Trip Generation at Traditional Shopping Centers

Transportation planners continually strive to reduce traffic congestion and improve roadway efficiency. The most popular ways to achieve these goals have traditionally focused on improving existing roads, constructing new facilities, or encouraging transportation demand management practices. Neotraditional town planners also strive to reduce congestion by designing compact pedestrian-friendly “villages” where goods and services are easily accessible by walking, bicycling, or transit. These villages cluster development where retail shops and services are a short distance from nearby neighborhoods. In a recent article in the University of California Transportation Center’s journal Access entitled “Traditional Shopping Centers,” Ruth L. Steiner investigated if a traditional neighborhood or New Urbanist design approach actually reduces automobile usage by promoting both walking and transit usage. The studies were based on six shopping districts that reflected principles...continued next page

About Site Impact Bulletin

The Florida Department of Transportation’s (FDOT) Site Impact Handbook states that, “The purpose of a site impact analysis and review is to determine potential traffic impacts, identify acceptable mitigation strategies, plan for the transportation requirements of future development, and maintain a balance between land use and the quality of transportation services.” A number of factors must be considered when analyzing the potential impacts of a site undergoing development or a change of use including trip generation, site access, on-site circulation and parking.

Because each site has unique characteristics, site impact analysis can be complex. In addition, new land uses are continuously emerging that are not addressed in the standard sources. To address this situation, FDOT has asked the Center for Urban Transportation Research to publish a newsletter summarizing the latest and most practical research related to factors considered during a site impact analysis.

We hope you find this newsletter valuable and invite your reactions, as well as ideas for articles in future editions. E-mail us at siteimpact@cutr.eng.usf.edu or write us at Site Impact Bulletin, Center for Urban Transportation Research, 4202 East Fowler Avenue, CUT 100, Tampa, FL 33620-5375. This newsletter can also be viewed on the CUTR website at http://www.cutr.eng.usf.edu/publications.htm.
of the New Urbanist approach. Located in the San Francisco Bay Area, each district offered employment opportunities and was surrounded by medium-density residential neighborhoods. All but one of the six shopping districts, an old suburban shopping mall, had a continuous sidewalk that abutted retail shops. Four of the six centers were within a half mile of a Bay Area Rapid Transit (BART) station.

In each district, it was found that the shops were not only frequented by locals, but also in large part by customers living outside the nearby neighborhood. Outside visitors were attracted to the area by the charm of the traditional design and the quality of merchandise being offered. As pointed out in the article, “shopping in (these) areas have become popular largely in response to the quality of their goods...crowded streets and frenetic purchasing contribute to a carnival atmosphere that, in itself, serves to attract even more customers.” Although the traditional design encouraged walking from nearby neighborhoods, it simultaneously attracted visitors from the outside who predominantly arrived by automobile. In five of the six districts, it was found that 85 percent of the non-local shoppers drove.

Consistent with the principles of the New Urbanist movement, Steiner found that a considerable percentage of shoppers from the nearby neighborhoods walked to each shopping district, especially when only a short distance was involved. In five of the six districts, the article reported that between 25 and 50 percent of customers walked from the nearby neighborhoods. In three of those districts, almost 66 percent of the residents living within a mile of the shopping area walked. In the remaining district, which was home to the older suburban mall, only 10 percent of customers walked. As expected, the closer a resident lived to the shopping district, the more willing they were to travel by foot. It was observed that customers who lived less than one mile from the shopping district were the most willing to walk, with the average distance of all walkers being a third of a mile. However, when the shopping trip involved the purchase and transport of groceries or other cumbersome goods, local residents often chose to drive.

Although each district was located near a BART transit center, only a small percentage arrived by BART or bus. Overall, only 5 percent of customers frequenting the retail shops arrived by any form of transit. Customers were more apt to use transit in the shopping districts where there was only a short walk between the BART station and the shops. In the case of one district, 15 percent of customers arrived by BART. In another district where a half-mile walk was involved, only 3 percent arrived by BART. Of those leaving the districts using BART, over a third walked to the BART station.

To study whether walking and transit ridership reduced traffic congestion and parking demand, Steiner looked to Institute of Transportation Engineers (ITE) trip generation rates and parking requirements. ITE generation rates provided the number of car trips that each use in each district could be expected to generate. She compared the actual number of customers frequenting the shopping district to the

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number suggested should be there by the ITE trip generation rate. By counting the number of shoppers in each retail area, it was found that the totals exceeded those predicted by ITE in four of the six districts. In the remaining two districts, activity was less than predicted. Steiner attributed this to the fact that these areas “mostly serve adjacent residents during a short commute period each day.” After subtracting the number of shoppers who did not drive to the district, the remaining amount nearly equaled the ITE trip generation rate or in some cases doubled the rate, most notably on Saturdays. In other words, the traditional shopping districts generated the same or more vehicle trips than conventional shopping developments, even after taking into account shoppers who walked from nearby residential areas.

Parking continued to be in high demand in three of the shopping districts. Areas that attracted a number of residents from outside the neighborhood experienced a high demand for parking. Only one district, where a high percentage of visitors were from the nearby neighborhood, had sufficient parking.

Conclusion
As discovered during this study, many people living in the surrounding area of these traditional districts did indeed walk to the nearby shops. However, these districts also attracted numerous customers from outside the neighborhood who drove. As Steiner stated, “counts and surveys taken during average (not major) shopping days reveal levels of traffic and parking demand in excess of comparable standards for peak demand.” Thus, the number of expected automobile trips generated by the retail uses did not decline as New Urbanist theory would suggest. Instead, automobile usage from outside visitors made up for the trips that locals would have completed had they chosen to drive instead of walk.

Steiner suggests that placing more high density residences near the district would inevitably increase the number of customers who could walk to the shops. However, retailers in the district, whose business relies significantly on visitors who drive from outside the immediate area, would still want to attract these types of customers. To do so, they must provide sufficient parking. As concluded in the article, “the New Urbanist’s challenge is to incorporate enough parking into the site plan to attract customers without making the physical design unattractive. To design a shopping center only for walkers, or even primarily for walkers, might doom the investment from the start.”

To view this article in full, see the Spring 1998 edition of Access, published by the University of California Transportation Center in Berkeley, CA, or online at www.cutr.eng.usf.edu. For additional information, contact Dr. Ruth L. Steiner at the University of Florida in Gainesville, FL at 352/392-0997, ext. 431 or at rsteiner@ufl.edu by e-mail. Adapted with permission.
This section of Site impact Bulletin will be devoted to responding to your issues. We encourage you to let us know how you feel about the content, what you consider important or difficult, or about anything else you would like to see discussed in this newsletter. Just send us an e-mail. We will make every effort to respond to your messages.

We Wanted To Know…..
We wanted to know what transportation professionals in Florida consider their largest and most common problems faced relative to trip generation characteristics of specific land uses as it relates to site impact assessment. So, we contacted several transportation practitioners in the state and asked a couple of pointed questions.

Q. What specific types of land uses do you find most problematic from a trip generation perspective?
A. The majority of those asked said that multi-use developments are the most common problematic land use. Most reported problems when determining the trip generation at multi-use developments with a gasoline station, convenience store and a fast food restaurant. Some said they had problems with land uses with multi-screen theaters (16 screens or more), recreational facilities like gyms or health spas, specialty retail uses like jewelry shops, single family homes and schools. Peak hours were said to be especially problematic.

The respondent who reported having problems with the trip generation characteristics of schools said the primary cause was that more and more school trips are shifting from school buses to private vehicles, resulting in additional trips, particularly at peak periods. That respondent speculated that this may be in response to changing parental attitudes toward school bus use.

What new land uses would you like to see added to ITE's Trip Generation, 6th Edition?

Q. The group desire was to see a variety of multi-use developments added. Additionally, individual practitioners wanted to see the following land uses added:

- Parks with 2 or more soccer fields,
- Conventional facilities and/or arenas,
- Assisted living facilities (ALF), and
- Neo-traditional land uses.

What Do You Think…..
What's your opinion? Do you have a different answer to our questions? Do you have any additional information that will shed light on the subject matter of this newsletter? Do you disagree with the article summaries in this newsletter and have a different article or paper you would like to see summarized here? Do you have any particular site impact issue that you want to let us know about? If so, we would like to hear from you. Just send us an e-mail at siteimpact@cutr.eng.usf.edu or write us at:

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Trip Generation for Entertainment Land Uses

A paper entitled “Trip Generation for Entertainment Land Uses” was written and presented by Julie M. Doyle, P.E. with the Duluth, GA consulting firm Street Smarts at the 69th Annual Meeting of the Institute of Transportation Engineers (ITE) held in August 1999. This paper presented trip generation data and analysis for several new and emerging land uses not currently included in Trip Generation, 6th Edition published by the Institute of Transportation Engineers (ITE). The land uses reviewed include:

- movie theater complexes with 16 or more screens,
- multi-use entertainment facilities offering video games and other indoor sporting activities,
- coffee shops,
- microbreweries, and
- laser tag facilities.

Movie Theaters

For years the majority of movie theaters in suburban areas typically contained fewer than ten screens. As such, the trip generation rates given in Trip Generation, 6th Edition for this land use category are for movie theaters with an average of between six and nine screens. However, recent development trends have seen the number of screens in an individual complex increase dramatically, with some housing 24 screens and more. Street Smarts performed trip generation studies of two existing theater complexes in the Atlanta area, one with 16 screens and the other with 24 screens. In each case, the complexes were stand-alone structures with distinct parking areas that serviced only theater patrons. Daily traffic counts at all complex driveways were collected on a Thursday, Friday and a Saturday.

The results of the traffic studies indicate that larger movie theater complexes generate fewer trips per screen than the smaller movie theater complexes used to derive the trip generation rates presented in Trip Generation, 6th Edition (see Table 1). Excluding Fridays as part of the weekday counts, the number of daily trips per screen made to the 16 and 24 screen theaters was approximately 36 percent less than ITE documented for a theater with fewer screens. It was discovered, however, that the number of trips made on a Friday for the larger theater was more than 50 percent higher than estimated by ITE. On Saturday, the busiest day at each of these cinemas, a 5 percent difference in the number of daily trips was seen between the larger and smaller facilities on a per screen basis.

In contrast to the number of daily trips, the per screen trip rate during Friday’s peak hour at the larger complexes was nearly 44 percent less than an average weekday at the smaller facilities, while the Thursday peak hour per screen trip rate was only 15 per-

<table>
<thead>
<tr>
<th>Facility</th>
<th>AM peak hour of adjacent street</th>
<th>PM peak hour of adjacent street</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee Shop</td>
<td>119.41</td>
<td>49%</td>
</tr>
<tr>
<td>Microbrewery</td>
<td>0</td>
<td>4.8</td>
</tr>
<tr>
<td>Laser Tag Facility</td>
<td>0</td>
<td>1.96</td>
</tr>
</tbody>
</table>

Table 1. Trip Generation Rates per Screen

<table>
<thead>
<tr>
<th>Facility</th>
<th>Daily trips/screen</th>
<th>Peak hour of generator per screen</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-9 screen theater&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Weekday&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Saturday</td>
</tr>
<tr>
<td></td>
<td>15.33</td>
<td>529.47</td>
</tr>
<tr>
<td>16 &amp; 24 screen theater (avg/screen)</td>
<td>Thurs Fri Sat Thrus Fri Sat</td>
<td></td>
</tr>
<tr>
<td></td>
<td>97.4</td>
<td>292.5</td>
</tr>
</tbody>
</table>

<sup>1</sup> Trip Generation, 6th Edition  
<sup>2</sup> Includes Fridays

Table 2. Weekday trip generation rates

<table>
<thead>
<tr>
<th>Entertainment Sports Activity Complex (trips/1000 sq. ft.)</th>
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</thead>
<tbody>
<tr>
<td>AM peak hour of adjacent street</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>0.14</td>
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</tbody>
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Table 3. Weekday trip generation rates

<table>
<thead>
<tr>
<th>Other new types of developments (trips/1000 sq. ft.)</th>
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</thead>
<tbody>
<tr>
<td>AM peak hour of adjacent street</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Coffee Shop</td>
</tr>
<tr>
<td>Microbrewery</td>
</tr>
<tr>
<td>Laser Tag Facility</td>
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</tbody>
</table>
percent of that for an average weekday rate as reported in *Trip Generation, 6th Edition*. On Saturdays, the smaller theaters generated 89 trips per screen during the peak hour while the larger theaters generated only 67 trips per screen, 25 percent fewer trips per screen.

**Entertainment/Sports Activity Complexes**

A separate trip generation study focused on a proposed multi-use entertainment complex that would provide patrons with dining, video games, and other indoor sporting activities. Although *Trip Generation, 6th Edition* contains data for multi-purpose recreational complexes, this category characterizes facilities that offer mostly outdoor rather than indoor activities. Therefore, the trip generation characteristics of an existing 48,600 sq. ft. entertainment/sports complex in Cobb County, Georgia were studied. Similar to the proposed development, the complex offered patrons restaurants, bar, videos, pool tables, and a bowling alley. Weekday trip generation rates per 1,000 square feet were developed. The observed rates are listed in Table 2.

**Other Developments**

Other types of land uses studied included microbreweries, coffee shops, and laser tag facilities. In each case, the land uses did not fit precisely into any of the land use categories listed in *Trip Generation, 6th Edition*. The businesses studied to determine appropriate trip generation rates were all located in shopping centers and shared parking with adjacent tenants. Data were collected for the weekday peak hours of the adjacent streets. Only vehicles coming to/from the specific businesses were counted. Weekday trip generation rates per 1,000 square feet were developed. The observed rates from this are listed in Table 3.

The full text of this paper is available on the 69th Annual Meeting of the ITE CD-Rom or online at [www.cutr.eng.usf.edu](http://www.cutr.eng.usf.edu). For additional information, contact Julie M. Doyle, P.E. at 770/813-0882 or at julied@streetsmarts-ga.com by e-mail. Adapted with permission.