

# The Commonwealth of Massachusetts

AUDITOR OF THE COMMONWEALTH

STATE HOUSE, BOSTON, MASSACHUSETTS 02108

TEL. (617) 727-2075

A. JOSEPH DeNUCCI

AUDITOR

2009-0509-3A4

August 5, 2009

The Honorable Richard R. Tisei  
The Honorable Bruce E. Tarr  
The Honorable Michael R. Knapik  
The Honorable Robert L. Hedlund  
The Honorable Scott P. Brown  
Massachusetts State Senate  
State House, Boston Massachusetts 02133

Dear Senators:

In response to your request, the Office of the State Auditor has conducted a limited scope audit of the Massachusetts Turnpike Authority's (MTA) Fast Lane Program to determine (1) the extent of overcharges relating to faulty axle readings of vehicles with transponders, (2) the cause of the faulty readings, and (3) what actions MTA has taken to remedy the problem. Our audit, which covered the period July 1, 2007 to June 22, 2009, was conducted in accordance with applicable generally accepted government auditing standards for performance audits and included such tests of the system as we deemed necessary, including interviews with MTA management and consultants and the examination of other appropriate evidence to support our conclusions. In addition, the objectives of our audit were designed to answer your specific questions, as follows:

1. The number of transactions in which overcharges have occurred.
2. The number of motorists who have been overcharged for tolls collected.
3. The defects in the collection system that have caused overcharging to occur.
4. Any appropriate means to refund those who have been overcharged.
5. The amounts of toll funds that have been overcharged.
6. Systemic safeguards which can be employed to prevent overcharging of tolls in the future.

Fast Lane is an electronic toll collection (ETC) system that is interoperable with the EZ pass system used in more than a dozen states. MTA has a contract with TransCore to operate the three Fast Lane service centers located in Auburn, Natick, and East Boston and to provide customer service on its behalf. TransCore enrolls Fast Lane customers, issues Fast Lane tags, sets up Fast Lane accounts, processes account payments, identifies toll violations, and provides other customer services. TransCore also operates a computer system known as the Advanced Revenue Collection System

(ARCS) to track all Fast Lane activity. A motorist may use Fast Lane if an Automatic Vehicle Identification (AVI) tag, also known as a transponder, is affixed to the front of his or her vehicle. Each tag is encoded with the vehicle's class. The signal is read and then verified by the Automatic Vehicle Classification (AVC) system at the toll collection booth. The AVC system uses loops, light curtains, and treadles in order to distinguish different classes of vehicles. The loop detects a vehicle as it enters an electronic toll plaza lane; the treadle in the pavement registers axle pressure and counts axles while a light curtain sees the beginning of the vehicle and the end of the vehicle as it passes by. In an express lane, an overhead scanner is used in place of a light curtain (See Attachment 1).

The Turnpike currently has 10 different vehicle classes (Class 1 through 10) classified by the total number of axles (See Attachment 2). As a vehicle passes through the electronic toll plaza's lane, the AVC system will read the transponder information. Each toll is calculated based on the distance traveled and the vehicle class, then is automatically charged against the motorist's account. If there is a mis-match between the vehicle class as signaled from the transponder and the class determined by the in-lane equipment, this transaction will be flagged as an "Under Class" event within the ARCS.

In order for the MTA and TransCore to make a determination as to which Under Class events were overcharging motorists, additional data was reviewed to ascertain whether other Under Class events occurred at other locations along the Turnpike within the same day (+/- 24 hours) as the identified Under Class event. For example, if a motorist was identified passing through other toll booths during the same day, or 24 hours before or after that time period, with fewer axles than that amount identified by the original Under Class event, that motorist would be identified as being overcharged and eligible for a refund. This test was extended to include an entire calendar month where nine or more Under Class events occurred. Any remaining Under Class events where a full determination could not be made because there were no other same day transactions were identified as unknown. Such a case could occur where a vehicle could have exited the Turnpike where there was no tollbooth to record the transaction.

The MTA and TransCore then designed and ran a report through ARCS for the entire 2008 fiscal year. The report revealed that there were over 119,000,000 Fast Lane ETC transactions during fiscal year 2008, 1,460,853 of which were Under Class events. MTA's review of the data identified Class 1 vehicles as having the greatest amount (461,336) of Under Class events. In order to validate the 1,460,853 Under Class events, the MTA and TransCore selected recent Under Class transactions for a single day (March 4, 2009) from a small selection of lanes at one Turnpike Interchange. According to

MTA management, "March 4, 2009 was selected as it was a weekday (Wednesday) and therefore had the normal mix of commuter and commercial traffic."

Results from this data proved to be consistent with the previous tests, in that the vehicles that were overcharged on March 4, 2009 were identified as Fast Lane private Class 1 passenger vehicles. In order to assess whether we could rely on the results of the analysis, we performed audit tests on transactions that had been identified as possible overcharges to ensure that the methodology employed by the MTA and TransCore was accurate, valid, and complete. Our results were consistent with those of the MTA and TransCore for the 75 transactions we examined. Further analysis and review by the MTA and TransCore of the data which had been developed resulted in the identification of 113,940 transactions totaling \$190,441.40, for an average of \$1.67 per overcharge. These results also identified 31,468 unknown Under Class events that were valued at \$53,443.25.

It was also determined that intermittent malfunctions of computer equipment at the electronic toll plazas caused motorists to be overcharged while using the Turnpike. The MTA and TransCore have identified and repaired equipment malfunctions including the replacement hardware for malfunctioning loops and improved the maintenance of light curtains whose sensors were blocked by snow and roadway salts or other contaminants splashed on the glass with more frequent cleaning. In addition, MTA and TransCore continue to investigate issues regarding Fast Lane overcharging that occurred when overhead scanners in the express lanes were unable to separate vehicles following too closely behind one another. We determined that although motorists have their own transponder, the AVC system has at times read the closely following vehicle as a different type of vehicle and charges that motorist an incorrect toll amount. This separation of vehicles has yet to be rectified and is particularly problematic during congested conditions when vehicles may be only inches apart. We also determined that the MTA had neither requested nor had TransCore completed Annual Certification Tests mandated by state contract for 2007 or 2008. We feel that the performance of these Annual Certification Tests might have alerted personnel that ETC lane equipment, such as sensors, were failing to perform to specifications.

Based upon our tests of the data provided to us, we concur with the conclusion that there were 113,940 transactions out of over 119,000,000 ETC transactions where Fast Lane motorists were overcharged, (a 0.096% error rate), which falls within MTA's contract provision with TransCore requiring ETC computer equipment to operate at a 99.5% accuracy rate. Equipment malfunctions were identified as the defects in the ETC system that caused some overcharging to occur, and these equipment malfunctions have been repaired. The MTA has determined that an appropriate means of

refund will be to credit any Fast Lane motorist's account that has been identified by the analysis as being overcharged. The amount of toll funds to be refunded totals \$190,441.40.

We recommend that the MTA ensure that TransCore complete the 2009 Annual Certification Test of ETC lane equipment that is currently in progress. We also recommend that the MTA and TransCore enhance their ETC preventive maintenance program by conducting quarterly reviews of Under Class events in order to detect any trends outside of the established guidelines, and continue to investigate Fast Lane overcharges due to the failure of overhead scanners in the express lanes to separate vehicles following too closely behind one another. Lastly, we recommend that the MTA and TransCore perform the same analysis for the year 2009 in order to determine whether there were any additional transactions where Fast Lane motorists were overcharged.

The MTA has reviewed this report, and agrees with the findings and recommendations of the State Auditor. The MTA further stated:

- *We are in the process of completing the FY09 Annual Certification Test.*
- *We have enhanced the ETC prevention maintenance program and will perform procedures to identify incorrect charges in a more timely manner. Additionally, vehicles charged incorrect amounts will be corrected within 30 days.*
- *The Turnpike will perform the same process on the year to date 2009 transactions.*

We hope that you find our audit and the MTA's response informative, and that it gives you a better understanding regarding the overcharging of Fast Lane motorists. If you should have any further questions, please do not hesitate to contact me or my Deputy for Audit Operations at (617) 727-6200.

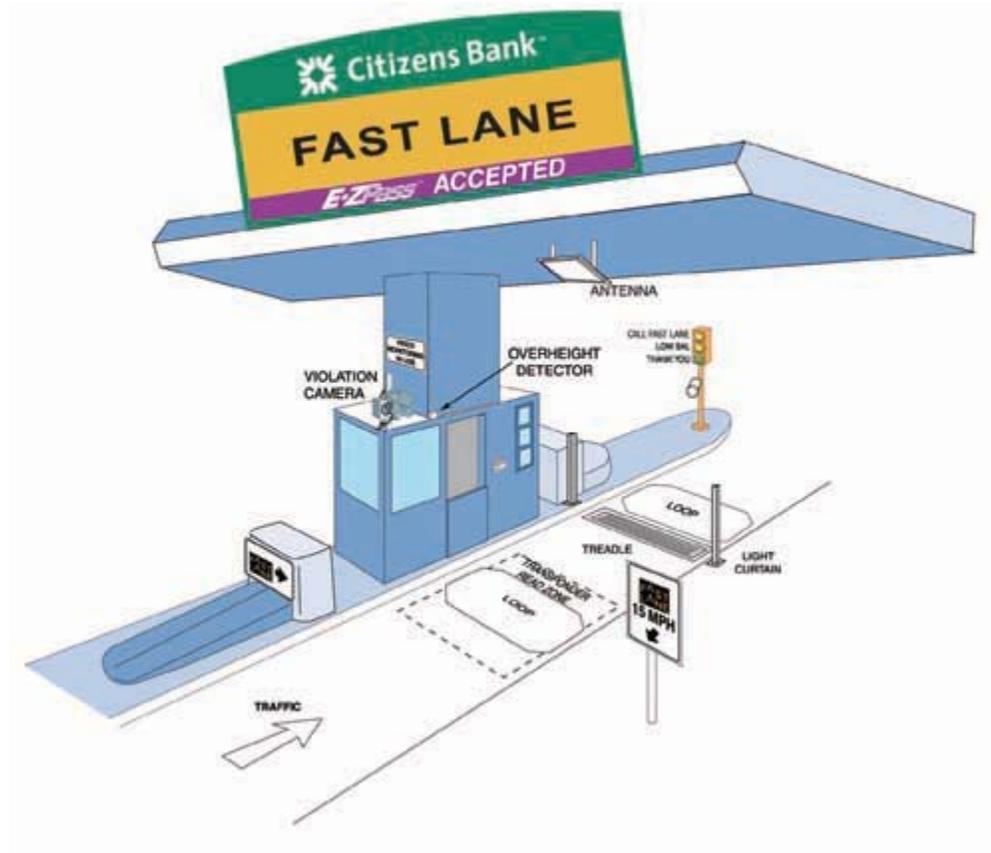
Sincerely,

A handwritten signature in black ink, appearing to read "A. Joseph DeNucci". The signature is written in a cursive, flowing style.

A. JOSEPH DeNUCCI  
Auditor of the Commonwealth

### Attachment 1

#### FAST LANE Toll Plaza



A Fast Lane-equipped vehicle travels through a Fast Lane at a toll plaza. The transponder identifies the vehicle as a participant in the program and gives the vehicle a green light, indicating that the transponder has automatically recorded the toll to the member's Fast Lane account.

## **Attachment 2**

### **Vehicle Class/Type Classifications**

#### **Class 1 - 2-Axle Passenger Vehicles**

- Passenger car.
- Light truck.
- Van.
- Motorcycle (with or without sidecar).

#### **Class 1 - Commercial Vehicles**

- Any Class 1 vehicle with commercial licenses plates, including taxis, hearses, and 2-axle limousines.

#### **Class 2 - 3 to 5 axle vehicle**

- Any Class 1 vehicle with a 1-, 2-, or 3- axle trailer.
- Any Class 1 vehicle with a 1-, 2-, or 3- axle unit that straddles the vehicle body.
- A 3- or 4- axle RV with single wheels.
- A 3- or 4- axle limousine.

#### **Class 3 - 5 to 9 axle truck**

- Tractor-trailer, car carrier, or truck with 5 to 9 axles.

#### **Class 4**

- Not used.

#### **Class 5**

- Any 2-axle vehicle with dual rear tires, including tow trucks.

#### **Class 6**

- Tractor, tractor-trailer, truck, or RV with dual wheels and 3 axles

#### **Class 7**

- Car carrier, truck, tractor-trailer, RV, or any vehicle with dual wheels and 4 axles.

#### **Class 8**

- Any 2- or 3-axle bus used to carry 15 or more passengers.

#### **Class 9**

- 5- to 12-axle tandem-trailer (Double Bottom).

#### **Class 10**

- Non-revenue accounts.