2010 Origin – Destination Survey

Summary Report

Prepared for

The Maine Turnpike Authority

HNTB

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Section 1. EXECUTIVE SUMMARY

In July and August of 2010, HNTB conducted an origin and destination (O&D) study of Maine Turnpike patrons. The purpose of the study was threefold: to update historical data on travel patterns on the Maine Turnpike, to acquire a better understanding of general patron characteristics (particularly of cash-paying patrons), and to help understand the extent to which open road tolling (ORT) could encourage cash-paying patrons to acquire an ***E-ZPass***. The study highlights are summarized below.

Response rate. The survey involved the distribution of at least 3,000 survey cards at every interchange. A total of 61,500 surveys were distributed to Maine Turnpike patrons. A total of **13,095** cards were returned, yielding a response rate of **21.3%.** A statistically valid number of responses was received at each interchange, thus achieving a survey whose confidence level was 95% with a confidence interval that was no greater than ±5%.

Residency. In the summer survey, just over **75%** of all respondents were Maine residents. This was slightly lower than the share observed in the previous survey (about 81%), which was conducted in the spring of 2004. However, the share was higher than the last *summer* survey (1998), in which **65%** of all respondents were Maine residents.

Trip frequency. Over half of the Maine Turnpike patrons responding to the survey reported using the roadway on *at least* a weekly basis. The average Turnpike patron responding to the survey traveled on the Turnpike **167 times** per year, or approximately once every other day. The average Turnpike patron who resided in Maine traveled on the Turnpike an average of **212 times** per year, or approximately 4 times per week.

Occupancy. The average trip on the Maine Turnpike involved 1.90 occupants per vehicle. This result from the summer of 2010 was slightly higher than the averages observed in the spring of 2004 (1.70 occupants per vehicle) and in the summer of 1998 (1.86). The Maine Turnpike has consistently exceeded the national average of 1.67 occupants per vehicle.

Trip type. Work-related trips (the combination of "home-based work" and "work-based" trips) made up almost half of the weekday trips, but only about 10% of the weekend trips. Overall, the combined share of "home-based shopping" and "home-based recreational" trips (22.1%) was roughly equal to the share of "home-based work" trips (20.4%). This result may have been

shaped in part by the fact that the survey cards were not always distributed during peak traffic periods, in order to avoid introducing delays at the toll plazas.

E-ZPass* usage vs. Cash**. Just over two-thirds of the respondents to the survey indicated that they have an ***E-ZPass. The average ***E-ZPass*** patron traveled on the Turnpike 201 times per year (or about 4 times per week), while the average cash-paying patron traveled on the Turnpike 94 times per year (or just under 2 times per week).

Reason for Not Acquiring *E-ZPass*. About half (48.5%) of cash-paying patrons indicated that the primary reason that they have not acquired an E-ZPass is because they don't travel frequently enough. However, of those who made this statement, about 4% actually said that they use the Turnpike either "almost every day" or "multiple times each day".

ORT and *E-ZPass* Conversion. About one-third of the cash-paying patrons indicated that they would be persuaded to acquire an ***E-ZPass*** if the Maine Turnpike Authority (or simply "the Authority") were to implement open road tolling (ORT) at its mainline plazas.

York Characteristics. The survey responses indicated the following characteristics relative to York Toll Plaza usage:

- About two-thirds of responding patrons (63.6%) indicated they only travel through the York Toll Plaza "a few times per year". This trip occurrence accounted for a mere 2.8% of the trips passing through the plaza annually.
- Less than 10% of the patrons indicated they travel through the plaza either "almost every day" or "multiple times each day". This trip frequency accounted for **more than two-thirds** of all trips passing through the plaza annually.
- The average Turnpike patron traveled through the York Toll Plaza an average of 46 times per year, or roughly once a week.
- Maine residents comprised nearly 40% of the patrons who used the plaza in the summer survey.

Additional Analysis. A more detailed look at selected survey responses indicated the following:

- If an east-west connector were built to connect Gorham and its surrounding communities with the Maine Turnpike, it could expect to serve up to 3,720 trips per day. This only includes vehicles connecting to the Turnpike; it does not include vehicles that would use the road to connect directly to other Greater Portland destinations.
- Similarly, an east-west connector in Central York County could expect to serve up to 6,350 trips per day seeking to connect to the Maine Turnpike.

- A preliminary feasibility evaluation of ZOOM bus service between Lewiston-Auburn and downtown Portland suggests it would support about 50 person-trips per day.

Section 2. CONDUCTING THE SURVEY

This section summarizes the manner in which the origin and destination (O&D) survey was conducted. A more detailed description of the decisions that supported this approach can be found in Appendix A.

2.1 SURVEY CARD

The Maine Turnpike Authority ("the Authority"), working with HNTB, developed a slate of 14 questions to pose to Turnpike patrons. These questions were very similar to those posed in the 2004 survey, with four primary modifications:

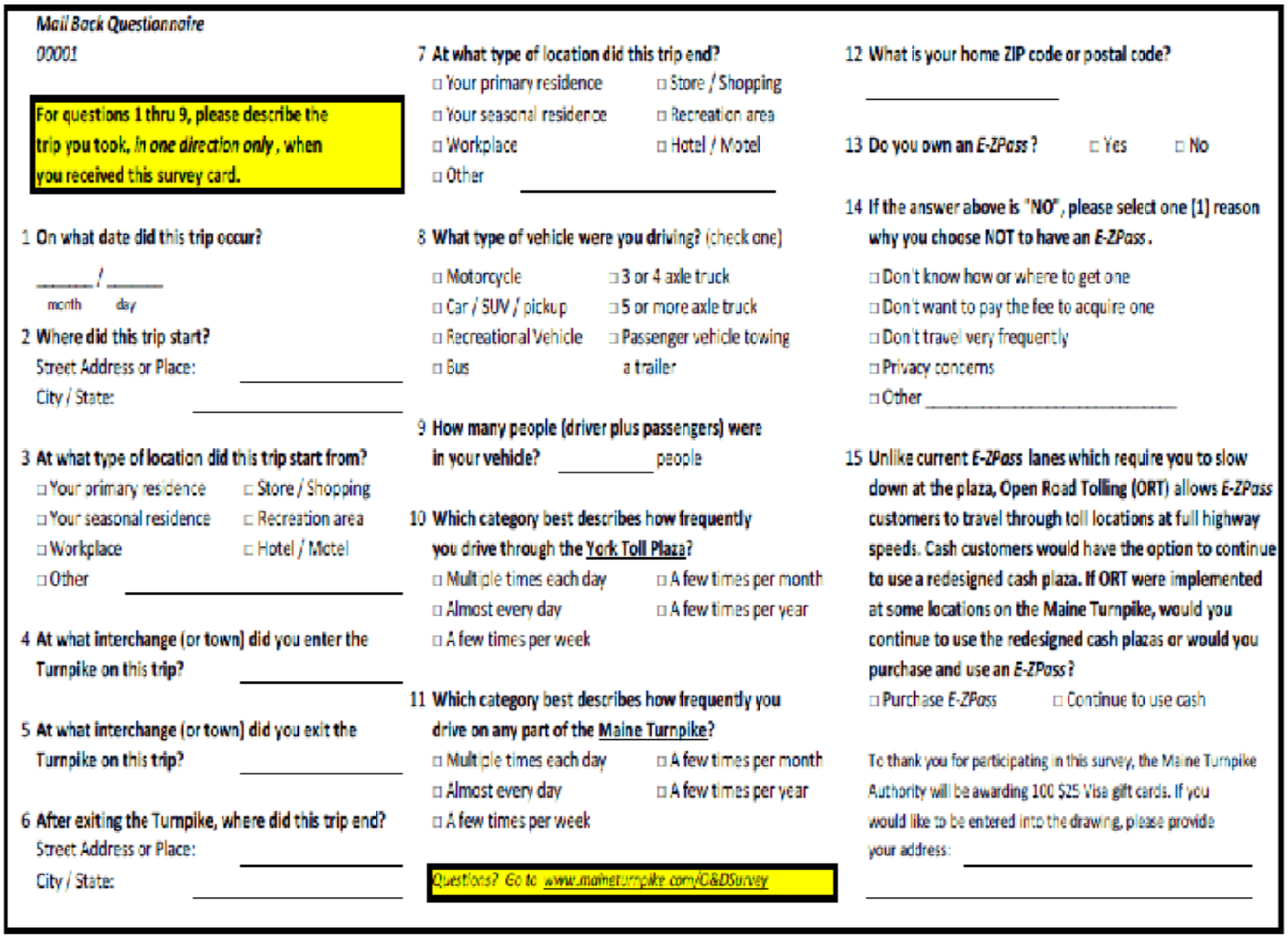
1. The question that specifically addressed commercial vehicle drivers (concerning how frequently they travel outside of Maine) was removed from the survey card. The previous results of this question did not provide valuable insight relating to Turnpike usage.
2. Some specific York Toll Plaza questions were presented to assist with the ongoing planning efforts involving the York Toll Plaza replacement project.
3. In order to update user data for the Maine Turnpike bond refinancing, Wilbur Smith Associates (WSA) proposed a question pertaining to the impact on patrons if ORT were to be implemented.
4. Instead of adding a space for comments, patrons were asked to provide their mailing address if they wished to be considered for a $25 gift card. As an incentive, the Authority awarded 100 such gift cards to randomly selected respondents.

The questions were printed on a postage-paid post card and distributed to Turnpike patrons. Those who elected to participate filled out the survey cards and placed them in the mail for delivery to the Maine Turnpike Authority. All cards were subsequently forwarded to HNTB.

In the 2004 survey, a brief set of directions was attached to the survey. However, the 2010 survey chose instead to post the instructions on the Maine Turnpike Authority's website. This reduced printing costs and saved space for more detailed questions on the card.

Before distributing the surveys, HNTB created a database to receive all survey card data. The entry of survey card data was performed primarily by HNTB staff, with some assistance from Maine Turnpike Authority staff.

Figure 1 illustrates the final survey card that was distributed to 61,500 Turnpike patrons.



Mail Back Questionnaire

00001

For questions 1 thru 9, please describe the trip you took, *in one direction only*, when you received this survey card.

1 **On what date did this trip occur?**

_____ / _____
month day

2 **Where did this trip start?**

Street Address or Place: _____

City / State: _____

3 **At what type of location did this trip start from?**

□ Your primary residence □ Store / Shopping
□ Your seasonal residence □ Recreation area
□ Workplace □ Hotel / Motel
□ Other _____

4 **At what interchange (or town) did you enter the Turnpike on this trip?** _____

5 **At what interchange (or town) did you exit the Turnpike on this trip?** _____

6 **After exiting the Turnpike, where did this trip end?**

Street Address or Place: _____

City / State: _____

7 **At what type of location did this trip end?**

□ Your primary residence □ Store / Shopping
□ Your seasonal residence □ Recreation area
□ Workplace □ Hotel / Motel
□ Other _____

8 **What type of vehicle were you driving?** (check one)

□ Motorcycle □ 3 or 4 axle truck
□ Car / SUV / pickup □ 5 or more axle truck
□ Recreational Vehicle □ Passenger vehicle towing a trailer
□ Bus

9 **How many people (driver plus passengers) were in your vehicle?** _____ people

10 **Which category best describes how frequently you drive through the York Toll Plaza?**

□ Multiple times each day □ A few times per month
□ Almost every day □ A few times per year
□ A few times per week

11 **Which category best describes how frequently you drive on any part of the Maine Turnpike?**

□ Multiple times each day □ A few times per month
□ Almost every day □ A few times per year
□ A few times per week

Questions? Go to www.maineturnpike.com/C&DSurvey

12 **What is your home ZIP code or postal code?** _____

13 **Do you own an *E-ZPass*?** □ Yes □ No

14 **If the answer above is "NO", please select one (1) reason why you choose NOT to have an *E-ZPass*.**

□ Don't know how or where to get one
□ Don't want to pay the fee to acquire one
□ Don't travel very frequently
□ Privacy concerns
□ Other _____

15 **Unlike current *E-ZPass* lanes which require you to slow down at the plaza, Open Road Tolling (ORT) allows *E-ZPass* customers to travel through toll locations at full highway speeds. Cash customers would have the option to continue to use a redesigned cash plaza. If ORT were implemented at some locations on the Maine Turnpike, would you continue to use the redesigned cash plazas or would you purchase and use an *E-ZPass*?**

□ Purchase *E-ZPass* □ Continue to use cash

To thank you for participating in this survey, the Maine Turnpike Authority will be awarding 100 $25 Visa gift cards. If you would like to be entered into the drawing, please provide your address: _____

_____

Figure 1 – Survey Card

2.2 *SURVEY TIMING*

One purpose of the O&D survey was to better understand patron characteristics and travel patterns as observed during the peak travel season. Historically, traffic levels on the Turnpike have peaked during the month of August. Therefore, the study was planned for the first two weeks of August. Any postponements due to inclement weather could be made up during the third and fourth weeks of August, when traffic levels (though starting to decline) are still very high.

Table 1 summarizes the location of the survey distribution by date and time. Further details concerning the selection of dates and times for each location can be found in Appendix A.

Table 1 – Survey Dates and Times by Location

LOCATION	Weekday		Weekend	
	Date	Time	Date	Time
York Plaza	3-Aug	7:00a - 10:00a	7-Aug	5:00p - 8:00p
Wells (19)	14-Jul	1:00p – 5:00p	7-Aug	4:00p - 8:00p
Kennebunk NB (25)	3-Aug	1:00p - 5:00p	7-Aug	8:00a - 12:00p
Kennebunk SB (25)	3-Aug	8:00a - 12:00p	7-Aug	1:00p - 6:00p
Biddeford (32)	4-Aug	1:30p - 4:00p	7-Aug	3:00p - 6:00p
Saco (36)	4-Aug	10:00a - 12:30p	7-Aug	12:00p - 2:00p
Scarborough (42)	4-Aug	8:00a - 12:30p	8-Aug	10:00a - 2:00p
I-295 SB (44)	4-Aug	1:30p - 5:00p	8-Aug	8:00a - 11:00a
South Portland (45)	5-Aug	1:00p - 5:00p	8-Aug	12:00p - 3:00p
Jetport NB (46)	5-Aug	8:00a - 1:00p	8-Aug	2:00p - 5:30p
Jetport SB (46)	5-Aug	3:00p - 5:00p	8-Aug	9:00a - 1:00p
Westbrook Arterial (47)	5-Aug	7:00a - 12:00p	8-Aug	9:00a - 4:30p
Riverside (48)	10-Aug	8:00a - 12:00p	14-Aug	10:00a - 1:00p
Falmouth Spur (52)	10-Aug	2:00p - 5:00p	14-Aug	2:00p - 5:30p
West Falmouth (53)	10-Aug	1:00p - 6:00p	14-Aug	10:00a - 3:00p
Gray (63)	11-Aug	2:00p - 6:00p	14-Aug	12:00p - 3:00p
Auburn NB (75)	11-Aug	9:00a - 1:00p	14-Aug	1:00p - 5:00p
Auburn SB (75)	11-Aug	9:00a - 1:00p	14-Aug	1:00p - 5:00p
Lewiston NB (80)	11-Aug	8:00a - 2:00p	15-Aug	8:00a - 1:00p
Lewiston SB (80)	11-Aug	8:00a - 12:00p	15-Aug	2:00p - 6:00p
Sabattus (86)	11-Aug	8:00a - 5:00p	15-Aug	8:00a - 5:00p
West Gardiner Plaza	12-Aug	1:00p - 5:00p	15-Aug	12:00p - 3:00p
Gardiner (103)	12-Aug	8:00a - 3:30p	15-Aug	9:00a - 2:00p
	26-Aug	8:00a – 12:00p		

2.3 SURVEY DISTRIBUTION PLAN

To be certain that as many patrons as possible received a survey, cards were distributed at all **entry** points to the Turnpike. For most locations, the cards were distributed as the patrons passed through the toll plaza at the point of entry. However, at interchanges that did not have a toll plaza (i.e., Exits 75, 80, and 86), cards were distributed on the on-ramps themselves.

The only exception to the "entry-only" approach concerned drivers entering the Turnpike from the north (that is, from the vicinity of Exit 109 in Augusta). These patrons did not receive a card until they reached either the Gardiner/I-295 plaza or the West Gardiner/I-95 plaza.

Based on the results of the 2004 O&D survey, a rate of return of 12.5% was estimated. In order to achieve statistical significance, it was determined that a total of 3,000 surveys would need to be handed out at each entry point.[1] These cards were divided and distributed on both weekdays and weekends. The weekday/weekend split was determined by the percentage of average weekday traffic versus average weekend traffic observed at each location. Additionally, Turnpike entrances with split interchanges (e.g., Exit 25 in Kennebunk) were divided still further, with each entry point receiving a number of cards that was proportional to the average annual daily traffic (AADT) volume counts by direction.

At interchanges with toll plazas, all vehicles—including ***E-ZPass*** customers—were stopped and handed a card by survey distributors. Entrances at free interchanges used regulatory signs to stop all vehicles on the ramps leading to the Turnpike. State Police provided assistance at free interchanges and at plazas with heavy traffic volumes.

Table 2 depicts the number of surveys distributed at each entering location. Note that some locations are split by direction.

[1] Additional survey cards were distributed at the York Toll Plaza and the Gardiner/I-295 Toll Plaza due to their prominence as Turnpike gateways. The heightened importance of these plazas led the Authority to acquire more information about them.

Table 2 – Total Survey Distribution, by Weekday vs. Weekend

Location (Exit#)	Total Surveys	# Weekday	# Weekend
York Plaza (NB)	6000	2714	3286
Wells NB (19)	1710	889	821
Wells SB (19)	1290	581	710
Kennebunk NB (25)	1770	1038	732
Kennebunk SB (25)	1230	568	662
Biddeford (32)	3000	1679	1321
Saco (36)	3000	1584	1416
Scarborough (42)	3000	1500	1500
I-295 SB (44)	3000	1290	1710
So. Portland (45)	3000	1830	1170
Jetport NB (46)	1950	1307	644
Jetport SB (46)	1050	735	315
Rand Rd. (47)	3000	1950	1050
Riverside (48)	3000	1680	1320
Falmouth Spur (52)	3000	1560	1440
W. Falmouth (53)	3000	1770	1230
Gray (63)	3000	1560	1440
Auburn NB (75)	1290	761	529
Auburn SB (75)	1710	975	735
Lewiston NB (80)	690	428	262
Lewiston SB (80)	2310	1340	970
Sabattus NB (86)	600	324	276
Sabattus SB (86)	2400	1320	1080
West Gardiner Plaza (SB)	3000	1590	1410
Gardiner NB (103)	2220	1529	691
Gardiner SB (103)	2280	1439	842

2.4 SURVEY CLASSIFICATION BY LOCATION

It was decided that a classification system to catalog cards by location would be implemented for each card. Cards were numbered by location. The first card distributed was number 00002 in Wells; the numbers then increased by order of interchange, ending with number 61,500 at Gardiner/I-295. Table A-4 in Appendix A depicts survey identification-numbered cards by location and by weekday and weekend. Note that an additional 1,500 cards were distributed at Gardiner / I-295—750 cards in the northbound (NB) direction, and 750 in the southbound (SB) direction. This decision is discussed further in Appendix A.

2.5 RESPONSE RATE

Of the 61,500 cards that were distributed, 13,095 were returned, yielding an overall response rate of **21.3%**. Table 3 compares the response rates by weekday and weekend.

Table 3 – Rate of Return

	Surveys Distributed	Surveys Returned	Rate of Return
Weekday	33,939	7,293	21.5%
Weekend	27,561	5,762	20.9%
Total*	61,500	13,095	21.3%

*40 surveys were returned with no trip date

Overall, the response rate for the 2010 O&D study was nearly 9% higher than the preceding study in 2004. This enabled the study to exceed its goal of achieving a 95% confidence level, with a confidence interval of ±5%.

Section 3. TRAVEL PATTERNS

3.1 QUESTION 1: DATE OF TRIP

As shown below, Question 1 of the O&D survey card asked patrons to identify the date of their trip on the Maine Turnpike (Turnpike).

> 1 On what date did this trip occur?
>
> ----------/----------
> month day

Survey cards were distributed during the first two weeks of August to weekday and weekend patrons on the Turnpike.[2] Question 1 was used to identify whether the trip being reported was taken on a weekday or on a weekend. This question was necessary because patrons may not have reported the trip they took at the time they received the survey card. For example, a patron receiving a survey card entering at Biddeford (32) on a weekday may have reported a trip entering at Saco (36) and exiting at South Portland (45) on a weekend.

Table 4 depicts the breakdown of weekday and weekend responses. For the purposes of this study, HNTB defined a weekday trip as a trip taken Monday through Thursday. A weekend trip was defined as a trip occurring Friday through Sunday.

Table 4 – Date of Trips

Trip Day	Total of Responses	Percent of Total Responses
Weekday	7,293	55.9%
Weekend	5,762	44.1%
Total*	13,095	100.0%

*40 surveys were returned with no trip date

[2] Survey cards were also distributed at Interchange 19 on July 14th and at Interchange 103 on August 26th. An explanation of these extra dates is included in Appendix A.

Table 4 simply shows that the survey received a representative sample of weekday and weekend traffic. Weekdays account for 57% of all calendar days over the course of the year, and weekday trips accounted for 56% of all responses to the O&D survey.

3.2 QUESTION 3 & 7: TRIP TYPE

As illustrated below, Questions 3 and 7 of the survey identified the types of trips that occurred on the Maine Turnpike.

3 At what type of location did this trip start from?

☐ Your primary residence ☐ Store/Shopping
☐ Your seasonal residence ☐ Recreation Area
☐ Workplace ☐ Hotel/Motel
☐ Other _____

7 At what type of location did this trip end?

☐ Your primary residence ☐ Store/Shopping
☐ Your seasonal residence ☐ Recreation Area
☐ Workplace ☐ Hotel/Motel
☐ Other _____

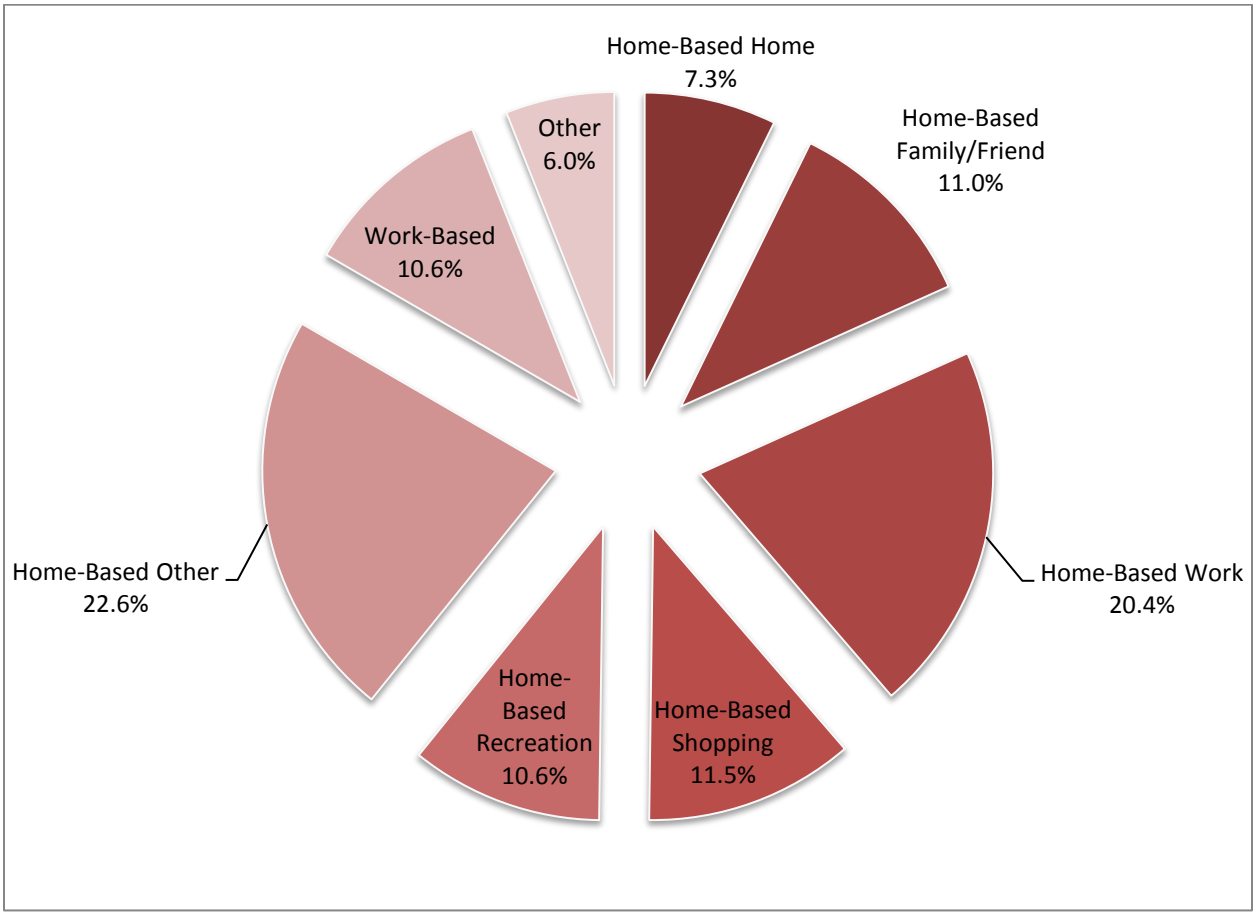
The responses to these two questions were subsequently grouped into six basic categories:

- **Home-Based Home.** These represent trips between a driver's primary residence and a seasonal residence.
- **Home-Based Work.** These represent trips between home and work. They could also be classified as "commuting" trips.
- **Home-Based Family/Friend**. These represent trips between the driver's home and the home of a friend or family member.
- **Home-Based Shopping.** These represent trips between home and any shopping location.
- **Home-Based Recreation.** These represent trips between home (or a seasonal residence) and a recreational area (campground, state park, amusement park, concert, etc.).
- **Home-Based Other.** These represent trips between home and other miscellaneous destinations, such as a school or a medical facility.
- **Work-Based.** These represent trips between work and any destination other than home. Typical work-based trips included customer calls and lunch-hour trips.

- **Other.** These represent any trip not captured in the preceding five categories. An example would be a trip made between two recreational areas, or between a doctor's office and a shopping plaza.

Figure 2 summarizes the various trip types made by Turnpike patrons.

Figure 2 – Trip Types on Maine Turnpike



Several observations may be drawn from Figure 2:

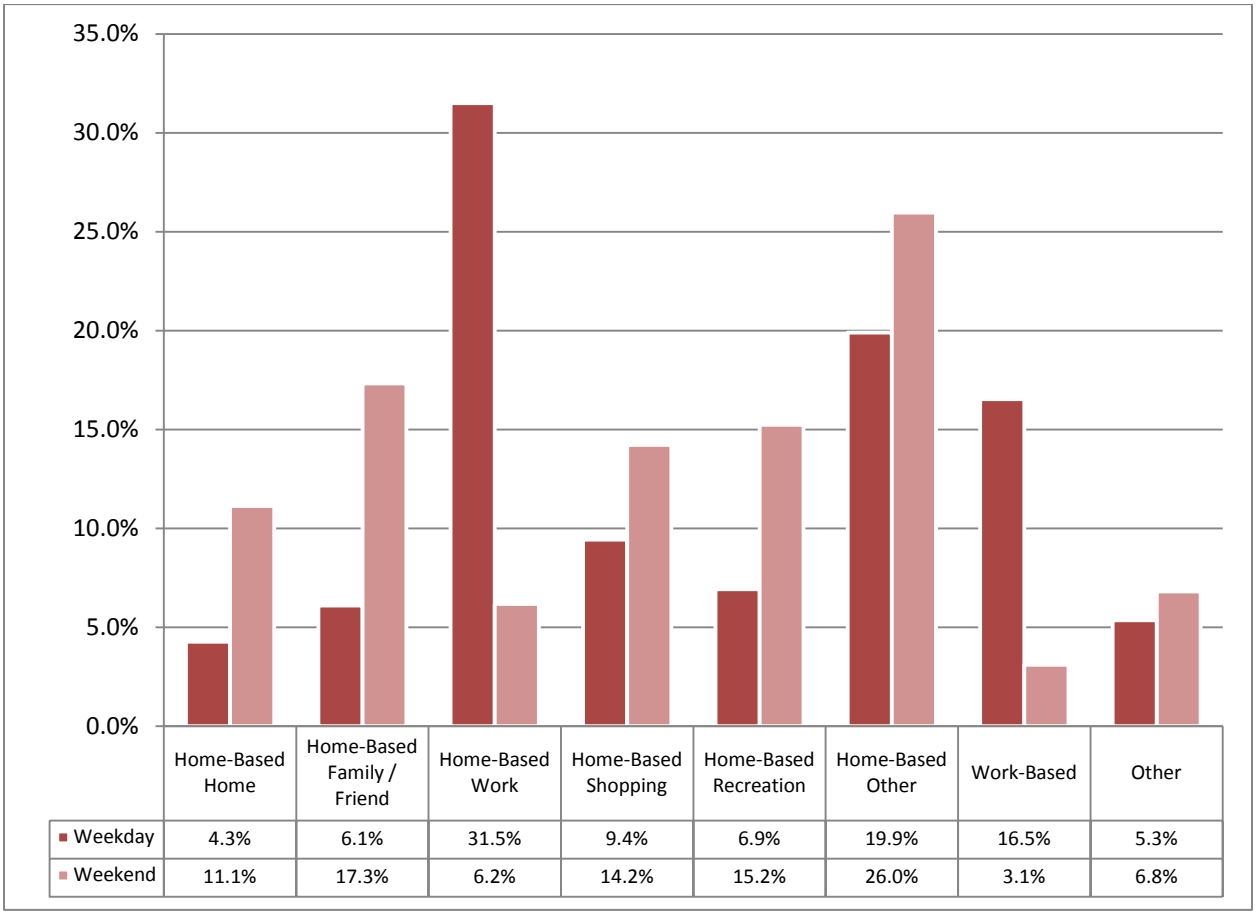
- The single largest catergory of trips was "Home-Based Other", accounting for nearly one-fourth of all survey responses.
- One out of 5 trips on the Turnpike (as recorded by the survey) was a "home-based work" trip. This second-largest category of trips could also be referred to as "commuting" trips.
- The combination of "home-based shopping" and "home-based recreation" trips was roughly equal to the number of "home-based work" trips.
- Overall, work-related trips (defined as the combined total of "home-based work" and "work-based trips") accounted for nearly one-third of all survey responses. By

comparison, the 1998 survey (the last O&D survey conducted in the summer) indicated that work-related trips accounted for about *one-fourth* of all survey responses. This indicates that the share of work-related traffic may be growing over time.

The survey responses indicated that the Turnpike served a wide variety of trip types. Six different trip types accounted for more than 10% of the total, while no single trip type accounted for as much as 25% of the trips. In short, the survey results suggested that the Turnpike has a very diverse customer base.

Figure 3 offers another view of the trip data by comparing weekday trip purposes with weekend trip purposes. In this report, "weekday" trips refers to trips taken Monday through Thursday, while "weekend" trips refers to trips taken Friday through Sunday.

Figure 3 - Trip Purpose Comparison, Weekday vs. Weekend



	Home-Based Home	Home-Based Family / Friend	Home-Based Work	Home-Based Shopping	Home-Based Recreation	Home-Based Other	Work-Based	Other
Weekday	4.3%	6.1%	31.5%	9.4%	6.9%	19.9%	16.5%	5.3%
Weekend	11.1%	17.3%	6.2%	14.2%	15.2%	26.0%	3.1%	6.8%

Figure 3 illustrates some sizable differences between weekday and weekend trip types.

- On weekends, just over a quarter of the trips on the Turnpike were "Home-Based Other". These trips included travel between home and miscellaneous destinations such

as medical appointments, churches, airports, restaurants, and schools. The share grew over 6% from weekdays to weekends.

- The share of "Home-Based Recreation" trips increased more than two-fold from weekdays (6.9%) to weekends (15.2%).
- "Home-Based Work" trips reduced from almost one-third of total trips on weekdays to just 6.2% of total trips on weekends. Likewise, "Work-Based" trips reduced from 16.5% on weekdays to 3.1% on weekends. In sum, while work-related trips (i.e., home-based work plus work-based trips) comprised nearly half of all weekday trips; they comprised only about one-in-10 weekend trips.

In short, while the share of work-related trips decreased dramatically from weekdays to weekends, the share of all other trip types increased.

One important caveat should be noted in reviewing the above trip type data. At most locations, surveys were **not** distributed during peak commuting hours.[3] This was because the process of distributing surveys tended to reduce the processing rate at the toll plazas. If the surveys were distributed during peak commuting periods, significant queues could have resulted. As a result, the survey may tend to understate the overall share of commuting traffic.

3.3 QUESTIONS 4 & 5: LOCATION OF TRIP ENTRANCE AND EXIT

Questions 4 and 5 asked patrons to identify the interchanges by which they entered and exited the Maine Turnpike. The questions are depicted as follows.

4 At what interchange (or town) did you enter the Turnpike on this trip? _____
5 At what interchange (or town) did you exit the Turnpike on this trip? _____

Table 5 summarizes some of the interchange-to-interchange data revealed by the survey. The table, which reflected the responses of both cash and ***E-ZPass*** patrons, breaks the Maine Turnpike down into 5 general areas:

- **Region 1** - South of the Maine Turnpike (South of the York Toll Plaza)

[3] See Table 1 for a summary of survey distribution times.

- **Region 2** - Southern Section (the six-lane section between the York Toll Plaza and Exit 44 {I-295 Connect in South Portland})
- **Region 3** - Central Section (Exit 45 {South Portland} through Exit 53 {West Falmouth})
- **Region 4** - Northern Section (Exit 63 {Gray} through Exit 86 {Sabattus})
- **Region 5** - Gardiner/Augusta and points north (Exits 102/103 {West Gardiner/I-295 Connection in Gardiner, respectively} and points north)

The data is sorted into categories based on the entering interchange. For each interchange, the most common destination is identified by bold, highlighted print.

Table 5 – Origin-Destination Patterns, by Originating Interchange

Origin	2010 Destination				
Plaza	**Region 1**	**Region 2**	**Region 3**	**Region 4**	**Region 5**
Region 1 - South of Turnpike					
York Plaza	n/a	**49%**	24%	10%	17%
Region 2 – Southern Section					
19 (Wells)	35%	**37%**	18%	4%	6%
25 (Kennebunk)	30%	**43%**	22%	3%	3%
32 (Biddeford)	9%	**51%**	30%	5%	6%
36 (Saco)	15%	33%	**41%**	6%	4%
42 (Scarborough)	32%	**34%**	23%	8%	4%
44 (I-295 Connect)	**63%**	37%		n/a	
Region 3 - Central Section					
45 (Maine Mall)	17%	27%	**31%**	21%	4%
46 (Jetport)	7%	29%	**40%**	18%	5%
47 (Rand Road)	10%	31%	**44%**	9%	7%
48 (Riverside St)	22%	23%	**39%**	12%	4%
52 (Falmouth)	**44%**	18%	38%	0%	0%
53 (West Falmouth)	6%	18%	**39%**	35%	2%
Region 4 - Northern Section					
63 (Gray)	13%	15%	**45%**	15%	12%
75 (Auburn)	13%	14%	**29%**	25%	18%
80 (Lewiston)	7%	11%	22%	**34%**	26%
86 (Sabattus)	10%	12%	14%	**40%**	25%
Region 5 - North End of Turnpike					
Gardiner/Augusta & North	26%	10%	11%	19%	**35%**

Notes:

Region 1 = South of York plaza
Region 2 = Southern Section (Exits 19 through 44)
Region 3 = Central Section (Exits 45 through 53)
Region 4 = Northern Section (Exits 63 though 86)
Region 5 = Gardiner / Augusta and points north

Some observations from Table 5 are listed below:

- Nearly three-fourths of all vehicles entering the Turnpike at the York Toll Plaza were destined for either the Southern or Central Sections. About one-in-six vehicles passing northbound (NB) through the York Toll Plaza traveled the length of the Turnpike to Gardiner, Augusta or beyond.
- At Biddeford and Saco—two of the busiest Turnpike interchanges—roughly three-fourths of all entering trips were destined for either the Turnpike's Southern or Central Section.
- For almost all Central Section interchanges, about 40% of the entering trips were destined for another Central Section interchange. This suggests the Central Section serves a lot of relatively short trips, since the Central Section (as defined in this report) is only eight miles long.

- Nearly two-thirds of the vehicles entering at Interchange 44 were destined for York and points south. In contrast to the other interchanges within the Central Section, Interchange 44 seemed to be primarily oriented toward serving long-distance trips.
- Almost half of the vehicles entering at Gray were destined for the Central Section. It appeared that Gray traffic was heavily oriented toward Greater Portland.
- Traffic entering at the Auburn interchange appeared to be fairly evenly dispersed throughout the entire Turnpike corridor. Its most common set of destinations was the Central Region, at 29%.
- Nearly two-thirds of all vehicles entering at Lewiston or Sabattus were destined for either the Northern Section or the North End.

Table 6 compares results from 2004 O&D Survey with the results from the 2010 O&D Survey. Once again, the most common destination associated with each point of origin is identified by bold, highlighted print. The data for 2010 is identical to the information in Table 6; it was repeated in this table for purposes of comparison.

Table 6 – Comparison of Origin & Destination Data, 2004-2010

	2004 Survey					2010 Survey				
Plaza	**Reg1**	**Reg2**	**Reg3**	**Reg4**	**Reg5**	**Reg1**	**Reg2**	**Reg3**	**Reg4**	**Reg5**
Region 1 - South of Turnpike										
York Plaza	n/a	39%	23%	14%	24%	n/a	**49%**	24%	10%	17%
Region 2 - Southern Section										
19 (Wells)	**44%**	33%	18%	4%	1%	35%	**37%**	18%	4%	6%
25 (Kennebunk)	30%	**44%**	22%	3%	1%	30%	**43%**	22%	3%	3%
32 (Biddeford)	14%	**45%**	36%	4%	1%	9%	**51%**	30%	5%	6%
36 (Saco)	14%	38%	**43%**	5%	1%	15%	33%	**41%**	6%	4%
42 (Scarborough)	21%	**42%**	28%	8%	1%	32%	**34%**	23%	8%	4%
44 (I-295 Connect)	44%	**56%**				**63%**	37%		n/a	
Region 3 - Central Section										
45 (Maine Mall)	21%	27%	**33%**	16%	2%	17%	27%	**31%**	21%	4%
46 (Jetport)	7%	21%	**47%**	23%	2%	7%	29%	**40%**	18%	5%
47 (Rand Road)	14%	**38%**	36%	10%	2%	10%	31%	**44%**	9%	7%
48 (Riverside St)	12%	28%	**42%**	15%	3%	22%	23%	**39%**	12%	4%
52 (Falmouth)	16%	12%	**56%**	15%	1%	**44%**	18%	38%	0%	0%
53 (West Falmouth)	8%	15%	**46%**	29%	3%	6%	18%	**39%**	35%	2%
Region 4 - Northern Section										
63 (Gray)	12%	10%	**49%**	14%	16%	13%	15%	**45%**	15%	12%
75 (Auburn)	16%	8%	**32%**	26%	19%	13%	14%	**29%**	25%	18%
80 (Lewiston)	11%	9%	32%	**37%**	11%	7%	11%	22%	**34%**	26%
86 (Sabattus)	*interchange opened Nov. 2004*					10%	12%	14%	**60%**	10%
Region 5 - North End of Turnpike										
Gard/Augusta & North	**39%**	2%	4%	27%	29%	26%	10%	11%	19%	**35%**

Notes:

Region 1 = South of York plaza
Region 2 = Southern Section (Exits 19 through 44)
Region 3 = Central Section (Exits 45 through 53)
Region 4 = Northern Section (Exits 63 though 86)
Region 5 = Gardiner / Augusta and points north

Based on Table 6, there were five locations whose most common destination in the summer 2010 survey was different from the spring 2004 survey:

- **Wells.** In the 2004 survey, the most common destination was Region 1 (south of York Toll Plaza); in the 2010 survey, it had changed to Region 2 (Southern Section).
- **Interchange 44.** In the 2004 survey, a majority of vehicles entering at this interchange were destined for Region 2. In the 2010 survey, nearly two-thirds of vehicles were destined for Region 1.

- **Rand Road.** The most common group of destinations shifted from Region 2 in 2004 to Region 3 in 2010. However, in both years, about 75% of all entering vehicles were destined for *either* Region 2 or Region 3 (Central Section).
- **Falmouth.** In 2004, the most common region of destination for vehicles entering at Exit 52 was Region 3. The most common destination shifted to Region 1 in the 2010 survey. It is likely that the dates and times in which the surveys were handed out greatly influenced this destination shift. It is also important to note that the NB on-ramp onto the Turnpike was closed due to construction on the Presumpscot River Bridge. This closure prevented vehicles from using Interchange 52 to reach Regions 4 and 5.
- **North End of the Turnpike**. The data indicates that, in 2010, patrons driving southbound (SB) from Augusta were more likely to connect to I-295 as opposed to I-95, when compared to the 2004 survey. This could be attributed to the fact that SB patrons wishing to access the new Gardiner Service Plaza must connect via I-295. The greater proportion of patrons using I-295 could also be related to the two intervening toll adjustments that have raised tolls at West Gardiner (from $0.75 in 2004 to $1.25 today) and at New Gloucester (from $1.00 in 2004 to $1.75 today).

3.4 QUESTION 2 & 6: LOCATION OF TRIP ORIGIN AND DESTINATION

In order to obtain information for the portion of a trip not on the Maine Turnpike, the survey included Questions 2 and 6. These questions asked patrons to record the exact location of their trip's start point and end point. The questions are shown below.

2 Where did this trip start? Street Address or Place: _____ City / State: _____
6 After exiting the Turnpike, where did this trip end? Street Address or Place: _____ City / State: _____

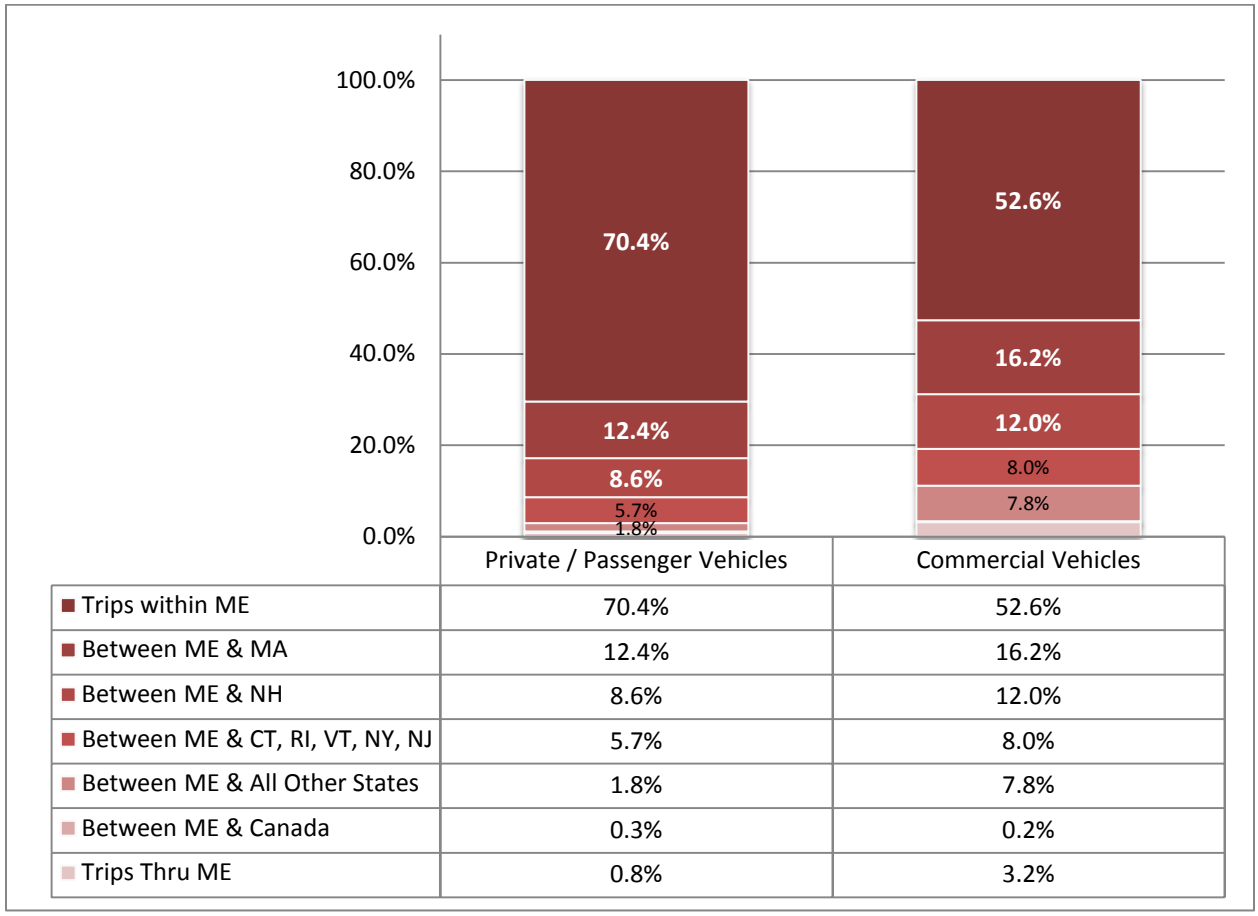
The purpose of these questions was to provide insight on detailed origin-destination patterns. In the past, such data has been used to address questions like:

- How might Turnpike patrons change their patterns if a particular Interchange ramp was closed for an extended period of time?

- How would Turnpike traffic be affected if I-295 SB between Gardiner and Topsham were closed during the summer months?
- How might the existing customer base change its travel patterns if a new interchange were added?

While a detailed evaluation of this specific origin-destination data is beyond the scope of this report, it is possible to make some general observations. A state-by-state summary of origins and destinations is contained in Figure 4. For purposes of the graphic, "Private/Passenger Vehicles" included all cars, SUVs, motorcycles, pickup trucks and recreational vehicles. The heading "Commercial Vehicles" included all heavy trucks and buses.

Figure 4 – Origin and Destination Summary by State and Vehicle Type



	Private / Passenger Vehicles	Commercial Vehicles
Trips within ME	70.4%	52.6%
Between ME & MA	12.4%	16.2%
Between ME & NH	8.6%	12.0%
Between ME & CT, RI, VT, NY, NJ	5.7%	8.0%
Between ME & All Other States	1.8%	7.8%
Between ME & Canada	0.3%	0.2%
Trips Thru ME	0.8%	3.2%

The following observations can be drawn from Figure 4.

- About 70% of all passenger car trips on the Turpike were intrastate trips. For commercial traffic, the share of number of intrastate trips was lower, at 53%. Therefore, a passenger vehicle on the Turnpike had a greater likelihood of traveling within Maine than a commercial vehicle.

- About 20% of private/passenger vehicle trips on the Turnpike were between Maine and either Massachusetts or New Hampshire. For commercial vehicles, this percentage was higher, at nearly 30%.
- The fact that trucks account for a greater proportion of interstate trips suggests that trucks, on average, take longer trips than passenger vehicles.
- Even though New Hampshire is Maine's closest neighbor, the most common out-of-state destination for Turnpike patrons was Massachusetts. About 12% of the Maine Turnpike's passenger cars and 17% of its commercial vehicles traveled between Maine and Massachusetts.
- The percentage of trips *through* Maine on the Turnpike (e.g., trips between Canada and a state other than Maine) was negligible. This suggested that Maine was almost exclusively a destination state.

This latter point is of economic consequence. States such as New Hampshire obtain an economic benefit from two types of tourists – those who travel *to* the state, and those who simply pass *through* the state. Maine's economy benefits from very few of the latter type of tourists.

3.5 QUESTION 11: FREQUENCY OF TRAVEL ON THE MAINE TURNPIKE

Question 11, depicted below, explored the frequency with which patrons travel the Maine Turnpike.

11 Which category best describes how frequently you drive on any part of the Maine Turnpike?

☐ Multiple times each day
☐ Almost every day
☐ A few times per week
☐ A few times per month
☐ A few times per year

Table 7 illustrates the breakdown of frequency-related responses made by all Maine Turnpike patrons.

Table 7 – Frequency of All Patrons on the Maine Turnpike

Frequency	Count of Maine Turnpike Use
A few times per year	23.4%
A few times per month	22.8%
A few times per week	19.3%
Almost every day	15.0%
Multiple times each day	19.5%

As Table 7 indicates, Turnpike patrons exhibited a wide range of trip frequencies. About one-in-four patrons indicated they traveled on the Turnpike a few times per year. Conversely, nearly one-in-five patrons said that they used the Turnpike multiple times each day. Between those two extremes were the remaining 57% of respondents; they were relatively equally dispersed among the remaining three categories.

In short, the Turnpike could not be broadly characterized as serving primarily "frequent" users or "infrequent" users. Users displaying a full range of trip frequencies were observed. It is worth noting, however, that more than one-third of Turnpike patrons responding to the survey used the roadway either "almost every day" or "multiple times each day".

Table 8 explores how trip frequency varied based on patrons' state of residency.

Table 8 – Frequency on Maine Turnpike by Patron State of Residency

Frequency	Maine	Massachusetts	New Hampshire	Other States and Canada
A few times per year	8.9%	57.2%	43.7%	85.3%
A few times per month	23.5%	29.8%	30.0%	9.4%
A few times per week	23.2%	9.0%	12.7%	3.9%
Almost every day	19.3%	2.0%	5.6%	1.1%
Multiple times each day	25.2%	2.0%	7.9%	0.3%

The following observations may be drawn from Table 8:

- About one-in-four Maine residents who responded to the survey stated they used the Turnpike "multiple times each day". This category was the most commonly cited frequency group for Maine residents.
- About one out of every 11 Maine residents who responded to the survey said they only traveled on the Turnpike "a few times per year". This was by far the least-cited frequency group for Maine residents.
- By contrast, the "multiple times each day" category was the least-cited frequency group for patrons who reside out-of-state.

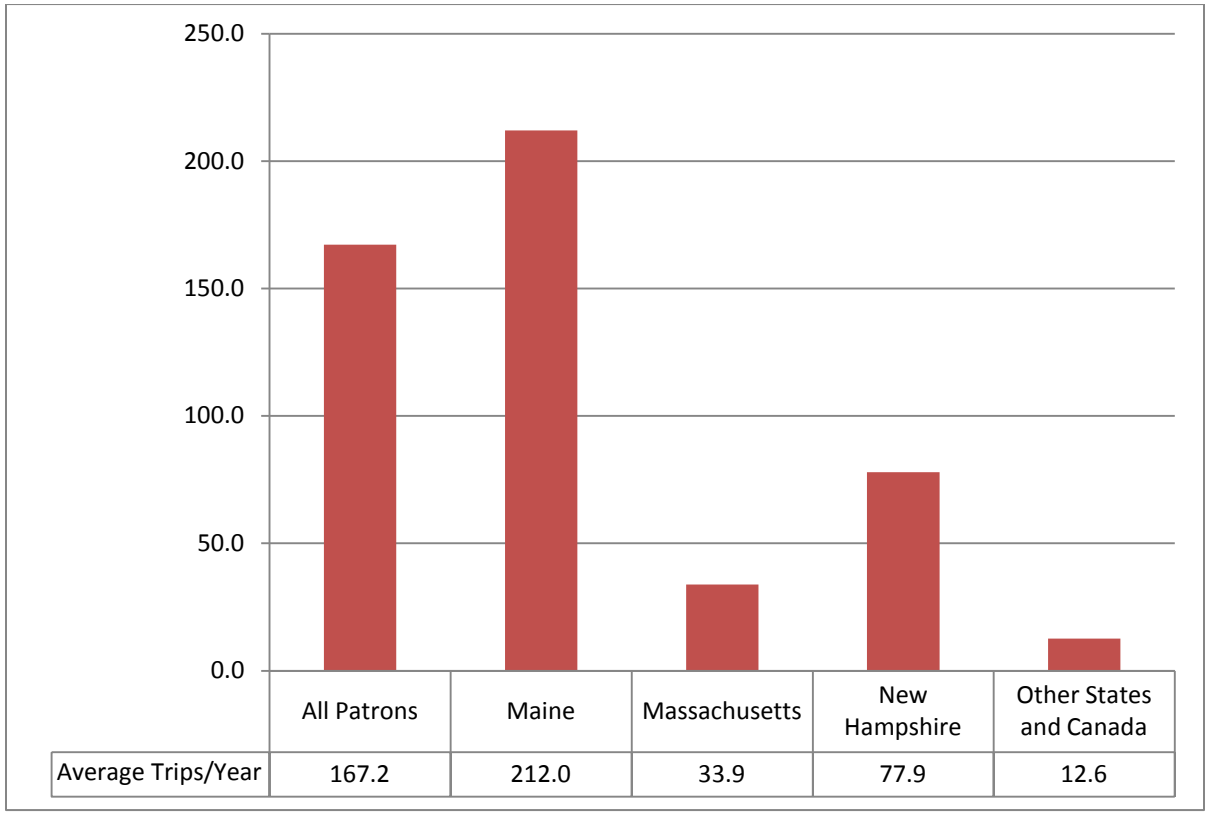
- Almost 90% of residents from outside the tri-state area (Maine, New Hampshire and Massachusetts) noted they only traveled a few times per year on the Maine Turnpike.

The data provided in Table 8 can be used to estimate the number of trips per year the average Turnpike patron took, assuming the sample included a representative cross-section of Turnpike users. HNTB made the following assumptions:

- "A few times per year" equates to an average of two, one-way trips per year (or one roundtrip on the Turnpike)
- "A few times per month" equates to an average of 26 trips per year (or roughly two trips per month)
- "A few times per week" equates to an average of two trips per week
- "Almost every day" equates to an average of five trips per week
- "Multiple times each day" equates to an average of 10 trips per week

Figure 5 built on these assumptions to show how the average number of trips taken over the course of a year varies by the state in which the patron resides.

Figure 5 – Summary of Average Trips per Year, by State Residence

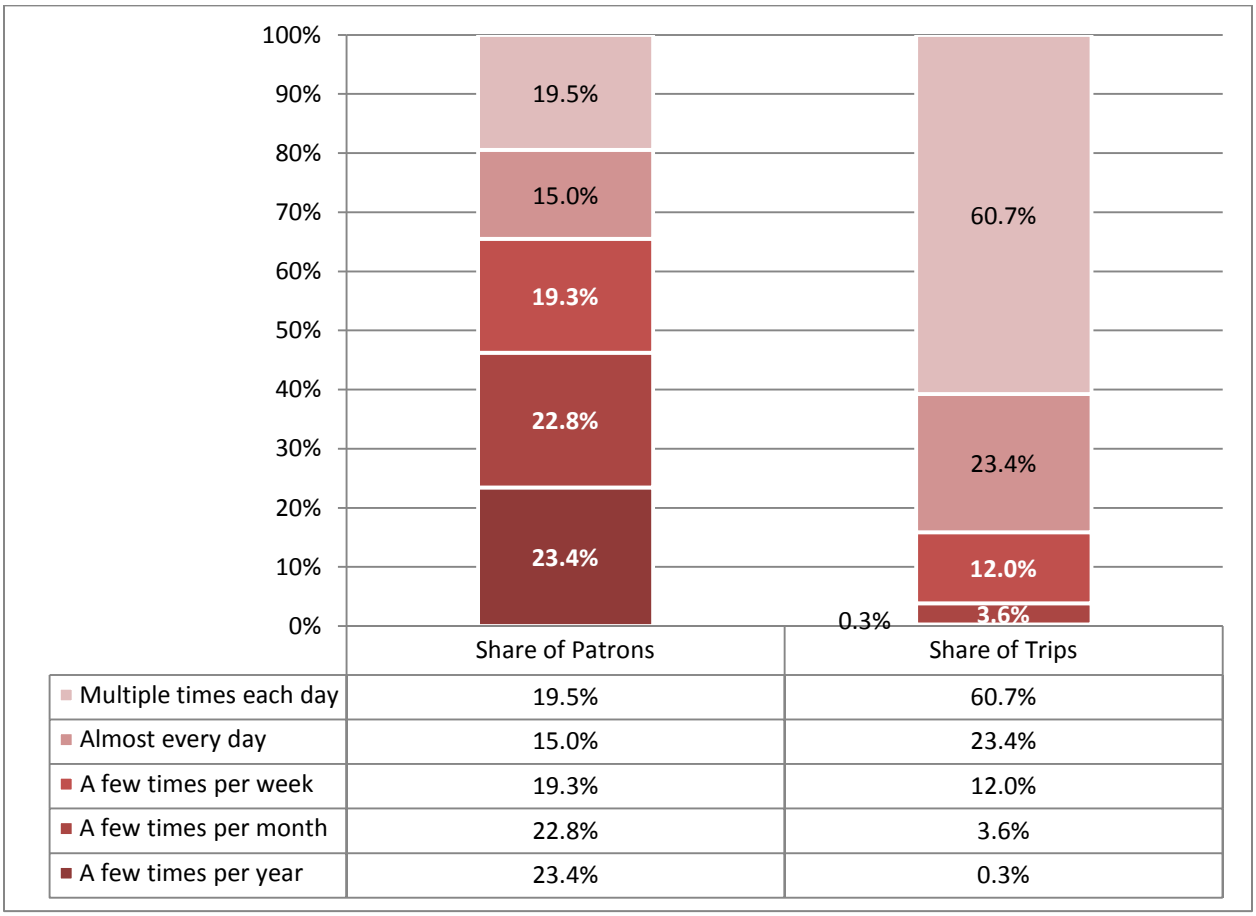


	All Patrons	Maine	Massachusetts	New Hampshire	Other States and Canada
Average Trips/Year	167.2	212.0	33.9	77.9	12.6

As Figure 5 illustrates, the survey suggested the average Turnpike patron uses the Turnpike *more than 160 times per year*, or nearly once every other day. While patrons outside the tri-state area (Maine, New Hampshire and Massachusetts) used the Turnpike relatively infrequently (11.8 times per year, or once per month), the average patron from Maine used the Turnpike very frequently (213 times per year, or *about four times per week*). In short, Maine residents who use the Turnpike tend to do so on a near-daily basis.

Figure 6 illustrates how trip frequency relates to the total number of trips taken over the course of a year.

Figure 6 – Relationship between Trip Frequency and Trips Taken



	Share of Patrons	Share of Trips
Multiple times each day	19.5%	60.7%
Almost every day	15.0%	23.4%
A few times per week	19.3%	12.0%
A few times per month	22.8%	3.6%
A few times per year	23.4%	0.3%

Two important observations may be drawn from Figure 6:

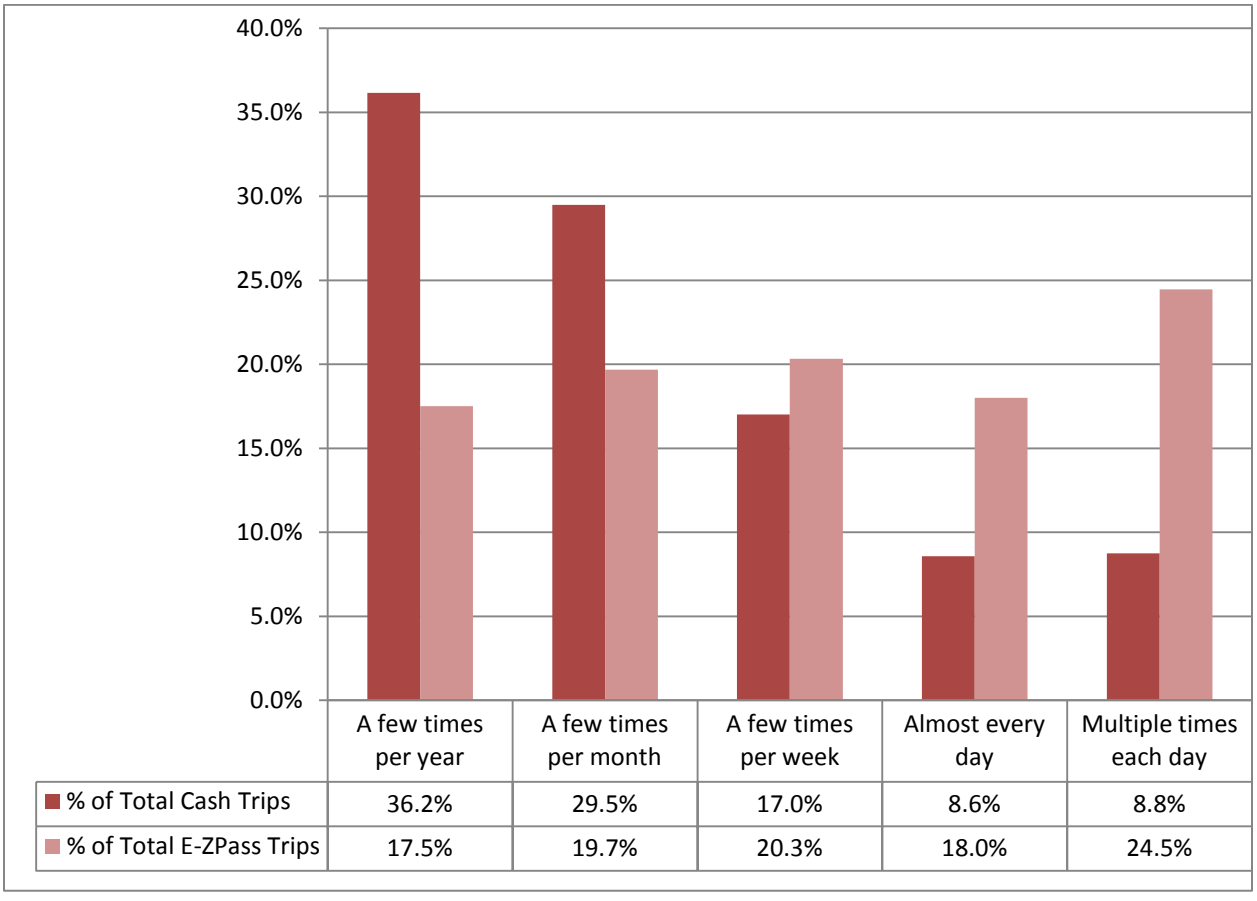
- Patrons who travel "multiple times each day" only account for one out of every five patrons (19.9%). However, these patrons generate **more than 60%** of all trips taken on the Maine Turnpike.

- Conversely, infrequent travelers (defined as those who travel "a few times per month" or "a few times per year") comprise about 45% of all Maine Turnpike patrons. However, these patrons generate **only 4%** of the total trips recorded on the Maine Turnpike.

In short, a relatively small group of frequently-traveling Turnpike patrons—less than 20% of all users—generates a majority of Turnpike trips. Conversely, a relatively large group of infrequently-traveling Turnpike patrons—nearly half of all users—generates less than 5% of Turnpike trips. In other words, if *all* of the Turnpike patrons that travel infrequently were to avoid the Turnpike entirely, overall traffic levels on the Turnpike would only decline by about 5%.

Figure 7 illustrates how trip frequency varies based on payment type (cash vs. ***E-ZPass***).

Figure 7 – Comparison of Trip Frequency, Cash vs. *E-ZPass* Patrons



	A few times per year	A few times per month	A few times per week	Almost every day	Multiple times each day
% of Total Cash Trips	36.2%	29.5%	17.0%	8.6%	8.8%
% of Total E-ZPass Trips	17.5%	19.7%	20.3%	18.0%	24.5%

Perhaps the most interesting observation from Figure 7 is that *about one-third of all cash patrons used the Turnpike on at least a weekly basis*. That is to say, about one out of three patrons who paid cash used the Turnpike at least "a few times per week". In fact, one out of

every 12 cash patrons *used the Maine Turnpike multiple times each day.* If half of these patrons converted to ***E-ZPass***, then the share of total trips taken by ***E-ZPass*** patrons would increase by more than 8%.

Section 4. PATRON CHARACTERISTICS

4.1 QUESTION 12: RESIDENCE OF TURNPIKE PATRONS

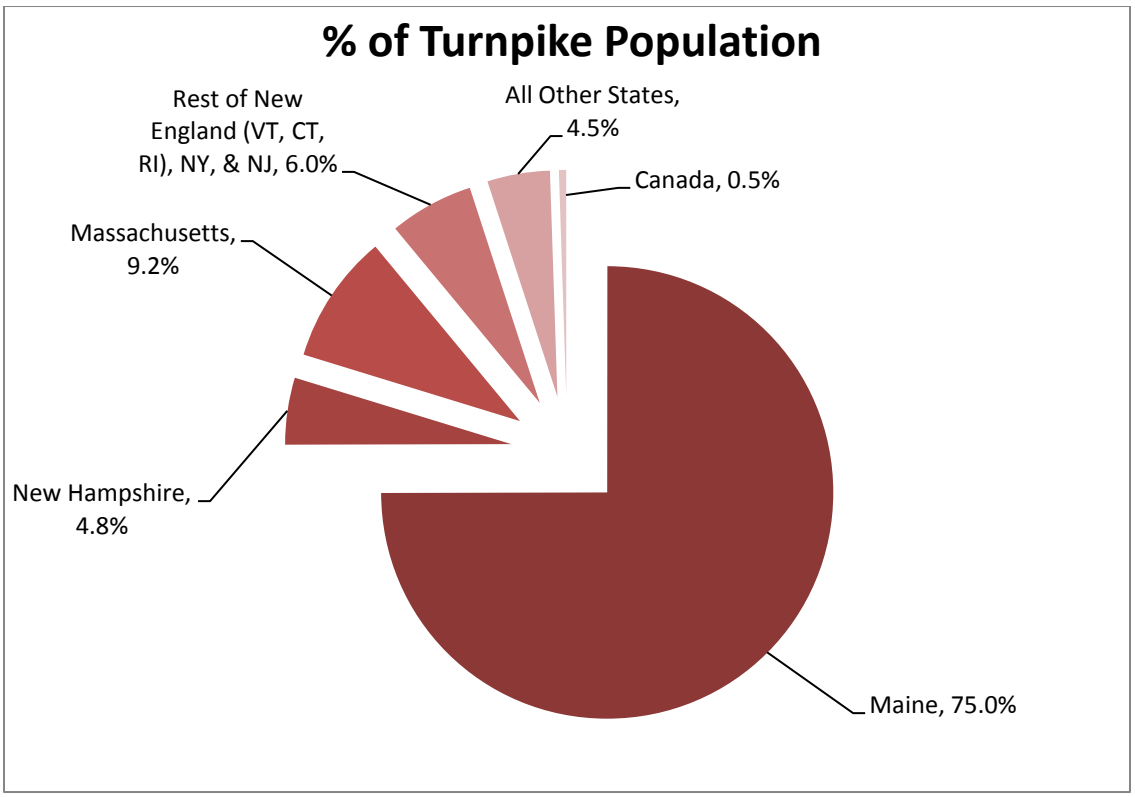
Another purpose of this report was to better understand the selected patron characteristics of the Maine Turnpike (or simply "the Turnpike"). Six survey questions were designed to highlight some of these characteristics. The questions are summarized and discussed in this section.

Question 12 is shown below:

> 12 What is your home zip code or postal code?
> _____

The answers to this question are summarized in Figure 8.

Figure 8 – State of Residency of Maine Turnpike Patrons, by Vehicle Type

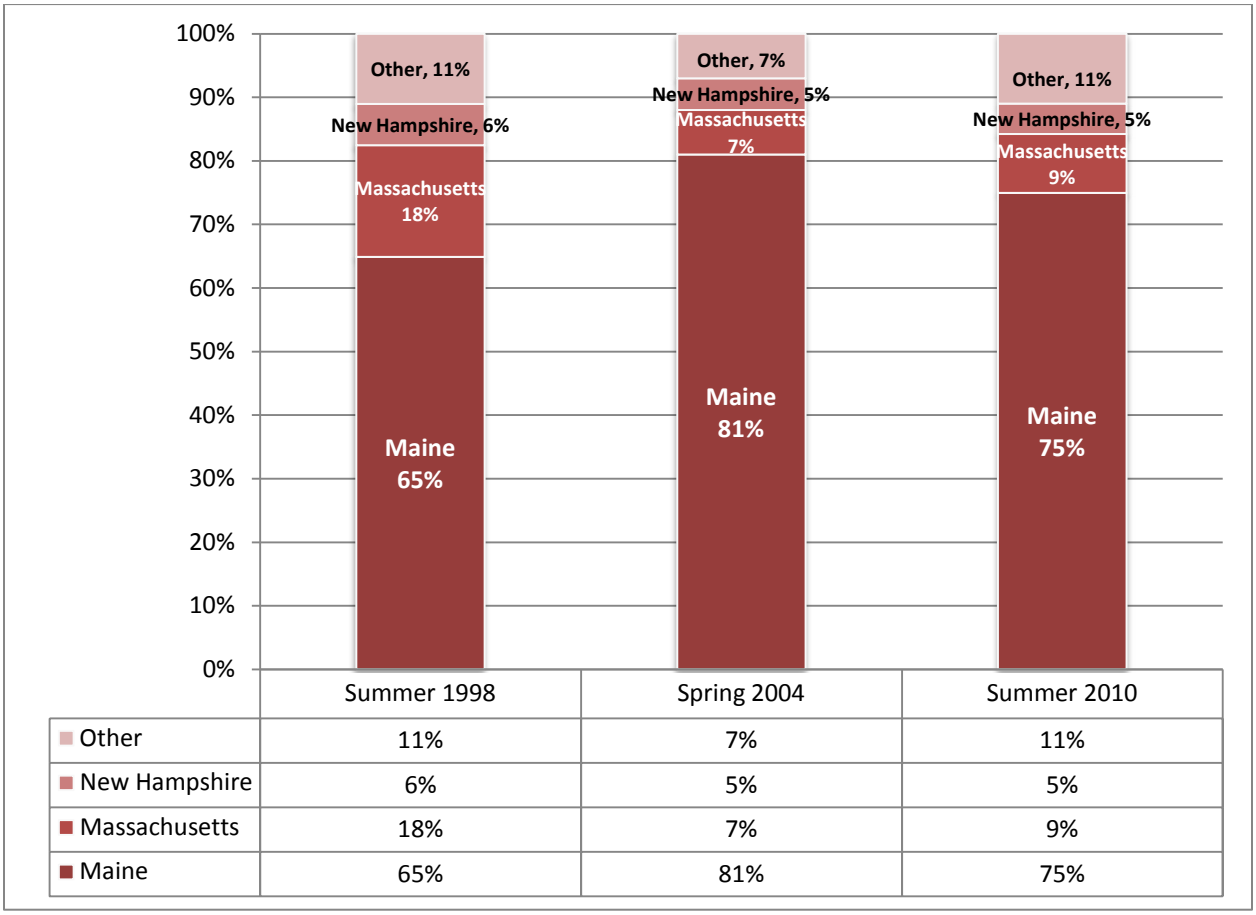


The following observations were drawn from Figure 8:

- Three-quarters of Turnpike patrons reside in Maine.
- Even though the only state Maine shares a border with is New Hampshire, the number of Massachusetts patrons was nearly double that of New Hampshire patrons.
- Less than one percent of patrons reported a Canadian residence. The small number of responses was somewhat surprising, although it may have been influenced by the fact that the postpaid card was only good if mailed within the United States.[4]

Figure 9 compares the data from the 2010 O&D Survey with data gathered during the previous two O&D surveys.

Figure 9 – In-State vs. Out-of-State Patrons, Previous 3 O&D Surveys



	Summer 1998	Spring 2004	Summer 2010
Other	11%	7%	11%
New Hampshire	6%	5%	5%
Massachusetts	18%	7%	9%
Maine	65%	81%	75%

The following observations may be drawn from Figure 9:

[4] If better data is needed concerning the percentage of patrons from Canada, a license plate survey may be a more effective means of gathering that data.

- The percentage of Maine patrons in the *summer* months grew from 65% in 1998 to 75% in 2010. This suggests that the proportion of in-state patrons during the summer months has increased over the past decade or so.
- The percentage of out-of-state patrons in the summer 2010 survey (25%) was higher than the percentage of out-of-state patrons in the spring 2004 survey (19%). This supports the conventional wisdom that the share of out-of-state vehicles tends to increase during the summer months.
- In both of the summer surveys (1998 and 2010), "other" traffic (i.e. vehicles outside of Maine, New Hampshire and Massachusetts) comprised 11% of all traffic.
- In all three surveys, Massachusetts vehicles were the most commonly observed out-of-state vehicles, followed by New Hampshire.

4.2 QUESTION 8: TYPE OF VEHICLE DRIVEN

Question 8, as depicted below, was designed to identify the various types of vehicles that traveled on the Maine Turnpike (Turnpike).

8 What type of vehicle were you driving?

☐ Motorcycle	☐ 3 or 4 axle truck
☐ Car / SUV / pickup	☐ 5 or more axle truck
☐ Recreational Vehicle	☐ Passenger vehicle towing a trailer
☐ Bus	

Table 9 summarizes the responses to Question 8. The table contains two columns of data; one column represents the 2010 O&D Survey responses, and the other shows 2004 O&D Survey data.

Table 9 – Types of Vehicles on the Maine Turnpike

Vehicle Type	2004	2010
Motorcycle	0.1%	0.2%
Car/SUV/pickup	91.2%	94.3%
Recreational Vehicle	0.8%	0.6%
Bus	0.4%	0.3%
3 or 4 axle truck	2.2%	1.4%
5 or more axle truck	4.2%	2.0%
Passenger vehicle towing a trailer	1.0%	1.3%

The most important observation that can be drawn from Table 9 is passenger vehicles make up the vast majority of Turnpike traffic. This was seen in both the 2004 and 2010 surveys. The

exact percentages should be assessed carefully. They are only valid to the extent that commercial vehicle drivers had the same likelihood of responding as passenger vehicle drivers. Nevertheless, it is clear the "car/SUV/pickup" category dominated the survey.

A more exact breakdown of vehicle types could be developed from a review of the Authority's toll revenue data, which is broken out by vehicle type.

4.3 QUESTION 9: NUMBER OF PATRONS PER VEHICLE

The purpose of Question 9 was to find out how many people, on average, traveled in each vehicle on the Maine Turnpike (Turnpike). The wording of the question is depicted a follows:

> 9 How many people (driver plus passengers) were in your vehicle? _____people

The responses to Question 9 are summarized in Table 10 below. For comparison purposes, the responses to the 2010 O&D Survey are compared with the responses from the previous three O&D Surveys (conducted in the spring of 1994, the summer of 1998, and the spring of 2004).

Table 10 – Number of Occupants per Vehicle on the Maine Turnpike

Number of Occupants in a Vehicle	Share of Occupants			
	1994 Survey (Spring)	***1998 Survey (Summer)***	***2004 Survey (Spring)***	***2010 Survey (Summer)***
1	64.9%	51.4%	58.9%	48.5%
2	25.4%	34.4%	29.8%	32.2%
3	5.4%	7.0%	6.3%	9.1%
4	2.6%	5.1%	3.2%	6.6%
5 or more	1.7%	2.1%	1.8%	3.6%
Average Occupants per Vehicle	***1.61***	***1.86***	***1.70***	***1.90***

The following observations may be drawn from Table 10:

- In general, the summer surveys exhibited higher average occupancy rates than the spring surveys. The summer surveys (1998 and 2010) both averaged about 1.9 occupants per vehicle, while the spring surveys (1994 and 2004) were in the range of 1.6 to 1.7 occupants per vehicle. This suggests that occupancy rates tend to increase in the summer, when vacation-related traffic (with typically higher occupancy rates) makes up a greater proportion of total traffic.

- The general trend appears to be that vehicle occupancy is increasing. In the spring, the 2004 survey (at 1.70 occupants per vehicle) was higher than the 1994 survey (at 1.61). Similarly, in the summer, the 2010 survey (1.90 occupants per vehicle) was higher than the 1998 survey (1.86)
- The 2010 survey was the first time that over half of the survey responses were from vehicles with more than 1 occupant (51.5%).
- All surveys exceeded the national average of 1.67 passengers per vehicle.

Table 11 compares average occupancy on weekdays with average occupancy on weekends, as indicated by the 2010 survey results.

Table 11 – Average Occupancy Comparison, Weekday vs. Weekend – 2010 Survey

Number of Occupants	Weekday	Weekend
1	62.8%	30.4%
2	24.0%	42.6%
3	6.4%	12.5%
4	4.2%	9.5%
5 or more	2.5%	5.0%
Average Occupants per Vehicle	**1.65**	**2.22**

Table 11 reveals that, on weekends, more than two-thirds of the vehicles on the Maine Turnpike are occupied by two or more patrons. By contrast, on weekdays nearly two-thirds of the vehicles had only one occupant. Overall, average occupancy on weekends was 34% higher than it was on weekdays.

Table 12 compares the vehicle occupancy characteristics of cash patrons with those of ***E-ZPass*** users, again based on the 2010 survey results.

Table 12 – Average Occupancy Statstics, Cash Patrons vs. *E-ZPass* Users – 2010 Survey

Number of Occupants	***E-ZPass***	**Cash**
1	52.6%	39.7%
2	30.4%	35.8%
3	7.9%	11.7%
4	6.1%	7.7%
5 or more	3.0%	5.0%
Average Occupants per Vehicle	**1.82**	**2.09**

As Table 12 illustrates, a majority of ***E-ZPass*** patrons had a single occupant, whereas a majority of cash-paying patrons had multiple occupants. In fact, average occupancy for ***E-ZPass*** patrons was 13% lower than it was for cash patrons.

4.4 QUESTION 13: E-ZPASS AND CASH PATRONS

The purpose of Question 13 (depicted below) was to identify the two fundamental types of patrons who traveled on the Maine Turnpike (Turnpike)—cash users vs. ***E-ZPass*** users.

13 Do you own an ***E-ZPass***?
☐ Yes ☐ No

Table 13 compares ***E-ZPass*** usage with cash usage.

Table 13 – *E-ZPass* Patrons vs. Cash Patrons

Cash Patrons	31.9%
E-ZPass Users	68.1%

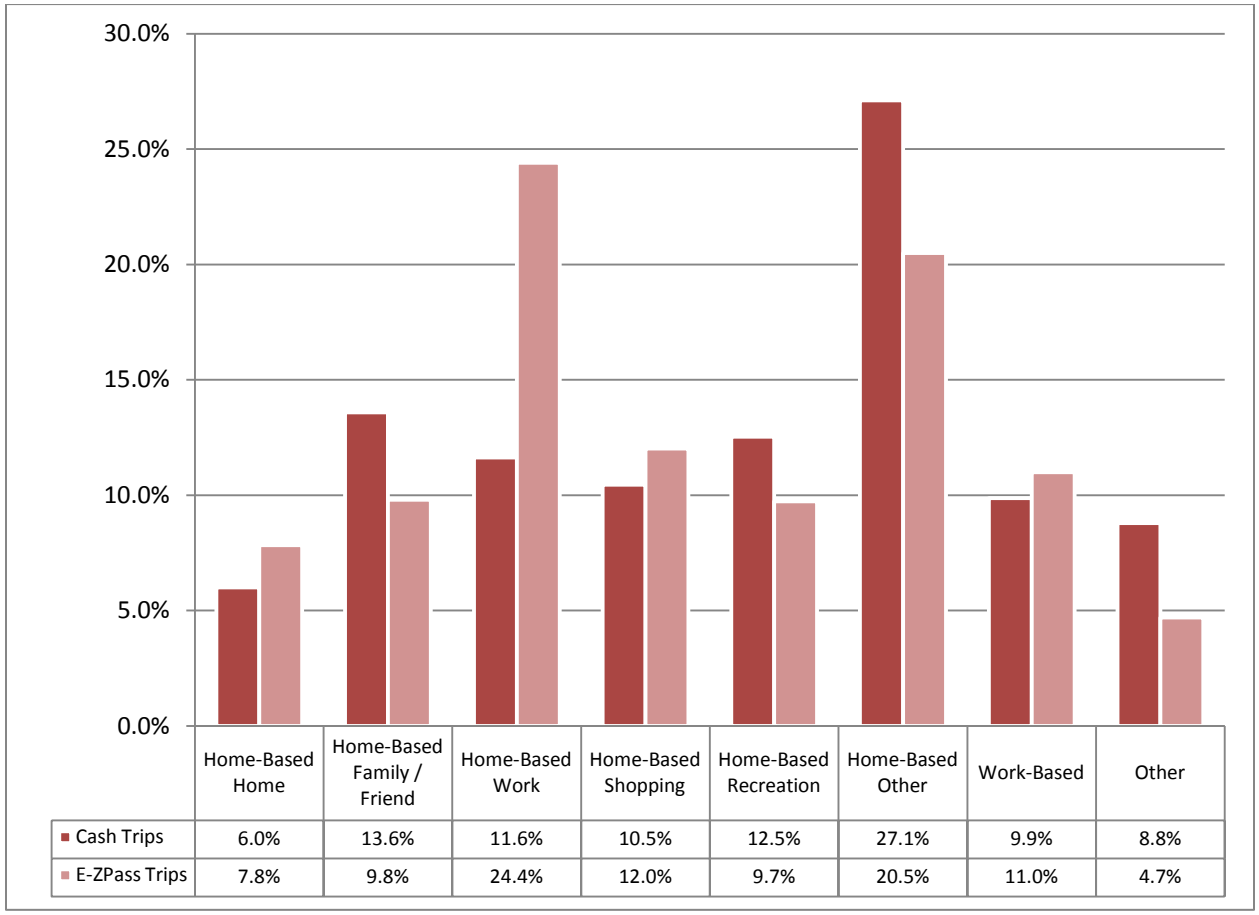
Table 13 indicates that over two-thirds of all patrons responding to the survey have an ***E-ZPass***. This represents a significant jump from the 2004 survey, when only about one-third of the respondents employed electronic toll collection, or ETC (which at the time was in the form of *Transpass*). Clearly, the conversion to E-ZPass in 2005 helped accelerate the conversion to ETC among Maine Turnpike patrons.[5]

It interesting to note that, in 2010, approximately **60%** of the toll transactions and toll revenue recorded by the Maine Turnpike Authority was attributable to E-ZPass. This is slightly lower than the 68% share of E-ZPass usage suggested by Table 13. This could indicate that E-ZPass users were slightly more likely to return a survey card than cash-paying patrons.

Figure 10 compares the trip purposes of cash patrons with those of ***E-ZPass*** patrons.

[5] During the 7+ years in which *Transpass* was in place, the share of ETC usage grew by **8** percentage points, from about 25% to 33%. In the following 6 years, after the conversion to E-ZPass, the share of ETC usage has grown by over **25** percentage points.

Figure 10 – Trip Purpose Comparison, Cash vs. *E-ZPass*



	Home-Based Home	Home-Based Family / Friend	Home-Based Work	Home-Based Shopping	Home-Based Recreation	Home-Based Other	Work-Based	Other
Cash Trips	6.0%	13.6%	11.6%	10.5%	12.5%	27.1%	9.9%	8.8%
E-ZPass Trips	7.8%	9.8%	24.4%	12.0%	9.7%	20.5%	11.0%	4.7%

The primary difference between the two payment types concerned "home-based work" and "home-based other" trips. Together, these two trips comprised about 40% of the total trips for both cash and ***E-ZPass*** patrons. However, for ***E-ZPass*** patrons, the share of home-based work trips was twice as high as it was for cash-paying patrons (24% vs. 12%).

4.5 QUESTION 14: REASONS FOR NOT PURCHASING AN E-ZPASS

As depicted on the following page, Question 14 explored various reasons why Maine Turnpike (Turnpike) cash patrons had not purchased an ***E-ZPass***.

14 If the answer above is "NO", please select one (1) reason why you choose NOT to have an ***E-ZPass***?

- ☐ Don't know how or where to get one
- ☐ Don't want to pay the fee to acquire one
- ☐ Don't travel very frequently
- ☐ Privacy Concerns
- ☐ Other _____

Table 14 summarizes the results of Question 14.

Table 14 – Summary of Reasons for Not Purchasing *E-ZPass*

Reason for Not Acquiring E-ZPass	***Share***
Don't know how or where to get one	9.5%
Don't want to pay the fee to acquire one	19.1%
Don't travel very frequently	48.5%
Privacy concerns	4.2%
Other	18.8%

According to Table 14, nearly half of Turnpike patrons who don't own ***E-ZPass*** stated that the primary reason is that they don't travel very frequently. Another one-in-five cash-paying patrons stated they simply don't want to pay the fee to acquire one.[6] Only about one-in-25 cash-paying patrons cited "privacy concerns" as the main reason for avoiding an ***E-ZPass*** purchase.

Table 15 provides an interesting look at the patrons who said they didn't buy an ***E-ZPass*** because they "don't travel very frequently". It isolates these patrons and summarizes the frequency with which they *actually* travel on the Turnpike, based on their responses to Question 11.

Table 15 – Frequency of Use for Cash-Paying Patrons who "Don't Travel Very Frequently"

Frequency	**Share**
A few times per year	50.8%
A few times per month	33.5%
A few times per week	11.6%
Almost every day	1.9%
Multiple times each day	2.3%

[6] The minimum charge for a typical passenger car to establish an E-ZPass account is currently $46.25. This includes a $25 fee to purchase the E-ZPass device, an additional $1.25 in sales tax, and a minimum opening balance of $20.

The key finding from Table 15 is that nearly 16% of patrons who avoided purchasing an ***E-ZPass*** because they "don't travel very frequently" actually use the Maine Turnpike *at least* a few times per week. That is, one out of six patrons who don't believe they travel frequently enough to warrant an ***E-ZPass*** actually uses the Maine Turnpike on a weekly basis.

4.6 QUESTION 15: ORT IMPACT ON E-ZPASS ACQUISITION

As depicted below, Question 15 asked whether cash patrons would purchase an ***E-ZPass*** if open road tolling (ORT) were to be installed on the Maine Turnpike. This question was proposed and drafted by Wilbur Smith Associates, who wished to use the results to support their traffic and revenue work for the Authority.

> 15 Unlike current ***E-ZPass*** lanes which require you to slow down at the plaza, Open Road Tolling (ORT) allows ***E-ZPass*** customers to travel through toll locations at full highway speeds. Cash customers would have the option to continue to use a redesigned cash plaza. If ORT were implemented at some locations on the Maine Turnpike, would you continue to use the redesigned cash plazas or would you purchase and use an ***E-ZPass***?
>
> ☐ Purchase ***E-ZPass*** ☐ Continue to use cash

Table 16 summarizes the responses to Question 15.

Table 16 – Cash Patrons' Decisions if ORT were Installed

Tolling Option	Total
Continue to Use Cash	69.8%
Purchase ***E-ZPass***	30.2%

It is interesting to note that *one-third of cash-paying patrons said they would purchase an **E-ZPass** if ORT were implemented.* This suggests the implementation of ORT could provide a significant boost to Turnpike ***E-ZPass*** usage. Of course, such statistics should be used with caution. Even if ORT is implemented, cash-paying patrons will still be required to take the initiative to complete an ***E-ZPass*** application and spend nearly $50 to establish an account.

These requirements could still serve as barriers to ***E-ZPass*** growth, notwithstanding the responses documented above.[7]

4.7 QUESTION 10: FREQUENCY OF TRAVEL THROUGH YORK TOLL PLAZA

Question 10, seen below, was helpful in analyzing how frequently Turnpike patrons traveled through the York Toll Plaza.

10 Which category best describes how frequently you drive through the York Toll Plaza?

- ☐ Multiple times each day
- ☐ Almost every day
- ☐ A few times per week
- ☐ A few times per month
- ☐ A few times per year

Figure 11 summarizes the responses to question 15. The results include responses from *all* patrons that responded to the survey, not just those who recorded a trip through the York Toll Plaza.[8]

[7] As a side note, HNTB reviewed E-ZPass growth on I-95 at the Hampton (NH) Toll Plaza in the 29 weeks immediately following its installation of ORT. The share of E-ZPass usage grew by 3.6% when compared to the same time period in the previous year. This is steady growth, but it is consistent with the rate of growth observed prior to the implementation of ORT. In short, it is not clear that ORT has spurred a significant shift into ***E-ZPass*** in New Hampshire.

[8] All patrons were presented with Question 10 as part of the O&D survey. However, not all patrons actually passed through the York Toll Plaza during the trip that was recorded on the survey. This section covers responses from *all* patrons who responded; subsequent analysis will focus on the characteristics of patrons who specifically recorded a trip that passed through the York Toll Plaza.

Figure 11 – Frequency of Travel through the York Toll Plaza

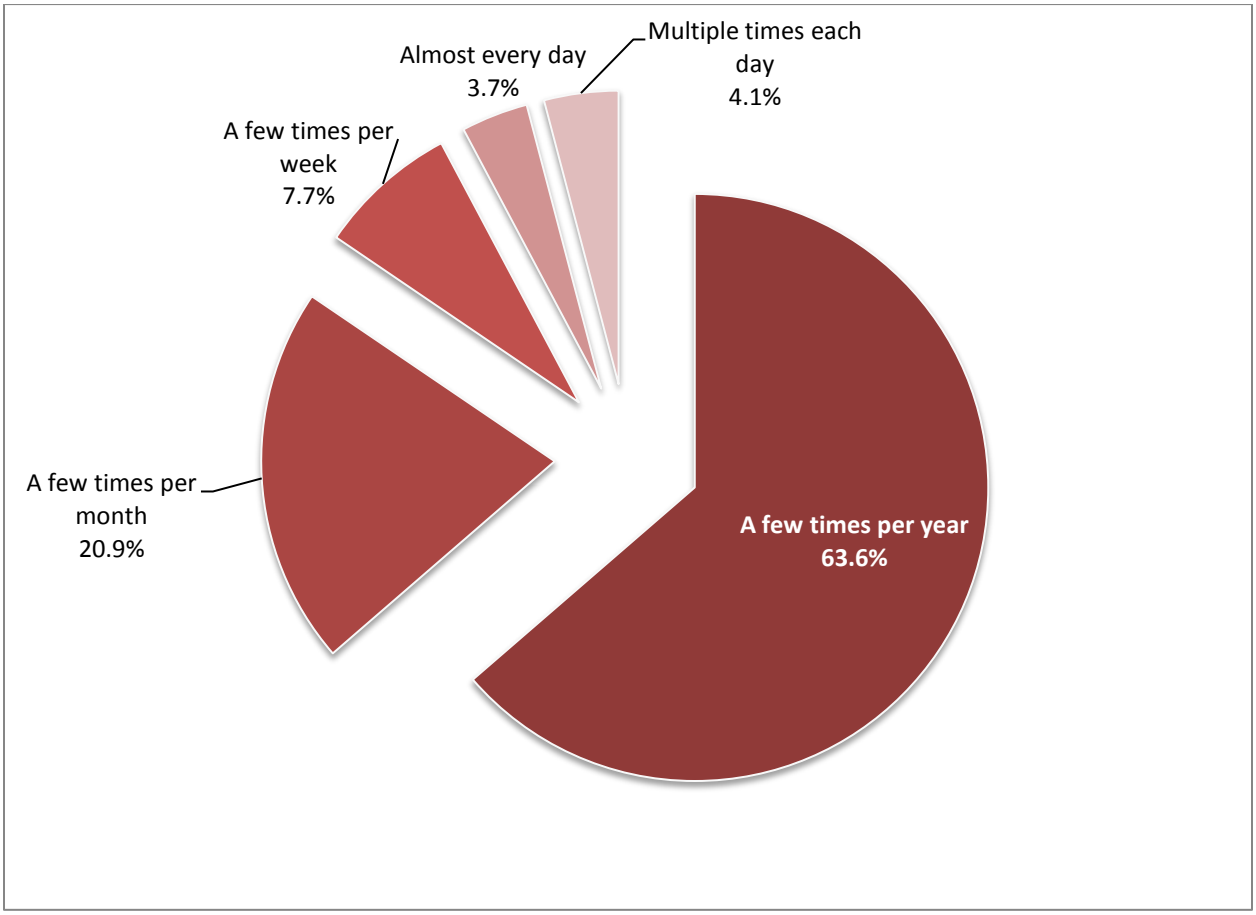
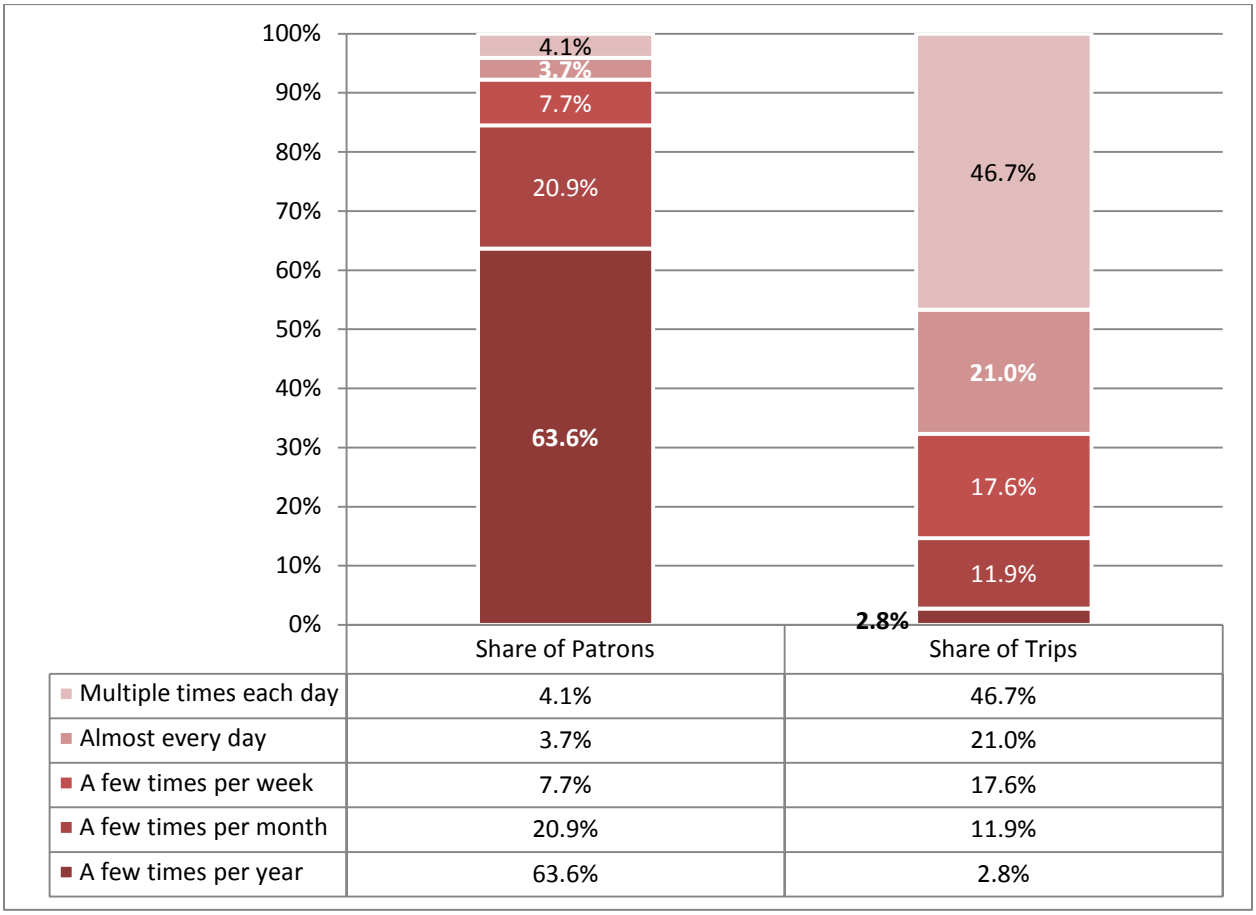


Figure 11 paints an interesting picture of usage of the York Toll Plaza. Roughly two-thirds of Turnpike patrons use the plaza a few times per year. However, about 15% of Turnpike patrons use the plaza on a weekly basis—that is, they travel through the plaza *at least* "a few times per week."

Figure 12 takes the frequency of trips and relates it to the estimated number of trips taken over the course of a year.

Figure 12 – Relationship between Frequency and Trips



	Share of Patrons	Share of Trips
Multiple times each day	4.1%	46.7%
Almost every day	3.7%	21.0%
A few times per week	7.7%	17.6%
A few times per month	20.9%	11.9%
A few times per year	63.6%	2.8%

As Figure 12 illustrates, less than 10% of the Turnpike's patrons who reported they passed through the York Toll Plaza traveled either "almost every day" or "multiple times each day". However, this small minority of patrons actually accounted for **more than two-thirds of all trips taken** through the York Toll Plaza. Meanwhile, the large group of patrons who traveled through the plaza "a few times per year" only accounted for 2.8% of all trips. In short, while the York Toll Plaza serves a lot of infrequent travelers, these patrons accounted for a very small share of the annual trips through the plaza.

Table 17 compares the frequency characteristics of cash patrons at the York Toll Plaza with those of ***E-ZPass*** patrons.

Table 17 – Comparison of Frequency Characteristics at York, Cash vs. *E-ZPass*

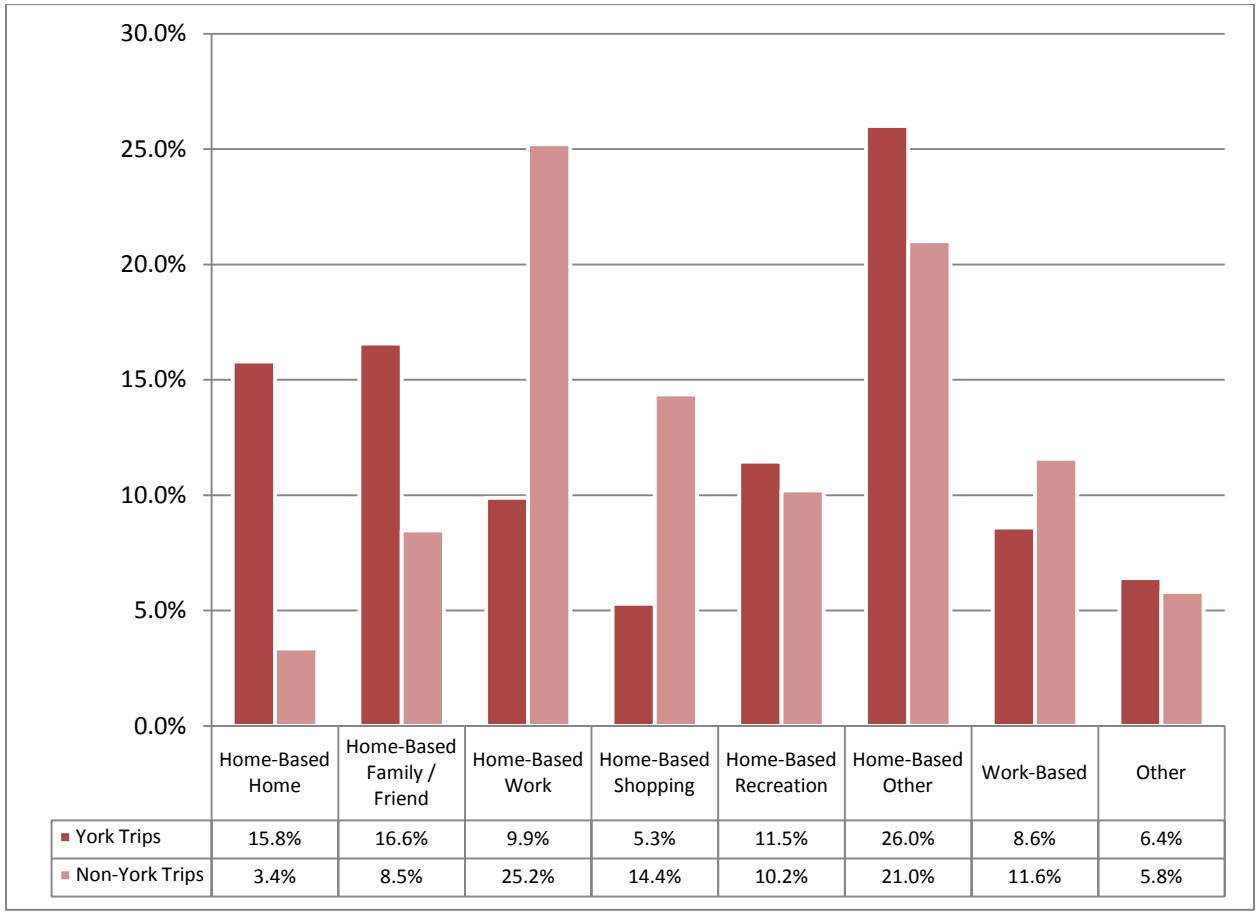
Frequency	Cash	*E-ZPass*	Overall
A few times per year	75.4%	58.2%	63.6%
A few times per month	14.5%	23.8%	20.9%
A few times per week	5.6%	8.7%	7.7%
Almost every day	2.2%	4.3%	3.7%
Multiple times each day	2.4%	4.9%	4.1%
Average Trips per Year	29.3	53.4	45.7

The following observations may be drawn from Table 17:

- The average Turnpike patron passed through the York Toll Plaza an average of 46 times per year, or about once per week.
- ***E-ZPass*** patrons passed through with 80% greater frequency than cash patrons.
- About 4% of the cash-paying patrons at York traveled very frequently—either "almost every day" or "multiple times each day". These patrons could almost certainly benefit from converting to ***E-ZPass***, both from a time- and a cost-savings perspective. In fact, if all of these frequently traveling, cash-paying patrons converted to ***E-ZPass***, then the volume of cash transactions at York would fall by almost 30%.

Figure 13 compares the trip purposes of patrons who used the York Toll Plaza with those of patrons who do not use the plaza.

Figure 13 – Trip Purpose Comparison, York Patrons vs. Rest of Turnpike



	Home-Based Home	Home-Based Family / Friend	Home-Based Work	Home-Based Shopping	Home-Based Recreation	Home-Based Other	Work-Based	Other
York Trips	15.8%	16.6%	9.9%	5.3%	11.5%	26.0%	8.6%	6.4%
Non-York Trips	3.4%	8.5%	25.2%	14.4%	10.2%	21.0%	11.6%	5.8%

The following observations may be drawn from Figure 13:

- A smaller share of home-based work (or "commuting") trips was observed at York, as compared to the rest of the Turnpike (14% vs. 21%).
- The York Toll Plaza also had a smaller share of "home-based shopping" and "home-based recreation" trips (12% combined, as compared to 21% combined for the rest of the Turnpike.
- However, York had a much higher share of trips considered to be "home-based other".
- The share of "work-based" and "other" trips was virtually identical for both York and the rest of the Turnpike.

Section 5. ADDITIONAL ANALYSIS

The previous sections summarized the sum of all patrons' responses to the 15 survey questions to better understand the travel patterns and patron characteristics observed on the Turnpike as a whole. This section identifies and examines three specific Turnpike user groups. Although the information provided in this section is not directly related to the primary purpose of the survey, it does provide valuable insight that can contribute to effective transportation planning in the future. The three Turnpike user groups considered in this section for further analysis are:

1. Patrons who may benefit from an east-west connector located between Gorham and I-95 in Portland;
2. Patrons who may benefit from an east-west connecter located in central York County; and,
3. Patrons who may benefit by extending the ZOOM commuter bus service to those making work-related trips between the Lewiston/Auburn interchanges and Portland.

5.1 GORHAM E-W CONNECTOR

Patron usage of the Maine Turnpike originating from points on the west side of Greater Portland has long been of interest to Turnpike and Department of Transportation planners. Since 1977 the feasibility of designing and implementing a corridor connector to better serve patrons traveling from Gorham and its surrounding communities has been the center of numerous studies funded by local communities, the Maine Turnpike Authority, and the Maine Department of Transportation.

Most recently, the Gorham East-West Corridor Feasibility Study examined various transportation options for improving connections between the region west of Portland and South Portland. To better understand Turnpike usage by patrons in the Gorham East-West Corridor study area, survey cards from users of these areas were reviewed. The purpose of the review was to address this question: *to what extent do users of Turnpike interchanges in Greater Portland travel to and from the Gorham Study Area?*

Table 18 summarizes the numbers of Turnpike patrons who travel daily between the Greater Portland interchanges (i.e., Exits 42, 45, 46, 47, and 48) and the Gorham Study Area. For the purposes of this review, HNTB expanded the Gorham Study Area to include the towns of Dayton, Hollis, Limerick, Limington, Sebago, and Waterboro. By using average daily traffic volumes for each Turnpike interchange, HNTB was able to estimate the potential number of users of an east-west corridor through the region.

Table 18 – Estimated Gorham E-W Connector Usage

	Interchange				
	42	**45**	**46**	**47**	**48**
Surveys w/ Destination in Gorham Study Area	75	27	41	158	45
Total Surveys Received	1,168	1,536	1,098	1,041	1,110
% Within Study Area	6.4%	1.8%	3.7%	15.2%	4.1%
AADT	10,916	23,796	16,370	8,114	18,603
Potential E-W Corridor Volume	701	418	611	1,232	754

The following observations may be drawn from Table 18:

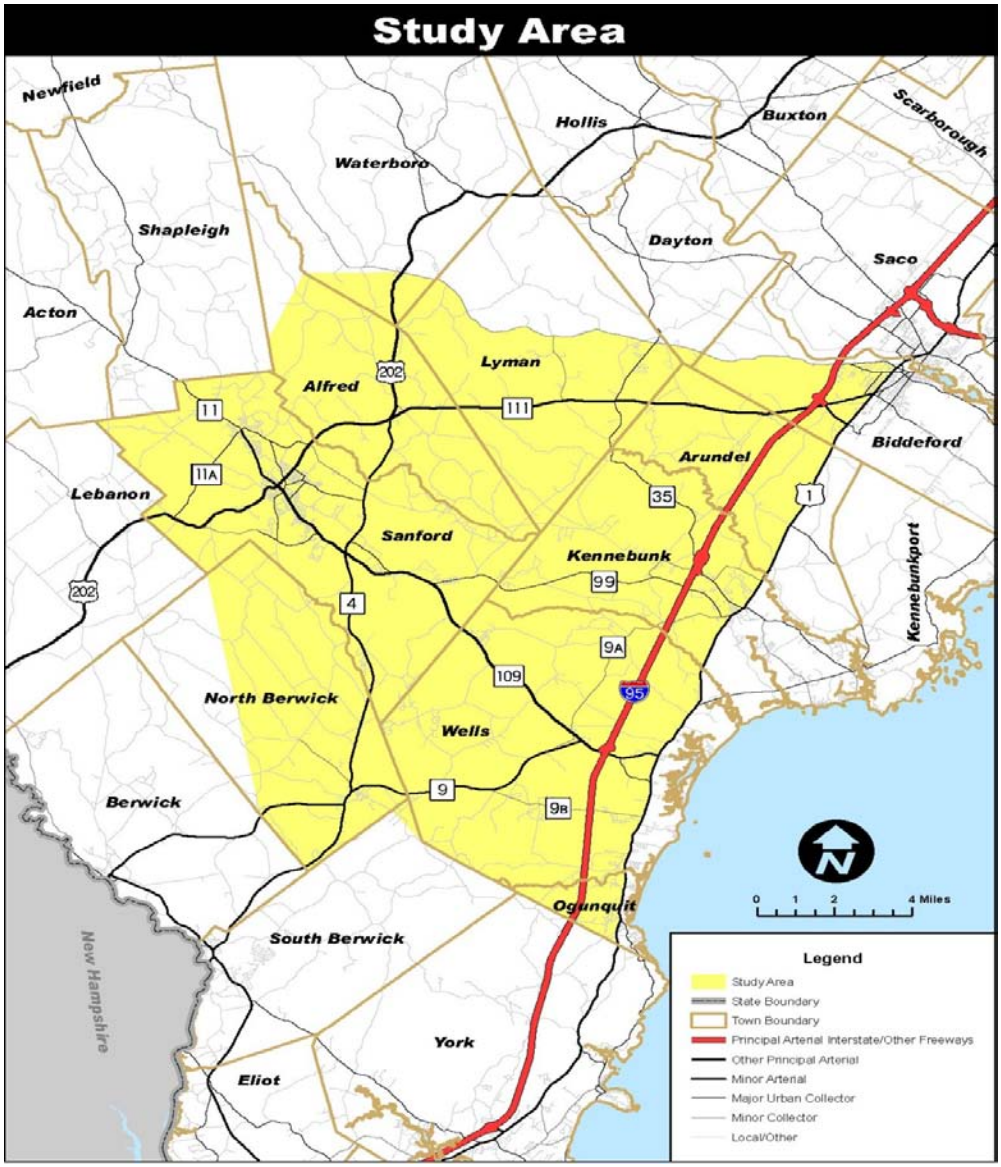
- A total of 3,716 vehicles per day could *potentially* use a new limited access highway to support connections between the Gorham Study Area and the Maine Turnpike.
- About 1,232 vehicles per day from the Gorham Study Area connect to the Maine Turnpike at Exit 47. This means that roughly one-third of the vehicles making the connection between the Gorham Study Area and the Turnpike currently use Exit 47.
- Interchange 45 served a relatively small number of patrons from the Gorham Study Area. This is perhaps due to the other interchanges being more directly accessible from these communities.
- This does not suggest that a new east-west roadway in this area would only serve 3,700 vehicles per day. Rather, this is the volume that could potentially use the roadway *to connect to the Turnpike*. Any such roadway would also serve patrons who wish to connect directly to points within Portland and South Portland, without using the Turnpike.

5.2 Central York County E-W Connector

Central York County is one of Maine's fastest growing regions. Previous studies of the area have examined conditions on State Routes 111, 136 and 109, as well as the US Route 202 corridor. The demand for a more inclusive study, including the development of a series of recommendations for improving connectivity within the region, prompted the Central York County Connections Study (CYCCS). The study area includes the towns of Acton, Alfred, Lebanon, Lyman, Sanford, Shapleigh, Springvale and Waterboro, and the major route corridors connecting the region.

Figure 14 highlights the CYCCS area.

Figure 14 – Central York County Connections Study Area



In conjunction with the CYCCS, it was requested that the number of Maine Turnpike patrons traveling to and from the study area be examined. Table 19 summarizes the number of O&D surveys that recorded a trip that either started or ended within the CYCCS area. Then, using average daily traffic volumes for Turnpike interchanges within the study area, HNTB estimated the potential volumes for an east-west corridor connecting directly to the Turnpike.

Table 19 - Estimated Central York County Corridor Usage

	Interchange		
	19	**25**	**32**
Surveys w/ Destination in CYCCS Area	79	96	266
Total Surveys Received	1,004	990	1,362
% Within CYCCS Study Area	7.9%	9.7%	19.5%
AADT	13,675	9,248	22,405
Potential E-W Corridor Volume	**1,076**	**897**	**4,376**

The following observations may be drawn from Table 19:

- The potential east-west corridor volume is 6,349 vehicles per day. This is about 70% higher than the potential east-west volume calculated for the Gorham Study Area (see Table 18).
- A strong majority (about 70%) of these east-west travelers connect to the Turnpike at Exit 32. The remaining 30% of east-west travelers connecting to the Turnpike in this region are relatively evenly split between Exits 19 and 25.

These numbers don't necessarily suggest that an east-west corridor in Central York County would be busier than a similar facility connecting Gorham to South Portland. There are two reasons for this. First, these numbers only indicate *potential* volumes; it is unlikely that *all* east-west travelers connecting to the Turnpike would use these routes if they were built. Second, these numbers say nothing about the potential volume of *through traffic* (i.e., traffic that does not connect to the Turnpike) on these facilities. It is likely that a prospective east-west corridor serving the Gorham Study Area would serve a greater volume of through traffic than a CYCCS corridor, since the corridor's eastern end would serve a greater number and variety of possible destinations.

5.3 ZOOM COMMUTER BUS SERVICE BETWEEN LEWISTON/AUBURN AND PORTLAND

ZOOM is a commuter bus service operated by ShuttleBus and funded by the Maine Turnpike Authority and the Maine Department of Transportation. It offers commuters between Biddeford-Saco and Portland an alternative means of transportation. ZOOM uses the Park & Ride lots at Exits 32 (Biddeford) and 36 (Saco) as pickup points, providing connections to various

destinations in Portland. Approximately 138 boardings per weekday were served by ZOOM in 2010.[9] The bus service does not operate on weekends or holidays.

Extending ZOOM commuter bus services to include trips between Lewiston-Auburn and Portland has become a topic of consideration recently. In order to better understand potential usage of a northern extension of ZOOM commuter bus service, survey cards reporting weekday trips between Lewiston-Auburn and Portland were reviewed. They were subsequently compared with a review of survey cards between Biddeford-Saco and Portland. The results may be summarized as follows:

- The survey cards indicated that **19.4%** of vehicles using Exits 32 or 36 were destined for (or returning from) downtown Portland on weekdays.
- A total of **65,880** vehicles used these two interchanges on an average weekday in 2010.
- Therefore, an estimated total of **12,780** trips per weekday traveled between Biddeford-Saco and Portland. [Note: 0.194 × 65,880 = 12,780]
- The ZOOM bus served about **138** trips per weekday.
- Therefore, ZOOM serves about **1.1%** of the trips traveling between Biddeford-Saco and Portland. [Note: 138 ÷ (12,780+138) = 0.011]
- The survey cards indicated that **13.2%** of vehicles using Exits 75 (Auburn) or 80 (Lewiston) were destined for (or returning from) Portland on weekdays.
- A total of **31,040** vehicles used these two interchanges on an average weekday in 2010.
- Therefore, an estimated total of **4,100** trips per weekday traveled between Lewiston-Auburn and Portland.
- If it is assumed that the ZOOM market share between Lewiston-Auburn and Portland would be the same as between Biddeford-Saco and Portland, then one could expect that **1.1%** of all trips traveling between Lewiston-Auburn and Portland would use the ZOOM bus service.
- If that is the case, then an estimated **46 trips per day** could be expected to be served by a ZOOM shuttle between Lewiston-Auburn and Portland.

In other words, if the popularity of ZOOM in Lewiston-Auburn matches its popularity in Biddeford-Saco, then a little less than 50 trips per day would be served.

[9] A typical commuter traveling to and from his place of work would make two boardings per day—one heading to work, and one heading home.

Appendix A. SURVEY PLANNING DOCUMENTATION

This appendix provides the supporting documentation for the information in Section 2.

SURVEY TIMING

HNTB and the Authority considered five key factors when determining the timing of the survey. These factors are summarized below.

1. Traffic and Revenue forecasting for the Authority is conducted on a 10-year basis. This information is required by Maine Turnpike Authority ("the Authority") bond holders. Wilbur Smith Associates (WSA), the engineering firm responsible for these reports, required additional information regarding patron response to the possible implementation of Open Road Tolling (ORT) at York. WSA provided HNTB with the following question for the survey card:

   *Unlike current **E-ZPass** lanes which require you to slow down at the plaza, Open Road Tolling (ORT) allows **E-ZPass** customers to travel through toll locations at full highway speeds. Cash customers would have the option to continue to use a redesigned cash plaza. If ORT were implemented at some locations on the Maine Turnpike, would you continue to use the redesigned cash plazas or would you purchase and use an **E-ZPass**?*

   In order to meet WSA's late September deadline, the survey had to be distributed no later than the beginning of August. Given a two-month window to prepare, the earliest the survey could be conducted was August.

2. The Authority routinely updates information regarding the travel patterns and general characteristics of its patrons in order to plan effectively. Previous O&D studies have been conducted on a five- to eight-year basis by HNTB for the Authority. The last study was conducted in May of 2004. Since then, the Maine Turnpike Authority has implemented a new ETC system and has instituted two toll rate adjustments. Given these significant changes, it was appropriate to update this information regarding the Authority's patrons.

3. The past O&D surveys have been conducted on an alternating pattern between capturing a "typical" travel period (represented by spring or fall traffic) and a "peak" travel period (represented by summer traffic). The survey conducted in May of 2004 captured a typical travel day; therefore, the Authority wanted to capture a summer

travel period in 2010. This survey could also serve as a follow-up to the summer travel survey performed in 1998.

Table A-1 summarizes the average daily traffic (ADT) volumes on the Maine Turnpike in 2009. The ADT in August is clearly the highest volume period of the year, and the best opportunity to capture a summer travel day.

Table A-1 – Average Daily Traffic, Maine Turnpike, 2009

Month	Average Daily Traffic
January	138,760
February	144,042
March	146,857
April	157,190
May	163,428
June	174,173
July	194,150
August	**200,930**
September	177,146
October	168,672
November	153,508
December	150,333

4. The Authority wanted to capture both a weekday and weekend travel day. As such, surveys were distributed at all locations twice—once on a weekday (Tuesday, Wednesday, or Thursday) and once on a weekend (Saturday or Sunday).

5. To avoid causing traffic delays, survey distribution times were determined based on the average hourly traffic through the interchanges. The assumption was made that, during the survey distribution, a rate of 300 vehicles per hour per lane would pass through without delaying traffic. Where possible, distribution times were scheduled to catch part of the peak traffic period. However, this was not possible at all locations due to high traffic volumes.

SURVEY DISTRIBUTION PLAN

Once the survey distribution days and times were determined, it was necessary to establish a distribution method. In doing such, the following goals were set:

- **Capture all patrons – *E-ZPass* and cash-paying**. In the past, surveys were sorted and distributed based on the method of toll payment. Cash-paying patrons received a survey card via a toll collector, while ETC patrons received a survey card by mail. However, since no address information existed for out-of-state ***E-ZPass*** customers, it was necessary to prepare a method to distribute to **all** patrons to ensure the capture of data from all payment types.

- **Incorporate all patrons entering from free interchanges.** Since there are no toll plazas between the New Gloucester Plaza and the West Gardiner Plaza, it was necessary to develop a method of including in the survey patrons entering at Auburn, Lewiston and Sabattus.

- **Ensure the survey is statistically valid.** To accurately depict a summer travel day on the Maine Turnpike, it was necessary for the survey to be statistically valid. To meet this criterion, HNTB had to design a method of distribution that would encourage patron participation.

- **Distribute all surveys**. Due to problems with survey distribution in 1998 and 2004, it was important to develop a method that ensured *all* surveys were distributed to patrons. This necessitated a more hands-on method of distribution that did not involve adding more responsibilities to the toll attendants.

These goals were achieved by the following steps.

I. Step 1 – Identify locations for survey distribution

To design an effective distribution process, it was necessary to determine the exact locations where the survey cards would be distributed. HNTB made the decision that cards should be distributed at **all entry locations** to the Maine Turnpike. These locations were:

- York Plaza – NB Only
- Entry only at the following interchanges: Wells, Kennebunk (NB and SB), Biddeford, Saco, Scarborough, South Portland, Jetport (NB and SB), Rand Road, Riverside, West Falmouth and Gray
- I-295 Southbound entry onto the Maine Turnpike at Interchange 44
- Falmouth Spur entry onto the Maine Turnpike at Interchange 52
- Entrance ramps (NB and SB) at Auburn, Lewiston and Sabattus
- West Gardiner/I-95 Plaza, SB entry only
- Gardiner/I-295 Plaza, NB and SB

This approach captured all entry points to the Maine Turnpike. To ensure that all vehicles were stopped and received a card from a distributor, traffic control plans were coordinated for each location. These plans included advanced warning signs and regulatory 'Stop' signs at all locations. At locations with heavy traffic volumes, as well as at Auburn and Lewiston, state police assisted in alerting patrons to the necessity to stop.

II. Step 2 – Develop a statistically valid survey

Based on predictions and standards set by the 2004 O&D study, a confidence level of 95% (with a confidence interval of ±5%) was attempted. In an effort to meet this criterion, a formula—suggested by Dr. Charles Colgan from the University of Southern Maine—was used to help determine the number of surveys to be distributed. The formula used was:

$$n = \frac{Z^2(.25)N}{Z^2(.25) + (N-1)C^2}$$

Where:

- **n** is the required number of responses to be "statistically valid"
- **N** is the population—that is, the average number of patrons who enter the Maine Turnpike at a particular location each day
- **Z** is the Z score (Z=1.96 for a 95% confidence level)
- **C** is the confidence interval desired

With a 95% confidence level, and a confidence interval of ±5%, the formula simplifies to:

$$n = \frac{0.9604N}{0.9579 + 0.0025N}$$

This formula allowed for the calculation of the number of *responses* required to meet a 95% confidence interval. However, in order to determine the number of cards to be distributed, it was necessary to estimate a response rate. Based on the response rate of the 2004 O&D study, a response rate of 12.5% was chosen

Table A-2 summarizes the required number of survey responses and the recommended number of surveys to be distributed at each entry point.

Table A-2 – Survey Distribution Plan by Interchange

Interchange	Average Daily Entering Traffic	# Responses Required	# Surveys to be Distributed
York Plaza	30,771	379	3035
Wells	9,362	369	2952
Kennebunk	5,506	359	2873
Biddeford	12,459	373	2982
Saco	15,622	375	3000
Scarborough	6,407	362	2900
I-295 SB	13,455	374	2988
South Portland	11,523	372	2974
Jetport	7,825	366	2930
Rand Rd.	4,531	354	2834
Riverside	9,827	370	2958
Falmouth	8,868	368	2946
West Falmouth	5,446	359	2871
Gray	8,730	368	2944
Auburn	8,954	368	2947
Lewiston	6,384	362	2899
Sabattus	2,438	332	2656
West Gardiner Plaza	7,741	366	2928
Gardiner/I-295	25,080	378	3027

It was decided to round numbers off, such that a total of 3,000 surveys would be distributed per interchange. The only exceptions were the toll plazas at York and Gardiner/I-295. At these interchanges, 6,000 and 4,500 surveys were distributed, respectively. The reasons for these changes are discussed below:

- Existing projects at the **York Plaza**, as well as the provided question from WSA, required a larger sampling size at the entry point. This was primarily because HNTB sought a statistically valid sample of both cash-paying patrons and ***E-ZPass*** patrons at York.

- After originally distributing 3,000 cards at **Gardiner/I-295**, it was deemed another 1,500 cards should be distributed due to heavy traffic volumes at the plaza. These were needed to acquire statistical validity in both the NB and SB directions.

III. *Step 3 – Allocate surveys to northbound vs. southbound, weekdays vs. weekends*

At some locations, like Kennebunk and the Jetport, it was necessary to separate cards by direction of travel. A ratio derived from the average NB/SB traffic split at the interchange was calculated based on traffic counts from the first two weeks of August 2009.

The Authority made the decision to distribute surveys on both weekdays and weekends. Thus it was necessary to determine the numbers of surveys to be distributed at each location on these two days.

A ratio of weekday traffic versus weekend traffic was calculated based on traffic counts at each interchange that were observed in the first two weeks of August 2009. This ratio was multiplied by the total number of surveys to be distributed at that location. At interchanges with heavier commuter traffic (e.g., Rand Road), a greater number of surveys was distributed on the weekdays. Conversely, at interchanges with tourist-based traffic, a greater proportion of surveys was distributed on weekend days.

Table A-3 illustrates the number of surveys to be distributed by direction on a weekend and weekday. As noted earlier, 3,000 cards were distributed at each interchange (with the exception of York and Gardiner/I-295). The variation from one interchange to another concerned the distribution by type of day and (where applicable) by direction.

Table A-3 – Total Survey Distribution by Weekday and Weekend

Location	Total Surveys	# Weekday	# Weekend
York Plaza (NB)	6000	2714	3286
Wells NB (19)	1710	889	821
Wells SB (19)	1290	581	710
Kennebunk NB (25)	1770	1038	732
Kennebunk SB (25)	1230	568	662
Biddeford (32)	3000	1679	1321
Saco (36)	3000	1584	1416
Scarborough (42)	3000	1500	1500
I-295 SB (44)	3000	1290	1710
So. Portland (45)	3000	1830	1170
Jetport NB (46)	1950	1307	644
Jetport SB (46)	1050	735	315
Rand Rd. (47)	3000	1950	1050
Riverside (48)	3000	1680	1320
Falmouth Spur (52)	3000	1560	1440
W. Falmouth (53)	3000	1770	1230
Gray (63)	3000	1560	1440
Auburn NB (75)	1290	761	529
Auburn SB (75)	1710	975	735
Lewiston NB (80)	690	428	262
Lewiston SB (80)	2310	1340	970
Sabattus NB (86)	600	324	276
Sabattus SB (86)	2400	1320	1080
West Gardiner Plaza (SB)	3000	1590	1410
Gardiner NB (103)	2220	1529	691
Gardiner SB (103)	2280	1439	842

It was decided that a classification system to catalog cards by location would be implemented for each card. Cards were numbered by location. The first card distributed was number 00002 in Wells; the numbers then increased by order of interchange and concluded with card number 61,500 at Gardiner/I-295.

Table A-4 depicts survey identification numbered cards by location and by weekday and weekend.

Table A-4 – Survey Card Numbers by Location

Location	Survey # Weekday	Survey # Weekend
York (NB) Plaza	03001 -- 05714	05715 -- 09000
Wells NB (19)	00583 -- 01470	02181 -- 03000
Wells SB (19)	00002 - 00582	01471 - 2180
Kennebunk NB (25)	09001 -- 10038	10607 -- 11338
Kennebunk SB (25)	10039 -- 10606	11339 -- 12000
Biddeford (32)	12001 -- 13678	13679 -- 15000
Saco (36)	15001 -- 16584	16585 -- 18000
Scarborough (42)	18001 -- 19549	19500 -- 21000
I-295 SB (44)	21001 -- 22289	22290 -- 24000
So. Portland (45)	24001 -- 25829	25830 -- 27000
Jetport NB (46)	27001 -- 28306	29042 -- 29685
Jetport SB (46)	28307 -- 29041	29686 -- 30000
Rand Rd. (47)	30001 -- 31949	31950 -- 33000
Riverside (48)	33001 -- 34679	34680 -- 36000
Falmouth Spur (52)	36001 -- 37559	37560 -- 39000
W. Falmouth (53)	39001 -- 40769	40770 -- 42000
Gray (63)	42001 -- 43559	43560 -- 45000
Auburn NB (75)	45001 -- 45760	46735 -- 47264
Auburn SB (75)	45761-- 46735	47265 -- 48000
Lewiston NB (80)	48001 -- 48427	49768 -- 50030
Lewiston SB (80)	48428 -- 49767	50031 -- 51000
Sabattus NB (86)	51001 -- 51324	52665 -- 52920
Sabattus SB (86)	51325 -- 52644	52921 -- 54000
W. Gardiner Plaza	54001 -- 55590	55591 -- 57000
Gardiner NB (103)	57001 – 57779; 60000 -- 60750	58469 -- 59159
Gardiner SB (103)	57780 – 58469; 60,751 -- 61,500	59160 -- 60000

IV. Step 4 – Traffic control and the act of survey distribution.

Once steps had been taken to calculate a valid number of surveys to be distributed at each location, further steps were needed for refinement to the distribution process. As mentioned previously, it was determined that all patrons were to be stopped during the survey distribution process. This required a change in regular traffic patterns.

Sign layouts were created for each distribution location, per the Manual on Uniform Traffic Control Devices (MUTCD) (2009 Edition). The following signs were chosen for use:

- **Survey Crew**. 48” x 48” diamond shape sign; orange with black border and legend.
- **At Plaza**. 12” x 36” rectangular shape sign; orange with black border and legend. Used at toll locations only.
- **Be Prepared to Stop**. 48” x 48” diamond shape sign; orange with black border and legend.
- **Stop Ahead**. 48” x 48” diamond shape sign; orange with black border and legend.

- **All Vehicles Must Stop**. 48" x 48" diamond shape sign; orange with black border. Used at plaza locations only.
- **Stop**. 36" x 36" regulatory stop sign.

All above signs were used at plaza entry points, spaced according to MUTCD guidelines. Limited space at some of the smaller interchanges required the removal of 'All Vehicles Must Stop' signs from the sign layout and mandated smaller spacing between warning signs.

Regulatory stop signs were placed just before the concrete barriers at interchanges with toll plazas, and just before survey distributors at free interchanges. Where hourly traffic volumes were heavy, at mainline plazas and at free interchanges, state police assisted with alerting vehicles to the change in traffic patterns.

There was concern over stopping ***E-ZPass*** customers in '***E-ZPass*** Only' lanes, due to the fact these patrons were not used to stopping in the lanes. Wherever possible, '***E-ZPass*** Only' lanes were closed to ensure the safety of survey distributors by forcing all vehicles to travel through 'Any Vehicle' lanes.

The number of distributors assigned to each location was based on (a) the number of toll lanes at tolled interchanges, and (b) the anticipated volume of traffic at free interchanges. A shift leader was designated at every location to ensure proper sign set up, complete card distribution, and appropriate safety procedures. A rotating schedule allowed survey distributors to take breaks when necessary.

The actual distribution of surveys went as follows:

- Drivers were waved forward from the regulatory 'Stop' signs towards the position of the survey distributers.

- Once vehicles had reached a complete stop, distributors offered a survey card to the driver accompanied with the following explanation:

  'Hi, we are doing a survey for the Maine Turnpike. The postage is pre-paid. If you take time to fill it out for us you are entered for a chance to win one of 100 gift cards.'

  Explanations varied at some locations as time did not always allow for this description. At the very least, drivers were informed the survey was for the Maine Turnpike. The survey was voluntary and drivers were not forced to take a card.

- If a driver refused to take a survey card, distributors simply thanked the driver for stopping and allowed him to continue driving.

V. Step 5 – Implement an incentive

Unlike past surveys, the Authority chose to implement an incentive program to encourage patron participation. This decision was based on low response rates from previous surveys and the need for a statistically valid sample.

The Turnpike decided to award $25 Visa gift cards to a random sampling of 100 survey respondents. Patrons were offered the opportunity to enter the drawing by including their address in a provided space on the survey card. The incentive opportunity was not mandatory for survey participants, and participants employed by or related to an employee of the Authority and HNTB were exempt from the drawing.

The procedure for the drawing was performed as follows:

- HNTB used the *RANDBETWEEN* function to identify the prospective winners. In Excel, HNTB input the equation [=RANDBETWEEN (2, 61501)] into one of the cells. Each time the equation was input, the program randomly selected a number between 2 and 61,501. Note that Survey Card 00002 was the first card distributed, and a total of 61,500 cards were handed out over the course of the survey.
- The equation [=RANDBETWEEN (2, 61501)] was copied 1,000 times in Excel, thus generating 1000 random numbers between 2 and 61,501.
- These random numbers were then cross-referenced with the actual survey cards that were returned to the Maine Turnpike Authority. Starting at the first random number generated by Excel, HNTB checked to see if (a) the card had been returned, and (b) the card contained a return address. If both conditions were met, then the card was pulled out and the data input into our master list of "winners". If both conditions were not met, then HNTB went to the next card in the list.
- This process was repeated until 115 survey cards were chosen. The first 100 were considered the "primary winners" and the next 15 were selected as "alternates" in case any of the "primary winners" provided undeliverable addresses.

The gift cards were mailed out to the first 100 "primary winners". A total of four gift cards were returned to the Authority (due to undeliverable addresses) and subsequently sent to "alternate" winners in order of selection.

RESPONSE RATE SUMMARY

(a) *Overall responses*

As noted in the previous section, the number of distributed surveys was designed to achieve a 95% confidence level with an assumed response rate of 12.5%. In actuality, the 2010 O&D survey achieved a response rate of 21.3% – a significant increase over the 2004 survey response rate.

Table A-5 depicts the overall rate of return, and the split between weekday and weekend return. The rate of return for weekdays was slightly greater than the rate of return for weekends.

Table A-5 – Rate of Return Summary

	Surveys Distributed	Surveys Returned	Rate of Return
Weekday	33,939	7,465	22.0%
Weekend	27,561	5,630	20.4%
Total	***61,500***	***13,095***	***21.3%***

*(b) Responses by cash vs. **E-ZPass***

HNTB distributed survey cards to all patrons passing through plazas at the designated times, regardless of whether cash or ***E-ZPass***. This allowed cards to be distributed to patrons based on interchange usage and not method of toll payment. Patrons were distinguished only by their response to question 13 of the card:

*Do you own an **E-ZPass**?* ☐ *Yes* ☐ *No*

Table A-6 summarizes the rate of response based on cash vs. ***E-ZPass***. Of all responses, more than two-thirds are from ***E-ZPass*** patrons.

Table A-6 – Rate of Return, *E-ZPass* vs. Cash Customers

Method of Tolling	Surveys Returned	Response Rate
Cash	4,151	31.86%
E-ZPass	8,878	68.14%
Total	13,029*	100.00%

*Note: The total of 'Surveys Returned' is 66 surveys short of the actual number of returned surveys. This is because not all patrons answered Question 13 that allowed for the classification of cash vs. ***E-ZPass***.

(c) Responses by location

Table A-7 summarizes the number of responses for each Turnpike entry point. The table also includes columns representing the number of surveys distributed. The right-most column

represents the confidence interval, assuming a confidence level of 95%. The goal was to have a confidence interval that was less than or equal to 5%.

Table A-7 – Response Rate and Confidence Interval by Location

Location	Distributed Surveys	Returned Surveys	Population	Response Rate	Confidence Interval
Auburn	3,000	737	8,954	24.6%	2.98%
Biddeford	3,000	628	12,459	20.9%	3.10%
Falmouth	3,000	564	8,868	18.8%	3.12%
Gardiner/I-295	5,494	1180	25,080	21.5%	2.45%
Gray	3,000	598	8,730	19.9%	3.09%
I-295 SB	3,000	617	13,455	20.6%	3.12%
Jetport	3,000	614	7,825	20.5%	3.07%
Kennebunk	3,000	656	5,506	21.9%	2.97%
Lewiston	3,000	649	6,384	21.6%	3.00%
Rand Rd	3,000	648	4,531	21.6%	2.93%
Riverside	3,000	572	9,827	19.1%	3.13%
Sabattus	2,006	506	2,438	25.2%	2.91%
Saco	3,000	648	15,622	21.6%	3.10%
Scarborough	3,000	689	6,407	23.0%	2.97%
South Portland	3,000	644	11,523	21.5%	3.08%
Wells	3,000	543	9,362	18.1%	3.14%
West Falmouth	3,000	777	5,446	25.9%	2.85%
West Gardiner Plaza	3,000	634	7,741	21.1%	3.04%
York Plaza	6,000	1191	30,771	19.9%	2.22%

Two important conclusions can be drawn from Table A-7:

- All locations show individual response rates greater than 18%. These rates range from 18.1% to 25.9%, all of which are greater than the estimated 12.5% return rate.
- The confidence intervals at all entry locations are less than 5%. Thus, each location meets a 95% confidence level.

In short, the survey was statistically valid for a 95% confidence level and achieved a rate of response above the estimated result.