

Downtown Bozeman Parking Study - 2014

A Project Completed for the City of Bozeman Parking Commission

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EXECUTIVE SUMMARY

On behalf of the City of Bozeman Parking Commission and the Downtown Bozeman Partnership, the Western Transportation Institute at Montana State University (WTI) conducted parking occupancy rate studies in the downtown Bozeman area between July and October of 2014. The purpose of this project was to understand how parking spaces near Main Street were being utilized. Occupancy rates, a measure of the level of utilization of a parking area for a specific period of time, were observed on several dates during the study period. Study dates included Tuesday, July 15; Saturday, July 19; Wednesday, August 6; Saturday, August 16; Thursday, September 4; and Saturday, October 4 (no MSU football game). Data collection activities ran between 9:00 a.m. and 8:00 p.m. on each of these respective dates. Once per hour, data collectors recorded the number of vehicles parked in the specific lots/areas of interest, and this data was then used to compute hourly occupancy rates.

When examined, on-street occupancy rates shared a similar trend between most block groups, both on weekdays and weekends in general. Occupancies tended to fluctuate throughout the day, depending on the location of the block. Peaks typically occurred around the lunch and/or dinner hours. On-street parking occupancy rates were generally high in 2014, typically exceeding 60 percent throughout the day and approaching 80+ percent at certain times. In some cases, 90 percent occupancy rates were observed and parking on certain block faces reached 100 percent occupancy on occasion.

High occupancy rates typically were not observed for off-street parking lots, with the exception of the Armory lot and the Willson lot across Mendenhall Street, where high occupancy was the norm throughout the day (generally above 60 percent for both lots). In the Armory and Willson lots, 100 percent occupancy was observed at several times. Conversely, the Carnegie lot, the Rouse lot and the parking garage all had lower occupancies throughout the day. The Carnegie lot occasionally exceeded an occupancy rate of 70 percent but generally remained below this figure. This lot is neighbored by the city parking garage, which may account for the lower occupancies observed in this lot. The Rouse lot reached 100 percent capacity on a couple of 2014 study dates, but typically remained below 60 percent occupancy. The parking garage rarely had occupancies that exceeded 40 percent. These observations may be indicative of two points. First, the Armory lot and the Willson lot continue to be the preferred off-street parking location for many downtown patrons, particularly given their close proximity to many Main Street businesses. Second, outlying lots, even with their proximity to downtown businesses, have remained a secondary location of choice for parking, following other on-street options.

When comparing occupancy rates from 2014 and 2012 (and when available, some dates in 2010), differences were observed depending on the specific date and time of day. For on-street parking, the differences observed in 2014 were occupancies being higher than those of 2012, particularly during the summer months (July and August). Off-street parking lot comparisons indicated that, while the number of vehicles observed at a given time may differ, the general trends in occupancies did not change between 2012 and 2014. These trends consisted of a rise in occupancies throughout the morning, a peak at lunch, a drop in the afternoon and another increase in the evening to reach a second peak.

1 INTRODUCTION

The City of Bozeman Parking Commission (Commission) and the Downtown Bozeman Partnership (Partnership) have an ongoing interest in monitoring the availability and usage of parking in the downtown Bozeman area. On behalf of the Commission and the Partnership, the Western Transportation Institute at Montana State University (WTI) conducted parking occupancy rate studies in the downtown area between July and October of 2014. This report presents the results from these studies, which focused on the utilization of parking spaces on a series of streets. To understand how parking spaces were being utilized, researchers observed occupancy rates for selected on-street and city-owned off-street parking areas.

Occupancy rate is a measure of the level of utilization of a parking area for a specific period of time. This metric will help the Parking Commission understand how parking is presently being used in the downtown area. Previous work completed during the summers of 2010 and 2012 established initial occupancy rates for two off-street lots in the study area, and, in 2012, addressed on-street parking along specific streets (1, 2). The results of the work discussed in this report allow comparisons of changes that have occurred in occupancy trends since that 2012 study, and, when applicable, since 2010 (for some locations).

1.1 Study Approach

WTI researchers followed a straightforward approach for completing the study. It consisted of observational data collection activities that occurred on six dates selected in consultation with the City of Bozeman Parking Commission:

- Tuesday, July 15;
- Saturday, July 19;
- Wednesday, August 6;
- Saturday, August 16;
- Thursday, September 4; and
- Saturday, October 4 (no MSU football game¹).

Data collection activities ran between 9:00 a.m. and 8:00 p.m. on each of these respective dates. The study area established by the Parking Commission is presented in Figure 1-1.

¹ Unlike the 2012 season, the MSU football team had home games on all four Saturdays in September, 2014. Consequently, the first Saturday of October was proposed as the date for data collection.

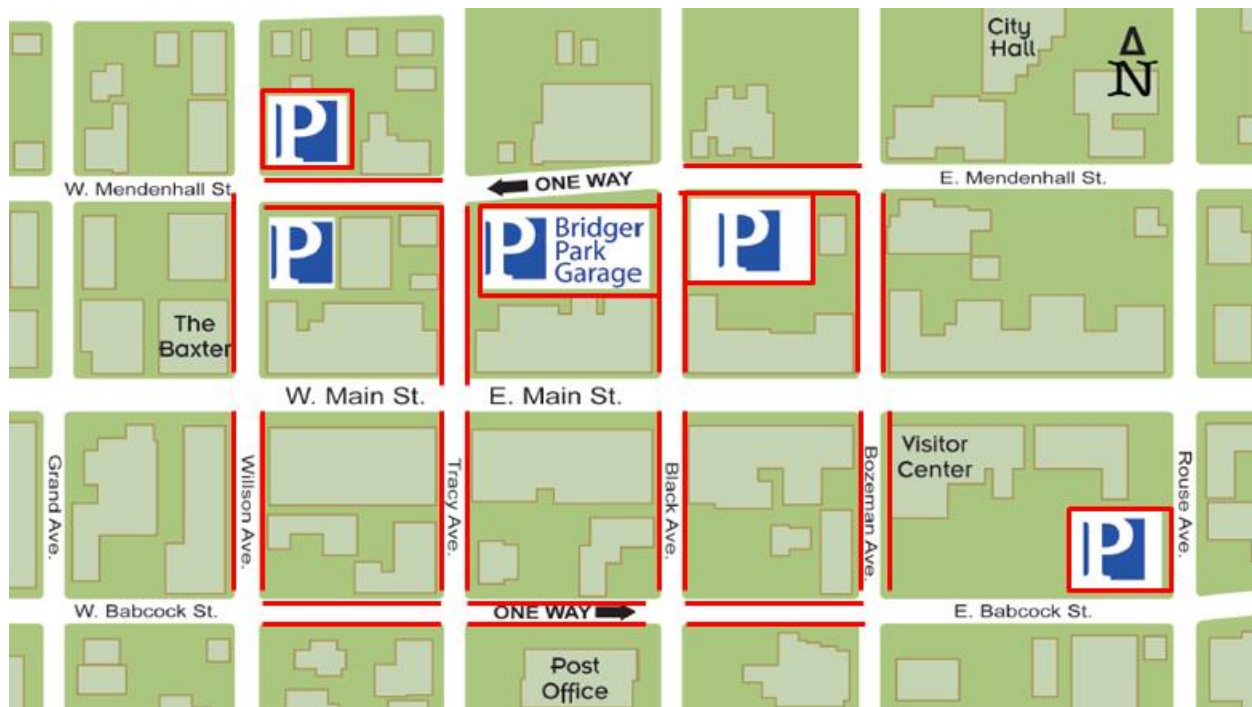


Figure 1-1: Downtown study area (Note: red lines indicate areas included in study)

The specific blocks/streets included in the study are as follows:

Surface lots

- 100 block N. Willson (Willson lot)
- Unit block N. Willson (Armory lot)
- Carnegie lot
- Rouse lot (Rouse and Babcock)

Block faces

- Unit block N. Tracy (Both sides)
- Unit block S. Tracy (Both sides)
- Unit block N. Black (Both sides)
- Unit block S. Black (Both sides)
- Unit blocks of W. Babcock St. between Willson Ave. and Bozeman Ave. (Both sides)
- Unit blocks of W. Mendenhall St. between Willson Ave. and Bozeman Ave. (Both sides)
- Unit block S. Willson (Both sides)
- Unit block N. Willson (West side only)
- Unit block S. Bozeman (Both sides)
- Unit block N. Bozeman (Both sides)

To collect the data necessary to measure occupancy rates, Montana State University civil engineering students canvassed the downtown study area, recording (once per hour) the number of vehicles observed to be parked in the specific lots/areas highlighted in Figure 1-1.

Upon completion of the field data collection effort, the data was analyzed to compute occupancy rates. They help in understanding how parking demand fluctuates during the course of a day for a particular block or parking lot. Using the hourly observations of parked vehicles collected in the field, occupancy rates were computed as:

$$OR = \frac{N_T}{P_S} * 100$$

Where:

OR = Occupancy rate, spaces/hour

N_T = total number of parked vehicles observed

P_S = total number of legal parking stalls

Researchers previously documented the total number of parking stalls on a block face or off-street lot during the 2010 and 2012 studies (1, 2). This information was used in the formula above to complete each occupancy rate calculation.

1.2 Organization of the Report

The results of the occupancy rate studies conducted on the different study dates are presented in the following chapter. The document concludes with a summary of the findings from the work.

2 RESULTS

This chapter presents the results of the analysis of occupancy rates, based on data collected on Tuesday, July 15; Saturday, July 19; Wednesday, August 6; Saturday, August 16; Thursday, September 4; and Saturday, October 4 (no MSU football game). The results are separated by the two types of parking studied: on-street stalls and off-street city-owned parking lots. When possible, comparisons between 2010 and 2012 data are provided. Based on the data available, these comparisons primarily employ data from the 2012 work.

2.1 Block Face Occupancy Rates

The Bozeman Parking Commission has an interest in documenting occupancy rates for on-street parking on key streets that run perpendicular to Main Street in the downtown district. This included on-street parking (block faces) on the east and west side of North Tracy Avenue, South Tracy Avenue, North Black Avenue, South Black Avenue, South Willson Avenue, South Bozeman Avenue and North Bozeman Avenue (note the dividing line of Main Street runs east and west across these roads, hence the North and South distinction). The west side of North Willson Avenue was also examined. Finally, the north and south sides of West Babcock Street and West Mendenhall Street between Willson Avenue and Bozeman Avenue were examined. The following sections will discuss the occupancy rate findings for each block face. Note that the findings for each block include combined data from both the east side and west side of the street (except for North Willson Avenue and West Babcock Street between Black Avenue and Bozeman Avenue).

2.1.1 North Bozeman Ave.

North Bozeman Avenue has approximately 22 on-street parking stalls. Table 2-1 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. As the results indicate, the block saw a general rise and fall in occupancy rates on each collection date as each day progressed. On weekdays, a peak of 17 vehicles was observed at 1:00 p.m. and 3 p.m. in July, a peak of 19 vehicles at 7:00 p.m. in August and a peak of 18 vehicles at 1:00 p.m. and 8:00 p.m. in September. These trends are further illustrated in Figure 2-1. On weekends, a peak of 17 vehicles was observed at 11:00 a.m., 12:00 p.m. and 8:00 p.m. in July, 15 vehicles at 8:00 p.m. in August and 19 vehicles at 9:00 and 10:00 a.m. in October. Oddly, the occupancy observed on Saturday, October 4, 2014 fell sharply after 5:00 p.m., which differed from all other weekend observations. The cause of this trend was likely a community walk in the area, which possibly impacted parking patterns on this block. On average, rates were lower than the maximum available occupancy throughout the day for both weekdays and weekends. Occupancy peaks did not typically exceed 80 percent, and typically remained low, usually between 50 and 70 percent. The general trends that were observed indicate that vehicles parking on this block are parking for downtown trip purposes, such as lunch and evening dining, which vary throughout the day.

Table 2-1: North Bozeman Ave. parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	9	40.9%	9:00 AM	9	40.9%
10:00 AM	6	27.3%	10:00 AM	15	68.2%
11:00 AM	14	63.6%	11:00 AM	17	77.3%
12:00 PM	12	54.5%	12:00 PM	17	77.3%
1:00 PM	17	77.3%	1:00 PM	16	72.7%
2:00 PM	14	63.6%	2:00 PM	16	72.7%
3:00 PM	17	77.3%	3:00 PM	16	72.7%
4:00 PM	13	59.1%	4:00 PM	15	68.2%
5:00 PM	7	31.8%	5:00 PM	9	40.9%
6:00 PM	13	59.1%	6:00 PM	11	50.0%
7:00 PM	13	59.1%	7:00 PM	15	68.2%
8:00 PM	13	59.1%	8:00 PM	17	77.3%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	8	36.4%	9:00 AM	4	18.2%
10:00 AM	9	40.9%	10:00 AM	8	36.4%
11:00 AM	14	63.6%	11:00 AM	11	50.0%
12:00 PM	15	68.2%	12:00 PM	11	50.0%
1:00 PM	11	50.0%	1:00 PM	9	40.9%
2:00 PM	13	59.1%	2:00 PM	9	40.9%
3:00 PM	9	40.9%	3:00 PM	3	13.6%
4:00 PM	13	59.1%	4:00 PM	10	45.5%
5:00 PM	13	59.1%	5:00 PM	14	63.6%
6:00 PM	17	77.3%	6:00 PM	13	59.1%
7:00 PM	19	86.4%	7:00 PM	13	59.1%
8:00 PM	17	77.3%	8:00 PM	15	68.2%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	6	27.3%	9:00 AM	19	86.4%
10:00 AM	7	31.8%	10:00 AM	19	86.4%
11:00 AM	14	63.6%	11:00 AM	15	68.2%
12:00 PM	16	72.7%	12:00 PM	14	63.6%
1:00 PM	18	81.8%	1:00 PM	13	59.1%
2:00 PM	15	68.2%	2:00 PM	16	72.7%
3:00 PM	6	27.3%	3:00 PM	16	72.7%
4:00 PM	6	27.3%	4:00 PM	14	63.6%
5:00 PM	15	68.2%	5:00 PM	15	68.2%
6:00 PM	14	63.6%	6:00 PM	10	45.5%
7:00 PM	17	77.3%	7:00 PM	7	31.8%
8:00 PM	18	81.8%	8:00 PM	2	9.1%

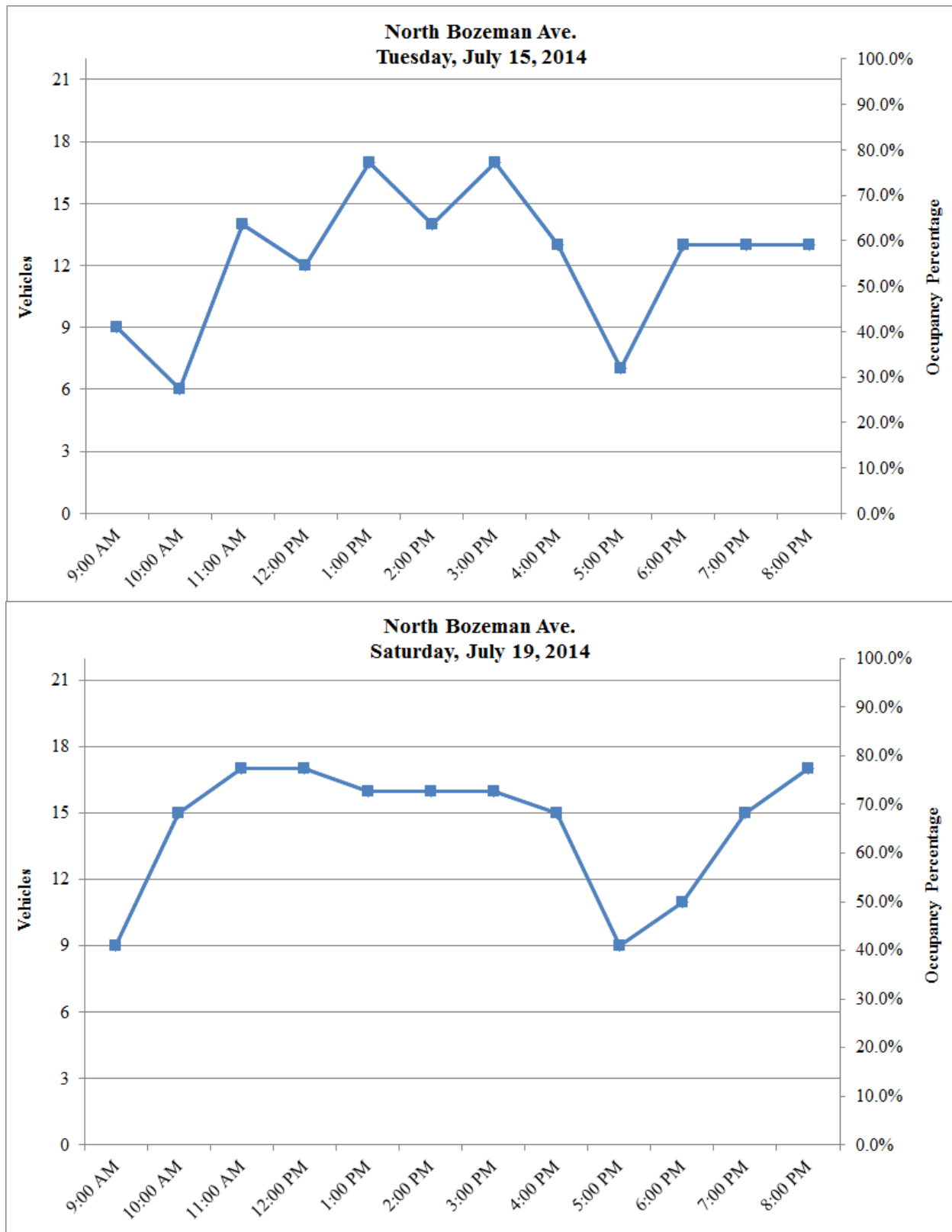


Figure 2-1: North Bozeman Ave. vehicle observations versus occupancy rates

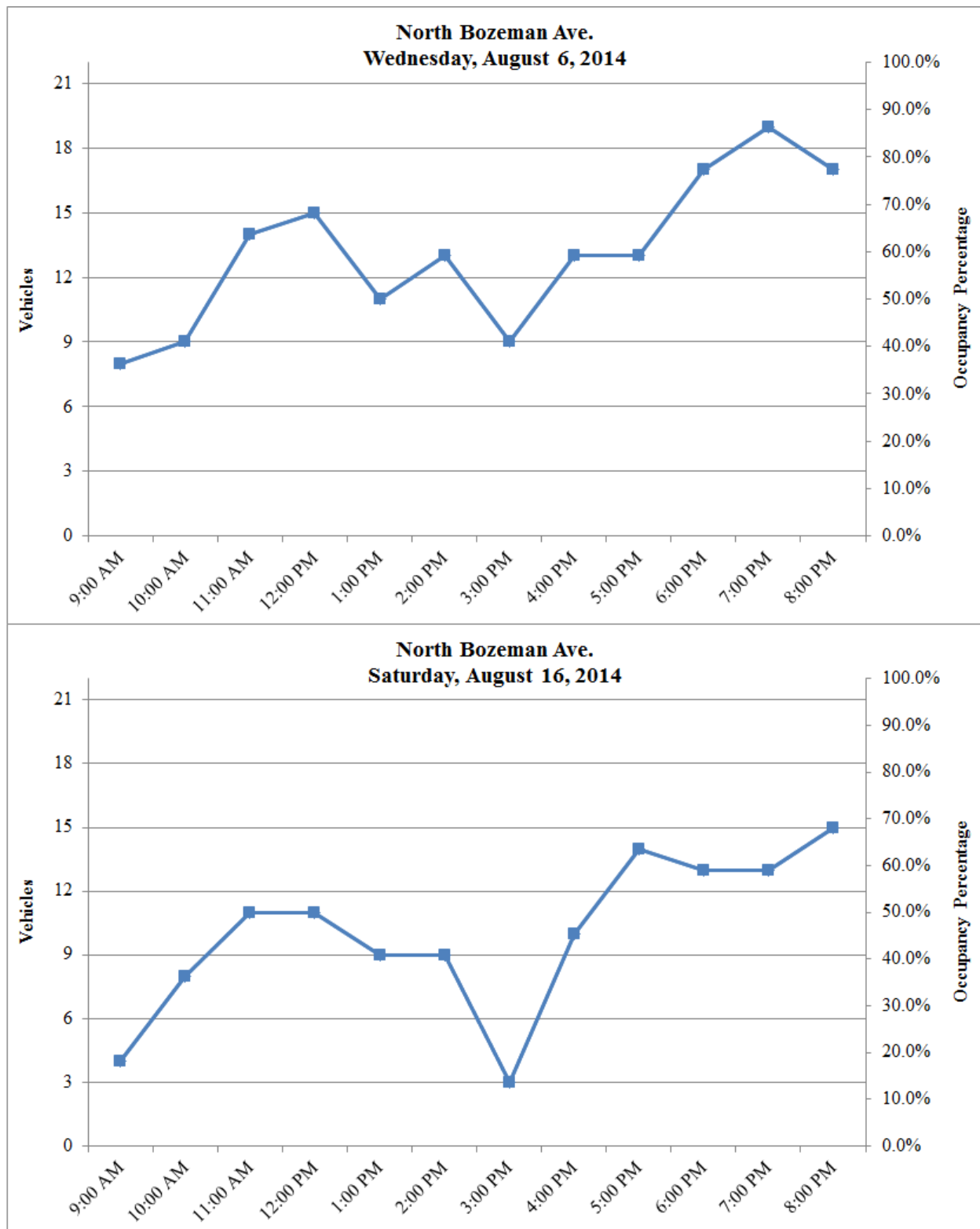


Figure 2-1 cont'd: North Bozeman Ave. vehicle observations versus occupancy rates

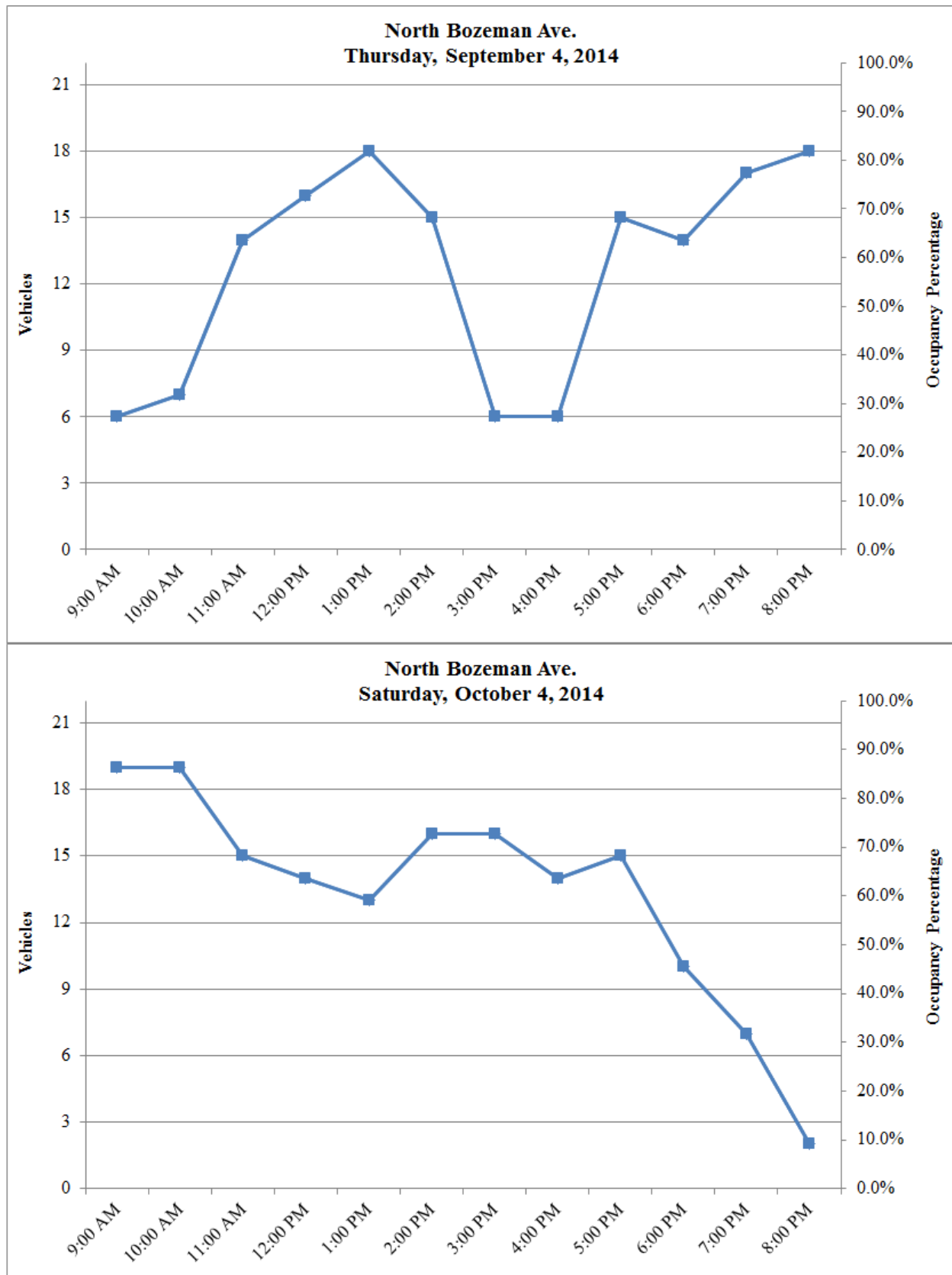


Figure 2-1 cont'd: North Bozeman Ave. vehicle observations versus occupancy rates

2.1.2 South Bozeman Ave.

South Bozeman Avenue has approximately 18 on-street parking stalls. Table 2-2 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. This block exhibited varying occupancy levels through the day in general. On some days, a late lunchtime peak was observed, with another peak in the early evening. These trends are further illustrated in Figure 2-2: South Bozeman Ave. vehicle observations versus occupancy rates. For weekdays, the July peak occupancy of 17 vehicles was observed at 3:00 p.m. and again from 6:00 p.m. to 8:00 p.m. The August weekday peak was 18 vehicles at 8:00 p.m., while the September weekday peak was 16 vehicles at 1:00 p.m. and 8:00 p.m. For weekends, peak occupancy was 17 vehicles at 11 a.m. and 1:00 p.m. in July, 16 vehicles at 6:00 p.m. in August and 17 vehicles from 9:00 a.m. and 1:00 p.m. in October. Similar to the North Bozeman Ave. block, this block also experienced declining occupancy rates through the day on October 4, 2014. Again, the cause of this trend was likely a community walk in the area, which possibly impacted parking patterns on this block. Peak occupancies exceeded 90 percent, and rarely fell below 50 percent.

Table 2-2: South Bozeman Ave. parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	10	55.6%	9:00 AM	6	33.3%
10:00 AM	12	66.7%	10:00 AM	11	61.1%
11:00 AM	13	72.2%	11:00 AM	17	94.4%
12:00 PM	16	88.9%	12:00 PM	15	83.3%
1:00 PM	10	55.6%	1:00 PM	17	94.4%
2:00 PM	17	94.4%	2:00 PM	14	77.8%
3:00 PM	15	83.3%	3:00 PM	14	77.8%
4:00 PM	14	77.8%	4:00 PM	13	72.2%
5:00 PM	10	55.6%	5:00 PM	12	66.7%
6:00 PM	17	94.4%	6:00 PM	13	72.2%
7:00 PM	17	94.4%	7:00 PM	9	50.0%
8:00 PM	17	94.4%	8:00 PM	15	83.3%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	11	61.1%	9:00 AM	5	27.8%
10:00 AM	12	66.7%	10:00 AM	9	50.0%
11:00 AM	15	83.3%	11:00 AM	11	61.1%
12:00 PM	14	77.8%	12:00 PM	14	77.8%
1:00 PM	12	66.7%	1:00 PM	15	83.3%
2:00 PM	10	55.6%	2:00 PM	12	66.7%
3:00 PM	13	72.2%	3:00 PM	14	77.8%
4:00 PM	16	88.9%	4:00 PM	10	55.6%
5:00 PM	10	55.6%	5:00 PM	10	55.6%
6:00 PM	17	94.4%	6:00 PM	15	83.3%
7:00 PM	17	94.4%	7:00 PM	16	88.9%
8:00 PM	18	100.0%	8:00 PM	14	77.8%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	9	50.0%	9:00 AM	17	94.4%
10:00 AM	12	66.7%	10:00 AM	17	94.4%
11:00 AM	13	72.2%	11:00 AM	17	94.4%
12:00 PM	15	83.3%	12:00 PM	17	94.4%
1:00 PM	16	88.9%	1:00 PM	14	77.8%
2:00 PM	13	72.2%	2:00 PM	12	66.7%
3:00 PM	11	61.1%	3:00 PM	11	61.1%
4:00 PM	11	61.1%	4:00 PM	13	72.2%
5:00 PM	14	77.8%	5:00 PM	12	66.7%
6:00 PM	15	83.3%	6:00 PM	12	66.7%
7:00 PM	15	83.3%	7:00 PM	5	27.8%
8:00 PM	16	88.9%	8:00 PM	7	38.9%

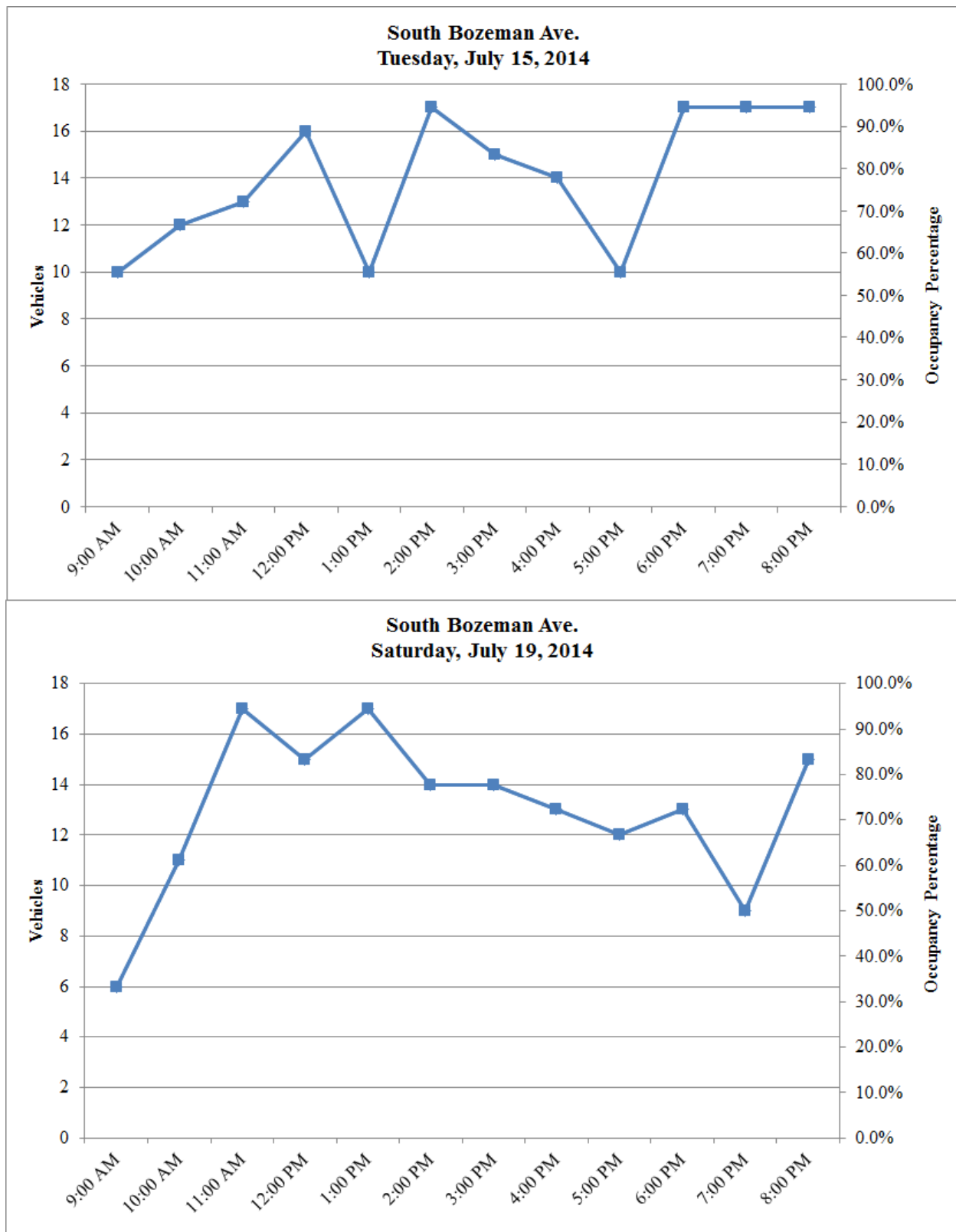


Figure 2-2: South Bozeman Ave. vehicle observations versus occupancy rates

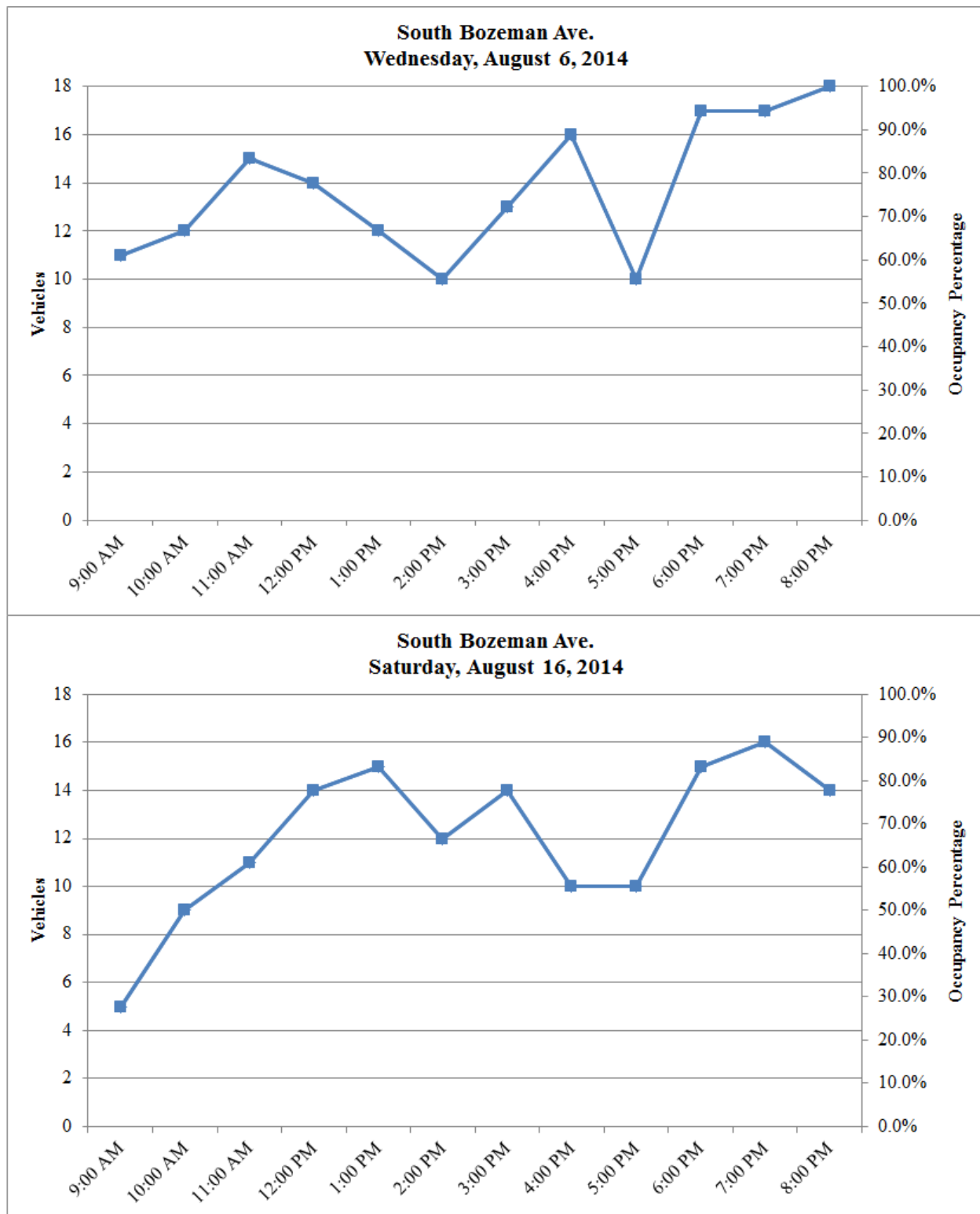


Figure 2-2 cont'd: South Bozeman Ave. vehicle observations versus occupancy rates

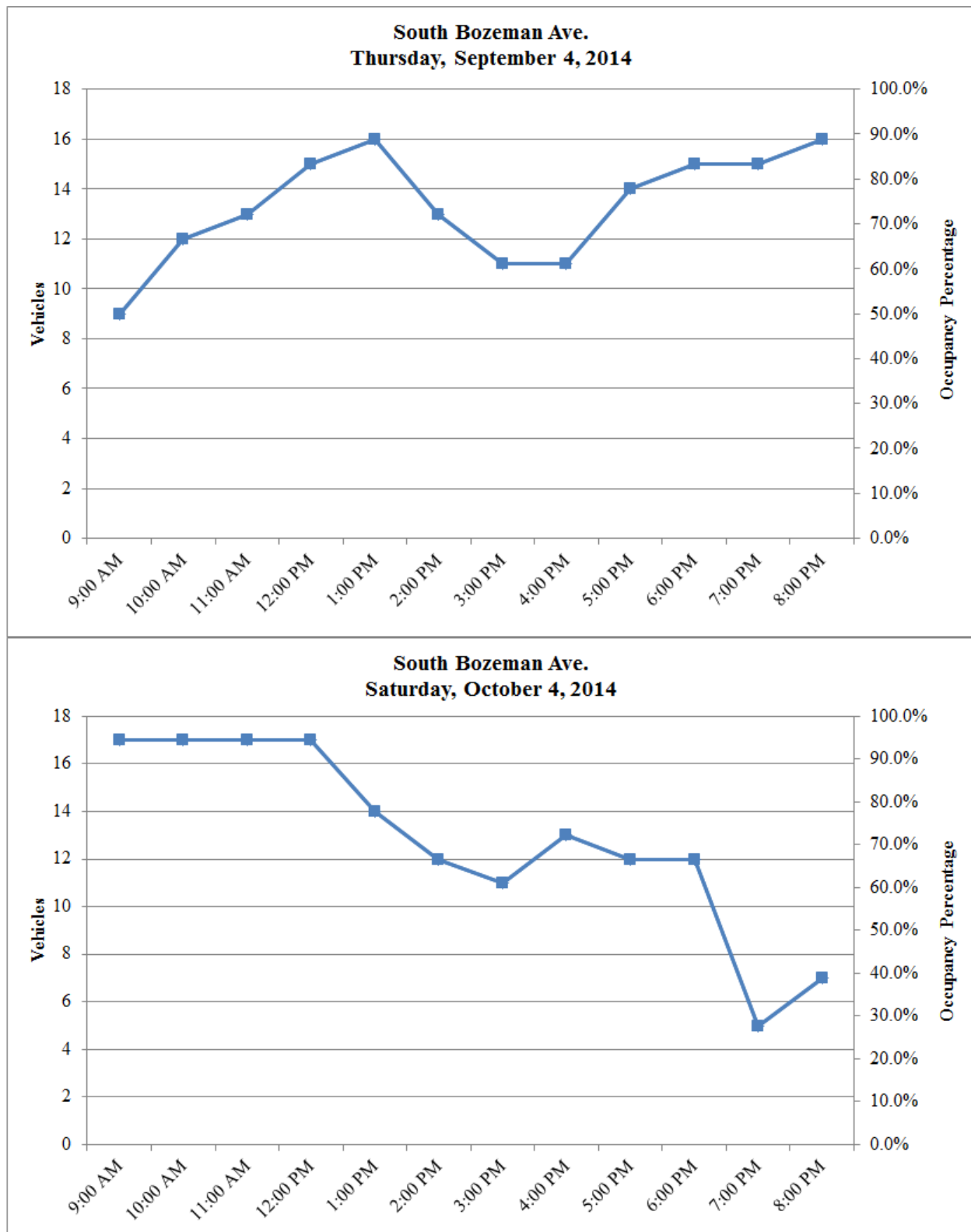


Figure 2-2 cont'd: South Bozeman Ave. vehicle observations versus occupancy rates

2.1.3 North Black Ave.

North Black Avenue has approximately 18 on-street parking stalls. Table 2-3 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. For the July weekday, the occupancy peak of 17 vehicles was at 12:00 p.m., while in August a peak of 17 vehicles occurred at 8:00. Peak occupancies for the September weekday occurred between 5:00 p.m. and 8:00 p.m. at 16 vehicles. In general, occupancies for this block fluctuated throughout the day, with peaks typically centered around meal times. The occupancy trends for this block are further illustrated in Figure 2-2: South Bozeman Ave. vehicle observations versus occupancy rates Figure 2-3. On weekends, the peak observed rate was approximately 95 percent occupancy at 12:00 p.m. on Tuesday, July 17; 12:00 p.m. and 1:00 p.m. on Wednesday, August 8; and at 8:00 p.m. on Saturday, August 18, 2014. On average, occupancy rates were much lower than this peak throughout the day. Occupancy rates were typically at or below 80 percent throughout each day, except around the peak periods identified earlier.

Table 2-3: North Black Ave. parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	10	55.6%	9:00 AM	10	55.6%
10:00 AM	12	66.7%	10:00 AM	15	83.3%
11:00 AM	13	72.2%	11:00 AM	14	77.8%
12:00 PM	17	94.4%	12:00 PM	14	77.8%
1:00 PM	11	61.1%	1:00 PM	15	83.3%
2:00 PM	13	72.2%	2:00 PM	12	66.7%
3:00 PM	10	55.6%	3:00 PM	11	61.1%
4:00 PM	13	72.2%	4:00 PM	12	66.7%
5:00 PM	13	72.2%	5:00 PM	7	38.9%
6:00 PM	15	83.3%	6:00 PM	14	77.8%
7:00 PM	16	88.9%	7:00 PM	14	77.8%
8:00 PM	16	88.9%	8:00 PM	13	72.2%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	12	66.7%	9:00 AM	14	77.8%
10:00 AM	10	55.6%	10:00 AM	15	83.3%
11:00 AM	13	72.2%	11:00 AM	13	72.2%
12:00 PM	15	83.3%	12:00 PM	15	83.3%
1:00 PM	15	83.3%	1:00 PM	14	77.8%
2:00 PM	13	72.2%	2:00 PM	11	61.1%
3:00 PM	10	55.6%	3:00 PM	9	50.0%
4:00 PM	13	72.2%	4:00 PM	9	50.0%
5:00 PM	16	88.9%	5:00 PM	13	72.2%
6:00 PM	16	88.9%	6:00 PM	14	77.8%
7:00 PM	15	83.3%	7:00 PM	13	72.2%
8:00 PM	17	94.4%	8:00 PM	15	83.3%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	15	83.3%	9:00 AM	9	50.0%
10:00 AM	13	72.2%	10:00 AM	16	88.9%
11:00 AM	15	83.3%	11:00 AM	13	72.2%
12:00 PM	13	72.2%	12:00 PM	13	72.2%
1:00 PM	14	77.8%	1:00 PM	13	72.2%
2:00 PM	13	72.2%	2:00 PM	14	77.8%
3:00 PM	11	61.1%	3:00 PM	15	83.3%
4:00 PM	14	77.8%	4:00 PM	13	72.2%
5:00 PM	13	72.2%	5:00 PM	7	38.9%
6:00 PM	16	88.9%	6:00 PM	15	83.3%
7:00 PM	16	88.9%	7:00 PM	16	88.9%
8:00 PM	16	88.9%	8:00 PM	16	88.9%

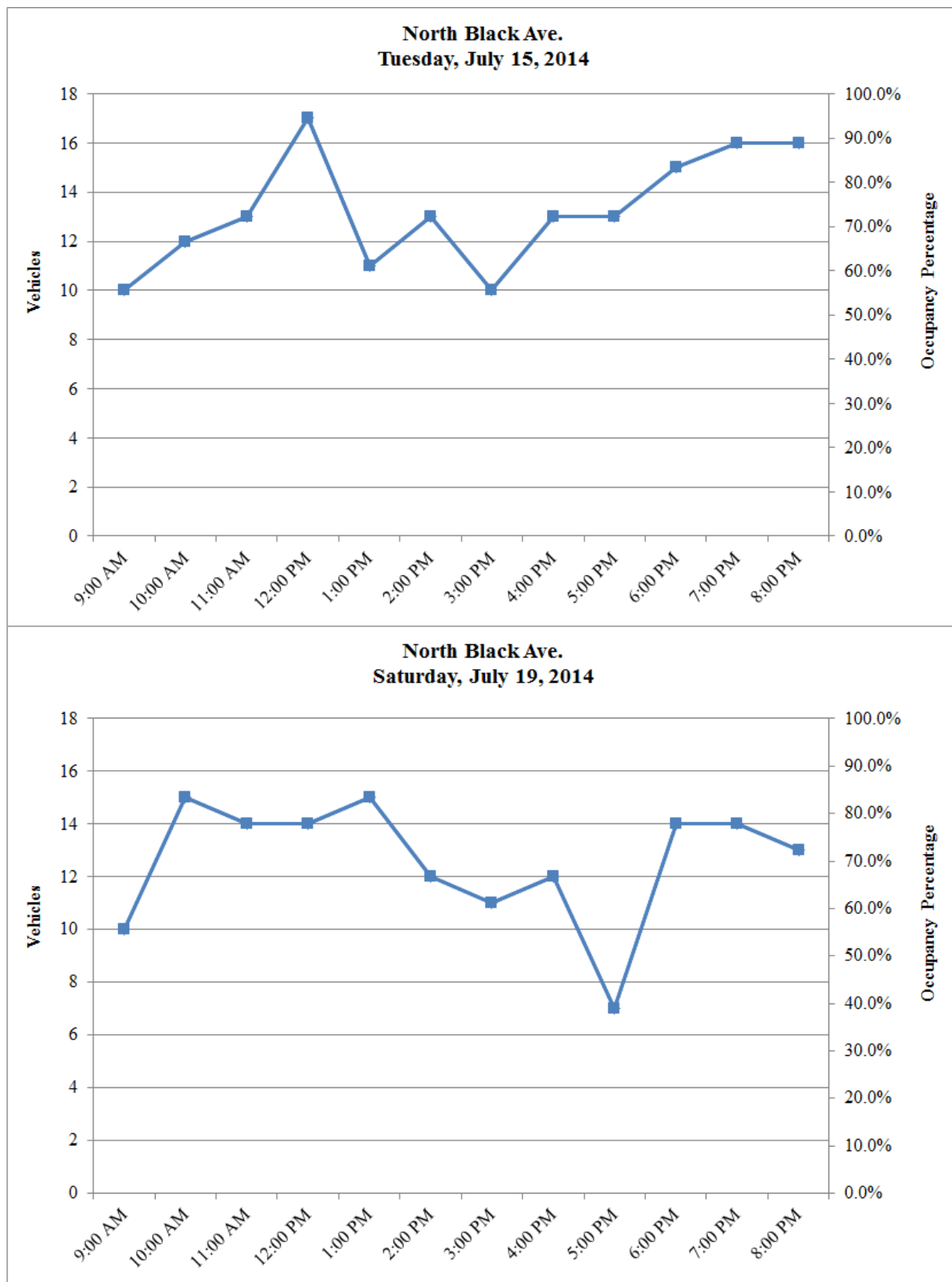


Figure 2-3: North Black Ave. vehicle observations versus occupancy rates

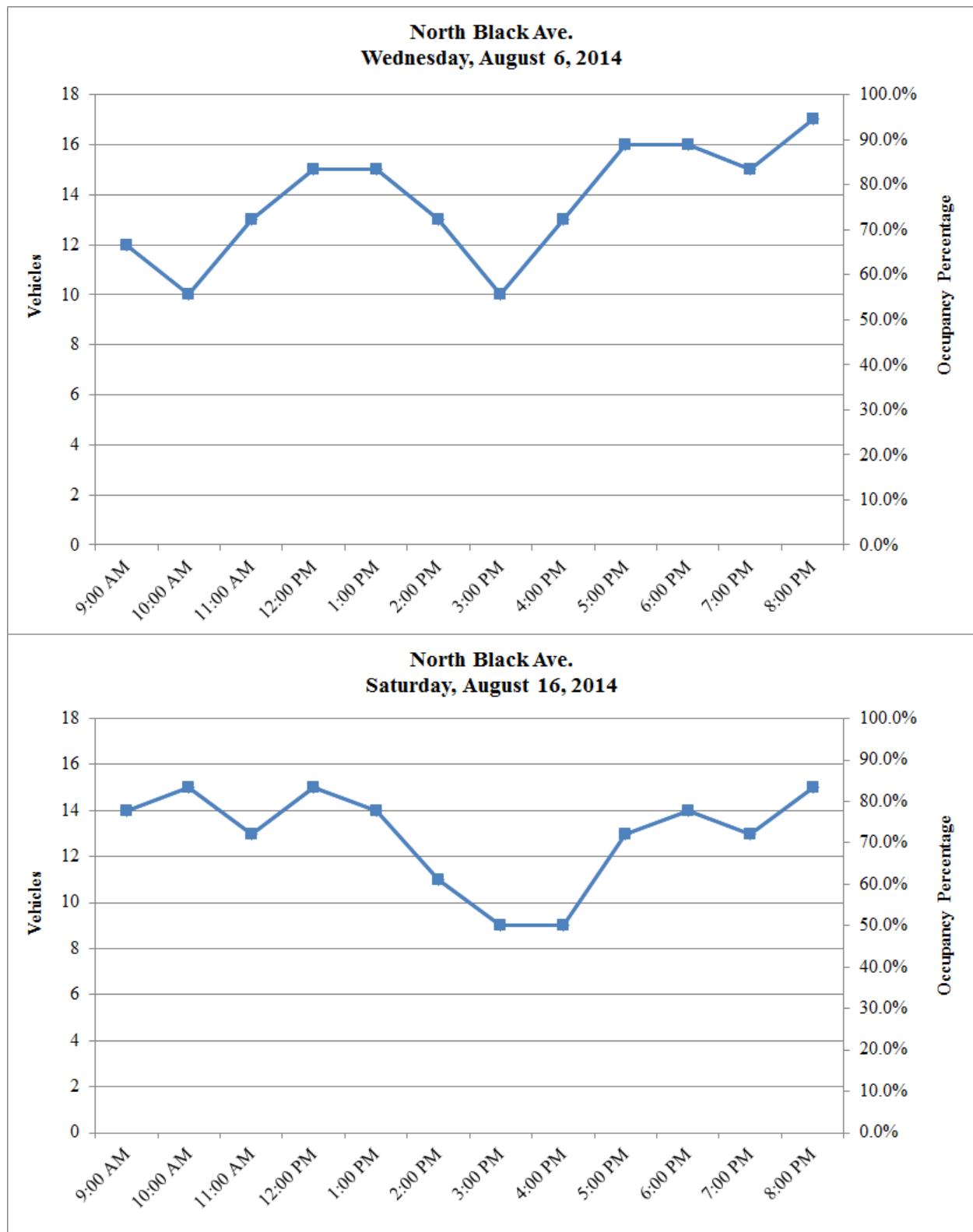


Figure 2-3 cont'd: North Black Ave. vehicle observations versus occupancy rates

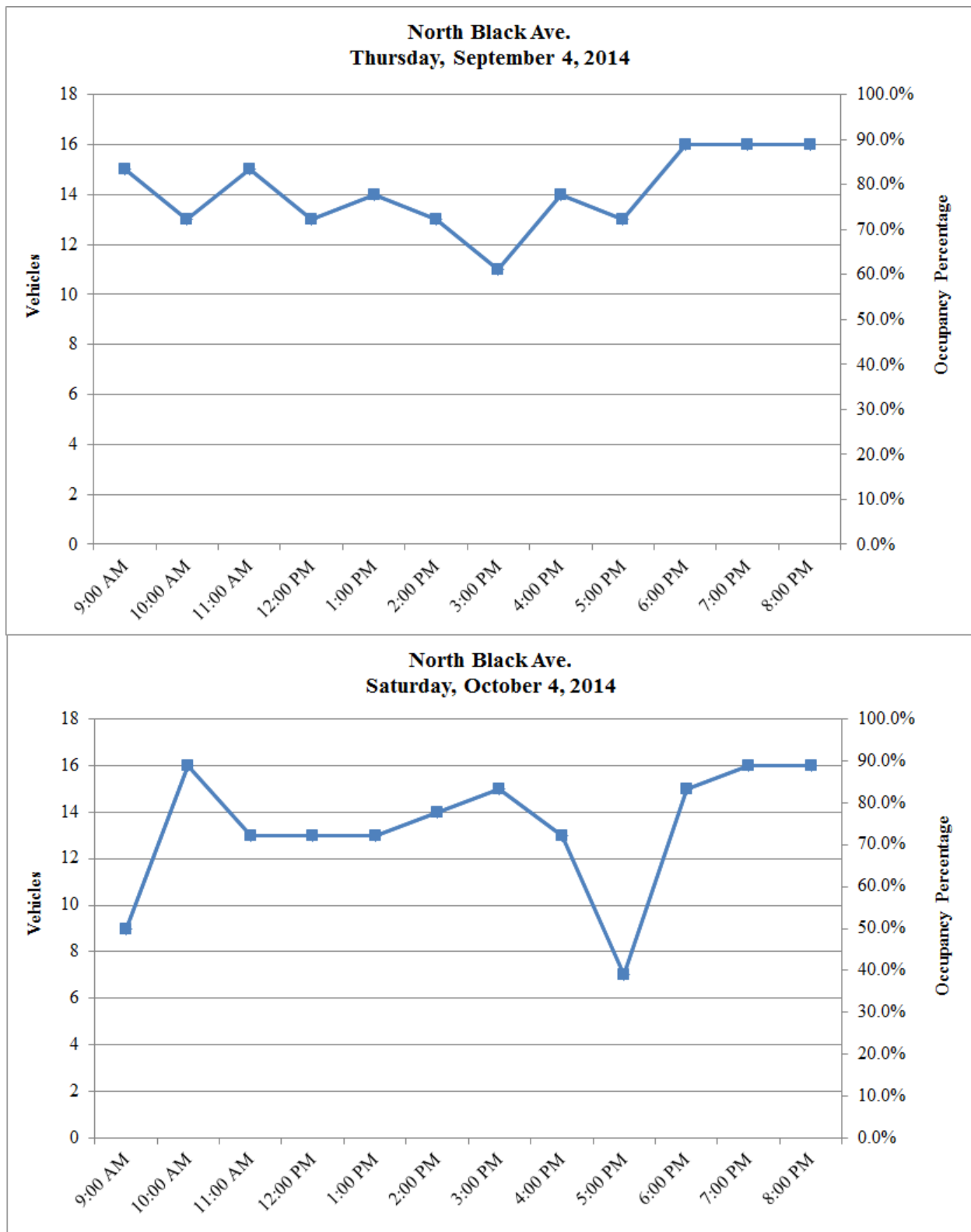


Figure 2-3 cont'd: North Black Ave. vehicle observations versus occupancy rates

2.1.4 South Black Ave.

South Black Avenue has approximately 15 on-street parking stalls. Table 2-4 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. The general trend observed on both weekdays and weekends was for occupancy rates to increase until 12:00 p.m. For weekdays, the July peak was 14 vehicles at 3:00 p.m., the August peak was 15 vehicles at 8 p.m. and the September peak was 14 vehicles at 11 a.m. On weekends, the July peak was 14 vehicles at 12 p.m. and 2 p.m., the August peak was 14 vehicles at 6:00 p.m. and 7:00 p.m. and the October peak was 13 vehicles at 10:00 a.m., 2:00 p.m., 3:00 p.m., 6:00 p.m. and 7:00 p.m. On most days, occupancies remained at or above 70 percent during most of the day. The occupancy trends for this block are further illustrated in Figure 2-2: South Bozeman Ave. vehicle observations versus occupancy rates Figure 2-4. The peak observed rate was approximately 100 percent occupancy at 8:00 p.m. on Wednesday, August 6, 2014.

Table 2-4: South Black Ave. parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014			Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	10	66.7%	9:00 AM	7	46.7%	9:00 AM	14	93.3%	9:00 AM	5	33.3%
10:00 AM	11	73.3%	10:00 AM	9	60.0%	10:00 AM	10	66.7%	10:00 AM	6	40.0%
11:00 AM	12	80.0%	11:00 AM	13	86.7%	11:00 AM	14	93.3%	11:00 AM	11	73.3%
12:00 PM	13	86.7%	12:00 PM	14	93.3%	12:00 PM	13	86.7%	12:00 PM	12	80.0%
1:00 PM	10	66.7%	1:00 PM	12	80.0%	1:00 PM	12	80.0%	1:00 PM	11	73.3%
2:00 PM	13	86.7%	2:00 PM	14	93.3%	2:00 PM	12	80.0%	2:00 PM	11	73.3%
3:00 PM	14	93.3%	3:00 PM	11	73.3%	3:00 PM	11	73.3%	3:00 PM	6	40.0%
4:00 PM	10	66.7%	4:00 PM	12	80.0%	4:00 PM	13	86.7%	4:00 PM	10	66.7%
5:00 PM	11	73.3%	5:00 PM	7	46.7%	5:00 PM	11	73.3%	5:00 PM	11	73.3%
6:00 PM	13	86.7%	6:00 PM	9	60.0%	6:00 PM	11	73.3%	6:00 PM	14	93.3%
7:00 PM	12	80.0%	7:00 PM	13	86.7%	7:00 PM	12	80.0%	7:00 PM	14	93.3%
8:00 PM	11	73.3%	8:00 PM	9	60.0%	8:00 PM	15	100.0%	8:00 PM	13	86.7%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	10	66.7%	9:00 AM	3	20.0%
10:00 AM	8	53.3%	10:00 AM	13	86.7%
11:00 AM	14	93.3%	11:00 AM	12	80.0%
12:00 PM	12	80.0%	12:00 PM	12	80.0%
1:00 PM	11	73.3%	1:00 PM	10	66.7%
2:00 PM	12	80.0%	2:00 PM	13	86.7%
3:00 PM	11	73.3%	3:00 PM	13	86.7%
4:00 PM	9	60.0%	4:00 PM	10	66.7%
5:00 PM	12	80.0%	5:00 PM	12	80.0%
6:00 PM	12	80.0%	6:00 PM	13	86.7%
7:00 PM	13	86.7%	7:00 PM	13	86.7%
8:00 PM	12	80.0%	8:00 PM	12	80.0%



Figure 2-4: South Black Ave. vehicle observations versus occupancy rates

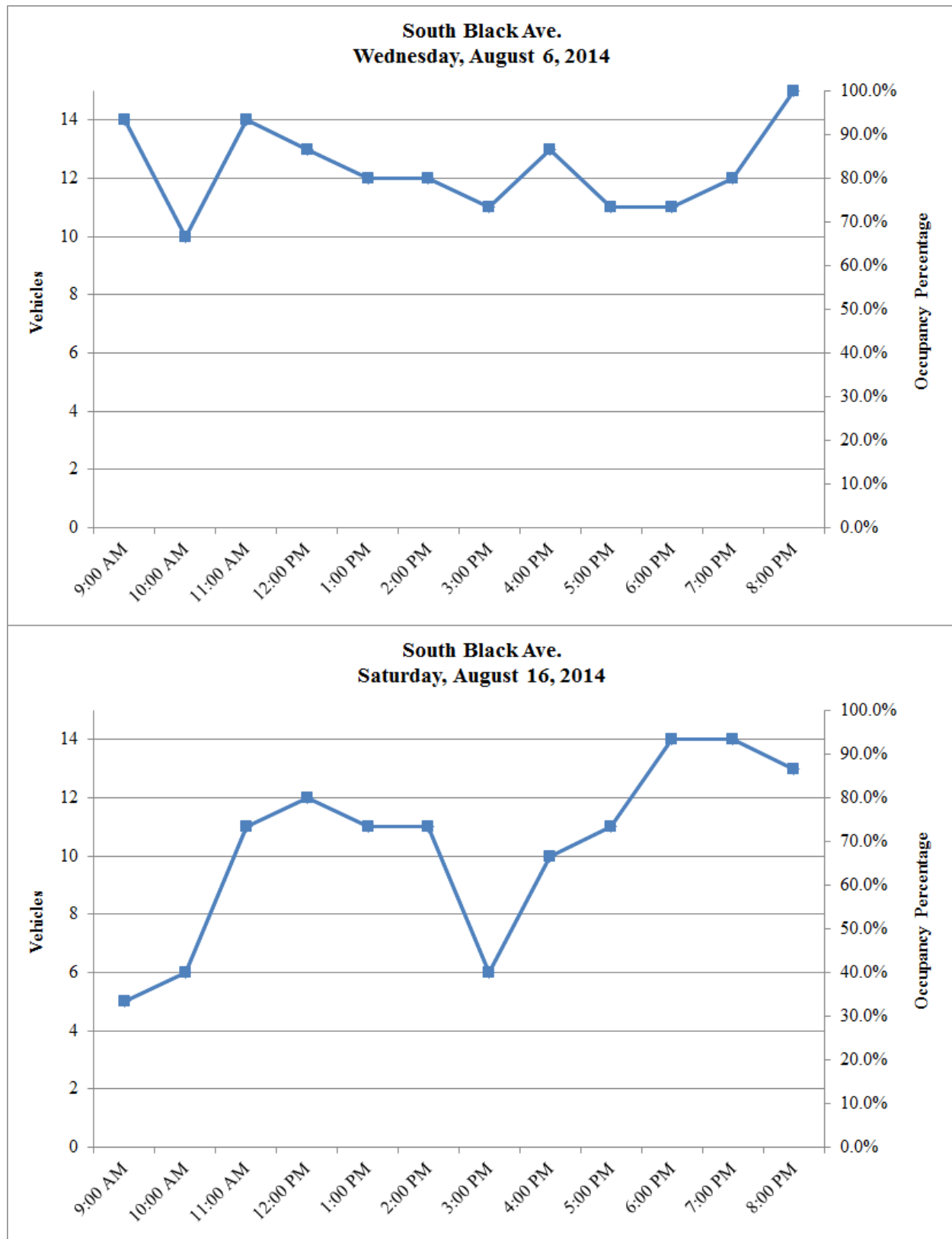


Figure 2-4 cont'd: South Black Ave. vehicle observations versus occupancy rates

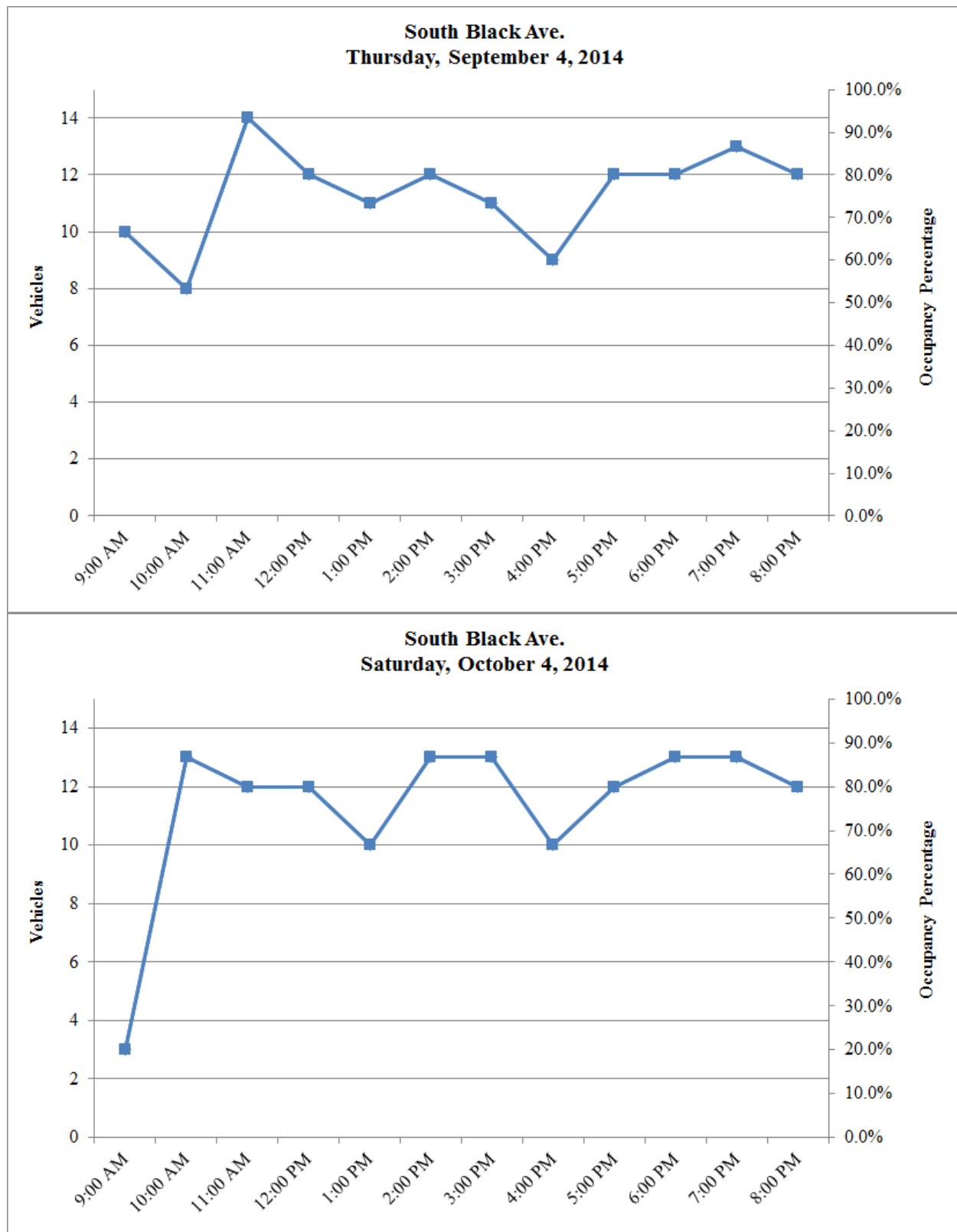


Figure 2-4 cont'd: South Black Ave. vehicle observations versus occupancy rates

2.1.5 North Tracy Ave.

North Tracy Avenue has approximately 17 on-street parking stalls. Table 2-5 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. The observed trend on all days was for occupancy to fluctuate throughout the day. The occupancy trends for this block are further illustrated in Figure 2-2: South Bozeman Ave. vehicle observations versus occupancy ratesFigure 2-5. For weekdays, the July peak was 14 vehicles at 10:00 a.m., the August peak was 17 vehicles at 7:00 p.m. and 8:00 p.m. and the September peak was 15 vehicles at 12:00 p.m. and 1:00 p.m. For weekends, the July peak was 16 vehicles at 1:00 p.m., the August peak was 15 vehicles at 8:00 p.m. and the October peak was 16 vehicles at 1:00 p.m. Occupancy rates generally remained between 60 and 90 percent throughout all study dates. Given its proximity to the downtown core, the higher observed occupancy trends throughout the day were expected.

Table 2-5: North Tracy Ave. parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	10	58.8%	9:00 AM	15	88.2%
10:00 AM	14	82.4%	10:00 AM	14	82.4%
11:00 AM	13	76.5%	11:00 AM	14	82.4%
12:00 PM	13	76.5%	12:00 PM	15	88.2%
1:00 PM	13	76.5%	1:00 PM	16	94.1%
2:00 PM	13	76.5%	2:00 PM	14	82.4%
3:00 PM	14	82.4%	3:00 PM	14	82.4%
4:00 PM	14	82.4%	4:00 PM	13	76.5%
5:00 PM	11	64.7%	5:00 PM	7	41.2%
6:00 PM	13	76.5%	6:00 PM	12	70.6%
7:00 PM	12	70.6%	7:00 PM	12	70.6%
8:00 PM	12	70.6%	8:00 PM	12	70.6%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	12	70.6%	9:00 AM	10	58.8%
10:00 AM	14	82.4%	10:00 AM	14	82.4%
11:00 AM	14	82.4%	11:00 AM	12	70.6%
12:00 PM	13	76.5%	12:00 PM	12	70.6%
1:00 PM	14	82.4%	1:00 PM	13	76.5%
2:00 PM	14	82.4%	2:00 PM	12	70.6%
3:00 PM	12	70.6%	3:00 PM	13	76.5%
4:00 PM	10	58.8%	4:00 PM	6	35.3%
5:00 PM	13	76.5%	5:00 PM	6	35.3%
6:00 PM	15	88.2%	6:00 PM	13	76.5%
7:00 PM	17	100.0%	7:00 PM	14	82.4%
8:00 PM	17	100.0%	8:00 PM	15	88.2%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	13	76.5%	9:00 AM	11	64.7%
10:00 AM	13	76.5%	10:00 AM	14	82.4%
11:00 AM	12	70.6%	11:00 AM	15	88.2%
12:00 PM	15	88.2%	12:00 PM	14	82.4%
1:00 PM	15	88.2%	1:00 PM	16	94.1%
2:00 PM	9	52.9%	2:00 PM	12	70.6%
3:00 PM	12	70.6%	3:00 PM	10	58.8%
4:00 PM	10	58.8%	4:00 PM	12	70.6%
5:00 PM	13	76.5%	5:00 PM	6	35.3%
6:00 PM	8	47.1%	6:00 PM	10	58.8%
7:00 PM	13	76.5%	7:00 PM	13	76.5%
8:00 PM	14	82.4%	8:00 PM	12	70.6%

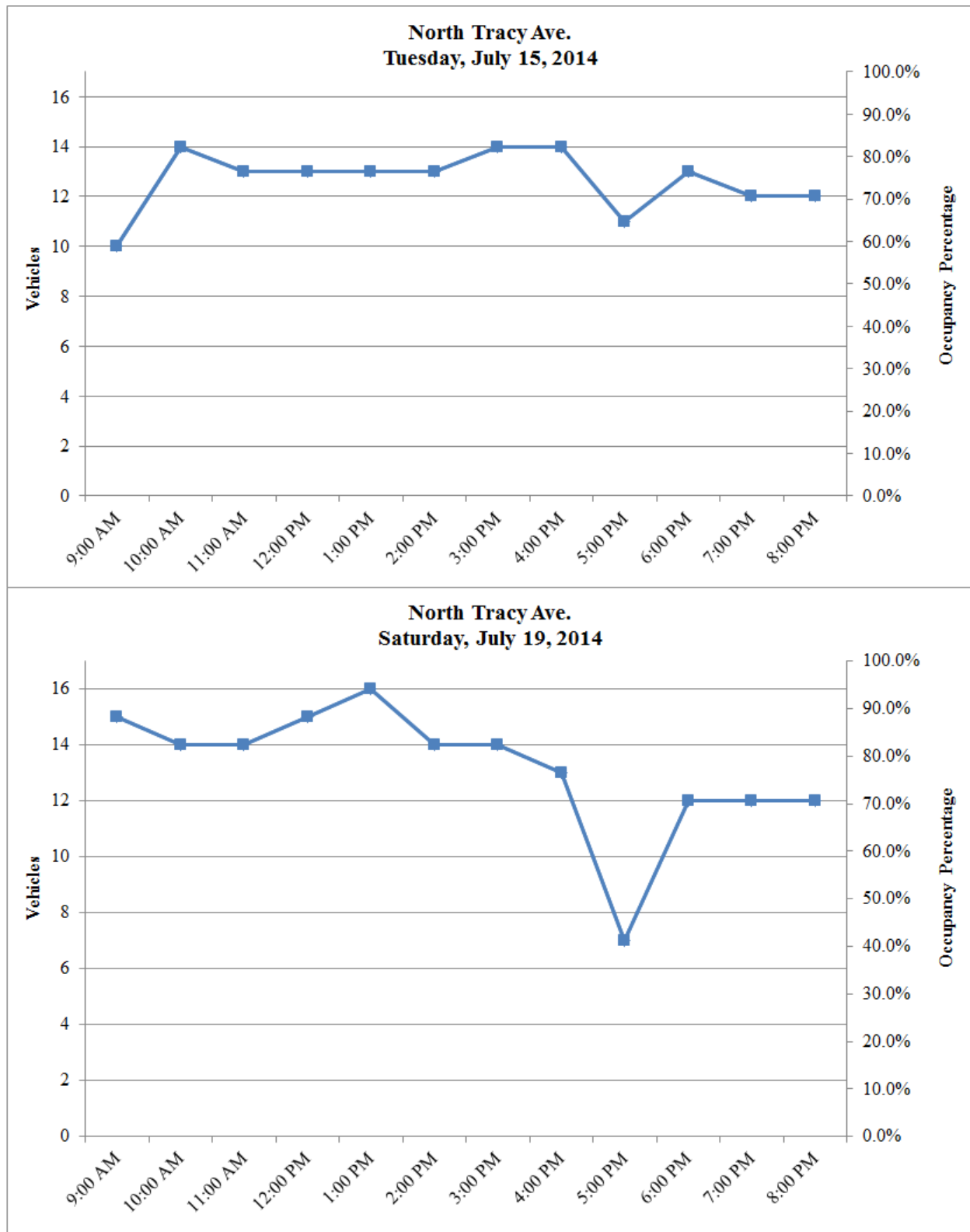


Figure 2-5: North Tracy Ave. vehicle observations versus occupancy rates

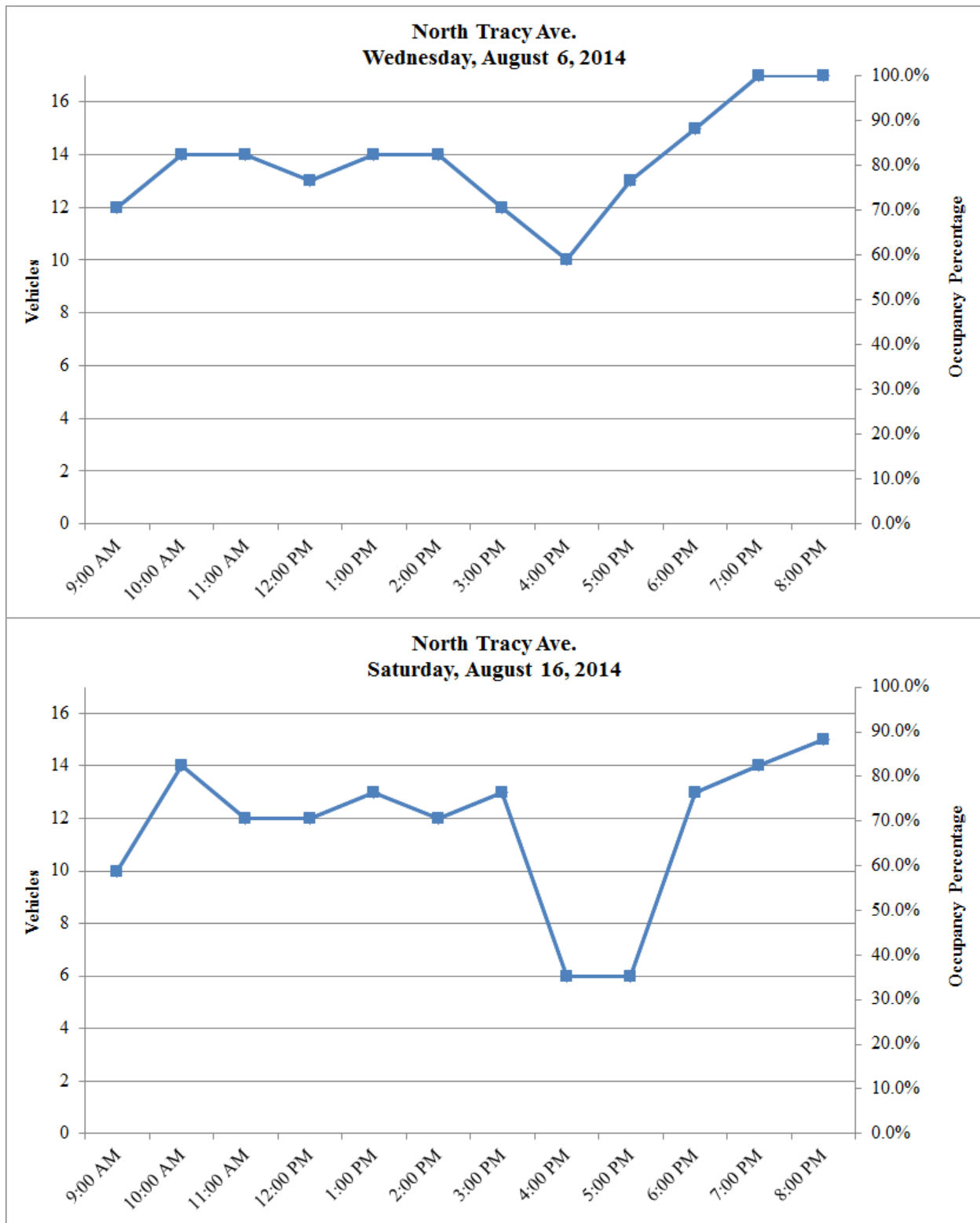


Figure 2-5 cont'd: North Tracy Ave. vehicle observations versus occupancy rates

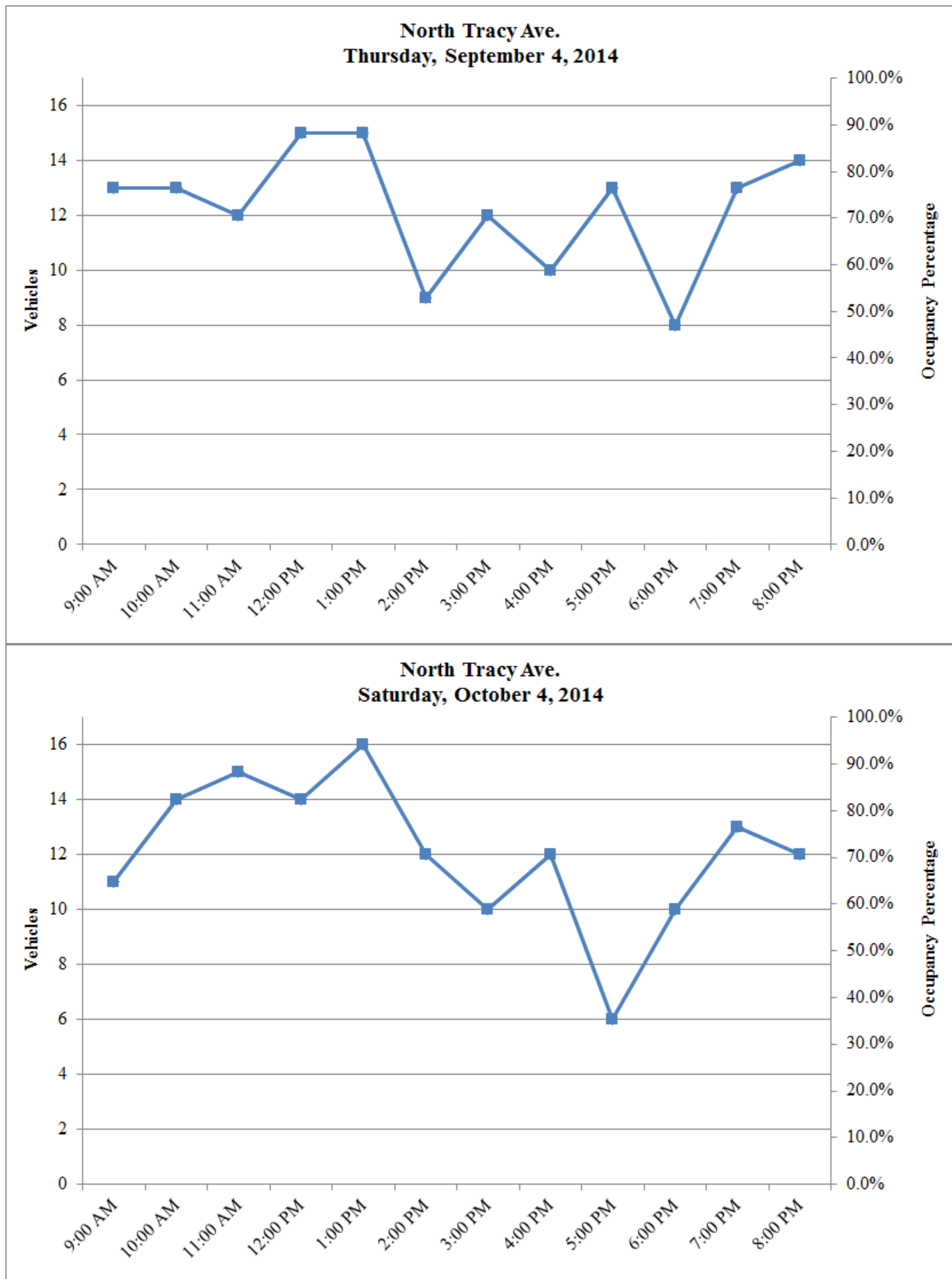


Figure 2-5 cont'd: North Tracy Ave. vehicle observations versus occupancy rates

2.1.6 South Tracy Ave.

South Tracy Avenue has approximately 20 on-street parking stalls. Table 2-6 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. The general trend was for occupancy to vary throughout the day after rising from lows in the early morning. For weekdays, the July peak was 18 vehicles at 11:00 a.m., the August peak was 18 vehicles at 10:00 a.m. and the September peak was 18 vehicles at 2:00 p.m. These earlier morning peaks were a slight deviation from the peaking trends observed on other blocks and may be the result of different business patterns for the nearby area. For weekends, the July peak was 18 vehicles at 2:00 p.m. and 4:00 p.m., the September peak was 18 vehicles at 12:00 p.m. and the October peak was 18 vehicles at 10:00 a.m. The occupancy trends for this block are further illustrated in Figure 2-2: South Bozeman Ave. vehicle observations versus occupancy rates Figure 2-6. On average, occupancy rates were much lower than the peak throughout the day, typically falling in a range between 60 and 90 percent.

Table 2-6: South Tracy Ave. parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014			Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	10	50.0%	9:00 AM	12	60.0%	9:00 AM	16	80.0%	9:00 AM	8	40.0%
10:00 AM	14	70.0%	10:00 AM	17	85.0%	10:00 AM	18	90.0%	10:00 AM	11	55.0%
11:00 AM	18	90.0%	11:00 AM	17	85.0%	11:00 AM	16	80.0%	11:00 AM	14	70.0%
12:00 PM	16	80.0%	12:00 PM	15	75.0%	12:00 PM	14	70.0%	12:00 PM	18	90.0%
1:00 PM	17	85.0%	1:00 PM	16	80.0%	1:00 PM	17	85.0%	1:00 PM	15	75.0%
2:00 PM	16	80.0%	2:00 PM	18	90.0%	2:00 PM	15	75.0%	2:00 PM	15	75.0%
3:00 PM	14	70.0%	3:00 PM	15	75.0%	3:00 PM	14	70.0%	3:00 PM	14	70.0%
4:00 PM	16	80.0%	4:00 PM	18	90.0%	4:00 PM	17	85.0%	4:00 PM	10	50.0%
5:00 PM	13	65.0%	5:00 PM	12	60.0%	5:00 PM	10	50.0%	5:00 PM	11	55.0%
6:00 PM	15	75.0%	6:00 PM	15	75.0%	6:00 PM	14	70.0%	6:00 PM	15	75.0%
7:00 PM	13	65.0%	7:00 PM	16	80.0%	7:00 PM	16	80.0%	7:00 PM	17	85.0%
8:00 PM	12	60.0%	8:00 PM	16	80.0%	8:00 PM	17	85.0%	8:00 PM	16	80.0%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	14	70.0%	9:00 AM	6	30.0%
10:00 AM	16	80.0%	10:00 AM	18	90.0%
11:00 AM	14	70.0%	11:00 AM	17	85.0%
12:00 PM	16	80.0%	12:00 PM	16	80.0%
1:00 PM	15	75.0%	1:00 PM	15	75.0%
2:00 PM	18	90.0%	2:00 PM	17	85.0%
3:00 PM	11	55.0%	3:00 PM	16	80.0%
4:00 PM	15	75.0%	4:00 PM	17	85.0%
5:00 PM	13	65.0%	5:00 PM	14	70.0%
6:00 PM	10	50.0%	6:00 PM	14	70.0%
7:00 PM	16	80.0%	7:00 PM	12	60.0%
8:00 PM	14	70.0%	8:00 PM	15	75.0%

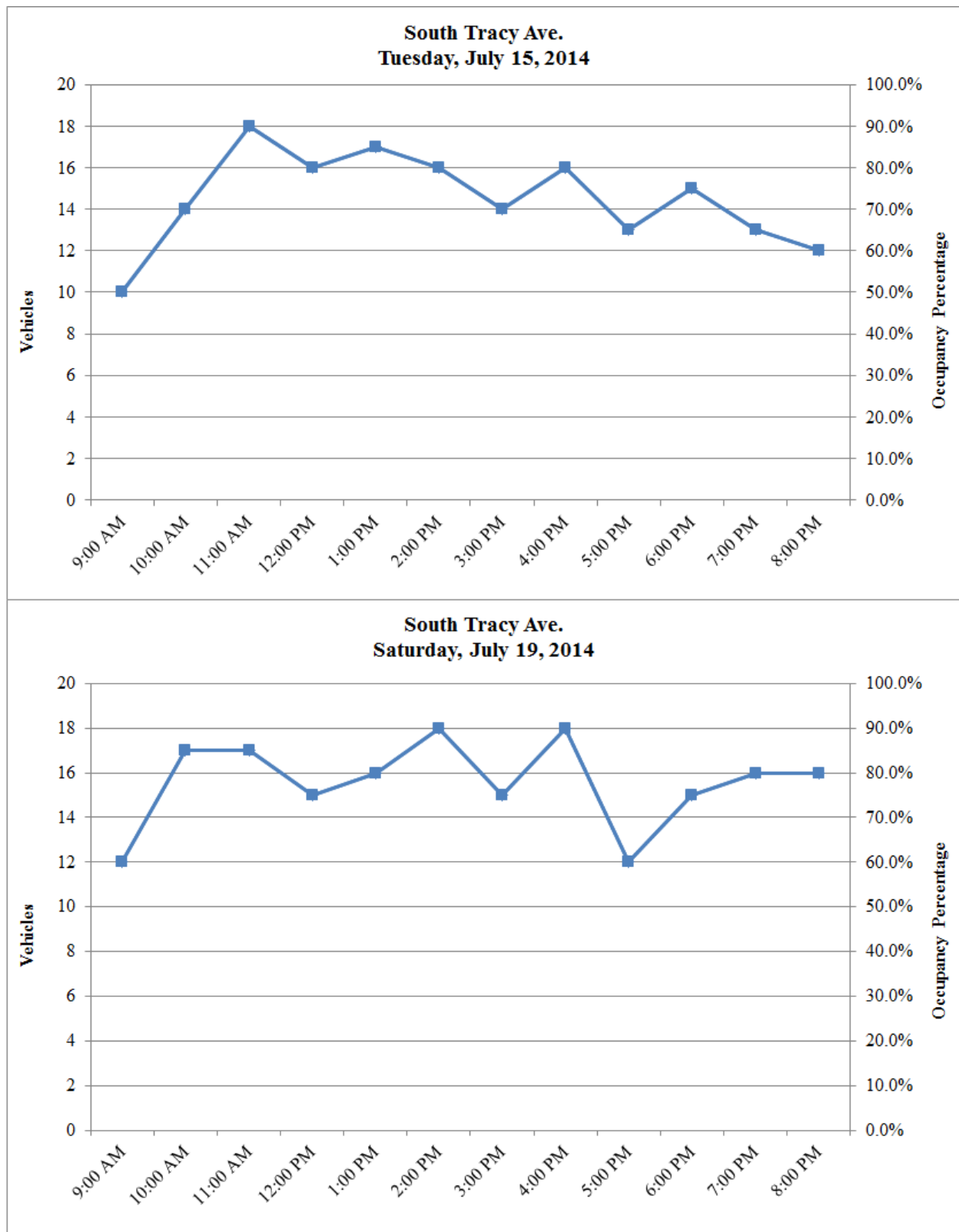


Figure 2-6: South Tracy Ave. vehicle observations versus occupancy rates

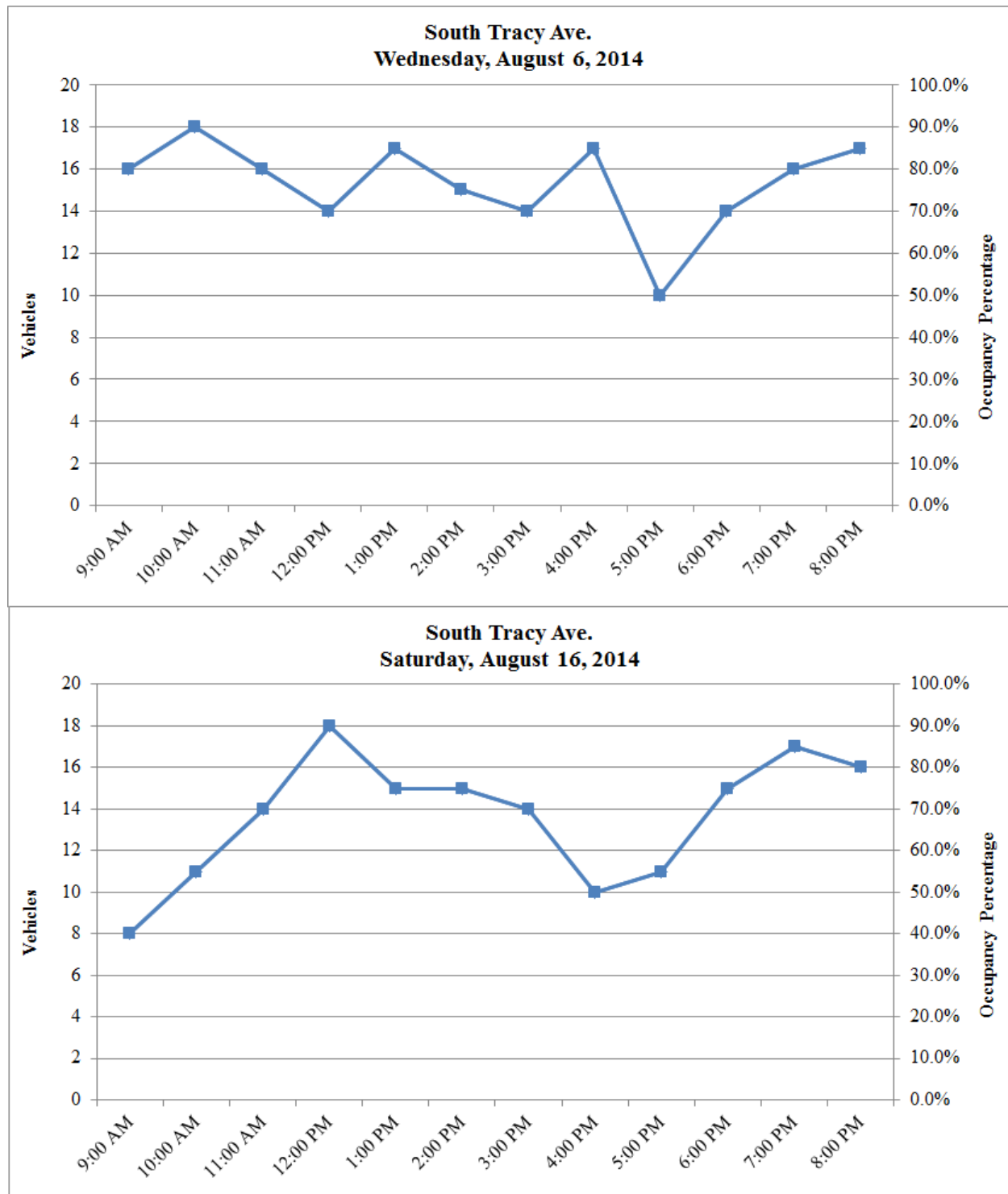


Figure 2-6 cont'd: South Tracy Ave. vehicle observations versus occupancy rates

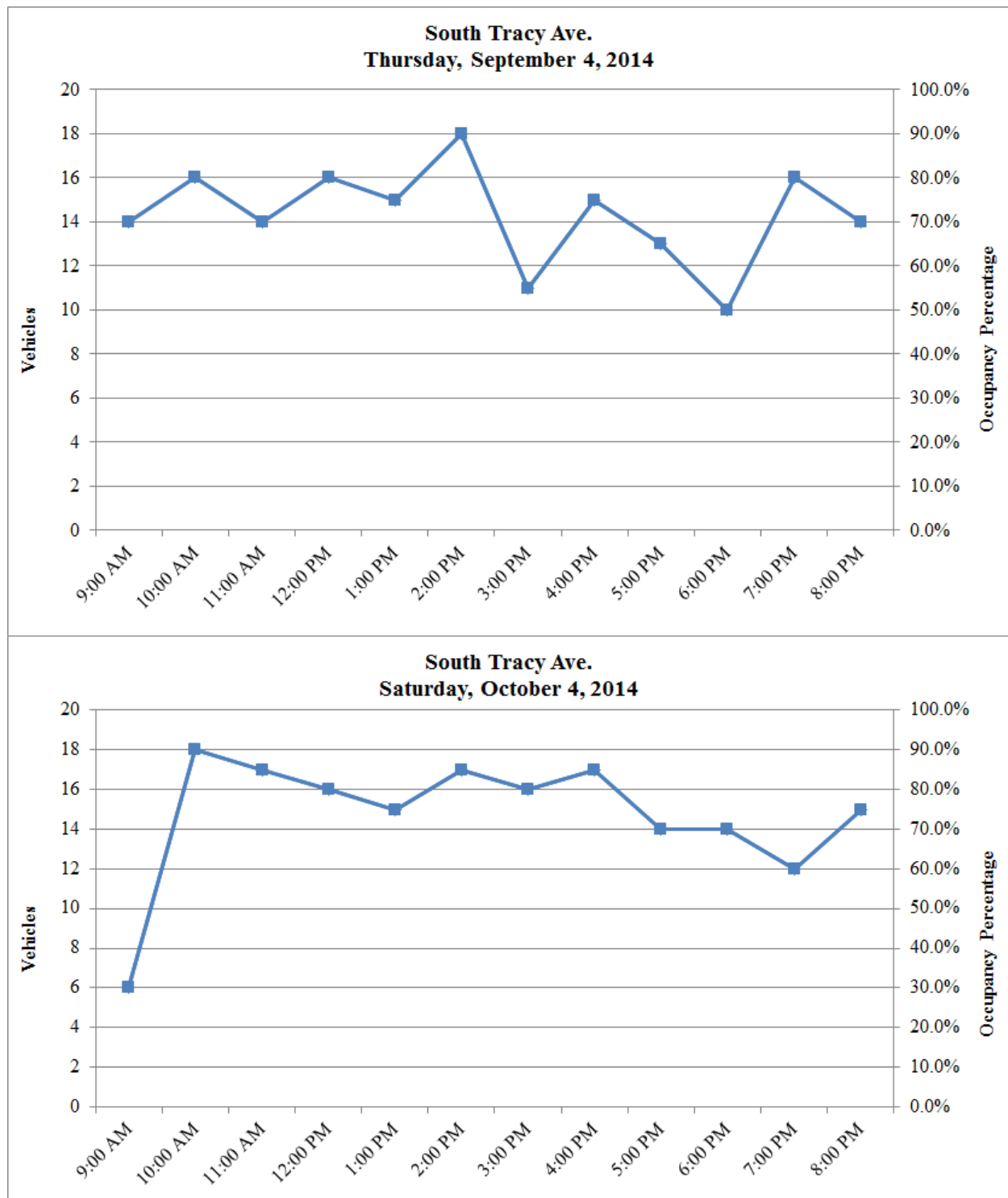


Figure 2-6 cont'd: South Tracy Ave. vehicle observations versus occupancy rates

2.1.7 North Willson Ave.

North Willson Avenue has approximately 9 on-street parking stalls, all located on the west side of this block face. This accounts for the lower number of on-street stalls compared to other blocks. Table 2-7 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. The general trend for this block was for occupancy to climb throughout the day, although some drops in the mid-afternoon were observed on some days. Weekday peak occupancy was 9 vehicles, occurring at 7:00 p.m. and 8:00 p.m. in July, 7:00 p.m. in August and 12:00 p.m., 1:00 p.m., 7:00 p.m. and 8:00 p.m. in September. Weekend peak occupancy was also 9 vehicles, occurring at 11:00 a.m., 12:00 p.m. and 7:00 p.m. in July, 8:00 p.m. in August and at 12:00 p.m., 1:00 p.m. and 8:00 p.m. in October. The occupancy trends for this block are further illustrated in Figure 2-2: South Bozeman Ave. vehicle observations versus occupancy rates Figure 2-7. On average, occupancy rates were typically above 50 percent throughout the days observed, which was expected given the proximity of the block to the downtown core.

Table 2-7: North Willson Ave. parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	0	0.0%	9:00 AM	0	0.0%
10:00 AM	4	44.4%	10:00 AM	1	11.1%
11:00 AM	6	66.7%	11:00 AM	5	55.6%
12:00 PM	5	55.6%	12:00 PM	9	100.0%
1:00 PM	8	88.9%	1:00 PM	9	100.0%
2:00 PM	7	77.8%	2:00 PM	8	88.9%
3:00 PM	6	66.7%	3:00 PM	7	77.8%
4:00 PM	6	66.7%	4:00 PM	7	77.8%
5:00 PM	6	66.7%	5:00 PM	5	55.6%
6:00 PM	8	88.9%	6:00 PM	8	88.9%
7:00 PM	9	100.0%	7:00 PM	9	100.0%
8:00 PM	9	100.0%	8:00 PM	8	88.9%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	3	33.3%	9:00 AM	1	11.1%
10:00 AM	3	33.3%	10:00 AM	2	22.2%
11:00 AM	6	66.7%	11:00 AM	6	66.7%
12:00 PM	8	88.9%	12:00 PM	7	77.8%
1:00 PM	7	77.8%	1:00 PM	8	88.9%
2:00 PM	6	66.7%	2:00 PM	7	77.8%
3:00 PM	8	88.9%	3:00 PM	4	44.4%
4:00 PM	7	77.8%	4:00 PM	5	55.6%
5:00 PM	7	77.8%	5:00 PM	8	88.9%
6:00 PM	8	88.9%	6:00 PM	8	88.9%
7:00 PM	9	100.0%	7:00 PM	8	88.9%
8:00 PM	8	88.9%	8:00 PM	9	100.0%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	4	44.4%	9:00 AM	4	44.4%
10:00 AM	5	55.6%	10:00 AM	5	55.6%
11:00 AM	7	77.8%	11:00 AM	6	66.7%
12:00 PM	9	100.0%	12:00 PM	9	100.0%
1:00 PM	9	100.0%	1:00 PM	9	100.0%
2:00 PM	6	66.7%	2:00 PM	8	88.9%
3:00 PM	8	88.9%	3:00 PM	5	55.6%
4:00 PM	6	66.7%	4:00 PM	5	55.6%
5:00 PM	7	77.8%	5:00 PM	8	88.9%
6:00 PM	8	88.9%	6:00 PM	7	77.8%
7:00 PM	9	100.0%	7:00 PM	7	77.8%
8:00 PM	9	100.0%	8:00 PM	9	100.0%

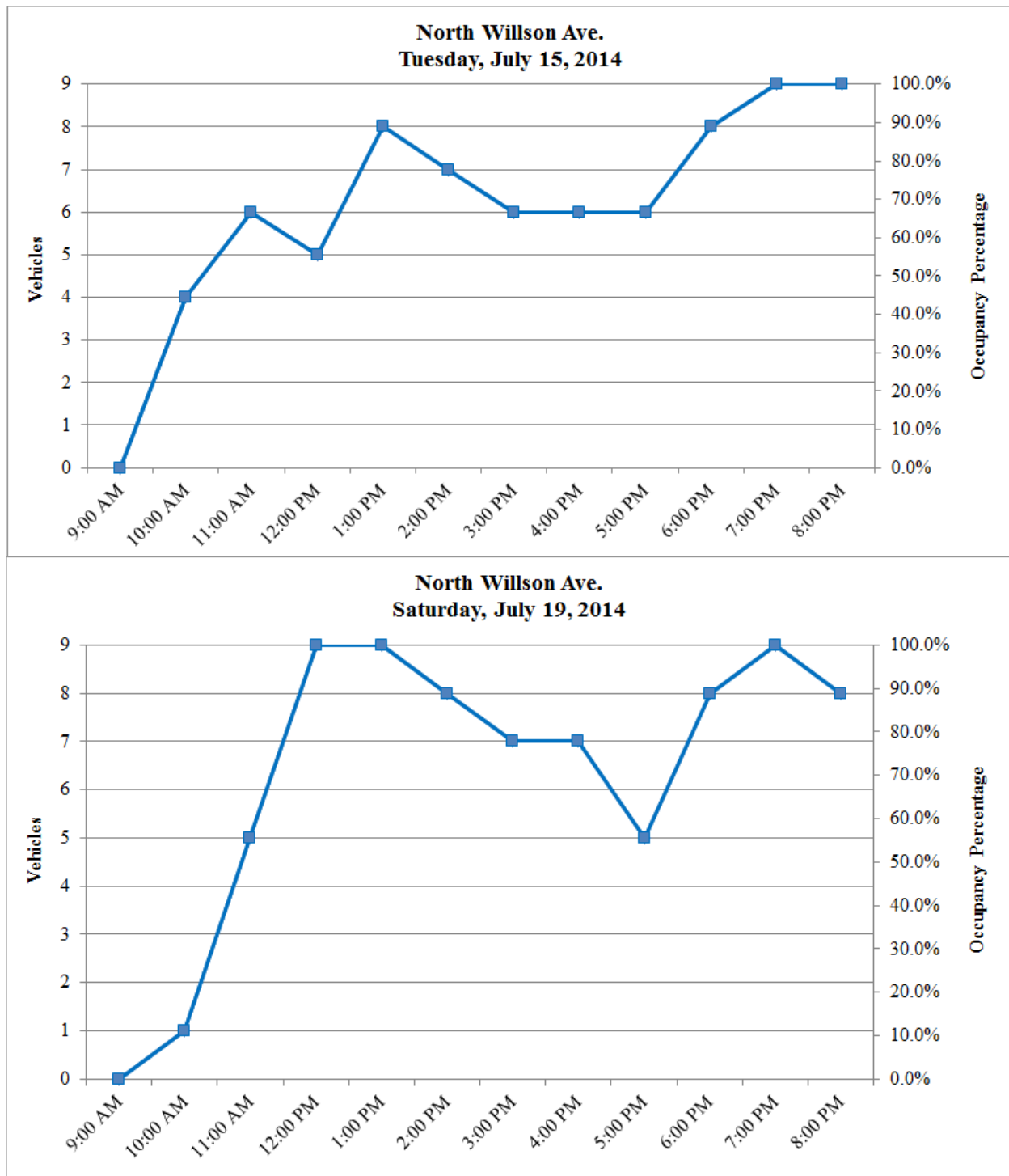


Figure 2-7: North Willson Ave. vehicle observations versus occupancy rates

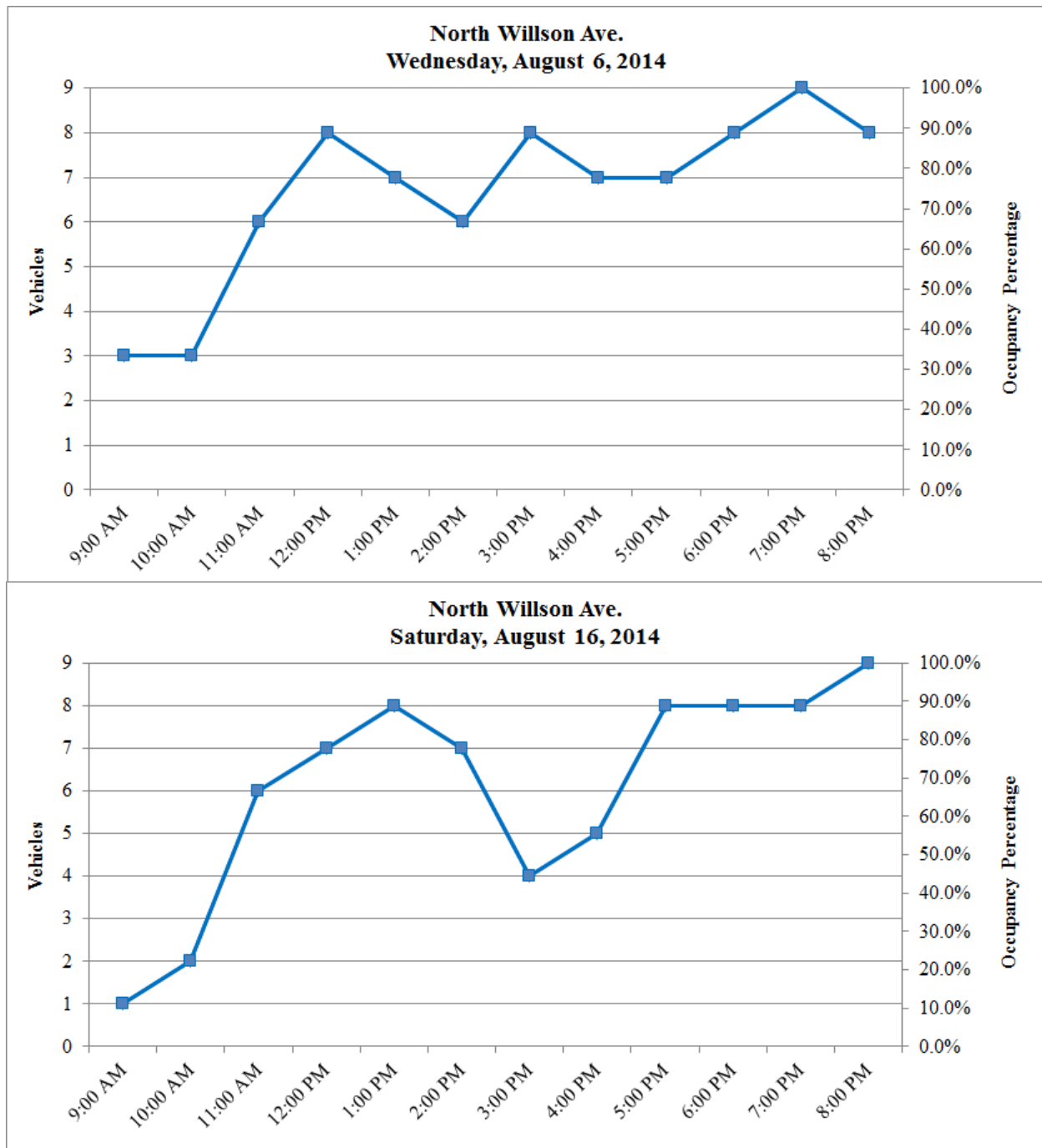


Figure 2-7 cont'd: North Willson Ave. vehicle observations versus occupancy rates

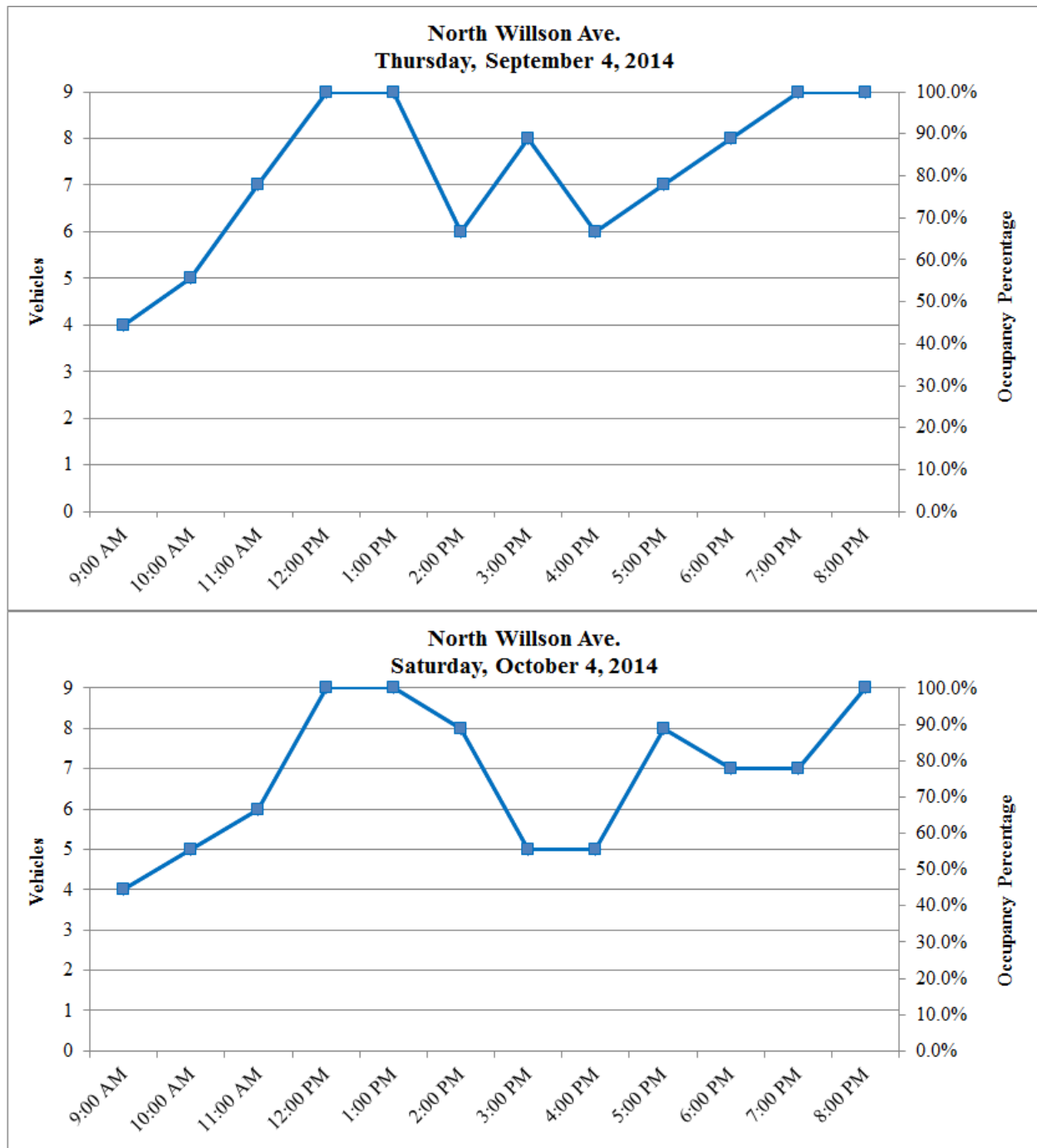


Figure 2-7 cont'd: North Willson Ave. vehicle observations versus occupancy rates

2.1.8 South Willson Ave.

South Willson Avenue has approximately 20 on-street parking stalls. Table 2-8 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. Similar to other blocks, occupancy fluctuated during each day, generally remaining high in the afternoon and evening. Weekday peak occupancy was 19 vehicles at 12:00 p.m. and 2:00 p.m. in July, 19 vehicles at 2:00 p.m. and 6:00 p.m. in August and 18 vehicles at 2:00 p.m. and 6:00 p.m. in September. Weekday peak occupancy was also 9 vehicles, occurring at 11:00 a.m., 12:00 p.m. and 7:00 p.m. in July, 8:00 p.m. in August and at 12:00 p.m., 1:00 p.m. and 8:00 p.m. in October. For weekends, the July peak was 20 vehicles at 3:00 p.m., the September peak was 18 vehicles at 4:00 p.m., 7:00 p.m. and 8:00 p.m. and the October peak was 18 vehicles at 7:00 p.m. The occupancy trends for this block are further illustrated in Figure 2-2: South Bozeman Ave. vehicle observations versus occupancy rates Figure 2-8. On average, occupancy rates were typically above 60 percent, with a peak occupancy of 100 percent observed on Saturday, July 19 at 3:00 p.m.

Table 2-8: South Willson Ave. parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014			Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	8	40.0%	9:00 AM	11	55.0%	9:00 AM	13	65.0%	9:00 AM	3	15.0%
10:00 AM	11	55.0%	10:00 AM	18	90.0%	10:00 AM	11	55.0%	10:00 AM	15	75.0%
11:00 AM	16	80.0%	11:00 AM	19	95.0%	11:00 AM	10	50.0%	11:00 AM	12	60.0%
12:00 PM	19	95.0%	12:00 PM	19	95.0%	12:00 PM	13	65.0%	12:00 PM	16	80.0%
1:00 PM	18	90.0%	1:00 PM	18	90.0%	1:00 PM	13	65.0%	1:00 PM	17	85.0%
2:00 PM	19	95.0%	2:00 PM	16	80.0%	2:00 PM	19	95.0%	2:00 PM	14	70.0%
3:00 PM	13	65.0%	3:00 PM	20	100.0%	3:00 PM	15	75.0%	3:00 PM	16	80.0%
4:00 PM	15	75.0%	4:00 PM	19	95.0%	4:00 PM	17	85.0%	4:00 PM	18	90.0%
5:00 PM	14	70.0%	5:00 PM	17	85.0%	5:00 PM	14	70.0%	5:00 PM	10	50.0%
6:00 PM	18	90.0%	6:00 PM	17	85.0%	6:00 PM	19	95.0%	6:00 PM	17	85.0%
7:00 PM	15	75.0%	7:00 PM	19	95.0%	7:00 PM	16	80.0%	7:00 PM	18	90.0%
8:00 PM	18	90.0%	8:00 PM	16	80.0%	8:00 PM	17	85.0%	8:00 PM	18	90.0%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	5	25.0%	9:00 AM	4	20.0%
10:00 AM	12	60.0%	10:00 AM	6	30.0%
11:00 AM	16	80.0%	11:00 AM	17	85.0%
12:00 PM	16	80.0%	12:00 PM	17	85.0%
1:00 PM	16	80.0%	1:00 PM	14	70.0%
2:00 PM	18	90.0%	2:00 PM	17	85.0%
3:00 PM	15	75.0%	3:00 PM	12	60.0%
4:00 PM	14	70.0%	4:00 PM	6	30.0%
5:00 PM	17	85.0%	5:00 PM	15	75.0%
6:00 PM	18	90.0%	6:00 PM	17	85.0%
7:00 PM	17	85.0%	7:00 PM	18	90.0%
8:00 PM	14	70.0%	8:00 PM	17	85.0%

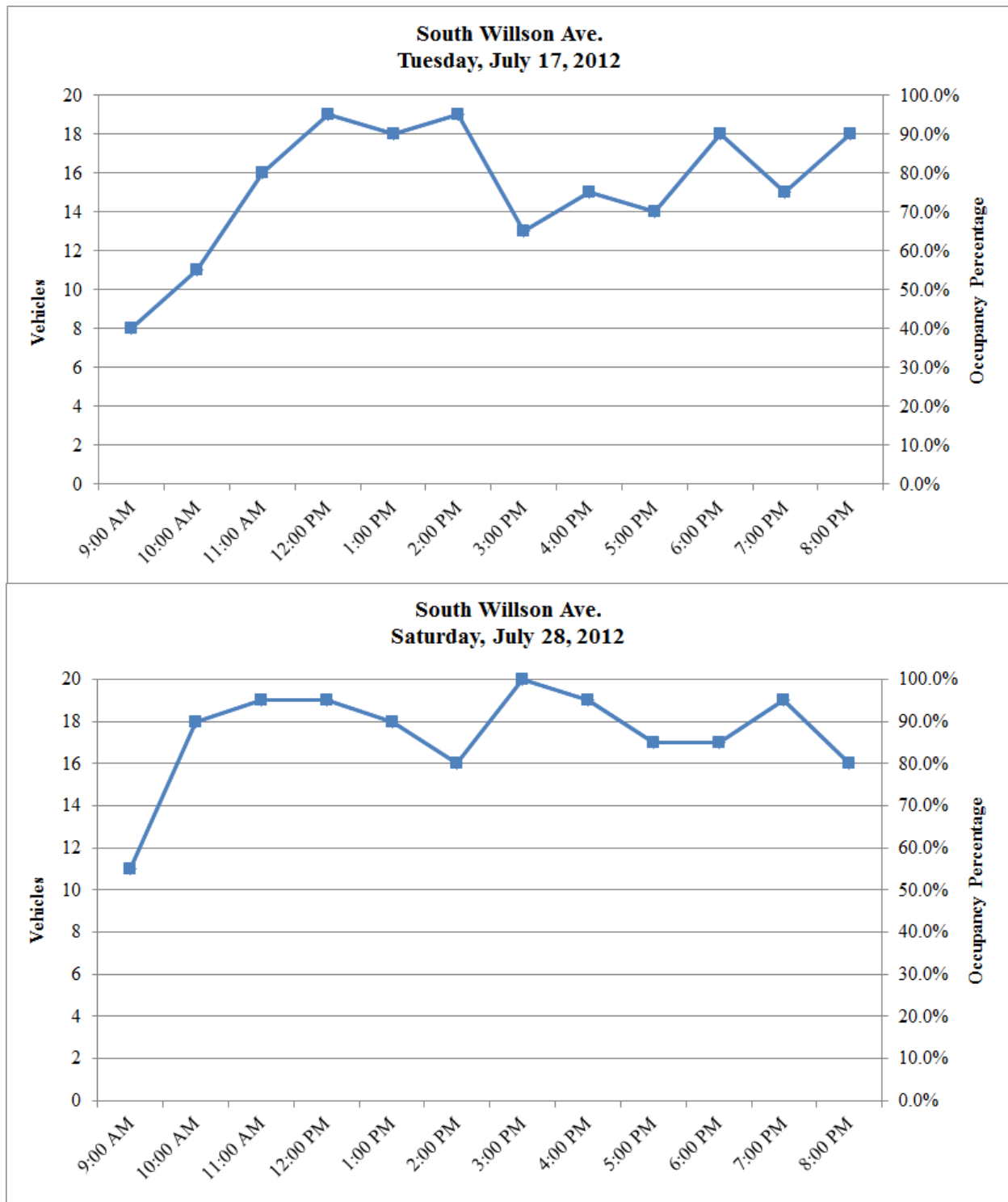


Figure 2-8: South Willson Ave. vehicle observations versus occupancy rates

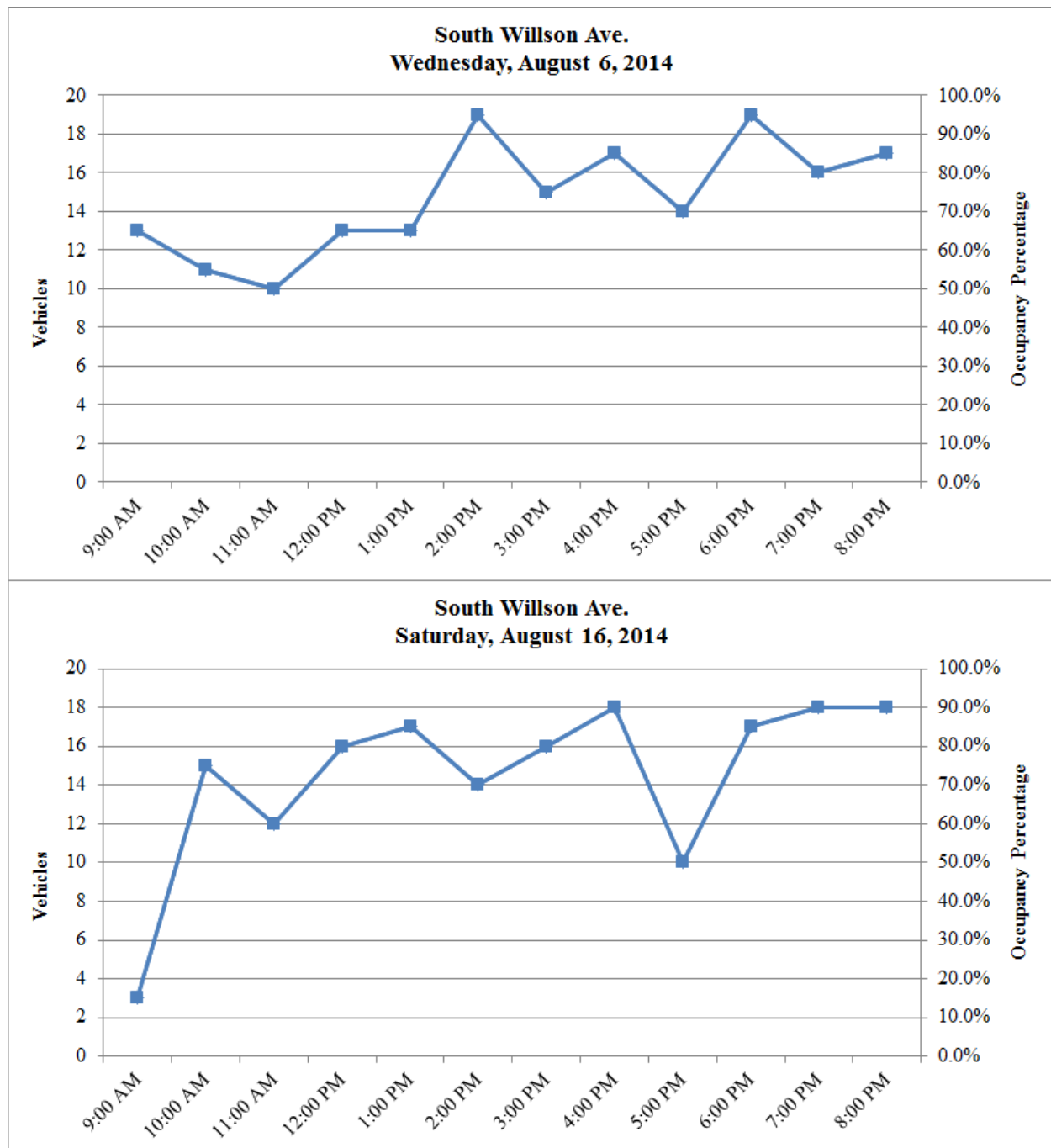


Figure 2-8 cont'd: South Willson Ave. vehicle observations versus occupancy rates

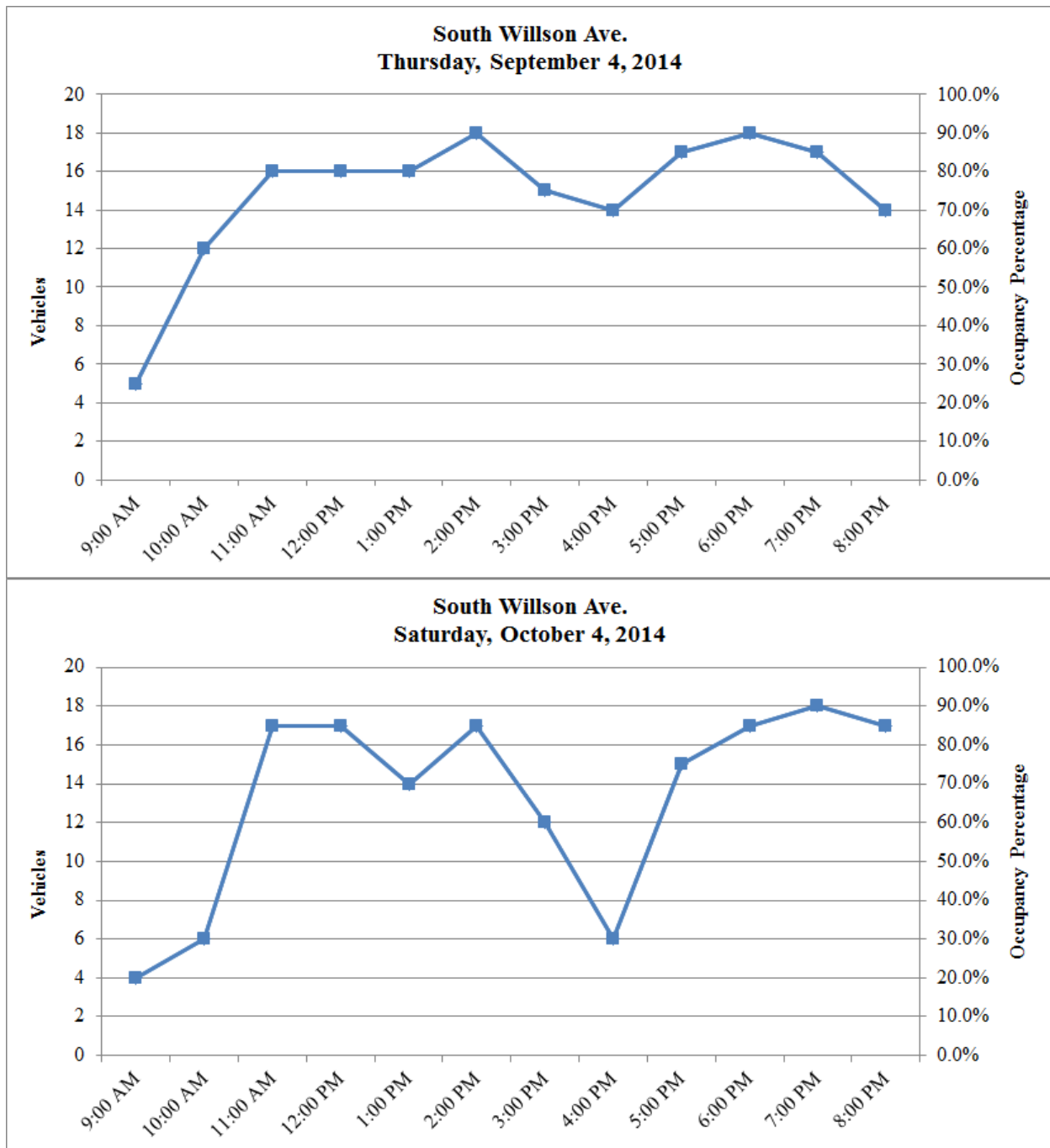


Figure 2-8 cont'd: South Willson Ave. vehicle observations versus occupancy rates

2.1.9 West Babcock St. - Willson Ave. to Tracy Ave.

West Babcock Street between Willson Avenue and Tracy Avenue has approximately 13 on-street parking stalls. Table 2-9 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. Unlike other block groups, the overall occupancy trend was more variable throughout the day. This variability may be the result of the block group being located on the periphery of the study area and the downtown core. While several dates saw a peak occurring around lunch, others (August 16 and October 4, 2014) had a peak occur in the mid-afternoon. On one date (September 4, 2014) the peak occurred at 7:00 p.m. Weekday peak occupancy was 13 vehicles at 1:00 p.m. on July 15, 2014. Weekend peak occupancies were 12 vehicles at 1:00 p.m. on July 28, 2014 and 3:00 p.m. on August 16, 2014. For the majority of observation times on all collection dates, occupancies were lower than these peaks. Overall, occupancy for this block generally remained at or below 80 percent. The overall trends for this block are presented in Figure 2-9.

Table 2-9: West Babcock St. between Willson and Tracy Aves. parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 28, 2012		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	5	38.5%	9:00 AM	2	15.4%
10:00 AM	5	38.5%	10:00 AM	8	61.5%
11:00 AM	5	38.5%	11:00 AM	8	61.5%
12:00 PM	9	69.2%	12:00 PM	11	84.6%
1:00 PM	13	100.0%	1:00 PM	12	92.3%
2:00 PM	9	69.2%	2:00 PM	11	84.6%
3:00 PM	10	76.9%	3:00 PM	7	53.8%
4:00 PM	10	76.9%	4:00 PM	9	69.2%
5:00 PM	10	76.9%	5:00 PM	5	38.5%
6:00 PM	3	23.1%	6:00 PM	2	15.4%
7:00 PM	10	76.9%	7:00 PM	5	38.5%
8:00 PM	7	53.8%	8:00 PM	9	69.2%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	6	46.2%	9:00 AM	0	0.0%
10:00 AM	5	38.5%	10:00 AM	7	53.8%
11:00 AM	5	38.5%	11:00 AM	5	38.5%
12:00 PM	4	30.8%	12:00 PM	4	30.8%
1:00 PM	9	69.2%	1:00 PM	5	38.5%
2:00 PM	7	53.8%	2:00 PM	7	53.8%
3:00 PM	5	38.5%	3:00 PM	12	92.3%
4:00 PM	9	69.2%	4:00 PM	8	61.5%
5:00 PM	7	53.8%	5:00 PM	4	30.8%
6:00 PM	5	38.5%	6:00 PM	6	46.2%
7:00 PM	6	46.2%	7:00 PM	10	76.9%
8:00 PM	7	53.8%	8:00 PM	6	46.2%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	3	23.1%	9:00 AM	3	23.1%
10:00 AM	8	61.5%	10:00 AM	4	30.8%
11:00 AM	10	76.9%	11:00 AM	4	30.8%
12:00 PM	7	53.8%	12:00 PM	5	38.5%
1:00 PM	6	46.2%	1:00 PM	4	30.8%
2:00 PM	9	69.2%	2:00 PM	11	84.6%
3:00 PM	9	69.2%	3:00 PM	2	15.4%
4:00 PM	10	76.9%	4:00 PM	3	23.1%
5:00 PM	8	61.5%	5:00 PM	5	38.5%
6:00 PM	3	23.1%	6:00 PM	7	53.8%
7:00 PM	12	92.3%	7:00 PM	8	61.5%
8:00 PM	10	76.9%	8:00 PM	5	38.5%

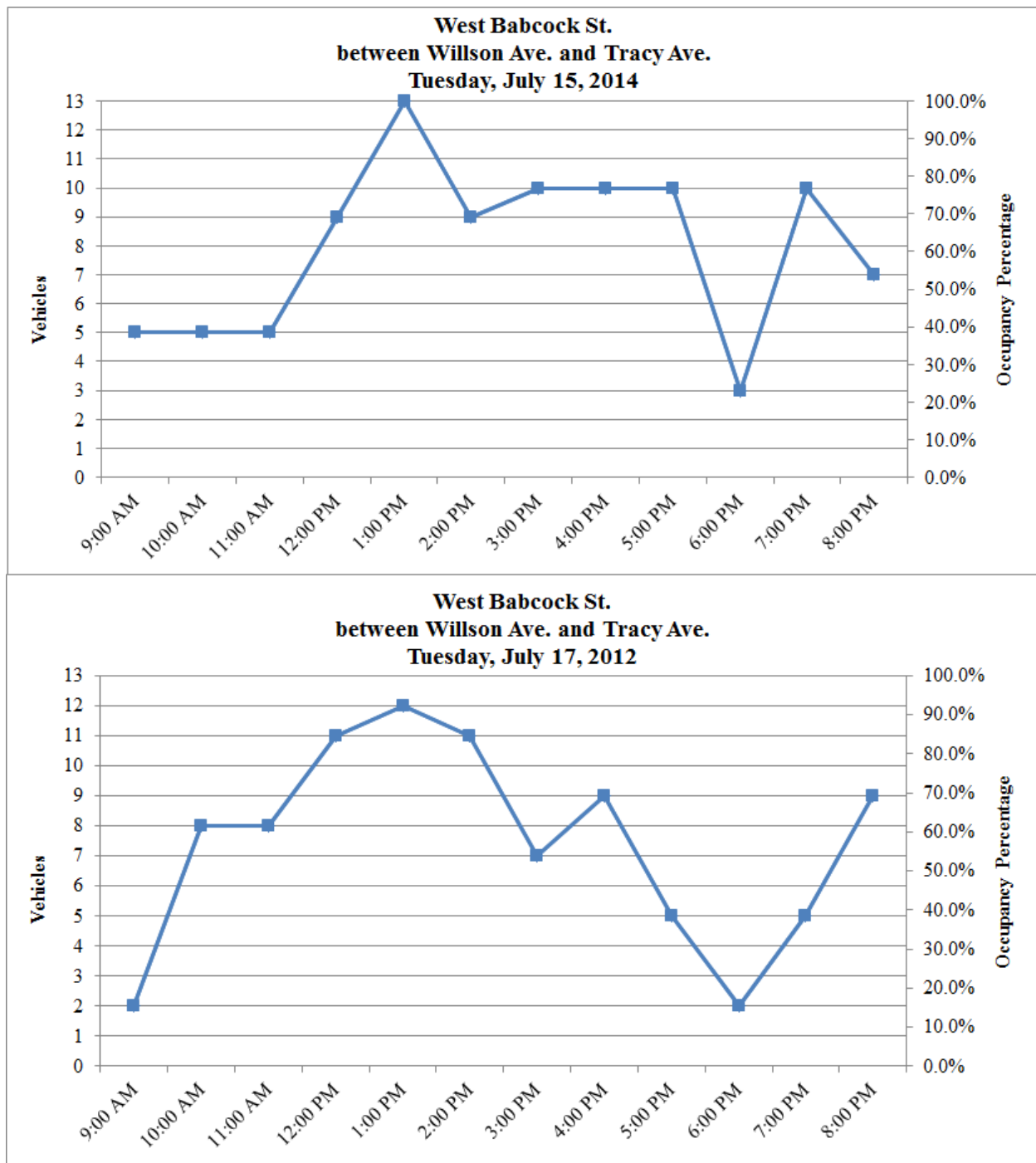


Figure 2-9: West Babcock St. between Willson and Tracy Aves. vehicle observations versus occupancy rates

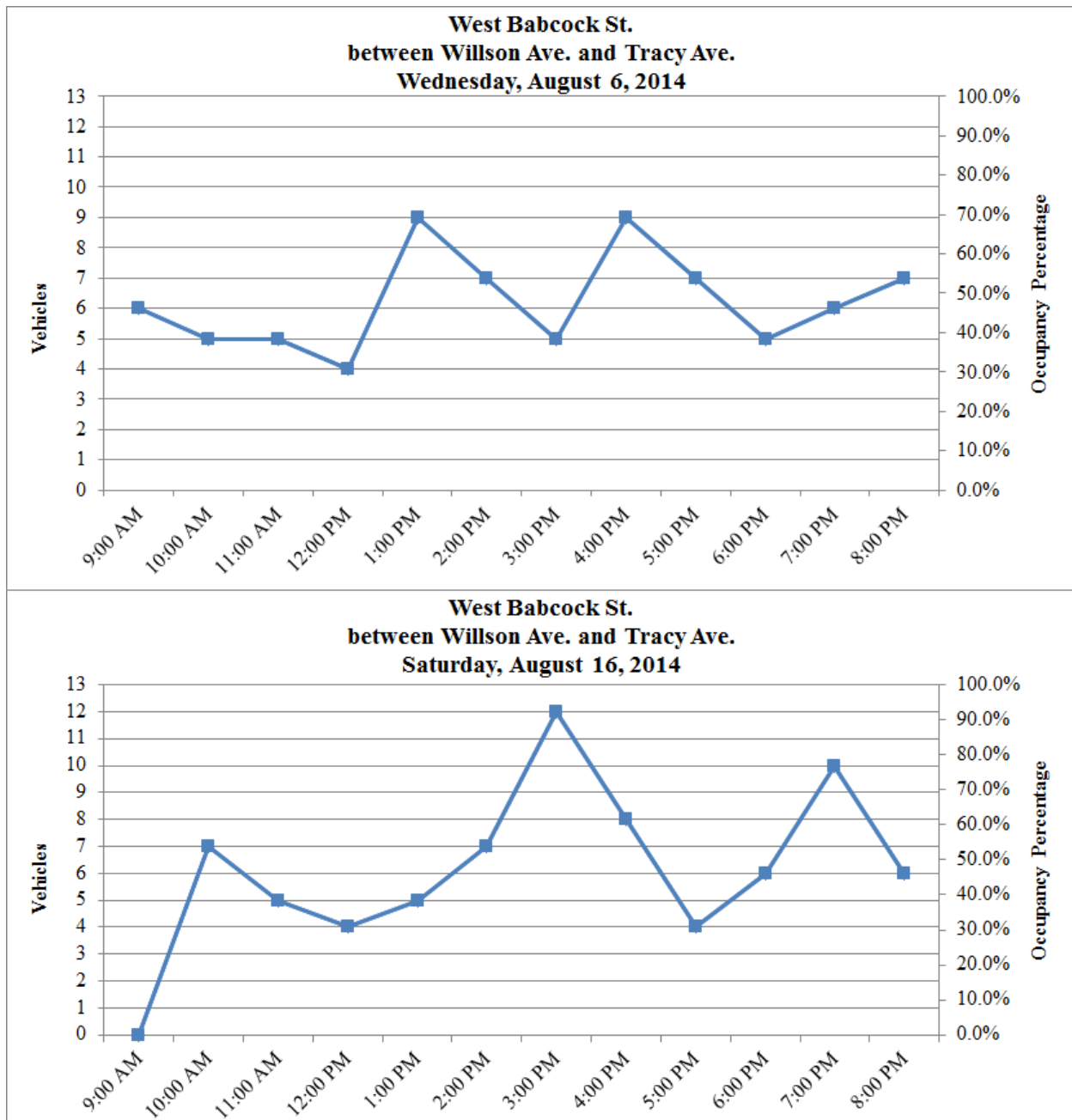


Figure 2-9 cont'd: West Babcock St. between Willson and Tracy Aves. vehicle observations versus occupancy rates

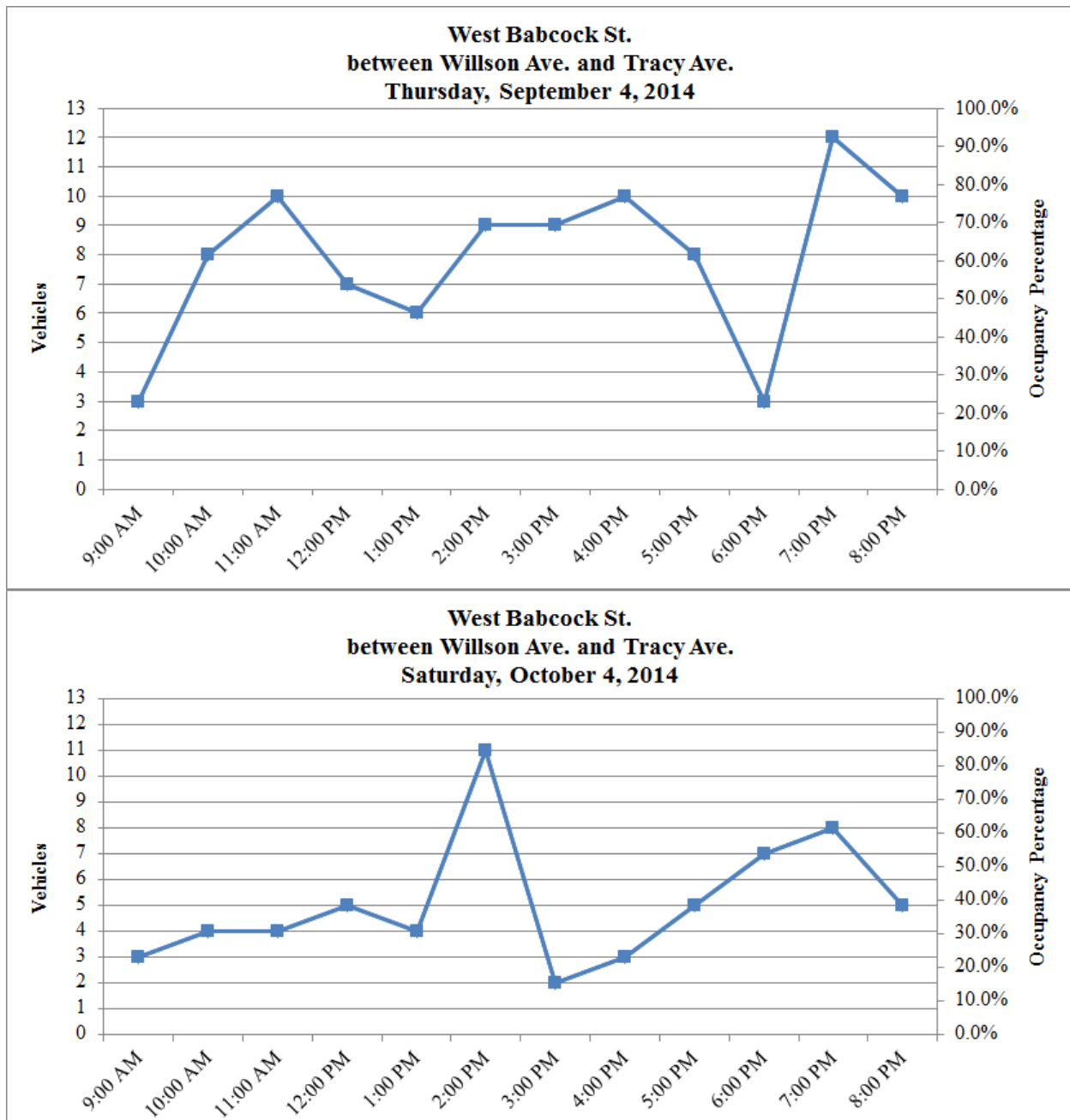


Figure 2-9 cont'd: West Babcock St. between Willson and Tracy Aves. vehicle observations versus occupancy rates

2.1.10 West Babcock St. - Tracy Ave. to Black Ave.

West Babcock Street between Tracy Avenue and Black Avenue has approximately 17 on-street parking stalls. Table 2-10 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. This block displayed a similar trend to others on weekdays, with occupancy rising in the morning, peaking around lunch, fluctuating downward in the afternoon and then experiencing a small rise in the evening (aside from July 15, 2014). Weekend trends were variable, with rises in occupancy occurring on July 19 and October 4, 2014, peaking at lunch on both of those days. Following this peak, trends fluctuated downward on both days, with a smaller, secondary peak occurring in the evening hours. On August 16, 2014, the trend was also for occupancy to rise in the morning, although less pronounced, with an initial peak occurring at 2:00 p.m. After this, occupancies fluctuated downward, but then spiked to the peak for the day at 8:00 p.m. For the majority of observation times, occupancies for this block generally remained at or below 70 percent. On only a few occasions, mainly for the weekday in July, was an occupancy above 80 percent observed. Only once (August 6, 2014 at 1:00 p.m.) was 100 percent occupancy reached. The overall trends for this block are presented in Figure 2-10.

Table 2-10: West Babcock St. between Tracy and Black Aves. parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	11	64.7%	9:00 AM	3	17.6%
10:00 AM	13	76.5%	10:00 AM	7	41.2%
11:00 AM	15	88.2%	11:00 AM	9	52.9%
12:00 PM	15	88.2%	12:00 PM	11	64.7%
1:00 PM	12	70.6%	1:00 PM	8	47.1%
2:00 PM	13	76.5%	2:00 PM	7	41.2%
3:00 PM	14	82.4%	3:00 PM	2	11.8%
4:00 PM	10	58.8%	4:00 PM	4	23.5%
5:00 PM	4	23.5%	5:00 PM	1	5.9%
6:00 PM	3	17.6%	6:00 PM	2	11.8%
7:00 PM	1	5.9%	7:00 PM	3	17.6%
8:00 PM	0	0.0%	8:00 PM	5	29.4%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	9	52.9%	9:00 AM	2	11.8%
10:00 AM	8	47.1%	10:00 AM	5	29.4%
11:00 AM	11	64.7%	11:00 AM	6	35.3%
12:00 PM	14	82.4%	12:00 PM	8	47.1%
1:00 PM	10	58.8%	1:00 PM	7	41.2%
2:00 PM	12	70.6%	2:00 PM	6	35.3%
3:00 PM	6	35.3%	3:00 PM	6	35.3%
4:00 PM	6	35.3%	4:00 PM	5	29.4%
5:00 PM	6	35.3%	5:00 PM	4	23.5%
6:00 PM	9	52.9%	6:00 PM	6	35.3%
7:00 PM	5	29.4%	7:00 PM	5	29.4%
8:00 PM	4	23.5%	8:00 PM	4	23.5%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	6	35.3%	9:00 AM	3	17.6%
10:00 AM	7	41.2%	10:00 AM	6	35.3%
11:00 AM	11	64.7%	11:00 AM	7	41.2%
12:00 PM	14	82.4%	12:00 PM	7	41.2%
1:00 PM	17	100.0%	1:00 PM	6	35.3%
2:00 PM	14	82.4%	2:00 PM	8	47.1%
3:00 PM	11	64.7%	3:00 PM	4	23.5%
4:00 PM	9	52.9%	4:00 PM	5	29.4%
5:00 PM	3	17.6%	5:00 PM	1	5.9%
6:00 PM	3	17.6%	6:00 PM	3	17.6%
7:00 PM	5	29.4%	7:00 PM	2	11.8%
8:00 PM	5	29.4%	8:00 PM	10	58.8%

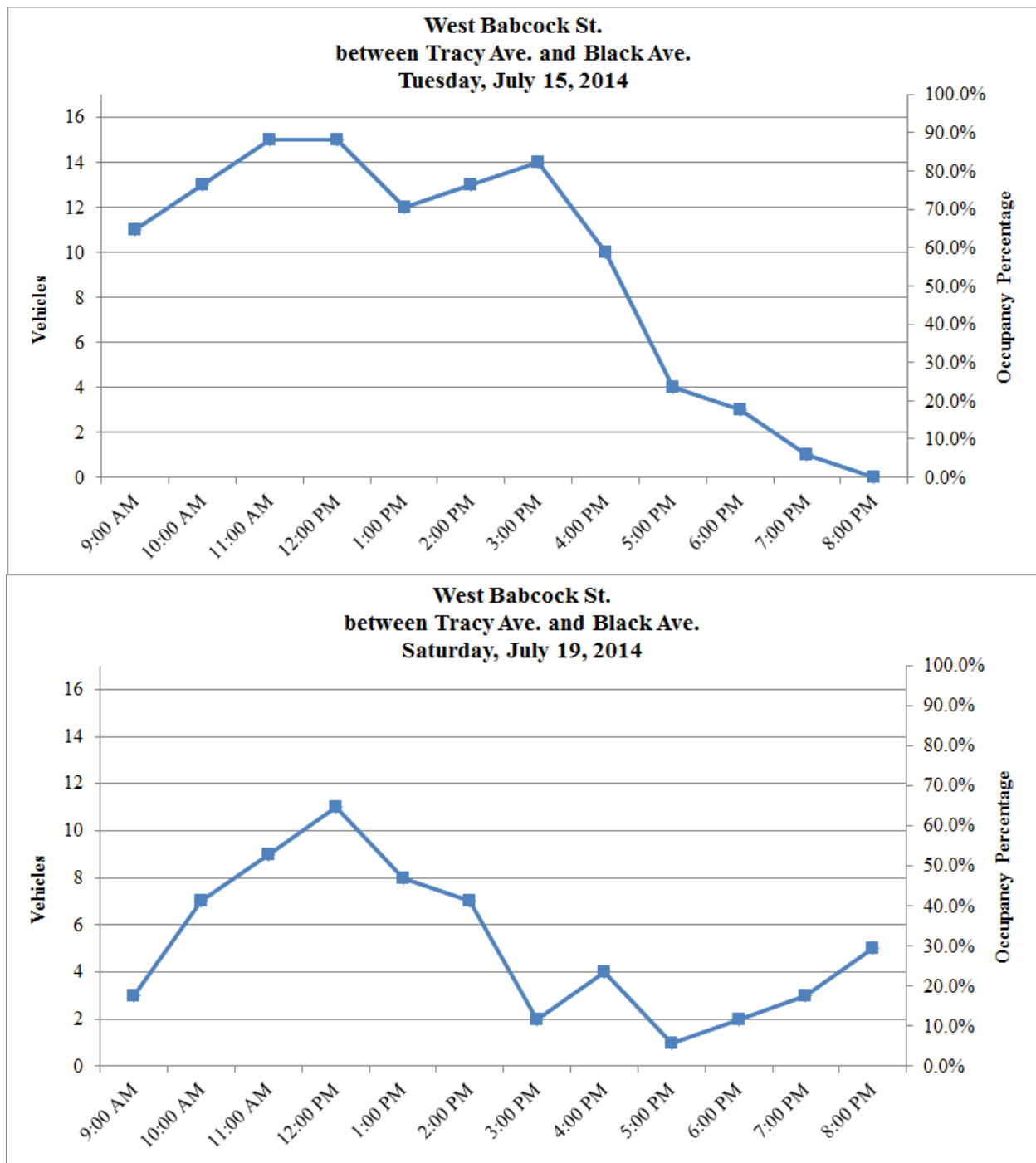


Figure 2-10: West Babcock St. between Tracy and Black Aves. vehicle observations versus occupancy rates

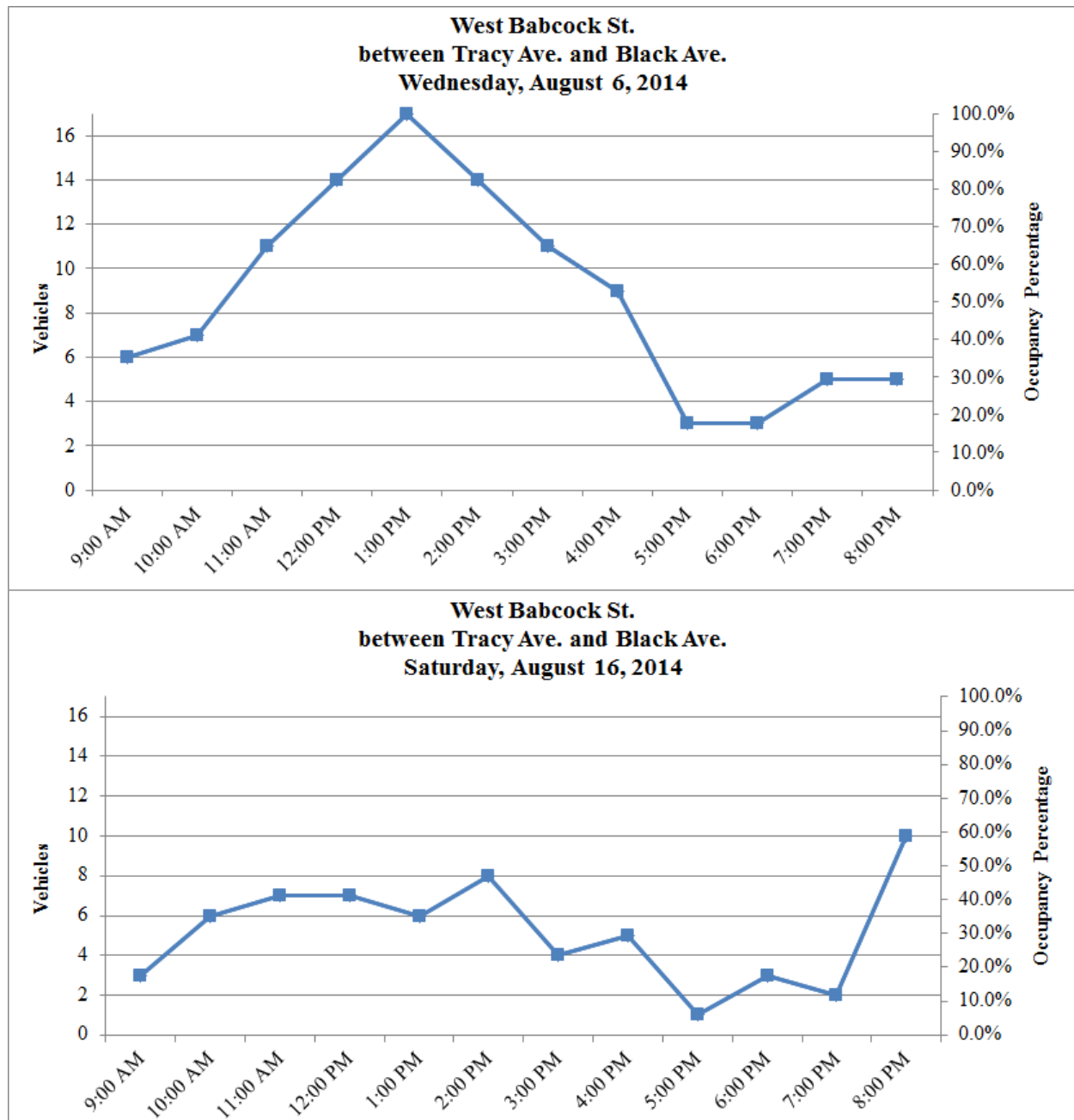


Figure 2-10 cont'd: West Babcock St. between Tracy and Black Aves. vehicle observations versus occupancy rates

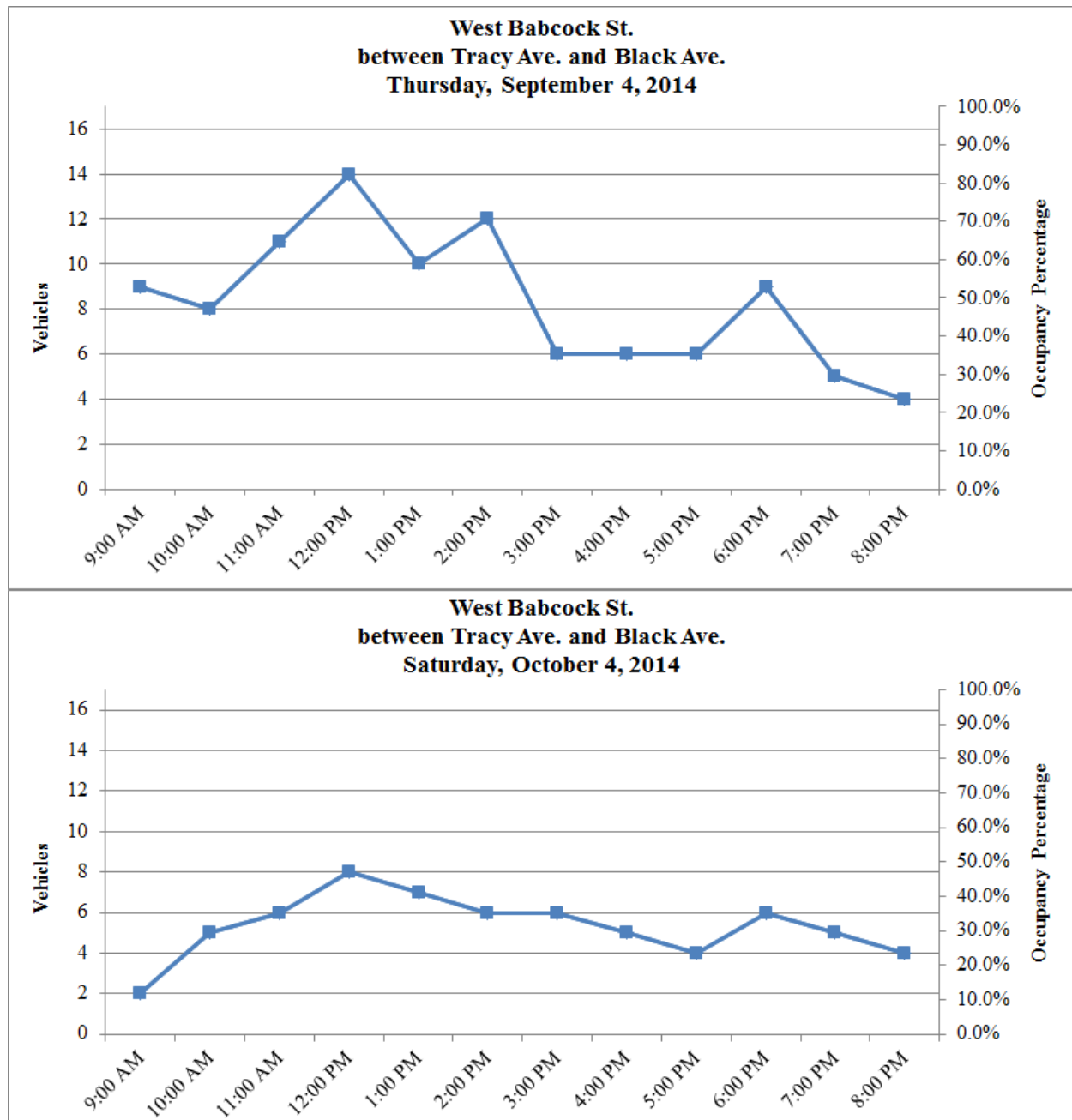


Figure 2-10 cont'd: West Babcock St. between Tracy and Black Aves. vehicle observations versus occupancy rates

2.1.11 West Babcock St. - Black Ave. to Bozeman Ave.

West Babcock Street between Black Avenue and Bozeman Avenue has approximately 9 on-street parking stalls. Table 2-11 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. This block displayed an interesting trend compared to the other blocks examined for weekdays in that occupancies were high (even being 100 percent) in the morning before falling off after 2:00 p.m. or 3:00 p.m. This would be indicative that this on-street parking might be heavily used by a nearby employer. Once occupancies began to fall, there was generally no secondary evening peak, with the exception of August 6, 2014. Weekend trends were variable, with rises in occupancy occurring on July 19 and October 4, 2014 throughout the morning, peaking at 11:00 a.m. on both of those days. Following this peak, trends fluctuated downward on both days, with no discernable pattern. On August 16, 2014, the trend was also for occupancy to rise in the morning as well as the early afternoon, peaking at 2:00 p.m. After this, occupancies fluctuated for a couple of hours and then completely dropped off at 5:00 p.m. As noted, on weekdays, occupancy rates in the high 80 to 100 percent range were frequently observed throughout the morning and early afternoon before dropping off for the day. On weekends, occupancies were far lower, only occasionally exceeding the 80 percent level. The overall trends for this block are presented in Figure 2-11.

Table 2-11: West Babcock St. between Black and Bozeman Aves. parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	8	88.9%	9:00 AM	4	44.4%
10:00 AM	8	88.9%	10:00 AM	7	77.8%
11:00 AM	8	88.9%	11:00 AM	8	88.9%
12:00 PM	8	88.9%	12:00 PM	7	77.8%
1:00 PM	8	88.9%	1:00 PM	8	88.9%
2:00 PM	8	88.9%	2:00 PM	7	77.8%
3:00 PM	8	88.9%	3:00 PM	7	77.8%
4:00 PM	6	66.7%	4:00 PM	7	77.8%
5:00 PM	3	33.3%	5:00 PM	6	66.7%
6:00 PM	3	33.3%	6:00 PM	6	66.7%
7:00 PM	3	33.3%	7:00 PM	3	33.3%
8:00 PM	2	22.2%	8:00 PM	4	44.4%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	9	100.0%	9:00 AM	3	33.3%
10:00 AM	9	100.0%	10:00 AM	6	66.7%
11:00 AM	9	100.0%	11:00 AM	9	100.0%
12:00 PM	9	100.0%	12:00 PM	8	88.9%
1:00 PM	9	100.0%	1:00 PM	4	44.4%
2:00 PM	9	100.0%	2:00 PM	5	55.6%
3:00 PM	7	77.8%	3:00 PM	6	66.7%
4:00 PM	6	66.7%	4:00 PM	6	66.7%
5:00 PM	6	66.7%	5:00 PM	8	88.9%
6:00 PM	5	55.6%	6:00 PM	4	44.4%
7:00 PM	5	55.6%	7:00 PM	4	44.4%
8:00 PM	3	33.3%	8:00 PM	2	22.2%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	9	100.0%	9:00 AM	2	22.2%
10:00 AM	9	100.0%	10:00 AM	3	33.3%
11:00 AM	9	100.0%	11:00 AM	4	44.4%
12:00 PM	9	100.0%	12:00 PM	5	55.6%
1:00 PM	8	88.9%	1:00 PM	6	66.7%
2:00 PM	9	100.0%	2:00 PM	7	77.8%
3:00 PM	7	77.8%	3:00 PM	6	66.7%
4:00 PM	6	66.7%	4:00 PM	6	66.7%
5:00 PM	3	33.3%	5:00 PM	2	22.2%
6:00 PM	3	33.3%	6:00 PM	2	22.2%
7:00 PM	6	66.7%	7:00 PM	2	22.2%
8:00 PM	6	66.7%	8:00 PM	2	22.2%

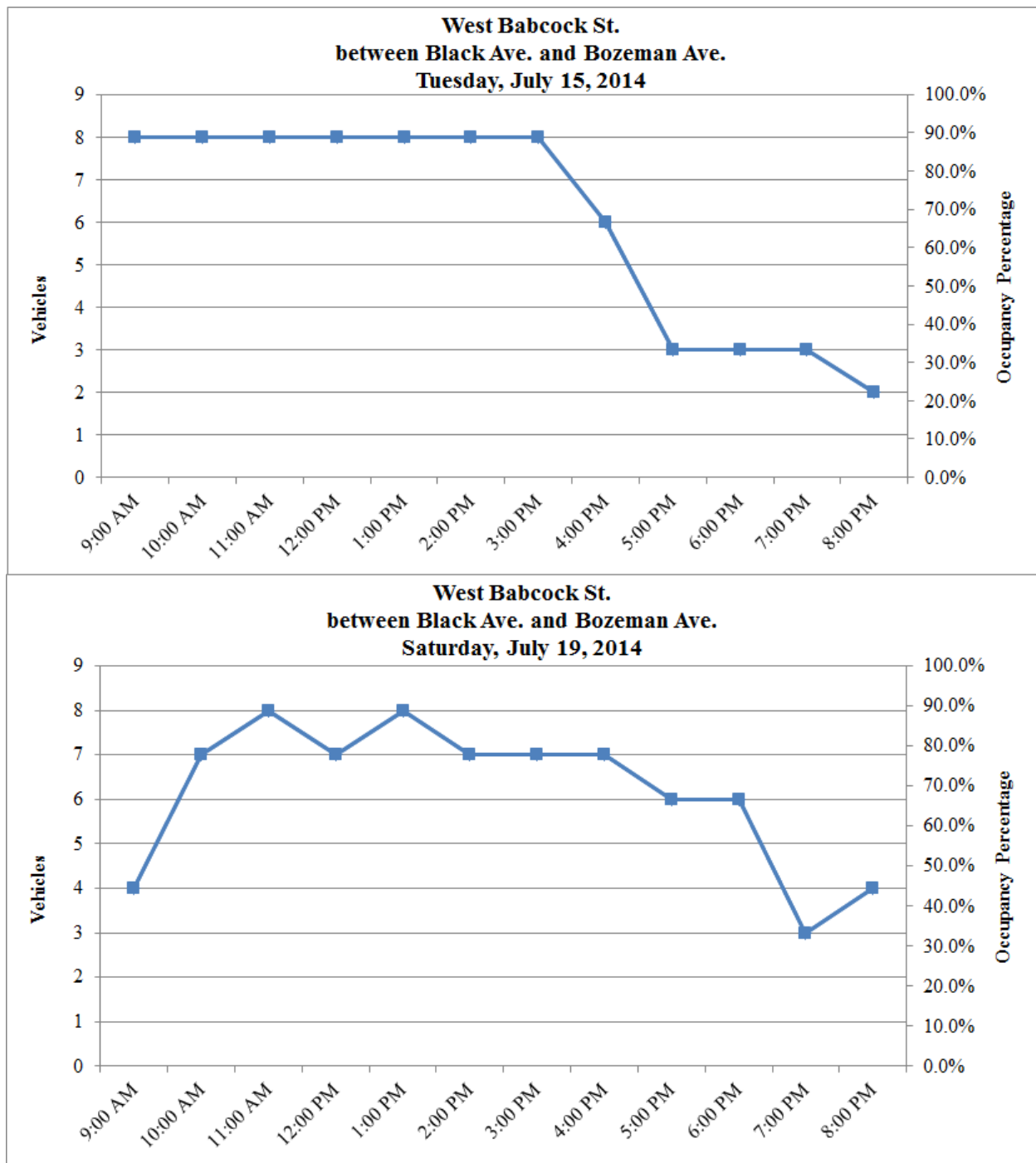


Figure 2-11: West Babcock St. between Black and Bozeman Aves. vehicle observations versus occupancy rates

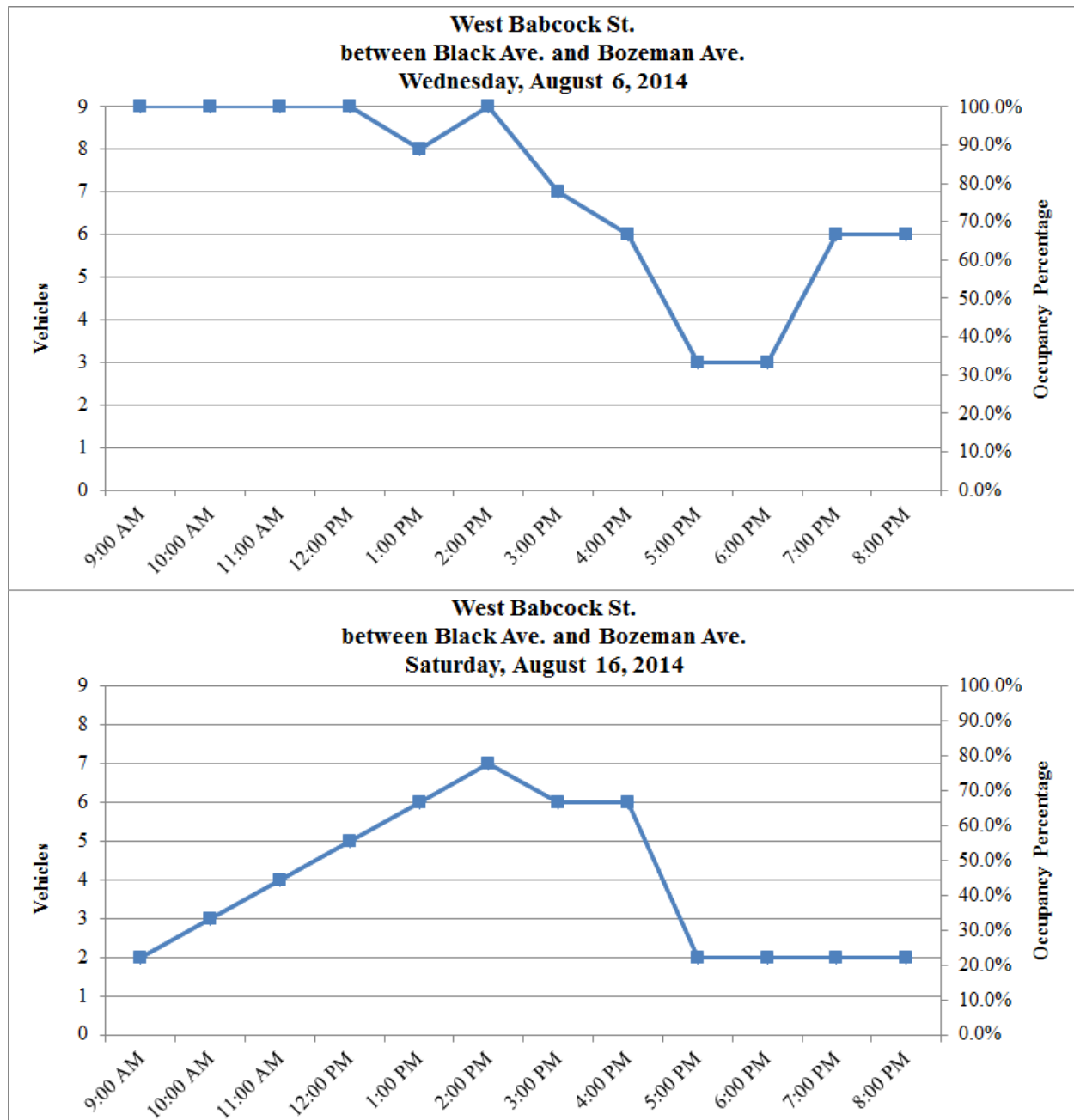


Figure 2-11 cont'd: West Babcock St. between Black and Bozeman Aves. vehicle observations versus occupancy rates

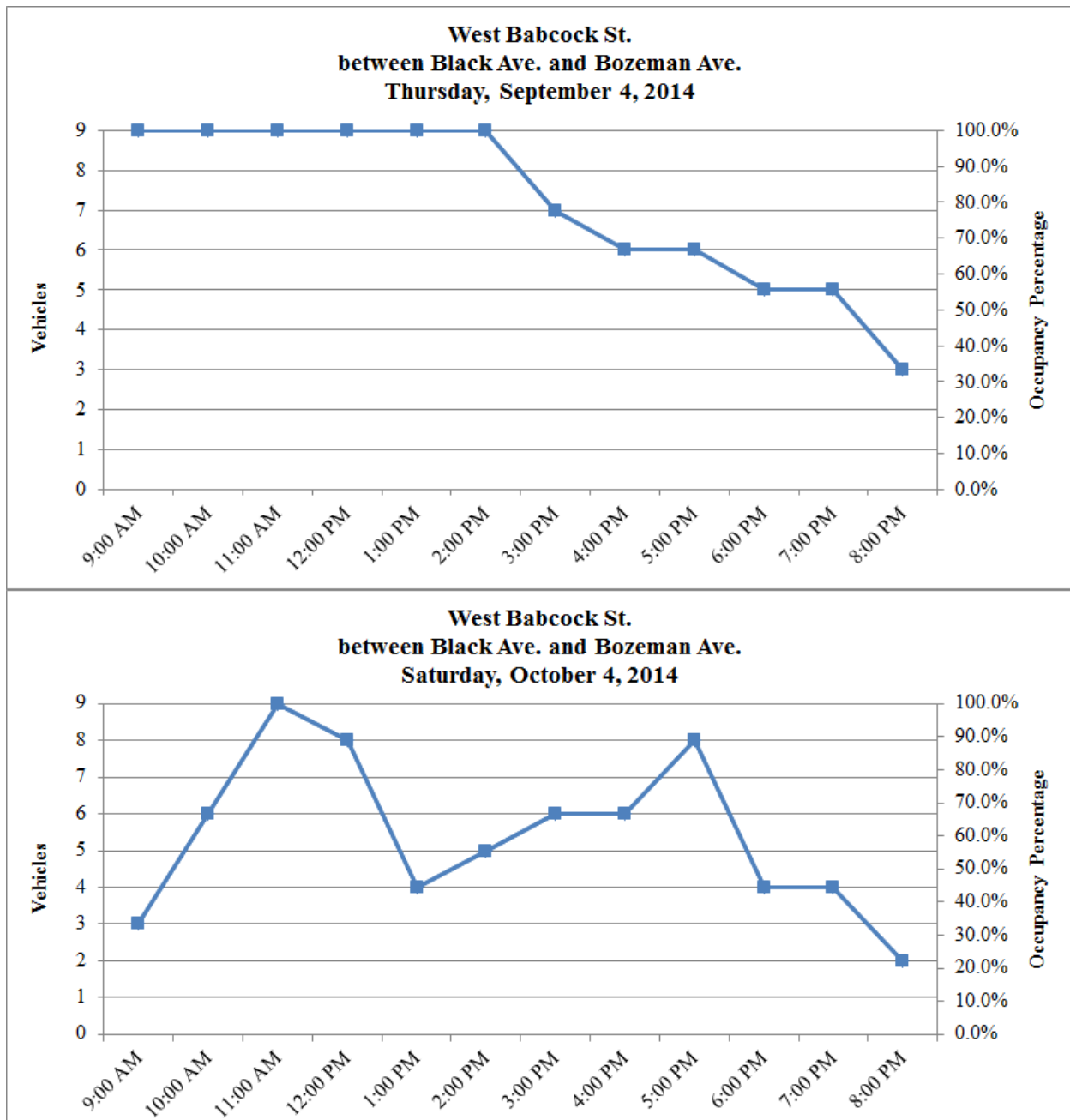


Figure 2-11 cont'd: West Babcock St. between Black and Bozeman Aves. vehicle observations versus occupancy rates

2.1.12 West Mendenhall St. - Willson Ave. to Tracy Ave.

West Mendenhall Street between Willson Avenue and Tracy Avenue has approximately 19 on-street parking stalls. Table 2-12 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. Weekday trends showed a good deal of variation, with rises in occupancies generally occurring throughout the morning and early afternoon. At that point, an initial peak was reached before occupancies fell through the afternoon. Occupancies rose again into the evening, reaching a second peak. Weekend trends were more consistent compared to weekdays, with occupancies rising through the morning and early afternoon, peaking between 12:00 p.m. and 2:00 p.m. Following this peak, occupancies formed a trough (displayed in Figure 2-12) throughout the afternoon and early evening, rising to a second peak at 8:00 p.m. on all days. Collectively, the trends observed for this block show the influence of its proximity to nearby parking lots and the parking garage. These facilities are likely the first choice of drivers looking for parking in this area, which results in the fluctuating trends observed during different periods of the day. For both weekdays and weekends, occupancies were generally low compared to other locations, only occasionally reaching or exceeding the 80 percent level a limited number of times. The overall trends for this block are presented in Figure 2-12.

Table 2-12: West Mendenhall St. between Willson and Tracy Aves. parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	0	0.0%	9:00 AM	7	36.8%
10:00 AM	8	42.1%	10:00 AM	11	57.9%
11:00 AM	13	68.4%	11:00 AM	12	63.2%
12:00 PM	10	52.6%	12:00 PM	12	63.2%
1:00 PM	14	73.7%	1:00 PM	14	73.7%
2:00 PM	13	68.4%	2:00 PM	14	73.7%
3:00 PM	9	47.4%	3:00 PM	9	47.4%
4:00 PM	9	47.4%	4:00 PM	6	31.6%
5:00 PM	7	36.8%	5:00 PM	5	26.3%
6:00 PM	10	52.6%	6:00 PM	7	36.8%
7:00 PM	14	73.7%	7:00 PM	10	52.6%
8:00 PM	13	68.4%	8:00 PM	14	73.7%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	6	31.6%	9:00 AM	8	42.1%
10:00 AM	4	21.1%	10:00 AM	11	57.9%
11:00 AM	4	21.1%	11:00 AM	10	52.6%
12:00 PM	10	52.6%	12:00 PM	16	84.2%
1:00 PM	15	78.9%	1:00 PM	15	78.9%
2:00 PM	15	78.9%	2:00 PM	13	68.4%
3:00 PM	7	36.8%	3:00 PM	6	31.6%
4:00 PM	4	21.1%	4:00 PM	4	21.1%
5:00 PM	8	42.1%	5:00 PM	5	26.3%
6:00 PM	12	63.2%	6:00 PM	11	57.9%
7:00 PM	15	78.9%	7:00 PM	16	84.2%
8:00 PM	17	89.5%	8:00 PM	16	84.2%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	9	47.4%	9:00 AM	3	15.8%
10:00 AM	12	63.2%	10:00 AM	10	52.6%
11:00 AM	6	31.6%	11:00 AM	13	68.4%
12:00 PM	13	68.4%	12:00 PM	14	73.7%
1:00 PM	14	73.7%	1:00 PM	11	57.9%
2:00 PM	6	31.6%	2:00 PM	15	78.9%
3:00 PM	7	36.8%	3:00 PM	7	36.8%
4:00 PM	6	31.6%	4:00 PM	6	31.6%
5:00 PM	6	31.6%	5:00 PM	6	31.6%
6:00 PM	12	63.2%	6:00 PM	4	21.1%
7:00 PM	10	52.6%	7:00 PM	13	68.4%
8:00 PM	11	57.9%	8:00 PM	16	84.2%

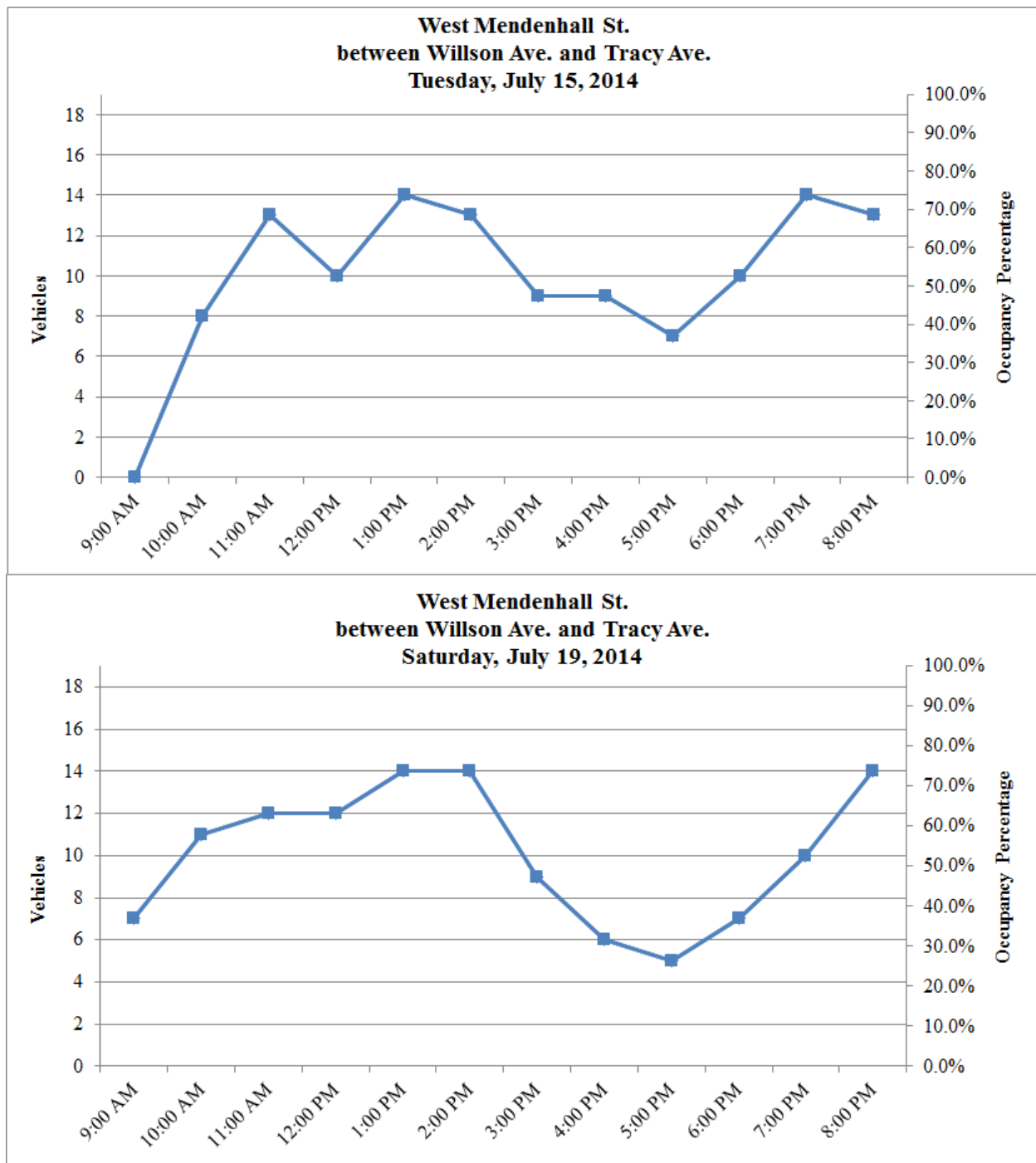


Figure 2-12: West Mendenhall St. between Willson and Tracy Aves. vehicle observations versus occupancy rates

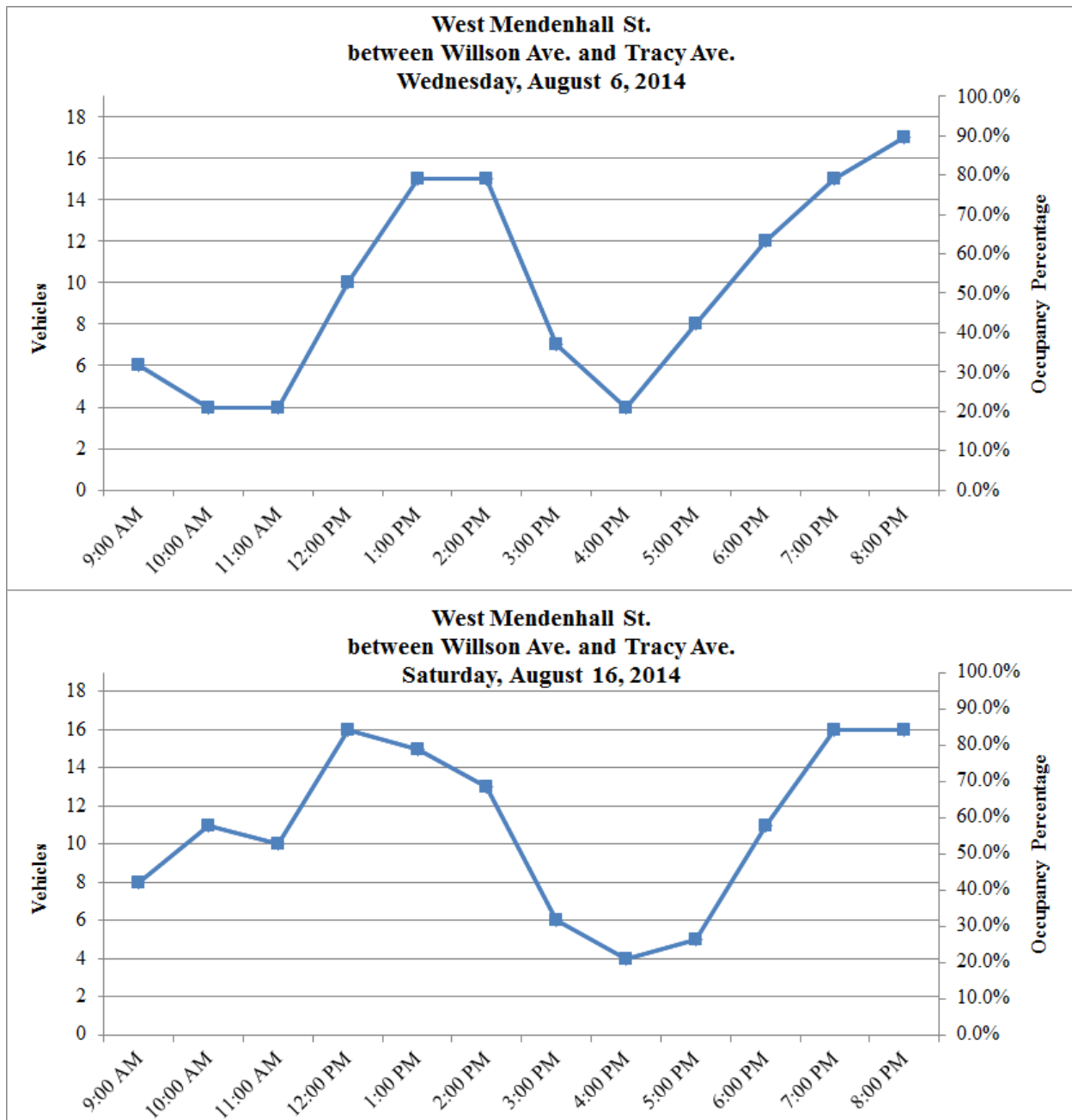


Figure 2-12 cont'd: West Mendenhall St. between Willson and Tracy Aves. vehicle observations versus occupancy rates

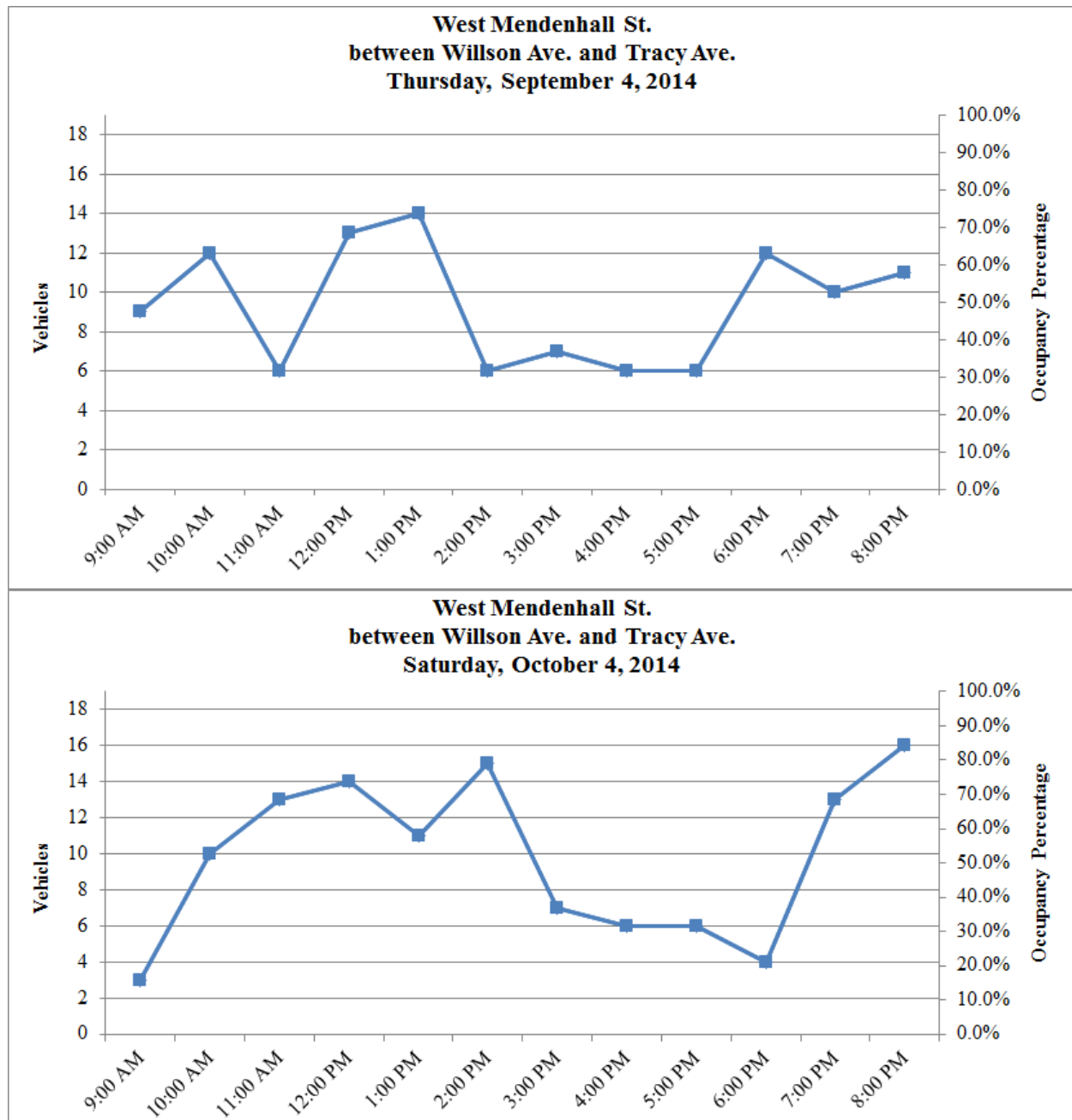


Figure 2-12 cont'd: West Mendenhall St. between Willson and Tracy Aves. vehicle observations versus occupancy rates

2.1.13 West Mendenhall St. - Black Ave. to Bozeman Ave.

West Mendenhall Street between Black Avenue and Bozeman Avenue has approximately 17 on-street parking stalls. Table 2-13 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the block. Weekday trends for this block were variable, with fluctuations in the morning, a peak at lunch, more fluctuation in the afternoon (generally a declining trend) and then a rise into the evening ending at a second peak. The exception to this evening trend was on July 15, 2014, when the evening peak occurred at 6:00 p.m. and was followed by a decline in occupancy. Weekend trends were similar in terms of variability, particularly among the individual collection dates. July 19, 2014 exhibited a trend of occupancies increasing in the morning, peaking from 12:00 p.m. to 2:00 p.m., and then falling off for the remainder of the day. The remaining weekend dates (August 16 and October 4, 2014), showed variations throughout the day with no discernable trends. This was evidenced by the timing of the peak occupancies for each day. The August 16, 2014 peak occurred at 8:00 p.m., while the October 4, 2014 peak occurred at 10:00 a.m. Once again, the trends observed for this block show the influence of its proximity to nearby parking lots and the parking garage. These facilities are likely the first choice of drivers looking for parking in this area, which results in the fluctuating trends observed during different periods of the day. For both weekdays and weekends, occupancies were generally low, only occasionally reaching or exceeding the 80 percent level. The overall trends for this block are presented in Figure 2-13.

Table 2-13: West Mendenhall St. between Black and Bozeman Aves parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	14	82.4%	9:00 AM	8	47.1%
10:00 AM	6	35.3%	10:00 AM	8	47.1%
11:00 AM	8	47.1%	11:00 AM	12	70.6%
12:00 PM	13	76.5%	12:00 PM	13	76.5%
1:00 PM	12	70.6%	1:00 PM	13	76.5%
2:00 PM	12	70.6%	2:00 PM	13	76.5%
3:00 PM	10	58.8%	3:00 PM	11	64.7%
4:00 PM	11	64.7%	4:00 PM	9	52.9%
5:00 PM	12	70.6%	5:00 PM	4	23.5%
6:00 PM	13	76.5%	6:00 PM	5	29.4%
7:00 PM	10	58.8%	7:00 PM	0	0.0%
8:00 PM	7	41.2%	8:00 PM	1	5.9%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	10	58.8%	9:00 AM	9	52.9%
10:00 AM	8	47.1%	10:00 AM	11	64.7%
11:00 AM	10	58.8%	11:00 AM	5	29.4%
12:00 PM	15	88.2%	12:00 PM	9	52.9%
1:00 PM	12	70.6%	1:00 PM	6	35.3%
2:00 PM	8	47.1%	2:00 PM	2	11.8%
3:00 PM	9	52.9%	3:00 PM	6	35.3%
4:00 PM	8	47.1%	4:00 PM	7	41.2%
5:00 PM	10	58.8%	5:00 PM	3	17.6%
6:00 PM	10	58.8%	6:00 PM	6	35.3%
7:00 PM	12	70.6%	7:00 PM	3	17.6%
8:00 PM	12	70.6%	8:00 PM	14	82.4%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	12	70.6%	9:00 AM	15	88.2%
10:00 AM	8	47.1%	10:00 AM	16	94.1%
11:00 AM	10	58.8%	11:00 AM	9	52.9%
12:00 PM	13	76.5%	12:00 PM	10	58.8%
1:00 PM	12	70.6%	1:00 PM	6	35.3%
2:00 PM	10	58.8%	2:00 PM	12	70.6%
3:00 PM	4	23.5%	3:00 PM	7	41.2%
4:00 PM	7	41.2%	4:00 PM	9	52.9%
5:00 PM	14	82.4%	5:00 PM	9	52.9%
6:00 PM	14	82.4%	6:00 PM	10	58.8%
7:00 PM	14	82.4%	7:00 PM	8	47.1%
8:00 PM	12	70.6%	8:00 PM	13	76.5%

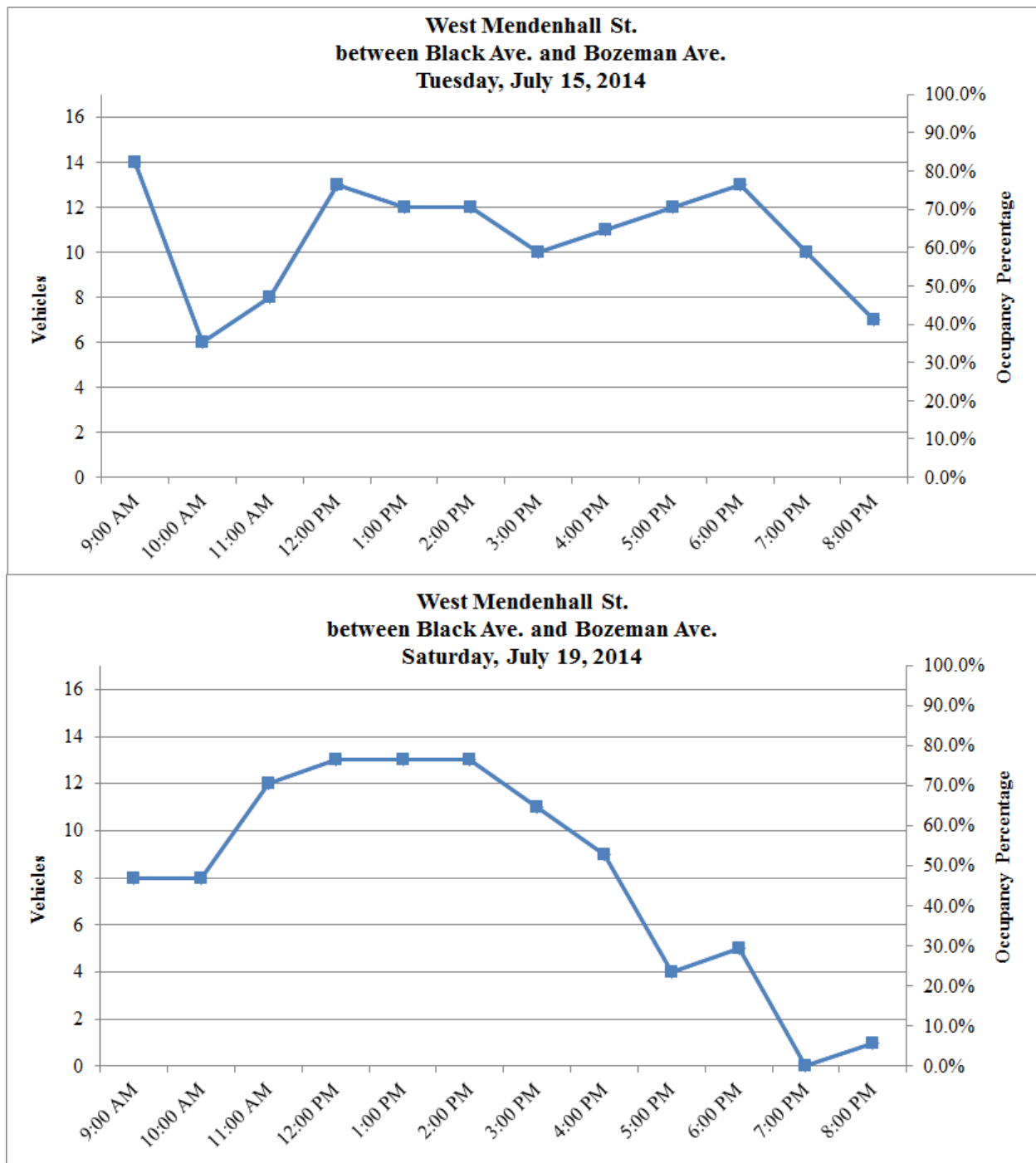


Figure 2-13: West Mendenhall St. between Black and Bozeman Aves. vehicle observations versus occupancy rates

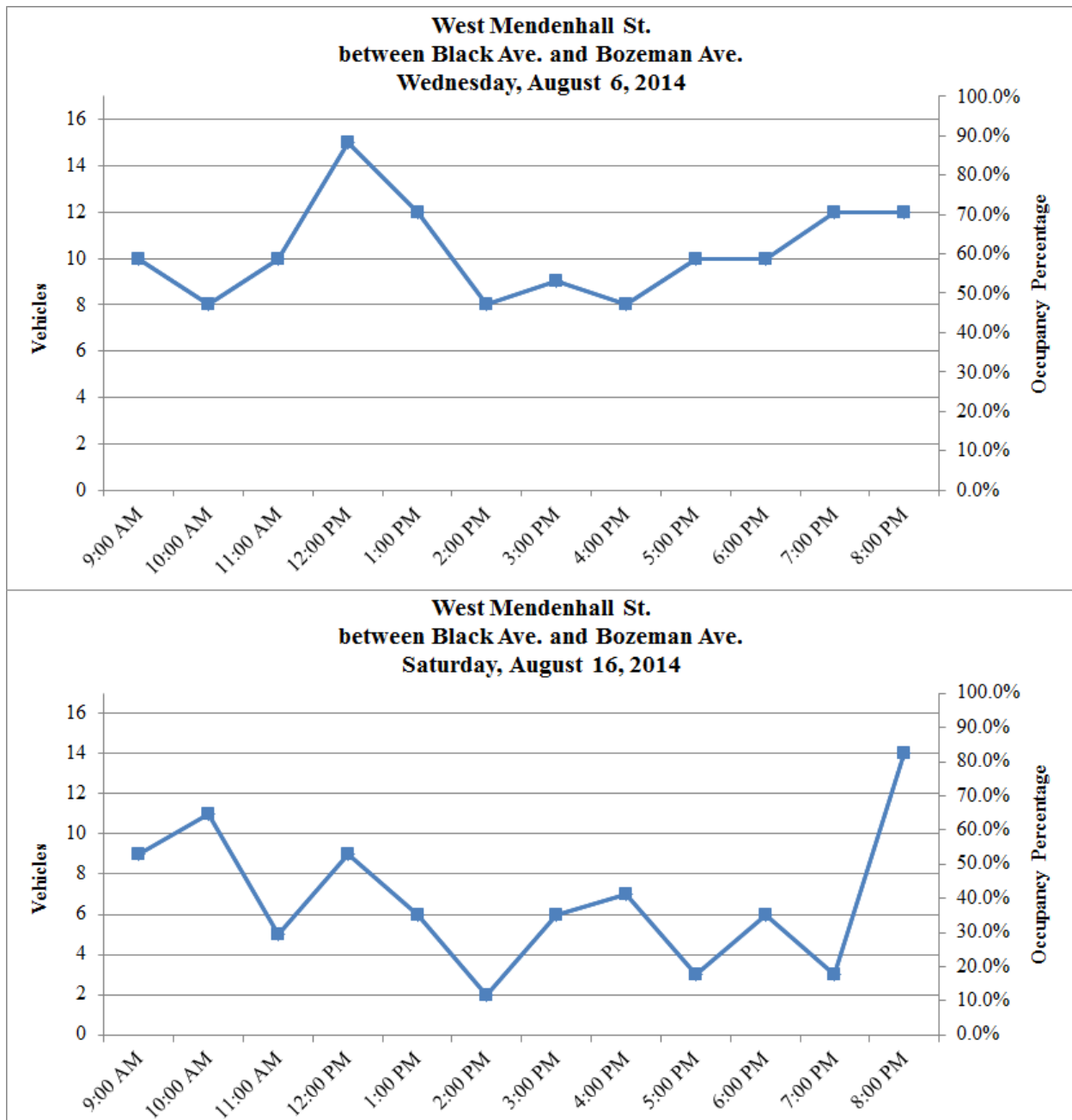


Figure 2-13 cont'd: West Mendenhall St. between Black and Bozeman Aves. vehicle observations versus occupancy rates

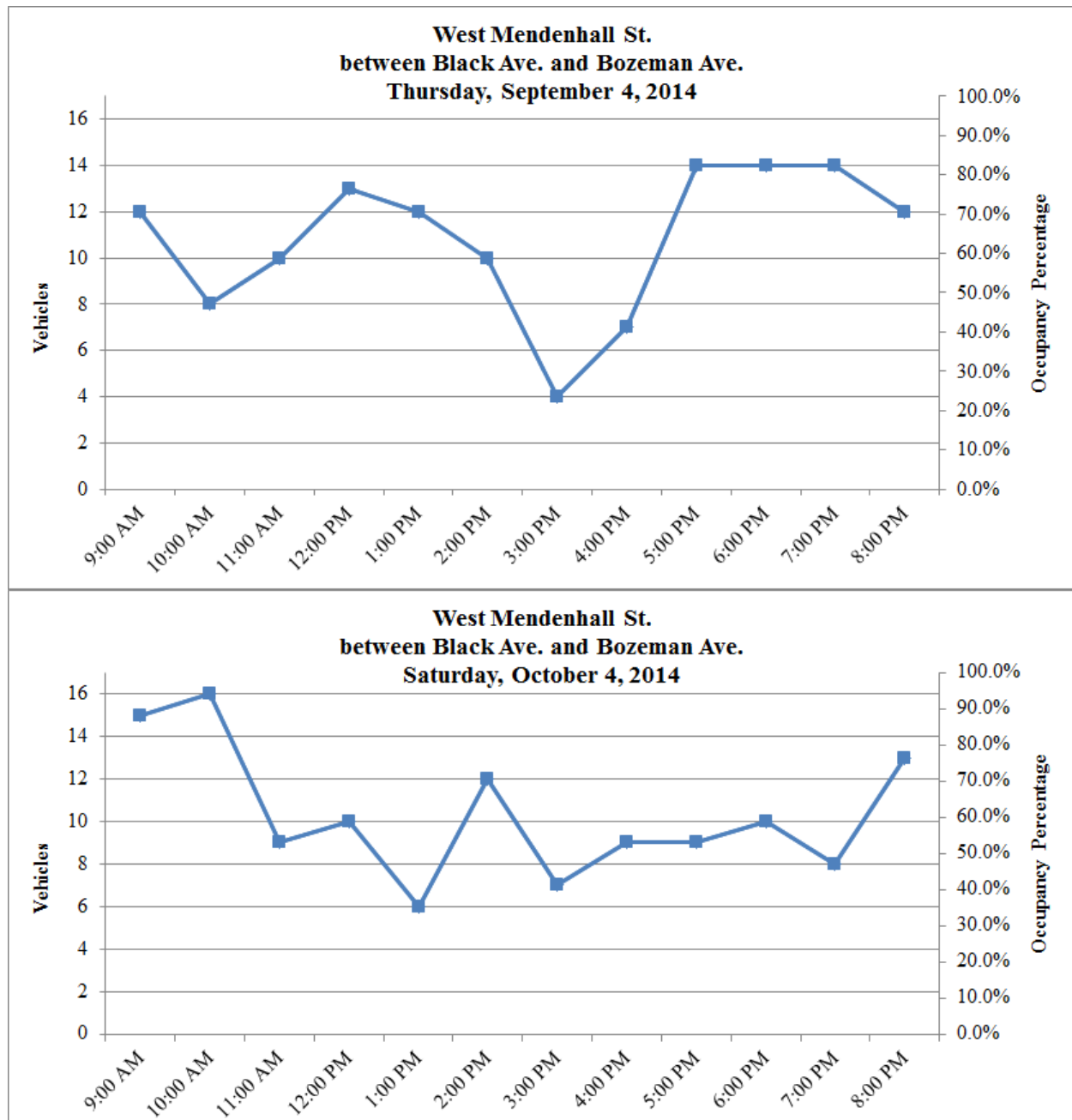


Figure 2-13 cont'd: West Mendenhall St. between Black and Bozeman Aves. vehicle observations versus occupancy rates

2.2 Lot-Specific Occupancy Rates

In addition to examining block-level occupancy rates, the Bozeman Parking Commission was also interested in the individual occupancy rates of four specific city-owned lots. These were the two lots located at the northeast and southeast corners of the Mendenhall Street and North Willson Avenue intersection (Willson and Armory lots, respectively); the Carnegie lot, located at the southeast corner of Mendenhall Street and Black Avenue; and the Rouse lot, located at the northwest corner of Babcock Street and Rouse Avenue. The following sections discuss the results of the occupancy rate analysis conducted for each of these specific parking lots.

2.2.1 Armory Lot

This off-street lot, located at the southeast corner of Mendenhall Street and North Willson Avenue, has a total of 28 stalls. Table 2-14 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the lot. This lot showed a pattern of occupancy rising throughout the morning, peaking around the lunchtime period, and then fluctuating throughout the afternoon before peaking once again in the evening for all study dates. At many times throughout the day on each study date, the lot had high occupancy, exceeding 80 percent. Even when occupancy was not high, it still remained above 50 percent. This was not surprising given the proximity of the lot to the downtown core. The occupancy trends for this lot are further illustrated in Figure 2-2: South Bozeman Ave. vehicle observations versus occupancy rates Figure 2-14.

Table 2-14: Armory lot parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	10	35.7%	9:00 AM	10	35.7%
10:00 AM	10	35.7%	10:00 AM	17	60.7%
11:00 AM	15	53.6%	11:00 AM	21	75.0%
12:00 PM	24	85.7%	12:00 PM	25	89.3%
1:00 PM	24	85.7%	1:00 PM	25	89.3%
2:00 PM	23	82.1%	2:00 PM	22	78.6%
3:00 PM	21	75.0%	3:00 PM	19	67.9%
4:00 PM	24	85.7%	4:00 PM	17	60.7%
5:00 PM	24	85.7%	5:00 PM	16	57.1%
6:00 PM	26	92.9%	6:00 PM	24	85.7%
7:00 PM	26	92.9%	7:00 PM	27	96.4%
8:00 PM	27	96.4%	8:00 PM	27	96.4%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	8	28.6%	9:00 AM	5	17.9%
10:00 AM	11	39.3%	10:00 AM	14	50.0%
11:00 AM	10	35.7%	11:00 AM	17	60.7%
12:00 PM	20	71.4%	12:00 PM	26	92.9%
1:00 PM	24	85.7%	1:00 PM	26	92.9%
2:00 PM	24	85.7%	2:00 PM	23	82.1%
3:00 PM	26	92.9%	3:00 PM	24	85.7%
4:00 PM	19	67.9%	4:00 PM	22	78.6%
5:00 PM	24	85.7%	5:00 PM	18	64.3%
6:00 PM	23	82.1%	6:00 PM	28	100.0%
7:00 PM	27	96.4%	7:00 PM	26	92.9%
8:00 PM	27	96.4%	8:00 PM	28	100.0%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	5	17.9%	9:00 AM	14	50.0%
10:00 AM	15	53.6%	10:00 AM	17	60.7%
11:00 AM	14	50.0%	11:00 AM	17	60.7%
12:00 PM	23	82.1%	12:00 PM	25	89.3%
1:00 PM	22	78.6%	1:00 PM	27	96.4%
2:00 PM	21	75.0%	2:00 PM	25	89.3%
3:00 PM	16	57.1%	3:00 PM	26	92.9%
4:00 PM	15	53.6%	4:00 PM	17	60.7%
5:00 PM	23	82.1%	5:00 PM	26	92.9%
6:00 PM	23	82.1%	6:00 PM	26	92.9%
7:00 PM	26	92.9%	7:00 PM	27	96.4%
8:00 PM	27	96.4%	8:00 PM	26	92.9%

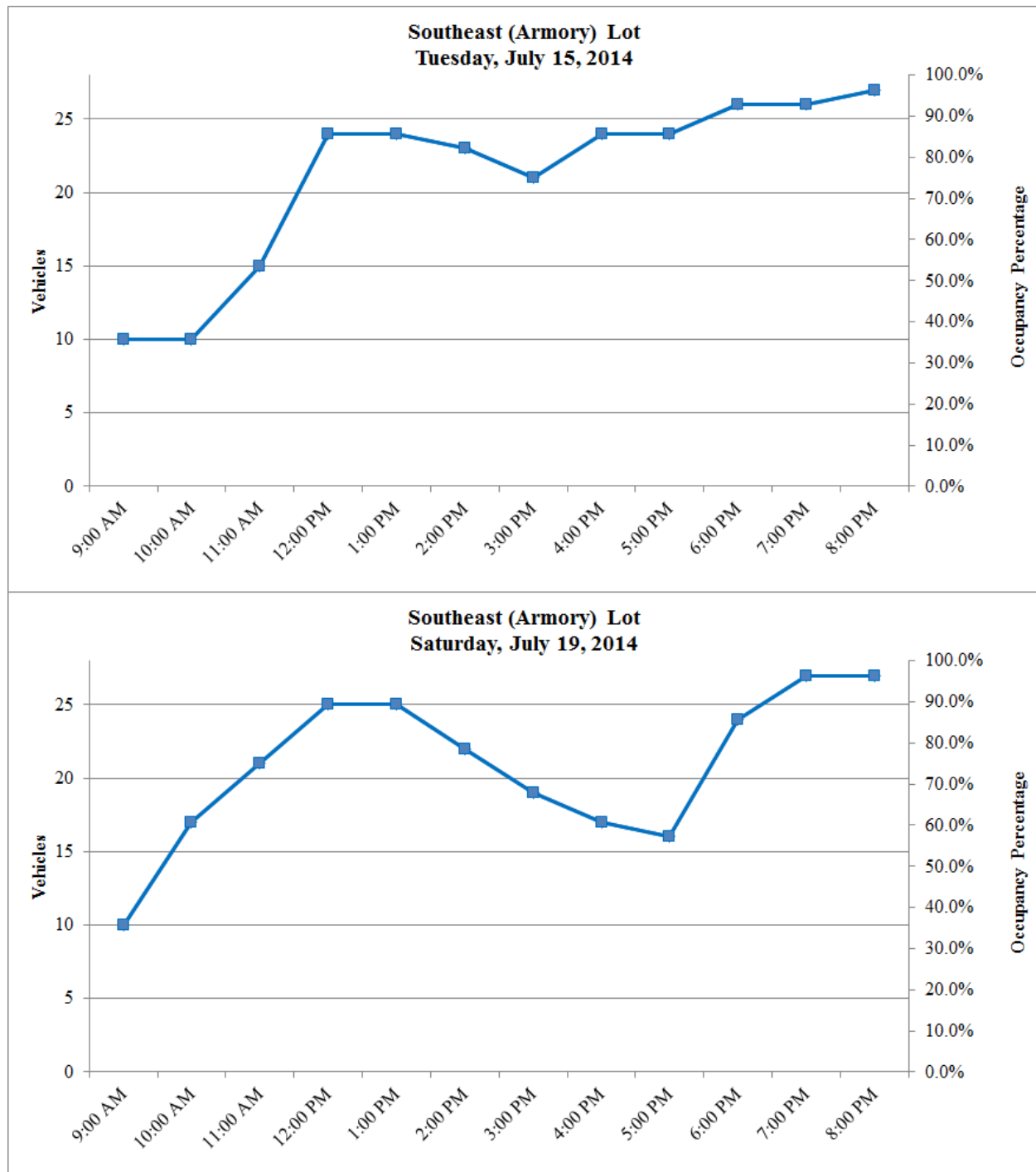


Figure 2-14: Armory lot vehicle observations versus occupancy rates

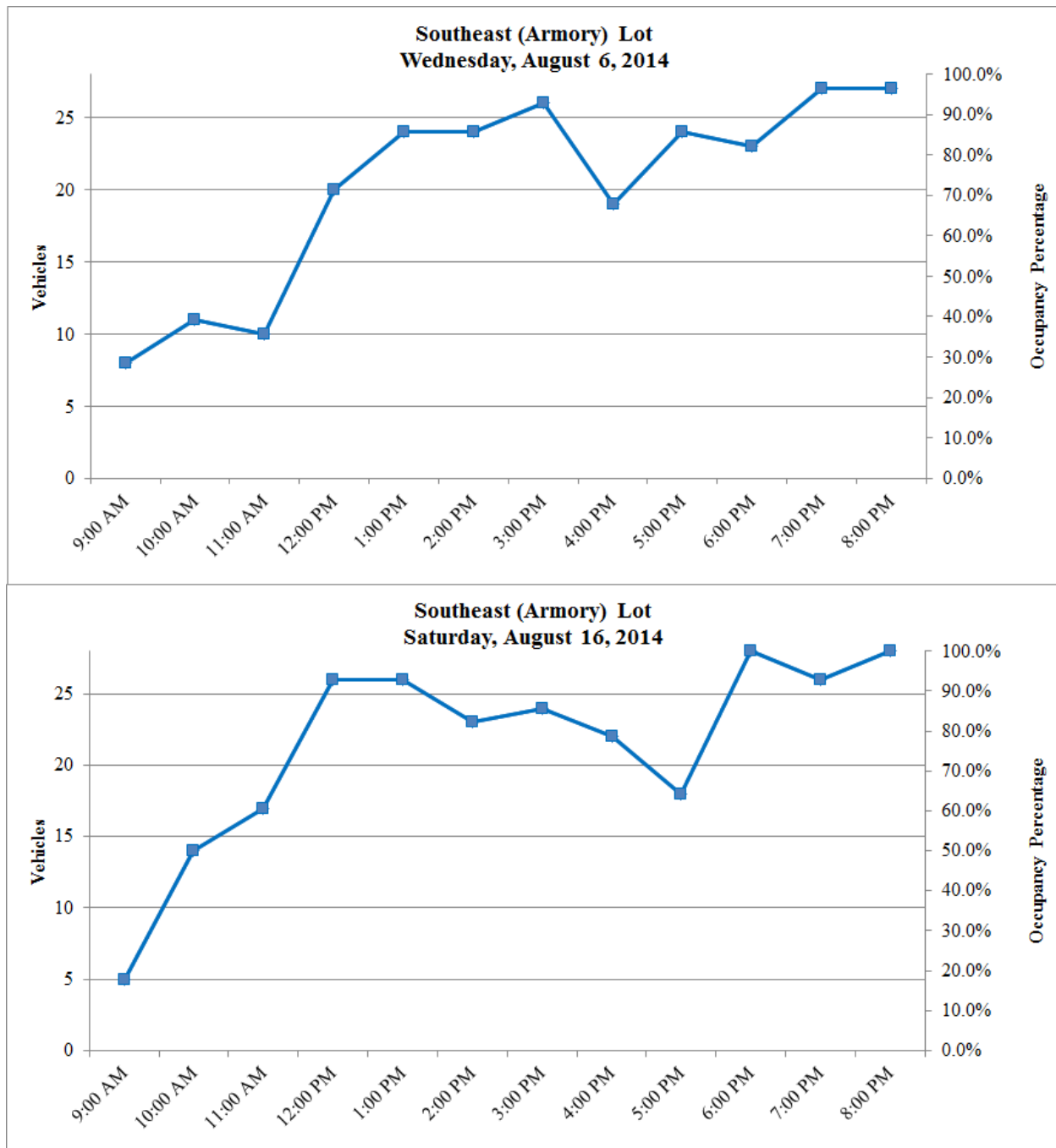


Figure 2-14 cont'd: Armory lot vehicle observations versus occupancy rates

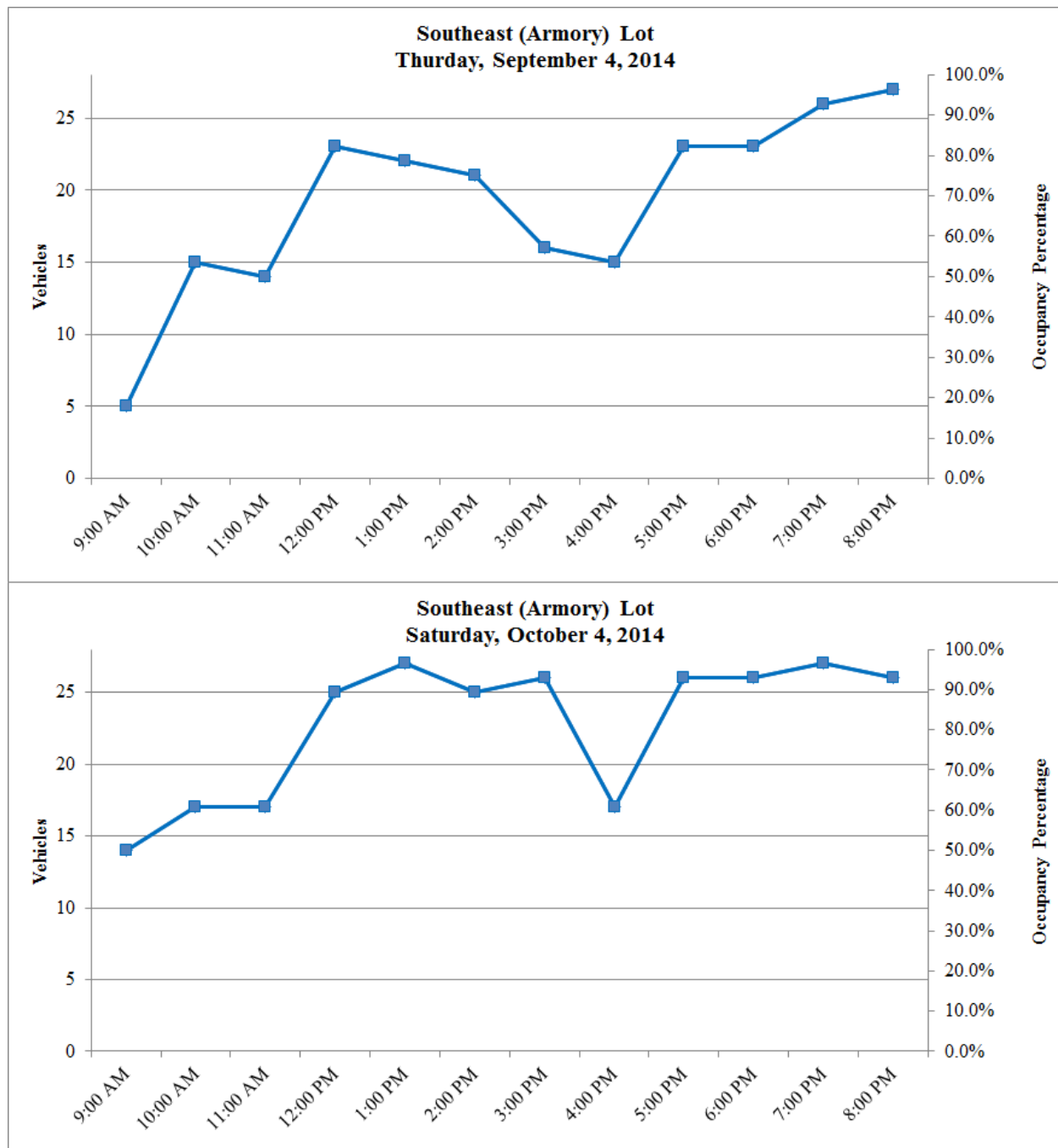


Figure 2-14 cont'd: Armory lot vehicle observations versus occupancy rates

2.2.2 Willson Lot

This off-street lot, located on the northeast corner of Mendenhall Street and North Willson Avenue, has a total of 44 stalls. Table 2-15 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the lot. This lot showed a pattern of occupancy rising throughout the morning, peaking around the lunchtime hours, and then dropping off throughout the afternoon, before peaking once again in the evening. Generally, the midday and evening peaks were similar to one another. On most days, occupancy rates topped out at 90 to 95 percent, although in some cases the lot reached 100 percent occupancy (August 6, 2014 at 7:00 p.m. and August 16, 2014 at 1:00 p.m. and 8:00 p.m.). These trends were expected given the proximity of the lot to downtown. The occupancy trends for this lot are further illustrated in Figure 2-2: South Bozeman Ave. vehicle observations versus occupancy rates Figure 2-15.

Table 2-15: Willson lot parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	7	15.9%	9:00 AM	3	6.8%
10:00 AM	12	27.3%	10:00 AM	8	18.2%
11:00 AM	20	45.5%	11:00 AM	25	56.8%
12:00 PM	32	72.7%	12:00 PM	36	81.8%
1:00 PM	42	95.5%	1:00 PM	39	88.6%
2:00 PM	23	52.3%	2:00 PM	36	81.8%
3:00 PM	23	52.3%	3:00 PM	28	63.6%
4:00 PM	18	40.9%	4:00 PM	17	38.6%
5:00 PM	16	36.4%	5:00 PM	15	34.1%
6:00 PM	23	52.3%	6:00 PM	22	50.0%
7:00 PM	36	81.8%	7:00 PM	35	79.5%
8:00 PM	27	61.4%	8:00 PM	40	90.9%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	5	11.4%	9:00 AM	7	15.9%
10:00 AM	8	18.2%	10:00 AM	7	15.9%
11:00 AM	15	34.1%	11:00 AM	11	25.0%
12:00 PM	27	61.4%	12:00 PM	27	61.4%
1:00 PM	41	93.2%	1:00 PM	44	100.0%
2:00 PM	34	77.3%	2:00 PM	34	77.3%
3:00 PM	24	54.5%	3:00 PM	25	56.8%
4:00 PM	13	29.5%	4:00 PM	10	22.7%
5:00 PM	18	40.9%	5:00 PM	20	45.5%
6:00 PM	41	93.2%	6:00 PM	33	75.0%
7:00 PM	44	100.0%	7:00 PM	40	90.9%
8:00 PM	39	88.6%	8:00 PM	44	100.0%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	8	18.2%	9:00 AM	13	29.5%
10:00 AM	16	36.4%	10:00 AM	17	38.6%
11:00 AM	15	34.1%	11:00 AM	16	36.4%
12:00 PM	22	50.0%	12:00 PM	28	63.6%
1:00 PM	40	90.9%	1:00 PM	42	95.5%
2:00 PM	27	61.4%	2:00 PM	31	70.5%
3:00 PM	18	40.9%	3:00 PM	25	56.8%
4:00 PM	15	34.1%	4:00 PM	22	50.0%
5:00 PM	27	61.4%	5:00 PM	26	59.1%
6:00 PM	25	56.8%	6:00 PM	36	81.8%
7:00 PM	37	84.1%	7:00 PM	42	95.5%
8:00 PM	41	93.2%	8:00 PM	38	86.4%

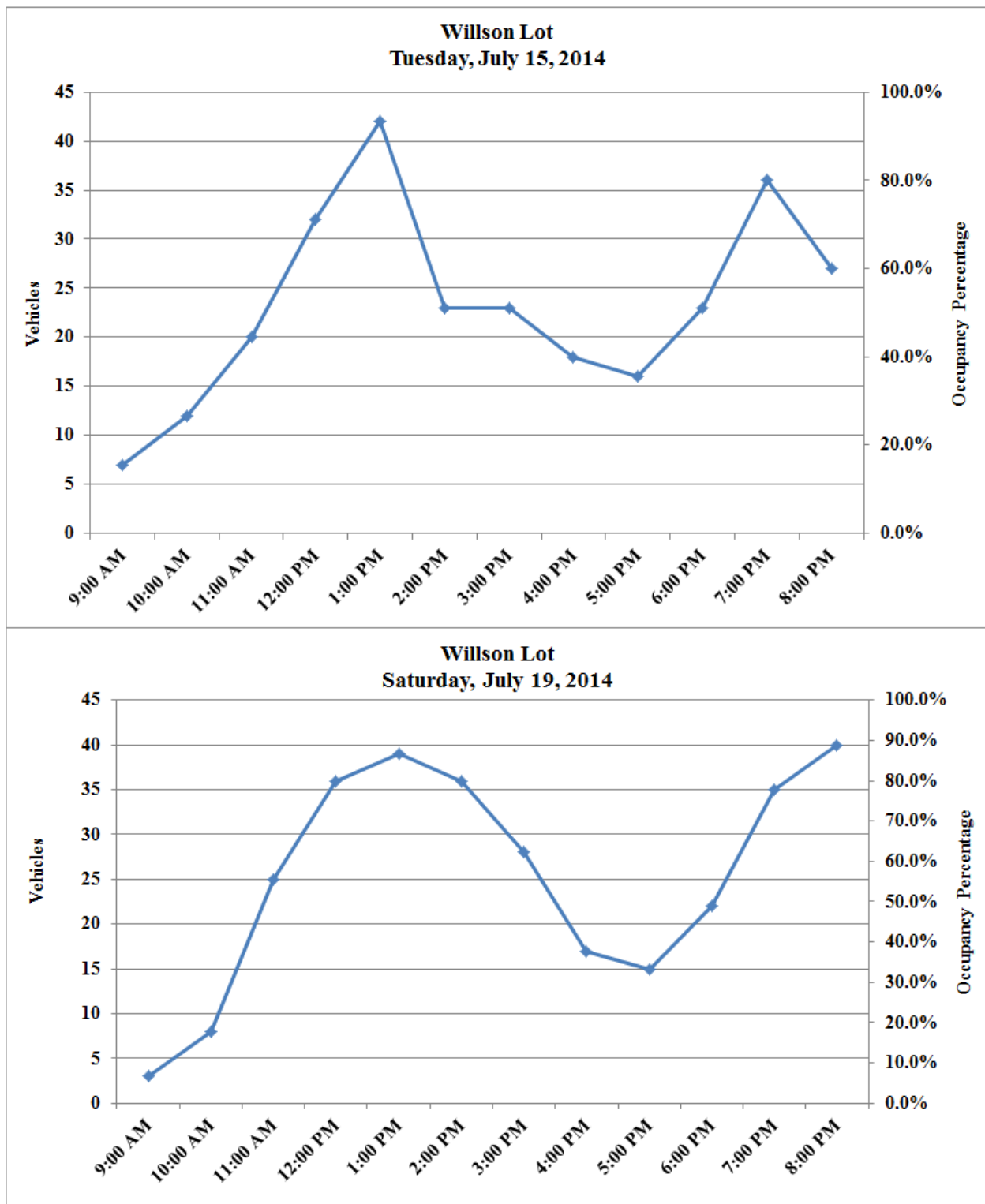


Figure 2-15: Willson lot vehicle observations versus occupancy rates

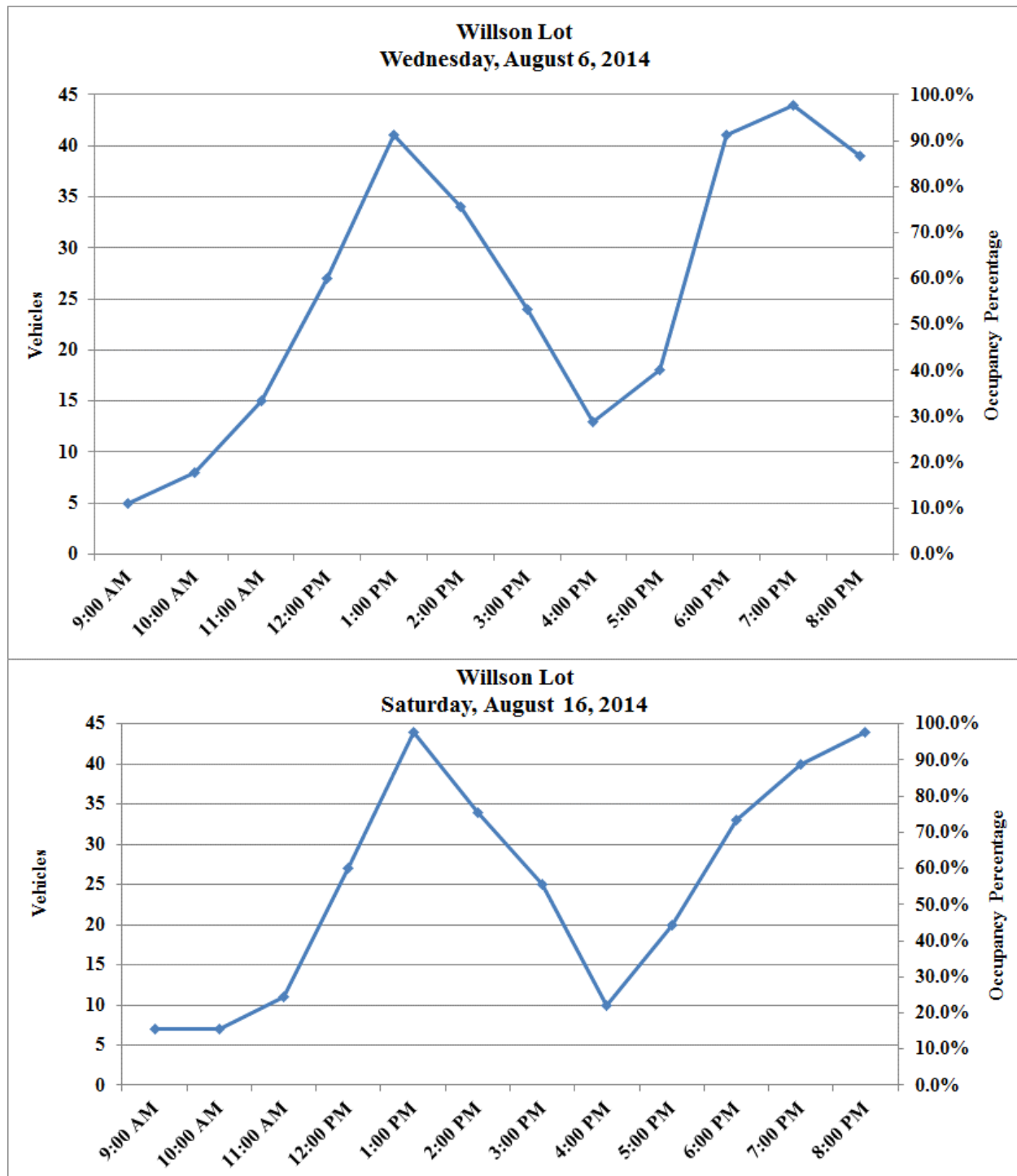


Figure 2-15 cont'd: Willson lot vehicle observations versus occupancy rates

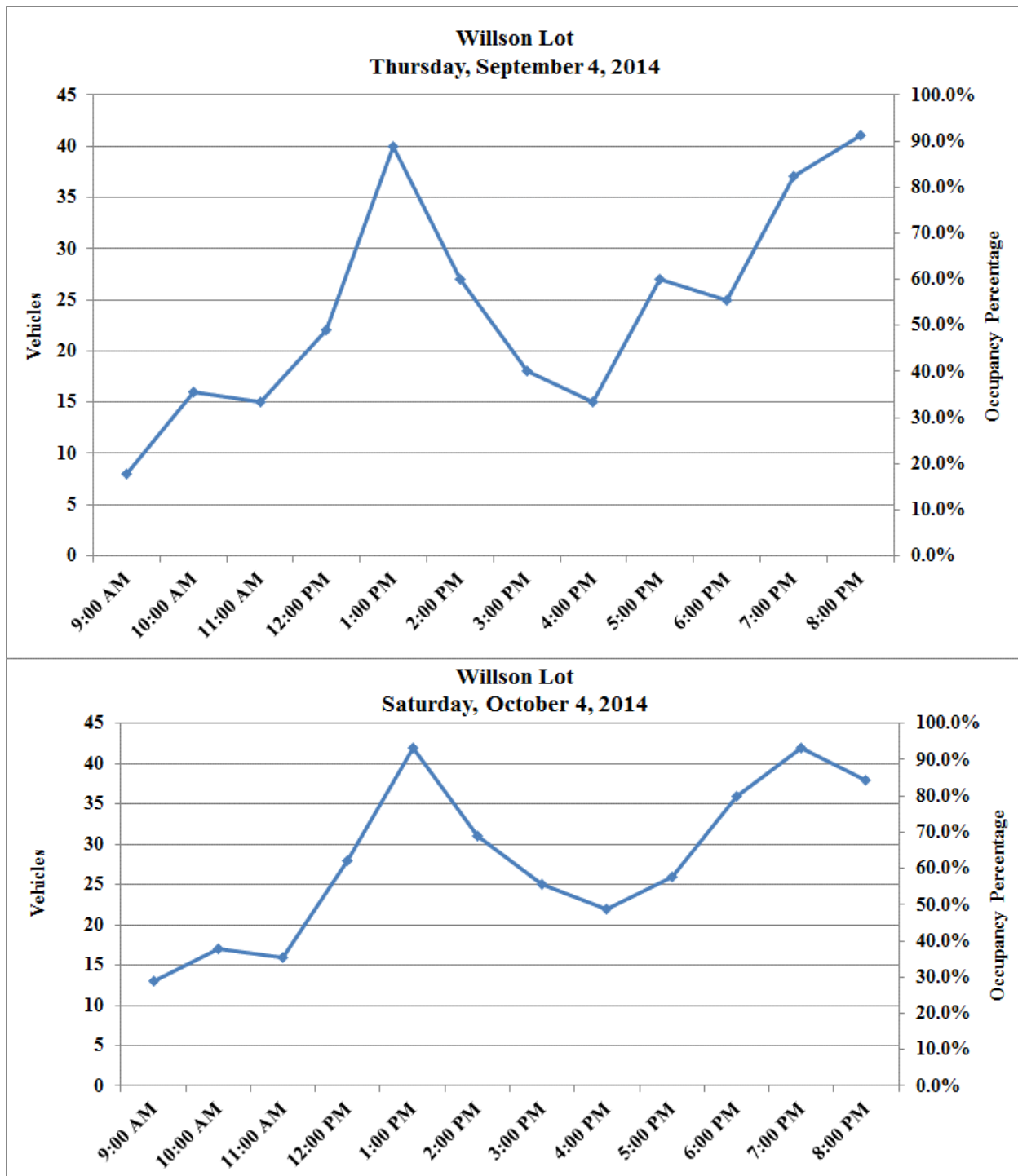


Figure 2-15 cont'd: Willson lot vehicle observations versus occupancy rates

2.2.3 Carnegie Lot

This off-street lot, located on the southeast corner of Mendenhall Street and North Black Avenue, has a total of 71 stalls. Table 2-16 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the lot. This lot exhibited different occupancy trends, depending on the specific observation date. Weekdays exhibited a pattern of occupancy rising throughout the morning and peaking at 12:00 p.m. This was followed by a drop in occupancy during the afternoon, before rising again to a second peak in the evening (generally lower or equal to the midday peak) occurring between 6:00 p.m. and 8:00 p.m. On weekends, occupancy rates generally remained low throughout the day, with lower peaks than those of weekdays observed during the morning or evening. On weekdays, occupancy peaks were approximately 70 percent with weekends displaying a similar result. It would appear that in part, the nearby city parking structure continues to free up additional spaces in this lot both during the week and on weekends. The occupancy trends for this lot are further illustrated in Figure 2-2: South Bozeman Ave. vehicle observations versus occupancy ratesFigure 2-16.

Table 2-16: Carnegie lot parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	29	40.8%	9:00 AM	28	39.4%
10:00 AM	27	38.0%	10:00 AM	52	73.2%
11:00 AM	34	47.9%	11:00 AM	53	74.6%
12:00 PM	54	76.1%	12:00 PM	54	76.1%
1:00 PM	47	66.2%	1:00 PM	54	76.1%
2:00 PM	47	66.2%	2:00 PM	43	60.6%
3:00 PM	25	35.2%	3:00 PM	30	42.3%
4:00 PM	38	53.5%	4:00 PM	23	32.4%
5:00 PM	44	62.0%	5:00 PM	18	25.4%
6:00 PM	39	54.9%	6:00 PM	24	33.8%
7:00 PM	47	66.2%	7:00 PM	39	54.9%
8:00 PM	42	59.2%	8:00 PM	39	54.9%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	29	40.8%	9:00 AM	56	78.9%
10:00 AM	21	29.6%	10:00 AM	54	76.1%
11:00 AM	28	39.4%	11:00 AM	45	63.4%
12:00 PM	55	77.5%	12:00 PM	30	42.3%
1:00 PM	42	59.2%	1:00 PM	25	35.2%
2:00 PM	21	29.6%	2:00 PM	33	46.5%
3:00 PM	25	35.2%	3:00 PM	34	47.9%
4:00 PM	37	52.1%	4:00 PM	43	60.6%
5:00 PM	54	76.1%	5:00 PM	38	53.5%
6:00 PM	54	76.1%	6:00 PM	50	70.4%
7:00 PM	54	76.1%	7:00 PM	39	54.9%
8:00 PM	50	70.4%	8:00 PM	31	43.7%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	34	47.9%	9:00 AM	30	42.3%
10:00 AM	23	32.4%	10:00 AM	38	53.5%
11:00 AM	38	53.5%	11:00 AM	30	42.3%
12:00 PM	54	76.1%	12:00 PM	34	47.9%
1:00 PM	51	71.8%	1:00 PM	28	39.4%
2:00 PM	36	50.7%	2:00 PM	20	28.2%
3:00 PM	28	39.4%	3:00 PM	24	33.8%
4:00 PM	31	43.7%	4:00 PM	22	31.0%
5:00 PM	51	71.8%	5:00 PM	26	36.6%
6:00 PM	53	74.6%	6:00 PM	38	53.5%
7:00 PM	55	77.5%	7:00 PM	49	69.0%
8:00 PM	54	76.1%	8:00 PM	53	74.6%

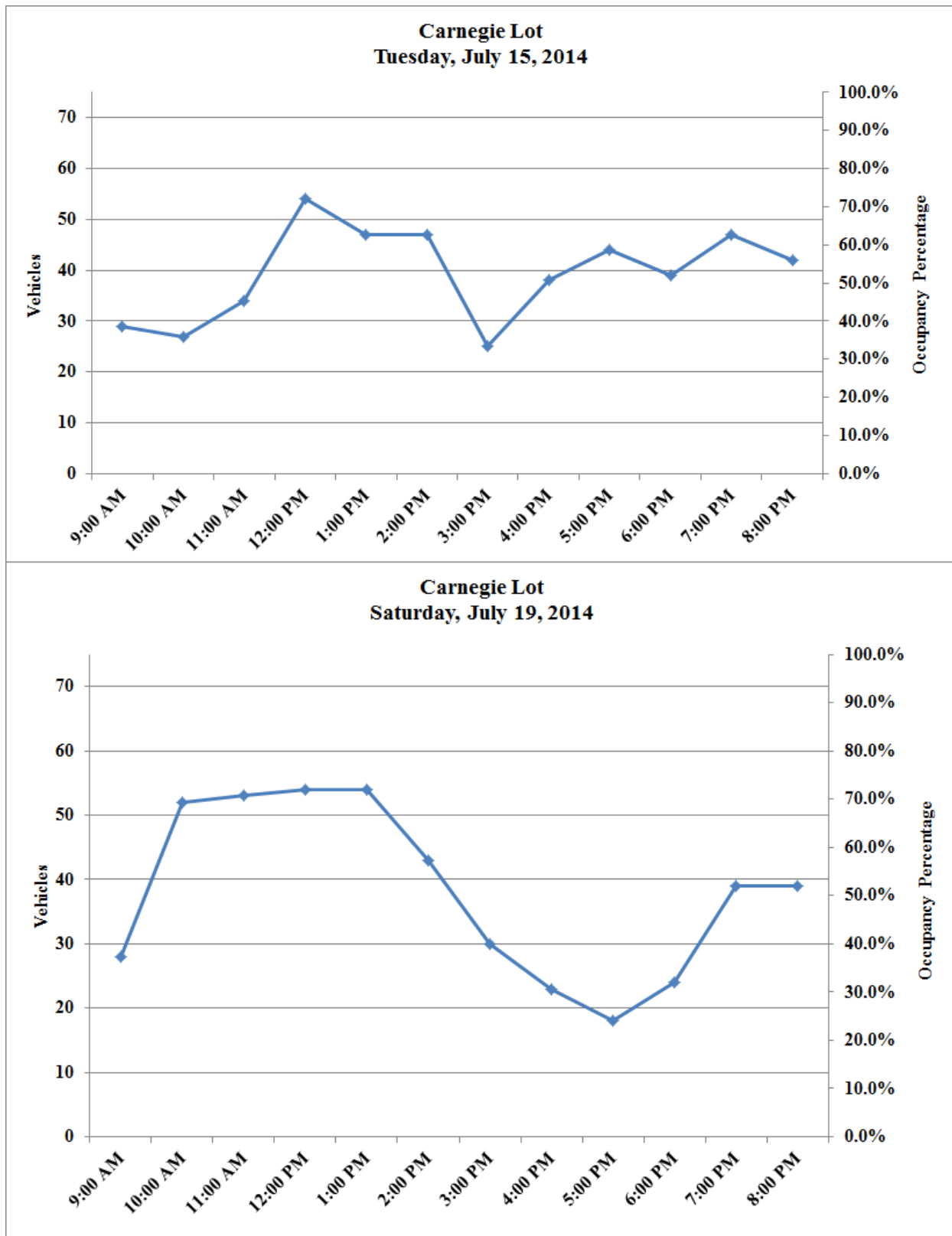


Figure 2-16: Carnegie lot vehicle observations versus occupancy rates

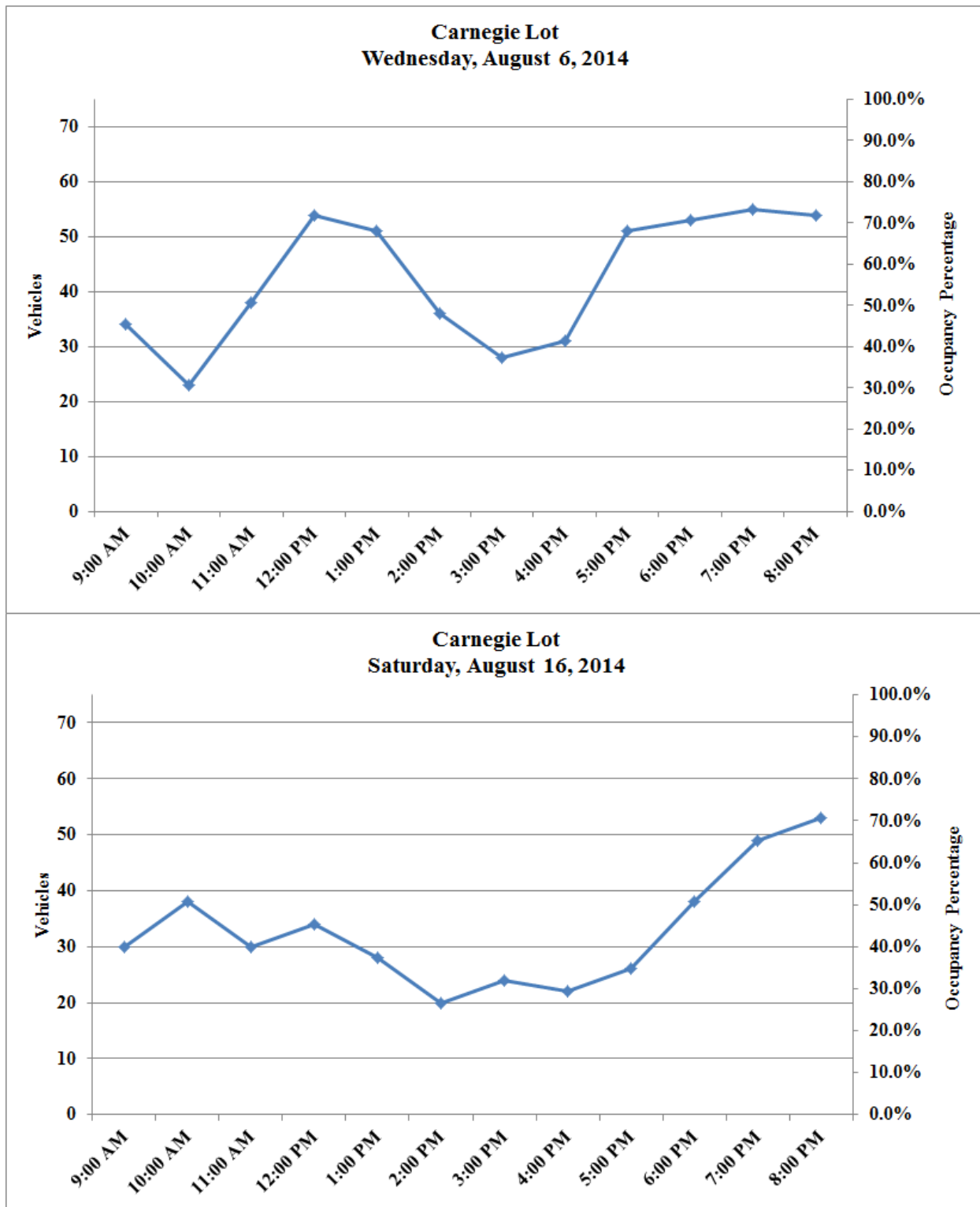


Figure 2-16 cont'd: Carnegie lot vehicle observations versus occupancy rates

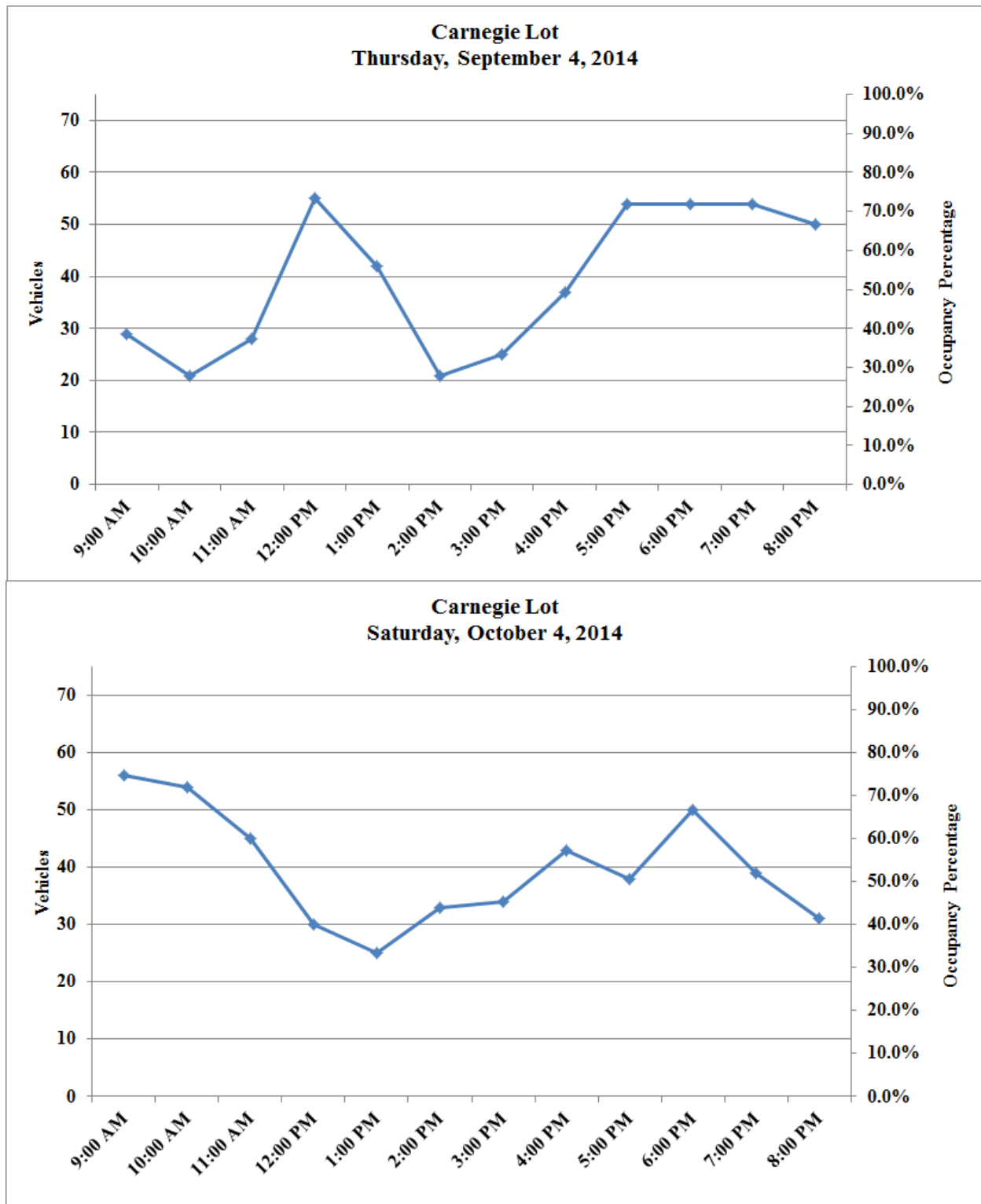


Figure 2-16 cont'd: Carnegie lot vehicle observations versus occupancy rates

2.2.4 Rouse Lot

This off-street lot, located on the northwest corner of Babcock Street and South Rouse Avenue, has a total of 46 stalls. Table 2-17 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the lot. Weekday occupancy peaks occurred in the morning between 12:00 p.m. and 2:00 p.m., depending on the collection date. This was followed by a drop in occupancy during the afternoon, before slight increases occurred in the evening. The midday peaks were the highest occupancies observed on weekdays. On weekends, occupancies fluctuated throughout the day, with peaks occurring at different times. One interesting trend was observed at this lot. On the weekend of July 19, 2014, occupancy was high throughout the midday period, but quite low at corresponding times on August 6, 2014 and October 4, 2014. On these latter dates, occupancy climbed throughout the day and into the evening. The cause of these collective trends is not clear. In general, occupancy for the lot remained at or below 90 percent for all study dates, with the exception of 100 percent occupancies occurring on July 15, 2014 at 2:00 p.m. and July 19, 2014 at 12:00 p.m. The occupancy trends for this lot are further illustrated in Figure 2-2: South Bozeman Ave. vehicle observations versus occupancy rates Figure 2-17.

Table 2-17: Rouse lot parking observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	19	41.3%	9:00 AM	19	41.3%
10:00 AM	26	56.5%	10:00 AM	38	82.6%
11:00 AM	31	67.4%	11:00 AM	39	84.8%
12:00 PM	37	80.4%	12:00 PM	46	100.0%
1:00 PM	46	100.0%	1:00 PM	38	82.6%
2:00 PM	36	78.3%	2:00 PM	24	52.2%
3:00 PM	33	71.7%	3:00 PM	20	43.5%
4:00 PM	24	52.2%	4:00 PM	13	28.3%
5:00 PM	26	56.5%	5:00 PM	19	41.3%
6:00 PM	42	91.3%	6:00 PM	15	32.6%
7:00 PM	36	78.3%	7:00 PM	16	34.8%
8:00 PM	38	82.6%	8:00 PM	27	58.7%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	27	58.7%	9:00 AM	8	17.4%
10:00 AM	21	45.7%	10:00 AM	13	28.3%
11:00 AM	31	67.4%	11:00 AM	23	50.0%
12:00 PM	42	91.3%	12:00 PM	22	47.8%
1:00 PM	37	80.4%	1:00 PM	22	47.8%
2:00 PM	22	47.8%	2:00 PM	25	54.3%
3:00 PM	22	47.8%	3:00 PM	16	34.8%
4:00 PM	19	41.3%	4:00 PM	18	39.1%
5:00 PM	14	30.4%	5:00 PM	12	26.1%
6:00 PM	15	32.6%	6:00 PM	11	23.9%
7:00 PM	22	47.8%	7:00 PM	17	37.0%
8:00 PM	22	47.8%	8:00 PM	22	47.8%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	20	43.5%	9:00 AM	8	17.4%
10:00 AM	26	56.5%	10:00 AM	10	21.7%
11:00 AM	32	69.6%	11:00 AM	10	21.7%
12:00 PM	39	84.8%	12:00 PM	6	13.0%
1:00 PM	35	76.1%	1:00 PM	12	26.1%
2:00 PM	40	87.0%	2:00 PM	15	32.6%
3:00 PM	27	58.7%	3:00 PM	14	30.4%
4:00 PM	24	52.2%	4:00 PM	21	45.7%
5:00 PM	22	47.8%	5:00 PM	30	65.2%
6:00 PM	20	43.5%	6:00 PM	33	71.7%
7:00 PM	19	41.3%	7:00 PM	33	71.7%
8:00 PM	29	63.0%	8:00 PM	27	58.7%



Figure 2-17: Rouse lot vehicle observations versus occupancy rates

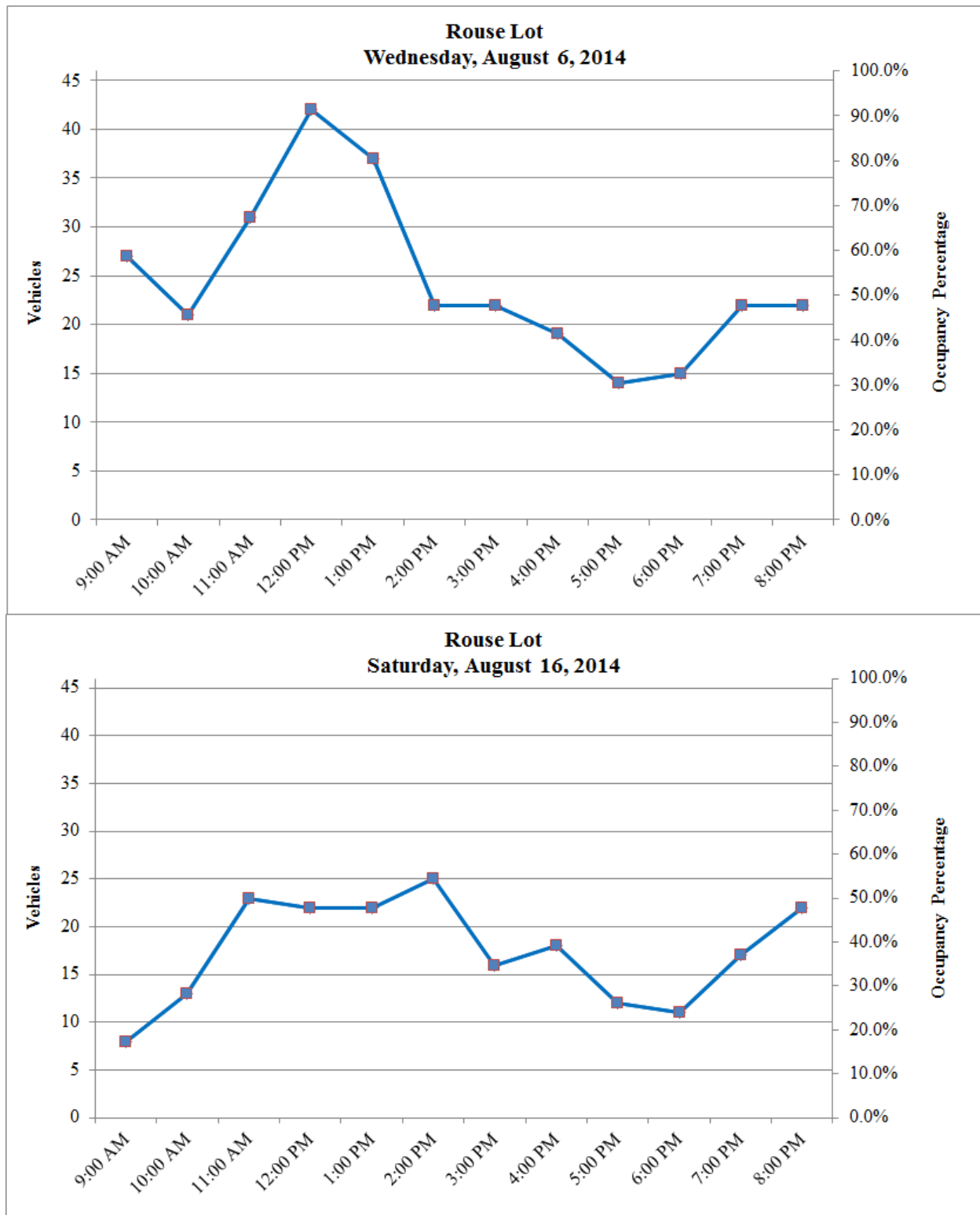


Figure 2-17 cont'd: Rouse lot vehicle observations versus occupancy rates



Figure 2-17 cont'd: Rouse lot vehicle observations versus occupancy rates

2.2.5 Parking Garage

The city parking garage, located along Mendenhall Street between Tracy Avenue and Black Avenue, has a total of 435 stalls. Table 2-17 presents both the number of vehicles parked during each observation period, as well as the resulting occupancy rate for the lot. Weekday occupancy peaks occurred on each weekday at 1:00 p.m. and then gradually fell throughout the afternoon and evening. The midday peaks were the highest occupancies observed on weekdays. Interestingly, a secondary peak, as observed for other parking lots and block faces did not occur in the evening. Occupancy on weekdays only exceeded 50 percent on one occasion (1:00 p.m. in July), indicating ample capacity is present to meet future needs. Weekend occupancy trends were slightly different from those of weekdays. The same rise in occupancy was observed throughout the morning, with a peak being reached at 1:00 p.m. In the afternoon, occupancies fell gradually before leveling off and remaining fairly constant in the evening. Collectively, the occupancy rates observed on weekends were lower than weekdays and rarely exceeded 20 percent, aside from in July. This may be an indication that drivers are using closer parking facilities to their destination on weekends when such spaces are available. The occupancy trends for this lot are further illustrated in Figure 2-18.

Table 2-18: Parking garage observations and occupancy rates

Tuesday, July 15, 2014			Saturday, July 19, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	102	23.4%	9:00 AM	29	6.7%
10:00 AM	131	30.1%	10:00 AM	63	14.5%
11:00 AM	161	37.0%	11:00 AM	91	20.9%
12:00 PM	196	45.1%	12:00 PM	120	27.6%
1:00 PM	219	50.3%	1:00 PM	133	30.6%
2:00 PM	194	44.6%	2:00 PM	111	25.5%
3:00 PM	172	39.5%	3:00 PM	90	20.7%
4:00 PM	149	34.3%	4:00 PM	70	16.1%
5:00 PM	119	27.4%	5:00 PM	59	13.6%
6:00 PM	70	16.1%	6:00 PM	49	11.3%
7:00 PM	46	10.6%	7:00 PM	46	10.6%
8:00 PM	35	8.0%	8:00 PM	44	10.1%

Wednesday August 6, 2014			Saturday, August 16, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	91	20.9%	9:00 AM	34	7.8%
10:00 AM	119	27.4%	10:00 AM	50	11.5%
11:00 AM	141	32.4%	11:00 AM	59	13.6%
12:00 PM	161	37.0%	12:00 PM	72	16.6%
1:00 PM	165	37.9%	1:00 PM	78	17.9%
2:00 PM	162	37.2%	2:00 PM	71	16.3%
3:00 PM	146	33.6%	3:00 PM	50	11.5%
4:00 PM	125	28.7%	4:00 PM	37	8.5%
5:00 PM	117	26.9%	5:00 PM	36	8.3%
6:00 PM	68	15.6%	6:00 PM	31	7.1%
7:00 PM	72	16.6%	7:00 PM	39	9.0%
8:00 PM	68	15.6%	8:00 PM	56	12.9%

Thursday, September 04, 2014			Saturday, October 04, 2014		
Time	Parked Vehicles	Occupancy Rate	Time	Parked Vehicles	Occupancy Rate
9:00 AM	99	22.8%	9:00 AM	25	5.7%
10:00 AM	141	32.4%	10:00 AM	44	10.1%
11:00 AM	143	32.9%	11:00 AM	50	11.5%
12:00 PM	165	37.9%	12:00 PM	58	13.3%
1:00 PM	181	41.6%	1:00 PM	66	15.2%
2:00 PM	175	40.2%	2:00 PM	62	14.3%
3:00 PM	161	37.0%	3:00 PM	47	10.8%
4:00 PM	132	30.3%	4:00 PM	32	7.4%
5:00 PM	121	27.8%	5:00 PM	39	9.0%
6:00 PM	80	18.4%	6:00 PM	47	10.8%
7:00 PM	71	16.3%	7:00 PM	50	11.5%
8:00 PM	54	12.4%	8:00 PM	56	12.9%

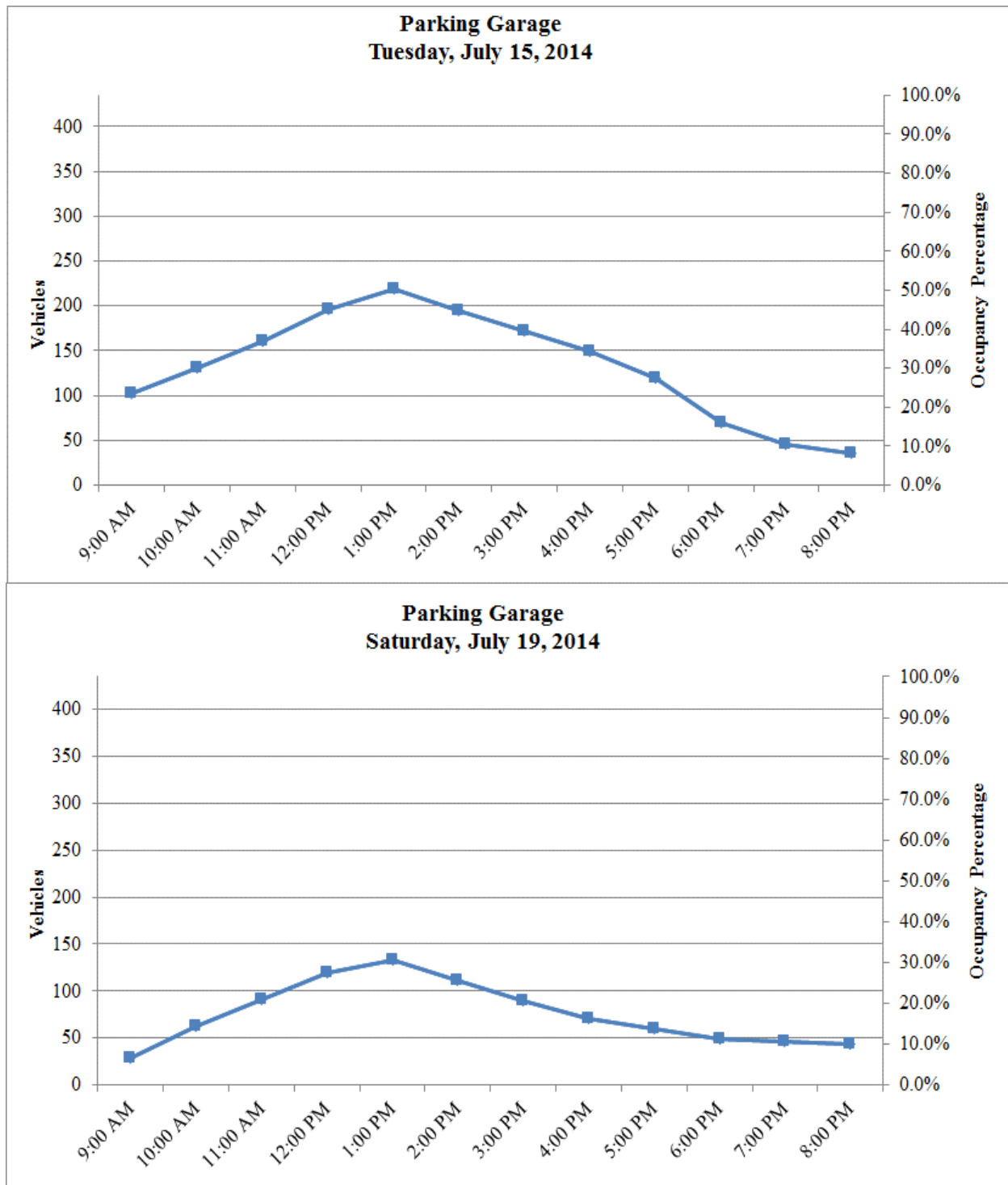


Figure 2-18: Parking garage observations versus occupancy rates

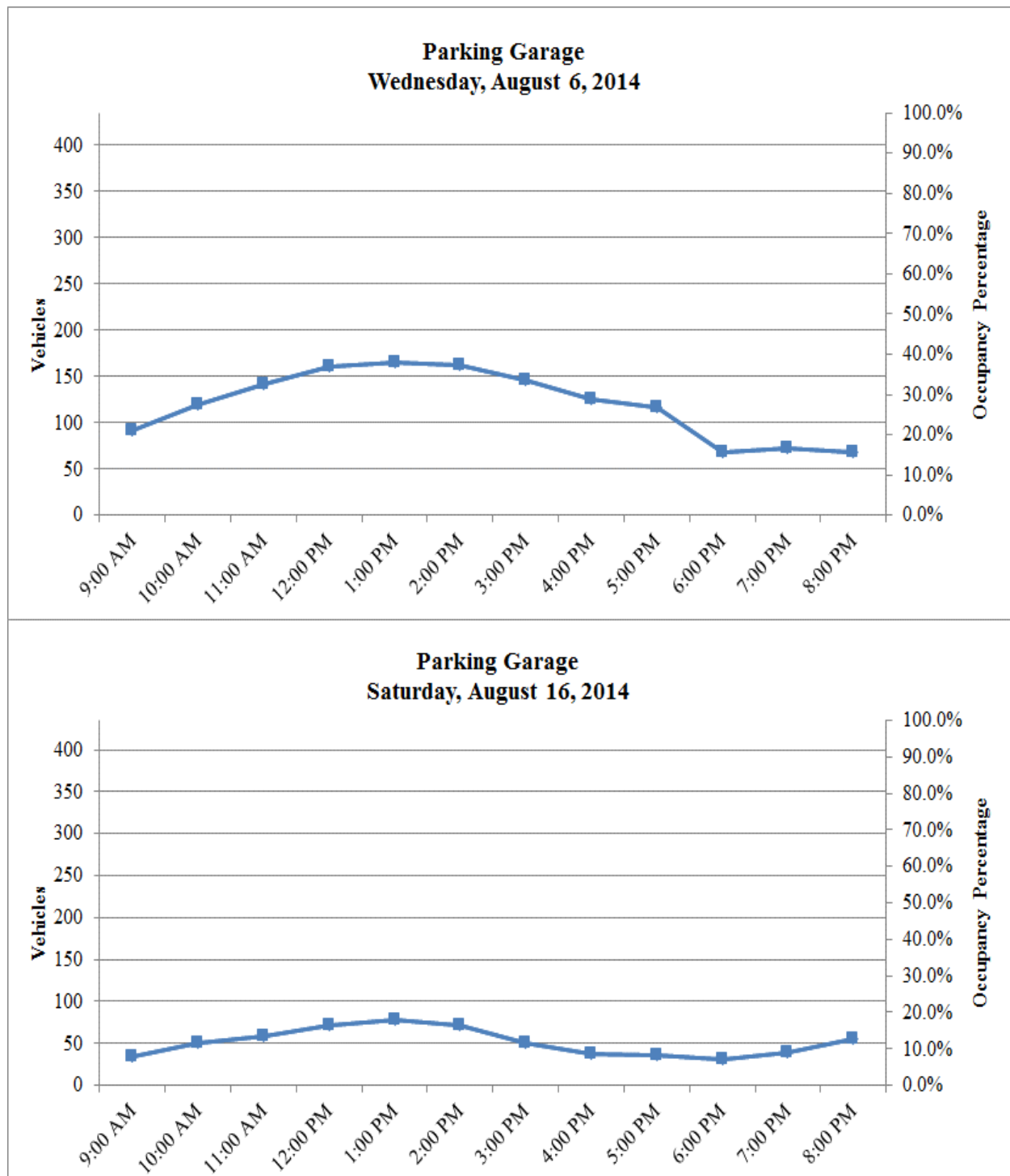


Figure 2-18 cont'd: Parking garage vehicle observations versus occupancy rates

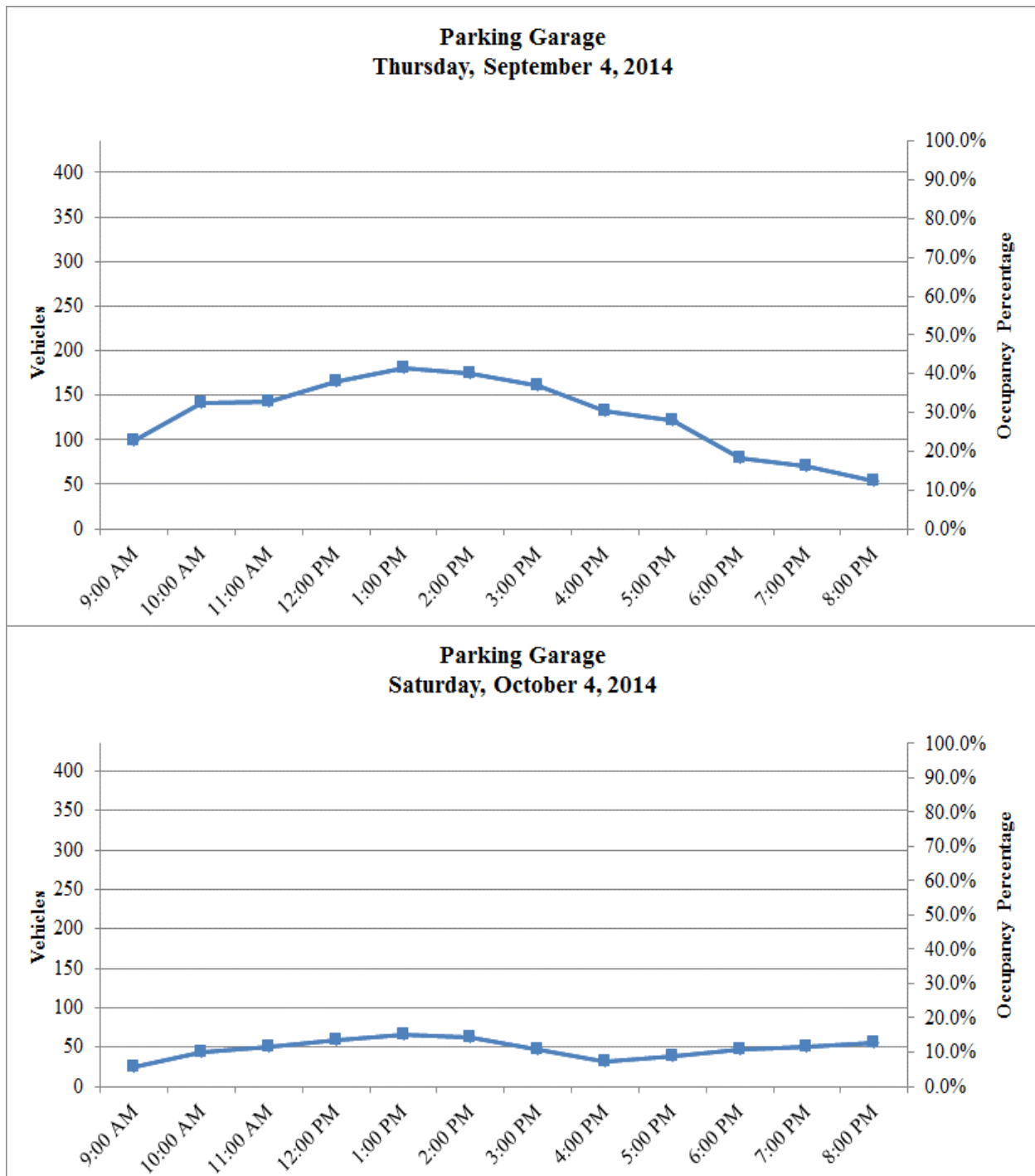


Figure 2-18 cont'd: Parking garage vehicle observations versus occupancy rates

2.3 Comparison of 2014 to 2012 and 2010 Occupancy Rates

Occupancy data collected during a previous study in 2012 (and in some cases 2010) allowed for comparisons to be made with the 2014 data of this report. Data from 2012 (and 2010 when available) was compared to the closest date from the 2014 study. For example, Tuesday, July 17, 2012 data was compared to Tuesday, July 15, 2014 data. It was believed that this approach provided the closest comparisons between similar days of the week for a given month. The only exceptions to this were the Saturday data collection efforts for September, 2012 and October, 2014. Data from different months were compared in these cases on account of Montana State University home football games occurring each Saturday during September, 2014. The following sections present the results of comparisons between occupancy rates for on street parking as well as the Armory lot, the Willson Lot and the downtown parking garage.

2.3.1 North Bozeman Ave. Comparison

A comparison of occupancy rates on North Bozeman Ave. between 2012 and 2014 yielded different results between various dates. Figure 2-19 presents the results of these comparisons. The peak occupancy for a July weekday was in the early afternoon in 2014, but in the early evening in 2012. July Saturday occupancies were generally higher throughout the day in 2014 versus 2012, although evening trends for both years closely matched. August weekday trends in 2014 versus 2012 were variable, with the 2014 occupancy peak occurring at 5:00 pm. versus 1:00 p.m. in 2012. August weekend occupancies more closely matched one another, although higher overall occupancies were observed throughout most of the day in 2012. September weekday comparisons showed much higher occupancies coinciding with the lunch hour in 2014, but generally similar trends throughout the afternoon and evening compared to 2012. The September/October Saturday comparisons indicated higher morning occupancies in 2014, similar trends to 2012 between the afternoons, and very different trends between each year in the evening. In 2014, occupancies sharply fell after 6:00 p.m. while the opposite was true in 2012. As indicated earlier, the cause of this 2014 trend was likely a community walk in the area, which possibly impacted parking patterns on this block. Collectively, the occupancy rates observed in 2014 indicate that this location still has varying levels of parking availability depending on the time of day compared to 2012.

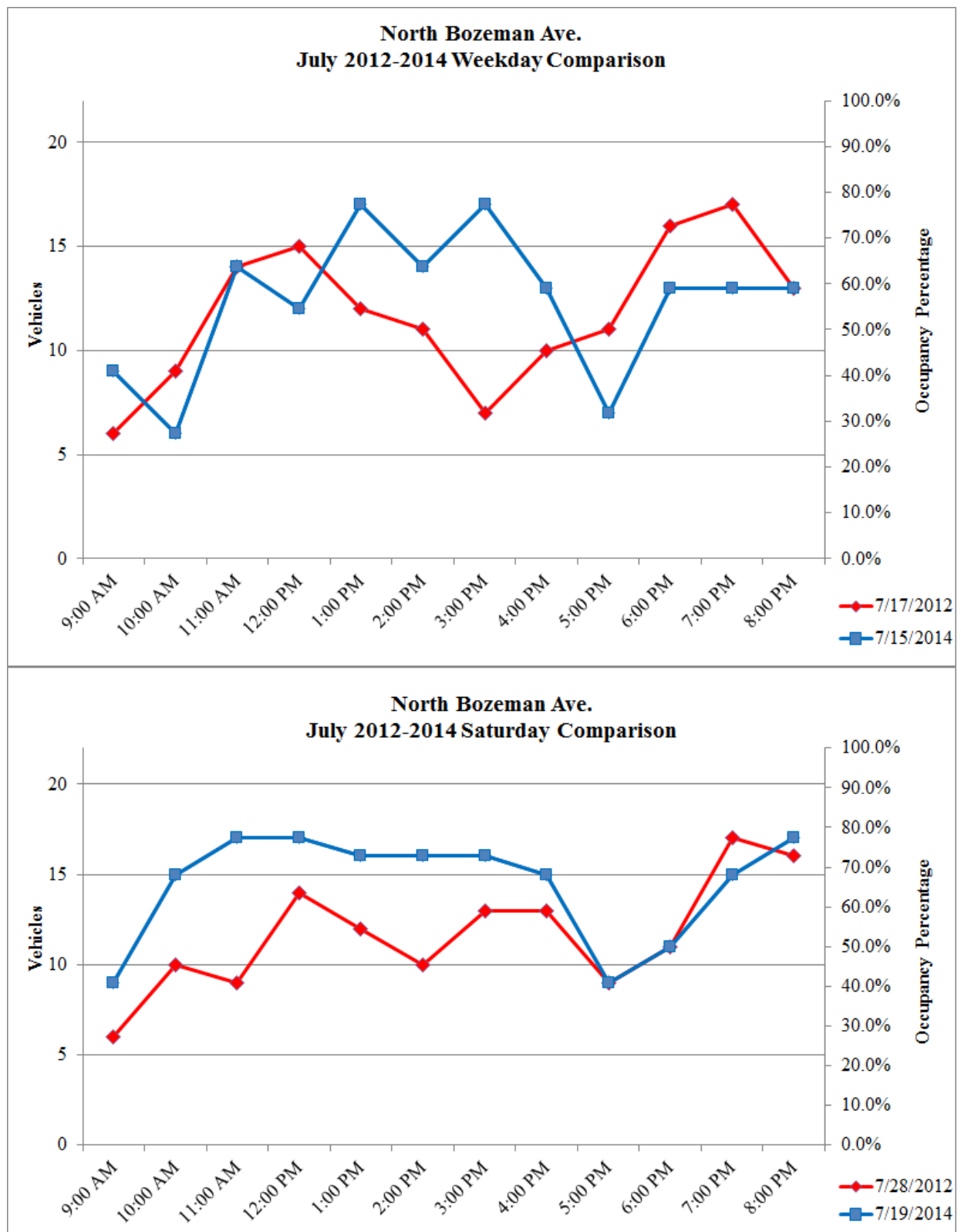


Figure 2-19: Comparison of North Bozeman Ave. occupancy rates for weekdays and weekends, July 2012 and 2014

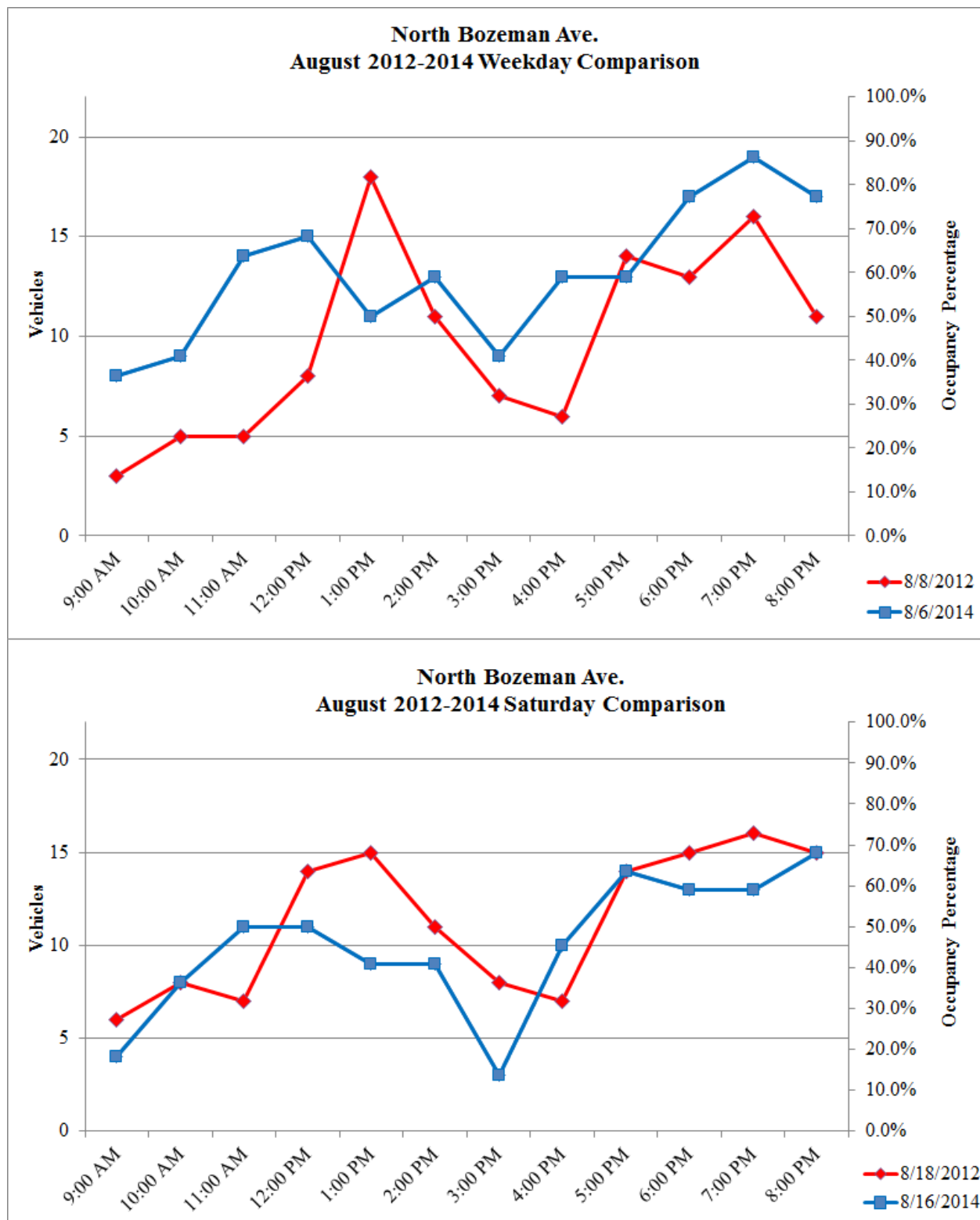


Figure 2-19 cont'd: Comparison of North Bozeman Ave. occupancy rates for weekdays and weekends, August 2012 and 2014

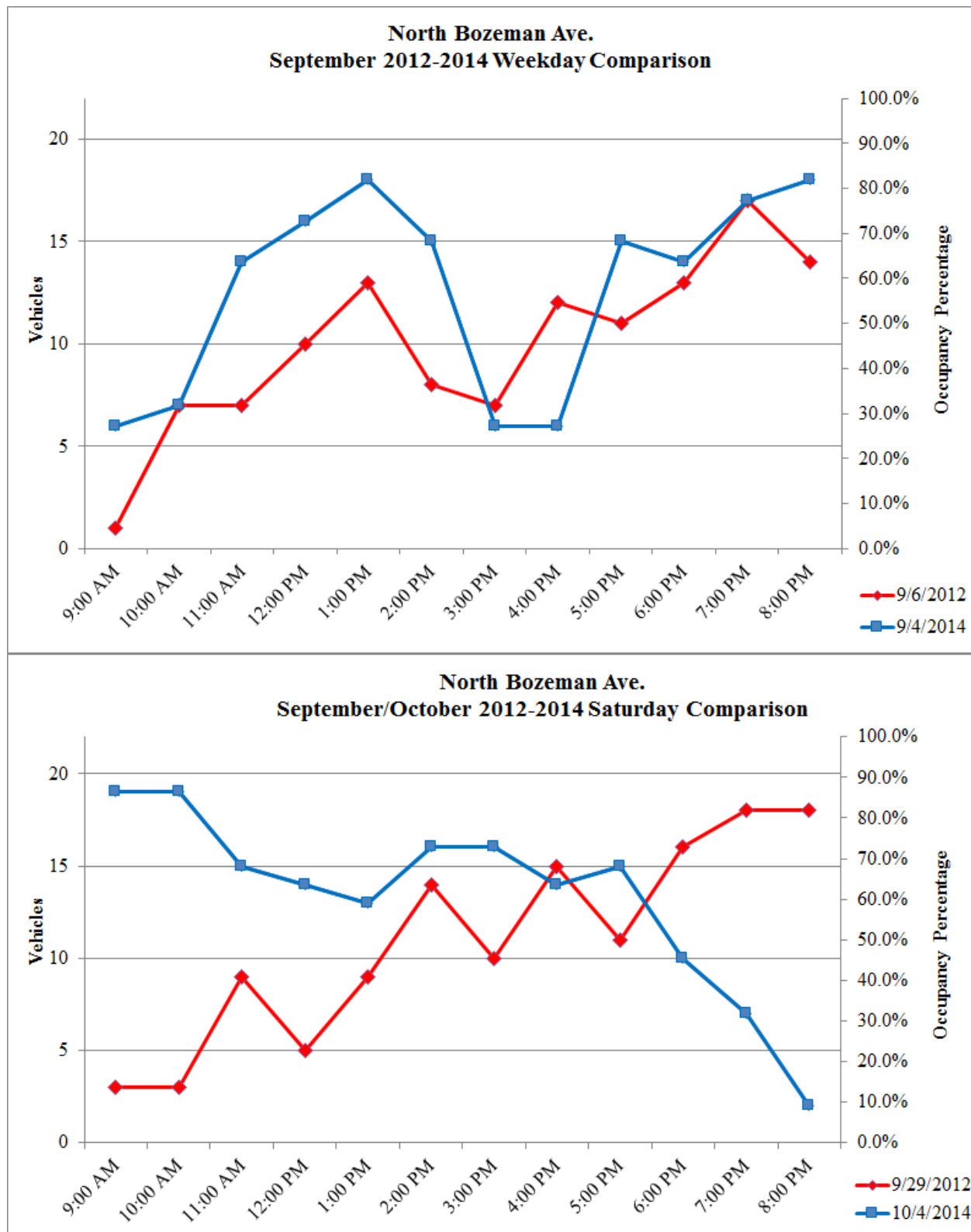


Figure 2-19 cont'd: Comparison of North Bozeman Ave. occupancy rates for weekdays and weekends, September/October 2012 and 2014

2.3.2 South Bozeman Ave. Comparison

The comparison of occupancy rates between 2012 and 2014 for South Bozeman Ave. produced a number of observations. Figure 2-20 presents the results of these comparisons. For July weekdays, peak occupancies were similar between each year and occurred at approximately the same times. Occupancies for Saturdays in July were typically higher in 2014, with peaks occurring at 10:00 a.m. and 1:00 p.m., compared to the 2012 peak at 8:00 p.m. August weekday trends between 2012 and 2014 were similar throughout the day, with the most notable differences occurring in the evening. Similarly, Saturdays in August showed similar trends throughout the day until 4:00 p.m. At this point, the general trends between years matched but the number of vehicles present diverged between years, with 2014 figures being higher. Weekdays in September were fairly different from one another with respect to occupancy levels throughout the day. In 2014, trends tended to be smoother, while 2012 occupancies varied significantly at different times with the overall peak being higher than in 2014. Finally, Saturdays in September/October produced different trends, with 2014 occupancies starting off high (on account of a local community walk in the area) and dropping off throughout the day. Conversely, 2012 occupancies climbed throughout the morning and afternoon, dropped off slightly, and then reached a peak in the evening. Collectively, this block showed high occupancies at various times throughout the day during both study years, typically coinciding with high activity times such as lunch and dinner.

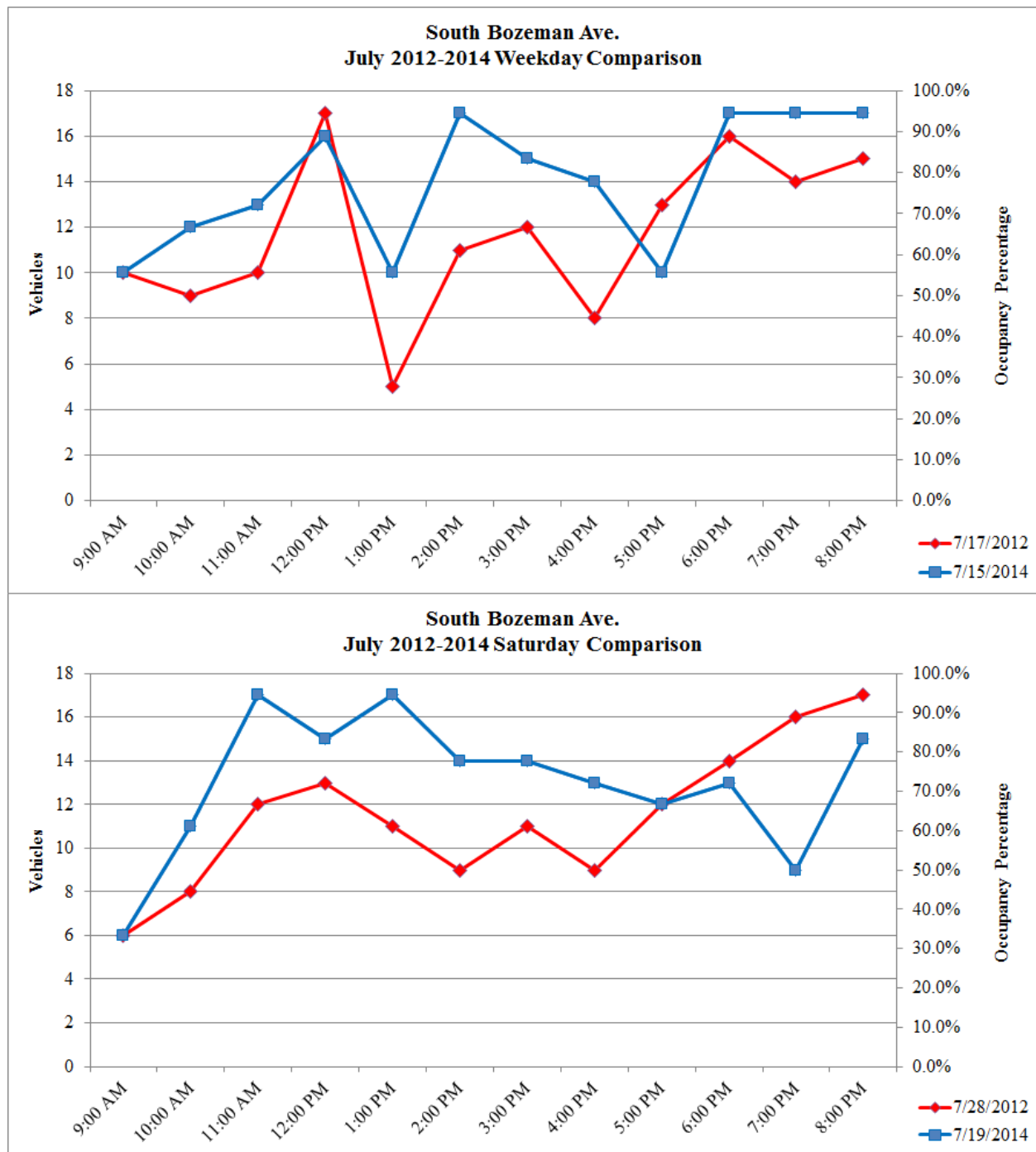


Figure 2-20: Comparison of South Bozeman Ave. occupancy rates for weekdays and weekends, July 2012 and 2014

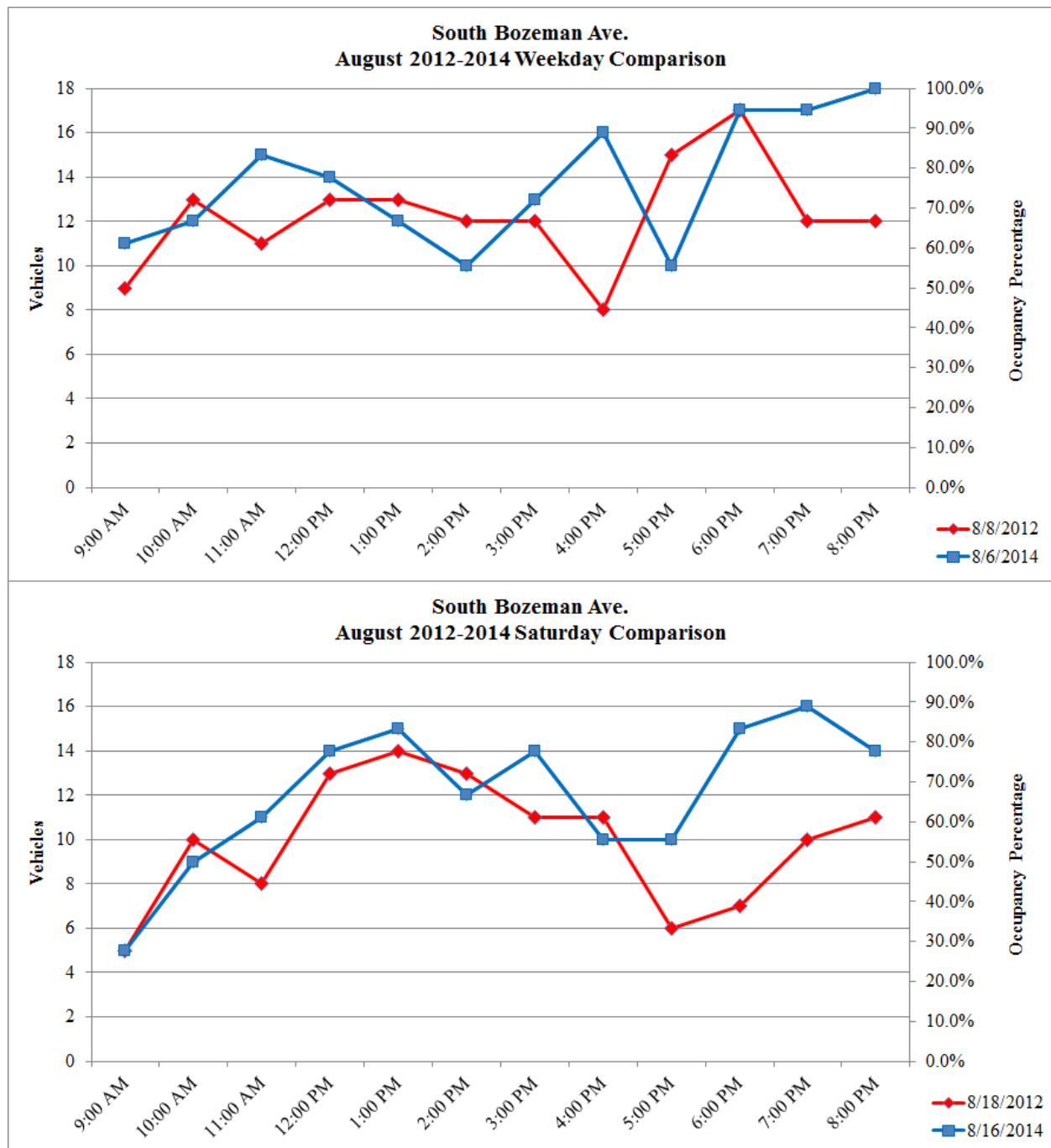


Figure 2-20 cont'd: Comparison of South Bozeman Ave. occupancy rates for weekdays and weekends, August 2012 and 2014

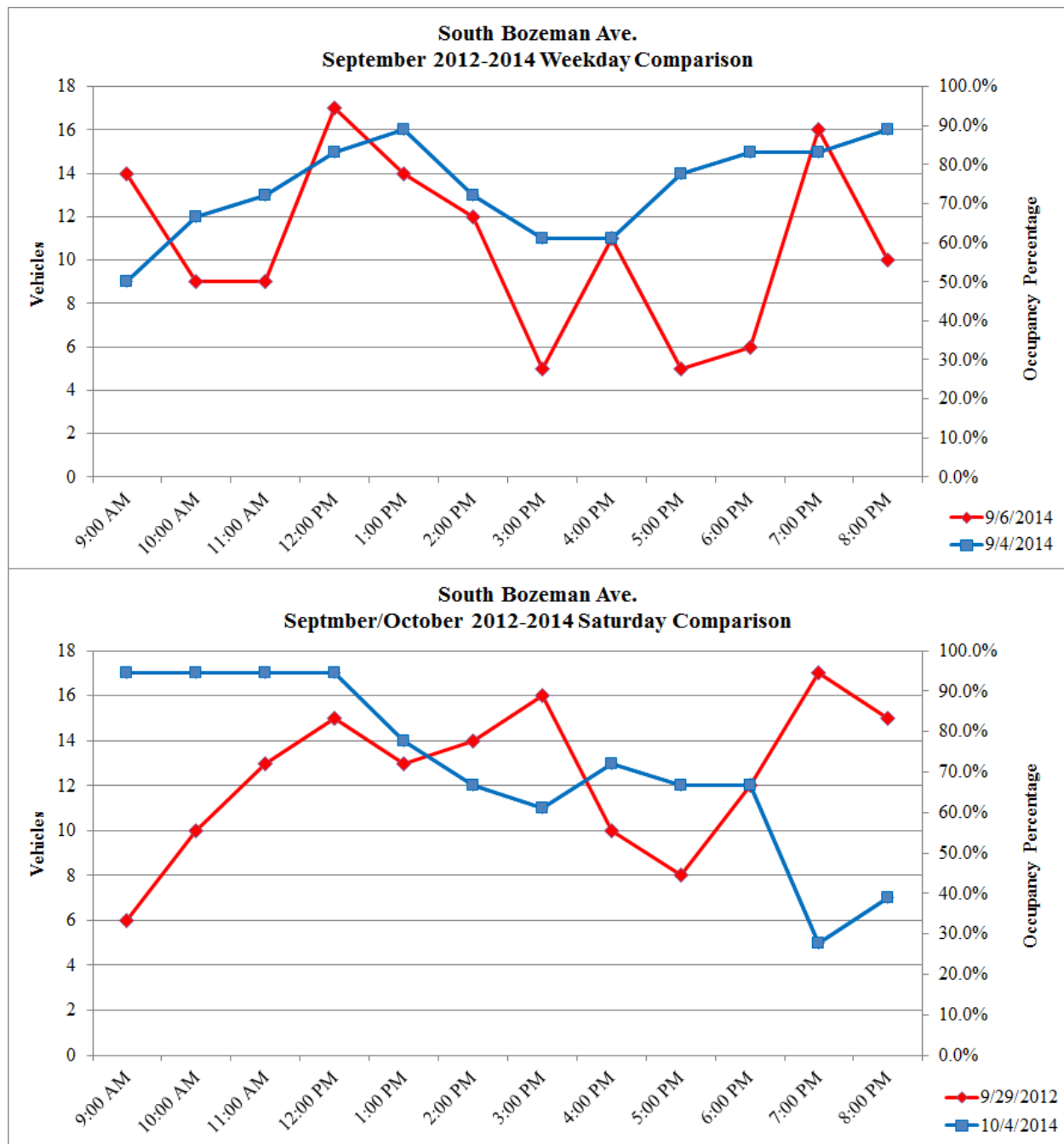


Figure 2-20 cont'd: Comparison of South Bozeman Ave. occupancy rates for weekdays and weekends, September/October 2012 and 2014

2.3.3 North Black Ave. Comparison

Comparisons from North Black Ave. from 2012 and 2014 indicated many similarities between occupancy trends, with only limited differences. Figure 2-21 presents the results of these comparisons. July weekday and Saturday occupancy trends largely matched one another, albeit with slight differences in the number of vehicles parked at a given time. August weekday and Saturday trends were also similar, although the weekday peak in 2014 was higher than in 2012, and the Saturday peak was higher in 2012 than in 2014. September weekday occupancies matched in terms of trend but were noticeably lower in vehicle count in 2012. This was attributable to the east side of the street being closed for construction in 2012. Finally, Saturday trends in September/October were similar between years, although the timing of the peaks for each year varied. Overall, the occupancy trends for this block remained consistent over time and only occasionally exceeded the 90 percent level.

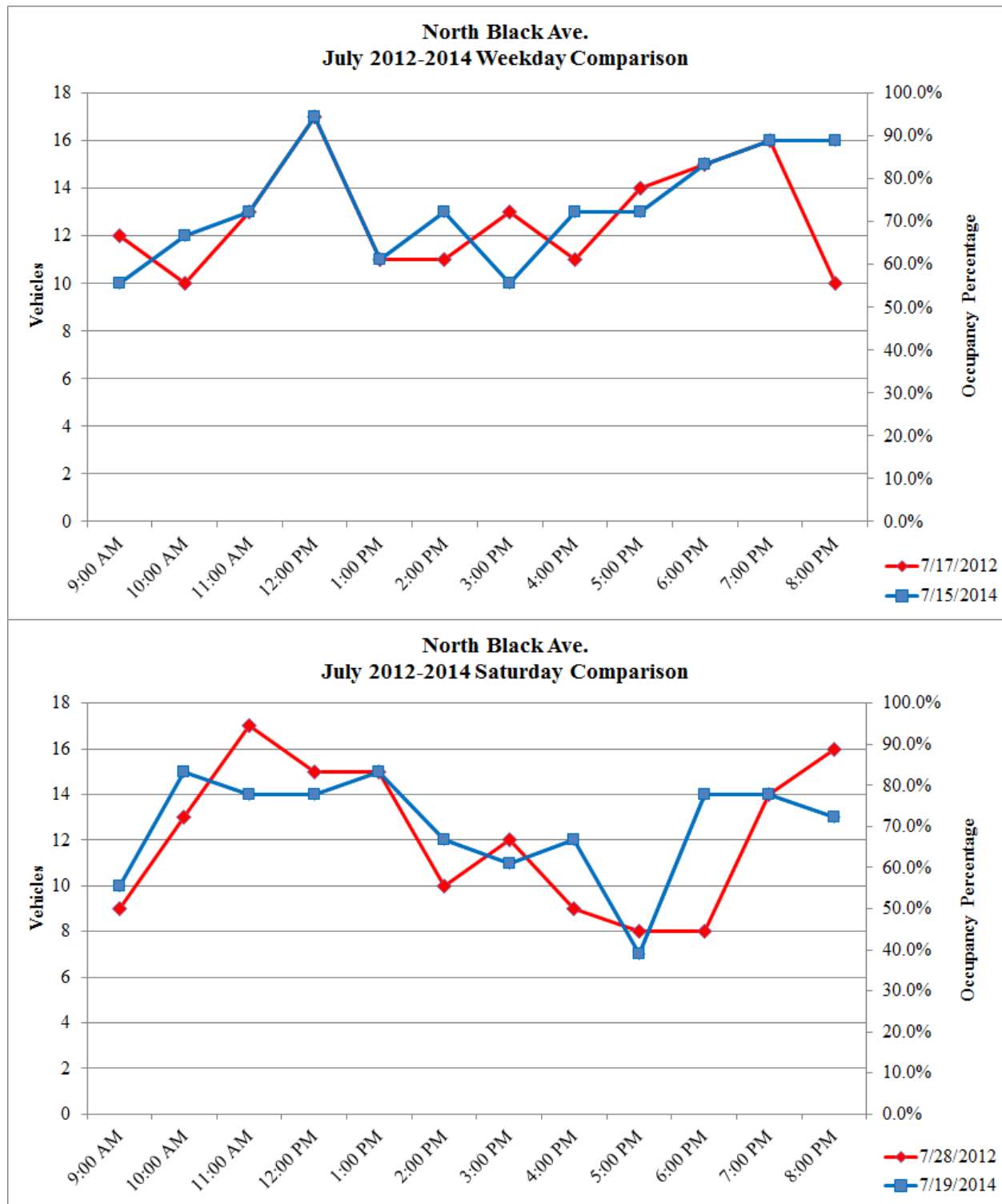


Figure 2-21: Comparison of North Black Ave. occupancy rates for weekdays and weekends, July 2012 and 2014

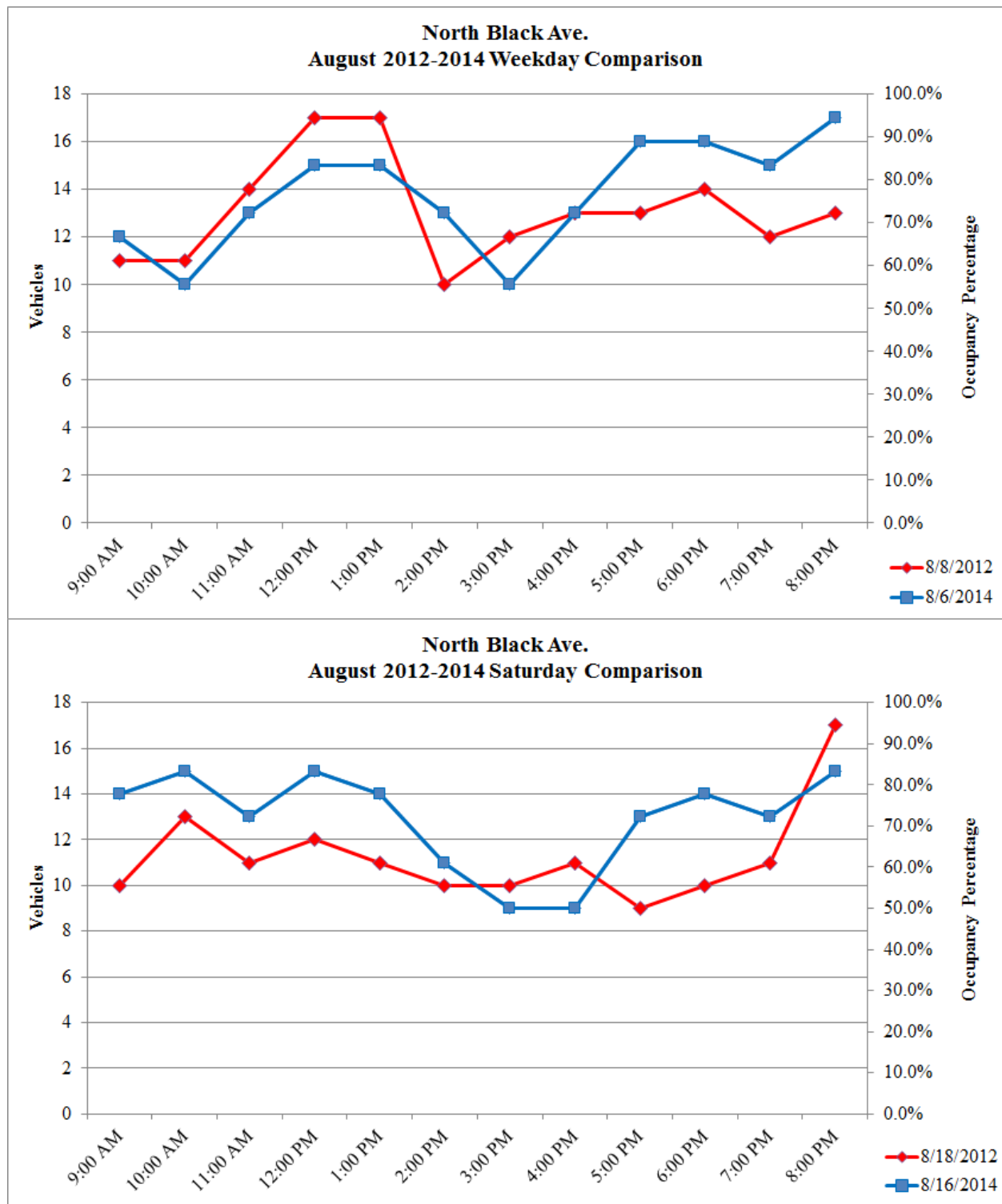


Figure 2-21 cont'd: Comparison of North Black Ave. occupancy rates for weekdays and weekends, August 2012 and 2014

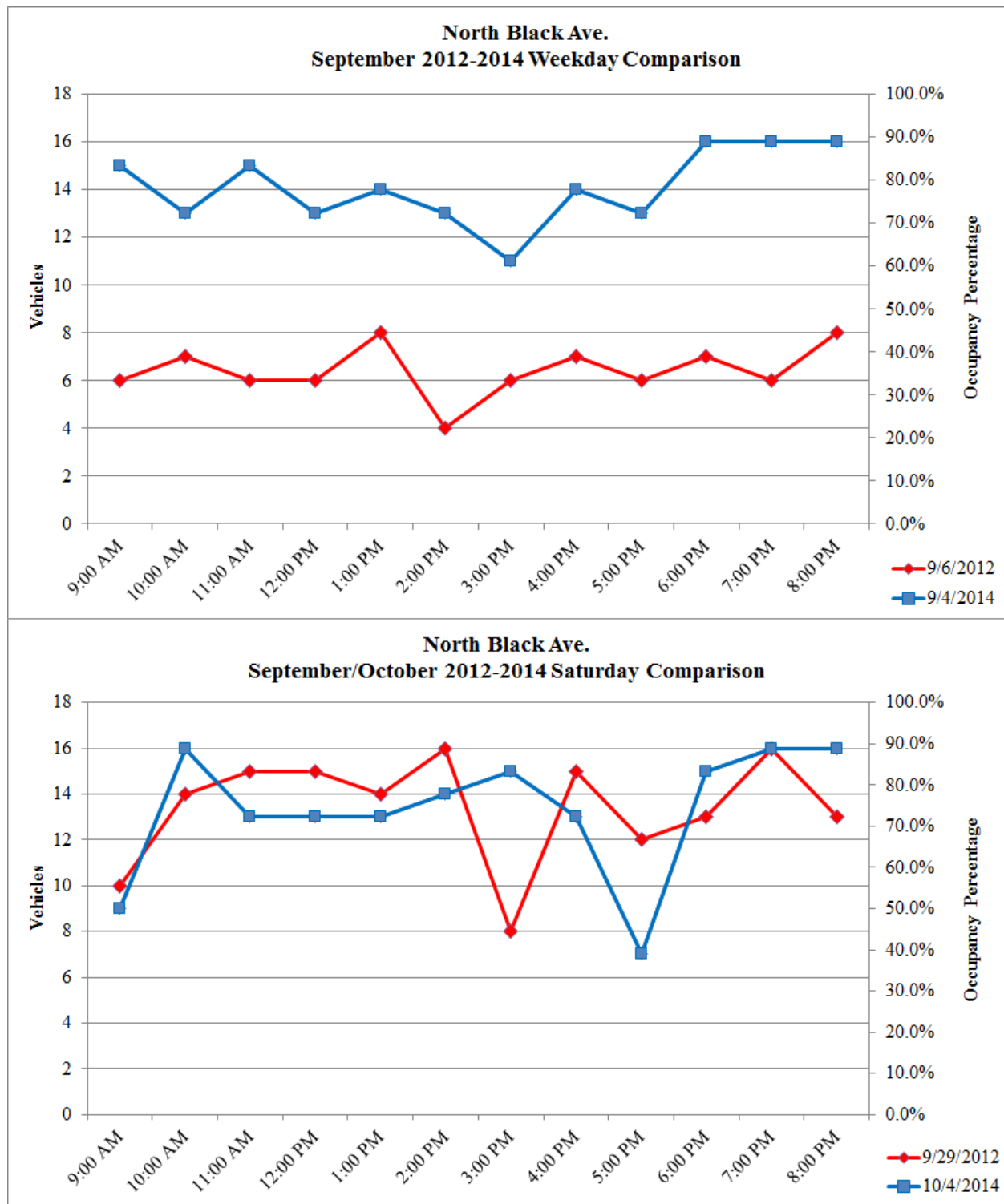


Figure 2-21 cont'd: Comparison of North Black Ave. occupancy rates for weekdays and weekends, September/October 2012 and 2014

2.3.4 South Black Ave. Comparison

Comparisons of occupancy trends for South Black Ave. between 2012 and 2014 showed generally similar patterns between each year. Figure 2-22 presents the results of these comparisons. July weekday trends exhibited higher occupancies throughout the day for each year, with the 2014 peak occurring in midafternoon. In both years, occupancies fell after 6:00 p.m. July Saturday trends were similar between each year, with 2014 occupancy rates generally higher than those of 2012 after 11:00 a.m. August weekday occupancies varied throughout the day both years, with 2014 occupancies generally higher, peaking at 8:00 p.m. August Saturday trends were also variable between each year, with 2012 occupancies peaking in midafternoon and 2014 occupancies peaking at 6:00 p.m. and 7:00 p.m. September weekday occupancies were notably different between 2012 and 2014 in number, but not in trend (except at 4:00 p.m.). Once again, this was the result of parking on the east side of the street being closed for construction in 2012. Finally, September/October Saturday occupancy trends were largely similar between years, with some differences in number occurring after 3:00 p.m. In general, occupancy rates for each collection year indicate that parking is available on this block for much of the day, although rates approaching 100 percent were observed a number of times, indicating capacity being reached.

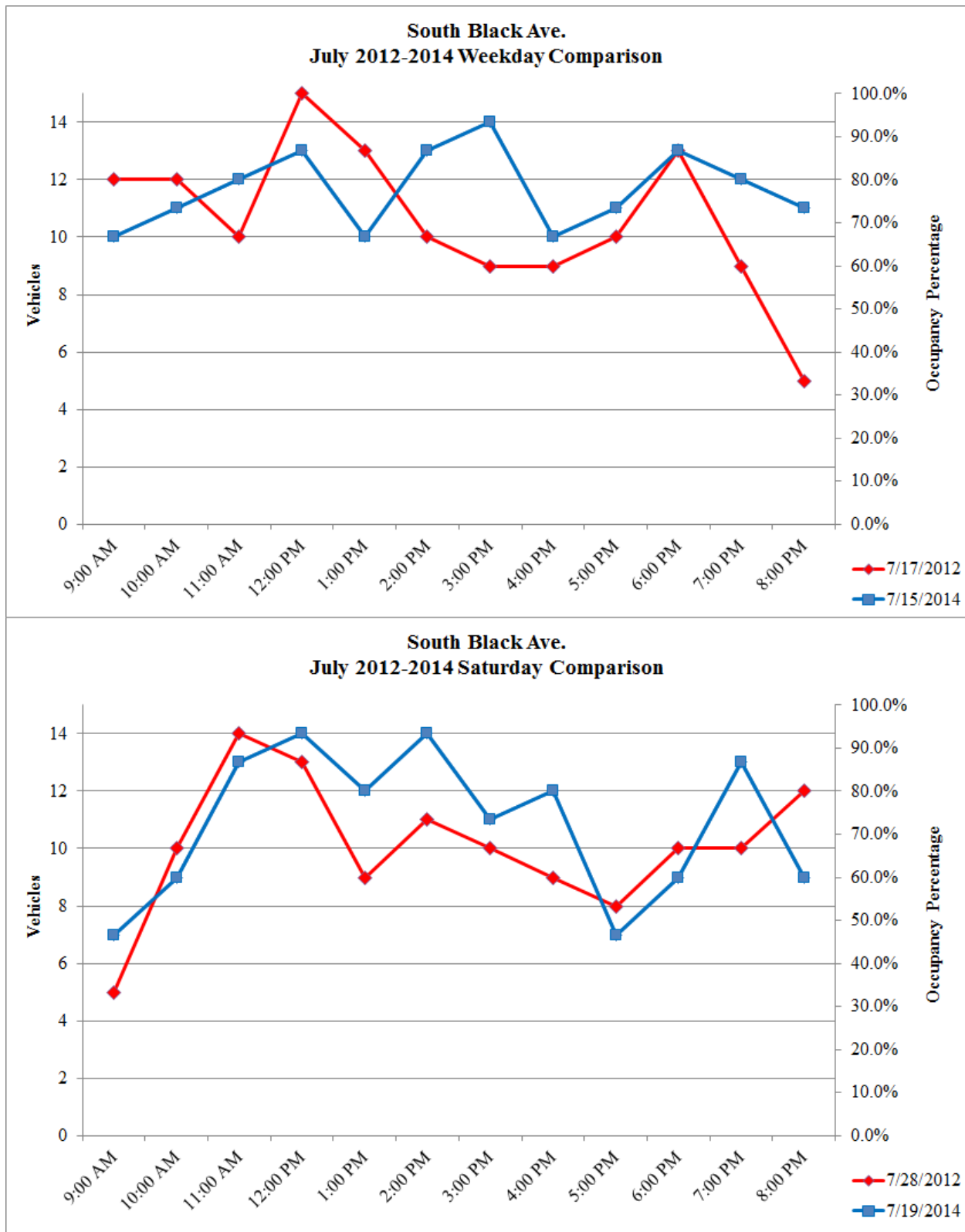


Figure 2-22: Comparison of South Black Ave. occupancy rates for weekdays and weekends, July 2012 and 2014

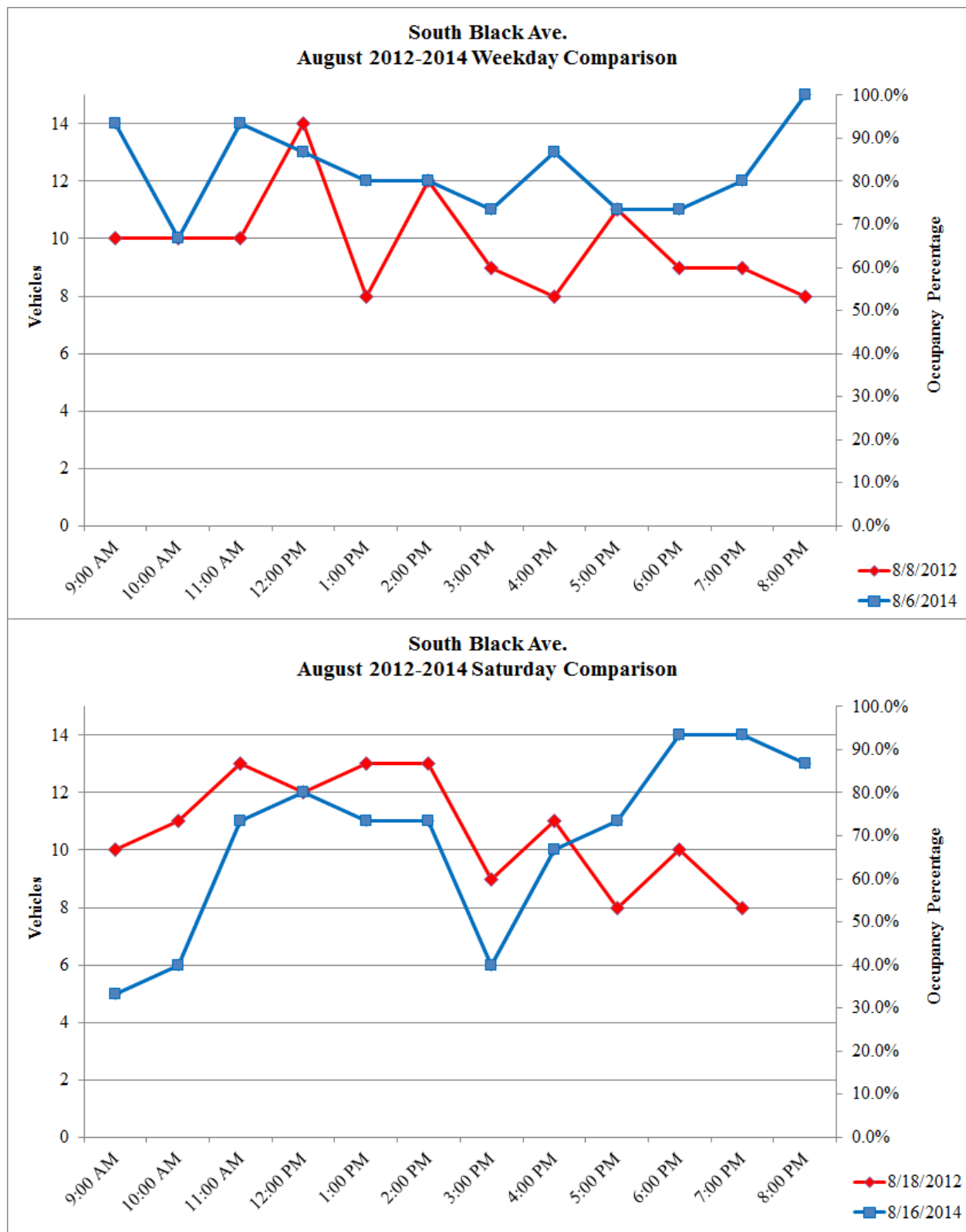


Figure 2-22 cont'd: Comparison of South Black Ave. occupancy rates for weekdays and weekends, August 2012 and 2014

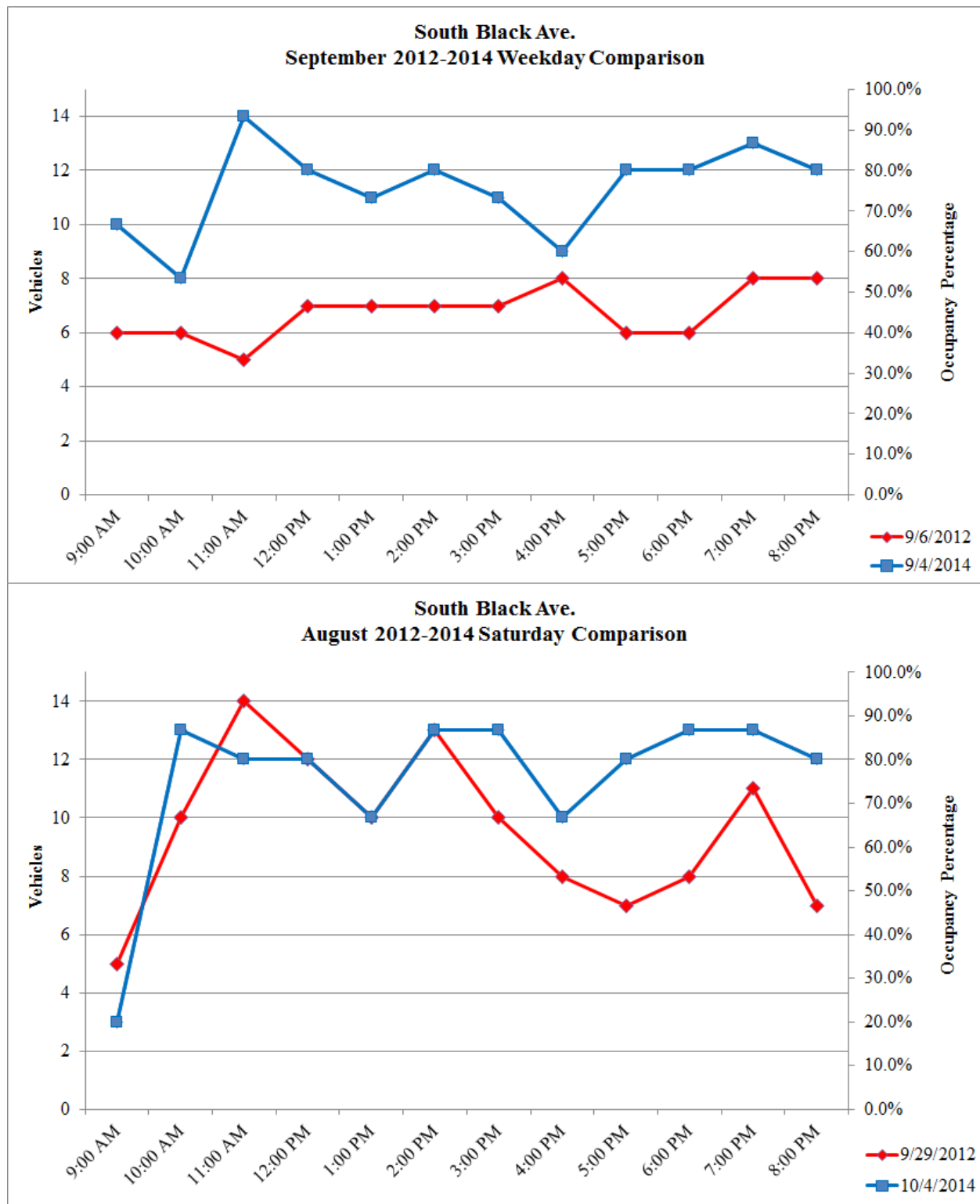


Figure 2-22 cont'd: Comparison of South Black Ave. occupancy rates for weekdays and weekends, September/October 2012 and 2014

2.3.5 North Tracy Ave. Comparison

Comparisons for North Tracey Ave. between 2012 and 2014 indicated that occupancy trends were largely the same each year. Figure 2-23 presents the results of these comparisons. July weekday trends exhibited a slight difference in occupancy from 10:00 a.m. to 5:00 p.m. between each year, although the difference in the number of observed vehicles was typically small. July Saturday trends generally matched each other in pattern, with some differences once again noted between the number of vehicles observed. August weekday and Saturday trends largely matched one another each year. Finally, September weekday and September/October Saturday trends were also similar to one another between each year, with some oscillations occurring in the afternoon. In general, occupancies remained at approximately 80 percent at most times, with 100 percent occupancy reached only on August 6, 2014 (7:00 p.m. and 8:00 p.m.). Otherwise, it appears there is generally some spare capacity available on this block at most times to meet demand.

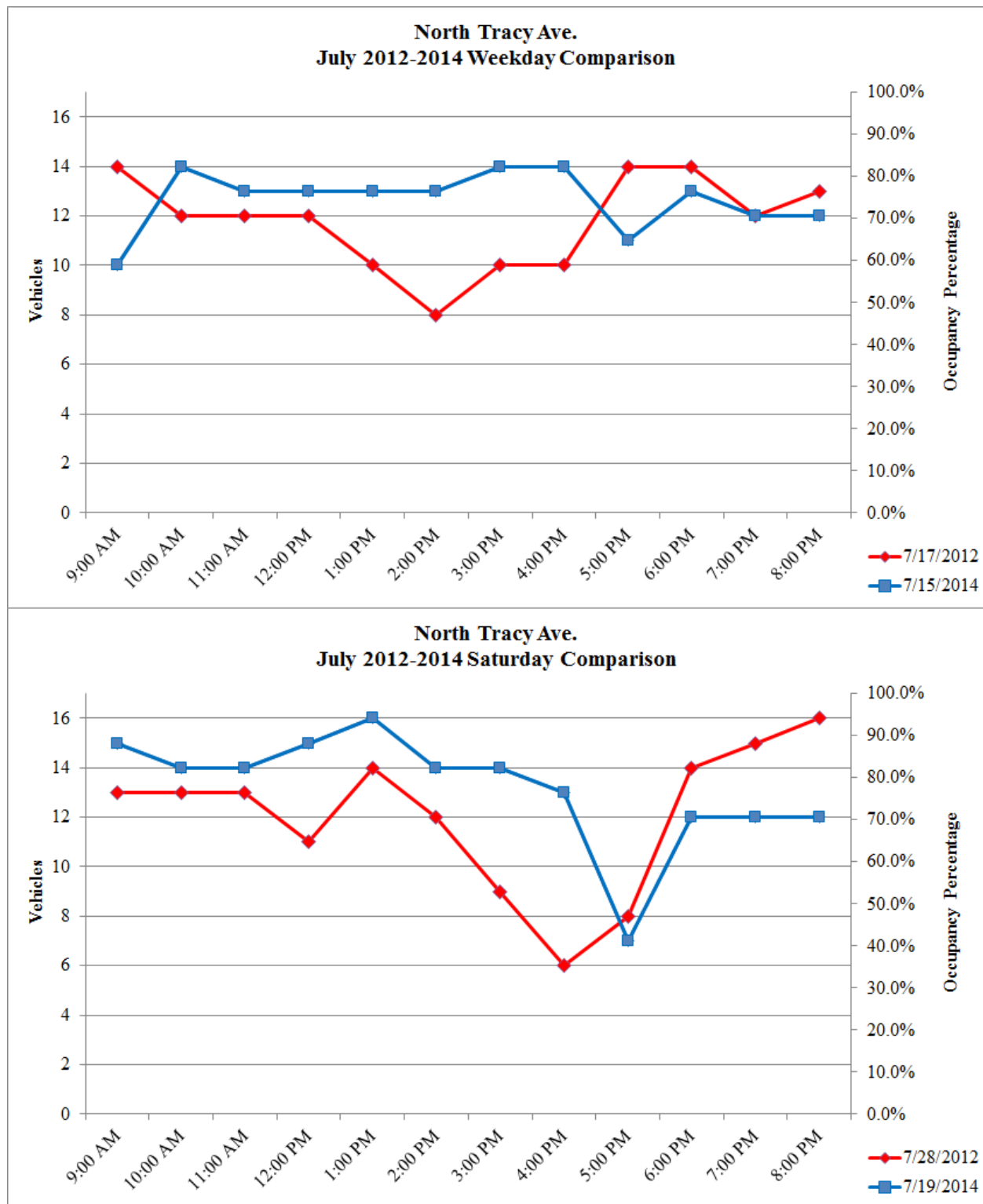


Figure 2-23: Comparison of North Tracy Ave. occupancy rates for weekdays and weekends, July 2012 and 2014

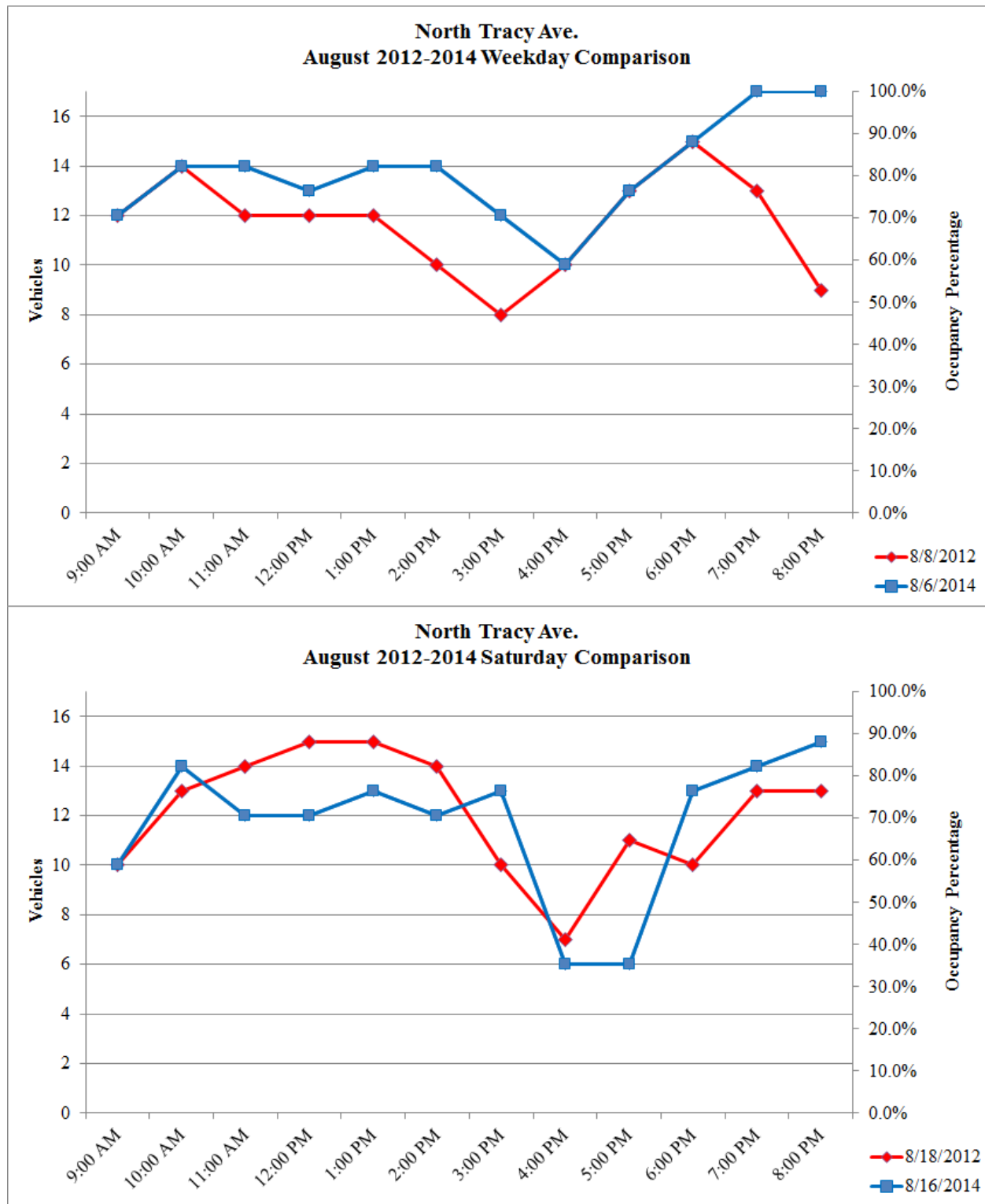


Figure 2-23 cont'd: Comparison of North Tracy Ave. occupancy rates for weekdays and weekends, August 2012 and 2014

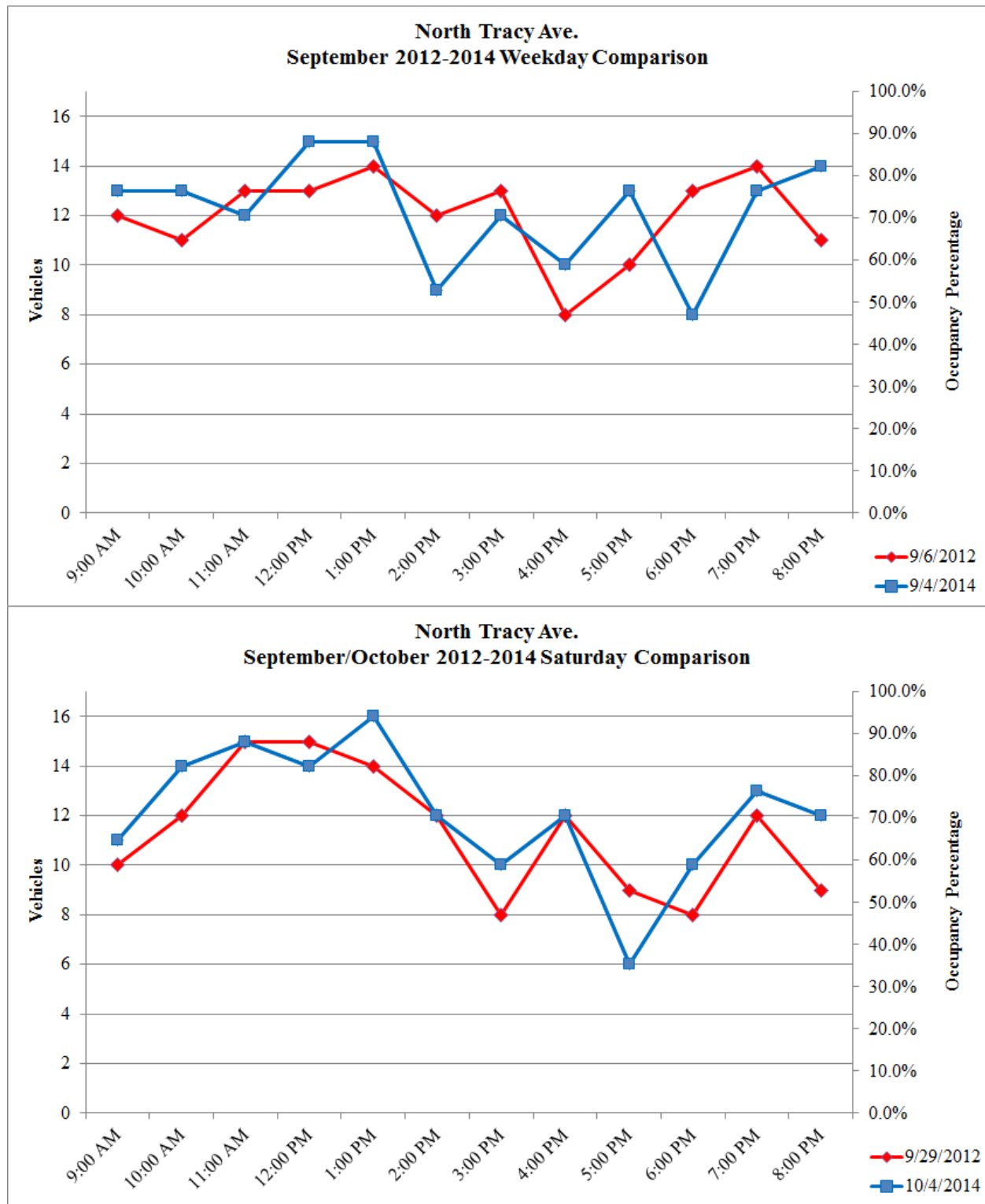


Figure 2-23 cont'd: Comparison of North Tracy Ave. occupancy rates for weekdays and weekends, September/October 2012 and 2014

2.3.6 South Tracy Ave. Comparison

Comparison of occupancy trends for South Tracy Ave. between 2012 and 2014 indicated slight differences between each year. Figure 2-24 presents the results of these comparisons. July weekday trends were generally similar, with one difference being lower occupancies in 2012 between 2:00 p.m. and 4:00 p.m. compared to 2014. Peaks in both years occurred around the lunch hour. July Saturday trends were different each year, with 2012 occupancies being lower than those of 2014 (except at 8:00 p.m.). August weekday and Saturday occupancy trends were fairly similar throughout the day, although some differences were present after 5:00 p.m. On the 2014 weekday, occupancy was much higher in the evening. On Saturday, the 2012 occupancies climbed sharply to match those observed in 2014. September weekday trends matched one another, while September/October trends displayed some differences. After a jump in the morning, 2014 occupancies remained steady throughout the day, dropping slightly in the evening. Occupancies in 2012 fluctuated throughout the day and began to fall in the late afternoon. Collectively, this block displayed occupancies that occasionally reached 90 percent, but generally remained at or below 80 percent during each year.

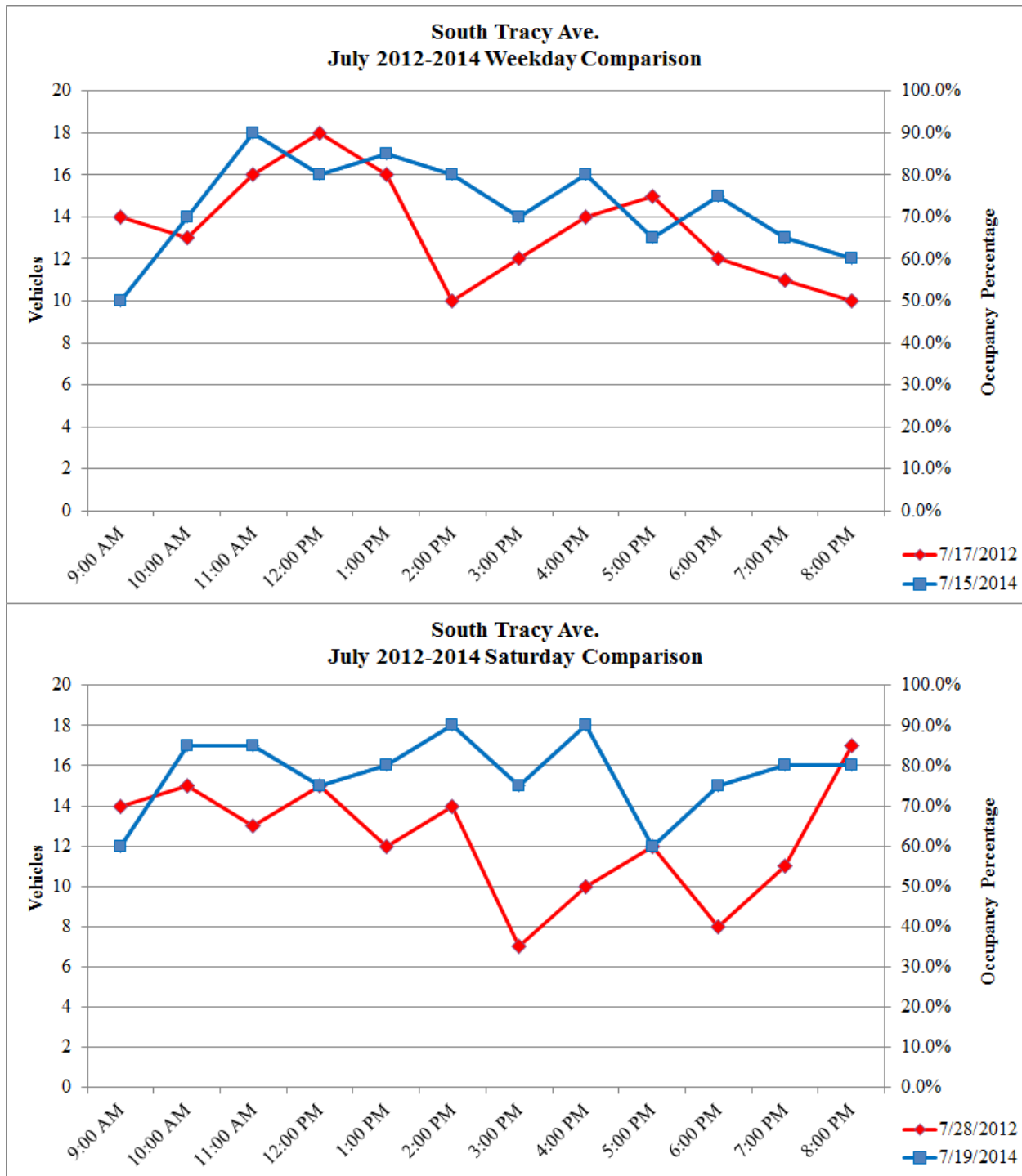


Figure 2-24: Comparison of South Tracy Ave. occupancy rates for weekdays and weekends, July 2012 and 2014

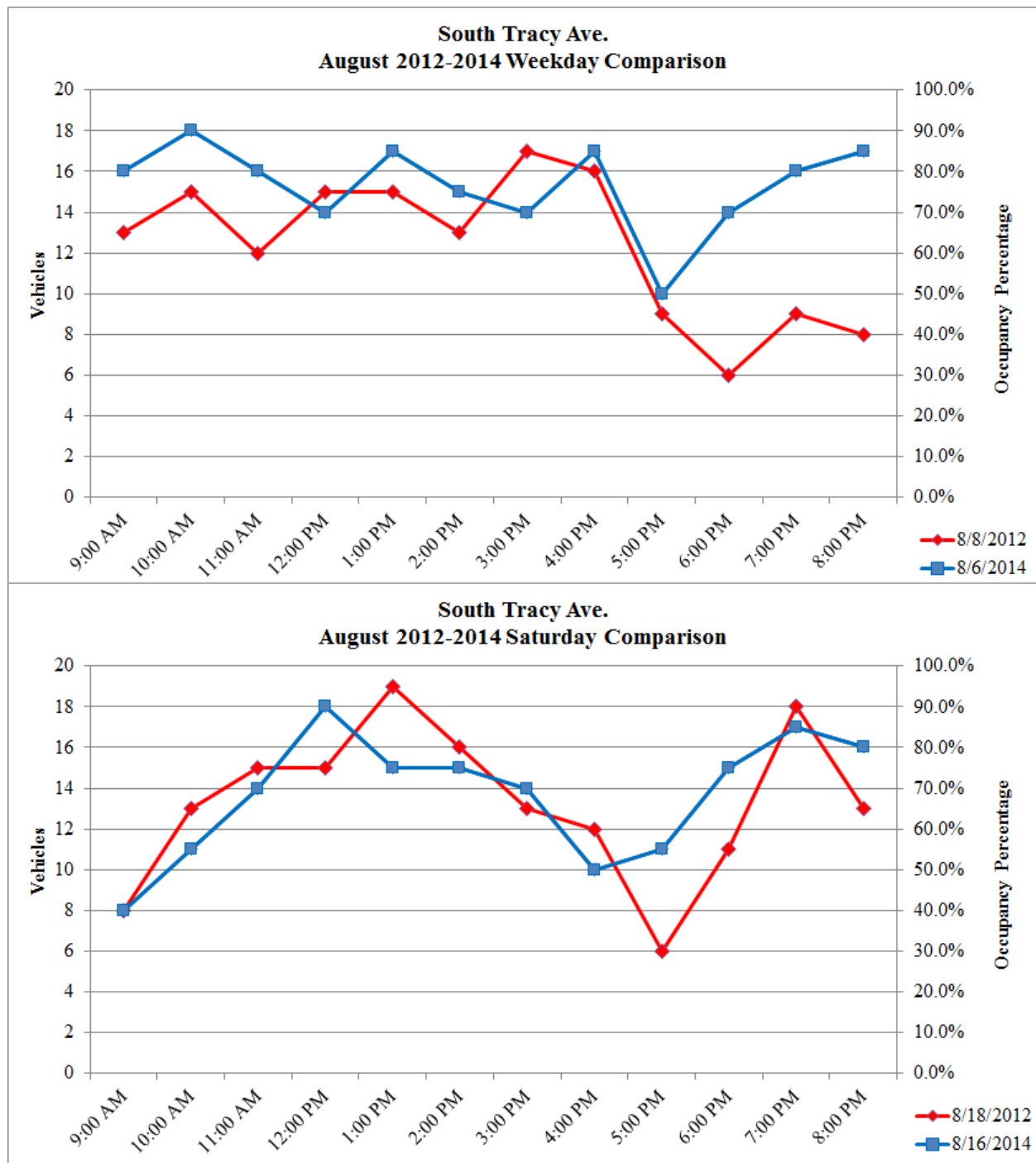


Figure 2-24 cont'd: Comparison of South Tracy Ave. occupancy rates for weekdays and weekends, August 2012 and 2014

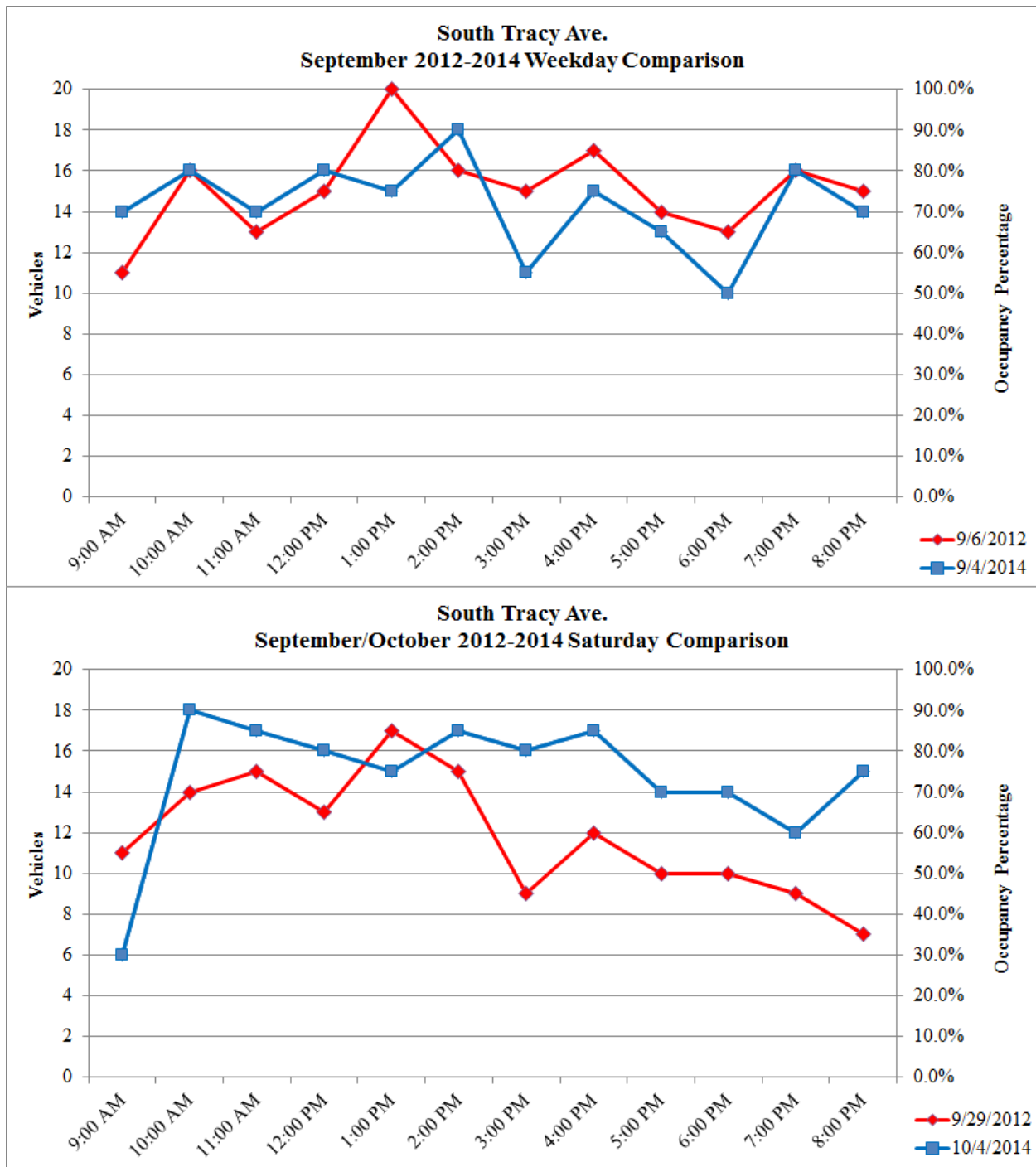


Figure 2-24 cont'd: Comparison of South Tracy Ave. occupancy rates for weekdays and weekends, September/October 2012 and 2014

2.3.7 North Willson Ave. Comparison

Comparisons of occupancy trends for North Willson Ave. from 2012 and 2014 indicated slight differences between the years. Figure 2-25 presents the results of these comparisons. For July weekdays and Saturdays, occupancies climbed in the morning, peaked at lunch, fell slightly in the afternoon and again peaked in the evening. These same trends were observed on August weekdays and Saturdays for both years as well. The notable differences in that month were the afternoon drops being more pronounced on Saturdays compared to July observations. Finally, occupancies for September weekdays during both years fluctuated throughout the day, with more notable peaks at lunch occurring in 2014 and dinner in 2012. On Saturdays in September/October, 2012 occupancies varied widely in the morning while they displayed a steady climb in 2014. In 2014, occupancies fell in the afternoon following a lunch peak, before climbing again in the evening. In 2012, the trend was for occupancy to climb throughout the afternoon and peak at dinner. Collectively, the results for this block underscore its proximity to downtown attractions, namely restaurants, which contribute to the frequent changes in occupancies and the peaks that were observed.

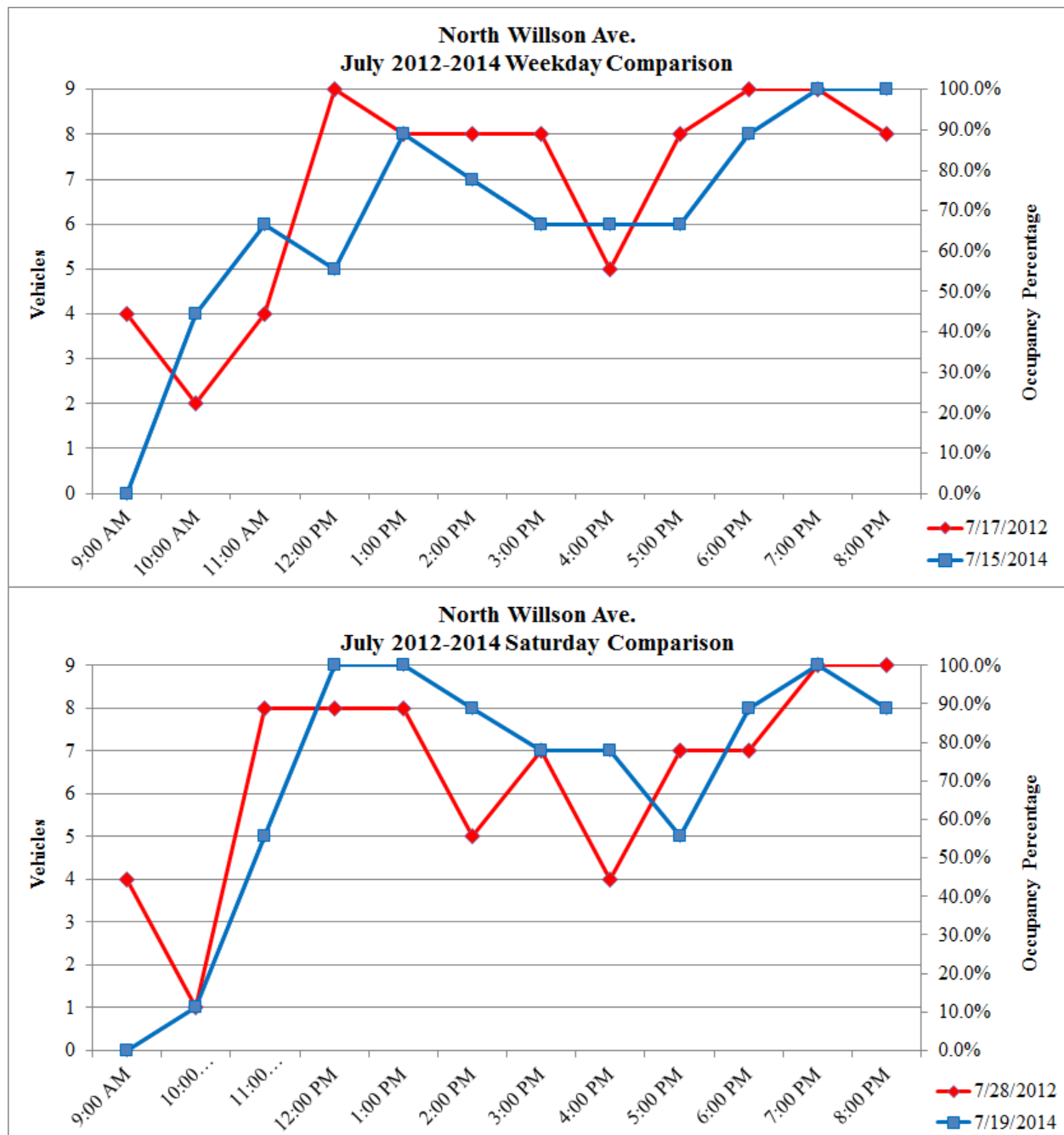


Figure 2-25: Comparison of North Willson Ave. occupancy rates for weekdays and weekends, July 2012 and 2014

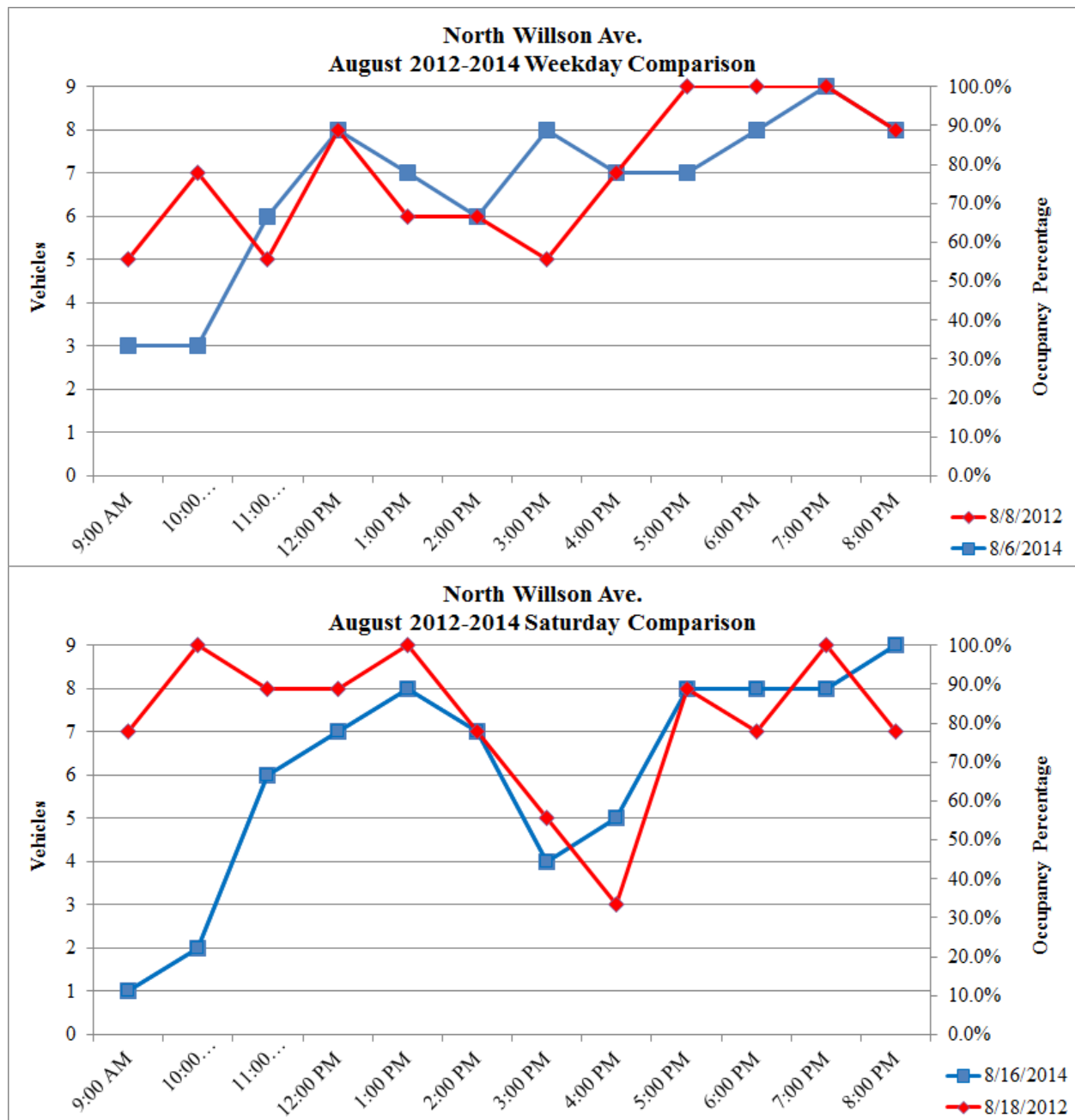


Figure 2-25 cont'd: Comparison of North Willson Ave. occupancy rates for weekdays and weekends, August 2012 and 2014

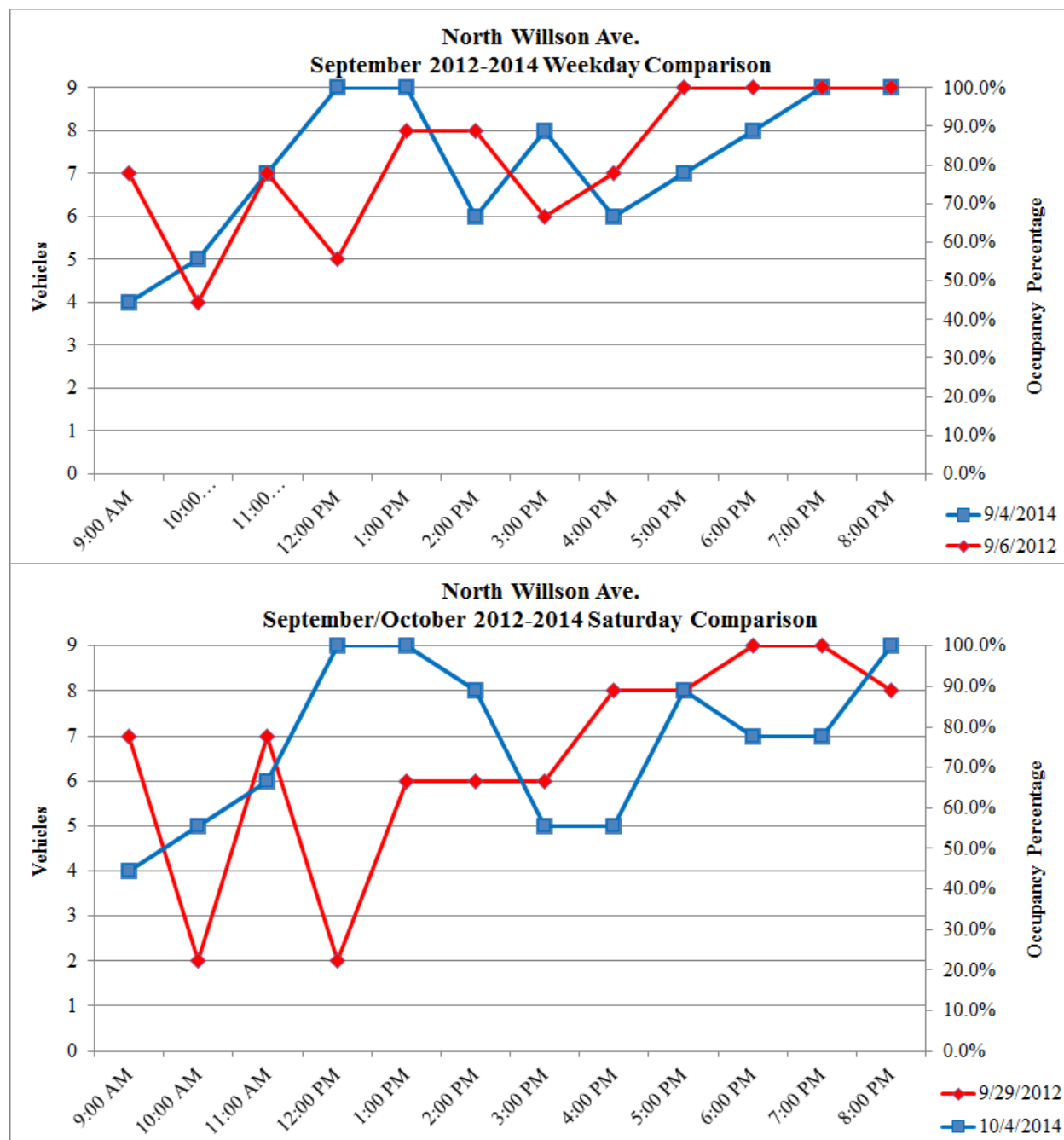


Figure 2-25 cont'd: Comparison of North Willson Ave. occupancy rates for weekdays and weekends, September/October 2012 and 2014

2.3.8 South Willson Ave. Comparison

Comparisons of South Willson Ave. occupancy rates in 2012 and 2014 indicated generally similar trends each year. Figure 2-26 presents the results of these comparisons. For July weekdays and Saturdays, the general trends matched one another, with some differences in the number of vehicles observed at various times. On weekdays during both years, occupancy rose to a peak at lunch and fluctuated downward much of the afternoon (with a rise observed in the evening in 2014). On weekends in both years, occupancies rose in the morning and plateaued after lunch in 2014 and fluctuated the remainder of the day in 2012. Similarly, trends for August weekdays and Saturdays matched one another. On both weekdays and Saturdays, occupancies rose throughout the day and peaked in the evening. For September weekdays, occupancy trends matched one another between years as well, rising throughout the day before falling off in the evening. Finally, September/October Saturday trends were largely similar between years, with peaks occurring in the evening. The notable deviation was a drop in occupancy rates between 2:00 p.m. and 4:00 p.m. in 2014. In both study years this block displayed high levels of occupancy throughout each day. Again, proximity to downtown attractions plays a significant role in this trend.

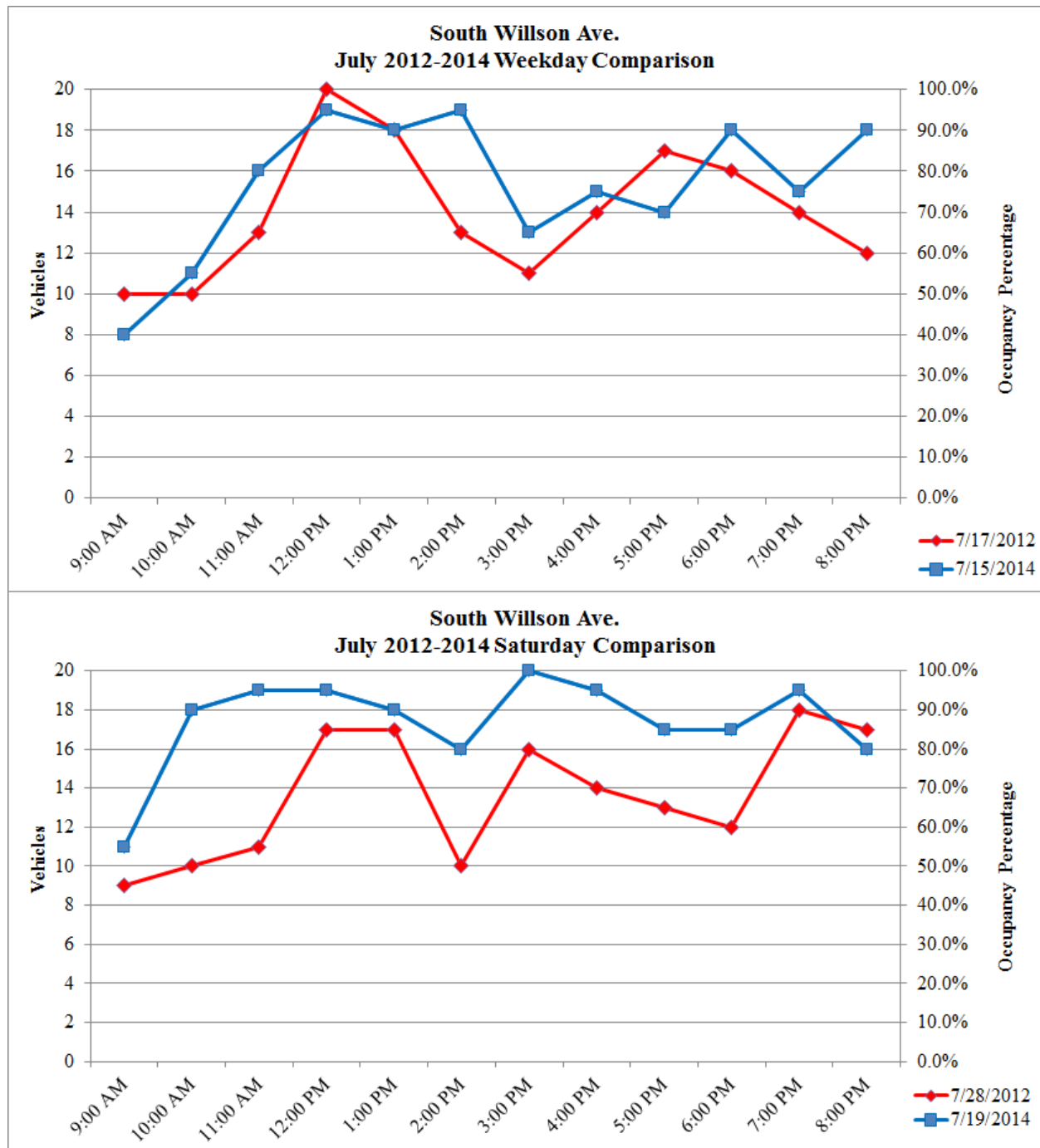


Figure 2-26: Comparison of South Willson Ave. occupancy rates for weekdays and weekends, July 2012 and 2014

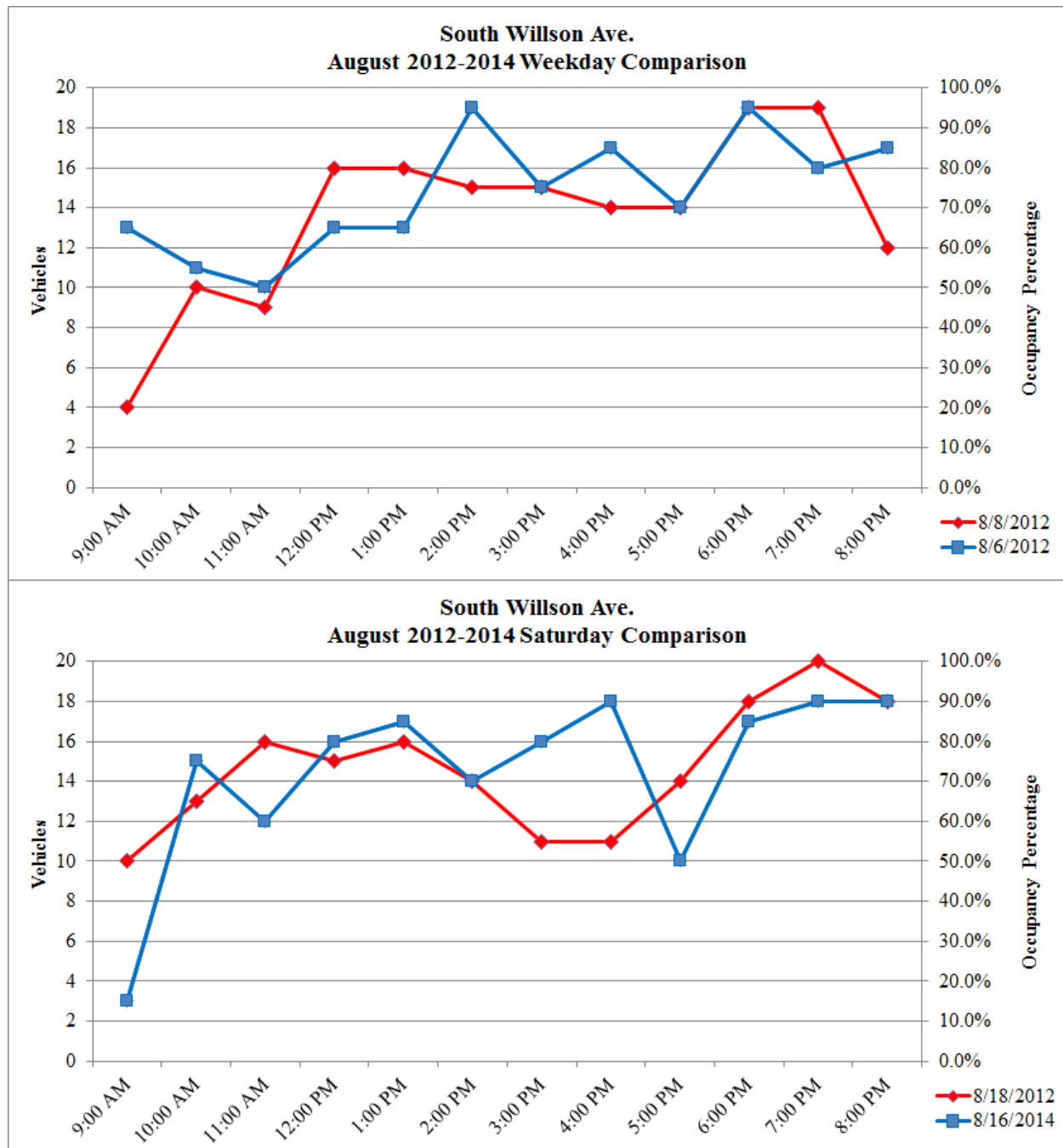


Figure 2-26 cont'd: Comparison of South Willson Ave. occupancy rates for weekdays and weekends, August 2012 and 2014

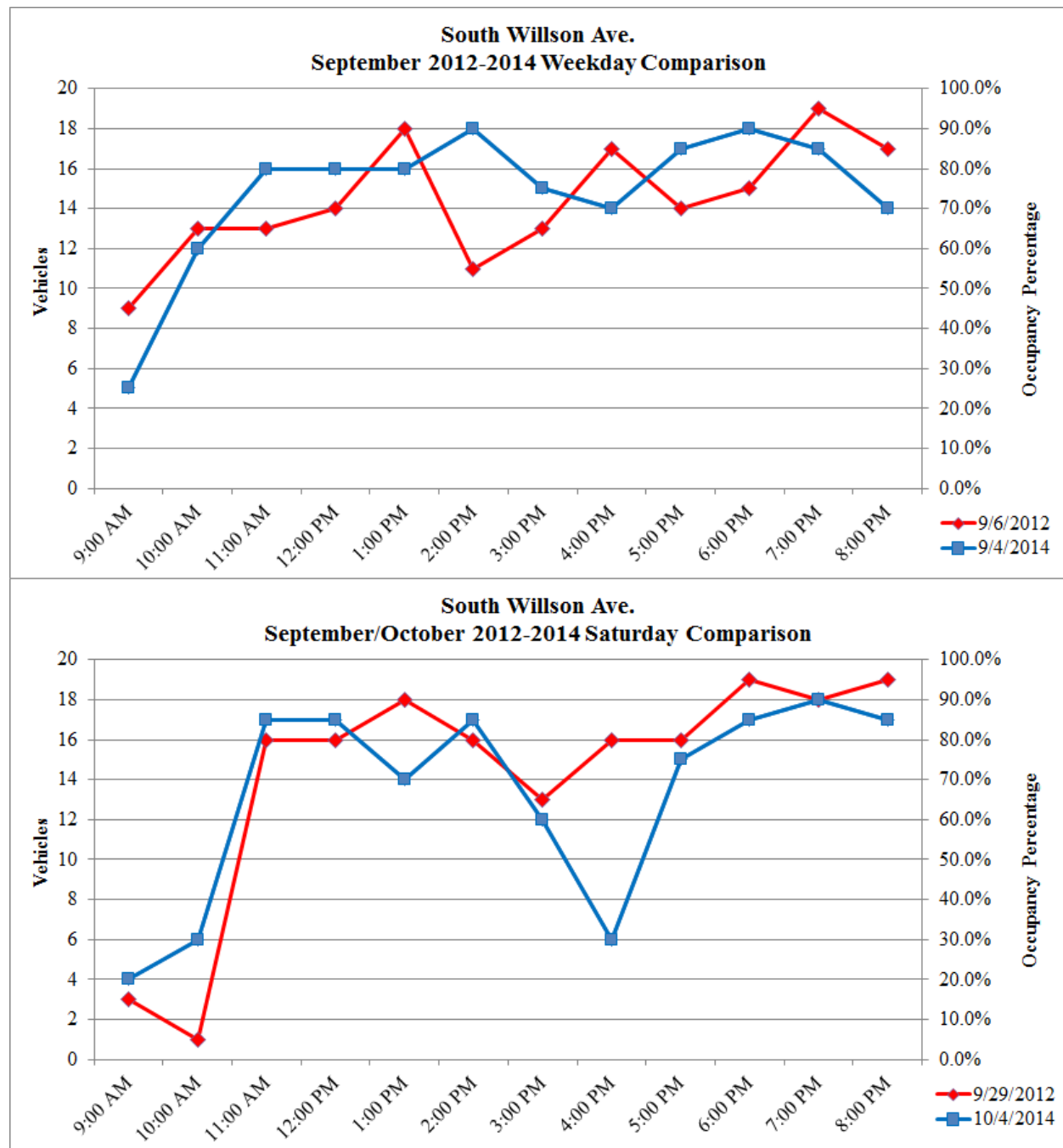


Figure 2-26 cont'd: Comparison of South Willson Ave. occupancy rates for weekdays and weekends, September/October 2012 and 2014

2.3.9 Armory Lot Comparison

The Armory lot had data available for comparison from all targeted dates in July, August and September in 2012 and 2014, as well as from three dates in 2010. Data collection in 2010 focused on three dates: Wednesday, August 11, 2010, Thursday, September 16, 2010 and

Saturday, September 11, 2010. The results of occupancy comparisons are presented in Figure 2-27.

July weekdays followed a similar pattern in occupancy, climbing throughout the day. The key difference observed was the afternoon drop in occupancy in 2012 versus the continued climb in 2014. Additionally, the 2012 peak occurred around lunch, while the 2014 peak was in the evening. For Saturdays in July, nearly identical trends were observed for both years, with occupancies climbing in the morning, peaking at lunch, dropping throughout the afternoon and rising to a second peak in the evening.

August weekday comparisons could be made between 2010, 2012 and 2014 data. Results showed that trends between all three years were identical, varying only by the number of vehicles observed at a given time. Occupancies rose throughout the morning, peaked at lunch, dropped off a bit in the early afternoon and peaked again in the evening. August Saturday comparisons were made for 2012 and 2014 data, and showed slightly different trends. In 2012, occupancies were high in the morning and early afternoon, fell in the late afternoon and rose into the evening. In 2014, occupancies rose in the morning, peaked at lunch and fell in the late afternoon before rising to a peak in the evening. The cause of these slight differences was not readily apparent.

September weekday comparisons between all three years of data illustrated an identical occupancy trend, with only small differences in the number of vehicles observed at a given time. Occupancies rose throughout the morning, peaked at lunch, fell in the afternoon and rose again to a second peak in the evening. September/October Saturday trends were also largely similar to one another. The exceptions were the 2012 spikes at 11:00 a.m. and 12:00 p.m., upward and downward, respectively. The general trends observed were a rise in occupancy in the morning and afternoon, a downward spike at 4:00 p.m. (2010 and 2014) and a peak in the evening. In general, occupancies remained high from lunch onward for these final collection dates.

Collectively, the results of comparisons for the Armory lot indicate that this site sees a quick increase in vehicles throughout the morning, reaching an initial peak at lunch. Once this peak is reached, trends tended to fluctuate throughout the afternoon depending on the study date/year before peaking again in the evening. The trends for this lot are closely tied to its proximity to downtown attractions and were similar to trends observed for on-street parking in the vicinity.

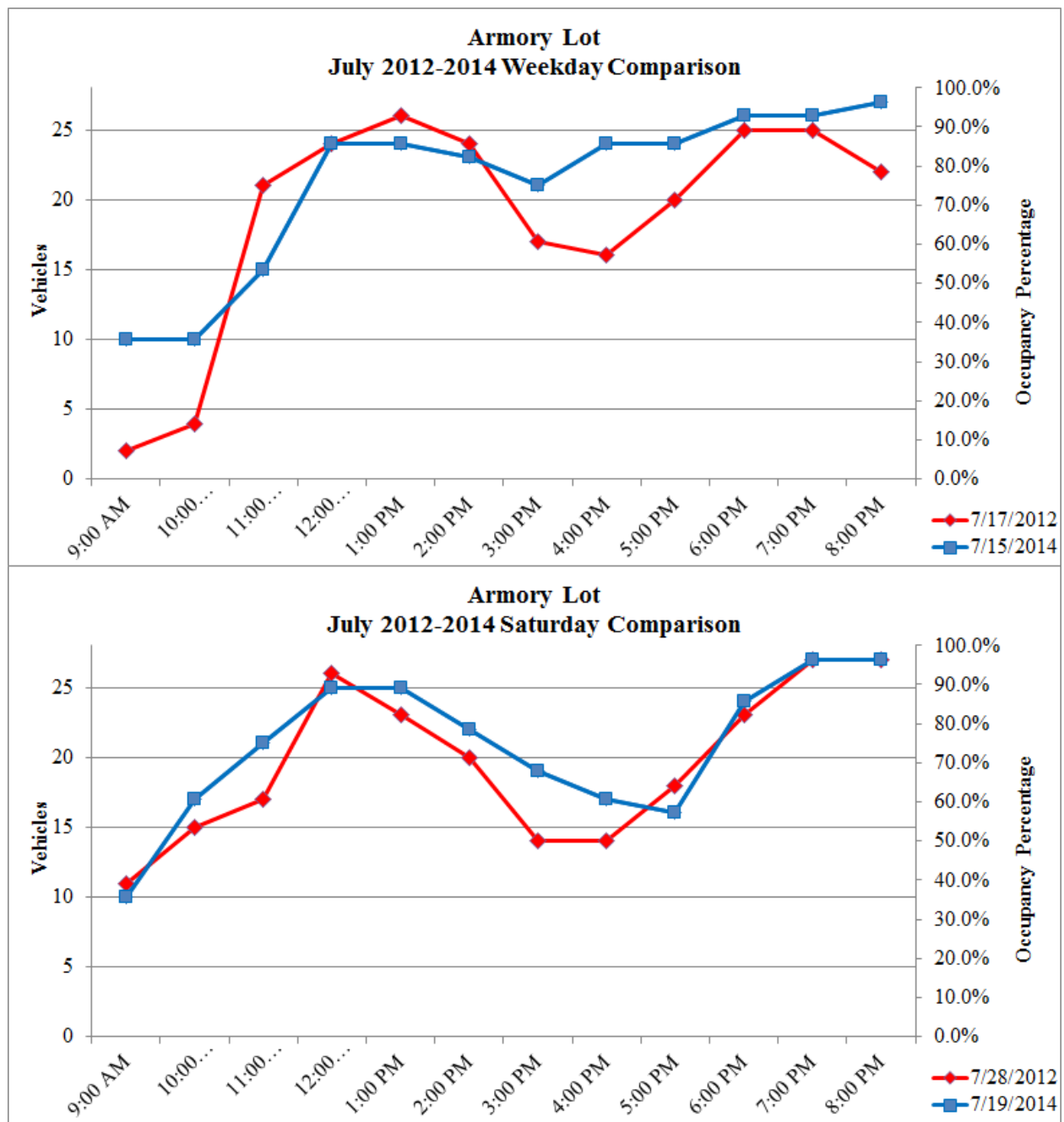


Figure 2-27: Comparison of Armory lot occupancy rates for weekdays and weekends, July 2012 and 2014

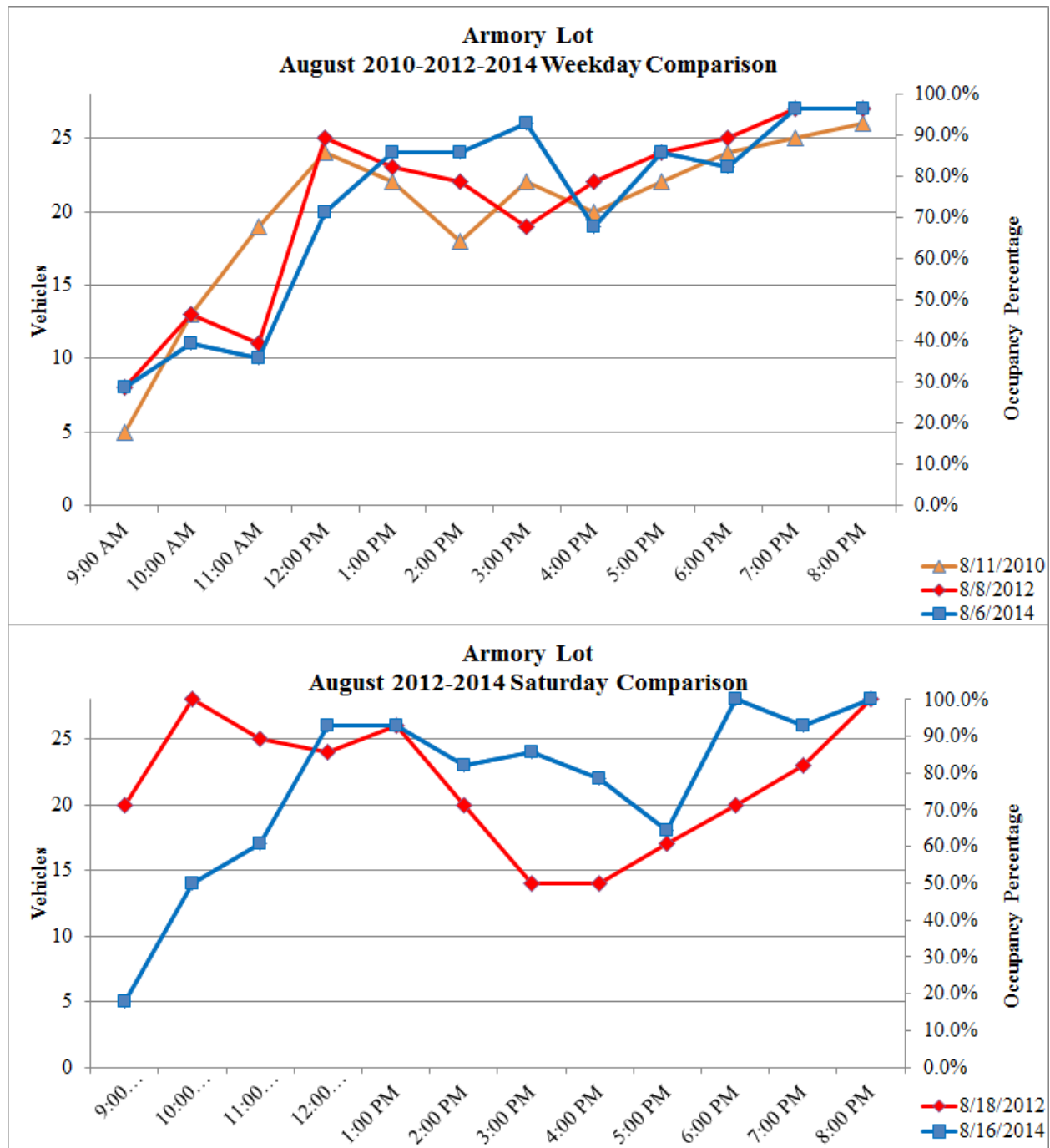


Figure 2-27 cont'd: Comparison of Armory lot occupancy rates for weekdays and weekends, August 2010, 2012 and 2014

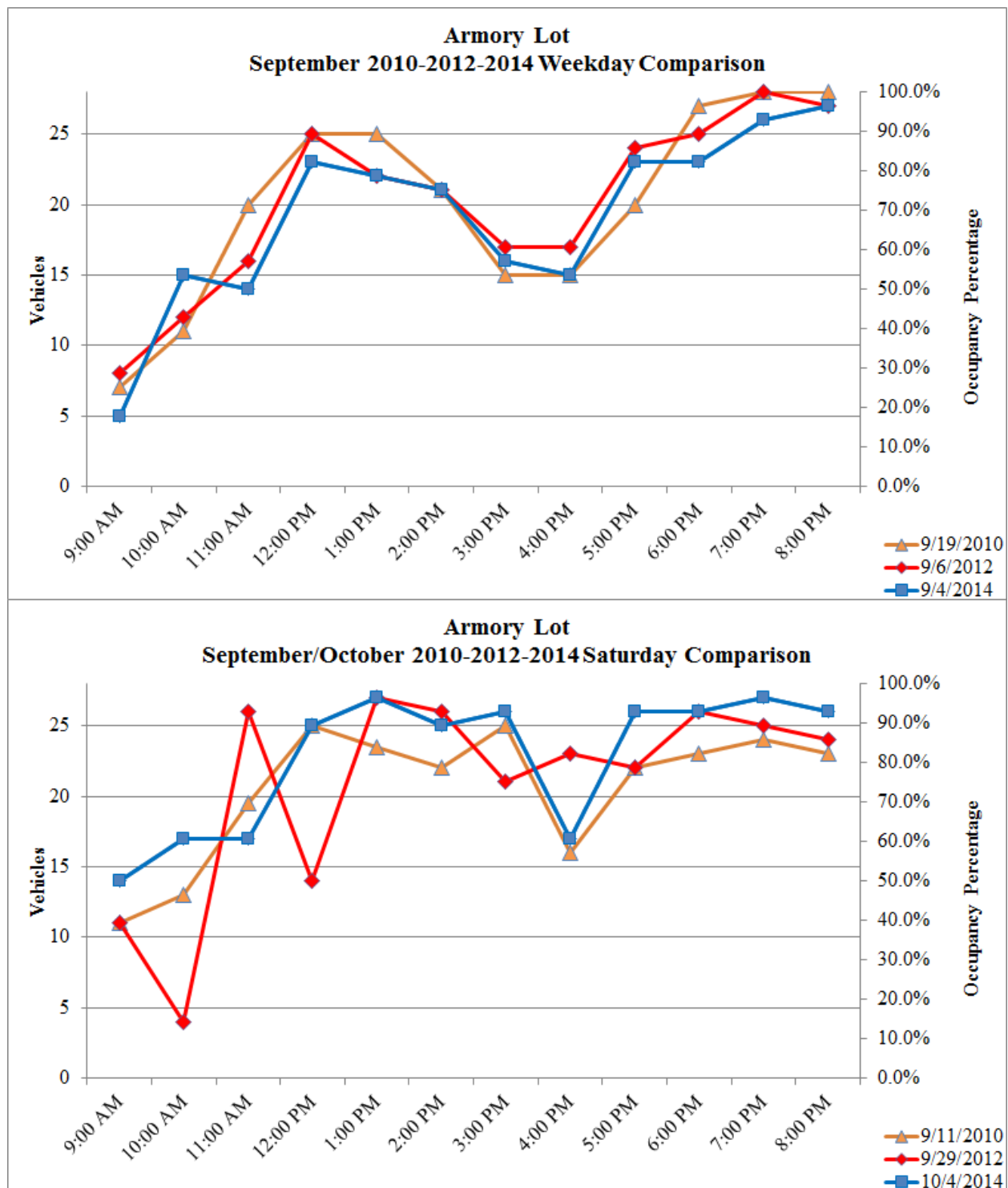


Figure 2-27 cont'd: Comparison of Armory lot occupancy rates for weekdays and weekends, September/October 2010, 2012 and 2014

2.3.10 Willson Lot Comparison

The Willson lot had data available for comparison from all targeted dates in July, August and September in 2012 and 2014, and one date in 2010 (Thursday, September 16, 2010). The results of occupancy comparisons for this lot are presented in Figure 2-28. Comparison of July weekdays found trends that largely matched one another between 2012 and 2014. Occupancies rose in the morning, peaked at lunch, fell in the afternoon and then rose again into the evening. A similar trend was observed for July Saturdays, although the afternoon drop was less in 2014 than it was in 2012.

August weekday trends matched those of July, with dual peaks occurring at lunch and in the evening. There was a slight shift in the afternoon decline in 2014, however. August Saturday trends also were similar between the years, following the same peaking pattern as other days. One slight difference was that the number of vehicles observed in the morning of 2012 was higher than in 2014.

September weekday analysis included data from 2010, allowing for three years of comparisons to be made. In this case, the overall trend between all three years matched, although fewer vehicles were observed at certain times during the 2010 collection date. The overall trend observed was for occupancy to rise to a peak at lunch, drop in the afternoon and then rise a second time to an evening peak. This same trend was also present when examining September/October Saturday data. The only difference was an increase in vehicle numbers throughout most of the day in 2014.

Collectively, the trends observed at this site remained consistent between the different observation days and across study years. This consistency is tied to the proximity of the lot to downtown attractions and the timing of activities at them. This is illustrated by the peaks that occur around meal times during the day and evening.

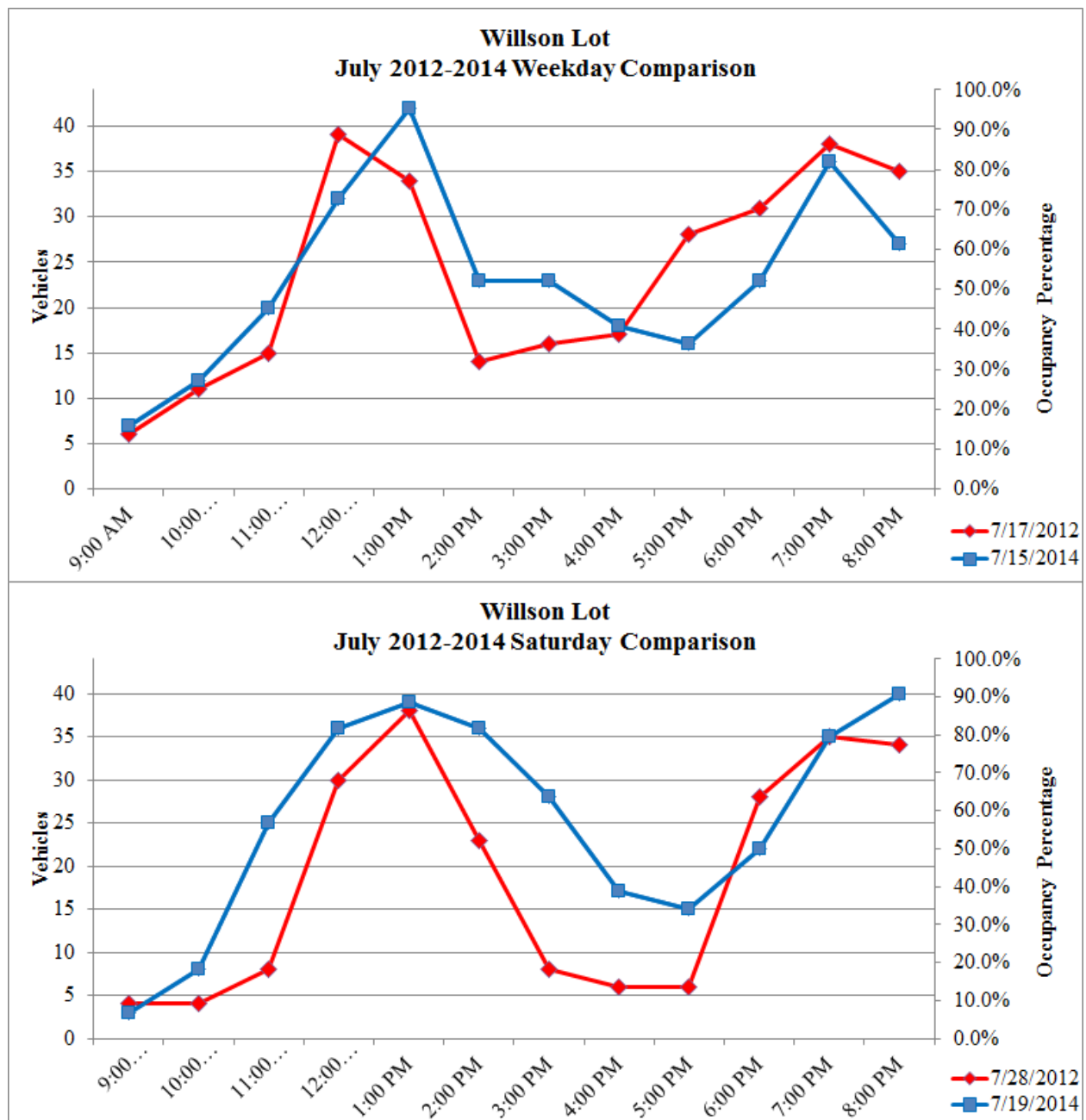


Figure 2-28: Comparison of Willson lot occupancy rates for weekdays and weekends, July 2012 and 2014

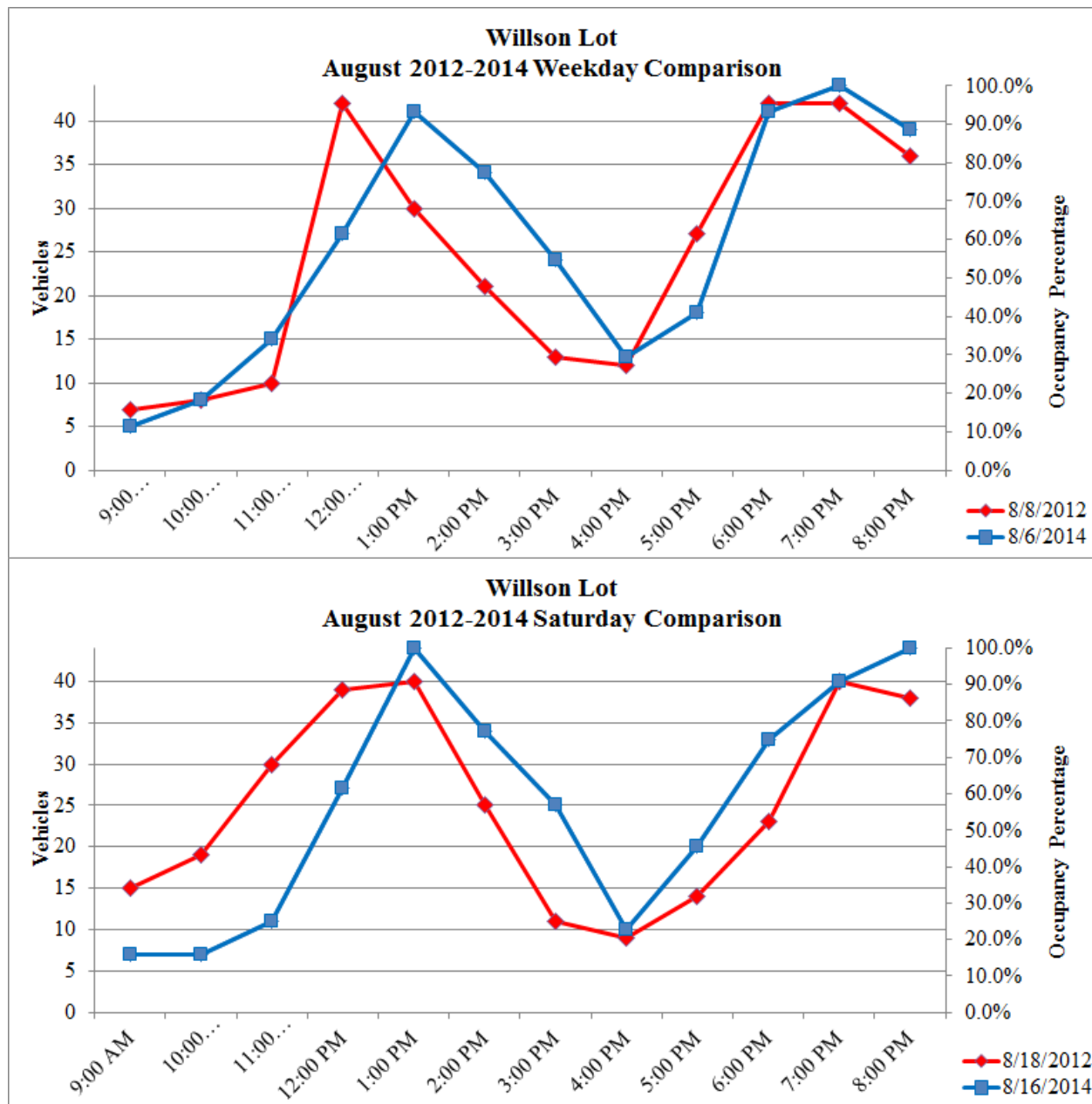


Figure 2-28 cont'd: Comparison of Willson lot occupancy rates for weekdays and weekends, August 2012 and 2014

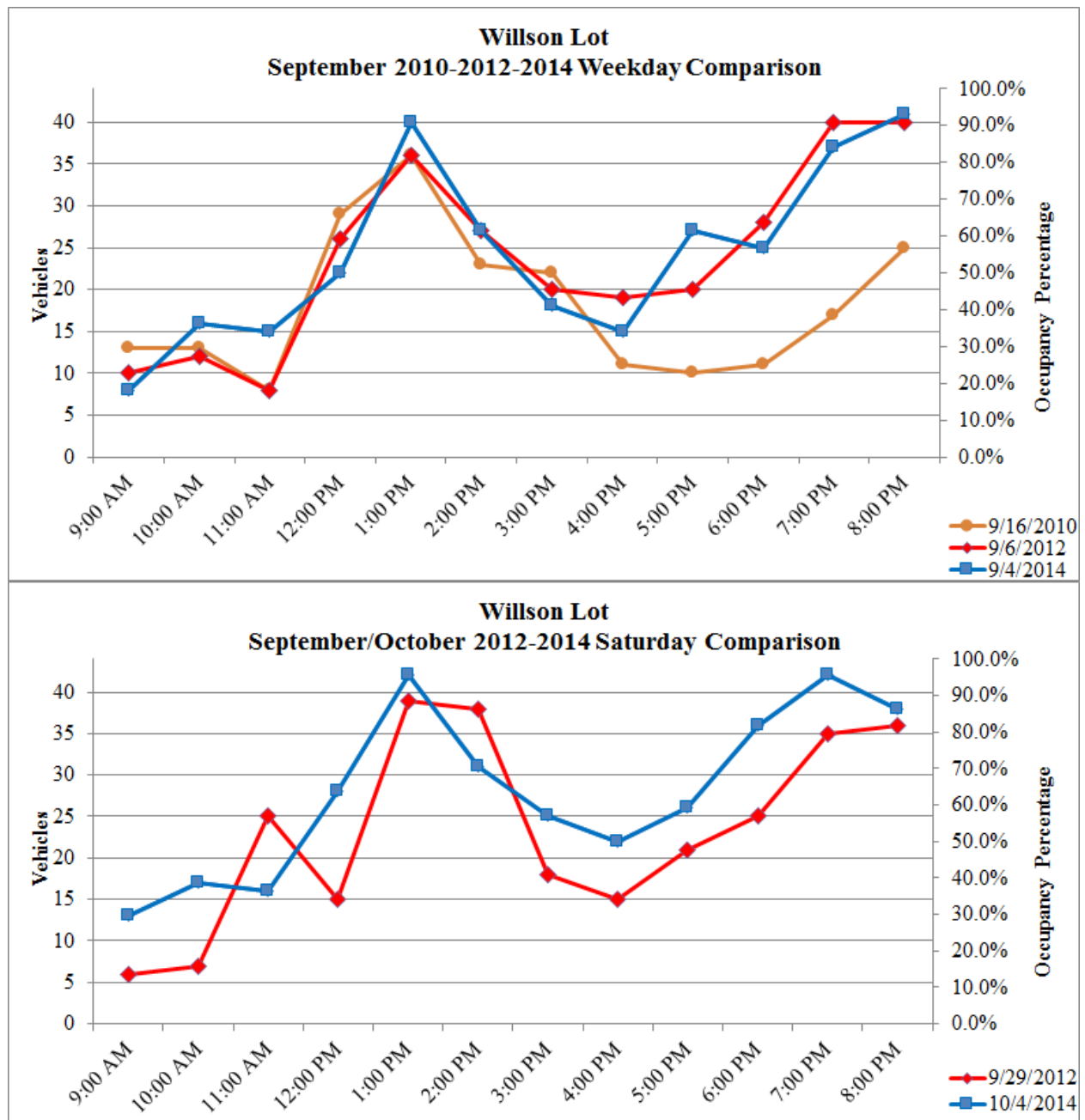


Figure 2-28 cont'd: Comparison of Willson lot occupancy rates for weekdays and weekends, September/October 2010, 2012 and 2014

2.3.11 Carnegie Lot Comparison

The Carnegie lot had data available for comparison from all targeted dates in July, August and September in 2012 and 2014. The results of occupancy comparisons for this lot are presented in Figure 2-29. July weekday comparisons found a generally similar trend between 2012 and 2014. Occupancies slightly climbed in the morning and leveled off at lunch, followed by a small drop in the afternoon and a second increase into the evening. This same trend was observed for July Saturdays as well, with the only difference being the number of vehicles present at a given time.

August weekday comparisons showed a similar trend as July at this site, with occupancy climbing in the morning, dropping after lunch and rising again in the evening. August Saturday trends were a departure from other observations in that occupancies generally remained level in the morning, dropped slightly in the early afternoon and then rose in the evening.

September weekday comparisons showed a similar trend to other months at this site, with some slight fluctuations during the morning. Afternoon and evening occupancies were higher in 2014 compared to 2012. September/October Saturday comparisons showed somewhat opposite trends, with 2014 data indicating a drop in occupancy throughout the morning, a gradual climb in the afternoon and a final decline in the evening. This contrasted with the 2012 trend where occupancy rose in the morning, fell in the afternoon, leveled after 3:00 p.m. and rose after 6:00 p.m. The local community walk during the 2014 collection date that affected other nearby parking may have been the cause of this difference in trends.

In general, this lot showed consistent trends across all collection dates and years (October 2014 notwithstanding). Only occasionally did occupancy reach 80 percent, showing this lot is used frequently, but not extensively. Proximity to the city parking garage also has a likely impact on the occupancy trends for this lot.

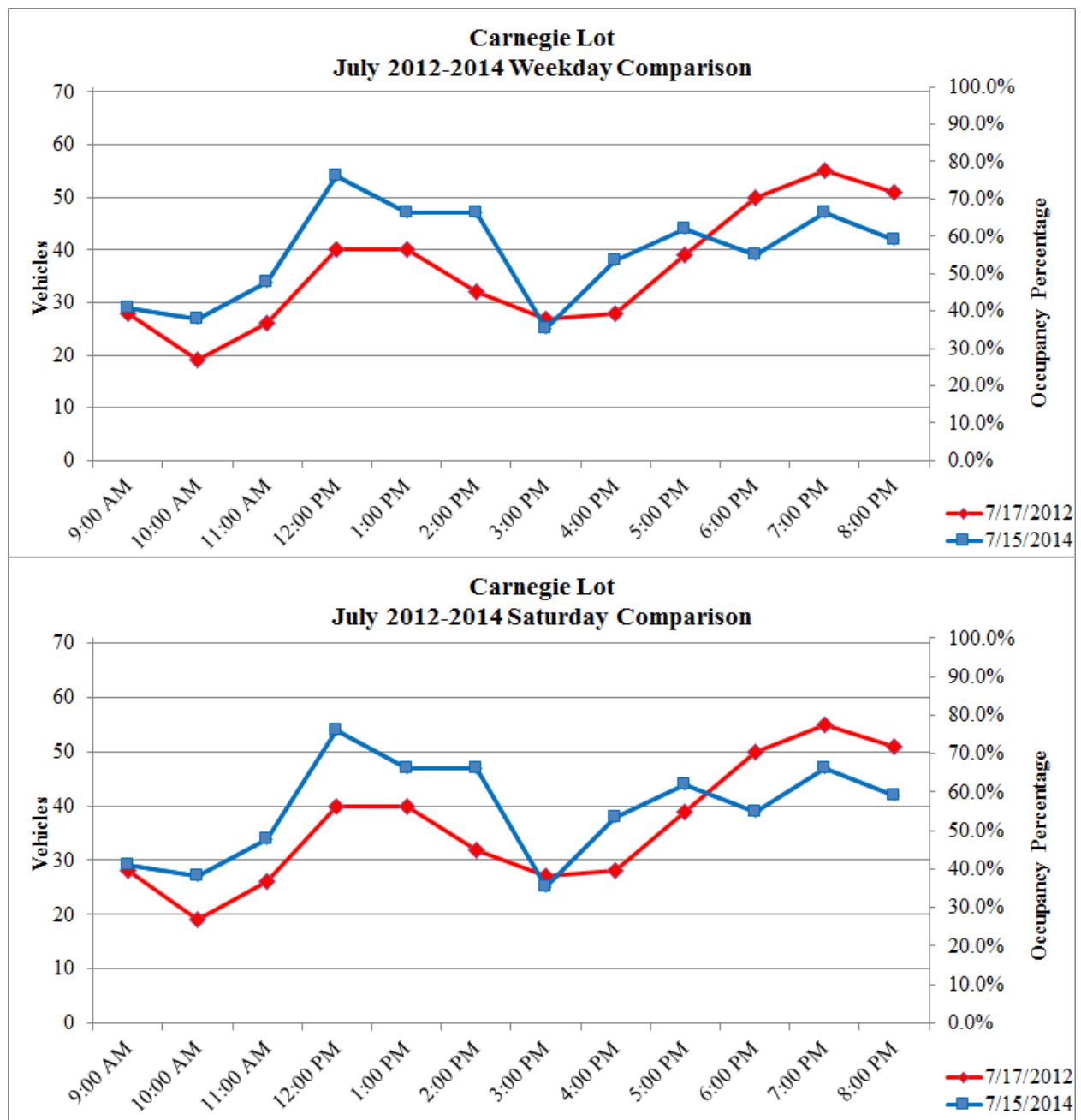


Figure 2-29: Comparison of Carnegie lot occupancy rates for weekdays and weekends, July 2012 and 2014

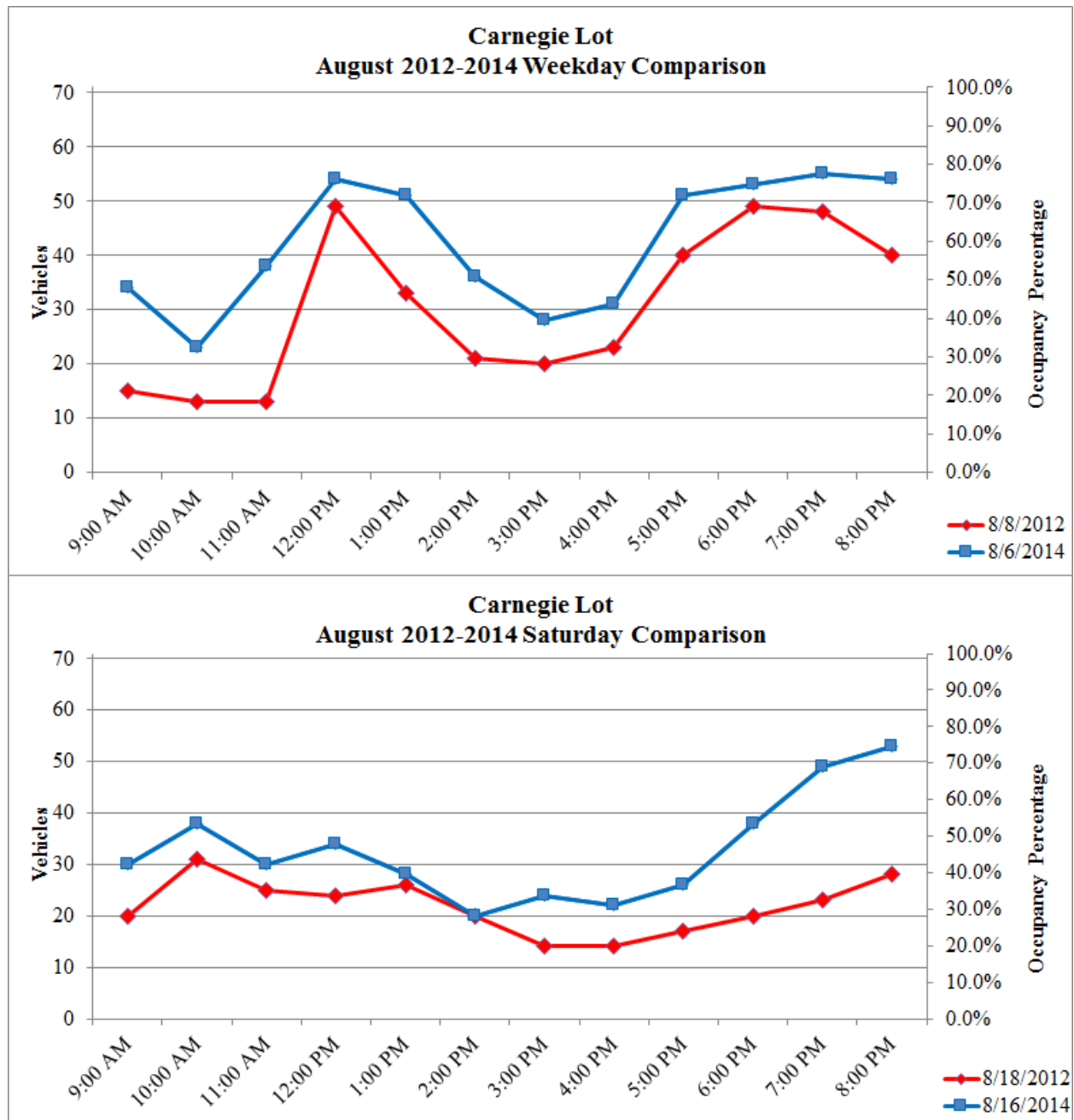


Figure 2-29 cont'd: Comparison of Carnegie lot occupancy rates for weekdays and weekends, August 2012 and 2014

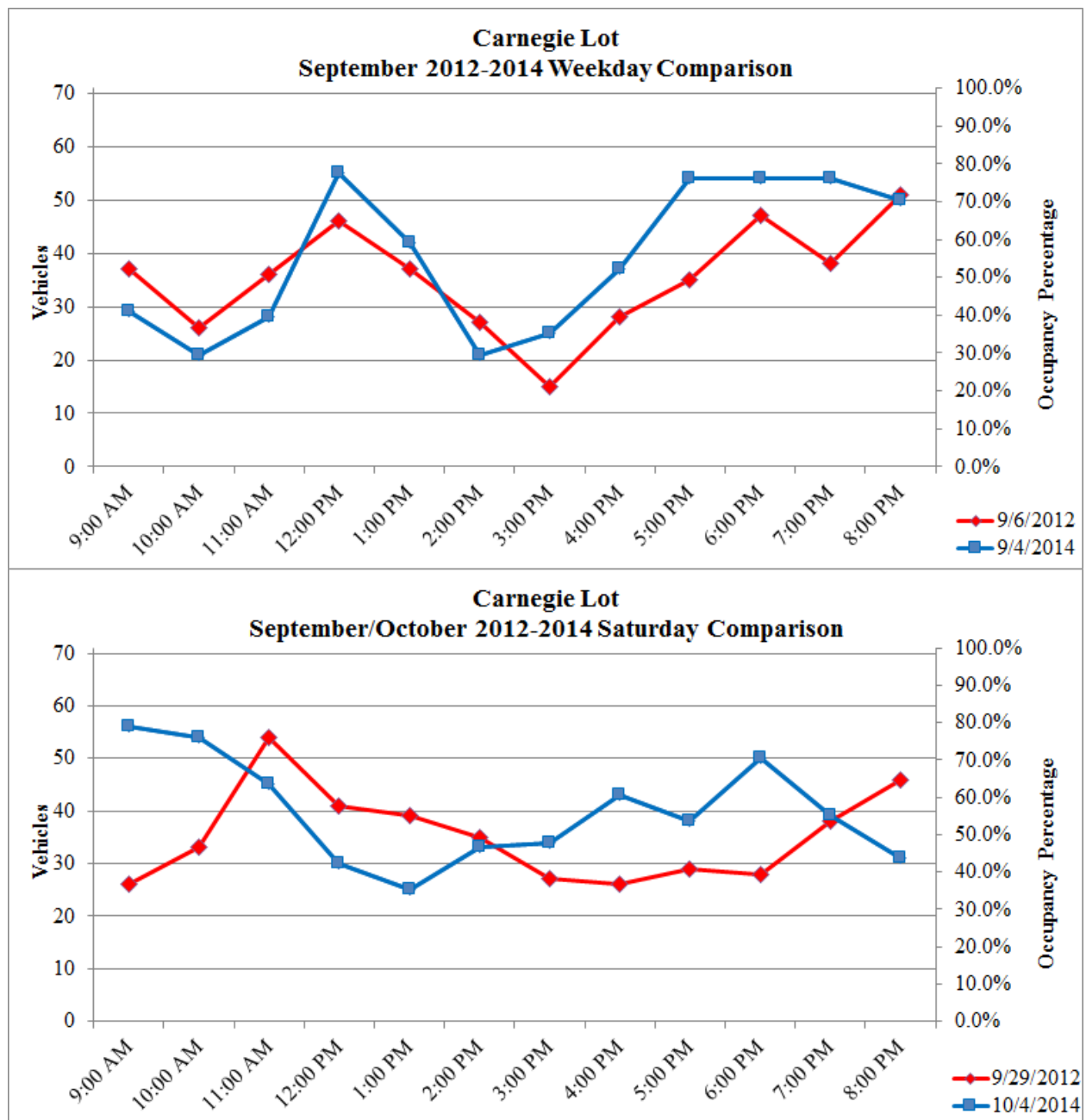


Figure 2-29 cont'd: Comparison of Carnegie lot occupancy rates for weekdays and weekends, September/October 2012 and 2014

2.3.12 Rouse Lot Comparison

The Rouse lot had data available for comparison from all targeted dates in July, August and September in 2012 and 2014. The results of occupancy comparisons for this lot are presented in Figure 2-30. July weekday trends were largely the same for each year, with 2014 exhibiting higher occupancies overall. In both years, occupancy rose in the morning, peaked at lunch, fell in the afternoon, started upward at 6:00 p.m. and then dropped slightly the remainder of the evening. July Saturday trends differed each year. In 2012, occupancies peaked in the morning and then fell the remainder of the day. In 2014, occupancies climbed in the morning and peaked at 100 percent at 12:00 p.m., fell sharply throughout the afternoon and then rose slightly at 8:00 p.m.

August weekday trends varied between years, with 2012 occupancies being generally level throughout the day, except for a dip between 2:00 p.m. and 4:00 p.m. In 2014, occupancy rose in the morning to a peak at lunch before dropping off for the remainder of the day, aside from a small rise in the evening. August Saturday trends were more alike between 2012 and 2014, with occupancy increases in the morning, leveling off in the afternoon. In the evening, each year differed slightly, with the 2012 trend being a further drop before leveling off again and the 2014 trend being an increase in occupancy in the evening.

September weekday trends indicated a much higher occupancy throughout the day in 2014 compared to 2012. In 2012, the occupancy trend was generally level throughout the day. In 2014, occupancy climbed in the morning, fell in the mid afternoon and evening and then increased at 8:00 p.m. September/October Saturday comparisons showed different trends between each year. In 2012, occupancy climbed in the morning, fluctuated at lunch, fell in the afternoon and slightly increased in the evening. In 2014, occupancies remained level in the morning and early afternoon before climbing in the late afternoon and evening. Once again, a local community walk in the vicinity of this lot may have impacted the 2014 trend, as it appeared to at other locations.

Collectively, this lot showed varying trends depending on the observation date and year. Only occasionally did this lot approach 100 percent occupancy, and typically there was parking available. Given the distance from most downtown attractions, it appears this lot is not as frequently used throughout the day compared to other locations. In this sense, given its location on the periphery of downtown, it could be considered supplemental parking compared to other sites.

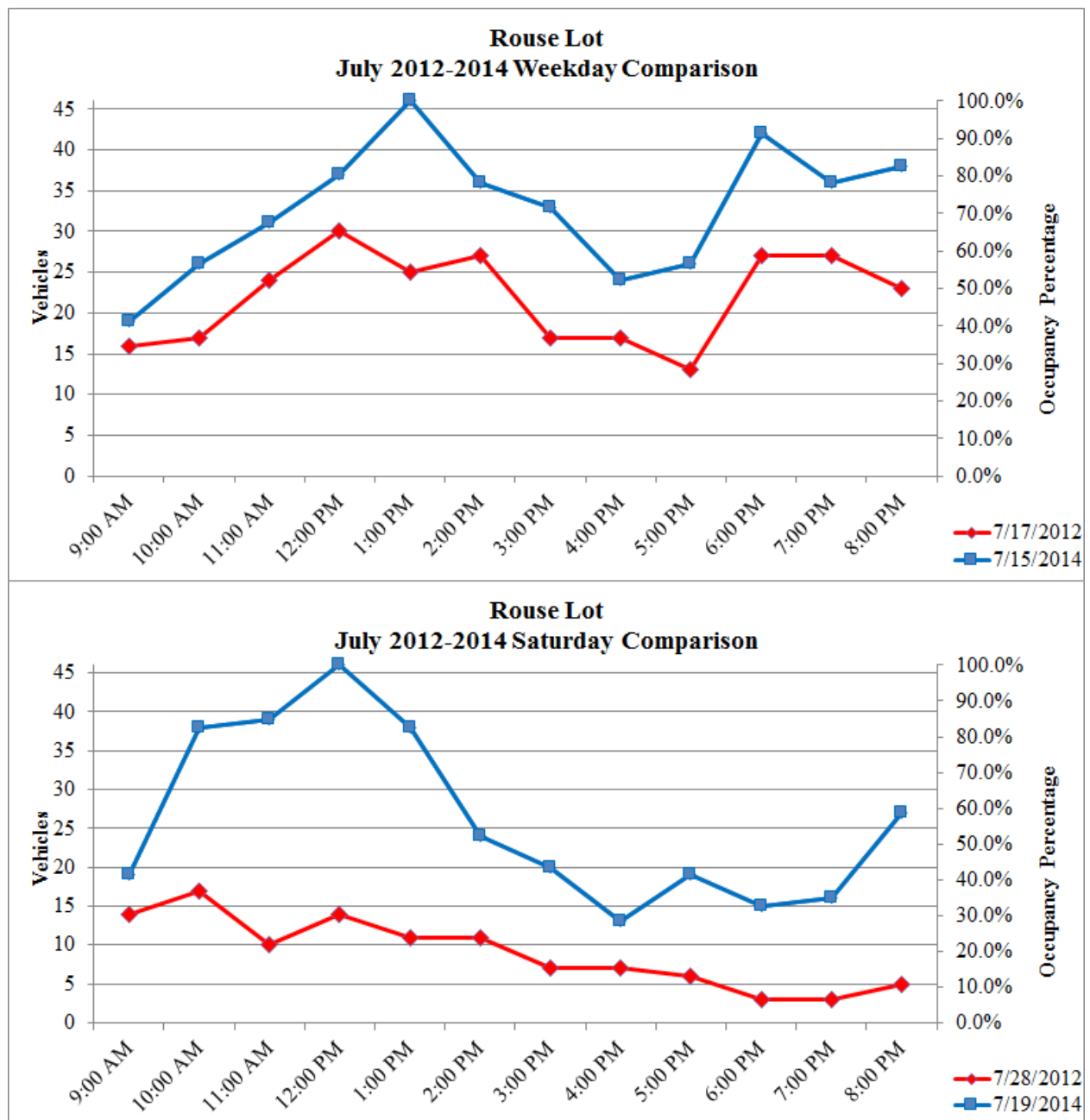


Figure 2-30: Comparison of Rouse lot occupancy rates for weekdays and weekends, July 2012 and 2014

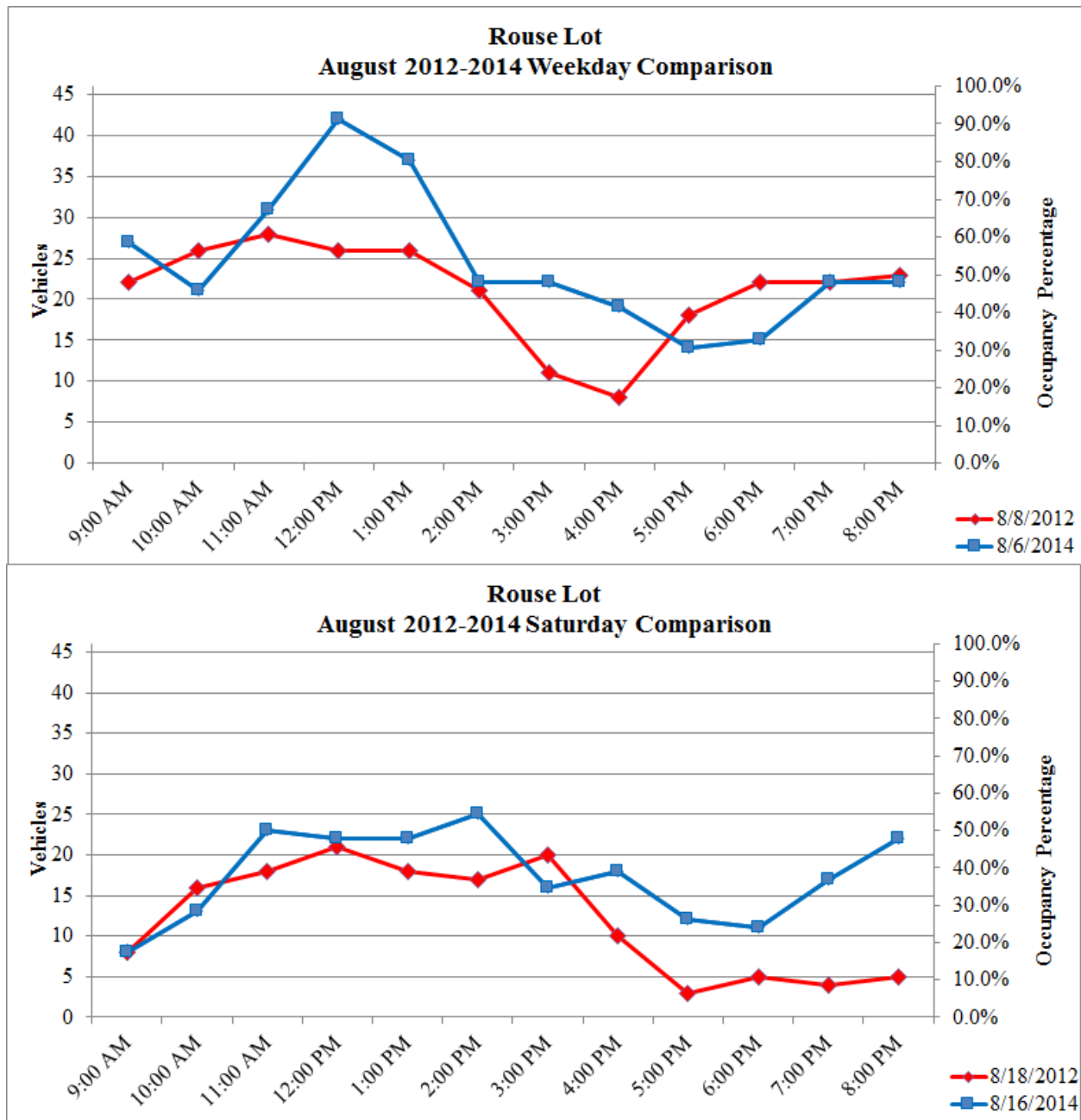


Figure 2-30 cont'd: Comparison of Rouse lot occupancy rates for weekdays and weekends, August 2012 and 2014

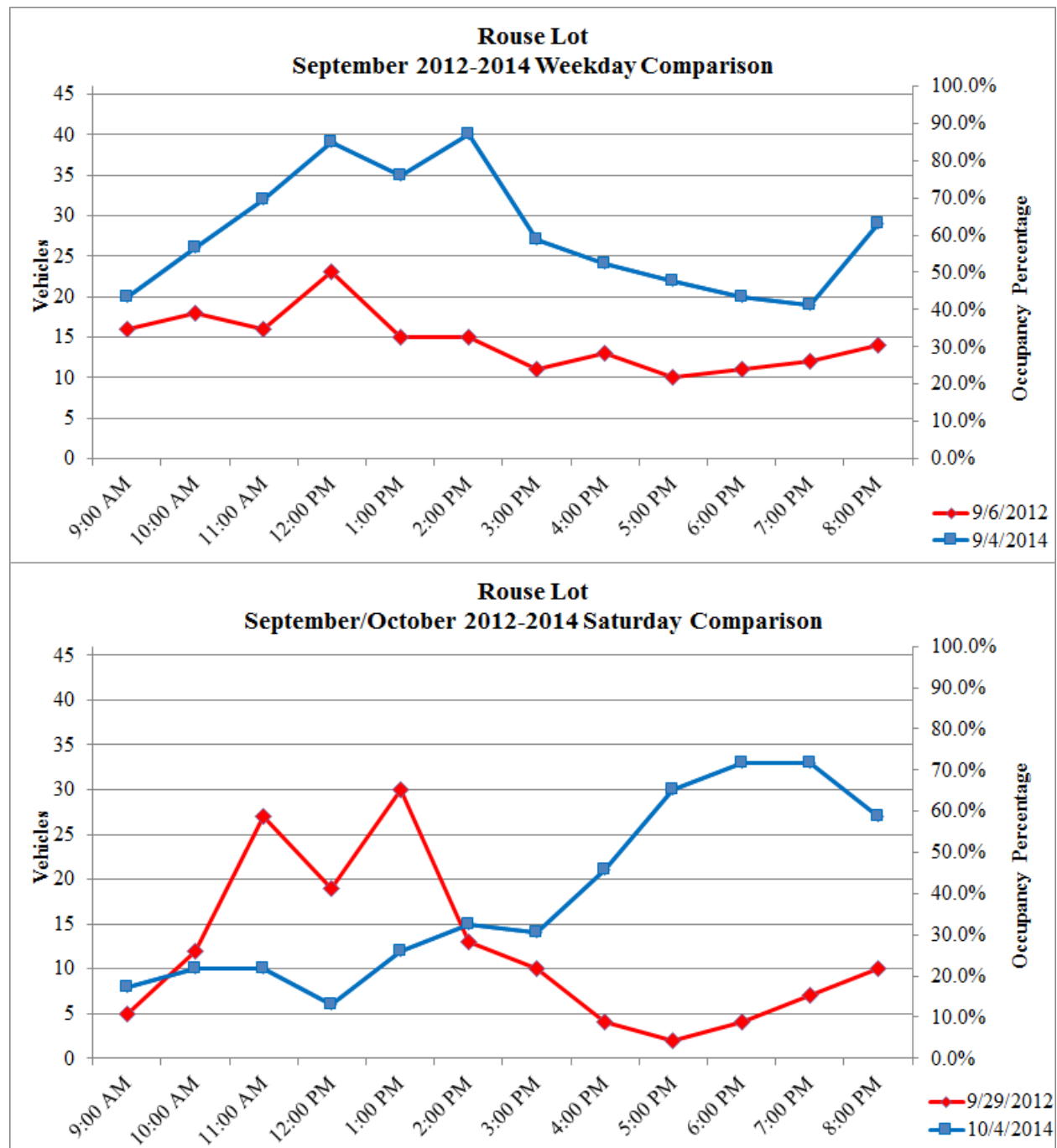


Figure 2-30 cont'd: Comparison of Rouse lot occupancy rates for weekdays and weekends, September/October 2012 and 2014

2.3.13 Parking Garage Comparison

Based on past data records provided by the city, direct comparisons to past years of data could be made for one weekday and one weekend of occupancy trends. The weekday comparison was made using data from Wednesday, August 11, 2010, Wednesday, August 8, 2012 and Wednesday, August 6, 2014. The weekend comparison used data from Saturday, September 11, 2010, Saturday, September 8, 2012 and Saturday, October 4, 2014. To facilitate future

comparisons, occupancy rate trends from the remaining 2014 dates from the parking garage are also presented. All data was obtained via the parking garage's electronic records rather than manual observation.

Figure 2-31 presents the occupancy for the July, 2014 weekday. As shown, occupancy climbed throughout the morning, peaked at approximately 50 percent at 1:00 p.m., and declined throughout the afternoon.

Figure 2-32 presents the occupancy for the July, 2014 weekend. The data shows a similar trend to the July weekday, in that occupancy increases throughout the morning and peaks at 1:00 p.m. This peak occupancy of approximately 30 percent is lower than the July weekday, and is followed by a gradual decline throughout the afternoon and evening.

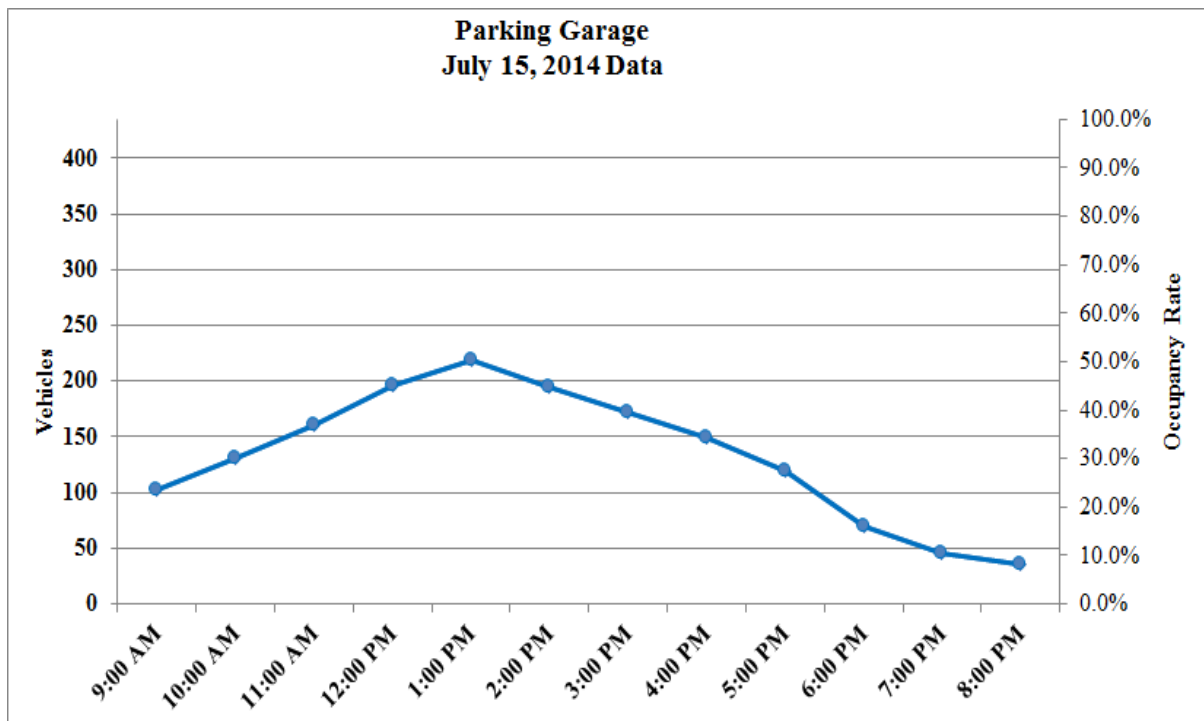


Figure 2-31: Parking garage occupancy rate, July 2014 weekday

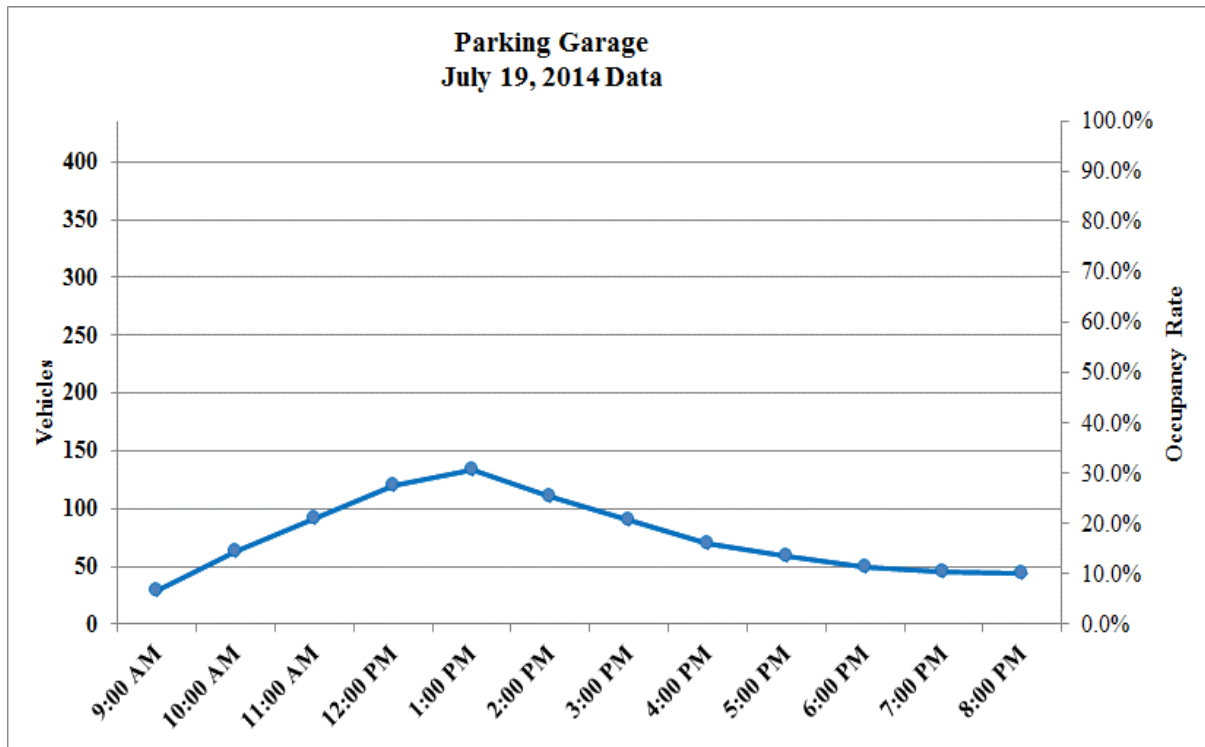


Figure 2-32: Parking garage occupancy rate, July 2014 weekend

A comparison of data between weekdays from multiple years is presented in Figure 2-33. The figure shows the same general occupancy trends throughout the day for a weekday during all years. Parking occupancy climbed throughout the morning, peaked at approximately 1:00 p.m. and then tapered off through the evening. The general trends observed follow that of the workday, where workers arrive in the morning and leave in the early evening. Occupancy was slightly higher throughout the day in 2014 compared to previous years, which suggests that slightly more vehicles are selecting the parking garage when visiting the downtown area. Among all of the years examined, the peak occupancy observed did not exceed 40 percent of the parking garage's capacity. Consequently, there is still ample parking in reserve to meet future parking growth in the downtown area on weekdays.

Figure 2-34 presents the August, 2014 weekend occupancy trends. As the figure illustrates, occupancy was low throughout the day, only reaching a peak of approximately 20 percent at 1:00 p.m. This was followed by a decline in occupancy in the early afternoon before a secondary rise between 7:00 p.m. and 8:00 p.m.

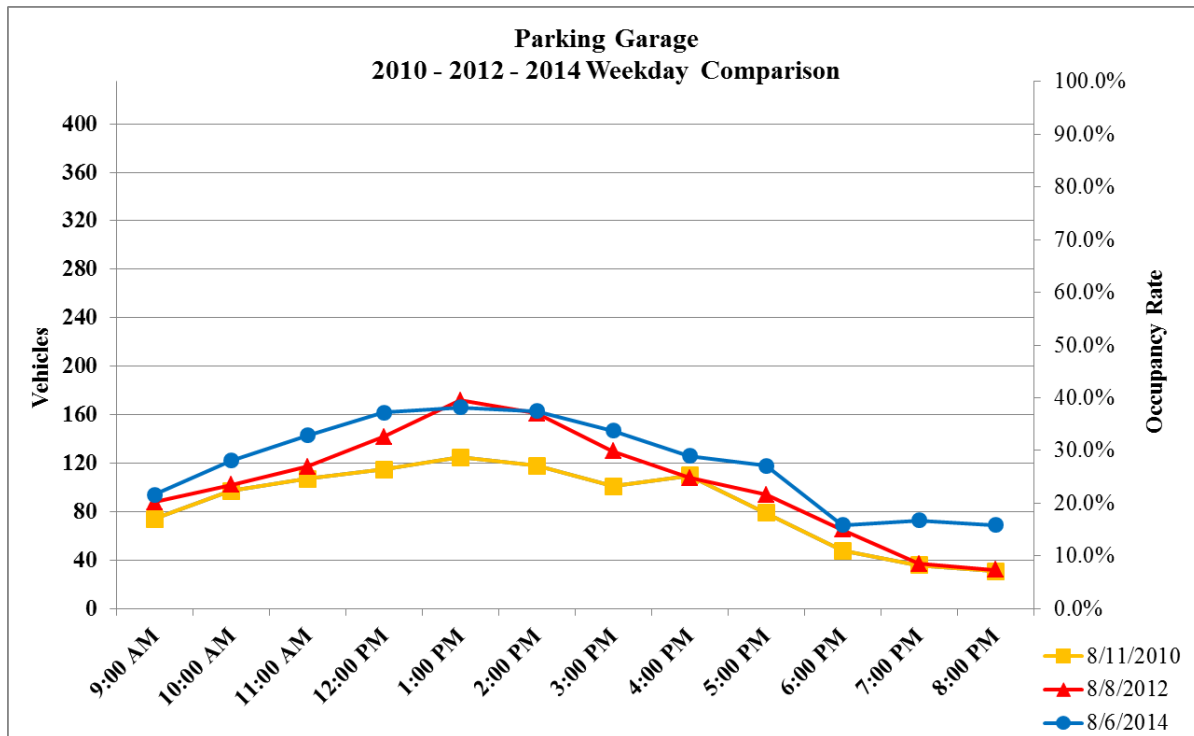


Figure 2-33: Comparison of parking garage occupancy rates Wednesday, August 11, 2010, Wednesday, August 8, 2012 and Wednesday, August 6, 2014

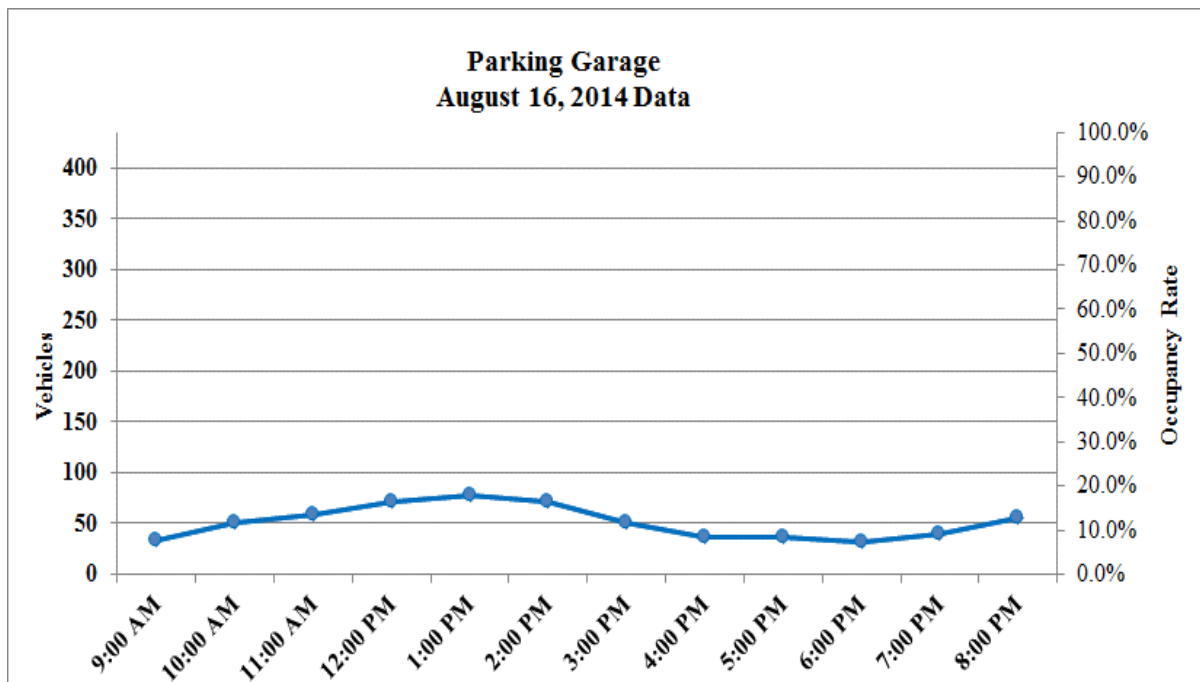


Figure 2-34: Parking garage occupancy rate, August 2014 weekend

Figure 2-35 presents the occupancy trends for the September, 2014 weekday. As the figure illustrates, occupancy climbed throughout the morning, peaked at 1:00 p.m. and fell throughout the afternoon and evening.

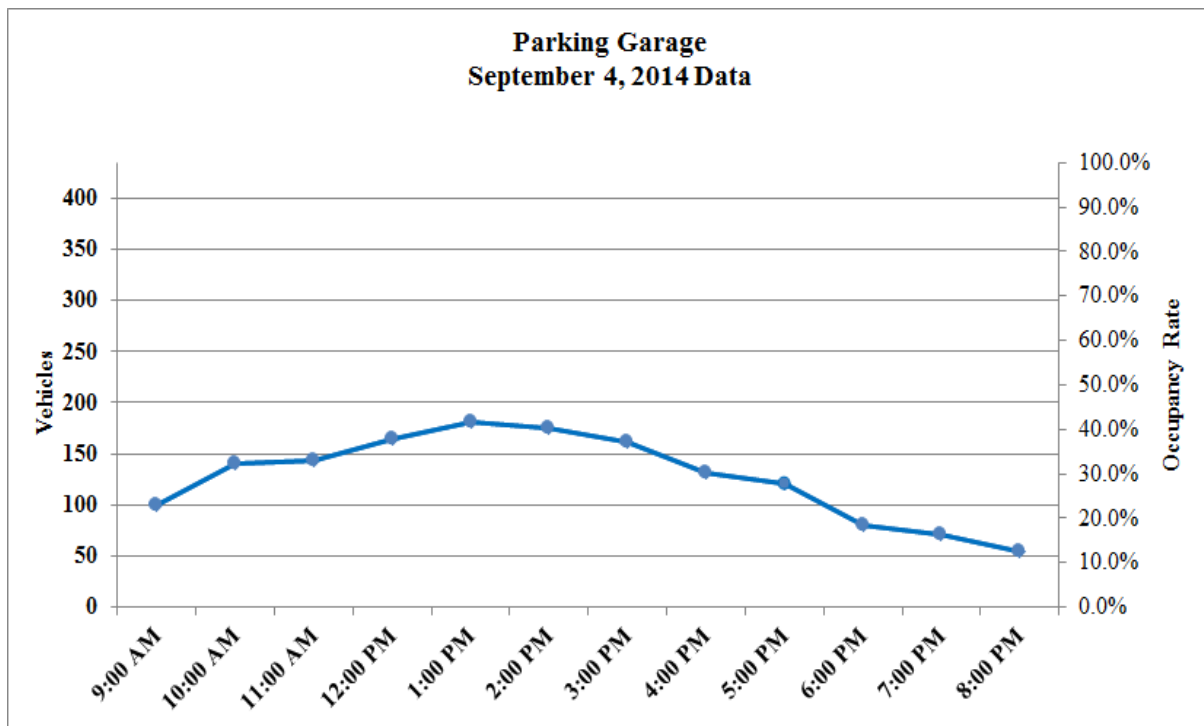


Figure 2-35: Parking garage occupancy rate, September 2014 weekday

Weekend comparisons between multiple years of data indicated a nearly identical trend, both in pattern and vehicles, compared to the observations of multiple years of weekday data. This is indicated in Figure 2-36. Once again, parking climbed throughout the morning and peaked at approximately 1:00 p.m. on all dates. From that peak, occupancies fell throughout the early afternoon but remained stable in the evening. Observations in 2014 show a slightly higher occupancy after 5:00 p.m. compared to those of 2010 and 2012. At no point did the occupancies observed on these dates exceed 20 percent, once again indicating that there is ample parking availability to handle future growth. It is interesting to note that during both years, there was no increase in occupancy observed in the evening, when one would expect downtown visitors at restaurants and bars to potentially use the parking garage in greater numbers. However, as the figures from the Armory lot indicated, it would appear that many vehicles park in this lot before seeking parking in other locations, which may explain the trends observed here.

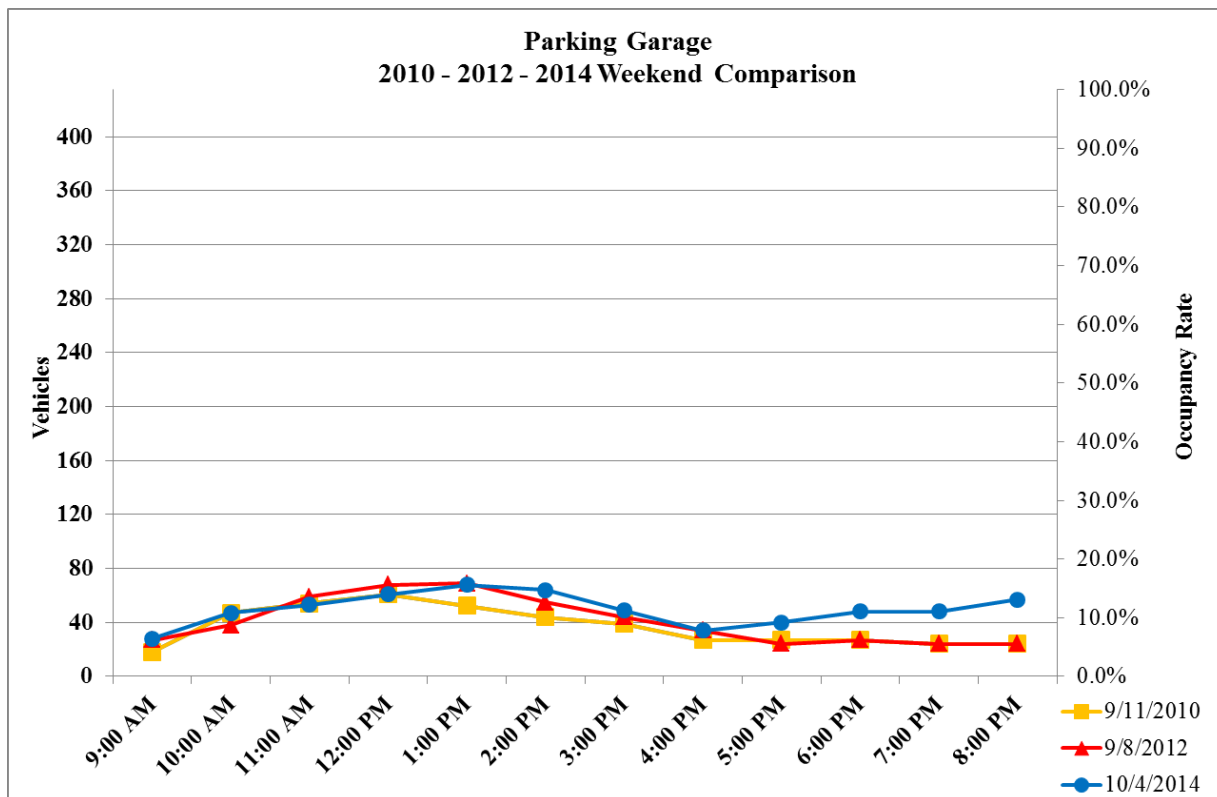


Figure 2-36: Comparison of parking garage occupancy rates Saturday, September 11, 2010, Saturday, September 8, 2012 and Saturday, October 4, 2014

2.4 Summary of Results

In general, a similar trend in occupancy rates was observed in 2012 and 2014 among all of the on-street and off-street parking examined, both on weekdays and weekends, for the majority of sites examined. Occupancy would increase throughout the morning and reach a peak during the noon hour. This was not surprising, as it coincided with the lunch hour when downtown restaurants were likely to be heavily frequented. Following this midday peak, occupancy rates for most parking locations would fall throughout the afternoon, before rising again to a second peak for the day during the evening hours. This second peak was typically lower than the initial peak occurring earlier in the day. A few differences in trends were observed between the years, but they were typically minor and of short duration (1-3 hours). Additionally, on-street parking on the periphery of the study area showed more variations throughout the day compared to internal blocks, but still followed the general trends observed elsewhere.

On-street parking occupancy rates were generally high in 2014, typically exceeding 60 percent throughout the day and approaching 80+ percent at certain times. In some cases, 90 percent occupancy rates were observed and parking on certain block faces reached 100 percent occupancy on occasion. One must keep in mind that rates above 85 to 90 percent can essentially represent 100 percent occupancy, as specific stalls are not laid out with pavement markings on the block faces. Drivers who parallel park on these block faces typically leave wasted space between vehicles, resulting in slightly lower observed occupancy than what is theoretically available.

This trend was not typically observed for off-street parking lots, with the exception of certain times in the Armory lot and the Willson lot across Mendenhall Street, where high occupancy was the norm throughout the day (generally above 60 percent for both lots). In the Armory and Willson lots, 100 percent occupancy was observed at several times. Conversely, the Carnegie lot, the Rouse lot and the parking garage all had lower occupancies throughout the day. The Carnegie lot occasionally exceeded an occupancy rate of 70 percent but generally remained below this figure. The Rouse lot reached 100 percent capacity on a couple of occasions in 2014, but typically remained below 60 percent occupancy. The parking garage generally had low occupancies on both weekdays and weekends, exceeding 50 percent occupancy at only one time on all study dates. These observations may be indicative of two points. First, the Armory lot and the Willson lot continue to be the preferred off-street parking location for many downtown patrons, particularly given their close proximity to many Main Street businesses. Second, outlying lots, even with their proximity to downtown businesses, have remained a secondary location of choice for parking, following other on-street options.

Based on data collected in 2012 (and when available, some dates in 2010), comparisons between occupancy rates of on-street parking and parking lots were made for different dates. On-street parking comparisons showed occupancy differences between 2012 and 2014, with these differences depending on the specific date and time of day. In many cases, the differences observed in 2014 were higher occupancies than those of 2012, particularly during the summer months (July and August). Whether this is indicative of increased tourism traffic, new businesses drawing additional patrons or another factor(s) is not clear. What is evident is that occupancies in 2014 continued to vary throughout the day and typically peaked around meal times.

Off-street parking lot comparisons indicated that, while the number of vehicles observed at a given time may differ, the general trends in occupancies did not change between 2012 and 2014. The trends observed in 2014 were more consistent to those of 2012 throughout the day compared to on-street parking. These trends consisted of a rise in occupancies throughout the morning, a peak at lunch, a drop in the afternoon and another increase in the evening to reach a second peak. The general constancy among lots over the comparison year suggests that, while the number of vehicles being served may change (typically increased in 2014), the business patterns being served (peaking around meals) and the timing related to them did not.

3 CONCLUSIONS

The purpose of this work was to conduct parking occupancy rate studies in the downtown Bozeman area between July and October of 2014. This was done in order to understand how parking spaces were being utilized. Occupancy rates, a measure of the level of utilization of a parking area for a specific period of time, were observed on several dates during the study period for selected on-street and city-owned off-street parking areas.

Study dates included Tuesday, July 15; Saturday, July 19; Wednesday, August 6; Saturday, August 16; Thursday, September 4; and Saturday, October 4 (no MSU football game). Data collection activities ran between 9:00 a.m. and 8:00 p.m. on each of these respective dates. To collect the data, Montana State University civil engineering students canvassed the downtown study area, recording the number of vehicles observed to be parked in the specific lots/areas of interest once per hour. The resulting data were then used to compute hourly occupancy rates.

When examined, on-street occupancy rates shared a similar trend between most block groups, both on weekdays and weekends in general. Occupancies tended to fluctuate throughout the day, depending on the location of the block. Peaks typically occurred around the lunch and/or dinner hours. On-street parking occupancy rates were generally high in 2014, typically exceeding 60 percent throughout the day and approaching 80+ percent at certain times. In some cases, 90 percent occupancy rates were observed and parking on certain block faces reached 100 percent occupancy on occasion. One must keep in mind that these rates essentially represent 100 percent occupancy, as specific stalls are not laid out with pavement markings on the block faces. As a result, drivers who parallel park on these block faces typically leave wasted space between vehicles, resulting in slightly lower observed occupancy than what is theoretically available.

High occupancy rates typically were not observed for off-street parking lots, with the exception of the Armory lot and the Willson lot across Mendenhall Street, where high occupancy was the norm throughout the day (generally above 60 percent for both lots). In the Armory and Willson lots, 100 percent occupancy was observed at several times. Conversely, the Carnegie lot, the Rouse lot and the parking garage all had lower occupancies throughout the day. The Carnegie lot occasionally exceeded an occupancy rate of 70 percent but generally remained below this figure. This lot is neighbored by the city parking garage, which may account for the lower occupancies observed in this lot. The Rouse lot reached 100 percent capacity on a couple of occasions in 2014, but typically remained below 60 percent occupancy. The parking garage generally had low occupancies on both weekdays and weekends, generally remaining at or below 40 percent. These observations may be indicative of two points. First, the Armory lot and the Willson lot continue to be the preferred off-street parking location for many downtown patrons, particularly given their close proximity to many Main Street businesses. Second, outlying lots, even with their proximity to downtown businesses, have remained a secondary location of choice for parking, following other on-street options. This may particularly be the case for the Rouse lot, which is further away from the higher concentration of downtown businesses.

When comparing occupancy rates from 2014 and 2012 (and when available, some dates in 2010), differences were observed depending on the specific date and time of day. For on-street parking, the differences observed in 2014 were higher occupancies than those of 2012, particularly during the summer months (July and August). Whether this is indicative of increased tourism traffic, new businesses drawing additional patrons or another factor(s) is not

clear. What is evident is that occupancies in 2014 continued to vary throughout the day and typically peaked around meal times.

Off-street parking lot comparisons indicated that, while the number of vehicles observed at a given time may differ, the general trends in occupancies did not change between 2012 and 2014. The trends observed in 2014 were more consistent to those of 2012 throughout the day compared to on-street parking. These trends consisted of a rise in occupancies throughout the morning, a peak at lunch, a drop in the afternoon and another increase in the evening to reach a second peak. The general consistency among lots over the comparison year suggests that, while the number of vehicles being served may change (typically increased in 2014), the business patterns being served (peaking around meals) and the timing related to them did not. All dates showed similar trends.

In the initial 2010 parking study, one of the best practices for parking management established a guideline that at least 50 percent of available public parking be occupied throughout the day (1). This metric continues to be fulfilled by on-street parking on all block faces a majority of the time, as evidenced by the data presented from 2012 and 2014 presented in this report. It was also true of the four off-street lots to varying extents. The Rouse lot had occupancy rates below 50 percent at some times, but still occupancy in this lot was typically higher than was observed in 2012. Consequently, this lot may be considered underutilized at present when the 50 percent threshold is employed.

While the results of the occupancy rate analysis did not indicate any problems at present, it is possible that issues may arise in the future. This is particularly true if downtown tourism traffic continues to grow. To a limited extent, this may have already been observed by some of the comparison trends between 2012 and 2014 data. In several cases, 2014 occupancy rates were consistently higher than those observed in 2012. As the analysis indicated, some on-street block faces and off-street lots in the downtown area saw significant increases in occupancy near lunch and dinner hours, and continued increases in parking occupancy could have an impact both at these times and others throughout the day. While adequate parking capacity still exists in the downtown area to absorb these peaks at present, occupancy rates (and possibly dwell times) should continue to be monitored in the future.

4 REFERENCES

- 1 Al-Kaisy, Ahmed and David Veneziano. "Downtown Bozeman Parking Study, Final Report." Western Transportation Institute, February, 2011.
- 2 Veneziano, David and Ahmed Al-Kaisy. "Downtown Bozeman Parking Study, Final Report (2012)." Western Transportation Institute, October, 2012.