Acadiana Planning Commission (APC)

Peer Review

November 2016

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U.S.Department of Transportation
Federal Highway Administration

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16. Abstract

This report details the proceedings of a peer review of the Acadiana Planning Commission's (APC) transportation model. The primary objective of the APC peer review was for APC to better understand the capabilities and limitations of the current model and provide recommendations for model improvements.

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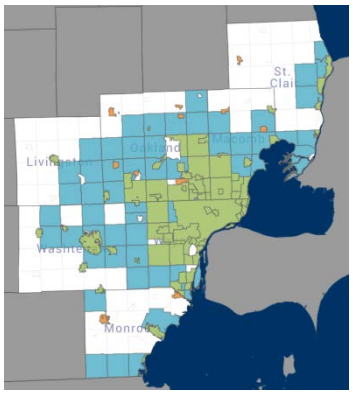
Acadiana Planning Commission (APC)
Peer Review



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Federal Highway Administration

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1.0 Introduction

1.1 Disclaimer

The views expressed in this document do not represent the opinions of FHWA and do not constitute an endorsement, recommendation or specification by FHWA. The document is based solely on the discussions that took place during the peer review sessions and supporting technical documentation provided by Acadiana Planning Commission (APC).

1.2 Acknowledgments

The FHWA would like to acknowledge the peer review members for volunteering their time to participate in this peer review. Panel members include:

- Ken Cervenka – Federal Transit Administration (FTA);
- Mei Ingram— North Carolina State University;
- Howard Slavin – Caliper Corporation;

Additional biographical information of each peer review panel member is located in appendix C.

1.3 Report Purpose

This peer review was supported by the Travel Model Improvement Program (TMIP), sponsored by FHWA. TMIP sponsors peer reviews so planning agencies can receive guidance from and ask questions of officials from other planning agencies across the nation. The peer review process is specifically aimed at providing feedback to agencies on travel modeling endeavors.

The primary objective of the APC peer review was for APC to better understand the capabilities and limitations of the current model and help APC decide how to proceed with model improvements.

The peer review panel convened for one day (September 29, 2016). During that time, APC presented background information and asked for guidance in all areas of their modeling practices, and the panel discussed these items and offered a series of formal recommendations to APC.

1.4 Report Organization

The remainder of this report is organized into the following sections:

- **Overview of the Acadiana Planning Commission (APC)—**This section highlights the responsibilities of the commission as well as some key characteristics of the Acadiana region.
- **Development of the Acadiana MPO (AMPO) Model—**This section discusses APC's existing model, future model updates, and the agency's goals for the current peer review.
- **Peer Review Discussion—**This section details the key discussions of the peer review panel with APC over the course of the one-day peer review meeting.
- **Peer Review Recommendations—**This section highlights the official recommendations made by the peer review panel. Some of the key discussion points are revisited here, but some new details also are added.

Four appendices also are included:

- Appendix A—List of Peer Review Panel Participants;
- Appendix B—Peer Review Panel Meeting Agenda;
- Appendix C—Peer Review Panel Member Biographies; and
- Appendix D—Documentation Provided to Panel Members by APC and Documents referenced in this report.

2.0 Overview of Acadiana Planning Commission (APC)

2.1 APC Role and Responsibilities

The Acadiana Planning Commission (APC) houses the Acadiana MPO (AMPO). The APC comprises a seven parish region, while AMPO fits within a subarea of six parishes. The AMPO area encompasses all of Lafayette Parish and portions of Acadia, Vermilion, Iberia, St. Landry and St. Martin Parishes. The AMPO Study Area is approximately 650 square miles with a population of 340,389.

The primary purpose of a travel demand model is to "help in making well-informed transportation policy decisions by showing the likely effects of policy changes on the transportation network. They can also show how changes in employment, population, land use, and development patterns, as well as investments in transportation infrastructure, might affect travel in a region."[1] The AMPO model is used to answer transportation planning questions and inform policy decisions in the Acadiana region. Some of these include:

- Alternative analysis for large projects (i.e., I-49 connector project)
- Estimated ADT of New roads/extensions and surrounding impacts
- Priority programs (vehicle hours of delay as a means of cost-benefit analysis)
- Estimated ADT for Single Axial loadings (Pavement depth)
- Model counts as a replacement for traffic counts
- Growth rates
- Estimated ADT for economic analysis
- Cordon analysis
- Select link analysis
- Zonal trip generation analysis

2.2 Regional Characteristics

The 2010 Census Lafayette Urbanized Area boundaries were expanded to include greater portions of Iberia, Acadia, Vermilion, St. Martin and St. Landry Parishes. On July 18, 2012 the United States Department of Transportation designated AMPO as a Transportation Management Area (TMA). AMPO worked with the Louisiana Department of Transportation and Development (DOTD) to identify the planning area boundaries. The AMPO study area increased from 426 sq. miles to 650 sq. miles and from a population of 245,619 to a population of 340,389.

Robust, sustained growth is expected in the AMPO study region through the year 2040. The region's population is projected to increase by 148,000 new residents (44%) from 2010 to 2040. Figure 1 shows the Year 2010 AMPO household population by transportation analysis zone (TAZ), and AMPO's

[1] Peer Review Process Guide: How to Get the Most Out of Your TMIP Peer Review. FHWA, Travel Model Improvement Program.

location within Louisiana. Lafayette, in the center of the planning area, is approximately 60 miles east of Baton Rouge.

Traditionally, this MPO area is largely traveled by auto. There are no marine ports, few railways, and two small airports. Trucks move most of the commerce through the AMPO area via two major interstates, I-10 and I-49. I-49 terminates at I-10 in Lafayette and becomes the signalized highway, US-90. The largest planned project in the region is the conversion of parts of US-90 into a freeway, called the I-49 Connector Project. Bike and pedestrian access is limited, but is growing. Transit represents less than 2% of all trips within the region.

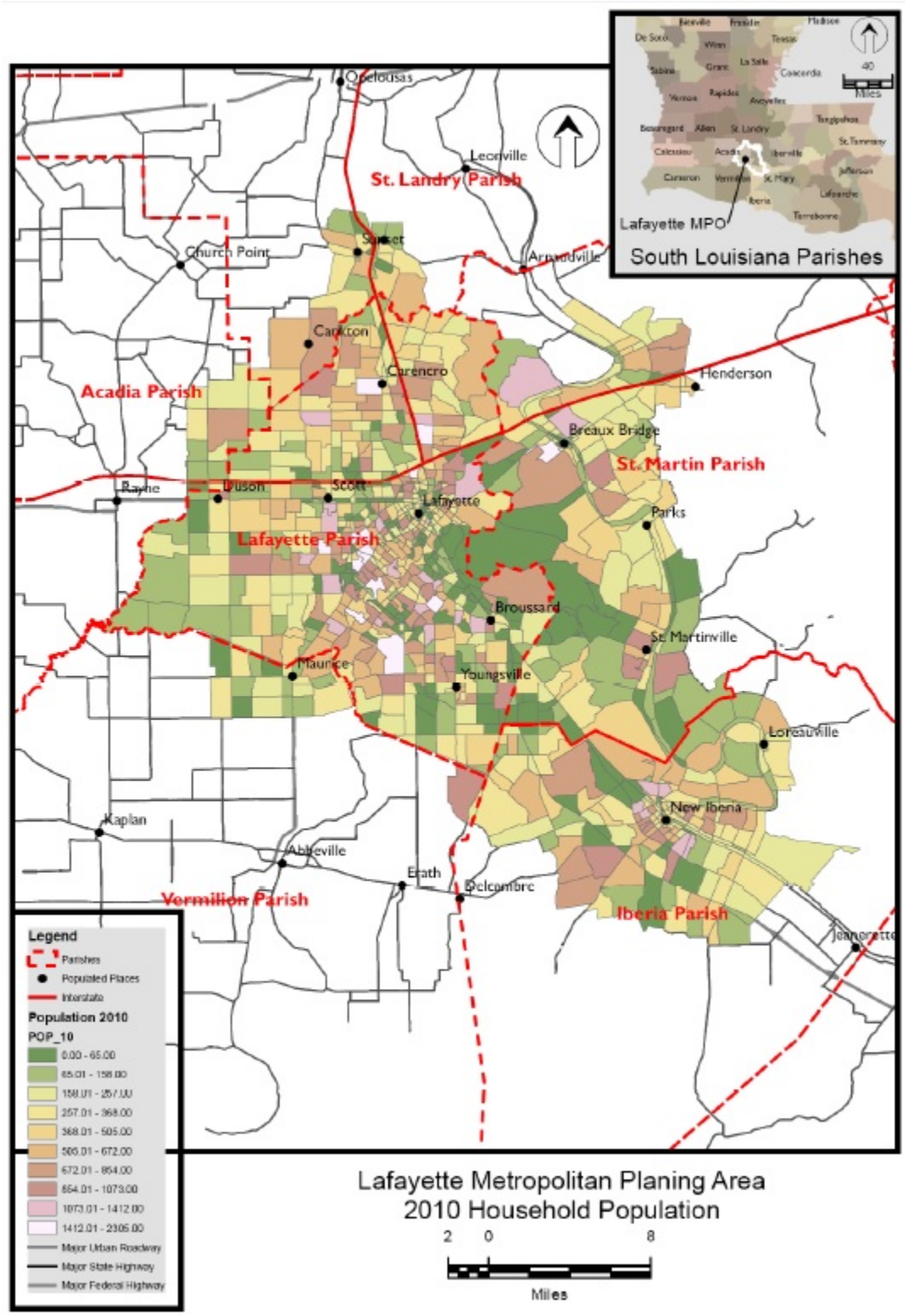

Figure 1 AMPO Regional Boundary and Household Population

(Source: APC, October, 2016.)

3.0 Development of the APC Model

3.1 Existing Model

APC currently uses a traditional trip-based three step model (i.e., no mode choice) on the TransCAD 5.0 software platform. The model was most recently updated, by a consultant and APC, in 2010 with a 2010 base year. Approximately half of the work to update the model was completed by APC.

3.1.1 Socioeconomic and Land-Use Inputs

When the 2010 base model was built, it was expanded from a 600 zone system to a 1033 zone system, with 47 zones representing external access points. There are approximately three to five blocks per TAZ. The model has the following land use and employment categories:

- Population
- Household size differentiated by one to two, three to four, and five or more individuals
- Total Dwelling Units
- Occupied Dwelling Units
- Retail Employment
- Other Employment
- Total Employment
- School Attendance

To project where people will live, APC used the official estimates developed by the state of Louisiana to estimate population in the coming years. APC reviewed the estimates and modified the projections based on recent trends in changing demographics and migration patterns.

APC calculated how many women were of child bearing age and how many elderly people lived in each zone. Based on these numbers, APC estimated how many people would be born and how many people would pass on. These are the same figures used by life insurance companies to estimate longevity. AMPO also looked at how many move in and move away from Lafayette using their age and gender as guidelines. Using birth, deaths, in-migration, and out-migration, the APC developed growth rates for each TAZ.

APC also reviewed Year 2010 aerial photographs to locate undeveloped land located in close proximity to new transportation projects that may be redeveloped into new subdivisions. In addition, APC hired a consultant to track down the location of each and every business, more than 150,000 businesses in all. The consultant used the employers' addresses and geocoded each business location. APC looked at the kind of business each employer was doing and then looked at the probable growth rates of each of these kinds of business. The method also entailed looking at how far away people travel to do business and shop in the Lafayette area. A factor was developed for each employment sector and then multiplied to find how big the business sector might be in the coming years. These analysis were used to develop one set of land-use forecasts for Year 2020, 2030, and 2040.

3.1.2 Trip Generation and Distribution

The model includes the following internal trip purposes:

- Home-Based Work,
- Home-Based Other,
- Home-Based School,
- Non-Home Based Work,
- Non-Home Based Other,
- Commercial Vehicle, and
- Truck.

It also includes the following external trip types:

- External-Internal (EI) Auto Trips,
- External-Internal (EI) Truck Trips,
- External-External (EE) Auto Trips, and
- External-External (EE) Truck Trips.

The model uses cross-classification trip production models for the home-based and non-home-based trip purposes. Trip rates, developed using the 1997 Baton Rouge Personal Transportation Survey, vary by household size are applied at the zonal level. These trip rates were refined as needed during the calibration process. Productions and attractions are distributed using a singly-constrained gravity model based on free flow skims by holding trip productions constant.

Commercial vehicle trips represent four-tire commercial vehicles, including delivery and service vehicles. Commercial vehicle trips are generated through a linear regression equation that relates zonal employment and households to trip productions and attractions. The trip attraction models are linear regression equations that relate zonal employment, households, and student enrollment to trip attractions. Productions and attractions are distributed using a singly-constrained gravity model by holding trip productions constant. Commercial Vehicle trip models were derived using the Quick Response Freight Manual, September 1996.

In order to build the EI and EE trip tables, roadside travel surveys conducted from 2000 were used and updated to the current traffic counts through extrapolation and the Fratar procedure to obtain trips crossing the study area boundary. The EI attraction equations used in this model were derived from the Baton Rouge, LA 2032 Metropolitan Transportation Plan Update. In addition, EI trips were also separated into auto and truck trips based on the vehicle classification counts at external stations. The year 2000 traffic counts at each external station were forecast to 2010, 2020, 2030, and 2040 by developing a growth factor based on historical traffic counts at the external stations. The total traffic at each station was then divided into EI and EE trips with the assumption that there would not be a significant change in the distribution from the base year.

3.1.3 Time-of-Day and Assignment

The AMPO model is a daily model. There is one set of skims for all time periods (i.e. separate skims are not developed for the peak and off-peak periods). Diurnal factors are used to divide trips into four time periods (i.e. AM Peak, Mid-Day, PM Peak, and Night). The AMPO model includes a User Equilibrium

(UE) assignment with the Bureau of Public Roads (BPR) volume-delay function. Feedback is not included between the model components.

3.1.4 Calibration and Validation

Validation of the AMPO Travel Demand Model proceeded from consideration of its areawide performance to the relative distribution of traffic by roadway functional classification and ADT range. In the final stage of the validation process, the accuracy of the model with respect to specific routes and roadway groups was analyzed. At each level, an appropriate degree of accuracy was defined in terms of the maximum tolerable deviation from base-year vehicular volumes (i.e., estimated annual average daily traffic) and Root Mean Square Error (RMSE).

Overall, the cumulative model volume for all network links associated with the DOTD traffic count locations of 4,860,904 vehicles differed from total model estimated ADT of 4,945,530 by 1.7 percent compared to an allowable error limit of five percent. Model estimated volumes are slightly higher than the observed traffic counts on Interstate routes while model volumes on all non-Interstate routes match observed counts well within acceptable deviations. An analysis of historical traffic counts along Interstates indicated a high degree of fluctuations. Due to this reason, the model estimated volumes on Interstates were considered to be valid. APC concluded that AMPO model performs well within the established limits of acceptable deviation from base-year estimated volumes.

The DOTD counts provided to APC consist of tube counts at 50-60 locations. Data is provided in 48 hour increments with 50-50 directional split, and includes axial adjustment factors by functional class, weekday adjustment factor, and seasonal adjustment factors.

3.2 APC's Goals for the Current Peer Review

The primary reasons that APC pursued a model peer review were to:

- Give confidence to the Policy and Technical Committee leaders on decision making abilities of the model,
- Compare the AMPO modeling practices to that of national practices,
- Solicit opinions on changes to the model,
- Opportunity to network with and educate ourselves through the experience of other modelers, and
- Obtain an objective assessment of our model as compared to others, nationwide.

APC also had specific questions that they requested the Peer Review to answer. The report provides answers to most, but not all, of the questions:

1. What other types of software might we consider using? Should we consider Activity based modeling?
2. What is a means to model the effects of changes in driver behaviors and incorporate into model (ex: Gas prices, lower employment rates, etc)?
3. What are common methods of demographic forecasting? How does our model forecasting method stack up?

4. Is there a way to enhance the current framework of the model to better capture potential performance measures?
5. Are our Calibration/Validation parameters adequate?
6. In traffic assignment what convergence factors are most commonly used now?
7. How are MPO's using Cell Phone data to change/improve travel demand modeling? How can we use this data?
8. Could you give advice on incorporating mode share into the model (ex: incorporating transit)? What algorithms are most effective? What sorts of data do we need to have in order to incorporate this step? Are there Grants that could be used to incorporate this measure into the model?
9. Can you discuss feedback loops and how they might be effective for our model?
10. Can you speak to induced demand and if it is possible to incorporate it into a trip based model?
11. How is the gamma function used in relationship to friction factors?
12. What would be an appropriate size of TAZ's for a model of our size?
13. Can we use signalized capacity reduction factors to enhance model sensitivity?
14. What are the advantages and disadvantages of validating traffic models against observed speeds?

4.0 Peer Review Discussion

The first half of the peer review was a presentation by APC on specific items to the peer review panel. During these presentations, many topics came up which initiated discussion among peer review panel members and between panel members and APC. This section documents the key points that arose during these presentations.

4.1 Type of Model and Software

The AMPO model is a trip-based model that uses the TransCAD platform. The panel did not think there was any reason to consider other modeling platforms given that TransCAD is widely used across the country and is the predominant software used in Louisiana.

Given that AMPO is a small MPO and the current model is a simple trip-based model, the panel suggested that AMPO focus on improvements to the current trip-based model and to possibly convert it to a more advanced trip-based model rather than consider an activity-based model. The panel suggested that AMPO could consider developing a more disaggregate model by modeling individual people rather than aggregate households at the TAZ level.

4.2 Transit and Non-Motorized Modeling

APC is interested in evaluating transit alternatives and modeling non-motorized travel. However, less than two percent of daily trips are by transit. Lafayette Transit System, the transit agency in APC, does not have interest in using the MPO model or working with the MPO for transit planning. Lafayette Transit System does not currently collect APC counts, but they are in the process of conducting a transit survey.

Similarly, APC is interested in modeling non-motorized travel. APC does have some non-motorized counts and they have looked into using Strava data which collects non-motorized data via a Smartphone or GPS device from its members. Aggregated non-motorized origin-destination and travel time data can be purchased from Strava.

Given the low transit and non-motorized shares in the region, and the lack of comprehensive data that can be used for estimation, calibration, and validation, the panel suggested not to incorporate a mode choice modeling component into the trip-based modeling system. The panel instead suggested using off-model and GPS techniques to develop forecasts of transit and non-motorized trips. The panel also suggested for APC to look into conducting a non-motorized travel survey.

4.3 Number and Size of TAZs and Model Run Times

APC is interested in developing TAZs at the block level, which would increase the number of TAZs from about 1,000 to a 3,000 to 5,000 zone system. Given that run times are not an issue with this model (i.e. current run times are twelve to twenty minutes depending on convergence factor used), the panel supported the desire to decrease zone size. However, they cautioned that it may be hard to develop employment and socio-demographic forecasts at such a fine zonal level and suggested discussing the feasibility with APC's demographer consultant and then developing the most disaggregate set of TAZs for which forecast year employment and demographics can be reliably developed. They also recommended that when TAZs boundaries are created that they use census geography so that the TAZs can be aggregated to the block group level.

The panel stated that APC should not be concerned about the model run times as they can be decreased by optimizing the TransCAD programming.

4.4 Data for Model Estimation, Calibration and Validation

4.4.1 Traffic Counts

APC validated its 2010 model to traffic count data. Currently APC obtains all of its traffic count data from DOTD. However, given the extensive factoring process that is applied to the counts, APC has expressed concern that the factored counts are underrepresenting actual volume. APC recently purchased their own traffic counters and plans to collect counts on key corridors. They also recently developed an extensive set of screenlines and plan to use the DOTD and APC counts to support the screenline analysis.

The panel recommended asking DOTD to provide time of day directional raw (i.e. non-factored) counts. These counts should then be reviewed closely to ensure they are reasonable. For example, since the APC economy is driven by the energy sector (i.e., price of oil), APC should expect to see a decrease in traffic volume starting in 2014.

4.4.2 Speed and Origin-Destination (OD) Data

APC has expressed interest in purchasing "big data" of travel time, speed and OD data. APC specifically looked into purchasing INRIX data but was discouraged by the high cost that was quoted.

The panel stated that APC should validate their highway assignment to roadway speed by time of day but stated that they did not necessarily need to purchase their speed data from INRIX or another company. Instead, the panel suggested that APC communicate with their congestion management project group to assess the roadway speed data available, as well as drive their region on key corridors during different parts of the day and check speeds or use Google maps to obtain speeds between different points in the region. They also suggested APC encourage DOTD to purchase travel time data for the entire state so that the cost to APC is minimal.

The panel stated that cell-phone OD data by purpose should be used with caution. The panel was much more supportive of using locally collected Bluetooth data.

4.4.3 Household Travel Survey

The last household travel survey conducted for the region was the 1997 Baton Rouge Personal Transportation Survey. The panel recommended reviewing how the demographic characteristics of the region has changed since 1997, by for example, comparing the 2000 and 2010 census data. The panel recommended conducting a new household travel survey if significant changes have occurred.

5.0 Peer Review Panel Recommendations

During the later half of the meeting, the peer review panel spent about one hour in an executive session, closed to all other participants of the meeting. The reason for this closed session was to allow panel members to speak freely and openly among themselves while developing formal recommendations. This section details those panel recommendations.

5.1 Socioeconomic and Employment Data

The panel was supportive of APC's use of Cohort analysis (i.e. birth rate, survival rate, in-out migrate rate) and land use planning (i.e. housing construction permit approach) for developing demographic forecasts. They emphasized the importance of taking into account migration rates since the region is growing rapidly. APC should consider forecasting additional socioeconomic variables in their dataset to support the development of the trip generation rates (i.e. household income, number of household vehicles), as discussed in the next section.

The panel also commended APC on their validation of the 150,000 businesses within the region. They recommended using more detailed employment categories, rather than just retail and non-retail. For example, categorizing employment into Industry, Office, Service and Retail is common in other MPOs, as they all attract individual (and commercial vehicle) trips by purpose differently.

5.2 Trip Generation

The panel recommended revising the trip rates that are used in the model. Ideally, the trip rates would be calculated from a new household travel survey within the region. However, if a household travel survey is not conducted, then the panel recommended borrowing trip rates from another region in Louisiana or surrounding states that has similar land-use and travel patterns (i.e. low density area dominated by auto travel).

The panel also recommended generating person trips at the household level. In addition, the model should include trip rates by more demographic characteristics besides household size. For example, household vehicles and income level are also correlated with trip rates.

5.3 Trip Distribution

The panel recommends moving to a doubly constrained gravity model for home based work (HBW) trips where there is a fixed set of workers and a fixed set of work locations. They also recommended that the gravity model be recalibrated using congested travel time skims, rather than free flow skims. K-factors should be validated to count data by time-of-day. At the district-to-district or county-to-county level, HBW trip distribution should be compared to Census Transportation Planning Products (CTPP) Journey-to-Work distributions. In addition, the model should be analyzed by sub-area distribution (e.g., at district and/or county level), in addition to trip length (minutes) and distance calibration by trip purpose and by time-of-day.

If a new household travel survey is conducted, then APC should consider replacing the gravity model with a destination choice model.

5.4 Time-of-Day and Feedback Loops

The panel stressed the importance of moving from a daily model to a peak directional model, and thus the importance of developing separate skims by time-of-day. Hourly time-of-day factors should be used to split the trips by time-of-day before assignment. The panel recommended that APC research the peak periods in their region (i.e. via examination of counts and professional judgment) and use that to determine the time periods for each set of skims. Feedback loops should be implemented between assignment and trip distribution to ensure consistency between these model components. The panel recommends following the guidance discussed in "Traffic Assignment and Feedback Research to Support Improved Travel Forecasting" prepared for FTA by Caliper Corporation.

5.5 Assignment and Highway Network

As mentioned above, it is critical for APC to develop separate congested skims by time-of-day. The panel also suggested that APC explore different assignment algorithm approaches. They recommended improving the volume delay function to match observed speeds at different levels of traffic volume. APC can "play around with" the volume delay parameters. Capacity should not differ by time-of-day (i.e., jam capacity should be used for all time periods).

The panel also recommended the following improvements to the highway network:

- Use consistent time-of-day multiplier across functional classes
- Use consistent capacity multipliers by time period by facility type
- Investigate intersection delay
- Review centroid connector locations (e.g., centroids should not be connected directly to freeways)

5.6 Off-Model Transit Planning

The panel has put together recommendations for alternative approaches to transit planning and forecasting that do not rely on the regional model:

- Use National Transit Database (NTD) and other data sources to compare local transit service and ridership to transit service in similar areas.
- Use transit accessibility tools, such as what is available in the TransCAD software the APC is currently using.
- Use direct demand prediction models such as TBEST, or even simple elasticity based approaches, to predict how ridership may change in the future in response to changes in zonal demographics and/or transit service.
- Use a ridership prediction model such as FTA's STOPS, that includes CTPP flows and/or survey derived expanded transit passenger linked trip tables as some of the inputs.
- Implement new transit service as a demonstration project, to see if it attracts enough riders to stay in service.
- A new region-wide transit rider survey would help the local planners and decision-makers gain a better understanding of the socio-economic characteristics and trip-making patterns of the existing transit users.

5.7 Off-Model Non-Motorized Planning

Similar to transit planning, the panel recommends that APC take an off-model approach to non-motorized planning. The panel recommends beginning the analysis by examining the existing household travel survey to gain an understanding of the existing local non-motorized travel patterns and the demographics of the individuals making these types of trips. The panel provided recommendations for alternative approaches to non-motorized trip planning and forecasting at the TAZ-level, without incorporating a formal non-motorized mode choice component directly within the regional model:

- *Use land use information*: Develop a simple relationship between pedestrian/bike trip productions and attractions and land use and roadway network data (such as sidewalk inventory, population and/or employment density etc.).
- *Use household travel survey*: Use the household survey data to estimate non-motorized person trip rates by trip purpose.
- *Using info from the existing regional model:* Extract portion of short distance trips from the distribution matrix by trip purpose as non-motorized demand (*e.g.*, setting maximum trip distance of 10 miles for bike and 1 mile for pedestrian trips) and obtain the total non-motorized trips by applying a ratio of non-motorized trip to auto vehicle trips based on household travel survey data or ratios borrowed from other travel demand models.

The panel also recommended the following reports and guidelines on non-motorized planning:

- "NCHRP Report 770: Estimating Bicycling and Walking for Planning and Project Development: A Guidebook", 2014, Transportation Research Board.
- "NCHRP Report 797: Guidebook on Pedestrian and Bicycle Volume Data Collection", 2014, Transportation Research Board.
- "Bicycle and Pedestrian Forecasting Tools: State of the Practice", 2015, Federal Highway Administration.
- "Methods for Estimating Bicycling and Walking in Washington State", 2014, State of Washington Department of Transportation.

5.8 Other Recommendations

The peer review panel made additional general recommendations to APC related to improvements of their travel demand model, such as placing additional emphasis on validation, including a comparison of modeled volumes to time of day directional traffic counts and class counts, by federal functional class and volume group; conducting reasonableness and sensitivity checks; and testing the model on observed “forecast” year (i.e. Year 2015).

They also suggested implementing all model improvements by hiring a travel demand modeling consultant that has a strong reputation for developing state-of-the practice travel demand models, through a competitive procurement process. Selection criteria should be weighted toward merit and what they will deliver for the cost. The consultant should discuss pros and cons of different potential approaches to model improvement before deciding on improvements to implement and data to collect, if applicable.

The panel recommended the following reports for use in guiding their model update efforts:

- "The TMIP Travel Model Validation and Reasonableness Checking Manual" (2nd edition), 2010, Federal Highway Administration.
- "NCHRP Report 716: Travel Demand Forecasting: Parameters and Techniques", 2012, Transportation Research Board.
- "NCHRP Report 765: Analytical Travel Forecasting Approaches for Project-Level Planning and Design", 2014, Transportation Research Board.

Appendix A List of Peer Review Panel Participants

This section lists all individuals who attended the meetings, including panel members, APC staff, and peer review support staff.

A.1 Peer Review Panel Members

Panel Member	Affiliation
Ken Cervenka	Federal Transit Administration (FTA)
Mei Ingram	North Carolina State University
Howard Slavin	Caliper Corporation

A.2 SRTC and Affiliated Agency Staff

Name	Affiliation
Chris Cole	Acadiana Planning Commission (APC)
Philip Roah	Acadiana Planning Commission (APC)

A.3 TMIP Peer Review Support Staff

Name	Affiliation
Sarah Sun	Federal Highway Administration (FHWA)
Rachel Copperman	Cambridge Systematics, Inc.

Appendix B Peer Review Panel Meeting Agenda

Table B-1: September 29, 2016 Agenda

Time	Description
8:30 – 8:40	Welcome (Chris Cole)
8:40 – 9:00	Introduction of attendees and panel members, brief panel process overview (panel chair)
9:00 -10:00	MPO Planning and Model Summary, Issues, and Expectations (Chris Cole/MPO staff)
10:00-10:15	Break
10:15-11:15	Questions from panel/discussion (panel, MPO staff – moderated by panel chair)
11:15-11:30	Break
11:30-1:00	Expert panel executive session (panel members and Rachel Copperman) (includes working lunch)
1:15-2:00	Expert panel recommendation and open panel discussion (moderated by panel chair)
2:00-2:45	Conclusive comments and adjournment (panel chair)
2:45	Adjourn

Appendix C Peer Review Panel Member Biographies

C.1 Ken Cervenka, Federal Transit Administration

Ken Cervenka has worked at the Federal Transit Administration (FTA) since 2007. His major responsibilities include technical assistance to MPOs, transit providers, and other agencies interested in preparing transit rider surveys and transit ridership forecasts, with a new emphasis on the relevance of travel forecasting to support performance-based planning. For New Starts and Small Starts transit projects, his responsibilities include a formal assessment of the plausibility of the ridership forecasts used in FTA's project evaluation process. Prior to joining FTA, he worked as the travel forecasting manager at the North Central Texas Council of Governments, the MPO for the Dallas-Fort Worth area, and prior to that worked as a transportation consultant at a traffic engineering firm in Dallas. He is a graduate of the University of Texas at Austin, with a Master in Civil Engineering.

C.2 Mei Ingram, North Carolina State University

Mei Ingram is a senior research associate at the Triangle Regional Model Service Bureau, Institute for Transportation Research and Education, located at the North Carolina State University, North Carolina. Her key role is to develop and maintain the Triangle Regional Model and provide technical support to the stakeholders and other users. Prior to the current position, she worked two years at North Carolina Department of Transportation as a senior transportation engineer and eight years with the Parsons Transportation Group/Barton-Aschman. She has over twenty years of experience in multimodal regional traffic demand model development and application for various urban sizes, travel behavior related survey design and analysis, regional economic development and socio-economic data forecast, air quality conformity study, and highway safety. She has Master degrees in Urban Studies from the University of Maryland at College Park and Transportation Economics from the University of North Carolina at Chapel Hill, and a Bachelor of Science in Physics from the Beijing Normal University, China.

C.3 Howard Slavin, Caliper Corporation

Howard Slavin is the founder and president of Caliper Corporation. He has more than thirty years of experience in travel demand modeling, geographic information systems, and the development of software for transportation forecasting. Dr. Slavin initiated and has guided the development of all Caliper's software products including TransCAD, MAPTITUDE, and TransModeler. He holds an AB degree from Yale College in Mathematics and Urban Studies, a Master's degree in Urban and Regional Planning from Harvard University, and a Ph.D. from the University of Cambridge in England.

Appendix D Documentation Provided to Panel Members by APC and Documents Referenced in this Report

2040 Transportation Plan Update Technical Memorandum No. 1 Travel Model Development Update
Prepared by Lafayette Metropolitan Planning Organization, dated June 2014.
Provides documentation of the AMPO model.

2040 Transportation Plan Update Technical Memorandum No. 2 Travel Model Development Update
Prepared by Lafayette Metropolitan Planning Organization in conjunction with Neel-Schaffer, Inc., dated March 2015.
Provides documentation on the transportation network and forecast volume on the roadways.

2040 Transportation Plan Update Technical Memorandum No. 3 Travel Model Development Update – Demographic Estimates
Prepared by Caliper Corporation for the Federal Transit Administration.
Provides documentation on the regional demographic forecasts.

Traffic Assignment and Feedback Research to Support Improved Travel Forecasting
Prepared by Acadiana Planning Commission in collaboration with Neel-Schaffer, Inc., dated July 2015.
Provides analysis of current traffic assignment and model feedback practices.

NCHRP Report 770: Estimating Bicycling and Walking for Planning and Project Development: A Guidebook
Prepared by Resource Systems Group, Fehr and peers, Mark Bradley Research and Consulting, and University of Texas for the Transportation Research Board, 2014.
Contains methods and tools for practitioners to estimate bicycling and walking demand as part of regional-, corridor-, or project-level analyses.

NCHRP Report 797: Guidebook on Pedestrian and Bicycle Volume Data Collection.
Prepared by Kittelson and Associates, University of Wisconsin-Milwaukee, University of California Berkeley, Toole Design Group, and McGill University for the Transportation Research Board, 2014.
Offers guidance on developing a non-motorized count program, gives suggestions on selecting appropriate counting methods and technologies, and provides examples of how organizations have used non-motorized count data to better fulfill their missions.

Bicycle and Pedestrian Forecasting Tools: State of the Practice
Prepared by Fehr & Peers, for the Federal Highway Administration, 2015.
This paper summarizes the state of the practice of bicycle and pedestrian forecasting tools.

Methods for Estimating Bicycling and Walking in Washington State
Prepared by Portland State University for The State of Washington Department of Transportation, 2014.

Presents method for calculating bicycle and pedestrian miles traveled.

Travel Model Validation and Reasonableness Checking Manual (2nd edition)
Prepared by Cambridge Systematics, Inc., for Federal Highway Administration, 2010.
Provides set of checks and provides concrete examples of their application for validating travel demand models.

NCHRP Report 716: Travel Demand Forecasting: Parameters and Techniques
Prepared by Cambridge Systematics, Inc.; Vanasse Hangen Brustlin, Inc.; Gallop Corporation; Chandra R. Bhat; Shapiro Transportation Consulting, LLC; and Martin/Alexiou/Bryson, PLLC for Transportation Research Board, 2012.
Provides guidelines on travel demand forecasting procedures and their application for helping to solve common transportation problems.

NCHRP Report 765: Analytical Travel Forecasting Approaches for Project-Level Planning and Design
Prepared by CSM Smith, Alan Horowitz, Tom Creasey, Ram Pendyala, Mei Chen for Transportation Research Board, 2014.
Describes methods, data sources, and procedures for producing travel forecasts for highway project-level analyses.

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