

## 5.0 PUBLIC INVOLVEMENT

The study area stakeholders and public members were engaged throughout the study. The project team distributed information and solicited feedback through regular meetings and open houses. C-470 corridor users were also surveyed to determine their perception of the existing problems along C-470, their opinion on installing express lanes along the corridor, and their current value of time. Their value of time was later used to determine the driver's propensity to use the express lanes over the general purpose lanes and also develop the projected toll rates for the corridor.

### 5.1 OVERVIEW

The public involvement process for the C-470 ELFS was designed to provide timely project updates and progress results with stakeholders and to encourage public comment and participation. With both the EA and ELFS occurring concurrently, the public involvement process for both was combined to minimize the number of required meetings and to avoid repetition. The public involvement process was part of an overall communications program that included agency involvement, community relations, media relations, and public relations. Public outreach efforts included open houses, small group meetings, one-on-one meetings, direct mailings, press releases, a Web site and email address, project phone number and mailing address, and focus groups. In addition monthly and quarterly meetings with stakeholders via standing meetings of the Project Management Team (PMT), Technical Working Group (TWG), and the Executive Working Group (EWG) were held. Due to the public's lack of familiarity with the express lane concept, an extensive educational outreach program was developed to educate the public on express lanes theories, history, and operations.

#### 5.1.1 PMT

The PMT consisted of project personnel from FHWA, CDOT, Wilson & Company, and PBS&J. Subcontractors Ordonez and Vogelsang, Hartwig and Associates, and others attended the meetings as needed. The team met monthly to coordinate resources and continue project planning. Minutes and action items were prepared for each meeting.

#### 5.1.2 TWG

The TWG met monthly throughout the project. The TWG consisted of project personnel from FHWA, CDOT, Wilson & Company, and PBS&J. Subcontractors attended as needed. Representatives of the three counties (Arapahoe, Douglas, and Jefferson) and eight cities (Littleton, Centennial, Greenwood Village, Highlands Ranch, Lakewood, Lone Tree, Golden, and Morrison) along the corridor also served on the TWG. A monthly meeting was held to present ongoing project reports and to discuss issues. Minutes and action items were prepared for each meeting.

### 5.1.3 EWG

The EWG met quarterly throughout the project. This policy-level group consisted of administrators from FHWA and CDOT, and project team members from Wilson & Company and PBS&J. Elected officials from Jefferson, Douglas, and Arapahoe counties and from the cities of Littleton, Lone Tree, Highlands Ranch, Golden, Morrison, Lakewood, Centennial, and Greenwood Village were invited to attend. Regional agencies were also represented including the Regional Transportation District (RTD), the DRCOG, the United States Environmental Protection Agency (EPA), the Federal Transit Association (FTA), Shea Homes, and the South Metro Chamber of Commerce. Colorado Transportation Commissioners also attended.

### 5.1.4 Open Houses/Workshops

The project team hosted four public open houses in October 2003, February 2004, June 2004, and December 2004. Both print and broadcast media were used to advertise the events, as well as the project Website and notices to local officials and public information officers. The total attendance for all four open houses was approximately 560 persons.

In addition to the open houses, three workshops specific to the ELFS were held on May 11, 12, and 13, 2004. Approximately 48 members of the public attended the three open houses, which served to educate the public on the express lane concept. Topics discussed included how express lanes operate, what they look like, and typical design features. Animated presentations showed typical express lane configurations and access types.

### 5.1.5 Newsletters

Four newsletters were produced and distributed at key project milestones. The newsletters provided updates, summarized public comments, and extended invitations to project open houses. A contact database of nearly 18,000 was maintained and consisted of property owners along the corridor, elected officials, media, Home Owners Associations (HOAs), civic groups, and individuals who requested to be included on the mailing list. In addition, a list of business owners along the corridor, plus businesses and residents along Santa Fe Drive, was rented as needed, expanding the mailing list to over 22,000.

### 5.1.6 Small Group Meetings

Small group meetings encouraged dialogues with communities along the corridor. Targeted groups included business, civic, and HOAs. The Speakers Bureau was promoted in the project newsletters, on the Web site, and via direct mailings to the groups in August 2003 and August 2004. The 43 meetings held from August 2003 to December 2004 were attended by nearly 1,000 members of the public. Actions were

documented in a Small Group Meeting Report, which noted the times, dates, and locations and issues discussed.

### 5.1.7 Project Website

The project Website ([www.c470.info](http://www.c470.info)) was launched in July 2003 and was promoted via project business cards, a news release, and newsletters. The site provided project information, schedules, frequently asked questions, meeting announcements, and related resources. The site also provided a means for commenting on the project and accessing project staff. Displays and handouts from each open house were posted to the site to allow the public greater access to information. From July 2003 to December 2004, the site had more than 100,000 requests for information.

### 5.1.8 Agency Coordination/Project Stakeholders

The project team met with all concerned federal, state, and local agencies to obtain input from all jurisdictions was considered in the shaping of the project.

The agencies included:

- FHWA
- EPA
- United States Fish and Wildlife Service (USFWS)
- Colorado Division of Wildlife (CDOW)
- United States Army Corp of Engineers (USACE)
- CDOT
- RTD
- DRCOG
- FTA
- Arapahoe County
- Douglas County
- Jefferson County
- City of Centennial
- City of Golden
- City of Greenwood Village
- City of Lakewood
- City of Lone Tree
- City of Morrison
- Highlands Ranch Metro District

### 5.1.9 Public Acceptance

During the public involvement process, members of the public and stakeholders had the opportunity to comment on the express lane alternative. Comments received were used to identify key concerns of the public and ultimately shape the recommended alternative. Throughout the process, similar issues were identified including noise, trails, access, highway capacity, future transit, and the environment.

Many people living in the residential communities adjacent to the corridor were worried about the potential for increased noise along C-470 with additional lanes. Many community members requested that noise walls be installed to mitigate noise.

Concerns were also voiced over the existing number of at-grade crossings along the adjacent C-470 trail and the increased safety risk of crossing several busy arterial intersections. The Public requested all trail crossings be grade separated and the C-470 trail be relocated as far from the travelway as possible.

Potential access locations to the express lanes received many comments throughout the process. The proposed access location, particularly at Colorado Boulevard, created concerns over potential increased traffic. Due to the increased efficiency of accessing the C-470 express lanes while others opposed it due to the potential of increased cut-through traffic, some public members supported the proposed access at Colorado Boulevard.

Most of all the comments recognized the need for capacity improvements along C-470, and most favored enhanced capacity through the addition of either express lanes or general purpose lanes.

Many stakeholders were concerned that the widening of C-470 to accommodate additional travel lanes would preclude the potential for a future light rail line along C-470. Members of the public were also concerned about the potential impacts to wildlife along their habitat. Concerns over air quality impacts were also identified.

## 5.2 C-470 FOCUS GROUPS

In June 2003, two qualitative research groups were formed consisting of individuals who live near the C-470 corridor and travel C-470 at least several times a week. The goal of the focus groups was to qualitatively assess drivers' responses to transportation problems on C-470 and to assess the potential for implementing express lanes. Depending upon which portion of the corridor members typically drive in, with Wadsworth Boulevard serving as the dividing line. Generally, drivers from the western segment were more accepting of using tolls as a way to fund additional capacity improvements, while drivers from the eastern segment noted that CDOT should not force toll roads on them as the only means to have the additional capacity. The

executive summary of the C-470 Focus Groups Report is in Appendix B; key findings of the report are shown below.

- On an average day, drivers from the western and eastern segment would be willing to pay \$0.98 and \$1.14, respectively.
- During the heaviest traffic, drivers from the western and eastern segment would be willing to pay \$3.72 and \$2.72, respectively.
- Drivers perceive that once the bonds are paid off, the tolls will go away.
- Drivers believe the word “value” should be removed from the express lanes title.
- Overall, 10 out of 18 drivers somewhat favored or strongly favor the idea of express lanes.
- Overall, 8 out of 18 drivers from the focus groups somewhat opposed or strongly opposed express lanes.

### 5.3 STATED PREFERENCE SURVEY

A Stated Preference Survey was conducted in April 2004 to assess market demand for express toll lanes on C-470. During the study, a commuter intercept survey and phone survey of more than 2,000 C-470 commuters was conducted. The commuter intercept survey targeted a random sampling of persons who used C-470 during rush hour. The main purpose of the commuter intercept survey was to determine what commuters were willing to pay to use express toll lanes, based on a given time savings. In addition to assessing the demand for express toll lanes, other information was gathered including:

- Travel characteristics of persons who commute in the C-470 corridor
- Awareness of the express toll lane concept
- Where commuters currently enter and exit C-470
- Reasons commuters avoid travel on C-470
- Support for developing express toll lanes on C-470

The toll amount based on a particular time savings was used to develop price sensitivity curves to estimate the demand for express toll lanes as a function of two variables: (1) the amount time that a person can save by using express toll lanes, and (2) the fee that is charged to use express toll lanes. These toll sensitivity curves correlate to a driver’s value of time. This value of time was then used in the micro-simulation traffic model to determine at what level of time savings and what toll rate a driver will enter the express lanes instead of waiting in the congested general purpose lanes. The Stated Preference Survey Executive Summary is contained in Appendix C; key findings are summarized below:

- 67 percent of the commuters surveyed thought it was an excellent, good, or an okay idea to develop express toll lanes on C-470; 31 percent thought it was a bad idea, and 2% had no opinion.

- 70 percent of the commuters surveyed indicated they would consider using the express lanes if the general purpose lanes were congested.
- 82 percent of the commuters surveyed indicated they had used toll highways, such as E-470, in other parts of the Denver metropolitan area,
- 11 percent of the commuters surveyed indicated that they already had a transponder for toll highways in the Denver area; 43 percent indicated that they did not currently have a transponder, but they would be very or somewhat likely to get one if express toll lanes were developed on C-470; 31 percent indicated they were not likely to get a transponder; and 15 percent had no opinion.
- 81 percent of the commuters surveyed indicated they would pay 20 to 30 cents per mile to use express toll lanes on C-470 in an emergency or if they were late for an appointment.

### 5.3.1 Toll Sensitivity Curves

The analysis of the stated preference survey involved developing models that could predict the rate commuters would be willing to pay to use Express Toll Lanes (ETLs) when C-470 was congested. The analyses capitalized on the unique qualities of the survey data collected and the comprehensive commuter intercept sample.

Surveys asked what cost the commuters would be willing to pay, based upon distance and time savings resulting from using express lanes. Two analyses were conducted to predict the rate commuters would be willing to pay to use express lanes. The first analysis focused on cost as a function of time savings; that is, what is the price commuters would pay to use express lanes for every minute saved in driving time. The second analysis focused on time savings as a function of cost; that is, how many minutes saved in travel time is a dollar worth. Simple regression procedures were used to examine the relationship between cost and time savings. To predict the rate commuters would be willing to pay for the use of express lanes, variables were created that computed cost per mile and minutes of time savings per mile. The regression equation for predicting the relationship between two (or more) variables is:

$$Y = a + bX$$

In this equation  $Y$  is the dependent variable,  $X$  is the independent variable,  $b$  is the slope (i.e., regression coefficient), and  $a$  is the intercept. When the equation is translated to compute cost per mile as a function of time savings, the regression equation is:

$$\text{cost per mile} = \text{intercept} + \text{slope} * \text{time savings per mile}$$

Conversely, when computing time savings per mile as a function of cost per mile, the regression equation is:

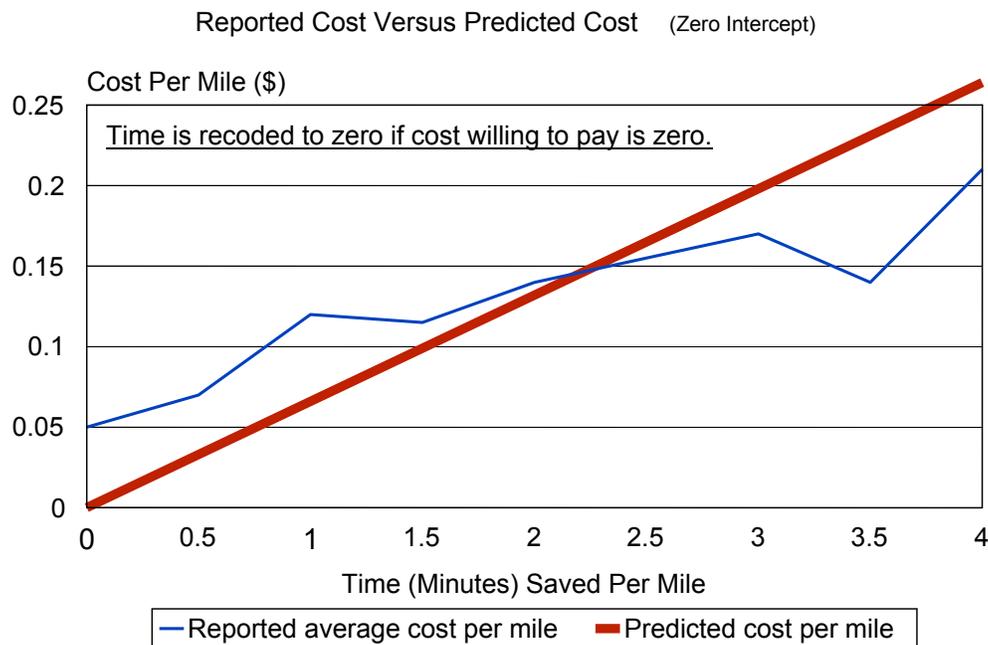
$$\text{time savings per mile} = \text{intercept} + \text{slope} * \text{cost per mile}$$

This model was applied to the survey data to predict both cost as a function of time savings and time savings as a function of cost. Analyses were also conducted with a zero intercept. In these analyses, the time savings variable is recoded to zero if the respondent indicated that they would not pay to travel in the express toll lanes.

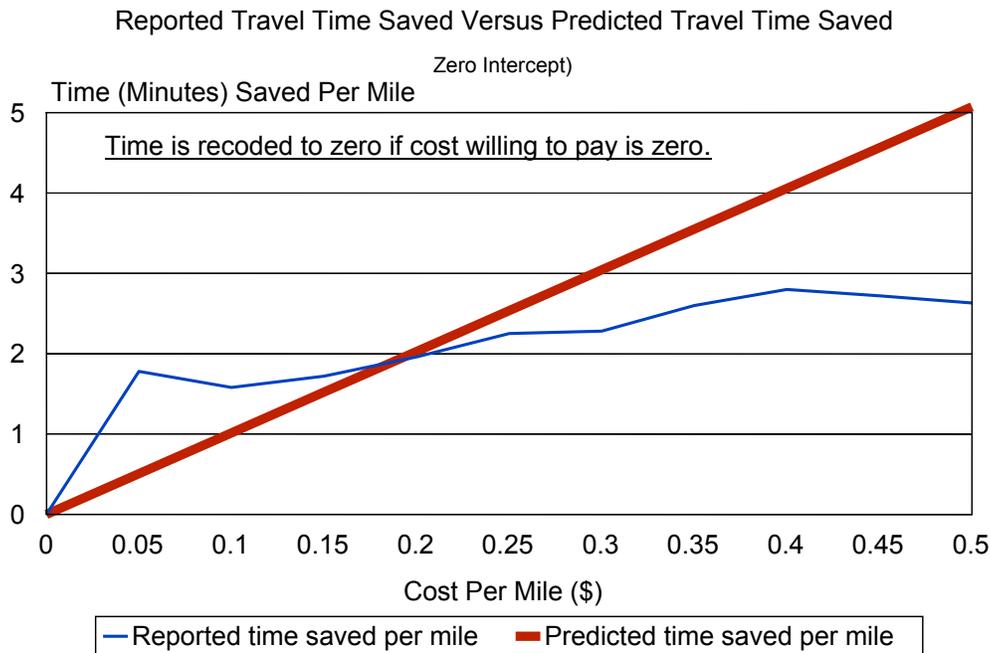
It is important to note that some commuters would be willing to pay to use the express toll lanes when there is no time savings. Simply avoiding heavy traffic may be reason enough for some of the population. The zero intercept graphs below will not accurately illustrate this group of commuters due to the nature of the model.

Figures 5.1 and 5.2 represent the toll sensitivity curves used to develop drivers' willingness to pay a toll based on a particular time savings.

**Figure 5.1**  
**Time Saved Per Mile as Function of Cost Per Mile**



**Figure 5.2**  
**Cost Per Mile as Function of Time Saved Per Mile**



### 5.3.2 Value of Time Calculations

One of the key input values in the micro-simulation model is drivers' estimated value of time. In the initial model runs, the value of time was taken directly from the stated preference survey, which calculated corridor users' value of time as being approximately \$6.00 per hour. This value was calculated by developing a linear regression equation that best fit drivers' responses to what they would be willing to pay based on given time savings. Based on documented results from a similar survey completed for SR-91 in Orange County, California, drivers surveyed on that corridor placed their value of total travel time as being \$8.50 per hour. The total travel time value assumes congested conditions are present only during a small portion of the commute. All values are in 2004 dollars. This would tend to resemble what drivers of the C-470 corridor are experiencing, based on current-day congestion levels. As traffic volumes along the corridor continue to grow, the degree and period of time during which congestion occurs will continue to increase, as will drivers' value of time.

A National Cooperation Highway Research Programs (NCHRP) report (Report 431, Valuation of Travel Time Savings and Predictability in Congested Conditions for Highway User-Cost Estimation) indicates that an adjustment factor needs to be applied

to account for travel during highly congested travel conditions. The report noted that drivers' value of time increases by a factor of 2.5 during periods of highly congested travel conditions. The AASHTO User Benefit Analysis for Highways recommended applying a 2.0 factor during highly congested periods. Using the results from the C-470 User Survey and a \$6 per hour value of time, the C-470 corridor's user value of time during highly congested periods would increase to between \$12 to \$15 per hour. All values are in 2004 dollars.

The sensitivity analysis also looked at researching other methods that past studies have used to calculate drivers' value of time during congested conditions. Five sources had computed drivers' value of time based on various input values that could be applied as nationwide averages. The studies used in the analysis, and their respective values of time, are shown in the Table 5.1. The value of times were adjusted to reflect the current dollar value based on the Consumer Price Index (CPI) for the year the study was completed.

**Table 5.1**  
**Value of Time Summary Table**

Study	Based on Data from Year	Value of Time Rates (\$/hr)	CPI (Study Year)	CPI (2004)	2004 Value of Time Rates (\$/hr)
AASHTO User Benefit Analysis for Highways	2000	10.96	174.0	189.4	11.93
NCHRP Report 431, Valuation of Travel Time Savings and Predictability in Congested Conditions for Highway User-Cost Estimation	1999	13.25	168.3	189.4	14.91
Measure the Economic Costs of Urban Traffic Congestions	2002	14.30	180.9	189.4	14.97
Uncovering the Distribution of Motorist Preferences for Travel Time and Reliability: Implications for Road Pricing	2002	14.83	180.9	189.4	15.53
Value of Time Savings	1999	11.38	168.3	189.4	12.81
				<b>Average</b>	<b>14.03</b>

The AASHTO User Benefit Analysis for Highways noted that a rough calculation typically used to derive a driver's value of time is to take 50 percent of their hourly income level. To derive this value, 2000 U.S. census data for the block groups surrounding the corridor were compiled to determine the average household income

for typical corridor users. Based on the data obtained, the average income for households surrounding the corridor is \$85,881 in 2004 dollars.

The next step in calculating the value of time was to determine the average number of wage earners per household who would typically commute during normal peak hours. The calculation assumed that the wage earners in the household would commute during typical AM and PM peak hours. Based on data taken from the 1997 DRCOG Household Survey for the Metro Denver Area, 1.37 persons on average make up the overall household income.

This assumption considers all household income levels found throughout the metro area, which averages approximately \$37,787. Based on the higher average household income level of \$85,881 for the C-470 corridor, it could be determined that drivers have higher paying jobs and that more people per household earn wages. This assumption was confirmed in reviewing a survey that was completed in 2003 by the United States Bureau of Labor Statistics and the United States Census Bureau (USBOC). That survey showed that for households with average income levels of approximately \$85,000, the factor of wage earners per household was 1.90; therefore, for a comparative analysis, the 1.37 and 1.90 factors were used to compute the average income levels for a peak hour commuters along C-470. Table 5.2 summarizes the results from calculating average hourly wage rates for drivers along the corridor. It shows that by using the 1.37 and 1.90 factors, the average annual income is \$62,687 and \$45,200, respectively. Using the methodology that a driver's value of time under normal commuting conditions is approximately 50 percent of a driver's hourly wage, the 1.37 and 1.90 factors result in a \$15.07 per hour and \$10.87 per hour average value of time. Taking the average of these two values results in an overall value of time of \$12.97 per hour.

Based on the documented values of time in previous studies, and the results from the stated preference survey, it is shown that an \$11 to \$15 per hour value could be used for a driver's value of time during highly congested periods. During off peak and shoulder peaks, where congestion levels are much lower, a driver's value of time would be closer to a value of \$6 per hour. Therefore, \$15 per hour was used in the analysis for this study. All values are in 2004 dollars.

**Table 5.2  
Value of Time Calculation for Corridor Users**

Arapahoe/Douglas/ Jefferson County Average in 2000	Arapahoe/Douglas/ Jefferson County Average in 2004	Mean Number of Earners per Household in 2003		Average Annual Income of Commuters		Average Hourly Wage of Commuters (\$/hr)		Average Value of Time (\$/hr)	
\$78,898	\$85,881	1.37	1.9	\$62,687	\$45,200	\$30	\$22	\$15	\$11
Taken from U.S. 2000 census data for areas within the C-470 corridor study area	Inflated to 2004 dollars based on CPI Index	Assumes 1.37 people in household would commute during peak hours (taken from DRCOG 1997 household survey)	Assumes 1.9 people in household would commute during peak hours (taken from National CPS Annual Demographic Survey for income levels around three-county average in 2003)	DRCOG	CPS (Bureau of Labor Statistics and Bureau of the Census	Assumes 40-hour work week for 52 weeks a year		Assumes commuters value of time is equal to 50% of hourly wage	

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