



## MEMORANDUM

**Date:** July 6, 2006  
**To:** Caltrans/ABAG Urban Infill Trip Generation Consultant/Management Team  
**From:** James M. Daisa, P.E.  
**Subject:** **Preliminary Results of the Pilot Study**

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### **Purpose of Pilot Surveys**

As described in the Working Paper #2: *Site Selection and Data Collection/Analysis Methodology*, a pilot study tested the use of intercept surveys to estimate trip generation for selected land uses that met the final Urban Infill Area criteria defined in the working paper. This memorandum summarizes the process, preliminary findings, and lessons learned from the pilot study at three San Francisco Bay Area locations.

### **Methodology**

The pilot study was based on the methodology described in Working Paper #2. This methodology is attached as Exhibit A with annotations where we deviated from the methodology.

### **Pilot Study Locations**

The selection of study sites focused on urban infill areas in Berkeley, Oakland, and San Francisco with a goal of selecting between five and ten sites of varying land uses. The identification of sites was straight-forward, but gaining permission from owners/management was difficult (see lessons learned section). Permission to conduct intercept surveys was received for three sites:

General Office Building – The selected general office building is located at [1388 Sutter Street](#), in San Francisco. This is a privately-owned 120,000 square foot (gross leasable area) office building with a wide variety of tenants comprised primarily of professional and services. The building manager indicated that the building was 100% occupied at the time of the survey. The building is located less than one block from Van Ness Boulevard, a major transportation corridor. The Civic Center BART Station is located within eight blocks of the office building, too distant to meet the transit proximity criteria. However, MUNI Routes 2 and 3 are within 300 feet of the site each providing a 10-minute headway for four hours of the day. The office building has an attached public parking garage which charges market-rates-about \$21.00 per day. The location of the office building meets both the nonresidential and residential density requirements. The surrounding land uses include a mix of commercial, retail, and residential. Although the office building does not contain any other uses, the ground floors of adjacent buildings contain cafes and retail. Upper floors contain offices and residential uses. There are several high-rise residential towers located within two blocks of the site. The surrounding uses could be classified as Central City (Not Downtown) or Urban Center.



Health / Fitness Club – Marks Health Club is located in Oakland at [298 14<sup>th</sup> Street](#). This site is a locally-owned, non-chain 18,000 square foot health club. The site is located adjacent to AC Transit Route 82 which has a less than 15-minute headway for more than five hours a day. The site is also within four blocks (0.29 miles) of the City Center / 12<sup>th</sup> Street BART Station. The surrounding area is mostly high rise, mixed-use, commercial office and residential buildings. The ground floors are comprised of restaurants and retail shops. Marks Health Club is bordered by a pay-uncovered parking lot and is also surrounded by metered on street parking. A city-owned garage is located within two blocks of the site, which charges about \$10.00 per day. This location meets both the nonresidential and residential density requirements. The surrounding area could be classified as Central Business District or Urban Core.

Retail – Shopping Center – The Gap and Gap Kids is located in the Oakland City Center at [1333 Broadway](#). The two stores operate as a single retail store comprised of 11,000 square feet. The surrounding area primarily consists of high-rise office buildings with ground floor retail with occasional apartment buildings. The Gap and Gap Kids is situated directly above the City Center / 12<sup>th</sup> Street BART Station, and directly along AC Transit's Routes 14 and 15, both with less than 15-minute headways for more than five hours a day. This location meets the requirements for both the nonresidential and residential density requirements. The surrounding area could be classified as Central Business District or Urban Core.

### **Intercept Surveys and Pedestrian Counts**

Intercept surveys and pedestrian counts were conducted during the following periods:

- Gap and Gap Kids: midday and afternoon surveys (11-6pm) were collected on Thursday June 1, 2006. A total of 83 surveys were collected, and a total of 1,108 people were counted entering or exiting the site.
- 1388 Sutter Street office building: morning (7:30 – 9:30am) and afternoon surveys (4-6pm) were collected on Wednesday, May 31, 2006. A total of 107 surveys were collected, and a total of 637 people were counted entering or exiting the site.
- Marks Health Club: morning (7-9am) and afternoon surveys (4-6pm) were collected on Wednesday, May 31, 2006. A total of 25 surveys were collected, and a total of 128 people were counted entering or exiting the site. This was a very small survey size.

### **Mode Share**

**Table 1** shows the average mode split for each of the three land uses in the pilot study. All three of the sites have a relatively low drive-alone mode share (less than 50%), but when all automobile modes are summed the sites range from 36% to 60%. Total transit (rail and bus) mode shares are range from 22% to 52%, with the highest transit mode share occurring at the retail site directly above the BART station. Walking also constituted a relatively high share of travel, ranging from 12% to 16%.

For comparison, **Table 2** summarizes the general mode share for all weekday trip purposes in the San Francisco Bay Area (source: Regional Travel Characteristics Report: Bay Area Travel Survey 2000, Metropolitan Transportation Commission). As compared to the survey results, the MTC data shows that, on average for all types of trips in the Bay Area, substantially higher share of automobile travel. It is important to note that these regional figures reflect suburban and urban areas.

**Table 1: Average Mode Split for Pilot Study Land Uses**

MODE SPLIT	Office Building	Health / Fitness Club	Retail – Shopping Center
Drove Alone	46%	47%	24%
Drove Others	8%	5%	5%
Passenger (car parked nearby)	1%	4%	2%
Passenger (was dropped off)	3%	0%	5%
Taxi	0%	4%	0%
<b>Subtotal all automobile trips</b>	<b>58%</b>	<b>60%</b>	<b>36%</b>
Rail (BART/MUNI/CalTrain/Amtrak)	10%	10%	34%
Bus	17%	12%	18%
<b>Subtotal all transit trips</b>	<b>27%</b>	<b>22%</b>	<b>52%</b>
Bicycle	2%	5%	0%
Walk	12%	16%	12%
Other (scooter)	1%	0%	0%
Note: percentages do not add to 100% due to rounding.			

**Table 2: Bay Area Weekday Trips by Travel Mode**

Mode	Percent
Vehicle Driver	56%
Vehicle Passenger	25%
<b>Subtotal auto trips</b>	<b>81%</b>
Transit Passenger	7%
Bicycle	2%
Walk	10%
Other	1%
<b>SUM</b>	<b>100%</b>

### Trip Generation Rates

Trip generation rates for the three sites were derived by estimating the number of vehicle trips and dividing these trips by the gross leasable square footage of the building. Vehicle trips are the sum of all vehicle related trips (drove alone, passenger, and taxi), and are estimated by applying the applicable mode shares to the highest hour of pedestrian counts in the morning, midday, or afternoon period. **Table 3** shows the calculated trip generation rates and compares them to ITE's average trip generation rate and/or fitted curve equation (from Trip Generation, 7<sup>th</sup> Edition).

The calculated trip rate for the office building is significantly lower than the ITE average rate or the ITE equation rate in both peak periods, by 50% to 93%. The calculated rate for the health club is nearly equal (2% difference) to the ITE average rate (ITE does not have an equation for this land use category) for the morning peak hour. The calculated afternoon peak hour trip rate, however, is significantly lower than the ITE average rate (by 235%). It is

important to note that the survey size for this site was very low (25 surveys) and additional health club sites will need to be surveyed to verify the conclusions drawn from this site.

**Table 3: Comparison of Surveyed and ITE Trip Rates for the Pilot Study**

Land Use	ITE Code	Surveyed Trip Rate (trips / KSF)		ITE Average Trip Rate (trips / KSF)		ITE Trip Rate from Equation (trips / KSF)		Difference between Surveyed Trip Rate and ITE Rate	
		AM	PM	AM	PM	AM	PM	AM	PM
Office Building	710	1.21	0.92	1.55	1.49	1.81	1.78	50% <sup>1</sup>	93% <sup>1</sup>
Health / Fitness Club	492	1.19	1.21	1.21	4.05	N/A	N/A	2% <sup>2</sup>	235% <sup>2</sup>
Retail Shopping Center	820	12.09 <sup>3</sup>	4.01	N/A <sup>4</sup>	3.75	N/A <sup>4</sup>	13.27	N/A	231%

<sup>1</sup> Difference calculated using ITE rate from equation.  
<sup>2</sup> Difference calculated using ITE average rate.  
<sup>3</sup> This rate is the midday rate representing the PM peak hour of the generator as defined by ITE.  
<sup>4</sup> ITE Trip Generation does not provide a weekday rate for “peak hour of the generator” for shopping centers. The trip generation manual provides rates for “apparel store” (Code 870). The average PM peak hour rate for this land use is 3.83 trips per 1,000 SF (rate based on equation is 3.82), and 4.20 trips for the PM peak hour of the generator (rate based on equation is also 4.20).

The calculated rate for the retail site is significantly lower than the ITE average rate for the PM peak hour, by about 230%. There appears to be a match between the calculated rate (12.07) for the midday (PM peak hour of the generator) and the ITE PM peak hour trip rate (13.27). However, the calculated PM peak hour rate for the Gap/Gap Kids is nearly identical to the PM peak hour rate presented in the Trip Generation manual for apparel store. One can draw several possible conclusions from this site:

- 1) It is best characterized as a shopping center a trip generation rate significantly lower than ITE rates for shopping centers.
- 2) It is best characterized as an apparel store closely matching ITE apparel store trip generation rates for the PM peak hour despite the fact that it has a very high non-auto share of trips.

It is clear that more retail sites need to be studied before drawing any conclusions about trip generation or comparisons with ITE. A greater diversity in retail types needs to be surveyed to best estimate urban shopping center trip generation rates.

## Lessons Learned

### Site Selection

The selection of individual sites appears to be one of the most difficult tasks in this research project. The selection of an area is a straight-forward process, once the residential, non-

residential and transit lines that meet urban infill criteria have been mapped. Even selecting an individual building within an area is relatively straight-forward. Gaining permission to conduct surveys is a time-consuming aspect, typically requiring face-to-face meetings with property owners or managers. Often times, the site is corporate owned requiring permission from a remote location. Even with a thorough explanation of the purpose of the survey, property owners/managers are reluctant to give permission citing tenant and patron privacy and inconvenience, or internal policies against soliciting of any type. Key findings from the pilot study include:

- A prior relationship with the property owner/management results in a more receptive introduction to the survey and its importance. Approaching owners/managers of past clients or contacts, or through organizations such as Transportation Management Associations, Downtown Business Associations or public agencies, should be the priority approach to selecting the remaining survey sites.

### Conducting the Surveys

Key findings of the pilot study in conducting the surveys includes:

- Complete knowledge of all access points of the site to ensure that we capture an accurate pedestrian count. It is critical to capture all pedestrians entering and exiting the building or the statistical application of the survey results will be invalid. The pilot study was successful in identifying all site entrances and capturing the total population.
- It is important to supervise the surveyors to ensure the necessary time periods are manned. There is some flexibility in the intercept surveys, but the pedestrian counts must be started and ended on time.
- The pilot study used professional surveyors to conduct the intercept surveys. While generally persuasive people, if they did not fully understand the purpose of the survey they had difficulty explaining it to the people being surveyed. Therefore it is important to provide adequate information to the surveyors so that they are received as being knowledgeable and trust worthy. This may require a pre-survey meeting to explain the purpose and hear the surveyors "pitch" to make sure they sound professional and friendly.
- People entering/exiting sites, particularly place of employment, may be hurried and do not want to take time to conduct the survey. While in-person surveys are best, we may consider augmenting the survey by employing a drop box for office or residential land uses where site visitors/residents can fill surveys out at a more convenient time during the day than when they are arriving / departing from work / home.
- We found that it worked well at the office building when the surveyor filled out the survey for the person while they were waiting for the elevator, making it more convenient.
- It is important to confirm with the site owner/manager that the appropriate independent variable data is available (e.g., building square footage, occupancy, etc.) before conducting the survey. It is also important to explain that anecdotal information is unacceptable, that the survey requires more precise information.

- We found that it was difficult to obtain a minimum of 100 completed surveys. Our return rate was 7%, 17%, and 20% for the three pilot sites. If these sites are typical, then it would take multiple days to obtain 100 surveys, which would have a significant affect on the cost of the study.

#### Analyzing the Data

Based on the limited number of surveys we have not encountered significant issues related to analyzing the data. Key findings include:

- There is the potential to double count automobile trips when a group of visitors fill out multiple surveys. For example, when the driver and a passenger both fill out a survey, the single automobile trip can be counted as two trips. For the pilot study, about 5% to 8% drive others, and 1% to 4% were passengers (car parked nearby). If the driver and passenger of the same vehicle were surveyed there trip has been double counted. One solution for this is to give the surveyors instructions to indicate if multiple surveys are from group, if possible. If this is not feasible the trip generation estimates may be somewhat conservative.

## Exhibit A

### Conducting the pilot surveys:

- 1) The methodology is based on the use of a professional surveying firm to conduct the intercept surveys (pilot studies will be conducted by Gene Bregman Associates, San Francisco).
  - The pilot surveys will be conducted on a Tuesday, Wednesday or Thursday of the week of May 29 through June 2. The surveys will be conducted from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m. Each completed survey will contain the time period of arrival or departure.
  - We have established a quota goal of obtaining a minimum of 100 completed surveys per site ~~and will continue the surveys each day until the minimum quota is reached~~. Low generation land uses such as day care centers may have a lower quota because it may not be possible to collect the minimum. ITE recommends a minimum of 100 surveys when conducting multi-use development intercept interviews.
  - One or two surveyors will ask people entering and exiting the site to fill out a short questionnaire and hand them a clipboard with a one-page series of questions.
  - KHA will arrange to have additional persons count every person entering and exiting the site from all access points.
- 2) KHA will contact the candidate sites prior to the surveys to gain permission to conduct surveys and ensure that additional independent variable information can be collected.

### E. Conducting the Final Surveys

The outcome of the pilot surveys will identify issues, problems, and additional data collection requirements for completing the full set of surveys. The consultant team will use the pilot surveys to refine the methodology. After refining the survey methodology, the remaining sites will be selected and additional surveys will be scheduled and conducted.

### F. Quality Review

Essentially, quality review is a second look at the data. In addition to review by the staff responsible for data collection, the quality control reviewer examines the collected data focusing on identifying missing and inconsistent data, and obvious anomalies