



# Wheaton PLD Parking Demand Study

## Assessment of Existing and Future Conditions

### Submitted To:

Montgomery County Government,  
DOT-Division of Parking Management

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## **Executive Summary**

DESMAN has been retained by the Montgomery County Department of Transportation to perform a Parking Supply and Demand Assessment Study of all Montgomery County owned Parking Assets and private parking assets within the Wheaton Parking Lot District (PLD). The goals of the study are to document the existing parking conditions in Wheaton, assess the impact of future development, and to determine the surplus/deficit of all parking in the Wheaton PLD. To achieve this, the project methodology has been completed in the following Phases: (I) Assessment of Existing Conditions, (II) Existing Land Use Analysis, and (III) Development Impact Analysis.

Hourly parking occupancy and turnover surveys were conducted in all County owned public parking facilities within Wheaton's PLD during the course of a typical weekday on Thursday April 23, 2015 between the hours of 9:00am to 6:00pm; on a typical Friday Night on April 24, 2015 between the hours of 4:00pm to 10:00pm; and on a typical weekend day on Saturday April 25, 2015 between the hours of 11:00am to 9:00pm.

The overall peak utilization of the County owned public parking assets on Thursday April 23, 2015 occurred at 1:00pm, during which time 588 (38%) of the 1,554 publicly-available parking spaces were occupied. The overall peak utilization of parking assets on Friday April 24, 2015 occurred at 8:00pm, during which time 700 (45%) of the 1,554 publicly-available parking spaces were occupied. The overall peak utilization of parking assets on Saturday April 25, 2015 occurred at 7:00pm, during which time 667 (43%) of the 1,554 publicly-available parking spaces were occupied. This analysis shows that overall there is currently adequate capacity in the County owned public parking facilities to support demand. However, some of the blocks within the Wheaton PLD are operating at capacity, especially during the Friday evening and weekend evening periods.

Vehicle turnover surveys were also performed for the County owned off-street and on-street meters during the same time periods as the parking occupancy counts. On Thursday April 23, 2015 there were a total of 1,206 vehicles surveyed and an overall average length of stay of 1.7 hours. On Friday April 24, 2015 there were a total of 2,075 vehicles surveyed and an overall average length of stay of 1.9 hours. On Saturday April 25, 2015 there were a total of 2,366 vehicles surveyed and an overall average length of stay of 1.6 hours. This analysis shows that there is high turnover among parkers and that people are, on average, parking less than 2 hours.

Currently, there is a 12% vacancy rate of all commercial space in the Wheaton PLD. It was assumed it would eventually drop to 10%. This 2% increase accumulates to an additional 22,558 sq. ft. of occupied commercial space. It was determined that from the absorption of vacant commercial space in the Wheaton PLD the peak parking demand would increase by 194, 253, and 219 vehicles during the weekday, Friday evening, and weekend periods, respectively. This growth in parking demand from the occupancy of currently vacant commercial space was considered in projecting the parking surplus/deficit.

In addition to the potential absorption of vacant commercial space, there are also two future developments planned in the Wheaton PLD identified by the Maryland National Capital Park and Planning Commission (MNCPPC). The two developments include the Wheaton Redevelopment Project and the Ava Wheaton residential project.

The Wheaton Redevelopment Project is planned on Block 21 and will displace Lot 13. It plans to include 205 residential units, 265,500 sq. ft. of office space for Montgomery County departments, a 35,000 sq. ft. town square, and 13,000 sq. ft. of retail/restaurant space. The property will include a 397 space garage which will be shared among office patrons in the building and the public. There will also be a separate garage for the residential component that will include 173 spaces.

The Ava Wheaton residential project plans to be located on Block 6 and will displace all existing land uses and parking on this block. At the time of the study, the commercial buildings on Block 6 were all vacant and the parking was inaccessible. The development plans to include 324 residential units and 430 parking spaces. It is projected that the Ava Wheaton residential project will create a parking deficit of one space during a typical weekday and a deficit of 40 spaces during a typical weekend evening in Block 6.

A parking deficit of 464 spaces is projected for the Wheaton Redevelopment Project in Block 21 during a weekday peak period (1:00pm). During a Friday evening there is a projected deficit of 66 spaces and a projected surplus of 68 spaces during a typical weekend day on Block 21. The existing peak parking demand at Lot 13, the existing on-street parking demand, and the demand generated by the Wheaton Redevelopment Project were considered in determining the future surplus/deficit. The analysis shows that off-site parking will be needed to support the Wheaton Redevelopment Project. Sufficient off-site parking is available at the WMATA garage and Garage 45, which are both within 4 blocks of the proposed Wheaton Redevelopment Project.

Overall, there is adequate parking in the Wheaton PLD to support the growth in parking demand from the absorption of vacant commercial space and two proposed developments in the Wheaton PLD. However, there are projected parking deficits in Blocks 6, 12, 20, 21, and 22. The deficit in Block 6 is from the proposed Ava Wheaton residential project. The deficit in Block 21 is due to the proposed Wheaton Redevelopment Project. There is substantial surplus parking available in Garage 45 and the WMATA garage.

## Section I: Introduction

DESMAN has been retained by the Montgomery County Department of Transportation to perform a Parking Supply and Demand Assessment Study of all Montgomery County owned Parking Assets and private parking assets within the Wheaton Parking Lot District (PLD). The goals of the study are to document the existing parking conditions in Wheaton, assess the impact of future development, and to determine the surplus/deficit of all parking in the Wheaton PLD.

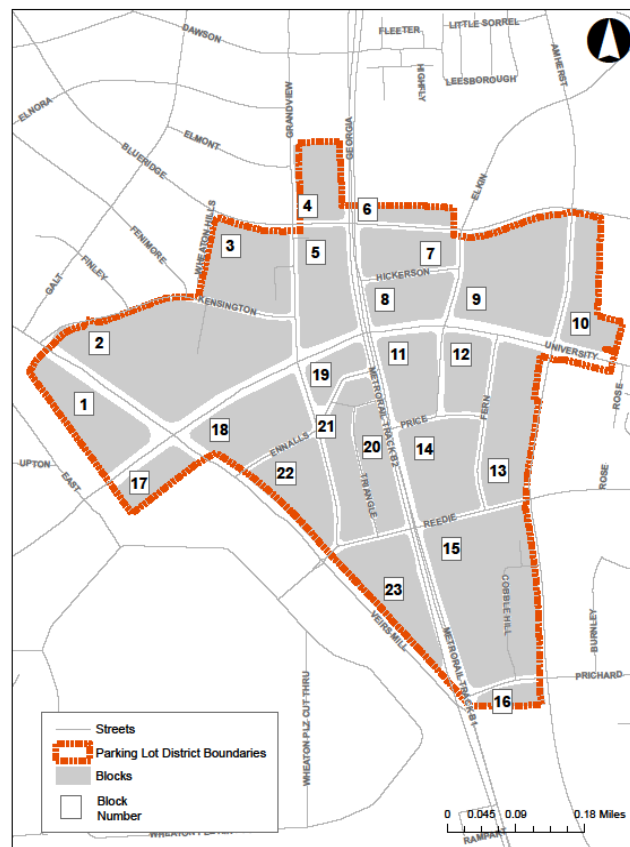
To achieve this, the project methodology has been completed in the following Phases:

- Phase I – Assessment of Existing Conditions
- Phase II – Existing Land Use Analysis
- Phase III – Development Impact Analysis

## Study Area

The initial part of the study focuses on the County owned on-street and off-street parking assets, which are located within the boundaries of the “Parking Lot District”, bound by Amherst Avenue to the East, Elmont Street to the North, Viers Mills Road to the West, and Prichard Road to the South. The Department of Parking Management has also established a coding system for each of the blocks located within the PLD. **Figure 1** illustrates the PLD boundaries and the block coding system described above.

**Figure 1: Wheaton Parking Lot District (PLD) Boundaries**



## Section II: Existing Parking Conditions

### Parking Supply

Public parking supply within Wheaton's PLD consists of both off-street and on-street spaces. **Table 1** presents the name and inventory of all on and off-street County owned public parking facilities located within the PLD boundaries. Overall, there are 1,554 County owned public spaces within the PLD. This is divided between five parking lots, one garage, and 374 metered on-street spaces. In addition to the 1,554 County owned public parking spaces there are 1,902 private spaces in the Wheaton PLD for customers and employees of the local businesses. The residential parking in the PLD was not considered in the analysis. An inventory of all public and private off-street and on-street parking in the Wheaton PLD by block is provided in the **Appendix**.

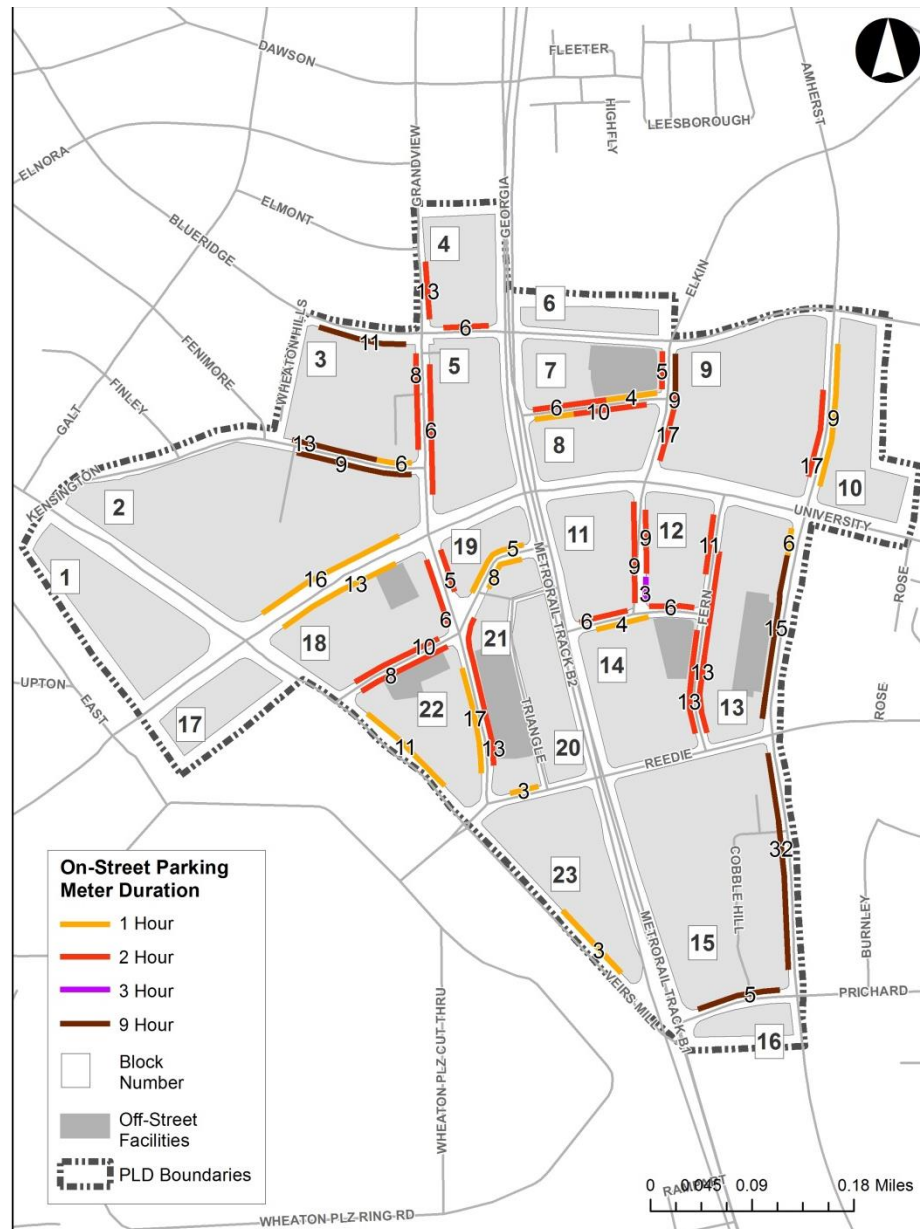
**Table 1: Existing County Owned Public Parking Supply**

Facility Name	Inventory
Lot 14	108
Lot 15	68
Lot 33	55
Lot 13	163
Lot 34	42
Garage 45	744
On-Street	374
<b>Total</b>	<b>1,554</b>

### On-Street

There are 374 metered on-street parking spaces within the PLD. The duration a parker is permitted to remain in an on-street space varies based on the designation of the meter. The geographic location of on-street parking meters, number of spaces along each block face, and meter duration restrictions within the Wheaton PLD can be seen in **Figure 2**. The majority of the meters within the PLD are one and two hour meters and are more centrally located, while there are fewer three and nine hour meters that tend to be located along the PLD's periphery.

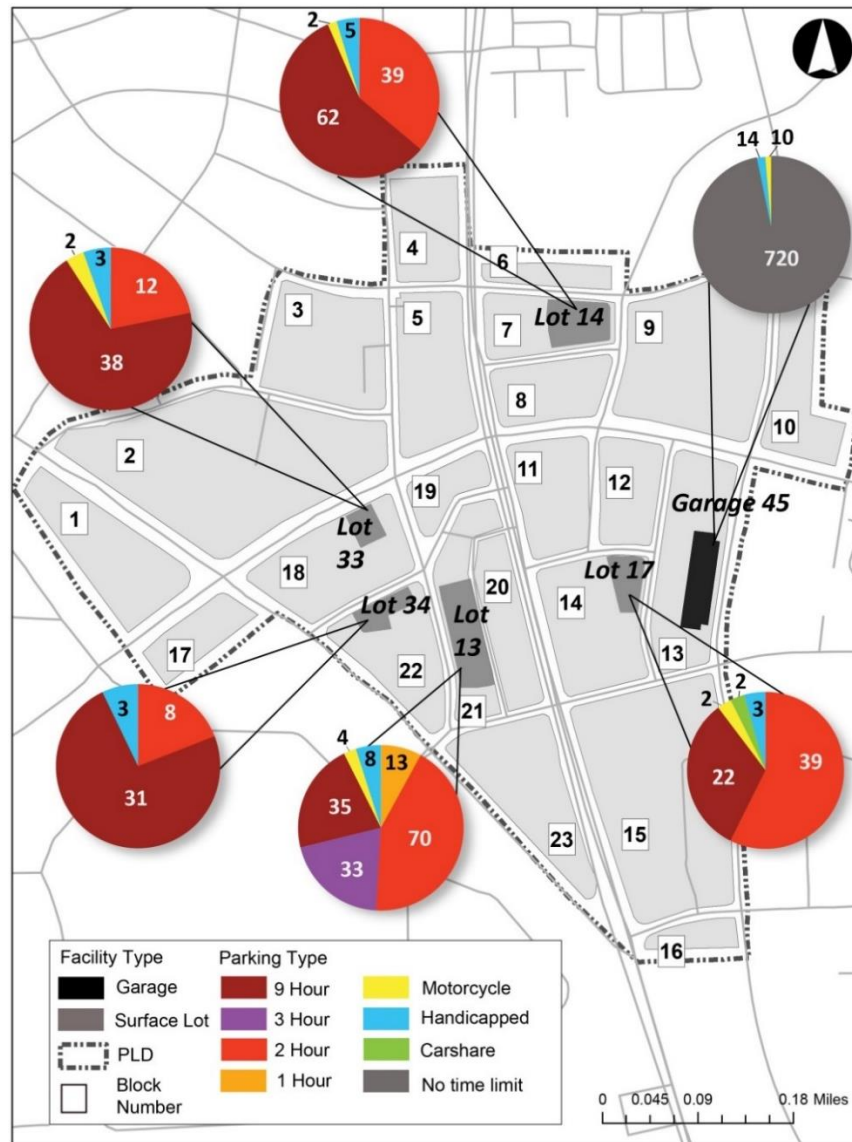
**Figure 2: On-Street Parking Inventory**



## Off-Street

Of the 1,180 off-street spaces within Wheaton's PLD, 436 can be found within five surface lots and 744 are in Garage 45. Similar to the on-street parking assets in the Wheaton PLD, the duration a parker is permitted to remain in a space varies, ranging from one hour to nine hours. In addition, the off-street facilities also have designated spaces for ADA, motorcycle, and car-sharing. The geographic location of the off-street parking assets and break down of parking space designation within the Wheaton PLD can be seen in **Figure 3**.

**Figure 3: Off-Street Parking Inventory**



**Figure 3** shows that the majority of the surface lots are centrally located and that each offer a variety of parking space types. The largest surface lot is Lot 13 which has a total of 163 spaces, while the smallest is Lot 34 which offers a total of 42 spaces. Two and nine hour parking restrictions is the dominant parking type, accounting for 356 of the 436 total surface lot spaces (82%). Lot 13 offers the most 2 hour parking spaces, which is likely associated with its central location, creating a higher turnover rate and allowing more drivers to park within the facility at a time. Lot 14 offers the greatest number of 9 hour parking spaces and is located along the periphery of the PLD boundary. A 9 hour parking space is intended to serve long-term parkers, like employees in the area.

Garage 45 is located on the edge of the PLD boundary and accounts for a total of 744 spaces. Since the majority of its users are likely to be either commuters or employees who are parking long term, there is no time restriction.



## Rates and Hours of Operation

There are no privately owned public parking facilities in the Wheaton PLD. The only public pay parking facilities are the ones owned by the County. Wheaton's parking rates are broken down between short-term and long-term users and are consistent for all surface lots, garages and on-street meters located within the PLD boundaries. Short-term parking is considered 3 hours or less and costs \$0.75 per hour both on-street and off-street. Long-term parking (over 3 hours) is \$0.60 per hour both on-street and off-street. The County also offers monthly permits, which cost \$113 per month. Garage 45 has a maximum daily rate of \$6.

The hours of operation for the surface lots and on-street meters is 9:00am to 6:00pm Monday through Saturday. The hours of operation for Garage 45 is Monday through Friday from 9:00am to 6:00pm. It is free on both Saturday and Sunday. All parking is free at all other times, including all day Sunday and on County holidays.

## Parking Utilization

Hourly parking occupancy and turnover surveys were conducted in all County owned public parking facilities within Wheaton's PLD during the course of a typical weekday on Thursday April 23, 2015 between the hours of 9:00am to 6:00pm; on a typical Friday Night on April 24, 2015 between the hours of 4:00pm to 10:00pm; and on a typical weekend day on Saturday April 25, 2015 between the hours of 11:00am to 9:00pm. During the surveys the weather was in the 60's with either clear skies or some overcast. It rained on Saturday evening starting at approximately 6:00pm. The results of the parking occupancy counts for each day by hour and by block is provided in the **Appendix**.

The overall peak utilization of the County owned public parking assets on Thursday April 23, 2015 occurred at 1:00pm, during which time 588 (38%) of the 1,554 publicly-available parking spaces were occupied. The overall peak utilization of parking assets on Friday April 24, 2015 occurred at 8:00pm, during which time 700 (45%) of the 1,554 publicly-available parking spaces were occupied. The overall peak utilization of parking assets on Saturday April 25, 2015 occurred at 7:00pm, during which time 667 (43%) of the 1,554 publicly-available parking spaces were occupied. A breakdown of the peak parking utilization for each survey day by parking facility type (i.e. garage, lots, and on-street meters) is shown in **Figure 4** through **Figure 6**. The peak period parking surplus/deficit by block for the County owned public parking assets are provided in the **Appendix**.

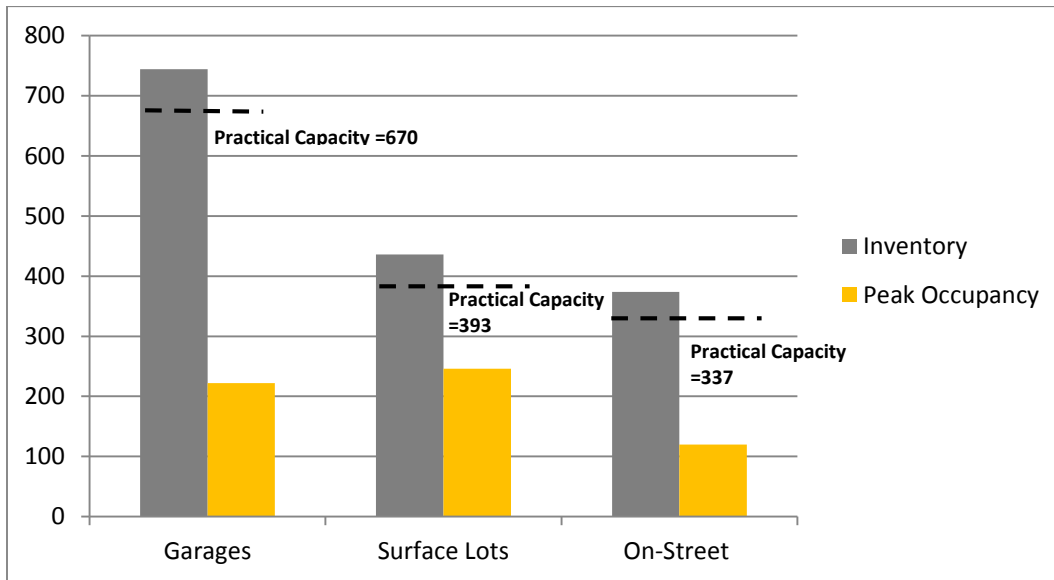
In addition to the inventory and occupancy, the practical capacity of each facility was examined. Practical capacity is a means of more accurately assessing the parking systems capacity in relation to its utilization. Practical capacity refers to the operational efficiency of a parking area or facility. Generally, a parking facility is perceived by its users to be at full operational (effective) capacity when occupancy levels reach 85% to 90%. Once this rate is exceeded, potential parkers find it difficult to locate open spaces and are more likely to continue to search for an available space, creating traffic flow problems, frustrating drivers, and ultimately leading them to park elsewhere.

The effective and efficient turnover of convenient parking spaces is most successful when the supply of spaces exceeds the peak demand for those spaces by 10% to 15%, meaning 10% to 15% of spaces are not

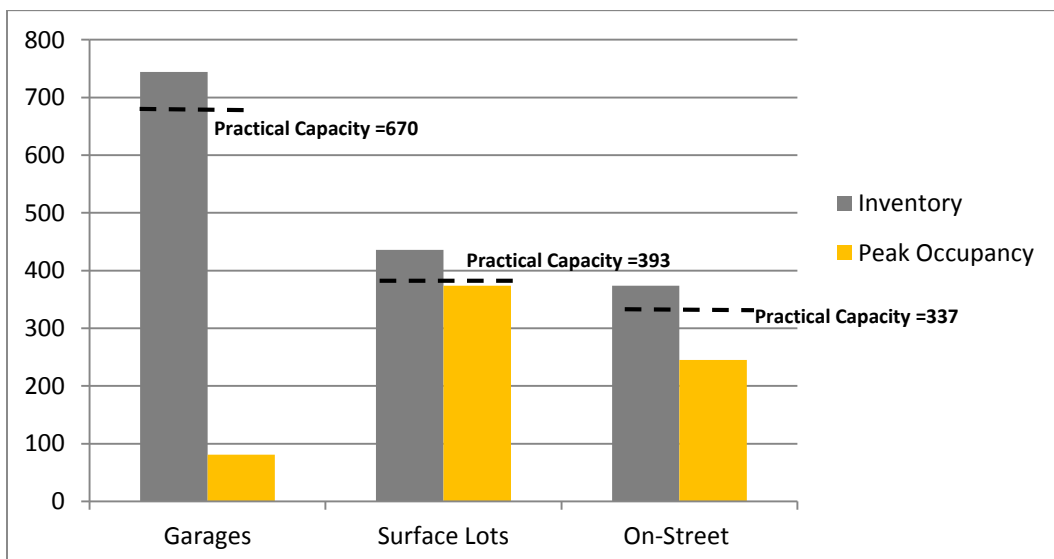
occupied at any given time and are available to parkers, therefore the practical capacity mentioned throughout the report refers to the inventory of each facility, accounting for 10% of available spaces.

As shown in **Figure 4**, there is adequate parking available in the garage, surface lots, and on-street to effectively support demand during the peak period of a typical weekday. During a Friday evening the surface lots get fairly full and begin to reach their practical capacity, as shown in **Figure 5**. There is still adequate parking available in the garage and on-street. However, during both a Friday and Saturday evening many of the centrally located streets and lots reached capacity based on observations.

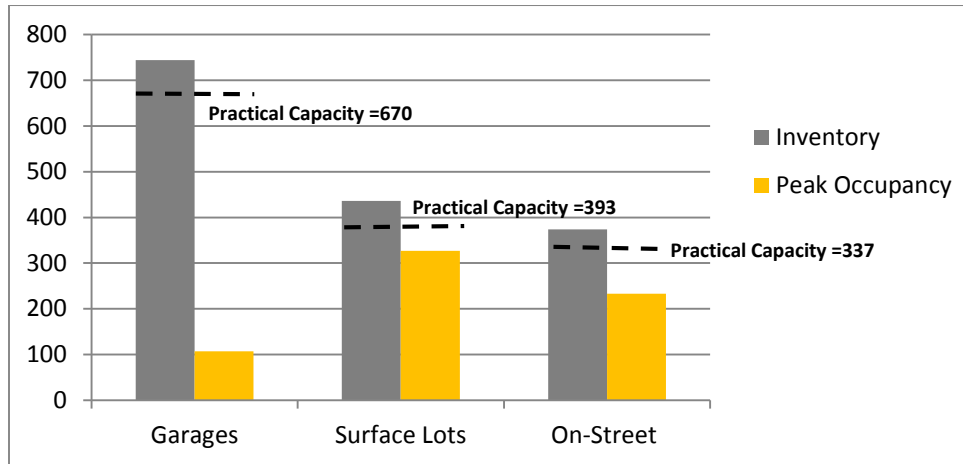
**Figure 4: Peak Parking Occupancy, Thursday April 23 at 1:00pm**



**Figure 5: Peak Parking Occupancy, Friday April 24 at 8:00pm**

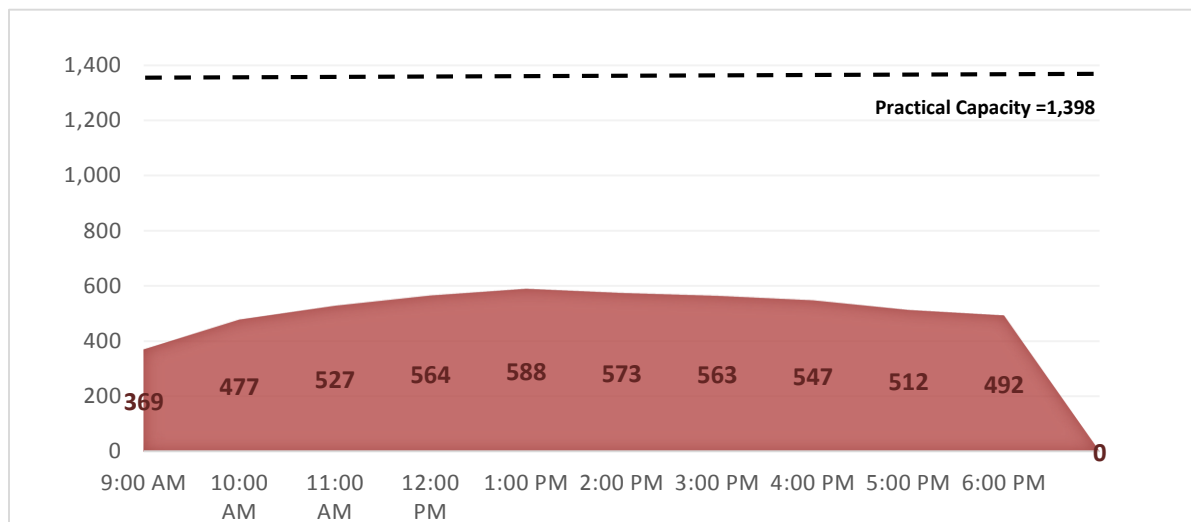


**Figure 6: Peak Parking Occupancy, Saturday April 25 at 7:00pm**



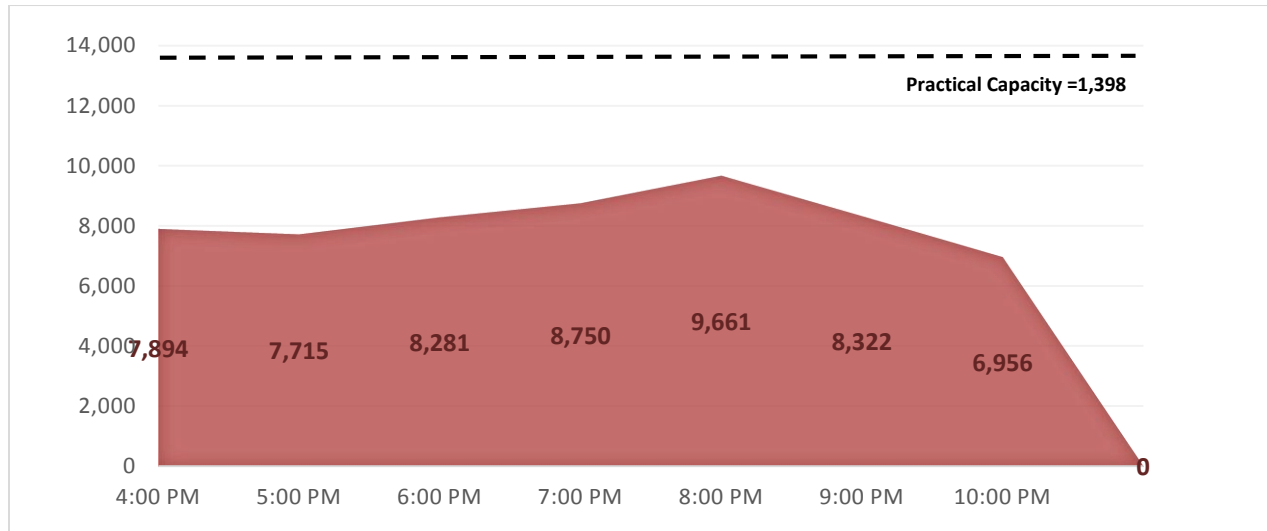
The hourly fluctuations in parking utilization of the County owned public parking assets (off and on-street) for each of the survey dates was analyzed, which are presented in **Figure 7** through **Figure 9**. The peak hour of occupancy between the hours of 9:00am and 6:00pm on April 23 was 1:00pm. The hourly parking utilization presented in **Figure 7** shows that occupancy remained fairly stagnant throughout the hours examined. This is likely due to parking assets being used primarily by employees within the PLD boundaries.

**Figure 7: Hourly Parking Occupancy, Thursday April 23**



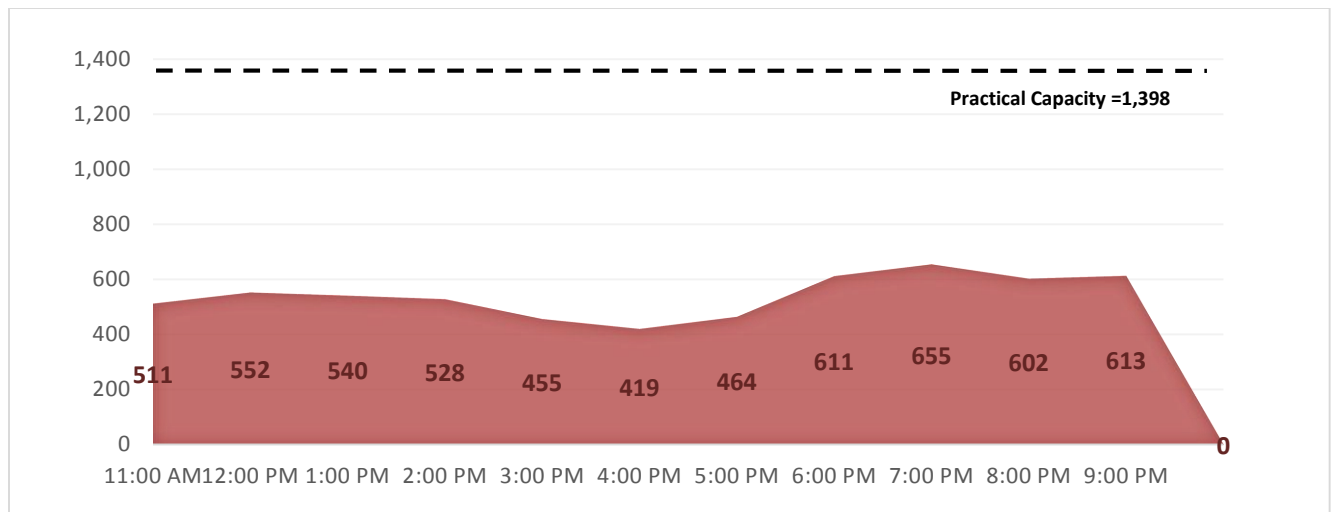
The peak hour of occupancy between the hours of 4:00pm and 10:00pm on Friday April 24 was 8:00pm. Hourly parking utilization presented in **Figure 8** shows that slight fluctuations in occupancy occurred; there was a decline in utilization until 5:00pm which then gradually increased until 8:00pm, in which the occupancy rate swiftly dropped again as parkers were likely returning to their homes.

**Figure 8: Hourly Parking Occupancy, Friday April 24**



The peak hour of occupancy between the hours of 11:00am and 9:00pm on Friday April 25 was 7:00pm. Hourly parking utilization presented in **Figure 9** shows that parking occupancy peaked around lunch (12pm), then at dinner (7pm), and then in the evening (9pm). This shows there is a lot of activity on weekend and a high turnover of spaces.

**Figure 9: Hourly Parking Occupancy, Saturday April 25**



In order to target where the high demand occupancy areas are located, maps presenting the peak occupancy rate by block for each of the survey dates examined were created. Each of the blocks examined is inclusive of all on-street and off-street County owned public parking assets within the PLD boundaries. These are presented and summarized below in **Figure 10** through **Figure 12**.

**Figure 10** shows that the majority of each blocks occupancy rate did not exceed 50% and that there were only two blocks (10 and 11) which exceeded an 80% occupancy rate, indicating that there is not a deficit of parking within the PLD during a typical weekday.

**Figure 10: Peak Parking Occupancy by Block, Thursday April 23 at 1:00pm**

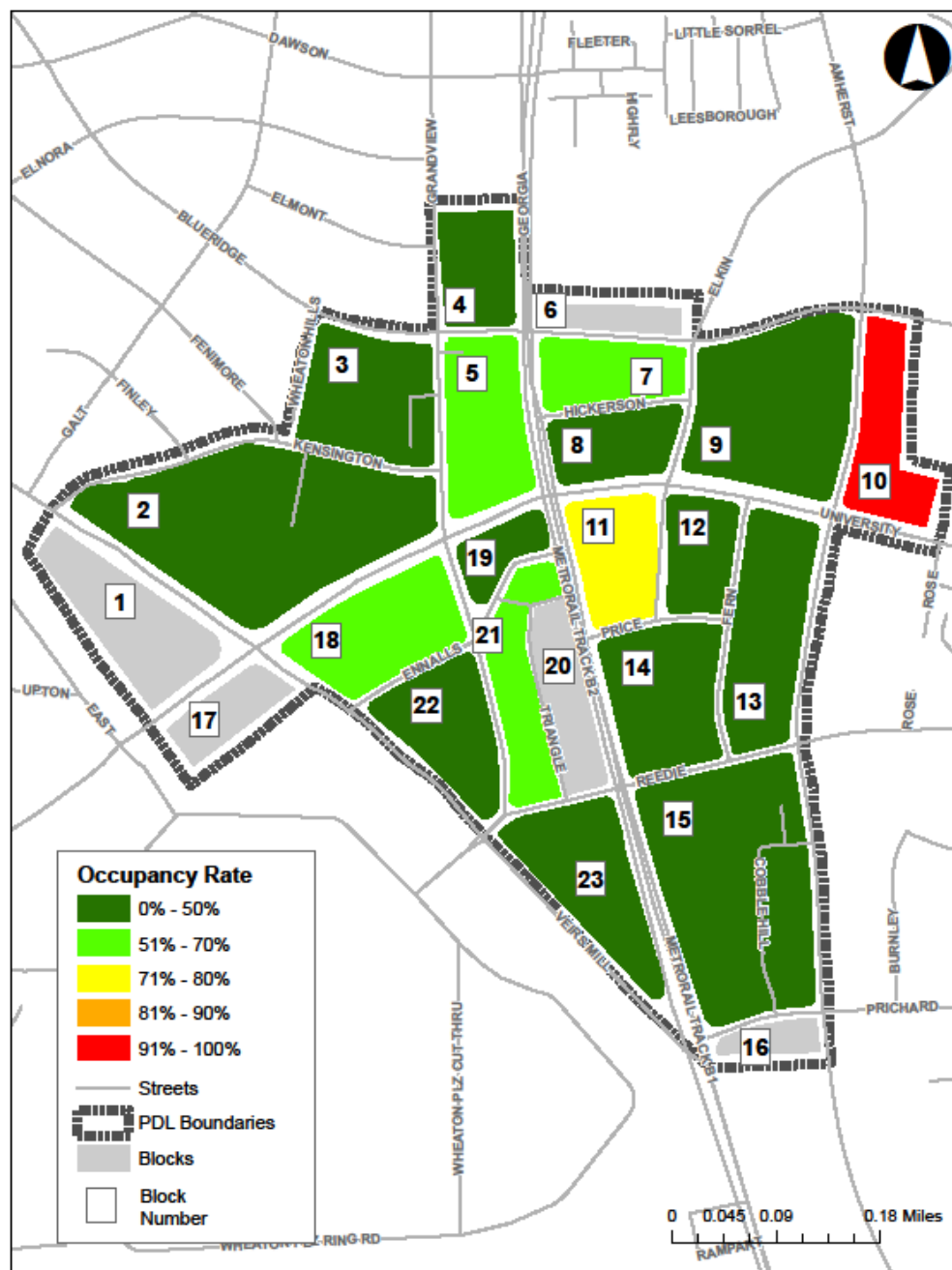
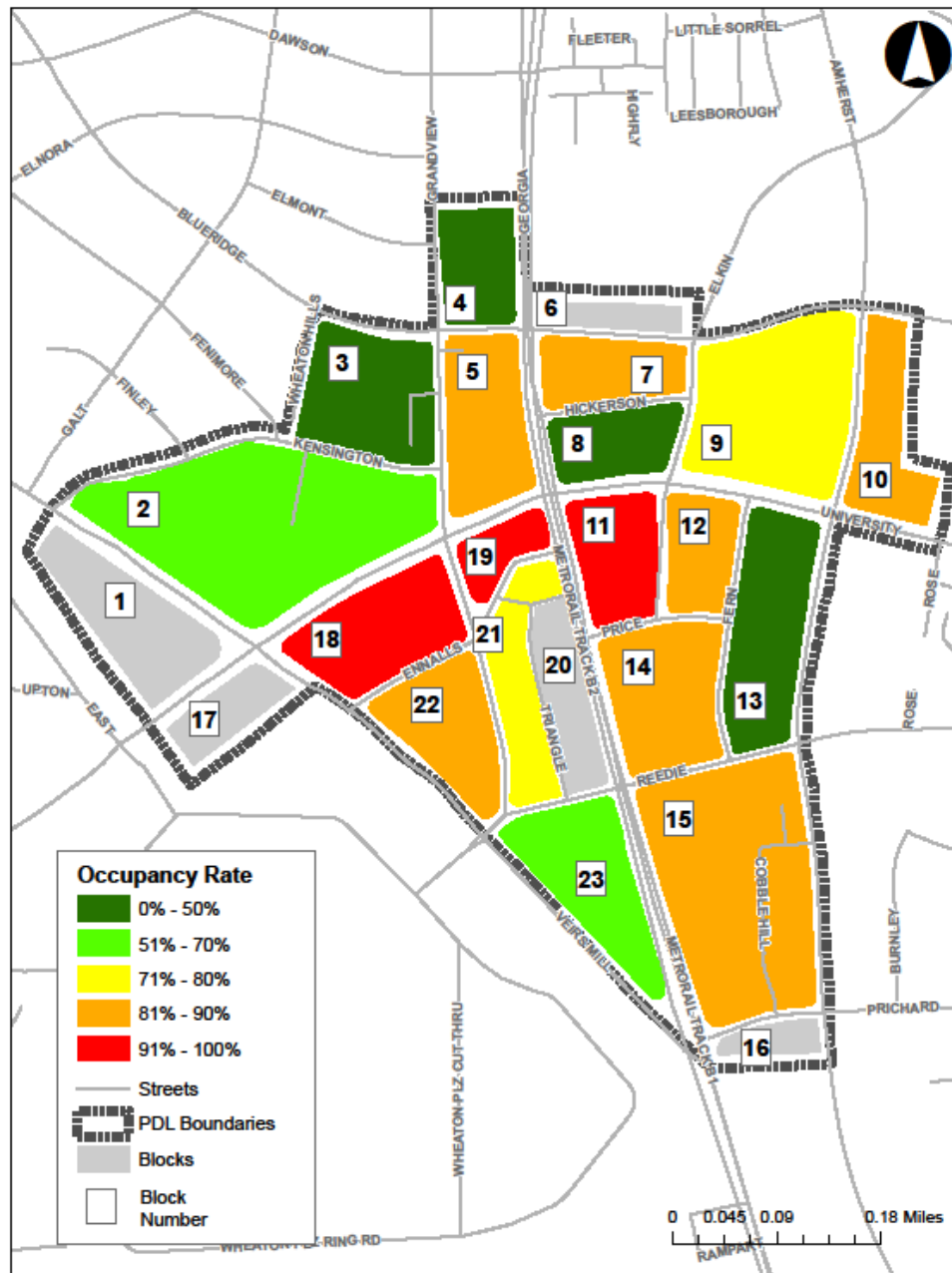


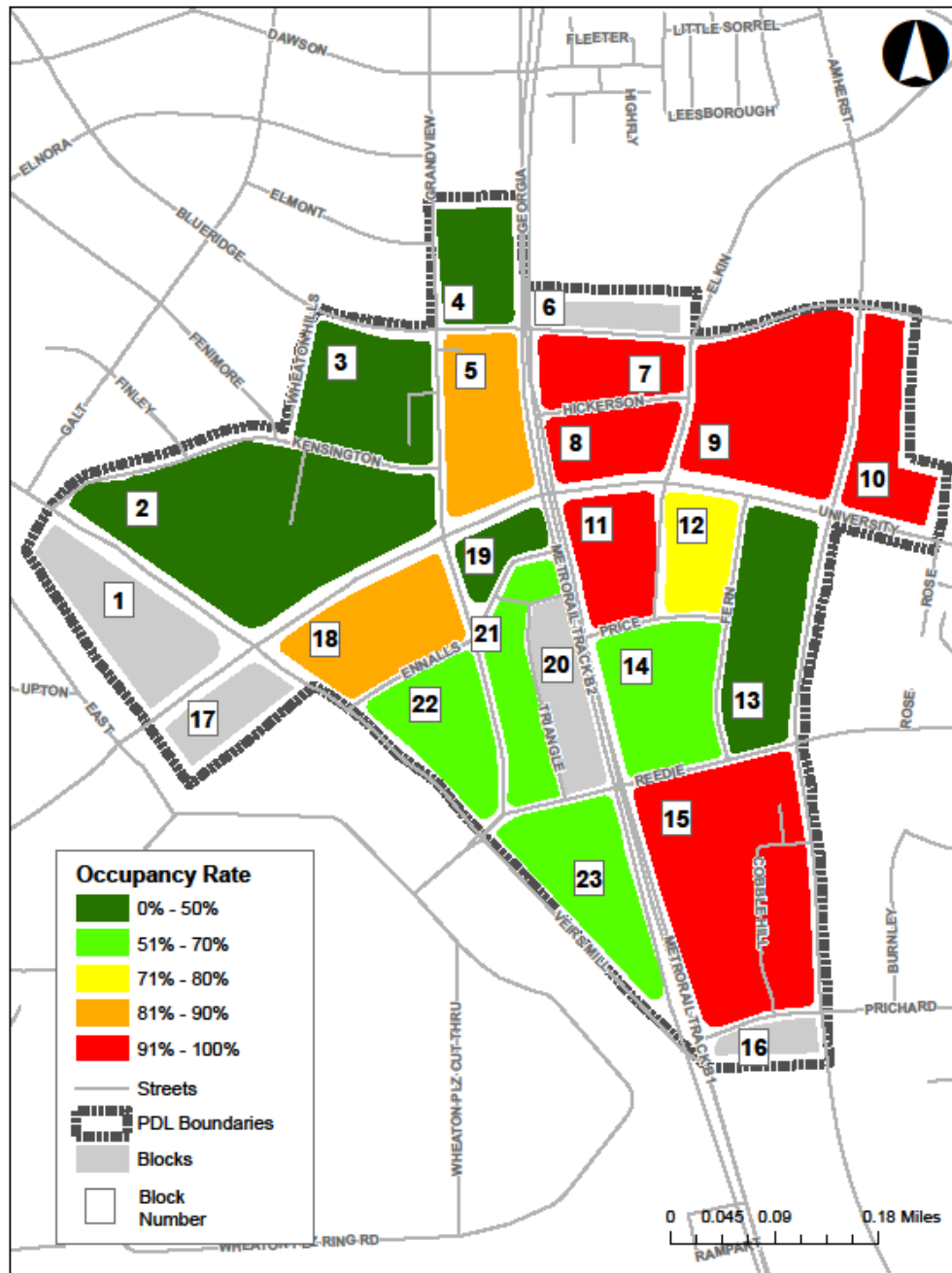
Figure 11 shows that the overall occupancy rate during a Friday evening is greater than on a typical weekday. Generally, more centrally located blocks displayed a higher occupancy rate, while lower occupancy rates can be seen along the PLD's periphery. Three of the blocks exceeded their practical capacity and a 90% occupancy rate (11, 18, and 19); while four blocks (3, 4, 8, and 13) displayed occupancy rates below 50%.

**Figure 11: Peak Parking Occupancy by Block, Friday April 24 at 8:00pm**



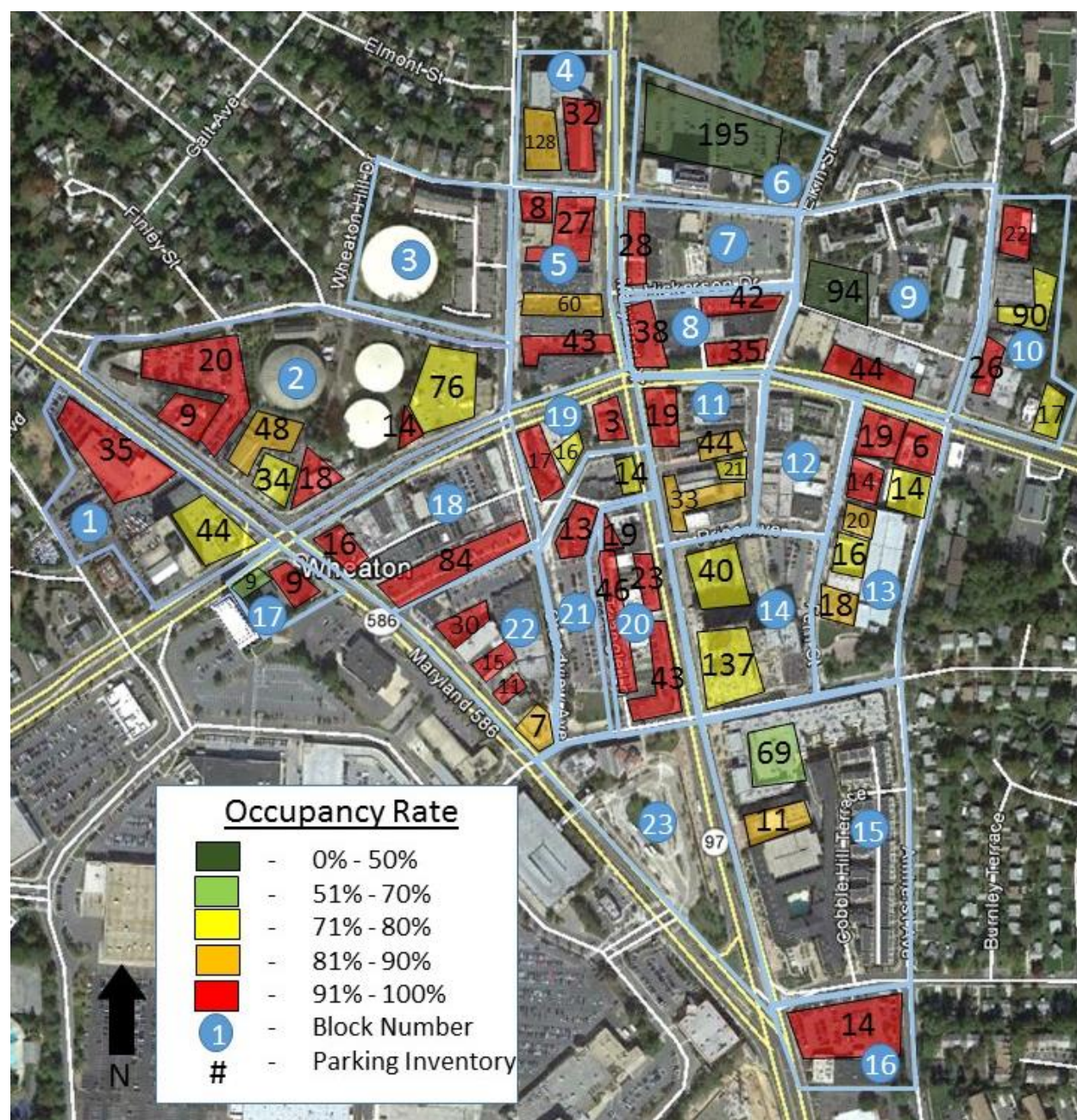
**Figure 12** displays the occupancy rate by block on Saturday at 7:00pm. This analysis shows that higher occupancy blocks can be seen along the eastern portion of the PLD (east of Georgia Avenue), particularly along the northeastern portion of the PLD. Six of the nine blocks located east of Georgia Avenue, had an occupancy rate greater than 90% (blocks 7, 8, 9 and 10). Alternatively, lower occupancy blocks tended to be located on the west end of the PLD, with seven of the nine blocks not exceeding a 70% occupancy rate.

**Figure 12: Peak Parking Occupancy by Block, Saturday April 25 at 7:00pm**





### Figure 13 – Private Parking Inventory and Occupancy



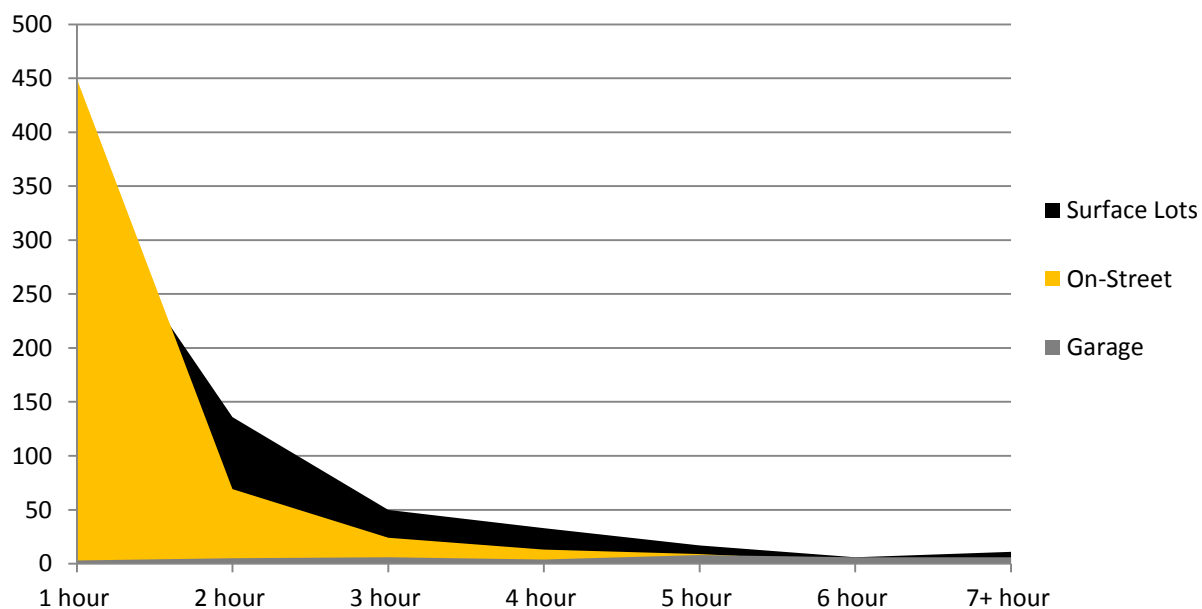


## Parking Turnover

Vehicle turnover surveys were also performed for the County owned off-street and on-street meters during the same time periods as the parking occupancy counts for each of the three days. The turnover surveys were conducted by recording a portion of the vehicles license plate number each hour in order to monitor its length of stay. The number of vehicles that parked for each length of stay (i.e. 1 hour, 2 hours, etc.) by type of facility (i.e. on-street, lots, and garage) are illustrated in **Figure 14** through **Figure 16**. The parking turnover data during each survey day is provided in the **Appendix**.

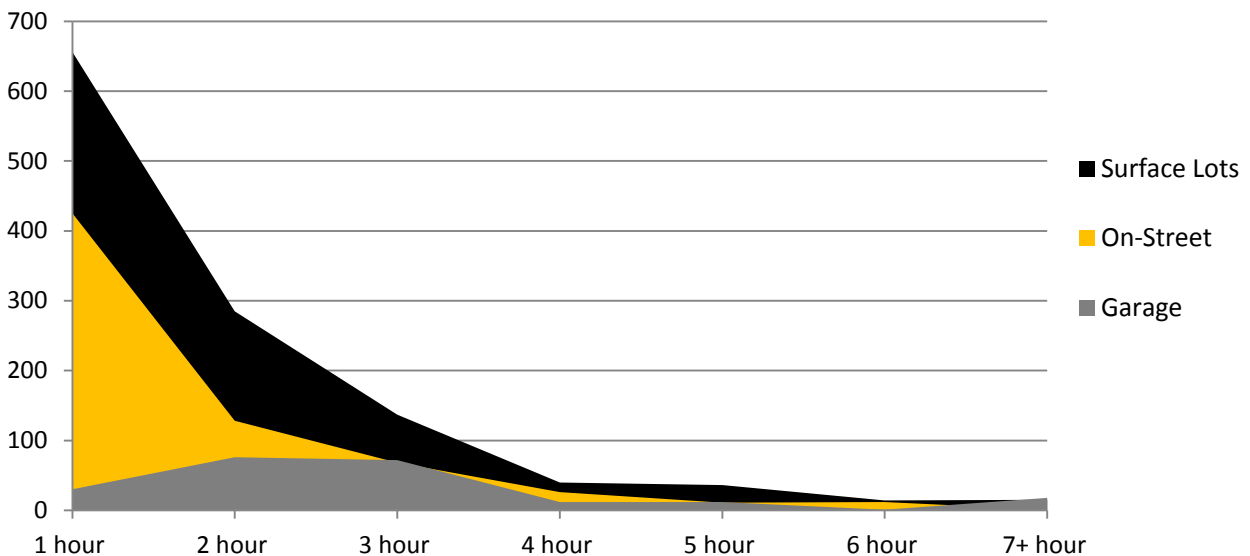
**Figure 14** summarizes the turnover data for Thursday April 23, 2015. There were a total of 1,206 vehicles surveyed and an overall average length of stay of 1.7 hours. On-street facilities experienced the largest number of parkers and shortest average length of stay (1.4 hours). The surface lots saw slightly less parkers than on-street and experienced an average length of stay of 1.8 hours. The garage had significantly less vehicles but they parked for a greater length of time, with an average length of stay of 4.3 hours. This is likely because there are mostly commuters and employees parking in the garage.

**Figure 14: Number of Vehicles Parked per Length of Stay, Thursday April 23, 2015**



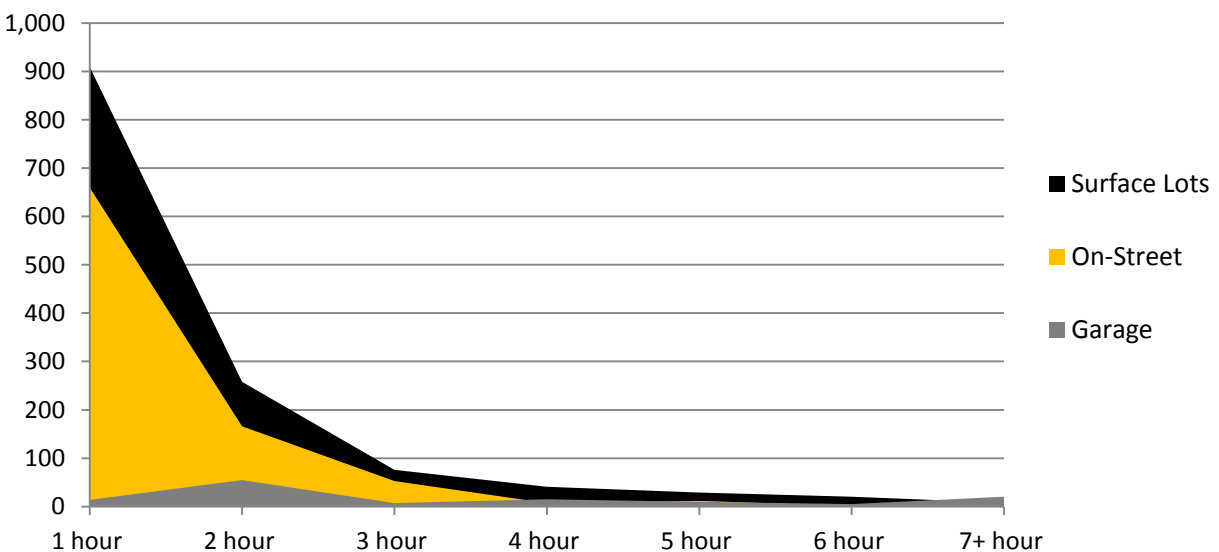
**Figure 15** summarizes the turnover data for Friday April 24, 2015. There were a total of 2,075 vehicles surveyed and an overall average length of stay of 1.9 hours. There were more vehicles parked in surface lots on Friday evening, followed by on-street, and then the garage. The average length of stay for both on-street and surface lots were slightly longer compared to the Thursday survey data, with the on-street meters average length of stay being 1.7 hours and the surface lots average length of stay being 1.8 hours. This is likely because the surveys analyzed the evening period (4pm – 10pm) which is when people were eating dinner and it is free to park after 6:00pm. The garage experienced greater turnover on Friday evening compared to Thursday with an average length of stay of 2.9 hours. This is likely because the meters and lots in the area were near capacity pushing people to utilize the garage parking as a last option.

**Figure 15: Number of Vehicles Parked per Length of Stay, Friday April 24, 2015**



**Figure 16** summarizes the turnover data for Saturday April 25, 2015. Due to a longer survey period on Saturday (10 hours) and a lot of activity in Wheaton the most number of vehicles were surveyed (2,366). The overall average length of stay was lower than the other two days at 1.6 hours. On-street meters saw the greatest number of parkers and the most turnover, with an average length of stay of 1.4 hours. Substantially more vehicles were parked for only 1 hour on-street. The surface lots had an average length of stay of 1.6 hours and had a more gradual spread of how long each vehicle parked. This is most likely because there are a variety of meter time length designations in each facility. Most vehicles parked in the garage for 2 hours, and there was an overall length of stay of 3.4 hours.

**Figure 16: Number of Vehicles Parked per Length of Stay, Saturday April 25, 2015**



## Section III: Land Use-Based Modeling of Parking Demand

### Existing Land Use Analysis

Although field surveys and turnover data provide insight into the overall parking demand, it is difficult to determine if there is an abundance or shortage of available spaces without a more in depth analysis of the individual land uses within Wheaton's PLD. The following data presents a comprehensive existing and future land use-based demand model using parking demand ratios which directly correlate to Wheaton's unique land uses and patterns of occupancy.

### Land Use-Based Modeling of Parking Demand

In order to determine the existing land use-based parking demand, parking demand factors were created by DESMAN. Land use-based parking demand factors or ratios are per-unit measures of peak hour parking generation. By applying these factors to the density of various land uses (office, retail, residential, etc.), the weekday, Friday evening, and weekend parking activity associated with each of these uses can then be estimated. **Table 2 through Table 4** summarize the existing weekday, Friday evening, and weekend peak parking demand factors based on the individual land uses and parking demand observed within Wheaton's PLD. The Demand Dependent Ratio represents a base parking demand ratio for each land use based on the Urban Land Institutes (ULI) *Shared Parking 2<sup>nd</sup> Edition* manual, the Institute of Traffic Engineers (ITE) *Parking Generation 4<sup>th</sup> Edition* manual, and DESMAN's survey observations.

DESMAN's research suggests that the ratios published by ULI and ITE are derived from suburban dominated, auto dependent case studies. Wheaton however, has a complex mix of land use activities and is home to a major Metro station, supported by significant public transit infrastructure (Metrorail, Metro Bus, County shuttle, bike lanes, etc.). Proximity and ease of access to public transportation, parking "synergy", and shared use with off-site facilities all result in a lowered parking demand ratio, as defined and summarized below.

The Auto Use factor represents the percentage of people who drove to their destination versus using other modes of transportation (i.e. transit, bike, walk, etc.). Based on the U.S. Census Bureau 2009-2013 American Community Survey for the Wheaton area (CDP), 75% of people commute in a single occupant vehicle. This was considered as a basis for the Auto Use factor for the office land use.

"Synergy" refers to the percentage of drivers who would already be making the trip to a given destination for another purpose. A common example of this can be seen when an office worker walks over to a restaurant during lunch; it is likely that this individual would have driven and parked at the restaurant had they not already been working in the vicinity.

The Off-Site Parking factor refers to the number, or percentage of people who are parking outside the study area, but are destined to a land use located in the Wheaton PLD. This was seen within Wheaton's PLD as tenants informed DESMAN that it was common place to see both employees and customer's park in the Westfield Wheaton Mall parking lot. Each of these factors was applied to the Demand Dependent Ratio to create the Auto Base – Auto Dependent Ratio, which is used throughout the land use based modeling process.

The total square footage of each land use category by block as provided by the County through its CoStar commercial real estate database and through verification by field observations and discussions with realtors is provided in the **Appendix**. There is a total of approximately 1.2 million square feet of commercial space in the Wheaton PLD, which does not include residential. The dominant land uses are office, retail, and restaurant with 857,614 square feet of occupied space. Approximately, 17.5% of the commercial space in the Wheaton PLD is vacant, which equates to 210,309 square feet of space.

**Table 2: Existing Weekday Land Use-Based Parking Ratios**

Land Use Category	Demand Dependent Ratio <sup>(1)</sup>	Auto Use <sup>(2)</sup>	Synergy <sup>(3)</sup>	Off-Site Parking <sup>(4)</sup>	Auto Base - Auto Dependent Ratio <sup>(5)</sup>
Office (per 1,000 sq. ft. GFA)	1.80	75%	0%	8%	<b>1.24</b>
Retail (per 1,000 sq. ft. GFA)	1.70	87%	25%	4%	<b>1.06</b>
Restaurant (per 1,000 sq. ft. GFA)	5.10	80%	15%	2%	<b>3.40</b>
Gas Station (per service bay)	0.50	100%	5%	0%	<b>0.48</b>
Church ( per 1,000 sq. ft. GFA)	0.50	75%	0%	0%	<b>0.38</b>
Grocery ( per 1,000 sq. ft. GFA)	2.00	80%	10%	0%	<b>1.44</b>
Auto Repair (Per 1,000 sq. ft. GFA)	1.30	95%	0%	0%	<b>1.24</b>
Municipal (Per 1,000 sq. ft. GFA)	1.60	80%	0%	10%	<b>1.15</b>

(1) Base Ratios were derived from ULI "Shared Parking"(2nd Edition) and ITE "Parking Generation" (4th Edition)

(2) Percentage of people who would drive to their destination

(3) Percentage of people who would already be parking in association with other uses

(4) Percentage of people parking off-site but destined for a land use in the Wheaton PLD

(5) Vehicles per 1,000 sq. ft. GFA

**Table 3: Existing Friday Evening Land Use-Based Parking Ratios**

Land Use Category	Demand Dependent Ratio <sup>(1)</sup>	Auto Use <sup>(2)</sup>	Synergy <sup>(3)</sup>	Off-Site Parking <sup>(4)</sup>	Auto Base - Auto Dependent Ratio <sup>(5)</sup>
Office (per 1,000 sq. ft. GFA)	1.6	75%	0%	8%	<b>1.10</b>
Retail (per 1,000 sq. ft. GFA)	2.9	90%	20%	4%	<b>2.00</b>
Restaurant (per 1,000 sq. ft. GFA)	10.3	92%	10%	2%	<b>8.36</b>
Gas Station (per service bay)	0.5	100%	5%	0%	<b>0.48</b>
Church ( per 1,000 sq. ft. GFA)	1.0	75%	0%	0%	<b>0.75</b>
Grocery ( per 1,000 sq. ft. GFA)	2.0	80%	10%	0%	<b>1.44</b>
Auto Repair (Per 1,000 sq. ft. GFA)	1.4	95%	0%	0%	<b>1.33</b>
Municipal (Per 1,000 sq. ft. GFA)	1.5	80%	0%	8%	<b>1.10</b>

(1) Base Ratios were derived from ULI "Shared Parking"(2nd Edition) and ITE "Parking Generation" (4th Edition)

(2) Percentage of people who would drive to their destination

(3) Percentage of people who would already be parking in association with other uses

(4) Percentage of people parking off-site but destined for a land use in the Wheaton PLD

(5) Vehicles per 1,000 sq. ft. GFA

**Table 4: Existing Weekend Land Use-Based Parking Ratios**

Land Use Category	Demand Dependent Ratio <sup>(1)</sup>	Auto Use <sup>(2)</sup>	Synergy <sup>(3)</sup>	Off-Site Parking <sup>(4)</sup>	Auto Base - Auto Dependent Ratio <sup>(5)</sup>
Office (per 1,000 sq. ft. GFA)	0.5	85%	0%	8%	<b>0.39</b>
Retail (per 1,000 sq. ft. GFA)	2.9	80%	20%	4%	<b>1.78</b>
Restaurant (per 1,000 sq. ft. GFA)	9.3	90%	15%	2%	<b>6.97</b>
Gas Station (per service bay)	0.5	95%	5%	0%	<b>0.45</b>
Church ( per 1,000 sq. ft. GFA)	5	85%	0%	0%	<b>4.25</b>
Grocery ( per 1,000 sq. ft. GFA)	2.0	90%	15%	0%	<b>1.53</b>
Auto Repair (Per 1,000 sq. ft. GFA)	1.3	95%	10%	0%	<b>1.11</b>
Municipal (Per 1,000 sq. ft. GFA)	0.2	85%	5%	8%	<b>0.15</b>

(1) Base Ratios were derived from ULI "Shared Parking"(2nd Edition) and ITE "Parking Generation" (4th Edition)

(2) Percentage of people who would drive to their destination

(3) Percentage of people who would already be parking in association with other uses

(4) Percentage of people parking off-site but destined for a land use in the Wheaton PLD

(5) Vehicles per 1,000 sq. ft. GFA

While **Table 2** through **Table 4** illustrate peak parking ratios for various land uses, these ratios alone cannot be used to calculate the parking demand during non-peak hours. Applying hourly adjustment factors to the peak parking ratios help to create a more accurate depiction of the overall demand, accounting for land uses that have different peak hours of activity than others. For instance, restaurants or bars may have a higher demand for parking during the evening hours when most offices are closed. **Table 5** through **Table 7** illustrates the percentage of hourly parking demand for a typical weekday, Friday evening, and weekend in Wheaton. These numbers were based on the Urban Land Institutes (ULI) *Shared Parking, 2<sup>nd</sup> Edition* manual and DESMAN's survey observations. The highlighted time period represents the peak hour of demand for each of the days surveyed. The squared off time period reflects the time periods surveys were conducted for those days.

**Table 5: Weekday Hourly Adjustments per Land Use**

Hour of Day	Office	Retail	Restaurant	Gas Station	Church	Grocery	Auto Repair Shop	Municipal
6:00 AM	3%	5%	40%	25%	10%	30%	3%	3%
7:00 AM	15%	10%	45%	35%	20%	35%	30%	15%
8:00 AM	50%	25%	50%	40%	30%	40%	45%	35%
9:00 AM	90%	50%	55%	45%	50%	45%	60%	40%
10:00 AM	100%	65%	70%	55%	100%	60%	75%	70%
11:00 AM	100%	70%	85%	60%	70%	70%	80%	75%
12:00 Noon	95%	70%	100%	75%	30%	90%	90%	85%
1:00 PM	95%	80%	95%	100%	15%	100%	100%	95%
2:00 PM	100%	85%	80%	97%	5%	95%	97%	100%
3:00 PM	100%	90%	70%	92%	10%	93%	92%	80%
4:00 PM	90%	100%	60%	88%	15%	90%	88%	70%
5:00 PM	70%	72%	87%	82%	20%	92%	82%	55%
6:00 PM	45%	70%	92%	75%	15%	95%	78%	35%
7:00 PM	30%	60%	90%	65%	10%	85%	60%	25%
8:00 PM	15%	55%	85%	70%	5%	75%	45%	15%
9:00 PM	5%	50%	65%	65%	0%	60%	3%	10%
10:00 PM	1%	30%	55%	55%	0%	50%	1%	10%
11:00 PM	0%	10%	50%	35%	0%	30%	0%	5%
12:00 Midnight	0%	0%	25%	20%	0%	5%	0%	0%

**Table 6: Friday Hourly Adjustments per Land Use**

Hour of Day	Office	Retail	Restaurant	Gas Station	Church	Grocery	Auto Repair Shop	Municipal
6:00 AM	3%	0%	45%	25%	10%	80%	3%	10%
7:00 AM	15%	0%	60%	35%	20%	90%	30%	40%
8:00 AM	50%	60%	70%	55%	30%	80%	65%	65%
9:00 AM	79%	75%	75%	60%	50%	70%	75%	80%
10:00 AM	100%	80%	78%	65%	100%	75%	85%	90%
11:00 AM	100%	90%	80%	70%	30%	80%	90%	100%
12:00 Noon	90%	95%	96%	85%	20%	85%	95%	80%
1:00 PM	95%	100%	98%	100%	10%	100%	100%	75%
2:00 PM	93%	88%	75%	90%	5%	93%	97%	65%
3:00 PM	83%	73%	50%	80%	5%	80%	92%	50%
4:00 PM	76%	63%	53%	70%	7%	50%	65%	40%
5:00 PM	42%	64%	60%	60%	20%	55%	60%	25%
6:00 PM	16%	59%	77%	68%	30%	75%	50%	15%
7:00 PM	15%	51%	92%	66%	10%	66%	40%	15%
8:00 PM	10%	47%	92%	64%	7%	50%	35%	10%
9:00 PM	5%	46%	100%	62%	0%	45%	20%	10%
10:00 PM	2%	45%	100%	60%	0%	43%	10%	10%
11:00 PM	0%	20%	90%	50%	0%	30%	5%	5%
12:00 Midnight	0%	10%	80%	20%	0%	15%	0%	0%

**Table 7: Weekend Hourly Adjustments per Land Use**

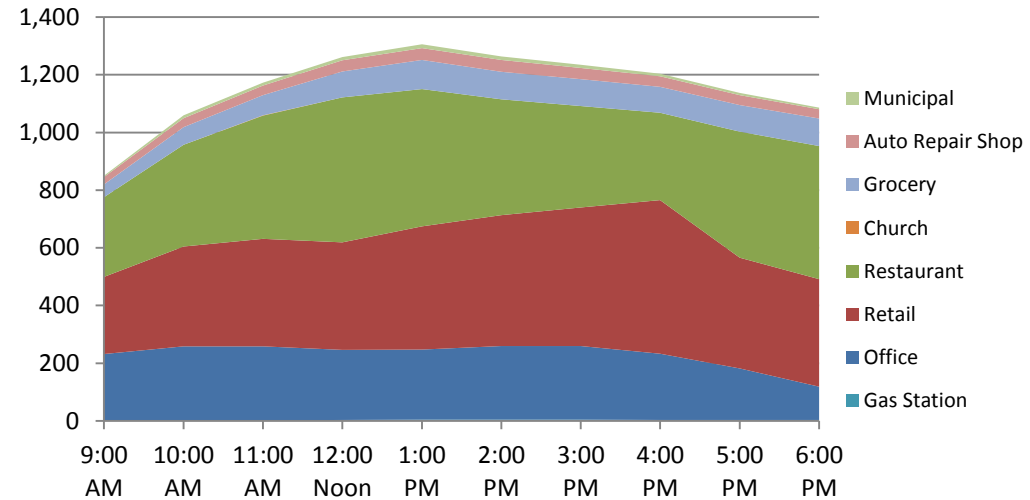
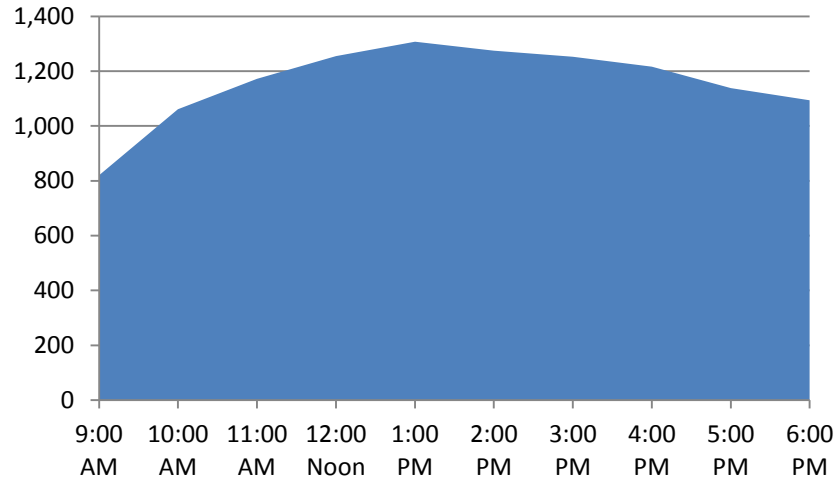
Hour of Day	Office	Retail	Restaurant	Gas Station	Church	Grocery	Auto Repair Shop	Municipal
6:00 AM	0%	1%	10%	20%	25%	60%	5%	0%
7:00 AM	20%	5%	25%	50%	75%	75%	20%	20%
8:00 AM	50%	10%	35%	80%	95%	80%	50%	50%
9:00 AM	90%	30%	45%	100%	100%	85%	75%	60%
10:00 AM	100%	40%	49%	75%	90%	100%	85%	100%
11:00 AM	90%	82%	50%	65%	80%	91%	95%	90%
12:00 PM	75%	85%	51%	70%	65%	81%	100%	80%
1:00 PM	60%	100%	52%	60%	55%	65%	90%	70%
2:00 PM	60%	90%	57%	62%	50%	68%	80%	65%
3:00 PM	50%	85%	63%	64%	30%	62%	70%	60%
4:00 PM	40%	78%	70%	65%	25%	59%	60%	40%
5:00 PM	25%	75%	76%	80%	20%	63%	30%	25%
6:00 PM	15%	65%	85%	90%	25%	67%	15%	8%
7:00 PM	6%	52%	95%	91%	20%	45%	10%	3%
8:00 PM	2%	51%	100%	95%	15%	60%	5%	2%
9:00 PM	1%	50%	100%	95%	2%	62%	0%	1%
10:00 PM	0%	20%	85%	90%	0%	10%	0%	0%
11:00 PM	0%	15%	70%	80%	0%	5%	0%	0%
12:00 AM	0%	0%	10%	50%	0%	0%	0%	0%

In order to validate the appropriateness and accuracy of the recommended ratios referenced in the above data, the pattern of parking demand generated for each land use was compared to the pattern of occupancy during the weekday, Friday, and weekend field surveys. This occupancy data includes both private and public parking facilities. **Figures 16** presents a comparison of the weekday counts performed on Thursday April 23, 2015 with the land use-based demand model. The land use-based demand model shows that the parking demand is primarily generated by retail, restaurant and office land uses. The parking demand during a typical weekday increases until 1:00pm and then gradually decreases throughout the rest of the day.

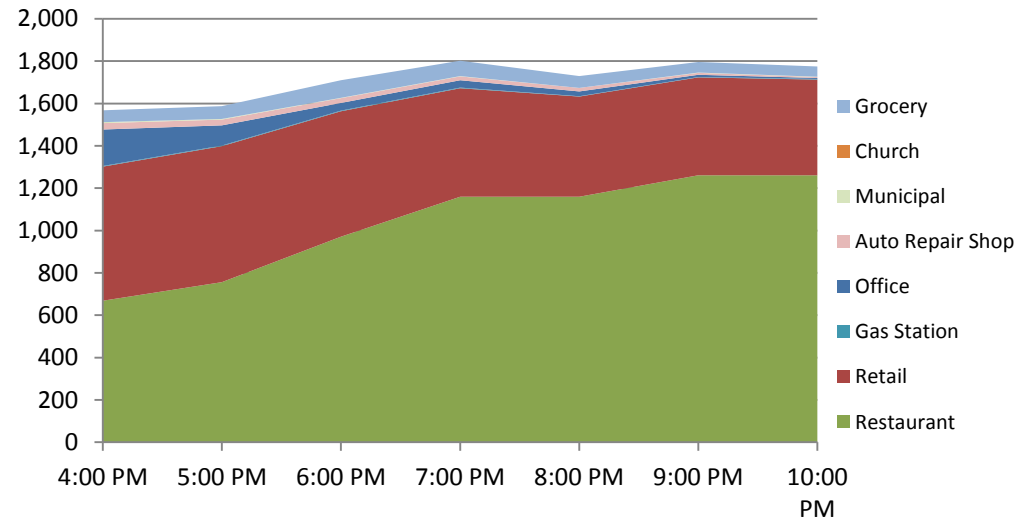
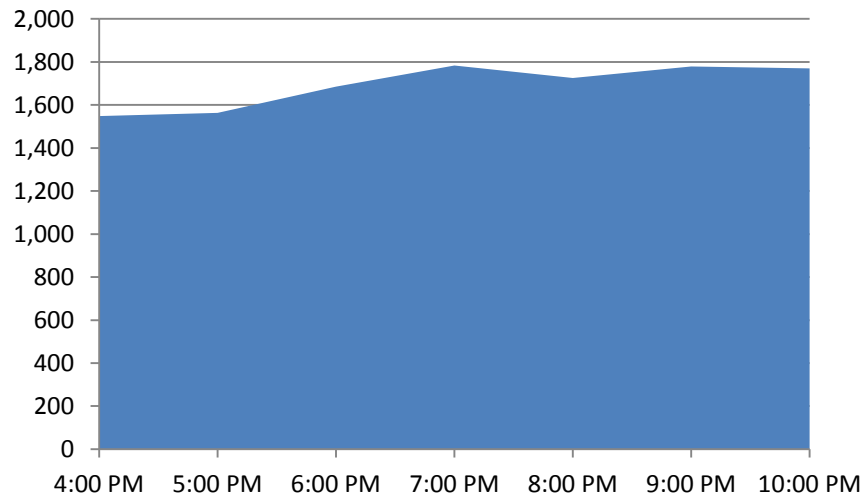
**Figure 17** presents a comparison of the Friday evening parking surveys and the individual land use-based demand model for the same period. These figures demonstrate that after 5:00pm the parking demand begins to increase, which is primarily driven by the restaurant activity in the area. The parking demand drops slightly at 8:00pm, but then picks back due to the nightlife activity at the bars in Wheaton.

**Figure 18** presents a comparison of the parking surveys and the individual land use-based demand model for Saturday. Overall, the parking demand stays fairly steady. However, there is an uptick at 1:00pm from retail and some lunch activity. The parking demand generated by restaurants gradually increases throughout the day and peaks at about 8:00pm.

**Figure 16: Comparison of Weekday Survey and Land Use-Based Parking Demand of Public & Private Facilities**

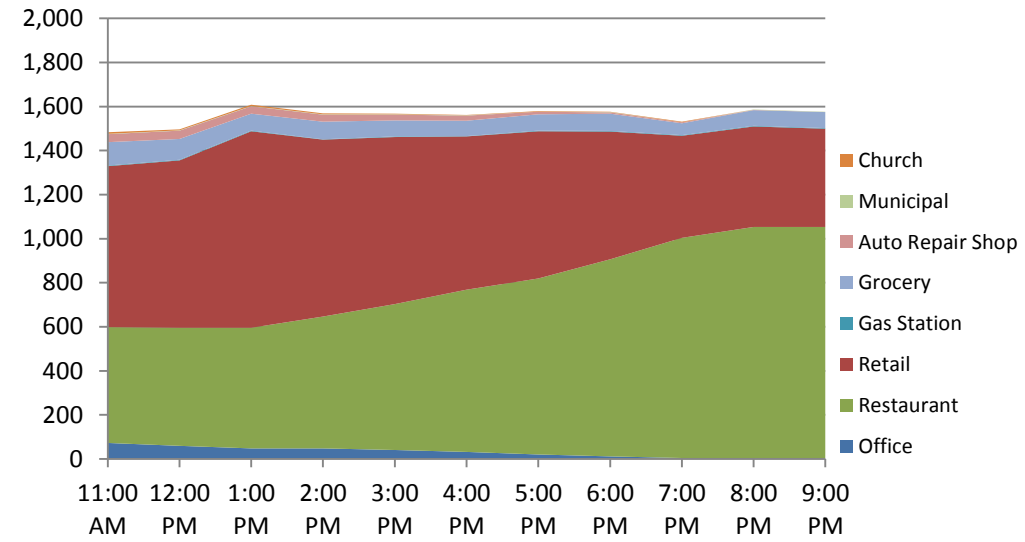
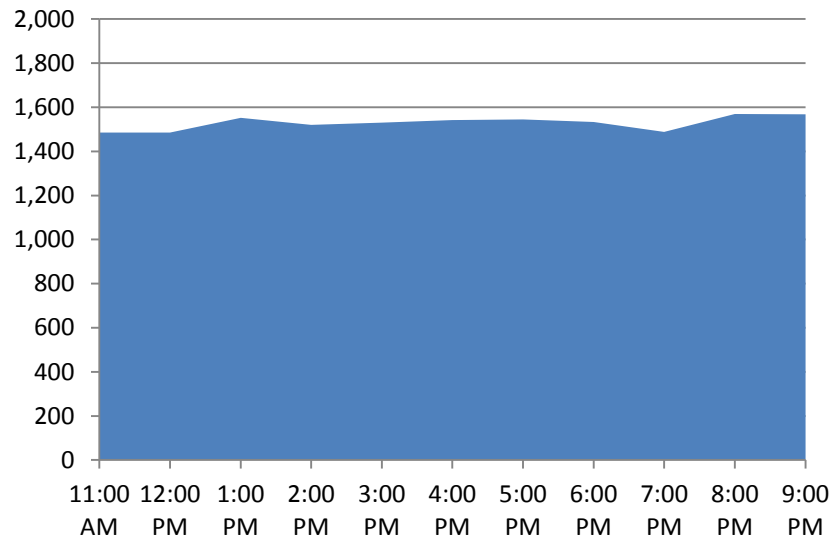


**Figure 17: Comparison of Friday Survey and Land Use-Based Parking Demand of Public & Private Facilities**





**Figure 18: Comparison of Weekend Survey and Land Use-Based Parking Demand of Public & Private Facilities**



## Section IV: Future Land Used-Based Modeling of Parking Demand

To determine the future parking demand in Wheaton both future developments and the absorption of vacant commercial space were considered, as both will have an impact on the demand for and availability of parking in the Wheaton PLD.

### Absorption of Vacant Commercial Space

**Table 8** shows the estimated amount of absorbed vacant commercial space in the Wheaton PLD for each land use. Currently, there is a 12% vacancy rate of all commercial space in the Wheaton PLD. It was assumed it would drop to 10%. This accumulates to an additional 22,558 sq. ft. of occupied commercial space. The estimated occupancy of vacant space for each land use was weighted based on the current amount of vacant space. A total of 73,000 sq. ft. of vacant office space in Block 6 at 11501 Georgia Avenue was excluded from the analysis, since there are plans for a residential development at this site.

**Table 8: Absorption of Vacant Commercial Space per Land Use**

Commercial Space	Office Sq.ft. <sup>(1)</sup>	Retail Sq.ft.	Restaurant Sq.ft.	Gas Station Sq.ft.	Church Sq.ft.	Grocery Sq.ft.	Auto Repair Shop Sq. ft.	Municipal Sq.ft.	Total Sq.ft.
Occupied Space	205,805	500,960	150,849	8,038	1,969	77,000	34,343	11,607	990,571
Vacant Space	48,196	57,804	24,727	0	0	0	6,582	0	137,309
Total Space	254,001	558,764	175,576	8,038	1,969	77,000	40,925	11,607	1,127,880
% Vacant - Existing	19%	10%	14%	0%	0%	0%	16%	0%	12%
% Vacant - Future	16%	9%	12%	0%	0%	0%	13%	0%	10%
Absorption <sup>(2)</sup>	7,918	9,496	4,062	-	-	-	1,081	-	22,558

(1) Excluded 73,000 s.f. of vacant office space at 11501 Georgia Avenue, since there are plans for a residential development on the site.

(2) Assumed 10% vacancy of commercial space, which equate to 2% absorption of existing vacant commercial space.

**Table 9** calculates the amount of additional peak parking demand generated from the absorption of vacant commercial space for each block. The amount of vacant space absorbed per block is weighted based on the amount of current vacant space. The peak parking demand ratios previously calculated from the land use-based model were applied for the analysis. Overall, it was determined that from the absorption of vacant commercial space in the Wheaton PLD the peak parking demand would increase by 194, 253, and 219 vehicles during the weekday, Friday evening, and weekend periods, respectively.

### Future Developments

In addition to the potential absorption of vacant commercial space, there are also two future developments planned in the Wheaton PLD identified by the Maryland National Capital Park and Planning Commission (MNCPPC). The two developments include the Wheaton Redevelopment Project and the Ava Wheaton residential project.

The Wheaton Redevelopment Project is planned on Block 21 and will displace Lot 13. It plans to include 205 residential units, 265,500 sq. ft. of office space for Montgomery County departments, a 35,000 sq. ft. town square, and 6,000 sq. ft. of retail/restaurant space. The property will include a 397 space garage

which will be shared among office patrons in the building and the public. There will also be a separate garage for the residential component that will include 173 spaces.

**Table 9: Peak Parking Demand from Absorption of Vacant Commercial Space per Block**

Block	Land Use	Vacant Space	Vacant Space Absorbed	Additional Peak Demand		
				Weekday	Friday	Weekend
<b>Block 2</b>	Office	4,900	805	6	1	0
<b>Block 4</b>	Office	36,476	5,992	43	4	1
<b>Block 5</b>	Retail	13,719	2,254	12	13	13
<b>Block 9</b>	Retail	6,600	1,084	6	6	6
<b>Block 10</b>	Office	2,000	329	2	0	0
<b>Block 11</b>	Retail	6,300	1,035	5	6	6
	Restaurant	1,800	296	6	14	12
	Office	2,000	329	2	0	0
<b>Block 12</b>	Auto Repair Shop	6,582	1,081	8	3	1
	Retail	6,765	1,111	6	6	6
	Office	2,820	463	3	0	0
	Restaurant	6,800	1,117	22	52	45
<b>Block 14</b>	Retail	875	144	1	1	1
<b>Block 17</b>	Retail	2,239	368	2	2	2
<b>Block 18</b>	Retail	6,871	1,129	6	6	6
<b>Block 19</b>	Retail	2,626	431	2	2	2
<b>Block 20</b>	Retail	3,880	637	3	4	4
	Restaurant	7,300	1,199	24	56	48
<b>Block 21</b>	Retail	733	120	1	1	1
<b>Block 22</b>	Restaurant	8,827	1,450	28	68	58
	Retail	6,536	1,074	6	6	6
<b>Block 23</b>	Retail	660	108	1	1	1
<b>Totals</b>		<b>137,309</b>	<b>22,556</b>	<b>194</b>	<b>253</b>	<b>219</b>

The Ava Wheaton residential project plans to be located on Block 6 and will displace all existing land uses and parking on this block. At the time of the study, the commercial buildings on Block 6 were all vacant and the parking was inaccessible. The development plans to include 324 residential units and 430 parking spaces.

**Table 10** shows the projected peak parking demand for each future development based on the planned programming. The peak parking demand ratios previously calculated from the land use-based model were applied for the analysis, except for the office component of the Wheaton Redevelopment Project. The projected number of employees and visitors as provided by each department was used to calculate the projected parking demand. The off-site parking demand factor for retail and restaurant was eliminated from the peak demand factor. This allows for a calculation of the actual peak parking demand. The parking demand ratio for a residential property was assumed to be 1.3 spaces/unit for residents and 0.15 spaces/unit for visitors. Since it is reserved parking for residents, the parking demand factor is static for all periods. However, the visitor parking demand factor fluctuates based on the hourly factors included in *ULI Shared Parking, 2<sup>nd</sup> Edition*. It is estimated that the Ava Wheaton residential development will

generate a peak demand of 470 vehicles during a Friday and weekend evening. The Wheaton Redevelopment project in Block 21 will generate a peak demand of 930 vehicles during a weekday afternoon, which includes the residential and commercial components.

**Table 10: Projected Peak Demand of Future Developments**

Block	Land Use	Size	Parking Demand		
			Weekday (1 PM)	Friday (7 PM)	Weekend (8 PM)
6	Ava Wheaton Residential Development	324 units	431	470	470
21	<u>Wheaton Redevelopment Project</u>				
	Residential	205 units	273	297	297
	Office <sup>(2)</sup>	265,500 s.f.	631	113	6
	Retail/Restaurant <sup>(1)</sup>	13,000 s.f.	27	57	52
<b>Total Future Parking Demand</b>			<b>930</b>	<b>468</b>	<b>356</b>

(1) Assumed half retail and restaurant space.

(2) Demand based on number of employees and annual visitors.

**Table 11** provides the projected surplus/deficit of parking on Blocks 6 and 21 from the two proposed developments. This analysis incorporates the existing parking demand and any existing public parking that is not being displaced at each site, which includes only the on-street parking in the area. No practical capacity factor was utilized for Ava Wheaton or the residential component of the Wheaton Redevelopment project since residents will have reserved parking. A 90% practical capacity factor was applied for the Wheaton Redevelopment Project and on-street parking. A deficit of 40 spaces is projected at the Ava Wheaton residential project during a Friday and Weekend evening. This parking deficit reflects the visitors, which will have to find parking in the area. A parking deficit of 464 spaces is projected for the Wheaton Redevelopment Project during a weekday peak period (1:00pm). The existing peak parking demand at Lot 13, the existing on-street parking demand, and the demand generated by the Wheaton Redevelopment Project were considered in determining the future surplus/deficit. This analysis shows that off-site parking will be needed to support the Wheaton Redevelopment Project.

**Table 11: Projected Surplus/Deficit of Parking per Blocks with Proposed Developments**

	Block 6 (Ava Wheaton Residential Dev.)			Block 21 (Wheaton Redevelopment Proj.)		
	Weekday	Friday	Weekend	Weekday	Friday	Weekend
<u>Demand</u>						
Future Development	431	470	470	930	468	356
Current Off-Street Parking Demand <sup>(2)</sup>	0	0	0	73	128	114
Current On-Street Demand	0	0	0	10	20	12
<b>Total Parking Demand</b>	<b>431</b>	<b>470</b>	<b>470</b>	<b>1,014</b>	<b>616</b>	<b>482</b>
<u>Supply</u>						
New Parking	430	430	430	570	570	570
On-Street Parking	0	0	0	22	22	22
<b>Total Parking Supply</b>	<b>430</b>	<b>430</b>	<b>430</b>	<b>592</b>	<b>592</b>	<b>592</b>
<b>Practical Parking Supply <sup>(1)</sup></b>	<b>430</b>	<b>430</b>	<b>430</b>	<b>550</b>	<b>550</b>	<b>550</b>
<b>Parking Surplus/Deficit per Block</b>	<b>(1)</b>	<b>(40)</b>	<b>(40)</b>	<b>(464)</b>	<b>(66)</b>	<b>68</b>

(1) Assumed no practical capacity factor for the residential development on Block 6 and Block 21, and a 90% practical capacity factor for the office and retail/restaurant portion of the Wheaton Redevelopment Project on Block 21.

(2) Does not include Mid County Regional Services Center Demand.

A potential opportunity for off-site parking to support the Wheaton Redevelopment Project is at the WMATA garage located at the southwest corner of Veirs Mill Road and Reddie Drive. This is approximately 4 blocks from the proposed site of the Wheaton Redevelopment Project. Based on information provided by WMATA there are 977 spaces in the garage and a peak utilization of only 35%. This shows there is substantial capacity available to support the surplus parking demand generated by the Wheaton Redevelopment Project. Based on the parking occupancy counts, there is also a surplus of parking available in Garage 45 during a weekday. Garage 45 is also approximately 4 blocks from the proposed Wheaton Redevelopment Project.

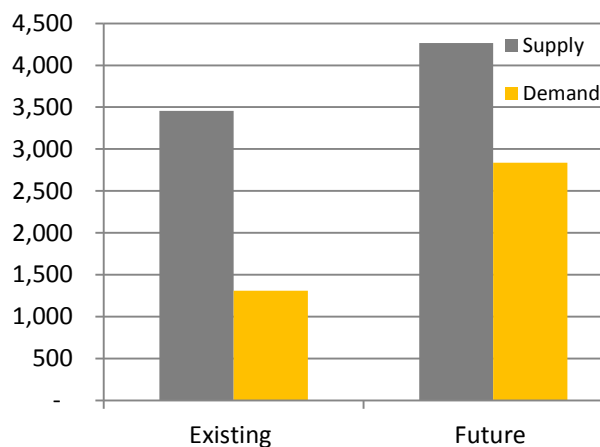
### Estimate of Future Surplus/Deficit by Block

Within the entire study area there is currently a total of 3,456 spaces, which includes 1,554 public spaces (on- and off-street) and 1,902 private spaces. Once the two developments are completed there will be a total of 4,266 spaces in the study area, which includes 2,478 private spaces, 1,414 public off-street spaces, and 374 on-street spaces. **Figures 19 through 21** show the peak period parking demand versus supply in the entire study area for the existing and future conditions. This analysis does not consider any practical capacity factor.

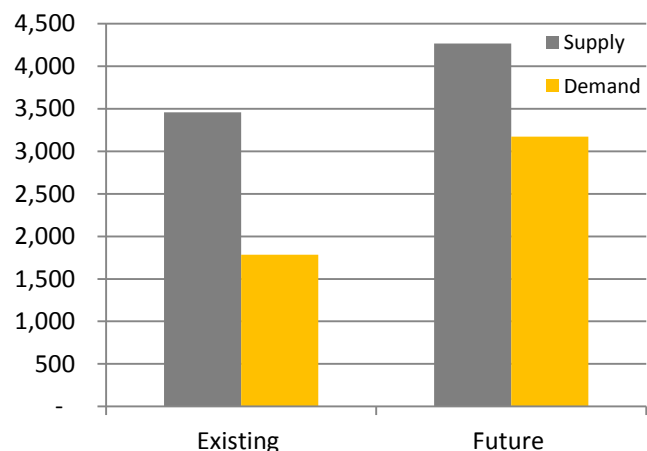
As shown in **Figure 19**, there is currently a surplus of 2,148 spaces during the peak weekday period in the entire Wheaton PLD area. This surplus of parking is projected to decrease to 1,078 spaces once the commercial vacancy reaches 10% and the two developments are constructed.

As shown in **Figure 20**, there is currently a surplus of 1,672 spaces during the peak Friday evening period in the entire Wheaton PLD area. This surplus of parking is projected to decrease to 746 spaces once the commercial vacancy reaches 10% and the two developments are constructed.

**Figure 19: Existing and Future Weekday Peak Parking Supply and Demand**



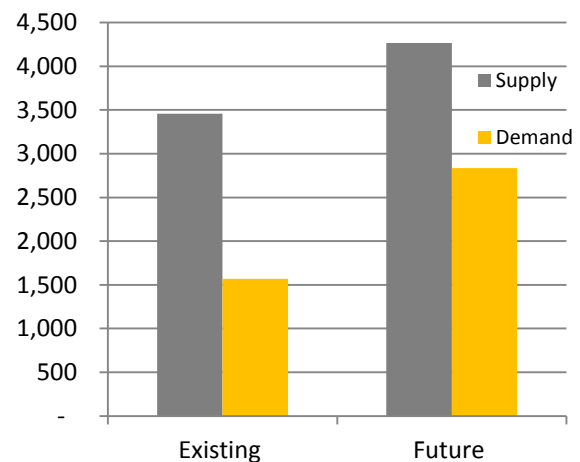
**Figure 20: Existing and Future Friday Evening Peak Parking Supply and Demand**



As shown in **Figure 21**, there is currently a surplus of 1,886 spaces during the peak weekend period in the entire Wheaton PLD area. This surplus of parking is projected to decrease to 1,082 spaces once the commercial vacancy reaches 10% and the two developments are constructed.

An analysis of the future surplus/deficit of parking by block was performed to give a better understanding of any deficits of parking in certain areas within the Wheaton PLD. This analysis considers both the absorption of vacant commercial space and the two future developments. Since the parking demand generated by absorbed commercial space will be primarily served by private parking associated with these buildings, the private parking inventory and utilization were considered as part of the surplus/deficit analysis. The analysis does not consider the parking inventory or demand from existing residential properties in the Wheaton PLD. A 90% practical capacity factor was applied except for the Ava Wheaton residential project and the residential component of the Wheaton Redevelopment Project. The results of the future parking surplus/deficit analysis by block for both public and private off-street and on-street parking in the Wheaton PLD is provided in the **Appendix**. **Figures 22 through 24** show the parking surplus/deficit per block on a weekday, Friday evening and Saturday, respectively. The private parking supply in Block 21 was not included in the analysis since it is intended exclusively for the private businesses employees and customers, and can't be used by the Wheaton Redevelopment Project.

**Figure 21: Existing and Future Weekend Peak Parking Supply and Demand**

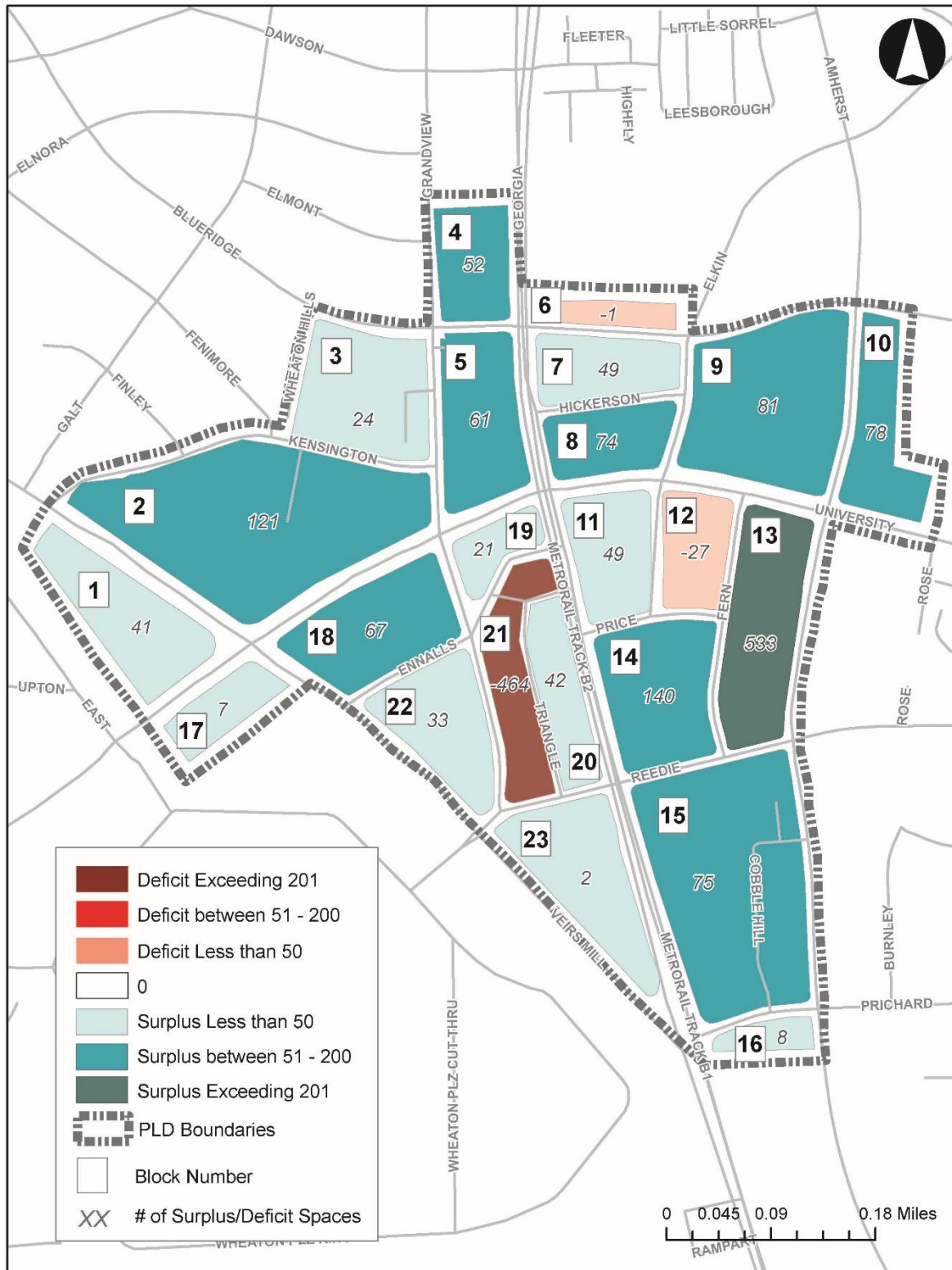


**Figure 22** shows the projected parking surplus/deficit by block during a peak weekday period (1:00pm). Based on the analysis, three blocks (6, 12, and 21) are projected to have a deficit of parking. The greatest deficit is 464 spaces in Block 21, where the Wheaton Redevelopment project is proposed. The projected deficit of 27 spaces in Block 12 could potentially be effectively supported by Garage 45, which is adjacent to Block 12.

**Figure 23** shows the projected parking surplus/deficit by block during a peak Friday evening period (7:00pm). There is a projected deficit of parking on five blocks (6, 12, 20, 21, and 22) within the Wheaton PLD. There is a total projected deficit of 86 spaces between Blocks 20 and 22. There is a projected deficit of 66 spaces in Block 21, but there is a surplus of 59 spaces in the Wheaton Redevelopment Public Garage. The deficit is related to the residential portion of the project. The surplus of public parking could support some of the projected deficits at Blocks 20 and 22, however there would continue to be a deficit of 27 spaces. Again, the deficit of parking at Block 12 could effectively be retained in Garage 45.

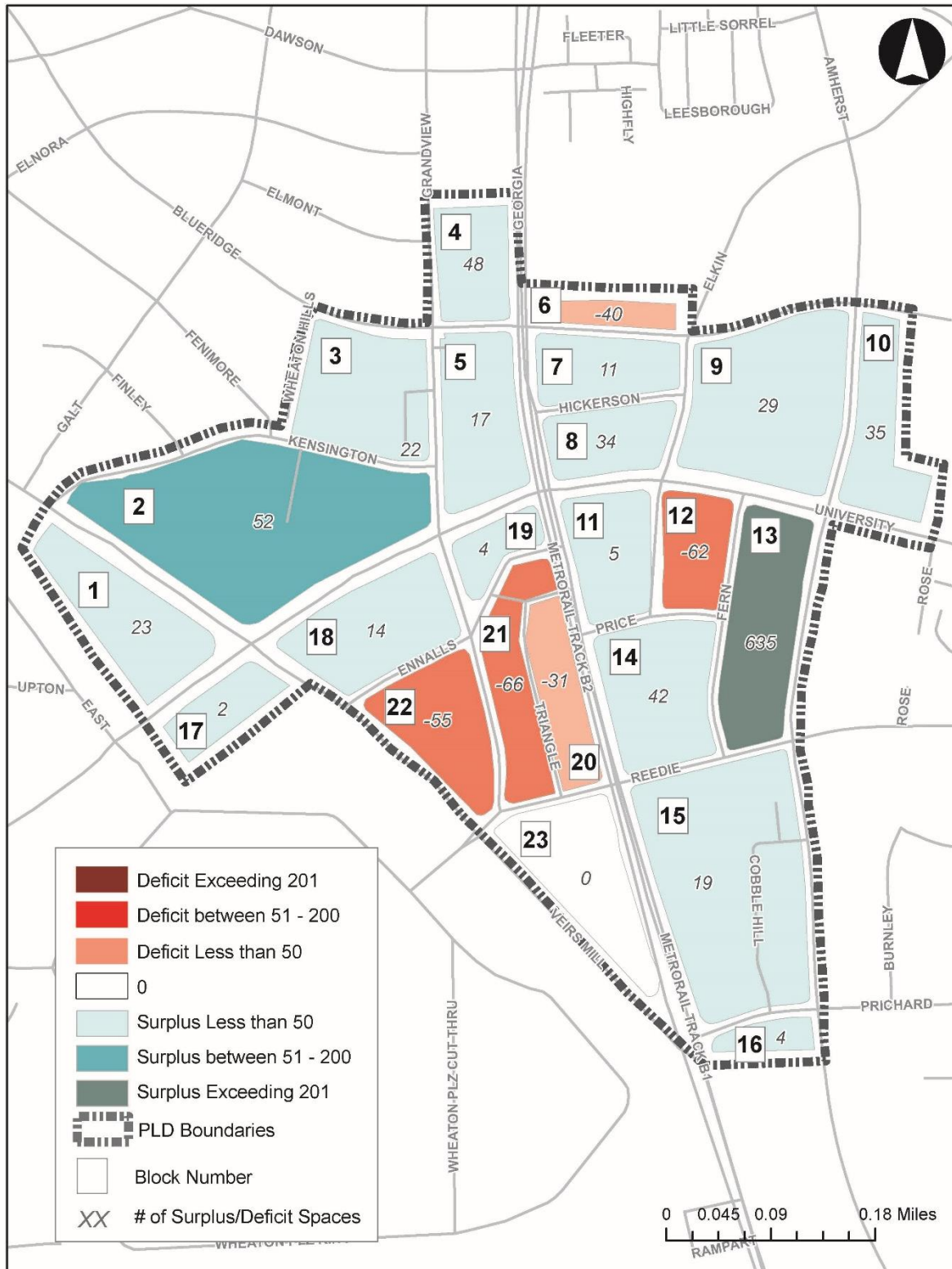
**Figure 24** shows the projected parking surplus/deficit by block during a peak weekend period (8:00pm). There is a projected deficit of parking on four blocks (6, 12, 20, and 22). The surplus of parking available in the public portion of the Wheaton Redevelopment Garage could effectively support the deficit on Blocks 20 and 22. Garage 45 could effectively support the deficit of parking on Block 12. The deficit of parking on Block 6 represents visitors to the Ava Wheaton residential project. These visitors will likely have to use parking in Lot 14, on-street, or any visitor parking provided on-site of the project.

**Figure 22: Future Weekday Peak Hour (1:00pm) Surplus/Deficit of All Public and Private On- and Off-Street Parking by Block**





**Figure 23: Future Friday Evening Peak Hour (7:00pm) Surplus/Deficit of All Public and Private On- and Off-Street Parking by Block**





**Figure 24: Future Weekend Peak Hour (8:00pm) Surplus/Deficit of All Public and Private On- and Off-Street Parking by Block**

