



CTDOT Automated Work Zone Speed Control Pilot

LEGISLATIVE REPORT

February 2024



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1. PILOT SUMMARY AND FINDINGS

In 2021, Connecticut enacted legislation (General Statutes, §13a-261 through §13a-268) requiring the Connecticut Department of Transportation (CTDOT) to establish a pilot program to operate work zone speed control systems on limited access highways. The Automated Work Zone Speed Control Pilot (the Pilot) is a joint program between CTDOT, the Connecticut Department of Emergency Services and Public Protection (DESPP), Connecticut Department of Motor Vehicles (DMV), and the Connecticut Judicial Branch.

Pursuant to the legislation, the Pilot was implemented to deploy no more than three systems at any given time, within select work zone locations to monitor vehicle speeds, issue warnings or violations to the registered vehicle owner when the system detected vehicle speeds of 15 mph or more above the posted speed limit and assess fines to repeat offenders.



Figure 1 | I-95 in East Lyme

Based on analysis of data collected from five system deployment locations, the introduction of automated speed control technology succeeded in attaining the Pilot’s primary goal of reducing vehicle speeding in work zones and thereby improving safety. This result reflects several factors, including the Pilot’s focus on transparency, public engagement, and public education.

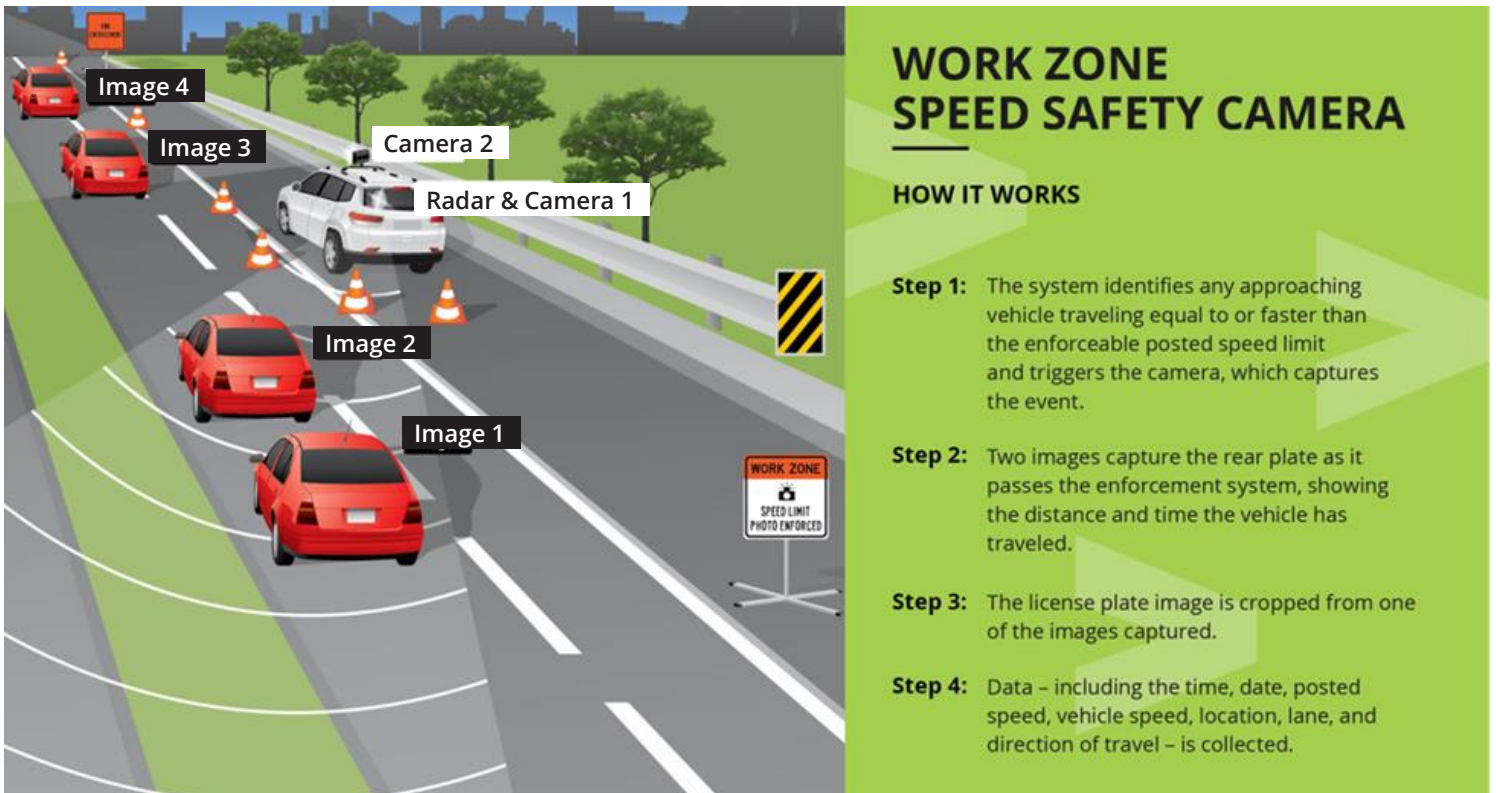


Figure 2 | How the work zone speed safety system works.

Key findings from the Pilot include:

- 1** Drivers in a work zone on average drove slower when the Pilot was in effect compared to the period before the Pilot started. This finding was based on sizeable collection of data before and after system deployment. Of the five locations analyzed, all showed reductions in driver speeds, with four locations showing significant reductions in speed when compared to data collected prior to enforcement. In particular, speeding reduced at two work zones on I-95 by 17 to 18 percent. This reduction can be attributed to the active speed enforcement, signage, and public outreach through the Know the Zone campaign. Speeding at other locations also reduced, but could have also been partially attributed to changes in work zone conditions that could not be controlled for in the data set.

The Pilot achieved success in moderating the behavior of drivers speeding in work zones through
- 2** the issuance of written Warnings and without substantial financial impact to motorists. During the Pilot, more than 24,900 Warnings were issued but fewer than 750 Notice of Violation with a fine were issued. The overall reduction of driver speed in tandem with the relatively low percentage of repeat offenders represents a strong indicator that automated speed control technology can be beneficial.

Inclusion of public outreach within any future work zone safety program will be beneficial to
- 3** educate the public and align public awareness with enforcement. The Pilot allowed CTDOT to conduct robust public outreach to educate drivers about the importance of work zone safety to drivers and workers, and the relationship between public safety and automated speed control technology. A *Know the Zone* branded public awareness campaign included a mix of highway billboards, targeted digital advertisements, media interviews, an ongoing social media presence, and other communications tools.

In summary, the Pilot developed an effective approach that can be adopted as part of a permanent Automated Work Zone Speed Control program.

2. PILOT PROGRAM BACKGROUND

After the Connecticut legislature approved the Pilot in 2021, CTDOT implemented a speed control system for use in work zones of limited access highways with speed limits of 45 mph or more. Pursuant to the legislation, the Pilot was implemented based on CTDOT's prioritization of safety for those working and driving on Connecticut roadways in response to growing public concern about speeding in work zones and the state's ongoing focus on improving roadway safety.

The Pilot was developed based on the collection of identical pre-deployment data sets focused on speed and traffic volume patterns in potential deployment zones defined as CTDOT active construction projects and/or maintenance activities. Complete traffic characteristics defined over a set period were compiled for each area to identify a comprehensive set of characteristics across all designated deployment zones, verify identical data from each area to allow for effective comparative analyses, and establish a base level of effectiveness with consistent data collection measures for each location and deployment. Deployment time periods ranged from one week for more mobile maintenance work zones, to between one month and seven months for long-term construction projects.

The system's image-capture equipment produced a series of images of speeding vehicles. The license plate data from these images were used to identify the registered vehicle owner, and recorded data was transmitted to the third-party System Administrator (SA) for review of the speeding event data and images for accuracy. Validated violations were advanced to sworn State Police officers of the DESPP for adjudication (validation or rejection).



Figure 3 | Deployed technology monitoring vehicle speeds.

CTDOT, DESPP, DMV, the CT Judicial Branch's Centralized Infractions Bureau (CIB), and the Program Administrator (PA) (HDR Engineering, Inc.) collectively developed the initial Pilot requirements. CTDOT also conducted a procurement for a SA to provide the equipment, software, and operational support to deliver the Pilot. That third-party vendor selected as the SA was American Traffic Solutions, Inc. doing business as Verra Mobility. The Pilot was based on development of an active construction project list for deployment location selection within respective geographic areas. CTDOT District Engineers served as the SA's on-site point of contact for the deployment of technology, oversight of speed control vehicle site locations, roadway signage, and site-specific safety requirements for construction work conducted during deployments. CTDOT administered



Figure 4 | Speed control equipment

all public awareness activities, including development and implementation of the Pilot's *Know the Zone* branding, messaging, and project web page along with external communications management (paid advertising, social media marketing, and news media relations.)



The PA assisted with program development and execution in tandem with oversight of SA work and deliverables. PA services included Quality Assurance of field and back-office operations; operational compliance and process updates; public outreach support for CTDOT Office of Communications; performance monitoring; and Pilot reporting. The SA provided a turnkey solution for system development; back-office testing; field deployment of speed control equipment; customer service and record keeping; and U.S. Postal mailings of Warnings and Notice of Violations. The SA also supported data collection and retention.

The Pilot's speed control system determined vehicle speeds using radar that was certified annually and tested daily, issued warnings or violations to the registered vehicle owners, and assessed fines to repeat offenders. Vehicles were considered speed violators if detected traveling 15 mph or more above the posted speed limit. Warnings were issued for the first violation, Notices of Violation with a \$75 fine

were issued for the second violation, and Notices of Violation with a \$150 fine were issued for all subsequent violations.

Sworn DESPP officers reviewed evidentiary packages, authorized issuance of Warnings and/ or Notices of Violation to registered vehicle owners, supported Pilot system design, development, and created Pilot specific forms. Warnings and Notices of Violation were issued when DESPP officers determined a violation occurred based on the recorded information, then subsequently mailed to the registered vehicle owner based on last known address of record. The CIB entered adjudicated violations into the judicial system for processing, accepted payment of fines, processed appeal requests, transferred violations cases to the Superior Court as needed and notified DMV of non-payment. DMV's Information Technology Department supported the Pilot with information related to available content of motor vehicle registration records. CTDOT's Legal Services Unit administered data privacy requirements.

Deliverables for the Pilot included:

-  Evaluation of collected data during the Pilot to determine program impacts on driver behavior based on data and evidence collected from active speed control equipment deployments.
-  Assessment of findings compared with baseline conditions for consideration of a long-term Automated Work Zone Speed Control program.

3. SPEED ENFORCEMENT EQUIPMENT

The Pilot's speed control system utilizes a Mobile Enforcement Unit that has been equipped with one or more motor vehicle sensors connected to a digital image-capture system that produces image recordings with a display of date, time, speed, and location of each motor vehicle allegedly operating in violation of the provisions of General Statutes §13a-263.

The Pilot system relied on three distinct elements:

- 1 Mobile Enforcement Unit Vehicles,
- 2 Equipment Hardware, and
- 3 Proprietary Software.

The Mobile Enforcement Units provided under the Pilot consisted of a standard automotive sport utility vehicle with installed equipment consisting of dual

radar for primary and secondary speed verification; full-color cameras; an optional thermographic camera (commonly known as an infrared camera, thermal imaging camera, or thermal imager) and connected auxiliary cameras for rear license plate capture. The dual radar also enabled simultaneous multi-vehicle speed and lane capture for easy identification of offending vehicles. System software independently verified the speed of each vehicle using proprietary detection algorithms, supported production of radar tracking graphs, and provided event reporting while emphasizing data privacy and protection of personal information at all times. Field workers were fully trained on Concept of Operations, equipment calibration, system accuracy requirements, and equipment performance standards. Pre-deployment preparation included extensive review of deployment protocols and review of alleged violations by DESPP, the PA, and SA.



Figure 5 | Deployed technology monitoring vehicle speeds.

4. SPEED CONTROL SYSTEM OPERATIONS

A Concept of Operations was created to provide a clear structure for the Pilot and established a baseline of protocols, including checklists for the PA to provide quality control on work zone selection and deployments, system tests prior to deployments, monitoring of SA compliance with Key Performance Indicators, and quality control of Warnings and Notices of Violations. All speed control equipment operations were conducted by SA field staff in accordance with guidelines set forth in the Concept of Operations and Standard Operating Procedures developed by the PA. Protocols emphasized delivery of consistent, effective, accurate, and safe field deployments.

Field operations' protocols were developed beginning in January 2023 in conjunction with pre-deployment of mobile units in data collection-only mode. These standards emphasized orientation of speed control equipment within a traffic-controlled area situated in the same direction of travel as adjacent traffic lanes, with positioning prohibited near yield signs on freeway ramps, on curves with advisory speeds, on significant downgrades, and in locations where foreground or background objects would adversely affect operation of image-capture equipment. Any deployment that might reasonably create a safety issue for the construction workers, general motoring public, and speed control mobile unit was not implemented.

Operations included signage that properly warned approaching traffic of operational mobile unit deployment in compliance with the Manual on Uniform Traffic Control Devices, angling of image-capture equipment to minimize images of vehicle windows, and digital masking of all vehicle occupants visible in any image.

Information captured from each event (video, images, and data) was temporarily stored on system hardware in the mobile enforcement unit and subsequently transmitted to the SA's central processing location for downloading into a proprietary smart mobility platform. All data collected by the speed safety systems was strictly used for the Pilot only. Access of data for surveillance or law enforcement purposes was not permitted.

Speed enforcement began with the deployment of mobile units in work zones on April 10, 2023. During this period, traffic volume and speed data was collected, as well as individual event data including images captured of individual vehicles identified as exceeding the speed threshold. The images were used to identify the registered vehicle owner, and for issuing either a Warning or Notice of Violation. Data collected during the Pilot was used as a proof of concept for a long-term program by assessing the Pilot's impact on driver behavior and safety in work zones. This necessarily required design, development, testing, and deployment of a fully accurate speed control system.

5. PUBLIC ENGAGEMENT

The Pilot included a robust and comprehensive *Know the Zone* branded public engagement and awareness campaign. CTDOT's Office of Communications implemented the initiative in the first quarter of 2023 before the onset of enforcement deployments with the objectives of:

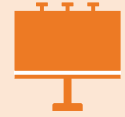
1. Establishing accessible, memorable, and easy to understand messaging that emphasized reducing work zone crashes;
2. Creating a connection between public safety in roadway work zones and the need to reduce speeding; and
3. Developing statewide awareness of the program's intent and protocols based on accurate information about the program's statutory, regulatory, and technical components.

The campaign was aligned directly with Connecticut's commitment to transparency. Elements of the campaign included deployment of signs prior to deployment of speed control equipment, creation of a map on CTDOT's *Know the Zone* web page to showcase deployment locations, and use of multiple media sources to educate drivers about the Pilot and the importance of driving safely in work zones. Pilot marketing included *Know the Zone* branded digital highway billboards, targeted advertisements on a variety of online platforms, and social media. The effort secured earned media coverage from TV news stations, radio news programs, newspapers, and online news sites.

Key results included capturing more than 41.2 million paid advertising impressions in Connecticut via 10 different media platforms that yielded a substantial Return on Investment (ROI) of \$8.73 per 1,000 paid ad impressions. This Cost Per Thousand measurement is used by the advertising

17.4 million impressions

via digital billboard ads



6.8 million impressions

via cable TV ads



4.1 million impressions

via Facebook and Instagram ads

All metrics were at least

▲ 10% higher than estimated

21 million additional impressions

from news media story pitching and social media marketing activities

sector to provide a general indicator of audience penetration and exposure. The ad campaign enjoyed a diversity of market penetration (including 17.4 million impressions via Digital Billboard ads, 6.8 million impressions via cable TV ads, and 4.1 million impressions via Facebook and Instagram ads. Terrestrial Radio in Connecticut accounted for an additional 3.9 million impressions. All metrics were at least 10% higher than estimated based on audience size and negotiated bonus spots.

In addition, the CTDOT Office of Communications oversaw news media story pitching and Social Media Marketing activities beginning in April and continuing through November that accounted for 21 million additional impressions.

6. RESULTS & CONCLUSIONS

Pilot operation allowed for a comprehensive assessment of results and conclusions. The following analysis is based on professional judgment and can be used for consideration during a future implementation of an AWZSC program. Data analysis for each work zone can be found in **Appendix A**.

To assess the impact the Pilot had on vehicle speeds, curves were plotted that represented the percentage of traffic traveling at each speed interval at various times during the Pilot. **Figure 6** illustrates the distribution of vehicle speeds for the project at I-95 in Norwalk prior to the start of enforcement,

and toward the end of the Pilot (amongst other timeframes). The shaded yellow area between the Start and End of Enforcement curves illustrates the substantial reduction in the percentage of vehicles speeding during the Pilot. In **Figure 7**, though data from prior to enforcement was not available, the graph illustrates a substantial reduction in the percentage of vehicles speeding between the start of enforcement and the end of the Pilot at the project at I-95 in East Lyme. Additional project graphs and an illustration on how to interpret them can be found in **Appendix A**.

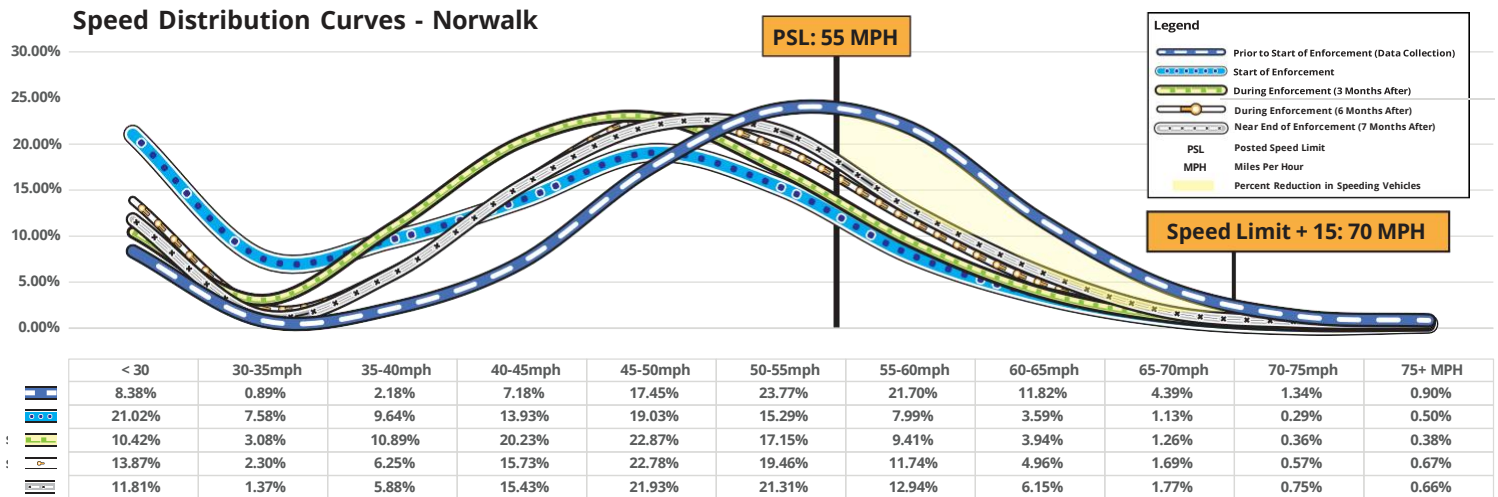


Figure 6 | Speed Distribution Curve for I-95 Norwalk - further details can be found in **Appendix A**.

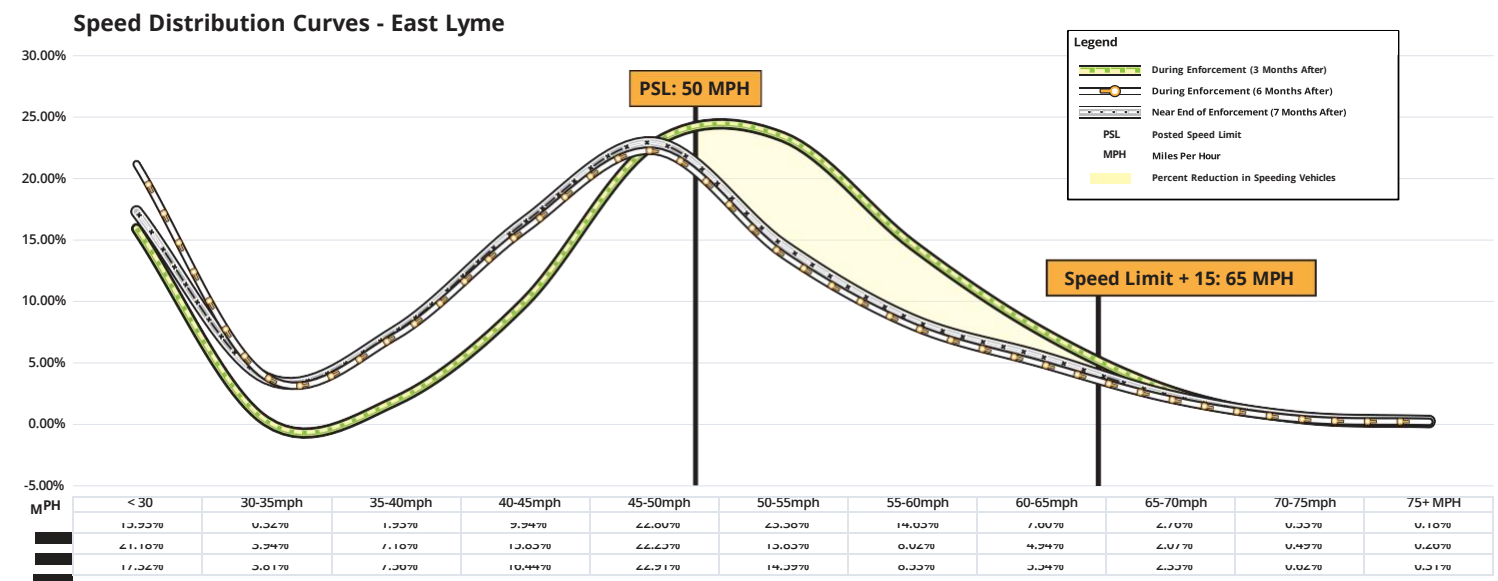


Figure 7 | Speed Distribution Curve for I-95 East Lyme - further details can be found in **Appendix A**.

6.1 Results

Speeds in work zones declined in all five work zones over the course of the Pilot.

- Speed reduction was seen on I-95 in Norwalk and East Lyme where speeding over the posted speed limit was reduced by approximately 18 and 17 percent respectively, between the pre-enforcement period and the end of enforcement.
- Both I-84 at Waterbury and Route 2 at East Hartford experienced reduced speeds, though other factors could have contributed to the speed reduction.

During the enforcement period, generally the percentage of vehicles speeding continued to reduce.

- At four of the five locations, speeds continued to reduce throughout the enforcement period, demonstrating continued effectiveness.
- Use of speed control technology over a longer period of time is likely to further influence driver behavior, thereby increasing the positive effects exhibited over the course of the Pilot.

Driver behavior may have been influenced by ancillary program features such as the public information campaign and roadway signs.

- There are various factors that can influence a driver's behavior, and there is no doubt that many factors were involved during the Pilot. Other elements of the Pilot, such as the "Know the Zone" campaign and standard signage notifying drivers of automatic speed enforcement prior to the work zone may have had a positive impact. Vehicle speeds may have been affected by other factors which could not be controlled, such as weather. Further details of the paid advertising campaign undertaken as part of the Pilot can be found in **Appendix B**.

Preponderance of Warnings issued in relation to Notices of Violation issued indicated the ability of speed control technology to reduce repeat violators.

- In addition to showcasing a low percentage of drivers who were subject to fines, the diminutive number of repeat offenders highlights that work zone safety technology can be effective without adding substantial costs to drivers.



Figure 8 | I-95 East Lyme

APPENDIX

Appendix A. Data Analysis Summary

Speed Distributions

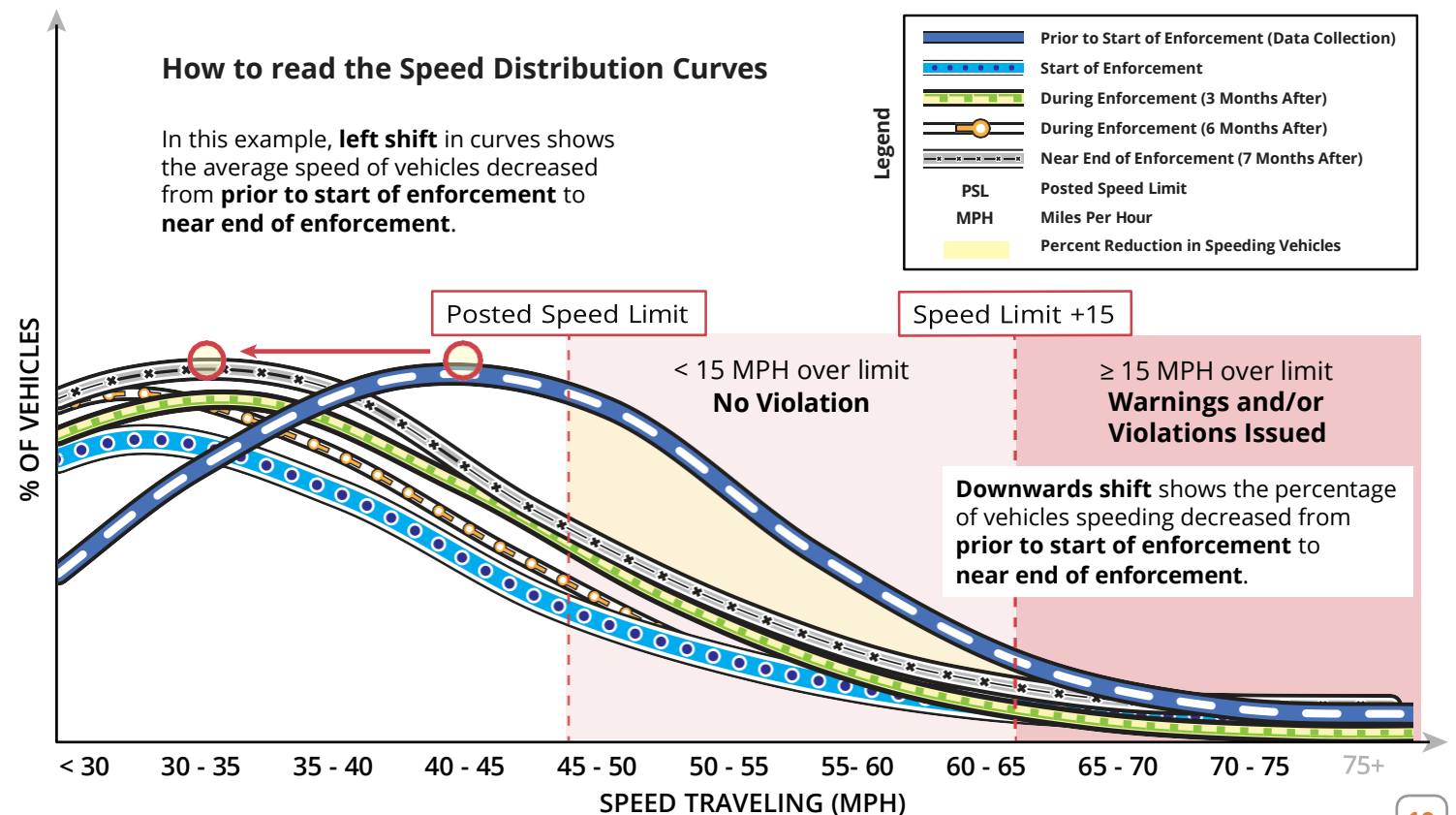
Analyzing the speed distribution data obtained from each work zone detailed how driver speeds changed over the course of the Pilot. The graphs on the following pages represent the speeds recorded at different periods of the Pilot. These periods are outlined to the right.

Speed changes cannot solely be attributed to the Pilot itself. There are various factors impacting speeds such as weather, traffic, lane closures and others. However, the analysis controlled for many of these factors, by selecting work zones and date ranges that would provide meaningful comparisons. It is also critical to recognize that the speed reductions observed were likely due to the Pilot overall, not just the equipment on the roadway. This includes the influence of mailed warnings,

Different periods of the Pilot:

- January 23, 2023 to April 9, 2023 representing speeds **Prior to Start of Enforcement (data collection only)**;
- April 10, 2023 to April 28, 2023 representing speeds at **Start of Enforcement**;
- May/June/July 2023 representing speeds **3 months after Start of Enforcement**;
- August/September 2023 representing speeds **6 months after Start of Enforcement**; and
- October/November 2023 representing speeds **near End of Enforcement**.

mailed notices of violation, extensive public outreach through the Know the Zone campaign, and roadway signing in advance of the equipment.

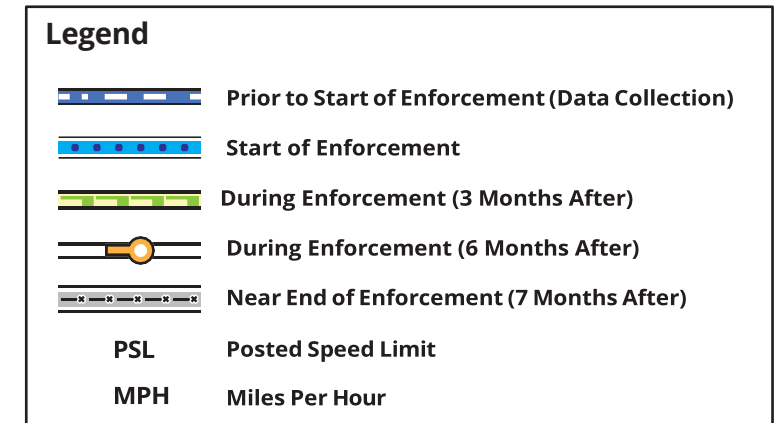


I-95 Norwalk

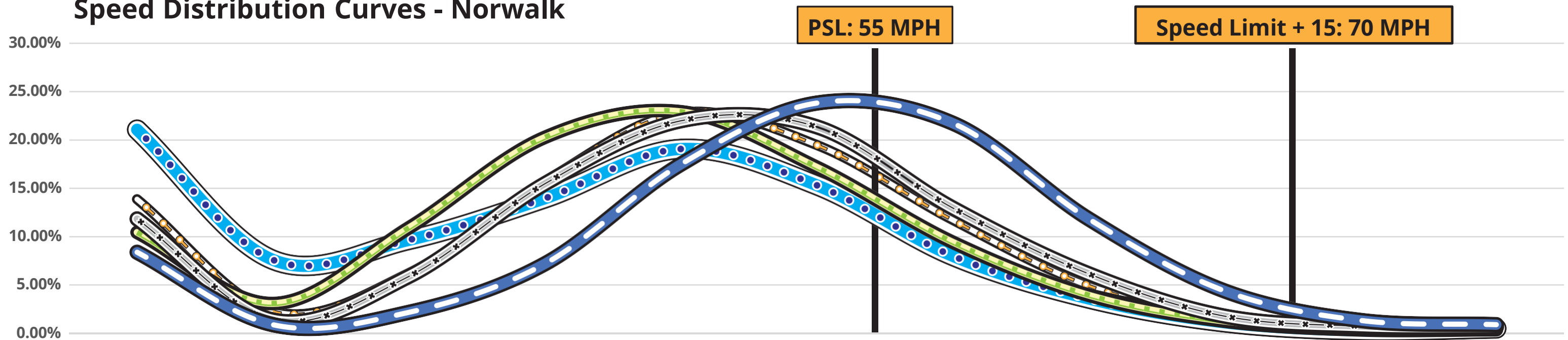
The I-95 Norwalk project provided the best and most controlled site for analysis, maintaining the same lane configurations and similar site conditions throughout the Pilot duration. This provided the most accurate comparison to be made between the data collected in the periods analyzed. At the Norwalk site, the speed distribution analysis showed a clear decrease in speeds as deployments continued throughout the duration of the Pilot. This is demonstrated by the clear shift between Prior to Enforcement data, Start of Enforcement data, During Enforcement data, and Near End of Enforcement data. Though the average number of vehicles fluctuated throughout the three

periods, likely due to the external factors listed previously, this was accounted for in the analysis via normalization of the volumes - minimizing any effect on trends seen in the graph above. Most importantly, we can see the decrease in the volume of drivers traveling at speeds between the posted speed limit and 15 mph above the speed limit when comparing Prior to Enforcement curve with the Near End Of Enforcement curve. In particular, a 17.89% reduction was seen in the share of drivers traveling at driving speeds above the posted speed limit between Prior to Enforcement and Near End of Enforcement. Given that this reduction is seen across average vehicle volumes

within the hundreds, the large reduction provides solid evidence for the success of the speed control system in maintaining safer driving speeds through CT work zones. Similarly, data shows the curves shifted 5 mph to the left demonstrating an overall reduction in speeds in each category. The sharp decrease in speed of drivers between Pre-Enforcement data and Start of Enforcement data could also have been attributable to social media, signage, or public awareness among other things along with the Pilot operations.



Speed Distribution Curves - Norwalk



	< 30	30-35mph	35-40mph	40-45mph	45-50mph	50-55mph	55-60mph	60-65mph	65-70mph	70-75mph	75+ MPH
	8.38%	0.89%	2.18%	7.18%	17.45%	23.77%	21.70%	11.82%	4.39%	1.34%	0.90%
	21.02%	7.58%	9.64%	13.93%	19.03%	15.29%	7.99%	3.59%	1.13%	0.29%	0.50%
	10.42%	3.08%	10.89%	20.23%	22.87%	17.15%	9.41%	3.94%	1.26%	0.36%	0.38%
	13.87%	2.30%	6.25%	15.73%	22.78%	19.46%	11.74%	4.96%	1.69%	0.57%	0.67%
	11.81%	1.37%	5.88%	15.43%	21.93%	21.31%	12.94%	6.15%	1.77%	0.75%	0.66%

I-95 East Lyme

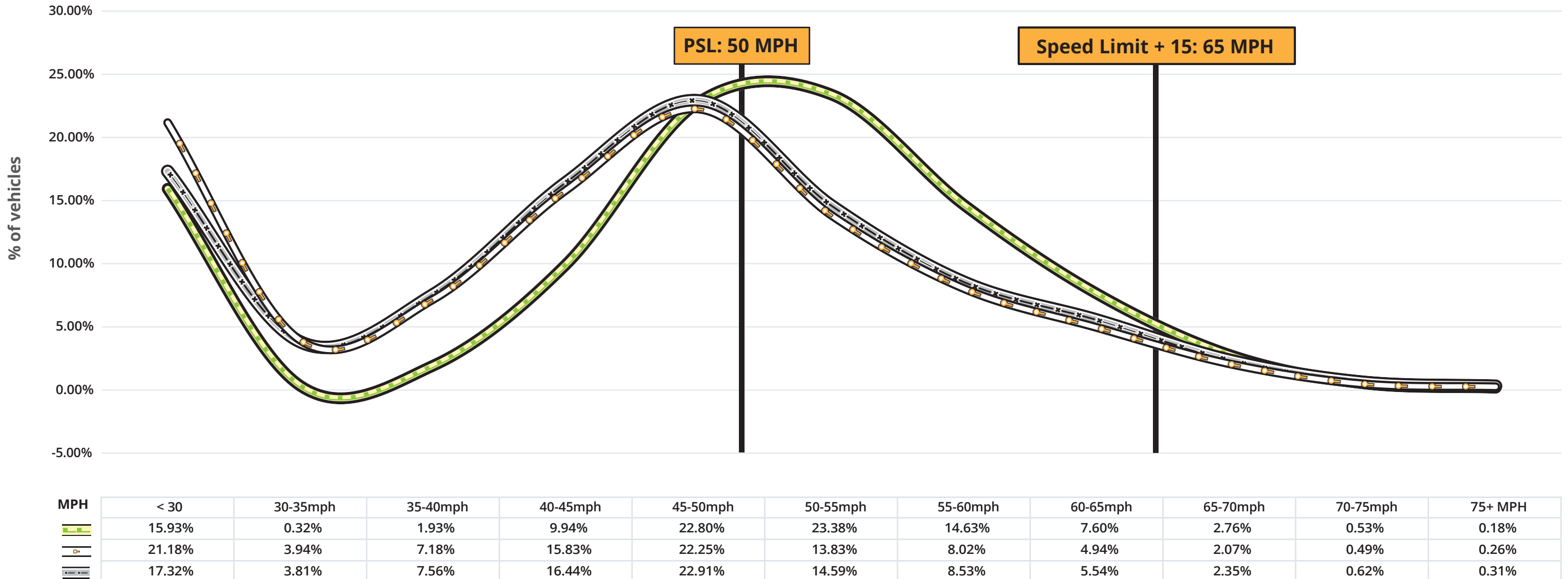
East Lyme showed decreased speeds between the start of the deployments in the location and a few weeks after. East Lyme did not include data from the Start of Enforcement or Prior to Start of Enforcement to include in the analysis, but provides good insight into how shifts in speed distribution can be seen even within a few months of beginning enforcement. Like Norwalk, East Lyme maintained relatively similar site conditions and lane configurations, allowing for a better analysis between collection periods. In

fact, within six months of enforcement operations, the share of drivers traveling at speeds 55-60 mph, above the speed limit, dropped by 6.1%. Additionally, the total share of drivers traveling above the posted speed limit reduced considerably by 17.14%. Again, this reduction marks a clear shift in drivers' traveling speeds above the speed limit. This is also evidenced by the shift of the speed distribution curves near the posted speed limit threshold.

Legend

- During Enforcement (3 Months After)**
- During Enforcement (6 Months After)**
- Near End of Enforcement (7 Months After)**
- PSL** **Posted Speed Limit**
- MPH** **Miles Per Hour**

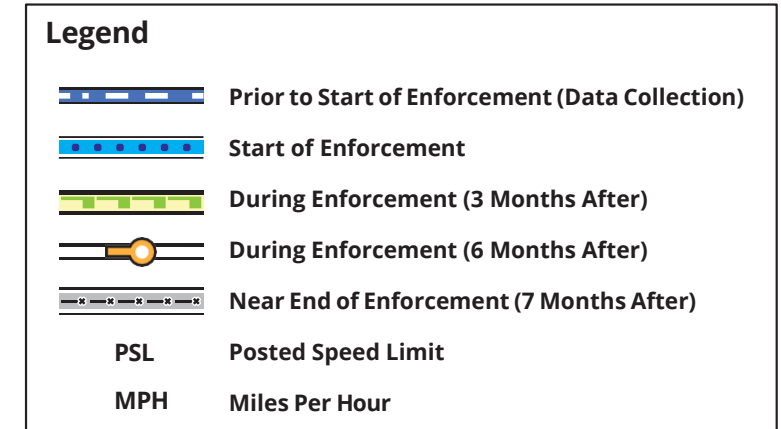
Speed Distribution Curves - East Lyme



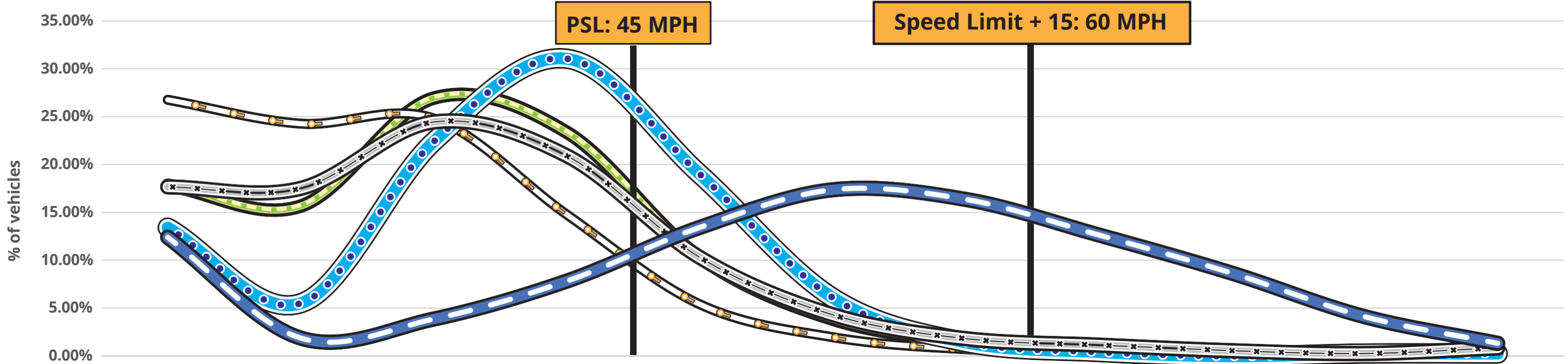
I-84 Waterbury

Analysis of Waterbury showed a decrease in vehicle speeds between study periods as well. Like other work zones, Waterbury exhibited a shift in driver speeds, decreasing from 55 mph to 45 mph. However, the outcome observed may be a result of the changes in lane configuration (i.e., additional lanes closed versus open) implemented after the Start of Enforcement,

resulting in lower driver speeds overall. Such variables can cause large shifts in driver behavior, as the traffic characteristics changed from the norm. However, the shift in speeds between the Start of Enforcement to Near End of Enforcement demonstrates a reduction during a stable lane configuration period.



Speed Distribution Curves - Waterbury



MPH	< 30	30-35mph	35-40mph	40-45mph	45-50mph	50-55mph	55-60mph	60-65mph	65-70mph	70-75mph	75+ MPH
— (Prior to Start of Enforcement)	12.42%	1.89%	3.88%	7.84%	13.44%	17.37%	16.36%	12.66%	8.67%	4.12%	1.35%
●●●● (Start of Enforcement)	13.43%	5.52%	22.41%	31.07%	19.02%	6.11%	1.45%	0.43%	0.00%	0.28%	0.28%
■ (During Enforcement (3 Months After))	17.81%	15.64%	26.90%	23.34%	10.29%	3.85%	1.45%	0.24%	0.24%	0.00%	0.24%
○ (During Enforcement (6 Months After))	26.73%	24.25%	24.78%	14.77%	5.42%	1.98%	0.74%	0.45%	0.29%	0.29%	0.29%
×××× (Near End of Enforcement (7 Months After))	17.68%	17.52%	24.45%	20.93%	10.32%	4.33%	1.84%	1.17%	0.58%	0.29%	0.88%

Route 2 East Hartford

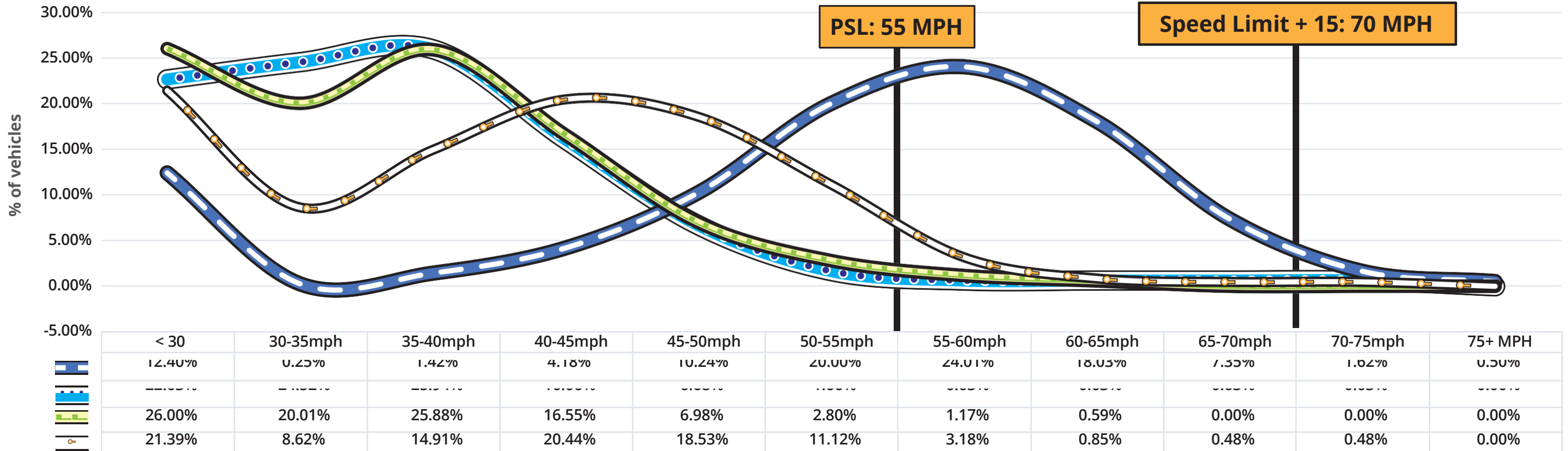
Like Waterbury, East Hartford displayed similar characteristics. The relative shift of the curve from Prior to Start of Enforcement and four months after Enforcement does display a reduction in driver speeds of approximately 10 mph (from 55 mph to 45 mph). However, this may again be influenced by the traffic characteristics between the study periods. For

example, this shift may have been due to congestion resulting from lane closures, as the project had closed one lane for many months after Start of Enforcement. Similarly, four months after enforcement, the lane configuration had altered again to one lane open, one lane closed - which may have attributed to the lower speeds observed.

Legend

- Prior to Start of Enforcement (Data Collection)**
- Start of Enforcement**
- During Enforcement (3 Months After)**
- During Enforcement (4 Months After)**
- PSL** **Posted Speed Limit**
- MPH** **Miles Per Hour**

Speed Distribution Curves - East Hartford



I-84 Newtown

Pre-enforcement data was not available for analysis of Newtown. However, the analysis here does provide another good example of how small shifts in driver speeds can be observed within a few months of enforcement. Newtown showed similar trends to that of the previous locations, although notably not as pronounced. As shown in the graph below, the data indicates that there was a reduction in drivers traveling at speeds between the two thresholds analyzed.

The share of drivers traveling at speeds between the thresholds identified or at excessive speeds eventually slowed down to 50-55 mph, resulting in the increase in drivers within that speed range in June. However, the shift in speeds between the Start of Enforcement to Near End of Enforcement demonstrates a reduction during a stable lane configuration period. This insight allows for better understanding of the feedback loop that the Pilot provides, continually decreasing speeds.

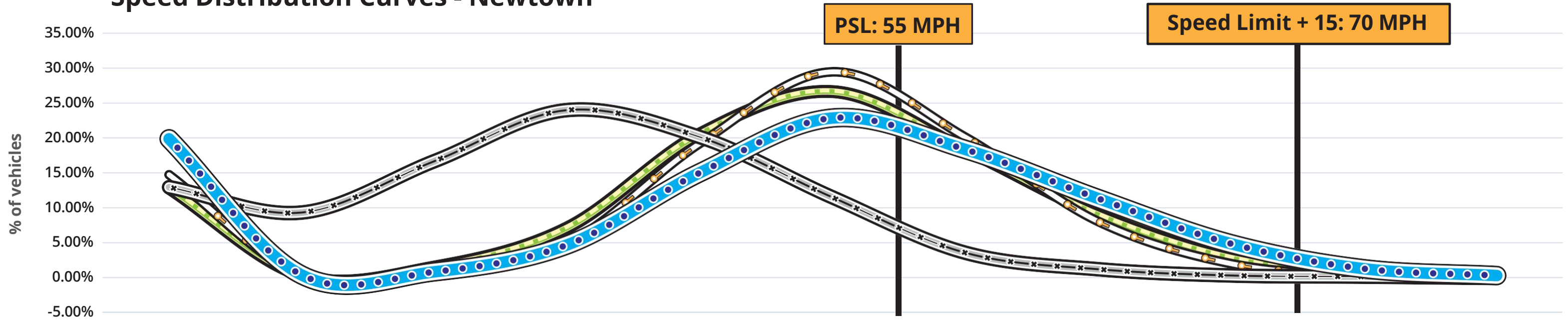
Legend

- Start of Enforcement
- During Enforcement (1 Months After)
- During Enforcement (3 Months After)
- Near End of Enforcement (5 Months After)

PSL Posted Speed Limit

MPH Miles Per Hour

Speed Distribution Curves - Newtown



MPH	< 30	30-35mph	35-40mph	40-45mph	45-50mph	50-55mph	55-60mph	60-65mph	65-70mph	70-75mph	75+ MPH
Start of Enforcement	19.87%	0.41%	0.88%	4.73%	15.05%	22.85%	18.33%	11.33%	4.88%	1.32%	0.34%
During Enforcement (1 Months After)	12.83%	0.32%	1.56%	7.17%	20.60%	26.62%	18.30%	8.98%	2.82%	0.52%	0.30%
During Enforcement (3 Months After)	14.74%	0.39%	0.69%	4.95%	19.24%	29.44%	20.08%	8.04%	2.02%	0.35%	0.07%
Near End of Enforcement (5 Months After)	12.97%	9.35%	16.70%	23.99%	20.12%	11.49%	3.59%	1.25%	0.35%	0.19%	0.00%

Appendix B. Paid Advertising Campaign

The *Know The Zone* program was supported by an ongoing paid advertising campaign spanning April to October 2023. The effort resulted in a total of more than 41.2 million impressions through ad placements on 10 different media platforms¹. The advertising budget of \$360,000 for placement only (production costs were separate) delivered a campaign cost of \$8.73 per 1,000 impressions. The Cost Per Thousand (CPM) measurement in the advertising sector provides a general indicator of audience penetration and exposure as a Return on Investment.



DIGITAL HIGHWAY BILLBOARDS			
Duration	Locations	Impressions	Notes
April - September (73 days)	Hartford, New Haven, Bridgeport, and Waterbury/I-95, I-91, and I-84	17,402,953	Total impression delivery was 23% higher than planned estimates due to negotiated bonus duration and high-daily circulation board selection.

CABLE TV				
Duration	Reach	Volume	Impressions	Notes
May - July (57 days)	32 cable stations statewide	2,397 advertisements	6,792,61	Total impressions delivered exceeded planned estimates by 12% through higher viewership and negotiated bonus spots.

OTT STREAMING TV				
Duration	Reach	Volume	Impressions	Notes
May - September (73 Days)	Statewide streaming providers (Peacock, Hulu, Roku, Comcast, etc.)	96%	755,533	Commercials ran statewide across various content providers with amplified geographic coverage for communities situated near speed safety cameras. Video completion rate was 3% higher than industry average.

STREAMING RADIO/PODCASTS			
Duration	Reach	Impressions	Notes
May - September (110 days)	Statewide streaming radio providers (Pandora, Sirius/XM, iHeart) and statewide podcasts	1,941,876	80% of impressions aired on Streaming Audio channels and 20% aired on podcasts. The majority of impressions were allocated statewide, with a portion dedicated to geo-targeting of communities near speed safety cameras. Total impressions exceeded planned estimates by 9%.

TERRESTRIAL RADIO				
Duration	Reach	Volume	Impressions	Notes
April - July (70 days)	17 stations statewide	1,901 advertisements	3,939,674	Commercials were aired during evening and weekend drive time. Advertising reach included Spanish language advertising on Hispanic channels. Placements emphasized scheduling ads on stations situated near deployment locations. Total impressions exceeded planned estimates by 14% through increased listenership on key stations and negotiated bonus spots.

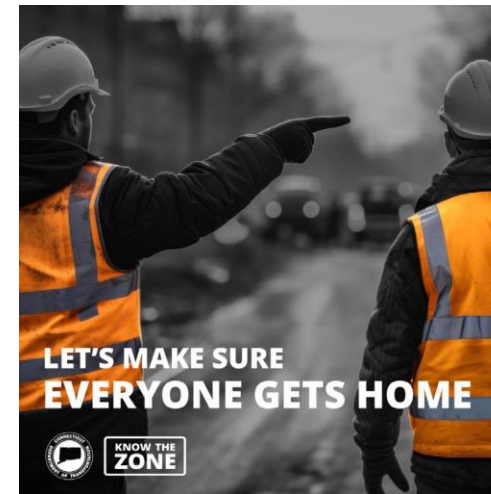
GAS STATION RADIO			
Duration	Reach	Impressions	Notes
May - September (103 days)	122 gas stations in CT	1,483,300	Impressions were earned through production of a single 30-second commercial. Total impressions exceeded planned estimates by 23% through addition of stations and placements.

¹ Source: Cashman Katz Marketing & Advertising

SOCIAL MEDIA VIDEO ADVERTISING - YOUTUBE				
Duration	Reach	Volume	Impressions	Notes
April - October	1,981,522	213,048	365,050; 19.92%	<i>Know the Zone</i> video ads on YT achieved a completion rate in excess of 20% and click-through rate (CTR) of 0.74%, which represents the highest range for promoted videos on YouTube (standard range: 0.50% - 0.80%). Viewer demographic and behavior analysis indicated men comprised the majority of audience share (63%), with male viewership led by 45-54 cohort (13%) and 35-44 cohort (12%). Mobile device viewing was most prevalent (75%) with a significant CTR on mobile devices (87%). Videos were typically watched on weekdays during the mid-afternoon or evening time period.

SOCIAL MEDIA VIDEO ADVERTISING - FACEBOOK / INSTAGRAM						
Duration	Format	Reach	Impressions	Video Plays	Engagements/ Engagement Rates ²	Notes
April - October	User Pages	408,267	2,144,016	2,059,049	1,216,389; 56.73%	Video ads were played over 4 million times, with a total of over 14,000 KTZ web page visits via click throughs.
	User Stories & Reels	56.73%	2,100,120	1,962,323	296,644; 14.13%	Ads viewed in Feeds had significantly more video completions and significantly higher Engagement Rate (57% vs 14%).
Total		718,607	4,244,136	4,021,372	1,513,033; 35.65%	

² Engagements data represents the percentage of users who provided a 'reaction' (e.g., 'liking' a video) or posted a comment.



Social media marketing activity undertaken via existing CTDOT accounts or identified by way of Internet research accounted for 445 online "conversations" that directly referenced or mentioned the Pilot.

DISPLAY BANNERS (GEO-FENCING)			
Duration	Impressions	Clicks	Notes
May - September (131 days)	2,702,020	2,702,020	Display banners were purchased on statewide websites that were geo-targeted to communities that hosted or abutted speed safety camera sites. The mean program click rate of 0.11%, which is defined as the percentage of website users that visit a target webpage after clicking on a banner ad, exceeded the industry average of 0.06%. Banner ads achieved 3X penetration in communities with speed safety camera sites (0.19%).

The screenshot shows the CT News Junkie website. At the top, there are navigation links for 'About CTNewsJunkie', 'Become A Press Patron!', 'Email Sign Up!', 'The Directory', 'Bills', '**NEW** Marketing Portal', and 'Vote'. Below this is the 'CT NEWS JUNKIE' logo with the tagline 'BECAUSE YOU NEED IT. BAD.' and a sub-headline 'Your trusted, authentic, locally owned and operated news source at the Connecticut Capitol since 2005.' A secondary navigation bar includes 'State Budget', 'Health Care', 'Business', 'Criminal Justice', 'Energy & Environment', 'Transportation', 'Politics', 'COVID-19', and 'Opinion'. The main content area features a 'Transportation' category and a large headline: 'Connecticut to Test Speed Enforcement Cameras in Work Zones Beginning in April' by Hugh McQuaid, dated March 29, 2023, 3:57 pm. Social media sharing buttons for Twitter, Facebook, LinkedIn, Reddit, Email, and Print are visible. A 'SPONSORED MESSAGES' bar is at the bottom.

CT News Junkie

The screenshot shows the Connecticut Public Radio website. The main headline is 'DOT speed camera program begins, urging drivers to slow down in work zones' by Jennifer Ahrens, published April 10, 2023 at 8:59 AM EDT. The article features a photo of a speed camera. A 'TOP HEADLINES' sidebar lists other news items. A 'SUBSCRIBE TO YOUR START' button is at the bottom right.

Connecticut Public

The screenshot shows the CT Insider website. The main headline is 'CT now using cameras to catch cars speeding in work zones. Here's how it works.' by Jordan Nathaniel Fenster, dated April 16, 2023. The article includes a photo of a speed camera in a work zone and a quote from a state spokesman: 'Connecticut's first-ever speed cameras are up and running, but though some infractions will be sent to drivers, the goal is not revenue, according to a state spokesman.'

CT Insider

EARNED MEDIA - AUDIENCE ANALYSIS				
Format	Site/Station	Dates	Impressions	Notes
Forum	City-Data.com	TK	TK	City-Data is an information website that presents data and information pertaining to United States cities, and offers public online forums for discussion.
TV News	WFSB 3 Eyewitness News	April 1 – October 31	125,391	Eyewitness News 3 is a local affiliate of CBS serving the Hartford–New Haven market.
TV News	WTNH 8 News	April 1 – October 31	165,122	News 8 is a local affiliate of ABC serving the Hartford–New Haven market.
TV News	WVIT 30 NBC CT News	April 1 – October 31	235,766	NBC Connecticut as is an NBC-owned and operated outlet serving the Hartford–New Haven market.
TV News	WTIC Fox 61 News	April 1 – October 31	86,631	Fox 61 is an affiliate of the Fox network that serves the Hartford–New Haven market.
Online News/ Newspaper	Courant.com (The Courant, Hartford)	April 1 – October 31	282,584	Founded in 1764, The Courant is the nation's oldest continuously published newspaper in the United States and the state's largest daily newspaper.
Online News	CTMirror.org (Connecticut Mirror)	April 1 – October 31	57,060	Launched in 2010, the Connecticut Mirror is a non-profit, online news outlet that reports on public policy, government, and politics.
Online News	Rep-am.com (Republican-American, Waterbury)	TK	TK	Established in 1990, The Republican-American is a family-owned newspaper based in Waterbury with origins that date back to 1844.
Online News	TheDay.com (The Day, New London, CT)	April 1 – October 31	102,708	Based in New London, The Day has been Southeastern Connecticut's local news establishment for over 140 years.
Online News	Ctnewsjunkie.com (CTNewsJunkie)	April 1 – October 31	29,890	Your trusted, authentic, locally owned and operated news source at the state Capitol since 2005.