Trip and Parking Generation Study of Orem Fitness Center-Abstract

The Brigham Young University Institute of Transportation Engineers student chapter (BYU ITE) completed a trip and parking generation study as proposed to the ITE Western District. The data were collected at the Orem Fitness Center, corresponding to Land Use Code 495. Bicycle and pedestrian data were not collected.

The Orem Fitness Center is located at 580 West 165 South in Orem, Utah. It has 216 total stalls, including 11 handicap stalls. Its operating hours are Monday through Friday 5 AM to 10 PM and Saturday 7 AM to 7 PM. The center is closed on Sundays. Independent variables include 108,000 square feet gross floor area, 10,800 members, and 150 employees. At any one time there are 12-20 part-time employees on duty and using the main parking lot. There are 10 full-time employees that use a private parking lot that was not observed. To adjust for this it was assumed that 7 employees were parked there from 9 AM to 5 PM and 2 employees at all other hours. These numbers were added to reported totals.

Data were collected on Saturday, March 3, Tuesday, March 6, and Thursday, March 8 from 7 AM to 7 PM using video equipment to record traffic movements. Members of BYU ITE watched the recordings to count the number of vehicles entering and exiting and summarized data to 15-minute increments. Parking counts were recorded at the beginning of each day and vehicle movements were used to calculate parking counts every 15 minutes.

Table 1 shows a summary of the Saturday peak hour of the generator (8:45-9:45 AM), the average weekday AM peak hour (7:00-8:00 AM), and the average weekday PM peak hour (5:00-6:00 PM). The average weekday is the computed average of the Tuesday and Thursday data. Table 2 and Table 3 show a comparison of observed trip rates and counts versus predicted trip rates and counts. Predicted values were given in *ITE Trip Generation 8th Edition*. Observed values show high variability in comparison to the predicted values. This can mostly be explained by the fact that there are only 2-4 observations currently in *Trip Generation* for the gross floor area independent variable. For the members and employees independent variables there is currently only one observation. The site has several large amenities such as swimming pools, and an indoor track, which increase the gross floor area even though only a few people can use these facilities at any one time. This could also impact the observed rates.

Table 4 shows a comparison of observed versus predicted parking generation for the peak hour (6:00-8:00 PM) as given in *ITE Parking Generation 4th Edition*. Observed counts are about half of predicted counts. It is believed that this can be explained by the same issues discussed in the previous paragraph.

Twelve different student members of BYU ITE participated in the study for a total of 98 work hours. It was an excellent training experience and opportunity for our chapter. Table 5 shows a breakdown of the level of effort.

Table 1: Trip Generation Data Summary for the Orem Fitness Center

Variable	Saturday	Average Weekday AM	Average Weekday PM
Peak Hour	8:45-9:45 AM	7:00-8:00 AM	5:00-6:00 PM
Total Trips	331	304	379
Trucks	3	1	0
Trip Rate (Employees)	2.21	2.03	2.53
Trip Rate (1000 ft^2 GFA)	3.06	2.81	3.51
Trip Rate (Members)	0.03	0.03	0.04
% Entering	54%	51%	52%
% Exiting	46%	49%	48%

Table 2: Comparison of Observed and Predicted Trip Rates[1]

Independent Variable	Saturday Peak Hour		Average Weekday AM Peak Hour		Average Weekday PM Peak Hour	
	Observed	Predicted	Observed	Predicted	Observed	Predicted
Number of Employees	2.21	2.59	2.03	3.50	2.53	3.16
Gross Floor Area	3.06	1.07	2.81	2.69	3.51	2.39
Number of Members	0.03	0.01	0.03	0.03	0.04	0.02

Table 3: Comparison of Observed and Predicted Trips[1]

Independent Variable	Saturday Peak Hour		Average Weekday AM Peak Hour		Average Weekday PM Peak Hour	
	Observed	Predicted	Observed	Predicted	Observed	Predicted
Number of Employees	331	389	304	525	379	474
Gross Floor Area	331	116	304	291	379	258
Number of Members	331	108	304	324	379	216

[1] "Observed" rates and counts are those observed in this study. "Predicted" rates and counts are those predicted using *ITE Trip Generation 8th Edition*.

Table 4: Comparison of Parking Generation[2]

Independent Variable	Weekday Peak Period (6-8 PM) Parking Count		Weekday Peak Period (6-8 PM) Parking Rate	
	Observed	Predicted	Observed	Predicted
Gross Floor Area	196	346	1.81	3.20

Table 5: Level of Effort

Task	Number of Students	Total Hours
Training & Planning	7	16
Repair & Set-up Equipment	4	14
Data Collection	12	48
Data Reduction	3	8
Write Report	2	12
	Total:	98

[2] "Observed" rates and counts are those observed in this study. "Predicted" rates and counts are those predicted using *ITE Parking Generation 4th Edition*.

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Trip Generation Data Form (Part 1)

Land Use/Building Type:[1] Recreational Community Center			ITE Land Use Code: 495
Source: BYU ITE Student Chapter			Source No. (*ITE use only*):
Name of Development: Orem Fitness Center			Day of the Week: Saturday, Tuesday, Thursday
City: Orem	State/Province: Utah	Zip/Postal Code: 84058	Day: Month: March Year: 2012
Country: U.S.A.			Metropolitan Area: Provo-Orem UT

1. For fast-food land use, please specify if hamburger- or nonhamburger-based.

Location Within Area:

- ☐ (1) CBD
- ☒ (2) Urban (Non-CBD)
- ☐ (3) Suburban (Non-CBD)
- ☐ (4) Suburban CBD
- ☐ (5) Rural
- ☐ (6) Freeway Interchange Area (Rural)
- ☐ (7) Not Given

Independent Variable: (include data for as many as possible)[2]	Actual	Estimated
150 (1) Employees (#)	☒	☐
_____ (2) Persons (#)	☐	☐
_____ (3) Total Units (#) (indicate unit: _____)	☐	☐
_____ (4) Occupied Units (#) (indicate unit: _____)	☐	☐
108,000 (5) Gross Floor Area (gross sq. ft.)	☒	☐
(% of development occupied 100%)		
_____ (6) Net Rentable Area (sq. ft.)	☐	☐
_____ (7) Gross Leasable Area (sq. ft.)	☐	☐
(% of development occupied _____)		
_____ (8) Total Acres (% developed: _____)	☐	☐
216 (9) Parking Spaces (% occupied: _____)	☒	☐
_____ (10) Beds (% occupied: _____)	☐	☐
_____ (11) Seats (#)	☐	☐
_____ (12) Servicing Positions/Vehicle Fueling Positions	☐	☐
_____ (13) Shopping Center % Out-parcels/pads	☐	☐
_____ (14) A.M. Peak Hour Volume of Adjacent Street Traffic	☐	☐
_____ (15) P.M. Peak Hour Volume of Adjacent Street Traffic	☐	☐
10,800 (16) Other Members	☒	☐
_____ (17) Other _____	☐	☐

Detailed Description of Development:[3]

Orem Fitness Center is a public pay-for-use recreational facility. It includes swimming, court sports, weight & cardio training, an indoor track, and fitness classes. Transit is available within 0.25 miles. Adjacent streets have sidewalks but no bicycle facilities.

2. Definitions for several independent variables can be found in the *Trip Generation*, Second Edition, *User's Guide* Glossary.

3. Please provide all pertinent information to describe the subject project, including the presence of bicycle/pedestrian facilities. To report bicycle/pedestrian volumes, please refer to Part 4 of this data form.

Other Data:

Vehicle Occupancy (#):
_____ A.M. _____ P.M. _____ 24-hour %

Percent by Transit:
_____ A.M. % _____ P.M. % _____ 24-hour %

Percent by Carpool/Vanpool:
_____ A.M. % _____ P.M. % _____ 24-hour %

Employees by Shift:

	Start Time	End Time	Employees (#)
First Shift:	_____	_____	_____
Second Shift:	_____	_____	_____
Third Shift:	_____	_____	_____

Parking Cost on Site: Hourly _____ Daily _____

Transportation Demand Management (TDM) Information:

At the time of this study, was there a TDM program (that may have impacted the trip generation characteristics of this site) underway?

- ☐ No
- ☐ Yes (If yes, please check appropriate box/boxes, describe the nature of the TDM program(s) and provide a source for any studies that may help quantify this impact. Attach additional sheets if necessary)

- ☐ (1) Transit Service
- ☐ (2) Carpool Programs
- ☐ (3) Vanpool Programs
- ☐ (4) Bicycle/Pedestrian Facilities and Site Improvements
- ☐ (5) Employer Support Measures
- ☐ (6) Preferential HOV Treatments
- ☐ (7) Transit and Ridesharing Incentives
- ☐ (8) Parking Supply and Pricing Management
- ☐ (9) Tolls and Congestion Pricing
- ☐ (10) Variable Work Hours/Compressed Work Weeks
- ☐ (11) Telecommuting
- ☐ (12) Other _____

Please Complete Form on Other Side

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Trip Generation Data Form (Part 2)

Summary of Driveway Volumes ***(All = All Vehicles Counted, Including Trucks; Trucks = Heavy Duty Trucks and Buses)***

	Average Weekday (M-F)						Saturday						Sunday					
	Enter		Exit		Total		Enter		Exit		Total		Enter		Exit		Total	
	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks
24-Hour Volume																		
A.M. Peak Hour of Adjacent[1] Street Traffic (7 – 9) Time *(ex.: 7:15 - 8:15)*:																		
P.M. Peak Hour of Adjacent[1] Street Traffic (4 – 6) Time:																		
A.M. Peak Hour Generator[2] Time: 7:00-8:00 AM	156	1	148	0	304	1												
P.M. Peak Hour Generator[2] Time: 5:00-6:00 PM	196	0	183	0	379	0												
Peak Hour Generator[3] Time (Weekend): 8:45-9:45 AM							178	1	153	2	331	3						

[1] Highest hourly volume between 7 a.m. and 9 a.m. (4 p.m. and 6 p.m.). Please specify the peak hour.
[2] Highest hourly volume during the a.m. or p.m. period. Please specify the peak hour.
[3] Highest hourly volume during the entire day. Please specify the peak hour.
Please refer to the *Trip Generation User's Guide* for full definition of terms.

Hourly Driveway Volumes- Average Weekday (M-F)

A.M. Period	Enter		Exit		Total		Mid-Day Period	Enter		Exit		Total		P.M. Period	Enter		Exit		Total	
	All	Trucks	All	Trucks	All	Trucks		All	Trucks	All	Trucks	All	Trucks		All	Trucks	All	Trucks	All	Trucks
6:00-7:00							11:00-12:00	91	0	105	0	196	0	3:00-4:00	131	0	94	1	225	1
6:15-7:15							11:15-12:15	96	0	109	0	205	0	3:15-4:15	139	1	114	1	253	2
6:30-7:30							11:30-12:30	92	0	98	0	190	0	3:30-4:30	147	1	124	1	271	2
6:45-7:45							11:45-12:45	93	0	103	0	196	0	3:45-4:45	152	1	118	0	270	1
7:00-8:00	156	1	148	0	304	1	12:00-1:00	86	0	106	0	192	0	4:00-5:00	160	1	128	0	288	1
7:15-8:15	167	4	120	0	287	4	12:15-1:15	75	0	98	0	173	0	4:15-5:15	174	0	132	0	306	0
7:30-8:30	155	5	120	1	275	6	12:30-1:30	72	0	94	0	166	0	4:30-5:30	184	0	159	0	343	0
7:45-8:45	119	6	101	1	220	7	12:45-1:45	64	0	84	0	148	0	4:45-5:45	183	0	173	0	356	0
8:00-9:00	106	5	106	2	212	7	1:00-2:00	58	0	70	0	128	0	5:00-6:00	196	0	183	0	379	0

☐Check if Part 3, 4 and/or additional information is attached.

Survey conducted by: Name: Clancy Black
Organization: Brigham Young University ITE Student Chapter
Address: 368 Clyde Building
City/State/Zip: Provo, UT 84602
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Please return to: Institute of Transportation Engineers
Technical Projects Division
1627 Eye Street, NW, Suite 600
Washington, DC 20006 USA
Telephone: +1 202-785-0060
Fax: +1 202-785-0609
ITE on the Web: www.ite.org

Parking Demand Survey Form

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*(fill in all highlighted cells - * are required data)*

			Land Use Code*	495		
			Name of Site	Orem Fitness Center		
			Brief Description of Site	Public facility used for swimming, basketball, fitness classes, etc.		
Transit*	Yes		**City**	Orem		
Area*	CND		**State**	UT	**Country**	USA
TMP*	No					
Parking Price*		0	Daily Rate	0	Hourly Rate	

Site Size*	**108,000**	**Units***	square feet	**Occupancy***	100%	**Land Use**
Site Size	150	**Units**	employees	**Occupancy**		
Site Size	10,800	**Units**	members	**Occupancy**		
Site Size		**Units**		**Occupancy**		

Number of Parking Spaces Provided at Site 216

Highest Observed Parking Demand for the following hours of the day *(hour beginning)**

Date	3/3/2012	3/6/2012	3/8/2012				
Day	Saturday	Tuesday	Thursday				
12 Mid							
1:00 AM							
2:00 AM							
3:00 AM							
4:00 AM							
5:00 AM							
6:00 AM							
7:00 AM	106	147	147				
8:00 AM	158	152	170				
9:00 AM	211	150	173				
10:00 AM	188	162	176				
11:00 AM	168	140	159				
12 Noon	144	128	141				
1:00 PM	126	108	116				
2:00 PM	127	99	99				
3:00 PM	111	110	115				
4:00 PM	109	153	139				
5:00 PM	103	178	159				
6:00 PM	105	197	141				
7:00 PM	105	200	158				
8:00 PM							
9:00 PM							
10:00 PM							
11:00 PM							

Person	Clancy Black	**Organization**	BYU ITE
Phone	(801) 422-2811		
Fax	(801) 422-0159		
Email	byuite@gmail.com		

Notes Employee-only lot with 10 stalls was not observed but was included. Seven cars were assumed from 9-5, and two cars other hours.

Enter data on the web at www.ite.org

Comments to: ite_staff@ite.org

IF not entered on web site, please mail to:

Institute of Transportation Engineers, 1627 Eye Street, NW Suite 600; Washington, DC 20006

Form version 1.4

Characteristic	Value
Number of Employees	150
Gross Floor Area (ft^2)	108,000
Number of Members	10,800
Number of Parking Stalls	216

Variable	Saturday (3/3/12)	Average Weekday AM	Average Weekday PM
Peak Hour	8:45-9:45 AM	7:00-8:00 AM	5:00-6:00 PM
Total Trips	331	304	379
Trucks	3	1	0
Trip Rate (Employees)	2.21	2.03	2.53
Trip Rate (GFA)	3.06	2.81	3.51
Trip Rate (Members)	0.03	0.03	0.04
% Entering	54%	51%	52%
% Exiting	46%	49%	48%

	Saturday 3/3/12		Average Weekday AM		Average Weekday PM	
Independent Variable	Calculated	ITE	Calculated	ITE	Calculated	ITE
Number of Employees	2.21	2.59	2.03	3.50	2.53	3.16
Gross Floor Area	3.06	1.07	2.81	2.69	3.51	2.39
Number of Members	0.03	0.01	0.03	0.03	0.04	0.02

Parking Generation

	Weekday Peak Period Parking Demand Count		Weekday Peak Period Parking Demand Rate	
Independent Variable	Observed	Predicted	Observed	Predicted
Gross Floor Area	196	346	1.81	3.20

	Saturday 3/3/12		Average Weekday AM Peak Hour		Average Weekday PM Peak Hour	
Independent Variable	Observed	Predicted	Observed	Predicted	Observed	Predicted
Number of Employees	331	389	304	525	379	474
Gross Floor Area	331	116	304	291	379	258
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Task	Number of Students	Total Hours
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