MEMORANDUM

TO: Polar Views LLC
c/o Ms. Rebecca Yarnie and
Mr. Daniel Yarnie
89 West Main Street, Unit 101
Northborough, MA 01532

FROM: Mr. Jeffrey S. Dirk, P.E.*, PTOE, FITE JSD
Managing Partner *and*
Mr. Makenlove Marc
Transportation Engineer
Vanasse & Associates, Inc.
35 New England Business Center Drive
Suite 140
Andover, MA 01810-1066
(978) 269-6830
jdirk@rdva.com
**Professional Engineer in CT, MA, ME, NH, RI and VA*

DATE: November 19, 2024

RE: 10102

SUBJECT: Parking Demand Study
Keystone Plaza – 221 Chandler Street (Routes 122/122A)
Worcester, Massachusetts

Vanasse & Associates, Inc. (VAI) has completed a Parking Demand Study for the parking lot that serves the Keystone Plaza located at 221 Chandler Street in Worcester, Massachusetts (hereafter referred to as the "Site"). The purpose of this study is to ascertain the peak-parking demands for the existing uses within the Site on a weekday, Saturday, and Sunday in order to determine if surplus parking is available to support the predicted parking demands of the mixed-use development that is proposed at 216 Chandler Street (the "Mixed-Use Project"). For context, Figure 1 depicts the location of the Site in relation to the Mixed-Use Development.

Based on this study, we have concluded that parking supply that will be available at the Site after the reconstruction of the parking lot as a part of the Mixed-Use Development (50 parking spaces) should be sufficient to accommodate the parking demands of the existing uses that are served by the lot and the predicted parking demands of the Mixed-Use Development. With the implementation of the planned Transportation Demand Management (TDM) program that is an integral part of the transportation improvement program for the Mixed-Use Development, it is expected that the predicted parking demands for the Mixed-Use Development will be reduced from those that have been assessed as a part of this study.

The following details the parking demand observations for the Site.

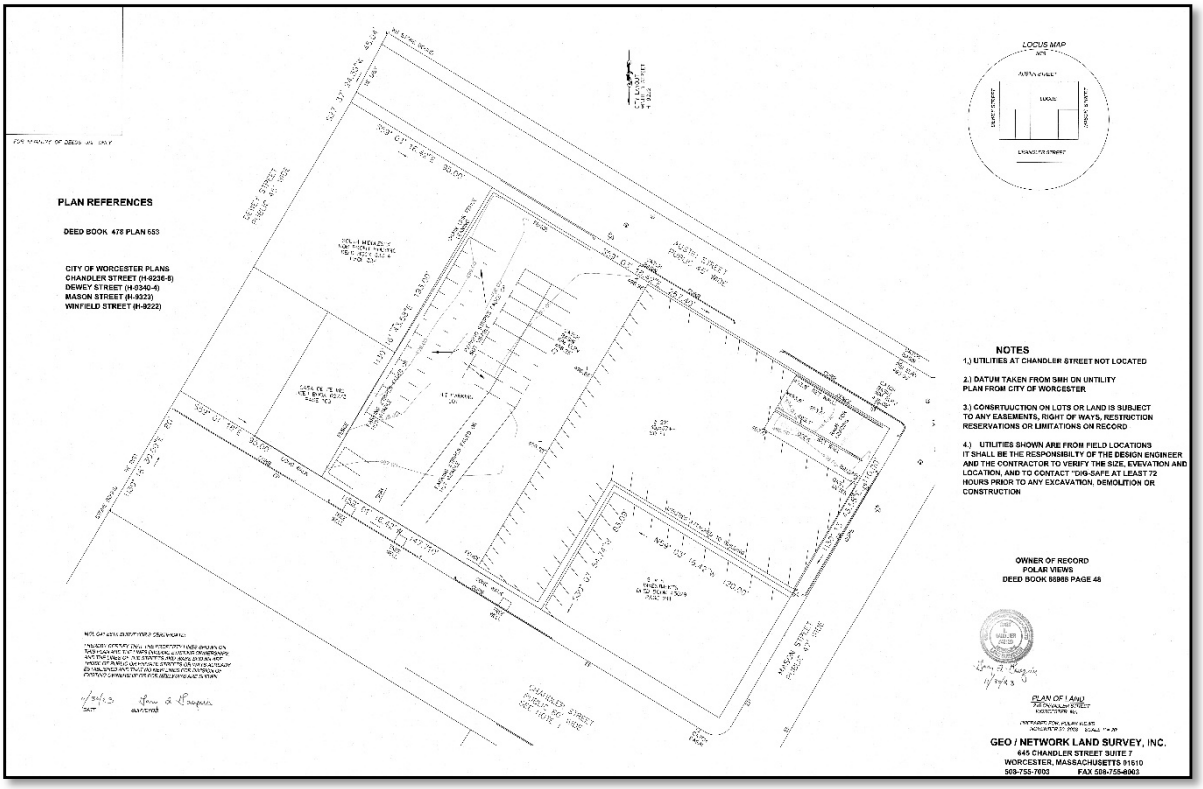
EXISTING CONDITIONS

A detailed field inventory of existing conditions within the Site was conducted in October 2024. The purpose of the field inventory was to determine the number of parking spaces that are provided within the Site, any parking restrictions or regulations (i.e., timed parking, assigned parking, etc.) and the land uses that are served by the parking. The Site contains a one-story commercial building and a private surface parking lot that provides parking for the following uses that are located within the commercial building: office (Complete Labor & Staffing and USA Limo & Car Service, Inc.), storage (Perez Shipping), a church

(Worcester Oshoffa Parish) and medical office (Hope Dental). Signs are posted around the perimeter of the parking lot identifying the parking lot as private property and that unauthorized vehicles (vehicles that are parked within the lot that are not associated with one of the business that occupy 221 Chandler Street) will be towed. There are no signs indicating assigned or timed parking limits within the parking lot.

The pavement markings within the parking lot were observed to be faded; however, there was evidence of marked parking spaces in some locations. Based on information provided by others in support of the Mixed-Use Development, it was determined that the surface parking lot at the Site provides parking for approximately 31 vehicles. Figure 2 provides the existing conditions survey for the Site.

Figure 2 – 221 CHANDLER STREET EXISTINNG CONDITIONS SURVEY



PARKING DEMAND OBSERVATIONS

In order to establish the base parking demands for the uses that occupy the Site, parking demand observations were performed on the following days: Tuesday, October 29th, 2024; Saturday, October 26th, 2024; and Sunday, November 3rd, 2024. The parking demand observations were performed between 7:00 AM and 7:00 PM on Tuesday and Saturday, and between 7:00 AM and 11:00 AM on Sunday. These time periods encompass the peak-parking demands for the existing uses that are served by the parking lot within the Site as well as the overlapping peak parking demand period for the uses that will be located within the Mixed-Use Development (21 multifamily residential units and 2,920± square feet (sf) of retail space), noting that the peak-parking demands for a multifamily residential development generally occur before the 7:00 AM start of the observation period and after the 7:00 PM conclusion. The number of vehicles observed parked within the Site were recorded in 15-minute intervals during the observation periods.

Table 1 summarizes the parking demand observations within the Site for each day during which the parking demand observations were performed, with Figures 2 through 4 providing a graphical summary of the number of vehicles parked within the Site. Of note, four (4) derelict vehicles were observed parked within the Site that were inoperable and will be removed. As such, these vehicles have been excluded from the parking demand observations.

As can be seen in Table 1, the peak-parking demand for the weekday was observed to occur at 12:15 PM on Tuesday, October 29, 2024, with 64.5 percent of the available parking spaces observed to be occupied (20 parking spaces); at 2:00 PM and again at 5:45 PM on Saturday, October 26, 2024, with 58.1 percent of the available parking spaces observed to be occupied (18 parking spaces); and at 10:15 AM on Sunday, November 3, 2024, with 83.9 percent of the available parking spaces observed to be occupied (26 parking spaces).

Table 1
221 CHANDLER STREET - PARKING DEMAND OBSERVATIONS

	Tuesday, October 29, 2024		Saturday, October 26, 2024		Sunday, November 3, 2024	
Time	(A) No. of Occupied Spaces	(B) Occupancy[a]	(C) No. of Occupied Spaces	(D) Occupancy	(E) No. of Occupied Spaces	(F) Occupancy
7:00 AM	7	22.6%	12	38.7%	17	54.8%
7:15	8	25.8%	12	38.7%	17	54.8%
7:30	8	25.8%	11	35.5%	16	51.6%
7:45	8	25.8%	10	32.2%	16	51.6%
8:00	8	25.8%	9	29.0%	16	51.6%
8:15	10	32.2%	10	32.2%	15	48.4%
8:30	8	25.8%	9	29.0%	16	51.6%
8:45	11	35.5%	9	29.0%	15	48.4%
9:00	11	35.5%	9	29.0%	15	48.4%
9:15	13	41.9%	14	45.2%	16	51.6%
9:30	14	45.2%	13	41.9%	18	58.1%
9:45	14	45.2%	13	41.9%	19	61.3%
10:00	15	48.4%	15	48.4%	23	74.2%
10:15	15	48.4%	15	48.4%	26	83.9%
10:30	13	41.9%	15	48.4%	25	80.6%
10:45	17	54.8%	14	45.2%	24	77.4%
11:00	16	51.6%	13	41.9%	24	77.4%
11:15	16	51.6%	14	45.2%	--	--
11:30	15	48.4%	14	45.2%	--	--
11:45	17	54.8%	13	41.9%	--	--
12:00 PM	18	58.1%	13	41.9%	--	--
12:15	20	64.5%	15	48.4%	--	--
12:30	18	58.1%	16	51.6%	--	--
12:45	17	54.8%	15	48.4%	--	--
1:00	19	61.2%	13	41.9%	--	--
1:15	16	51.6%	17	54.8%	--	--
1:30	15	48.4%	15	48.4%	--	--
1:45	17	54.8%	15	48.4%	--	--
2:00	14	45.2%	18	58.1%	--	--
2:15	14	45.2%	16	51.6%	--	--
2:30	13	41.9%	15	48.4%	--	--
2:45	14	45.2%	15	48.4%	--	--
3:00	13	41.9%	10	32.2%	--	--
3:15	13	41.9%	12	38.7%	--	--
3:30	12	38.7%	12	38.7%	--	--
3:45	12	38.7%	12	38.7%	--	--
4:00	13	41.9%	11	35.5%	--	--
4:15	13	41.9%	11	35.5%	--	--
4:30	16	51.6%	11	35.5%	--	--
4:45	14	45.2%	12	38.7%	--	--
5:00	13	41.9%	15	48.4%	--	--
5:15	13	41.9%	17	54.8%	--	--
5:30	16	51.6%	15	48.4%	--	--
5:45	15	48.4%	18	58.1%	--	--
6:00	14	45.2%	16	51.6%	--	--
6:15	19	61.3%	16	51.6%	--	--
6:30	19	61.3%	16	51.6%	--	--
6:45	18	58.1%	14	45.2%	--	--
7:00	17	54.8%	15	48.4%	--	--

[a]Based on a total of 31 parking spaces.

MIXED-USE DEVELOPMENT PARKING DEMANDS

In order to determine the parking demands of the Mixed-Use Development, parking demand data published by the Institute of Transportation Engineers (ITE)[1] for similar land uses as those proposed were used (multifamily residential and a small retail use). The ITE parking data is based on observations that have been conducted at specific land uses, including multifamily housing and small retail uses, and includes predictive parking demand data that can be used as a guide to determine the adequacy of parking to support a specific land use or uses under study. Table 2 summarizes the ITE peak parking demand data for a multifamily residential community and a small retail use situated in a similar urban/suburban setting.

Table 2
ITE PEAK-PARKING DEMAND DATA

Land Use Code/Time Period	Peak-Parking Demand	
	Average Rate	85th Percentile
Multifamily Housing (Mid-Rise):[a]		
Weekday	1.23	1.45
Saturday	1.04	--
Strip Retail Plaza (<40k):[b]		
Weekday	2.79	4.44
Saturday	2.77	4.36

[a]ITE Land Use Code 221, *Multifamily Housing (Mid-Rise)* per dwelling unit.
[b]ITE Land Use Code 822, *Strip Retail Plaza (<40k)* per 1,000 square feet of gross leasable area.

As can be seen in Table 2, the ITE parking demand data for a multifamily residential building indicates that the average peak parking demand on a weekday is 1.23 parking spaces per dwelling unit, with an observed 85th percentile peak-parking demand[2] of 1.45 parking spaces per unit. On a Saturday, the average observed peak parking demand was observed to be 1.04 parking spaces per unit; an 85th percentile peak-parking demand is not available as there was a limited data set (two (2) observation sites).

The ITE parking demand for a small retail use (classified by ITE as a "Strip retail Plaza (<40k)") indicates that the average peak parking demand on a weekday is 2.79 parking spaces per 1,000 square feet (sf) of gross leasable area (gla), with an observed 85th percentile peak-parking demand of 4.44 parking spaces per 1,000 sf gla. On a Saturday, the average observed peak parking demand was observed to be 2.77 parking spaces per 1,000 sf gla, with an observed 85th percentile peak parking demand of 4.36 parking spaces per 1,000 sf gla.

Sunday parking demand data is not provided by ITE for these specific land uses; however, it is reasonable to assume that the data would be similar to or lower than those that are documented for a Saturday. As such, for the purpose of this assessment the Saturday parking demand data for the subject land uses was used.

[1]*Parking Generation*, 6th Edition; Institute of Transportation Engineers; Washington, D.C.; October 2023.
[2]The 85th percentile peak-parking demand is defined as the parking demand at which 85 percent of the observed peak-parking demand falls below and 15 percent are above.

Mixed-Use Development Peak Parking Demands

The parking demands of the Mixed-Use Development were developed using the 85th percentile peak parking demands that are shown in Table 2 for each of the respective land uses. This approach (using the 85th percentile peak demand) is a common design approach and represents an above-average design consideration. Table 3 summarizes the resulting parking demands for the Mixed-Use Development on a weekday and on a Saturday.

Table 3
MIXED-USE DEVELOPMENT
PEAK PARKING DEMANDS

Land Use	Peak Parking Demand (Spaces)		
	Weekday	**Saturday**	**Sunday**
Residential (21 units)	30	30	30
Retail (2,920 sf)	13	13	13

As can be seen in Table 3, applying the 85th percentile peak parking demand data to the constituent components of the Project results in a peak parking demand of 30 parking spaces for the residential component of the Mixed-Use Development and 13 parking spaces for the retail component on a weekday and on a Saturday and Sunday. The lack of variation in the peak parking demand by day of week is due to the relatively small size of the of the specific uses.

Parking Demands by Time of Day

Once the peak parking demands for the specific land uses are determined, the demand data can then be disseminated over the course of the day using time-of-day parking distribution data that is provided by the ITE as a part of the parking demand observations. The time of day information allows for an evaluation of parking demands during specific periods of the day and is useful when multiple uses may share parking and the specific uses have different peak parking demand periods. In the case of the Mixed-Use Development, the residential and retail components will have different peak parking demand periods, which allows for the sharing of parking between the uses. Table 4 disseminates the peak parking demands for each land use over the course of the day on a weekday and on a Saturday. Similar to the parking demand data, time-of-day parking distribution data is not available for a Sunday and, as such, the Saturday time of day distribution was assumed for a Sunday.

As can be seen in Table 4, the peak parking demand for the Mixed-Use development is predicted to occur at 6:00 PM on a weekday and on a Saturday, with a predicted peak parking demand of 30 vehicles and 29 vehicles, respectively. On a Sunday, the predicted peak parking demand during the observation period (7:00 AM and 11:00 AM) is predicted to occur at 11:00 AM with a predicted peak parking demand of 26 vehicles.

Table 4
MIXED-USE DEVELOPMENT PARKING DEMAND BY TIME OF DAY

	Weekday					Saturday					Sunday				
	Residential Component[a]		Retail Component[b]			Residential Component[a]		Retail Component[b]			Residential Component[a]		Retail Component[b]		
Time	(A) % of Peak-Parking Demand	(B=Ax30) Project Parking Demand	(C) % of Peak-Parking Demand	(D=Cx13) Project Parking Demand	**(E=B+D) Total Weekday Parking Demand**	(F) % of Peak-Parking Demand	(G=Fx30) Project Parking Demand	(H) % of Peak-Parking Demand	(I=Hx13) Project Parking Demand	**(J=G+I) Total Saturday Parking Demand**	(J) % of Peak-Parking Demand	(K=Jx32) Project Parking Demand	(L) % of Peak-Parking Demand	(M=Nx13) Project Parking Demand	**(O=K+M) Total Sunday Parking Demand**
7:00-7:15 AM	77%	23	0%	0	**23**	77%	23	0%	0	**23**	77%	23	0%	0	**23**
7:15-7:30	77%	23	0%	0	**23**	77%	23	0%	0	**23**	77%	23	0%	0	**23**
7:30-7:45	77%	23	0%	0	**23**	77%	23	0%	0	**23**	77%	23	0%	0	**23**
7:45-8:00	77%	23	0%	0	**23**	77%	23	0%	0	**23**	77%	23	0%	0	**23**
8:00-8:15	66%	20	19%	2	**22**	66%	20	0%	0	**20**	66%	20	0%	0	**20**
8:15-8:30	66%	20	19%	2	**22**	66%	20	0%	0	**20**	66%	20	0%	0	**20**
8:30-8:45	66%	20	19%	2	**22**	66%	20	0%	0	**20**	66%	20	0%	0	**20**
8:45-9:00	66%	20	19%	2	**22**	66%	20	0%	0	**20**	66%	20	0%	0	**20**
9:00-9:15	60%	18	33%	4	**22**	60%	18	38%	5	**23**	60%	18	38%	5	**23**
9:15-9:30	60%	18	33%	4	**22**	60%	18	38%	5	**23**	60%	18	38%	5	**23**
9:30-9:45	60%	18	33%	4	**22**	60%	18	38%	5	**23**	60%	18	38%	5	**23**
9:45-10:00	60%	18	33%	4	**22**	60%	18	38%	5	**23**	60%	18	38%	5	**23**
10:00-10:15	57%	17	47%	6	**23**	57%	17	55%	7	**24**	57%	17	55%	7	**24**
10:15-10:30	57%	17	47%	6	**23**	57%	17	55%	7	**24**	57%	17	55%	7	**24**
10:30-10:45	57%	17	47%	6	**23**	57%	17	55%	7	**24**	57%	17	55%	7	**24**
10:45-11:00	57%	17	47%	6	**23**	57%	17	55%	7	**24**	57%	17	55%	7	**24**
11:00-11:15	55%	17	55%	7	**24**	55%	17	66%	9	**26**	55%	17	66%	9	**26**
11:15-11:30	55%	17	55%	7	**24**	55%	17	66%	9	**26**	–	–	–	–	–
11:30-11:45	55%	17	55%	7	**24**	55%	17	66%	9	**26**	–	–	–	–	–
11:45-12:00	55%	17	55%	7	**24**	55%	17	66%	9	**26**	–	–	–	–	–
12:00-12:15 PM	52%	16	89%	12	**28**	52%	16	85%	11	**27**	–	–	–	–	–
12:15-12:30	52%	16	89%	12	**28**	52%	16	85%	11	**27**	–	–	–	–	–
12:30-12:45	52%	16	89%	12	**28**	52%	16	85%	11	**27**	–	–	–	–	–
12:45-1:00	52%	16	89%	12	**28**	52%	16	85%	11	**27**	–	–	–	–	–
1:00-1:15	50%	15	100%	13	**28**	50%	15	100%	13	**28**	–	–	–	–	–
1:15-1:30	50%	15	100%	13	**28**	50%	15	100%	13	**28**	–	–	–	–	–
1:30-1:45	50%	15	100%	13	**28**	50%	15	100%	13	**28**	–	–	–	–	–
1:45-2:00	50%	15	100%	13	**28**	50%	15	100%	13	**28**	–	–	–	–	–
2:00-2:15	52%	16	73%	9	**25**	52%	16	96%	12	**28**	–	–	–	–	–
2:15-2:30	52%	16	73%	9	**25**	52%	16	96%	12	**28**	–	–	–	–	–
2:30-2:45	52%	16	73%	9	**25**	52%	16	96%	12	**28**	–	–	–	–	–
2:45-3:00	52%	16	73%	9	**25**	52%	16	96%	12	**28**	–	–	–	–	–
3:00-3:15	51%	15	73%	9	**24**	51%	15	79%	10	**25**	–	–	–	–	–
3:15-3:30	51%	15	73%	9	**24**	51%	15	79%	10	**25**	–	–	–	–	–
3:30-3:45	51%	15	73%	9	**24**	51%	15	79%	10	**25**	–	–	–	–	–
3:45-4:00	51%	15	73%	9	**24**	51%	15	79%	10	**25**	–	–	–	–	–
4:00-4:15	57%	17	66%	9	**26**	57%	17	66%	9	**26**	–	–	–	–	–
4:15-4:30	57%	17	66%	9	**26**	57%	17	66%	9	**26**	–	–	–	–	–
4:30-4:45	57%	17	66%	9	**26**	57%	17	66%	9	**26**	–	–	–	–	–
4:45-5:00	57%	17	66%	9	**26**	57%	17	66%	9	**26**	–	–	–	–	–
5:00-5:15	62%	19	70%	9	**28**	62%	19	64%	8	**27**	–	–	–	–	–
5:15-5:30	62%	19	70%	9	**28**	62%	19	64%	8	**27**	–	–	–	–	–
5:30-5:45	62%	19	70%	9	**28**	62%	19	64%	8	**27**	–	–	–	–	–
5:45-6:00	62%	19	70%	9	**28**	62%	19	64%	8	**27**	–	–	–	–	–
6:00-6:15	65%	20	75%	10	**30**	65%	20	67%	9	**29**	–	–	–	–	–
6:15-6:30	65%	20	75%	10	**30**	65%	20	67%	9	**29**	–	–	–	–	–
6:30-6:45	65%	20	75%	10	**30**	65%	20	67%	9	**29**	–	–	–	–	–
6:45-7:00	65%	20	75%	10	**30**	65%	20	67%	9	**29**	–	–	–	–	–
7:00-7:15	65%	20	70%	9	**29**	65%	20	70%	9	**29**	–	–	–	–	–

[a]Based on ITE Land Use Code 221, *Multifamily Housing (Mid-Rise)*.
[b]Based on ITE Land Use Code 822, *Strip Retail Plaza (<40k)*.

PARKING ADEQUACY ASSESSMENT

In order to determine the adequacy of the parking supply that will be available at the Site to accommodate the parking demands of the existing uses that are served by the parking lot and the predicted parking demands of the Mixed-Use Development, the predicted parking demands by time of day for the Mixed-Use Development shown in Table 4 were added to the observed parking demands for the parking lot that serves the Site that are shown in Table 1. Table 5 shows the resulting composite parking demands.

In conjunction with the Mixed-Use Development, the parking lot that serves the Site will be reconstructed and improved to provide marked parking spaces and associated drive aisles that will accommodate parking for 50 vehicles, including 35 standard parking spaces, eight (8) of which will include electric vehicle (EV) charging stations; 12 compact parking spaces, one (1) of which will include an EV charging station; and three (3) handicapped accessible parking spaces, one (1) of which will include an EV charging station.

As can be seen in Table 5, the peak parking demand for the Site with consideration of the parking demands of the Mixed-Use development, was identified to occur at 6:00 PM on a weekday with a parking demand of 49 vehicles, at 2:00 PM on a Saturday with a parking demand of 46 vehicles and at 10:15 AM on a Sunday with a parking demand of 50 vehicles.

Based on this assessment, the 50 parking spaces that will be available after the reconstruction of the parking lot within the Site should be sufficient to accommodate the parking demands of the existing uses that are served by the lot and those of the Mixed-Use Development. With the implementation of the planned Transportation Demand Management (TDM) program that is an integral part of the transportation improvement program for the Mixed-Use Development, it is expected that the predicted parking demands for the Mixed-Use Development will be reduced from those that have been assessed as a part of this study.

Table 5
221 CHANDLER STREET PREDICTED PARKING DEMAND

	Weekday			Saturday			Sunday		
Time	(A) Mixed-Use Development Parking Demand[a]	(B) Existing Uses Parking Demand[b]	(C=A+B) Total Parking Demand	(D) Mixed-Use Development Parking Demand[c]	(E) Existing Uses Parking Demand[d]	(F=D+E) Total Parking Demand	(G) Mixed-Use Development Parking Demand[e]	(H) Existing Uses Parking Demand[f]	(I=G+H) Total Parking Demand
7:00-7:15 AM	23	7	30	23	12	35	23	17	40
7:15-7:30	23	8	31	23	12	35	23	17	40
7:30-7:45	23	8	31	23	11	34	23	16	39
7:45-8:00	23	8	31	23	10	33	23	16	39
8:00-8:15	22	8	30	20	9	29	20	16	36
8:15-8:30	22	10	32	20	10	30	20	15	35
8:30-8:45	22	8	30	20	9	29	20	16	36
8:45-9:00	22	11	33	20	9	29	20	15	35
9:00-9:15	22	11	33	23	9	32	23	15	38
9:15-9:30	22	13	35	23	14	37	23	16	39
9:30-9:45	22	14	36	23	13	36	23	18	41
9:45-10:00	22	14	36	23	13	36	23	19	42
10:00-10:15	23	15	38	24	15	39	24	23	47
10:15-10:30	23	15	38	24	15	39	24	26	50
10:30-10:45	23	13	36	24	15	39	24	25	49
10:45-11:00	23	17	40	24	14	38	24	24	48
11:00-11:15	24	16	40	26	13	39	26	24	50
11:15-11:30	24	16	40	26	14	40	--	--	--
11:30-11:45	24	15	39	26	14	40	--	--	--
11:45-12:00	24	17	41	26	13	39	--	--	--
12:00-12:15 PM	28	18	46	27	13	40	--	--	--
12:15-12:30	28	20	48	27	15	42	--	--	--
12:30-12:45	28	18	46	27	16	43	--	--	--
12:45-1:00	28	17	45	27	15	42	--	--	--
1:00-1:15	28	19	47	28	13	41	--	--	--
1:15-1:30	28	16	44	28	17	45	--	--	--
1:30-1:45	28	15	43	28	15	43	--	--	--
1:45-2:00	28	17	45	28	15	43	--	--	--
2:00-2:15	25	14	39	28	18	46	--	--	--
2:15-2:30	25	14	39	28	16	44	--	--	--
2:30-2:45	25	13	38	28	15	43	--	--	--
2:45-3:00	25	14	39	28	15	43	--	--	--
3:00-3:15	24	13	37	25	10	35	--	--	--
3:15-3:30	24	13	37	25	12	37	--	--	--
3:30-3:45	24	12	36	25	12	37	--	--	--
3:45-4:00	24	12	36	25	12	37	--	--	--
4:00-4:15	26	13	39	26	11	37	--	--	--
4:15-4:30	26	13	39	26	11	37	--	--	--
4:30-4:45	26	16	42	26	11	37	--	--	--
4:45-5:00	26	14	40	26	12	38	--	--	--
5:00-5:15	28	13	41	27	15	42	--	--	--
5:15-5:30	28	13	41	27	17	44	--	--	--
5:30-5:45	28	16	44	27	15	42	--	--	--
5:45-6:00	28	15	43	27	18	45	--	--	--
6:00-6:15	30	14	44	29	16	45	--	--	--
6:15-6:30	30	19	49	29	16	45	--	--	--
6:30-6:45	30	19	49	29	16	45	--	--	--
6:45-7:00	30	18	48	29	14	43	--	--	--
7:00-7:15	29	17	46	29	15	44	--	--	--

[a]See Column E of Table 4; [b]See Column A of Table 1; [c]See Column J of Table 4; [d]See Column C of Table 1; [e]See Column O of Table 3; [f]See Column E of Table 1.

As shown in Table 4, the total peak-parking demands are consistent with or lower than the available parking spaces at the Site. While some peak demands exceed the 50 spaces available, the removal of the four (4) immobile cars with the construction of the Site combined with the availability of street parking along Chandler Street and Austin Street, indicates that 50 parking spaces will be sufficient to accommodate the Project. The following summarizes the parking demand analysis for the Site, with Figures 5 through 7 providing a graphical summary of the number of vehicles parked (existing plus proposed parking demand) within the Site for each day during which the parking demand analysis was performed.

SUMMARY

VAI has completed a Parking Demand Study for the parking lot that serves the Keystone Plaza located at 221 Chandler Street in Worcester, Massachusetts. This study has defined the peak-parking demands for the existing uses within the Site on a weekday, Saturday and Sunday, and has determined the predicted parking demands of the mixed-use development that is proposed at 216 Chandler Street.

Based on this study, it has been concluded that parking supply that will be available at the Site after the reconstruction of the parking lot as a part of the Mixed-Use Development (50 parking spaces) should be sufficient to accommodate the parking demands of the existing uses that are served by the lot and the predicted parking demands of the Mixed-Use Development. With the implementation of the planned TDM program that is an integral part of the transportation improvement program for the Mixed-Use Development, it is expected that the predicted parking demands for the Mixed-Use Development will be reduced from those that have been assessed as a part of this study.

cc: File

ATTACHMENTS

PARKING SITE PLAN
PARKING OBSERVATIONS
ITE PARKING GENERATION DATA

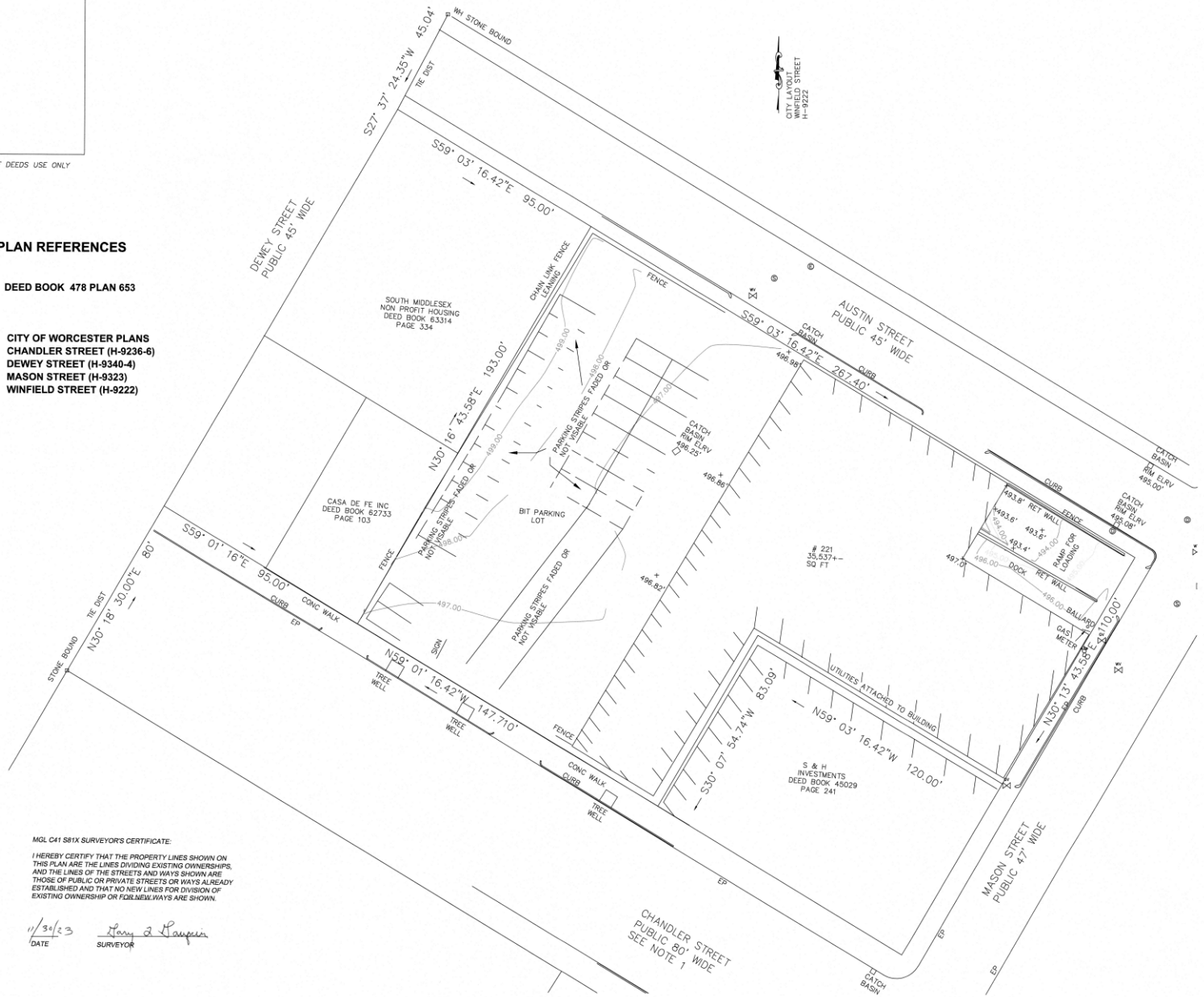
PARKING SITE PLAN

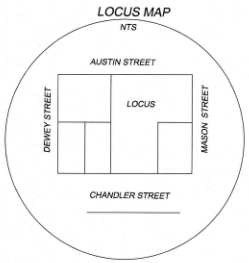
FOR REGISTRY OF DEEDS USE ONLY

PLAN REFERENCES

DEED BOOK 478 PLAN 653

CITY OF WORCESTER PLANS
CHANDLER STREET (H-9236-6)
DEWEY STREET (H-9340-4)
MASON STREET (H-9323)
WINFIELD STREET (H-9222)





NOTES

1,) UTILITIES AT CHANDLER STREET NOT LOCATED

2.) DATUM TAKEN FROM SMH ON UNTILITY PLAN FROM CITY OF WORCESTER

3.) CONSRTUUCTION ON LOTS OR LAND IS SUBJECT TO ANY EASEMENTS, RIGHT OF WAYS, RESTRICTION RESERVATIONS OR LIMITATIONS ON RECORD

4.) UTILITIES SHOWN ARE FROM FIELD LOCATIONS IT SHALL BE THE RESPONSIBILTY OF THE DESIGN ENGINEER AND THE CONTRACTOR TO VERIFY THE SIZE, EVEVATION AND LOCATION, AND TO CONTACT "DIG-SAFE AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION, DEMOLITION OR CONSTRUCTION

OWNER OF RECORD
POLAR VIEWS
DEED BOOK 68988 PAGE 48

MGL C41 S81X SURVEYOR'S CERTIFICATE:

I HEREBY CERTIFY THAT THE PROPERTY LINES SHOWN ON THIS PLAN ARE THE LINES DIVIDING EXISTING OWNERSHIPS, AND THE LINES OF THE STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW LINES FOR DIVISION OF EXISTING OWNERSHIP OR FOR NEW WAYS ARE SHOWN.

11/30/23
DATE

Gary L Gauquier
SURVEYOR

GARY L GAUQUIER #46120 REGISTERED LAND SURVEYOR

11/30/23

PLAN OF LAND
216 CHANDLER STREET
WORCESTER, MA

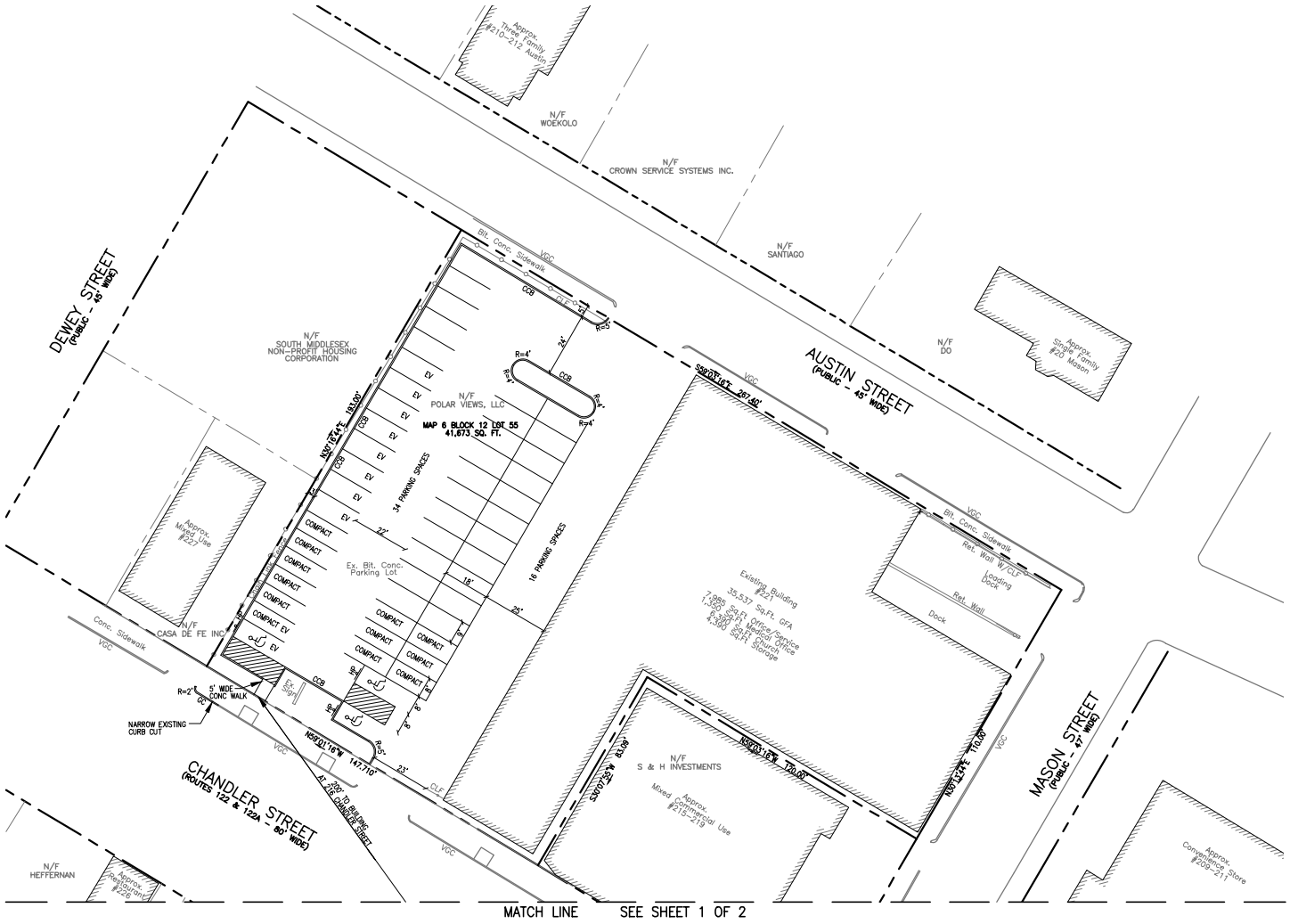
PREPARED FOR: POLAR VIEWS
NOVEMBER 30, 2023 SCALE 1" = 20'

GEO / NETWORK LAND SURVEY, INC.
645 CHANDLER STREET SUITE 7
WORCESTER, MASSACHUSETTS 01610
508-755-7003 FAX 508-755-8003

FILE #22-116

NOTE:

1. EXISTING PARKING LOT TO BE RESTRIPED WITH CURBING INSTALLED



LEGEND:

- EXISTING PROPERTY LINE
- 490 EXISTING CONTOUR – HIGH
- 491 EXISTING CONTOUR – LOW
- 490 PROPOSED CONTOUR – HIGH
- 491 PROPOSED CONTOUR – LOW
- EXISTING EDGE PAVEMENT
- EXISTING CURB
- PROPOSED EDGE OF PAVEMENT
- PROPOSED CURB
- D EXISTING DRAIN LINE
- D PROPOSED DRAIN LINE
- W EXISTING WATER LINE
- W PROPOSED WATER LINE
- S EXISTING SEWER LINE
- S PROPOSED SEWER LINE
- PROPOSED EROSION CONTROL

PARKING SUMMARY

CURRENT ZONE: BUSINESS, GENERAL (BG-3.0)
OVERLAY ZONE: COMMERCIAL CORRIDORS (CCOD-E)

PARKING SPACE REQUIREMENTS

PROPOSED USE – 216 CHANDLER		REQUIRED
MULTI-FAMILY: 1/D.U X 21 UNITS =		21 SPACES
	21 SPACES*0.50=	11 SPACES*
GUEST: 1/10 D.U X 21 UNITS =		3 SPACES
		14 SPACES
COMMERCIAL: 1/500 SQ.FT X 2,920 SQ.FT. =		6 SPACES
		20 SPACES REQUIRED

* SPECIAL PERMIT REQUIRED FROM PLANNING BOARD FOR REDUCTION OF 50% OF BASE RESIDENTIAL REQUIREMENT

EXISTING USE – 221 CHANDLER		REQUIRED
OFFICE/SERVICE: 1/500 SQ.FT.	X 7,985 SQ.FT. =	16 SPACES
STORAGE: 1/3,000 SQ.FT.*75%	X 4,590 SQ.FT. =	2 SPACES REQUIRED
CHURCH: 0.25/PERSON*75%	X 55 PEOPLE =	11 SPACES
MEDICAL OFFICE: 4/TREATMENT ROOM*75%	X 2 ROOMS =	6 SPACES
		35 SPACES
	35 SPACES*0.75 =	27 SPACES REQUIRED**

** 25% ADMINISTRATIVE REDUCTION FOR USES AT 221 CHANDLER

REQUIREMENT W/ENTITLEMENTS & ADMIN REDUCTION = 47 SPACES REQUIRED
BASE REQUIREMENT W/12 SPECIAL PERMIT = 52 SPACES REQUIRED
50 SPACES PROVIDED
12 COMPACT (24%)
10 EV SPACES (20%)

NOTE: SPECIAL PERMIT REQUIRED FROM PLANNING BOARD TO REDUCE DRIVING AISLE WIDTH AT 221 CHANDLER FROM 24' TO 22'

GRAPHIC SCALE

30 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

REV. NO.	DATE	REVISION
1	11/19/24	CITY COMMENTS

TITLE:

DEFINITIVE SITE PLAN
FOR
216 & 221 CHANDLER STREET
WORCESTER, MASSACHUSETTS 01610

PREPARED FOR:
POLAR VIEWS, LLC
89 WEST MAIN STREET UNIT 101
NORTHBOROUGH, MASSACHUSETTS 01532

PROPERTY OWNER:
DANIEL YARNIE
89 WEST MAIN STREET UNIT 101
NORTHBOROUGH, MASSACHUSETTS 01532

PREPARED BY:
J.M. GRENIER ASSOCIATES INC.
118 TURNPIKE ROAD SUITE 200
SOUTHBOROUGH, MASSACHUSETTS 01772
TELE NO.: (508) 845-2500 jmgrenier@townisp.com

SCALE: 1" = 20'
DATE: NOVEMBER 5, 2024

LAYOUT PLAN 2/2

SHEET NO.: SHEET 5 OF 10
PROJECT NO.: G-698

PARKING OBSERVATIONS

TDC

Transportation Data Corporation
P.O. Box 486 Norwood, MA 02062
tel (781) 587-0086 cell (781) 439-4999

VAI #10102/Daniel LaCivita
221 Chandler Street Lot, Worcester, MA
7:00 AM-7:00 PM (15-Min. Intervals)
Tuesday, October 29, 2024

Vehicle Parking Accumulation Study:

Time	Lot	Occupancy
7:00	11	22.4%
7:15	12	24.5%
7:30	12	24.5%
7:45	12	24.5%
8:00	12	24.5%
8:15	14	28.6%
8:30	12	24.5%
8:45	15	30.6%
9:00	15	30.6%
9:15	17	34.7%
9:30	18	36.7%
9:45	18	36.7%
10:00	19	38.8%
10:15	19	38.8%
10:30	17	34.7%
10:45	21	42.9%
11:00	20	40.8%
11:15	20	40.8%
11:30	19	38.8%
11:45	21	42.9%
12:00	22	44.9%
12:15	24	49.0%
12:30	22	44.9%
12:45	21	42.9%
13:00	23	46.9%
13:15	20	40.8%
13:30	19	38.8%
13:45	21	42.9%
14:00	18	36.7%

14:15	18	36.7%
14:30	17	34.7%
14:45	18	36.7%
15:00	17	34.7%
15:15	17	34.7%
15:30	16	32.7%
15:45	16	32.7%
16:00	17	34.7%
16:15	17	34.7%
16:30	20	40.8%
16:45	18	36.7%
17:00	17	34.7%
17:15	17	34.7%
17:30	20	40.8%
17:45	19	38.8%
18:00	18	36.7%
18:15	23	46.9%
18:30	23	46.9%
18:45	22	44.9%
19:00	21	42.9%

Vanasse & Associates inc
Transportation Engineers & Planners

35 New England Business Center Drive
Suite 140
Andover, MA 01810-1066
Office 978-474-8800
Fax 978-688-6508

Calculations

Job: Worcester
Location: #221 Chandler St
Title: Parking Study
Calculated by: SRF

Job Number: 10102
Date: 10/26/24
Sheet 1 of 1
Checked by:

START TIME	# OF CARS	START TIME	# OF CARS
7:00 AM	16	3:00	14
7:15	16	3:15	16
7:30	15	3:30	16
7:45	14	3:45	16
8:00	13	4:00	15
8:15	14	4:15	15
8:30	13	4:30	15
8:45	13	4:45	16
9:00	13	5:00	19
9:15	18	5:15	21
9:30	17	5:30	19
9:45	17	5:45	22
10:00	19	6:00	20
10:15	19	6:15	20
10:30	19	6:30	20
10:45	18	6:45	18
11:00	17	7:00	19
11:15	18		
11:30	18		
11:45	17		
12:00	17		
12:15	19		
12:30	20		
12:45	19		
1:00	17		
1:15	21		
1:30	19		
1:45	19		
2:00	22		
2:15	20		
2:30	19		
2:45	19		

TDC

Transportation Data Corporation
P.O. Box 486 Norwood, MA 02062
tel (781) 587-0086 cell (781) 439-4999

VAI #10102/Daniel LaCivita
221 Chandler Street Lot, Worcester, MA
7:00 AM-11:00 AM (15-Min. Intervals)
Sunday, November 3, 2024

Vehicle Parking Accumulation Study:

Time	Lot	Occupancy
7:00	21	43%
7:15	21	43%
7:30	20	41%
7:45	20	41%
8:00	20	41%
8:15	19	39%
8:30	20	41%
8:45	19	39%
9:00	19	39%
9:15	20	41%
9:30	22	45%
9:45	23	47%
10:00	27	55%
10:15	30	61%
10:30	29	59%
10:45	28	57%
11:00	28	57%

ITE PARKING GENERATION DATA

Land Use: 221 Multifamily Housing—2+ BR (Mid-Rise)

Description

Mid-rise multifamily housing with two or more bedrooms is a residential building with between four and 10 floors (levels) of residence that contain at least one dwelling unit with two or more bedrooms. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways.

Land Use Subcategory

Data are separated into two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

Time-of-Day Distribution for Parking Demand

The following table presents a composite (weekday and Saturday) Time-of-Day distribution of parking demand for three general urban/suburban study sites.

Hour Beginning	Percent of Peak Parking Demand
	Weekday/Saturday Composite
12:00-4:00 a.m.	100
5:00 a.m.	96
6:00 a.m.	86
7:00 a.m.	77
8:00 a.m.	66
9:00 a.m.	60
10:00 a.m.	57
11:00 a.m.	55
12:00 p.m.	52
1:00 p.m.	50
2:00 p.m.	52
3:00 p.m.	51
4:00 p.m.	57
5:00 p.m.	62
6:00 p.m.	65
7:00 p.m.	68
8:00 p.m.	75
9:00 p.m.	82
10:00 p.m.	87
11:00 p.m.	91

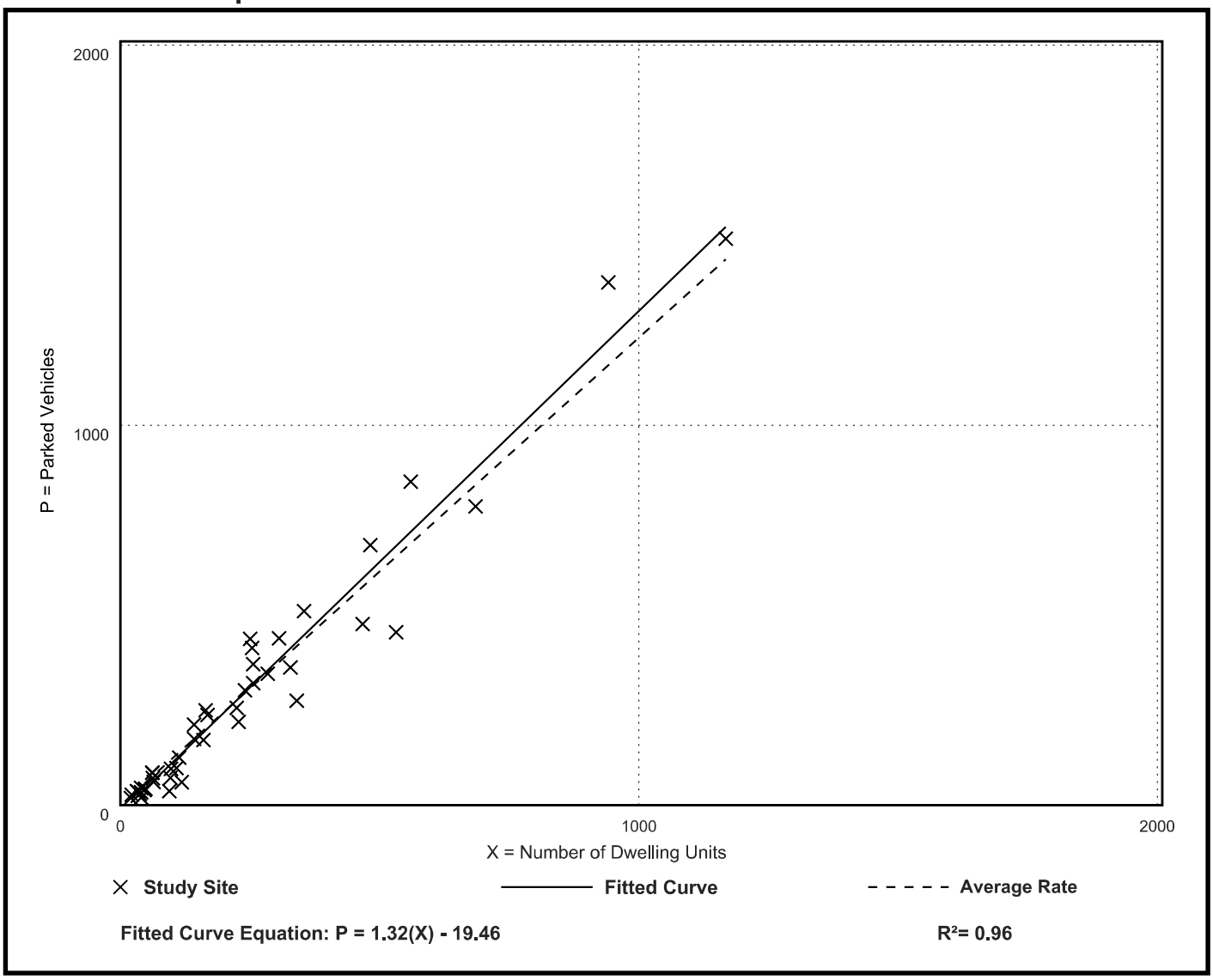
Multifamily Housing - 2+ BR (Mid-Rise) Not Close to Rail Transit (221)

Peak Period Parking Demand vs: Dwelling Units
On a: Weekday (Monday - Friday)
Setting/Location: General Urban/Suburban
Number of Studies: 44
Avg. Num. of Dwelling Units: 231

Peak Period Parking Demand per Dwelling Unit

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
1.23	0.39 - 1.75	0.98 / 1.45	1.15 - 1.31	0.27 (22%)

Data Plot and Equation



Fitted Curve Equation: P = 1.32(X) - 19.46

R^2= 0.96

Multifamily Housing - 2+ BR (Mid-Rise) Not Close to Rail Transit (221)

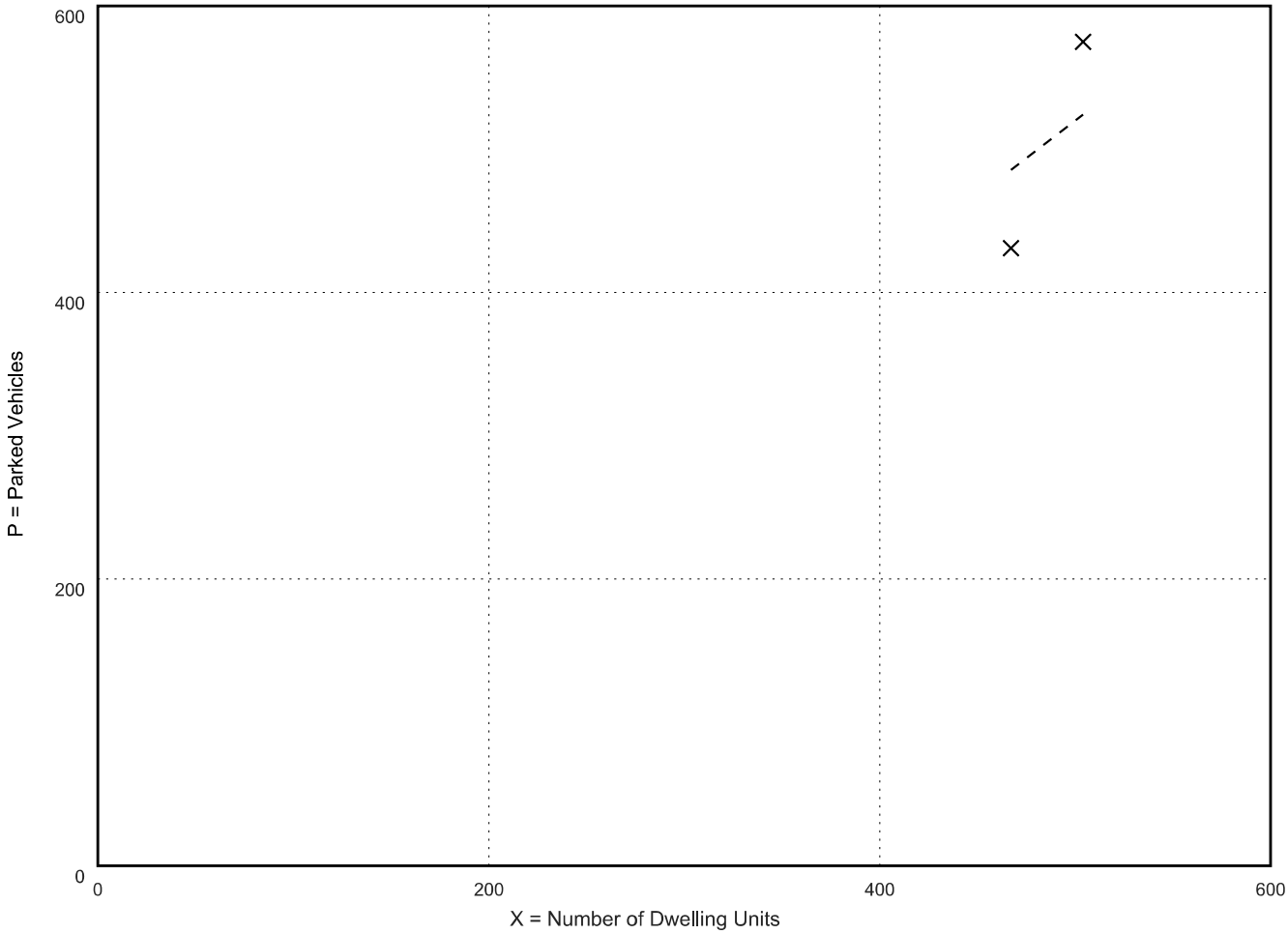
Peak Period Parking Demand vs: Dwelling Units
On a: Saturday
Setting/Location: General Urban/Suburban
Number of Studies: 2
Avg. Num. of Dwelling Units: 486

Peak Period Parking Demand per Dwelling Unit

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
1.04	0.92 - 1.14	*** / ***	***	*** (***)

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: *

R^2= *

Land Use: 822 Strip Retail Plaza (<40k)

Description

A strip retail plaza is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Each study site in this land use has less than 40,000 square feet of gross leasable area (GLA). Because a strip retail plaza is open-air, the GLA is the same as the gross floor area (GFA) of the building.

The 40,000 square feet GLA threshold between shopping plaza and strip retail plaza (Land Use 822) is based on an examination of the parking demand database. All shopping plazas with a supermarket as their anchor in the database are larger than 40,000 square feet GLA.

Time-of-Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand on a Monday–Thursday (five study sites), a Friday (two study sites), and a Saturday (four study sites).

Hour Beginning	Percent of Peak Parking Demand		
	Monday–Thursday	Friday	Saturday
12:00–4:00 a.m.	—	—	—
5:00 a.m.	—	—	—
6:00 a.m.	—	—	—
7:00 a.m.	—	—	—
8:00 a.m.	19	19	—
9:00 a.m.	33	40	38
10:00 a.m.	47	44	55
11:00 a.m.	55	52	66
12:00 p.m.	89	96	85
1:00 p.m.	100	96	100
2:00 p.m.	73	84	96
3:00 p.m.	73	52	79
4:00 p.m.	66	50	66
5:00 p.m.	70	63	64
6:00 p.m.	75	49	67
7:00 p.m.	70	100	70
8:00 p.m.	54	94	70
9:00 p.m.	48	73	51
10:00 p.m.	—	—	—
11:00 p.m.	—	—	—

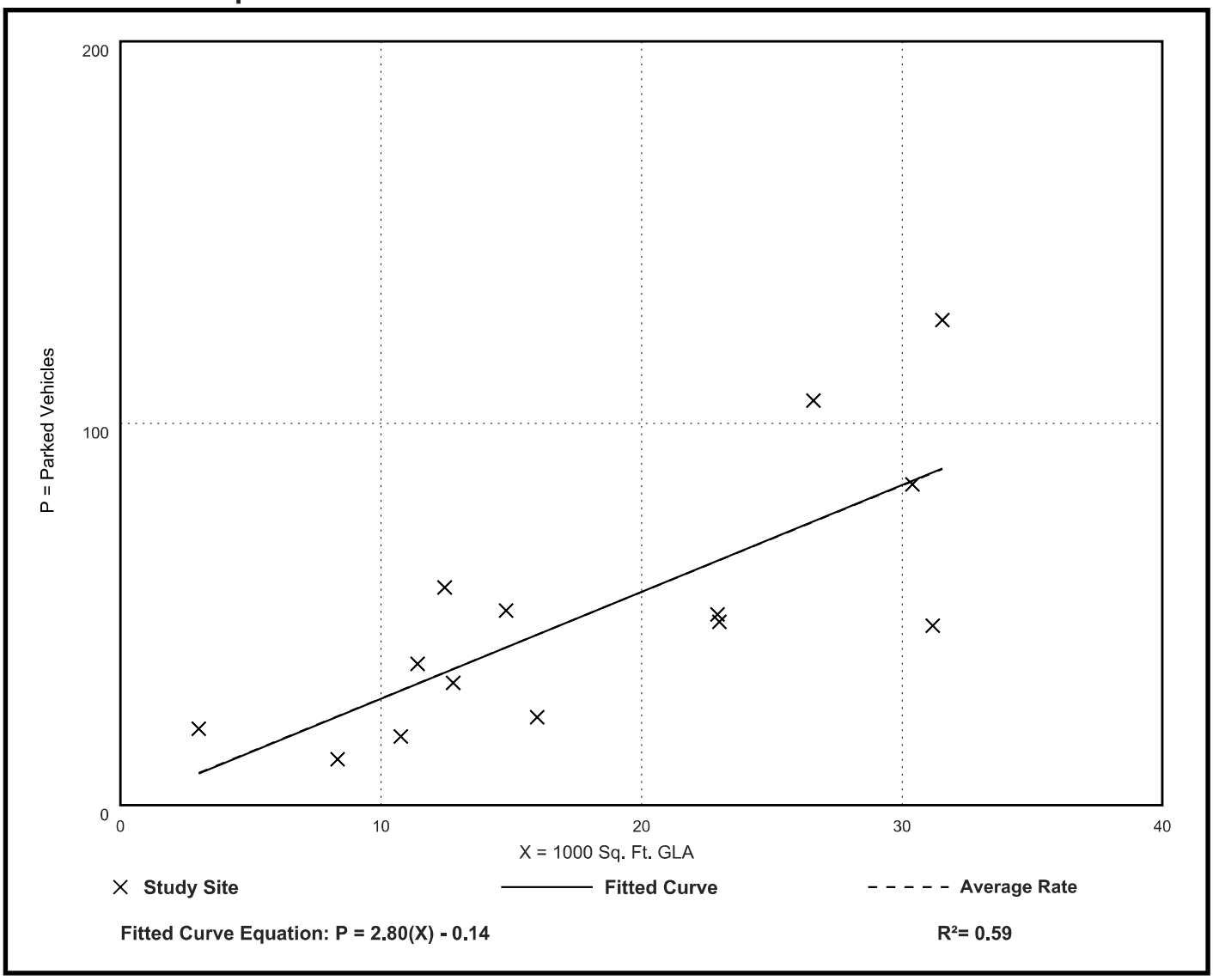
Strip Retail Plaza (< 40k)
(822)

Peak Period Parking Demand vs: 1000 Sq. Ft. GLA
On a: Weekday (Monday - Thursday)
Setting/Location: General Urban/Suburban
Number of Studies: 14
Avg. 1000 Sq. Ft. GLA: 18

Peak Period Parking Demand per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
2.79	1.44 - 6.67	2.07 / 4.44	***	1.14 (41%)

Data Plot and Equation



Fitted Curve Equation: P = 2.80(X) - 0.14

R^2= 0.59

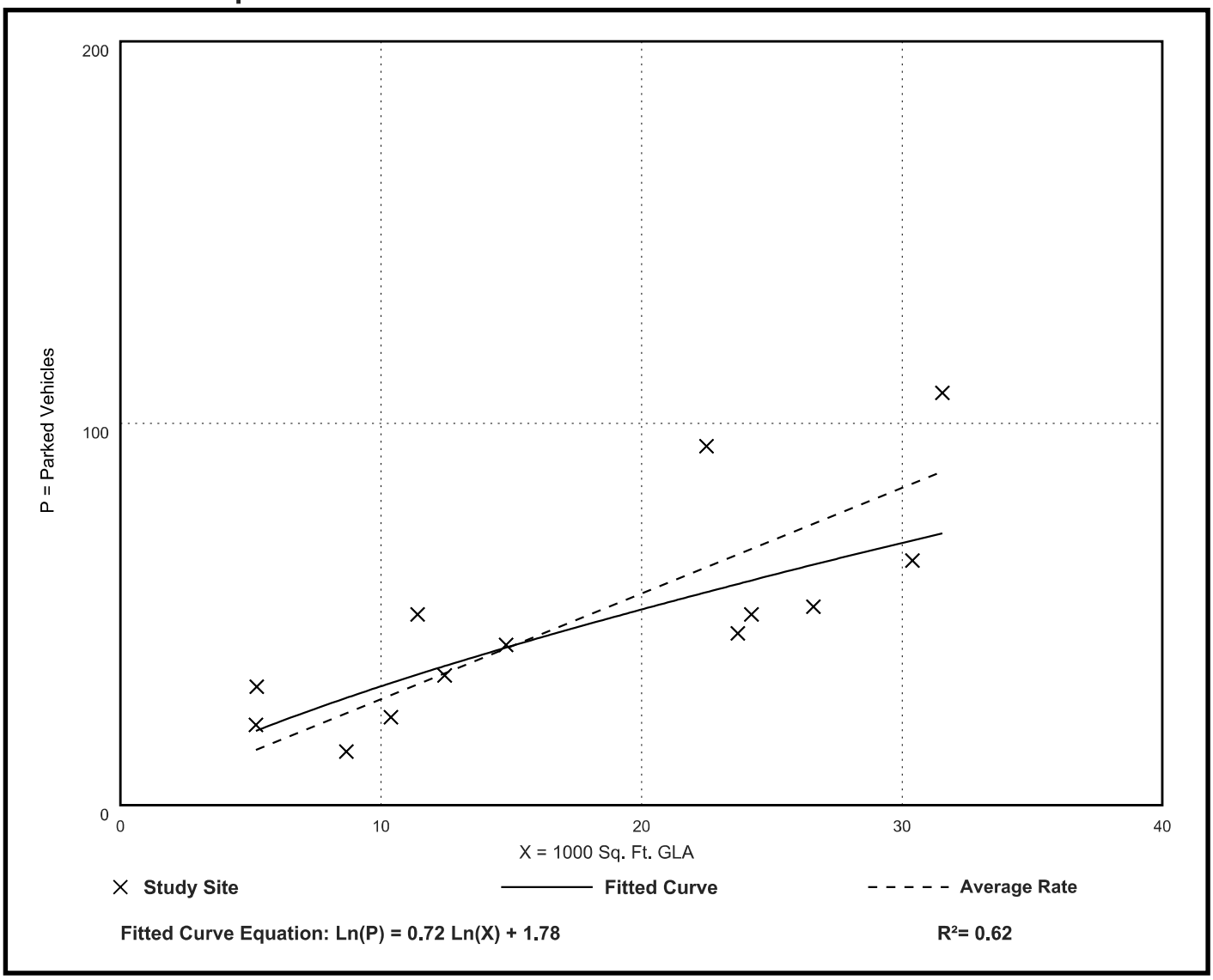
Strip Retail Plaza (< 40k)
(822)

Peak Period Parking Demand vs: 1000 Sq. Ft. GLA
On a: Saturday
Setting/Location: General Urban/Suburban
Number of Studies: 13
Avg. 1000 Sq. Ft. GLA: 17

Peak Period Parking Demand per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
2.77	1.61 - 5.93	2.09 / 4.36	***	1.03 (37%)

Data Plot and Equation



Fitted Curve Equation: Ln(P) = 0.72 Ln(X) + 1.78

R^2= 0.62