

SR 520 Tolling

Telephone Survey Report

Prepared for the SR 520 Tolling Implementation Committee

Executive Summary

The purpose of the survey was to assess attitudes toward tolling, as well as the specifics of which bridges should be tolled, when tolling should start, and the use of electronic and variable rate tolling. The survey also helped better understand travel behavior. The phone survey was administered to a stratified random sample of 1,204 respondents, stratified relative to bridge use. These strata were four user types:

- Used just 520 Bridge in last week (n = 230)
- Used just I-90 Bridge in last week (n = 317)
- Used both bridges in last week (n = 254)
- Used neither bridge in last week (n = 403)

Key Findings:

- ***Most Supported Tolling the 520 Bridge***

Three-fifths or more of the respondents supported tolling the 520 Bridge as a means of paying for a portion of the bridge replacement.

- ***Electronic Tolling Increased Support for Tolling***

With many people still unfamiliar with electronic tolling, knowing that electronic tolling means vehicles travel at normal speeds through the toll area resulted in a third or more being *much more likely* to support tolling the 520 Bridge. This was more so the case for those who use the 520 Bridge (44%) or both bridges (47%), compared to those who used just the I-90 Bridge (35%) or neither bridge (35%).

- ***Most Supported Variable Rate Tolling***

There was support for variable rate tolling, especially among those who used the 520 Bridge exclusively or used both bridges (520 users - 45% strong support, I-90 users - 37% strong support, dual-bridge users - 44% strong support, neither bridge users – 39% strong support).

- ***Off-Peak and Weekend Toll Rate Information Increased the Appeal of Variable Rate Tolling***

Variable rate tolling was even more appealing when respondents knew that the toll rates during off-peak times would be about half of peak toll rates (520 users - 70%, I-90 users - 64%, dual-bridge users - 71%). Similar results were found in regard to weekend rates (520 users - 69%, I-90 users - 67%, dual-bridge users - 71%).

- ***Most Supported Tolling in 2010 When They Considered the Effects on Toll Amounts and Financing Costs***

Well more than half supported beginning tolling of the existing 520 Bridge in 2010 when they knew that such early tolling would result in lower tolls and financing costs. This was especially the case among those who used the 520 Bridge exclusively (520 users - 62%, I-90 users - 57%, dual-bridge users - 55%, neither bridge users – 59%).

- ***Most Supported Early Tolling When They Considered the Effects on Travel Speeds***

About half supported beginning tolling of the existing 520 Bridge in 2010 when they knew that such early tolling would result in faster travel speeds on the 520 Bridge, but slower speeds on the I-90 Bridge during peak commute times. This was more so the case among those who used the 520 Bridge exclusively and less so among those who used the I-90 Bridge exclusively (520 users - 57%, I-90 users - 47%, dual-bridge users - 49%, neither bridge users – 52%).

- ***Alternatives to Tolled Routes Were Important***

While most supported tolling the 520 Bridge, many also believed that alternatives to paying the toll were important. Three-fifths or more reported that having other un-tolled highways was somewhat or very important (520 users - 61%, I-90 users -63%, dual-bridge users - 63%, neither bridge users – 77%), with those who used neither bridge thinking this was most important. Even higher percentages thought that having public transit available as an alternative to paying the toll was somewhat or very important (520 users - 71%, I-90 users -72%, dual-bridge users - 71%, neither bridge users – 87%), with those who used neither bridge thinking this was most important.

- ***520 Bridge Users More Supportive of Tolling Both Bridges to Keep Tolls Lower***

I-90 Bridge users were the least supportive of tolling both bridges. Those who used the 520 Bridge exclusively and those who used both bridges (as well as those who used neither bridge) were more supportive of tolling both bridges when they knew the toll would be higher on 520 if just 520 was tolled (520 users - 73%, I-90 users - 47%, dual-bridge users - 59%, neither bridge users – 67%).

- ***I-90 Bridge Users Less Supportive of Tolling Both Bridges Even if it Decreases Travel Speeds***

I-90 Bridge users were the least supportive of tolling both bridges even when they knew that tolling only the 520 Bridge would result in slower trips on I-90 due to traffic diversion from the tolled 520 Bridge. Those who used the 520 Bridge exclusively and those who used both bridges (as well as those who used neither bridge) were more supportive of tolling both bridges when they knew this would result in faster trips on both bridges (520 users - 75%, I-90 users - 47%, dual-bridge users - 60%, neither bridge users – 67%).

- *Use of Tolls to Improve I-90 Increased I-90 Users Support for Tolling Both Bridges*

Even though I-90 Bridge users were the least supportive of tolling both bridges, their support increased by 6% (from 47% to 53%) when they knew that tolls on the I-90 Bridge would be used, in part, to make improvements to the I-90 Bridge.

- *Toll Revenues Should Also Be Used to Reduce Driving Alone*

In addition to paying a portion of the cost of replacing the bridge and improving the 520 corridor, many respondents also favored using toll revenues to reduce the use of single occupancy vehicles on the bridges. Many favored using toll revenues for transit on 520 (46% or more), transit on I-90 (30% or more), and incentives for carpooling (33% or more).

- *Most People Would Continue to Use 520 When Tolls Are Implemented.*

More than a third reported being likely to pay the toll when tolling is implemented (520 users - 37%, I-90 users - 40%, dual-bridge users - 38%). This was followed by taking other un-tolled routes, changing their time of travel to when the toll is less, and taking transit.

Introduction

Background and Objectives

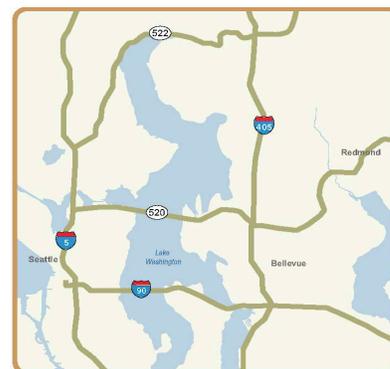
With tolling being considered as one of the financing and traffic demand management strategies on some of the major highways in the Puget Sound region, the need to better understand public knowledge, attitudes and likely reactions becomes increasingly important. The existing State Route 520 Bridge across Lake Washington needs to be replaced. A variety of funding sources will be needed to pay for the project, including a combination of federal funds, state gas tax funds and tolls.

An understanding of the public's attitudes and likely responses to tolling, as well as to different tolling scenarios can also be used to inform decisions regarding tolling implementation and to develop effective communication strategies.

To this end, PRR conducted a telephone survey designed to target four 'user types':

1. Those who use just the 520 Bridge
2. Those who use just the I-90 Bridge
3. Those who use both bridges
4. Those who use neither bridge

The purpose of the survey was to assess travel behavior, attitudes toward tolling, as well as the specifics of which bridges should be tolled, when tolling should start, and the use of electronic and variable rate tolling. This survey will serve as a baseline against which future waves of the survey can be compared to track trends in public opinion, as well as assess the impact of communication efforts.



Lake Washington and surrounding highways

Survey Methodology

In consultation with the Washington State Department of Transportation and the 520 Tolling Implementation Committee, PRR:

- Developed a statistically-valid telephone survey. This process involved review and editing of several drafts of survey questions. A final draft of the survey questions (see Appendix A) was programmed into Computer Assisted Telephone Interviewing software.
- Used the following sampling frames as a basis for the random selection of potential respondents:
 - Random digit dial list of telephone numbers from within zip codes in the 520 Travel Shed considered to have households less likely to use either of the bridges
 - A list of 520 Bridge users from a May 2008 license plate survey.
 - A list of I-90 Bridge users from a June 2008 license plate survey.
- Pre-tested the survey. The survey questions were pre-tested and monitored on the first night of the survey fielding. The pre-testing indicated that the survey questions were working well and no changes were made to the questions.
- Administered the survey to a stratified random sample of 1,204 respondents. The sample was stratified relative to the four user types mentioned above and provided adequate numbers of cases for statistical analysis purposes.
 - Just 520 Bridge users (n = 230)
 - Just I-90 Bridge users (n = 317)
 - Use both bridges (n = 254)
 - Use neither bridge (n = 403)
- To reduce sample bias, a minimum of four attempts per potential respondent were made to establish telephone contact at different times of the day and days of the week.

- Using the very strict Council for Marketing and Opinion Research (CMOR) formula for computing the response rate (which includes in its formula the inclusion of “no answers, busy signals, and answering machines”), this survey had a response rate of 8%¹. However, the “cooperation rate” (defined as the percentage of qualified respondents who were contacted and who completed the survey) was 46%.

Data Processing and Analysis

Data processing consisted of coding and entering quantitative and qualitative responses with the use of a CATI (Computer-Assisted Telephone Interview) system. Qualitative variables were coded to convert them to quantitative measures. Response range and logic checks were performed to ensure the data was clean before data analysis was conducted. Data analysis was conducted with SPSS (Statistical Packages for the Social Sciences).

Data analysis involved the use of appropriate descriptive statistical techniques (frequencies and percentages) and explanatory statistical techniques (in this case Cramer’s V, Kendall’s tau c, and logistical regression) to test for the statistical significance of relationships between and among variables.² Throughout this report, relationships between variables that are statistically significant at the .05 level or better, and that are meaningful to an understanding of the data are reported. For example, a significance level of .05 means that there are only 5 chances out of 100 that what appears to be a relationship between variables is actually the case. The significance levels are reported as the “p” values in the footnotes.

- 1 Using the approved CMOR approach, response rate is defined as the number of completed surveys plus partial or suspended divided by the number of completed surveys, plus partial or suspended surveys, plus qualified refusals, plus break-offs, plus no answer, plus busy signal, plus answering machine, plus soft refusals, plus hard refusals, plus scheduled callbacks, plus unspecified callbacks.
- 2 Cramer’s V is a measure of the relationship between two variables and is appropriate to use when one or both of the variables are at the nominal level of measurement. Cramer’s V ranges from 0 to +1 and indicates the strength of a relationship. Kendall’s Tau c is a measure of the relationship between two variables and is appropriate to use when both of the variables are at the ordinal level of measurement. Tau c ranges from -1 to +1 and indicates the strength and direction of a relationship. The higher the Cramer’s V or Tau c coefficients, the stronger the relationship. In the case of Tau c, the strength of the relationship can be either positive (a direct relationship) or negative (an inverse relationship). The accompanying “p” scores presented in this report for Cramer’s V and Kendall’s tau c indicate the level of statistical significance. Logistical regression was used to identify variables that predict support for tolling the 520 Bridge and for the likelihood to pay the toll.

Sample Demographics

Table 1 presents the sample demographics for all cases combined.

Table 1. Sample Demographics	%
Gender (n = 1,204)	
Female	46.7
Male	53.3
Age (n = 1,204)	
18 - 24	2.5
25 - 34	8.6
35 - 44	21.3
45 - 54	28.1
55 - 64	24.0
65 and older	14.0
Refused	1.6
Household Income (2007) before taxes (n=1,204)	
Under \$20,000	1.7
\$20,000 - \$29,999	1.8
\$30,000 - \$54,999	8.9
\$55,000 - \$74,999	11.5
\$75,000 - \$89,999	9.0
\$90,000 - \$124,999	16.2
\$125,000 - \$149,999	8.0
\$150,000 and above	17.6
Refused	23.3
Education (n = 1,204)	
Less than high school	0.6
High school	7.6
Some college/technical school/Associates degree	25.7
Bachelors degree	31.7
Post graduate work	10.7
Graduate degree	22.3
Refused	1.4

Race (n = 1,204)	
White/Caucasian (not Hispanic/Latino background)	81.6
White/Caucasian (Hispanic/Latino background)	1.4
Black/African American	2.2
Asian/Pacific Islander	6.1
Hispanic/Latino	0.9
Native American	0.7
Multi-racial	1.7
Other	0.2
Refused	5.1
Household Size (n = 1,204)	
1	12.6
2	39.3
3	19.9
4	19.8
5	6.3
6	1.5
7 or more	0.8
Number Employed in Household (n = 1,204)	
0	13.8
1	32.1
2	43.7
3	8.1
4	1.9
5	0.2
6	0.1
Employment Status (n = 1,204)	
Employed full-time	61.5
Employed part-time	13.7
Student full-time	1.0
Student part-time	0.7
Homemaker	5.1
Retired	14.1
Unemployed	2.6
Refused	1.2

Results

Travel Behavior

Survey respondents were asked to report on their use of the 520 and I-90 bridges in regard to number of days per week used, times of day used, trip purposes, modes of travel and amount of congestion experienced.

I-90 Bridge Used More Days per Week

A little more than a quarter (27%) of those who used the 520 Bridge did so five or more days in the last week, while more than two-fifths (42%) of the I-90 Bridge users used the bridge that frequently.

About Equal Percentages Traveled During Peak and Mid-day Periods

Regardless of the bridge used there were about equal percentages of people reporting AM peak (520 users - 50%, I-90 users - 51%, dual-bridge users - 41%), mid-day (520 users - 42%, I-90 users - 48%, dual-bridge users - 47%), and PM peak (520 users - 49%, I-90 users - 48%, dual-bridge users - 48%) travel times, with evening and overnight travel times much less likely.

Table 2

Q4 - What time of the day do you typically travel across the 520 Bridge?						
	Used just 520		Used just I-90		Used both bridges	
	Count	%	Count	%	Count	%
AM peak (5 am to 9 am)	114	49.57	162	51.10	103	40.55
Mid-day (after 9 am to before 3 pm)	96	41.74	154	48.58	120	47.24
PM peak (after 3 pm to 7 pm)	113	49.13	153	48.26	122	48.03
Evening (after 7 pm to 10pm)	31	13.48	52	16.40	46	18.11
Overnight (after 10 pm to before 5 am)	3	1.30	13	4.10	10	3.94
Total	230	100	317	100	254	100

About Half Used the Bridges to Commute Back and Forth to Work

Commuting to and from work was the primary reason people used the bridges (520 users - 49%, I-90 users -53%, dual-bridge users - 48%), followed by recreational activities (520 users - 29%, I-90 users - 24%, dual-bridge users - 29%), and running errands/shopping (520 users - 17%, I-90 users - 26%, dual-bridge users - 22%).

Table 3

Q5 - For what trip purposes did you use the 520 Bridge in the last week?						
	Used just 520		Used just I-90		Used both bridges	
	Count	%	Count	%	Count	%
Travel to or from work	113	49.13	169	53.31	123	48.43
Travel to or from school	8	3.48	12	3.79	14	5.51
Errands / shopping	38	16.52	82	25.87	56	22.05
Non-commute work-related travel	26	11.30	60	18.93	47	18.50
Recreational activities	66	28.70	77	24.29	73	28.74
Visit family or friends	30	13.04	61	19.24	51	20.08
Other	1	0.43	4	1.26		
Don't know					2	0.79
Total	230	100	317	100	254	100

Most Drove Alone When Using the Bridges

More than two-thirds of respondents reported that they drove alone when using the bridge(s) during the last week (520 users - 68%, I-90 users - 71%, dual-bridge users - 76%). This was followed by carpooling with household members (520 users - 25%, I-90 users - 37%, dual-bridge users - 34%), carpooling with non-household members (520 users - 13%, I-90 users - 11%, dual-bridge users - 11%), and taking the bus (520 users - 8%, I-90 users - 6%, dual-bridge users - 4%).

Table 4

Q6 - Which of the following modes of travel did you use during your travel on 520 during the last week?						
	Used just 520		Used just I-90		Used both bridges	
	Count	%	Count	%	Count	%
Drove alone	157	68.26	224	70.66	193	75.98
Carpooled with household members	58	25.22	117	36.91	86	33.86
Carpooled with non-household members	30	13.04	35	11.04	29	11.42
Took the bus	19	8.26	20	6.31	11	4.33
Vanpooled	4	1.74	2	0.63	1	0.39
Other			3	0.95		
Total	230	100	317	100	254	100

520 Bridge Was More Congested

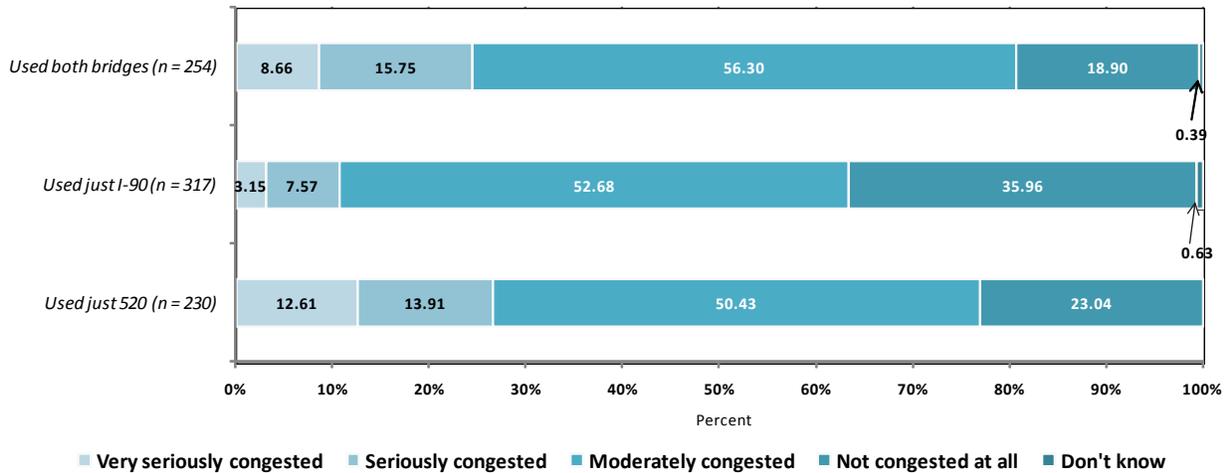
Those who used just the I-90 Bridge reported less congestion (11% seriously or very seriously congested) compared to those who used just the 520 Bridge (27% seriously or very seriously congested) or used both bridges (24% seriously or very seriously congested).³

³ Cramer's V = .166, p = .000

Chart 1

Q8 - In general, how congested was traffic when you drove across the Bridge during the last week?

Base = All respondents who used a bridge in last week



Those most likely to report more congestion on the bridge were:

- Traveling during the peak commute times (520 users⁴, I-90 users⁵, dual-bridge users⁶)

Support for Replacing 520 Bridge and Tolls to Help Pay for Replacement

The respondents were asked to rate how strongly they agreed or disagreed that the 520 Bridge needed to be replaced, as well as their support for tolling the bridge to pay for a portion of the bridge replacement costs. In addition, they were asked how electronic tolling affected their support for tolling the 520 Bridge and how important it is to have available alternatives such as transit and un-tolled routes.

Most Agreed the 520 Bridge Needs to be Replaced, Especially Those Who Used It

4 Cramer's V = .215, p = .014

5 Cramer's V = .333, p = .000

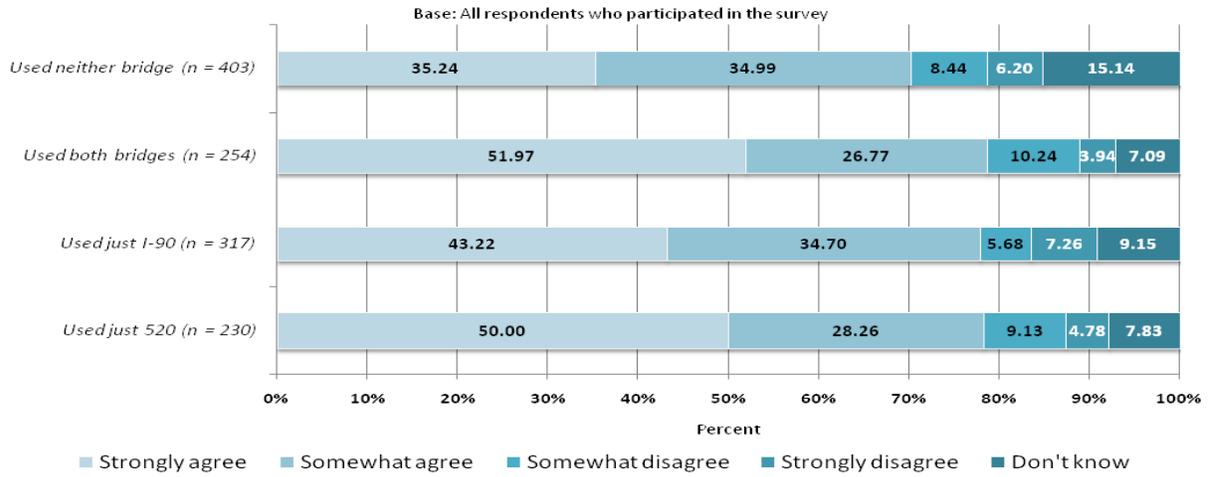
6 Cramer's V = .185, p = .034

7 Cramer's V = .103, p = .000

Although most agreed the 520 Bridge needs to be replaced, half or more of those who used 520 or both bridges strongly agreed (520 users – 50%, dual-bridge users – 52%). Agreement that the 520 Bridge needs to be replaced was less strong among I-90 Bridge users or those who used neither bridge (I-9 users – 43%, neither bridge users 35%).⁷

Chart 2

Q7 - How much do you agree or disagree that the 520 Bridge needs to be replaced?



Those more likely to agree that the bridge needs to be replaced were/had:

- Employed (520 users⁸, I-90 users⁹)
- Experienced more congestion on the bridge in the last week (520 users¹⁰, dual-bridge users¹¹)

Most Supported Tolling the 520 Bridge

Three-fifths or more of the respondents supported tolling the 520 Bridge as a means of paying for a portion of the bridge replacement, although this was somewhat less so among those who used just the I-90 Bridge (60% compared to 65% or higher for the other “user groups”).

8 Cramer's V = .253, p = .002

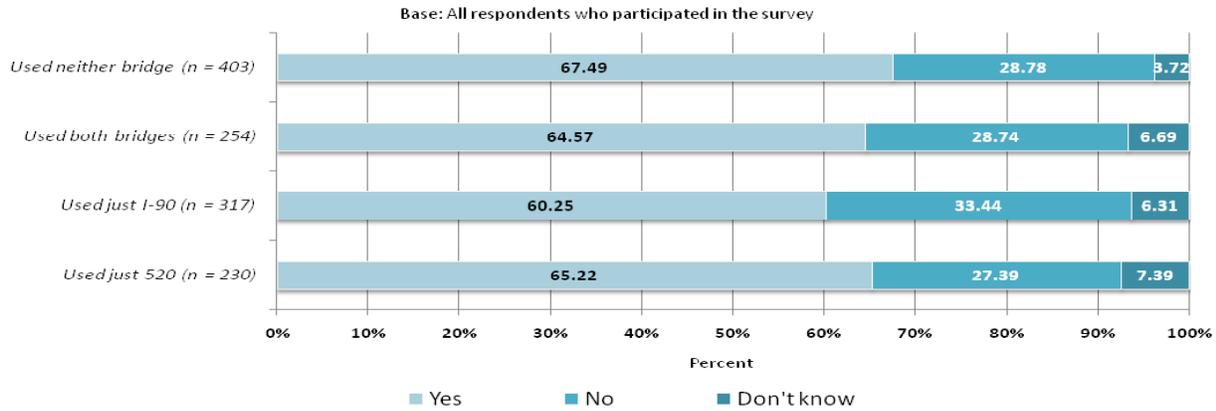
9 Cramer's V = .183, p = .05

10 Tau c = .142, p = .003

11 Tau c = .123, p = .005

Chart 3

Q9 - Do you support paying for a portion of the 520 Bridge replacement project with tolls?



Those more likely to support tolling the 520 Bridge were:

- Employed (520 users¹²)
- More educated (520 users¹³)
- Older (I-90 users¹⁴ and dual-bridge users¹⁵)
- Females (520 users¹⁶)

Electronic Tolling Increased Support for Tolling

With many people still unfamiliar with electronic tolling, knowing that electronic tolling means vehicles travel at normal speeds through the toll area resulted in a third or more being *much more likely* to support tolling the 520 Bridge. This was more so the case for those who used the 520 Bridge (44%) or both bridges (47%), compared to those who used just the I-90 Bridge (35%) or neither bridge (35%).

¹² Cramer's V = .290, p = .008

¹³ Cramer's V = .303, p = .002

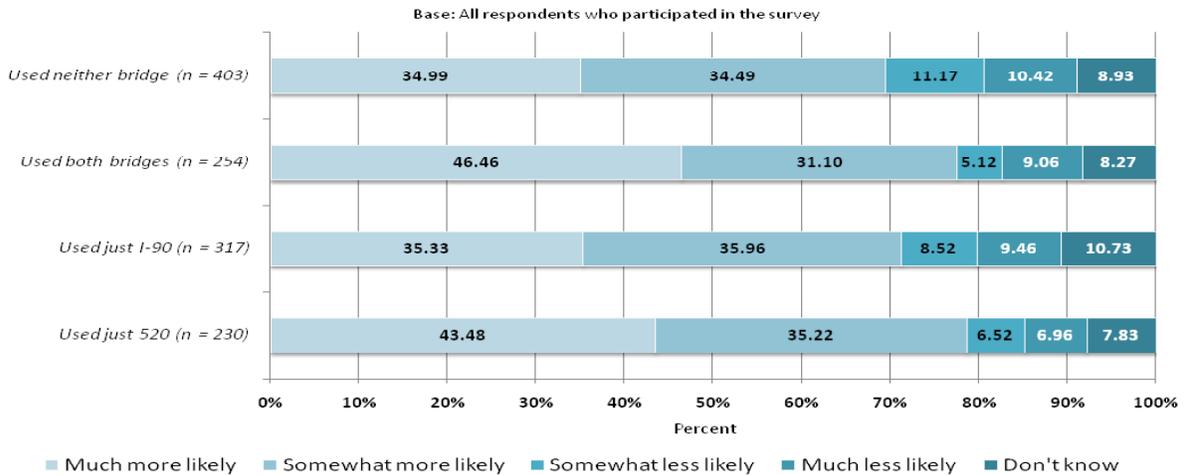
¹⁴ Tau c = .198, p = .021

¹⁵ Tau c = .157, p = .05

¹⁶ Cramer's V = .137, p = .046

Chart 4

Q10 - Current technology allows tolls to be collected electronically as vehicles travel across the bridge at regular highway speeds. There will be no toll booths. Knowing this, does this make you more or less likely to support tolling of the 520 Bridge?



Those more likely to support tolling once they knew about electronic tolling had:

- Higher incomes (I-90 users¹⁷, use neither bridge¹⁸)
- Driven alone across the bridge in last week (I-90 users¹⁹)
- Experienced more congestion on the bridge in last week (520 users²⁰)

Alternatives to Tolloed Routes Were Important

While most supported the tolling of the 520 Bridge, many also believed that alternatives to paying the toll were important. Three-fifths or more reported that having other un-tolled highways was somewhat or very important (520 users - 61%, I-90 users - 63%, dual-bridge users - 63%, neither bridge users - 77%), with those who used neither bridge thinking this was most important.²¹

17 Tau c = .181, p = .001

18 Tau c = .142, p = .003

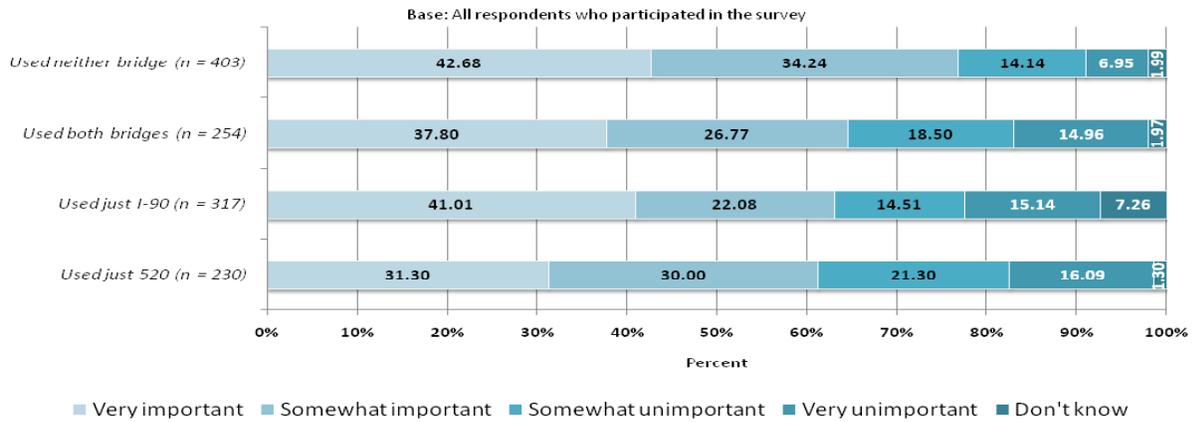
19 Tau c = .119, p = .030

20 Cramer's V = .163, p = .05

21 Cramer's V = .127, p = .000

Chart 5

Q24a - How important is having other un-tolled highways that you could choose to use?



Those more likely to think that un-tolled routes are important had/were:

22 Tau c = -.147, p = .005

23 Tau c = -.197, p = .000

24 Tau c = -.106, p = .008

25 Tau c = -.102, p = .048

26 Tau c = -.225, p = .000

27 Tau c = -.149, p = .011

28 Tau c = -.169, p = .005

29 Tau c = .153, p = .035

30 Cramer's V = .196, p = .033

31 Cramer's V = .226, p = .009

32 Cramer's V = .145, p = .022

33 Tau c = -.130, p = .016

34 Tau c = -.166, p = .001

35 Tau c = -.350, p = .000

36 Tau c = -.282, p = .000

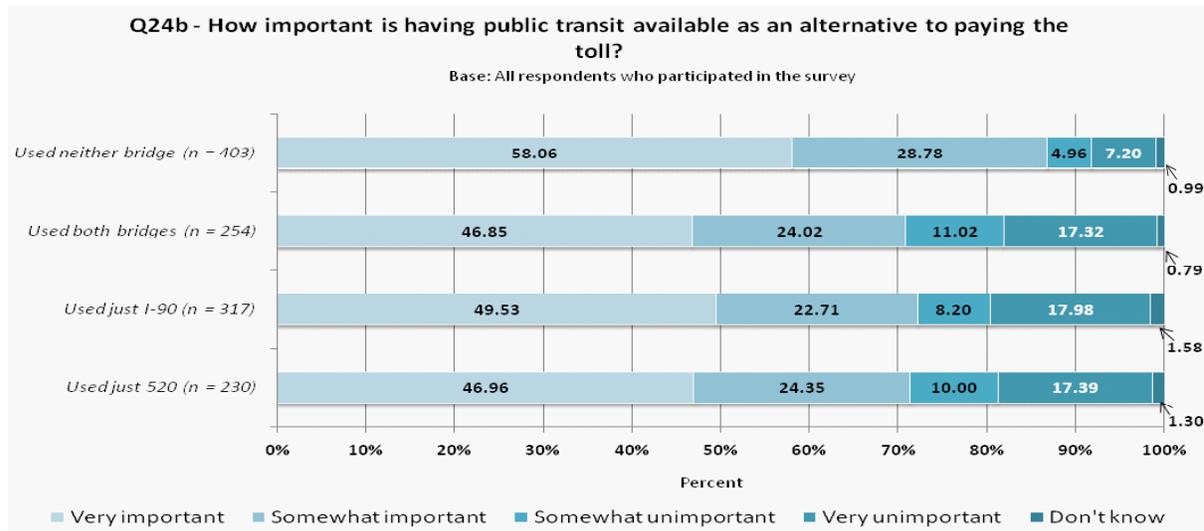
37 Tau c = -.154, p = .022

38 Cramer's V = .104, p = .000

- Less education (520 users²², I-90 users²³, use neither bridge²⁴)
- Older (dual-bridge users²⁵)
- Less income (520 users²⁶, I-90 users²⁷, dual-bridge users²⁸)
- Females (520 users²⁹)
- Used bridge for non-work related trips (520 users³⁰)
- Traveled on the bridge during non-peak times (520 users³¹, dual-bridge users³²)
- Used the 520 Bridge fewer days in the last week (520 users³³)
- Experienced less congestion on the bridge in the last week (520 users³⁴)
- Less likely to pay the toll (520 users³⁵, I-90 users³⁶, dual-bridge users³⁷)

Even higher percentages thought that having public transit available as an alternative to paying the toll was somewhat or very important (520 users - 71%, I-90 users - 72%, dual-bridge users - 71%, neither bridge users - 87%), with those who used neither bridge thinking this was most important.³⁸

Chart 6



Those more likely to think that public transit was important were:

- Older (dual-bridge users³⁹)
- Females (dual-bridge users⁴⁰, neither bridge users⁴¹)
- Less likely to pay the toll (520 users⁴², dual-bridge users⁴³)

When Should Tolling Begin?

The respondents were asked to indicate their preference for when tolling should begin – either 2010 when construction begins or not until 2016 when the new bridge is completed. Two factors were then introduced to see their impact on respondents’ preference for when tolling should begin. These factors were toll amounts/ financing costs and travel speeds.

³⁹ Tau c = -.130, p = .009

⁴⁰ Tau c = .159, p = .016

⁴¹ Tau c = .191, p = .000

⁴² Tau c = -.143, p = .039

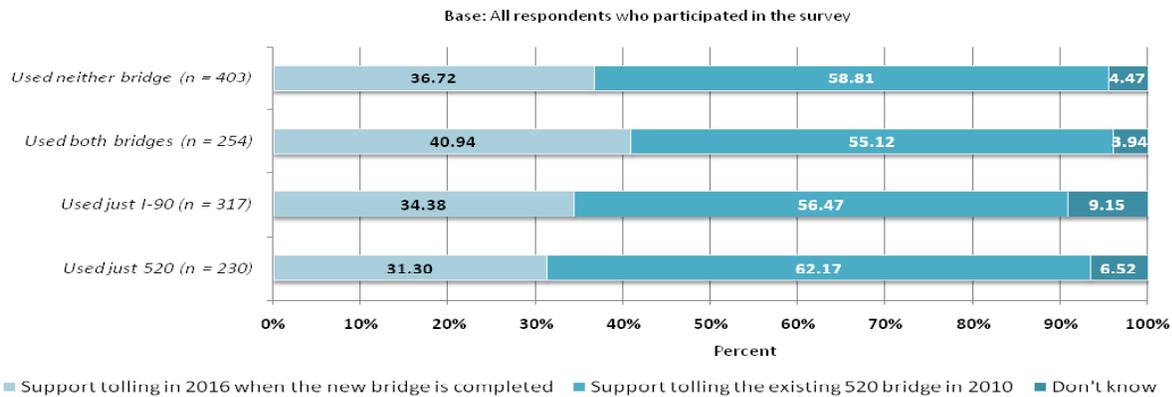
⁴³ Tau c = -.140, p = .030

Most Supported Tolling in 2010 When They Considered the Effects on Toll Amounts and Financing Costs

Well more than half supported beginning tolling of the existing 520 Bridge in 2010 when they knew that such early tolling would result in lower tolls and financing costs. This was especially the case among those who used the 520 Bridge exclusively (520 users - 62%, I-90 users -57%, dual-bridge users - 55%, neither bridge users – 59%).⁴⁴

Chart 7

Q11 - If you knew that tolling the existing 520 Bridge sooner would result in lower tolls and financing costs for the project would you:



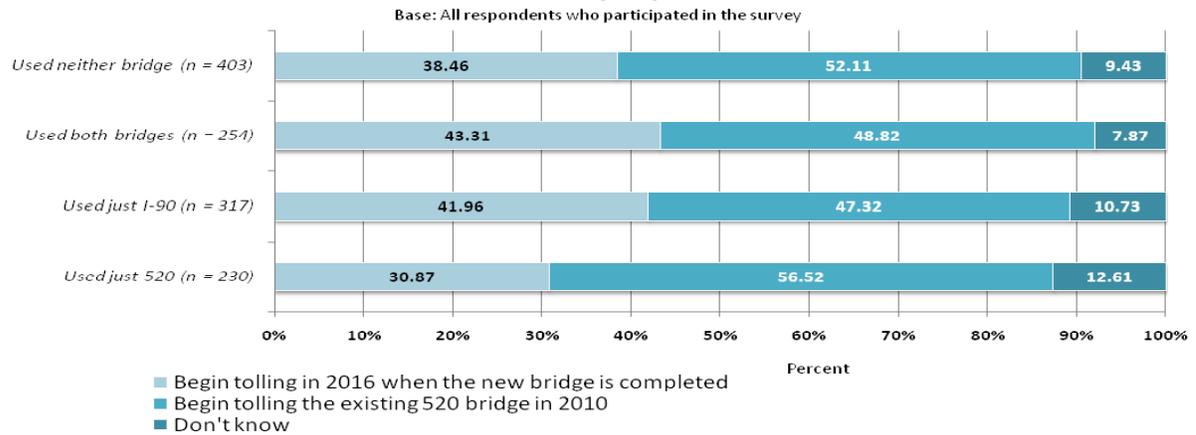
Most Supported Early Tolling When They Considered the Effects on Travel Speeds

About half supported beginning tolling of the existing 520 Bridge in 2010 when they knew that such early tolling would result in faster travel speeds on the 520 Bridge, but slower speeds on the I-90 Bridge during peak commute times. This was more so the case among those who used the 520 Bridge exclusively and less so among those who used the I-90 Bridge exclusively (520 users - 57%, I-90 users - 47%, dual-bridge users - 49%, neither bridge users – 52%).

44 Cramer's V = .075, p = .037

Chart 8

Q12 - If you knew that as soon as they begin tolling the 520 Bridge that trips across the 520 Bridge would be faster during peak commute times, and that trips across the I-90 Bridge would be slightly slower during peak commute times, would you prefer to:



Should Both Bridges Be Tolled?

Respondents were also asked if both the 520 and I-90 bridges should be tolled. Several factors were then introduced to see their impact on respondents' preference for tolling just the 520 Bridge or tolling both bridges. These factors were toll amounts, travel speeds, and how toll revenues would be used.

520 Bridge Users More Supportive of Tolling Both Bridges to Keep Tolls Lower

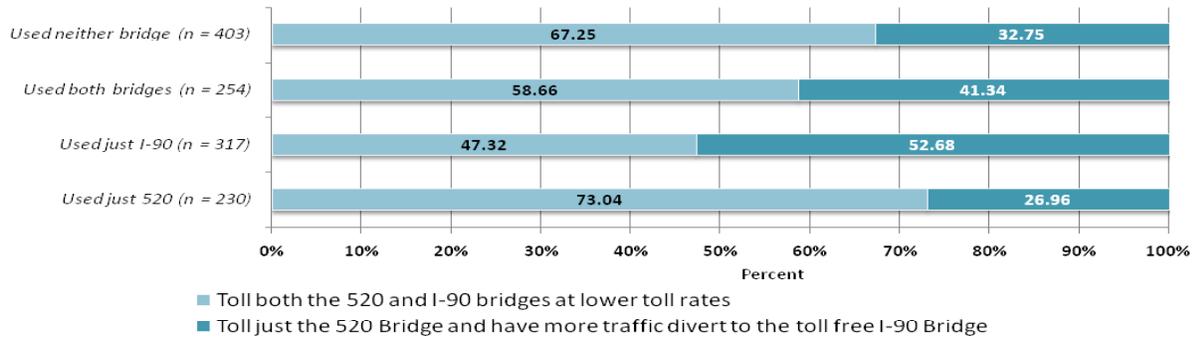
I-90 Bridge users were the least supportive of tolling both bridges (less than half, 47%). Those who used the 520 Bridge exclusively and those who used both bridges (as well as those who used neither bridge) were more supportive of tolling both bridges when they knew the toll would be higher on 520 if just 520 was tolled (520 users - 73%, I-90 users - 47%, dual-bridge users - 59%, neither bridge users - 67%).⁴⁵

⁴⁵ Cramer's V = .196, p = .000

Chart 9

Q13 - Tolling only the 520 bridge would require higher tolls than tolling both 520 and I-90 bridges. Would you prefer:

Base: All respondents who participated in the survey



Those more likely to support tolling both bridges once they know that doing so would lower tolls had:

- Driven alone across the bridge in the last week (I-90⁴⁶)

I-90 Bridge Users Less Supportive of Tolling Both Bridges Even if it Decreased Travel Speeds

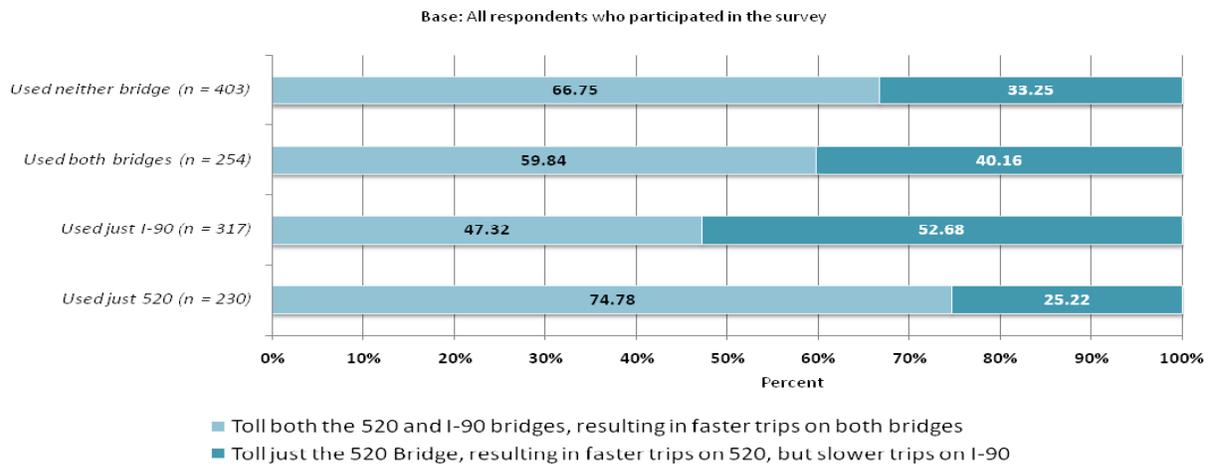
A majority (53%) of I-90 Bridge users opposed tolling both bridges even when they knew that tolling only the 520 Bridge would result in slower trips on I-90 due to traffic diversion from the tolled 520 Bridge. Those who used the 520 Bridge exclusively and those who used both bridges (as well as those who used neither bridge) were more supportive of tolling both bridges when they knew this would result in faster trips on both bridges (520 users - 75%, I-90 users - 47%, dual-bridge users - 60%, neither bridge users - 67%).⁴⁷

⁴⁶ Cramer's V = .119, p = .034

⁴⁷ Cramer's V = .202, p = .000

Chart 10

Q14 - Which statement comes closest to your personal preference:



Those more likely to prefer tolling both bridges, resulting in faster trips on both bridges were:

- Females (dual bridge users⁴⁸)
- Those who used the I-90 Bridge fewer days in the last week (I-90 users⁴⁹)

Use of Tolls to Improve I-90 Increased I-90 Users Support for Tolling Both Bridges

Even though I-90 Bridge users were the least supportive of tolling both bridges, their support increased by 6% (from 47% to 53%) when they knew that tolls on the I-90 Bridge would be used, in part, to make improvements to the I-90 Bridge.⁵⁰

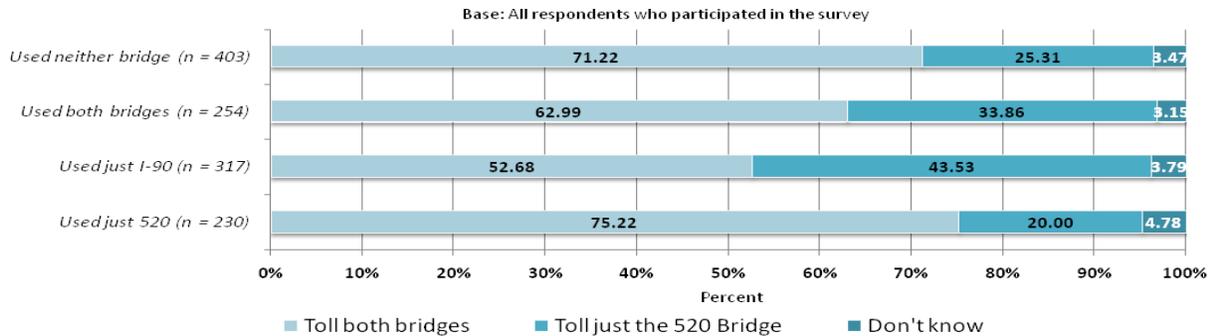
48 Cramer's V = .135, p = .031

49 Tau c = -.140, p = .026

50 Cramer's V = .136, p = .000

Chart 11

Q15 - If you knew that the revenue from I-90 Bridge tolls would also be used to make improvements to the I-90 Bridge, would you prefer to:



Those more likely to prefer tolling both bridges, if they knew tolls would also be used to improve I-90 were:

- Females (dual bridge users⁵¹)
- Those who used I-90 fewer days in the last week (I-90 users⁵², dual-bridge users⁵³)

Toll Revenues Should Also Be Used to Reduce Driving Alone

In addition to paying a portion of the cost of replacing the bridge and improving the 520 corridor, many respondents also favored using toll revenues to reduce the use of single occupancy vehicles on the bridges. Many favored using toll revenues for transit on 520 (46% or more), transit on I-90 (30% or more), and incentives for carpooling (33% or more).

⁵¹ Cramer's V = .127, p = .046

⁵² Tau c = -.190, p = .003

⁵³ Tau c = -.198, p = .003

Table 5

Q16- Tolls on the 520 Bridge will be used to replace the bridge, improve the highway, and operate and maintain it into the future. Which of the following, if any, do you think tolls on the 520 Bridge should also be used for?

	Used just 520		Used just I-90		Used both bridges		Used neither bridge	
	Count	%	Count	%	Count	%	Count	%
Transit on 520	137	59.57	154	48.58	116	45.67	193	47.89
Transit on I-90	76	33.04	108	34.07	75	29.53	131	32.51
Transit on 522 (Bothell / Lake City Way)	42	18.26	59	18.61	51	20.08	101	25.06
Incentives to carpool, vanpool or ride the bus	94	40.87	119	37.54	84	33.07	158	39.21
Use tolls only for replacing the bridge and improving the corridor	49	21.30	88	27.76	71	27.95	90	22.33
Other	4	1.74	3	0.95	7	2.76	13	3.23
Total	230	100	317	100	254	100	403	100

Variable Rate or Flat Rate Tolling?

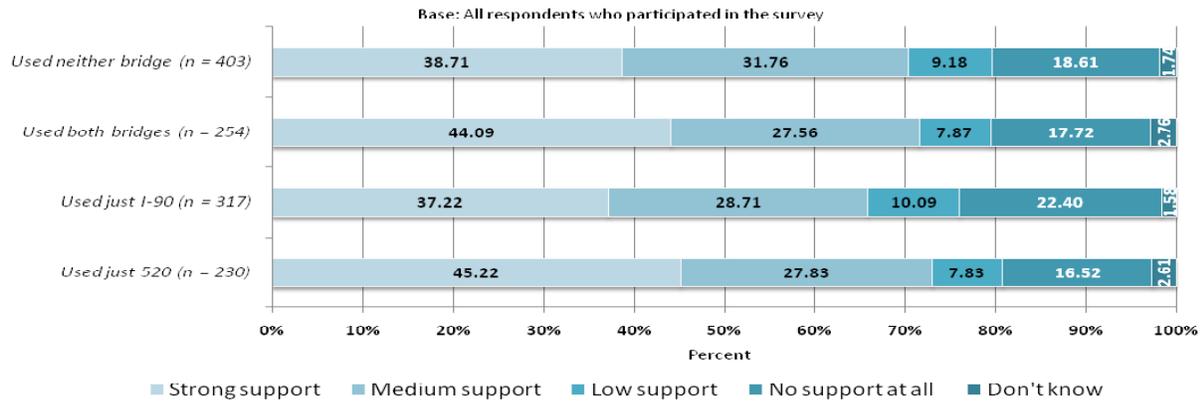
Survey respondents were described the nature of variable rate tolling and were then asked to rate their level of support for such tolling. They were then asked which of three things that variable rate tolling results in were most important to them. Several factors were then introduced to assess their impact on respondents' support for variable rate tolling. These factors were off-peak tolls being about half of the peak time amount and weekend rates being even lower. They were also asked if they would have been likely to have traveled during the off-peak period in reference to their last peak period trip across the bridge knowing that the off-peak toll amounts would be lower.

Most Supported Variable Rate Tolling

There was support for variable rate tolling, especially among those who used the 520 Bridge exclusively or used both bridges (520 users - 45% strong support, I-90 users - 37% strong support, dual-bridge users - 44% strong support, neither bridge users - 39% strong support).

Chart 12

Q17 - Toll rates on the bridges may vary by time of day – higher during morning and evening commute times, lower during other times of the day to reduce peak period congestion. This is known as variable rate tolling. How much would you support this?



Those more likely to support variable rate tolling had/were:

- More education (520 users⁵⁴)
- More income (I-90 users⁵⁵, dual bridge users⁵⁶)
- Males (I-90 users⁵⁷)
- Females (dual bridge users⁵⁸)

Faster Trips and Traveling Off-Peak More Important Results of Variable Rate Tolling Than Generating Funding for the Bridge

Of these three results – 1) get a faster trip during peak commute times, 2) being able to travel during off-peak times when the toll is lower, and 3) generating more funding for the bridge replacement – faster trips and traveling off-peak were about equally important, with generating more funding for the bridge replacement being less important.

⁵⁴ Cramer's V = .201, p = .032

⁵⁵ Tau c = .166, p = .003

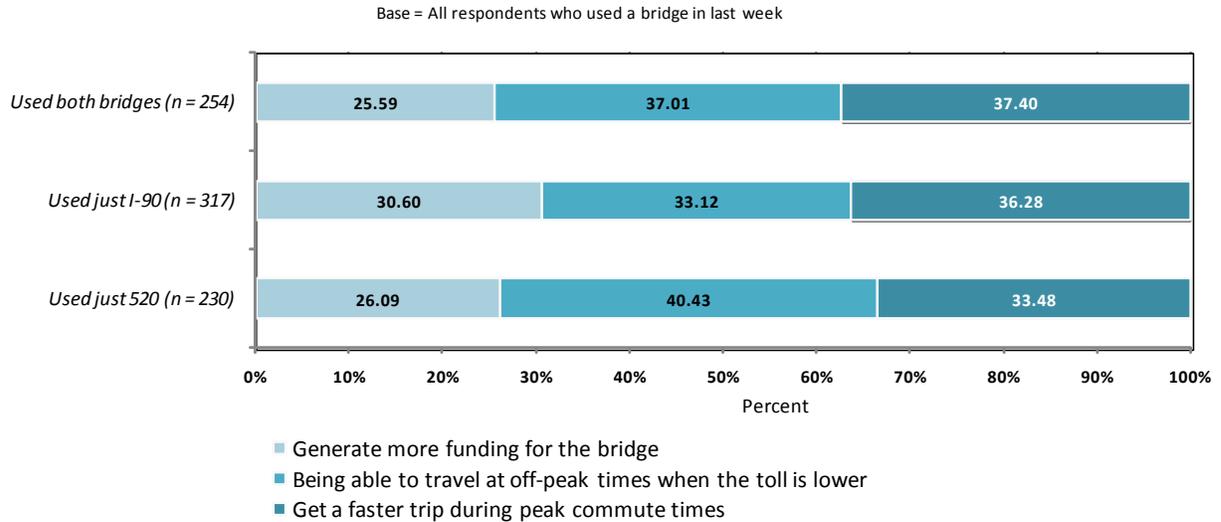
⁵⁶ Tau c = .143, p = .016

⁵⁷ Cramer's V = .183, p = .015

⁵⁸ Tau c = .138, p = .038

Chart 13

Q18 - Variable rate tolls could result in three things. Which of these are most important to you?



Those more interested in getting a faster trip had:

- More income (I-90 users⁵⁹)
- Used trip for work commute (I-90 users⁶⁰)
- Traveled during peak commute times (520 users⁶¹, I-90 users⁶²)
- Experienced more congestion in the last week (520 users⁶³)

Those more interested in being able to travel during off-peak when the toll is lower were:

- Older (I-90 users⁶⁴)

Off-Peak and Weekend Toll Rate Information Increased the Appeal of Variable Rate Tolling

Variable rate tolling was even more appealing when respondents knew that the toll rates during off-peak times would be about half of peak toll rates (520 users - 70%, I-90 users - 64%, dual-bridge users - 71%). Similar results were found in regard to weekend rates (520 users - 69%, I-90 users - 67%, dual-bridge users - 71%).

⁵⁹ Cramer's V = .237, p = .025

⁶⁰ Cramer's V = .158, p = .019

⁶¹ Cramer's V = .171, p = .035

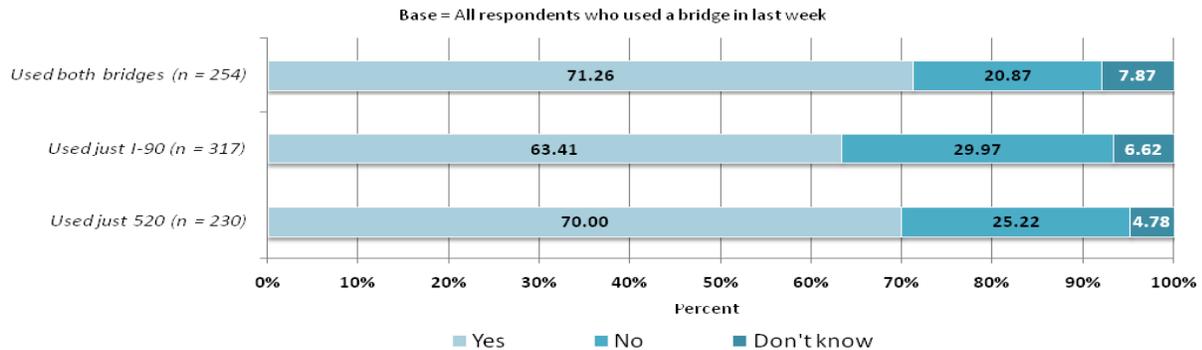
⁶² Cramer's V = .180, p = .006

⁶³ Cramer's V = .204, p = .004

⁶⁴ Cramer's V = .202, p = .004

Chart 14

Q19 - Would variable rate tolling be more appealing to you if you knew that the toll rate during non-commute times would be about half as much as the toll rate during the busiest commute times?



Those less likely to support variable rate tolling if they knew that the off-peak rate would be about half of the peak commute time rate had:

- Traveled on bridges for work commute purpose (520 users⁶⁵, I-90 users⁶⁶, dual-bridge users⁶⁷)
- Traveled on bridges during peak commute times (520 users⁶⁸, I-90 users⁶⁹)
- Used the 520 Bridge more days in the last week (520 users⁷⁰)

About Half Would Have Traveled at Off-Peak During Last Trip Across Bridge If there Was Variable Rate Tolling

When asked to think about their last peak period trip across the bridge and knowing that the off-peak toll rate would be about half of the peak toll rate, more than half indicated that they would have shifted their trip to the off-peak period (520 users - 52%, I-90 users - 54%, dual-bridge users - 55%).

Those less likely to travel off-peak (relative to their last peak time trip) were/had:

- Employed (520 users⁷¹, I-90 users⁷²)
- Used bridges for work commute trip (520 users⁷³, I-90 users⁷⁴)

65 Cramer's V = .148, p = .029

66 Cramer's V = .187, p = .001

67 Cramer's V = .130, p = .047

68 Cramer's V = .233, p = .001

69 Cramer's V = .153, p = .009

70 Tau c = -.171, p = .009

71 Cramer's V = .362, p = .000

72 Cramer's V = .216, p = .03

73 Cramer's V = .233, p = .001

74 Cramer's V = .179, p = .002

- Driven alone across bridge in last week (I-90 users⁷⁵)
- More education (520 users⁷⁶)
- More income (520 users⁷⁷, I-90 users⁷⁸, dual-bridge users⁷⁹)
- Females (dual-bridge users⁸⁰)

75 Cramer's V = .117, p = .042

76 Tau c = -.188, p = .011

77 Tau c = -.277, p = .001

78 Tau c = -.178, p = .018

79 Tau c = -.256, p = .002

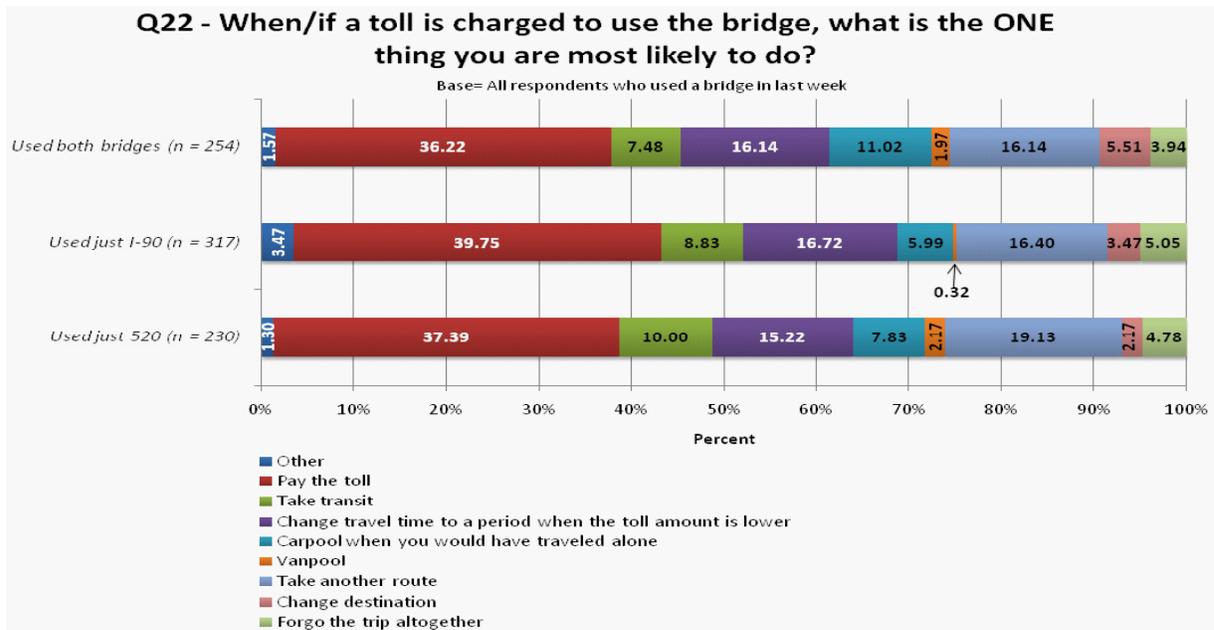
80 Cramer's V = .159, p = .015

Likelihood to Pay Toll

Most People Would Continue to Use 520 When Tolls Are Implemented

When asked what was the number one thing they were most likely to do when tolling is implemented, more than a third reported being likely to pay the toll (520 users - 37%, I-90 users - 40%, dual-bridge users - 38%). This was followed by taking other un-tolled routes, changing their time of travel to when the toll is less, and taking transit.

Chart 15



Those most likely to pay the toll had/were:

- More education (520 users⁸¹, I-90 users⁸²)
- More income (520 users⁸³, I-90 users⁸⁴, dual-bridge users⁸⁵)
- Used bridge for work commute in last week (I-90 users⁸⁶)
- Used bridges during peak commute times (520 users⁸⁷, I-90 users⁸⁸)
- Driven alone across bridge during last week (I-90 users⁸⁹)
- More supportive of tolling once they knew about electronic tolling (520 users⁹⁰, I-90 users⁹¹, dual-bridge users⁹²)
- More likely to support early tolling once they knew that would result in lower tolls and financing costs (520 users⁹³, I-90 users⁹⁴)
- More likely to support tolling both bridges once they knew that would result in lower tolls on both bridges (520 users⁹⁵, I-90 users⁹⁶)

I-405, I-5 and SR 522 Likely Alternate Routes to Be Used

For those who said they would be most likely to use an alternate route, a quarter (25%) of exclusive 520 Bridge users said they would divert to the I-90 Bridge, while 29% of dual-bridge users said they would use I-90.

Many others said they would shift to I-405 to I-5 or I-5 to I-405 as an un-tolled route:

- Exclusive 520 Bridge users (25%)
- Exclusive I-90 Bridge users (73%)
- Dual-bridge users (46%)

State Route 522 was also reported as likely to be used as an alternate un-tolled route:

- Exclusive 520 Bridge users (36%)
- Exclusive I-90 Bridge users (6%)

81 Tau c = .168, p = .016

82 Cramer's V = .213, p = .015

83 Tau c = .376, p = .000

84 Tau c = .229, p = .002

85 Tau c = .289, p = .000

86 Tau c = .255, p = .008

87 Cramer's V = .299, p = .009

88 Cramer's V = .248, p = .012

89 Cramer's V = .238, p = .022

90 Tau c = .196, p = .004

91 Tau c = .187, p = .002

92 Tau c = .140, p = .031

- Dual-bridge users (20%)

A good number would also use local streets as alternate un-tolled routes:

- Exclusive 520 Bridge users (14%)
- Exclusive I-90 Bridge users (17%)
- Dual-bridge users (5%)

Regression Analysis

Since cross-tabulation analysis (such as that described thus far) investigates the relationship between only two variables at a time without controlling for other variables or any interaction effects, logistical regression analysis was performed to more fully understand the relationship of the travel behavior, attitudinal and demographic variables in regard to support towards tolling the 520 Bridge and towards likelihood to pay the toll.

Predicting Support for Tolling the 520 Bridge

520 Bridge Users

Those most likely to support tolling the 520 Bridge were those who:

- Were more supportive of replacing the existing bridge (7.7 times more likely to support tolling)
- Were more supportive of variable rate tolling (3.8 times more likely to support tolling)
- Had incomes above \$75,000 (4.1 times more likely to support tolling)
- Were more supportive of starting tolling in 2010 (0.1 times more likely to support tolling)

These four variables accounted for 34% of the variance in support for tolling the 520 Bridge.

I-90 Bridge Users

Those most likely to support tolling the 520 Bridge were those who:

- Were more supportive of electronic tolling (8.7 times more likely to support tolling)
- Were more supportive of starting tolling in 2010 (0.13 times more likely to support tolling)
- Experienced less congestion on the I-90 Bridge (0.11 times more likely to support tolling)

These three variables accounted for 26% of the variance in support for tolling the 520 Bridge.

Dual- Bridge Users

Those most likely to support tolling the 520 Bridge were those who:

- Were more supportive of electronic tolling (5.5 times more likely to support tolling)
- Were more supportive of replacing the existing bridge (3.3 times more likely to support tolling)
- Were more likely to pay the toll (3.0 times more likely to support tolling)
- Were more supportive of starting tolling in 2010 (0.13 times more likely to support tolling)

These four variables accounted for 32% of the variance in support for tolling the 520 Bridge.

Predicting Those Most Likely to Pay the Toll

520 Bridge Users

Those most likely to pay the toll were those who:

- Used 520 Bridge more days in last week (1.6 times more likely to pay toll)
- Were less likely to shift to off-peak travel (0.36 times more likely to pay toll)
- Experienced less congestion (0.24 times more likely to pay toll)
- Thought un-tolled routes were less important (0.24 times more likely to pay toll)
- Were more supportive of starting tolling in 2010 (0.24 times more likely to pay toll)

These five variables accounted for 32% of the variance in the likelihood to pay the toll.

I-90 Bridge Users

Those most likely to pay the toll were those who:

- Were more supportive of electronic tolling (6 times more likely to pay the toll)
- Had fewer vehicles (0.59 times more likely to pay toll)
- Thought un-tolled routes were less important (0.33 times more likely to pay toll)
- Were less supportive of variable rate tolling if they knew the off-peak rate is about half of the peak rate (0.29 times more likely to pay toll)
- Were less likely to shift to off-peak travel (0.21 times more likely to pay toll)

These five variables accounted for 25% of the variance in the likelihood to pay the toll.

Dual- Bridge Users

Those most likely to pay the toll were those who:

- Were more supportive of tolling the 520 Bridge (2.6 times more likely to pay toll)
- Were less likely to shift to off-peak travel (0.27 times more likely to pay toll)

These two variables accounted for 13% of the variance in the likelihood to pay the toll.

Appendix A: Tolling Survey

Hello, my name is _____ and I'm calling for the Washington State Department of Transportation to get opinions on issues regarding travel on the 520 and I-90 bridges. This is not a sales call. It's an opportunity to express your opinions. (Note to interviewers – it is not required that they use the bridges.)

- Start by using the RDD list of supposed non-users. – May I please speak with an adult 18 years of age or older in your household. Would that be you? (IF NO, ASK TO SPEAK WITH THE QUALIFIED PERSON AND REPEAT INTRO SECTION.)
- From 520 sample list -- May I please speak with the person in your household who uses the 520 Bridge (also known as the Evergreen Point Floating Bridge) most often? Would that be you? (IF NO, ASK TO SPEAK WITH THE QUALIFIED PERSON AND REPEAT INTRO SECTION)
- From I-90 sample list -- May I please speak with the person in your household who uses the I-90 Bridge most often? Would that be you? (IF NO, ASK TO SPEAK WITH THE QUALIFIED PERSON AND REPEAT INTRO SECTION)

I'd like to ask you some questions on a strictly confidential basis. The questions will take about 12 minutes of your time.

Screener/Quota Questions

1. Do you or does anyone in your household work for a transportation agency?

- No
- Yes (thank and terminate)
- Don't know/refused (thank and terminate)

2. How many days in the last week did you travel in your personal vehicle across the 520 Bridge?

- 0 (potential qualifier for non-user)
- 1 (occasional user)
- 2 (occasional user)
- 3 (3-7 = frequent user)
- 4
- 5
- 6
- 7

2a. How many days in the last week did you travel in your personal vehicle across the I-90 Bridge?

- 0 (potential qualifier for non-user)
- 1 (occasional user)
- 2 (occasional user)
- 3 (3-7 = frequent user)
- 4
- 5
- 6
- 7

Quota for 520 Users = 400 (ask all questions)

Quota for I-90 Users = 400 (ask all questions. Qs 3-6 & 8 & 17-24 will be rewritten to refer to I-90 users)

Quota for non-users of 520 and I-90 = 400. Based on “0” answers to Qs 2 and 2a (ask questions 1-2a, 7, 9-17, 24-36)

I. Travel Behavior and Support for Building New Bridge

3. In the last week what days did you cross the 520 Bridge? (choose all that apply)

- Monday
- Tuesday
- Wednesday

- Thursday
- Friday
- Saturday
- Sunday

**4. What time of the day do you typically travel across the 520 Bridge?
Would you say: (choose all that apply)**

- AM peak (5 am to 9 am)
- Mid-day (after 9 am to before 3 pm)
- PM peak (after 3 pm to 7 pm)
- Evening (after 7 pm to 10pm)
- Over night time (after 10 pm to before 5 am)

**5. For what trip purposes did you use the 520 Bridge in the last week?
Would you say: (multiple choices allowed)**

- Travel to or from work (if chosen, get work zip code and city)
- Travel to or from school (if chosen, get school zip code and city)
- Errands/shopping
- Non-commute work-related travel
- Recreational activities
- Visit family or friends
- Other (specify)
- Don't know (do not read)

**6. Which of the following modes of travel did you use during your travel
on 520 during the last week? (read; multiple responses allowed)**

- Drove alone
- Carpooled with household members
- Carpooled with non-household members
- Took the bus
- Vanpooled
- Other (please specify)

7. How much do you agree or disagree that the 520 Bridge needs to be replaced? Would you say:

- Strongly disagree
- Somewhat disagree'
- Somewhat agree
- Strongly agree
- Don't know

8. In general, how congested was traffic when you drove across the 520 Bridge during the last week? Would you say:

- Not congested at all
- Moderately congested
- Seriously congested
- Very seriously congested
- Don't know (do not read)

9. Do you support paying for a portion of the 520 Bridge replacement project with tolls?

- No
- Yes
- Don't know

II. Tolls for 520

I'd like to ask you a few questions about tolls and the construction of a new 520 Bridge. The bridge will need to be tolled in order to help pay for the cost of replacement. You may know that the Dept. of Transportation is proposing to replace the 520 Bridge and improve 520 from I-5 to Redmond. There are a couple of issues that we need your opinion about.

The first question has to do with how the tolls are collected.

10. Current technology allows tolls to be collected electronically as vehicles travel across the bridge at regular highway speeds. There will be no toll booths. Knowing this, does this make you more or less likely to support tolling of the 520 Bridge? Would you say:

- Much less likely
- Somewhat less likely
- Somewhat more likely

- Much more likely
- Don't know

The next questions have to do with when we start tolling the 520 Bridge.

11. If you knew that tolling the existing 520 Bridge sooner would result in lower tolls and financing costs for the project would you:

- Support tolling the existing 520 bridge in 2010
- Support tolling 520 in 2016 when the new bridge is completed
- Don't know

12. If you knew that as soon as they begin tolling the 520 Bridge that:

- Trips across the 520 Bridge would be faster during peak commute times, and that (INTERVIEWER TO PAUSE HERE)
- Trips across the I-90 Bridge would be slightly slower during peak commute times

Would you prefer to:

- Begin tolling the existing 520 bridge in 2010, or
- Begin tolling in 2016 when the new bridge is completed
- Don't know

Next, we have some questions about also tolling the I-90 Bridge. Current state and federal funds will pay for about half the cost of the 520 bridge and highway project. The remainder is anticipated to come from tolls.

13. Tolling only SR 520 would require higher tolls than tolling both 520 and I-90 bridges. As I read the following statements, please tell me which statement comes closest to your personal preference: (rotate and read)

- a. Toll just the 520 Bridge and have more traffic divert to the toll-free I-90 Bridge
- b. Toll both the 520 and I-90 bridges at lower toll rates

14. As I read the following statements, please tell me which statement comes closest to your personal preference: (rotate and read)

- a. Toll just the 520 Bridge, resulting in "faster" trips on 520, but slower trips on I-90
- b. Toll both the 520 and I-90 bridges, resulting in "faster" trips on both bridges

15. If you knew that the revenue from I-90 tolls would also be used to make improvements to the I-90 Bridge, would you prefer to: (rotate and read)

- Toll just the 520 Bridge, or
- Toll both bridges
- Don't know

Now a question about how the toll revenue should be used.

16. Tolls on the 520 Bridge will be used to replace the bridge, improve the highway, and operate and maintain it into the future. Which of the following, if any, do you think tolls on the 520 Bridge should also be used for? Would you say: (Rotate and read first 4 responses, multiple answers allowed)

- Transit on 520
- Transit on I-90
- Transit on 522 (Bothell/Lake City Way)
- Incentives to carpool, vanpool or ride the bus
- Use tolls only for replacing the bridge and improving the corridor
- Other (specify)

And now some questions about the toll amounts.

17. Toll rates on the bridges may vary by time of day – higher during morning and evening commute times, lower during other times of the day to reduce peak commute period congestion. This is known as variable rate tolling. How much would you support that? Would you say:

- No support at all
- Low support
- Medium support
- Strong support
- Don't know

18. Variable rate tolls could result in three things. Which of these are most important to you? (rotate and read, accept just one)

- Get a faster trip during peak commute times
- Being able to travel at off-peak times when the toll is lower
- Generate more funding for the bridge

19. Would variable rate tolling be more appealing to you if you knew that the toll rate during non-commute times would be about half as much as the toll rate during the busiest commute times?

- No
- Yes
- Don't know

20. Thinking about the last time you crossed the bridge during the peak commute times and knowing that the toll rate during non-commute times would be about half as much as the toll rate during the busiest commute times, would you be likely to cross the bridge during the less expensive times?

- No
- Yes
- Don't know

21. Would variable rate tolling be more appealing to you if you knew that the toll on the weekend would be lower compared to weekday tolls?

- No
- Yes
- Don't know

22. When a toll is charged to use the 520 Bridge, what is the ONE thing you are most likely to do? Would you say: (ROTATE and READ; choose just one)

- Pay the toll (skip to Q24)
- Take transit (skip to Q24)
- Change travel time to a period when the toll amount is lower (skip to Q24)
- Carpool when you would have traveled alone (skip to Q24)
- Vanpool (skip to Q24)
- Take another route
- Change destination (skip to Q24)
- Forgo the trip altogether (skip to Q24)
- Other (specify) (skip to Q24)

**23. What alternate route are you most likely to take? Would you say:
(rotate and read, accept just one)**

- I-90
- 522 (Lake City Way/Bothell Way)
- I-5 to I-405 or I-405 to I-5
- Local streets
- Other (specify)

24. When tolls are charged on 520, how important are each of the following?(Rotate and read a-b)

- a. Having other un-tolled highways that you could choose to use. Would you say:
- Very unimportant
 - Somewhat unimportant
 - Somewhat important
 - Very important
 - Don't know (do not read)
- b. Having public transit available as an alternative to paying the toll. Would you say:
- Very unimportant
 - Somewhat unimportant
 - Somewhat important
 - Very important
 - Don't know (do not read)

III. Demographics

We have a few questions about yourself and your household. Your answers will be strictly confidential and will be combined with those of other respondents for statistical analysis purposes.

25. What is your home zip code?

26. How many working vehicles do you have at your household? (do not read)

- 1
- 2
- 3

- 4
- 5
- 6
- 7 or more

27. How many people, including yourself, live in your household? (do not read)

- 1
- 2
- 3
- 4
- 5
- 6
- 7 or more

28. How many people in your household, including yourself, are employed for wages?

- 1
- 2
- 3
- 4
- 5
- 6
- 7 or more

29. Which of the following best describes your work situation? Would you say:

- Employed full-time
- Employed part-time
- Student full-time
- Student part-time
- Homemaker
- Retired
- Unemployed
- Refused

30. What is the highest level of education you have completed? Would you say:

- Less than high school
- High school
- Some college/technical school/Associates degree
- Bachelor degree
- Post graduate work
- Graduate degree
- Refused

31. Which of the following broad ranges includes your age?

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65 and older
- Refused

32. Which of the following income categories applies to your household's total annual income (before taxes) for 2007?

- Under \$20,000
- \$20,000 to less than \$30,000
- \$30,000 to less than \$55,000
- \$55,000 to less than \$75,000
- \$75,000 to less than 90,000
- \$90,000 to less than \$125,000
- \$125,000 to less than \$150,000
- \$150,000 and above
- Refused

33. Which of the following best describes your ethnic/racial background?

Would you say:

- White/Caucasian (not Hispanic/Latino background)
- White Caucasian (Hispanic/Latino background)
- Black/African American
- Asian/Pacific Islander
- Hispanic/Latino
- Native American
- Multi-racial
- Other (specify)
- Refused

34. Would you be willing to participate in a discussion group or other further research efforts to help the Department of Transportation learn more about opinions of citizens like you regarding tolling?

- NO (skip to Q36)
- YES
- DK/REF (skip to Q36)

35. Could I have your name, phone number and email address so that you can be contacted again.

Name: _____

Phone: _____

Email address: _____

36. Gender: (interviewer enter)

- Male
- Female

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