Trend Study: Understanding the Impacts of I-85 Express Lanes Extension on Northeast Metro Atlanta Communities

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PREPARED FOR

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Independent Study

In Collaboration with

HNTB

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Executive Summary

In support of the I-85 Express Lanes Extension implementation, researchers at Georgia State University (GSU) with support from the Georgia Department of Transportation (GDOT) conducted four annual surveys over the period 2018-2022, to obtain information on mode of travel, frequency of use, reasons for use, travel-time savings, and trip-time reliability of users of both the express lanes and general purpose lanes within the corridor. This trend study aims to determine if there is an unequal distribution of burdens or benefits for environmental justice (EJ) populations that live near and use the I-85 corridor in Gwinnett County. Additionally, the study aims to determine if the express lanes improved commuting for all Northeast I-85 Metro-Atlanta commuters. This study was commissioned by GDOT, with support from GSU researchers and in partnership with Noble Insight, LLC, and HNTB with support from GDOT.

Opened to traffic in November 2018, the I-85 Express Lanes Extension is Georgia's third managed toll lanes, extending 10 miles north of the existing toll lane beginning at Old Peachtree Road, and running through Hamilton Mill Road in Gwinnett County. To access the I-85 Express Lanes Extension, commuters are required to obtain a Peach Pass to pay the toll (fee). The toll amount is based on a dynamic pricing structure with the cost rising as express lanes demand increases and falling as demand decreases.

For the purpose of this study, EJ group status was defined in two ways: that of low-income, or poverty-only and that of poverty *and* racial minority status. That is, researchers examined responses of multiple groups: non-EJ, or those living in census block groups that do not exceed regional poverty or racial minority thresholds; EJ poverty, or those living in census block groups where the percentage of those who are low-income exceeds the regional average; and EJ poverty and race, or those who reside in census block groups where both the poverty levels and percent of racial minority exceed regional averages.

This is a trend study, which means a new survey sample was collected for each of the four years the research team went into the field to collect data. Disproportionate stratified sampling was used to ensure equal numbers of EJ and non-EJ respondents were collected. Weights were used with all analyses to bring the sample back into proportion with the area population. Each year (except Year 3), approximately 20 weeks were spent in data collection. Face-to-face interviews were the primary mode of administration prior to 2020 and COVID-19, because they produce better response rates compared to self-administered survey response rates which are currently below 10%.[1] A convenience sample was also collected (grid sample) to replace targeted sample members who refused or were ineligible to participate in the study. In Year 3, the design was adjusted to account for COVID-19 restrictions that impacted early years of data collection. Instead of the usual extended data collection period with face-to-face interviewing, researchers utilized a combination of self-administered, online surveys from March 2022 until early May 2022 and a brief period of face-to-face interviewing (two weeks in April/May) during this time.

Under the poverty-only EJ definition researchers found no statistically significant differences between EJ and non-EJ groups in terms of commute times to and from work, in use of express lanes, nor in attitudes and perceptions. Commute times did shorten significantly after the express lanes opened; however, the first post-opening wave of data collection is completely confounded with the COVID-19 pandemic. Therefore, the shorter commute time cannot be attributed to the new I-85 Extension Express Lanes. Under the race and poverty EJ definition researchers found longer commute times that were statistically significant for EJ group members in the baseline, but all commuters benefited from the lower commute times after opening of the express lanes. Therefore, the opening of the express lanes did not cause any disproportionate burdens to this group. On the commute to work, EJ group members' commute averages over four minutes longer than that of non-EJ group members. On the return home commute, EJ group members averaged about a six minute longer commute compared to non-EJ group members.

[1] Dillman, D., J. Smyth, and L. Christian (2014). "Response rate and measurement differences in mixed-mode surveys using mail, telephone, interactive voice response (IVR) and the Internet." *Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method.* Hoboken, NJ: Wiley.

Perceptions of inequities can be almost as important as actual inequities. No attitudes or perceptions of the I-85 Express Lane Extension were found that demonstrated a potential source of inequity for EJ groups.

1 Introduction

In November 2018, GDOT opened the I-85 Express Lanes Extension. The I-85 Express Lane Extension is Georgia's third managed toll lanes, extending 10 miles north of the existing toll lane beginning at Old Peachtree Road, and running through Hamilton Mill Road in Gwinnett County (See Figure 1).

To access the I-85 Express Lanes Extension, commuters are required to pay a toll (fee) using a Peach Pass transponder. The toll is determined through dynamic pricing with the cost rising as demand increases and falling as demand decreases.

Researchers at GSU with support from GDOT conducted four annual surveys over the 2018-2022 period, to determine if there is an unequal distribution of burdens or benefits for EJ groups by the creation of the I-85 Express Lanes Extension, and if the express lanes improved commuting for all Northeast Metro-Atlanta commuters. To answer these questions, researchers designed a four-year trend survey study of the residents most likely to use the new express lanes heading to and from work. The first survey was implemented almost one year prior to the opening of the I-85 Express Lanes Extension (November 2018), and the next three were implemented one, two, and three years after the opening.

This report uses all four years of data from the trend study to answer the question of potential impacts to EJ populations from the I-85 Express Lanes Extension. The researchers examine travel pattern differences that may exist between EJ groups and non-environmental justice (non-EJ) groups and whether there are differences in the attitudes toward express lanes. The next section will define EJ groups and list how they have been defined in other studies. The subsequent section presents the data and methods of analysis followed by a section of results, discussion, and conclusions.

1.1 Environmental Justice Groups

According to the Federal Highway Administration (FHWA) Environmental Justice Reference Guide, addressing EJ means "identifying and addressing disproportionately high and adverse effects of the agency's programs, policies, and activities on minority populations and low-income populations to achieve an equitable distribution of benefits and burdens."[2] EJ populations, then, include both minority populations and low-income populations.

Minority populations. The definition of a minority from the FHWA Order 6640.23A includes a person who is a member of any of the following groups:

1. Black: a person having origins in any of the black racial groups of Africa;
2. Hispanic or Latino: person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race;
3. Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent;
4. American Indian and Alaskan Native: a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition; or
5. Native Hawaiian or Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

[2] *FHWA Environmental Justice Reference Guide, 2015.*

Low-income populations. The FHWA defines a "low-income" individual as a person "whose median household income is at or below the Department of Health and Human Services poverty guidelines."[3] These guidelines are established for federal aid programs and differ slightly from the U.S. Census Bureau's definition of poverty thresholds, which are a statistical measure of poverty developed from household income and family size, adjusted yearly for inflation. Given the data available for analysis, researchers used the Census Bureau's poverty threshold measures to define low-income populations.

In most situations, following the FHWA definition of environmental justice groups that includes minority and low-income is appropriate. Litman and Brenman (2012)[4] found that distinguishing between demographic versus functional status is more appropriate for a study evaluating the implementation of toll lanes. Litman and Brenman suggest that demographic categories, such as race and age, are less meaningful for socially equitable transportation planning than are functional statuses, such as poverty and physical disability.

As an FHWA case study, the city of Dallas, Texas, recently evaluated the EJ impact of their new toll lanes and defined EJ solely as based on economic status.[5] Therefore, it is reasonable to define the EJ population in this study as low-income groups and leave racial minority status out of the EJ identification process, while still examining differences in express lane usage among various minority and non-minority groups.

Within the study area (5-mile radius around the express lanes, see below for more information), 39% of the population is African American according to the 2019 American Community Survey (ACS) five-year average. While racial minority status is certainly very important and its impact is assessed in this study, it is not evident that minority status in and of itself creates barriers to using tolled facilities. Therefore, it is reasonable to define the EJ population in this study as low-income groups and leave racial minority status out of the EJ-identification process—while still examining differences in toll lane usage among various minority and non-minority groups.

2 Data and Methods

The first step in the study was to define the appropriate population. A population was selected from a 5-mile buffer area, surrounding the I-85 Express Lanes Extension (see Figure 1). The buffer was selected around the five northern-most access points of the I-85 Express Lane Extension. Most potential respondents live in Gwinnett County and a few live in Hall County. The buffer was then divided into a set of 51 census block groups that included areas where residents were most likely to use the I-85 Express Lane Extension traveling into Atlanta for work.

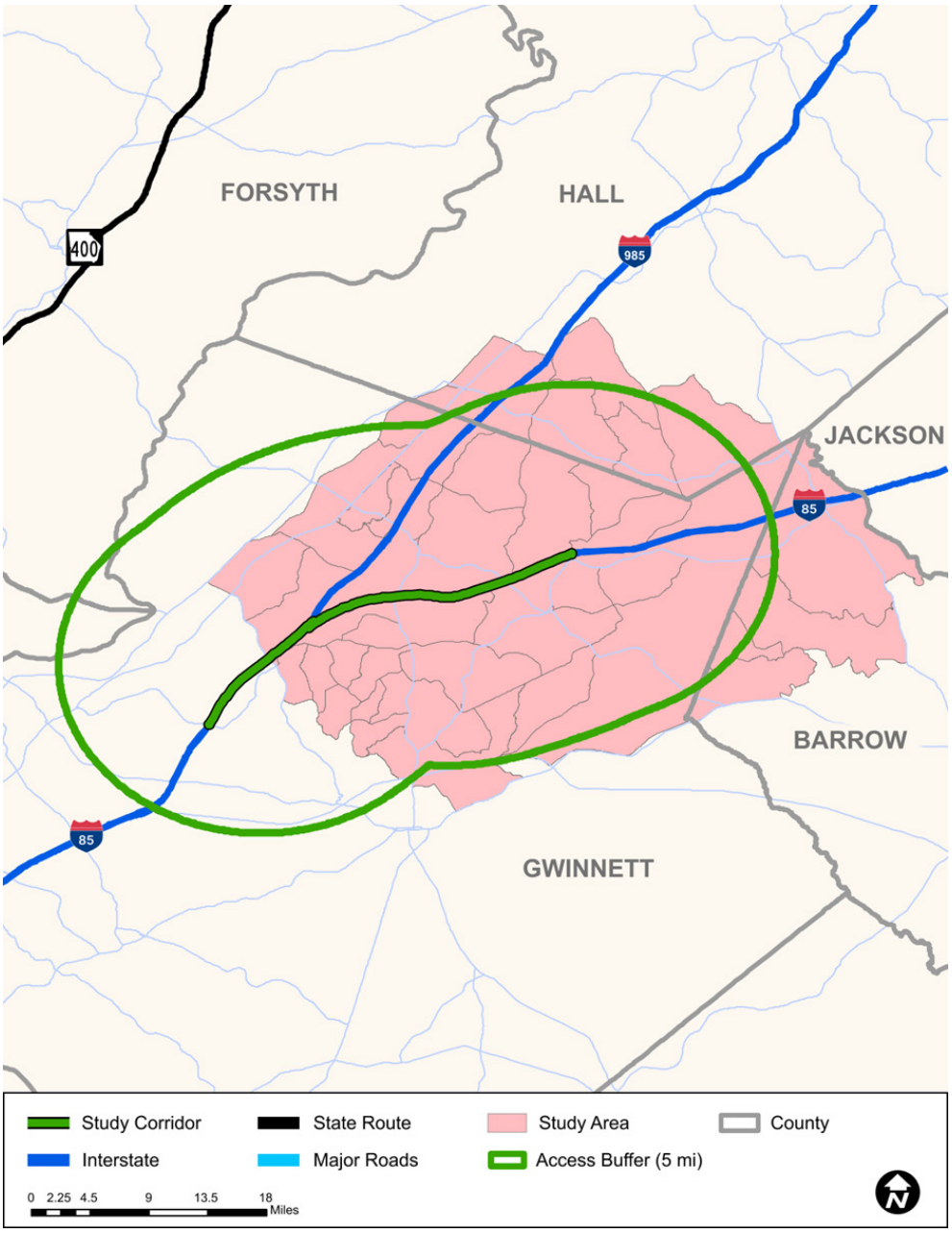
In order to ensure representation from non-EJ and EJ groups, researchers developed the samples using an area-based EJ definition, as is common practice in transportation planning. That is, EJ and non-EJ populations at the block group level were defined based on geographic-area income and racial minority characteristics following the Atlanta Regional Commission's (ARC) definition of EJ areas rather than the individual characteristics of the households (as these would be impossible to identify prior to sampling). ARC defines low-income EJ populations as those households whose incomes that fall below the median poverty rate for the 10-county metropolitan Atlanta area. Likewise, ARC defines an area with racial minority populations that exceeds the median for the metropolitan Atlanta region as an EJ minority area. The 10-county metropolitan Atlanta area includes Cherokee, Clayton, Cobb, DeKalb, Douglas, Fayette, Fulton, Gwinnett, Henry, and Rockdale counties, as well as the city of Atlanta.

[3] *FHWA Environmental Justice Reference Guide 2015, p. 10.*

[4] *Litman, T. and M. Brenman. 2012. "A New Social Equity Agenda for Sustainable Transportation," Presented at 2012 Transportation Research Board Annual Meeting, paper 12-3916, http://www.vtpi.org/equityagenda.pdf.*

[5] *Wesch, Sandy and Brandy T. Huston, 2012. Regional Tolling Analysis Informs NEPA Assessment of Cumulative Impacts on Low-Income Populations. Texas Department of Transportation.*

Figure 1. The Geographic Area that Includes the I-85 Express Lane Extension Metro-Area Population



The ACS, the most robust demographic tool available to calculate the EJ thresholds as specified by ARC, was used to create geographically-defined EJ groups. For each year of data collection, new thresholds were calculated based on the most recent ACS five-year averaged dataset available. Researchers assigned each census block group to an EJ-related status. For the pre-opening year of data collection, the 2015 five-year averaged ACS data were used. The final year of data collection, three years after the express lanes opened, the 2019 ACS five-year data were used. Census block groups are not stagnant. Therefore, census block groups that met the EJ definition for one year of data collection may not meet the definition in another year of data collection. In fact, 84% of census block groups shifted between EJ group statuses over the period of the study.

All occupied residential addresses within the 51 census block groups were retrieved from Dunhill, a company licensed to manage and sell U.S. post office addresses. The GSU research team did not include group quarter defined addresses (e.g., nursing home), business addresses, vacant addresses, or P.O. Boxes. For each of the four years of data collection, the research team selected a distinct sample in order to conduct the trend study to assess behavior change within residents of the 51 census block groups over time.

Researchers used a disproportionate stratified probability sampling method. All census block groups were first stratified by the aforementioned racial minority and poverty thresholds into four groupings:

1. Greater than threshold poverty and racial minority composition levels;
2. Greater than poverty threshold composition level;
3. Greater than threshold racial minority composition level; and
4. Less than threshold poverty and racial minority composition levels.

This sampling allowed the researchers to achieve a balanced design as well as providing the greatest flexibility in defining EJ status. Weights were calculated and used in all analyses to make the sample proportionate to the original population, and thus, representative.

2.1 Sampling

Participant eligibility was further defined as those residents of the area who commute on the I-85 Express Lanes Extension heading toward Atlanta for work. Researchers cannot know whether potential participants are eligible prior to implementing the survey. This meant the researchers surveyed the households in the sample to determine eligibility by asking participants whether they used I-85 to commute toward Atlanta for work. If a participant answered that they did not use I-85 to commute toward Atlanta for work, they were considered 'ineligible' to participate in the study. If the participant answered the eligibility question and was found to be ineligible, the researchers identified the participant as ineligible and the survey was deemed complete. If the participant was found to use I-85 to commute toward Atlanta for work, they were considered eligible, and the remainder of the survey was conducted.

An alternate grid sample was introduced when a targeted respondent refused to participate, was ineligible, the address was bad, or the participant never responded. Researchers located an eligible neighbor, defined as living on the same block as the target, to participate in the study. No grid respondents were collected during the Year 3 data collection effort. Analyses show that grid sample participants did not introduce bias into the earlier bivariate analyses. However, researchers created an indicator variable for the grid sample and included it in all regression analyses to remove any potential bias it might have in the multivariable analyses. In collecting the grid sample, the team averaged visiting two homes per block to complete one survey. This increased both the completed survey totals, and it increased the denominator used to calculate the response rates.

At baseline, prior to the express lanes opening, the researchers selected a sample size of 1,368. There were 49 bad addresses leaving us with a sample of 1,319. The research team engaged in two contact methods:

- mailing a postcard with online link
- face-to-face survey interviewing.

The research team received a final response rate of 32% or 428 targeted respondents. Of these, only 19% or 82 met the eligibility requirement (see Table 1). The addition of 140 grid respondents increased the sample to 1,599 and the adjusted response rate is 36%.

For data collection efforts in Year 1, Year 2, and Year 3, post-opening of the express lanes, the researchers made several adjustments. Year 1 data collection started in the field in December 2019. In early March 2020, the citizens of the state of Georgia were placed under the state of emergency mandated restrictions due to the novel coronavirus (COVID-19) pandemic, which disrupted traditional travel patterns. Consequently, the Georgia State University Institutional Review Board (IRB) modified all research to ensure the health and safety of all researchers and research participants, impacting data collection efforts for Year 1. The project team researchers were reauthorized to resume data collection, but only to collect data by nonintrusive measures. Researchers mailed postcards with online links and surveys with return-addressed, stamped envelopes. The project team considered several ideas to increase responses, and ultimately decided to extend the survey for several months and send a second mailing. The data collection period ended in November 2020. Post-COVID-19 state restrictions, very few additional responses were collected (n=31). The research team had a 30% response rate for Year 1 post-opening.

The Years 2 and 3 post-opening survey efforts were both impacted by state and GSU-imposed COVID-19 pandemic research restrictions. When the Year 2 post-opening wave of data collection began, research remained restricted to remote-contact only. Beginning June 10, 2021, two months (2/3 of the entire data collection period) after data collection started, research teams were allowed back into the field to collect data face-to-face. Year 3 post-opening data collection was shortened to six weeks. Researchers utilized a combination of self-administered, online surveys from March 2022 until early May 2022 and a brief period of face-to-face interviewing (two weeks in April/May). Researchers were confident that the change in methodology, including the shorter period of face-to-face interviews and smaller sample, would not impact their ability to analyze trends and to develop a regional assessment of the impacts, if any, of express lanes on the attitudes and travel behaviors of EJ and non-EJ communities.

The switch to remote-contact-only surveys meant researchers collected few responses once the COVID-19 pandemic started, despite increased time and additional mailings. The low response rate follows national trends of low participation rate for self-administered surveys. Nationally, the response rates for self-administered surveys are now below 10%.[6]

In addition to lower-than-expected response rates, COVID-19 also has the potential to bias, or shape, the findings of this study, because the closures from the pandemic directly affected travel behavior. In the Year 3 report, this was found to be the case. Minorities, living in block groups where the percentage of the population below the poverty level is lower than the Atlanta metropolitan area average, were most likely to participate in the study post-COVID-19 and still be eligible compared to other racial and economic groups. Thus, a COVID-19 indicator variable was created and used in all multivariable analyses to control for the statistical bias this introduced.

[6] Dillman, D., J. Smyth, and L. Christian (2014). "Response rate and measurement differences in mixed-mode surveys using mail, telephone, interactive voice response (IVR) and the internet." *Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method.* Hoboken, NJ: Wiley.

Table 1. Sample Sizes Across Years of Data Collections

	Baseline	Year 1+	Year 2+	Year 3+	Total
Adjusted Viable Sample Size	1,319	1,388	1,387	1,540	5,634
Completed Surveys	428	397	259	70	1,154
Response rate target only	32%	29%	19%	5%	20%
Eligible Target	82	62	30	8	182
Ineligible Target	346	335	229	62	972
Eligible Grid	140	76	23	0	239
Total Target & Grid	568	473	282	70	1,393
Total Eligible	222	138	53	8	421
Response Rate*	36%	31%	20%	5%	23%

**Response rate calculated as (completed +grid)/(sample size + (grid *2))*
+Adjusted data collection methods due to COVID restrictions

2.2 Survey Instrument

The survey is divided into three main sections with a total of 50 questions. The first section addresses travel behaviors and experiences, along with travel knowledge of the Atlanta metropolitan area. The second section focuses on attitudes, preferences, and perceptions of travel in Atlanta. The last section focuses on respondent demographics (refer to Appendix A for a copy of the survey).

3 Findings

Findings for this trend study are divided into two primary topics. First, trends in commute behaviors and patterns for EJ group differences are presented. The section thereafter examines EJ group differences in attitudes, preferences, and perceptions of travel and congestion in Atlanta. All analysis variables are introduced within each section.

3.1 Commuting Behavior Trends

Table 2 presents measures of central tendency for the variables used in this section (means and percentages) by year of data collection for the eligible sample. Distance in miles from home to work ranges from 31 at pre-opening to 34 in Year 3. The majority of the sample at each year drives alone to and from work (≥88%). At pre-opening, 46% of participants had a Peach Pass transponder. For Years 1-3, that increased slightly. Table 3 shows Peach Pass ownership by EJ group definition, also illustrated in Figures 2 and 3. There is no statistically significant difference in Peach Pass ownership between EJ and non-EJ groups. No regressions were conducted on Peach Pass ownership because of the small sample size in Year 2 and Year 3.

The outcomes of interest for this section are commuting times to and from work measured in minutes. Commute times to work ranged from an average of 54 minutes at pre-opening to 44 minutes, on average, by Year 3. Commute times are generally longer on the commute home from work, averaging between 56 and 64 minutes. Over the course of the study, use of the express lanes increased, but not for Year 3. As noted, caution should be used when interpreting the Year 3 effects given the small sample size collected in that wave.

Table 2. Descriptions of Commute Variables (Means or Percent)

	Pre-opening	Year 1	Year 2	Year 3
Distance to Work	31.16	33.49	33.47	34.67
Commute Mode:				
Drive Alone	88%	88%	91%	100%
Have Peach Pass	46%	57%	51%	50%
Commute Time:				
To Work	54.88	53.20	47.63	44.53
From Work	64.07	60.60	55.87	56.73
Use Express Lanes on Morning Commute				
Daily	0%	17%	30%	13%
A Few Times/Week	0%	16%	15%	37%
1-2 Times/Week	0%	11%	10%	0%
A Few Times/Month	0%	23%	10%	0%
Once/Month	0%	17%	10%	0%
Never	100%	16%	25%	50%
Commute During Morning Rush	33%	30%	16%	19%
Use Express Lanes on Evening Commute				
Daily	0%	24%	35%	13%
A Few Times/Week	0%	28%	10%	37%
1-2 Times/Week	0%	18%	5%	0%
A Few Times/Month	0%	8%	15%	0%
Once/Month	0%	16%	10%	13%
Never	100%	5%	25%	37%
Commute During Evening Rush	32%	30%	17%	19%
N (sample size)	221	138	53	8

Table 3. Peach Pass Ownership Percent over Time by EJ Group Definitions

	Poverty -Only		Race and Poverty	
	EJ	**Non-EJ**	**EJ**	**Non-EJ**
Baseline	48.7%	45.8%	43.5%	50.8%
Year 1	39.9%	61.8%	60.1%	63.3%
Year 2	48.2%	55.1%	55.9%	52.6%
Year 3	0%	53.7%	49.0%	66.7%

Figure 2. Peach Pass Ownership Percent over Time for Poverty-only EJ Status

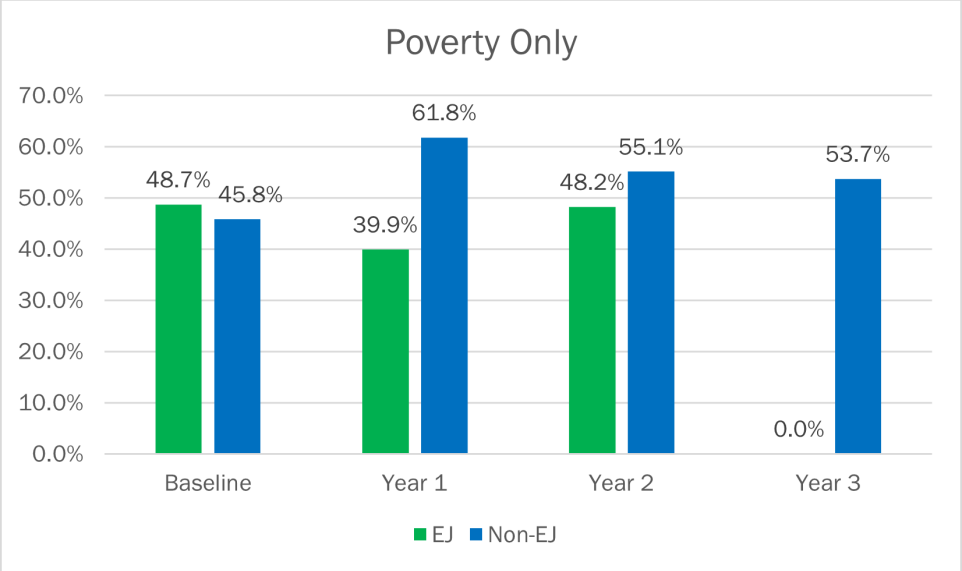
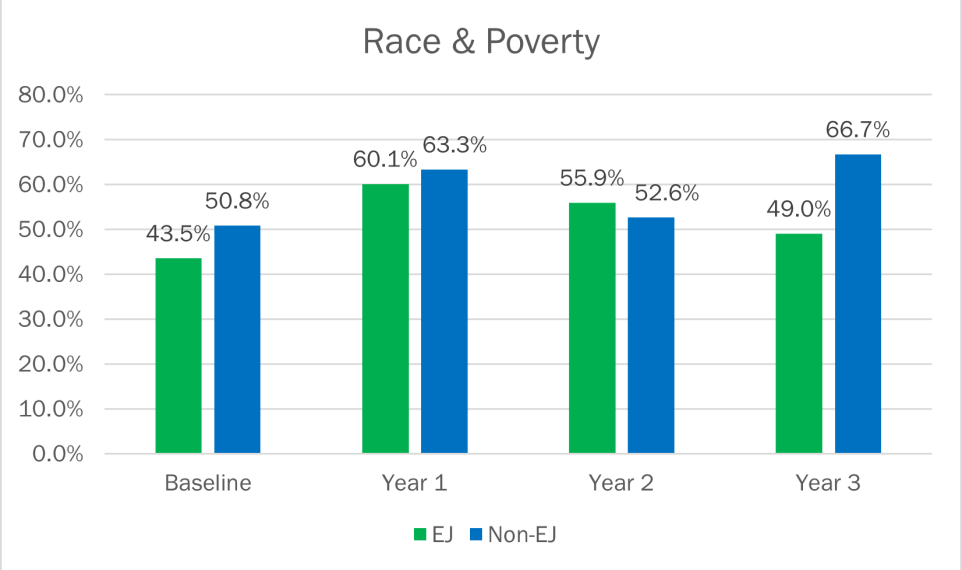


Figure 3. Peach Pass Ownership Percent over Time for Race and Poverty EJ Status



In the regressions that follow, using the express lanes is treated as a series of indicator variables. A variable for 'daily use' was created, a variable for 'never use' was created, and a variable for 'occasional use' was created. The 'occasional use' of express lanes variable will be treated as the reference category (comparison group).

Three regression models were developed to examine the trends and changes to commute times over the study period compared to the baseline, and whether there were any significant differences between EJ and non-EJ groups.

Model 1 examines the differences in commute time between EJ groups not controlling for any other potential explanations of commute time. This model should provide the largest EJ group difference; a starting point. The trend in commute times over the four years of data collection are not linear; therefore, Model 1 includes a dummy variable to distinguish each post-opening year of the express lanes from the baseline or prior to opening of the express lanes.

The next two models attempt to eliminate any EJ group differences. Model 2 adds the commute distance to regressions. Model 3 (if needed) adjusts for use of express lanes (daily or no use) and commuting during peak periods (morning rush commuting to work or evening rush commuting from work).

Table 4 shows the variables used under each regression model. The following sections presents the regression models' results applied to the survey data collected over the study period.

Table 4. Regression Model Variables

	Model 1	Model 2	Model 3
Intercept	x	x	x
EJ Group	x	x	x
1 Year Post-Opening (2019/20)	x	x	x
2 Years Post-Opening (2021)	x	x	x
3 Years Post-Opening (2022)	x	x	x
Distance Traveled (miles)		x	x
Use Express Lanes Daily			x
Never Use Express Lanes			x
Commute During Evening Rush			x

3.1.1 Commute Time to Work: Poverty-Only

Table 5 presents the first sets of linear regressions predicting commute time (in minutes) to work for EJ and non-EJ group members based on the poverty-only EJ definition. On average, Model 1 shows that EJ group members spend .44 seconds longer on their commute compared to non-EJ group members, but it is not a statistically significant difference. The trend in commute times over the four years of data collection are not linear; therefore, Model 1 includes a dummy variable to distinguish each post-opening year of the express lanes from the baseline or prior to opening of the express lanes. Year 1 post-opening of the express lanes shows a decline in commute times, but they do not reach statistical significance.

Model 2 adds the commute distance to regressions, and the EJ group difference in commute times was reversed to favor EJ group members but, again, the difference is not statistically significant. Distance traveled is positively associated with increased commute times as would be expected and is statistically significant. Once we control for distance traveled to work, we see statistically significant reductions in commute time after the express lanes opened, averaging a three-minute decline at Year 1, a seven-minute decline at Year 2, and a 13-minute decline at Year 3. The introduction of "distance traveled" results in a significant increase in the R-square for Model 2 compared to Model 1.

Model 3 added controls for usage of the express lanes and commuting during the morning rush. These variables were not significantly associated with the commute time and did not impact the association between EJ groups and commute time heading to work. Furthermore, the introduction of express lanes usage and peak period commuting do not impact the R-square compared to Model 2.

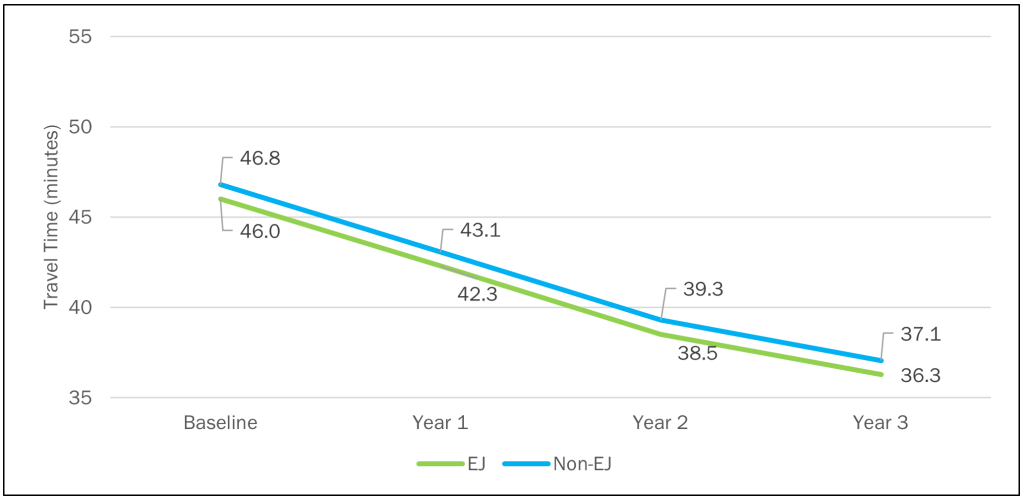
Table 5. Regressing Commute Time (in minutes) Heading to Work by EJ Status (poverty-only)

N=429	Model 1	Model 2	Model 3
Intercept	53.30 (2.13)*	55.59 (1.75)*	46.79 (2.40)*
EJ Group	0.44 (4.24)	-0.79 (1.61)	-0.78 (3.37)
1 Year Post-Opening (2019)	-1.13 (2.44)	-3.28 (1.70)	-3.73 (2.01)
2 Years Post-Opening (2020)	-6.72 (3.48)	-7.57 (2.84)*	-7.50 (2.81)*
3 Years Post-Opening (2022)	-8.78 (6.35)	-13.10 (5.19)*	-9.74 (5.21)
Distance Traveled (miles)		0.84 (0.06)*	0.81 (0.06)*
Use Express Lanes Daily			5.43 (4.53)
Never Use Express Lanes			-3.03 (2.12)
Commute During Morning Rush			0.40 (1.82)
R-square	.02	.35	.35

Notes: Controlling for grid sample. Reference category: Non-EJ, baseline, use express lanes occasionally. Standard errors in parentheses.
** indicates statistical significance at the .05 level (p<.05)*

Figure 4 illustrates the average commute times from Table 5, Model 3 for EJ and non-EJ groups. The graphic shows the 'reference' category (i.e., the intercept) that represents the non-EJ group in the Baseline year. Changes in commute times for the years post-opening are calculated by adding the regression variables for post-opening. The commute times for the EJ group are represented by adjusting the non-EJ commute times by the variable representing the EJ group. The researchers found a significant decline in commute times two years after the express lanes opened.

Figure 4. Estimated Travel Times (in Minutes) Heading to Work by Poverty-Only EJ Status (Model 3)



3.1.2 Commute Time to Work: Race and Poverty

Table 6 presents the regression model results, examining EJ differences in commute times by the race and poverty EJ definition. Residents of census block groups that exceed the thresholds for racial minority composition, but do not exceed the poverty threshold, are now treated as EJ group members. Under this EJ definition, Model 1 shows that EJ group members spend an average of 2.22 more minutes on their commute compared to non-EJ group members, but the difference is not statistically significant. The only significant difference over time is at Year 2 when commute times declined by an average of 6.85 minutes.

Model 2 controlled for distance traveled. The EJ group increase in commute time still does not reach statistical significance. Distance traveled is positively associated with increased commute times as would be expected. Once we control for distance traveled to work, we see statistically significant reductions in commute time that appear linear. The introduction of distance traveled to Model 2 results in the largest change in R-square.

Model 3 controls for use of the express lanes and commuting during the morning rush. Commuting during the morning rush hours adds an average of 11 minutes to the commute. After controlling for these variables, the EJ group difference in commute times is now statistically significant. EJ group members, on average, have a 4.17 minute longer morning commute. Overall, the reduction of commute times post opening of express lanes is also statistically significant.

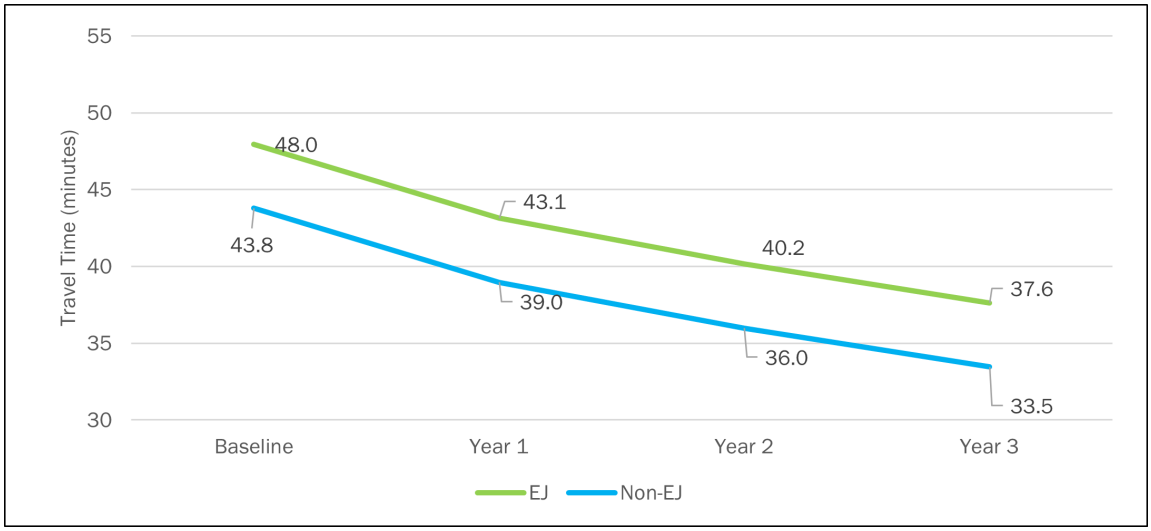
Table 6. Regressing Commute Time (in minutes) Heading to Work by EJ Status (race & poverty)

N=429	Model 1	Model 2	Model 3
Intercept	51.86 (2.65)*	53.37 (2.16)*	43.79 (2.85)*
EJ Group	2.22 (2.49)	3.30 (2.03)	4.17 (1.99)*
1 Year Post-Opening (2019)	-1.65 (2.49)	-4.04 (2.05)*	-4.82 (2.07)
2 Years Post-Opening (2020)	-6.85 (2.50)*	-7.72 (2.83)*	-7.81 (2.79)*
3 Years Post-Opening (2022)	-9.07 (6.34)	-13.48 (5.18)*	-10.33 (5.20)*
Distance Traveled (miles)		0.84 (.06)*	0.82 (0.06)*
Use Express Lanes Daily			6.57 (4.53)
Never Use Express Lanes			-2.66 (4.30)
Commute During Morning Rush			11.10 (2.11)*
R-square	.02	.35	.39

Notes: Controlling for grid sample. Reference category: Non-EJ, baseline, use express lanes occasionally. Standard errors in parentheses.
** indicates statistical significance at the .05 level (p<.05)*

Figure 5 illustrates the average commute times from Table 6, Model 3 for EJ and non-EJ groups. A significant declining trend in commute times is found over the four-year period. When higher income, racial minority neighborhoods are treated as EJ groups, the gap between the EJ groups becomes statistically significant with EJ group members having worse commute times.

Figure 5. Estimated Travel Times (in minutes) Heading to Work by Race & Poverty EJ Status (Model 3)



3.1.3 Commute Time from Work: Poverty-Only

Table 7 presents the first sets of linear regressions predicting commute home from work in minutes for EJ and non-EJ group members based on the poverty-only EJ definition. Again, Model 1 examines the differences in commute time between EJ groups not controlling for any other potential explanations of commute time. On the commute home from work, there are no statistically significant EJ group differences. There are no statistically significant changes in commute time over time either.

Model 2 controls for distance traveled. The net of distance traveled shows that there are still no statistically significant differences between the EJ groups. Distance traveled is positively associated with increased commute times, as would be expected. Once we control for distance traveled to work, we see statistically significant reductions in commute time after the express lanes opened, averaging a 5.77-minute decline in Year 1 and an 8.9-minute decline in Year 2 post-opening. While the trend continues in Year 3, it is not statistically significant. We should be cautious interpreting the Year 3 effects given the small sample size. By adjusting the regression for distance traveled. the R-square for Model 2 increases significantly compared to Model 1.

Model 3 controls for use of express lanes and commuting during the evening rush hours. The results of these added variables show that the EJ group differences as well as the reduction in commute time trend remains fairly consistent. Using the express lanes daily is associated with a statistically significant 2.96-minute increase in commute time. Commuting during the evening rush hours adds an average of 14 minutes to the evening commute times regardless of EJ group status. The observed change in R-square by adding usage of the express lanes and commuting in the evening rush is relatively small in comparison to the changes observed after introducing distance traveled.

Table 7. Regressing Commute Time (in minutes) Heading Home from Work by EJ Status (poverty-only)

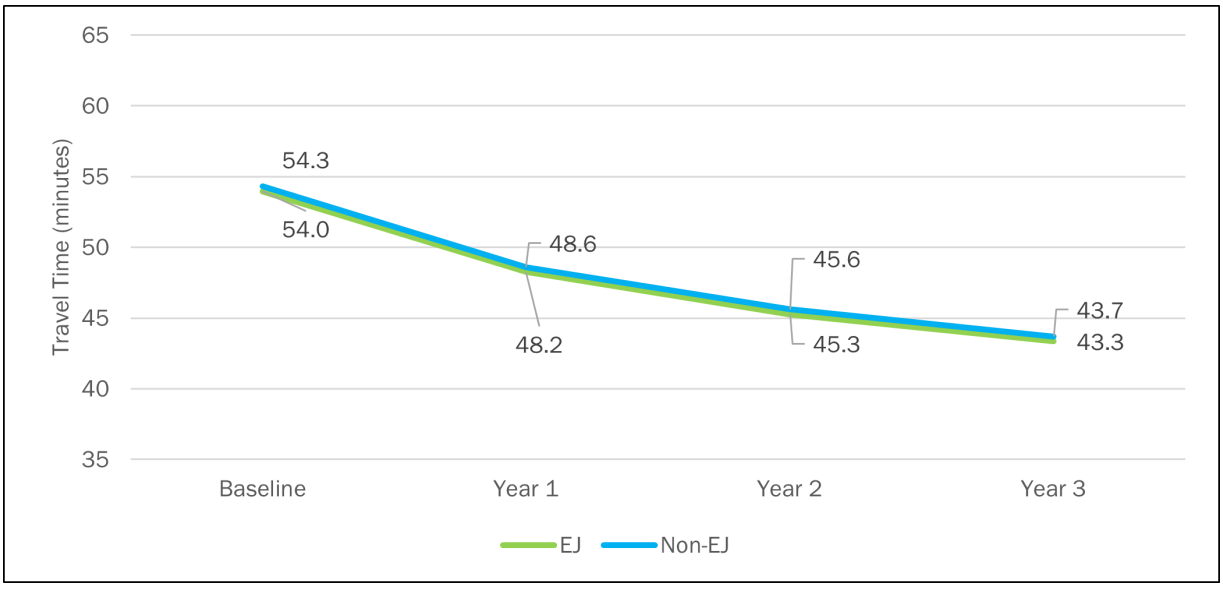
N=429	Model 1	Model 2	Model 3
Intercept	62.61 (2.68)*	65.21 (2.30)*	54.30 (2.96)*
EJ Group	-0.86 (5.33)	-1.81 (4.55)	-0.35 (4.38)
1 Year Post-Opening (2019)	-3.32 (3.07)	-5.77 (2.62)*	-5.71 (2.61)*
2 Years Post-Opening (2020)	-7.96 (4.37)	-8.94 (3.73)*	-8.69 (3.69)*
3 Years Post-Opening (2022)	5.86 (7.98)	-10.78 (6.82)	-10.60 (6.71)
Distance Traveled (miles)		0.96 (0.08)*	1.00 (0.07)*
Use Express Lanes Daily			2.96 (5.10)*
Never Use Express Lanes			-9.76 (7.31)
Commute During Evening Rush			14.50 (2.56)*
R-square	.01	.28	.34

Notes: Controlling for grid sample. Reference category: Non-EJ, baseline, use express lanes occasionally. Standard errors in parentheses.

** indicates statistical significance at the .05 level (p<.05)*

Figure 6 illustrates the average commute times from Table 7, Model 3 for EJ and non-EJ groups. A significant decline in commute times is found initially, and they remain lower than pre-opening through Years 2 and 3. Differences between EJ groups are not statistically significant.

Figure 6. Estimated Travel Times (in minutes) Heading Home from Work by Poverty-only EJ Status (Model 3)



3.1.4 Commute Time from Work: Race and Poverty

Table 8 presents the same sets of linear regressions predicting commute home from work in minutes for EJ and non-EJ group members based on the race and poverty EJ definition. Again, Model 1 examines the differences in commute time between EJ groups not controlling for any other potential explanations of commute time. EJ group members now include residents from upper income, racial minority census block groups. On the commute home from work, no statistically significant EJ group difference is found. The commute time has decreased post-opening of the express lanes, but not enough to reach statistical significance.

Model 2 adds a control for distance traveled. Overall, EJ group members have a 5.67-minute longer average commute time compared to non-EJ group members. Distance traveled is positively associated with increased commute times, as would be expected. Once we control for distance traveled to work, we see statistically significant reductions in commute time after the express lanes opened, averaging a 7-minute decline in Year 1, a 9-minute decline in Year 2 post-opening, and a non-statistically significant decline of 11 minutes in Year 3 post-opening. We should be cautious interpreting the Year 3 effects given the small sample size.

Model 3 adjusts for use of express lanes and commuting during the evening rush hour. EJ group members continue to have a statistically significant longer commute time on average compared to non-EJ group members. The reduction of commute times remains fairly consistent as well. Those who use the express lanes daily or never use the express lanes do not experience better commute times compared to those who use the express lanes occasionally. Commuting during the evening rush hours adds more than 14 minutes to the commute time regardless of EJ group status. As observed before, the introduction of traveled distance results in the largest change in R-square when comparing the three regression models.

Table 8. Regressing Commute Time (in minutes) Heading Home from Work by EJ Status (race & poverty)

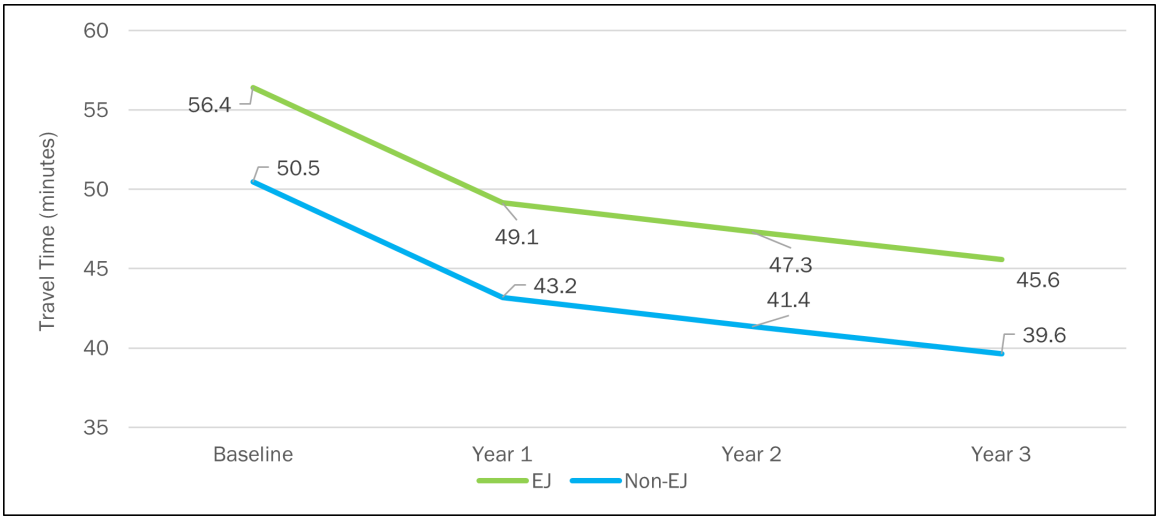
N=429	Model 1	Model 2	Model 3
Intercept	59.63 (3.33)*	61.36 (2.84)*	50.45 (3.34)*
EJ Group	4.44 (3.13)	5.67 (2.66)*	5.96 (2.58)*
1 Year Post-Opening (2019)	-4.33 (3.14)	-7.05 (2.68)*	-7.27 (2.68)*
2 Years Post-Opening (2020)	-8.16 (4.35)	-9.16 (3.70)*	-9.10 (3.66)*
3 Years Post-Opening (2022)	-6.37 (7.96)	-11.40 (6.78)	-10.83 (6.67)
Distance Traveled (miles)		0.96 (.08)*	1.00 (0.07)*
Use Express Lanes Daily			4.29 (5.10)
Never Use Express Lanes			-10.28 (7.26)
Commute During Evening Rush			14.44 (2.55)*
R-square	.02	.29	.35

Notes: Controlling for grid sample, COVID-19 restrictions. Reference category: Non-EJ, baseline, use express lanes occasionally. Standard errors in parentheses.

** indicates statistical significance at the .05 level (p<.05)*

Figure 7 shows the average commute times from Table 8, Model 3 for EJ and non-EJ groups. The research team found a significant decline in commute times in Years 1 and 2, and they remain lower than pre-opening commute times through Years 3.

Figure 7. Estimated Travel Times (in Minutes) Heading Home from Work by Race & Poverty EJ Status (Model 3)



In sum, the data suggest that EJ groups defined by both race and poverty experience longer commute-time on the I-85 expressway both during the morning to work, and the evening return home. Commute times have also reduced over the four years of this study.

3.2 Attitudes, Preferences, and Perceptions

Perceptions of inequities can be as important as actual inequities. Therefore, attitudes and perceptions were also addressed in the surveys. Respondents were asked if they thought their commute had improved since the opening of the I-85 Express Lane Extension. Table 9 provides their responses on a five-point scale that ranged from consistently worse to consistently better. No pattern or trend in attitudes emerges. Between Year 1 and Year 2, there is an increase in the percentage of respondents who perceive their commute as consistently worse. Likewise, there is a decrease in the percentage of respondents who perceive their commute is somewhat better between Year 1 and Year 2. The few respondents in Year 3 are evenly split between no change in their commute and perceiving their commute as somewhat better.

Table 9. Perception of Commute Time Post-Opening of I-85 Atlanta Express Lanes

Since Opening of Express Lanes my Commute is	Consistently Worse	Somewhat Worse	The Same	Somewhat Better	Consistently Better
Year 1 Post-Opening	11%	10%	33%	30%	16%
Year 2 Post-Opening	19%	7.0%	45%	20%	10%
Year 3 Post-Opening	0.0%	0.0%	50%	50%	0.0%

Table 10 presents regressions of the perceptions of improved commute times. The first column shows results for the poverty-only EJ definition and the second column shows results for the race and poverty definition. Note that there is a difference with this analysis compared to earlier analyses in that the baseline (pre-opening year of data collection) is excluded, as the question specifically refers to post-opening perceptions. The analytic sample is smaller, and Years 1 and 2 are compared to Year 3 in this analysis.

Table 10. Regression of Perception of Commute Improving Post-Opening

N=211	Poverty-Only	Race & Poverty
Intercept	2.52 (0.55)*	2.47 (0.57)*
EJ Group	-0.16 (0.37)	0.08 (0.21)
1 Year Post-Opening (2019)	-0.45 (0.45)	-0.07 (0.45)
2 Years Post-Opening (2020)	-0.38 (0.46)	-0.39 (0.46)
Distance Traveled (miles)	-0.00 (0.01)	-0.00 (0.01)
Use Express Lanes Daily	1.13 (0.25)*	1.15 (0.25)*
Never Use Express Lanes	0.12 (0.36)	0.10 (0.36)
Commute During Rush Hours	-0.24 (0.35)	-0.25 (0.34)
R-square	.12	.12

Notes: Controlling for grid sample, COVID-19 restrictions. Reference category: Non-EJ, Year 3 post opening, use express lanes occasionally. Baseline data is not included in this analysis. Standard errors in parentheses.
** indicates statistical significance at the .05 level ($p<.05$)*

The perceptions of commuting are on a five-point scale ranging from zero to four. The intercept values of 2.52 and 2.47 respectively, can be interpreted as the average commute perception at Year 3. Thus, at Year 3, on average, commuters perceived their commute as about the same as before the express lanes opened. Any differences between Year 3 and Years 1 and 2 are not statistically significant. There are no EJ group differences in perceptions of commute improvements based on either EJ definition. Distance traveled was not associated with perception of commuting time. Daily use of express lanes was associated with an increased perception that the commute was better compared to those who only occasionally used the express lanes. Never using the express lanes and traveling during the rush hours were not statistically associated with perceptions of commute times.

Figures 8 and 9 present the trends in perceptions of improved commuting by the poverty-only EJ definition followed by the race and poverty EJ definition. Note that any value above a two signifies perception of improved commute. These graphs show little to no difference by EJ groups for either definition. The trend shown is not so much a decline, but is more of a constant in the "2" range which can be interpreted as perceptions are that commutes have remained the same despite the express lane extension.

Figure 8. Perception of Improvement in Commuting Time Post-Opening of Express Lanes by Poverty-Only EJ Status

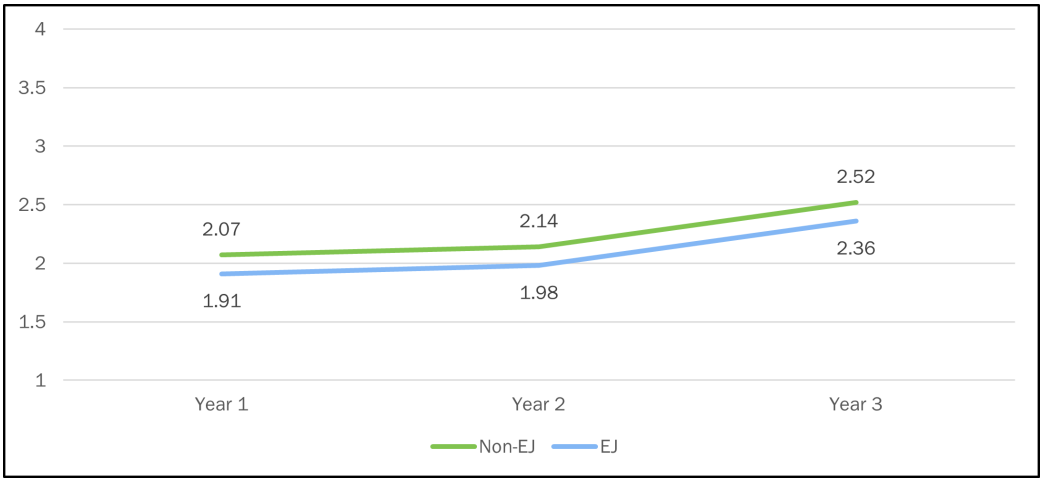


Figure 9. Perception of Improvement in Commuting Time Post-Opening of Express Lanes by Race & Poverty EJ Status

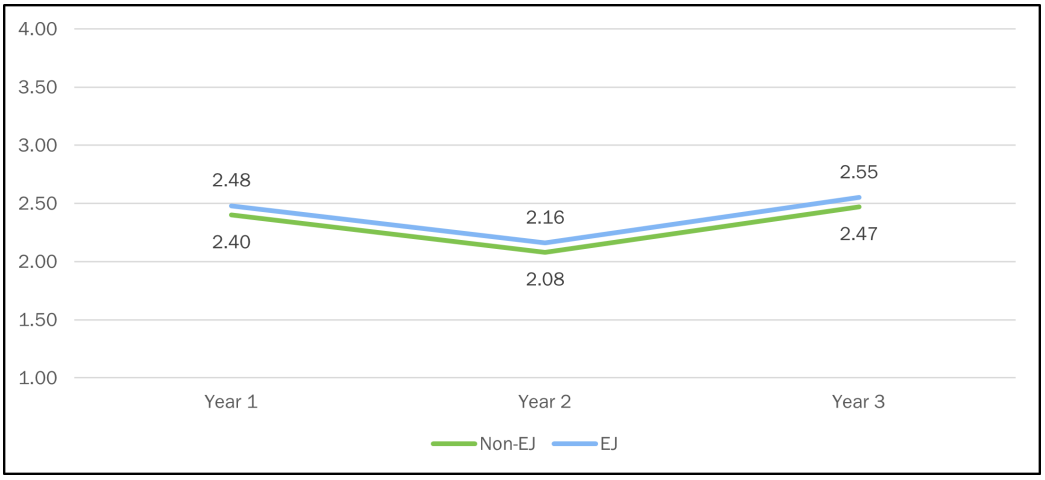


Table 11 presents five attitudinal questions regarding commuting to and from work from the Northeast Metro-Atlanta area. The five questions all have five response options: strongly disagree; disagree; neither agree nor disagree; agree; and strongly agree. In general, over 80% of respondents at all four time points of the trend study agree or strongly agree that they spend too much time in traffic, over 70% agree or strongly agree commuting is stressful, and 67% agree or strongly agree commuting is frustrating and that they are often late due to heavy traffic.

The first step in understanding these types of attitudinal questions is to determine if they are all addressing the same concept. The researchers assess this first with Cronbach's alpha, which is a measure of how well questions reliably hang together. If they do, researchers then assess their validity through factor analysis.

The Cronbach's alpha, a measure of reliability that ranges from 0 (completely unreliable) to 1.0 (completely reliable), for the five questions was 0.849. This is excellent and suggests all items indicate a single concept.

The next step was to run factor analyses. The first factor analyses run included all five questions. The model fit a single attitudinal concept well and explained 69% of the total variance (it should explain 60% minimum to be considered acceptable). This provides evidence that the five questions reliably and validly represent participants' attitudes toward Atlanta's traffic congestion.

Table 11. Attitudes toward I-85 Metro-Atlanta Commute (Percent)

N=613	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I spend too much time in traffic.	2.5%	5.8%	10.1%	32.2%	49.4%
I find commuting to be stressful.	3.5%	9.7%	15.6%	35.6%	35.6%
I'd be willing to pay a toll to lessen my commute.	18.6%	23%	14.7%	27.6%	16.2%
I find commuting to work to be frustrating.	4%	14%	14.2%	36.3%	31.4%
I often get home late from work due to heavy traffic.	2.8%	18.1%	11.8%	27.1%	40.2%

The attitude factor generated by the factor analyses is a standardized continuous variable. This means it has a mean (average) of zero and a standard deviation of one. Higher values will indicate worse attitudes toward commuting in Northeast Metro Atlanta. Table 12 presents regression analyses of the attitudes toward Atlanta's traffic for both the poverty-only EJ definition and the race and poverty EJ definition.

Findings are similar across EJ definitions in Table 12. There are little to no differences in attitudes toward traffic on I-85 between EJ and non-EJ groups across either definition. Attitudes toward traffic improved after the express lanes opened. Commuting during rush hours worsened attitudes toward traffic on I-85.

Table 12. Regressions of Attitudes toward Atlanta Traffic

N=416	Poverty-Only	Race & Poverty
Intercept	-0.19 (0.18)	-0.22 (0.19)
EJ Group	0.17 (0.18)	0.07 (0.11)
1 Year Post-Opening (2019)	-0.35 (0.11)*	-0.38 (0.11)*
2 Years Post-Opening (2020)	-0.25 (0.16)	-0.27 (0.16)*
3 Years Post-Opening (2022)	-0.60 (0.30)*	-0.62 (0.31)*
Distance Traveled (miles)	0.02 (0.00)*	0.02 (0.00)*
Use Express Lanes Daily	-0.16 (0.21)	-0.15 (0.22)
Never Use Express Lanes	-0.13 (0.34)	-0.13 (0.34)
Commute During Rush Hours	0.36 (0.17)*	0.35 (0.17)*
R-square	.10	.10

Notes: Controlling for grid sample, COVID-19 restrictions. Reference category: Non-EJ, Year 3 post opening, use express lanes occasionally. Baseline data is not included in this analysis. Standard errors in parentheses.

** indicates statistical significance at the .05 level (p<.05)*

Figures 10 and 11 present trends in attitudes toward Atlanta's traffic by the poverty-only EJ definition followed by the race and poverty EJ definition. The trends show that attitudes improved greatly immediately after the opening of the express lanes. Gradually, as area residents acclimated to the change in transportation infrastructure, attitudes, while still more positive than prior to the opening, stagnated. Again, Year 3 shows another decline, but recall that there are few participants at Year 3 and the decline is not statistically significant.

Figure 10. Attitudes toward Atlanta Traffic by Poverty-Only EJ Status

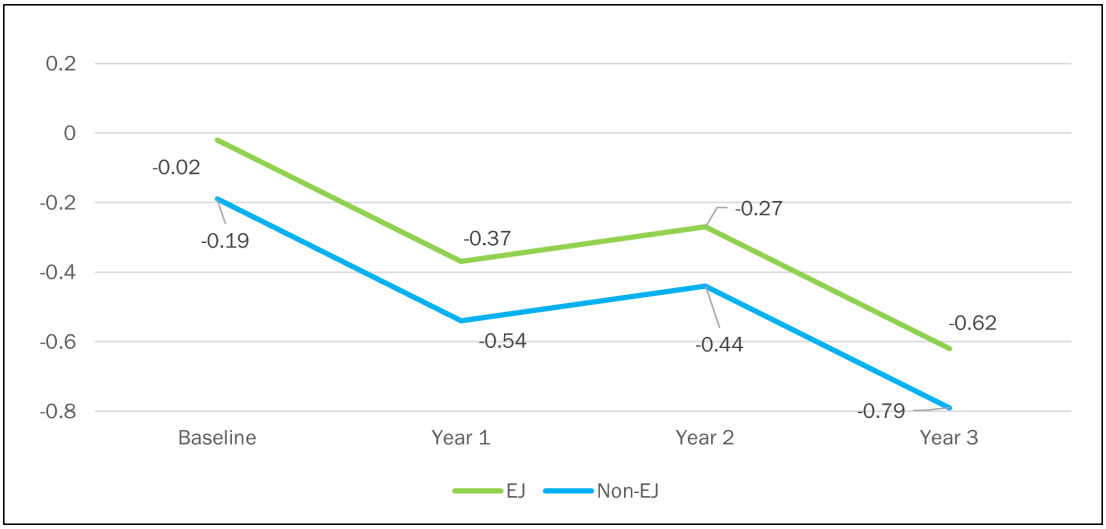


Figure 11. Attitudes Toward Atlanta Traffic by Race & Poverty EJ Status

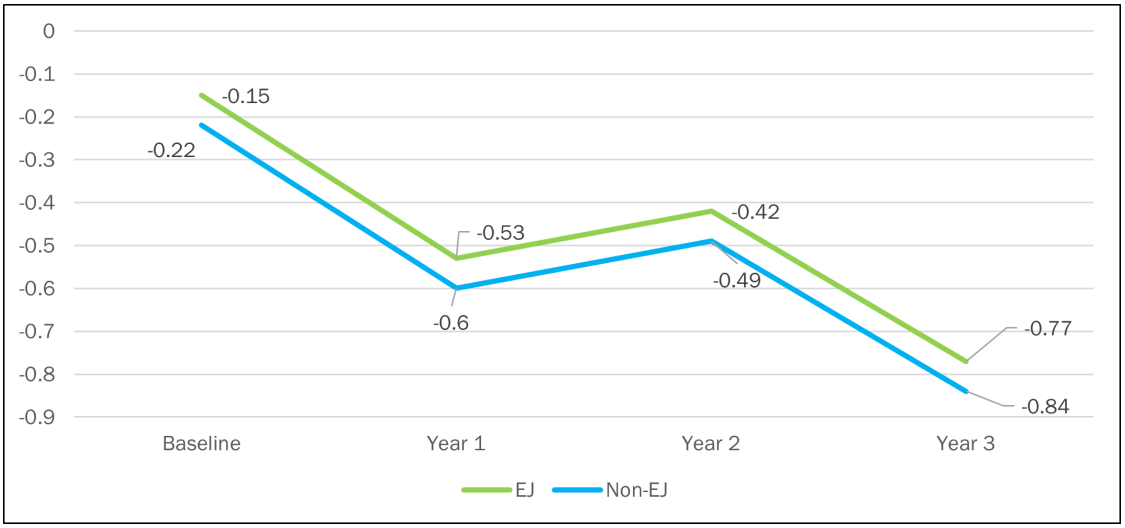


Table 13 presents seven perception and attitudinal questions regarding express lanes. In general, few agree or strongly agree that they cannot afford to use express lanes (20.3% and 10.9% respectively). Few also agree or strongly agree that express lanes benefit low-income commuters (5% and 1.2% respectively). There is more agreement that express lanes are fair (40.9% agree, 10% strongly agree), improve traffic for all (26.5% agree or strongly agree), and 80% agree or strongly agree that express lanes benefit higher income commuters. Less positively, 45.4% of commuters agree or strongly agree that while they can afford express lanes, they probably would not take them, and 40.8% agree or strongly agree that there are too few access points.

Table 13. Perceptions of Express Lanes (Percent)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I can't afford to take express lanes.	11%	33.9%	23.9%	20.3%	10.9%
Express lanes benefit low-income commuters.	46.8%	31.2%	15.9%	5%	1.2%
Express lanes are fair because they charge tolls only to those who choose to use them.	15.6%	15%	18.6%	40.9%	10%
Express lanes improve traffic for all commuters.	21.1%	31.3%	21.2%	22.4%	4.1%
Express lanes benefit higher-income commuters.	2.6%	4.9%	12.5%	39.3%	40.7%
I can afford to pay to take express lanes, but I probably would not take them.	9.4%	23.9%	21.3%	28%	17.4%
There are too few places to enter and leave the express lanes for my commute.	7.3%	26.7%	25.2%	26.1%	14.7%

The seven perception and attitude questions listed in Table 13 do not belong to a single concept. Four questions do reliably and validly fit together: Express lanes benefit low-income commuters, Express lanes are fair, express lanes improve traffic for all commuters, and express lanes benefit high income commuters (reverse coded). The factor explains approximately 45% of the variability in these four questions. This concept is called Perception of Express Lanes Benefits. The mean of express lanes benefits is zero with a standard deviation of one. Higher values signify perceptions of greater benefits.

Table 14 presents regression analyses of the attitudes toward express lanes benefits for both the poverty-only EJ definition and the race and poverty EJ definition. First, there does not appear to be much difference in these perceptions based on EJ definition. Under either definition, there are no statistically significant differences between EJ and non-EJ groups. Perceptions of the benefits of express lanes worsen slightly over time, as evidenced by the significant negative coefficients on the Year 1 through Year 3 variables.

Table 14. Regressions of Perception of Express Lane Benefits

N=416	Poverty-Only	Race & Poverty
Intercept	0.34 (0.18)	0.46 (0.19)*
EJ Group	-0.14 (0.18)	-0.21 (0.11)
1 Year Post-Opening (2018)	-0.45 (0.11)*	-0.39 (0.11)*
2 Years Post-Opening (2019)	-0.39 (0.16)*	-0.37 (0.16)*
3 Years Post-Opening (2020)	-0.68 (0.28)*	-0.64 (0.28)*
Distance Traveled (miles)	-0.00 (0.00)	-0.00 (0.00)
Use Express Lanes Daily	-0.11 (0.21)	-0.16 (0.21)
Never Use Express Lanes	-0.26 (0.30)	-0.24 (0.30)
Commute During Rush Hours	-0.15 (0.17)	-0.14 (0.17)
R-square	.08	.08

Notes: controlling for grid sample, COVID-19 restrictions. Reference category: Non-EJ, baseline, use express lanes occasionally. Standard errors in parentheses.
** indicates statistical significance at the .05 level (p<.05)*

Figures 12 and 13 present trends in perceptions of express lane benefits for the poverty-only EJ definition followed by the race and poverty EJ definition. The trends show that perceptions of the express lane benefits declined slowly over time for both EJ and non-EJ groups. This suggests a slight reduction in the belief of benefits express lanes provide. Again, Year 3 shows another decline, but recall that there are few participants at Year 3 and the decline is not statistically significant.

Figure 12. Perception of Express Lanes Benefits by Poverty-Only EJ Status

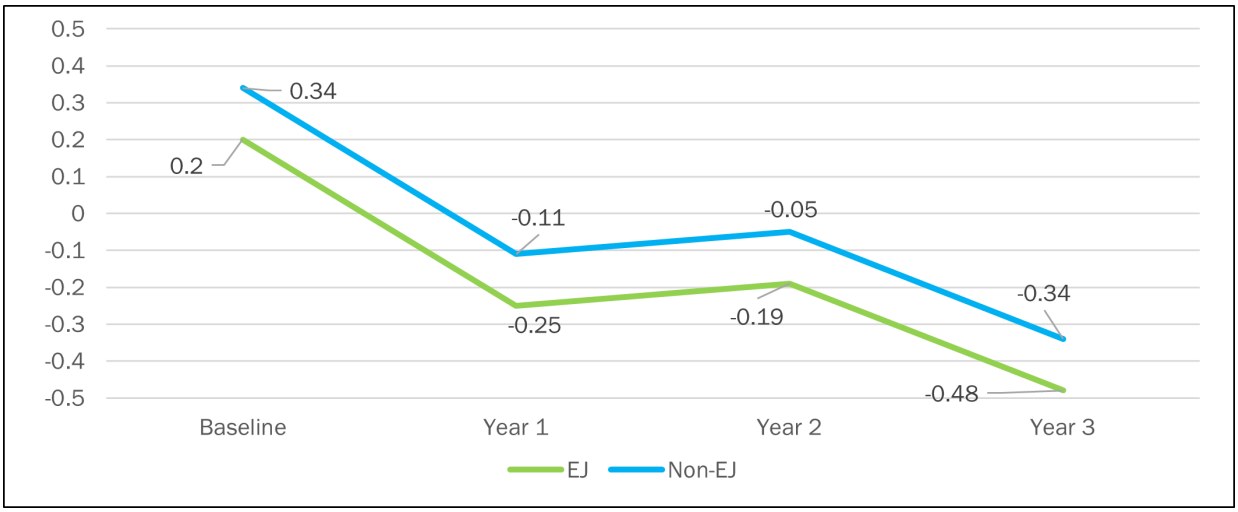
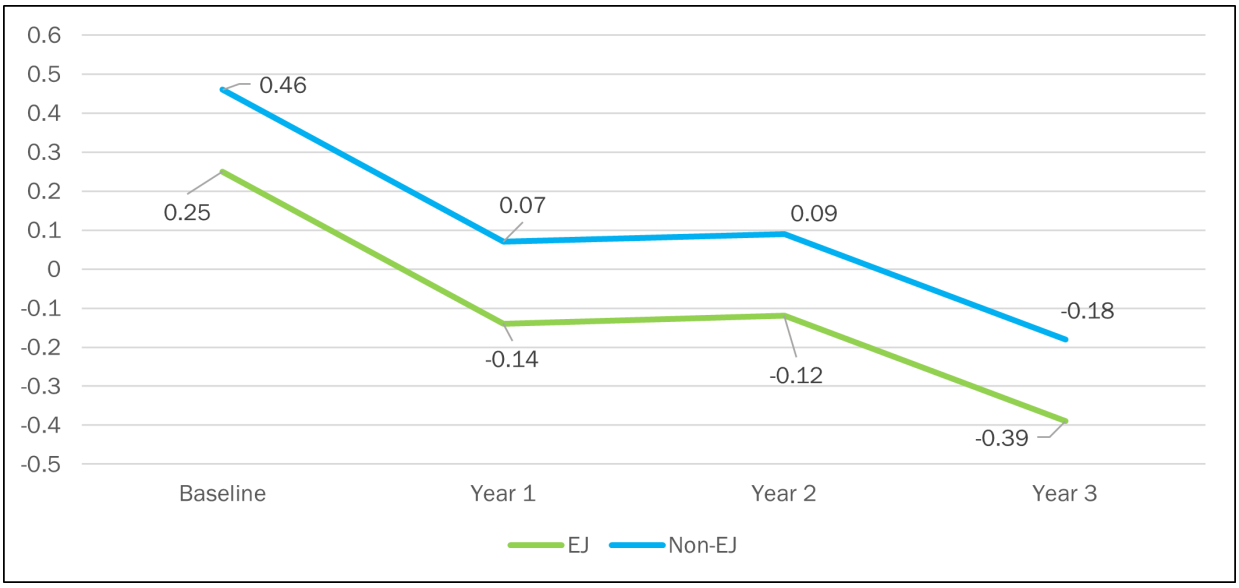


Figure 13. Perception of Express Lanes Benefits by Race & Poverty EJ Status



4 Conclusion

In November 2018, GDOT opened the I-85 Express Lanes Extension. These were Georgia's third managed toll lanes, extending 10 miles north of the existing toll lane beginning at Old Peachtree Road, and running through Hamilton Mill Road in Gwinnett County.

Researchers at GSU with support from GDOT conducted annual surveys over a four-year period (2018-2022), to determine if there is an unequal distribution of burdens or benefits for EJ groups by the creation of the I-85 Express Lane Extension, and if the express lanes improved commutes for all northeast Metro-Atlanta travelers.

Residents living near and using I-85 to get to work tend to drive alone on their work commutes (88%). Commute times have declined since the advent of the I-85 Express Lanes. Approximately 50% have a Peach Pass transponder and about 45% of residents use the express lanes daily or a few times per week.

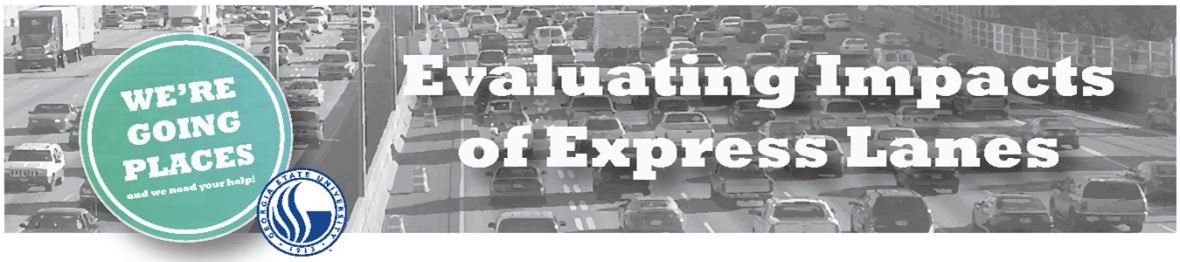
Two definitions of environmental justice were tested. One definition focused only on poverty as the criteria for EJ status. The second definition followed the original FHWA definition of EJ by including both poverty status and minority status. Under the poverty-only EJ definition, we find no statistically significant differences between EJ and non-EJ groups in terms of commute times to and from work, in use of express lanes, nor in attitudes and perceptions.

Under the race and poverty EJ definition; however, researchers found longer commute times that are statistically significant for EJ group members in the baseline, but all commuters benefited from the lower commute times after opening of the express lanes. While EJ group members (under the race and poverty definition only) continued to experience higher commute times post-opening compared to the non-EJ group, they also experienced lower commute times compared to the baseline that are proportional with the lower commute times experienced by the non-EJ group members. Therefore, the opening of the express lanes did not cause any disproportionate burdens to this group. On the commute to work, EJ group members' commute averages over 4 minutes longer than that of non-EJ group members. On the return home commute, EJ group members averaged about a 6-minute longer commute compared to non-EJ group members.

Perceptions of inequities can be almost as important as actual inequities. No attitudes or perceptions of the I-85 Express Lane Extensions were found that demonstrated a potential source of inequity for EJ groups.

Several things make the I-85 Express Lanes different from the I-75 South Express Lanes and the NWC Express Lanes. First, I-85 had an existing toll lane. The added toll lane was an extension rather than a completely new model of travel. This means residents may have already owned transponders and were more familiar with toll roads on their commute. Isolated findings show differences in attitudes and perceptions of the Express Lanes during Year 1 and Year 2 post-opening. However, analyzing all four years in tandem shows no trends in travel patterns or commute behaviors despite residents potentially knowing of or using the existing toll lane. Secondly, there are methodological differences. I-85 was subjected to COVID-19 data collection restrictions as early as the Year 1 post-opening. The first part of Year 2 post-opening wave of data collection also was compromised by COVID-19 restrictions. Year 3 post-opening data collection was shortened in terms of time as well as in terms of the face-to-face data collect efforts that provide more robust response rates. These methodological differences and lower-than-expected response and eligibility rates make assessing EJ group differences difficult to determine.

APPENDIX A. The Survey



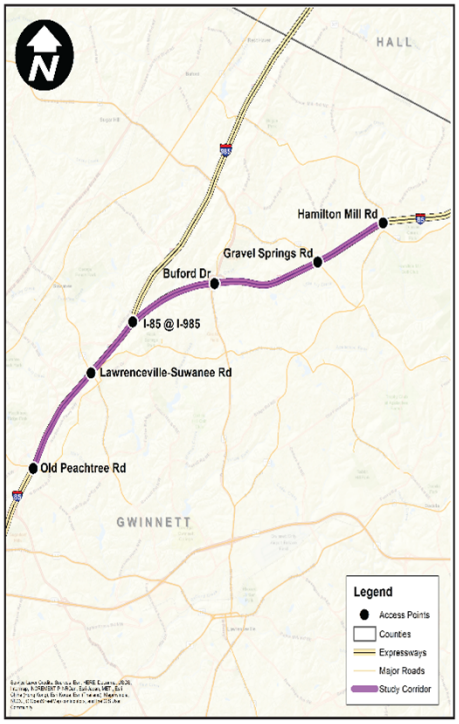
I. Travel To and From Work

This set of questions assesses your travel experience on the days you go to work. Transportation planners are interested in workplace location because travel to work activity often affects other daily travel. Please answer all questions that follow. Check the box that best represents your answers to the question posed, or fill in the blank as specified.

1. On a typical day going to or from work, do you travel (driving, bus, vanpool, carpool, etc.) on the Interstate 85 (I-85) corridor heading towards Atlanta's downtown? (See map below) ☐ YES ***(Skip to Q3)*** ☐ NO

2. If no, why not? ☐ I don't drive. ☐ I am retired. ☐ I take an alternate route to Atlanta. ☐ I work in the suburbs. ☐ I work from home. ☐ Other _____

If no, thank you very much for your time. We are interested in those who travel I-85. You can stop here. Please put this in the self-addressed, stamped envelope and mail it.



This section assumes that you have a single job. If you have more than one job, please answer for the job for which you travel I-85 toward downtown Atlanta. Consider this your primary job. Only answer for the days you travel to work for the primary job, which means you will not be traveling more than 7 days in a typical week.

3. Did you travel on I-85 toward Atlanta to get to work last year?
   ☐ YES ***(Skip to Q4)*** ☐ NO

3a. If no, what changed that you now drive on I-85 toward Atlanta for work? (Choose one response)
   ☐ Changed job or got a job
   ☐ Construction on usual route to work
   ☐ I-85 Express Lanes improved time to work
   ☐ COVID-19
   ☐ Other; please specify _____

4. What is the zip code of your employer? __ __ __ __ __

5. How many days per week do you travel to work? _____ (number of days)

6. In miles, how far is your primary workplace from your home? _____ (miles)

7. In a typical week, how do you generally get to work? (choose one answer)
   ☐ I work at home ☐ I drive by myself ☐ I carpool ☐ I ride in a vanpool
   ☐ I take public transit (bus) ☐ Ride share (Uber or Lyft) ☐ Other _____

8. On a typical day, when do you leave to go to work?
   ___ (hour) ___ (minute) ___ (am / pm)

9. On a typical day, about how many minutes is your commute to work?
   ____ (minutes) (enter 0 if you work at home)

10. If there was little to no traffic, how many minutes would it take you to get to work? ____ (minutes) (enter 0 if you work at home)

11. On days when you know there is heavy traffic, how much additional commuting time do you give yourself in order to get to work on time? ____ (minutes) (enter 0 if you work at home)

12. On a typical day, when do you leave work at the end of your day or shift? ___ (hour) ___ (minute) ___ (am / pm)

13. On a typical day, about how many minutes is your return commute home from work? _____ (minutes) (write 0 if you work at home)

OVER

14. In a typical week, how many days do you consistently get to work on time? (Circle the best answer)
    None One Two Three Four Five Six Seven

15. Do you usually make additional stops on your way to or from work (for example, dropping off or picking up children, spouse, or friend)?
    ☐ **YES** ☐ **NO** ***(Skip to Q16)***

15a. If yes to Q15, on average, about how many minutes does this add to your commute time? _____ (minutes) (enter 0 if you work at home)

16. COVID-19 state restrictions affected some people's commute times. During the 2020 pandemic lockdown did you
    ☐ Work as normal, but enjoy a faster commute
    ☐ Work as normal and commute time remained the same
    ☐ Switch to working from home
    ☐ Have hours reduced, or lost your job
    ☐ Other; please specify _____

II. Commute Preferences

In 2018, the Express Lanes Extension opened on I-85. Express Lanes are toll lanes built alongside the existing roads, adding a travel option for motorists. They support transit by providing free access for buses and vanpools. In addition, individual drivers can use these lanes by paying a toll using a Peach Pass Transponder. Toll rates will increase and decrease based on demand, ensuring travel speeds of 45 mph. These Express Lanes are reversible, allowing drivers to use the lanes to get into downtown Atlanta during weekday morning commute times, and out of, or away from, downtown Atlanta during the evening rush hours.

17. Do you have a Peach Pass Transponder?
    ☐ **YES** ☐ **NO** ***(Skip to Q23)***

18. In a typical month, how often do you use the Express Lanes to get to work?
    ☐ Daily ☐ A few times per week ☐ Once or twice a week ☐ A few times per month ☐ About once per month ☐ Never

19. In a typical month, how often do you use the Express Lanes to get home after work?
    ☐ Daily ☐ A few times per week ☐ Once or twice a week ☐ A few times per month ☐ About once per month ☐ Never

20. Do you use the Express Lanes for other travel needs?
    ☐ **YES** ☐ **NO**

21. How has your commute time changed now that the Express Lanes are in operation?
    ☐ Commute time is consistently worse
    ☐ Commute time is somewhat worse
    ☐ Commute time is same
    ☐ Commute time is somewhat better
    ☐ Commute time is consistently better

22. Under what circumstances do you tend to use the Express Lanes the most? (Choose all that apply)
    ☐ Personal reason (e.g. running late)
    ☐ Traffic is particularly heavy to or from work
    ☐ Weather is bad
    ☐ Traffic is particularly heavy due to downtown event
    ☐ Traffic is light, so toll is inexpensive
    ☐ Other; please specify _____

23. How much do you agree or disagree with the following statements? (Check the box that matches your level of agreement)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
23a. I spend too much time in traffic.	☐	☐	☐	☐	☐
23b. I find commuting to be stressful.	☐	☐	☐	☐	☐
23c. I'd be willing to pay a toll to lessen my commute time.	☐	☐	☐	☐	☐
23d. I find commuting to work to be frustrating.	☐	☐	☐	☐	☐
23e. I often get home late from work due to heavy traffic.	☐	☐	☐	☐	☐

24. How much do you agree or disagree with the following statements about Express Lanes?	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
24a. I can't afford to take Express Lanes.	☐	☐	☐	☐	☐
24b. Express Lanes benefit low-income commuters.	☐	☐	☐	☐	☐
24c. Express Lanes are fair because they charge tolls only to those who choose to use them.	☐	☐	☐	☐	☐
24d. Express Lanes have improved traffic for all commuters.	☐	☐	☐	☐	☐
24e. Express Lanes benefit higher income commuters.	☐	☐	☐	☐	☐
24f. I can afford to pay to take Express Lanes, but I probably would not take them.	☐	☐	☐	☐	☐
24g. There are too few places to enter and leave the Express Lanes for my commute.	☐	☐	☐	☐	☐

25. How much do you agree or disagree with the following statements about why you live where you do? I choose to live where I do because:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
25a. It is an easy commute to work (for me or someone in my household).	☐	☐	☐	☐	☐
25b. It is affordable.	☐	☐	☐	☐	☐
25c. It is in a good school district.	☐	☐	☐	☐	☐
25d. I know the area well.	☐	☐	☐	☐	☐
25e. It is near my family or friends.	☐	☐	☐	☐	☐
25f. It is convenient to public transportation.	☐	☐	☐	☐	☐
25g. Other (write in): _____	☐	☐	☐	☐	☐

III. Socio-Demographics

To understand how the Express Lanes affect individuals and households in the different communities who live near the new lanes, we need to understand the types of people who live in these communities. Your household was chosen to represent others in your community; therefore, ***it is really important that you answer ALL the following questions****. Your answers will help us to understand how your community currently uses the highway and how the new Express Lanes are being used.*

Please remember that we are keeping your personal information confidential. Only the researchers at Georgia State University will ever see individual responses. We will not share this data, nor will it be used for any purpose other than to understand the effect of toll lanes on nearby communities.

All responses to these questions will be grouped by community, and analyses will be focused on averages - not on individual responses.

26. How many people, including yourself, live in your household? _____ (number of persons)

27. How old are you? ☐18-25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56-65 ☐ 66-75 ☐ Over 75

28. What is your gender? ☐ Male ☐ Female

29. Which racial/ethnic group best represents you? ☐ (non-Hispanic) Black or African American ☐ (non-Hispanic) White or Caucasian ☐ (non-Hispanic) Asian or Asian American ☐ Latino/a, Hispanic American ☐ Multiracial ☐ Other, please specify _____

OVER

30. What is the primary language spoken in your home? ☐ English ☐ Spanish ☐ Portuguese ☐ Mandarin Chinese ☐ Other _____

31. What is the highest degree or level of schooling you have completed? ☐ Not a high school graduate ☐ High school graduate (includes GED)
☐ Some college ☐ Associate degree or technical school degree ☐ Bachelor's or undergraduate degree
☐ Graduate degree (includes professional degree like MD or JD) ☐ Other, please specify _____

32. Which of the following best describes your current situation? ☐ Employed full-time at one job ☐ Employed part-time
☐ Employed at several jobs ☐ Regular volunteer ☐ Retired ☐ Full-time homemaker ☐ Full-time student ☐ Disabled
☐ Unemployed looking for work ☐ Unemployed not looking for work ☐ Other, please specify _____

33. How many years have you lived at your current address (round up or down to nearest year)? _____ (years)

34. What was your total household income last year? ☐ Less than $10,000 ☐ $10-$19,999 ☐ $20-$29,999 ☐ $30-$39,999
☐ $40-$49,999 ☐ $50-$64,999 ☐ $65-$79,999 ☐ $80-$99,999 ☐ $100,000 or more

35. What could the Georgia Department of Transportation (GDOT), State Road and Tollway Authority (SRTA), Georgia Regional Transportation Authority (GRTA), or other agencies do to improve your commute?

_____

_____

_____

_____

_____

_____

_____

That's it! Thank you so much for taking the time to answer our questions.

The information you shared will be very helpful for evaluating commuting on I-85.