RITA Intelligent Transportation Systems Joint Program Office

Seattle/Lake Washington Corridor Urban Partnership Agreement

National Evaluation: Surveys, Interviews, and Workshops Test Plan

www.its.dot.gov/index.htm
Final – January 13, 2011
Publication Number FHWA-JPO-11-055

U.S. Department of Transportation
Research and Innovative Technology Administration

SEATTLE/LAKE WASHINGTON CORRIDOR
URBAN PARTNERSHIP AGREEMENT

NATIONAL EVALUATION: SURVEYS, INTERVIEWS, AND WORKSHOPS TEST PLAN

By

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Prepared for

United States Department of Transportation
Federal Highway Administration
Office of Operations
1200 New Jersey Avenue, S.E.
Washington, DC 20590

Contract No. DTFH61-06-D-00007/ORDER 07-T-08002/WO BA07-041

January 13, 2011

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Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FHWA-JPO-11-055		

4. Title and Subtitle	5. Report Date
Seattle/Lake Washington Corridor Urban Partnership Agreement: Surveys, Interviews and Workshops Test Plan	January 13, 2011
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
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9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Battelle 505 King Avenue Columbus, OH 43201	11. Contract or Grant No. DTFH61-06-D-00007/ORDER 07-T-08002/WO BA07-041

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
U.S. Department of Transportation Research and Innovative Technology Administration Federal Highway Administration Federal Transit Administration 1200 New Jersey Avenue, S.E. Washington, DC 20590	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This report presents the Survey, Interviews, and Workshops Test Plan for the national evaluation of the Seattle/Lake Washington Corridor (LWC) Urban Partnership Agreement (UPA) under the United States Department of Transportation (U.S. DOT) UPA Program. The Seattle/LWC UPA projects focus on reducing congestion by employing strategies consisting of combinations of tolling, transit, telecommuting/travel demand management (TDM), and technology, also known as the 4 Ts. Those strategies include variable tolling on all lanes of the SR 520 bridge, additional bus service in the SR 520 corridor, implementing active traffic management systems, and real-time traveler information signs on highways and at transit stops and stations. This Surveys, Interviews and Workshops Test Plan is one of ten test plans being developed. The other nine test plans consist of the following: traffic, transit, tolling, telecommuting/TDM, safety, environmental, content analysis, cost benefit analysis and exogenous factors. Each test plan is based on the Seattle/LWC UPA National Evaluation Plan. This test plan describes survey, interview and workshop data sources, data availability, and possible risks associated with the data. The methods for analyzing the data are discussed. The schedule and responsibilities for collecting, analyzing, and reporting the survey, interviews and workshop related analyses are presented.

17. Key Word	18. Distribution Statement
Urban Partnership Agreement, Congestion Reduction Demonstration, congestion pricing, tolling, HOT, congestion reduction, transit, bus rapid transit, telecommuting, evaluation	

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
		66	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

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ACKNOWLEDGEMENTS

A number of representatives from the Seattle/LWC UPA partnership agencies and the United States Department of Transportation provided information critical to the development of the test plans. The assistance of Tyler Patterson and Janet Matkin, from WSDOT; and Jane Lappin, Margaret Petrella, and Sean Peirce from the United States Department of Transportation Volpe National Transportation Systems Center is both recognized and appreciated.

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LIST OF ABBREVIATIONS

4Ts	Tolling, Transit, Telecommuting, and Technology
ATM	Active traffic management
CTR	Commute Trip Reduction
DMS	Dynamic message signs
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HOT	High-occupancy tolling
HOV	High-occupancy vehicle
I-5	Interstate 5
I-405	Interstate 405
I-90	Interstate 90
IRT	Incident Response Team
LWC	Lake Washington Corridor
MOE	Measure of effectiveness
Metro	King County Metro
MUTCD	Manual of Uniform Traffic Control Devices
P&R	Park and ride
PSRC	Puget Sound Regional Council
RITA	Research and Innovative Technology Administration
RSG	Resource System Group
TDM	Travel demand management
UPA	Urban Partnership Agreement
U.S. DOT	U.S. Department of Transportation
VMT	Vehicle miles traveled
Volpe	Volpe National Transportation Systems Center
WSDOT	Washington State Department of Transportation

1.0 INTRODUCTION

This report presents the test plan for collecting and analyzing data from surveys, interviews and workshops for the national evaluation of the Seattle Lake Washington Corridor (LWC) Urban Partnership Agreement (UPA) under the United States Department of Transportation (U.S. DOT) UPA program. The Seattle/LWC UPA is one of several large field deployments around the United States that are receiving U.S. DOT funding and which are intended to demonstrate congestion pricing and supporting strategies. The Seattle/LWC national evaluation will address the four primary U.S. DOT UPA evaluation questions shown in Table 1-1.

Table 1-1. U.S. DOT National Evaluation "Objective Questions"

Objective Question #1	How much was congestion reduced in the area impacted by the implementation of the tolling, transit, technology, and telecommuting strategies? It is anticipated that congestion reduction could be measured by one of the following measures, and will vary by site and implementation strategy: • reductions in vehicle trips made during peak/congested periods; • reductions in travel times during peak/congested periods; • reductions in congestion delay during peak/congested periods; and • reductions in the duration of congested periods.
Objective Question #2	What are the associated impacts of implementing the congestion reduction strategies? It is anticipated that impacts will vary by site and that the following measures may be used: • increases in facility throughput during peak/congested periods; • increases in transit ridership during peak/congested periods; • modal shifts to transit and carpools/vanpools; • traveler behavior change (e.g., shifts in time of travel, mode, route, destination, or forgoing trips); • operational impacts on parallel systems/routes; • equity impacts; • environmental impacts; • impacts on goods movement; and • effects on businesses.
Objective Question #3	What are the non-technical success factors with respect to the impacts of outreach, political and community support, and institutional arrangements implemented to manage and guide the implementation?
Objective Question #4	What are the overall costs and benefits of the deployed set of strategies?

The questions shown in Table 1-1 will be addressed by carrying out the following 10 "evaluation analyses" described in the Seattle/LWC UPA National Evaluation Plan: congestion, tolling, transit, telecommuting/travel demand management (TDM), technology, safety, equity, environmental, non-technical success factors, and cost benefit. Each of these 10 analyses relies upon various evaluation measures of effectiveness.

"Test plans" are the evaluation planning documents that describe how specific data will be collected and processed to yield the evaluation measures of effectiveness required for the various analyses. Whereas evaluation analyses are categorized according to related evaluation questions

or types of impacts, for example all equity-related impacts are addressed in the equity analysis, test plans are categorized according to common data types or sources. For example, the "Traffic System Data Test Plan" collects and processes all of the traffic data required for the national evaluation. There are a total of ten test plans for the Seattle/LWC UPA national evaluation. In addition to this Surveys, Interviews and Workshops Test Plan, there are test plans focusing on the following types of data: traffic, tolling, transit, telecommuting/TDM, safety, exogenous factors, environmental, content analysis, and cost benefit.

The relationship between test plans and evaluation analyses is discussed in Section 1.2. In short, analyses describe the evaluation questions and hypotheses to be investigated and the test plans describe how the data and measures of effectiveness needed to support the evaluation will be collected and processed. Most test plans collect data and provide measures of effectiveness that will be used in multiple analyses and most analyses rely upon data and measures developed through several different test plans.

The remainder of this introduction chapter identifies the Seattle/LWC UPA deployments and elaborates on the relationship between test plans and evaluation analyses. The remainder of the report is divided into these 6 sections corresponding to the various surveys, interviews and workshops: Chapter 2.0 describes the Volpe National Transportation Systems Center ("Volpe") Household Travel Survey. Chapter 3.0 describes the on-board surveys for transit riders. Chapter 4.0 describes the survey of Redmond TOD residents. Chapter 5.0 describes the stakeholder interviews and workshops. Chapter 6.0 describes the interviews with Washington State Patrol officers, Incident Response Team (IRT) operators, and bus operators. Chapter 7.0 describes surveys that the local partners are conducting in support of their own research but which will also inform the national evaluation.

1.1 The Seattle/LWC UPA

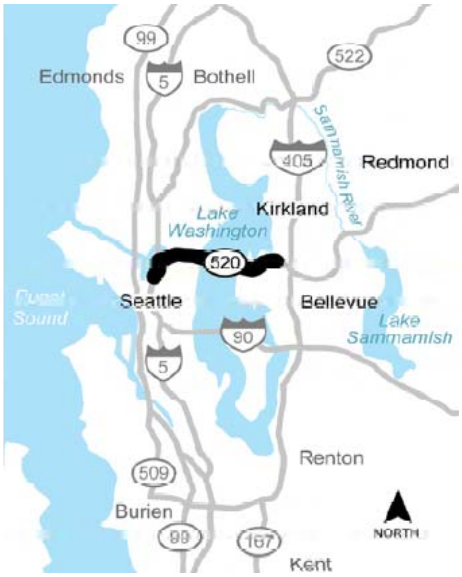
The Seattle/LWC was selected by the U.S. DOT as an Urban Partner to implement projects aimed at reducing congestion based on four complementary strategies known as the 4Ts: Tolling, Transit, Telecommuting/TDM, and Technology. Under contract to the U.S. DOT, a national evaluation team led by Battelle is assessing the impacts of the projects in a comprehensive and systematic manner in the Seattle/LWC and other sites. The national evaluation will generate information and produce technology transfer materials to support deployment of the strategies in other metropolitan areas. The national evaluation will also generate findings for use in future Federal policy and program development related to mobility, congestion, and facility pricing.

The Seattle/LWC UPA partners are the Washington State Department of Transportation (WSDOT), King County, and the Puget Sound Regional Council (PSRC). The Seattle/LWC projects are intended to reduce congestion on SR 520 between Interstate 405 (I-405) and Interstate 5 (I-5), a heavily-traveled east-west commuter route across Lake Washington. The lake separates downtown Seattle and points south from eastside communities like Redmond, Kirkland and Bellevue. The location of SR 520 is shown in Figure 1-1.

The U.S. DOT is allocating $154.5 million in Federal grant funding for the Seattle/LWC projects, drawn from Federal Highway Administration (FHWA), Federal Transit Administration

(FTA) and Research and Innovative Technology Administration (RITA) funding programs. The Seattle/LWC UPA projects consist of the following:

- **Variable tolling** on all lanes of SR 520 between I-405 and I-5.
- **Active Traffic Management** (ATM) on SR 520 and Interstate 90 (I-90)—the major freeway alternate route located about three miles south of SR 520—including lane control, dynamic message and advisory speed limit signage to alert drivers to delays and direct travel away from incident-blocked lanes.
- **Travel time signs** to provide travelers headed toward Seattle with real-time travel time estimates for SR 520 and alternate routes.
- **Enhanced bus service on SR 520** adding 90 one-way peak period trips and including purchase of 43 new buses.
- **Improvements to transit stops/stations** including improvements to two park-and-ride lots and real-time information displays at stops/stations.



Washington State Department of Transportation, "SR 520 Variable Tolling Project Environmental Assessment," March 2009.

Figure 1-1. SR 520 Location

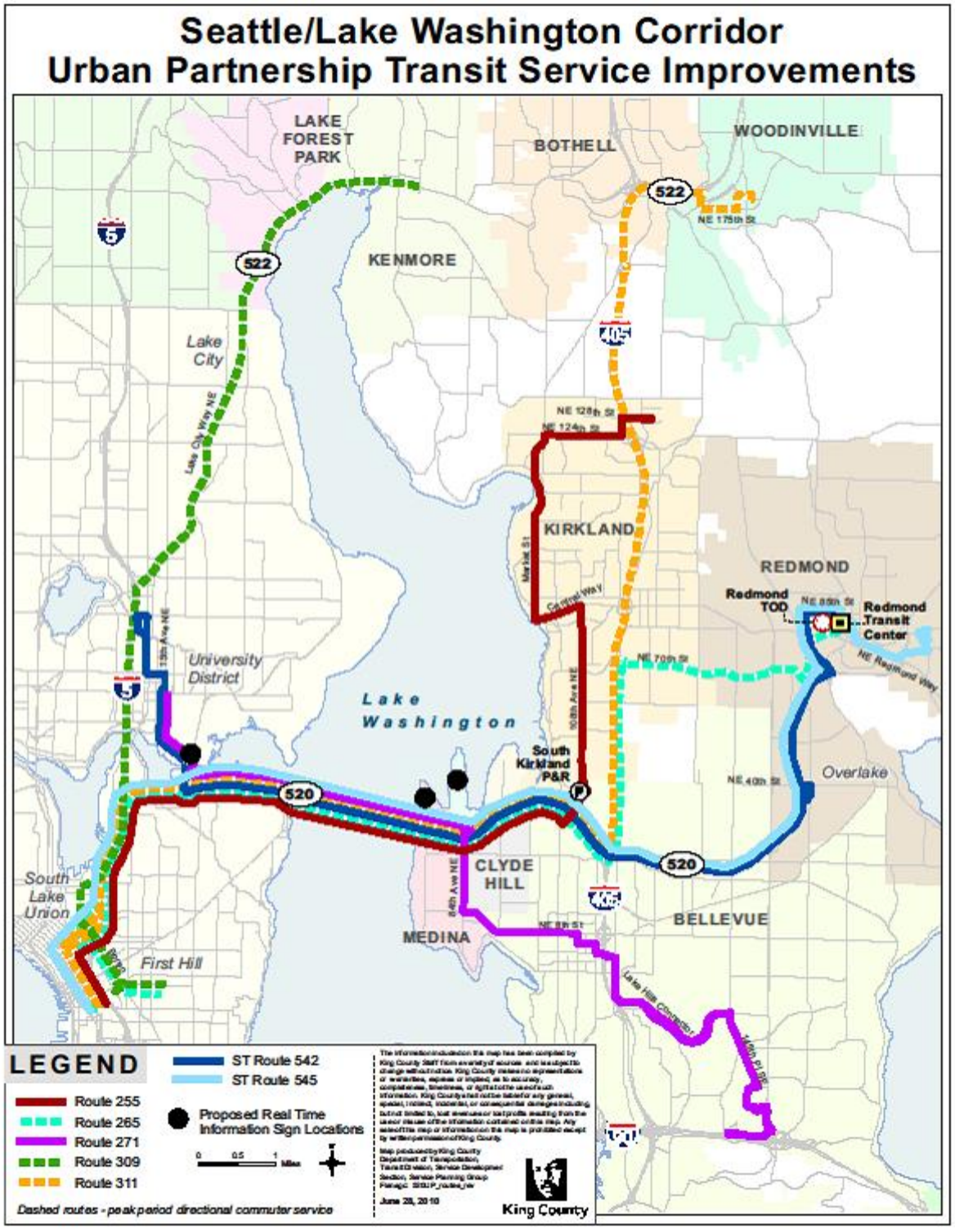
- **Various travel demand management strategies** funded locally such as employer-based strategies to promote ridesharing or telecommuting.
- **Regional ferry boat improvements** including new and replacement vessels, dock repairs, and terminal improvements.

Figure 1-2 shows the locations of the WSDOT UPA tolling and technology projects and Figure 1-3 shows the location of the UPA transit projects.

Schedule for the Seattle/LWC UPA Projects. The UPA projects will become operational in a phased manner. Tolling on SR 520 is currently scheduled to begin in mid-March 2011. UPA projects coming on line in advance of tolling include: Redmond Park-and-Ride/Transit Oriented Development (July 2009), travel time signs (second quarter 2010), active traffic management (SR 520 in third quarter 2010; I-90 in first quarter 2011), and new transit service (fourth quarter 2010). Transit real-time information displays are scheduled to be operational in the second quarter of 2011. The other park-and-ride project—South Kirkland—will be completed in 2014 and will not be evaluated because it will not become operational until after the evaluation is complete in 2012. The decision was made jointly by U.S. DOT and the local partners that because they are not expected to impact SR 520 corridor travel, the regional ferry boat improvements will not be evaluated.

Washington State Department of Transportation, WSDOT Projects website, "Lake Washington Congestion Management Projects," http://www.wsdot.wa.gov/Projects/LkWaMgt/UPAmap.htm, July 4, 2009.

Figure 1-2. Seattle/LWC UPA Tolling and Technology Projects



King County Department of Transportation, July 1, 2010.

Figure 1-3. Seattle/LWC UPA Transit Projects

1.2 Seattle/LWC National Evaluation Plan and the Use of Survey, Interview, and Focus Group Data

Table 1-2 shows which of the various Seattle/LWC UPA test plans will contribute data to each of the evaluation analyses. The "flow" between test plans is "one way" in the sense that test plans feed data and measures to the analyses rather than the reverse. The solid circles show where data from a given test plan constitutes a major input to an analysis; the open circles show where data from a given test plan constitutes a supporting input to an analysis. As shown in Table 1-2, the Surveys, Interviews and Workshops Test Plan provides major input to all of the evaluation analyses except for the cost benefit analysis.

Table 1-3 summarizes the survey, interview and workshop data collection that will be carried out in support of the national evaluation, including identification of the party responsible for carrying out the activity. Table 1-3 includes only those activities intended specifically to support U.S. DOT research. The national evaluation team's utilization of the results of surveys being conducted by the local partners to support local partner research (that is, activities not intended specifically to support the national evaluation) are discussed in Chapter 7.0. As discussed further in Chapter 7.0, in some cases the national evaluation team will or may ask the local partners to consider adding a few questions to their surveys. Note that although the Volpe household survey will include a transit component, a separate, pre- and post-deployment on-board transit survey will be required. The separate survey is necessary to achieve an acceptable sample size of transit users and to ensure access to new transit users—those that begin using transit after UPA deployment and which would not be included in the Volpe sample given their panel methodology.

Table 1-3 reflects the following changes relative to the Seattle/LWC Evaluation Plan finalized in November 2009:

- Eliminated the "General Public" survey because the marginal value of reaching a region-wide audience was not believed to warrant the expense.
- Replaced the "Corridor Drivers" survey with the Volpe Household Travel Survey, which will be funded and carried out by U.S. DOT (thus eliminating a major evaluation expense for the local partners).
- Eliminated the "Workers Changing to Telecommuting, Ride Sharing or Flexible Work Arrangements" survey(s). Current local partner surveys and the Volpe Household Travel Survey will provide data in this area.
- Eliminated the "Major Employers" and "Commercial Vehicle Operators" interviews because, since the final Evaluation Plan eliminated the Business Impacts and Goods Movement Analysis, these data are no longer required. (Those two analyses were eliminated because the local partners did not expect significant impacts in those areas and it was determined that limited evaluation resources could be better utilized.)

Table 1-2. Relationship Among Test Plans and Evaluation Analyses

Seattle UPA Test Plans	Evaluation Analysis: Congestion Analysis	Tolling Analysis	Transit Analysis	Telecommuting / TDM Analysis	Technology Analysis	Safety Analysis	Environmental Analysis	Equity Analysis	Non-Technical Factors Analysis	Cost Benefit Analysis
Traffic System Data Test Plan	●	○	○	○	●	○	●	○		●
Tolling Test Plan		●						○		●
Transit System Data Test Plan	○	○	●	○	●		○	○		●
Telecommuting Data Test Plan	○			●			○	○		○
Safety Test Plan						●				●
Surveys, Interviews & Workshops Test Plan	●	●	●	●	●	●	●	●	●	
Environmental Data Test Plan	○						●	○		●
Content Analysis Test Plan	○	○	○	○	○	○	○	○	●	
Cost Benefit Analysis Test Plan										●
Exogenous Factors Test Plan	○	○	○	○	○	○	○	○	○	○

● — Test Plan Data Constitutes a Major Input to the Evaluation Analysis

○ — Test Plan Data Constitutes a Supporting Input to the Evaluation Analysis

Table 1-3. National Evaluation Survey, Interview and Workshop Data Collection Activities

Data Collection Activity	Organization Responsible for Conducting the Survey/Interview/ Workshop	Summary Description
Surveys		
Corridor Users Survey (Household Travel Diary Survey)	Volpe	• Pre- and post-SR 520 tolling • Panel (same respondents pre and post) • 1,500 households total; 1,300 from random sample of SR 520 and I-90 drivers; 200 from on-board recruitment of transit riders • Each member of each household completes detailed, 2-day travel diary and some attitudinal questions • Will include some panel maintenance activities between pre and post-deployment surveys that may provide additional opportunities to gather attitudinal data
Transit On-Board Surveys	Local partners	• Pre- and post-SR 520 tolling • 500 valid surveys in each round • General travel behavior • Perceptions of the UPA strategies
Redmond Transit Oriented Development – Residents	Local partners	• Post-deployment only • Residents of TOD apartments • General travel behavior before and after moving to apartments • Factors influencing decision to move to TOD apartments
Interviews and Workshops		
Stakeholder Interviews and Workshops	National evaluation team	• Pre- and post-deployment: two rounds of small-group interviews with key UPA program participants, one at end of the implementation phase and one at the end of the operational phase • Large-group workshops after each round of interviews • Gain insights into the institutional arrangements, partnerships, outreach methods and other activities contributing to the successful planning, deployment and operation of the UPA projects
Washington State Patrol Interviews	Local partners	• Post-deployment only • Perception of the safety, congestion reduction and other impacts of the UPA projects
WSDOT Incident Response Team Member Interviews	Local partners	• Post-deployment only • Perception of the safety, congestion reduction and other impacts of the UPA projects
Bus Operator Interviews	Local partners	• Post-deployment only • Perception of the safety, congestion reduction and other impacts of the UPA projects

Table 1-4 summarizes the data to be collected through surveys, interviews and workshops and the rationale behind it, that is, the relationship between each data element and the associated measures of effectiveness (MOEs) and evaluation hypotheses and questions identified in the Seattle/LWC Evaluation Plan. Table 1-4 is organized by the population groups to be studied and then by the study instrument to be used. The proposed surveys, interviews and workshops are based on the latest (early June 2010) information from the local partners and Volpe.

Table 1-4. Surveys, Interviews and Workshop Data Element Summary

Survey/ Interview/ Workshop	Data Element	Measures of Effectiveness	Hypotheses/ Questions	Baseline	Post-Deploy-Ment
Population – Corridor Households (Chapter 2)					
1. Volpe Household Travel Survey	1.1 Travel Diary (Origins and destinations, trip logs, trip start and end times, trip purpose) 1.2 Route/lane used and toll paid	• Utilization of the SR-520 tolling system • Changes in travel times and destination patterns • Differences in use of Priced Facility • Contribution of UPA strategies to mode shift to transit, telecommuting, and carpooling	SEATolling-1 SEACong-2 SEACong-6 SEACong-7 SEAEquity-2 SEATransit-1	X	X
1. Volpe Household Travel Survey	1.3 Vehicle ownership	• Automobile ownership	SEAEquity-2	X	X
1. Volpe Household Travel Survey	1.4 Trip Satisfaction Levels	• Change in perception of traffic congestion	SEACong-10 SEACong-11	X	X
1. Volpe Household Travel Survey	1.5 Familiarity/ ridership on transit 1.6 Flexibility in work/school hours 1.7 Ability to telework 1.8 Employer-paid commuting, parking, or transit benefits	• Changes in teleworking • Mode choice	SEATele/TDM-1 SEATele/TDM-2	X	X
1. Volpe Household Travel Survey	1.9 Perception of change in congestion levels	• Change in perception of traffic congestion	SEACong-10 SEACong-11	X	X
1. Volpe Household Travel Survey	1.10 Trip Purpose and reasons for any deviations from typical commute patterns	• Contribution of UPA strategies to trip making	SEACong-1 SEACong-3	X	X

Table 1-4. Surveys, Interviews and Workshop Data Element Summary (Continued)

Survey/ Interview/ Workshop	Data Element	Measures of Effectiveness	Hypotheses/ Questions	Baseline	Post-Deploy-Ment
Population – Corridor Households (Chapter 2) – Continued					
1. Volpe Household Travel Survey	1.11 Attitudes about tolling, pricing, equity, transit	• How will travelers utilize the tolling system • Differences in use of priced facility	SEATolling-1	X	X
1. Volpe Household Travel Survey	1.12 Socio-demographic descriptors	• Used for analysis of other data elements	SEAEquity-1 SEAEquity-2	X	X
Population – Transit Riders (Chapter 3)					
2. On-board Transit Rider Survey	2.1 Prior mode of transit riders	• Actual and percent change in drivers and carpooler switching to transit after tolling	SEATransit-2	X	X
2. On-board Transit Rider Survey	2.2 Reasons for using transit	• Contribution of UPA strategies contributing to mode shift to transit	SEATransit-4	X	X
2. On-board Transit Rider Survey	2.3 Length of commute in time and distance	• Calculation of change in vehicle miles traveled (VMT)	SEAEnv-1	X	X
2. On-board Transit Rider Survey	2.4 Number of cars in the household	• Automobile ownership	SEAEquity-3	X	X
2. On-board Transit Rider Survey	2.5 Perception of UPA transit improvements (travel time dynamic message signs [DMS], more frequent bus service)	• Percentage of respondents citing a reduction in travel time • Percentage of respondents citing an improvement in travel reliability	SEATransit-1 SEACong-10	X	X
2. On-board Transit Rider Survey	2.6 Socio-demographic descriptors	• Used for analysis of other data elements	SEAEquity-1 SEAEquity-2	X	X
Population – Redmond TOD Residents (Chapter 4)					
3. Redmond TOD Resident Survey	3.1 Reasons for residence	• Contribution of UPA strategies contributing to mode shift to transit	SEATransit-4		X
3. Redmond TOD Resident Survey	3.2 Number of cars per household	• Automobile ownership	SEAEquity-2		X
3. Redmond TOD Resident Survey	3.3 Prior mode of travel 3.4 Use of public transportation	• Actual and percent change in residents switching to or increasing use of transit	SEATransit-2		X
3. Redmond TOD Resident Survey	3.5 Socio-Economic descriptions	• Used for analysis of other data elements	SEAEquity-1 SEAEquity-2		X

Table 1-4. Surveys, Interviews and Workshop Data Element Summary (Continued)

Survey/ Interview/ Workshop	Data Element	Measures of Effectiveness	Hypotheses/ Questions	Baseline	Post-Deploy-Ment
Population – Washington State Patrol (Chapter 6)					
4. State Patrol Interviews	4.1 Perception of changes in crashes and incidents since tolling, ATM and real-time travel times on DMS operational	• Change in perception of safety	SEASafety-1		X
4. State Patrol Interviews	4.2 Perception of change in congestion levels since tolling, ATM and real-time travel times on DMS operational	• Change in perception of traffic congestion	SEACong-10		X
Population – Washington DOT Incident Response Team (IRT) Responders (Chapter 6)					
5. IRT Member Interviews	5.1 Perception of changes in crashes and incidents since tolling, ATM and real-time travel times on DMS operational	• Change in perception of safety	SEASafety-1		X
5. IRT Member Interviews	5.2 Perception of change in congestion levels since tolling, ATM and real-time travel times on DMS operational	• Change in perception of traffic congestion	SEACong-10		X
Population – Transit Operators (Chapter 6)					
6. Bus Operator Interviews	6.1 Perception of changes in crashes and incidents since tolling, ATM and real-time travel times on DMS operational	• Change in perception of safety	SEASafety-1		X
Population – Transit Operators (Chapter 6) – Continued					
6. Bus Operator Interviews	6.2 Perception of change in congestion levels since tolling, ATM and real-time travel times on DMS operational	• Change in perception of traffic congestion	SEACong-10		X

Table 1-4. Surveys, Interviews and Workshop Data Element Summary (Continued)

Survey/ Interview/ Workshop	Data Element	Measures of Effectiveness	Hypotheses/ Questions	Baseline	Post-Deploy-Ment
Population – Commuters (Chapter 7)					
7. Commuter Surveys (Commute Trip Reduction)	7.1 Mode for typical commute trips 7.2 Frequency of Use	• Number of new ridesharers and telecommuters	SEATele/TDM-1	X	X
7. Commuter Surveys (Commute Trip Reduction)	7.3 Days per week telecommuting	• Number of commuters rescheduling or eliminate trips	SEATele/TDM-1	X	X
7. Commuter Surveys (Commute Trip Reduction)	7.4 Days per week using various commute modes (drive alone, carpool, bicycle, etc.) or alternative arrangements (telecommuting, compressed work weeks). 7.5 Length of commute in miles	• Numbers of vehicle trips and VMT reduced on SR-520 and related corridors, by mode, including carpool, vanpool, bus, walk, bicycle, compressed workweeks, telecommuting	SEATele/TDM-1	X	X
Population – Agency Stakeholders (Chapter 5)					
8. Stakeholder Interviews and Workshop	8.1 Roles in UPA and Expectations	• Observations from UPA participants	SEANon-Tech1 SEANon-Tech2	X	X
8. Stakeholder Interviews and Workshop	8.2 Institutional Arrangements – Keys to Success	• Observations from UPA participants	SEANon-Tech1 SEANon-Tech2	X	X
8. Stakeholder Interviews and Workshop	8.3 Outreach Activities – Keys to Success	• Observations from UPA participants	SEANon-Tech1 SEANon-Tech2	X	X
8. Stakeholder Interviews and Workshop	8.4 Lessons Learned	• Observations from UPA participants	SEANon-Tech1 SEANon-Tech2	X	X

This test plan includes preliminary questions for each of the surveys, interviews, and workshops. The questions and data collection protocols will be further refined by the local partners as they proceed with their data collection plans, with the national evaluation team providing continuing review and consultation.

Table 1-5 summarizes the high-level timeline for conducting the various interviews, surveys, and workshops. As indicated in Table 1-5, baseline data collection will occur over the period September 2010 to March 2011. Post-deployment data collection will occur over the period September 2011 (a few months after implementation of the final UPA project) to March 2012 (the end of the one-year post-deployment operational period). Table 1-5 also identifies what specific data products are expected to be transmitted to the national evaluation team by those responsible for data collection (e.g., survey data sets, survey analysis results, etc.).

All three of the surveys will compare conditions before (baseline) and after (post-deployment) implementation of UPA projects with the Volpe and transit rider surveys explicitly including before and after rounds of surveying. Although the Redmond TOD includes only an after survey, it includes exploration of issues pre- vs. post-TOD implementation. The general logic for survey timing is that the baseline surveys should be conducted in advance of the implementation of any UPA projects which are expected to significantly impact responses to the specific questions on the survey in question and the post-deployment surveys be conducted after the implementation of all UPA projects which could impact responses. For the most part, the timing of the Volpe and on-board transit rider surveys reflect that: The baseline Volpe Survey was conducted in November-December 2010 with the transit on-board survey planned for February 2011 (after the transit enhancements are in place but before the tolling begins). All the after surveys are scheduled to be implemented several months after the last UPA project (tolling on SR 520) is operational. In other areas of national evaluation data collection, such as with transit and traffic system data, data will be collected on a continuous basis and therefore the incremental impact of individual projects will be explored as those projects incrementally come on line. In the case of surveys, where it is not practical to conduct a separate survey after each project becomes operational, the impact of individual projects can only be parsed via questions exploring why traveler behavior changed or what factors contributed to perceptions.

Table 1-5. Surveys, Interviews and Workshop Timelines

Survey, Interview Element	Baseline Data Collection	Post-Deployment Data Collection End	Data Source and Agency	Data Products to be Transmitted to National Evaluation Team
Volpe Household Travel Survey	Nov.-Dec. 2010	Nov.-Dec. 2011	Volpe Center	Datasets and Analysis Reports
On-Board Transit Rider Survey	Feb. 2011	Feb. 2012	King County Metro	Datasets and Analysis Reports
Redmond TOD Resident Survey	NA	Feb. 2012	King County Metro	Datasets and Analysis Reports
Stakeholder Interviews	Jan. 2010	Mar. 2012	National Evaluation Team	NA (national evaluation team will conduct these interviews)
Stakeholder Workshop	Mar. 2011	Apr. 2012	National Evaluation Team	NA
Interviews with Washington Patrol Officers	NA	May-Jun. 2011	WSDOT	Interview Findings Report
Interviews with Incident Response Team Operators	NA	May-Jun. 2011	WSDOT	Interview Findings Report
Interviews with Bus Operators	NA	May-Jun. 2011	King County Metro	Interview Findings Report
Commuter Surveys (Commute Trip Reduction)	2010[1]	2011[1]	WSDOT	WSDOT and PSRC transmit report
SR 520 Toll Marketing Survey	Jun. 2010 & Sep.2010	Sep. 2011	WSDOT	WSDOT to transmit report

[1] Commute Trip Reduction surveys are conducted in a phased, on-going manner by the local partners, with various employers surveyed at various times of the year. As such, timing will vary. Also, as the local partners refine their schedule for TDM enhancements, it will be important to coordinate further with them to synchronize the times of various surveys with specific TDM activities.

2.0 VOLPE HOUSEHOLD TRAVEL SURVEY

This chapter describes the purpose, approach, data analysis, and schedule and responsibilities associated with the household travel survey which will be conducted by the Volpe national Transportation Systems Center.

2.1 Purpose

The Volpe Household Travel Survey addresses national evaluation hypotheses and questions regarding travel behavior in response to the UPA strategies. In addition, the survey will provide insight into travelers' perception of the impact and value of the UPA project for addressing congestion issues. These surveys will reveal the perceived personal advantages and disadvantages of the UPA strategies to the individual traveler and household and the perceptions of the broader societal implications (e.g., equity, safety, and environment). From a national evaluation standpoint, the information on travel behavior, including changes in travel patterns (e.g., different origins and or destinations, time of travel or route) and the reason for the change is essential for several reasons. Not only will it provide a valuable direct source of data on impacts and perceptions, but it will play a key role in helping to differentiate the impact of the UPA from the influence of various exogenous factors.

Although the Volpe survey will contribute extensively to the national evaluation, there are certain limitations and tradeoffs. For example, although the Volpe survey will include 200 transit users, a separate before-after transit on-board survey is needed to obtain a larger sample and to provide room for all of the questions of interest to the national evaluation. Also, being a panel survey (the same people are surveyed pre- and post-UPA deployment), the Volpe survey will be unable to gather input from all new users—travelers who begin using roads or transit only after the UPA deployment. The absence of such input should be considered when drawing conclusions but it will not significantly impact the effectiveness of the survey for the national evaluation and the benefits of a panel approach more than outweigh this disadvantage.

The Volpe survey will explicitly compare responses pre- and post-UPA project implementation. Since the survey will probe behavior and perceptions which could be impacted by any and all of the UPA projects, the baseline survey will be conducted before most of the UPA projects become operational and well before the core pricing project (tolling on SR 520) becomes operational. The post-deployment survey will be conducted several months after the last UPA project (tolling on SR 520) becomes operational.

2.2 Survey Approach

This section includes extensive material excerpted or paraphrased from the May 10, 2010 Draft Evaluation Plan prepared by Resource System Group (RSG), the Volpe survey contractor. The Volpe Household Travel Survey uses a travel diary approach with a panel of current users of I-90 and SR 520. Participants will complete a 2-day travel diary before and after variable tolling begins on the SR 520 bridge. Demographic and attitudinal surveys will also be a part of the process. The Volpe Household Travel Survey is focused on changes in behavior by current users of the corridor. The following sections provide some high-level information on the survey.

The survey sample will be randomly drawn from current users of SR 520 and I-90 using license plate capture and intercepts of transit riders with stratification by income, and potential oversampling of low-income households. A sample size of 1,500 households is the goal of the survey, 1,300 recruited from license plates on the roadways and the remaining 200 from intercepts on buses. Notably, since the survey is at the household level, participants recruited from the license plate readers might still have household members who are transit riders. The sampling strategy will also identify approaches towards including non-English speakers and, in cooperation with King County, ensuring representation from vanpool riders in.

Selected households will be selected for participation in the sample by screening (via an online tool) for eligibility assessment, (e.g., residence location), willingness to participate, and ability to complete phase 2 of the study (e.g., not planning to move out of the region). Survey participants will be provided with a small incentive to ensure continued participation.

The survey will be conducted online, with the option to complete the survey by telephone. Participants will receive a paper "memory jogger" to record details throughout the day.

2.3 Potential Data Elements from the Survey

This section includes extensive material excerpted or paraphrased from the May 10, 2010 Draft Evaluation Plan prepared by Volpe. The list of data items is expected to evolve as the study instrument is developed and tested by Volpe in coordination with the local partners. However, the following data elements are anticipated for the 2-day trip-by-trip diary:

- Origins and destinations
- Trip purpose
- Start/end times
- Travel mode
- Vehicle occupancy, driver/passenger status, and relationship to other passengers (for private modes)
- Route/lane used and toll paid
- Traveler information sources consulted
- For trips on corridor of interest, follow-up questions on satisfaction with trip
- In addition, information is required on:
    - Demographics: age, sex, employment status, income, educational attainment, driver licensure (for each household/respondent)
    - Household vehicles (make, model)
    - Typical commute (frequency, mode)
    - Familiarity/ridership on transit
    - Flexibility in work/school hours
    - Ability to telework
    - Employer-paid commuting, parking, or transit benefits
    - Ownership of toll transponder (may be excluded in baseline)
    - Attitudes, e.g., "Driving on Seattle-area highways is stressful for me"

2.4 Data Analysis

This section includes extensive material excerpted or paraphrased from the May 10, 2010 Draft Evaluation Plan prepared by Volpe. Fundamentally, the Volpe survey analysis will compare traveler responses before and after UPA project implementation in order to understand how the UPA projects impact behavior and attitudes. Some information on the impact of individual projects will be gathered through questions that explore the "why?" aspect of any before-after changes in travel behavior and/or attitudes.

As a part of their research, the Volpe Center plans to conduct two rounds of data analysis:

- After phase 1 of the study (pre-variable tolling), the Volpe team will calculate basic descriptive statistics from the dataset to generate a profile of respondents, to summarize corridor travel patterns, and to establish a baseline on attitudinal questions.
- After phase 2 (post-variable tolling), a similar set of descriptive statistics will be generated for comparison purposes. Testing of key hypotheses will be conducted using (paired) t-tests, chi-square tests, regression analysis, discrete choice models, or other techniques suited to the nature of the data collected and the hypotheses to be tested. In addition to the formal hypothesis testing, additional exploratory analysis will be conducted to test the effects of other demographic, attitudinal, and travel variables on changes in household travel behavior and usage of the priced facility.
- The analysis will look at before-and-after comparisons of travel behavior:
    - Mode choice
    - Vehicle occupancy / carpooling
    - Route/lane choice
    - Origin-destination patterns
    - Travel times
    - Trip scheduling (departure time) and chaining
    - Trip purposes
    - Trip generation, overall VMT/PMT, daily travel time budget
    - Teleworking
    - Use of traffic information and navigation systems
    - Vehicle ownership
    - Equity – differences in response to road pricing by:
        - Demographics / income and education
        - Geography
        - Use / ownership of technology
        - Workplace flexibility / telework and TDM options
    - User satisfaction:
        - Transit attributes (e.g., wait times, travel times)
        - Traffic/congestion attributes
        - Stress/anxiety using highways
        - Overall commute satisfaction

- Attitudes toward:
  - Tolling / user fees
  - Congestion / reliability
  - Transit
  - Fairness / equity

The three columns in the following table (Table 2-1) identifies the questions, the associated data and the analytical methods identified by Volpe as part of their household travel survey.

Table 2-1. Questions, Data and Analytical Methods Identified by the Volpe Household Travel Survey

Volpe Evaluation Topic / Question	Data Required	Analytical Method
How does use of facility change with advent of tolling? Number of trips, timing, purpose, mode, vehicle occupancy	Travel diary: trip logs (incl. lane/facility used), trip start/end times, trip purpose.	Before and after comparative analysis (t-test)
Did the distribution of travel times around the peak become flatter following the commencement of tolling?	Travel diary: trip logs, start/end times.	Before and after comparative analysis (F-test and K-S test)
How did origin / destination patterns change following the commencement of tolling?	Travel diary: geocoded trip log data.	Visual diagrams showing change in traffic flow patterns.
Changes in total household daily travel time	Travel diary: trip logs, start/end times. Total travel time.	Before and after comparative analysis (t-test)
Relationship between workplace flexibility and changes in commute trip times	Travel diary: trip logs, start/end times; demographic survey. Total minutes (or minutes/trip) change in commute trip departure time.	Before and after comparative analysis (t-test)
Changes in teleworking	Travel diary: trip logs, trip purpose (activity). Total minutes spent teleworking OR number of days with some recorded telework.	Before and after comparative analysis (t-test)
Differences in priced facility use by household income	Travel diary: trip logs, demographic survey. Usage split between high-occupancy tolling (HOT) lane and GP lane (Atlanta) or SR-520 and I-90 bridges (Seattle) during study period, by person/household, by income group.	ANOVA or t-test among groups
Effects of employer reimbursement for tolls	Travel diary: trip logs, lane/route taken, toll paid; plus demographic survey data on employer benefits. Tolls paid or paid trips per person / household.	ANOVA or t-test among groups
Relationship between personal attitudes about tolling and use of priced facility	Attitudinal survey questions, travel diary trip logs (facility used)	ANOVA among attitudinal groups and/or correlation analysis

In addition to conducting these various analyses, Volpe will be working with the national evaluation team to track changes in exogenous factors such as gas prices and employment levels that can affect VMT and congestion. As always with "real world" studies of this nature, interpretation of results will acknowledge these potentially confounding factors.

The data and analysis to be provided to the national evaluation team by Volpe correlates closely with survey data needed to test national evaluation hypotheses, as indicated in Table 1-3. As such, it is expected that, for the most part, the results provided by Volpe (frequency distributions, cross-tabulations, etc.) will be used directly to test national evaluation hypotheses and answer questions. Although limited analysis is expected to be necessary, the national evaluation team and Volpe will coordinate as necessary to carry out any additional analysis.

Data from the Volpe Household Travel Survey will play important roles in hypothesis testing and question answering in almost every national evaluation analysis, addressing the following major issues:

- Utilization of various UPA projects/systems, including tolling, transit, telecommuting and technologies (travel time signs, active traffic management, etc.).
- Perception of the appropriateness and effectiveness of UPA projects/systems as traffic congestion reduction mechanisms.
- Changes in travel behavior (modes, routes, times, origins and destinations, etc.) and the reasons for those changes, including reactions to both UPA projects and non-UPA related factors such as changes in employment.
- As part of the equity analysis, the distribution of impacts and differences in utilization and perception associated with various subpopulations.

2.5 Schedule and Responsibilities

The survey will be carried out by Volpe (through their survey contractor RSG) and will include close coordination with the local partners and the national evaluation. Table 2-2, from Volpe's May 10, 2010 Draft Evaluation Plan identifies the schedule for activities. Volpe expects that Battelle will receive data sets from Volpe within two months after Volpe receives them from RSG, that is Wave 1 in March 2011 and Wave 2 in March 2012. Volpe expects to provide Battelle Wave 1 preliminary analysis results about May 2011, within approximately two months after they receive the data set from RSG. Volpe expects to do more extensive analysis of Wave 2 results and therefore it may take more time before providing Battelle the analysis results.

Table 2-2. Tentative Household Travel Survey Schedule

Activity	Date
Draft Survey Methodology Plan	7 May 2010
Coordination with Seattle local partners	May 2010
Final survey review with FHWA	27 May 2010
Surveys programmed online/final testing of online tool	June 2010
Pilot Study	September 2010
Wave 1 – (Before Tolling)	December 2010
Wave 1 Dataset delivered to Volpe	29 January 2011
Panel Maintenance	January-August 2011
Wave 2 – (After Tolling)	December 2011
Seattle final dataset delivered to Volpe	January 2012

3.0 ON-BOARD TRANSIT RIDER SURVEY

This chapter describes the purpose, approach, data analysis, and schedule and responsibilities associated with the pre- and post-deployment transit on-board rider survey that will be conducted by the local partners.

3.1 Purpose

In addition to the Volpe Household Travel Survey, the national evaluation team recommends stand-alone, on-board transit rider surveys. The Household Travel Survey will not include enough transit riders to draw statistically significant conclusions about transit riders on the SR 520 corridor. Also, it will not be able to capture new transit riders after the start of tolls on SR 520. In contrast, the on-board surveys will provide detailed information on transit rider perceptions as well as report on their travel behaviors before and after UPA project deployment. The on-board surveys are critical to understanding how and why transit riders' attitudes and/or travel behavior have been impacted and by which specific UPA projects. Wherever possible, the results of the on-board surveys will be compared to the results of the Volpe Household Travel Survey to compare trends (e.g., modes of travel before and after the institution of tolling; attitudes on the equity of tolling; and perceptions of changes in travel times before and after tolling).

As stated in the Evaluation Plan, it was agreed by the local partners and the national evaluation team that transit survey data will be collected only for King County Metro ("Metro") bus routes. The reason is because 20 of the 25 routes that cross SR 520 are operated by Metro, and because all but one of the routes with UPA funded service enhancements are operated by Metro. The only Sound Transit route that will be included in the on-board surveys will be the Route 542 because it will be a new route funded by the UPA.

It is recommended that the on-board surveys be limited to riders of routes on SR 520. It is possible that some travelers may respond to SR 520 tolling and/or UPA enhancements to transit service on SR 520 and SR 522 by starting to ride, or increasing their use of, transit on SR 522 or I-90. For example, there could be a case of someone who used to drive the SR 520 bridge, decided to switch to transit to avoid the new tolls, and whose origins and destinations were best served by transit routes that use SR 522 or I-90 to get over or around the lake. However, the number of such travelers is expected to be too small to warrant the additional expense of surveying SR 522 and I-90 transit users; the vast majority of transit usage changes are expected to manifest on SR 520 transit routes.

3.2 Approach

Metro conducts passenger surveys in conjunction with service changes every September, February, and June. However, these surveys are specific to the area(s) where the service change occurs. They will not have enough responses from riders on SR 520 to draw statistically significant conclusions about transit service in that corridor. Therefore, it has been determined that special surveys to support the national evaluation—both pre- and post-deployment—will be necessary.

The transit rider surveys will fundamentally compare travel behavior and attitudes before and after UPA project implementation. King County Metro will introduce the UPA transit service enhancements in two waves. The first will be in October 2010. The second will be in February 2011. The baseline survey will be conducted in February 2011 after the second wave of transit service enhancements but before the initiation of tolls on SR 520 in March 2011. The baseline survey will include questions asking respondents to compare enhanced (i.e., February 2011) transit performance to September 2010 performance. The post-deployment survey should be conducted one year later (February 2012).

King County Metro has contracts with about 10 survey vendors who conduct Metro's on-board surveys using a standard protocol specified by Metro. The national evaluation team has reviewed that protocol and has no objection with Metro utilizing it for the national evaluation supporting survey. That protocol includes self-administration of questionnaires in which a survey contractor representative rides the bus and distributes and collects the surveys. Passengers have the option of mailing the survey later as the surveys are formatted with the postage paid.

Table 3-1 shows the 19 Metro bus routes and the 1 Sound Transit route that will be surveyed. Another route, the Route 280, operates on SR 520 as well but was eliminated from consideration because it has only two trips at 2:06 a.m. and 3:13 a.m. In order to have statistically significant results with acceptable sampling error, it is recommended that a minimum of 500 questionnaires be collected. If one assumes that roughly 10 questionnaires can be completed on each bus, a sample size of 500 completed questionnaires would require 50 bus trips to obtain the required sample size. The bus trips to be surveyed will be selected from a random sample of the trips presented in Table 3-1 and would be conducted on a Tuesday, Wednesday, or Thursday.

Table 3-1. Bus Routes on SR-520 to be Surveyed

Route	No. of a.m. trips[1]
167	4
242	7
243	3
250	6
252/257	13
255/256	40
260	3
261	5
265	6
266	5
268	4
271	34
272	7
277	6
311	9
982	1
986	1
542[2]	TBD

[1] Includes trips in both directions where applicable

[2] Sound Transit route.

3.3 Preliminary On-Board Rider Survey Questions

Questions will include, but not be limited to, respondents' origin and destination, how they arrived at the transit station/stop, prior mode of travel, their reasons for using transit, access to a private automobile, the type of fare paid, and in the post deployment wave, their perceptions of UPA transit improvements, congestion, and the equity of pricing. The following questions are recommended for inclusion in the on-board ridership surveys. The questions are modeled after those used in the Minnesota and Miami UPA evaluations. The final wording of the questions, sequencing, and format for the surveys will be determined by Metro and their contractors in coordination with the national evaluation team.

Recommended questions are as follows. Questions to be asked only in the post-deployment survey are shown in italics; all other questions should be asked in both the baseline and post-deployment surveys.

1. On which route are/were you traveling when you received this survey? Please enter the route number.(Will be pre-entered) _____

2. From which zip code/area/bus stop did you depart today? _____

3. To which zip code/area/bus stop are you traveling to today? _____

4. What is your trip purpose?

___ Work
___ School
___ Personal business
___ Social/entertainment
___ Medical
___ Shopping
___ Other, please specify in the space below

5. What is your MAIN reason for using the bus?

___ Save time
___ Avoid traffic
___ Save money
___ Don't drive/no car
___ Difficulty in finding parking at destination
___ Other (specify:_____)

6. Approximately how many days a week do you ride this bus for this trip?

___ 4-5 days per week
___ 1-3 days per week
___ Less than one day per week
___ First time riding

7. How long have you been riding this bus?

___ Less than 6 months
___ 6 months to 1 year
___ 1 to 5 years
___ More than 5 years
___ First time riding

8. How did you make this trip before you began riding this bus?

___ Drove alone
___ Carpooled
___ Rode another bus
___ Always made the trip by this bus
___ Did not make the trip
___ Other, please specify: _____

9. How did you get to the park-and-ride lot or bus stop for this bus trip? (check ONE only)

___ Walked
___ Drove alone and parked
___ Drove with others and parked
___ Dropped off by car
___ Other, please specify in the space below

10. How many automobiles are in your household?

___ 0
___ 1
___ 2
___ 3
___ 4
___ 5 or more

11. Did you have a automobile available for this trip?

___ Yes ___ No

12. How do you pay for your bus fare this trip?

___ Cash
___ Metro ticket
___ Orca Card --
    ___ epurse
    ___ pass
___ UPass
___ Other (please specify) _____

13. Does your employer pay some/all of your bus pass?

___ Yes ___ No

14. *Did tolls on SR 520 influence your decision to ride this bus? (to be included in the survey once tolling is in place)*

___ *Yes* ___ *No*

15. *Do you think charging variable tolls on SR 520 based on traffic conditions is a fair way to reduce congestion on SR 520? (to be included in the survey once tolling is in place)*

___ *Yes* ___ *No*

16. *Are you a toll customer on SR 520 with an active Good to Go! account? (to be included in the survey once tolling is in place)*

___ *Yes* ___ *No*

17. *If yes, how frequently do you use your Good to Go! pass to drive on SR 520 as a single driver? (to be included in the survey once tolling is in place)*

___ *Less than 1 day per week*
___ *1 day per week*
___ *2 or 3 days per week*
___ *4 or more days per week*

18. How would you rate each of the following aspects of this bus service?

Please circle the number that best reflects your opinion	*Very Poor*	*Poor*	*Fair*	*Good*	*Very Good*	*Don't Know*
On time performance	1	2	3	4	5	0
Travel time	1	2	3	4	5	0
How long buses run	1	2	3	4	5	0
How often buses run	1	2	3	4	5	0
Wait time at station/stop	1	2	3	4	5	0
Value for money of service	1	2	3	4	5	0
Availability of seats	1	2	3	4	5	0
Parking availability at the Park and Ride lots	1	2	3	4	5	0
Your overall satisfaction with this bus service	1	2	3	4	5	0
Your overall satisfaction with King County Metro	1	2	3	4	5	0

19. *How does your current <u>average travel time</u> on this bus compare to before tolls began on SR 520? (to be included in the survey once tolling is in place)*

___ *30 minutes faster or more*
___ *15 to 29 minutes faster*
___ *5 to 14 minutes faster*
___ *1 to 4 minutes faster*
___ *About the same*
___ *Slower*

20. *Does the bus stop/station where you begin your trip include signs with real time arrival information? (to be included in the survey once tolling is in place)*

___ *Yes* ___ *No*

21. *If yes, how easy to understand is the information on the signs? (to be included in the survey once tolling is in place)*

___ *Very Easy* ___*Somewhat Easy* ___*Somewhat Difficult* ___*Very Difficult*

22. *If yes, do you find the real time arrival information beneficial? (to be included in the survey once tolling is in place)*

___ *Yes* ___ *No*

23. Are you:

___ Male ___ Female

24. Approximately what was your household's total income last year? *Categories will be aligned with other surveys for this and the following demographic questions.*

___ Less than $10,000
___ $10,000–$24,999
___ $25,000–$34,999
___ $35,000–$49,999
___ $50,000–$74,999
___ $75,000–$99,999
___ $100,000–$149,999
___ $150,000–$199,999
___ $200,000–$249,999
___ $250,000 or more
___ Prefer not to answer

25. What is your age?

___ Under 18
___ 18-24
___ 25-34
___ 35-44
___ 45-54
___ 55-64
___ 65 or over

26. Which best describes your race?

___ African American/Black
___ American Indian or Alaskan Native
___ Asian
___ White or Caucasian
___ Other _____

27. Are you of Hispanic or Latino origin?

___ Yes
___ No

3.4 Data Analysis

This discussion focuses on the analysis of data collected by King County through the on-board transit rider survey. As noted in Chapter 2.0, Volpe will include 200 transit users in their household travel survey. That sample is too small to address the national evaluation needs and will not include full representation of travelers who begin using transit only after UPA project implementation, and thus the need to conduct a separate on-board survey. However, the Volpe survey may yield results of interest to the national evaluation and the data analysis of the on-board survey will include consideration of Volpe results as well.

King County or their survey consultant will perform standard, basic data quality and error checks as they compile the raw survey results, such as checks for outliers and incomplete responses. The national evaluation team will perform additional checking as they begin to analyze the data.

The results from the on-board rider surveys will be used primarily in the transit analysis and will compare pre-tolling and transit project implementation to post-tolling and transit project implementation. The survey results will be used to identify types of individuals changing from driving alone or carpooling to riding transit as well as types of individuals making new trips by transit. The survey results will be analyzed by members of the national evaluation team in a number of ways. In addition to examining the responses to each question, cross tabulations will be run to explore the interaction of different variables, such as income and bus use. Some examples of the analyses to be conducted using the survey data are highlighted below.

- **Prior mode of travel and mode change to transit.** This analysis will examine possible mode change to transit as a result of the Seattle/LWC UPA projects. By asking riders about their main reason for taking transit, the on-board surveys will provide a key source for information on mode change to transit and the factors influencing this mode change.
- **Frequency of use and use of other modes.** The survey results will identify how long riders have taken the route and how frequently they use it. Once tolling begins on SR 520, the survey will also ask riders whether they have a transponder and if so how frequently they use it to drive across SR 520 in their personal automobile.
- **Equity issues.** Riders will be asked whether they believe dynamic tolling on SR 520 is a fair way to address congestion and whether the presence of tolls influenced their decision to use transit. The responses related to frequency of bus use, factors influencing use, and benefits of use will be examined by income levels, gender, and zip code zones as part of the equity analysis.
- **Perceptions of the bus service on SR 520.** Riders will be asked questions about their perceptions of transit service (e.g., reliability, frequency of service, travel times) before and after the institution of tolls on SR 520. Responses to these questions will be used in the congestion, tolling, and other analyses.

Although the on-board surveys will be conducted at multiple time points and include the possibility that a particular survey respondent may participate in multiple surveys, the national evaluation team assumes that this will not be tracked as part of the survey. The national evaluation team anticipates largely relying upon descriptive statistics, such as estimating means, percentages, ranges, etc. as well as associated tests such as t-tests, likelihood ratio F-tests, and

Chi-Square tests to determine if there are significant differences among rider groups, time points, etc.

3.5 Schedule and Responsibilities

King County Metro will be responsible for conducting the on-board rider surveys. According to the local partners, new transit service funded by the UPA will be implemented in two parts, the first part in October 2010 and the second part in February 2011. Assuming that variable pricing on SR 520 commences as scheduled in March 2011, it is recommended that the baseline on-board survey be conducted in February 2011, after the second wave of transit enhancements. It is recommended that the post-deployment survey be conducted in February 2012. This will allow for consistency in the survey period, and it will also allow time for SR 520 transit riders to form an opinion about changes in travel conditions due to the introduction of tolls.

4.0 REDMOND TOD USER SURVEY

This chapter describes the purpose, approach, data analysis, and schedule and responsibilities associated with the Redmond Transit Oriented Development user survey that will be conducted by the local partners.

4.1 Purpose

The Redmond TOD project consists of a six-story mixed use building (residential and commercial space) and a three story park and ride (P&R) garage. Project construction began in late 2007 and was completed in October 2009.

The UPA evaluation will include a survey of apartment residents of the Redmond TOD to assess whether it achieved any of the travel-related objectives listed below of interest to the national evaluation. These include:

- increasing opportunities for residents and workers to meet their daily needs by taking transit or walking;
- attracting new riders to transit, including "choice" riders that could otherwise drive;
- shifting the transit station mode of access to be less reliant on park-and-ride and more oriented toward walking;
- reducing automobile ownership, vehicular traffic, and associated parking requirements that would otherwise be necessary to support that development; and
- enhancing the environment through reduced emissions and energy consumption derived from shifts in commuting.

4.2 Approach

The Redmond TOD user surveys will focus on the residents of Veloce apartments at Redmond TOD. Prior to the UPA, there were no apartments or business (the location featured only a surface park-and-ride lot) and, therefore, there is no baseline survey of TOD residents. Nevertheless, the surveys will include questions on how resident travel habits changed before and after they resided and/or shopped at the Redmond TOD.

Since the Veloce apartment resident population is relatively small (there are 322 units total), the national evaluation team recommends conducting a census , that is, asking each resident to complete the survey. Residents will be asked questions including, but not limited to, how long they have resided in the TOD, what influenced their decision to move into the TOD, how many automobiles they own, and their travel patterns before and after moving into the TOD. Each apartment resident should be asked to complete the survey. The goal should be to obtain no fewer than 150 completed surveys. Specification of the survey protocol will be at the discretion of King County and/or their consultant, but the national evaluation team recommends door-to-door survey administration. Such an approach will yield a higher response than mail-out or on-line (web-based) surveying, and, since respondents are concentrated in one small geographic

area, it can be done efficiently. King County and/or their consultant will finalize the survey protocol in coordination with the national evaluation team.

4.3 Preliminary Questions for Survey of Redmond TOD Apartment Residents

Proposed questions for the survey of Redmond TOD apartment residents are as follows:

28. How long have you lived in the Redmond TOD?

____ More than a year
____ 6 months to a year
____ Less than 6 months

29. How important were the following factors in your decision to live at Redmond TOD?

	Very Important	Somewhat Important	Not Important
Quality of Housing			
Cost of Housing			
Access to Transit			
Quality of Neighborhood			
Access to Shops and Services			
Access to Highway			

30. How many automobiles do you have in your household?

____ 0
____ 1
____ 2
____ More than 2

31. Did the number of automobiles in your household change after moving into Veloce Apartments?

____ Increased ___ Decreased ____ Stayed the same

32. How did you primarily get to work last week?

___ Car, truck, van
___ Motorcycle
___ Bus
___ Rail
___ Bike
___ Walk
___ Taxi
___ Worked at home

33. If you got to work last week mostly in a car truck or van, how many people including you normally rode in the vehicle?

34. Prior to living at the Redmond TOD, how did you normally get to work?

___ Car, truck, van
___ Motorcycle
___ Bus
___ Rail
___ Bike
___ Walk
___ Taxi
___ Worked at home

35. What is the zip code or location of your work place?

36. How frequently do you use public transportation per week?

___ Never
___ Once a week
___ 1-2 times per week
___ More than 2 times per week

37. How does this compare to before you lived at Veloce Apartments?

___ Increased ___ Decreased ___ Stayed the same

38. How frequently do you walk in the area around this neighborhood?

___ Never
___ Once a week
___ 1-2 times per week
___ More than 2 times per week

39. How does this compare to before you lived at Veloce Apartments?

___ Increased ___ Decreased ___ Stayed the Same

40. Are you:

___ Male
___ Female

41. Approximately what was your household's total income last year?

___ Less than $10,000
___ $10,000–$24,999
___ $25,000–$34,999
___ $35,000–$49,999
___ $50,000–$74,999
___ $75,000–$99,999
___ $100,000–$149,999
___ $150,000–$199,999
___ $200,000–$249,999
___ $250,000 or more
___ Prefer not to answer

42. What is your age?

___ 18-24
___ 25-34
___ 35-44
___ 45-54
___ 55-64
___ 65 and over

43. Which best describes your race?

___ African American/Black
___ American Indian or Alaskan Native
___ Asian
___ White or Caucasian
___ Other _____

44. Are you of Hispanic or Latino origin?

___ Yes
___ No

4.4 Data Analysis

King County or their survey consultant will perform standard, basic data quality and error checks as they compile the raw survey results, such as checks for outliers and incomplete responses. The national evaluation team will perform additional checking as they begin to analyze the data. The national evaluation team will coordinate with King County and/or their survey consultants to assess and as necessary, adjust for response bias as may be observed by comparing the demographics of respondents to TDO residents and business patrons in general. Census data provides one possible source for comparison.

The results of the Redmond TOD surveys will be used primarily in the transit analysis. Surveys of the residents of Veloce Apartments will be used to identify their modes of travel to work and to what extent transit accessibility influenced their decision to reside there.

Some examples of the analyses to be conducted using the survey data are highlighted below.

- **Influencing factors.** Residents will be asked about factors, including access to transit, that influenced their decision to reside at Veloce. This relates to identifying the contributory efforts of various UPA strategies in mode shifts (SEATransit-4).
- **Level of automobile ownership and mode of travel to work.** Residents will be asked how many personal automobiles they own/lease and how they journey to work. They will also be asked about their mode of travel to work prior to living at Veloce in order to see whether the TOD contributed to a mode shift.

4.5 Schedule and Responsibilities

Since there was no TOD prior to the UPA, there is no baseline Redmond TOD survey. It is recommended that the post-deployment surveys be conducted in February 2012 to concide with the post-deployment transit on-board surveys.

King County Department of Transportation TOD Section will be responsible for conducting the resident survey at the Redmond TOD. Metro and the King County Department of Transportation TOD Section will finalize the questions to be included in the surveys in cooperation with the national evaluation team. Members of the national evaluation team will analyze the results and incorporate them into the UPA reports.

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5.0 STAKEHOLDER INTERVIEWS AND WORKSHOPS

This chapter describes the purpose, approach, data analysis, and schedule and responsibilities associated with the stakeholder interviews and workshops that will be conducted by the national evaluation team to gather a wide variety of lessons learned from Seattle/LWC UPA program participants.

5.1 Purpose

The purpose of the stakeholder interviews and workshops is to gain insights into the institutional arrangements, partnerships, outreach methods, and other activities contributing to the successfully planning, deploying, and operating the Seattle/LWC UPA projects. The results of the interviews and workshops will be used in the non-technical success factor analysis. The results will be of benefit to other organizations and individuals seeking to enhance existing, or develop new multi-agency/multi-jurisdictional partnerships to promote innovative transportation solutions to address traffic congestion.

5.2 Approach

Two rounds of interviews and workshops will be conducted. The first round of interviews and workshop will focus primarily on lessons learned and issues associated with the planning and implementation phases of the UPA deployment. The interviews will be conducted in approximately January 2011 which, depending on the individual UPA project (deployment schedules vary), is shortly after or shortly before projects become operational. The first workshop—a group discussion of planning and implementation phase issues, including those identified through the interviews—will be held within six weeks after the completion of the interviews. The second round of interviews and workshop will occur approximately one year later, in the March-April 2012 timeframe.

Table 5-1 lists the stakeholder interviewees. At the suggestion of WSDOT, the list shown in Table 5-1 has been expanded to include interviews with a representative from Microsoft and from several municipalities. These interviews will be conducted if national evaluation resources permit, which will be a function of how long it takes to schedule and conduct the other interviews. The national evaluation team agrees that these interviews would add value but believe they are somewhat lower priority than the other interviewees with the organizations that have played a more central role in the UPA. Note that the local partners will identify the names of the specific people to be interviewed at Microsoft and municipalities.

Aspresented in Table 5-1, in some cases multiple individuals from the same agencies have been identified to be interviewed. The intent is to interview both the top officials – such as the Chair or the Commissioner – as well as the key senior staff involved in the Seattle/LWC UPA. Due to their busy schedules it may not be possible to schedule interviews with all the top officials identified. It is anticipated that between 12 and 14 interviews will be completed for the Seattle/LWC UPA National Evaluation based on the availability of individuals and the ability to schedule interviews.

Based on previous experience, it is anticipated that each interview will take between one hour and one and one-half hours. The questions will be sent to the individuals in advance of the interviews to help facilitate discussion. Two members of the Battelle team will participate in each interview. One individual will lead the interview, ask the questions, and take notes. The second individual will take notes using a laptop computer and record the session if the interviewee agrees.

Table 5-1. Preliminary List of Stakeholder Interviewees

Name	Organization
Peter Heffernan	King County Metro
Ron Posthuma	King County Metro
Charlie Howard	Puget Sound Regional Council
Mark Hallenbeck	University of Washington
Rep. Judy Clibborn	Washington State House
Sen. Mary Margaret Haugen	Washington State Senate
Richard Ford	Washington Transportation Commission
Brian Smith	WSDOT
Patty Rubstello	WSDOT
Shuming Yan	WSDOT
Craig Stone	WSDOT
Resources Permitting	
(To be identified by local partners)	Microsoft
(To be identified by local partners)	1 representative each from the cities of Seattle, Bellevue, Kirkland, and Redmond

5.3 Interview Questionnaires

Table 5-2 provides the questionnaire for the pre-deployment interviews. Table 5-3 provides the draft questionnaire for the post-deployment interviews. The post-deployment questionnaire may be revised based on the results of the pre-deployment interviews and workshop, as well as to address any issues or concerns that emerge during the implementation and operation of the Seattle/LWC UPA projects. Interviewers will also have a series of probes to use in drawing responses from interviewees if needed. These probes will include key issues such as: obtaining legislative authority for SR 520 tolling, the linkage between tolling the existing bridge and funding the replacement bridge, reaching an agreement on high-occupancy vehicle treatment on the bridge, working with FHWA on Manual of Uniform Traffic Control Devices (MUTCD) issues related to new ATM and tolling related signage, and working with the Transportation Commission on toll rate setting.

Table 5-2. Pre-Deployment Interview Questionnaire

Interviewee: _____ **Date:** _____ **Interviewer(s)**: _____	
Introduction	• Explain the National UPA Evaluation purpose, scope, and sponsors. • Describe the purpose and process for the stakeholder interviews. • Note that the interviews are confidential. Responses will not be attributed to specific individuals.
Role in UPA and Expectations	1. Please describe your agency's role and your personal role in planning, designing, and implementing the Seattle UPA projects. 2. What is your agency's objective(s) in participating in the UPA? What benefits did you expect to be realized when you decided to participate in the UPA? Have these expectations changed at all during the planning and pre-deployment process? If so, what has changed and why? 3. What would constitute success from the UPA projects for you and your agency? What about the UPA overall? Has your view of what constitutes success changed during the planning and pre-deployment process? If so, in what way and why?
Institutional Arrangements	4. Have you and your agency worked with the other partnership agencies, organizations, and individuals before? If so, what has been the focus of this work? How would you classify past working relationships – successful, unsuccessful, mixed? (Check for all partners – WSDOT, King County, PSRC, Regional Feds, legislators, and other local communities and advocacy groups). 5. What do you think were the keys to bringing all the agencies and jurisdictions together to develop the UPA partnership and to implement the UPA projects? What do you think will be the keys to maintaining the partnership throughout the deployment and operation process? 6. Have there been any changes in the partnership agencies and jurisdictions, including yours, that have influenced implementation of the UPA projects? If so, how have these changes been addressed? 7. Do you feel there have been any changes in the commitment to the UPA projects on the part of your agency/jurisdiction or other agencies/jurisdictions? If yes, please explain the nature and the potential causes of these changes. 8. What have been the biggest challenges during the implementation process? How have these challenges been addressed by the partners, including your agency/jurisdiction? Have they been effectively overcome? 9. Were there any specific institutional issues that had to be addressed? If so, how were they addressed by the partners, including your agency/jurisdiction? Have they been effectively overcome? 10. Were there any specific policy or political issues that had to be addressed? If so, how were they addressed by the partners, including your agency/jurisdiction? Have they been effectively overcome? 11. How will the decision on how revenues will be allocated or reinvested be made? What do you think the plan should be for use of the revenues? 12. Were there any technical or technology-related issues that had to be addressed? If so, how were they addressed by the partners, including your agency/jurisdiction? Have they been effectively overcome?

Table 5-2. Pre-Deployment Interview Questionnaire (Continued)

Outreach Activities	13. A variety of outreach activities have been used to engage policy makers, the public, and other groups in the implementation of the Seattle UPA projects. What do you feel have been the most successful activities? Have you been involved in any of these activities? If so, what has been your experience? Are there other outreach activities you feel would be of benefit? Do you anticipate any issues or concerns with public acceptance of the SR 520 variable tolling, the telecommuting programs, or other project elements?
Lessons Learned	14. Based on your experience to date, would you do anything differently if you were beginning to plan and implement the same projects in a different part of the city with the same funding? What if the project as a whole had twice the funding? What if the project as a whole had half the funding? 15. What do you feel are the key experiences or lessons learned so far to share with individuals in other areas? 16. Are there any other topics you would like to bring up related to the UPA?

Table 5-3. Post-Deployment Interview Questionnaire

Interviewee: _____ **Date:** _____ **Interviewer(s)**: _____	
Introduction	• Explain the National UPA Evaluation purpose, scope, and sponsors. • Describe the purpose and process for the stakeholder interviews. • Note that the interviews are confidential. Responses will not be attributed to specific individuals.
Role in UPA and Expectations	1. Please describe your agency's role, and your personal role in deploying and operating the Seattle UPA projects. 2. What is your agency's objective(s) in participating in the UPA? What benefits did you expect to be realized when you decided to participate in the UPA? Have these expectations changed at all during the deployment and operation of the various projects? If so, what has changed and why? Have your expectations been realized? 3. What would constitute success from the UPA projects for you and your agency? What about the UPA overall? Has your view of what constitutes success changed during the deployment and operation of the various projects? If so, in what way and why? (Since it is anticipated that most individuals will be re-interviewed, these questions may be modified to focus on any changes that occurred during the deployment).
Institutional Arrangements	4. How would you describe your working relationships with other UPA partners during the deployment and operation phases? Did your working relationship change during the deployment and operation of the UPA projects? If so, how did it change? (Check for all partners – WSDOT, King County, PSRC, Regional feds, legislators, and other local communities and advocacy groups). 5. What do you think have been the keys to maintaining the partnerships throughout the deployment and operation process? 6. Have there been any changes in the partnership agencies and jurisdictions, including yours, that have influenced the deployment and operation of the UPA projects? If so, how have these changes been addressed? 7. Do you feel there have been any changes in the commitment to the UPA projects on the part of your agency/jurisdiction or other agencies/jurisdictions? If yes, please explain the nature and the potential causes of these changes. 8. What have been the biggest challenges during the deployment and operation phases? How have these challenges been addressed by the partners, including your agency/jurisdiction? Have they been effectively overcome? 9. Were there any specific institutional issues that had to be addressed? If so, how were they addressed by the partners, including your agency/jurisdiction? Have they been effectively overcome? 10. Were there any specific policy or political issues that had to be addressed? If so, how were they addressed by the partners, including your agency/jurisdiction? Have they been effectively overcome? 11. How was the decision on how to allocate or reinvest revenues made? Does the use match your ideas on how the revenues should be used? 12. Were there any technical or technology-related issues that had to be addressed? If so, how were they addressed by the partners, including your agency/jurisdiction? Have they been effectively overcome?

Table 5-3. Post-Deployment Interview Questionnaire (Continued)

Outreach Activities	13. A variety of outreach activities have been used to engage policy makers, the public, and other groups in the implementation of the Seattle UPA projects. What do you feel have been the most successful activities? Have you been involved in any of these activities? If so, what has been your experience? Are there other outreach activities you feel would be of benefit? Do you anticipate any issues or concerns with public acceptance of the tolled lanes, the telecommuting programs, or other project elements?
Lessons Learned	14. Based on your experience to date, would you do anything differently if you were beginning to deploy and operate the same projects in a different part of the city with the same funding? What if the project as a whole had twice the funding? What if the project as a whole had half the funding? 15. What do you feel are the key experiences or lessons learned so far to share with individuals in other areas? 16. Are there any other topics you would like to bring up related to the UPA?

5.4 Workshop

A workshop will be conducted at the conclusions of each round of interviews. All of the individuals interviewed will be invited to participate in the workshop, which is anticipated to be approximately three hours in length. Other key participants may also be invited based on discussions with the local partners. The purpose of the workshop is to foster additional dialog among the key stakeholders. The common themes identified during the interviews will be used to frame the group discussion, which will explore these and other topics in more detail. Table 5-4 presents the format for the pre-deployment workshop. It is anticipated that the post-deployment workshop will follow a similar format, although changes may be made based on the first workshop and interview results.

Table 5-4. Workshop Format

1. Welcome and Self Introductions – 10 minutes
2. Purpose of Workshop – 5 minutes
3. Summary of Key Point from Interviews and Additional Discussion – (20 minutes each) 80 minutes
   - Expectations/Initial Conditions
   - Institutional Arrangements
   - Outreach Activities
   - Lessons Learned
4. Expectations for Operations – 20 minutes
5. Concluding Remarks – 20 minutes

5.5 Data Analysis

Immediately following each round of interviews, the interview notes and tape recordings will be reviewed and the major comments will be documented. The responses of each stakeholder to every question will be summarized. Researchers at the Humphrey Institute at the University of Minnesota will use a qualitative research analysis software called NVivo to help organize, analyze, and summarize interviews. The categories for summarizing the results will be identified using both questionnaires. Subcategories will be used to provide more detail on the various topics covered in both sets of interviews.

A summary report will be prepared highlighting the common themes emerging from the interviews, as well as unique perspectives. The summary report will be organized by the interview questions, with a final section presenting overarching themes and tips for other areas.

The workshop discussion will be summarized immediately following each workshop. The workshop summary will highlight the discussion of the interview questions. Additional perspectives will be documented, as will reinforcement of the common themes from the interviews. The workshop summary will be of benefit to the Seattle/LWC partnership agencies, other agencies in the metropolitan area, and agencies throughout the country.

5.6 Schedule and Responsibilities

The first round of stakeholder interviews will be conducted in approximately January 2011 and the first workshop within six weeks after completion of the interviews. The second round of interviews will be conducted in the March-April 2012 timeline. The results from the interviews and the workshops will be summarized after each round. Members of the Battelle team will conduct the pre- and post-deployment interviews, facilitate the workshops, analyze data, and report results. Local partner responsibilities will primarily consist of assisting the national evaluation team in finalizing interviewees, facilitating national evaluation team efforts to connect with interviewees, and assistance with planning and hosting the two workshops.

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6.0 INTERVIEWS WITH WASHINGTON STATE PATROL OFFICERS, WSDOT IRT OPERATORS, AND BUS OPERATORS

This chapter describes the purpose, approach, data analysis, and schedule and responsibilities associated with interviews and discussions with state patrol, IRT operator, and bus operator that will be conducted by the local partners to support the national evaluation.

6.1 Purpose

The primary purpose of these interviews is to collect information from public agency personnel who are in a position to observe firsthand the potential safety impacts of the Seattle/LWC UPA projects. Specifically, these personnel will be questioned regarding any perceived changes in safety (increases or decreases in the risk of a crash or in the actual number of crashes, crash severity and the time required to clear incidents) and the relationship between any such changes and the new UPA roadway elements (travel time signs, toll system signage, and ATM variable speed and lane controls). A secondary purpose of these interviews is to gather perceptions related to traffic operations in general, including congestion levels. These interviews will be conducted post-deployment only. The local partners will be responsible for conducting these interviews and providing the national evaluation team with finding reports summarizing the input from interviewees.

6.2 Approach

The Washington State Patrol officers, WSDOT IRT operators, and King County Metro bus operators to be interviewed by the local partners in consultation with the national evaluation team.

In the interest of time and resources, these interviews should be conducted in three groups, one each with the state patrol offices, IRT operators, and bus operators. The group interviews will involve a facilitator (typically the local partner) leading the group through the questions described in Section 6.3 Each session is expected to last no more than 90 minutes. A group size of about 5 persons is ideal. While existing meeting structures should be taken advantage of, the personnel selected should be those assigned to and experienced in operations of the SR520 corridor. These interviews will be conducted post-deployment of most UPA projects.

6.3 Interview Questions

The preliminary interview questions are presented in Tables 6-1 through 6-3. Table 6-1 contains the questions for Washington State Patrol officers. Table 6-2 presents the interview questions for WSDOT Incident Responders. Table 6-3 outlines the questions for bus operators.

Table 6-1. Preliminary Interview Questions for the Washington State Patrol Officers Group

Introduction – By the Facilitator	• Explain the National UPA Evaluation purpose, scope, local partners, and sponsors. • Describe the purpose and process for the interviews of Washington State Patrol officers, including a brief description of SR 520 tolling, SR 520 and I-90 ATM, and real-time travel time signs that will be discussed in the interview • Note that the interviews are confidential. Responses will not be attributed to any individual.Ask if recording the conversation is acceptable. • Participant Introductions o How long have you been a patrol officer? o How long have you worked on the SR 520 corridor?
SR 520 Operations	1. Based on your experience and observations, have you noticed any changes in collisions or other incidents since the implementation of tolling ? 2. (Ask only if changes were noted) Do you feel that these changes are related to the tolling on SR 520? If so, how? If not, what do you think accounts for these changes? *(If interviewee does not mention new UPA signage the interviewer will prompt about the potential for new, unfamiliar travel time and/or toll signage to cause drivers to make more sudden lane changes).* 3. Based on your experience and observations, have you noticed any changes in the congestion levels, on the SR 520 bridge before and after the implementation of tolling? 4. (Ask only if changes were noted) Do you feel that these changes are related to the tolling on SR 520? If so, how? If not, what do you think accounts for these changes?
Active Traffic Management (aka, "Smarter Highways")	5. What has been your experience and observation with the use of variable speed limits and lane control? 6. Have you noticed any changes in the operations on the SR 520 or I-90, including congestion levels and collisions, when the Smarter Highways (active traffic management) elements, such as variable speed limits and lane control are in operation? 7. (Ask only if changes were noted) If so, what changes have you noticed? What do you think accounts for these changes 8. Is the new highway signage clearly understood by the drivers, in your opinion? If not, please explain further.
Real-Time Travel Times on Dynamic Message Signs (DMS)	9. Based on your experience and observation, have you noticed any problems or concerns with the real-time travel time DMS signs? 10. Have you noticed any changes in operation of SR 520 and I-90, including congestion levels or incidents , when travel times are posted on DMS? 11. (Ask only if changes were noted)) If so, what changes have you noticed? What do you think accounts for these changes?
Closing	12. Other comments?

Table 6-2. Preliminary Interview Questions for the Incident Response Team (IRT) Responder Group

Introduction – By the Facilitator	• Explain the National UPA Evaluation purpose, scope, local partners, and sponsors. • Describe the purpose and process for the interviews with Incident Response Team operators, including a brief description of SR 520 tolling, SR 520 and I-90 ATM, and real-time travel time signs that will be discussed in the interview • Note that the interviews are confidential. Responses will not be attributed to any individual.Ask if recording the conversation is acceptable. • Participant Introductions o How long have you been an IRT Responder? o What parts of the SR 520 corridor do you typically operate in?
SR 520 Operations	1. Have you noticed any changes on SR 520, including increases or decreases in the number of incidents and collisions, changes in the duration of incidents (that is, are they cleared any faster or slower than before), changes in the type or severity of incidents and collisions, or changes in the location of incidents and collisions? 2. (Ask only if changes were noted) Do you feel that these changes are related to the tolling on SR 520? If so, how? If not, what do you think accounts for these changes? *(If interviewee does not mention new UPA signage the interviewer will prompt about the potential for new, unfamiliar travel time and/or toll signage to cause drivers to make more sudden lane changes).* 3. Based on your experience and observations, have you noticed any differences in the operation, including congestion levels, of I-90 since the SR 520 tolling implementation? If so, please describe the changes you have noticed. 4. (Ask only if changes were noted) Do you feel that these changes are related to the tolling on SR 520? If so, how? If not, what do you think accounts for these changes?
Active Traffic Management (aka, "Smarter Highways")	5. What has been your experience and observation with the use of variable speed limits and lane control? 6. Have you noticed any changes in the operations on SR 520 or I-90, including congestion levels and collisions, when the Smarter Highways (active traffic management) elements, such as variable speed limits and lane control are in operation? 7. (Ask only if changes were noted) If so, what changes have you noticed? What do you think accounts for these changes 8. Is the new highway signage clearly understood by the drivers, in your opinion? If not, please explain further.
Real-Time Travel Times on Dynamic Message Signs (DMS)	9. Based on your experience and observation, have you noticed any problems or concerns with the real-time travel time DMS signs? 10. Have you noticed any changes in operation of SR 520 and I-90, including congestion levels or incidents , when travel times are posted on DMS? 11. (Ask only if changes were noted)) If so, what changes have you noticed? What do you think accounts for these changes?
Closing	12. Other comments?

Table 6-3. Preliminary Interview Questions for the Transit Operators Group

Introduction	• Explain the National UPA Evaluation purpose, scope, local partners, and sponsors. • Describe the purpose and process for the interviews of bus operators, including a brief description of SR 520 tolling, SR 520 and I-90 ATM, and real-time travel time signs that will be discussed in the interview • Note that the interviews are confidential. Responses will not be attributed to any individual. Ask permission for recording. • Participant Introductions o Please describe your responsibilities related to operating buses in the SR 520 corridor (includes SR 520, I-90, SR 522) o How long have you been a bus operator? o How long have you driven routes in the SR 520 corridor?
SR 520 Tolling Operations	1. What were the main challenges in operating a bus on SR 520 before tolling was in place? 2. Compared to SR-520 before tolling, is driving a bus now easier or more difficult? Please explain why. 3. Have you received any comments from bus riders concerning SR-520? If so, what type of comments have you received? 4. Do you feel any more or less safe driving on SR 520 now that tolling has been implemented? Why or why not?
I-90 Operations *(Ask only if the interviewee operates a route on I-90)*	5. Based on your experience and observations, have you noticed any differences in the operation, including congestion levels, of I-90 since the tolling was implemented on SR 520? 6. (Ask only if changes were noted) Do you feel that these changes are related to the tolling on SR 520? If so, how? If not, what do you think accounts for these changes?
SR 522 Operations *(Ask only if interviewee operates a route on SR 522)*	7. Based on your experience and observations, have you noticed any differences in the operation, including congestion levels, of SR 522 since the tolling was implemented on SR 520? 8. (Ask only if changes were noted) Do you feel that these changes are related to the tolling on SR 520? If so, how? If not, what do you think accounts for these changes?
Active Traffic Management (aka, "Smarter Highways")	9. What has been your experience and observation with the use of variable speed limits and lane control? 10. Have you noticed any changes in the operation of SR 520 or I-90, including congestion levels and collisions, when the Smarter Highways (active traffic management)elements, such as variable speed limits and lane control are in operation? 11. (Ask only if changes were noted) If so, what changes have you noticed? What do you think accounts for these changes? 12. Is the new highway signage clearly understood by the drivers, in your opinion? If not, please explain further
Real-Time Travel Times on Dynamic Message Signs (DMS)	13. Based on your experience and observation, have you noticed any problems or concerns with the real-time travel time DMS signs? 14. Have you noticed any changes in operation of SR 520 and I-90, including congestion levels or incidents , when travel times are posted on DMS? 15. (Ask only if changes were noted)) If so, what changes have you noticed? What do you think accounts for these changes?
Closing	16. Other comments?

6.4 Data Analysis

The interviewers (the local partners or their consultant) will review the interview notes and tape recordings and will document the major comments. A summary report will be prepared highlighting the common themes emerging from the interviews, as well as the unique perspectives. The summary report will be organized by the interview questions, with a final section presenting overlying themes and lessons learned and recommendations for related projects. The interview results will be used in conjunction with other data in the safety analysis.

6.5 Schedule and Responsibilities

The interviews with Washington State Patrol officers, IRT operators, and bus operators will focus on the completed UPA deployment and will be conducted in May-June 2011.

The responsibilities for conducting and analyzing the interviews are outlined below.

- The local partners and/or their consultant will finalize the interview questions using the draft questions below; identify the individuals to be interviewed with the State Patrol, IRT operators,, bus operators; schedule and conduct the interviews (three sessions, one for each agency and with each session included multiple agency representatives); and document the results in a summary report.
- Members of the Battelle team will review the final interview questions and the list of individuals to be interviewed, review the summary report, and incorporate the interview results into the interim and final national evaluation reports.

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7.0 LOCAL PARTNER SURVEYS OF INTEREST

This chapter describes other surveys of interest to the national evaluation. These surveys are being conducted by the local partners for their particular needs and purposes and are not driven by the evaluation of UPA project elements. Recognizing that the above surveys have specific local goals and objectives, the national evaluation team and the local partners will coordinate to the extent possible to ensure that no "piggy-backing" opportunities for the national evaluation team are missed. In some cases, the national evaluation team may recommend the addition of a few questions to the surveys for consideration. In other cases, the national evaluation team will need results from the survey for specific analysis. As the surveys above are planned and conducted, the local partners will work with the national evaluation team to identify opportunities and possible areas of interest to the national evaluation.

7.1 Future and Ongoing Surveys of Interest

The following local partner surveys have been identified of interest to the national evaluation:

SR 520 Toll Marketing Survey (WSDOT). WSDOT is conducting a Toll Marketing Survey to assess the efficacy of the outreach campaign for the tolling implementation on SR 520 bridge. The cross-sectional survey will be conducted three times (April-May 2010, September-October 2010, and September 2011). Data from this survey will provide useful additional information into travelers perceptions and awareness of tolling on the SR 520 bridge that will be of interest for the national evaluation.

High-Occupancy Vehicle (HOV) Study (University of Washington). This survey is currently being planned to collect data on HOV use on SR 520. The scope and the timing of the survey are still being finalized. The data from the survey is expected to provide supporting information for the congestion and tolling analyses especially on carpooler perspectives and behaviour.

Commute Trip Reduction (CTR) Survey (WSDOT). The Commute Trip Reduction Law was passed in 1991 and requires some 1,100 worksites with 100 or more employees to plan and implement programs to reduce vehicle trips and VMT by promoting commute alternatives. The law applies to all populous counties in the state, including those in the Puget Sound. The law also requires affected worksites to survey employees and submit survey data to WSDOT. This data will be used to assess mode shift at affected worksites in the SR 520 corridor. The CTR survey results will provide critical data to the national evaluation on mode shift, time shift and trip elimination. The national evaluation team will ask WSDOT to include several additional questions pertaining to the productivity impacts of telecommuting.

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APPENDIX A – COMPILATION OF HYPOTHESIS/QUESTIONS FROM THE SEATTLE UPA NATIONAL EVALUATION PLAN

Evaluation Analysis	Hypothesis/ Question Number	Hypothesis/Question
Congestion	SEACong-1	Deploying the UPA projects reduced travel times and increased speeds on SR 520 over Lake Washington (between I-5 and I-405)
	SEACong-2	Deploying the UPA projects did not increase travel times or decrease speeds of these nearby facilities: • I-90 general purpose lanes (between I-5 and I-405) • I-90 Express Lanes • I-90 (between Issaquah/MP 19.41 and I-405) • SR 522 (between I-405 and I-5) • I-5 (between SR 522 and I-405) • I-405 (between SR 167 and SR 522) SR 520 (between SR 202 and I-405)
	SEACong-3	Deploying the UPA projects improved travel time reliability on SR 520 over Lake Washington (between I-5 and I-405)
	SEACong-4	Deploying the UPA projects did not decrease travel time reliability of nearby facilities, namely: • I-90 general purpose lanes (between I-5 and I-405) • I-90 Express Lanes • I-90 (between Issaquah/MP 19.41 and I-405) • SR 522 (between I-405 and I-5) • I-5 (between SR 522 and I-405) • I-405 (between SR 167 and SR 522) SR 520 (between SR 202 and I-405)
	SEACong-5	Total Corridor Throughput of the roadways around and over Lake Washington remained the same or increased as a result of the Seattle/LWC projects
	SEACong-6	Vehicle and person throughput on SR 520 remained the same or increased as a result of the Seattle/LWC projects

Evaluation Analysis	Hypothesis/ Question Number	Hypothesis/Question
Congestion (Continued)	SEACong-7	The Seattle/LWC UPA projects did not reduce the throughput on nearby facilities, namely: • I-90 general purpose lanes (between I-5 and I-405) • I-90 Express Lanes • I-90 (between Issaquah/MP 19.41 and I-405) • SR 522 (between I-405 and I-5) • I-5 (between SR 522 and I-405) • I-405 (between SR 167 and SR 522) SR 520 (between SR 202 and I-405)
	SEACong-8	The UPA projects will improve averages speeds on SR 520 (to be consistently above a specific target speed to be agreed upon in advance by the local partners and U.S. DOT)
	SEACong-9	The UPA projects did not increase the temporal or spatial extent of congestion on nearby facilities, namely: • I-90 general purpose lanes (between I-5 and I-405) • I-90 Express Lanes • I-90 (between Issaquah/MP 19.41 and I-405) • SR 522 (between I-405 and I-5) • I-5 (between SR 522 and I-405) • I-405 (between SR 167 and SR 522) • SR 520 (between SR 202 and I-405)
	SEACong-10	Travelers will perceive that congestion has been reduced in the SR 520 corridor
	SEACong-11	Travelers will not perceive that congestion increased on nearby facilities, namely: • I-90 general purpose lanes (between I-5 and I-405) • I-90 Express Lanes • I-90 (between Issaquah/MP 19.41 and I-405) • SR 522 (between I-405 and I-5) • I-5 (between SR 522 and I-405) • I-405 (between SR 167 and SR 522) • SR 520 (between SR 202 and I-405)

Evaluation Analysis	Hypothesis/ Question Number	Hypothesis/Question
Tolling	SEATolling-1	How will travelers utilize the SR520 tolling system?
	SEATolling-2	Variable pricing SR 520 will regulate vehicular access so as to improve the operation of SR 520
Transit	SEATransit-1	Seattle/LWC UPA projects will enhance transit performance in the SR 520 corridor through reduced travel times, increased reliability, and increased capacity
	SEATransit-2	Seattle/LWC UPA projects will facilitate an increase in ridership and a mode shift to transit on the SR 520 corridor
	SEATransit-3	Mode shift to transit will result in reduced road congestion on the SR 520 corridor
	SEATransit-4	What was the relative contribution of each Lake Washington UPA project element to increased ridership and mode shift to transit?
Telecommuting/TDM	SEATele/TDM-1	Promotion of commute alternatives and other options (mode, time) removes trips and VMT from SR 520
	SEATele/TDM-2	What was the relative contribution of the various Seattle UPA Telecommuting/TDM initiatives on reducing SR 520 vehicle trips/VMT?
	SEATele/TDM-3	Employees who use telecommuting as an alternative to commuting and their managers will perceive no reduction in the employees' productivity
Technology	SEATech-1	The travel time signs will promote a more even distribution of traffic between SR 520 and alternate routes (I-405 and SR 522)
	SEATech-2	Active Traffic Management will promote smoother traffic flow and better throughput on SR 520 and I-90 during non-incident conditions
	SEATech-3	Active Traffic Management will reduce the number of congestion-causing collisions on SR 520 and on I-90.
	SEATech-4	Active Traffic Management in the Lake Washington Corridor will reduce the duration of congestion-causing incidents on SR 520 and I-90
	SEATech-5	Active Traffic Management will reduce the impact severity of congestion-causing incidents
Safety	SEASafety-1	Tolling, ATM and traveler information (e.g., travel time sign) strategies that entail unfamiliar signage and which may alter existing traffic flows will not adversely affect highway safety

Evaluation Analysis	Hypothesis/ Question Number	Hypothesis/Question
Equity	SEAEquity-1	What are the direct social effects (tolls paid, travel times, adaptation costs) for various transportation system user groups from tolling the SR 520 Bridge, transit, and other UPA strategies?
	SEAEquity-2	What is the spatial distribution of aggregate out-of-pocket and inconvenience costs, and travel time and mobility benefits?
	SEAEquity-3	Are there any differential environmental impacts on certain socio-economic groups?
	SEAEquity-4	How does reinvestment of revenues from tolling SR 520 impact various transportation system users?
Environmental	SEAEnvironmental-1	What are the impacts of the UPA strategies in the SR 520 corridor on air quality?
	SEAEnvironmental-2	What are the impacts on perceptions of overall environmental quality?
	SEAEnvironmental-3	What are the impacts on energy consumption?
Non-Technical Success	SEANon-Tech-1	What role did factors related to these five areas play in the success of the deployment? 1. People (sponsors, champions, policy entrepreneurs, neutral conveners) 2. Process (forums [including stakeholder outreach], meetings, alignment of policy ideas with favorable politics and agreement on nature of the problem) 3. Structures (networks, connections and partnerships, concentration of power and decision-making authority, conflict-management mechanisms, communications strategies, supportive rules and procedures) 4. Media (media coverage, public education) 5. Competencies (cutting across the preceding areas: persuasion, getting grants, conducting research, technical/technological competencies; ability to be policy entrepreneurs; knowing how to use markets)
	SEANon-Tech-2	Does the public support the UPA strategies as effective and appropriate ways to reduce congestion?
Cost Benefit	SEACostBenefit-1	What is the net benefit (benefits minus costs) of the Seattle/ LWC UPA projects?

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FHWA-JPO-11-055

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