National Transportation Safety Board
Office of Highway Safety
Washington, DC 20594

HWY24MH013

HIGHWAY FACTORS

Group Chair's Factual Report

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A. CRASH INFORMATION

Location: Swanton, Lucas County, Ohio
Date: August 15, 2024
Time: 5:29 a.m. EDT

B. HIGHWAY FACTORS GROUP

Group Co-Chair	Dan Walsh, P.E. Senior Highway Factors Investigator NTSB
Group Co-Chair	David Inman Senior Highway Factors Investigator NTSB
Responding on behalf of OTIC	Chris A. Matta, P.E. Chief Engineer/Deputy Executive Director Ohio Turnpike and Infrastructure Commission

C. CRASH SUMMARY

For a summary of the crash, refer to the *Crash Information and Summary Report*, which can be found in the NTSB docket for this investigation.

D. DETAILS OF THE INVESTIGATION

The Highway Factors Group Chair's Factual Report begins with a discussion on roadway data that includes the crash locations, construction history, average daily traffic volumes, traffic crash summary, speed limit, typical section for the I-80/90 eastbound direction, rumble strips, highway markings, horizontal and vertical alignment, cross slope and signage for the I-80/90 eastbound direction. The report provides a summary of the Ohio Turnpike and Infrastructure Commission (OTIC) toll collection system and conversion made from the old 2009 toll collection system to the current 2024 toll collection system. The report summarizes the traffic incident management response and video documentation of the crashes. Finally, the report concludes with similar toll plaza designs in Ohio and other U.S. states, and permanent closure of low-speed lanes in Pennsylvania, Illinois, and Texas.

E. ROADWAY DATA

1.0 Crash Locations

Figure 1 illustrates the crash locations which occurred on Interstates 80/90 (I-80/90) approximately 17 miles west of Toledo, Ohio.[1]

Figure 1. Crash map (Source: Google Maps revised).

Figure 2 illustrates the three crash locations in relation to the Swanton Township Toll Plaza. Crash #1 occurred on I-80/90 at approximately mile marker 48.7 in the eastbound direction in Lucas County, Ohio. Crash #2 occurred on I-80/90 at approximately mile marker 48.0 in the eastbound direction in Fulton County, Ohio. Crash #3 occurred on I-80/90 at approximately mile marker 50.8 in the westbound direction in Lucas County, Ohio.

[1] I-80 runs concurrently with I-90 from near Portage, Indiana, to Elyria, Ohio.

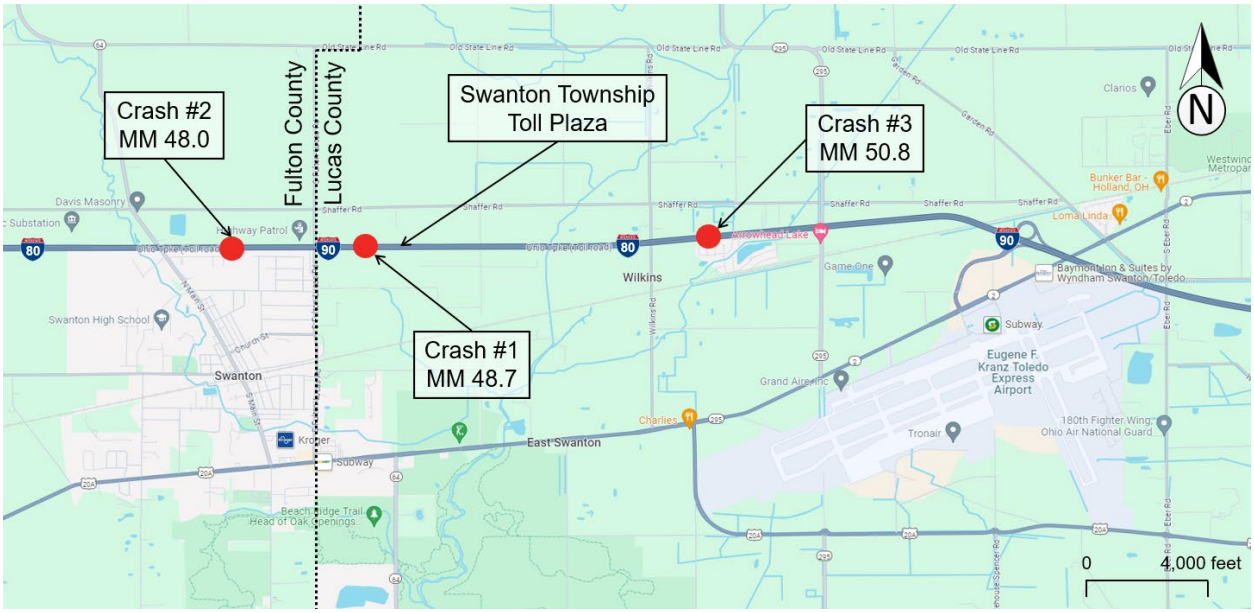


Figure 2. Three locations of the crashes in relation to the Swanton Township Toll Plaza (Source: Google Maps revised).

2.0 Construction History

The Swanton Township Toll Plaza lanes opened for public use on April 10, 2024, at mile marker 49. Construction of the toll plaza was completed in April of 2022. Figure 3 illustrates the Swanton Township Toll Plaza and the lane assignments in the eastbound and westbound directions of travel. The eastbound toll booth lanes are configured such that toll lanes #1 through #3 are located to the right in the low-speed lanes.[2] Toll lanes #4 through #7 are located to the left adjacent to the median barrier in the high-speed lanes.[3] The westbound toll booth lanes (#8 through #16) are configured in a similar manner as the eastbound toll booth lanes with the numbering system ordered sequentially from south to north. Prior to the toll booth, there was a portable changeable message sign located 2.7 miles before, a 2-mile advance warning sign, a 1-mile guide sign, a ½-mile guide sign, and an exit area guide sign (see Table 5 for additional signage and distances prior to the toll booth).

[2] A description of how tolls are collected in the low-speed and high-speed lanes can be found in Section F – Ohio Turnpike and Infrastructure Commission (OTIC) Toll Collection System.

[3] Toll lanes #4, #7, #8, and #11 are located on the shoulders of the high-speed lanes. The Ohio Turnpike and Infrastructure Commission considers the shoulders as open road tolling lanes and has toll equipment above the shoulder similar to the travel lanes.

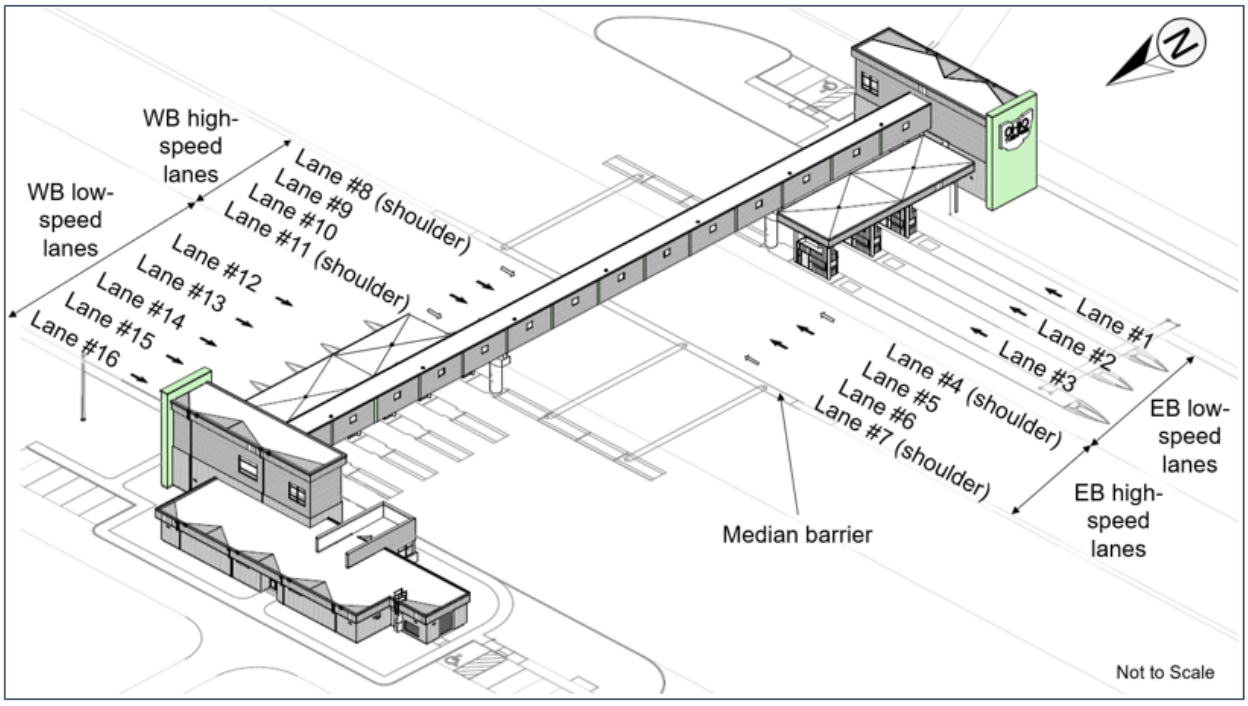


Figure 3. Swanton Township Toll Plaza and the lane assignments in the eastbound and westbound directions of travel. (Source: Ohio Turnpike and Infrastructure Commission revised).

3.0 Crash #1 Prior to the Swanton Township Toll Plaza

Figure 4 illustrates Crash #1 occurred in the eastbound right lane of the high-speed toll lanes prior to the Swanton Township Toll Plaza when a Toyota Highlander (hereinafter referred to as "Toyota") slowed to move right into the low-speed toll lanes and was struck from the rear by a Mack truck-tractor in combination with a semitrailer (hereinafter referred to as "Mack").

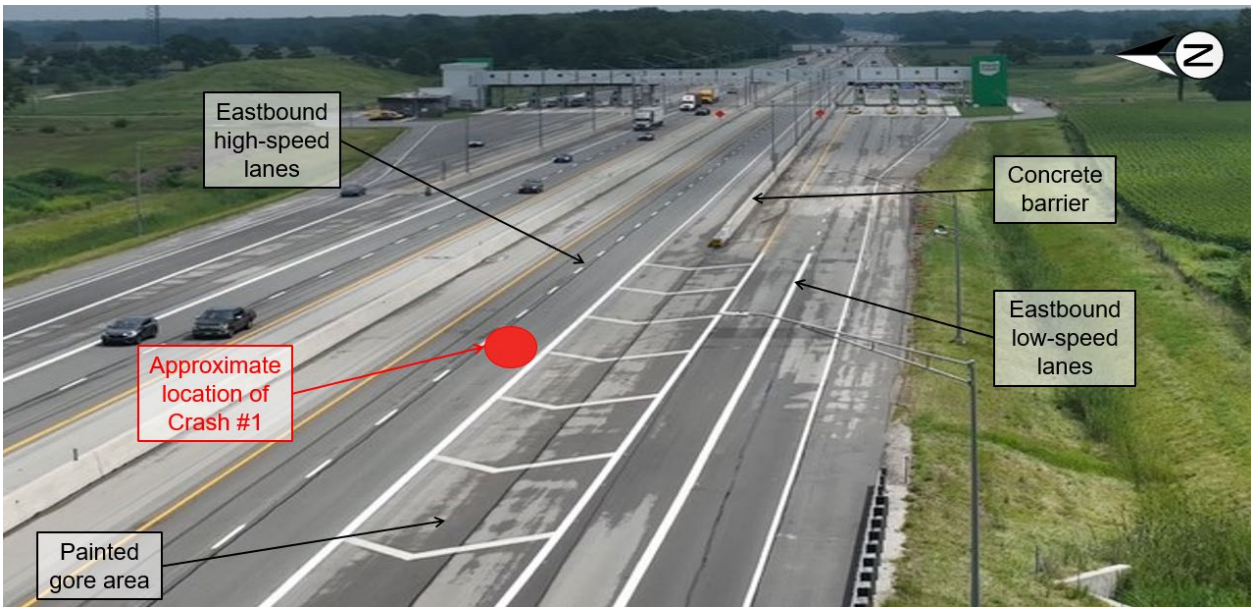


Figure 4. Crash #1 occurred in the eastbound right lane of the high-speed toll lanes prior to the Swanton Township Toll Plaza (Source: Ohio State Highway Patrol revised).

Figure 5 illustrates the final rest of the Toyota, and the final rest and roadway evidence left by the Mack.

Figure 5. Final rest of the Toyota, and the final rest and roadway evidence left by the Mack (Source: Ohio State Highway Patrol revised).

4.0 Average Daily Traffic Volumes

Table 1 summarizes the average daily traffic volumes on I-80/90 in the vicinity of the crashes.[4]

Table 1. Average daily traffic volumes on I-80/90.

Year	Average Daily Traffic Volumes
2023	25,614
2022	25,370
2021	25,311
2020	20,720
2019	23,512

5.0 Traffic Crash Summary

Table 2 summarizes the traffic crash data by year on I-80/90 from mile markers 43 through 55, both eastbound and westbound.[5]

Table 2. Traffic crash data by year on I-80/90.

Year	Crashes
2023	54
2022	53
2021	65
2020	64
2019	81
Total	**317**

Table 3 summarizes the traffic crash severity on I-80/90 from mile markers 43 through 55, both eastbound and westbound.

Table 3. Traffic crash severity on I-80/90.

Crash Severity	Crashes
Serious Injury	4
Minor Injury	33
Injury Possible	20
Property Damage / No Injuries	260
Total	**317**

Table 4 summarizes the traffic crash type on I-80/90 from mile markers 43 through 55, both eastbound and westbound.

[4] See Highway Attachment – Average Daily Traffic Volumes on I-80/90.
[5] See Highway Attachment – I-80/I-90 Traffic Crash Data.

Table 4. Traffic crash type on I-80/90.

Crash Type	Crashes
Fixed Object	103
Sideswipe – Passing	77
Animal	57
Rear End	30
Other Non-Collision	21
Other Object	14
Unknown	9
Parked Vehicle	2
Overturning	2
Angle	1
Pedestrian	1
Total	**317**

6.0 Speed Limit

The posted regulatory speed limit for I-80/90 in the vicinity of the crashes was 70 miles per hour (mph). The posted speed limit for motorists traveling through the toll booth lanes at the Swanton Township Toll Plaza in the eastbound and westbound direction was 10-mph. The 70-mph traffic is separated from the 10-mph traffic by a deceleration ramp with a separating gore area and then a concrete median wall. The 10-mph speed limit signs were posted at the nose of each island separating the channelized lanes as motorists approached the transaction booth.

7.0 Typical Section for I-80/90 Eastbound Direction

Figure 6 illustrates the typical section for the I-80/90 eastbound direction in the vicinity of Crash #1 prior to the Swanton Township Toll Plaza.[6] A red dashed line depicts the location in which the typical section was drawn. The I-80/90 eastbound direction consisted of two high-speed lanes and two low-speed lanes separated by a painted gore area. Each of the high-speed and low-speed lanes was approximately 12-feet wide. Crash #1 occurred in the eastbound right lane of the high-speed lanes denoted by the red highlighted text in the lower portion of the figure.

A paved shoulder existed adjacent to the right lane of the low-speed lanes that was approximately 10-feet wide. A paved shoulder existed adjacent to the left lane of the high-speed lanes that was approximately 14-feet wide. The I-80/90 eastbound and westbound directions were separated by a median barrier.

[6] See Highway Attachment – Typical Sections for I-80/90.

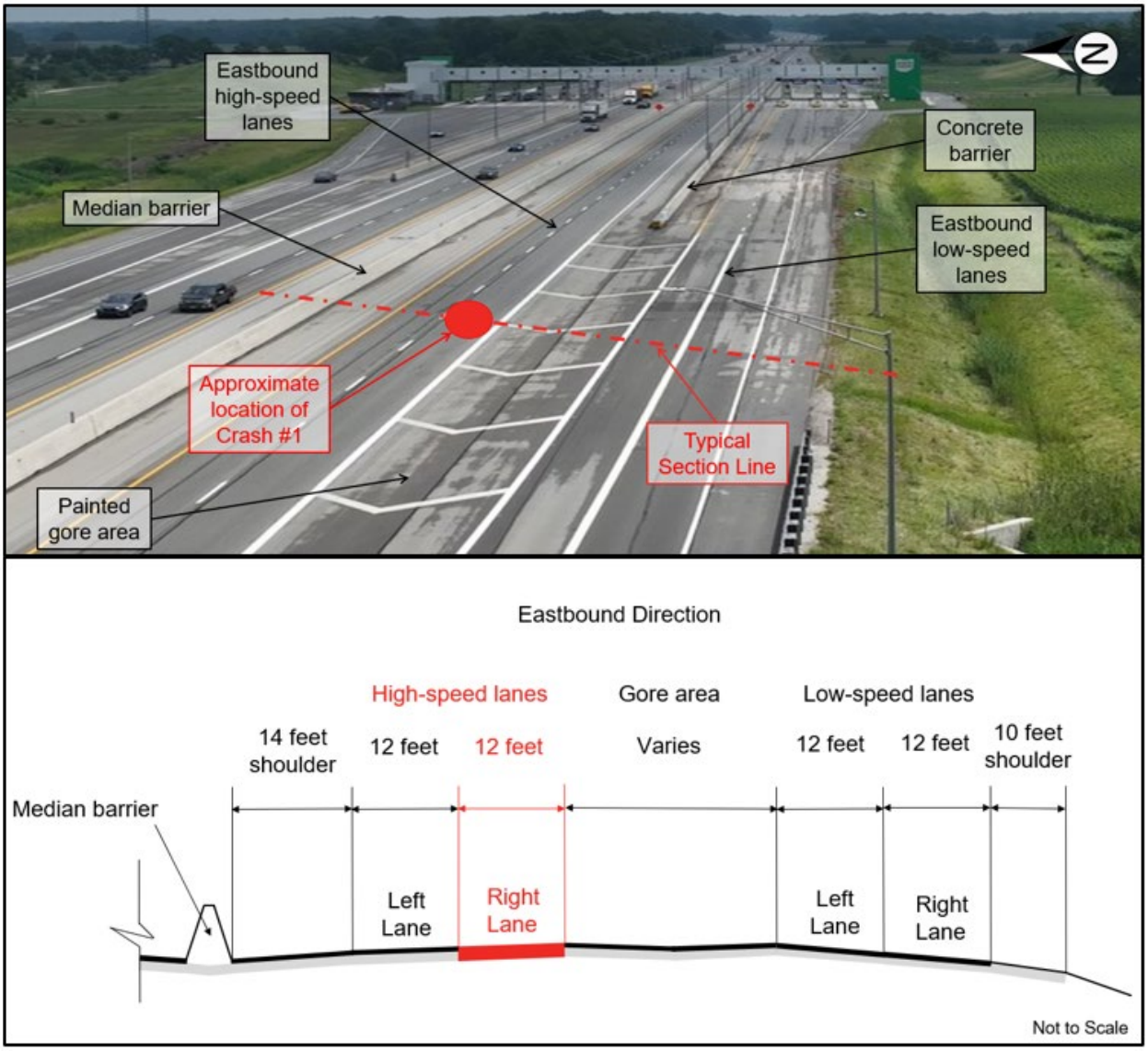


Figure 6. Typical section for the I-80/90 eastbound direction in the vicinity of Crash #1 prior to the Swanton Township Toll Plaza (Source: Ohio State Highway Patrol revised).

8.0 Rumble Strips

Three sets of rumble strips existed in the eastbound low-speed lanes spaced approximately 350 feet apart.[7] Each set of rumble strips contained 15 grooves spaced approximately 8-inches apart. The depression of the rumble strip into the pavement was approximately 1/2-inch.

[7] See Highway Attachment – Rumble Strip Details for I-80/90.

9.0 Highway Markings

The highway marking separating the paved shoulder from the eastbound left lane of the high-speed lanes consisted of a permanent 6-inch-wide solid yellow line.[8] The highway markings separating the two eastbound high-speed lanes consisted of permanent 6-inch-wide broken white lines with a pattern consisting of 10-foot-long dashes with 30-foot spacing. The highway marking separating the paved gore area from the eastbound right lane of the high-speed lanes consisted of a permanent 12-inch-wide solid white line. The paved gore area consisted of permanent 24-inch-wide solid white chevron lines. The highway marking separating the paved gore area from the eastbound left lane of the low-speed lanes consisted of a permanent 12-inch-wide solid white line. The highway marking separating the two eastbound low-speed lanes consisted of a permanent 12-inch-wide solid white line. The highway marking separating the paved shoulder from the eastbound right lane of the low-speed lanes consisted of a permanent 6-inch-wide solid white line. The pavement markings for the roadway and Toll Plaza are in compliance with the Manual on Uniform Traffic Control Devices and ODOT Traffic Engineering Manual (TEM).

10.0 Horizontal and Vertical Alignment

The horizontal alignment for I-80/90 in the vicinity of the crash location was on a straight tangent section.[9]

The vertical alignment for I-80/90 in the vicinity of the crash location was on a downgrade negative slope of (-) 0.34% for motorists traveling in the eastbound direction.[10]

11.0 Cross Slope for I-80/90 Eastbound Direction

Figure 7 illustrates the cross slope for the I-80/90 eastbound direction in the vicinity of Crash #1 prior to the Swanton Township Toll Plaza. The cross slope of the two high-speed lanes and two low-speed lanes consisted of a downward 1.6 percent slope. The cross slope of the painted gore area consisted of a downward 1.6 percent slope toward the center of the gore area. The cross slope of the paved shoulders adjacent to the left lane of the high-speed lanes and right lane of the low-speed lanes consisted of a downward 4 percent slope.

[8] See Highway Attachment – Pavement Markings on I-80/90.
[9] See Highway Attachment - Horizontal and Vertical Alignment on I-80/90.
[10] Roadway vertical alignments are a combination of various parabolic curves and connecting tangent grades.

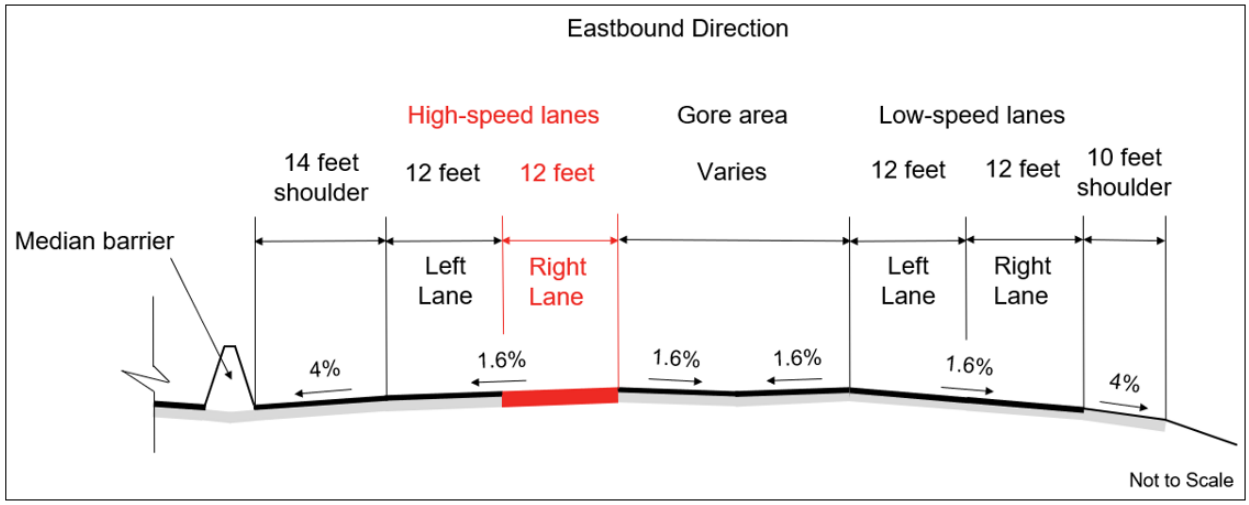


Figure 7. Cross slope for the I-80/90 eastbound direction in the vicinity of Crash #1 prior to the Swanton Township Toll Plaza.

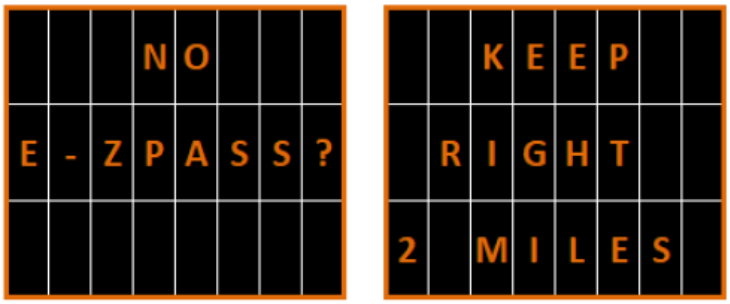
12.0 Signage Prior to Crash #1

Table 5 summarizes the signage for the I-80/90 eastbound direction in the vicinity of Crash #1 and #2 prior to the Swanton Township Toll Plaza. The area of impact for Crash #1 was about 1,238 feet west of the toll plaza and the area of impact for Crash #2 was about 4,987 feet west of the toll plaza. NTSB investigators conducted a nighttime scene drive-through of the crash site in the eastbound direction on August 18, 2024, which revealed the reflectivity of the signs and highway pavement markings were in excellent condition.

Table 5. Signage for the I-80/90 eastbound direction in the vicinity of Crash #1 and #2 prior to the Swanton Township Toll Plaza.

Signage	Sign Location	Distance west of Toll Plaza
	Posted at Toll Plaza booths	150 feet
Crash #1 Area of Impact		1,238 feet

	Roadside Right	1,671 feet
	Overhead	1,892 feet
	Roadside Right	3,703 feet
	Overhead	4,508 feet
	Roadside Right	4,970 feet
Crash #2 Area of Impact		4,987 feet

	Overhead	1.34 miles
	Roadside Right	1.94 miles
	Median and Roadside Right	2.01 miles
	Median	2.15 miles
	Overhead	2.28 miles
	Portable Changeable Message Sign in Median[11]	2.69 miles

[11] Listed below are the dates of installation and messages for the portable changeable message signs located in the median. The portable changeable message signs were supplemental to the Manual on Uniform Traffic Control Devices (MUTCD) and OTIC elected to implement the supplemental portable changeable message signs.

- Beginning on 4/8/24, the messages "NEW TRAFFIC PATTERN" – "STARTING 4/10/24" was displayed.

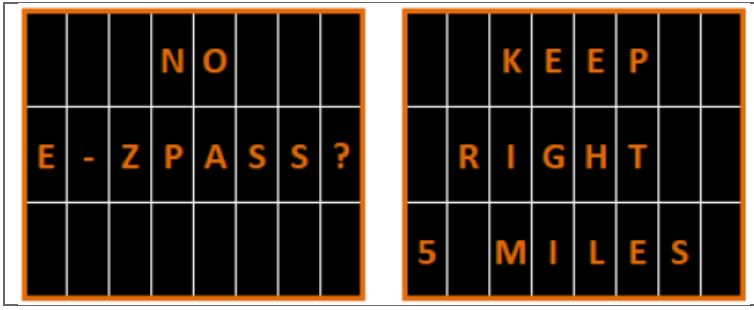
	Portable Changeable Message Sign in Median	5.64 miles

Table 6 summarizes the signage for the I-80/90 eastbound direction past the Swanton Township Toll Plaza.

Table 6. Signage for the I-80/90 eastbound direction past the Swanton Township Toll Plaza.[12]

Signage	Sign Location	Distance east of Toll Plaza
	Roadside Right	1.3 miles

F. OHIO TURNPIKE AND INFRASTRUCTURE COMMISSION (OTIC) TOLL COLLECTION SYSTEM

Figure 8 illustrates the Ohio Turnpike and Infrastructure Commission (OTIC) toll collection system. The OTIC provided a narrative of what a driver would expect traveling eastbound from Indiana and westbound from Pennsylvania for cash or credit card paying customers and E-ZPass paying customers:[13]

- On 4/10/24, the messages read "NEW TRAFFIC PATTERN" – "TICKETS/CASH EXIT X MI".
- On 4/25/24 the message was changed to "NO E-ZPASS?" "KEEP RIGHT X MILES".

[12] The signs for this toll plaza as shown in Tables 5 and 6 are in compliance with the Manual on Uniform Traffic Control Devices and ODOT Traffic Engineering Manual (TEM).

[13] E-ZPass paying customers travel through the OTIC toll plazas in the high-speed lanes where the toll is paid electronically by an antenna reading an electronic transponder that attaches to the inside of the windshield of the vehicle. At the time the transponder is read, the correct toll fare due is paid electronically from a pre-paid customer account.

A cash or credit card paying customer traveling eastbound across Ohio from Indiana would:

- Merge to the right two lanes to pay a flat rate toll at the Westgate Toll Plaza (TP 4).
- Merge to the right two lanes to obtain a ticket at the Swanton Township Toll Plaza (TP 49).
- Merge to the right two lanes to surrender the ticket obtained at the Swanton Township Toll Plaza (TP 49) to a toll collector or automatic toll payment machine at the Newton Falls Toll Plaza (TP 211) by using the toll booths and pay their fare.
- Travel un-tolled the rest of the way into Pennsylvania.
- A cash or credit card paying customer could also go through the open road toll (high-speed) lanes and pay online or receive an invoice.

An E-ZPass paying customer traveling eastbound across Ohio from Indiana would:

- Using the left two lanes, pay a flat rate toll by using the open road toll lanes (high-speed lanes) through the Westgate Toll Plaza (TP 4). The equipment in the open road toll lanes registers a transaction.
- Using the left two lanes, use the open road toll lanes (high-speed lanes) and proceed through the Swanton Township Toll Plaza (TP 49) without stopping. The equipment in the open road toll lanes registers an entering transaction.
- Using the left two lanes, use the open road toll lanes (high-speed lanes) through the Newton Falls Toll Plaza (TP 211) without stopping. The equipment in the open road toll lanes registers an exit transaction.
- Travel un-tolled the rest of the way into Pennsylvania.

A cash or credit card paying customer traveling westbound across Ohio from Pennsylvania would:

- Merge to the right two lanes to pay a flat rate toll by using the Eastgate Toll Plaza (TP 239).
- Merge to the right two lanes to obtain a ticket at the Newton Falls Toll Plaza (TP 211).
- Merge to the right two lanes to surrender the ticket obtained at the Newton Falls Toll Plaza (TP 211) to a toll collector or automatic toll payment machine at the Swanton Township Toll Plaza (TP 49) by using the toll booths and pay their fare.
- Using the left two lanes, pay a flat rate toll by using the Westgate Toll Plaza (TP 4) and then enter Indiana.
- A cash or credit card paying customer could also go through the open road toll (high-speed) lanes and pay online or receive an invoice.

<u>An E-ZPass paying customer traveling westbound across Ohio from Pennsylvania would:</u>

- Pay a flat rate toll by using the open road toll lanes (high-speed lanes) through the Eastgate Toll Plaza (TP 239). The equipment in the open road toll lanes registers a transaction (at the time of the incident, the open road toll lanes were under construction through the Eastgate Toll Plaza, and all westbound traffic used the toll booths).
- Using the left two lanes, use the open road toll lanes (high-speed lanes) and proceed through the Newton Falls Toll Plaza (TP 211) without stopping. The equipment in the open road toll lanes registers an entering transaction.
- Using the left two lanes, use the open road toll lanes (high-speed lanes) and proceed through the Swanton Township Toll Plaza (TP 49) without stopping. The equipment in the open road toll lanes registers an exit transaction.
- Using the left two lanes pay a flat rate toll by using the open road toll lanes (high-speed lanes) and proceed through the Westgate Toll Plaza (TP 4) without stopping and then enter Indiana. The equipment in the open road toll lanes registers a transaction.

Figure 8. OTIC toll collection system (Source: OTIC revised).

The OTIC provided an explanation of the "Obtain Ticket" system and the user it targets:

> *"The ticket system provides a way for the Turnpike to classify/bill the non-E-ZPass user's trip by the portion of the road they used. Approximately 36% of the Turnpike's customers did not have E-ZPass in 2017.*
>
> - *For instance, a passenger car without an E-ZPass that enters the Turnpike at the Toledo Airport Interchange (TP 52) would get a ticket there, travel to Elmore Interchange (TP 81), surrender the ticket and pay a toll of $2.75 for that 29-mile trip.*

- *If the customer that entered at TP 52 traveled to the Warren Interchange (TP 209) they would pay a fare of $15.00 for that 157-mile trip.*

Many of the users of the Ohio Turnpike do not utilize E-ZPass. The ticket system provides customers without E-ZPass a way to pay their fare for using the toll road.

The users that are being targeted are customers without E-ZPass."

G. TOLL PLAZA COLLECTION SYSTEM CONVERSION

In 2024 the OTIC completed conversion to a new system for collecting tolls. Use of the previous system began in 2009. Figure 9 illustrates the OTIC conversion made from the old 2009 toll collection system to the current 2024 toll collection system. The conversion included the following:

- TP-52 through TP-209, located on the exit/entrance ramps, had the entry gates removed and at least one dedicated E-ZPass exit lane with gate removed and installed license plate cameras.[14]
- Constructed new open road tolling lanes (high-speed lanes) and new conventional toll lanes/booths on the mainline at the Westgate Toll Plaza (TP 4), Swanton Township Toll Plaza (TP 49), Newton Falls Toll Plaza (TP 211), and Eastgate Toll Plaza (TP 239).
- The OTIC anticipates removing the tolling equipment from the nine untolled plazas, located on the exit/entrance ramps, shown in red at TP 13, 25, 34, 39, 215, 216, 218, 232, and 234, later in 2025.
- Designed, tested, and integrated the new toll collection system and Customer Service Center hardware and software.

[14] For TP-52 thru TP-209, located on the exit/entrance ramps, there are no gates on any entrance lanes, where customers either get tickets or drive through and their E-ZPass is read. On exit at those toll plazas the ticketed customers surrender their ticket and pay the toll or E-ZPass users use the E-ZPass lanes.

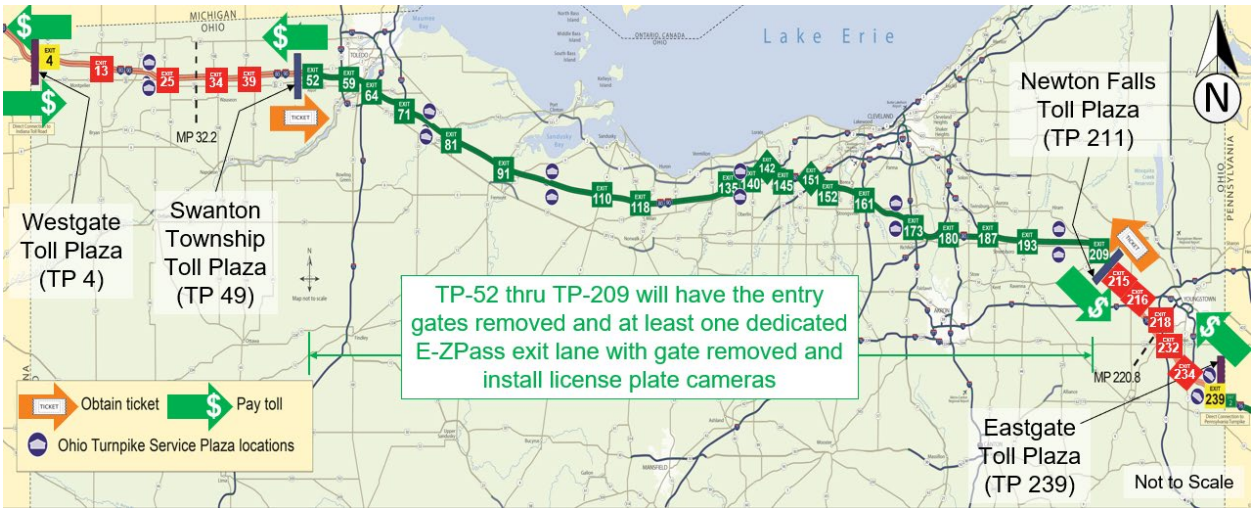


Figure 9. OTIC conversion made from the old 2009 toll collection system to the current 2024 toll collection system (Source: OTIC revised).

The Ohio Turnpike Service Plaza locations shown in **Figure 9** have full-service rest areas where customers can stop, use restrooms, get fuel, food, etc. The full-service rest areas are located along the turnpike mainline and accessed by deceleration ramps. The OTIC has seven full-service rest areas eastbound and seven full-service rest areas westbound along the turnpike. No tolls are required for customers to access the full-service rest areas, and they do not exit the turnpike system.

The strategic plan and construction undertaken by the Ohio Turnpike for the new toll collection system with highway speed E-ZPass lanes at mainline toll plazas was completed to provide OTIC customers with quality service and value and allow the OTIC to implement innovative, adaptable and sustainable technology and operational programs while being financially responsible. The OTIC responded to a series of questions regarding an all-electronic toll system from NTSB investigators in an email dated November 5, 2024.[15]

H. TRAFFIC INCIDENT MANAGEMENT RESPONSE TO THE THREE CRASHES

Tables 7 and 8 summarize the OTIC traffic incident management response to the three crashes.

Table 7. OTIC radio call sign identifiers.

Radio Call Sign Identifiers	
Berea Communications Center	"Berea"
Western Division Superintendent of Maintenance	"1010"
Western Division Assistant Superintendent of Maintenance	"1011"

[15] See Highway Attachment – Ohio Turnpike and Infrastructure Commission 11-5-24 Email.

Contractor's Zone Person for Resurfacing Project just east of the crashes	"R50"
Contractor's Zone Person for Resurfacing Project at Toll Plaza 34	"TP34"
OTIC's contracted Incident Response Service (Autobase)	"1150A"
Swanton Maintenance Section Foreman	"1210"
Swanton Maintenance Assistant Section Foreman	"1211"
Elmore Maintenance Section Foreman	"1310"
OTIC's contracted Incident Response Service (Autobase)	"1350A"

Table 8. OTIC traffic incident management response to the three crashes.

Crash #1, 5:29 am, MM 48.7, Eastbound[16]
At 5:35 am, crash at MM 48.7 EB is called in to "Berea" by "R50".
At 5:36 am, "1150A" contacts "R50" asking "R50" if their assistance is necessary. "R50" advises "1150A" to standby. "1150A" is located at TP39.
At 5:40 am, "R50" contacts "1150A" and tells them to head to MM 48.7 EB.
At 5:41 am, communications between "1010" and "R50" for information. "R50" advises "1010" appears lanes are blocked, and traffic starting to back up on the mainline.
At 5:44 am, "R50" calls "1010". Begin discussions on diversion. "R50" advises that it appears that right now, traffic can get past the incident on the mainline. "1010" advises will get crews coming in.
At 5:47 am, "1010" calls "R50" for traffic flow information to determine if just the ramps are blocked for TP 49 or if the mainline is blocked. "R50" advises that is being determined by Fire/Patrol.
At 5:48 am, "1010" calls "Berea" to place diversion notification on message boards prior to Toll Plaza 39. "1010" begins traveling to reposition any message boards that are facing WB traffic so that they face EB traffic.
At 5:49 am, "1150A" contacts "R50". "1150A" advises they are just west of the maintenance building (MM 48.3) and traffic is backing up. "1150A" is advised to stay back and try to get traffic into the left lane.
At 5:51 am, "R50" requests "1150A" to place cone in front of EB access road gate from Fulton-Lucas Road so that DVS (wreckers) can get to the scene. This is at MM 48.3. "1150A" is then advised to backup with the queue once he's done at the access road. "R50" communicates that another truck will be heading back to assist as well.
At 5:51 am, "1010" calls "Berea" that MM 38.9 board has been flipped to face EB traffic and to turn on diversion message for the portable changeable message board (PCMB) located in the median to read "Road Blocked, Traffic Must Exit" or "Road Blocked, Use Exit 39", for the PCMB located further away from the diversion point.
At 5:52 am, "1010" calls Turnpike (Patrol), requesting any available patrol staff come to ramps at MM 39 to divert traffic connecting to State Route 109.

[16] Time difference of 25 minutes between Crash #1 and Crash #2.

At 5:58 am, "1210" advises "1010" that he is about 5 minutes from the scene. "1010" advises "1210" to meet at TP 39[17] to place flares out for diversion. "1210" advises "1010" that 3 crew members are coming in and will head that way in a zone truck.
Crash #2, 5:54 am, MM 48.0, Eastbound[18]
Time difference of 30 minutes between Crash #2 and Crash #3.
At 5:59 am, second crash at MM 48 EB is called in to "Berea".[19]
At 6:09 am, "1210" advises "Berea" that they are on scene at the first crash at MM 48.7. Two life flights are about to land and entire roadway is closed both EB and WB.
At 6:11 am, "1150A" calls "1010" to ask if assistance is needed with the diversion at Toll Plaza 39. "1010" advises "1150A" to stay behind the EB backup to warn traffic, until he advises otherwise.
At 6:12 am, traffic is diverted off at Toll Plaza 39 eastbound.
At 6:18 am, "1010" calls "TP34" and asks them to come to the diversion to provide advance warning in case it starts to backup eastbound.
At 6:24 am, "1210" calls "1211". "1211" advises he is arriving on scene of the second crash at MM 48 EB.
Crash #3, 6:24 am, MM 50.8, Westbound
At 6:25 am, crash at MM 50.8 WB is called in to "Berea" by "1011".
At 6:28 am, "1011" calls "Berea" and reports that all lanes are blocked westbound.
At 6:31 am, "1011" calls "1350A" and asks them to head westbound to sit behind the westbound backup and protect the back of the queue.
At 6:31 am, "Berea" activates PCMB ahead of crash to warn of stopped traffic and consider alternate route.
At 6:36 am, "1010" calls "1210". Advises to send everyone they can as soon as they arrive at the Maintenance Building to Toll Plaza 52 to assist with a diversion there.
At 6:37 am, "1011" calls "Berea" to place diversion notification on message boards prior to Toll Plaza 52.
At 6:37 am, "1011" calls "1310". Advises to send 3 people to Toll Plaza 52 to assist with the diversion and protect the back of the queue.
At 6:45 am, "1010" notifies "Berea" that the diversion at Toll Plaza 52 WB is in place.
At 6:47 am, "1310" advises "1011" that 3 people are headed his way to assist with the diversion at Toll Plaza 52.
At 6:51 am, "1350A" arrives at the backup at Toll Plaza 52 WB to provide advance warning.

[17] TP 39 is a non-tolled plaza, located on the exit/entrance ramps, in which the tolling equipment is scheduled to be removed later in 2025.
[18] Time difference of 30 minutes between Crash #2 and Crash #3.
[19] Communication log indicated at 5:59 am patrol staff were advised by communications center of the crash.

The OTIC traffic incident management system (TIMS) guidelines indicated the following:[20]

*"**1. Purpose***

A. Ensure that an Ohio Turnpike and Infrastructure Commission (OTIC) Guideline exists to manage traffic backups and travel delays.
B. Ensure that a flexible and adaptable system exists to effectively provide the most efficient and safe travel for Turnpike customers.

2. Scope and Application

A. Establishes a graduated response operational plan to manage traffic backups and/or travel delays, beginning with the initial notification and continuing through conclusion of the event.
B. Defines the inter-departmental coordination to facilitate the delivery of assistance and communications to mitigate a traffic backup and/or travel delay.
C. Assigns specific functional responsibility to the appropriate OTIC departments and contracted entities.

5. Operational Guidelines

A. Anticipated Traffic Delays
B. Traffic Incidents
  a. Traffic Watch
  b. Traffic Warning
  c. Communications
C. Coordination of External Agencies
D. Protecting the back of the Queue
E. Media Inquiries

6. Traffic Conditions and Recommended Action Plans

A. Less Than 3 Mile Traffic Backup
B. Greater Than 3 Mile Traffic Backup

7. Traffic Diversions

A. Diversion Process
  a. Voluntary Diversion
  b. Mandatory Diversion
B. Trapped Traffic

[20] See Highway Attachment - Traffic Incident Management System Guidelines.

a. Reversing Motorists
b. Utilizing Crossovers

C. Diversion Limitations

D. Discontinuing a Diversion

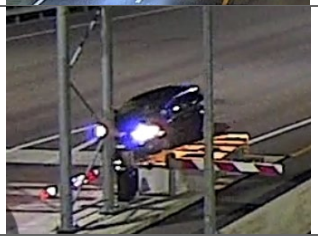
8. PCMB Assistance

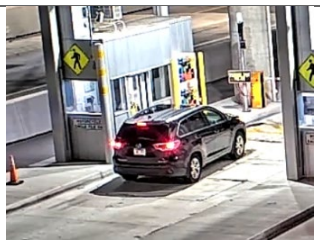
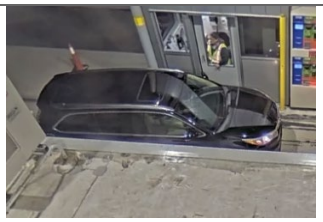
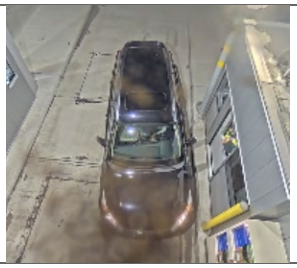
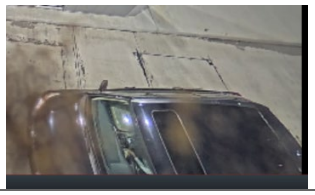
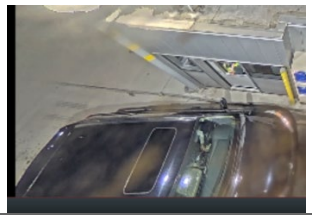
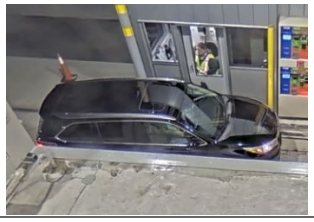
- *Scope*
- *PCMB Transfer*
- *PCMB Assignment and Activation*
- *PCMB Deactivation*
- *PCMB Responsibility"*

I. VIDEO DOCUMENTATION

Table 9 summarizes the video documentation for the two vehicles involved in Crash #1, the Toyota and Mack, at the Westgate Toll Plaza (TP 4). TP 4 is the first toll plaza for customers entering Ohio traveling eastbound from Indiana. OTIC provided NTSB investigators with video documentation from a total of 12 cameras at TP 4 on August 15, 2024, between 4:48 am and 4:54 am. The TP 4 eastbound toll booth lanes are configured such that toll lanes #1 through #4 are located to the right in the low-speed lanes. Toll lanes #5 and #6 are located to the left adjacent to the median barrier in the high-speed lanes. The westbound toll booth lanes (#7 through #12) are configured in a similar manner as the eastbound toll booth lanes with the numbering system ordered sequentially from south to north.

Table 9. Video documentation for the two vehicles involved in Crash #1, the Toyota and Mack, at the Westgate Toll Plaza (TP 4).

Camera View	Starting Time	Notes	Photograph	Transaction Type
TP 4 - Looking to the west	4:49:27	Mack is visible about to pass under the camera view in Lane #5.		E-ZPass high-speed lanes
TP 4 – Looking to the southwest	4:50:39	Toyota is visible as it first approaches the toll plaza in Lane #4.		Cash low-speed lanes

TP 4 – Looking to the northeast	4:50:56	Toyota is visible on the far side of a commercial motor vehicle (CMV) as they both approach toll plaza booth. Toyota is visible until it leaves the toll plaza in Lane #4.		Cash low-speed lanes
TP 4 – Overhead passenger's side view from the next booth.	4:50:57	Toyota approaches the toll booth and is visible until it departs the toll booth in Lane #4.		Cash low-speed lanes
TP 4 – Overhead front view	4:50:58	Toyota approaches the toll booth and is visible until it departs the toll booth in Lane #4.		Cash low-speed lanes
TP 4 – Overhead driver's side view	4:50:59	Toyota approaches the toll booth and is visible until it departs the toll booth in Lane #4.		Cash low-speed lanes
TP 4 – Overhead passenger's side view	4:50:59	Toyota approaches the toll booth and is visible until it departs the toll booth in Lane #4.		Cash low-speed lanes
TP 4 – Overhead passenger's side view from the next booth	4:51:00	Toyota approaches the toll booth and is visible until it departs the toll booth in Lane #4.		Cash low-speed lanes

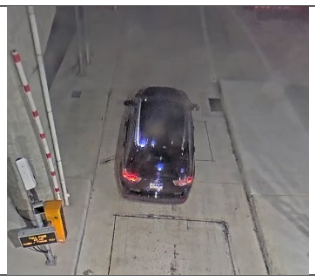
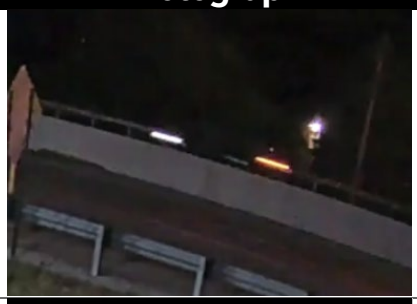
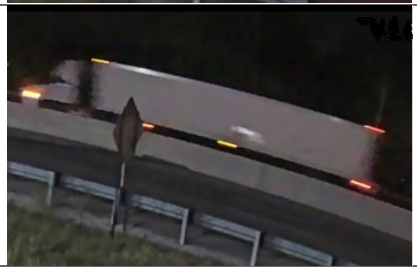
TP 4 – Overhead rear view	4:51:04	Rear of the Toyota is visible as it stops by toll booth. Toyota stays in the view until it departs the toll plaza in Lane #4.		Cash low-speed lanes
	4:52:04	The Toyota leaves all camera views.		

Table 10 summarizes the video documentation for the two vehicles involved in Crash #1 at the Swanton Turnpike Maintenance Building (MB2) located at MM 48.4, approximately 0.3 miles west of the crash location. OTIC provided NTSB investigators with video documentation from a total of 6 cameras at MB2 on August 15, 2024, between 5:27 am and 1:00 pm. The video shows eastbound and westbound traffic on I-80/90 in front of the MB2 building.

Table 10. Video documentation for the two vehicles involved in Crash #1 at the Swanton Turnpike Maintenance Building (MB2) located at MM 48.4, approximately 0.3 miles west of the crash location.

Camera View	Starting Time	Notes	Photograph
MB2 – Post entrance looking to the south	5:29:58	Toyota entered the camera view as it travels eastbound.	
MB2 – Post entrance looking to the south	5:30:01	Mack entered the camera view as it travels eastbound.	
MB2 – Post entrance	5:30:11	Both have left the camera view.	

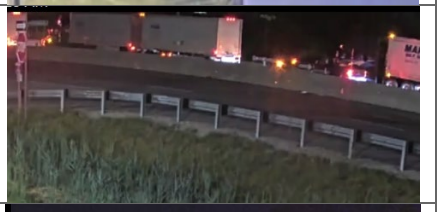
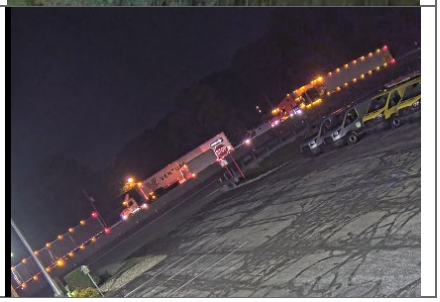
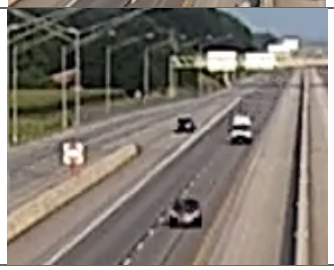
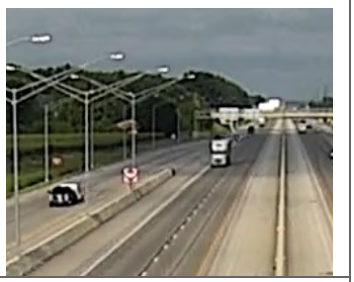
MB2 – Post entrance looking to the southeast	5:38:19	Two CMVs are visible as they react to stopped traffic in front of them. Traffic queue begins to be visible.	
MB2 – Post entrance looking to the southeast	5:48:15	Traffic is queued and there is no movement.	
MB2 – Fuel Pumps looking to the south	5:48:02	Traffic is queuing farther west of Crash #1.	

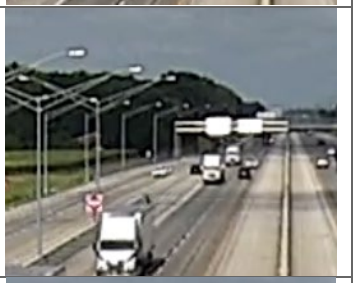
Table 11 summarizes the video documentation for ten gore excursions that occurred on July 25, 2024, for eastbound traffic approaching the Swanton Township Toll Plaza.[21] OTIC provided NTSB investigators with video documentation from one camera at the Swanton Township Toll Plaza from July 25, 2024, through August 15, 2024. The one camera captured video for a 24-hour period each day. NTSB investigators found ten gore excursions occurred on the first day, July 25, 2024. After documenting the ten gore excursions, NTSB investigators did not proceed to document any further gore excursions that may have occurred from July 26, 2024, through August 15, 2024. The ten gore excursions that occurred on July 25, 2024, are summarized in the table below.

Table 11. Video documentation for ten gore excursions that occurred on July 25, 2024, for eastbound traffic approaching the Swanton Township Toll Plaza.

Gore Excursion Number	Starting Time	Notes	Photographs

[21] A gore excursion is a term used where a vehicle crosses the triangular-shaped area denoted by solid white chevron lines where a roadway meets an exit or entrance ramp.

1	7:53:12	After 5 seconds a dark colored sedan cuts through the gore area from the high-speed lanes to the low-speed toll lanes.	
2	7:58:45	After 10 seconds a dark colored SUV cuts through the gore area from the high-speed lanes to the low-speed toll lanes.	
3	8:07:14	At the beginning there is a dark colored sedan in the inside high speed toll lane. The sedan changes lanes and goes between two CMVs and disappears from view. The frontmost of the two CMVs changes lanes to the inside lane. As traffic nears the dark sedan cuts through the gore area coming from the low-speed toll plaza lanes and comes back to the outside high-speed lane.	
4	8:58:10	As traffic begins to near the camera a light-colored SUV begins to enter the gore area to the low-speed lanes and then comes back to the high-speed lanes.	
5	9:26:48	After 8 seconds a dark colored sedan in the inside lane. The dark colored sedan makes a sudden late exit across both lanes to the low-speed lanes. The sedan is in the gore area in the photo. Just behind and to the right of the CMV.	
		After 10 seconds a dark colored CMV is visible. Behind the CMV are	

6	9:29:00	two passenger cars. Both passenger cars move to the low-speed lanes with the front car passing through the gore area. Shortly afterwards another car passes through the gore area to move to the low-speed lanes.	
7	9:42:08	After 15 seconds a dark colored SUV crosses through the gore area to enter the low-speed lanes.	
8	9:51:26	At the beginning there is a dark colored SUV in the inside high-speed lane. The SUV changes lanes between two CMVs and cuts through the gore area to access the low-speed lanes.	
9	9:52:09	9 seconds a dark colored vehicle is visible in the gore area as it moved from behind a CMV to access the low-speed lanes.	
10	9:53:08	After 11 seconds a dark colored SUV is clearly visible cutting through the gore area to access the low-speed lanes.	

The one camera at the Swanton Township Toll Plaza on August 15, 2024, at 5:29 am was out of focus and did not depict the crash sequence of Crash #1.

J. SIMILAR TOLL PLAZA DESIGNS IN OHIO AND OTHER U.S. STATES

The toll plazas in Ohio that were similar in design to the Swanton Township Toll Plaza, and contained high-speed and low-speed lanes, were the following:

- Westgate Toll Plaza (TP 4),
- Newton Falls Toll Plaza (TP 211), and
- Eastgate Toll Plaza (TP 239). At the time of the incident, the open road toll lanes were under construction through the Eastgate Toll Plaza, and all westbound traffic used the toll booths.

All four toll plazas (Westgate Toll Plaza – TP 4, Swanton Township Toll Plaza – TP 49, Newton Falls Toll Plaza - TP 211, and Eastgate Toll Plaza – TP 239) opened on April 10, 2024.

1.0 Westgate Toll Plaza (TP 4)

Figures 10 through 15 illustrate the signage for motorists approaching the Westgate Toll Plaza (TP 4) in the eastbound direction at the times of the three crashes. The signs advise motorists of the upcoming toll plaza and construction zone. The speed limit was reduced from 55 mph to 50 mph immediately prior to entering the construction zone.

Figure 10. First toll plaza signs located approximately two miles west of the Westgate Toll Plaza (TP 4).

Figure 11. 55 mph speed limit signs located approximately 1.6 miles west of the Westgate Toll Plaza (TP 4).

Figure 12. 50 mph speed limit signs located approximately 1.1 miles west of the Westgate Toll Plaza (TP 4) and immediately prior to entering the construction zone.

Figure 13. Toll plaza signage and construction zone located approximately one mile west of the Westgate Toll Plaza (TP 4).

Figure 14. Toll plaza signage and construction zone at the confluence of the high-speed lane located to the left and low-speed lanes located to the right prior to the Westgate Toll Plaza (TP 4).

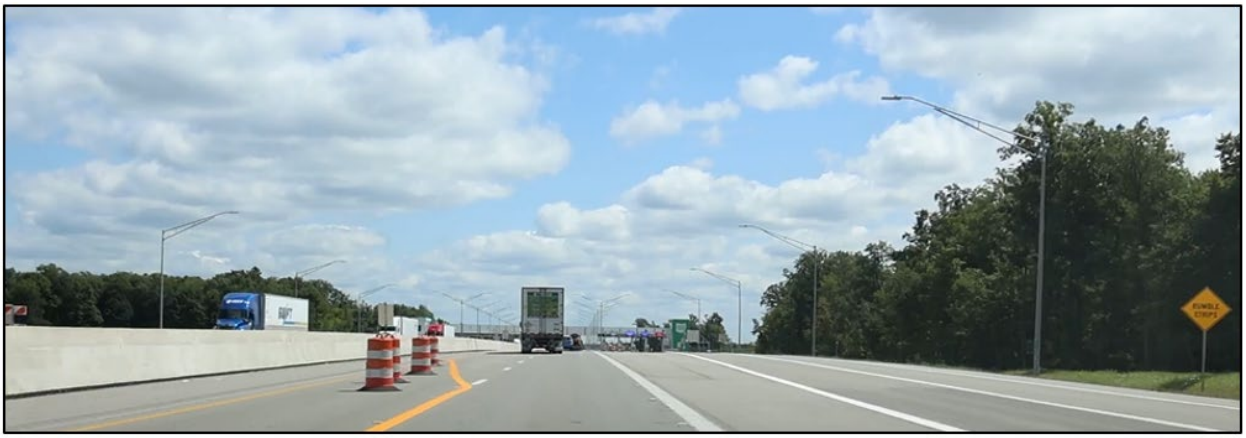


Figure 15. The construction zone ends just prior to the Westgate Toll Plaza (TP 4) and high-speed lanes located to the left expand to two lanes.

Prior to the Westgate Toll Plaza (TP 4), there was a portable changeable message sign, a 2-mile advance warning sign, a 1-mile guide sign, a ½-mile guide sign, and an exit area guide sign.

2.0 Newton Falls Toll Plaza (TP 211)

Figure 16 illustrates the westbound high-speed and low-speed lanes prior to the Newton Falls Toll Plaza TP 211 looking to the northwest.

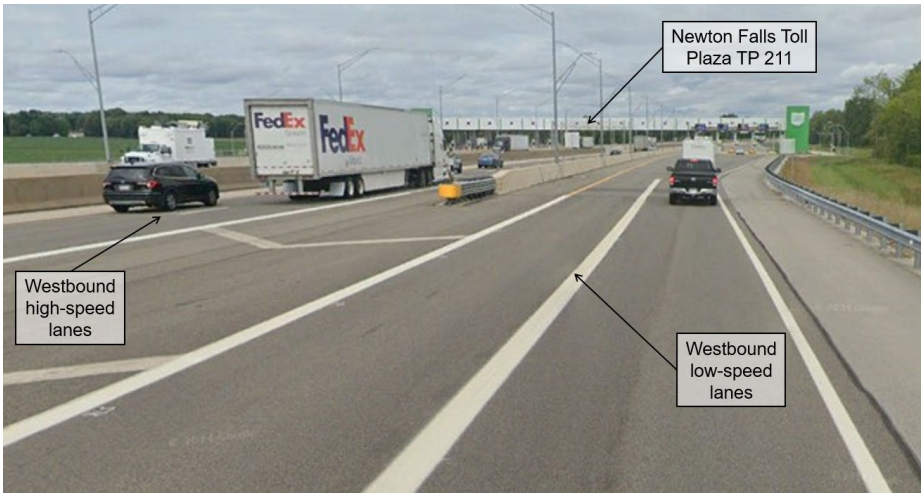


Figure 16. Westbound high-speed and low-speed lanes prior to the Newton Falls Toll Plaza TP 211 looking to the northwest (Source: Google Street View revised, imagery date August 2024).

Prior to the Newton Falls Toll Plaza (TP 211), there was a portable changeable message sign, a 2-mile advance warning sign, a 1-mile guide sign, a ½-mile guide sign, and an exit area guide sign.

3.0 Other Tolling Facilities in the U.S. that utilize Open Road Tolling-Cash Hybrid Toll Designs

Other tolling facilities in the U.S. that utilize open road tolling-cash hybrid toll designs, but not all electronic tolling include the following:

- Central Florida Expressway
- Maine Turnpike
- New Hampshire DOT/Bureau of Turnpikes
- New Jersey Turnpike Authority
- Globalvia Inversiones Holding LLC (Virginia Pocohontas Parkway)
- Richmond Metropolitan Transportation Authority
- Washington State DOT (Tacoma Narrows Bridge)

K. PERMANENT CLOSURE OF LOW-SPEED LANES IN PENNSYLVANIA

The Pennsylvania Turnpike Commission (PTC) indicated in an email to NTSB investigators dated March 14, 2025, they permanently closed the low-speed lanes at the Gateway East Toll Plaza near the Ohio state line to "*eliminate the need for vehicles to slow down and merge back into traffic that is traveling at normal speeds through the express* [high-speed] *E-ZPass lanes.*" The Gateway East Toll Plaza was converted to all electronic tolling in October 2019. The PTC subsequently converted the rest of the turnpike system to all electronic tolling in June 2020.[22]

Also, the PTC indicated in an email to NTSB investigators dated March 19, 2025, that they "*implemented all electronic tolling due to it being safer, quicker, more convenient for customers and better for the environment. All electronic tolling is safer because customers no longer have to stop or change lanes depending on their payment method.*"[23]

Figure 17 illustrates the permanent closure of the eastbound low-speed lanes using raised tubular markers at the Gateway East Toll Plaza in Pennsylvania near the Ohio state line looking to the east.

[22] See Highway Attachment – Pennsylvania Turnpike Commission 3-14-25 Email.
[23] See Highway Attachment – Pennsylvania Turnpike Commission 3-19-25 Email.

Figure 17. Permanent closure of the eastbound low-speed lanes using raised tubular markers at the Gateway East Toll Plaza in Pennsylvania near the Ohio state line looking to the east (Source: Google Street View revised, imagery date June 2024).

Figure 18 illustrates all electronic tolling used for the eastbound high-speed lanes at the Gateway East Toll Plaza in Pennsylvania near the Ohio state line looking to the east.

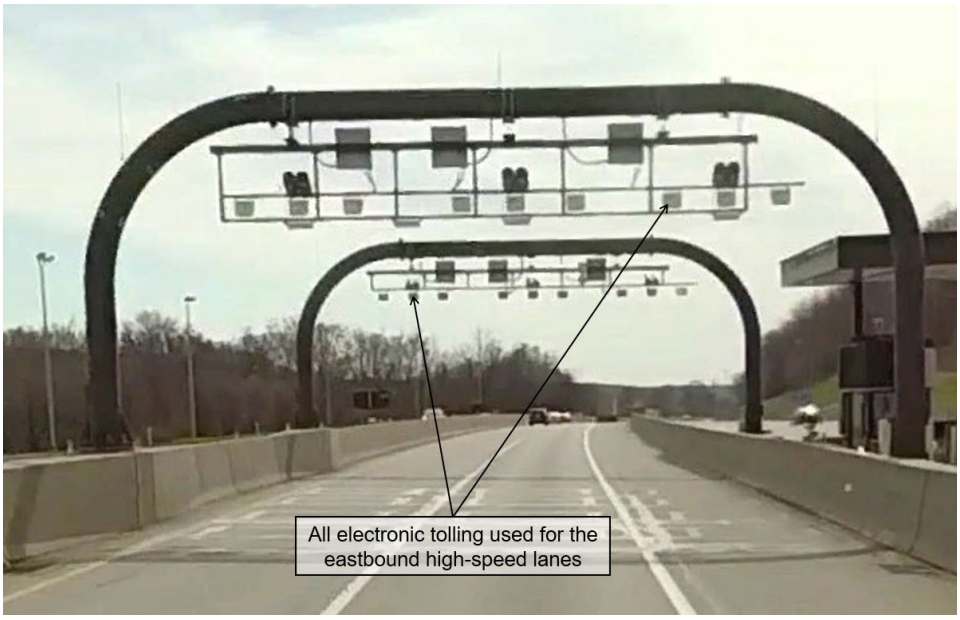


Figure 18. All electronic tolling used for the eastbound high-speed lanes at the Gateway East Toll Plaza in Pennsylvania near the Ohio state line looking to the east (Source: Google Street View revised, imagery date June 2024).

Figure 19 illustrates the permanent closure of the westbound low-speed lanes using raised tubular markers at the Neshaminy Falls Toll Plaza in Pennsylvania looking to the west.

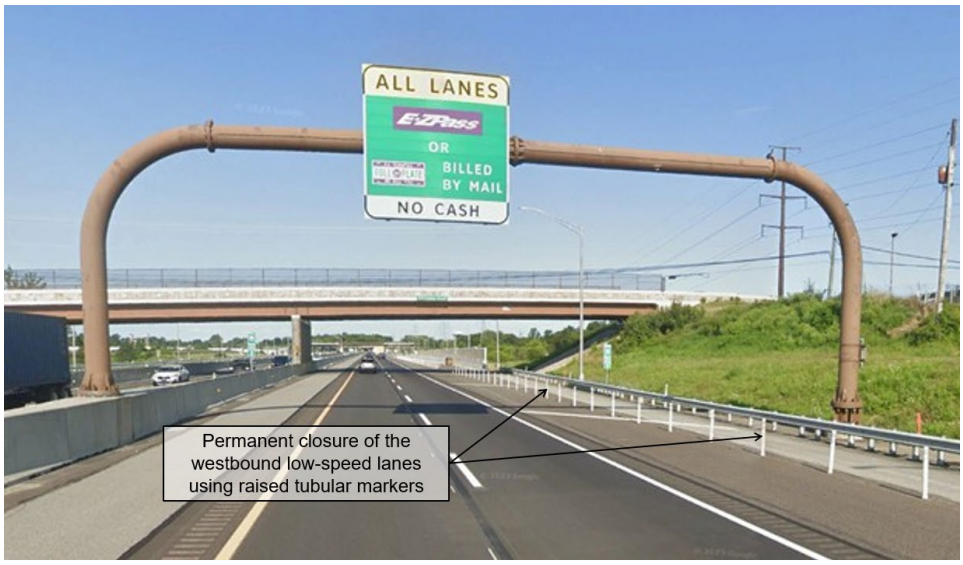


Figure 19. Permanent closure of the westbound low-speed lanes using raised tubular markers at the Neshaminy Falls Toll Plaza in Pennsylvania looking to the west (Source: Google Street View revised, imagery date August 2023).

Figure 20 illustrates all electronic tolling used for the westbound high-speed lanes at the Neshaminy Falls Toll Plaza in Pennsylvania looking to the west.

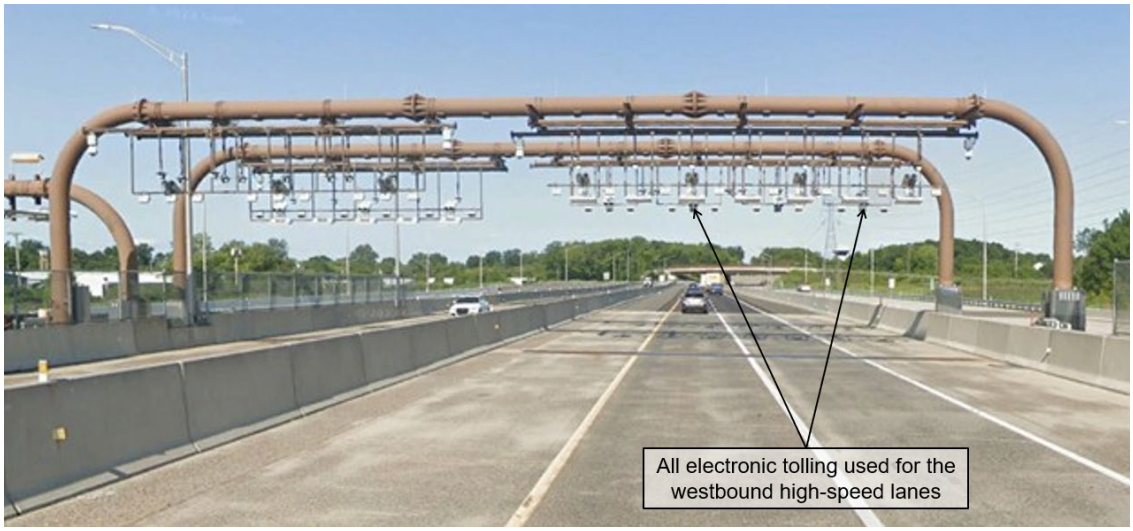


Figure 20. All electronic tolling used for the westbound high-speed lanes at the Neshaminy Falls Toll Plaza in Pennsylvania looking to the west (Source: Google Street View revised, imagery date August 2023).

In an email from the PTC to NTSB investigators dated July 11, 2025, PTC indicated they operated an open road tolling-cash hybrid system for approximately 16 years, at several toll plaza areas before converting to all electronic tolling.

L. PERMANENT CLOSURE OF LOW-SPEED LANES IN ILLINOIS

Figure 21 illustrates the permanent closure of the eastbound low-speed lanes using crosshatch road markings at the Marengo Toll Plaza 7 in Illinois looking to the southeast.

Figure 21. Permanent closure of the eastbound low-speed lanes using crosshatch road markings at the Marengo Toll Plaza 7 in Illinois looking to the southeast (Source: Google Street View revised, imagery date August 2023).

Figure 22 illustrates all electronic tolling used for the eastbound high-speed lanes at the Marengo Toll Plaza 7 in Illinois looking to the southeast.

Figure 22. All electronic tolling used for the eastbound high-speed lanes at the Marengo Toll Plaza 7 in Illinois looking to the southeast (Source: Google Street View revised, imagery date August 2023).

Figure 23 illustrates the permanent closure of the westbound low-speed lanes using crosshatch road markings at the Belvidere Toll Plaza 5 in Illinois looking to the west.

Figure 23. Permanent closure of the westbound low-speed lanes using crosshatch road markings at the Belvidere Toll Plaza 5 in Illinois looking to the west (Source: Google Street View revised, imagery date October 2022).

Figure 24 illustrates all electronic tolling used for the westbound high-speed lanes at the Belvidere Toll Plaza 5 in Illinois looking to the west.

Figure 24. All electronic tolling used for the westbound high-speed lanes at the Belvidere Toll Plaza 5 in Illinois looking to the west (Source: Google Street View revised, imagery date October 2022).

M. PERMANENT CLOSURE OF LOW-SPEED LANES IN TEXAS

Figure 25 illustrates the permanent closure of the westbound low-speed lanes using concrete barrier at the President George Bush Turnpike Toll Plaza in Texas looking to the southwest.

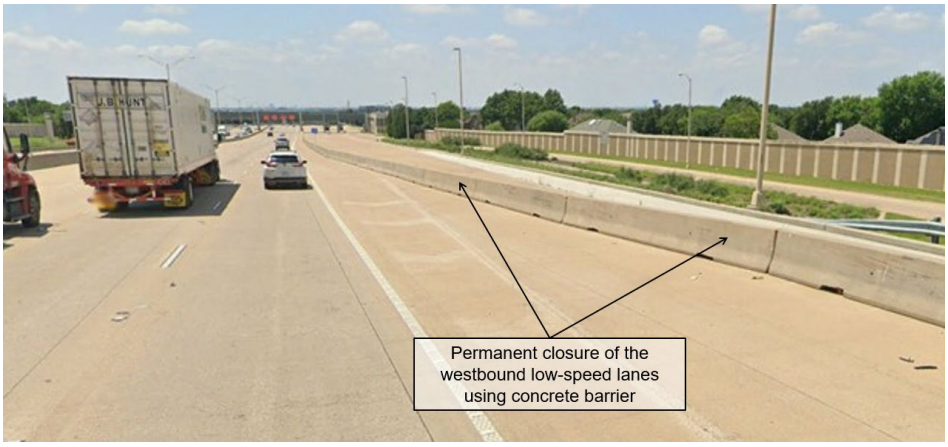


Figure 25. Permanent closure of the westbound low-speed lanes using concrete barrier at the President George Bush Turnpike Toll Plaza in Texas looking to the southwest (Source: Google Street View revised, imagery date May 2024).

Figure 26 illustrates all electronic tolling used for the westbound high-speed lanes at the President George Bush Turnpike Toll Plaza in Texas looking to the southwest.

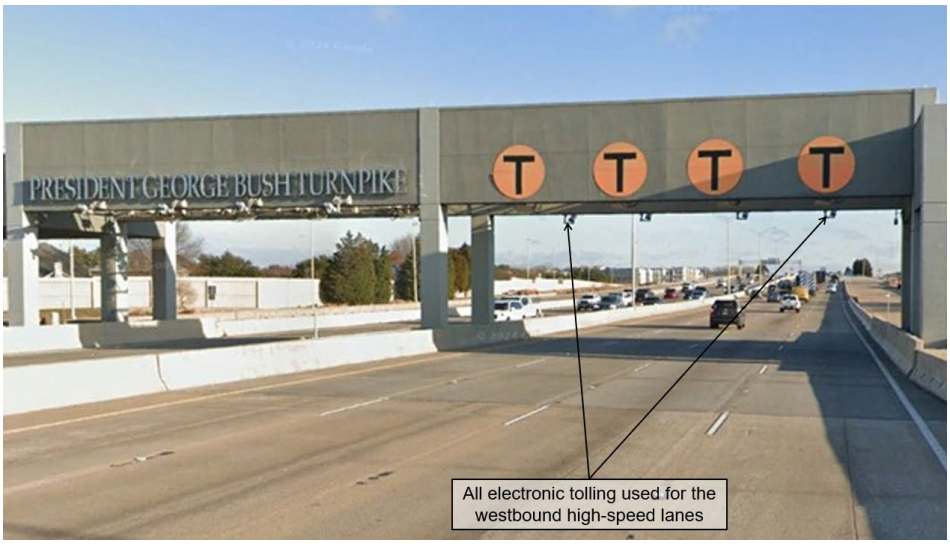


Figure 26. All electronic tolling used for the westbound high-speed lanes at the President George Bush Turnpike Toll Plaza in Texas looking to the southwest (Source: Google Street View revised, imagery date May 2024).

In an email from the North Texas Tollway Authority (NTTA) to NTSB investigators dated July 8, 2025, NTTA indicated they operated an open road tolling-cash hybrid system for approximately 10 years, on average, in those areas before converting to all electronic tolling.

N. DOCKET MATERIAL

The following attachments and photographs are included in the docket for this investigation:

LIST OF ATTACHMENTS:

Highway Factors Attachment –	Average Daily Traffic Volumes on I-80/90
Highway Factors Attachment –	I-80/I-90 Traffic Crash Data
Highway Factors Attachment –	Typical Sections for I-80/90
Highway Factors Attachment –	Rumble Strip Details for I-80/90
Highway Factors Attachment –	Pavement Markings on I-80/90
Highway Factors Attachment –	Horizontal and Vertical Alignment on I-80/90
Highway Factors Attachment –	Ohio Turnpike and Infrastructure Commission 11-5-24 Email
Highway Factors Attachment –	Traffic Incident Management System Guidelines
Highway Factors Attachment –	Pennsylvania Turnpike Commission 3-14-25 Email
Highway Factors Attachment –	Pennsylvania Turnpike Commission 3-19-25 Email

Submitted by:

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