

**STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

Maine Turnpike Authority)	
Natural Resources Protection Act)	
Site Location of Development Act)	PRE-FILED DIRECT TESTIMONY
York Tollbooth Replacement)	OF MARSHALL JARVIS
L-27241-TG-A-N)	
L-27275-TP-A-N)	

I. Introduction and Summary

My name is Marshall N. Jarvis, II, and I am providing testimony on the operation and benefits of an “All Electronic Tolling” system, or AET, as an alternative to the “Open Road Tolling,” or ORT, facility proposed by the Maine Turnpike Authority for replacing the existing York Tollbooth.

As noted in MTA’s application, its proposed ORT facility will utilize both highway-speed lanes and cash-collection lanes. This design is similar to the Hampton, NH tollbooth. Drivers with electronic toll collection transponders (in this area of the country called E-ZPass transponders) may utilize the highway speed lanes and pay the toll automatically, while cash customers are diverted from the main roadway to cash booths to pay the toll.

In an AET system there are no cash lanes. Drivers with E-ZPass transponders pay the toll the same way as in an ORT facility, but “cash” customers are billed by mail—so-called “pay by plate.” A picture is taken of the cash customer’s license plate, and an invoice is sent by mail for payment of the toll. A fee is added to the cash customer’s bill to cover administrative costs of sending the invoice and to encourage drivers to convert to E-ZPass use. There are benefits and challenges to an AET system, as discussed below, but without question the use of AET systems is on the rise in many states, including Massachusetts, New Hampshire and New York, to name a few close states. Further, improvements in video technology and increases in E-ZPass

usage rates are encouraging many states to convert to AET.

In this proceeding MTA has proposed an ORT facility that will result in wetland and other impacts. MTA concedes that an AET facility, with its significantly smaller footprint, would not cause any environmental impact. This includes the avoidance of all site impacts (no large tollbooth, no access road, no parking lot, no administration building—no risk to turtles!). Further environmental benefits are realized through reduced gasoline use and greenhouse gas emissions.

The primary drawback of an AET facility is “leakage”—the term given for the toll revenues lost when non-E-ZPass customers do not pay the toll, either because the video camera cannot read their license plate, DMV information is not accurate, or the driver simply ignores the mailed invoice. The trend in the industry shows that leakage rates are going down, and E-ZPass use is going up, which makes AET a practicable alternative for MTA for the replacement of the York Tollbooth.

II. Education and Professional Background

I am the Chairman of Jarvis Cutting Tools, an engineering company that designs and manufactures special precision cutting tools for aerospace materials, located at 100 Jarvis Avenue, Rochester, New Hampshire. I have been the Chairman of Jarvis Cutting Tools since 2014, and before that I was an executive of Jarvis Company. Jarvis Company is a worldwide manufacturer of meat machinery, machine tools, experimental jet engine blades and vanes, artificial knees and hips, and precision cutting tools.

I obtained a Bachelors in Macro Economics-at Claremont McKenna College, graduating in 1964, and have studied mechanical engineering courses at Harvey Mudd College. I am resident of York Harbor, Maine, where I have lived with my wife Joan since 1974.

III. History and Background with MTA and York Tollbooth Replacement Project

Please see Exhibit “A” for a timeline of the York tollbooth replacement process, and my involvement with this effort. In summary, I have been involved with this project since 2006 when MTA first proposed to replace the York tollbooth. I have attended numerous public meetings held by the MTA and the U.S. Army Corps of Engineers on varying versions of proposed replacement designs. I have met with current and former MTA officials, and have also met with local officials, state legislators, and Governors Baldacci and LePage to discuss options for replacing the York tollbooth.

I have testified on legislation that has required MTA to consider alternatives in replacing the York tollbooth, and have worked with local officials to take action to ensure that the opinions and concerns of local residents are part of this process. I have worked with engineering firms that have evaluated options for the York tollbooth, and have discussed options for tollbooth replacement with numerous media outlets.

In 2006, I, along with my wife and others, organized the citizen group “Think Again,” comprised of residents of the Town of York and other communities, that were advocating for the Turnpike Authority to reduce the environmental and social impacts of its proposed York Tollbooth replacement with the use of All Electronic Tolling, or “AET”. Think Again was active in participating in permitting proceedings back in 2010 when MTA first proposed to relocate the York Tollbooth and its members, which count more than 100, have continued to raise funds, seek engineering guidance, and inform citizens about the practicality of AET as an alternative to the ORT facility proposed by the Turnpike Authority.

IV. Experience With Tollbooth Policy/Engineering

Since 2006, I have spent a significant amount of my personal and professional time on

tollbooth design, engineering and policy. I became involved in the York Relocation Plaza in 2006 when the MTA was playing one town against another on the relocation project to build a new \$60 million plaza where there were no rush hours or congestion except for a few weekends in the summer. I talked to Governor Baldacci's office and they explained that the MTA was an independent agency over which they had no control or influence. Mary Andrews, past State Senator from York, recommended that I discuss potential legislation with the current representatives from York. I spoke with Dawn Hill and Windol Weaver. Representative Weaver agreed to draft legislation to force the MTA to justify the project. The bill was passed unanimously by the Transportation Committee and signed by Governor Baldacci forcing the MTA to justify the project. As a result of this outreach and legislative action, the initial replacement plaza proposed by MTA, a \$60 million facility, was never built.

Since this first failed attempt to reconstruct the York Tollbooth, I have reviewed all of the MTA's filings with state and federal regulatory officials, including traditional all cash lane proposals, the ORT facility currently proposed by MTA, and AET facilities. I have reviewed engineering assessments by many of MTA's consultants and engineers, including those issued by HNTB, CDM Smith, and Jacobs Engineering.

During this time I have met with current and past MTA officials, including Peter Mills and his predecessor, to discuss MTA's plans for replacement of the existing York Tollbooth. I have given presentations on tollbooth options to the York Board of Selectmen, local legislators, and Governor LePage. I have visited and inspected tolling systems in Colorado, Texas, California, Washington, Massachusetts, Connecticut, New York, New Hampshire, Italy, Denmark, Japan, Ireland and the Faroe Islands.

Over this time period I have met with numerous transportation officials to discuss

tollbooth construction, engineering and policy. I have met with and spent time with Peter Goldmark, the retired Chairman of the New York Port Authority and a classmate at Choate College, George Campbell, past head of both the Maine DOT and the NH DOT, Tom Tinlin, current Administrator of the Mass DOT, and many others in the industry.

V. Benefits of AET Systems

There are numerous recognized and accepted benefits of an AET system. HNTB, one of MTA's consulting engineers, has noted that AET provides numerous advantages:

“Safety. Cashless toll collection dramatically reduces roadway accidents by eliminating the need for drivers to stop at a toll plaza.

Environmental friendliness. Motorists no longer need to slow down or leave their cars idling to pay tolls. The result is a reduction in noise and in auto emissions that contribute to air pollution.

Speed. Open-road tolling reduces congestion and helps keep traffic moving at highway speeds.

Convenience. Using license plate imagery, open-road tolling allows all motorists to be treated as customers, even if they don't possess a system transponder.

Fairness. All-electronic tolling distributes the cost of the toll system evenly among users by ensuring that drivers pay based on miles driven.

Cost savings. Open-road tolling helps customers trim fuel consumption by eliminating stop-and-go driving. Customers who sign up for and use transponders to pay their tolls also pay a reduced fee.

Revenue generation. Collecting tolls electronically creates a more consistent revenue flow that can be used to maintain and expand the roadway system.”¹

Further, in this proceeding, it is undisputed that an AET facility would not cause any site-specific environmental damage whereas MTA's proposed ORT facility will adversely impact wetland and other natural resources.

¹ HNTB “Cashless Conversion,” Closing the Miami-Dade Expressway Authority system sets the stage for open-road tolling, 2011 (attached at Exhibit “B”).

These benefits of AET will continue to increase as E-ZPass use increases. In 2007, E-ZPass usage at the York tollbooth was 50%. In 2014, the year CDM Smith did its AET alternatives analysis, E-ZPass use had grown to 64%. Currently, MTA states that E-ZPass use is at 76% at the York tollbooth. This increase is greater than all prior MTA predictions, as well as the figures used by both CDM Smith and HNTB in the AET assessments in the applications filed with DEP. As noted above, CDM Smith used the then-accurate figure of 64%, although that figure is now outdated. The 2009 AET analysis by HNTB Report assumed the York Plaza would not achieve 75% E-ZPass use until 2030, and usage rates have already exceeded this figure. In other words, actual E-ZPass use achieved the 75% goal 14 years before the MTA predicted it.

Improvements in video equipment technology also make AET a more practical option. Raytheon, a major supplier of AET hardware, reports that they have 99.9% image capture accuracy. Their system captures the speed of the vehicle first. Then, it photographs the front license plate, the vehicle itself, and finally the rear license plate. Because transactions are almost always a round trip, the system has multiple opportunities to capture the information. These systems are automated and invoices are sent out on a rational basis; i.e. weekly, bi-weekly or monthly.

There are challenges with AET, namely “leakage,” or the failure of cash customers to pay the toll when invoiced by mail. With some initial AET systems, unreadable license plates were an issue, although current video technology has essentially removed this limiting factor. The Commonwealth of Massachusetts is reporting leakage figures with its new AET system of approximately 4% of total revenue, which is approximately 21% of motorists subject to video/license plate billing. Toll revenues lost through leakage are offset by two other factors—

surcharges on invoiced “cash” customers and reduced O&M costs of AET facilities. Even MTA’s own consultant, CDM Smith, concluded that over the first ten year period MTA would net \$24 million in additional revenues with an AET system, even assuming “leakage” rates from 30-60%, significantly higher than occurring in the new Massachusetts system.

To further reduce lost revenue, Maine is part of a three-state compact with New Hampshire and Massachusetts for collection and enforcement of non-E-ZPass toll collection. As noted by CDM Smith, non-E-ZPass users from these three states account for 73% of all cash customers at the York tollbooth. As these three states have enforcement reciprocity (meaning you cannot renew your vehicle registration if you have outstanding toll charges in any of these states), and given that $\frac{3}{4}$ of cash customers are subject to this enforcement, leakage rates in excess of 27% for cash customers (the out-of-state/Canadian drivers) are difficult to defend.

VI. Rise of AET in New England/United States

In 2016, the International Bridge, Tunnel and Turnpike Association (“IBTTA”) collected tolling information from 36 tolling agencies in 18 states, which agencies account for 80% of all toll revenue in the United States.² This survey data shows that use of cash lanes is decreasing, with numerous tolling agencies converting to 100% AET facilities. As noted in the IBTTA Survey, “[t]olling is moving away from cash and embracing technology—all electronic tolling (AET).” (p. 5). The data shows that from 2010 to 2015, toll collection from electronic systems, including video tolling, increased from 70% to 81%, with cash toll collection dropping from 30% to only 18%. This change in the source of toll revenue has accompanied a significant increase in transponder—or EZ Pass—use, with the number of transponders increasing from 30 million in

² The IBTTA 2016 National Toll Technology Survey is attached at Exhibit “C.”

2010 to 50 million in 2015.³

IBTTA notes that Colorado and Washington State have converted to AET, and as of 2015, California, Kentucky, Florida, North Carolina, Maryland, Delaware, Pennsylvania, and New York had converted toll facilities to AET or were planning to do so. AET has become so widespread and so much more efficient than cash that the federal government mandated that all new toll plazas on federally funded roads must be AET starting in 2016.

In September of 2009 ACS/Xerox issued a “white paper” on AET, noting that “even the most ardent skeptic would find it hard to argue against All Electronic Tolling, because it’s one of those rare innovations that truly benefits everyone involved.” ACS Report p. 2 (attached at Exhibit “E”). ACS concluded that AET increases the efficiency of a toll collection system, while significantly lowering operating costs. ACS noted the growth in AET use in New Jersey and Maryland, and the then improvements in video technology, that accurately capture plate images 99% of the time. ACS also noted the importance of “interoperability”—or the ability of transponders from one state to be used in other states. Fortunately, as noted by HNTB (one of MTA’s engineering consultants in this project) the Maine E-ZPass operates with tolling systems from Maine to Illinois, and south to Virginia, and transponders from these states work in Maine as well.⁴ This significantly increases toll revenues from transponder users, due to the shared

³ As part of Florida’s assessment of AET, the state noted the significant rise in AET facilities from 2010 to 2015—from 7 highway systems in only 3 states and the Province of Ontario in 2010, to 33 highway systems (constructed and in process) in more than 14 states in 2015. Please see the Central Florida Expressway Authority All Electronic Summary at Exhibit “D.”

⁴ See HNTB Tolling Workshop Presented to Joint Transportation Committee, June 2, 2009, attached at Exhibit “F.”

technology of the devices.⁵

Close to Maine, Massachusetts just removed all cash tollbooths from the Massachusetts Turnpike.⁶ E-ZPass usage on the Mass Pike is approximately 73% on the Western Turnpike and 74% on the tunnels, and is 81% on the Boston Extension and 85% on the Tobin Bridge.⁷ MTA estimates that current E-ZPass usage at the York tollbooth is similar, at 76%. MassDOT converted to AET to improve safety, reduce congestion, and to reduce carbon emissions. It is important to note that MassDOT eliminated cash tollbooths both in “commuter” areas, such as the Tobin Bridge and the Boston Extension, and on the Western Turnpike, which section of the highway is less commuter focused, and is used by travelers from many other states and Canada.

With regard to safety, MassDOT reviewed assessments by the National Transportation Safety Board, which concluded that “toll authorities nationwide experience rear-end collision rates that exceed other types of collisions, in part because toll plazas interrupt the flow of high-speed traffic to intermittently collect tolls.” (Tinlin, p. 5). MassDOT noted that the crash rate for the Weston toll plaza is approximately 60% higher than the adjacent mainline section of roadway. (Tinlin, p. 5).

Massachusetts also recognized the significant environmental benefits of AET, due to reductions in idling and acceleration, which the Commonwealth estimated would save between 500 and 2,500 gallons of gasoline per day, and would reduce greenhouse gas emissions by up to

⁵ The International Bridge, Tunnel and Turnpike Association (“IBTTA”) is working on a program to develop nationwide interoperability, and has noted that the E-ZPass system is a model for this effort. See IBTTA Status of Interoperability—September 2016, attached at Exhibit “G.”

⁶ Please see the All-Electronic Tolling Update, Thomas J. Tinlin, Highway Administrator, Highway Division, Mass DOT, November 18, 2015, attached at Exhibit “H.”

⁷ These figures are based on 2015 data. Immediately prior to the conversion in 2016 E-ZPass use overall on the Mass Pike was 75%. In just three months E-ZPass use overall on the Mass Pike has jumped to 86%.

7,800 tons per year.

Conversion to AET also will significantly reduce Massachusetts' O&M costs for operating the MassPike. The AET conversion will negate the need for toll takers and the associated labor and benefits costs, and will allow the state to reallocate some personnel to other projects, such as roadway maintenance and other capital projects. Prior to conversion to AET, the cost to operate the toll collection system was approximately \$56.4 million (for toll collector salaries, cash collection, E-ZPass processing and equipment maintenance). MassDOT estimated that an AET system would only cost \$35-37 million per year—an annual savings of nearly \$20 million. Contracts were awarded to Raytheon to construct the AET system, and to TransCore, MassDOT's existing E-ZPass contractor, for the “back office” operations, including toll collections from non-E-ZPass drivers.

In addition to Massachusetts, in the last several months the State of New Hampshire has placed its plans on hold for ORT facilities in Dover, Rochester, and Salem, NH, pending a further review of the feasibility of AET. Advocates for AET in New Hampshire have noted that the case for ORT was flawed, with overestimates for “unreadable” plate images and “uncollectible” non-E-ZPass customers.⁸

Advocates for AET in New Hampshire noted that on the Tobin Bridge in Massachusetts, approximately 20% of image based revenue went uncollected, as compared to the 50.7% predicted by the engineering firm HNTB for the New Hampshire tolls. HNTB also overestimated “unreadable images” at 25.6%, even though MassDOT reports only 7% “unreadable” images, with Washington State DOT reporting 10%. As noted above, new video

⁸ An assessment of ORT v. AET facilities in New Hampshire, entitled “All-Electronic Tolling (AET) vs. Open-Road Tolling (ORT) in New Hampshire,” by the Lower Bellamy River Collaborative (the “New Hampshire Report”) is attached at Exhibit “I.”

units are virtually flawless in reading license plates, with only 0.1% unreadable images.

The New Hampshire Report also noted that compliance rates for paying tolls invoiced by mail is often higher under AET than with an ORT facility. As in Massachusetts, the call for AET in New Hampshire is based on increased safety, reduced environmental impacts (both site impacts and due to reductions in emissions and greenhouse gases) and improved traffic flow. The New Hampshire Report, using data collected from NH DOT, showed that while E-ZPass revenue continues to grow as a percentage of total revenue, cash toll revenue continues to decline. From 2013 to 2016, E-ZPass revenue grew from \$76,686 to \$92,414, while cash revenue dropped over the same time period from \$38,876 to \$34,729. (See New Hampshire Report p. 12). Because the cost of maintaining a cash collection ORT system will continue to climb, while cash revenues continue to fall, investing in an ORT facility was a poor long-term financial decision in New Hampshire.

Advocates for AET in New Hampshire also noted that privacy concerns are not an issue. Motorists can apply for an anonymous account, and New Hampshire law protects personal information from disclosure to third parties. Finally, advocates have noted that outdated data is of little value in evaluating the feasibility of AET, given the significant recent improvements and changes in AET technology.

VII. Conclusion

Many states, including Massachusetts, New York, and New Hampshire, are converting existing tolling facilities to AET. It is undisputed that AET provides numerous benefits, including improved safety, reduced environmental impacts, and convenience. AET also reduces traffic impacts, and dramatically reduces capital costs of new toll plazas, as well as the ongoing O&M costs. In this proceeding, MTA agrees that an AET facility would result in zero

environmental impacts.

Further, improvements in video technology and increasing E-ZPass use have reduced the amount of “leakage” from cash users. Maine has a collective enforcement agreement with New Hampshire and Massachusetts, and drivers from these three states account for 73% of all cash customers. When added to the 76% of motorists that already have E-ZPass transponders, the percentage of Canadian or other state drivers—the only users with a significant risk for leakage—**constitutes only 6% of the users of the York Tollbooth**. For the reasons set forth in the testimony of Peter Smith, MTA will realize more revenue from an AET system, and such a system will not result in any environmental impacts. As such, it is a reasonable, rational, and practicable alternative to the ORT facility proposed by MTA. Indeed, it is the only rational alternative.

Date: April 7, 2017

Marshall N. Jarvis
Marshall Jarvis

STATE OF MAINE

County of York

Date: April 7, 2017

Personally appeared before me the above named Marshall Jarvis, who, being duly sworn, did testify that the foregoing testimony was true and correct to the best of his knowledge and belief.

Before me,

Cathy G. Brown
Notary Public

My commission expires: 3/19/21

CATHY G. BROWN
Notary Public Maine
My Commission Expires March 19, 2021