

**U-Pass at the University of British Columbia:  
Lessons for Effective Demand Management in the Campus Context**

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## ABSTRACT

Using the new U-Pass Program at the University of British Columbia as a case study, this paper provides an analysis of the conditions and strategies necessary for effective transportation demand management in the university and college campus context.

Following several years of incremental changes in travel behaviour, a mandatory universal transit pass (U-Pass) was introduced at UBC in September 2003, generating a fifty percent increase in transit ridership and a twenty percent decrease in single occupant vehicle traffic. Drawing on TDM theory and travel behaviour data from the literature, the paper examines the factors contributing to the success of the U-Pass, including demographic data, transit and transportation facilities, and campus housing and land use. The paper places special emphasis on parking policy and regional planning obligations and objectives.

The first section provides a review of the literature on transportation demand management through the analysis of TDM tools and policy approaches and their effect on transportation choice. The analysis is focussed on the effect of transportation cost and pricing policy on travel behaviour, with particular emphasis on the university setting. The second section discusses the factors underlying demand management at UBC, including demographic conditions, transportation and land use patterns, and parking policy. Using transportation mode split data from 1997 to the present, the third section examines the impact of TDM strategies implemented at UBC between 1997 (the beginning of its TDM program) and 2003, when U-Pass was implemented. Finally, the paper provides a comparative analysis of other North American U-Pass programs, including their objectives and TDM impact.

Based on this analysis, the paper finds that the most effective TDM strategies are those that both increase the cost of operating a single occupant vehicle (SOV) *and* provide a practical alternative. These types of strategies are particularly well suited to university and college campuses, where large numbers of commuters flow in and out of a central area, and where mandatory policies and fees can more easily be applied.

The lessons learned at UBC have important implications for other universities and post secondary institutions seeking to address the costs of increased traffic congestion and parking requirements. The paper concludes by exploring other opportunities for universal transit pass programs, including applications in community and corporate environments.

## **I. INTRODUCTION**

Urban transportation has become one of the most important public policy issues facing contemporary North American cities. With declining funding for new infrastructure and growing recognition of the costs—environmental, economic and social—of our society’s heavy reliance on the automobile, transportation demand management (TDM) has emerged as a key policy instrument for dealing with urban congestion problems (Giuliano, 1992). In some circles, TDM has been recognized as a cost-effective method for addressing congestion since the 1980s, but there is now widespread appreciation of the need for fully integrated TDM strategies as part of comprehensive regional and transportation planning (Berman and Radow, 1997; Lim, 1997; Meyer, 1999; Ferguson, 2000).

At its most basic level, transportation demand management can be defined as any tool or strategy aimed at utilizing existing transportation resources more efficiently, generally by minimizing single occupant vehicle traffic. Proponents of TDM suggest transportation-related problems be addressed through better management and innovative policy solutions that focus on efficiency and passenger mobility. Examples include peak-hour tolls, increased public transit service, and strategic pricing of parking (Victoria Transport Policy Institute, 2002). While traditional transportation planning typically relies on expensive supply-side solutions, TDM emphasizes low-cost solutions aimed at improving a system’s overall efficiency (Jolly, 2003).

Using the new U-Pass Program at the University of British Columbia as a case study, this paper provides an analysis of the conditions and strategies necessary for effective transportation demand management in the university and college campus context. The first section provides a review of the literature on transportation demand management through the analysis of TDM tools and policy approaches and their effect on transportation choice. The analysis is focussed on the effect of transportation cost and pricing policy on travel behaviour, with particular emphasis on the university setting. The second section discusses the factors underlying demand management at UBC, including demographic conditions, transportation and land use patterns, and parking policy. Using transportation mode split data, the third section examines the impact of TDM strategies implemented at UBC between 1997 (the beginning of its TDM program) and 2003, when U-Pass was implemented. Finally, the paper provides a comparative analysis of other Canadian U-Pass Programs, including their objectives and TDM impact.

## **II. TRANSPORTATION DEMAND MANAGEMENT – AN OVERVIEW**

Transportation demand management is defined as a method of planning that attempts to reduce auto dependency by focussing on the *demand* for travel. Through a wide variety

of tools and strategies, TDM encourages a more efficient and environmentally conscious attitude toward driving – it has been referred to as the ‘art of modifying travel behaviour’ (Ferguson, 1990). TDM encompasses both alternatives to driving alone and the techniques for supporting strategies that encourage those alternatives (Berman and Radow, 1997). TDM is unorthodox in that it pushes the realm of transportation planning into a broader context, meshing transportation more tightly into land use planning and the social structure of a region (Lim, 1997). Demand management measures fall into two broad groups: ‘carrots’—incentives such as HOV lanes for carpools, subsidized transit passes, or programs for cyclists; and ‘sticks’—disincentives such as highway tolls, parking charges and vehicle levies. Used effectively, these measures can change the amount, time, and mode of travel.

TDM can be used as a policy tool to address many types of urban transportation problems, including traffic congestion, air pollution, greenhouse gas emissions, and general concerns regarding mobility and accessibility. According to the Victoria Transport Policy Institute:

TDM treats mobility as a means to an end, rather than an end in itself, and so helps individuals and communities meet their transport needs in the most efficient way, which often reduces total vehicle traffic. TDM prioritizes travel based on the value and costs of each trip, giving higher value trips and lower cost modes priority over lower value, higher cost travel, when doing so increases overall system efficiency. It emphasizes the movement of people and goods, rather than motor vehicles, and so gives priority to public transit, ridesharing and non-motorized travel, particularly under congested urban conditions (2002).

Regardless of the objective or target market, an effective TDM strategy generally requires the cooperation of many different constituencies, including private sector developers, landowners, employers or business associations, and public bodies and government agencies (Ferguson, 2000).

The traditional focus of transportation planning has been on physical infrastructure and capital investment; transportation officials rarely considered the impact that new or expanded roads and highways might have on future growth, land use, or transportation demand (Lim, 1997). Travel demand forecasting methods generally fail to account for latent demand, and as such, congestion often develops much faster than anticipated. It is not unusual for new American highways to be operating at or above capacity within a few years (Ferguson, 1990; Orski, 1990). Highways in North America have historically been considered public utilities—not unlike like the water or power supply—to be supplied ‘on demand’. Thus, unsurprisingly, traditional approaches to traffic congestion have centred on supply-side solutions, that is, expanding existing infrastructure (Orski, 1990). Supply-oriented solutions have become more problematic in recent years, with shrinking government resources, growing environmental concerns, and opposition to major highway construction increasingly common.

When TDM first became popular in the mid to late eighties, the literature was sceptical, yet cautiously optimistic (Orski, 1990; Ferguson, 1990; Giuliano, 1992); but by the end of the decade, in depth case studies and best practices dominated the literature (Pogue, 1997; Berman and Radow, 1997; Kadesh and Roach, 1997; Lim, 1997; Stewart and Pringle, 1997; Alvord, 2000; Ferguson, 2000; Enoch, 2003; Orsini, 2003; Balsas, 2003). Despite mixed results and significant obstacles to implementation, demand management has become a significant part of the transportation planning process in North America.

Case studies have shown that travel behaviour can be changed under the appropriate circumstances—circumstances that TDM policies can bring about (Bartholomew, 1995; Saka et al., 2001; Enoch, 2003; Orsini, 2003). Yet the vast majority of North Americans still choose to commute in a single occupant vehicle, despite years of encouragement to use more sustainable modes of transport. Indeed, managing transportation demand has proved to be exceedingly difficult. Unlike recycling, made commonplace through highly successful elementary school ‘blue box’ campaigns in the late eighties and early nineties, personal travel is not an easily changed social behaviour. For a majority of North Americans, the private automobile (usually with one occupant) is an integral part of daily life—changing this reality is a challenging task. For TDM strategists to be successful, they must recognize that dependence on the automobile is perfectly rational, given the travel incentives and disincentives that influence transportation choice in many of our communities. The marginal cost of operating a private automobile is relatively low, making driving the fastest, most convenient, and most comfortable form of transportation available for a given price. Furthermore, in many areas, alternatives to the private automobile are extremely limited or non-existent.

Providing commuters with meaningful alternatives is a critical part of an effective demand management strategy. In the absence of good transit service, which is generally the best alternative, a comprehensive carpool program can make carpooling a more attractive option for drivers. On the other hand, TDM strategies that focus only on persuasion or appeals to altruism—prize draws at work, preferential carpool parking, ‘GoGreen’ Campaigns—are not likely to be effective. These kinds of approaches do very little to improve the travel options available to drivers, and therefore offer limited appeal (Meyer, 1999; Giuliano, 1992; Rees, 2001). Providing drivers with alternative travel choices is essential, but unless there are meaningful incentives (carrots), or disincentives (sticks) for drivers to use an alternative mode of transportation, few of them will actually change their behaviour (Meyer, 1999). Experience has shown that people make their transportation decisions based (almost exclusively) on cost and convenience. In most cases, the private automobile wins every time (Ferguson, 1990, 2000). If a TDM incentive is to be truly meaningful, then it must change the relative cost or convenience of a transportation alternative(s) compared with the car. There are two ways to do this: price-based incentives (parking charges, subsidized vanpools, free transit passes) and time-based incentives (express buses, HOV lanes, time off for carpoolers). Though all of these make ridesharing more attractive, research indicates that financial ‘sticks’—increased parking charges in particular—are the most effective deterrents to solo driving (Robinson, 1997; Lim, 1997; Stewart and Pringle, 1997; Meyer, 1999; Ferguson, 2000).

Undervalued parking is one of the primary causes of traffic congestion in urban areas—if the marginal costs of driving were higher, travel behaviour would change significantly (Ferguson, 2000). According to Meyer, there are two ways to increase the marginal costs of driving—by raising the cost of driving for everyone in a given area (through increased fuel taxes, tolls, or levies) or by providing individual drivers with choices based on monetary consequences. The first method is relatively uncommon—few governments are willing to upset large blocks of voters (particularly motorists) with new fees or taxes. In British Columbia, the failed attempt in 2001 by the Greater Vancouver Transportation Authority (TransLink) to raise funds through a new levy on all vehicles in the region clearly illustrates the political challenges associated with the implementation of such a strategy. One of the best ways to implement the second method is through parking ‘cash outs’, whereby an employer offers all employees a monthly transportation allowance, while simultaneously implementing an equal charge for parking that was previously provided for ‘free’. Employees who continue to drive are no worse off, but have a financial incentive to explore (cheaper) travel options (Orski, 1990; Meyer, 1999; Ferguson, 2000).

Two decades of experience with transportation demand management allow us to draw several conclusions. Effective TDM strategies must first provide drivers with meaningful alternatives to the automobile; second, they must provide incentives for drivers to use those alternatives; and third, they must secure support and participation from both public and private sector stakeholders. Public acceptance is critical in order to implement the incentives/disincentives necessary for a successful TDM program. Many good plans fail because they lack the public support and political will necessary to implement the ‘sticks’—the controversial, and most effective elements of demand management (Lim, 1997, Stewart and Pringle, 1997). TDM is a “very messy business” that requires cooperation and support from many different groups within the community (Ferguson, 1990). Flexibility is a key component of this support—in order to achieve any measurable success, TDM strategies must recognize and respond to important variations in local conditions (Ferguson, 1990).

Legislation has made demand management strategies a requirement of transportation plans in many US jurisdictions, particularly California, but this has not been the case in Canada. Indeed, despite reams of literature extolling the virtues of TDM programs, most Canadian jurisdictions have at best been tentative in their approach to TDM (Stewart and Pringle, 1997). In the absence of legislation—and perhaps more significantly, funding—from senior governments, TDM strategies have developed much more slowly in Canada, and tend to focus on voluntary compliance through low-level incentives. Vancouver and Toronto both incorporated aggressive demand management strategies into regional transportation plans in the 1990s, but their implementation and approval processes were fraught with difficulty (Stewart and Pringle, 1997; Lim, 1997; Robinson, 1997). Canadian TDM initiatives are frustrated by the absence of “a well-formed national strategy and broad consensus on a set of integrated actions for tackling urban sustainability” (Jolly, 2003).

In contrast, Canadian universities and colleges are a significant and growing niche market for the application of demand management strategies. Following the lead of campuses in the United States, particularly the University of Washington in Seattle, Canadian schools are beginning to develop sustainable transportation programs (Creighton, 1998). A U-Pass program is generally the cornerstone of these efforts. U-Pass—meaning universal transit or transportation pass—is a popular TDM strategy in use at more than seventy universities and colleges in the United States (Victoria Transport Policy Institute, 2002) and twenty Canadian institutions. U-Pass aims to reduce pressure on parking infrastructure and reduce vehicle traffic to campus by lowering the price of transit for students. Under the U-Pass model, post-secondary institutions establish a contract with their local transit authority to provide fare-free transit for students. The University administration typically pays the transit authority an annual fee—based on student transit ridership—financed through increased student fees. As a result, for every student on any day, a bus ride to campus (or anywhere else in the system) is free (Brown, Hess, Shoup, 2001).

Ultimately, addressing our transportation challenges will require a wholesale shift in how society thinks about local travel (Robinson, 1997). An important part of this shift must include changing the focus of the transportation debate from *mobility* to *access*. There is no better place to begin this change than on our university and college campuses. Universities generally have control over two of the major variables essential to strong TDM programs—parking availability and land use control—enabling them to more easily develop and introduce coordinated programs of incentives and disincentives than in the typical community, where responsibilities are fragmented (Transportation Research Board, 2001).

The University of British Columbia implemented a highly successful U-Pass Program in September of 2003. Transit ridership increases have exceeded predictions and parking demand and traffic congestion on campus has been significantly reduced. The following section provides a detailed discussion of demand management strategies in place at UBC.

### **III. DEMAND MANGEMENT AT UBC**

As a comprehensive research institution with more than 40,000 students, the University of British Columbia is one of Canada's largest universities. It is also the second largest employer in the Greater Vancouver Regional District (GVRD), with 10,000 faculty and staff. An additional 2,500 people work at the UBC hospital and other affiliated organizations on or near campus. Physical access is a significant challenge for the University. Located on the crest of a hill on the Point Grey peninsula, the campus is geographically isolated from the rest of the region by 2,000 acres of parkland. With a residential population of only 11,000 people— 9,000 students, staff and faculty and 2,000 permanent residents—UBC is a commuter campus and a major regional traffic generator.

UBC is the second largest commuter destination in the GVRD, with more than 120,000 trips to and from campus on a daily basis (Urban Systems, UBC Transit Plan, 2003).

Massive boosts in UBC's research funding (a 48% increase in 2003 alone) coupled with increasing enrolment (between two and three percent each year) have fostered a massive construction boom at UBC (UBC Annual Report, 2003). As of Fall 2003, there was more than \$600 million worth of institutional construction projects taking place at UBC (ibid.). With most of the academic core built out, new construction is occurring on former surface parking lots (the number of parking stalls has been reduced by more than 2,000 since 1997). In addition to institutional growth, the University is planning major commercial and residential growth as part of its 'University Town' community, which will double the campus population by 2021 and significantly increase the commercial/retail space on campus.

To address this growth, the GVRD passed an Official Community Plan (OCP) Bylaw for UBC in July 1997. A Memorandum of Understanding between the University and the GVRD sets out how UBC will work with its regional partners to implement the OCP. The OCP commits UBC to improving the transportation choices available to members of its community by developing a transit-oriented transportation system and limiting the use of private automobiles. Specifically, UBC is required to pursue the following commitments (UBC OCP, 1997):

- Develop and implement a comprehensive and integrated transportation management strategy – the UBC Strategic Transportation Plan;
- Reduce single occupant vehicle (SOV) travel to and from campus by 20% within 5 years (Fall 2002);
- Increase transit ridership by 20% within 5 years (Fall 2002);
- Act as the “lead agency in the development of a UBC U-Pass, in collaboration with the City of Vancouver and TransLink, with the funding initially to come from increases in parking fees beyond those in the parking business plan”;

UBC hired a Director of Transportation Planning in mid-1997, and the TREK Program Centre—UBC's transportation planning department—was created shortly thereafter. In November 1997, the University initiated a two-year consultation process to guide the development of the Strategic Transportation Plan (STP). A Transportation Advisory Committee (TAC) was established to identify issues and make recommendations. The TAC was comprised of over 25 different stakeholder groups—including university staff, faculty and students, local neighbourhood associations, the City of Vancouver, the GVRD, Ministry of Transportation and Highways, TransLink, University Endowment Lands, and others. After many contentious drafts, numerous subcommittees and several evolutions of the TAC, the STP was approved by the University's Board of Governors in November 1999 (UBC STP, 1999).

As required by the GVRD, the STP recommends a 'comprehensive and integrated transportation demand management strategy' be implemented for the university. Though U-Pass was recognized as the cornerstone of the University's TDM efforts, the plan also



included carpooling and cycling programs, and policy to index the minimum daily parking rate to the cost of a round trip transit fare (one zone). Included in the plan are policies for reviews and updates as needed in order to best serve the transportation needs of the UBC community (UBC STP, 1999). Although the STP policies provide a long-term framework, the targets set out in the STP correspond with the five-year timeline in the OCP.

In order to guide and measure the impact of the University’s TDM strategies, traffic counts of all trips to and from the campus are taken each year. The first counts, conducted in Fall 1997, established the benchmark conditions for the OCP and STP (Table 1). The targets for Fall 2002 identified in the STP were determined by extrapolating Fall 1997 benchmark travel data to Fall 2002 (assuming 1997 mode shares and an increase in trips due to growth in enrolment and campus housing), and by calculating a 20% reduction in the trend forecast number of SOV trips, and a 20% increase in transit trips (Urban Systems, Transportation Status Report, 2003).

**Table 1: Strategic Transportation Plan Targets (person trips, 24 hours)**

<b>Mode</b>	<b>Benchmark (Fall 1997)</b>	<b>Target (Fall 2002)</b>
<b>Single Occupant Vehicles</b>	46,000	42,800
<b>Transit</b>	19,000	26,500
<b>Heavy Trucks</b>	300	300

*Source: UBC STP, 1999*

Between 1997 and 2002, UBC developed and implemented several pieces of its transportation demand management strategy. The University’s initial TDM efforts focussed on increasing the transportation alternatives available to the university community—increased and more efficient transit service, carpooling programs, an emergency ride home program, and cycling programs and facilities. The University’s attempts to implement financial ‘carrots’ and ‘sticks’ were not successful in the short term.

As a result of ongoing pressure from UBC and increased transit funding, TransLink increased transit service to the university significantly between Fall 1997 and Fall 2002. With the addition of express buses on Broadway and higher frequency service on other university routes, there was a 30 percent increase in transit service during this period. As a result, transit ridership to/from UBC increased dramatically, suggesting a strong latent demand that had not been accommodated by previous levels of service. In order to optimize the increased service to campus, UBC attempted to spread out the AM peak period rush hour. The University adjusted the start time for morning classes, effective

September 2001. The change saw 50 percent of classes shift from an 8:30 AM start time to a 9:00 AM start time, and 25 percent of classes shift from an 8:30 AM start time to an 8:00 AM start time. By spreading out class start times, transit demand was spread over a longer period of time, allowing for more efficient use of buses.

In an effort to make carpooling more attractive for UBC commuters, UBC implemented a comprehensive carpooling program in 2001. The program includes access to web-based ridematching services to help commuters organize carpoolers, priority parking for carpools of three or more, a guaranteed ride home in the event of an emergency, and a reward program that includes transit tickets, gift certificates, and vehicle maintenance vouchers. In an effort to improve the safety and convenience of cycling, UBC also developed a comprehensive, long term cycling strategy. The University installed more than 500 bicycle racks and 75 secure bike lockers, and began a long-term plan to retrofit older buildings with showers and change rooms. The University partnered with students to create a campus bike shop and community bike programs, and provided funding to improve the cycling infrastructure and bike lanes along key routes to campus.

Beginning in 1997, the University began to control the supply and price of parking on campus. Construction on surface parking lots and time restrictions in certain parking areas eliminated more than 1200 parking stalls between 1997 and 2002. However, the University did not index daily parking rates to transit fares. The University was forced to back down in response to criticism from students and staff that parking prices should remain the same until there was another alternative (i.e. better bus service/U-Pass). Due to massive internal resistance and criticism from students and faculty, only a partial increase was implemented—from \$2 per day to \$3.50 per day, rather than from \$2 to \$4, as was planned (Personal Notes, 2001).

UBC initiated U-Pass discussions with TransLink and the Alma Mater Society (the UBC student society) in early 1998, but was unable to achieve a deal that was workable for all parties. Based on the existing revenue generated by UBC students, and the cost of providing the additional service that would be required, TransLink pegged the price of the pass at more than \$30 per month—far more than U-Pass programs in place at other North American institutions. It was determined that the cost of the program—which would be mandatory for all 39,000 full and part-time students—was prohibitive, and discussions were put on hold (*ibid.*).

In early 2003, a third party consulting firm—Urban Systems Limited—conducted a full review of UBC’s transportation conditions and travel patterns to determine the impact of the STP in reaching the goals laid out in the OCP. Table 2 shows the detailed breakdown of trips by mode.

**Table 2: 1997 and 2002 Trips by Mode (person trips, 24 hours)**

Mode	Fall 1997		Fall 2002		Change (absolute value)	Change* (adjusted for growth)
	Trips	Mode %	Trips	Mode %		
<b>SOVs</b>	46,000	43%	48,400	43%	5%	-11%
<b>HOVs</b>	36,100	34%	29,100	26%	-19%	-35%
<b>Transit</b>	19,000	18%	29,700	26%	56%	40%
<b>Bicycles</b>	2,700	3%	3,300	3%	22%	6%
<b>Pedestrians</b>	1,400	1%	1,600	1%	14%	-2%
<b>Other</b>	900	1%	1,400	1%	56%	40%
<b>Totals</b>	<b>106,100</b>	<b>100%</b>	<b>113,500</b>	<b>100%</b>	<b>7%</b>	<b>-9%</b>

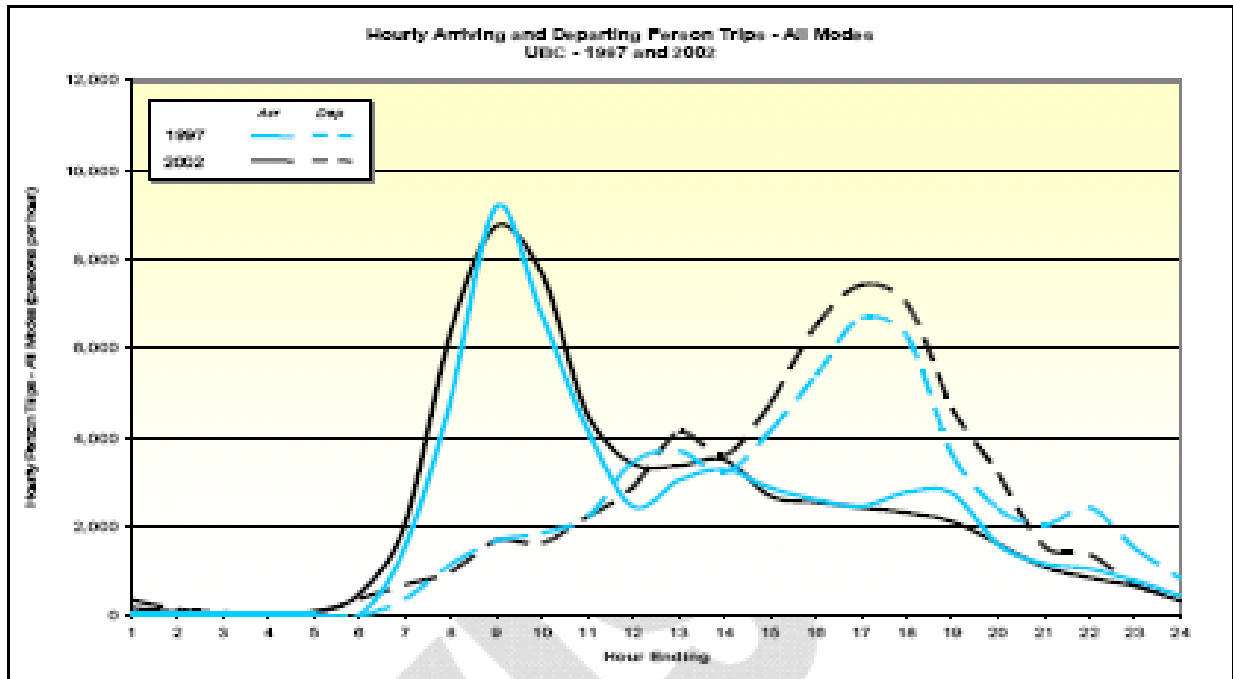
\* based on 16% growth in the daytime campus population

Source: *Urban Systems, UBC Transportation Planning, 2003*

The most significant change between 1997 and 2002 was the dramatic increase in transit ridership—clearly the University had met its first OCP commitment. There was a 56 percent increase in total transit ridership during this period, primarily due to increases in transit capacity on University routes. Significantly, detailed ridership data suggested that latent demand for transit was still strong, and further increases in capacity would result in additional increases in ridership (Urban Systems, Transportation Status Report, 2003). As shown in Table 2, there was not a corresponding decrease in single occupant vehicle trips, leaving UBC significantly short of its OCP objective. Despite a 75 percent increase in parking fees, the marginal daily cost of transit was still higher than that of parking (\$4 vs. \$3.50). As noted earlier, most drivers (students, staff, and faculty), would not consider taking the bus unless there was a significant price advantage over parking (ibid).

The modest change in the spread of peak period arrivals was also significant. As a result of the change in class start times, TransLink was able to carry more passengers to and from UBC with the same number of buses. The status report attributed 12 percent of the transit ridership increase to the class start time shift—in other words, buses serving UBC were able to carry 12 percent more passengers during the peak period, because fewer people were travelling at the peak of the AM rush (ibid.).

**Figure 1: Hourly Arriving and Departing Person Trips – All Modes (1997-2002)**



Source: Urban Systems, Transportation Status Report, February 2003

UBC had not reached its SOV reduction target by Fall 2002, a direct result of the University’s failure to implement more aggressive, financially based demand management strategies. The status report identified the U-Pass program as “the single most effective means of achieving changes in travel patterns (ibid.). Though the university had not reached its SOV target, it had been successful in reducing the rate of daily trips to/from campus. While the total number of trips increased, the number of trips per person decreased eight percent between 1997 and 2002 (Table 3).

**Table 3: Person Trips and Growth at UBC**

	Fall 1997 Actual	Fall 2002 Actual	Change
<b>Daily person trips to/from UBC (24 hour period)</b>	106,100	113,500	7%
<b>Daytime campus population</b>	42,300	49,000	16%
<b>Trip rate (person trips per capita)</b>	2.51	2.31	-8%

Source: Urban Systems, Transportation Status Report, 2003)

#### IV. U-PASS AT UBC – IMPLEMENTATION AND IMPACT

As transit service to the campus improved throughout 1998 and 1999, transit ridership grew significantly. During this period, interest in the U-Pass proposal resurfaced, and discussions between UBC and the AMS continued. In late 1999, the AMS struck a U-Pass Advisory Committee to advise student council. The committee recommended a wide range of concessions from the University, including a cash contribution to the program, a 30 percent rebate for students living in campus residence, and AMS control over certain program elements (UBC Transportation Planning, 2002). Major restructuring of BC Transit and the creation of the Greater Vancouver Transportation Authority (TransLink) limited the effectiveness of negotiations during this period. In February 2000, TransLink presented a new U-Pass proposal at \$25 per month, which was subsequently rejected by the AMS, stalling negotiations for several months. In the summer of 2000, negotiations began again under a new AMS executive, and a price of \$23 per month was negotiated in October 2000. In January 2001, student council rejected the proposal, citing insufficient financial contributions from the university administration (ibid.)

The AMS and UBC continued to work with TransLink through 2001 and early 2002, and although the parties could not reach an agreement, the University and TransLink took measures to improve transit service and reduce costs, including changing class start times and improving and expanding express bus service to UBC. In Spring 2002, TransLink conducted a formal ‘willingness-to-pay’ survey of UBC students. The survey supported the position long held by the AMS—that most students would not support U-Pass at a cost of more than \$20 per month (Willingness to Pay Survey, Spring 2002).

By Fall 2002, TransLink had agreed to a \$23 monthly card price, and the University agreed to subsidize the program by \$3 per month (almost \$1 million), bringing the cost to students to \$20 per month. In February 2003, student council approved the proposal and held a referendum to seek approval for a mandatory fee increase of \$80 per semester, effective September 2003. It was the most successful referendum in UBC history—more than 15,000 students turned out to vote, and 69 percent voted in favour of the program. In exchange for the University’s significant financial contribution to the U-Pass, student representatives endorsed a further increase (14%) in the budget parking rate, bringing the minimum daily price for campus parking from \$3.50 to \$4.00—in line with a one zone round trip transit fare. In anticipation of U-Pass, the fee increase took effect May 1<sup>st</sup> 2003.

Additional transit service and capacity were critical components of the implementation phase. With peak period buses to UBC already at standing loads, the success of the program was critically dependent on major capacity improvements. TransLink scheduled a 30 percent increase in service hours, and allocated additional service hours for

deployment as required. A comparison of Fall 2003 traffic patterns with years previous shows how the success of the U-Pass Program. Table 4 compares Fall 2003 mode splits with those of Fall 2002, and Table 5 shows Fall 2003 mode splits with those of Fall 1997.

**Table 4: 2002 and 2003 Daily Trips by Mode (person trips, 24 hours)**

Mode	Fall 2002		Fall 2003		Change (absolute value)	Change* (adjusted for growth)
	Trips	Mode %	Trips	Mode %		
SOVs	48,400	43%	45,000	38%	-7%	-9%
HOVs	29,100	26%	21,700	19%	-25%	-27%
Transit	29,700	26%	45,400	39%	53%	51%
Bicycles	3,300	3%	2,400	2%	-3%	-5%
Pedestrians	1,600	1%	1,200	1%	-25%	-27%
Other	1,400	1%	900	1%	-4%	-6%
<b>Totals</b>	<b>113,500</b>	<b>100%</b>	<b>116,600</b>	<b>100%</b>	<b>3%</b>	<b>1%</b>

\* based on 1.8% growth in daytime campus population

Source: Urban Systems Limited, UBC Transportation Planning, 2003

**Table 5: 1997 and 2003 Daily Trips by Mode (person trips, 24 hours)**

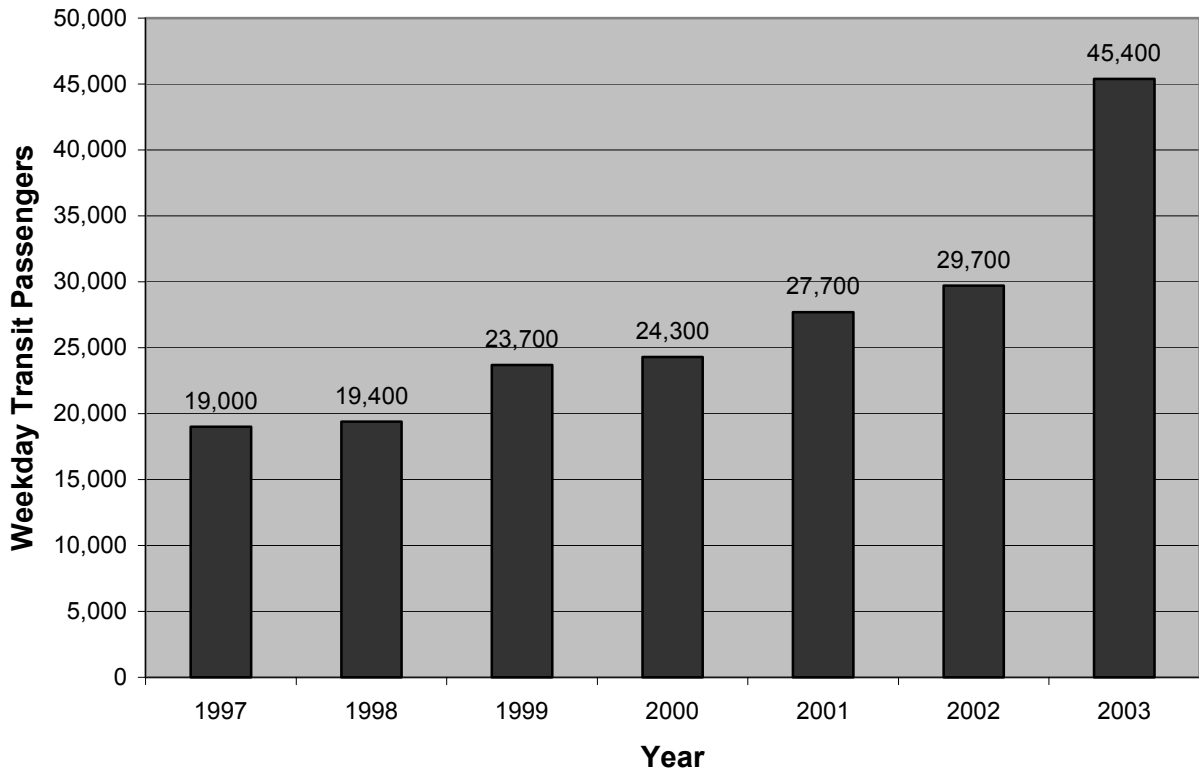
Mode	Fall 1997		Fall 2003		Change (absolute value)	Change* (adjusted for growth)
	Trips	Mode %	Trips	Mode %		
SOVs	46,000	43%	45,000	38%	-2%	-20%
HOVs	36,100	34%	21,700	19%	-40%	-58%
Transit	19,000	18%	45,400	39%	139%	121%
Bicycles	2,700	3%	2,400	2%	-11%	-29%
Pedestrians	1,400	1%	1,200	1%	-14%	-32%
Other	900	1%	900	1%	0%	-18%
<b>Totals</b>	<b>106,100</b>	<b>100%</b>	<b>116,600</b>	<b>100%</b>	<b>10%</b>	<b>-8%</b>

\* based on 18% growth in daytime campus population

Source: Urban Systems Limited, UBC Transportation Planning, 2003

As indicated above, U-Pass was immediately successful. By December 2003, SOV traffic had been reduced nine percent from 2002 levels and 20 percent from 1997 levels (when adjusted for growth), and the demand for parking had been reduced by nearly 20 percent (TransLink Board Report, November 10<sup>th</sup> 2003). Plans for a new 1,600-stall parkade on campus have been delayed until at least 2008. The most significant change has been in transit ridership—more than 50 percent more transit trips were made in Fall 2003 than in Fall 2002—dramatically exceeding initial forecasts of a 35 percent increase (UBC Media Release, Oct 31, 2003). The introduction of U-Pass increased the weekday transit mode share from 26 percent in Fall 2002 to approximately 40 percent in Fall 2003 (TransLink Board Report, November 10<sup>th</sup> 2003). Figure 2 shows the overall increase in UBC transit ridership between 1997 and 2003.

**Figure 2: Transit Ridership at UBC (1997-2003)**



*Source: TransLink, Board Report, November 10<sup>th</sup> 2003*

With most of the Strategic Transportation Plan implemented, U-Pass and parking fees were the final pieces in the University's TDM strategy. U-Pass bundled the University's other TDM programs (carpooling, emergency ride home, cycling and others) into one initiative, and provided the 'real alternative' necessary for an increase in parking prices. By meeting the key requirements of good TDM policy—providing meaningful transportation alternatives through improved transit service; providing significant incentives through a discounted transit pass and increased parking rates; and gaining broad public support through a campus referendum—the introduction of U-Pass reduced SOV traffic by 20 percent from 1997 levels (when adjusted for growth). U-Pass has allowed the University to meet its final two OCP objectives (implement U-Pass and reduce SOV travel), and boost transit ridership by 35 percent over 2002. Perhaps most importantly for UBC, meeting its regional transportation commitments has enabled the University to proceed with much anticipated campus development.

## V. OTHER U-PASS EXPERIENCE

There are well over a hundred U-Pass programs in place at universities and colleges across North America, including more than 20 in 12 Canadian cities. Aside from UBC, the largest programs include Simon Fraser University (Burnaby), Thompson Rivers University (Kamloops), the University of Victoria, the University of Calgary, Southern Alberta Institute of Technology (Calgary), University of Guelph, McMaster University (Hamilton), Queen's University (Kingston), Nipissing University (North Bay), Trent University (Peterborough), University of Western Ontario (London), Brock University (St. Catherines), and Saint Mary's University (Halifax).

More than half of Canada's U-Pass programs have been implemented since 1999, due in large part to the growing awareness of their potential to benefit students (through cheap access to transit), transit operators (through increased ridership and stable revenue), and the institution itself (through decreased traffic, reduced demand for parking, and other environmental benefits). U-Pass is successful (and possible) because of the highly centralized nature of most post-secondary institutions, whereby control over parking prices and land use policy rests with one organization (the administration), while control over student fees rests with another (the student union). Providing the two organizations can work together, they have at their disposal the tools necessary for effective demand management.

As noted earlier, the UBC U-Pass was successful, in part, because of the institution's decision to increase parking fees. The stronger the financial disincentives (primarily parking fees) to leave the car at home, the more likely it is a driver will respond to the financial incentive offered in the form of a discount transit pass. At the University of Victoria for example, parking prices increased by 90% between 1993 and 2002 (U-Pass Toolkit, May 2004). When U-Pass was introduced in September 2000, sales of parking permits decreased by 12 percent, and the proportion of students taking transit to school increased from 31 percent in 1998 to 51 percent in 2003 (ibid.). Prior to the implementation of U-Pass, post-secondary students represented 13 percent of Victoria transit ridership. One year after the introduction of the program, (1999-2000), post-secondary students represented 24 percent of transit riders (ibid.).

At Simon Fraser University, an institution notorious for its transportation problems, U-Pass has also been a major success. U-Pass was implemented at SFU and UBC at the same time (September 2003), leading to a 48 percent increase in transit ridership to SFU's main Burnaby Mountain campus. In addition, SOV traffic has been reduced to 2000 levels, and the university is revising its long term parking requirement forecasts. Indeed, the modal share for transit for SFU is now comparable to that of downtown Vancouver (TransLink Board Report, Feb. 24<sup>th</sup> 2005).



The University of Calgary, in partnership with the Students' Union and Calgary Transit, introduced U-Pass in September 2002 to deal with the growing problem of overcrowded parking facilities. Initial reports indicated that transit ridership increased by nearly 50 percent, but the impact in the parking lots was not as significant (*The Gauntlet*, October 24, 2002). However, as parking prices are increased over time, the University expects more drivers to take advantage of their U-Pass and leave their vehicles at home (U of C Business Plan, 2003-2007).

## VI. CONCLUSION

Nearly two years after the implementation of U-Pass at UBC and SFU, it is worth considering the ongoing impact of the program. The growth rate in public transit ridership in Vancouver for the 2004 calendar year was 8.3 percent, double the rate of growth for all Canadian public transit systems combined (TransLink Board Report, February 24<sup>th</sup> 2005). TransLink estimates that with U-Pass, UBC and SFU students made 1.6 million more trips in 2004 than in 2003, accounting for 15 percent of 2004 growth (*ibid.*). As noted earlier, both UBC and SFU now have transit modal shares that are comparable to that enjoyed by downtown Vancouver (40 to 50 percent).

From a demand management perspective, U-Pass is clearly a success. More specifically, U-Pass, used as a mandatory financial incentive to take transit, coupled with increased parking fees (a disincentive to drive) can be an incredibly effective tool for increasing transit use, minimizing vehicle traffic, and reducing the demand for parking. Moreover, the cost of a U-Pass program can be minimal, for individual students, for the transit operator, and for the institution. Even when a major investment by the university or college might be required to make the program viable, U-Pass can still be economical, compared to the investment in parking facilities that might otherwise be required. For example, the University of BC's annual contribution to the U-Pass Program (approximately \$1 million per year) is a bargain, considering the opportunity cost of the land and resources that would be required for another parkade.

It is important to note that the transportation alternatives initially provided at UBC, such as better transit service, carpool incentives, and improved cycling facilities, were relatively ineffective. As long as the price for parking was less than a one-zone return transit fare, many drivers did not have the incentive they needed to stop driving. In other words, until UBC provided its commuters with real alternatives, *and* an incentive to use them (through a discounted transit pass and higher parking fees), it was unable to significantly reduce the number of vehicle trips to and from campus. In addition to the incentives and disincentives UBC ultimately provided, the institution had enough flexibility to meet the needs of a strong student union. By working together, university and student leaders were ultimately able to build support for the most controversial (and the most important) elements of the university's TDM strategy—those elements that

provided the financial incentives necessary to change travel behaviour. The UBC experience illustrates the effectiveness of ‘financial coercion’ in changing travel behaviour—significant incentives or disincentives are required for TDM to have a significant impact on travel demand.

The most important lesson to be drawn from this study however, is the potential application of the U-Pass Program in other Canadian cities. The U-Pass model can be applied at other universities, colleges, and perhaps even large employers and residential developments. For example, in Vancouver, the success of U-Pass has encouraged TransLink to work toward the development of a U-Pass-like Community Pass for residents of new market housing developments at SFU (Burnaby Mountain) and UBC (Point Grey). For the purposes of this project, a Community Transit Pass has been defined as a deeply discounted annual transit pass tailored to households located in sustainable communities with a single landlord (UBC News Release, September 4<sup>th</sup> 2003). The developments at UBC and SFU present good opportunities for a Community Pass, because transit service levels are very high, they are located at the end of the transit network, and capacity is available in the reverse peak direction (TransLink Board Report, February 7<sup>th</sup> 2005).

If the success of U-Pass at Canadian post-secondary institutions is any indication, future applications in residential (and potentially commercial) communities look promising indeed.

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