ITEM 10 – INFORMATION
February 18, 2026

Regional Transportation Safety Trends and
Findings from Inventory of Roadway Safety Strategies

Background: TPB staff will brief the board on findings from its recent Regional Roadway Safety Study Update and assessment of regional safety activities. Proposed by the TPB as part of the 2024 Regional Roadway Safety Summit, the assessment inventories the activities of member jurisdictions to address roadway safety in the region and attempts to understand the effectiveness of deployed strategies, as well as barriers to implementing countermeasures and programs. Staff will also present a related paper that reviews current research on the effectiveness of automated traffic enforcement.

Attachments

- 2025 TPB Regional Roadway Safety Update
- Regional Inventory of Roadway Safety Strategies
- Automated Speed and Red-Light Enforcement White Paper

AUTOMATED SPEED AND RED-LIGHT ENFORCEMENT WHITE PAPER

Impacts on Safety

February 2026

National Capital Region
Transportation Planning Board

AUTOMATED SPEED AND RED-LIGHT ENFORCEMENT WHITE PAPER
Prepared by ICF and Fehr & Peers on behalf of National Capital Region Transportation Planning Board (TPB). This white paper reflects a review and synthesis of existing published sources only. Published in February 2026.

ABOUT THE TPB
The National Capital Region Transportation Planning Board (TPB) is the federally designated metropolitan planning organization (MPO) for metropolitan Washington. It is responsible for developing and carrying out a continuing, cooperative, and comprehensive transportation planning process in the metropolitan area. Members of the TPB include representatives of the transportation agencies of the states of Maryland and Virginia and the District of Columbia, local governments, the Washington Metropolitan Area Transit Authority, the Maryland and Virginia General Assemblies, and nonvoting members from the Metropolitan Washington Airports Authority and federal agencies. The TPB is staffed by the Department of Transportation Planning at the Metropolitan Washington Council of Governments (COG).

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Executive Summary

Automated traffic enforcement leveraging speed and red-light cameras has become an established component of roadway safety in the metropolitan Washington region. Evidence from international research, national evaluations, and local programs consistently demonstrate that ATE reduces crashes, lowers excessive speeds, and helps prevent severe and fatal injuries. In the region's major jurisdictions, deployments have shown measurable safety gains, especially in school zones and residential road corridors. These results align with the Safe System Approach, which emphasizes managing speeds and shaping road user behavior to prevent life-threatening crashes.

At the same time, implementation challenges remain. Differences in state and local legal frameworks create uneven authority and operational rules, complicating regional coordination. Public skepticism in parts of the region reflects concerns about fairness, equity, and transparency. Sustained effectiveness depends not only on technical performance but also on building public trust through careful site selection, transparent reporting, and reinvestment of revenues toward safety improvements.

For the TPB, the regional experience suggests that automated enforcement is a proven tool that can support broader safety goals when designed and communicated appropriately. To maximize effectiveness, ATE must be consistently framed as a safety strategy; paired with roadway design, public outreach and education; and coordinated across jurisdictions. Additionally, equity safeguards are crucial, as incorporation of income-based fine reductions, payment plan options, and equitable camera placement can help avoid disproportionate impacts on lower-income or minority communities.

1.1 Purpose

The purpose of this white paper is to answer a central question for the Transportation Planning Board (TPB): How effective is automated traffic enforcement (ATE) leveraging speed and red-light cameras in reducing severe crashes, and what practices can ensure fair, reliable, and publicly supported implementation of ATE throughout the metropolitan Washington region? ATE can include various tools such as speed, red-light, stop-sign, school bus stop-arm, bus lane, and restricted lane cameras. This white paper specifically focuses on ATE that uses speed and red-light cameras. The sections that follow synthesize research examining the effectiveness of ATE in reducing the number and severity of crashes, establishing target traffic speeds, and generating related safety benefits. This document also examines national and international practices to understand how programs can be designed and managed to minimize disproportionate impacts on marginalized communities and build long-term public trust.

1.2 Background and Regional Legal Context in D.C., Maryland, and Virginia

ATE has been used as a roadway safety strategy in the metropolitan Washington region since both the District of Columbia and Maryland each authorized red-light cameras in 1997. Over time, metropolitan Washington jurisdictions have followed suit with speed and red-light camera deployments designed to deter unsafe driving, manage speeds, and reduce crash frequency and severity. While the District of Columbia, Maryland, and Virginia (commonly referred to as the DMV region) share similar safety goals, their programs have evolved under distinct legal frameworks that shape where and how ATE can be deployed as seen in **Table 1.** Tables detailing the different automated traffic enforcement fine schedules by statute and regulation in D.C., Maryland, and Virginia can be found in **Appendix A.**

The District of Columbia was an early adopter, introducing red-light cameras in 1997 and later expanding their ATE program to include speed, stop-sign, and bus-lane enforcement. Authorized under D.C. Code § 50-2209.01–.11,[1] the program grants the Mayor of the District of Columbia broad authority to deploy ATE citywide. In D.C., speed violations are recorded when vehicles exceed the posted speed limit by 11 mph or more.[2] The code specifies a structure for semi-annual reporting from the District Department of Transportation (DDOT)/Department of Motor Vehicles (DMV) to the D.C. Council. These reports include information such as the top 15 camera locations by citation value, jurisdictions where vehicles with outstanding citations are registered, new camera installations and their justification, and citation counts by location. In addition, the Chief Financial Officer must provide monthly updates to the Mayor and Council on ATE revenue and projections. The statute further requires the Mayor to develop a multi-year expansion plan as part of the District's long-term safety strategy. In 2023, the District began an expansion of the program from 129 ATE

[1] Council of the District of Columbia. D.C. Code § 50-2209.01 – 50-2209.11, Subchapter V. Automated Traffic Enforcement.

[2] District Department of Transportation. Automated Safety Camera Program. https://asc.ddot.dc.gov/

cameras to 500+ ATE cameras[3][4] The expanded program leverages a revised methodology that considers both proactive and reactive sources of data to inform traffic safety camera deployment.[5] The research cited in this paper for D.C. reflects results from its original legacy program.

In Maryland, automated enforcement is authorized by the state but deployed under a locally implemented framework, except for its work zone speed camera program operated by the state. Under Transportation Article §§ 21-809[6], 21-810[7], and 21-202.1[8], local jurisdictions may establish speed and red-light ATE programs by ordinance, provided they comply with state requirements for signage, operational standards, and annual reporting. The state defines where cameras may be used, such as in school zones or residential areas with speed limits of 35 mph or less, and caps fines for violations, which are treated as civil penalties without driver points. The cameras are triggered to record speed violations when a vehicle exceeds the posted speed limit by 12 mph or more. Local jurisdictions, however, are responsible for identifying camera locations based on crash and speed data, operating and maintaining equipment, processing citations, and reinvesting revenue in safety programs. The state's Speed Monitoring Systems Reform Act of 2014[9] introduced error-rate limits and citizen complaint procedures. The state operates its own automated speed enforcement program in work zones along controlled access roadways with a speed limit of 45 mph or higher, and issues fines according to a different fine schedule.[10]

Virginia first permitted local jurisdictions to adopt automated red-light camera ordinances in 2007.[11] In 2020, the state authorized local jurisdictions to adopt automated speed enforcement in school and work zones via Virginia Code 46.2-882.1[12]. The law allows ticketing only for drivers going more than 10 miles per hour (mph) over the posted speed limit; mandates officer certification of violations; and requires clear signage and data purging within defined timeframes.

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[3] Lott, E. (2021). Public roundtable: The District Department of Transportation's use of automated traffic enforcement cameras. https://ddot.dc.gov/sites/default/files/dc/sites/ddot/release_content/attachments/Final%20DDOT%20Testimony%20ATE%20Roundtable%20November%202021_submitted%20to%20Council.pdf

[4] District Department of Transportation. (2026). Automated safety camera program. https://asc.ddot.dc.gov/#overview

[5] District Department of Transportation. (2026). Selection methodology for automated safety camera locations. https://asc.ddot.dc.gov/pages/methodology

[6] Maryland General Assembly. Maryland Annotated Code, Transportation Article §21–809. *https://mgaleg.maryland.gov/mgawebsite/laws/StatuteText?article=gtr&section=21-809&enactments=false*

[7] Maryland General Assembly. Maryland Annotated Code, Transportation Article §21–810. *https://mgaleg.maryland.gov/mgawebsite/laws/StatuteText?article=gtr&section=21-810&enactments=False&archived=False*

[8] Maryland General Assembly. Maryland Annotated Code, Transportation Article §21–202.1. *https://mgaleg.maryland.gov/mgawebsite/Laws/StatuteText?article=gtr&section=21-202.1*

[9] Maryland General Assembly. Speed Monitoring Systems Reform Act of 2014. *Legislation – SB0350, https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/SB0350?ys=2014rs*

[10] Maryland Department of Transportation State Highway Administration. Maryland SafeZones Automated Speed Enforcement. https://www.safezones.maryland.gov/ase/pages/overview.aspx?PageId=4

[11] Virginia General Assembly. Code of Virginia §15.2-968.1. Use of violation monitoring systems to enforce traffic light signals and certain traffic control devices. https://law.lis.virginia.gov/vacode/title15.2/chapter9/section15.2-968.1/

[12] Virginia General Assembly. Code of Virginia § 46.2-882.1. Use of photo speed monitoring devices in highway work zones, school crossing zones, and high-risk intersection segments; civil penalty. *Legislative Information System,* https://law.lis.virginia.gov/vacode/title46.2/chapter8/section46.2-882.1/

Table 1: Regional ATE Frameworks

State/ District	Code(s)	Year Passed	Addresses:	Grants Authority to:
District of Columbia	§ 50-2209.01	1997	General automated traffic enforcement	Mayor of D.C.
	§ 50-2209.11	2013	Expansion of automated traffic enforcement program, with specific requirements for red-light, speed, stop-sign, and bus lane enforcement cameras	Mayor of D.C.
Maryland	§ 21-809	2014	Speed cameras outside of work zones, error-rate limits, citizen complaint procedures	Local jurisdictions
	§ 21-810	2009	Speed cameras in work zones	State agencies
	§ 21-202.1	1997	Red-light cameras	Local jurisdictions
Virginia	§ 46.2-882.1	2020	Speed cameras in school/work zones, enforcement thresholds, officer cert. of violations, signage, data purging	Local jurisdictions
	§ 15.2-968.1	2007	Red-light camera enforcement	Local jurisdictions

These frameworks illustrate the region's various approaches to ATE implementation and oversight. D.C. maintains centralized authority and long-term planning; Maryland balances local discretion with state-mandated safeguards; and Virginia employs targeted deployments with strict procedural requirements. These differences affect opportunities for regional coordination. For TPB, understanding these regional nuances is essential to identifying common standards for transparency, evaluation, and communication, ensuring that ATE programs across the region can be deployed in ways that are credible, equitable, and focused on safety.

1.3 Key Findings

A review of regional, national, and international research suggests that ATE can be an effective tool for improving roadway safety, but its long-term success depends on careful program design and public trust. The following key findings highlight the most important lessons for the metropolitan Washington region:

- **Crash Reduction:** Automated enforcement reduces both the number and severity of crashes by deterring high-risk driving behaviors. Results across different regions show consistent improvements when programs are sustained and strategically deployed, such as when automated red-light enforcement is installed at a site with high rates of side impact crashes rather than at a site with higher rates of rear-end crashes.
- **Speed Management:** Speed cameras have been shown to lower excessive speeding and promote safer travel speeds, particularly in sensitive areas like school zones and residential road corridors.
- **Integrating ATE into Comprehensive Safe System Strategies:** ATE strengthens overall roadway safety when combined with education, engineering/roadway design, and data-driven enforcement practices by protecting vulnerable users and reinforcing safer driving habits.
- **Long-Term Safety Impacts:** Sustained programs that are consistently evaluated and adjusted appropriately maintain safety benefits over time, while those that are paused or scaled back often experience a loss of earlier gains.

- **Considerations for ATE Implementation:** Different legal frameworks in D.C., Maryland, and Virginia shape how ATE programs operate. It is difficult for each jurisdiction to enforce penalties against a driver from another jurisdiction who has not paid a citation. Stronger regional coordination, transparency, and equity safeguards can enhance fairness, accountability, and long-term program credibility.

Methodology

This white paper focuses specifically on automated traffic enforcement through speed cameras and red-light cameras. The analysis combined literature collection and evaluation of regional, national, and international programs to understand how this technology influences safety outcomes. Specifically, it examined before-and-after studies of crash and speed trends; assessed outcomes from programs in the District of Columbia, Maryland, and Virginia; and reviewed lessons from national peer jurisdictions, such as New York City, to identify practices that improve program performance. Together, these steps informed the key findings and recommendations presented in this white paper.

1.4 Safe System Approach

Implementing automated speed and red-light camera enforcement aligns with the Safe System Approach (SSA), which emphasizes shared responsibility among road users, roadway designers, and policymakers to prevent fatalities and serious injuries. The U.S. Department of Transportation has adopted the Safe System Approach and promotes its adoption across the transportation community.[13] Two SSA elements are particularly relevant to ATE:

- **Safe Road Users:** ATE programs are designed to encourage compliance with traffic laws by deterring unsafe driving behaviors such as speeding and red-light running.
- **Safe Speeds:** Speed management is central to reducing crash risk and severity. Evaluating how ATE contributes to lowering mean speeds and reducing extreme speed violations provides a direct link to Safe System outcomes.

1.5 Literature Review

The literature review process focused on real-world outcomes of speed and red-light camera programs to establish a foundation for the white paper's findings. The team drew from 19 sources, both primary and secondary, including evaluations conducted by local jurisdictions, national research organizations, and international case studies. Emphasis was placed on before-and-after analyses that quantified changes in crash rates, speed distributions, and violation frequencies. The team shared an initial literature list with TPB staff and added additional sources based on staff feedback. A complete list of these sources is presented in **Appendix B.**

Regional evaluations from the DMV region were reviewed to assess how ATE programs have performed locally, with particular attention to variations in legal and community context. These findings provided the basis for understanding ATE's safety effects and informed the synthesis of lessons learned and key takeaways presented in this white paper.

[13]U.S. Department of Transportation (2025). What is a safe system approach? https://www.transportation.gov/safe-system-approach

The literature collection and review focused on two primary areas:

- **Safety Outcomes:**
  - Crash Reduction: Impacts of ATE on total, fatal, and severe crashes.
  - Speed Management: Effects on mean speeds and high-end speed violations.
  - Integrating ATE into Comprehensive Safe System Strategies: Explores how ATE contributes to broader safety goals, such as preventing dangerous driving behaviors and protecting the most vulnerable road users, by complementing education, engineering, and equitable enforcement efforts.
  - Long-Term Safety Impacts: Evidence of sustained crash and speed reductions beyond initial deployment.
- **Considerations for ATE Implementation**
  - A synthesized overview of implementation focus areas for regional best practices, including comparison of the varying legal frameworks, equity considerations, public perception and engagement, and operational practices that shape ATE program performance.

Findings

1.6 Safety Outcomes

Regional, national, and international examples show that automated enforcement is not experimental but a well-established safety practice. In the United States, ATE programs have expanded from large metropolitan areas such as New York City and Washington, D.C. to suburban jurisdictions such as Bellevue, Washington, Fairfax County, Virginia, and Montgomery County, Maryland. Countries such as Hungary, France, Sweden, and Australia have more than two decades of experience deploying speed cameras at scale and documenting sustained reductions in crashes and fatalities (International Transport Forum, 2021; Transport Accident Commission Victoria, 2023). The following ATE deployment examples provide insight into the technology's performance in a variety of environments.

The following sections describe evidence of ATE's safety outcomes, from the metropolitan Washington region and expanding to international research. The discussion is organized around measurable safety impacts: crash reduction, speed management, integration into comprehensive safe system strategies, and long-term outcomes.

CRASH REDUCTION

In the metropolitan Washington region, Washington, D.C. was among the first U.S. cities to adopt automated traffic enforcement. Following the initial deployment of speed cameras, studies using data collected for the years 2016 to 2019 documented a roughly 30 percent reduction in injury crashes near sites with cameras deployed through D.C.'s legacy program (Abdelhalim et al, 2021). At the time of the study, the District operated approximately 84 speed cameras across a mix of arterial corridors and local streets, with 29 sites evaluated using before-and-after analysis. Montgomery County followed with one of the nation's first suburban speed camera programs, expanding it to 110 speed cameras and 51 red-light cameras by 2024. Corridors with speed cameras (school zones and residential road corridors) were associated with a 39 percent reduction in the likelihood of crashes resulting in an incapacitating or fatal injury when analyzing data on crashes between 2004-2013 as compared with crashes in Fairfax County, VA on similar roads (Hu & McCartt, 2016). Crash reduction effectiveness may also vary by type of automated traffic enforcement and by the predominant crash

type of the site prior to ATE deployment. An evaluation of the effectiveness of red-light camera deployments at intersections from Montgomery, Prince George's, and Howard Counties found that appropriate deployment of the red-light cameras reduced side-impact crashes but not rear-end collisions. The evaluation explored multiple time spans before and after implementation for each intersection (MDOT SHA, 2018-a). This evidence suggests that when deployed with appropriate site selection and program design, ATE is associated with substantial reductions in fatal or serious injury crashes in various roadway contexts.

Studies in other U.S. cities have also reported crash reductions following the implementation of ATE cameras. In New York City, one of the country's largest speed camera programs with over 2,200 cameras deployed across 750 school speed zones (within a quarter-mile radius of a school building) as of 2023, expanded to 24/7 operation in August 2022. This change resulted in an additional 8 percent reduction in injury crashes during overnight and weekend hours when comparing the year before and the year after the expansion (NYC DOT, 2025). The city of Bellevue in Washington State offers another perspective as a small suburban city with more than a decade of photo enforcement experience. Between 2010 and 2023, Bellevue has seen drops in violations and overall crash frequencies with 3 or fewer non-Killed/Serious-Injury crashes per year at its three school-zone speed camera sites, mostly located along minor arterials and neighborhood collectors (Fehr & Peers, 2025). According to a study by the Insurance Institute for Highway Safety (IIHS), large cities that implemented red-light cameras experienced a 21 percent reduction in fatal crashes caused by red-light running and a 14 percent decrease in overall fatal crashes at signalized intersections compared to cities without similar programs between 2010 and 2014 (Hu & Cicchino, 2017).

Research around the globe consistently demonstrates that automated speed enforcement reduces crashes. A comprehensive analysis by the International Transport Forum found that lowering mean speeds produces substantial safety benefits. For example, an analysis of automated point-to-point (P2P) speed enforcement using speed data collected before and after implementation found there was a 10 percent reduction in mean speed and a 14 percent reduction in speed variability between 2009 and 2011, with an estimated decrease in crashes of 32 percent using a before period of 2006 to early 2009 and an after period of the remainder of 2009 through 2011. Similarly, the introduction of speed cameras in France in 2003 was linked to sustained reductions in crashes; fatalities decreased by 26 percent on main rural roads, 31 percent on rural motorways, 38 percent on urban motorways, and 14 percent on urban roads (International Transport Forum, 2018).

Table 2: Crash Reduction from Speed / Red-Light Cameras

Context	Location	Crash Reduction from Speed / Red-Light Cameras
Regional	Washington, D.C.	30 percent reduction in injury crashes near camera sites
Regional	Montgomery County, MD	39 percent reduction in likelihood that a crash resulted in a fatal or serious injury
National	Large cities in the U.S.	21 percent reduction in fatal crashes caused by red-light running and 14 percent overall decrease
National	NYC	8 percent decrease in crashes during overnight and weekend hours.
National	Bellevue, WA	>3 non-Killed/Serious-Injury crashes per year
International	France	26 percent on main rural roads, 31 percent on rural motorways, 38 percent on urban motorways, and 14 percent on urban roads
International	Italy	32 percent overall reduction in crashes following speed camera rollout

A complete list of sources is presented in **Appendix B.**

SPEED MANAGEMENT

The relationship between speed and crash severity is well established: a pedestrian struck at 40 mph faces a fatality risk three times higher than one struck at 25 mph (National Highway Traffic Safety Administration [NHTSA], n.d.). Automated enforcement addresses this risk by reducing excessive speeding and curbing the most dangerous behaviors occurring at high-risk locations.

Within the metropolitan Washington region, jurisdictions have seen improvements in speed reduction where ATE is deployed. In Montgomery County, an independent study analyzing camera effects on speed 7.5 years after the program's implementation (when 92 speed cameras were in operation) found that speed cameras were associated with a 10 percent reduction in mean speeds and a 62 percent reduction in the likelihood that a vehicle was traveling more than 10 mph above the speed limit at camera sites (Hu & McCartt, 2016). In D.C., early deployment of speed cameras through its legacy program was associated with measurable speed reductions at seven camera sites selected randomly from a total of 60 targeted enforcement zones, with mean speeds decreasing by 14 percent and fewer drivers exceeding the posted limit by more than 10 mph over the first six months after implementation (Retting & Farmer, 2003). In Virginia, more targeted programs show that the speed management benefits extend to localized environments around school zones. The City of Alexandria installed five speed cameras along arterial roads in school zones in 2022, with speeds dropping between 14 percent and 30 percent after the first few weeks of enforcement at most sites, especially during school arrival and dismissal periods (City of Alexandria, 2024). Similarly, Fairfax County's pilot program, launched in 2023 in nine school zones and one construction zone, saw violations drop by 15 percent to 27 percent at school sites during the program's first year (Fairfax County Government, 2023–2025).

Evaluations from multiple U.S. cities indicate that automated speed enforcement is associated with substantial reductions in speeding violations across urban and suburban contexts. Within one year of the expansion of New York City's 24/7 speed camera operation in 2022, speeding violations at enforced locations declined by 30 percent (NYC DOT, 2023). In Philadelphia, an evaluation of the Roosevelt Boulevard automated speed enforcement program found significant safety gains, with excessive speeding violations dropping by more than 90 percent within two years of implementation (Governors Highway Safety Association [GHSA], 2023). Bellevue reinforces these findings from a suburban context. More recent evaluations have shown that Bellevue's school zone speed cameras have had positive effects, as speeding violation rates have continuously declined between 2010 and 2023 (Fehr & Peers, 2025).

International evidence demonstrates a similar dynamic in that automated enforcement reduces both average travel speeds and the prevalence of excessive speeding. The International Transport Forum's 2021 Speed Camera Review examined outcomes from 12 jurisdictions, including Australia, France, Finland, Norway, the Netherlands, and the United Kingdom, and found that speed cameras consistently curb extreme speeding behavior. Across sites included in the review, the share of vehicles exceeding the limit by more than 15 km/h (~9 mph) typically dropped by 50–70 percent, while average speeds fell by 2–10 km/h (~1-6 mph) depending on roadway context. Reductions tended to be greater on urban and arterial corridors than on motorways or rural roads where higher design speeds and variable traditional enforcement (human officer-led) patterns limited behavioral change (International Transport Forum, 2021).

Table 3: Speed Reduction from Speed Cameras

Context	Location	Crash Reduction from Speed
Regional	Fairfax County	25 percent reduction in violations at school sites
Regional	Alexandria	Sustained speed compliance between school arrival and dismissal periods

Context	Location	Crash Reduction from Speed
Regional	Washington, D.C.	14 percent reduction in mean speed and fewer drivers exceeding the posted speed limit by more than 10 mph
Regional	Montgomery County, MD	62 percent decline in the likelihood that a vehicle was traveling more than 10 mph above the speed limit at camera sites
National	Bellevue, WA	Continuous decline of speeding violation rates
National	Philadelphia	90 percent decline in speeding violations across camera corridor
National	NYC	30 percent decline in speeding violations across camera zones
International	Australia	50 – 70 percent reduction in vehicles exceeding the speed limit over 15 km/h (~9 mph)

*A complete list of sources is presented in **Appendix B.***

INTEGRATING ATE INTO COMPREHENSIVE SAFE SYSTEM STRATEGIES

ATE can influence roadway safety beyond reducing overall crash frequency. This section highlights how ATE affects the nature and severity of crashes, helps prevent the most life-threatening outcomes, and protects vulnerable road users.

The National Highway Traffic Safety Administration (NHTSA) and the Federal Highway Administration (FHWA) agree that automated speed enforcement has been effective in reducing traffic fatalities when used appropriately as part of a comprehensive roadway safety program (NHTSA and FHWA, 2023). Pairing automated enforcement with other strategies can strengthen long-term behavioral change by reinforcing safe driving expectations through multiple channels. In the metropolitan Washington region, Montgomery County, the City of Alexandria, and Fairfax County have adopted ATE as part of their enforcement toolkit, allowing officers to focus on other locations with safety needs. FHWA and NHTSA support a data-driven process both for selecting ATE as a strategy within a broader safety program and for identifying specific site locations for ATE deployment (NHTSA & FHWA, 2023),

ATE is commonly paired with other countermeasures across jurisdictions within the metropolitan Washington region. **Table 4** illustrates just a few examples of how ATE may be paired with other countermeasures to support safety gains. Maryland's SafeZones program, an automated speed enforcement initiative operated by the Maryland Department of Transportation State Highway Administration (MDOT SHA) and the state police to reduce speeding in highway work zones, showed reduced excessive speeding and fewer worker injuries through a combination of signage, public outreach, and consistent enforcement (Maryland SafeZones, 2019). Similarly, the City of Rockville observed that pairing an existing speed camera with new bike lanes produced a notable decline in speeding citations, reinforcing how street design and ATE can work together to sustain speed compliance (Barnett-Woods, 2024). In New York City, the time per day that speed cameras were active was expanded, which combined with school street redesigns and education campaigns, has led to fewer severe nighttime crashes, particularly those involving pedestrians (NYC DOT, 2023). Maryland's red-light camera program demonstrates the principle of targeted enforcement at high-risk intersections, recording reductions in side-impact (angle) crashes, one of the most dangerous crash types, while also discouraging aggressive driving and red-light running (MDOT SHA, 2018-b).

Table 4: Examples of ATE and Paired Strategies

Context	Location	ATE and Paired Strategy
Regional	Rockville	Speed camera & road diet and bike lanes
Regional	DMV	ATE cameras & police officer enforcement
Regional	Maryland	Red-light cameras & high-risk locations
Regional	Maryland	Work zone cameras & signage, public outreach, and consistent enforcement
National	NYC	Speed cameras in school zones & street redesigns and education campaigns

*A complete list of sources is presented in **Appendix B.***

LONG-TERM SAFETY IMPACTS

The longevity of automated enforcement outcomes has been examined for more than two decades. Many jurisdictions report sustained reductions in risky driving behaviors, though some studies indicate that benefits may diminish over time or vary by location. Documented long-term benefits include sustained decreases in mean speeds, lower rates of high-end speeding, continued reductions in serious and fatal crashes, and more uniform traffic flows.

Maryland's evaluations illustrate the complexity of long-term impacts. Red-light cameras reduced aggressive driving and angle crashes in the years following installation, but effectiveness varied between intersections and measurable improvements were not universal, mostly due to environment variables such as intersection design, signal timing, approach speeds, and driver behavior (MDOT SHA, 2018-a). Similarly, the SafeZones program achieved notable reductions in excessive speeding. However, maintaining compliance required ongoing public outreach and monitoring efforts, including education campaigns through billboards, Public Service Announcements (PSA), and social media, as well as the use of large warning signs and digital speed trailers to alert drivers in advance (Maryland SafeZones, 2019). Montgomery County's program has continued to reduce high-risk speeding, though evaluations note that benefits are concentrated at enforced sites. This suggests that while targeted deployment can be effective at specific locations, broader system-wide improvements often require complementary measures, such as expanded coverage, public education, or road design, to influence regional driving behavior.

The effectiveness of ATE is further underscored by what happens when enforcement is withdrawn. A study examining the effects of deactivating red-light cameras in 14 large U.S. cities, including Charlotte, NC, Baltimore, MD, San Diego, CA, and Houston, TX, found that turning cameras off, even temporarily, increases all fatal crashes by 16 percent, effectively reversing prior improvements (Hu & Cicchino, 2017).

Bellevue, Washington offers an example of lasting compliance at school zone camera sites, where violations dropped sharply after installation and stayed low for more than a decade. The persistence of these results is an example of how automated enforcement can foster long-term behavioral change when consistently applied and well-communicated. However, the same program's mixed red-light camera outcomes, showing fewer injury crashes at some intersections and minimal change at others, underscore that effectiveness depends on site-specific conditions and implementation context (Fehr & Peers, 2025).

International reviews note that long-term ATE results can differ across corridors, with variations often linked to roadway design, traffic conditions, and the visibility of ATE cameras and signage (International Transport Forum, 2018; International Traffic Safety Data and Analysis Group, 2021). For instance, results tend to be more consistent on arterial or urban corridors with clear lane delineation and lower speed limits, while multilane highways and rural roads with higher design speeds show smaller reductions (International Transport Forum, 2018). Sites with complex intersections or frequent access points may also see uneven compliance due to greater driving complexity and variable traffic flow. Visibility plays a key role as well, as programs that maintain conspicuous signage and cameras generally achieve more sustained speed reductions than covert or mobile deployments (International Transport Forum, 2018; International Traffic Safety Data and Analysis Group, 2021).

Taken together, the long-term record suggests that automated enforcement can deliver durable safety benefits, but only when programs are maintained, adapted to local conditions, and paired with broader safety strategies. Examples such as Bellevue's implementation of ATE in school zones and Maryland's SafeZones initiative show that programs can normalize compliance over time. At the same time, mixed results from red-light cameras, uneven site performance, and the rebound effects observed when cameras are deactivated all highlight a tool whose effectiveness depends on consistent application and integration with wider safety policies.

1.7 Considerations for Regional ATE Implementation

Building on the research findings, this section translates some of the observed outcomes into practical insights for how the effectiveness of ATE deployments can be strengthened by addressing regional challenges and leveraging available opportunities. Understanding the factors that shape implementation is essential to ensuring that automated enforcement achieves its intended safety goals in an equitable and sustainable way.

Using the MWCOG region as an example, this section examines how differing legal frameworks, operational structures, and public expectations influence program design and performance. The region offers a useful case study because D.C., Maryland, and Virginia have adopted varied approaches that reflect local priorities while navigating shared challenges. These examples help illuminate overarching considerations that regions may encounter when seeking to develop or refine automated enforcement programs. **Table 5** summarizes these cross-cutting considerations and highlights common focus areas, best practices, and case studies/examples drawn from across the metropolitan Washington area.

As a multi-state region, jurisdictions within the metropolitan Washington region experience difficulties in enforcing penalties against out-of-state drivers who have not paid an automated traffic enforcement citation. On December 15, 2021, the TPB sent a letter to state executives asking them to explore interjurisdictional reciprocity[14], and MWCOG has identified regional ticket reciprocity as a key 2026 Legislative Priority.[15] In the fall of 2024, the D.C. Council passed the "Strengthening Traffic Enforcement, Education, and Responsibility" (STEER) Act, enabling the District to sue out of state drivers with repeat and outstanding citations (Spiegel, 2024). By strengthening regional coordination, the region can improve the enforcement of traffic safety laws and see increased effectiveness of ATE in reducing crashes and managing speeds.

[14]TPB. (2022) December 15, 2021 Meeting minutes. https://www.mwcog.org/events/2022/1/19/transportation-planning-board/

[15] MWCOG. (2026). COG legislative priorities. https://www.mwcog.org/documents/2026/01/14/cog-legislative-priorities-featured-publications-infrastructure-legislative-priorities/

Table 5: Regional Implementation Focus Areas and Best Practices

Themes	Focus Areas	Best Practice	Case Studies/ Examples
Legal Context	Statutory differences across D.C., Maryland, and Virginia create inconsistencies in authorization, enforcement thresholds, and program oversight. These gaps complicate cross-jurisdictional coordination, data sharing, and public communication.	Regular information-sharing on signage practices, reporting approaches, and communication strategies can help jurisdictions learn from one another and improve program transparency. In places where jurisdictions choose to pursue it, reciprocal citation enforcement can further support consistency for travelers and reinforce equitable application of ATE.	D.C. operates under a centralized citywide statute; Maryland balances local discretion with state safeguards; Virginia's newer framework targets school and work zones with officer certification and strict procedural rules.
Site Selection Considerations	Without careful design, ATE programs may place additional burdens on some populations by imposing disproportionate fines on lower-income residents or by clustering cameras in already over-policed areas.	Jurisdictions can mitigate uneven impacts through data-driven site selections focused on crash risk rather than citation volume and through public-facing dashboards that report outcomes. Pairing enforcement with education and engineering also helps to reduce unintended social impacts of ATE programs.	Montgomery County prioritizes school zones and residential corridors; Alexandria limits cameras to school zones protecting vulnerable users; Fairfax County links enforcement to Vision Zero and maintains public dashboards.
Public Perception and Engagement	Public trust in ATE programming depends on agency transparency, appropriate siting for deployment, and an understanding of the safety need for ATE.	Building trust requires clear and consistent communication that frames ATE as part of broader Vision Zero and Safe System goals. Transparent reporting, community engagement during site selection, and visible reinvestment of revenues in safety improvements help demonstrate accountability.	Montgomery County and Alexandria publish detailed evaluations; Fairfax County engages the public through education campaigns and dashboards; D.C. continues to face scrutiny for limited transparency on revenue use, but, D.C. has an online dashboard where the public can see where cameras are located and the number of citations per camera.
Operational Practices	Program effectiveness depends on reliability, proper calibration, and transparent data reporting. Inconsistent maintenance or opaque data management can undermine credibility and raise legal challenges.	Standardizing operational practices, such as calibration schedules, error-rate reporting, and consistent evaluation of crash outcomes can enhance reliability and public confidence. Shared data frameworks also allow jurisdictions to compare performance and identify best practices regionally.	Montgomery County conducts regular performance reviews; Fairfax County phased their ATE rollout to ensure functionality; D.C.'s large system underscores the need for quality control at scale.

Appendix A: Fine Schedules

Table 6. Fine Schedules for Speed Violations

Jurisdiction	Reference	Violation	Fine
Maryland	§ 21-809(c)(2)[16]	12 to 15 MPH in excess of limit	$40.00
		16 to 19 MPH in excess of limit	$70.00
		20 to 29 MPH in excess of limit	$120.00
		30 to 39 MPH in excess of limit	$230.00
		40 or more MPH in excess of limit	$425.00
Virginia	§ 46.2-882.1[17]	Traveling at speeds of at least 10 miles per hour above the posted speed limit in school crossing zones, highway work zones, and high-risk intersections with speed cameras	Shall not exceed $100.00
Washington D.C.	18 DCMR § 2200[18]	11 to 15 mph in excess of limit	$100.00
		16 to 20 mph in excess of limit	$150.00
		21 to 25 mph in excess of limit	$200.00
		Over 25 mph in excess of limit on controlled access roadways	$400.00
		Over 25 mph in excess of limit on non-controlled access roadways	$500.00

Table 7. Fine Schedules for Red-Light Violations

Jurisdiction	Reference	Violation	Fine
Maryland	§ 21-202.1[19]	Failure to stop at steady circular red signal	Shall not exceed $100.00
		Failure to stop at steady red arrow	
Virginia	§ 15.2-968.1[20]	Failure to obey traffic lights	Shall not exceed $50.00
		Illegal right turn on red	
		Illegal left turn on red	
Washington D.C.	18 DCMR § 2600[21]	Passing red light	$150.00
		Right turn on red: failure to come to a complete stop before turning	$100.00
		Right turn on red: failure to yield right-of-way to vehicle or pedestrian	$100.00
		Violation of “No Turn on Red” sign	$100.00

[16] Maryland General Assembly. Maryland Annotated Code, Transportation Article §21-809. https://mgaleg.maryland.gov/2025RS/bills/hb/hb0182E.pdf

[17] Virginia General Assembly. Code of Virginia § 46.2-882.1. Use of photo speed monitoring devices in highway work zones, school crossing zones, and high-risk intersection segments; civil penalty. *Legislative Information System,* https://law.lis.virginia.gov/vacode/title46.2/chapter8/section46.2-882.1/

[18] Council of the District of Columbia. D.C. Municipal regulations title 18, chapter 22. https://dcrules.elaws.us/dcmr/18-2200/

[19] Maryland General Assembly. Maryland Annotated Code, Transportation Article §21–202.1. https://mgaleg.maryland.gov/mgawebsite/Laws/StatuteText?article=gtr&section=21-202.1

[20] Virginia General Assembly. Code of Virginia §15.2-968.1. Use of violation monitoring systems to enforce traffic light signals and certain traffic control devices. https://law.lis.virginia.gov/vacode/title15.2/chapter9/section15.2-968.1/

[21] Council of the District of Columbia. D.C. Municipal regulations title 18, chapter 26. https://dcrules.elaws.us/dcmr/18-2600/

Appendix B: List of Sources

Abdelhalim, A., Bailey, L., Dalphy, E., & Raboy, K. (2021). Data Enforced: An exploratory impact analysis of automated speed enforcement in the District of Columbia. Institute of Electrical and Electronics Engineers (IEEE). https://doi.org/10.1109/ITSC48978.2021.9565046

Barnett-Woods, B., (2025, October). Multimodal Transportation: Plan to Action [Conference presentation]. 2025 APA National Capital Area Planning Conference, Washington D.C., United States.

City of Alexandria. (2024). School speed camera evaluation report. Alexandria Department of Transportation & Environmental Services. https://www.alexandriava.gov/sites/default/files/2024-10/SchoolSpeedCameraEvaluationReport_2024.pdf?utm_source

Code of Virginia § 46.2-882.1. (2020). Use of photo speed monitoring devices in school crossing zones, work zones, and high-risk intersection segments. https://law.lis.virginia.gov/vacode/title46.2/chapter8/section46.2-882.1

D.C. Code § 50-2209.01–11. (n.d.). Automated traffic enforcement. https://code.dccouncil.gov/dc/council/code/titles/50/chapters/22/subchapters/V

Fairfax County Government. (2023–2025). Speed camera program pilot, expansion, and updates. Fairfax County, VA. https://www.fairfaxcounty.gov/topics/speed-cameras

Fehr & Peers. (2025). Bellevue B-Safe technical memos 1 and 2.

Governors Highway Safety Association. (2023). Automated enforcement in a new era: Lifesaving programs, meaningful community engagement, equitable enforcement, component of the Safe System approach. GHSA. https://www.ghsa.org/resource-hub/automated-enforcement-new-era

Hu. W. & Cicchino, J.B. (2017). Effects of turning on and off red light cameras on fatal crashes in large U.S. cities. *Journal of Safety Research, 61*, 141-148. https://doi.org/10.1016/j.jsr.2017.02.019

Hu, W. & McCartt, A.T. (2016). Effects of automated speed enforcement in Montgomery County, Maryland, on vehicle speeds, public opinion, and crashes. *Traffic Injury Prevention*, 17(sup1), 53-58. https://doi.org/10.1080/15389588.2016.1189076

Insurance Institute for Highway Safety. (n.d.). Red light running. https://www.iihs.org/research-areas/red-light-running

International Transport Forum. (2021). Speed and crash risk. OECD/ITF. https://www.itf-oecd.org/sites/default/files/docs/speed-crash-risk.pdf?utm_source

Maryland Department of Transportation State Highway Administration. (2018-a). Evaluating the impacts of red light camera deployment on intersection traffic safety. https://rosap.ntl.bts.gov/view/dot/36086?utm_source

Maryland Department of Transportation State Highway Administration. (2018-b). Red light and speed camera safety programs: Statewide summary. MDOT SHA.

Maryland SafeZones. (2019). SafeZones automated speed enforcement annual report. https://transops.s3.amazonaws.com/uploaded_files/Maryland%20SafeZones%20Fact%20Sheet%202019%20Summer.pdf

National Highway Traffic Safety Administration (NHTSA) & Federal Highway Administration (FHWA). (2023). Speed safety camera program planning and operations guide. https://www.pedbikeinfo.org/downloads/SpeedSafetyCameraProgramPlanningOperationsGuide2023.pdf

New York City Department of Transportation. (NYC DOT). (2025). New York City automated speed enforcement program 2024 report. https://www.nyc.gov/html/dot/downloads/pdf/speed-camera-report.pdf

Retting, R. A., & Farmer, C. M. (2003). Evaluation of Speed Camera Enforcement in the District of Columbia. *Transportation Research Record: Journal of the Transportation Research Board*, *1830*(1), 34-37. https://doi.org/10.3141/1830-05

Retting, R. A., Kyrychenko, S. Y., & McCartt, A. T. (2017). Evaluation of automated speed enforcement on crashes in Montgomery County, Maryland, using a before–after study with comparison group. *Traffic Injury Prevention,* 18(4), 387–393.

Spiegel, A. (2024, October 1). *D.C. can finally sue Maryland, Virginia drivers over unpaid tickets*. Axios Washington D.C. https://www.axios.com/local/washington-dc/2024/10/01/dc-traffic-tickets-lawsuits-dangerous-driving-rules

Transport Accident Commission Victoria. (2023). Speed camera program evaluation report. TAC Victoria.