

DIVISION OF RESEARCH AND INNOVATION
Research Initial Scope of Work
FY 10/11

I. Project Number: P359

Project Title: **Trip Generation Rates for Traffic Impact Analyses of Smart-Growth Land-Use PROJECTS**

II. Task Number: 1942

Task Title: **Validation of Smart-Growth Land-use PROJECTS Trip-Generation Rates Methodology** (produced by Task 1940)

III. Project Problem Statement:

The objective of related Task 1940 (currently underway by UCD's ITS) is to develop an acceptable methodology for estimating multi-modal trip-generation rates of proposed smart-growth land use projects in California. To validate and calibrate the selected methodology, multi-modal trip-generation data from an appropriate sample of smart-growth sites in California is required (which is the focus of this Scope of Work for related Task 1942).

IV. Objective:

At selected appropriate existing occupied smart-growth land use sites in representative areas of California, obtain cordon volume counts of total person trips crossing in-bound and out-bound of each site, classified into motor vehicle, transit, and non-motorized trips (as described in V). Compile, clean, analyze, and report the data in a usable format.

V. Task Description of Work and Expected Deliverables:

A small group of practicing traffic engineers and planners is currently providing technical input and oversight of Task 1940 (currently underway by UCD's ITS). This group will also provide input regarding data collection for Task 1942, including: appropriate sites in California, the types of data that are needed, how and at what times data is to be collected, and the manner in which results of the data collection effort are to be analyzed and reported. That group will also assist Caltrans staff in reviewing proposals received in response to this SoW and selecting an appropriate contractor for this Task 1942 effort.

The selected contractor will submit a proposed data collection methodology – including output data formats and quality control – to Caltrans for review and approval. Important information is provided below regarding Caltrans preferences for this methodology, which should be responded to in proposals:

Data resulting from this SoW at each approved selected site is as follows:

1) Required data:

- a) Cordon volumes (directional - in and out): for vehicles (including vehicle occupancy rates) as well as pedestrians, bicyclists, and transit users

DIVISION OF RESEARCH AND INNOVATION
Research Initial Scope of Work
FY 10/11

- b) # of Person Trips – (vehicle occupancy rates)
 - c) Weekday daily and peak hours (am & pm) by 15 minute increments
 - d) Adequate site data, as specified in the ITE Handbook, for all land uses and transportation facilities & services within each site that is selected and approved for data collection, and as needed regarding locational and surrounding areas. Contractor will also provide photos of each study site (as needed), along with a diagram of each study site area.
- 2) The selected contractor will clean, compile, analyze, and report the collected data in a manner that clear, accurate, and useful to the Task 1940 project team.
- 3) Caltrans staff will provide a list of candidate data collection sites to the Selected Contractor. The contractor will select the requisite number of sites from that list, or may propose other sites in California that have the same or similar characteristics. The final set of proposed data collection sites shall be subject to approval by Caltrans.

General considerations regarding the location of data collection include:

- a) Data collection should be conducted at sites in California that:
- have smart growth attributes appropriate to their area-types.
 - are representative of appropriate types of areas in California.
 - are located in areas with previous and expected continued growth and in which traffic studies are typically required.
 - include at least two different types of land uses (retail, residential, office).
 - are 100 acres or less in size to (1) make data collection efforts manageable and cost-effective, and (2) to avoid having to survey internal vehicle trips.

Data will also be collected and provided for at least one “base case” site (e.g., suburban, single-use, low-density) in each major study region for comparison purposes to the smart growth study sites in that region.

- b) For technical reasons, data should not be collected at sites:
- Located in remote rural areas without significant population growth.
 - For which significant remote (offsite) parking is available within walking distance.
 - That experience significant amounts of “through” travel (of any mode).
 - With significant amounts of very unusual and unlikely land uses.
 - That have significant factors not directly related to their smart-growth features, such as the presence of large groups of people with particular characteristics (such as near colleges or universities, areas with particularly low or high incomes, and the like).
 - Larger than 100 acres in size (although this may vary, if justified).

DIVISION OF RESEARCH AND INNOVATION

Research Initial Scope of Work

FY 10/11

c) *Other considerations:*

- It is preferable to avoid the use of video cameras (to avoid potential problems with confidentiality and public concern).
- It will probably not be necessary to undertake intercept surveying, and it would be preferable to avoid doing so (due to difficulties and costs associated with collecting, collating, and analyzing results).
- Obtain and summarize traffic studies, if available, prepared regarding the initial local review and approval of the project's approval (for comparison to data collected via Task 1942).

4) Deliverables:

- Proposed sites for data collection – for Caltrans review and approval
- Proposed data collection methodology including forms, database and summary formats, and quality control – for Caltrans approval.
- Cordon count summaries (by 15 minutes and by hour for each mode and total) for each site, including quality control checks.
- Report describing what was done and observations that Caltrans' trip generation researchers who use this data should be aware of.

VI. **Background:**

Most traffic impact analyses conducted in California and throughout the U.S. base estimates of land use development impacts on the Institute of Transportation Engineers' (ITE) *Trip Generation*, or on SANDAG's similarly constructed *Traffic Generators*. The ITE *Trip Generation Handbook* describes procedures for adjusting vehicle trip generation rates to account for the effects of mixed-use development, but not for other aspects of smart-growth development such as: transit service availability, density, location and access to employment and services, pedestrian and bicycle facilities, etc.

This lack of an acceptable methodology and data to appropriately analyze all forms and locations of proposed development presents serious challenges for practitioners, local and regional agencies, and the state when identifying potential impacts of proposed smart growth development projects. Such information is necessary to provide sufficient infrastructure and services for people traveling by all modes, to properly design and locate such improvements, and to avoid "over-sizing" nearby them.

The ITE Handbook describes procedures for collecting traffic generation data at developed sites; however, it does not state how multi-modal data is to be collected. The smart growth analysis methodologies that UCD researchers are investigating for Task 1940 differ substantially from conventional ITE trip-generation methods. In order to provide substantiation of the validity of the various methods being

DIVISION OF RESEARCH AND INNOVATION
Research Initial Scope of Work
FY 10/11

considered, and to be able to calibrate the selected methodology, the study team requires empirical multi-modal trip-generation data from as many representative developed smart growth sites in California as possible.

More background information can be found in the [attached document](#).

VII. Estimate of Duration: Spring 2011 thru Spring 2012 (6 months to one year)

VIII. Related Research: See Attachment for list of related research.

IX. Deployment Potential:

Very high, as the objective of Tasks 1940 and 1942 is to develop and provide a methodology that traffic engineers, transit agencies, developers, and local governments can use in conducting Traffic Impact Analysis of proposed smart growth land use development projects in California. This Task 1942 data collection effort will provide information necessary to validate and calibrate the selected methodology and make it usable and acceptable for application in California.

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(Continued on next page)

DIVISION OF RESEARCH AND INNOVATION
Research Initial Scope of Work
FY 10/11

Attachment: **Key Literature** pertaining to topic – (*partial list*)

- (1) *Trip Generation* Eighth Edition, Institute of Transportation Engineers, Washington D.C., 2008.
- (2) Travel and the Built Environment, Journal of the American Planning Association, May 2010, Reid Ewing and Robert Cervero. ("Meta analysis" of studies of the effects of land use and transportation on travel)
- (3) "Assessment of Local Models and Tools for Analyzing Smart-Growth Strategies" – DKS Associates, et al., for Caltrans -July 2007. Report is available at:
http://www.dot.ca.gov/newtech/researchreports/reports/2007/local_models_tools.pdf
- (4) "Trip Generation Rates for Urban Infill Land uses in California – Phase 1: Data Collection Methodology and Pilot Application" Kimley-Horn Associates, EPS & ABAG (for Caltrans) April 2008. http://www.dot.ca.gov/newtech/researchreports/reports/2008/ca_infill_trip_rates-phase_1_final_report_appendices_4-24-08.pdf
- (5) "Trip Generation Rates for Urban Infill Land uses in California – Phase 2: Additional Data Collection" Kimley-Horn Associates, for Caltrans, June 15, 2009.
http://www.dot.ca.gov/research/researchreports/reports/2009/final_summary_report-calif_infill_trip-generation_rates_study_july_2009.pdf
- (6) "Transit-Oriented Development and Household Travel: A Study of California Cities," Daniel Chatman, UCLA Institute of Transportation Studies, School of Public Affairs, (for Caltrans) August 2006.
http://www.policy.rutgers.edu/faculty/chatman/documents/TODs_and_travel_in_CA.pdf
- (7) Findings of the "Statewide Transit-Oriented Development Study: Factors for Success in California," 2002. <http://transitorienteddevelopment/miscellaneous/StatewideTOD.htm>
- (8) TCRP Report 128 "Effects of Transit-Oriented Development on Housing, Parking, and Travel" recently produced trip-generation rates at 17 transit-oriented developments in the U.S. The study used ITE trip generation methods, and has received an acknowledgement from ITE that its findings will be considered in updates to the *Trip Generation* manual. (Go to the TCRP website to locate and download final report.)
- (9) Station Area Transportation Study, by the San Francisco MTC (Rachel Gossan, analyst, 2005) – a thorough, empirical study of travel behavior near rail stations.
- (10) NCHRP Project 8-51 - "Enhancing Internal Trip Capture Estimation for Mixed-Use Developments" – will provide updated internal travel "capture" rates for mixed land uses.
- (11) A study funded by U.S. EPA is currently underway, entitled: "Mixed-use Development and Vehicle Trips: Improving the Standard Estimation Methodology" (under EPA's Smart-growth Mission Contract).
- (12) A study for the San Diego Association of Governments (SANDAG) is underway of traffic and parking generation at mixed use projects in non-CBD areas throughout the San Diego region. (note: see SANDAG's website for updated information on the results of this effort)

In addition, other known relevant literature includes studies by Cervero, Handy, Chatman, Ewing, Krizek, Kuzmiak, Frank, etc.