Review of VMT Estimating Tools in Advance of SB743 Implementation

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Session 4B-1
California Environmental Quality Act (CEQA)

- Established in 1970; California’s counterpart to NEPA
- Disclosure of significant and less-than-significant impacts to the natural and physical environment
- Transportation analysis focused on LOS and exceedance of adopted requirements

**Issues:**
- LOS (i.e., average delay per vehicle) does not represent a physical impact – more of a social inconvenience
- Resulted in substantial overbuilding in intersection / roadway capacity
- Created difficulties in implementing transit/bike/pedestrian projects
Senate Bill 743 (SB743)

- Adopted in 2013
- Required OPR to identify alternative metrics to LOS and to modify CEQA to implement the changes, focused on transit-priority areas
- To date, two documents have been released:
  - “Preliminary Evaluation of Alternative Methods of Transportation Analysis”
  - “Updating Transportation Impacts Analysis in the CEQA Guidelines: Preliminary Discussion Draft of Updates to the CEQA Guidelines Implementing SB743”
Vehicles Miles Traveled (VMT)

Measure of:
- Distance traveled by private vehicles between all origins/destinations of a project
- Total use of a roadway facility

Considered a better measure of physical environmental effects (air pollution, energy)

Different metrics for land use and transportation projects:
- Land Use: Calculated on ratio basis and compared to regional averages for that land use (e.g., VMT/capita or VMT/employee)
- Transportation: Calculated on an area-wide basis
City, county or regional travel demand model

- Input land use into project’s TAZ
- Traditional 4-step (trip-based) model:
  - Model estimates trip generation, mode of travel and origin/destination of each trip
- Tour-based model:
  - Model identifies journey-to-work trips, identifies length of each element
- Provides aggregate VMT (number of trips to each regional TAZ and the distance between centroids)
- Post-processing to determine ratios
Travel Demand Model Pros/Cons

Pros

- Accurate (no need to use regional averages)
- Accounts for substitution effect of regional-influencing uses
- Can measure project-only or area-wide changes

Cons

- Complex, time consuming, not easily accessible
- Limited to standard “MIPS” land use categories
- Need to determine correct model geographic area
VMT Calculations for Land Use Projects – Sketch Models

Spreadsheet or enhanced spreadsheet models

- Input land use and limited demographics/project characteristics
- Project-level model:
  - Applies average trip rates, trip lengths
- Area-wide level model (scenario planning):
  - Assesses net-change in land use totals due to different urban forms, applies average trip rates and trip lengths
- Provides estimated VMT
- Post-processing to determine ratios
Project-Level Sketch Model Pros/Cons

Pros
- Easy to use
- Does not require purchase of, or knowledge of, complex and expensive modeling programs
- Accessible to cities, agencies and consultants

Cons
- Based on average or standard values
- May not account for geographic context
- Does not consider regional context
- Unclear on accuracy and consistency with full travel demand models
VMT Calculations for Transportation Projects

- City, county or regional travel demand model
  - Add or modify roadway link
  - Project specific VMT:
    - Select project link, model determines number of users x length of trip
  - Area-wide VMT:
    - For each link, model sums distance of each link x volume on each link

- Account for induced demand and change in trip lengths/routes

- Question on potential land use changes for major projects
Conclusions

Land use projects

- All approaches to estimate VMT ratios have pluses and minus:
  - City, county or regional models most accurate, but complex and may not be accessible for all users
  - Sketch models easy, but rely on average values and cannot address regional context and unknown consistency with regular travel demand models

Transportation projects

- Must use travel demand model estimate VMT
  - Need to carefully consider appropriate model scale
Next Steps

- **Validate sketch tools**
  - Conduct test cases to determine accuracy of sketch models
    - Evaluate by land use type, jurisdiction, project characteristics, etc.

- **Look for approaches to “shortcut” analyses**
  - Use of more-detailed averages?
  - Exclusion of certain project types?
Shortcuts for Land Use Projects

- Determine number of trips by trip purpose for each land use type
  - From California State Household Travel Survey or model
- Use city, county or regional model to develop average trip lengths by purpose for each TAZ
- Determine project-specific travel demand using sketch model or detailed spreadsheet model (account for unique project characteristics)
- Apply all three factors to estimate total VMT for the project
Shortcuts for Transportation Projects

Identify projects that would likely have negative or minimal increase in VMT:

- Changes to intersection controls or provision of turn-pockets
- Grade separations
- Roadway restriping
- Transit, pedestrian and bicycle enhancements

Focus evaluations on major capacity projects that may induce demand or change travel patterns:

- Additional freeway/highway lanes
- Expanded urban arterials
For More Information

- California Office of Planning and Research (OPR)
  - www.opr.ca.gov

- California Environmental Quality Act (CEQA)
  - resources.ca.gov/ceqa

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