Carsharing and Public Parking Policies: Assessing Benefits, Costs, and Best Practices in North America

MTI Report 09-09

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CARSHARING AND PUBLIC PARKING POLICIES: ASSESSING BENEFITS, COSTS, AND BEST PRACTICES IN NORTH AMERICA

March 2010

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16. **Abstract**

At present, local jurisdictions across North America are evaluating how best to provide parking spaces to carsharing vehicles in a fair and equitable manner. Some have initiated implementation of carsharing parking policies, and many continue to evolve as the demand and need for carsharing grows. Many others are seeking guidance on carsharing parking, based on the fledgling experience of other cities. This study documents the state of the practice with respect to carsharing and parking policies in North America. The study begins by providing background on the evidence of carsharing benefits and an overview of carsharing and parking policy internationally. This is followed, in Section Three, by a more detailed description of carsharing parking policies in North America that highlights key policy attributes, including parking allocation, caps, fees and permits, signage, enforcement, public involvement processes, and impact studies. In Section Four, in-depth case studies are presented for more advanced carsharing parking policies in the United States, including Philadelphia, Pennsylvania; Portland, Oregon; Washington, D.C.; and the San Francisco Bay Area and the Bay Area Rapid Transit (BART) District. In Section Five, the results of a survey exploring the public's opinion about the provision of on-street parking for carsharing in the San Francisco Bay Area is presented. Finally, in Section Six, key results are summarized to provide policy guidance to local governmental agencies considering the implementation of carsharing parking policies.

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EXECUTIVE SUMMARY

North American carsharing (short-term vehicle access) growth was on a near-exponential trajectory from the late 1990s to 2004. A large body of empirical evidence now documents carsharing's effectiveness in reducing auto ownership, vehicle miles traveled (VMT), and vehicle emissions; increasing public transit use; and allowing more efficient use of roadways and parking facilities. Despite the significant benefits of carsharing, from 2005 to 2008, membership and vehicle growth rates among carsharing organizations have slowed from their exponential climb, but continue at a healthy moderated pace in both the United States and Canada. One of the major barriers to the wider use and growth of carsharing services is the development of a dense network of parking access locations for carsharing vehicles by users, such as on-street, public off-street, and public transit station parking. Moreover, the free or affordable provision of these spaces in key locations to carsharing operators can keep the cost of carsharing services down and thus increase the demand for these services. Of course, affordability of carsharing spaces is a term relative to the costs of the region, but at a minimum, spaces should be considered affordable in the context of the cost of acquisition and maintenance of the space in addition to the capital and operational cost of the carsharing vehicle occupying the space.

At present, local jurisdictions across North America are evaluating how best to provide parking spaces to carsharing vehicles in a fair and equitable manner. Some have initiated implementation of carsharing parking policies, and many continue to evolve as the demand and need for carsharing grows. Many others are seeking guidance on carsharing parking, based on the fledgling experience of other cities.

This study documents the state of the practice with respect to carsharing and parking policies in North America. The study begins by providing background on the evidence of carsharing benefits and an overview of carsharing and parking policy internationally. This is followed, in Section Three, by a more detailed description of carsharing parking policies in North America that highlights key policy attributes, including parking allocation, caps, fees and permits, signage, enforcement, public involvement processes, and impact studies. In Section Four, in-depth case studies are presented for more advanced carsharing parking policies in the U.S., including Philadelphia, Pennsylvania; Portland, Oregon; Washington, D.C.; and San Francisco Bay Area and the Bay Area Rapid Transit (BART) District. In Section Five, the results of a survey exploring the public's opinion about the provision of on-street parking for carsharing in the San Francisco Bay Area is presented. Finally, in Section Six, key results are summarized to provide policy guidance to local governmental agencies considering the implementation of carsharing parking policies.

Local governments in North America have addressed the issue of carsharing parking in a number of ways. With respect to on-street parking, some cities have established "option zones" that designate on-street carsharing parking. Other cities have allocated parking stalls to carsharing as a "vehicle-class" rather than dedicating parking spots to specific carsharing operators. In other cities, some operators are charged for on-street parking at the rate of foregone meter revenue or permit fees. With respect to public off-street parking, a number of cities provide market rate, discounted, and free parking in municipal parking lots and garages for carsharing.

Based on the four case studies and expert interviews, the authors have identified three policy tracks that local governments and public transit operators might use as a model for developing their carsharing parking policies. These policy approaches include a sample policy framework for parking allocation, caps, fees/permits, signage/installation, impact studies, enforcement and public involvement based on varying degrees of governmental support. The first framework, "carsharing as an environmental benefit," is an example of maximum governmental support. Under this framework, the government considers carsharing to play a definable role in mitigating a variety of public costs associated with personal automotive use. In this sense, many public agencies view carsharing as contributing to the public good and therefore justify the allocation of public resources. The second framework, "carsharing as a sustainable business," provides moderate support to carsharing. Under the second framework, carsharing is still seen as a service that produces environmental benefits, but it is also a revenue-earning enterprise. Hence, a public agency provides more limited support and infrastructure for the carsharing service, and the carsharing organization is expected to carry a larger share of the operational costs moving forward. The final policy framework, "carsharing as a business," provides a minimum level of governmental support. Under this framework, carsharing is little more than another commercial operator within the urban environment. It bares the full cost of pursuing special parking allocations under the same regime offered to any other business in any other industry. The details of these three frameworks are described in table 1.

Public involvement is an important aspect of allocating carsharing parking and should be incorporated into the process for allocating parking stalls. Public involvement in this process can reduce opposition to the conversion of pre-existing parking stalls and provide both jurisdictions and operators with valuable information on the highest-demand/highest potential use locations. The particular method of public involvement should reflect the unique institutions and policy procedures established in each jurisdiction. Some examples of public involvement could include endorsement by neighborhood councils (as in Washington, D.C.); a public comment, hearing, and approval process for the allocation of parking stalls; or an appointed/elected body to comment or approve parking requests. Some jurisdictions have provided city councils and parking authorities with varying degrees of authority over carsharing parking that can include public involvement through regular meetings and public comment periods.

Table 1 Carsharing Parking Policy Approaches for Local Governments

	Carsharing as an Environmental Benefit *Maximum Governmental Support*	Carsharing as a Sustainable Business *Moderate Governmental Support*	Carsharing as a Business *Minimum Governmental Support*
Allocation	Jurisdiction may allocate parking spaces on a case-by-case basis or through more informal processes, such as non-binding council/board of director resolutions.	Jurisdiction that once allocated parking spaces through an informal process, formalizes this process.	Jurisdiction maintains a highly formalized and established process for the allocation of carsharing parking spaces, including a process for allocation among multiple operators.
Caps (for example, limit on number of carsharing spaces)	Does not impose any cap on the number of carsharing spaces or percentage of spaces that may be converted to carsharing.	May impose a cap on the number and location of carsharing spaces or the total percentage of spaces jurisdiction-wide that may be converted to carsharing.	Imposes a cap on the number and location of carsharing spaces or the total percentage of spaces jurisdiction-wide, which may be converted to carsharing.
Fees and Permits	Recognizing the social and environmental benefits of carsharing, parking is provided free-of-charge or significantly below market cost.	Fees may be based on cost recovery of parking provision (for example, foregone meter revenue, administrative costs, and so on). Fees may be reduced to reflect environmental goals, such as charging a reduced carpool rate for carsharing parking.	Fees based on a cost recovery or profit-based methodology. This could include permit costs, lost meter revenue, and administrative expenses for program management.
Signage, Markings, and Installation	Jurisdiction pays for the sign installation and maintenance, striping, and markings.	Jurisdiction pays for the installation and operator pays for the maintenance of signage, striping, and markings.	Requires carsharing operator to pay for the installation and maintenance of signage, striping, and markings.
Social and Environmental Impact Studies	Require that carsharing operators study and document local social and environmental benefits at regular intervals.	May require carsharing operators to study and document local social and environmental benefits on a one-time basis or at regular intervals.	Does not require any social and environmental impact study of carsharing.
Parking Enforcement	Local police may maintain ticket authority. Citations for parking in carsharing stalls are greater than most other parking violations.	Local police may maintain ticket/citation authority.	Local police may have ticketing authority. Citations for parking in carsharing spots are the same as most other parking violations.
Public Involvement	Informal process, if any, led by the jurisdiction to elicit public input into the location and number of carsharing parking spots allocated. Staff may determine this internally, without public comment.	Informal process where the jurisdiction and carsharing organization seek public input into the location and number of carsharing parking spots through public notification and staff management of possible public concerns.	Highly formalized process where carsharing organization is responsible for obtaining public input and approval on the location and number of carsharing parking spots through neighborhood councils, commissions, or formal hearings.

Indeed, the results of a survey exploring San Francisco Bay Area residents' opinions about the provision of on-street parking for carsharing underscore the importance of public involvement in the development of carsharing parking policies. More respondents indicated a willingness to convert spaces for carsharing than to oppose such a conversion. The types of parking that had both the greatest support and least opposition to conversion to carsharing parking were taxi zones, no parking/no stopping zones, and restriping existing parking spaces; however, a large share of respondents did support conversion of metered parking. About half of respondents thought that carsharing organizations should compensate the city for these on-street spaces. Among those that thought that carsharing organizations should compensate the city for these spaces, most indicated that the organization should pay a reduced cost (52 percent), the cost of the parking permit (19 percent), or the cost of lost meter revenue. Many felt that there should be a different policy for granting on-street parking spaces to for-profit carsharing providers versus non-profit carsharing providers (61 percent).

In the future, operator competition is expected to increase in many local jurisdictions. As such, local governments and public transit operators should develop forward-looking policies that provide an equitable means of allocating parking stalls (both in terms of total number and location). To address the total number of stalls, local jurisdictions can either limit the number of spaces allocated per an operator, provide a limited number of spaces per a given membership level (for instance, one parking stall per 100 members served), or choose not to limit the number of carsharing spaces. If a jurisdiction chooses to allocate spaces based on membership, it should be cautious because larger organizations may have a strategic advantage, and there is no definition of active verses casual membership in carsharing (for instance, how frequently a member uses the service). Allocating based on membership will give larger organizations an additional strategic advantage at a time when they already have one. Hence, such action could inevitably lower competition in the industry and raise consumer costs. In addition, there is an informal distinction in the industry between active membership and passive (or casual) membership in carsharing. Active members use carsharing regularly, whereas passive members rarely use the service, and they may be members in a nominal sense through a no-cost or low cost plan. These issues should be considered when weighing the importance of the size of a carsharing organization. Some of the methods that can be used to address competition over the location of parking stalls between operators include a first-come/first-served policy, lottery, collaborative process negotiated with the parking authority and all service providers, and tandem stalls (more than one operator with an equal number of adjacent stalls).

There are a number of methods that can be used for assessing the value of on-street parking spaces provided to carsharing operators. On-street parking fees can be based on the cost of residential parking permits, foregone meter revenue, operations and maintenance, or market cost for private or public off-street parking in a given parking district or municipal jurisdiction. Additionally, jurisdictions may choose to charge fees for converting parking stalls including the conversion costs associated with removing meters, striping curbs, and administrative overhead.

Parking policies should include enforcement mechanisms to prevent non-carsharing vehicles from parking in carsharing-only stalls. Jurisdictions should ensure that they have

the proper statutory authority at a minimum to ticket violators.

With respect to distinguishing between carsharing and car rental services, local governments should cautiously weigh the nature of the services being provided and their impacts on the transportation network. Carsharing frequently differs from car rental in distinct ways. Car rental is generally used for day-long or multi-day trips and is rarely used for servicing daily transportation needs. As such, car rental is not widely considered a substitute of car ownership. Conversely, carsharing is frequently a membership-based service where members frequently use carsharing for more frequent, short-term local transportation needs. One way to assess the effectiveness of services provided is to require operators to conduct usage/impact surveys and provide regular feedback to local governments. Similarly, public transit operators can require similar operator surveys to ensure that carsharing users are taking public transit.

INTRODUCTION

A large body of empirical evidence now documents carsharing's (short-term auto access) effectiveness in reducing auto ownership, vehicle miles traveled (VMT), and vehicle emissions; increasing public transit use; and allowing more efficient use of roadways and parking facilities. Despite the significant benefits of carsharing, from 2005 to 2008, membership and vehicle growth rates among carsharing organizations have moderated in both the U.S. and Canada (Shaheen, Cohen, and Chung 2009; Shaheen, Cohen, and Roberts 2006). One of the major barriers to the wider use and growth of carsharing services is the development of a dense network of parking access locations for carsharing vehicles by users, such as on-street, public off-street, and public transit station parking (Millard-Ball, Murray, and Schure 2006). Moreover, free or affordable provision of these spaces in key locations to carsharing operators can keep the cost of carsharing services down and thus increase demand for these services. A carsharing expert, David Brook, notes:

> Finding and leasing parking spaces in urban areas turns out to be a more difficult and time-consuming job than most carsharing organizations anticipate. Providing designated, reserved on-street parking spaces can be one of the important ways a local government can support the growth of carsharing. Typically, such spaces are established under the same regulation that enables a city to designate parking for other classes of vehicles, such as taxicabs, movie or hotel zones. (2005, pg. 8)

Parking is an important issue because parking locations define the vehicle network of the carsharing organization. In addition, parking is an asset that cities can offer to carsharing organizations to help lower costs and facilitate growth in lieu of monetary support, which may not be a legal or financial option for public agencies. At present, local jurisdictions across North America are evaluating how best to provide parking spaces to carsharing vehicles in a fair and equitable manner. Some have initiated implementation of carsharing parking policies, and many continue to evolve as the demand and need for carsharing grows. Many others are seeking guidance on carsharing parking, based on the fledgling experience of other cities.

This study documents the state of the practice with respect to carsharing and parking policies in North America. The study begins by providing background on the evidence of carsharing benefits and an overview of carsharing and parking policy internationally. This is followed, in Section Three, by a more detailed description of carsharing parking policies in North America that highlights key policy attributes, including parking allocation, caps, fees and permits, signage, enforcement, public involvement processes, and impact studies. In Section Four, in-depth case studies are presented for more advanced carsharing parking policies in the U.S., including Philadelphia, Pennsylvania; Portland, Oregon; Washington, D.C.; and the San Francisco Bay Area and the Bay Area Rapid Transit (BART) District. In Section Five, the results of a survey exploring the public's opinion about the provision of on-street parking for carsharing in the San Francisco Bay Area is presented. Finally, in Section Six, key results are summarized to provide policy guidance to local governmental agencies considering the implementation of carsharing parking policies.

BACKGROUND

Auto ownership is widespread in North America. In 2001, 92.1 percent of U.S. and 78.2 percent of Canadian households owned at least one vehicle (U.S. Department of Transportation 2003; Canadian Statistics 2005). Over 60 percent of U.S. and 35 percent of Canadian households owned two or more vehicles (U.S. Department of Transportation 2003; Canadian Statistics 2005). Not surprisingly, transportation represents the second and third largest consumer expenditures in the U.S. (19.1 percent) and Canada (13.6 percent), respectively (U.S. Department of Labor 2005; Canadian Statistics 2004). With auto ownership and fuel costs rising, individuals are seeking alternatives to private vehicle ownership. Short-term auto use or carsharing programs—through hourly rates and subscription-access plans—provide such an alternative, especially for individuals living in major urban areas, households with one or more vehicles, and those with access to other transportation modes, such as public transit and carpooling.

The principle of carsharing is simple: individuals gain the benefits of private vehicle use without the costs and responsibilities of ownership (Shaheen, Cohen, and Roberts, 2006). Instead of owning one or more vehicles, a household or business accesses a fleet of shared-use autos on an as-needed basis. Individuals gain access to vehicles by joining an organization that maintains a fleet of cars and light trucks in a network of locations. Generally, participants pay a fee each time they use a vehicle (Shaheen, Schwartz, and Wipyewski 2004; Shaheen, Cohen, and Roberts 2006). Carsharing became popularized in Europe in the mid- to late-1980s. Approximately 600,000 individuals belong to carsharing organizations worldwide. Since 1994, a total of 49 carsharing programs have been deployed in North America—33 are operational, and 16 are defunct. As of July 1, 2008, there were 14 active programs in Canada and 19 in the U.S., with an estimated 319,000 carsharing members sharing approximately 7,500 vehicles in North America. The four largest providers in the U.S. and Canada support 99 percent and 95.2 percent of total membership, respectively (Shaheen, Cohen, and Chung 2009).

An increasing body of empirical evidence supports that carsharing is an effective tool to reduce auto ownership, VMT, and vehicle emissions; increase public transit use; and allow for more efficient use of roadways and parking facilities. A major impact of carsharing on the transportation system is a reduction in vehicle ownership. Canadian studies and member surveys suggest that between 15 to 29 percent of carsharing participants sold a vehicle after joining a carsharing program, while 25 to 61 percent delayed or had forgone a vehicle purchase (Price and Hamilton 2005; Price et al. 2006; Katzev 1999; Cooper et al. 2000; Lane 2005; Zipcar 2006). U.S. studies and surveys indicate that between 23 to 32 percent of carsharing participants sold a personal vehicle, and between 29 to 68 percent postponed or entirely avoided a car purchase (Walb and Louden 1986; Price and Hamilton 2005; Price et al. 2006; Katzev 1999; Cooper 2000; Cervero et al. 2002; Cervero and Tsai, 2004; Cervero et al. 2007; Lane 2005; Zipcar 2006). Furthermore, U.S. and Canadian data reveal that each carsharing vehicle removes between five to 20 cars from the roads (Cervero et al., 2002; Cervero and Tsai, 2004; Cervero et al. 2007; Lane 2005; Zipcar 2006). According to recent European studies, a carsharing vehicle reduces the need for four to ten privately owned vehicles (Ryden and Morin 2005). Location-specific variations are likely to result in differences in this impact measure. A reduction in vehicle ownership, in turn, is likely to

result in fewer VMT, reduced traffic congestion and parking demand, and an increase in the use of public transportation and other transport modes (such as biking and walking) in lieu of car travel (Lane 2005, Millard-Ball et al. 2005; AutoShare 2008). VMT reduction data range from as little as 7.6 percent to as much as 80 percent of a member's total VMT in Canada and the U.S. Estimates differ substantially between members that gave up vehicles after joining a carsharing program and those that gained vehicle access through carsharing (Cooper et al. 2000; Lane 2005; Zipcar 2006; City CarShare 2004). Shaheen et al. (2009) calculates an average reduction of 44 percent in VMT per carsharing user across North American studies. European studies also indicate a large reduction in VMT, between 28 to 45 percent (Shaheen, and Cohen 2007). Carsharing also induces lower VMT by emphasizing variable driving costs, such as per hour or mileage charges.

Furthermore, reduced vehicle ownership and VMT lowers greenhouse gas (GHG) emissions, as trips are shifted to public transit, biking, and walking. Transportation is a major contributor of carbon dioxide (CO2) and other GHG emissions, accounting for approximately 27 percent of total anthropogenic emissions in the U.S. and 14 percent globally. In Europe, carsharing is estimated to reduce the average user's CO2 emissions by 40 to 50 percent (Ryden and Morin 2005). In 2007, Communauto announced a 13,000-ton reduction in CO2 emissions as a result of their 11,000 carsharing users in the province of Quebec, Canada. Communauto calculates that each carsharing user reduces his or her distance traveled by car by 2,900 kilometers per year on average. Furthermore, they anticipate with a potential market of 139,000 households in Quebec that annual CO2 emission reductions could be as high as 168,000 tons per year (Communauto 2007). Carsharing members also report a higher degree of environmental awareness after joining a carsharing program (Lane 2004).

Finally, carsharing also shows evidence of beneficial social impacts. Households can gain or maintain vehicle access without bearing the full costs of car ownership (Shaheen, Meyn, and Wipyewski 2003; Litman 2000). Depending on location and organization, the maximum annual mileage up to which carsharing is more cost effective than owning or leasing a personal vehicle lies between 10,000 to 16,093 kilometers (Litman 2000; Calgary Alternative Transportation Cooperative 2005). Low-income households and college students can also benefit from participating in carsharing (Shaheen, Schwartz, and Wipyewski 2004).

Despite the significant benefits of carsharing, from 2005 to 2008, membership and vehicle growth rates among carsharing organizations have moderated in both the U.S. and Canada (Shaheen, Cohen, and Chung 2009; Shaheen, Cohen, and Roberts 2006). One of the major barriers to the wider use and growth of carsharing services is the development of a dense network of parking access locations for carsharing vehicles by users, such as on-street, public off-street, and public transit station parking (Millard-Ball, Murray, and Schure 2006). Moreover, free or affordable provision of these spaces in key locations to carsharing operators will keep the cost of carsharing services down and thus increase the demand for these services.

To gauge the state of carsharing and parking internationally, Shaheen and Cohen (2007) conducted a survey of 33 international carsharing experts from 21 countries where carsharing was operational and/or planned from May to June 2006. Experts represented

both academics and carsharing operators who provided information on carsharing in Australia, Austria, Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the U.S. The survey did not represent carsharing in Denmark, Finland, and Norway due to expert non-response. A review of the literature provided supplemental information. They found that on-street carsharing parking existed in ten nations around the world (see Table 2 below). The majority of North American carsharing and parking policies were in locations where carsharing was well established, and the more detailed policies were found in areas with sizable carsharing memberships. Of the 15 nations with carsharing operations, 66 percent (ten of 15) indicated that on-street parking was available to carsharing organizations. Additionally, experts stated that carsharing operators in 40 percent of those nations (six of 15) were provided with dedicated carsharing parking zones. In Australia, Europe, and North America, the majority of experts indicated that operators had access to free and/or reduced cost parking and that parking was frequently provided as a form of non-monetary support. Experts from 60 percent of these nations (nine of 15) noted that supportive parking policies are integral to the success of carsharing in their countries (Shaheen and Cohen 2007). In Table 2 below, "Yes" means: "Yes, it is provided."

Table 2 Overview Carsharing Parking Around the World

	On-Street Parking Available to CSO	Cost to CSO	Dedicated Parking Zones provided to CSO	Parking given as a form Non-monetary Support
Asia				
Japan	No			No
Singapore	No			No
Australia				
Australia	Yes	Free	Yes	Yes
Europe				
Austria	Yes		Yes	No
Belgium	Yes		Yes	Yes
France	No			No
Germany	Yes	Free and Reduced		Yes
Italy	Yes	Free	Yes	Yes
Netherlands	Yes	Free and Reduced		Yes
Spain	No			
Sweden	Yes	Free and Reduced		Yes
Switzerland	No			Yes
United Kingdom	Yes	Free and Reduced	Yes	Yes
North America				
Canada	Yes	Free		Yes
United States	Yes	Free and Reduced	Yes	Yes

Source: Transportation Research Record: Journal of the Transportation Research Board, No. 1992, Transportation Research Board of the National Academies, Washington, D.C., 2007, pp. 81-89.

CARSHARING PARKING POLICIES IN NORTH AMERICA

In this section, carsharing parking policies in North America for both local jurisdictions and public transit agencies are documented. Local jurisdictions typically have authority over on-street parking and public off-street parking. Public transit agencies typically have jurisdiction over parking in their transit station lots (including transit stations, kiss-and-ride, park-and-ride, and so on). First, the authors discuss the methods by which information was gathered for this section. Second, an overview of carsharing and parking policies in the U.S. is presented. Third, motivations and challenges of implementing carsharing parking policies are summarized. Fourth, policies implemented by cities and public transit authorities are described and enumerated by level of policy development and key policy attributes, including parking allocation, caps, fees and permits, signage, enforcement, public involvement processes, and impact studies.

METHODS

Research on North American carsharing parking began with a literature and Internet review. This initial research was supplemented with a survey administered to 27 North American carsharing operators from January to May 2008, including 15 (of the 18 operators) in the U.S. and all of the 13 operators in Canada (See Carsharing Operator Survey instrument in Appendix A). Zipcar—with service in both the U.S. and Canada—completed survey responses for each region. In addition, 34 interviews were conducted with public officials in governmental agencies involved in developing and administering carsharing and parking policies in the U.S. (See Expert Interview Script in Appendix B.) Expert interviews were conducted in all local jurisdictions with the exception of Brookline (MA) and Chicago (IL) in the U.S. and Montreal (QC), Toronto (ON), and Vancouver (BC) in Canada.

OVERVIEW

Eighteen local jurisdictions in North America have existing or pending carsharing parking policies, three of which are in Canada and 15 in the U.S. Eight transit agencies (seven in the U.S. and one in Canada) also have carsharing parking policies. An overview of municipal carsharing parking policies is provided in Table 3, and an overview of public transit authorities' parking policies is provided in Table 4. In some areas, these policies are formalized through written regulations, local ordinances, or user agreements or contracts that grant special use of parking by carsharing organizations. In other areas, the policies are more informal and typically determined administratively by agency staff and/or on a case-by-case approval basis. Table 3 shows the jurisdiction and the policy. Although regions differ in the types of the organizations present, there is little in the way of correlation with the types of the policies implemented and the types of carsharing organizations present within the jurisdiction.

Table 3 Brief Description of Local Jurisdiction Carsharing Parking Policies in North America

Local Jurisdiction	Description of Carsharing Parking Policy
Arlington, VA (U.S.)	The county partnered with Flexcar and Zipcar to provide on-street and off-street parking to reduce start-up costs and to encourage carsharing membership and growth as part of a pilot program that was discontinued in 2005; however, both on-street/off-street parking spaces remained (ACCS 2005; Arlington County Environmental and Transportation Services 2008).
Austin, TX (U.S.)	The City Council passed a resolution providing four on-street spaces and exempting carsharing vehicles from parking meter charges in the downtown and University of Texas areas (Austin City Council 2006).
Baltimore, MD (U.S.)	In 2008, the Parking Authority of Baltimore City (PABC) aimed to create Baltimore CarShare, a separate non-profit carsharing organization, as a parking demand management tool and planned to provide free on-street or off-street parking spaces in PABC-controlled garages. The City Council passed an ordinance in 2007 to allow towing of any non-carsharing vehicle from designated carsharing spaces (Parking Authority of Baltimore 2008). However, PABC has since decided to release a request for proposal to third-party operators.
Bellingham, WA (U.S.)	The local parking office has an ordinance and established procedures allotting parking spaces for carsharing (Bellingham Public Works 2008).
Boulder, CO (U.S.)	Parking meter revenue is used to subsidize carsharing operations (Boulder CarShare 2008).
Brookline, MA (U.S.)	The city has a license agreement with Zipcar allocating six on-street spaces (exempt from two-hour time limit) at $750/space/year (Millard-Ball 2005).
Cambridge, MA (U.S.)	Section 16.3E of Cambridge's Traffic Rules and Regulations Guidelines allows off- and on-street parking to be allocated and reserved for carsharing. The city provides a few on-street parking spaces for an annual fee. However, it prefers that carsharing operators lease private off-street spaces rather than use public on-street spaces due to high demand for on-street spaces. Additionally, street cleaning, construction, and snow emergencies are additional challenges to on-street parking. The city is exploring allowing carsharing parking to count for some required off-street accessory parking in residential and commercial developments and a range of policy and zoning options. It expects to propose a strategy in 2009 (City of Cambridge 2009).
Chicago, IL (U.S.)	Six spaces were provided to I-GO in 2004 free-of-charge, and 45 additional parking spaces are to be allocated near public transit stations to I-Go and Zipcar by September 2009 for $88,000 for a two-year lease agreement (CTA, 2008). On-street parking is provided to I-GO on a case-by-case basis through the city Aldermans. I-GO has only a few on-street spaces, which present logistical management challenges in coordinating with snow-removal and street cleaning schedules. The Aldermans must ultimately get permission from the City of Chicago to allocate on-street spaces to carsharing. Historically, only non-profit organizations, such as I-GO, have received an allocation of on-street parking within the city.
Montreal, QC (CAN)	Communauto can purchase parking permits; this is an exclusive privilege not granted to other businesses (Communauto 2008).
Philadelphia, PA (U.S.)	Parking spaces are requested through the Philadelphia Parking Authority, and spaces have been granted to carsharing based on the premise that shared-vehicle use helps to maximize overall parking availability (PhillyCarShare 2008; City of Philadelphia 2006).
Portland, OR (U.S.)	The city designates "Option Zones" for on-street carsharing parking via orange poles on parking meters (Portland Department of Transportation 2006). Option zones constitute Portland's way of indicating locations with good public transit service and allow the city to adjust the activity permitted there.

San Francisco, CA (U.S.)	City CarShare pays the discounted carpool rate for municipal off-street parking (approximately 50 percent of the full monthly rate); currently, they have only two on-street parking spaces on Polk Street across from San Francisco City Hall, which are provided free-of-charge and were approved on a one-time basis by the Board of Supervisors. At present, the city is not actively considering carsharing parking policy development but plans to re-evaluate both off-street and on-street carsharing policies in the future. Carsharing parking policy development will resume when the city implements its parking pricing pilot using advanced meters to manage price and availability in the city's parking districts (City of San Francisco 2005; SFMTA 2008; City CarShare 2008).
Seattle, WA (U.S.)	The city maintains an established process for granting carsharing parking. Rather than dedicating the spaces to a carsharing operator, Seattle's parking stalls are designated to carsharing vehicles as a class, similar to taxi zones. Seattle Bill 116300, passed on September 11, 2008, defines carsharing, carsharing vehicle and carsharing zone. It also grants authority to the Traffic Engineer to establish carsharing parking stalls/zones and enable parking fines for illegally parking in carsharing parking spots (City of Seattle 2008; City of Seattle Legislative Information Service 2008). (City of Seattle 2008; City of Seattle Legislative Information Service 2008).
Toronto, ON (CAN)	The city donated on-street parking permits to AutoShare, so carsharing members can park near their homes. AutoShare has also been given a 30 percent discount on monthly parking permits by the Toronto City Council (AutoShare 2008).
Vancouver, BC (CAN)	Cooperative Auto Network (CAN) has purchased universal parking permits, which are allowed in all 19 of the city's parking zones (CAN 2008).
Washington, D.C. (U.S.)	In 2005, D.C. allowed on-street parking spaces to be dedicated to Flexcar and Zipcar vehicles. Following the 2007 carsharing merger of Flexcar and Zipcar, all spaces were converted to Zipcar. New parking is requested by Advisory Neighborhood Councils and approved by the D.C. Department of Transportation (DDOT) (DDOT 2007).
Berkeley, CA (U.S.) (proposed)	At present, there is no official policy. In 2004, six spaces where designated to City CarShare vehicles in municipal lots when Berkeley entered into a fleet reduction contract with City CarShare. Berkeley is developing a policy for allocating on-street carsharing parking and would like to bring a formal policy proposal to the City Council in early 2009 (City of Berkeley Public Works Department, 2008).
Los Angeles, CA (U.S.) (proposed)	The City Council has approved a one-year pilot with Zipcar near the University of California, Los Angeles and University of Southern California campuses. The Los Angeles Department of Transportation has granted Zipcar ten on-street parking spaces in each of the two pilot locations beginning in Summer 2009. The spaces were originally non-metered spaces to avoid any loss of revenue to the City of Los Angeles (City of Los Angeles 2008).
California (U.S.)	AB 2154 changed the California Vehicle Code to allow cities/counties to establish designated on-street parking for carsharing vehicles and ridesharing vehicle use.

Table 4 Brief Description of Public Transit Agency Carsharing Parking Policies in North America

Public Transit Agency	Description of Carsharing Parking Policy
Bay Area Rapid Transit (BART) District – San Francisco, CA (U.S.)	In July 2002, the BART District allocated up to 24 parking spaces for City CarShare vehicles at various BART stations after submitting data that illustrated positive impacts on ridership among other factors. In February 2006, BART's Board approved parking for Flexcar and Zipcar and allocated eight parking spaces to each operator. Since the merger of Flexcar and Zipcar, Zipcar acquired all 16 parking spaces. Carsharing parking was converted from monthly permitted spaces, and operators pay a monthly fee (from $63 to $115 per space). Operators are responsible for signage and maintenance. BART's policy allows a maximum of three parking spaces per operator at each station (BART 2008).
Chicago Transit Authority (CTA) – Chicago IL (U.S.)	In 2004, CTA approved a pilot to allow I-GO to park vehicles in designated parking stalls at five CTA stations (CTA 2004). In July 2008, the CTA Board approved a two-year lease agreement allowing a total of 45 I-GO and Zipcar vehicles at 20 CTA park-and-ride lots and stations. CTA will earn approximately $88,000 over this two-year period under the recently approved lease agreement (CTA Press Release 2008). In October 2008, CTA and I-GO approved the launch of a joint "smart card," enabling vehicle access and public transit ridership with a common card (Wisniewski 2008).
Metropolitan Atlanta Rapid Transit Authority (MARTA) – Atlanta, GA (U.S.)	Flexcar began parking carsharing vehicles at MARTA stations in October 2006. The program began with one vehicle parked at two in-town MARTA station parking lots (MARTA 2006). As of September 2008, Zipcar had seven vehicles parked at five MARTA stations (Zipcar 2009). MARTA maintains a lease agreement with Zipcar and does not charge for these spaces.
Metropolitan Transportation Authority / Metro-North – New York, NY (U.S.)	A new agreement between the Metro-North Railroad and Enterprise allows Enterprise customers to reserve a vehicle online and purchase a five percent discounted rail ticket. Enterprise provides a vehicle ready at the station or an employee to provide transportation to a nearby Enterprise office. Under this five-year contract, Enterprise will provide rental car services at 23 Metro-North stations, compensating the public transit authority $40,000 annually plus ten percent of the program's annual revenue (Anders and Brucker 2007).
New Jersey Transit (U.S.)	New Jersey Transit partnered with Zipcar on April 16, 2008, to provide parking spaces at five public transit stations (New Jersey Transit 2008).
TransLink – Vancouver BC (Canada)	TransLink offers CAN parking stalls at select stations of SkyTrain (New Economy Development Group 2006) and assigns parking stalls on an as-needed basis free-of-charge. CAN has four parking stalls at TransLink stations (CAN 2008).
TriMet – Portland OR (U.S.)	TriMet requires carsharing parking requests to be submitted by carsharing operators to TriMet's General Manager for approval. TriMet allows a maximum of ten carsharing parking spaces at each park and ride lot. TriMet charges for signage and daily park-and-ride fees (TriMet, 2008).
Washington Metropolitan Area Transit Authority (WMATA) – Washington D.C. (U.S.)	Under its current contract, 104 carsharing vehicles are parked at 38 of Metro's 44 short-term, metered Kiss & Ride lots. Meter heads have been removed, and carsharing signs have been erected at the spots. An additional 33 stations are served by carsharing vehicles parked nearby, providing carsharing service to 73 of Metro's 86 stations. Metro has capped the number of spaces available at each Kiss & Ride lot; the maximum varies by lot. Metro does not currently charge for the spaces (WMATA 2008).

MOTIVATIONS AND CHALLENGES

The results of the interviews conducted with public officials revealed some common themes about the motivations for and challenges of developing and implementing carsharing parking policies. Carsharing and the provision of public parking for it were generally viewed as a public service. Many indicated that carsharing was an important mechanism for cities to reduce auto ownership, VMT, congestion, and parking demand as well as to improve air quality and the environment. Some also noted that carsharing helped promote higher density development and smart growth practices. Public transit agencies typically viewed carsharing as a way to increase access to public transit and ridership.

On the other hand, many expressed concern about reallocating limited parking resources for use by private carsharing organizations. Several mentioned that every space designated for carsharing is one less space that can be used by the general public. Public transit agency officials were also concerned that carsharing users might park at transit stations but not actually use it. In fact, a few local governments (Bellingham, Cambridge, and Washington, D.C.) did face some public opposition among residents who were concerned that the allocation of on-street parking spaces would reduce parking in their neighborhood (Bellingham Public Works 2008; City of Cambridge 2008; DDOT 2007; WMATA 2008). However, many local governments did not face public opposition.

Legal and institutional barriers were also noted as a challenge to the development and implementation of carsharing parking policies. Three cities noted that developing new institutional processes for on-street carsharing parking was very difficult and confusing (for instance, applications, processes, and enforcement). Additionally, many indicated that cost was a significant barrier. Questions were also raised about whether there should be different provisions for for-profit and non-profit carsharing operators. The fair allocation of parking among multiple carsharing operators competing for spaces was also noted as a concern.

A number of concerns specific to local jurisdictions also arose. Arlington County was unsure about whether the county or the state had jurisdiction for passing codes and ordinances for carsharing parking (Arlington County Environmental and Transportation Services 2008). The City of Berkeley was concerned about responsibility for enforcement of carsharing parking (City of Berkeley Public Works Department 2008). Zoning in Cambridge prohibits operating a business in a residential neighborhood, and carsharing vehicles are a commercial enterprise (City of Cambridge 2008). Philadelphia's ordinance only allows on-street parking to be dedicated to a non-profit carsharing provider. However, since its approval Zipcar—a for-profit provider—has begun service and would like an amendment to allow them access to carsharing parking (Philadelphia Parking Authority 2008). The City of Seattle does have ordinances that allow carsharing parking; however, a city attorney indicated that the city was prohibited from renting a public space to a private organization and is currently working on a resolution to this issue (City of Seattle 2008; City of Seattle Legislative Information Service 2008).

Some cities have already responded to prior legal and institutional challenges by amending their policies. Seattle and Portland are amending their policies to enhance the wording of

their carsharing signage to include "violators will be ticketed" and providing enforcement, such as towing of non-carsharing vehicles parked in carsharing-only spaces (City of Seattle 2008; City of Seattle Legislative Information Service 2008; Portland Department of Transportation [DOT] 2006, 2008). Philadelphia, Bellingham, and Baltimore have already adopted municipal ordinances allowing any private vehicles to be towed from a designated carsharing vehicle's parking space (Philadelphia Parking Authority 2008; Bellingham Public Works 2008; Parking Authority of Baltimore 2008). Fines range from $20 US in Bellingham to between $41 and $160 US in Philadelphia (Philadelphia Parking Authority 2008; Bellingham Public Works 200). Although Arlington has designated carsharing parking signage, enforcement remains an unresolved issue because Arlington does not have formal ordinances or regulations defining an enforcement policy (ACCS 2005; Arlington County Environmental and Transportation Services 2008). Ultimately, the flexibility afforded to municipalities in allocating carsharing policies may often rest with the definitions within state law. Often the ceding of public rights-of-way can only be justified in cases where a public good is being served. In a strict legal sense, a public good cannot be proven if the service itself (for instance, carsharing) does not have a legal definition under state law. Thus, although carsharing has grown into the mainstream conscious over the last decade, it still lacks a formal definition in many areas. This makes formal policies more difficult to put into place.

Carsharing Parking Policies in North America: Key Elements

Among both formal and informal carsharing parking policies in the U.S., seven key policy elements are identified. These include:

1. Allocation of parking to operators;

2. Caps or limits on the total number of parking spaces for carsharing and/or for carsharing operators;

3. Fees assessed (typically monthly or annually) to operators for use of the parking spaces or to purchase a parking permit;

4. Signage and markings that identify the parking space as designated to carsharing and responsibility to their installation and maintenance;

5. Enforcement mechanisms including, for example, ticketing, booting, and towing;

6. Public involvement processes; and

7. Documentation of the social and environmental impacts of carsharing by the operator.

In the subsections that follow, the range of agencies' policies is described for each policy element.

PARKING ALLOCATION

Carsharing parking is typically allocated either through a formal procedure or through less formalized processes (for instance, variances, special permits, and case-by-case city council approvals). Six cities (Austin, Brookline, Cambridge, Montreal, Toronto, and Vancouver) currently allocate on-street carsharing parking through less formal processes and are exploring policy and zoning options to develop a more formal procedure (Austin City Council 2006; Millard-Ball 2005; City of Cambridge 2008; Communauto 2008; AutoShare

2008; CAN 2008). Seven local governments (Arlington County, Baltimore, Bellingham, Philadelphia, Portland, Seattle, and Washington, D.C.) have established formal polices for allocating on-street carsharing parking through various local ordinances and zoning provisions. Most of these policies allocate carsharing parking in metered spaces or create separate parking zones for carsharing vehicles. Some local government carsharing and parking policies—both formal and informal—require some type of written contract or lease agreement with the carsharing operator. The agreements can specify terms of use, fees, and limit liability for the public space by a private enterprise.

Three Canadian cities (Montreal, Toronto, and Vancouver) with informal policies allocate on-street carsharing parking through the use of special or general-use parking permits. They use existing permitted spaces and have created special provisions for providing permits to carsharing vehicles (Communauto 2008; AutoShare 2008; CAN 2008). The major advantage of carsharing parking in permit zones, compared to metered spaces, is that additional legal provisions are not needed and enforcement mechanisms are typically already in place.

Some agencies with less formal carsharing and parking policies initiate carsharing parking through pilot programs. For example, Arlington County allocated 43 on-street parking spaces dedicated to carsharing as part of a pilot/risk-sharing agreement with Flexcar and Zipcar in 2005 (ACCS 2006; Arlington County Environmental and Transportation Services 2008). In Austin, the city council approved a resolution authorizing the City Manager to allocate four permanent parking spaces (two in the downtown and two near the University of Texas) for a 12-month pilot program (Austin City Council 2006).

The more formal allocation process in Philadelphia is unique in that it distinguishes between for-profit and non-profit carsharing providers. On-street parking is only granted to non-profit carsharing providers, who may apply for the exclusive-use of parking stalls on a "first-come, first-served, basis" in one of six designated block faces managed by the Philadelphia Parking Authority. The Philadelphia City Council may designate additional reserved carsharing parking spaces after considering four factors: 1) the accessibility of reasonably close curbside parking by residents, 2) desire of residents in close proximity of a proposed parking space to have access to carsharing, 3) accessibility of an area to public transit and alternative transportation modes, and 4) desirability of a proposed location by a carsharing operator. The Parking Authority also has the authority to temporarily designate reserved carsharing parking spaces for a provisional period of six months given consideration of the four factors described above (PhillyCarShare 2008; Philadelphia Parking Authority 2008). Portland's carsharing and parking policy are another example of a formal allocation procedure. Carsharing operators must submit requests biannually to install new or relocate existing on-street parking spaces. After a request is submitted, the city conducts a site evaluation for each location requested and provides written notice to property owners and tenants adjacent to a parking space, 30 days prior to installation (Portland DOT 2006, 2008).

Currently, a carsharing operator submits a request, which is reviewed by the transportation planning staff, to initiate the formal procedure for carsharing parking in Seattle. The transportation staff forwards the request to the Traffic Controls and Parking Management

division for review to approve or deny the request. Approved requests are followed with written notification to adjacent property owners. At present, Seattle is undergoing a process of amending its carsharing parking policies. Seattle Bill 116300, passed on September 11, 2008, defines carsharing, carsharing vehicle and carsharing zone. It also grants authority to the Traffic Engineer to establish carsharing parking stalls/zones and enable parking fines for illegally parking in carsharing parking spots (City of Seattle 2008; City of Seattle Legislative Information Service 2008).

Another formal allocation process in Washington, D.C. gives the Director of the Department of Public Works the authority to authorize carsharing parking spaces in consultation with the affected Advisory Neighborhood Council (within a 30-day period). Typically, however, individuals, businesses, and/or carsharing operators submit a request for carsharing parking to their Advisory Neighborhood Council, which then submits the request to the District Department of Transportation (which is housed in the Department of Public Works). DDOT will only consider such requests after their respective Advisory Neighborhood Council has endorsed them.

Prior to the Flexcar/Zipcar merger in October 2007, both operators met jointly with the DDOT, in Washington, D.C., to select on-street parking spaces in a collaborative process. In some cases, the DDOT allocated tandem spots (spots for two carsharing vehicles) in which one spot would be dedicated to each operator. All parking spaces were converted to Zipcar spaces after the merger.

Because of concern of the Advisory Neighborhood Councils about taking residential permitted parking for carsharing parking spaces, the DDOT in Washington, D.C. prioritized the creation and conversion of parking spaces as follows: 1) DDOT first attempts to create parking spaces where spaces had not existed prior (for instance, loading zones, no-parking zones, and so on); 2) then DDOT converts metered spaces; and 3) DDOT considers the removal of residential permitted parking. About half of the carsharing spaces have been created from areas where parking spaces had not existed prior and about half from the removal of metered parking spaces (DDOT 2007, 2008; WMATA 2008).

Another formal mechanism, employed by public transit operators, is the use of the request for proposal (RFP) process to encourage a carsharing operator to locate vehicles at public transit parking lots and to re-negotiate existing parking agreements. The RFP serves as a method for initiating a joint contract, lease, or real estate usage agreement between the transit agency and the carsharing operator. Currently, BART, CTA, MARTA, and WMATA maintain some type of written contract with carsharing operators. WMATA's RFP is unique in that they issue an open RFP, which can grant parking to more than one carsharing operator at their transit facilities.

CAPS

Three local governments (Arlington, Portland, and Washington, D.C.) and three public transit agencies (BART, CTA, and WMATA) with established carsharing parking policies limit the number or locations of on-street parking spaces used for carsharing. For example, Portland initially had a limit of 100 on-street metered spaces that could be used for carsharing,

and these spaces were allocated evenly between the two carsharing operators in the city (Zipcar and Flexcar). Zipcar retained Flexcar's 50 parking spaces following their merger in October 2007. Portland's initial policy allowed an unlimited number of unmetered on-street spaces to be converted to carsharing. In January 2009, the City of Portland amended its policy and imposed a parking space cap of 200 spaces per carsharing operator (including metered and unmetered) (Portland DOT 2006, 2008). The caps have been installed as a legal mechanism to prevent an over-allocation of spaces to carsharing without further review from public officials.

Public transit agency parking caps have generally been determined by administrative limits imposed by transit agency boards, departments, and the RFP process. The BART District's most recent Executive Decision Document allocates up to eight parking spaces per operator, with a maximum of three spaces per a station. The CTA board approved a two-year lease agreement with a self-imposed cap of 45 carsharing spaces at the transit authority's 20 kiss-and-ride lots and stations. WMATA's most recent RFP allows 104 carsharing parking spaces at 38 of Metro's 44 short-term, metered Kiss & Ride lots.

Other local governments limit the number of carsharing parking spaces by specifying geographic boundaries or establishing special procedures for the approval of additional spaces. For example, although Philadelphia does not have a limit on the number of on-street parking spaces for carsharing, the total possible number of spaces is limited by the requirement that carsharing parking be allowed only in six block-face locations (Philadelphia Parking Authority 2008). Other locations can only be approved on a case-by-case basis by Philadelphia's City Council (Philadelphia Parking Authority 2008). Similarly, Washington, D.C. does not have a cap on the number of carsharing parking spaces; however, additional parking stalls beyond the initial 86 allocated during the pilot program must be requested and approved by a local Advisory Neighborhood Commission (DDOT 2007, 2008; WMATA 2008).

Detailed parking data on the number of carsharing parking spaces and the total number of on-street and public transit parking spaces is available from Arlington, Portland, Washington, D.C., and the BART District. The number of spots dedicated to carsharing in these four locations is a small fraction of the total number of metered and general-use on-street parking spots. In both cases, the number of parking spots converted to carsharing represents less than one percent of both the total number of on-street parking spaces and the total number of metered on-street parking spaces (See Table 5 below) (ACCS 2005; Arlington County Environ. and Transportation Services 2008; Portland DOT 2006, 2008; DDOT 2007, 2008; WMATA 2008; BART 2008).

Table 5 Dedicated Carsharing On-Street and Public Transit Parking Relative to Total Available Parking

Local Government	Metered Parking Spaces	Metered Spaces Converted to Carsharing	Percentage of Metered for Carsharing	On-street Spaces	On-street Carsharing Parking Spaces	Percentage On-Street Parking Dedicated to Carsharing
Arlington County, VA	2,373	20	.08%	53,000	43	0.08%
Portland, OR	14,500	100	0.69%	-	66	-
Washington, D.C.	16,000	41	0.25%	260,000	86	0.033%

Public Transit Agency	Total Number of Off-Street Public Transit Parking Spaces	Number of Off-Street Carsharing Parking Spaces	Percentage to Parking Dedicated to Carsharing
BART District	46,000	40	0.09%
WMATA	63,000	182	0.3%

FEES AND PERMITS

Fees

Some local governments and public transit agencies have implemented pricing mechanisms to recover lost parking revenue from the conversion of parking from general-use to carsharing-only spaces. The decision to charge an operator for parking and the method used to develop that charge is often related to a jurisdiction's perception of the benefits and costs of providing carsharing parking. In general, municipalities are not obligated to charge for carsharing parking, if they deem the public benefit of carsharing to be worth at least the forgone revenue. For those cities that do choose to charge, there are a number of methods that can be used to assess the value of on-street parking spaces provided to carsharing operators. These are typically based on one or a combination of the following: 1) cost of residential parking permits; 2) cost of foregone meter revenue; 3) cost of providing the parking (for instance, operations and maintenance); or 4) the market cost for private or public off-street parking in a given parking district or municipal jurisdiction. Additionally, cities may assess operators for the cost of converting a parking space from general use to carsharing use, which can include removing meters, striping curbs, and administrative overhead.

One method that agencies can use to value the cost of carsharing parking is the cost of off-street parking. This can include the market cost of private off-street parking (for

example, fees charged by private parking garages and lots) as well as the cost of public off-street parking (for instance, fees charged by public transit operators and/or municipal governments for public garages and lots). One real estate firm, Colliers International, conducts an annual market study reporting average off-street parking costs in cities around the world. Table 6 below shows the average cost of off-street parking reported by Colliers International for many North American cities where carsharing is currently operational, as well as selected international cities/countries.

Table 6 Private-Sector Survey of Off-Street Parking Costs

North American Cities	Average Monthly Cost (USD)
Atlanta	$90
Baltimore	$150
Boston	$460
Chicago	$310
Columbus	$110
Jacksonville	$110
Los Angeles	$196
Minneapolis/St. Paul	$183.50
New York (Downtown)	$462
New York (Midtown)	$528.44
Oakland	$192.50
Philadelphia	$300
Portland	$182
San Francisco	$350
Seattle	$260
Washington, D.C.	$240
International Cities	**Average Monthly Cost (USD)**
Amsterdam	$423.12
Auckland	$300.08
Frankfurt	$261.56
London	$1,166.87
Melbourne	$493.03
Montreal	$290.01
Munich	$412.34
Oslo	$482.35
Paris	$330.80
Singapore	$182
Stockholm	$508.92
Sydney	$774.76
Tel Aviv	$198.48
Tokyo	$552
Toronto	$290
Vancouver	$218.40
Victoria	$180

Source: 2008 Colliers International Annual Parking Rate Survey

Agencies can also value the cost of carsharing parking based on the cost of public off-street parking. This can include the fees charged by public transit operators and/or municipal governments for off-street public garages and lots. For example, in San Francisco, City CarShare pays a discounted rate for municipal off-street parking garages. City CarShare is charged at the same rate as carpool parking (approximately 50 percent of the full monthly rate) (SFMTA 2008).

Another method used by agencies is to value the cost of carsharing parking based on meter revenue lost due to the conversion to carsharing parking. This requires that an agency value the average cost of meter revenue within, for example, a parking district or citywide. The BART District, Portland, and Cambridge use a cost of service and recovery methodology. Although Cambridge did not charge for carsharing parking initially, after the first three years, the city implemented a plan to charge for parking based on the location of the space plus lost meter revenue (City of Cambridge 2008). BART charges a carsharing operator the monthly cost of a parking permit, unique to each BART station (BART 2008). In Portland, parking permit fees for metered spaces are assessed at the average annual cost of foregone meter revenue for a particular meter district plus administrative costs (Portland DOT 2006, 2008). Portland's DOT reviews permit fees through a cost of service study assessing meter revenue and maintenance costs (Portland DOT 2006, 2008; Millard-Ball 2005).

Portland's Cost of Service and Recovery Model for Carsharing Parking in Meter Districts:

Permit Cost = Foregone Meter Revenue + Maintenance Costs + Administrative Costs

Portland's Cost of Service and Recovery Model for Carsharing Parking for Unmetered Spaces:

Permit Cost = Installation Costs + Maintenance Costs + Administrative Costs

Note: In the first year of Portland's policy, permit fees were reduced to 50 percent of the full cost.

For unmetered spaces converted to carsharing parking, Portland assesses administrative, installation, and maintenance costs (Portland DOT 2006, 2008). Seattle and Bellingham charge fees intended to cover administration time and enforcement; however, Seattle is considering adopting a new fee policy (City of Seattle 2008; City of Seattle Legislative Information Service 2008; Bellington Public Works, 2008).

Portland and Washington, D.C. have studied the monetary value of on-street parking spaces for carsharing (Portland DOT 2006, 2008; DDOT 2007; WMATA 2008). Portland estimated that the combined cost of foregone meter revenue and the installation of signage cost the city $60,000 in 2005 (Portland DOT 2006, 2008). Portland also estimated an administrative cost of $264 per stall annually for maintaining the program (Portland DOT 2006, 2008). The DDOT estimated foregone meter revenue and installation (painting the asphalt), totaling $150,000 (DDOT 2007; WMATA 2008). DDOT also estimated future program costs of $75,000 annually for foregone meter revenue and $40,000 for more permanent asphalt striping to discourage illegal parking (DDOT 2007; WMATA 2008).

In an effort to value the actual demand for each parking space, Portland considered a proposal to value individual parking spaces rather than the average cost of all on-street stalls in 2006. The proposal would have taken parking permit and meter revenue from each block-face to reflect block and neighborhood variations in parking demand. Using this formula, annual parking fees would have varied from $435 to $3,046, depending upon the space. (Portland DOT 2006, 2008)

Both Portland and Washington, D.C. estimate an average annual meter revenue of $1,700 to $1,800 per stall; this equates to $141 to $150 per month (Portland DOT 2007; Brook 2006; DDOT 2007). On an annual basis, this is lower than the average cost of off-street parking identified by Collier's International study. Collier's estimated that off-street parking in Portland and Washington, D.C. averaged $182 per month ($2,184 annually) and $240 per month ($2,880 annually), respectively (Colliers 2008). This suggests that cities valuing on-street stalls to the amount of foregone meter revenue may be undervaluing parking spaces, particularly if average annual meter revenue is less than the market cost of off-street parking spaces.

Permits

A number of cities also provide parking permits for carsharing vehicles. Some of these permits can allow either "exclusive-use" of all parking zones within a city or "exclusive-use" of a particular parking stall. Parking permits for carsharing vehicles have been used in Philadelphia, Montreal, Toronto, and Vancouver (Philadelphia Parking Authority 2008; Communauto 2008; AutoShare 2008; CAN 2008). At present, the only policy framework used by Canadian cities has been the implementation of various parking permit mechanisms to allocate on-street parking in Canadian cities. In Philadelphia, carsharing operators can apply for exclusive use of a parking stall from the Philadelphia Parking Authority for $150 annually per stall. In Montreal, Communauto has been able to purchase parking permits; an exclusive privilege not granted to other businesses (Communauto 2008). In Toronto, the city has donated on-street parking permits to AutoShare, so carsharing members can park near their homes. Toronto has given AutoShare a 30 percent discount on monthly parking permits by the Toronto City Council (AutoShare 2008). In Vancouver, the city has established universal parking permits that allow CAN vehicles to be parked in all 19 of the city's parking zones (CAN 2008).

SIGNAGE

All of the cities that allow on-street carsharing parking, where carsharing is currently operational, also allow special signage to denote carsharing stalls. In Washington, D.C. and Arlington County, carsharing stalls are denoted by orange poles and pavement markings (DDOT 2007; WMATA 2008; Arlington County Environmental and Transportation Service 2008). According to DDOT, signage and pavement markings combined with enforcement aid in preventing illegal parking in stalls reserved exclusively for shared-use vehicles. Some agencies, such as Arlington County, the BART District, and Philadelphia, require that operators install and maintain carsharing signage (Arlington County Environmental and Transportation Service 2008; Philadelphia Parking Authority 2008; DDOT 2008). Although DDOT currently maintains the orange poles and pavement markings, it is working

to renegotiate operator contracts to require that carsharing organizations install poles and maintain the pavement markings. Portland, Oregon maintains carsharing "Option Zones" denoted by similar orange poles, which attach to parking meters (Portland DOT 2007, 2008).

ENFORCEMENT

For carsharing operators, preventing non-shared use vehicles from parking in carsharing stalls is important for operators to ensure that when a member returns a vehicle, there is a dedicated and reserved place for that vehicle to be parked. A number of cities have established mechanisms for enforcing carsharing parking. In the District of Columbia, the Director of the Department of Public Works can authorize the Department of Motor Vehicles to issue special license plates to identify carsharing vehicles to aid in parking enforcement. Despite the legislative authority to do so, special plates have not been issued to carsharing vehicles in Washington, D.C. (DDOT 2007, 2008; WMATA 2008). In the District, both the Public Works and the Metropolitan Police Departments maintain ticket-writing authority. Unauthorized vehicles parked in carsharing spaces are subject to a $100 fine, which is greater than other parking violations. In Philadelphia, parking illegally in a carsharing parking space is fined a $35 penalty (Philadelphia Parking Authority 2008). In Portland, parking enforcement requests are only accepted from designated personnel at a carsharing organization (Portland DOT 2007, 2008).

PUBLIC INVOLVEMENT

Four local governments (Arlington County, Philadelphia, Portland, and Washington, D.C.) have incorporated public involvement into the process of allocating carsharing parking (Arlington County Environmental and Transportation Services 2008; Philadelphia Parking Authority 2008; Portland DOT 2007, 2008; DDOT 2007, 2008; WMATA 2008). Philadelphia has enacted an ordinance that allows carsharing organizations to work with community groups to decide where carsharing parking is placed. In Washington, D.C., carsharing operators must first request a parking space through their Advisory Neighborhood Council before installation will be considered by the DDOT. In Portland, carsharing operators must work with neighborhood and community groups to gain approval on the location of carsharing parking spaces prior to installation.

IMPACT STUDIES

A few local governments and public transit agencies have required carsharing operators to conduct parking impact studies; however, such studies are rarely released publicly and are usually used for internal purposes only. Local governments and public transit agencies have been reluctant to tie policy decisions to the results of impact studies.

For example, Portland requires a carsharing operator to report vehicle usage rates over a six-month period after a new vehicle is placed. Low usage rates may result in the relocation of a carsharing parking space/permit by the City Traffic Engineer. Some parking spaces have been given up as neither the city or the operator want to maintain spaces with low-usage rates (Brook, 2008).

In Washington, D.C., carsharing operators must provide the DDOT with quarterly data to assess the impacts of the parking program. DDOT receives quarterly data from the operators including membership growth, vehicle numbers, and usage rates for each vehicle (DDOT, 2008). One of the reasons for collecting vehicle utilization data was to ensure vehicles placed in low-income neighborhoods were being used, which is a requirement of DDOT. When competition among multiple operators existed, there was substantial concern about the proprietary nature of the data collected. As such, for the purposes of the evaluation, Washington, D.C. combined Flexcar and Zipcar data (DDOT 2008).

In the San Francisco Bay Area, the BART District initially wanted the carsharing operators to conduct surveys and demonstrate that BART users were indeed using the carsharing vehicles parked in BART spaces and whether there was any increase in ridership resulting from the vehicles. Based on this initial concern, BART encouraged City CarShare to approach the City of Berkeley and other local governments to inquire about on-street parking spaces near BART stations. Although difficult to measure the direct benefits of the carsharing spaces on BART users, the staff eventually concluded that carsharing spaces augmented public transportation use in part from data provided by City CarShare (BART 2008). No public study was generated from this effort.

CASE STUDIES

The cities of Philadelphia, Pennsylvania; Portland, Oregon; and Washington, D.C. were selected as case study locations because the local governments and parking authorities have adopted detailed carsharing parking policies including: definitions of carsharing;[1] procedures for allocating parking; a methodology for valuing carsharing spaces; and administrative policies on permits, signage, and parking enforcement. Additionally, the BART District in the San Francisco Bay Area provides a fourth case study that exemplifies how a public transit operator might consider allocating carsharing parking. The policies of the four case studies follow below.

PHILADELPHIA

Carsharing was first launched in Philadelphia in 2002, by the non-profit operator, PhillyCarShare. PhillyCarShare started with nine members and two vehicles. In April 2004, the City of Philadelphia partnered with PhillyCarShare on a fleet reduction initiative aimed at replacing municipal fleet motor pool vehicles with carsharing vehicles (PhillyCarShare 2007). In March 2008, a second for-profit operator launched services in Philadelphia with 110 vehicles (Zipcar 2008). During this time, Zipcar successfully won the bid for Philadelphia's municipal contract and began providing fleet service to the city in July 2008 (Zipcar 2008; City of Philadelphia 2006). Within a week of Zipcar's launch in Philadelphia, a third operator, Flexcar, announced the launch of its fleet. Zipcar and Flexcar later merged in October 2007. Philadelphia is also served by U-Carshare, a for-profit service provided by U-haul, which has gradually entered into the carsharing industry. As of September 2008, there were an estimated 56,000 members and 550 vehicles in the Philadelphia market served by all three operators.

PARKING POLICY

The City of Philadelphia has developed a formal carsharing parking ordinance. In October 2006, Philadelphia Council Members, DiCicco, Blackwell, and Verna, introduced bill number 060761, an ordinance establishing Philadelphia's carsharing parking regulations (City of Philadelphia 2006). Philadelphia's current policy only allows carsharing parking to be allocated to a non-profit operator (PhillyCarShare 2008); thus, Zipcar and U-Carshare do not have any on-street parking spaces. At present, PhillyCarShare has 76 on-street parking spaces in 61 different locations (PhillyCarShare 2008). PhillyCarShare pays an annual permit fee of $150 per vehicle (Philadelphia Parking Authority 2008). PhillyCarShare points of departure (or pods), where a member has access to one or more vehicles, are denoted by signs measuring 18"x 22" stating: "Reserved for PhillyCarShare." They are posted on U-poles at both ends of each pod (PhillyCarShare 2008). Initially, PhillyCarShare also painted the ground with their logo and "reserved," but the City of Philadelphia has discontinued this practice, and it is now prohibited (PhillyCarShare 2008). In addition, PhillyCarShare has 33 parking spaces in 17 off-street Philadelphia Parking Authority lots (PhillyCarShare 2008). Generally, the parking spaces reserved for carsharing vehicles are free to PhillyCarShare, with the exception of two paid lots. In these paid lots, PhillyCarShare is assessed $1 a day—the same rate as the general

public (Philadelphia Parking Authority 2008).

Philadelphia's policy permits non-profit carsharing organizations to reserve on-street stalls through a process that includes: 1) consent from adjacent property owner(s), 2) letters of support from civic associations and the district councilperson, and 3) approval from the Streets Department and Philadelphia Parking Authority (PhillyCarShare 2008). Non-profit carsharing operators meeting the city's legislative definition may apply for the exclusive-use of a parking stall from the Parking Authority. Exclusive-use locations are allocated on a "first-come, first-served basis." Philadelphia enumerates six parking locations (or blockfaces) where on-street carsharing parking may be established (City of Philadelphia 2006). The Philadelphia Parking Authority manages requests for carsharing parking in these areas. The City Council and the Parking Authority may establish additional carsharing parking spaces. Non-profit carsharing operators may apply for the exclusive use of a parking stall from the Parking Authority. The Philadelphia ordinance specifies that exclusive-use permits cost $150 per location per year. Parking illegally in a carsharing parking space is subject to a $35 fine (City of Philadelphia 2006). Figure 1 below provides a summary of key provisions of Philadelphia's carsharing parking provisions.

PORTLAND

CarSharing Portland first launched its service in Portland in March 1998, and was the first formal carsharing service in the U.S. Carsharing Portland launched with four vehicles as a private for-profit company. After four years of operation, Carsharing Portland had 25 vehicles (Brook 2008). In 2001, CarSharing Portland was acquired by Seattle-based Flexcar, which later merged with Zipcar in October 2007. Zipcar and U-Haul's U-Carshare currently serve Portland. At present, U-Carshare's fleet of PT Cruiser vehicles are only parked at U-haul locations within the city. Zipcar has an estimated 150 on-street parking spaces in Portland, and parking spaces are denoted by striping that states: "carsharing parking only." Zipcar also has an estimated 12 public off-street parking spaces in Portland (Portland DOT 2008). As of September 2008, there were approximately 9,300 members and 225 vehicles in the Portland market, which is served by two operators.

Legislative Definitions
Policy defines a "carsharing organization" as "a non-profit organization that is generally open to the public and that permits members to use vehicles available at public accessible locations on a pay per use basis."
General Provisions
A carsharing parking permit may be revoked by the City of Philadelphia for public health, safety, or access needs. Generally, the Philadelphia Parking Authority must provide a 30-day written notice of termination except in unusual circumstances.
Allocation
Non-profit carsharing operators may apply for the exclusive-use of a parking stall from the Parking Authority. Exclusive-use locations are allocated on a "first-come, first-served basis."
Cap
No official parking cap has been established for carsharing. The city finds no reason why the "enabling" legislation should set a limit. City of Philadelphia Bill No. 060761, which establishes on-street carsharing parking in Philadelphia, enumerates six parking locations (blockfaces) where on-street carsharing parking may be established. Since the adoption of this ordinance, the City Council has approved a subsequent ordinance that identifies additional locations. The Philadelphia Parking Authority manages requests for carsharing parking in these areas. Additionally, the Philadelphia City Council may designate additional reserved carsharing parking spaces after considering four factors: 1) the accessibility of reasonably close curbside parking by residents, 2) desire of residents in close proximity of a proposed parking space to access carsharing, 3) accessibility of an area to public transit and alternative transportation modes, and 4) desirability of a proposed location by a carsharing operator. The Parking Authority may temporarily designate reserved parking spaces for a provisional period of six months using the preceding four factors. After the six-month provisional period, District Council Members are supposed to introduce legislation making the spaces in their district permanent.
Fee Structure
Carsharing operators may apply for the exclusive-use of a parking space from the Parking Authority. Exclusive-use permits cost $150 per location per year. This is the same fee the Philadelphia Parking Authority charges for loading zones, which also removes parking from public use.
Permits, Signage, and Markings
Carsharing operators may apply for exclusive-use permits from the Parking Authority.
Parking Enforcement
Only a carsharing organization can park a carsharing vehicle in designated parking spots. Parking illegally in a carsharing parking space results in a $35 fine.

Figure 1 On-Street Parking Provisions in Philadelphia

PARKING POLICY

Portland has also developed an extensive carsharing parking policy. In October 2006, Portland's DOT adopted TRN-3.309—a series of administrative rules governing Portland's carsharing parking regulations (City of Portland 2005). These rules allow on-street parking spaces to be dedicated to carsharing. They are reserved for the exclusive use of one carsharing operator. Both for-profit and non-profit carsharing operators are allowed to submit requests biannually to install new or relocate existing on-street parking spaces (City of Portland 2005). This can entail relocating the orange "mobility node" poles used to

designate the carsharing parking spaces (Portland DOT 2008).

Portland's ordinance allows a total of 50 metered, on-street parking spaces per carsharing operator. When approved, the ordinance allowed an unlimited number of unmetered parking spaces on the basis that carsharing reduces air and water pollution, congestion, and VMT/VKT and increases public transit ridership, biking, and walking (Portland DOT 2008). However, the ordinance was amended in January 2009, with a limit of 150 unmetered parking spaces, for a total maximum of 200 on-street spaces per carsharing organization (City of Portland 2005). Portland's parking policy does not distinguish between for-profit and non-profit carsharing providers. Parking permit fees for metered spaces are the equivalent to the average annual cost of foregone parking meter revenue (approximately $1,500 annually per space) in the meter district, plus administrative and installation costs (valued at $264 a space) (Portland DOT 2008). Parking permit fees for unmetered spaces vary by location and include administrative, installation, and maintenance costs. As part of Portland's administrative rules, carsharing operators must survey their membership annually on their travel behavior. Surveys are jointly developed with and approved by the DOT. Results must be provided to the DOT at the beginning of each fiscal year (Portland DOT 2006). Carsharing operators must also report on the monthly use of public parking spaces, membership, and fleet size to the DOT (City of Portland 2005).

Portland recently re-evaluated its policy and imposed a parking space cap of 200 spaces per carsharing operator (including metered and unmetered spaces) (City of Portland 2005). Additionally, the City of Portland is considering charging a market rate for metered on-street spaces. Initially, when an operator requested spaces, the city's parking department sought feedback from adjacent property owners. However, under the recent policy revision, the carsharing operator must obtain written approval from adjacent landowners to reduce the burden on city staff. Additionally, if the parking space is located within an Area Parking Permit Program, the carsharing organization must notify and obtain approval from the Neighborhood Association's parking committee. Figure 2 provides the on-street parking provisions for carsharing in Portland.

Legislative Definitions

"Carsharing" is defined as a "shared-use vehicle program that provides a geographically distributed fleet of vehicles to serve its members." A "carsharing organization" is defined as "an organization that provides pre-approved members with access to self-drive vehicles at geographically distributed locations for an hourly rate that includes fuel, maintenance, and insurance." A "carsharing parking permit" is defined as "the permit issued by the City Traffic Engineer to identify carsharing vehicles that are [eligible] to park in designated on-street spaces."

General Provisions

The carsharing operator must meet the definition provided in the legislation. Parking spaces are reserved for the exclusive use of one carsharing operator. The City Traffic Engineer may provide a 30-day written notice to relocate carsharing parking spaces and permits.

Allocation

Carsharing operators are allowed to submit requests biannually to install new or relocate existing on-street parking spaces. The City conducts a site evaluation for each location requested and provides written notice to property owners and tenants adjacent to a parking space, 30-days prior to installation. *NOTE: Carsharing spaces are prohibited from being located in Portland's downtown retail core.*

Cap

Portland initially had a limit of 100 on-street, metered spaces that could be used for carsharing, and these spaces were allocated evenly among all carsharing operators. Portland's initial policy allowed an unlimited number of unmetered on-street spaces to be converted to carsharing. In January 2009, the City of Portland amended its policy and imposed a parking space cap of 200 spaces per carsharing operator (including metered and unmetered). Requests are reviewed and approved by the City Traffic Engineer.

Fee Structure

The Bureau of Transportation System Management may establish fees based on cost-of-service and recovery of foregone meter revenue for the installation and maintenance of any on-street carsharing space. Parking permit fees for metered spaces are the equivalent to the average annual cost of foregone parking meter revenue per space in the meter district, plus the administrative and installation costs. Parking permit fees for unmetered spaces are equivalent to the administrative, installation, and maintenance costs. Portland's DOT annually reviews permit fees through a cost of service study assessing meter revenue and maintenance costs. Portland estimates an administrative cost of $264 per stall annually for providing on-street metered and permitted carsharing parking. Relocating existing on-street spaces at the request of a carsharing operator includes the administrative cost of the removal of the existing space plus the cost of the installation and maintenance of the new space. Carsharing permit fees are regularly reviewed and adjusted through Portland DOT's Cost of Service Study to reflect the most current meter revenue and maintenance costs.

NOTE: Permit fees were 50 percent of the full cost during the first year of this policy. In subsequent years, permit fees were increased to reflect 100 percent of the full cost. Additionally, a carsharing operator may provide a bike rack at a parking space. The installation cost of this bike rack can be deducted as part of the one-time installation fee. Bike racks become property of the City of Portland.

Permits, Signage, and Markings

Carsharing vehicles parked in reserved carsharing parking must display a designated carsharing parking permit. Carsharing permits are valid for one year and may be renewed on an annual basis. Portland prohibits the use of the public rights-of-way to display advertising or brochures.

Requirements of Carsharing Operators

Permits for parking spaces are issued after receipt of permit fees. Carsharing operators must survey their membership annually on travel behavior. Surveys are jointly developed with and approved by the DOT. Survey results must be provided to the DOT at the beginning of each fiscal year. Carsharing operators must report monthly to the DOT on the use of the public parking spaces, membership, and fleet size. Carsharing operators must pay for all citations and towing fees.

Parking Enforcement

Portland DOT is responsible for notifying carsharing operators of events, street cleaning, and maintenance that require vehicles to be relocated. Parking enforcement attempts to notify the carsharing operator prior to citing or towing vehicles in designated spaces. Carsharing vehicles may be cited or towed for failure to move vehicles promptly upon notification. Only designated staff employed by each carsharing operator can make parking enforcement requests. "Meter maids cite non-carsharing vehicles parked in a carsharing space;" however, the vehicles are rarely towed (Brook 2008). Typically, the city will only immediately tow a vehicle in an emergency (Brook 2008). One principal challenge with parking enforcement is when a non-carsharing vehicle parks in a carsharing space, the carsharing vehicle must then park in another permitted or metered space; this typically yields a citation from the meter maid against the carsharing vehicle (Brook 2008). Other challenges are street cleaning and street closures (block party, construction, and occasionally snow removal). Once or twice a year, Portland restricts parking on one side of the street or the other by posting signs. Proper notification to carsharing operators and members is crucial, and in some cases, carsharing vehicles can be inadvertently towed or the street sweeper maneuvers around the vehicles (Brook 2008).

Miscellaneous Policies

Low usage rates over a six-month period may result in the relocation of a carsharing parking space/permit by the City Traffic Engineer. Some parking spaces have been given up as neither the city or the operator wants to maintain spaces/pods with low usage rates (Brook 2008). Also, the DOT may remove an existing carsharing parking space for construction or maintenance. For example, if construction is happening on an adjacent lot (i.e., the sidewalk and parking is used for staging building materials), the carsharing company has to yield the spot (Brook 2008).

Figure 2 On-Street Parking Provisions for Carsharing in Portland

WASHINGTON D.C. METROPOLITAN AREA

The Washington D.C. metropolitan area includes the District of Columbia, Arlington County, and WMATA. Carsharing first appeared in the District of Columbia in 2001 when Flexcar and Zipcar launched carsharing services. Flexcar's initial launch included 11 vehicles stationed near WMATA public transit stations (WMATA 2008). In October 2007, Flexcar and Zipcar merged; the on-street parking spaces of both operators were retained and converted to Zipcar parking spaces in most locations throughout the Washington D.C. metropolitan area. As of Fall 2008, there were two carsharing operators in Washington D.C.: Zipcar and U-Haul's U-CarShare. However, only Zipcar has on-street and public transit parking in Washington D.C. and Arlington County. In September 2008, there were an estimated 37,000 carsharing members and 780 carsharing vehicles in the Washington, D.C. metropolitan area. The DDOT, WMATA, and Arlington County have each allocated on-street and public transit parking in the Washington D.C. metropolitan area to carsharing.

WMATA was the first jurisdiction in the Washington, D.C. metropolitan area to incorporate carsharing parking at its Kiss & Ride lots in a 2001 pilot program with Flexcar (WMATA 2008). In 2001, WMATA issued an RFP for their first pilot carsharing program. WMATA's most recent one-year RFP covers 38 stations and may be renewed with one-year extensions (with a maximum of up to five years) (WMATA 2008). Since WMATA covers eight jurisdictions within the transit authority, the pilot had to cover all eight jurisdictions to ensure that equal carsharing access is provided to riders in all of the jurisdictions (WMATA 2008). The pilot started with Flexcar and included the conversion of metered parking at 18 WMATA's Kiss & Ride lots. Meter heads were removed and carsharing signs were erected

at the spots. In 2004, an additional RFP was issued to enable Zipcar participation. Unlike a typical RFP process, WMATA's RFP is not exclusive to one operator (WMATA 2008). The 2004 RFP was granted to both Flexcar and Zipcar, expanding the number of locations to 31 Kiss & Ride lots. Under the current contract, 104 carsharing vehicles are parked at 38 of Metro's 44 short-term, metered Kiss & Ride lots (WMATA 2008). Based on the current number of locations enumerated in WMATA's RFP, there is a cap of 182 parking stalls.

In 2004, Arlington County launched a pilot carsharing program with Flexcar and Zipcar. Arlington County Commuter Services (ACCS) initiated a risk-sharing partnership with Flexcar and Zipcar to increase the number of carsharing vehicles in Arlington County that spring (Arlington County Environmental and Transportation Services 2008). With Arlington County guaranteeing a revenue minimum, Flexcar and Zipcar were assured that placing additional vehicles in uncertain locations would not be prohibitively expensive (ACCS 2005).

This partnership was based on a "subtraction model" in which Flexcar and Zipcar needed approximately $1,200 per vehicle per month to break-even. Arlington County, Flexcar, and Zipcar deducted the revenue generated from the total needed per vehicle to determine the per month subsidy that was needed, if applicable (Arlington County Environmental and Transportation Services 2008). As part of this risk-sharing partnership, Arlington County allocated on-street parking spaces near WMATA stations. In the first deployment phase, Flexcar and Zipcar were each granted 10 on-street parking spaces (half of which were varied by each location). A year later, Arlington County initiated a second phase during which additional carsharing spaces were added (Arlington County Environmental and Transportation Services 2008).

In October 2005, the District of Columbia's Municipal Code was amended to allow designated on-street carsharing parking; this resulted in the District's first on-street carsharing spaces. Sections 2406.12 and 2406.13 of the District of Columbia's Municipal Code provide the legislative basis for carsharing parking in Washington, D.C. (District of Columbia 2005).

The District of Columbia does not distinguish between for-profit and non-profit carsharing providers; it allows on-street parking spaces to be dedicated to carsharing vehicles, which must be registered to and operated by a carsharing operator in the District of Columbia and maintain D.C. license plates. Up to seven vehicles must be located in low-income neighborhoods, as defined by the DDOT. The District maintains limitations to prevent carsharing operators from replacing private off-street parking with public on-street parking (District of Columbia 2005).

The carsharing operator must provide the DDOT with data annually to assess the impacts of the parking program. The DDOT receives quarterly data from the operators including membership growth, number of vehicles, and use rates for each vehicle (DDOT 2008). One of the reasons for collecting vehicle usage data is to ensure that the vehicles required by DDOT in low-income neighborhoods are being used. Prior to the merger of Flexcar and Zipcar, Washington, D.C. combined their data to address concerns about the proprietary nature of these numbers (DDOT 2008). See Figure 3 for on-street parking provisions for carsharing in Washington, D.C..

Following the merger of Flexcar and Zipcar, there was a slight reduction in the number of vehicles located in Arlington County. As of September 2008, Arlington County provides 81 on-street parking stalls to Zipcar as part of this program (Arlington County Environmental and Transportation Services 2008). All of the pre-merger carsharing parking spaces at WMATA and in the District of Columbia were maintained; Zipcar operated all of these spaces.

Collectively, these three jurisdictions provide 167 on-street parking spaces and 182 public transit parking stalls designated to carsharing free-of-charge. All three jurisdictions typically collaborate on a bi-annual survey of all carsharing members in the District of Columbia metropolitan area. The bi-annual survey collects information on usage impacts and public transit ridership. At present, all three jurisdictions collect this information; however, only Arlington County has published these in a public study (Arlington County Environmental and Transportation Services 2008). Additionally, all three jurisdictions designate carsharing parking through the same common orange poles and signage.

General Provisions

The Director of the Department of Public Works is authorized to establish reserved on-street parking spaces for the exclusive use of carsharing vehicles. Vehicles must be registered to and operated by a carsharing operator. The carsharing operator must enter into a one-year contract. One-year contracts can be renewed, renegotiated, or terminated based on study evaluation results. Requests for carsharing parking spaces by the operator, neighborhood residents, and tenants must be taken to the respective Advisory Neighborhood Council for endorsement before the District will consider allocating a carsharing space.

Allocation

The Director of the Department of Public Works may authorize spaces, but must consult with affected Advisory Neighborhood Councils within 30 days. Up to seven vehicles must be located in low-income neighborhoods as defined by the DDOT. The carsharing operator must provide a list of pre-existing private parking locations and agree not to eliminate any of these parking locations until the size of their fleet within the District exceeds the list of pre-existing vehicles by 50 percent. In other words, a carsharing provider in the District must provide a list of existing vehicle locations (all off-street) in advance of requesting on-street spaces and agree not to remove any off-street spaces until their current fleet size exceeds their initial fleet size by 50 percent, thereby attempting to avoid the replacement of private off-street parking with free on-street spaces. The carsharing operator may eliminate one private parking space for each additional public parking space up to a maximum of 25. This does not mean that there is a limit on the number of on-street parking spaces but rather a limitation on the number of private off-street spaces that can be substituted for public on-street parking stalls. Prior to the Flexcar/Zipcar merger, both operators would meet jointly with the DDOT to select on-street parking spaces in a collaborative effort. In some cases, the District allocated tandem spots (spots for two carsharing vehicles) in which one spot would be dedicated to each operator. All parking spaces were converted to Zipcar spaces after the Flexcar/Zipcar merger in October 2007. In 2005, before initiating the on-street parking program, there was concern by the Advisory Neighborhood Council about taking residential permitted parking for carsharing parking spaces. To address these concerns, the DDOT incorporates Advisory Neighborhood Councils into the request/allocation process and prioritizes the creation and conversion of parking spaces. First, the District attempts to create parking spaces where spaces had not existed previously (for instance, loading zones, no-parking zones, and so on), then converts metered spaces, and lastly considers the removal of residential permitted parking. NOTE: Of the 86 carsharing spaces, 46 were created from areas where parking spaces had not existed prior, and 41 were created from the removal of metered parking spaces.

Cap
The program currently allocates 86 on-street parking spaces for carsharing. There are no municipal off-street parking garages in the District of Columbia. Prior to the Flexcar/Zipcar merger, the total number of on-street spaces was divided equally between the operators. There is no cap limiting the total number of carsharing parking spaces.
Fee Structure
The DDOT reserves the right to charge a fee for on-street parking spaces. The District is not currently charging for on-street parking spaces, but is considering parking fees in the future. This may be based on a cost-recovery strategy based upon average annual meter revenue.
Permits, Signage, and Markings
Orange poles and pavement markings denote carsharing parking spaces. Signage and markings aid in preventing illegal parking and the District in parking enforcement. Currently, the District must install and maintain orange poles and pavement markings. However, the District is working to renegotiate this in subsequent operator contracts to require the operator to install poles and maintain the parking spaces.
Requirements of Carsharing Operators
The carsharing operator must provide the DDOT with quarterly data to assess the impacts of the parking program. The carsharing operator must indemnify the District of Columbia against legal liabilities associated with the use of public space for carsharing operations.
Parking Enforcement
The Director of the Department of Public Works may authorize the Department of Motor Vehicles to issue special license plates to identify carsharing vehicles to aid in parking enforcement; however, this has not been done yet. All carsharing vehicles, regardless of whether they are parked in a public or private space, must be registered in the District of Columbia and maintain D.C. license plates. Both Public Works and the Metropolitan Police Department maintain ticket-writing authority. Unauthorized vehicles parked in carsharing spaces are in violation and subject to fines. Fines for illegal parking in a carsharing spot are $100 and greater than other parking violations.

Figure 3 On-Street Parking Provisions for Carsharing in Washington, D.C.

ARLINGTON COUNTY: BI-ANNUAL CARSHARING PARKING REVIEW

Twice a year, Arlington County reviews its carsharing parking, and operators can request additional parking stalls by completing an application. Additional spaces requested by carsharing operators are examined by Arlington County's transportation demand management and parking offices who evaluate proposed spaces based on their location, feasibility, and concentration of existing carsharing vehicles (Arlington County Environmental and Transportation Services 2008). If Arlington County determines there is demand for a vehicle request, the space is approved (Arlington County Environmental and Transportation Services 2008). It is important to note that there has only been small annual vehicle growth, to date. Arlington County has a policy of not placing more than one carsharing vehicle in front of local retail establishments. Local business owners feel strongly about maintaining open on-street parking adjacent and nearby their establishments (Arlington County Environmental and Transportation Services 2008).

The on-street spaces allocated in Arlington County were formerly metered spaces prior to their conversion to carsharing parking. Because of the perceived public benefits provided

to county residents and commuters, Arlington County does not charge for carsharing parking spaces and has no plans to change this policy (Arlington County Environmental and Transportation Services 2008). Although there was initial concern over lost meter revenue, Arlington County decided that this was insignificant. With over 10,000 parking meters in the county, the number of stalls dedicated to carsharing is considered very minimal (Arlington County Environmental and Transportation Services 2008). Arlington County estimates that the lost revenue can be recovered by adding additional metered spaces elsewhere (Arlington County Environmental and Transportation Services 2008) .

Arlington County has been highly concerned with streetscape management. As such, Arlington County adopted Portland's orange poles for denoting on-street carsharing parking (Arlington County Environmental and Transportation Services 2008). These poles were adopted quickly by other jurisdictions in the Washington, D.C. metropolitan area. In Arlington County, Flexcar and Zipcar were responsible for the costs, installation, and maintenance of the poles, signage, and striping (Arlington County Environmental and Transportation Services 2008). When non-carsharing vehicles are parked in carsharing stalls, the local police issue tickets to the violating vehicle, and the carsharing vehicle is parked in another open space (Arlington County Environmental and Transportation Services 2008).

Arlington County meets with the operators quarterly (now Zipcar only) and requests data, including membership and usage/mileage statistics. As part of these quarterly meetings, Arlington County and the operator inspect the stalls to identify any maintenance/ operational issues. Although Arlington County does not maintain a written contract, agreement, or permit with the operators, they are considering this in the future (Arlington County Environmental and Transportation Services 2008). It is interesting to note that Arlington County encourages carsharing to be incorporated into new developments in a transportation management plan as part of the transportation demand management and site planning development process (Arlington County Environmental and Transportation Services 2008). See Figure 3 for on-street parking provisions for carsharing in Washington, D.C.

SAN FRANCISCO BAY AREA

Carsharing first appeared in San Francisco with the Short-Term Auto Rental (STAR) demonstration project from 1983 to 1985. Carsharing re-emerged in San Francisco in 2001 with the launch of the non-profit operator City CarShare. In August and October 2005, two for-profit operators, Flexcar and Zipcar also launched service in San Francisco (and later merged in October 2007). As of Fall 2008, there were three carsharing operators in San Francisco—City CarShare, Zipcar, and for-profit U-Haul's U-CarShare. City CarShare and Zipcar also serve Berkeley and Oakland in the East Bay.

In September 2008, there were an estimated 26,000 carsharing members and 900 carsharing vehicles in the San Francisco metropolitan area. In October 2008, the City of San Francisco issued a request for quote (or RFQ) for carsharing with the objective of reducing municipal operating expenses and enhancing its fleet service quality. The City of San Francisco has allocated two city parking spots on a one-time basis to City CarShare

and the BART District provides public transit parking to City CarShare and Zipcar. These spots are "on-street", but were never part of the public right-of-way, rather they belonged to the City. Thus, use by City Carshare of an allocation of city property, than a result of policy with respect to ceding on-street, public right of way.   At present, a U-Carshare fleet of PT Cruiser vehicles is only parked at U-haul locations within the city.

SAN FRANCISCO

In San Francisco, carsharing parking policy is developed and implemented by the San Francisco Municipal Transportation Agency (SFMTA). In San Francisco, City CarShare pays the discounted carpool rate for municipal off-street parking (approximately 50 percent of the full monthly rate) (City of San Francisco 2005, SFMTA 2008). City CarShare has only two on-street parking spaces on Polk Street across from San Francisco City Hall. These spaces are provided free-of-charge and were approved on a one-time basis by the San Francisco Board of Supervisors (City Carshare 2008). At present, the SFMTA is not actively considering carsharing parking policy development, but plans to re-evaluate both off-street and on-street carsharing policies in the future. Carsharing parking policy development will resume when the SFMTA completes the implementation of the San Francisco parking pilot project, SF*park*, using demand responsive parking to manage pricing and availability throughout the day for the city's parking districts (SFMTA 2008). In addition, the planning code of the City of San Francisco has taken initiative to encourage carsharing through parking provision. The Municipal Planning Code Section 166 states that carsharing spaces must be provided in new developments that meet certain size requirements. The level of required carsharing parking allocation is dependent on the development size. Only carsharing organizations that are certified by the city through a third-party evaluation can be eligible for such spaces. The carsharing requirements stated in the municipal code are presented in Table 7 (City of San Francisco, 2009).

Table 7 Parking Requirements within the San Francisco Planning Code Section 166

Number of Residential Units	Number of Required Car Share Parking Spaces
0 - 49	0
50 - 200	1
201 or more	2, plus 1 for every 200 dwelling units over 200

Number of Parking Spaces Provided for Non-Residential Uses or in a Non-Accessory Parking Facility	Number of Required Car Share Parking Spaces
0 - 24	0
25 - 49	1
50 or more	1, plus 1 for every 50 parking spaces over 50

Berkeley

In Berkeley, the City Council has allocated eight spots (two off-street and six in municipal garages) on a case-by-case basis to City CarShare, which has maintained a fleet agreement with the city since 2004.

BART DISTRICT

From 1999 to 2000, there were a series of demonstration/pilot studies of shared-vehicle systems at BART stations, including CarLink I (1999) at the Dublin-Pleasanton BART station and Hertz (2000) at the Fremont BART station. Both programs incorporated traditional and reverse commute travel patterns where two or more commuters shared one vehicle (for example, commuters traveling on BART to work and commuters traveling from home to BART).

Initially, BART staff was concerned about allocating parking spaces to carsharing because most of the parking lots were already full. BART wanted the carsharing operators to conduct surveys and demonstrate that BART users were indeed using the carsharing vehicles parked in their lots (BART 2008). Based on this initial concern, BART encouraged City CarShare to approach the City of Berkeley and other local governments to request on-street parking spaces near BART stations (BART 2008). Although difficult to measure the direct benefits of the carsharing spaces on BART users, the staff eventually concluded that carsharing spaces augmented public transportation use (BART 2008).

In July 2002, the BART District and City CarShare entered into a pilot program in which BART allocated up to 24 parking spaces for City CarShare vehicles at various BART stations. Initially, two City CarShare vehicles were placed per station at BART's Glen Park station in San Francisco and the Rockridge and Lake Merritt stations in Oakland; the spaces were provided free-of-charge (BART 2008).

In 2006, two additional for-profit companies, Flexcar and Zipcar, launched carsharing services in the San Francisco market. In February 2006, BART's board approved parking for Flexcar and Zipcar in an Executive Decision Document calling for the expansion of carsharing services, which allocated eight parking spaces to each operator (BART 2008). Accordingly, BART parking stalls are allocated to a carsharing operator rather than carsharing as a vehicle class. In October 2007, Flexcar and Zipcar merged, under Zipcar's name. At that time, Zipcar acquired the former Flexcar parking spaces at BART under the pre-existing real estate permit negotiated by the operators and BART (BART 2008).

BART has two types of parking at many of its transit stations: monthly reserved and daily parking. Parking costs vary by BART station. A monthly reserved parking space ranges from $30 to $115.50, and daily parking fees range from $1 to $5 (BART 2009). Typically, up to 25 percent of a station's parking lot is dedicated to monthly reserved parking, and at most of the stations, this parking is sold out with a waitlist (BART 2008). Parking for monthly permit holders is reserved until 10AM and is available for other users after that. BART also has a daily fee (pay-per-use) and single day reserved parking. For BART's daily parking, a driver has the option of pre-purchasing a single-day reserved permit online or can park in a numbered parking stall and pay for their parking with either cash or a BART ticket inside the fare gate areas to ensure that parking is being used by BART riders (BART 2008). BART also offers airport/long-term parking at a limited number of South Bay and East Bay locations.

BART's real estate department negotiates a permit agreement with each carsharing operator, which includes general terms and a liability release (BART 2008). Carsharing operators are responsible for signage and maintenance. BART has a policy of only allowing a maximum of three parking spaces per operator at each station (BART 2008). Most often, monthly permitted spaces have been converted to carsharing, and the carsharing operator must pay the monthly parking fee at that the respective station ranging from $63 to $115 per month per space (BART 2008). Non-carsharing vehicles parking in assigned carsharing spaces can be problematic. BART charges a $40 initial fine for permit-related violations with additional late fees. However, like other monthly reserved parking, BART's parking enforcement will cite/fine non-carsharing vehicles parked in carsharing stalls (BART 2008).

At many BART stations, there is a waiting list for monthly reserved spaces that exceeds the total number of parking stalls. An individual can remain on the waitlist for a monthly reserved space from a couple of months to a couple of years to acquire a parking permit, depending upon the station. Carsharing operators are exempt from the general waitlist process to request permitted spaces (BART 2008).

PUBLIC PERCEPTIONS OF PARKING FOR CARSHARING

In September 2008, an intercept survey was administered to pedestrians in the San Francisco Bay Area to understand the public's opinions about the provision of on-street parking for carsharing. See Appendix C for the survey instrument. A total of 425 clipboard surveys were collected from four locations: downtown San Francisco near City Hall/Civic Center (19 percent); the Rockridge neighborhood near the Rockridge BART station in Oakland (39 percent); Downtown Oakland near the Convention Center (28 percent); and Downtown Berkeley between the Downtown Berkeley BART station and Berkeley City Hall (28 percent). Carsharing organizations participated in the pretesting of the surveys and provided comments on the instrument design. In particular, one carsharing organization requested that we address the distinction between for profit and non-profit carsharing in the survey design. All locations were in urban areas with rail and bus transit, carsharing service, and on- or off-street carsharing parking. These areas are typical of those where carsharing parking would be located, and respondents in this area were more likely to have exposure and knowledge of carsharing and parking. Language barriers proved to be a challenge to survey implementation in some areas, and as a result, new locations were selected to ensure adequate response. The resources available to this project did not allow for implementation in languages other than English. The results of this survey are applicable to the neighborhoods in the Bay Area in which they were implemented, and they are not generalizable to the entire region.

Because the survey was an intercept survey, the respondent pool is subject to some degree of self-selection. The survey was also administered in locations that had a high degree of transit accessibility via both rail and bus. In addition, all of the locations had limited parking supply, as they were all urban locations. The Rockridge neighborhood was the least dense and most residential of the selected sites. This neighborhood is a high traffic commercial main street that is a destination for many, as well as a key route to the University of California. Thus, the survey provides preliminary insight as to whether there are critical trends of support or opposition for carsharing parking. However, these results cannot necessarily characterize the balance of opinions in other regions of the country, which may be different. For similar regions, however, this survey can inform researchers of what to explore and perhaps enable improvements in future studies.

DEMOGRAPHIC ATTRIBUTES

The demographics of the respondents illustrate a working age population with a racial mix slightly skewed towards Caucasians and Asians in comparison to the general population. The survey respondents were split equally by gender. A little more than two-thirds were between the ages of 18 to 45 (68 percent), an additional 17 percent were between the ages of 46 and 55, and 11 percent were between 56 and 65. Only, three percent of the sample was older than 65. Most identified themselves as Caucasian (63 percent), followed by Asian (11 percent), then African American and Latino (each at nine percent), and Native American and Pacific Islander races constituting two percent, collectively. Table 7 illustrates a complete distribution of the age and gender profile.

Table 8 Demographic Attributes of Respondents

Gender (N=419)	Percent
Males	48
Females	48
No Answer	4
Age (N=405)	**Percent**
18-25	19
26-35	28
36-45	21
46-55	17
56-65	11
>65	3
No Answer	1

CARSHARING EXPOSURE

Respondents were asked whether they were familiar with carsharing prior to the survey. Eighty-six percent of the sample indicated that they were familiar with it, while ten percent also were members of a carsharing organization. The respondents were then asked a series of questions about their relationship to the neighborhood in which they were surveyed, their perception of local on-street parking, and relative support or opposition to allocating certain types of existing spaces towards carsharing. The results show that respondents were generally more supportive of allocating parking to carsharing than they were against it. However, there are some key caveats that should be understood.

Respondents had different relationships with the neighborhood in which they were surveyed. Some lived locally, others worked locally, while others were visiting for a variety of reasons. How these groups reacted to carsharing parking was different. First, it is important to understand how they perceive parking supply within their neighborhood. Table 8 shows the respondent's perception of parking supply as defined by their location when taking the intercept survey and the reason they were in the region.

Table 8 shows that most respondents feel that more parking is desired within the neighborhood. This was generally true regardless of the neighborhood and regardless of the reason the respondent was in the area. That is, both residents and visitors in each neighborhood generally felt that parking was not in oversupply, and this is important when considering their general support for allocating some of this limited parking supply to carsharing.

Table 9 Perception of Parking Supply by Location and by Purpose at Intercept Location

	Response Category	Way too little parking; I wish there was more	It would be nice to have more parking	There is just enough parking	There is too much parking, there should be less	Unsure	No opinion	Other	Total (Repondents)
Within this neighborhood, what is your opinion of on-street parking supply (or the amount of on-street parking)?	Civic Center SF	21%	25%	27%	5%	3%	8%	11%	75
	Rockridge Bart	17%	32%	32%	3%	1%	6%	8%	161
	Downtown Berkeley	35%	30%	13%	4%	0%	5%	14%	111
	Downtown Oakland	18%	32%	21%	5%	0%	9%	16%	57
	All Together (%)	23%	30%	24%	4%	1%	6%	11%	404
What is the primary purpose of your trip today?	I work or attend school in the neighborhood	28%	29%	23%	1%	1%	5%	12%	164
	I am a resident and live in the neighborhood	17%	32%	32%	6%	1%	5%	7%	95
	I am visiting the neighborhood for shopping	29%	40%	14%	0%	0%	6%	11%	35
	I am visiting the neighborhood for dining	19%	37%	15%	19%	0%	0%	11%	27
	I am visiting the neighborhood to participate in	21%	14%	28%	5%	0%	19%	14%	43
	Other	16%	38%	24%	3%	3%	3%	14%	37
	Total (Respondents)	92	122	97	16	4	25	45	401

Table 9 illustrates how people at different survey sites for a variety of reasons either supported or opposed carsharing parking in that location. Table 10(a) presents respondents' relationship with the neighborhood as classified by the specific neighborhood. Table 10(b) shows the relative support or opposition that respondents had for converting specific types of parking spaces within the respective neighborhood. The percents shown are the "percent of respondents within the neighborhood" as defined by the column in both sections of the table.

Table 10 Respondent Relationship with Neighborhood and Support for Carsharing Parking

(a) What is the primary purpose of your trip today?

Response \ Location	Civic Center SF	Rockridge Bart	Downtown Berkeley	Downtown Oakland	Total
I work or attend school in the neighborhood	50%	27%	50%	51%	173
I am a resident and live in the neighborhood	13%	32%	20%	19%	98
I am visiting the neighborhood for shopping	6%	13%	5%	3%	35
I am visiting the neighborhood for dining	5%	7%	6%	8%	28
I am visiting the neighborhood to participate in recreational or social activities	12%	10%	14%	7%	46
Other	14%	10%	5%	12%	41
Total	78	166	118	59	421

(b) Which types of spaces would you oppose/support converting for the purpose of designated carsahring use only?

Response \ Location	Civic Center SF		Rockridge Bart		Downtown Berkeley		Downtown Oakland		Total	
	Oppose	Support	Oppose	Support	Oppose	Support	Oppose	Support	Oppose	Support
Metered parking	37%	39%	24%	56%	29%	47%	35%	53%	124	213
Taxi zones	22%	47%	19%	49%	18%	45%	13%	47%	77	200
Truck loading zones	25%	32%	29%	36%	25%	30%	30%	37%	116	143
"No parking" or "No Stopping Zones"	19%	39%	20%	43%	22%	39%	15%	53%	83	182
On-street permitted parking	30%	28%	26%	46%	20%	35%	25%	47%	107	169
Reallocating exsiting parking spaces	18%	44%	17%	46%	13%	45%	17%	43%	67	191
Other	3%	6%	1%	5%	8%	7%	8%	2%	17	23
I would be fine with any of these spaces being converted	6%	22%	5%	19%	6%	21%	3%	22%	23	87
Total Respondents at the location	79		167		119		60		425	

Table 9(a) shows that half the people surveyed in the downtown locations were there for work or school. Rockridge was more atypical with nearly a 30-30 split between workers and residents. Table 9(b) provides the percentage of people supporting or opposing the

conversion of a specific type of space to a dedicated carsharing space. Respondents were allowed to pick more than one response, so the percentages do not sum to 100 but reflect the percentage of respondents electing each specific option among others. With a few exceptions, more people supported the conversion of spaces to carsharing than opposed them in each neighborhood. This occurred because a typical respondent supported the conversion of more spaces then they opposed. For example, roughly 70 percent of all respondents opposed the conversion of at least one type of space, while 93 percent of all respondents supported the conversion of at least one type of space. Thus, most respondents had opinions about the types of spaces that they would support and oppose for carsharing conversion. Table 11 illustrates this result in the context of the respondent's relationship with the neighborhood.

Table 11 Neighborhood Relationship and Carsharing Parking Support and Opposition

Purpose of Trip Type of Space	I work or attend school in the neighborhood		I am a resident and *live in the neighborhood*		I am visiting the neighborhood for *shopping*		I am visiting the neighborhood for *dining*		I am visiting the neighborhood to *participate in recreational or social activities*		Other	
	Oppose	Support	Oppose	Support	Oppose	Support	Oppose	Support	Oppose	Support	Oppose	Support
Metered parking	36%	46%	19%	66%	31%	40%	25%	46%	22%	48%	34%	49%
Taxi zones	19%	46%	17%	51%	23%	43%	18%	36%	11%	57%	20%	46%
Truck loading zones	23%	31%	31%	41%	23%	34%	39%	32%	24%	43%	37%	20%
"No parking" or "No Stopping Zones"	22%	40%	19%	45%	17%	40%	18%	43%	20%	50%	15%	46%
On-street permitted parking	27%	35%	23%	54%	17%	46%	36%	32%	26%	37%	22%	34%
Reallocating exsiting parking spaces	13%	43%	19%	51%	20%	40%	25%	46%	11%	54%	12%	34%
Other	6%	5%	2%	6%	0%	6%	4%	0%	7%	9%	2%	5%
I would be fine with any of these spaces being converted	7%	20%	3%	22%	9%	17%	4%	25%	2%	20%	7%	20%
Total persons within PURPOSE OF TRIP Category	173		98		35		28		46		41	

Table 11 also shows that support for converting some spaces to carsharing generally outweighs opposition. In particular, the difference between percentages of support and opposition are largest among those who are neighborhood residents. This result is important because it suggests that allocating parking for carsharing may receive less opposition from locals than from people commuting into the neighborhood. In addition, the data also show that opposition to converting some spaces within a neighborhood is not insignificant. That is, the conversion of any of the listed spaces was opposed by at least 20 percent of people living in a neighborhood. Hence, while support does outweigh opposition, there is no type of space that is universally endorsed for conversion to carsharing parking.

Finally, respondents were also asked whether they thought carsharing organizations should compensate the city for on-street spaces. About half thought that they should (48 percent), approximately one third thought they should not (33 percent), and the remaining were unsure. When respondents were asked whether a different policy should exist for granting

on-street parking to for-profit versus non-profit carsharing providers, about 61 percent agreed, while 23 percent thought there should be no difference with the rest uncertain. More than half of the respondents (53 percent) indicated that carsharing operators should be required to obtain consent from neighboring residents and businesses before converting a parking space to carsharing. This emphasizes the importance of public involvement in carsharing parking policy development.

Overall, respondents, and particularly residents, offered more support than opposition to allocating parking to carsharing. While the survey suggests support, it does not reflect a unanimous endorsement of parking for carsharing and finds that a large portion of the respondents feel that carsharing organizations should compensate the city for spaces.

CONCLUSION

The provision of on-street parking dedicated to carsharing vehicles is an important policy issue confronting local governments. Some of the municipal parking policies include: 1) provisions for on-street parking; 2) exemption from parking time limits; 3) creation of carsharing parking zones; 4) free or reduced cost parking spaces and/or parking permits; 5) universal parking permits (for instance, carsharing vehicles can be returned to any on-street location); and 6) formalized processes for assigning on-street parking spaces.

When considering the allocation of on-street and public off-street carsharing parking, local governments should consider addressing the following questions:

- How will carsharing be defined (for example, for-profit operators, non-profit operators, hourly rentals)?

- What will be the procedure for allocating carsharing parking (for example, city council, parking authority)?

- Should there be a different policy for providing parking or charging fees between for-profit and non-profit carsharing providers?

- How will the local government manage competition among multiple players seeking carsharing parking and how will disputes be managed?

- What is the methodology for valuing the parking spaces and will an operator be charged (for example, cost-recovery based on lost meter revenue or permit fees, administrative and maintenance expenditures, and market-based valuation of parking in a vicinity)?

- What policies will the city need to implement to address permits, signage, and parking enforcement for carsharing vehicles?

- What are the primary goals of the community in providing on-street or other parking spaces to carsharing organizations?

Local governments in North America have addressed the issue of carsharing parking in a number of ways. With respect to on-street parking, some cities have established "option zones" that designate on-street carsharing parking. Other cities have allocated parking stalls for carsharing as a "vehicle-class" rather than dedicating parking spots to specific carsharing operators. In other cities, some operators are charged for on-street parking at the rate of foregone meter revenue or permit fees. With respect to public off-street parking, a number of cities provide market rate, discounted, and free parking in municipal parking

lots and garages to carsharing.

Based on the four case studies and expert interviews, the authors have identified three policy tracks that local governments and public transit operators might use as a model for developing their carsharing parking policies. These policy approaches include a sample policy framework for parking allocation, caps, fees/permits, signage/installation, impact studies, enforcement, and public involvement based on varying degrees of governmental support. The first framework, "carsharing as an environmental benefit," is an example of maximum governmental support. The second framework, "carsharing as a sustainable business," provides moderate support to carsharing, and the final framework, "carsharing as a business," provides a minimum level of governmental support. The details of these three frameworks are described in Table 11.

Table 12 Carsharing Parking Policy Approaches for Local Governments

	Carsharing as an Environmental Benefit Maximum Governmental Support	Carsharing as a Sustainable Business Moderate Governmental Support	Carsharing as a Business Minimum Governmental Support
Allocation	Jurisdiction may allocate parking spaces on a case-by-case basis or through more informal processes, such as non-binding council/board of director resolutions.	Jurisdiction that once allocated parking spaces through an informal process, formalizes this process.	Jurisdiction maintains a highly formalized and established process for the allocation of carsharing parking spaces, including a process for allocation among multiple operators.
Caps (for instance, limit on number of carsharing spaces)	Does not impose any cap on the number of carsharing spaces or percentage of spaces that may be converted to carsharing.	May impose a cap on the number and location of carsharing spaces or the total percentage of spaces jurisdiction-wide that may be converted to carsharing.	Imposes a cap on the number and location of carsharing spaces or the total percentage of spaces jurisdiction-wide, which may be converted to carsharing.
Fees and Permits	Recognizing the social and environmental benefits of carsharing, parking is provided free-of-charge or significantly below market cost.	Fees may be based on cost recovery of parking provision (for instance, foregone meter revenue, administrative costs, and so on). Fees may be reduced to reflect environmental goals, such as charging a reduced carpool rate for carsharing parking.	Fees based on a cost recovery or profit-based methodology. This could include permit costs, lost meter revenue, and administrative expenses for program management.
Signage, Markings, and Installation	Jurisdiction pays for the sign installation and maintenance, striping, and markings.	Jurisdiction pays for the installation and operator pays for the maintenance of signage, striping, and markings.	Requires carsharing operator to pay for the installation and maintenance of signage, striping, and markings.
Social and Environmental Impact Studies	Require that carsharing operators study and document local social and environmental benefits at regular intervals.	May require that carsharing operators study and document local social and environmental benefits on a one-time basis or at regular intervals.	Does not require any social and environmental impact study of carsharing.
Parking Enforcement	Local police may maintain ticket authority. Citations for parking in carsharing stalls are greater than most other parking violations.	Local police may maintain ticket/citation authority.	Local police may have ticketing authority. Citations for parking in carsharing spots are the same as most other parking violations.
Public Involvement	Informal process, if any, led by the jurisdiction to elicit public input into the location and number of carsharing parking spots allocated. Staff may determine this internally without public comment.	Informal process where the jurisdiction and carsharing organization seek public input into the location and number of carsharing parking spots through public notification and staff management of possible public concerns.	Highly formalized process where carsharing organization is responsible for obtaining public input and approval on the location and number of carsharing parking spots through neighborhood councils, commissions, or formal hearings.

Public involvement is an important aspect of allocating carsharing parking and should be incorporated into the process for allocating parking stalls. Public involvement in this process can reduce opposition to the conversion of pre-existing parking stalls and provide both jurisdictions and operators with valuable information on the highest demand/highest potential use locations. The particular method of public involvement should reflect the unique institutions and policy procedures established in each jurisdiction. Some examples of public involvement could include endorsement by neighborhood councils (as in Washington, D.C.); a public comment, hearing, and approval process on the allocation of parking stalls; or an appointed/elected body to comment or approve parking requests. Some jurisdictions have provided city councils and parking authorities with varying degrees of authority over carsharing parking, which can include public involvement through regular meetings and public comment periods.

Indeed, the results of a survey exploring San Francisco Bay Area residents' opinions about the provision of on-street parking for carsharing underscore the importance of public involvement in carsharing parking policy development. More respondents indicated a willingness to convert spaces to carsharing than to oppose conversion to carsharing use only. The types of parking that had both the greatest support and least opposition to conversion to carsharing parking were taxi zones, no parking/no stopping zones, and restriping existing parking spaces; however, a large share of respondents did support conversion of metered parking. About half of respondents thought that carsharing organizations should compensate the city for these on-street spaces. Among those that thought that carsharing organizations should compensate the city for these spaces, most indicated that the organization should pay a reduced cost (52 percent), the cost of the parking permit (19 percent), or the cost of lost meter revenue. Many felt that there should be a different policy for granting on-street parking to for-profit carsharing providers versus non-profit carsharing providers (61 percent).

In the future, operator competition is expected to increase in many local jurisdictions. As such, local governments and public transit operators should develop forward-looking policies that provide an equitable means of allocating parking stalls (both in terms of the total number and location). To address the total number of stalls, local jurisdictions can either limit the number of spaces allocated per operator; provide a limited number of spaces per a given membership level (for example, one parking stall per 100 members served); or choose not to limit the number of carsharing spaces. Some of the methods that can be used to address competition over the location of parking stalls between operators include a first-come/first-served policy, lottery, collaborative process negotiated with the parking authority and all service providers, and tandem stalls (more than one operator with an equal number of adjacent stalls).

A broader issue that is also relevant to consider is the orchestration of parking policies that support organizations such as carsharing along with the overall appropriate pricing of parking within the urban environment. Parking, a long underpriced urban commodity is an asset that many cities are looking to direct in more intelligent ways. Parking has long been a necessary accessory to the automobile and often a source of public costs. Policies aimed at congestion mitigation and demand management in conjunction with broader demand responsive pricing may be a trend aimed at parking demand management in the coming decades. There are a number of methods that can be used for assessing the value

of on-street parking spaces provided to carsharing operators. On-street parking fees can be based on the costs of residential parking permits, foregone meter revenue, operations and maintenance, or market cost for private or public off-street parking in a given parking district or municipal jurisdiction. Additionally, jurisdictions may choose to charge fees for converting parking stalls, including conversion costs associated with removing meters, striping curbs, and administrative overhead.

Parking policies should include enforcement mechanisms to prevent non-carsharing vehicles from parking in carsharing-only stalls. Jurisdictions should ensure that they have the proper statutory authority at a minimum to ticket violators.

With respect to distinguishing between carsharing and car rental services, local governments should cautiously weigh the nature of the services being provided and their impacts on the transportation network. One way to assess the services provided is to require operators to conduct usage/impact surveys and provide regular feedback to local governments. Similarly, public transit operators can require similar surveys of operators to ensure that public transit riders are using the carsharing vehicles.

APPENDIX A:
CARSHARING OPERATOR SURVEY

Basic Metrics: Parking

1. Do the jurisdictions in which your organizations operate provide **PUBLIC ON-STREET parking** for shared-use vehicles?

No _____   **If no**, please skip to **question 3**.

Yes _____ **If yes**, please specify as of June 30, 2007, the number of **PUBLIC ON-STREET parking** spaces by jurisdiction below.
_____
_____

2a. Is your organization charged for **PUBLIC ON-STREET parking**?

No _____   **If no**, please skip to **question 2c.**

Yes _____ **If yes**, explain how **PUBLIC ON-STREET parking** rates are calculated by jurisdiction.
_____
_____

2b. Does your organization compete with another carsharing operator(s) for **PUBLIC ON-STREET parking**?

No _____   **If no**, please skip to **question 2d**.

Yes _____ **If yes**, please explain how additional operators have affected the cost of **PUBLIC ON-STREET parking** in your market.
_____
_____

2c. Did your organization provide any non-monetary compensation in exchange for discounted or free **PUBLIC ON-STREET parking** rates (e.g., low-emission vehicles or placement in low-income areas)?

No _____

Yes _____ **If yes**, please specify by jurisdiction below.
_____
_____

2d. How were **PUBLIC ON-STREET parking** spaces converted to shared-use parking? Please check all that apply below.

___Conversion of metered parking
___Conversion of truck loading zones
___Conversion of taxi zones
___Conversion from no stopping or no parking zones

___Exemptions from parking time limits
___Re-striping existing parking spaces
___Other, please specify_____

2e. How are **PUBLIC ON-STREET** shared-use vehicle parking spaces identified by jurisdiction (e.g., orange mobility node in D.C.) ?
_____
_____

3a. Have the jurisdictions in which your organizations operate provided **PUBLIC OFF-STREET parking** for shared-use vehicles?

No _____   **If no**, please skip to **question 4**.

Yes _____ **If yes**, please specify as of June 30, 2007, the number of **PUBLIC OFF-STREET parking** spaces by jurisdiction below.
_____
_____

3b. Is your organization charged for **PUBLIC OFF-STREET parking**?

No _____   **If no**, please skip to **question 3d**.

Yes _____ **If yes**, please specify the charge for **PUBLIC OFF-STREET parking** by jurisdiction below.
_____
_____

3c. Please explain how **PUBLIC OFF-STREET parking** rates are calculated by jurisdiction?
_____
_____

3d. Does your organization compete with another carsharing operator(s) for **PUBLIC OFF-STREET parking**?

No _____   **If no**, please skip to **question 3e**.

Yes _____ **If yes**, please explain how additional operators have affected the cost of **PUBLIC OFF-STREET parking** in your market.
_____
_____

3e. Did your organization provide any non-monetary compensation in exchange for discounted or free **PUBLIC OFF-STREET parking** rates (e.g., low emissions vehicles or placement in low-income areas)?

No _____

Yes _____ **If yes**, please specify by jurisdiction.
_____

_____

4. As of June 30, 2007, please specify the number of **PRIVATE OFF-STREET parking** spaces your organization makes available to its members by jurisdiction below.
_____
_____

5. In your opinion, what are the relative advantages of on-street and off-street parking for shared-use vehicle organizations?
_____
_____

6. Can you direct us to any reports, policies, state legislation, local ordinances, and/or individuals that can describe the jurisdictions on- and off-street parking policies in more detail?
_____
_____

7. In your opinion, what sorts of amendments to state and/or local laws or regulations, if any, are required to legally implement a range of carsharing parking options in the future?
_____
_____

Reductions in Parking Spaces

8. Has your organization negotiated with the city or local developers to reduce the number of parking spaces constructed with developments?

Yes _____   No _____   (if No, skip to question 9)

If yes, please describe briefly the nature of these negotiations and what some of the typical outcomes are by jurisdiction:
_____
_____
_____

9. In total, approximately how many parking spaces would you estimate have **not** been constructed **directly** as a result of your organization's existence by jurisdiction? ("Directly" would be as a result of specific negotiations with the carsharing organization and the developer. "Indirectly" would be as a result of carsharing reducing the aggregate need for car ownership in the area, and in general, reducing the perceived need for vehicle spaces in a region. An estimated "indirect" reduction attributable to your organization is welcome, but we imagine that such an estimate would be difficult.)

APPENDIX B:
EXPERT INTERVIEW SCRIPT

I.   Introduction:

Hello, my name is _____. I am a researcher at the University of California, Berkeley. I am working on a research project, sponsored by the University of California, Berkeley and the Mineta Transportation Institute, examining the public parking policies related to carsharing. As part of this study, we are conducting interviews with experts to explore their experiences and opinions on this issue. Your name has been provided to me as someone who is knowledgeable about this topic. Are you willing to be interviewed? This interview should take 10 to 15 minutes. Is this a good time or could we schedule a time that is more convenient for you?

II.   Preliminary Information

    1. Identify name, position, and organization.

    2. Time at which the interview took place.

    3. Interview conducted by telephone or meeting?

III.   Experience/Background of Interviewee

    4. In your current position at XXXX, what is your role in carsharing parking?

    5. How long have you been involved in carsharing parking policy and in what have you done to address this issue?

IV.   Perceptions

    6. In general, what are the benefits and drawbacks of providing parking to carsharing operators?

V.   Proposed or Existing Policy

    7. Is your organization/agency providing or considering providing on-street or other types of parking to a carsharing operator(s)? Why?

VI.   Legal and Institutional Barriers

    8. Has your organization encountered (or do you think it will encounter) legal barriers to dedicating public parking to a carsharing operator(s)? Yes or No? If Yes go to a. If No, go to 9.

        a) How have you (or do you plan) to address these barriers?
        b) What sorts of amendments to state and/or local laws or regulations, if any, are required to legally implement a range of carsharing parking options in your area?

    c) What criteria do you think carsharing providers need to fulfill to get allocated spaces?

    d) What type of information, if any, do you think carsharing operators should report to the granting authority?

9. Are there any other institutional barriers that you may have faced implementing and/or operating your program or planned carsharing parking program? If so, how was it or will it be addressed? If Yes go to a. If No, go to 10.

    a) How have you (or do you plan) to address these barriers?

VII.   Program/Policy Implementation & Allocation

10. Next, we have some questions about the specifics of how you implement (or plan to implement) the provisions of public parking for carsharing vehicles. Do you provide (or plan to provide) on-street parking and/or off-street parking to carsharing vehicles?

    a) [*If they have on-street parking or plan to have it*] Have you (or are you planning to) converted loading zones, taxi zones, and/or metered parking to carsharing parking? [*Ask only if this had not been addressed previously*] Have you (or do you think you might) encountered barriers to converting these spaces to carsharing parking?

    b) Do you allow (or plan to) special signage or other mechanisms for identifying these spaces? [*Ask only if this had not been addressed previously*] Are there regulations governing this or is it at the discretion of the operator?

11. Is there an established process (or do you plan to develop one) of requesting and allocating this parking? If Yes, go to a. If No, go to 12.

    a) How does this process work (or how do you think this process will work)? How was it developed (or how are you developing this process)? If no, how is (or how will) the parking (be) allocated?

12. [*If they have a program in place*] Have you changed the way parking is allocated since you first started allocating carsharing parking? If yes, why and what did you change? If No, go to 13.

VIII.   Valuation of Parking

13. Are carsharing organizations charged (or will they be charged) for on-street or off-street parking? If Yes, go to a. If No, go to 14.

    a) How is (or will) this charge be calculated? Does it (or will it) be based on any of the following? If so, how? If not, why?
        1. Lost meter revenue,
        2. Market value of public parking spaces,
        3. Market value of private off-street spaces,

4. Avoided auto ownership and operation costs,
5. Increased public transit use,
6. Decreased vehicle miles traveled (due to modal shift),
7. Improved air quality,
8. Social benefits to low-income households,
9. Increased public transit ridership, and
10. More efficient use of roadways and parking facilities.

14. Is there (or do you think there should be) a different policy for granting on-street parking spaces and requiring compensation between for-profit and non-profit carsharing providers? Why or why not?

IX.   Public Perception

15. [*If this hasn't been covered elsewhere*] Have you experienced any public opposition for your program or planned program? If so, how was it or will it be addressed?

X.   Closing Thoughts

16. [*Ask only if interviewing a transit operator*] How does (or how might) public transit station parking policies encourage carsharing? Can you identify any specific challenges to the implementation of such parking?

17. Can you share any relevant documentation on parking and carsharing (e.g., legislation, reports, etc.) with us?

18. Is there anything that you might like to add to this interview?

19. Do you have any take away messages with which you want to leave us?

20. Can you recommend anyone else we may want to interview for this study?

Thank you very much for participating in this study. We really appreciate your time. (Obtain email address)

APPENDIX C:
PUBLIC OPINION SURVEY

Researchers at the University of California, Berkeley and Mineta Transportation Institute invite you to take a short survey on carsharing. It should take no more than 10 minutes. The purpose of this survey is to understand your opinions about possible provision of on-street parking for carsharing vehicles. The information that is obtained in connection with this study will not be linked to you in anyway. Your participation in this study is anonymous, and you may choose to withdraw at any time.

First, I would like to read you a definition of carsharing, accepted by the majority of operators in North America.

"All Car sharing organizations offer members access to network of shared vehicles, 24-hours, 7 days a week, at unattended self-service locations. Car share services include gas, insurance and maintenance. Car sharing organizations help members save money over the cost of individual car ownership by encouraging members to drive less often, plan trips more, use other modes of transportation more, and drive fuel efficient vehicles when a car is needed. Car sharing is defined by its environmental and social purpose: to decrease individual car ownership, provide affordable access to vehicles for all constituencies—including those less able to afford car ownership—as well as motivating residents to walk, cycle and take public transportation, and dependence on fossil fuels while reducing the emission of greenhouse gases. "

1) Were you familiar with carsharing prior to this survey?   [ ]   Yes   [ ] No

2) If yes, approximately how long have you known about it?: _____ months or _____ years

3) How did you first learn about it?
_____

4) Are you a member of a carsharing organization?   [ ]   Yes   [ ] No

5) What is the primary purpose of your trip today? (Please select one response.)
[ ]   I work or attend school in the neighborhood.
[ ]   I am a resident and live in the neighborhood.
[ ]   I am visiting the neighborhood to: [ ]   Shop
                                                      [ ]   Dine
                                                      [ ]   Participate in Recreational or
                                                              Social Activities
[ ]   Other:
_____

4) How did you arrive here today? (Please select one response.) [ ] Private Automobile [ ] Bicycle [ ] Walking [ ] Transit (Bus, BART, etc.) [ ] Other: _____	5) Do you ever park a car in this area? [ ] Yes [ ] No If yes, then how frequently: _____times a week _____times per month
6) Within this neighborhood, what is your opinion of on-street parking supply (or the amount of on-street parking)? (Please select one response.) [ ] Way too little parking; I wish there was more. [ ] It would be nice to have more parking. [ ] There is just enough parking. [ ] It would be nice to have a little less parking. [ ] There is too much parking, there should be less. [ ] Unsure [ ] No opinion [ ] Other_____	7) To what extent (overall) do you feel that on-street parking improves or detracts from the quality of the surrounding neighborhood (in terms of quality-of-life, safety, access, etc.)? (Please select one response.) [ ] Greatly detracts from the quality of the neighborhood [ ] Somewhat detracts from the quality of the neighborhood [ ] Makes no difference to the quality of the neighborhood [ ] Somewhat improves the quality of the neighborhood [ ] Greatly improves the quality of the neighborhood [ ] Unsure [ ] No opinion [ ] Other_____

8) If carsharing parking were established or expanded in this neighborhood, some on-street space might be allocated.

a) Which types of spaces would you *oppose* converting for the purpose of designated carsharing use only? (please select all that apply)

<Read all answers before accepting response>
[ ] **Metered parking**
[ ] **Taxi zones**
[ ] **Truck loading zones**
[ ] **"No Parking" or "No Stopping Zones"**
[ ] **On-street permitted parking**
[ ] **Reallocating existing parking spaces**
[ ] **Other**_____
[ ] **None**, I would be fine with any type of space being converted

b) Which types of spaces would you *support* converting for the purpose of designated carsharing use only? (please select all that apply)

<Read all answers before accepting response>
[ ] **Metered parking**
[ ] **Taxi zones**
[ ] **Truck loading zones**
[ ] **"No Parking" or "No Stopping Zones"**
[ ] **On-street permitted parking**
[ ] **Reallocating existing parking spaces**
[ ] **Other**_____
[ ] **None**, I don't think any type of space should be converted

9) Do you think carsharing organizations should compensate the city for these spaces?

[ ]   Yes   [ ]   No   [ ]   Not sure

If yes, how? (Please select one response)
          [ ]   Carsharing organizations should pay but at a reduced cost.
          [ ]   Carsharing organizations should pay the cost of the parking permit.
          [ ]   Carsharing organizations should pay the cost of lost meter revenue.
          [ ]   Depends on what type of space is given or if the carsharing
          organization has to meet criteria
          [ ]   Other: _____
Why: _____

10) Among carsharing providers, there are two types of business models, for-profit and non-profit. The next set of questions will ask you your opinion based on business model. Let's review the definitions of both first.

Non-profit: A legally constituted organization whose objective is to support or engage in activities of public or private interest without commercial or monetary profit. Profits are put back into the organization or service.	For-Profit: A business or organization whose primary goal is to make a monetary profit.

a) Do you think there should be a different policy for granting on-street parking spaces between for-profit and non-profit carsharing providers?

[ ]   Yes

[ ]   No

[ ]   Not sure

b) Do you think there should be a different policy for carsharing public parking space compensation between for-profit and non-profit carsharing providers?

[ ]   Yes. If yes, how should compensation for public spaces be different for for-profit and non-profit organizations?_____
[ ]   Unsure
[ ]   No. Both profit and non-profit carsharing organizations should be treated equally.
[ ]   Not sure

11) Who do you think should be required to provide consent for on-street space to be converted to reserved carsharing parking? (Please check all that apply.)
[ ]   No one in particular
[ ]   The municipal government/streets or traffic department/parking authority
[ ]   Elected officials who represent the area
[ ]   Relevant community association or business association
[ ]   Adjacent property or business owner
[ ]   Majority of residents and/or businesses on the block
[ ]   Other_____

12) Demographic Information (the person administering the survey can observe this information)

Sex: M   [ ]   Age: 18-25 [ ]   Ethnicity: American Indian/Alaska Native [ ]

    F   [ ]   26-35 [ ]   African American   [ ]
                    36-45 [ ]   Asian   [ ]
                    46-55 [ ]   Hawaiian / Pacific Islander [ ]
                    56-65 [ ]   Latino / Hispanic   [ ]
                    >65   [ ]   Caucasian   [ ]
            Decline to Answer: [ ]   Decline to Answer: [ ]

13) Do you have any further comments on carsharing parking?

ACRONYMS AND ABBREVIATIONS

Abbreviation	Term	Definition/Explanation
ACCS	Arlington County Commuter Services	Promotes and facilitates the use of transportation modes other than single-occupancy vehicles in Arlington, VA.
BART	Bay Area Rapid Transit District	A heavy-rail public transit system that serves the San Francisco Bay Area.
CAN	CooperativeAutoNetwork	Co-operative Auto Network is the carsharing co-op that has been serving Metro Vancouver since 1997.
CO2	Carbon Dioxide	A greenhouse gas (GHG) that is a part of vehicle emissions.
CTA	Chicago Transit Authority	Operates the nation's second largest public transportation system and covers the City of Chicago and 40 surrounding suburbs.
DDOT	District of Columbia Department of Transportation	Manages and maintains transportation infrastructure in the District of Columbia to ensure that people, goods, and information move efficiently and safely, with minimal adverse impacts on residents and the environment.
DOT	Department of Transportation	
MARTA	Metropolitan Atlanta Rapid Transit Authority	Provides bus and rail service in the Atlanta, Georgia area.
PABC	Parking Authority of Baltimore City	
RFP	Request for Proposal	When a government issues a new contract it sends out RFPs to agencies that it believes may be qualified to participate. An RFP lists project specifications and application procedures.
SFMTA	San Francisco Municipal Transportation Authority	Manages the San Francisco bus, street car, cable car, and light rail service.
STAR	Short-Term Auto Rental	Carsharing demonstration project in San Francisco from 1983 to 1985
TriMet	Tri-Metropolitan Transportation District	Serves the Portland, Oregon Metro Area that includes most of Clackamas, Multnomah, and Washington counties
WMATA	Washington Metropolitan Area Transit Authority	Metrorail and Metrobus transit services in Washington, D.C., Maryland, and Virginia communities.
VMT	Vehicle Miles Traveled	Calculated by multiplying Annual Average Daily Traffic (AADT) by length of roadway section in miles.

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Ms. Murray is a member of the Bay Area Rapid Transit (BART) District Board of Directors, elected in 2004 and re-elected in 2008. She served as President of the Board in 2008 and represents District 1 in central Contra Costa County. She is a former elected member of the Walnut Creek City Council, serving as Mayor twice during her 10-year tenure. She was also a member of the city's Planning and Transportation Commissions. Ms. Murray is a former Chair of the Central Contra Costa Transit Authority and currently serves as an ex officio member of the Contra Costa Transportation Authority. She is also a former Chair of the State of California's Departmental Transportation Advisory Committee.

Ms. Murray holds a Master in Public Administration from Harvard University's John F. Kennedy School of Government. She recently completed a term as a Director of the Harvard Alumni Association. Ms. Murray earned her Bachelor of Arts in English and journalism and her secondary credential from San Jose State University.

Past professional positions she has held include Acting Assistant General Manager of the Service Development and Marketing Department at AC Transit District in Oakland and Acting Director of Transportation for the University of California at Berkeley. While at UCB, Ms. Murray created the Berkeley TRiP Commute Store, which promoted alternatives to driving alone. Earlier she was the General Manager of Bay Area Transportation Corporation, a non-profit paratransit company serving people with disabilities, the elderly, and Head Start preschoolers.

ELLIOT MARTIN, PH.D.

Elliot Martin is a Post-Doctoral Research Engineer at the Transportation Sustainability Research Center (TSRC) within the Institute of Transportation Studies at UC Berkeley. He holds a PhD in Civil and Environmental Engineering from UC Berkeley, completed in August of 2009. During his time as a graduate student, Elliot has contributed to a variety of projects at TSRC and the Innovative Mobility Research (IMR) group, which he joined in 2005. He has co-authored a variety publications in peer-reviewed journals and conference proceedings. In 2006, he completed a dual Masters in Transportation Engineering and City and Regional Planning also at UC Berkeley. Prior to graduate school, Elliot worked as an Assistant Economist at the Federal Reserve Bank of Richmond. He graduated from Johns Hopkins University in 2001 with a degree in Economics and Computer Science.

ADAM P. COHEN

Adam Cohen is a Research Associate with Innovative Mobility Research (IMR) and the Transportation Sustainability Research Center (TSRC) at the Institute of Transportation Studies at UC Berkeley. Adam joined the group in 2004,and has focused his research on worldwide carsharing. He has co-authored numerous carsharing publications in peer-reviewed journals and conference proceedings. In 2008, he completed a dual Masters in city & regional planning and international affairs from the Georgia Institute of Technology. Adam graduated from the University of California, Berkeley with a dual Bachelors degree in urban studies and legal studies.