

# 2014



**Washington State  
Department of Transportation**



## **JOINT TOLL AND FERRY CSC FEASIBILITY STUDY**

**FINAL January 30, 2014**

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# Executive Summary

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This report was prepared in response to the 2013 Washington State Legislature's ESSB 5024 directing the Washington State Department of Transportation (WSDOT) to study the feasibility of a single account-based system for toll road and ferry users. Specifically the study evaluated:

1. Ferry fare payment with *Good To Go!* pass and single customer account for ferries and tolls
2. Combined customer services for ferries and tolls
3. Integrated ferry reservation system and tolls back office system

Additionally the study includes initial considerations regarding the concept of integrating *Good To Go!* as a payment method for parking at the Sea-Tac International Airport, given the similar nature of this type of integration.

The recommendations in this report are influenced by the fact that both the Ferry Division (WSF) ticketing system and the Toll Division customer service center will either be near the end of its life cycle or at the end of its contract term in 2018. After considering current and future toll and ferry operations, this report presents the following recommendations:

1. Ferry fare payment with a *Good To Go!* pass is feasible and should be implemented;
2. WSDOT should begin immediately to develop policies for integrating a single customer account system for its ferry and toll customers; and
3. WSF and the Toll Division should immediately begin work to replace their back office systems with a single, unified system that can handle ferries ticketing and reservations, tolls, and future transportation applications.

Additional analysis and planning is needed to fully define an integration strategy and detailed schedule.

## Ferry Fare Payment with *Good To Go!*

This report includes the preliminary analysis of several alternatives for implementing *Good To Go!* as a ferry payment option. The study team recommends mounting toll antennas directly on existing ferry booths to minimize capital costs and still meet technical performance requirements.

Ferry fare payment with a *Good To Go!* pass will require new business rules and accounting changes to minimize risk of leakage in revenue collections and to appropriately account for revenues and costs. The study team reviewed these elements, did not find any fatal flaws, and identified high-level concepts.

To deploy the *Good To Go!* payment system additional planning and design is required. However, adding this payment method would provide an increased customer convenience as well as a more unified WSDOT user fee payment approach. Complete integration would require the transition to a single back office with the back-end discounting necessary to replace the popular front-end ferry ticket discounting such as the multi-ride card.

## Single Account for Ferries and Tolls

There are many opportunities for efficiencies by integrating various aspects of the ferries and toll customer and account systems at this time. The current ferries ticketing system needs to be replaced for a variety of reasons and the Toll Division is considering replacement of the existing toll customer back office system. The tentative timeline for the Toll Division to commence operations on a new back office system is July 2018. Ferries staff believes a new ticketing system should be considered for



implementation by 2018, consistent with the 2012 Fare Media Study. Further integration opportunities exist as well in deploying *Good To Go!* as a payment method for parking at Sea-Tac airport.

This study recommends that WSDOT plan for a single customer account system to support both ferries and tolls, and have the capacity to support other payment applications.

### **Customer Services Integration**

The customer service call centers for ferries and tolls are drastically different in the functions they serve. Staff at the *Good To Go!* call center provide account services (opening, closing and updating accounts), answer questions and address disputes regarding toll bills, process payments, and support adjudication. In contrast, the WSF call center provides a wide array of travel services to people seeking information on ferry schedules, trip planning, services for people with disabilities, fares, alerts and emergencies, terminal parking availability and reservations. The ferries call center is an integral part of ferry operations and is co-located with the ferries operations watch center. In emergencies or other disruptions in service, the ferries call center works closely with Watch Center staff to inform all affected parties. Commensurate with the higher level of skill and responsibility, the pay scales are very different. For these reasons, the study team recommends integration of the toll and ferries phone system as part of the 2018 system integration. It is further recommended that staffing of the customer service centers remain separate and distinct, but that basic cross-training be deployed.

### **Reservations**

The study also includes a review of the current ferries reservation system. Much like the customer account integration, the study team recommends integrating the reservations system with the tolls back office in 2018. The reservation system is integrated with the ferry ticketing system. Since both the ferries and tolls back office systems are nearing the end of their life cycle, waiting to add this functionality would be more cost effective.

### **Advanced Implementation**

WSDOT could advance the implementation of *Good To Go!* as a ferry fare payment method at six terminals by separating the work from the single integrated customer account system and deploying in two phases. This would be the quickest way to deploy and deliver *Good To Go!* as a ferry fare payment method where *Good To Go!* is more widely used by the end of 2016. Customers could pay ferry fares with *Good To Go!* passes for approximately two years before launching the single customer account system. Chapter 7 discusses the advanced implementation concept.



Inside this report you will find the following:

- **Chapter 1**, Introduction, describes the study purpose and context including the previous studies and research on this topic.
- **Chapter 2**, Existing Toll Operations, describes existing conditions.
- **Chapter 3**, Existing Ferry Operations, describes existing conditions.
- **Chapter 4**, *Good To Go!* as a Ferry Payment Method, describes adding *Good To Go!* as a payment method for ferries and describes changes to WSF and *Good To Go!* back office systems to form a single-account system, which would support the *Good To Go!* payment method as well as ferry reservations in the longer term. Recommendations are made to migrate the WSF discount system (e.g. multi-ride cards) to a back-end discount system.
- **Chapter 5**, Customer Service Functions, describes current customer service operations for Toll and Ferries Divisions. It lays out alternatives for combining Toll and Ferry customer service units, including qualitative benefits and costs.
- **Chapter 6**, Vehicle Reservations, describes the potential transitioning the Ferries reservation system to the Statewide Customer Service Center.
- **Chapter 7**, Advanced Implementation, describes the requirements, costs and schedule for implementing *Good To Go!* using a phased approach.
- **Chapter 8**, *Good To Go!* as a Parking Payment Method, describes the potential for *Good To Go!* to be used at the Sea-Tac airport for customer parking.

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# Chapter 1 – Introduction

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## Study Purpose

In 2013 the Legislature passed budget proviso ESSB 5024 requiring WSDOT to study the feasibility of a single account-based system for toll road and ferry users. This study considered and evaluated the feasibility for using a *Good To Go!* pass with ferry operations; the ability to service a single account for toll roads and ferry users as well as for other transportation purposes such as Port of Seattle parking; and a customer service center that meets the needs of ferry and toll road operations. In addition, the study evaluated the feasibility of integration with the ferry reservation system.

The main focus of this study was to evaluate opportunities for increased integration of the WSDOT Ferries and Toll Divisions while incorporating lessons learned.

## Previous Studies

This section reviews previous studies related to a single-account system and *Good To Go!* for ferry payment. The previous work was reviewed and considered as part of the study analyses.

### **Joint Transportation Committee Study of the Washington State Ferry Fares (2012)**

The 2011 Legislature funded a Joint Transportation Committee (JTC) study of the Washington State Ferry (WSF) fares that recommends the most appropriate fare media for use with the reservation system and the implementation of demand management pricing and interoperability with other payment methods. The study was overseen by a Policy Work Group which included legislators, Washington State Transportation Commissioners, representatives from the Governor's Office and WSF, and a public representative.

The Fare Media Study identified 10 main recommendations which primarily focused aligning the fares to be equitable with other routes and developing a per foot charge for vehicles. In addition, the Fare Media Study recommended using *Good To Go!* as a form of payment to provide more customer convenience, and to replace the existing ferries ticketing system, also known as Wave2Go or Gateway.

### **Fare Media Study Updates (2013)**

As a follow-up to the Fare Media Study, in early 2013, WSF hired IBI Group (IBI) to perform further analysis. The work included a peer review to assess other ferry operations, worldwide, and to better understand how they were using new technologies to efficiently operate. IBI found that there wasn't an industry standard and that WSF was at the leading edge for many of its operations.

Within the same study, IBI reviewed software vendors currently offering a fully integrated ticketing and reservations system, along with other critical features needed at WSF, to determine if there were off-the-shelf options available to meet WSF's needs.

In mid-2013 IBI completed a study to outline a technical concept for integration with *Good To Go!*. The study provided an initial technical concept for phased implementation of *Good To Go!* as a form of

payment reflecting recommendations from the Fare Media Study with minimal modification to the existing Wave2Go system.

## Research

### Washington State Transportation Commission Survey (2011)

In a 2011 Washington State Transportation Commission Ferry Survey, customers were asked how important it is that WSF allow customers to combine all their fare products on one card or account. The results, as shown in Table 1-1, indicate that WSF customers would be very likely to use a combined WSF account and many believe it is an important fare media option.

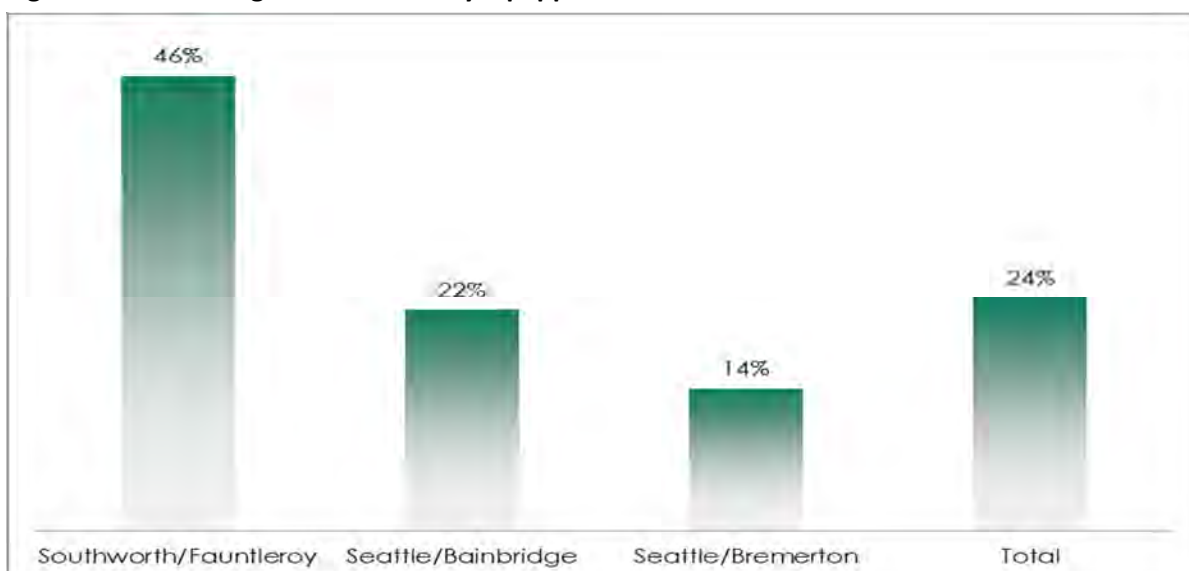
**Table 1-1: WSF Account-Based System**

If WSF offered one account/card to pay for all ferry travel:		
Region	People somewhat or very likely to participate	People who think this is somewhat or very important
South Sound	71%	56%
San Juan Islands	66%	45%
North Sound	62%	43%
Central Sound	61%	45%

### Good To Go! Pass Study (2013)

As part of a *Good To Go!* pass study, WSDOT evaluated ferry riders use of *Good To Go!* The purpose of the study was to determine the proportion of ferry riders whose cars are already equipped with *Good To Go!* passes, with results highlighted in Figure 1-1 and complete study results in Appendix E.

**Figure 1-1: Percentage of Cars on Ferry Equipped with a *Good To Go!* Pass**



## Chapter 2 – Current Toll Operations

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### Toll Program Overview

WSDOT currently operates three toll facilities: the SR 16 Tacoma Narrows Bridge, the SR 520 Bridge, and the SR 167 HOT lanes. When tolling began on the Tacoma Narrows Bridge in 2007, it was a standalone turnkey operation which processed 13 million transactions generating \$30 million in revenue. In 2008, WSDOT opened the SR 167 High-Occupancy Toll (HOT) Lanes Pilot Project, which converted existing SR 167 High-Occupancy Vehicle (HOV) lanes to HOT Lanes. In 2011, WSDOT started pre-completion tolling on the SR 520 Bridge. In FY 2013, the Toll Division handled 35 million transactions with revenue of \$115 million for these three facilities.

Additionally, WSDOT is working on several toll projects at various stages of development. Express toll lanes (also known as HOT lanes) are being built on I-405 between Bellevue and Lynnwood and scheduled to open in 2015. The deep bored tunnel that will replace SR 99 through downtown Seattle will be tolled when it opens to traffic in 2016. The SR 167 HOT lanes will be extended further south by several miles in 2017. By FY 2017, if all authorized toll facilities are operational it is projected that the division will process 65 million transactions with \$190 million in revenue.

WSDOT leverages private sector resources with an integrated team of consultants and vendors. WSDOT has a single vendor that operates the Statewide Customer Service Center for all current and future toll facilities. Additionally WSDOT has contracted with a new statewide toll system vendor to supply, install, operate and maintain future toll systems.

### Toll Division Payment Methods and Rates

#### Account Establishment

Frequent customers are encouraged to open a *Good To Go!* account. Customers are required to deposit at least \$30.00 and are able to set up auto-charge through a bank account or credit card to replenish their account when it reaches a low balance threshold. The most accurate and lowest cost method for customers to pay tolls on WSDOT toll roads is with a *Good To Go!* pass (transponder). Passes are a small, radio frequency device mounted on a vehicle's windshield or license plate to identify each vehicle and match customers to their toll account. Customers can purchase a pass and open an account through several venues: in person at one of three walk-in centers (Seattle, Bellevue, and Gig Harbor), by phone, online, or by fax or mail. Passes are also available for purchase at several local retailers; customers still need to set up and fund an account after buying the pass. *Good to Go!* customers with a personal pass account can have up to six vehicles on a single account.

A *Good To Go!* pass is not required for account holders. Customers who do not want to purchase a pass can open a "Pay By Plate" account and register each vehicle's license plate. Vehicles that use Pay By Plate are charged the posted *Good To Go!* Pass Account toll rate plus a 25-cent fee per toll transaction.

## Infrequent User Payment Options

Although most customers pay their tolls using a *Good To Go!* account, there are two additional payment options available to toll users on Tacoma Narrows Bridge and SR 520, “Pay By Mail” and “Short Term Accounts”.

For vehicles without a pass, the registered owner will receive a bill in the mail. Alternatively drivers can set up a “Short Term Account”, which is valid for up to 14 days and then it automatically closes. Drivers have up to 72 hours after traveling a tolled facility to set up a Short Term Account and pay 50-cents less than the Pay By Mail toll rate. Tolls are charged directly to a debit or credit card.

Additionally on Tacoma Narrows Bridge only, drivers can stop and pay the toll with cash or credit card at one of the manual toll booths, the current toll rate is \$1.00 more than the *Good To Go!* pass rate.

## Commercial Accounts

For commercial and fleet customers, *Good To Go!* offers a commercial account option allowing an unlimited number of vehicles on the account, rather than the six-vehicle limit on personal accounts. Commercial accounts require a pre-paid account, and also offer replenishment and auto-charge methods.

## Account Validation and Replenishment

*Good To Go!* accounts remain valid with a positive balance. For customers who have signed up for auto-replenishment, once the account balance reaches the established minimum (currently \$8), the account is auto-replenished, to the minimum pre-paid balance (currently \$30). For customers who do not have auto-replenishment established, their *Good To Go!* account will continue to post tolls until the pre-paid balance is exhausted. If the *Good To Go!* account balance goes negative, the customers will receive a bill in the mail at a higher toll rate. The customer will continue to be billed via Pay By Mail until they replenish their *Good To Go!* account.

## Rate Structure

Tolls are established in Washington Administrative Code by the Washington State Transportation Commission (WSTC), and are set by toll facility. Toll structures vary:

- Managed lanes (for example SR 167 HOT Lanes): WSTC has established a minimum and maximum toll and tolls are dynamic and automatically calculated based on real-time traffic conditions.
- Other toll facilities (for example SR 520): Tolls may change by time of day on a set schedule, with higher tolls assigned to vehicles with more axles.
- Toll Rates and Fees: WSTC sets rates for *Good To Go!* pass and Pay By Mail transactions. Fees, discounts and exemptions are also set by the WSTC.

Toll rates are evaluated by the WSTC annually or as often as necessary to ensure that traffic management and revenue goals are being met, and that adjustments are made as necessary.

## Toll Collection on the Roadway

WSDOT has deployed open-road tolling on each of the existing toll facilities allowing customers to pay tolls using an established *Good To Go!* account and vehicle mounted pass. These transactions occur at

highway speeds when customers drive through the toll points. Each toll site requires the necessary power and communications connections and pass reading equipment. On SR 520 and Tacoma Narrows Bridge, special camera systems have also been installed at toll points so that customers can pay their toll via a picture of their license plate using Pay By Plate, Pay By Mail or a Short Term Account, previously described. WSDOT's manual toll booths on Tacoma Narrows Bridge are staffed by a third-party vendor.

Distinguishing features of open-road tolling are:

- Highly redundant equipment, which ensures that toll systems can continue collecting tolls even if one or more pieces of equipment fail;
- Sensitive high-speed equipment that can collect tolls from vehicles traveling at posted highway speeds;
- Vehicle classification performed by in-pavement detectors in order to assess the correct toll;
- Extremely high performance requirements, which ensure that very few vehicles pass through without detection;
- Robust, hardened equipment that can survive roadside conditions typical to the region.

## Revenue Deposit and Reconciliation

### Revenue Deposit

When a *Good To Go!* customer establishes an account or adds to their pre-paid balance, the funds are collected in a central toll account. As customers drive on tolled facilities and toll transactions are posted to their accounts, funds in the amount of each toll are transferred from the central toll account to the specific fund for each tolled facility. For example, when a customer incurs a \$5 toll on SR 520, the SR 520 fund receives \$5 in revenue.

### Transaction Reconciliation

When the current *Good To Go!* back office was developed, WSDOT established toll transaction reconciliation procedures. These procedures were designed to account for funds processed as toll transactions, received at the back office, posted to customer accounts, and processed through the WSDOT TRAINS accounting system.

## Vendors and Systems

### Statewide Customer Service Center

In December 2009, WSDOT awarded the Statewide Customer Service Center to Electronic Transaction Consultants Corporation (ETCC). This was structured as a "services only contract" that required ETCC to provide the staff, systems, facilities, and supplies necessary to operate and maintain the Statewide CSC in accordance with WSDOT business rules and requirements. The Statewide CSC provides the customer interface for WSDOT toll customers. All customer interactions are handled by the Statewide CSC call center, website, and walk-in centers. In addition, the CSC manages customer accounts, processes all electronic toll transactions, performs image review, interfaces with the Department of Licensing for license plate look-ups to identify the registered owner of vehicles without a *Good To Go!* account, processes Pay By Mail invoices if users are not *Good To Go!* customers, produces violation notices, and processes customer payments. Furthermore, the Statewide CSC provides adjudication support and

facilities necessary to pursue non-payment of tolls. The initial term of the contract expires June 30, 2014, the contract allows up to two, two-year extensions. A new procurement for a back office vendor is expected to commence if funding is made available in 2014 with the new back office vendor operations starting in July, 2018.

### **Statewide Roadside Toll System**

With several toll projects underway, in June of 2012 WSDOT contracted with Telvent to supply, install, operate, and maintain three toll systems:

- I-405 Express Toll Lanes (scheduled opening mid to late 2015)
- SR 99 Tunnel Toll System (scheduled opening 2016)
- SR 520 Replacement Bridge Toll System (scheduled opening fall 2016)

In addition, the contract allows for up to four additional toll systems to be added to the contract.

## **Toll Customer Service Operations**

As of the end of 2013, there were approximately 453,000 *Good To Go!* accounts and 800,000 active passes. The toll customer service call center answers an average of 61,000 calls per month, with average wait times of 40 seconds and average call length of 5 minutes. Most of the calls to the customer service center are related to account inquiries or billing questions.

### **Staffing (positions, numbers, bargaining units)**

The *Good To Go!* customer service center is staffed by approximately 50 customer service representatives (CSR), about 30 of these are dedicated to the call center. The CSRs are employees of the vendor and are not represented by a union.

### **Location and Good To Go! pass sales**

*Good To Go!* customer services operate one call center and three walk-in centers. The walk-in centers are located in Seattle (University District), Bellevue, and Gig Harbor. The call center is co-located with the Seattle walk-in center.

Passes can also be purchased at select Fred Meyer, Walgreens, and QFC locations. In order for their new pass to work, customers must activate their pass and account with *Good To Go!* if purchased from a retailer.

### **Hours of Operation**

Automated phone and online services are available 24/7 and customer service representatives are available by phone Monday through Friday from 8 a.m. to 5 p.m. and Saturday from 9 a.m. to 1 p.m.

Walk-in centers are open Monday through Friday from 8 a.m. to 5 p.m., Saturday from 9 a.m. to 1 p.m. and closed on Sundays and Washington state holidays.



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### **CSC Vendor Cost Allocation**

The contract cost with ETCC for *Good To Go!* for customer and account services is based on increments of active toll accounts. This is not a traditional cost structure for such toll services, and is expected to change with the future procurement for *Good To Go!* customer services.

## Chapter 3 – Current Ferry Operations

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### Ferries Division Overview

WSDOT operates the largest ferry system in the United States, with 22 ferries, 20 terminals and 10 routes reaching from Tacoma at the south end of Puget Sound to Sidney, British Columbia. Washington State Ferries was created in 1951 and today carries more than 22.5 million riders per year.

### Ferries Division Payment Methods and Fares

WSF uses three forms of fare media: Wave2Go, ORCA, and WSF commercial accounts. Commercial accounts are specific to freight and other commercial customers and are separate from Wave2Go.

#### Wave2Go

Wave2Go includes point of sale devices at seller booths, kiosks and internet services for direct purchase of WSF fares, and links to the ferry accounting systems. The system provides single ride cards, multi-ride cards, monthly passes, and revalue cards for full fare passengers. System limitations and issues include the complex fare determination process, and software and supplier support complications.

#### One Regional Card for All (ORCA)

ORCA is the regional smart-card product used by seven Puget Sound region transit agencies including WSF. WSF accepts ORCA for full fares, monthly passes, and for employer purchases of monthly passes. ORCA is not accepted for multi-ride cards, although the ORCA system has the ability to store multi-ride products on regional smart cards.

#### Commercial Accounts

WSF currently offers its commercial customers the opportunity to sign up for a commercial business account, which allows companies to have all their vehicles pay for WSF passage by charging back to a single account. Individual employees carry a charge card that is processed at the time of travel, and includes the company's name and account number. The commercial account system tracks the travel of each business account and bills the firm at the end of the month for all ferry usage.

### Fare Structure

Consistent with toll rates, ferry fares are also set by the WSTC. As described below and shown in Table 3-1, the fare structure is based on three guiding principles, to which additional discounts and surcharges are added, and further modified by one-point or two-point fare collection.

### ***Base Fare Guiding Principles***

- **The CUBE policy.** Under the CUBE policy, all measures of vehicle size – height, length, and width – are valued equally so users are charged equally for the space they occupy.
- **Tariff Route Equity (TRE).** TRE, a time and distance-based fare structure, adds a component to the fare structure where price relationships between routes are proportional to the amount of service time being used by the customer.
- **Passenger/vehicle fare relationship.** The current relationship between vehicle/driver and passenger fares is approximately 3.5 to 1.

### ***Surcharges***

- **Vehicle peak season surcharge.** A peak period surcharge of 25 percent (35 percent on the San Juan Islands routes) applies to full vehicle fares (small, senior, or standard) from May through mid-October. The peak surcharge does not apply to vehicles using multi-ride cards.
- **Bicycles.** The bicycle surcharge is \$1.00 on full fare single purchase passenger fares (more on the San Juan Island routes). Multi-ride, monthly pass and ORCA cardholders are exempt from the surcharge.
- **Fuel surcharge.** WSF is authorized to implement a fuel surcharge with 30-days' notice when fuel costs exceed the budgeted amount. WSF may only implement a fuel surcharge in 2.5 percent increments, up to a maximum surcharge of 10 percent. This has never been implemented.
- **Vessel Replacement Surcharge.** Effective Oct. 1, 2011, at the direction of the legislature, WSF implemented a 25-cents per ticket vessel replacement capital surcharge.

**Table 3-1: Fare Structure Principles**

Three Guiding Principles for Base Fare Structure																	
Cube		Tariff Route Equity	Relationship Passenger/Vehicle Fares														
Vehicle Rates		Vehicle Rates Passenger Rates	Vehicle Rates Passenger Rates														
Fares based on space occupied height, width & length		Price relationship between routes based on service time/ travel sheds	Vehicles cost 3.5 times more than passengers														
Discounts and Surcharges Applied to Base Fare Structure																	
Discounts (% decrease)		Surcharges (% of flat fee increase)															
<b>Senior (65+), Disabled, Medicare Card</b> <ul style="list-style-type: none"><li>• Passenger Rates – 50%</li><li>• Vehicle Rates – 50% of the driver portion of the vehicle rate</li></ul>		<b>Peak Season – Vehicles – May 1 to Sept. 1</b> <ul style="list-style-type: none"><li>• 25% (35% in San Juans)</li><li>• Applies to full fare vehicles not multi-ride cards</li></ul>															
<b>Youth (6-18)</b> <ul style="list-style-type: none"><li>• Passenger Rates – 50%</li><li>• Under 6 - Free</li></ul>		<b>Bicycles All Year (+ passenger fare)</b> <ul style="list-style-type: none"><li>• \$1.00 (\$2.00 Anacortes-San Juans non-peak/ \$4.00 peak and \$4.00/\$6.00 Anacortes-Sidney ) on full fare passengers</li></ul>															
<b>Frequent Vehicle</b> <ul style="list-style-type: none"><li>• Multi-ride card (standard or small car)</li><li>• 20% - non-peak (25% San Juans)</li><li>• 45% - peak (50% San Juans) peak</li><li>• Van Pools – Free vehicle, pay passenger fee</li></ul>		<b>Vehicle Overheight</b> <ul style="list-style-type: none"><li>• Vehicles under 30’</li><li>• Double the regular fare</li></ul>															
<b>Frequent Passenger</b> <ul style="list-style-type: none"><li>• Multi-ride card 20% - all year (25% San Juans)</li><li>• Monthly pass 20%+ (if use max 31 times, 58%)</li><li>• Ferry-transit multimodal pass (not used) 20%+ (if use max 31 times, 58%)</li></ul>		<b>Fuel Surcharge – periodic – passengers &amp; vehicles</b> <ul style="list-style-type: none"><li>• Maximum 10% (depends on fuel expenditures relative to fuel budget)</li></ul>															
<b>San Juans Inter-Island Passengers</b> <ul style="list-style-type: none"><li>• Free</li></ul>		<b>Vessel Replacement Fund – passengers &amp; vehicles</b> <ul style="list-style-type: none"><li>• \$0.25 per ride</li></ul>															
<b>Director’s Promotional Authority</b> <ul style="list-style-type: none"><li>• Chinook Book 2 for 1 passenger coupons</li><li>• 10% frequent commercial</li></ul>																	
Fare Collection																	
One Point (collect round trip fare)		Two-Point (collect one-way fare)															
<b>Passengers (10 routes/sub-routes)</b> <table><tr><td>Seattle-Bainbridge</td><td>Mukilteo-Clinton</td></tr><tr><td>Seattle-Bremerton</td><td>Pt. Defiance-Tahlequah</td></tr><tr><td>Fauntleroy-Vashon</td><td>Anacortes-San Juans</td></tr><tr><td>Edmonds-Kingston</td><td>San Juans-Sidney</td></tr><tr><td>Fauntleroy-Southworth</td><td>Southworth-Vashon</td></tr></table>		Seattle-Bainbridge	Mukilteo-Clinton	Seattle-Bremerton	Pt. Defiance-Tahlequah	Fauntleroy-Vashon	Anacortes-San Juans	Edmonds-Kingston	San Juans-Sidney	Fauntleroy-Southworth	Southworth-Vashon	<b>Passengers (2 routes/sub-routes)</b> <table><tr><td>Port Townsend-Coupeville</td></tr><tr><td>Anacortes-Sidney</td></tr></table>		Port Townsend-Coupeville	Anacortes-Sidney		
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<b>Vehicles (6 routes/sub-routes)</b> <table><tr><td>Fauntleroy-Vashon</td><td>Anacortes-San Juans</td></tr><tr><td>Pont Defiance –Tahlequah</td><td>San Juans-Interisland</td></tr><tr><td>Southworth-Vashon</td><td>San Juans-Sidney</td></tr></table>		Fauntleroy-Vashon	Anacortes-San Juans	Pont Defiance –Tahlequah	San Juans-Interisland	Southworth-Vashon	San Juans-Sidney	<b>Vehicles (8 routes/sub-routes)</b> <table><tr><td>Seattle-Bainbridge</td><td>Mukilteo-Clinton</td></tr><tr><td>Seattle Bremerton</td><td>Port Townsend-Coupeville</td></tr><tr><td>Edmonds-Kingston</td><td>Anacortes-Sidney</td></tr><tr><td>Fauntleroy-Vashon</td><td>Fauntleroy-Southworth</td></tr></table>		Seattle-Bainbridge	Mukilteo-Clinton	Seattle Bremerton	Port Townsend-Coupeville	Edmonds-Kingston	Anacortes-Sidney	Fauntleroy-Vashon	Fauntleroy-Southworth
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Fauntleroy-Vashon	Fauntleroy-Southworth																

## Discounts

- **Senior/disabled discounts.** As a federal transportation grant recipient, WSF must comply with a number of federal guidelines, including tariff-related policies. Senior/disabled discounts of 50 percent are applied to passenger and to the driver portion of vehicle/driver fares.
- **Youth discounts.** WSF offers a youth fare which is equal to the senior/disabled fare. Customers age 6 – 18 are eligible.
- **Frequent user discounts (multi-ride products)**
  - **Vehicle & driver.** Customers can purchase a multi-ride card (good for 90 days) that contains 10 roundtrips at a 20 percent discount from the base season regular fare and the peak surcharge does not apply. In the San Juans the discount is 25 percent and the card is good for 5 round-trips.
  - **Passengers.** Passengers can purchase a 90-day multi-ride card that contains 10 roundtrips at a 20 percent (35 percent in the San Juan Islands) discount. Customers can also purchase a non-transferable monthly pass that can be used for a maximum of 31 passenger roundtrips during a month.
  - **Pre-Registered Van pools.** Van pools are free, with occupants required to each pay the passenger fare with a minimum requirement of five passengers, including the driver.
  - **Small cars.** Vehicles under 14 feet are priced at 70 percent of the regular, senior, or multi-ride card vehicle/driver fares (based on the vehicle portion of the fare).
- **Director's Authority.** RCW 47.60.315 gives the chief executive officer of the ferry system the authority to offer promotional, discounted, and special event fares to the general public and commercial enterprises for the purpose of maximizing capacity use and the revenues collected by the ferry system. The Director has used this authority to implement two discount programs:
  - **Commercial frequent user.** Commercial customers can qualify for a 10 percent discount by making 12 one-way trips a week.
  - **Two for one passage for off peak passengers.** This is done through the Chinook Book.

## Vendors and Systems

### Wave2Go

WSF's electronic fare system Wave2Go was purchased from Gateway Ticketing System. This proprietary system was deployed in 2005 as a replacement for a previous point of sale system that had been operational since the early 1990's. Among other benefits, the new system addressed repeated audit findings regarding separation of duties by more clearly separating fare media sales and collection functions.

When WSDOT awarded the contract to Gateway Ticketing, WSF's goal was to procure a system that would remain as close to off-the-shelf as possible, and then work with the vendor to tailor it to meet WSF's ticketing needs. (The system was mainly designed for amusement parks.)

After years of incremental and "best effort" improvements made to the ticketing system by both the vendor and WSDOT, users still require an extraordinary amount of support on a 24/7 basis, which has strained IT support resources. Weekends routinely require immediate response to anywhere from a half-dozen to thirty issues. Daily attention is needed from support staff. Adding further complexity to the business model would be difficult to implement. WSF is considering replacing Wave2Go with an account-based fare collection system around 2018. Further information about the Gateway Ticketing System can be found in Appendix F.

## ORCA

ORCA is the regional smart-card based public transportation fare payment system that allows customers to use one card to ride public transportation services in King, Pierce, Kitsap, and Snohomish counties. Possession of a valid ORCA card allows customers to ride buses, rail and ferries, subject to the transportation privileges provided by the product loaded on the card.

ORCA is governed through a seven-agency interlocal agreement. King County METRO and Sound Transit jointly manage and administer the program. The other five agencies are WSF, Community Transit, Pierce Transit, Everett Transit, and Kitsap Transit.

The ORCA card was launched in April 2009 and is fully operational with almost 1.8 million cards in circulation, as of December 2013. During the last quarter of 2013, there were approximately 361,000 cards used each month.

Customers can choose various combinations of products such as multiple passes or stored value plus a pass. The system is designed to check through the available products on a customer's card and choose the one best suited for the trip.

A key difference between the ORCA system and other types of pre-paid toll/fare systems (including *Good To Go!*) is that ORCA is card based rather than account based. This means that, similar to a prepaid gift card, the payment information is stored on the card itself, rather than in an account record held at the back office. When a customer purchases a pass product or pre-pays funds into an e-purse, the funds and/or product are loaded and stored on a chip in the card the next time that the card is presented to a reader. The reader device stores the fare tables, and it is the interaction between the two that computes and deducts the appropriate fare.

## Ferries Customer Service Operations

The customer service center at Washington State Ferries provides:

- Customer information, travel and trip planning, reservations
- Referrals to other ferry systems throughout the state for tourists, infrequent users, customers with special needs and commuters
- Assistance with fares, refunds, issues or assistance with on-line ferry ticketing
- ORCA card assistance
- Ferry system lost and found
- Website and customer updates concerning ferry issues
- In-person customer outreach at terminals and on ferries

In calendar year 2012, the call center (which can be reached through a local line, 800 line and 511) received 187,235 calls, of which 112,403 calls went to an operator. The rest of the callers were able to get the needed information through voice recognition schedule/fare software. Of these calls, 40 percent were related to reservations while 60 percent dealt with other aspects of customer information.

### Staffing (positions, numbers, bargaining units)

The WSF call center has seasonal variations in staffing. In the height of the summer season (mid-June through early September) there are 22 customer service agents, thirteen full-time and eight on-call to fill

in shifts, as needed. In the off season, (Mid-Sept through mid-June) there are 10 full-time staff with 8 on-calls available.

The staff includes a group of technically skilled web agents who update Highway Advisory Radios and Variable Message Signs; arrange for special travel permitting for oversize vehicles; work with group travel (e. g. Camp Orkila on Orcas Island); assist commercial customers and update the WSF web sites. This group also inputs the seasonal schedule for the website, works with a number of school groups, answers customer emails and researches customer issues. Each operator is expected to take 10-12 calls per hour.

All of the WSF customer service agents are members of the Inland Boatmen's Union, the largest of the ferry unions.

### **Hours of operation**

The WSF call center during the summer peak season is open seven days a week from 7 a.m. to 7:45 p.m. During the off season, is open seven days a week from 7 a.m. to 6:45 p.m.

### **Customer Information**

Most of the calls received by the WSF call center deal with general information concerning ferry schedules, fares, driving directions and travel times. The customer service agents assist disabled persons to plan trips and arrange accommodation for travel. The agents also help customers with transit connections at the ferry terminals and local parking availability near the terminals.

Additionally the agents explain policies regarding security, safety, where dogs are permitted and how customers can request elevator and restroom access.

The staff is responsible for the ferry system's Variable Message Sign, Highway Advisory Radio and Terminals Advisory Radio. The staff updates messages when needed very much like a traffic management center.

### **Schedules**

Agents explain the schedule, the crossing times, the deviations from schedules, tidal cancellations and boat moves. They explain the meaning of the icons on schedules, which can be confusing for non-frequent users. Most frequently asked questions concern the multi-destination routes of Anacortes/San Juan Islands and Fauntleroy/Vashon/Southworth.

### **Fares**

Customer service agents explain the rationale of fares, which are based on the length, width and height of vehicles. They help customers understand when they pay and how much, what documentation is needed for reduced fares and the best deal for a frequent user, depending on their travel patterns. The customer service agents assist with refunds, lost tickets and provide ORCA phone support. They resend tickets purchased on-line, provide revalue cards for ticket orders and help customers manage their Wave2Go or ORCA accounts. They also work closely with WSF commercial accounts, assisting commercial customers with reservations, permitting and fare explanations.



## **Directions and tourist direction questions**

WSF routes are gateways to many Washington locations. Customers want to know what time they need to leave their start point to be in a particular location by a certain time. WSF customer service agents know basic travel times and mileage for most key destinations served by ferries.

## **Special needs**

Customer service agents assist customers needing preferential loading, helping each customer get the correct form, arrange their loading and ensure they understand what accommodations can be made for them. They are the intermediaries for TTY operators and assist customers to receive the half fare discount or free attendant care benefit. WSF provides forms for customers with a disability to receive either a Regional Reduced Fare Permit or a Washington State Ferry Disability Permit and then, in the case of the WSDOT pass, provides the personal pass. Agents also provide revalue cards for seniors, allowing them to avoid buying a passenger ticket each time they travel.

## **Transit coordination and parking**

WSF customer service agents assist customers with making their transit and train connections, as well as other ferry system connections. WSF agents work with Metro, Kitsap, Jefferson, Island, Community, Everett and Skagit transit agencies as well as a private provider in the San Juan Islands. Agents also assist customers with both park and ride and pay-to-park-availability near ferry terminals.

## **Wave2Go account management**

The WSF call center provides support, both technical and non-technical, for customers with Wave2Go accounts. This includes retrieving and sending the bar code for customers who have lost tickets, suspending revalue cards when requested, replacing lost revalue cards, resending undelivered online ticket orders not yet received by the customer and starting the refund process when appropriate.

## **WSF lost and found and information desk**

The call center staff handles lost and found for Colman Dock (almost 6000 lost items yearly) and provides helpful information to Colman Dock customers (40 percent of customers) concerning transportation and locations of facilities in Seattle, Bainbridge and Bremerton. As one of the few information stations in downtown Seattle, the staff helps people get to hospitals, the transit tunnel, the train station and as other locations in downtown.

## **Updating website and customers about ferry issues**

WSF customer service agents update the WSF website information including variations the from schedule, disruptions in service, wait times, traffic issues, and galley closures.

The agents also send email alerts to advise 14,000 customers about cancellations, late ferries, changes to services (boats, galleys, Wi-Fi), elevator issues and road conditions or connecting transportation issues that may affect a customer's commute. They work to keep customer information current. This group is responsible for updating information in the "Save a Spot" reservation website.

## **Emergency situations**

When there is a disruption in ferry service, the call center staff becomes part of the WSF emergency operations center, assisting in solutions for service for customers. The call center shares space with the

WSF 24-hour Operations Center, so that they can work together to ensure customers have the most up-to-date information.

## Ferry Reservation Functions

During peak sailing times, vehicle space on ferries is a scarce commodity. Sailings often overload, resulting in congestion in and around ferry terminals and long wait times for customers. At the same time, there is excess vehicle capacity on off peak sailings, resulting in the need to manage and spread demand for vehicle space on the ferries.

The 2009 WSF Long-Range Plan proposed a reservation system as the primary strategy to manage demand, spread peak vehicle traffic, and improve asset utilization, thus reducing customer wait times, community traffic congestion due to queuing, and the need for costly terminal and vessel expansion projects.

In June of 2012, WSF implemented Phase 1 of the new reservation system, which included its Port Townsend-Coupeville, Sidney, B.C., and commercial vehicles on San Juan Islands routes.

The WSF call center currently takes reservations on the Port Townsend/Coupeville route, the international route between Anacortes-San Juan Island-Sidney, B.C., and for commercial customers between Anacortes and the San Juan Islands. Beginning in December, 2014, call center agents will begin taking reservations between Anacortes and the San Juan Islands for all customers.

Reservation functions are summarized here, with additional information in Appendix F.

### Technology – System Phases

The reservations project began in 2010 with the Vehicle Reservation System Predesign Study. WSF proposed implementing the project in three Phases. Phase 1 is complete and WSF is currently planning for Phase 2.

- Phase 1: Port Townsend/ Coupeville, Anacortes/ Sidney, and commercial vehicles on Anacortes/ San Juan Islands routes
- Phase 2: All vehicles on Anacortes/ San Juan Islands routes and commercial vehicles system-wide
- Phase 3: All vehicles on Seattle/ Bainbridge, Seattle/ Bremerton, and Edmonds/ Kingston

Although the Predesign Study assumed WSF could buy an existing reservations software package and integrate it with its ticketing system, this was ultimately not realized. Off-the-shelf software packages that could be easily integrated WSF's existing ticketing system were not available. WSF ultimately designed and built its own reservation system, allowing for flexibility to tailor the system as needed in future phases.

### Planned Phase 2 Enhancements

Phase 2 planning is currently underway to provide reservations to all customers in the San Juan Islands to/from Anacortes. Phase 2 is expected to be implemented in December 2014 with the following features:

- Enhanced business logic that allocates reservable space to residents of the San Juan Islands.
- Functionality for redeeming reservations at all terminals in the San Juan Islands including those that lack tollbooths for fare collection.

- Functionality for assessing a no-show fee where vehicle fares are not collected or where operating efficiencies can be achieved.
- Additional customer communication methods.
- Business process changes and code logic designed to promote lean efficiencies.

### **Phase 3 – Vehicle Reservations Central Sound**

WSF is scheduled to begin planning Phase 3 upon successful completion of Phase 2. At this time, it does not appear feasible to move to Phase 3 until the Gateway Ticketing System has been replaced. The challenges around integrating with the Gateway Ticketing System has caused up to a 60 second increase in transaction time at the tollbooth. This is being managed on Phase 1 and Phase 2 routes by adding tollbooth sellers so as to not impact vehicle staging and sailing on-time performance. WSF will not be able to add additional staffing for Central Sound routes and therefore will need a better integrated system prior to Phase 3. It should be noted that the 2013 Legislature budget did not include funding for Phase 3.

### **Reservation Management**

The Save a Spot website went live in 2012 and redemption began at terminals the same year. Since then, several software updates have been rolled out to improve performance, fix bugs, and add features.

Some of the defining features of Save a Spot include:

- Multiple methods for managing reservations
- Refundable deposits that apply to the fare price
- Different account types
  - Universal Account
  - Premier Account – for frequent users
  - Commercial Account
- Flexible change and cancelation policies

### **Staffing Needs to Support Save a Spot**

In the first 13 months of operation 256,852 reservations were made; 15 percent were made by the customer service agents with the rest completed by the customer on-line. Customers also changed 27,649 reservations, with 34 percent of these changes made by the customer service agents. About 9,743 customers canceled their own reservations, with 26 percent of the cancelations completed by customer service agents. Most reservation callers also need additional information such as how to get to their final destination, what to do if they need an elevator, arrival information as well as information about customs, immigration or rules around children traveling internationally.

### **Communications with Customers**

The vehicle reservations system allows staff to email alerts or pertinent information to reservation holders, cancel sailings and refund customers. They also change reservations and refund customers outside of the policies when there is an emergent issue with a customer.

WSF call center staff work with truck drivers carrying loads over 80,000 gross vehicle weight and terminal engineering staff to ensure that the risk of damage to transfer spans is minimized at the

terminals. Permits are issued based on axle weight, tidal conditions, etc. Call center staff also work with customers piloting vehicles over 8.5 feet wide.

Commercial account customers are assisted daily with making, canceling or changing reservations, as business plans can change quickly. The call center works with large groups to assist in making group reservations.

## Chapter 4 – *Good To Go!* as a Ferry Payment Method and a Single Account for Ferries and Tolls

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This study examined opportunities for the use of *Good To Go!* passes as a WSF payment method as well as the combination of the WSF Gateway Ticketing System and the *Good To Go!* back office system by 2018, when the existing systems will reach their end of service life and contract term. It was determined that this is feasible, with the main benefits of *Good To Go!* as a payment method, in terms of cost savings and streamlining, expected in the longer-term replacement of these systems.

### Deployment of *Good To Go!* at Ferry Terminals

To offer *Good To Go!* as a ferry payment option toll equipment will be required at all ferry terminals. As described in Table 3-1, ferry fares vary widely depending on the vehicle, customer and route. Ferry customers are also subject to a security screen prior to boarding. For these two reasons, open-road fare collection is not appropriate for WSF customers, instead a vehicle using a *Good To Go!* pass as a payment method would still be required to stop at a booth for fare assessment and security screening prior to payment.

The feasibility of various toll collection methods were examined. At this conceptual stage, work focused on toll equipment and physical infrastructure at the terminals, and computer networking required to link the equipment into existing WSDOT computer systems.

#### Required Systems Changes

Deployment of *Good To Go!* functionality requires locating toll equipment at ferry terminals, establishing a connection with the existing ticketing system, providing connections back to the WSF data center and out to external toll systems. With the exception of the connection to the existing ferries ticketing system, this deployment is no different than the toll systems currently deployed along WSDOT toll road facilities; local toll equipment installed at toll points with connections back to a central host computer (FMAS) that compiles transactions, monitors system health, and transmits toll transactions to the toll customer account back office. Additional description can be found in Appendix B, including the anticipated communications network between the toll and ferry systems to support *Good To Go!* as a payment method. While further detailed design is required before this system can be finalized and deployed, this description captures the key elements to validate feasibility of this concept.

#### Proposed Data Connections

To facilitate the data elements needed at the various locations in support of ferry fare payment with a *Good To Go!* pass, several assumptions were identified:

- The ferry point-of-sale system will continue to comply with payment card industry (PCI) requirements
- The toll and ferry data networks local to each terminal will be separated
- Any connections between the toll and ferry networks will be heavily controlled

No personal data would be included anywhere in the toll system at either the terminals or the data center, just like the existing roadside toll systems already deployed.

Existing communications network equipment across WSF will support separated networks for ferry and toll data. This will be achieved by setting up a separate toll connection from the data center to each terminal and out to each booth across the existing routers and switches.

Where the ferry and toll networks need to share data, a controlled connection will be established. In each terminal network room, a new firewall will be installed between the ferry point of sale system and the lane controller servers to allow transmission of only the required data elements (as outlined above).

### **Toll Equipment Concept**

The base toll equipment concept consists of toll antennas positioned to read passes in every booth. This could be accomplished through several methods. See Appendix C for more details about the alternatives considered. This study recommends that toll equipment be mounted to existing physical infrastructure. This solution performs as nearly as well as the other alternatives that were considered, with considerable advantages in convenience, deployment and cost. It presents a cost-effective solution for the WSF terminal layout and functionality.

In the recommended configuration, antennas are mounted to each ferry booth via brackets, and attached via electrical and communications cabling to a reader within the attic space of one of the booths. Toll vendor testing will be required in order to establish the correct mounting height and location for optimal reads. While WSDOT does not currently use the side-fire configuration, it has been used with success by other toll authorities. An alternative canopy-mounted deployment where a terminal canopy exists may be used with further design development depending on the overall cost and long term maintenance needs.

A toll reader would be positioned centrally, where possible, to collect data from antennas at each lane in the terminal. A likely location for the reader would be the attic space above one of the booths. In some tollbooths, heat generation of additional equipment will result in the need for more power and air conditioning. A lane controller would be located in the terminal building. All of this equipment must be linked to power and communications cabling. A central computer would be located in the data center and linked via the existing WSDOT network; this location is already well connected to the WSDOT network. Some additional network and switching gear would be required to accomplish this configuration. See Appendix B for more details about the network concept.

## **Toll & Ferry Back-Office Integration**

One main goal of this study was to examine opportunities to combine toll and ferry back-office systems.

### **Gateway Ticketing System Replacement**

The Gateway Ticketing System is due to be replaced in 2018 as most ticketing systems have a 10-year useful life before the technology becomes outdated. Although the current system is functioning as intended, it has several limitations and issues. Off-the-shelf reservation software is difficult to integrate with Wave2Go. It also has very limited vendor support – service must be scheduled approximately one year in advance. Because of these challenges and limitations, WSF will build its own and hopes to replace Wave2Go with an account-based fare collection system around 2018.

## Good To Go! Vendor Replacement

The current *Good To Go!* back office vendor, Electronic Transaction Consultants Corporation (ETCC), was contracted in 2009 and took over back office operations in 2011. The initial contract ends June 30, 2014 and allows up to two, two-year extensions that could bring the end date to mid-2018. If the 2014 Legislature makes funding available, WSDOT will start procurement for new back office vendor to be ready to start in July 2018.

## Back Office Integration

This study recommends replacing the WSF ticketing and *Good To Go!* back office systems in approximately the same timeframe. The 2018 system replacement and contract end date should be used as an opportunity to fully combine the two systems.

The combined two systems will use a single integrated account and payment method for tolls and WSF vehicle trips. The WSF discount program should also be fully integrated into the new combined back office.

A single customer account system by 2018 would include:

- A single transportation customer account
- Transaction interfaces to existing and future toll facilities
- Ticketing and reservation services for ferry applications
- Payment of ferry fares with *Good To Go!* passes

## Communications and Public Education

WSF customers must be informed of their option to pay for fares with *Good To Go!*. Changes to payment options at the booth will be communicated via signing at the booth, as well as existing customer communication methods. A focused education campaign specific to existing ferry customers about features of the new payment method, including options for purchasing a pass, account requirements and where to go with questions would increase awareness of this new option, as well.

Changes to back office procedures will also need to be communicated to the many WSF customers who already have *Good To Go!* accounts. These customers will learn of changes to account practices including business rules via updated terms and conditions which are routinely sent out by *Good To Go!*. WSDOT should expect to perform heavy outreach to ensure the public is aware of the new integrated account features and customer service as well as potential changes to the WSF multi-ride program.

## Business Rules

Business rules govern all aspects of toll operations and toll processing, posting and accounting. WSF fares will be processed through the toll back office as with other tolls. However, several features distinguish WSF fares, facilities and functions from their counterparts on existing tolled facilities. Existing business rules will require modification, and new rules will need to be added, in order to accommodate the unique features and needs of ferry operations, such as:

- High dollar amount of ferry fares compared to typical tolls
- Ferry service model requires many unique customer programs



- Network unreliability at remote terminals undermines ability to process in real time

*Good To Go!* customer Terms and Conditions will have to be updated once business rules are set. These updates are done for a variety of reasons on a regular basis and should not pose a barrier to implementation. WSDOT will also have to undertake considerable communication with customers about rules and responsibilities of payment of ferry fares via *Good To Go!*.

## Toll Transaction Posting and Reconciliation

WSF fare transactions will be posted within WSDOT's TRAINS from the general toll fund to the WSF fund. Fully redundant accounting will occur via toll transaction processing by the toll back office on one hand and ferry ticket sales processing by the ferry reservation system on the other. Reconciliation investigation and customer service functions for WSF customer use of ORCA as a payment method have been used successfully for several years precedent and can serve as a precedence for payment using *Good To Go!*. Reconciliation will be performed via reports sent from the Toll Division to WSF. Long-established WSF accounting procedures will also be used to investigate anomalies in the daily reconciliation report. Toll customer service representatives (CSRs) can help customers with account and transaction questions using specific operating procedures to be developed prior to go-live.

## Workplan – Contracting, Costs and Schedule

Implementation of payment of ferry fares with *Good To Go!* passes at terminals and implementation of a single payment method and customer service system comprise two separate work efforts that can be done simultaneously. This approach eliminates repeating work and ensures only launching *Good To Go!* as a payment method once full payment functionality can be offered. On the downside, this approach defers the customer convenience of paying ferry fares with *Good To Go!* passes until the second half of 2018.

### ***Scope - Payment of ferry fares with Good To Go! passes***

For in-lane toll equipment at ferry terminals, the Toll Division would contract with a toll vendor for design, installation, testing, and operations. It is possible but not a given that WSDOT would contract with the current statewide Roadway Toll System vendor that is already providing in-lane toll equipment and systems on I-405, SR 99, and SR 520. While the roadway toll systems on these facilities are much more complex than the ferry toll booth lanes, they have same system foundations.

Operations and maintenance costs are likely to follow the same approach as currently employed for other roadway toll systems. For this work, the vendor would be responsible for all maintenance and for the system operating at a level that meets specific performance metrics.

### ***Scope – Single payment method and customer service system***

This work would include coordinated scoping, preliminary design work, complete requirements and concept of operations development. Once this work is complete, the project team would start a procurement to hire a new vendor to design, test, and deploy a single customer account system.

### ***Costs***

This study includes preliminary cost estimates for the advanced implementation only, shown in outline form in Chapter 7 and described in more detail in Appendix D. At this time, the Toll Division is planning

to move forward to procure a new back office system in preparation for the current contract expiration in 2018. There will be additional cost to deploy a single customer account system to support additional applications such as ferries ticketing and reservations. However, there are cost savings to procuring one rather than two systems. In order to compile cost estimates, further systems engineering work is necessary pertaining to requirements, business rules, and concept of operations.

### ***Schedule***

Work on a single payment and customer service system could start as the Toll Division begins its new back office procurement effort in early 2014. This work represents the critical path to establishment of a single system. Preliminary design and procurement would continue up to 18 months. Once WSDOT hires a back-office vendor, work to design, test, and deploy the new single customer account system would take up to three years. With tolls back office work starting in 2014, and assuming funding for a single back office vendor contract in July 2015, the new single customer account system could go live in the second half of 2018.

Preliminary design, procurement and deployment of in-lane toll equipment at ferry terminals would occur simultaneously with the single payment method work.

## **Recommendation**

This study recommends the following:

- Mounting toll equipment to existing physical infrastructure at ferry terminals. This option offers considerable advantages in convenience, deployment and cost, presenting a cost-effective solution for the WSF terminal layout and functionality.
- Replacing the WSF ticketing and *Good To Go!* back office systems in approximately the same timeframe. The combined two systems, with integrated discount and reservation functions, will use a single integrated account and payment method for tolls and WSF vehicle trips.

## **Advanced Implementation**

WSDOT could advance the implementation of *Good To Go!* as a ferry fare payment method at six terminals by separating the work from the single integrated customer account system and deploying in two phases. This would be the quickest way to deploy and deliver *Good To Go!* as a ferry fare payment method where *Good To Go!* is more widely used by the end of 2016. Customers could pay ferry fares with *Good To Go!* passes for approximately two years before launching the single customer account system. Chapter 7 discusses the advanced implementation concept.

## Chapter 5 – Customer Service Functions

This study included an analysis of the feasibility of integrating the toll and ferry customer service center operations. After reviewing the current work functions of both the WSF and Tolls customer service centers, the study team considered three alternatives for combining the two facilities:

- **Full combination**, one center for all toll and ferry customer services
- **Shared responsibilities**, staff specialized on tolls or ferries, with overflow assistance
- **Continue separation of customer service**, with telephone connection and Interactive Voice Response (IVR) for customer convenience

Each of the three alternatives was analyzed according to qualitative cost, customer service needs and operational requirements and the recommendation is to integrate the IVR phone system as part of the 2018 system integration.

Table 5-1 summarizes the call center statistics and Table 5-2 shows the alternatives ranked against each other, using the same ranking system shown in Table C-1. The benefits and challenges of each alternative are discussed in the following section.

**Table 5-1: General Call Center Statistics**

	Ferries	Tolls
Average calls received per month (rounded)	10,000 - winter / 21,000 - summer	61,000
Average Length of Calls (min)	3-5	5-6
On duty Service Representatives	10 - winter / 17 - summer	30
Most common request	various aspects of customer information	account maintenance such as opening/closing accounts
2nd most common request	reservations	toll bill payments

### Full Combination

This alternative would combine all customer service functions for ferries and tolls into one center located in offices large enough to accommodate all necessary staff. This would be possible in the Ferries Headquarters Building, although it would increase the planned footprint of staff within the building. While there are potential efficiencies to gain from combined overhead, this option presents challenges:

- **Ferry service complexity:** Training personnel to answer tolls calls would likely not be an issue, but training representatives to simultaneously support complex WSF operations (along with tolls topics) would be challenging.
- **Combined call center location:** If the combined call center were not co-located with the Ferries Watch Center, the combination would degrade ongoing support of the Ferries operations center currently provided by WSF call center staff; lost efficiencies and the degradation of customer service from separating Ferries call center and operations center personnel may outweigh any overhead efficiencies in this scenario.

- **Staffing:** WSF call center staff are currently WSDOT employees, while the toll call center staff are vendor employees. Combining groups would require changes.

### Shared Responsibilities

In a shared-responsibility alternative, customer service representatives would focus on either Ferries or Tolls, but also be available to provide backup on specific topics for overflow in high volume situations. This alternative reduces the challenges for fully cross-training service representatives on ferries and toll topics. However, providing backup for ferries information, including reservations, might require that the staff be state workforce since this complex work is traditionally done by WSDOT. This could result in higher staffing costs compared to the current outsourced support.

### Maintain Separation with Automatic Telephone Connection

While maintaining separate call centers doesn't leverage any efficiencies from combined overhead, it would likely result in lower costs. It would support ongoing, effective delivery of the disparate service topics handled by these two groups. Continued separation of the two service centers would also maintain clear roles and responsibilities. The study team identified other areas where the two centers could coordinate in the future to provide better overall services to customers. These include some basic background education to service representatives and providing phone tree connections between the two centers.


















## Considerations

The WSF call center is an integral part of the ferry operations center at all times. During a disruption in service, the watch center supervisors and the call center employees work together to develop messaging and emergency schedules, update information on the website, operate the Highway Advisory Radio, Variable Message Center, and email alerts while the watch center supervisors are working to inform regulatory agencies, transit agencies, and system management. It is critical to ferry operations that the watch supervisors and information agents work closely together in these situations. The toll call center customer service center is operated by a third party and does not work with any Transportation Management Center nor does it operate informational signage.

The WSF call center is part of WSDOT's 511 system, with an Interactive Voice Response System that gives calling customers fare and schedule information, disruption information as well as the capability, (requested for the summer of 2014) to preselect information to expedite reservations on reservable routes. The toll call center is not part of 511 and is a stand-alone system operated by a private vendor.

WSF call center is information oriented, assisting customers with schedules, fares, trip planning, reservations, lost and found, ADA assistance, preferential loads, ORCA and Wave2Go accounts, web site updates, customer messages on disruptions, and ticketing issues. The toll call center is account-based only. Thus there is a large disparity between job functions and the skill set required to perform the necessary customer service between the two call centers.

**Table 5-2: Customer Service Center Alternative Ranking**

	Capital Cost	Ongoing Cost	Operational Benefits	Customer Experience	<b>Key</b>  has less of impact compared to other alternatives  meets the criterion  relatively neutral  less than desirable  does not meet the criterion
<b>Full Combination</b>					
<b>Share Responsibilities</b>					
<b>Maintain Separation</b>					

## Recommendation

This study recommends integrating the ferry and toll phone system as part of the 2018 system integration. It is further recommended that staffing of the customer service centers remain separate and distinct, but that basic crossing-training be deployed.

## Chapter 6 – Vehicle Reservations

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This study evaluated the feasibility of transitioning the Ferries reservation system to the Statewide Customer Service Center. As described in Chapter 3, in June of 2012, WSF implemented Phase 1 of the new reservation system, which included its Port Townsend-Coupeville, Sidney, B.C., and San Juan Islands routes for commercial travel only. Beginning in December 2014, WSF call center personnel will begin taking reservation between Anacortes and the San Juan Islands for all customers.

### Considerations

Fully integrating the ferries reservation module into a new combined back office will require:

- Moving all functionality supported by the ferries reservation system into the new system
- Updates to the existing payment portals for reservations and interfaces that are currently operated by the ferries system
- Updates to multiple subsystems and interfaces such as the payment portals (kiosks, web) and ticketing system interface

### Recommendation

It is recommended that full integration of the WSF reservation function be included in the combined back office system by 2018.

## Chapter 7 – Advanced Implementation of *Good To Go!* at Select Ferry Terminals

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WSDOT could advance the implementation of *Good To Go!* as a ferry fare payment method by separating the implementation of *Good To Go!* as a ferry fare payment method from the single integrated customer account system and deploying in two phases. This would be the quickest method to deploy *Good To Go!* as a ferry fare payment method, delivering the functionality by the end of 2016. This would allow customers to pay ferry fares with *Good To Go!* passes approximately two years in advance of launching the single customer account system.

By contrast Chapter 4 discusses a combined, full implementation of the single payment method and customer service system in a single effort. This approach would eliminate repeat work and launches *Good To Go!* as a payment method once full payment functionality can be offered. On the downside, this approach defers the customer convenience of paying ferry fares with *Good To Go!* passes until the second half of 2018.

This chapter discusses requirements, costs and schedule for implementing *Good To Go!* using a phased approach.

### Phased Implementation Concept

A phased implementation would deploy *Good To Go!* as a payment method, prior to the full combination of back office systems. The advanced implementation would make *Good To Go!* available to ferry customer in 2016 at the six terminals shown in Figure 6-1. This work would start with coordinated scoping and preliminary design work between the WSF and the Toll Division. This initial coordination would include preliminary systems engineering and requirements development, as well as concept tests at one or more locations. Following these preliminary design efforts, the project team would write and finalize contract change orders to integrate the three key systems into existing contracts:

- Ferry terminal toll lane system at terminals
- Gateway ferry ticketing system
- *Good To Go!* toll customer account system

Once contracted, the vendors for each system would complete their design, testing, and deployment work to reach a common go-live for the full integration. Public outreach, customer education and call center personnel training would run concurrently to support go-live.



## Terminals

The six terminals chosen for advanced deployment, shown in red in Figure 7-1, offer several advantages for initial implementation:

- They are the geographically closest terminals to the toll facilities, which would facilitate toll system installation and adjustments as necessary
- They have a relatively high existing *Good To Go!* pass saturation, up to 46 percent. Many ferry customers on these routes already know about and use *Good To Go!* for tolling. See Appendix E.

Among recent 2013 WSF Origin/Destination Travel Survey respondents on the Fauntleroy-Vashon-Southworth, Seattle-Bremerton, and Seattle-Bainbridge routes that paid a vehicle fare, about 45 percent indicated that their household had a *Good To Go!* toll account. Of these respondents, approximately 70 percent paid a one-time, regular vehicle fare, with the remainder using multi-ride discounted fare media. Assuming that regular fare vehicle customers with *Good To Go!* accounts could be expected to take advantage of the early deployment of *Good To Go!* at ferry terminals, the raw survey period data suggests that these eligible customers comprise about one third of the vehicle ridership on the Fauntleroy-Vashon-Southworth, Seattle-Bremerton, and Seattle-Bainbridge routes.

## Toll Equipment

The base toll equipment concept consists of toll antennas positioned using existing infrastructure to read passes at every booth, making it easier for customers to use their *Good To Go!* account. Limited deployment in select lanes was considered, but ultimately rejected due to the confusion it could present to customers.

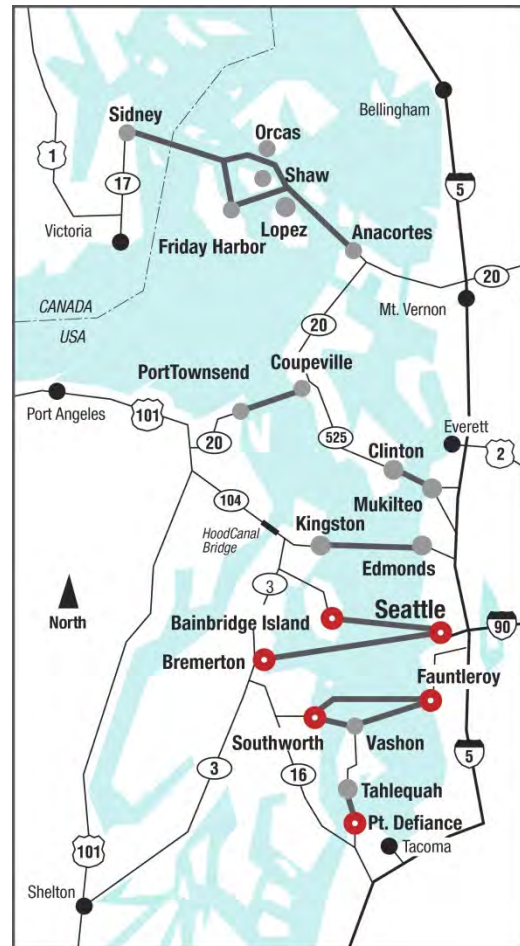
## Back Office Integration

To process *Good To Go!* payments of ferry fares during an advanced deployment at six terminals, the existing ferry and tolls back office system will need modifications. Work will be needed to verify requirements, update documentation, complete a testing program, and finally implement the system changes and commence operations.

### *WSF Back-Office Modifications*

The integration with Gateway will allow the Gateway system at the tollbooth to communicate with the toll lane controller when the *Good To Go!* form of payment is selected by the seller. The tollbooth operator will calculate the fare and choose *Good To Go!* as the payment method in order to begin the sale. This action will trigger the lane controller to activate the pass reader. If the pass is valid, the toll lane controller will return a confirmation message to the toll booth and create a transaction containing the transaction ID and sale amount, along with other identifying information.

**Figure 7-1: Phase 1 Implementation Terminal Locations**



A similar solution was designed for the ORCA form of payment collected at WSF. Therefore, the *Good To Go!* integration costs required for advanced deployment at six terminals were included in preliminary estimates were determined based on the similarities of the ORCA integration. Additionally, there will be some minor coding changes to have the *Good To Go!* form of payment to report through WSF's Great Plains, which is used as the revenue reporting system that reports directly to TRAINS.

### ***Toll Back-Office Modifications***

While the existing toll back office system does allow configurable system modifications, much of the work to support payment processing of ferry fares would likely require changes to the system itself.

In general, the types of system changes that would be required to support *Good To Go!* processing of ferry fare payments would include:

- Updates to customer and operator interfaces (screens and menus)
- Updates to interface between back office system and in-lane system
- Revisions to existing reports and creation of new reports
- Potential need to develop a special pass validation list specific for customers that qualify them to use *Good To Go!* at the ferry terminals
- Modifications to customer account settings

## **Discounts**

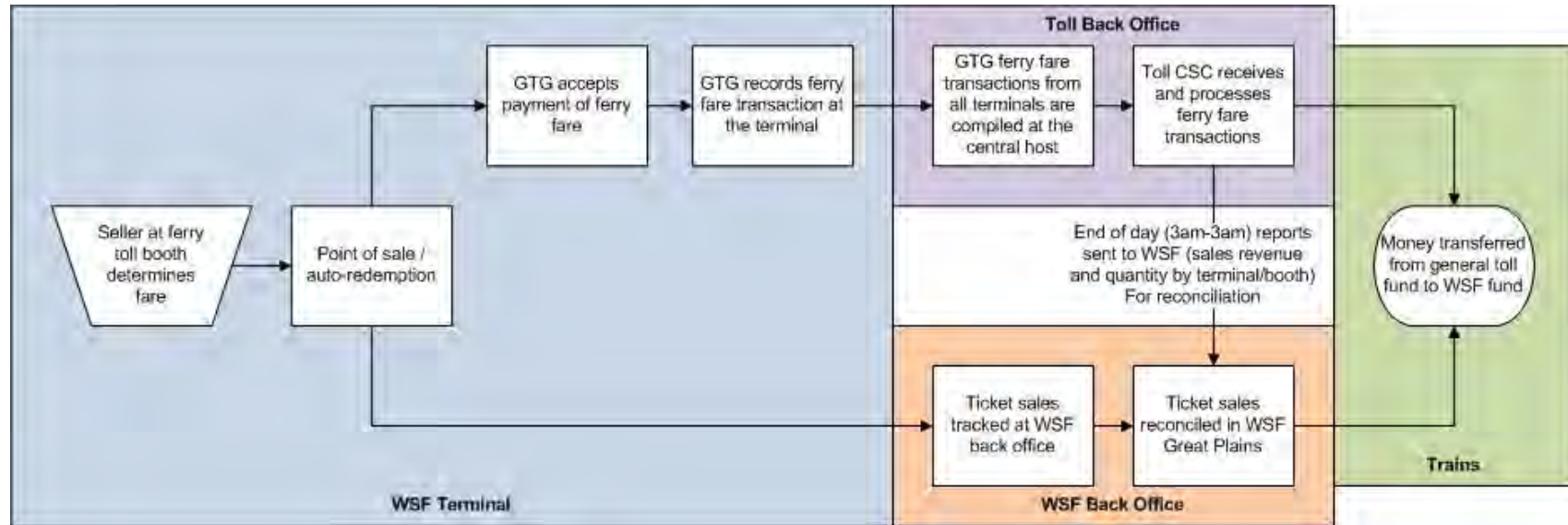
The *Good To Go!* back office system can technically accommodate a discount program. However, the current method of discount implementation available in the *Good To Go!* system functions differently than the WSF discount system. As a result, it is recommended that integration of ferry discounts with *Good To Go!* be deployed during the full integration in 2018.

## **Required Accounting Changes**

To advance *Good To Go!* as a payment method at select terminals, WSDOT will need to define accounting functions to support ferries point-of-sale redemption processing from the ferry terminal, through the tolls back office and into WSDOT's accounting system. Reconciliation of toll transactions and reconciliation in the toll and ferries systems will also be established.

Figure 7-2 illustrates the anticipated accounting data flow required to establish *Good To Go!* payment methods. Assumptions and anticipated changes/additions to established accounting practices and business rules are described in the text below, with additional detail in Appendix A. Further definition will be required before a pass can be accepted as a form of payment, but this document captures the key elements to validate concept feasibility.

Figure 7-2: Accounting Processing to Support Early *Good To Go!* Payment of Ferry Fares at Six Terminals



## Business Rules

Business rules govern all aspects of toll operations and toll processing, posting and accounting. The deployment of *Good To Go!* as a payment option for ferries will require modifications to the *Good To Go!* back office business rules. Particularly business rules related to:

- Minimum *Good To Go!* account balance;
- Replenishment of amount;
- Credit-card backing; and
- Maximum fare payable with *Good To Go!*.

In order to advance deployment of *Good To Go!* at select ferry terminals WSF fares will be processed through the toll back office consistent with other tolls. However, several features distinguish WSF fares, facilities and functions from their counterparts on existing tolled facilities. New business rules and other issues will need to be addressed in order to accommodate the unique features and needs of ferry operations, such as:

- High dollar amount of ferry fares;
- Unique ferry customer programs; and
- Network issues at remote terminals impacting the ability to process in real time.

Table 7-1 shows the unique features of WSF functions discussed to date, along with the business rules which will need to be established or modified as a result.

**Table 7-1: Unique WSF Features and Associated Business Rules**

High Value Fares
• Re-set minimum account replenishment threshold to minimize credit card transactions
• Increase minimum replenishment amount to reduce revenue collection risk
• Increase minimum account balance to reduce revenue collection risk
• Set maximum fare payable by <i>Good To Go!</i> to reduce revenue collection risk
• Require account backing by credit card to reduce revenue collection risk
Lost Revenue Recovery
• Explore billing for fares not chargeable to credit card (card expired, etc.)
• Adjudication for fares not paid via billing (card expired, etc.)
• Revenue recovery fees for fares not paid through typical method
Service Model
• Set cost allocation for <i>Good To Go!</i> payment of fares based on cost recovery model
• Allow ferry customers to split fares between <i>Good To Go!</i> and other payment methods
• Explore future WSF Discount plan support – none at this time
• Explore future WSF Commercial customer support – none at this time
• Establish atypical accounting report covering 3am to 3am to match WSF reporting period
Terminal Network Unreliability
• Compile transactions at FMAS and process as with typical tolls
• Do not store any PCI information on the tolls lane system
• No real-time charges of customer credit cards through tolls back office

*Good To Go!* customer Terms and Conditions will need to be updated once business rules are finalized. These updates are done for a variety of reasons on a regular basis and should not pose a barrier to implementation. WSDOT will also have to ensure considerable communication with customers about rules and responsibilities of payment of ferry fares via *Good To Go!*.

## Toll Transaction Posting and Reconciliation

WSF fare transactions will be posted within WSDOT's TRAINS from the general toll fund to the WSF fund. Fully redundant accounting will occur via toll transaction processing by the toll back office on one hand and ferry ticket sales processing by Great Plains on the other. Reconciliation will be performed via reports sent from the Toll Division to WSF. Long-established WSF accounting procedures will also be used to investigate anomalies in the daily reconciliation report. Toll customer service representatives can assist customers with account and transaction questions; with specific operating procedures to be developed during go-live. Both the customer service and reconciliation investigation functions have successful precedent with the ORCA payment method.

## Customer Service Needs during early Implementation

Several minor changes will need to be made at ferries and toll customer service centers to support the advanced implementation of the *Good To Go!* pass as a payment method.

WSF CSRs will investigate *Good To Go!* customer service and billing issues much as they do with ORCA now. WSF CSRs will contact *Good To Go!* in a pre-determined manner if an adjustment to a customer account is required. In order to implement this process, both *Good To Go!* and WSF customer service representatives will require relatively minimal training and updates to customer service protocols and manuals.

Concept-level costs to accomplish this work have been included in the estimates shown below.

## Implementation Assessment

Once implemented, the advanced implementation of *Good To Go!* as a payment method should be further studied for its effectiveness against its stated goal of increasing customer convenience. Some measures that might indicate the potential for increasing customer satisfaction or convenience are the following:

- Percentage of WSF customers with passes
- Percentage of transactions using *Good To Go!*
- Stated customer satisfaction on periodic surveys

Early *Good To Go!* implementation should also be studied for its effectiveness from a deployment perspective. For example, metrics such as equipment failure rates, maintenance needs, impact on WSF terminal operations including tollbooth throughput and vessel on-time performance, and customer service issue resolution could be compared to current and/or expected values in order to understand the impacts of the early implementation.

These evaluations will inform the full long-term integration of the *Good To Go!* and WSF back office systems during system design.

## Workplan – Contracting, Costs and Schedule

With the advanced implementation of payment of ferry fares with *Good To Go!* passes at six terminals, full back office combination by 2018 would still be required as described in Chapter 3. There would also be additional costs to deploy lane-side equipment at the remaining ferry terminals in order to make *Good To Go!* a payment method throughout the ferry system.

### Scope - Lane equipment

Toll Division could contract with the statewide toll vendor for design, installation, testing, and operations for in-lane toll equipment at select ferry terminals. If advanced implementation at six terminals is desired, it is assumed WSDOT would contract with the statewide Roadway Toll System vendor providing in-lane toll equipment and systems on I-405, SR 99, and SR 520. While the roadway toll systems on these facilities are much more complex than the ferry toll booth lanes, they have same foundational system.

Operations and maintenance costs would follow the same approach as currently employed for other roadway toll systems. For this work, the vendor would be responsible for all maintenance and for the system operating to meet specific performance metrics.

### Scope - Back office

Advancing *Good To Go!* ahead of full back-office integration would require modifications to current back office toll and ferry systems. These changes are included in the planning-level estimate shown in Table 7-2.

### Costs

The conceptual cost estimation yielded the range shown in Table 7-2 for early implementation at six terminals, including all design and implementation as well as ferries and tolls back office systems changes. While basic field investigation of deployment concepts was performed in order to facilitate estimation and rule out fatal flaws for an early deployment at six terminals, some assumptions were made to generate basic estimates for the project. WSDOT will need to perform further preliminary design and system engineering to further refine the estimates. See Appendix D for more detail.

**Table 7-2: Early Implementation Concept-Level Cost Estimates**

Mounting Alternative	Cost Range	
	Low	High
Deployment at Six Terminals <i>Antenna on Existing Infrastructure</i>	\$ 4,249,000	\$ 5,162,000

### Schedule

If funding is authorized for the deployment of *Good To Go!* at six terminals, including both lane-side equipment and modifications to existing back-office systems, it would take up to 2.5 years to deploy. Preliminary design would take up to 6 months, with vendor change orders completed a year after funding authorization. The vendor design, testing, and deployment work would take up to a year and half. Assuming funding authorization for preliminary design is provided starting in July 2014, and funding

for vendor contracts is provided in July 2015, advance deployment at the six terminals could be complete by the end of 2016.

## Considerations

The advanced implementation at six terminals would result in redundant work during the full integration in 2018. Further, some ferry fare payment functionality, such as multi-ride discounts, would not be available until full integration is completed. The work to advance implementation also includes change orders to existing contracts which can introduce risks.

## Recommendation

The benefits of the advanced implementation of *Good To Go!* as a ferry fare payment method outweigh the other considerations and this study recommends advanced implementation, should funding be made available. Details of the alternatives considered and the necessary requirements are included in Appendices A through D.



## Chapter 8 – *Good To Go!* as a Parking Payment Method

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Several toll authorities in the US allow customers to pay for airport parking using their toll accounts. Using *Good To Go!* as a payment method for Sea-Tac Airport parking would have a similar approach to deploying at ferry terminals. A toll pass reader could be added to the parking payment system allowing customers to pay via their *Good To Go!* accounts. If the *Good To Go!* account has funds (just like at ferry terminals), the toll system would send an approval message to the parking system and the vehicle would be allowed to enter the parking garage. Vehicles not approved to pay with *Good To Go!* would need to choose another payment method (credit card, take a parking ticket, etc).

When the vehicle leaves the parking garage, the integrated toll system in the exit lanes would read the pass, calculate charges and allow exit, or if charges exceed funds direct vehicle to a cashier.

### Considerations

Some of the benefits of installing *Good To Go!* systems at Sea-Tac airport are:

- Expands the use and value for *Good To Go!* customers who install a pass on their vehicle;
- Offers another automated, convenient way to pay parking fees;
- Customers who choose to pay with *Good To Go!* no longer need to open windows, reach for credit cards, or remember a paper ticket;
- Could also accommodate the existing Sea-Tac monthly parking program for frequent travelers; and
- Increases market share of *Good To Go!* for reduction of operating costs on all tolled facilities.

However, like supporting *Good To Go!* payment of ferry fares, paying for airport parking raises several questions which need to be addressed:

- Parking charges can be significantly higher than road tolls; what rules need to be implemented to minimize risk to revenue collections?
- Even with a closed system, tracking vehicles in and out of parking facilities can be a challenge; how would Sea-Tac and WSDOT handle exception cases and customer concerns?
- Allocation of *Good To Go!* operations costs is well established for WSDOT toll facilities; how would these costs be allocated for parking transactions at the Port of Seattle's Sea-Tac Airport?

### Recommendation

Based on the feasibility findings from this report regarding payment of ferry fares with *Good To Go!* passes, and the similarities and benefits of providing this payment method for parking at Sea-Tac Airport, this study recommends further analysis to evaluate the costs, schedules, and benefits of adding *Good To Go!* as a Sea-Tac Airport parking payment method.

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# Appendix A – Advanced Implementation Accounting Requirements

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## Toll Transaction Processing

### Toll Transaction Processing at WSF Terminals

As described in the above report, a fare will be determined at the tollbooth and redeemed as with any other form of payment. The pass will automatically be checked against a list of valid passes (“white list”) sent periodically on a configurable frequency to local storage in the lane controller. The valid tag list will confirm that the account linked to the pass in the vehicle meets all of the criteria required by the business rules for a valid account.

*Good To Go!* will then accept payment of the ferry fare, and record the transaction at the ferry terminal on a central toll host server (FMAS) using data points preliminarily identified as:

- Date
- Time
- Ferry terminal
- Ferry toll booth lane number
- Fare amount
- Toll transaction ID created by terminal-based toll equipment
- WSF transaction ID created by ferry point of sale system
- Toll pass ID

At no point will PCI or customer-identifying information be stored locally or transmitted to the toll system or toll back office; a firewall between the WSF and toll systems will be established to ensure this separation.

For the purposes of feasibility review, the study has assumed that both the ferry ticketing system and the toll customer account system will need corresponding transaction ID numbers so that trouble shooting and customer inquiries between systems can be more easily addressed.

Toll pass ID is the unique number from the pass mounted on the customer vehicle. This number does not contain any personal information. It is used for matching transactions to customer accounts at the toll back office.

### Toll Transaction Processing at the Back Office

WSF fare transactions will be treated as those from any other tolled Facility. All WSF transactions will be processed to the same WSF facility, though for reconciliation and customer service purposes transactions will be identifiable by terminal and booth lane through data elements. Incoming fare transactions from all terminals will first be compiled at the central host (FMAS) located at the WSF data center. The compiled data will then be sent to the toll back office for processing and posting to customer accounts according to business rules.

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## Business Rules

Business rules govern all aspects of toll operations and toll processing, posting and accounting. WSF fares will be processed through the toll back office as with other tolls. However, several features distinguish WSF fares, facilities and functions from their counterparts on existing tolled facilities. Existing business rules will require modification, and new rules will need to be added, in order to accommodate the unique features and needs of ferry operations, such as:

- High dollar amount of ferry fares compared to typical tolls
- Service model rather than capital improvement, with many unique customer programs
- Network unreliability at remote terminals undermines ability to process in real time

Table A-1 shows the unique features of WSF functions discussed to date, along with the business rules which will need to be established or modified as a result.

**Table A-1: Unique WSF Feature and Associated Business Rules Needed**

<b>High Value Fares</b>
• Re-set minimum account replenishment threshold to minimize credit card transactions
• Increase minimum replenishment amount to reduce revenue collection risk
• Increase minimum account balance to reduce revenue collection risk
• Set maximum fare payable by GTG to reduce revenue collection risk
• Require account backing by credit card to reduce revenue collection risk
<b>Lost Revenue Recovery</b>
• Explore billing for fares not chargeable to credit card (card expired, etc.)
• Adjudication for fares not paid via billing (card expired, etc.)
• Revenue recovery fees for fares not paid through typical method
<b>Service Model</b>
• Set cost allocation for <i>Good To Go!</i> payment of fares based on cost recovery model
• Allow ferry customers to split fares between <i>Good To Go!</i> and other payment methods
• Explore future WSF Discount plan support – none at this time
• Explore future WSF Commercial customer support – none at this time
• Establish accounting report covering 3am to 3am WSF reporting period
<b>Terminal Network Unreliability</b>
• Compile transactions at FMAS and process as with typical tolls
• Do not store PCI information locally for use when network down
• No real-time payment while customer at the booth

*Good To Go!* customer Terms and Conditions will have to be updated once business rules are set. These updates are done for a variety of reasons on a regular basis and should not pose a barrier to implementation. WSDOT will also have to undertake considerable communication with customers about rules and responsibilities of payment of ferry fares via *Good To Go!*.

# Appendix B – Advanced Implementation Supporting Communications Network

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## Proposed Data Elements

To support *Good To Go!* as a ferry fare payment method, specific data is needed in the following locations:

- Toll customer account back office
- WSF data center:
  - Toll host servers
  - Ferry host servers
- Ferry terminals:
  - Toll equipment
  - Point of sale system

### Toll customer account back office

To post a ferry toll transaction, the toll customer account back office needs certain data elements. The following data elements have been preliminarily identified (in no particular order):

- Date
- Time
- Ferry terminal
- Ferry toll booth lane number
- Fare amount
- Toll transaction ID created by terminal-based toll equipment
- WSF transaction ID created by ferry point of sale system
- Toll pass ID

For the purposes of feasibility review, the study has assumed that both the ferry ticketing system and the toll customer account system will need corresponding transaction ID numbers so that trouble shooting and customer inquiries between systems can be more easily addressed.

The toll pass ID is the unique number from the pass mounted on the customer vehicle. This number does not contain any personal information. It is used for matching transactions to customer accounts at the toll back office.

What has not been decided is the specific ferry toll transaction information that would be displayed on toll customer account statements. If the project is deployed, this decision will be addressed in final design. This study assumes transaction information would likely follow the existing format of road toll transactions on customer statements.

## **2901 WSF Data Center – Toll Host Servers**

Toll host servers will be installed at the WSF data center primarily to compile toll transaction data from the ferry terminals and transmit these to the toll customer account back office. The transaction data itself is described above.

The toll host servers will also monitor the health of toll equipment installed at the ferry terminals and provide alerts to toll operations technicians when concerns are identified. This data would include general equipment diagnostic information. Remote access for toll equipment troubleshooting would also be supported.

## **WSF Data Center – Ferry Host Servers**

The existing ferry host servers at the data center will continue tracking ticket sales and ticket issuances. For ferry fares purchased with a toll pass, the ferry host servers would continue tracking transaction data as they do today and would include the addition of a toll transaction ID created by terminal-based toll equipment

As described above, the study has assumed that both the ferry ticketing system and the toll customer account system transaction ID numbers will be tracked through each system.

## **Ferry Terminal – Toll Equipment**

Toll equipment will be installed at each ferry terminal. From the preliminary design, this is assumed to be one toll reader and antenna per toll booth lane and a pair of redundant lane controller servers in the terminal network room.

The primary purpose of the lane controller servers is to create each toll transaction and transmit this to the toll host servers at the data center. To create a toll transaction, the following data would be provided by the ferry point of sale system:

- Ferry toll booth lane number
- Fare amount
- WSF transaction ID created by ferry point of sale system

The remaining data elements to create the toll transaction would be generated by the toll equipment itself before transmitting the transaction to the toll host servers.

The other critical data element residing on the lane controller servers is a list of pass IDs that are approved by *Good To Go!* for ferry fare payment; also known as a tag validation list. This list will be generated by the toll customer account back office and transmitted to the lane controller servers via the toll host servers at the data center. It is expected that a full tag validation list will be provided once a day with incremental updates provided throughout the day. The tag validation list will only contain pass IDs; it will not include any personal account information.

When requested by the ferry point of sale system, the lane controller servers will read the toll pass at the corresponding booth. If a pass is read and the pass ID matches to the tag validation list, the lane controller will transmit payment authorization back to the ferry point of sale system the following data:

- Toll transaction ID created by terminal-based toll equipment

If the pass ID does not match the tag validation list, or no pass is read by the toll equipment, than a payment declined message will be transmitted to the ferry point of sale system.

## Ferry Terminal – Point of Sale System

With ferry fare payment by toll passes, the ferry point of sale system will continue to sell and issue ferry tickets. For customers who wish to pay a ferry fare with their *Good To Go!* pass, sellers will determine the appropriate fare and select *Good To Go!* as the payment method. When this is selected, the ferry point of sale system will transmit the following to the lane controller servers to request payment:

- Ferry toll booth lane number
- Ferry fare amount

If the lane controller servers transmit back payment authorization, the seller will confirm the transaction and the point of sale system will transmit back the following to complete the toll transaction creation:

- WSF transaction ID created by ferry point of sale system

If the lane controller servers transmit back a payment decline method, the seller will collect payment from the customer with an alternative method.

## Proposed Data Connections

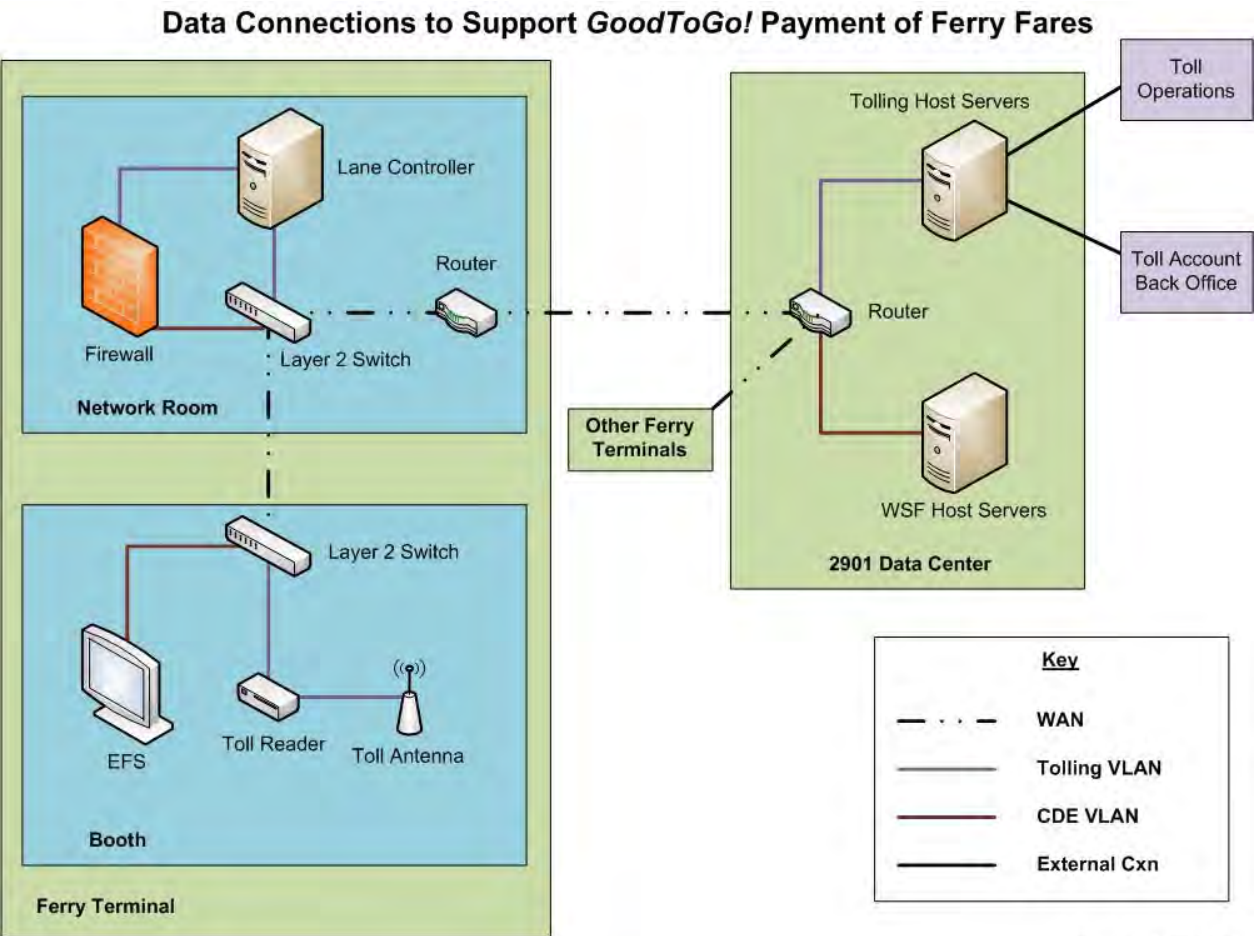
To facilitate the data elements needed at the various locations in support of ferry fare payment with toll passes, several assumptions were identified:

- The ferry point of sale system will continue to comply with PCI requirements
- The toll and ferry data networks will be separated
- Any connections between the toll and ferry networks will be heavily controlled

No personal data is included anywhere in the toll system at either the terminals or the data center (just like the existing roadside toll systems already deployed).

Existing communications network equipment across WSF will support separated networks for ferry and toll data. This will be achieved by setting up a separate toll VLAN and MPLS VRF from the data center, down to each terminal, and out to each booth, across the existing routers and switches in Figure B-1.

Figure B-1: Data Connections to Support Early *GoodToGo!* Payment of Ferry Fares



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Where the ferry and toll networks need to share data, a controlled connection will be established. In each terminal network room, a new firewall will be installed to bridge between the ferry point of sale system and the lane controller servers to allow transmission of only the required data elements.

# Appendix C – Advanced Physical Infrastructure Requirements

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## Toll Payment Methods and Infrastructure Requirements

Two methods of open-road tolling are now being employed in Washington State: tolls are collected via vehicle-mounted passes and photo-tolling. In both of these methods, equipment automatically recognizes a customer via equipment mounted over the roadway, and transmits it via computer systems to the *Good To Go!* back office.

Distinguishing features of open-road tolling are:

- Highly redundant equipment, which ensures that toll systems can continue collecting tolls even if one or more pieces of equipment fail;
- Sensitive high-speed equipment that can collect tolls from vehicles traveling at posted highway speeds and above;
- Very high performance requirements, which ensure that very few vehicles pass through without payment;
- Robust, hardened equipment that can survive roadside conditions typical in the region.

### Passes

One of the options customers use to pay open-road tolls is a pass mounted on their vehicle. Passes are typically mounted to the inside of the front windshield; in some cases they are mounted to a license plate or another location on the outside of a vehicle.

The physical equipment required to read a vehicle-mounted pass includes an antenna mounted overhead with a bracket; a local computer which will be placed in the terminal building; and electrical and communications equipment and cabling linking the equipment together. Finally, a centralized computer equipment (FMAS) unique to each tolled system collects toll transaction information and processes it before sending it to the *Good To Go!* back office for posting to customer accounts. The WSF FMAS is expected to be located in the 2901 network room in downtown Seattle; this location is already well connected to the WSDOT network.

While antennas mounted overhead are most typical method for high-speed open road tolling, side-mounted antennas have been deployed in other parts of the US and proven to work in a production environment. Care must be taken to mount the antenna in a location where it can read passes mounted on all types of vehicles.

### Photo-Tolling

Photo-tolling works by matching a license plate to a customer using video cameras at the toll point. It is a convenient method to toll customers who do not use a facility frequently, or who do not want to use a pass for some reason. However, photo-tolling is more expensive to perform than pass-based tolling due

to the cost of additional equipment needed and the cost of matching photographs to license plates/customers.

For these reasons photo-tolling was not considered for WSF fare payment. All customers will be required to have a valid *Good-to-Go!* account and pass, or use a different payment method at the booth. This eliminates the need for cameras and back-office license plate matching.

### **Swipe-able Good To Go! Cards**

Some toll systems have debit-type cards linked to customer accounts for use in paying tolls and other services such as parking fees. Washington State is not yet using this payment method, but it was included in the alternatives analysis because it could provide a convenient way for customers to pay ferry fares in the future.

### **Toll Booths**

Toll booth collection is also performed in Washington State, but it was not relevant to this study since ferry customers already have the option to pay with cash and credit cards at ferry booths.

### **Unique Conditions of WSF Fare Collection**

Ferry fares vary tremendously depending on the vehicle, customer and route. Ferry customers must also be subject to a security screen prior to boarding. For these two reasons, it has been determined that open-road fare collection is not appropriate for WSF customers. All vehicles using *Good To Go!* as a payment method will continue to be required to stop at a booth for fare assessment and security screen prior to payment.

## **Toll Method Alternatives**

This study determined that there are five variations or alternatives of *Good To Go!* as a payment method which will meet the unique needs of WSF. This determination was based on information gathered during terminal tours, workshops and various meetings between experts from WSF and the Toll Division.

These alternatives vary in their capital and maintenance costs, convenience, performance and deployment schedule. Each alternative is described below, and the alternatives are then shown ranked against each other as a method to implement *Good To Go!* as a Phase 1 payment method. A detailed assessment of each alternative is provided in a following section.

### **Alternative 1: Antenna on Gantry**

The gantry-mounted method involves installing one gantry over all lanes in order to mount antennas over the lanes at each booth. This placement would mimic the placement in a typical toll installation. Although there are variations in gantry design, the principal concept would be that a single gantry structure similar to a sign bridge or truss would be constructed at the terminal plaza spanning the entire width of the plaza and lanes. The antennas would be mounted directly overhead of each lane. Due to the relatively small and lightweight antennas and related equipment the gantry structure could be designed for light duty as compared to a typical highway gantry structure.



## **Alternative 2: Antenna on Cantilever**

The cantilever mounting concept would also accommodate an overhead antenna configuration via a single pole, similar to a street-light pole, with a cantilevered arm reaching out over the lane from the side. A single pole could also accommodate an arm to each side to cover two lanes.

## **Alternative 3: Antenna on Existing Infrastructure**

In this configuration, the antenna would be mounted to the side of the payment lane, where it would be focused towards the vehicle in a horizontal angled position. This is commonly referred to as a “side-fire” configuration. In a side-fire configuration, the antenna would be mounted to the booth structure itself. The height of the antenna would be such that its read zone could be focused across the toll lane to capture the *Good To Go!* passes from varying vehicle heights (cars and large commercial vehicles).

An alternative to this option would be to mount the antenna to an existing terminal canopy. Under this alternative, a *Good To Go!* antenna would be located directly overhead of the toll lane making use of the existing toll plaza canopy structure. This would be accomplished by installing an antenna mounting bracket directly into the overhead structure of the toll plaza canopy. Conduit and or cable runs may be hidden within the canopy structure as opposed to surface mounts. This option would only be available at terminals with existing canopies: within the Phase 1 implementation group, that includes the Coleman and Bremerton terminals.

## **Alternative 4: Swipe-able Good To Go! Cards**

An alternative to reader mounting would be to require the traveler to present a wallet-sized *Good To Go!* card to the booth attendant, which the attendant would swipe through an existing card reader inside the booth. No antenna or reader would be required. Swipe-able cards are not currently used for tolling purposes in Washington State, but they have been used successfully by other US toll authorities.

## **Alternative 5: Handheld Good To Go! Reader**

A second alternative to reader mounting would be to require the booth attendant to step outside the booth to read the vehicle pass with a hand-held mobile reader. No antenna would be required. Handheld readers are not currently used for tolling purposes in Washington State, but they have been used successfully by other US toll authorities.

## **Toll Method Assessment Criteria**

To conduct an assessment of the various alternatives it is necessary to evaluate the potential impacts and viability of each infrastructure solution. The intention of this assessment is provide an initial high level review of each alternative to identify any fatal flaws and to further examine the impacts for future consideration. In providing this assessment, several key criteria were established in order to compare and assess each alternative. Below is an explanation of the criteria considered in the assessment.

## Capital Cost

This assessment criterion relates to the potential capital cost impact of providing the required infrastructure and considers the impact or level of complexity of installing the support structure to mount a *Good To Go!* antenna at each ferry terminal tollbooth lane. This criterion considers the physical impact of the lane infrastructure. It takes into consideration elements such as civil work required for foundations/footings for poles or gantries, including on ferry docks in some locations. It also considers other infrastructure such as mounting structures, brackets, cabling for communications and power requirements. Finally, it includes the cost of fitting a new structure into the highly-constrained tollbooth area.

The intent of this element is not to quantify the actual cost of the solution but to assist in establishing a relative scale of comparison specific to elements that differ between alternatives such as design, material, fabrication and installation. Elements common to all alternatives such as antennas, communications infrastructure and FMAS computers are not discussed or considered in this section. Full capital costs are discussed with the implementation estimate in Chapter 7.

## Maintenance

This assessment criterion takes into consideration the impacts related to the ease of maintenance of the *Good To Go!* antenna and related infrastructure, as well as the related cost to operate and maintain. This includes such aspects as accessibility to the equipment, lane closures, down time, and impact to terminal operations as they differ between alternatives. For example, gantry or overhead mounted antennas may require specialized equipment such as bucket trucks for maintenance access since the equipment will be high overhead.

## Convenience

This assessment criterion considers the solution's convenience to the public.

## Performance






This assessment criterion relates to how accurately the method would complete a transaction. In the case of an antenna system, it relates to how well the antenna could accurately read vehicles with *Good To Go!* passes. Specifically this evaluates the difference between side mounted (side-fire) and overhead mounted antennas. In a side-fire configuration, the antenna is located alongside the lane and focused in a more horizontal fashion across the lane. In an overhead mounted configuration, the antenna's read zone can be directly tuned or focused vertically downward to a specific location on the pavement in front of the terminal booth.

## Schedule

This assessment criterion relates to the amount of time it would take to implement the solution, including environmental planning and permitting, infrastructure and toll system design, back office modifications to toll and WSF systems, and construction time. It also includes the time needed to make programming changes specific to the alternative.

Applying these criteria elements, the alternatives were evaluated and compared against each other to provide a high-level comparison. The matrix below represents the summarized results of this assessment. Alternatives were assessed for each criterion on a qualitative five-level scale as shown in Table C-1.

**Table C-1: Rating Scale Description**

	Indicates that the alternative meets the criteria and has less of an impact compared to other alternatives
	Indicates the alternative meets the criterion but is slightly less desirable.
	Indicates the alternative is relatively neutral in terms of cost or impacts compared to the other alternatives.
	Indicates the alternative may experience or introduce complexities that are less than desirable compared to other alternatives.
	Indicates that the alternative does not meet the criterion and is much less desirable compared to other alternatives.

## Phase 1 Implementation Method Assessment

Each of the five alternatives for Phase 1 implementation was ranked against each other in Table C-2. Each alternative is discussed below with regard to the measurement criteria.

### Alternative 1:


























#### Antenna on Gantry

**Capital Cost** – Gantries required footings and foundations. At some terminals, these would have to be installed on wooden pier structures, increasing costs.

**Maintenance** – With the overhead gantry mounting, any maintenance or access to the antenna would require a lane closure and loss of use of the lane for that period of time.

**Convenience** – The tollbooth attendant process would be limited to pressing a button inside the tollbooth indicating the method of payment.

Pass reads would happen automatically once the toll system was invoked.

Table C-2: Phase 1 Toll Method Ranking	Capital Cost	Maintenance	Convenience	Performance	Schedule
<b>Alternative 1</b> <i>Antenna on Gantry</i>					
<b>Alternative 2</b> <i>Antenna on Cantilever</i>					
<b>Alternative 3</b> <i>Antenna on Existing Infrastructure</i>					
<b>Alternative 4 – Defer Analysis</b> <i>Swipe-able Good To Go! Card</i>					
<b>Alternative 5 – Defer Analysis</b> <i>Handheld Good To Go! Reader</i>					

**Performance** - From a performance perspective, the overhead gantry mounting of the antenna would potentially provide the greatest accuracy, simplicity in setup and tuning of the electronic equipment.

**Schedule** – Design, procurement and installation will require more time due to the gantry than a solution with no structure. With a full gantry at the terminal plaza, some users and local residents may be opposed to the visual aesthetics a gantry introduce, which may require time for public involvement. The environmental planning and permitting process required for a gantry solution can be expected to be relatively complex as it would involve foundation design and construction.

## **Alternative 2: Cantilever Mounted Antennas**

**Capital Cost** – The overall cost of a cantilever structure could also be moderately higher than that of the other alternatives including material costs as well as design, construction and installation. Although the foundation/footing needs may not be as great the gantry structures, constructing the infrastructure required to support the cantilevers on wooden pier structures might be costly.

**Maintenance** – The overhead mounting again would require a lane closure and loss of use of the lane during maintenance needs.

**Convenience** – The tollbooth attendant process would be limited to pressing a button inside the tollbooth indicating the method of payment. Pass reads would happen automatically once the toll system was invoked.

**Performance** - From a performance perspective, the overhead cantilever mounting of the antenna would potentially provide the greatest accuracy, simplicity in setup and tuning.

**Schedule** – Design, procurement and installation will require more time due to the cantilever than a solution with no structure. The visual aesthetics of a cantilever structure may also encounter a negative impact from local residents necessitating a time-consuming public involvement process. Although not as intrusive as a full gantry, the environmental planning and permitting process required for cantilevers could be relatively complex as it would involve foundation design and construction.

## **Alternative 3: Antenna on Existing Infrastructure**

**Capital Cost** – This solution makes use of existing infrastructure leading to a relatively low capital cost.

**Maintenance** – In the worst-case scenario, an overhead mounting to the existing canopy would require a lane closure and loss of use of the lane for that period of time. Maintenance of a side-fire antenna would much less disruptive to operations. In most cases, maintenance access to the antenna could be accomplished by simple use of a ladder as opposed to a bucket or lift truck.

**Convenience** – The tollbooth attendant process would be limited to pressing a button inside the tollbooth indicating the method of payment. Pass reads would happen automatically once the toll system was invoked. This solution would be the most convenient to the public and to WSDOT.

**Performance** - From a performance perspective, the side-fire mounting may encounter more performance challenges compared to an overhead mounting. With the side-fire antenna, the radio frequency field is transmitted in more of a horizontal direction across the lane to read the *Good To Go!* pass in the vehicle. In this configuration, measure must be taken to avoid accidentally reading a *Good To Go!* pass in an adjacent lane and inadvertently charging the wrong customer. This can be mitigated through the reader logic and additional lane controller software logic.

**Schedule** – This solution would be the fastest to implement because it would require minimal design, procurement and installation time, and the most minimal integration with Wave2Go and *Good To Go!*

back office systems. A new side-fire antenna type would need to be introduced and tested, which would take time. The environmental planning and permitting would be relatively simple, if necessary at all.

#### **Alternative 4: Swipe-able Good To Go! Cards**

**Capital Cost** – These cards would be processed through the existing Wave2Go card machine so no additional peripherals would need to be added within the booth. However the cards would require some integration with the WSF Wave2Go and *Good To Go!* Back office systems, which would be difficult and expensive.

**Maintenance** – No maintenance needs because no additional equipment is required.

**Performance** – Swipe-able cards would perform very well since card reads would be assured by a swiping action inside the booth. No antenna tuning would be required and mis-reads would be non-existent.

**Convenience** – Public convenience would be highly impacted due to the need to carry and present a *Good To Go!* card in order to use the service. Customers would need to be educated in this new toll solution since it does not currently exist. Tollbooth operators would also need to swipe the card, requiring a change to their work process.

**Schedule** – Card integration with the WSF Wave2Go and *Good To Go!* back office systems would have a large schedule impact.

#### **Alternative 5: Mobile Good To Go! Reader**

**Capital Cost** – The addition of a mobile card reader inside the tollbooth might require retrofitting the existing booth space. Safety enhancements for the tollbooth attendant would add to the cost of this alternative.

**Maintenance** – Mobile pass readers would need periodic maintenance. However, a malfunctioning mobile reader could be swapped for a spare in a short period of time, and therefore maintenance might not require a tollbooth closure in order to be performed.

**Performance** – Mobile readers would need to pass closely to a pass. This would be accomplished relatively easily when the pass was mounted on the windshield of a typical passenger vehicle or on a motorcycle license plate, but less well on a large truck where the pass might not be easily visible from the ground. No antenna tuning would be required.

**Convenience** – The tollbooth attendant process would be highly impacted due to the need to step outside the booth with a mobile reader and move around a vehicle in order to read the mounted pass.

**Schedule** – The time to integrate this solution would be relatively low, though new scanner equipment would need to be introduced and tested in order to integrate into the existing toll vendor solution.

The remaining three alternatives were further analyzed in order to form a recommended alternative for an advanced implementation. See Chapter 7 and Appendix D for more information about costs.

Figure C-1 shows the differences in physical infrastructure between the three alternatives that were advanced for further analysis. As illustrated in the figure, the toll equipment is essentially the same regardless of the major variations in capital cost, O&M cost and schedule arising from the physical infrastructure selected to support the toll equipment.

**Figure C-1: Physical Infrastructure Alternatives**

**Alternative 1 – Gantry**



**Alternative 2 – Cantilever**



**Alternative 3 – Existing Infrastructure\***



\* use existing infrastructure such as ferry booth or terminal canopy

## Appendix D – Advanced Implementation Cost Estimates

Of the five Alternatives evaluated in Appendix C, three were further analyzed and cost estimates were prepared.

### Alternative 1: Antenna on Gantry

The gantry-mounted method involves installing one gantry over all lanes in order to mount antennas over the lanes at each booth. A single gantry structure similar to a sign bridge would be constructed at the terminal plaza spanning the entire width of the plaza and lanes. The antennas would be mounted directly overhead of each lane, mimicking the placement in a typical toll installation.

### Alternative 2: Antenna on Cantilever

The cantilever mounting concept would also accommodate an overhead antenna configuration via a single pole, similar to a street-light pole, with a cantilevered arm reaching out over the lane from the side. A single pole could also accommodate an arm to each side to cover two lanes.

### Alternative 3: Antenna on Existing Infrastructure

In this configuration, the antenna would be mounted to the side of the payment lane, where it would be focused towards the vehicle in a horizontal angled position. This is commonly referred to as a “side-fire” configuration.

An alternative to this option would be to mount the antenna to an existing terminal canopy. Under this alternative, a *Good To Go!* antenna would be located directly overhead of the toll lane making use of the existing toll plaza canopy structure. This option would only be available at terminals with existing canopies: within the early implementation group that includes the Coleman and Bremerton terminals.

**Table D-1: Alternative Estimates**

Mounting Alternative	Estimate - 5% contingency	Estimate - 20% contingency
<b>Alternative 1 - Total</b>	<b>\$6,306,000</b>	<b>\$7,664,000</b>
Toll System	\$4,731,000	\$5,897,000
WSF Back Office	\$394,000	\$442,000
Toll Back Office	\$1,181,000	\$1,325,000
<b>Alternative 2 - Total</b>	<b>\$5,473,000</b>	<b>\$6,634,000</b>
Toll System	\$3,855,000	\$4,824,000
WSF Back Office	\$405,000	\$453,000
Toll Back Office	\$1,213,000	\$1,357,000
<b>Alternative 3 - Total</b>	<b>\$4,248,000</b>	<b>\$5,162,000</b>
Toll System	\$2,462,000	\$3,202,000
WSF Back Office	\$447,000	\$490,000
Toll Back Office	\$1,339,000	\$1,470,000



## Appendix E – *Good To Go!* Pass Study

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### Background

*Good To Go!* RF passes are currently in use for tolling on three Washington facilities. Drivers can submit payment without stopping at a tollbooth, reducing congestion on these routes. This same system could be implemented on Puget Sound ferries, optimizing the loading process.

### Purpose

The purpose of the study was to determine the proportion of ferry riders whose cars are equipped with *Good To Go!* passes.

### Testing

#### Execution

Testing was performed on ferries leaving Pier 52 during the afternoon peak and ferries leaving the Southworth terminal during the morning peak. The windshields of cars travelling between Seattle and Bremerton/Bainbridge Island and between Southworth and Fauntleroy/Vashon Island were monitored for *Good To Go!* passes or evidence of tag presence, including Velcro mounts and sticker shields. Counts of tagged cars and total cars were recorded. Two testers were present. Each tester monitored one of the two operational slips.

#### Test Schedule

Testing of pass penetration was performed on Friday, October 18 and Thursday, October 24, 2013 at the downtown Seattle ferry terminal. Four Bremerton and five Bainbridge Island ferries were surveyed. Testing of pass penetration at the Southworth slip was performed in Monday, October 21 and Tuesday, October 22, 2013.

The departure times of ferries surveyed are listed below:

Bremerton	Bainbridge Island	Fauntleroy/Vashon Island
15:00	15:00	5:00
16:20	15:45	6:00
17:35	16:40	6:40
18:45	17:30	7:55
19:20	18:20	



## Procedures

The following procedures were used for the study:

### **Authorization**

WSF sent out a Quick Notice to WSF personnel in advance of the study.

Surveyors checked in with the Terminal Agent at the terminal thirty minutes prior to start of testing and followed Terminal Agent direction about placement of surveying personnel. The location of the surveyor was pre-arranged to allow a clear view of vehicle windows, but keep surveyors out of the way of ferry passengers and WSF personnel.

The surveyors checked out with the WSF Terminal Agent upon completion of the study.

### **Set-up**

The following locations were monitored:

- Seattle slip for Bremerton bound ferry
- Seattle slip for Bainbridge Island bound ferry
- Southworth slip for Fauntleroy/Vashon Island bound ferry

Each of the surveyors was positioned at the location selected by the WSF Terminal Agent, and shifted position only with permission of the Terminal Agent.

### **Test Procedure followed by the Surveyors**

1. Visit ferry dock several days prior to testing to verify observation locations.
2. Record arrival and departure times of all Bainbridge Island, Bremerton, and Fauntleroy/Vashon Island bound ferries scheduled to arrive during the testing period.
3. Travel to facility 45 minutes before scheduled arrival of the first ferry.
4. Check in with ferry officials.
5. Position testers at location selected by WSF Terminal Agent before ferry boarding begins.
6. Once ferry boarding begins, count and record the total number of cars exiting and entering the ferry with passes present on their windshield or with evidence of pass presence.
7. Repeat steps 5 and 6 for remaining scheduled tests.
8. Input test data into testing spreadsheet.

## Results and Analysis

### **Results**

This section provides tables of car and pass counts for each ferry arrival/departure. WSF sales data for sailings was sent by WSF so saturation could be determined.

Table E-1 shows the number of passes counted and the total number of cars on each of the ferries surveyed.

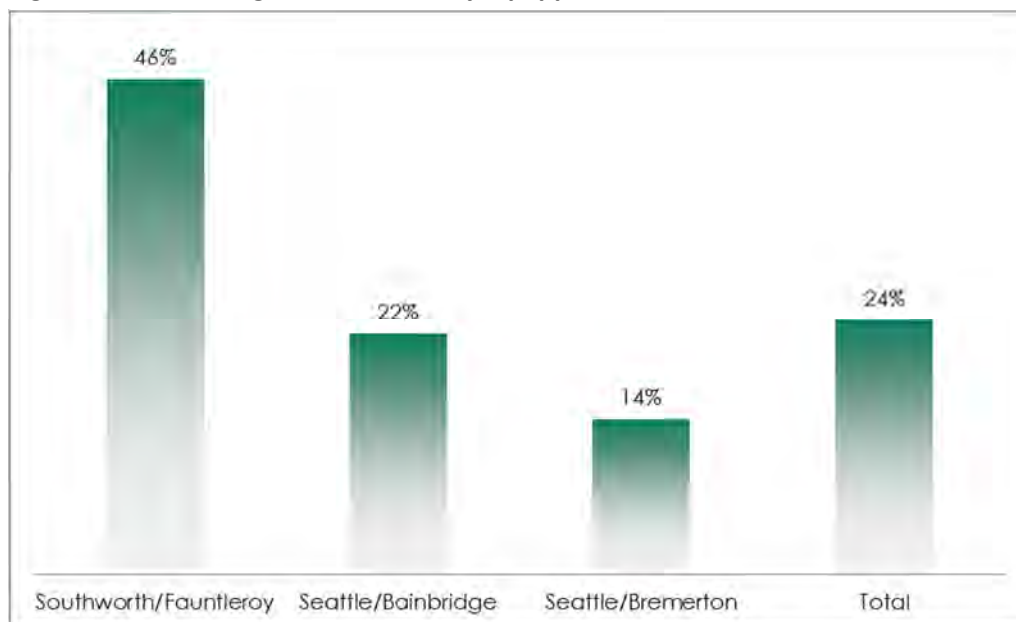
**Table E-1: Ferry Pass Testing Results**

From	To	Time	Date	Total Passes	Total Vehicles	Penetration
Fauntleroy	Southworth	4:25	10/21/2013	5	18	28%
Southworth	Fauntleroy	6:00	10/21/2013	34	112	30%
Southworth	Fauntleroy	6:40	10/21/2013	39	52	75%
Southworth	Fauntleroy	7:55	10/21/2013	45	58	78%
Southworth	Fauntleroy	8:20	10/21/2013	14	39	36%
Southworth	Fauntleroy	5:00	10/22/2013	28	53	53%
Southworth	Fauntleroy	6:00	10/22/2013	36	110	33%
Southworth	Fauntleroy	6:40	10/22/2013	25	56	45%
Southworth	Fauntleroy	7:55	10/22/2013	26	58	45%
Southworth	Fauntleroy	8:20	10/22/2013	10	15	67%
Seattle	Bainbridge Island	15:01	10/18/2013	40	259	15%
Seattle	Bainbridge Island	15:47	10/18/2013	52	238	22%
Seattle	Bainbridge Island	16:50	10/18/2013	49	307	16%
Seattle	Bainbridge Island	17:31	10/18/2013	42	210	20%
Seattle	Bainbridge Island	18:42	10/18/2013	42	179	23%
Seattle	Bainbridge Island	16:40	10/24/2013	33	301	4%
Seattle	Bainbridge Island	17:30	10/24/2013	38	229	6%
Seattle	Bainbridge Island	18:20	10/24/2013	25	168	13%
Bainbridge Island	Seattle	16:10	10/24/2013	31	164	16%
Bainbridge Island	Seattle	17:00	10/24/2013	12	159	25%
Bremerton	Seattle	14:55	10/24/2013	13	70	44%
Bremerton	Seattle	16:20	10/24/2013	14	76	28%
Bremerton	Seattle	17:17	10/24/2013	21	77	43%
Seattle	Bremerton	15:00	10/24/2013	27	82	46%
Seattle	Bremerton	16:20	10/24/2013	40	119	21%
Seattle	Bremerton	17:35	10/24/2013	31	100	31%
Seattle	Bremerton	18:45	10/24/2013	21	59	20%

## Analysis

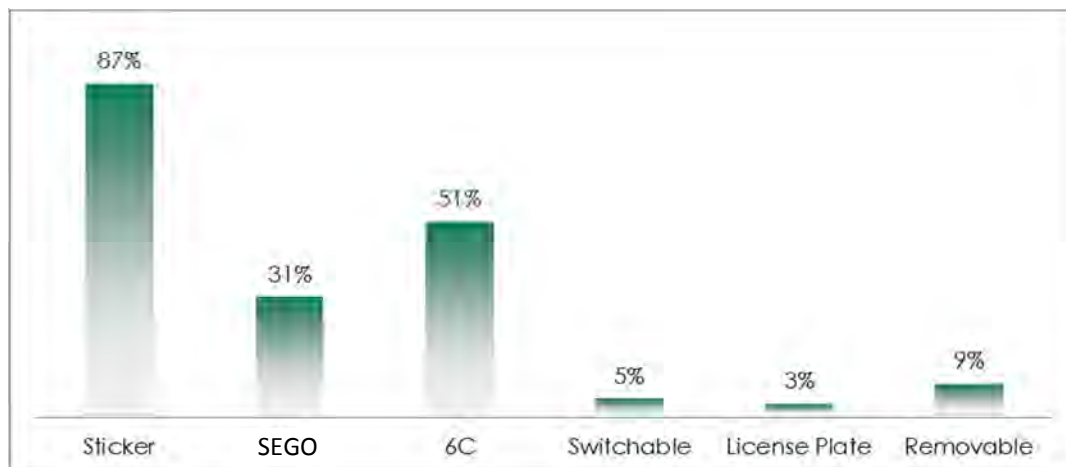
Penetration of passes varied from route to route. Penetration on all routes varied from 14 percent to 46 percent. Figure E-1 below shows the total proportion of cars with passes per route. Overall, 24 percent of cars had a pass.

**Figure E-1: Percentage of Cars on Ferry Equipped with Pass**



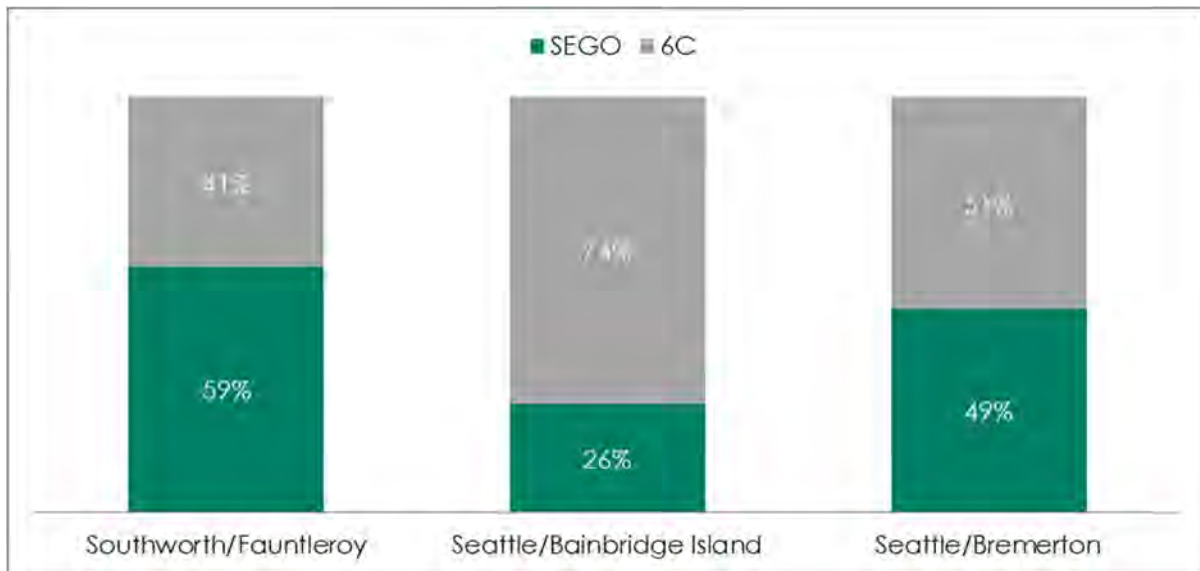
The most common pass form was the sticker. Nearly one third of cars with passes had a TransCore Super eGo (SEGO) sticker pass, and more than half had a 3M manufactured 6C protocol sticker pass. Switchable, License Plate, and Removable passes accounted for the rest of the total. The exact breakdowns can be seen in Figure E-2.

**Figure E-2: Pass Types Seen on Cars Travelling on Ferry**



The Southworth/Fauntleroy route had 31 percent more SEGO passes than 6C passes. On the Seattle/Bremerton route, there were 5 percent more 6C passes than SEGO. However, 6C passes on the Seattle/Bainbridge Island route outnumbered SEGO passes 3 to 1.

**Figure E-3: Share of SEGO and 6C Passes**



In the last year surveyed, 2008, WSF served 297,000 unique riders (*Fare Media Study 2012*). Due to the recession, it can be assumed that the number of unique riders served has not changed since 2008. Half of those riders entered the ferry in an automobile, and 39 percent were frequent riders. There were a total of 6 million car trips on the ferry system in 2012 (*Traffic Statistics Rider Segment Report January 16<sup>th</sup>, 2013*). The proportion of trips on each of the routes surveyed in this study is shown in Figure E-4. For this study it is assumed that the share of unique automobile passengers served by each route is proportionate to the share of total trips on that route. The penetration percentages calculated from the data collection can then be used to determine the number of frequent unique riders on each route that do not possess passes. The following figures are multiplied to get the number of unique riders *without* passes for each route:

- Ratio of Car trips on given route over total car trips on all routes
- Percentage of cars surveyed on given route that do not have passes
- Total number of unique frequent riders

**Figure E-4: Cars on Surveyed Routes as a Percentage of All Cars Transported**



## Conclusion

Overall, it was found that 24 percent of the sampled cars possess *Good To Go!* passes. Penetration was highest on the Southworth/Fauntleroy route; 46 percent of all vehicles on those boats possessed a pass.

This is largely due to the presence of the Tacoma Narrows Bridge, even more evident as there are more SEGO tags than 6C tags on that route. Penetration of tags was lower on the Bainbridge and Bremerton routes, 22 percent and 14 percent respectively.

Previous studies confirm that 39 percent of approximately 150,000 passengers using vehicles were frequent users. It is assumed that 24 percent of these users already have *Good To Go!* passes. This leaves approximately 44,000 remaining frequent automobile users who may require passes. The Seattle-Bremerton routes will require an additional 19,000 passes, the most of the surveyed

**Table E-2: New Passes Recommended**

Route	Recommended New Passes
Southworth/Fauntleroy	2,300
Seattle/Bainbridge	19,100
Seattle/Bremerton	5,100
Total	43,800

routes. The summary of recommended new passes by route is shown in Table E-2. According to the 2012 *Fare Media Study*, over 60 percent of frequent ferry users would obtain a *Good To Go!* pass if it could be used for payment on WSF vessels. Nearly 90 percent of these riders would obtain a pass if using *Good To Go!* meant paying a reduced fare. Therefore, it is recommended that the number of new passes to be stocked equal the number of frequent users who do not yet possess them.

There are some gaps in this study that must be addressed. Only three of the eight total WSF routes were surveyed. Penetration on the northern routes (i.e. Keystone-Port Townsend) is likely lower due to their distance from current Washington State toll facilities. Additionally, the trip counts of the 2012 *Traffic Statistics Rider Segment Report* were broadly applied to the unique and frequent ridership estimates from the 2012 *Fare Media Study*. In this study, frequent riders are proportionally distributed across the system with total trip counts. However, it is likely that frequent riders are more common on the commuting routes between major population centers. In order to get more accurate estimates of new pass demand, more data is needed on the proportion of frequent ferry riders who use vehicles.

This report provides an estimate of the number of new passes that would be needed if WSDOT decides to implement automatic payment methods for WSF fares using pass readers.

## Appendix F – WSF Ticketing and Reservation Systems

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### Gateway Ticketing System

While in general the Gateway Ticketing System is functioning as intended, the off-the-shelf software and systems have a number of limitations and issues. The system was built on a foundation of aging but inexpensive software that was designed in the 1980's for much smaller applications. Many modules of the ticketing system were built in MS-DOS and retain its characteristics, making it difficult and costly to adapt to new business opportunities and the changing business environment.

Because the application in use pre-dates the Microsoft Windows environment, several layers of software have been required to address key deficiencies. For example, the concept of a complete SQL transaction is not inherent in the basic code; instead, a series of local text files at each tollbooth keeps track of individual pieces of a transaction. These journal files are constantly processed and re-processed to assure that the SQL records in a central data base agree with the activity logged at each seller location.

The individual ticketing system programs cannot be hosted on Windows servers. Modern business applications are typically built around the concept of “services” in the computer operating system that support a range of tasks and provide built-in security and integrity. This approach is the standard in Microsoft Windows but was not available when the current system was developed. As a result, WSDOT developed customized shells around some of these programs so that they behave like a Windows Service and can be counted on to be “awake” at all times.

User security is also lower in the ticketing system than would be expected in a modern enterprise-class solution. The point of sale software is not integrated with the enterprise directory of users, and so must maintain a separate set of passwords and permissions for the users in addition to permissions secured by the corporate Microsoft Active Directory. This shortcoming is both a security risk and an added burden to administrators.

As changes in the business environment arise, business applications must be modified to meet new challenges and requirements. This is very difficult with existing ticketing system, because the vendor does not provide an Application Programming Interface (API) with the exception of one module, the sales processing engine. As a result, significant processing changes like interfaces to reservations or changes to the procedures followed at tollbooths must be coded by the vendor, with resulting monetary costs, delays, and prioritization determined by the vendor, not WSDOT. This reliance on the vendor is felt particularly keenly when deploying new approaches like ORCA or *Good To Go!* integration. Every enhancement becomes a bolt-on (“best effort”) vs. a plugin using well-tested APIs and approaches. WSDOT has been addressing these new business needs with a significant amount of database programming; however, these database exchanges of information have reached a point where further reliance on them could be untenable.

WSDOT is at a disadvantage with the current ticketing system in terms of moving forward into meaningful integration with social media tools and mobile devices. The vendor has no roadmap or clearly developed plans to provide this integration, so progress will be constrained. In addition, business enhancements are not a priority for the vendor because they have limited applicability for the vendor's other clients.

After six years of incremental and “best effort” improvements made to the ticketing system by both the vendor and WSDOT, users still require an extraordinary amount of support on a 24/7 basis, which has strained IT support resources. Weekends routinely require immediate response to anywhere from a half-dozen thirty issues. An evening that does not require immediate attention from support staff is a rarity. Adding further complexity to the business model will be difficult to render in the software. The long-term approach to fare and toll collection merits a stronger foundation.

Thus far, WSF has been able to work around these system limitations. WSF has elected to build its own reservation software rather than buy an off-the-shelf product because of the difficulty of integrating off-the-shelf packages with Wave2Go and very limited vendor support which must be scheduled approximately one year in advance. WSF is looking at replacing Wave2Go with an account-based fare collection system around 2018. A new account-based fare collection system would provide the following benefits:

- **Customers.** WSF customers have *Good To Go!* accounts, ORCA cards, and use more than one WSF fare media product during a year
- **Fare media options.** An account-based system would allow WSF to offer its customers a variety of products. This could include a program that provides discounts or other incentives to frequent riders rather than requiring them to pre-pay for a non-refundable multi-ride card.
- **Reservations.** An account-based system would integrate with the reservation system so that customers would be able to make reservations through the same system and could have it linked to the same payment account.
- **Commercial accounts.** An account based system would allow WSF to integrate the commercial account system with its fare system.
- **Demand management pricing.** An account-based system would support time of day, day of week or other demand management pricing options, while preserving options to support frequent user policies.

## WSF Reservation Functions

### Routes and Planned Expansion

During peak sailing times, vehicle space on ferries is a scarce commodity. Sailings often overload, resulting in congestion in and around ferry terminals and long wait times for customers. At the same time, there is excess vehicle capacity on off peak sailings, resulting in the need to manage and spread demand for vehicle space on the ferries.

The 2009 WSF Long-Range Plan proposed a reservation system as the primary strategy to manage demand, spread peak vehicle traffic, and improve asset utilization, thus reducing customer wait times, community traffic congestion due to queuing, and the need for costly terminal and vessel expansion projects.

In June of 2012, WSF implemented Phase 1 of the new reservation system, which included its Port Townsend-Coupeville, Sidney, B.C., and San Juan Islands routes for commercial travel only.

The WSF call center currently takes reservations on the Port Townsend/Coupeville route, the international route between Anacortes-San Juan Island-Sidney, B.C., and for commercial customers

between Anacortes and the San Juan Islands. Beginning in December 2014, call center personnel will begin taking reservation between Anacortes and the San Juan Islands for all customers.

### **Vehicle Reservation System Goals**

In designing the new reservation system, WSF identified three goals centered around its three primary groups of stakeholders: customers, communities, and WSF.

- The system must work for WSF customers, being easy to use and offering an adequate degree of predictability, spontaneity, and flexibility.
- The system must work for ferry communities, reducing the negative impacts of queuing outside the terminal and allowing WSF customers and local residents to access local businesses and reduce congestion in residential neighborhoods.
- The system must work for WSF, recognizing the unique circumstances of its different routes, helping the agency manage demand, improving asset utilization, and responding to legislative direction.

### **Technology – System Features**

The reservations project began in 2010 with the Vehicle Reservation System Predesign Study. WSF proposed implementing the project in three Phases. Phase 1 is complete and WSF is currently planning for Phase 2.

- Phase 1: Port Townsend/ Coupeville, Anacortes/ Sidney, and commercial vehicles on Anacortes/ San Juan Islands routes
- Phase 2: All vehicles on Anacortes/ San Juan Islands routes and commercial vehicles system-wide
- Phase 3: All vehicles on Seattle/ Bainbridge, Seattle/ Bremerton, and Edmonds/ Kingston

Although the Predesign Study assumed WSF could buy an existing reservations software package and integrate it with its ticketing system, this was ultimately not realized. Off-the-shelf software packages that could be easily integrated into WSF's existing ticketing system were not available. WSF ultimately designed and built its own reservation system, allowing for flexibility to tailor the system as needed in future phases.

### **Planned Phase 2 Enhancements**

Phase 2 planning is currently underway to provide reservations to all customers in the San Juan Islands to/from Anacortes. Phase 2 is expected to be implemented in December 2014 with the following features:

- Enhanced business logic that allocates reservable space to residents of the San Juan Islands.
- Functionality for redeeming reservations at all terminals in the San Juan Islands including those that lack tollbooths for fare collection.
- Functionality for assessing a no-show fee where vehicle fares are not collected or where operating efficiencies can be achieved.
- Additional customer communication methods.
- Business process changes and code logic designed to promote lean efficiencies.



### Phase 3 – Vehicle Reservations Central Sound

WSF is scheduled to begin planning Phase 3 upon successful completion of Phase 2. At this time, it does not appear feasible to move to Phase 3 until the Gateway Ticketing System has been replaced. The challenges around integrating with the Gateway Ticketing System have caused up to a 60 second increase in transaction time at the tollbooth. This is being managed on Phase 1 and Phase 2 routes by adding tollbooth sellers so as to not impact vehicle staging and sailing on-time performance. WSF will not be able to add additional staffing for Central Sound routes and therefore will need a better integrated system prior to Phase 3. It should be noted that the 2013 Legislature budget did not include funding for Phase 3.

### Reservation Management

The Save a Spot website went live in 2012 and redemption began at terminals out of the new system in the same year. Since then, several software updates have been rolled out to improve performance, fix bugs, and add features.

Some of the defining features of Save a Spot include:

- **Multiple methods for managing reservations.** Customers are able to make, change, and cancel reservations online using the Save a Spot website and by phone.
- **Refundable deposits that apply to the fare price.** In order to make a reservation, most customers pay a deposit that is a portion of their fare. This deposit is applied to the total fare due when they check-in at the terminal. WSF is looking at modifying its operations by only requiring a valid credit card upfront to secure a reservation instead of collecting a deposit upfront. This simplifies tollbooth operations, allowing customers to use any form of payment including vehicle multi-ride products, and is expected to speed up the transaction time. If a customer does not travel on their reserved sailing or within the same operational day from the same terminal, then a reservation no-show fee will be charged.
- **Different account types.** Customers can choose to sign up for an account or make a reservation as a guest user. Accounts allow customers to store information like credit cards and vehicle types so that they do not need to re-enter this every time they make a reservation. Three types of accounts are available to customers:
  - **Universal Account.** Any customer can establish a universal account.
  - **Premier Account.** Premier accounts provide benefits to frequent ferry users, like not having to pay a deposit, and require a multi-ride revalue ticket to qualify. With the elimination of the reservation deposit, WSF is considering eliminating the premier account. This will help simplify the program.
  - **Commercial Account.** Commercial accounts provide benefits to commercial customers, like not having to pay a deposit, and require a WSF business account to qualify.
- **Flexible change and cancelation policies.** Customers can change or cancel reservations online or by phone. Customers receive a refund on their deposit if they cancel before 5pm of the day prior to the day of their sailing. They are allowed one free change after 5pm of the day prior to the day of their sailing.

### Staffing Needs to Support Save a Spot

- **Reservation Manager** – a full time reservation manager is needed to help monitor and manage the vehicle reservation system. This role will be responsible for monitoring system performance

to see if goals are being met and working with internal and external staff to modify business processes, as needed.

- **Revenue Control** – the revenue control department is responsible for handling reservation refunds, including refunding customers their reservation deposit when there are system problems. In addition, integration with the Gateway Ticketing System doesn't allow terminal staff to refund customers who have already redeemed their reservation but the sailing departure was cancelled due to weather or vessel repair. This happens frequently on the Port Townsend/Coupeville route due to heavy fog.
- **Information Agents** – approximately 20 percent of all vehicle reservations are made via an information agent. These customers don't have access to a computer, are not comfortable performing a financial transaction on-line, or English is their second language. In addition, many customers want to speak to the information agent to get additional assistance planning their overall travel. The percentage of calls to WSF is higher for customers calling an information agent to change or cancel their reservation due to concerns of whether they will be refunded their reservation deposit.
- **Web Agents** – web agents provide additional customer communication by placing information on the Save a Spot website, terminal advisory radios, and highway advisory radios. In addition, the web agents manage the reservations when there is a service disruption which includes relaxing business rules and sending additional communication to both reservation holders and all customers who have signed up for email notifications.
- **Terminal Load Manager** – a newly identified position that will be more critical with Phase 2 is a terminal load manager. This position helps plan where reservation vs. non-reservation vehicles will be staged to ensure all reservation holders board their reserved sailing. In addition, this position walks the line prior to the vehicle tollbooth, pulling vehicles around the queue to get them staged for their reserved sailing.

## Staffing

In the first 13 months of operation 256,852 reservations were made; 15 percent were made by the customer service staff with the rest completed by the customer on-line. Customers also changed 27,649 reservations, with 34 percent of these changes made by the customer service agents. About 9,743 customers canceled their own reservations, with 26 percent of the cancelations completed by customer service agents. Most reservation callers also need information concerning how to get to their final destination, what to do if they need an elevator, arrival information as well as information about customs, immigration and rules around children traveling internationally.

## Communications with Customers

The vehicle reservation system allows staff to email alerts or pertinent information to reservation holders, cancel sailings and refund customers. They also change reservations and refund customers outside of the policies when there is an emergent issue with the customer.

WSF call center staff work with truck drivers carrying loads over 80,000 gross vehicle weight and terminal engineering staff to ensure that the risk of damage to the transfer spans is minimized at terminals. Permits are issued based on axle weight, tidal conditions, etc. Staff also work with customers piloting vehicles over 8.5 feet wide.

Commercial account customers are assisted daily with making, canceling or changing reservations, as business plans can change quickly. The call center works with large groups to assist in making group reservations.