

Overview of Trip-Generation for Urban Infill, Mixed-use, and Transit-Oriented Development Land Use Projects

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Transportation engineers and planners in the U.S. typically use the Institute of Transportation Engineers' (ITE) vehicle trip-generation rates estimates as a starting-point in preparing transportation impact analyses or studies (TIA or TIS) of proposed land use development projects. TIAs estimate local transportation impacts of such projects and are used to help identify needed project mitigations. Caltrans LD-IGR program staff also use locally-required TIAs to estimate the potential effects of proposed land use projects on the State Highway System (SHS) and to identify mitigations. Accuracy in preparing TIAs is thus very important to ensure that proposed mitigations are adequate and appropriate for the location, amount, and types of travel anticipated.

ITE cautions that their trip-generation rates are not appropriate or accurate for assessing land use projects located in downtowns, places served by public transit, or with transportation demand management (TDM) programs.¹ That is because the ITE data is collected primarily at single-use suburban land use developments with plentiful parking and little transit service. In fact, traffic counts data that ITE receives that do not fit these criteria are not accepted for inclusion in ITE's Trip-Generation.² Unfortunately, there is no source of trip-generation data for such projects currently available in the U.S.^{3,4}

To address this deficiency, several studies have recently been conducted that collected site-specific data in California. One of these was a national Transit Cooperative Research Program (TCRP) study that produced trip-generation data for multi-family housing (which had 90 to 854 units each) in 17 transit-oriented developments (TODs) in four metropolitan areas in the U.S.^{5,6} Six of the 17 study sites are in California. This study, published in 2007, found that **the housing units studied produced an average of 44% fewer daily vehicle trips than ITE rates predict for the same land uses not located near transit.**

Since 2004, Caltrans has sponsored and funded two major studies of trip-generation rates at urban infill and other "smart growth" land uses in California. The first produced trip-generation rates data for 25 urban infill land uses in California.⁷ These included: mid-rise apartments, general office buildings, and quality restaurants at urban infill sites located within walking distance of frequent transit service in core

¹ *Trip Generation Handbook: An ITE Recommended Practice (June 2004)*. Page 15: "If the site is located in a downtown setting, served by significant public transportation, or is the site of an extensive transportation demand management program, the site is not consistent with the ITE data and the analyst should collect local data and establish a local rate."

² Personal communication with Lisa Fontana-Tierney, ITE's national Trip Generation coordinator, Washington, D.C. 2010.

³ "Evaluation of the Operation and Accuracy of Five Available Smart Growth Trip Generation Methodologies." UC Davis Institute of Transportation Studies, for Caltrans, September, 2011: pp 2-6. http://pubs.its.ucdavis.edu/publication_detail.php?id=1495

⁴ However, such data is regularly collected and reported in the United Kingdom (England, Ireland, Wales & Scotland) as well as Australia and New Zealand. For more information, see: <http://www.trics.org/>

⁵ *ITE Journal*, "New Transit Cooperative Program Research Confirms Transit-Oriented Developments Produce Fewer Auto Trips" June 2009, by G.B. Arrington and Kimi Iboshi Sloop. Summarizes findings of TCRP Report 128: "Effects of TOD on Housing, Parking and Travel," 2007, which is available on the Transit Cooperative Research Program's website.

⁶ These are: Washington D.C.; Portland, Oregon; the San Francisco Bay Area; and the Philadelphia, PA/Newark, New Jersey.

⁷ *ITE Journal*, "Trip Generation Rates for Urban Infill Land Uses in California", June 2009. James Daisa and Terry Parker.

areas of the S.F. Bay Area, LA, and San Diego. It found that **ITE trip generation rates predict up to twice the number of vehicle trips than were actually found at the sites studied during peak travel times.**

Specifically, it found that morning peak-hour trip rates were 27% to 50% lower than ITE rates predicted; and afternoon peak-hour trip rates were 26% to 50% lower than ITE rates predicted.⁸

Since 2009, researchers at the UC Davis Institute of Transportation Studies (ITS) have been conducting another Caltrans-funded study to develop trip-generation rates for a variety of “smart-growth” land uses in California. UCD researchers collected trip-generation rates data for 30 land uses in California, in Sacramento, the S.F. Bay Area, and Southern California. The results indicate that the actual (counted) number of vehicle trips during the morning peak travel hour were 2.3 times lower on average than ITE trip estimates for 19 of 24 study sites. It also found that actual (counted) afternoon peak-hour vehicle trips were 2.4 times lower on average than ITE trip estimates at 23 of 27 study locations.⁹

As part of the UC Davis study, researchers also conducted a thorough annotated review of available studies on quantitative relationships between the built environment and travel throughout the U.S. This literature review revealed that several variables -- especially location, density, land use mixture, and connectivity – significantly influence amounts and modes of travel.¹⁰

In addition, **the UCD study also developed a method and spreadsheet tool for adjusting ITE trip-generation rates for “smart growth” land use projects, such as urban infill, mixed-use, and transit-oriented development projects in California.** These tools are being considered by the national Institute of Transportation Engineers as a possible “recommended practice” via an update of ITE’s Trip-Generation Handbook. Regardless of whether ITE recommends these tools for national use, the UCD method and spreadsheet tool potentially can be used to estimate trip-generation rates for some types of smart growth land use projects proposed in California.¹¹

⁸ “Trip-Generation Rates for Urban Infill Land Uses in California - Phase 2: Data Collection FINAL REPORT” For Caltrans Divisions of Transportation Planning and Research & Innovation. By Kimley-Horn * Associates. June 15, 2009. At: http://www.dot.ca.gov/research/researchreports/reports/2009/final_summary_report-calif_infill_trip-generation_rates_study_july_2009.pdf

⁹ For more information, see UCD’s “Smart Growth Trip-Generation” Final Report - Appendix “E” UCD’s Data Collection Methodology and Results, at: <http://ultrans.its.ucdavis.edu/projects/smart-growth-trip-generation>

¹⁰ For more information, see UCD’s “Smart Growth Trip-Generation Final Report” - Appendix “B”, Annotated review of land use & transportation literature, at: <http://ultrans.its.ucdavis.edu/projects/smart-growth-trip-generation>

¹¹ For more information, see UCD’s “Smart Growth Trip-Generation” Final Report - Appendix “F” Methodology for Adjusting ITE Trip Generation Estimates for Smart Growth Projects, and Smart Growth Trip-Generation Adjustment Tool, at: <http://ultrans.its.ucdavis.edu/projects/smart-growth-trip-generation>