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President's Message

By Joe De La Garza, ITE Western District President

The Western District Executive Committee met on September 16th for the Fall Executive Board Meeting. This meeting is a Kick-Off and On-Boarding meeting for our Secretary-Elect Pat Marnell and also provides an opportunity for the current Board to review current income and expenses and check our current budget year-to-date. Additional discussion topics included the closing of the fiscal year of 2021/2022 and review of the 2022 Annual Meeting budget and begin planning for the budget for the 2022/2023 Fiscal Year. We were pleased to recognize that the 2022 Annual Meeting had excess revenues and the Board discussed the best ways to provide support to future annual meetings (2023 Portland, 2024 Sacramento, 2025 Long Beach, and 2026 Bellview) as well as provide for an additional Leadership ITE scholarship and support for our Section 101 initiative which helps the Board to outreach with selected local sections. Thanks again to the Annual Meeting LAC and all who helped organize as well as those who attended the meeting. It was a technical and financial success!

There are a few different Western District Committee Chairs that have been reappointed including Advertising Manager, Ryan Zellers, Student Funding and Initiatives Chair , Kayla Fleskes, LAC Committee, Cathy Leong. Jeanne Acutanza has been appointed to fill the Technical Chair position as Pat Marnell moves into the Secretary position in January.

It is never too early to start looking forward to our 2023 Annual Meeting in Portland! It will be a joint meeting with ITE International on August 13-16, 2023 and we look to have great representation from the Western District.

Lastly, I wanted to highlight Western District Members and organizations that were recognized at the International Meeting in New Orleans: Transportation Achievement – TSMO, STC Traffic, Section Momentum Award, Southern California Section, Student Chapter Momentum, Portland State University, Western District Rising Star, Cameron Shew, Pedestrian and Bicycle Standing Committee Joh LaPlante Aware, City of West Linn, Oregon and one of the 2022 ITE Young Leaders to Follow, Kimberly Leung. Congratulations to all of the award winners!!

2023 Joint ITE International and Western District Annual Meeting

Portland, OR - August 13-16

Annual Board Meeting Highlights

By Doug Smith, PE, Western District Secretary-Treasurer

On June 26th, 2022, the Western District Board members, committee chairs, section representatives, and guests met in Palm Springs, California for the 2022 Western District Annual Board Meeting.

President Joe De La Garza discussed the appointment of four chairs in September 2022. He also provided updates on awards and section reports.

Secretary-Treasurer Doug Smtih reviewd the year to date budget and outstanding awards were reviewed and revised. Minor revisions were made to the 2022-2023 proposed budget which was approved during the board meeting.

The international vice president and past president, Rosana Correa and Randy McCourt, provided updates on ITE international. Memberhip is expected to reach 17,000 members in 2023 and is in good financial condition.

District administrator Dalene Whitlock provided updates to travel policies and office duties. Additionally, she shared that at the Winter Board Meeting, the board made decision to rename the Board Meetings to Fall Executive Committee Meeting. Winter Board Meeting, and Summer Board Meeting due to Sections moving to a calendar year rather than a fiscal year.

Advertising Manager Ryan Zellers shared that Western ITE is still seeking addditional sponsors and advertisers. Currently there are 8 sponsors.

Cameron Shew shared that the website reconfiguration has been completed and has received positive feedback. Some updates are still needed, including increased cloud storage.

Technical committee chair Patrick Marnell reported that CPP and USC completed their data collection project.

Career Guidance Committee Chair Jenny Tapat announced updates to the MiteY Mentorship program, including developing an engagement plan and reviewing mentorship award nomination descriptions and requirements.

Student Funding and iniatiatives chair Kayla Fleskes shared that the endowment fund balance was over $520,000. The fund has decreased due to recent economic conditions. Student traffic bowl will be moving to a virtual event.

District LAC committee chair Cathy Leong discussed future annual meetings. The 2023 Portland Annual Meeting will be a joint meeting with ITE International from August 13-16, and Julie Kentosh is serving as LAC Chair. The 2024 Sacramento Annual Meeting will be held from June 23-26, and Cameron Shew is serving as LAC Chair.

Updates were shared by the following Section Representatives: Lauren Davini from San Francisco Bay Area, Nick Carcha from Central California, Keoni Wasano from Hawaii, Phuong Nguyen from San Diego, Edward Alegre from Southern California, and Jeanne Acutanza from Washington.

The meeting adjourned at 4:06 pm. The next Board Meeting will held Friday, January 27, 2023 in Oakland.

Annual Business Meeting Highlights

By Doug Smith, PE, Western District Secretary-Treasurer

The 2022 Annual Business Meeting for ITE's Western District was called to order on Tuesday, June 28th at 12:03PM by President Joe De La Garza. The meeting commenced with the Pledge of Allegiance and a moment of silence for deceased members Raymond Granstedt, Ethlyn Ann Hansen, Ralph Lambert and Donald Robbins.

President De La Garza introduced the Committee Chairs and Section Representatives before District Awards were presented by the Student Initiatives Committee, Student Endowment Fund Committee, Technical Committee, as well as for Section Awards and Transportation Project of the Year.

The final call for ballots was followed by the convening of the tellers committee by President Joe De La Garza. The Tellers Committee was headed by Dalene Whitlock. Western District President De La Garza addressed the membership and provided a recap of the past year and a state of the District. Some of the highlights included: the locations of the 2023 Annual Meeting with ITE International in Portland, Oregon, the 2024 Annual Meeting in Sacramento, California, and the 2025 Annual Meeting in Long Beach, CA. He reported that the Districts financial health is stable.

Secretary-Treasurer Doug Smith summarized the state of the District's accounts for FY 2021-2022 and introduced the proposed budget for FY 2022-2023. The budget was approved by the membership.

The final order of business was the announcement of the winners of the 2022 election: President Kimberly Leung, Vice President Doug Smith, Secretary-Treasurer Patrick Marnell. The meeting was adjourned after the announcement of the 2023 Board at 1:28PM.

MiteY Mentorship

The Career Guidance is intended to promote the advancement of the transportation planning and engineering profession by fostering close association of senior and professionals with young professionals. This year's Career Guidance Track at this year's Annual Joint Meeting included three session events. The first event was an ice cream social intended to provide an opportunity for young members and first time Annual meeting attendees to meet our ITE leadership. Through a series of guided prompts, attendees formed roundtable discussions sharing their thoughts on first job experiences, favorite ice cream flavors, and post-COVID travel plans.

The second session consisted of a panel session on Ethical Dilemmas. Special thanks to **Hon. Fred Minagar** (Mayor City of Laguna Niguel, Orange County); **Rosana Correa** (ITE International Vice President); **Jeanne Acutanza** (WSP); **Tim Harpst** (Horrocks Engineers); and **Kimberly Leung**, Western District Vice President, SFMTA along with moderator **Cathy Leong** who shared lessons and insights on their experiences when faced with two courses of action. Please check out the Career Guidance Resource page under the District's website to watch a recording of this powerful conversation.

The final event consisted of the MiteY Race. Teams of 2-3 participants competed in challenging tasks around the Renaissance Hotel. Thank you to all the student teams that participated. The top teams were:

1st place

Kezia Suwandhaputra & James Umphress

Oregon State University

2nd Place

Shawn Howard, UCLA

Cade Luongo, UC Berkeley

3rd place

Garett Davis, Brian Kao, & Matthew Lin

UC Berkeley

MiteY Mentorship

Are you looking for guidance on how to navigate the next stage(s) of your professional career? Have questions on what work/life balance looks like or how to manage conflict in the workplace? Check out the MiteY Mentorship website under the Resources tab of the Western District website or contact **Jenny Tapat**, Career Guidance Committee Chairperson.

2022 Annual Meeting Award Winners

Award	2022 Recipient
Best Annual Meeting Paper Award	Ronald Milam, Jerry Walters, and Melanie Gill, "Balancing Congestion Relief and Induced VMT"
Best Annual Meeting Paper Award by a Young Professional	Jonathan Howard, "Lessons Learned Designing California's First Turbo Roundabout"
James H. Kell Award	Student Competition – 1st Place Gabe Denson, Cal Poly SLO Garett Davis, UC Berkeley Bryan Kao, UC Berkeley
Lifetime Achievement Award	Jim Hanks
Individual Achievement Award	Thomas Mericle
Outstanding Undergraduate Student	Sophia Tan, University of California, Los Angeles
Outstanding Graduate Student	Eileen Chai, Oregon State University
Outstanding Educator	Paul Valadao, California Polytechnic State University, San Luis Obispo
Section/Chapter Activities Award, Large Section	Oregon Section
Section/Chapter Activities Award, Small Section	Hawaii Section
Section/Chapter Communication Award	Southern California Section
Section/Chapter Momentum Award	Southern California Section
Student Chapter Award	Oregon State University
Student Chapter Momentum Award	Portland State University
Student Paper Award	Peter Yu, "Development of a Triplet of Enhanced Yellow Change Interval Kinematic Formulas for Vehicular Turn Phases at Signalized Intersections"
Student Traffic Bowl Winner	Oregon State University
Transportation Project of the Year	Caltrans, "Enrico Fermi Diverging Diamond Interchange and Border Wait Time Technologies and Information Systems"
Young Professional Achievement Award	Cameron H. Shew
Outstanding Technical Paper	Ziyuan Pu (M), Zhiyong Cui, Jinjun Tang, Shuo Wang, Yinhai Wang, and Yinhai Wang (M), "Multi-Modal Traffic Speed Monitoring: A Real-Time System Based on Passive Wi-Fi and Bluetooth Sensing Technology"

2022 Best Paper

The District's Best Paper Award is one of the most prestigious presented each year. The winning paper is presented here.

Balancing Congestion Relief and Induced VMT

Ronald T. Milam, AICP, PTP; Jerry Walters, PE; and Melanie Gill

This paper has been slightly edited for length. Read the full text and citations at westernite.org/technical-compendia/compendium2022/

Introduction

Many western U.S. communities continue to grow, which creates new demand for public infrastructure including roadways. While few question the need to expand sewer, water, and power infrastructure, expanding roadways stirs debate. Roadway capacity expansion, especially in congested areas, is associated with negative effects of induced vehicle travel, including new vehicle miles of travel (VMT). The induced VMT increases energy consumption and emissions, while also diminishing potential congestion relief benefits of new capacity. While academic research has consistently found similar induced vehicle travel effects[1][2][3][4][5], technical guidance for how to apply this research in transportation planning and impact analysis practice is still evolving[6].

Recently, California published new technical guidance on how to analyze induced VMT impacts as part of revisions to the California Environmental Quality Act (CEQA).

- Technical Advisory on Evaluating Transportation Impacts in CEQA, California Governor's Office of Planning and Research (OPR) (December 2018)
- Transportation Analysis Framework [TAF] First Edition, Evaluating Transportation Impacts of State HighwaySystem Projects, Caltrans (September 2020)

The revisions to CEQA came in response to Senate Bill (SB) 743, which solidified VMT as the preferred metric for transportation impact analysis. Beyond transportation impacts, VMT is also an important input for air quality, greenhouse gas (GHG), and energy impact analysis under CEQA and may also be required for some projects under the National Environmental Policy Act (NEPA). The available methods for analyzing induced vehicle travel have notable limitations. Supporting academic research for elasticity methods raise important questions about the effectiveness of roadway capacity expansion to reduce congestion and VMT. This paper summarizes the new guidance and explains how to use the academic research to inform practitioner choices about which induced vehicle travel methods are most appropriate in different contexts considering their limitations and strengths.

Guidance Summary

As indicated in the OPR's Technical Advisory and Caltrans' TAF, two methods are highlighted to forecast induced VMT: 1) an empirical approach using elasticities derived from academic research, and 2) a travel demand model. Each method has its pros and cons, and practitioners must examine how to reconcile these two methods to perform a complete analysis satisfying the CEQA (and NEPA) expectations.

Elasticity Methods

The elasticity method is based on statistical studies that quantify induced vehicle travel that is exclusively associated with expanding roadway capacity (i.e., adding lane miles). The elasticity of VMT to lane miles includes short-term and long-term estimates of induced vehicle travel effects. Short-term effects occur 1- 2 years after a roadway capacity project is open to traffic. Long-term effects tend to occur within a 10 to 20-year timeframe. In general, the elasticities reflect the change in total VMT attributable to the project while controlling for other factors that contribute to VMT growth.

Under the elasticity method, Caltrans recommends the use of National Center for Sustainable Transportation (NCST) Induced Travel Calculator to forecast long-term induced VMT. The NCST Calculator includes 2016-2019 VMT and lane-mile data so the user only needs to input the baseline year (preferably the latest year), change in lane miles associated with a proposed project, and the type of functional classification (selected from a drop-down menu). For interstate highways (class 1), the VMT forecast is based on inputs for the corresponding Metropolitan Statistical Area (MSA) and uses an elasticity of 1.0. For other freeways and expressways (class 2) and other principal arterials (class 3), the calculator uses county-level inputs and an elasticity of 0.75.

According to NCST, the calculator is applicable for General Purpose (GP), High Occupancy Vehicle (HOV), or high-occupancy toll (HOT) lane projects involving the addition lanes to class 1, 2, and 3 facilities, which cover the SHS and most major arterials. For a specific map of class 1, 2, and 3 facilities, refer to the Caltrans statewide functional classification map available at the following website - https://dot.ca.gov/programs/research-innovation-system-information/highway-performance-monitoring-system/functional-classification.

The Induced Travel Calculator limitations are listed below. Analysts should consider each limitation and how it may

contribute to over- or under-estimates of induced travel effects.

- **The elasticities produce a forecast of total VMT attributable to a project.** This is important since the CEQA Guidelines Section 15064.3(a) states, "For the purposes of this section, "vehicle miles traveled" refers to the amount and distance of automobile travel attributable to a project." One of the main research studies used for the calculator contains the following sources of induced vehicle travel effects.[7]
  - Changes in commercial driving = 19 to 29%
  - Changes in individual or household driving = 9 to 39%
  - Changes in population due to in-migration to the MSA = 5 to 21%
  - Diversion of traffic = 0 to 10%
- **Concentrating on the effects associated only with automobile travel produces lower elasticity values** ranging from 0.14 to 0.70 with changes in individual or household driving being 0.39 to 0.49. The lower elasticity range is aligned with the long-term elasticity of 0.39 that was estimated by Cervero, based on California data. It relies on a modeling methodology that accounted for the effect of previous development and roadway capacity investment on lane mile increases.[8] Other studies have also found an elasticity of lane-miles with respect to total VMT of 0.33 revealing a strong two-way relationship, where every 10% increase in VMT, lane-miles grew by 3.3%. [9] It should also be noted that the Duranton and Turner research revealed a 17% decline in interstate lane-mile per capita compared to a 63% increase in VMT per capita during the 1983-2003 study timeframe.
- **Most of the data used in the research studies ranges from the 1980s to the early 2000s**, although one study extended its data from 1981 to 2015.[10] This period may not be reflective of current VMT trends and may not produce induced vehicle travel elasticities that accurately represent HOT lane effects given their limited availability in comparison to GP and HOV lanes. Also important to note are the substantial socioeconomic changes that were contributing to increasing VMT per capita at the time of data collection (e.g., 1980s to early 2000s). This period was also prior to widespread use of transportation network companies (TNCs), substantial internet shopping, expanded food delivery, and recent COVID-19 travel disruptions.
- **The elasticities are not sensitive to network effects associated with some roadway capacity projects** such as bottlenecks that may have larger effects on travel times, and bridges that can substantially reduce the distance between origins and destinations.
- **Without sensitivity to the project corridor context, the calculator results may over- or under-estimate induced VMT effects.** The elasticities are not sensitive to land use context, geographic constraints (e.g., water or topography barriers), or the amount of existing congestion. Bridges are a particularly useful example. A new bridge has the potential to substantially reduce existing trip lengths, which could offset potential induced vehicle travel effects. The elasticity method does not recognize this benefit.
- **The calculator only produces an annual VMT forecast**. Project analysis typically requires weekday forecasts. Use of Performance Measurement System (PeMS) or similar data to estimate an annualization factor is recommended to create weekday values.
- **The VMT forecast represents the project-generated effect but does not include information about the no project condition.** This is one of the bigger limitations of elasticity methods because understanding what would otherwise happen without the project is required for CEQA/NEPA impact analysis and is essential information for decision making. Travel demand models help isolate what may happen if the project is not built
- **The VMT forecast does not include a distribution of VMT by speed bin**. VMT by speed bin is commonly needed for air quality and greenhouse gas (GHG) analysis.
- **The VMT forecasts do not include potential VMT effects beyond the MSA or county boundaries.**
- **In uncongested suburban areas, the VMT forecasts from the calculator may be unreasonably high and would not be compatible with observed trip rates and trip lengths.** Without congestion, vehicle trip rates and lengths are not influenced or suppressed in these areas. This lack of sensitivity to corridor land use and congestion context means that adding lane miles in a suburban area with no congestion will have the same proportional effect as adding lane miles in an urban area with multiple hours of congestion.

A final note about the use of elasticities derived from research is to recognize the difficulty of 'controlling for' the wide variety of factors that contribute to traffic growth over time. First, travel speed or travel time is the more relevant variable for predicting travel behavior changes. Lane-miles serve as a proxy and are used in the research because the data is easier to obtain, but that should not be interpreted to mean that lane-miles are the sole or even the most relevant variable. Second, one matched-pairs study

revealed no statistically distinguishable difference in traffic volume growth rates between highways with capacity expansion versus those without in San Diego, California.[11] Contrary to other research, this finding would suggest that VMT increases resulting from induced vehicle travel effects are solely attributable to longer trip lengths. The combination of evidence above suggests that the treatment of induced vehicle travel in transportation impact analysis consider and acknowledge these limitations (see Appendix A for more information).

Travel Demand Models

When utilizing a travel demand model (possibly with off-model post processing), the requirements for analyzing the full impacts of vehicle travel from a capacity-increasing project include changes in VMT due to changes in:

- Trip length (generally increases VMT);
- Mode shift (generally shifts from other modes toward automobile use, increasing VMT);
- Route choice (can act to increase or decrease VMT but is likely to decrease emissions because more direct or preferred facility routing occurs); and
- Newly generated trips (generally increases VMT).

The major issue for practitioners using the travel demand model approach in impact analysis is that most models in California and the rest of the U.S. do not have feedback processes that influence trip generation rates or land use growth allocation. Hence, these components of the models tend to be 'fixed' versus being dynamically linked to changes in accessibility associated with a transportation network modification. Models also tend to lack dynamic validation (i.e., sensitivity testing) to help users understand their level of sensitivity to small network changes. Additional processing is required to handle these limitations of a model, as outlined below.

- **Lack of sensitivity to trip generation; this must be manually adjusted**. If a trip generation module is not sensitive to travel time and cost, the analyst can manually adjust the vehicle trip generation rates or use off-model processing to increase the VMT forecasts. An important part of the adjustment process is to verify that it is warranted. Adjustments may not be appropriate in suburban or rural areas where congestion is not severe enough to suppress existing vehicle trip making. In these settings, land uses are already generating vehicle trips at full demand levels (i.e., rates like those in the ITE Trip Generation Manual) and further increases would not be reasonable due to a roadway capacity change. A comparison to ITE rates could be used as the evidence to determine an appropriate adjustment.
- **Reliance on fixed land use inputs.** Analysts can create alternative specific land use forecasts using expert panels or integrated land use and transportation models as summarized below.
  - Anticipated scenarios must be created, requiring local knowledge. Employ an expert panel, including local agencies' land use planners, to develop a scenario of anticipated land use growth for project alternatives. This process should recognize whether land use effects are intra- or inter-regional. If population is being attracted from an adjacent region, the difference in VMT per capita generation rates may also need to be addressed.
  - Supplemental model runs may be needed. Employ a land use model and run it iteratively with a travel demand model. A wide range of land use models exist, but most are likely to be too time consuming or costly to apply for an individual project.
- **Model results must be adjusted align with the short-term elasticity research**. Note that this is only possible for short-term elasticities, which range from 0.1-0.60 as documented in the CARB research noted above. VMT forecasts from travel models are not directly comparable to long-term elasticity-based VMT forecasts as explained in more detailed below and in Appendix A.
- **Travel demand models may also suffer from limited sensitivity due to their structure or design**. These types of limitations are often revealed through dynamic validation testing and are commonly associated with lack of convergence in trip assignment or lack of feedback processes to trip distribution and mode choice. Regional and local models commonly lack dynamic validation despite industry recommendations to verify the sensitivity of the model's features.[12]
- **Fixed parameters for internal-external (IX) and external-internal (XI) trips, as well as commercial vehicle trips, are a common problem**. These are issues that can be rectified through model refinements and modifications. If these types of sensitivity issues exist with a current model, then projects should rely on the elasticity method for long-term induced VMT forecasts until the model is modified or enhanced to produce forecasts that include all applicable induced travel effects. Verification of the model's sensitivity is a specific requirement of the TAF First Edition. It includes a checklist to evaluate a model's adequacy and sensitivity to longterm induced vehicle travel effects.
- **A final issue that is whether (and how) use of static traffic assignment (STA) instead of dynamic traffic assignment (STA) in travel demand models affects VMT forecasts**. One research paper directly

comparing STA and DTA estimates revealed how the limited sensitivity of STA over-predicts traffic volumes, which would contribute to overestimates of VMT.13 Further, dynamic tolling for HOT or fully tolled lanes has the potential to increase the vehicle throughput per lane, which could cause induced VMT. Per lane flow rates drop to as low as 1,100 vehicles per hour during congested hours compared to a functional lane capacity closer to 1,900-2,000 during off-peak hours. Projects that use dynamic tolling can increase the existing flow rates closer to the 1,900 value during peak hours. This difference may include some induced VMT versus VMT that simply shifted from other hours. A DTA would help capture this effect compared to an STA that has limited sensitivity to operational effects throughout individual hours.

Despite the noted model limitations, a model may still be useful to understand the incremental difference between project alternatives that the NCST Calculator or other elasticity methods will not reveal. The model's forecasts of VMT can also be stratified by speed bin. Thus, use of a travel demand model may be useful under the following conditions.

- Comparisons between no build and build alternatives in the same analysis year are useful for impact-related decisions. This comparison can be used to estimate a short-term induced vehicle travel elasticity that can be compared against the short-term academic elasticity estimates for reasonableness.
- The NCST Calculator is not applicable or has greater limitations than a travel demand model.
- VMT by speed bin is needed to evaluate emissions for air quality or greenhouse gas analysis.

Suggested Approaches

Based on the assessments of the two methods, three approaches may apply for CEQA (and NEPA) analysis.

Approach #1: Model Method

The model method, as the name indicates, uses the best available travel demand model to perform the analysis to meet CEQA expectations. The benefit of this method is to generate a complete set of model outputs that can be used to prepare the transportation, air quality, GHG, and energy impact analyses. This method does require the most effort to address model limitations. Before using the model method, the following two steps should be performed to ensure the model is sufficiently sensitive to long-term land use and trip generation changes.

Step 1: Long-term land use change

Reduced congestion along a project corridor could lead to land development occurring farther from urban centers, which could generate more and/or longer trips that increase VMT. Given that most travel demand models do not include a feedback process to land use allocation, an expert panel (such as one comprised of local agencies' planners) could estimate changes to land use growth allocations that would likely result from the project. Note that different alternatives associated with the same project, e.g., GP lane alternative vs. HOT lane alternative, may lead to different amounts of land use change.

Step 2: New trip generation

The travel demand model trip rates should be assessed on whether they reflect suppressed travel due to congestion. In other words, is congestion severe enough in the study area that residents, workers, or visitors choose not to make some trips? If suppressed travel is confirmed, then an increase in vehicle trip rates may occur due to the improved traffic condition resulting from the project. An expert panel, which could be the same as the one for the long-term land use change, could be employed to evaluate the potential adjustments needed to trip rates. As noted above, the ITE Trip Generation Manual may serve as a source for 'full demand' vehicle trip rates or household travel surveys based on place or community types without congested conditions.

In addition, the following model parameters should be checked, and if warranted, adjusted to improve sensitivity.

- If the model has fixed IX XI trips, then projects that would be expected to influence IX XI patterns may require post-processing or other adjustments to appropriately account for expected effects.
- Verify that the model's assignment step reaches a stringent convergence criterion such that volume forecasts produced by the model contain limited noise (i.e., unexpected changes in magnitude or distance from the network change).
- Induced commercial vehicle travel effects are often not included in regional and local travel demand models and would require re-estimation or post-processing. In some cases, application of statewide models such as the California Statewide Travel Demand Model may be appropriate to capture commercial vehicle effects. Off-model approaches are another option.
- TNCs and future autonomous vehicles (AV) are not commonly included in travel demand models and may become a larger share of VMT in the future. Creative application of these models, similar to the Fehr & Peers AV testing or post-processing of model outputs, would be necessary to approximate TNC and AV effects.14 Use of TrendLab+ or other scenario modeling tools including VisionEval may also be appropriate. Guidance from traditional sources such as TRB is still evolving and should be

monitored. A recent example is the Updating Regional Transportation Planning and Modeling Tools to Address Impacts of Connected and Automated Vehicles, Volume 2: Guidance, Washington DC: The National Academies Press: https://doi.org/10.17226/25332.

As noted above, the TAF First edition includes a checklist (Table 4 of Section 4.5) that specifies model capabilities required for induced vehicle travel assessment, including:

- Land use response to network changes;
- Sensitivity of trip-making behavior to network travel times and travel costs;
- Sufficiency of detail and coverage of modelled roadway and transit networks;
- Network assignment processes – whether the model reaches appropriate convergence; and
- Model calibration and validation.

As recommended by Caltrans, a model should pass all five checks before the analyst concludes that the model is appropriate for producing induced VMT forecasts. Beyond VMT, the model needs to pass these checks to also be acceptable for producing design volumes. In some cases, accepting a model with limitations may still be superior to the elasticity method. The analyst will need to balance the pros and cons of each method given the specific project under analysis and the context. In addition, if the NCST Calculator can be applied to the project, Caltrans recommends that the induced VMT estimated by the model should be within 20 percent of the value provided by the NCST Calculator. **However, this recommendation does not recognize that current travel demand model forecasts and elasticitybased long-term induced vehicle travel forecasts are not directly comparable.** Current models do not account for all long-term effects, such as changes in trip generation and land use.

While a model or model process can be developed to include full sensitivity to long-term effects, it will always be challenging to produce a direct comparison to the elasticity-based methods. The elasticity method forecasts VMT changes attributable to a project while controlling for variables such as population growth, employment growth, and income changes because the method is trying to isolate the VMT effect of just adding lane miles.

By contrast, a travel demand model forecasts VMT changes based on variables such as population and employment growth, and income changes, in addition to changes in the transportation network. The model results can be used to compare no build and build differences typically caused by changes in trip distribution (activity choice), mode choice, and trip assignment. If feedback to long-term land use growth allocation and vehicle trip generation rates is added to the modeling process, then a travel demand model may produce results closer to the elasticity method but will still suffer the inability to isolate just the long-term VMT change attributable to the increase in lane miles. The expectation of a model appropriately sensitive to short-term and long-term induced vehicle travel effects is that the long-term change in VMT associated with the project should be greater than the short-term change. Assessments made for models that do not satisfy all the checks above should include disclosure of specific limitations and how they may have affected any associated analysis results.

Use of a model does not exclude use of the elasticity-based method discussed below. The short-term elasticities can be used as a reasonableness check for model no build versus build comparisons. Scenario analysis can also be used to isolate some of the long-term induced vehicle travel effects to verify the reasonableness of model forecasts. For any of these checks, the analyst should clearly identify whether the elasticity method is being used to predict total VMT attributable to the project or select types of VMT such as that associated with induced household driving versus commercial driving.

Approach #2: Elasticity Method

Given the limitation of a travel demand model in estimating long-term induced vehicle travel effects, the empirical-based NCST Induced Travel Calculator, or directly using elasticities, is another way to generate the long-term induced vehicle travel effects on VMT. However, whether to use the full elasticity is an important question given the information presented above about the individual sources of induced VMT that were attributed to lane mile increases. The online NCST Calculator uses the following standard formula based on published research to estimate VMT attributable to a project (induced VMT):

Project-Induced VMT = [%Δ Lane-Miles] x [Baseline VMT] x [Elasticity]

where, %Δ Lane-Miles = The increase of lane miles expressed as a percentage of the total lane-miles in the study area (i.e., MSA or County as noted above). This must be a positive number.

The benefit of an elasticity-based method is that it requires little effort, however it has the limitations noted in the previous section. Relying on this method alone may not provide a complete picture of potential VMT effects and may over- or under-estimate the impact of induced vehicle travel by not accounting for other factors contributing to long-term traffic increases.

A final consideration for this method is that some induced VMT analysis such as that to comply with CEQA may require isolating the VMT solely from passenger vehicles. This is possible based on an accounting method of induced vehicle travel sources developed by Duranton.

Basically, up to .70 of the 1.03 elasticity was due to passenger vehicle related VMT while the remainder was associated with increased commercial vehicle driving.

Approach #3: Hybrid Method

A hybrid method is to integrate both the model and elasticity methods. This approach allows the same land uses for all alternatives but would acknowledge the limitation of using fixed land use inputs. Notably, the discussion would describe which alternative the land use forecasts best reflect and how the accessibility differences between the alternatives could affect the allocation of future growth. The model will be used to forecast the short-term induced travel effect for the build condition of project alternatives, while the NCST calculator is used to forecast long-term VMT effects of the project build alternatives. The details of this method are listed below:

Step 1: The travel demand model will be used to generate volume forecasts and VMT information for no build and build alternatives with a fixed set of land use forecasts.

The agency that developed the land use forecasts will inform the analyst whether these land use forecasts represent the build or no build condition. Typically, project development and environmental impact analysis is only performed on projects that have already been included in a regional transportation plan (RTP), so typical RTP land use forecasts are most likely to represent build conditions. The environmental document will acknowledge that the actual land use will likely differ among alternatives. If feasible, the analyst can qualitatively explain how the project could affect land use and what the likely outcome would be in terms of the direction of change with respect vehicle trips and VMT. This could include how the project alternatives could affect the allocation of future growth, whether that reallocation would place additional growth in locations likely to generate higher or lower levels of VMT per capita, and whether the project will increase regional growth totals and VMT or just the regional distribution of the overall growth. The model will generate short-term (1-2 year) induced vehicle travel effects for each of build alternatives. For base year and opening year with project scenarios, the Home-based Work and Home-based University/School trips should be held constant as in the corresponding no build scenarios, because the work and university/school locations will not change immediately upon the opening of the project to traffic.

Step 2: For the environmental document, the NCST Induced Travel Calculator, or directly the long-term elasticities, will be employed to generate the long-term induced travel effect for VMT.

	Model Method	Elasticity Method	Hybrid Method
Effort Required	High	Low	High
VMT Output	• Total VMT - stratified by speed bin and vehicle type depending on model • Short-term induced VMT	• Long-term induced VMT	• Total VMT - stratified by speed bin and vehicle type depending on model • Short-term induced VMT • Long-term induced VMT
Level of Confidence	**Moderate** – most models will lack full sensitivity to trip generation and land use changes associated with long-term induced vehicle travel effects.	**Moderate** – Limited sensitivity to context and explaining the counter-factual of what would happen if the project is not built.	**Moderate/High** – Same limitations noted for the other two methods but offers the most complete picture of VMT effects.

Summary of Suggested Approaches

If multiple alternatives are involved, the NCST Calculator, or directly the long-term elasticities, will be used to generate the long-term induced travel for the build alternatives that include GP, HOV, or HOT lanes. The VMT attributable to the project should be separated into the categories noted above and disclosed so reviewers understand that some of the induced VMT is directly related to the economic benefits that are likely part of the purpose and need justification for the project. The model and the NCST induced VMT forecasts can be reported as a range, and the environmental assessment could be based on the VMT forecast that is best suited to the specific corridor context. For example, the NCST Calculator may systematically overestimate VMT associated with new bridge lane miles so inclusion of the travel demand model induced VMT effects could help provide a more complete picture of potential effects.

Analysts will need to consider that the induced vehicle effects not captured by the travel demand model could influence the peak hour design volumes and the VMT by speed bin estimates used for emissions analysis. At a minimum, these limitations should be acknowledged and disclosed in the project development and environmental documents.

Takeaways

The concept of induced vehicle travel is becoming better understood in transportation planning and engineering practice such that public agencies are developing detailed technical guidance. For this guidance to be effective though, it needs to clearly explain the strengths and limitations of applicable methods. This paper complements current guidance and expands on the information available to practitioners to improve the reasonableness and confidence in their forecasting processes and outcomes

Committee Updates

District Local Arrangements Committee (LAC)

By Cathy Leong, PE, Committee Chair

The Palm Springs Annual Meeting was a great success thanks to the efforts of the local LAC lead by Dennis Acuna and Gianfranco Laurie. In addition to assisting with the recent Annual Meeting, the District LAC Committee has been continuing advance planning for our upcoming meetings. Coordination with ITE International and planning for District sponsored events for the 2023 joint meeting in Portland from Aug 13-16, 2023 is underway. The Annual Meeting website has already been updated with information about the 2023 meeting (www.westernite.org/annualmeeting/). In addition, the 2024 LAC has kicked off their planning for the 2024 meeting in Sacramento from June 23-26, 2024 and the District recently signed a hotel contract for the 2025 Long Beach meeting which will be held from June 29-July 2, 2025 at the Westin Long Beach.

Public Relations Committee

By Giancarlo Ganddini, Committee Chair

Lifetime Achievement Award

The Western District Lifetime Achievement Award is considered the District's highest recognition of professional accomplishment and outstanding services in the interest of Western District. It is designed to honor members of Western District who, as active or retired members in good standing

of Western District, have accomplished significant achievements over a period of not less than 20 years that have benefited the membership of Western District, ITE as an organization, and the profession of transportation engineering and/or planning. The 2022 ITE Western District Lifetime Achievement Award was presented to Jim Hanks at this summer's Virtual Annual Meeting.

Individual Achievement Award

The Western District Individual Achievement Award is presented annually to an active member in good standing of Western District who has accomplished significant individual achievements that benefit Western District, and/or ITE, and/or the profession of transportation engineering/planning primarily during recent years. The 2022 ITE Western District Lifetime Achievement Award was presented to Thomas Mericle at this summer's Virtual Annual Meeting.

Student Funding & Initiatives Committee (SFIC)

By Kayla Fleskes, PE, Committee Chair

After two years of virtual events, the Student Funding and Initiatives Committee (SFIC) was excited to be able to host in-person student events and activities at this year's Annual Meeting in Palm Springs for nearly 50 student members. The Annual Meeting started off with the Kell Competition on Sunday, a student-led transportation themed competition hosted by Oregon State University. The next two days were packed with student-focused events like a career guidance panel session on ethical dilemmas in the workplace, a student and faculty leadership forum, and of course, the Student Traffic Bowl. This year's winner was Oregon State University. Several student awards were also handed out at the Annual Meeting, such as the Student Chapter Award presented to Cal Poly SLO and the Student Chapter Momentum Award, presented to Portland State University.

All the student activities and awards led by the SFIC are made possible by the Student Endowment Fund, which supports over $15,000 worth of student initiatives and scholarships every year. Thank you to all the past and current donors who have made these initiatives possible. For more information on the Endowment Fund and to donate, please visit: https://westernite.org/student-endowment-fund

Technical Committee

By Pat Marnell, Committee Chair

Congratulations to this Year's Best Annual Meeting Paper Award winners Ronald T. Milam, Jerry Walters, and Melanie Gill for their paper "Balancing Congestion Relief and Induced VMT"

Congratulations to this Year's Best Annual Meeting Paper Award by a Young Professional Jonathan Howard for his paper "Lessons Learned Designing California's First Turbo Roundabout"

WESTERNITE IS GOING GREEN!

The Spring 2023 edition will be the last printed edition of the WesternITE. Make sure you are on our email list and keep an eye on our website at www.westernite.org for future electronic newsletters.

Many Thanks for Attending the 2022 Western District Annual Meeting in Palm Springs!

The 2022 Western District Annual Meeting in Palm Springs was a successful event and the first in-person meeting since the start of the Covid-19 pandemic. We appreciate all our sponsors, exhibitors, speakers, student volunteers and attendees for making this annual meeting possible – we couldn't have done it without you! We had over 500 registered attendees, 55 notable exhibitors, 90 professional speakers and the first Caltrans track. Also, we hope you enjoyed the fun entertainment at Family Night located the Palm Springs Air Museum as well as the 1950's sock-hop themed Annual Awards Banquet. The 2022 Technical Compendium is already available at https://westernite.org/technical-compendia/compendium2022/ Thank you for attending the annual meeting in Palm Springs and we hope you visit again soon!

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Section and Chapter Updates

Alaska Section

by Matt Coburn, Section Representative

ITE Alaska Section is slowly but surely returning to its pre-pandemic level of activities. Unfortunately, the annual joint meeting was postponed once again, but our annual Member Appreciation BBQ was finally resurrected, albeit very soggy. In addition, the Section is moving forward with planning the annual scholarship beer and wine tasting fundraiser in November. We are excited to fill the coffers once again and to continue offering scholarships to students of transportation-related disciplines.

After the summer's hiatus, the Section resumed monthly meetings virtually in September and will return to in-person luncheon meetings in October. Alaska Section will be attempting a hybrid meeting setup to reach more members and provide better options for presenters. Based on member feedback, many are excited to return to in-person meetings and we are confident the Section will move forward with even stronger attendance and commitment.

Hawaii Section

by Mike Motoki, Secretary-Treasurer

The Hawaii Section continues their virtual meeting format which is more convenient for outer island members to attend. In April, Kathleen Rooney presented some of the key initiatives that are changing transportation in the state and analyzed current investment decisions through a new lens. Our August meeting featured Kelly Akasaki and Mike Packard who discussed updates to the City & County's Pedestrian Crossing Guidelines.

In May we hosted our 2nd Annual Transportation Solutions event focused on multimodal sensors and detection. Pre-

senters were asked to focus on projects showcasing how their product addressed specific issues. A special thank you to our industry partners Cubic, Econolite, Iteris, Miovision, NoTraffic, and Wavetronix.

The Section had a record number of attendees at this year's Western District Annual Meeting in Palm Springs. It was well timed as the section received the Small Section Activity Award.

Our Section also supported the University of Hawaii Student Chapter by participating in their Welcome Back Club Showcase and hosted a resume and speed interview workshop.

In September we hosted our first in-person meeting since 2019. We went on a technical tour of the Honolulu bus facility showcasing the City's new electric buses. The City shared their zero emissions transition plan and discussed the necessary infrastructure improvements to support an all-electric fleet by 2040.

Southern California Section

By Marc Violett, Section Representative

The past six months of 2022 were full of excitement for ITE So Cal. The section continued to have meetings and social events.

In March, ITE So Cal had a virtual joint meeting with RSBITE, ITS San Diego, and ITE Central Coast. The meeting titled, "Spaces and Places" focused on use cases for public right of way. As we see a bit of a different thought process in approaching how to use space available. The meeting was well attended and enjoyed.

In April, a group of ITE So Cal members were invited to take a tour of the City of Pasadena's Traffic Management Center. The City of Pasadena is responsible for events at the Rose Bowl and it's TMC reflects the necessity of technology to better assist their residents. A happy hour was then enjoyed by the group after the tour.

Saly Heng, ITE So Cal Secretary, addressing members at the Summer Mixer

May brought ITE So Cal to their annual student night which was held in person for the first time since 2019. It was held at Knott's Berry Farm Hotel jointly hosted with Orange County Traffic Engineering Council (OCTEC). There were five universities that presented, CSU Fullerton, UCLA, USC, Cal Poly Pomona, and UCI, and ITE So Cal was able to provide $7,000 in scholarships.

In June, ITE So Cal teamed up with ITS California to host a joint meeting. The meeting's topic was discussing the future of transportation in Los Angeles, including handling the increased transportation demand that will be present during the upcoming United States hosted World Cup and Olympics. It was a great event that was well attended and informative.

July and August included a summer hiatus from formal meetings. However, ITE So Cal did host a summer social event at Rock 'N Brews in Buena Park. The meeting included attendees from a variety of consultants and agencies. In September, ITE So Cal continued its recent annual tradition to dedicate a meeting topic to equity in transportation. The presenters from the Town of Apple Valley and the City of Long Beach provided unique perspectives and projects based on, amongst other things, equitable goals.

ITE So Cal looks forward to the remainder of 2022, as well as the return of the Holiday Mixer at Knott's Berry Farm!

San Francisco Bay Section

By Tony Henderson, Section Representative

Since the last update, the San Francisco Bay Area Section meeting schedule has slowed due to the Western District Conference and the International Meeting, but we have still hosted a few virtual technical meetings and social gatherings. The technical sessions included a Student Showcase in April featuring UC Berkeley, San Jose State University, San Francisco State University, and Stanford, and a joint meeting with our Central Coast and NorCal Sections in September for a session on what's new with the 7th Edition of the HCM.

The Section hosted a virtual escape room in May, which presented a unique format for professionals to network while solving puzzles against the clock. The Section also hosted a member Happy Hour at Mad Oak in July in Oakland. This was a great opportunity for people to network in person across the broad range of transportation professionals in the Bay Area.

The Section continues to support three university chapters, including the (recently chartered) Stanford University Chapter as well as the existing UC Berkeley and San Jose State University Chapters. The SF Bay Area Section is currently soliciting nominations for the 2023 Board and will hold elections in the Fall, and has speakers lined up for October and November meetings. We look forward to continuing more events into the Fall and next year and being able to see people in-person again!

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Going Green!

The Western District is ending its printed correspondence with the Spring 2023 edition of the WesternITE. All future editions will be electronic only. Make sure your contact information is updated on your member profile at www.ite.org or contact WesternITE editor Ellie Simpson at ellen.simpson@hdrinc.com for help.

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