

Trip Generation Characteristics of Free-Standing Discount Superstores

FREE-STANDING DISCOUNT SUPERSTORES HAVE GAINED IN POPULARITY BECAUSE OF THEIR CONVENIENCE, COMBINING GENERAL RETAIL MERCHANDISE, FULL-SERVICE GROCERY DEPARTMENTS AND OTHER SPECIALTY SHOPS AT DISCOUNT RATES. THIS STUDY SHOWED A P.M. PEAK-HOUR TRIP GENERATION RATE OF 5.50, SUBSTANTIALLY HIGHER THAN THE STANDARD ITE FREE-STANDING DISCOUNT SUPERSTORE P.M. PEAK-HOUR RATE OF 3.87.

BY GEORGIANA M. VIVIAN

IN THE PAST DECADE, THE NUMBER of proposed free-standing discount superstores has increased throughout the United States. These stores have continued to gain in popularity because of their convenience, combining general retail merchandise, full-service grocery departments and other specialty shops, such as pharmacies and photo processing, at discount rates.

Due to this popularity, many localities are growing concerned over the impact of these stores on their communities and infrastructure system. Regarding traffic impacts, an important issue has been raised concerning whether the published Institute of Transportation Engineers (ITE) trip generation rates for free-standing discount superstores are accurate for superstores that are larger than the average facilities documented in *Trip Generation*.

This feature provides a summary of a trip generation study prepared for a major discount superstore company located throughout the United States by looking at traffic conditions related to five free-standing discount superstores.

INTRODUCTION

Trip generation for traffic impact analyses typically is conducted using trip generation rates published by ITE. For most retail land uses, traffic impacts are focused on the p.m. peak-hour of adjacent street traffic to determine the needed infrastructure improvements surrounding the store.

In the case of free-standing discount superstores, the published trip generation rates are based on surveys conducted during the 1990s and 2000 throughout the United States.

It is believed that larger superstores may generate at different rates. It should be noted that: only 10 stores were surveyed for the ITE rate; the average size of the stores surveyed in determining the ITE rate was 161,000 square feet,

although many of today's free-standing discount superstores have more than 200,000 square feet (213,210 for purposes of this study); and free-standing discount superstores intuitively should have a higher trip generation rate than free-standing discount stores, which by definition do not contain a full-service grocery store but have most of the other amenities of the superstore.

This study was undertaken to provide additional information regarding the issues noted above. The principal question to be addressed in the study was whether today's free-standing discount superstores with sizes greater than 200,000 square feet have different trip generation characteristics than the free-standing discount superstores averaging 161,000 square feet, which were sources of data for ITE Land Use Code 813. The current ITE category used for a free-standing discount superstore is Land Use Code 813.

Discount superstores are free-standing stores with off-street parking. They offer a variety of customer services and centralized cashiering and contain a full-service grocery department under the same roof that shares entrances and exits with the discount superstore area. They typically maintain long store hours, seven days a week.

The stores included in this land use often are the only ones on the site, but they also can be found in mutual operation with a related or unrelated garden center and/or service station. They sometimes are found as separate parcels within a retail complex with their own dedicated parking area. Land Use Code 815 (free-standing discount store) is a related use.

Table 1 depicts the ITE published average daily weekday rate of traffic and the p.m. peak-hour rate of adjacent street traffic for a free-standing discount superstore per 1,000 square feet of gross floor area (GFA). Per the discussion, Table 1

Table 1. ITE Trip Generation, 7th Edition, Volume 3.

Comparison of published trip generation rates			
	ITE Free-Standing Discount Superstore (Land Use Code 813)	ITE Free-Standing Discount Store (Land Use Code 815)	ITE Shopping Center (Land Use Code 820)
Number of studies	10	47	407
Average 1,000 square feet of GFA	161	115	379
Average weekday trip generation rate	49.21	56.02	42.94
Average p.m. peak-hour trip generation rate per 1,000 square feet, peak hour of adjacent street traffic	3.87	5.06	3.75

also includes the rate for Land Use Code 815 for comparison.

In addition to the use of the free-standing discount superstore, often when part of a larger retail development, traffic impact analysis will be conducted using the ITE rate for Land Use Code 820 (shopping center). For discussion purposes, the shopping center rate also is included in Table 1.

METHODOLOGY

This study included five stores in the states of Oklahoma and Texas that fit the ITE definition of free-standing discount superstore to estimate their peak-hour trip generation. Field review of all locations included a sketch-level drawing of the site plan, including the driveways to be counted at each location.

Each building's square footage was attained and calculated either by site plans obtained from each local jurisdiction in which the superstore was located, by a measuring wheel during field review, or by contact with the store. The square footage of the garden center and tire and lube shop were included in the square footage calculations.

Staff were positioned at the driveway openings and traffic counts at each of the facilities were conducted on two typical weekdays (Tuesday, Wednesday and/or Thursday) from 4:00 p.m. to 6:00 p.m. The first weekday count was taken in July 2003 and the second in October 2003. It should be noted that no inclement weather occurred during either season of the traffic counts. The peak hour of adjacent traffic was determined

to be from 4:30 p.m. to 5:30 p.m. and was used for analysis purposes.

SITE SELECTION

As defined in ITE's *Trip Generation, 7th Edition*, free-standing discount superstore locations chosen for study had dedicated parking, provided general merchandise and a grocery store and operated seven days a week. In addition, it was decided to include only stores with a size of 200,000 square feet or greater. Each location is described below, including the type of services (in addition to general merchandise) provided at that superstore location.

Garden Center/Grocery/Pharmacy/Photo Center/Portrait Studio/Tire and Lube

The GFA totals 210,945 with the garden center and tire and lube shop and currently is on the site with no other developments. Six driveways were counted for the analysis.

Garden Center/Gas Station/Grocery/Pharmacy/Photo Center/Portrait Studio/Tire and Lube

The superstore site totals 209,115 square feet with the garden center and tire and lube shop. The building has a driveway entrance from a gas station located at the southwest corner of the property. For analysis purposes, the traffic entering in and out of the driveway connecting the gas station and superstore parking lot was counted and, therefore, the gas station was excluded from the analysis. A total of four driveways were counted for analysis.

Garden Center/Gas Station/Grocery/McDonald's/Pharmacy/Photo Center/Portrait Studio/Tire and Lube

The building totals 204,000 square feet with the garden center and tire and lube shop and has an additional four-pump gas station of 225 square feet. For purposes of this study, the gas station's square footage was not included in the analysis. Six driveway entrances to the parking lot were counted for the analysis.

Garden Center/Grocery/McDonald's/Pharmacy/Photo Center/Portrait Studio/Tire and Lube/Vision Center

The superstore site totals 209,000 square feet with the garden center and tire and lube shop. Four driveways were counted for analysis.

Garden Center/Gas Station/Grocery/Pharmacy/Photo Center/Portrait Studio/Tire and Lube/Vision Center

The superstore totals 233,000 square feet with the garden center and tire and lube shop. Five driveways were counted, including a driveway entrance between the parking area for the superstore and another retail store with a separate driveway entrance.

TRIP GENERATION ANALYSIS

Trip generation was conducted by utilizing the average peak-hour (4:30 p.m. to 5:30 p.m.) counts and the square footage of each free-standing discount superstore to determine the trips per 1,000 square feet during the p.m. peak hour. Furthermore, the average traffic turning in and out of the superstore driveways each was divided by total traffic to determine the p.m. peak hour in and out percentages.

The two days of traffic counts (July and October 2003) were summarized for each of the five locations. The average rate of the two weekday counts for p.m. peak hour traffic and the in and out percentages are calculated in Table 2. In addition, Table 3 utilizes the ITE fitted curve equation for the free-standing discount superstore.

LIMITATIONS OF STUDY

Although this study was conducted using standards that comply with ITE

Table 2. Trip generation for free-standing discount superstore trip generation included in this study.

Site	Day	p.m. peak-hour trips				Site traffic	1,000 square feet	p.m. peak-hour trip generation rate (trips per 1,000 square feet), peak hour of adjacent street traffic
		In	In %	Out	Out %			
1	1	672	50.8%	650	49.2%	1322	210.95	6.27
	2	715	49.6%	727	50.4%	1442	210.95	6.84
	Average	694	50.2%	689	49.8%	1383	210.95	6.56
2	1	484	49.7%	489	50.3%	973	209.12	4.65
	2	508	49.4%	520	50.6%	1028	209.12	4.92
	Average	496	49.6%	505	50.4%	1001	209.12	4.79
3	1	651	51.9%	604	48.1%	1255	204.00	6.15
	2	759	51.7%	708	48.3%	1467	204.00	7.19
	Average	705	51.8%	656	48.2%	1361	204.00	6.67
4	1	438	49.2%	453	50.8%	891	209.00	4.26
	2	397	47.0%	448	53.0%	845	209.00	4.04
	Average	418	48.1%	451	51.9%	869	209.00	4.16
5	1	606	51.5%	570	48.5%	1176	233.00	5.05
	2	624	48.0%	677	52.0%	1301	233.00	5.58
	Average	615	49.6%	624	50.4%	1239	233.00	5.32
Average			49.9%		50.2%	1170	213.21	5.50

Table 4. Comparison of study trip generation rates to ITE trip generation rates, p.m. peak hour, peak hour of adjacent street traffic.

	Average 1,000 square feet of GFA	Average rate
ITE Trip Generation, 7th Edition Free-Standing Discount Superstore (Land Use Code 813)	161.00	3.87
ITE Trip Generation, 7th Edition Free-Standing Discount Superstore fitted curve trip generation, p.m. peak hour, peak hour of adjacent street traffic	213.21	3.96
Study average	213.21	5.50

trip generation procedures, it is important to note its limitations so that transportation professionals can determine how best to use the results. The following limitations are noted:

- The study included sites located only in the south central United States.
- Only five sites were included in the study.
- The study analyzed only weekday p.m. peak-hour conditions and did not include daily counts or Saturday counts.

Despite these limitations, the study provides new information on a land use category that does not appear to be fully addressed in previous studies.

CONCLUSIONS

Trip generation rates for the stores included in this study, as shown in Table 2, were compared to the p.m. peak-hour rate of adjacent street traffic for free-standing discount superstore as shown in Table 1. Table 4 summarizes the ITE trip generation rate and the average trip generation rate for the free-standing discount

Table 3. Fitted curve free-standing discount superstore trip generation, p.m. peak hour, peak hour of adjacent street traffic.

Site	1,000 square feet	Fitted curve equation average vehicle trip ends	Trip generation rate (trips per 1,000 square feet)
1	210.95	834.85	3.96
2	209.12	827.11	3.96
3	204.00	805.45	3.95
4	209.00	826.60	3.96
5	233.00	928.12	3.98
Average	213.21	844.43	3.96

superstores analyzed in this study for the p.m. peak hour of adjacent street traffic.

The results shown in Table 4 indicate that today's free-standing discount superstores with sizes greater than 200,000 square feet have significantly higher trip generation rates than the stores used to supply data for ITE Land Use Code 813. This leads to the following recommendations:

- Transportation professionals should consider using the trip generation rates documented in this study when analyzing free-standing discount superstores that more closely match the characteristics of the stores included in this study as compared to the stores used to supply data for ITE Land Use Code 813.
- ITE should consider adding a new land use category consistent with today's free-standing discount superstores with sizes greater than 200,000 square feet, as described below.

The proposed definition for the new ITE land use category is:

- Large Free-Standing Discount Superstore (greater than 200,000 square feet)

This category generally is described as a free-standing superstore with off-street parking and a GFA of 200,000 square feet or greater. These stores usually have a variety of customer services, centralized cashing and a wide range of products, and include a garden center, service station, auto service center, full-line grocery

store and, often, a fast-food restaurant (all inclusive in the GFA).

These stores typically are open 24 hours, seven days a week and often are stand-alone facilities, but also can be found in mutual operation with other retail store(s). Typically, the discount superstore will maintain its own dedicated parking when part of a larger shopping center.

It is recommended that the square footage used for this category include any garden centers, tire and lube shops, internal restaurants and external gas station. This recommendation is made to provide a common basis for comparison that is based on total square footage.

As mentioned previously, the ITE trip generation rate for a shopping center is frequently used to develop trip rates for free-standing discount superstore locations that share parking with other unrelated retail stores. When preparing traffic impact assessments, this issue should be looked at closely because the currently accepted ITE trip generation rate using the average rate for a shopping center during the p.m. peak hour of adjacent traffic is 3.75, as identified in Table 1. ■



GEORGIENA M. VIVIAN

is vice president of VRPA Technologies Inc., which she founded in 1988. She has more than 35 years of experience in transportation

planning and financing, congestion management, traffic engineering, environmental assessment and community outreach. Specific experience includes preparation of regional and local transportation plans and programs and associated environmental documents; peer review and development of traffic impact studies; and preparation of 1/2-percent sales tax plans and impact fee programs for transportation improvements.



Institute of Transportation Engineers

Advertise your company products and services by placing a banner ad on the ITE Web site!

Placing a banner ad is a great way to reach ITE's more than 16,000 members and other Web site guests.

Target Your Market

When you place a section banner ad on the ITE Web site, you choose where your advertisement is placed. If you are hiring a new employee you may want to place your banner ad within the Employment Center. Have a new product line you're looking to promote? Look no further than the Technical Information section.

Increase Your Exposure

Vertical banners are displayed on the left side of the screen within the navigation bar. This means your ad will be seen on almost every page of the ITE Web site! Only one advertiser uses the designated space at a time, and there are only two vertical spaces available. Ads are placed in the order that they are received.

Please visit www.ite.org/marketing/bannerads.asp for ad specifications. For availability, please contact Christina Garneski, Marketing Sales Manager, at +1 202-289-0222 ext. 128 or cgarneski@ite.org.

Visit www.ite.org/marketing/bannerads.asp to download an order form today!