Appendix C
Area Projects Travel Demand

Parkmerced

TABLE 23
PARKMERCED PROJECT AM AND PM PEAK HOUR TRIP DISTRIBUTION SUMMARY

	Person Trips		Transit Trips		Vehicle Trips	
	Work	**Non-work**	**Work**	**Non-work**	**Work**	**Non-work**
Downtown	18.1%	2.8%	46.4%	16.6%	8.8%	1.4%
Rest of SD 1	11.4%	2.2%	24.8%	10.5%	7.1%	1.4%
SD 2	12.8%	11.9%	10.5%	23.5%	14.2%	11.0%
SD 3	10.0%	18.9%	5.8%	18.2%	11.2%	19.1%
SD 4	18.3%	30.1%	7.8%	15.5%	19.3%	29.9%
Subtotal SF	70.6%	65.9%	95.3%	84.2%	60.6%	62.7%
Brisbane, DC, Colma, SB, SSF	12.7%	24.3%	2.2%	11.9%	16.9%	26.5%
Rest of SB	12.0%	2.8%	0.9%	0.6%	16.4%	3.1%
EB	3.7%	3.5%	1.5%	2.9%	4.6%	3.7%
NB	1.0%	3.5%	0.0%	0.4%	1.4%	4.0%

Source: Fehr & Peers, September 2009

CHAPTER 9. NET NEW PERSON TRIPS

The net new trips generated by the project can be calculated by subtracting existing trips generated (Chapter 1) from the forecasted total project trips generated (Chapter 8). As described in Chapter 1, the existing trips were estimated in order to quantify the current contributions of the existing land use to the transportation system. This land use will be redeveloped as part of the project. The net new trips for the AM and PM peak hours are shown in Tables 24 and 25, respectively, for auto, transit, and bicycle and represent trips that will be external to the site and thus affect the transportation network.

TABLE 24
PARKMERCED PROJECT NET NEW TRIPS - AM PEAK HOUR

	Person Trips					Vehicle Trips
	Auto	Transit	Bicycle	Reduced	Total	
Existing Conditions	2,117	908	91[1]	-	3,116	1,331
Future Cumulative Forecast	6721	1395	252	-2677	6,089	2,952
Net New (difference)					**3,095**	**1,621**
SF Guidelines[2]	9,386				9,386	
SFCTA CHAMP Model	3,083				3,495	

Notes:
[1] Bicycle trips were not calculated as part of the existing conditions. BATS identifies that 3% of trips made are bicycle trips, therefore, the resulting value is 3% of the auto and transit trips combined.
[2] The *SF Guidelines* are based on standard rates and do not account for site design, land use diversity, development density, internalization, or other trip reduction factors.
Source: Fehr & Peers , September 2009

TABLE 25
PARKMERCED PROJECT NET NEW TRIPS - PM PEAK HOUR

	Person Trips					Vehicle Trips
	Auto	Transit	Bicycle	Reduced	Total	
Existing Conditions	2,260	968	99[1]	-	3,387	1,421
Future Cumulative Forecast	7999	1686	299	-2595	9,448	4,522
Net New (difference)					**6,234**	**3,101**
SF Guidelines[2]	12,762				12,762	
SFCTA CHAMP Model	3,589				4,247	

Notes:
[1] Bicycle trips were not calculated as part of the existing conditions. BATS identifies that 3% of trips made are bicycle trips, therefore, the resulting value is 3% of the auto and transit trips combined.
[2] The *SF Guidelines* are based on standard rates and do not account for site design, land use diversity, development density, internalization, or other trip reduction factors.
Source: Fehr & Peers, September 2009

Non-Parkmerced Projects

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Memorandum

Date:	September 9, 2009
To:	Bill Wycko, San Francisco Planning Department
From:	Tim Erney / Ryan Niblock
Subject:	19th Avenue Corridor Study – Proposed Travel Demand Analysis Assumptions for Non-Parkmerced Development (Final)

This memorandum summarizes the methodology and key analysis assumptions in the travel demand calculations for non-Parkmerced area projects to be evaluated in the 19th Avenue Corridor Study. The purpose of this corridor study is to evaluate the future travel conditions along 19th Avenue in the southwestern corner of San Francisco in relation to the anticipated growth in development and planned and potential transportation improvements. Included in the list of areawide projects are: Arden Wood, Stonestown Village, San Francisco State University (SFSU), Parkmerced, 77-111 Cambon Drive, 800 Brotherhood Way, 700 Font Boulevard (School of the Arts site), and the Balboa Park Better Neighborhoods Plan.

This final version of the memorandum supersedes an interim version submitted June 22, 2009[(1)] and contains new sources of information and new proposed trip generation methodologies for the SFSU, 77-111 Cambon Drive, and 800 Brotherhood Way projects. After the June 22, 2009 memorandum, two additional memoranda were submitted (dated September 1, 2009 and September 3, 2009)[(2)] which compared the initial trip generation for these projects with trip generation calculations from various other sources and proposed adjustments to ensure consistency. This memorandum incorporates those changes to methodology and represents the final travel demand analysis assumptions for non-Parkmerced development to be used in the 19th Avenue Corridor Study.

Methodology

Resources

For the evaluation of the non-Parkmerced projects within the corridor study, travel demand characteristics were developed for each project using information from two primary sources:

- The San Francisco Planning Department's Transportation Guidelines for Environmental Review – October 2002 (*SF Guidelines*), which includes general trip generation information plus trip distribution and mode split data for the four quadrants of San Francisco; and,

(1) *19th Avenue Corridor Study – Proposed Travel Demand Analysis Assumptions for Non-Parkmerced Development (Updated)*, AECOM (June 22, 2009).

(2) *19th Avenue Corridor Study – Trip Generation Comparison for Non-Parkmerced Development*, AECOM (September 1, 2009).
19th Avenue Corridor Study – SFSU Trip Generation Adjustment, AECOM (September 3, 2009).

- The San Francisco County Transportation Authority (SFCTA) travel demand model, herein referred as the "SF Model."

In addition to the above primary sources, supplementary information was obtained from the following sources:

- 2000 U.S. Census, Summary File 3: Place of Work for Workers 16 Years and Over – State and County Level (2000);
- SFSU's *2008 Transportation Survey* (2008), conducted by Nelson \ Nygaard Consulting Associates;
- *Campus Master Plan Environmental Impact Report (Final), San Francisco State University*, URS Corporation (August 2007), referred to as the "Campus Master Plan EIR";
- *Cambon Mixed Use Project Transportation Impact Analysis*, Fehr + Peers Transportation Consultants (December 2007), referred to as the "Cambon Draft TIA";
- *800 Brotherhood Way Project Transportation Study*, CHS Consulting Group (May 13, 2004), referred to as the "800 Brotherhood Study"; and,
- *Balboa Park Station Area Plan Transportation Study*, AECOM (formerly Korve Engineering) (December 2006).

Travel Demand Model

To support the corridor study, five separate model scenarios were considered:

- **Existing (2005)**;
- **Tier 1 – 2030 Baseline**
  This model scenario considers background growth throughout the City and region;
- **Tier 2 – 2030 Build**
  In addition to conditions under Tier 1, this model scenario considers the area development projects—i.e., 2030 Baseline plus the area development projects;
- **Tier 3 – 2030 Build plus Public Improvements**
  In addition to conditions under Tier 2, this model scenario considers the improvements proposed (or recently implemented) by various state and municipal government agencies, including Caltrans, the San Francisco Municipal Transportation Agency (SFMTA), the SFCTA, and the Department of Public Works (DPW). These improvements include the following:
    - Speed limit reduction to 30 mph on 19th Avenue (Caltrans);
    - Upgrade of signal infrastructure and installation of pedestrian signals, curb ramps, and street lighting at 16 intersections along 19th Avenue (Caltrans);
    - Striping of edgelines along both sides of 19th Avenue to designate the parking lane and eliminate sidewalk parking (SFMTA / Caltrans);
    - Installation of corner bulbs, pedestrian refuge islands, and landscaping along 19th Avenue (SFCTA);
    - Installation of sidewalk trees and low-growing shrubs in the median of 19th Avenue (DPW);

- Installation of a bike route through SFSU between Buckingham Way and Holloway Avenue to serve as an alternative to any future 19th Avenue bikeway (SFMTA);
- Implementation of traffic calming measures on Holloway Avenue east of Junipero Serra Boulevard, including possible bicycle lanes, a chicane, and bulb-outs (SFMTA);
- Implementation of policy recommendations and design guidelines to improve pedestrian safety, accessibility, and streetscape design (e.g., pedestrian-scaled street lighting, landscaping, street furniture, etc.) in the project area as part of the Better Streets Plan (SFMTA / Planning Department);
- Implementation of traffic calming measures on 19th Avenue between Junipero Serra Boulevard and Randolph Street, including possible bicycle lanes and bulb-outs (SFMTA);
- Redesign of the intersection of Alemany Boulevard / Brotherhood Way / Orizaba Avenue, including possible signalization and rechannelization (to facilitate connections between Parkmerced and Interstate 280) or conversion to a roundabout (SFMTA);
- Implementation of Transit Effectiveness Project (TEP) changes to transit service in the study area, including termination of the M-Ocean View at SFSU and extension of the J-Church from Balboa Park Station to SFSU to cover service on the former M route (SFMTA); and,
- Implementation of transit priority treatments along 19th Avenue to improve transit operations (SFMTA); and,

- **Tier 4 – 2030 Build plus Public and Private Improvements**
  In addition to conditions under Tier 3, this model scenario considers additional transportation improvements proposed as part of the area development projects. These improvements include the following:
  - Realignment of the J-Church and M-Ocean View into the Parkmerced project site between 19th Avenue / Holloway Avenue and Junipero Serra Boulevard / 19th Avenue, including relocation of the 19th Avenue / Holloway Avenue station to the southeast corner of the intersection inside the Parkmerced site and creation of two additional stops inside the development;
  - Redesign of Parkmerced's internal roadway network, including an enhanced "grid" network on the west side of the site and the narrowing of Crespi Drive;
  - Realignment of Crespi Drive and Font Boulevard at 19th Avenue and installation of northbound left-turn pockets at the new intersections;
  - Redesign of the Junipero Serra Boulevard / Brotherhood Way Interchange to facilitate on- and off-ramp merge / diverge movements;
  - Redesign of the intersection of Brotherhood Way / Chumasero Drive / Thomas More Way to facilitate traffic entering the Parkmerced project site from westbound Brotherhood Way east of Junipero Serra Boulevard;
  - Installation of pedestrian and bicycle treatments at the intersection of Lake Merced Boulevard / Brotherhood Way, including possible removal of channelization, roadway narrowing and restriping, and relocation or redesign of crosswalks; and,
  - Creation of new intersections on Lake Merced Boulevard at Gonzalez Drive and Vidal Drive and redesign of existing intersections at Higuera Avenue and Acevedo Avenue.

The most-recent land use program for each of the area projects was included into the following model traffic analysis zones (TAZs) under the 2030 Build run:

- Parkmerced: TAZ 31, 34, 52, 883, 884, 887, and 888; and,
- Non-Parkmerced:
    - Arden Wood: TAZ 430;
    - Stonestown: TAZ 918; and,
    - SFSU and 700 Font Boulevard: TAZ 917.

Parkmerced TAZ 883 also contains the 77-111 Cambon Drive site, while Parkmerced TAZ 884 also contains the 800 Brotherhood Way site. Data for the Balboa Park project was obtained from the *Balboa Park Station Area Plan Transportation Study* and did not rely on SF Model outputs.

Travel Demand Characteristics

For the purposes of the corridor study, it is necessary to track the vehicle-trips and transit-trips associated with each of the area development projects as a means to determine project contributions to intersection volumes and transit ridership. As such, the travel characteristics of each project will be developed separately and then manually assigned to the future roadway network. This approach will also allow for additional refinements to the travel demand characteristics for Parkmerced and the other area projects, and for the identification of any outstanding inconsistencies between the various data sources.

For the purposes of this evaluation, the proposed methodology and approach were separated into two categories—the Parkmerced development and non-Parkmerced projects—with different assumptions provided for each category. For each category, recommendations were developed for the following travel demand characteristics:

- Trip generation;
- Trip distribution;
- Mode split and average vehicle occupancy (AVO);
- Inbound / outbound splits; and,
- Internal trip capture.

Internal trip capture was considered for the Stonestown and SFSU projects, due to their location on sites with a large mix of uses and high potential for trips with origins and destinations within the site. Smaller, single-use projects typically do not exhibit internal trip capture, so its effects on trip generation were not considered for these cases.

The assumptions for the Parkmerced development will be covered in a separate submittal. As such, this memorandum focuses on the assumptions for the non-Parkmerced projects.

Proposed Travel Demand Assumptions – Non-Parkmerced Projects

In general, the travel demand approach bases all travel demand characteristics on output from the SF Model, with the exception of trip generation rates. For trip generation purposes, information was obtained from both the SF Model and the *SF Guidelines*. However, the trip generation in the SF Model is based on the number of household units and employment by different land use types on a TAZ level, whereas the *SF Guidelines* approach is based on trip rates provided for each land use type by number of units or size

of each land use. To compare the trip generation differences between both sources, the land use program for each area TAZ as modeled in the 2030 Build scenario was converted to the number of units and square feet of land use type.

It should be noted that the *SF Guidelines* only presents trip generation information for the weekday daily and weekday PM peak hour time periods. However, the corridor study will also be assessing the weekday AM peak hour. To estimate the weekday AM peak hour trip generation rates, information from the Institute of Transportation Engineers' (ITE) *Trip Generation, 8th Edition* was used for all the non-Parkmerced proposed developments. From *Trip Generation*, a ratio of AM peak hour to PM peak hour trip generation rates was determined for each land use, and then applied to the appropriate *SF Guidelines* rate. In general, variations between the two sources are to be expected, as they use different methodologies and approaches. For instance, the *SF Guidelines* assumes that each land use is isolated and so all trips are considered new trips, while the SF Model accounts for the trip linking within a building or a development, thereby generating fewer new trips.

In addition, the *SF Guidelines* recommends the use of census data from relevant census tracts to develop the mode split and trip distribution for residential uses. However, census data is only available for place of work (at the county level) and generally only applicable to work trips; therefore, use of other sources of information to supplement the census data is recommended. For the purposes of the corridor study, SF Model outputs were used in conjunction with the census data to develop the mode split and trip distributions for residential uses.

The following sections detail the assumptions concerning travel demand characteristics for each of the non-Parkmerced projects. All *SF Guidelines* calculations are included in the attached Appendix to this memorandum.

Arden Wood (TAZ 430)

Since TAZ 430 includes a K-8 school (West Portal Lutheran School) in addition to residential uses, data cannot be used directly from this TAZ to accurately assess the travel demand characteristics of the Arden Wood project. Therefore, data from the adjacent TAZ 394 was used instead.

Trip Generation

Table 1 presents a comparison of the weekday AM peak hour, weekday PM peak hour, and daily trip generation results from the SF Model and the *SF Guidelines* for the 2030 Build land use program for TAZ 394. As the table indicates, the SF Model's peak hour trip generation for TAZ 394 is approximately 80 percent in the weekday AM peak hour and 54 percent in the weekday PM peak hour of the *SF Guidelines* trip generation estimate.

To account for the difference in trip generation values, it is proposed that an average between the two values be used for the assessment of the Arden Wood project. This would result in a reduction in trips as estimated from the *SF Guidelines* of 10 percent in the weekday AM peak hour and 23 percent in the weekday PM peak hour—in other words, the proposed trip generation would be 90 percent of the *SF Guidelines* totals in the AM peak hour and 77 percent in the PM peak hour. This factor would be applied to the *SF Guidelines* trip generation for the proposed Arden Wood project.

Trip Distribution

The Arden Wood project trip distribution for non-work trips was assumed to be equivalent to the SF Model's estimated trip distribution for the Sunset District. The distribution of work trips was based on data from the 2000 U.S. Census on place of work of residents in the nearby Census Tracts 308, 309, 330, and 331, prorated using the SF Model distribution for the Sunset District and the typical distribution assumed for work trips within San Francisco (60 percent SD-1 and 40 percent combined to SD-2, SD-3, and SD-4). The assumed distribution is summarized in **Table 2**.

Mode Split / AVO

The SF Model mode split and AVO information for TAZ 430 were assumed for the Arden Wood project and are summarized in **Table 3**.

Inbound / Outbound Split

The SF Model inbound / outbound split for TAZ 430 was assumed for the Arden Wood project and is summarized in **Table 4**.

Table 1: Arden Wood – Trip Generation Comparison

Time Period	Trips		Comparison Ratio
	SF Model[1]	*SF Guidelines*[2]	
AM Peak Hour	384	482	0.80
PM Peak Hour	503	924	0.54
Daily	6,566	9,333	0.70

Source: *SF Guidelines*, 2002; SF Model, 2009; AECOM, 2009.
Notes:
(1) SF Model trips for TAZ 394.
(2) *SF Guidelines* calculations by AECOM, based on the SF Model land use inputs for TAZ 394.

Table 2: Arden Wood – Trip Distribution

Time Period	Trip End							
	SD-1	SD-2	SD-3	SD-4	EB	NB	SB	Other
Non-Work Trips[1]								
AM Peak Hour	9.9%	15.9%	22.9%	36.2%	2.7%	1.3%	11.1%	0.0%
PM Peak Hour	8.5%	17.0%	20.9%	40.6%	2.0%	0.9%	10.1%	0.0%
Work Trips[2]								
AM Peak Hour	45.2%	7.5%	7.5%	15.1%	4.4%	2.2%	18.1%	0.0%
PM Peak Hour	45.2%	7.5%	7.5%	15.1%	3.8%	1.7%	19.2%	0.0%

Source: SF Model, 2009; U.S. Census, Summary File 3, 2000; AECOM, 2009.
Notes:
(1) SF Model trip distribution for the Sunset District from neighborhood-aggregated trip tables.
(2) 2000 U.S. Census, Summary File 3 for Census Tracts 308, 309, 330, and 331, prorated using the SF Model trip distribution for the Sunset District and the typical 60 / 40 work-trip split for SD-1 versus SD-2, SD-3, and SD-4.

Table 3: Arden Wood – Mode Split and Average Vehicle Occupancy

Time Period	Mode				Average Vehicle Occupancy
	Auto	Transit	Walk	Other	
AM Peak Hour	68.2%	18.8%	11.0%	2.1%	1.11
PM Peak Hour	74.8%	13.2%	10.3%	1.6%	1.14

Source: SF Model, 2009.

Table 4: Arden Wood – Inbound / Outbound Split

Source	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
TAZ 430	25.6%	74.4%	59.1%	40.9%

Source: SF Model, 2009.

Stonestown Village (TAZ 918)

TAZ 918 primarily contains the existing Stonestown Galleria shopping center. Since the proposed Stonestown Village would have similar visitor-serving characteristics, it was assumed that the travel demand information from the SF Model would be appropriate for the assessment of this new development.

Trip Generation

Table 5 presents a comparison of the weekday AM peak hour, weekday PM peak hour, and daily trip generation results from the SF Model and the *SF Guidelines* for the 2030 Build land use program for TAZ 918. As the table indicates, the SF Model's peak hour trip generation for TAZ 918 is approximately 81 percent in the weekday AM peak hour and 38 percent in the weekday PM peak hour of the *SF Guidelines* trip generation estimate.

To account for the difference in trip generation values, it is proposed that an average between the two values be used for the assessment of the Stonestown Village project. This would result in a reduction in trips as estimated from the *SF Guidelines* of 10 percent in the weekday AM peak hour and 31 percent in the weekday PM peak hour—in other words, the proposed trip generation would be 90 percent of the *SF Guidelines* totals in the AM peak hour and 69 percent in the PM peak hour. This factor would be applied to the *SF Guidelines* trip generation for the proposed Stonestown Village project.

Trip Distribution

The SF Model trip distribution for TAZ 918 was assumed for the Stonestown Village project, and is summarized in **Table 6**.

Mode Split / AVO

The SF Model mode split and AVO information for TAZ 918 were assumed for the Stonestown Village project and are summarized in **Table 7**.

Inbound / Outbound Split

The SF Model inbound / outbound split for TAZ 918 was assumed for the Stonestown Village project and is summarized in **Table 8**.

Internal Trip Capture

As stated previously, the Stonestown Village project is proposed on a site with a large mix of uses (Stonestown Galleria) and thus, a high potential for trips with origins and destinations within the site. The *SF Guidelines* suggests a weekday PM peak hour trip generation rate of 13.5 trips per 1,000 gross square feet of space for general retail uses. However, ITE's *Trip Generation* recommends a weekday PM peak hour trip generation rate of 3.73 trips per 1,000 square feet of gross leasable area for shopping centers. The substantial difference between the two sources suggests that use of the "general retail" trip generation rates provided by the *SF Guidelines* likely does not consider the effect of internal trip capture among the various retail and service uses provided within a typical shopping center. Therefore, the SF Model outputs for internal / external split were assumed in order to account for the effect of internal trip capture both within the proposed Stonestown Village project and between the Stonestown Village project and the existing Stonestown Galleria.

The SF Model internal / external split for TAZ 918 was assumed for the Stonestown Village project and is summarized in **Table 9**.

Table 5: Stonestown Village – Trip Generation Comparison

Time Period	Trips		Comparison Ratio
	SF Model[(1)]	*SF Guidelines*[(2)]	
AM Peak Hour	3,682	4,555	0.81
PM Peak Hour	4,375	11,633	0.38
Daily	54,980	128,034	0.43

Source: *SF Guidelines*, 2002; SF Model, 2009; AECOM, 2009.
Notes:
(1) SF Model trips for TAZ 918.
(2) *SF Guidelines* calculations by AECOM, based on the SF Model land use inputs for TAZ 918.

Table 6: Stonestown Village – Trip Destination

Time Period	Trip End							
	SD-1	SD-2	SD-3	SD-4	EB	NB	SB	Other
AM Peak Hour	4.0%	12.6%	20.8%	39.9%	3.4%	3.0%	9.8%	6.5%
PM Peak Hour	2.7%	12.1%	21.6%	43.6%	2.7%	1.7%	10.1%	5.5%

Source: SF Model, 2009.

Table 7: Stonestown Village – Mode Split and Average Vehicle Occupancy

Time Period	Mode				Average Vehicle Occupancy
	Auto	Transit	Walk	Other	
AM Peak Hour	75.8%	15.6%	7.4%	1.2%	1.11
PM Peak Hour	83.8%	8.3%	6.6%	1.3%	1.09

Source: SF Model, 2009.

Table 8: Stonestown Village – Inbound / Outbound Split

Source	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
TAZ 918	67.6%	32.4%	42.2%	57.8%

Source: SF Model, 2009.

Table 9: Stonestown Village – Internal Trip Capture

Source	AM Peak Hour		PM Peak Hour	
	Internal	External	Internal	External
TAZ 918	6.6%	93.4%	11.3%	88.7%

Source: SF Model, 2009.

San Francisco State University (TAZ 917)

For the assessment of the proposed SFSU expansion, the travel characteristics were primarily based from the SF Model (TAZ 917 is primarily the existing SFSU campus) and from the Campus Master Plan, which evaluated the proposed expansion. Additional adjustments were made after comparison against additional travel demand calculations for the project from the Cambon Draft TIA.

Trip Generation

Table 10 presents a comparison of the weekday AM peak hour, weekday PM peak hour, and daily trip generation results from the SF Model and the *SF Guidelines* for the 2030 Build land use program for TAZ 917. As the table indicates, the SF Model's peak hour trip generation for TAZ 917 is approximately 56 percent in the weekday AM peak hour and 61 percent in the weekday PM peak hour of the *SF Guidelines* trip generation estimate. Although the total daily trips are similar, the *SF Guidelines* approach results in a higher percentage of trips in the peak hours.

To account for the difference in trip generation values, it is proposed that an average between the two values be used for the assessment of the SFSU project. This would result in a reduction in trips as estimated from the *SF Guidelines* of 22 percent in the weekday AM peak hour and 20 percent in the weekday PM peak hour—in other words, the proposed trip generation would be 78 percent of the *SF Guidelines* totals in the AM peak hour and 80 percent in the PM peak hour. This factor would be applied to the *SF Guidelines* trip generation for the proposed SFSU project.

Trip Distribution

The SF Model's estimated trip distribution for TAZ 917 was compared against the trip distribution presented in the *SFSU Campus Master Plan EIR* (2007). These two data sets are summarized in **Table 11**. Because the trip distribution presented in the *SFSU Campus Master Plan EIR* was not aggregated by Superdistrict, the estimated trip distribution to each Superdistrict was developed based on general traffic patterns and the location of the campus. As the table indicates, the SF Model estimates a higher share to SD-1, SD-3, and "Other" (i.e., out-of-region) trips, but a lower share to SD-2 and SB trips, when compared against the Superdistrict-aggregated *Master Plan EIR* distribution. For the purposes of the corridor study, the *Master Plan EIR* distribution is assumed for the SFSU project because it was developed based on existing traffic patterns in the area.

Mode Split / AVO

The SF Model's estimated mode split and AVO for TAZ 917 were compared against empirical mode split and AVO data from SFSU's *2008 Transportation Survey* conducted by Nelson \ Nygaard Consulting Associates. These two data sets are summarized in **Table 12**. As the table indicates, there are substantial differences between the mode split and AVO predicted by the SF Model and the empirical data. After a preliminary trip generation comparison for the Campus Master Plan project against calculations from the Campus Master Plan EIR and Cambon Draft TIA, an average of the mode shares and AVO between the SF Model and *2008 Transportation Survey* was assumed for SFSU, which is also summarized in **Table 12**.

Inbound / Outbound Split

The SF Model inbound / outbound split for TAZ 917 was assumed for the SFSU project and is summarized in **Table 13**.

Internal / External Split

The SF Model internal / external split for TAZ 917 was compared against empirical data on place of residence and trip linking characteristics from SFSU's *2008 Transportation Survey*. **Table 14** summarizes the SF Model internal / external split and **Table 15** summarizes data from the *2008 Transportation Survey*. As the tables indicate, the SF Model's internal split for TAZ 917 is higher than the percentage of the campus population living on-campus. On a given school day, it is generally expected that this would hold true, as students, faculty, and staff may visit multiple locations (e.g., classrooms, offices, libraries, cafeterias, etc.). Therefore, the SF Model internal / external split for TAZ 917 was assumed for the SFSU project.

Table 10: SFSU – Trip Generation Comparison

Time Period	Trips		Comparison Ratio
	SF Model[(1)]	*ITE*[(2)]	
AM Peak Hour	2,590	4,604	0.56
PM Peak Hour	2,620	4,302	0.61
Daily	35,206	35,200	1.00

Source: *SF Guidelines*, 2002; SF Model, 2009; AECOM, 2009.
Notes:
(1) SF Model trips for TAZ 917.
(2) *ITE* calculations by AECOM, based on the SF Model land use inputs for TAZ 917.

Table 11: SFSU – Trip Distribution Comparison

Source	Trip End							
	SD-1	SD-2	SD-3	SD-4	EB	NB	SB	Other
SF Model (TAZ 917)								
AM Peak Hour	14.1%	13.4%	18.9%	30.8%	4.4%	3.6%	9.3%	5.6%
PM Peak Hour	11.6%	13.2%	19.4%	33.2%	4.1%	3.4%	9.4%	5.7%
SFSU Campus Master Plan EIR	6%	20%	17%	35%	3%	2%	16%	1%

Source: *SFSU Campus Master Plan EIR*, 2007; SF Model, 2009; AECOM, 2009.

Table 12: SFSU – Mode Split and Average Vehicle Occupancy Comparison

Source	Mode				Average Vehicle Occupancy
	Auto	Transit	Walk	Other	
SF Model (TAZ 917)					
AM Peak Hour	61.7%	19.0%	17.6%	1.8%	1.10
PM Peak Hour	67.1%	12.4%	18.7%	1.8%	1.11
2008 Transportation Survey	33.3%	49.1%	12.3%	5.3%	1.16
Adjusted Mode Split and AVO					
AM Peak Hour	47.5%	34.0%	14.9%	3.5%	1.13
PM Peak Hour	50.2%	30.8%	15.5%	3.6%	1.14

Source: *SFSU 2008 Transportation Survey Results*, Nelson \ Nygaard Consulting Associates, 2008; SF Model, 2009.

Table 13: SFSU – Inbound / Outbound Split

Source	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
TAZ 917	50.9%	49.1%	49.5%	50.5%

Source: SF Model, 2009.

Table 14: SFSU – Internal / External Split (SF Model)

Source	AM Peak Hour		PM Peak Hour	
	Internal	External	Internal	External
TAZ 917	19.7%	80.3%	18.2%	81.8%

Source: SF Model, 2009.

Table 15: SFSU – Place of Residence and Trip Linking

Trip Characteristic	Share
Place of Residence	
On-Campus	8.3%
Off-Campus	91.7%
Trip Linking (Most Recent Origin in Trip)	
Home	89.4%
Work	4.3%
Brief off-campus trip	3.3%
Other	3.0%

Source: *SFSU 2008 Transportation Survey Results*, Nelson \ Nygaard Consulting Associates, 2008.

77-111 Cambon Drive (TAZ 883)

Travel demand assumptions for the 77-111 Cambon Drive project were primarily obtained from the Cambon Draft TIA prepared by Fehr + Peers Transportation Consultants in December 2007.

Trip Generation

After a preliminary trip generation comparison for the 77-111 Cambon Drive project against calculations from the Cambon Draft TIA, the trip generation from the Cambon Draft TIA was assumed for the 77-111 Cambon Drive project.

Trip Distribution

To be consistent with previous transportation analysis conducted for the 77-111 Cambon Drive project, the trip distribution from the Cambon Draft TIA was assumed. The assumed trip distribution by land use and trip type is summarized in **Table 16**. The Cambon Draft TIA assumes that the project would exhibit the same trip distribution characteristics for the weekday AM and PM peak hours.

Mode Split / AVO

To be consistent with previous transportation analysis conducted for the 77-111 Cambon Drive project, the mode split and AVO from the Cambon Draft TIA was assumed. The assumed mode split and AVO by land use is summarized in **Table 17**. The Cambon Draft TIA assumes that the project would exhibit the same mode split and AVO characteristics for the weekday AM and PM peak hours.

Inbound / Outbound Split

To be consistent with previous transportation analysis conducted for the 77-111 Cambon Drive project, the inbound / outbound split from the Cambon Draft TIA was assumed. The assumed inbound / outbound split is summarized in **Table 18**.

Table 16: 77-111 Cambon Drive – Trip Distribution

Time Period	Trip End							
	SD-1	SD-2	SD-3	SD-4	EB	NB	SB	Other
Residential								
Work	42.7%	9.5%	9.5%	9.5%	9.2%	2.2%	17.4%	0.0%
Non-work	42.7%	9.5%	9.5%	9.5%	9.2%	2.2%	17.4%	0.0%
Retail								
Work	5.4%	10.1%	20.7%	29.8%	9.3%	3.9%	17.0%	3.8%
Non-work	2.0%	12.0%	22.0%	46.0%	2.0%	1.0%	10.0%	5.0%

Source: *Cambon Mixed Use Project Transportation Impact Analysis*, Fehr + Peers, 2007.

Table 17: 77-111 Cambon Drive – Mode Split and Average Vehicle Occupancy

Land Use	Mode				Average Vehicle Occupancy
	Auto	Transit	Walk	Other	
Residential	62.7%	30.2%	3.0%	4.1%	1.26
Retail	76.8%	6.6%	15.9%	0.7%	1.80
Total	68.9%	18.4%	9.9%	2.7%	1.51

Source: *Cambon Mixed Use Project Transportation Impact Analysis*, Fehr + Peers, 2007.

Table 18: 77-111 Cambon Inbound / Outbound Split

Source	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
Cambon Draft TIA	40.0%	60.0%	57.4%	42.6%

Source: *Cambon Mixed Use Project Transportation Impact Analysis*, Fehr + Peers, 2007.

800 Brotherhood Way (TAZ 884)

Travel demand assumptions for the 800 Brotherhood Way project were primarily obtained from the 800 Brotherhood Study prepared by CHS Consulting Group in May 2004, with adjustments based on outputs from the SF Model for TAZ 884, which contains the project site.

Trip Generation

After a preliminary trip generation comparison for the 800 Brotherhood Way project against calculations from the 800 Brotherhood Study, the trip generation from the 800 Brotherhood Study was assumed for the 800 Brotherhood Way project.

Trip Distribution

To be consistent with previous transportation analysis conducted for the 800 Brotherhood Way project, the trip distribution from the 800 Brotherhood Study was assumed. The assumed trip distribution is summarized in **Table 19**. The 800 Brotherhood Study assumes that the project would exhibit the same trip distribution characteristics for the weekday AM and PM peak hours.

Mode Split / AVO

The trip generation presented in the 800 Brotherhood Study assumes that the project would exhibit a 100 percent auto share and would generate no transit trips due to poor transit service in the project area. For the purposes of the 19th Avenue Corridor Study, the SF Model mode split and AVO information for TAZ 884 were assumed instead and are summarized in **Table 20**.

Inbound / Outbound Split

To be consistent with previous transportation analysis conducted for the 800 Brotherhood Way project, the inbound / outbound split from the 800 Brotherhood Study was assumed. The assumed inbound / outbound split is summarized in **Table 21**.

Table 19: 800 Brotherhood Way – Trip Distribution

Time Period	Trip End							
	SD-1	SD-2	SD-3	SD-4	EB	NB	SB	Other
AM Peak Hour	22.9%	22.6%	22.6%	22.6%	3.1%	3.1%	3.1%	0.0%
PM Peak Hour	22.9%	22.6%	22.6%	22.6%	3.1%	3.1%	3.1%	0.0%

Source: *800 Brotherhood Way Project Transportation Study*, CHS Consulting Group, 2004.

Table 20: 800 Brotherhood Way – Mode Split and Average Vehicle Occupancy

Time Period	Mode				Average Vehicle Occupancy
	Auto	Transit	Walk	Other	
AM Peak Hour	70.3%	10.9%	17.0%	1.8%	1.14
PM Peak Hour	69.1%	7.3%	22.3%	1.3%	1.16

Source: SF Model, 2009.

Table 21: 800 Brotherhood Way – Inbound / Outbound Split

Source	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
800 Brotherhood Study	19.5%	80.5%	66.7%	33.3%

Source: *800 Brotherhood Way Project Transportation Study*, CHS Consulting Group, 2004.

700 Font Boulevard – School of the Arts Site (TAZ 917)

Trip Generation

Since TAZ 917 includes SFSU, data cannot be used directly from this TAZ to accurately assess the trip generation of the 700 Font Boulevard project. Therefore, data from the adjacent TAZ 52 was used instead. **Table 22** presents a comparison of the weekday AM peak hour, weekday PM peak hour, and daily trip generation results from the SF Model and the *SF Guidelines* for the 2030 Build land use program for TAZ 52. As the table indicates, the SF Model's peak hour trip generation for TAZ 52 is approximately 40 percent in both the weekday AM and PM peak hours of the *SF Guidelines* trip generation estimate.

To account for the difference in trip generation values, it is proposed that an average between the two values be used for the assessment of the 700 Font Boulevard project. This would result in a reduction in trips as estimated from the *SF Guidelines* of 30 percent for both the weekday AM and PM peak hours—in other words, the proposed trip generation would be 70 percent of the *SF Guidelines* totals in the AM and PM peak hours. This factor would be applied to the *SF Guidelines* trip generation for the proposed 700 Font Boulevard project.

Trip Distribution

The 700 Font Boulevard project trip distribution for non-work trips was assumed to be equivalent to the SF Model's estimated trip distribution for the Sunset District. The distribution of work trips was based on data from the 2000 U.S. Census on place of work of residents in the nearby Census Tracts 309, 332.01, and 332.02, prorated using the SF Model distribution for the Sunset District and the typical distribution assumed for work trips within San Francisco (60 percent SD-1 and 40 percent combined to SD-2, SD-3, and SD-4). The assumed distribution is summarized in **Table 23**.

Mode Split / AVO

The SF Model mode split and AVO information for TAZ 52 were assumed for the 700 Font Boulevard project and are summarized in **Table 24**.

Inbound / Outbound Split

The SF Model inbound / outbound split for TAZ 52 was assumed for the 700 Font Boulevard project and is summarized in **Table 25**.

Table 22: 700 Font Boulevard – Trip Generation Comparison

Time Period	Trips		Comparison Ratio
	SF Model[1]	*SF Guidelines*[2]	
AM Peak Hour	975	2,422	0.40
PM Peak Hour	1,102	2,783	0.40
Daily	14,144	19,066	0.74

Source: *SF Guidelines*, 2002; SF Model, 2009; AECOM, 2009.
Notes:
(1) SF Model trips for TAZ 52.
(2) *SF Guidelines* calculations by AECOM, based on the SF Model land use inputs for TAZ 52.

Table 23: 700 Font Boulevard – Trip Distribution

Time Period	Trip End							
	SD-1	SD-2	SD-3	SD-4	EB	NB	SB	Other
Non-Work Trips[1]								
AM Peak Hour	9.9%	15.9%	22.9%	36.2%	2.7%	1.3%	11.1%	0.0%
PM Peak Hour	8.5%	17.0%	20.9%	40.6%	2.0%	0.9%	10.1%	0.0%
Work Trips[2]								
AM Peak Hour	44.5%	7.4%	7.4%	14.9%	4.6%	2.3%	18.9%	0.0%
PM Peak Hour	44.5%	7.4%	7.4%	14.9%	4.0%	1.7%	20.1%	0.0%

Source: SF Model, 2009; U.S. Census, Summary File 3, 2000; AECOM, 2009.
Notes:
(1) SF Model trip distribution for the Sunset District from neighborhood-aggregated trip tables.
(2) 2000 U.S. Census, Summary File 3 for Census Tracts 309, 332.01, and 332.02, prorated using the SF Model trip distribution for the Sunset District and the typical 60 / 40 work-trip split for SD-1 versus SD-2, SD-3, and SD-4.

Table 24: 700 Font Boulevard – Mode Split and Average Vehicle Occupancy

Time Period	Mode				Average Vehicle Occupancy
	Auto	Transit	Walk	Other	
AM Peak Hour	59.7%	20.1%	19.0%	1.2%	1.18
PM Peak Hour	63.6%	12.8%	22.1%	1.5%	1.18

Source: SF Model, 2009.

Table 25: 700 Font Boulevard – Inbound / Outbound Split

Source	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
TAZ 52	33.5%	66.5%	57.4%	42.6%

Source: SF Model, 2009.

Balboa Park Better Neighborhoods Plan

The travel demand calculations from the *Balboa Park Station Area Plan Transportation Study* prepared by AECOM (formerly Korve Engineering) in December 2006 were assumed for the Balboa Park project. It should be noted that only the Kragen Site is considered for specific evaluation as an area project in this corridor study. The other subareas and sites proposed for development in the Balboa Park Better Neighborhoods Plan have been included in the SF Model's 2030 land use files and are considered as "background" projects.

Trip Generation

Table 26 summarizes the trip generation assumptions for the Balboa Park project, which are based on the *SF Guidelines*. Since the study only evaluated conditions for the weekday PM peak hour, trip generation ratios for the weekday AM peak hour compared to the weekday PM peak hour were obtained from ITE's *Trip Generation*.

Trip Distribution

Table 27 summarizes the trip distribution assumptions for the Balboa Park project. Trip distribution for the weekday AM peak hour were developed by assuming the distributions by land use and trip type were the same as the weekday PM peak hour, but adjusting the trip generation rates for each land use as described above.

Mode Split / AVO

Table 28 summarizes the mode split and AVO assumptions for the Balboa Park project.

Inbound / Outbound Split

Table 29 summarizes the inbound / outbound split assumptions for the Balboa Park project.

Table 26: Balboa Park – Trip Generation

Time Period	Trips[(1)]
AM Peak Hour	462
PM Peak Hour	983
Daily	11,190

Source: *Balboa Park Station Area Plan Transportation Study*, Korve Engineering, 2006; AECOM, 2009.
Notes:
(1) *SF Guidelines* calculations by Korve Engineering, based on the Kragen Site land use program.

Table 27: Balboa Park – Trip Distribution

Time Period	Trip End							
	SD-1	SD-2	SD-3	SD-4	EB	NB	SB	Other
AM Peak Hour	27.4%	8.0%	35.5%	6.0%	6.4%	2.3%	11.6%	2.9%
PM Peak Hour	17.9%	8.3%	46.8%	5.5%	5.0%	2.2%	10.6%	3.7%

Source: *Balboa Park Station Area Plan Transportation Study*, Korve Engineering, 2006.

Table 28: Balboa Park – Mode Split and Average Vehicle Occupancy

Time Period	Mode				Average Vehicle Occupancy
	Auto	Transit	Walk	Other	
AM Peak Hour	62.8%	21.3%	14.0%	1.9%	1.45
PM Peak Hour	62.1%	17.0%	19.0%	1.9%	1.60

Source: *Balboa Park Station Area Plan Transportation Study*, Korve Engineering, 2006; AECOM, 2009.

Table 29: Balboa Park – Inbound / Outbound Split

Source	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
Balboa Park Station Area Plan Transportation Study	27.1%	72.9%	53.0%	47.0%

Source: *Balboa Park Station Area Plan Transportation Study*, Korve Engineering, 2006; AECOM, 2009.

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Memorandum

Date:	September 9, 2009
To:	Bill Wycko, San Francisco Planning Department
From:	Tim Erney / Ryan Niblock
Subject:	19th Avenue Corridor Study – Trip Generation for Non-Parkmerced Development

This memorandum summarizes the finalized trip generation for non-Parkmerced development, based on the assumptions summarized in the Non-Parkmerced Assumptions Memo dated September 9, 2009[(1)]. These trip generation numbers represent the finalized person-trips and vehicle-trips to be assumed for non-Parkmerced development in the traffic and transportation analyses to be conducted as part of the 19th Avenue Corridor Study.

Trip Generation

Table 1 summarizes the assumed trip generation for non-Parkmerced development projects for the weekday AM and PM peak hours.

(1) *19th Avenue Corridor Study – Proposed Travel Demand Analysis Assumptions for Non-Parkmerced Development (Final)*, AECOM (September 9, 2009).

Table 1: Trip Generation for Non-Parkmerced Development

Project	Weekday AM Peak Hour						Weekday PM Peak Hour					
	Person-Trips by Mode					Vehicle Trips	Person-Trips by Mode					Vehicle Trips
	Auto	Transit	Walk	Bike / Other	Total		Auto	Transit	Walk	Bike / Other	Total	
Inbound												
Arden Wood	25	7	4	1	36	22	72	13	10	2	96	63
Stonestown Village	298	66	29	5	398	269	637	71	50	11	769	584
SFSU (Campus Master Plan)	374	268	118	28	788	331	365	224	113	26	727	321
77-111 Cambon Drive	147	43	23	6	220	97	188	62	33	9	292	124
800 Brotherhood Way	34	5	8	1	49	30	145	15	47	3	210	125
700 Font Boulevard	76	25	24	2	127	64	135	27	47	3	212	114
Balboa Park (Kragen Site)	77	15	25	2	119	42	323	95	76	10	503	206
Outbound												
Arden Wood	71	20	11	2	105	64	50	9	7	1	67	44
Stonestown Village	143	31	14	2	191	129	872	97	69	15	1,053	800
SFSU (Campus Master Plan)	361	259	113	27	760	319	372	228	115	26	741	328
77-111 Cambon Drive	219	65	35	10	328	145	139	46	25	7	217	92
800 Brotherhood Way	141	22	34	4	200	124	73	8	23	1	105	63
700 Font Boulevard	150	51	48	3	251	127	100	20	35	2	157	85
Balboa Park (Kragen Site)	213	84	28	6	331	157	287	72	76	9	445	175

Source: *SF Guidelines*, 2002;
SF Model, 2009;
2000 U.S. Census, Summary File 3: Place of Work for Workers 16 Years and Over – State and County Level, 2000;
SFSU 2008 Transportation Survey, Nelson \ Nygaard Consulting Associates, 2008;
Campus Master Plan Environmental Impact Report (Final), San Francisco State University, URS Corporation, 2007;
Cambon Mixed Use Project Transportation Impact Analysis, Fehr + Peers, 2007;
800 Brotherhood Way Project Transportation Study, CHS Consulting Group, 2004;
Balboa Park Station Area Plan Transportation Study, Korve Engineering, 2006;
AECOM, 2009.

Notes:
All trips are external.