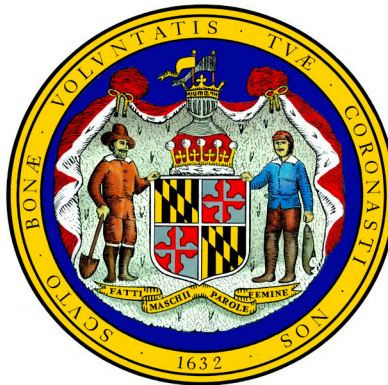


Special Review

Maryland Transportation Authority

Data Analysis of Electronic Tolling and
Customer Service Processes

March 2023



OFFICE OF LEGISLATIVE AUDITS
DEPARTMENT OF LEGISLATIVE SERVICES
MARYLAND GENERAL ASSEMBLY

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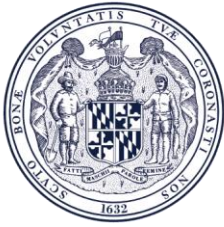
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MARYLAND GENERAL ASSEMBLY

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Legislative Auditor

March 22, 2023

Senator Clarence K. Lam, M.D., Senate Chair, Joint Audit and Evaluation Committee
Delegate Jared Solomon, House Chair, Joint Audit and Evaluation Committee
Members of Joint Audit and Evaluation Committee
Annapolis, Maryland

Ladies and Gentlemen:

We have conducted a special review of certain Maryland Transportation Authority (MDTA) electronic tolling and customer service processes. This review was initiated based on various allegations and concerns we received through our fraud, waste, and abuse hotline and from constituent concerns conveyed to us by several members of the Maryland General Assembly. As of April 2, 2022, 74 complainants had contacted our fraud, waste, and abuse hotline, many of whom had multiple complaints, including being charged for a toll they did not incur, charged an incorrect rate (such as charged full price when they had an *E-ZPass* or commuter plan), or charged multiple times for the same trip.

Our review had two specific objectives based on an analysis of MDTA tolling and customer data. The first objective was to determine if MDTA improperly charged tolls to Thomas J. Hatem Memorial Bridge discount plan customers. The second objective was to determine if, at all toll facilities, MDTA improperly charged customers for the same toll twice.

To enable us to perform this analysis, we requested electronic data extracts of MDTA tolling data and customer service data for the ten-month period from April 13, 2021 to February 13, 2022, from which we performed specialized data analysis tests and queries. The requested extracts included over 430 million detailed transactions, representing over 115 million unique tolling transactions related to over 5 million customer accounts. Our objectives did not include a review and assessment of MDTA customer service relations or interactions with customers about tolling complaints and inquiries.

Hatem Bridge Discount Plan Customers Improperly Charged Tolls

Based on our data analysis, we identified approximately \$435,000 in potentially improper toll charges related to 10,474 Thomas J. Hatem Memorial Bridge discount plan customers that warrant further follow-up by MDTA. Under the discount plan, customers pay \$20 annually for unlimited trips by a two-axle vehicle and should not be charged tolls if the vehicle has a properly mounted *E-ZPass* transponder.

Our detailed analysis of these discount plan customers' accounts disclosed a significant spike in toll charges during the three-week period from December 24, 2020 to January 15, 2021. During this period, 4,465 customers were charged 7,813 tolls totaling \$62,595.

Based on our review of the related vehicle images taken by tolling cameras for 37 judgmentally selected tolls during the spike period, we believe MDTA should have dismissed 25 of these tolls relating to 23 customers since the vehicle images showed a properly mounted transponder or the image was insufficient to determine if the transponder was properly mounted. For 11 of those 25 tolls where the photographic image was insufficient to determine if a transponder was properly mounted, since the license plate number was associated with the *E-ZPass* account we believe the burden should have been on MDTA to prove user error by a discount plan customer before charging a toll.

Customers Improperly Charged Tolls Twice

Based on our data analysis for all MDTA toll facilities, we identified 82,847 customers that were potentially charged more than once for a single trip through a toll facility. The toll charges (including both potential duplicate tolls and correct tolls) for these customers totaled approximately \$645,000. A majority of these tolls (80 percent) occurred at three toll facilities – the Intercounty Connector (ICC), the William Preston Lane Jr. Memorial (Bay) Bridge, and the Fort McHenry Tunnel.

Our test of 65 of these customers determined that 62 customers were improperly charged. Specifically, 36 customers were improperly charged at least twice based on the same information for one unique toll transaction (vehicle, time of day, and toll facility) and another 26 customers were improperly charged because MDTA misapplied a separate, unrelated vehicle's toll transaction to the customer.

Our further review of the vehicle images taken by tolling cameras for the 65 customers disclosed various examples of customers being charged twice for a single trip through the toll facility. For example, a customer traveling on the I-95 Express Toll Lanes was charged twice based on tolling equipment cameras in two

lanes mistakenly reading the same vehicle twice and another customer was improperly charged twice for the same trip on the ICC.

Although not a formal objective of the review, using the electronic data extracts, we also attempted to determine the timeliness of transaction postings to customer accounts. Untimely transaction posting had been a source of frustration expressed by the motoring public when we initiated our review. Our analysis showed a marked improvement in timeliness of transaction posting from an average of 279 days pre-April 2021 to a 20-day average after that date.

Since this special review was not an audit conducted in accordance with *Government Auditing Standards*, we did not include recommendations for our observations. Nevertheless, we believe MDTA should proactively perform similar data analysis periodically to ensure the continued accuracy of its systems and processes and the appropriateness of customer toll charges.

We provided MDTA with the necessary information to follow-up on the customers identified through our data analysis who were potentially charged improper tolls. Finally, we shared with MDTA the criteria used in our data analysis so that, in conjunction with the tolling contractors, MDTA could perform similar analyses in the future. Any corrective actions taken by MDTA regarding customer tolling accuracy will be subject to review during our next fiscal compliance audit of MDTA.

We shared our observations with the Maryland Department of Transportation (MDOT) and MDTA in March 2023. Although this report contains no recommendations, we provided a draft copy of the report to MDOT and MDTA for review and comment. MDTA has provided a written response to our findings, which we believe demonstrates its agreement and describes an appropriate corrective action plan. This response has been included as an Appendix to this report.

We wish to acknowledge the cooperation extended to us during the review by MDOT, MDTA, and its tolling contractors.

Respectfully submitted,

A handwritten signature in black ink that reads "Gregory A. Hook". The signature is written in a cursive, flowing style.

Gregory A. Hook, CPA
Legislative Auditor

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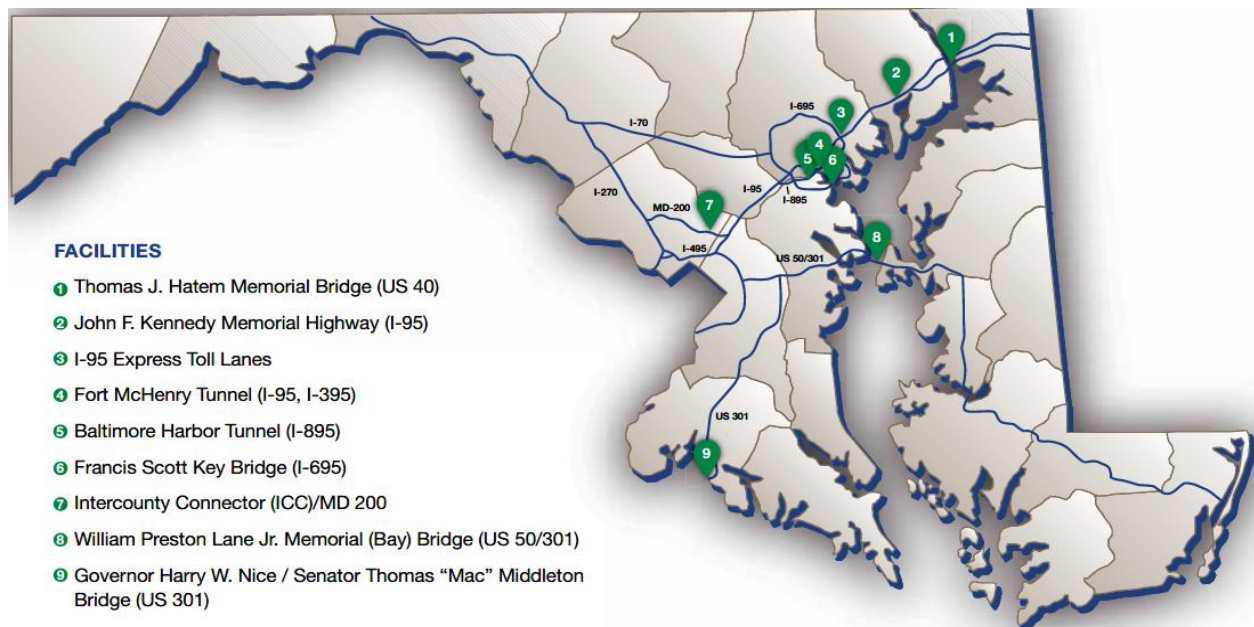
Background Information

Maryland Transportation Authority (MDTA) Responsibilities

Title 4 of the Transportation Article, Annotated Code of Maryland, establishes MDTA as an agency of the State, to act on behalf of the Maryland Department of Transportation with regard to the supervision, financing, construction, operation, maintenance, and repair of the State's toll facilities. The governing board of MDTA consists of eight members who are appointed by the Governor with the advice and consent of the Senate. The Secretary of Transportation serves as the Chairman.

MDTA is responsible for the collection of toll revenue at the State's nine toll collection facilities (see Figure 1). Effective March 5, 2020, the State discontinued the collection of cash tolls. Since that time, customers can pay tolls electronically through *E-ZPass*, through video tolling billing notices, or by credit card using the Pay-by-Plate program.¹

Figure 1
Map of MDTA's Nine Toll Collection Facilities



Source: MDTA Fiscal Year 2022 Financial Statements

¹ Pay-by-Plate is similar to video tolling except the tolls are charged to a customer's credit card on file with MDTA.

During fiscal year 2022, toll collections totaled \$702.6 million, which were mainly comprised of *E-ZPass* collections totaling \$562.4 million (see Figure 2). MDTA also operates twelve walk-in Customer Service Centers (five at selected MDTA toll facilities and seven at Motor Vehicle Administration offices) and one Customer Service Call Center.

Figure 2
Toll Collections and Transactions by Facility
Fiscal Year 2022

(collections expressed in millions of dollars and transactions expressed in thousands)

Toll Facility	<i>E-ZPass</i> Tolls		Video Tolls		Pay-by-Plate Tolls		Total	
	Collections	Transactions	Collections	Transactions	Collections	Transactions	Collections	Transactions
Fort McHenry Tunnel	\$169.4	35,452	\$42.6	5,968	\$.570	139	\$212.6	41,559
John F. Kennedy Memorial Highway/I-95	152.1	12,544	24.5	1,644	.214	25	176.8	14,213
Baltimore Harbor Tunnel	67.4	21,103	23.4	3,780	.404	100	91.2	24,983
Intercounty Connector	51.9	27,150	11.4	3,826	.297	134	63.6	31,110
William Preston Lane Jr. Memorial (Bay) Bridge	40.7	10,936	13.0	1,935	.202	48	53.9	12,919
Francis Scott Key Bridge	41.5	10,038	11.4	1,723	.180	44	53.0	11,805
Governor Harry W. Nice Memorial / Senator Thomas “Mac” Middleton (Nice) Bridge	14.9	2,393	5.8	574	.097	15	20.8	2,982
Thomas J. Hatem Memorial Bridge	12.5	4,089	5.2	396	.037	5	17.7	4,490
I-95 Express Toll Lanes	12.0	7,752	0.9	384	.013	8	13.0	8,144
Total	\$562.4	131,457	\$138.2	20,230	\$2.014	518	\$702.6	152,205

Note: Numbers may not sum to total due to rounding.

Source: MDTA Fiscal Year 2022 Financial Statements

Customer Discount Plans

MDTA has six customer discount plans for two-axle vehicles available to *E-ZPass* Customers – the Baltimore Region plan, the Governor Harry W. Nice Memorial / Senator Thomas “Mac” Middleton (Nice) Bridge plan, two plans for the William Preston Lane Jr. Memorial (Bay) Bridge, and two plans for the Thomas J. Hatem Memorial Bridge. Each discount plan provides customers with reduced toll charges due to frequent usage at certain toll facilities. For example,

the Baltimore Region discount plan costs customers \$70 for 50 discounted trips within 45 days (\$1.40 per trip) at three tolls facilities (Fort McHenry Tunnel, Baltimore Harbor Tunnel, and Francis Scott Key Bridge). At John F. Kennedy Memorial Highway and Thomas J. Hatem Memorial Bridge two trips are deducted for each trip (\$2.80) under the Baltimore Region discount plan because tolls are only collected in one direction. Additionally, for the two Hatem Bridge plans, customers pay \$20 annually for unlimited trips by a two-axle vehicle. MDTA also has two discount plans for vehicles with five or more axles at seven of the nine toll facilities (does not apply to the Intercounty Connector or the I-95 Express Toll Lanes).

Tolling Contractors

In February 2018, the Board of Public Works (BPW) approved two separate contracts totaling \$359.4 million to replace MDTA's prior contractor that provided both the toll collection system (hardware and software for toll facilities to record transactions) and the customer service center (including related software to process recorded toll transactions to individual customers). One contractor was awarded a nine-year contract for the customer service center totaling \$200.4 million, with two renewal options valued at an additional \$72.4 million. A second contractor was awarded a nine-year contract for the toll collection system totaling \$71.9 million, with two renewal options valued at an additional \$14.7 million.

The transition to the new toll collection system began in May 2019 and involved installing new tolling system equipment and software. Although the installation of the equipment and software was completed in July 2020, MDTA had a lengthy process of testing and calibrating the toll collection system, and the transition to the new customer service center contractor took more time than planned. In order to maintain continuity of services, MDTA obtained BPW approval in January 2021 to extend the contract of the previous tolling contractor until March 2022 at a cost of \$38 million. In April 2021, MDTA made the final transition to the new tolling system and customer service center.

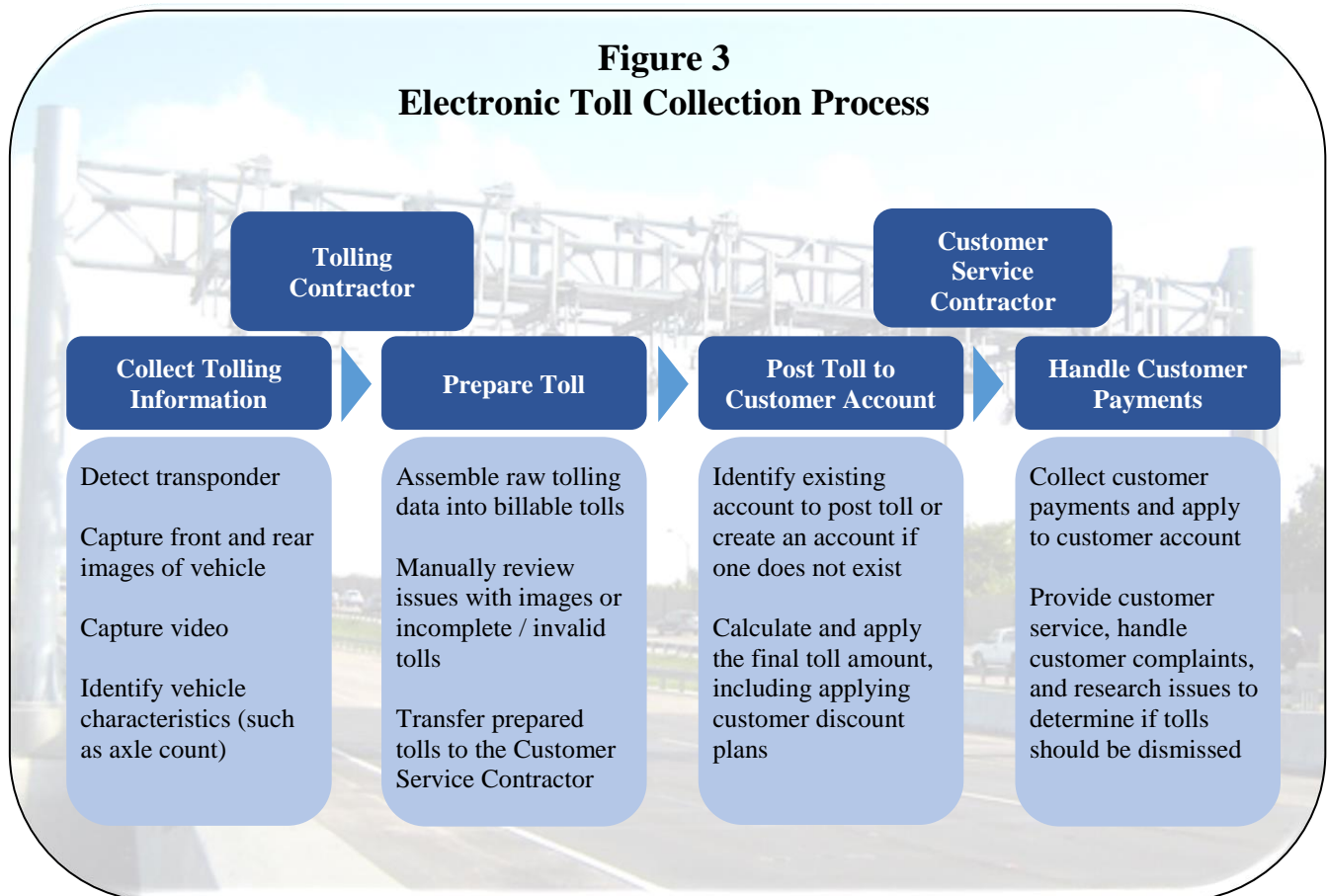
Electronic Toll Collection Process

In the new All Electronic Tolling system, images of the front and rear license plates are taken for all vehicles driving through a toll facility. *E-ZPass* transactions are recorded when a vehicle with a transponder travels through a toll facility. Video tolling occurs when a customer drives through a toll facility without using an *E-ZPass* transponder (the customer does not have their *E-ZPass* transponder in the vehicle, the customer does not have an *E-ZPass* account, the customer did not register their license plate on their *E-ZPass* account, or the

tolling equipment did not read the transponder), and the images are used to identify the vehicle, whose owner is sent a bill at an increased toll rate to cover processing fees. Pay-by-Plate is similar to a video tolling except the tolls are charged to a customer's credit card on file with MDTA.

For video tolling and Pay-by-Plate, MDTA's system attempts to automatically determine the license plate from the image and assigns a confidence percentage as to the certainty that the license plate was captured accurately. Images for which the system reflects a low degree of confidence in the accuracy are manually reviewed and verified before being billed to the vehicle owners. See Figure 3 for a summary of how MDTA's two tolling contractors work together to process electronic tolls.

Figure 3
Electronic Toll Collection Process



In response to concerns raised in the *2022 Joint Chairman's Report* regarding the accuracy of tolling equipment, MDTA issued a report, dated January 2023, which concluded that the tolling system has a high degree of accuracy with a low error rate. MDTA based its conclusions on a review of tolling transactions for the seven-day period from September 22, 2022 to September 28, 2022. MDTA detailed that many issues perceived by the public as tolling errors were not system

errors, and provided examples of customer-generated activities that will result in perceived errors:

- Customer fails to properly mount their transponder.
- Customer does not add their vehicle license plates to their *E-ZPass* account.
- Customer does not maintain a positive account balance by not keeping their credit card or bank account information current.
- Customer does not renew a discount plan or prepay for the Hatem Bridge discount plan.

MDTA explained that the following system errors rarely occur:

- A vehicle was over classified (miscounted the number of axles).
- An applicable discount was not given.
- A toll was processed twice or split into two separate trips.
- A toll is charged to the wrong customer.

We did not review MDTA's report in detail or determine the accuracy of the conclusions. Our special review analyzed tolling and customer data for the ten-month period from April 13, 2021 to February 13, 2022, which did not include the seven-day period in September 2022 that MDTA used for its analysis. Our special review determined that system errors did occur, in some cases with great frequency (for example, many system errors were identified over a certain time period for Hatem Bridge discount plan holders), and duplicate charges occurred that were not attributable to customer errors.

Scope, Objectives, and Methodology

Scope

This review was initiated based on various allegations and concerns received through our fraud, waste, and abuse hotline and from certain members of the Maryland General Assembly subsequent to the issuance of our fiscal compliance audit report of Maryland Transportation Authority (MDTA) dated September 13, 2021. However, similar concerns, but to a lesser extent, were initially raised during our recent fiscal compliance audit of MDTA at which time we received allegations that MDTA was not taking sufficient action to detect and address the overbilling of customers for electronic tolling due to issues with its new toll equipment.

During that audit, we reviewed MDTA's processes to monitor its electronic tolling system and the actions taken to address any deficiencies it had identified. Based on our review, we were able to substantiate the allegations regarding certain insufficient MDTA actions. See Exhibit 1 for the toll collection finding and MDTA's response published in our fiscal compliance audit report of MDTA dated September 13, 2021. We presented the MDTA audit finding to the Maryland General Assembly's Joint Audit and Evaluation Committee on December 1, 2021 and to the Appropriation Committee's Transportation and the Environment Subcommittee on February 2, 2022.

As of April 2, 2022 (shortly after we initiated this special review), 74 complainants had contacted our fraud, waste, and abuse hotline, many of whom had multiple complaints. See Exhibit 2 for a summary of the allegations and concerns we received. For example, 29 complainants stated they were charged for a toll they did not incur (such as being charged for a toll on a vehicle they did not own). Additionally, 24 complainants stated they were charged an incorrect rate (such as charged full price when they had an *E-ZPass* or commuter plan) or were charged multiple times for the same trip.

In addition, in February 2022, we met with several legislators to discuss constituent concerns with the accuracy of *E-ZPass*, video tolling, and the Hatem Bridge discount plan. Based on the allegations we received and legislator concerns, we initiated a special review to analyze certain *E-ZPass* and video tolling transactions.

Our special review was conducted during the period from February 17, 2022 through January 20, 2023 and the results herein reflect information we were able to obtain during this period. Other information relevant to our review may exist

and should be used by MDTA to correct the issues noted in the report and provide the appropriate restitution to any customers improperly charged.

We conducted this review under the authority of State Government Article, Section 2-1220 of the Annotated Code of Maryland. Our review did not constitute an audit conducted in accordance with generally accepted government auditing standards. The items tested were judgmentally selected. Neither statistical nor non-statistical sampling was used to select the items tested. Therefore, the results from any tests conducted or disclosed by us cannot be used to project those results to the entire population from which the test items were selected. Finally, while our review found certain tolling errors similar to the complaints we received through our fraud, waste, and abuse hotline, we did not identify any issues that warranted a referral to the Office of the Attorney General – Criminal Division.

Since this was not an audit conducted in accordance with *Government Auditing Standards*, we did not include recommendations for our findings/observations. Nevertheless, we believe the analysis we performed should be undertaken periodically by MDTA to ensure the continued accuracy of its systems and processes and the appropriateness of customer toll charges. Any corrective actions taken by MDTA regarding customer tolling accuracy will be subject to review during our next fiscal compliance audit of MDTA scheduled to begin in 2024.

Objectives and Methodology

The objectives of our review were:

1. to determine if MDTA improperly charged tolls to Thomas J. Hatem Memorial Bridge discount plan customers, and
2. to determine if MDTA improperly charged customers for the same toll twice.

Our review included data analysis and related tests, observations, and discussions with MDTA personnel and individuals at its electronic tolling contractors, as we deemed necessary to accomplish our objectives. Specifically, to accomplish our objectives, our Data Analytics Unit met with representatives from the Maryland Department of Transportation, MDTA, and the two tolling contractors (the tolling system contractor and the customer service center contractor) to gain an understanding of the available tolling data and file structure. Our objectives did

not include a review and assessment of MDTA customer service relations or interactions with customers about tolling complaints and inquires.

Between March 2022 and May 2022, we requested various information (such as data tables, examples of standard reports, and read-only access to tolling and customer service systems) to determine the specific tolling and customer data needed to accomplish our objectives. By August 2022, we received all requested electronic data extracts of tolling data and customer data for the ten-month period from April 13, 2021 to February 13, 2022² in order to perform specialized data analysis tests and queries. The requested extracts included over 430 million detailed transactions, representing over 115 million unique tolling transactions related to over 5 million customer accounts.

Data Extracts Subject to Our Analysis

- Included over **430 million** detailed transactions
- Representing over **115 million** unique tolling transactions
- Related to over **5 million** customer accounts

Although by August 2022 we determined that we had received complete data sets, the process to obtain this information took many months. Specifically, our Data Analytics Unit reviewed the data sets, which resulted in the need to meet with MDTA and the contractors to clarify and occasionally modify the requests. Additionally, the tolling contractors and MDTA had to balance our requests with other competing priorities to maintain the continuity of services at MDTA tolling facilities. The analysis of these records was time consuming to ensure the results we obtained were complete and accurate, which accounted for the majority of the effort during our review period.

Although not a formal objective of this special review, given our access to millions of MDTA tolling records, we performed some limited work to assess if posting of tolling transactions was timely from April 2021 to January 2022. In addition to tolling errors, customers had complained about past delays in posting transactions to customer accounts, which MDTA acknowledged occurred. Our limited review of the records was intended to assess if timely postings were now occurring.

² We performed certain procedures to provide reasonable assurance that the extracts received were reliable and contained the requested information.

Office of Legislative Audits' (OLA) Observations

Objective 1 – Thomas J. Hatem Memorial Bridge Discount Plan

Objective: To determine if the Maryland Transportation Authority (MDTA) improperly charged tolls to Thomas J. Hatem Memorial Bridge discount plan customers.

Background

According to MDTA records, as of February 1, 2022, there were 57,615 Hatem Bridge discount plan customers. MDTA provides two discount plans for the Thomas J. Hatem Memorial (Hatem) Bridge under which customers pay \$20 per year for unlimited trips over the Hatem Bridge for two-axle vehicles.³ If the customer transponder associated with the plan is properly mounted in the vehicle and read by the tolling equipment, no toll will be charged. Therefore, if a Hatem Bridge discount plan customer is charged a toll, it represents a problem with either the tolling equipment (MDTA error), the customer not having the transponder properly mounted in the vehicle and/or maintaining a positive account balance (customer error), or a combination of both.

As of April 2, 2022, our fraud, waste, and abuse hotline received four complaints related to Hatem Bridge discount plan customers being incorrectly charged tolls. Additionally, our fiscal compliance audit report of MDTA dated September 13, 2021 disclosed that MDTA identified an overbilling issue due to tolling equipment miscounting axles at the Hatem Bridge. In response to the overbilling issue, MDTA reviewed transactions for Hatem Bridge discount plan customers between October 21, 2019 and November 26, 2019 and identified 5,646 transactions for two-axle vehicles that may have been overbilled. MDTA's review resulted in it crediting the related accounts \$67,000.

Methodology

To accomplish our objective, we performed the following:

- Obtained an understanding of the Hatem Bridge discount plans and the requirements for customers to receive the discount.

³ MDTA provides two discount plans for the Hatem Bridge – Choice A and Choice B. The Choice A plan uses a transponder that only works at the Hatem Bridge toll facility and the Choice B plan uses a transponder that works at all toll facilities accepting *E-ZPass* (meaning the customer receives the *E-ZPass* tolling rate at all other MDTA toll facilities). The Choice B plan also includes savings on 3 and 4 axle vehicle tolls at the Hatem Bridge. Under both plans, the unlimited trips only applies to the Hatem Bridge.

- Obtained and gained an understanding of MDTA account data and Hatem Bridge tolling data that occurred or were posted to customer accounts from April 2021 through January 2022.
- Developed criteria (detailed below) to identify potential high-risk instances where customers with the Hatem Bridge discount plan did not receive the discount.
- Conducted data analysis for the period of review that identified tolls meeting the criteria.
- Reviewed the results of our analysis for unusual trends or patterns that could be indicative of tolling problems (such as time periods with unusual increases in customers not receiving the discount).
- Performed testing of the analysis results and reviewed detailed account information for a selection of tolls in MDTA's source systems (such as reviewing the related images and customer account details) to confirm whether or not a toll was proper.

Conclusion as of January 20, 2023

Based on our analysis of the Hatem Bridge tolling data during the period from April 13, 2021 through January 30, 2022,⁴ we identified approximately \$435,000 in potentially improper charges related to 10,474 customers that we concluded warrant further follow-up by MDTA. We also determined that MDTA did not determine the full impact (duration and impacted customer accounts) of a tolling equipment malfunction at the Hatem Bridge that it had previously identified in January 2021. As of March 2023, we provided MDTA with the necessary information to follow-up on the customers identified through our data analysis who were potentially charged improper tolls. Additionally, we shared with MDTA the criteria used in our data analysis so that, in conjunction with the tolling contractors, MDTA could perform similar analyses in the future.

OLA Data Analysis

As noted above, customers with a discount plan should not be charged a toll if the transponder is properly mounted in the vehicle and the tolling equipment correctly reads the transponder. In order to identify Hatem Bridge discount plan customers with potentially improper transactions, we filtered the Hatem Bridge toll transactions that met all four of the following criteria:

- The customer had an active Hatem Bridge discount plan at the time of the toll.
- The vehicle was two-axle based on the tolling data.

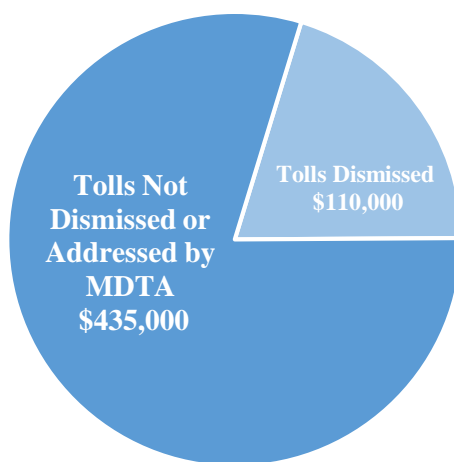
⁴ This includes all tolls that occurred, were sent to the customer service contractor, and/or were posted to customer accounts from April 13, 2021 through January 30, 2022. This also includes tolls as far back as July 21, 2020 due to MDTA's backlog in posting toll transactions.

- The same vehicle, based on the license plate, received the discount on other tolls at the Hatem Bridge on the same customer account.
- The discount plan customer did not receive the expected zero dollar toll transaction when traveling the Hatem Bridge, as would be the case if MDTA properly applied the discount plan.

Based on our analysis, we identified 11,488 Hatem Bridge discount plan customers⁵ that were charged for approximately 68,000 potentially improper tolls totaling \$545,000. Our analysis of these tolls disclosed that 2,645 customers (23 percent) were charged tolls on multiple occasions (more than 5 instances), including 686 customers that were charged tolls in more than 20 instances.

MDTA had not initiated any proactive analysis to identify if Hatem Bridge discount plan customers were erroneously charged tolls and we were advised that MDTA had only addressed overbillings for specific customers who complained about their charges. As a result, MDTA had not investigated and dismissed potentially improper tolls totaling \$435,000 related to 10,474 customers. For the remaining \$110,000 in tolls related to 2,194 customers,⁶ MDTA had determined the tolls were, in fact, improper and had dismissed the tolls based on customer-initiated disputes (see Figure 4).

Figure 4
A Majority of Potentially Improper Hatem Bridge Discount Plan Toll
Were Not Dismissed or Addressed by MDTA



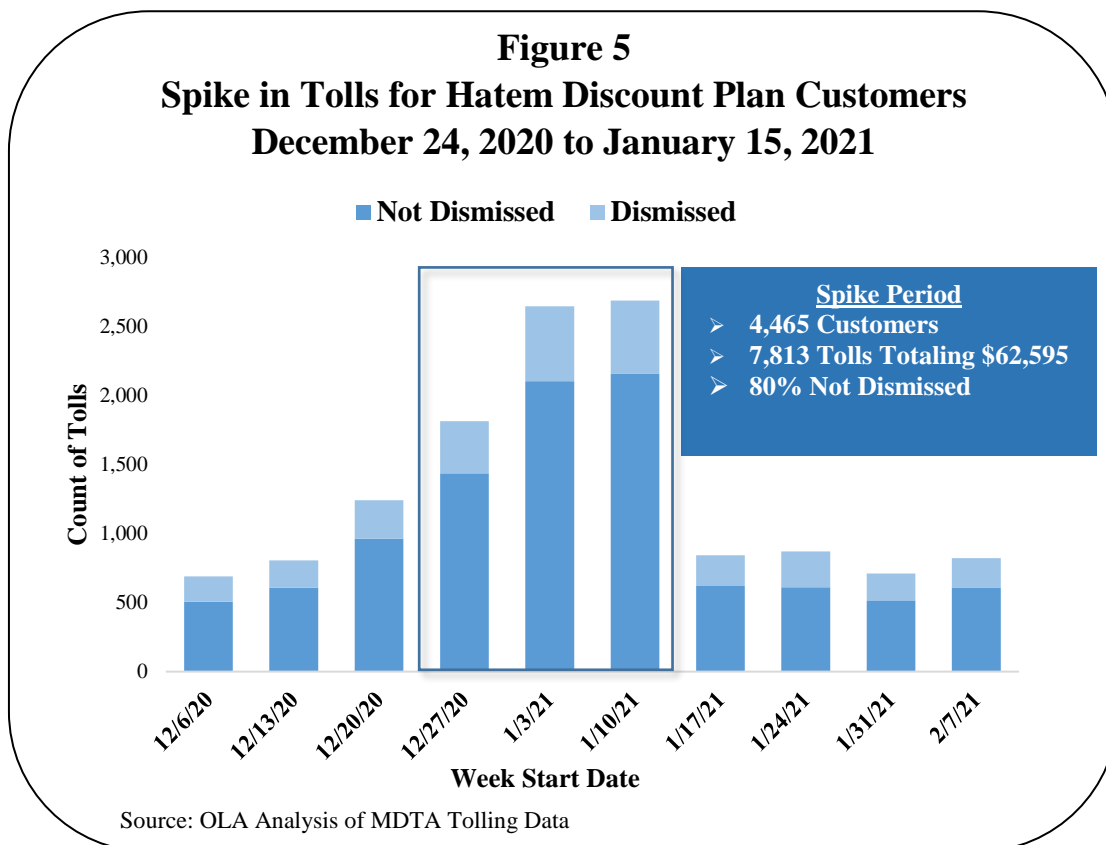
Source: OLA Analysis of MDTA Tolling Data

⁵ A majority of the customers were longstanding Hatem Bridge discount plan holders with over 78 percent having the plan for two or more years previously.

⁶ At least 1,180 customers had certain improper tolls dismissed by MDTA while other potentially improper tolls were not dismissed.

The proactive analysis of tolling and customer data by MDTA is critical to identify and correct potential tolling issues similar to the overbilling issue that occurred between October 21, 2019 and November 26, 2019, which was the subject of a prior OLA audit report finding. Since MDTA was not performing this type of analysis, certain irregularities continued to occur and MDTA had not identified the full extent of these irregularities.

For instance, our analysis identified a significant spike in tolls charged to Hatem Bridge discount plan customers during the three-week period from December 24, 2020 to January 15, 2021.⁷ During this period, 4,465 of the 11,488 customers were charged 7,813 tolls totaling \$62,595 for which MDTA had only dismissed \$12,552 based on customer-initiated disputes (see Figure 5).



In order to determine if the tolls charged to Hatem Bridge discount plan customers during the spike period were proper or whether the tolls should have been dismissed by MDTA, we reviewed 37 judgmentally selected tolls (related to 27 customers). We confirmed that the tolling equipment did not record a reading

⁷ These tolls were included in our data analysis period from April 13, 2021 through January 30, 2022 due to MDTA's backlog in posting toll transactions. See Footnote 4 for further details.

of the customers' transponders for any of these 37 tolls and we also reviewed the vehicle images taken by tolling cameras for these tolls. Our review disclosed that 7 of these tolls had already been dismissed by MDTA and we concluded that another 25 tolls (related to 23 customers) should have been dismissed by MDTA but were not (see Figure 6). For 14 of these 25 tolls, the related vehicle image showed a properly mounted transponder, which if working properly, should have been read by the tolling equipment and no toll should have been charged.

For the other 11 tolls, the related vehicle image was insufficient to determine if the transponder was in the vehicle and therefore the toll charge was questionable. For those cases where the photographic image was insufficient to determine if a transponder was properly mounted, we believe the burden should have been on MDTA to prove user error by a discount plan customer before charging a toll. Specifically, a review of our Customer Account Vehicle Registration Data confirmed that all 11 of these vehicles were registered to the corresponding customer account as of the time MDTA provided us with the data. See Figure 7 on pages 20 to 22 for examples of the vehicle images we reviewed.

In response to our inquiries regarding the spike in tolls, MDTA advised us that it had identified a tolling equipment malfunction on January 14, 2021, which it believed had been fully resolved the following day. MDTA also believed it had dismissed all improper charges to customer accounts. However, as noted above, the tolling issues extended beyond the one day identified by MDTA and most of the improper charges had not been refunded.

Figure 6
Results of OLA's Review of Tolling Images

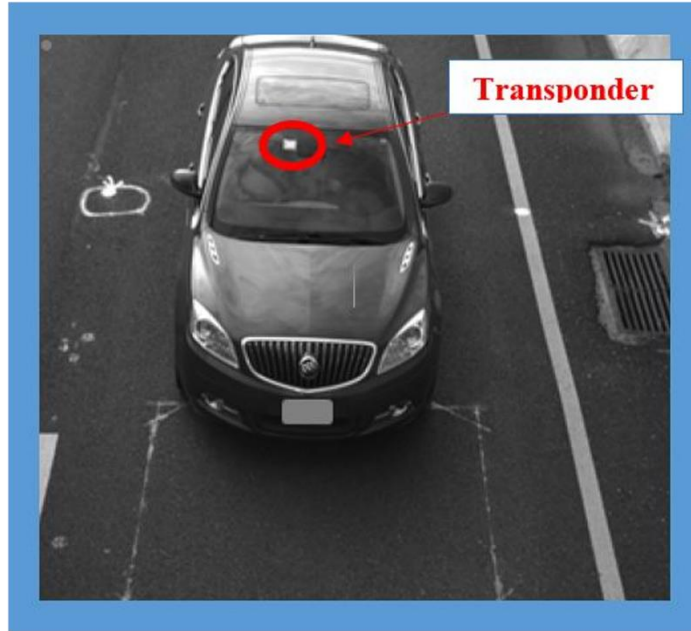
Conclusions	Tolls Tested	Tolls Not Dismissed
Transponder was visible and properly mounted based on tolling images (MDTA error).	18	14
Image did not capture some or all of the vehicle, or quality was insufficient to make a clear determination if a transponder was present and properly mounted (MDTA error).	14	11
Transponder was not visible or was not properly mounted in the vehicle based on the tolling images (customer error).	5	5
Total	37	30

Based on our review of the toll images, we believe MDTA would have dismissed 25 tolls relating to 23 customers if the customer disputed them since the transponder was visible or the image was insufficient to determine if the transponder was properly mounted.

Source: OLA Analysis of MDTA Tolling Data

Figure 7
Examples of Thomas J. Hatem Memorial Bridge Toll Images

Example 1
Transponder Properly Mounted



Example 2
Insufficient Image to Determine if Transponder was Properly Mounted



Figure 7
Examples of Thomas J. Hatem Memorial Bridge Toll Images

Example 3
Insufficient Image Quality to Determine if Transponder
Was Properly Mounted



Example 4
Insufficient Image to Determine if Transponder was Properly Mounted
Since a Vehicle is Not Identified in Front Image

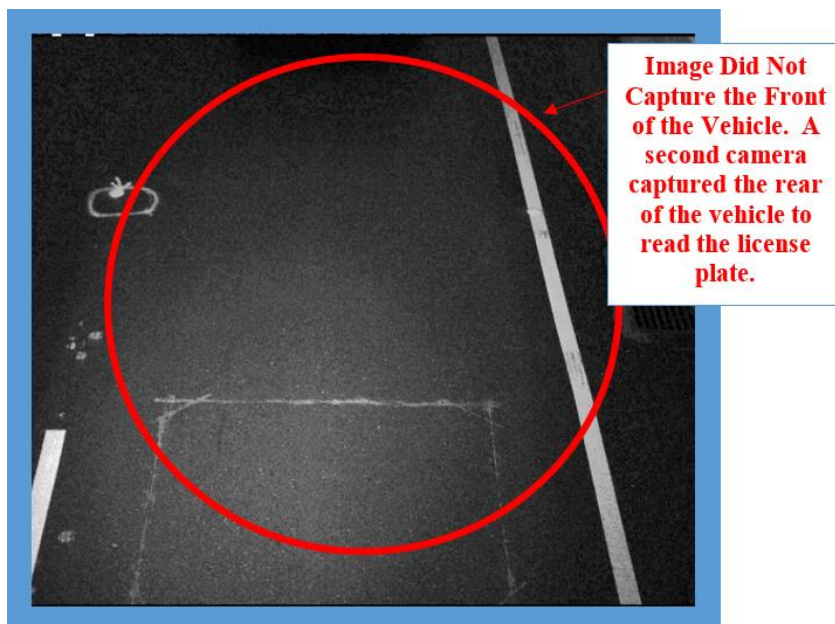


Figure 7
Examples of Thomas J. Hatem Memorial Bridge Toll Images

Example 5
Transponder Not Properly Mounted



Objective 2 – Duplicate Toll Analysis

Objective: To determine if MDTA improperly charged customers for the same toll twice.

Background

As of April 2, 2022, our fraud, waste, and abuse hotline had received seven complaints related to potential duplicate tolls at four MDTA tolling facilities (Baltimore Harbor Tunnel, Fort McHenry Tunnel, Bay Bridge, and the Intercounty Connector or ICC). Additionally, our fiscal compliance audit report of MDTA dated September 13, 2021 disclosed that customers were being billed twice due to cameras misreading vehicles in other toll lanes at the Fort McHenry Tunnel and the Francis Scott Key Bridge. Also, the audit report identified issues with tolling equipment at the ICC that resulted in vehicle misreads, which could have caused incorrect toll charges or overbillings.

For all tolling facilities except the ICC, the customers are charged tolls based on traveling through a single toll facility. For the ICC, customers are charged tolls based on a constructed toll trip, which takes into account the customers starting and ending toll gantry points. The entire length of the ICC includes 12 toll gantries (6 gantries in each direction) from I-370 to US 1.⁸ MDTA stated that it has multiple system controls to prevent customers from receiving duplicate billings, such as filters that are supposed to detect multiple trips that are within short time intervals or meet other criteria and prevent customers from being improperly charged for multiple trips.

Methodology

To accomplish our objective, we performed the following:

- Identified scenarios based on consideration of the complaints received through our fraud, waste, and abuse hotline, review of the data, and developing an understanding of related tolling processes that could be indicative of duplicate tolls being charged to customers.
- Developed specific criteria to apply for each scenario to identify potential duplicate tolls.
- Conducted data analysis for the period of review that identified specific groups of tolls meeting the criteria.

⁸ The toll rates for the ICC vary depending on peak hours (Mon - Fri: 6am - 9am; 4pm - 7pm excluding federal holidays), off-peak hours (Mon - Fri: 5am - 6am; 9am - 4pm; 7pm - 11pm; Sat and Sun: 5am - 11pm), and overnight (Sun - Sat: 11pm - 5am). As of the date of this report, to travel the entire length of the ICC, drivers of cars and light trucks with *E-ZPass* pay \$3.86 during peak hours, \$2.98 off-peak, and \$1.23 overnight.

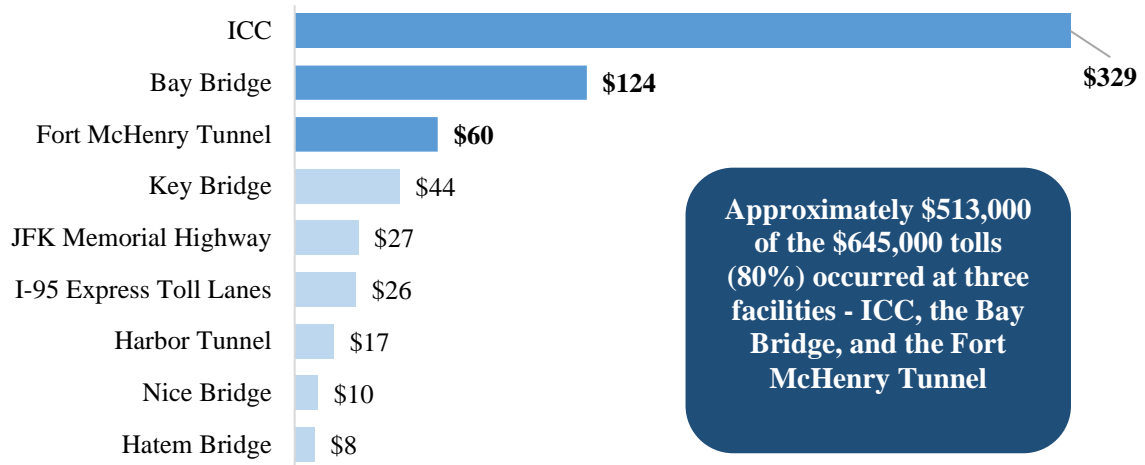
- Reviewed the analysis results for unusual trends or patterns that could be indicative of tolling problems, such as significant increases in the potential duplicates during certain periods of time or at certain MDTA facilities.
- Performed testing of the potential duplicate toll groups and reviewed detailed account and related information for each toll tested in MDTA's source systems. This included reviewing the related images from each toll and reviewing related customer account details to make a determination if the tolls were duplicates/overcharges or if there were other factors involved.

Conclusion as of January 20, 2023

We determined that potential duplicate tolls occurred and MDTA's processes did not prevent the toll charges from being applied to customer accounts. Based on our data analysis for all toll facilities, we identified 82,847 customers, during the period from April 13, 2021 to January 30, 2022,⁹ that were potentially charged more than once for a single trip through a toll facility. The toll charges (including both potential duplicate tolls and correct tolls) for these customers totaled approximately \$645,000. A majority of these tolls (80 percent) occurred at three toll facilities – the ICC, the William Preston Lane Jr. Memorial (Bay) Bridge, and the Fort McHenry Tunnel (see Figure 8 on the following page). Our subsequent test of 65 of these customers determined that 62 were improperly charged. As of March 2023, we provided MDTA with the necessary information to follow-up on the customers identified through our data analysis who were potentially charged improper tolls. Additionally, we shared with MDTA the criteria used in our data analysis so that, in conjunction with the tolling contractors, MDTA could perform similar analyses in the future.

⁹ This includes all tolls that occurred, were sent to the customer service contractor, and/or were posted to customer accounts from April 13, 2021 through January 30, 2022. This also includes tolls as far back as July 21, 2020 due to MDTA's backlog in posting toll transactions.

Figure 8
Breakdown of the \$645,000 Tolls Charges by Facility
(dollar amounts in thousands)



Source: OLA Analysis of MDTA Tolling Data

OLA Data Analysis

We analyzed tolling data to identify instances in which customers were improperly charged multiple times for the same trip, either in entirety or in part. We conducted our analysis based on three scenarios we developed, each with its own set of criteria (see Figure 9).

Figure 9
Data Analysis Scenarios and Criteria

Analysis Scenario	Criteria that Must be Met by Two or More Tolls
Scenario A	<u>Customer was Charged Twice at the Same Facility</u> <ul style="list-style-type: none">• The tolls were within 6 seconds of each other for the same customer at the same MDTA tolling facility/gantry. For ICC tolls, this included tolls within 6 seconds at the entry gantry and/or the exit gantry.• The license plate and/or the transponder were the same.
Scenario B	<u>Customer was Charged for Their Vehicle and Another Vehicle at the Same Facility</u> <ul style="list-style-type: none">• The tolls were within 6 seconds of each other for the same customer at the same MDTA tolling facility/gantry. For ICC tolls, this included tolls within 6 seconds at the entry gantry and/or the exit gantry.• The license plate and the transponder (when applicable) were different between the vehicles in the toll group.• One of the tolls was for a vehicle, based on license plate, that was not registered to the customer account nor appeared on any other tolls on that customer account during our review period.
Scenario C	<u>Customer was Charged for Multiple Trips on the ICC at the Same Time</u> <ul style="list-style-type: none">• The tolls were charged to the same customer at the ICC.• The license plate and/or the transponder were the same.• The tolls overlapped in terms of time.

Based on our analysis, we identified approximately \$645,000 in tolls comprised of 135,495 transaction groupings (for example, one correct transaction and one apparently incorrect transaction for the same customer at a facility) with potential duplicate tolls related to 82,847 customers across all MDTA tolling facilities (see Figure 10 on the following page). A majority of the customers (88 percent) had either one or two instances of potential duplicate tolls. The remaining 12 percent of customers had more than two instances of potential duplicate tolls, including 526 customers with more than 10 instances. For all analysis scenarios, we included only toll groups (two or more tolls charged to the same vehicle) in which no tolls were dismissed by MDTA. All MDTA toll facilities were included in Analysis Scenarios A and B, while Analysis Scenario C was unique to the ICC.

Figure 10
Summary of Analysis Scenarios with Potential Duplicate Tolls

Analysis Scenario	Transaction Groupings with Potential Duplicate Tolls	Number of Tolls	Number of Customers ¹	Tolls Charged ²
Scenario A (all toll facilities)	42,791	85,810	31,786	\$198,000
Scenario B (all toll facilities)	66,016	132,049	46,633	329,000
Scenario C (only ICC toll facility)	26,688	53,376	16,075	118,000
Total	135,495	271,235	82,847	\$645,000

¹ The total number of customers is actually 94,494 but this includes 11,647 customers that were in more than one of the scenarios. The total number of customers in the figure reflects the number of unique customers.

² The tolls charged includes both the correct toll and the potential duplicate toll(s).

Source: OLA Analysis of MDTA Tolling Data

We randomly selected 65 customers with tolls totaling \$380.52 for review and testing from the analysis scenario population of potential duplicate tolls (50 customers selected from Analysis Scenario A or B and 15 customers selected from Analysis Scenario C). This testing included inspection of tolling images, related customer accounts, billing records, etc. to make a determination if the tolls were, in fact, duplicates.

Our test disclosed that 62 of the customers (95 percent) were improperly charged more than once for a single trip through a toll facility and 3 customers were correctly charged only one time. Specifically, 36 customers were improperly charged at least twice based on the same information for one unique toll transaction (vehicle, time of day, and toll facility) and 26 were improperly charged because MDTA misapplied a separate, unrelated vehicle's toll transaction to the customer (see Figure 11 on the following page).

Figure 11

Summary of Test Results of Customers with Duplicate Tolls
(see Exhibit 3 for a detailed listing of customers with duplicate tolls)

Analysis Scenario	Customers Tested	Duplicate Tolls		
		Total with Duplicate Tolls	Two or More Tolls for Same Vehicle	Tolls from a Different Vehicle Misapplied
Scenario A	25	25	22	3
Scenario B	25	22	0	22
Scenario C	15	15	14	1
Total	65	62	36	26

Source: OLA Analysis of MDTA Tolling Data

Our detailed review of the tolling facility images disclosed several conditions that resulted in duplicate billings caused by MDTA system errors and not due to any fault of the customer (see Figure 12 on pages 29 to 31). For example, we noted that customers were improperly:

- charged twice for unknown reasons (MDTA believes this was due to a mistake by its customer service contractor during a manual review of the tolling images) (Example 1);
- charged for an unrelated vehicle traveling in close proximity including one instance where a customer was billed for an MDTA police vehicle (Examples 2 and 5);
- charged twice because their vehicle was picked up by transponder readers and/or cameras in two lanes due to poor calibration (Example 3);
- charged for an unrelated vehicle in another lane due to poor camera focus (Example 4); and
- charged twice for the same trip on ICC due to the system improperly identifying multiple starting and exiting points for the same vehicle (Example 6).

Figure 12

Examples of Duplicate Toll Images

Example 1 - Fort McHenry Tunnel

Customer Charged Twice Based on the Same Information for the Toll
(vehicle, time of day, and toll facility)



Example 2 - Fort McHenry Tunnel

Customer Charged Twice Based on MDTA Misapplying a
Separate Vehicle's Toll Transaction to the Customer

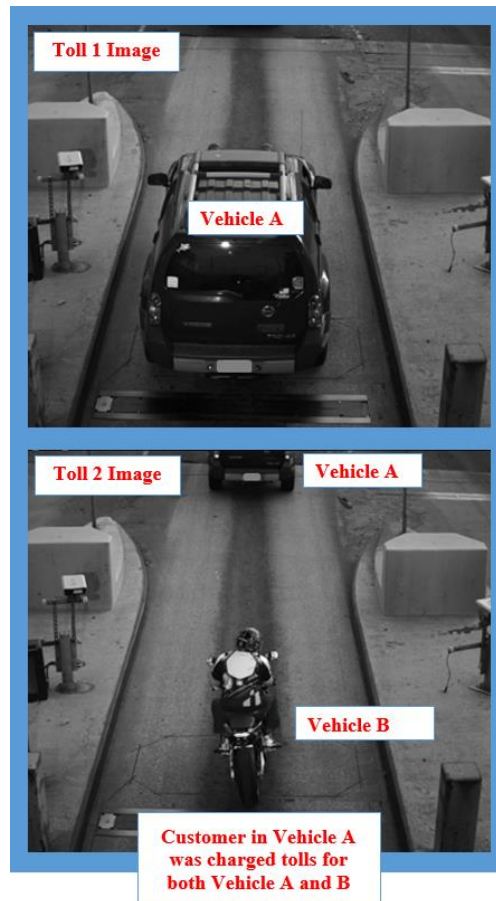
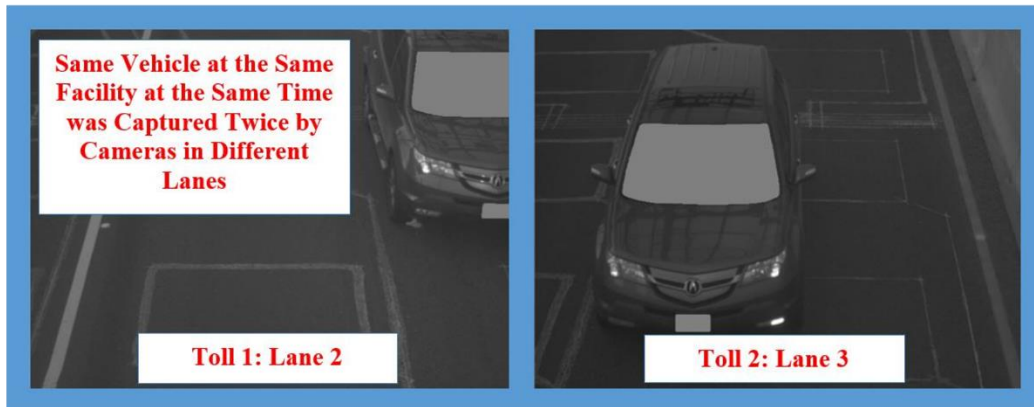


Figure 12

Examples of Duplicate Toll Images

Example 3 - I-95 Express Toll Lanes

Customer Charged Twice Based on the Same Information for the Toll
(vehicle, time of day, and toll facility)



Example 4 - Intercounty Connector

Customer Charged Twice Based on MDTA Misapplying a Separate Vehicle's Toll Transaction to the Customer

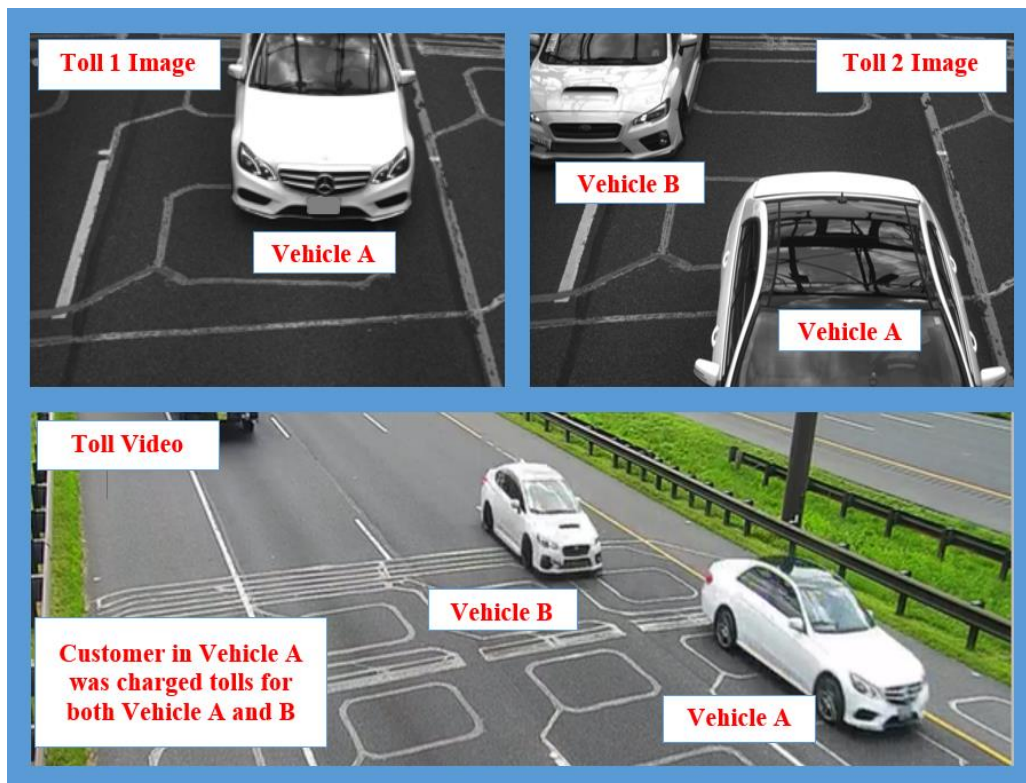


Figure 12

Examples of Duplicate Toll Images

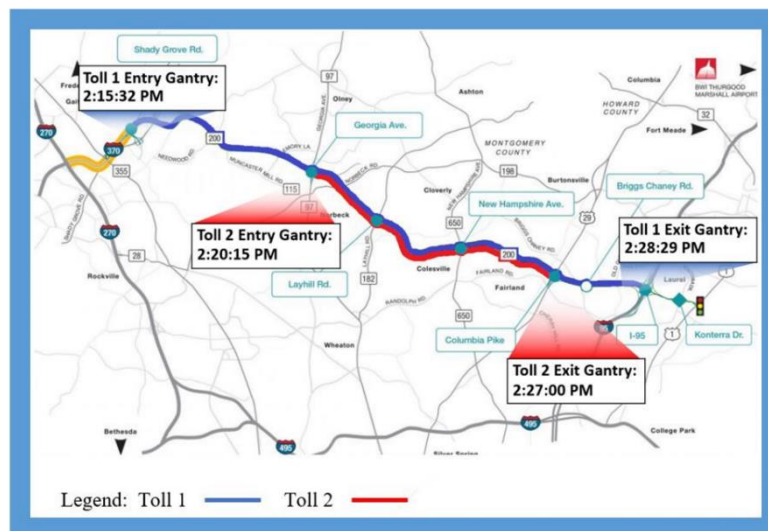
Example 5 – Francis Scott Key Bridge

Customer Charged Twice Based on MDTA Misapplying a Separate Vehicle's Toll Transaction to the Customer



Example 6 – Intercounty Connector

Customer Charged Twice Based on MDTA Overlapping Toll for a Single Trip in One Direction



Our testing also identified that the overcharges related to the duplicate tolls can vary on a case-by-case basis and can result in the customer being charged more than twice the proper amount. For example, for non-ICC tolls tested, 13 of the 25 customers were charged more than twice the proper amount. This means the customer was properly charged for a toll at the *E-ZPass* or discounted toll rate but was also charged a toll at a higher video toll rate.

Conversely, there were also instances where the resulting charges were less than twice the proper amount. For example, the overcharge amount for the ICC tolls was generally for the overlapping portion of the two tolls, which is shorter than the full distance travelled by the customer. Specifically, ICC tolls are based on both the starting and ending gantry points located at various sections of the ICC. As a result, a customer could be improperly charged twice for an overlapping portion of the ICC trip, but not for the entire distance of the trip.

Additional Issue Reviewed - Delays in Posting Tolls to Customer Accounts Appear to Have Been Resolved

Background

As noted in the Electronic Toll Collection Process section of the Background Information found on pages 9 to 11 of this report, each toll transaction results in a toll trip constructed by the tolling contractor. The tolling contractor then sends the constructed trips to the customer service contractor in order to post the tolls to customer accounts. Based on MDTA's contract documents, MDTA expected the tolling contractor to send toll transactions to the customer service contractor within 30 days of the toll transaction. Once the customer service contractor receives the toll transactions, *E-ZPass* transactions are posted to customer accounts. The video toll and Pay-by-Plate transactions can take longer to process if there are issues with the images associated with the vehicle.

MDTA's issues with delays in posting tolls to customer accounts had been well-documented (both with MDTA press releases and during testimony at legislative hearings). In addition, our fraud, waste, and abuse hotline also received various complaints about significant delays in tolls being posted to customer accounts. For example, some customers complained that because of undue delays in posting tolls, they were not able to review their tolling history to the extent necessary to ensure their tolls were valid. Delays in posting tolls can also impact a customer's ability to take timely action to correct issues that result in higher toll charges, such as not being aware that the customer's *E-ZPass* transponder was not working properly for an extended period of time.

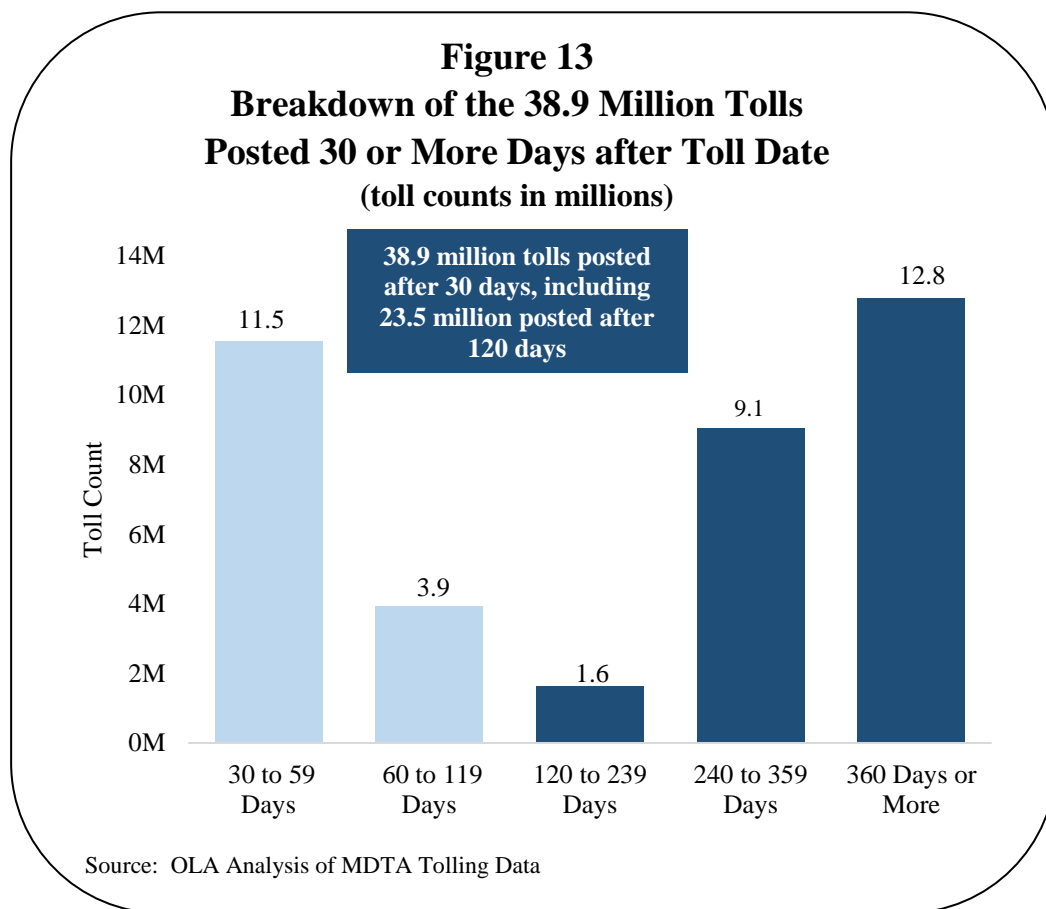
When MDTA was transitioning to its new tolling contractor and customer service contractor, the COVID-19 pandemic health crisis impacted its tolling operations. Specifically, although Maryland tolls remained in effect, a Governor's Executive Order effective March 5, 2020 resulted in MDTA closing its Customer Service Centers, ceasing the collection of cash tolls, suspending notifications of video tolls due, and suspending collection efforts of unpaid tolls previously billed. According to MDTA management, on October 15, 2020, MDTA resumed the mailing of video toll notices and collection efforts on previously unpaid tolls. This pause in sending notifications of video tolls due, coupled with the transition to the new contractors resulted in a significant backlog of tolling transactions that needed to be posted to customer accounts.

OLA Data Analysis and Observations

During our data analysis of tolling and customer data, we noted many instances in which toll charges were not posted to customer accounts in a timely manner. We performed a system-wide analysis to determine the length of time between the toll

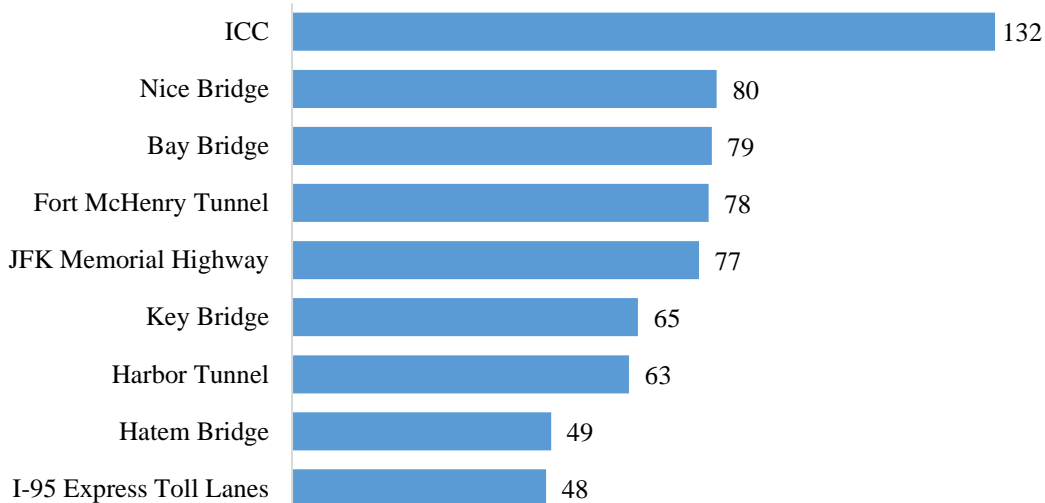
transaction and the posting to a customer's account. Our analysis reviewed 115.9 million tolls, relating to approximately 5.3 million customers, which occurred or the tolling contractor had sent to the customer service contractor for posting to customer accounts from April 2021 to January 2022.

Our review identified 38.9 million transactions that were posted to customer accounts 30 days or more after the toll was incurred. This included 23.5 million tolls posted 120 days or more after the tolls occurred, of which 12.8 million tolls were posted 360 days or more after the tolls occurred (see Figure 13).



As noted in Figure 14, for the 115.9 million tolls we reviewed, the average time between a toll transaction occurring and posting to a customer's account ranged from a high of 132 days at the ICC and a low of 48 days at the I-95 Express Toll Lanes.

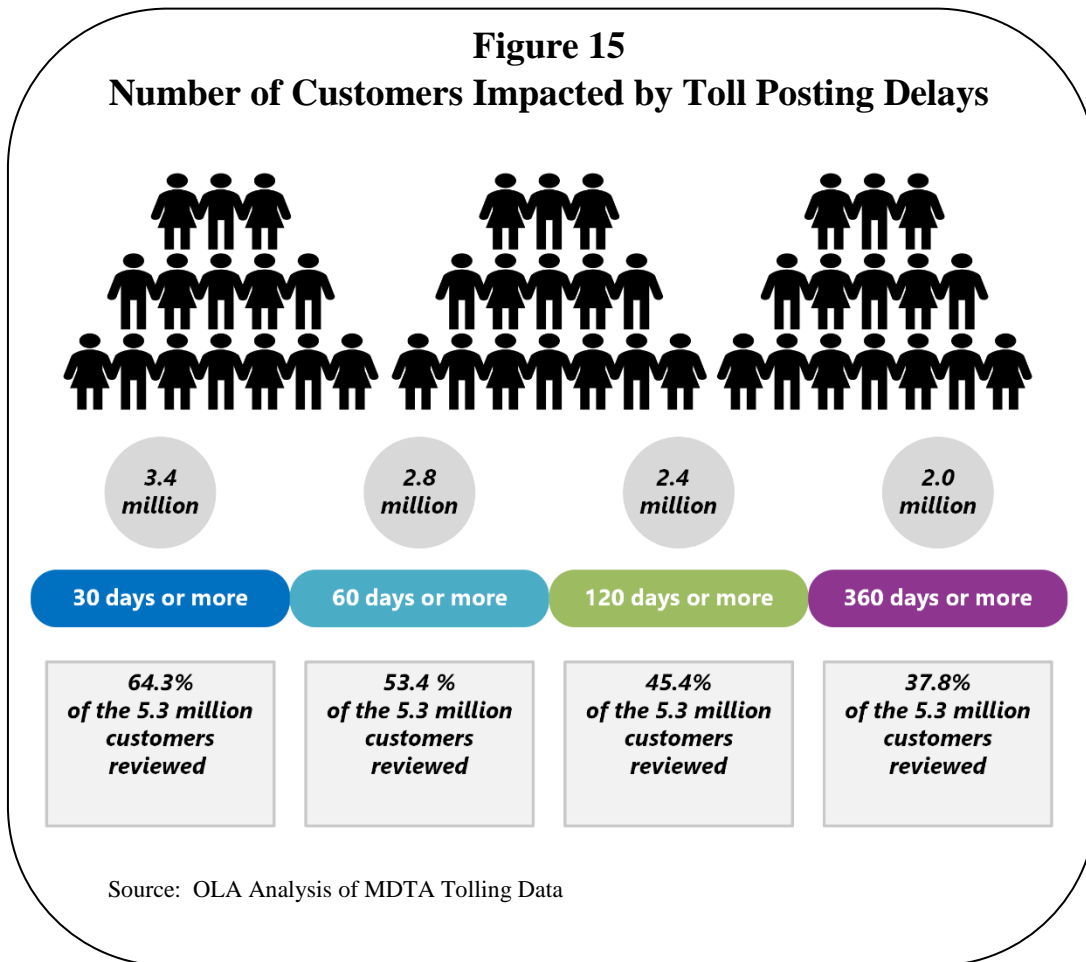
Figure 14
Average Days to Post Tolls by MDTA Tolling Facility



Source: OLA Analysis of MDTA Tolling Data

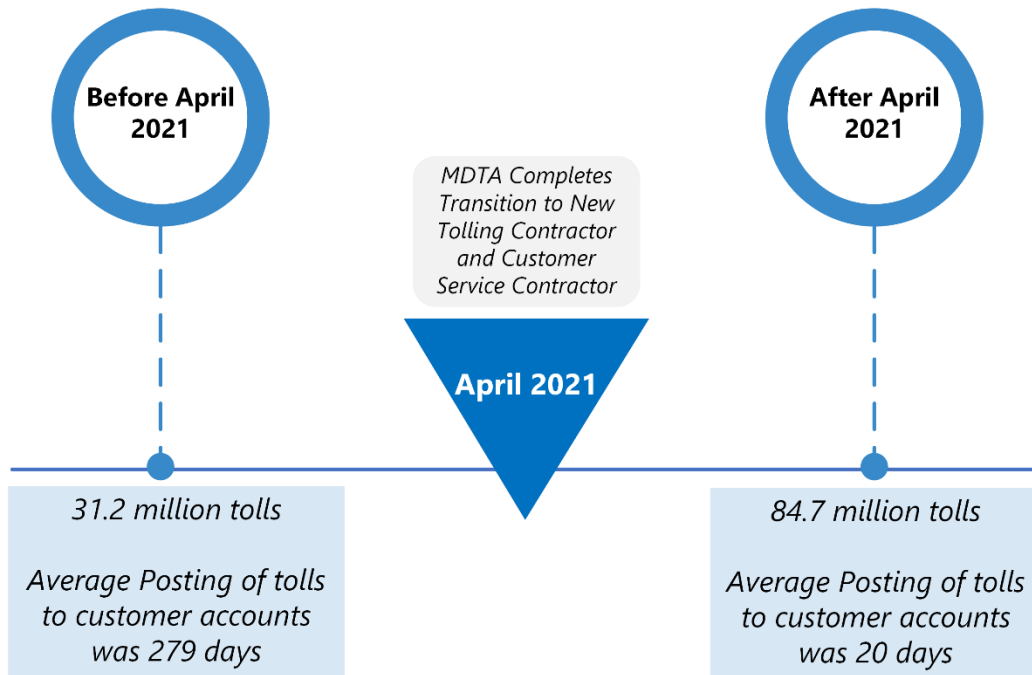
Since there was a significant number of tolls posted to customer accounts 30 days or more after the toll was incurred, we performed a stratification analysis to determine how many customers experienced these delays with one or more of their tolls. Our stratification disclosed that approximately 3.4 million customers of the 5.3 million customers we reviewed (64 percent) experienced one or more tolls posted to their account after 30 days. This included approximately 2.0 million customers with tolls posted 360 days or more after the tolls occurred (see Figure 15 on the following page). For example, one customer had 978 tolls totaling \$1,525 from the ICC toll facility posted to their account 360 days after the toll occurred. Based on the tolling data, this customer routinely travelled through this toll facility.

Figure 15
Number of Customers Impacted by Toll Posting Delays



For the 115.9 million tolls we analyzed, 31.2 million tolls related to periods before MDTA completed its transition to the new contractors in April 2021 and 84.7 million tolls related to period after April 2021. The 31.2 million tolls that occurred prior to the transition represents tolling activity that was unresolved at the time of the transition and considered by MDTA to be backlogged due to pandemic-related factors. Our analysis also disclosed that the average time in posting tolls significantly improved after transitioning to the new contractors in April 2021. Specifically, the average time to post tolls to customer accounts was 279 days before April 2021 and 20 days after (see Figure 16 on the following page).

Figure 16
Improvement in the Average Days for Posting Tolls to Customer Accounts after MDTA Transitions to New Contractors



Source: OLA Analysis of MDTA Tolling Data

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Toll Collection Finding and Response from OLA's Fiscal
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Finding 1

MDTA actions did not determine the impact of electronic toll collection system issues on its customers and identify and correct certain related customer overbillings.

Analysis

MDTA did not sufficiently determine the impact of certain issues with its electronic toll collection system on its customers and identify and correct related customer overbillings. MDTA began transitioning to the new electronic tolling contractor in a series of scheduled facility upgrades from approximately May 2019 to July 2020. The tolling system has edits and other processes designed to proactively detect and automatically correct tolling mischarges (such as, customers charged twice for the same toll event). MDTA also operates a service center for customer complaints, and center staff have the ability to correct customer *E-ZPass* accounts when tolling errors occur that are not automatically detected and corrected by the system.

In December 2019, MDTA became aware of issues with its new system implementation (including overbilling of customers due to tolling equipment or software failures) through observations of toll transactions and customer complaints. For example, according to MDTA records, during the period from December 2019 to October 2020, it documented certain incidents of tolling errors resulting from problems with tolling equipment at four facilities (the Fort McHenry Tunnel, Intercounty Connector, the I-95 Express Toll Lanes, and the Thomas J. Hatem Memorial (Hatem) Bridge). Our review of these incidents also disclosed an issue at the Francis Scott Key Bridge that MDTA had not previously documented. Although MDTA worked with its vendor to implement corrective action, the resultant actions were not always sufficient to determine the impact of these issues on customers during its investigation of the tolling errors as further described below.

Fort McHenry Tunnel

In December 2019, MDTA conducted an investigation of a tolling equipment malfunction that resulted in incorrect axle counts causing customer overbillings (that is, two axle vehicles being charged for additional axles). MDTA records indicated it had questioned its new tolling contractor about the

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extent of preventative tolling equipment maintenance and employee training performed, pointing out that even though there was no loss of revenue, the possibility of customer overbillings could potentially generate unwanted publicity for MDTA.

While MDTA could provide documentation that the tolling equipment was fixed, it could not provide us with documentation that it researched the impact of the problem on customers until the corrective actions were taken. After we brought our concern about the impact on customers to MDTA's attention in April 2021, it further investigated the issue and determined it related to equipment malfunctions in one of the twenty-two lanes over a period of 25 hours. MDTA advised us that it subsequently identified approximately 7,700 customers were overbilled \$84,400. As of August 2021, MDTA advised us it was in the process of correcting these customers' accounts.

In addition, we identified another concern with customers being billed twice on certain dates in January, March, August, and September 2020 due to cameras misreading vehicles in other toll lanes (similar to the issue noted below at the Francis Scott Key Bridge). MDTA management advised us that they were not aware of this issue and that these types of errors are extremely rare since its tolling system is supposed to automatically detect and correct such errors. Nevertheless, upon us bringing the issue to MDTA's attention in April 2021, it performed limited research (two separate 24-hour periods during March and September 2020) to determine if the errors resulted in customers being overbilled. MDTA advised us that a small number of customers were overbilled but it did not determine the amount of the overbillings or conduct further research by reviewing other time periods.

Francis Scott Key Bridge

We identified customers being billed twice on certain dates in April and May 2020 due to cameras misreading vehicles in other toll lanes (similar to the issue noted above at the Fort McHenry Tunnel). In this instance, customers were both correctly charged for a 2-axle vehicle (\$3), and then incorrectly charged again for a 5-axle vehicle (\$24) one second later. As with the aforementioned Fort McHenry Tunnel issue, MDTA management advised us that they were not aware of this issue and that these types of errors are

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extremely rare since its tolling system is supposed to automatically detect and correct such errors. Nevertheless, upon us bringing the issue to MDTA's attention in April 2021, it performed limited research (two separate 24-hour periods during April and May 2020) to determine if the errors resulted in customers being overbilled. MDTA again advised us that a small number of customers were overbilled, but it did not determine the amount of the overbillings or conduct further research by reviewing other time periods.

Intercounty Connector and the I-95 Express Toll Lanes

According to MDTA's records, during the period from April 6, 2020 to August 18, 2020, there were issues with the equipment (such as camera cables) at the Intercounty Connector that resulted in vehicle misreads, which could have caused incorrect toll charges or overbillings. A similar situation was noted for the I-95 Express Toll Lanes during the period from October 6, 2020 to October 9, 2020. While MDTA could document that the equipment issues were fixed, it had not determined the extent of customer overbillings.

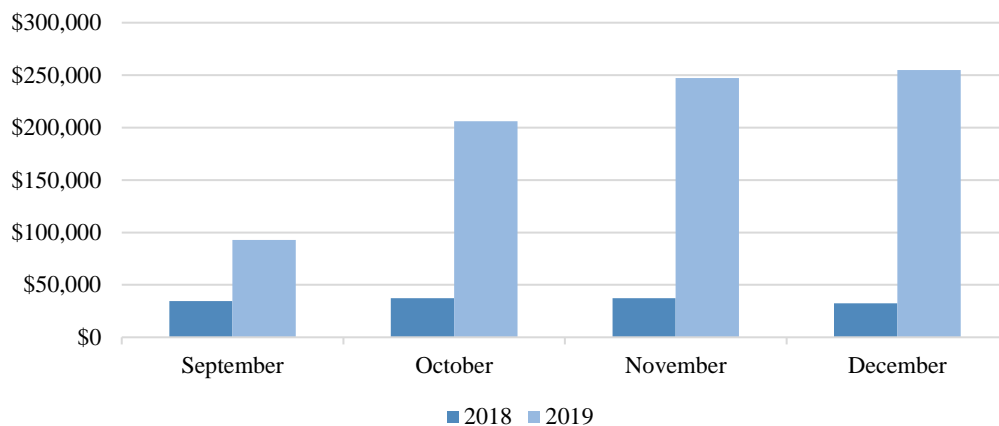
Thomas J. Hatem Memorial (Hatem) Bridge

MDTA identified an overbilling issue due to the miscounting of axles at the Hatem Bridge. In this instance, MDTA proactively performed a review of transactions for commuter plan customers between October 21, 2019 and November 26, 2019 and identified 5,646 transactions for 2-axle vehicles that may have been overbilled. MDTA management advised the related accounts were credited \$67,000.

We were unable to quantify the potential overbilling related to these issues due to the lack of available data; however, MDTA acknowledged that it would be expected that tolling errors would increase during the new system implementation and there was a general increase in tolls dismissed from tolling errors, but could not cite the above issues as the cause. Specifically, according to MDTA records, during the period September 2019 to December 2019 there was a significant increase in the amount of tolls dismissed due to errors compared to September 2018 to December 2018 (see Figure 3). The dismissed tolls in 2019 represented almost five percent of tolls billed compared to one percent in 2018.

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Figure 3
Comparison of Tolls Dismissed
2018-2019



Source: MDTA Records

Recommendation 1

We recommend that MDTA

- a. review and evaluate significant tolling issues (such as, an increase in similar customer complaints or a pattern of tolling abnormalities). For example, MDTA may want to consider developing a formal policy to review and evaluate tolling issues and determine the extent of customer overbillings for appropriate corrective actions (such as making restitution); and**
- b. review previously identified electronic toll issues to determine the extent of customer overbillings and in consultation with legal counsel, assess the practicality of related customer restitution.**

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Agency Response	
Analysis	
Please provide additional comments as deemed necessary	<p>The Maryland Transportation Authority (MDTA) acknowledges that in certain limited circumstances, customers were charged an incorrect toll rate; however, the MDTA respectfully disagrees with the suggestion from the Office of Legislative Audits (OLA) that these identified issues are part of a larger unknown problem. Although hardware or software problems may occur on occasion, MDTA's tolling system has a robust real-time monitoring system that alerts to anomalies so that issues can be quickly identified and corrected to minimize any potential errors. During the audit period, MDTA processed an average of 158 million transactions per year. In a detailed analysis provided to OLA covering four specific days at two different facilities, MDTA identified 15 occurrences of customers being overcharged out of a total of 230,687 transactions. This reflects an error rate of 0.000098.</p> <p>During the COVID-19 pandemic, the MDTA quickly transitioned to all-electronic tolling (AET) for the safety of its customers and employees and undertook a major transition from the old tolling system to the new one, including the replacement of toll equipment at 131 toll locations. While numerous controls were in place with the contractors during the toll equipment transition, transaction accuracy is most at risk when new equipment is installed as it must go through a tuning and calibration process. MDTA maintains a robust, statistical sampling-based quality assurance and quality control program, including multiple layers of verification, automated alerts, business intelligence analytics, and system safety nets to achieve the highest degree of accuracy from its tolling system. In addition, the new tolling system provides MDTA enhanced ability to perform system monitoring and auditing compared to its previous system.</p> <p>The MDTA seeks to deliver excellent customer service. If it is determined that a customer was charged a higher toll rate than was appropriate, the MDTA refunds the difference to the customer. If it is determined that a customer was charged a lower toll rate than was appropriate, the MDTA does not seek additional funds from the customer. It is also important to note that the processing of some customer refunds were delayed due to the backlog of transactions associated with the switch to AET as a result of COVID-19 and a scheduled delay in processing due to the transition to the</p>

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Agency Response (continued)	
Analysis	
	<p>new tolling system.</p> <p><u>MDTA Issue Analysis Summary</u></p> <p>One tracking tool utilized by MDTA is an Issue Analysis Summary (IAS), which documents known system issues. MDTA provided its IAS tracker to OLA, which included 25 issues (4 resulting in overcharges and 21 in undercharges). The relevance is that the analysis includes the four overcharge issues identified by the MDTA and statistically unidentifiable errors.</p> <p><i>Fort McHenry Tunnel (FMT) Equipment Malfunction</i></p> <p>From the initial identification of the issue by the MDTA in December 2019, the MDTA analyzed, isolated, and corrected the equipment failure, except for crediting customers' accounts. When questioned by OLA the MDTA recognized the oversight and determined the number of customers impacted, amount overbilled, and began to process credits owed to customers.</p> <p><i>Intercounty Connector (ICC) and I-95 Express Toll Lanes (ETL)</i></p> <p>MDTA is not aware of any discussions with OLA involving these transactions to date. The ICC transactions were part of the backlog of transactions and as such, credits could not be processed until posted. In total, 703 ICC transactions require a credit totaling \$425.54. In total, 1,720 ETL transactions require a credit totaling \$3,440.21. In both cases, the MDTA identified and fixed the issue and documentation exists supporting our actions.</p> <p><i>Thomas J. Hatem Memorial (Hatem) Bridge</i></p> <p>MDTA agrees with the analysis and as indicated the MDTA identified and resolved the issue and credited all 5,646 impacted transactions totaling \$67,000.</p> <p><u>Potential Overcharges Cited by OLA</u></p> <p>At the time of the exit conference, OLA provided the MDTA with information regarding customers being billed twice. OLA provided a 3-hour</p>

Exhibit 1
Toll Collection Finding and Response from OLA's Fiscal
Compliance Audit Report of MDTA Dated September 13, 2021
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Agency Response (continued)																																											
Analysis																																											
	<p>time window for four dates, lane numbers, and indicated the duplicate transactions were all <i>E-ZPass</i>®. Information was not provided to the MDTA regarding FMT January or August transactions. Since one of the lanes indicated was permanently closed during the timeframe identified by OLA, the MDTA created a report looking for transactions, with the same transponder, within minutes of each other for the entire toll facility. The report spanned 24-hours for each date provided. Due to automated filters and blocks in place, most cases of duplicate charges are prevented at a point in the transaction processing prior to posting to the customer's <i>E-ZPass</i> account. In this case, the MDTA traced each transaction to the customer's <i>E-ZPass</i> account to verify if duplicate charges occurred. A rigorous analysis was performed, and a detailed spreadsheet was provided to OLA identifying 15 overcharge transactions, including 8 duplicate transactions and 7 misclassifications, out of 230,687 transactions, along with supporting documentation for every transaction reviewed.</p> <table border="1"> <thead> <tr> <th rowspan="2">Toll Facility</th><th rowspan="2">Date</th><th rowspan="2">Total Transactions</th><th colspan="2">Incorrect Transactions</th><th rowspan="2">Error Rate</th></tr> <tr> <th>Count</th><th>Amount</th></tr> </thead> <tbody> <tr> <td>FMT</td><td>3/12/20</td><td>83,946</td><td>5</td><td>\$ 13.80</td><td>0.000060</td></tr> <tr> <td>FMT</td><td>9/2/20</td><td>101,533</td><td>1</td><td>\$ 21.00</td><td>0.000010</td></tr> <tr> <td>FSK</td><td>4/23/20</td><td>25,082</td><td>6</td><td>\$ 126.00</td><td>0.000239</td></tr> <tr> <td>FSK</td><td>5/30/20</td><td>20,126</td><td>3</td><td>\$ 54.00</td><td>0.000149</td></tr> <tr> <td colspan="2">Total</td><td>230,687</td><td>15</td><td>\$ 214.80</td><td>0.000098</td></tr> </tbody> </table> <p>Detection of issues at these low error rates requires rigorous analysis far exceeding conventional standards (e.g. ANSI/ASQ Z1.9, GAO/PCIE Financial Audit Manual GAO-08-585G, 2020 AICPA AU-C Section 530, etc.). Today, when the report (duplicate transponder read) is run, no transactions are identified, consistently demonstrating an extremely low error rate.</p> <p>The analysis also discusses an increase in tolls dismissed. The dismissals are for video toll transactions and not <i>E-ZPass</i> transactions, which is the primary focus of the aforementioned issues.</p>					Toll Facility	Date	Total Transactions	Incorrect Transactions		Error Rate	Count	Amount	FMT	3/12/20	83,946	5	\$ 13.80	0.000060	FMT	9/2/20	101,533	1	\$ 21.00	0.000010	FSK	4/23/20	25,082	6	\$ 126.00	0.000239	FSK	5/30/20	20,126	3	\$ 54.00	0.000149	Total		230,687	15	\$ 214.80	0.000098
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Exhibit 1
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Agency Response (continued)			
Recommendation 1a	Agree	Estimated Completion Date:	12/1/21
Please provide details of corrective action or explain disagreement.	The MDTA has an established process to ensure significant tolling issues are identified, stopped, and fixed; customer accounts that are negatively impacted are credited; and lost revenue is recovered from MDTA's contractors. The MDTA will formalize the process in documented procedures.		
Recommendation 1b	Agree	Estimated Completion Date:	12/1/21
Please provide details of corrective action or explain disagreement.	The MDTA will review and reconcile previously identified electronic toll issues from the tolling transition to ensure the customer credits identified in this finding and not already processed, are processed.		

Exhibit 2

Summary of Allegations Received through the Office of Legislative Audits' Fraud, Waste, and Abuse Hotline

As of April 2, 2022, 74 complainants had contacted our fraud, waste, and abuse hotline regarding MDTA tolling issues, with many having multiple complaints.

- 29 complainants stated they were charged for a toll they did not incur. This included being charged a toll for a vehicle they did not own, charged a toll they did not incur, or charged on a transponder that had been canceled.
- 24 complainants stated they were charged an incorrect rate (such as charged full price when they had an *E-ZPass* or commuter plan) or were charged multiple times for the same trip.
- 15 complainants had payment-related issues. This included replenishment charges that were excessive, payments that were not properly credited to their account, unable to make payments on their account, and accounts referred to the State's Central Collection Unit while tolls were still under dispute.
- 16 complainants had billing-related issues. This included receiving bills for transactions that occurred months to more than a year prior, never receiving an initial bill and now being charged late fees, and receiving new bills for transactions they had already paid.
- 25 complainants stated that MDTA's customer service quality was poor (not timely and/or not effective).
- 9 complainants stated other issues not listed above (such as issues with Maryland's website for *E-ZPass* – DriveEZMD.com).

Exhibit 3

Summary of Duplicate Tolls Tested with Estimated Overcharges

Count	Analysis Scenario ¹⁰	Toll Charges				
		Total Charges	Amount Correct ¹¹	Estimated Improper	Percent Overcharged	
1	Fort McHenry Tunnel and Baltimore Harbor Tunnel					
	1	A	\$8.00	\$4.00	\$4.00	100%
	2	A	8.00	4.00	4.00	100%
	3	A	8.00	4.00	4.00	100%
	4	A	8.00	4.00	4.00	100%
	5	A	12.00	6.00	6.00	100%
	6	A	8.00	4.00	4.00	100%
	7	B	16.00	8.00	8.00	100%
		\$68.00	\$34.00	\$34.00	100%	
8	Francis Scott Key Bridge					
	1	A	\$5.40	\$1.40	\$4.00	286%
	2	B	5.40	1.40	4.00	286%
	3	B	5.40	1.40	4.00	286%
	4	B	7.00	3.00	4.00	133%
	5	B	5.40	1.40	4.00	286%
			\$28.60	\$8.60	\$20.00	233%
	William Preston Lane Jr. Memorial (Bay) Bridge					
13	1	A	\$5.40	\$1.40	\$4.00	286%
14	2	B	6.50	2.50	4.00	160%
15	3	B	6.50	2.50	4.00	160%
16	4	B	6.50	2.50	4.00	160%
17	5	B	6.50	2.50	4.00	160%
18	6	B	6.50	2.50	4.00	160%
19	7	B	6.50	2.50	4.00	160%
20	8	B	5.40	1.40	4.00	286%
		\$49.80	\$17.80	\$32.00	180%	
21	John F. Kennedy Memorial Highway and I-95 Express Tolls Lanes					
	1	A	\$16.00	\$8.00	\$8.00	100%
	2	A	2.38	1.19	1.19	100%
	3	B	3.08	1.54	1.54	100%
			\$21.46	\$10.73	\$10.73	100%
24	Intercounty Connector					
	1	A	\$5.93	\$4.38	\$1.55	35%
	2	A	2.86	1.68	1.18	70%
	3	A	1.93	1.49	0.44	30%

¹⁰ There are three Analysis Scenarios (A, B, and C) that used different sets of criteria to identify duplicates. The criteria for each Analysis Scenario are specified in Figure 9 on page 26.

¹¹ For ICC tolls that were partially overlapping, correct charges were calculated based on MDTA's toll calculator on the MDTA website for the full trip actually driven by the customer. For all other tolls, the correct charges were based on the toll that was properly charged.

Exhibit 3

Summary of Duplicate Tolls Tested with Estimated Overcharges

	Count	Analysis Scenario ¹⁰	Toll Charges			
			Total Charges	Amount Correct ¹¹	Estimated Improper	Percent Overcharged
27	4	A	2.48	1.24	1.24	100%
28	5	A	5.26	3.52	1.74	49%
29	6	A	4.98	2.72	2.26	83%
30	7	A	5.94	2.72	3.22	118%
31	8	A	1.80	1.18	0.62	53%
32	9	A	3.17	2.26	0.91	40%
33	10	A	4.07	2.72	1.35	50%
34	11	A	2.31	1.83	0.48	26%
35	12	A	4.76	3.52	1.24	35%
36	13	A	2.98	1.74	1.24	71%
37	14	A	3.17	2.02	1.15	57%
38	15	A	5.29	2.92	2.37	81%
39	16	B	1.92	0.96	0.96	100%
40	17	B	5.10	3.86	1.24	32%
41	18	B	4.16	2.92	1.24	42%
42	19	B	2.98	1.74	1.24	71%
43	20	B	3.17	2.26	0.91	40%
44	21	B	1.84	1.12	0.72	64%
45	22	B	1.24	0.62	0.62	100%
46	23	B	1.92	0.96	0.96	100%
47	24	B	2.31	1.35	0.96	71%
48	25	C	12.05	5.28	6.77	128%
49	26	C	5.20	2.28	2.92	128%
50	27	C	3.13	2.26	0.87	38%
51	28	C	3.87	2.98	0.89	30%
52	29	C	3.63	2.72	0.91	33%
53	30	C	3.13	2.26	0.87	38%
54	31	C	4.35	2.02	2.33	115%
55	32	C	4.48	2.72	1.76	65%
56	33	C	4.02	1.76	2.26	128%
57	34	C	3.13	1.30	1.83	141%
58	35	C	4.05	2.92	1.13	39%
59	36	C	7.23	4.47	2.76	62%
60	37	C	8.70	5.28	3.42	65%
61	38	C	*	*	*	*
62	39	C	*	*	*	*
			\$148.54	\$89.98	\$58.56	65%
		TOTAL	\$316.40	\$161.11	\$155.29	96%

* We were unable to determine the related overcharges due to the nature of how these ICC toll trips were constructed.

APPENDIX



**Maryland
Transportation
Authority**

Wes Moore, Governor
Aruna Miller, Lt. Governor
Paul J. Wiedefeld, Chairman

Board Members:
Dontae Carroll Mario J. Gangemi, P.E.
William H. Cox, Jr. Cynthia D. Penny-Ardinger
William C. Ensor, III Jeffrey S. Rosen
W. Lee Gaines, Jr. John F. von Paris

William Pines, P.E., Executive Director

March 21, 2023

Gregory A. Hook, CPA
Legislative Auditor
Office of Legislative Audits
The Warehouse at Camden Yards, Suite 400
315 West Camden Street
Baltimore MD 21201

Dear Mr. Hook:

The Maryland Transportation Authority (MDTA) has reviewed the Office of Legislative Audits (OLA) draft special review report—Data Analysis of Electronic Tolling and Customer Service Processes. We thank and recognize the OLA auditors for their extensive work and cooperation for this special review. Before addressing specific details, MDTA assures all our customers and the OLA that all accounts with potential transactions identified by this special review have been credited. While the special review included no formal recommendations, the subsequent paragraphs are offered to describe the measures MDTA has in place to effectively address the special review findings.

We appreciate the opportunity to respond to OLA's report and also appreciate the auditors' acknowledgement of specific toll transactions as "potential" mischarges (i.e., the uncertainty of actual mischarges). After an in-depth, case-by-case look at a sampling of potential mischarges, MDTA has provided OLA with multiple unique scenarios that meet the auditors' criteria for calculating potential mischarges yet are in fact correct toll charges. We understand that OLA labeled these tolls as potential mischarges because of how resource intensive it is to review individual toll transactions, and that the limited sampling was not intended to provide a characterization of the population of all 115 million transactions, totaling approximately \$423.5 million. For the same reason, MDTA has chosen to benefit our customers and has credited all potential impacts.

Regarding the Hatem Bridge potential mischarges, all customers with an active Hatem Bridge Plan who traveled during the 3-week time-period between December 24, 2020 and January 15, 2021, when an equipment malfunction occurred, have been credited. The temporary equipment malfunction was repaired in January 2021, which prevented further impacts. Furthermore, in February 2022, MDTA changed a longstanding business rule for the benefit of our Hatem Plan (\$20.00 per year) customers. Prior to this date, which included the auditors' review period of transactions, customers were required to maintain an active account (e.g., positive account balance) to receive the discounted Hatem Plan toll rate.

Gregory A. Hook, CPA
Page Two

This measure was in place to ensure customers remained in good standing on their account in order to receive the benefits of the discount plan. The current revised business rule now only requires an active transponder with an active Hatem Plan to be present and properly mounted for the vehicle to receive the Hatem Plan discount. Lastly, MDTA proactively processed courtesy credits for Hatem Plan customers who were previously charged a toll because their account was inactive. The MDTA will be rerunning the queries to ensure all such applicable tolls occurring since July 2020, which were part of the pandemic related tolling backlog, have been credited.

Regarding the potential duplicate mischarges, MDTA has credited all customer tolls meeting the OLA criteria for the potential mischarge portion of the tolls charged (i.e., the correct amount of a duplicate remains). Although MDTA recognizes that several of the potential duplicate mischarges were correctly charged tolls (i.e., not mischarges), MDTA opted to provide credits to all customers meeting the OLA criteria to provide better customer service while maintaining cost efficiency. Many of these transactions occurred during or following the pandemic when MDTA was manually metering transaction processing to lessen the financial impact on customers from pandemic backlog processing. The MDTA also acknowledges that human errors resulted in two of the duplicate scenarios during the manual processing of the pandemic backlog. These manual processes for the pandemic backlog are no longer in place, and as noted by the auditors, transactions are now processed timely.

Lastly, in CY2021, MDTA implemented a new standard operating procedure specifically addressing customer credits and is continually improving its quality management processes.

Thank you again for your partnership in helping to ensure the accuracy of our processes and excellence in customer service.

Sincerely,



Paul J. Wiedefeld
Chairman

cc: Matthew Streett, CPA, CFE, Assistant Director, OLA
Ms. Samantha Biddle, Deputy Secretary, MDOT
Ms. Jaclyn Hartman, Chief Financial Officer, Office of Finance, MDOT
William Pines, P.E., PMP, CCM, Executive Director, MDTA
Deborah Sharpless, CPA, Chief Financial Officer, MDTA

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