

Appendix E3

DRAFT Summary of Operational and Pricing Strategy Best Practices

February 21, 2008

I. Introduction and Research Focus

Recent legislative direction (ESHB 2358 – “the Ferry Bill”) mandated a review of the following operational and pricing strategies with the intent of finding new ways to improve service on the Washington State Ferry System. The strategies included:

- Feasibility of using reservation systems
- Methods of encouraging transportation mode shifts
- Methods of improving on-dock operations
- Cost-benefit analysis of remote vs. over-water holding
- Methods of reorganizing holding areas and minimizing on-dock employee parking
- Schedule modifications
- Efficiencies in exit queuing and metering
- Interoperability with other transportation services
- Options for leveling vehicle peak demand
- Options for increasing off-peak ridership

In response to the legislative direction, WSF directed its staff and consultants to research the following initial list of strategies:

- Congestion pricing
- Reservation systems
- High occupancy toll (HOT) lanes
- Mode shift strategies
- Ticketing operations
- Increasing holding facilities
- Entry and exit queuing and metering
- Scheduling
- Fees and discounts that would support operational strategies

An early research step was to compile best practices about how and where such strategies have been applied, what their effect was, and whether the strategy may have potential application to WSF’s system. This memorandum is a summary of the transportation operations best practices research. Each example was selected based on its ability to illustrate a concept, and none of the examples are given detailed descriptions. The purpose of both the examples and this memorandum is to offer some operational and pricing concepts for consideration. Further research will be done on those that interest decision makers as having potential for implementation within the Washington State Ferry System.

The legislative direction and preliminary strategies listed reflect the ultimate and immediate WSF goals to: increase the efficiency of daily operating procedures; to increase vehicle load during off-peak hours; and to increase passenger, rather than vehicle, load altogether. Therefore, operational strategies were selected that accomplish either faster transactions or daily operations; traveler mode shift (choosing an alternative means of travel other than a single occupant vehicle); or a traveler time shift (changing a time of departure based on traffic information or travel preferences.) The following table presents WSF’s goals and strategies and the corresponding research topics:

Goal	WSF Strategy	Corresponding Research Topic
Increase Operating Efficiencies	Ticketing operations	Intelligent Transportation Systems (ITS): Electronic fare collection
	Increasing holding facilities	Parking Management Strategies ITS: Parking management
	Entry and exit queuing and metering	Reservations systems ITS: Advanced Traveler Information Systems
	Scheduling	<i>*Topic of a separate study *</i>
Traveler Mode Shift	Congestion pricing	Congestion pricing
	HOT lanes	Congestion pricing (HOT lane applications)
	Mode shift strategies	Congestion pricing Transit marketing Car sharing
Traveler Time shift	Congestion pricing	<i>See Congestion Pricing and HOT lanes</i>
	Reservations systems	Reservations systems
Support for Operational Strategies	Fees and Discounts	Pricing Notes Alternate revenue sources

This memorandum is organized into the following sections:

i. **Existing WSDOT Travel Demand Management programming:**

This section lists and briefly describes the facilities and programs that Washington State Department of Transportation (WSDOT) offers with the intent of reducing peak hour vehicle demand. (This section does not include a description of regional transit agencies and services.) The programs listed in this section represent the current strategies that WSDOT uses to encourage traveler mode shifts and time shifts.

ii. **Operational and Pricing Strategies to Consider:**

This section presents operational and pricing best practices in the transportation industry related to the following research topics:

- Congestion pricing
 - Area-wide
 - Corridor-wide
 - Lane applications (including HOT lanes)
 - Pricing Notes
 - Alternate Sources of Revenue
- Reservation systems (examples from aviation, cargo, bus and theme parks)
- Parking management
 - Remote parking
 - Shared parking
 - Preferential parking
 - Vehicle valet
 - Employer-driven reduction programs
- Transit marketing
- Car sharing
- Intelligent transportation systems
 - Real time traffic information
 - Parking management
 - Electronic fare collection

iii. Operational Strategies in Action: Ferry System Applications

This section describes instances of operational and pricing strategies under study in this analysis being applied to other ferry systems across the world.

iv. Summary of Findings

This section provides a summary table that matches WSF operational goals to their corresponding best practices and states the general effects of implementing those strategies.

v. Bibliography

This section lists all sources researched, both cited and consulted. It is organized first by section of the document and then by subject.

II. Existing WSDOT Transportation Demand Management Programs

Through existing programs, WSDOT already encourages commuters in the region, including its own employees, to use alternative times and modes of travel. This list is not inclusive or comprehensive of all the mode shift or time shift strategies or services active in the region. Instead, it focuses on WSDOT programs because they set a baseline for programming that WSDOT currently offers versus what expanded programming it could offer in the future.

Legislative and WSF Strategies*	WSDOT Initiative
Congestion pricing (including HOT lanes)	SR 167 “Good to Go” – coming soon
Ticketing	ORCA card – coming soon
Entry and exit queuing and metering	Puget Sound Traffic Flow Map (and FerryCam.com)
Mode shift strategies	Vanpool program - Priority carpool/vanpool loading on ferries - Rideshare fare discount on ferries RideShare On-Line Park and Ride Lots Trip Reduction Performance Program Commute Trip Reduction Program
Fees and discounts to support operational strategies	Trip Reduction Performance Program Commute Trip Reduction Program Rideshare fare discount on ferries

*WSF strategies were only listed that apply to existing WSDOT programming

“Good to Go”: The electronic form of payment accepted at the Tacoma Narrow Bridge and, eventually, for SR 167 HOT lanes. This form of payment avoids the inconvenience of toll booths, but recognizes a varying payment schedule by vehicle or time of day as applicable¹.

Vanpool: Legislative efforts to encourage vanpool use started in 1998 and increased in 2003 when a five-year, nine million dollar vanpool grant program was approved to help transit agencies with the capital costs of buying vehicles. In 2004, the Legislature also approved the use of financial incentives to encourage new vanpool riders and drivers. Van requests have exceeded the projected amount and WSDOT has projected being unable to meet the demand².

- In addition to helping promote to WSDOT vanpool program, WSF rewards carpools and vanpools by offering them preferential loading and by giving rideshare vehicles reduced fares. Exclusive staging area “diamond lanes” are available for carpool and vanpool vehicles, and those lanes get loaded first. In addition, carpools with three or more passengers and vanpools with five or more passengers are eligible for an annual vehicle permit at the cost of \$20.00. This cost covers both the vehicle and driver. Additional passengers pay the applicable passenger fare³.

RideShare On-Line: “WSDOT invested in expanding Rideshare Online statewide early in 2005, contributing to nearly doubling the number of visitors in the first nine months of the year compared with the same period in 2004. As of September 2005, nearly 13,000 individuals had sought ridematch information from the online service. A survey is being developed to track successful matches and the persistence of the groups formed.”⁴

Park and Ride Lots: Although there is no dedicated state funding for park and ride lots, approximately 270 lots (and more than 30,000 parking spaces) have been built, owned and operated through successful partnerships with transit agencies, other government agencies and local jurisdictions. Washington offering more than 30,000 parking spaces⁵.

Puget Sound Traffic Flow Map: WSDOT maintains real-time traffic information related to incidents and congestion online⁶. WSF also has cameras showing dock and queuing conditions online.⁷

¹ WSDOT website: <http://www.wsdot.wa.gov/GoodToGo/about.htm>

² WSDOT website: <http://www.wsdot.wa.gov/TDM/vanpool.htm>

³ Washington Administrative Code

⁴ Ibid.

⁵ WSDOT website: <http://www.rideshareonline.com/prlots.htm>

⁶ WSDOT website: <http://www.wsdot.wa.gov/Traffic/Seattle/>

Trip Reduction Performance Program: WSDOT started a competitive grant program in 2003 to employers, agencies, nonprofits, developers and property managers to provide incentives to their employees for utilizing alternative modes of transportation to single occupant vehicle trips and/or other travel demand management measure such as telework. \$1.5 million was appropriated for 2005-2007, and an additional \$1.5 million was appropriated for 2007-2009⁸.

Commute Trip Reduction Program: The Legislature passed the Commute Trip Reduction (CTR) Law in 1991, incorporating it into the Washington Clean Air Act. The goals of the program were to “reduce traffic congestion, reduce air pollution, and petroleum consumption through employer-based programs that decrease the number of commute trips made by people driving alone.” At participating worksites, the drive-alone rate dropped from 70.8 percent in 1993 to 65.7 percent in 2005. Beginning in March 2006, new requirements were implemented that direct municipalities to develop Commute Trip Reduction Plans for eligible employers. (Employers with over 100 employees are required to comply.) Municipalities may also opt to designate areas with employers of smaller size to participate on a voluntary basis. These areas are referred to as Growth and Transportation Efficiency Centers and they have their own planning guidelines. The planning targets of the new requirements are⁹:

- 10% reduction in drive-alone travel in participating municipalities by 2011
- 13% reduction in VMT by commuter in participating municipalities by 2011
- Additional local targets as necessary to meet Urban Growth Area goals

ORCA card: One Regional Card for All is the Puget Sound’s version of a “SmartCard” a plastic card with an embedded computer chip that will serve as fare media for Sound Transit, King County Metro, Washington State Ferries, Community Transit, Everett Transit, Pierce Transit, and Kitsap Transit. Implementation of the card has been tested and is awaiting final approval to begin operations.¹⁰

⁷ WSDOT website: <http://www.wsdot.wa.gov/ferries/cameras/>

⁸ WSDOT website: <http://www.wsdot.wa.gov/TDM/TRPP/>

⁹ WSDOT website: <http://apps.leg.wa.gov/WAC/default.aspx?cite=468-63-030>

¹⁰ <http://soctech.cs.washington.edu/wiki/ORCA/ORCA> and <http://www.kitsaptransit.org/OrcaFactSheet.html>

III. Operational and Pricing Strategies to Consider

In this section, each research area is presented with the following descriptions:

- Definition: explains the concept and its general intent or why it typically gets implemented (the “what?” and “why?”)
- Examples and Effectiveness: gives a few examples of a concept’s application and outcomes. (The level of detail is general and brief, focused on “who?” “where?” and “how?”.)
- Considerations for Ferry Implementation: assesses the concepts using some preliminary criteria to assist decision makers in selecting the most interesting concepts for further study.

Congestion pricing

Definition: Also referred to as “value pricing” this means the application of a toll, fee or tax for access to transportation facilities during set hours (usually peak travel periods) with the intent of using the price to limit the demand. The intent of redistributing traffic away from the most congested periods is what distinguishes congestion pricing from general tolling. (Tolling can be implemented to create, even maximize, revenues, or to manage congestion. Different pricing strategies are used to realize each goal.) As a means of managing traffic, congestion pricing has three general applications:

- Area-wide - meaning that access is tolled to an entire downtown or activity center area
- Corridor - meaning that access is tolled along a facility such as a bridge or freeway that connects an activity center or downtown to a commute shed
- Specific lanes – meaning that only certain lanes on a bridge or freeway are tolled (this includes High Occupancy Toll, or “HOT” lanes)

Examples and Effectiveness:

- Area-wide :
 - London: Since 2003 drivers have been charged 8 pounds per entry into Central London (transit vehicles, ADA vehicles, motorcycles and taxis are exempt, residents receive a discounted rate.) Congestion pricing was implemented as a means of reducing traffic in

the city's core, thereby creating a more walkable environment. The fee is assessed all day and every day by mounted cameras photographing vehicle license plates and a license plate recognition database.¹¹

RESULT: There has been a 22% decrease in entering traffic and a 30% increase in transit ridership.

- Singapore: Since 1975 drivers have been assessed a flat fee to enter into central Singapore during peak periods. Congestion pricing was implemented to reduce traffic and the need for parking in the city's central area. The program started with the morning peak and eventually expanded to morning and evening peak and most of Saturdays. (Transit, motorcycles, cabs and 4+ carpools are exempt all day.) Means of collection began manually and then progressed to ERP (a transponder).¹²

RESULT: When it was first implemented, traffic decreased in the central region by 44%. With each additional tolled period, traffic decreased a minimum of 25%.

- Stockholm: Since its successful demonstration in 2006 and successful vote in 2007, taxes have been imposed on vehicles entering central Stockholm on weekends. The program was initiated as a demonstration program to measure the potential reduction of traffic and the improvement in air quality. Video cameras and a license plate recognition database charges each owner a fee per entry (the rate varies by time of day). Owners may settle their accounts on-line or at kiosks located throughout the city.¹³

RESULT: There has been a 20-25% decrease in vehicle traffic during tolled periods, and a 6% increase in transit use.

- Corridor

- Toronto: Since its construction, drivers on SR 407 have been tolled by transponder and license plate recognition cameras and databases. Tolls have been charged on this facility since its construction as a means of managing traffic. Drivers pay their accounts monthly. Before 2002, the fee was variable, increasing to its highest point during peak

¹¹ Transit Cooperative Research Program. "Chapter 14: Road Value Pricing" AND "Scanning Tour"

¹² Transit Cooperative Research Program. "Chapter 14: Road Value Pricing"

¹³ Ibid.

periods. Since 2002, the fee has been a flat rate all day every day, with a surcharge imposed for drivers with no transponder¹⁴.

RESULT: Since the change to the flat rate, there has been a 30% decline in vehicle traffic.

- Port Authority of New York and New Jersey: Since 2001, drivers have been assessed a toll to utilize bridges and tunnels owned by the Port Authority at a rate that varies by both time of day and by means of collection. The new pricing scheme was implemented as a means of better managing traffic, giving drivers an incentive to drive during off-peak periods. Cash paying drivers are charged \$6 all day. EZ Pass (transponder) users are charged \$5 during the peak period and \$4 during the off-peak period.¹⁵

RESULT: There has been a 7% reduction in the morning peak and a 4% reduction in the evening peak. There has also been an increase in EZ Pass users.

- Specific lanes

- SR 167: In Spring of 2008, the existing HOV lane on SR 167 in King County will be converted to a HOT lane. Tolls will vary by level of congestion, and will be collected via electronic transponder. This will be a demonstration project to determine the feasibility to of tolling as a means of traffic management in the Seattle region.¹⁶

RESULT: To be determined

- I-394 Minneapolis: Since 2005, the HOV lane on I-394 in Minneapolis has been converted to a HOT lane with tolls that vary by level of congestion (\$1 to \$4 generally with a maximum charge of \$8.) 2+ carpools, transit and motorcycles are exempt. The lane was converted to a HOT lane as a means of better managing traffic.¹⁷

RESULT: Vehicle throughput in the corridor has increased 5% since the system's inception.

¹⁴ Ibid.

¹⁵ Transit Cooperative Research Program. "Chapter 14: Road Value Pricing"

¹⁶ WSDOT website. SR 167 Project page.

¹⁷ Munnich and Buckeye

- SR 91 Orange County: Since 1995 drivers have been tolled on SR 91 at published rates that vary by time of day and day of week (generally between \$1 and \$4.75.) Congestion pricing was implemented as a means of better managing corridor traffic. 3+ carpools receive a discount and a subscription service discount is available for those who use the lanes over 25 times a month. Tolls are collected by electronic transponder.¹⁸

RESULT: The tolled lanes handle 33% of corridor traffic (up from 14% before the tolls were imposed.) There has also been a 40% increase in carpools and vanpools in the corridor.

- Other Notable Applications:

- Kennedy Airport, New York City: In late 2007, as a means of avoiding the summer delays that result from heavy summer travel, the USDOT proposed auctioning peak summer slots at Kennedy Airport to avoid delays of previous years.¹⁹

RESULT: Ultimately, the Air Transport Association refused the idea of congestion pricing and the idea was dropped. The ATA claimed that congestion pricing has been proven to fail when applied to aviation, and the airlines prefer the approach of capping the number of flights that has been applied to La Guardia and Reagan Washington National.

- Tappan Zee Bridge, New York: In 1997, as a means of improving traffic flow and reducing congestion, the Tappan Zee Bridge performed a demonstration project involving freight vehicles only. Cash-paying trucks utilizing the bridge during peak periods were charged double the regular toll. Trucks with transponders and trucks using the bridge during off-peak periods were exempt from the surcharge²⁰.

RESULT: Unfortunately results were negligible because outreach and education was lacking (trucking company management didn't know of the demonstration project until after it had already scheduled its trucks for delivery.) An exit survey at the conclusion of the project revealed that if management had known it would have purchased transponders and/or scheduled the trucks differently.

¹⁸ Transit Cooperative Research Program. Chapter 14: Road Value Pricing

¹⁹ Conkey, December 11, 2007

²⁰ Transit Cooperative Research Program. Chapter 14: Road Value Pricing

Considerations for Ferry Implementation

Assessment Question	YES/NO
Encourages passenger mode shift?	YES
Reduces negative land side impacts?	YES
Encourages higher off-peak vessel utilization?	YES
Improves convenience and attractiveness to customers?	NO
Requires capital outlay?	NO
Requires additional operating budget?	NO
Potential for revenue generation?	YES
Potential for alternative funding measures/public-private partnerships?	YES
Systemwide breadth of impact?	YES

WSF could implement congestion pricing in the following role(s):

Service provider	X	Employer		Community partner	
------------------	---	----------	--	-------------------	--

Pricing Notes:

Pricing strategies generally focus on either imposing a surcharge (price increase) or offering an incentive (price decrease). Congestion pricing examples are classified by their pricing strategy in the table below.

	Example	Details
Examples of Price Increase	London	Flat rate all day
	Singapore	Flat rate all day
	Stockholm	Entry taxed on weekends; price fluctuates by time of day (higher during demonstrated peak periods)
	Toronto	Surcharge for peak periods and additional surcharge for cash payment
	Minneapolis	Price increases as congestion increases
	New York	Surcharge for peak periods; additional surcharge for cash payment
Examples of Price Decrease	Port Authority of NY and NJ	Discount for EZ pass users Discount for off-peak use
	Orange County	Discount for subscription users; discount for carpools

In the case of transit, fare increases typically result in fare elasticity of about .33: for every fare increase of 10%, system ridership will drop by 3.3%²¹. However, the elasticity also varies by type of service, by size of service area, and by time of day.

- Peak hour fares are less elastic than off-peak fares.
- Fares in smaller areas are more elastic than fares in larger areas.
- Bus fares are more elastic than rail fares.

²¹ Gardner

Alternate Revenue Sources

Because fare increases are political, and often problematic, many transit properties consider other options for increasing revenue before they impose a price increase²². These may include:

- New fare programs
 - To employers: In 1991, the Regional Transportation District (RTD) in Denver, Colorado introduced the EcoPass, a program that invited employers to purchase tax-deductible annual farecards to offer their employees as a pre-tax employee benefit. To participate in the program, employers were required to buy farecards for all their employees whether or not the employees used transit. Participation exceeded RTD's forecasts, transit ridership increased, and RTD has had few employers drop out, even after prices increase.²³
 - To tourists: The SkyTrain system in Bangkok was experiencing ridership levels 1/3 lower than forecast levels. It launched a major campaign including new (higher) tourist fares and fare media (a day pass), special information and maps, and improved signage and advertising. In four years, tourist ridership increased from 3,000/day to 45,000/day.²⁴
 - To shoppers: Downtown businesses in Iowa City, IA participate in "Park and Shop" and "Bus and Shop" programs: for every \$15 purchase, customers receive a parking validation or a transit pass. Merchants settle up with the agency at the end of each month for the cost of the fares and/or parking; merchants also pay the advertising costs of the marketing campaign²⁵.
- Parking revenue
- Advertising revenue
 - In May of 2007, Los Angeles MTA made \$146,000 off of one McDonald's ad campaign in Union Station alone²⁶.

²²Gardner

²³ Transit Cooperative Research Program "Cases on Revenue Generated by Public Transit Agencies"

²⁴ Anderson

²⁵ Transit Cooperative Research Program "Cases on Revenue Generated by Public Transit Agencies"

²⁶ "Los Angeles MTA Goes Commercial"

- Transit oriented development and/or joint development projects
 - In fifteen years, joint development generated over \$150 million for WMATA²⁷.
- Innovative financing
 - “Tax advantaged leases, diesel fuel swaps and strategic borrowing and refinancing have generated over \$100 million for WMATA²⁸”.

²⁷ Gardner

²⁸ Ibid.

Reservation systems

Definition: Capability of transferring demand management to passengers, as Internet-hosted computer systems allow passengers to reserve their travel slot (at the time and price of their choice).

Examples and Effectiveness

- Passenger airline examples:

- For the sake of customer convenience and cost-savings, Southwest Airlines was the first airline to host their own website with ticket-booking capability in 1996²⁹.

RESULT: In the third quarter of 2007, 74% of SWA bookings were made on-line using its own website. In June of 2007, 69% of passengers checked in on-line or at a kiosk.

- Southwest has also launched SWABIZ, a service that allows business clients to plan, purchase and track business travel on-line³⁰.

RESULT: Enrollments continue to rise; they increased by 23% in 2006.

- American Airlines developed the Semi Automatic Business Research Environment (SABRE), a computerized passenger booking program internal to American, in 1964³¹. As other airlines developed their own software and computerized bookings through travel agencies became more and more common, the need developed for a common software that would work across airlines and be accessible by external users (such as passengers wanting to book their own tickets.) SABRE software was eventually used to start Travelocity, an on-line booking website for American Airlines as well as four other major carriers. In 1999, Travelocity had grown to be the world's largest on-line booking website with sales over \$808 million.³²

RESULT: SABRE became so profitable in not only selling on-line booking software but also consulting to and outsourcing services for other airlines, hotels and rental car

²⁹ Southwest Airlines Fact Sheet AND Zellner

³⁰ Southwest Airlines Fact Sheet

³¹ McDonald

³² Naim

companies that in March of 2000 American Airlines spun off SABRE as its own independent business, but remained its largest client. In 1999, SABRE's total revenues were \$2.4 billion.

- As of September 25, 2007 Transportation Security Administration (TSA) is considering reservations for passenger screening times to reduce passenger wait times at security checkpoints³³.

RESULT: *To be determined*

- Freight and cargo examples:

- In 2005, to offer more convenience to shippers, and to incur less cost from erroneous orders or argumentative clients, DHL cargo services introduced Import Express Online. Users can specify all instructions for their shipments including terms of sale, pickup schedule and amount of insurance desired. Shipment status can be accessed on demand or retrieved from automatic status notifications via email³⁴.

RESULT: A survey of over 500 shippers conducted by Business Week concluded that "40 percent of respondents are booking more than a quarter of their shipments electronically. They expect to substantially increase this with a full 60 percent expecting to be doing the majority of their bookings electronically by mid-2005."³⁵ In addition, "three-quarters of the respondents said that the ability to book shipments through the Web is very important and 87 percent said that it is important or very important for them to be able to see and manage their bookings online."

- In 2007, to update their cargo services, offer more convenience to customers and streamline their own operations, Southwest Airlines introduced on-line cargo booking services that allow shippers to book shipments over the Internet instead of delivering their goods to a Southwest warehouse facility first³⁶.

RESULT: To be determined.

³³ Frank

³⁴ Seemuth

³⁵ "Freight Forwarders Responses"

³⁶ Ibid.

- Bus example
 - GoToBus.com started as the “Chinatown Bus,” a low cost inter-city bus service to help connect people to jobs. It kept costs down by using on-line reservations to organize routes.³⁷

RESULT: GoToBus.com and has been so successful that it has expanded to other parts of the country as well as into tour services.

- Other examples for consideration
 - To regulate crowds at the most popular rides at its theme parks, and to allow an option for bypassing long queues, Disney launched the FastPass system. Patrons visit a kiosk to draw advance tickets for popular rides (the kiosk regulates the number of patrons per advance ride time in increments of 15 minutes. FastPass holders have their own line and priority boarding)³⁸.

RESULT: FastPass has been popular enough that Disney is now considering a text message or cell phone application to allow patrons to book remotely.

³⁷ McClure

³⁸ Powers

Considerations for Ferry Implementation

Assessment Question	YES/NO
Encourages passenger mode shift?	NO
Reduces negative land side impacts?	YES
Encourages higher off-peak vessel utilization?	YES
Improves convenience and attractiveness to customers?	YES
Requires capital outlay?	YES
Requires additional operating budget?	YES
Potential for revenue generation?	YES
Potential for alternative funding measures/public-private partnerships?	YES
Systemwide breadth of impact?	YES

WSF could implement congestion pricing in the following role(s):

Service provider	X	Employer	X	Community partner	
------------------	---	----------	---	-------------------	--

Parking management

Definition: The attempt to limit the need for parking capacity in the most congested locations travel periods. (For WSF this applies both to the queuing that results from unmet passenger vehicle demand, but also to WSF employee parking which is currently offered “on-dock” in the ferry staging areas.) The following examples have been selected to be applied to WSF as follows:

- For ferry patrons:
 - Remote parking: providing the means to park away from the activity center, and to distribute parking demand over a wider area and more facilities.
 - Preferential parking based on vehicle type and/or occupancy: making access to some or all parking available to drivers on a conditional basis.
 - Shared parking: providing the means to utilize parking spaces for more than one purpose or land use.
 - Vehicle valet service: providing the service whereby for a fee, drivers leave their cars with a third party service that will park them and then retrieve them at the appointed time.
- For ferry employees
 - Employer –driven parking reduction programs: utilizing financial incentives, disincentives or service provisions to encourage employees to use alternative modes to single occupant vehicle travel.

Examples and Effectiveness

- Remote parking:
 - In Denver, Colorado, to facilitate employee travel to and from the airport and to offer transit patrons a direct connection, the Regional Transportation District (RTD) offers non-stop bus connections to the airport from select park-and-Ride lots. SkyRide bus service costs \$7, \$9 or \$11 each way to and from the airport, depending on the park-and-Ride lot served, but there is no parking charge at the park-n-Ride lots. However, EcoPasses, or employer-sponsored transit passes, are also applicable to SkyRide routes making it a free service for airport employees.

RESULT: In 2006, SkyRide served an average of over 19 boardings per hour³⁹.

- From 2002-2004, to provide commuters an option to downtown parking prices and to solve a parking shortage, the Downtown Business Partnership of Baltimore began funding a Downtown Area Shuttle (DASH) that circulated through downtown destinations from the Ravens Stadium. Patrons paid \$50 per month to park in any of the 1200 stadium lots; carpools paid \$20 per month⁴⁰. Shuttle service is free to those who use monthly parking and \$0.50 a ride to those using it as a circulator service downtown. After 2004, (and the termination of the 3-year federal grant) the service was cancelled both due to funding shortage and due to the 4500 additional parking spaces that got built downtown⁴¹.

RESULT: Over 725 commuters utilized the DASH commuter service.

- In 1992, “to encourage urban development in downtown Chattanooga while limiting congestion and air pollution, the Chattanooga Area Regional Transit Authority (CARTA) developed a strategy to provide peripheral parking and a free shuttle service. . . The two parking garages Shuttle Park South (550 spaces) and Shuttle Park North (650 spaces), are owned by CARTA and operated privately. The free shuttle buses are financed through the garages’ parking revenues.⁴²”

RESULT: Between 1992 and 1998, over 1 million riders were served, and over \$400 million was spent on development in Chattanooga, including the aquarium, over 100 retail shops and over 60 restaurants.

- Preferential parking based on vehicle type and/or occupancy: In 1977, to reduce the need for parking, the Pentagon offered guaranteed parking for carpools.

RESULT: 10,000 parking spaces were available. 4960 carpool passes were distributed.

- Shared parking:

³⁹ Regional Transportation District Service Development Archive, 2006 Family of Services Tables and Charts

⁴⁰ Zimbler

⁴¹ Fieser

⁴² Parking Spaces Community Places: Finding the Balance through Smart Growth Solutions

- In 1994, the Lloyd District in Portland (an area across the river from downtown that includes land uses such as the convention center and the Rose Garden Arena) started a Transportation Management Association, a non-profit business association of large and small employers. The goal was to reduce the parking demand and better manage area traffic using improvements and programs funded by member support, City of Portland funds and grants. Through its partnership with city, the TMA manages parking supply including on-street parking. It was re-designated to carpool only, 5-hour parking, etc. The TMA and City share revenues, which are used to fund more transportation demand management programs⁴³.

RESULT: Through its promotion of transit, parking management, ride share programs, and other travel demand management programming, the Lloyd District achieved a drive-alone rate of only 42% in 2005⁴⁴.

- In 2006, the 65-acre Commons PUD in Denver, CO established a 63-20 corporation to own and manage parking within the PUD. The 63-20 corporation will build the parking facilities and contract out the operations and maintenance to a parking district. The parking district will be comprised of property owners and will direct the parking revenues to pay debts to the 63-20 and to finance TDM programs. A 63-20 Corporation is a private, not-for-profit corporation created for the purpose of financing public improvements on behalf of a political subdivision⁴⁵.

RESULTS: The mode split will be assessed as area develops; there is already a mode split of 55% on alternate modes to Downtown Denver.

- Metropolitan Place TOD across the street from Renton Transit Center includes a 2-story parking garage (240 spaces) with 4,000sf of ground level retail space and 90 apartments above.

RESULTS: 150 building spaces are used as park and ride spaces. The residential parking stall use is .6 per unit⁴⁶.

⁴³ Lloyd District TMA website

⁴⁴ Lloyd TMA Annual Report 2006

⁴⁵ Boulder Village Area Plan: Parking Management Case Studies

⁴⁶ Ibid.

- Vehicle valet services

- The City of Pasadena utilizes a “Universal Valet service” downtown that enables drivers to leave their car at the valet stand of their choice, and request a pick up time and place (valet stand) of their choice. The cost is \$7 with a validation and \$10 without one.⁴⁷

RESULT: *Utilization information pending*

- Employer-driven parking reduction programs

- In 1992, California enacted “parking cash out” legislation that allowed employers to pay employees either as an incentive to encourage use of alternative transportation modes or in lieu of providing them parking.

RESULT: A study of eight Southern California employers performed after the legislation by TCRP found that an average subsidy of \$2 per employee per month reduced the need for employee parking by 12%⁴⁸.

- From 1993 to the present, to encourage the use of alternate modes of travel, San Diego Savings and Trust Bank has paid employees 125% the cost of monthly parking.

RESULT: 37% of their employees carpool and 14% use transit⁴⁹.

- In 1990, to encourage the use of alternate modes of travel, Ventura County Government, rather than offering direct payment, has allowed employees to earn cash prizes through accruing points. Points are awarded each day an employee doesn’t drive.

RESULT: In the first 5 months, the County's vehicle trips decreased by 13 percent, with only 69 percent of employees driving alone⁵⁰.

⁴⁷ City of Pasadena website: <http://www.oldpasadena.org/info.asp>

⁴⁸ TCRP. Chapter 13: Parking Pricing and Fees

⁴⁹ Comsis Corporation.

⁵⁰ Ibid.

Considerations for Ferry Implementation

Assessment Question	YES/NO
Encourages passenger mode shift?	YES
Reduces negative land side impacts?	YES
Encourages higher off-peak vessel utilization?	NO
Improves convenience and attractiveness to customers?	NO
Requires capital outlay?	NO
Requires additional operating budget?	NO
Potential for revenue generation?	YES
Potential for alternative funding measures/public-private partnerships?	YES
Systemwide breadth of impact?	NO

WSF could implement congestion pricing in the following role(s):

Service provider	X	Employer	X	Community partner	X
------------------	---	----------	---	-------------------	---

Transit marketing

Definition: The promotion of public transportation services by public agencies with the intent of encouraging more ridership. For the purposes of this report, there are four categories of transit marketing that will be covered:

- Mass market promotions: focused on increasing ridership or knowledge of a particular route or service by distributing a high volume of materials rather than delivering materials to select audiences or rider groups.
- Mass market promotions with incentives: mass market promotions that offer participating riders a gift or reward for their ridership.
- Targeted information: focused on increasing ridership by advertising a specific goal, service or route or advertising in a specific geographic area.
- One on One promotions: encouraging ridership by offering the services of someone who will act as a guide throughout the transit system.

Examples and Effectiveness:

- In general the following trends apply to the effectiveness of transit and alternative modes marketing⁵¹):
 - Providing information only does not decrease vehicle trips but does result in smaller increases.
 - Providing both information and access to alternative modes (such as vanpool programs) can reduce vehicle trips by an average of 8.5%.
 - Programs that focus on financial incentives or disincentives to using alternative modes can reduce vehicle trips by an average of 16.4%.
 - Employers that combine both access to alternative modes (such as vanpools) with financial incentives or disincentives can decrease vehicle trips by an average of 24.5%.

⁵¹ Commuter Choice Primer

- Mass market promotions (the following examples involve marketing a new phone-in automated route information service to encourage its use⁵²):

- In the 1980's the Central Ohio Transit Authority (Cleveland) advertised using a "door drop" of printed information about the service onto people's front doors in neighborhoods across the city.

RESULT: After the door drop calls to the new service increased by 400%.

- In 1990, the Hamilton Street Railway in Ontario Canada advertised using TV commercials, phone directory ads and flyers.

RESULT: After the campaign calls to the new service doubled.

- In 1995, Calgary advertised using a "wrapped" bus (a bus covered with advertisement material), radio and newspaper ads.

RESULT: During the promotion, calls to the new service increased 26%.

- Mass market promotions with incentives⁵³:

- In the mid-1980's to increase awareness and use of the transit system, Pembroke County Transit started a "Try Transit Week" that included a \$0.25 ride day and free rides given to special needs riders such as elderly and disabled. The week also included special public events and campaigns.

RESULT: During the week, ridership increased by 35%. After that week, ridership remained 30% higher than before, and continued at a higher level for three years.

- Beginning in 1997, to increase public awareness, Houston METRO held a "Try Transit Week" event where unlimited ride passes were made available for \$5 during that week.

RESULT: Each year ridership has increased over the previous year's.

⁵² TCRP. Chapter 11: Transit Information and Promotion

⁵³ Ibid.

- Targeted information

- In 1993, the Hamilton Street Railway in Ontario, Canada wanted to increase ridership on relatively new routes. They printed ride coupons and mailed them directly to residents within ¾ mile of the routes they wanted to promote⁵⁴.

RESULT: Ridership on the targeted routes increased by 50%.

- In 1995, to increase awareness about a new service instituted along I-94, the Metropolitan Transit Development Board in San Diego mailed new service and safety program information to residents located within the I-94 corridor with a free round-trip ticket⁵⁵.

RESULT: The ticket redemption rate was 22% and ridership on the route increased by 5%.

- In 1996, the Central Ohio Transit Authority wanted to increase ridership on its special event routes (especially during sports game days). They mailed a postcard advertising the service to all residents within ¼ mile of the route⁵⁶.

RESULT: As a result game day ridership increased by 46% and revenue increased by 77%.

- In 2006, Arlington Rapid Transit in Arlington, VA started advertising to teens to increase transit ridership among teenagers. They printed t-shirts, Frisbees and started a website dedicated to the program⁵⁷.

RESULT: The program was successful in capturing teen attention and participation and is seeking permanent funding.

⁵⁴ TCRP. Chapter 11: Transit Pricing and Information

⁵⁵ Ibid.

⁵⁶ Ibid.

⁵⁷ Markon

- One-on-One promotions:
 - In Portland, Oregon, to increase awareness and transit ridership, Tri-Met experimented with a telemarketing program, where each telemarketer would speak personally to each person he called and offer them transit information and free-ride coupons⁵⁸.

RESULT: 85% of those contacted accepted the offer and 20% kept riding transit after the promotion.

Considerations for Ferry Implementation

Assessment Question	YES/NO
Encourages passenger mode shift?	YES
Reduces negative land side impacts?	YES
Encourages higher off-peak vessel utilization?	NO
Improves convenience and attractiveness to customers?	NO
Requires capital outlay?	NO
Requires additional operating budget?	NO
Potential for revenue generation?	NO
Potential for alternative funding measures/public-private partnerships?	YES
Systemwide breadth of impact?	NO

WSF could implement congestion pricing in the following role(s):

Service provider		Employer		Community partner	X
------------------	--	----------	--	-------------------	---

⁵⁸ TCRP. Chapter 11: Transit Pricing and Information

Car sharing

Definition: Programs typically run by commercial businesses that allow members access to a fleet of vehicles on an as-needed basis. Vehicle fleets of varying sizes may be dispersed throughout a metropolitan area in downtown areas, office buildings, dense neighborhoods, or shopping districts. Typically members call or book on-line to reserve a pick-up time and a duration of use. National brands of car sharing companies include Seattle-based Flexcar and Boston-based Zipcar (though the two companies announced a merger in October of 2007.)

Examples and Effectiveness

- Local Examples:
 - Flexcar began a car-sharing business in the Seattle area in 1998 as a joint venture with King County to encourage the use of alternate modes of travel.

RESULT: In October 2005, the Association of Washington Business presented Flexcar with an award for, among other accomplishments, “removing over 7,000 cars from the road in King County alone since its inception.”⁵⁹

In October of 2006, Flexcar and King County announced a Job Access program at White Center, whereby King County Metro would utilize Flexcar to supplement Metro Transit service. “In an average month more than 1,300 trips are taken by Job Access participants.”⁶⁰
 - National Examples:
 - In January 2007, Flexcar reported 30,000 participants nationally. Zipcar reported 80,000 members⁶¹.

RESULT: Surveys of car-sharing participants indicated that between 11% and 26% of participants sold a personal vehicle and between 12% and 68% delayed the purchase of a vehicle. They also indicate that each car-sharing vehicle removes between 6 and 23 vehicles from the road⁶².

⁵⁹ Williams, October 20, 2005

⁶⁰ Williams, October 9, 2006

⁶¹ Hodges

⁶² Shaheen

In September of 2006, Flexcar and Zipcar both received over \$21 million in private capital to fund expansion plans⁶³.

- Three companies compete for car-sharing business in San Francisco: Flexcar, Zipcar and City CarShare (a local non-profit).

RESULT: In January 2007 in San Francisco, there are 13,000 car-sharing participants, 4,000 of whom joined in the 2006⁶⁴.

- Flexcar and Zipcar started university campus pilots programs in 2002.

RESULT: In September of 2007, 70 colleges and universities participated in car-sharing programs nationwide⁶⁵.

⁶³ Goo

⁶⁴ Cabanatuan

⁶⁵ Bruno

Considerations for Ferry Implementation

Assessment Question	YES/NO
Encourages passenger mode shift?	YES
Reduces negative land side impacts?	YES
Encourages higher off-peak vessel utilization?	NO
Improves convenience and attractiveness to customers?	YES
Requires capital outlay?	NO
Requires additional operating budget?	NO
Potential for revenue generation?	NO
Potential for alternative funding measures/public-private partnerships?	YES
Systemwide breadth of impact?	YES

WSF could implement congestion pricing in the following role(s):

Service provider	X	Employer		Community partner	X
------------------	---	----------	--	-------------------	---

Intelligent Transportation Systems (ITS)

Definition: ITS utilizes advanced communications technology to provide real-time information about the operational condition of transportation infrastructure and services. It is the technological means to assess and manage conditions within the transportation system. As such, it has been applied to transit and highway systems, utilized to estimate travel time information, relied on to track the location of transit vehicles, utilized to monitor and manage traffic signal systems, and used to provide signal pre-emption to emergency vehicles. It also provides the technological means to collect tolls and to vary toll levels by level of congestion. This document summarizes some successful applications of the following forms of ITS:

- Advanced Traveler Information Systems
 - 511 Programs
- Parking Management
- Fare Collection

Examples and Effectiveness

- Advanced Traveler Information Systems
 - Local examples
 - From 1993-1997, WSDOT participated in a field operations test of ITS technology that included camera coverage and VMS signs at the Edmonds Ferry Terminal in 1999.

RESULT: In the final report submitted in 1998, WSDOT claimed its success as defined by the improved efficiencies of monitoring by camera, rather than by drive-by queue length counts, and the utilization of the WSF website by passengers checking terminal conditions before beginning their trip. Terminal condition information was made available to the public through freeway and arterial-based variable messaging signs (VMS) and on-line⁶⁶.
 - In 1996, WSDOT and other partners in the Seattle region formed a partnership known as Smart Trek to participate in the ITS Metropolitan Model Deployment Initiative (MMDI). They offered services including a new WSDOT website with links to real-time traffic information, King County Metro Online (a transit route planning feature), Traffic TV, Transit Watch (real-time transit arrival and

⁶⁶ Wetherby

departure information at transit centers) and Fastline (a subscriber service for real-time traffic information sent to portable handheld devices⁶⁷).

RESULT: The WSDOT website has been maintained and is rated as one of the top ten websites for advanced traveler information services in the nation.

- 511 Systems: On July 21, 2000, the Federal Communications Commission designated “511” as the national traveler information number. The general goal behind the 511 service is to provide travelers with timely information to allow them to make informed travel decisions and to avoid compounding delays caused by incidents and peak hour traffic. The following examples illustrate how states, regions and localities have utilized it.
 - San Francisco Bay Area uses voice recognition technology and a series of menus to connect callers with transit, vanpool, carpool, and highway information. It also provides a call transfer to a regional or local rideshare operator⁶⁸.
 - I-81 Region in Virginia provides callers the option of listening to tourist information including lodging, restaurants and “things to do” in the 35 county coverage area. This system uses voice recognition for the queries and is fully automated using both text to speech and recorded messages⁶⁹.
 - iFlorida offers travel times on all of the limited access highways and most of the major arterials in Central Florida and current weather information and time-slice (starting and ending time) forecasts for defined road segments. Projected conditions from 15 minutes to two or three days out are provided for each identified roadway segment⁷⁰.

⁶⁷ Metropolitan Model Deployment Initiative

⁶⁸ 511 America’s Traveler Information Number

⁶⁹ Ibid.

⁷⁰ Ibid.

- Arizona DOT improved its 511 system in 2003 to include touchtone and voice recognition options for use, road-segment information, transit information, "quick report" congestion and incident summaries, a 2-minute recorded message option for airport information, statewide coverage, and call transfer options to airports, the Arizona Office of Tourism, and all of Arizona's rural/regional transit operators.

RESULT: Usage increased from approximately 20,000 calls per month to 60,000 calls per month. (A week-long promotion by DMS signs spiked calls to over 150,000.)⁷¹

- Parking Management

- In 2001-2002 Acadia National Park (located on Mount Desert Island in Maine) introduced a comprehensive ITS program with the intent to decrease their need for parking facilities, to better manage traffic around the island, and to improve air quality. The ITS programming included real-time parking information, "next bus" technology to complement the new island circulator/shuttle, and a traveler information system which counted and summarized all the data received and relayed it to travelers over the web, the telephone and the parking display signs⁷².

RESULT: Of visitors using the parking information, 43% changed the time they visited a destination and 38% changed destinations based on the information.

44% of the users of the real time parking information said it helped them decide to use the Island Explorer bus.

The average number of excess parked vehicles per day fell from 325 in 2001 to 274 in 2002 even though total number of visitors to the Park grew.

⁷¹ Battelle Memorial Institute and University of Arizona

⁷² Zimmerman, Coleman, Daigle

- From 2004-2006, to better manage traffic around park and rides, Bay Area Rapid Transit (BART) started a reservation program at specific park and ride lots where drivers could reserve a parking space on-line or on the phone through voice recognition technology.

RESULT: The program was successful enough that it has been continued indefinitely. Part of its success was in attracting new riders: 45% of those surveyed who utilized the service said they had never ridden BART before the service was available⁷³.

- WMATA offers a reserved parking program that it hosts on its website. Customers pay a monthly premium of \$45 to be sent a hanging “reserved” car tag each month which allows them to access the lot and be guaranteed a space until 10am, when the lot is made available to the general public. Reservations patrons are also charged a daily exit fee. (SmarTrip cards must be used to exit the facility.)

RESULT: 5,000 users (about 10% of the daily park and ride volume) utilize the reservations service⁷⁴.

- Private parking providers have also entered the market using ITS.

RESULT:

Mobile Parking LLC owns 400 parking facilities in 50 cities across the U.S. Service, and sells parking spaces by reservation. Drivers call a toll-free number from their cellular telephones to check parking availability in their city. After the driver provides the operator with his or her final destination, the operator directs the driver to the closest available space. The first reservation is free. Additional reservations cost \$1.75 each. At some of Mobile Parking’s partner garages, customers can also pay the parking fee itself through Mobile Parking⁷⁵.

Spot Scout sells parking spaces either online or through Web-enabled cellular telephones. A text message is sent to the driver’s cell phone with a confirmation code

⁷³ Shaheen

⁷⁴ Smartcard Alliance. “Smartcards and Parking.”

⁷⁵ Advanced Parking Management Systems

and directions to the facility. SpotScout™ also allows users to sell their personal parking spaces to other motorists for short-term use⁷⁶.

- Electronic Fare Collection (The following are examples of SmartCard technology: cards containing computer chips that track expenditures and act like credit cards, automatically deducting the price of access to a service from the account balance at each time of use.)
 - In 1999, the Washington Metropolitan Area Transit Authority became the first transit agency in the United States to utilize SmartCard technology with the goal of making travel on the system more convenient for passengers. The SmarTrip card could be used on any METRO service (bus and rail) and for access and payment at park and ride lots.

RESULT: Within five years over 650,000 SmarTrip cards were in circulation⁷⁷.

The popularity of the SmarTrip card is such that CitiBank is partnering with WMATA to offer a combined SmarTrip and credit card: a credit card that rewards users for using it on METRO (5% credit for the first five months) with the same touch and go technology at METRO stations as the SmarTrip card.⁷⁸

- In 1997, Hong Kong introduced the “Octopus card.” Patrons can utilize it at parking meters, on all transit services (bus, rail and ferry), at selected shops and retail centers, selected vending machines, phone booths and photos booths.

RESULT: Over 7 million transactions per day are recorded on Octopus cards, representing a daily value of over \$6.5 million⁷⁹.

“While Octopus cards are anonymous by default, over 500,000 personalized cards have been issued and are used for the Octopus Automatic Add-Value Service. Twelve Hong Kong banks and one credit card company support the automatic add-value service. Because each personalized card has a unique identification number, up to 40,000 cards

⁷⁶ Ibid.

⁷⁷ Smartcard Alliance “Washington Metropolitan Area Transit Authority SmarTrip”

⁷⁸ <http://www.wmata.com/riding/smartrip.cfm#combo>

⁷⁹ Smartcard Alliance “Hong Kong Octopus Card”

are also being used as security passes at housing estates, for staff identification cards, and as loyalty cards.”⁸⁰

⁸⁰ Ibid.

Considerations for Ferry Implementation

Assessment Question	YES/NO
Encourages passenger mode shift?	NO
Reduces negative land side impacts?	YES
Encourages higher off-peak vessel utilization?	YES
Improves convenience and attractiveness to customers?	YES
Requires capital outlay?	YES
Requires additional operating budget?	YES
Potential for revenue generation?	YES
Potential for alternative funding measures/public-private partnerships?	YES
Systemwide breadth of impact?	YES

WSF could implement congestion pricing in the following role(s):

Service provider	X	Employer		Community partner	X
------------------	---	----------	--	-------------------	---

IV. Operational Strategies in Action: Ferry System Applications

There are several international examples of the strategies that WSF is considering being put into practice by ferry systems seeking to make their services both more efficient and more attractive to customers. This chapter will provide current examples of the following kinds of strategies being utilized:

- Reservations systems
- Mode shift strategies
- Ticketing operations

Reservations Systems

Several ferry systems offer reservations for specific sailings by phone, e-mail or on-line. Generally, the policy is that at the time of reservation the full sailing fare is charged (plus, in the case of Cape May-Lewes ferries, an additional reservations fee.) The fare is considered non-refundable, though all systems offer changes in reservations or their use as stand-by in case the reserved sailing time is missed. All systems require that vehicles arrive at least 20-30 minutes ahead of their sailing time, or their reservation is considered cancelled. (Their fare may still be accepted on other sailings as space is available, but the missed reservation means the loss of guaranteed and priority loading on other sailings.)

- Northumberland Ferries, serving Prince Edward Island in Eastern Canada, offers the NOW Pass and the NOW Assured Pass, both different applications of pre-paid reservations⁸¹.
 - The NOW Pass is issued at the time of reservation, or a confirmation number is given in the case of phone-in reservations. It is non-refundable, can be used on other sailings, space permitting, is good for up to a year, and limited to vehicles under 20-feet in length.
 - The NOW Assured Pass can be purchased from ferry offices or other participating locations and may be used for guaranteed access onto any sailing as long as the vehicle arrives at least 20 minutes ahead of the sailing time. The pass is good for up to one year, and is also limited to vehicles less than 20 feet in length.
- BC Ferries in western Canada offers “RBI” (Reserved Boarding on the Internet) as well as reservations by phone and e-mail for some routes in their system, though they are required on specific northern routes⁸². Reservations are non-refundable, but can be changed for a fee. Discounts are given for booking at least two weeks in advance.

⁸¹ Northumberland Ferries website.

⁸² BC Ferries website.

- Cape May-Lewes Ferries in New Jersey sells reservations on-line and by phone, and advertises selling up to 100% by reservations: "required for guaranteed sailing time." A non-refundable booking fee is also applied at the time reservations are made, though the ticket price is transferable to a different sailing.⁸³
- Fjord 1⁸⁴, a ferry operator in Western Norway, is also a collective of transport companies including bus tours, railroads and car ferries. It offers on-line registration for any of its modes once customers have registered on its website.
- North Carolina DOT⁸⁵ offers reservations on a few routes only, and they can only be made by calling the departure terminal. Vehicles must arrive at least 30 minutes prior to loading or reservations are cancelled.
- The Steamship Authority⁸⁶ serving Martha's Vineyard, Woods Hole and Nantucket offers reservations on-line or by phone. Unused reservations may be used up to a day after the reserved sailing as space is available, but priority loading is no longer applicable. Reservations may be changed or cancelled, and fully refunded, with at least two hours notice ahead of the reserved sailing time.

Mode Shift Strategies

Ferry systems across the world are trying a variety of ways to make car-free travel more possible and attractive.

- Cape May Lewes ferries operates its own shuttles, which have differing seasonal and weekend hours and frequencies, from ferry terminals into towns and points of interest.
- IDO⁸⁷, the ferry operator in Istanbul, offers free fares to passengers arriving at terminals using ground or rail transport services.
- Fjord 1 offers reservations on all their modes of transport services, as previously noted, but they also offer automated route planning with travel distance and travel time noted by mode.
- Fosen Trafikklag⁸⁸, the ferry operator around Trondheim Fjord in Norway, offers free fares to walk-ons and to car passengers. This is a new program that started with a pilot project. Despite

⁸³ Cape May-Lewes Ferries website.

⁸⁴ Fjord1 website.

⁸⁵ NCDOT Ferries website.

⁸⁶ The Steamship Authority website.

⁸⁷ IDO Company 2006 Annual Report.

⁸⁸ Fosen Trafikklag website.

the fact that more people took advantage of the new program, the operator did not lose revenue.

Ticketing Operations

Simplifying or expediting the ticketing process saves time and expense for ferry operators and improves the customer experience. Utilizing a reservation system aids in ticketing by managing the demand for each sailing, and making ticket sales accessible to customers on their own schedules through the use of computer technology. Simplifying the fare structure by offering free fares to walk-ons, as they do around Trondheim in Norway, also helps expedite the ticket process by requiring fewer passengers to be processed by ferry staff, and by simplifying vehicle transactions. All vehicles can be ticketed using the same process instead of having to account for number of passengers. The following examples serve to illustrate additional means of improving the ticketing process:

- Cape May-Lewes⁸⁹ offers a discount on return-fare passage if the return sailing is booked at the same time as the crossing reservation.
- IDO is beginning the use of thermal tickets with barcodes to replace conventional tickets as a means of expediting the ticket process. In addition, the IDO ferries already utilize camera technology to scan vehicle license plates and match them with license plate databases⁹⁰.
- The Steamship Authority issues a Fast Ferry ID to registered customers that can be used and referred to when purchasing tickets, making reservations or using a coupon from the 10-ride ticket book⁹¹.

⁸⁹ Cape May-Lewes Ferries website.

⁹⁰ IDO Company 2006 Annual Report.

⁹¹ The Steamship Authority website.

V. Summary of Findings

Traveler mode shifts and time shifts can be accomplished in a variety of ways, and most effectively by combining a mix of services with a mix of financial incentives or disincentives (i.e. a mix of “carrots” and “sticks”). In addition, several strategies can accomplish multiple goals at the same time. Congestion pricing, for example, both decreases traffic in peak periods and increases transit ridership and/or ridesharing in every example. However, in both London and Singapore, it was also implemented along with an increase in transit service that travelers could utilize. The following table presents the strategies whose implementations in other places are best suited to meeting WSF goals.

Strategy	General Effects	Meets WSF Goals		
		Increase Operational Efficiencies	Time Shift	Mode Shift
Congestion pricing	Reduces traffic during higher priced periods Increases transit ridership Shifts demand to off peak periods	X	X	X
Passenger reservations	Reduces queuing Reduces customer /employee confrontation Manages demand (some forced to off peak periods) Increases vendor competition	X	X	
Shared parking	Increases ridesharing Increases transit use	X		X
Remote parking	Decreases activity center traffic Increases transit use	X		X
Car sharing	Decreases personal vehicle use and/or purchase			X

Meets WSF Goals				
Strategy	General Effects	Increase Operational Efficiencies	Time Shift	Mode Shift
ITS: Advance Traveler Information Systems	Customer appreciation Increases interest in fee-based services Increases use of other promoted facilities and services	X	X	
ITS: Electronic fare collection	Reduces ticketing time Reduces or removes cost of toll booth or meter upkeep Increases revenues	X		

VI. Bibliography

Research Focus and Legislative Direction

Goldenberg, Joy. "Washington State Ferries Operational Strategies: Situation Assessment," Washington State Ferries, December 10, 2007 (memorandum)

Goldenberg, Joy. "Washington State Ferries Pricing Strategies: Situation Assessment," Washington State Ferries, December 10, 2007 (memorandum)

House Committee on Transportation, "Engrossed Substitute House Bill 2358." March 5, 2007.

House Committee on Transportation, "ESHB 2358 Work Plan." August, 2007. (Memorandum)

Existing WSDOT Travel Demand Programming

Washington Administrative Code 468-300-020. Vehicle under 20', motorcycle, and stowage ferry tolls. Effective May 1, 2007. Accessed January 31, 2008. <<http://apps.leg.wa.gov/WAC/default.aspx?cite=468-300-020>.

WSDOT website (accessed December 17, 2007):

- Good To Go <http://www.wsdot.wa.gov/GoodToGo/about.htm>
- Vanpool, RideShare On-Line, Park and Ride Lots <http://www.wsdot.wa.gov/tdm>
- Puget Sound Traffic Flow Map <http://www.wsdot.wa.gov/Traffic/Seattle/>
- On-line Ferry Terminal Cameras <http://www.wsdot.wa.gov/ferries/cameras/>
- Trip Reduction Performance Program <http://www.wsdot.wa.gov/TDM/TRPP/>
- Commute Trip Reduction <http://www.wsdot.wa.gov/tdm/ctr> and <http://apps.leg.wa.gov/WAC/default.aspx?cite=468-63-030>
- ORCA card <http://soctech.cs.washington.edu/wiki/ORCA/ORCA> and <http://www.kitsaptransit.org/OrcaFactSheet.html>

Operational and Pricing Strategies to Consider

Congestion Pricing

Anderson, Paul. "Initiatives Boost Metro Ridership and Revenue." *International Railway Journal*. June 2005. 24-26

Conkey, Christopher. "Airlines Seem to Foil Congestion Pricing." *Wall Street Journal*, Dec 11, 2007. B.15

Gardner, Michele. "Managing Your Money: Putting a 'Price' on Fare Change." *Mass Transit*. February/March 2005. 24-28

"Los Angeles MTA Goes Commercial." *Mass Transit*. May 2007. 71

Munnich, Lee W. Jr., and Kenneth R. Buckeye. "I-394 MnPASS High-Occupancy Toll Lanes Planning and Operational Issues and Outcomes (Lessons Learned in Year 1)." *Transportation Research Record: Journal of the Transportation Research Board*, No. 1996. Transportation Research Board, Washington, D.C., 2007. pp. 49–57

Scanning Tour Summary Report Pricing Experience in Northern Europe: Lessons Learned and the Applicability to Minnesota and the United States. Minneapolis, State and Local Policy Program, Humphrey Institute of Public Affairs, University of Minnesota, October 2006.

Transit Cooperative Research Program. "Cases on Revenue Generated by Transit Agencies." Report 31, Volume 2: Funding Strategies for Public Transportation. Washington DC, Transportation Research Board, 1998.

Transit Cooperative Research Program. "Chapter 14: Road Value Pricing." Report 95: Traveler Response to Transportation System Changes. Washington DC, Transportation Research Board, 2003.

WSDOT website. SR 167 Project page. December 7, 2007.
<<http://www.wsdot.wa.gov/Projects/SR167/HOTLanes/>>

Other Sources Consulted

Conkey, Christopher. "Plan to Unclog New York Airports Is a Mixed Bag; Big Airlines Are Victors As Peak Flights Capped; Will That Do the Job?" *Wall Street Journal*, Dec 20, 2007. D.8

Reservation Systems

Frank, Thomas. "Officials consider reservations for airport security; TSA could emulate restaurant system to reduce lines." USA Today. September 25, 2007. A.5

"Freight Forwarders' Responses to Second "Chicken & Egg Survey" Indicate That More Airlines Need to Join Electronic Portals." Business Wire. August 30, 2004.

GoToBus.com website. December 17, 2007. < <http://www.gotobus.com/>>

McClure, Rosemary. "Chinatown bus' service makes inroads." Los Angeles Times. May 20, 2007. L.6

McDonald, Michele. "Selling Seats." Air Transport World. Summer 2004 68

Naim, Geoff. "Spin-off will help improve image of airline IT company." Financial Times. May 17, 2000. 04

Powers, Mike. "Disney's FastPass entering digital era." Orlando Sentinel. September 6, 2007. A1

Seemuth, Mike. "Booking for Profit." Air Cargo World. Newark, Nov 1, 2007.

Southwest Airlines Fact Sheet. January 22, 2008.

<http://www.southwest.com/about_swa/press/factsheet.html>

Zellner, Wendy. "The Trick to Selling Airline Tickets Online? Minimalism." Business Week. September 18, 2000.

Other Sources Consulted

Jensen, Denis. "Less Hassle, More Perks." Sales and Marketing Management. Jun 2004. 53

Parking management

Boulder Village Area Plan: Parking Management Case Studies. UrbanTrans Consultants, January 2006. January 23, 2008. <http://www.ci.boulder.co.us/files/PDS/Transit%20Village/btv_parking_management_case_studies_1.pdf>

City of Pasadena website. January 23, 2008. <<http://www.oldpasadena.org/info.asp>>

Commuter Choice Primer: An Employer's Guide to Implementing Effective Commuter Choice Programs. FTA/FHWA/EPA. December 17, 2008.
<http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_PR/13669.html>

Comsis Corporation Implementing Effective Travel Demand Management Measures: Inventory of Measures and Synthesis of Experience. USDOT and Institute of Transportation Engineers, 1993. December 17, 2007 <<http://www.bts.gov/ntl/DOCS/474.html>>

Fieser, Ezra. "Baltimore's downtown commuters parking shuttle ending." Baltimore Daily Record. December 8, 2004.

Lloyd District TMA website. January 23, 2008. <<http://www.lloydtma.com/carpool.htm>>

Lloyd TMA Annual Report 2006. January 23, 2008.
<http://www.lloydtma.com/pdf%20files/2006%20Annual%20Report%20Final%20w_Cover.pdf>

Parking Spaces Community Places: Finding the Balance through Smart Growth Solutions. Environmental Protection Agency, Washington DC, January 2006. January 23, 2008.
<<http://www.epa.gov/smartgrowth/pdf/EPAParkingSpaces06.pdf>>

Regional Transportation District Service Development Archive, 2006 Family of Services Tables and Charts. January 23, 2008. <http://www.rtd-denver.com/Service/Performance/Documents/Performance_2006_Complete.pdf>

Shaheen, Susan and Charlene Kemmerer. Smart Parking Linked to Transit: Lessons Learned from the San Francisco Bay Area Field Test. Transportation Sustainability Research Center, University of California, Berkeley. November 15, 2007.

Transit Cooperative Research Program. "Chapter 13: Parking Pricing and Fees." Report 95: Traveler Response to Transportation System Changes. Transportation Research Board, Washington, DC, 2003.

Zimble, Robin. Driving Urban Environments: Smart Growth Parking Best Practices. Governor's Office of Smart Growth, Annapolis, MD, January 23, 2008.
<<http://www.smartgrowth.state.md.us/pdf/Final%20Parking%20Paper.pdf>>

Other Sources Consulted

Aegean Ferry Services website. December 17, 2007. <<http://ferries-turkey.com/turkey-domestic/ist-ces-bod-faq-en.html#q14>>

Moore, Linda A. "Vehicle Valet: Business Cashes in on Time Saver." The Commercial Appeal. May 1, 2004. C.1

Nelson-Nygaard. Glendale Downtown Mobility Study. March, 2007.

Nelson-Nygaard. City of Pasadena Traffic Reduction Strategies Study Draft Report. November 2006.

TDM Case Studies and Commuter Testimonials. Transportation Demand Management Institute of the Association for Commuter Transportation. December 17, 2007.
<<http://ntl.bts.gov/lib/4000/4300/4377/tmcsct.pdf>>

Transit Cooperative Research Program. "Chapter 18: Parking Management and Supply." Report 95: Traveler Response to Transportation System Changes. Transportation Research Board, Washington, DC, 2003.

Transit Marketing

Commuter Choice Primer: An Employer's Guide to Implementing Effective Commuter Choice Programs. FTA/FHWA/EPA. December 17, 2007.
<http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_PR/13669.html>

Markon, Jerry. "County Steers Teens Toward Public Transit; Initiative Aims to Reduce Reliance on Cars" The Washington Post. Oct 26, 2006. AAVE.3

Transit Cooperative Research Program. "Chapter 11: Transit Information and Promotion." Report 95: Traveler Response to Transportation System Changes. Transportation Research Board, Washington, DC, 2003.

Other Sources Consulted

Payne, Paul. "Free Trips Boost Ridership." The Press Democrat. December 28, 2006. B2

Transit Cooperative Research Program. "Chapter 12: Transit Pricing and Fares." Report 95: Traveler Response to Transportation System Changes. Transportation Research Board, Washington, DC, 2003.

Car Sharing

Bruno, Laura. "Car Sharing Gains Steam on Campuses." USA Today. September 19, 2007.

Cabanatuan, Michael. "Car-sharing catching on with Bay Area drivers: Firms provide autos for those who don't want hassle of ownership." San Francisco Chronicle. January 22, 2007.

Goo, Sara Kehaulani. "Businesses and Universities Help Drive Growth of Flexcar, Zipcar." The Washington Post. September 5, 2006. D01

Hodges, Jane. "Wheels on Demand for City Dwellers." January 11, 2007.

<http://online.wsj.com/article_email/SB116848391939473381-lMyQjAxMDE3NjE4MTQxODEzWj.html>

Shaheen, Susan A., Adam P. Cohen and J. Darius Roberts. "Car Sharing in North America: Market Growth, Current Developments and Future Potential." Transportation Research Record: Journal of the Transportation Research Board. No. 1966. Transportation Research Board of the National Academies. Washington, DC 2006. P. 116-124.

John Williams. "Flexcar wins Environmental Excellence Award from Association of Washington Business." Flexcar Press Release. October 20, 2005.

John Williams. "Flexcar and King County team up to make transportation affordable in White Center." Flexcar Press Release. October 9, 2006.

Other Sources Consulted

"Zipcar strikes deal with Equity Residential." Boston Business Journal. Friday, July 27, 2007

Intelligent Transportation Systems

ITS Lessons Learned. January 15, 2008.< <http://www.itslessons.its.dot.gov/>>:

- 511 America's Travel Information Number: Implementation and Operational Guidelines for Service. Version 2.0 511 Deployment Coalition: September 2003
- Advanced Parking Management Systems: A Cross-Cutting Study. FHWA, January 2007.
- Battelle Memorial Institute and University of Arizona. Model Deployment of a Regional Multi-modal 511 Traveler Information System Final Report. Arizona Department of Transportation and USDOT. September 30, 2005.
- Metropolitan Model Deployment Initiative: Seattle Evaluation Report Final Draft. USDOT, May 2000.

- Transit Cooperative Research Program Report 92: Strategies for Improved Traveler Information. Transportation Research Board. Washington DC, 2003.
- Wetherby, Bruce. Seattle Wide-area Information For Travelers: Institutional Issues Study. WSDOT, 1998.
- Zimmerman, Carol A., Thomas G. Coleman, and John Daigle. Evaluation of Acadia National Park ITS Field Operational Test: Final Report. ITS Joint Program Office, July 2003.

Smart Card Alliance. "Smart Cards and Parking." January 2006. January 24, 2008. <<http://www.smartcardalliance.org/pages/smart-cards-applications-transportation#smart-cards-and-transit>>

Smart Card Alliance. "Hong Kong Octopus Card." 2005. January 24, 2008. <<http://www.smartcardalliance.org/pages/smart-cards-applications-transportation#smart-cards-and-transit>>

Smart Card Alliance. "Washington Metropolitan Area Transit Authority SmarTrip." 2005. January 24, 2008. <<http://www.smartcardalliance.org/pages/smart-cards-applications-transportation#smart-cards-and-transit>>

WMATA SmarTrip website. January 24, 2008. <<http://www.wmata.com/riding/smartrip.cfm#combo>>

Other Sources Consulted

Conrad L. Dude ed. Compendium: Papers on Advanced Surface Transportation Systems. Texas Transportation Institute, Texas A&M University. August 2004.

IBI Group and Cambridge Systematics. Washington State Comprehensive Tolling Study Background Paper #8: Toll Technology Considerations, Opportunities and Risks. January 2006.

Kopf, Jaime, M., Jennifer Nee, John M. Ishimaru, and Mark E. Hallenbeck. ATIS Evaluation Framework. Washington State Transportation Center, University of Washington, May 2005.

Operational Strategies in Action: Ferry System Applications

BC Ferries website. February 19, 2008. <<http://www.bcferrries.com>>

Cape May-Lewes Ferries website. February 19, 2008. <<http://www.capemaylewesferry.com/reserv/reservations.html>>

Fjord1 website. February 19, 2008. < <http://www.fjord1.no/en/>>

Fosen Trafikklag website. February 19, 2008. <<http://www.fosen.no>>

IDO Companies 2006 Annual Report. Istanbul Fast Ferries and Istanbul Metropolitan Municipality (IDO) website. February 19, 2008.
<<http://www.ido.com.tr/en/index.cfm?page=SubPage&textid=1287&kapsam=264&ln=en>>

North Carolina Department of Transportation Ferries website. February 19, 2008.
<<http://www.ncdot.org/transit/ferry/>>

Northumberland Ferries website. February 19, 2008. < http://www.peiferry.com/index_english.php>

The Steamship Authority website. February 19, 2008. < <http://web3.steamshipauthority.com/ssa/>>