



Parking Taxes as a Means of Congestion Pricing: A Feasibility Assessment

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Executive Summary

During the Spring Semester of 2007, students in a graduate-level practicum course in the George Mason University School of Public Policy's Transportation Policy, Operations, and Logistics (TPOL) program researched and analyzed the feasibility of implementing a parking tax on commercial parking garages in Arlington County, Virginia, as a method for reducing vehicular congestion, particularly single-occupancy vehicle (SOV) traffic.

This report examines four parking tax policy options available to Arlington and assesses each alternative based on its possible revenue generation, advantages, and disadvantages. In addition, it reviews any implementation issues that may arise, including County taxing authority, the effects of employer-subsidized parking, on-street parking competition, regional cooperation, and stakeholder acceptance.

We conclude that should Arlington County want to move forward with implementing a parking tax, it should institute a congestion charge on individual vehicles entering or exiting garages during peak congestion periods. Of the four options explored, this taxing method would be the most effective approach for achieving the goals of lessening traffic during peak congestion periods and changing the driving habits of those most responsible for traffic congestion in the County.

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Disclaimer

This report was prepared by students in the Transportation Policy, Operations, and Logistics program in the School of Public Policy at George Mason University for Arlington County, Virginia. It is intended to inform interested parties and encourage discussion. The views in this report are those of the authors and not necessarily those of George Mason University or Arlington County.

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SECTION 1

Introduction

Arlington County, Virginia, has a total population of nearly 200,000 people, a population density of roughly 7,300 people per square mile, and more private office space than the downtown areas of many major cities, such as Los Angeles, Seattle, or Atlanta. As a result, Arlington faces a daunting combination of transportation challenges, including traffic congestion, excessive parking demand, and near-capacity transit facilities.

To address the increased congestion caused by the abundance of single-occupancy vehicles (SOV) traveling in major transportation corridors during the peak commuting hours, the County has identified SOV reduction as a major policy goal. This report explores several policy options to reach that goal.

The purpose of this study is to determine the feasibility of implementing a parking tax on commercial parking garages within the County as a method for reducing SOV traffic.

1.1. Background

While many factors have contributed to the proliferation of SOV use within the County, the abundance of parking for office and retail users within the County has been raised as a particularly significant contributor to this problem. The profusion of single-use parking that is available in Arlington has led the County to examine its effects on congestion on the County's streets and highways. Much of this congestion is in the major commuting corridors (I-66, I-395, U.S. Route 1, U.S. Route 50, Columbia Pike, and the George Washington Memorial Parkway) and can be attributed to pass-through traffic destined for Washington, DC. A significant portion of it, however, is believed to be destined for the major Arlington County employment centers of the Jefferson Davis and the Rosslyn-Ballston corridors.

Numerous parking experts have noted problems of both overabundance and exclusivity in today's American parking market.¹ In Arlington, the problem of overabundance has the potential to further congest County roadways as more SOV users exploit the availability of low-cost parking. The exclusivity of many commercial parking facilities designated for single-usage leads to a surplus of spaces available for motorists destined for employment and retail locations within the County.

1.2. Organization

At the request of Arlington County, a team of graduate students from the Transportation Policy, Operations, and Logistics (TPOL) program at George Mason University's School of Public Policy evaluated a congestion parking tax strategy to determine if it would ease traffic within the County. Research focused on the current commuting situation in Arlington, lessons learned in other jurisdictions, various pricing policy options, and

¹ Donald C. Shoup, *The High Cost of Free Parking* (Chicago: Planners Press : American Planning Association, 2004), 650-53.

implementation hurdles the County might face. The team's research methodology focused heavily on parking tax case studies from other jurisdictions, academic papers, and previous Arlington County parking studies. The statistical data used by the research team came primarily from existing information supplied by the County, the U.S. Census Bureau, and the Metropolitan Washington Council of Governments. This research formed a solid foundation from which the team could evaluate current parking and commuting conditions in Arlington and develop pricing policy options for the County.

1.3. Policy Options

After a review and analysis of conditions in Arlington and the experience of other jurisdictions, the following four parking tax policy options were developed:

1. Taxing individual vehicles based on peak hour entrance and exit from parking facilities.
2. Taxing parking operators based on the number of spaces occupied during peak hours.
3. Taxing parking operators based on revenues collected during peak hours.
4. Keeping tax policy as is and focusing on other parking strategies.

Each option then was assessed on its possible revenue generation, advantages (such as congestion mitigation), and disadvantages (such as equity issues).

Finally, the team completed a review of the implementation issues that could arise, including County taxing authority, the effects of employer-subsidized parking, on-street parking competition, regional cooperation, and stakeholder buy-in.

Based on a review of each option, we believe that Option 1, a per vehicle charge on the driver, would allow Arlington County the best opportunity for reducing congestion through the implementation of a parking tax. Other applications could also work, though less efficiently. In addition, it is possible to institute a hybrid scheme that directs different methods of taxation at different parking consumers.

SECTION 2

Arlington County Background

2.1. Transportation in Arlington

At 26 square miles, Arlington is geographically the smallest self-governing county in the United States. Yet with an estimated count of 199,776 people living in Arlington,² the County's population density of approximately 7,300 per square mile is by far the highest in Virginia.³

Two interstate highways run through Arlington: I-66 in the northern part of the County, and I-395 in the southern part of the County. Both have high-occupancy vehicle (HOV) lanes or restrictions. A number of major multi-lane arterial roads also serve Arlington, including U.S. Route 1, U.S. Route 50, Columbia Pike, and the George Washington Memorial Parkway.

Several transit options serve Arlington. The Orange, Blue, and Yellow lines of the Washington Metropolitan Area Transit Authority (WMATA) Metrorail system run through the County. Additionally, WMATA Metrobus (regional bus system), Arlington Transit (ART – local bus system), and Virginia Railway Express (VRE – commuter rail) provide service in Arlington. Since the inception of Metrorail service in the 1970's, neighborhoods along the rail lines have grown into centers of activity, including Rosslyn, Courthouse, Clarendon, and Ballston along the Orange line, and Pentagon City and Crystal City along the Blue and Yellow lines.

2.1.1. The Arlington Workforce

Nearly 164,000 people now work outside the home in Arlington. The federal government is the largest single employer in the County. Arlington's top private employers include the Virginia Hospital Center, Verizon, SAIC, AES, CACI, and Marriott International.⁴ Between 2000 and 2030, the County's total daytime population (business and residential) is expected to increase 45 percent and approach 400,000.⁵

According to the 2000 Census, only 30 percent of employed residents of Arlington work within the County, while non-residents hold 79 percent of the jobs in Arlington.⁶

² United States Census Bureau, "2006 Population Estimates," http://factfinder.census.gov/servlet/SAFFPopulation?_event=ChangeGeoContext&geo_id=05000US51013&geoContext=&street=&county=arlington&cityTown=arlington&state=04000US51&zip=&lang=en&se=on&ActiveGeoDiv=&useEV=&pctxt=fph&pgsl=010&submenuId=population_0&ds_name=null&ci_nbr=null&q_r_name=null®=null%3Anull&keyword=&industry=

³ Ibid.

⁴ Housing & Development Arlington Department of Community Planning, "Arlington County Profile," http://www.arlingtonva.us/Departments/CPHD/planning/data_maps/CPHDPlanningDataandMapsProfile.aspx, and CNN, "Fortune 500, Largest Companies in Virginia," <http://money.cnn.com/magazines/fortune/fortune500/states/V.html>.

⁵ Arlington MTP, "Baseline Conditions Report," (2005), 18.

⁶ ———, "Second Draft," (2006), 9.

Appendix A details the activity in Arlington County for workers 16 years and over, as reported by the U.S. Census Bureau in the 2005 American Community Survey.⁷

2.1.2. Travel Volumes

Despite growth in employment and housing density in several major corridors throughout the County, historical traffic counts indicate that traffic volumes in Arlington have remained relatively constant for the past several years.⁸ Furthermore, studies have shown that average commute times also remained steady in Arlington between 1990 and 2000.⁹ Major interstates and parkways carry over 50 percent of all traffic on any given day, while local residential streets carry very little traffic.¹⁰ Regionally significant roads such as US Route 1, US Route 50, the George Washington Memorial Parkway, and I-395 have absorbed most of the traffic increase over the last 20 years.

2.1.3. Origin-Destination Information

Employees in Arlington travel daily from jurisdictions throughout the Washington-Baltimore Metropolitan Statistical Area and beyond. According to the 2000 Census, Arlington workers traveled to the County from the following locations:

Figure 2-1, Arlington Commuters by Jurisdiction.

Jurisdiction	Number of Commuters	Percentage
Fairfax County, VA; Fairfax City, VA; Falls Church City, VA	50,297	30.7%
Arlington County, VA	34,379	21.0%
Prince George's County, MD	15,912	9.7%
Washington, DC	12,164	7.4%
Prince William County, VA; Manassas City, VA; Manassas Park City, VA	10,897	6.7%
Alexandria City, VA	10,755	6.6%
Montgomery County, MD	10,063	6.2%
Other places in Virginia	8,548	5.2%
Other places in Maryland	8,178	5.0%
Other states	2,474	1.5%
Total	163,666	100%

While the majority of the non-resident Arlington workforce lives in the neighboring communities of Fairfax County, Falls Church, Alexandria, and Washington, DC, a growing number of employees live in exurban areas such as Prince William, Loudoun, Stafford counties. These areas offer limited transit options, which can necessitate increased vehicular travel.

⁷ United States Census Bureau, "American Community Survey, Means of Transportation to Work by Selected Characteristics for Workplace Geography," http://factfinder.census.gov/servlet/STTable?_bm=y&-context=st&-qr_name=ACS_2005_EST_G00_S0804&-ds_name=ACS_2005_EST_G00_-CONTEXT=st&-tree_id=305&-redoLog=false&-geo_id=05000US51013&-format=&-lang=en.

⁸ Arlington MTP, "Second Draft," 8.

⁹ _____, "Baseline Conditions Report," 21.

¹⁰ Ibid., 17.

2.1.4. Modal Split Information

Higher incomes and auto ownership rates, coupled with a geographic shift of residents to suburban areas over the past two decades, have contributed to greater rates of commuters driving alone nationwide. Arlington is no exception to this trend.

According to the 2000 Census, 60 percent of the 164,000 workers commuting to jobs in Arlington County drove alone – up from 55 percent in 1990 – with approximately 91,314 SOVs now parking in Arlington each day. About 18 percent travel to work by car or vanpool, 17 percent by transit, and 5 percent by other means, including biking and walking. The total number of transit patrons commuting to jobs in Arlington increased only 2.4 percent between 1990 and 2000.¹¹

The drive-alone rate for employed residents of Arlington is nearly 55 percent – also higher than the 1990 figure.¹² From 1990 to 2000, approximately two percent of the County’s employed residents shifted from riding transit to driving-alone¹³ and the total number of employed residents commuting to jobs in two- and three-occupant vehicles decreased nearly 19 percent.¹⁴

2.1.5. Morning Peak Commuting Times

As the table below indicates, the peak commuting time in Arlington during the morning rush hour occurs between 6:30-9:00 a.m. Nearly half of work-related SOV traffic is generated between 7:00-9:00 a.m., and over one-quarter is generated between 7:30-8:30 a.m.

Figure 2-2, Arlington County 2005 Transportation to Work: Time Arriving at Work from Home.¹⁵

	Total	Car, truck, or van – drove alone	Car, truck, or van – carpooled	Public transportation (excluding taxicab)
TIME ARRIVING AT WORK FROM HOME	156,187	91,314	21,745	35,068
12:00 a.m. to 4:59 a.m.	1.9%	2.9%	1.1%	0.1%
5:00 a.m. to 5:29 a.m.	2.0%	2.9%	1.2%	0.4%
5:30 a.m. to 5:59 a.m.	5.0%	6.4%	4.2%	1.9%
6:00 a.m. to 6:29 a.m.	6.7%	6.3%	7.1%	8.6%
6:30 a.m. to 6:59 a.m.	10.5%	9.1%	15.4%	11.8%
7:00 a.m. to 7:29 a.m.	14.8%	10.1%	23.0%	21.9%
7:30 a.m. to 7:59 a.m.	14.6%	12.9%	18.4%	16.2%
8:00 a.m. to 8:29 a.m.	13.7%	13.7%	13.3%	13.2%
8:30 a.m. to 8:59 a.m.	9.2%	9.9%	4.3%	9.9%
9:00 a.m. to 11:59 p.m.	21.6%	25.8%	12.0%	15.9%

¹¹ Ibid., 19.

¹² Ibid., 18.

¹³ Ibid.

¹⁴ Ibid., 19.

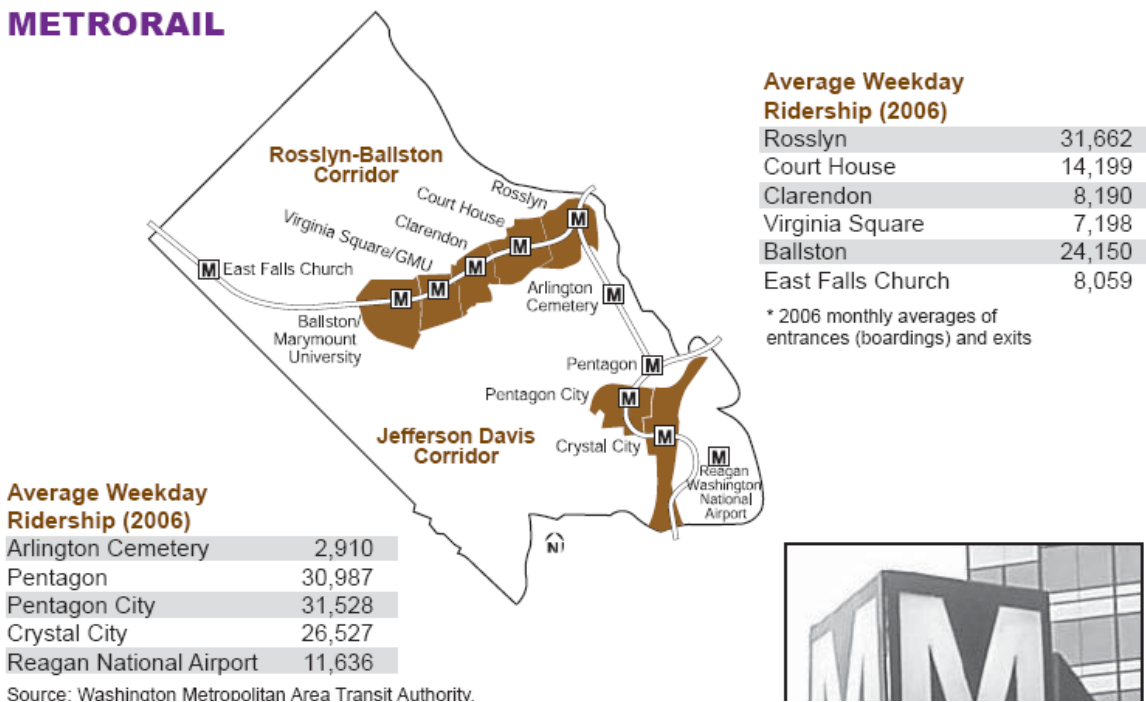
¹⁵ United States Census Bureau, "American Community Survey, Means of Transportation to Work by Selected Characteristics for Workplace Geography."

2.1.6. Metrorail Ridership and Station Boardings

Transit-oriented developments have channeled much of the County's development along its two Metrorail corridors. Therefore, Arlington has been able to grow rapidly without major expansions to its highway network. Instead, County residents and workers have been able to utilize rail and bus service to reach a variety of mixed-use development options. As a result, Arlington's transit usage is second in the region, trailing only Washington, DC.¹⁶

The two charts below show the average weekday ridership at the County's eleven Metrorail stations and the growth the stations have seen over the past twenty-six years.

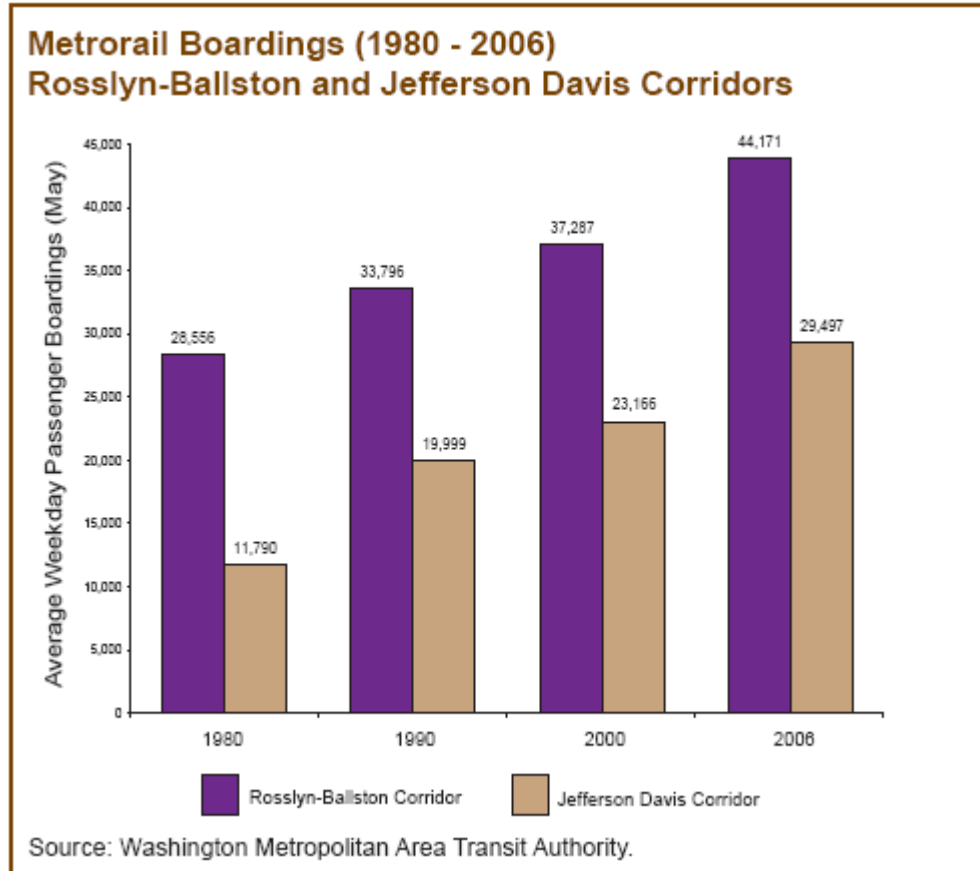
Figure 2-3, Metrorail Ridership by Station.¹⁷



¹⁶ Arlington MTP, "Baseline Conditions Report," 5.

¹⁷ Arlington County, "Transportation Profile," <http://www.arlingtonva.us/Departments/CPHD/Documents/10252Profile2007TransportationandMiscellaneous.pdf>

Figure 2-4, Metrorail Boardings by Corridor.¹⁸



2.2. Existing Parking Policies

Arlington County has hundreds of parking facilities, with over 72,000 parking spaces available in the Rosslyn-Ballston corridor alone.¹⁹ Many more spaces exist in the Jefferson Davis and Columbia Pike corridors.

Like most jurisdictions around the country, Arlington County sets minimum parking requirements for specified uses in its zoning ordinance. However, in order to encourage pedestrian activity in Metro corridors, these requirements may be reduced or waived. Parking studies of the Courthouse, Clarendon, and Virginia Square areas have found that peak occupancies of garages in these areas have rarely exceeded 70 percent, typically remaining less than half-full during the morning, afternoon, and evening.²⁰ While construction of shared-use facilities is becoming more common (especially when required by the County), the majority of facilities built in Arlington remain single-use, meaning that they are dedicated solely for occupants of particular buildings. Shared use of these garages could result in increased efficiency of the garages, allowing retail and restaurant patrons to use the excess capacity during times of lower demand for office use.

¹⁸ Ibid.

¹⁹ Arlington MTP, "Second Draft," 9.

²⁰ Arlington County, "Integrated Parking Plan, Draft Report," (2004), 2-4 - 2-6.

2.2.1. Provision of Public Parking

Parking demands in Arlington are affected by location and predominant land uses. The vast majority of parking spaces in Arlington County are owned privately (77 percent),²¹ and their use is generally limited to a building's residential or commercial occupants. Arlington County provides the following public parking options,²² mostly located within the Metro corridors:

- Ballston Garage – a 2,800-space facility.
- Barcroft Park Parking Garage.
- Multi-use parking deck above I-66 in Ballston.
- Department of Human Services Garage in Clarendon – 461 spaces available for public use in the evening and on weekends.
- Parking meters – more than 4,000 have been installed so far, providing a mix of short-term and long-term spaces.
- Private shared parking facilities – some new developments have been required to provide shared parking as part of site plan conditions.

Numerous federal facilities, such as the Pentagon and its 8,770 parking spaces,²³ are major destinations within the County for commuters. Since such facilities are most likely exempt under federal law from state and/or local taxes, these private facilities were not considered in our assessment. Furthermore, the Metropolitan Washington Airports Authority, which operates Ronald Reagan Washington National Airport, is exempt from taxation on revenues under section 5.1-172 of the Commonwealth of Virginia's Code. Therefore, the airport's 8,016 public parking spaces²⁴ also have not been included in our assessment.

2.2.2. Pricing of Parking Facilities

Parking in Arlington County is priced primarily in three ways: hourly (including metered parking), daily, and monthly. Current median parking rates within the County are approximately as follows:

Figure 2-6, Pricing of Arlington Parking Facilities.²⁵

Area	Hourly		Daily		Monthly	
	Price	% +/- Median	Price	% +/- Median	Price	% +/- Median
Ballston	\$ 4.00	0%	\$ 8.00	-11%	\$ 90.00	-16%
Virginia Square	\$ 3.75	-6%	\$ 8.75	-3%	\$ 87.50	-19%
Clarendon	\$ 4.00	0%	\$ 8.00	-11%	\$ 100.00	-7%
Court House	\$ 4.00	0%	\$ 8.00	-11%	\$ 100.00	-7%
Rosslyn	\$ 5.00	25%	\$ 10.00	11%	\$ 121.00	13%
Crystal/Pentagon City	\$ 4.50	13%	\$ 15.00	67%	\$ 105.00	-2%
County Median	\$ 4.00		\$ 9.00		\$ 107.50	

²¹ Inc. Kimley-Horn and Associates, "Master Transportation Plan," (Arlington County, VA: 2005), 11.

²² "Parking Workbook," in *Arlington County Parking Symposium* (2003), 1-9. and Arlington MTP, "Second Draft," 9.

²³ "The Pentagon: Facts and Figures Overview," <http://pentagon.afis.osd.mil/facts.cfm>.

²⁴ Metropolitan Washington Airports Authority, "Comprehensive Annual Financial Report: Year Ended December 31, 2005," (Washington, D.C.: 2005), 89.

²⁵ Compilation of class research.

Prices seem to reflect the dominant land use of the area. Parking prices in more office-oriented areas, such as Rosslyn and Crystal/Pentagon City, tend to be higher than County median averages. In retail areas, such as Pentagon City, Ballston, and Clarendon, hourly parking rates are reduced to minimize the impact on shoppers who might otherwise travel to regional shopping areas with free parking, such as Tysons Corner in Fairfax County. For example, the parking rate at Pentagon Centre varies from \$0.00 to \$2.00 per hour in a staggered fashion, with the first hour costing \$1.50 or more (e.g. \$1.50 first hour, \$2.00 for two hours, \$3.00 for three hours, etc.). Patrons of select restaurants in Pentagon Centre can also receive parking validation that varies in amount to pay for all or a portion of the cost of their parking.

Daily and monthly parking customers, who make most of the work trips in Arlington, are presented with a variety of payment plans. Using the Pentagon City area as an example, daily parking is generally a maximum of \$16.00 per day, although rates are set so that a commuter who works in the area can pay \$14.00 for 10 hours of parking time. These daily rates are still quite high compared to monthly parking rates in the area, which can be as low as \$100.00, as observed at Pentagon Row along Army Navy Drive. In fact, all monthly parking rates for both Pentagon City and Crystal City are less than the federal limit of \$215.00 for the tax-free benefit of employer-paid parking. In comparison, a commuter would pay \$294.00 per month for a standard month of 21 workdays at a daily rate of \$14.00 per day. Therefore, the “discount” of a monthly parking pass as compared to paying the daily rate encourages commuters to purchase monthly parking permits. (It should be noted that many facilities offer further discounts to employees of adjacent buildings that the facility is meant to serve. Pentagon Row, for instance, offers employees a monthly parking pass for \$65.00, although it is not clear who exactly are considered employees.) Once a monthly parking permit is purchased, employees have a disincentive to utilize other means of transport because they have already received a parking subsidy.

Hourly parking rates in areas with larger concentrations of office space tend to be higher, with charges as much as \$4.00 to \$5.00 per hour, including the first hour, observed in areas such as Crystal City. As such, parking garages in these areas do not effectively price themselves for short-term parkers during standard business hours. After 4:00 p.m. Monday through Friday and on weekends, however, most parking garages in these areas are free to the public in order to encourage patronage of retail shops and restaurants during the off-hours. Daily parking rates in these office-oriented areas have been observed from \$10.00 to \$16.00, with the vast majority of garages being \$16.00 per day. Monthly parking rates, however, have been observed to be a substantial discount compared to daily rates, with \$10.00 parking garages being priced at \$105.00 per month (a savings of \$105.00) and \$16.00 parking garages being priced at \$130.00 per month – a savings of \$206.00.

SECTION 3

 Lessons Learned in Other Jurisdictions

3.1. Benefits

3.1.1. Traffic Congestion

A parking tax is a form of pricing that attempts to internalize the externalities caused by private vehicle use. Our research indicated that jurisdictions have implemented parking taxes for two main reasons: traffic congestion reduction and revenue generation. See Appendix C for more detailed information about the parking taxes experiences of other jurisdictions.

Unfortunately, the limited amount of information on post-tax vehicle congestion makes it hard to evaluate the ultimate success of the programs. The success of the London cordon charge gives the impression that there should be a substantial decrease in traffic congestion, as London's downtown traffic decreased over 20 percent after the cordon tax was instituted.²⁶ This experience led Santa Barbara to estimate that a variable pricing scheme would reduce peak hour demand by 20 percent.²⁷ On the other hand, several jurisdictions experienced little to no impact as a result of parking taxes. New Orleans saw little impact on vehicular traffic following the initiation of a parking tax.²⁸ San Francisco raised rates through a 25 percent tax, yet only a slight decrease in use occurred.²⁹

3.1.2. Travel Mode Shift

Initial investigation of the impact of parking taxes on other transportation modes indicates that mode shift depends upon a number of variables. Foremost among these is the type of parking tax applied, as the literature indicates that behavioral change will vary depending upon the type of tax.

Independent researcher Todd Litman identified two broad categories of parking taxes – (1) commercial parking taxes, which apply to parking transactions, and (2) per space levies, which are a special property or excise tax applied to parking facilities on a per-space basis – and concluded that a per space levy is more efficient at reducing sprawl.³⁰

A study of Washington State's parking tax further refines the parking taxes into five categories, including long-term parking tax, peak-period parking tax, parking

²⁶ Genevieve and Susan Hanson Giuliano, "Managing the Auto," in *The Geography of Urban Transportation*, ed. Susan Hanson and Genevieve Giuliano (New York: Guilford Press, 2004).

²⁷ Parsons Brinckerhoff Quade & Douglas Inc., "101 in Motion Final Report," (Santa Monica, CA: Santa Monica County Association of Governments, 2006).

²⁸ Berk & Associates, "Parking Tax Analysis," (Seattle, WA: City of Seattle, 2002), 6.

²⁹ Economic and Planning Systems Inc., "Santa Cruz Paid Parking Policy Analysis," in *City of Santa Cruz Master Transportation Study* (2002).

³⁰ Todd Litman, "Parking Taxes: Evaluating Options and Impacts," (Victoria, BC: Victoria Transport Policy Institute, 2006).

operation tax, general parking tax and accessory parking tax.³¹ Which tax is optimal varies based on desired results. The long-term parking tax, the peak-period parking tax and the accessory parking tax were found to have the most impact on changing commuters' behavior, and, by extension, use of other modes.

As in other economic situations, behavioral impacts are a function of price elasticity. Litman, for instance, estimated that a 10 percent increase in parking prices would reduce parking demand by two to four percent.

In addition to price, though, other factors affect how well a parking tax pushes drivers to other abandon their SOV commutes. To help shift riders to transit, carpools, slug lines and off-peak hour commutes, adequate transit alternatives must be available and localities must have strong marketing campaigns and Transportation Demand Management (TDM) programs. A Transportation Research Board (TRB) study found that most travelers, with the exception of commuters, have a choice of destinations.³² Unless acceptable travel alternatives are available, parking pricing schemes cause drivers to switch destinations rather than modes. The report goes on to state that differential parking fees, as well as other incentives and options, can influence the modes to which travel demand shifts. For example, if rideshare vehicles are granted free parking, former SOVs are more likely to carpool than use transit, and even transit users may be persuaded to carpool. On the other hand, if subsidized transit passes are provided, the opposite is likely to occur.

3.1.3. Revenue

In an effort to mitigate traffic congestion and generate revenue, some U.S. jurisdictions have begun to impose parking taxes on persons who park in commercial parking facilities. The imposition of a parking tax, as with the imposition of most taxes, is a politically sensitive issue.³³ Levying such a tax is based on the right of the jurisdiction to tax the privilege of parking a vehicle in a parking facility. These taxes are either based on a flat rate or a percentage of the revenue collected. In some jurisdictions, higher rates are imposed on persons who contribute most to congestion by driving during the hours congestion is at its worst. In these instances, non-peak period parkers pay a lower rate. The peak period tax rate is used more as a tool to manage transportation demand than as a method of generating revenue. When implementing a parking tax, especially a peak period parking tax, the amount of parking revenues raised should be sufficient to cover the costs that will be expended by the jurisdiction to collect the tax and enforce the parking tax regulations. These taxes are generally considered to be a subset of sales or excise taxes that all parkers pay, unless exempted by statute.

The peak traffic periods generally occur during the five-day work week, limiting overall revenues because there are specific periods during the morning and evening when the tax is collected. As a result, peak period taxes do not generate the maximum amount of parking revenues for jurisdictions. Additionally, peak period taxes are more difficult to administer, for both parking operators and local officials in charge of tax collection and enforcement.

³¹ Washington State Commute Trip Reduction Office, "Local Government Parking Policy and Commute Trip Reduction -- 1999 Review," (Washington State Department of Transportation, 1999).

³² Transit Cooperative Research Program's Report 95, Chapter 13 ("Parking Pricing and Fees")

³³ Information in the next two paragraphs is taken from: Ulberg, Cy, Graciela Etchart and Bethany Whitaker, 1992. *TRAC: Local Option Commercial Parking Tax Analysis*, Research Project GC 8719, Task, 30, Parking Tax Evaluation, Washington State Transportation Center (TRAC), 1992.

Most parking tax ordinances contain no peak period tax provisions. Generally, parking tax regulations are structured so that parking tax rates remain constant. There are, however, some localities that have regulations relating to peak period parking prices, but these regulations define parking fees that operators of city- and county-owned garages charge their customers.

Jurisdictions appear to favor taxation on a percentage-of-revenue basis, as opposed to a flat, per vehicle rate. The percentage tax is easy to administer, as parking lot operators are only required to remit a percentage of their revenue, usually on a quarterly basis. However, not differentiating the tax by time of day would yield minimal congestion reduction during peak commuter hours, as there would be no incentive to shift trips to off-peak hours. The percentage tax also would not address the need to reduce long-term parking customers relative to short-term parking customers. Providing more short-term parking spaces appeals to downtown retail merchants. With respect to equity, percentage taxes best distribute costs among parking customers, in that all are treated equally. The parking tax is imposed solely on persons with vehicles, so those without, or those relying on public transit, would not be impacted directly.

3.2. Impacts

3.2.1. Building and Property Owners

Building and property owners subject to any kind of congestion pricing in their sphere of activity are predictably reluctant to shoulder the burden of what they view as an arbitrary tax. A recent Transport-for-London survey found 63 percent of residents and 72 percent of firms were opposed to the looming expansion of the London Cordon, even after five years of efficacious management of London's traffic congestion.³⁴

As the Santa Barbara plan was implemented modestly in order to encourage off-peak usage of the downtown and not adversely affect businesses,³⁵ there was a minimal impact on congestion. The endeavor also included residential parking restrictions, to prevent parking spillover into neighboring areas.

Since parking taxes have not demonstrated a negative impact on retail sales in areas with robust economies, we estimate that the relative economic stability of the Washington, DC region, combined with a limited congestion-based parking tax, would cause minimal negative impacts on building and property owners.

3.2.2. Parking Operators

Parking operators generally experience some loss in gross revenues after parking pricing goes into effect. When the pricing is variable, or limited to peak periods, the

³⁴ Mark Rice-Oxley, "London Doubles Size of Its Controversial Pay-to-Drive Zone," *The Christian Science Monitor* 2007.

³⁵ Parsons Brinckerhoff Quade & Douglas Inc., "101 in Motion Final Report," 45.

losses seem to be greater because the facilities cannot make up the shortfall by charging different prices for off-peak parking.

In San Francisco, the combined effect of moderately reduced trip numbers and significantly reduced parking duration in response to parking price increases slightly lowered overall parking income.³⁶ Because San Francisco's parking price was a tax, the City received substantial new revenues, but the loss in gross revenues to private parking operators was even greater.

In 1981, morning peak-period occupancy decreased by 40 percent when Madison, WI, introduced a \$1.00 peak-period surcharge on all cars entering three municipal parking facilities before 9:30 a.m. and staying for longer than three hours.³⁷ Otherwise, the parking rate remained \$0.20 an hour. The three participating parking facilities represented 22 percent of Madison's total off-street parking. A free shuttle service to and from satellite parking lots was instituted prior to implementation of the surcharge.

Santa Barbara estimated variable pricing of its 3,200 downtown spaces would reduce peak hour demand by as much as 20 percent through a time or mode shift, although many of these parkers might simply move to private lots.³⁸ Operators reacted to the loss of parking revenue by increasing the peak price.

When Chicago raised parking rates at eight municipal garages in 1978, monthly parking leases fell 25 percent, while short-term parking counts increased about two percent.³⁹ Revenue at these garages increased over the period, despite the fact that the eight-hour and short-term parking rates were still below the nearby private rates. Changes in rate structure at the nearby private facilities did not seem to influence this effect. Chicago exhibited the highest reported price elasticity of all studies reviewed.

Monthly parking permit sales fell by 36 percent when Eugene, OR, raised downtown lot prices by 100 percent in 1995, reflecting a price elasticity just half of that Chicago experienced.⁴⁰ It should be noted that these congestion fees applied only to government-owned facilities. It is estimated that elasticity would likely be far lower in response to a tax levied on all garages in a neighborhood.

Market forces obviously play a large role in determining how damaging a tax is to parking operators. Abundant parking in Miami resulted in operators absorbing most of the increase, while in Los Angeles the increase was fully passed on to the user.⁴¹

3.2.3. Commuters

The income of Arlington County residents and commuters has been, on average, extremely high compared to the national average. Therefore, parking rates that would be unreasonable in most of the country are more acceptable in this region.

³⁶ Economic and Planning Systems Inc., "Santa Cruz Paid Parking Policy Analysis," 268.

³⁷ Ibid., 270.

³⁸ Parsons Brinckerhoff Quade & Douglas Inc., "101 in Motion Final Report."

³⁹ Economic and Planning Systems Inc., "Santa Cruz Paid Parking Policy Analysis," 270.

⁴⁰ Ibid., 269.

⁴¹ Berk & Associates, "Parking Tax Analysis."

Figure 3-1, Arlington County (1959 - 1999).⁴²

	1959	1969	1979	1989	1999
Household Income	\$ 6,844	\$ 9,502	\$ 21,713	\$ 46,884	\$63,001
Family Income	\$ 8,670	\$ 13,743	\$ 28,771	\$ 58,180	\$78,877

Projections for Arlington County have foreseen steady economic and population growth well into the future. As a result, the County could be vulnerable to increased SOV congestion and decreased parking availability. Planners must look to TDM strategies, such as limiting parking, shifting commutes to mass transit, and making other mode choices more accessible and convenient. Social justice and equity impacts issues must also be further researched before moving forward. For example, the Seattle case study revealed that an individual commuter’s income and economic status had a direct effect on the success of parking tax initiatives.⁴³ Also in Washington State, the Puget Sound Region study revealed that commuter parking taxes were influenced by behavior and public acceptance.⁴⁴ In most cases, marketing was a good communication tool for the public to understand where the revenues would be spent. Commuters favor knowing that their money is going towards congestion management, environmental improvements, and revenue generation projects.

The Washington State study also reported that different categories of parkers may be taxed at different rates to target specific categories of parkers or regions. The Seattle case study found the following impacts on commuters: little to no change in behavior for patrons who could afford the tax increase, reduced number of trips, shorter stays, a decline in retail customers as shoppers could go to a neighboring shopping mall where parking is free, and a weakened competitive advantage of the central business district over other jurisdictions. Consistently important factors for commuters have included: economic efficiency, consistency with strategic planning objectives, and equity.

Appendix E details the results of an unscientific survey of the commuting patterns of Arlington workers and their possible reaction to the imposition of a congestion parking tax.

3.2.4. Retail Establishments

Retail customers and visitors generally prefer on-street parking, which ordinarily is controlled through parking meters. Parking meter fees would not be affected by a congestion parking tax, meaning direct impacts on retailers might be minimal. The brunt of the direct impact would be borne by commuters parking for employment purposes.

⁴² Sources: U.S. Census Bureau, and Housing & Development Arlington Department of Community Planning, "Median Household and Family Income," http://www.arlingtonva.us/Departments/CPHD/planning/data_maps/Census/income/CensusIncomeIncome1.aspx.

⁴³ Berk & Associates, "Parking Tax Analysis."

⁴⁴ Ibid.

A study by the TRB found that there had been very little study of the effects of parking tax increases on retail customers and visitors.⁴⁵ Arlington County, in its November 2006 Second Draft of the Master Transportation Plan, Parking and Curbside Management Element, likewise recognized that there is limited data available to analyze this issue in the County. This shortage of data is exacerbated by the development of newer technologies, like the use of variable meters, which would require more recent research, even if there had existed substantial data resources.

Business groups invariably oppose parking tax increases as harmful to their interests, but what information does exist is often anecdotal. In 2005, the Pittsburgh Downtown Partnership asserted that a "survey" of downtown businesses showed a negative impact on retail from a parking tax increase, however no data was provided.⁴⁶ In 2006, the same group repeated a number of assertions it made the previous year but eliminated the claim of lost business. This would seem to indicate that there had, in fact, been no actual loss of business revenue. Regardless of its veracity, though, this perception must be countered by extensive outreach to the business community.

Despite these limitations, some data is available. Melbourne, Australia; Madison; Ashland, OR; and Chicago experienced an increase in use of short term parking after parking tax increases. Chicago showed an increase in transit use – a pattern that held for retail customers far more than for working commuters. The desirability of a downtown area, combined with high income shoppers, led to no loss of revenue in downtown Seattle, Santa Monica, or pre-Katrina New Orleans after parking tax increases. Results were similar in Los Angeles, where the presence or absence of gridlock was a more important factor in shoppers' location decisions. The fact that Tysons Corner is viewed by many as synonymous with gridlock could be an indication that shoppers might not view that area as an alternative to shopping in Arlington County.

In San Francisco, parking demand was relatively inelastic, so the result of a parking tax increase on retail shoppers was minimal.⁴⁷ Negative impacts did occur in Miami, however, which had competition from attractive mall alternatives outside the business district.⁴⁸ Coupled with a weak Latin American economy, there was a noticeable decline in downtown retail revenues. Negative impact on downtown retail also occurred after imposition of a parking tax increase in Seattle in 2001-2002. However, this coincided with a technology bust that hit the region. Business in the downtown area was robust both before and after the relatively short period of economic downturn. Because of its similarities, retail in Arlington County could expect to see little negative impact from the imposition of a parking tax.

3.2.5. Residential Spillover Effects

The manner in which a jurisdiction manages its parking can have a large effect on both the availability of parking and the perception of that availability. A common problem occurs when expensive garage spaces compete with cheap curbside metered spaces for the same clientele. This leads to the perception of lack of parking and increased traffic congestion as people circle city blocks looking for under priced curbside parking.

⁴⁵ Transit Cooperative Research Program, "Parking Pricing and Fees," in *TCRP Report 95* (Federal Transit Administration, 2005).

⁴⁶ City Of Pittsburgh, "Parking Tax Regulations," (2006).

⁴⁷ "Parking Tax," (San Francisco, CA: City and County of San Francisco Controller's Office, 2006).

⁴⁸ Berk & Associates, "Parking Tax Analysis."

However, there is often a perception of a lack of parking among residents despite ample parking in the immediate vicinity. Some planners contend that eliminating minimum parking provisions might improve the residential parking situation as developers could better tailor construction to meet parking demand, prevent excess, unused parking spaces, and save \$20,000 to \$30,000 per parking space. Better buy-in and acceptance of new parking management methods can likely be obtained by urban planners with outreach to and input from the local residents. Where spillover is a serious concern, limiting parking in residential areas to those with parking stickers could alleviate neighborhood concerns.

SECTION 4

Congestion Pricing Policy Options

4.1. Overview

This section describes the various parking tax policy alternatives available to Arlington County. The team identified three feasible parking tax options that could be implemented to alleviate traffic congestion during peak periods. Option 1 involves charging individual vehicles that enter or exit a garage during peak hours. Option 2 involves charging garage operators a fee for every vehicle that enters or exits a garage during peak hours. Option 3 involves charging garage operators a percentage of the revenue they collect from vehicles that enter or exit a garage during peak hours. In addition, we explored the implications of maintaining Arlington's status quo policies. A summary of the options and their potential impacts can be found in Appendix B.

These taxing options are not mutually exclusive and Arlington could utilize a hybrid tax scheme in order to capture drivers with employer-subsidized and non-subsidized parking. As detailed in Section 5, the large amount of employer-subsidized parking in Arlington presents a unique challenge to instituting a tax designed to discourage SOV commuting. One method of taxation might be easier to implement in garages with heavily subsidized parking, while another method might be easier to implement in garages with mostly non-subsidized parkers. There is precedent for such a split, as Baltimore's parking tax is levied as a flat fee against monthly permits and a percentage of revenue for daily parking rates.

4.2. Revenue Calculation Assumptions

In order to estimate traffic reductions and revenue accruing to the County under the various proposals, several assumptions had to be made. Foremost among these is the price elasticity of parking demand. It was the experience of several cities around the country that when similar parking alternatives are not available, price elasticity ranges from -0.2 to -0.4. Therefore, the price elasticity of parking demand in Arlington was assumed to be -0.3, which means for every 10 percent increase in the cost of parking, three percent of drivers would switch to another mode (or, in the case of a congestion tax, time-shift away from taxable hours).

The price currently paid to parking operators represents another estimation made for the purposes of analysis. While daily parking rates average about \$10.00 in Arlington's two transit corridors, the cost of monthly permits implies a daily rate of about \$6.00. Since most SOV commuters likely purchase monthly passes, this \$6.00 was used for calculation.

With employers representing a major factor in parking policies, their response to increased rates is just as important as that of the commuters themselves. While firm figures were unavailable, it was estimated that about two-thirds of SOV commuters in Arlington are provided free parking by their employers. However, due to the significant tax advantages of supplying free parking, the price elasticity of parking demand from the employer's perspective is likely to be far lower than that of drivers. For this calculation, a rate of -0.15 was used.

Finally, current SOV traffic in the transit corridors of Arlington County during peak hours had to be estimated. Based on the 2005 American Community Survey, approximately 91,000 employees drive to work alone in Arlington. Of these, roughly 55 percent arrive between 6:30-9:00 a.m., with 36 percent arriving between 7:30-9:00 a.m. That would imply between 33,000 and 50,000 vehicles enter Arlington (depending on the definition of peak hours), the vast majority of which are presumed to park in the transit corridors. An estimate of 35,000 cars was selected.

4.3. Impacts and Reactions

The subsections below review the equity impacts of a parking tax on garage operators and parking patrons. As outlined in Section 5, we recommend the County establish a significant auditing component within the parking program to collect and verify parking tax receipts from all of the participating garages.

4.3.1. Building Owners and Parking Operators

The County should keep in mind that any tax it implements, especially one with non-uniform application, as in a peak-hour charge, will entail administrative costs on garage operators. Since many for-profit operators rely on slim profit margins, the County should be prepared to provide garage operators with financial support, either through direct grants or tax incentives, for the technology and infrastructure upgrades needed to collect the tax.

In addition, the County should be aware of possible geographical discrimination among garage owners if it decides to phase implementation of a parking tax in the Metrorail corridors or specific neighborhoods first. Arlington could refund a portion of the tax to garage operators in order to make up the lost income, but this would require accurate historical figures on garage revenues. The County may already have this data in a usable format, but this accounting would also add to the cost of the implementation.

4.3.2. Parking Patrons

Parking taxes are regressive, as those with lower income would pay more of a portion of what they earn than high-income individuals. These same low-income individuals may have less flexible work hours and be unable to shift to avoid the morning peak timeframe.

Congestion charges imposed on commuters during peak hours in cities like London and Singapore have reduced traffic and increased local revenues. The key to the success of these charging schemes, though, has been the wide availability of well-established, highly-accessible, and universally-convenient public transit systems. Arlington County enjoys a mature public transportation system that could accommodate commuters shifting from SOV to transit, but the County should be aware that a growing number of employees start their days in exurban jurisdictions that do not have well-developed public transit systems. In addition, due to the dispersed geographic reach of the Washington, DC region, we expect only marginal movement from SOV to carpooling.

The County may wish to distinguish between SOV and HOV users. Without a distinction, there is less incentive to move from SOV to HOV use as the driver will be forced to pay the congestion charge whether they enter the facility as a lone driver or with multiple passengers.

Further, we believe casual users or visitors to Arlington would be least deterred from SOV travel because of the high likelihood that they are not aware of the parking tax. We recommend that the County consider launching a public relations campaign to highlight the new tax that includes posting signs at all affected garage entrances to alert parkers to the tax and its hours.

4.4. Option 1: Tax Individual Vehicle during Peak Hours

4.4.1. Overview

This option would impose a tax on individual vehicles entering or exiting garages during peak congestion hours. We believe this would be the best way to charge each vehicle for the actual congestion it causes and force drivers to recognize the fee, but it could be the hardest system to implement because of multiple technological hurdles.

4.4.2. Revenue

Based on the assumptions spelled out above, the efficacy of a congestion parking tax would vary based on its amount. The table below illustrates the reduction in SOV traffic and inflow of income the County could expect for a daily parking tax fee between \$0.25 and \$6.00. Since a charge levied against vehicles directly bypasses employer subsidization, the assumptions about its prevalence and flexibility are irrelevant in this analysis.

Figure 4-1, Option 1 Revenue Table

SOV	Price Elasticity	Price per Day				
35,000	-0.3	\$6.00				
Tax Fee	Vehicle Reduction	County Revenue		Tax Fee	Vehicle Reduction	County Revenue
\$0.25	-438	\$ 2,160,156		\$3.25	-5,688	\$ 23,816,406
\$0.50	-875	\$ 4,265,625		\$3.50	-6,125	\$ 25,265,625
\$0.75	-1,313	\$ 6,316,406		\$3.75	-6,563	\$ 26,660,156
\$1.00	-1,750	\$ 8,312,500		\$4.00	-7,000	\$ 28,000,000
\$1.25	-2,188	\$ 10,253,906		\$4.25	-7,438	\$ 29,285,156
\$1.50	-2,625	\$ 12,140,625		\$4.50	-7,875	\$ 30,515,625
\$1.75	-3,063	\$ 13,972,656		\$4.75	-8,313	\$ 31,691,406
\$2.00	-3,500	\$ 15,750,000		\$5.00	-8,750	\$ 32,812,500
\$2.25	-3,938	\$ 17,472,656		\$5.25	-9,188	\$ 33,878,906
\$2.50	-4,375	\$ 19,140,625		\$5.50	-9,625	\$ 34,890,625
\$2.75	-4,813	\$ 20,753,906		\$5.75	-10,063	\$ 35,847,656
\$3.00	-5,250	\$ 22,312,500		\$6.00	-10,500	\$ 36,750,000

4.4.3. Advantages

The biggest advantages of this option are that the drivers would see the cost every time they traveled during peak periods and that the fee could be collected upon entry or exit from the garage. Collection at entry might better publicize the tax to drivers, while collection at exit, where most fare collection booths are located, might be easier to administer. Garages that use entry card systems, mostly for monthly parkers, would need to install a cashier or credit card payment system in order to collect the tax from occasional users. If they choose to collect the tax upon exit, the garages would need to work out a system for dealing with people who park beyond the hours of manned operations.

4.4.4. Disadvantages

The biggest disadvantage of this option is the high costs of monitoring traffic into and out of the garages and collecting the tax. The costs include both the technology to track and remit payments and the infrastructure to facilitate the new procedures inside the garage.

4.5. Option 2: Tax on Operator per Vehicle during Peak Hours

4.5.1. Overview

This option would levy a tax on the garage operators for each vehicle entering or exiting a garage during peak hours. While the garage would have the option of passing the fee onto the customer, it would not be mandatory, meaning garage operators would not be compelled to raise rates.

A time-of-day variable pricing scheme has been reported to have worked in Los Angeles to reduce peak hour congestion. It should be stated from the outset that other city comparisons are not necessarily directly comparable to what Arlington County may or could implement. Some cities, such as Madison, Eugene, and Chicago for example, only taxed (or raised rates) at public or a limited number of garages. Also, the literature reports conflicting results of the impact of these pricing schemes.

4.5.2. Revenue

Once again, the table below illustrates the reduction in vehicle count and realized revenue the County could expect from a flat-fee parking tax. In this calculation, though, the prevalence of free parking and the elasticity of its provision factor into the calculations. Because only one-third of cars parking are presumed to be affected by the tax, its overall efficacy is far lower than were the tax charged directly to vehicles. As the rate increases, fewer drivers would receive the parking benefit, increasing the effect of the tax. However, as long as any free parking for employees exists, this method will not be as effective as a direct levy against individual vehicles.

Figure 4-2, Option 2 Revenue Table

SOV	Elasticity	Price per Day		Free Parking %		Employer Elasticity	
35,000	-0.3	\$6.00		67.0%		-0.15	
Fee	Park Free	Vehicle Count	County Revenue	Fee	Park Free	Vehicle Count	County Revenue
\$0.25	66%	-147	\$ 2,178,306	\$3.25	59%	-2,339	\$ 26,537,075
\$0.50	66%	-300	\$ 4,337,539	\$3.50	58%	-2,557	\$ 28,387,461
\$0.75	65%	-458	\$ 6,476,675	\$3.75	58%	-2,781	\$ 30,205,444
\$1.00	65%	-621	\$ 8,594,688	\$4.00	57%	-3,010	\$ 31,990,000
\$1.25	64%	-790	\$ 10,690,552	\$4.25	56%	-3,245	\$ 33,740,103
\$1.50	63%	-965	\$ 12,763,242	\$4.50	56%	-3,485	\$ 35,454,727
\$1.75	63%	-1,145	\$ 14,811,733	\$4.75	55%	-3,730	\$ 37,132,847
\$2.00	62%	-1,330	\$ 16,835,000	\$5.00	55%	-3,981	\$ 38,773,438
\$2.25	61%	-1,521	\$ 18,832,017	\$5.25	54%	-4,238	\$ 40,375,474
\$2.50	61%	-1,717	\$ 20,801,758	\$5.50	53%	-4,500	\$ 41,937,930
\$2.75	60%	-1,919	\$ 22,743,198	\$5.75	53%	-4,767	\$ 43,459,780
\$3.00	60%	-2,126	\$ 24,655,313	\$6.00	52%	-5,040	\$ 44,940,000

4.5.3. Advantages

One benefit of this option is that most operators already collect data on the number of vehicles coming in and out of their garages, so accounting for the tax would not be a major burden. The garages could simply multiply the number of cars entering and/or exiting during peak hours by the charge and remit the payment to the County.

A second benefit is the flexibility given to garage owners as they could choose whether or not to pass the tax charge onto their customers. Of course, this is not the most advantageous way to reduce SOV traffic, but it might help alleviate some of the opposition to the tax from garage operators.

4.5.4. Disadvantages

The major drawback to this option is that the commuter would not necessarily know about the parking tax if the garage operator buried it in the overall parking price. From another point of view, politically this could be considered an advantage. In addition, the County and garage operators would need to determine a way to deal with monthly parkers who pay for parking en bloc instead of each time they enter the garage.

4.6. Option 3: Tax on Operator Revenues during Peak Hours

4.6.1. Overview

This option would impose a percentage rate tax on revenues of garage operators during peak hours. While similar to Option 2 in that the tax is assessed on the

operator, Option 3 is different in how the tax is calculated. This option would further bury the parking tax in the overall price of parking for the consumer.

4.6.2. Revenue

Revenue and vehicle count results for Option 3 are very similar to Option 2, in that they rely on the same basic assumptions and taxing mechanisms. However, rather than the rate being a specific dollar amount, rates are based on percentages of overall cost. The table below illustrates the results that could be expected for this method.

Figure 4-3, Option 3 Revenue Table

SOV	Elasticity	Price per Day		Free Parking %		Employer Elasticity	
35,000	-0.3	\$6.00		67.0%		-0.15	
Fee	Park Free	Vehicle Count	County Revenue	Fee	Park Free	Vehicle Count	County Revenue
4%	66%	-141	\$ 2,091,533	56%	59%	-2,434	\$ 27,355,171
8%	66%	-287	\$ 4,165,526	60%	58%	-2,646	\$ 29,118,600
12%	65%	-438	\$ 6,221,074	64%	57%	-2,863	\$ 30,851,789
16%	65%	-595	\$ 8,257,267	68%	57%	-3,084	\$ 32,553,830
20%	64%	-756	\$ 10,273,200	72%	56%	-3,311	\$ 34,223,818
24%	63%	-922	\$ 12,267,965	76%	56%	-3,543	\$ 35,860,843
28%	63%	-1,094	\$ 14,240,654	80%	55%	-3,780	\$ 37,464,000
32%	62%	-1,270	\$ 16,190,362	84%	54%	-4,022	\$ 39,032,381
36%	62%	-1,452	\$ 18,116,179	88%	54%	-4,269	\$ 40,565,078
40%	61%	-1,638	\$ 20,017,200	92%	53%	-4,521	\$ 42,061,186
44%	60%	-1,830	\$ 21,892,517	96%	53%	-4,778	\$ 43,519,795
48%	60%	-2,026	\$ 23,741,222	100%	52%	-5,040	\$ 44,940,000
52%	59%	-2,228	\$ 25,562,410				

4.6.3. Advantages

The advantages of implementing a percentage-of-revenue-tax are the same as Option 2, including flexibility for the operator and ease of collection.

4.6.4. Disadvantages

This option has the same disadvantages as Option 2, including indistinguishable charges to the customer and difficulty assessing the tax on monthly parkers. In addition, as mentioned above, a tax on operator revenue would bury the parking tax deeper into the overall price of parking for the consumer.

Further, this option may generate unequal charges from different garage operators. For example, if one garage charges much less per vehicle than another, the cheaper garage would pay a lower amount of tax because it takes in less revenue than the

higher-priced garage. Unlike the other options, the higher-priced garage operator would pay more in net taxes under Option 3 than the lower-priced garage operator.

Finally, this option may be the most difficult to calculate. In order for the tax to qualify as a congestion tax, it will need to be assessed only on revenue earned from those cars entering or exiting during peak hours. While tracking car counts for a flat rate should be relatively straightforward, garages would need to monitor the entry of individual cars to differentiate between those that should be charged the tax and those that should not. For garages employing time-stamp tickets this is not a major issue; however, patrons using a monthly parking pass would be far more difficult to track. It is this disadvantage that led Baltimore to institute its hybrid flat-rate/percentage parking tax.

4.7. Option 4: Status Quo and/or Other Congestion Reduction Policies

4.7.1. Overview

The final option is to forgo any increase in parking taxes and maintain status quo parking policies. This is the easiest and cheapest alternative, but it would do nothing to reduce congestion in the County. There is room for growth in vehicular parking, though, as garages in the employment-heavy Courthouse, Clarendon, and Virginia Square areas rarely exceed more than 70 percent occupancy, usually remaining less than half full throughout the day.

4.7.2. Revenue

This option would not generate any additional revenue for Arlington County. Alternatively, it could save the County the implementation, evaluation, and auditing costs of implementing a parking tax.

4.7.3. Advantages

In addition to saving technological implementation costs for the County and garage operators, this option enjoys the following benefits:

1. The County would not have to spend money attempting to implement an untested policy.
2. County resources could be directed towards other anti-congestion policies that might yield greater results, such as variable message signs directing drivers to open garages or a cordon charging system similar to London.
3. There would not be any spillover impacts in other jurisdictions where people would try to park to avoid paying the parking tax.
4. The public would not view the additional parking tax as a type of double taxation.
5. Employees with non-subsidized parking would not feel disadvantaged in spending extra money to cover increased parking costs.
6. There would not be any competitive disadvantages for businesses located in the taxed corridors.

4.7.4. Disadvantages

With Arlington unlikely to increase its road network in the future, this option does not start the process of addressing current or future parking congestion in Arlington. Maintaining the status quo does not provide a method to compel drivers to change their driving habits during the peak hours.

SECTION 5

Implementation Issues

This section describes the implementation issues Arlington County must be aware of before enacting a commercial parking tax. First, we examine several potential hurdles to successful implementation. Second, we highlight the importance of early outreach to interested stakeholders and the public. Third, we outline ways in which the County could phase-in implementation of the tax. Finally, we recommend the inclusion of an evaluation component with any parking tax plan for assessment and auditing purposes.

5.1. Potential Hurdles

Arlington has a number of policy hurdles to overcome before it could implement a parking tax successfully. The impediments detailed below require significant adjustments to a variety of legal, cultural, and social norms that cause many Arlington workers to drive their individual cars to work every day and park them at a low personal cost. Without addressing these issues, the County will not see major reductions in SOV traffic destined for Arlington.

5.1.1. Parking Tax Authority

Arlington must be granted the statutory authority to enact a parking tax and ensure that any parking tax plan conforms to all applicable state, local, and federal laws and regulations. Provisions of the Virginia Code and Arlington Ordinances dealing with authority over parking and taxes are included in Appendix D.

Section 3 of Article VII of the Constitution of the Commonwealth of Virginia provides that the State can, through general law or special act, allow local jurisdictions to exercise powers, such as the enactment of a tax, that are typically reserved for the State. Since this provision requires the Virginia General Assembly to approve any new parking tax in Arlington, the County should start by determining if any form of a parking tax already exists. If not, it would need to seek legislative authority from the General Assembly. The County also should review its local ordinances to make sure they comply with the imposition of a parking tax. The Office of the County Attorney, the County Board, and the Arlington delegates and senators in Richmond will need to determine the appropriate state and local authorizing language.

In addition, since federal clean air and transportation authorization statutes have provisions that could relate to the use of a parking tax as a means of reducing congestion and pollution, Arlington should be prepared to comply with these regulations in order to be eligible to receive federal funding for implementation of its parking tax program.

5.1.2. Employer-Subsidized Parking

Arlington must find a way to deal with the large number of employees who enjoy some level of subsidized parking from their employers. This problem has a unique angle in Arlington with so many federal employees and contractors working in each of

the Metrorail corridors. Ideally, parking taxes would increase the rates charged to motorists for parking and discourage many from SOV travel during peak congestion times. With Arlington hoping that the financial burden of the parking tax would affect travel behavior, any parking tax instituted by the County must be designed to discourage employers from continuing to subsidize parking to their employees. Otherwise, employees would not be affected by any level of parking tax because their employers would continue paying the full benefit. The County, then, would have difficulty affecting any change in driving behavior so long as employers continue to subsidize parking for their employees – even if a significant tax was levied.

5.1.3. Rigid Work Schedules

Arlington must be aware that many employers do not offer flexible work schedules to their employees. The County would like to see employees shift their mode of transport or time of travel in response to a congestion parking tax, however, not every workplace offers flexible work schedules or telecommuting options that would allow employees to alter their travel times. Under current practice, for instance, federal employees are assumed to be ineligible for telecommuting unless their agencies select them for work-at-home programs. The high number of public sector and government-contract employees in Arlington significantly reduces the pool of workers who would be able to move their commute times.

5.1.4. Competition from On-Street Parking

Arlington must evaluate its on-street parking policies in order to limit the ability of commuters to shift from garage parking to meter parking. At this time, Arlington's under pricing of on-street parking already is partially responsible for excessive parking demand and an inefficient use of parking facilities.

Furthermore, under priced metered spots encourage additional traffic congestion as drivers search for on-street parking. Studies have shown that the nationwide average price of curb parking in downtown areas is only 20 percent of that for parking in a garage, giving drivers a strong incentive to cruise, and that cruising for curb parking generates about 30 percent of the traffic in central business districts.⁴⁹

5.1.5. Carpoolers

Arlington must devise a way to deal with non-SOVs that park in Arlington. There may be cases where the County should not assess the full congestion parking tax, such as on the driver of a carpool. The County could register carpool drivers and vehicles, then either not charge them the tax or reimburse them for the instances when they carpool. While there would be significant auditing challenges with this arrangement, the County should weigh carefully the disincentive for ridesharing that would occur if all drivers are responsible for paying the tax each day regardless of how many people ride in their vehicle.

⁴⁹ Donald Shoup, "Gone Parkin'," *New York Times*, March 29, 2007.

5.1.6. Technology

Advancements in parking technologies may provide viable opportunities for Arlington to manage its congestion, but the associated costs could impede successful adoption. A number of potential arrangements that coordinate specific technologies may enable the County to streamline implementation of its parking tax initiative – such as vehicle detection systems, license plate recognition applications, digital cameras, radio frequency identification, and wireless data communication and telemetry applications.

Many of these solutions, though, depend upon the County's current and future information technology plans. In this context, a broader program for parking demand management that can provide real-time, accurate information on parking lot occupancy utilizing variable message boards, Short Message Services and Interactive Voice Response systems could be developed as a public-private partnership between garage operators, industry leaders, and Arlington County.

Furthermore, integrating different transaction options, such as EZ Pass or other parking payment mechanisms, would be an integral aspect and could also facilitate the County's capacity to develop collection systems independent of commercial garage facilities, while providing parkers with a convenient way to pay without cash or credit cards. While there is an increasing array of alternatives, the initial investment as well as the operation and maintenance costs of such systems may not be sustainable.

5.2. Regional Cooperation and Competition

Arlington should consider the impact that a commercial parking tax would have on the conditions in neighboring jurisdictions, including the City of Alexandria, Fairfax County, and Metro parking lots, as commuter parking could spill over into these other locations as drivers try to avoid paying Arlington's tax. While this would meet the objective of reducing traffic in Arlington, it could engender ill-will from Arlington's neighbors.

In addition, Arlington should be aware of the impact a commercial parking tax could have on retail businesses and restaurants in Arlington. While the experiences of desirable downtown retail centers with above-average income shoppers – such as Seattle, Santa Monica, and pre-Katrina New Orleans – bode well for Arlington as it competes with alternative shopping areas like Tysons Corner and Potomac Mills, the County risks losing commercial businesses and customers to neighboring jurisdictions if it implements a congestion parking tax on its own.

5.3. Early Buy-In from the Public and Stakeholders

The County should organize an outreach campaign to educate the interested stakeholders about the parking tax well in advance of its enactment. There are likely to be major political barriers to approval from Arlington residents, employers, garage owners, and garage operators who either do not want to pay the increased price for parking or do not want to lose parking revenues to the County. Adequately addressing early on how the businesses and the public would benefit from reduced congestion and enhanced transportation facilities could help minimize the political backlash against any proposal to raise taxes.

A parking tax should be accompanied by an expenditure plan, detailing how revenues would be spent, so that the stakeholders could see the benefits of any parking tax. The tax could provide increased incentives to take transit, carpool, walk, or cycle and substantial amounts of revenue to fund local transit, bicycle facilities, and improvements for motorists such as real-time parking guidance systems. In addition, while such benefits could be immediately experienced at the local level, there are other potential long-term benefits on a global level through the reductions of air pollution brought about by reductions in both congestion and on the reliance on automobiles as the primary source of local transportation.

5.4. Phased Implementation

The County could phase implementation of a parking tax in order to gauge and adjust its impact on building owners, garage operators, and the commuting public. We outline below options for introducing the tax according to location, price, and time of day.

5.4.1. Location

The County might consider instituting a parking tax first in areas that already experience congestion and have paid garage parking, starting with the Metrorail corridors. Not only are these corridors the destination point for most workers in Arlington, they also enjoy multiple public transit options and established fare collection systems with current parking operators. Further, most parking outside of the Metrorail corridors is free, so it would be difficult to implement a new charging system in these parking lots.

We suggest that Arlington start with a parking tax pilot project in Rosslyn. This neighborhood is a nexus for public transit, an area where the County already has a demonstrated congestion problem due to the mix of pass-through and destination traffic during peak periods, and an attractive location close to the Pentagon and Washington, DC, where few businesses would move away from solely because of a parking tax.

5.4.2. Price

The County could increase the parking tax rate over time so that businesses, garage operators, and drivers could acclimate themselves to the new tax. Since commuters have little short-term flexibility in their mode of transport, giving them time to adjust to their schedules or find alternative means to work might lessen the impact of the tax on those with lower incomes.

5.4.3. Time of Day

Since our research indicated the highest peaks during the morning commute in Arlington is between 7:30-8:30 a.m., the County could target this period for its congestion pricing. A more aggressive approach would tax the hours 7:00-9:00 or 6:30-9:30 a.m. Should Arlington want to go further and address congestion during the evening commute, it could impose a tax on vehicles exiting garages during the peak evening periods of 5:30-6:30 p.m. or 5:00-7:00 p.m.

5.5. Auditing and Evaluation Components

In order to implement a congestion parking tax successfully, Arlington must establish a significant auditing component within the County's parking program to collect and verify the parking tax receipts from all of the participating garages.

If it established an exemption for carpool vehicles, the County would need to conduct regular spot checks of garages to ensure that drivers are not abusing the system.

In addition, the County should monitor the tax rate closely to see if adjustments should be made in either direction in order to reach the desired policy goal of reducing SOV travel during peak periods.

SECTION 6

Conclusions

Arlington County tasked this George Mason University student research team with gauging the feasibility of imposing a parking tax on commercial and public garage facilities in order to reduce peak-period SOV travel. In addition to evaluating the current and predicted traffic and parking demand conditions in Arlington County, our study reviewed and analyzed the parking policy alternatives that have been adopted by municipalities across the United States. Next, we identified four parking tax policy options that could address traffic congestion issues. Then, we assessed the possible revenue generation, advantages, and disadvantages of each option. Finally, we identified a number of implementation issues that the County could face should it move forward with instituting a parking tax.

Our preliminary investigation concludes that it would be feasible for Arlington County to implement a parking tax as a congestion pricing mechanism. While it should be noted that the large amount of employer-subsidized parking in Arlington presents a unique challenge to instituting a tax designed to discourage SOV commuting, below are a number of policy recommendations we make to Arlington as it considers the establishment of a congestion parking tax:

- We recommend that the County collect a supplemental tax on individual vehicles as they enter or exit commercial garages during peak congestion periods, since the high visibility of this method offers the greatest potential for modifying the driving behavior of individual motorists. The County also could consider the operator-dependent options in the context of its broader initiatives for parking demand management. As such, the alternatives presented within this report are not mutually exclusive, and the County should consider the possibility of implementing a hybrid approach that directs different methods of taxation at different parking populations.
- We do not make a specific recommendation on the level of tax to be assessed, instead opting to present the correlation between SOV reduction and financial rates of return based on a reasonable set of economic assumptions. Establishing the appropriate amount would be dependent upon the County's priorities for expected reductions in traffic and anticipated financial resources.
- If the County does pursue a new parking tax policy, we recommend that it consider narrowing the morning and afternoon peak periods of fee assessment. In the morning, the period between 7:00-9:00 a.m. captures nearly one-half of daily SOV commuters, with the 7:30-8:30 a.m. hour accounting for roughly one-quarter of all drivers. While accurate congestion figures were not available, the evening congestion period generally runs between 5:00-7:00 p.m.
- We recommend that the County consider targeting the tax in specific neighborhoods or corridors – particularly the Metro corridors where most SOVs park each day. In addition, we recommend that the County develop a pilot program to evaluate technologies and performance before implementing a countywide taxing program.

APPENDIX A

U.S. Census Bureau, 2005 American Community Survey
 Means of Transportation to Work by Selected Characteristics
 For Workplace Geography--Arlington County, Virginia

Subject	Total	<u>Margin of Error</u>	Car, truck, or van -- drove alone	<u>Margin of Error</u>	Car, truck, or van -- carpooled	<u>Margin of Error</u>	Public transportation (excl taxicab)	<u>Margin of Error</u>
Workers 16 years and over	162,880	+/-6,280	91,314	+/-4,908	21,745	+/-2,660	35,068	+/-3,315
EARNINGS IN THE PAST 12 MONTHS (IN 2005 INFLATION-ADJUSTED DOLLARS) FOR WORKERS								
\$1 to \$9,999	4.9%	+/-0.8	4.0%	+/-1.0	4.8%	+/-2.1	4.5%	+/-1.7
\$10,000 to \$14,999	3.5%	+/-0.8	2.6%	+/-0.9	4.7%	+/-2.3	4.8%	+/-2.1
\$15,000 to \$24,999	8.4%	+/-1.4	7.8%	+/-1.7	11.2%	+/-4.2	8.4%	+/-2.8
\$25,000 to \$34,999	8.5%	+/-1.3	8.5%	+/-1.7	7.6%	+/-3.1	7.5%	+/-2.5
\$35,000 to \$49,999	14.3%	+/-1.4	14.7%	+/-1.9	9.4%	+/-3.6	18.6%	+/-3.3
\$50,000 to \$64,999	14.9%	+/-1.7	16.3%	+/-2.4	15.1%	+/-4.0	13.1%	+/-3.2
\$65,000 to \$74,999	7.3%	+/-1.0	7.9%	+/-1.3	7.7%	+/-2.6	6.3%	+/-2.0
\$75,000 or more	38.3%	+/-2.0	38.2%	+/-2.7	39.5%	+/-6.2	36.9%	+/-4.4
Median earnings (dollars)	59,756	+/-2,785	60,857	+/-2,033	61,019	+/-8,291	55,965	+/-4,649
CLASS OF WORKER								
Private for-profit wage and salary workers	51.5%	+/-2.1	55.8%	+/-3.1	48.3%	+/-5.3	45.2%	+/-5.0
Private not-for-profit wage and salary workers	9.8%	+/-1.4	11.6%	+/-2.0	7.3%	+/-2.8	5.8%	+/-2.0
Local government workers	4.1%	+/-0.8	5.3%	+/-1.1	2.5%	+/-1.6	2.8%	+/-1.3
State government workers	1.2%	+/-0.7	1.6%	+/-1.2	1.0%	+/-0.8	0.6%	+/-0.7
Federal government workers	29.4%	+/-1.9	22.7%	+/-2.4	39.3%	+/-5.4	44.6%	+/-5.1
Self-employed workers in own not incorporated business	4.0%	+/-0.9	3.0%	+/-0.8	1.5%	+/-1.1	1.1%	+/-0.8
Unpaid family workers	0.0%	+/-0.1	0.0%	+/-0.2	0.0%	+/-0.8	0.0%	+/-0.5
Workers 16 years and over who did not work at home	156,187	+/-6,045	91,314	+/-4,908	21,745	+/-2,660	35,068	+/-3,315

Parking Taxes as a Means of Congestion Pricing: A Feasibility Assessment

Subject	Total	<u>Margin of Error</u>	Car, truck, van or -- drove alone	<u>Margin of Error</u>	Car, truck, or van -- carpooled	<u>Margin of Error</u>	Public transportation (excl taxicab)	<u>Margin of Error</u>
TIME ARRIVING AT WORK FROM HOME								
12:00 a.m. to 4:59 a.m.	1.9%	+/-0.6	2.9%	+/-1.0	1.1%	+/-1.0	0.1%	+/-0.2
5:00 a.m. to 5:29 a.m.	2.0%	+/-0.7	2.9%	+/-1.0	1.2%	+/-1.1	0.4%	+/-0.4
5:30 a.m. to 5:59 a.m.	5.0%	+/-1.1	6.4%	+/-1.7	4.2%	+/-2.1	1.9%	+/-1.2
6:00 a.m. to 6:29 a.m.	6.7%	+/-1.1	6.3%	+/-1.4	7.1%	+/-2.3	8.6%	+/-2.6
6:30 a.m. to 6:59 a.m.	10.5%	+/-1.2	9.1%	+/-1.3	15.4%	+/-4.4	11.8%	+/-3.2
7:00 a.m. to 7:29 a.m.	14.8%	+/-1.5	10.1%	+/-1.8	23.0%	+/-4.6	21.9%	+/-3.6
7:30 a.m. to 7:59 a.m.	14.6%	+/-1.8	12.9%	+/-2.1	18.4%	+/-5.8	16.2%	+/-3.8
8:00 a.m. to 8:29 a.m.	13.7%	+/-1.3	13.7%	+/-1.9	13.3%	+/-3.6	13.2%	+/-2.6
8:30 a.m. to 8:59 a.m.	9.2%	+/-1.1	9.9%	+/-1.5	4.3%	+/-1.8	9.9%	+/-2.2
9:00 a.m. to 11:59 p.m.	21.6%	+/-1.8	25.8%	+/-2.5	12.0%	+/-3.6	15.9%	+/-3.1
Workers 16 years and over in households	162,880	+/-6,280	91,314	+/-4,908	21,745	+/-2,660	35,068	+/-3,315
VEHICLES AVAILABLE								
No vehicle available	4.9%	+/-1.0	0.9%	+/-0.5	0.4%	+/-0.5	16.4%	+/-3.3
1 vehicle available	26.1%	+/-2.0	25.1%	+/-2.4	19.5%	+/-5.5	29.7%	+/-4.2
2 vehicles available	41.8%	+/-2.0	42.7%	+/-2.5	46.2%	+/-5.6	35.0%	+/-3.9
3 or more vehicles available	27.3%	+/-2.1	31.2%	+/-2.5	33.9%	+/-6.4	18.9%	+/-3.5

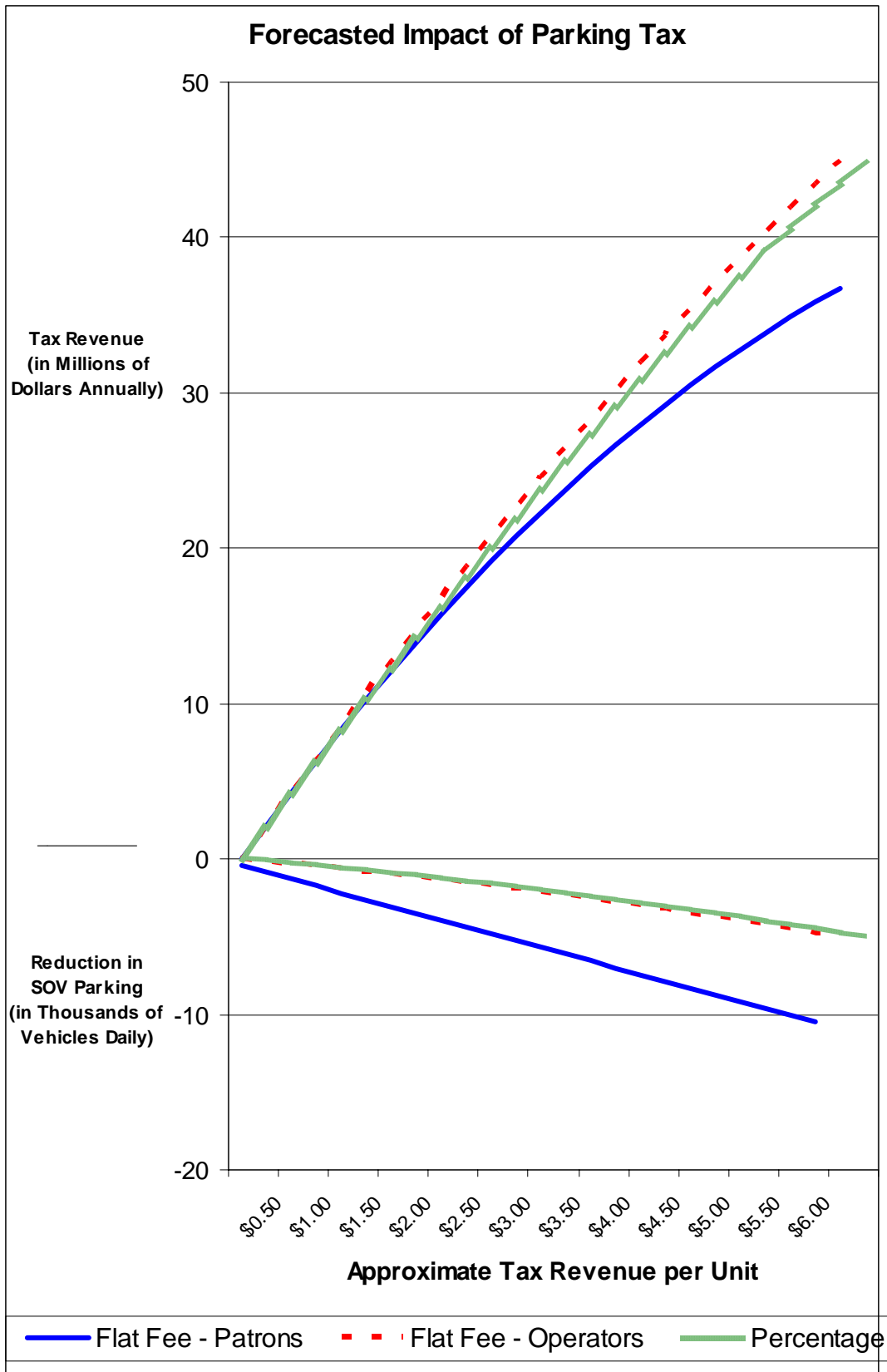
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APPENDIX B

Summary of Policy Options and Forecasted Impact

Alternative →		<i>Option 1: Tax Individual Vehicle during Peak Hours</i>	<i>Option 2: Tax on Operator per Vehicle during Peak Hours</i>	<i>Option 3: Tax on Operator Revenues during Peak Hours</i>	<i>Option 4: Status Quo and/or Other Congestion Polices</i>
POLICY	<i>Parking Tax Authority</i>	★	★	★	◇
	<i>Employer-Subsidized Parking</i>	★★★	◇	◇	◇
IMPLEMENTATION	<i>Impact on Garage Operator</i>	★	☞	☞	★★★
	<i>Collection and Auditing</i>	★	★★★	★★★	◇
	<i>Conducive Technologies</i>	★★★	★	★	◇
	<i>Integration with other Demand Management</i>	★	◇	◇	◇
RESULTS	<i>SOV Reduction</i>	★★★	★	★	◇
	<i>Revenue</i>	★★★	★★★	★★★	◇

KEY							
Good	★★★	Fair	★	Neutral	◇	Poor	☞



APPENDIX C

Case Studies Most Applicable to Arlington

Madison, WI

Introduction: Prior to the implementation of a parking tax in 1981, peak-time traffic in the downtown Madison area was at capacity in many locations, with little opportunity for increased road capacity. In addition, some public on-street and the majority of public off-street parking facilities in the area were at or above capacity during weekday peaks. The shortage of parking was cited as a handicap to filling vacant office space. Parking policies at the time targeted the needs of short-term parkers and encouraged commuters to use alternative modes of transportation.

Tax structure: In 1981, as part of a parking demonstration project, Madison imposed a \$1 peak period surcharge on all cars entering three municipal parking facilities before 9:30 am and staying longer than three hours. Apart from this, parking rates remained \$0.20/hour. The three garages made up 22 percent of Madison's off-street parking. Provision of a free shuttle service to and from satellite parking lots preceded the imposition of the surcharge.

Peak period demand effects: Morning peak period occupancy fell 40 percent. Parkers who used the surcharged garages prior to the demonstration were surveyed to determine their travel patterns during the demonstration: 22 percent of parkers simply moved to private lots, six percent arrived later or stayed fewer than three hours, and five to eight percent changed travel mode. Relatively few individuals used the free shuttle service.

Overall demand considerations: Mode shifts were modest, but the time and location shifts could reduce congestion. The city helped guard against transit ridership losses by pegging parking rates to transit fares.⁵⁰

San Francisco, CA

Introduction: The San Francisco parking tax, in place since the 1970s, is one of few studies to look into the concurrent effects of pricing on revenue generation and on the number of trips made, as discouraging private vehicle traffic in downtown areas was one of the goals of the tax. The City has seen a 2 percent overall reduction in the number of parked cars, significant reductions in parking durations, and a slight reduction in overall parking income (likely due to underreporting of income.)

Tax structure: San Francisco first implemented a 15 percent parking tax in the 1970s on both public and private parking spaces, excluding metered and residential spaces. The tax was raised to 25 percent in 1980. The lesson to be learned from San Francisco is that a municipality must clearly define who is subject to the tax and how it will be applied in order to help minimize or avoid future legal battles.

⁵⁰ Richard W. Willson, Donald C. Shoup, "Parking Subsidies and Travel Choices: Assessing the Evidence," ed. University of California Transportation Center (Berkeley: University of California, 1990).; City of Madison, "City of Madison Comprehensive Plan," (2006).; Economic and Planning Systems Inc., "Santa Cruz Paid Parking Policy Analysis.;" Parsons Brinckerhoff Quade & Douglas Inc., "101 in Motion Final Report."

Peak period demand effects: It is important to note that baseline parking rates in the region were already extremely high. Commuters were far more likely to shift travel behavior in response to price changes than were shoppers; long-term parking declined relative to short-term parking. In the year following the tax, commuters showed a price elasticity of -0.27 and shoppers showed a price elasticity of -0.08, meaning that commuters were three times more likely than shoppers to limit their trips in response to the parking tax. The high rates motivated shoppers to curtail their parking, although overall retail sales registered insignificant changes.

Pricing revenues returned: The combined effect of moderately reduced trip numbers and significantly reduced parking duration in response to the price increases slightly lowered overall parking income. Since the parking price increase was a tax, the City received significant new tax revenues, though the loss of gross revenues to private parking operators was greater.

Use of revenues: The revenues are split into two pots, with the general fund receiving 15 percent and public transportation receiving 10 percent.⁵¹

Eugene, OR

Introduction: In 1995, Eugene instituted a parking demonstration that raised monthly parking lease rates at two municipal garages and several surface lots over a one-year period.

Tax structure: Garage rates rose from \$16.00 to \$30.00 per month (an 88 percent increase), and surface lot rates rose from either \$6.00 to \$16.00 per month (a 167 percent increase) or \$16.00 to \$34.00 per month (a 113 percent increase), based on location. Short-term meter violation fines were also increased to deter commuter parking.

Demand effects: Monthly parking permit sales decreased from 560 to 360, reflecting a price elasticity of -0.60. Half of the former parkers switched to carpools or rode a free shuttle, and half parked elsewhere.⁵²

Santa Barbara, CA

Introduction: The City currently imposes a surcharge of \$2.00 for parkers leaving after 4:30 p.m. within the designated zone.

Peak period demand effects: Under a proposed variable parking rate system, discounts could be offered to commuters who arrive and park prior to the peak hour. This strategy may work at the local university, where large numbers of staff and faculty pay for parking. However, modifying this measure from an all-day price increase to variable pricing will likely lessen overall impacts. Based on Madison's experience, variable pricing of 3,200 spaces may reduce peak hour demand by up to 20 percent via a change in time or mode. Changes in travel behavior are less clear as many of these parkers may switch to private lots.

⁵¹ Willson, "Parking Subsidies and Travel Choices: Assessing the Evidence."; Economic and Planning Systems Inc., "Santa Cruz Paid Parking Policy Analysis."; Berk & Associates, "Parking Tax Analysis."; San Francisco Charter Section 16.110(4); Controller's Office City and County of San Francisco, "Parking Tax," (2006).

⁵² Willson, "Parking Subsidies and Travel Choices: Assessing the Evidence."

Overall demand effects: Using parking pricing incentives to encourage off-peak arrivals and departures in downtown Santa Barbara would need to be done in a modest way so as not to affect businesses. Thus the relative congestion reduction would also be modest. A daily drawing for \$200.00 in prizes resulted in a 24-space reduction in demand in downtown Santa Barbara as part of the "Try Something New" pilot program in 2001.

Tax impacts: This effort would need to be tied to residential parking restrictions to minimize impacts to neighboring residential areas. Some private businesses might be impacted by loss of visitors or shoppers. Loss of parking revenue would need to be considered or countered with a peak price increase.⁵³

Los Angeles, CA

Many buildings in downtown Los Angeles employ a variable parking rate system for controlling peak hour parking and traffic. This system offers discounts to commuters who arrive and park prior to the peak hour, and has proven to be quite successful.⁵⁴

Baltimore, MD

After initially implementing a flat rate parking tax, in 2001, the City of Baltimore changed its tax structure to a percent-of-revenue tax (in the amount of 11 percent) for daily and weekly transient parking. Effective July 1, 2003, the rate is 12 percent. Monthly contracts are still based on a flat fee of \$15.00 per month. The tax structure was changed because the flat rate was difficult to monitor and audit and required tracking of individual transactions.⁵⁵

⁵³ Parsons Brinckerhoff Quade & Douglas Inc., "101 in Motion Final Report."

⁵⁴ Ibid.

⁵⁵ Berk & Associates, "Parking Tax Analysis."

APPENDIX D

Parking Tax Authority
In Virginia Code and Arlington Ordinances

The following are provisions in the Code of Virginia, 1950, as amended,⁵⁶ and the Code of the County of Arlington, Virginia, 1957,⁵⁷ that may have some bearing on implementation of a congestion parking tax:

Code of Virginia, 1950, as amended § 15.2-204. Uniform charter powers.
Cities and towns shall have all powers set forth in Article 1 (§ 15.2-1100 et seq.) of Chapter 11, known as the uniform charter powers. Such powers do not need to be set out or incorporated by reference in a city or town charter.
Counties shall have all powers set forth in Article 1 (§ 15.2-1100 et seq.) of Chapter 11 only when such powers are specifically conferred upon the county.

Code of Virginia, 1950, as amended § 15.2-1100. Powers conferred; exercised by council.
A municipal corporation shall have and may exercise any or all powers set forth in this article, regardless of whether such powers are set out or incorporated by reference in a municipal charter. All powers vested in a municipal corporation by this chapter shall be exercised by its governing body.

Code of Virginia, 1950, as amended § 15.2-402. Board of county supervisors; election; terms; chairman; vacancies.
A. The powers and duties of the county as a body politic and corporate shall be vested in a board of county supervisors ("the board")....

Code of Virginia, 1950, as amended § 15.2-1201. County boards of supervisors vested with powers and authority of councils of cities and towns; exceptions.
The boards of supervisors of counties are hereby vested with the same powers and authority as the councils of cities and towns by virtue of the Constitution of the Commonwealth of Virginia or the acts of the General Assembly passed in pursuance thereof....

Code of Virginia, 1950, as amended § 15.2-967. Parking facilities.
Any locality may provide off-street automobile parking facilities and open them to the public, with or without charge, and when any locality constructs or has constructed any such facility, it may lease space therein for private commercial purposes which are necessary for sound fiscal management of the parking facility or which space is not suitable for parking.

Code of Virginia, 1950, as amended § 58.1-3706. Limitation on rate of license taxes.
A. Except as specifically provided in this section and except for the fee authorized in § 58.1-3703, no local license tax imposed pursuant to the provisions of this chapter, except §§ 58.1-3712, 58.1-3712.1 and 58.1-3713, or any other provision of this title or any charter, shall be imposed on any person whose gross receipts from a business, profession or occupation subject to licensure are less than: (i) \$100,000 in any locality with a population greater than 50,000; or (ii) \$50,000 in any locality with a population of

⁵⁶ <http://legis.state.va.us/Laws/CodeofVa.htm>

⁵⁷ <http://www.municode.com/resources/gateway.asp?pid=11749&sid=46>

25,000 but no more than 50,000. Any business with gross receipts of more than \$100,000, or \$50,000, as applicable, may be subject to the tax at a rate not to exceed the rate set forth below for the class of enterprise listed:

1. For contracting, and persons constructing for their own account for sale, sixteen cents per \$100 of gross receipts;
2. For retail sales, twenty cents per \$100 of gross receipts;
3. For financial, real estate and professional services, fifty-eight cents per \$100 of gross receipts; and
4. For repair, personal and business services, and all other businesses and occupations not specifically listed or excepted in this section, thirty-six cents per \$100 of gross receipts...

Code of Virginia, 1950, as amended § [46.2-1219](#). Regulation of vehicular and pedestrian traffic on certain parking lots.

The governing body of any county, city, or town may by ordinance regulate the flow of vehicular and pedestrian traffic, the parking of vehicles, and speed limits on parking lots which are open to the public and designed to accommodate fifty or more vehicles, but no such ordinance shall conflict with state law.

Code of Virginia, 1950, as amended § [15.2-2303.1](#). Development agreements in certain counties.

- A. In order to promote the public health, safety and welfare and to encourage economic development consistent with careful planning, any county with a population between 10,300 and 11,000 according to the 1990 United States Census through which an interstate highway passes may include in its zoning ordinance provisions for the governing body to enter into binding development agreements with any persons owning legal or equitable interests in real property in the county if the property to be developed contains at least one thousand acres.
- B. Any such agreements shall be for the purpose of stimulating and facilitating economic growth in the county; shall not be inconsistent with the comprehensive plan at the time of the agreement's adoption, except as may have been authorized by existing zoning ordinances; and shall not authorize any use or condition inconsistent with the zoning ordinance or other ordinances in effect at the time the agreement is made, except as may be authorized by a variance, special exception or similar authorization. The agreement shall be authorized by ordinance, shall be for a term not to exceed fifteen years, and may be renewed by mutual agreement of the parties for successive terms of not more than ten years each. It may provide, among other things, for uses; the density or intensity of uses; the maximum height, size, setback and/or location of buildings; the number of parking spaces required; the location of streets and other public improvements; the measures required to control stormwater; the phasing or timing of construction or development; or any other land use matters.

...

Code of Virginia, 1950, as amended § [46.2-1230](#). Authority of counties, cities, and towns to issue parking permits.

The governing body of any county, city, or town may by ordinance provide for the issuance of permits for motor vehicles parking on public streets, to set the rates for the permits, and to set the term of validity of the permits. In setting the rates, the governing body may differentiate between motor vehicles registered in the political subdivision issuing the permit and other motor vehicles.

(1972, c. 819, § 46.1-252.01; 1989, c. 727.)

Code of Virginia, 1950, as amended § [62.1-198](#). Legislative findings and purposes.

The General Assembly finds that there exists in the Commonwealth a critical need for additional sources of funding to finance the present and future needs of the

Commonwealth for water supply; wastewater treatment facilities; drainage facilities; solid waste treatment, disposal and management facilities; recycling facilities; resource recovery facilities; professional sports facilities; certain heavy rail transportation facilities; public safety facilities; airport facilities; the remediation of brownfields and contaminated properties; the design and construction of roads, public parking garages and other public transportation facilities, and facilities for public transportation by commuter rail; and the location or retention of federal facilities in the Commonwealth and the support of the transition of former federal facilities from use by the federal government to other uses....

Note: Section 62.1-198 gives authority to Virginia Resources Authority.

Code of the County of Arlington, Virginia, 1957 § 11-59.1. Parking garages or lots.

Every person engaging in any of the following business services shall pay an annual license tax of thirty-six cents (\$0.36) for each one hundred dollars (\$100.00) of gross receipts from the business during the preceding calendar year: parking garage, parking lot, u-park-it lot, valet parking lot, other parking facilities. (Ord. No. 96-17, 12-7-96)

Code of the County of Arlington, Virginia, 1957 § 14.2-40. Designations of zones.

(a) The county manager is hereby authorized to designate the specific portions or areas of highways, streets, parking lots, and roads in the County of Arlington, Virginia, to be known as parking meter zones, and upon which parking meters shall be installed and maintained. Such parking meter zones to be established in the discretion of the county manager, based upon the results of an engineering and traffic investigation.

(b) Parking meter zones now in existence as heretofore established shall continue to be maintained upon the specific portions or areas of highways, streets, parking lots, and roads heretofore designated by action of the county board of Arlington County, Virginia, unless and until the county manager, in his discretion based upon an engineering study and investigation, shall determine otherwise and eliminate the existing parking meter zones or any of them or any parking meter zones hereafter designated by him.

(c) The county manager is authorized to designate and post land owned or leased by the county board as a permit parking zone, to be restricted to holders of valid parking permits. Parking permits shall include the following:

- (1) Employee permits.
- (2) Temporary permits.
- (3) Juror permits.

(d) It shall be unlawful to park any vehicle in permit parking zones without a valid current permit.

(e) Any person who shall violate this section shall be punished by a fine of not less than one dollar (\$1.00) nor more than one hundred dollars (\$100.00).

(12-12-60; 7-3-67; 7-8-72; Ord. No. 92-33, 7-11-92)

Results of Arlington County Worker Questionnaire

Overview

In an unscientific poll, the research team surveyed 85 workers in Arlington County about their weekly commuting and parking habits. This study was conducted in the Crystal City, Rosslyn, Ballston and Virginia Square areas of Arlington. The results are intended to offer a small-scale assessment of the possible effects of a change in the pricing of garage parking on individual commuting behavior.

1. Total Audience Responses: What is your primary method of transportation to work each week?

Method of Transportation to Work	Percentage
Drive	47%
Public Transportation	44%
Bike/Walk	9%

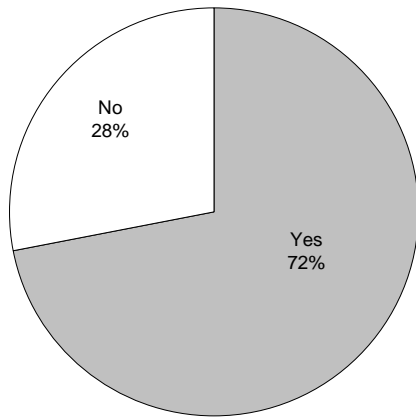
2. Driver's Responses: What is your County of Residence?

County/Jurisdiction of Residence	Percentage
Arlington	28%
Fairfax	45%
District of Columbia	15%
Maryland	7%
Prince William	5%

3. Drivers' Responses: On a typical workday, what time do you arrive at work?

Time of Arrival at Work	Percentage
5:30 - 6:30 a.m.	5%
6:30 - 7:30 a.m.	10%
7:30 - 8:30 a.m.	18%
8:30 - 9:30 a.m.	45%
After 9:30 a.m.	22%

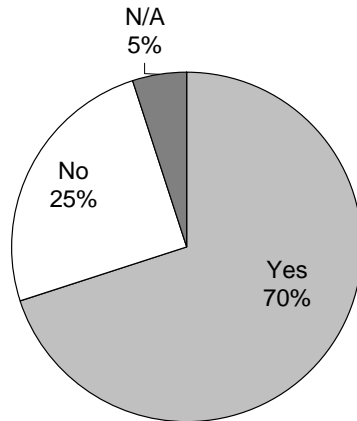
4. Drivers' Responses: When you drive to work, do you park in a garage?



5. Drivers' Responses: How important is the cost of parking to your decision over whether to drive?

Importance of Cost of Parking	Percentage
Not Important	15%
Somewhat Important	22.5%
Neutral	7.5%
Important	30%
Very Important	25%

6. Drivers' Responses: If you could save money by arriving earlier than 7:30 a.m. or later than 9:30 a.m., would you adjust your commuting schedule?



Questionnaire Summary and Conclusions

The questionnaire responses indicate that 47 percent of the Arlington workers polled drive to work daily. This number is well below national averages due at least in part to the accessibility of transit in the Arlington area and its walkable nature. Land-use and transit decisions based on Smart Growth principles have paid dividends for Arlington in reducing the number of drivers daily into the corridor. Forty-four percent of those polled use public transportation and nine percent listed walking or biking as their primary method of transportation to work.

The majority of the drivers (45 percent) that were polled reside in neighboring Fairfax County. The second highest response on home jurisdiction was Arlington County, with 28 percent of the drivers polled. Despite having a robust public transportation system, many Arlington residents who work within the County choose to drive to work. The remaining jurisdictions represented in the poll were Washington, DC (15 percent), Maryland (7 percent), and exurban Prince William County (5 percent).

Seventy-two percent of the workers surveyed said that they park in a garage when they drive to work. The majority of workers in the Rosslyn-Ballston corridor park in garages where there is little surface parking and limited on-street parking. Arlington County has identified the search for parking and the entry into parking garages as a contributing factor in its daily road congestion. An examination of the typical daily arrival times illustrates why drivers entering a garage could cause such a considerable amount of congestion. Eighteen percent of drivers surveyed stated that they typically arrive at work between 7:30-8:30 a.m., but the data show that the highest response by far was 45 percent of the drivers surveyed arrive at work between 8:30-9:30 a.m. A combined 63 percent of those drivers surveyed arrive within a two-hour window (7:30-9:30 a.m.) in the mornings. These peak arrival times are consistent with the peak periods of congestion reported by the Census Bureau.

When asked about the importance of the price of parking, drivers reported mixed results. A combined 55 percent said that the price of parking was either "Important" or "Very Important." However, 37.5 percent stated that the price of parking was "Not Important" or only "Somewhat Important." While the cost of parking does not seem to be a strong predictor in a commuter's decision over whether to drive to work, 70 percent of this same audience responded that they would consider changing their schedules if they could save money by arriving earlier than 7:30 a.m. or later than 9:30 a.m. These responses may seem to be contradictory, but it appears that if Arlington County were to implement a congestion pricing tax on parking in garages, commuters would consider changing their arrival times to avoid the higher prices.

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