# EL PASO COUNTY COMMISSIONERS COURT

February 22, 2022

Hon. Walter Miller
Chair – Transportation Policy Board
El Paso Metropolitan Planning Organization
211 N. Florence St.
El Paso, Texas 79901

***RE: El Paso County Public Comment on Metropolitan Transportation Plan (MTP) and Transportation Improvement Plan (TIP) and Transportation Conformity Report (TCR)***

Dear Chairman Miller,

At the special session of the El Paso County Commissioners Court held on February 17, 2022, the Court voted 4-1 to submit the following public comment to the El Paso Metropolitan Planning Organization's Call for Public Comment regarding the development and upcoming adoption of the Regional Mobility Strategy (RMS) 2050 Metropolitan Transportation Plan (MTP), RMS 2023-2026 Transportation Improvement Plan (TIP), and Transportation Conformity Report (TCR). Specifically, the County offers the following items for the MPO's review and consideration:

1. The County hired a third-party and independent consultant, Smart Mobility, Inc., to evaluate the Downtown I-10 Segment 2 Project data set and related traffic projections. The findings of that report are incorporated into this letter and comment as Attachment A. It is important to note that this report is submitted as a matter of record from the County to the MPO as both agencies continue to review the findings identified within the report. It is the County's intent to foster a thoughtful dialogue with the MPO and the Texas Department of Transportation – El Paso District regarding the data contained within the report to further refine these critical transportation planning activities.

2. As discussion continues between the County and MPO, the Court requests that the comment period for these planning documents be extended beyond the existing 30-day period. The MPO's Public Participation Plan, Section 4, only provided a minimum public comment period but not a maximum. The data presented in Attachment A should be shared with not only planning agencies but the community at large to foster further dialogue and understanding of these strategic documents, which may in turn, lead to additional public comment.

3. Given the analysis completed by the County's consultant, and the request to engage in a dialogue regarding data and findings within the report, the County requests that the MPO share the Draft 2050 Travel Demand Model with the County and its consultant. Use of the

model will be limited to the expansion of the existing analysis currently underway by the Consultant. The County understands that, at this time, the model is not considered final and should not be used for any other purpose.

4. Revise the 2050 Metropolitan Transportation Plan and place the Border Highway East – Phase I Project (CSJ 0924-06-591 and MPO ID No. F059X-CAP-1) somewhere within the 2032 Network Year (it currently is in FFY 2040). Further, revise the MTP and place the Border Highway East Phase II Project (CSJ 0924-06-592 and MPO ID No. F059X-CAP-2) within the 2040 Network Year (it is currently in FFY 2050).

Finally, the County may revise, modify or withdraw any of these comments given that the MPO has extended the comment period to March 9, 2022. Thank you for your critical work on this issue and we look forward to continuing the dialogue to make the MPO's Regional projects successful in meeting the present and future needs of the El Paso region collectively.

Regards,

**El Paso County Commissioners Court**

*cc:* *Hon. Ricardo A. Samaniego, Vice Chair – TPB, El Paso Metropolitan Planning Organization*
*Maya Sanchez, Vice Chair – TPAC, El Paso Metropolitan Planning Organization*
*Eduardo Calvo, Executive Director, El Paso Metropolitan Planning Organization*
*Tomas Trevino, P.E., District Engineer, TxDOT - El Paso District*
*J. Eddie Valtier, P.E., Deputy District Engineer, TxDOT - El Paso District*
*Betsy C. Keller, Chief Administrator, El Paso County*
*Norma R. Palacios, Executive Director, El Paso County Public Works*
*Jose M. Landeros, Director of Strategic Development, El Paso County Administration*
*Sal Alonzo, Associate Director, El Paso County Planning & Development*

*enc.* *Attachment A: Review of I-10 Segment 2 (Downtown) Expansion Proposal and Draft El Paso MPO MTP*

Attachment A

# Review of I-10 Segment 2 (Downtown) Expansion Proposal and Draft El Paso MPO MTP

Prepared by Norman Marshall, President Smart Mobility, Inc.

for

El Paso County Planning & Development Department

February 2022

## Executive Summary

I have reviewed materials related to the proposed I-10 Segment 2 (Downtown) expansion including traffic counts, traffic speed data and transportation modeling files. Based on this review, I present the following findings regarding the proposed I-10 Downtown expansion included in the draft El Paso Metropolitan Planning Organization's (MPO) 2050 Metropolitan Transportation Plan (MTP) (Project ID 1063X-CAP):

1) Urban freeway congestion cannot be eliminated.
2) Urban freeway congestion Is caused by too many short local trips on the freeway, and expansion shifts even more of these trips to the freeway.
3) Trucks are not the problem.
4) The Texas Department of Transportation (TxDOT)/El Paso MPO model speed and delay metrics are inaccurate, and the model exaggerates the benefits of freeway expansion.
5) Adverse impacts of urban freeway expansion are not adequately considered in the planning process including:
    a. congestion at street intersections caused by concentration of ramp traffic
    b. diverting traffic away from streets where traffic is the lifeblood of many businesses
    c. an unbalanced transportation investment strategy that worsens regional congestion in the long run.
6) Downtown I-10 recommendations to minimize adverse impacts include:
    a. eliminate "transit-adaptive" lanes,
    b. eliminate conversion of portions of Yandell Drive and Wyoming Avenue downtown to frontage roads,
    c. create a street collector-distributor system that keeps many local trips off I-10, and
    d. review the number of I-10 general-purpose lanes by section after making the other changes.

I have modeled a preliminary alternative that combines these elements using the 2045 TXDOT/El Paso regional model. The results are promising. I will refine this alternative in the final phase of this project – hopefully using the 2050 MTP model which the ***El Paso MPO and TxDOT have so far refused to provide***[1].

[1] The MTP model files were requested immediately after the publication of the Draft MTP on January 24, 2022, and the request was denied on January 25, 2022.

# Table of Contents

# 1 Background

El Paso County contracted with Smart Mobility, Inc. in September 2021 to:

1) review I-10 Downtown alternative modeling,
2) develop conceptual alternatives, and
3) model conceptual alternatives.

I have over 30 years of experience in travel demand modeling. Before co-founding Smart Mobility in 2001, I worked at RSG for 14 years and developed a national modeling practice there. I have experience with dozens of different regional travel demand models across regions of all sizes - including developing new models from scratch, making expensive enhancements in models, applying models, and reviewing models. Clients have included state departments of transportation, Metropolitan Planning Organizations, cities, public interest groups, and the Federal government. I have presented at several national transportation conferences including the areas of dynamic traffic assignment (DTA), induced travel, land use forecasting, modeling non-motorized trips, and transportation system resiliency. I have attached my resume at the end of this report.

When the contract was signed in September 2021, we immediately requested data from the El Paso MPO and from TxDOT. The MPO quickly responded but we didn't receive all the TxDOT data until late December. This delay hindered progress on this project during this 3-month period.

The data received includes:

- traffic count data,
- traffic speed data, and
- TxDOT/El Paso MPO regional modeling files for the 2045 MTP and 2045 MTP Amendment 2.

I call it the TxDOT/El Paso MPO model because the MPO is not at liberty to provide the entire model. That requires a license agreement with TxDOT. We have not received the modeling files for the 2050 MTP. The El Paso MPO claims that they cannot provide these files until the MTP and conformity determination are approved by the Federal government in November 2022. There is no such Federal requirement to withhold these data. In fact, these data are essential to a complete review of the MTP.

Review of the Draft El Paso MPO Metropolitan Transportation Plan (MTP) was not originally part of the scope but as it is integrally linked to the Downtown I-10 project, it is critical that I prepare comments now during the comment period, although I am continuing to work on the final phase of the project.

This report summarizes findings from Phases 1 and 2 and some preliminary findings from Phase 3.

# 2 Urban freeway congestion cannot be eliminated

Despite billions of dollars having been spent on urban freeway expansion, urban freeway congestion has gotten progressively worse. The 2020 report *The Congestion Con*, published by Transportation for America states:

> In an expensive effort to curb congestion in urban regions, we have overwhelmingly prioritized one strategy: we have spent decades and hundreds of billions of dollars widening and building new highways. We added 30,511 new freeway lane-miles in the largest 100 urbanized areas between 1993 and 2017, an increase of 42 percent. That rate of expansion significantly outstripped the 32 percent growth in population in those regions over the same time period. Yet this strategy has utterly failed to “solve” congestion…
>
> Between 1993-2017, the total annual hours of delay (the extra time spent traveling at congested rather than free-flow speeds) in the nation’s top 100 urbanized areas has increased by a whopping 144 percent.[2]

The statistics for the El Paso urbanized area for 1993 – 2017 are:

- 45% increase in population
- 102% increase in freeway lane miles
- 157% increase in congestion delay

Freeway expansion in the El Paso region has not reduced freeway congestion. A particularly notable Texas example of the failure to solve urban freeway congestion through expansion is the Katy Freeway in Houston.

> With 26 lanes at its widest point, the Katy Freeway in the Houston metro is the Mississippi River of car infrastructure. Its current girth, which by some measures makes it the widest freeway in North America, was the result of an expansion project that took place between 2008 and 2011 at a cost of $2.8 billion. The primary reason for this mega-project was to alleviate severe traffic congestion.
>
> And yet, after the freeway was widened, congestion got worse. An analysis by Joe Cortright of City Observatory used data from Houston’s official traffic monitoring agency to find that travel times increased by 30 percent during the morning commute and 55 percent during the evening commute between 2011 and 2014. A local TV station found similar increases.[3]

In the larger Texas metropolitan areas, TxDOT has largely given up on trying to eliminate peak period freeway congestion – instead focusing on constructing parallel managed lanes where vehicles are restricted to certain vehicles, and/or are subject to tolling. For these managed lanes to attract traffic, it is implicitly assumed that the general-purpose lanes will be congested forever.

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[2] Transportation for America. The Congestion Con: How more lanes and more money equals more traffic, 2020. file:///C:/Google%20Drive/Library/Congestion-Report-2020-FINAL.pdf

[3] Schneider, Benjamin. CityLab University: Induced Demand., September 6, 2018. Bloomberg CityLab. https://www.bloomberg.com/news/articles/2018-09-06/traffic-jam-blame-induced-demand

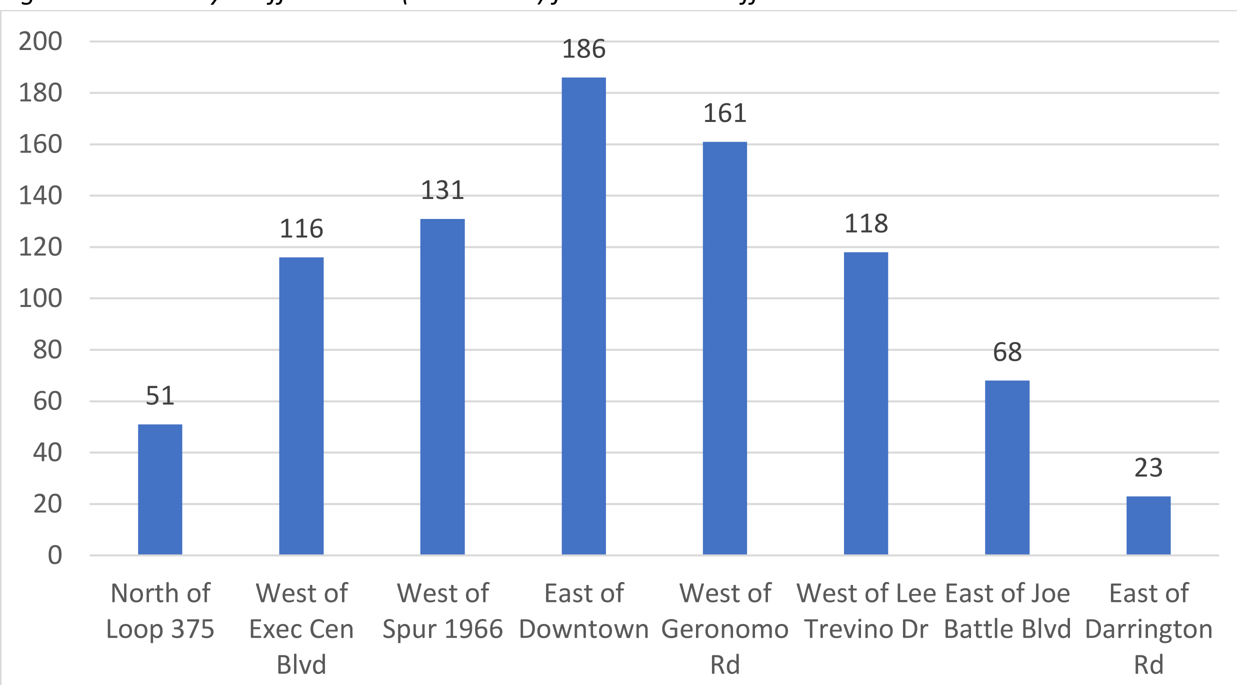
I-10 expansion could be beneficial, but it is important that expectations be realistic. Freeway expansion projects have consistently failed to live up to their promises.

# 3 Urban freeway congestion Is caused by too many short local trips on the freeway, and expansion shifts even more of these trips to the freeway

We have understood why expansion cannot eliminate urban freeway congestion for at least 30 years, although we have often ignored this knowledge in our planning processes. In 1992 Anthony Downs coined the term *triple convergence* to describe how peak period traffic congestion is inevitable because drivers will compensate for capacity increases by (a) shifting routes, (b) shifting travel time of travel, and (c) shifting travel mode.[4] After capacity expansion, the new equilibrium will be just as congested as the old equilibrium. Downs describes how drivers will choose "limited-access roads that are faster than local streets if they are not congested", but the attractiveness of such routes will cause them to become congested "to the point where they have no advantage over the alternate routes" (i.e., over arterial and local street routes).

In the El Paso region, local traffic comprises most of the traffic on I-10 in the Downtown section. Figure 1 shows daily traffic counts compiled by TxDOT at various I-10 locations.

*Figure 1: I-10 Daily Traffic Counts (Thousands) from TxDOT Traffic Counts*



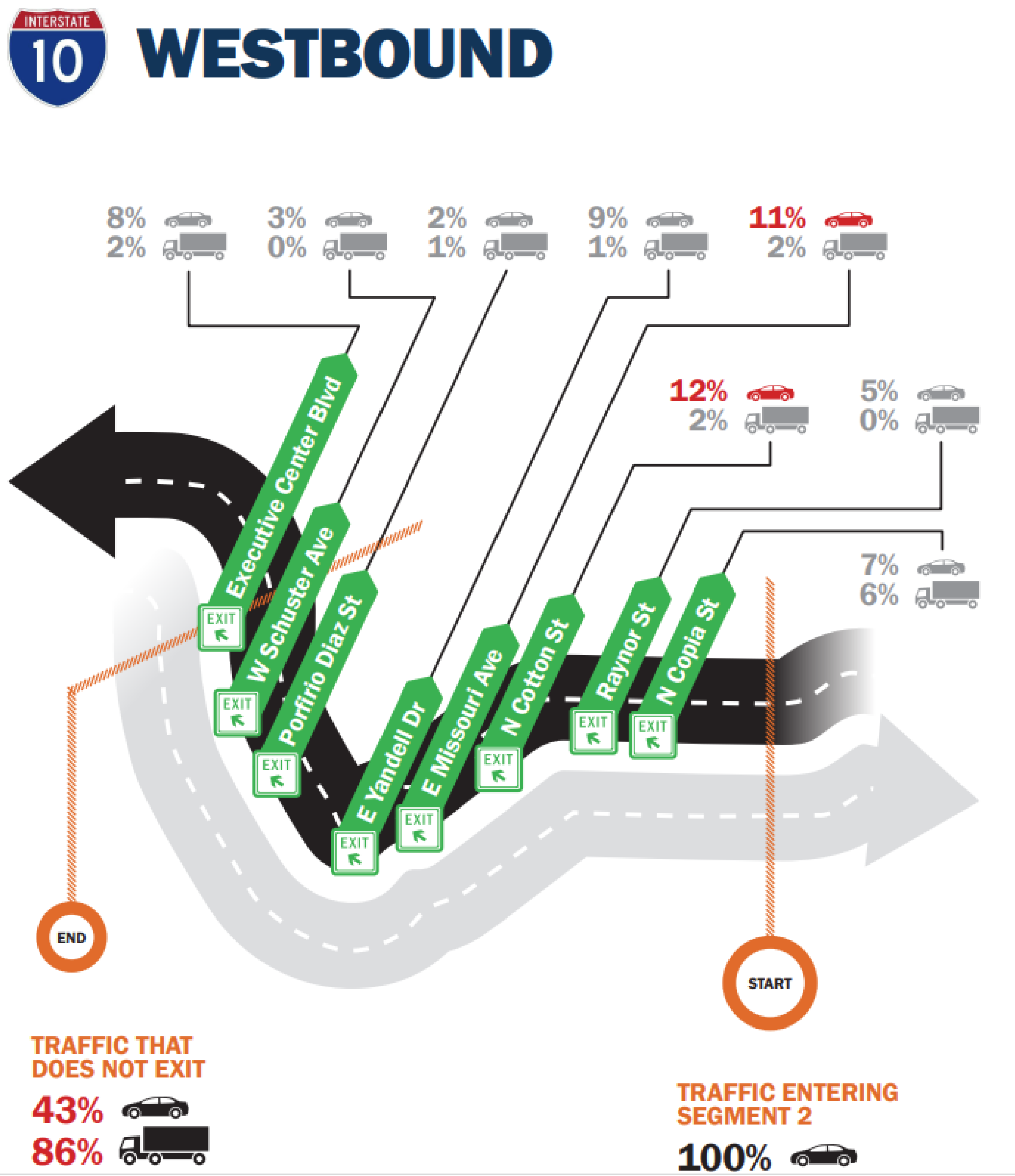

As shown in Figure 1, the daily I-10 traffic volume east of Downtown is almost 4 times as great as it is to the north of Loop 375 and 8 times as great as it is at the southern end of the region. Even at these outer

[4] A. Downs. *Stuck in traffic: Coping with peak-hour traffic congestion*. Brookings Institution, Washington DC (1992)

locations, through traffic represents only a small portion of total traffic. In the 2017 base year model, there are only 650 trucks and 2100 autos daily traveling all the way through the region on I-10. This represents 1.5 % of total daily traffic to the east of Downtown. Most of the "external" traffic has origins or destinations inside the region.

I-10 Downtown materials prepared by TxDOT illustrate that only 43% of cars entering Segment 2 from the east continues past the end of Segment 2 at Executive Center Boulevard. More than half (57%) exit in the greater Downtown area. A third of the traffic entering from the east exits at East Yandell Drive, East Missouri Avenue or North Cotton Street.

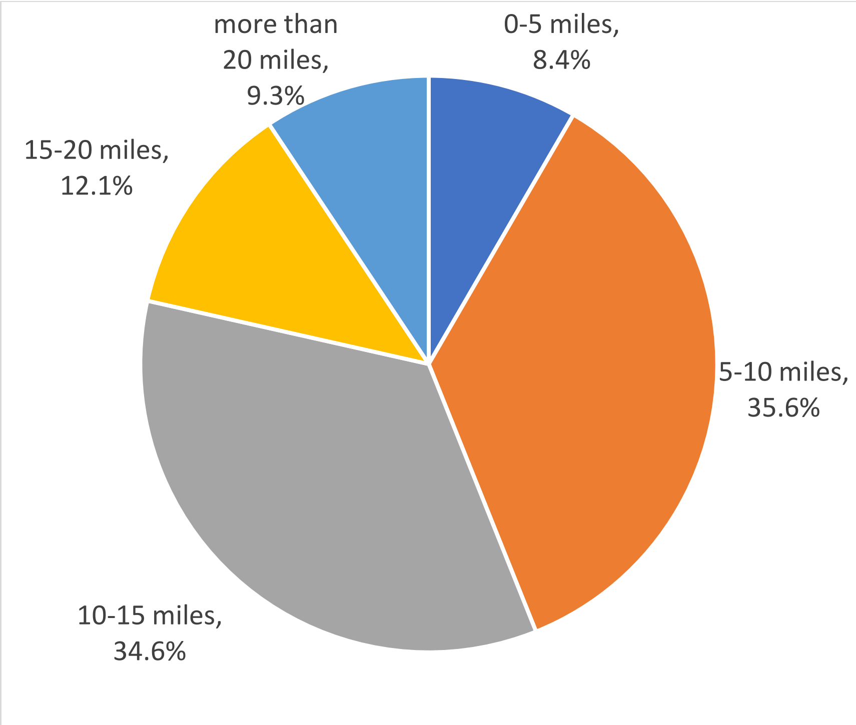
*Figure 2: I-10 Daily Traffic Counts (Thousands)*




Source: https://www.reimaginei10.com/docs/TxDOT_EPCS_Boards.pdf

TxDOT most likely prepared the data in Figure 2 using the regional transportation model's "select link" feature. I used this same feature to analyze Segment 2 on-ramps and off-ramps in the 2017 base model. The trip length distribution of all vehicles entering or exiting I-10 in Segment 2 during the model's afternoon peak period are summarized in Figure 3.

*Figure 3: Trip Length Distribution for Trips Entering and Exiting I-10 Segment 2 During the Afternoon Peak Period (2:30 – 6:30 p.m.) calculated from the 2017 base year model*



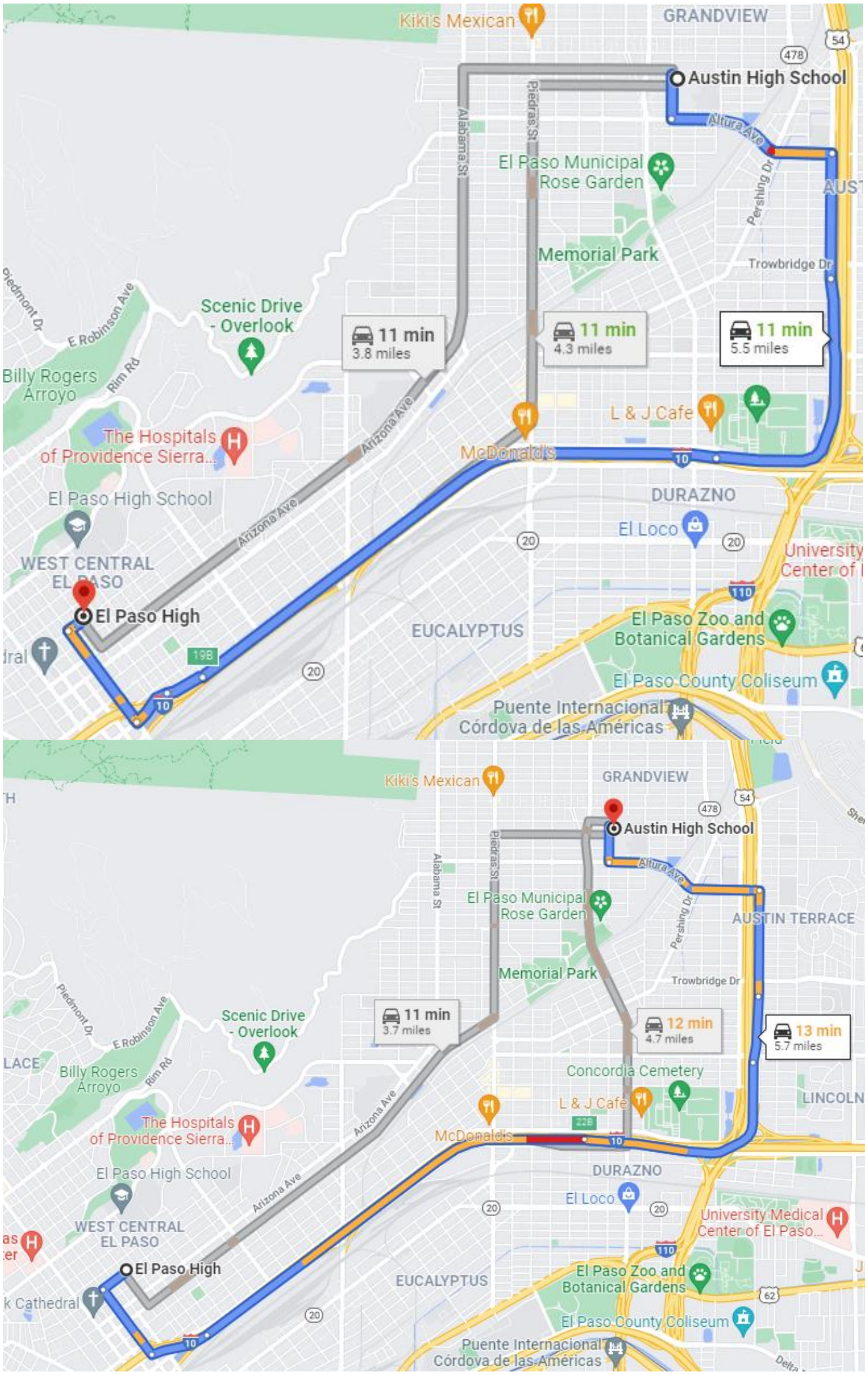

As shown in Figure 3, almost half of the trips are less than 10 miles in length. Less than 10% have length exceeding 20 miles.

Figure 3 shows the distribution from 26 ramps. Some of the ramps have a much higher proportion of very short trips. For example, 29% of the modeled trips entering I-10 westbound west of Copia Street are less than 5 miles in length, i.e. mostly traveling to the Downtown.

Many of these short trips are traveling out of their way to save a minute or two. If short trips could be removed from I-10, I-10 would be uncongested, even in peak traffic periods.

Figure 4 gives an example of how short local trips travel on I-10 today and how expansion could attract even more short local trips to I-10.

*Figure 4: Afternoon Routing at 3:30 p.m. on* Thursday, February 10, 2022



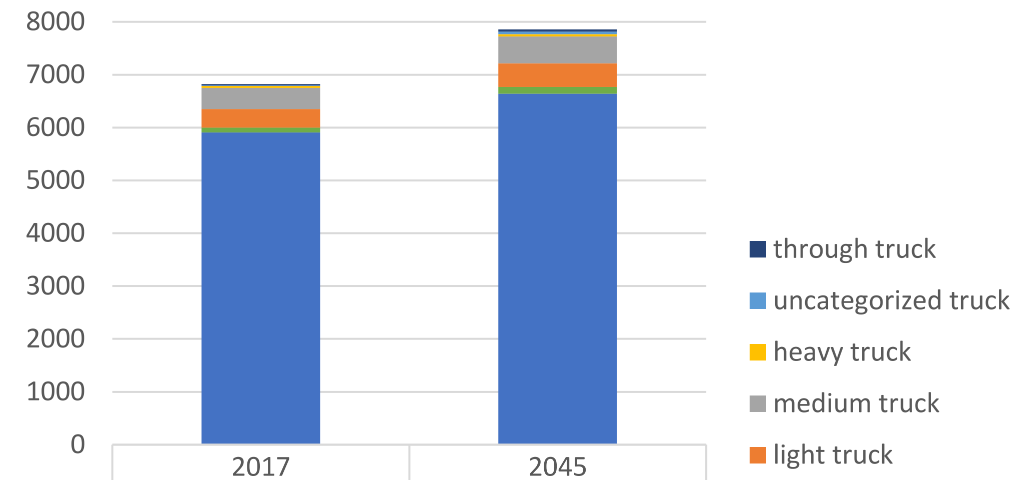

In the top figure, a trip from Austin High School to El Paso High School (westbound) takes an equal 11-minutes using US 54 and I-10 as on city streets despite the street route being 1.7 miles shorter. I-10 is uncongested westbound in the afternoon and many travelers will choose the I-10 route.

The bottom figure shows the reverse trip from El Paso High School to Austin High School (eastbound). There is significant congestion on I-10 (shown in red). The street route is 2 minutes faster and probably will be chosen by most travelers. This was at 3:30 p.m. and the difference likely would be greater in the 5 p.m. hour. However, if I-10 is expanded and becomes less congested, more local peak period trips will use I-10.

## 4 Trucks are not the problem

Figure 5 shows the modeled distribution of afternoon peak period traffic eastbound between Piedras and Copia. While the model shows a doubling of through trucks between 2017 and 2045, the 2045 number is still less than 1% of total traffic. Local heavy trucks are also less than 1% of total traffic. Cars and light trucks are 92% of total traffic in 2017 and 90% of total traffic in 2045.

*Figure 5: Afternoon Peak Period Eastbound Piedras to Copia Modeled Traffic Classification*




| | 2017 | 2045 |
|---|---|---|
| through truck | 22 | 41 |
| uncategorized truck | 13 | 46 |
| heavy truck | 36 | 45 |
| medium truck | 398 | 507 |
| light truck | 355 | 449 |
| through car | 88 | 130 |
| car | 5910 | 6638 |

## 5 The TxDOT/El Paso MPO model speed and delay metrics are inaccurate, and the model exaggerates the benefits of freeway expansion

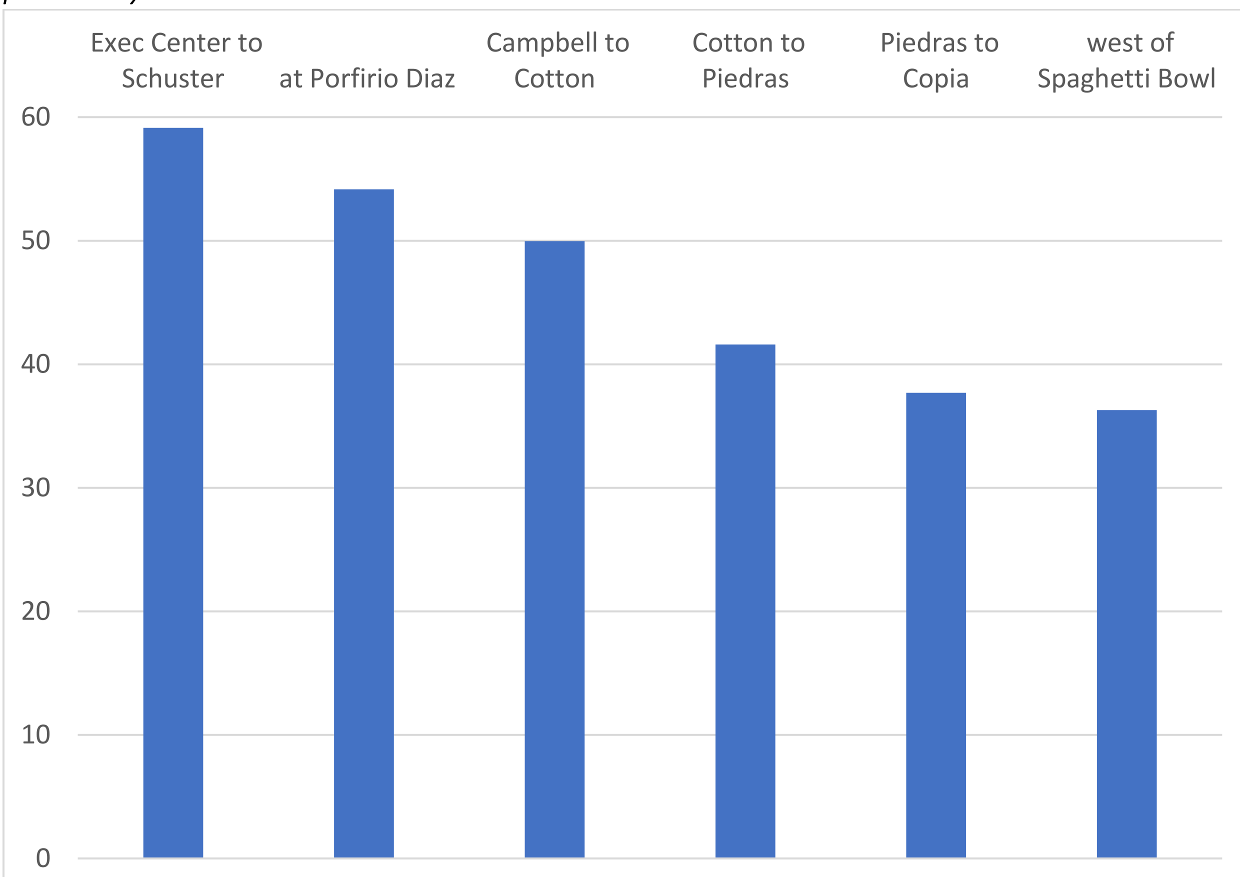
The MTP congestion metrics for the 2017 base year and the 2050 No-Build and Build alternatives are "Travel Time Index" and "PM Peak Hour Delay per Capita (mins)" (Table 5-11, p 5-22). Both metrics compare modeled congested travel time to an assumed uncongested travel time. For example, if a freeway segment has an assumed 60 mph travel time and a congested model speed of 30 mph, the travel time is twice as high as the uncongested travel time and the Travel Time Index for that segment for that period is 2.0.

Delay is calculated similarly. Building on the example of a 60-mph uncongested speed and a 30-mph congested speed, and further assuming the segment is 1 mile long, the uncongested travel time is 1 minute, and the congested travel time is 2 minutes. The delay is 1 minute per vehicle or 1 hour for every 60 vehicles. If the volume is 6000, there are 100 vehicle hours of delay for that segment in that period.

Regional metrics are calculated by summing up thousands of separate calculations for each roadway segment in each period (morning peak 6:30 – 8:30 a.m., mid-day 8:30 a.m. – 2:30 p.m., afternoon peak 2:30 – 6:30 p.m. and overnight 6:30 p.m. to 6:30 a.m.)

The underlying model calculations for the road segments are inaccurate, so the aggregate measures are inaccurate. 24/7 speed data for I-10 have been collected from cell phones and other electronic devices. Relying on 2019 (pre-pandemic) speed data, the primary bottleneck on I-10 Segment 2 is eastbound in the afternoon peak period and begins in the Spaghetti Bowl (Segment 3) as shown in Figure 6.

*Figure 6: 2019 Average Weekday Speed Afternoon Peak Period (2:30 – 6:30 p.m.) from 24/7 speed data provided by TxDOT*

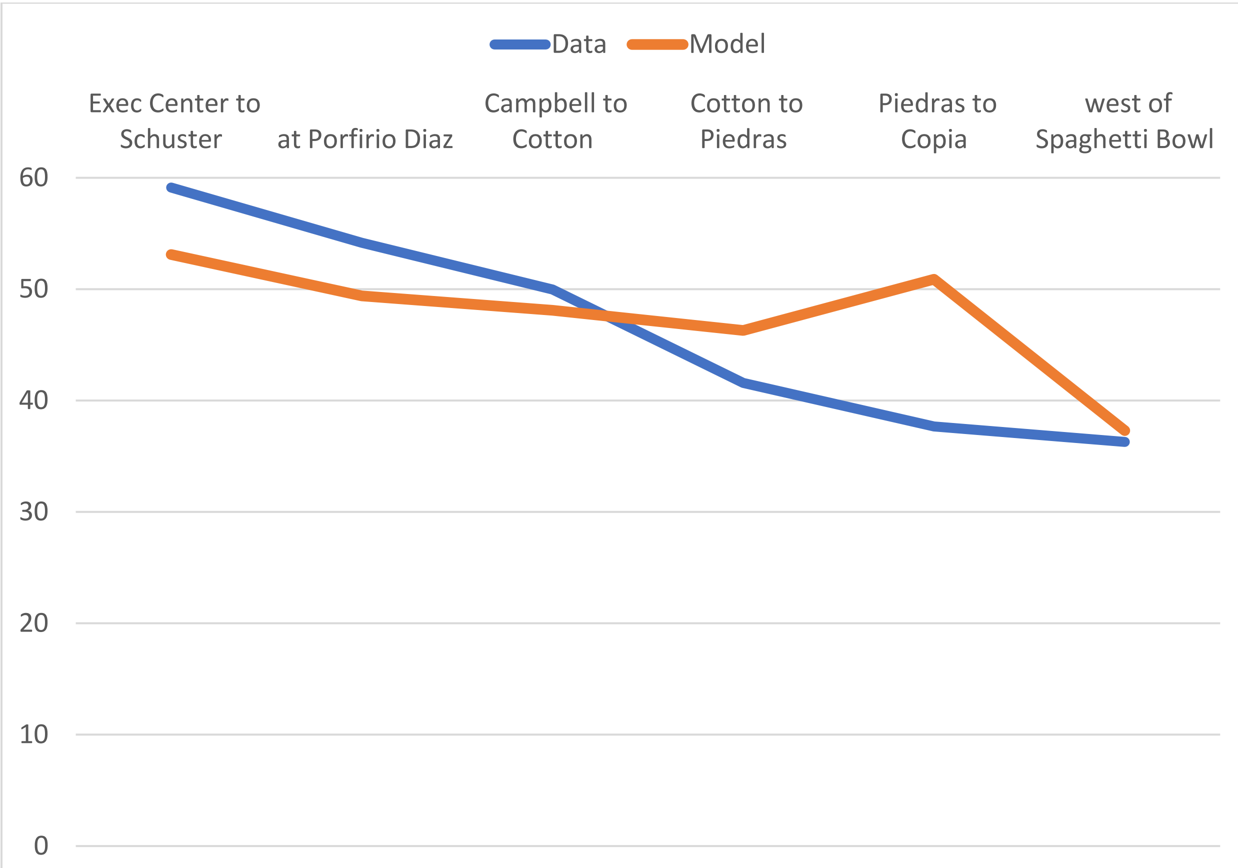



The data in Figure 6 suggests that eastbound traffic backs up west of the Spaghetti bowl in the weekday afternoon peak period but that the eastern end of Segment 2 is uncongested most days.

There is no similar bottleneck westbound in Segment 2 at any time of day. Traffic can slow down some in the afternoon peak period at the western end where a lane is dropped after Executive Center Boulevard, but this is localized and not as severe as eastbound bottleneck at the Spaghetti Bowl.

The model fails to match the actual speed data in the afternoon peak period as shown in Figure 7.

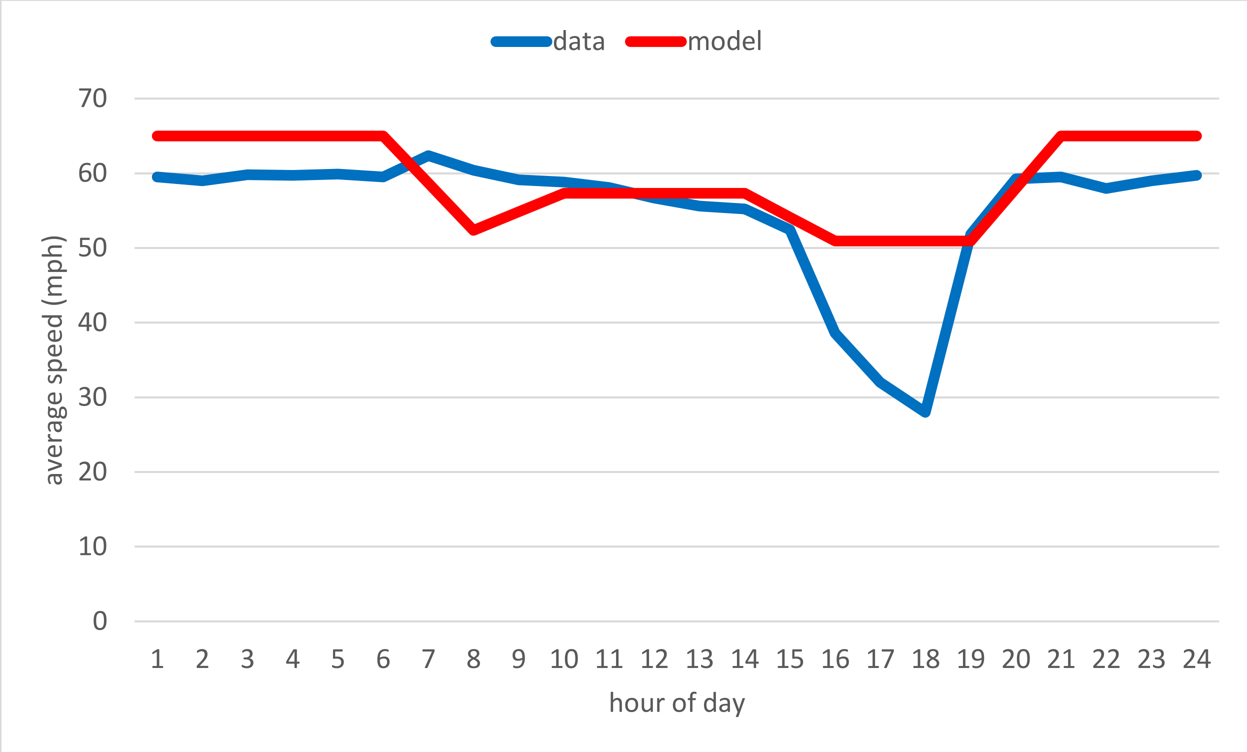
*Figure 7: 2019 Afternoon Peak Period (2:30 – 6:30 p.m.) Speed vs. 2017 Base Year Model from 24/7 speed data provided by TxDOT*




The model treats every segment as independent. Although the model correctly identifies the Spaghetti Bowl as the lowest-speed section, it fails to account for how this bottleneck affects upstream traffic flow and therefore overestimates the speed between Piedras and Copia. It also underestimates speeds that are less affected by bottlenecks including the west half of Segment 2.

Model speeds match data even more poorly across the 24-hour day as illustrated in Figure 8 for the I-10 eastbound between Piedras and Copia.

*Figure 8: Piedras to Copia Eastbound 2019 Speed (24/7 data provided by TxDOT) vs. 2017 Base Year Model*




Model errors shown in Figure 8 include:

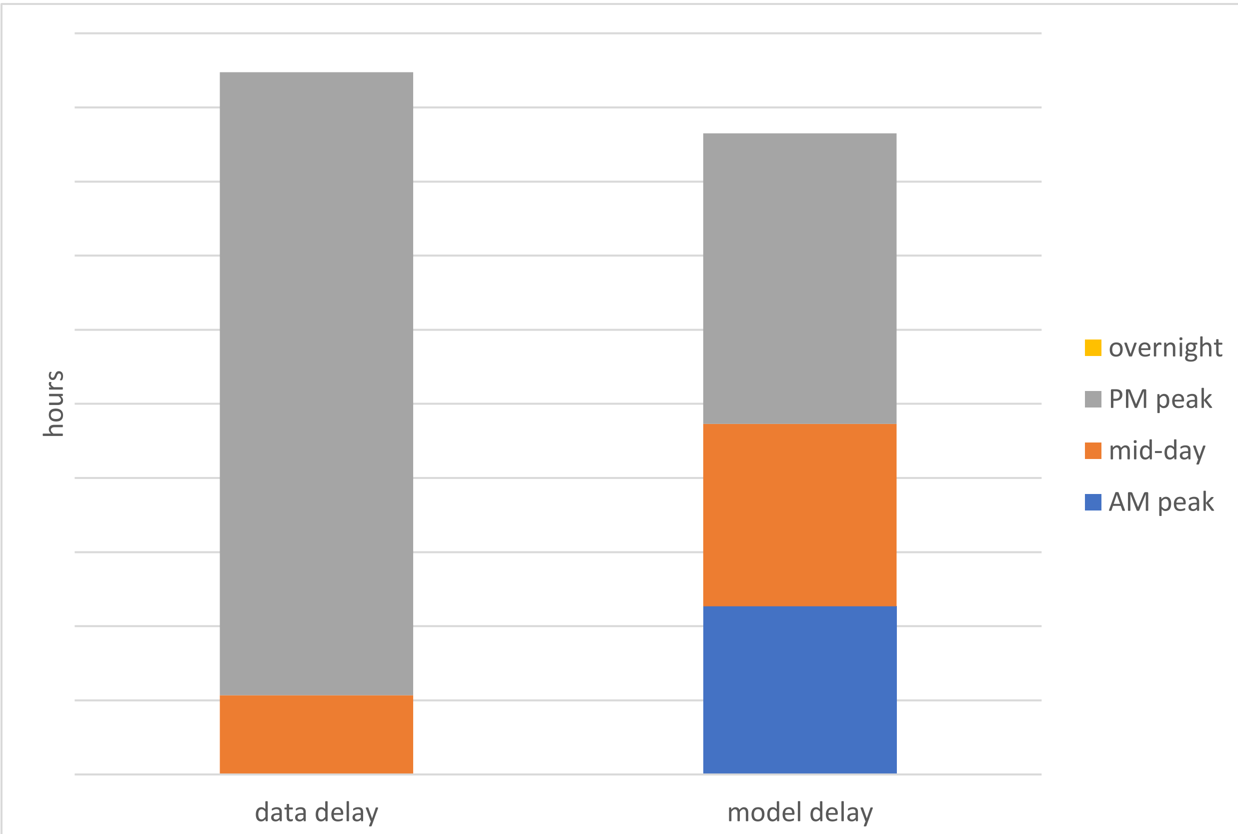
- overestimating overnight period (6:30 p.m. – 6:30 a.m.) model speeds as 65 mph when speeds really average 60 mph,
- showing a morning period (6:30 – 8:30 a.m.) speeds as lower than overnight speed when the data show no decline in speed and even a slight increase, and
- missing the afternoon effects of the Spaghetti Bowl bottleneck upstream in this segment.

Although the model speeds match the data best in the middle of the day (8:30 a.m. – 2:30 p.m.), the calculated delay from this period is still problematic because it is based on a 65-mph reference speed which is never achieved in this section of I-10 at any time of day.

Although the actual afternoon peak hour speed upstream of the Spaghetti Bowl bottleneck is lower than the modeled speed, it is incorrect to conclude that the model generally underestimates congestion. It overestimates congestion in some places and at some times, and underestimates congestion at other places and at other time. This makes the model unreliable for planning.

The actual uncongested average speed taken from the overnight period is 60 mph as illustrated in Figure 8. Using 60 mph rather than the 65-mph value assumed in the model and MTP delay calculations, there is little delay outside the PM peak period. Figure 9 compares delay based on actual speeds vs. delay as calculated in the model. The model incorrectly indicates that over half of the delay is outside the afternoon peak period, while greatly underestimating the afternoon peak period.

*Figure 9: Afternoon Peak Period Delay Eastbound Piedras to Copia – Data (relative to 60 mph speed) vs. Model (relative to 65 mph speed), both multiplied by traffic volume*




These delay calculation errors are caused by incorrectly treating successive road segments as independent. This modeling method, static traffic assignment or STA, was adopted 40 years ago when computers were less powerful that today's smart phones. In peak periods, traffic congestion is characterized by queues behind bottlenecks. In STA there are no queues behind bottlenecks. As documented above, this leads to the model predicting delay in the wrong places at the wrong times.

In my peer-reviewed journal article: *Forecasting the impossible: The status quo of estimating traffic flows with static traffic assignment and the future of dynamic traffic assignment*[5]*,* I document that STA cannot be relied on for planning in congested networks. The only solution is to replace STA with a more modern Dynamic Traffic Assignment (DTA) algorithm. This is practical today, especially for smaller and medium-sized regions, including the El Paso region I have made presentations at 3 national transportation conferences concerning the urgency for making these changes. I get no disagreement

5 https://www.sciencedirect.com/science/article/pii/S2210539517301232?via%3Dihub

and hear that the modelers will get around to this eventually. The larger Texas MPOs have control of their models; the El Paso MPO model is currently controlled by TxDOT.

# 6 Adverse impacts of urban freeway expansion are not adequately considered in the planning process

Property takings are a major impact of the proposed I-10 Downtown expansion that is well understood. There are other adverse impacts that are less well understood and analyzed.

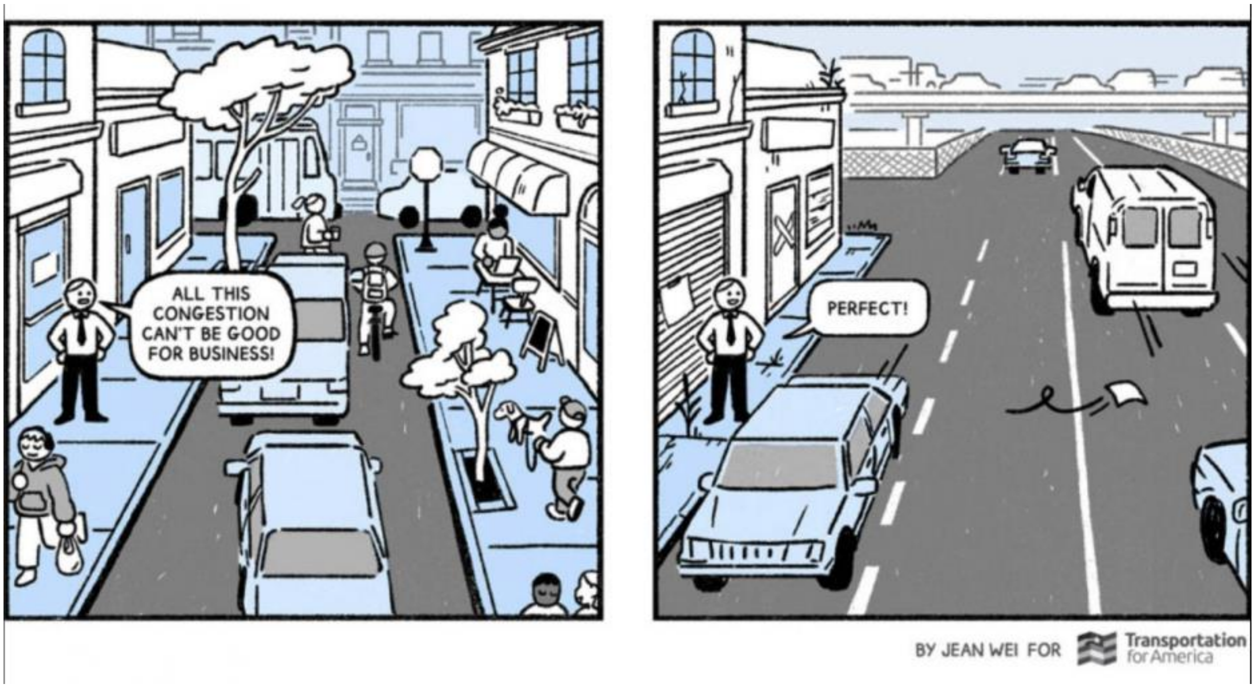
## 6.1 Congestion at street intersections caused by concentration of ramp traffic

In many cities, the most congested streets are those intersecting with freeway ramps. Freeway expansion often makes congestion worse in these areas, and these impacts generally are not considered in environmental analyses of freeway expansion.

## 6.2 Diverting traffic away from streets where traffic is the lifeblood of many businesses

Many businesses depend on pass-by traffic for visibility and for customers. When local traffic shifts to freeways, there are winners and losers. The losers are the businesses that are bypassed by the freeway. The winners are the businesses concentrated at freeway access points, which are often dominated by large chains.

*Figure 10: Traffic is the Lifeblood of Many Businesses*[6]




[6] Wei, Jen, Transportation for America. https://www.cnu.org/publicsquare/2022/02/11/solving-congestion-problem

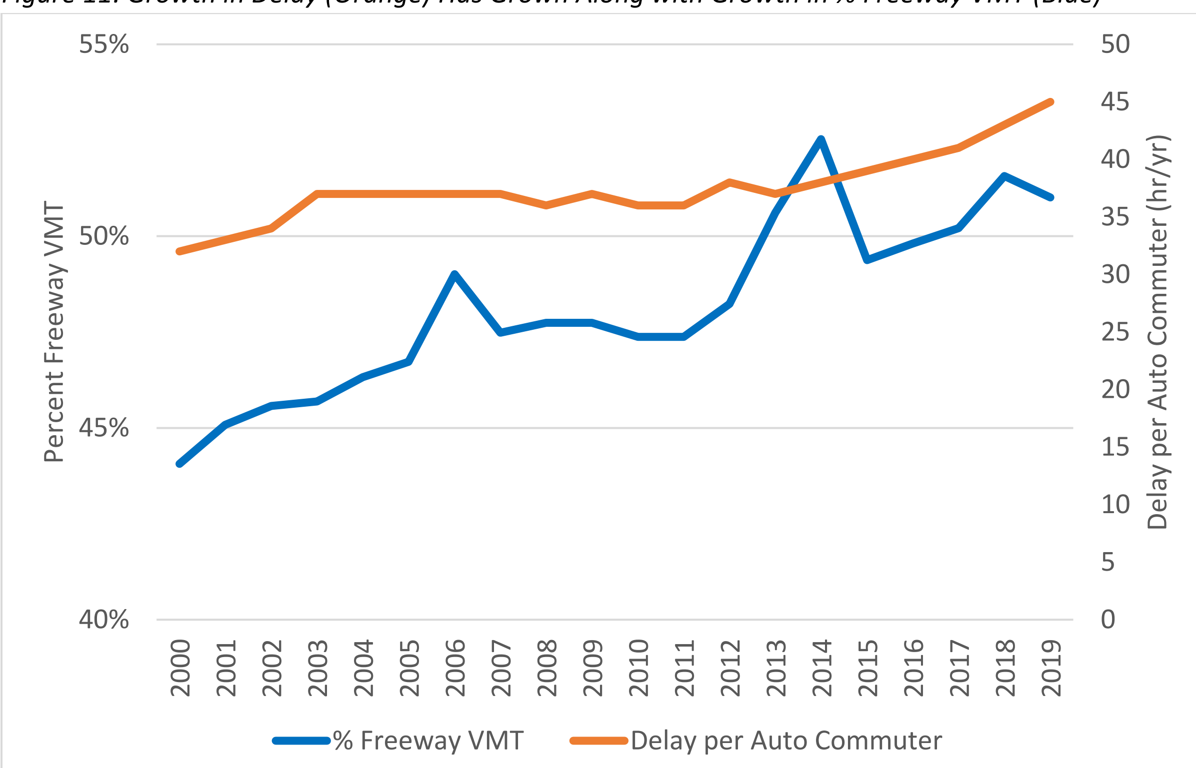
## 6.3 An unbalanced transportation investment strategy that worsens regional congestion in the long run

In statistical analysis of congestion data across 74 U.S. region, I found that the amount of freeway capacity in a region is unrelated to the amount of congestion. In contrast, the statistical analysis shows that more arterial street capacity strongly reduces congestion.[7]

To understand this critical difference between the congestion benefits of freeway and arterial street capacity, it is useful to return to Downs' discussion of triple convergence, and particularly to the element of shifting routes. Downs describes how drivers will choose "limited-access roads that are faster than local streets if they are not congested", but the attractiveness of such routes will cause them to become congested "to the point where they have no advantage over the alternate routes" (i.e., over arterial and local street routes).

Freeway expansion directs an increasing share of total traffic to freeways. However, because no trip begins or ends on a freeway, directing more traffic to freeways also creates bottlenecks on the local street system in the vicinity of the freeway access points. Data from the well-publicized Texas Transportation Institute (TTI) *Urban Mobility Report* for the El Paso region shows that as urban freeways have been widened, the share of traffic on freeways (blue line) has increased over the past 20 years, from about 43% to about 50% (including arterial roadways but excluding local streets).

*Figure 11: Growth in Delay (Orange) Has Grown Along with Growth in % Freeway VMT (Blue)*

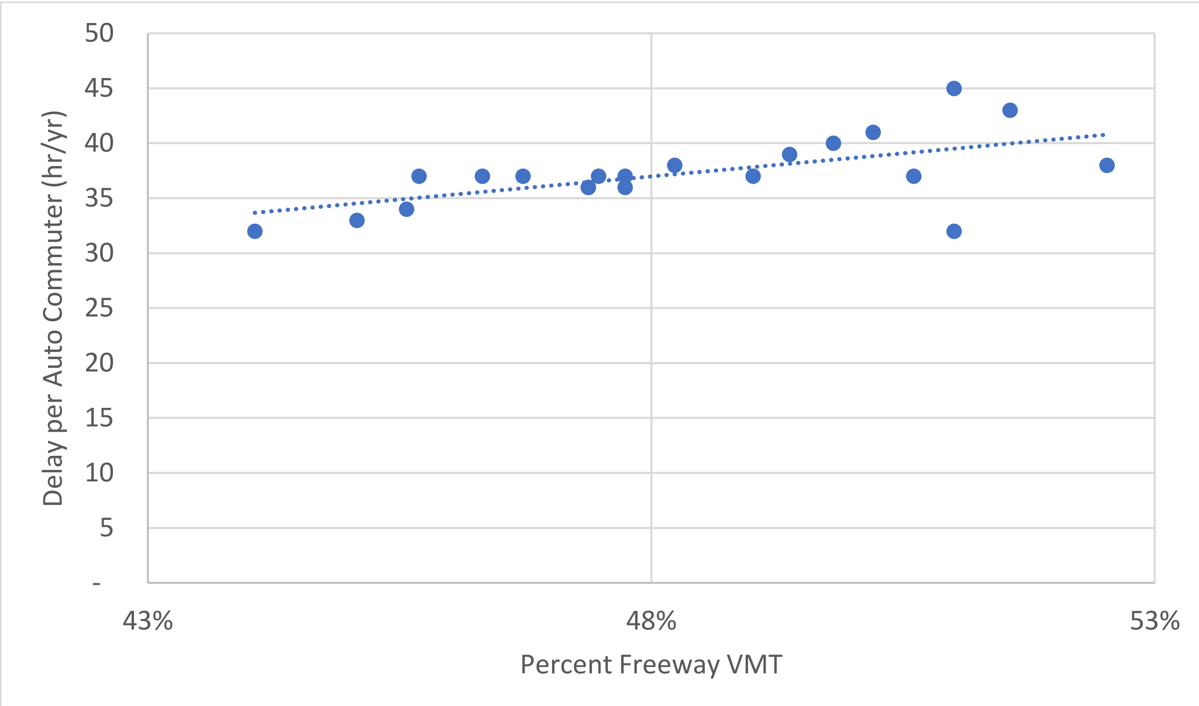



The "delay per auto commuter" (orange line) calculated by TTI has increased over this 20-year period as well. Sometimes, correlations of two variables growing over time are just correlations, but this one likely

[7] Marshall, N. A Statistical Model of Regional Traffic Congestion in the United States 2016.https://trid.trb.org/view/1392295

is a causal relationship. **Simply put, freeway expansion causes congestion.** Figure 12 plots the delay per auto commuter as a function of the percent freeway VMT. As freeways are widened, the access points become increasing congested, so widening freeways causes more peak-period congestion – the opposite of what is promised.

*Figure 12: Freeway Expanses Causes Regional Delay*




It is worth repeating a quote from The Congestion Con:

> In an expensive effort to curb congestion in urban regions, we have overwhelmingly prioritized one strategy: we have spent decades and hundreds of billions of dollars widening and building new highways.

Total funding is limited and the singular focus on large highway expansion mega projects is accompanied by insufficient investment in the larger highway network, particularly in growth areas. The freeway expansion encourages decentralized land use, but the roadway network is insufficient in outlying areas areas to accommodate the growth. Therefore, freeway expansion causes more congestion when analyzed across the entire regional network.

The Shift Calculator estimates that each Interstate lane mile in the El Paso region will create:

- additional 3 to 4 million vehicle miles traveled (VMT) per year, and
- 198,000 more gallons of gasoline per year.[8]

The induced travel caused by a combination of factors including circuitous routes for local trips, choosing destinations farther away and more dispersed land use.

[8] Rocky Mountain Institute. https://shift.rmi.org/

# 7 Downtown I-10 recommendations to minimize adverse impacts

The TxDOT/El Paso MPO Draft MTP I-10 expansion plan is summarized in Table 1:

*Table 1: I-10 Expansion Projects in the Draft MTP*

| Segment | From | To | General purpose | Adaptive/ transit | Frontage roads | Cost (millions) | Year |
|---|---|---|---|---|---|---|---|
| 1G | Thorn | Executive Center | | +1 | | $62 | 2041 |
| 2 | Executive Center | Copia | +1 | +1 | +2 | $787 | 2027 |
| 3A | Copia | Paisano | +1 | +1 | | $319 | 2031 |
| 3B | Paisano | Airway | +1 | +1 | | $239 | 2033 |
| 3C | Airway | Yarbrough | +1 | +1 | | $433 | 2041 |
| 3D1 | Yarbrough | Zaragoza | +1 | +1 | | $337 | 2041 |
| 3D2 | Zaragoza | Eastlake | +1 | +1 | | $337 | 2037 |

These projects are not independent. When any section is widened, the traffic volume generally will increase on that section, and this often causes upstream and/or downstream bottlenecks on adjacent sections if they are not widened.

I am focusing on the Downtown project (Segment). The Purpose of the project as presented at the Downtown 10 Virtual Public Meeting #2 (February 24 – March 16, 2021) is:

- Improve mobility and long-term congestion management,
- Reduce conflict points and improve incident management, and
- Bring facility up to current design standards.

In developing an alternative design concept, I am considering these needs but also trying to minimize the adverse impacts discussed above.

The El Paso MPO has been unwilling to provide Draft MTP modeling files, so I have been unable to "look under the hood" to fully review the TxDOT/El Paso MPO proposal in detail or to model other concepts using the same tool, However, I can make general recommendations including:

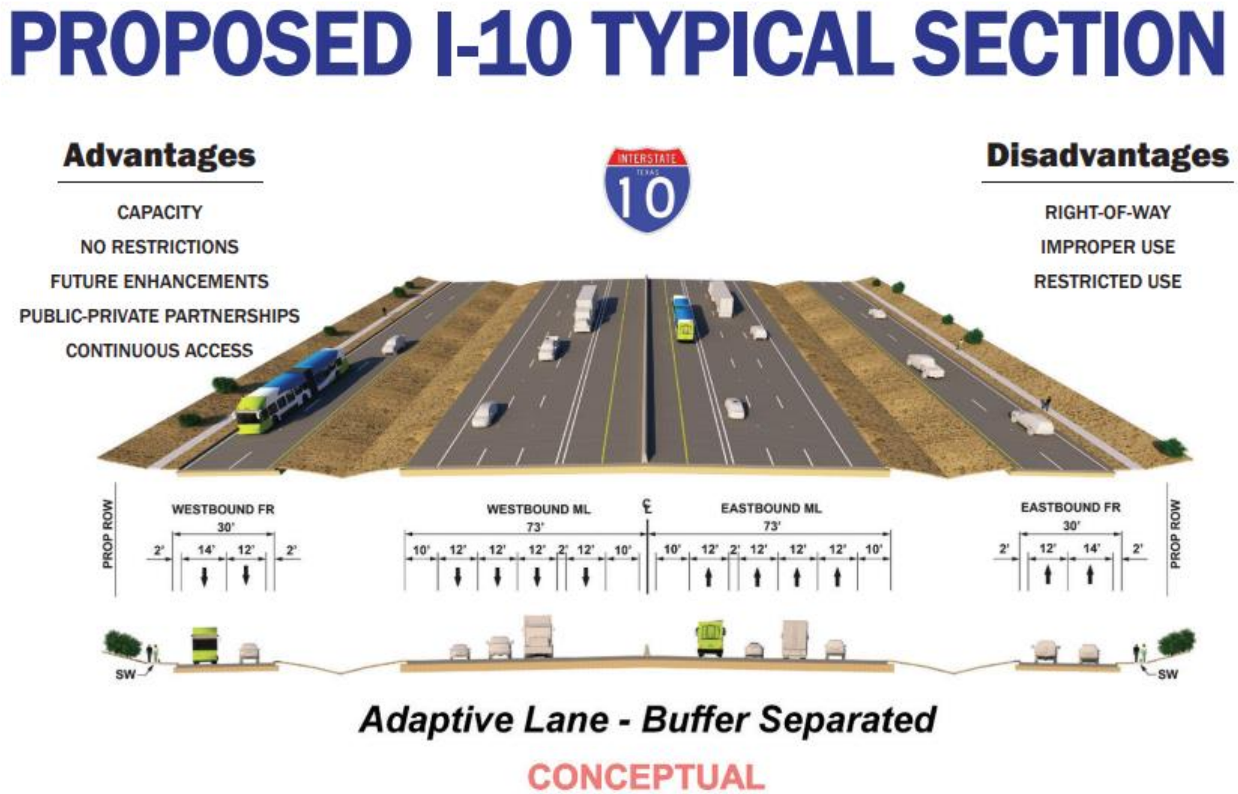
1) eliminate "transit-adaptive" lanes,
2) eliminate conversion of portions of Yandell Drive and Wyoming Avenue downtown to frontage roads,
3) create a street collector-distributor system that keeps many local trips off I-10, and
4) review the number of I-10 general-purpose lanes by section after making the other changes

I have modeled a preliminary alternative that combines these elements using the 2045 TXDOT/El Paso regional model. The results are promising. I will refine this alternative in the second phase of this project – hopefully using the 2050 MTP model.

## 7.1 Eliminate "transit-adaptive" lanes

The attributes of these "transit-adaptive" lanes are not described in the MTP. Figure 13 reproduces a TxDOT graphic showing adaptive lanes.

*Figure 13: TxDOT Adaptive Lane Illustration*




The 2045 model includes only 5 bus routes that use I-10. This represents fewer than 10 buses per hour on any segment of I-10. Figure 13 shows only a single bus in the adaptive lanes but constructing these lanes cannot be justified solely for transit.

The other possible options are a) high-occupancy vehicle lanes (HOV), b) toll lanes, or c) a combination of (a) and (b) – high-occupancy toll lanes (HOT). As is documented above, there is little long-distance through traffic on I-10. Some of this long-distance travel is heavy trucks that almost certainly would be excluded from the adaptive lanes. For local traffic to use the adaptive lanes, vehicles would have to enter in the right-hand general-purpose lane, then weave across the other general-purpose lanes, and cross the 2-foot buffer to enter the adaptive lane. To exit, the vehicles would have to reverse this process. Figure 13 shows 3 general purpose lanes in each direction but the MTP plan for I-10 is significantly wider:

- 5 general-purpose lanes in each direction west of the Trench,
- 4 general-purpose lanes in each direction in the Trench, and
- 6 general-purpose lanes in each direction east of the Trench.

It wouldn't make sense for local travelers to cross all these lanes to enter and exit the adaptive lane unless the general-purpose lanes were very congested. But if the general-purpose lanes were very congested, all this weaving would cause safety and operational problems, and drivers would need to begin the exit weaving process very early to be sure of being able to exit at the desired location.

Furthermore, a single adaptive lane is unattractive to travelers who are in a hurry because they are not confident that they won't get stuck behind a slow vehicle without being able to pass. For this reason, 2 managed lanes in each direction are generally constructed – often with direct connect flyover ramps at key locations to eliminate the weaving problems. In this case, it appears that neither 2 lanes in each direction or flyover ramps could be justified.

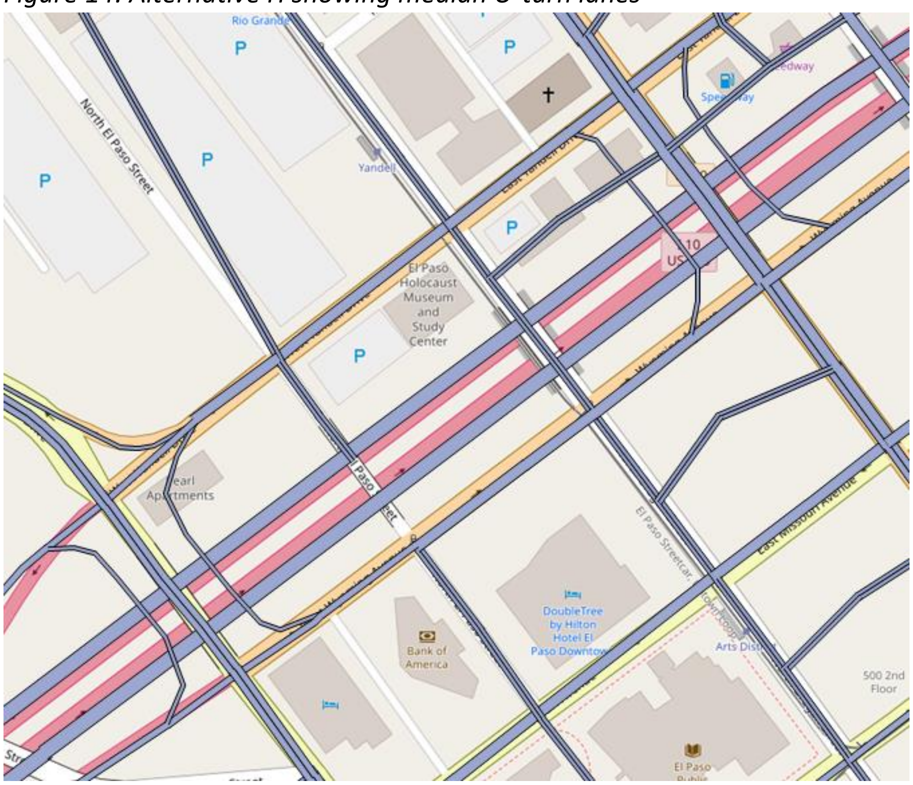
I recommend that these lanes be removed unless their value is clearly demonstrated.

## 7.2 Eliminate conversion of portions of Yandell Drive and Wyoming Avenue downtown to frontage roads

An Alternative H shapefile[9] provided by TxDOT show continuous frontage roads including the conversion of portions of Yandell Drive and Wyoming Avenue to frontage roads downtown. In Alternative H, a central feature of these downtown frontage roads is median U-turn lanes (Figures14 and 15).

These median U-turns will require a lot of property taking and likely are unnecessary. I recommend that these lanes be removed unless their value is clearly demonstrated.

*Figure 14: Alternative H showing median U-turn lanes*



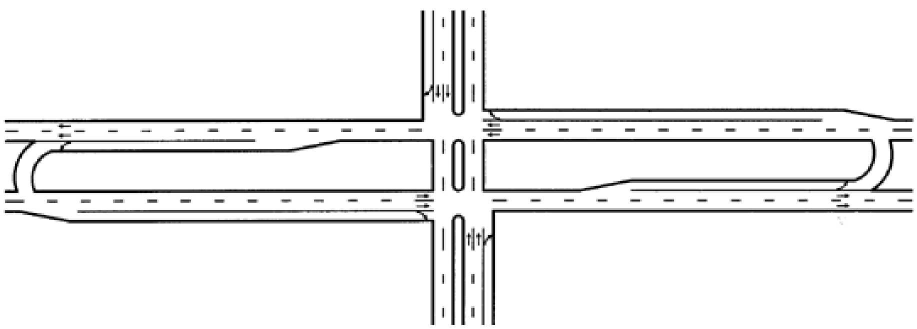

[9] The TxDOT/El Paso MPO model uses TransCAD software. The shapefile was exported from TransCAD but does not include all of the information required by the TransCAD model for a simulation.

*Figure 15 TxDOT description of median U-turn lanes*

# Median U-turns

The median U-turn intersection shifts left turns out of the intersection. Traffic wishing to turn left makes a U-turn in the median beyond the main intersection and then a right turn at the intersection. Eliminating the left turn at the main intersection simplifies signal timing and provides more green time and less congestion. Benefits include improved:

- Safety
- Mobility
- Connectivity
- Frontage road traffic flow



Texas Department of Transportation



Source: http://www.my35.org/capital-median-u-turns.htm

The frontage road conversion is not needed. Functionally, the frontage roads would just replace the two existing one-way streets. Frontage roads do not need have wider lanes or higher speed limits than these streets. The TxDOT *Roadway Design Manual* minimum design standards for urban frontage roads are 10-foot-wide lanes and a design speed of 30 mph.[10] It is doubtful that the median U-turns are needed. The proposed conversion would cause a significant number of takings. It also is likely that the frontage roads would be over-designed and result in in higher-speed roads that would be dangerous for pedestrians.

The El Paso region is already especially unsafe for pedestrians. It is ranked the 20th worst out of the 100 largest metropolitan regions in the U.S. based on the number of pedestrian fatalities per capita [11] This ranking is slightly higher than Houston (18th) but worse than San Antonio (28th) Dallas (31st) or Austin (46th). Reducing the number of fatalities in the El Paso region will require narrowing and slowing streets, and this proposed conversion in a part of the city with many pedestrians is a step in the wrong direction.

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[10] TxDOT *Roadway Design Manual*, July 1, 2020. http://onlinemanuals.txdot.gov/txdotmanuals/rdw/manual_notice.htm

[11] Smart Growth America. Dangerous by Design 2021. https://smartgrowthamerica.org/dangerous-by-design/

## 7.3 Create a street collector-distributor system that keeps many local trips off I-10

Most states build few frontage roads in urban centers, instead letting the local street grid provide access to urban freeways. The emphasis on urban frontage roads in Texas exacerbates the problem of too much local traffic jumping on and off the freeways by providing too many access points. Freeways operate best with widely spaced ramps. The Transportation Research Board (TRB) has published *Guidelines for Ramp and Interchange Spacing*.[12] It recommends minimum interchange spacing of 2 to 3 miles in rural areas, based on operations and safety considerations, with a lower 1 mile minimum spacing in urban areas – trading off operations and safety somewhat given the greater pressure to provide access. The Texas urban frontage road model generally places ramps closer than a mile apart.

The best aspect of the version of the downtown "frontage roads" illustrated in Figure 14 is that it does not include this problem of too many ramps in a short space. Instead, the frontage roads operate as a collector-distributor system where local traffic exits the freeway and one end and then reconnects some distance beyond.

I recommend that this collector-distributor idea should be considered over a much longer distance to separate long-distance and local traffic as much as is practical. These should not be built to rural freeway standards. They should be built to urban design standards given in the National Association of City Transportation Officials (NACTO) *Urban Street Design Guide* and that was adopted by the City of El Paso "as the official design guidelines for the Capital Improvement Projects and other City funded street and roadway improvement projects within the City of El Paso" in 2014.[13]

I tested a preliminary alternative in the 2045 model that combines the recommended approaches described above including:

- No transit/adaptive lanes
- No added general-purpose lanes between Downtown and Spaghetti Bowl
- Converting frontage roads to collector-distributor streets between Downtown and east side of Spaghetti Bowl including filling in two missing links:
  - Eastbound east of Cotton Street (also in MTP)
  - Westbound connecting Gateway Boulevard through Spaghetti Bowl.
- Removing all 19 ramps between Downtown and the Spaghetti Bowl

The preliminary modeling results are promising. The modeled afternoon eastbound traffic is considerably lower than in the 2045 reference model, and even lower than the 2017 modeled volumes.

[12] Transportation Research Board. National Cooperative Highway Research Program (NHCRP) Report 687. Guidelines for Ramp and Interchange Spacing.

[13] https://nacto.org/wp-content/uploads/2015/06/ElPaso-UBDG-USDG-Resolution-5-20-14.pdf

*Figure 16: Afternoon Peak Period (2:30 – 6:30 p.m.) Modeled Traffic Volume Piedras to Colia*

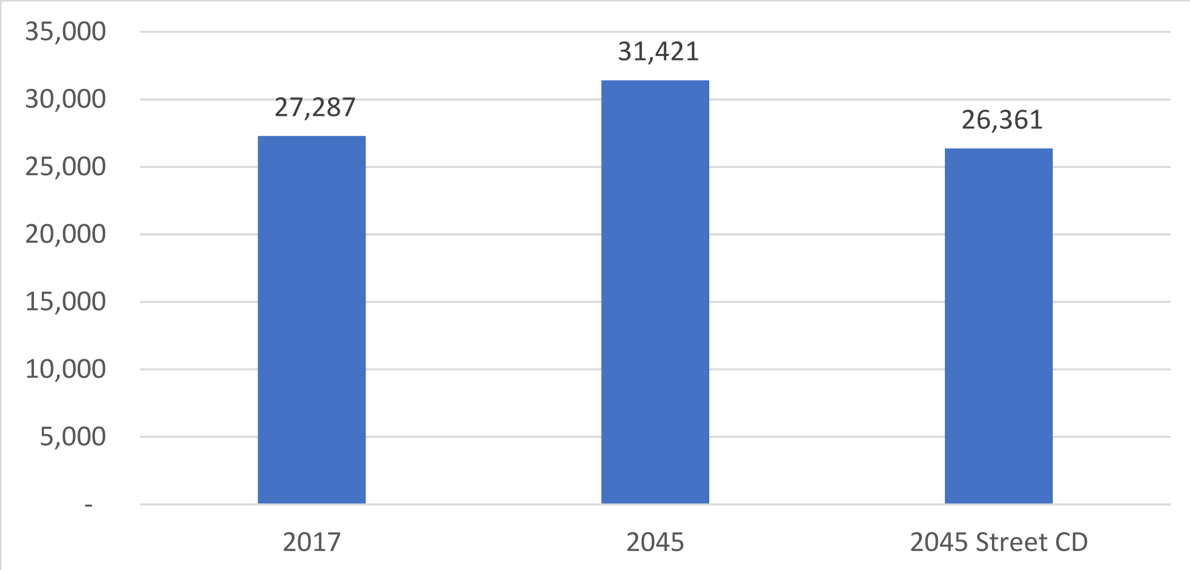
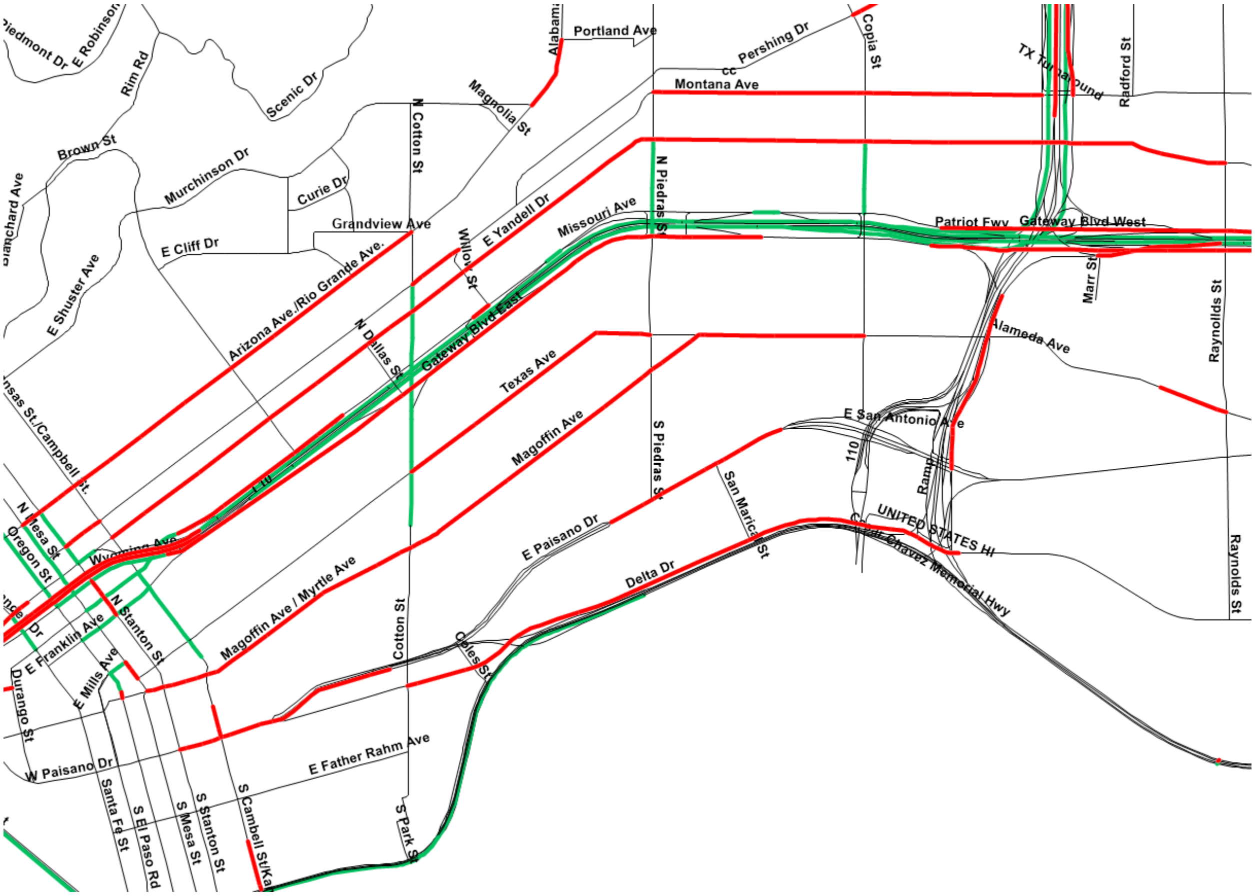



Figure 16 is based on the differences between the 2045 amended MTP model and a 2045 Street CD alternative model. The segments colored green (including I-10) have modeled traffic volumes that are lower by 1000 vehicles or more across the 4-hour afternoon peak period (2:30 – 6:30 p.m.) Traffic also would be lower on Cotton Street, Piedras Street and Copia Street in the vicinity of I-10 which could relieve congestion in these areas. The links that are colored red have traffic volumes that are higher than 1000 vehicles or more across the 4-hour period. As shown in the figure, the diverted traffic is spread across multiple east-west streets. These streets appear to have adequate capacity, and additional traffic would help some businesses along these streets. Interestingly, the traffic volumes along the eastbound and westbound collector-distributor streets (i.e., Gateway Boulevard) are not particularly high because other parallel streets offer more direct routes for many local trips.

Figure 17: *Afternoon Peak Period (2:30 – 6:30 p.m.) Modeled Traffic Volume Differences Piedras to Copia (Green = 1000+ Lower With Street Collector-Distribution System and Red = 1000+ Higher)*




# 8 Remaining Work

In the final phase of this project, I will refine this alternative and do a more complete evaluation. I will consider the need for adding general purpose lanes and I also will look at extending the street collector-distributor concept to the west of downtown.

It would be most useful for everyone, including the El Paso MPO and TxDOT, to do these analyses with the 2050 MTP model rather than the outdated 2045 model.

## NORMAN L. MARSHALL, PRESIDENT

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## EDUCATION:

Master of Science in Engineering Sciences, Dartmouth College, Hanover, NH, 1982----------------

Bachelor of Science in Mathematics, Worcester Polytechnic Institute, Worcester, MA, 1977

## PROFESSIONAL EXPERIENCE: (34 Years, 20 at Smart Mobility, Inc.)

Norm Marshall helped found Smart Mobility, Inc. in 2001. Prior to this, he was at RSG for 14 years where he developed a national practice in travel demand modeling. He specializes in analyzing the relationships between the built environment and travel behavior and doing planning that coordinates multi-modal transportation with land use and community needs.

### Regional Land Use/Transportation Scenario Planning

Envision Central Texas Vision (5-countyregion)—implemented many enhancements in regional model including multiple time periods, feedback from congestion to trip distribution and mode choice, new lifestyle trip production rates, auto availability model sensitive to urban design variables, non-motorized trip model sensitive to urban design variables, and mode choice model sensitive to urban design variables and with higher values of time (more accurate for "choice" riders). Analyzed set land use/transportation scenarios including developing transit concepts to match the different land use scenarios.

Portland Area Comprehensive Transportation System (PACTS) – the Portland Maine Metropolitan Planning Organization. Updating regional travel demand model with new data (including AirSage), adding a truck model, and multiclass Dynamic Traffic Assignment (DTA) including differentiation between cash toll and transponder payments.

Loudoun County Virginia Dynamic Traffic Assignment – Enhanced subarea travel demand model to include Dynamic Traffic Assignment (Cube). Model being used to better understand impacts of roadway expansion on induced travel.

Vermont Agency of Transportation-Enhanced statewide travel demand model to evaluate travel impacts of closures and delays resulting from severe storm events. Model uses innovate Monte Carlo simulations process to account for combinations of failures.

California Air Resources Board – Led team including the University of California in $250k project that reviewed the ability of the new generation of regional activity-based models and land use models to accurately account for greenhouse gas emissions from alternative scenarios including more compact walkable land use and roadway pricing. This work included hands-on testing of the most complex travel demand models in use in the U.S. today.

Climate Plan (California statewide) – Assisted large coalition of groups in reviewing and participating in the target setting process required by Senate Bill 375 and administered by the

California Air Resources Board to reduce future greenhouse gas emissions through land use measures and other regional initiatives.

Chittenden County (2060 Land use and Transportation Vision Burlington Vermont region) – led extensive public visioning project as part of MPO's long-range transportation plan update.

Flagstaff Metropolitan Planning Organization – Implemented walk, transit and bike models within regional travel demand model. The bike model includes skimming bike networks including on-road and off-road bicycle facilities with a bike level of service established for each segment.

Chicago Metropolis Plan and Chicago Metropolis Freight Plan (6-county region)— developed alternative transportation scenarios, made enhancements in the regional travel demand model, and used the enhanced model to evaluate alternative scenarios including development of alternative regional transit concepts. Developed multi-class assignment model and used it to analyze freight alternatives including congestion pricing and other peak shifting strategies.

**Municipal Planning**

City of Grand Rapids – Michigan Street Corridor – developed peak period subarea model including non-motorized trips based on urban form. Model is being used to develop traffic volumes for several alternatives that are being additional analyzed using the City's Synchro model

City of Omaha – Modified regional travel demand model to properly account for non-motorized trips, transit trips and shorter auto trips that would result from more compact mixed-use development. Scenarios with different roadway, transit, and land use alternatives were modeled.

City of Dublin (Columbus region) – Modified regional travel demand model to properly account for non-motorized trips and shorter auto trips that would result from more compact mixed-use development. The model was applied in analyses for a new downtown to be constructed in the Bridge Street corridor on both sides of an historic village center.

City of Portland, Maine – Implemented model improvements that better account for non-motorized trips and interactions between land use and transportation and applied the enhanced model to two subarea studies.

City of Honolulu – Kaka'ako Transit Oriented Development (TOD) – applied regional travel demand model in estimating impacts of proposed TOD including estimating internal trip capture.

City of Burlington (Vermont) Transportation Plan – Led team that developing Transportation Plan focused on supporting increased population and employment without increases in traffic by focusing investments and policies on transit, walking, biking and Transportation Demand Management.

### Transit Planning

Regional Transportation Authority (Chicago) and Chicago Metropolis 2020 – evaluated alternative 2020 and 2030 system-wide transit scenarios including deterioration and enhance/expand under alternative land use and energy pricing assumptions in support of initiatives for increased public funding.

Capital Metropolitan Transportation Authority (Austin, TX) Transit Vision – analyzed the regional effects of implementing the transit vision in concert with an aggressive transit-oriented development plan developed by Calthorpe Associates. Transit vision includes commuter rail and BRT.

Bus Rapid Transit for Northern Virginia HOT Lanes (Breakthrough Technologies, Inc and Environmental Defense.) – analyzed alternative Bus Rapid Transit (BRT) strategies for proposed privately-developing High Occupancy Toll lanes on I-95 and I-495 (Capital Beltway) including different service alternatives (point-to-point services, trunk lines intersecting connecting routes at in-line stations, and hybrid).

### Roadway Corridor Planning

I-30 Little Rock Arkansas – Developed enhanced version of regional travel demand model that integrates TransCAD with open source Dynamic Traffic Assignment (DTA) software, and used to model I-30 alternatives. This model models freeway bottlenecks much more accurately than the base TransCAD model.

South Evacuation Lifeline (SELL) – In work for the South Carolina Coastal Conservation League, used Dynamic Travel Assignment (DTA) to estimate evaluation times with different transportation alternatives in coastal South Caroline including a new proposed freeway.

Hudson River Crossing Study (Capital District Transportation Committee and NYSDOT) – Analyzing long term capacity needs for Hudson River bridges which a special focus on the I-90 Patroon Island Bridge where a microsimulation VISSIM model was developed and applied.

## PUBLICATIONS AND PRESENTATIONS (partial list)

DTA Love: Co-leader of workshop on Dynamic Traffic Assignment at the June 2019 Transportation Research Board Planning Applications Conference.

Forecasting the Impossible: The Status Quo of Estimating Traffic Flows with Static Traffic Assignment and the Future of Dynamic Traffic Assignment. *Research in Transportation Business and Management* 2018.

Assessing Freeway Expansion Projects with Regional Dynamic Traffic Assignment. Presented at the August 2018 Transportation Research Board Tools of the Trade Conference on Transportation Planning for Small and Medium Sized Communities.

Vermont Statewide Resilience Modeling. With Joseph Segale, James Sullivan and Roy Schiff. Presented at the May 2017 Transportation Research Board Planning Applications Conference.

Assessing Freeway Expansion Projects with Regional Dynamic Traffic Assignment. Presented at the May 2017 Transportation Research Board Planning Applications Conference.

Pre-Destination Choice Walk Mode Choice Modeling. Presented at the May 2017 Transportation Research Board Planning Applications Conference.

A Statistical Model of Regional Traffic Congestion in the United States. Presented at the 2016 Annual Meeting of the Transportation Research Board.

## MEMBERSHIP/AFFILIATIONS

Associate Member, Transportation Research Board (TRB)

Member and Co-Leader Project for Transportation Modeling Reform, Congress for the New Urbanism (CNU)