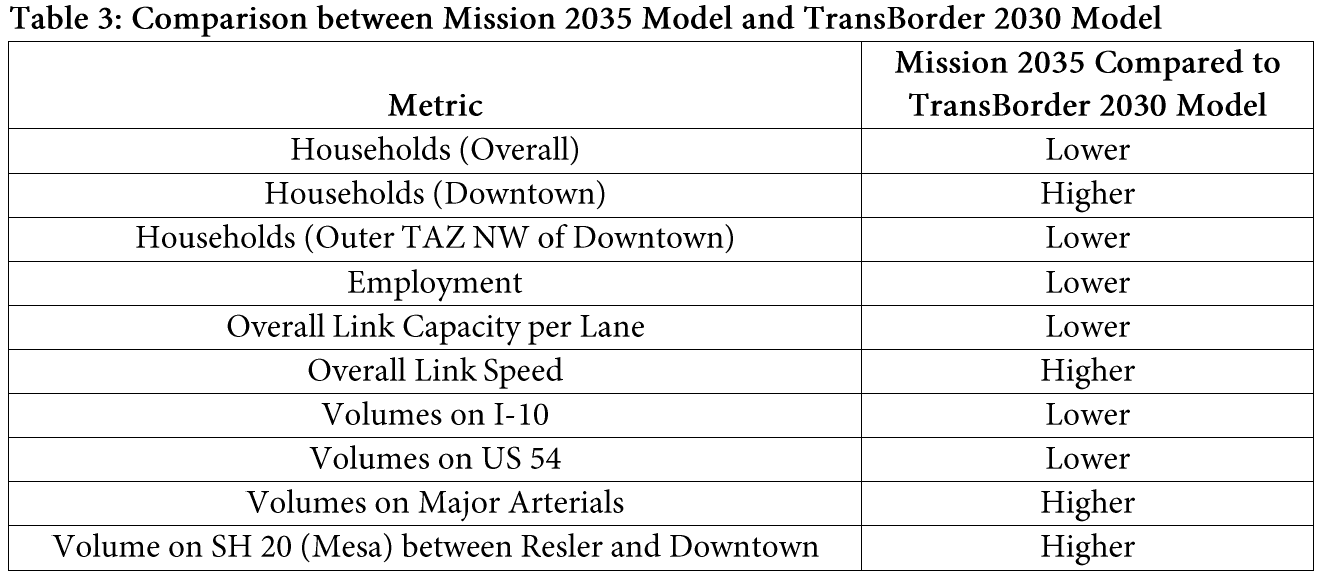
**El Paso Travel Demand Modeling and Micro Simulation Summary**

**Model Comparisons**

**Comparison of El Paso 2035 Mission Model and 2030 TransBorder Model**

***Tech Memo BHW\_20100930\_mod.pdf***

A technical memorandum dated on 10/07/10 called “Comparison between the El Paso Mission Model and the TransBorder Model” highlights the differences in the two models in TRANSCAD environment. The comparison of the 2035 Mission Model with the 2030 TransBorder model considered the difference between the network geometry, connectivity, link attributes such as area types, number of lanes, roadway capacity, link speeds, ramps functional classification and difference in traffic volumes. Also reviewed were the differences between the two model TAZ structures and socio-economic data. Table 3, from the above memo, summarizes the differences between the two models.



**Comparison of Assignments Between Mission Model Trip Tables and Pseudo Horizon Trip Tables**

***Tech Memo – Pseudo Horizon Trip Tables12\_1\_2011.pdf***

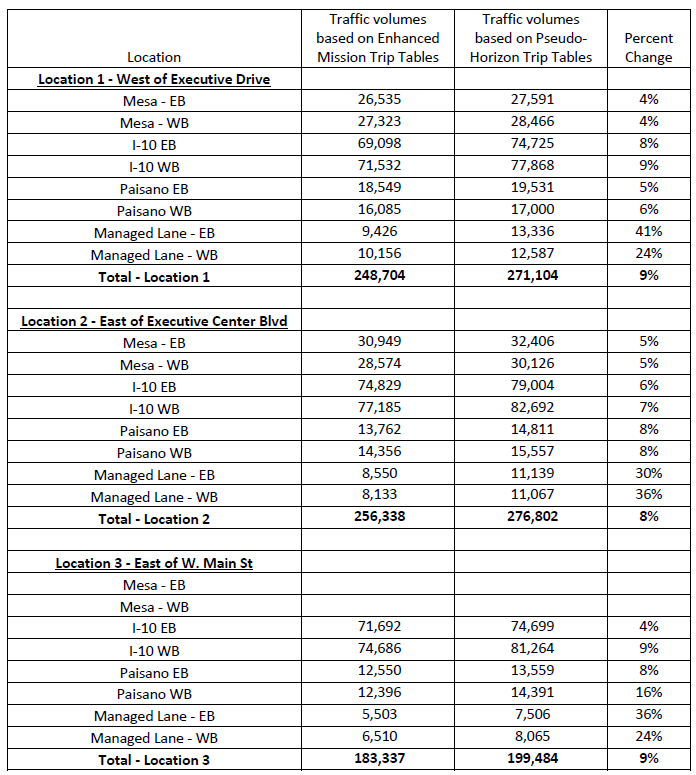
A technical memorandum dated on 12/01/11 called “Model Results Using Pseudo-Horizon Trip Tables” describes the methodology used to develop 2040 pseudo-Horizon trip tables based on the demographic changes between the original Mission travel demand mode and the new Horizon model. The pseudo-Horizon trip tables needed to be developed for the Mission model in lieu of the unavailability of fully functional Horizon model.

This analysis also provides a comparison of traffic assignments using the original Mission model trip tables and the pseudo-Horizon trip tables for some key locations. The results presented, in the memo, illustrate the sensitivity of the model to demographic data changes between the Mission and Horizon travel demand models. Both sets of assignments assume a managed lane facility in the Border Highway West study area (the managed land facility is parallel to Paisano between Sunland Park Drive on the west end and down El Paso/Loop 375 on the east end).

Several broad assumptions were made to complete this analysis.

* Demographic data for the Mission model are based on models provided by El Paso MPO
* Demographic data for the Horizon model were developed by Alliance Transportation Group, Inc. Other data pieces (network, model parameters, trip tables, etc.) for the Horizon model are still currently under development, so the Horizon model cannot be used directly.
* The network assumptions and model parameters were consistent between the two test runs (Enhanced Mission model versus Pseudo-Horizon model).

The table below shows the differences between assignments using the two models at specific screenline locations.



**Comparison of El Paso Mission Model versus Enhanced Mission Model**

***Final Forecasting Methodology Memo\_CDArea\_8\_13\_2012.pdf***

A technical memorandum dated on 8/13/2012 called “Collector-Distributor Final Traffic Forecasting Methodology Memorandum” contains information comparing El Paso Mission model versus Enhanced Mission model. The Mission Model is a daily traffic forecasting model developed within the TransCAD travel demand modeling software platform. Due to the characteristics of the Border Highway West project, additional data from the Mission Model was requested to allow for estimation of travel demand over smaller periods than one twenty-four daily period. Of particular concern is the level of travel demand and resulting roadway congestion during the AM and PM peak periods. Developing four time periods (AM, MD (Midday), PM and NT (Night Time) to develop a 24-hour daily volume was used to create the enhanced Mission Model.

Traffic count data in the El Paso area was collected in 2009 and 2010. Figure 9, in the above named memo shows the daily distribution of traffic per half-hour increment over 20 locations in the El Paso area (concentrated near the Border Highway West study area). This data indicates that the peak three-hour AM period is between 7:00 AM and 10:00 AM, while the peak three-hour PM periods is between 3:30 PM and 6:30 PM. The midday period is therefore five and a half hours long, from 10:00 AM to 3:30 PM. The night period is twelve and a half hours long, from 6:30 PM to 7:00 AM.

There were Network attribute modifications to the original Mission model to accommodate Time of Day volumes and tolling. These new attributes can be found in Table 5 of the file mentioned above. These fields are in addition to the fields used in the standard Mission Model execution.

Network Lookup Modifications

The speed/capacity lookup table used to develop the daily Mission Model has been modified consistent

with the goal of the enhanced Mission Model. The daily Mission Model uses free flow speeds and

volume-delay functions that predict average congested speeds throughout the course of 24 hours. This

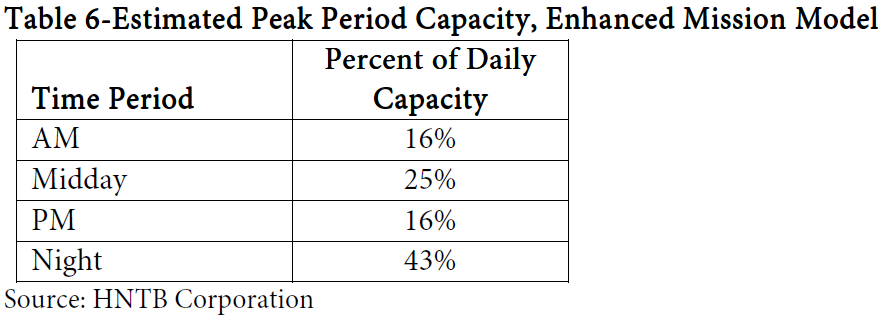
average condition does not accurately reflect the impacts of congestion during the most congested periods

of the day, namely the AM and PM peak periods. Therefore, the speeds used in the daily model were

altered to more closely represent free flow conditions, with the volume-delay parameters updated to more

consistently respond to traffic congestion experienced during the congested peak periods. Appendix D

provides the current network lookup table. Daily capacities were not altered in the enhanced Mission Model. The daily capacities were disaggregated, with each period receiving a portion of the daily capacity. The Mission Model daily capacity for each roadway link are subdivided into the four time periods, as shown in Table 6.



Two new functional classifications have been added to the Mission Model lookup table. Class 15

represents managed lane facilities east of US 54 while class 16 represents managed lane facilities west of I-110. These two new functional classes have been added to provide flexibility in controlling the differences in operational characteristics between the managed lanes and the general purpose lanes within close proximity. Roadway speeds between the general purpose lanes and the managed lanes dictate the volume of traffic using a managed lane facility. The difference in speed between the managed lane and the general purpose lane must be high enough to offset the cost of using the managed lane before traffic will utilize the facility. The enhanced Mission Model lookup table provides an approximate 10 to 13 mile per hour difference between managed lanes and nearby general purpose lanes. This differential represents the reliability of speeds along the managed lanes. Validation of the speed differentials was conducted using the 2035 Cesar Chavez corridor, You will find these differences in Table 14.(***Final Forecasting Methodology Memo\_CDArea\_8\_13\_2012.pdf)***

The major corridors within the Border Highway West study area have enhanced Mission Model assignments within 5 percent of the original Mission Model assignment.

Enhanced validation was conducted in the Schuster/Yandell area immediately south and east of the

University of Texas El Paso (UTEP) campus. Oregon Street was added from Glory Road/Baltimore Drive

to the north and EB I-10 ramps to the south to better represent traffic flow in the area and to relieve Mesa

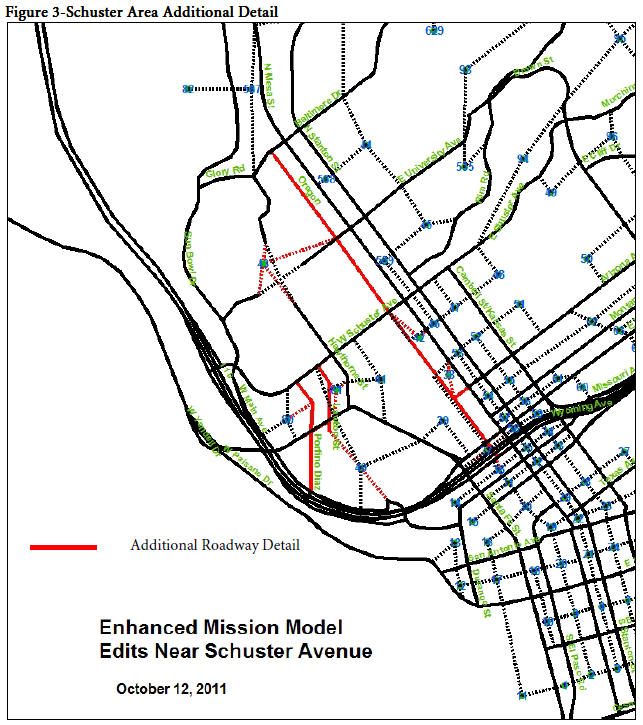
of taking on most of the N-S traffic. Porfirio Diaz was added between Schuster to the north and I-10

ramps to the south and Lawton Street was added from Schuster to the north and to just south of Yandell

to also better represent traffic flow between Paisano and the UTEP area. As a result of these additional

roadways some of the zone connectors in the area were also moved. Figure 3 shows the additional detail

in the Schuster/Yandell area.

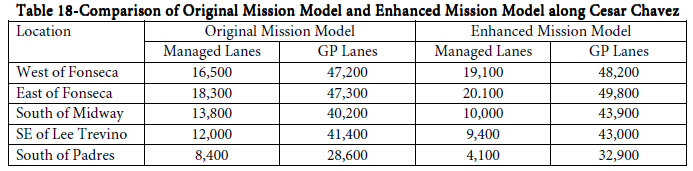


The modifications made to the Enhanced Mission Model are intended to improve the ability to forecast

traffic in the El Paso area considering the option of toll facilities. The toll volumes generated for the Cesar

Chavez managed lane project are therefore being used as a validation check for the model’s modifications.

Table 18 compares assignments on the Cesar Chavez general purpose and managed lane facilities between the original Mission Model and the Enhanced Mission Model.



For further information about the two models, refer to the above memorandum for AM and PM period validations, VMT, median household income, number of households and vehicle operating costs.

**Alternative Analysis**

**BHW, Collector-Distributor (CD), and Spur 1966**

**Two Percent Growth Analysis as Recommended by TPP**

***TechMemo\_ElPasoTrafficForecastTwoPercGrowth5\_18\_2012.pdf***

The 2015 and 2035 traffic forecasts for the El Paso BHW and CD projects have been updated to

reflect TPP’s comment for a flat two percent growth rate for the project area. The two percent

growth rate shown in the line diagrams does not reflect capacity constraints of I-10, Paisano

Drive, and Mesa Street; or toll sensitivity for the BHW. Further analysis will need to be

conducted to better estimate toll road usage.

**Spur 1966 Area**

**Corridor VISSIM Modeling**

**Schuster Bridge – Schuster Round-A-Bout and T Intersection with US85 – 8 Lanes I-10**

***Schuster Alt B Tech memo 8 Lane I-10\_11\_17\_10.docx***

HNTB analyzed a potential bridge connection between US 85 (Paisano Drive) and Schuster Avenue for the year 2035. Two intersections are included in the analysis: US 85/Schuster Avenue and a proposed Schuster Avenue roundabout. The adjacent I-10 facility is assumed to be a 8- lane cross section for this analysis. This I-10 configuration is forecasted to have low mainline speeds in future year 2035, which increases the diversion to US 85 as an alternative route. For the purposes of this analysis, the managed lane facility is not assumed to be constructed. This analysis, therefore, presents the worst case scenario for I-10 diversion traffic navigating through the US 85 and Schuster corridors.

Turning movements show that the majority of the traffic at these two intersections occurs in the PM peak hour. Both intersections operate at overall LOS C or better. Based on simulation, the maximum queue expected is approximately 450 feet at both intersections. The SBL (exiting parking structure) at the Schuster roundabout experiences 156 seconds of delay per vehicle or LOS F: severely degraded operations. It is expected that only 20 vehicles leaving the parking structure will experience this LOS (SBL movement). Majority of traffic leaving the parking structure turns right (using semi-bypass lane) to access I-10. This movement is expected to operate at LOS A. With the implementation of the managed lane, the (northbound right to northbound left) I-10 diversion traffic is expected to decrease. This decrease in volume is expected to reduce traffic delay and improve traffic operations at both intersections. With this reduction, traffic delay for the southbound approach at the roundabout is expected to decrease and provide adequate LOS.

**Schuster Bridge – Schuster Round-A-Bout and T Intersection with US85 – 10 Lanes I-10**

***Schuster Alt B Tech memo 10 Lane I-10\_11\_15\_10.docx***

HNTB investigated a potential bridge connection between US 85 (Paisano Drive) and Schuster Avenue in the year 2035. Two intersections are included in the analysis; US 85/Schuster Avenue and a proposed Schuster Avenue roundabout. Additional improvements considered within the analysis include the restriping of I-10 to create an additional lane in each direction (10 lane cross section). This I-10 configuration is forecasted to have low mainline speeds in future year 2035, which increases the diversion to US 85 as an alternative route. For the purposes of this analysis, the managed lane facility is not assumed to be constructed. This analysis, therefore, presents the worst case scenario for I-10 diversion traffic navigating through the US 85 and Schuster corridors.

Turning movements show that the majority of the traffic at these two intersections occurs in the PM peak hour. Both intersections operate at overall LOS C or better. Based on simulation, the maximum queue expected is approximately 550 feet at both intersections. The SBL (exiting the parking structure) at the Schuster roundabout experiences 129 seconds of delay per vehicle or LOS F: severely degraded operations. A minimal amount of traffic leaving the parking structure will experience this LOS. With the implementation of the managed lane, the (northbound right to northbound left) I-10 diversion traffic is expected to decrease. This decrease in volume is expected to reduce traffic delay and improve traffic operations at both intersections. With this reduction traffic delay for the southbound approach at the roundabout is expected to decrease and provide adequate LOS. To further improve traffic operations prior to the implementation of the managed lane, a southbound semi-bypass lane can be incorporated into the roundabout design to improve operations.

**Schuster Area 2035 Alternatives (early in the process)Full Build with Managed Lanes, Alt 1, Alt 2 and Alt B**

***2035VolumesSchusterAlts9\_9\_2011.xlxs***

TRANSCAD assignments were run for four alternatives in the Schuster area involving different access to US85. The alternatives were Full Build with managed lanes, Alt.1 has US85 access at Schuster to/from the north only, Alt. 2 has USH85 access at Schuster to/from both north and South and Alt B has US85 access to Schuster with an at-grade intersection. Alternatives with less access and without the managed lanes resulted in less traffic using the Schuster structure (7.7 to 11.8k) than full build with access to managed lanes and US85 (13k).

**Sun Bowl Drive Traffic Impacts When Changing From 2 Lanes to 4 Lanes**

***TrafficImpactsSunBowlDrFrom2to4Lns12\_22\_11.pdf***

The proposed expansion of Sun Bowl Drive is anticipated to have local traffic circulation impacts in the Schuster Avenue Extension study area. The Enhanced Mission Model was used to analyze Sun Bowl Drive being changed to 4-lanes from W. Schuster Avenue to N. Mesa Street making a loop through the University of El Paso. The expansion of Sun Bowl was used in conjunction with two scenarios of the new alignment of Schuster Avenue. The first scenario was the new Schuster Avenue connection having directional ramps to/from the north at Paisano Drive/US 85 and the second scenario was having the new W. Schuster Avenue connection to Paisano Drive/US 85 an at-grade intersection. The above scenarios were then compared to a no-build of Sun Bowl Drive which has 2-lanes from the south entrance of Sun Bowl stadium going north to Don Haskins Center.

The modeling results indicate north-south travel is most impacted by the proposed Sun Bowl Drive expansion. 1700 to 3100 additional trips are anticipated to use Sun Bowl Avenue with the proposed expansion. The design of the new Schuster Avenue extension impacts the usefulness of the Sun Bowl Drive expansion. An at-grade intersection between the new Schuster Avenue connection and US 85 (Paisano Drive) allows increased north-south travel from downtown El Paso via Paisano Drive , new Schuster Avenue connection, and expanded Sun Bowl Drive. This is also seen with the reduced volumes projected on N. Mesa Street, Oregon Street and Hawthorne Street. The new Schuster Avenue connection alternative, with ramps to/from the north, reduces the usefulness of the Sun Bowl Drive expansion with no access to/from the south.

See Appendix A in the above report for traffic impacts of the surrounding local roadways between no-build (2-lanes) and build (4-lanes).

2) No new Coles Street interchange, closing local access to Loop 375 at Santa Fe Street, S. Oregon Street, S. Kansas Street and S. Campbell Street. The only local access from Loop 375 will be at S. Mesa Street and right-in and right-out at S. Park Street.

3) No new Coles Street interchange, and maintaining all local access with Loop 375 at S. Oregon Street, S. Kansas Street, S. Campbell Street, S. Mesa and right-in and right-out at S. Park Street, including access at Santa Fe Street.

**Spur 73 Proposed Geometry and LOS (SYNCHRO and VISSIM)**

***AtGrade\_GradeSep Spur 73\_2\_09\_12.docx***

TxDOT retained HNTB for a proposed roadway connection between Schuster Avenue and US 85. This connection is referred to as Spur 73.( now known as Spur 1966) A managed facility is also proposed to have access to Spur 73 between US 85/ Spur 73 & Schuster/Spur 73 roundabout. The proposed connection includes 2 alternatives that only affect the intersection of US 85 and Spur 73. The first alternative analyzes the intersection at grade and the second is grade separated. Using traffic analysis software such as Synchro and VISSIM, HNTB analyzed traffic operations and recommends appropriate geometry to provide acceptable traffic operations to 2035. For this analysis, level of service (LOS) is considered acceptable at or better than LOS D.

Conclusion

Based on the presented alternative analysis, Alternative 1 provides adequate traffic operations and does not allow any free flow movements which may result in unsafe downstream weaving and vehicle queues.

Further analysis is recommended once approved forecasts are obtained from TxDOT TPP to refine the roundabout geometry and establish appropriate turn storage bay lengths.

**Downtown El Paso (Enhanced Mission Travel Demand Model)**

**2035 Traffic Impacts of a New Diamond Interchange on Loop 375 at Coles Street**

***2035 Analysis of a New Interchange on Loop 375 at Coles Street12\_29\_2011.docx***

The proposed Interchange at Coles Street/E. 4th Avenue and Loop 375 is anticipated to have local traffic circulation impacts in the downtown area. The Enhanced Mission Model was used to analyze a new interchange connecting Coles Street/4th Avenue to Loop 375 or Cesar E. Chavez Border Highway. There were four scenarios tested and all four included the managed lane option:

1. New Coles Street interchange, closing local access to Loop 375 at Santa Fe Street, S. Oregon Street, S. Kansas Street and S. Campbell Street. The only local access from Loop 375 will be at S. Mesa Street and right-in and right-out at S. Park Street. (See Figure 1 in document above).
2. No new Coles Street interchange, closing local access to Loop 375 at Santa Fe Street, S. Oregon Street, S. Kansas Street and S. Campbell Street. The only local access from Loop 375 will be at S. Mesa Street and right-in and right-out at S. Park Street.
3. No new Coles Street interchange, and maintaining all local access with Loop 375 at S. Oregon Street, S. Kansas Street, S. Campbell Street, S. Mesa and right-in and right-out at S. Park Street, including access at Santa Fe Street.
4. No new Coles Street interchange and maintaining all local access with Loop 375 at S. Oregon Street, S. Kansas Street, S. Campbell Street, S. Mesa and right-in and right-out at S. Park Street, access at Santa Fe Street removed.

The modeling results indicate East-West travel to downtown El Paso is most impacted by the proposed interchange at Coles Street with Loop 375 closures at Santa Fe Street, S. Oregon Street, S. Kansas Street and S. Campbell Street with the only local access from Loop 375 at S. Mesa Street and right-in and right-out at S. Park Street. Traffic was diverted from all North-South local streets off of Loop 375 to the new interchange at Coles Street and using E. Paisano Drive to get to the downtown area. S. Cotton Street also showed an increase in traffic north of E. Paisano Drive. The model showed 21,000 trips on Coles Street with the new interchange in place. Due to the proposed interchange, traffic was taken off of E. Paisano Drive and Delta Drive east of S. Cotton Street because that traffic was diverted to Loop 375/Cesar E. Chavez Border Highway due to direct access from Coles Street to the downtown area. Border Highway to the west of downtown was impacted by only 500 to 700 additional trips due to the proposed interchange.

# Downtown El Paso (VISSIM Micro-Simulation)

Downtown El Paso was analyzed with proposed alternatives as part of the BHW project. The analysis occurred primarily with VISSIM micro-simulation. The main study areas include: Coles interchange configuration, toll feasibility of Coles interchange, local intersection configurations with the Coles interchange, and downtown access alternatives. All of the initial scenario analysis was studied using preliminary 2035 AM and PM peak hour traffic forecasts numbers directly from the Enhanced MISSION model.

## Coles Interchange with Tolling

The first analysis of the Coles interchange had a non-tolled diamond interchange with tolled direct connectors. With this alternative no other downtown access from Loop 375 was assumed. To have the tolled direct connectors an alternative route to downtown needed to be maintained which is the need for the non-tolled diamond interchange. VISSIM modeling for the peak hours was analyzed using the direct connectors as managed lanes. Under this modeling platform vehicles had static routes between origin and destination pairs. There would be dynamic feedback with the managed lanes so vehicles could make a real time decision of which route would maximize their utility. Using this modeling technique queues formed on Loop 375 westbound because a large number of vehicles chose to take the non-tolled diamond interchange verse the tolled direct connectors. From this initial analysis the tolling of the Coles Interchange was classified as unfeasible, because it caused extra delay on Loop 375 mainline.

Coles Diamond Interchange verse Coles Direct Connectors

***ColesAlternativeTechMemo2\_23\_12.pdf***

A technical memorandum dated on 2/23/12 called “Coles Interchange Alternatives” analyzed the traffic operations of the diamond interchange verse the direct connectors both with no other access points downtown. The analysis found that both alternatives have unacceptable delay on the local system or Loop 375. The diamond interchange had queues form onto WB loop 375. The direct connectors eliminated quick routes to some key OD pairs, which caused some back tracking and extra intersection delay on the local intersections. This memorandum proved the need for other access options downtown. In addition the diamond interchange at Coles was eliminated as a feasible alternative due to right-of-way restrictions.

## Downtown Access Alternatives

***ColesDowntownMemo2\_29\_12.pdf***

A technical memorandum dated on 2/29/12 called “Coles Downtown Memo” added to the analysis additional access points downtown at Kansas, Campbell, and Mesa Street. The alternatives for downtown access with the configuration presented in the memorandum, were later changed due to design constraints or public opinion.

## Final Recommendation

***TrafficOperationalAnalysisDowntownElPaso4\_25\_12.pdf***

The final technical memorandum dated on 4/25/12 called “Traffic Operational Analysis Downtown El Paso” analyzed the preferred geometry at downtown. This included the Coles direct connectors, right-in at Campbell Street, right-out at Mesa Street, and left-out U-turn ramp at Mesa street. Also, the impact from not including the Mesa U-turn ramp was analyzed. Using the preferred geometry all merge, diverge, and weave segment on Paisano Drive and Loop 375 were analyzed along with LOS of local intersections affected by the Coles direct connectors.

**Revised Loop 375/Paisano Ramp Analysis (9/19/2012)**

***OperationsDowntownWesternRamps.pdf***

The technical memorandum dated on 9/19/2012 called “Operational Analysis of Loop 375 Ramps to Delta Drive” analyzed a new ramp configuration between Loop 375 and downtown El Paso. The major change in ramp configuration displaces the western ramps from Coles Street to a new intersection with Delta Drive just east of Coles Street. The operational analysis indicated that the new design had adequate LOS that was comparable to the previous configuration.

**Traffic Analysis of Downtown Access Configuration (10/17/2012)**

***TrafficCBDAccessOreCambKans10-17-12.pdf***

This technical memorandum evaluates the operation of Loop 375 with downtown access at Campbell Street (right in), Kansas Street (right out), and Oregon Street (right in). This configuration was analyzed with 2035 PM peak hour forecasts. In addition, existing operations of the Stanton Bridge during Thursday and Friday PM were analyzed. The operation indicated the build condition has adequate operations with PM 2035 traffic under normal conditions. However, Stanton Bridge queues remain an issue and have the potential to continue to back onto Loop 375. The build condition does improve the storage length for Stanton queues before a spillover would occur.

To support this analysis maps were created in TransCAD from several select link analysis. The select links analysis shows the distribution of traffic from Stanton Bridge and from WB Loop 375 in the build and no build condition.

***DirectConnectorDistribution.pdf*** *–* Shows the distribution from WB Loop 375 which uses the direct connector.

***DtwnRightInDistribution.pdf*** – Displays the traffic distribution from WB Loop 375 that makes a right in at Campbell or Oregon Street in the build condition.

***NoBuildDowntownDistribution.pdf*** – Shows the traffic distribution from WB Loop 375 making a right in at downtown in the no build condition.

***BuildWBLoop375SelectLink.pdf*** – Show the percentage of traffic from WB Loop 375 east of the direct connectors and where it distributes in downtown.

***PreferredRouteDowntownBuild.pdf*** – Show the preferred routes from WB Loop 375 for TAZ in the downtown area between direct connectors, downtown right in, and WB BHW.

***StantonDCLTraffic.pdf***  - Shows the destination distribution of trips from Stanton DCL.

**Collector-Distributor (CD) Area**

**Traffic Impacts of I-10 Ramps To/From the West at Resler Drive**

***Diff2035Buildvs2035Buildw\_NewReslerWRamps4\_30\_12.pdf,* *Westside Ramps at Resler and I-10 CD Area4\_30\_12.msg*** and ***Resler proposed ramps to-fromI-10N5\_14\_12.docx***

In response to a design suggestion from the I-10 collector-distributor (I-10 CD) Value Engineering workshop, HNTB reviewed the traffic volume impacts of constructing a set of ramps between Resler Drive and I-10 to the north. Resler Drive currently has direct ramp connections only to I-10 to and from the south. The proposed ramp connections were coded into the Enhanced Mission travel demand model, with the ramps terminating on the I-10 CD south of the access points between I-10 and the CD system. This would allow traffic using the proposed ramps to have nearly immediate access between the ramps and I-10 directly.

Most of the centroids are loading onto N. Mesa Street to the north of the new ramps. There are only a total of 2200 trips using both ramps and most of those trips were destined for I-10 and those trips were diverted from Sunland Park/I-10 interchange and N. Mesa/I-10 interchange. Some traffic was diverted from southbound Sunland Park and redistributed to southbound Resler Drive onto westbound I-10/CD.

The westbound I-10 ramp at N. Mesa Street appears low, which is due to trips coming off of westbound Resler Drive and continuing onto the CD rather than onto I-10. Then they cut across to the westbound ramp at N. Mesa Street to get onto I-10. This occurs in the model because of congestion on I-10 and as a result of this, the ramp speed is faster than the speed on I-10.

In conclusion, there wasn’t enough traffic using the ramps to justify any further studies.

**Traffic Impacts of Access Scenarios To/From Doniphan/Racetrack and McNutt (NM273)**

***Re impacts of McNutt closure5\_3\_12.msg, OriginalPreferredDoniphanMcNutt5\_08\_12.docx, RE Proposed Alternative B for DoniphanMc Nutt area5\_08\_12.msg, AltADoniphanMcNutt5\_08\_12.docx, AltBDoniphanMcNutt5\_08\_12.docx*** and ***Comparing\_ExistingAltDoniphantoProposedAltAandAltB 5\_07\_12.xls***

The proposed alternatives at Doniphan Drive, Racetrack Drive and McNutt Road (NM273) were coded into the Enhanced Mission travel demand model. Mc Nutt Road, Alternative A, has no access to BHW but Race Track Drive does have access to BHW and no direct connectors to Doniphan Drive. Mc Nutt Road, Alternative B, consists of, no access to BHW from Mc Nutt Road or Race Track Drive and no direct connectors to Doniphan Drive. Alternative A and B were compared to no access at Mc Nutt Road and direct connectors to Doniphan Drive from BHW and W. Paisano Drive. In a previous alternative when Mc Nutt Road had access to both BHW and W. Paisano Drive the model volume for Mc Nutt Road was approximately 19,000.

When comparing Alternative A or Alterative B to the preferred alternative at the time which included no access to Mc Nutt Road and direct connectors to Doniphan Drive from BHW and W. Paisano Drive there was no impact south of Executive Center Boulevard to BHW,. I-10 or W. Paisano Drive (US85)

A full comparison analysis of proposed Alternatives A and B and existing Alternative can be found in the above file “***Comparing\_ExistingAltDoniphantoProposedAltAandAltB 5\_07\_12.xls”***.

**2015 and 2035 Reversal of Ramps Analysis on I-10 Between Resler Drive and Redd Road**

***Reversal of Ramps Analysis on I106\_5\_2012.docx*** and ***MesaI10RampReversal2%forecast6\_20\_12.pdf***

The following findings are direct assignment volumes using the Enhanced Mission travel demand model.

I-10 eastbound off ramp at N. Mesa Street has approximately 11,100 less through trips in 2035 crossing N. Mesa Street to get to eastbound Collector/Distributor (CD), they are now staying on I-10 until south of N. Mesa Street. 1) 2035 with original ramp configuration 12,900 2) 2035 with reversed ramps configuration 1,800.

I-10 westbound off ramp at N. Mesa Street has approximately 8100 less through trips in 2035 crossing N. Mesa Street to get to westbound CD, they are now staying on I-10 until north of N. Mesa Street.1) 2035 with original ramps configuration 9,800 and 2) 2035 with reversed ramps configuration 1,700

As a direct result of reversing ramps east and west of N. Mesa Street there are approximately 20,000 more trips staying on I-10 and getting onto the westbound CD west of N. Mesa Street or eastbound CD east of N. Mesa Street. 1) 2035 with original ramps configuration 103,000 trips and 2) 2035 with reversed ramps configuration 123,000 trips.

As a direct result of reversing ramps between Resler Drive and N. Mesa Street there are approximately 28,500 more trips staying on CD west of Resler Drive and getting onto or off of westbound/eastbound I-10 east of N. Mesa Street. There are approximately 34,000 less trips on I-10 at that same location., The 5,500 trip difference comes from 2000 additional trips using Resler Drive and the rest is spread out using parallel routes/local streets due to being on the CD for a longer distance.- 1) 2035 CD with original ramps configuration 20,900 and 2) 2035 CD with reversed ramps configuration 49,400 3) 2035 I-10 with original ramps configuration 152,200 and 4) 2035 I-10 with reversed ramps configuration 118,200.

***MesaI10RampReversal2%forecast6\_20\_12.pdf*** shows an actual 2015 and 2035 traffic forecast of the area of the ramp reversals with the 2% growth recommended by TPP.

**NM 273 (Mc Nutt Road) Access Maintained**

***TechMemoNM273\_McNuttAccessMaintained7\_23\_2012.pdf***

The purpose of this memorandum is to describe the methodology for updating traffic forecasts on Border Highway West (BHW) and I-10 collector-distributor (CD) project when McNutt/NM273 access to US 85 is added to the project. The projects include a tolled facility connecting Loop 375 in downtown El Paso to US 85 (W. Paisano Drive) south of Sunland Park. The traffic forecasts for this project also consider on-going planning and environmental study work for the I-10 CD project, Spur 1966, two on-going traffic impact studies within the CD study limits, and limited access to downtown El Paso.

Including access between NM273 and US 85 did not impact traffic projections, in the project area, east of I-10. All east/west roadway volumes west of I-10, in the CD project area, had traffic diverted from them including W. Mesa Street, Sunland Park and Doniphan Drive. Of the 13,500 trips in 2035 on NM 273, 3600 were diverted from US 85, 7900 were diverted from Doniphan Drive and 2300 diverted off of I-10. The new diverted traffic is 300 trips larger than the 13,500 on NM273 due to rounding when balancing of the roadways were completed. Traffic projections on BHW segment north of Executive Center Boulevard are expected to decrease by approximately 1600 vehicles as trips to/from NM 273 must use US 85 and Executive Center Boulevard rather than BHW.

**NM 273 Access Options (VISSIM Model)**

***OperationsUS85NM273\_7\_23\_12.pdf***

Two alternatives were analyzed for NM 273 access to US 85. The two alternatives included: a lane add/drop on US 85 at the merge /diverge points with NM 273, and 2 through lanes on US 85 with a merge diverge to US 85. The analysis was done with VISSIM using peak hour 2035 traffic forecasts. The VISSIM model also captured the operation of the Doniphan Extension/US 85 intersection. The technical memorandum “Traffic Operational Analysis of US 85 at NM 273 Merge/Diverge” was sent out on 7/23/2012. The analysis showed that either merge/diverge alternative would be acceptable, but the lane add/drop alternative had a slight operational advantage.

**Border Highway West (BHW)**

**Traffic Impacts of Partial Construction of BHW**

***TechMemo\_Partial Build of BHW facility\_draft\_6-15-2012.docx***

The purpose of this memorandum is to show the effect of volumes on the Border Highway West (BHW) with phased implementation. Two scenarios are reported within this memorandum. The first scenario constructs the BHW from the northern limits to the Spur 1966 interchange, which maintains existing access along Loop 375 through downtown. The second scenario constructs the BHW from Spur 1966 to the eastern limits, and includes modifications to access in downtown El Paso. The traffic forecasts for the BHW project also consider on-going planning and environmental study work for the I-10 collector-distributor (CD) project and Spur 1966, two on-going traffic impact studies within the CD study limits and limited access to downtown El Paso.

BHW West of Spur 1966 (BHW East of Spur 1966 Eliminated)

When the eastern end of the BHW is eliminated, access to downtown is retained at S. Santa Fe Street, S. Mesa Street, S. Campbell Street/S Kansas Street, Park Street and the Cole Street and E. Paisano Drive direct connectors are not constructed. As a result of the above alignment there are 20,000 – 25,000 trips that continue to use Loop 375 east of Campbell/Kansas that would use the Coles Street direct connectors if available.

Western end of BHW remains on the same alignment as the full build with the BHW facility terminating at the Spur 1966 interchange. The eastern termination of the BHW facility forces traffic to exit at the eastbound off ramp and enter at the westbound on ramp at Spur 1966. This causes an increase in traffic by 179% to 196% respectively.. The mainline volumes on BHW West of Spur 1966 retains between 82% and 96% of the full build traffic.

BHW East of Spur 1966 (BHW West of Spur 1966 Eliminated)

When the western end of the BHW is eliminated, access to downtown is consistent with the full build BHW. The BHW and Spur 1966 interchange will have the eastbound off ramp and westbound off ramp eliminated. The volumes on the eastbound on ramp and westbound off ramp at BHW and Spur 1966 are 201% to 167% higher respectively. The mainline volume on BHW east of Spur 1966, retains 70%-of the full build traffic through the tolled section.

# Executive Drive BHW/I-10 Interchanges (SYNCHRO)

***RE:Executive SPUI6\_26\_12.msg***

***BHW Executive Center Corridor (BHWTight Diamond) Update6\_26\_12.msg***

Geometric configurations for the Executive Drive interchanges with BHW and I-10 were analyzed in Synchro to develop lane geometry and interchange type. The analysis indicated that a SPUI at BHW interchange provided the best level of service. Details on recommended geometry are detailed in the Appendix.

***ExecutiveBHW with 2 WBL lanes.msg***

The exchange of emails discusses the need to remove the auxiliary lane between I-10 SB off ramp and BHW NB on ramp. The 2035 peak hour VISSIM models indicates the auxiliary lane as originally designed by Halff causes delay within the weave segment. Removing the auxiliary lane improves traffic operations.

**Volume Comparison Using Four Combinations of BHW Alignments**

***TechMemoBHWAltsBR\_BB\_RB\_RR\_7\_26\_12.docx***

The purpose of this memorandum is to show the effect of volumes on Border Highway West (BHW) when four combinations of BHW alignments are compared.

The four combinations are:

* Border A (eastern end) and Border B (western end)
* Border A (eastern end) and Rail B (western end) – preferred alignment
* Rail A (eastern end) and Rail B (western end)
* Rail A (eastern end) and Border B (western end)

The project includes a tolled facility connecting Loop 375 in downtown El Paso to US 85 (W. Paisano Avenue) just south of I-10. The traffic forecasts also consider on-going planning and environmental study work for the I-10 collector-distributor (CD) project with NM 273 included and Spur 1966, two on-going traffic impact studies within the CD study limits and limited access to downtown El Paso.

Figure 1 through 4 in ***TechMemoBHWAltsBR\_BB\_RB\_RR\_7\_26\_12.docx*** shows the two Border alignments (A and B) and two Rail alignments (A and B).

Observations

All of these observations are being compared to the forecasts sent to TPP, which is eastern Border A and western Rail B. Table 1 in ***TechMemoBHWAltsBR\_BB\_RB\_RR\_7\_26\_12.docx*** compares forecasted volumes for all four BHW alignment combinations. Below is a summary of those findings.

The Border B alignment shows differences in traffic volumes West of Executive Center, including BHW, US 85/W. Paisano Drive and I-10 when compared to the Rail B alignment. This difference is due to the Border B alignment’s reconfiguration of Executive Center Boulevard, as shown in Figure 4. The reconfigured Executive Center Boulevard provides a more direct connection between the NM 273, Doniphan Drive area and I-10 than does the Rail B alignment, which more heavily utilizes BHW.

Modifying the alignment East of Racetrack (between Rail A and Border A) has minimal traffic volume implications West of Executive Center Boulevard (Rail B).

Modifying the alignment West of Executive Center Boulevard (Border B) has minimal traffic volume implication East of Race Track 0Drive (either Rail A or Border A).

**Loop 375 and I-10 (BOTA) Ramps**

**Traffic Operational Analysis of Potential Ramp Configuration**

***OperationsofI10BHWdirectconnectorramps.pdf (8/29/2012)***

A traffic operational analysis was completed using 2035 forecasted peak hour volumes for a potential ramp configuration between EB Loop 375 to EB I-10 and WB I-10 to WB Loop 375. The analysis indicated that in isolation the proposed design has adequate LOS (E or better). However, the ramps would need to be implemented as part of a capacity expansion projects for the I-10/US 54/Loop 375 interchange.

**Impacts to BHW with Removing BOTA Ramps**

***MemoBHWwithoutBOTAramps.pdf (9/10/2012)***

This analysis was done using the factored subarea Mission Model. Both a medium and high growth scenarios were analyzed. The analysis compared 2035 daily traffic assignments with and without the BOTA ramps. The analysis indicates that if the BOTA Ramps are removed from the 2035 build condition BHW has fewer trip between downtown and Spur 1966. However, impacts to BHW dissipate north of Spur 1966 with more vehicles using the Spur 1966 ramps.

**Miscellaneous Requests**

**BHW Study Area Need and Purpose Request for EIS**

***NeedandPurposeRequestfromDarrin7\_25\_12Old.xlsx***

A chart with no build existing and future volumes for the study area was requested to show need and purpose for the Border Highway West (BHW) project. This data will be included in the Environmental Impact Statement (EIS). 2010 traffic counts, 2010 and 2015 ADT model assignments, 2010-2015 annual growth rates, 2015, 2025 and 2035 forecasted volumes, 2015 capacity, and 2015 and 2025 volume to capacity (V/C) ratios are shown in the above named file.

**Analysis for Reducing Sunland Park area from 2% to 1.12% Annual Growth Rate**

***SunlandEmploymentpercentchange8\_02\_12.pdf, SunlandHHpercentchange8\_02\_12.pdf, SunlandParkLandUsewithLegend8\_02\_12.pdf, ComparisonSunlandPark.pdf, SunlandAreaTAZTrips8\_1\_12.xlsx* and *20120817\_Mission\_HNTB\_2%\_Comparison\_SunlandPark\_Set.pdf***

HNTB conducted this analysis to show the Sunland Park corridor growth rate should be reduced from the 2% TPP recommended to a compounded 1.12% growth rate. The Enhanced Mission model shows an average growth rate of 1.09%. When comparing existing buildings with the future zoning map, most of the land parcels are already built out. Future zoning is generally consistent with the current land uses, so it is unlikely that there will be much redevelopment occurring in this area.

The average annual growth rate (compounded) for households and employment for the zones in the Sunland Park area is less than 1.5 percent per year. Based on the maps showing existing buildings, future zoning as well as the household and employment growth maps, HNTB suggests that a lower growth rate should be used for the Sunland Park area than the 2 percent per year average annual growth rate (compounded) suggested by TPP.

As a result of this analysis the future forecasted volumes for Sunland Park corridor were reduced to 1.12% (compounded) from the 2.00% (compounded) that was recommended by TPP.

**Spreadsheet Showing TRANSCAD Scenarios Tested for All Three Projects – Spur 1966, Collector-Distributor and Border Highway West**

***ScenariosRanforSchuster\_Sunland\_Downtown\_US54I10Analyses07\_25\_12.xlsx***

This spreadsheet summarizes the combinations of scenarios ran for Spur 1966, Collector-Distributor (CD) and Border Highway West (BHW). Some of them were implemented into the final recommended plan and others were just tested for feasibility.

**Select Link Analysis**

**Collector-Distributor (CD) Area**

**Trips To/From New Ramp Connector - I-10 to Southbound US54**

***2035 Analysis of New Ramp Connector from I10toUS54\_12\_16\_11.docx***

The Enhanced Mission Model was used to analyze a new ramp connector from I-10 to southbound US 54. There were a total of 7200 vehicles per day using the new ramp. A select link analysis was conducted on the new ramp to determine where the trips were coming from or going to. It was determined 5300 of these 7200 trips were headed to the border crossing. The Enhanced Mission Model predicts that the I-10 to southbound US 54 connector would encourage traffic to use the new ramp rather than the existing I-110 connection, as the I-110 connection is modeled as a ramp with lower speed and capacity. A signing plan to keep these vehicles destined for the Port of Entry from using the proposed connection of I-10 to SB US 54 as a shortcut to jump the Port of Entry queue should be developed. The remaining 1900 trips predicted by the Enhanced Mission Model were destined for Loop 375. Although, most of these 1900 trips were destined to Downtown, over 10% were predicted to use Border Highway West to get to Sunland Park and points north.

**Downtown El Paso**

**Downtown El Paso Select Link Analysis**

***Tech Memo\_Select Link Summary12\_3\_10.pdf***

HNTB utilized the Mission 2035 travel demand model modified for time of day analysis (Enhanced Mission Model) to evaluate the traffic pattern through downtown El Paso. Specific points were selected on either side of the downtown and trips across those points were tracked throughout the network. The following table shows the results of 10 locations chosen within the downtown area and the map shows the 10 select link locations and the tracked volume locations.**Fort Bliss Analysis**

**2010 Base and 2035 Full Build Trips To and From Fort Bliss using I-10 (CD), BHW and US85 (Paisano)**

***TechMemoFortBlissSelectLink6\_26\_12Base2010FullBuild2035\_JKS.docx***

The purpose of this memorandum is to show the forecasted interaction between Fort Bliss and the Border Highway West (BHW) facility. This memorandum estimates the portion of Base 2010 and Full Build 2035 traffic to/from Fort Bliss that will use Border Highway West, I-10 and US85/Paisano Drive in the project area, and what percent of total daily trips on I-10 and BHW, and US85/Paisano Drive are coming/going to Fort Bliss. The Enhanced Mission Model represents Fort Bliss as traffic analysis zones 166-178, 214-216, and 486. Year 2010 and 2035 traffic projections from the Enhanced Mission Model indicate nearly 158,500 and 227,000 daily trips respectively coming in/out of Fort Bliss.

There are 17 zones that represent Fort Bliss and the highest generator of traffic is zone 172 with 23,688 trips in 2010 and 29,849 trips in 2035 for an increase of 26%. The total number of trips in/out of Fort Bliss is 43% greater in 2035. Within the BHW analysis area, I-10 is the preferred route for trips in/out of Fort Bliss for both 2010 and 2035. Table 1 (in the above file) shows trips using specific routes, their locations, the percent of total trips on a facility going to/from Fort Bliss and percent of the total Fort Bliss trips.

Using 2010 base model, there are approximately 4.5 to 6.8 percent of I-10 traffic and approximately 1.5 to 1.9 percent of US85/Paisano Drive traffic is related to Fort Bliss activities. With the BHW being a future project, there will be no volumes associated to it in 2010. Using 2035 full build model, there are approximately 4.5 to 7.5 percent of I-10 traffic, approximately 3 to 5 percent of BHW traffic and less than one percent of US85/Paisano Drive traffic is related to Fort Bliss activities. The BHW project reconfigures the area near Doniphan Drive, resulting in fewer vehicles using US85/Paisano Drive in 2035 than in 2010.

**Travel Time or Signal Delay**

**2035 Traffic Impact with 30 Second Delays Downtown and at Spur 1966**

***Diversion from addition signal delay memo\_3\_23\_12.pdf***

Texas Department of Transportation (TxDOT) has requested additional analysis at Spur 1966 and W Paisano Drive (US 85) and also a separate analysis at S Campbell Street/S Kansas Street and Loop 375. Both scenarios include an additional 30 second delay for the westbound through movement to simulate the addition of a traffic signal.

**Forecast assumptions**

The Enhanced Mission Model (a TransCAD travel demand model) was used to forecast the potential traffic diversion from introducing a traffic signal to W Paisano Drive (US 85) and Loop 375 respectively. The Enhanced Mission Model was not developed to explicitly model the delay associated with intersection traffic control across the entire El Paso region, however, the model does allow for testing of traffic impacts of introducing additional delay beyond a typical condition. In this case, an additional 30 seconds of delay was added for one specific movement at each of the two intersections independently. Additionally, several modifications to the existing transportation system have been identified as part of the 2035 design year condition for the I-10 Collector-Distributor (CD), Spur 1966 and Border Highway West (BHW) projects. The additional modifications can be found in ***Diversion from additional signal delay Memo\_3\_23\_12.pdf***

**Modeling Results**

The modeling results for a westbound delay at S Campbell Street/S Kansas Street and Loop 375 indicate that approximately 2500 vehicles that would normally turn right onto S. Mesa Street are now using S Campbell Street/S Kansas Street and working their way north to the downtown. There are also approximately 1800 westbound vehicles that were diverted from Loop 375/BHW west of downtown. Approximately 500 additional daily trips would be anticipated to use W. Paisano Drive, while another 500 additional daily trips would be anticipated to use westbound I-10. Few through trips on Loop 375 are impacted, as shown by the reduction of 500 vehicles on Loop 375 east of the E Paisano connectors. Rather, there is a reduction of over 700 vehicles from the southbound E Paisano connector to westbound Loop 375, indicating local traffic in the downtown area is more heavily influenced by the additional delay.

The modeling results for a westbound delay at Spur 1966 and W Paisano Drive indicate that approximately 1900 westbound through vehicles diverted off of W. Paisano Drive with 110 additional vehicles using westbound BHW and the remainder using I-10. 1400 additional westbound vehicles attempted to avoid the westbound delay at Spur 1966 by using BHW (780 additional westbound trips beyond the 111 additional through trips) or I-10 (650 additional westbound trips that appear to use Schuster and Spur 1966 to access W Paisano Drive).

The above results can be found in ***Diversion from additional signal delay Memo\_3\_23\_12.pdf*** . See Figures 1 and 2.

**Downtown El Paso Business Access Travel Time Comparison**

***Downtown\_access\_traveltime7\_17\_2012.pdf***

The purpose of this memorandum is to quantify the difference in travel time to access businesses in downtown El Paso from points east via Loop 375 when the proposed modifications to access are implemented along Loop 375 south of downtown as part of the Border Highway West (BHW) project. The proposed access changes can be found in ***Downtown\_access\_traveltime7\_17\_2012.pdf.***

**Summary**

The proposed BHW will consolidate access between Loop 375 and downtown El Paso, specifically at Santa Fe Street, Mesa Street and Park Street. Accessing businesses in close proximity to these removed access points is anticipated to require up to one additional minute.

A similarly sized area in the vicinity of Paisano Drive and Coles Street is anticipated to experience improved travel time to access businesses due to the addition of direct connections between Loop 375 and Paisano. Therefore, a net zero impact is anticipated for the downtown El Paso business community.

**Tolling Methodology Memorandums**

**Interim Horizon Model Tolling Methodology (Preliminary)**

***Interim Horizon Model Tolling Methodology Memo 12-29-2011.doc***

**Enhanced Mission Model Tolling Methodology (Preliminary)**

***Enhance Mission Model Toll Methodology Memo 1-04-2012.pdf***

Texas Department of Transportation (TxDOT) contracted HNTB to conduct traffic forecasting and analysis in support of the environmental analysis for the Border Highway West project west of downtown El Paso, Texas. This project includes a proposed extension of Schuster Avenue to cross I-10 and connect with US 85 (Paisano Avenue), a collector-distributor system along I-10 near the Sunland Park interchange, and the Border Highway West project.

The memorandums outline the process proposed to incorporate open road tolling into the traffic assignment process of the Interim Horizon and Enhanced Mission travel demand models. The above two files were developed in the preliminary stages of the above named projects.

An interim Horizon Model was to be developed with new traffic analysis zones and socio-economic data and the process had been started but then the TxDOT decided it was more data intensive than anticipated and they needed volumes completed for the projects to move forward. It was then decided to have HNTB to use the current Mission Model and develop an Enhanced Mission Model, containing four peak period auto trip tables by trip purpose, allowing for traffic assignments to be conducted for each of the four time periods. These four traffic assignments are aggregated to a daily traffic assignment. Before this process the twenty-four hour trip table was assigned to the highway network, resulting in the daily traffic assignment.

**Tolling**

Per the Market Valuation Agreement (MVA) between Camino Real and TxDOT, the 2015 base auto toll rate is $0.10/mile, with trucks having a rate 2 to 5 times the base rate.  For modeling purposes, a truck toll rate of 3 times the auto will be utilized, 2015 truck toll rate equals $0.30/mile.  The MVA states the base toll rate will be adjusted to maintain LOS C or better on the facility.  The MVA also includes a 2% MINIMUM escalation, or the CPI, whichever is greater.  For modeling purposes, a 2% escalation will be utilized.  This results in a 2035 base toll rate of $0.15/mile for autos and $0.45/mile for trucks.

**Toll Sensitivity Testing.(DRAFT)**

***Tech Memo – Toll Traffic and Revenue Study 10-10-2012.pdf***

This technical memorandum describes the methodology, assumptions and forecasts based on a preliminary toll sensitivity analysis for the Border Highway West toll road in the El Paso region of Texas. In addition to toll sensitivity analysis, this study presents the forecasted toll traffic and revenue for Border Highway West from the opening year 2015 to future year 2055. These traffic and revenue forecasts are preliminary and they are not intended to be used directly in support of project financing.

**Project Background**

Border Highway West is a proposed 4-lane controlled-access toll facility in El Paso, Texas. The project limits extend from Racetrack Drive near Doniphan Road and New Mexico (NM) 273 on the west to United States Highway (US) 54 east of downtown, a total project length of approximately 9 miles. All existing roadways would remain non-tolled. The project is included in the Mission 2035 Metropolitan Transportation Plan (from east of Park Street to the Schuster Extension/Spur 1966). For the purposes of this study, BHW is proposed to extend further west to I-10 south of the collector-distributor (CD) project limits on US 85.

**Limitations of Analysis**

The actual results from the completed Horizon model will show differences from the forecast year 2040 traffic volumes presented in this memorandum.

Several broad assumptions were made to complete this analysis:

* Demographic data for the enhanced Mission model are based on models provided by El Paso MPO
* The network assumptions and model parameters for base and future year are consistent with the information available to HNTB at this time.

**Recommendations**

HNTB recommends that this preliminary traffic and revenue study be followed by more comprehensive traffic and revenue studies. Before considering the project for project financing, an investment-grade traffic and revenue study is typical and recommended. A comprehensive investment-grade traffic and revenue study would typically entail detailed land use analysis of the study area by an independent economist, and stated preference surveys to determine the willingness to pay tolls among potential users of the system.

HNTB also recommends re-evaluating toll sensitivity and updating toll traffic and revenue estimates once the calibrated Horizon travel demand model and stated preference surveys become available because the growth rates and patterns are different compared to the enhanced Mission model.

**Disclaimers**

HNTB has adopted the most current professional practices, processes and assumptions to develop the preliminary traffic and revenue forecasts presented in this study. However, for any tolled facility, there could be differences between forecasted results and actual results due to circumstances beyond the purview of this study. The traffic and revenue forecasts in this study are only intended to broadly reflect the overall long-term trend. There could be variations for any specific year due to economic conditions and other factors.

Finally, it should be emphasized that the results presented in this study are to be considered preliminary and all findings may be subject to considerable refinement. The project was not analyzed at a level of detail that is sufficient to be used for project financing. More detailed studies involving independent socio-economic data review, stated preference surveys and travel pattern surveys would be required before the findings are considered sufficient for project financing.

* The results presented in this report present the findings based on models, assumptions and information available as of the date of this report.
* All traffic and gross toll revenue forecasts are subject to future economic and social uncertainty, demographic developments due to short-term and long-term deviations from anticipated or planned growth.
* All planned regional transportation projects have been included as are known and available at this time. HNTB cannot predict with certainty any other construction activities beyond the planned projects from the MPO.
* HNTB is not responsible for the socio-economic or demographic forecasts that drive the traffic, or the 2 percent per year growth rate that TPP has directed HNTB to use for forecasts.
* Any changes in any of the other assumptions used in the analysis could materially affect actual toll transactions and revenue.
* Several assumptions were made to estimate the O&M costs and unpaid transactions.

**Final Methodology Memorandums Sent to TPP for Approval**

The forecasted volumes for all three projects below represent the 2% (compounded) growth rate recommended by TPP except in the Sunland Park corridor which 1.12% (compounded) growth rate was used.

**Spur 1966 (5/31/2012)**

***Final Forecasting Methodology MemoSpur1966\_5\_31\_2012.pdf***

**BHW (8/03/2012)**

***Final Forecasting Methodology Memo\_BHW\_8\_3\_12.pdf***

**CD Area (8/13/2012)**

***Final Forecasting Methodology Memo\_CD\_8\_13\_2012.pdf***

**Design Sheets Sent to TPP for Approval Spur 1966 (5/31/2012)**

**(these were updated by MPO after being sent to TPP for approval, don’t have updated files)**

***KFactorPaisanoEofSpur1966.xlsx***

***KFactorPaisanoWofSpur1966.xlsx***

***KFactorSchusterEofSunBowl.xlsx***

***KFactorSchusterWofHawthorne.xlsx***

***KFactorSpur1966NofBHW.xlsx***

***KFactorSpur1966SofBHW.xlsx***

**BHW (8/03/2012)**

***KFactorBHWNofExecutiveCenter.xlsx***

***KFactorBHWSofDoniphan.xlsx***

***KFactorBHWSofExecutiveCenter.xlsx***

***KFactorBHWSofSpur1966.xlsx***

***KFactorLoop375EofDowntownEofColes.xlsx***

***KFactorLoop375SofDowntownEofCampbell\_Kansas.xlsx***

**CD Area (8/13/2012)**

Includes Medium and Heavy Truck Percentages Used in Air and Noise Analysis

***KFactorI10EBonRampsEastofWPaisanoDr.xlsx***

***KFactorI10EofNMessa.xlsx***

***KFactorI10EofPaisano.xlsx***

***KFactorI10EofResler.xlsx***

***KFactorI10EofSunlandPark.xlsx***

***KFactorI10FrntgRdEBbtwnMesa\_Resler.xlsx***

***KFactorI10FrntgRdEBbtwnResler\_Sunland Park.xlsx***

***KFactorI10FrntgRdWBbtwnMesa\_Resler.xlsx***

***KFactorI10FrntgRdWBbtwnResler\_Sunland Park.xlsx***

***KFactorI10WBoffRampEastofWPaisanoDr.xlsx***

***KFactorI10WBoffRampfromPaisanoandI10toFrntgRd.xlsx***

***KFactorI10WofExecutiveCntr.xlsx***

***KFactorI10WofNMessa.xlsx***

***KFactorReslerEBonRamptoCD.xlsx***

***KFactorReslerWBoffRampfromCD.xlsx***

***KFactorSunlandSBoffRamptoPaisanoI10EB.xlsx***