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An Exploratory Study of Parking in a Lexington Neighborhood

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An Exploratory Study of Parking in a Lexington Neighborhood

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“If it is feasible to establish a market to implement a policy, no policy-maker can afford to do without one.” J.H. Dales

Executive Summary

This study looked to test parking utilization rates in the Linden Walk, Aylesford Place and Transylvania Park (300 Block) neighborhood, while also studying resident perceptions of parking. It was concluded that Transylvania Park’s Residential Permit Parking resulted in underutilization of parking, while Linden Walk and Aylesford Place’s free on-street parking resulted in overutilization of parking due to spillover from the University of Kentucky. The purpose of the study was to determine if Lexington-Fayette Urban County Government should invest the resources to conduct an official parking study of the aforementioned Lexington neighborhood.

A comparison of research findings from this neighborhood against industry parking standards and Lexington’s requirements for a parking study, indicates that an official parking study would be a reasonable use of local parking management resources; however, because not all areas of Lexington were evaluated there is no claim made that this is necessarily the *best* use of local parking management resources. This research indicates that Linden Walk and Aylesford Place experience overutilization of on-street parking during peak hours (8 a.m-5 p.m) and that Transylvania Park (300 Block) experiences underutilization of parking at all times, when compared to the industry’s efficient utilization standards of 85-90% occupancy. Linden Walk and Aylesford Place were also compared to Lexington’s utilization standards for a Residential Permit Parking district of 75% overall utilization with at least 25% non-resident contribution standards. It was determined that both streets exceed the 75% peak

occupancy threshold but only Aylesford Place had a non-resident occupancy level above 25%, with non-residents accounting for 32% of the occupancy during peak hours.

Introduction & Research Question

This study commenced as an attempt to investigate anecdotal complaints regarding mismanagement of parking in the Linden Walk, Ayelsford Place and Transylvania Park (300 Block) neighborhood in Lexington, KY during the hours of peak parking demand by commuters at the nearby University of Kentucky campus. Linden Walk and Ayelsford Place have free on-street parking, while Transylvania Park (300 Block) is regulated as a Residential Permit Parking (RPP) district. This study was intended to evaluate on-street parking utilization rates in the Linden Walk, Ayelsford Place and Transylvania Park neighborhood and determine if they how they compare to indicators of acceptable parking management. Further, this study attempts to explore resident perceptions of parking availability and to gauge their potential support for a new parking regulation. Finally, an estimate of resident vs. non-resident curb utilization rates were derived and compared against Lexington’s criteria for initiating an official parking management study.

Historical Overview of the Economics and Regulation of Parking

Charging for available parking is not a new concept. In 1935 Oklahoma City installed the “Park-O-Meter No.1” in their downtown. (History.com) According to Auto-Evolution.com,

“As elsewhere across America, the city was faced with congestion and economic problems, both caused, ironically, not by the vehicles themselves, but by the fact that most of them were parked during the day. The fact that people who worked in any given area of the city left the cars parked all day long caused, for one, problems for merchants in the city. They were losing money because other customers, having nowhere to park, moved along without visiting the merchants’ stores.”(Auto-Evolution.com)

As the percentage of motor vehicles to U.S residents continued to grow throughout the 20th century from roughly 41% in 1960 to 76% in 1990 (U.S. Department of Transportation), some cities began to use creative methods to manage parking. One policy that has been tried by some parking management authorities is the creation of Parking Benefit Districts (PBD), a type of managed parking district.

Initially utilized in commercial areas, one such program began in Pasadena, CA in 1993. Old Pasadena created a Parking Meter Zone (PMZ) that uses parking meter revenue to finance public improvements in the metered area. (Shoup) Further, “Old Pasadena had no parking meters until 1993, and curb parking was restricted only by a two-hour time limit. Customers had difficulty finding places to park because employees took up the most convenient curb spaces, and moved their cars every two hours to avoid citations.”(Shoup) Of key importance is the fact that these revenues were used to fund public improvements in the area. In order to create parking turnover, the meter prices were set based on demand. Building on this concept of regulating parking, cities have attempted to manage spillover in some residential areas as well.

The balance between residents and commuters in residential spillover zones, in which residents are given parking preference and non-residents purchase excess space at market rates is one form of Managed Parking/(Performance Pricing). In general,

Managed Parking is a policy that attempts to create a balance among parking users by managing parking demand by charging free market rates. Some cities, such as Boulder, CO have attempted this type of program (Attachment A). However, this type of managed permit parking has grown out of a program called the Residential Permit Parking (RPP).

Charging for residential parking began in 1972, when Arlington County, Virginia enacted the first Residential Permit Parking (RPP) district in the U.S, after the General Assembly of Virginia passed legislation, enabling local governments to issue residential parking permits. The program was put in place to provide residents in residential areas relief from heavy daytime commuter parking spillover. (Arlington Environmental) According to Arlington County.gov, “Only neighborhood residents with County issued permits and their visitors may park on these streets during restricted parking hours; drivers without zone permit stickers, FlexPass or a short-term visitor pass risk ticketing and towing.” Although this program’s constitutionality was challenged in 1977, its constitutionality was upheld and the program has grown to serve 23 zones and over 6,000 residences. (Arlington Residential Permit Parking) While nearly identical programs have begun across the country since the late 1970s (including an RPP in Lexington, KY), some programs have attempted to find a balance between the needs of residents and non-resident commuters, as will be discussed in greater detail later in this document.

Residential Permit Parking (RPP) Lexington, KY

Program History: First enacted in Lexington in 1990, the RPP aimed “to address negative impacts neighborhoods can experience as a result of too many non-resident vehicles using local streets for parking.” (LexPark) It now has designations in twenty-seven (27) neighborhoods in Lexington. For the purpose of this document, Transylvania Park (300 Block) is the relevant RPP in consideration. According to Lexington’s Code of Ordinances, an RPP ensures that “no person shall park a vehicle in any such space so designated for more than the time period specified on such signs, unless the vehicle displays a parking permit authorized by that resolution.”(Lexington Code of Ordinances)

Presently, Lexington’s RPP is enforced by the Lexington-Fayette Parking Authority (LFCPA) dba. LexPark. This agency has enforced Lexington’s on and off-street parking services since July 1st, 2008, pursuant to parking management contracts with the Lexington-Fayette Urban County Government (LFUCG). According to their website, LexPark’s mission is to provide, maintain and operate adequate, high-quality, customer-focused public parking and encourage economic growth for the benefit of the residents, businesses and visitors of Lexington-Fayette County. (LexPark)

Requirements to Petition a Parking Study:

Before an RPP can be implemented, an official study of the proposed restricted area must be requested. A minimum of 65% of owners/residents must sign a study petition on the street or block in question. The study normally takes between six and eight weeks to complete and includes an assessment of parking in the area at various times and under various conditions.

Program Implementation:

1. The RPP program requires that a minimum of 75% of spaces are occupied during peak hours, while at least 25% are occupied by non-residents of the area.
2. The time the study will take place will vary but will take into consideration the major traffic generators potentially causing parking congestion. Different times and days of the week will be included in the study to give a feel of the impact non-resident motorists have on the area in question.
3. Once a study and the resulting report have been completed, LexPark reports findings to the Council Services Committee, which meets on the first Monday of every month. It is at this meeting where a decision is made to deny or implement a Residential Parking Permit District. All affected neighbors are contacted before the meeting to insure that they have a chance to speak on the issue if so desired.

(Lexington Code of Ordinances)

Fee Structure: At present in Lexington, the fee is \$10.00 for an annual residential permit, which is valid from August 31st-September 1st.

Permit Distribution: Two resident permits are allowed to each household, including renters and homeowners in an RPP district.¹ Two free guest permits are also issued for each household and are valid for thirty days.

Economics of Parking

¹ There are instances where residences with high levels of off-street parking are excluded

Generally, in Lexington, KY, on-street curbside parking space in residential neighborhoods is a public good, albeit, a potentially congestible public good if there are no meters. A public good is a good that is non-rival and non-excludable in consumption. (Rosen)

A non-rival good is a good that once produced, can be consumed by an additional consumer at no additional cost. (Holcombe) For example, Person A can park in Space X for 1 hour. Further, Person B can then park in Space X after Person A exits. Person A's consumption of Space X did not eliminate Person B's ability to consume Space X, albeit at a later time. With the exception of most residential on-street parking (non-RPP districts) in Lexington, most Lexingtonians can consume on-street parking, with relative ease.

Non-excludability means that users cannot effectively be excluded from using the good. In essence, one does not have to pay for the good in order to derive utility (nominal fees aside). In Lexington, a commuter student from Nicholasville may drive into Lexington and park in a (non-RPP district) curbside space in a residential neighborhood, and they are legally allowed to do so. They are allowed to consume this parking good, despite the fact that they do not pay the taxes associated (directly or indirectly) with the production, maintenance or delivery of said public good.

According to Nolan Miller, "Private goods are goods where consumption by one person prevents consumption by another, and one person has the right to prevent the other from consuming the object." (Miller) As is the case with Lexington's Residential Permit Parking ordinance, neighborhood residents of a Residential Permit Parking

district are granted the right to exclude non-residents from consuming neighborhood parking, thus creating exclusion. Conversely, free on-street parking in highly congestible areas enables select users to park for unlimited amounts of time, subsequently creating rivalry.

Parking in Lexington Near the University of Kentucky

In residential areas near heavy traffic generators, like the University of Kentucky, and downtown commercial areas, parking demand can exceed parking capacity and parking spillover can flow into nearby neighborhoods, which can lead to congestion in demand for parking. If demand for curb parking is too high, the area can become congested, and consumption becomes rivalrous. According to Donald Shoup,

“Parking should be free when occupancy is less than 85% at a zero price because it is then a public good in the sense that the cost of adding another user is zero. But when demand increases, the public good becomes crowded, it takes time to find a vacant space, and the marginal cost of adding another user increases.”

(Shoup)

If a good becomes congested, other users become effectively excluded from utilizing the good. As large parking generators drive up vehicular traffic and parking demand, users will look for free on-street parking in neighborhoods close to their final destination. If select parties are over-utilizing a good without paying a higher cost, they are free-riding. This is seen as inefficient and is not an equitable allocation, as select users are able to claim and hold curb spaces for many hours.

Generally, most individuals exhibit rational choices to maximize personal utility and sometimes, this comes at the expense of others. According to Litman, “If on-street parking is free or inexpensive, motorists will cruise around looking for an available space rather than paying for off-street parking, resulting in parking and traffic congestion, and inefficient utilization of off-street facilities.” (Litman) This overutilization has led to the implementation of Residential Permit Parking (RPP) in Lexington, as it works to quash the spillover problem and subsequent overutilization in select areas. In the study area, Transylvania Park maintains an RPP district, while Linden Walk and Aylesford Place maintain free on-street parking. Please see the study area below:

Parking Study Area



Legend

Parking Study Area

- University of Kentucky Boundary
- Free On-Street Parking (Parking on two sides of street)
- Free On-Street Parking (Parking on one side of street)
- Residential Permit Parking Only
- Residential Permit Parking Only

0 205 410 820 Feet

Lexington’s Residential Permit Parking Program Could Be Exclusionary

The RPP program has mainly served to address issues in the downtown and University of Kentucky area.”(LexPark) The program aims to mitigate the “free-rider” problem² caused by parking spillover from large traffic generators. Lexington’s RPP

² A free-rider is someone that enjoys the personal benefits of a good without bearing the cost, allowing other parties to bear the majority or total burden of associated costs

prevents non-residents (Lexington-Fayette taxpayers and non-taxpayers) from parking in a designated area.

Lexington's RPP program, enacted in 1990, has grown to include twenty-seven districts. While this program generally prevents non-residents from over-utilizing the curb space/free-ride, it has the potential to polarize residents vs. commuters, as it enables only residents to utilize the curb space and, consequently, enables residents to exclude potential parkers, and free-ride themselves. It appears to be poor policy to implement Residential Permit Parking districts in areas where underutilization would result.

This program takes perceived "free on-street" parking, and excludes select groups from consumption. The parking is free in the sense that there is no marginal cost associated with consumption. There are significant costs associated with production and maintenance that are offset through tax revenues. Thus, it merely enables only residents to consume parking, while others bear the burden of street, curb, and general maintenance and enforcement (sometimes fees cover enforcement). This program may be successful in protecting residents' interests but does not attempt to balance the parking needs of various community members.

By excluding non-residents from parking in this area, the parking spillover problem is ignored and the RPP merely treats a "symptom"³. Subsequently, the spillover problem is not solved, rather, nearby neighborhoods with free on-street parking may absorb the resulting spillover and negative impacts deflected by the nearby RPP. According to the

³ Neighborhood residents suffer from the negative impacts of the parking spillover

Transit Research Administration, “Over the long run, there is a risk that parking pricing implemented in one area and not in surrounding areas may encourage a shift to destinations that do not charge for parking, or where rates are more favorable.” (Transit Research Administration) In addition, there are even fewer parking options available, which may lead to a cyclical process of mismanagement. In essence, RPP implementation can lead to greater congestion in free parking areas, while the RPP area remains under-used. Pursuant to observations, mismanagement appears to exist within the Linden Walk, Aylesford Place and Transylvania Park neighborhood, when compared to industry standards.

C. Research and Methods

On-street parking is generally considered a public good, when peak occupancies are at or just below 85-90%. According to the Metropolitan Area Transportation Council, “Occupancies of 85-90% or just below are ideal - the demand is being met without waste. High occupancies in one area combined with lower occupancies nearby indicate a parking management problem - you need to figure out how to get some of the excess demand to use the nearby available supply (lack of knowledge of nearby spaces or restrictions on who can park there are two examples why demand and supply don't match up).” (Metropolitan Area Planning Council) Generally, industry practice suggests that 85% occupancy is the standard benchmark for gauging utilization. For the purposes of this study, rates below 85% were considered underutilized, rates at 85-90% were considered occupied, and rates above were defined as over-occupied.

Externalities Caused by Mismanagement

There are costs associated with congestion caused by vehicular traffic. Below are some examples of the externalities that can occur when parking management leads to additional vehicular traffic.

- **Indirect User Costs**-Land and building costs go up if more off-street parking is needed. Increased road wear can occur on residential roadways that are not built for high volume traffic.
- **Environmental**- Congestion can increase ground level ozone and release other pollutants into the air.
- **Social** (Center for Policy Research) - Increased congestion can lead to hazards for pedestrians and bicyclists. Space hunting can become prevalent as drivers search for free parking. Blocked driveways and illegal parking can also become issues if parking areas are over crowded.

Lexington, KY's On-Street Parking Space Measurement (Marking)

Pursuant to a telephone conversation with Mr. Robert Fraser, an engineer with the Lexington-Fayette Urban County Government's (LFUCG) Department of Traffic Engineering, parking space requirements were determined. Mr. Fraser explained that LFUCG engineers leave on-street parking spaces "unmarked" or unmeasured until a formal neighborhood request is made to "mark" or measure the spaces. According to Mr. Fraser, a residential parking space is defined as 20 feet long.

How does one determine if a space meets the threshold? If a space is, “19 ft long”, it is generally at the discretion of an engineer to make the judgment. If an area is in a commercial district, or in an area that has high demand, engineers may be more flexible. Further, the lower-end cutoff tends to be at a “couple feet” below 20 feet (Fraser) For this study, a useable parking space was assumed to be no less than eighteen feet and six inches.

D. Study Design

This study was intended to examine on-street parking utilization rates in the Linden Walk, Ayelsford Place and Transylvania Park neighborhood and determine if they were functioning as public goods. Further, this study attempts to explore resident perceptions of parking access and to gauge residents’ potential support for controlled parking. Finally, resident vs. non-resident curb utilization rates were compared to Lexington’s criteria for initiating an official parking study.

Lexington’s Residential Permit Parking & Study Design

As was discussed above, utilization rates were benchmarked against industry standards of 85-90% utilization. In addition, legal parking spaces were determined, subsequent to a conversation with an LFUCG engineer. If a particular street was found to experience under or over-utilization, they were then compared to Lexington’s requirements for initiating an official parking study.

According to LexPark, “In order to begin the process of determining whether a street is a good candidate for a Residential Parking Permit District, a petition must be signed by a minimum of 65% of the property owners/residents on the street or block in question.” (LexPark) As capstone projects are to remain neutral, it was not appropriate to attempt organize a petition drive. Therefore, a survey was constructed that attempted to gauge residents’ perceptions about parking. Two questions from the survey provide the basis for correlating residents’ likelihood of signing a petition that would request government action to address neighborhood parking problems.

1. Do you experience problems finding on-street parking during the school year? Yes/No
2. Would you support an effort that “reserves” a portion of your neighborhood’s on-street parking spaces for non-residents who pay a fee? Yes/No

Next, in order to determine if an RPP is appropriate, “LexPark’s study complies with guidelines as stated in Resolution 168-90.” In short, it requires that a minimum of 75% of the parking spaces on the street in question be occupied with at least 25% of the occupied spaces being utilized by non-residents of the area.”(LexPark) LexPark normally collects license plate data to determine if the address of the vehicle’s owner falls within or outside the area in question in order to estimate resident vs. non-resident utilization rates.

Due to the fact that this study must comply with Institutional Review Board (IRB) confidentiality requirements in order to be reasonably expedited, the author has taken an alternative approach. In order to estimate utilization rates of residents vs. non-

residents, data on the number of cars parked in each neighborhood were collected during peak and non-peak parking hours in February and March. Peak hours were determined by the University of Kentucky's Human Resources Policy and Procedure Number 70.0: Attendance/Hours of Work schedule of 8:00 a.m-5:00 p.m (Monday-Friday) (University of Kentucky Human Resources).

It was assumed that the difference between peak and non-peak parking was the difference between non-resident and resident parking utilization. This was tested using a regression, controlling for observations, as it was not feasible to match license plates with local residents' addresses. Further, these observed rates were compared with industry standard rates to determine if over-or under-utilization occurred. Finally, the rates were also benchmarked against Lexington's 75%/25% study requirement levels. Binomials were used to determine if the observations met the aforementioned thresholds. (=if(x>"Y", 1,0))

Due to the lack of sufficient observations recorded with the survey, the survey results are merely listed and discussed as a potential indication of resident interest. No claim is made about their reliability.

Data Collection

The data collected for this study were gathered from three primary sources. First, automobile counts were taken to measure curb utilization rates on each street of the Linden Walk, Ayelsford Place and Transylvania Park (300) Block neighborhood. A survey was distributed on each street of the aforementioned neighborhood. Finally,

measurements were made on the neighborhood roadways in order to approximate the number of legally allotted parking spaces.

Auto-Counts

The automobile counts were taken both systematically and randomly. First, convenience counts were randomly made throughout the month of February during peak and non-peak hours. A total of ten (10) counts were made, during peak and non-peak hours that captured Monday-Friday throughout the month. Five (5) peak counts were made Monday-Friday and five (5) non-peak hour counts were also made to capture occupancy rates on Monday-Friday. These counts totaled 30 observations. These counts did not occur in any particular order. The method was purely random and was based on the survey taker's ability to make the necessary trip to the survey site.

The second set of auto-counts, were taken in a systematic fashion. From Friday, March 23rd through Thursday, March 29th, a peak and non-peak count were taken each day. The survey-taker drove to the streets and recorded the number of automobiles parked on each street. This number was then logged, along with the date and time of collection and rounded to the nearest fifteen-minute interval. The data were collected in this manner so as to attempt to closely approximate the difference between peak and non-peak demand for each day. The second set of counts, were made in a systematic manner, recording peak and non-peak observations on the same day for five consecutive days. These counts totaled 30 observations. In all, 60 auto count observations are documented.

On-Street Parking Supply

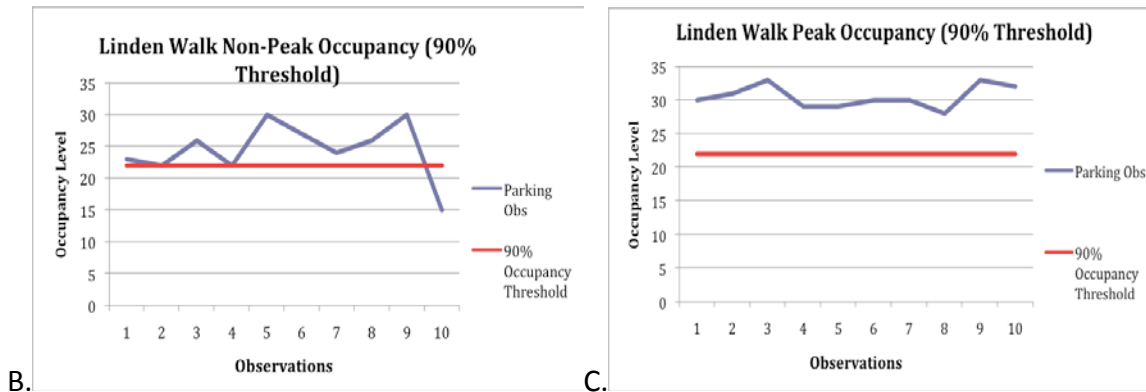
The curb parking supply was determined using LFUCG's standard of twenty-foot space increments, in a process called marking. Using a tape measurer, each street's parking spaces were measured on three different days, in daylight. The cutoff point for spaces was made at the limit of eighteen feet and five inches as this is the rounding point before a "couple feet".

Pursuant to a conversation with Robert Fraser, an LFUCG engineer, a couple feet were determined to be the rough measure of a cutoff. In essence eighteen feet and six inches was the cutoff for a space. It was determined that there were twenty-four usable parking spaces on Linden Walk, forty-two spaces on Ayelsford Place and thirty-seven spaces on Transylvania Park (300 Block). In general, on-street spaces are left un-marked until the community requests a formal marking. According to Mr. Fraser, this ensures that more cars can fit on a street.

E. Findings

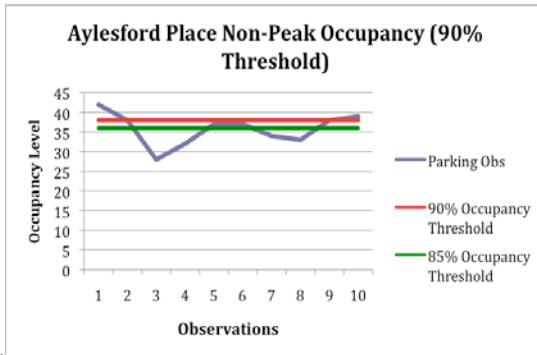
Street Comparisons to the Industry Standard (85-90% Threshold)

Linden Walk appears to experience overutilization during both peak and non-peak hours.

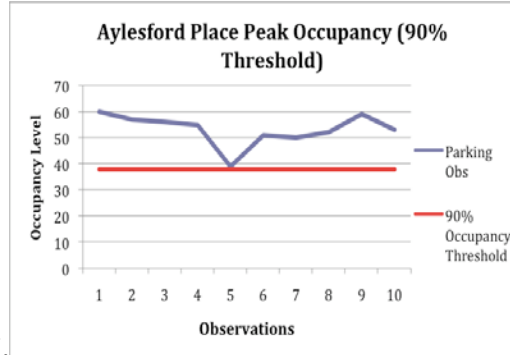


The lower and upper bounds of Linden Walks’s 85-90% threshold are 20 and 22 autos, respectively, with a total parking market of 24 spaces. On average, Linden Walk has a non-peak hour occupancy of 25 automobiles. The average of 25 autos equates to an occupancy rate of about 104% or 25/24 during this period. Further, Linden Walk experiences even greater overutilization of on-street parking during peak hours. As chart B demonstrates, all 10 LW observations during peak hours showed utilization levels above the 90% threshold. In addition, Linden Walk’s peak utilization average was 31 autos, resulting in a utilization rate of $31/24= 129\%$. Occupancy rates can be higher when one accounts for various vehicle sizes and automobiles parking illegally. It should be noted that LW’s occupancy rates appear to be driven mostly by residents, according to the definition assumed for this study that non-peak hour parkers are residents. A regression is reported later in this document that tests the difference between resident and non-resident utilization rates.

In general, Aylesford Place appears to have properly functioning on-street parking during non-peak hours. However, this roadway becomes congested and over-utilized during peak hours.



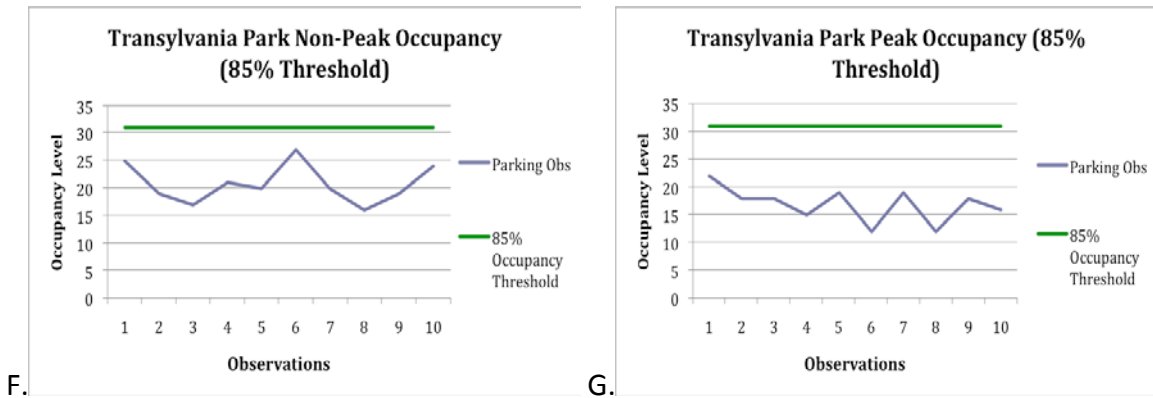
D.



E.

The lower and upper bounds of Aylesford Place’s 85-90% threshold are 36 (35.7) and 38 automobiles, respectively, with a total parking market of 42 spaces. On average, Aylesford Place has a non-peak hour occupancy of 36 automobiles. The average of 36 autos equates to an occupancy rate of about 86% or 36/42 during this period. While Aylesford Place appears to have properly functioning levels of occupancy during non-peak hours, as shown in Chart D, Aylesford Place experiences overutilization of on-street parking during peak hours. As Chart E demonstrates, all 10 Aylesford Place observations during peak hours showed utilization levels at or above the 90% threshold. In addition, Aylesford Place’s peak utilization average was 53 autos, resulting in a utilization rate of $53/42= 126\%$.

Transylvania Park appears to experience underutilization of on-street parking during non-peak and peak hours.

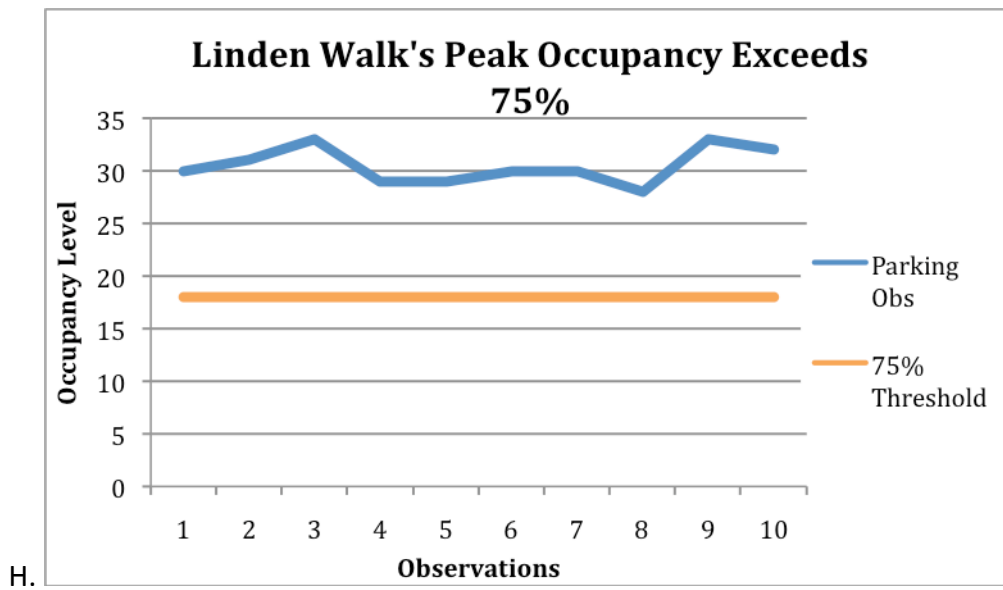


The lower and upper bounds of Transylvania Park’s 85-90% threshold are 31 and 33 spaces, respectively, with a total parking market of 37 spaces. On average, Transylvania Park has a non-peak hour occupancy of 21 automobiles. The average of 21 autos parked equates to an occupancy rate of about 57% or 21/37 during this non-peak hour period. It should be noted that parking rates in Transylvania Park during non-peak hours are higher than during peak hours, due to residents’ commuting out of the neighborhood for work and nonresidents being prohibited from using the vacated spaces. Non-peak underutilization of parking in the area is about 12 automobile spaces. This may be an opportunity to allow non-resident demanders to park while these residents have left the district. Further, the utilization rates decrease on average in the Transylvania Park area during peak hours to a level of 17/37= 46%. On average, this is an underutilization of roughly 45% (14/31), as 17/31=55% leaves 14 potential spaces unoccupied during peak hours. Chart F shows that non-peak rates are considerably below the 85% occupancy rate. Chart G shows that Transylvania Park’s peak occupancy rates are below the 85% threshold.

Findings/How Do Linden Walk and Aylesford Place Compare to Lexington's RPP Study

Criteria?

Linden Walk exhibits peak occupancy levels that meet Lexington's 75% total occupancy level but non-residents (according to the definition assumptions in this study) do not appear to account for 25% of their occupancy rates. Linden Walk does not meet the criteria to implement an official RPP study, based on the congestion levels.



It should be noted that Linden Walk experiences overutilization during non-peak hours as well, with only residents parking. Linden Walk's occupancy rates were 104% and 129% for non-peak and peak occupancy periods, respectively. Residents alone occupy well over 90% of the spaces on the street. All 10 Linden Walk peak observations were above Lexington's threshold of 75% (18 automobiles) occupancy, as shown in Chart H.

The difference between peak and non-peak parking (assumed to be non-resident and resident) occupancy was $31-25=6$ on average. Therefore, the non-resident contribution to congestion appears to be roughly $6/31$ (Linden Walk Peak Average) = 20%, on average. Lexington requires that at least 25% of the congestion be caused by non-resident parking to initiate an RPP.

Further, a regression was performed, controlling for each street. It was found that days of the week do not matter and there is a significant difference between resident and non-resident parking of six vehicles. Therefore, it is clear that these rate differences are not merely random occurrences. During peak hours, after 20 observations, the model shows that an average of six additional automobiles were parked on Linden Walk. This occurs with a P of <0.01 , indicating that there is a significant chance that this would occur again with repeated observations. It is not merely a chance occurrence to find this result. However, this difference is not large enough to constitute 25% of the congestion. The dependant variable used were the parking rates, while the independent variables included days of the week, location and peak hours.

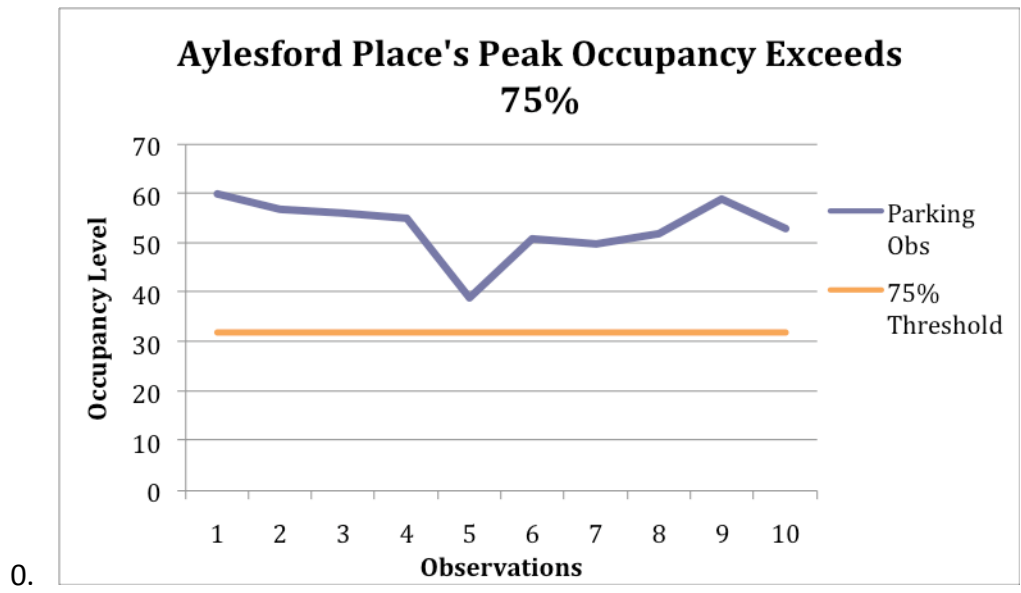
Linden Walk

VARIABLES	(1) parking
Tuesday	-0.750 (1.108)
Wednesday	0.750 (1.456)
Thursday	1 (2.113)
Friday	-1

peak	(3.407)
	6***
Constant	(1.650)
	24.50***
	(1.330)
Observations	20
R-squared	0.503

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Aylesford Place exhibits occupancy levels above the 75% threshold and non-residents appear to account for 32% of AP's occupancy rates during peak hours (avg peak 53)-(36 avg non-peak)= 17; 17/53=32%). Aylesford Place's peak occupancy level observations were all above the 75% threshold. On average occupancy rates were 126% or 53/42 during peak hours.



On average, the non-residents' occupancy appears to meet the 25% threshold, as non-residents account for 32% or 17/53 of total occupancy during peak hours. Further, after a regression was performed, it was found that there is a significant

difference between resident and non-resident parking of 17 vehicles. Therefore, it is clear that these rate differences are not merely random occurrences. The difference between peak and non-peak parking is significant at 17.4 automobiles. The associated p is as follows: $p < 0.01$. We can be 95% confident that this result is likely to occur again with repeated attempts. The dependent variables used were the parking rates, while the independent variables included days of the week, location and peak hours. The model and results are as follows:

Aylesford Place	
VARIABLES	(1) parking
Tuesday	-2.750 (2.795)
Wednesday	-5.250 (3.172)
Thursday	-1.500 (3.020)
Friday	-5.500 (4.661)
peak	17.40*** (2.332)
Constant	38.80*** (2.295)
Observations	20
R-squared	0.808

Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Findings and Transylvania Park (300 Block)

Transylvania Park (300 Block) exhibits a significant difference between peak and non-peak hour utilization. The key finding in these observations is the fact that there are

significantly fewer users in the parking district during peak UK demand hours. During peak hours, there are four (-3.9) less users parking on the street. The associated p is as follows: $p < 0.05$. We can be confident that this occurrence is not merely a chance occurrence, as this value suggests that repeated attempts are likely to render a similar result. The dependent variables used were the parking rates, while the independent variables included days of the week, location and peak hours.

Transylvania Park	
VARIABLES	(1) parking
Tuesday	-2.500 (2.794)
Wednesday	-5.750* (3.022)
Thursday	-3.250 (2.750)
Friday	-1.750 (2.848)
peak	-3.900** (1.369)
Constant	23.45*** (2.392)
Observations	20
R-squared	0.529

Robust standard errors in parentheses
 *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Survey:

The survey was intended to examine whether residents perceive a parking problem and whether they would support an alternative parking policy that reserves some spaces for non-resident commuters who pay a fee. The survey procedure was as follows:

Procedure: The survey selection was based on a systematic sampling of every other building structure on each side of the residential roadway(s). First, there was an attempt to ring the doorbell of each home. If there was no response after 10 seconds, 5 knocks were then made. If there was no doorbell, the door was knocked 5 times. Knocking in the absence of a doorbell and other forms of contact are covered in the “Other” response category, as the survey was administered due to alternative forms of contact. The following presents the survey’s response rate. The denominator represents the individuals who were asked and the numerator represents the number of people who agreed to complete the survey. These were all attempts for the same residents. In addition, the denominator decreases as responses occur.

Transylvania Park Survey Distribution:

TP	Attempt 1	Attempt 2	Attempt 3	Total TP Response Rate
Date	02/19/12 Sunday	02/21/12 Tuesday	02/23/12 Thursday	_____
Response Rate	5/14=36%	4/8=50%	1/4=25%	10/14=71%

Aylesford Place Survey Distribution:

AP	Attempt 1	Attempt 2	Total AP Response Rate
Date	02/23/12 Thursday	02/28/12 Tuesday	_____
Response Rate	6/15=40%	4/9=44%	10/15=67%

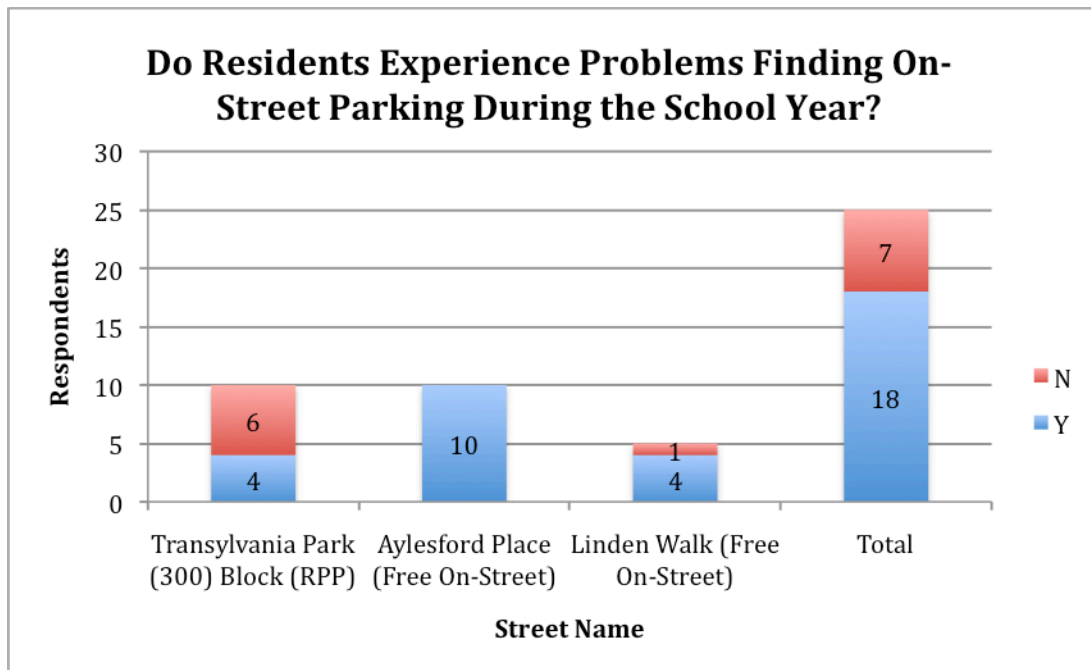
Linden Walk Survey Distribution:

LW	Attempt 1	Attempt 2	Total LW Response Rate
Date	03/01/12 Thursday	03/04/12 Sunday	_____
Response Rate	4/14=29%	1/8=13%	5/14=36%

The total response rate was 25/43=58%.

Notes: The combined response rate for Transylvania Park and Aylesford Place was 20/29=69%.

Do Surveyed Residents Report Problems Finding On-Street Parking During the School Year?



J.

In gauging the merits of a potential parking problem, a survey was distributed, with a goal of gaining a general understanding of residents' perceptions of parking in the area.

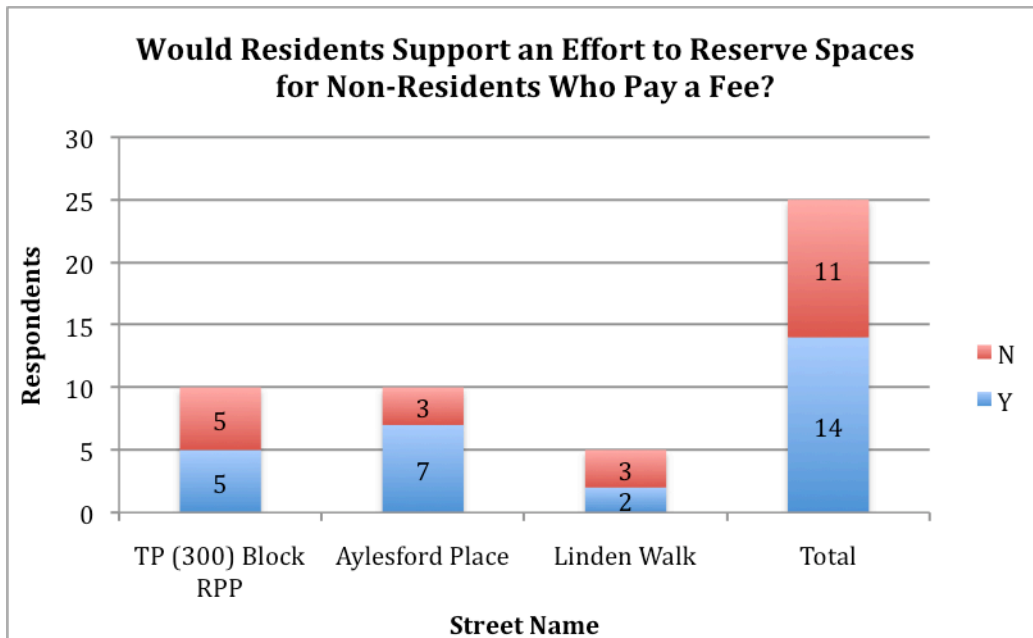
One question was: "Do you experience problems finding on-street parking during the school year?" The majority of Transylvania Park respondents (6 of 10) did not report problems finding parking during UK's school session. Respondents from of Aylesford Place and Linden Walk, frequently answered that they experienced difficulty finding on-street parking. In total, (18 of 25 respondents or 72%) expressed having had difficulty finding on-street parking during the school year.

These results may be explained partially by the demographics of those surveyed. For example, (6 of 10) respondents on Transylvania Park were homeowners. Similarly, three of the homeowners mentioned that they "worked very hard to achieve a Residential Permit Parking District". Of the six respondents that explained that they did not have an issue finding parking, four were homeowners. It is possible to infer that association with the Residential Permit Program may be associated with greater satisfaction with on-street parking availability.

Aylesford Place and Linden Walk's respondents were primarily renters, however, residing in a non-controlled on-street parking area may explain their responses more effectively. Twelve of the 15 respondents were renters. Nearly all (14 of 15) of these respondents said that they had trouble finding on-street parking. This can be contrasted with (2 of 4) Transylvania Park renters who said that they did not have a problem finding on-street parking. District affiliation seems to provide a more consistent explanation of

respondents' answers, as (6 of 7) respondents who expressed no issue with parking were in the Residential Permit Parking area. Finally, the renters who expressed dissatisfaction on Transylvania Park may have been excluded from the Residential Permit Parking, as some occupied residences are barred from joining.

Would Respondents Support an Effort That “Reserves” a Portion of On-Street Parking Spaces for Non-Residents Who Pay a Fee?



This second question was “Would you support an effort that “reserves” a portion of your neighborhood’s on-street parking spaces for non-residents who pay a fee? Yes/No”. Fifty-six percent (14/25=56%) of the 25 respondents said they would support such an effort. This neighborhood support level falls well below the required petition level 65% of residents that LexPark requires for a study to begin.

However, 7 out of 10 surveyed on Aylesford Place answered in the affirmative, and this level would surpass the 65% threshold for Lexington's petition support.

Homeowners seem to have the greatest likelihood of opposing the aforementioned effort. In total, (6 of 11) respondents that answered in the negative were homeowners. Similarly, (6 of 9) homeowner respondents said they would not support this type of program.

G. Recommendations

Finding a Balance With Parking Spillover

Transylvania Park (300 Block) has underutilized parking spaces during peak and non-peak hours. I would recommend holding community meetings (inclusive of all residents/owners/renters) to help educate residents about potential benefits of Managed Parking/Performance Parking that works to maintain 85-90% curb utilization. A type of Managed Parking, known as the Parking Benefit District (PBD), could be a good path for this area. Non-resident commuters could purchase passes up to the 85-90% threshold during peak hours and share parking with residents. A Parking Benefit District earmarks these revenues back into the neighborhood for local improvements. This may provide an incentive for residents to support a policy that enables the sharing of on-street parking. This program may be a difficult "sell", as many residents appear to have taken ownership of the Residential Permit Parking district. This may be seen as the equivalent of attempting to take an entitlement away from a beneficiary.

Aylesford Place appears to be the best candidate for a Residential Permit Parking (RPP) district. First, it appears to have adequate resident (non-peak) occupancy at 86%.

In addition, non-residents may be responsible for 32% of peak hour utilization.

Community meetings with residents of this block could further determine if this type of program would be appropriate.

Transylvania Park would need to be studied further to determine if a Managed Permit would be feasible, given resident support. There are two primary pitfalls to be aware of in this policy. First, although there is room for more parking on Transylvania Park, residents on this street may be hesitant to allow non-residents to park in their neighborhood. As is disclosed in the Attachments at the end of this document, residents may be likely to support non-resident permits if they would receive some economic or public benefit. Accordingly, “curb maintenance” was the most popular choice among Transylvania Park residents, as (5 of 10) respondents expressed the need for curb improvements.

In addition, it may be logical to allow residents who are currently excluded from using on-street parking to purchase permits. Regardless, further study that promotes practices that encourage 85-90% occupancy rates (or just below) can help alleviate externalities associated with congestion pushed to nearby streets while these parking space are empty and thereby improve the entire community’s quality of life.

Linden Walk demonstrates significant overutilization in parking rates. Unfortunately, the survey size was too small to gain much insight into residents’ opinions. Linden Walk does not appear to be well-suited for a Managed Permit District, as residents occupy significant levels of space at all times. Further, the survey size was so small that even exploratory indications are inconclusive. The best policy here may be

to consider the possibility of opening both sides of the street for parking, and creating a one-way roadway. This may lead to congestion, as the area is in high demand but a Residential Permit Parking district could be used as a contingency. For example, if residents utilize an efficient number of spaces but overflow persists, a Residential Permit Parking district could be implemented.

In general, it may be reasonable to implement Residential Permit Parking districts only in areas that can occupy between 85-90% of on-street parking with only local residents. In addition, other areas that may have qualified for a Residential Permit Parking district in the past but whose residents will occupy a significant percentage of space below 85-90% of on-street parking should open their highly demanded spaces to non-residents, local businesses and other who are willing to pay a market rate. These spaces should only be sold up to the 85-90% threshold. Boulder, CO offers a Neighborhood Permit Parking (NPP) in residential areas that could be a model for the study area. See Document A in the attachments.

Study Limitations

There are a few limitations associated with this study pertaining to data collection.

To begin, I could have measured the parking spaces incorrectly. Some measurements may have been excessive and some may not have recorded enough of the anticipated space. Similarly, it is possible that a car may have been counted more

than once as the survey taker made auto counts. In addition, it is possible that an automobile was overlooked during the counting process.

The survey may have numerous limitations. For example, it is entirely possible that the un-surveyed residents may have responded differently than those surveyed. Further, some respondents may have read the questions differently from other respondents, indicating that the survey may have not done a proper job in measuring responses. Further, the survey sample size was so small, that it fails to have significant external validity.

It is possible that Linden Walk's congestion at all hours is not due primarily to residents. Night classes, convenience and other factors may affect a portion of the occupancy in this area. Although findings between peak and non-peak hours were significant, the difference is still fairly small.

Future Research

The RPP districts throughout Lexington-Fayette have significant promise in further research. Testing policy on a regular basis to ensure best practices and efficiency is a responsibility of the municipality. Further, ensuring that the potential harmful effects of particular policies are not adversely affecting other members of the community holds promise in future research.

In order to fully validate the research in this document, a full study should be commenced. Although the measurement methods disclosed in this document provide a

strong indication of actual trends, explicitly tracing license plates to local residents is a responsible procedure by which to accurately measure resident utilization rates.

Attachments

A. Boulder, Colorado Neighborhood Permit Parking (NPP)(294,567) (US Census

Boulder, CO)

Boulder, CO offers a good insight into how to implement a Managed Permit Program, given similar circumstances to Lexington, KY.

Program History: The NPP program began as an RPP in 1986, when the Boulder City Council first adopted the RPP legislation. In response to spillover parking into residential neighborhoods from the University of Colorado at Boulder and other traffic generators, the RPP gave preference to residents and local businesses located within the zone. (Boulder, CO Neighborhood Parking Permit) However, in 1997, the City approved an improved version of the RPP, the Neighborhood Permit Parking (NPP) program.

Adopted as part of the City of Boulder Transportation Master Plan, “the NPP program was developed as a tool to balance the needs of all who park on our streets, including residents, visitors and commuters.”(Boulder, CO Neighborhood Permit Parking) According to Mark Guenther from the City of Boulder, “The NPP offered: The availability of commuter permits within permit parking zones; the ability to tailor the time and duration of restrictions to meet the needs of the neighborhood; and the one time only, per day, short-term parking component.” The program has grown to include ten (10) neighborhoods, including several blocks that abut against UC Boulder property.

Program Goals:

1. Improve the balance between preserving neighborhood character and providing public access to community facilities.
2. Revenue neutral

How to Petition a Study: 25 residents must sign a petition

Fee Structure:

Resident: \$17 annually

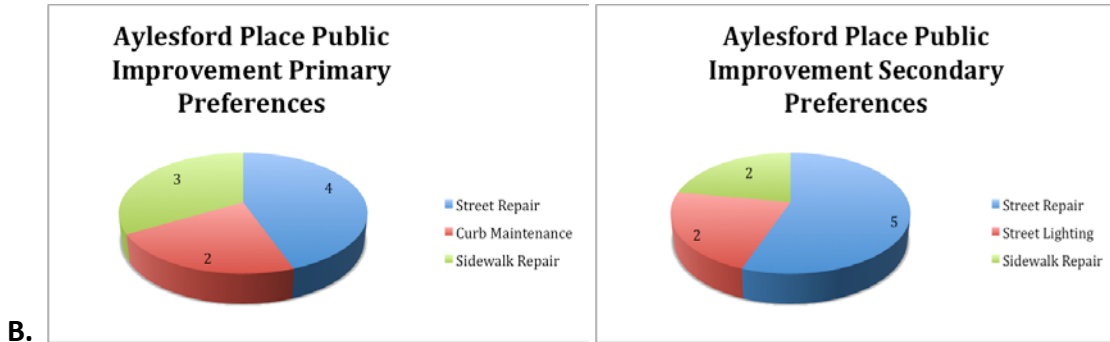
Business: \$ 75 annually

Commuter: \$78 quarterly (Distributed on blocks where occupancy rates are 75% or less and 85% or less in Goss/Grove.)

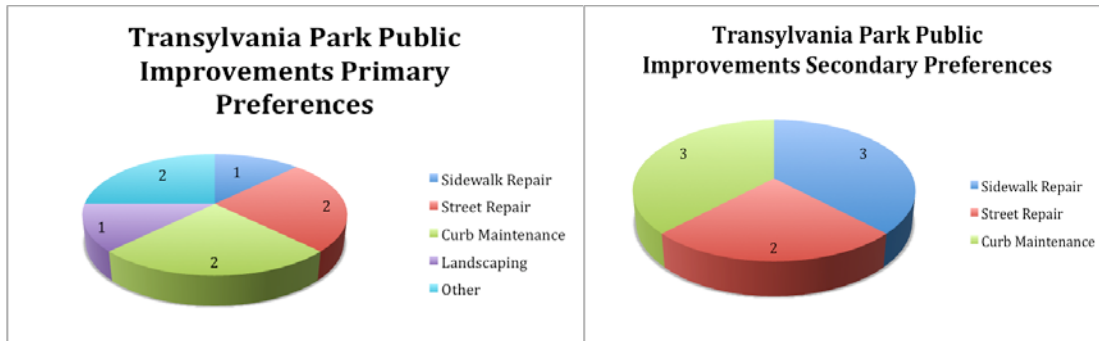
Visitors: Two free with purchase of a resident permit

Guest: Free, available upon resident request

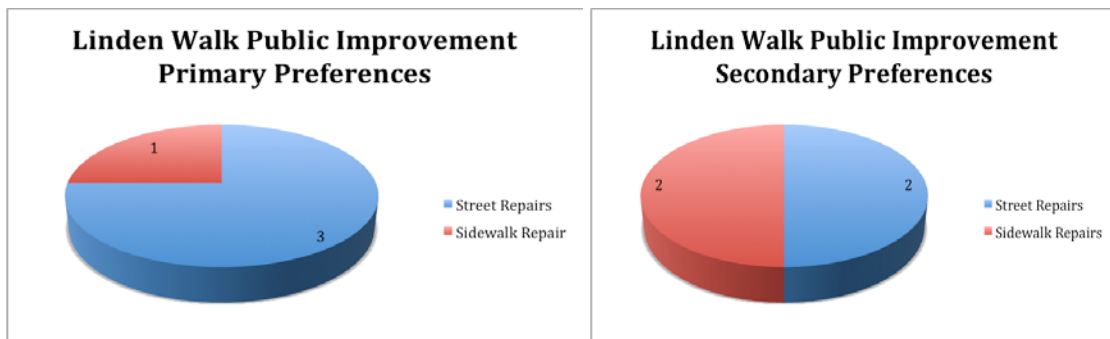
Permit Distribution: Mapleton, High /Sunset, Fairview, University Heights, East Ridge, West Pearl: 3 permits are distributed to a maximum of 3 unrelated people per unit and Columbine, Goss Grove, University Hill & Whittier: 4 permits are distributed to a maximum of 4 unrelated people per unit.



Aylesford Place Mode: Street Repair



Transylvania Park Mode: Curb Maintenance



Linden Walk Mode: Street Repair

C. LW/AY/TP

Parking Survey

Gender Male/Female

1. Are you a: Homeowner or Renter
2. Do you experience problems finding on-street parking during the school year?
Yes/No
3. How many licensed drivers are in your household? _____
4. How many automobiles are in your household? _____
5. How many off-street parking spaces does your residence offer? _____
6. Do non-neighborhood persons frequently park on your street? Yes/No
7. Do you work or study at UK? Yes/No
 - a. If yes, would you say you walk/bike/take the bus (not drive alone) to campus:
(Frequently 4 times or more per week/Sometimes 2-3per week/Infrequently 1 per week)
8. What "public" neighborhood improvement/service would you most like to see in your neighborhood?
-(sidewalk repair, landscaping, street repairs, street lighting, curb maintenance)

other: _____
9. Which improvement/service is the next most important?
-(sidewalk repair, landscaping, street repairs, street lighting, curb maintenance)

other: _____
10. From \$0-\$10 what amount would you be willing to pay for an annual on-street parking pass, if you knew that the funds would directly finance public improvements in your neighborhood?

\$ ____.
11. Please read the following:
Would you support an effort that "reserves" a portion of your neighborhood's on-street parking spaces for non-residents who pay a fee? Yes/No
12. Would your answer to the question above change if the "fee" proceeds directly funded improvements in your neighborhood? Yes/No

13. Including your off-street parking options, would 1 on-street parking pass be enough to accommodate your household? Yes/No

If no, how many would your household need? _____

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