

TDM *Review*



University Mobility
TDM in a Campus Setting

Association for Commuter Transportation

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Library Alert: TDM Review's volume numbering got out of sequence due to an apparent typo in 2006; the error was inadvertently perpetuated in subsequent issues. This issue reflects the corrected volume by adding Roman numeral X—thus 'Volume XVI'. 2006 issues should be indexed as Volume XIV; 2007 issues should be indexed as Volume XV.

Cover Photo: Stanford University Parking & Transportation Services

The Transportation Demand Management Experience at Stanford University

Brodie Hamilton, Director, Parking & Transportation Services, Stanford University

Californians love to drive their cars. Even at Stanford University, located about 40 miles south of San Francisco, where the mild weather allows for nearly year-around walking and bicycling, there often is reluctance to abandon one's car in favor of healthier and environmentally friendlier commutes.

So how does a university convince its students, faculty, and staff to use an alternative commute instead of driving alone to campus? Stanford University's experience suggests one tried-and-true answer: Offer a comprehensive Transportation Demand Management (TDM) program.

A Turning Point

For years, Stanford University has promoted alternative transportation

among its campus community, which currently comprises 11,000 employees (faculty and staff), 8,500 Stanford Hospital employees, 7,000 undergraduate students (most of whom live on campus), and 8,000 graduate students (about 60 percent of whom live on campus). However, the turning point came in 2002, when Stanford began expanding its TDM efforts.

The stepped-up effort paid off with a decrease between 2002 and 2007 of 20 percent in the university employee drive-alone rate, an increase in Commute Club participation of 82 percent, a decrease in commuter parking permit sales, and significant increases in the use of the university shuttle system for commute purposes. Despite steady growth in the

university population, the university has to date also met its goal of "no net new peak-hour commute trips."

Campus Growth Tied to Trip Reduction Goals

In December 2000, the Santa Clara Board of Supervisors approved the Stanford University General Use Permit (GUP), which placed many conditions on Stanford's planned land use, growth, and development (the university's long-range development plan). One of the conditions of the GUP states that Stanford shall mitigate the transportation impact of its additional development and population growth either through a program of "no net new commute trips" or through proportional funding of mitigation



measures for specified impacted intersections.

Given its commitment to both the environment and positive relations with neighboring communities, Stanford selected the option of limiting the number of commute trips to campus in an effort to reduce local and regional traffic congestion, improve air quality, and minimize the environmental impacts of Stanford University commuters. With this option, traffic levels at 16 entry and exit points to and from Stanford University are measured in the spring and fall of each year to determine if the university is meeting this goal. With the university population steadily growing, yet the allowable peak-hour commute trips restricted to the level measured in 2001¹, meeting the GUP trip limit goal is a significant challenge.

To meet this challenge, the university implemented a wide range of new TDM measures and marketing efforts that have proven effective in dramatically reducing the single occupant vehicle commute levels within the university community. With university employees generating the vast majority of the peak-hour trips, this group has been the primary focus of the TDM efforts.

Stanford's TDM Program Overview

Prior to 2002, the university provided a number of commuter benefits, including Clean Air Cash (a program to pay commuters not to drive alone), free shuttle service, free parking permits for carpoolers, reserved spaces for carpools and vanpools, vanpool subsidies, pre-tax payroll deduction for transit, an Emergency Ride Home program (for full and part-time alternative transportation users), a Freshman Emergency Ride Home program (for freshmen abiding by the "Freshmen No Cars" policy), and

¹ Based on the traffic counts, the peak hour in the AM is 8:00–9:00, and the peak hour in the PM is 5:00–6:00.

an extensive infrastructure serving the bicycling community. In addition, the university has had a parking-fee program in place for many years.

In 2002, the university began to expand the alternative transportation options and incentives in a planned effort to meet the GUP peak-hour trip limit. These efforts were developed and coordinated through the Parking & Transportation Services (P&TS) department. The Commute Club was created to give new and existing alternative transportation users a sense of community and identity, thereby increasing both education about and participation in alternative transportation programs, as well as maintaining member loyalty. To join the Commute Club, Stanford commuters agree not to drive alone to campus, and they give up their parking permit (annual permit costs range from \$234 for a "C" permit to \$603 for an "A" permit). The benefits are many, including potential savings from not purchasing a Stanford parking permit and up to \$234 per year in Clean Air Cash offered by Stanford University. The program has grown from 3,706 members during the 2002 academic year to 6,755 in the 2007 academic year—an 82 percent increase.

Additional program enhancements and activities have been added over the last six years. Transit and rail programs were developed after looking at the point of origin of commuters and identifying what types of services would serve a large number of these commuters. Other program elements were developed to help alternative transportation users maintain mobility options when not bringing a car to campus. Heavy emphasis has been placed on communicating the alternative transportation options to the Stanford community and providing rewards for participation. These TDM program expenses are covered by a combination of parking permit revenue and a special fee assessed on schools and departments for increases in their gross square footage.

(This special fee was established to provide funding for the many university-wide mitigation projects and programs required in the university's growth plan.) Provided below is a partial list of Stanford University's TDM efforts since 2001.

Shuttle and Bus Services

Extended free shuttle service areas and hours. Stanford's free shuttle system, the Marguerite, is the major link between regional bus/rail services and the university, providing more than 85,000 hours of service per year on 13 routes serving more than 160 stops. The Marguerite shuttle is named for the horse that pulled a 12-person buggy between the Stanford University site and the train station from the late 1880s through about 1909. The Marguerite now includes 34 buses owned by the university, with the operation and maintenance functions provided by separate vendors.

Environmentally friendly fuel. In June 2005, P&TS began running the entire fleet of Marguerite shuttle buses on B-5 (a blend that is 5 percent biodiesel and 95 percent petroleum diesel). A transition to B-20 (20 percent biodiesel and 80 percent petroleum diesel) will occur in the near future. Two 35-foot diesel/electric hybrid transit buses will join the fleet next year.

Real-time information. The shuttle's automated transportation management system allows riders to view online shuttle schedules, real-time bus locations, and predicted arrival times at the P&TS website (http://fops-cf.stanford.edu/stanford_ivl/).

The Line U/Stanford Express. This service, developed through a partnership between Alameda/Contra Costa (AC) Transit and Stanford, provides free boarding to all university employees, hospital employees, and students on express buses (highway coaches) from the East Bay (east of the San Francisco Bay), and connects with East Bay transit systems

and the commuter rail (ACE Train) from California's Central Valley.

Regional Transit Programs Subsidized by Stanford

Caltrain GO Pass. This pass, developed through a partnership between Stanford and Caltrain, provides university employees with free boarding on the Caltrain commuter rail, serving the San Francisco Peninsula.

Valley Transportation Authority (VTA) Eco Pass program. This program provides university employees and hospital employees free boarding on regional bus and light rail services, including regular service to the East Bay.

Try Transit program. Short-term 100 percent transit subsidies on any regional transit system are provided to encourage selected drive-alone commuters to try alternative transportation.

Online Commute Information and Assistance

P&TS Online Commute Cost and Carbon Calculator. This interactive calculator, available on the P&TS website, allows users to see the obvious and hidden financial costs and environmental impacts (CO₂ emissions) of commuting by car.

Web-based Stanford ridematching services. Developed in cooperation with 511.org, a regional rideshare program, this tool allows Stanford community members to search for rideshare partners. The search can be limited to other Stanford employees only, or broadened to include individuals from other employers in the area. P&TS also *partnered with 511.org to create a Spanish-language flyer that was distributed to all 1,000 administrative departments around campus notifying them of 511.org's Spanish-language ridematching services.*

Extensive P&TS website. Information on all of the alternative transportation programs and incentives offered by the university, as well as information and links to other transportation services, can be

found at <http://transportation.stanford.edu>.

Incentive Programs

Commute Club's Refer-a-Friend program. This program rewards Commute Club members with cash when they convince their friends or coworkers to turn in their Stanford parking permits and switch to an alternative transportation commute.

Increased value of Clean Air Cash. Stanford offers cash payments, distributed on a quarterly basis, to Commute Club members (commuters who commit not to commute by single occupant vehicle). The value of this incentive has increased almost every year since 2001. The current value is \$234 per year, more than twice the amount offered seven years ago.

Gifts and prizes. Bi-annual membership drives, prize drawings (valued up to \$4,000), and member gifts are used as rewards for membership in the Commute Club.

Part-time pledge. Through online registration, commuters who must drive on a regular basis can commit to commuting during non-peak traffic periods or to using alternative transportation on a part-time basis. Participants are entered into a drawing for cash rewards up to \$1,500.

Increased cost for parking permits. Annual parking permit fee increases since 2001 range from 54 percent to 116 percent. The "A" commuter permit, which provides parking close to most campus destinations, has increased from \$391 to \$603. The "C" commuter permit increased from \$108 to \$234, and the inexpensive "Z" permit (\$54), which was valid only in lots more distant from the center of campus, was eliminated in 2005.

Addressing Barriers to Commute Alternatives

Free car rental vouchers for Commute Club members. Commute

Club members may use an Enterprise rental car for free for up to 12 hours for planned and unplanned errands and appointments.

Hourly car rental rates. The on-campus Enterprise Rent-A-Car office offers rentals by the hour to all members of the campus community (18 years of age and older). Discounted half-day and full-day rates also are available.

Carsharing. All members of the campus community (18 years of age and older) may join the Zipcar carsharing program. Of the eight cars currently on campus, five are gasoline/electric hybrids.

Peak Hour Trip Reduction Program. This program engages all university schools and administrative units to actively encourage staff to commute by alternative transportation and/or to adjust work hours so their commute is outside the peak commute hours.

New bicycle facilities and educational programs. Stanford offers an estimated 12,000 bike rack spaces on campus along with clothes lockers, bike storage rentals, and showers. A full-time bicycle coordinator provides bike safety information and presentations and coordinates bike program promotions, such as bicycle registration, subsidies for folding bicycles that can be taken to a commuter's seat on the train, and discounts on helmet purchases.

Marketing and Outreach

Personal outreach to new employees and peak-hour drivers. In response to feedback that people are experiencing "information overload," P&TS staff now call parking permit holders to inform them about alternative transportation program elements directly applicable to them. In addition, P&TS staff called more than 1,000 GO Pass-eligible employees who live within five miles of a Caltrain station to inform them of their eligibility for a free Caltrain pass, and to educate them about the benefits of using

Caltrain to commute to campus. New employees receive a folder describing the specific alternative transportation options available to get them from their home to Stanford.

Enhanced marketing efforts. Targeted mailings (postcards, emails), interactive posters, banners, monthly email updates, flash animations, online quizzes, newspaper articles, and more are produced to better educate the Stanford community of program offerings. Recent postcard, poster and banner messages have focused on raising the awareness of individual commuters of the impact that drive alone commutes can have on the environment.

Transportation Love Stories. Commute Club members were invited to submit personal testimonials on the benefits of using alternative transportation. Responses were received from every level of the campus community, including a student who used her Clean Air Cash subsidy to purchase a new bike, a faculty member who reduced stress and improved health by navigating by foot through Stanford's beautiful campus, a concerned researcher who realized that using public transit was one significant way he could reduce pollution, a grandmother who bypassed stereotypes and got back on her bike, and a true "Commute Hero" who, despite a battle with multiple sclerosis, challenges herself everyday by walking and riding the Marguerite Shuttle to campus. Winners were photographed and their "love stories" reprinted on posters and postcards distributed around campus, which complemented information on Stanford's spring 2006 Commute Club Membership Drive. Some of these stories can be seen at http://transportation.stanford.edu/alt_transportation/CC_stories.php.

Measuring the Effectiveness of the TDM Program

Parking & Transportation Services monitors a number of areas to evaluate the impact of the TDM program on

Table 1: University Employee Mode Splits (%)

Primary Mode	2002 ¹	2003	2004	2005	2006	2007
Bicycle	7.0	9.3	9.6	9.9	10.3	11.8
Caltrain	4.0	9.9	11.7	14.3	15.8	17.7
Carpool	10.0	9.2	9.8	9.7	10.0	9.4
Drive Alone	72.0	65.8	63.6	57.8	54.4	51.9
Marguerite/Bus	4.0	2.8	2.9	4.2	4.8	4.9
Other	-	-	-	1.3	1.4	1.2
Vanpool	1.0	0.6	0.6	0.5	0.4	.3
Walk	2.0	2.3	1.9	2.2	2.8	2.9

¹ First year of new annual survey format

the commute patterns of the Stanford University community. Below are five measurements used to analyze the commute trends. The data² show that the TDM program is contributing to the change in how and when commuters get to the campus, and to the university achieving the goal of no net new peak hour commute trips. These trends are contributing to the university's expanding efforts to reduce its carbon footprint and move toward becoming sustainable.

Employee drive-alone rate. Since 2002, P&TS has conducted an annual commute mode survey, which provides both behavioral and attitudinal information. All individuals completing the survey are entered into a drawing for cash rewards (up to \$1,000), iPods, and other prizes. The survey results show a

reduction in the university employee³ drive-alone rate from 72 percent in 2002, to about 52 percent in 2007. Much of this commute-mode change is due to the shift in employee commuters from drive alone to the Caltrain commuter rail service. This shift, in large part, is in response to Stanford offering free Caltrain boarding through the GO Pass program established in the fall of 2002. Table 1 shows the survey results for university employees⁴. Looking at all university commuters, the drive-alone rate has dropped from 48.9% in 2003 to 35.8% in 2007 (comparison data for 2002 is not available).

Commute Club membership. The Commute Club membership (including all university employees, hospital employees, and commuting students) has grown from 3,706 total members

Table 2: Commute Club Membership

Academic Year	Clean Air Cash Recipients	Carpoolers	Carpools	Total Commute Club Membership
2002	2,416	1,290	625	3,706
2003	2,550	1,330	489	3,880
2004	2,581	1,542	621	4,123
2005	2,793	1,793	817	4,586
2006	4,108	2,127	1,014	6,235
2007	4,579	2,176	1,102	6,755

² All data, except cordon count trip data, is collected and maintained through the P&TS data base. Cordon count data is collected and maintained by the traffic consultant hired by the County of Santa Clara.

³ University employees are the focus of the TDM efforts because they are the vast majority of peak-hour commuters.

⁴ The automatic rounding feature in Excel may result in some columns totaling less than 100 percent

during the 2002 academic year, to 6,755 in the 2007 academic year (an 82 percent increase). Table 2 shows these figures as well as the corresponding increases in Clean Air Cash recipients and carpoolers.

Peak hour commute trips. Each year, the peak-hour trip counts have been kept below the morning and afternoon baseline levels.⁵ This is of particular significance given that the number of staff (the vast majority of peak-hour commuters) has grown by more than 1,500 during this period (Table 3).

**Table 3:
Peak-Hour Commute Trips**

Year	AM Trips	PM Trips
2001 (baseline)	3,474	3,591
2002	3,275	3,586
2003	3,413	3,476
2004	3,176	3,586
2005	3,383	3,561
2006	3,048	3,427
2007	3,058	3,494

Parking permit sales to university employees. Over the last four years, the number of active university employee commuter permits during the peak parking lot demand period (winter) has decreased by 7 percent. Table 4 quantifies the active university employee commuters with parking permits in mid-February of each year. This is also of particular significance in light of the growth in the staff population noted previously. A similar trend is seen when looking at all commuter permits (university employees, hospital employees, and students).

⁵ Trip counts are measured each year by a consultant hired by the County of Santa Clara during six weeks in the spring and two weeks in the fall. Trip credits may be applied to reduce the actual trip levels measured. A credit is accrued for each individual transported on the Marguerite Shuttle during the peak commute time and outside the 16 cordon points. Credits were applied on the PM counts in 2004 and 2005.

**Table 4:
Commuter Parking Permit Sales**

Academic Year	University Employee Parking Permits	All Commuter Parking Permits ¹
2002	6,787	13,497
2003	6,649	14,240
2004	7,105	14,874
2005	7,102	14,730
2006	6,974	14,239
2007	6,818	14,090
2008	6,613	13,390

¹ All commuter parking permit counts include university employees, hospital employees, commuting students, and other non-residents. The counts exclude about 5,000 residential permits held by students living on campus.

Marguerite shuttle ridership. The ridership on the shuttle system has continued to grow over the last 10 years. With the introduction of new buses and an automated transportation management system in 2004, the shuttle switched from manual ridership counts (conducted by the bus drivers) to a more accurate automated system, making it difficult to accurately compare the automated ridership data to historical manual counts. Looking at the automated count data available, the ridership increased from 972,291 in academic year 2004 to

1,325,489 in 2007, a 36 percent increase. Over this same three year period, the shuttle system experienced a 60 percent increase in ridership during the afternoon peak commute time (4 p.m. – 6 p.m.). Shuttle service at the Caltrain commuter rail stations (combined shuttle boardings and alightings) increased 24 percent from 438,461 in 2004 to 543,270 in 2007.

Summary

The Stanford University experience demonstrates that application of TDM measures can have dramatic impacts on drive-alone commute rates. Regular program evaluation helps to determine if program elements are contributing to the success of the TDM effort and to justify expenses. Since Stanford University started expanding its TDM efforts in 2002, it has seen a 20 percent drop in the university employee drive-alone rate, an increase in Commute Club participation of 82 percent, a decrease in commuter parking permit sales of between 7 percent and 11 percent, and a 60 percent increase in ridership of the university shuttle system during peak commute periods. In addition, the university has met its goal of no net new peak-hour commute trips.



Stanford's Marguerite free shuttle.

The positive results seen with the Stanford program over the last six years are due in large part to the following factors:

- A clear understanding of the commuter population through the use of employee and student data (residence, affiliation, whether they hold a parking permit, primary commute mode, etc.), in conjunction with readily available GIS (Geographic Information System) programs.
- Close proximity of regional rail and bus services, and strong partnerships with the agencies providing these services.
- Financial resources to establish a comprehensive and expanding array of transportation options and programs that encourage both full-time and part-time alternative transportation use.
- Continuous and varied targeted marketing and outreach to all commuters.
- Incentives for commuters to join and remain among the ranks of alternative transportation users.
- Dedicated and capable staff to develop, implement, integrate, and sell the program elements.
- Strong support from the university administration.

The success of Stanford University's TDM program can be attributed in large measure to a comprehensive approach, which leverages the synergy among multiple program elements. Individually, many elements of the program mentioned here could have a positive impact on the reduction in drive-alone rates, peak hour trips, or other metrics. However, a comprehensive program can make each element more attractive to or useable by commuters. This approach has proven effective in maximizing the many benefits realized by Stanford University, its commuters, and the community. **ACT**



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