CITY OF PASADENA

Traffic Reduction Strategies Study

Draft Report

Appendix A: Case Studies

Nelson\Nygaard Consulting Associates
785 Market Street, Suite 1300
San Francisco, CA 94103

November 2006

Table of Contents

Page

Table of Figures

Page

Chapter 1. Bellevue, Washington (Downtown)

In downtown Bellevue, Washington, the drive alone commute rate fell by 30% from 1990 to 2000, falling from 81% driving alone to 57%.

Introduction

Bellevue, Washington, (population 117,137) sits on the east side of Lake Washington, about a ten mile drive from downtown Seattle. Much like Pasadena, it is a relatively prosperous and growing suburb in the orbit of a much larger city. Bellevue is notable for the progress that it has made in reducing drive alone rates in its downtown, despite the fact that it is not served by rail transit and has relatively little influence over its regional transit agency. Perhaps most importantly, at the beginning of the 1990s, its downtown workers were substantially more auto dependent (with an 81 percent drive alone rate) than the average worker in Pasadena.

The City of Bellevue's Commute Trip Reduction program (CTR) was implemented by ordinance in 1993, two years after the State of Washington adopted the Commute Trip Reduction (CTR) Law, requiring cities in the most populous counties of the State to develop and implement a commute trip reduction ordinance. The city CTR now encompasses 53 employers and roughly 22,000 employees. The ordinance applies to every employer (private, public or non-profit) with 100 or more full-time employees arriving at a single worksite between 6 – 9 am.

The Bellevue Downtown Association, composed of 186 businesses, manages several voluntary programs to limit commute trips. TransManage, the transportation arm of the association, has actively promoted transit, ridesharing, and carpool services, partially through an employee commute benefit package. The package includes a FlexPass, to be used on different transit services and taxis, as well as a Qualified Transportation Fringe Benefits package, which allows employers with 20 or more employees to contribute up to $100 per month in transit or vanpool services as a tax-deductible expense. Flexpasses, issued by King County Metro, the Seattle area's regional transit agency, provide employees with free access to all of the agency's buses. Under this "universal transit pass" program, employers pay $65 per year per employee for every employee in their workforce: in return, every employee receives an annual pass, a benefit which has a normal annual price of $396-$1584.

Employers can require employees to pay for up to half the cost of the FlexPass. Employers who do participate in this program are eligible for a maximum $5,000 King County telework grant. The size of the incentive is based on the number of employees who telework at least one day a week.

The Association recognizes employers who go beyond providing FlexPasses and offer comprehensive commute reduction programs. Verizon Wireless Bellevue was this year's "Diamond Award" winner for managing a program that included:

- Transit, carpool and vanpool subsidy
- Work options and non-motorized mode incentives
- Guaranteed Ride Home

- Internal ride match service
- Reserved priority HOV parking
- Bicycle parking
- Showers and lockers
- Telework, flextime and compressed workweek

Parking Policy

Currently, Bellevue requires downtown office buildings of more than 50,000 square feet to identify the cost of parking as a separate line item in all leases, with the minimum monthly rate per space not less than twice the price of a bus pass. For example, since the price of a monthly bus pass was $72 in 2003, the minimum price of a leased parking space was $144 a month. This requirement for "unbundling" parking costs does not increase the overall cost of occupying office space in a building because the payment for the office space itself declines as a result. In other words, unbundling separates the rent for offices and parking, but does not increase their sum. Bellevue is perhaps unique in routinely requiring the unbundling of parking costs from office leases. This innovative policy has several advantages. It makes it easy for employers to "cash-out" parking for employees (that is, to offer employees the value of their parking space as a cash subsidy if they do not drive to work), since employers can save money by leasing fewer spaces when fewer employees drive. It also makes it easier for shared parking arrangements to occur, since building owners can more easily lease surplus parking spaces to other users.

In addition, the city has shifted from high minimum parking requirements to enforcing parking maximums. The city code now set no minimums for housing and mixed-use retail located in certain downtown zones. All downtown residential units are limited to no more than two parking spaces. This move to less parking has had a noticeable impact on private employers. The engineering firm CH2M Hill still offers free parking to drive-alone employees, but it also gives $40 per month to employees if they opt instead to walk, bicycle, carpool, or take transit. Ultimately, this saves employers money who no longer have to provide expensive parking and it lightens an employee's transportation budget.

Trip Reduction Results

Bellevue's CTR sets trip reduction goals in terms of reducing the proportion of single-occupant vehicles and vehicle-miles traveled per employee from the 1992 base year values. These targets started at the goal of a 15% reduction by 1995, rising to 20% in 1997, 25% in 1999, and 35% in 2005. Vehicle commute trips are calculated at one trip per person (two-person carpools counting as ½ trips per occupant, three-person carpools as 1/3 trips, etc.) Each vehicle commute trip eliminated due to telecommuting, alternative work schedules, bicycling, or walking counts as 1.2 trips eliminated.

Results from the Commute Trip Reduction program have been impressive. Overall in downtown Bellevue, the drive alone commute rate fell by 30% from 1990 to 2000, falling from 81% driving alone to 57%. In 1993, after considerable progress in reducing drive alone rates had already taken place, the Commute Trip Reduction went into effect. Among the CTR-affected worksites in the downtown, drive alone rates then dropped from 72.9% in 1993 to 58.5% in 2001, almost a 20% decrease. Among all CTR-affected worksites citywide, the drive-alone rate has dropped from 76.6% in 1993 to 69.2% in 2001 - almost a 10% decrease respectively. These numbers do not meet the ambitious targets set under the Bellevue ordinance, but are notable nonetheless.

References

City of Bellevue, www.onelesscarbellevue.org

City of Bellevue Ordinance, Chapter 14.40

Commuter Challenge Pacesetter Newsletter March 2001,

http://www.commuterchallenge.org/cc/newsmar01_flexpass.html

http://www.commuterchallenge.org/cc/profiles/awards04_verizon.html

http://www.planning.org/zoningpractice/askauthor/06/askauthor0206.htm

Bellevue Municipal Code, http://www.cityofbellevue.org/bellcode/Bluc2025A.html

Siegman, Patrick, "How to Get Paid to Bike to Work: A Guide to Low-traffic, High-profit Development," 1996.

Chapter 2. Boulder, Colorado (Downtown)

Since 1995, the drive-alone rate for employees in downtown Boulder has fallen almost 36%, from 56% driving alone to 36%, while the transit mode share has more than doubled from 15% to 34%.

Introduction

Set in a region dominated by auto commuting, with a population of only 100,000 people, no rail transit in the city, and no control over its main transit provider, Boulder, Colorado, is in many ways similar to Pasadena. In 1990, before Boulder changed their transportation policies, transit mode split was the same as Pasadena: 4% of work trips were made by transit (Pasadena has a 4.4% transit mode split city-wide). By the same token, car ownership in Boulder is virtually identical to that of Pasadena: 50% of Boulder households have 1 car or less, 85% have 2 cars or less.

Given its circumstances, Boulder may seem an unlikely candidate for successful traffic reduction. However, due to concerted efforts to invest in alternative mobility strategies, downtown Boulder has grown with little increase in traffic congestion. During the same period, sales tax receipts in downtown Boulder have increased by more than 100%.

Like Pasadena, Boulder is a medium-sized city (population 92,000) in a much larger metropolitan region: in Boulder's case, the Denver region. Like Pasadena, Boulder puts a high priority on creating a walkable, vibrant community, with a focus on a high quality of life. It should be noted that Boulder (at least at present) is dependent on bus transit to meet its public transportation needs. Boulder had very little transit at the time that CAGID was established and the city's efforts at traffic reduction began; bus service improvements have arrived subsequently.

Boulder is also useful as an example of a community that has been steadily evolving from a relatively low density, auto-oriented suburban city, to a community focused on transit-oriented development and traffic reduction. As recently as 1993, its drive alone rate for downtown employees was 65% (or slightly lower than Pasadena's citywide rate): now, just 36% drive alone.

Boulder's downtown business district, having recovered from near death in the 1970's, today comprises over 1,200 businesses and roughly 10,000 employees. Faced with both a shortage of parking for customers and citizens' aversion to additional traffic, the city developed a program that combines reduced subsidies for downtown parking with aggressive transportation demand management. These initiatives have been introduced through a special district – the Central Area General Improvement District (CAGID), which was established in the 1970s. The Board of CAGID, which makes the final decisions on issues such as new parking construction, is comprised of the City Council. However, considerable power over decisions such as parking charges is held by the Downtown Management Commission (DMC), which is made up of local businesses and property owners, although its actions are subject to City Council review.

The program was set up in conjunction with the creation of the Pearl Street pedestrian mall. The intention was to provide parking on a district-wide basis on the periphery of the mall, avoiding the need to provide on-site parking for each business. It was seen as a tool for economic revitalization and promoting a good pedestrian environment, with the two going hand in hand.

Transportation Policies

Boulder is most notable for its integrated approach, which allows CAGID to invest in the optimum mix of transit, demand management and parking supply to improve downtown access. These measures are designed to reduce auto dependence and promote alternate modes of transportation. The following specific transportation strategies have been employed in Boulder.

Transit

Boulder's only mode of transit is the bus. Instead of operating services by number, however, the city has chosen to name each of its local services in its Community Transit Network – HOP, SKIP, JUMP, BOUND, DASH, STAMPEDE, and BOLT (which connects Boulder to Longmont). All of these lines are accessible for free, to holders of the Eco-Pass described below. The first of these lines, HOP, was intended as, "the first fully-packaged community transit service to meet the specific needs and requests of the Boulder community." HOP now provides 1.1 million annual rides and was a major catalyst to the downtown's revitalization.

As noted in the Strategy Sheet appendix, the Central Area General Improvement District in downtown Boulder, provides free transit passes (the Eco-Pass program) on Denver's Regional Transportation District (RTD) light rail and buses to more than 8,300 employees, employed by 1,200 different businesses in downtown Boulder. To fund this program, Boulder's downtown parking benefit district pays a flat fee for each employee who is enrolled in the program, regardless of whether the employee actually rides transit. Because every single employee in the downtown is enrolled in the program, the Regional Transportation District in turn provides the transit passes at a deep bulk discount. Due to its large size, CAGID purchases passes at the rate of $83 per person per year.

Bicycling

Bicycling is a strongly encouraged mode of transportation. The City of Boulder offers over 350 miles of bicycle facilities, which include on-street lanes, designated routes, and multi-use paths. The downtown Boulder Transit station provides free bicycle storage lockers and all local Boulder and RTD regional buses are equipped with bike racks. Maps covering city, university, mountain, and regional trails and paths are available through the City.

Parking & Transportation Demand Management

- **No parking requirements**. The City has no minimum parking requirements for non-residential uses within the CAGID area. Developers are allowed to build as much or as little parking as they choose, subject to design standards in the zoning code, and to manage it as they see fit. If they choose to build little or no parking on-site, they can purchase permits for public lots and garages from the DMC for resale to their employees. This is usually a much cheaper strategy than building parking onsite.

  Public garage permits cost $213 per quarter ($852 per year), and surface lot permits (for which there is a waiting list) $134 ($536 per year). Residential minimum parking requirements are set at one space per unit, although these have had little impact since developers have tended to provide two spaces per unit given perceived market demands.

- **Funding of public parking**. Shared public parking facilities are constructed and operated by CAGID, and funded through CAGID's general obligation bonds. This debt is supported primarily by revenue from parking charges (including meters), and secondarily by property and other taxes paid by property owners (providing 16% of revenue). Thus, compared to many downtowns, where parking is heavily subsidized by public contributions of both dollars and land, much of the cost of the parking system paid for by those who park, resulting in lower drive alone rates. In Boulder, while the parking permit prices for public garages and lots would not be able to fund the full cost of constructing and operating a parking space, the rates nonetheless cover a substantial portion of the cost. The DMC currently manages 202 spaces in non-metered surface lots, 2,209 spaces in five structures, and 871 metered spaces, 61 of which are in a surface lot (2004 figures).

- **Demand management**. On-street meter revenue is used to provide all employees with benefits such as a free universal transit pass (called an Eco-Pass); Guaranteed Ride Home; ride-matching services; bicycle parking; and a number of other benefits. In 2002, these programs cost just under $325,000. This focus was prompted by the reality of limited street capacity to handle more traffic, and simple economics. "CAGID realized that the economics of parking garages are dismal," according to James Bailey, a former planner who helped establish the system. The DMC determined that demand management was a cheaper strategy than building new parking alone. These TDM programs are not directly managed by CAGID, but through the City's Downtown and University Hill Management Division.

- **Curb parking**. All downtown parking meter revenue – more than $1 million per year – is transferred to CAGID from the City's General Fund. This responsibility, together with the fact that local businesses and property owners comprise the DMC, gives it a strong incentive to create new curb parking. One of its first moves was to create more curbside, metered parking through converting parallel spaces to diagonal.

- **Reduced parking requirements**. Outside of the CAGID area, the City has also experimented with lower, more flexible parking requirements in mixed-use districts. A single parking requirement for all non-residential uses allows the use to change freely. For example, an office use can be converted into a restaurant, without the barrier of having to add new parking. There are also low parking requirements for residential uses in many parts of the city.

- **Residential Parking Benefit Districts**. Neighborhood Permit Parking initiatives have been introduced to prevent overspill parking from commuters trying to avoid parking restrictions and charges downtown. Commuters are eligible, however, to buy on-street parking permits for $60 per quarter – another example of the integration of on-street and off-street management. Commuter permits are limited to four per block face, on blocks where average occupancy is lower than 75%. This RPP program is designed to be revenue neutral, and so commuter fees cross-subsidize low annual resident fees of $12 per year. Sophisticated enforcement is used, with license plates entered into a handheld commuter, meaning that motorists cannot evade the restrictions by simply moving their cars every few hours.

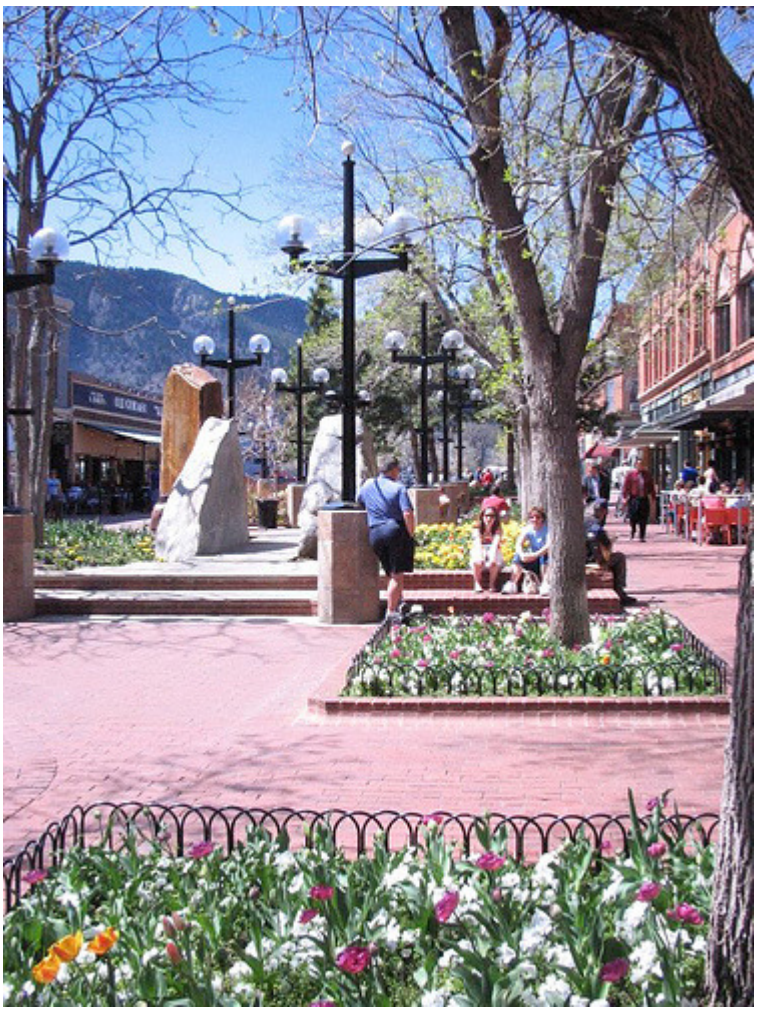
- **Discounted validated parking**. Downtown businesses can bulk-purchase meter tokens or validated stamps, in order to offer free parking to their customers. A common practice in many downtowns with parking charges, it avoids the risk of customers turning to other retail destinations in order to avoid parking charges.

Some of the parking policies described above -- such as creating more on-street parking spaces, and allowing a limited number of commuters to park in residential areas during the day -- clearly do not act, in and of themselves, to reduce driving. Creating more opportunities to park generally has the opposite effect. However, by adopting the strategies that allow the provision of some needed parking at low cost, Boulder has been able to save scarce capital and invest it in improving transit and transportation demand management programs. Meter revenues purchase transit passes, rather than simply going toward more parking construction.

Impacts of Transportation Policies

Development Feasibility

Initially, developers and property owners were skeptical of the proposals to create CAGID, but according to local planners and developers, they have been convinced by its success in catalyzing economic development. According to James Bailey: “In the 1970s, downtown was dying. They had to do something. This was a pretty pragmatic approach.”



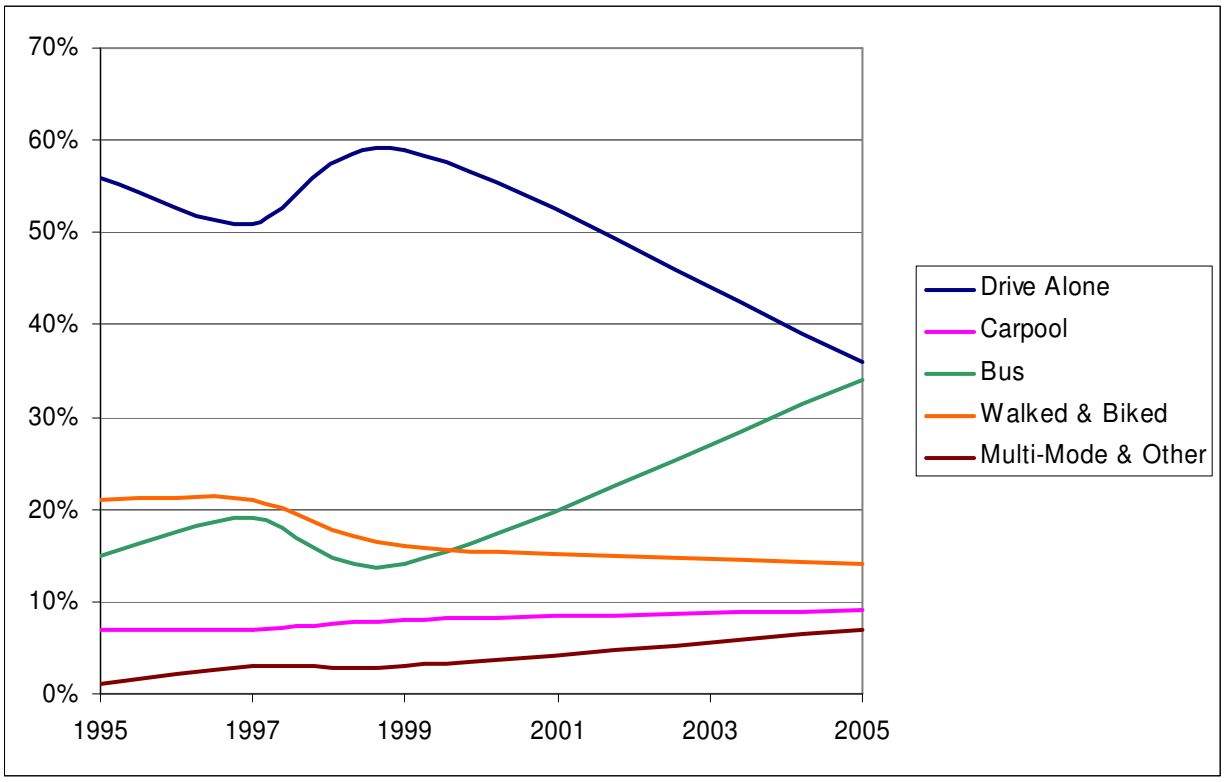
Already, rapid growth has brought Boulder close to the population and employment levels that in 1996 were projected for 2020. The downtown pedestrian-oriented "Pearl Street Mall" has tripled in length in the past decade, as automobile-oriented parcels at either end have been redeveloped. There are numerous examples of new developments that have taken place in recent years, such as the 300,000 square foot One Boulder Plaza. Pearl Street is one of the only examples of a successful pedestrian mall in the United States. According to local planners, a small mixed-use zone on East Pearl Street, close to the city's downtown, was established in the 1980s but barely used for more than a decade, at least partly due to high parking requirements. A reduction in requirements adopted in 1997 to one space per 400 square feet of non-residential development (one space per 500 square feet if commercial makes up less than 50% of the development) has been a key to encouraging recent development.

Traffic and Parking

According to the Downtown Management Commission, there has been an increase in available parking, partly due to the construction of new garages, but also due to more employees taking transit. Since the downtown baseline figures were established in 1995, the drive-alone rate has fallen almost 36% from 56% to 36% in 2005, while the transit rate has more than doubled from 15% to 34%. According to the City of Boulder, the drive alone rate dropped dramatically after 1999 because of an increase in transit service (17 different routes at 15 minute headways) and

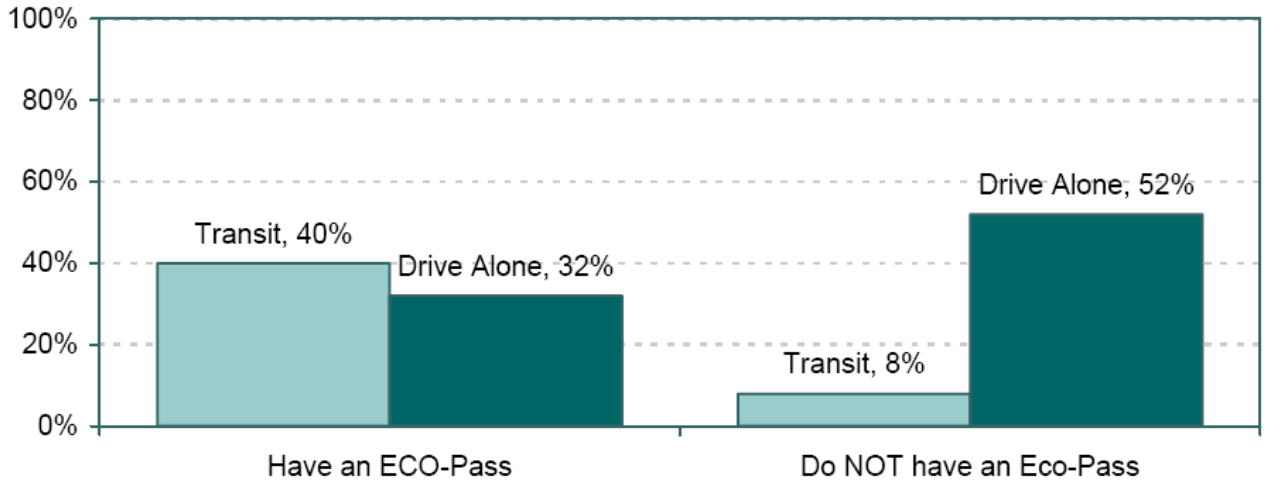
the emergence of an Eco-Pass "culture." Roughly 50% of downtown employees now live within two blocks of a transit stop and the resulting ridership is estimated at a parking equivalent of 4,390 spaces.

Figure 2-1 Downtown Boulder Mode Split



The Eco-Pass program has enjoyed great success in part due to the support of the business community. There are 10,000 employees working in the downtown area with 83% participating in the program. Those individuals with an Eco-Pass commuted by transit at five times the rate than those without as shown in the figure below.

Figure 2-2 Travel Mode Used for Work Commute



While new development is not required to incorporate on-site parking, some projects have done so due to market demands – but only to the point where it is economic. At the 400,000 square foot One Boulder Plaza, for example, two stories of underground parking are provided, equivalent to 1.2 spaces per 1,000 square feet. However, site constraints meant that about half the parking for employees is provided off -site through CAGID. The cost to the individual of these off-site permits is about $50 per month cheaper per employee.

References

Interviews and e-mail correspondence with local developers, planners, and CAGID staff.

City of Boulder, http://www.bouldercolorado.gov

City of Boulder (2003), Transportation Master Plan. Approved by City Council September 16, 2003.

City of Boulder (2003), Neighborhood Parking Program 2002. Annual Update. Staff Report to City Council, February 24, 2003.

City of Boulder (2004), 2004-05 Approved Budget.

Downtown Boulder Employee Transportation Survey, 2006.

"Downtown Boulder," EPA Air Innovation Conference, 2006.

Steuteville, Robert (2003), "Boulder: a model for excellence in mixed-use design," New Urban News, December 2003.

US Environmental Protection Agency (undated), Downtown Boulder. Best Workplaces for Commuters District. www.commuterchoice.gov/campaign/boulder.htm

US Environmental Protection Agency, Parking Spaces/Community Places.

Chapter 3. Arlington County, Virginia, Rosslyn-Ballston Corridor

In the 1960s and 1970s, this suburban corridor consisted largely of tired strip malls with the ubiquitous free parking, a surrounding fabric of single-family homes, and sharply declining population and retail sales. Today, development in the corridor is booming, but with little growth in traffic. Traffic counts from 1997 to 2004, for example, show that while office and residential development grew by 17.5% and 21.5% respectively, traffic along the Rosslyn-Ballston corridor grew by only 2.3%. Census Journey-to-Work Survey data show that over 47% of corridor residents now take transit to work.

Introduction

Arlington County, Virginia is an inner suburb in the Washington, DC region, located across the Potomac River from the District of Columbia. The County's development policies over the past thirty years have turned Arlington into one of the best United States based case studies of intense development designed to maximize the benefits of a new rail line. This case study focuses on the Rosslyn-Ballston Corridor – the route of Metro's Orange Line, which opened in 1979. Arlington used its new rail line to support major economic growth and revitalization, with little growth in traffic.

Nearly 18,000 residential units, almost 14 million square feet of offices, 1.5 million square feet of retail and 1,218 hotel rooms have been built since the start of the 1980s in the area served by Rosslyn, Courthouse, Clarendon, Virginia Square and Ballston stations. Other major development areas include the Jefferson Davis and Columbia Pike Corridors. In total, the County offers more than 46 million square feet of office and retail space -- more than either downtown Dallas, Denver or Seattle.

This degree of success in economic revitalization would not have been possible without the planning decisions taken in the 1960s regarding Metrorail. At the time, the Rosslyn-Ballston corridor was an aging, low-density commercial stretch that was facing decline and losing population and retail business. In a move to support this corridor and spur future development, County leaders insisted that Metro be built underground, rather than in freeway median.

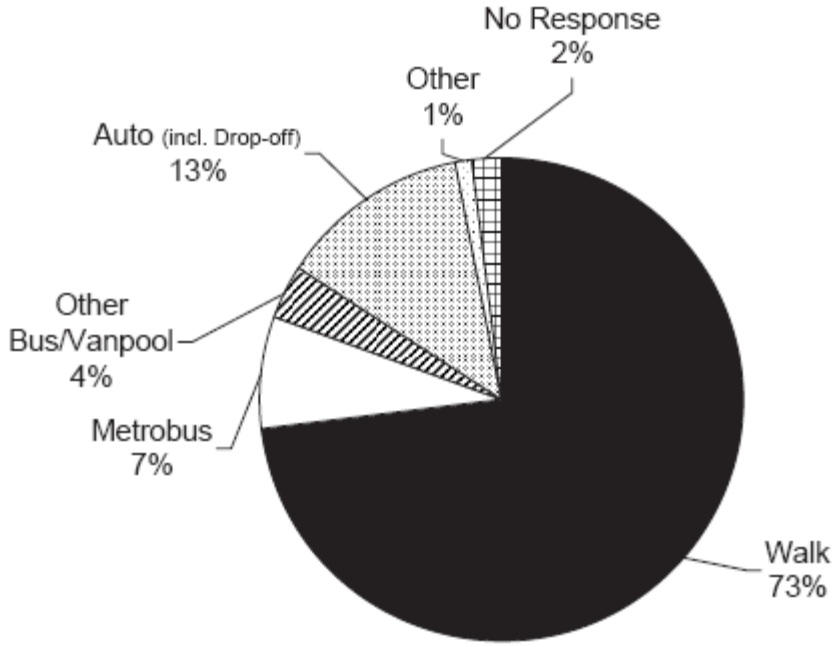
In turn, the County channeled nearly all development along the two Metro rail lines. Over and above the stations, it has promoted high-density development, with floor area ratios of 4.0-10.0 and 15-20 stories high. Densities then rapidly taper down first to townhouses, and then to existing single-family residential areas.

The result: Arlington has been able to grow rapidly without major expansions in the highway network. It has also achieved economic prosperity, with the lowest property tax rate among the major cities and towns in northern Virginia and a AAA bond rating. The Metrorail corridors provide 50% of the County's tax base, on only 7% of the land. The County also enjoys far lower vacancy rates and higher lease and sale prices, compared to other locations in the region.

Transit ridership has increased rapidly as a result. An important benefit from the point of view of the transit agency has been that the mixed-use nature of Arlington's transit oriented development has promoted balanced ridership over the course of the day -- rather than the sharp peaking

experienced at more park-and-ride oriented Metro stations. It is also worth noting that thanks to transit-oriented development policies and market-rate parking charges at the stations, just 13% of passengers boarding at the five Rosslyn-Ballston corridor stations use a car to reach the station. Nearly three-quarters of Metro riders walk to reach the rail stations.

Figure 3-1 Metrorail Mode Access Split



Metrorail Access at five Rosslyn-Ballston Corridor Stations - 39,500 Daily Boardings.
Source: WMATA May 2002 weekday Metrorail ridership and access data

While accommodating growth at the stations, the County has sought to preserve many of its older residential neighborhoods, and protect them from spillover parking and other impacts from new development around transit. These neighborhoods have benefited from substantial reinvestment.

Traffic Levels

Arlington's development has generated only modest levels of additional traffic on local streets. Census Journey-to-Work Survey data show that almost half of corridor residents take transit to work. Traffic counts from 1997 to 2004 show that while office and residential development grew by 17.5% and 21.5% respectively, traffic along the Rosslyn-Ballston corridor grew by only 2.3%. Most transit riders get to stations by foot or bus – there is little long-term commuter parking. Surveys at large apartment buildings have shown peak hour auto trip generation rates of one per 5.9 units, far below the standard in the Institute of Transportation Engineers' Trip Generation manual.

Key Transportation Policies

Arlington County's key parking and transportation demand management policies have included the following:

- **Protection of residential areas**. Arlington County has Residential Permit Parking zones around all Metro stations and major commercial areas, in order to prevent rail commuters from parking in residential neighborhoods during the day. This is particularly important as many older single-family home neighborhoods, where residents are dependent on curb parking, are located within a short walk of the rail stations.

- **Reduced parking minimums close to Metro stations**. In the Rosslyn-Ballston corridor, the County's Zoning Ordinance significantly reduces minimum parking requirements for certain uses. For commercial development within ¼ mile of a Metro station, they are halved from 1 per 530 square feet to 1 per 1000 square feet. For retail and service-commercial uses within 1,500 feet of a Metro station, they are waived entirely for the first 5,000 square feet. Actual parking ratios are often lower, following negotiations between the County and developer – in some cases, no additional parking is required.

- **Parking maximums**. The National Capital Planning Commission (NCPC) sets parking maximums for all federal government buildings in the region. In Arlington County, the maximum is one space per three employees. While these are advisory only, outside the District of Columbia, they are generally followed in suburban counties such as Arlington.

- **Parking & transportation demand management conditions**. The County requires developers to agree to a number of parking and transportation demand management conditions, through the site plan approval process. While these are negotiated on a case-by-case basis, those for recent developments have usually included:

    - Market-rate parking charges for single occupant vehicles

- Unlimited discount-rate parking reserved for carpools and other rideshare vehicles
- Monitoring of parking demand and traffic generation
- Provision of short-term public parking (metered) at garage entrances
- Shared parking
- Car-sharing provision

- **Shared parking**. Most parking in Arlington is privately owned and managed. However, the County does run one garage, at Ballston Metro Center. It has also opened a garage serving a County office building for public use at evenings and weekends.

- **Unbundled Parking Pricing**. Although Arlington does not have a comprehensive policy regarding the unbundling of parking costs from housing costs, several new developments have adopted the practice. (Across the river in Washington, DC, unbundling is also the norm for condominiums and rental apartments.) For example, developer Charles E. Smith recently constructed a new high-rise apartment building and charges each unit $50 per month for the first parking space and $200 per month for each additional space. By contrast, along Pasadena's Gold Line, most developers still follow the conventional Southern California practice of bundling parking. A notable exception, however, is the Alexan City Place project near Lake Station which partially unbundled parking: the project includes one 'free' parking space with each apartment, but each additional space is priced at $75 per month. The new Del Mar Station residences (which also happen to be managed by Charles E. Smith) will also offer priced additional spaces upon its completion.

Impacts of Transportation Policies

Development Feasibility

Arlington's policies overall have had an extremely positive impact on development feasibility in the Rosslyn-Ballston corridor. In the 1960s and 1970s, retail sales and population were declining sharply. Now, Arlington County has the lowest vacancy rates and highest rents in the entire region, outside the District of Columbia. According to developers and real estate attorneys who have worked in Arlington, the Rosslyn-Ballston Corridor remains attractive for development because of its location, transportation access, good government services, and predictable development review and approval process.

Key statistics include:

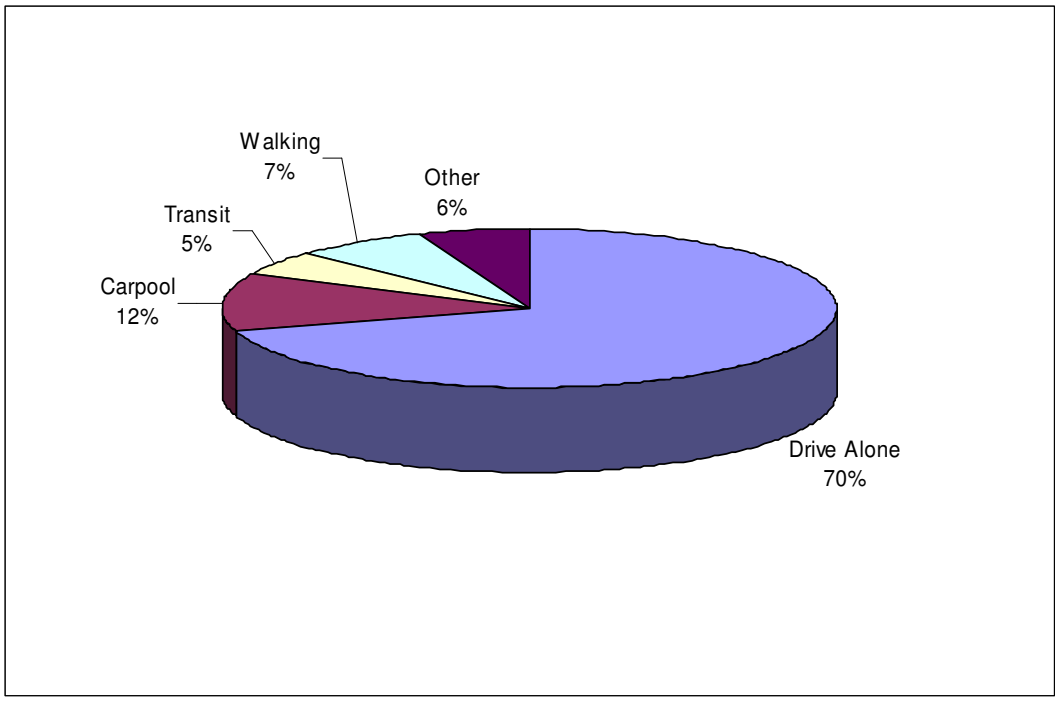
- Fourfold increase in office space between 1972 and 2002, from 4.9 million to 21.1 million square feet.
- Eight per cent increase in housing supply from 1972 to 2002.
- Continuing demand for development. In 2002, there were several thousand apartment units in the development pipeline.
- The Metrorail corridors provide 50% of the County's tax base, on 7% of the land.

Comparing Arlington and Pasadena

There are certainly substantial geographical differences between Arlington and Pasadena. However, there are also key lessons that can be drawn from the Arlington experience that may be useful for Pasadena. It is important to note that Arlington's success represents 27 years of TOD development and policy supported by an effective rail line. Since Pasadena's Gold Line was established in 2003, the Arlington comparison is more of an illustration of the results Pasadena could hope to achieve over time with appropriate policy decisions, rather than a contemporary equivalent example. Figure 3-1 and Figure 3-2 illustrate the difference between Arlington's station areas, which have had a quarter-century to mature, and the Gold Line station areas. Whereas over two-thirds of Pasadena Gold Line station area residents (defined as those living within a half-mile of the Pasadena Gold Line stations) drive alone to work, only 42% of Rosslyn-Ballston Station area residents do the same in Arlington.

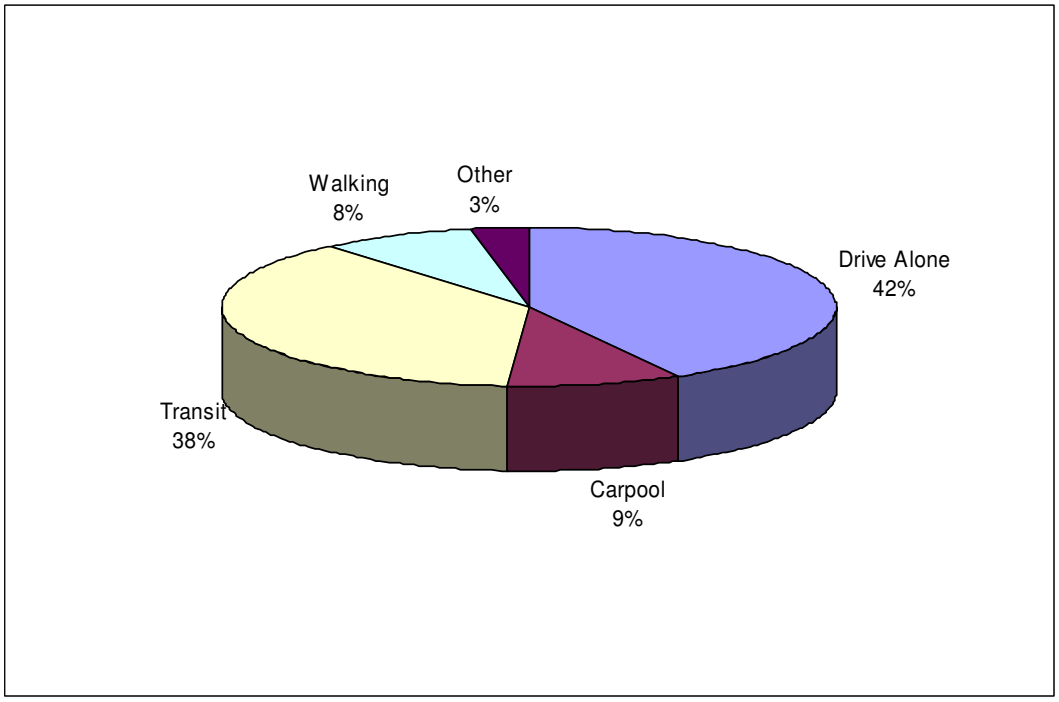
Although the introduction of Metrorail served as a catalyst to the Rosslyn-Ballston corridor's astounding development and excellent pedestrian access, rail alone did not bring about change. Whereas parking charges are widespread in the Arlington corridor and the average monthly parking fee is just over $100, most workers and residents in the Gold Line station areas receive free parking, and for the minority who do pay something, Metro area parking fees in Pasadena only run an average of roughly $68 per month. Transit patrons often pay only $29 per month, or are given free parking. As a result, we find striking differences in driving rates for both station area residents and especially for transit patrons accessing the stations. The decision in Arlington to require market-rate parking charges for single-occupant vehicles at virtually all new developments, including market-rate parking fees for transit riders, has been the single most important factor behind the low drive-alone rates for both transit riders and those who work in the station areas. For any city that wants to welcome substantial growth in station areas with little traffic, Arlington's market-rate parking policies - applied even to transit riders - is a powerful model.

Figure 3-2 Gold Line Resident Mode Split



Source: LandView 6, ½ mile station radii

Figure 3-3 Rosslyn-Ballston Mode Split



Source: LandView 6, ½ mile station radii

References

Arlington County Department of Environmental Services, http://www.arlingtonva.us/departments/EnvironmentalServices/dot/traffic/counts/EnvironmentalServicesCounts.aspx

Arlington County Department of Community Planning, Housing & Development,

http://www.arlingtonva.us/Departments/CPHD/Documents/46462006%20Arlington%20County%20Development.pdf

Charles E. Smith, http://www.archstoneapartments.com/

Dulles Rail Corridor Project, www.dullescorridorrail.com/newsletters/nl0604long.htm

Interviews with developers, realtors, County Commissioners and Board members, and neighborhood associations.

Jennings, Howard (2003), Integration of TDM into the Development Approval Process. Arlington County, Virginia. Paper presented at Association for Commuter Transportation conference, Salt Lake City.

Langdon, Philip (2003), "TOD times five: How the subway revived a VA suburb," New Urban News, September 2003, pp 13-14.

Leach, Dennis (2004), "The Arlington County Case Study. Rosslyn-Ballston Corridor," in Dittmar, Hank and Ohland, Gloria (eds), The New Transit Town. Best Practices in Transit-Oriented Development, pp. 132-153. Washington, DC; Island Press.

Lund, Hollie and Richard Willson (2005), "The Pasadena Gold Line: Development Strategies, Location Decisions, and Travel Characteristics along a New Rail Line in the Los Angeles Region," San Jose, CA, p. 71-72.

Nelson\Nygaard (2003), Parking Workbook. Prepared for Arlington County Parking Symposium.

US Environmental Protection Agency (forthcoming), Parking Spaces/Community Places.

Chapter 4. Lloyd District, Portland, Oregon

In the nine years since the baseline figures were measured (in 1997), the drive alone rate among all Lloyd District employees has fallen almost 29%, from 60% to 43%.

Introduction

The Lloyd District Transportation Management Association (TMA) is a non-profit business association representing large and small employers in the Lloyd District. Portland's Lloyd District is comprised of approximately 650 businesses and 20,000 employees with the Lloyd TMA having 69 member businesses and approximately 9,000 employees. These businesses invest over $1 million annually to commute trip reduction programs in the district. TMA programs include the Passport Annual Transit Pass, carpool matching services, and carsharing. Part of the program's broader goal is contribute to the City of Portland's development target of 17,000 new jobs and 4,000 new housing units, while minimizing the amount of traffic created by this new development.

Funding

Participating Lloyd TMA businesses pay no dues. Instead the association is funded through three sources:

- A Business Improvement District that is a "fee/assessment" on property owners. The BID then provides membership to all businesses located in buildings paying the assessment. The BID generates 40% of the TMA's budget.
- Parking meter revenue which supplements the BID and is targeted toward programs that serve business and employee needs. This accounts for one-third of the budget.
- Commissions on the sales of transit passes. The TMA receives 3% on all transit passes sold to businesses through the TMA and/or its Transportation Store. In 2005, the TMA sold over $1.2 million in transit passes, and therefore received about $36,000 in commissions (comprising 16% of the TMA budget).

The state of Oregon has a Business Energy Tax Credit (BETC) that businesses can take advantage of for investments they make in employee transportation programs that result in measurable reductions in single occupancy vehicle (SOV) trips. Businesses can receive a 35% business income tax credit for investments in transit subsidy programs. The Lloyd TMA works with member businesses to transfer credits to the association. The TMA then packages the combined credits and sells them on the open market to companies in Oregon that have made profits (thus receiving a tax credit, much like air quality credits). Over the past three years, Lloyd TMA has averaged about $200,000 a year in BETC credits. When a business transfers their BETC, they become a voting member of the "Transportation Opportunity Fund" which is a list of infrastructure improvements that the TMA then invests in (i.e., lighting, bus shelter improvements, transit trackers, streetscape art/amenities, pedestrian crossing improvements, etc.). All contributing members vote each year and infrastructure improvements are prioritized and funded annually. Essentially, businesses give their tax credits to the TMA, which subsequently uses them to provide additional transit, pedestrian and bike oriented infrastructure improvements throughout the district.

Impacts on Mode Choice

The Lloyd District has seen a remarkable decline in drive-alone commute trips coupled with a rapid rise in bus and light rail use. In the nine years since the baseline figures began in 1997, the drive alone rate among all Lloyd District employees (including employees of both TMA member companies and non-member companies) has fallen almost 29%. Although the number of employees in the district has fluctuated from year to year, the percentage of drive alone trips has decreased from the previous year in six out of the last seven years. Meanwhile, transit ridership has increased more than 86% over the same period. The Lloyd TMA has an ultimate transit goal of 42%. TMA employees have demonstrated even more remarkable results with some businesses showing a combined transit and bike mode share of nearly 65%.

The primary impetus behind this surge in riders has been the Passport Annual Transit Pass Program. The Passport program gives every employee in the Lloyd District TMA unrestricted access to all Portland buses and light rail, at no cost to the employee, as well as free taxi rides home in cases of emergency, and ten cents off Starbucks coffee purchases. Passes are purchased at a discounted bulk rate of $189 per employee (regular TriMet all-zone annual passes are $792) by TMA businesses.

The Passport program grew out of an agreement to eliminate parking. In return for agreeing to eliminate free commuter parking in the Lloyd district (i.e., monthly rates and meters) the business community was given special consideration for fares, which led to the development of the Passport Annual Pass program. In addition, the District was given revenue sharing from the meter district and signed an agreement to establish a maximum parking ratio on all new parking development of 2.0 stalls per 1,000 square feet (previously unregulated) which led to an agreement to provide new and enhanced transit service the district. After the District achieved certain pre-established goals for ridership, mode split, and funding, it was able to implement its "Fareless Square" program, which allowed the Lloyd District to join the fare-free downtown zone.

Figure 4-1 2005 Employee Commute Choice Survey Results

2005 SURVEY RESULTS			1997	2005	% Change
Commute Method	Total Trips	Total Auto Trips	% of Trips	% of Trips	
Drive Alone	10754	10754	60%	42.7%	-28.9%
Carpool/Vanpool	2766	1309	16%	11.0%	-31.4%
Bus/MAX	9849	0	21%	39.1%	86.2%
Bicycle	822	0	3%	3.3%	8.8%
Walk	567	0	2%	2.3%	12.5%
Telecommute	198	0	0%	0.8%	NA
Compressed Work Week	237	0	1%	0.9%	-5.9%
Total Weekly Trips	25193	12063	100%	100%	

Carpooling has declined since 1997 at almost the same rate as drive alone commuting due to the shift towards transit. It is important to note, however, that whereas drive alone trips have continued to drop, carpool trips have remained relatively constant since 2003. Bicycle, walk, telecommute, and compressed work week trips have changed very little despite having the TMA set a bicycle ridership target of 10%.

The TMA baseline figures set in 1997, representing approximately 5,000 employees, were established as a way to measure progress toward Portland's traffic reduction goals for the district. Since the baselines were instituted, TMA programs account for a reduction of four million peak hour vehicle miles traveled. In today's terms, it represents 1,008 vehicles per day removed from peak hour traffic.

Lessons Learned

What are the factors that most account for the decline in the drive alone commute rate in the Lloyd District? In particular, what accounts for the near doubling of the mode share for transit, even as carpooling and vanpooling declined, and bicycling and walking gained only slightly? Several likely factors stand out. First, while the Lloyd District has been served by the Blue Line light rail line (Portland's first line) since the opening of the line in 1986, the system has been extended significantly since 1997, when reporting on commute figures for the Lloyd District began. The original Blue Line ran only from downtown Portland, through the Lloyd District, and out to the east. In 1998, the western half of the Blue Line opened, going from downtown Portland to Hillsboro. Then in 2001, the Red Line, taking passengers from downtown Portland through the Lloyd District and out to the Portland International Airport opened. These two extensions gave Lloyd District employees access to many more residential locations.

However, considering the evidence from other studies, perhaps the single most important factor driving the increase in transit ridership was the widespread provision of free transit passes to Lloyd District employees under the Passport Annual Transit Pass Program. For these employees, a $792 per year transit pass suddenly became free. As described in the Universal Transit Pass strategy sheet later in this report, these programs frequently result in a doubling or even tripling of transit commuting rates among those receiving free passes. By contrast, while the TMA and Lloyd District employers have marketing programs that encourage carpooling, vanpooling, walking and bicycling to work, and do offer some services and small benefits to these types of commuters, there is simply no financial incentive of equal power offered to commuters

using these modes. Providing equally strong financial incentive programs for these modes -- for example, a parking cash-out program worth at least $800 per year -- would likely result in strong gains for carpooling, walking and bicycling as well. The essential point here is that in evaluating transportation demand management programs, it is crucial to keep an eye on the financial incentives facing the employee. In the Lloyd District, as can be seen in dozens of similar programs, employees shifted toward the commute mode that they were offered a substantial new financial incentive to use -- toward transit, in the case of the Lloyd District. For the choices where financial incentives remained essentially the same, there was relatively little change in behavior.

References

Lloyd TMA Annual Report 2006, http://www.lloydtma.com/pdf%20files/ 2006%20Annual% 20Report%20Final%20w_Cover.pdf

Interview with Rick Williams, Lloyd TMA Executive Director, August 21-22 & September 25, 2006

Chapter 5. Portland, Oregon (Downtown)

Since 1975, the City of Portland has had a cap of roughly 40,000 parking spaces downtown, which includes existing and new facilities. The effect of this cap was a decrease in the downtown parking ratio from 3.4 long-term parking spaces per 1,000 square feet of office space in 1973 to 1.5 in 1990. The limit, however, did increase to 44,000 in the 1980s and slightly more in the 1990s to adjust for economic growth. Figure 5-1 below reveals the parking maximums for various uses and districts within Portland. City officials credit these limits with helping to increase transit mode split from about 20% in the early 1970s to 48% in the mid-1990s.

Figure 5-1 Portland Area Parking Maximums

	DD 2&3	DD4	DD 1& 5, UD	RD 5	RD 3 & 4, DD 6	Transit Zone	Rest of Region
Office	0.7	0.8	1.0	1.5	2.0	3.4	4.1
Retail	1.0	1.0	1.0	1.5	12.0	5.1	6.2
Medical centers	1.5	1.5	1.5	1.5	2.0	4.9	5.9
Schools/ colleges	1.0	1.0	1.0	1.5	2.0	0.3*	0.3*
Industrial	0.7	0.7	0.7	0.7	0.7	None	None
Community services	0.25	0.25	0.25	0.25	0.25	Varies	Varies

DD = downtown district; UD = university district; RD = river district; * = per students and staff.
Per 1,000 square feet net building area, unless noted otherwise.
Source: City of Portland, 2003.

References

Litman, Todd (2006) Parking Management Best Practices, p.96.

Chapter 6. Washington, DC, Employer Outreach

As a result of Washington DC's Employer Outreach Program, daily vehicle trips have fallen by 81,150 from 2002 to 2005 with VMT dropping 1,339,818 over the same period.

Introduction

The National Capital Region Transportation Planning Board at the Metropolitan Washington (D.C.) Council of Governments has five Transportation Emission Reduction Measures (TERMs) in place as part of its Commuter Connections program, a free service providing employers and employees the best commute options to get to work and home. Its "Employer Outreach" portion has had the most positive effect in reducing daily vehicle trips and vehicle miles traveled (VMT). The Employer Outreach involves using Jurisdiction Sales Representatives to encourage private employers to voluntarily adopt TDM measures, and monitoring Metrochek transit passes and SmartBenefits programs provided by previously unaccounted employers.

Employer Outreach Program

Employers who opt to participate in the program fall into one of four levels – Bronze, Silver, Gold, or Platinum. According to the MWCOG, the levels are differentiated by their degree of participation:

- Bronze level employer programs only offer commute information.
- Silver programs provide commute information, an Employee Transportation Coordinator and at least one other TDM measure. This measure could be one of the following: preferential

parking, carpool/vanpool formation meetings, bike racks or lockers, transportation fairs, informal telecommuting or flexible work hours.

- Gold programs provide Silver level services plus extra measures such as financial incentives, parking "cash out", formal telecommuting programs, parking fees, on-site ridematching, employee shuttles to transit stations, showers and lockers for cyclists and company vanpools.
- Platinum programs provide two or more Gold level measures with the company actively promoting its TDM program.

The Employer Outreach program has led to a significant reduction in daily vehicle trips. Total impact, based on the 876 Gold and Platinum level members and those employers offering Metrocheks, daily vehicle trips have fallen by 81,150 from 2002 to 2005 with VMT dropping 1,339,818 over the same period.

References

Commuter Connections Transportation Demand Management Evaluation Project: Transportation Emission Reduction Measures (TERMs) Revised Evaluation Framework 2002-2005. Report prepared by LDA Consulting for the Metropolitan Washington Council of Governments (MWCOG). Washington, DC: MWCOG, March 2004. http://www.mwcog.org/uploads/pub-documents/+11dXw20040614122853.pdf

Nicholas Ramfos, Chief – Alternative Commute Programs, Metropolitan Washington Council of Governments

Transport Canada, TDM Database, 2003. http://www.tc.gc.ca/programs/environment/UTSP/tdm/prj61e.htm

Chapter 7. Cambridge, Massachusetts

Cambridge's Travel Demand Management Ordinance requires that developers reduce the drive alone rate for their development to 10% below the average rate for the census tract in which their development sits. Although the ordinance applies only to new development and building expansions, by two years after the adoption of the ordinance, citywide drive alone rates had declined, even as the state of Massachusetts experienced increasing drive alone rates.

Introduction

Cambridge has a sophisticated Parking and Travel Demand Management (PTDM) ordinance. Its goals are to "improve mobility and access, reduce congestion and air pollution, and increase safety." The ordinance requires new and expanding commercial, education, and religious developments with more than five parking spaces to implement a PTDM plan to reduce auto use to 10% below the average for that census tract. Developments with more than twenty spaces must implement a full plan with an annual review of their mode split while a building with less than twenty spaces must apply three trip reduction measures. All structures subject to the annual review must reserve 10% of parking as HOV preferentially located spaces and construct bicycle parking equal to 10% of the parking supply. Developers who fail to meet the targets can be fined; in a worst case scenario their parking facilities can be shut down by the city. Residential developments are not covered under the ordinance. Instead, developers must conduct a traffic study for every residential structure over 50,000 square feet under a process covered by special permit. The ordinance currently covers roughly 30,000 employees and graduate students.

Impacts of the Ordinance

The ordinance is notable for both its impact on new developments and it's popularity. It has been in effect for eight years and enjoys widespread support among the city council, city planners, the business community, and the public. The city council voted on September 11, 2006 to eliminate the sunset clause (Section 10.18.090) on the ordinance due to its success.

Citywide journey to work data (see Figure 7-1) suggests that in a mostly built-out city, only limited effects can be achieved with any ordinance that covers only new development. However, in comparison to the state of Massachusetts, the city is making good progress. Whereas Cambridge saw reductions in its drive alone rate among all groups, Massachusetts witnessed an increase.

Cambridge is experiencing significant new development, but the percentage increase in the number of residents and employees in the city is relatively small. The Travel Demand Management Ordinance requires that developers reduce the drive alone rate for their development to 10% below the average rate for the census tract in which their development sits. Examining citywide data from the 1990 and 2000 census, by two years after the adoption of the ordinance, citywide drive alone rates had changed from 37.7% to 35.3% for Cambridge residents, and 51.2% to 50.6% for those who work in Cambridge. More progress was apparently made among Cambridge residents who also work in Cambridge. This group displayed a nearly 24% drop in its drive alone rate with a 35% increase in its bike to work rate.

References

Phone conversations with Jean Clark, PTDM Planning Officer on August 3 & September 13, 2006.

Cambridge Department of Community Development, Parking and Transportation Demand Management, http://www.cambridgema.gov/cdd/et/tdm/index.html

Cambridge City Council Committee Report, August 7, 2006, http://www.cambridgema.gov/cityclerk/CommitteeReport.cfm?instance_id=299

Figure 7-1 Cambridge Journey to Work Data

2000 Census

	Residents	Employees	Resident & Employee
Drive Alone	35.3%	50.6%	19.0%
Transit	24.9%	22.7%	13.3%
Rideshare	5.2%	8.5%	4.6%
Bike	3.9%	2.4%	5.4%
Walk	24.3%	12.6%	45.2%
Other	1.1%	0.7%	1.1%
Work at home	5.3%	2.5%	11.4%

1990 Census

	Residents	Employees	Resident & Employee
Drive Alone	37.7%	51.2%	24.8%
Transit	23.4%	20.8%	12.3%
Rideshare	7.5%	10.6%	6.6%
Bike	2.9%	2.0%	4.0%
Walk	24.2%	13.2%	44.5%
Other	4.3%	2.2%	7.8%

Figure 7-2 Massachusetts Journey to Work Data

	1990	2000
Drive Alone	72.1%	73.8%
Transit	8.3%	8.7%
Rideshare	10.7%	9.0%
Bike	0.4%	0.4%
Walk	5.4%	4.3%
Other	3.0%	3.7%

Chapter 8. San Francisco, California (Downtown)

Employment in downtown San Francisco doubled between 1968 and 1984, while the number of cars traveling into the downtown stayed the same.

Introduction

In a rapidly growing San Francisco, downtown transportation policy centered on the realization that together with improving transit, controlling parking was the City's most powerful tool for managing congestion – and unlike gas taxes or transit funds, it was a key tool that lay entirely under the City's control.

That policy has been successful, allowing San Francisco to cut in half the drive alone rate for the downtown core. According to the San Francisco Planning Department, employment in downtown San Francisco doubled between 1968 and 1984, while the number of cars traveling into the downtown stayed the same.

City planners recognized that constrained capacity in the regional highway system – particularly the San Francisco-Oakland Bay Bridge – made it impossible to develop a downtown that promoted access by car. The 500,000 employees that work downtown have more alternatives to driving because San Francisco aggressively improved transit in the 1970s (a decade which saw the completion of BART and Muni Metro subways) and implemented a Downtown Plan that encouraged pedestrian-friendly density. By policy choice, the local public transit system, Muni, is a low-fare, very high subsidy system (farebox recovery is about 25%), and in 2003 the voters showed their commitment by renewing the local half-cent sales tax for transportation.

Parking has also been controlled. New buildings were built atop existing surface parking lots and most were required to build little or no parking. Instead, starting in the early 1960s the San Francisco Parking Authority developed 11 public parking garages on the periphery of downtown. Of the approximately 40,000 total off-street parking spaces in downtown San Francisco, the Parking Authority owns and operates about 10,500 (26%). Parking at these garages is priced to discourage long-term commuter parking and to support shorter-term shopping, business, and errand trips.

San Francisco's decision to limit the number of parking spaces allowed at downtown buildings -- that is, to set maximum parking requirements, instead of the minimum parking requirements imposed by many American cities -- arose from the recognition of one simple fact. Aside from congestion pricing, limiting the number of parking spaces in an area is the single most effective tool available to a city to limit traffic congestion. San Francisco limits the number of parking spaces available in the downtown (especially commuter parking spaces) in order to limit the number of cars that will attempt to enter the downtown at rush hour. Setting maximum parking requirements sparks a simple chain of events. Limiting the number of parking spaces causes building owners to charge for commuter parking spaces, in order to balance supply with demand. Commuters respond to parking prices by driving less, and carpooling, riding transit, bicycling and walking more.

Two points about commuter parking in downtown San Francisco are worth noting. First, for employees who want to drive, parking in many garages is readily available. Second, the price of commuter parking is currently about the same as the annualized cost to build and operate a structured or underground parking space in downtown San Francisco: the median monthly rate for an unreserved parking space is $335. Essentially, San Francisco's maximum parking requirements have resulted in a place where drivers - in sharp contrast to most American cities - pay for the full cost of the parking that they use.

Another important part of San Francisco's strategy has been the creation of Transit Preferential Streets. Market Street, the spine of downtown, is the classic example. Bus-only lanes (though imperfectly enforced) give priority to transit. Curb cuts and garage entries are prohibited virtually everywhere along it, reducing the number of auto drivers with a reason to use it; the sidewalks are wide and the adjoining buildings are required by design standards to provide pedestrian friendly façades.

Overall, the San Francisco strategy can be characterized by a willingness to accept high parking prices (resulting from market forces, regulation and taxes), extensive investment in transit infrastructure, and high transit operating subsidies. From a development perspective, the city seems to have prospered under this regime with very dense employment and high land values.

Policy Framework

San Francisco's transportation policy framework is guided by an unusually strong set of General Plan policies. The guiding principle of the Transportation Element of this plan is the Transit First policy, first established in 1973. The 1984 Downtown Plan followed up with strong specific policies. Some specific highlights are described in the following sections.

Transit Preferential Streets

To implement the Transit First policy, the downtown plan adopted the following basic policy: "Improve speed of transit travel and service by giving priority to transit vehicles where conflicts with auto traffic occur, and by establishing a transit preferential streets system."

To attract more people to transit, San Francisco planners knew that transit needed to move faster. Creating Transit preferential streets, the General Plan policy established, "would be accomplished by the use of exclusive lanes (with flow or contra-flow), by constructing bus loading platforms, relocating bus stops and/or by equipping buses and trolleys with devices to trigger lights in their favor at intersections… Other actions should include restricting autos from streetcar and cable car tracks and eliminating automobile turning movements that conflict with transit vehicles."

San Francisco's policy should be contrasted with the policies that are included in the general plans for most American cities. Most American cities have adopted automobile Level of Service as the primary measure of performance for their transportation system. At intersections, automobile level of service estimates the average seconds of delay a motor vehicle will experience. As a policy goal, most city general plans then usually establish a minimum desired level of service for intersections in the city (e.g., no more than 40 seconds of delay at rush hour). The key problem with level of service as a performance measure is that it measures delay only to vehicles, not people. A bus with 50 passengers on board is counted the same as an automobile with one passenger. In order to improve auto level of service at a given intersection, for example,

traffic engineers may feel obliged to remove transit priorities in order to give more accommodation for cars. The result may be that the intersection can handle more vehicles but fewer people.

San Francisco's policy keeps the focus on moving the maximum number of people, and has had a seemingly paradoxical result. Managing streets under a policy of moving transit vehicles first, even at the price of delaying private automobiles, has drawn enough people onto transit to reduce congestion, so that for those who do still drive to work, there is less delay.

On many streets, particularly on those with streetcar lines, many Transit Preferential Street measures (exclusive bus lanes, bulb-outs at bus stops and so on) have been implemented. On several major bus corridors, however, buses have become increasingly bogged down in traffic congestion. To combat this, a new network of Bus Rapid Transit corridors is in planning, with detailed planning and public outreach now underway for the Geary and Van Ness corridors. In essence, San Francisco is renewing its commitment to the policies established 22 years ago in the downtown plan.

Bicycling

In recent years, San Francisco has also made major strides in improving bicycling in the city, including in downtown San Francisco. The City has legislated the installation of bicycle parking in all City-owned garages and privately-owned garages that rent automobile space to the public. New bicycle parking requirements also apply to certain new and renovated commercial and residential buildings, and in some cases, the installation of clothes lockers and showers is also required. A BikeStation has been established in the Embarcadero BART station, and new racks installed on sidewalks throughout the city. On San Francisco's streets, bike lanes have been added in many places -- no small accomplishment, given the intense competition for street space. On Valencia Street in the Mission District, for example, four lanes were reduced to two lanes plus a center turn lane and bike lanes. Before and after measurements found a 144% increase in bicycling, from 88 to 215 bicyclists per hour, while the number of bicycle crashes remained essentially constant.

Early data on the results of San Francisco's efforts shows bicycling on the rise, albeit from a small base. United States Census "Journey to Work Data" for San Francisco shows bicycle commute rates approximately doubled, from 0.95% to 1.8% of all work trips.

Parking Policy Tools

Parking Requirements Downtown

San Francisco was one of the earliest cities to introduce maximum parking requirements for office uses in its downtown core. Under the “Transit First” policy, parking may take up only up to 7% of a building’s gross floor area. This is equivalent to allowing a maximum of .233 parking spaces per thousand square feet of development. New buildings must have an approved parking plan prior to receiving an occupancy permit. In some cases, only short-term parking is allowed; in others, a mix of long-term, short-term and carpool parking is approved. The City also levies a Transit Impact Development Fee for downtown office development – a policy recently extended to all non-residential uses, and to all parts of the City.

These parking restrictions have sometimes been challenged in recent years. Nevertheless, recent major projects have been designed with little or no parking. The Sony Metreon, a four story, 350,000 square-foot entertainment center, opened in June 1999 amid predictions that it would create a parking crisis and gridlock. The project was built with no parking. The majority of users arrive by foot and transit, and the remainder can park in the existing, 2,600-space 5th & Mission Garage across the street. As of March 2000, peak utilization of the garage has averaged 78%, with not a single parking shortage period in the evening when visitation to Metreon peaks.

The City's downtown ballpark, SBC Park, faced dire predictions that it would create gridlock and parking shortages because everyone would drive there. Instead, the park's 5,000 space lots do not regularly fill. According to the Department of Parking and Traffic's Bond Yee, 60% of ballpark fans are taking transit even to the relatively remote Ballpark location, exceeding planners' initial goals.

The City is currently considering extending maximum parking requirements – or at least abolishing parking minimums – in other transit-rich parts of San Francisco.

Zoning

In the summer of 2006, San Francisco enacted a new zoning ordinance affecting downtown commercial zones (C-3) in an effort to reduce traffic congestion, increase housing affordability, and create a safer and more livable street environment for walking, bicycling, and public transit. The most important sections of the ordinance establish maximum parking requirements for residential units, eliminate the remaining vestiges of minimum parking requirements in downtown Francisco a requirement for residential units of one space per four dwelling units) and require the unbundling of parking costs in all residential structures over ten dwelling units. The main portions of the ordinance include:

1. Eliminates the previous minimum off-street parking requirement of one space per four dwelling units.
2. Establishes a new maximum parking requirement of 0.75 spaces per dwelling unit for one bedroom units and one space per dwelling unit for two bedrooms units.
3. Requires car-share parking spaces in all newly constructed residential buildings (if parking is made available).
4. All residential parking costs in new structures over ten dwelling units must be unbundled.

Unbundled Parking

San Francisco now requires the unbundling of parking costs from housing costs in both downtown commercial and residential zones (DTR and C-3 Districts) in all residential structures over ten dwelling units. Currently, it is the only known example in the state of California of requiring unbundling by ordinance. The Planning Code, quoted below, is a good example of the ordinance language for establishing this requirement: (Article 1.5: Off-Street Parking and Loading, Sec. 167.): "..(a) In DTR and C-3 Districts, all off-street parking spaces accessory to residential uses in new structures of 10 dwelling units or more, or in new conversions of non-residential buildings to residential use of 10 dwelling units or more, shall be leased or sold separately from the rental or purchase fees for dwelling units for the life of the dwelling units, such that potential renters or buyers have the option of renting or buying a residential unit at a price lower than would be the case if there were a single price for both the residential unit and the parking space…"

The ordinance also requires inclusionary affordable units to have the same opportunity to purchase or lease parking spaces as other units.

SOMA Studios and Apartments, San Francisco is one example of the results of San Francisco's policy of encouraging the unbundling of parking costs from housing costs. Unbundling parking costs in this development lowered parking demand, freeing up space for a childcare center and 19,000 square feet of neighborhood serving retail, including a market. The new five-story building combines 74 family apartments with 88 small studios, a parking garage and lobby spaces for the four floors of housing above. There are a total of 66 parking spaces available (.38 spaces per unit).

San Francisco Parking Authority

The San Francisco Parking Authority was established in the 1950s to design, finance (primarily via revenue bonds), construct, and manage off-street parking supply in the City. It has various, and often conflicting, objectives that it must balance. According to its Director, its objectives include:

- Increase the availability of short-term parking for shopping and other commercial purposes via price disincentives that discourage all-day commuter parking.
- Manage visitor and merchant perceptions that the cost of parking in San Francisco is competitive (compared to shopping alternatives in the suburbs), fair, and reasonable.
- Encourage car-pooling via pricing (e.g., reducing the $350 monthly cost per space to $175 for carpool vehicles).

The balance it strikes between competing interests, constituencies, and political demands is a delicate one, and the Parking Authority feels it has achieved considerable success, especially in terms of revenue generation. However, it does not have the benefit of clear goals to manage towards nor, apart from revenue generation, ways to measure its success.

Parking Pricing and Revenue

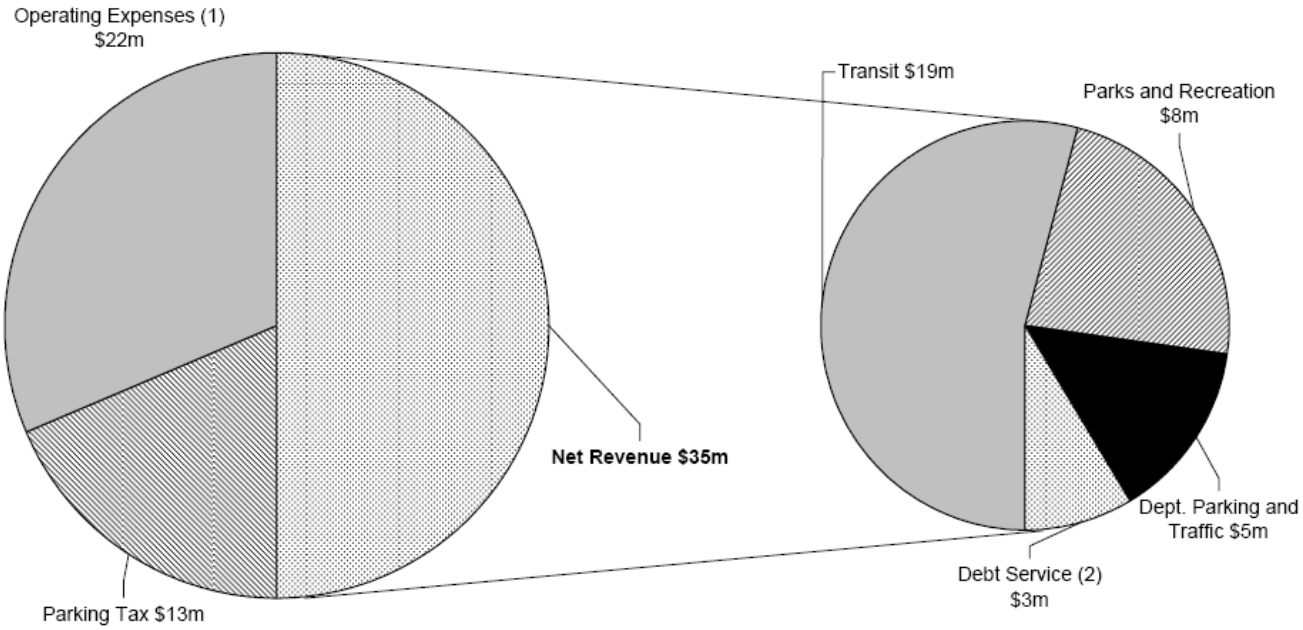
In downtown San Francisco, the Planning Code (equivalent to the Zoning Code in most other cities) mandates that all off-street parking pricing must discourage all day parking. The Planning Code (Article 1.5, Sec. 155, (g)) says:

> *In order to discourage long-term commuter parking, any off-street parking spaces provided for a structure or use other than residential or hotel in a C-3 District [downtown], whether classified as an accessory or conditional use, which are otherwise available for use for long-term parking by downtown workers shall maintain a rate or fee structure for their use such that the rate charge for four hours of parking duration is no more than four times the rate charge for the first hour, and the rate charge for eight or more hours of parking duration is no less than 10 times the rate charge for the first hour. Additionally, no discounted parking rate shall be permitted for weekly, monthly or similar time-specific periods.*

This provision, however, has had only limited, if any, impact. At present, prices set by the Parking Authority respect the mandated pricing structure but, like all other parking garages, the Parking Authority still offers lower parking rates for time-specific periods (e.g., monthly and “early bird” all-day rates). Among privately owned downtown parking facilities, almost all violate the Planning

Code's pricing policy. It is common to see facilities charge flat all-day or monthly rates, with no discount available for short-term parkers. According to the City Planning Department, parking rates are not monitored and the Planning Code is not enforced because its enforcement resources are extremely limited.

Figure 8-1 Parking Authority Revenue Allocation, FY 2003



(1) Includes debt service for non-profit garages. (2) For for-profit garages

One of the Parking Authority's greatest successes is the amount of net revenue that it raises for other City expenditures such as public transit and parks – $35 million in FY 2003 (Figure 8-1). In FY2002, parking revenues amounted to 26% of Muni's $439 million in operating revenue – the largest single line item of any revenue source (This includes parking tax and fine revenue, as well as the garage revenue).

An important point is that Parking Authority garages are financed entirely through revenue bonds rather than general obligation bonds. The former means that fees from the garage are used to pay back all of the debt, and in San Francisco's case, there is a substantial surplus to fund other improvements. The latter, probably more common approach, is to use general tax revenues or tax increment financing to cover the costs of building parking – a direct shift of public monies to parking.

In addition to the net revenue that the Parking Authority generates for the City ($35 million in FY 2003), San Francisco annual parking-related revenue also comes from on-street parking meters ($16 million/yr), parking fines ($15 million/yr), and a 25% parking tax ($50 million/yr).

Parking Tax

In the 1970s, the City of San Francisco imposed a 15% parking tax on the revenues from all off-street parking spaces in the City, and in 1980, voters approved an additional 10% surcharge for a total parking tax of 25%. Local sales tax does not apply to parking fees.

For the last three fiscal years, the parking tax has generated about $50 million each year. Muni, San Francisco's transit system, receives 40% of the net parking tax revenue. Parking lot operators are responsible for collecting the parking tax and paying the City. In San Francisco, most off-street parking spaces are rented by a property owner to a professional parking operator. The parking operator collects a fee from the parking patron for the space rental plus the 25% parking tax.

Residential Permit Parking

Many neighborhoods in central San Francisco are experiencing similar issues to those in Center City, where the number of residential permits issued far exceeds the available curbspace. In other words, the permit becomes a “hunting license” rather than a guarantee of an on-street space.

One proposed approach – outlined in draft neighborhood plans that are currently undergoing environmental review, but not yet implemented – is to restrict the number of permits in line with the available spaces. Permits would then be sold at market rate, in order to ensure that demand stays within the available supply. Revenue would be used for neighborhood transportation and streetscape improvements, such as utility undergrounding.

In some neighborhoods, the market rate might well be the same as the existing administrative charge, but in some dense parts of the City, such as Market/Octavia, the cost could be hundreds of dollars per year. Existing residents would be grandfathered in.

The aim of these proposals is not just to manage street parking more effectively, but also to reduce the obstacles to new housing development. One of the biggest barriers to new residential development with little on-site parking is the fear of existing residents that street parking problems will be exacerbated. Restricting permit numbers through market pricing would not only remove street parking as a concern, but also make development more attractive, since it would raise permit prices and thus generate more revenue for the neighborhood.

References

Interview with Ron Szeto, Director, San Francisco Parking Authority, 11/19/04

Interview with Amit Ghosh, Director of Strategic Planning, San Francisco Planning Department, 11/24/04.

Interview with Ken Rich, Senior Planner, San Francisco Planning Department, 12/6/04

Report of the San Francisco Parking and Traffic Commission, Management Audit of City-Owned Garages, Board of Supervisors Budget Analyst, November 1993

Appendix B, Parking Tax Analysis for the City of Seattle, prepared by Berk and Associates

Parking Management Strategies: A Handbook for Implementation. Prepared for the Regional Transportation Authority of Northeastern Illinois by K.T. Analytics, Inc. in association with Barton-Aschmann, Inc. and Eric Scheffler. 1995.

San Francisco Planning and Urban Research Association (2002), Vision of a Place. A Guide to the San Francisco General Plan.

What is the Problem with Parking? Parking and Better Neighborhoods: Getting it right. San Francisco Planning Department 2002. http://www.sfgov.org/site/planning_index.asp?id=25134

San Francisco Planning Department, Transportation Plan Element, Part 2 Excerpts on Parking related policies.

San Francisco Planning Department, Draft plan for Market/Octavia. Excerpts with garage wrap sketches 2004.

Chapter 9. Vancouver, Canada

As a deliberate transportation strategy, Vancouver tremendously increased housing capacity in the downtown area to reduce commuting times and congestion, in what became known as the "living-first strategy". From 1991 to 2002, the number of residents living downtown increased by 62%, to 76,000, but car trips into downtown remained relatively constant. In 1994, walking and cycling trips made up 20 percent of all daily trips into the downtown and together made up the third-highest used mode behind auto and transit trips: by 1999, walking and cycling trips made up 35 percent of all daily trips and are now the most frequently used mode.

Introduction

In 1991, the City of Vancouver, Canada responded to the problem of congestion with their Central Area Plan. As a deliberate transportation strategy, the plan tremendously increased housing capacity in the downtown area to reduce commuting times and congestion, in what became known as the "living-first strategy". Calling for streets to be the "focal point of public life," the plan called for public realm improvements – wider sidewalks, bike lanes, maintaining curb parking as a buffer – to foster movement on foot. Given Vancouver's cold, wet and windy winters – hardly Southern California's balmy climate – it was a remarkable ambition.

Other key points of the transportation strategy were summarized in the 1997 Vancouver Transportation Plan as follows:

> *The increase in peak period trips to downtown should be accommodated by a major expansion in transit;*
>
> *Overall road capacity to the downtown will not be increased above the present level;*
>
> *Bicycle access both to and within downtown will be improved by providing...a safe and effective network of routes throughout downtown;…*
>
> *Short-term parking will be managed to ensure there is sufficient parking to meet normal demand;...*
>
> *The fundamental principle of the plan is to create a sustainable transportation system that will meet the needs of the present without compromising the future.*

For the past fifteen years, Vancouver has achieved remarkable success with this strategy. From 1991 to 2002, the number of residents living downtown increased by 62%, to 76,000. The increase in downtown population indeed resulted in reducing the burden on the city's transportation network, as downtown residents live closer to work and within a "complete community, placing residents within walking distance of most destinations". Vancouver officials found this confirmed by the walking and cycling and auto traffic trends: "In 1994, walking and cycling trips made up 20 percent of all daily trips into the downtown and together made up the third-highest used mode behind auto and transit trips. In 1999, walking and cycling trips made up 35 percent of all daily trips and are now the most frequently used mode, followed closely by car and transit trips. At the same time, car trips into downtown remained relatively constant."

Setting maximum parking requirements, combined with improving transit, has resulted in transit carrying the largest share (about 40%) of commuters to downtown. In addition, the Greater Vancouver Transportation Authority, Translink, implemented a parking tax on all non-residential property in January 2006. The tax has been set by bylaw for 2006 at $0.78 per square meter (7.25 cents per square foot). Finally, overall, downtown Vancouver is economically successful, and Vancouver has been ranked as the most livable city in the world.

As downtown Vancouver continues to grow rapidly, following the same fundamental transportation strategy, their downtown transportation model finds that with the full implementation of their 2002 Downtown Transportation Plan, congestion will decline while transit ridership continues to increase. Average vehicle speeds will increase by 3% from 1996 to 2021, while average transit speeds will increase by 14%. The model result is significant considering that "while the number of trips made into the downtown increases, there is no increase in road capacity and additional facilities are provided for pedestrians and cyclists."

Bus Rapid Transit

In November 2000, Vancouver's TransLink system began implementing in stages its 98B Bus Rapid Transit (BRT) Line, which is worthy of special notice. Ultimately, this line has proved to be on of the most successful BRT services in North American in terms of cost-effectiveness and time savings. The line stretches ten miles from the town of Richmond in the south, through Vancouver International Airport, to downtown Vancouver. Completed in the summer of 2001, the BRT line cost $52 million for vehicles, on-board transit management systems, stations, busways, land, and traveler information systems. The system has been implemented with the following guidelines:

- Frequency of service of between 6 and 20 vehicles per hour.
- Station spacing between 400 – 1,500 meters depending on area density.
- Average speeds on arterial roads of 16 MPH (by comparison, San Francisco Muni buses travel an average of only 8 MPH)

Impacts

System benefits have greatly outweighed the costs of constructing and maintaining the line. The most immediate result of the line's implementation is observed in time savings. The 98 B-Line is estimated to have a 20% time savings from previous services, primarily due to the real-time vehicle location tracking system and traffic signal priority measures. These improvements in travel time have coaxed motorists from their vehicles. Surveys show that roughly 23% of B-Line users were former car drivers or passengers, which has resulted in a reduction of 5 million vehicle miles traveled (VMT). With a daily ridership of 18,000 persons in 2002, the B-Line removes over 4,100 motorists from the roads each day.

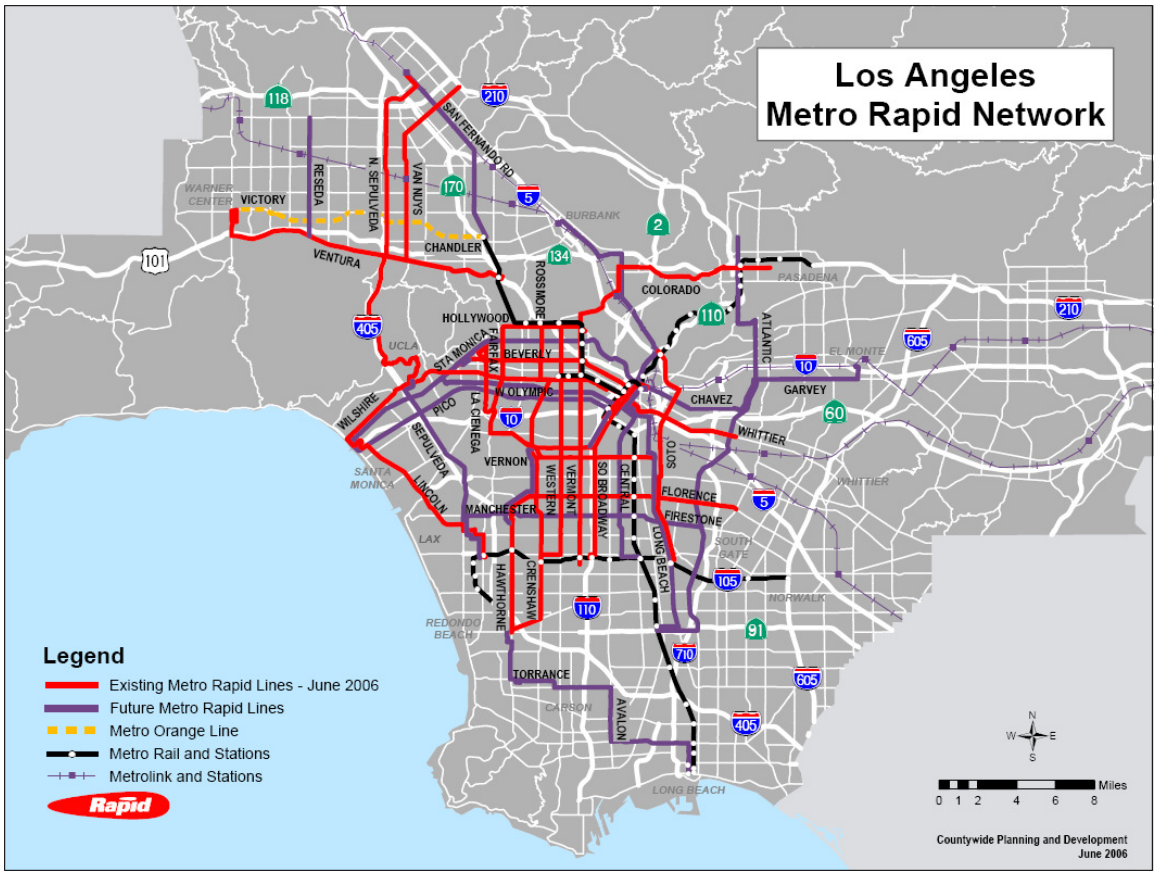
In addition to user benefits, TransLink has also reaped great rewards from BRT. Due to reduced travel times and on-time performance results, TransLink has been able to lower its total number of vehicles and vehicle hours of operation by 25%. The only potential disadvantage of the B-Line is the delay to cross-street traffic from providing signal priority to transit vehicles. Results have demonstrated, however, that the impact has been minor with only a 1% reduction in cross-street traffic in Vancouver and 6% in Richmond. When accounting for total travel time savings, and capital and operating costs, benefits are estimated to be 30% higher than system costs.

Reference

IBI Group. 98 B-Line Bus Rapid Transit Evaluation Study. Report for TransLink and Transport Canada. Vancouver, BC: IBI Group, September 2003. http://novax.com/products/media/98B-Line%20Final%20Report.pdf

The Greater Vancouver Transportation Authority, http://www.translink.bc.ca/ParkingTax/

Chapter 10. Los Angeles, California, MetroRapid Buses



Introduction

As a local example of quickly deployed investment in transit, it is worth noting the success of the Metro Rapid Program. This partnership between the Los Angeles County Metropolitan Transportation Authority (MTA), the City of Los Angeles Department of Transportation (LADOT) and other partner cities --including Pasadena -- is a marriage of improvements in street design, to protect the speed and reliability of transit, with investment in frequent service, better buses and less frequent stops.

In basic terms, on the transit provider side (primarily under the MTA's control), the key attributes are:

- Simple route layout: Makes it easy to find, use and remember
- Frequent service: Buses arrive as often as every 3-10 minutes during peak commuting times
- Fewer stops: Stops spaced about a ¾ mile apart, like rail lines, at most major transfer points

- Level boarding: Low-floor buses speed-up dwell times
- Color-coded buses and stops: Metro Rapid's distinctive red paint makes it easy to identify Metro Rapid stops and buses

On the street design side (primarily under the LADOT's control, or in the case of the city of Pasadena, under the management of the Transportation Department), the key attributes are:

- Bus priority at traffic signals: New technology reduces traffic delay by extending the green light or shortening the red light to help Metro Rapid get through intersections
- Enhanced stations: Metro Rapid stations (designed to emulate light rail transit stations) provide information, lighting, canopies and "Next Trip" real-time arrival displays

Of course, as with any partnership, many of these areas (such as the location and design of stops) are decided and designed in partnership, with both agencies involved. The program is a primary example of how close cooperation between city traffic engineers (the professionals who design streets, set street standards and set measures for the performance of streets) and transit planners (who route and schedule buses) can result in a major increase in the performance of transit service – even when relatively little funding is available, and the prospects for additional rail transit funding appear distant or uncertain.

Results

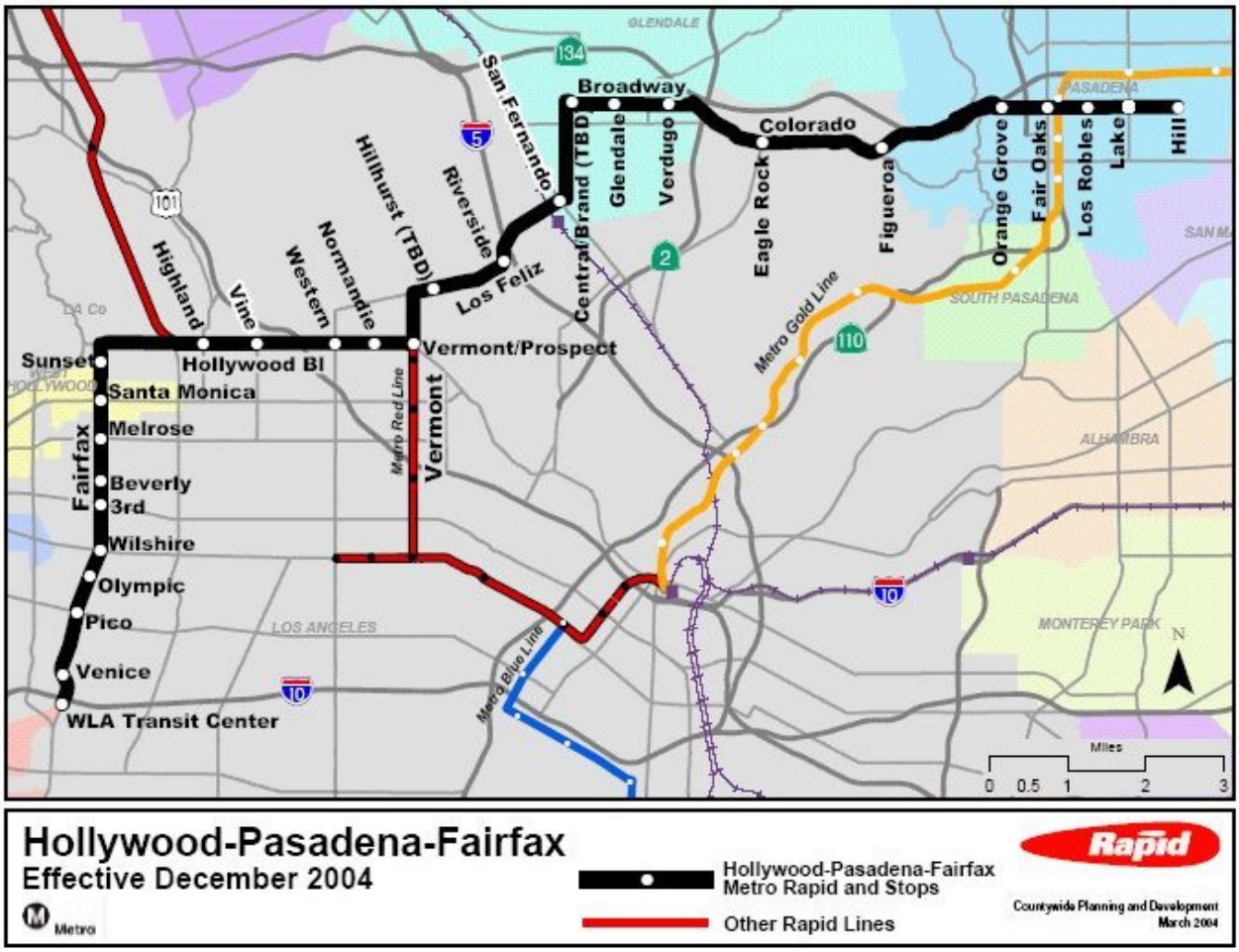
According to the Federal Transit Administration (FTA), the result is an express arterial bus service that has reduced passenger travel times by as much as 29%, with ridership increases of nearly 40%. According to the FTA, approximately one third of the reduction in travel time results from the bus signal priority system, with the majority of the balance attributed to fewer stops and headway-based schedules.

MetroRapid in Pasadena

In December, 2004, MetroRapid Line 780 was established running along Colorado Boulevard to Pasadena. Shortly after its implementation, the City of Pasadena approved the introduction of signal prioritization along Colorado Blvd. as an essential ingredient to MetroRapid service. The line currently attracts roughly 6,300 passengers per day, slightly more than the entire ARTS bus system of 6,000 passengers per day. When signal prioritization and bus stop improvements are implemented (so far, neither Glendale nor Pasadena's improvements are complete) along the length of the line, ridership can be expected to increase. Line 780 intersects both the Gold Line and the upcoming MetroRapid Line 762 at Memorial Park Station.

Slated to open in June, 2007, the new MetroRapid Line 762 will service the same route as Lines 260-361 on Fair Oaks Avenue.

Figure 10-1 MetroRapid Line 780



References

Metro San Gabriel Valley Governance Council, http://www.metro.net/board/Items/2005/11_November/20051108OtherSectorSGV_Item8.pdf

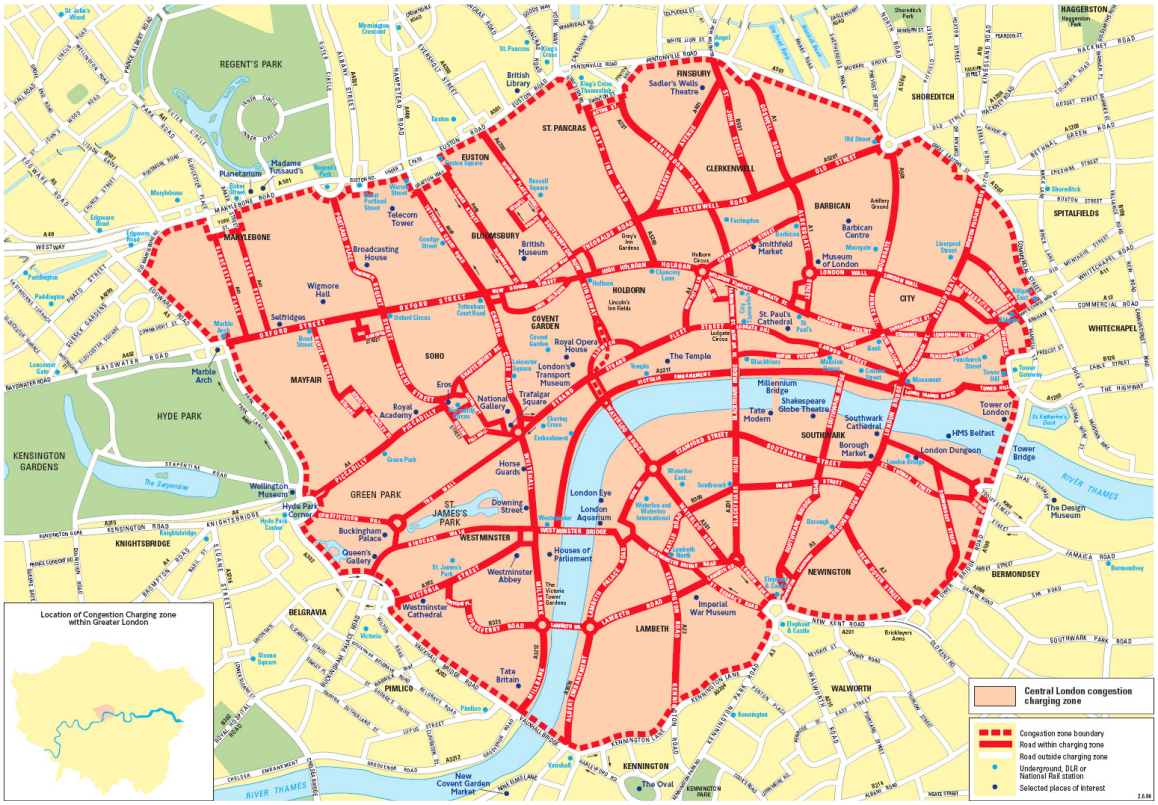
http://www.mta.net/board/Items/2006/06_June/20060613OtherSectorSGV_Item10.pdf#search=%22metro%20rapid%20762%22

http://www.metro.net/projects_programs/rapid/overview.htm#TopOfPage

Chapter 11. London, United Kingdom, Congestion Pricing

Since the beginning of 2003, when congestion pricing was introduced in central London, the number of vehicle trips in the congestion pricing zone has fallen by 17%. Congestion, measured in terms of person-hours of delay per mile traveled, has fallen by 26%. Despite the decline in vehicle trips, there have been no significant impacts on the performance of businesses or the overall economy within the zone.

Figure 11-1 London Congestion Zone



Credit: Transport for London (www.tfl.gov.uk)

Introduction

The London congestion pricing program has been in place since the beginning of 2003, covering a 10 square-mile large zone of central London, see Figure 11-1. The zone is approximately half the size of the city of Pasadena. Congestion fees are charged between 7:00AM and 6:30PM Mondays to Fridays, except on public holidays. There is a flat fee of £8 ($15) per day for entering, exiting or driving within the zone if the fee is paid by 10:00 PM on the same day. There is an additional surcharge of £2 if the fee is paid between 10:00 PM until midnight. Late payment fees are charged immediately after midnight, and amount to £50 for the first 14 days, £100 for the following 14 days, and £150 thereafter. Vehicles with three or more outstanding penalty fees may be booted or removed; this policy is effective across the entire Greater London area. The congestion charge can be paid in advance or on the same day in the following locations:

- Online
- At selected shops, gas stations and car parks
- By mail
- By telephone
- By text message from your mobile phone
- At Internet kiosks

Exemptions

The following vehicle classes are automatically exempt from paying the congestion charge:

- Motorbikes, mopeds and bicycles
- London licensed taxis
- Emergency vehicles
- National Health Service (NHS) vehicles
- Vehicles used by disabled persons
- Disabled passenger-carrying vehicles (e.g. Dial-A-Ride)
- Licensed buses with 9 or more seats

The following vehicle classes are also exempt form the congestion charge after paying an annual £10 registration fee to Transport for London (TfL):

- Electrically propelled vehicles
- Certain alternative fuel vehicles meeting strict emissions standards, e.g. gas, electric and fuel cell vehicles (including bio/dual fuel)
- Specially adapted recovery vehicles
- Breakdown vehicles in use to provide roadside assistance or recovery services operated by accredited organizations

Residents who live in the charging zone are eligible for a 90% discount from the Congestion Charge on one private vehicle.

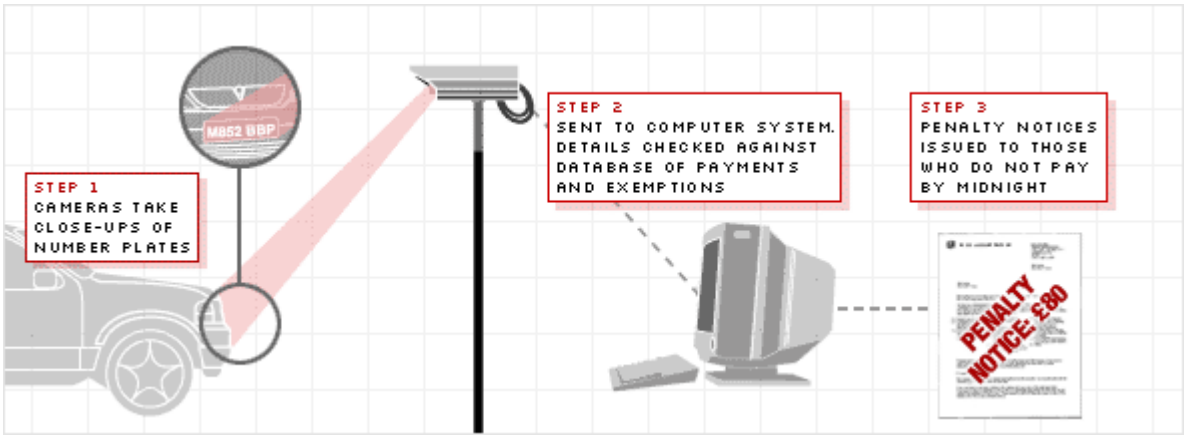
Camera Monitoring

There is currently a network of 203 enforcement camera sites, of which 174 sites are located along the boundary and the remaining 29 sites throughout the 10 square mile large zone in central London. All lanes of traffic at exit and entry points as well as sites within the zone are monitored and ten Mobile Patrol Units are used for enforcement purposes. There are an additional 64 monitoring camera sites which provide supplementary traffic monitoring over and above that provided by the enforcement network.

Cameras, similar to those used for security purposes at ports and airports, provide high quality analogue video-stream signals to an Automatic Number Plate Recognition (ANPR) computer

system. The system uses both color cameras and mono cameras, with at least one color camera at each camera site.

All captured images are streamed back to the ANPR system in central London which delivers information on the exact time and date that the images were taken. All images are automatically matched against the database of those who have registered to pay; images of those who have done so are discarded. Images of violators from all cameras along with the information from the ANPR reader are stored as back-up in case the information is questioned.



Credit: BBC (http://news.bbc.co.uk/1/shared/spl/hi/uk/03/congestion_charge/exemptions_guide/html/pay.stm)

Effectiveness and Impacts

According to the most recent Annual Report (June, 2006) reductions in congestion inside the zone average 26% since the introduction in 2003. Congestion is defined as the excess delay above that which would be experienced under clear conditions. London's pre-congestion baseline delay was 2.3 minutes per kilometer with 2005 figures showing an improvement to 1.8 minutes per kilometer. These reductions in travel times are a result of less traffic. Statistics from 2005 confirm a 17% drop in total traffic with a 31% decrease in potentially-chargeable vehicles in relation to equivalent pre-charging figures for 2002. From 2002 to 2005, the total number of car vehicle-kilometers driven fell 39%.

Road accidents have also fallen with a net reduction of between 40 and 70 personal injury accidents per year. There is no evidence of adverse traffic impacts on roads surrounding the zone. On the contrary, there is an overall pattern of slowly declining "background" traffic levels from various measurements of traffic in inner London.

Data revealed no significant impacts on business performance; recent economic activity saw a brief decline due to the July 2005 subway bombings, but retail and business profitability have since rebounded. Overall, the congestion zone appears to have a neutral effect. Surveys also indicate that 78% of the charge payers are satisfied with the quality of service.

The scheme generated net revenues of £90 million in 2004/05 and £122 million in 2005/06 (provisional figures), which are being spent largely on improved bus service within London. The increase in revenue between the two years can to a large extent be contributed to a fee increase from £5 to £8 in July of 2005. Interestingly, the 60% increase in daily fee seems to only have contributed to a 4% reduction in entering traffic – towards the lower end of Transport for London's prior expectation. However, these results have yet to be confirmed.

The success in the central London charging zone has prompted a future western extension of the zone. Baseline data collection has begun for all key indicators and Transport for London has defined monitoring proposals for the extension.

According to Litman (2006), London's congestion pricing system, while successful, is not considered optimal because:

- The fee is not based on how many miles a vehicle is driven within the charging area.
- The fee is not time-variable, that is, the fee is not higher during the most congested periods and lower during less congested periods.
- The fee does not vary by location. It would be more efficient to have higher rates on more congested roads.
- The system has relatively high overhead costs.
- Transit service (particularly the Tube) is crowded and unreliable, although this is changing as bus service improves and pricing revenue is used to upgrade the system.

Parking Policy

Until recently, most of Great Britain had parking policies that were quite similar to typical policies in the United States, with high minimum parking requirements set for all land uses. London, however, was a pioneering city in replacing minimum parking requirements in many areas with maximum standards in the early 1970s. By the 1990s, this shift accelerated. In 1995, for example, the London Borough of Kensington and Chelsea reversed directions: the borough declared that all of its existing off-street parking requirements would henceforth be maximums rather than minimums, without changing any of the numbers.

In 1996, London tightened its parking standards, adopted the following maximum standards:

- Central London - 1 space to 10,764 - 16,146 sq ft (1,000 -1,500 sq m)
- Inner London - 1 space to 6458 - 10,764 sq ft (600 - 1,000 sq m)
- Outer London - 1 space to 3229 - 6458 sq ft (300 - 600 sq m)

In 2001, the shift from minimum to maximum parking standards in the UK, was codified as national government planning policy guidance, which local authorities are statutorily bound to follow. National transportation guidelines for local planning now specify that, “plans should state maximum levels of parking for broad classes of development…There should be no minimum standards for development, other than parking for disabled people.”

The explicit reasoning set out by the government is to reduce congestion, act as a demand management tool, and allow higher development densities. Local authorities are warned to be cautious in prescribing different parking standards for town centers and peripheral locations, to avoid creating "perverse incentives" for out of center development through the attraction of additional parking.

The standards for England[1] are set out in the table below. The guidance suggests these are a minimum, and calls for regional and local authorities to adopt more rigorous standards where appropriate..

Figure 11-2 National Maximum Parking Standards for England

Use	National maximum parking standard	Threshold at which standard applies (gross floorspace)
Residential	1.5 spaces per dwelling	-
Food retail	1 per 151 sq ft (14 sq m)	10,764 sq ft (1,000 sq m)
Non-food retail	1 per 215 sq ft (20 sq m)	10,764 sq ft (1,000 sq m)
Cinemas, conference facilities	1 per 5 seats	10,764 sq ft (1,000 sq m)
Other leisure	1 per 237 sq ft (22 sq m)	10,764 sq ft (1,000 sq m)
Offices	1 per 323 sq ft (30 sq m)	26,910 sq ft (2,500 sq m)
Colleges/universities	1 per 2 staff plus 1 per 15 students	26,910 sq ft (2,500 sq m)
Stadia	1 per 15 seats	1,500 seats

Source: Department of the Environment, Transport and the Regions (2001).

References

Transport for London (www.tfl.gov.uk)

Transport for London (2006) Central London Congestion Charging. Impacts Monitoring. Fourth Annual Report, June 2006.

Litman, Todd (2006) London Congestion Pricing, Implications for Other Cities. VTPI.

Litman, Todd (2006) Parking Management Best Practices, p.97.

Shoup, Donald (2004) The High Cost of Free Parking, p.92.

[1] Separate standards are to be issued for Scotland and Wales.

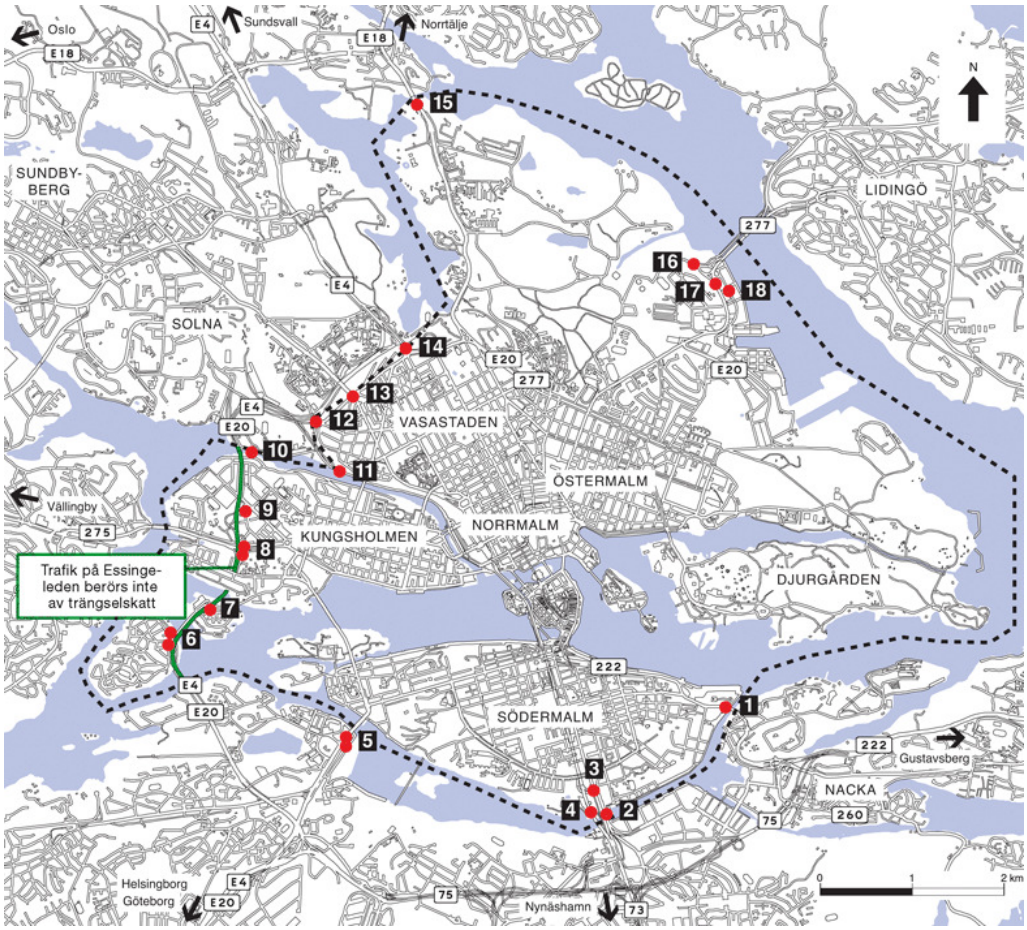
Chapter 12. Stockholm, Sweden Congestion Pricing

Six months into the trial of congestion pricing the average traffic reduction across the control points between 6:30 AM and 6:29 PM is 22%.

Introduction

Sweden's capital Stockholm is the most recent city to introduce congestion charging. The Swedish government and the City of Stockholm have managed a 7-month trial period of a congestion tax in Stockholm between January 3 and July 31, 2006. During this period, vehicles entering or exiting any of the 18 control points in to or out of Stockholm inner city on weekdays between 6:30 AM and 6:29 PM are required to pay a congestion tax. A referendum on the permanent implementation of congestion charges held on September 18, 2006 succeeded with a 51.7% approval. The zone covering the city's core is approximately 13 square miles in size.

Figure 12-1 Stockholm Congestion Zone



Vehicles are registered by cameras photographing the license plates, similar to the London scheme. Vehicles equipped with an electronic onboard unit for direct debit payment are also identified through this means. Traffic flow is not affected as drivers are not required to stop or slow down when driving past a control point.

The cost per entrance or exit is $1.35, $2 or $2.70 depending on the time of day. The maximum amount is charged during peak hours between 7:30-8:29 AM and 4:00-5:29 PM. The maximum amount payable per vehicle per day is $8. Payment must be registered within 14 days of passage. Owners of vehicles that are not equipped with an onboard unit must pay the fees at local chain stores, via credit card, on the Internet, or through Internet banks. If the tax is not paid within the two-week time frame, the vehicle owner will receive a reminder to pay the tax within four weeks, and an additional administration charge of $9.50. If the tax and fees are not paid within the four-week period, a new reminder is sent out with an additional $70 fee.

Exemptions

The following vehicles are exempted from the congestion tax:

- Emergency vehicles
- Buses with a total weight of at least 14 tons
- Diplomatic cars
- Taxis
- Motorcycles
- Vehicles registered abroad
- Military vehicles
- Cars that are equipped with technology for partial or total operation using electricity, alcohol or gas other than gas, and are registered as such at the Swedish Road Administration.

Owners of the following types of vehicles must apply for an exemption:

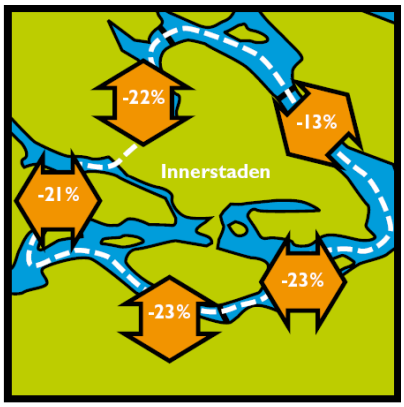
- Mobility service vehicles with total weight below 14 tons
- Cars that are used by persons with a disabled person parking badge

Cost of Implementation

The Swedish government has budgeted $510 million to cover all the costs of the implementation, including technology, transit improvements (such as 12 new express bus lines, expanded service for nearly 20 other bus lines and new bus stops), about 1,800 new park-and-ride lots, information campaigns and monitoring. The revenue from the congestion charge is currently roughly $8 million per month. If the congestion charge becomes permanent it will yield a significant annual surplus of $75 million (after deduction for maintenance and operations). In other words, the system will be repaid in less than 7 years. In addition, estimates of socioeconomic gains, due to shorter travel times, increased traffic safety and improved health and environment, yield savings of an additional $100 million annually.

Effectiveness and Impacts

Six months into the trial the average traffic reduction across the control points between 6:30 AM and 6:29 PM is 22% and nearly 100,000 vehicle trips per day have been removed from the roads. The reduction reached its peak during afternoon rush hours with 24%. Traffic reduction in the inner city was a little bit lower than the average across the control points, showing a 15% drop in vehicle kilometers traveled. This indicates that individuals driving within the control points take advantage of the reduced traffic situation and drive more. Vehicle travel times dropped significantly within and around the inner city. The largest reductions were observed around the control points, where time spent in congestion was reduced by a third in the morning peak hour and by half in the evening peak hour.



Credit: www.stockholmsforsoket.se

Public transport usage has increased by 6% between spring 2005 and spring 2006. The congestion trial seems to explain 4.5%, while increase in gas prices and other external factors cover the remaining 1.5%.

A conservative estimate of the effects on personal injury accidents is 5-10% reduction within the zone.

References

The Stockholm Trials (www.stockholmsforsoket.se)

Stockholms Stad (2006) Facts and results from the Stockholm Trial. Second Version - June 2006.