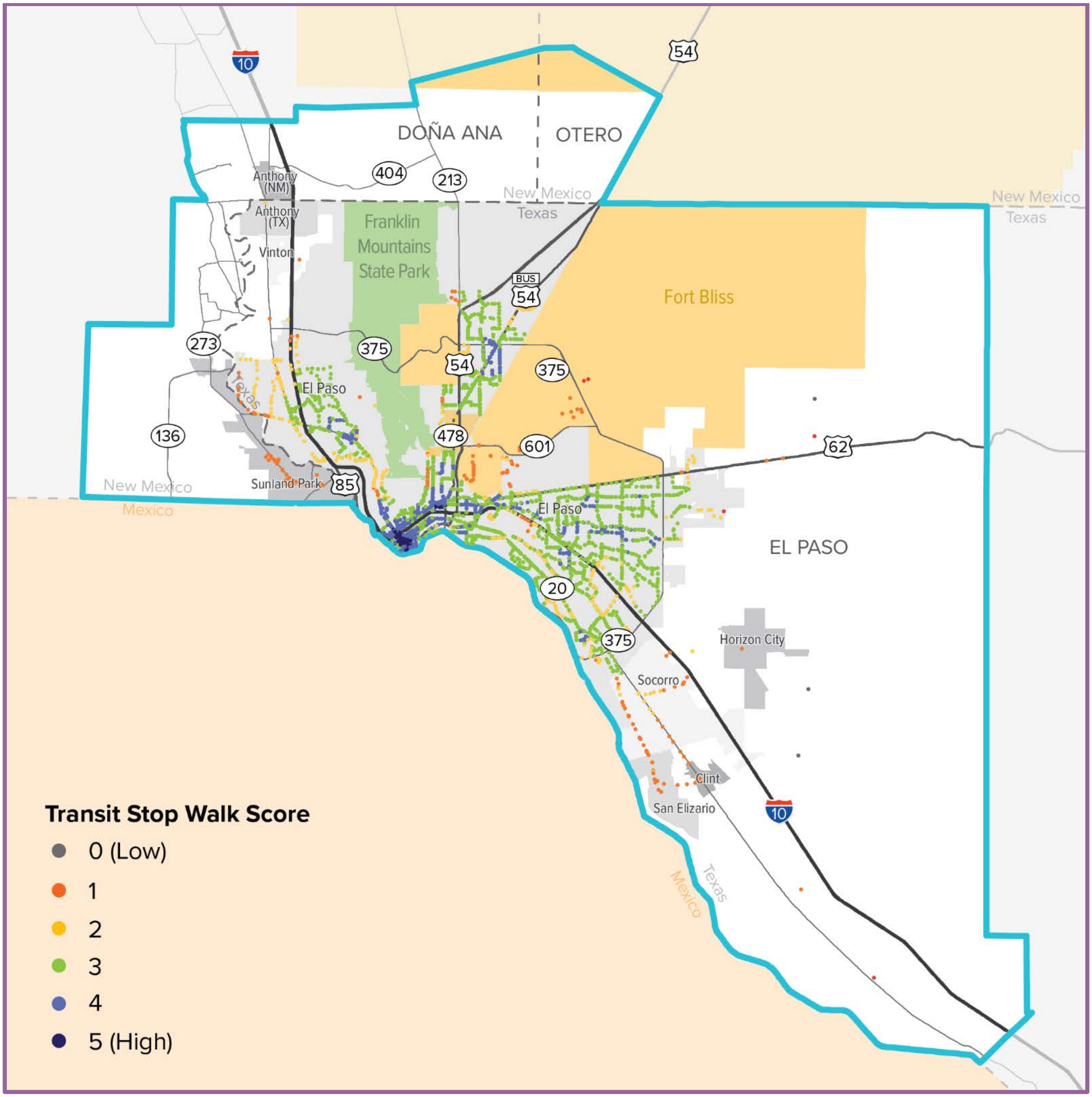
SCORE	POPULATION	PERCENT	EMPLOYMENT	PERCENT
1	174,911	20%	39,342	12%
2	185,914	21%	86,208	26%
3	378,113	43%	120,725	37%
4	128,290	15%	58,846	18%
5	4,999	1%	13,130	4%

A closer look at walkability near transit stops reveals that roughly a third of transit stops are in areas with a high walkability score (4 or 5), and that only 4% of transit stops are in areas with very poor walkability. It is important that the areas surrounding transit stops are walkable since almost all transit trips start and end with a walking trip. Figure 4.7 shows transit stops based on their relative walkability.

TABLE 4.2: TRANSIT STOPS BY WALKABILITY SCORE

SCORE	TRANSIT STOPS	PERCENT
1	106	4%
2	378	13%
3	1,501	52%
4	806	28%
5	81	3%

FIGURE 4.7: TRANSIT STOPS BY WALK SCORE



BICYCLE ACCESSIBILITY ANALYSIS

The bicycle analysis was conducted in a manner similar to the walkability analysis. A geospatial analysis was done to measure the availability of bicycle infrastructure and other indicators of bicycle accessibility throughout the MPO. Some of the same indicators that were used in the walkability analysis – such as intersection density, parks, schools, and destinations – were also used in the bicycle analysis.

Methodology

A bicycle network was created to measure the coverage of bicycle infrastructure throughout the region. The bicycle network consists of residential roads, bike lanes, roads with shoulders, and shared-use paths. Residential roads were included in the network because these are roads that typically have very light traffic, low traffic speeds and are generally receptive to cycling. Like what was done in the walkability analysis, the ratio of residential roads to the total roadway network in an area was measured. This measurement shows what percent of roads in an area are receptive to cycling. For example, if the ratio is 1:1 (or 1), then an area is made up entirely of residential roads that are all receptive to cycling. If the ratio is 1:2 (or .5), then half of the roads in an area are residential roads that are receptive to cycling (Figure 4.8). Areas are given a score of 1-5 based on the ratio of residential roads to all roads in the roadway network. Additional points were given to areas with more bicycle infrastructure, such as bike lanes (Figure 4.9), shared-use paths (Figure 4.10), or wide shoulders (Figure 4.11).

Bike sharing stations were also factored into the analysis. The presence of a bike sharing station within an area resulted in an additional point being factored into the final cycling accessibility score, which also included other measurements such as intersection density, parks, schools, and other destinations.

Once all factors were measured and scored, the scores were summed together to create a master bicycle accessibility score. This score was then adjusted to a 1-5 scale with 5 indicating good cycling accessibility and 1 indicating poor cycling accessibility.

FIGURE 4.8: RESIDENTIAL ROAD RATIO

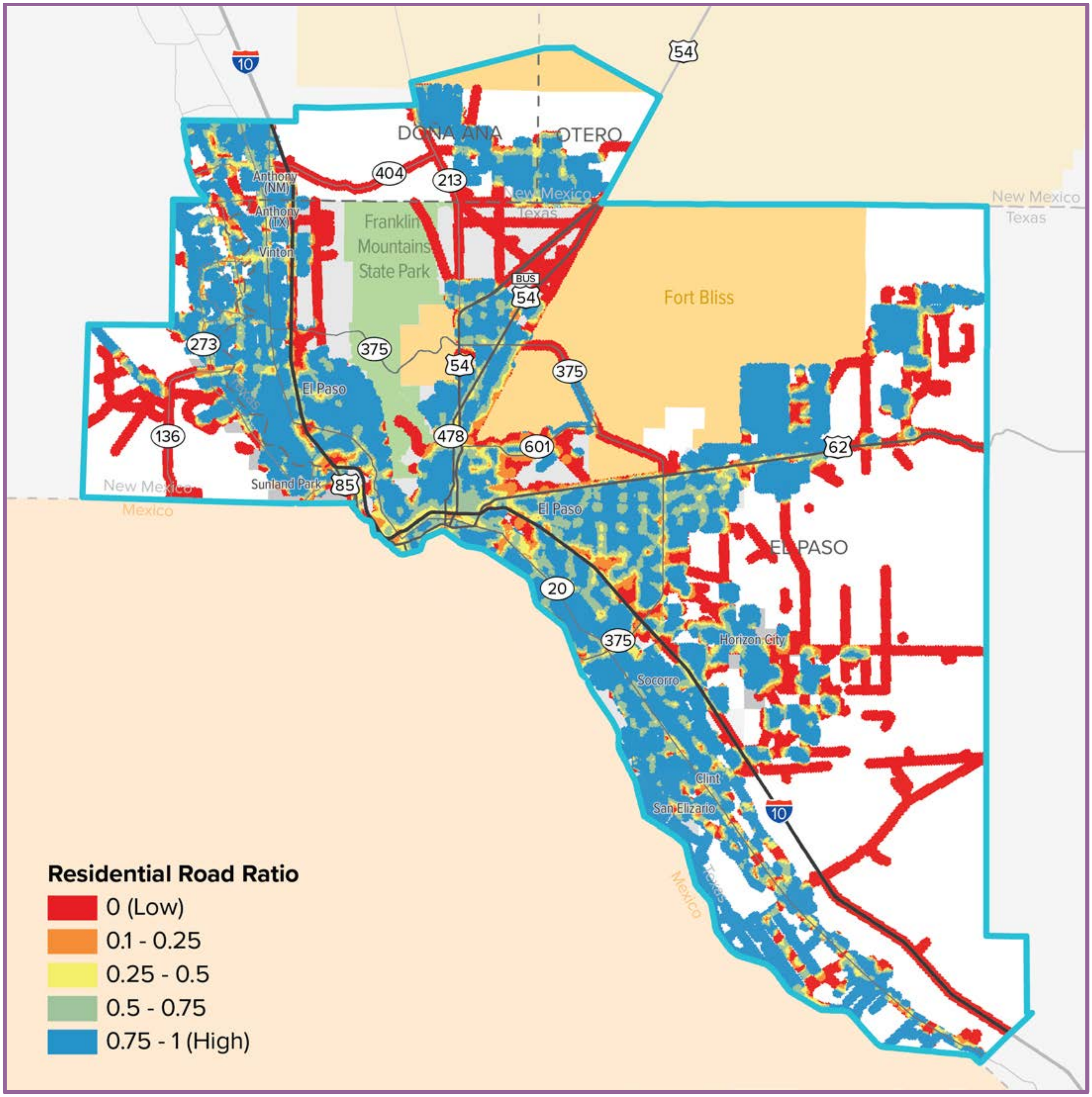


FIGURE 4.9: EXISTING BIKE LANES

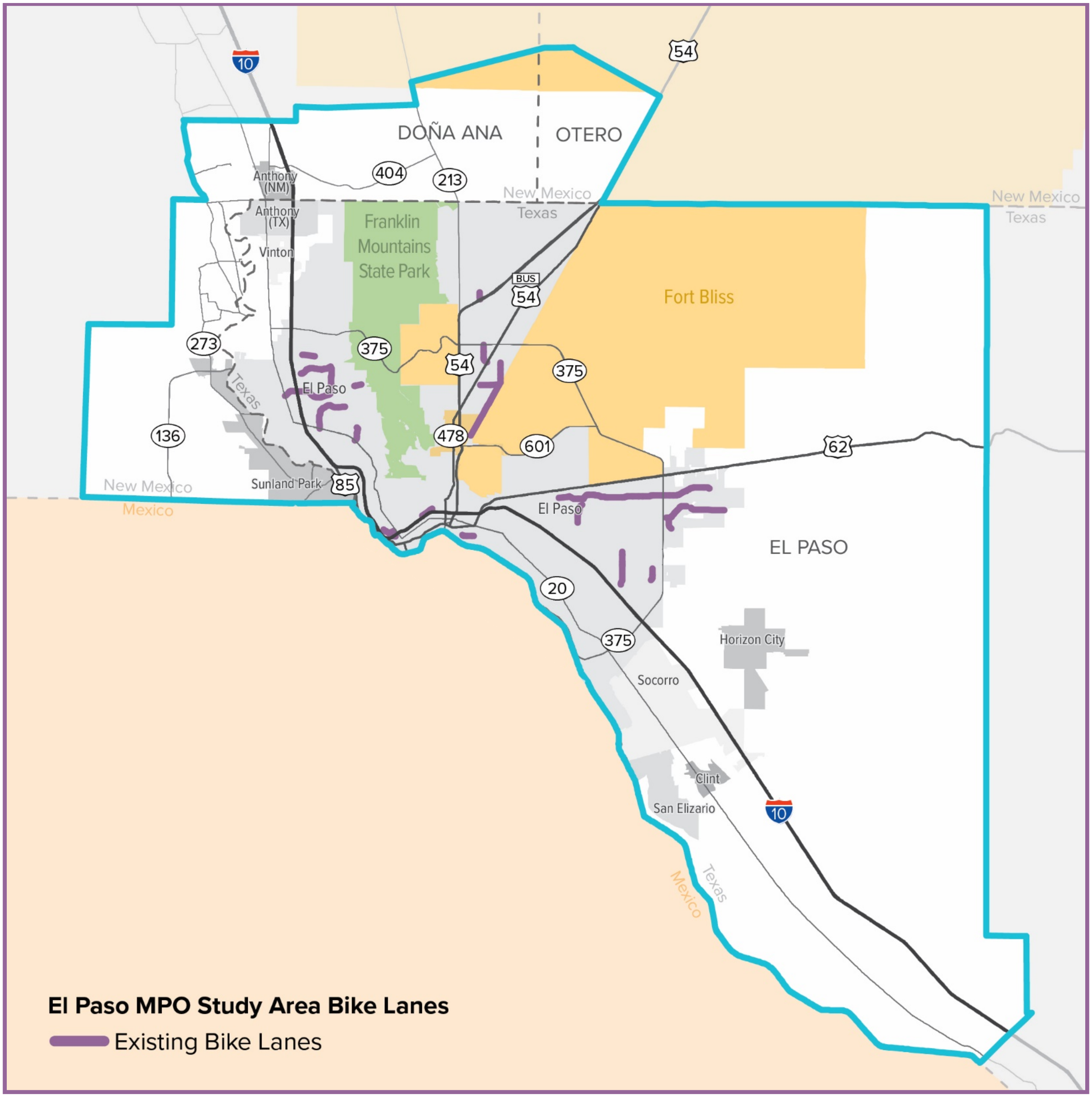


FIGURE 4.10: SHARED USE PATHS

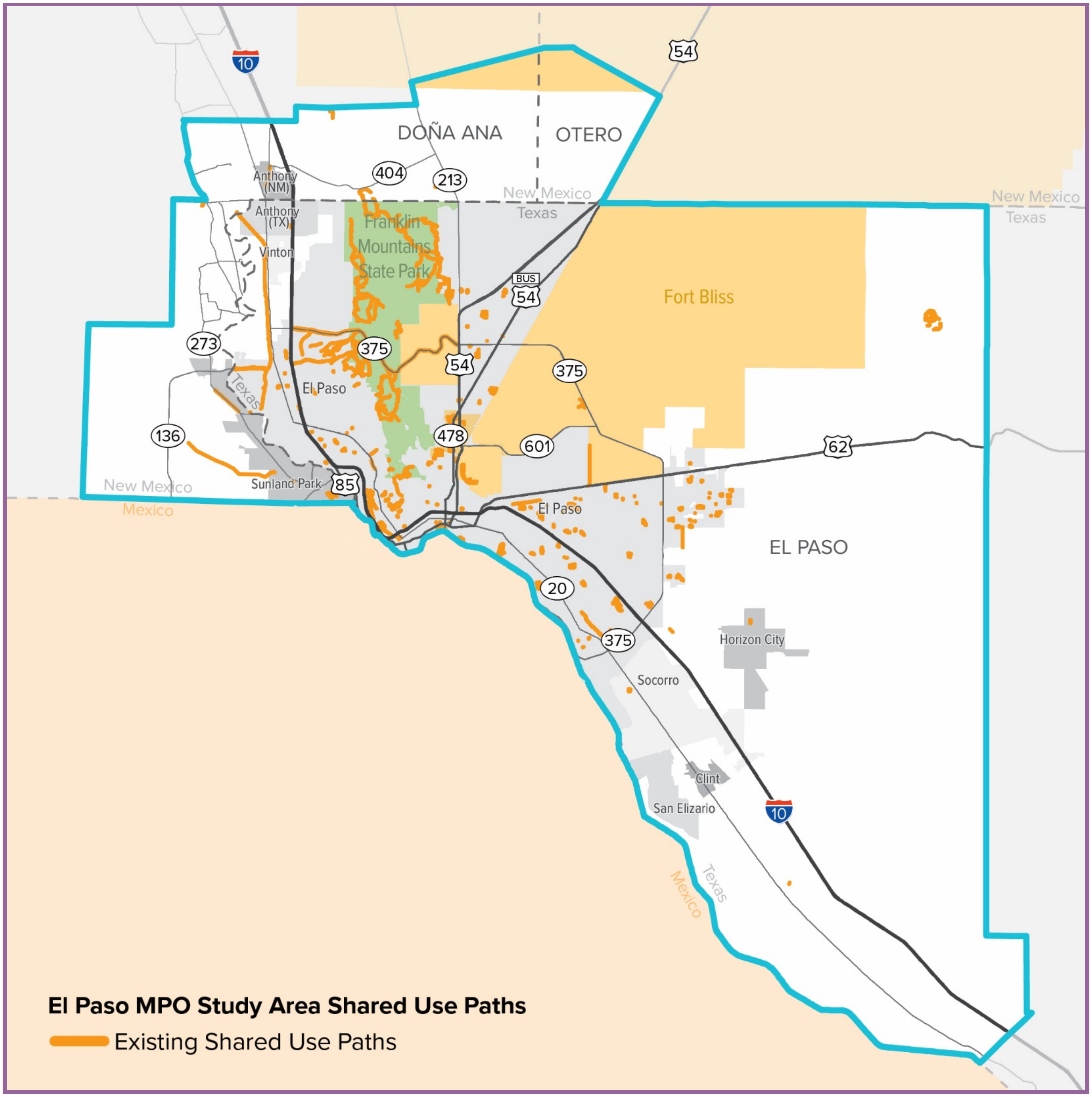
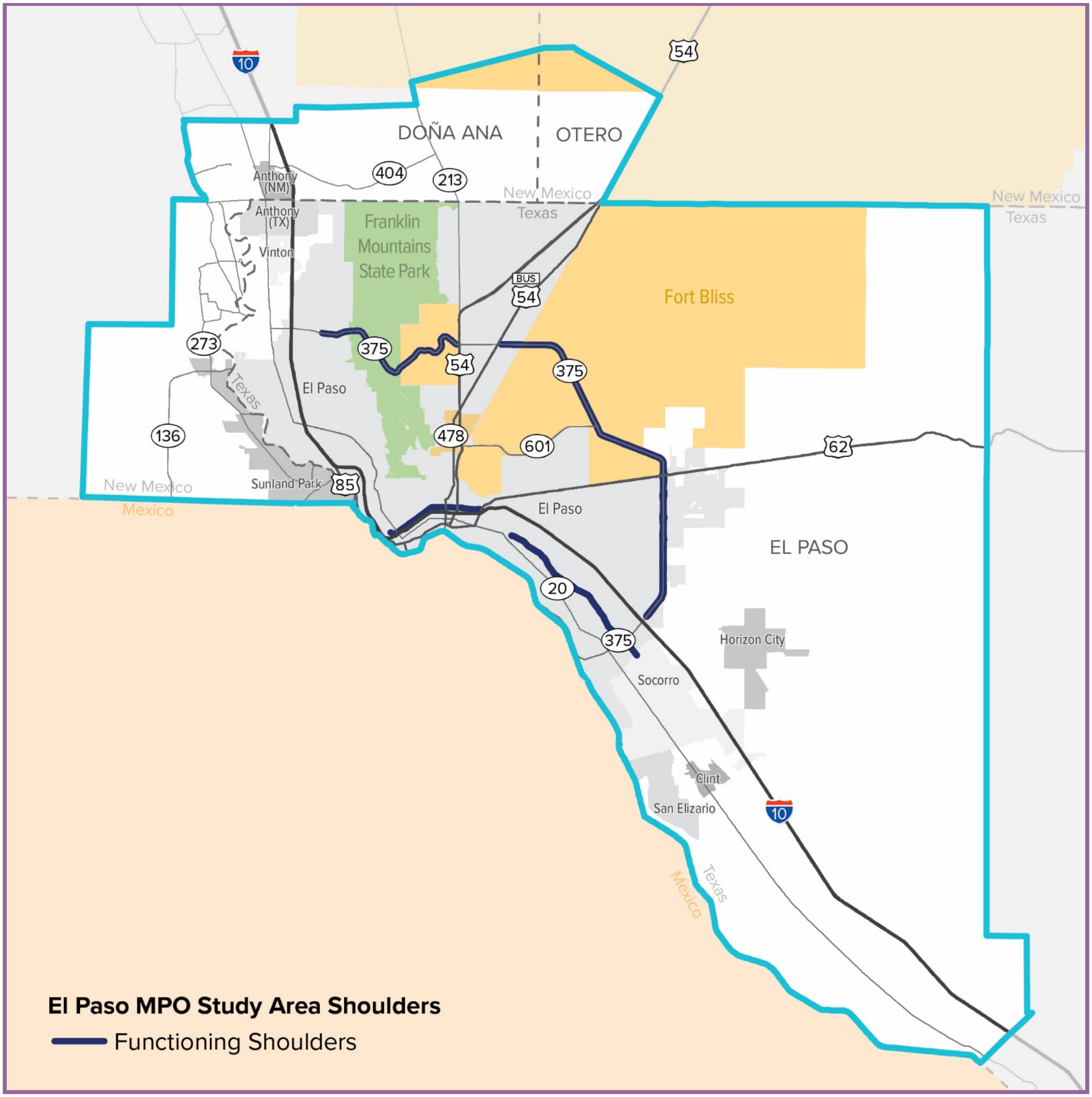


FIGURE 4.11: WIDE SHOULDERS



Analysis Results

Utilizing the analysis described in the previous section, bicycle accessibility scores were assigned to each TAZ. Scores ranged from 1-5, with some zones receiving no score due to a lack of data, and can be seen in Figure 4.12. A score of 1 illustrates low bicycle accessibility, while a score of 5 illustrates high bicycle accessibility. Population, employment, and transit access were measured within each of these zones to better understand how many of the region's population and jobs are in areas with relatively high and low bicycle accessibility.

FIGURE 4.12: BICYCLE ACCESSIBILITY SCORES

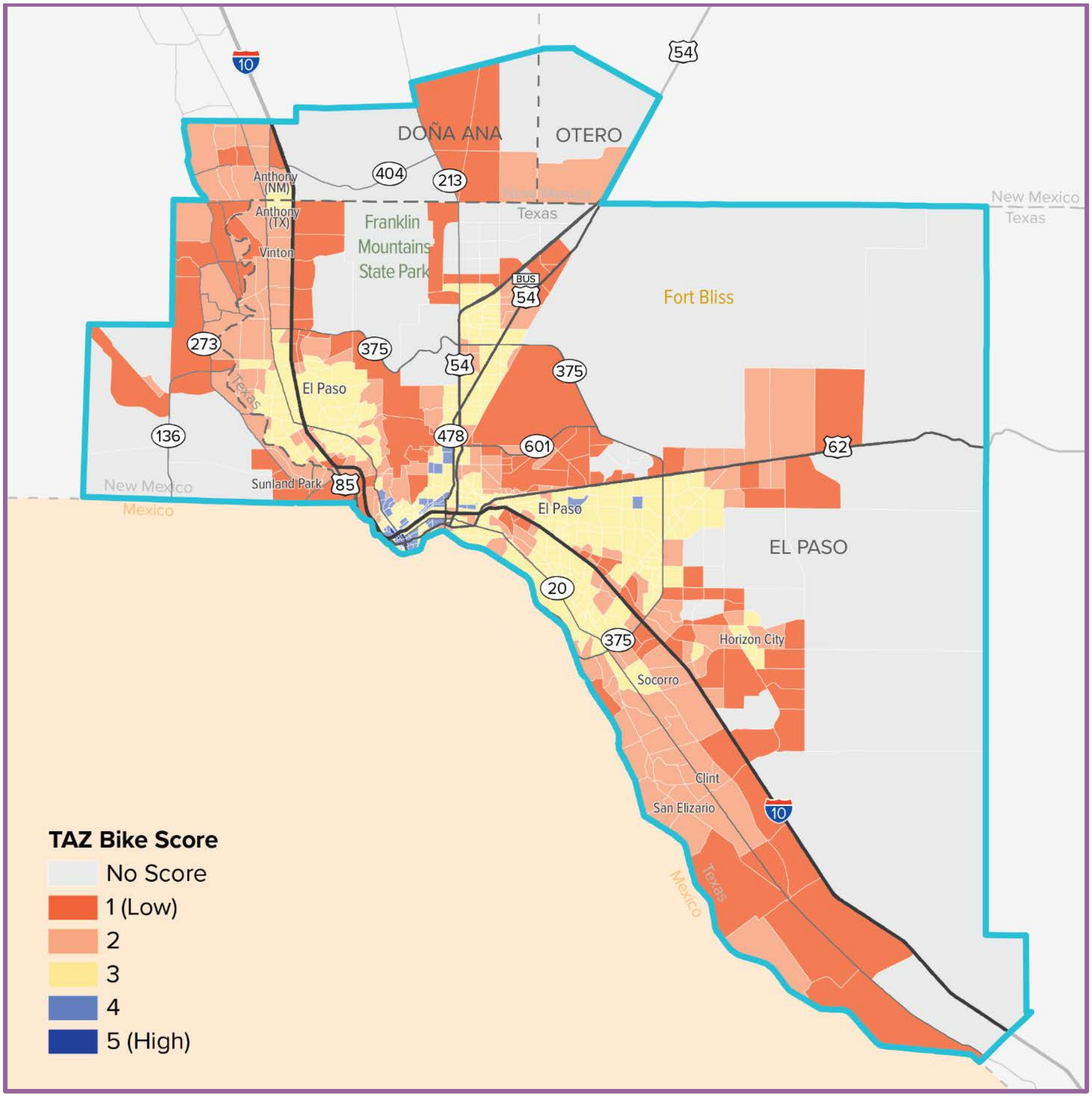


Table 4.3 shows that most of the population lives in an area with a score of 3. The distribution of population by bike score is similar to the distribution of population in the walkability analysis, however, there are some key differences. The main difference is that the proportion of the population living in areas with a very poor bicycle accessibility score is much smaller than the proportion of the population living in areas with a very poor walkability score. This is likely because it's not common for people to live in parts of the region that lack the low-traffic, residential roads that are generally conducive to cycling, but that may not have a well-connected sidewalk network. On the other hand, there are many places where people live that lack sidewalks and have poorly connected road networks.

TABLE 4.3: POPULATION AND EMPLOYMENT WITHIN BICYCLE ACCESS ZONES

SCORE	POPULATION	PERCENT	EMPLOYMENT	PERCENT
1	63,216	7%	53,519	16%
2	208,086	24%	94,436	29%
3	532,161	61%	134,525	41%
4	65,558	8%	24,945	8%
5	3,206	0%	10,660	3%

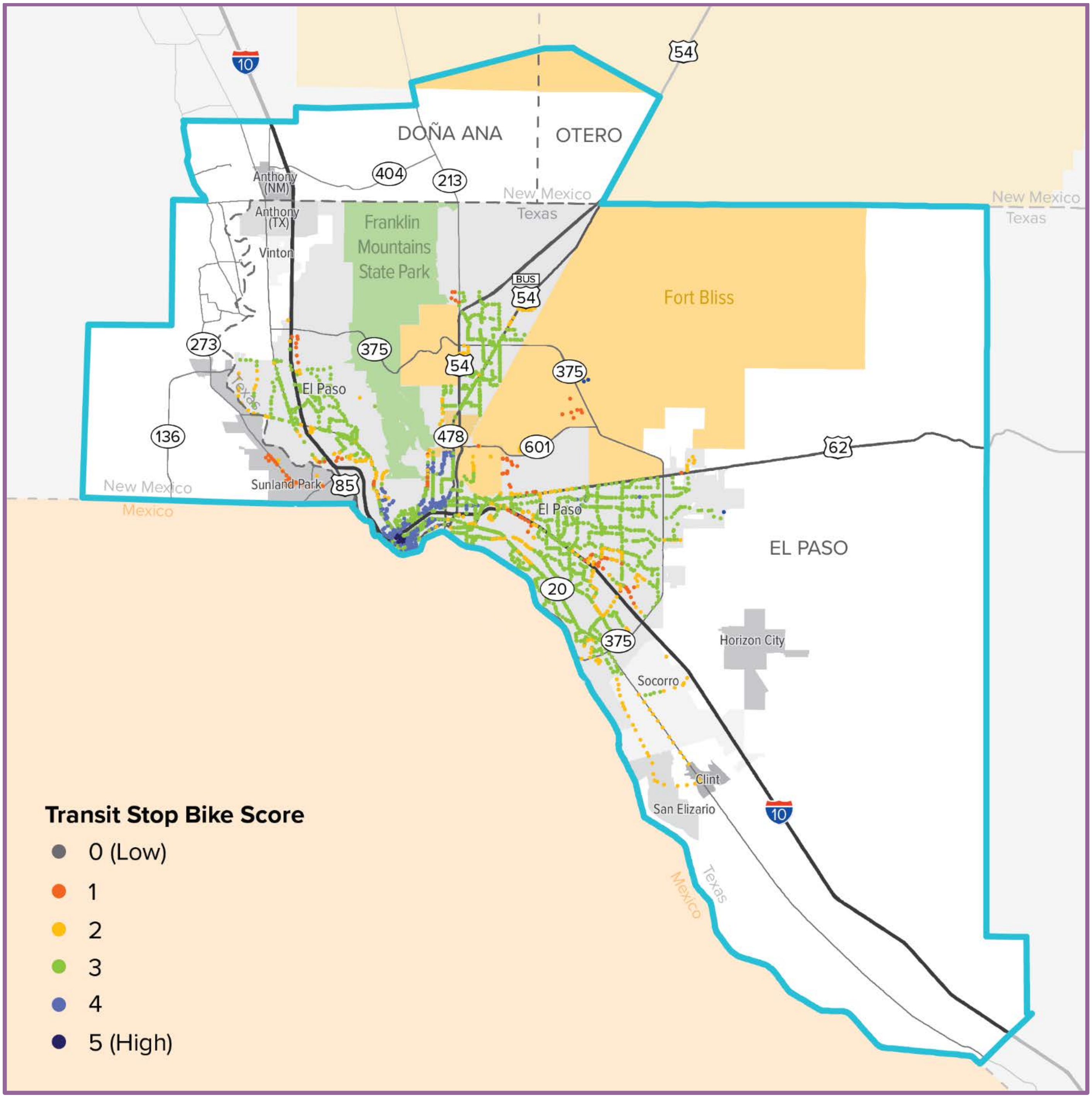
The distribution of employment by bicycle accessibility score closely resembles the distribution of employment by walkability. Roughly 40% of jobs are in an area with a bicycle accessibility score of 3 and a little more than 50% of jobs are in an area with a bicycle accessibility score of 3 or higher. Highly bike-able employment is overwhelmingly concentrated in the central part of El Paso, which is more conducive to bicycle access due to the abundance of low-speed, highly connected roads. Relatively few bike lanes currently exist in El Paso, but most of the ones that do exist are in the central part of the city.

Table 4.4 shows the number of transit stops within the different bicycle accessibility zones. Figure 4.13 shows transit stop locations symbolized by their bicycle accessibility score. Only 16% of transit stops are in an area with a bicycle accessibility score of 4 or 5. While it is not always practical to complete the first or last leg of a transit trip on a bicycle due to most buses having limited room for bicycles, improved cycling accessibility near transit can help strengthen the link between a bike share network and a transit system.

TABLE 4.4: TRANSIT STOPS WITHIN BICYCLE ACCESS ZONES

SCORE	TRANSIT STOPS	PERCENT
1	120	4%
2	362	13%
3	1,919	67%
4	412	14%
5	59	2%

FIGURE 4.13: TRANSIT STOPS BY BIKE SCORE



WALKING AND BIKING GAP ANALYSIS

Active Transportation Mode Share

Mode share refers to the type of transportation mode chosen per trip by an individual; this section focuses on bike and walk trips occurring in the El Paso MPO Region. The El Paso MPO 2045 Travel Demand Model (TDM) produces estimates of mode shares for several trip purposes using travel surveys and observed trends to generate an informed calculation. The following maps (Figures 4.14 and 4.15) illustrate future bike and walk trip density for home based work trips (HBW) by traffic analysis zones characterized by majority origin, majority destination, or zones with a balance of both trip types. These maps provide context on how future active transportation demand will be distributed throughout the area, based on trip density by mode. Bike trip density is seen in East El Paso, downtown, and along the Mesa Street Corridor. Walk trip density is most prominent in the central business district, and seen moderately in East El Paso and along the Mesa Street Corridor.

FIGURE 4.14: 2045 BICYCLE TRIP DENSITY BY TAZ

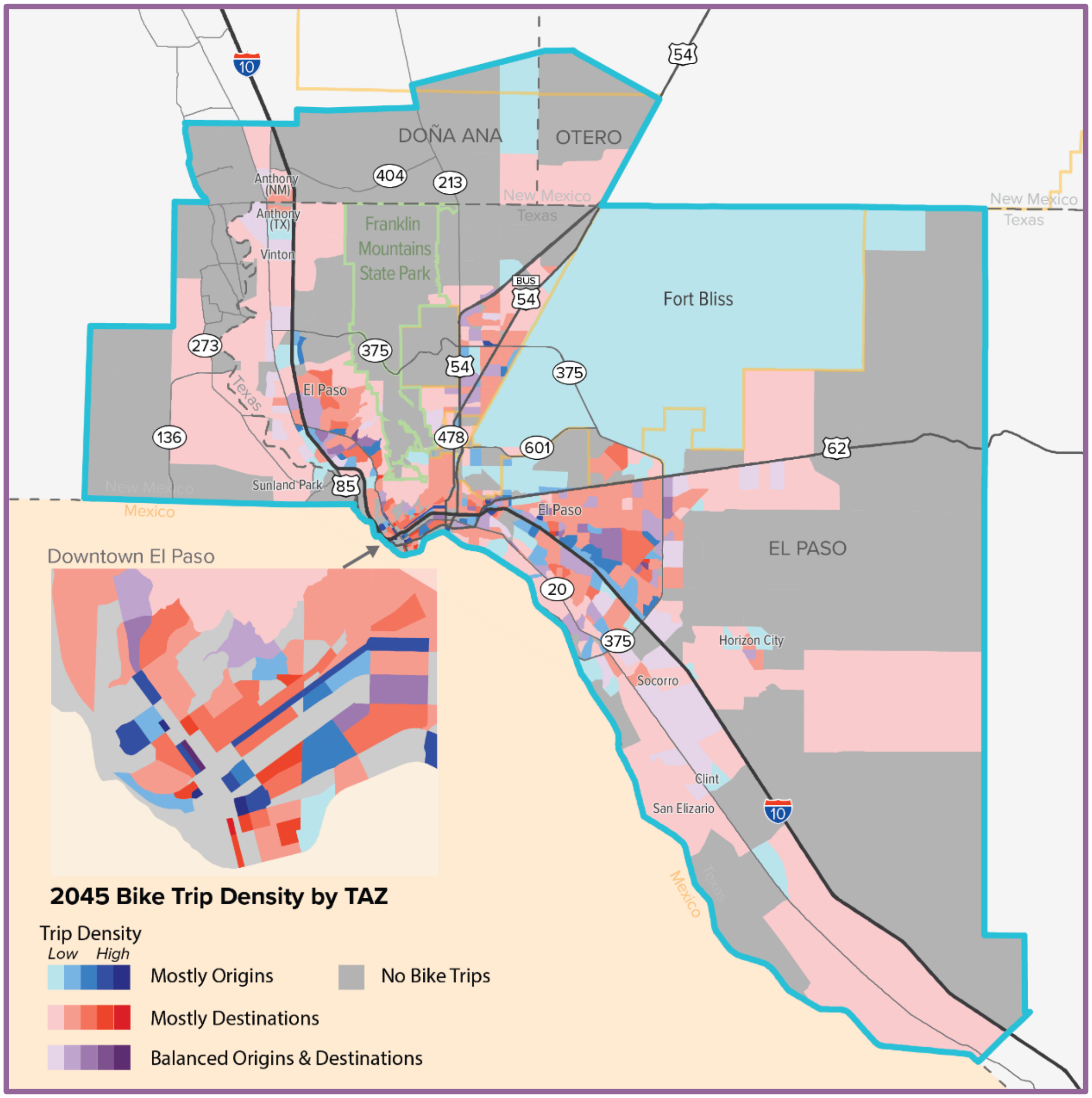
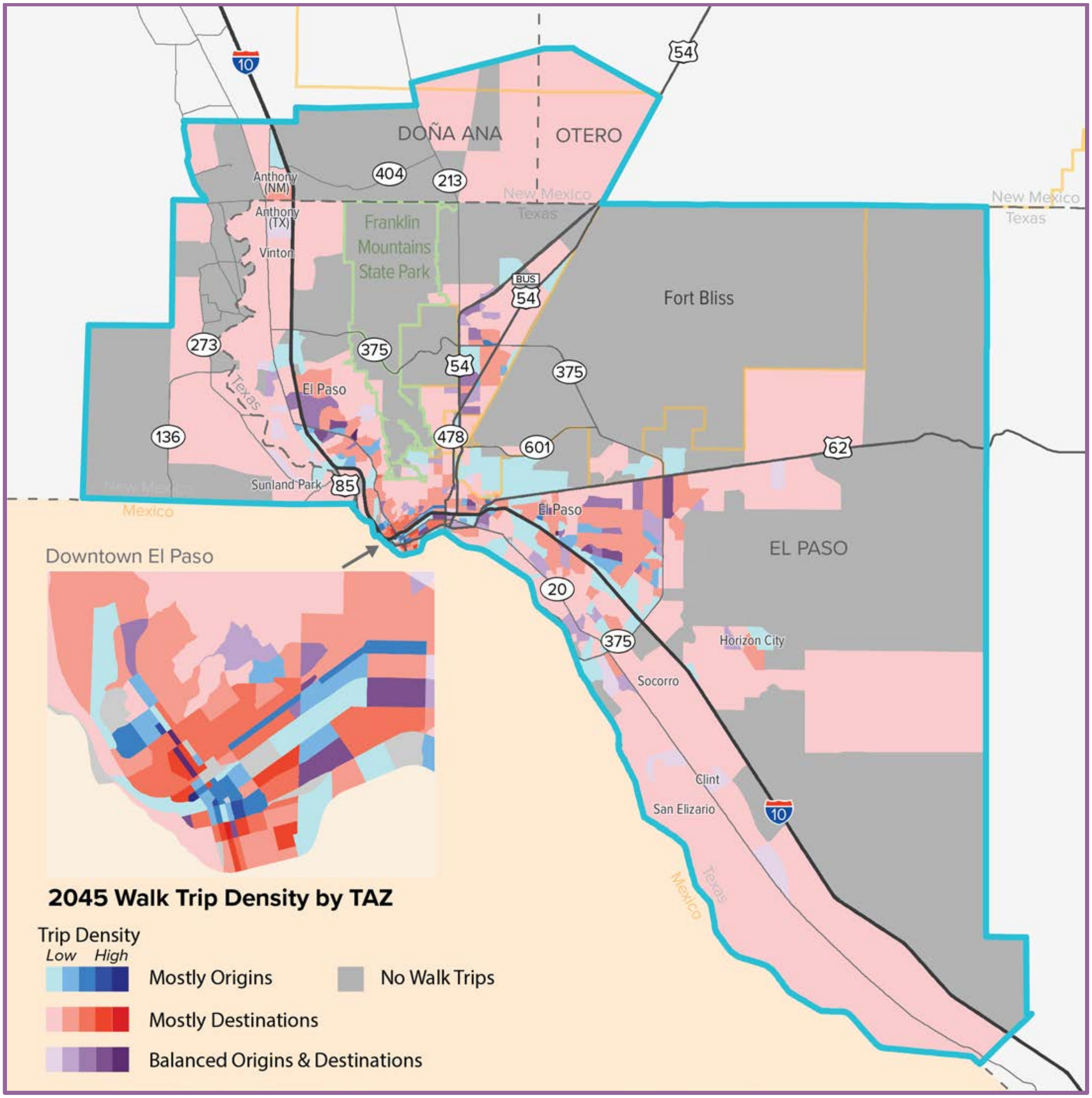


FIGURE 4.15: WALK TRIP DENSITY BY TAZ



Walk Gaps

Analyzing existing conditions provides the framework for preparing the walking and biking gaps analysis as it identifies existing infrastructure deficiencies. To identify gaps in the walking and bicycling network, the project team utilized the El Paso 2045 Travel Demand Model (TDM) and the walk and bike scores noted previously. Origin and destination TAZs were evaluated to represent regional demand for walk trips Figures 4.16 and 4.17 illustrate origin and destination TAZ walk demand. Gaps were identified by comparing low walk score TAZs to high walk demand TAZs, which shows locations where a high walk demand is not adequately served by pedestrian infrastructure (Figure 4.18). These areas should be prioritized when planning future pedestrian infrastructure projects. Providing pedestrian infrastructure in deficient areas will improve the overall walkability and connectivity of the region, and can support the region's goals towards reducing emissions and increasing the number of safe, affordable transportation options other than single occupant vehicles.

FIGURE 4.16: WALK ORIGIN DEMAND

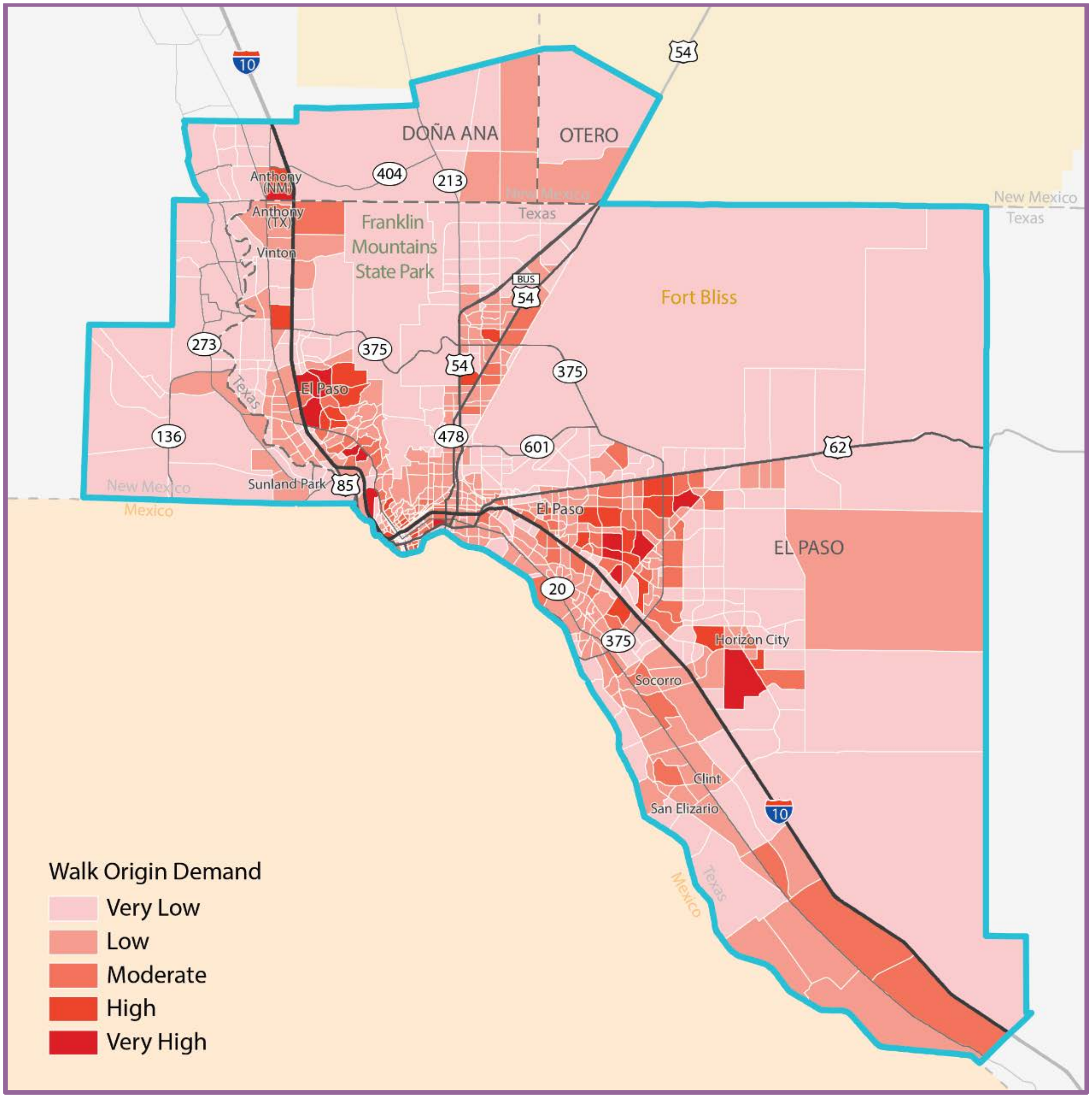


FIGURE 4.17: WALK DESTINATION DEMAND

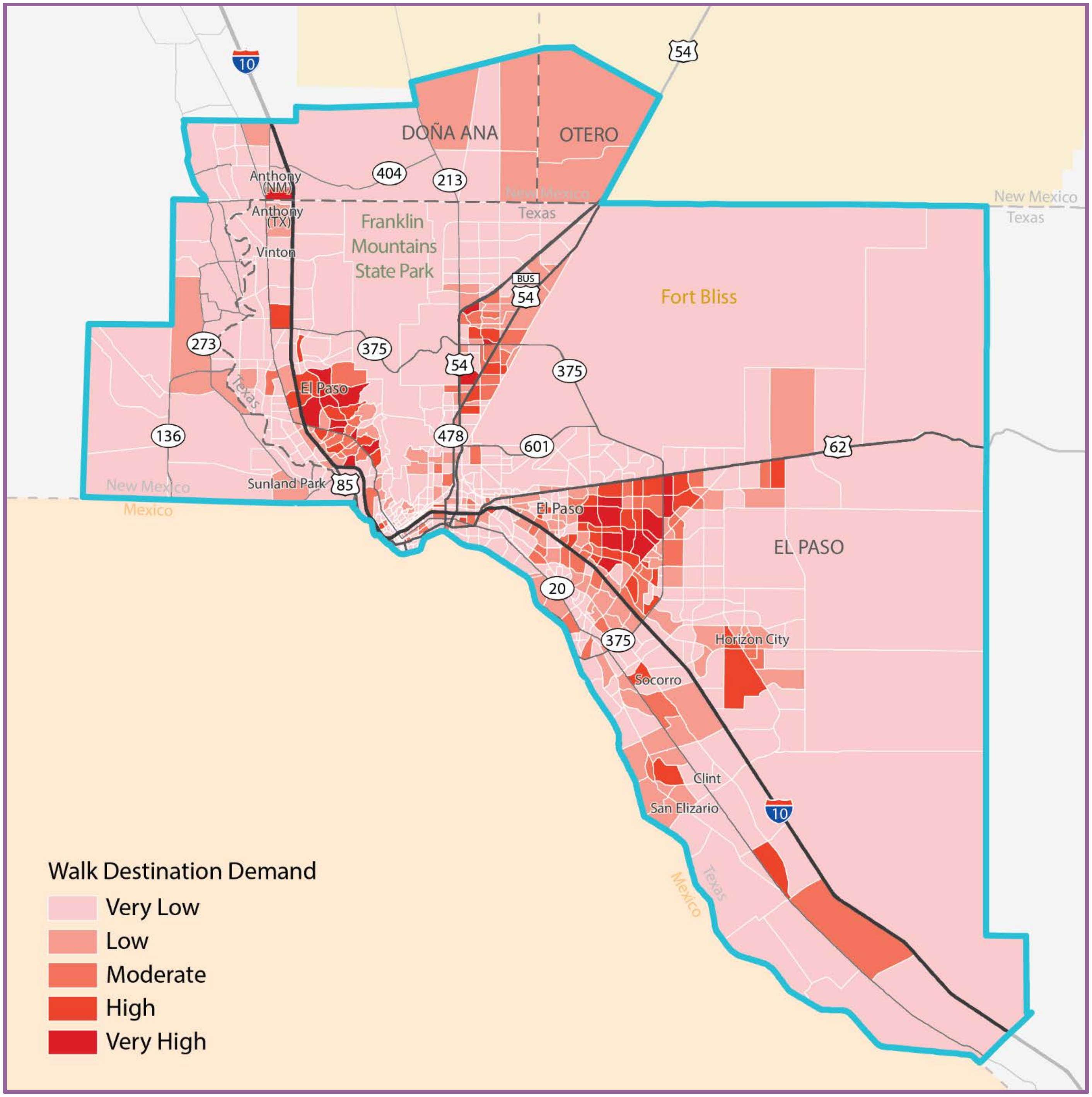
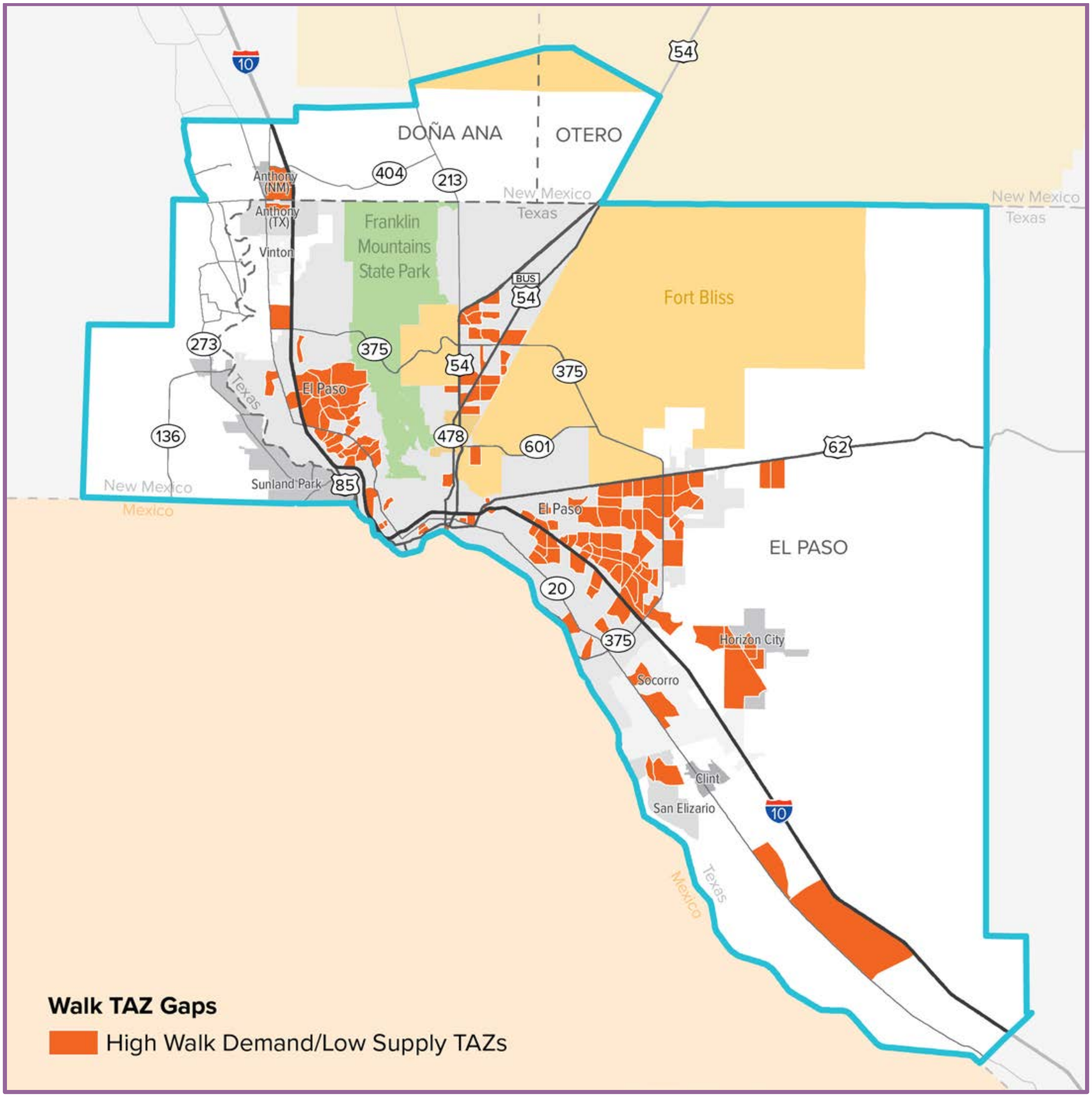


FIGURE 4.18: WALK GAPS



Bicycle Gaps

Bicycle infrastructure gaps are classified multiple different ways. The first type of gap identifies areas with high bicycle demand per the El Paso 2045 TDM but that have poor bicycle accessibility scores. Figures 4.19 and 4.20 illustrates bicycle origin and destination demand based on the El Paso 2045 TDM. Figure 4.21 illustrates intersecting areas where high bicycling demand is met by low bicycling accessibility scores, indicating a disconnect between bicycling demand and the facilities provided within that TAZ. Bicycle demand is represented by origin and destination scores weighted by trip count and trip percentage. The second way to identify future bicycle gaps is to review the future Regional Active Transportation Network against high bicycling demand TAZs. Figure 4.22 shows high bicycle demand TAZs that are not connected to the region via the future Regional Active Transportation Network. Lastly, comparing bicycle demand against the future regional network and local planned bicycle facilities remove gaps that can be addressed by local bicycle infrastructure investment. Figure 4.23 shows potential bicycle gaps where high bicycle demand is not met by either the future Regional Active Transportation Network or existing/planned bicycle facilities. This map illustrates that the future Regional Active Transportation Network and planned El Paso bike facilities form a comprehensive network that results in a much more connected region, but that some gaps still exist. It should be emphasized that the future bike facilities are simply proposed and that further coordination towards implementation is essential for creating a comprehensive and connected bicycle network.

FIGURE 4.19: BIKE ORIGIN DEMAND

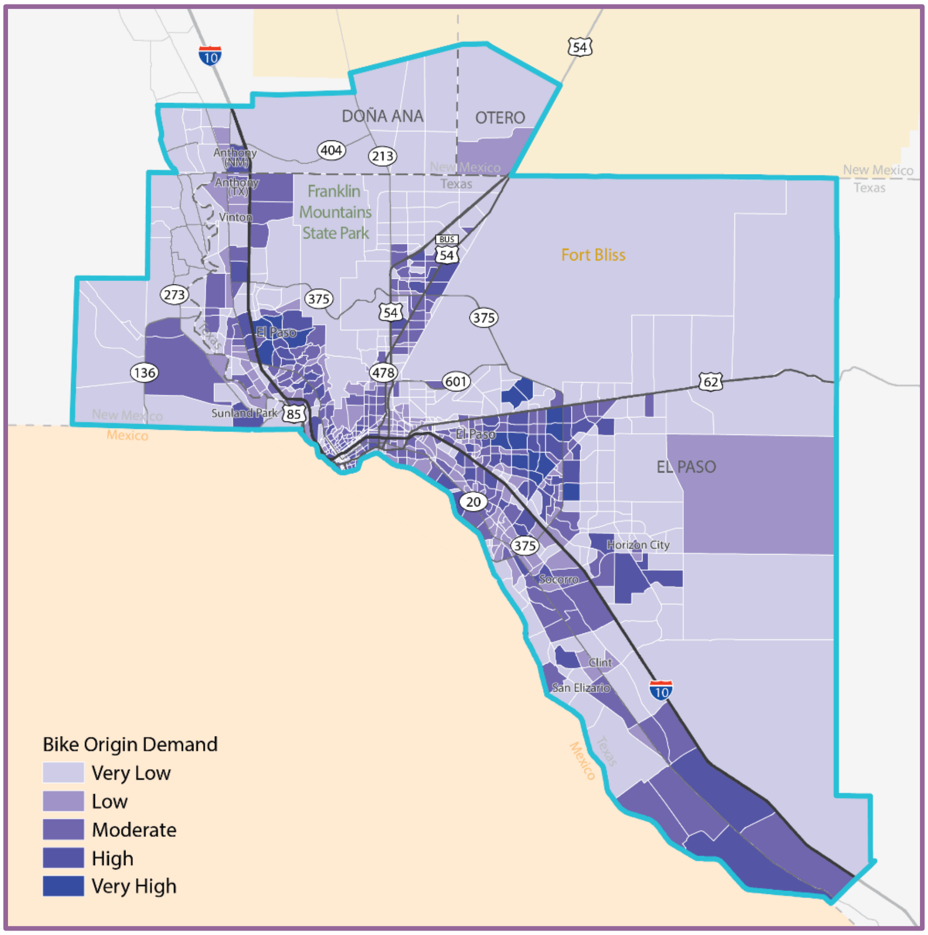


FIGURE 4.20: BIKE DESTINATION DEMAND

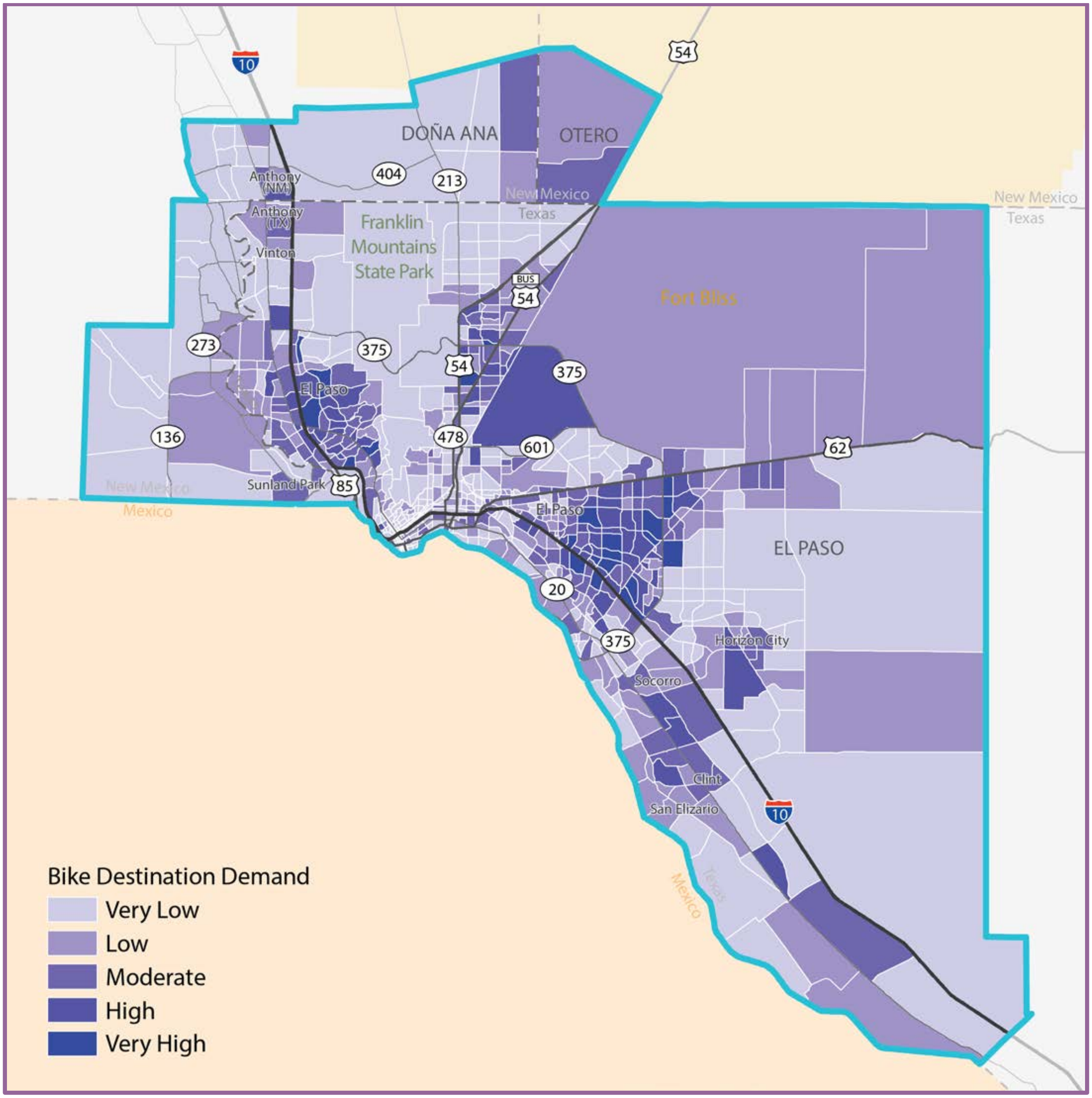


FIGURE 4.21: BIKE GAPS BASED ON BIKE SCORES

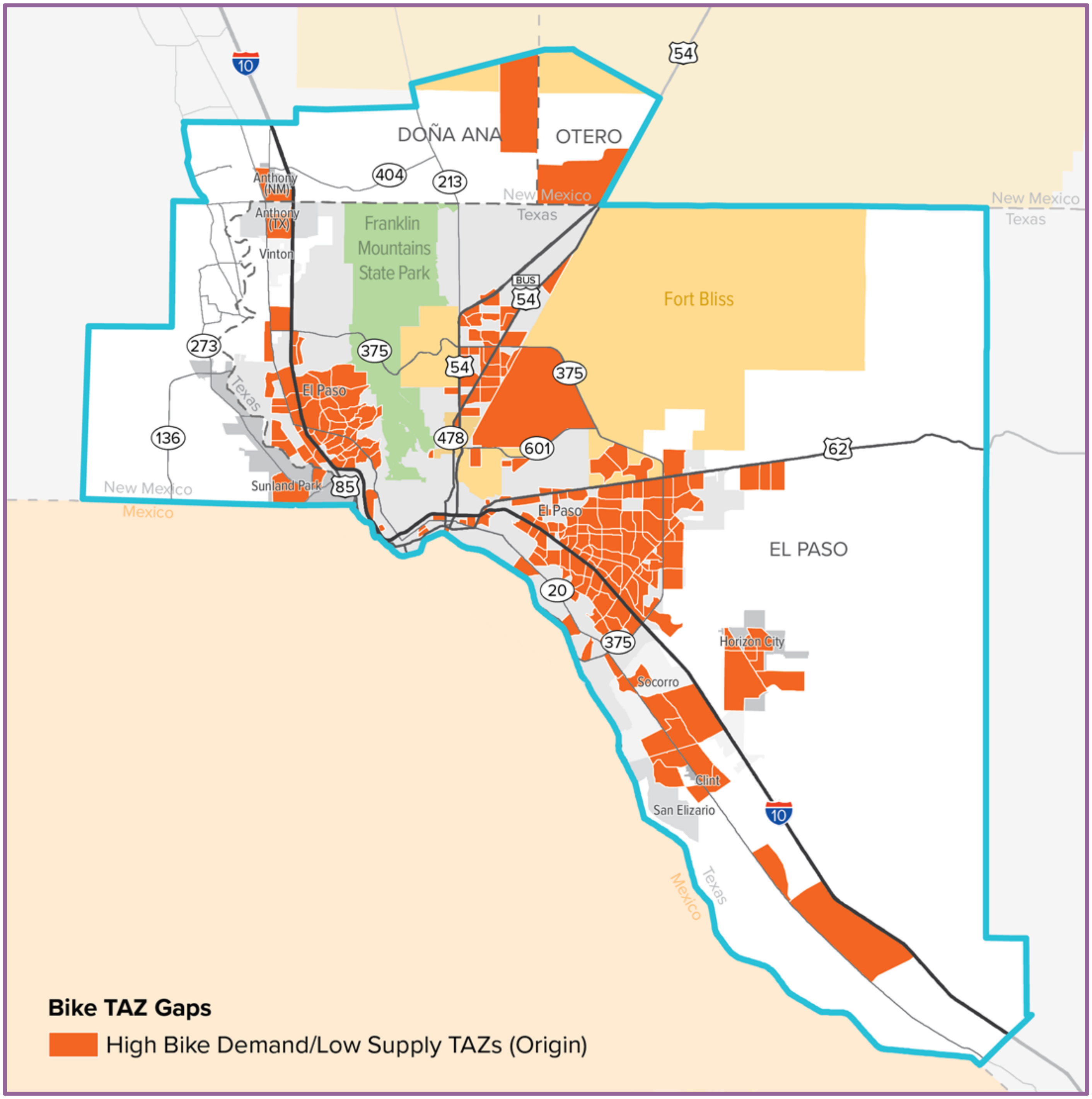


FIGURE 4.22: REGIONAL ACTIVE TRANSPORTATION NETWORK GAPS

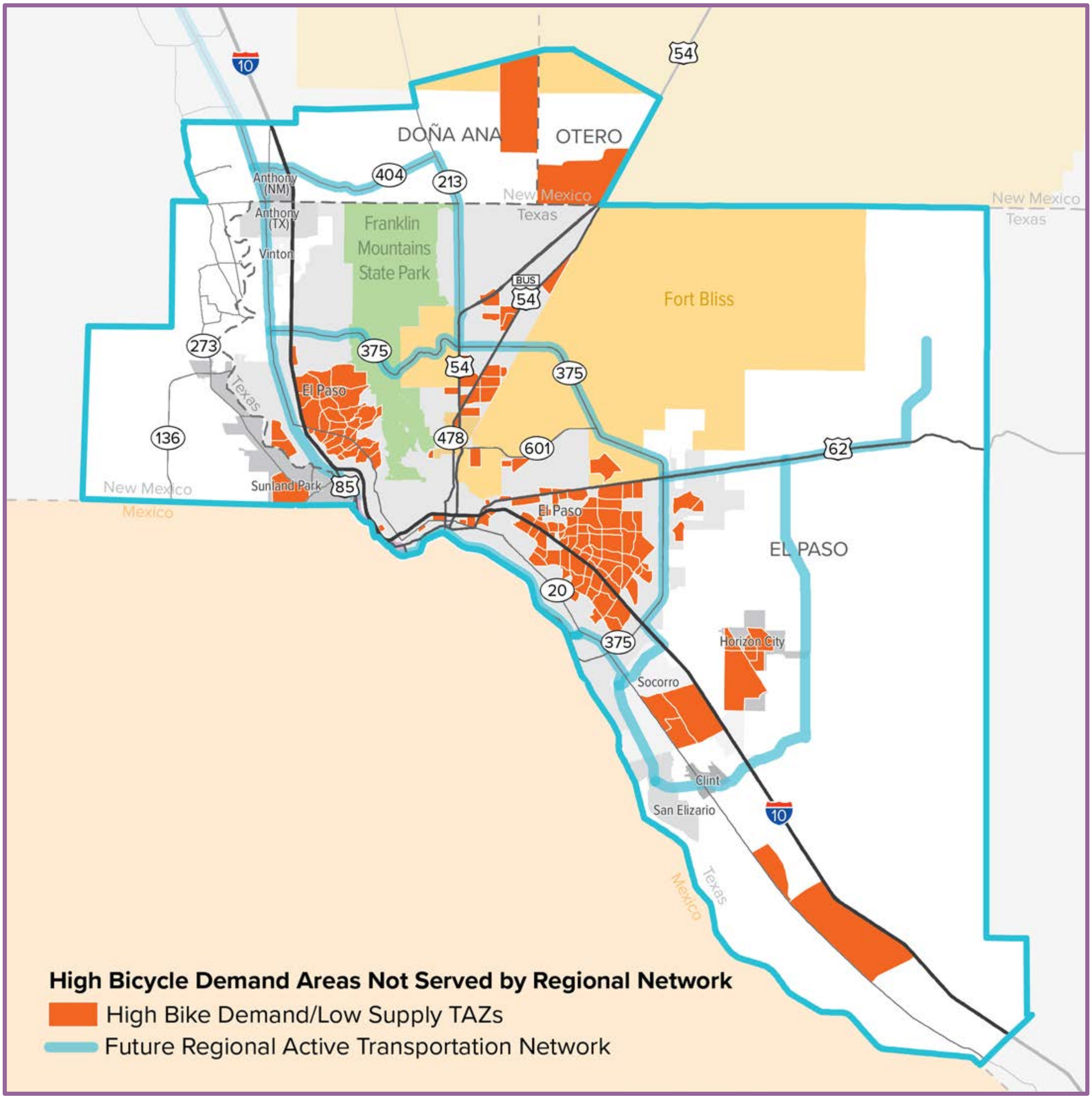
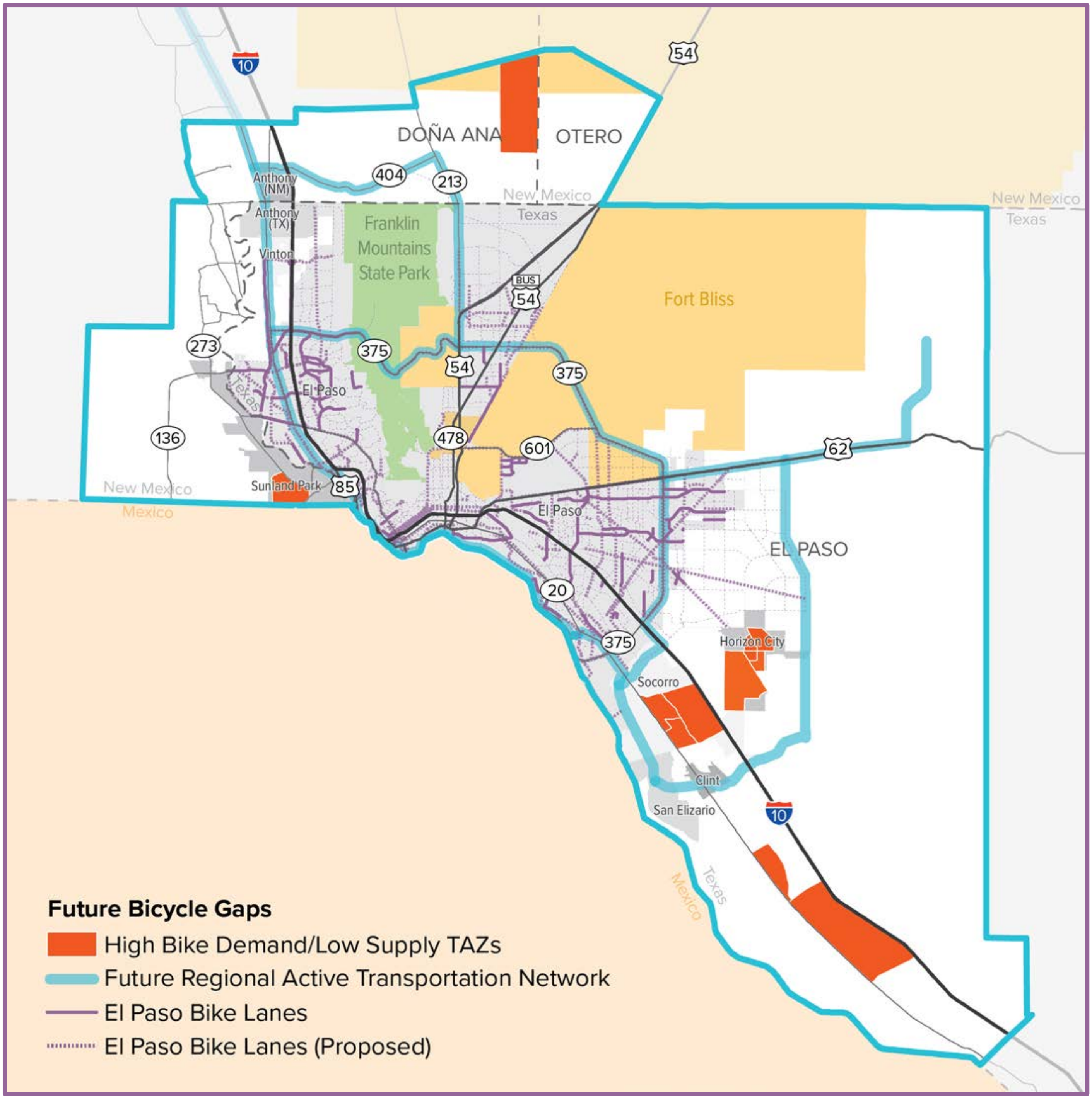


FIGURE 4.23: FUTURE BICYCLE FACILITY GAPS



SUMMARY

Analyzing and scoring the walking and cycling conditions throughout the region has revealed that some areas are more walkable or more accessible by bicycle than other areas. Some areas have excellent walking or cycling conditions, and other areas have very poor walking or cycling conditions. It is not completely necessary for all areas to have excellent walking or cycling conditions. The results of the active transportation gaps analysis identified specific locations where investment and development of both bicycle and pedestrian facilities can improve regional connectivity. Several of the shared-use paths proposed by the City of El Paso's 2016 Bicycle Master Plan address significant gaps in the regional active transportation network, and the MPO should consider updating the RATP to include these facilities where appropriate.